2.4.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5 and RF Chamber 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Screened Room (5)	Rainford	Rainford	1545	36	23-Jan-2021
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Multimeter	Iso-tech	IDM101	2419	12	28-Nov-2021
Mast Controller	Maturo Gmbh	NCD	4810	-	TU
Tilt Antenna Mast	Maturo Gmbh	TAM 4.0-P	4811	-	TU
Horn Antenna (1-10GHz)	Schwarzbeck	BBHA 9120 B	4848	12	10-Mar-2021
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	28-Nov-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5102	12	06-Oct-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5103	12	06-Oct-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5104	12	09-Dec-2020
EmX Emissions Software	TUV SUD	EmX	5125	-	Software
Screened Room (11)	Rainford	Rainford	5136	36	01-Nov-2021
Mast	Maturo	TAM 4.0-P	5158	-	TU
Mast and Turntable Controller	Maturo	Maturo NCD	5159	-	TU
Turntable	Maturo	TT 15WF	5160	-	TU
Horn Antenna (1-10GHz)	Schwarzbeck	BBHA 9120 B	5215	12	10-Mar-2021
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5470	12	16-Mar-2021
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5475	12	17-Mar-2021
2m SMA Cable	Junkosha	MWX221-02000AMSAMS/A	5518	12	01-Apr-2021
8m N Type Cable	Junkosha	MWX221-08000NMSNMS/B	5522	12	24-Mar-2021
EMI Test Receiver	Rohde & Schwarz	ESW44	5527	12	06-Feb-2021

Table 123

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment

2.5 Spurious Radiated Emissions

2.5.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (d) and 15.205
ISED RSS-247, Clause 5.5
ISED RSS-GEN, Clause 6.13

2.5.2 Equipment Under Test and Modification State

A2348, S/N: C07D100W02H7 - Modification State 0

2.5.3 Date of Test

17-August-2020 to 03-September-2020

2.5.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 6.3, 6.5 and 6.6.

The EUT was placed on the non-conducting platform in a manner typical of a normal installation.

Ports on the EUT were terminated with loads as described in ANSI C63.4 clause 6.2.4 for each type of port on the EUT.

For frequencies > 1 GHz, plots for average measurements were taken in accordance with ANSI C63.10, clause 4.1.4.2.5 to characterise the EUT. Where emissions were detected, final average measurements were taken in accordance with ANSI C63.10, clause 4.1.4.2.2.

The plots shown are the characterisation of the EUT. The limits on the plots represent the most stringent case for restricted bands, (74/54 dBuV/m) when compared to 20 dBc outside restricted bands. The limits shown have been used as a threshold to determine where further measurements are necessary. Where results are within 10 dB of the limits shown on the plots, further investigation was carried out and reported in results tables.

The following conversion can be applied to convert from dBµV/m to µV/m:
10^(Field Strength in dBµV/m/20).

To determine the emission characteristic of the EUT above 18 GHz, the test antenna was swept over all faces of the EUT whilst observing a spectral display. The frequency of any emissions of interest was noted for formal measurement at the correct measurement distance of 1m. This procedure was repeated for all relevant transmit operating channels.

At a measurement distance of 1 meter the limit line was increased by 20*LOG(3/1) = 9.54 dB.

In the 30 MHz to 1 GHz range pre-scans were only performed on the main radio mid channel.

2.5.5 Example Test Setup Diagram

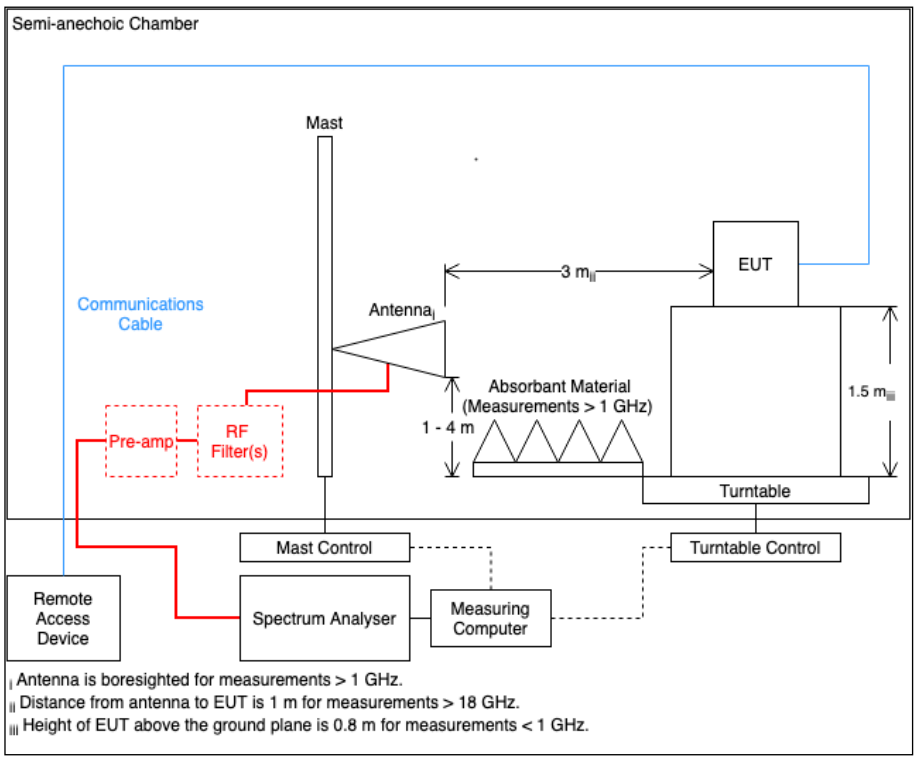

Figure 169

2.5.6 Environmental Conditions

Ambient Temperature	20.4 - 23.2 °C
Relative Humidity	45.5 - 66.5 %

2.5.7 Test Results

2.4 GHz Bluetooth Low Energy (DTS)

LE1M

iPA

Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 124 - 2402 MHz (CH0), LE1M, iPA, Core 0, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

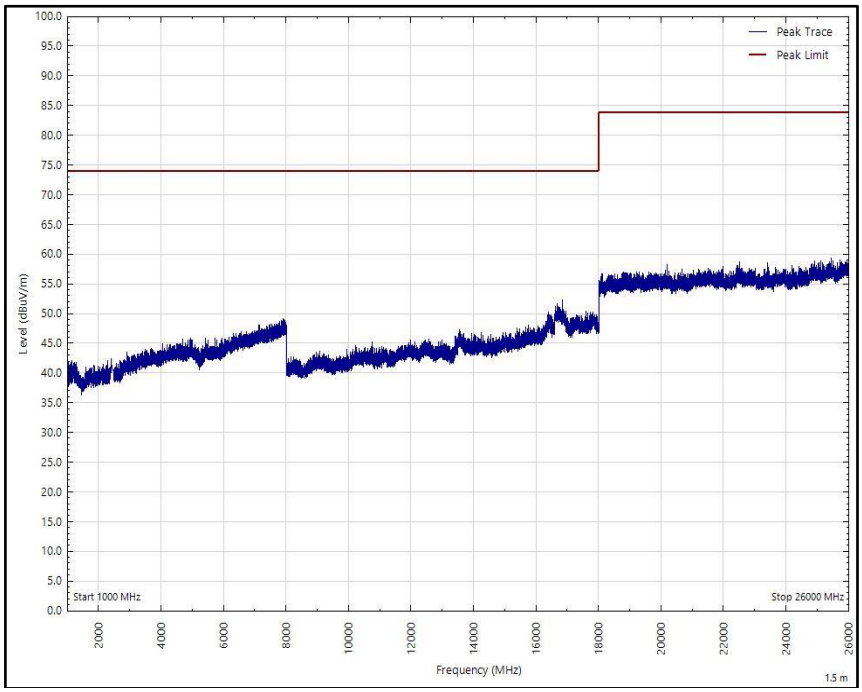

Figure 170 - 2402 MHz (CH0), LE1M, iPA, Core 0, 1 GHz to 26 GHz, Horizontal (Peak)

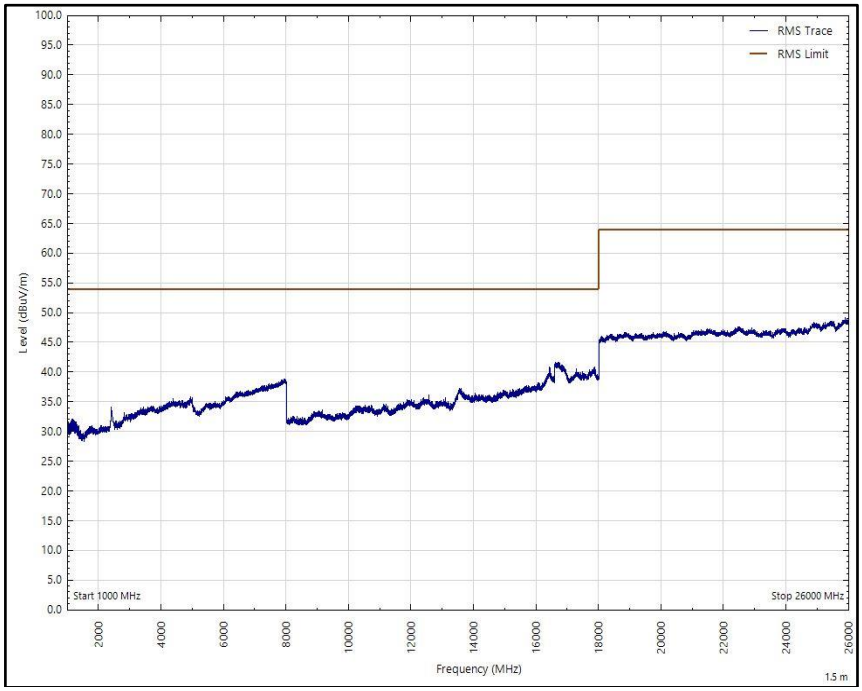

Figure 171 - 2402 MHz (CH0), LE1M, iPA, Core 0, 1 GHz to 26 GHz, Horizontal (rms)

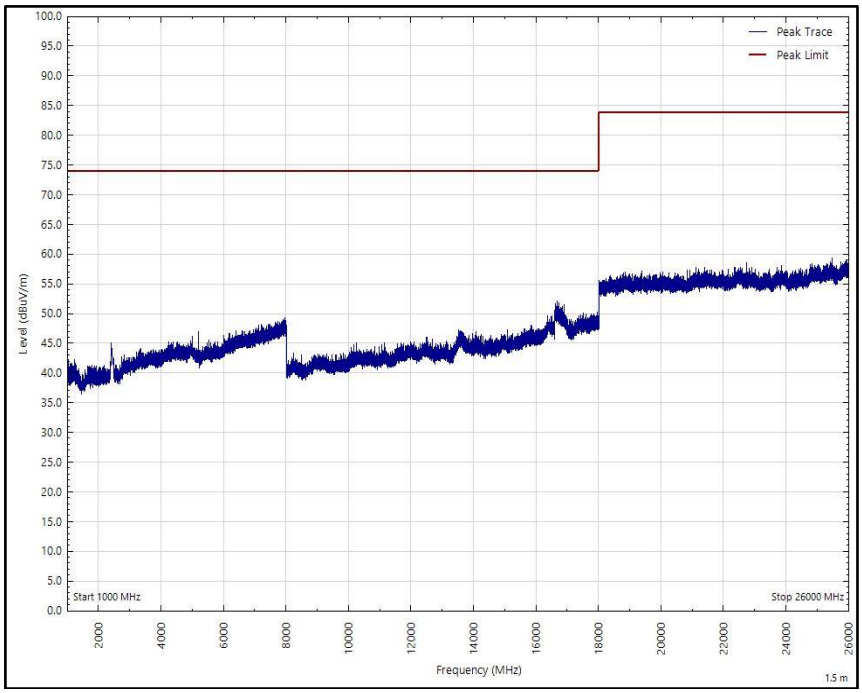

Figure 172 - 2402 MHz (CH0), LE1M, iPA, Core 0, 1 GHz to 26 GHz, Vertical (Peak)

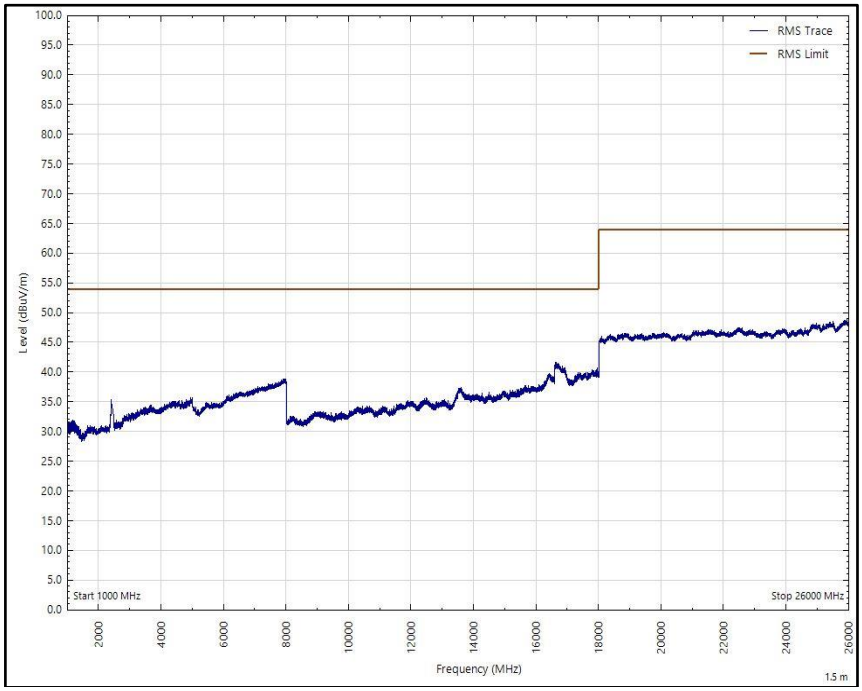

Figure 173 - 2402 MHz (CH0), LE1M, iPA, Core 0, 1 GHz to 26 GHz, Vertical (rms)

Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 125 - 2480 MHz (CH39), LE1M, iPA, Core 0, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

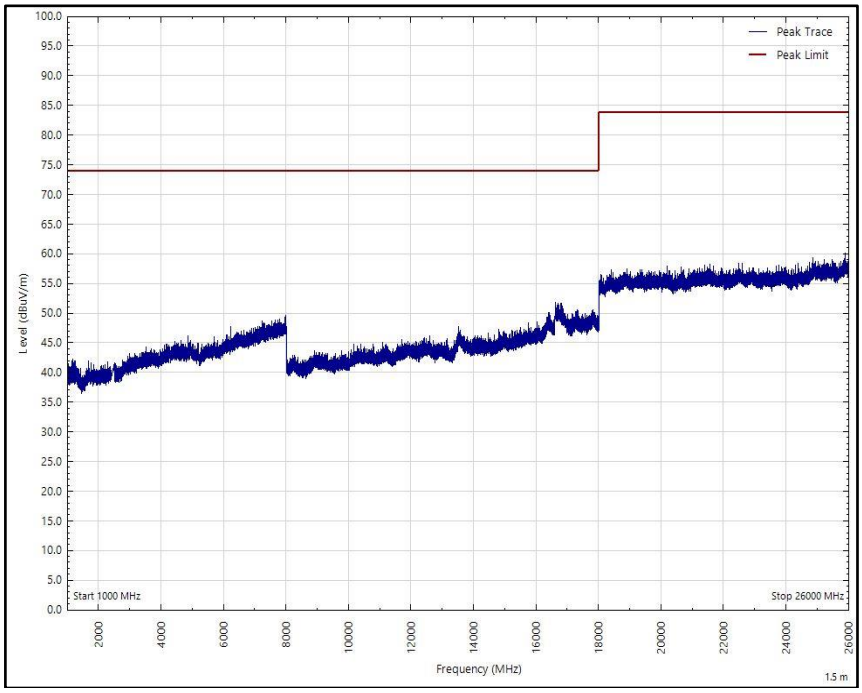

Figure 174 - 2480 MHz (CH39), LE1M, iPA, Core 0, 1 GHz to 26 GHz, Horizontal (Peak)

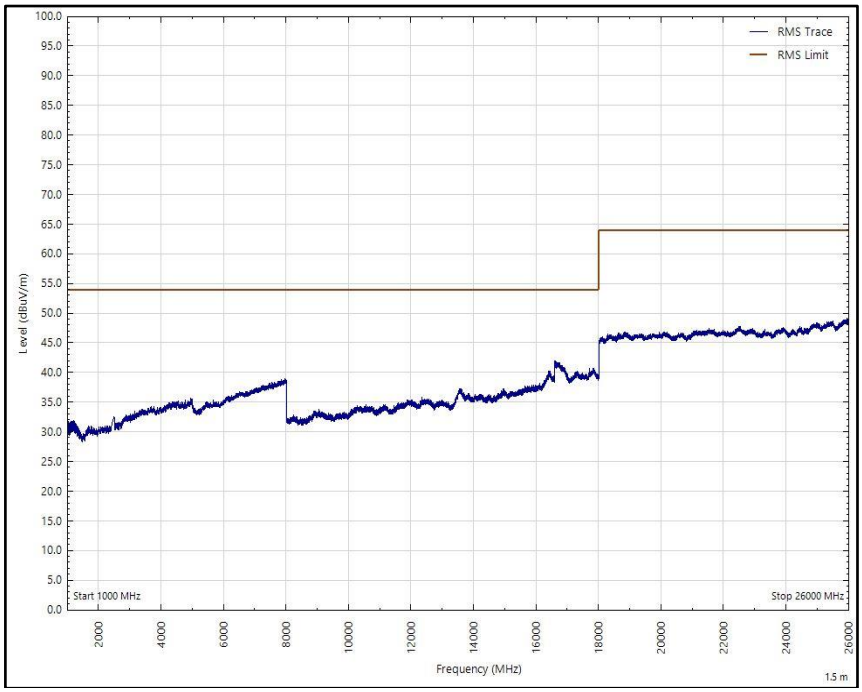

Figure 175 - 2480 MHz (CH39), LE1M, iPA, Core 0, 1 GHz to 26 GHz, Horizontal (rms)

