ATHEXGROUP
Athens Exchange Group

Athens Stock Exchange

VOLATILITY INTERRUPTION (VI)

March 2022

Description

The Volatility Interrupter protects investors from shares' sharp price movements (market volatility) and ensures the equal dissemination of information to the entire market.

The Volatility Interrupter is activated when the price of a security is going to change in a predefined percentage:

- **During Continuous Trading**
  when a new order entered in to the system may cause a trade in a price that exceeds some specific price thresholds, a halt in the continuous trading of this security is triggered, leading to the activation of a pre-call phase followed by an auction

- **During any Auction's Pre-call phase**
  under specific conditions, there is no auction event, but an extension of the Pre-Call phase

Volatility Interrupters during Continuous Trading

The triggering of Volatility interrupters during continuous trading (CAMM) is due to the violation of the static or dynamic price range. The trading of the security is automatically halted, and a pre-call phase follows.

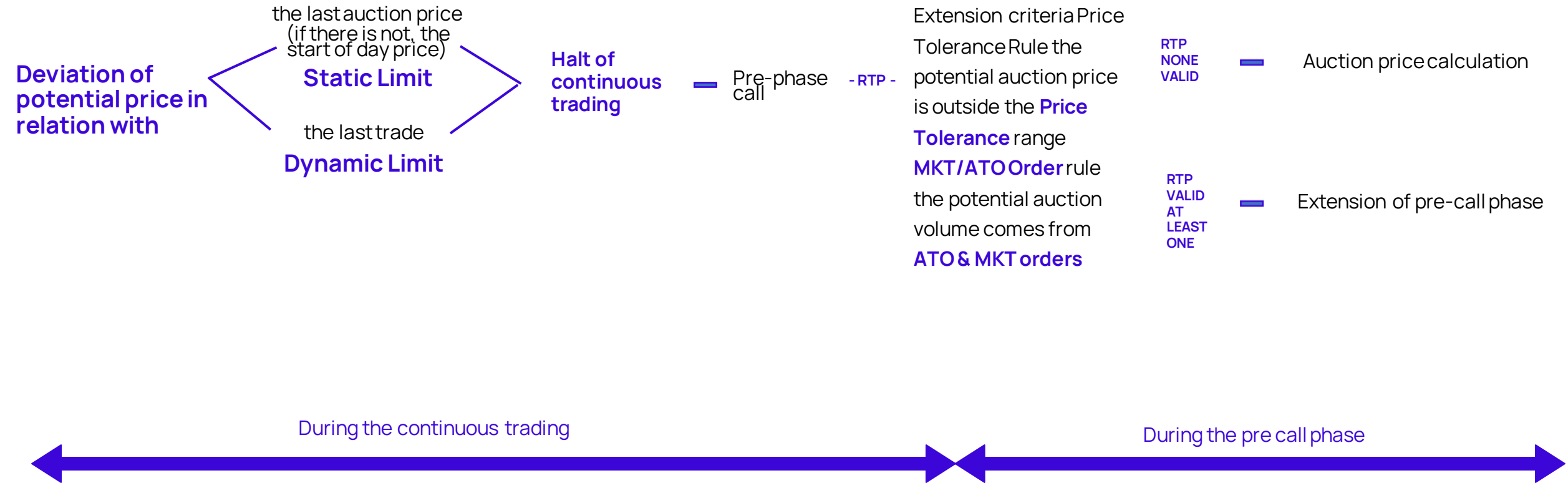| Type of limit	Reference Price
Static limit	**Static Reference price , which is based on the price of the Last Auction** If there is no price from the last auction, then as reference price is used the price of the previous auction or the start of day price
Dynamic limit	**Dynamic Reference price, which is based on the price of the Last trade** The last trade before the start of execution of an order is taken into consideration. If there are no previous trades, then the first trade of the order under examination is used

Volatility Interrupters during Pre-Call

When the Volatility Interrupter mechanism is triggered during an auction price calculation, then there is no auction event, but an extension of the Pre-Call phase

Extension of the Pre-Call phase of an auction for a specific security, when:

- the potential auction price lies outside the **Price Tolerance Range: Price Tolerance Rule**

- the potential auction volume is less than the volume of **MKT and ATO Orders** on either side: **MKT/ATO Order Rule**

Volatility Interrupters

Deviation of potential price in relation with

the last auction price (if there is not, the start of day price)
Static Limit

the last trade
Dynamic Limit

Halt of continuous trading

Pre-phase call

- RTP -

Extension criteria Price Tolerance Rule the potential auction price is outside the **Price Tolerance** range **MKT/ATO Order** rule the potential auction volume comes from **ATO & MKT orders**

