APPROVED
by resolution of the Board of
CJSC JSCB National Clearing Centre
on November 29, 2012
(Minutes No. 167)

Methodology for Determination of Risk Parameters of the CJSC "MICEX Stock Exchange" Securities Market

1. Terms and Definitions

1.1. This Methodology for Determination of Risk Parameters of the CJSC "MICEX Stock Exchange" Securities Market (hereinafter the "Methodology") involves the following terms and definitions:

Upper (Lower) Penalty Repo Rate	The rate upon which the amount of the back leg is calculated (the second security purchase and sale trade), concluded between the Clearing Centre and a defaulting Clearing Member or between the Clearing Centre and a non-defaulting Clearing Member (in case the Clearing Centre fails to fulfill its obligations to a non-defaulting Clearing Member) during settlement of cases associated with non-fulfillment of obligations concerning trades with partial collateral.
Volatility	The repo rate or security price variability measure, its quantitative estimate being a standard deviation of repo trade rates or relative deviations of security prices in the OJSC Moscow Exchange stock market in the course of the Risk Assessment Period.
Risk Parameter Calculation Time	A time point when the risk parameters are calculated in accordance with the Clearing Rules.
Interest Risk Assessment Range	A range of interest rate values used by the Clearing Centre to evaluate the interest risk of trades with partial collateral. 3 levels of Interest Risk Assessment Range limits are determined.
Market Risk Assessment Range	A range of security price values used by the Clearing Centre to evaluate the market risks of trades with partial collateral. 3 levels of Market Risk Assessment Range limits are differentiated.
Discount	A discount applied to the Security Calculated Price accepted as collateral in repo trades to determine the price of the first leg
Repo Rate Band	A range of repo rate values outside which there can be no rate of orders for conclusion of repo trades submitted by the Trading Members in the course of trading.
Clearing Centre	Joint-Stock Commercial Bank "National Clearing Centre" (Closed Joint-Stock Company).

Concentration Limits of the first and the second levels	A net obligation (net claim) limit set for a Clearing Member under a given settlement code for which the Market and Interest Risk Rates of the first, the second and the third levels are applied. To be stated as an amount of securities.
Risk Assessment Period	A period considered by the Clearing Centre as sufficient to discover and settle the cases of a Clearing Member's failure to execute (improper execution) its trade obligations and/or margin claims. Three levels of Risk Assessment Periods are determined.
Clearing Rules	Rules of clearing activity performed by the Joint-Stock Commercial Bank "National Clearing Centre" (Closed Joint-Stock Company) at the securities market.
Calculated Repo Rate	A rate determined by the Clearing Centre following the results of conclusion of repo trades during the Trading Day in the Market sector Main market of the Closed Joint Stock Company MICEX Stock Exchange. To be used for definition of upper and lower limits of the Repo Rate Band as well as upper and lower limits of the Interest Risk Assessment Range. To be determined individually for each security.
Calculated Price	A price used to define upper and lower limits of the Price Band as well as upper and lower limits of the Market Risk Assessment Range.
Order Book Order	An order submitted in the course of trading in the securities market which is not an ad hoc trade order.
Order Book Trade	A trade executed based on order book orders.
Interest Risk Rate	Value of repo Calculation rate fluctuation possible with the given confidence level during the Risk Assessment Period. Three levels of the Interest Risk Rate are set.
Market Risk Rates	A value of Calculated price change possible with the given confidence level during the Risk Assessment Period. Three levels of the Market Risk Rate are set.
Trading Day	A day when the security trading is held in the stock market.
Price Band	A price value range used during monitoring of share and bond prices accepted as collateral in repo trades. Upon approximation of order prices to the Price Band limits a procedure of shifting Market Risk Assessment Range limits is performed for this security.

1.2. Terms not defined herein have the meaning given thereto by the current legislation and other Russian Federation regulations as well as the internal documents of the Clearing Centre and the Rules regulating security trading in CJSC MICEX Stock Exchange.

1.3. The Methodology contains the following conventions (all sub-scripts hereof indicate the Trading Days and are based on the assumption that risk parameters are evaluated as of Risk Parameter Calculation Time of the day *i)*:

No	Parameter	Convention
1	Designation of the Trading Day during which risk parameters for the next Trading Day are determined (a sub-index).	i
2	Calculated price in roubles (bonds or shares). For bonds – a full price (a price with account of accumulated coupon profit).	P_i
3	A calculated "net" price of a bond in per cent of par.	$P\_sttlmnt_i$
4	Prices of the best purchase and sales orders at the moment of risk parameter calculation. To be determined in roubles for shares, and in per cent of par for bonds.	BID_i , ASK_i
5	Prices of the best orders for attraction and application of funds at the moment of risk parameter calculation. To be determined in per cent per annum.	RR_BID_i , RR_ASK_i
6	A Price of the last trade (security closing) in the Main trading mode at the moment of Risk Parameter calculation.	P_close_i
7	Relative change of the calculated price in per cent.	r_i
8	A weighting coefficient used in Volatility calculation (to be determined at Risk Parameter calculation time of the day *i*).	a_i
9	A non-Trading Day accounting coefficient.	G_i
10	Security volatility (in the Risk Assessment Period).	σ_i
11	A tentative value of the Market Risk Rate.	S_i^p
12	The Market Risk Calculated Rate.	V_i
13	An average weighted («net») bond price. To be determined in per cent of par.	P_wa_i
14	Accumulated coupon profit. To be determined in roubles.	NKD_i
15	A bond cash flow including coupon payments, depreciation, principal payments in *t* years from the date of risk parameter calculation. To be determined in roubles.	$CashFlow_i(t)$
16	A bond liquidity indicator according to the trading results of the day i	l_i
17	A smoothed indicator of bond liquidity according to the trading results of the day i	L_i
18	A smoothed indicator of bond issuer liquidity according to the trading results of the day i	L_issuer_i
19	T-year risk-free rate derived from the zero-coupon yield curve for the governmental bonds.	$G_i(t)$
20	A volume of bond trading on the day *i* in the main trading mode. To be determined in roubles.	$Volume_i$
21	Z-spread of a bond according to the trading results of the day *i.*	Z_wa_i
22	Z-spread of the bond issuer according to the trading results of the day *i.*	Z_issuer_i
23	Theoretical bond Z-spread.	Z_theor_i
24	A theoretical bond price.	P_theor_i
25	Calculated Z-spread of a bond.	$Z\_sttlmnt_i$
26	Bond modified duration.	$MDur_i$
27	Modified duration of issuer's debt.	$MDur\_issuer_i$
28	G-curve volatility.	σ_curve_i
29	Z-spread volatility.	σ_z_i