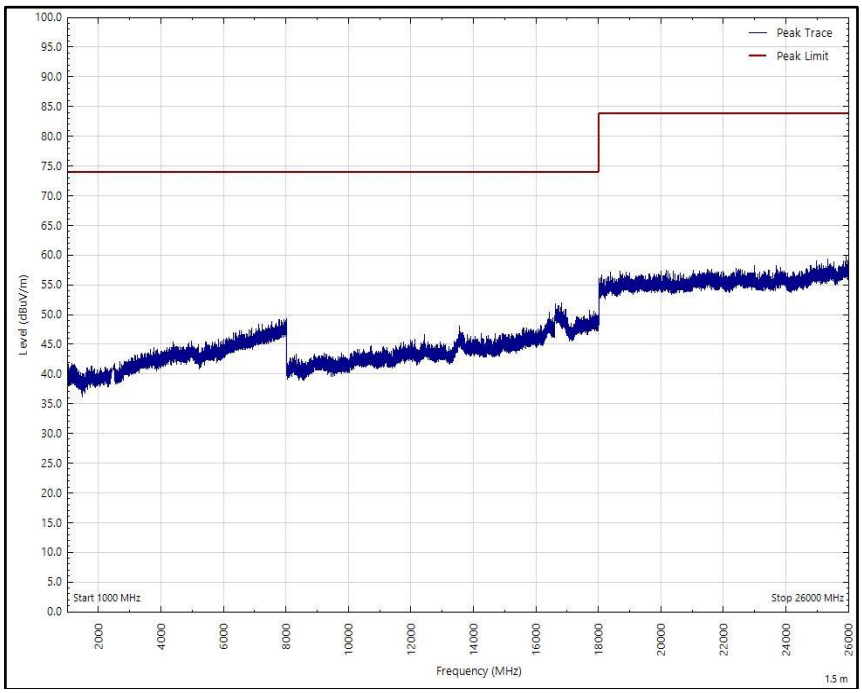

Figure 176 - 2480 MHz (CH39), LE1M, iPA, Core 0, 1 GHz to 26 GHz, Vertical (Peak)

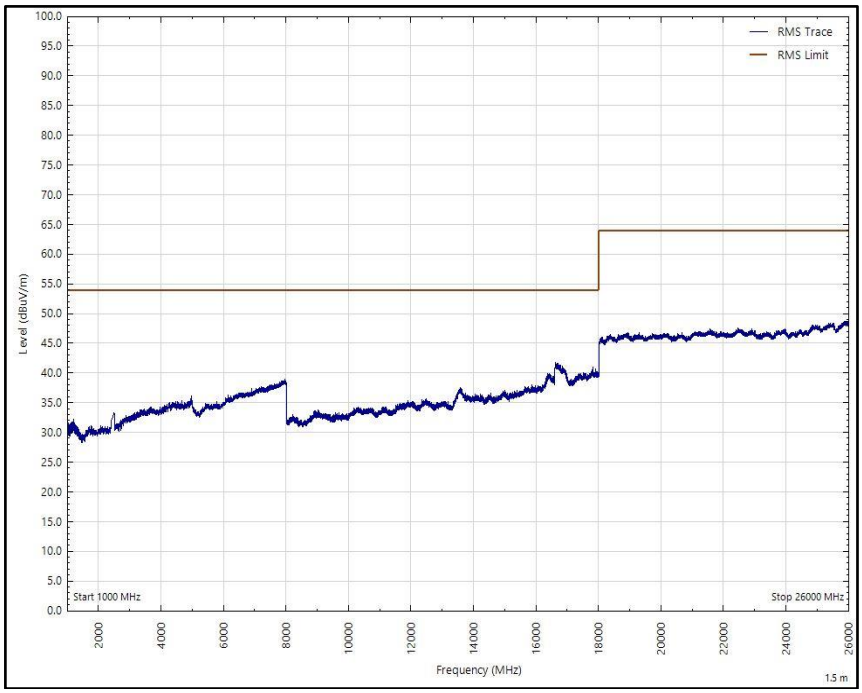

Figure 177 - 2480 MHz (CH39), LE1M, iPA, Core 0, 1 GHz to 26 GHz, Vertical (rms)

Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 126 - 2402 MHz (CH0), LE1M, iPA, Core 2, 1 to 26 GHz

*No emissions found within 10 dB of the limit.

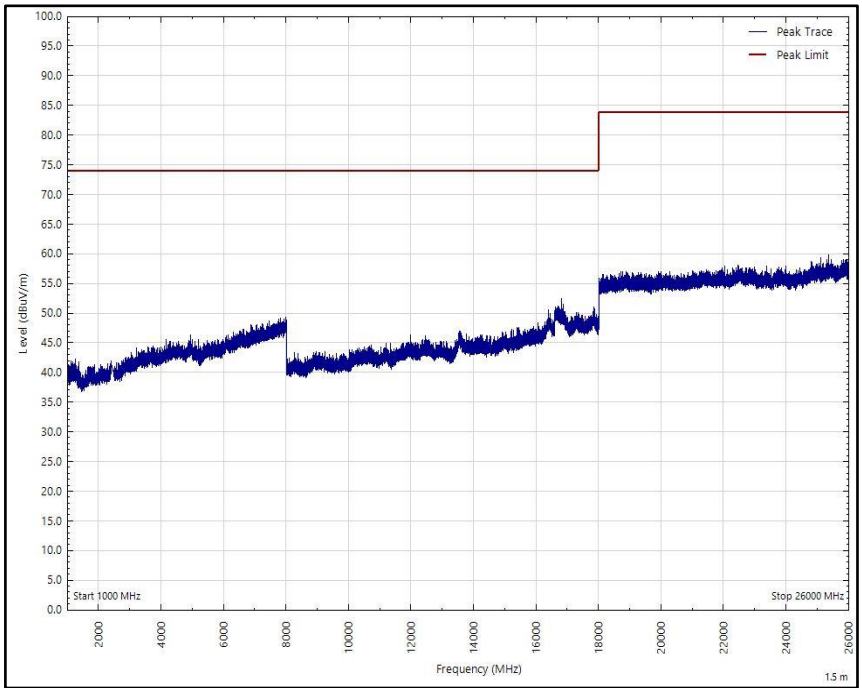

Figure 178 - 2402 MHz (CH0), LE1M, iPA, Core 2, 1 GHz to 26 GHz, Horizontal (Peak)

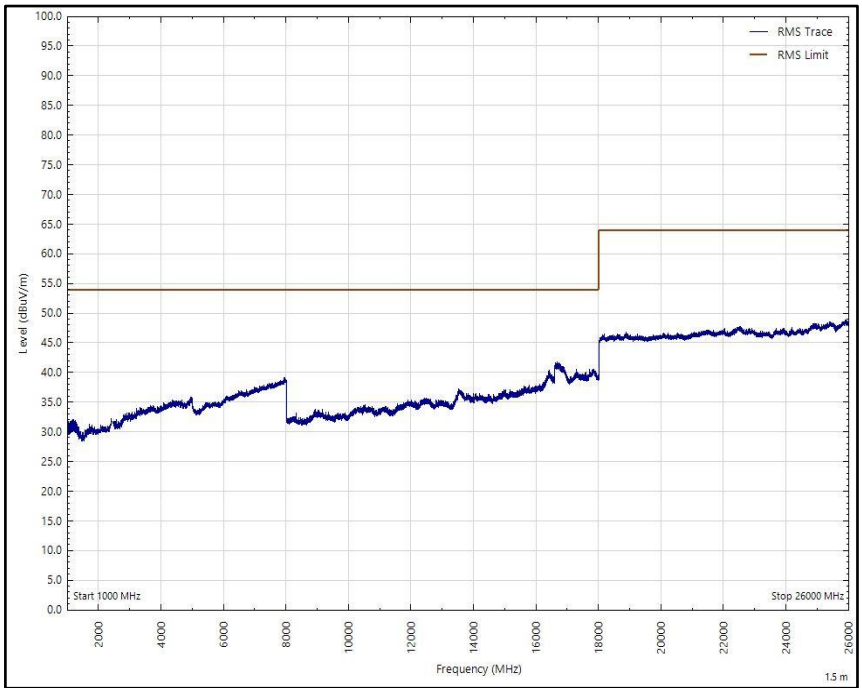

Figure 179 - 2402 MHz (CH0), LE1M, iPA, Core 2, 1 GHz to 26 GHz, Horizontal (rms)

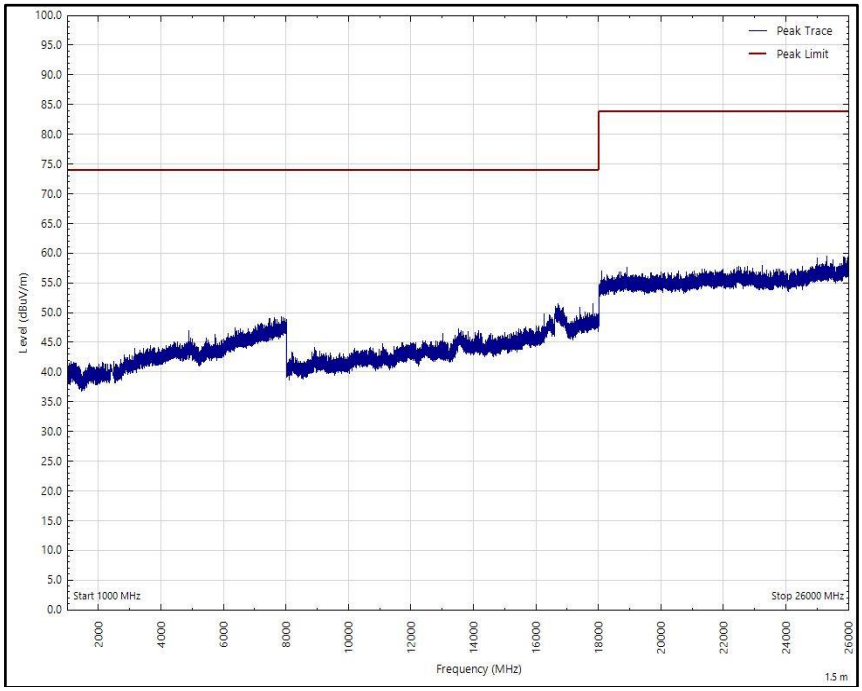

Figure 180 - 2402 MHz (CH0), LE1M, iPA, Core 2, 1 GHz to 26 GHz, Vertical (Peak)

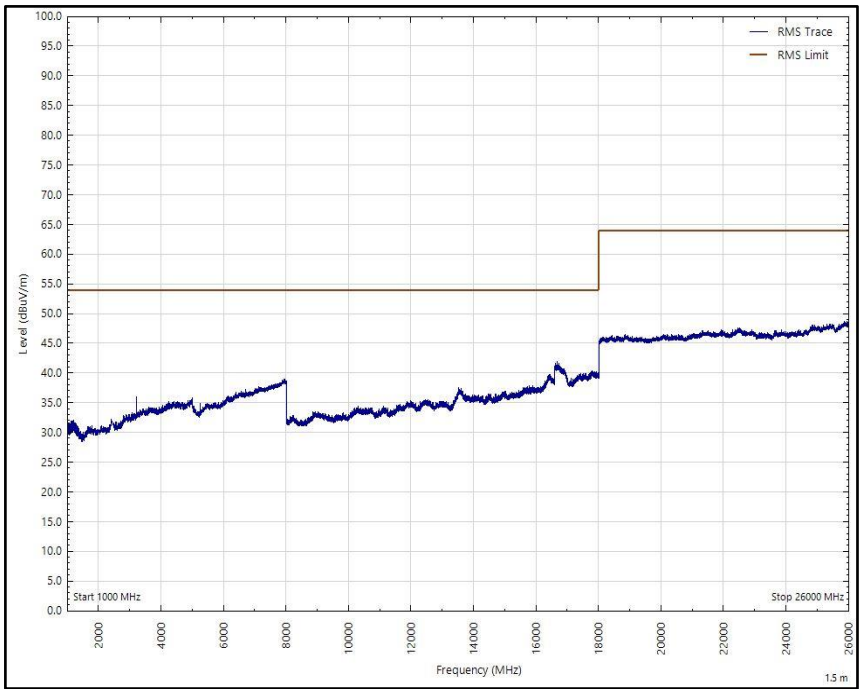

Figure 181 - 2402 MHz (CH0), LE1M, iPA, Core 2, 1 GHz to 26 GHz, Vertical (rms)

Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 127 - 2440 MHz (CH17), LE1M, iPA, Core 2, 30 MHz to 26 GHz

*No emissions found within 10 dB of the limit.

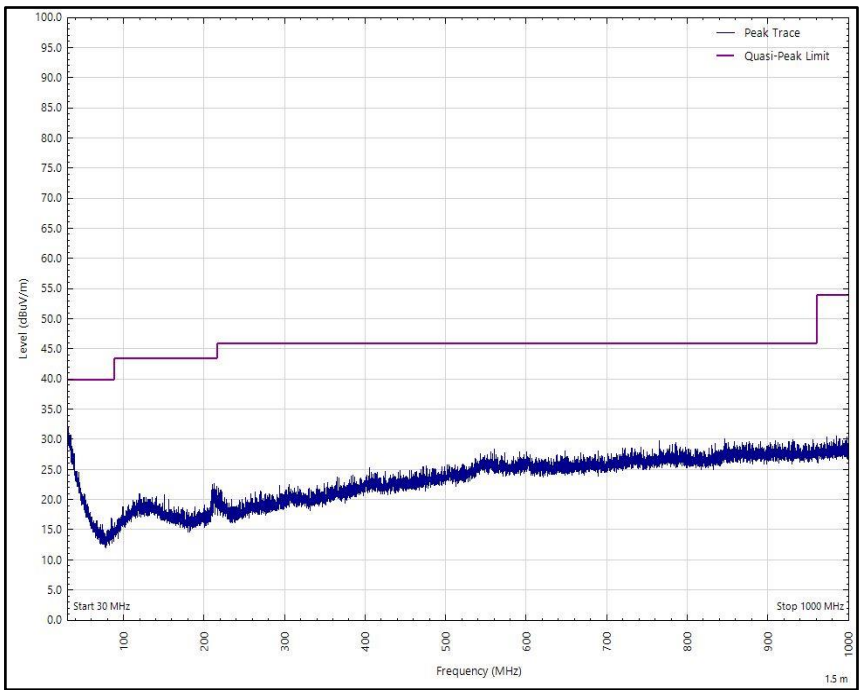

Figure 182 - 2440 MHz (CH17), LE1M, iPA, Core 2, 30 MHz to 1 GHz, Horizontal (Peak)

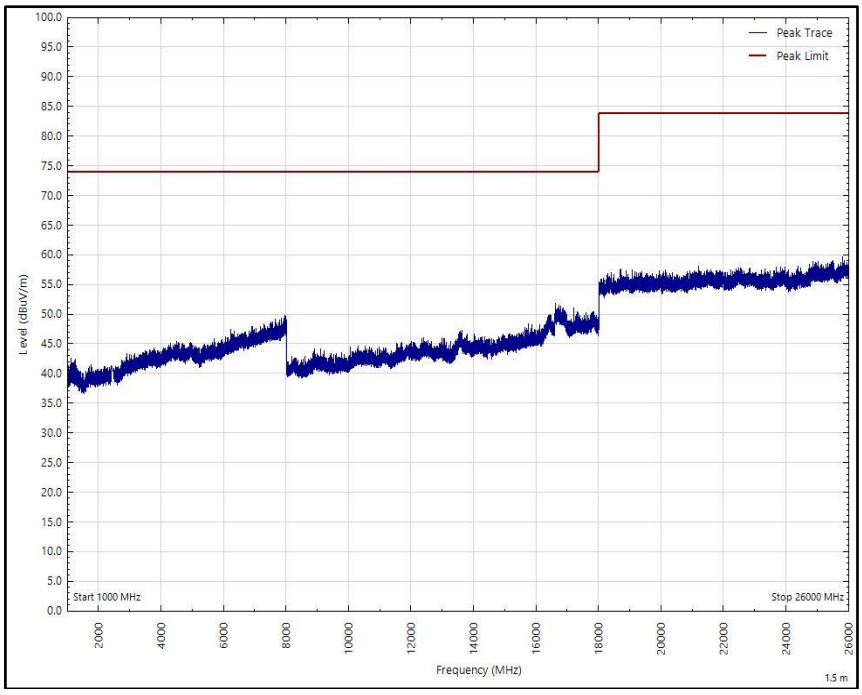

Figure 183 - 2440 MHz (CH17), LE1M, iPA, Core 2, 1 GHz to 26 GHz, Horizontal (Peak)

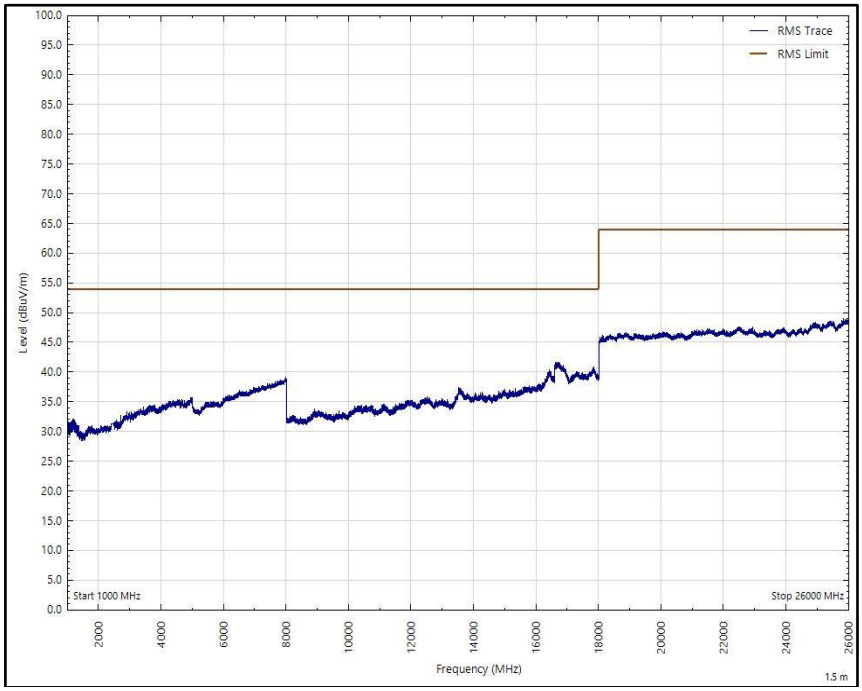

Figure 184 - 2440 MHz (CH17), LE1M, iPA, Core 2, 1 GHz to 26 GHz, Horizontal (rms)

