**APPROVED**

by the Executive Board

Moscow Exchange

On September 18, 2013 (Minutes No.82)

CEO Moscow Exchange

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# Methodology for calculation of the indicative foreign exchange rate

1. **General Provisions**
	1. The present Methodology for calculation of the indicative foreign exchange rate (the Methodology) establishes a procedure for calculation of the indicative foreign exchange rate (hereinafter the Indicative Exchange Rate) by Open Joint Stock Company “Moscow Exchange MICEX-RTS” (hereinafter the Moscow Exchange) used for calculation of equity indices of Moscow Exchange Group and (or) other indicators as required for conducting the on-exchange trading and executing transactions on the Exchange’s markets.
	2. The Indicative Exchange Rate is calculated by the Exchange on the basis of information about FX trading run by the Exchange (hereinafter Moscow Exchange Rate) and/information on foreign exchange rates that are published by participants of the interbank market and disclosed by the information agency Thomson Reuters (hereinafter Reuters Indicative Rate), and/or information on foreign currency trades published by Thomson Reuters (further the Reuters Trade Rate), and or foreign exchange rate announced by interbank market members (further the Interbank Market Rate).
	3. The list of Indicative Exchange Rates calculated by the Exchange and parameters for their calculation are detailed in the Appendix 1 to this Methodology.
	4. The list of interbank market members (the Participants of the interbank market), whose announced quotes are used for the Indicative Foreign Exchange Rate calculation is included into the Appendix 2 here.
	5. This Methodology for calculation, amendments and supplements thereto shall be approved by the Moscow Exchange and become effective on the date determined by the Moscow Exchange.
	6. The Methodology as approved by the Executive Board (amendments and supplements thereto) shall be published on the website of the Moscow Exchange not later than 1 working day prior to its effective data, unless the Exchange resolves otherwise.
2. **Indicative Exchange rate calculation specifics**
	1. If this Methodology provides for the use of only the Moscow Exchange Rate in calculation the Indicative rate, the Indicative Exchange Rate value shall be equal to the Moscow Exchange Rate.
	2. If this Methodology provides for the use of only the Reuters Indicative Rate in calculation the Indicative rate, the Indicative Exchange Rate value shall be equal to the Reuters Indicative Rate.
	3. If the Moscow Exchange Rate and the Reuters Indicative Rate to be used for calculation of the Indicative Exchange Rate, the Indicative Exchange Rate value shall be equal to one of the said rates value subject to provisions in clauses 2.3.1 - 2.3.6 herein.
		1. From 10.00 am to 07.00 pm on the Exchange’s trading day the Indicative Exchange Rate shall be equal to the Moscow Exchange Rate, whereas for the rest of the time during the Exchange’s trading day it shall be equal to the Reuters Indicative Rate. The switch from the Reuters Indicative Exchange Rate to the Moscow Exchange Rate takes place starting from 10.00 am on the Exchange’s trading day after the relevant information about trading in the US dollar run by the Exchange becomes available. The switch from the Moscow Exchange Rate to the Reuters Indicative Exchange Rate takes place starting from 07.00 pm on the Exchange’s trading day after the relevant information on exchange rates published by Participants of the interbank market and disclosed by the information agency Thomson Reuters becomes available.
		2. If the Moscow Exchange Rate is not calculated on the trading day of the Moscow Exchange including for the reason of not holding trading in the US dollar by the Exchange, then the Reuters Indicative Exchange Rate shall be used for calculation of the Indicative Exchange Rate unless provided for otherwise by a resolution of the Moscow Exchange.
		3. If the information about trades in a relevant instrument from the list stated in Appendix 1 hereto (the Instrument) executed during the FX trading run by the Exchange is unavailable as at the moment of the Indicative rate calculation from 10.00 am to 07.00 pm on the Exchange’s trading day, then the Indicative Exchange Rate shall be deemed equal to its last value calculated by the Moscow Exchange.

If the information about trades in a relevant Instrument that were executed during the FX trading run by the Exchange is unavailable for 15 minutes as at the moment of the Indicative rate calculation from 10.00 am to 07.00 pm on the Exchange’s trading day, while actual data on rates disclosed by the Participants of the interbank market and published by Thomson Reuters is being available, the Indicative Exchange Rate shall be deemed equal to the Reuters Indicative Rate unless otherwise decided by the Exchange.

If the receipt of relevant information about trading during the FX trading run by the Exchange is resumed in the period of time from 10.00 am to 07.00 pm on the Moscow Exchange’s trading day, then the Indicative Exchange Rate shall be determined based on the Moscow Exchange Rate.

