



European Securities and
Markets Authority

MiFID II Review Report

MiFID II/MiFIR review report on Algorithmic Trading

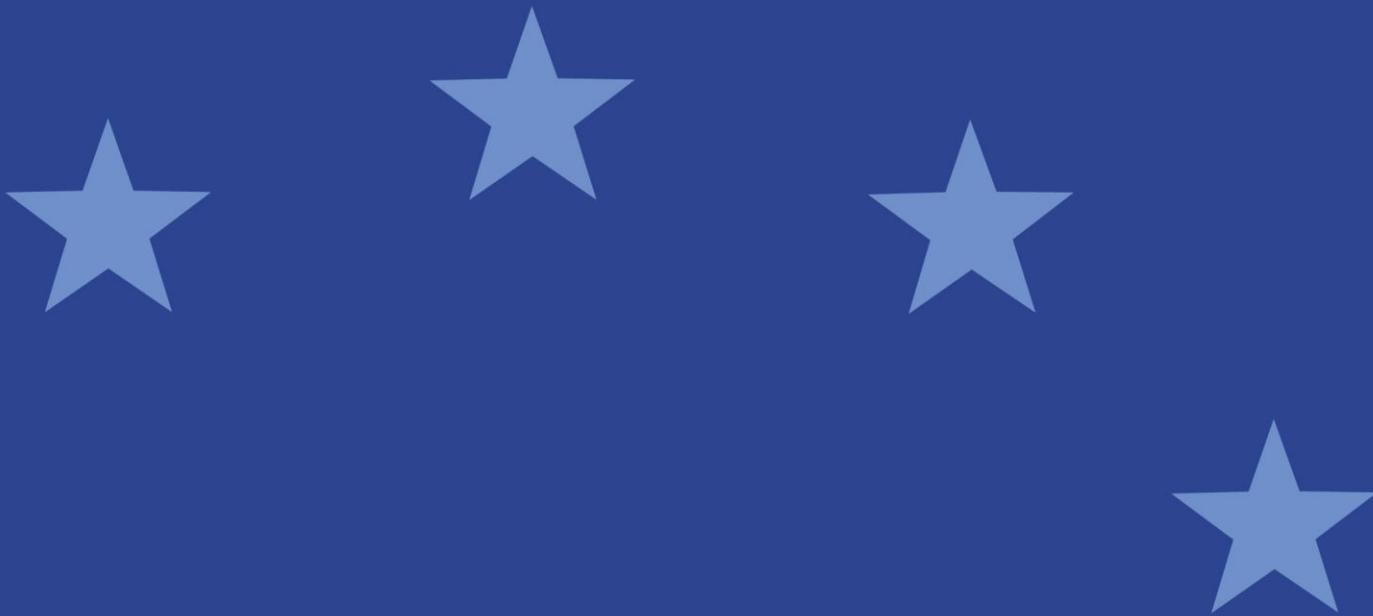


Table of contents

1	Executive Summary	8
2	Introduction	10
3	Overall approach.....	11
3.1	Legal framework	11
3.1.1	Algorithmic trading	11
3.1.2	High-frequency trading	13
3.1.3	Direct Electronic Access (DEA)	13
3.2	Development of algorithmic trading, HFT and DEA	14
3.2.1	Overall assessment	14
3.2.2	State of play of algorithmic trading, HFT and DEA	16
3.2.3	Evolution of algorithmic trading and HFT	20
3.3	Scope of Algorithmic trading	21
3.3.1	Algorithmic trading and OTC trading	21
3.3.2	Algorithmic trading and DEA users.....	23
3.4	High Frequency Trading and high intraday message rates	24
3.4.1	Background.....	25
3.4.2	Feedback to the consultation.....	25
3.4.3	ESMA’s assessment and recommendations	26
3.5	Direct Electronic Access (DEA)	26
3.5.1	Authorisation requirement for persons dealing on own account and having DEA access to trading venue	26
3.5.2	Direct Electronic Access and sub-delegation	29
3.5.3	Notification of DEA users to NCAs	32
3.5.4	Direct Electronic Access and On-line Brokerage.....	33
3.6	Third-country firms	34
3.6.1	Background.....	34
3.6.2	Feedback to the consultation.....	35
3.6.3	ESMA’s assessment and recommendations	36
4	Organisational requirements for investment firms.....	37
4.1	Notifications to NCAs, exchange of information and on-going supervision	37
4.1.1	Background.....	37
4.1.2	Feedback to the consultation.....	38
4.1.3	ESMA’s assessment and recommendations	39

4.2	Application RTS 6: algorithmic trading	40
4.2.1	Background.....	40
4.2.2	Feedback to the consultation	40
4.2.3	ESMA’s assessment and recommendations	42
4.3	Application RTS 6: testing and testing environment	42
4.3.1	Background.....	42
4.3.2	Feedback to the consultation	43
4.3.3	ESMA’s assessment and recommendations	46
4.4	Application RTS 6: annual self-assessment	47
4.4.1	Background.....	47
4.4.2	Feedback to the consultation	48
4.4.3	ESMA’s assessment and recommendations	50
5	Organisational requirements for trading venues	51
5.1	Capacity and Resilience of Trading Venues	52
5.1.1	Background.....	52
5.1.2	Feedback to the consultation	53
5.1.3	ESMA’s assessment and recommendations	54
5.2	Testing of algorithms.....	55
5.2.1	Background.....	55
5.2.2	Feedback to the consultation	57
5.2.3	ESMA’s assessment and recommendations	58
5.3	Circuit Breakers	59
5.3.1	Background.....	59
5.3.2	Feedback to the consultation	61
5.3.3	ESMA’s assessment and recommendations	62
5.4	Co-location and fee structure	63
5.4.1	Background.....	63
5.4.2	Feedback to the consultation	64
5.4.3	ESMA’s assessment and recommendations	65
5.5	Orders to Transactions Ratio (OTR)	65
5.5.1	Background.....	65
5.5.2	Feedback from the consultation.....	66
5.5.3	ESMA’s assessment and recommendations	68
5.6	Monitoring of compliance with trading venues’ rules	69
5.6.1	Background.....	69

5.6.2	Feedback to the consultation	71
5.6.3	ESMA’s assessment and recommendations	74
6	Tick size, market making, asymmetric speedbumps, and trade feeds.....	76
6.1	Tick-size regime	76
6.1.1	Tick size regime applicable to shares	79
6.1.2	Tick size regime applicable to third-country shares	84
6.1.3	Tick size regime applicable to ETFs	88
6.1.4	Tick size regime for non-equity instruments	89
6.2	Market making agreements	90
6.2.1	Background.....	90
6.2.2	Feedback from the consultation.....	92
6.2.3	ESMA’s assessment and recommendations	95
6.3	Speedbumps in Financial Markets	96
6.3.1	Background.....	97
6.3.2	Feedback from the consultation.....	98
6.3.3	ESMA’s assessment and recommendations	101
6.4	Asymmetry of private and public feeds	104
6.4.1	Background.....	104
6.4.2	Feedback to the consultation	106
6.4.3	ESMA’s assessment and recommendations	108
7	Annexes	110
7.1	Annex I: Summaries of the responses to the consultation	110
7.2	Annex II: Mandate.....	152
7.3	Annex III: List of the proposals made in the Review Report	153
7.4	Annex IV: Regime applying to third-country firms	156
7.5	Annex V: Template for notifications to NCAs under Article 17(2) and 17(5) of MiFID II	168

Acronyms and definitions used

ADNT	Average Daily Number of Transactions
AMF	Autorité des Marchés Financiers
CDR (EU) 2017/565	Commission Delegated Regulation (EU) 2017/565 of 25 April 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council as regards organisational requirements and operating conditions for investment firms and defined terms for the purposes of that Directive
CDR (EU) 2019/442	Commission Delegated Regulation (EU) 2019/442 of 12 December 2018 amending and correcting Delegated Regulation (EU) 2017/587 to specify the requirement for prices to reflect prevailing market conditions and to update and correct certain provisions
CFTC	Commodity Futures Trading Commission
CP	Consultation Paper
Danish FSA	Danish Financial Supervisory Authority
DEA	Direct Electronic Access
EC	European Commission
ETC	Exchange Traded Commodity
ETF	Exchange Traded Fund
ETN	Exchange Traded Note
EU	European Union
ESMA	European Securities and Markets Authority
FBA	Frequent Batch Auction
FITRS	Financial Instruments Transparency System
HFT	High Frequency Trading
IFR	Investment Firm Review
LME	London Metal Exchange
MAR	Market Abuse Regulation – Regulation (EU) 596/2014 of the European Parliament and of the Council
MiFID II	Markets in Financial Instruments Directive (recast) - Directive 2014/65 of the European Parliament and of the Council
MiFIR	Markets in Financial Instruments Regulation – Regulation 600/2014 of the European Parliament and of the Council
MRMTL	Most Relevant Market in terms of Liquidity

MTF	Multilateral Trading Facility
NCA	National Competent Authority
OTC	Over-the-counter
OTF	Organised Trading Facility
OTR	Order to Transaction Ratio
POP	Passive Order Protection
Q&A	Question and answer
RCB	Reasonable Commercial Basis
RTS	Regulatory Technical Standard
RTS 1	Commission Delegated Regulation (EU) 2017/587 of 14 July on transparency requirements for trading venues and investment firms in respect of shares, depositary receipts, exchange-traded funds, certificates and other similar financial instruments and on transaction execution obligations in respect of certain shares on a trading venue or by a systematic internaliser
RTS 6	Commission Delegated Regulation (EU) 2017/589 of 19 July 2016 on the organisational requirements of investment firms engaged in algorithmic trading
RTS 7	Commission Delegated Regulation (EU) 2017/584 of 14 July 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council with regard to regulatory technical standards specifying organisational requirements of trading venues
RTS 8	Commission Delegated Regulation (EU) 2017/578 of 13 June 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council on markets in financial instruments with regard to regulatory technical standards specifying the requirements on market making agreements and schemes
RTS 9	Commission Delegated Regulation (EU) 2017/566 of 18 May 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council on markets in financial instruments with regard to regulatory technical standards for the ratio of unexecuted orders to transactions in order to prevent disorderly trading conditions
RTS 10	Commission Delegated Regulation (EU) 2017/573 of 6 June 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council on markets in financial instruments with regard to regulatory technical standards on requirements to ensure fair and non-discriminatory co-location services and fee structures
RTS 11	Commission Delegated Regulation (EU) 2017/588 of 14 July 2016 supplementing Directive 2014/65/EU of the European



Parliament and of the Council with regard to regulatory technical standards on the tick size regime for shares, depositary receipts and exchange-traded funds

SEC

US Securities and Exchange Commission

SI

Systematic Internaliser

TRV Report

Trends, Risks and Vulnerabilities Report

TV

Trading venue



1 Executive Summary

Reasons for publication

Directive 2014/65/EU¹ (MiFID II) and Regulation (EU) No 600/2014² (MiFIR) provide for a number of review reports requiring the European Commission (EC), after consulting ESMA, to report to the European Parliament and the Council on various provisions. This final report covers the review provision on the impact of requirements regarding algorithmic trading including high-frequency algorithmic trading set out under Article 90(1)(c) of MiFID II.

Contents

Many provisions and requirements of MiFID II relate either directly or indirectly (e.g. direct electronic access or tick sizes) to algorithmic trading. This review report therefore adopts a holistic approach to algorithmic trading and reviews all provisions related directly and indirectly to algorithmic trading with the aim of both simplifying the regime and making it more efficient.

Section 2 provides for an introduction to the report.

Section 3 presents cross-cutting topics regarding algorithmic trading and high frequency trading. ESMA analyses the general provisions relating to algorithmic trading and high-frequency trading and, more specifically, the issues around the concepts of “algorithmic trading”, “Direct Electronic Access”, as well as the authorisation regime for EU and non-EU algorithmic trading firms deploying their strategies on EU trading venues.

Section 4 discusses the organisational requirements for investment firms that engage in algorithmic trading, including high-frequency traders. It includes more specifically proposals regarding the notification of algorithmic traders to competent authorities; the testing requirements and the self-assessment exercises to be performed by investment firms.

Section 5 focusses on the organisational requirements for trading venues that enable algorithmic trading on their systems. The report includes here recommendations and proposals regarding the self-assessment exercises to be performed by trading venues, circuit breakers, the fee structures of trading venues, order to trade ratios as well as market outages.

Finally, Section 6 addresses the other provisions that aim at better framing the activity of algorithmic and high-frequency traders such as tick sizes and market making, while also discussing new issues which have recently emerged on EU markets and are very closely associated to algorithmic trading. This includes the deployment of mechanisms called speedbumps and the sequence of trade confirmation to individual participants by trading venues versus the public disclosure of such transactions.

Next Steps

This report is submitted to the European Commission and is expected to be taken into consideration by the European Commission for further legislative proposals on the MiFID II / MiFIR regime.

ESMA stands ready to provide additional technical advice on the legislative amendments suggested in the report.

¹ Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Directive 2002/92/EC and Directive 2011/61/EU (OJ L 173, 12.6.2014, p. 349–496).

² Regulation (EU) No 600/2014 of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Regulation (EU) No 648/2012 (OJ L 173, 12.6.2014, p. 84).

2 Introduction

Article 90 (1)(c) of MiFID II:

Before 3 March 2020 the Commission shall, after consulting ESMA, present a report to the European Parliament and the Council on:

[...]

(c) the impact of requirements regarding algorithmic trading including high-frequency algorithmic trading;

[...]

1. MiFID II/MiFIR require the European Commission (EC) to present reports to the European Parliament and the Council, after consulting ESMA, on a number of provisions. Article 90(1)(c) of MiFID II provides in particular for the submission of a report on “the impact of requirements regarding algorithmic trading, including high-frequency algorithmic trading”.
2. The MiFID II mandate is therefore not specific regarding which provisions should be reviewed in the concerned report. The concept of algorithmic trading is broad, and many provisions of MiFID II are related either explicitly to this type of trading (e.g. Article 17 of MiFID II) or indirectly (e.g. Direct Electronic Access or tick sizes).
3. In this report, ESMA has considered that it was necessary to adopt a holistic approach and to review all relevant provisions together. The report therefore covers (i) the overall approach towards algorithmic trading and high frequency trading and in particular the authorisation regime attached to these types of market participants, (ii) the provisions applicable to algorithmic and high-frequency traders, (iii) the provisions applicable to trading venues allowing or enabling algorithmic trading through their systems and (iv) other provisions that aim at better framing the activity of algorithmic and high-frequency traders (e.g. tick size and market making).
4. ESMA has also considered it necessary to include analysis of new issues which have recently emerged in EU markets and that are very closely linked to algorithmic trading, i.e. the recent deployment of mechanisms called speedbumps and the issue about the sequence of publication between (i) the order/trade confirmations sent to individual participants and (ii) the public disclosure of orders and transactions.
5. Article 90(1)(c) of MiFID II requires the Commission to present its report by 3 March 2020. However, a series of unexpected events have forced ESMA and the Commission to reconsider this deadline. In particular, Brexit and the COVID-19 crisis have not only shifted the order of priorities for EU regulators, but this has also forced EU markets to adjust quickly to this new reality making the analysis of the impact of MiFID II more challenging to undertake in practice.

6. This report is based on the responses received to the consultation paper that ESMA published in December 2020³. These responses are available for further information on the ESMA website. The summaries of the responses received are also available in Annex I.
7. Considering the broad scope and complexity of the issues covered in the below report, ESMA has also included in Annex III a table summarising the main proposals.

3 Overall approach

8. This section addresses some cross-cutting issues regarding the MiFID II regime applicable to firms engaged in algorithmic trading, including high-frequency trading (HFT). It first sets out the legal framework governing this activity in Level 1 and then provides an overview of firms conducting algorithmic trading, including HFT, in the EU. It further discusses two issues that have arisen regarding the scope of application of MiFID II algorithmic trading and HFT rules in relation to Direct Electronic Access (DEA) and third-country firms. A summary of rules applicable to HFT in some third-country jurisdictions is provided in Annex IV-C.

3.1 Legal framework

9. As part of its objective of having more efficient and resilient markets, MiFID II seeks to keep pace with technological developments and the general electronification of trading which now affect all market segments.
10. Whilst recognising the benefit of new trading technologies, MiFID II aims at addressing the potential risks from increased use of technology, including algorithmic trading, HFT or DEA. As explained in Recital (63) of MiFID II, “Those potential risks from increased use of technology are best mitigated by a combination of measures and specific risk controls directed at firms that engage in algorithmic trading or high-frequency algorithmic trading techniques, those that provide direct electronic access, and other measures directed at operators of trading venues that are accessed by such firms”.

3.1.1 Algorithmic trading

11. Under Article 4(1)(39) of MiFID II, algorithmic trading is defined as “trading in financial instruments where a computer algorithm automatically determines individual parameters of orders such as whether to initiate the order, the timing, price or quantity of the order or how to manage the order after its submission, with limited or no human intervention, and does not include any system that is only used for the purpose of routing orders to one or more trading venues or for the processing of orders involving no determination of any

³ Consultation Paper on the MiFID II/MiFIR review report on Algorithmic Trading, 18 December 2020, ref. ESMA70-156-2368 (<https://www.esma.europa.eu/press-news/consultations/consultation-paper-mifid-ii-mifir-review-report-algorithmic-trading>).

trading parameters or for the confirmation of orders or the post-trade processing of executed transactions”.

12. The definition is further specified in Article 18 of Commission Delegated Regulation (EU) 2017/565⁴ which sets out that “[...] a system shall be considered as having no or limited human intervention where, for any order or quote generation process or any process to optimise order-execution, an automated system makes decisions at any of the stages of initiating, generating, routing or executing orders or quotes according to pre-determined parameters”.
13. In response to questions from stakeholders, ESMA also issued Q&As⁵ to clarify the scope of the computer algorithms captured by the MiFID II definition, notably that the use of algorithms which only serve to inform a trader of a particular investment opportunity is not considered as algorithmic trading, provided that the execution is not algorithmic.
14. An investment firm⁶ that uses algorithmic trading is required to comply with specific requirements to identify and mitigate the risks associated with this type of trading. Those requirements include in particular:
 - a. Notification to the NCA of its Home Member State and to the NCAs of the trading venues where it deploys its algorithmic trading strategies;
 - b. Provision of information upon request about its trading algorithms, systems and controls to the NCA of its Home Member State (this NCA may share this information with the NCAs of the trading venues where the investment firm deploys its strategies); and
 - c. Compliance with specific organisational requirements, as discussed in section 4.
15. Likewise, a trading venue that allows algorithmic trading through its system must comply with specific obligations that are set out in section 5.
16. However, and in contrast to HFT, the mere use of algorithmic trading techniques other than HFT does not trigger the requirement for that person to be authorised as an investment firm.

⁴ Commission Delegated Regulation (EU) 2017/565 of 25 April 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council as regards organisational requirements and operating conditions for investment firms and defined terms for the purposes of that Directive (OJ L 87, 31.3.2017, p. 1–83).

⁵ See for instance questions 1 to 3 of section 3 of the MiFID II/MiFIR Q&As on market structure topics (https://www.esma.europa.eu/sites/default/files/library/esma70-872942901-38_gas_markets_structures_issues.pdf).

⁶ Those requirements also apply to members or participants of regulated markets and MTFs who are not required to be authorised under MiFID II pursuant to points (a), (e), (i) and (j) of Article 2(1) as well as to credit institutions authorised under Directive 2013/36/EU pursuant to Article 1(3)(a) of MiFID II.

3.1.2 High-frequency trading

17. High-frequency trading is a subset of algorithmic trading. Article 4(1)(40) of MiFID II defines high frequency algorithmic trading technique as “an algorithmic trading technique characterised by:

(a) infrastructure intended to minimise network and other types of latencies, including at least one of the following facilities for algorithmic order entry: co-location, proximity hosting or high-speed direct electronic access;

(b) system-determination of order initiation, generation, routing or execution without human intervention for individual trades or orders; and

(c) high message intraday rates which constitute orders, quotes or cancellations.”

18. Article 19 of Commission Delegated Regulation (EU) 2017/565 further defines a “high message intraday rate” as the submission, on average, of any of the following:

“(a) at least 2 messages per second with respect to any single financial instrument traded on a trading venue;

(b) at least 4 messages per second with respect to all financial instruments traded on a trading venue”;

where only messages concerning financial instruments for which there is a liquid market are to be included in the calculation.

19. Where a firm is using a high-frequency algorithmic trading technique, the exemption from authorisation as an investment firm when only dealing on own account under Article 2(1)(d) of MiFID II is no longer available. Nor are the exemptions under Article 2(1)(e) of MiFID II for operators dealing on own account in emission allowances and Article 2(1)(j) of MiFID II for commodity firms. The required authorisation aims at ensuring that those firms are subject to organisational requirements under MiFID II and that they are properly supervised. Firms that are exempted from MiFID II under points (a), (e), (i) and (j) of Article 2(1) of MiFID II and that use algorithmic trading techniques are not required to be authorised as investment firm but are subject to the measures and controls aiming to tackle the specific risks arising from algorithmic trading (Article 1(5) of MiFID II).

20. In addition to the requirements applicable to firms engaged in algorithmic trading, firms using high-frequency algorithmic trading techniques are subject to specific record keeping requirements that are discussed in section 4.

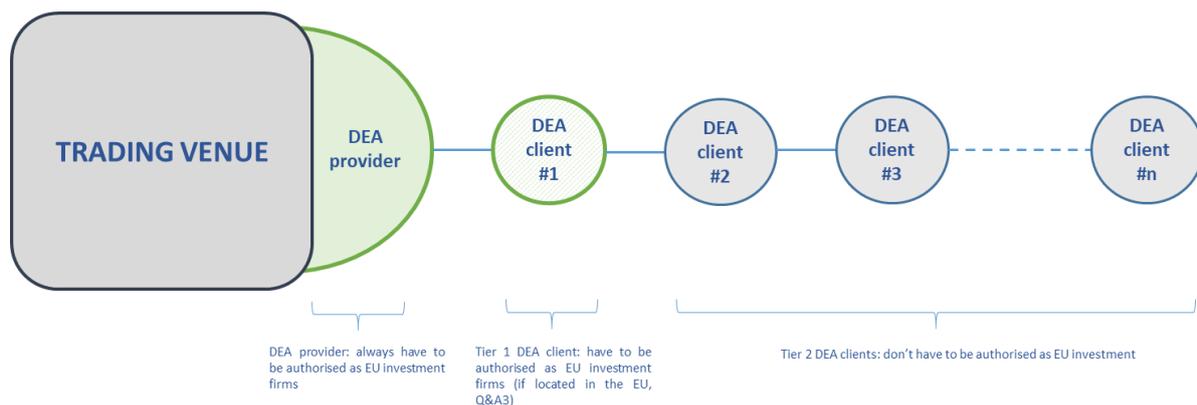
3.1.3 Direct Electronic Access (DEA)

21. A further concept important to note in the context of trading technology is Direct Electronic Access (DEA). Under Article 1(41) of MiFID II, DEA refers to “an arrangement where a member or participant or client of a trading venue permits a person to use its trading code so the person can electronically transmit orders relating to a financial instrument directly

to the trading venue and includes arrangements which involve the use by a person of the infrastructure of the member or person or client or any connecting system provided by the member or participant or client, to transmit the orders (direct market access or DMA) and arrangements where such an infrastructure is not used by a person (sponsored access)”.

22. Article 21(4) of Commission Delegated Regulation (EU) 2017/589⁷ (RTS 6) further introduces the concept of sub-delegation by referring to: “A DEA provider allowing a DEA client to provide its DEA access to its own clients ('sub-delegation') [...]”.
23. When a person accesses a trading venue using DEA, the exemption from authorisation as investment firm for persons only dealing on own account under Article 2(d) of MiFID II is no longer available to that person.
24. DEA providers must be authorised as investment firms or credit institutions under Article 48(7) of MiFID II and cannot operate under the equivalence regime for third-country firms. Furthermore, DEA providers must comply with additional organisational requirements.

FIGURE 1: AUTHORISATION REQUIREMENTS FOR DEA USERS



Source: ESMA.

3.2 Development of algorithmic trading, HFT and DEA

3.2.1 Overall assessment

3.2.1.1 Background

25. Financial markets have significantly evolved over the past decade as a consequence of new technologies. Many market participants now make use of algorithmic trading where a computer algorithm automatically determines aspects of an order with minimal or no human intervention and algorithmic trading continues to expand across asset classes

⁷ Commission Delegated Regulation (EU) 2017/589 of 19 July 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council with regard to regulatory technical standards specifying the organisational requirements of investment firms engaged in algorithmic trading (OJ L 77, 20.3.2019, p. 417-448).

from the more mature equity and interest rate markets to commodity markets. This has led to significant changes in market structures and microstructures and has required to adapt EU legislation to this new paradigm.

26. The impact of algorithms used for routing and executing trades in financial instruments has been one of the most discussed topics in the financial industry for some time. As set out in Recital (62) of MiFID II, “trading technology has provided benefits to the market and to market participants generally such as wider participation in markets, increased liquidity, narrower spreads, reduced short term volatility and the means to obtain better execution for clients”. However, Recital (62) of MiFID II notes that trading technology also gives rise to a number of potential risks such as an increased risk of the overloading of the systems of trading venues due to large volumes of orders, risks of algorithmic trading generating duplicative or erroneous orders or otherwise malfunctioning in a way that may create a disorderly market, risk of overreaction to market events exacerbating volatility and risk of market abuse behaviours. Through Level 1 and Level 2, MiFID II aims at mitigating the risks identified arising from algorithmic trading or high-frequency algorithmic trading techniques.
27. In the CP, ESMA asked stakeholders for their overall assessment of the MiFID II framework for algorithmic trading, HFT and DEA and the risks other than the one mentioned in MiFID II that would deserve further regulatory attention.

3.2.1.2 Feedback to the consultation

28. The vast majority of the responses received made an overall positive assessment of the MiFID II framework for algorithmic trading, HFT and DEA. Many of them highlighted that the EU markets performed well over the highly volatile period following the COVID-19 outbreak, considering that as an indication of the adequate requirements set out under the MiFID II framework. Several respondents explicitly requested not introducing any changes to the current regime unless grounded on a robust cost-benefit analysis.
29. A wide range of comments were however made on some specific points, such as better calibrating the regulatory regime applying to algorithmic trading based on the degree of sophistication of the algorithms and the impact that those algorithms could have. Concerns were also expressed about the decreasing differences between HFTs and the rest of algorithmic traders. Diverging views were expressed about the level playing field issue created by the lack of an EU harmonised regime for third-country DEA users, notably in the Brexit context.
30. As regards the *identification of other risks that would deserve further regulatory attention beyond those presented in MiFID II*, most stakeholders could not identify risks and impacts on market structures other than those already mentioned in MiFID II that would deserve further regulatory attention. A limited number of responses considered that only the largest market participants can keep up with the heavy investments required by the current technological ‘arms race’. This not only reduces competition, but also leads to a concentration of risks in a small number of firms (including CCPs).

3.2.1.3 ESMA's assessment and recommendations

31. ESMA took note of the overall positive assessment made by stakeholders of the MiFID II framework for algorithmic trading, HFT and DEA and does not intend to propose a substantial revision of the existing regime.
32. ESMA however also noted the suggestions made by some respondents to amend or clarify the existing framework on specific points. As these suggestions were reiterated in the responses to the more focussed questions of the CP, they are further discussed in the relevant sections of this report.

3.2.2 State of play of algorithmic trading, HFT and DEA

33. In preparation of the CP, ESMA conducted a fact-finding exercise with NCAs and trading venues to try to assess the prevalence of algorithmic trading, HFT and DEA. This section first considers the notifications received by NCAs for such activities and then analyses recent trends in the development of algorithmic trading and HFT.

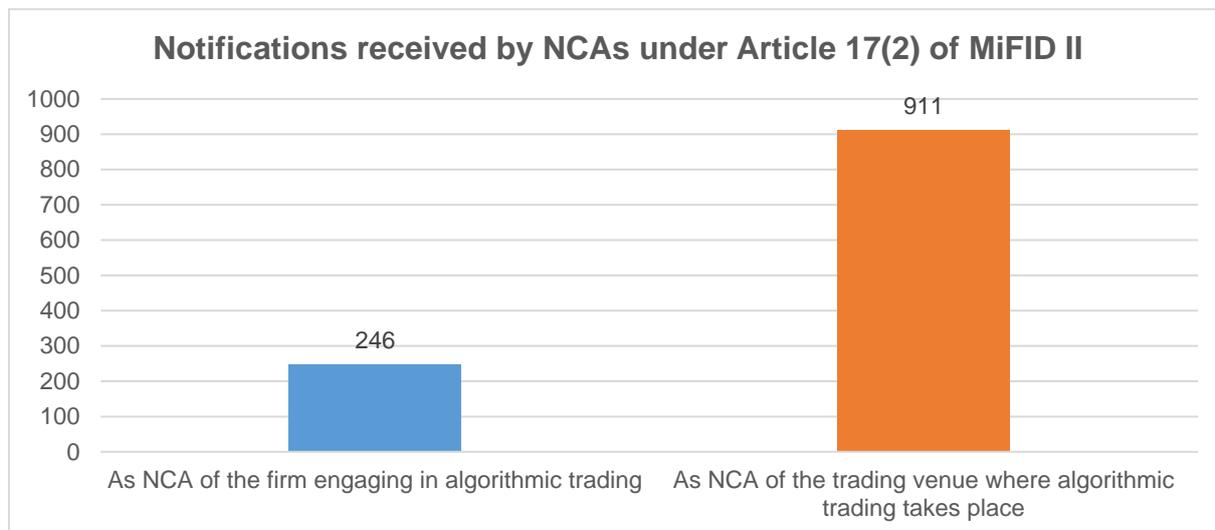
3.2.2.1 Authorisations and notifications

34. Based on the responses received from NCAs, no person has been authorised as an investment firm solely for applying an HFT technique when dealing on own account and therefore, not being eligible to the exemptions under Articles 2(1)(d)(iii), 2(1)(e) and 2(1)(j) of MiFID II. This does not come as a surprise as a person applying an HFT technique can reasonably be expected to be either a direct member or participant of a trading venue or have DEA to a trading venue to reduce latency and preserve the confidentiality of the algorithms used. That person would therefore be authorised as an investment firm in the first place. Some firms using HFT techniques also execute client orders, in which case they would need to seek authorisation on that sole basis.

Notifications of algorithmic trading under Article 17(2) of MiFID II

35. The graphs and tables below provide the number of notifications from firms that engage in algorithmic trading received by NCAs in 18 Member States, either as NCA of the firm or as NCA of the trading venue where the firm engages in algorithmic trading. Figure 2 gives the number of notifications (246) received directly from firms nationally engaging in algorithmic trading and the number of notifications (911) received from firms engaging in algorithmic trading on different venues (meaning that the average firm is active on roughly four different venues). Where a firm engages in algorithmic trading on a domestic trading venue, that firm is counted in each of the two notifications. The number of notifications received may not however fully reflect the number of firms engaged in algorithmic trading or providing DEA. As a reminder, under Article 1(5) of MiFID II - members or participants of trading venues that are not investment firms are also required to provide such notifications.

FIGURE 2: NOTIFICATIONS RECEIVED BY NCAs FROM FIRMS THAT ENGAGE IN ALGORITHMIC TRADING



Source: Data collection from NCAs in the EU Member States

FIGURE 3: NOTIFICATIONS RECEIVED BY NCAs FROM FIRMS THAT ENGAGE IN ALGORITHMIC TRADING PER MEMBER STATE

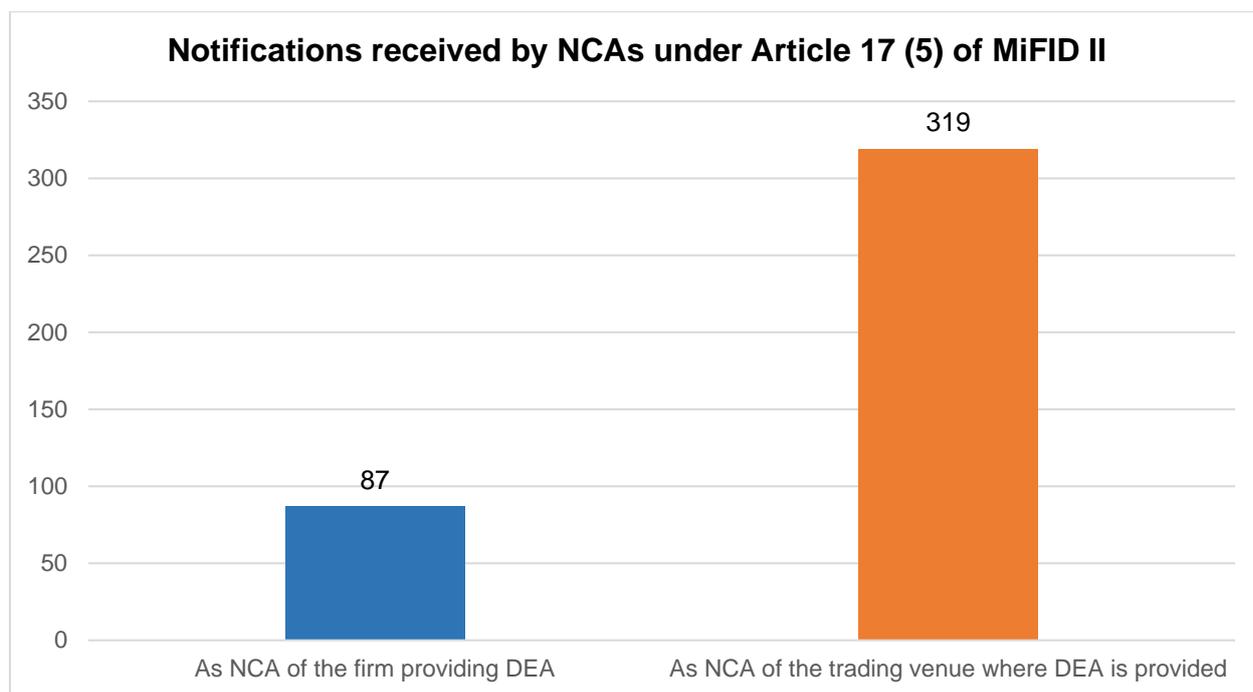
Notifications received per Member State under Article 17(2) of MiFID II		
Member State	As NCA of the firm engaging in algorithmic trading	As NCA of the trading venue where algorithmic trading takes place
Austria	3	2
Belgium	2	58
Czech Republic	7	11
Estonia	1	1
Finland	2	43
France	20	79
Germany	81	288
Greece	12	19
Hungary	3	3
Ireland	6	15

Italy	21	57
Malta	3	0
Netherlands	25	60
Norway	2	37
Poland	14	40
Portugal	2	42
Spain	31	74
Sweden	11	43

Source: Data collection from NCAs in the EU Member States.

36. Very few non-investment firms (i.e. members or participants of regulated markets or MTFs who are not required to be authorised under MiFID II pursuant to points (a), (e), (i) and (j) of Article 2(1) of MiFID II) have notified that they engage in algorithmic trading in accordance with Article 1(5) of MiFID II. Some NCAs received notifications from third-country firms that engage in algorithmic trading on EU trading venues even if such notifications are not foreseen in MiFID II.
37. The percentage of members or participants of trading venues that have notified the NCA of the trading venue at which they engage in algorithmic trading varies significantly across EU jurisdictions. There appears to be no simple correlation between the size of the trading venue and the percentage of firms using algorithmic trading techniques. On the largest trading venues, the percentage typically ranges between 42% and 60%. However, the percentage can also be close to, or exceed 50% on some smaller venues, including in the Nordic countries, whilst remaining below 10% on some regional exchanges.
38. The graphs and tables below provide the number of notifications received from investment firms providing DEA to a trading venue by NCAs, either as NCA of the investment firms or as NCA of the trading venue where the investment firms are providing DEA. Where an investment firm provides DEA to a domestic trading venue, that investment firm is counted in each of the two notifications.

FIGURE 4: NOTIFICATIONS RECEIVED BY NCAs FROM DEA PROVIDERS



Source: Data collection from NCAs in the EU Member States.

FIGURE 5: NOTIFICATIONS RECEIVED BY NCAs FROM DEA PROVIDERS

Notifications received per Member State under Article 17(5) of MiFID II		
Member State	As NCA of the firm providing DEA	As NCA of the trading venue where DEA is provided
Austria	4	3
Belgium	0	21
Czech Republic	2	2
Estonia	1	0
Finland	1	17
France	11	30
Germany	24	78
Greece	6	7
Hungary	3	0

Ireland	1	5
Italy	3	21
Malta	0	0
Netherlands	1	25
Norway	1	20
Poland	5	12
Portugal	2	21
Spain	20	35
Sweden	2	11

Source: Data collection from NCAs in the EU Member States.

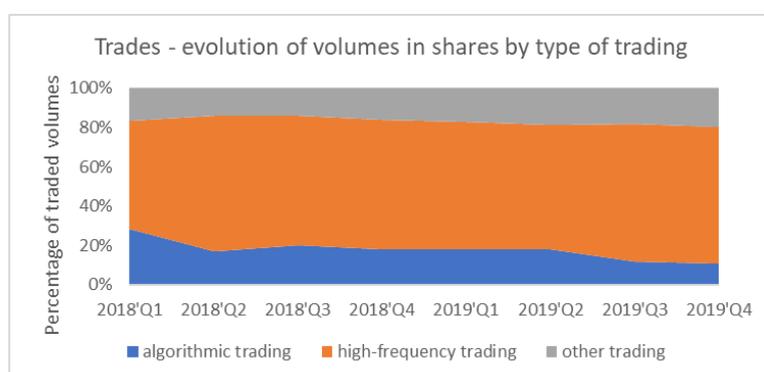
39. There is no legal requirement for a DEA provider to inform its NCA about the number of its DEA clients or whether DEA provision allows for sub-delegation. Although some NCAs are collecting information on a domestic basis, this is not common practice across EU Member States.

3.2.3 Evolution of algorithmic trading and HFT

40. In order to analyse the evolution of algorithmic trading, including HFT, ESMA has collected the data from RMs and MTFs in the EU. Overall, 52 trading venues from 24 EU countries have provided aggregated quarterly figures for the years 2018 and 2019. The analysis below is focused on the three main asset classes, i.e. shares, bonds and derivatives.

41. As shown in Figure 6 below, the split of trading in shares across the three categories of trading identified, i.e. algorithmic trading other than HFT, HFT and non-algorithmic trading, has remained rather stable in Q2 2018 and 2019. HFT related volumes represent the largest part with around 60% of traded volumes. As a reminder, the definition of HFT only applies to liquid instruments.

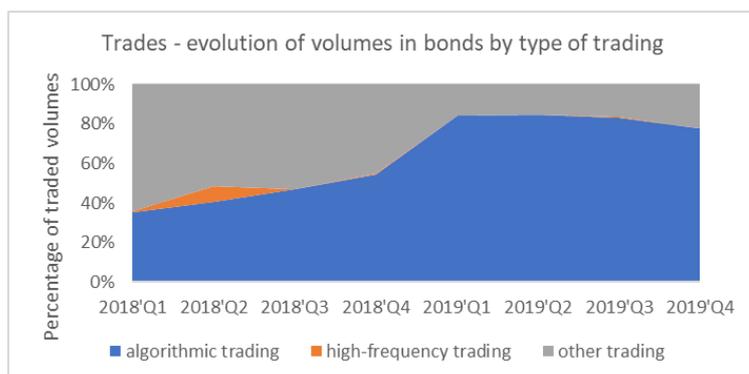
FIGURE 6: ALGORITHMIC TRADING IN SHARES



Source: Data collection from RMs and MTFs in the EU Member States

42. Trading in bonds, presented in Figure 7, shows a totally different pattern. After being almost fully non-algorithmic until mid-2019, bond trading then saw a significant increase in algorithmic trading in Q2 2019, with a peak in Q3 2019 where algorithmic trading other than HFT accounted for around 80% of trading. Contrary to the other asset classes, there is only marginal high-frequency trading in bonds, which could be explained by the less liquid nature of those instruments.

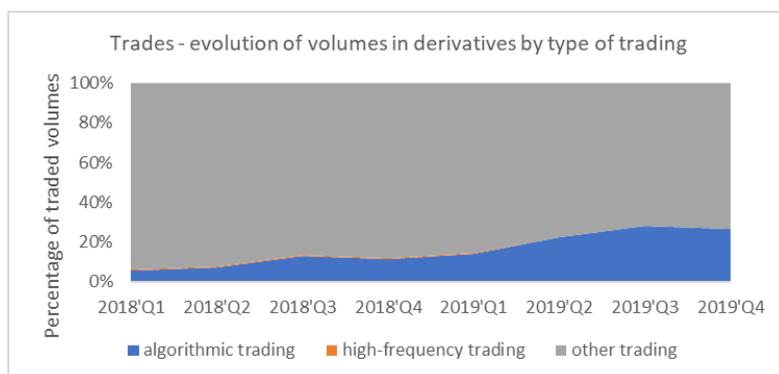
FIGURE 7: ALGORITHMIC TRADING IN BONDS



Source: Data collection from RMs and MTFs in the EU Member States

43. In case of derivatives, the split of trading between algorithmic and non-algorithmic trading has remained stable until Q2 2019 where algorithmic trading other than HFT started to increase. In Q4 2019, non-algorithmic trading accounted for around 70% of derivatives trades.

FIGURE 8: ALGORITHMIC TRADING IN DERIVATIVES



Source: Data collection from RMs and MTFs in the EU Member States

3.3 Scope of Algorithmic trading

3.3.1 Algorithmic trading and OTC trading

3.3.1.1 Background

44. As recalled above, Article 4(1)(39) of MiFID II defines algorithmic trading as “trading in financial instruments where a computer algorithm automatically determines individual

parameters of orders such as whether to initiate the order, the timing, price or quantity of the order or how to manage the order after its submission, with limited or no human intervention [...].”

45. Ahead of MiFID II application, ESMA received questions from stakeholders on the scope of the algorithmic trading requirements set out in Article 17 of MiFID II, including whether those requirements applied to electronic OTC trading. ESMA considered that the provisions of Article 17, and notably the multiple references in this Article to investment firms engaging in algorithmic trading “on trading venues” were self-explanatory. ESMA also noted at the time that the risks arising from algorithmic trading (e.g. an increased risk of the overloading of trading systems, the risk of generating duplicative or erroneous orders and overreaction to market events) are likely to create more detrimental consequences to orderly markets when trading takes place on multilateral systems. This analysis was reflected in a Q&A on Market Structures Issues.⁸
46. However, ESMA also gave thoughts to more recent market developments, including the increasing role played by systematic internalisers (SI) as execution venues and the use of more and more sophisticated technology by market participants. ESMA is of the view that there could be merit in extending the definition of algorithmic trading to OTC trading and selectively applying some of the requirements currently set out in Level 2. This would ensure that the quotes displayed, streamed, or sent to counterparties or clients by SIs are not a source of risks for the SI itself and a source of confusion, disruption and potential chain reactions in the market. Key algorithmic trading requirements for SIs would include (i) governance arrangements for trading systems and trading algorithms, (ii) controlled deployment of algorithms (iii) a kill functionality and other risk controls. ESMA does not consider that it would be proportionate to extend those requirements to all investment firms trading OTC.
47. In the CP, ESMA asked stakeholders whether the potential risks attached to algorithmic trading should also be given consideration in certain OTC trading areas and, in particular, if some algorithmic trading requirements should be extended to SIs.

3.3.1.2 Feedback to the consultation

48. The responses received expressed strong support for the views expressed in the Q&A on Market Structure Issues, i.e. that the definition of algorithmic trading should be limited to on-venue trading.
49. A majority of sell-side firms strongly disagreed with the proposal to extend the definition of algorithmic trading in Level 1 and apply some of the algorithmic trading requirements to SIs. They considered that the typical risks arising from algorithmic trading on TVs (such as risk of systems overloading, risks of algorithmic trading generating duplicative or erroneous orders, risk of overreaction to market events), would not be relevant on SIs. The quotes published by SIs outside trading venues only create risks for the SI itself and

⁸https://www.esma.europa.eu/sites/default/files/library/esma70-872942901-38_gas_markets_structures_issues.pdf. Direct Electronic Access (DEA) and algorithmic trading Q&A 9

are not a source of risk to the EU financial system as a whole. Furthermore, concerns were expressed that extending the definition of algorithmic trading to SIs would not be relevant in particular for “Opt-in” SIs that may not be using algorithmic trading functionalities.

50. However, a group of stakeholders considered it necessary to extend some of the MiFID II algorithmic trading requirements to OTC trading, but not the entire regime. Within this group it was possible to identify two sub-groups: some respondents supported extending the regime only to SIs, while others, including trading venues, supported applying the MiFID II regime to SIs and any other firm undertaking OTC trading using automated trading processes.

3.3.1.3 ESMA’s assessment and recommendations

51. ESMA took note of the mixed feedback received to the CP where some respondents supported a carefully calibrated extension of the scope of algorithmic trading requirements while others, mainly sell-side firms acting themselves as SIs, opposed it.