30	The Market Risk Rate of the first (second, third) level. To be determined in per cent.	$S\_1(2,3)_i$
31	Upper limit of the Price Band. To be determined in roubles for shares, in % of par for bonds.	PcH_i
32	Lower limit of the Price Band. To be determined in roubles for shares, in % of par for bonds.	PcL_i
33	Upper limit of the Market Risk Assessment Range of the first (second, third) level. To be determined in roubles.	$PtH\_1(2,3)_i$
34	Lower limit of the Market Risk Assessment Range of the first (second, third) level. To be determined in roubles.	$PtL\_1(2,3)_i$
35	The repo Calculated Rate. To be determined in per cent per annum.	$REPOrate_i$
36	An average weighted repo rate.	$REPOrate\_wa_i$
37	An indicator of the one-day repo rate (shares) MICEXEQRRON.	$REPO\_equity_i$
38	An indicator of the one-day repo rate (bonds) MICEXBORRON.	$REPO\_bond_i$
39	A value of the Rate change.	r_IR_i
40	A tentative value of the Interest Risk Rate.	Δ_i^p
41	The Interest Risk Calculated Rate.	V_IR_i
42	The repo Interest Risk Rate of the first (second, third) level.	$\Delta\_1(2,3)_i$
43	Upper limit of the Repo Rate Band.	$RRcH_i$
44	Lower limit of the Repo Rate Band.	$RRcL_i$
45	Upper limit of the Interest Risk Assessment Range of the first (second, third) level. To be determined in roubles.	$RRtH\_1(2,3)_i$
46	Lower limit of the Interest Risk Assessment Range of the first (second, third) level. To be determined in roubles.	$RRtL\_1(2,3)_i$
47	Discount.	$DiscountREPO_i$
48	A bond nominal value.	$Facevalue_i$
49	The lower penalty repo rate	$LPenRate_i$
50	The repo trade term. To be determined as a number of calendar days between dates of settlement of the 1st and the 2nd legs	$REPOterm_i$
51	Minimum restrictive levels of the Market Risk Rates of the first (second, third) level. To be set individually for each security. To be set in per cent.	$S\_1(2,3)\_\min$
52	The maximum restrictive level of the Market Risk Rate for shares.	$S\_\max\_eq$
53	A minimum step of the Market Risk Rate change.	h
54	A volatility multiplier determining the level of confidence for the Market Risk Assessment Range.	q
55	A smoothing coefficient for liquidity values.	α
56	A period for evaluation of the risks of the first (second, third) level. To be determined in days.	$rh\_1(2,3)$
57	The Market Liquidity Risk Rate for shares.	liq_eq
58	The Market Liquidity Risk Rate for bonds.	liq_bnd
59	The maximum restrictive level of the Market Risk Rate for bonds.	S_max_bnd
60	A coefficient of relation between the value of the Price Band and the value of the Market Risk Assessment Range.	x_pr
61	A coefficient of relation between the value of the Repo Rate Band and the value of the Interest Risk Assessment Range.	x_IR
62	A minimum step of the Interest Risk Rate change.	h_IR
63	The Market Liquidity Risk Rate of repo trades. To be set in per	liq_RR

	cent per annum.	
64	The minimum restrictive level of the First (Second) Level Interest Risk Rate.	$\Delta\_1(2)\_\min$
65	A value of maximum approximation of the best quotations to the limit of the Price Band. To be set in shares from the Price Band for the instrument.	*w*
66	Such a period of time that if during this period the best quotations are maximally approximate to the Price Band/Repo Rate Band limit, then after its termination it is necessary to shift limits of the Band in the course of trading. To be set in minutes.	*u*
67	A scale coefficient for calculation of the bond liquidity value.	*Scale*
68	A scale coefficient for calculation of a weighting accounting coefficient for issuer's spread.	*DurScale*
69	The upper Penalty Repo Rate.	*HPenRate*
70	The maximum value of the Lower Penalty Repo Rate.	*max_LPenRate*

2. General provisions

2.1. The Methodology is elaborated in accordance with the Clearing Rules and defines the procedure for the determination of risk parameters used by the Clearing Centre to control and manage risks.

2.2. The Methodology, amendments and additions thereto are approved by the Clearing Centre Supervisory Board and come into effect on the date fixed by the Clearing Centre authorized executive body.

2.3. The Methodology shall be published on the Clearing Centre's website.

3. Parameters of Risk Management System

3.1. The Methodology contains the rules of determining the following risk-parameters:

- Calculated Prices (shares and bonds participating in trades with partial collateral);
- Market Risk Rates;
- Upper and lower limits of the Market Risk Assessment Range;
- Upper and lower limits of the Price Band;
- Discount;
- Concentration Limits of the first and the second levels;
- Calculated Repo Rates;
- Interest Risk Rates;
- Upper and lower limits of the Interest Risk Assessment Range;
- Upper and lower limits of the Repo Rate Band;
- Upper and Lower Default repo Rate.

3.2. Other parameters listed in the paragraph 1.3 of the Methodology are technical and are used for the calculation of the risk-parameters specified in the paragraph 3 of the Methodology.

3.3. The values of the parameters stated in the paragraph 1.3 of the Methodology numbered 2-50, are calculated at the Risk Parameter Calculation Time every Trading Day.

3.4. The values of the parameters stated in the paragraph 1.3 of the Methodology numbered 51-67, as well as values of the Concentration Limits of the first and the second levels are approved by the authorized executive body of the Clearing Centre and are redefined if required.

4. Basic Principles of the Market and Interest Risk Rate Calculation

4.1. The Market and Interest Risk Rates are calculated individually for each security participating in trades with partial collateral.

4.2. To calculate the Market and Interest Rates an exponential weighting (exponentially weighted moving average – EWMA) methodology for Volatility evaluation is applied.

4.3. The minimum and maximum restrictive levels of the Market Risk Rates and the Minimum restrictive levels of Interest Risk Rates are set.

4.4. The authorized executive body of the Clearing Centre is entitled to make a decision on setting the Market and Interest Risk Rates different from the calculated values.

5. Algorithm for Determining Calculated Prices for Shares

5.1. The Share Calculated price (P_i) is determined by adjustment of the share closing price in accordance with the purchase order prices (BID_i) and sale order prices (ASK_i): $P_i = mid(BID_i, P\_close_i, ASK_i)$, where mid - a function computing a median if there are purchase and sale orders. If there were no trades in the main trading mode, then the calculated price of the previous day is assumed as the closing price. If there are only sales orders, then $P_i = \min(P\_close_i, ASK_i)$. If there are only purchase orders, then $P_i = \max(P\_close_i, BID_i)$. Otherwise $P_i = P\_close_i$. Order prices are determined based on the main trading mode.

5.2. The authorized executive body of the Clearing Centre is entitled to make a decision on setting the Calculated Price of shares different from the value calculated in accordance with the above algorithm.

6. Algorithm for Determining the Market Risk Rates for Shares

6.1. The following three levels of the Market Risk Rates for shares are differentiated (hereinafter in this section – the Rate):

6.1.1. The First Level Rate is determined for small volumes of the security position. It is expected that the position can be closed in a short time without significant impact on the security price. To be calculated based on the First Level Risk Assessment Period. Effective for positions up to the Concentration Limit of the first level. The value of the Concentration Limit of the first level is determined based on liquidity of this security.

6.1.2. The Second Level Rate is determined for mean volumes of the security position. To be calculated based on the Risk Assessment Period for the risk of the second level (it is expected that the position can be closed during this period). Effective for positions beyond Concentration Limit of the first level but not exceeding the Concentration Limit of the second level.