* + 1. To smooth out fluctuations of the Indicative Exchange Rate that occur in case of switching from the Reuters Indicative Exchange Rate to the Moscow Exchange Rate, the following smoothing algorithm shall be used:



where:

t – number of seconds that have passed after the moment when relevant market data duringteh FX trading run by the Exchange became available again;

t0 - 60;

– Moscow Exchange Rate;

– Reuters Indicative Exchange Rate;

– Indicative Exchange Rate.

* + 1. In case of switching from the Moscow Exchange Rate to the Reuters Indicative Exchange Rate the algorithm described in Clause 2.3.4. herein shall be used provided that =, =, where t – number of seconds that have passed after the moment when relevant information about the Reuters Indicative Exchange Rate became available again.
		2. When switching from the Moscow Exchange Rate to the Reuters Indicative Exchange Rate at 7:00 pm MSK, the smoothing algorithm stated in Clause 2.3.4 hereof shall start to be applied t0 seconds prior 7:00 pm MSK.
	1. If the Reuters Indicative Rate and Interbank Market Rate are to be used for calculation of the Indicative Exchange Rate pursuant to this Methodology, the Indicative Exchange Rate shall be equal to one of the said rates value subject to provisions in clauses 2.4.1 - 2.4.3, unless the resolution of the Moscow Exchange prescribes otherwise.
		1. The Indicative Exchange Rate shall be equal to the Reuters Trade Rate on the day *d*, if on at least 10 trades in the Instrument used for the Reuters Trade Rate were executed on that day.
		2. The Indicative Exchange Rate shall be equal to the Interbank Market Rate, if on the day *d* the Moscow Exchange received data at least from 5 Participants of the interbank market needed for calculation the Indicative Exchange Rate.
		3. Should requirements in clauses 2.4.1-2.4.2 are not met, the Exchange shall have the right to set the Indicative Exchange Rate on the trading day d equal to one of the following (unless the Moscow Exchange resolves otherwise): а) exchange rate value obtained based on the other sources, established at interbank currency market effective at the moment of the Moscow Exchange’s decision on setting the Indicative Exchange Rate; b) exchange rate value established in the course of trading on the Russian and global currency exchanges effective at the moment the Moscow Exchange’s decision on setting the Indicative Exchange Rate.
1. **Moscow Exchange Rate calculation**
	1. The Moscow Exchange Rate is calculated based on trades executed during the FX trading run by the Exchange for a relevant Instrument.
	2. The Moscow Exchange Rate is calculated each second from 10.00 am to 07.00 pm on the Moscow Exchange’s trading day.
	3. The Moscow Exchange Rate is calculated according to the following formula:



where:

Rtmicex – Moscow Exchange Rate at the moment t;

MAt – Moving Average at the moment t determined in accordance with Clause 3.4 herein.

* 1. The Moving Average at the moment t is calculated in accordance with the following formula:



where:

MAt – Moving Average at the moment t;

Ri – Price of the last trade at the moment i calculated after discarding outliers (the highs and lows) in accordance with Clause 3.5 herein;

M – averaging period expressed in seconds and determined in accordance with Appendix 1 herein.

* 1. The price of the last trade after discarding outliers (the highs and lows) at the moment t is calculated according to the formula:



where:

Rt – price of the trade after discarding outliers at the moment t;

Rt-1 – price of the last trade after discarding outliers at the moment t-1;

RAt – price of the last trade in a relevant Instrument at the moment t (without taking into account direct trades);

K – maximum deviation determined in accordance with Appendix 1 herein;

S – period for calculation of outliers expressed in seconds and determined in accordance with Appendix1 herein.

1. **Reuters Indicative Rate calculation**
	1. The Reuters Indicative Rate is calculated each second from 10.00 am to 11.50 pm MSK on the Moscow Exchange’s trading day.
	2. The Reuters Indicative Rate is calculated according to the following formula:



where:

Rtres – Reuters Indicative Rate at the moment t;

MAt – Moving Average at the moment t determined in accordance with Clause 4.3 herein.

* 1. The Moving Average at the moment t is calculated in accordance with the following formula:



where:

MAt – Moving Average at the moment t;

Ri – Average quotation after discarding outliers at the moment i, determined in accordance with clause 4.4 herein;

M – averaging period expressed in seconds and determined in accordance with Appendix 1 herein.

* 1. Average quote after discarding outliers at the moment d shall be determined using the following formula:



where:

Rt – average quote after discarding outliers at the moment t;

Rt-1 – average quote after discarding outliers at the moment t-1;

RAt – average quote before discarding outliers at the moment t, determined in accordance with clause 4.5 herein;

K – maximum deviation, determined in accordance with Appendix 1 herein;

S – period for calculation of outliers expressed in seconds and determined in accordance with Appendix1 herein.