RTP NONE VALID — Auction price calculation

RTP VALID AT LEAST ONE — Extension of pre-call phase

During the continuous trading

During the pre call phase

RTP (Random Time Period) *interferes for the determination of auction price or the extension of pre-call phase*

Volatility Interrupter Schema
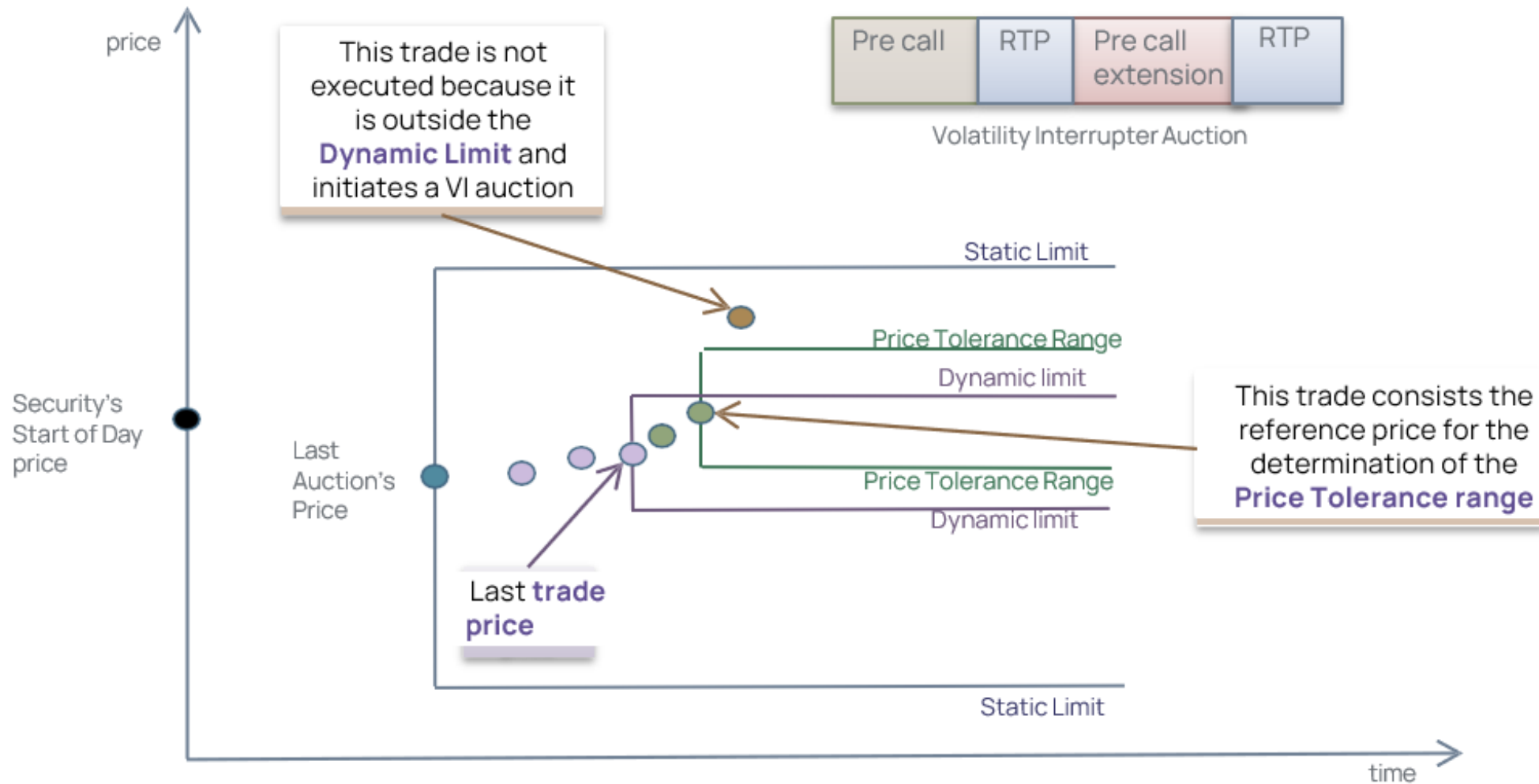
Markets with Volatility Interrupter

Volatility Interrupter:

Main Market

Mechanism is Supported in:

Bonds Market

ETF's

Parameters of VI in Main Market (1/2)

The parameters of VI in **Main market**, for securities of **High** or **Middle Liquidity Class**, are the following:

High or Middle Liquidity Class

Static limit *(from the last auction price or the start of day price)*	±10%, **or** ±15% (closing price less than 0.05€*)
Dynamic limit *(from the last trade)*	±3%, **or** N/A (closing price less than 0.05€*)
Time	Pre call: 2min Extension: 1min RTP: 1min
Pre call extension	Price Tolerance Rule: 30% of static limit, **or** MKT/ATO Rule

(*) : If the closing price of a stock during a 3-day period remains below the price of 0.05€, the VI of that stock will be changed the day after.

Parameters of VI in Main Market (2/2)

The parameters of VI in **Main market**, for securities of **Low Liquidity Class**, are the following:

Low Liquidity Class

Static limit
(from the last auction price or the start of day price)

±10%, **or**

±15% (closing price less than 0.05€*)

N/A (without Market Maker)

Dynamic limit
(from the last trade)

±3%, **or**

N/A (closing price less than 0.05€*)

Time

Pre call: 2min

Extension: 1min

RTP: 1min

Pre call extension

Price Tolerance Rule: 30% of static limit, **or**

MKT/ATO Rule

(*) : If the closing price of a stock during a 3-day period remains below the price of 0.05€, the VI of that stock will be changed the day after.

Volatility Interrupter & Securities with price below 0,05€

If the closing price of a stock in **Main market during a 3-day period** remains below the price of 0.05€, the VI of that stock **will be changed the day after.**
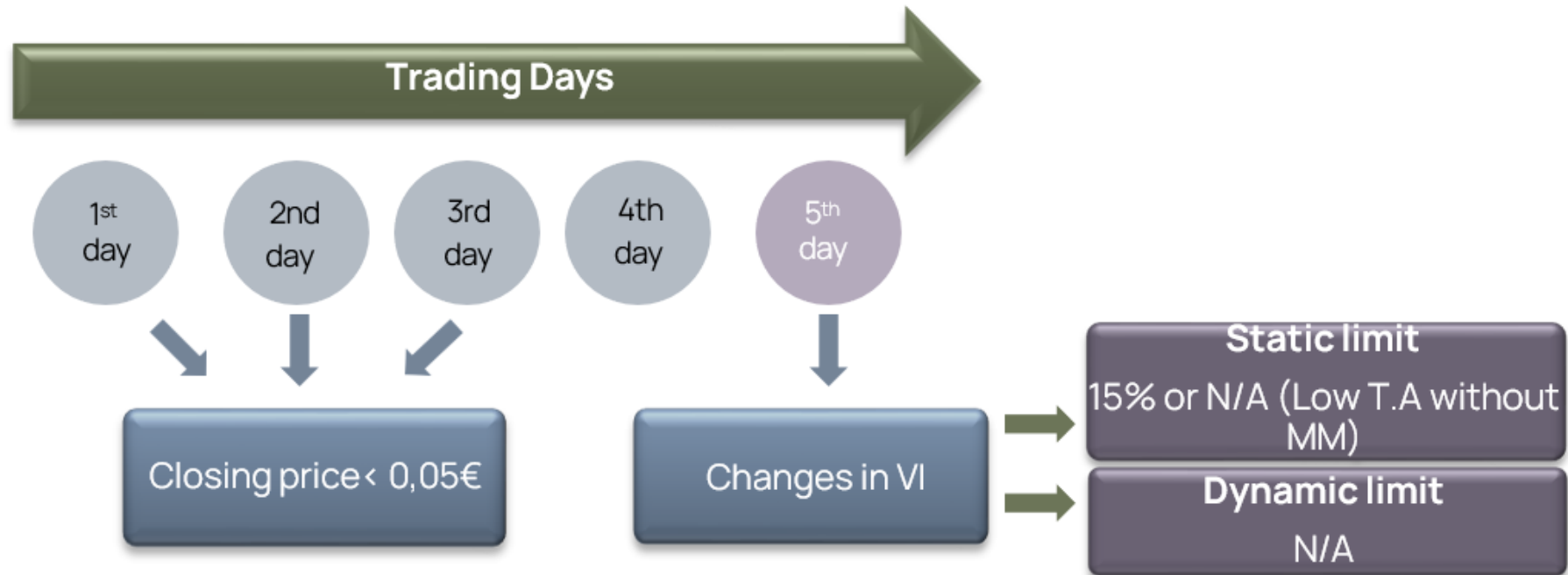
The new **VI parameters** are valid until the end of next month. At the end of next month, if all the closing prices of this stock remain **above €0.05,** then the **VI parameters** change again.