6.1.3. The Third Level Rate is determined for large volumes of the security position. To be calculated based on the Risk Assessment Period for the risk of the third level (it is expected that the position can be closed during this period). Effective for positions beyond Concentration Limit of the second level.

6.2. To determine Share Rates a methodology of Volatility evaluation based on exponential weighting (exponentially weighted moving average – EWMA) is applied.

6.3. Rates of the first, the second and the third levels are calculated each Trading Day *i* at the Risk Parameter calculation time.

6.4. To calculate the First Level Rates (S_1_i):

6.4.1. Relative change of Calculated Price r_i :is calculated

$$r_i = \max\left[\left|\frac{P_i - P_{i-2}}{P_{i-2}}\right|;\left|\frac{P_i - P_{i-1}}{P_{i-1}}\right|\right]$$

i.e. maximum of 2 values:

- the one-day relative Calculated Price fluctuation;
- the two-day relative Calculated Price fluctuation.

6.4.2. A weighting coefficient a_i is determined.

6.4.2.1. If the relative price fluctuation r_i is more than Volatility evaluation σ_{i-1} of the previous Trading Day, then $a_i = a_{upper}$, otherwise $a_i = a_{lower}$:

$$a_i = \begin{cases} a_{upper}, \; if \;\; r_i > \sigma_{i-1} \\ a_{lower}, \; if \;\; r_i \le \sigma_{i-1} \end{cases}$$

6.4.2.2.If there was more than one non-Trading Days in between two Trading Days *i-2* and *i*, then a weighting coefficient a_i is equated to zero. In accordance with the Methodology a non-Trading Day is:

- A non-business day in the Russian Federation provided that it is a business day in Europe and the USA;
- A non-Trading Day for an instrument (hereinafter in the Methodology – a day when trading in the main trading mode in CJSC MICEX Stock Exchange is not held) provided that it is a business day in the Russian Federation.

6.4.3. A non-Trading Day accounting coefficient G_i in the following Period is determined for risk evaluation:

$$G_i = \sqrt{1 + \frac{m_i}{rh\_1}}$$

m_i - parameter for a particular security is determined as a sum of a number of non-Trading Days for this security in the following Risk Assessment Period.

6.4.4. Volatility is recalculated in accordance with the formula:

$$\sigma_i = \sqrt{(1 - a_i) \cdot \sigma_{i-1}^2 + a_i \cdot r_i^2} \qquad (6.1)$$

If price fluctuation r_i exceeds the Rate S_1_{i-1} and there is no more than one holiday in between the Trading Days *i* and *i-2*, then along with the Volatility calculated in accordance with the formula (6.1), the following value is calculated:

$$\sigma_i^* = \frac{r_i}{q} \qquad (6.2)$$

In this case Volatility σ_i is determined according to the formula: $\sigma_i = \max(\sigma_i, \sigma_i^*)$.

In the formula (6.2) and hereinafter *q* parameter is a volatility multiplier determined based on the retrospective analysis and back-testing.

6.4.5. A tentative value of the Rate S_i^p is determined in accordance with the following algorithm:

if $ceiling\left(\frac{q \cdot \sigma_i}{h}\right) \cdot h \geq S_{i-1}^p + h$, then $S_i^p = ceiling\left(\frac{q \cdot \sigma_i}{h}\right) \cdot h$; otherwise

if $ceiling\left(\frac{q \cdot \sigma_i}{h}\right) \cdot h \leq S_{i-1}^p - h$ and the time period from the last fluctuation of the Tentative value of the Rate constitutes not less than *n* Trading Days, then $S_i^p = S_{i-1}^p - h$;

otherwise $S_i^p = S_{i-1}^p$, where *ceiling* – a rounding function upwards to a whole number.

6.4.6. The Minimum restrictive levels of the First Level, the Second Level and the Third Level Rates ($S\_1\_\min$, $S\_2\_\min$, $S\_3\_\min$) are determined with the purpose of:

- Restriction of a model risk in the case of extremely low Volatility valuation in course of implementation of risk scenarios;
- Prevention of trading stoppage upon significant narrowing of the Price Band.

6.4.7. The Value of the Market Risk Calculated Rate V_i is calculated with account of the fact that it can be changed only discretely with a minimum step of h:

$$V_i = \min\left(ceiling\left(\frac{\max(S_i^p \cdot G_i + liq\_eq; S\_1\_\min)}{h}\right) \cdot h; S\_\max\_eq\right). \qquad (6)$$

6.4.8. The final values of the Market Risk Rate S_1_i are determined as equal to the value of the Market Risk Calculated Rate V_i. The Clearing Centre is entitled to make a decision on setting the final value of the Market Risk Rate S_1_i different from the value of the Market Risk Calculated Rate V_i.

6.5. Values of the Second Level Rates (S_2_i) and the Third Level Rates (S_3_i) are determined with account of Volatility in Risk Assessment Periods for the risks of the second and the third levels with account of the set minimum and maximum restrictive levels of the Market Risk Rate for shares:

$$S\_2_i = \min\left(ceiling\left(\frac{\max\left(\sqrt{\frac{rh\_2}{rh\_1}} \cdot S\_1_i; S\_2\_\min\right)}{h}\right) \cdot h; S\_\max\_eq\right),$$

$$S\_3_i = \min(ceiling(\frac{\max(\sqrt{\frac{rh\_3}{rh\_1}} \cdot S\_1_i; S\_3\_\min)}{h}) \cdot h; S\_\max\_eq)$$

6.6. The authorized executive body of the Clearing Centre is entitled to make a decision on setting Rates of the first, the second and the third levels different from calculated values.

7. Algorithm for Determining Bond Calculated Prices

7.1. Z-spread in accordance with the trading results is calculated (provided that there was trading with the bond on this Trading Day): Z_wa_i. This parameter is calculated as a solution to the following equation:

$$\frac{P\_wa_i}{100} \cdot Facevalue_i + ACP_i = \sum_t \frac{CashFlow_i(t)}{(1 + G_i(t) + Z\_wa_i)^t}$$

where P_wa_i - an average weighted price of the bond on this Trading Day;

$Facevalue_i$ - current par value in roubles;

$CashFlow_i(t)$ – a monetary flow in roubles (coupon payment, depreciation, capital amount) in t years from the date of the risk parameter calculation;

$G_i(t)$ – *a* risk-free profit for t years, calculated based on the zero-coupon profit curve of governmental bonds (G-curve) in accordance with the Methodology of calculation of zero-coupon profit curve of governmental bonds.

7.2. Values of bond (l_i, L_i) and issuer L_issuer_i liquidity are calculated:

$$l_i = \frac{Volume_i}{\exp(scale \cdot abs(Z\_wa_i - Z\_sttmnt_{i-1})};$$

$$L_i = \alpha \cdot l_i + (1-\alpha) \cdot L_{i-1};$$

$L\_issuer_i = Avg_j(L_{i,j})$, where Avg_j - an arithmetic average for all issuer bonds, $Volume_i$ - a bond trading volume on the day i, α - a smoothing coefficient for liquidity values, *scale* – a scale coefficient.