* 1. Average quote before discarding outliers at the moment t shall be determined using the formula:

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where:

RAt – average quote before discarding outliers at the moment t;

n – number of Participants of the interbank market included on the List indicated in clause 1.4. herein at the moment of Reuters Indicative Rate Calculation;

RMbt – average quote of the Participant b at the moment of time t, determined in accordance with clause 4.6 herein.

* 1. Average quote of the Participant b at the moment of time t shall be determined using the formula:

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where:

RMbt – average quote of Participant b at the moment of time t;

Bidbt – average bid quote of Participant b at the moment of time t;

Askbt – average ask quote of Participant b at the moment of time t.

* 1. If Bidbt and/or Askbt, is not available in Thomson Reuters system at the moment of time t, the average quote by Participant b at the moment of time t (RMbt) is not calculated.
	2. If the Participant has not made available bid and/or ask quotes used for Reuters Indicative Rate calculation in the period of more than 15 minutes, the quotes of such Participant will not be used for Reuters Indicative Rate calculation till the Participant resumes publishing the quotes.
	3. If quotes announced by less than three Participants are used at the moment of Reuters Indicative Rate calculation, the Reuters Indicative Rate will not be calculated and equals the last calculated Reuters Indicative Rate value.
	4. If Thomson Reuters has not published quotes due to failure of communication systems or otherwise, Reuters Indicative Rate shall be equal to the last calculated Reuters Indicative Rate.
	5. If the Moscow Exchange has not received quotes from Thomson Reuters during the period of more than one hour, the Moscow Exchange shall have the right for the main (additional) session of the relevant market to set the fixed (flat) Reuters Indicative Rate, equal one of the following а) exchange rate announced by the Bank of Russia; b) exchange rate value obtained based on the other sources, established at interbank currency market effective at the moment of the Moscow Exchange’s decision on setting the fixed (flat) Reuters Indicative Rate; c) exchange rate value established in the course of trading on the Russian and global exchanges effective at the moment the Moscow Exchange’s decision on setting the fixed (flat) Reuters Indicative Rate.
1. **Reuters Trade Rate calculation**
	1. Reuters Trades rate is calculated based on foreign exchange trades (in a relevant Instrument) published by Thomson Reuters.
	2. The Reuters Trade Rate is calculated once a day as of 11:30 am Kiev time.
	3. To calculate Reuters Trade Rate shall be used data on trades in a relevant Instrument disclosed for the period from 8:30 till 11:30 Kiev time on the current trading day. Trades showing price deviation from the median price value calculated for all trades in the Instrument from 8:30 till 11:30 Kiev time more than 1%, will be excluded from calculation.
	4. Reuters Trade Rate on the trading day *d* shall be calculated using the formula:



where:

Rtdeal –Reuters Trade Rate on trading day d;

Ri – price of the i-th trade;

n – number of trades used for Reuters Trade Rate calculation in accordance with clause 5.3 herein.

1. **Interbank Market Rate**
	1. The Interbank Market Rate is calculated once a day as of 11:30 am Kiev time.
	2. The list of Participants of the interbank market whose announced exchange rate are used for the Interbank Market Rate calculation is included into the Appendix 2 here.The maximum and minimum values announced by the Participants on the day *d* are not used for Interbank Market Rate calculation.
	3. The Interbank Market Rate on the trading day *d* shall be calculated using the formula:



where:

Rdbank – Interbank Market Rate on trading day d;

Ri – rate announced by the i-the Participant of the interbank market;

n – number of rate values provided by the Participants of the interbank market on trading day d except for minimum and maximum values.

* 1. Interbank Market Rate shall be calculated if it is used to calculate Indicative Exchange Rate on the relevant day.
1. **Disclosure of the Indicative Exchange Rate**
	1. The Moscow Exchange daily publishes on its website the last Indicative Exchange Rate calculated upon closure of the main session during which FX trading is run according to the main session results.

Appendix 1

to the Methodology for calculation of

the indicative foreign exchange rate

# List of Indicative Exchange Rates and calculation parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Indicative Exchange Rate** | **Rates used for Indicative Exchange Rate calculation**  | **Instrument** | **Maximum deviation K** | **averaging period M** | **Period for calculation of outliers S** |
| Indicative USD/RUB Exchange Rate | Moscow Exchange Rate | USDRUB\_TOM | 0.0005 | 60 | 60 |
| Reuters Indicative Exchange Rate | RUBTNOR | 0.0005 | 60 | 60 |
| Indicative EUR/RUB Exchange Rate | Moscow Exchange Rate | EURRUB\_TOM | 0.0005 | 60 | 60 |
| Reuters Indicative Exchange Rate | EURRUBTNOR | 0.0005 | 60 | 60 |
| Indicative GBP/USD Exchange Rate | Reuters Indicative Exchange Rate | GBP | 0.0005 | 60 | 60 |
| Indicative AUD/USD Exchange Rate | Reuters Indicative Exchange Rate | AUD | 0.0005 | 60 | 60 |
| Indicative JPY/USD Exchange Rate | Reuters Indicative Exchange Rate | JPY | 0.0005 | 60 | 60 |
| Indicative CHF/USD Exchange Rate | Reuters Indicative Exchange Rate | CHF | 0.0005 | 60 | 60 |
| Indicative USD/UAH Exchange Rate |  Reuters Trades Rate | UAH=D1 | - | - | - |
| Interbank Market Rate | UAH | - | - | - |