52. After further consideration, ESMA remains of the view that there is merit in better taking into account market developments since the application of MiFID II, including the increasing role of SI trading. As noted above, a selective application of algorithmic requirements to the quotes displayed, streamed, or sent to counterparties or clients by SIs would ensure that those quotes are not a source of risks for the SI itself and a source of confusion, disruption and potential chain reactions in the EU financial system. ESMA appreciates the specific situation of “Opt-in SIs” that may be smaller and less sophisticated firms and therefore only propose to selectively extend algorithmic trading requirements to SIs using algorithmic trading techniques.

53. ESMA therefore proposes to selectively extend algorithmic trading requirements to SIs by amending Article 17(1) to include a reference to SIs and a mandate for ESMA to further specify applicable requirements to SIs in Level 2. Taking into account the feedback to the CP, ESMA’s preliminary view is that (i) governance arrangements for trading systems and trading algorithms, (ii) controlled deployment of algorithms (iii) a kill functionality and other risk controls would be the most likely items to take into consideration. Article 17(2) of MiFID II would also need to be amended to introduce a notification of the use of algorithmic trading techniques by SIs to their NCA and allow access by the NCA to the algorithms used by SIs.

3.3.2 Algorithmic trading and DEA users

3.3.2.1 Background

54. In the CP, ESMA noted that some uncertainty had emerged as to whether the definition of algorithmic trading in Article 4(1)(39) of MiFID II and the related algorithmic trading requirements only applies to members, participants or clients of trading venues or includes DEA clients as well.

55. ESMA explained that the definition of algorithmic trading refers to a trading technology used to send orders to a trading venue while DEA relates to a specific way of accessing trading venues (i.e. how the orders are channelled to the trading platform) that is recognised and regulated by MiFID II. The two definitions therefore do not appear contradicting, and it is possible for a firm using algorithmic trading or HFT techniques to channel its orders through DEA.
56. ESMA suggested in the CP to clarify that, in these circumstances (algorithmic or high frequency traders using DEA), the DEA client is subject to the MiFID II algorithmic trading regime regardless of whether it is authorised as an investment firm or not.

3.3.2.2 Feedback to the consultation

57. The majority of the responses received were supportive of ESMA's preliminary view that the algorithmic trading framework should apply to DEA users using algorithmic trading techniques. However, ESMA notes that there seems to have been some confusion in the comments made as some stakeholders expressed support for ESMA's proposal, whilst considering that algorithmic trading requirements should only continue to apply to members, participants and clients.
58. Respondent opposing ESMA's views considered that the risks arising from DEA users were adequately addressed by the current regime, whereby they operate under the monitoring and controls of the DEA providers, which are investment firms. They also noted that ESMA's proposal could raise level playing field issues between EU and non-EU firms accessing trading venues.

3.3.2.3 ESMA's assessment and recommendations

59. As reported above, the feedback to the proposal put out in the CP appears somewhat confusing. There seems to be however no strong majority for amending Level 1 to require all DEA clients to comply with the MiFID II algorithmic framework. As it is the case for other issues discussed in this report, respondents seem to favour an approach where DEA providers act as a safety portal to EU markets allowing lighter regulatory burden to be put on the DEA clients only dealing on own account.
60. ESMA agrees that applying the algorithmic trading framework to all DEA clients operating on EU trading venues might be too far-reaching, in particular considering the requirements and obligations DEA providers are subject to (Article 17(5) of MiFID II and Chapter 3 of RTS 6). In contrast to the original suggestion, it is therefore not proposed to apply the MiFID II algorithmic trading framework to DEA clients that are not authorised as investment firms.

3.4 High Frequency Trading and high intraday message rates

61. While section 3.1.2 presents the general legal framework for HFT, this section focusses on one of the main criteria of the HFT definition, the high intraday day message rate.

3.4.1 Background

62. In addition to the reference to (i) an infrastructure intended to minimise latency and (ii) system-determination of order initiation, generation, routing or execution without human intervention, the definition of HFT in Article 4(1)(40) of MiFID II includes “high message intraday rates”. Article 19 of CDR 2017/565 defines such high message intraday rates by a static number of messages sent per second with respect to any single liquid financial instrument or with respect to all the liquid financial instruments traded on a trading venue.

63. More specifically, a “high intraday message rate” is defined in Article 19 of Commission Delegated Regulation (EU) 2017/565 as “the submission on average of any of the following:

“(a) at least 2 messages per second with respect to any single financial instrument traded on a trading venue;

(b) at least 4 messages per second with respect to all financial instruments traded on a trading venue”;

64. Only messages concerning financial instruments for which there is a liquid market and messages introduced for the purpose of dealing on own account are to be included in the calculation. Messages submitted by their DEA clients are excluded from the calculation of the DEA provider’s high intraday message rate.

65. ESMA appreciates the need for a clear and precise definition of HFT allowing for a uniform application across all EU jurisdictions of the authorisation requirement for persons that apply a high frequency algorithmic trading technique. However, the ever-increasing speed of execution which is available to market participants willing and able to make the necessary investments to that end may contribute to blurring the line between algorithmic trading and HFT. The question therefore arises as to whether the thresholds and criteria set out in Article 19 of CDR 2017/565 remain valid, and more broadly whether static daily message rates remain a relevant criterion for the purpose of defining HFT or whether other approaches should be considered.

66. In the CP, ESMA asked stakeholders for their views on the current definition of HFT and for potential suggestions to replace the high message intraday rates with other criteria or amend the thresholds currently set in Level 2.

3.4.2 Feedback to the consultation

67. About half of the respondents, including trading venues, were broadly satisfied with the current HFT definition.

68. Respondents concerned with the current HFT regime or definition made many, and sometimes opposite, proposals. A couple of them suggested deleting the specific authorisation requirements for HFT firms and addressing applicable requirements, including record keeping requirements, through calibration of RTS 6. Many respondents considered that the definition of HFT and the high message intraday rate (HMIR) were

not well calibrated as they capture more firms than necessary. In line with Recital 61 of MiFID II, the definition of HFT in Article 4 should refer to a “trading strategy” and should include only outright proprietary trading; excluding (i) trading on own account to hedge client-related activity or (ii) firms acting as market makers or primary dealers and sending firm quotes. On the contrary, a couple of other respondents were of the view that there were no reasons for limiting the HMIR to dealing on own account, stressing that the risk profile of a trading technology does not lessen simply because it is applied on behalf of clients.

69. As regards the HMIR, a couple of respondents suggested increasing the thresholds or used metrics that are transparent, objective and measurable, including latency and bandwidth metrics, to be regularly recalibrated based on input from trading venues. Some respondents considered however that adjustable criteria would not give sufficient certainty to market participants and should be avoided.

3.4.3 ESMA’s assessment and recommendations

70. ESMA took note of the fact that not much support was expressed by respondents to the CP for amending the Level 1 definition of HFT in Article 4(1)(40) of MiFID II. ESMA also noted that various, and sometimes contradicting, proposals were made for amending the definition of the HMIR in the Commission Delegated Act. On balance, ESMA considers that the responses to the CP and the experience with the application of the current requirements do not provide sufficient reason to develop potential amendments to HMIR.

71. ESMA therefore does not suggest any amendment to the Level 1 definition of HFT or to the calculation methodology of HMIR in Level 2.

3.5 Direct Electronic Access (DEA)

72. As the way in which trading venues operate has evolved, notably through the development of electronic trading, so have the means of access to these trading venues. Due to continuous technological evolution, DEA has facilitated access to trading venues across continents, offering new trading opportunities to market participants and providing new sources of liquidity. The experience gained with the DEA framework since the application of MiFID II however suggests that some amendments to the Level 1 provisions governing DEA could contribute to making the DEA regime clearer and more efficient to the benefit of market participants and NCAs and help to address some unlevel playing field issues.

3.5.1 Authorisation requirement for persons dealing on own account and having DEA access to trading venue

3.5.1.1 Background

73. Although not formally considered as a member or participant of a trading venue, persons accessing trading venues via DEA have the capacity to enter orders directly into a trading

system in a way similar to a member or participant, i.e. with control over their trading decisions and reduced latency of execution. When trading under the DEA provider's trading code, the DEA user or client represents a potential source of market or credit risk magnified by the use of sophisticated technology. In light of those risks, and as provided for in Article 2(1)(d)(ii) of MiFID II, a person that only deals on own account and would otherwise be eligible to a MiFID II exemption, has to be authorised as an investment firm when having DEA to a regulated market, an MTF or an OTF. Such authorisation aims, in particular to ensure that these firms are subject to appropriate organisational requirements under MiFID II and are properly supervised. Under the current framework, co-legislators have therefore included the need for authorisation of DEA users as an additional risk mitigation measure on top of the obligations to be met by the DEA provider which ultimately retains responsibility for all trades entered into the venue's trading system under its trading code. As explained, ESMA has clarified in a Q&A that this authorisation to apply or authorisation only apply to Tier 1 DEA users⁹.

74. This authorisation requirement however does not apply to third-country firms having DEA to EU venues, thereby creating an unlevel playing field between EU and non-EU DEA users trading on own account on EU venues. Potential requirements are left to national discretion, although the risks of disorderly markets or the risks for the DEA provider created by those third-country firms are similar to the ones that the authorisation requirement seeks to address in the EU. ESMA appreciates that some Member States may be unwilling to impose national requirements on third-country firms where such requirements would not evenly apply across the EU, thereby putting their trading venues at a competitive disadvantage.
75. The situation is different for DEA providers as EU trading venues can only permit EU authorised investment firms or credit institutions to provide DEA as set out under Article 48(7) of MiFID II. ESMA has further recalled this licensing obligation in its Q&A on MiFID II Market structure issues (Question 25, Section 3 on Direct Electronic Access (DEA) and algorithmic trading)¹⁰.
76. ESMA is of the view that the costs of requiring full authorisation of a person dealing on own account as an investment firm for the sole purpose of having DEA access, including as a Tier 1 client, outweigh the benefits expected from such authorisation. ESMA considers that the obligations and responsibilities relating to the DEA provider, including under Article 17(5) of MiFID II and Articles 22(3) and 23(2) of RTS 6, provide an appropriate and sufficient framework for addressing the risks of disorderly trading arising from DEA access to only deal on own account.
77. As a reminder, under Article 17(5) of MiFID II, an investment firm that provides DEA to a trading venue must have in place effective systems and controls which notably ensure that trading by clients using the service is properly monitored and that appropriate risk controls prevent trading that may create risks to the investment firm itself or that could

⁹ Q&A24 of section 3 of the ESMA Q&As on MiFID II market structures topics
(https://www.esma.europa.eu/sites/default/files/library/esma70-872942901-38_qas_markets_structures_issues.pdf)

¹⁰ https://www.esma.europa.eu/sites/default/files/library/esma70-872942901-38_qas_markets_structures_issues.pdf

create or contribute to a disorderly market. Furthermore, Article 22(3) of RTS 6 provides that a DEA provider allowing sub-delegation must ensure that a prospective DEA client which intends to sub-delegate its DEA has a due diligence framework in place that is at least equivalent to a DEA provider due diligence framework before sub-delegating such access. Under Article 23(2) of RTS 6, a DEA provider is also required to carry out an annual risk-based reassessment of the adequacy of its clients' systems and controls, in particular taking into account whether a DEA client has expressed an intention to subdelegate the access it receives from the DEA provider.

78. In the CP, ESMA therefore proposed to delete the obligation to seek for authorisation as investment firm set out in Article 2(1)(d)(ii) of MiFID II for DEA users¹¹. DEA users who only dealing on own account would no longer to be authorised as investment firms - except where they would fall within the scope of the remaining exceptions to the exemption of Article 2(1)(d) of MiFID II (and in particular when they apply high-frequency trading techniques).

79. With respect to DEA providers, and to further ensure harmonised implementation across the EU, ESMA supported in the CP giving more prominence to the requirement for DEA providers to be authorised as investment firms or credit institutions. To that end, ESMA proposed that such requirement should be spelled out in Article 1 of MiFID II and not only be indirectly provided for through an obligation on trading venues under Article 48 of MiFID II.

3.5.1.2 Feedback to the consultation

80. All respondents agreed with ESMA's proposal to no longer require a DEA user only trading on own account on a trading venue to be authorised as an investment firm. In line with ESMA's analysis, the point generally made by those respondents, is that the combination of a robust set of rules that apply to either a direct member or DEA provider (as an EU regulated entity) means that it is possible to delete the exemption in Art (2)(1)(d) in respect of DEA users without diminishing the level of oversight available to regulators and venues over EU markets and their direct and indirect participants.

81. The very few respondents who commented on the proposal to amend Article 1 of MiFID II to spell out DEA providers' authorisation as investment firms supported it or did not oppose it.

3.5.1.3 ESMA's assessment and recommendations

82. ESMA notes the broad support from stakeholder for deleting the authorisation requirement for DEA users only trading on own account and for the analysis of the role and responsibilities of the DEA provider underpinning this proposal.

¹¹ Article 2(1)(d)(ii) of MiFID II does not include an explicit obligation for DEA users but rather introduces for this type of market participants an exception to the exemption from authorisation. In practice, this means that the exemption set out under Article 2(1)(d) is not available for them and that they are therefore required to be authorised.

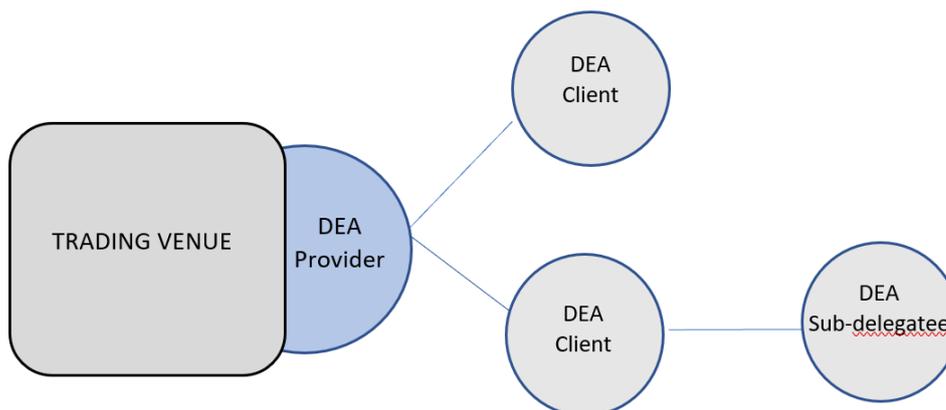
83. ESMA reiterates the view expressed in the CP that the costs of requiring full authorisation as an investment firm of a person dealing on own account on the sole ground that it has DEA access, outweigh the benefits expected from such authorisation. ESMA considers that the obligations and responsibilities relating to DEA providers, including under Article 17(5) of MiFID II and Articles 22(3) and Article 23(2) of RTS 6, provide an appropriate and sufficient framework for addressing the risks of disorderly trading arising from dealing on own account via DEA access.
84. ESMA therefore proposes to delete the exception to the exemption from authorisation as investment firm set out in Article 2(1)(d)(ii) of MiFID II for persons having DEA to a trading venue. This Level 1 amendment will also address the level playing field issue arising between EU and third-country DEA users trading on own account on EU venues.
85. Considering the prominent role of DEA providers, ESMA also proposes transferring to Article 1 of MiFID II the requirement currently set out in Article 48(7) under which DEA providers must be authorised as investment firms under MiFID II or credit institutions under Directive 2013/36/EU.

3.5.2 Direct Electronic Access and sub-delegation

3.5.2.1 Background

86. Some additional complexity was added to the DEA framework with the introduction of the concept of sub-delegation in Article 21(4) of RTS 6, which provides that: “A DEA provider allowing a DEA client to provide its DEA access to its own clients ('sub-delegation') shall be able to identify the different order flows from the beneficiaries of such sub-delegation without being required to know the identity of the beneficiaries of such arrangement”.
87. The diagram below describes the basic sub-delegation of DEA where a DEA client sub-delegates its DEA access to a third party. Although Article 21(4) of RTS 6 generally refers to DEA sub-delegation, ESMA understands that such sub-delegation only occurs in the context of Direct Market Access (DMA) and that no firm is sub-delegating sponsored access.

FIGURE 9: DEA SUB-DELEGATION



Source: ESMA

88. A key issue arising from the concept of sub-delegation of DEA relates to the application of the exemption in Article 2(1)(d) to those firms accessing a trading venue via DEA sub-delegation. Looking at Figure 9, the question arises as to which firms should be considered as having DEA to a trading venue for the purpose of Article 2(1)(d)(ii) and be therefore required to seek authorisation as an investment firm under MiFID II.

89. In a Q&A¹² published in November 2017 (Question 24, Section 3 on Direct Electronic Access (DEA) and algorithmic trading), ESMA considered that the definition of DEA, which refers to “an arrangement where a member or participant or client of a trading venue permits a person to use its trading code so the person can electronically transmit orders relating to a financial instrument directly to the trading venue [...]” infers a direct contractual arrangement between the DEA provider and the DEA client. A person who directly interacts with the member to obtain the use of its trading code, and who is explicitly authorised by the member to use it, should therefore be understood to have DEA to a trading venue for the purpose of Article 2(1)(d).

90. Where the DEA client sub-delegates the DEA access, and in contrast to the circumstances described above, ESMA understands that the person benefitting from the DEA sub-delegation (Tier 2 DEA clients) would, in most cases, not technically be in possession of the trading code of the DEA provider. The trading code is not passed down to the ultimate users of DEA, but only appended to the order message by the DEA provider before being submitted to the trading venue. Therefore, ESMA does not consider such Tier 2 DEA clients as having DEA for the purpose of Article 2(1)(d) of MiFID II.

91. To address the uncertainty that has arisen in relation to DEA sub-delegation and Tier 2 clients and in line with the rationale set out above, ESMA proposed in the CP to introduce a definition of DEA sub-delegation in Article 4 of MiFID II, and not let this concept only

¹² https://www.esma.europa.eu/sites/default/files/library/esma70-872942901-38_gas_markets_structures_issues.pdf

appear incidentally in RTS 6. This would allow to clarify that Tier 2 clients should be considered DEA users for the purposes of MiFID II obligations relating to DEA.

92. In the CP, ESMA asked stakeholders about their experience with sub-delegation and views about the proposal to amend the definition of DEA in Article 4(1)(39) to include DEA sub-delegation.

3.5.2.2 Feedback to the consultation

93. Whilst some stakeholders considered that sub-delegation is not very common, other stakeholders, including large sell-side firms, were of the view that sub-delegation of DEA is a frequent and important practice, including to access listed derivatives markets. For those stakeholders, DEA sub-delegation allows brokers and intermediaries who do not have the scale to be a direct member of all EU trading venues to provide access to those liquidity pools to their clients without bearing the cost and complexity linked to membership to multiple venues. Should DEA sub-delegation no longer be permitted, this would lead to a concentration of brokers/intermediaries. DEA sub-delegation is also frequent to allow non-EU affiliates of the same group to access EU markets and Brexit has led to an increase of such type of DEA sub-delegation. Stakeholders that answered this specific point also agreed that Tier 2 clients would not have access to the trading code of the DEA provider and should not be considered as having DEA for the purpose of Article 2(1)(d) of MiFID II.

94. Based on the very few responses received, Tier 2 clients may include EU regulated entities, EU entities that are not regulated under MiFID II but benefit from a MiFID II exemption (e.g. ancillary activity exemption) and third-country entities that have at least some form of local regulatory authorisation.

95. The proposal to include sub-delegation in the definition of DEA created some confusion amongst stakeholders who were uncertain about its actual impact. Some respondents disagreed with the proposal as, in their understanding, the insertion of sub-delegation into the definition of DEA, coupled with the proposal to amend Article 1 of MiFID II to require a DEA provider to seek authorisation, could inadvertently lead to an authorisation requirement for both the sub-delegator and the market member. Some others questioned whether a Tier 1 client that would not be authorised as an investment firm or a credit institution could sub-delegate DEA access to a Tier 2 client. Only one respondent supported the proposal considering that it is legitimate to maintain an authorisation requirement for DEA users offering DEA sub-delegation to their own clients given their sub-delegation services necessarily come with investment services such as execution of orders.

3.5.2.3 ESMA's assessment and recommendations

96. ESMA took note of the confusion created by the proposal to include sub-delegation in the definition of DEA in Article 4(1)(41) of MiFID II. ESMA's intention with this proposal was to clarify that from a DEA user perspective, there should be no distinction between Tier 1 DEA users and sub-delegated DEA users (or Tier 2 DEA clients). Such a distinction has

previously been made in ESMA Q&A 24 on DEA¹³ to limit the impact of the authorisation requirement for DEA users, but ESMA is of the view that the proposal to remove the authorisation requirement for DEA users only trading on own account renders this distinction redundant. Together with the removal of the authorisation requirement for DEA users, ESMA therefore proposes to amend Level 1 to clarify that a Tier 2 DEA client is a DEA user. This would avoid possible misinterpretation and should provide more clarity on the regime.

97. ESMA also notes that the proposal to include sub-delegation in the definition of DEA raised questions from stakeholders about the regulatory treatment of DEA users sub-delegating their DEA to Tier 2 clients. The existing framework may indeed give rise to different interpretations. ESMA therefore invites the Commission to clarify whether DEA users sub-delegating DEA to Tier 2 clients trading on own account or executing client orders should be authorised as investment firms. For the avoidance of doubts, this clarification request does not impact ESMA's proposal that DEA users only dealing on own account and not sub-delegating access should no longer be required to be authorised as investment firms.

3.5.3 Notification of DEA users to NCAs

3.5.3.1 Background

98. Under Article 17(5) of MiFID II, an investment firm that provides direct electronic access to a trading venue must notify the competent authorities of its home Member State and of the trading venue(s) at which the investment firm provides direct electronic access. No information is currently required to be provided to the relevant NCAs by the DEA provider on the persons to whom DEA is provided. In the CP, ESMA considered that there would be value for the NCAs to have a better understanding of the magnitude of DEA access, both as the NCA of a trading venue where DEA is provided and as the NCA of a DEA provider. ESMA therefore suggested in the CP that Article 17(5) of MiFID II is amended to include the number and names of entities to which DEA access is provided, with an annual update.

3.5.3.2 Feedback to the consultation

99. Most respondents were against this proposal which they considered as unnecessary burdensome without identified benefits. They stressed that DEA clients' LEI is available in Transaction Reporting. NCAs therefore already have access to the identity of the DEA users to which a DEA provider is providing access. As an alternative, it was suggested that the NCA could make a specific request to the DEA provider whenever needed.

¹³ https://www.esma.europa.eu/sites/default/files/library/esma70-872942901-38_gas_markets_structures_issues.pdf, page 28

3.5.3.3 ESMA's assessment and recommendations

100. ESMA took note of the responses provided by market participants but continues nonetheless to consider that the provision by the DEA provider of the list of its DEA users, including Tier 2 clients benefitting from sub-delegation, would be most helpful for supervisory purposes. Identification of the DEA users will help improving the traceability of transactions in some specific situations where the DEA user may not be identified in transaction reports received from the DEA provider, including where the DEA user is not the beneficial owner of the financial instrument. It will also provide NCAs with a more granular view on who is operating in the markets. ESMA considers that asking DEA providers for more information about their DEA users is also consistent with the need for NCAs to adapt supervisory practices to the increased reliance on the role and responsibilities of DEA providers proposed in this report. ESMA therefore proposes amending the third paragraph of Article 17(5) of MiFID II to include the list of DEA users to which DEA is provided in the notifications by DEA providers, together with an annual update of the list.

3.5.4 Direct Electronic Access and On-line Brokerage

3.5.4.1 Background

101. As trading technology continues to evolve, questions have been raised as to whether on-line brokerage should be considered as providing retail investors with DEA, and more specifically DMA, to trading venues and the potential consequences thereof, including the on-line broker being qualified as DEA provider and having to meet applicable requirements under RTS 6.

102. Article 20 of CDR (EU) 2017/565 further clarifies that a person is not considered to have DEA when that person "cannot exercise discretion regarding the exact fraction of a second of order entry and the lifetime of the order within that time frame". Clients of online brokers do not have control over the exact fraction of a second when their orders enter the trading venue's systems and therefore cannot be considered as having DEA access.

103. In addition, under Article 4(1) of MiFID II, the Directive only applies to persons "whose regular occupation or business is the provision of one or more investment services to third parties and/or the performance of one or more investment activities on a professional basis". Unless exceptional circumstances apply, retail clients are not considered to perform investment activities on a professional basis and are therefore not required to seek authorisation as investment firms.

104. In the CP, ESMA asked stakeholders whether they agreed with the analysis above and considered to further clarify the matter.

3.5.4.2 Feedback to the consultation

105. All stakeholders agreed with ESMA analysis that clients of on-line brokers should not be considered as having DEA access. Most of the respondents also agreed with the

arguments supporting the analysis, i.e. that on-line clients do not have control over the exact fraction of a second when their orders enter the trading venue's trading system and that retail clients are not considered to perform investment activities on a professional basis and are therefore not required to seek authorisation as investment firms. Those respondents were of the view that no further clarification was needed. Some respondents stressed the importance of online brokerage as a means to increase retail investors' participation in EU capital markets. Two respondents suggested to further clarify DEA by referring to a qualitative criterion (dedicated access line for the DEA user) and a quantitative one (time elapsed between the order is received by potential DEA provider and the transmission of such order to the trading venue).

3.5.4.3 ESMA's assessment and recommendations

106. Considering the broad support from stakeholders for the analysis developed in the CP, ESMA does not consider it necessary to further clarify in Level 1 or in Level 2 the difference between DEA and on-line brokerage. ESMA also notes that quantitative criteria in areas of ever evolving technology would appear challenging to establish and that only a DEA user having sponsored access would benefit from a dedicated line to access the trading venue.

3.6 Third-country firms

3.6.1 Background

107. Article 1(1) sets out the scope of MiFID II which "shall apply to investment firms, market operators, data reporting services providers and third-country firms providing investment services or providing investment activities through the establishment of a branch in the Union".

108. Member States may require a third-country firm to establish an EU branch to provide investment services to retail clients. When they do not have established a branch in the Union, third-country firms may provide investment services and activities to eligible and professional clients in the EU subject to an equivalence decision made by the Commission for that third country in accordance with Articles 46 to 49 of MiFIR. Pending an equivalence decision by the Commission, Member States' national regimes apply to the provision of investment services and activities by third-country firms.

109. In relation more specifically to Article 2(1)(d) of MiFID II and persons dealing on own account and using HFT techniques or being a member or participant of a trading venue or having DEA access, ESMA conducted a stocktaking exercise with NCAs to understand how national regimes apply. The result of this stocktaking exercise is provided in Annex IV-B and shows the heterogeneity of applicable requirements.

110. The lack of a harmonised EU regime for third-country firms creates an unlevel playing field between EU and non-EU firms, with a competitive advantage provided to the latter. While an EU firm would have to be authorised as an investment firm in the EU notably when having DEA to a trading venue (Tier 1 user) or applying HFT techniques and be

subject to the stringent MiFID II/MiFIR regulatory framework (e.g. capital requirements, Article 17 of MiFID II and RTS 6), non-EU firms would only be subject to the applicable national regime, if any.

111. The difference of treatment appears even less justified in practice considering that, from a risk perspective, there is no major difference between the activities of EU or non-EU HFT firms or DEA users. Those risks are related to the trading technology used rather than the location from where the activity is undertaken. It is therefore questionable whether the MiFID II regime delivers on its objective to address the risks arising from trading technology developments and to prevent disorderly trading conditions on EU markets by leaving in many circumstances the requirements applicable to third-country firms to the discretion of each Member State.
112. The lack of a harmonised EU regime for third-country firms also creates an unlevel playing field across EU trading venues as third-country firms using HFT techniques and/or using DEA are more attracted to trade on trading venues where national rules do not require them to be authorised as an investment firm or to comply with requirements equivalent to the ones set out in MiFID II.
113. In the CP and in this report, ESMA proposes to no longer require DEA users only trading on own account to be authorised as investment firms (see section 3.5 above), which would address the unlevel playing field issue with third-country DEA users only dealing on own account. To address the remaining issue regarding third-country HFT firms, ESMA suggested amending Level 1 to require third-country HFT firms accessing EU trading venues to be authorised as investment firms.
114. ESMA notes that a similar unlevel playing field issue does not arise with respect to DEA provision as trading venues may only permit members or participants to provide DEA where they are authorised under MiFID II or under Directive 2013/36/EU.

3.6.2 Feedback to the consultation

115. A majority of stakeholders were against the proposal to require third country HFT firms to be registered as investment firms, with split views from trading venues. The arguments put forward against this proposal mainly focussed on risk assessment and liquidity impact. A larger number of respondents suggested to operate a distinction between direct membership and DEA and apply to the latter the reasoning underpinning the proposal on DEA users, i.e. to rely on the DEA provider to undertake the necessary controls and checks and act as a safety portal to EU markets. According to those respondents, third-country (and EU) firms that conduct HFT activity on EU markets should be required to do so via DEA, unless the firm conducting the HFT strategy is regulated in the EU as an investment firm.
116. Stakeholders opting against the proposal also stressed that an authorisation would not meaningfully improve the present situation whilst likely resulting in third-country HFT firms withdrawing from EU markets, which would significantly harm the ability of exchanges to compete on a global basis. This negative impact on EU liquidity could be very significant

considering the broad encompassing HFT definition/thresholds. It was also noted that the authorisation requirement for third-country firms would undermine the equivalence framework set out in Title VIII of MiFIR for the provision of investment services and performance of activities by third-country firms following an equivalence decision with or without a branch.

117. Proponents of the authorisation of third-country HFT firms mentioned the need to preserve the integrity of financial markets and provide an equal treatment to EU and non-EU firms.

3.6.3 ESMA's assessment and recommendations

118. ESMA acknowledges that a majority of respondents did not support the proposal to require third-country HFT firms accessing EU venues to be authorised as investment firms. However, ESMA does not necessarily agree with all arguments put forward by respondents opposing the proposal put forward in the CP.
119. From a risk perspective, it is true that technology is more and more spread among market participants and algorithmic trading techniques tend to become the norm. However, ESMA considers that there are still legitimate reasons to differentiate HFT DEA users from other DEA users (i.e. those that are not using HFT techniques).
120. The definitions of HFT set out under Article 4(1)(40) of MiFID II and Article 19 of CDR (EU) 2017/565 are meant to capture algorithmic traders which are the more technologically advanced, the most active on EU markets (in terms of daily number of messages sent) and, therefore, can be seen as presenting the highest risk of creating disorderly trading conditions on EU markets.
121. For this reason, ESMA continues to believe that it is appropriate that the activity of HFT is subject not only to the controls and checks of DEA providers but that the HFT themselves are subject to adequate requirements and supervision when trading on EU trading venues.
122. ESMA has also taken the comments made regarding the possible impact of an authorisation of third-country HFT firms on the liquidity available on EU markets carefully into account. ESMA is of course committed to ensuring that EU trading venues remain competitive worldwide and that liquidity available on their platforms is not affected by unnecessary rules. However, in the specific case of third-country HFTs, ESMA considers that there are other elements to be taken into account which should limit, if not prevent, the withdrawal of third-country HFT to happen.
123. ESMA notes in this respect that certain jurisdictions have already set in place, at national level, a form of authorisation regime for third-country HFT firms that are active on trading venues within their jurisdiction. This does not seem to have fundamentally impacted the liquidity available on these trading venues or, more generally, the willingness of third-country firms to trade in those countries.
124. In addition, the new authorisation requirements would indeed affect mainly HFT firms that are active on EU markets solely to deal on account. In practice, as noted in the CP and confirmed by some market participants, HFT firms are generally not only dealing on own

account but offer a much broader spectrum of services and activities which might already require their compliance with the MiFID II regime. In addition, due the technological costs involved, HFT firms, are often part of big corporate groups with a subsidiary or a branch already authorised in the EU.

125. For these reasons, ESMA continues to view as appropriate requiring third-country HFT firms accessing EU trading venues to be authorised as investment firms, should they access EU trading venues through DEA or as member or participant. However, ESMA also considers that third-country HFT firms subject to an equivalent supervisory framework in their home country should be allowed to access EU trading venues through DEA or as member or participant without being authorised as an investment firm in the EU. To that end, a specific equivalence framework should be developed at EU level.
126. ESMA notes that this authorisation requirement or specific equivalence framework for third-country HFT firms would be without prejudice to the equivalence framework for third-country HFT firms providing investment services to eligible counterparties and professional clients in the EU under Article 46 of MiFIR.

4 Organisational requirements for investment firms

127. This section of the report discusses organisational requirements for investment firms, as stipulated in Article 17 of MiFID II and further specified in the relevant Level 2 regulations such as RTS 6.
128. The section addresses the process of notifications to NCAs by investment firms engaged in algorithmic trading under Article 17(2) and (5) of MiFID II, as well as the co-operation between NCAs in the context of requests for information under the same Article.
129. RTS 6 specifies the details of the organisational requirements for investment firms engaged in algorithmic trading. In relation to the current review, the focus was on particular provisions that were deemed most relevant, relating to the characterisation of algorithms, the testing of algorithms, and the annual self-assessment.

4.1 Notifications to NCAs, exchange of information and on-going supervision

4.1.1 Background

130. Article 17(2) of MiFID II stipulates that an investment firm that engages in algorithmic trading is required to notify the NCA of its home Member State and of the trading venue at which the investment firm engages in algorithmic trading as a member or participant of the trading venue.
131. According to the same Article, the NCA of the investment firm may require the investment firm to provide, on a regular or ad-hoc basis, (i) a description of the nature of its algorithmic trading strategies, (ii) details of the trading parameters or limits to which the system is

subject, (iii) the key compliance and risk controls that it has in place to ensure that the conditions laid down in Article 17(1) of MiFID II are satisfied and (iv) details of the testing of its systems. Furthermore, also according to Article 17(2) of MiFID II, the NCA of the investment firm may at any time request further information about the firm's algorithmic trading strategies and the systems used for that trading.

132. Furthermore, and as mentioned in section 3.5.3 above, according to Article 17(5) of MiFID II, an investment firm that provides DEA to a trading venue shall notify the NCAs of its home Member State and of the trading venue at which it provides DEA accordingly. The competent authority of the investment firm may request, on a regular or ad-hoc basis, a description of the systems and controls and evidence that those have been applied. The NCA of the investment firm is required, on the request of a competent authority of a trading venue in relation to which the investment firm provides DEA, to communicate without undue delay the information referred to above.
133. Based on a questionnaire sent to NCAs, ESMA analysed national practices for notifications to NCAs by investment firms under Articles 17(2) and 17(5) of MiFID II, in particular, regarding the process and timing of notifications and what information they required to communicate as part of the notifications.
134. Taking the results to the questionnaire into consideration, ESMA sought market participants' opinions regarding developing harmonized notification templates within RTS 6 that investment firms would use, for the purpose of Articles 17(2) and 17(5) of MiFID II, to notify the NCAs of their home Member State and the NCAs of the trading venue at which they engage in algorithmic trading or DEA.
135. ESMA did not see a need to develop a specific template for the exchange of information between NCAs. ESMA sought stakeholders' views on whether they agree with this approach.
136. ESMA also sought views on whether market participants see merit in clarifying that investment firms should submit the notifications according to Articles 17(2) and 17(5) 'without undue delay'.

4.1.2 Feedback to the consultation

137. Regarding the first question, the majority of the respondents supported ESMA's proposal of developing a harmonized template for notifications to NCAs, and also agreed with the exemplificative list of information provided by ESMA in point 84 of the CP, especially because it imposes no new requirements, nor does it create any additional administrative burden for firms.
138. Several of the agreeing participants noted the importance of ensuring that such template harmonization does not impose new requirements (outside the criteria outlined in Article 17) or create uncertainty as to how it should be completed.

139. Most respondents added that any initiative aimed at making communications more standardized and homogeneous at EU level is likely to bring positive effects on the efficiency of the financial industry's communications and administrative processes.
140. It is relevant to clarify that the few respondents that did not agree with ESMA's proposal considered it to be currently unnecessary, and that the NCAs should have flexibility to ask for the notification information they need. Therefore, they saw no merit in a prescriptive ESMA template for investment firm notifications to NCAs.
141. Regarding the question on the absence of an additional communication template to exchange information between the NCAs, the majority of participants agreed with ESMA's position. Market participants have also not identified any major issues from the lack of a specific template.
142. In relation to the proposal of introducing 'without undue delay', the majority of the respondents agreed. However, they also noted that ESMA should further clarify this topic. Several participants would welcome further guidance as to what types of situations are considered 'without undue delay' and what consequences should be applicable when such requirement is violated.
143. Respondents that did not agree with ESMA's proposals stated that no further clarifications are needed since no major issue or concern was raised in relation to the topic of notifications and added that restrictive interpretations might impose an unreasonable burden on firms. They noted that since the level of sophistication and the quantity of algorithms used vary by firms, it is fundamental that each firm remains responsible for deciding how to do the notification, while taking sufficient time for it.

4.1.3 ESMA's assessment and recommendations

144. In the view of the feedback received to the CP, ESMA is suggesting developing a template for notifications to NCAs under Article 17(2) and 17(5) of MiFID II. The exemplificative template is detailed in Annex V and should be used for first notifications as well as updates or amendments of existing notifications. This template would be developed under the current mandate of Article 17(7)(a) of MiFID II and would hence only require a Level 2 change (RTS 6). Firms are encouraged to use the template already on a voluntary basis.
145. Regarding the template for exchange of information between NCAs, ESMA considers that it would not be advisable at this stage to prescribe any additional template. ESMA considers that the notification template as mentioned above can be used as the template for the exchange of information between NCAs.
146. Taking into consideration the feedback received regarding the clarification that notifications should be done 'without undue delay', ESMA is of the view that this concept should be introduced. This would require a Level 1 change.

4.2 Application RTS 6: algorithmic trading

4.2.1 Background

147. In the CP, ESMA reflected on whether there is a need to clarify better the definition of algorithmic trading, as provided for in Article 18 of the Commission Delegated Regulation (EU) 2017/565. ESMA has provided guidance through Q&As on this definition clarifying for instance that the use of algorithms which only serve to inform a trader of a particular investment opportunity is not considered as algorithmic trading, provided that the execution is not algorithmic. ESMA asked stakeholders for their view on the definition of algorithmic trading, i.e., whether the guidance provided is sufficient or whether more clarifications should be given.

148. In the same context, ESMA also contemplated whether it would be of use to explicitly exclude certain types of algorithms from the scope of the provisions governing algorithmic trading. ESMA noted though that while it is true that all algorithms and algorithmic trading strategies do not entail the same level of sophistication and risk, a selective application of MiFID II requirements appears difficult to implement in practice. With this in mind, stakeholders were asked to consider whether there should be specific requirements for different type of algorithms or algorithmic trading strategies in RTS 6.

4.2.2 Feedback to the consultation

149. In response to the first question on the definition, a slight majority of respondents expressed a preference to maintain the definition as it currently stands. Those in favour of the current definition noted that the definition is clear, that previous concerns have been addressed by additional guidance provided in ESMA Q&As, and that therefore changes to the definition are not required. Respondents noted that attempts to make the definition more specific or granular would likely lead to confusion, and that it will not be possible to conclusively capture all types of algorithms or strategies. Respondents also highlighted that any detailed changes should be developed in close consultation with industry specialists, as there are large differences between algorithms and trading modalities in equity and fixed income markets.

150. Those in favour of changing the definition suggested the following ideas:

- a. Distinguishing between 'algorithms' providers/technology ownership/sponsorship' and 'algorithms' user/client', whereby the regulation should focus on the former;
- b. Allowing for a risk-based approach and refining for simple (less sophisticated, lower risk profile or limited market impact) versus complex algorithmic strategies;
- c. In particular, accounting for differences in strategies that are mainly replicating, with minor extensions, types of orders that are native in the trading venues (e.g. dynamic stop loss orders), and those that optimize the placement of quotes on the market;

- d. Differentiating for pure execution algos and automated execution processes (TWAP, VWAP, SOR, Autospreaders, etc);
- e. Excluding algos that run market making strategies;
- f. Distinguishing between liquidity providers and high-frequency traders who operate different business models;
- g. Clarifying the scope of algorithmic trading in relation to chains of orders;
- h. Clarifying the notion of “limited human intervention”, e.g. ongoing/ real-time human active monitoring versus passive monitoring.

151. In terms of process, some stakeholders highlighted that according to them clarifications could be done by producing a list of examples from which it is clear what is to be understood as algorithmic trading and what is not, in order to avoid conceptual ambiguity. Some suggested this could be done via Q&A.

152. However, other respondents noted that any clarifications in terms of what is excluded in the regulatory framework or what should not be considered as algorithmic trading should preferably be decided on Level 1.

153. Lastly, some stakeholders took the opportunity to indicate points related to other questions in the CP. These included the following:

- a. Clarifying the distinction between DEA and order routing;
- b. Excluding trading via DEA or OTC from the algorithmic trading requirements;
- c. Limiting the scope and continuing the exclusion of SI quoting from the definition of algorithmic trading;
- d. Amending the Level 1 definition of algorithmic trading by inserting an explicit reference to trading “on a trading venue”.

154. In response to the second question, on tailored requirements, the majority of respondents did not consider it necessary to outline specific requirements in RTS 6 for different types of algorithms or algorithmic trading strategies. Among the arguments used, it was noted that the current requirements are adequate as they stand and that specific requirements may only add complexity and lead to ambiguity.

155. Of those respondents that did call for an amendment to the requirements, many referred to their response to the previous question as to where the differentiation could potentially be introduced. Some respondents went for a ‘middle way’, by expressing that it would be more appropriate to maintain the current requirements but with more proportionality in their application than to develop new requirements for less complex algorithmic trading. They highlighted that this principle should be more explicitly applied, wherever possible, e.g., through the introduction of a general statement.

4.2.3 ESMA's assessment and recommendations

156. Considering that the provisions generally work well, and in view of the slight majority of respondents in favour of keeping the current definition on algorithmic trading as well as maintaining the current requirements for investment firms employing algorithmic trading strategies, ESMA would refrain from suggesting any Level 1 or Level 2 changes to the framework.
157. While ESMA has reflected on the notion of proportionality for the requirements (vis-à-vis the level of complexity of the algorithmic strategy for instance), ESMA also has to acknowledge that it is very difficult to concretely incorporate such a concept into regulatory drafting. There is a risk that such a modification would lower the convergent application of rules between Member States, and that it would bring further complexity since it requires, for instance, to define what a complex algorithm is. Such an exercise would be a particularly tricky one considering the fast-changing developments in the technologies and strategies used in algorithmic trading.

4.3 Application RTS 6: testing and testing environment

4.3.1 Background

158. In the CP, ESMA recalled that, as regards the testing requirements in RTS 6, a distinction can be made between stress testing (Article 10), conformance testing (Article 6) and general methodology and testing (Article 5 and 7). In relation to testing environments, Article 7 of RTS 6 requires an investment firm to use a testing environment that is separated from its production environment and that is used specifically for the testing and development of algorithmic trading systems and trading algorithms. To do so, the investment firm may use its own testing environment, or a testing environment provided by a trading venue, a DEA provider or a vendor. An investment firm should however retain full responsibility for the testing of its algorithmic trading systems, trading algorithms or algorithmic trading strategies and for making any required changes to them.
159. ESMA also recalled that the general methodology requires to ensure that the algorithm or the algorithmic system does not behave in an unintended manner, does not contribute to disorderly trading conditions, continues to work effectively in stressed market conditions and, where necessary under those conditions, allows for switching off the algorithmic trading system or trading algorithm (hereafter referred to as 'behavioural testing' of algorithms).
160. ESMA in the CP noted that some clarifications on behavioural testing could be beneficial. In particular, ESMA proposed to clarify what it means to test on disorderly trading conditions to enhance convergence in testing and testing environments for behavioural testing.
161. In this respect, ESMA also proposed that the definition of disorderly trading conditions refers to circumstances where the maintenance of a fair, orderly and transparent execution of trades is compromised.

162. Considering the various Level 2 regulations (including RTS 6, RTS 7, RTS 8) for which the definition of disorderly trading conditions would be used, ESMA proposed to insert the definition directly in Level 1. Furthermore, due to the variety in testing environments offered and used, ESMA in the CP also proposed to produce additional guidance covering the expectations concerning the checks and testing to be done for behavioural testing.
163. ESMA proposed to provide additional guidance on, inter alia, the variety of conditions or scenarios that should be tested. ESMA indicated for instance that this type of behavioural testing should focus on the interaction between the tested algorithm and the market, and that it should in particular detect whether the tested algorithm contributes to the amplification of market movements that are unrelated to real economic context. Furthermore, more guidance could also be published on the specific elements that should be taken into account or general scenarios that should be included, in order to recreate the above-mentioned dynamics in the testing environment. Considering the level of detail required for such guidance, ESMA proposed to develop this in Level 2 (RTS 6), after engaging with stakeholders to establish the appropriate elements or scenarios.
164. Finally, ESMA also considered it beneficial to require investment firms to report, in the annual self-assessment under Article 9 of RTS 6, the specific testing environments used and for which algorithms. This would help NCAs to develop a full view on the usage of testing environments and to ensure that proper testing is performed in accordance with RTS 6 (see also section 4.4 below).