Volatility Interrupter in Main Market Example 1

Example 1: Extension of programmed pre call phase of security of High or Middle Liquidity Class EXAE during the opening pre call phase is as follows:

Example 1

Start of day	5€
Static limit	10%
Dynamic limit	3%
Price Tolerance Rule	3%

Price Tolerance Rule:
30% of static limit ➔ 30% * 10% = 3%

BBO during the pre call:

Projected Price / Volume

100 @ 5
From buy side, all the volume comes from **ATO orders**
Pre call extension due to **ATO/MKT Rule**

Volatility Interrupter in Main Market Example 2

Example 2: Extension of programmed pre call phase of security of High or Middle Liquidity Class EXAE during **the opening** pre call phase is as follows:

Example 2

Start of day	5€
Static limit	10%
Dynamic limit	3%
Price Tolerance Rule	3%

Price Tolerance Rule:
30% of static limit ➔ 30% * 10% = 3%

BBO during the pre call:

Buy	Sell
600 @ 5,30	100 @ 5,30

Projected Price / Volume

100 @ 5,30

Auction price deviates from the start of day price: 6%

Pre call extension due to **Price Tolerance Rule**

Example 3: Extension of programmed pre call phase of security of Low Liquidity Class KRI (which has a MM) during the opening pre call phase is as follows:

Example 3

Start of day	0,04€ (< 0,05€)
Static limit	15%
Dynamic limit	N/A
Price Tolerance Rule	4,5%

Price Tolerance Rule:
30% of static limit ➔ 30% * 15% = 4,5%

BBO during the pre call:

Buy	Sell
600 @ ATO	100 @ 0,04

Projected Price / Volume

100 @ 0,04

From buy side, all the volume comes from ATO orders

Pre call extension due to **Price Tolerance Rule**

Volatility Interrupter in Main market Example 4

Example 4: Extension of programmed pre call phase of security of Low Liquidity Class KRI (which has a MM) during the opening pre call phase is as follows:

Example 4

Start of day	0,04€ (< 0,05€)
Static limit	15%
Dynamic limit	N/A
Price Tolerance Rule	4,5%

Price Tolerance Rule:
30% of static limit ➔ 30% * 15% = 4,5%

BBO during the pre call:

Buy	Sell
600 @ 0,038	100 @ 0,04

Projected Price / Volume

100 @ 0,038

F100 @ 0,038

Auction price deviates from the start of day price: 5%

Pre call extension due to **Price Tolerance Rule**

Volatility Interrupter in Main market Example 5

Example 5: Activation of VI due to Static limit of security of High or Middle Liquidity Class EXAE during the continuous phase is as follows:

Example 5

Last auction price	5€
Static limit	10%
Dynamic limit	3%

Last trades

100 @ 5,10
100 @ 5,20
100 @ 5,30
100 @ 5,40

The unexecuted part of MKT order will be transferred as LMT order

BBO:

Buy	Sell
	100 @ 5,43
	100 @ 5,46
300 @ MKT	100 @ 5,51

Trades after the MKT Order:

Trades	Deviation from last auction
100 @ 5,43	8,60%
100 @ 5,46	9,20%
100 @ 5,51	10,20%

- Activation of VI due to Static limit.
- Last trade will not be executed.

New BBO:

Buy	Sell
100 @ 5,46	100 @ 5,51

Volatility Interrupter in Main market Example 6

Example 6: Activation of VI due to Static limit of security of High or Middle Liquidity Class EXAE during the continuous phase is as follows:

Example 6

Last auction price	5€
Static limit	10%
Dynamic limit	3%

Last trades

100 @ 5,10

100 @ 5,20

100 @ 5,30

100 @ 5,40

BBO:

Buy	Sell
	100 @ 5,43
	100 @ 5,46
300 @ MKT	100 @ 5,51

Trades after the MKT Order:

Trades	Deviation from last auction
100 @ 5,43	8,60%
100 @ 5,46	9,20%
100 @ 5,51	10,20%

- Activation of VI due to Static limit.
- Last trade will not be executed.