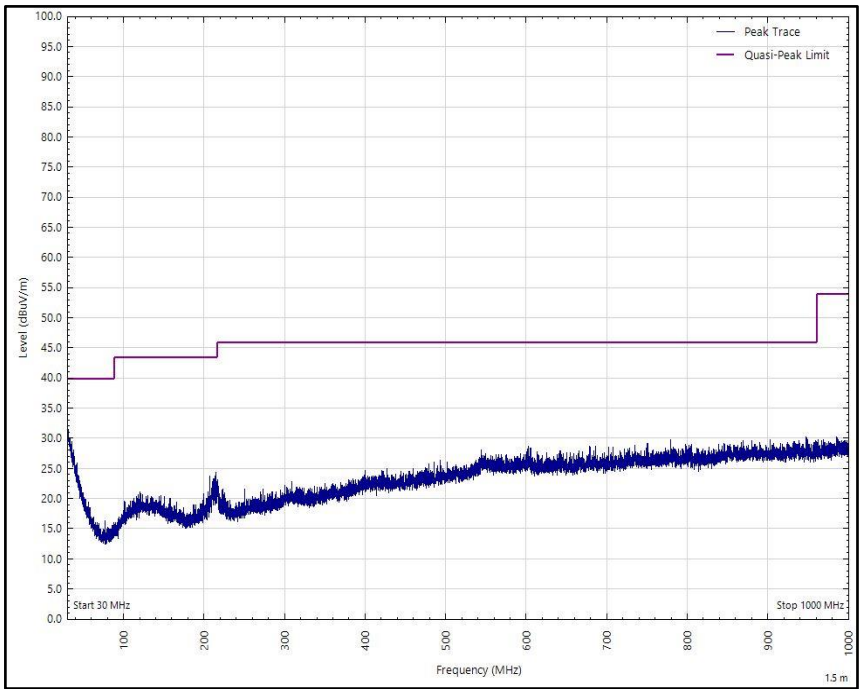

Figure 185 - 2440 MHz (CH17), LE1M, iPA, Core 2, 30 MHz to 1 GHz, Vertical (Peak)

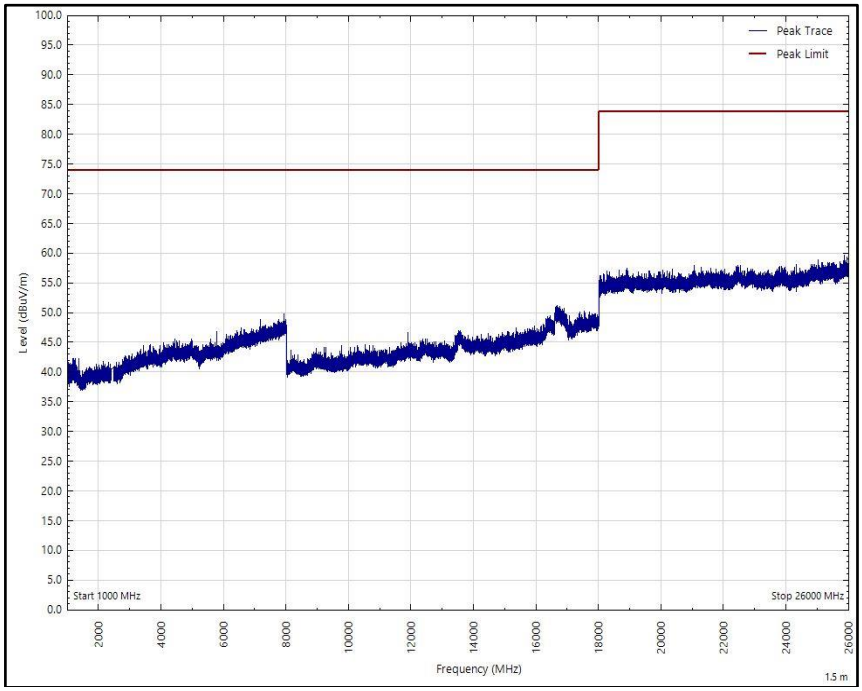

Figure 186 - 2440 MHz (CH17), LE1M, iPA, Core 2, 1 GHz to 26 GHz, Vertical (Peak)

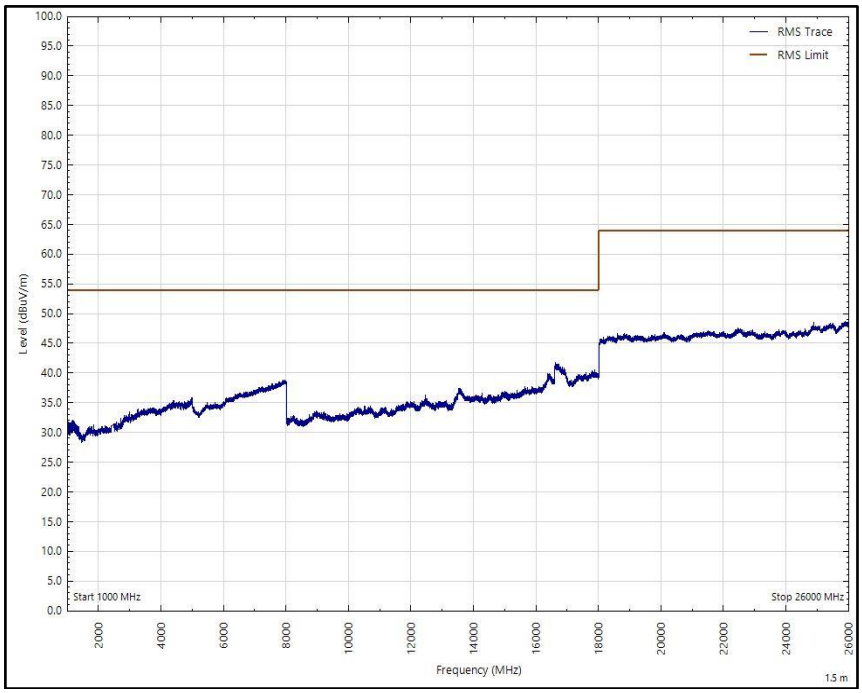

Figure 187 - 2440 MHz (CH17), LE1M, iPA, Core 2, 1 GHz to 26 GHz, Vertical (rms)

Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 128 - 2480 MHz (CH39), LE1M, iPA, Core 2, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

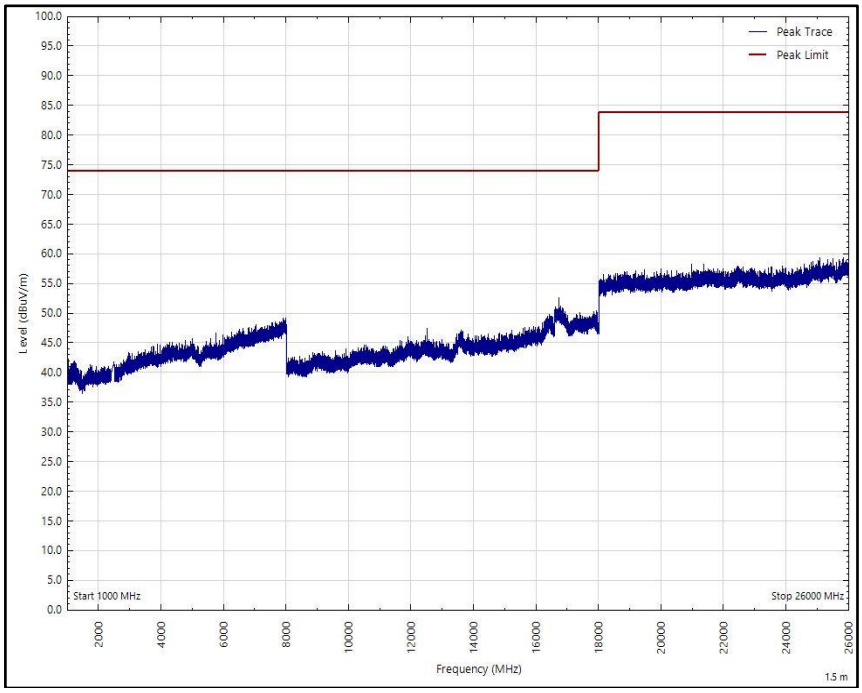

Figure 188 - 2480 MHz (CH39), LE1M, iPA, Core 2, 1 GHz to 26 GHz, Horizontal (Peak)

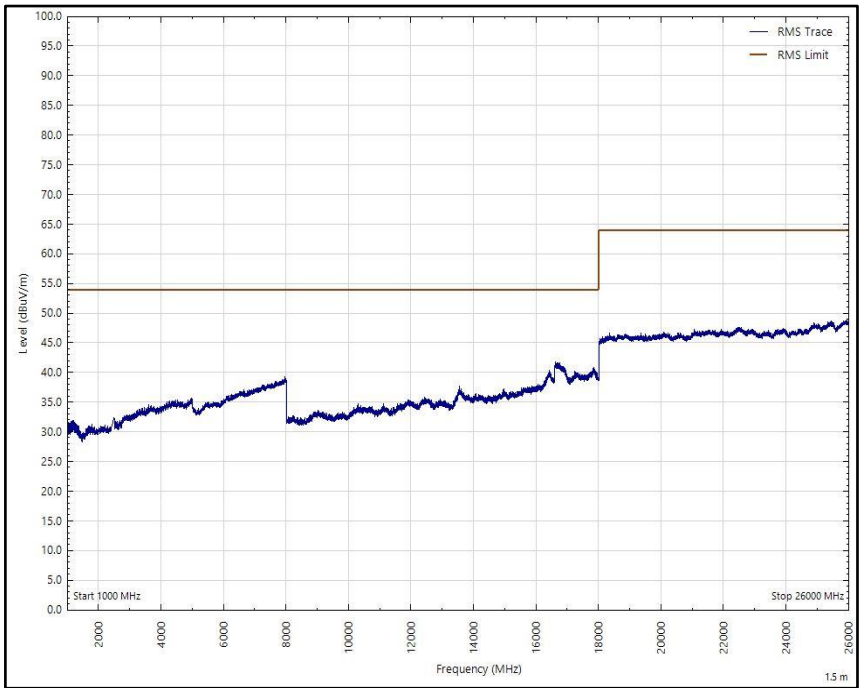

Figure 189 - 2480 MHz (CH39), LE1M, iPA, Core 2, 1 GHz to 26 GHz, Horizontal (rms)

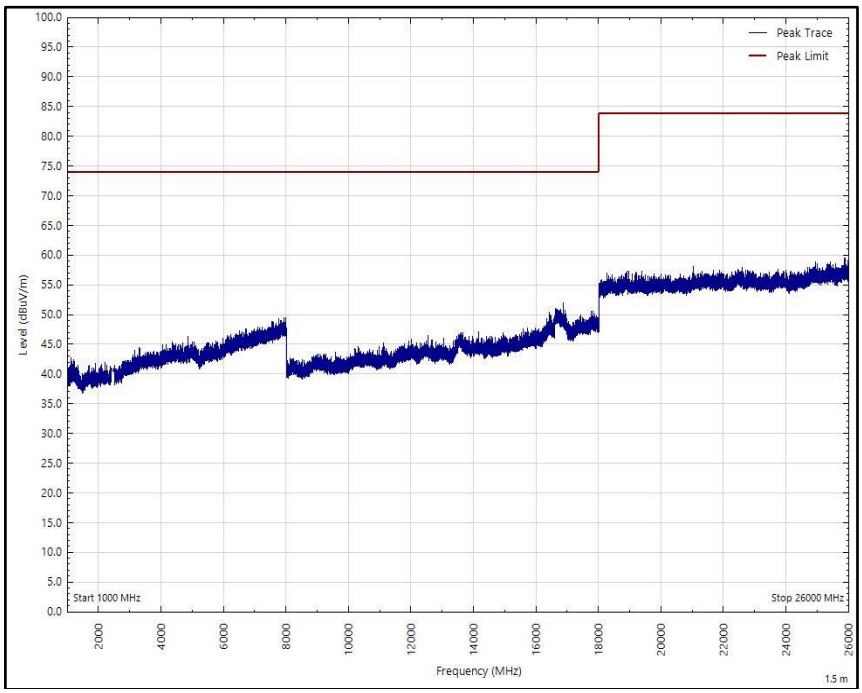

Figure 190 - 2480 MHz (CH39), LE1M, iPA, Core 2, 1 GHz to 26 GHz, Vertical (Peak)

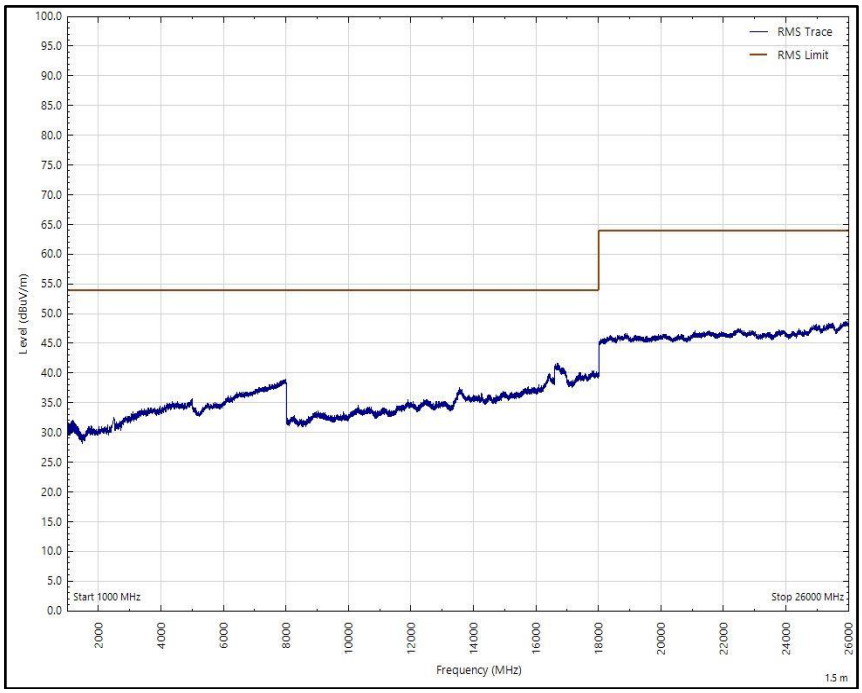

Figure 191 - 2480 MHz (CH39), LE1M, iPA, Core 2, 1 GHz to 26 GHz, Vertical (rms)

Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 129 - 2440 MHz (CH17), LE1M, iPA, Core 0, 30 MHz to 26 GHz

*No emissions found within 10 dB of the limit.

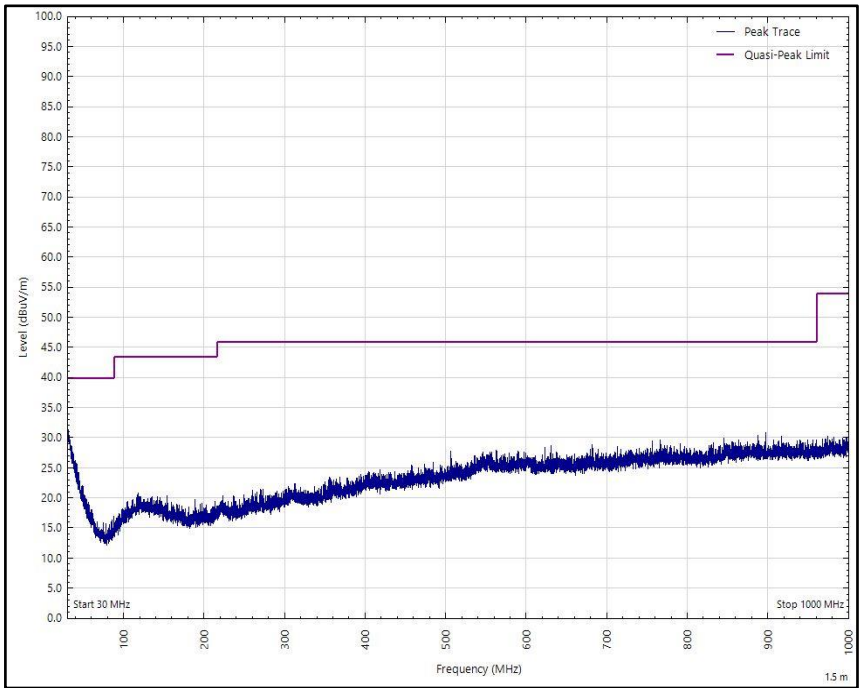

Figure 192 - 2440 MHz (CH17), LE1M, iPA, Core 0, 30 MHz to 1 GHz, Horizontal (Peak)

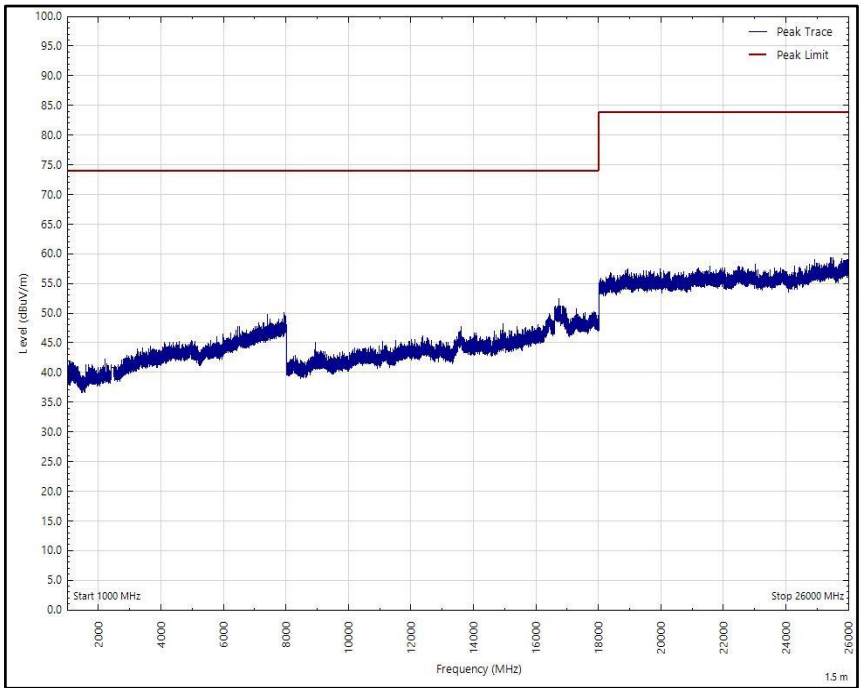

Figure 193 - 2440 MHz (CH17), LE1M, iPA, Core 0, 1 GHz to 26 GHz, Horizontal (Peak)