4.3.2 Feedback to the consultation

165. In response to the question on users' experience of testing environments and on whether there is a need for any improvements, stakeholders had varying comments. While some respondents noted that they had a good experience with the testing environments, most respondents would see it necessary to have at least some improvements in the way the testing environments are set up or offered. Some highlighted that the testing environments offered by trading venues are suitable only for conformance, gateway and connectivity testing, the testing of simple algorithms, and some stress testing. Environments would rarely be able to meet the requirements, design, functional scope required to cater for all type of businesses and algorithms and would require enhancements to be of sufficient quality and reliability to test complex ecosystems and undertake robust testing of disorderly trading conditions. Firms alternatively perform tests based on test scenarios and simulation in their own testing environments.
166. Among respondents there was some discrepancy as to whether the onus should be on the trading venue to support all realistic scenarios or on the investment firm to design and deploy test scenarios that are appropriate and proportionate to their business. Proponents of the latter mentioned that, as testing algorithms' behaviour often requires the simulation of several venues and data sources at the same time, the behavioural testing of algorithms is mostly executed in an environment designed and maintained by the investment firm, and should best be left to the responsibility of the investment firm.

167. Some respondents expressed a preference for no changes to the framework, as they have had good experience with testing environments, and they consider that the current regulation provides sufficient clarity.
168. As mentioned, most respondents suggested at least some improvements and provided comments on a variety of aspects. A large group of respondents provided comments on the limited representativeness of real trading conditions in testing environments and provided suggestions for more realistic testing (same message order capacity, focus dates for simulation of stressed conditions, improved data quality, ensured liquidity to interact with, open testing sessions, use of real symbols instead of synthetic/mock symbols). However, some respondents advocated for a less strict demarcation in production and testing, e.g. through the use of dummy symbols in the production environment or through being able to use an environment that is not completely *separate* from its production environment but rather does not *impact* its production environment.
169. Several respondents commented on the up-time or availability of the testing environments and noted that this could be improved to avoid unnecessary delays in deployment, e.g. by making available testing facilities during normal business hours on every business day or making the test periods longer in the event of major changes. This was mentioned in relation to both trading venues and providers of algorithms.
170. A couple of respondents also noted that at least two testing environments should be available: one running the current production version and one running the new release environment that includes the upgrades to be introduced.
171. A few respondents noted that the stress testing requirements set out in Article 10 of RTS 6 are too prescriptive (i.e. more discretion should be left to the investment firms). These respondents highlighted that stress testing of algorithms should not be prescribed at a mandatory level based only on the last 6 months trading. Stress testing should allow for firms to choose realistic scenarios. Respondents noted that recent market events, such as COVID-19 volatility episodes in Q1 2020, are illustrative for this purpose.
172. The following suggestions were also made:
- a. Charging for access to the testing environment, which is sometimes being done, could disincentive members to perform testing. The test environments should not be looked at as profit centres by trading venues;
 - b. It should not be required to run conformance testing of algorithms with trading venues where such algorithms do not directly connect to the venue but use a trading gateway or DEA;
 - c. Algorithms' providers should be encouraged to use independent verification systems. Frequently algorithms' providers use their own software to check and control the well-functioning of their algorithms; however there should always be an independent piece of software that double checks this to ensure the implementation is correct;

- d. In the case of the use of an unregulated supplier, it may be difficult to ensure that the latter carries out the necessary tests to verify the algorithms supplied (despite the contractual obligation). Furthermore, investment firms also face difficulties because of the protections imposed by intellectual property which prevent them from accessing the algorithm data and code necessary to appropriately carry out the tests;
 - e. Certification tests are often very complex, too time consuming and insufficiently focused on what is important to test and verify, e.g. sometimes the firms have to create special versions of the software, especially for the certification test, which defeats the purpose of a certification test;
 - f. More formalised mechanisms should be established to solicit, assess and respond to member feedback on requirements for testing environments, with this information shared with NCAs;
 - g. ESMA should promote more consistency between trading venues. Testing criteria and process can be different from venue to venue, causing different testing outcomes;
 - h. Testing environments should be used by a dedicated testing team, which performs tests according to the requirements stated. It could be problematic if tests are only performed by developers (developer in test) - i.e. the same person who writes the code according to the requirements - as they interpret the requirement.
173. Lastly, on the process, two respondents noted that the suggestions for improvement should not result in a Level 1 change but should rather be identified as best practice through further ESMA guidance or be developed by a dedicated technical industry group.
174. Regarding the question on the definition for disorderly trading conditions, a general reaction to the consultation was that the current testing regulatory framework is perceived by most respondents to be adequate to ensure stability to algorithm trading activities. A recurring argument adopted to support this stand was the lack of any major issues caused by algorithmic trading firms during the COVID-19 crisis, where markets experienced high volatility and abnormal conditions.
175. Overall, from the consultation it also emerged that there is a clear preference to keep testing requirements “principle based” rather than strictly prescriptive, in order to allow market participants to tailor tests according to their specific features.
176. On these premises, the proposal to introduce of a definition of “disorderly trading conditions” received only limited support.
177. The main reason is that a definition would fail to account for the differences in trading models and market structures in all asset classes, as well as all scenarios where “disorderly trading conditions” may occur. Along the same lines, some flagged the unnecessary burden and costs an exhaustive definition could add on market participants with respect to testing.

178. In addition, the proposal to define “disorderly trading conditions” as a market where the maintenance of a fair, orderly and transparent execution of trades is compromised, was considered not to bring any added value to the existing wording. Furthermore, some respondents observed that disorderly trading conditions can occur without trading being compromised.
179. Nevertheless, a few respondents saw merit in ESMA providing concrete examples to supplement the definition and help identifying disorderly trading conditions.
180. The few favourable respondents to the introduction of a definition of “disorderly trading conditions” suggested to include certain risks relating to market structure disruption (as system outages, trading venues disconnection, or inability to access the system) or general IT failures as well as extraordinary and unlikely conditions (in terms of market volatility and volumes).
181. Similarly, the proposal to provide additional guidance on the expectations concerning the checks and tests to be done for behavioural testing received split views in the consultation.
182. A slight majority of respondents argued that procedures in place for testing are already sufficiently comprehensive, well developed and effective. They also reiterated the importance of a principle- and proportionality-based approach to testing to better address the complexities and heterogeneity of automated trading activities.
183. Respondents that were in favour of the proposal argued that further guidance on testing would enhance the consistency and comparability of results obtained by different investment firms.

4.3.3 ESMA’s assessment and recommendations

184. ESMA firstly acknowledges that from the consultation it emerged that
- a. the current rules on testing are perceived to have delivered on their objectives;
 - b. participants overall have good experience with testing environments, and
 - c. flexibility in testing is necessary in order to cover all the specificities of automated trading activities.
185. ESMA however also notes that most respondents would see it necessary to have at least some improvements in the way the testing environments are set up or offered. Therefore, these suggestions to improve the representativeness of testing environments will be considered for a future RTS review. In addition, several issues that were mentioned by a larger number stakeholders may merit some adjustments on Level 2 (e.g. availability of the testing environment, testing of new releases into the production environment in parallel to the testing environment). In reaction to comments asking for a less strict demarcation in the testing and production environment, ESMA continues to see risks that may arise from experimenting with new algorithmic strategies or systems.

186. As for the specific testing on disorderly trading conditions, ESMA would express its view on both the definition as well as the guidance.
187. In view of the feedback on the definition, ESMA notes that the mere reference to “disorderly trading conditions” seemed to have provided adequate indications to investment firms on how to conduct testing. Furthermore, a further elaboration of the definition may fail to cover all specific risks that may derive from different algorithmic trading systems, especially considering their constant development. Thus, ESMA would abstain from further prescribing a definition for “disorderly trading conditions”.
188. ESMA considers that the best way forward for including all the possible scenarios and granting flexibility to adapt testing to the specific feature of systems, would be to maintain the current reference to “disorderly trading conditions” as it is.
189. With respect to the proposal to provide additional guidance on behavioural testing, ESMA understands from the consultation that the need for flexibility has to be combined with the need to enhance the consistency and comparability of results obtained by different investment firms.
190. This request for more comparability confirms ESMA’s initial view that further convergence across systems would improve the current testing regime.
191. To combine the need for flexibility, together with the possibility to make tests more comparable, ESMA proposes to amend the RTS 6 to have a principle-based testing regime, where testing should ensure certain outcomes, e.g. no contribution to excess volatility. ESMA believes this solution would leave discretion to investment firms on the details of how to conduct testing, whilst permitting comparability on what has been tested for.
192. All of the above proposals concern Level 2 changes, and ESMA would take these into account at a later stage when reviewing the RTS.

4.4 Application RTS 6: annual self-assessment

4.4.1 Background

193. Pursuant to Article 9 of RTS 6, investment firms are required to assess their compliance with Article 17 of MiFID II (and record their self-assessment) at least once a year. In the course of that process the firm should review, evaluate and validate: (a) its algorithmic trading systems, trading algorithms and algorithmic trading strategies; (b) its governance, accountability and approval framework; (c) its business continuity arrangement; and (d) its overall compliance with Article 17 of MiFID II, having regard to the nature, scale and complexity of its business.
194. As noted in the CP, the lack of clear guidance and the free format of the self-assessment create very different outcomes in the level of detail of the submitted self-assessments. This renders it difficult for the NCA to compare outcomes. Hence, ESMA proposed to

have a specific format - harmonised at EU level - in order to improve consistency and comparability.

195. ESMA also proposed a couple of other adjustments to the Level 2 text in this area. These proposals align with the RTS 7 proposals below, and any changes made to the RTS 6 provisions should be done in a harmonised fashion with those of RTS 7.
196. Firstly, ESMA deemed the exercise to be a proper due diligence assessment and noted that it should be more detailed than a simple statement of compliance. Secondly, in order to increase the quality of such assessments, ESMA would see merit in asking investment firms to submit their self-assessment to their NCA for review. Moreover, since ESMA considers that investment firms should diligently perform the self-assessment, and expects an increased burden for the investment firm, it was proposed to amend the frequency to every two years. Nonetheless, this should not apply to the stress testing done in accordance with Article 10, for which the frequency would continue to be on an annual basis. ESMA's proposal allowed NCAs to request the self-assessment to be performed more frequently if necessary.
197. Lastly, as mentioned above, ESMA proposed to require investment firms to report in the annual self-assessment more information on testing environments. Such information would include, inter alia, the testing environment used to test compliance with the criteria in Article 5(4) of RTS 6 and for which algorithms this holds. This proposal was made to allow NCAs to verify that proper testing is performed in accordance with RTS 6 as well as provide a full view on the usage of testing environments.

4.4.2 Feedback to the consultation

198. In the CP, ESMA asked market participants whether they would see merit in developing a standard format which investment firms would use for their self-assessment. A slight majority of respondents were against such a proposal highlighting that many firms have already implemented the process of their annual assessment, and that the proposed change of the format would not be justified since there has been no evidence that the assessments were insufficient. They also stressed that it is important that the review is evaluated by the regulators.
199. Furthermore, these respondents believe that any self-assessment needs to consider the nature, scale and complexity of the concerned business and that a one-size-for-all approach would therefore not be appropriate. Instead, high-level principles for assessment are more appropriate and the criteria for the self-assessment included in Annex of RTS 6 are sufficiently detailed.
200. On the opposite spectrum, some respondents agreed that a standard template would be helpful and indicated that there are already some examples of templates among market participants. They considered that the standard format would facilitate a consistent approach and would provide more legal certainty to participants.
201. Moreover, respondents highlighted that if such format is to be developed:

- a. it should be not overly prescriptive and give sufficient flexibility to firms of different sizes and practices,
- b. it should be consulted with the relevant industry associations,
- c. a cost-benefit analysis should be conducted before proposing the template,
- d. it could only provide the minimum requirements, allowing larger firms to add additional information which they may consider relevant.

202. With regards to the set of adjustments which ESMA proposed to the self-assessment, the majority of respondents did not concur with the proposal. Many respondents would be in favour of less frequent assessments, but either disagreed with or did not comment on the other elements put forward in the consultation.

203. Overall, the respondents who did not agree with the ESMA proposal found the approach overly prescriptive. In particular, the proposed changes in relation to incorporating information on testing in the assessment could lead in their view to adding complexity to the assessment and would not be useful. Many firms suggested that the review should be submitted to NCAs only upon request.

204. At the same time, a fair number of respondents agreed that the assessment should be a proper due diligence and that the reports should be validated by the NCA. While it is important to increase the quality of reports, it is also relevant that the dialogue between firms and NCAs is improved. Interestingly, many respondents who agreed with the proposals indicated that the assessment should remain on an annual basis, or to be adapted to the frequency of deployment of new technologies. For those respondents, the proposal to add information related to the testing environment seems sensible.

205. With regard to targeted adjustments to the RTS 6, there were various interesting suggestions made in the replies to the consultation, for instance:

- a. Article 7 of RTS 6 on testing environments should be less prescriptive, and rather than specifying the exhaustive list of elements of the testing environment which needs to be separated from the production, it should rather clarify the principle that the testing should not impact the production environment;
- b. Article 9 of RTS 6 on self-assessment could specify the submission date to the NCA. For instance, it was suggested that for the self-assessment of the year 2020, the reference dates to be used by firms could be 1 Jan 2020 - 31 Dec 2020, and the submission date to the NCA would be 30 April 2021;
- c. Article 10 of RTS 6 on stress tests is considered too prescriptive, creating implementation challenges. For instance, specifying the look back period to six months removes the flexibility for firms to test what might be a more appropriate look back period;

- d. Article 16 of RTS 6, on real time monitoring, should recognise that not all investment firms which are using algorithmic trading techniques are members of a trading venue. It should also consider that in practice such monitoring is done by the trader, while the controls of the risk department and/or independent risk control function are not real-time;
- e. Article 17(3) of RTS 6 on reconciliation should require investment firms to compare their electronic trading logs with "an external view of its trades and positions" rather than "information about its outstanding orders and risk exposures".

206. Some respondents believed that the overall regulatory burden put on investment firms by RTS 6 should be reduced.

207. Moreover, a few firms considered that further guidance could be provided to clarify the requirements on stress testing under Article 10 of RTS 6, such as characteristics of the environments to be used, tests granularity, metrics to be considered, lookback period of the tests, methodologies used and key performance indicators (KPIs) to be considered.

4.4.3 ESMA's assessment and recommendations

208. In view of the feedback provided to the consultation, ESMA considers that it would not be appropriate at this stage to develop a specific template for the self-assessment as an attempt at harmonising the submissions to the NCAs. ESMA recognises in particular the need for flexibility and the fact that different investment firms use more or less sophisticated algorithms in the trading. Therefore a "one-size-fit-all" template would be too prescriptive. However, it is important that the assessment is not just a statement of compliance, but that it is a proper due diligence of the regulatory requirements.

209. With respect to the frequency of the assessment, in order to align it with the frequency performed by the trading venues under RTS 7, ESMA sees merit in aligning the approaches, and making the obligatory self-assessment a biennial exercise and introducing the obligation to send it to NCAs. Nevertheless, in duly justified cases, NCAs should keep the ability to request the self-assessment more regularly, for example on cases where the previous assessment indicated some issues that NCAs want to follow up on.

210. At the same time, in view of the limited support for the other amendments proposed to the self-assessment, ESMA would not specify a more detailed approach with this respect.

211. Finally, ESMA takes note of the useful technical proposals put forward with regard to RTS 6. Those changes will be considered by ESMA at a later stage when the technical standards will be reviewed, which will include further consultation of the changes proposed.

5 Organisational requirements for trading venues

212. Article 48 of MiFID II describes the requirements regarding systems resilience, circuit breakers and electronic trading. The objective of those requirements is to ensure that algorithmic trading and HFT do not create a disorderly market and cannot be used for abusive purposes. Trading venues should therefore ensure that their systems are resilient and properly tested to deal with increased order flows or stress market conditions and that circuit breakers are in place to temporarily halt trading or constrain it in case of sudden and unexpected price movements.
213. RTS 7 further specifies the organisational requirements for trading venues, limiting the scope of application to those trading venues which “allow or enable algorithmic trading”. Those are further defined under Article 1 of RTS 7 as trading venues “where order submission and order matching is facilitated by electronic means”. The rationale is explained in Recital 3 which clarifies that “risks arising from algorithmic trading can be present in any type of trading system that is supported by electronic means”.
214. Recital 3 of RTS 7 further clarifies that “specific organisational requirements should be laid down in respect of regulated markets, multilateral trading facilities and organised trading facilities allowing for or enabling algorithmic trading through their systems. Such trading systems are those where algorithmic trading may take place as opposed to trading systems in which algorithmic trading is not permitted, including trading systems where transactions are arranged through voice negotiation.”
215. ESMA is of the view that RTS 7 applies to all trading venues except those that operate a voice trading system. The scope of RTS 7 therefore includes (i) trading venues without auto matching, (ii) trading venues explicitly prohibiting algorithmic trading as well as (iii) electronic platforms where orders can be submitted through voice.
216. It should be noted that RTS 7 provides some flexibility for trading venues and their NCAs to apply the provisions in a proportionate manner. In other words, the requirements set out in RTS 7 “should be considered according to the nature, scale and complexity of the algorithmic trading activity undertaken” (Recital 5 of RTS 7).
217. Furthermore, those trading systems which are excluded from the scope of application of RTS 7 remain nevertheless bound by the provisions contained in Article 48 of MiFID II. In fact, MiFID II provisions have a broader scope applying to all trading systems and regardless whether order submission and order matching is facilitated by electronic means.
218. More specifically, ESMA considers that voice trading systems remain bound by Article 48(1) of MiFID II and are expected “to have in place effective systems, procedures and arrangements to ensure its trading systems are resilient, have sufficient capacity to deal with peak order and message volumes, are able to ensure orderly trading under conditions of severe market stress, are fully tested to ensure such conditions are met and are subject to effective business continuity arrangements to ensure continuity of its

services if there is any failure of its trading systems". ESMA has recently clarified the scope of application of RTS 7 in a Q&A¹⁴ which encompasses the above considerations.

5.1 Capacity and Resilience of Trading Venues

5.1.1 Background

219. Trading venues are required to have in place all necessary systems, procedures and arrangements to comply with MiFID II requirements in terms of system resilience, circuit breakers and electronic trading. Article 48 of MiFID II sets out those requirements.

220. In particular, Article 48(1) requires trading venues to ensure its systems are resilient, have sufficient capacity and are able to ensure orderly trading under conditions of market stress. Furthermore, those systems need to be fully tested and subject to business continuity arrangements.

221. RTS 7 further specifies the requirements to ensure trading venues' systems are resilient and have adequate capacity. Trading venues should assess their compliance at least once a year, taking into account the nature, scale and complexity of their business. RTS 7 further specifies a non-exhaustive list of elements that should be taken into account when undertaking the self-assessment. The self-assessment should only be sent to their NCA when requested.

222. Furthermore, in accordance with RTS 7, trading venues should also have clearly defined development and testing methodologies to ensure that (a) the trading system does not behave in an unintended manner; (b) the compliance and risk management controls embedded in the systems work as intended, including the automatic generation of error reports; and, (c) the trading system can continue to work effectively in case of a significant increase of the number of messages managed by the system. Trading venues should also take all necessary steps to avoid that their trading systems contribute to disorderly trading conditions.

223. In the CP, ESMA has assessed the appropriateness of the self-assessment from the perspective of both NCAs and trading venues in order to understand whether the exercise is useful and whether some changes should be introduced. The CP provided some proposals based on the feedback provided to ESMA by trading venues as to whether the self-assessment raised any issues or brought about any changes to their systems.

224. In addition, when drafting the CP, ESMA has also collected views from NCAs on the appropriateness of the self-assessment and invited them to share the main conclusions drawn from analysing TV's self-assessments.

¹⁴ See Question 31 on the Direct Electronic Access (DEA) and algorithmic trading section of ESMA's Questions and Answers on MiFID II and MiFIR market structures topics (https://www.esma.europa.eu/sites/default/files/library/esma70-872942901-38_qas_markets_structures_issues.pdf).

225. On the back of the feedback¹⁵ provided by both trading venues and NCAs, ESMA was satisfied that the self-assessment has overall achieved its purpose and remains appropriate to be undertaken by trading venues. Nevertheless, ESMA proposed in the CP some targeted changes in this respect.
226. Firstly, in order to foster convergence amongst jurisdictions, ESMA proposed to create a harmonised approach for the self-assessment by creating a clear format¹⁶ trading venues should follow when undertaking their assessment, with the aim of improving the appropriateness and comparability of the exercise amongst trading venues and NCAs.
227. The proposed harmonisation would ensure that trading venues undertake proper due diligence on their systems and controls based on a structured approach, enabling a coherent identification of the main aspects of focus. At the same time, such approach would ensure that trading venues not only assess their compliance with article 48 MiFID II, but also with all requirements of RTS 7.
228. Secondly, ESMA believed that the self-assessment should include a proper due diligence from trading venues on their systems and controls which might increase trading venues burden in performing such assessment. Hence ESMA proposed that the self-assessment should be performed every two years instead of annually. ESMA also noted in the CP that NCAs should retain the possibility to request the self-assessment to be performed more frequently should they deem necessary.
229. Finally, ESMA also suggested in the CP that the self-assessment should be submitted to the NCA as a requirement rather than on a voluntary basis.

5.1.2 Feedback to the consultation

230. A slight majority of respondents agreed with ESMA's proposal to harmonise and create a clear structure for the performance of the self-assessment.
231. Despite many respondents agreeing with the need to foster convergence on the due diligence required from trading venues to perform the self-assessment, many market participants cautioned ESMA about the need of not over complicating the exercise and, hence, suggested to only limit the harmonisation to high level content and principles. According to respondents, the self-assessment should take into consideration the nature, scale and complexity of the algorithmic trading activity undertaken on the trading venue.
232. In addition, most respondents that agreed with the proposal to create a clear structure for the performance of the self-assessment also recommended further consultation (possibly via a roundtable) on the content of such harmonised structure.
233. Those who disagreed with ESMA's approach considered that the self-assessment has worked well and achieved its purpose and therefore, remains appropriate to be

¹⁵ A thorough analysis of the feedback provided by NCAs and trading venues can be found in the CP.

¹⁶ Please see similar proposal in the context of the annual self-assessment to be performed in the context of RTS 6 in section 4.2.2.

undertaken by trading venues. In addition, they feared that proposal leads to a very detailed reporting mechanism that could represent a real burden for trading venues.

234. Other respondents were of the view that the guidance already provided in the Annex of RTS 7 is sufficiently clear and represents a solid base for the establishment of a harmonised approach and format to the self-assessment.
235. On ESMA's proposal to limit the performance of the self-assessment to every two years instead of keeping it as a yearly exercise, a significant majority of respondents agreed with ESMA.
236. Some of these respondents also cautioned that algorithms may evolve rapidly and therefore they agreed that NCAs should also retain the possibility to request the self-assessment to be performed more frequently. However, in case NCAs retain the possibility to request the self-assessment more frequently than every two years, some respondents suggested that ESMA should consider providing guidance that limits those circumstances. For example, respondents mentioned as justified circumstances to request a new self-assessment cases where a trading venue has either encountered compliance issues or, where a trading venue introduces material changes to the existing framework.
237. Most respondents also agreed with ESMA's suggestion to require trading venues to share the results of the self-assessment with their NCA.
238. Finally, a number of respondents did not provide concrete comments on this question but rather noted that regardless the way forward, the requirements should be aligned with those applicable to investment firms.

5.1.3 ESMA's assessment and recommendations

239. During the period of application of MiFID II, the performance of the self-assessment has overall achieved its objectives of ensuring trading venues are resilient and have sufficient capacity to ensure orderly trading conditions. The feedback to the CP has also demonstrated that trading venues are comfortable with the existing arrangements in which NCAs request and analyse the information presented in the self-assessment. Considering the current situation, ESMA does not want to change the status quo and will therefore not propose any changes with regards to the way the self-assessment is presented. With regards to the timing of the self-assessment ESMA keeps its proposal to require the self-assessment to be a biennial exercise and for trading venues to send the results to their respective NCAs.
240. ESMA believes that allowing flexibility to trading venues and NCAs to perform and receive the self-assessment will continue to contribute to a successful application of the requirements. Flexibility in this area will also allow NCAs to have a proportionate approach taking into consideration the trading venues' different scale, size and risk posed to the market. A one-size-fits-all approach may not be the most suitable way to successfully address the implementation of the self-assessment provisions. Similarly, to

the conclusions reached for investment firms, ESMA is taking the same approach for trading venues and will not create a template for the self-assessment.

241. It is important however to reiterate that, despite not proposing any standardisation of the requirements or a harmonisation of templates, the self-assessment should include a proper due diligence from trading venues on both Level 1 as well as RTS 7 requirements.
242. As noted in the CP, ESMA is of the view that, where the performance of the self-assessment is done in a proper due diligent way, it does not require a yearly exercise. Taking the feedback into account from respondents to the CP, ESMA keeps its proposal to require the self-assessment to be performed every two years and the requirement to send it to NCAs.
243. Nevertheless, in duly justified cases, NCAs should keep the ability to request the self-assessment more regularly, for example on cases where the previous assessment indicated some issues that NCAs want to follow up on.
244. The proposal to change the yearly self-assessment to a biennial exercise and to require trading venues to send them to their respective NCAs entails a change to Level 2, in particular to Article 2(1) of RTS 7 which ESMA would propose at the next possible review of RTS 7.

5.2 Testing of algorithms

5.2.1 Background

245. The increased importance of algorithmic trading strategies, including HFT strategies, in today's financial markets, requires appropriate regulatory initiatives to be set forth in order to prevent these strategies to adversely impact EU market structures. In addition, appropriate testing of algorithms so as to ensure that these strategies cannot create or contribute to disorderly trading conditions is paramount.
246. Article 48(1) of MiFID II stipulates that “[...] Member States shall require a regulated market to have in place effective systems, procedures and arrangements to ensure its trading systems [...] are fully tested” to guarantee they are resilient, have capacity to deal with peak order and message volumes, and overall to ensure continuity of its services in case of any failure.
247. Additionally, Article 48(6) of MiFID II requires trading venues to ensure that algorithmic trading cannot create or contribute to disorderly trading conditions. To do so, trading venues should have in place systems and arrangements requiring members or participants to carry out appropriate testing and should provide environments to facilitate such testing. Furthermore, trading venues should have in place the necessary tools to manage any disorderly trading conditions which may arise from algorithmic trading systems. RTS 7 further specifies the above requirements and includes provisions on the testing of trading systems, conformance testing and testing of members' algorithms to avoid disorderly trading conditions.

248. According to Article 9 of RTS 7, trading venues should make use of clearly defined development and testing methodologies, before deploying or amending a trading system.
249. Articles 9(1) and (2) of RTS 7 further stipulate that trading venues should require their members to certify that the algorithms they deploy have been appropriately tested, through a conformance test. To that end, and according to Article 9(4), trading venues are required to provide a conformance testing environment to their actual and prospective members.
250. The conformance testing should ensure that the basic functioning of the member's trading system, algorithms and strategies complies with the trading venue's conditions or with the conditions of the direct market access provider. For this purpose, the testing shall verify if that the algorithmic trading system or trading algorithm:
- a. interacts with the trading venue's matching logic as intended; and,
 - b. adequately processes the data flows downloaded from the trading venue.
251. Finally, Article 10(2) of RTS 7 further specifies the characteristics of the testing environment that have to be provided by trading venues.
252. The testing of algorithms is paramount to the efficiency of markets. The purpose of testing is to avoid disorderly trading conditions by recreating real market conditions to ensure the well-functioning of algorithms under changing circumstances and identified possible shortcomings before deployment. To that effect, ESMA noted in its CP that the requirements to perform algorithm testing under Article 48(6) of MiFID II and further specified in RTS 7 remain appropriate and do not require any significant changes at this stage.
253. Nonetheless, ESMA's analysis highlighted a potential overlap between the respective obligations for investment firms and trading venues on aspects related to testing included in RTS 6 and RTS 7. In particular, ESMA noted an overlap relating to conformance testing and testing of algorithms for disorderly trading conditions. The identified overlapping points concern Article 5(1) and (4) and Article 7(1) of RTS 6 with Article 9(1) and (2) and Article 10(1) of RTS 7.
254. In the CP, ESMA noted its intention to further analyse the responsibilities attributed to trading venues and investment firms with respect to testing, pursuant to RTS 6 and 7, in order to provide market participants with further clarity if necessary. To that effect, ESMA asked market participants for their views on whether the overlapping requirements are considered beneficial or whether they should be removed.
255. Furthermore, the CP also looked into the conditions for the conformance testing and the testing of algorithms which put an emphasis on investment firms and trading venues to have controls in place to manage volatility and prevent disorderly trading conditions. ESMA requested market participants' views on the need for trading venues to provide for a more robust set of trading scenarios in testing environments in order to ensure that

trading venues' systems can cope with the algorithms deployed by their members or prospective members.

256. Finally, ESMA also welcomed market participants' views on the appropriateness of testing environments currently available.

5.2.2 Feedback to the consultation

257. The majority of respondents that provided a view on whether there are any overlapping requirements between RTS 6 and 7 agreed with ESMA's analysis. However, most of these respondents stated that these overlapping requirements are beneficial and, in some circumstances, expected as they increase overall resilience and don't put the onus of testing on either side.

258. Some respondents however requested a clarification of the respective responsibilities falling under trading venues and investment firms. The majority of respondents agreed that trading venues should be responsible for providing adequate, resilient, solid and reliable testing environments.

259. Generally, trading venues noted that the ability to test and certify the soundness of the algorithms is solely the responsibility of the investment firm. These respondents add that, if the responsibility for the testing itself can only reside with the investment firm, the role of trading venues should be solely to provide testing environments and seek confirmation that firms using their platforms have conducted appropriate testing.

260. Investment firms however believed that the maintenance of orderly and resilient markets lies with trading venues and the way they operate their market infrastructure is critical. Accordingly, from both a practical and theoretical standpoint, an effective, comprehensive and proper testing of algorithms relies primarily on the testing facilities maintained by trading venues as they are best placed to simulate the trading conditions that prevail on their platforms and thereby ensure that testing is effective and realistic.

261. Some respondents also mentioned that a clearer definition of what stress testing and conformance testing mean is needed. Respondents saw that, from a trading venue perspective, a conformance test consists in testing the software of the member firms' trading infrastructure and concerns both the operations generated by an algorithm and the operations that require human intervention. It aims at verifying the correct connection of the investment firm's system to that of the trading venue. Stress testing concerns testing that the investment firm must carry on its algorithm against which, for the purposes of MiFID II, the trading venue asks for a self-certification form from the member.

262. Respondents also provided a concrete proposal to address existing gaps for the requirements applicable to trading venues and investment firms (in RTS 7 and RTS 6 respectively). In particular, under Article 10(1) of RTS 7, investment firms are not only required to certify to trading venues that their algorithms have been tested but should also explain the testing they have undertaken. This obligation is not replicated in RTS 6.

263. Given that this particular requirement is only spelled out in RTS 7 (typically applicable only to trading venues), a number of investment firms seemed to be unaware of this obligation. The proposal was therefore to also include this provision in RTS 6 to avoid any possible unclarity.
264. On the testing requirements themselves, ESMA requested feedback from market participants on two key aspects. The first related to the robustness of testing scenarios whilst the second asked market participants whether the testing environments provided by trading venues are appropriate for the testing of algorithms and algorithmic trading strategies.
265. On the first question, the feedback received indicates that market participants do not believe that more robust testing should be set. Respondents argued that the current requirements are appropriate to the needs of the market and ensure that disorderly trading is prevented.
266. Some of these respondents noted the example of the volatile period during the outbreak of the COVID-19 pandemic emphasizing that trading venues proved to be generally resilient. For them, this shows that the current testing practices remain appropriate to the needs of the market.
267. A few respondents reiterated the need for the requirement to be proportionate ensuring that testing scenarios are set considering the complexity, scale, and nature of the tested algorithms or strategies. Furthermore, respondents noted that testing should follow a principle-based approach and that too prescriptive testing would not reflect the heterogeneity of individual business models and trading strategies.
268. Finally, some respondents noted that testing should only be required where there are material changes to the algorithms.
269. On the second question, most respondents were of the view that testing environments are currently fit for purpose, despite a number of respondents indicating that testing environments could be improved.
270. Whilst respondents see testing environments as appropriate for testing the basic operating logics of the algorithms for the purposes of conformance tests, other areas could be improved, and trading venues should be encouraged to provide more realistic simulation environments. On this point, one respondent alerted ESMA that trading venues cannot only replay historic data but should produce a more realistic simulation of market conditions, including allowing algorithm users to interact with other algorithms.

5.2.3 ESMA's assessment and recommendations

271. Overall respondents consider that the requirements on testing of algorithms under RTS 7 have delivered on their objectives of ensuring resilient and orderly markets. In addition, the experience of market participants has been largely positive. Also, in relation to the overlapping requirements between RTS 6 and 7, market participants have shared that those may also bring benefits.

272. While ESMA would not propose any amendments to the RTS 6 and 7 overlaps, ESMA does propose to look further into the testing of disorderly trading conditions. As mentioned in Section 4, ESMA sees a need for flexibility as well as a need to enhance the consistency and comparability of results obtained by different investment firms. ESMA therefore reiterates that it proposes to amend the requirements for investment firms in RTS 6 to have a principle-based testing regime, which will have implications for RTS 7 as well (e.g. Article 10).
273. Lastly, ESMA also takes note of the request to improve certain elements of the testing environments and some other useful proposals that market participants put forward that merit consideration.
274. For all of the above, in line with the proposals under the previous section, ESMA will consider those changes at a future review of RTS 6 and 7, including further consultation on those changes.

5.3 Circuit Breakers

5.3.1 Background

275. Circuit breakers are employed by trading venues as a way of protecting markets against episodes of extreme volatility affecting particular instruments or the whole market. Circuit breakers play an important role in today's financial markets. The role of circuit breakers has been very prominent in a variety of circumstances such as periods of extreme volatility which materialised, for example, during the 2008 financial crisis.
276. Paragraph 5 of Article 48 of MiFID II sets out the requirements relating to circuit breakers. Accordingly, where there is a significant price movement during a short time interval, trading venues should be able to halt trading and, in exceptional circumstances, to cancel, vary or correct a transaction. Trading venues should adequately parameter their trading halts so that they are sufficient to prevent significant disruptions to the orderliness of trading and taking into account:
- a. the liquidity of the different asset classes and sub-classes; and,
 - b. the nature of the market model and types of users.
277. In addition, where a trading venue that is material in terms of liquidity in a financial instrument halts trading, it should ensure that it notifies other competent authorities in order for them to coordinate a market-wide response and determine whether it is appropriate to halt trading on other trading venues until trading resumes on the original market.
278. Article 19 of RTS 7 further specifies the mechanisms to manage volatility to be used by trading venues. In particular, trading venues need to have mechanisms to halt or constrain trading at all times during trading hours. Furthermore, Article 19(2) of RTS 7 requires trading venues to ensure that (a) mechanisms to halt or constrain trading are

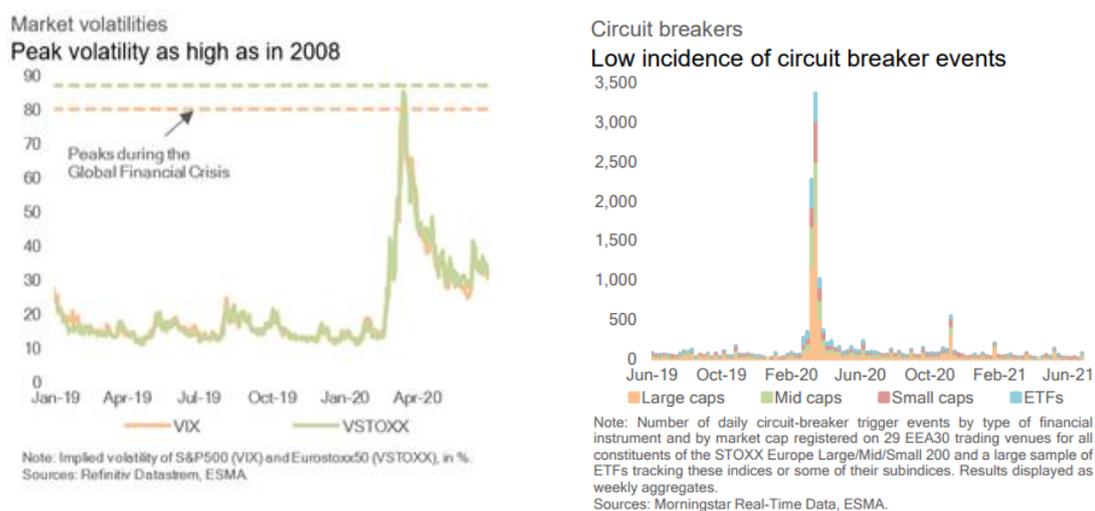
tested before implementation and periodically thereafter when the capacity and performance of trading systems is reviewed; (b) IT and human resources are allocated to deal with the design, maintenance and monitoring of the mechanisms implemented to halt or constrain trading; (c) mechanisms to manage market volatility are continuously monitored. Finally, Article 19(3) and (4) respectively require trading venues to maintain records of the rules and parameters set for such mechanisms and to ensure that they can be manually overridden if needed to ensure orderly trading.

279. Furthermore, ESMA has issued guidelines on the calibration of circuit breakers and publication of trading halts under MiFID II¹⁷ to ensure a consistent application of the provisions under Article 48(5) of MiFID II across the EU.

280. In order to understand whether the calibration and deployment of circuit breakers have been effective in the EU, ESMA has analysed trading data during the beginning of the COVID-19 pandemic in 2020. The period between the end of February 2020 and March 2020 was characterised by a significant sell-off and high volumes traded. EU trading venues faced periods of very high volatility which are comparable to those of the 2008 financial crisis – see Figure 10.

281. In its second Report on Trends, Risks and Vulnerabilities of 2020 (TRV Report 2020)¹⁸, ESMA noted that “trading venues proved to be broadly resilient, despite the surge in trading activity, message traffic and market movements. Circuit breakers were widely and efficiently used, and trading capacity was tested by volumes reaching all-time highs, with few operational issues.”

FIGURE 10: MARKET VOLATILITIES AND CIRCUIT BREAKERS



282. Furthermore, the TRV Report 2020 noted that the number of events triggering circuit breakers in the second and third week of March reached record levels of around 2,400

¹⁷ https://www.esma.europa.eu/sites/default/files/library/esma70-872942901-63_mifid_ii_guidelines_on_trading_halts.pdf

¹⁸ See TRV – ESMA Report on Trends, Risks and Vulnerabilities 2020
https://www.esma.europa.eu/sites/default/files/library/esma_50-165-1287_report_on_trends_risks_and_vulnerabilities_no.2_2020.pdf

and 4,000 respectively. This compares, for example, with previous peaks of daily triggers of circuit breakers of around 1,500 around the Brexit referendum in the week of 20 June 2016. In April, the occurrences stabilised to an average of 200 per week and declined afterwards to a level close to the long-term average of around 150 per week.

283. ESMA has subsequently published its second Report on Trends, Risks and Vulnerabilities of 2021¹⁹ reaching similar conclusions. The number of circuit breaker events have remained stable over the first half of 2021 despite a moderate increase in January. This increase corresponded with higher trading volumes and the GameStop episode related market movements. Overall circuit breakers have, also in this period of volatility, achieved its objectives of contributing to managing high volatility events.

284. In addition to the study provided in the TRV Reports, NCAs have noted that, during the high volatility periods at the end of Q1 2020, circuit breakers have worked in accordance with their expectations. Some trading venues have highlighted to their regulators that trading halt parameters were adjusted during this period to better reflect the temporary market volatility. Trading venues stated that the mechanisms worked quite well and addressed any potential disorderly trading concerns during the relevant period.

285. Taking into account the evidence presented by ESMA's TRV Reports and the feedback received from NCAs and trading venues regarding the application of the circuit breaker mechanisms in times of high market volatility, no changes to the regulatory framework was envisaged by ESMA in the consultation.

286. Furthermore, in the CP, ESMA stressed that the process for the calibration of the trading halts parameters and its reporting obligation as prescribed in the guidelines were giving important information to NCAs and ESMA, whilst at the same time, providing trading venues with enough flexibility to be able to undertake adjustments when required without incurring in a too burdensome process. Therefore, ESMA deemed that its guidelines also remain at this stage appropriate and did not propose any changes.

5.3.2 Feedback to the consultation

287. Overall, the respondents agreed with the analysis indicating that the circuit breaker mechanism has achieved its objective of protecting markets against episodes of extreme volatility affecting some instruments or the whole market. This has been evidenced during the recent volatility events. Some replies compared circuit breakers to short selling bans and consider the former to be a more efficient mechanism contributing effectively to the orderliness of trading.

288. While the majority of respondents agreed that the current regulatory requirements are fit for purpose, some respondents provided suggestions on how they could be further improved. Firstly, some respondents believed that there should be more transparency from the trading venues on the circuit breaker mechanisms they used. This would allow investment firms to anticipate the trading venues' actions during the volatility events and

¹⁹ See TRV – ESMA Report on Trends, Risks and Vulnerabilities 2021 [esma50-165-1842_trv2-2021.pdf \(europa.eu\)](https://esma.europa.eu/press-material/press-conferences-and-news/esma-report-on-trends-risks-and-vulnerabilities-2021)

assess their own algorithms and arrangements for those circumstances. They explained that currently this information is published only by some trading venues.

289. In addition, they considered that there should be greater regulatory scrutiny of the process used by trading venues when updating their procedures impacting circuit breakers with, for example, a mandatory disclosure to trading venue's members. Additionally, some respondents would appreciate the parameters used for circuit breakers to be simplified, in order to make them more predictable for the market participants.

290. With regards to cooperation arrangements, some market participants consider it useful that, following a volatility event, the resumption of trading happens simultaneously at different exchanges. Trading venues however disagreed with such proposal and considered each marketplace having its own dynamics and such interlinkage to be very costly. However, the procedure of dissemination of the information about a halt in trading could be improved, even though some of the trading venues considered that EU market structure is more prone to "local" events and full coordination would therefore not be justified. Finally, one trading venue considered the mandatory reporting of circuit breaker parameters too burdensome and believed this should be reconsidered.

5.3.3 ESMA's assessment and recommendations

291. Overall, there seems to be an agreement that the circuit breaker mechanisms are working well, and that no major regulatory changes are needed at this stage. During the recent events of high volatility, circuit breakers seemed to have played a positive role and no specific shortcomings regarding the current rules have emerged during these particular market circumstances. However, some targeted improvements could be made to the framework, as evidenced by the feedback provided to the consultation.

292. First, ESMA considers that the proposal to foster more transparency from trading venues with respect to their circuit breakers mechanisms would be beneficial for the market. It would allow participants to better prepare for the volatility events, and to understand how the resumption of trading will be organised. Additionally, ESMA would find it beneficial that any changes to that parameters are communicated to the members of the venue, and possibly consulted with them when necessary.

293. With regards to the cooperation arrangements between different marketplaces, ESMA understands that circuit breakers are foreseen to take place only in exceptional circumstances, and often require human judgement and manual intervention. Therefore, as explained in the responses to the consultation, it would be very challenging to synchronise such actions, in order to allow the resumption of trading to happen at the same time. On balance, ESMA would therefore not find it necessary to require such synchronisation. At the same time, it should be highlighted that an efficient dissemination of the information regarding halting and resumption of trading should remain a priority for venues in their communication with the market participants.

294. As for the mandatory reporting of the technical parameters of the circuit breakers, ESMA considers them a valuable source of information and would prefer to keep them reported

for the monitoring purposes. In particular, the implementation efforts have been already made in order to set this reporting in place and ESMA therefore disagrees with the proposal of removing this at this point in time.

5.4 Co-location and fee structure

5.4.1 Background

295. The advancements in technology enabled the use of more sophisticated ways of trading, such as HFT. This new technique is facilitated by the co-location of market participants' facilities in close physical proximity with the trading venue's matching engine. In order to ensure fair trading conditions for all market participants, MiFID II imposes certain obligations on trading venues offering such co-location services.

296. Articles 18(5) and 48(8) of MiFID II require that the rules of the trading venues on co-location services are transparent, fair and non-discriminatory. Further detailed requirements regarding co-location services are provided in Commission Delegated Regulation (EU) 2017/573 (RTS 10)²⁰. Similarly, Articles 18(5) and 48(9) of MiFID II require Member States to ensure that trading venues have fee structures, including execution fees, ancillary fees and any rebates, which are transparent, fair and non-discriminatory. Fees should also not create incentives to place, modify or cancel orders or to execute transaction in a way which contributes to disorderly trading conditions or market abuse. Trading venues should also impose market making obligations against any rebates granted.

297. Articles 18(5) and 48(9) of MiFID II allow fees to be adjusted based on the length of time for which the order was maintained and calibrated per financial instrument. Higher fees can be imposed on orders which are immediately cancelled. Similarly, participants cancelling a large number of orders compared with transactions executed and participants using HFT techniques can be subject to higher fees, in order to reflect the additional burden on the system capacity. Requirements regarding fee structures have also been further specified in RTS 10.

298. In the questionnaire prepared by ESMA, only few NCAs reported that trading venues under their supervision offer co-location services. Where such services are provided, the relevant NCAs assessed the quality of information provided by the venues as adequate. The conditions describing the co-location services were easily accessible on the trading venues' websites and were found in compliance with the regulatory requirements. The same services were made available to all customers on fair and non-discriminatory conditions.