The issuer debt modified duration is calculated in the following manner:

$$MDur\_issuer_i = \frac{\sum_{IssuerName==Issuer} MDur_{i-1}(IssuerName) \cdot L_i(IssuerName)}{\sum_{IssuerName==Issuer} L_i(IssuerName)}.$$

7.3. The issuer Z-spread (Z_issuer_i) is calculated depending on the trading volume for each issue of bonds on this day and the issuer Z-spread on the previous day:

$$Z\_issuer_i = \frac{\sum_j (l_{i,j} \cdot Z\_wa_{i,j}) + Z\_issuer_{i-1} \cdot L\_issuer_{i-1}}{\sum_j (l_{i,j}) + L\_issuer_{i-1}}$$, where $\sum_j$ - summing up of all issues of issuer's bonds participated in trading on the day i.

7.4. A theoretical bond Z-spread (Z_theor_i) is calculated in the following manner:

$Z\_theor_i = \frac{l_i \cdot Z\_wa_i + Z\_sttlmnt_{i-1} \cdot L_{i-1} + Flag \cdot Z\_issuer_i \cdot L\_issuer_i \cdot DurFactor}{l_i + L_{i-1} + Flag \cdot L\_issuer \cdot DurFactor}$, where $Flag$=0, if $L_i > L\_issuer_i$, otherwise $Flag$=1, where

$DurFactor = \exp(-DurScale \cdot abs(MDur_{i-1} - MDur\_issuer_i))$,

DurScale – a scale coefficient.

7.5. A bond theoretical price is calculated based on the theoretical Z-spread (Z_theor_i) and the governmental bond zero-coupon profit curve (G-curve) according to the formula: $\frac{P\_theor_i}{100} \cdot Facevalue_i = \sum_t \frac{CashFlow_i(t)}{(1 + G_i(t) + Z\_theor_i)^t} - ACP_i$, where ACP_i – accumulated coupon profit of bonds, $CashFlow_i(t)$ - a bond monetary flows.

7.6. The Bond Calculated price ($P\_sttlmnt_i$) is determined by adjustment of the theoretical price in accordance with the purchase order prices (BID) and sale order prices (ASK): $P\_sttlmnt_i = mid(BID_i, P\_theor_i, ASK_i)$, where mid - a function computing a median, if there are orders for purchase and sale. If there are only sale orders, then $P\_sttlmnt_i = \min(P\_theor_i, ASK_i)$. If there are only purchase orders, then $P\_sttlmnt_i = \max(P\_theor_i, BID_i)$. Otherwise $P\_sttlmnt_i = P\_theor_i$. Order prices are determined based on the main trading mode and from the supplementary sources.

7.7. If $P\_sttlmnt_i \neq P\_theor_i$, Bond Calculated Z-spread is determined ($Z\_sttlmnt_i$) based on the Bond Calculated Price $P\_sttlmnt_i$ according to the algorithm stated in the paragraph 7.1 by substitution of the average weighted price P_wa_i for calculated price $P\_sttlmnt_i$. Then, Z_issuer_i risk parameter is recalculated according to the formula from the paragraph 7.3 by substitution of the parameter Z_wa_i for $Z\_sttlmnt_i$.

7.8. A Full Bond Calculated price in roubles (P_i) is calculated in the following manner:

$P_i = \frac{P\_sttlmnt_i}{100} \cdot Facevalue_{i+1} + НКД_{i+1}$

7.9. The bond modified duration is calculated according to the following formula:

$MDur_i = \frac{1}{P_i} \cdot \sum_t \frac{CashFlow_i(t) \cdot t}{(1 + G_i(t) + Z\_sttlmnt_i)^{t+1}}$

7.10. The authorized executive body of the Clearing Centre is entitled to make a decision on setting the Bond Calculated Price different from the value calculated according to the algorithm above.

8. Algorithm for Determining Market Risk Rates for Bonds

8.1. To determine Market Risk Rate for bonds (hereinafter in this section – the Rate) the Interest Rate volatility is evaluated. The Interest Rate Volatility is evaluated as a sum of Zero-coupon profit curve Volatility and Z-spread Volatility. To evaluate Volatility of these values

a Volatility evaluation methodology based on exponential weighting (exponentially weighted moving average – EWMA) is applied.

8.2. G-curve volatility calculation (σ_curve_i) is similar to volatility calculation with EWMA methodology, used for share price volatility calculation (paragraphs 6.4.1-6.4.4) with substitution of r_i variable for r_curve_i variable, which is recalculated based on the results of each Trading Day in the following manner: $r\_curve_i = \max_j(abs[G\_curve(\theta_j)_i - G\_curve(\theta_j)_{i-1}];$

$abs[G\_curve(\theta_j)_i - G\_curve(\theta_j)_{i-2}]),$

where maximum is taken for different time periods θ_j of G-curve.

8.3. Z-spread volatility calculation (σ_z_i) is similar to volatility calculation with EWMA methodology, used for share price volatility calculation (paragraphs 6.4.1-6.4.4) with substitution of r_i variable for r_z_i variable, which is recalculated based on the results of each Trading Day in the following manner:

$$r\_z_i = \max(abs[Z\_sttlmnt_i - Z\_sttlmnt_{i-1}]; abs[Z\_sttlmnt_i - Z\_sttlmnt_{i-2}]),$$

where $Z\_sttlmnt_i$ - a Z-spread calculated value according to the results of the day i.

8.4. Bond volatility (σ_i) is determined according to a formula:

$$\sigma_i = MDur_i \cdot (\sigma\_curve_i + \sigma\_z_i),$$

where $MDur_i$ - a modified bond duration.

8.5. To determine the First Level Rate:

8.5.1. A tentative value of the Rate S_i^p is calculated in accordance with the following algorithm:

if $ceiling\left(\frac{q \cdot \sigma_i}{h}\right) \cdot h \geq S_{i-1}^p + h$, than $S_i^p = ceiling\left(\frac{q \cdot \sigma_i}{h}\right) \cdot h$; otherwise

if $ceiling\left(\frac{q \cdot \sigma_i}{h}\right) \cdot h \leq S_{i-1}^p - h$ and time from the last change of the Rate Tentative value constitutes not less than *n* Trading Days, then $S_i^p = S_{i-1}^p - h$;

otherwise $S_i^p = S_{i-1}^p$, where *ceiling* – a rounding function upwards to a whole number.

8.5.2. The Value of the calculated rate V_i is calculated with account of the fact that the calculated rate can be varied only discretely with a minimum step *h*:

$$V_i = \min\left(ceiling\left(\frac{\max(S_i^p \cdot G_i + liq\_bnd; S\_1\_\min)}{h}\right) \cdot h; S\_\max\_bnd\right).$$

8.5.3. The final value of the First Level Rate (S_1_i) is determined as equal to the value of the Market Risk Calculated Rate V_i. The Clearing Centre is entitled to make a

decision on setting the final value of the Rate S_1_i different from the value of the Market Risk Calculated Rate V_i .