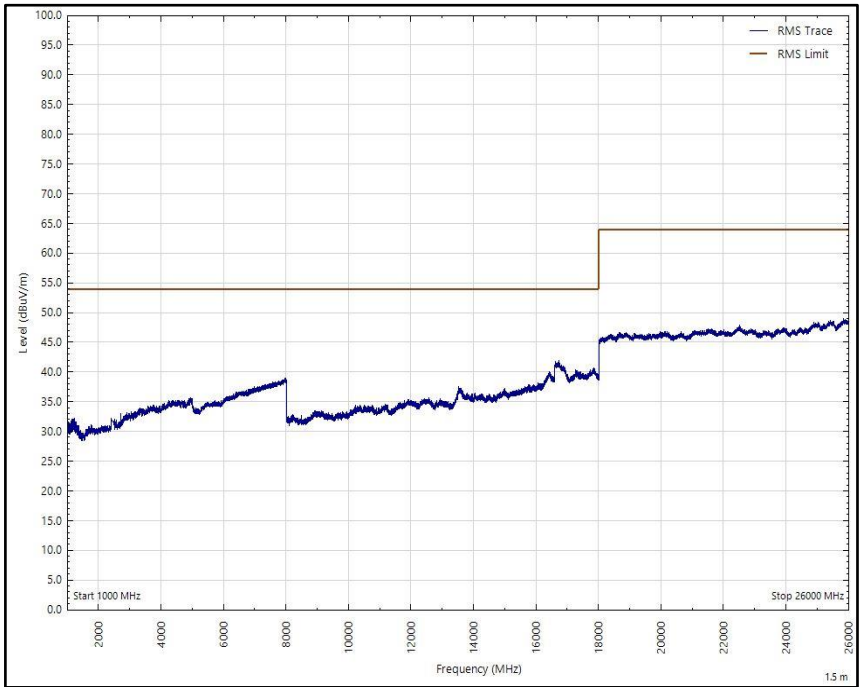

Figure 194 - 2440 MHz (CH17), LE1M, iPA, Core 0, 1 GHz to 26 GHz, Horizontal (rms)

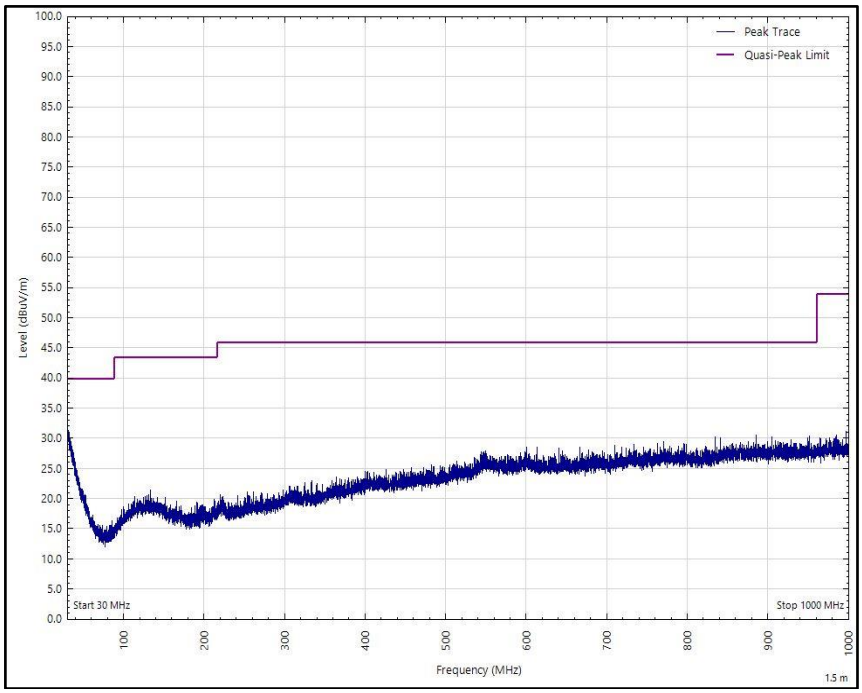

Figure 195 - 2440 MHz (CH17), LE1M, iPA, Core 0, 30 MHz to 1 GHz, Vertical (Peak)

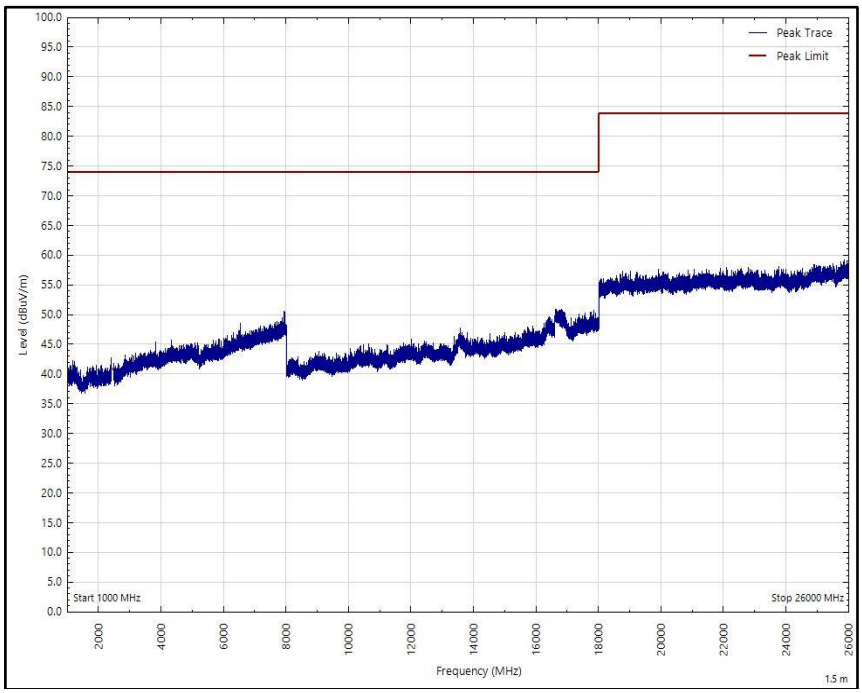

Figure 196 - 2440 MHz (CH17), LE1M, iPA, Core 0, 1 GHz to 26 GHz, Vertical (Peak)

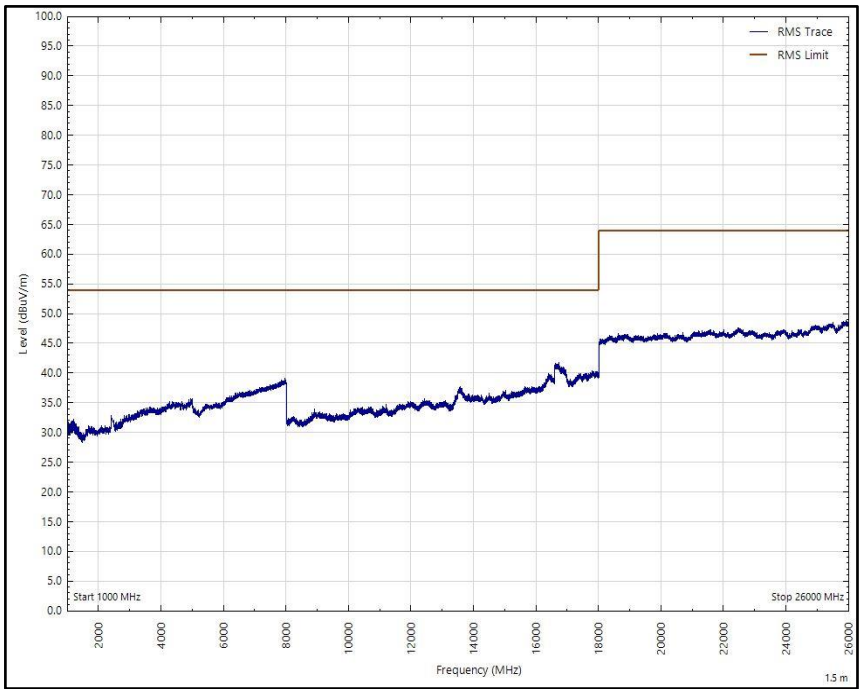

Figure 197 - 2440 MHz (CH17), LE1M, iPA, Core 0, 1 GHz to 26 GHz, Vertical (rms)

Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 130 - 2402 MHz (CH0), LE1M, iPA, Core 1, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

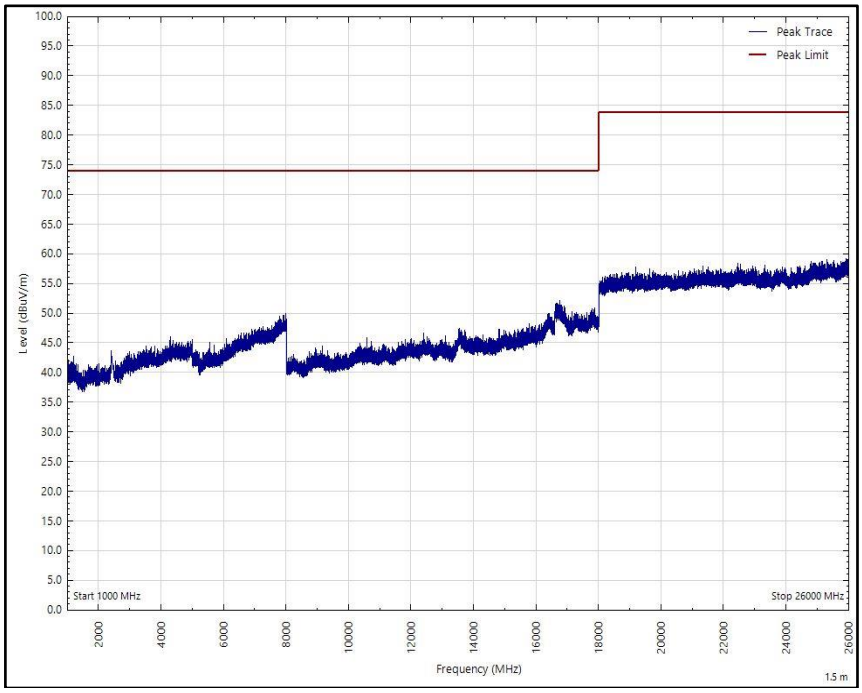

Figure 198 - 2402 MHz (CH0), LE1M, iPA, Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

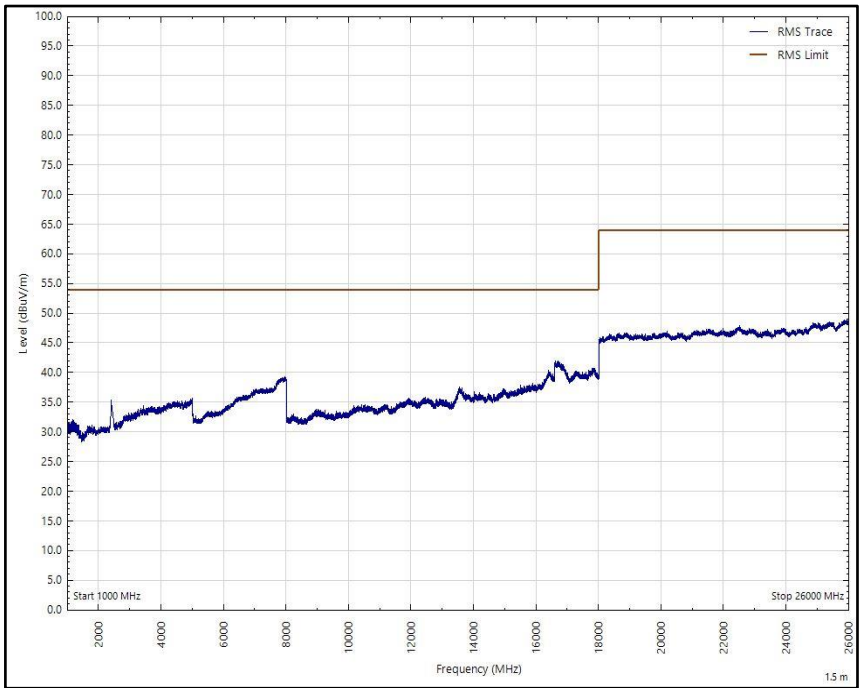

Figure 199 - 2402 MHz (CH0), LE1M, iPA, Core 1, 1 GHz to 26 GHz, Horizontal (rms)

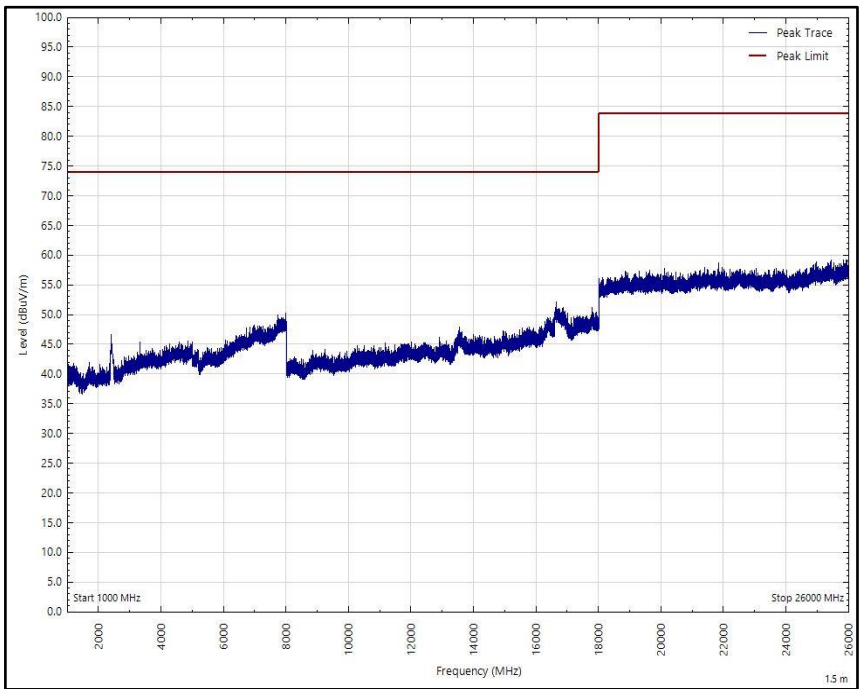

Figure 200 - 2402 MHz (CH0), LE1M, iPA, Core 1, 1 GHz to 26 GHz, Vertical (Peak)

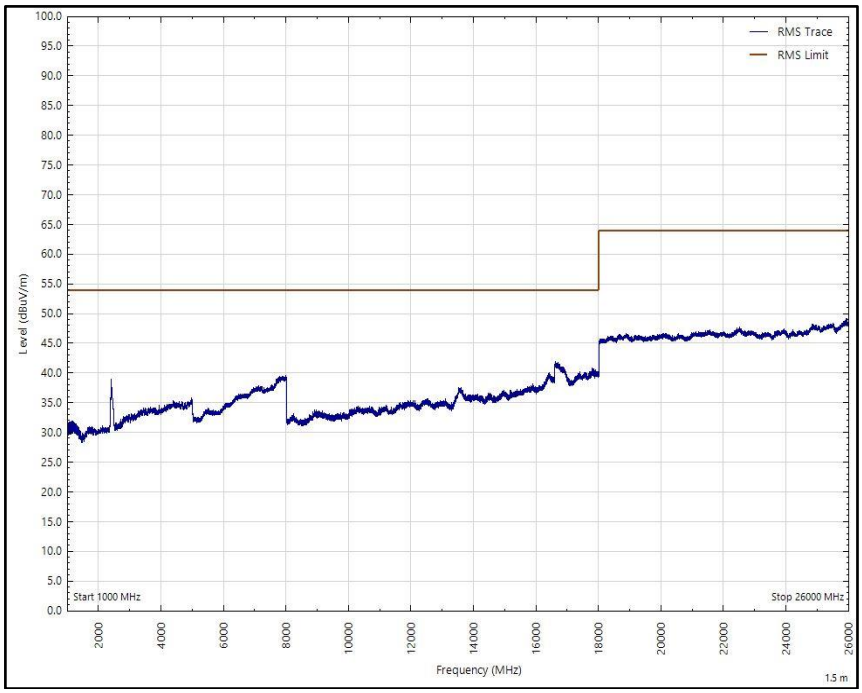

Figure 201 - 2402 MHz (CH0), LE1M, iPA, Core 1, 1 GHz to 26 GHz, Vertical (rms)

Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 131 - 2440 MHz (CH17), LE1M, iPA, Core 1, 30 MHz to 26 GHz

*No emissions found within 10 dB of the limit.