299. The fee structures and any changes introduced to them are assessed by the relevant authorities on an ongoing basis. NCAs reported to be duly informed about updates of fees

²⁰ Commission Delegated Regulation (EU) 2017/573 of 6 June 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council on markets in financial instruments with regard to regulatory technical standards on requirements to ensure fair and non-discriminatory co-location services and fee structures (OJ L 77, 20.3.2019, p. 145-147).

by trading venues under their supervision. Furthermore, if any issue arises in this context, the trading venue and its NCA engage in a discussion to find a solution prior to the entry into force of any amendment. NCAs consider their trading venues' fee structures to be fair and non-discriminatory.

300. Trading venues use different criteria when determining their rebates, incentives and disincentives. Most frequently they take into account the type of market participant and offer incentives for participants who provide liquidity and market makers. Rebates are usually decided based on the order book presence time, the average order size and the presence at the best bid and offer. Some venues do not offer any rebates, and the fees are based on traded volumes or number of traded contracts. A vast majority of trading venues do not adjust their fees for cancelled orders according to the length of time for which the order was maintained. Instead, venues impose a penalty fee for those participants who exceed certain daily order to trade ratio. The threshold is usually calculated per asset class, and it also often takes into account whether a participant is an active market maker.
301. The assessment of fees by NCAs focuses on ensuring that they are in line with the regulatory requirements and do not lead to disorderly trading conditions. Some authorities have encountered situations where the fee structure could have led to disorderly trading. Trading venues also publish certain information about their fees according to Article 4 of RTS 10. This information is also generally assessed as adequate by the NCAs, despite one authority noting that some harmonisation of the publications could be considered, in order to facilitate the comparison of the information provided by various entities.
302. Overall, the assessment of fees structures and related disclosures by the trading venues were assessed as compliant and adequate by the NCAs. So far, no complaint has been raised by the customers of the fees not being fair or discriminatory. Therefore, no amendment was proposed by ESMA regarding these legal provisions.

5.4.2 Feedback to the consultation

303. The majority of respondents to the consultation considered the co-location services and fee structures currently used on EU trading venues as fair and non-discriminatory.
304. Regarding co-location services, one respondent proposed that Article 1(2) of RTS 10 includes connectivity to external telecommunications services where a better latency is sometimes offered to some participants. Similarly, another respondent proposed to request trading venues to provide a fair and competitive environment across telecommunication providers. For them, these proposals could be addressed by supervisory actions and should not necessarily require changes in the regulation.
305. With regards to fees, it was suggested by one respondent that fee structures which promote non-genuine orders should be prohibited. Moreover, some replies highlighted the need to further work in the area of costs of market data. For these respondents, price of data is not always related to their cost base, which is detrimental for clients. This topic

is covered under a separate workstream on market data and will not be covered again in this paper.²¹

306. Most respondents (including both trading venues and members and participants of those trading venues) considered the scope of the current disclosures under RTS 10 sufficient and did not consider it useful to further amend the structure of these publications. Trading venues highlighted that there should be sufficient flexibility regarding the RTS 10 publications since they offer different services.

307. However, many market participants considered it necessary that the implementation of those publication requirements is enhanced. They reported that some trading venues do not publish the required information, while for others the information provided is often not presented in a clear manner (e.g. information on co-location services). Similarly trading venues can have very different fee structures, e.g. some venues provide more granular information, while others only include a unique fee. This leads to making the comparison of costs of co-location and cost of trading very challenging. Some respondents would also consider it useful to publish historical prices for at least last five years to better identify increases in costs.

308. Overall, it appears that, while there is support for simplifying and improving the publications required under RTS 10, there is not a general agreement on prescribing a standard enhanced format for the disclosures.

5.4.3 ESMA's assessment and recommendations

309. In view of the overall positive feedback from various stakeholders, including National Competent Authorities, trading venues and their clients, as well as other market participants replying to the consultation, ESMA considers that the regulatory requirements regarding co-location and fee structures have been working well.

310. Nevertheless, in view of the comments made by the respondents, although ESMA does not recommend any Level 1 or Level 2 change at this stage, it strongly encourages trading venues to make sure that the information provided with regards to co-location and fee-structure is available in a manner which is useful and easy to understand. To that effect, some trading venues could simplify their publications. Furthermore, the customers should be able to understand how the fees have changed and how they compare to previous fees, therefore any changes to the price list should be clearly indicated and explained.

5.5 Orders to Transactions Ratio (OTR)

5.5.1 Background

311. According to Article 48(6) of MiFID II, "Member States shall require a regulated market to have in place effective systems, [...] including systems to limit the ratio of unexecuted

²¹https://www.esma.europa.eu/sites/default/files/library/esma70-156-4305_final_report_mifid_ii_mifir_obligations_on_market_data.pdf

orders to transactions that may be entered into the system by a member or participant, to be able to slow down the flow of orders if there is a risk of its system capacity being reached and to limit and enforce the minimum tick size that may be executed on the market”. Further detailed requirements regarding monitoring of the orders to transactions ratio (OTR) are provided in Commission Delegated Regulation (EU) 2017/566 (RTS 9)²².

312. Furthermore, Recital 1 of RTS 9 clarifies that “[...] trading venues should have a number of systems, procedures and arrangements in place to ensure that algorithmic trading systems cannot create or contribute to disorderly trading conditions including systems to monitor and, where appropriate, limit the ratio of unexecuted orders to transactions”.
313. Article 3 of RTS 9 provides further details on the methodology to calculate the OTR. In particular, Article 3(1) clarifies that two types of OTR should be monitored: the first one based on volumes, and the second one based on the number of orders and transactions. Trading venues are indeed required to calculate the ratio of unexecuted orders to transactions for each of their members and participants at least at the end of every trading session in both of the following ways: (a) in volume terms: (total volume of orders/total volume of transactions) -1; and (b) in number terms: (total number of orders/total number of transactions) -1.
314. Additionally, Article 3(2) of RTS 9 clarifies that the maximum ratio of unexecuted orders to transactions calculated by the trading venue should be considered as exceeded by a member or participant during a trading session if the trading activity of that member or participant in one specific instrument, taking into account all phases of the trading session, exceeds either or both of the two ratios.
315. Article 3(3) and (4) clarify that the calculation of the number of messages received from each member or participant should follow the counting methodology per order type set out in the Annex of RTS 9. For order types not covered in this Annex, the trading venue should proceed in accordance with the general system based on message counting and on the basis of the most similar order type appearing in the Annex.

5.5.2 Feedback from the consultation

316. ESMA sought the market participants’ opinions regarding its proposal to set out the maximum OTR ratio, which would be calibrated per asset class.
317. Previously, ESMA had already sent a questionnaire to trading venues, to determine the trading venues’ methodologies to calculate the maximum accepted ratio of unexecuted orders to transactions and to set volume and price thresholds to reject erroneous orders. ESMA also asked trading venues to explain exactly what limits are in place on a per asset class basis.

²² Commission Delegated Regulation (EU) 2017/566 of 18 May 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council on markets in financial instruments with regard to regulatory technical standards for the ratio of unexecuted orders to transactions in order to prevent disorderly trading conditions (OJ L 77, 20.3.2019, p. 84-89).

318. The responses received to the questionnaire indicated that there are different methodologies used by trading venues to calculate their maximum limit and consequently different thresholds applied.

319. After the analysis of all responses to the questionnaire, it was possible to assess the highest and lowest figures calculated as maximum accepted ratio by trading venues. The below figure provides an overview on the limits reported by the trading venues:

FIGURE 11: RANGE OF OTR LIMITS, BASED ON TV'S QUESTIONNAIRE DATA

		Number based (unit)	Volume based (EUR)
Market makers	Maximum reported	5,000,000	125,000,000,000
	Minimum reported	10,000	50,000
Other	Maximum reported	5,000	125,000,000
	Minimum reported	50	1,000

Source: Data collection from responses provided by NCAs to ESMA's questionnaire

320. Consequently, ESMA assessed in the CP whether it would be possible to achieve more convergence on the maximum OTRs applied on EU trading venues in order to strengthen and harmonise the level of protection these limits are meant to provide.

321. In order to achieve such objective, ESMA proposed to introduce a Level 1 amendment to include an empowerment for ESMA to develop technical standards to set out the maximum OTR ratio, calibrated per asset class.

322. The vast majority of respondents welcomed ESMA's efforts to ensure a consistent level of protection across trading venues. However, respondents did not agree with ESMA's proposal, considering it as too restrictive. Most respondents also defended that the OTR calibration should be left to the trading venues' discretion, as it seems almost impossible to define an adequate maximum ratio which would reflect varying liquidity levels across different venues and the characteristics of each market.

323. Therefore, most respondents agreed that each trading venue should be allowed to set the maximum OTR per instrument/product based on the knowledge of the local market ensuring that the ratios are relevant and kept up to date.

324. A few of the respondents also stated that further regulation on OTR might lead to a decrease in liquidity and market efficiency, and the implementation of an artificial cap would naturally lead to a less competitive market, as market makers could not aggressively compete to provide the best bid and offer based simply on market factors.

325. Furthermore, several respondents added that there is no sign of a material risk to investors arising from the absence of a maximum OTR ratio, nor a clear evidence that variances in OTR ratios affect the level of protection across the EU.

326. The few respondents that agreed with ESMA's proposal stated that a maximum OTR ratio should be defined to strengthen and harmonise the level of protection that these limits are meant to provide. The respondents also added that monitoring the market participants

activity via the OTR ratios is important to protect the system capacity of the trading venues.

Frequency of OTR breaches and consequences

327. In the CP, ESMA also sought views on whether the established limits were frequently exceeded, and what were the consequences, if any, of those breaches.
328. The vast majority of the responses to the CP confirmed that the maximum limits were rarely exceeded. Similarly, the responses received from the trading venues to the questionnaire also pointed in the same direction, as most of the respondents reported either zero or a very low number of breaches of the OTRs during 2019.
329. Several respondents also added that breaches might not be a frequent event, but they still happen. However, the limited number of breaches should not be viewed as an example of any failure in the current OTR guidelines. In fact, some respondents added that such limited breaches are a testament to appropriate algorithm testing and monitoring from participants.
330. Regarding the consequences of any breach, most of the respondents agreed that the current consequences are the most appropriate ones, without however specifying what these consequences are.

5.5.3 ESMA's assessment and recommendations

331. Taking into consideration the feedback received, ESMA is not proposing any legislative amendments to set a maximum OTR ratio at this stage, nor proposing any harmonisation regarding the consequences of any breaches or limits exceeded.
332. Especially in relation to the possible harmonisation of the maximum OTR ratio per asset class, ESMA believes that no legislative action is needed in the current context. Beyond the fact that the first years of application of MiFID II have not revealed any significant shortcomings, such a harmonisation would also be very complex to implement in practice. An accurate calibration of maximum OTR needs to be based on a multitude of factors (liquidity, type of participants, capacity of the system) which appear, at this stage, better managed at trading venue level.
333. ESMA continues to believe that an appropriate calibration of the maximum OTR threshold is paramount to ensuring that an efficient protection against trading systems' overload and improving the quality of the liquidity disclosed. NCAs and trading venues are therefore invited to continue their efforts in this respect making sure that the OTR thresholds used are effective in limiting the number of unexecuted or cancelled orders and, ultimately, in contributing to orderly trading conditions. ESMA will continue monitoring OTR and might reconsider its position in the future if and where needed.
334. Therefore, ESMA understands that a certain level of flexibility should be maintained and that the benefits in proposing a harmonisation in the requirements would not outweigh the additional costs.

335. With regards to the frequency and consequences of limit breaches, taking the feedback from the CP into consideration, ESMA believes that it would not be beneficial at the current stage to impose such harmonisation. ESMA agrees that it is important to provide trading venues with the necessary flexibility to determine the consequences of any breach and to adopt procedures tailored to their business models and clients. This discretion should however not lead to making the OTR regime redundant and trading venues should be able to demonstrate that the limits and procedures they set in place are effectively contributing to limiting the number of unexecuted orders as prescribed in Level 1.

5.6 Monitoring of compliance with trading venues' rules

5.6.1 Background

336. In addition to the requirements set out in Article 48 of MiFID II relating to systems resilience, circuit breakers and electronic trading, trading venues also have an obligation of monitoring compliance with its rules. Articles 31 and 54 require trading venues to maintain effective arrangements and procedures for the monitoring of their members and participants' compliance with its rules. The monitoring should be able to identify infringements to the trading venues' rules or disorderly trading conditions or conduct that may indicate behaviour that is prohibited under Regulation (EU) No 596/2014 (MAR) or system disruptions in relation to a financial instrument.

337. Article 31(2) of MiFID II sets out the requirement for investment firms operating an MTF or an OTF to immediately inform their competent authority of "significant infringements of [their] rules or disorderly trading conditions or conduct that may indicate behaviour that is prohibited under Regulation (EU) No 596/2014 or system disruptions in relation to a financial instrument". Furthermore Article 31(2) of MiFID II sets out the requirement for NCAs to communicate such information to other NCAs and to ESMA. Article 54(2) sets out identical obligations for regulated markets.

338. Article 81 of Commission Delegated Regulation (EU) 2017/565 further clarifies which are the circumstances in which a trading venue is bound by the requirement to immediately inform its competent authority of significant infringements of its rules or disorderly trading conditions or system disruptions in relation to a financial instrument. The list of such circumstances is detailed in Annex III Section A of the same Commission Delegated Regulation.

339. Furthermore Article 81(2) of Commission Delegated Regulation (EU) 2017/565 narrows the requirement to provide information only to such cases where "*significant events which have the potential to jeopardise the role and function of trading venues as part of the financial market infrastructure*" take place.

340. It can be noted that the circumstances mentioned in Articles 31(2) and 54(2) of MiFID II and Article 82 of Commission Delegated Regulation (EU) 2017/565 regarding cases in which trading venues should inform their NCA, and the NCA in turn should inform ESMA, of conduct that may indicate behaviour that is prohibited under MAR are already detailed in MAR and hence are out of the scope of this report.

341. ESMA has had a preliminary discussion on (i) the possible need to clarify which circumstances should be considered as encompassed by Articles 31(2) and 54(2) of MiFID II; and (ii) the possibility to adopt a common procedure for notification of such instances. Whilst ESMA did not deem it necessary at this stage to take action under (i) as the relevant circumstances are clearly stated in Annex III, Section A of Commission Delegated Regulation (EU) 2017/565, it acknowledged the benefit to proceed under (ii) to adopt a common procedure to notify ESMA and other NCAs of the occurrence of circumstances under Articles 31(2) and 54(2) of MiFID II.

342. The focus of this Final Report will be on the outages issue.

343. The procedure to notify ESMA and other NCAs of the occurrence of a disruption on a trading venues' system put in place in the beginning of 2020 allowed ESMA and NCAs to share important information on disruptions that took place throughout the year.

344. For example, thanks to this procedure, ESMA and NCAs became aware of four different incidents²³ that occurred in the EU in 2020 leading to important halts of trading and more recently a further three outages already in 2021:

- a. 14 April 2020: Deutsche Börse T7 trading outage which also affected that also affected a number of other trading venues given that the T7 trading system is widely used across the EU.
- b. 1 July 2020: A second incident reported by Deutsche Börse which halted trading for several hours. As with the first occurrence, it also affected a number of other trading venues within the EU.
- c. 26 August 2020: A so called Distributed-Denial-of-Service attack (DDoS attack) was performed against a number of European Exchanges, including the Vienna Stock Exchange. Given the use by the Vienna Stock Exchange of the Deutsche Börse technology ESMA received reports of temporary halts to trading that lasted between one and two hours in most cases, in a variety of trading venues in Germany including EEX and Eurex as well as trading venues from another three NCAs.
- d. 19 October 2020: A system disruption caused by a technical issue on a middleware component used by Euronext affected all markets operated by Euronext. This led to an interruption of trading on all cash and derivatives segments at Euronext Lisbon, Brussels, Amsterdam, Dublin and Paris. The outage also affected the closing auction process.
- e. 7 June 2021: A trading halt due to a functional issue on ICE Endex trading systems affected the Emissions Allowances market segments operated by ICE Endex. Trading was not affected on the other segments operated by the trading venue. Due to a functional issue, ICE Endex could no longer guarantee fair and orderly

²³ An outline of the incidents is described in further detail in the CP.

markets. Therefore at 09:42 CET the EUA and EUAA markets were closed and a market message was broadcasted by ICE Endex. After having resolved the issue, ICE Endex reopened the EUA and EUAA market segments at 10:55 CET and 11:10 CET respectively.

- f. 17 June 2021: Trading in Euronext index options and futures segments halted at 8:56 CET due to an issue caused by a software defect within the trading chain triggering its full failure. This defect was triggered by the creation of an intraday strategy on the index options and futures segment. After resolving the issue, order submissions were allowed from 13:00 CET and the segment was reopened at 13:15 CET. All instruments on other segments opened at normal times.
- g. 23 June 2021: A system disruption to Financial & Risk Transaction Services Ireland Limited's (FRTSIL's) trading system (FXT), which occurred 23 June 2021, resulted in difficulty for a number of clients in accessing FXT (the system that provides access to the trading platform operated by the venue). The issue was first identified at 02:19 CET and the issue relates to the AAA authentication system operated on a global level by the Refinitiv group. Trading restarted at 08:51 CET after Refinitiv had resolved the issue (failover of the APAC servers).

345. When observing how these events have unravelled in the past year, ESMA has noted that, where an outage suspends trading on a trading venue, there seems to be no or only very limited migrations of volumes to other trading venues which remain open for trading. This is particularly visible with respect to instruments for which the halted trading venues is the main market.

346. Some reasons for such behaviour have emerged in recent discussions on this topic, including the fact that algorithmic traders use solely the main market for their data reference points. Although this may not be a cause of concern for a relatively short outage, a long suspension of trading in the main market however may affect the orderliness of markets where suddenly there is no liquidity available for otherwise very liquid instruments. In addition, there is a risk that even a short outage may affect the trading venues' closing auctions which affects, for example the pricing of funds and ETFs which can cause significant disruption to market participants.

347. ESMA put forward in the CP a possible proposal which required algorithmic traders to always use at least two different reference data points to ensure there is always the possibility for the trading activity to migrate from the main market to another trading venue in the case of an outage. ESMA asked market participants' views on this proposal as well as any other legislative initiative which could be undertaken to ensure there is continuity of trading in other trading venues in the circumstances where the main market is affected by an outage.

5.6.2 Feedback to the consultation

348. In relation to how the notification process is currently working, a majority of respondents to the CP agreed that it should be improved in case of IT incidents and system outages.

Hence the focus of the report will be on these outages rather than on the other circumstances prescribed on Article 31 and 54 of MiFID II.

349. With regards to the number of outages referred to in the CP, some respondents have mentioned that in some instances they have taken note of the incident via means other than the trading venue itself. In past outages, trading venue communication has not always been adequate.
350. In order to improve the process, respondents noted that a market-wide approach to communication should be ensured as opposed to bilateral communication. The latter has proven not to be always effective and it is imperative that relevant information is provided to the market without delays.
351. Some participants noted in their responses that trading venues should make use of best practices to improve the notification process rather than more regulation. Regulators should focus their intervention on providing guidance on the communication and behaviour expected from exchanges during an outage. Where the issue facing the exchange is serious, the trading venue should make clear to the market that services are unlikely to be resumed in the short term. Furthermore, where possible, a last known good reference price should be communicated, or last known good trade timestamp to allow for more accurate position reconciliation. Regulators should clarify how existing obligations such as those set out in RTS 7 should apply in these scenarios.
352. Respondents also emphasized the need for trading venues to have clear policies in place that indicate how orders and trades that are pending during the interruption will be treated when normal conditions resume.
353. Many respondents also mentioned the requirement to restore operations within two hours. Their view is that the requirement under Article 15(2) of RTS 7 can give the wrong incentives for a trading venue to resume its operations too quickly without properly solving the issue. These respondents suggested therefore to delete this obligation from RTS 7 and rather focus on ensuring that the trading venue resumes its operations effectively rather than quickly.
354. Some respondents also provided ESMA with suggestions on what can be done to improve the notification process.
355. Some market participants suggested that communication channels and procedures to be followed during an outage should be agreed up front. Furthermore, any communications should be made in a clear and timely manner with updates available real-time, with a significant number of respondents adding that information should be given with set intervals even if the update is "no update".
356. Finally, respondents suggested that a multi-cast approach should be taken as opposed to sequential bilateral conversations, suggesting trading venues to open conference call lines to provide periodic updates. Another respondent suggested that a crisis management team should be set at each trading venue responsible to communicate with members.

357. In terms of reopening the market, respondents suggested that primary markets should follow a clear and pre-agreed process, when reopening the market, in order to allow members time to respond. The respondents suggested including a minimum time between announcement of an outage and the possibility for the market to reopen in addition to a minimum time between a market reopening notice and the actual reopening.
358. Some respondents also suggested that in light of the new DORA legislation ESMA should not make any changes insofar as this legislation applies.
359. On whether ESMA should take any initiatives to ensure continuity of trading when there is an outage on the primary market, a slight majority of respondents were of the view that there is no need to put forward any initiatives to ensure there is continuity of trading in case of an outage in the main market.
360. These respondents argued that primary markets are resilient, and that outages are a rare event and therefore the ability to trade in the main market is not endangered. Respondents considered that the current legislative framework is appropriate.
361. Other respondents were of a different view and advocated for further regulatory initiatives to ensure there is continuity of trading should the main market suffer from an outage. However, only very few respondents agreed with the example put forward by ESMA that algorithmic traders should be required to use more than one reference data point.
362. The majority of respondents who would like to see regulatory guidance in this area believed that industry-led initiatives together with targeted regulation intervention can ensure continuity of trading in case of outages in the main market. In particular, regulators should mandate minimum standards of communication and remove the requirement to resume operations within two hours of a disruptive incident. In addition, it is important to ensure there is always a robust price mechanism in place when the primary market is suffering a disruptive incident.
363. Respondents suggested that the closing auction should always take place and therefore, the regulator should define a secondary venue for handling the closing auction in case the primary market is closed due to an outage. Furthermore, regulators should ensure more interoperability of post-trade processes and systems.
364. A considerable number of respondents were of the view that a CTP could contribute to the continuity of trading as it has the potential to continue providing a reference price that would facilitate trading on secondary venues. In addition, it could replace the primary market as the main benchmark reference feed used by market participants.
365. Respondents were also of the view that any reference to the most relevant market in terms of liquidity should be removed from MiFID II and replaced with the CTP as an acceptable reference price. Furthermore, the primary market should always have arrangements with an alternative venue to run essential services such as opening and closing auctions but also the alternative venue should be able to pick the central order book.

5.6.3 ESMA's assessment and recommendations

366. The past year has shown that, despite primary markets being generally resilient, outages can happen and have a detrimental effect on the well-functioning of markets. In addition to the outages referred to and discussed in the CP, ESMA already took note²⁴ of a number of other outages which occurred on some other EU primary markets in 2021.

367. Data shows that there is an impact on all trading venues when the primary market is down. In effect, when there is an outage on the primary market, trading on alternative venues also drop in the same proportion as that on primary market, even though market participants could use these alternative venues to continue their trading activity. There are a number of factors contributing to this:

- a. uncertainty about order status at the time of the outage on the primary market. Since orders were sent to the primary market and in the absence of a confirmation on the status of these orders, market participants are unwilling to resend those orders to an alternative venue.
- b. When the primary market is facing a disruption, the market lacks a reference price. Such circumstance prevents a number of market participants from shifting their activity to alternative trading venues.
- c. Miscommunication from the affected trading venues. This results in uncertainty with regards to the time lag between outage and resuming trading. Market participants are unaware of the exact ETA and lack updates on the progress of the disruption.

368. Furthermore, smaller trading venues are now commonly using trading platforms and architecture that are provided by a limited number of big exchanges. This consolidation of trading systems across the EU critically changes the outlook of these events. If in the past an outage was limited to the market where it occurred, nowadays an outage in a market has a widespread effect, affecting a number of different exchanges across different jurisdictions. This was certainly the case described in the CP of those outages that affect Euronext and Deutsche Börse.

369. Following a number of conversations with market participants and the feedback received to the consultation, including the considerations made above, ESMA is of the view that there is a need for a coordinated effort between the industry and regulators to ensure the effects of an outage are as limited as possible and there is continuity of trading when there is an outage on the primary market.

370. This final report will present a number of initiatives, not only at the legislative level but also as practices that could be put in place via an industry-led initiative.

371. Firstly, trading venues which are facing an outage, should communicate clearly and rapidly with all members and participants of their venue. The communication should

²⁴ A short description of these outages is available in Section 5.6.1.

include not only relevant information on the fact that trading has been halted, but also a clear playbook for reopening, giving the market a clear indication on what to expect. Furthermore, trading venues should ensure they provide regular updates to their members and participants at constant intervals, even where there are no changes to the status of the disruption. This will ensure that market participants have an expectation on when the reopening is to be envisaged rather than seeking constantly for updates.

372. At this stage, ESMA understands that trading venues should do the utmost to ensure the resuming of normal operations in the shortest timeframe possible, but the speed of recovery should not undermine the full resolution of the issue. In any case, ESMA considers that trading venues should have business continuity arrangements in place aiming at resuming trading within or close to two hours from the incident. ESMA understands that the two-hour target has not always been met and has not necessarily been helpful in all cases and may reconsider whether this remains the appropriate timeframe. Any potential change to the timeframe set out in Article 15(2) of RTS 7 would be subject to a further ESMA consultation.
373. The focus of trading venues should always be to ensure that they communicate to members and participants the status of all orders sent to the trading venue prior to the outage. This communication should be done without undue delay giving certainty to all market participants on the status of those pending orders, including the ability to resort to alternative trading venues to fulfil those trades.
374. Finally, trading venues should make clear to members and participants from the outset where and how any communication regarding outages will take place in the event of one occurring. This communication should be done via means that are accessible to all market participants at the same time (e.g. via the trading venue public website).
375. Trading venues are invited to improve their communication towards market participants based on the feedback received during the consultation and summarised in this report. ESMA will, in parallel, develop providing more formalised guidance to trading venues on what is expecting from them in terms of communication in case of market outages.
376. Additionally, ensuring continuity of trading during normal trading hours is important but it is even more important to make sure that an outage in the primary market should not, in any circumstance, affect the closing auction of the day. This would have a detrimental effect on the price formation process, and more importantly the closing price of the trading day, which affects the normal valuation of funds, ETFs and benchmarks. Therefore, trading venues should focus their efforts in ensuring that the closing auction can take place. Should the primary market not be able to resume operations in time for the closing auction, ESMA has discussed if an alternative venue could retain the obligation to run the closing auction.
377. Despite being an option often put forward by market participants, ESMA sees a number of issues putting such initiative forward as a legislative proposal. The first obstacle relates to which alternative venue would be required – and would have the necessary technology – to perform the closing auction. In addition, despite most market participants having

access to a wide range of trading venues, some might not have such access. Furthermore, currently not all instruments available across the EU primary markets are available on alternative venues which may create an unlevel playing field between different trading venues.

378. Taking this into account, while ESMA understands that the use of alternative venues may be, in some circumstances, a possible solution, it does not deem it suitable at this stage to propose initiatives which mandate the use of alternative trading venues. Therefore, ESMA relies on industry initiatives that incentivise market participants to shift trading to alternative venues where there is a primary market outage. At this point, ESMA will not propose any regulatory change that imposes on market participants a requirement to connect to any alternative trading venue. Nevertheless, ESMA will keep monitoring developments in this area also at the international level and stands ready to provide technical support should the Commission request further assistance and evidence on how to best ensure business continuity.

379. In relation to the issue of a lack of a reference price, ESMA understands a future European consolidated tape (CTP) could allow all market participants to have access to reliable trade information and could be able to derive a reference price from that tool. ESMA will not, at this stage put forward any legislative initiative with regards to the issue of the lack of a reference price until further details are made public with relation to the characteristics, features, and functionality of a future CTP.

380. ESMA will continue to monitor developments in this area and assess whether any proposal in this context may be beneficial in light of the future plans of the European Commission with regards to the establishment and functioning of a CTP in the EU.

6 Tick size, market making, asymmetric speedbumps, and trade feeds

6.1 Tick-size regime

381. Since 3 January 2018, trading venues in the EU need to comply with a mandatory tick size regime as prescribed under Article 49 of MiFID II²⁵. In particular, Article 49(2) of MiFID II envisages the tick size regime to “(a) be calibrated to reflect the liquidity profile of the financial instrument in different markets and the average bid-ask spread, taking into account the desirability of enabling reasonably stable prices without unduly constraining further narrowing of spreads; (b) adapt the tick size for each financial instrument appropriately.”

382. Article 49(3) of MiFID II further mandates ESMA to develop “draft regulatory technical standards to specify minimum tick sizes or tick size regimes for specific shares, depositary receipts, exchange-traded funds, certificates, and other similar financial

²⁵ Article 49 of MiFID II imposes the requirement to comply with the tick size regime to regulated markets, while Article 18 of MiFID II imposes such requirement for MTFs and OTFs.

instruments where necessary to ensure the orderly functioning of markets, in accordance with the factors in paragraph 2 and the price, spreads and depth of liquidity of the financial instruments.” Article 49(4) extends ESMA’s capacity to develop draft regulatory technical standards applying to any other specific instrument other than those listed in Article 49(3) where necessary.

383. In line with Article 49 of MiFID II, ESMA has developed the Commission Delegated Regulation 2017/588²⁶ (RTS 11) which outlines that orders in shares, depositary receipts and certain types of exchange-traded funds (ETFs) should be subject to minimum tick sizes. For other financial instruments a tick size regime was not deemed useful to contribute to the orderliness of the markets and hence, not introduced.
384. The tick size regime prescribed in Article 2 of RTS 11 is determined based on both (i) the Average Daily Number of Transactions (ADNT) in the most relevant market in terms of liquidity (i.e. the trading venue in the EU with the highest turnover) and, (ii) the price of the order. For ETFs, the tick size regime is determined based on both (i) the liquidity band in the table in RTS 11’s Annex corresponding to the highest ADNT and, (ii) the price of the order.
385. Article 3 of RTS 11 sets out the calculation and publication procedure to be followed by the NCA of the most relevant market in terms of liquidity. In practice, this task (i.e. determination and publication of ADNTs) has been delegated to ESMA which publishes the necessary information through its Financial Instruments Transparency System (FITRS)²⁷.
386. During the first months of application of the tick size regime, ESMA was made aware that EU trading venues were facing challenges due to the lack of applicability of the tick size regime to systematic internalisers and the application of the tick size regime to shares for which the main pool of liquidity was located outside of the EU.
387. ESMA noted that the ability of systematic internalisers to provide quotes not subject to the tick size regime could undermine the overall quality of the liquidity available, the efficient valuation and pricing of financial instruments, and the level playing field between trading venues and systematic internalisers. Hence, following ESMA’s proposal, Commission Delegated Regulation 2019/442²⁸ amended Article 10 of RTS 1, prescribing that SIs, when providing quotes for shares and depositary receipts up to standard market size, should be subject to the tick size regime.
388. Furthermore, ESMA published a Q&A²⁹ clarifying Article 15(2) of MiFIR which states that “in justified cases” systematic internalisers may execute orders at a better price than the quoted prices provided that the price falls within a public range close to market conditions.

²⁶Commission Delegated Regulation (EU) 2017/588 of 14 July 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council with regard to regulatory technical standards on the tick size regime for shares, depositary receipts and exchange-traded funds (OJ L 87, 31.3.2017, p. 411–416).

²⁷ https://registers.esma.europa.eu/publication/searchRegister?core=esma_registers_fitrs_equities

²⁸ Commission Delegated Regulation (EU) 2019/442 of 12 December 2018 amending and correcting Delegated Regulation (EU) 2017/587 to specify the requirement for prices to reflect prevailing market conditions and to update and correct certain provisions (OJ L 77, 20.3.2019, p. 56–58).

²⁹ Q&A 29 from the Tick Sizes section in [Q&A on MiFID II and MiFIR market structures Topics](#)

ESMA, in this respect, specified that “to ensure that price improvements do not undermine the efficient pricing of instruments traded, price improvements on quoted prices would only be justified when they are meaningful and reflect the minimum tick size applicable to the same financial instrument traded on a trading venue”.

389. Further amendments to the tick size regime were introduced in November 2019 in the context of the Investment Firm Review (IFR) Regulation and IFR Directive undertaken by the European Commission. The IFR Regulation added Article 17(a) to MiFIR requiring systematic internalisers’ quotes and price improvements to comply with the tick size regime while exempting SIs from the tick size regime when matching LIS orders at mid-point within the current bid and offer prices. The regime initially was envisaged to enter into force by 26 March 2020³⁰, but then delayed due to market circumstances and the COVID-19 crisis. The IFR Directive amended Article 49 of MiFID II to introduce a similar exemption for regulated markets when matching LIS orders at mid-point (the exemption applies also to MTFs and OTFs through Article 18(5) of MiFID II).
390. With regards to third-country shares, ESMA’s Final Report³¹ published in December 2018 concluded that the determination of tick sizes for third-country shares based on ADNT in the EU could result in an underestimation of the available liquidity, leading to larger tick sizes in the EU compared to third countries and contributing to a competitive disadvantage for EU trading venues. As a result, in February 2019, Commission Delegated Regulation 2019/443³² amended RTS 11 modifying the tick size regime for third-country shares³³, and allowing NCAs to adjust the ADNT for the relevant third-country share taking into account the transactions executed on the third-country trading venue with the highest turnover for that share.
391. ESMA has published a number of Q&As addressing various aspects of the tick size regime. Among the clarifications that have been introduced, ESMA has specified that, as the tick size regime aims at ensuring the orderly functioning of the market³⁴, its application extends to all orders submitted to trading venues, including orders that are waived from pre-trade transparency. As an exemption to the previous, the tick size regime is not applicable to transactions executed in systems that match orders on the basis of a reference price as per Article 4(1)(a) of MiFIR, or to negotiated transactions as per Article 4(1)(b) of MiFIR. As per the recent amendments to MiFID II and MiFIR adopted in the context of the IFR review (see above), orders above the large-in-scale threshold can also now be executed at mid-points.
392. ESMA has further clarified that the tick size regime applies to Frequent Batch Auction (FBA) systems that do not benefit from a reference price waiver³⁵. This prohibits the

³⁰ In March 2020, ESMA announced an extension of the deadline for the new regime’s application: [Public Statement](#).

³¹ [Final report: Amendment to Commission Delegated Regulation \(EU\) 2017/588 \(RTS 11\)](#)

³² Commission Delegated Regulation (EU) 2019/443 of 13 February 2019 amending Delegated Regulation (EU) 2017/588 as regards the possibility to adjust the average daily number of transactions for a share where the trading venue with the highest turnover of that share is located outside the Union (OJ L 77, 20.3.2019, p. 59–60).

³³ Financial instruments traded or admitted to trading on an EU trading venue where the most liquid trading venue by turnover is located outside the Union.

³⁴ Q&A 6 from the Tick Sizes section in [Q&A on MiFID II and MiFIR market structures Topics](#)

³⁵ [Final Report: Call for evidence for Periodic Auctions](#) and Q&A 11 from [Q&A on MiFID II and MiFIR market structures Topics](#)

execution of transactions in those systems at a price that corresponds to the mid-point in cases where the spread consists of an uneven number of ticks.

6.1.1 Tick size regime applicable to shares

6.1.1.1 Background

393. In the CP, ESMA explained that the feedback received over the past two years has confirmed that the tick size regime overall had a positive effect on EU markets, limiting competition on tick among venues, increasing market depth and reducing transaction costs in particular for less aggressive market players. ESMA discussed in the CP two studies published by the Autorité des Marchés Financiers (AMF)³⁶ and by the Danish Financial Supervisory Authority (Danish FSA)³⁷.
394. Overall, the AMF study concludes that the increase in tick size has had the desired effect on microstructures as order books appear more stable, with longer order lifetime, larger transaction size and smaller OTR, which all together enable a clearer legibility of the price formation process. For SME shares the new tick size regime, which allows for a more appropriate calibration of tick sizes, has a beneficial effect resulting in more volumes traded.
395. The Danish FSA paper concludes that for large cap (liquid) shares, the tick size regime has contributed to lower transaction costs, despite that such reduction could also be driven by other exogenous factors. For small and medium cap shares, the impact that the change to the new regime had on transaction costs is found to be negligible, at least for trades below DKK 500,000. An important point highlighted from this paper is that the tick size regime contributed to avoid tick size competition, which in the past had detrimental effects for venues' market share and affected market quality. This was an explicit goal of the introduction of the MiFID II mandatory tick size regime and it is therefore important to note that the regime has delivered on this objective.
396. While the above-mentioned studies do not specifically concern depositary receipts, ESMA explained that it had not received specific concerns in respect of these instruments and would expect that the conclusions reached with respect to shares also apply to depositary receipts.
397. In this context, ESMA did not propose any changes to the tick size regime in the CP. ESMA simply suggested moving the provisions contained in Article 49 of MiFID II into MiFIR.
398. Those provisions, which are anyhow specified in a Delegated Regulation (RTS 11) directly applicable in the EU, do not seem to necessitate adaption at national level and Article 49 of MiFID II has, as far as ESMA is aware, only been copied and pasted into national laws without modifications. The transposition mechanism therefore appears

³⁶ AMF, 2019. "[MiFID II: Impact of the new tick size regime after several months of implementation](#)"

³⁷ Danish FSA, 2020. "[Assessment of the tick size rules in MiFID II](#)"

superfluous here and introduces less legal certainty for market participants. Article 49 of MiFID II is therefore one of the provisions that could be moved to MiFIR giving it direct binding legal force. This approach would also be consistent with the decision by co-legislators to stipulate directly into MiFIR that systematic internalisers are also subject to the tick size regime (see new Article 17a of MiFIR).

6.1.1.2 Feedback to the consultation

399. Respondents' views were split regarding the overall impact of the MiFID II tick size regime on EU markets even though a majority of market stakeholders remained positive about the current tick size regime and its impact on EU markets.
400. Amongst those that expressed some reservations regarding the tick size regime, two main groups can be identified.
401. Several respondents expressed some dissatisfaction regarding the latest amendments to the tick size regime introduced into MiFID II and MiFIR in the context of the "investment Firm Review". In particular, they considered that the limitation introduced regarding the execution of transactions at mid-point is damaging for EU markets and stakeholders. In their view, execution at mid-point is a valid execution point and should be allowed for trades of all sizes otherwise forcing one of the parties to a trade to cross the spread and bear additional costs. Constraints on mid-price execution therefore result in more costly execution putting EU firms at a competitive disadvantage compared to their third-country pairs.
402. Other respondents challenged not the general objective behind having a mandatory tick size regime but rather the calibration of the regime as specified in RTS 11. A first group of respondents considered that, while tick sizes had a positive effect in particular on small capitalisation shares (reduced bid-offer spread and increased liquidity), the tick sizes are too low for certain categories of shares, notably middle capitalisation shares. This view is shared by another group of respondents which stressed that, for Nordic markets, the minimum tick sizes in the Annex of RTS 11 are too small and fail to ensure appropriate market depth and have increased adverse selection (this measures the probability and the level of a price move after a trade).
403. However, other respondents considered on the contrary that the tick sizes resulting from the table in the Annex of RTS 11 are too big. According to them, the implementation of RTS 11 has resulted in an increase of applicable ticks for the vast majority of instruments traded on their platforms. This has led to an increase in bid-ask-spreads (e.g. when comparing Q4/2017 spreads with Q4/2020 spreads) and therefore of transaction costs in particular for retail investors. Some also explained that large tick sizes limit the competition among market-makers by restricting them from offering investors more attractive prices and thereby increase indirectly transaction costs. Regarding indirect effects, some also claimed that larger tick sizes and spreads promote higher volatility levels and increased price movements in conjunction with high volume trades. For all those reasons, those respondents asked for a recalibration of the tick size regime to allow more flexibility and comparably smaller tick sizes.

404. Finally, one respondent who supported the tick size regime noted that, as time passes, the number of transactions tends to increase (and the average traded notional to decrease). Therefore, ESMA was invited to reflect on whether the liquidity bands in the Annex of RTS 11 should be revised increasing the ADNT figures by 20%.
405. In the CP, ESMA also asked market participants about other possible issues regarding the tick size regime. Beyond the points already made to the previous question on the tick size regime and its calibration as set out in RTS 11, respondents raised other issues on (i) the scope of the regime, (ii) the general methodology used to determine the applicable tick size, (iii) operational issues encountered with FITRS, (iv) the supervision of tick sizes and the need for further guidance, (v) the competitiveness issues created for EU entities compared to their non-EU competitors, (vi) systematic internalisers, (vii) other issues.
406. Regarding the scope of the regime, one respondent supported introducing an exemption for shares that are traded only one single trading venue in the EU. Where a share is traded only on one trading venue, there is indeed no risk of tick sizes being used as a competition tool and the tick size regime is therefore seen as an unnecessary burden (e.g. for SME GMs). Another respondent supported extending the tick size regime to futures.
407. Regarding the general methodology set out in RTS 11, some respondents invited ESMA to reflect on whether the ADNT used for determining the tick size regime should also include volumes executed on lit MTFs so as to better reflect the liquidity available in the EU rather than only the liquidity traded on the most relevant market in terms of liquidity. Respondents also considered that more frequent updates (e.g. twice a year) of the ADNTs would be more appropriate, allowing to better reflect possible changes of the liquidity profile of instruments.
408. Regarding operational issues and FITRS, respondents stressed that updates are not always well coordinated (e.g. delayed updates, regular ad hoc adjustments) creating implementation challenges for trading venues and SIs. This more generally could lead to uncoordinated application of tick sizes by trading venues and SIs, introducing an unlevel playing field between them.
409. Other specific comments were made regarding FITRS and the determination of the MRMTL: (i) the erroneous qualification of SIs as MRMTL for certain instruments and (ii) the misreporting by reporting entities of the first day of trading which leads to errors in the determination of MRMTLs and related indicators (including ADNTs). Some respondents would also welcome the inclusion of the field "Calculation Time" for the different MiFID II parameters in the full ECR files and delta files – as they are provided on the ESMA register website. They considered this information crucial since it allows trading venues to select the correct information to use in their systems when more than one data point is published for the same calculation period (which is particularly relevant in case of half-yearly updates).
410. Regarding the supervision of the tick size regime, some respondents stated they would support more rigorous supervision and enforcement of the tick size regime in particular

regarding SIs and MTFs using RFQ systems. They also noted that more guidance would be welcomed to ensure that the applicable rules are clear and that there is not remaining uncertainty regarding the scope of application of the tick size regime. In particular, they expressed the view that more guidance might be needed on (i) the circumstances where mid-point transactions can be executed and (ii) the application of tick sizes to Frequent Batch Auction systems. Regarding the latter, they noted that the UK FCA latest guidance clarifies that “transactions executed off-tick at the mid-price are permissible when required by the auction algorithm used by the FBA”.

411. Many respondents raised concerns about the competitiveness of EU stakeholders, in particular vis-a-vis UK parties. For instance, they drew ESMA’s attention to a recent statement from the UK FCA [“Supervisory Statement on the Operation of the MiFID Markets Regime after the end of the EU withdrawal transition period” issued on 16 December] where it is clarified that “from 1 January we will until further notice regard the shares of EU issuers who have not sought admission to trading in the UK as illiquid and subject to the pre-trade and post-trade Large-in Scale thresholds associated with having an Average Daily Turnover (ADT) of under 50,000” (point 27 of the statement). This results in lower LIS thresholds being applicable in the UK which means that it is possible for UK firms to execute transactions at mid-point for smaller sizes (outside the reference price waiver).
412. Regarding systematic internalisers, one respondent expressed a preference for limiting the application of the tick size regime to transactions below the LIS threshold, in order to ensure a more level playing field between SIs and other trading venues.
413. Finally, regarding other comments made, one respondent stressed that while the mandatory tick size regime has limited unhealthy competition between trading venues, nonetheless the current fragmentation of EU markets remains harmful for liquidity. They recommended to improve concentration of liquidity through a prohibition of off-book and SI trading.
414. Another respondent flagged that the tick size regime has a detrimental effect on instruments other than shares, including instruments which are not themselves subject to the tick size regime such as derivatives. They considered that if the tick size regime has had some positive effects for shares, this does not compensate the negative impact this regime has had for instruments using those shares as underlying.

6.1.1.3 ESMA’s assessment and recommendations

415. While views remain polarized on the overall impact of the tick size regime, there is a majority of respondents considering that this regime has overall delivered on its objectives. ESMA acknowledged the concerns raised by respondents regarding the calibration of the regime but also notes that those concerns are not consistent and even sometimes contradictory.