8.6. Values of the Second Level Rates (S_2_i) and Third Level Rates (S_3_i) are determined with the help of Volatility calculation in the Periods in order to evaluate risks of the second and the third levels with account of the set minimum and maximum restrictive levels of the Market Risk Rate for bonds:

$$S\_2_i = \min(ceiling(\frac{\max(\sqrt{\frac{rh\_2}{rh\_1}} \cdot S\_1_i; S\_2\_\min)}{h}) \cdot h; S\_\max\_bnd),$$

$$S\_3_i = \min(ceiling(\frac{\max(\sqrt{\frac{rh\_3}{rh\_1}} \cdot S\_1_i; S\_3\_\min)}{h}) \cdot h; S\_\max\_bnd)$$

8.7. The authorized executive body of the Clearing Centre is entitled to make a decision on setting Rates of the first, the second and the third level different from calculated values.

9. Determination of Upper and Lower Limits of the Market Risk Assessment Range for Shares and Bonds

9.1. The Upper limit of the Market Risk Assessment Range of the first (second, third) level is determined as the Calculated Price in roubles plus the value of the Market Risk Rate of the first (the second, the third) level:

$PtH\_1_i = P_i \cdot (1 + S\_1_i)$;

$PtH\_2_i = P_i \cdot (1 + S\_2_i)$;

$PtH\_3_i = P_i \cdot (1 + S\_3_i)$.

9.2. The Lower limit of the Market Risk Assessment Range of the first (second, third) level is determined as the Calculated Price in roubles minus the value of the Market Risk Rate of the first (the second, the third) level:

$PtL\_1_i = P_i \cdot (1 - S\_1_i)$;

$PtL\_2_i = P_i \cdot (1 - S\_2_i)$;

$PtL\_3_i = P_i \cdot (1 - S\_3_i)$.

9.3. The values of the Risk evaluation limits and Calculated prices for shares are rounded off to the decade $ceiling[\log_{10}(LotSize)] + 2$, where LotSize – is a lot size in the main trading mode, $ceiling[\ ]$- is a rounding function upwards to a whole number.

9.4. The limits and the Calculated Prices in roubles for bonds are rounded off to the 2nd decade.

10. Algorithm for Determining Upper and Lower Limits of the Price Band.

10.1. For bonds the Upper limit of the Price Band (PcH_i) and the Lower Limit of the Price Band (PcL_i) are determined in the following manner:

$$PcH_i = P\_sttlmnt_i \cdot (1 + \frac{S\_1_i}{x\_pr}),$$

$$PcL_i = P\_sttlmnt_i \cdot (1 - \frac{S\_1_i}{x\_pr}).$$

10.2. For shares the upper limit of the Price Band and the Lower Limit of the Price Band are determined in the following manner:

$$PcH_i = P_i \cdot (1 + \frac{S\_1_i}{x\_pr}),$$

$$PcL_i = P_i \cdot (1 - \frac{S\_1_i}{x\_pr}).$$

10.3. x_pr coefficient is determined based on the statistical information on the relation between two-day security price change and intraday price deviation from the Calculated Price during the Trading Day.

11. Determination of Discount for Shares and Bonds

11.1. The Discount is set equal to the value of the Market Risk Rate of the first level:

$$DiscountREPO_i = S\_1_i$$

12. Determination of Concentration Limits for Shares and Bonds

12.1. The Concentration Limit of the first level means evaluation of the maximum position volume for this security, which can be closed in a short time without significant impact on the security price. The Concentration Limit of the second level is an evaluation of the maximum position volume for this security which can be closed during the Risk Assessment Period of the second level without significant impact on the security price.

12.2. In order to determine Concentration Limits of the first and the second levels, shares and bonds are divided in 2 groups according to their liquidity. Then the Concentration Limits are set in these groups based on the trading volume and expert evaluation of the Clearing Centre.

12.3. Values of the Concentration Limits may be adjusted depending on the additional market factors.

12.4. Final values of the Concentration Limits of the first and the second levels are set by the decision of the authorized executive body of the Clearing Centre.

13. Algorithm for Determining Repo Calculated Rate

13.1. For each security participating in the repo trades the repo Calculated Rate is determined during procedure of risk parameter calculation.

13.2. The repo Calculated Rate is calculated according to the following algorithm:

13.2.1. In case repo trades with this security were concluded during the Trading Day, the average weighted Repo Rate (*REPOrate_wa*) for this security is

calculated in the repo regimen with the Central Counterparty according to the following formula:

$$REPOrate\_wa_i = \frac{\sum_j (REPOrate_{i,j} \cdot Volume_{i,j})}{\sum_j Volume_{i,j}}$$, where $REPOrate_{i,j}$, $Volume_{i,j}$

- the rate and volume of *j* repo trade on day *i*.

13.2.2. In case no repo trades were concluded during the Trading Day with this security, the last value of one-day repo rate Indicator for shares/bonds is taken as an average weighted repo rate, respectively.

13.2.3. The repo Calculated Rate for this security ($REPOrate_i$) is determined by adjusting average weighted repo rate for orders on fund attraction (RR_BID_i) and fund application (RR_ASK_i): $REPOrate_i = mid(RR\_BID_i, REPOrate\_wa_i, RR\_ASK_i)$, where *mid* - a function, computing a median, if there are orders for attraction and application of funds. If there are orders only for application of funds, then $REPOrate_i = \min(REPOrate\_wa_i, RR\_ASK_i)$. If there are orders only for attraction of funds, then $REPOrate_i = \max(REPOrate\_wa_i, RR\_BID_i)$. Otherwise $REPOrate_i = REPOrate\_wa_i$.

13.2.4. If required the authorized executive body of the Clearing Centre can make decision on changing value of the repo Calculated rate.

14. Determination of Interest Risk Rates

14.1. For each security accepted as collateral in repo trades three levels of Interest Risk Rates are determined during the risk parameter calculation procedure. The Interest Risk Rate of the first level is effective when the volume of exposed positions is lower or equal to the Concentration Limit of the first level. The Interest Risk Rate of the second level is effective for positions exceeding in volume the Concentration Limit of the first level but not exceeding the Concentration Limit of the second level. The Interest Risk Rate of the third level is effective for positions exceeding in volume the Concentration Limit of the second level.

14.2. As the main methodology for determination of repo Interest Risk Rates a Volatility Evaluation methodology based on exponential weighting (exponentially weighted moving average – EWMA) is applied.

14.3. The repo Interest Risk Rates of the first, the second and the third levels are calculated every Trading Day *i* during Risk Parameter Calculation Time. For calculation of the repo Interest Risk Rates of the first level (Δ_1_i):

14.3.1. a value of the rate fluctuation (r_IR_i) is calculated as maximum of one-day and two-day fluctuations of repo rates:

$$r\_IR_i = \max(abs[REPOrate_i - REPOrate_{i-1}]; abs[REPOrate_i - REPOrate_{i-2}])$$

14.3.2. A weighting coefficient is determined a_i.

14.3.2.1. If the rate fluctuation value r_IR_i is more than Volatility evaluation σ_{i-1} of the previous Trading Day, then $a_i = a_{верхняя}$, otherwise $a_i = a_{нижняя}$:

$$a_i = \begin{cases} a_{верхняя}, \ if \ \text{r\_IR}_i > \sigma_{i-1} \\ a_{нижняя}, \ if \ \text{r\_IR}_i \le \sigma_{i-1} \end{cases}$$

14.3.2.2. If there were more than one holiday in between two Trading Days *i-2* and *i* then the weighting coefficient a_i is equated to zero.