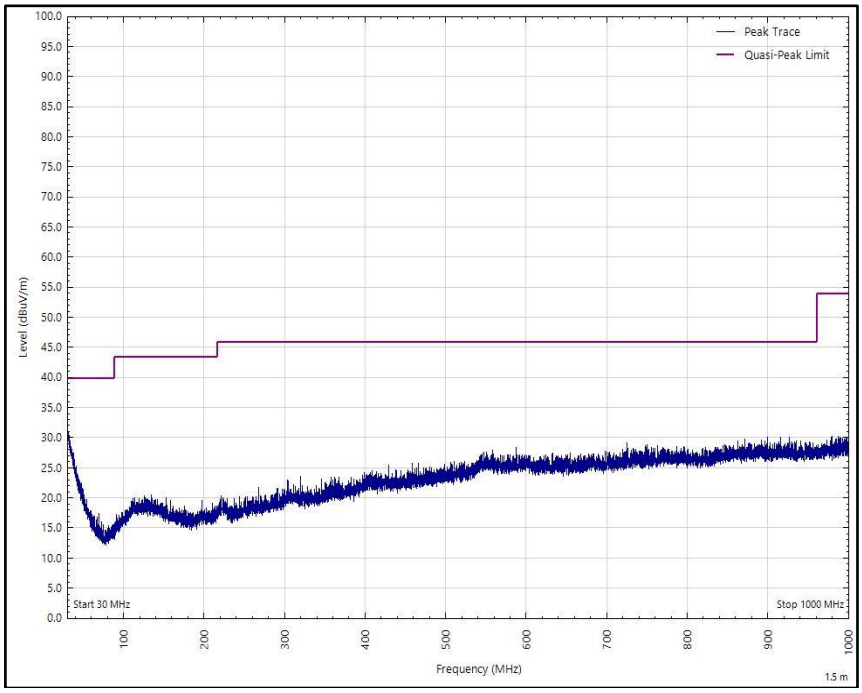

Figure 202 - 2440 MHz (CH17), LE1M, iPA, Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

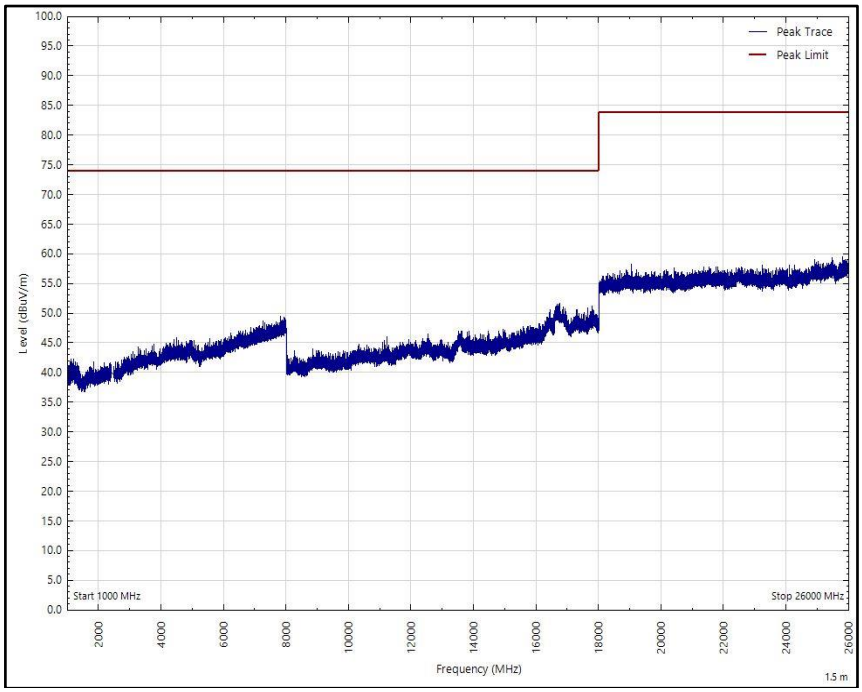

Figure 203 - 2440 MHz (CH17), LE1M, iPA, Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

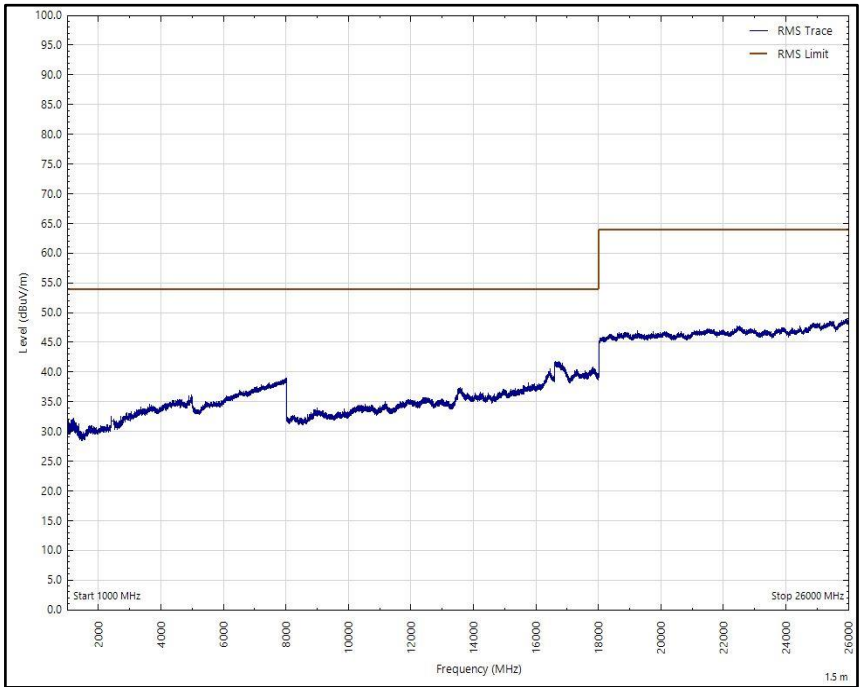

Figure 204 - 2440 MHz (CH17), LE1M, iPA, Core 1, 1 GHz to 26 GHz, Horizontal (rms)

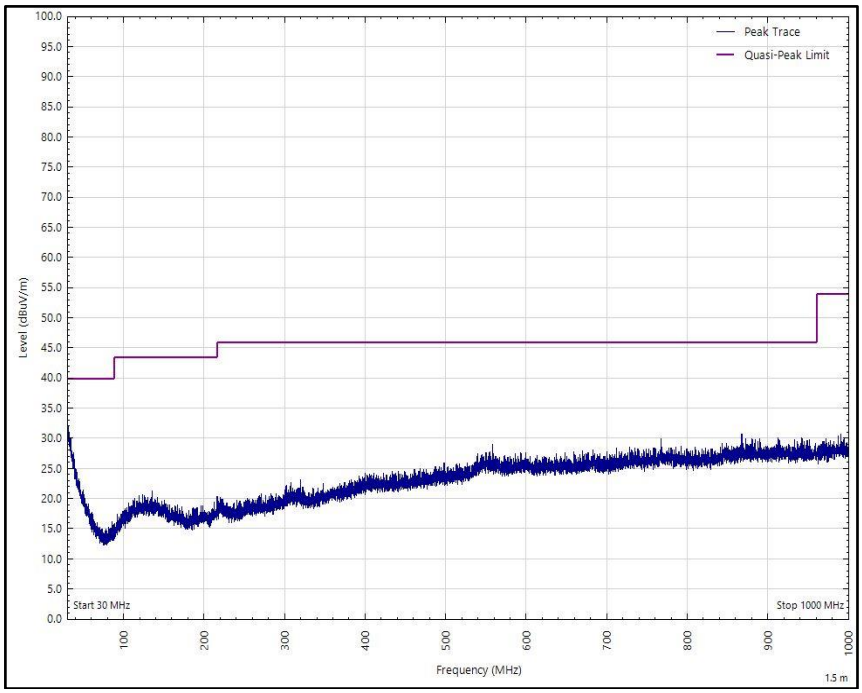

Figure 205 - 2440 MHz (CH17), LE1M, iPA, Core 1, 30 MHz to 1 GHz, Vertical (Peak)

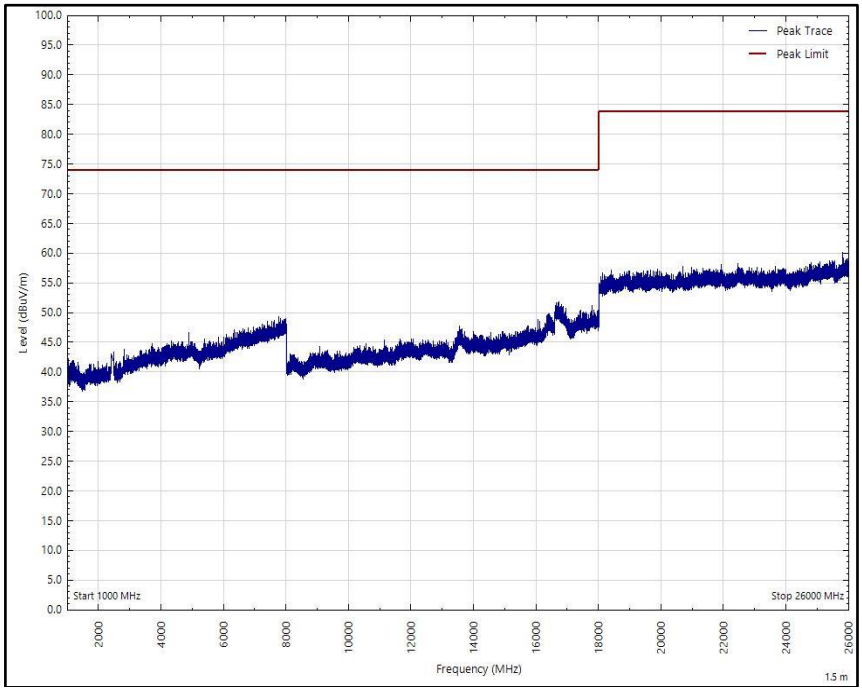

Figure 206 - 2440 MHz (CH17), LE1M, iPA, Core 1, 1 GHz to 26 GHz, Vertical (Peak)

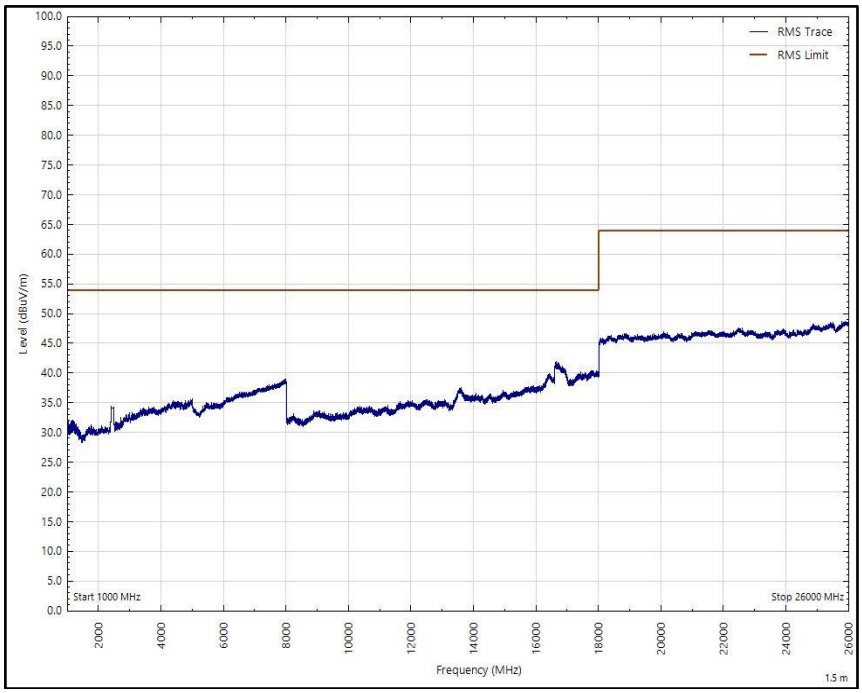

Figure 207 - 2440 MHz (CH17), LE1M, iPA, Core 1, 1 GHz to 26 GHz, Vertical (rms)

Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 132 - 2480 MHz (CH39), LE1M, iPA, Core 1, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

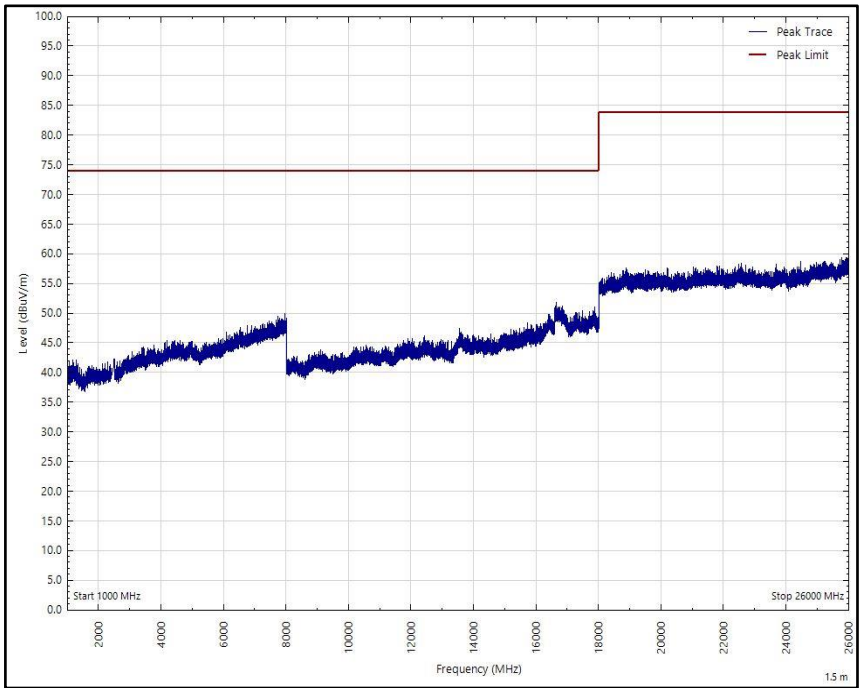

Figure 208 - 2480 MHz (CH39), LE1M, iPA, Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

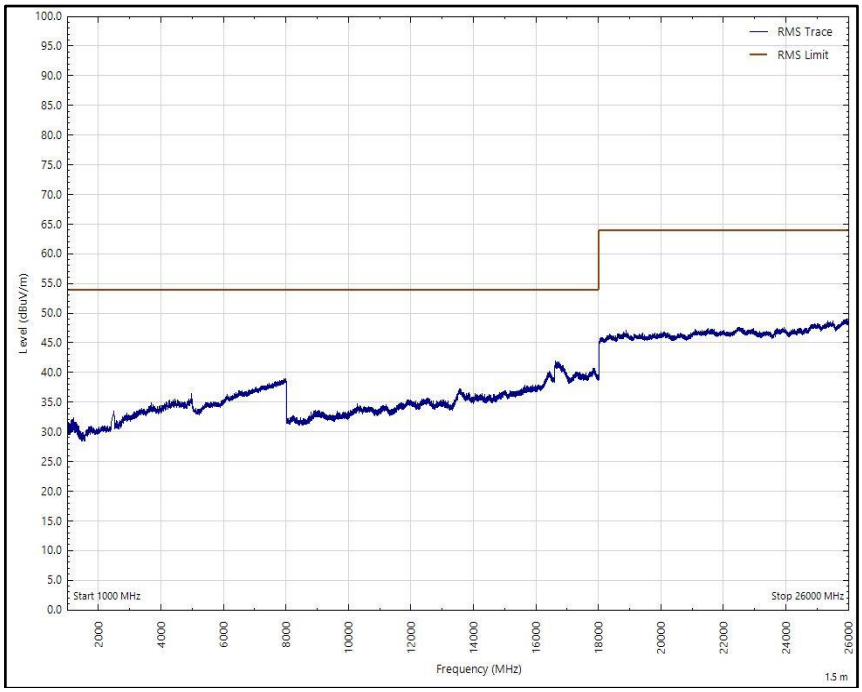

Figure 209 - 2480 MHz (CH39), LE1M, iPA, Core 1, 1 GHz to 26 GHz, Horizontal (rms)

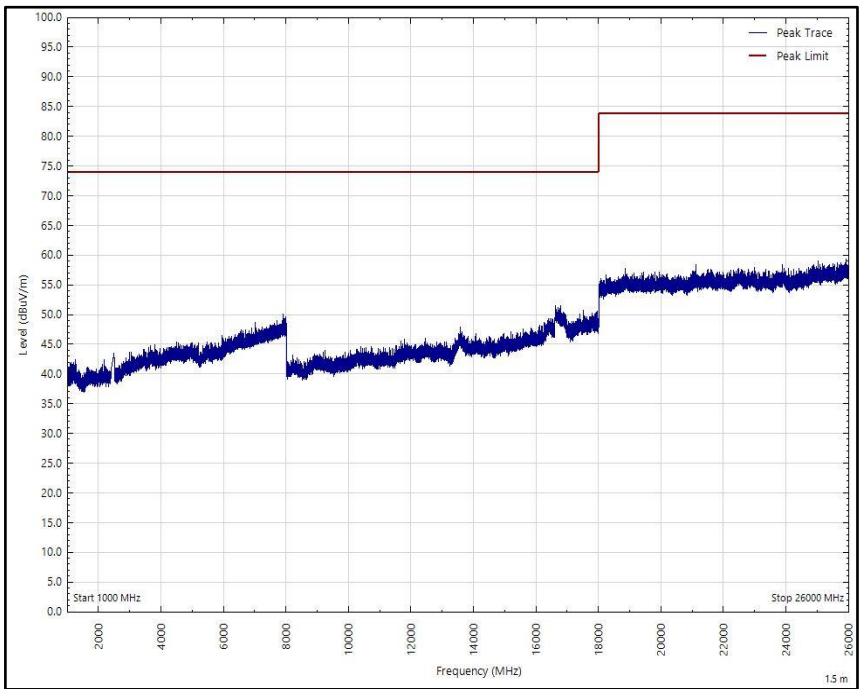

Figure 210 - 2480 MHz (CH39), LE1M, iPA, Core 1, 1 GHz to 26 GHz, Vertical (Peak)

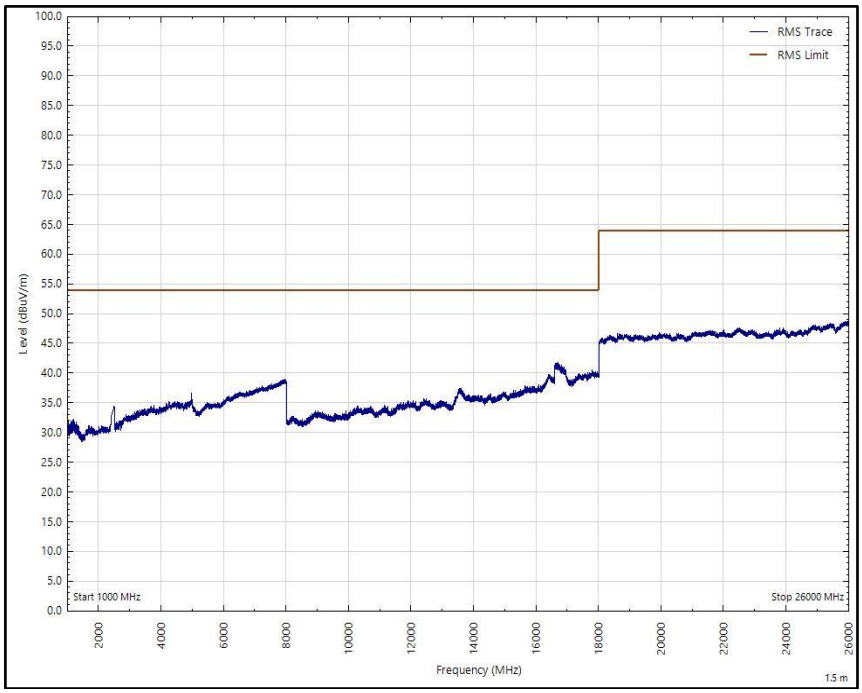

Figure 211 - 2480 MHz (CH39), LE1M, iPA, Core 1, 1 GHz to 26 GHz, Vertical (rms)

ePA

Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 133 - 2402 MHz (CH0), LE1M, ePA, Core 0, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