416. In this context, ESMA does not recommend any substantial review of the calibration of the tick size regime in the short term. ESMA will however continue to monitor the application of this regime and its impact on EU markets.
417. Regarding the recent amendments introduced in MiFID II and MiFIR in the context of the so-called Investment Firm Review (IFR) Regulation and IFR Directive, these amendments have been proposed by the Commission and approved by co-legislators. ESMA therefore considers that this approach still reflects co-legislators' views. In the absence of concrete evidence that these new provisions have created insurmountable obstacles for the EU market participants and systematic internalisers in particular, it appears premature to recommend new legislative adjustments at this stage. As for the rest of the tick size regime, ESMA will however remain vigilant regarding the impact these new provisions have on systematic internalisers and is open to receive evidence should the concerns expressed by certain respondents materialise in the future.
418. Regarding the application of the tick size regime to systematic internalisers, it should also be clarified that Article 17a of MiFIR allows systematic internalisers to match "orders large in scale at mid-point within the current bid and offer prices".
419. Regarding the other proposed changes to the tick size regime, many would require an amendment of RTS 11. ESMA welcomes the input received which might be used as a basis for a future review of RTS 11. It might however be useful to provide some preliminary comments on these inputs.
420. It can be argued that the tick size regime, which is primarily meant to limit unhealthy competition between trading venues, can be regarded as an unnecessary burden for instruments which are only traded on one single trading venue in the EU. This would typically be the case for SME shares, where applying too broad tick sizes could limit the development of liquidity. Hence ESMA will reflect further on this issue and come forward with amendments, if deemed useful.
421. ESMA remains sceptical about including liquidity from MTFs to determine the relevant tick size liquidity band. While the current regime does not take the real liquidity available in the EU into account, this was a deliberate decision: the tick size regime has been carefully calibrated taking only the activity on the most relevant market in terms of liquidity into account. Broadening the perimeter of the trading venues considered for the calculation without revisiting the liquidity bands in the Annex of RTS 11 would lead to inflated ADNT and more (if not "too") granular tick sizes.
422. ESMA is aware of remaining issues regarding the Financial Instruments Transparency System (FITRS) and, more generally, the quality of the data used for the calibration of the tick size regime. While the overall quality of the information provided through the ESMA systems (FIRDS and FITRS) has already significantly improved since the launch of these systems, there is still room for improvement. ESMA acknowledges that the system does not always publish information in a timely manner or sometimes perform the calculations based on erroneous data leading to misleading results.

423. Improving the accuracy of the transparency calculations and the reliability of the publication system is very high on the ESMA's Agenda. ESMA is therefore working on many different initiatives in parallel in this respect. However, as ESMA's publications rely primarily on the data submitted by reporting entities it is key to improve the quality and accuracy of the submitted data. Hence ESMA stresses the importance of receiving high quality and standardised data, encouraging reporting entities to maintain their efforts to continuously improve the quality of their submissions to ESMA.
424. ESMA was not aware of existing concerns regarding the supervision and enforcement of the tick size regime, in particular regarding SIs and MTFs using RFQ systems. The tick size regime is precisely meant to avoid unhealthy competition between all EU execution platforms, and it is crucial that relevant provisions are applied consistently in all Member States. ESMA therefore invites market participants to share with ESMA and relevant NCAs any suspected cases of non-application of these obligations.
425. Finally, the withdrawal of the UK from the EU has created concerns about a possible divergence of applicable rules. As far as ESMA is aware, the UK has maintained the MiFID II tick size regime in place even though some indirect factors (e.g. different LIS thresholds) might have created regimes which are misaligned between the two jurisdictions. ESMA is however not aware that this specific issue has had significant impact on EU and UK market structures thus far.
426. Nevertheless, the possible regulatory divergence between the EU and the UK and the impact this could have on EU market structures remain high on ESMA's Agenda. ESMA will continue monitoring this very closely and encourage market participants to share any concerns and observations they might have in this respect.

6.1.2 Tick size regime applicable to third-country shares

6.1.2.1 Background

427. Quickly after the start of application of the MiFID II regime, the application of the tick size regime to third-country shares has raised concerns among market participants. The tick size regime which is calibrated based on the liquidity available on the most liquid EU trading venue (i.e. the EU most relevant market in terms of liquidity) was indeed not well suited to shares with a main pool of liquidity located outside the EU (so called "third-country shares).
428. For those shares, the standard regime would therefore lead to underestimated ADNT and, as a consequence, too broad tick sizes being applied. In order to address this situation, RTS 11 was amended and an alternative procedure was introduced for third-country shares. Such procedure allows NCAs to adjust the ADNT used to determine the applicable tick size regime so as to take into account the transactions executed on the third-country trading venue with the highest turnover for trading of that share. It was also considered that this alternative ADNT determination method would mainly be relevant to instruments traded with reasonable frequency in the EU. The adjustment is therefore limited to shares traded on average at least once per day on the most liquid EU trading

venues (i.e. ADNT on the most relevant market in terms of liquidity for the previous year is equal to or higher than one).

429. In the CP, ESMA reported on evidence received indicating that this ad hoc procedure has led to positive results, e.g. a very significant increase in trading volumes after the adjustment of the ADNT (and therefore of the applicable tick size) for third-country shares.

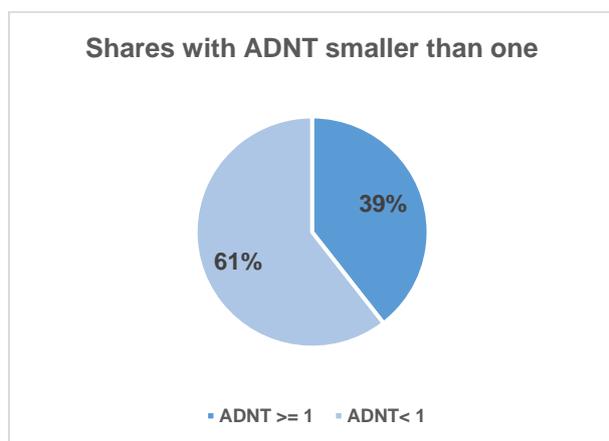
430. ESMA also discussed in the CP some remaining concerns, in particular raised by German trading venues which traditionally offer for trading a very large variety of third-country shares (more than 10,000 of those shares on certain German trading venues). Such venues expressed the view that the current adjustment procedure is too resource intensive, requiring ADNTs to be adjusted on a per-share basis. They also questioned the non-application of the ad hoc procedure for shares with an ADNT in the EU smaller than one. In the CP, ESMA did not propose any change to this regime.

FIGURE 12: NUMBER OF ISINS WITH ADJUSTED ADNT PER RCA

RCA	Number of ISIN with adjusted ADNT
CZ	1
DE	1452
FR	1
GB	74
IE	4
SE	1

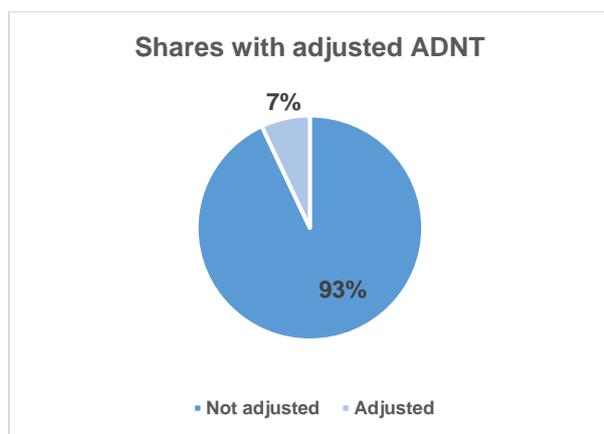
Source: ESMA/ FITRS, data extracted on 10/09/2020.

FIGURE 13: PERCENTAGE OF SHARES IN FITRS WITH AN ADNT ON MRMTL SMALLER THAN ONE



Source: ESMA/ FITRS, data extracted on 10/09/2020.

FIGURE 14: PERCENTAGE OF SHARES IN FITRS WITH AN ADJUSTED ADNT



Source: ESMA/ FITRS, data extracted on 10/09/2020.

431. ESMA indeed considered that an 'ISIN by ISIN' adjustment procedure remained a reasonable solution, allowing EU trading venues to maintain their competitiveness and market share while providing a manageable framework which gives sufficient legal certainty to market participants. ESMA also noted that the administrative burden for all parties involved should be reduced over time as trading venue operators and competent authorities can leverage on previous years' calculation exercises (e.g. for the identification of third country shares or the sourcing of data for third country venue ADNTs) making the adjustment procedure more efficient over time.

432. Regarding shares with an ADNT in the EU smaller than one, ESMA noted in particular that this concerns 60% of shares currently available in FIRDS (more than 13,000 ISINs). Opening the adjustment procedure to those shares would therefore significantly increase the administrative burden for all parties involved and make the adjustment procedure not the exception but the norm.

6.1.2.2 Feedback to the consultation

433. While a majority of respondents agreed with ESMA's proposal not to further amend RTS 11, various respondent advocated for introducing further amendments to the regime applicable to third-country shares. These respondents considered that, while the adjustment procedure has allowed to address certain issues, the process remains too burdensome for the parties involved and it still contains some limitations (e.g. with respect to instruments with an ADNT on MRMTL < 1).

434. Amongst those advocating for a further revision of the regime, two main approaches emerged. Some suggested to simply remove third-country shares from the scope of RTS 11. In their view, third-country shares should not be subject to a specific tick size regime in the EU and trading venues should be allowed to align with the primary market allowing EU investors (retail investors in particular) to trade at prices that are similar to the price in the shares' home markets. Some also noted that ESMA's treatment of third-country

shares is not consistent with the STO regime where all non-EU ISIN have been exempted from Article 23 of MiFIR.

435. Other respondents were more nuanced and, rather than a full exemption, recommend a more efficient and automatic procedure for third-country shares. They noted in particular that the condition to have an ADNT on the MRMTL < 1 means that, in practice, only a small subset of third-country shares can benefit from the adjustment procedure while other shares are subject to a tick size which does not allow efficient pricing (in particular when compared to other third-country trading venues). They therefore support the deletion of the condition relating to ADNT < 1 , while maintaining the rest of the adjustment process.
436. Finally, many respondents, including some in favour of status quo, invited ESMA to monitor the development related to the tick size regime in the context of Brexit. The UK's withdrawal from the EU has indeed given a new dimension to issues related to third-country shares. The UK departure has not only increased the number of third-country shares but, given the remaining interconnectedness between the UK and EU markets, it has more generally amplified the importance of well calibrated tick sizes to support the competitiveness of EU markets. Some respondents suggested in this respect improved cooperation with the UK and Switzerland or even the development of a harmonised tick size regime in collaboration with UK and Swiss authorities.

6.1.2.3 ESMA's assessment and recommendations

437. ESMA welcomes the input provided and acknowledges the remaining concerns raised by market participants regarding the treatment of third country shares for the purpose of the tick size regime.
438. The responses to the consultation have overall confirmed that the new regime has addressed the main concerns regarding third country shares and that no new amendment to the tick size regime is needed in the very short term. However, responses to the CP have also shed light on some issues which are still outstanding, in particular with respect to shares with an ADNT smaller than one.
439. The UK withdrawal from the Union has put more emphasis on issues relating to third-country shares. As mentioned above, ESMA is committed to ensuring that competitiveness of EU firms and trading venues is not affected by this new financial paradigm and stands ready to take initiatives if and where necessary. Therefore, while it is not considered necessary to amend the regime applicable to third-country shares in the very short term, ESMA will continue monitoring the impact of tick size on EU market structures and could come up with some new proposals regarding third-country shares at some point in time.

6.1.3 Tick size regime applicable to ETFs

6.1.3.1 Background

440. RTS 11 prescribes that ETFs which have shares and depositary receipts as underlying should be subject to the tick size regime due to the correlation between ETFs and the underlying equity instruments. In case of an ETF where one or more underlying components are not subject to the tick size regime, the ETF itself is not required to comply with the regime. For ETFs that are subject to the tick size regime, a tick size should be applied which is equal to or greater than the tick size corresponding to (i) the liquidity band in the Annex of RTS 11 corresponding to the highest ADNT and (ii) the price of the submitted order. This corresponds in practice to the most granular minimum tick size possible under RTS 11.
441. In the CP, ESMA reported on the concerns received regarding the identification of ETFs that are subject to the regime. Trading venues appear to face challenges about the identification of the exact list of constituents of ETFs traded on their platforms making it difficult for them to differentiate between ETFs that are subject to the regime and those that are not. In addition, ESMA has received questions from market participants about the regulatory framework applicable to ETFs which incorporate, for technical reasons, instruments that are not subject to the tick size regime. This would typically be the case for ETFs which are created to track as closely as possible the price of an index but, for technical reasons, also have a marginal set of derivatives as underlying.
442. In order to address these issues, ESMA proposed extending the scope of application of the regime to all ETFs traded in the EU (all subject to the liquidity band in the Annex of RTS 11 corresponding to the highest ADNT). The objective was not only to simplify the regime but also to ensure more legal certainty and consistent application of RTS 11 in the EU.

6.1.3.2 Feedback to the consultation

443. Respondents expressed mixed views regarding ESMA's proposals in relation to ETFs. Sell-side firms appeared in general reluctant or even opposed to broadening the mandatory tick size regime to all ETFs while trading venues acknowledged the concerns expressed by ESMA regarding ETFs and were more favourable to revising the scope of application of RTS 11 in relation to ETFs.
444. Despite those points of disagreement, some general conclusions can be drawn from the responses received. Most respondents concluded that the tick size currently applied to ETFs is unsatisfactory and creates an unlevel playing field between the different execution platforms (including SIs). In fact, the current regime requires TVs and SIs to know about the constituents of each single ETF traded under their systems and this seems very challenging to check and track. As a consequence, there has been uncertainty regarding the exact perimeter of application of the tick size regime leading to an unlevel playing field for both venues and investors that use them.

445. However, a majority of respondents disagreed with the ESMA proposal to extend the current tick size regime applicable to ETFs to all ETFs traded in the EU. They noted that a one-size-fits-all approach would have harmful consequences for ETF markets. In fact, for certain categories of ETFs (typically money market or fixed-income ETFs), such an approach would lead to a 5 to 20 time increase of the current applicable tick sizes with obvious consequences for spreads and prices. Respondents therefore suggested an ad hoc regime for ETFs but few concrete proposals were made in that respect. One suggestion consisted in adding to the current liquidity band used for ETFs, two new liquidity bands with more granular tick sizes. Others simply advocated for a regime that is specific to the ETF asset class.
446. Additionally, some respondents questioned the application of a mandatory tick size regime to ETFs. In their view, the shortcomings in share markets justifying the establishment of a harmonised tick size regime are not observed in the ETF markets. For instance, they stressed that, while EU equity markets are actively traded through order books, ETFs predominantly trade in the EU through 'Request for Quote' (RFQ) systems or Systematic Internalisers. Due to these market structures the establishment of a harmonised regime is, in their view, less relevant.
447. Lastly, it was stressed that ETFs are not subject to any obligation to trade on trading venue or with an SI. A too strict or poorly calibrated regime could therefore incentivise more trading to take place OTC without price constraints.

6.1.3.3 ESMA's assessment and recommendation

448. ESMA welcomed the input received which have confirmed (i) that the tick size regime applicable to ETFs remains unsatisfactory and a source of diverging practices and (ii) that proposal made to broaden the scope of the current RTS 11 regime to all ETFs should not be pursued.
449. ESMA will therefore further reflect on alternative options for ETFs and might come back with new proposals in a future consultation on RTS 11.

6.1.4 Tick size regime for non-equity instruments

6.1.4.1 Background

450. In the CP, ESMA noted that, while market structures and microstructures for certain non-equity financial instruments have developed since 2015, they remain at a level of sophistication, electronification and interconnectedness that is far below the ones for equity instruments and shares. Even for fungible non-equity financial instruments like bonds, the market share of high-frequency traders remains limited when compared to shares.
451. More importantly, ESMA stressed that if competition between non-equity trading venues has increased after the application of MiFID II, tick sizes have not started to be used as

a competition tool between those trading venues making the application of a harmonised tick size regime less relevant in this area.

452. It was therefore concluded that tick size regimes for non-equity financial instruments are not necessary at this stage. This would introduce unnecessary complexity which does not seem justified by the current practices.

6.1.4.2 Feedback to the consultation

453. There was almost unanimous support amongst respondents for not widening the scope of the mandatory tick size regime to non-equity financial instruments.

454. Only one respondent suggested to enlarge the tick size regime to liquid futures. According to this respondent, tick sizes for futures were usually set at times when liquidity was mostly provided by human traders, spreads were much wider, and therefore the ability of market makers to price an asset precisely was diminished. Tick sizes appear now too large for current futures' markets, artificially constraining spreads. Therefore, such respondent supported the establishment of a mandatory tick size regime with the objective of better calibrated or "optimal" tick sizes.

6.1.4.3 ESMA's assessment and recommendations

455. Responses received have confirmed ESMA's view that tick size regimes for non-equity financial instruments are not necessary at this stage. ESMA believes this would introduce unnecessary complexity which does not seem justified by the current market conditions. ESMA therefore does not propose to broaden the scope of the MiFID II tick size regime to any other instruments at this stage.

6.2 Market making agreements

6.2.1 Background

456. As stated in Recitals (62) and (113) of MiFID II, there are two main goals in establishing market making agreements as envisaged in MiFID II. Firstly, as advanced technologies may bring new risks to the market, MiFID II aims to maintain market participants' ability to transfer risks efficiently during stressed market conditions ensuring sufficiently liquid markets. Secondly, the Article 17 provisions aim at introducing an element of predictability to the provision of liquidity in the order book by requiring contractual obligations for firms deploying certain types of strategies.

457. To this end, Article 17(3) of MiFID II requires investment firms that engage in algorithmic trading to pursue a market making strategy to notify the trading venue where such strategy is deployed and to enter into a binding agreement with specific quoting obligations. These obligations include carrying out their strategy continuously during a specific proportion of the venue's trading hours, except under exceptional circumstances, and have in place effective systems and controls to ensure the fulfilment of these quoting obligations.

458. Article 17(4) details when an investment firm engaging in algorithmic trading should be considered as pursuing a market making strategy. This is the case when the firm posts “firm, simultaneous two-way quotes of comparable size and at competitive prices relating to one or more financial instruments on a single trading venue or across different trading venues, with the result of providing liquidity on a regular and frequent basis to the overall market”.
459. Article 48 of MiFID II similarly requires regulated markets to have in place “written agreements with all investment firms pursuing a market making strategy on the regulated market” as well as “schemes to ensure that a sufficient number of investment firms participate in such agreements which require them to post firm quotes at competitive prices with the result of providing liquidity to the market on a regular and predictable basis, where such a requirement is appropriate to the nature and scale of the trading on that regulated market.” Article 18(5) of MiFID II extends these obligations to MTFs and OTFs.
460. Article 48(3) of MiFID II prescribes that the written agreement between the investment firm and the trading venue specifies at least the obligations of the investment firm in relation to the provision of liquidity and any incentives offered by the trading venue for this activity. The trading venue is further expected to monitor compliance of investment firms with such written agreement, inform its NCA about the content of such agreement and, if requested, provide further information to its NCA.
461. As mandated under Article 48(12)(f) of MiFID II, ESMA has further specified these obligations in the Commission Delegated Regulation (EU) 2017/578 (RTS 8)³⁸. It clarifies both the provisions relating to investment firms which engage in algorithmic trading pursuing market making strategies and the provisions relating to the trading venues where such strategies take place.
462. RTS 8 requires members or participants engaged in algorithmic trading pursuing a market making strategy to enter into a market making agreement with the operator of the trading venue where they operate. This obligation applies more specifically to investment firms that have, during half of the trading days over a one month period, posted “firm, simultaneous two-way quotes of comparable size and competitive prices [...] for at least 50 % of the daily trading hours of continuous trading”.
463. Trading venues should specify in their market making agreements, among other issues, the financial instrument or instruments covered by the agreement and the minimum obligations to be met by the investment firm in terms of presence, size and spread³⁹. Article 2 of RTS 8 clarifies that the agreement should, at the minimum, impose to the concerned investment firms to post “firm, simultaneous two-way quotes of comparable size and competitive prices in at least one financial instrument on the trading venue for

³⁸ Commission Delegated Regulation (EU) 2017/578 of 13 June 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council on markets in financial instruments with regard to regulatory technical standards specifying the requirements on market making agreements and schemes (OJ L 87, 31.3.2017, p. 183–188).

³⁹ Investment firms shall be required at least to post firm, simultaneous two-way quotes of comparable size and competitive prices in at least one financial instrument on the trading venue for at least 50 % of daily trading hours of during which continuous trading takes place excluding opening and closing auctions and calculated for each trading day.

at least 50 % of daily trading hours of during which continuous trading takes place excluding opening and closing auctions and calculated for each trading day”.

464. The MiFID II market making framework also includes, as explained above, an obligation for trading venues to adopt schemes incentivising the provision of liquidity on their platforms on a regular and predictable basis. The provision of incentives for market making is mandatory only for a subset of traded instruments specified in Article 5 of RTS 8, where those instruments are traded on a continuous auction order book. In order to incentivise continuity in liquidity provision even in stressed market conditions, market making schemes should describe the incentives offered by the trading venue distinguishing between normal and stressed market conditions.
465. The question of the incentives to be offered raised some questions amongst market participants and ESMA has provided guidance through Q&As. For example, ESMA has clarified that trading venues have the ability to adjust their scheme of incentives, which may well be of a “monetary” or “non-monetary” nature as long as they effectively support trading and provision of liquidity to the market on a regular and predictable basis and in particular when it is the most volatile⁴⁰.
466. Article 7 in RTS 8 further requires trading venues to make public the terms of their market making agreements, the firms which have signed such agreements and the financial instruments covered. In order to provide for fair and non-discriminatory market making schemes, venues are required to provide the same type of incentives to participants which perform equally.

6.2.2 Feedback from the consultation

467. In the CP, ESMA presented a general overview of the current market making practices in the EU, on the basis of the data collected from NCAs and TVs. Such analysis led to the conclusion that the regulatory framework in place has brought more predictability into the high-speed market making activity, as performed by HFTs and algorithmic traders during normal market conditions. Despite this, the framework appears less effective in incentivising the provision of liquidity, in particular during volatility episodes (e.g. stressed market conditions) and for instruments where liquidity is scarcer. Nevertheless, as highlighted in the CP, the results emerging from the data collected might not fully represent the exact impact of MiFID II provisions on the current market making practices. ESMA has therefore asked market participants to complement such findings with their views.
468. A large number of respondents shared ESMA's assessment of the status of the market making regime. According to the respondents, the current market making regime has led to more predictability into the high-speed market making activity. However, respondents highlight that the monetary incentives aimed at improving liquidity in stressed and

disorderly markets might have an insignificant impact on market makers' behaviour under stressed market conditions. According to such respondents, incentives do not compensate the risk of a bankruptcy that market makers have to bear, since the losses associated to market risks are many orders of magnitude higher than fee incentives.

469. In relation to this, some respondents were sceptical about the concept of "stressed market conditions". Such respondents highlighted how maintaining such concept might not prove useful if there is no possibility to provide effective incentives during stressed market conditions. Furthermore, respondents pointed out that the definition of "stressed market conditions" differs for each trading venue depending on the nature and profile of market. These respondents believe trading venues are better positioned than regulators to assess the market making needs of their own markets and to define what qualifies as "stressed market conditions" based on the nature and profile of the market that they maintain.
470. Other respondents were of the view that the provisions of the market-making regime do not achieve their purpose because the scope of the provisions in RTS 8 is too wide and general. Moreover, they observed that many of the requirements set out in RTS 8 appear to be clearly designed for market makers pursuing an HFT-strategy.
471. Such respondents suggested that possibly the regulatory intention was to apply such provisions only to HFTs pursuing a market making strategy and not to encompass cases such as market makers quoting prices because they (i) are also the issuer of the financial instruments, (ii) they are part of the same company group as the issuer of the financial instrument, or (iii) they have a contractual obligation with an issuer of financial instruments or the exchange. Respondents noted that in the latter circumstances the predictability of liquidity provision in the order books is not at stake.
472. The provisions in RTS 8 have also been criticized for not having meaningfully increased liquidity. Some respondents believed that trading venues are better positioned than regulators to assess the market making needs of their own markets, and subsequently design and implement market making programs that effectively stimulate liquidity provision. In fact, it is in the trading venues' best interest to foster liquidity on their markets.
473. In the CP, ESMA has sought views on the possible amendments aiming at streamlining the MiFID II market making regime and making it more effective. In this respect ESMA has put forward three proposals⁴¹ to amend RTS 8. On the basis of the above-mentioned feedback provided by market participants, "proposal A", consisting in limiting the application of the scope of Articles 1 and 2 related to market making agreements to continuous trading order books, is the proposal that has received broader support.

⁴¹ in order to provide more legal clarity and accommodate a greater variety of liquidity profiles and trading patterns, ESMA proposed to: (a) limit the application of the scope of Articles 1 and 2 to continuous trading order books; (b) broaden the obligation of have market making schemes to all instruments and types of trading systems; (c) require the establishment of monetary incentives (including fee rebate for the best liquidity providers only) for illiquid instruments and SME growth market segments.

474. In the context of the analysis of the market making regime, ESMA additionally pointed out that the current provisions leave a certain degree of discretion to trading venues in order to define the content of the market making agreements or of the market making schemes. In this respect ESMA asked market participants if such flexibility is deemed useful and whether certain concepts and provisions should be further clarified.
475. The vast majority of respondents considers the flexibility provided by the current regime to be appropriate and practical, claiming that venues' discretion to define market making agreement and scheme proves useful. Therefore, respondents did not see the need for further clarification or change.
476. However, a considerable number of respondents express the view that, despite a certain degree of discretion in the definition of the content of the market making agreements being suitable, it would be helpful for ESMA to clarify certain aspects of the regime. In particular, the respondents highlighted that the market making requirements, thresholds and calculation methodologies should be harmonized, as these elements are reported to currently diverge significantly across venues. Moreover, some respondents asked for the standardisation of the definitions of certain terms and concepts, such as competitive price, incentives provided on the basis of the operation realized and stressed market conditions. Also the importance to address this issue duly taking into account the differences among asset classes and without adopting a "one-size-fits-all" approach to different asset classes was stressed.
477. With reference to the coexistence on EU trading venues of RTS 8 market making requirements and other contractual liquidity provision obligations, ESMA saw merit to investigate, through the CP, any possible overlap that might exist as well as alleviations for Primary Dealers. Therefore, market participants were asked to assist with ESMA's work by providing their feedback and expertise on how the DMO agreements are designed and how to better take them into account for the purpose of the application of RTS 8.
478. ESMA received positive feedback on the proposal to exempt Primary Dealers from MiFID II market making agreements requirements on each trading venue on which they are active. In this regard, market participants do not see such an exemption as a possible source of any regulatory loophole. In addition to this, respondents suggest that the exemption should go beyond primary dealers and should target the EU government bond asset class as a whole.
479. In fact, these respondents argued that market making agreement regulatory requirements appear to be primarily drafted for equity markets and were not originally aimed at other asset classes such as EU government bonds, which already had an existing and proven framework to ensure liquidity and transparency.
480. From market participants' feedbacks it emerged that Primary Dealers in EU government bond markets have obligations defined in agreements with specific DMOs. These obligations, which included quoting obligations in terms of minimum duration of the quotation, maximum bid-offer spreads, minimum size to be displayed, were set to

promote liquidity and transparency in the secondary markets. Primary Dealers as per their Primary Dealer agreements with their DMOs, are free to fulfil their quoting obligations on eligible trading venues.

481. ESMA understands that the obligations of Primary Dealers do not directly conflict with market making agreements. Nevertheless, respondents reported that the MiFID II market making requirements might overlap with Primary Dealers obligations, resulting in an additional set of rules on which those liquidity providers should ensure compliance. Some respondents also notice that market making requirements appear originally designed for equity markets, while Primary Dealers are active in EU government bonds, where liquidity provision is organised in a different manner. Overall, it appears that this creates an unclear situation for Primary Dealers where MiFID II market making obligations, trading venues rules/supervision and DMO obligations overlap.

6.2.3 ESMA's assessment and recommendations

482. Thanks to the feedback received from market participants, ESMA could compile a more comprehensive picture of the current market making regime.

483. Overall, the consultation confirms ESMA's analysis that the current market making regulatory framework proves to be meaningful for the market making activity undertaken by algorithmic or high frequency traders trading through continuous trading order books, enshrining in law a practice that used to be performed outside a dedicated regulatory framework.

484. Such view is supported by market participants' agreeing on ESMA's proposal "A", which envisages to limit the application of the scope of Articles 1 and 2 related to market making agreements to continuous trading order books.

485. However, there is evidence that this regulatory framework had a limited impact on the provision of liquidity in some key circumstances. Market participants highlighted how the current requirements of RTS 8 appear to be too general to concretely incentivize liquidity, especially under exceptional circumstances such as stressed market conditions and in case of illiquid instruments.

486. On one hand, it could be argued that in order to increase liquidity the current requirements should be tightened or complemented with further regulatory obligations. On the other hand, it is necessary to consider the feedback and the empirical evidence provided by market participants showing that incentives to support liquidity, under highly volatile market conditions, do not appear effective as they cannot compensate the potential losses which market makers might bear due to stressed market conditions.

487. In light of this, ESMA concurs with the considerations expressed by market participants and agrees that trading venues are spontaneously incentivized to attract liquidity and are indeed better positioned to assess the market making needs of their own markets.

488. Therefore, ESMA believes that a simplification of the market making requirements may benefit the resilience of liquidity. ESMA sees merit in removing the concept of "normal

trading conditions” as well as “stressed market conditions”, leaving trading venues to identify the market conditions under which incentives are to be offered. ESMA proposes to limit the obligation for trading venues to offer the same incentives to market participants on a non-discriminatory basis, clearly specifying in the market-making agreements the conditions under which the incentives are offered.

489. In relation to Primary Dealers, ESMA acknowledges that the obligations of Primary Dealers do not directly conflict with market making agreements. Nevertheless, as there might be a burdensome overlap between the MiFID II market making requirements and other obligations applying to Primary Dealers, ESMA sees merit in clarifying in RTS 8 that Primary Dealers and liquidity providers subject to a liquidity contract, should not be required to comply with the market making requirements imposed by RTS 8.

490. In addition, ESMA recognises that the market making requirements appear originally designed for equity markets, and that Primary Dealers’ activity is concentrated in EU government bonds. Therefore, ESMA sees merits in exempting the government bond asset class from the market making requirements since the activity performed by Primary Dealers appears better suited to this asset class.

491. ESMA is aware that the proposals formulated above would result in simplifying the current regime and making some provisions of RTS 8 less demanding and more adaptable for the concerned parties.

492. Therefore, ESMA invites the European Commission to similarly reflect on the actual impact and the practical benefits that such a simplified regime may have on the market making agreements and schemes and to assess whether the objectives sought by the Legislator in Level 1 can be achieved and guaranteed solely through a more principle-based regime at Level 1.

6.3 Speedbumps in Financial Markets

493. In financial markets, a “speedbump” is a mechanism implemented by some trading venues, consisting in a delay applied to incoming orders before they enter the matching engine for execution. Speedbumps have been introduced with the aim to regulate the speed of high-frequency traders and to curb ultrafast trading strategies, as some argue that this could increase overall market quality.

494. The length and design of the speedbumps can vary considerably across trading venues, but mainly it is possible to distinguish between two types of speedbumps: (i) “symmetric” speedbumps, whereby the duration of the delay is same across all orders and, it is therefore imposed equally to all order types, and (ii) “asymmetric” speedbumps, where the delay does not apply to all order types (e.g. delays apply only to aggressive orders and not passive orders).

6.3.1 Background

495. Currently there is no specific legal provision targeting the introduction and functioning of speedbumps. Some provisions of MiFID II however appear relevant.
496. Article 47(1)(d) of MiFID II requires Member States to ensure that regulated markets establish “transparent and non-discretionary rules and procedures that provide for fair and orderly trading and establish objective criteria for the efficient execution of orders”. Article 18(1) of MiFID II contains similar requirements in relation to MTFs and OTFs.
497. It can be argued that the introduction of asymmetric speedbumps is transparent if market participants are informed about the mechanism and its features and the measure is non-discretionary as any participant can provide passive liquidity. However, it could be questionable if such a measure aims at providing for fair and orderly trading.
498. The concept of “fair trading” can be understood as not providing an illegitimate advantage or favouring one market participant or a subset of market participants⁴². In light of such interpretation, the question whether asymmetric speedbumps could entail an advantage for a specific set of market participants (i.e. liquidity providers) arises. Furthermore, the impact of asymmetric speedbumps on orderly trading could also be questioned, as such mechanisms could entail the risk of increasing non-tradeable liquidity in the order book.
499. Article 48(2)(b) of MiFID II requires regulated markets to have in place “schemes to ensure that a sufficient number of investment firms participate in market making agreements which require them to post firm quotes at competitive prices with the result of providing liquidity to the market on a regular and predictable basis, where such a requirement is appropriate to the nature and scale of the trading on that regulated market”. As per Article 18(5) of MiFID II, MTFs and OTFs operators also must comply with the same provision. Similarly, Article 17 of MiFID II imposes to the most active liquidity providers, when their activity is above a certain threshold, to provide quotes “continuously during a specified proportion of the trading venue’s trading hours”.
500. In this context, the question could be raised about whether the liquidity is provided in a regular and predictable way by these market makers not subject to the artificial delay and who would be able to cancel or modify their quotes before incoming orders enter the matching engine. Market making obligations have been envisaged with the aim of introducing “an element of predictability to the apparent liquidity in the order book” (Recital 1, RTS 8) and it can be questioned whether a market maker can be considered as complying with RTS 8 obligations (posting competitive quotes for 50% of the time) when it has the possibility to cancel in priority its quotes (i.e. before they get executed).

⁴² As per IOSCO Objectives and Principles of Securities Regulation: “The fairness of the markets is closely linked to investor protection and, in particular, to the prevention of improper trading practices. Market structures should not unduly favour some market users over others. Regulation should detect, deter and penalize market manipulation and other unfair trading practices”.

501. Beyond the question about the compliance to the existing rules, asymmetric speedbumps raise the question whether they allow more market makers to operate increasing the competition and generally favouring tighter spreads.

6.3.2 Feedback from the consultation

502. In the CP ESMA presented an overview on how the use of speedbumps has evolved, originating in the US to then being differently applied in various trading venues around the globe. With respect to the application of asymmetric speedbumps in the EU, ESMA asked market participants feedback on various aspects on the current application of such mechanism and potential challenges which could arise from the use of asymmetric speedbumps.

a. Disclosure of information to the market about the functioning of speedbumps

503. ESMA sought views from market participants about whether those trading venues which introduced asymmetric speedbumps in the EU have provided sufficient information regarding the mechanism used and, if not, which additional information would be useful to disclose to market participants.

504. A large number of respondents commented that it is important that the functioning of the mechanism governing speedbumps is clearly disclosed to the public. In their view, trading venues introducing speedbumps should also detail how this mechanism will benefit overall market quality, competition, and fairness. These respondents did not comment directly with respect to the information currently disclosed by trading venues which introduced speedbumps.

505. A subset of respondents emphasized how it would be beneficial to ensure that a robust consultation process is put in place before introducing such mechanisms, highlighting how ESMA could play a role in harmonising practices for consultation. In a similar spirit some respondents recommended that a more harmonized approach with respect to the treatment and approval of exchange rule filings could be adopted across the EU. This approach could be inspired to the rule filing processes used by US regulators, including the SEC and the CFTC, where (i) all rule filings are publicly available, (ii) rule filings contain basic information regarding the proposal and its consistency with relevant regulatory requirements, and (iii) market participants have an opportunity to submit feedback prior to the rule filing being approved.

506. Several respondents argued that, overall, the trading venue which has introduced asymmetric speedbumps in the EU, has provided sufficient transparency regarding the mechanism put in place and its effects. Furthermore, such trading venue appears to have involved members and participants in the discussion through several rounds of consultation and trial periods. Some of those respondents added that, if asymmetric speedbumps were to become a more widespread mechanism, it would make sense to set minimum standards of information to be disclosed by the trading venues adopting such mechanism.

b. Possible segmentation of retail order flow

507. In the context of the discussion on the current application of speedbumps in the EU, ESMA further asked to market participants if these mechanisms which allow liquidity providers to provide quotes which can be filled only against retail order flow should be considered beneficial for the overall market quality in the EU.
508. Respondents discussed several aspects of these models which give liquidity providers a privileged access to retail order flow. Multiple respondents highlighted that such arrangements have a positive impact on market quality, as long as they offer to retail investors competitive prices and do not fully segregate retail order flow from the rest of the market (i.e. allowing retail order flow to remain on venue, hence contributing to price formation and greater market transparency). Such respondents compared the benefit of these models to cases where liquidity providers offer quotes that can be filled only against retail order flow in a construct that is bilateral and does not have conditions around the EBBO, i.e. models known as “payment for order flow”.
509. The latter arrangements, where market makers do not compete on prices, were seen by some respondents as intrinsically problematic from a retail investor and best execution perspective. In light of the increasing use of such arrangements, respondents stressed that, at the European level, and in the context of the upcoming review of MiFID II/MiFIR it would be important to:
- a. adopt the proposals made by ESMA to strengthen the definition of multilateral trading, beginning with moving the definition from MiFID II to MiFIR;
 - b. review the provisions on hybrid trading systems enshrined in Annex 1 of both RTS 1 (equity) and RTS 2 (non-equity) to ensure there is a clear distinction between bilateral and multilateral trading;
 - c. in order to deliver the Capital Market Union (CMU) objectives, focus on establishing a true level playing field that underpins investor protection, particularly for retail investors via a review of the process for the authorisation of market models in the EU, including the introduction of a compulsory opinion from ESMA, mirroring the existing arrangements for transparency waivers. Furthermore, as part of this process, pay particular attention to ‘zero fee’ and payment for order flows with a focus on best execution requirements.
510. Few respondents commented that such mechanisms, which allow liquidity providers to offer quotes which can be filled only against retail order flow, might add complexity to the market and lead to a fragmentation of trading. In their view, ESMA should focus on such mechanisms in order to understand if they effectively provide benefits to retail clients.

c. Market Making requirements

511. In the CP, ESMA discussed the possibility that the advantages asymmetric speedbumps offer to market makers might increase the risk of fading liquidity during stressed market conditions. More generally, the question was raised whether asymmetric speedbumps,

considering the advantages they provide to market makers to cancel or update their quotes, do not increase the possibility for liquidity providers to post liquidity which is effectively non-tradable. ESMA therefore asked stakeholders whether trading venues which introduce speedbumps, should be required to tighten their market making requirements.

512. A large majority of respondents stated that they do not support the introduction of tighter market making requirements. Some of these respondents argued that the introduction of speedbumps has a beneficial effect on the market quality, often leading to tighter spreads. Hence, applying stricter market making requirements would not be useful and could even prove detrimental by deterring competition or increasing cancellation rates by market makers.
513. More specifically one respondent argued that market makers already need to invest in technology to be able to exploit the delay offered by the speedbumps. Introducing tighter market making requirements would further increase the barriers to entry in the market.
514. Another set of respondents considered that the tightening of market making requirements should be left to the trading venues' initiative. The general view of these respondents is that market quality should be evaluated after the introduction of speedbumps on a case-by-case basis, and new measures should be introduced only if and where necessary.

d. Use of speedbumps in equity markets

515. In the CP, ESMA discussed whether speedbumps can be considered a suitable mechanism for equity markets. ESMA expressed the view that asymmetric speedbumps might not be a well-suited arrangement for equity markets and asked feedback to stakeholders on the possibility of prohibiting in Level 1 the use of such mechanism for equities.
516. Stakeholders' views were split regarding this topic. Part of the respondents argued that speedbumps can attract liquidity providers and, hence, stimulate more liquid markets and better pricing. Respondents believed that speedbumps could have a positive effect if deployed in equity markets. Other respondents highlighted that speedbumps appear in principle well suited for equity markets, but further evidence on their impact should be gathered.
517. Another group of respondents argued that speedbumps are more suited to non-equity than equity markets, due to the diverging characteristics of these markets and of the instruments traded.
518. Nevertheless, it can be concluded that respondents generally did not support the introduction of an explicit prohibition of speedbumps in Level 1. Such consideration was motivated by the lack of sufficient evidence on the effects of such mechanisms if applied to equities. Respondents suggested as a possible alternative the introduction of a common process for filing and approval, the evaluation of the mechanism on a case-by-case basis, the issuance of an ESMA guidance on this matter and continued regulatory scrutiny on the evolution of such phenomenon and its implication.

e. Regulatory initiatives regarding speedbumps and other issues raised by stakeholders

519. ESMA asked stakeholders if they believe some specific regulatory initiatives should be put forward with regards to the use of speedbumps.
520. The majority of respondents stated that some initiatives could be desirable. The proposed initiatives encompassed various possibilities such as (i) transparency obligations for trading venues introducing this mechanism, (ii) the adoption of a consistent regulatory approach across the EU when evaluating the introduction of such mechanisms, (iii) ESMA to have an active role in promoting robust and auditable consultation processes, (iv) additional guidance to be issued by ESMA and (v) further data analysis to be undertaken.
521. A group of respondents expressed the view that speedbumps appear to have a positive effect on market microstructure and that there is hence no further need for regulatory initiatives.
522. ESMA asked stakeholders to highlight any other possible issues they deem relevant with respects to speedbumps. Stakeholders highlighted diverse elements such as (i) the fact that there is not sufficient evidence on the effects of speedbumps to consider a strong regulatory intervention at this stage, (ii) the need to ensure market participants are provided with full transparency over the technical functioning of the mechanism, (iii) the risks that the use of this mechanism could pose (e.g. increase of non-addressable liquidity and added complexity to the market).
523. Some respondents also highlighted how speedbumps might offer advantages only to a subset of market participants and how a harmonised consultation process could help prevent conflicts of interest.

6.3.3 ESMA's assessment and recommendations

524. ESMA has taken into account the feedback from the consultation in relation to speedbumps. Despite market participants expressing diverging views on this market mechanism, ESMA notes that respondents seemed to overall agree on two aspects. The first is that when trading venues introduce such trading arrangements, it should be ensured that there is sufficient information disclosure to market participants. The second aspect is that, to assess if guidance or legislative initiatives are needed, the evolution of the use of speedbumps and their impact on EU markets should be monitored.

a. Disclosure of information to the market about the functioning of speedbumps

525. Overall, it emerged from the consultation that the functioning of the mechanism governing speedbumps should be clearly disclosed to the public prior to their deployment and that trading venues should provide, after speedbumps are implemented, an assessment of how such mechanism has impacted the overall market quality, competition, and fairness of trading.

526. ESMA agrees with the consideration expressed by several stakeholders that at the current stage there is not sufficient evidence to reach a firm conclusion about the overall effects of speedbumps on market quality and market structures, due to the limited application of such mechanisms. ESMA therefore sees merit in continuing monitoring the use of such mechanisms and opting for specific legislative proposals or guidance only if and where necessary at a later point in time.
527. However, ESMA believes that the feedback received highlights that there is merit in including in the current legislative framework a specification regarding the use of 'non-discriminatory' trading mechanisms by trading venues' operators.
528. Such recommendation aims at ensuring a more equal treatment amongst market participants, with the objective of promoting fair trading. Currently trading venues are mandated to ensure non-discriminatory access rules. ESMA believes that, analogously it could be mandated that the trading arrangements of the venue are non-discriminatory.
529. Furthermore, ESMA agrees with the argument brought forward by some stakeholders who noted that a standardised public consultation process would help ensure fairness in consultation, improve transparency and avoid possible conflicts of interest between the trading venue and its participants.
530. ESMA believes that when trading venues introduce changes to their rulebooks that have the potential to have major impacts on market participants or EU market structures and microstructures, a public consultation process is beneficial as it enhances transparency, offers an opportunity to trading venues to reach out to the wider public when discussing the specifics of the mechanisms to be introduced and ensures that a large number of stakeholders can submit feedback prior to approval of the change.
531. For such reasons, ESMA invites trading venues to undertake public consultations when changes to their rulebooks that have the potential to have major impacts on market participants or EU market structures and microstructures are introduced. While it is not proposed to introduce any regulatory obligation at this stage, ESMA will continue following the introduction of new trading mechanisms closely and will change its approach if deemed necessary.
532. Overall ESMA is of the view that trading venues should ensure stakeholders have sufficient clarity on the mechanism governing speedbumps. Hence, ESMA invites trading venues to ensure sufficient information is provided to stakeholders not only during the consultation process but also once the mechanism is implemented. Furthermore, ESMA invites venues to share with market participants relevant evidence regarding the impact speedbumps might have had in terms of market quality, competition, and fairness of trading.

b. Possible segmentation of retail order flow

533. ESMA understands the view expressed by market participants that some mechanisms which allow liquidity providers to provide quotes which can be filled only against retail

order flow, need to be further analysed. Hence ESMA is not minded at this stage to recommend any measure with respect to such mechanisms.

534. Nevertheless, considering an increased participation of retail investors to financial markets, and the possibility of those mechanisms becoming more common on EU trading venues, ESMA believes that the functioning and effects of such mechanisms should be monitored, with the aim of issuing guidance if evidence of market fragmentation was to materialise. The absence of concrete proposals in this report is also without prejudice of any other guidance already published by ESMA on investor protection topics.

535. Regarding existing ESMA guidance, ESMA would like to also draw attention on the statement recently published on “payment for order flow” trading models since this issue was also mentioned by some respondents to the consultation⁴³.

c. Market Making requirements

536. ESMA, on balance, agrees with respondents that the introduction of speedbumps should not automatically trigger more restrictive market making obligations. As mentioned in the section discussing the MiFID II market making regime, the provision of liquidity is a complex activity which is influenced by many factors (type of instruments, type of trading systems, etc...) and should be analysed holistically. Trading venues are generally better placed to adapt their market making agreement to specific situations and ESMA does not recommend at this stage specific requirements for trading venues using asymmetric speedbumps.

537. Additionally, it should be noted that, at the current stage, there is not sufficient information on the effects of speedbumps (in particular asymmetric speedbumps). It therefore appears premature to draw final conclusions on how to frame the practice.

