1. DEFINITIONS

Acronym or Term	Definition
PAF	Price Adjustment Factor
PAF Day 1	The 3rd trading day prior to the Expiry Day
PAF Day 2	The 2nd trading day prior to the Expiry Day
PAF Day 3	The trading day prior to the Expiry Day
M1	Front Month Contract
M2	Second Month Contract
Window	16:25 - 16:30 Singapore Time
VWAP	Volume weighted average price

2. WHAT IS PAF?

The Price Adjustment Factor (PAF) is a volume-weighted average of spread trades in the M1/M2 spread during the five- minute marker window for each of the 3 days prior to front month contract expiry.

It determines OQD's front month (M1) final settlement price on expiry day. The last business day of the calendar month. M1 Marker Price, on Expiry Day, will be calculated using the Marker Price of M2 trades in the 5 minutes' marker window, adjusted by the pre-determined Price Adjustment Factor (PAF).

3. CURRENT PAF METHODOLOGY

The current PAF methodology uses a volume-weighted average of M1/M2 trades for each individual trading day for the penultimate 3 days prior to M1 expiry. These 3 individual VWAPs are then averaged to create a mean average PAF number.

For trade *j* on M1/M2 spread, during the window, on PAF Day i

- Let Pij denote the traded price of trade j
- Let Qij denote the traded quantity of trade j

Let us define PAF_{i} such that

$$PAF_{\text{i}} = \frac{\Sigma PijQij}{\Sigma Qij}$$

For i = 1,2,3

Then PAF is defined as

$$PAF = \frac{\Sigma PAFi}{3}$$

4. PROPOSED PAF METHODOLOGY

For trade *k* on M1/M2 spread, during the window, from PAF Day 1, 2 & 3

- Let Pk denote the traded price of trade k
- Let Qk denote the traded quantity of trade k

Let us define PAF such that

$$PAF = \frac{\Sigma PkQk}{\Sigma Qk}$$

5. PURPOSE OF CHANGE

The proposed PAF methodology uses a volume-weighted average over all 3 days of M1/M2 trades, which allows the PAF to account for trade volume of different days, giving greater emphasis to days with higher volume.

For example, if PAF Day 1/2/3 had 50, 30, 15 trades respectively, this proposed method will give more weighting to day 1 because there are more trades on day 1.

6. EXAMPLE OF PROPOSED PAF CALCULATION

PAF Day1	Time	CC	Product	Description	Price	Qty	Price x Qty
	16:29:58.6	OQ	DME Oman Future	M1/M2	0.63	1	0.63
	16:29:57.6	OQ	DME Oman Future	M1/M2	0.59	1	0.59
	16:29:54.9	OQ	DME Oman Future	M1/M2	0.61	1	0.61
	16:29:47.5	OQ	DME Oman Future	M1/M2	0.59	5	2.95
	16:29:45.0	OQ	DME Oman Future	M1/M2	0.59	1	0.59
	16:29:34.4	OQ	DME Oman Future	M1/M2	0.59	1	0.59
	16:29:26.9	OQ	DME Oman Future	M1/M2	0.58	1	0.58
	16:29:23.5	OQ	DME Oman Future	M1/M2	0.55	3	1.65
	16:29:14.6	OQ	DME Oman Future	M1/M2	0.52	1	0.52
	16:29:14.5	OQ	DME Oman Future	M1/M2	0.54	1	0.54
	16:29:07.7	OQ	DME Oman Future	M1/M2	0.52	1	0.52
	16:29:05.0	OQ	DME Oman Future	M1/M2	0.53	1	0.53
	16:29:04.9	OQ	DME Oman Future	M1/M2	0.54	4	2.16
	16:29:04.5	OQ	DME Oman Future	M1/M2	0.54	1	0.54
	16:28:44.8	OQ	DME Oman Future	M1/M2	0.52	1	0.52

PAF Day 2	Time	CC	Product	Description	Price	Qty	Price x Qty
	16:29:26.4	OQ	DME Oman Future	M1/M2	0.24	1	0.24
	16:29:24.4	OQ	DME Oman Future	M1/M2	0.25	1	0.25
	16:29:23.6	OQ	DME Oman Future	M1/M2	0.38	1	0.38
	16:29:23.2	OQ	DME Oman Future	M1/M2	0.5	1	0.5
	16:29:22.9	OQ	DME Oman Future	M1/M2	0.39	1	0.39
	16:29:22.3	OQ	DME Oman Future	M1/M2	0.47	1	0.47
	16:29:22.0	OQ	DME Oman Future	M1/M2	0.5	1	0.5
	16:29:21.6	OQ	DME Oman Future	M1/M2	0.5	1	0.5
	16:27:21.0	OQ	DME Oman Future	M1/M2	0.5	1	0.5
	16:27:20.3	OQ	DME Oman Future	M1/M2	0.47	1	0.47
	16:26:19.8	OQ	DME Oman Future	M1/M2	0.52	1	0.52
	16:26:19.3	OQ	DME Oman Future	M1/M2	0.48	1	0.48
	16:25:26.4	OQ	DME Oman Future	M1/M2	0.24	1	0.24
	16:25:24.4	OQ	DME Oman Future	M1/M2	0.25	1	0.25

PAF Day3	Time	CC	Product	Description	Price	Qty	Price x Qty
	16:26:11.9	OQ	DME Oman Future	M1/M2	-0.32	1	-0.32
	16:26:03.9	OQ	DME Oman Future	M1/M2	-0.32	1	-0.32
	16:26:00.4	OQ	DME Oman Future	M1/M2	-0.26	1	-0.26
	16:25:58.5	OQ	DME Oman Future	M1/M2	-0.2	1	-0.2
	16:25:55.2	OQ	DME Oman Future	M1/M2	-0.13	1	-0.13
	16:25:52.6	OQ	DME Oman Future	M1/M2	-0.04	1	-0.04
	16:25:48.9	OQ	DME Oman Future	M1/M2	0.07	1	0.07
	16:25:47.1	OQ	DME Oman Future	M1/M2	0.15	1	0.15
	16:26:11.9	OQ	DME Oman Future	M1/M2	-0.32	1	-0.32
	16:26:03.9	OQ	DME Oman Future	M1/M2	-0.32	1	-0.32

6.1. CALCULATION UNDER CURRENT PAF

For PAF Day 1, we have $PAF_1 = \frac{\Sigma P1jQ1j}{\Sigma Q1j} = \frac{\text{Sum of Price x Qty on PAF Day 1}}{\text{Qty on PAF Day 1}} = \frac{13.52}{24} = 0.56$

For PAF Day 2, we have $PAF_2 = \frac{\Sigma P2jQ2j}{\Sigma Q2j} = \frac{\text{Sum of Price x Qty on PAF Day 2}}{\text{Qty on PAF Day 2}} = \frac{5.69}{14} = 0.41$

For PAF Day 3, we have $PAF_3 = \frac{\Sigma P3jQ3j}{\Sigma Q3j} = \frac{\text{Sum of Price x Qty on PAF Day 3}}{\text{Qty on PAF Day 3}} = \frac{-1.69}{10} = -0.17$

Hence, $PAF = \frac{0.56+0.41-0.17}{3} = 0.27$

6.2. CALCULATION UNDER PROPOSED PAF

We have $PAF = \frac{\text{Sum of Price x Qty over 3 Days}}{\text{Sum of Qty over 3 Days}} = \frac{17.52}{48} = 0.37$