The unexecuted part of MKT order will be transferred as LMT order

New BBO:

Buy	Sell
100 @ 5,30	100 @ 5,40

Example 7: Activation of VI due to Static limit of security of Low Liquidity Class KRI (which has a MM) during the opening pre call phase is as follows:

Example 7

Start of day price	0,040€ (< 0,05€)
Last auction price	0,042€
Last trade	0,039€
Static limit	15%
Dynamic limit	N/A
Price Tolerance Rule	4,5%

The unexecuted part of MKT order will be transferred as LMT order

BBO:

Buy	Sell
	100 @ 0,42
	100 @ 0,43
300 @ MKT	100 @ 0,44

Trades after the MKT Order:

Trades	Deviation from last trade	Deviation from last auction
100 @ 0,42	8%	0%
100 @ 0,43	2%	2%
100 @ 0,44	2%	5%

New BBO:

Buy	Sell
100 @ 5,30	100 @ 5,40

- The Dynamic limit doesn't exist. Activation of VI due to Static limit.
- Last trade will not be executed.

Volatility Interrupter in Bonds Market

The parameters of **VI** in **Bonds Market,** are the following:

Bonds Market

Static limit *(from the last auction price or the start of day price)*	±10%
Dynamic limit *(from last trade)*	±3%
Time	Pre call: 2min Extension: 1min RTP: 1min
Pre call extension	Price Tolerance Rule: 30% of static limit, **or** MKT/ATO Rule

Volatility Interrupter in Bonds Market Example1

Example 1: Activation of VI due to Dynamic limit in Bonds Market During the trading in NIRB1:

Example 1

Last auction price	100
Static limit	10%
Dynamic limit	3%

Last trades

10 @ 100
10 @ 100

Enter Buy Order

Buy	**Sell**
10 @ 104	

Enter Sell Order

Buy	**Sell**
10 @ 104	10 @ 100

- Activation of VI due to Dynamic limit.
- Last trade will not be executed.

Volatility Interrupter in Bonds Market

The parameters of VI in **ETFs,** are the following:

ETF's

Static limit

(from the last auction price or the start of day price)

±10%

Dynamic limit

(from last trade)

±3%

Time

Pre call: 2min

Extension: 1min

RTP: 1min

Pre call extension

Price Tolerance Rule: 30% of static limit, **or**

MKT/ATO Rule

Volatility Interrupter in Bonds Market

Example 1: Activation of VI due to Dynamic limit in ETFs During the trading in **ALPHA ETF FTSE** Athex Large Cap :

Example 1

Last auction price	100
Static limit	10%
Dynamic limit	3%

Last trades

10 @ 100
10 @ 100

Enter Buy Order

Buy	Sell
10 @ 104	

Enter Sell Order

Buy	Sell
10 @ 104	10 @ 100

- Activation of VI due to Dynamic limit.
- Last trade will not be executed.

Trading on ATHEX

Trading on ATHEX at a Glance (1/2)

Market	Market Making	Price	Fluctuation limits	Volatility Interrupters		Closing algorithm	
				Static limit	Dynamic limit	Main	Alternative
Main market- High Liquidity Class	Yes	≥ 0,05	± 30%	10%	3%	Auction	VWAP of last 30' of trading session
	No			10%	3%		
	Yes	< 0,05		15%	N/A		
	No			15%	N/A		
Main market – Middle Liquidity Class	Yes	≥ 0,05	± 30%	10%	3%	Auction	VWAP of last 30' of trading session
	No			10%	3%		
	Yes	< 0,05		15%	N/A		
	No			15%	N/A		
Main market – Low Liquidity Class	Yes	≥ 0,05	± 30%	10%	3%	Auction and Significant auction value	Weighted average of a percentage of last trades, based on the transaction value
	No		± 10%	N/A	3%		
	Yes	< 0,05	± 30%	15%	N/A		
	No		± 10%	N/A			
Bonds	Yes	-	Unlimited	10%	3%	VWAP of last 30 minutes' trades of trading session	VWAP of last 60 minutes' trades of trading session

Trading on ATHEX at a Glance (2/2)

	Market Making	Fluctuation Limits	Closing Algorithm	
			Main	**Alternative**
Surveillance	N/A	±20%	Significant percent of trades	Start of day price
ETFs	Yes	±30%	Last trade	Start of day price
Warrants	Yes	±50% adjusted to ±100%, to +200% and to +400%	Market	Start of day price
Alternative Market	N/A	±10% adjusted to ±20%	VWAP of 30% of last trades	Start of day price
Alternative Bonds Market	N/A	Unlimited	VWAP of last 30 minutes' trades of trading session	VWAP of last 60 minutes' trades of trading session