538. Nevertheless, ESMA reiterates the view that these mechanisms increase the possibility to post non-addressable liquidity since they by design facilitate the cancellation of orders by market makers. ESMA would therefore propose to include a new requirement for trading venues introducing such mechanisms to evaluate and monitor their impact on the quality of the liquidity available on their platforms and duly take into account, among others, the risk of non-tradable liquidity.

e. Use of speedbumps in equity markets

539. ESMA acknowledges that, despite split views expressed by respondents with respect to the suitability of speedbumps for equity markets, the large majority of respondents was not in favour of prohibiting their use of speedbumps in Level 1. Respondents stressed that there is a lack of evidence regarding the possible negative consequences of such mechanism and that other initiatives could prove more useful. For instance, ESMA could

⁴³ See ESMA public statement published on 13 July 2021, ref. ESMA35-43-2749, https://www.esma.europa.eu/sites/default/files/library/esma35-43-2749_esma_public_statement_pfof_and_zero-commission_brokers.pdf

issue some guidance on the use of speedbumps or introduce a standardized public consultation process.

540. Following this feedback, ESMA agrees that it is premature to include a specific prohibition in Level 1 at this stage. Nevertheless, ESMA reiterates that it would be beneficial for trading venues to undertake a public consultation process, as this could allow to best capture market participants views and evaluate their concerns if an application of speedbumps to equity markets was to be envisaged. More in general such public consultation process could also be helpful for NCAs when assessing new market developments and provide feedback and ideas from a larger range of stakeholders on possible changes in market structures and microstructures.

f. Regulatory initiatives regarding speedbumps and other issue raised by stakeholders

541. Reflecting on the feedback received, ESMA agrees that at the current stage there is not sufficient evidence to provide specific guidance to the market regarding the use of speedbumps. Nevertheless, as previously discussed, ESMA intends to continue monitoring the use of such mechanisms and provide guidance at a later stage if needed. ESMA overall believes that the proposals which have been put forward in this Report are sufficient at this stage to address the concerns expressed by market participants in relation to speedbumps.

6.4 Asymmetry of private and public feeds

6.4.1 Background

542. In the CP, ESMA presented the discussion that has arisen in the market around trading venues' private and public transaction data feeds. Such discussion revolves around the discrepancy in the timing of the private fill confirmation (the individual trade confirmation sent to the counterparties to the transaction) and the public trade message (the trade publication to all market participants) as well as around market participants not receiving market data at the same time.

543. Broadly speaking, models on feeds can be deterministic or non-deterministic. In the first case, this would concern trading venues that have made a choice between prioritising either the private fill confirmation or the trade message, whereas in non-deterministic models, the publishing sequence is not pre-determined.

544. Furthermore, timeframes with respect to the above models can vary, and, when measured at a very granular latency level, the difference between the timing of the private fill confirmation or the trade message can be greater or smaller (including on the same platform).

545. Noting that this is an area where market participants may have different opinions, ESMA invited stakeholders to comment on this matter, to understand the implications of the timing of public trade messages versus private fill confirmations and the advantages and

disadvantages of one preceding the other. In parallel, considering there is currently no specific legal provision in MiFID II/MiFIR, ESMA consulted on whether this may merit any Level 1 or Level 2 amendments.

546. Despite there currently being no specific legal provision targeting explicitly the timing of feeds, some provisions of MiFID II appear relevant when looking at the aspects of latency, informational advantages and non-discriminatory access to services. In particular, in the CP, ESMA noted that:

- a. Articles 6 and 10 of MiFIR require trading venues to publish transactions as close to real-time as is technically possible;
- b. Article 47(1)(e) and Article 19(3)(b) of MiFID II stipulate the requirement, for regulated markets and MTFs respectively, to have effective arrangements to facilitate the efficient and timely finalisation of the transactions executed under its systems, which can be relevant with respect to private fill confirmations;
- c. Article 47(1)(d) of MiFID II prescribes Member States to ensure that regulated markets establish “transparent and non-discretionary rules and procedures that provide for fair and orderly trading and establish objective criteria for the efficient execution of orders” and Article 18(1) of MiFID II contains similar requirements in relation to MTFs and OTFs;
- d. different references to the concepts of “non-discretionary rules” and “fair trading” which prohibit providing an illegitimate advantage or favouring one market participant or a subset of market participants; and
- e. Article 48(8) of MiFID II requires trading venues to ensure that their rules on co-location services are transparent, fair and non-discriminatory.

547. ESMA in the CP noted as a general remark that, in line with the MiFIR transparency provisions, all efforts should be made to publish post-trade information within the public feed as close to real-time as technically possible. ESMA considered that theoretically, the best solution would be that the two feeds are published at the same time, despite being aware that such a solution is not technically conceivable given the inherent characteristics of these feeds and associated systems.

548. Also, in general, ESMA expressed the view that the model should be deterministic, so that the sequencing of feeds is clear, consistent and predictable. Furthermore, it should be transparent to all market participants which model is employed by the trading venue.

549. ESMA noted in the CP the arguments from stakeholders from both sides of the discussion but did not yet indicate its own stance on the topic. ESMA noted that it would like to further research the topic and receive input from market participants.

550. ESMA hence asked stakeholders for their view on the sequencing of the two feeds, on the information availability about the sequencing, and on whether there should be any legislative amendments or policy measures in respect of these feed dynamics.

6.4.2 Feedback to the consultation

551. In response to the first question, the consultation confirmed that it is not feasible for the public and private feeds to be published at the same time, given the inherent characteristics of these feeds and associated systems.
552. More in detail, the consultation feedback highlighted that private and public feeds are the product of two separate processes managed by distinct systems and, as such, the complete elimination of asymmetry between the two is unfeasible. Respondents also reported that the relevant discrepancy is generally considered acceptable, as it is almost intangible.
553. Some respondents also pointed out that the latency goes beyond the control of public venues and concluded that trading venues should retain discretion with regard to the design of their trading systems.
554. Answers also suggested that in the majority of cases the public feed precedes the private ones. Those who took a clear stance in respect of whether there should be a deterministic or non-deterministic approach were all favourable to the adoption of a deterministic approach.
555. Answers were mixed with respect to which of the two feeds should be published first, with a slight majority of respondents favouring priority to be assigned to the public feed. This preference was justified by the need for transparency, avoidance of information asymmetries among market participants or reduction of risk of inside information.
556. Respondents supporting the opposite idea (i.e. to put the private feed first) argued this is necessary to grant time to market participants to hedge their transactions. They also flagged the risk that a public publication coming first would provide some market participants (especially HFT) with an ability to react faster without needing to commit capital to a trade. Lastly, the same respondents stressed that there is no evidence that information received through private fill confirmations is used as inside information, or to take open positions instead of hedging the executed transactions.
557. In relation to information availability, most trading participants stated that a trading venue's chosen sequencing of the public and private feeds is not always sufficiently clear to all market participants and that the information is not easily or not consistently available from all trading venues, or only after bilateral interaction. Some noted that the reason behind this is that trading venues are currently not required to publish information on this topic.
558. Some trading participants expressed their view that information about the relative timing of public and private feeds and other microstructure dynamics should be made available, to provide a level playing field between participants, improve competition, and dispel misunderstandings about how the marketplace operates. Some explicitly expressed that transparency alone is not sufficient. Others noted that the lack of documentation is not material because it only impacts HFTs. As an alternative, trading venues could provide

timestamp information necessary to allow participants to easily measure and monitor these dynamics themselves.

559. From the side of trading venues, varying responses were received. On the availability of information, some mentioned that information about the sequencing of data feeds is available on the respective website. Others said it can only be found on a specific section accessible for trading members only. Lastly, some venues noted that they do not publish any specific information on the sequencing between private and public feeds. ESMA received from only two venues a public link as to where this particular information or general information on the IT systems can be found.

560. Some venues additionally made the following remarks:

- a. Each market participant will only receive private fill confirmations for their own orders and transactions;
- b. The two feeds or paths are architecturally separate (point to point vs multicast) and transit through two completely different component of the trading infrastructure;
- c. It is usually not guaranteed in which order the messages would be received due to the non-deterministic elements of the platform;
- d. The objective of the platform is to disseminate information as quickly as possible;
- e. Pre-trade and post-trade data are available 15 minutes after their initial publication on the website.

561. On the need for legislative amendments or policy measures, it emerged from the consultation that a majority of respondents, consisting of both trading venues and trading participants, did not see a need for introducing prescriptive legislation on the operability of feed dynamics. Among the arguments that were given, mainly from the side of trading venues, it was mentioned that the decision on feed dynamics for a venue heavily depends on the server, system environment and configuration of the venue. It should therefore be left at the discretion of trading venues' operators and industry participants to adjust the models based on liquidity dynamics within the scope of applicable regulatory frameworks. Additionally, it was noted by respondents that a measure that would aim at prioritising public over private messages may not be proportionate in terms of the potential benefits versus the risks inherent in such an approach.

562. Nevertheless, a couple of respondents were in favour of introducing limited rules for trading venues related to the transparency of feed dynamics, which would include publication of information such as whether models are deterministic or not and whether the public or private feed is faster (and by how much, what is the ratio etc).

563. A number of respondents were in favour of introducing legislative amendments or policy measures, in particular requiring that trading venues should have a deterministic trade feed distribution model, whereby public trade messages should be provided at the same

time or ahead of private fill confirmations in accordance with a set level of tolerance. It was mentioned that any potential legislation on this aspect should give more prominence to the principles of fairness and equal access to information. Others noted that it would be beneficial to the market if there was harmonisation across the market as to which feeds are published first but that this should be tackled through a set of best practices within the industry.

564. Finally, some respondents would welcome further information from ESMA as to the objectives and the exact details of legislative amendments and/or policy measures in order to be able to compare these options and speak out a preference.

6.4.3 ESMA's assessment and recommendations

565. ESMA takes note of the fact that market participants confirmed that publishing private and public feed simultaneously is not technically feasible.

566. ESMA also acknowledges that the publishing sequence between the private fill confirmation and public trade messages seems to depend on the trading system and IT architecture used by each trading venue. In addition, there is a demand for flexibility in the publishing regime to allow discretion for trading venues in designing their trading system.

567. Despite a slight majority in favour of the public feed to be published first, ESMA observes that there does not seem to be overall a strong demand for prescriptive rules on the sequence of the feeds and that no significant risk seems to arise from neither of the models (public or private feed first).

568. At the same time, there seems to be an overall request for more transparency regarding the model used (e.g. deterministic vs non-deterministic, public vs private first), as currently in most cases this information is not publicly available.

569. Furthermore, ESMA believes information disclosure on the feed sequence would make the publication process clearer, more consistent and more predictable, to the benefit of all market participants.

570. In light of the above, ESMA proposes to require trading venues to disclose the publication model adopted and, for deterministic models, the relevant sequence of publication, or in other terms, which between the private fill confirmation and public trade messages is published first under their systems. ESMA believes this proposal would increase transparency and avoid uncertainty on how feeds are disseminated. This proposal would require a Level 1 change.

571. At the same time, ESMA would propose to avoid indicating which of the feeds should be published first in order to grant trading venues discretion on the design of their trading systems.

572. Finally, in relation to the suggestion that trading venues could provide the timestamp information, ESMA agrees that it is crucial that trading venues provide sufficient



information to market participants and use timestamps that are granular enough. In addition, ESMA would also consider it beneficial if EU trading venues could work further on harmonising the timestamping standards they used. This would allow for analyses from trading participants to easily measure and monitor these feed dynamics themselves (both on specific trading venues but also between trading venues trading the same instruments). However, for the time being, ESMA does not believe that specific new regulatory requirements should be added to the MiFID II framework. Instead, ESMA encourages EU trading venues to cooperate and work together on the granularity and harmonisation of timestamps.

7 Annexes

7.1 Annex I: Summaries of the responses to the consultation

Q1: What is your overall assessment of the MiFID II framework for algorithmic trading, HFT and DEA?

A majority of respondents made a positive assessment of the MiFID II framework for algorithmic trading, HFT and DEA. Some of those highlighted that the EU markets performed well over the highly volatile period following the COVID-19 outbreak, considering that an indication of the adequate requirements set out under the MiFID II framework. Other responses, on the contrary, negatively assessed the MiFID II framework.

Irrespective of the overall assessment of the framework, a wide range of comments were received.

Some respondents not supporting any changes to the current regime recommended that, in case ESMA proposes targeted amendments to the current regime, these changes should be grounded on a robust cost-benefit analysis.

On the other side of the spectrum, other respondents recommended revising the regime to introduce more proportionality:

- Some considered that the risks posed by algorithmic trading in equities cannot be extrapolated to algorithmic trading activity in non-equity financial instruments. One of these responses requested a full exemption for investment firms engaged in algorithmic trading in derivatives having spot FX contracts as underlying.
- Other stakeholders proposed exempting members of trading venues which are not investment firms from the MiFID II provisions. Another respondent requested applying the MiFID II regime only to market participants using algorithms on a systematic basis.
- Some responses considered necessary reducing the overall complexity of the system and addressing specifically the risks posed by algorithmic trading. Some of these responses proposed as specific parameters to identify the algorithmic trading activities that deserved regulatory attention taking for instance in account the degree of sophistication of the algorithms and the impact that these algorithms could have (on the basis of the turnover of the algo and the primary liquidity of the instrument).

A couple of responses addressed the definition of HFT, noting the decreasing differences between HFTs and the rest of algorithmic traders. One of these responses considered that the current approach to determine high intra-day rates is not future proof and that it does not seem to capture additional firms.

Some noted that the DEA concept is becoming meaningless in the context of the observed technological developments, that make impossible to differentiate DEA from other order

routing systems. In this respect, it is worth noting that certain respondents asked for more accurate guidelines on the DEA concept as they identify diverging interpretations and practices across EU jurisdictions.

Finally, a few respondents considered that Brexit will lead to an increasing number of unregulated third-country firms accessing EU trading venues through DEA, creating an unlevel playing field between them and EU entities, which are obliged to become investment firms. Another market participant also identified the same foreseeable outcome (i.e. more unregulated firms accessing EU trading venues) but did not consider that a matter of concern, due to the role of 'gatekeeper' of DEA providers.

Q2: In your views, are there risks other than the one mentioned in MiFID II or impacts on market structure developments due to market electronification/ algorithmic trading that would deserve further regulatory attention? Please elaborate.

Most stakeholders could not identify risks other than those mentioned in MiFID II or impacts on market structure developments due to market electronification/ algorithmic trading that would deserve further regulatory attention.

A few respondents considered that the current technological 'arms race' is having two main consequences:

- Reducing competition, as only the big market participants can keep up with the heavy investments required leading to a concentration of risks in a small number of firms; and
- The speed at which pre-trade information must be updated makes it non-usable for non-algorithmic participants who may have to use post-trade data to make investment decisions in the mid-term.

Moreover, some respondents called for further reinforcing the operational resilience of trading venues, claiming that outages persist there.

Other responses identified risks related to cybercrime and the concentration of risks in a limited number of CCPs.

Q3: Do you consider that the potential risks attached to algorithmic trading should also be given consideration in other trading areas? Please elaborate.

A large majority of the responses received supported ESMA's view as expressed in the Q&A on Market Structure Issues, i.e. that the definition of algorithmic trading should be limited to on-venue trading.

Some considered necessary extending some of the MiFID II requirements to OTC trading, but not the entire regime. In particular, one of these responses explained that their algorithmic OTC trading activity is unlikely to impact the orderly trading on multilateral venues because such situation would only occur with the combination of three events: i) algorithms' malfunctions; ii) large size orders; and iii) transmission of price aberration on a multilateral system through hedging strategies.

It is possible to identify two sub-groups amongst these respondents: some supported extending the regime only to systematic internalisers, while others considered necessary applying the MiFID II regime not only to systematic internalisers but to any other firms undertaking OTC trading using automated trading processes.

Q4: Do you agree with this analysis? If not, please explain why.

A large majority of respondents was supportive of ESMA's preliminary view that the algorithmic trading framework should apply to DEA users using algorithmic trading techniques while other respondents were against it. The latter stressed in particular that:

- the risks posed by DEA users are adequately addressed by the current regime, whereby they operate under the monitoring and controls of the DEA providers, which are investment firms; and
- imposing more regulatory obligations would raise level playing field issues between EU and non-EU firms accessing trading venues through DEA.

A couple of responses urged ESMA to adapt the regulatory requirements to the different types of algorithmic market participants: while the algorithm developers should be subject to the entire range of testing requirements, the users of those algorithms, which cannot modify the code, should be subject to less stringent requirements.

One of these responses warned against the excessive regulatory burden that MiFID II could create because it would implicitly create 'barriers to entry' that would reduce competition by eliminating small and medium size participants.

A couple of respondents noted that applying the algorithmic trading framework to EU DEA users would further increase the unlevel playing field between EU and non-EU firms accessing EU markets via DEA.

Q5: Did you encounter any specific issue with the definition of HFT? Do you consider that the definition should be amended? Do you have any suggestion to replace the high message intraday rates with other criteria or amend the thresholds currently set in Level 2? Please elaborate and provide data supporting your response where available.

A small majority of respondent supported the current HFT definition while making some proposals for improvement. One respondent stressed that, should any change be contemplated to address the concerns arising from the current static thresholds, this would require adequate consultation of market participants.

Some respondents noted that it is increasingly difficult to differentiate the activity of HFTs from ordinary algorithmic traders. Some of those respondents suggested deleting the concept of HFT and simply adjust requirements for low latency firms in RTS 6.

Other respondents considered that the current thresholds are inadequate because the multiple trading activities undertaken by firms makes it too easy to reach. They consequently requested raising the threshold or establishing different criteria, including qualitative criteria but no advanced proposal was made.

Whilst some respondents were of the view that the HFT definition should include agency trading, other respondents considered that not all own account trading activities should be considered for the determination of HFT. These stakeholders proposed exempting the activities related to market making (in particular in the firm's own financial instruments), liquidity provision paid by the issuer or acting as primary dealer. Only trading activity corresponding to a real trading strategy should be taken into account, in line with Recital (61) of MiFID II.

A few stakeholders considered that the HFT definition should not be applicable to trading activity in certain financial instruments: i.e derivatives having spot FX contracts as underlying and fixed-income instruments.

The determination of the high intra-day rate (HIDR) was addressed by several responses:

- a couple of responses considered that the HIDR should be substituted by qualitative criteria determined by the trading venues, while another stakeholder considered that the HIDR should be established by trading venues on a periodic basis;
- on the opposite side, a couple of respondents opposed to any type of dynamic intra-day thresholds;
- one respondent asked not to consider cancellation messages for those purposes as the possibility to cancel quotes is critical for dealers.

A number of clarifications or adjustments were requested in relation to the identification of HFT activity:

- the time period for the assessment (one respondent asking in particular for shorter periods);
- the HIDR should not be considered when the other two requirements in Article 4(1)(40) of MiFID II are not met;
- low latency infrastructures;
- proximity hosting;
- high-speed DEA.

Q6: Based on your experience, is sub-delegation of DMA access a frequent practice? In which circumstances? Which benefits does it provide to the DEA user and to the sub-delegatees? Are you aware of sub delegation arrangements in the context of sponsored access? If so, please elaborate.

Split views were expressed by respondents. According to some of them, including national trade associations and some trading venues, sub-delegation of DMA is not very common. Some other trading venues explained that they had no information to assess the magnitude of sub-delegation.

Other stakeholders, including large sell-side firms, considered that sub-delegation of DEA is a frequent and important practice, including to access listed derivatives markets. For those stakeholders, DEA sub-delegation allows brokers and intermediaries who do not have the scale to be a direct member of all EU trading venues to provide access to those pools of liquidity to their clients without bearing the cost and complexity linked to membership of multiple venues. Should DEA sub-delegation no longer be permitted, this would lead to a concentration of brokers/intermediaries. DEA sub-delegation is also frequent to allow non-EU affiliates of the same group to access EU markets and Brexit led to an increase of such type of DEA sub-delegation. Stakeholders that addressed the point also agreed that Tier 2 clients would not have access to the trading code of the DEA provider and should not be considered as having DEA for the purpose of Article 2(1)(d) of MiFID II.

One trading venue noted that DEA provision to third-country firms is currently subject to different national approaches among the EU Member States and would welcome a harmonised framework for such DEA provision across the EU to create a level playing field and provide predictability to third-country firms. No respondent was aware of sub-delegation of sponsored access.

Q7 (for DEA Tier 1 clients): Do you sub-delegate direct electronic access? If so, are your Tier 2 clients typically regulated entities/investment firms? Are they EU-based or third-country based?

A limited number of respondents provided some information on their Tier 2 clients. One stakeholder explained that its Tier 2 clients include both entities that are not regulated under MIFID II and third-country entities, but these entities will always have at least some form of local regulatory authorisation or exemption (e.g. ancillary activity exemption). Another one mentioned that Tier 2 clients tend to be a combination of EU and non-EU based entities, regulated within their respective local jurisdictions.

One respondent highlighted that sub-delegation is commonly used in intra-group arrangements, while two others ask for clarification on the use of sub-delegation for intra-group entities, suggesting that intra-group sub-delegation should be excluded from the DEA definition.

Q8: Do you agree with this analysis? If not, please explain why. Do you consider that further clarification is needed in this area? If so, what would you suggest?

All stakeholders agreed with ESMA analysis that clients of on-line brokers should not be considered as having DEA access. Most of the respondents also agreed with the arguments supporting the analysis, i.e. (i) on-line clients do not have control over the exact fraction of a second when their orders enter the trading venue's trading system and (ii) retail clients are not considered to perform investment activities on a professional basis and are therefore not required to seek authorisation as investment firms. These respondents were of the view that no further clarification was needed. Some respondents stressed the importance of online brokerage as a mean to facilitate market access for retail investors and to further develop EU capital markets.

Two stakeholders suggested to further clarify when a person can “exercise discretion regarding the exact fraction of second of order entry and the lifetime of the order within that time frame” and fall in the scope of DEA service, using qualitative and quantitative criteria. The qualitative criterion suggested would focus on whether a client benefits from a dedicated network/link for its trading activities, namely its orders run on a specific data connection line where no other orders can go through. The quantitative criterion would refer to the time elapsed between an order from a client is received by potential DEA provider and the transmission of such order to the trading venue.

A sell-side firm explained that even in the case of DEA sub-delegation to retail clients, retail clients are not to be considered to perform investment activities on a professional basis and should therefore not be required to seek authorisation as investment firms

A trading venue argued that only sponsored access clients can exercise full discretion of order entry and have equivalent direct access to trading venue systems as members and participants of trading venues. That venue therefore suggested that ESMA considers removing DMA, i.e. where clients access trading venues through a DMA provider’s infrastructure and systems, from the definition and scope of DEA.

Q9: Do you agree with ESMA’s proposal? If so, do you consider that the requirements considered above relevant? Should there be additional ones? If you disagree with ESMA’s proposal, please explain why.

A majority of the sell-side firms that responded to the question strongly disagreed with the proposal to extend the definition of algorithmic trading in Level 1 and apply some of the algorithmic trading requirements to systematic internalisers. The main argument put forward is that quotes from systematic internalisers cannot be a source for risk of market disturbances and should therefore not fall under the regulation. According to these respondents, it is not reasonable to assume that the typical risks that may affect trading venues (such as risk of systems overloading, risk of algorithmic trading generating duplicative or erroneous orders, risk of overreaction to market events), would occur on systematic internalisers. A couple of respondents noted that the quotes made by a systematic internaliser create risks to the systematic internaliser itself and not a source of risk to the financial system, which the MiFID II algorithmic trading framework seeks to address. One stakeholder further noted that extending the definition of algorithmic trading to systematic internalisers would not be relevant for “opt-in” systematic internalisers that may not be using algorithmic trading functionalities.

In addition, more often than not, systematic internalisers use algorithms which are simultaneously used on a trading venue which means that they have to comply with all relevant organisational requirements (e.g. regarding the testing of algorithms). Furthermore, applying the algorithmic trading framework to systematic internalisers would be costly which could discourage new systematic internalisers from opting-in, or lead to current systematic internalisers ceasing their activity, with the effect of reducing liquidity and efficiency of EU markets with little improvement in market robustness. One firm stressed in particular that there currently is no observed source of risk or confusion or potential disruption from chain reactions in bond markets from systematic internalisers using algorithms.

Although opposed to extending the algorithmic trading definition to systematic internalisers in Level 1, some sell-side firms had more nuanced views. One firm considered that it is appropriate for firms acting as systematic internalisers to be required to apply governance, testing and appropriate risk controls to the algorithms that they use for quote generation. The main purpose is that the quotes displayed, streamed or sent to counterparties or clients are not a source of risk for the systematic internaliser itself and/or a source of confusion, disruption or potential chain reactions in the wider market. A couple of firms suggested that, should some controls be applied to OTC automated trading processes, these obligations (i) should be fitted to the OTC trading activity including to the various asset classes traded to avoid disruption for clients, and (ii) should apply independently from the size of the dealer using OTC automated trading processes.

All trading venues that responded to the question, as well as a couple of HFT firms, agreed with ESMA's proposal given the increasing role played by systematic internalisers or supported the spirit of it, i.e. to consider the potential risks arising from algorithmic trading wherever trading takes place. A trading venue noted in particular that, as systematic internaliser trading is, by definition, frequent and systematic and considering systematic internalisers are eligible execution venues for the purposes of the trading obligation, it is prudent to ensure that quotes they display, stream or send to counterparties or clients are subject to key organisational provisions such as:

- (i) governance arrangements for trading systems and trading algorithms;
- (ii) controlled deployment of algorithms; and
- (iii) kill functionality and other risks controls.

Q10: Do you agree with ESMA's proposals above? Please elaborate.

Authorisation of DEA users

All respondents agreed with ESMA's proposal to no longer require a DEA user only trading on own account on a trading venue to be authorised as an investment firm. The point generally made by these respondents is that the combination of a robust set of rules that apply to either a direct member or to the DEA provider (as an EU regulated entity) means that it is possible to delete the exemption in Article (2)(1)(d) in respect of DEA users without diminishing the level of oversight available to regulators and venues over EU markets and their direct and indirect participants. This also has the benefit of ensuring that there is no difference in treatment between EU firms and non-EU firms and there is consistency of regulation across the EU.

Inclusion of sub-delegation in the definition of DEA

The proposal to include sub-delegation in the definition of DEA created some confusion amongst stakeholders. Some respondents were not sure to understand the impact of this proposal and questioned whether a Tier 1 client, that would not be authorised as a bank or investment firm, could sub-delegate DEA access to a Tier 2 client. Other respondents disagreed with the proposal as, in their understanding, the insertion of sub-delegation into the definition of DEA coupled with the proposal for Article 1 of MiFID II to require a DEA provider

to seek authorisation could inadvertently lead to an authorisation requirement for both the sub-delegator and the market member.

Only one sell-side firm supported this inclusion because it considered legitimate to maintain an authorisation requirement for DEA users offering DEA sub-delegation to their own clients given their sub-delegation services necessarily come with investment services such as execution of orders. According to this respondent, the definition of DEA should be amended to make the distinction between those clients using DEA on own account only and clients sub-delegating DEA to their own clients.

Provision of DEA users' number and names to the NCA on an annual basis

Most respondents were against the proposal to amend Article 17(5) of MiFID II to provide the number and names of DEA clients annually to the NCA. This was considered an unnecessary burden without identified benefits as the DEA clients' LEIs are available in Transaction Reports. Alternatively, it was suggested that the NCA could make a specific request to the DEA provider whenever needed.

Authorisation of third-country HFT firms as investment firms

A majority of stakeholders were against the proposal to require third-country HFT firms to be registered as investment firms, with split views from trading venues.

The arguments put forward against this proposal mainly focussed on risk assessment and liquidity impact. Respondents stressed that seeking a consistent treatment of EU and third-country firms cannot be an end itself. The focus must be on whether authorisation as an investment firm is necessary from the point of view of maintaining the integrity of EU markets. In that regard, some stakeholders suggested that the risk arising from third-country HFT firms were already adequately addressed by the requirements and controls operated either by the trading in case of direct participation or by the DEA provider. However, a larger number of respondents suggested to operate a distinction between the two types of access and apply the reasoning underpinning the proposal on DEA users' authorisation (i.e. reliance on the DEA provider requirements) to HFT firms accessing EU markets via DEA. According to these respondents, third-country (and EU) firms that conduct HFT activity on EU markets should be required to do so via DEA, unless the firm conducting HFT strategy is already regulated in the EU as an investment firm. This would strike the right balance between providing equal access for, and oversight over, EU and international HFT firms as these firms would be already subject to the relevant control frameworks of the DEA provider who themselves are subject to RTS 6.

Stakeholders against the proposal also stressed that MiFID II authorisation regime would not meaningfully improve the present situation and could undermine the attractiveness of EU markets. One trading venue in particular stressed that the proposal would raise substantial barriers for third-country HFT firms to participate in EU capital markets, likely resulting in third-country HFT firms withdrawing their participation in EU markets, which would significantly harm the ability of exchanges to compete on a global basis. In its view, the proposal would thereby seriously undermine the EU's ambitions to foster the Capital Markets Union and increase the international role of the Euro. This negative impact on EU liquidity could be very significant considering the broad encompassing HFT definition/thresholds. Another respondent stressed

that such extra-territoriality, if enacted, could harm EU investment firms operating on non-EU trading venues, as it would likely prompt 'retaliatory' protectionist rules in third countries.

Finally, one respondent noted that the proposed authorisation requirement for third-country firms would undermine the equivalence framework set out in Title VIII of MiFIR for the provision of investment services and performance of activities by third-country firms following an equivalence decision with or without a branch.

Proponents of the authorisation of third-country HFT firms mentioned the need in to preserve the integrity of financial markets and to ensure an equal treatment of EU and non-EU firms.

Q12⁴⁴: Do you see merit in ESMA developing a template for notifications to NCAs under Articles 17(2) and 17(5) of MiFID II? If not, please justify your position.

The majority of the respondents supported ESMA's proposal of developing a harmonised template for notifications to NCAs, and also agreed with the exemplificative list of information provided by ESMA on paragraph 84 of the consultation paper.

Most agreed that any initiative aiming to make communications more standardised and homogeneous at EU level is likely to bring positive effects on the efficiency of the financial industry's communications and administrative processes.

Several of the agreeing participants also noted the importance of ensuring that such template does not impose new requirements (outside the criteria outlined in Article 17) or create uncertainty as to how it should be completed. In fact, most added that the template should not be associated with any additional administrative burden for firms.

One of the respondents added that NCAs should also have flexibility to ask, as part of the notification, information they really need from investment firms and not unnecessary information.

Several participants did not agree with ESMA's proposal, deeming it to be currently unnecessary. According to them, NCAs should have flexibility to ask for the notification of information they need, and they see no merit in a prescriptive (and most likely burdensome) ESMA template for investment firms' notifications to NCAs.

Three of the respondents suggested that instead of developing a template for notifications to NCAs, investment firms should restrict the notifications to their own NCA only. The NCAs would then exchange these notifications amongst themselves to the extent necessary. This approach would reduce red tape significantly and, at the same time, ensure that every NCA has the necessary information at any given time.

Q13: Do you agree that it would be useful to clarify that notifications should be done 'without undue delay'?

⁴⁴ Please note that there was no question 11 in the consultation paper.

Most of the respondents agreed that ESMA should further harmonise the timeframe for the notifications. Several added that more clarification of the concept would be beneficial, and that even though they agree with the overall harmonisation idea and adopting 'without undue delay', then further guidance as to what types of situations are 'without undue delay' would be welcomed.

The participants that did not agree with ESMA's proposal justified it by stating that no further clarifications are needed since no major issue or concern was raised on this topic and it is redundant to add such definition to the law when all the players understand the concept.

The majority of non-agreeing participants also added that such restrictive clarification might impose an unreasonable burden on firms and that, since the level of sophistication and the quantity of algorithms used vary by firms, it is fundamental that each firm remains responsible for deciding how to notify its NCA and the NCAs of the trading venues where it operates its algorithms.

Q14: Do you agree with ESMA's approach for the exchange of information between NCAs? If not, please justify your position.

The vast majority of the respondents agreed with ESMA's proposal to facilitate the exchange of information should there be a need in the future. Some added that a template for the exchange of information between NCAs would already be desirable, as such template may reduce the burden for participants making the same notification to several NCAs.

One of the respondents suggested that any format should be determined after discussions between ESMA and the NCAs.

Another respondent recommended to also use such type of communication channel to exchange information, related to the notification, from the home NCA of the investment firm using algorithms on trading venues to the NCAs of the concerned trading venues. This would allow firms to only notify their own NCA and not all the NCAs of the trading venues where they intervene. By analogy, under the short selling regulation, market makers notify their status only to their NCA and not to all the NCAs of the trading venues on which they are market makers. The respondent also added that a unique notification to ESMA could also be a new possibility that should be explored in order to mutualise NCAs' resources.

One respondent noted that there is no clear evidence of any issues regarding this topic. The respondent also stated that developing a template for the exchange of information between NCAs a) may not automatically increase the level of interaction between NCAs and b) may not address the fact that NCAs are best placed to assess the level and content of information they need.

Q15: What is your view on clarifying the definition of algorithmic trading? If you deem it beneficial to refine the definition and account for further types of algorithms or algorithmic trading strategies, please provide your suggestion as well as underlying rationale.

A slight majority of respondents expressed a preference for maintaining the definition as it currently stands. Those in favour of the current definition noted that the definition is clear, that

previous concerns have been addressed by additional guidance provided in ESMA Q&As, and that therefore changes to the definition are not required. Respondents noted that attempts to make the definition more specific or granular would likely lead to confusion, and that it will not be possible to conclusively capture all types of algorithms or strategies. Respondents also highlighted that any detailed changes should be developed in close consultation with industry specialists, as there are large differences between algorithms and trading modalities in equity and fixed income markets.

Those in favour of changing the definition suggested the following ideas:

- a. Distinguishing between 'algorithms' providers/technology ownership/sponsorship' and 'algorithms' user/client', whereby the regulation should focus on the former;
- b. Allowing for a risk-based approach and refining for simple (less sophisticated, lower risk profile or limited market impact) versus complex algorithmic strategies;
- c. In particular, accounting for differences in strategies that are mainly replicating, with minor extensions, types of orders that are native in the trading venues (e.g. dynamic stop loss orders), and those that optimize the placement of quotes on the market;
- d. Differentiating for pure execution algorithms and automated execution processes (TWAP, VWAP, SOR, Autospreaders, etc);
- e. Excluding algorithmic traders that run market making strategies;
- f. Distinguishing between liquidity providers and high-frequency traders who operate different business models;
- g. Clarifying the scope of algorithmic trading in relation to chains of orders;
- h. Clarifying the notion of "limited human intervention", e.g. ongoing / real-time human active monitoring versus passive monitoring.

In terms of process, some stakeholders highlighted that according to them clarifications could be done by producing a list of examples from which it is clear what is to be understood as algorithmic trading and what is not, in order to avoid conceptual ambiguity. Some suggested this could be done via Q&As.

However, other respondents noted that any clarifications in terms of what is excluded in the regulatory framework or what should not be considered as algorithmic trading should preferably be decided on Level 1.

Lastly, some stakeholders took the opportunity to indicate points related to other questions in the consultation paper. These included the following:

- a. Clarifying the distinction between DEA and order routing;
- b. Excluding trading via DEA or OTC from the algorithmic trading requirements;

- c. Limiting the scope and continuing the exclusion of SI quoting from the definition of algorithmic trading;
- d. Amending the Level 1 definition of algorithmic trading by inserting an explicit reference to trading “on a trading venue”.

Q16: Do you think there should be specific requirements for different type of algorithms or algorithmic trading strategies in RTS 6? Please explain.

The majority of respondents did not consider it necessary to outline specific requirements in RTS 6 for different types of algorithms or algorithmic trading strategies. Among the arguments used, it was noted that the current requirements are adequate as they stand and that specific requirements may only add complexity and lead to ambiguity.

Of those respondents that did call for an amendment to the requirements, many referred to their response to the previous question as to where the differentiation could potentially be introduced (e.g. synthetic order types, automated execution decisions, simple algorithmic strategies, market making/liquidity provision).

Some respondents expressed the need for proportionality and highlighted that this principle should be applied wherever possible. According to respondents this principle should be used as a general interpretation criterium and in that way differentiate, for example, whether aggressive or and passive/simple algorithms might be treated differently. Respondents noted that, in particular considering the use of different types of complex and less complex algorithms as part of the same basis, the principle of proportionality is better suited as opposed to newly calibrated requirements. One respondent expressed that the overall level of proportionality should be increased and that it is necessary to integrate a general statement aimed at confirming the use of proportionality for all the provisions on algorithmic trading.

Q17: What is your experience with testing environments? Are they used frequently? If not, why? Do you see a need for any improvements?

While some respondents noted that they had a good experience with the testing environments, most respondents would see it necessary to have at least some improvements in the way the testing environments are set up or offered. Some highlighted that the testing environments offered by trading venues are suitable only for conformance, gateway and connectivity testing, the testing of simple algorithms, and some stress testing. Environments would rarely be able to meet the requirements, design, functional scope required to cater for all type of businesses and algorithms and would require enhancements to be of sufficient quality and reliability to test complex ecosystems and undertake robust testing of disorderly trading conditions. Firms alternatively perform tests based on test scenarios and simulation in their own testing environments.

Among respondents, there was some discrepancy as to whether the onus should be on the trading venue to support all realistic scenarios or on investment firms to design and deploy test scenarios that are appropriate and proportionate to their business. Proponents of the latter mentioned that, as testing algorithms' behaviour often requires the simulation of several venues and data sources at the same time, the behavioural testing of algorithms is mostly

executed in an environment designed and maintained by the investment firm, and should best be left to the responsibility of the investment firm.

Some respondents expressed a preference for no changes to the framework, as they have had good experience with testing environments, and they consider that the current regulation provides sufficient clarity.

As mentioned, most respondents suggested at least some improvements and provided comments on a variety of aspects. A large group of respondents provided comments on the limited representativeness of real trading conditions in testing environments and provided suggestions for more realistic testing (same message order capacity, focus dates for simulation of stressed conditions, improved data quality, ensured liquidity to interact with, open testing sessions, use of real symbols instead of synthetic/mock symbols). However, some respondents advocated for a less strict demarcation in production and testing, e.g. through the use of dummy symbols in the production environment or through being able to use an environment that is not completely separate from its production environment but rather does not impact its production environment.

Several respondents commented on the up-time or availability of the testing environments and noted that this could be improved to avoid unnecessary delays in deployment, e.g. by making available testing facilities during normal business hours on every business day or making the test periods longer in the event of major changes. This was mentioned in relation to both trading venues and providers of algorithms.

A couple of respondents also noted that at least two testing environments should be available: one running the current production version and one running the new release environment that includes the upgrades to be introduced.

A few respondents noted that the stress testing requirements set out in Article 10 of RTS 6 are too prescriptive (i.e. more discretion should be left to the investment firms). These respondents highlighted that stress testing of algorithms should not be prescribed at a mandatory level based only on the last 6 months trading. Stress testing should allow for firms to choose realistic scenarios. Respondents noted that recent market events, such as COVID-19 volatility episodes in Q1 2020, are illustrative for this purpose.

The following suggestions were also made:

- a. Charging for access to the testing environment, which is sometimes being done, could disincentive members to perform testing. The test environments should not be looked at as profit centres by trading venues;
- b. It should not be required to run conformance testing of algorithms with trading venues where such algorithms do not directly connect to the venue but use a trading gateway or DEA;
- c. Algorithms' providers should be encouraged to use independent verification systems. Frequently algorithms' providers use their own software to check and control the well-functioning of their algorithms; however there should always be an independent piece of software that double checks this to ensure the implementation is correct;

d. In the case of the use of an unregulated supplier, it may be difficult to ensure that the latter carries out the necessary tests to verify the algorithms supplied (despite the contractual obligation). Furthermore, investment firms also face difficulties because of the protections imposed by intellectual property which prevent them from accessing the algorithm data and code necessary to appropriately carry out the tests;

e. Certification tests are often very complex, too time consuming and insufficiently focused on what is important to test and verify, e.g. sometimes the firms have to create special versions of the software, especially for the certification test, which defeats the purpose of a certification test.

f. More formalised mechanisms should be established to solicit, assess and respond to member feedback on requirements for testing environments, with this information shared with NCAs;

g. ESMA should promote more consistency between trading venues. Testing criteria and process can be different from venue to venue, causing different testing outcomes;

h. Testing environments should be used by a dedicated testing team, which performs tests according to the requirements stated. It could be problematic if tests are only performed by developers (developer in test) - i.e. the same person who writes the code according to the requirements - as they interpret the requirement.

Lastly, on the process, two respondents noted that the suggestions for improvement should not result in a Level 1 change but should rather be identified as best practice through further ESMA guidance or be developed by a dedicated technical industry group.

Q18: Do you agree that the definition of “disorderly trading conditions” should be clarified? If yes, how would you define such trading conditions?

The majority of respondents were against the proposal to introduce a definition of “disorderly trading conditions” referring to a market where the maintenance of a fair, orderly and transparent execution of trades is compromised. The main arguments at the base of this opposition were:

- No definition is needed as currently there is a robust control framework able to ensure stability to algorithm trading activities. This was proved by the well-functioning of algo trading activities against the high volatility which was experienced due to the COVID-19 crisis;
- A definition would fail to account for the differences in trading models and market structure in all assets classes;
- An attempt to define all scenarios would add an overly complex burden on market participants with respect to testing;
- A principle-based approach would be preferable as it would allow market participants to tailor tests according to their specific features.

With respect to the particular definition suggested, some opposing respondents were of the view that it is vague and does not add any value, whilst some others pointed out that disorderly trading conditions can occur without trading being compromised.

Nevertheless, a few (opposing) respondents that did not see merit in a definition, did see merit in ESMA providing concrete examples to identify disorderly trading conditions, whilst some others encouraged ESMA to improve tools available and in particular test symbols in the test environments.

Only the minority of respondents were favourable to the proposal. Favourable respondents also made some suggestions such as:

- To include certain risks relating to market structure disruption (as system outages, trading venues disconnection, or inability to access the system) as well as extraordinary and unlikely conditions (in terms of market volatility and volumes) or general IT failures; and
- To provide specific instances to help concretely identify the conditions, also by way of examples which could supplement the definition.

Among favourable respondents, few were of the view that a Level 1 amendment is the best solution and pointed out that including the same definitions into RTS 6, 7, 9 would also be a good option.

A few respondents did not take a clear stand. Some motivated their lack of reply on the need to have further background on the definition to express a view.

Q19: Do you agree that ESMA should provide additional guidance on the expectations concerning the checks and testing to be done, in particular for testing on disorderly trading conditions?

The majority of respondents were against ESMA's proposal to provide additional guidance on the expectations concerning the checks and tests to be done, in particularly for testing on disorderly trading conditions.

These respondents argued that the procedures in place are already sufficiently comprehensive, well developed and effective (e.g. "behaviour testing" is already implemented via throttles, circuit breakers, electronic fat fingers, stress tests, etc., which in turn automatically trigger kill switches etc.)

This group also stressed a principle-based and proportionate guidance approach is essential. Such approach provides firms with the necessary flexibility to identify elements to be tested depending on the features of the algorithms and asset classes and therefore permits to better address the complexities of automated trading activities. Contrastingly, a more perspective approach would fail to be comprehensive, and would only increase complexity and costs without adding value.

A few respondents pointed out that testing environments cannot replicate exactly market functioning, and on this basis highlighted either the impossibility to have tests that guarantee complete certainty of the algorithm behaviour or the importance to include initial limited live

trading as part as overall testing. One respondent suggested ESMA to introduce regulations to encourage trading venues to provide concrete risks controls including the ability to mechanically validate the setting at the exchange.

Favourable respondents were the minority and argued that further guidance on testing would enhance the consistency and comparability of results obtained by different investment firms.

Some of them also stressed the need for guidance to be principle-based rather than prescriptive considering the need for flexibility. Furthermore, some favourable respondents indicated that for the proposals to be effective, it would be essential to consult with the industry, especially to collect information from market participants on practical examples concerning the checks and testing. One respondent suggested ESMA to clarify that testing should be done on a platform which allows an algorithm to interact with other algorithms in a realistic simulation of a live market.

Q20: Would you agree that it could be beneficial if ESMA develops a prescribed format for the self-assessment foreseen in Article 9 of RTS 6?

There were mixed views with regards to whether a standard format of self-assessment for investment firms should be developed. A small majority of replies was against the proposal. Respondents highlighted that many firms have already implemented the process of their annual assessment, and the proposed change of format would not be justified since there has been no evidence that the current assessments are insufficient. They also stressed that it is important that the review is evaluated by the regulators. Furthermore, those respondents believed that any self-assessment need to take into account the nature, scale and complexity of business and a one-size-for-all approach would not be appropriate. Instead, high-level principles for assessment are more appropriate and the criteria for the self-assessment included in Annex of RTS 9 are sufficiently detailed.

Other respondents agreed that a standard template would be helpful and indicated, that there are already examples of such standard template, such as a common approach adopted by Italian investment firms. They considered that the standard format would facilitate a more consistent reporting and would provide legal certainty to participants. One firm recommended that the assessment remain annual, given the fast pace of innovations in the market.