14.3.3. A Non-Trading Day Accounting coefficient G_i is determined in the following Risk Assessment Period:

$$G_i = \sqrt{1 + \frac{m_i}{rh\_1}}$$

m_i parameter for a particular security is determined as a sum of a number of non-Trading Days for the given security in the following Risk Assessment Period.

14.3.4. Volatility is calculated according to the formula:

$$\sigma_i = \sqrt{(1 - a_i) \cdot \sigma_{i-1}^2 + a_i \cdot r\_IR_i^2} \qquad (14.1)$$

If r_IR_i rate fluctuation exceeded the Interest Risk Rate of the first level Δ_1_{i-1} and there were no holidays in the interval between Trading Days *i* and *i-2*, then along with the Volatility calculated according to the formula (14.1), the value is calculated:

$$\sigma_i^* = \frac{r\_IR_i}{q} \qquad (14.2)$$

In this case the maximum value from (14.1), (14.2) is taken as Volatility σ_i.

In the formula (14.2) *q* parameter is a volatility multiplying factor.

14.3.5. A tentative value of the Interest Risk Rate Δ_i^p is determined in accordance with the following algorithm:

if $ceiling\left(\frac{q \cdot \sigma_i}{h\_IR}\right) \cdot h\_IR \ge \Delta_{i-1}^p + h\_IR$, then $\Delta_i^p = ceiling\left(\frac{q \cdot \sigma_i}{h\_IR}\right) \cdot h\_IR$; otherwise

if $ceiling\left(\frac{q \cdot \sigma_i}{h\_IR}\right) \cdot h\_IR \le \Delta_{i-1}^p - h\_IR$ and the time period from the last change of the tentative value of the Interest Risk Rate constitutes not less than *n* Trading Days, then $\Delta_i^p = \Delta_{i-1}^p - h\_IR$;

otherwise $\Delta_i^p = \Delta_{i-1}^p$, where *ceiling* – a rounding function up to a whole number.

14.3.6. The minimum restrictive levels of the Interest Risk rates of the first and the second levels ($\Delta\_1\_\min$ and $\Delta\_2\_\min$) are determined for:

- Restriction of a model risk in the case of extremely low Volatility valuation in course of implementation of risk scenarios;
- Prevention of trading suspension upon significant narrowing of the Repo Rate Band.

14.3.7. A final value of the Interest Risk Rate of the first level Δ_1_i is determined by multiplying the tentative value of the Interest Risk Rate Δ_i^p by the Non-Trading Days accounting coefficient plus the repo operation Market Liquidity Rate (*liq_RR)*, with account of the Minimum restrictive level of the Interest Risk Rate of the first level $\Delta\_1\_\min$ and Minimum Step of the Interest Risk rate fluctuation h_IR:

$$\Delta\_1_i = ceiling\left(\frac{\max(\Delta_i^p \cdot G_i + liq\_RR; \Delta\_1\_\min)}{h\_IR}\right) \cdot h\_IR$$

14.4. The value of the Interest Risk Rate of the second level (Δ_2_i) is determined by recalculation of Volatility for the Period of evaluation of second-level risks with account of the set Minimum restrictive level of the Interest Risk Rate of the second level $\Delta\_2\_\min$ and the Minimum step of Interest Risk Rate fluctuation *h_IR*:

$$\Delta\_2_i = ceiling\left(\frac{\max((\Delta_i^p \cdot G_i + liq\_RR) \cdot \sqrt{\frac{rh\_2}{rh\_1}}; \Delta\_2\_\min)}{h\_IR}\right) \cdot h\_IR .$$

14.5. The value of the Interest risk rate of the third level (Δ_3_i) is determined in the following manner:

$$\Delta\_3_i = S\_3_i \cdot \frac{365 \cdot 100\%}{REPOterm}$$

where *REPOterm* – a number of calendar days between execution date of the 1st and the 2nd legs.

14.6. An authorized executive authority of the Clearing Centre is entitled to make a decision on setting the Interest Risk rates of the first, the second and the third levels different from calculated values.

15. Algorithm for Determining Interest Risk Assessment Range Upper and Lower limits

15.1. Interest Risk Assessment Range limits are determined in roubles. For calculation in roubles the price of the first leg is multiplied by the corresponding rate (the repo Calculated rate plus\minus the Interest Risk Rate of the corresponding level) and the repo trade term expressed in years.

15.2. The Upper limit of the Interest Risk Assessment Range for Interest Risks of the first (the second, the third) levels is determined in the following manner:

$$RRtH\_1_i = \frac{(REPOrate_i + \Delta\_1_i)}{100} \cdot P_i \cdot (1 - DiscountREPO_i) \cdot \frac{REPOterm}{365}$$

$$RRtH\_2_i = \frac{(REPOrate_i + \Delta\_2_i)}{100} \cdot P_i \cdot (1 - DiscountREPO_i) \cdot \frac{REPOrate}{365}$$

$$RRtH\_3_i = \frac{(REPOrate_i + \Delta\_3_i)}{100} \cdot P_i \cdot (1 - DiscountREPO_i) \cdot \frac{REPOrate}{365}$$

15.3. Lower limit of the Interest Risk Assessment Range for Interest Risks of the first (the second, the third) levels is determined in the following manner:

$$RRtH\_1_i = \frac{(REPOrate_i - \Delta\_1_i)}{100} \cdot P_i \cdot (1 - DiscountREPO_i) \cdot \frac{REPOterm}{365}$$

$$RRtH\_2_i = \frac{(REPOrate_i - \Delta\_2_i)}{100} \cdot P_i \cdot (1 - DiscountREPO_i) \cdot \frac{REPOrate}{365}$$

$$RRtH\_3_i = \frac{(REPOrate_i - \Delta\_3_i)}{100} \cdot P_i \cdot (1 - DiscountREPO_i) \cdot \frac{REPOrate}{365}$$

15.4. Limits of the Interest Risk Assessment Range are rounded off to the second decade for bonds and to the decade $ceiling[\log_{10}(LotSize)] + 2$, where LotSize – a lot size in the main trading mode.

16. Algorithm for Determining Upper and Lower Limits of the Repo Rate Band

16.1. Upper and lower limits of the Repo Rate Band are set in order to restrict interest rates in the orders for repo trades submitted by the members in the course of trading (individual Repo Rate Band is set for each security).

16.2. The Upper limit of the Repo Rate Band ($RRcH_i$) and the lower limit of the Repo Rate Band ($RRcL_i$) are determined in the following manner:

$$RRcH_i = REPOrate_i + \frac{\Delta\_1_i}{x\_IR},$$

$$RRcL_i = REPOrate_i - \frac{\Delta\_1_i}{x\_IR}$$

16.3. The coefficient x_IR is determined based on statistical information on the relation between the two-day repo rate fluctuation for a security and the Order Book Trade repo rate deviation from the Calculated repo rate during a Trading Day.