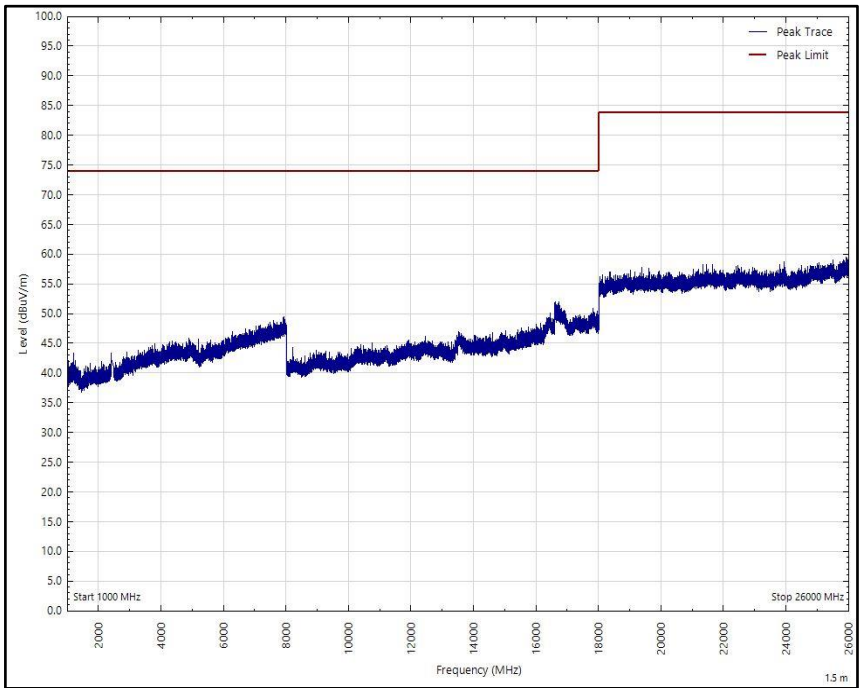

Figure 212 - 2402 MHz (CH0), LE1M, ePA, Core 0, 1 GHz to 26 GHz, Horizontal (Peak)

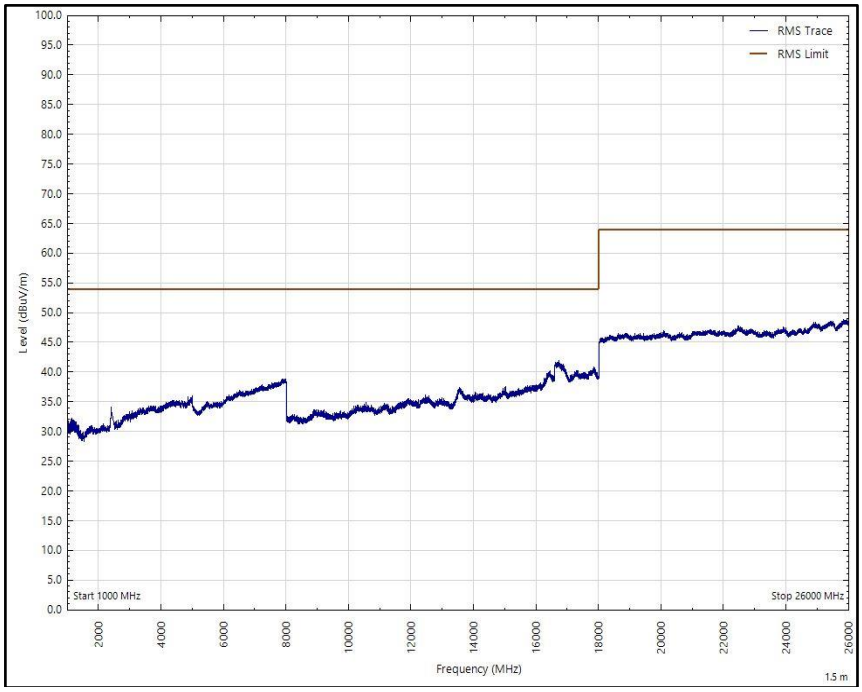

Figure 213 - 2402 MHz (CH0), LE1M, ePA, Core 0, 1 GHz to 26 GHz, Horizontal (rms)

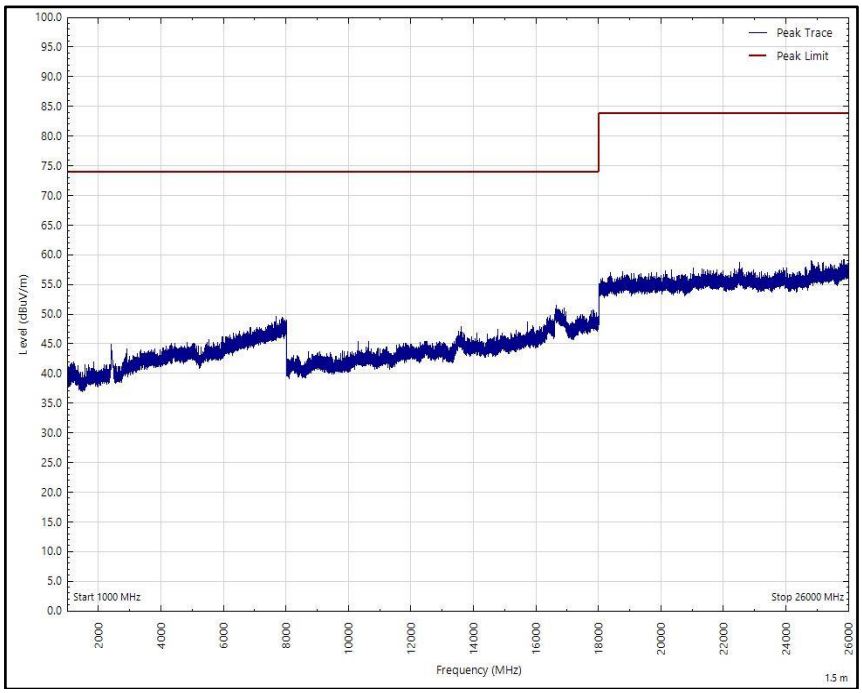

Figure 214 - 2402 MHz (CH0), LE1M, ePA, Core 0, 1 GHz to 26 GHz, Vertical (Peak)

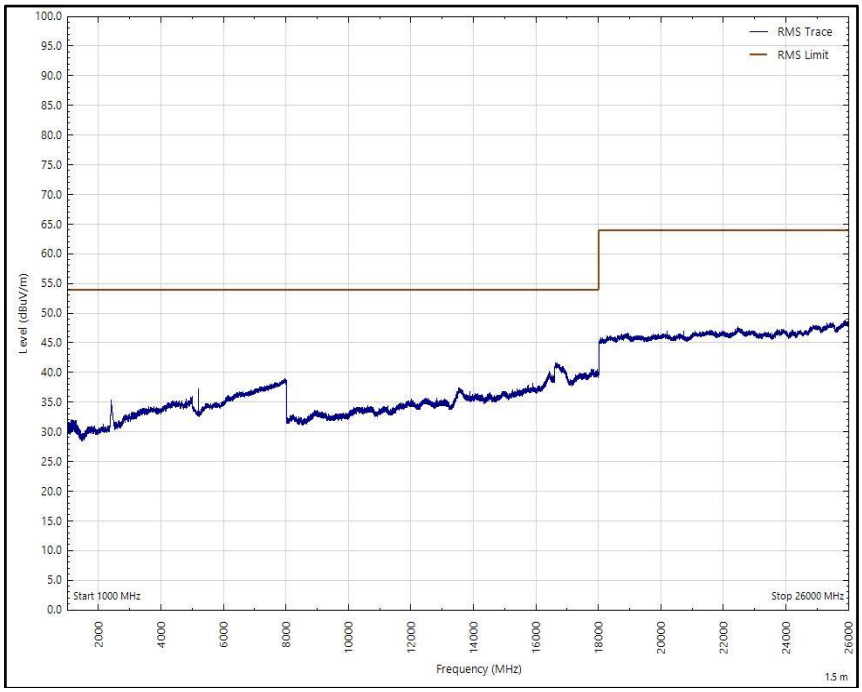

Figure 215 - 2402 MHz (CH0), LE1M, ePA, Core 0, 1 GHz to 26 GHz, Vertical (rms)

Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 134 - 2480 MHz (CH39), LE1M, ePA, Core 0, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

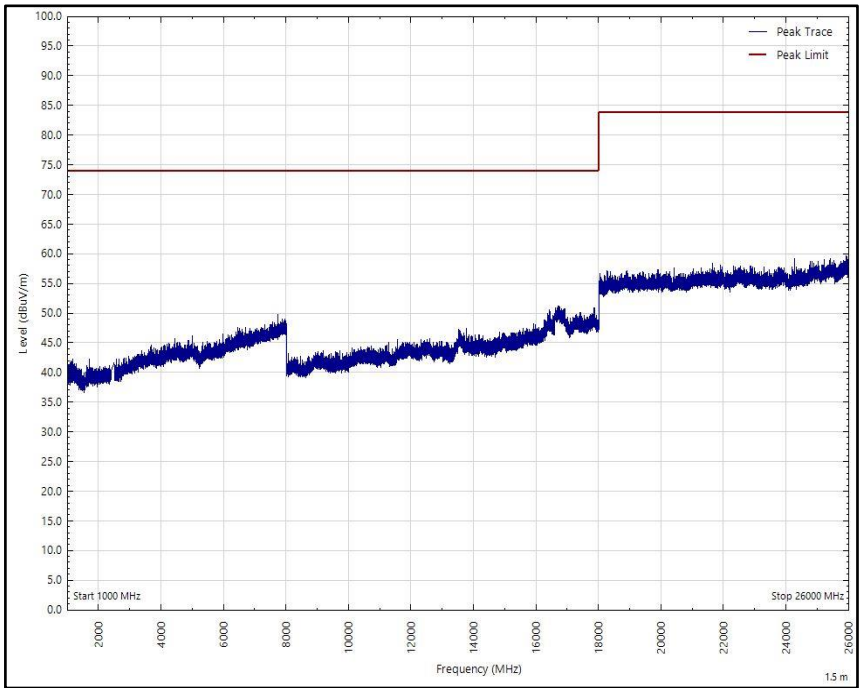

Figure 216 - 2480 MHz (CH39), LE1M, ePA, Core 0, 1 GHz to 26 GHz, Horizontal (Peak)

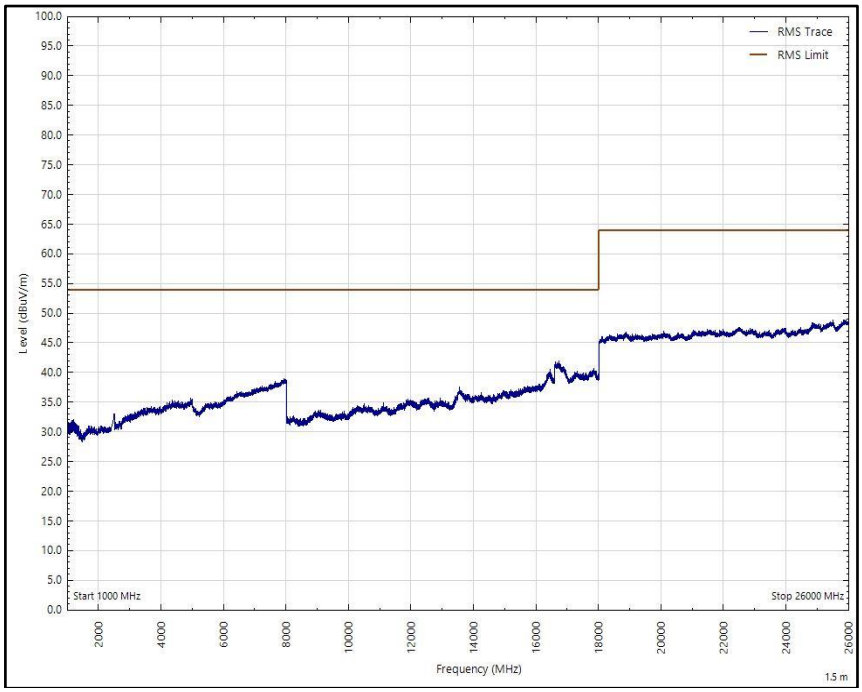

Figure 217 - 2480 MHz (CH39), LE1M, ePA, Core 0, 1 GHz to 26 GHz, Horizontal (rms)

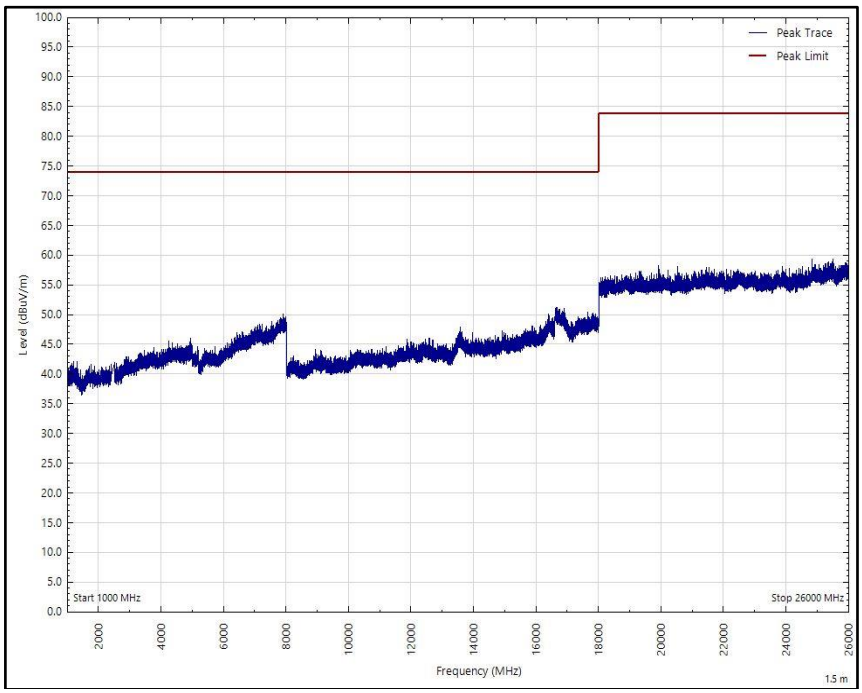

Figure 218 - 2480 MHz (CH39), LE1M, ePA, Core 0, 1 GHz to 26 GHz, Vertical (Peak)

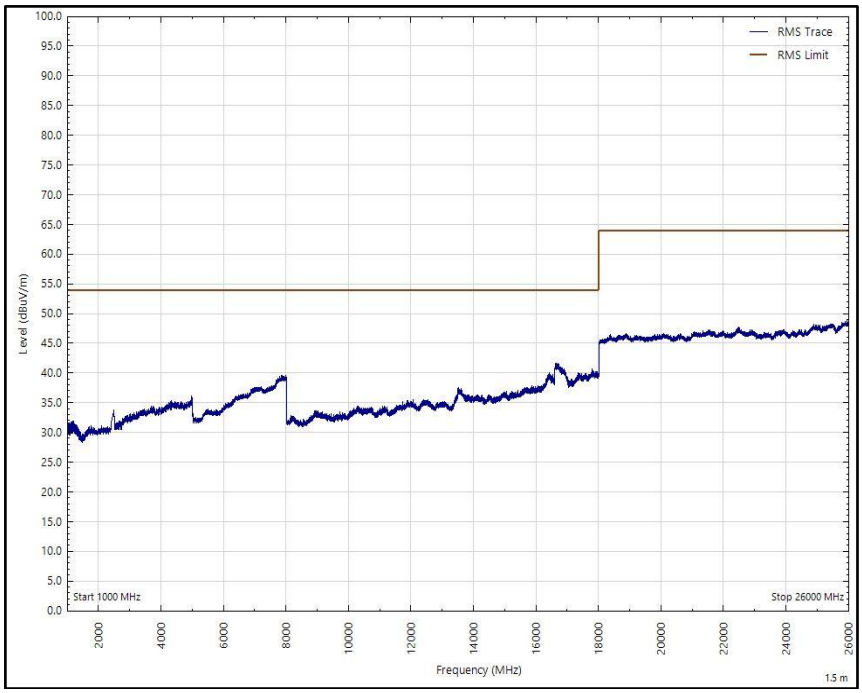

Figure 219 - 2480 MHz (CH39), LE1M, ePA, Core 0, 1 GHz to 26 GHz, Vertical (rms)

Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 135 - 2440 MHz (CH17), LE1M, ePA, Core 0, 30 MHz to 26 GHz

*No emissions found within 10 dB of the limit.