Appendix 2

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**List of Participants of the interbank market publishing quotes used for Reuters Indicative Exchange Rate and Interbank Market Rate**

1. List of Participants of the interbank market publishing quotes used for Reuters Indicative USD/RUB Exchange Rate calculation
* Sberbank CIB
* Metallinvestbank
* Societe Generale Group
* OOO Morgan Stanley Bank
* OOO Deutsche Bank
* PJSC Citibank
* Sviaz Bank
* ING (Eurasia)
* Bank of Moscow
* Evrofinance Mosnarbank
* GPB
* HSBC Bank
* Renaissance Capital
* The Royal Bank of Scotland
* Sberbank of Russia
* Expobank
1. List of Participants of the interbank market publishing quotes used for Reuters Indicative EUR/RUB Exchange Rate calculation
* Sviaz Bank
* Sberbank CIB
* Sberbank
* ROSBANK
* Premex
* Morgan Stanley Bank
* Metallinvestbank;
* ING BANK (Eurasia)
* HSBC Bank
* Deutsche Bank
* Citibank
1. 2. List of Participants of the interbank market publishing quotes used for Reuters Indicative AUD/USD Exchange Rate calculation
* The Royal Bank of Scotland US
* Den Norske Bank
* Rabobank
* Barclays Bank Plc London
* Toronto Dominion Bank
* Societe Generale
* Kaspi Bank
* Brown Brothers NYC
* Commerzbank
* The Royal Bank of Scotland UK
* Commonwealth Bank Australia
* Nordea
* Hilal Bank
* CIBC TORONTO
* Bank of New York
* Bank of Tokyo Mitsubishi
* Bank of China
1. List of Participants of the interbank market publishing quotes used for Reuters Indicative GBP/USD Exchange Rate calculation.
* Nedbank Johannesburg
* Den Norske Bank
* The Royal Bank of Scotland US
* Commerzbank
* Rabobank
* Barclays Bank Plc London
* Windsor Brokers
* Kaspi Bank
* Allied Irish Bank Dublin
* Brown Brothers NYC
* The Royal Bank of Scotland UK
* Commonwealth Bank Australia
* Okobank Finland
* Nordea
* Banca Acros
1. 4. List of Participants of the interbank market publishing quotes used for Reuters Indicative JPY/USD Exchange Rate calculation.
* Allied Irish Banks plc
* Banca Akros
* Brown Brothers Harriman & Co.
* DBS Bank Ltd
* Den Norske Bank
* Kaspi Bank
* Nordea Bank
* Rabobank Group
* SEB Group
* Societe Generale Group
* The Commonwealth Bank of Australia
* The Royal Bank of Scotland Group
* UBS Investment Bank
1. 5. List of Participants of the interbank market publishing quotes used for Reuters Indicative CHF/USD Exchange Rate calculation.
* Banca Akros
* Brown Brothers Harriman & Co.
* Commerzbank
* Danske Bank
* Den Norske Bank
* HSBC
* Kaspi Bank
* Nordea Bank
* Rabobank Group
* Societe Generale Group
* The Bank of New York Mellon
* The Commonwealth Bank of Australia
* The Royal Bank of Scotland Group
* UBS Investment Bank
* WGZ Bank
* Zürcher Kantonalbank
1. 6. List of Participants of the interbank market publishing quotes used for Interbank Market USD/UAH Exchange Rate.
* Alfa Banking Group
* CJSC Renaissance Capital
* CJSC Unicreditbank
* Commerzbank AG
* HSBC Holdings
* OJSC Oschadbank
* OJSC OTP Bank
* OJSC Prominvestbank
* OJSC SEB Corporate Bank
* OJSC Ukrgazprombank
* OJSC VTB Bank
* PJSC Bank ¾
* PJSC Citibank
* PJSC Credit Agricole – CIB
* PJSC Forum Bank
* PJSC ING Bank
* PJSC International Invest Bank
* PJSC Privat Bank
* PJSC Raiffeisen Bank Aval
* PJSC Ukreximbank
* PJSC Ukrgazbank
* PJSC UkrSibbank
* PJSC Ukrsotsbank
* PJSC Universal Bank
* The Royal Bank Of Scotland Group