17. Procedure for Shifting Price Band Limits and Repo Rate Band Limits Before and in the Course of Trading (Expansion of the Price Band and Repo Rate Band)

17.1. The limits of the Price Band as well as the Limits of the Repo Rate Band (hereinafter – the Band Limit) for any security before and in the course of trading are shifted in case of triggering of automatic signal pointing out the need to shift the Band Limits except cases specified in the clause 17.2 of the Methodology.

17.2. Provided there is information as to the absence of substantial changes in the current market environment as well as to the absence of representative volume of orders and trades, the authorized executive body of the Clearing Centre is entitled to leave the Band limit unchanged upon the triggering of an automatic signal.

17.3. A signal pointing out the need to shift a limit of the Price Band in order to control pricing of orders for the conclusion of securities purchase and sale trades is represented by one of the following events:

- Prices of the best system purchase orders standing in the order line, (the best demand) have approached the Upper Price Band Limit for a value lower than the value of $w \cdot (PcH_i - PcL_i)$ and this market situation continued for a period of time determined by the value of the risk parameter *u*;
- The rates of the best system sale orders standing in the order line, (the best offer) have approached the Lower Price Band limit for a value lower than the value of $w \cdot (PcH_i - PcL_i)$ and this market situation continued for a period of time determined by the value of the risk parameter *u*;

17.4. A signal pointing out the need to shift a limit of the Repo Rate Band in order to control pricing of orders for the conclusion of repo trades on attraction and application of funds is represented by one of the following events:

- rates of the best Order Book Orders for attraction of funds standing in the order line have approached the Upper Repo Rate Band Limit for a value lower than the value of $w \cdot (RRcH_i - RRcL_i)$ and this market situation continued for a period of time determined by the value of the risk parameter *u*;
- rates of the best Order Book Orders for use of funds standing in the order line have approached the Upper Repo Rate Band Limit for a value lower than the value of $w \cdot (RRcH_i - RRcL_i)$ and this market situation continued for a period of time determined by the value of the risk parameter *u*;

17.5. In case the automatic signal does not trigger with the security price/repo trade rate for a security at the OTC market simultaneously approaching the limit of the Band for a value lower than the value $w \cdot (RRcH_i - RRcL_i)$ or being outside the limits of the Band, the authorized executive body of the Clearing Centre is entitled to shift the limit of the Band.

17.6. When making the decision on the shift of the Upper (Lower) Price Band limit in order to control the pricing of orders for the conclusion of security purchase and sale trades, the upper (lower) limit is shifted for a value $\frac{(PcH_{i-1} - PcL_{i-1})}{4}$ aside from the Calculated Price, where

PcH_{i-1} – the value of the Upper Price Band limit determined on the day *i-1*;

PcL_{i-1} – the value of the Lower Price Band limit determined on the day *i-1*.

17.7. When making the decision on the shift of the Upper (Lower) Repo Rate Band limit, the upper (lower) limit is shifted for a value $\frac{(RRcH_{i-1} - RRcL_{i-1})}{4}$ aside from the Calculated repo rate, where

$RRcH_{i-1}$ – the value of the Upper limit of the Repo Rate Band determined on the day *i-1*;

$RRcL_{i-1}$ – the value of the Lower limit of the Repo Rate Band determined on the day *i-1*.

18. Procedure for Shifting Limit of Market Risk Assessment Range Before and in the Course of Trading until Time Determined by the Clearing Rules (Market Risk Assessment Range expansion)

18.1. In case of shift of the upper (lower) limit of the Price Band the upper (lower) limits of the Risk Assessment Range for the Market risks of the first, the second and the third levels are shifted[1]. The new value of the Market Risk Assessment Range limits is determined as follows:

18.1.1. For shares:

[1] Whereas the Market Risk Rates and the Security Discount remain unchanged.

- If the Upper Price Band limit is shifted, the values of the Upper Limit of the Market Risk Assessment Range for the risks of the first, the second and the third levels are calculated in the following manner[2]:

$$PtH\_1 = \begin{cases} P_{i-1} + (PcH - P_{i-1}) \cdot x\_pr, if\ x\_pr <= 2 \\ P_{i-1} + (PcH - P_{i-1}) \cdot 2, if\ x\_pr > 2 \end{cases},$$

$$PtH\_2 = PtH\_2_{i-1} + (PtH\_1 - PtH\_1_{i-1}),$$

$$PtH\_3 = PtH\_3_{i-1} + (PtH\_1 - PtH\_1_{i-1}), \text{ where}$$

PtH_1, PtH_2, PtH_3 – new values of the Upper Limits of the Risk Assessment Range for the Market risks of the first, the second and the third levels;

PcH – a new value of the Upper Price Band limit;

PtH_1_{i-1}, PtH_2_{i-1}, PtH_3_{i-1} – values of the Upper Limit of the Risk Assessment Range for the market risks of the first, the second and the third levels determined on the day *i-1*;

PcH_{i-1} – a value of the Upper Price Band limit determined on the day *i-1*.

- If the Lower Price Band limit is shifted, the values of the Lower Limit of the Market Risk Assessment Range for the risks of the first, the second and the third levels are calculated in the following manner:

$$PtL\_1 = \begin{cases} P_{i-1} + (PcL - P_{i-1}) \cdot x\_pr, if\ x\_pr <= 2 \\ P_{i-1} + (PcL - P_{i-1}) \cdot 2, if\ x\_pr > 2 \end{cases},$$

$$PtL\_2 = PtL\_2_{i-1} + (PtL\_1 - PtL\_1_{i-1}),$$

$$PtL\_3 = PtL\_3_{i-1} + (PtL\_1 - PtL\_1_{i-1}), \text{ where}$$

PtL_1, PtL_2, PtL_3 – new values of the Lower Limits of the Risk Assessment Range for the Market risks of the first, the second and the third levels;

PcL – a new value of the Lower Price Band limit;

PtL_1_{i-1}, PtL_2_{i-1}, PtL_3_{i-1} – values of the Lower Limit of the Risk Assessment Range for the market risks of the first, the second and the third levels determined on the day *i-1*;

PcL_{i-1} – a value of the Lower Price Band limit determined on the day *i-1*.

18.1.2. for bonds:

- If the Upper Price Band limit is shifted, the values of the Upper Limit of the Market Risk Assessment Range for the risks of the first, the second and the third levels are calculated in the following manner:

$$PtH\_1 = \begin{cases} P_{i-1} + P_{i-1} \cdot \dfrac{(PcH - P\_sttlmnt_{i-1})}{P\_sttlmnt_{i-1}} \cdot x\_pr, if\ x\_pr <= 2 \\ P_{i-1} + P_{i-1} \cdot \dfrac{(PcH - P\_sttlmnt_{i-1})}{P\_sttlmnt_{i-1}} \cdot 2, if\ x\_pr > 2 \end{cases},$$

$$PtH\_2 = PtH\_2_{i-1} + (PtH\_1 - PtH\_1_{i-1}),$$

$$PtH\_3 = PtH\_3_{i-1} + (PtH\_1 - PtH\_1_{i-1}), \text{ where}$$

[2] *x_pr* coefficient may be more than two if, for instance, Market Risk Rate is increased because of non-trading days, i.e. is calculated for a broken period, and the Price Band should remain calculated for one-day price fluctuations.