Furthermore, respondents highlighted that if such format is to be developed:

- it should be not overly prescriptive and give sufficient flexibility to firms of different sizes and practices;
- it should be consulted with the relevant industry associations;
- a cost and benefits analysis should be conducted before proposing the template;
- it should only provide the minimum requirements, allowing larger firms to add additional information which they may consider relevant.

Q21: Do you agree with the changes proposed to the self-assessment of Article 9 of RTS 6?

Most respondents did not concur with the amendments to the self-assessment proposed by ESMA. In many cases, the respondents only accepted the reduced frequency of assessment to a bi-annual basis, but either clearly disagreed or did not comment on the other proposed amendments (the proposal was drafted as a package and these latter replies are therefore considered as expressing a disagreeing position).

Overall, the replies which did not concur with the ESMA proposal found the approach overly prescriptive. In particular, the proposed changes with regard to test environments could lead in their view to adding complexity to the assessment and were not considered useful. Many firms suggested that the review should be submitted to NCAs only upon request.

A fair number of respondents agreed that the assessment should be a proper due diligence. The reports should be validated by the NCA. While it is important to increase the quality of reports, it is also relevant that the dialogue between investment firms and NCAs is improved. Interestingly, many respondents who agreed with the proposals indicated that the assessment should remain to be prepared on annual basis, or to be adapted to frequency of deployment of new technologies. In general, the proposal to add information related to the testing environment was considered sensible.

Additionally, one respondent suggested that, in addition to the reference dates, the submission date should also be defined.

Q22: Would you propose any other targeted legislative amendments to RTS 6? Please include a detailed explanation of the proposed amendment and of the underlying issue that this amendment would aim to tackle.

The following proposals on possible RTS 6 amendments were put forward by the respondents:

- Article 6(1) of RTS 6 on conformance testing should only concern "directly connected" algorithmic trading systems and trading algorithms, in order not to require unnecessary tests as , for example, when changes are made to upstream pre-trade risk management checks;
- Article 7 of RTS 6 on testing environments seems too prescriptive; it should clarify the principle that no testing should impact the production; the current wording could be understood as prescribing that the software / hardware used for testing should be different than the one used for production;
- Article 9 of RTS 6 on self-assessment could specify the submission date to the NCA;
- Article 10 of RTS 6 on stress tests is too prescriptive and should be more principle-based; the current version creates implementation challenges; in particular, specifying the look back period to six months removes the flexibility for firms to test what might be a more appropriate look back period; in addition, it should be clarified that the test should be done "both under normal and severe but plausible market conditions";
- Article 16 of RTS 6, on real time monitoring, should be adapted to take into account that not all investment firms which are using algorithmic trading techniques are

members of a trading venue; it should also consider that in practice such monitoring is done by the trader, while the controls of the risk department and/or independent risk control function are not real-time;

- Article 17(3) of RTS 6 on reconciliation should require investment firms to compare their electronic trading logs with "an external view of [their] trades and positions" rather than "information about [their] outstanding orders and risk exposures"; ESMA should also consider replacing "its own electronic trading logs" with "the information that the post-trade controls are based on";

- the overall regulatory burden put on investment firms by RTS 6 should be reduced;

- further guidance could be provided to clarify the requirements on stress-tests under Article 10 of RTS 6, such as characteristics of the environments to be used, tests granularity, metrics to be considered, lookback period of the tests, methodologies used and KPIs to be considered.

Q23: Do you agree with ESMA's proposal to harmonise and create a clear structure for the performance of the self-assessment?

A slight majority of respondents agreed with ESMA's proposal to harmonise and create a clear structure for the performance of the self-assessment.

Respondents in favour of the proposal believed that there is a need to have further convergence on the due diligence required from trading venues. However, respondents cautioned that this exercise should be limited to high-level content and principles.

Some respondents suggested that the self-assessment takes into consideration the nature, scale and complexity of the algorithmic trading activity undertaken on the trading venue and highlighted that any further development should be as simple as possible for all involved participants.

One respondent considered that ESMA could seek to create a modular self-assessment, with different modules being required depending upon the type of trading system employed.

Finally, most respondents that agreed with the proposal also suggested that further consultation (possibly via a roundtable) on the content of such harmonised structure may be advisable.

Respondents who disagreed with ESMA's approach considered that the self-assessment has achieved its purpose, has so far worked quite well and remains appropriate to be undertaken by trading venues.

Some respondents argued that the proposal is vague and could lead to a very detailed reporting mechanism that would represent a real burden for trading venues and might create redundancies.

Other respondents were of the view that the guidance already provided in the Annex of RTS 7 is sufficiently clear and represents a solid base for the establishment of a harmonised approach and format to the self-assessment.

Finally, should any initiatives be undertaken in this area, a number of respondents advised that trading venues should be given enough time to implement any new approach.

Q24: Do you agree with limiting the self-assessment to every two years and to require trading venues to share it with their relevant NCA?

The vast majority of respondents agreed with ESMA's proposal to require the self-assessment to be performed every two years and to require trading venues to share it with the relevant NCA.

Some of these respondents also cautioned that algorithms may evolve rapidly and therefore NCAs should also retain the possibility to request the self-assessment to be performed more frequently.

Despite agreeing with limiting the self-assessment to two years, a minority of respondents disagreed with the obligation to share the self-assessment with NCAs as, in their view, it would add unnecessary administrative burden and costs to trading venues.

Some respondents requested ESMA, should NCAs retain the possibility to request the self-assessment more frequently than every two years, to consider providing guidance that limits the circumstances whereby NCAs can make such request. For example, this could include circumstances where the trading venue has either encountered compliance issues or, where a trading venue introduces material changes to the existing framework. In such instances, a more frequent assessment(s) would be deemed necessary and justified.

A minority of respondents noted that algorithms tend to evolve fairly quickly requiring regular reviews to mitigate any potential risk arising from it. The self-assessment should be done at a different time than for RTS 6 and on a risk-based assessment depending on complexity, scale, and nature of the activity.

Finally, a number of respondents did not provide concrete comments on this question but rather noted that, regardless of the way forward, the requirements should be aligned with those applicable to investment firms.

Q25: Do you agree with ESMA's analysis about the overlapping requirements between RTS 6 and 7? Are those overlaps considered beneficial, should they be removed or are there any gaps? Are there any further points that should be clarified?

The majority of respondents that provided a view on whether there are any overlapping requirements between RTS 6 and 7 agreed with ESMA's analysis. However, most of these respondents stated that those overlapping requirements are beneficial and, in some circumstances, expected as they increase the overall resilience and don't put the onus of testing on either side.

Some respondents however called for a clarification of the respective responsibilities falling under trading venues and investment firms. The majority of respondents agreed that trading venues should be responsible for providing adequate, resilient, solid and reliable testing environments. They however noted that the ability to test and certify the soundness of the algorithms they deploy is solely the responsibility of the concerned investment firms.

Generally, trading venues considered that the responsibility for the testing itself can only reside with the investment firm, but trading venues must provide testing environments and should seek confirmation that firms using their platforms have conducted appropriate testing.

Investment firms however believed firmly that the maintenance of orderly and resilient markets lies with the trading venues and the way they operate the market infrastructure is critical. Accordingly, from both a practical and principled standpoint, an effective, comprehensive and proper testing of algorithms (although relying on both market participants and trading venues) relies primarily on the facilities maintained by trading venues. Trading venues are best placed to simulate the trading conditions that prevail on their platforms and thereby ensure that testing is effective and realistic. While the testing conducted by investment firms is key, it is not an equal or adequate substitute to the testing that is taking place on trading venues which are very well placed to support the testing of algorithms in production-like environment.

Some respondents also mentioned that a clearer definition of what stress test and conformance test mean is needed. Respondents considered that, from a trading venue perspective, a conformance test concerns both the operations generated by an algorithm and the operations that require human intervention and is aimed at verifying the correct connection of the investment firm's system to that of the trading venue. However, stress testing concerns testing that the investment firm must carry on its algorithm against which, for the purposes of MiFID II, the trading venue asks for a self-certification from the member.

One concrete proposal was that only Article 10 of RTS 7 contains the obligation on investment firms both to certify to trading venues that their algorithms have been tested for their contribution to market disorder and to explain the testing (Article 10 (1) of RTS 7). Many investment firms seem to have been unaware of these responsibilities because they did not occur in RTS 6. For them, it would, therefore, be very helpful to avoid misunderstanding to reproduce the relevant clauses in RTS 6. In general, overlapping requirements are beneficial in protecting fair and efficient markets by ensuring that both investment firms and trading venue operators have clear and consistent regulation which avoids gaps.

Q26: What is your view with regards to the testing of algorithms requirements? Do you agree that more robust testing scenarios should be set?

A significant majority of respondents did not agree that more robust testing should be set.

Respondents argued that the current requirements are appropriate to the needs of the market and ensure that disorderly trading is prevented. Some of these respondents noted the example of the volatile period during the outbreak of the COVID-19 pandemic emphasizing that analysis proved trading venues to be broadly resilient. With this in mind, these respondents did not see a reason to require more robust testing.

A few respondents reiterated the need for the requirement to be proportionate ensuring that testing scenarios are set considering the complexity, scale, and nature of the trading algorithm.

Furthermore, respondents noted that testing should be principle-based approach and that too prescriptive testing would not reflect the heterogeneity of individual business models and trading strategies.

Finally, some respondents noted that testing should only be required where there are material changes to the algorithms.

Q27: Are the testing environments available for the testing of algorithms appropriate for this purpose?

Most respondents were of the view that testing environments are currently fit for purpose.

However, a number of respondents indicated that testing environments could be improved. Whilst they considered environments as appropriate for testing the basic operating logics of the algorithms for the purposes of conformance tests, other areas could be improved. In order for testing to be robust and have sufficient quality and reliability, some respondents were of the view that trading venues should be encouraged to provide more realistic simulation environments.

One respondent also mentioned that trading venues cannot only replay historic data but produce a realistic simulation of market conditions, including allowing algorithm users to interact with other algorithms.

Q28: Do you agree with ESMA's analysis that the circuit breaker mechanism achieved its objective to avoid significant disruptions to the orderliness of trading?

Overall, respondents agreed with the analysis indicating that the circuit breaker mechanism has achieved its objective of protecting markets against episodes of extreme volatility affecting particular instruments or the whole market. This has been evidenced during the past volatility events. Some replies compared the circuit breakers mechanism to short selling bans and considered the former to be a more helpful mechanism in aiding the orderliness of trading.

Q29: Do you agree that the requirements under Article 48(5) of MiFID II complemented by RTS 7 and the guidelines on the calibration of circuit breakers and publication of trading halts under MiFID II remain appropriate? If not, what regulatory changes do you deem necessary?

While majority of respondents agreed that the current regulatory requirements are fit for purpose, some respondents provided the following suggestions:

- there should be more transparency from the trading venues on the circuit breaker mechanisms in order to allow investment firms to assess their arrangements and algorithms; currently this information is published only by some venues.

- There should be greater regulatory scrutiny of the process used by trading venues when updating their procedures impacting circuit breakers; to this end, Article 48(5) of MiFID II could include an obligation to provide information on circuit breakers to trading venue's members.
- Circuit breaker parameters used by some trading venues should be simplified and be more predictable for market participants.
- Some market participants considered it useful that following the volatility event, the resumption of trading happens simultaneously at different exchanges. Trading venues disagreed with such proposal and considered each marketplace having its own dynamics and such interlinkage very costly.
- The procedure of dissemination of the information about the halt in trading could be improved; other trading venues considered EU market structure more prone to "local" events and coordination effort would not be justified.
- The requirement to report to ESMA the circuit breaker parameters are burdensome and should be re-considered.

Q30: Do you agree that the co-location services and fees structures are fair and non-discriminatory? Please elaborate.

The majority of respondents considered the co-location services and fee structures as fair and non-discriminatory. Some of respondents highlighted that the same requirements should apply to third-party service vendors and proprietary trading platforms.

Regarding co-location services, one respondent proposed that Article 1(2) of RTS 10 includes connectivity to external telecommunications services, which in their view is needed to address an issue of better latency of some participants. Similarly, another respondent proposed to further ensure that trading venues provide fair and competitive environment across telecommunication providers. These proposals could be addressed by supervisory actions and should not require changes in the regulation.

With regards to fees, it was suggested by one respondent that fee structures which promote non-genuine orders should be prohibited. Moreover, some replies highlighted the need of further work in the area of costs of market data, that are not related to their cost base, which is detrimental for clients. This topic is covered under a separate workstream on market data.

Q31: Do you think that the disclosures under RTS 10 made by the trading venues are sufficient or should they be harmonised among the different entities? Please explain.

Most respondents, including trading venues and several market participants, considered the current disclosures under RTS 10 sufficient and did not consider it useful to further harmonise these publications. Trading venues highlighted that there should be sufficient flexibility for these publications to reflect the different services they offer.

Many market participants however considered it necessary that the publications are enhanced. Some trading venues do not publish the required information. Among those that do publish information, the disclosed information is often overly complex, which makes it very challenging to discuss the conditions and negotiate the rising prices. In particular, the information provided on co-location services is sometimes unclear. Moreover, the comparison of costs of co-location is challenging, since some venues provide granular information, while others only include unique fee. Few replies indicated that fees should be provided separately for co-locations and other services. Some recommended that historical prices are included for at least last 5 years.

Overall, it appears that while their publications should be simplified and enhanced, there is not a general agreement on implementing a standard format for the disclosures.

Q32: Do you agree with ESMA's proposal to set out the maximum OTR ratio, calibrated per asset class?

The vast majority of respondents welcomed ESMA's efforts to ensure a consistent level of protection across trading venues. However, they did not agree with ESMA's proposal and considered it too restrictive.

The respondents that did not support ESMA's proposal defended that the OTR calibration should be left to the trading venues.

Several stated that it would be difficult to define an adequate maximum ratio which would reflect varying liquidity levels across different venues. Some respondents went further and added that it would be impossible to set a maximum ratio since it should take into consideration the characteristics of each market. Therefore, most agreed that each trading venue must be allowed to set the OTR per instrument/product based on the knowledge of the local market, in order to ensure that the ratios are relevant and kept up to date.

A few respondents also stated that further regulation on OTR ratio might lead to a decrease in liquidity and market efficiency, and that the implementation of an artificial cap would naturally lead to less competitive markets, as market makers could not aggressively compete to provide the best bid and offer simply related to market factors.

Some respondents also raised concerns that an implementation of a maximum OTR might not only affect algorithm traders, but also manual traders.

Furthermore, several respondents added that there is no sign of a material risk to investors arising from the absence of a maximum OTR ratio, nor a clear evidence that variances in OTR ratios affect the level of protection across the EU. they added that even if there is an impact, it should also be considered that a maximum OTR threshold may negatively affect the competitiveness of efficient trading venues in favour of less efficient trading venues.

Most of the few respondents that agreed with ESMA's proposal did not provide a clear explanation on the benefits that such proposal may bring to the market.

The only respondent that further explained its opinion stated that a maximum OTR ratio should be defined in order to strengthen and harmonise the level of protection that these limits are

meant to provide. The respondent also added that monitoring the market participants activity via the OTR ratios is important to protect the system capacity of the trading venues.

Finally, amongst the respondents that did not agree with ESMA's view, several suggested further regulation measures regarding the OTR:

1. ESMA should explicitly exclude from the OTR ratio and provisions market makers who are providing quotes in, for example, securitized derivatives.
2. Regarding the methodology for OTR calculation, it appears that there are different interpretations of RTS 9 on how certain types of order modifications are counted. For cases where the original order volume is reduced, it appears that some venues treat this as one order while others treat it as two orders. These types of discrepancies should be resolved before a common approach is proposed.
3. Restrictions on OTR should apply to all HFTs that are not registered market makers. Such measure would provide a good incentive for participants to become registered market makers.
4. In order to achieve more independent oversight and to challenge the OTR methodology used by trading venues, ESMA should require trading venues to include them in their RTS 7 self-assessments, particularly in light of its proposal to require the self-assessments to be submitted to NCAs.
5. Ex-ante controls to testing algorithms are fundamental to ensure that algorithmic trading systems cannot create or contribute to disorderly trading conditions. The real risks for the capacity of trading systems derives from capacity reached in very short periods of time (bursts), while the OTR is measured on a daily basis. Furthermore, the capacity of trading systems should be assessed against an absolute number of processed messages, regardless the number of transactions they generated.

Q33: Do you agree that the maximum limits are not frequently exceeded? Please explain any potential underlying issues in this respect that should be recognised.

The vast majority of respondents agreed with ESMA's findings about the potential breaches. Most also confirmed that the maximum limits were rarely exceeded.

Several respondents also added that breaches might not be a frequent event, but they still happen. However, breaches should not be view as an example of any failure in the current OTR regime. In fact, some respondents added that such limited breaches are a testament to appropriate algorithm testing and monitoring from participants and prove that trading venues set fair limits, thus being better suited to set those OTR limits.

Some respondents also added that such rare event reflects the level of investment that has been made by trading venues to be able to provide appropriate levels of capacity.

Most of the respondents did not stated any other underlying issue that should be addressed regarding this topic.

However, one respondent said that there are frequent misleading or false alerts triggered due to the predefined calculation method of the OTR and suggested to introduce a 'de minimis' limit rule for order events. The respondent added that it is not necessary to calculate the OTR based on volume in addition to the number-based calculation method, as this often leads to false alerts as well.

Q34: Do you agree with the consequences as described of exceeding the maximum limits or should there be a more convergent approach? Please provide any comment or suggestion regarding the procedures in place by trading venues in case of a member exceeding the prescribed limit.

Most of the respondents agreed that the current consequences are the most appropriate ones.

Several also stated that the procedures set out by ESMA are procedures commonly adopted by trading venues, which have proven to be effective. Therefore, no further convergent approach is needed.

Even if such was not the case, most of the respondents also stated that the current regime provides trading venues with the necessary flexibility to determine the consequences of any breach. Trading venues should be able to adopt procedures that are tailored to their business models to remain competitive.

Nonetheless, some respondents also suggested some other mechanisms:

1. Stopping or halting orders;
2. A trading venue should be able to adjust the financial incentives provided, rather than censure or the issuing of a fixed penalty (this would allow the market maker and the trading venue to reach a commercial decision upon whether the circumstances that led to the breach justify the continuation of liquidity provision; it also may help to reduce disruptions to liquidity during volatile market conditions).

Q35: Do you agree with the need to improve the notification process in case of IT incidents and system outages? Beyond the notification process between NCAs and ESMA, which improvements could be done regarding communication of incidents to the public?

A majority of respondents were of the view that the notification process in case of IT incidents and system outages should be improved.

As noted in the consultation paper, there have been a number of system disruptions in 2020. Some respondents have mentioned that in some instances they have been informed about the incident via means other than the trading venue itself. In past outages, trading venue communication has not always been adequate.

Therefore, respondents noted that a market-wide approach to communication should be ensured as opposed to bilateral communication. The latter has proven not to be always

effective, and that care should also be given to providing relevant information to the market in time.

Some participants noted that trading venues should make use of best practices to improve the notification process rather than more regulation. Regulators should focus their intervention on communication and behaviour expected from exchanges during an outage. Where the issue facing the exchange is serious, they should make clear to the market that services are unlikely to be resumed in the short term. Furthermore, where possible, a last known good reference price should be communicated, or the last known good trade timestamp to allow for more accurate position reconciliation. Regulators should clarify how existing obligations such as those set out in RTS 7 should apply in these scenarios.

Respondents also emphasized the need for trading venues to have clear policies in place that indicate how orders and trades that are pending during the interruption will be treated when normal conditions resume.

On the two-hour limit to restore operations, respondents defended that it can give the wrong incentives to trading venues to resume their operations without properly solving the issue. These respondents suggested deleting the requirement under Article 15(2) of RTS 7.

A respondent was of the view that a more harmonised approach should improve efficiency. This approach can be built on the process that is already in place. They also noted that it is quite hard to notify on cross border events since there are different requirements and templates within NCAs.

On particular suggestions on what can be done in order to improve the notification process, some suggestions were brought forward by respondents.

Some market participants suggested that communication channels should be agreed up front and procedures followed during an outage. Furthermore, any communications should be made in a clear and timely manner with updates available real-time, with a significant number of respondents adding that information should be given with set intervals even if the update is “no update”.

Finally, respondents suggested that a multi-cast approach should be taken as opposed to sequential bilateral conversations, suggesting trading venues to open conference call lines to provide periodic updates. Another respondent suggested that a crisis management team should be set at each trading venue responsible to communicate with members.

In terms of reopening the market, respondents suggested that primary markets should follow a clear and pre-agreed process while reopening the market in order to allow members time to respond. The respondents suggested including a minimum time between announcement of an outage and the possibility of the market reopening in addition to a minimum time between a market reopening notice and then the actual reopening.

The minority of respondents that did not think the notification process should be improved believe that the current notification process is adequate and provides the right tool to deal

with system outages and incidents. Regulators should not interpose themselves between the trading venue and the communication mechanism.

Some respondents did not believe there is a need for streamlining the process via additional guidance.

Some respondents also suggested that, in light of the new DORA legislation, ESMA should not make any changes insofar the legislation applies.

Q36: Do you believe any initiative should be put forward to ensure there is more continuity on trading in case of an outage on the main market, e.g., by requiring algo traders to use more than one reference data point?

A slight majority of respondents were of the view that there is no need to put forward any initiatives to ensure there is continuity on trading in case of an outage in the main market.

These respondents argued that primary markets are resilient, and that continuity of trading is extremely high and, therefore, the ability to trade in the main market is not endangered. Respondents considered that the current legislative framework is appropriate.

Other respondents were of a different view and would like to see further regulatory initiatives to ensure there is continuity of trading, should the main market suffers from an outage. However, only very few respondents agreed with the example put forward by ESMA that algorithmic traders should be required to use more than one reference data point.

The majority of respondents who would like to see regulatory guidance in this area believed that industry-led initiatives together with targeted regulatory intervention can ensure continuity of trading in case of outages in the main market. In particular regulators should mandate minimum standards of communication, remove requirement to resume operations within two hours (Article 15(2) or RTS 7). In addition, it is important to ensure there is always a robust price mechanism in place. Respondents suggested that the closing auction should always take place and therefore, the regulator should define a secondary venue for handling the closing auction in case the primary market is closed due to an outage. Furthermore, regulators should ensure interoperability of post-trade.

A considerable number of respondents were of the view that a CTP could contribute to the continuity of trading as it has the potential to continue providing a reference price that would enable trading to continue on secondary venues. In addition, it could replace the primary market as the main benchmark reference feed used by market participants.

Respondents were also of the view that any reference to the most relevant market in terms of liquidity should be removed from MiFID II and replaced with the CTP as an acceptable reference price. Furthermore, the primary market should always have arrangements with an alternative venue to run essential services such as opening and closing auctions but also the alternative venue should be able to pick the central order book.

Finally, some noted that there should be regulatory expectation on all intermediaries to have some sort of access to alternative venues and not be dependent on a single provider. This would not have to be achieved via direct membership but also through DEA.

Q37: Do you agree with the view that the tick size regime had overall a positive effect on market depth and transaction costs?

Views were split regarding the overall impact of the MiFID II tick size regime on EU markets even though a majority of market stakeholders remained positive about the current tick size regime and its impact on EU markets.

Amongst those that expressed some reservations regarding the tick size regime, two main groups can be identified.

Several respondents expressed first dissatisfaction regarding the latest amendments to the tick size regime introduced into MiFID II and MiFIR in the context of the “Investment Firm Review”. In particular, they considered that the limitation introduced regarding the execution of transactions at mid-point is damaging for EU markets and stakeholders. In their view, execution at mid-point is a valid execution point and should be allowed for trades of all sizes otherwise forcing one of the parties to a trade to cross the spread and bear additional costs. Constraints on mid-price execution therefore result in more costly execution putting EU firms at a competitive disadvantage compared to their third-country pairs.

Other respondents challenged not the general objective behind having a mandatory tick size regime but rather the calibration of the regime as specified in RTS 11. A first group of respondents considered that, while tick size had a positive effect in particular on small capitalisation shares (reduced bid-offer spread and increased liquidity), the tick sizes are too low for certain categories of shares, notably middle capitalisation shares. This view is shared by another group of respondents which stressed that, for Nordics markets, the minimum tick sizes in the Annex of RTS 11 are too low and fail to ensure appropriate market depth and have increased adverse selection (this measures the probability and the level of a price move after a trade).

Other respondents considered on the contrary that the tick sizes resulting from the table in the Annex of RTS 11 are too big. According to them, the implementation of RTS 11 has resulted in an increase of applicable ticks for the vast majority of instruments traded on their platforms. This has led to an increase in bid-ask-spreads (e.g. when comparing Q4/2017 spreads with Q4/2020 spreads) and therefore of transaction costs in particular for retail investors. Some also explained that large tick sizes limit the competition among market-makers by restricting them from offering investors more attractive prices and thereby increase indirectly transaction costs. Regarding indirect effects, some also claimed that larger tick sizes and spreads promote higher volatility levels and increased price movements in conjunction with high volume trades. For all those reasons, those respondents asked for a recalibration of the tick size regime so as to allow more flexibility and comparably smaller tick sizes.

Finally, one respondent who supported the tick size regime nevertheless noted that as time passes the number of transactions tends to increase (and the average traded notional to

decrease). They therefore invited ESMA to reflect on whether the liquidity bands in the Annex of RTS 11 should be revised increasing the ADNT figures by 20%.

Q38: Is there any further issue you would like to highlight regarding tick size regime?

Beyond the points already made to the previous question on the tick size regime and its calibration as set out in RTS 11, respondents raised other issues on (i) the scope of the regime, (ii) the general methodology used to determine applicable tick size, (iii) operation issues encountered with FITRS, (iv) the supervision of tick sizes and the need for further guidance, (v) the competitiveness issues created for EU entities compared to their non-EU competitors, (vi) systematic internalisers and (vii) other issues.

Regarding the scope of the regime, one respondent supported introducing an exemption for shares that are traded only on one single trading venue in the EU. Where a share is traded only on one trading venue, there is indeed no risk of tick sizes being used as a competition tool and the tick size regime is therefore seen as an unnecessary burden (e.g. for SME GMs). Another respondent supported extending the tick size regime to futures.

Regarding the general methodology set out in RTS 11, some respondents invited ESMA to reflect on whether the ADNT used for determining the tick size regime should also include volumes executed on lit MTFs so as to better reflect the liquidity available in the EU rather than only the liquidity traded on the most relevant market in terms of liquidity. Respondents also considered that more frequent updates (e.g. twice a year) of the ADNTs would be more appropriate, allowing to better reflect possible changes of the liquidity profile of instruments.

Regarding operational issues and FITRS, respondents stressed that updates are not always well coordinated (e.g. delayed updates, regular ad hoc adjustments) creating implementation challenges for trading venues and systematic internalisers. This more generally can lead to uncoordinated application of tick sizes by trading venues and systematic internalisers, introducing unlevel playing field between them.

Other specific comments were made regarding FITRS and the determination of the MRMTL: (i) the erroneous qualification of systematic internalisers as MRMTL for certain instruments and (ii) the misreporting of by reporting entities of the first day of trading leading introducing errors in the determination of MRMTLs and related indicators (including ADNTs). Some respondents would also welcome the inclusion of the field "Calculation Time" for the different MiFID II parameters in the full ECR files and delta files – as they are provided on the ESMA register website. They considered this information crucial since it allows trading venues to select the correct information to use in their systems when more than one data is published for the same calculation period (which is particularly relevant in case of half year updates).

Regarding the supervision of the tick size regime, some respondents would support more rigorous supervision and enforcement of the tick size regime in particular regarding systematic internalisers and MTFs using RFQ systems. They also noted that more guidance would be welcomed to ensure that the applicable rules are clear and that there is not remaining uncertainty regarding the scope of application of the tick size regime. Amongst the points where more guidance might be needed, they mentioned (i) the circumstances where mid-point transactions can be executed and (ii) the application of tick size to Frequent Batch Auction

systems. Regarding the latter, they noted that UK FCA latest guidance clarifies that “transactions executed off-tick at the mid-price are permissible when required by the auction algorithm used by the FBA”.

Many respondents raised concerns about the competitiveness of EU stakeholders, in particular vis-à-vis UK competitors. For instance, they drew ESMA’s attention to a recent statement from the UK FCA [“Supervisory Statement on the Operation of the MiFID Markets Regime after the end of the EU withdrawal transition period” issued on 16 December] where it is clarified that “from 1 January we will until further notice regard the shares of EU issuers who have not sought admission to trading in the UK as illiquid and subject to the pre-trade and post-trade Large-in Scale thresholds associated with having an Average Daily Turnover (ADT) of under 50,000” (point 27 of the statement). This results in lower LIS thresholds being applicable in the UK and, to mention only one tick size related impact, the possibility to execute transactions at mid-point for smaller sizes.

Regarding systematic internalisers, one respondent expressed a preference for limiting the application of the tick size regime to transactions below the LIS threshold, in order to ensure a more level playing field between systematic internalisers and trading venues.

Finally, regarding other comments made, one respondent stressed that while the mandatory tick size regime has limited unhealthy competition between trading venues, the current fragmentation of EU markets remains harmful for liquidity. They recommended to improve concentration of liquidity through a prohibition of off-book and systematic internaliser trading.

Another respondent flagged that the tick size regime has a detrimental effect of instruments other than shares, including instruments which are not themselves subject to the tick size regime such as derivatives. For this reason, they considered that the negative effects of tick sizes applicable to the underlying may outweigh any positive effect of the tick size regime.

Q39: Do You agree with the proposal not to amend the tick size regime for third country shares? Please explain.

While a majority of respondents agreed with the ESMA proposal not to amend the tick size regime, various respondent invited ESMA to amend the regime applicable to third-country shares. The latter considered that, while the adjustment procedure has allowed to address certain issues and to avoid material issues with respect to third country shares, the process remains too burdensome for the parties involved and still contains too many limitations (e.g. with respect to instruments with an ADNT on MRMTL < 1).

Amongst those advocating for a new revision of the regime, two main approaches emerged. Some called for changing the approach and simply exempt third-country shares from the scope of RTS 11. For them, third-country shares should not be subject to a specific tick size regime in the EU and trading venues should be allowed to align with the tick sizes used on the primary market allowing EU investors (retail investors in particular) to trade at prices that are similar to the price in the shares’ home markets. Some also noted that ESMA’s treatment of third-country shares with respect to tick sizes is not consistent with the Share Trading Obligation (STO) regime where all non-EU ISIN have been exempted from Article 23 of MiFIR.

Other respondents were more nuanced and, rather than a full exemption, recommended a more efficient and automatic procedure for third-country shares. They noted in particular that the condition to have an ADNT on the MRMTL < 1 means that, in practice, only a subset of third-country shares can benefit from the adjustment procedure while other shares are subject to a tick size which does not allow efficient pricing (in particular when compared to other third-country trading venues). They therefore supported the deletion of the condition relating to ADNT < 1 while maintaining the rest of the adjustment process.

Finally, many respondents, including some in favour of status quo, invited ESMA to monitor the development related to the tick size regime in the context of Brexit. The UK's withdrawal from the EU has indeed given a new dimension to issues related to third-country shares. The UK departure has not only increased the number of third-country shares but, given the remaining interconnectedness between the UK and EU markets, it has more generally amplified the importance of well calibrated tick size to support the competitiveness of EU markets. Some respondents suggested in this respect improved cooperation with the UK and Switzerland or even the development of a harmonised tick size regime in collaboration with UK and Swiss authorities.

Q40: Do you agree with the proposal to widen the scope of the tick size regime to all ETFs? Would this pose challenges in your view? Please explain.

Respondents expressed mixed views regarding ESMA's proposals in relation to ETFs. Sell-side firms appeared in general reluctant or even opposed to broadening the mandatory tick size regime to all ETFs while trading venues acknowledged the concerns expressed by ESMA regarding ETFs and were more favourable to revising the scope of application of RTS 11 in relation to ETFs.

Despite those points of disagreement, some general conclusions can be drawn from the responses received. Most respondents concluded first that the tick size regime currently applied to ETFs is unsatisfactory and creates unlevel playing field between the different execution platforms (including systematic internalisers). The current regime requires trading venues and systematic internalisers to know about the constituents of each single ETF traded under their systems which is challenging, if not impossible, to check and track. This has led to uncertainty regarding the exact perimeter of application of the tick size regime resulting in discrepancies across securities and venue types and to an unlevel playing field for both venues and the types of investors that use them.

However, a majority of respondents disagreed with the ESMA proposal to simply extend the current ETF regime to all ETFs traded in the EU. This one-size-fits-all approach would have harmful consequences for ETF markets. For certain categories of ETFs (typically money market or fixed-income ETFs), such an approach would lead to a 5 to 20 time increase of the current applicable tick sizes with obvious consequences for spreads and prices. Respondents would therefore support a more ad hoc regime for ETFs but few concrete proposals were made in that respect. One suggestion though would consist in adding to the current liquidity band used for ETFs, two new liquidity bands with more granular tick sizes. Others simply advocated for a regime that is specific to the ETF asset class.

As mentioned, some respondents more generally questioned the application of a mandatory tick size regime to ETFs. In their view, the shortcomings in share markets justifying the establishment of a harmonised tick size regime are not observed in the ETF markets. For instance, they stressed that, while EU equity markets are actively traded on trading venue order books, the EU ETF market predominantly uses the 'Request for Quote' (RFQ) or through systematic internalisers. These market structures would make the establishment of a harmonised regime less relevant.

Lastly, it was stressed that ETFs are not subject to any obligation to trade on trading venue or with a systematic internaliser. A too strict or poorly calibrated regime could therefore incentivise more trading to take place OTC without price constraints

Q41: Do you agree with the proposal not to widen the scope of the tick size regime to non-equity instruments? Please explain.

There was almost unanimous support for not widening the mandatory tick size regime to non-equity financial instruments.

Only one respondent supported widening the tick size regime to liquid futures. According to this respondent, tick sizes for futures were usually set at times when liquidity was mostly provided by human traders, spreads were much wider, and the ability of market makers to price an asset precisely was much diminished. These tick sizes are now too large for current futures' markets, artificially constraining the spreads. They therefore support to establish a mandatory tick size regime with the objective better calibrated or "optimal" tick sizes.

Q42: Do you agree with ESMA findings and assessment of the current MiFID II market making regime?

A majority of respondents considered that the MiFID II/MiFIR market making regime has fulfilled its purpose, contributing to predictability and a more stringent framework.

With reference to incentives to improve liquidity in stressed or disorderly markets, some respondents stressed that monetary incentives might have an insignificant impact on market maker behaviour under stressed market conditions as no incentives can compensate the risk of a bankruptcy. For them, there is no amount of fee incentive that will convince market-makers to take on "bad" market risk, since the losses associated to market risks are many orders of magnitude higher than fee incentives. Therefore, in light of this, these respondents proposed to remove the concept of stressed market conditions, if there is no incentive attached to it.

Regarding the concept of "stressed market conditions", a couple of respondents were of the view that the definition of "stressed market conditions" will always be relative. Therefore, trading venues should be left discretion to define what qualifies as "stressed market conditions" based on the nature and profile of the market that they maintain.

Other respondents were of the view that the provisions of the market-making regime have not achieved their purpose. These respondents argued that the scope of the provisions in RTS 8 is too wide and general, and not efficient enough to create incentives for market makers. Moreover, many of the requirements set out in RTS 8 should only be applicable for market

makers pursuing an HFT-strategy. The respondents noted that it was probably never the intention that the provisions of RTS 8 would also apply to market makers that quote prices (i) because they are also the issuer of the financial instruments, (ii) where they are part of the same company group as the issuer of the financial instrument, or (iii) where they have a contractual obligation with an issuer of financial instruments or the exchange.

The RTS 8 was also criticized for not having meaningfully increased liquidity: the contractual obligations imposed by the RTS 8 market making agreements are, in general, very permissive. These respondents believed trading venues are better positioned than regulators to assess the market making needs of their own markets, and subsequently design and establish market making programs that effectively stimulate liquidity provision.

Q43: What do you think of ESMA proposals and suggested amendments to RTS 8? In your view, what other aspects of the market making regime require to be amended and how?

A small group of respondents did not agree with any ESMA's proposals and suggested amendments to RTS 8 and urged ESMA to leave the RTS 8 untouched, stating that it has proven its practicality.

About half the respondents agreed with ESMA's proposal a), that is to limit the application of the scope of Articles 1 and 2 of RTS 8 to continuous trading order books. In relation to this, some respondents suggested moving the list and definitions of trading systems from Annex I of RTS 2 to the Annexes of MiFID II, so it could be more easily used for other topics (e.g. in RTS 8).

None of the respondents agreed with proposal b), as they believed that broadening the obligation of having market making schemes to all instruments and types of trading systems would create an unnecessary additional burden on trading venues.

About half the respondents did not agree with ESMA's proposal c), as they did not believe that such incentives should be subject to additional regulatory requirements. They argued that these incentives are more efficient when initiated within the industry, and that there is no amount of fee incentive that will induce market-makers to take on "bad" market risks, because the potential losses they could bear are many orders of magnitude larger than any possible fee incentives.

A few respondents were in favour of ESMA's proposal on incentives, and believed that an attractive incentive scheme could successfully attract liquidity providers in illiquid instruments. To this aim, these incentives should go beyond the types of incentives currently offered by trading venues such as fee rebates.

Q44: What are market participants views regarding the flexibility left in the MiFID II market making regime? Would you agree with ESMA further clarifying certain relevant concepts? If yes, which ones?

A majority of respondents believed the flexibility provided by the current regime is appropriate and practical, and that the discretion to define the market making agreement and scheme

should remain with the trading venues. Therefore, they did not see the need for further clarification or change on any concept.

However, a group of respondents were of the view that, if a certain degree of discretion in the definition of the content of the market making agreements is suitable considering the peculiarity of different trading venues, it would nevertheless be helpful for ESMA to clarify and make certain aspects of the regime clearer. In particular:

- the market making requirements, thresholds and calculation methodologies should be harmonized across various venues - the respondents stressed that currently these elements diverge significantly across venues;
- the definitions of certain terms or concepts should also be standardised, such as: (i) stressed market conditions, (ii) competitive price, (iii) incentives provided on the basis of the operation realized.

Some of these respondents also stressed the importance to address this issue taking into account the differences among asset classes without adopting a “one-size-fits-all” approach to different asset classes.

Q45: Could you please describe how Primary Dealers agreements are designed (number of designated Primary Dealers, transparency about investment firms having signed such agreements, typical obligations contained, etc...). Do you consider that Primary Dealers should be exempted from the Article 1 of RTS 8? Do you consider that this can introduce a regulatory loophole?

A large majority of respondents welcomed ESMA’s proposal to exempt primary dealers from MiFID II market making requirements for each trading venue on which they are active. They did not see such an exemption as the source of any regulatory loophole. In addition to this, they suggested that the exemption should go beyond primary dealers and should target the EU government bond asset class as a whole.

In fact, these respondents argued that market making requirements, in particular those relating to market making agreements, were primarily drafted for equity markets and were not aimed at other asset classes such as EU government bonds. Government bonds already had an existing and proven framework to ensure liquidity and transparency, based on various Debt Management Office (DMO) requirements and monitoring on one side, and free competition between investment firms on the other side.

More specifically, primary dealers in EU government bond markets have obligations defined in agreements with specific DMOs. These obligations are set to promote liquidity and transparency on secondary markets and include some quoting obligations in terms of minimum duration of the quotation, maximum bid-offer spreads, minimum size to be displayed. Primary dealers as per their agreements with their DMOs, are free to fulfil their quoting obligations on eligible trading venues.

These respondents reported that, since 2018, the MiFID II market making agreement requirements, again designed for equity markets, have forced Primary Dealers in EU government bonds to fulfil market making obligations on each trading venue on which they are

active. Consequently, this has created confusion for primary dealers who have to simultaneously comply with the MiFID II market making obligations, the trading venues rules/supervision and their DMO obligations.

Only a couple of respondents did not consider that primary dealers should be exempted from Article 1 of RTS 8. They however supported the removal of the comparable quote size requirement from RTS 8 market making agreements as in some cases it prohibits or penalises market makers who are providing more liquidity on one side of the book while still maintaining a two-sided quote above the minimum size obligation.

A couple of other respondents highlighted that Regulation 236/2012 on short selling and certain aspects of credit default swaps provides different definitions for “authorized primary dealer” and “market making activities” (Article 1(1)k and 1(1)n). For this purpose, the respondents were of the view that it could be useful to introduce also in MiFID II framework the definition of Primary Dealer, basis on the definition provided by Regulation 236/2012.

Q46: Do you think that venues which introduced asymmetric speedbumps provide enough information regarding the mechanism used? If not, what additional information would be useful to disclose to market participants?

Most of the respondents commented (independently from the information currently available) that it is important that the functioning of the mechanism is clearly disclosed to the public. Among these respondents some argued that ESMA could play a role in ensuring that trading venues put in place a robust consultation process before introducing a new mechanism. Other respondents considered that trading venues introducing such mechanisms should detail how it will benefit overall market quality, competition and fairness. Those also recommended that a more harmonized approach with respect to the consideration and approval of exchange rule filings be adopted across the EU. This approach could be inspired by the rule filing processes used by US regulators, including the SEC and CFTC, where (i) all rule filings are publicly available; (ii) rule filings contain basic information regarding the proposal and its consistency with relevant regulatory requirements; and (iii) market participants have an opportunity to submit feedback prior to the rule filing being approved.

A smaller set of respondents argued that, overall, the trading venue which has introduced asymmetric speedbumps in the EU has so far provided sufficient transparency regarding the mechanism which has been put in place and its effects and has involved members and participants in the discussion through rounds of consultation and trial periods. Some respondents commented that if asymmetric speedbumps were to become a more widespread mechanism, it would make sense to set minimum standards of information to be disclosed by the trading venues adopting such mechanism.

Q47: Reflecting on those mechanisms which allow liquidity providers to provide quotes that can be filled only against retail order flow, do you think that such mechanisms are beneficial in terms of market quality? Is there any specific aspect that you think should be further taken into account, also considering the type of instruments traded? Please specify the venue of reference and the type of arrangement discussed.

Multiple respondents argued that such models benefit retail orders, offering to retail investors competitive prices and not fully segregating such retail order flow from the rest of the market,

they have a positive impact. The respondents compared such models to models where liquidity providers offer quotes that can be filled only against retail order flow in a construct that is only bilateral and does not have conditions around the EBBO (“payment for order flow”). Those are arrangements whereby market makers do not compete on prices, and where platform fees are fully supported by the market-makers, and not by retail participants. Several respondents highlighted how such arrangements are intrinsically problematic from a retail investor and best execution perspective. Such respondents stressed that at the European level, and in the context of the upcoming review of MiFID II/MiFIR, it would be important to:

- (i) adopt the proposals made by ESMA to strengthen the definition of multilateral trading, beginning with moving the definition from MiFID II to MiFIR;
- (ii) review the provisions on hybrid trading systems enshrined in Annex 1 of both RTS 1 (equity) and RTS 2 (non-equity) to ensure there is a clear distinction between bilateral and multilateral trading; and
- (iii) in order to deliver CMU, focus on establishing a true level playing field that underpins investor protection, particularly for retail investors via: 1) a review of the process for the authorisation of market models in the EU, including the introduction of a compulsory opinion from ESMA, mirroring the existing arrangements for transparency waivers; 2) as part of this process, pay particular attention to ‘zero fee’ and payment for order flows models with a view to ensuring the Best Execution requirements are met.

A respondent highlighted that such mechanisms allow retail orders to remain on-venue where they contribute to price formation and greater market transparency. If this is not the case, more retail activity would migrate off-exchange into private liquidity pools where a concentrated group of market participants would gain an informational advantage over this retail order flow. A respondent highlighted that it is vital that trading venues retain the discretion to innovate, i.e. bespoke order types, execution priority or separate order books for certain categories of investors (e.g. retail). This would level the playing field between trading venues and systematic internalisers in their treatment of certain categories of clients. One respondent commented that ideally, within an exchange, all market participants should have the ability to interact with the same flow on screen as this leads to the most efficient price discovery, the healthiest order books and is therefore in the best interest of the end investor. However, if on one hand these mechanisms might cause market fragmentation, they attract, on the other, retail flow to the screens that would otherwise have traded OTC. Respondents therefore invited ESMA to balance the cost of fragmentation vs the potential value of attracting retail volume to screen.

Along the same line, other respondents noted that such mechanisms (i.e. mechanism which allow liquidity providers to provide quotes that can be filled only against retail order flow) might add complexity and more fragmentation to the market are a type of payment for order flow (i.e. exchanges charge market makers for privilege access to retail order flow). In this context, they invited ESMA to carefully review such mechanisms, before adopting any final stance on them, to understand if they effectively provide benefits to retail clients and are compliant with the conflicts of interest management rules in MiFID II.

Q48: Do you think that venues which introduce asymmetric speedbumps should set tighter market making requirements? Please explain why and how tight those new requirements should be.

Some respondents, although not directly replying to the question, stated that in their view the introduction of speedbumps can be seen as a mechanism which offers only to some market participant the possibility to use a certain type of orders (cancellation not subject to delay). They invited ESMA to further monitor these mechanisms to understand better the effects on order book liquidity.