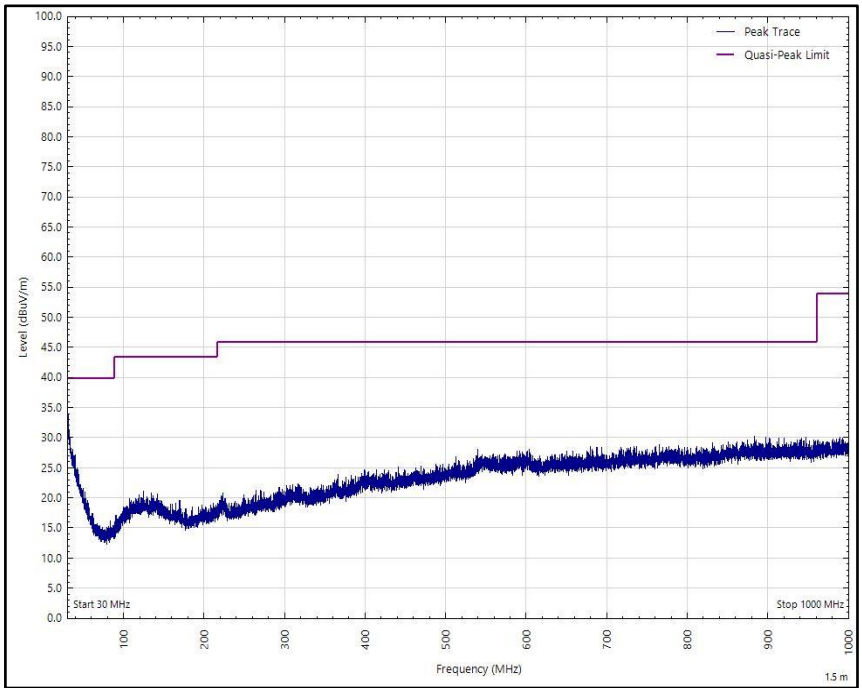

Figure 220 - 2440 MHz (CH17), LE1M, ePA, Core 0, 30 MHz to 1 GHz, Horizontal (Peak)

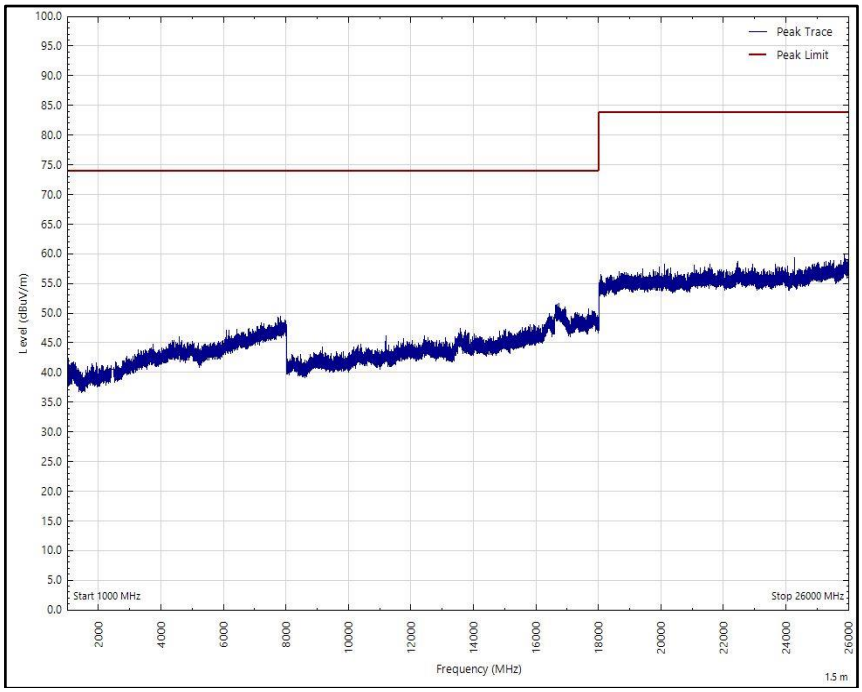

Figure 221 - 2440 MHz (CH17), LE1M, ePA, Core 0, 1 GHz to 26 GHz, Horizontal (Peak)

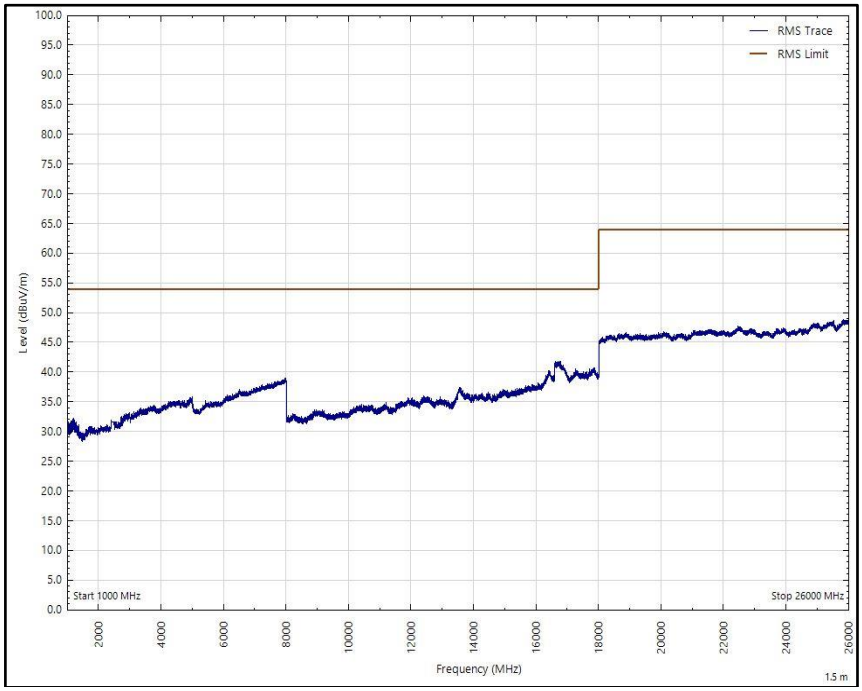

Figure 222 - 2440 MHz (CH17), LE1M, ePA, Core 0, 1 GHz to 26 GHz, Horizontal (rms)

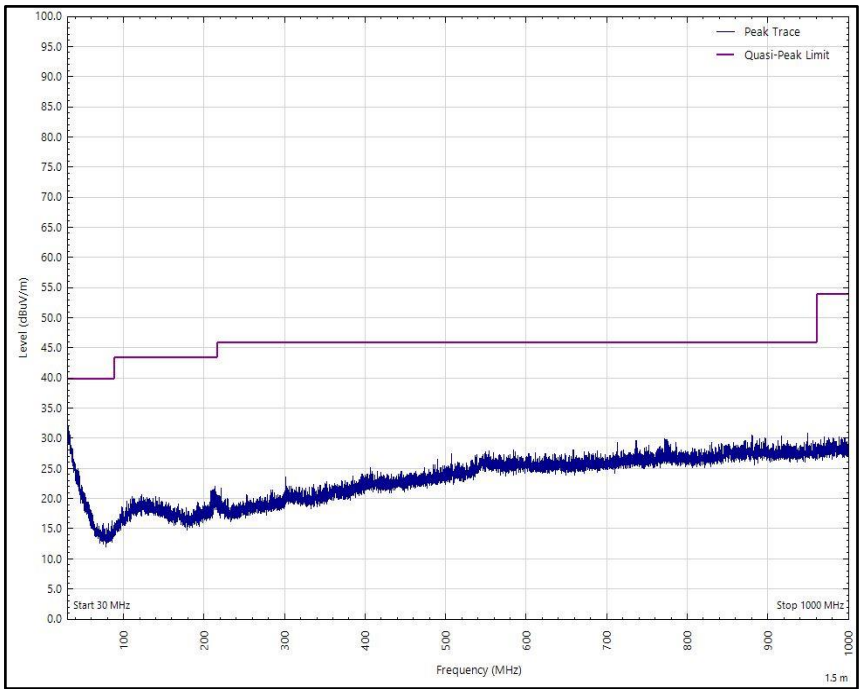

Figure 223 - 2440 MHz (CH17), LE1M, ePA, Core 0, 30 MHz to 1 GHz, Vertical (Peak)

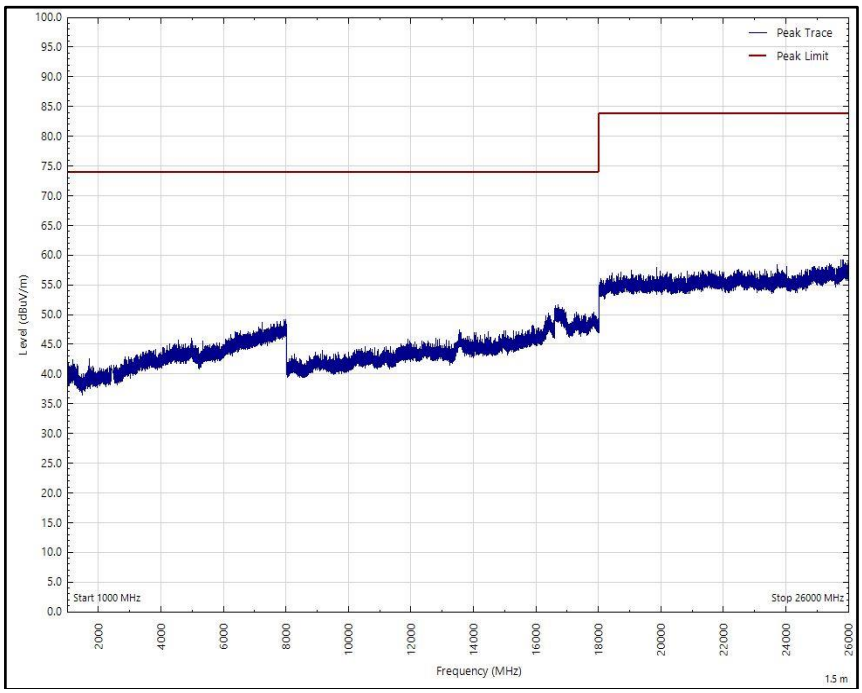

Figure 224 - 2440 MHz (CH17), LE1M, ePA, Core 0, 1 GHz to 26 GHz, Vertical (Peak)

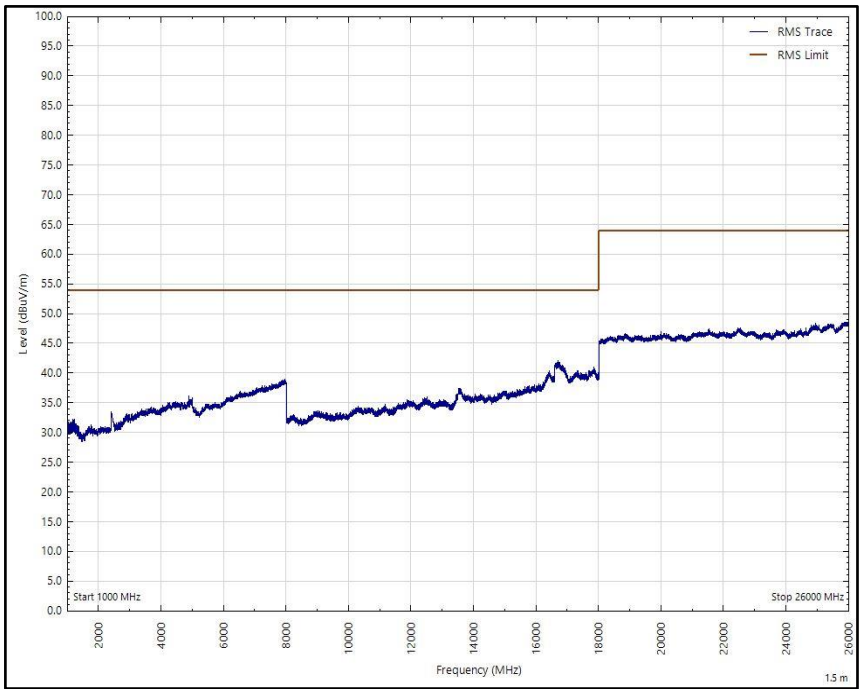

Figure 225 - 2440 MHz (CH17), LE1M, ePA, Core 0, 1 GHz to 26 GHz, Vertical (rms)

Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 136 - 2402 MHz (CH0), LE1M, ePA, Core 1, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

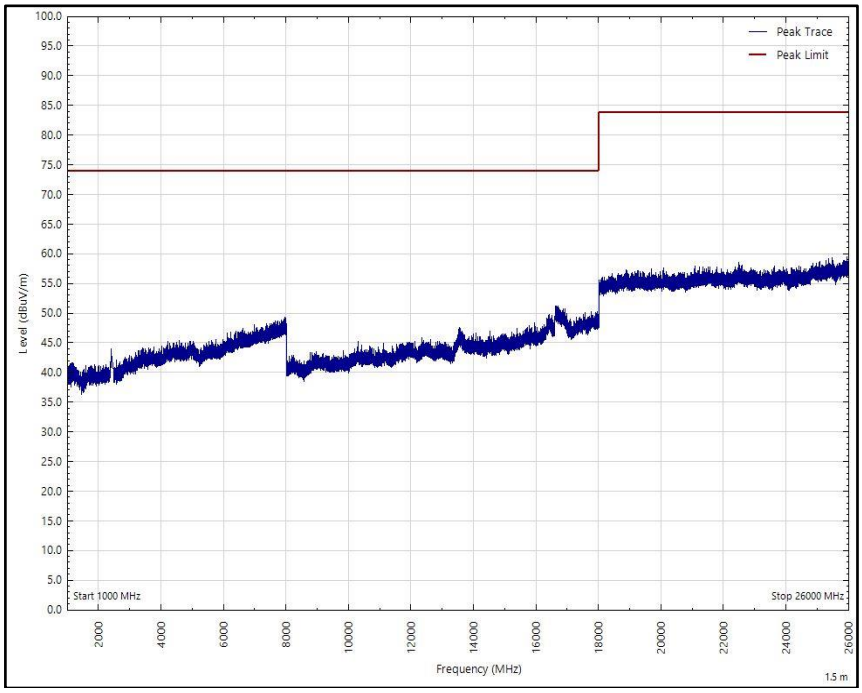

Figure 226 - 2402 MHz (CH0), LE1M, ePA, Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

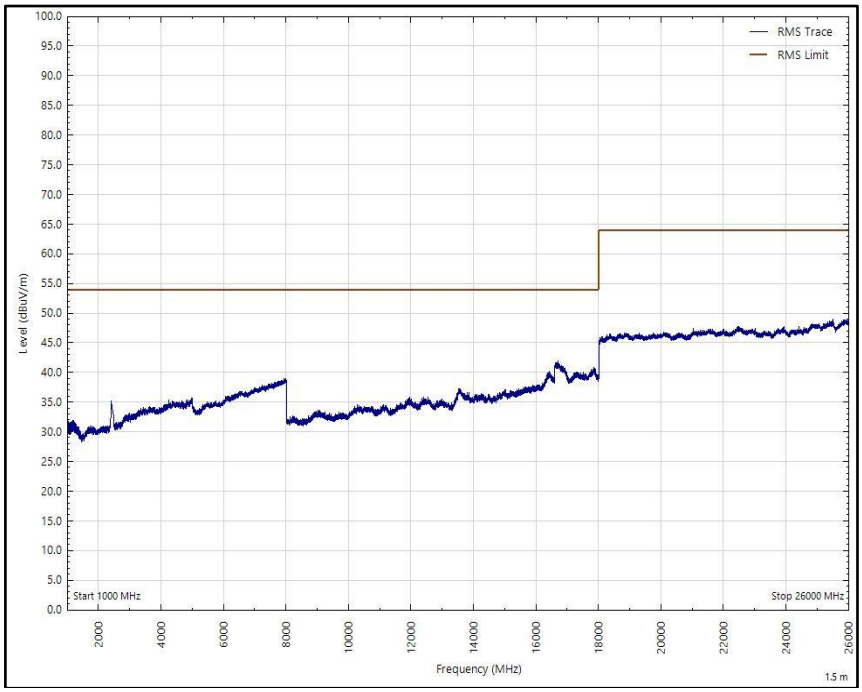

Figure 227 - 2402 MHz (CH0), LE1M, ePA, Core 1, 1 GHz to 26 GHz, Horizontal (rms)

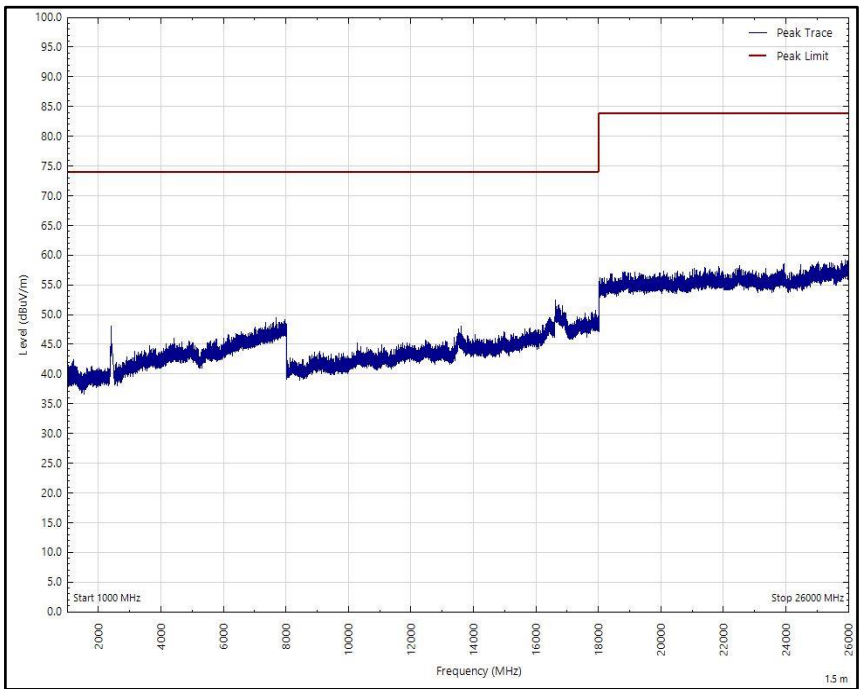

Figure 228 - 2402 MHz (CH0), LE1M, ePA, Core 1, 1 GHz to 26 GHz, Vertical (Peak)

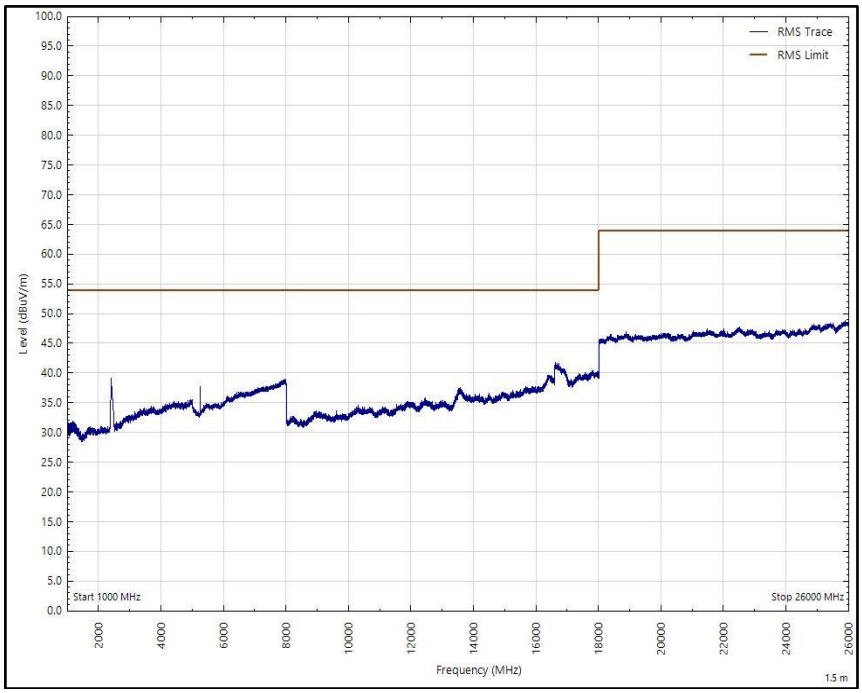

Figure 229 - 2402 MHz (CH0), LE1M, ePA, Core 1, 1 GHz to 26 GHz, Vertical (rms)

Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 137 - 2440 MHz (CH17), LE1M, ePA, Core 1, 30 MHz to 26 GHz

*No emissions found within 10 dB of the limit.