PtH_1, *PtH_2*, *PtH_3* – new values of the Upper Limits of the Risk Assessment Range for the Market risks of the first, the second and the third levels;
PcH – a new value of the Upper Price Band limit;
PtH_1_{i-1}, PtH_2_{i-1}, PtH_3_{i-1} – values of the Upper Limit of the Risk Assessment Range for the Market risks of the first, the second and the third levels determined on the day *i-1*;
PcH_{i-1} – a value of the Upper Price Band limit determined on the day *i-1*.

- If the Lower Price Band limit is shifted, the values of the Lower Limit of the Market Risk Assessment Range for the risks of the first, the second and the third levels are calculated in the following manner:

$$PtL\_1 = \begin{cases} P_{i-1} + P_{i-1} \cdot \dfrac{(PcL - P\_sttlmnt_{i-1})}{P\_sttlmnt_{i-1}} \cdot x\_pr, if\ x\_pr <= 2 \\ P_{i-1} + P_{i-1} \cdot \dfrac{(PcL - P\_sttlmnt_{i-1})}{P\_sttlmnt_{i-1}} \cdot 2, if\ x\_pr > 2 \end{cases},$$

$PtL\_2 = PtL\_2_{i-1} + (PtL\_1 - PtL\_1_{i-1})$,
$PtL\_3 = PtL\_3_{i-1} + (PtL\_1 - PtL\_1_{i-1})$, where
PtL_1, *PtL_2*, *PtL_3* – new values of the Lower Limits of the Risk Assessment Range for the Market risks of the first, the second and the third levels;
PcL – a new value of the Lower Price Band limit;
PtL_1_{i-1}, PtL_2_{i-1}, PtL_3_{i-1} – values of the Lower Limit of the Risk Assessment Range for the market risks of the first, the second and the third levels determined on the day *i-1*;
PcL_{i-1} – – a value of the Lower Price Band limit determined on the day *i-1*.

19. Procedure for Shifting Limit of Interest Risk Assessment Range Before and in the Course of Trading until Time Determined by the Clearing Rules (Interest Risk Assessment Range expansion)

19.1. In case of shift of the upper (lower) limits of the Repo Rate Band the upper (lower) limits of the Interest Risk Assessment Range are shifted. The new values of the Interest Risk Assessment Range limits are determined as follows:

- If the Upper Repo Rate Band limit is shifted, the values of the Upper Limit of the Interest Risk Assessment Range for the risks of the first, the second and the third levels are calculated in the following manner:

$$RRtH\_1 = \begin{cases} \dfrac{REPOrate_{i-1} + (RRcH - REPOrate_{i-1}) \cdot x\_IR}{100} \cdot P_i \cdot (1 - DiscountREPO_i) \\ \cdot \dfrac{срокРЕПО}{365}, if\ x\_IR <= 2 \\ RRtH\_1_{i-1} + \dfrac{RRcH - RRcH_{i-1}}{100} \cdot P_i \cdot (1 - DiscountREPO_i) \cdot \dfrac{REPOterm}{365}, \\ if\ x\_IR > 2 \end{cases},$$

$RRtH\_2 = RRtH\_2_{i-1} + (RRtH\_1 - RRtH\_1_{i-1})$,
$RRtH\_3 = RRtH\_3_{i-1} + (RRtH\_1 - RRtH\_1_{i-1})$, where

RRtH_1, *RRtH_2*, *RRtH_3* – new values of the Upper Limits of the Risk Assessment Range for the Interest risks of the first, the second and the third levels;
RRcH – a new value of the upper limit of the Repo Rate Band;
RRtH_1$_{i-1}$, *RRtH_2*$_{i-1}$, *RRtH_3*$_{i-1}$ – values of the Upper Limit of the Risk Assessment Range for the interest risks of the first, the second and the third levels determined on the day *i-1*;
$RRcH_{i-1}$ – a value of the Upper Repo Rate Band limit determined on the day *i-1*.

- If the Lower Repo Rate Band limit is shifted, the values of the Lower Limit of the Interest Risk Assessment Range for the risks of the first, the second and the third levels are calculated in the following manner:

$$RRtL\_1 = \begin{cases} \dfrac{REPOrate_{i-1} + (RRcL - REPOrate_{i-1}) \cdot x\_IR}{100} \cdot P_i \cdot (1 - DiscountREPO_i) \\ \cdot \dfrac{срокРЕПО}{365}, if\ x\_IR <= 2 \\ RRtL\_1_{i-1} + \dfrac{RRcL - RRcL_{i-1}}{100} \cdot P_i \cdot (1 - DiscountREPO_i) \cdot \dfrac{REPOterm}{365}, \\ if\ x\_IR > 2 \end{cases}$$

$RRtL\_2 = RRtL\_2_{i-1} + (RRtL\_1 - RRtL\_1_{i-1})$,

$RRtL\_3 = RRtL\_3_{i-1} + (RRtL\_1 - RRtL\_1_{i-1})$, where

RRtL_1, *RRtL_2*, *RRtL_3* – new values of the Lower Limits of the Risk Assessment Range for the Interest risks of the first, the second and the third levels;
RRcL – a new value of the lower limit of the Repo Rate Band;
$RRtL\_1_{i-1}$, $RRtL\_2_{i-1}$, $RRtL\_3_{i-1}$ – values of the Upper Limit of the Risk Assessment Range for the interest risks of the first, the second and the third levels determined on the day *i-1*;
$RRcL_{i-1}$ – a value of the Lower Repo Rate Band limit determined on the day *i-1*.

20. Algorithm for Determining Upper (Lower) Penalty Repo Rate

20.1. The Upper or the Lower Penalty Repo Rate is used depending on the orientation of a repo trade (trade to buy/sell securities) concluded between the Clearing Centre and a defaulting Clearing member or between the Clearing Centre and a non-defaulting Clearing member:

20.1.1. The Lower Penalty Repo Rate is used in case if a defaulting Clearing Member/ Clearing Centre buys the securities for roubles (applies the funds) in the first leg (the first trade to buy/sell securities). The Lower Penalty Repo Rate ($LPenRate_i$) is equal to the Calculated Repo rate for this security minus Repo Interest Risk Rate of the second level but not exceeding the maximum value of the Lower Penalty Repo rate (*max_LPenRate*).

20.1.2. The Upper Penalty Repo Rate is used in case if a defaulting Clearing Member/ Clearing Centre sells the securities for roubles (attracts the funds) in the first leg (the first trade to buy/sell securities). The Upper Penalty Repo Rate (*HPenRate*) is constant and is set by the Authorized Executive body of the Clearing Centre.