Few respondents were of the view that it would be beneficial to introduce tighter market making requirements. The argument was supported by the idea that as such mechanisms provide benefit to a targeted group of market participants, i.e. liquidity providers. It would therefore be appropriate to introduce more stringent market making requirements for market participants benefitting from these mechanisms. They considered that speedbumps do not necessarily lead to reduced spreads which also support tighter market making requirements to be put in place.

However, the large majority of respondents were against the introduction of tighter market making requirements. Some stated that the tightening of market making requirements should be left to the trading venues' initiative, after evaluating if such measure is deemed useful. The general view was that market quality should be evaluated after the introduction of speedbumps, and further measures should be introduced only if and where necessary. Another group of respondents commented that they did not support or would not see a connection between market making requirements and speedbumps. In their views the introduction of speedbumps has a beneficial effect on market quality, often leading to tighter spreads. In this sense applying stricter market making requirement would not be useful and could, on the contrary, deter competition or increase cancellation rates by market makers who would need to post tighter quotes. One respondent argued, more in details, that for the speedbump to be useful for market makers, some market makers might need to invest in technology to exploit the delay offered by the speedbump. The respondent argued that tightening market making requirements would further increase barrier to entry in the market.

Q49: Do you agree on the conclusion that speedbumps might not be a well-suited arrangement for equity markets? If yes, do you think that such arrangements for equities should be prohibited in Level 1? Please explain.

A group of respondents agreed that speedbumps appear as a mechanism which is more suited for non-equity instruments rather than for equity markets. Nevertheless, among these respondents, the large majority did not support the proposal to ban the use of asymmetric speedbumps for equity instruments through Level 1. They invited ESMA to explore other alternatives: (i) a common process for filing and approval; (ii) a careful evaluation of the mechanism and its application on a case-by-case basis; (iii) the publication of guidance on use of speedbumps or, more generally, (iv) regulatory scrutiny on the evolution of such phenomenon and its implications.

The majority of respondents however disagreed with ESMA's view that speedbumps are not suited to equity instruments. Some respondents stated that speedbumps are well suited for equity instruments, as they can attract more liquidity providers and, in turn, stimulate more

liquid markets and better pricing. Some respondents believed that, in principle, speedbumps are also suited to equity markets, but further research from trading venues should be initiated on the impact of such mechanism. In any case, no prohibition should be put in place unless there is a proof of negative effect which speedbumps might have on market quality. Two of those respondents additionally stressed that, even if ESMA should not directly regulate the introduction of speedbumps, it should consider how to regulate the possible conflict of interest when exchanges introduce new measures which might be beneficial only to a subset of market participants without clear benefits to the overall market quality. They suggested ESMA to put in place strong and transparent consultations, where all respondents views' are carefully weighted.

Finally, other respondents believed that, at this stage, it is not possible to undertake any regulatory intervention due to the lack of sufficient evidence.

Q50: Do you think that the introduction and functioning of speedbumps should be further regulated? If yes, which specific requirements would you like to be included in EU legislation?

Some respondents stated that they would be in favour of some form of regulation, among which some supported transparency obligations for trading venues with regard to the mechanism. Other respondents supported a consistent regulatory approach in the EU when evaluating the introduction of such mechanisms. Another respondent stressed in this respect that the effect of speedbumps is not limited to one trading venue but might affect EU market microstructures as a whole. A group of respondents stated that no further regulation appears necessary at this stage, they would support some initiatives to be undertaken. Such initiatives could encompass:

- (i) to require trading venues to provide full transparency around such mechanisms when implemented;
- (ii) for ESMA to push for a more robust and auditable consultation process including an assessment of potential conflicts of interest between the market and its owners (Article 47 of MiFID II) and the possible effects of speedbumps on related asset classes and market structures;
- (iii) for ESMA to provide additional guidance regarding the interplay between speedbumps and current MiFID II requirements, including the obligations to have (a) transparent and non-discretionary rules and procedures that provide for fair and orderly trading (MiFID II Articles 47(1)(d) and 18(1)) and (b) non-discriminatory rules governing access to the facility (MiFID II Articles 53(1) and 18(3). ;
- (iv) to undertake data analysis based on recent speedbump mechanisms implemented in the EU;
- (v) to support ongoing dialogue between regulators and those venues who plan to introduce speedbumps.

Q51: Is there any specific issue you would like to highlight about speedbumps?

Respondents highlighted several points, among which:

(i) Speedbumps have not been in use long enough to consider a strong regulatory intervention in this area. More evidence on the effect of such mechanisms should be gathered before taking any regulatory decision. Furthermore, if such mechanisms are implemented it is necessary to provide market participants with full transparency over their technical functioning.

(ii) Empirical evidence shows that speedbump have had a positive impact on the market where they are applied in the EU: spreads have gotten significantly tighter and the diversity of Liquidity Providers has increased.

(iii) Asymmetric speedbumps might lead to non-addressable liquidity as market makers might artificially post more competitive quotes to attract liquidity, and use the time delay to subsequently cancel or modify such quotes. This setup may grant advantages to liquidity providers and increase the risk of fading liquidity during stressed conditions.

(iv) For equity instruments, as the information signals on which equity pricing is based are more difficult to define, the application of speedbumps on a trading venue could increase order flow fragmentation.

(v) There is a misperception that high-frequency traders are speculators who move markets to extremes. In fact, the vast majority of HFT searches for very small arbitrage opportunities, as between futures and cash markets or between the prices of exchange-traded funds and their underlying. These actions increase market efficiency by tightening bid-ask spreads and reducing transaction costs for all market participants.

(vi) Asymmetric speedbumps could benefit the market (especially in options markets). Nevertheless, the implementation details of the implemented functionality are key as unnecessary complexity in the design could have the opposite effect. For instance, speedbumps with a relatively long delay on aggressive orders could lead to an unfair advantage for liquidity providers at the expense of liquidity takers.

(vii) Asymmetric speedbumps have had only a limited effect where implemented outside the EU. A more impactful way to address the existing off-book information asymmetry and improve on-book market quality for options markets would be to increase the Large in Scale thresholds and, for regulated markets, to increase the obligations on market makers to quote tighter.

(viii) ESMA should take the opportunity to push for more robust and auditable consultation processes by trading venues implementing such mechanisms. In line with its obligation to manage conflicts of interest, a trading venue should be required to take into account all, rather than a narrow subset of, member firms' concerns as well as the overall health of the market rather than its own commercial objectives.

Q52: What are your views on the relative timing of private fill confirmations and public trade messages? If you are a trading venue, please provide in your answer an explanation of the model you have in place.

Only a few respondents agreed with ESMA to aim for the two feeds to be published simultaneously, at least on a best effort basis. Respondents pointed out that private and public feeds are managed by two separate processes and distinct systems, and that, as such, the complete elimination of asymmetry between the two is unfeasible. However, as the relevant discrepancy is almost intangible, it could generally be considered as acceptable. Some others, stressing that the latency goes beyond the control of public venues, concluded that venues should retain discretion with regard to the design of their trading system.

Only a couple of respondents were clear in taking a stance of whether there should be a deterministic or non-deterministic approach, but those that did agreed with ESMA that a deterministic approach should be established.

Most respondents focused in their answers on whether, if a priority was established, it should be given to the private or a public feed. In this respect, a slight majority of respondents supported a public feed to be published first. This choice was generally justified by the need for transparency, avoidance of information asymmetries among market participants or reduction of risk of inside information. According to one respondent, priority to the public feed seems also to be the most common model used by trading venues currently.

Respondents supporting the opposite idea (i.e. to put the private feed first) argued this is necessary to grant time to market participants to hedge their transactions. They also flagged the risk that a public publication coming first would provide some market participants (especially HFT) with an ability to react faster without needing to commit capital to a trade. The same respondents stressed that there is no evidence that information received through private fill confirmations is used as inside information, or to take open positions instead of hedging the executed transactions.

Lastly, a few respondents suggested ESMA to undertake a proper cost benefit analysis before any action is taken.

Q53: Do you consider information on the sequencing of these two feeds at trading venues to be easily available? If you are a trading venue, please provide a link to where this information can be found publicly.

Most trading participants stated that a trading venue's chosen sequencing of the public and private feeds is not always sufficiently clear to all market participants and that the information is not easily or not consistently available from all trading venues, or only after bilateral interaction. Some noted that the reason behind this is that trading venues are currently not required to publish information on this topic.

Some trading participants expressed their view that information about the relative timing of public and private feeds and other microstructure dynamics should be made available, to provide a level playing field between participants, improve competition, and dispel misunderstandings about how the marketplace operates. Some explicitly expressed that transparency alone is not sufficient. Others noted that the lack of documentation is not material because it only impacts HFTs. As an alternative, trading venues could provide timestamp information necessary to allow participants to easily measure and monitor these dynamics themselves.

From the side of trading venues, varying responses were received. On the availability of information, some mentioned that information about the sequencing of data feeds is available on the respective website. Others said it can only be found on a specific section accessible for trading members only. Lastly, some venues noted that they do not publish any specific information on the sequencing between private and public feeds. Two venues provided a public link as to where this particular information or general information on the IT systems can be found.

Some venues additionally made the following remarks:

- a. Each market participant will only receive private fill confirmations for their own orders and transactions;
- b. The two feeds or paths are architecturally separate (point to point vs multicast) and transit through two completely different component of the trading infrastructure;
- c. It is usually not guaranteed in which order the messages would be received due to the non-deterministic elements of the platform;
- d. The objective of the platform is to disseminate information as quickly as possible;
- e. Pre-trade and post-trade data are available 15 minutes after their initial publication on the website.

Q54: Do you think there should be any legislative amendments or policy measures in respect of these feed dynamics?

A majority of respondents, consisting of both trading venues and trading participants, did not see a need for introducing prescriptive legislation on the operationality of feed dynamics. Among the arguments that were given, mainly from the side of trading venues, it was mentioned that the decision on feed dynamics for a venue heavily depends on the server, system environment and configuration of the venue. It should therefore be left at the discretion of trading venues' operators and industry participants to adjust the models based on liquidity dynamics within the scope of applicable regulatory frameworks. Additionally, it was noted by respondents that a measure that would aim at prioritising public over private messages may not be proportionate in terms of the potential benefits versus the risks inherent in such an approach.

Nevertheless, a couple of respondents were in favour of introducing limited rules for trading venues related to the transparency of feed dynamics, which would include publication of information such as whether models are deterministic or not and whether the public or private feed is faster (and by how much, what is the ratio etc).

A number of respondents were in favour of introducing legislative amendments or policy measures, in particular requiring that trading venues should have a deterministic trade feed distribution model, whereby public trade messages should be provided at the same time or ahead of private fill confirmations in accordance with a set level of tolerance. It was mentioned



that any potential legislation on this aspect should give more prominence to the principles of fairness and equal access to information. Others noted that it would be beneficial to the market if there was harmonisation across the market as to which feeds are published first but that this should be tackled through a set of best practices within the industry.

Finally, some respondents would welcome further information from ESMA as to the objectives and the exact details of legislative amendments and/or policy measures in order to be able to compare these options and speak out a preference.

7.2 Annex II: Mandate

Article 90 (1)(c) of MiFID II:

Before 3 March 2019 the Commission shall, after consulting ESMA, present a report to the European Parliament and the Council on:

[...]

(c) the impact of requirements regarding algorithmic trading including high-frequency algorithmic trading;

[...]

7.3 Annex III: List of the proposals made in the Review Report⁴⁵

Topic	Section	Regulatory tool	Proposed change
Algorithmic trading requirements to be selectively applied to systematic internalisers	3.3.1.3	Level 1	ESMA proposes to introduce a reference to systematic internalisers in Article 17 of MiFID II and a mandate for ESMA to further specify what requirements should apply to systematic internalisers.
Authorisation of DEA users dealing on own account	3.5.1.3	Level 1	ESMA proposes to delete the exception to the exemption from authorisation as investment firm set out in Article 2(1)(d)(ii) of MiFID II for persons having DEA to a trading venue. This means that no authorisation requirement will be needed for DEA users dealing on own account.
Authorisation of DEA provider	3.5.1.3	Level 1	ESMA proposes to transfer to Article 1 of MiFID II the requirement currently set out in Article 48(7) under which DEA providers must be authorised as investment firms under MiFID II or credit institutions under Directive 2013/36/EU.
Tier 2 DEA clients	3.5.2.3	Level 1	ESMA proposes to clarify that Tier 1 and Tier 2 DEA clients are both DEA users.
Notifications to NCAs by DEA providers	3.5.3.5	Level 1	ESMA proposes to amend Article 17(5) of MiFID II to include the list of DEA users to which DEA is provided in the notifications by DEA providers, together with an annual update of the list.
Authorisation of third-country HFT firms	3.6.3	Level 1	ESMA proposes to require third-country HFT firms accessing EU trading venues to be authorised as investment firms, should they access EU trading venues through DEA or as member or participant. ESMA also proposes to develop a specific equivalence framework at EU level. Where, based on this new equivalence regime, a third-country HFT firm is considered to be subject to an equivalent supervisory framework in their home country, it

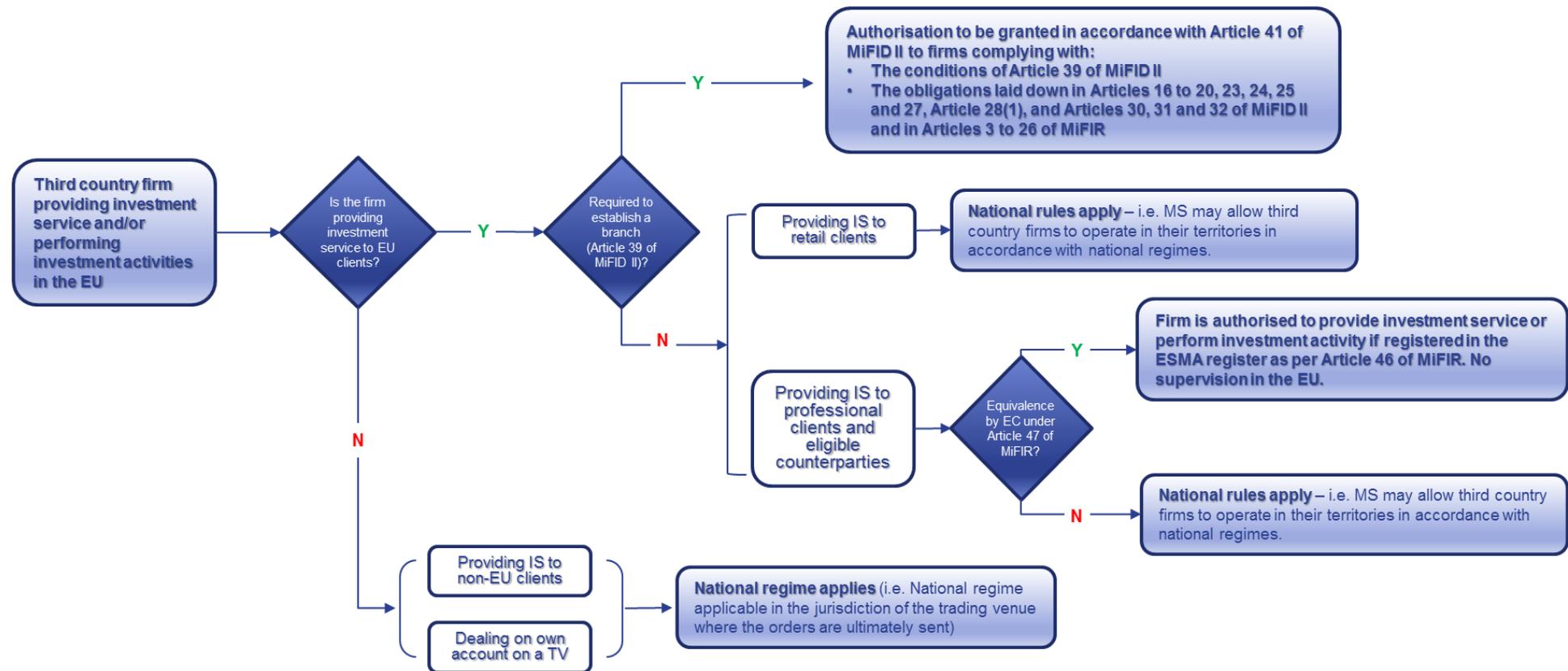
⁴⁵ The list in this Annex is not meant to be an exhaustive summary of all the proposals and recommendations included in the report. In particular, if the list includes all the proposed amendments to the Level 1 provisions, it only lists some Level 2 and Level 3 initiatives which can be published by ESMA (only the issues where ESMA already has concrete proposals were included). Readers are therefore invited to read the entire report to have a complete picture of ESMA's proposals and recommendations.

			should be allowed to access EU trading venues through DEA or as member or participant without being authorised as an investment firm in the EU.
Notification to NCAs by algorithmic trading investment firms	4.1.3	Level 2 (RTS 6)	ESMA proposes to develop a template for notifications to NCAs under Article 17(2) and 17(5) of MiFID II. The exemplificative template is detailed in Annex IV to the report, and can be used by firms on a voluntary basis.
Timing of notification	4.1.3	Level 1	ESMA proposes to clarify that the notifications of Article 17 of MiFID II should be done 'without undue delay'.
Testing regime	4.3.3	Level 2 (RTS 6)	ESMA proposes to have, in RTS 6, a principle-based testing regime, where testing should ensure certain outcomes, e.g. no contribution to excess volatility.
Periodic self-assessment of algorithmic trading investment firms	4.4.3	Level 2 (RTS 6)	ESMA proposes to require a proper due-diligence self-assessment which should be made every second year. Firms should send the assessment to their NCA, who can require the assessment to be made more frequently.
Capacity and resilience of trading venues	5.3.3	Level 2 (RTS 7)	ESMA proposes to require a proper due-diligence self-assessment which should be made every second year. Trading venues should send the assessment to their NCA, who can require the assessment to be made more frequently.
Testing of algorithms	5.2.3	Level 2 (RTS 7)	ESMA proposes to look further into the testing of disorderly trading conditions and sees a need for flexibility as well as a need to enhance the consistency and comparability of results obtained by trading venues.
Market Outages	5.6.3	Level 3/Guidance	ESMA will provide guidance to trading venues on what is expected from them in terms of communication in case of market outages.
Tick size	6.1.1.1	Level 1	ESMA proposes to move the provisions contained in Article 49 of MiFID II into MiFIR.

Market Making	6.2.3	Level 2 (and possibly Level 1)	<p>ESMA proposes to remove the concept of “normal trading conditions” as well as “stressed market conditions in RTS 8, exempt in RTS 8 from the market making requirements (i) Primary Dealers and liquidity providers subject to a liquidity contract and (ii) the government bond asset class</p> <p>ESMA invites, in parallel, the European Commission to reflect on the actual impact and the practical benefits that such a simplified regime may have on the market making agreements and schemes and to assess whether the objectives sought by the Legislator in Level 1 can be achieved and guaranteed solely through a more principle-based regime at Level 1.</p>
Speedbumps in Financial Markets	6.3.3	Level 1	<p>ESMA proposes to include in the current legislative framework a specification mandating trading venues the implementation of ‘non-discriminatory’ trading mechanisms.</p> <p>ESMA proposes to include a new requirement for trading venues introducing speedbumps, mandating such venues to evaluate and monitor the impact speedbumps have on the quality of the liquidity available on their platforms and duly take into account, among others, the risk of non-tradable liquidity.</p>
Private vs public confirmation feeds	6.4.3	Level 1	<p>ESMA proposes to require trading venues to disclose the publication model adopted and, for deterministic models, the relevant sequence of publication, or in other terms, which between the private fill confirmation and public trade messages is published first under their systems.</p>

7.4 Annex IV: Regime applying to third-country firms

Annex IV-A: General third-country regime in MiFID II / MiFIR:



Annex IV-B: Outcome of the stocktaking exercise

The information below is for general guidance purposes only. Market participants are invited to check with their legal counsel the requirements that would apply to them considering their specific situation.

Member State	Are third-country firms dealing on own account required to establish a branch in the EU?	Authorisation regime applicable to third country firms dealing on own account and falling under the cases listed under points (ii) and (iii) of Article 2(1)(d) of MiFID II
Austria	No	Third Country firms that hold no EU banking license are not permitted to deal on own account in Austria
Bulgaria	Yes	Third country firms dealing on own account have to establish branches authorised and supervised in accordance with the criteria of Article 39 to 41 of MiFID II.
Czech Republic		No specific authorisation needed.
Cyprus	Yes	Third country firms dealing on own account have to establish branches authorised and supervised in accordance with the criteria of Article 39 to 41 of MiFID II.
Finland	No	No specific authorisation regime in Finland but FIN-FSA has issued binding regulations on the conditions on which Finnish trading venues may accept third country entities dealing on own account as their members or participants.
France	No	No specific authorisation needed.
Germany	N/A	No specific authorisation for third country firms accessing EU trading venues via DEA until a European regulation is in place. HFT firms need to establish branches authorised and supervised as per Articles 39 to 41 of MiFID II
Greece	No	No specific requirement /authorisation needed.
Ireland	No	No specific authorisation needed.

Italy	Yes/No (see next column)	<p>In alternative to the establishment of a subsidiary in Italy, third country firms shall:</p> <ul style="list-style-type: none"> • establish a branch (in accordance with articles 39 to 41 MiFID II), or • be registered by ESMA following a Commission's equivalence decision pursuant to Article 47(1) of MiFID II. In the absence of the Commission decision or where such decision is no longer in effect, third country firms may provide such services in Italy even without the establishment of a branch only if duly authorised to do so by Consob, subject to the fulfilment of specific conditions identified by the law.
Latvia	Yes	Third country firms dealing on own account have to establish branches authorised and supervised in accordance with the criteria of Article 39 to 41 of MiFID II.
Luxembourg	No	<p>No specific authorisation needed.</p> <p>For third country firms dealing on own account when executing clients orders , where the execution of clients orders is taking place in Luxembourg, the concerned third country firms (which do not benefit from the MiFIR equivalence or the CSSF equivalence regime) needs to establish branches authorised and supervised as per Articles 39 to 41 of MiFID II.</p>
Malta	Yes	<p>To date, the MFSA does not have an authorisation regime that is applicable to third country firms dealing on own account and falling under the cases listed in points (ii) and (iii) of Article 2(1)(d) of MiFID II</p> <p>Third country firms dealing on own account have to establish branches authorised and supervised in accordance with the criteria of Article 39 to 41 of MiFID II.</p>

The Netherlands	No	No authorisation required. Under Dutch law, third country firms that trade exclusively on own account on NL trading venues can request an exemption from authorization granted by the AFM.
Poland	Yes	Third country firms dealing on own account have to establish branches authorised and supervised in accordance with the criteria of Article 39 to 41 of MiFID II.
Portugal	Yes	Authorisation regime depends on the activity undertaken. A third country firm can deal on own account as a member or participant of a trading venue or through DEA without being authorised. However, where this third country firm undertakes market making or HFT activities or is dealing on own account when executing client orders, it will have to establish a subsidiary and be authorised as an EU investment firm.
Spain	No	No specific authorisation needed.
Sweden	Yes	Third country firms dealing on own account have to establish branches authorised and supervised in accordance with the criteria of Article 39 to 41 of MiFID II As a temporary measure, from 31 December 2020 to the end of 2021, third country firms that have DEA to a trading venue and are trading solely on own account will be able to do so without having to establish a branch in Sweden subject to certain conditions. Should these conditions not be fulfilled, an establishment of a branch will be required.

Annex IV-C: Algorithmic Trading in some third countries

Algorithmic Trading Requirements in the United States

In the US, FINRA member firms are required to be member firms of the FINRA) that engage in algorithmic strategies are subject to SEC and FINRA rules governing their trading activities, including SEC Rule 15c3-5 (Risk management controls for brokers or dealers with market access) and [FINRA Rule 3110 \(Supervision\)](#).

Under SEC Rule 15c3-5, brokers or dealers with market access must establish, document, and maintain a system of risk management controls and supervisory procedures reasonably designed to manage the financial, regulatory, and other risks of the business activity. This requirement encompasses firms that use market access to trade in a proprietary capacity, as well as those that offer market access as agent for customers. The required procedures are intended to address the risks of automated trading, including algorithmic strategies.

A firm's procedures to manage financial risks must (i) prevent the entry of orders that exceed appropriate pre-set credit or capital thresholds in the aggregate for each customer and the broker or dealer and, where appropriate, more finely-tuned by sector, security, or otherwise by rejecting orders if such orders would exceed the applicable credit or capital thresholds; and (ii) prevent the entry of erroneous orders, by rejecting orders that exceed appropriate price or size parameters, on an order-by-order basis or over a short period of time, or that indicate duplicative orders.

A firm's procedures to manage regulatory risks must (i) prevent the entry of orders unless there has been compliance with all regulatory requirements that must be satisfied on a pre-order entry basis; (ii) prevent the entry of orders for securities for a broker or dealer, customer, or other person if such person is restricted from trading those securities; (iii) restrict access to trading systems and technology that provide market access to persons and accounts pre-approved and authorized by the broker or dealer; and (iv) assure that appropriate surveillance personnel receive immediate post-trade execution reports that result from market access.

Under FINRA Rule 1220(b)(4)(A), an "algorithmic trading strategy" is an automated system that generates or routes orders (including order-related messages), but does not include an automated system that solely routes orders, in their entirety, to a market centre. Covered systems include those that generate or route orders (or order-related messages) in any equity security (including options), preferred security or convertible debt security, whether sent to an exchange or handled over the counter.

FINRA has published several initiatives aiming at increasing the scope of trading information FINRA receives, providing more transparency into trading activities to market participants

and investors, and requiring firms engaged in electronic trading and their employees to be trained, educated and accountable for their role in equity trading.⁴⁶

As such, FINRA guidance⁴⁷ include several effective supervision and control practices that firms can employ to reduce the likelihood and mitigate the impact of future problems including market-impact events related to technology issues. These suggested practices include the following:

General Risk Assessment and Response – Firm should undertake a holistic review of their trading activity and consider implementing a cross-disciplinary committee to assess and react to the evolving risks associated with algorithmic strategies.

Software/Code Development and Implementation – Firms should also focus efforts on the development of algorithmic strategies and on how those strategies are tested and implemented.

Software Testing and System Validation – Testing of algorithmic strategies prior to being put into production is an essential component of effective policies and procedures.

Trading Systems – Firms should develop their policies and procedures to include review of trading activity after an algorithmic strategy is in place or has been changed.

Compliance – Ensuring that there is effective communication between compliance staff and the staff responsible for algorithmic strategy development is a key element of effective policies and procedures.

Furthermore, a person who is primarily responsible for the design, development or significant modification of an algorithmic trading strategy relating to equity, preferred or convertible debt securities, or who is responsible for the day-to-day supervision or direction of such activities, must pass the Series 57 exam and register as a Securities Trader. Requiring this minimum standard of knowledge aims at ensuring that developers are properly educated in securities rules and able to assess whether the products they are designing to implement trading strategies comply with applicable regulations.

*

* *

On 17 December 2015, the Commodity Futures Trading Commission (CFTC) published a notice of proposed rulemaking, Regulation Automated Trading, and on November 25, 2016, following the conclusion of a reopened comment period, the CFTC issued a notice of proposed rulemaking to supplement Regulation AT (together, "Regulation AT").⁴⁸ Regulation AT proposed pre-trade risk controls at the level of exchanges as well as the trading firm or futures commission merchant level. the Regulation AT NPRM included provisions that would

⁴⁶ See FINRA Regulatory Notice 15-09, available at <https://www.finra.org/rules-guidance/notices/15-09>.

⁴⁷ <https://www.finra.org/rules-guidance/key-topics/algorithmic-trading#overview>.

⁴⁸ Regulation Automated Trading, 80 FR 78824 (Dec. 17, 2015) and Regulation Automated Trading, 81 FR 85334 (Nov. 25, 2016).

have (1) Required certain types of market participants, based on their trading functionality, strategies, or market access methods, to register with the Commission notwithstanding that they did not hold customer funds or otherwise intermediate futures markets. (2) Compelled those registrants, including participants not currently registered with the Commission, to produce source code to the Commission without a subpoena; and (3) required exchanges, FCMs, and certain trading firms to implement risk controls.

On 15 July 2020, the CFTC withdrew Regulation AT and rejected the policy responses listed above as means of addressing the perceived associated with automated trading or algorithmic trading relative to other forms of electronic trading underlying Regulation AT .⁴⁹ Instead, on the same date, the CFTC issued Proposed Risk Principles for Electronic Trading which require exchanges to take steps to prevent, detect, and mitigate market disruptions and system anomalies associated with electronic trading.⁵⁰

Under those Proposed Risk Principles, first, exchanges must have rules to prevent, detect, and mitigate market disruptions and system anomalies associated with electronic trading. Second, exchanges must have risk controls on all electronic orders to address those same concerns. Third, exchanges must notify the CFTC of any significant market disruptions and give information on mitigation efforts. The Proposed Risk Principles include acceptable practices, which provide that an exchange can comply with the principles by implementing rules and risk controls that are reasonably designed to prevent, detect, and mitigate market disruptions and system anomalies associated with electronic trading.

The National Futures Association (NFA) in June 2002 issued Interpretive Notice 9046 (“Interpretative Notice”), subsequently revised in December 2006, relating to the supervision of automated order routing systems (“AORSs”).⁵¹ The Interpretative Notice applies to all NFA members that employ AORSs, and provides binding guidance to, among other things, implement firewalls, conduct testing, and perform capacity reviews, as well as consider implementation of pre-trade controls.

Algorithmic Trading Requirements in Japan

In Japan, the report published in 2016 by the Financial Services Agency of Japan (the “FSA”) recommended the development of the regulatory framework for “high-speed algorithmic” traders. In response to the recommendation, the Financial Instruments and Exchange Act (FIEA) was amended in May 2017 to require that any person who conducts High-Speed Trading⁵² in Japanese market be registered as “High-Speed Traders”

⁴⁹ Regulation AT Withdrawal, 85 FR 42755 (July 15, 2020).

⁵⁰ Electronic Trading Risk Principles, 85 FR 42761 (July 15, 2020).

⁵¹ NFA, Interpretive Notice 9046, “Supervision of the Use of Automated Order-Routing Systems” (Dec. 12, 2006), available at <https://www.nfa.futures.org/rulebook/rules.aspx?RuleID=9046&Section=9>.

⁵² Under the FIEA (<http://www.japaneselawtranslation.go.jp/law/detail/?id=3538&vm=04&re=02>), there is no requirement for high frequency and the defining term “High-Speed Trading” is used. Article 2 (41): The term “High-Speed Trading” as used in this Act means any of the following acts for which the determination on performance of the act is automatically made by an electronic data processing system, and the provision of information necessary for conducting the purchase and sale of Securities or a Market Derivatives Transaction based on that determination to a Financial Instruments Exchange or any other person specified by Cabinet

(hereinafter "HST")⁵³ and that the person ensure the robust internal control framework including system risk controls, governance framework and appropriate risk management.

Under the FIEA, "High Speed Trading" is generally defined as algorithmic trading of securities or derivatives that minimises latency by submitting orders in close proximity to the trading venue's matching engine and that ensures any measure by which such orders are segregated from other orders. This definition would include algorithmic trading using virtual servers which are located inside a stock exchange, exemplified by the co-location service provided by the Tokyo Stock Exchange and Osaka Stock Exchange.

In general, FSA's regulatory and supervisory framework for HST introduces a registration system and rules in order to enable authorities to monitor HST's transactions and internal controls so that the authorities could require HST to comply with domestic requirements in a fair and appropriate manner. FSA rules' main aspects include:

Registration system: the FIEA requires registration of any person conducting High Speed Trading in Japanese market who is not yet licensed as Financial Instruments Business Operators (FIBOs), Registered Financial Institutions or remote Trading Participants⁵⁴. In the process of entering into registration, HST are required to clarify which markets to conduct High Speed Trading, what categories of securities or listed derivatives to trade, and which broker dealers to use. The FIEA also prohibits domestic broker dealers from intermediating orders from unregistered HST or licensed HST when broker dealers are unable to confirm the adequacy of operational control system or risk controls of HST.⁵⁵ In addition, the registration system also requires HST domiciling overseas to appoint a Japanese representative/agency so that they can communicate with the Japanese authorities smoothly and swiftly.

Regulations governing the business of high frequency traders: the FIEA and the Guidelines for HST Supervision require HST to develop robust operational control system monitoring their own High Speed Trading transactions and to ensure robust governance structure and adequate human resources to conduct their business in an appropriate manner. The requirement also includes establishment of internal rules and the

Office Order is made by means of information and communications technology, which is specified by Cabinet Office Order as a means of shortening the time normally required for the provision of information (excluding acts specified by Cabinet Order as those which, in consideration of their content and other factors, are found not to compromise the protection of investors).

⁵³ See the Article 2 (42) of the FIEA: The term "High-Speed Trader" as used in this Act means a person registered by the Prime Minister pursuant to Article 66-50.

⁵⁴ See Article 2 (19) of the FIEA.

⁵⁵ See Article 116-4 of the Cabinet Office Order on Financial Instruments Business, etc. (Acts Equivalent to Act of Accepting the entrustment of Sale and Purchase of Securities Pertaining to High-Speed Trading to be Conducted by Persons Other Than High-Speed Traders) Article 116-4 The acts to be specified by Cabinet Office Order as referred to in Article 38, item (viii) of the Act are the following acts: (i) an act of a High-Speed Trader which has received an order for suspension of business pertaining to High-Speed Trading (including a person provided in Article 16-4-2 of the Cabinet Order; the same applies in the following item) accepting the entrustment of sale and purchase of Securities or Market Derivatives Transactions pertaining to the High-Speed Trading; (ii) an act of a High-Speed Trader which cannot be confirmed to have implemented the measures for securing sufficient management of an electronic data processing system and other facilities for High-Speed Trading accepting the entrustment of sale and purchase of Securities or Market Derivatives Transactions pertaining to the High-Speed Trading; and (iii) High-Speed Trading to be conducted by a person other than a High-Speed Trader provided in Article 38, item (viii) of the Act (limited to those pertaining to the acts specified in Article 2, paragraph (41), item (iii) of the Act; hereinafter the same applies in this item) or the act specified in item (i) of that paragraph pertaining to the High-Speed Trading under the preceding two items conducted by the High-Speed Trader provided in these items.

mechanism/procedures to prevent unauthorised transactions (i.e. unexpected orders or orders that may cause disruptions in domestic markets) and to mitigate the impacts of such orders promptly.

Supervision and notifications for high frequency traders: when there is any change in the registered information of HST, broker dealers and HST are required to notify the authorities within two weeks from the day of change. In case there is any change in the contents or methods of trading, they are required to notify FSA without delay. Additionally, the authority may issue the reporting order and/or business improvement order if deemed necessary and appropriate for public interest or protection of other investors. The authority may also revoke the registration or order the suspension of all or part of HST's business activities when significant breaches of regulations are found.

Record-keeping and annual business reporting: HST are required to keep records of their transactions by for example, order tickets and transaction blotters and to retain them for 7 to 10 years depending on the type of the records. Foreign traders can alternatively rely on books and records made in accordance with foreign regulations (such as MiFID II) to comply with Japan's HST requirements. HST are also required to annually submit a business report which contains the information prescribed in the FIEA including the summary of their annual business activities, and the amount of trades corresponding with their strategies, as well as BS and PL.

Controls and Training: robust internal control framework for preventing unfair trading and appropriate training for employees are also required. Specific rules require HST to develop and maintain robust internal control framework to prevent any type of unfair trading such as insider trading and trading through abuse of material non-public information, as well as develop and maintain robust market surveillance framework against market manipulation.

Investigations and penalties: the Securities and Exchange Surveillance Commission (SESC) may conduct investigations against HST to check compliance with domestic regulations and may issue a recommendation to FSA to take administrative actions when deemed appropriate. Exchanges may also investigate against HST to ensure compliance with regulations.⁵⁶ Penalties are also applicable (both pecuniary/imprisonment) in case there are significant deficiencies in information provided during the registration process (i.e mendacious information in registered information), violation of administrative order to suspend trading or significant misreporting.

⁵⁶ See Article 85-5 of the FIEA. (Investigation on Persons Engaged in High-Speed Trading) Article 85-5 (1) Beyond what is provided for in Article 84, a Financial Instruments Exchange is to investigate the compliance of a person engaged in High-Speed Trading with laws and regulations and dispositions by government agencies which are based on laws and regulations and to take any other necessary measures, in accordance with this Act and with its articles of incorporation and other rules, in order to ensure the fair purchase and sale of Securities and Market Derivatives Transactions on the Financial Instruments Exchange Market, as well as to protect investors.

Algorithmic Trading Requirements in Hong Kong

In 2014 in Hong Kong, the Securities and Futures Commission introduced specific rules addressing Electronic Trading and Algorithmic Trading specifically in the Code of Conduct for licensed or registered persons.

The SFC's Code of Conduct identifies "Algorithmic trading" as a form of Electronic Trading (together with internet trading and direct market access - DMA) and defines it as computer generated trading activities created by a predetermined set of rules aimed at delivering specific execution outcomes. No specific definition is provided for High Frequency Trading, which is treated as a form of Algorithmic trading.

Section 18 of the SFC's Code of Conduct sets out the general principles applicable to all forms of Electronic Trading. Principles related to electronic trading in general include obligations relating to the control and supervision of orders and operations, adequate security, reliability and capacity, contingency measures, record keeping and post-trade controls.

It also contains specific requirements on algorithmic trading which includes: (i) **obligations for licensed or registered persons** involved in the design and development or approved to use algorithmic trading systems to be adequately qualified; (ii) appropriate **testing for** algorithmic trading system and trading algorithms to operate as designed; and (iii) **risk management** to be carried out by licensed or registered person to ensure the integrity of its algorithmic trading system and trading and that systems and algorithms operate in the interest of markets' integrity.

Schedule 7 of the Code of Conduct further specifies principles for algorithmic trading:

Qualifications: a licensed or registered person which uses internally developed algorithmic trading system or trading algorithms, or provides them for use by its clients, are obliged to ensure persons in charge of the design and the development of the algorithm trading system are adequately qualified to understand the compliance and regulatory issues which may arise from the use of algorithm trading system. A licensed or registered person should also provide the persons approved to use its algorithmic trading system with up-to-date documentation for operating its algorithmic trading system.

Systems testing: a licensed or registered person should ensure that the algorithmic trading system and trading algorithms it uses or provides to clients for use are adequately tested before deployment., Tests should ensure that the system operates as designed and takes into consideration extreme market circumstances, as well as the characteristics of different trading sections. Furthermore, the system needs to be tested in such a way as to be satisfied that it would not interfere with the operation of a fair and orderly market.

Risk management: a licensed or registered person has to ensure controls to avoid orders that may be erroneous or interfere with the operation of a fair and orderly market and to protect the licensed or registered person and its clients from being exposed to excessive financial risk. A licensed or registered person should regularly conduct post-trade reviews of trading activities conducted through its algorithmic trading system, including the relevant

order instructions to identify any suspicious market manipulative or abusive activities or market events or system deficiencies.

Record-keeping: documentation on the designed developments, algorithmic trading systems and trading algorithms need to be documented and recorded in writing. These records should be retained for a period of no less than 2 years after its system and algorithms are ceased to be used.

In addition, Scheme 7 of the Code of Conduct sets out the obligation for licensed or registered persons to perform due diligence checks on third party services providers on electronic systems. As regard direct market access (DMA), when a licensed or registered person allows their client for sub-delegation of DMA services to another person, both the licenced or registered person and client should have risk management mechanisms and supervisory controls in place. Furthermore, such person should meet the minimum client requirements established by the licensed or registered person and a written agreement is in place between such person and the client.

Algorithmic Trading Requirements in Australia

In May 2018, the Australian Securities and Investment Commission (ASIC) issued Regulatory Guide 241⁵⁷ on Electronic Trading (RG241) to give guidance on how trading participants should comply with their obligations under the ASIC Market Integrity Rules (Securities Markets). The goal of the ASIC Market Integrity Rules and associated guidance is “improving transparency and integrity of crossing systems and to strengthen the requirements for market participants to maintain fair, orderly and transparent markets and to deter market manipulation”⁵⁸.

RG 241 defines ‘algorithmic programs’ as automated strategies using programmable logic, system-generated (rather than human-generated) messages based on a set of predetermined parameters, logic rules and conditions. These programs include algorithmic trading, automated order generation and automated order routing. In respect to High Frequency Trading, pursuant to REP 597⁵⁹, ASIC adopts IOSCO’s principles and definition.

The current framework set by REG 241 establishes rules for trading participants using Automatic Order Processing (AOP) with specific provisions for algorithmic programs. Some of the rules on AOP entail:

Automated filters, including processes to record and to have a direct control over AOP and its parameters, including controls for immediately suspending, limiting or prohibiting AOP and trading messages.

⁵⁷ ASIC (2018). Source: <https://asic.gov.au/regulatory-resources/find-a-document/regulatory-guides/rq-241-electronic-trading/>

⁵⁸ Dark liquidity and high-frequency Trading. Source: <https://asic.gov.au/regulatory-resources/markets/market-structure/dark-liquidity-and-high-frequency-trading/>

⁵⁹ ASIC (2018). Source: <https://asic.gov.au/regulatory-resources/find-a-document/reports/rep-597-high-frequency-trading-in-australian-equities-and-the-australian-us-dollar-cross-rate/>

Trading and security management arrangements to determine and log the origin of orders and messages. Systems shall ensure capacity and continuity in case of disaster and of access by unauthorised persons.

Organisational and technical requirements which include trading record obligations, capital requirements for trading participants, best execution obligations and client order priority requirements.

Access authorisation: Before giving this access, a trading participant must ensure that the client, client's agent or representative has adequate skills and knowledge through rules and procedures demonstrating so and ensuring a continuous supervision. In addition, agreements between trading participants and authorised persons must be in place.

Review and certification of documentations and systems for AOP, including an initial review and certification to ASIC before use of its system for AOP; internal review of any material system's changes; and annual reviews and notifications to ASIC.

Where poor AOP controls lead to continuing patterns of order deletions, order amendments, high order-to-trade ratios relative to the underlying security, over trading or wash trading, ASIC may also cease, suspend, limit or prohibit AOP, access by one or more authorised persons, clients, financial product or Market.

In addition, the specific provision of REG 241 applicable to systems using algorithmic programs require to set up additional risk management and speed monitoring mechanisms. Trading participants using algorithmic programs are also expected to have an arrangement with an authorised person using their own algorithmic trading models.

7.5 Annex V: Template for notifications to NCAs under Article 17(2) and 17(5) of MiFID II

N.	Field/Content	Description	Format
1	Type of notification	Indicates whether it concerns a notification ex Article 17(2) or 17(5) of MiFID II.	'Article 17(2)' OR 'Article 17(5)'
2	Date of the notification	Indicates the date the notification is sent to the NCA.	DD/MM/YYYY
3	LEI	Indicates the Legal Entity Identifier code.	Free text – 20 characters
4	Company's Legal Name	Indicates the legal company's name as per the registration deed, and not the company's usual and known name.	Free text
5	Address	Indicates the registered company's full address.	'Address' 'Postcode' 'City' 'Country'
6	Key point of contact	Indicates the name, role, e-mail and phone contact of the key point of contact. In the case of having several key points of contact, to indicate at least one back-up point of contact.	'Name' 'Role' 'E-mail' 'Phone'
7	First declaration or update	Indicates whether this is a first notification or an update/amend of an existing one.	'First declaration' OR 'Update'
8	Date of first declaration	In case of an update identified in Field 6, indicates the date of the initial declaration to be updated.	DD/MM/YYYY
9	Date of launch of the company's activity	Indicates the date of the registration deed of the company.	DD/MM/YYYY

10	Identification of the trading venues	Indicates the complete list of trading venues, identified by name and MIC code.	<p>'Name of the trading venue'</p> <p>'MIC code' – 4 characters</p>
11	Identification of the type of financial instruments	Indicates the complete list of financial instruments used.	<p>'Shares'</p> <p>'Depository receipts'</p> <p>'Certificates'</p> <p>'ETFs'</p> <p>'Other equity-like'</p> <p>'SFPs'</p> <p>'Bonds (except ETCs and ETNs)'</p> <p>'ETCs and ETNs'</p> <p>'Emission allowances'</p> <p>'C10 derivatives'</p> <p>'Securitised derivatives'</p> <p>'Emission allowances derivatives'</p> <p>'IR derivatives'</p> <p>'Equity derivatives'</p> <p>'Credit derivatives'</p> <p>'FX derivatives'</p> <p>'Commodity derivatives'</p> <p>'CFDs'</p>
12	Client and/or own account	Indicates if the investment firm provides investment services or deals on own account.	<p>'Investment services'</p> <p>OR</p> <p>'Own account'</p> <p>OR</p> <p>'Both'</p>
13	Type and number of trading algorithms used	Indicates the number of algorithms used per type of algorithmic strategy.	Free text

14	Description	Indicates the detailed description of each of the algorithmic strategies used.	Free text
15	Market making or high-frequency trading strategy	Indicates if the algorithmic strategy is pursuing a market making strategy or high-frequency trading strategy.	Free text
16	Interdependency between trading algorithms	In case of several algorithmic strategies identified in Field 13, this field indicates its interdependency, if any.	Free text
17	Usage of algorithms	Indicates if the investment firm uses the algorithmic strategies as a provider or as a client.	'Algo provider' OR 'Algo user/client'
18	Other	Indicates any other information to be provided to the NCA.	Free text