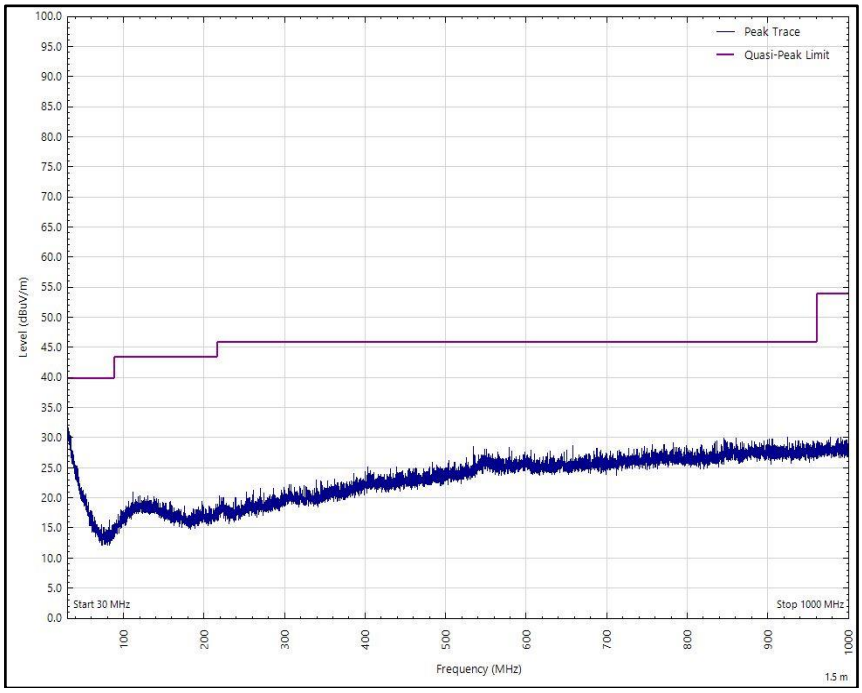

Figure 230 - 2440 MHz (CH17), LE1M, ePA, Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

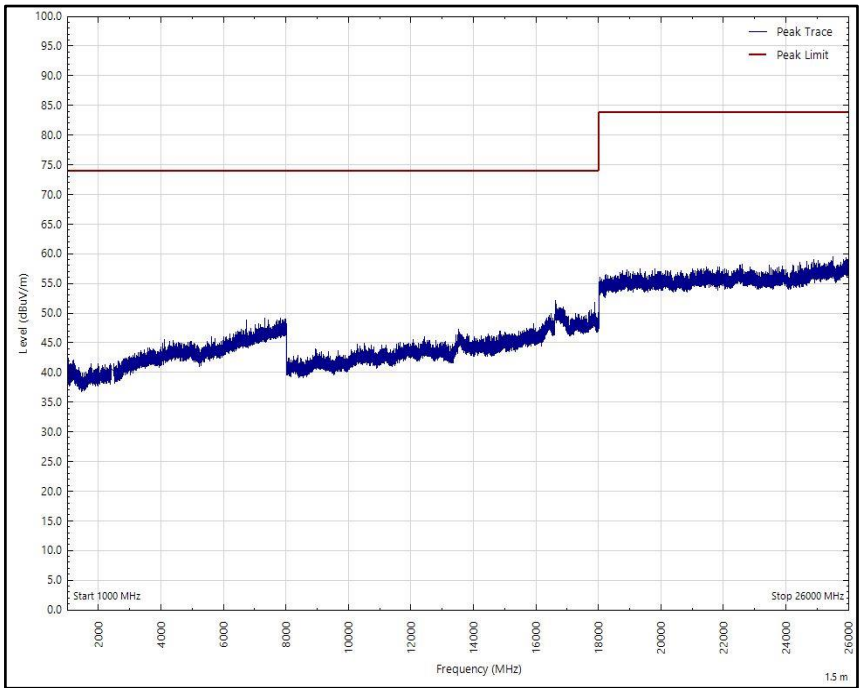

Figure 231 - 2440 MHz (CH17), LE1M, ePA, Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

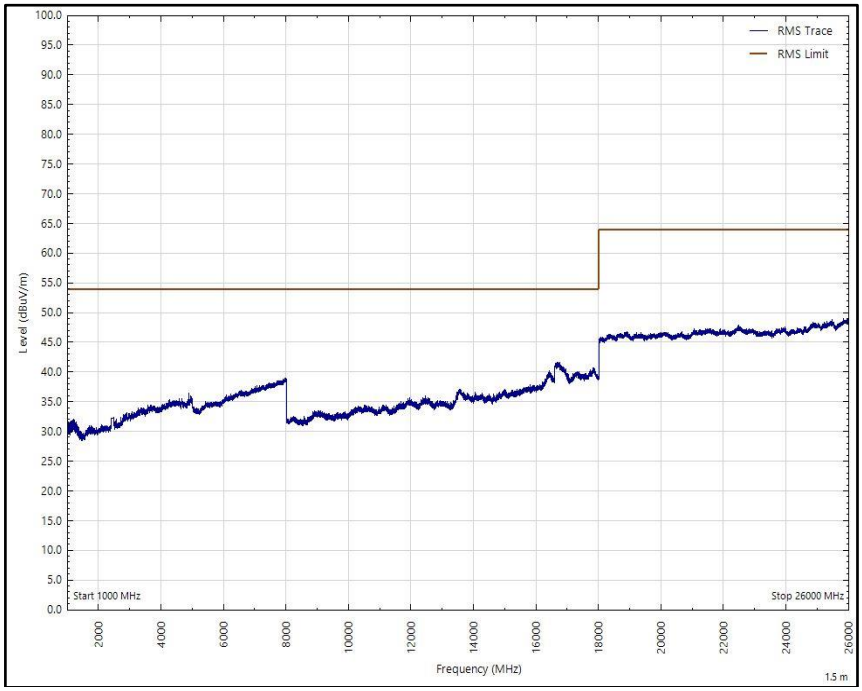

Figure 232 - 2440 MHz (CH17), LE1M, ePA, Core 1, 1 GHz to 26 GHz, Horizontal (rms)

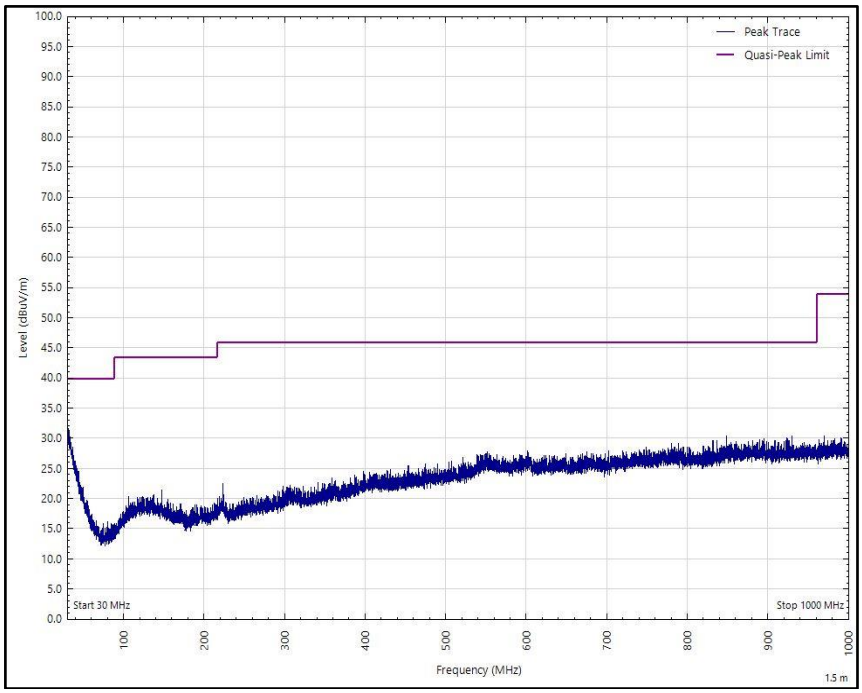

Figure 233 - 2440 MHz (CH17), LE1M, ePA, Core 1, 30 MHz to 1 GHz, Vertical (Peak)

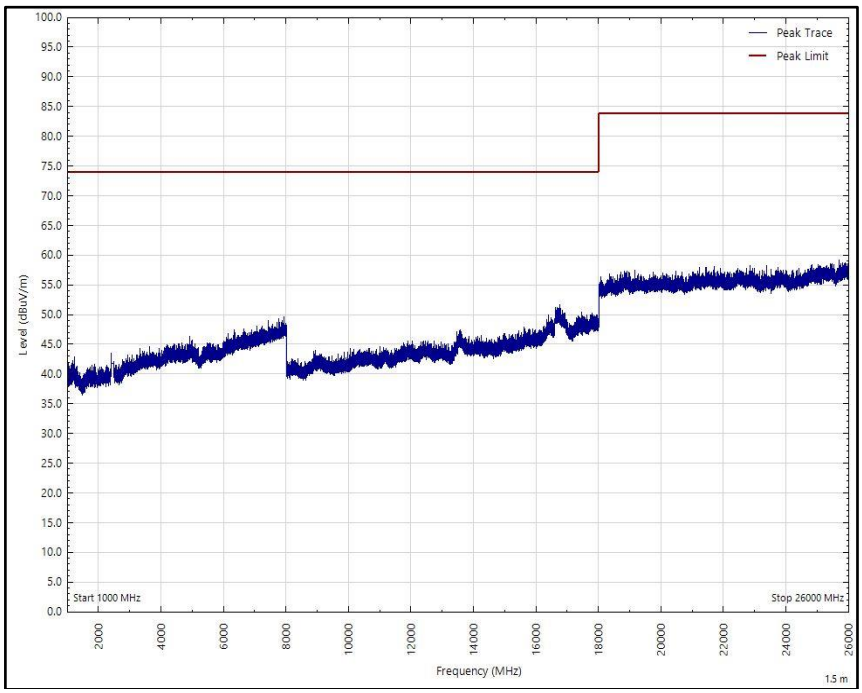

Figure 234 - 2440 MHz (CH17), LE1M, ePA, Core 1, 1 GHz to 26 GHz, Vertical (Peak)

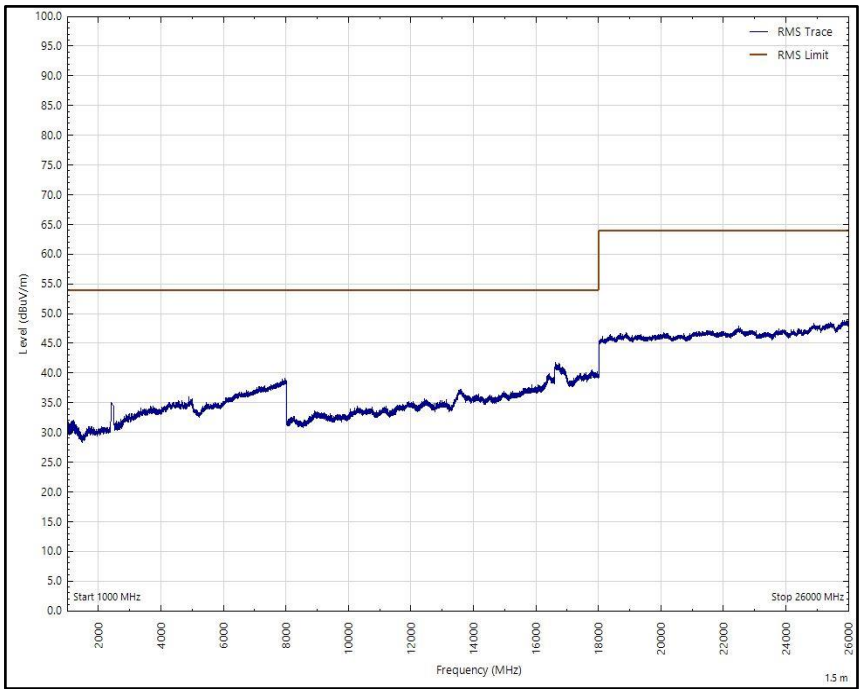

Figure 235 - 2440 MHz (CH17), LE1M, ePA, Core 1, 1 GHz to 26 GHz, Vertical (rms)

Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 138 - 2480 MHz (CH39), LE1M, ePA, Core 1, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

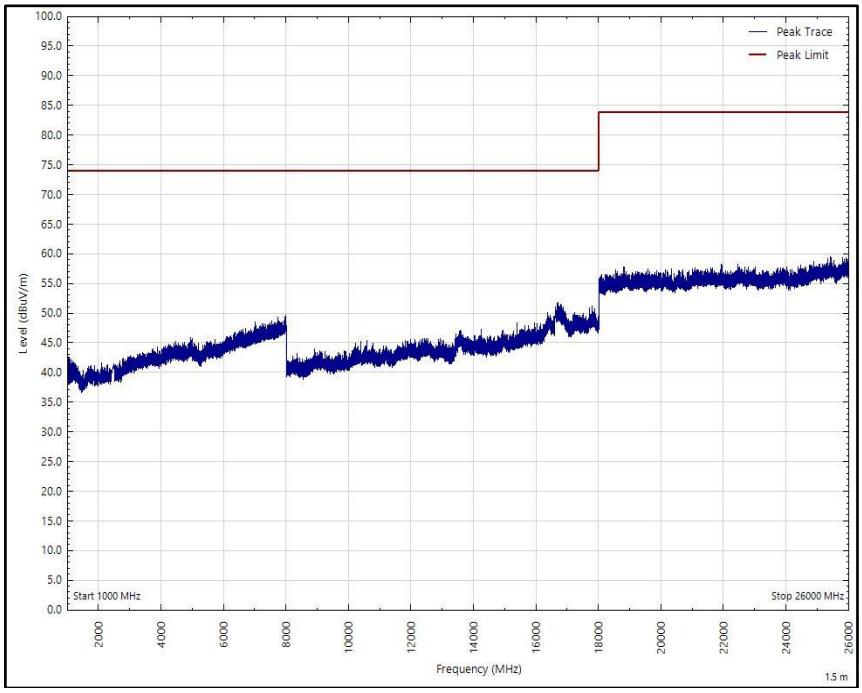

Figure 236 - 2480 MHz (CH39), LE1M, ePA, Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

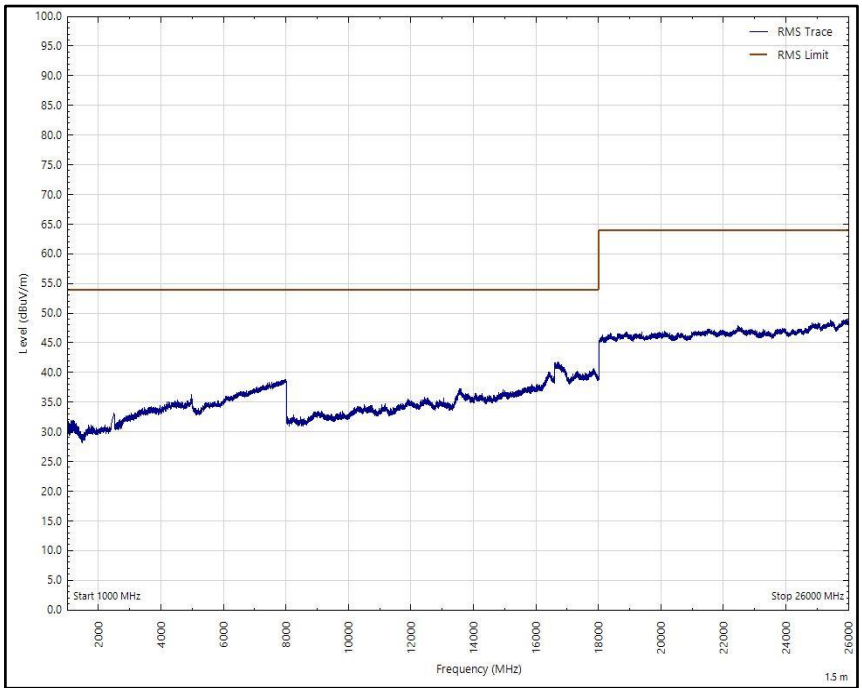

Figure 237 - 2480 MHz (CH39), LE1M, ePA, Core 1, 1 GHz to 26 GHz, Horizontal (rms)

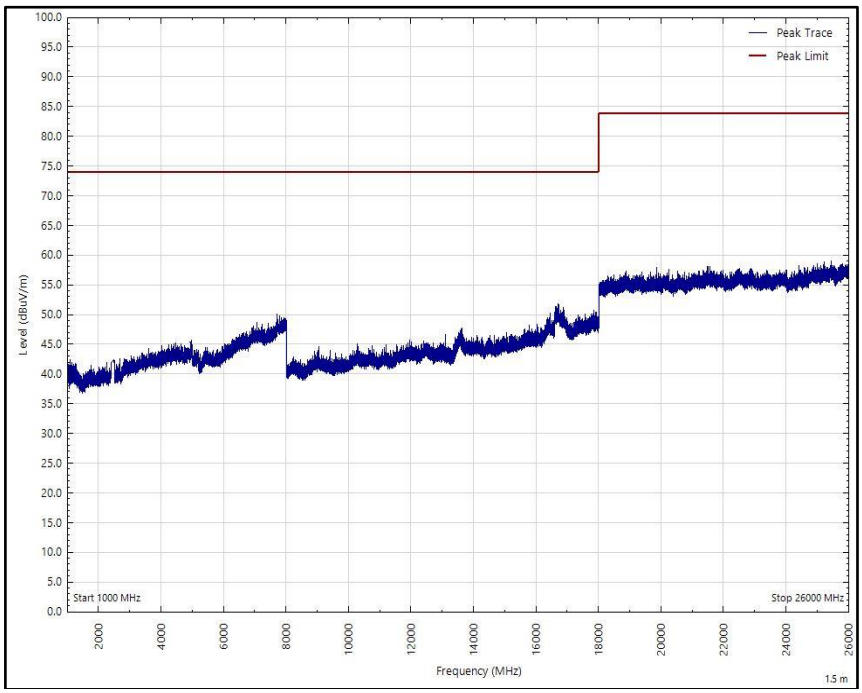

Figure 238 - 2480 MHz (CH39), LE1M, ePA, Core 1, 1 GHz to 26 GHz, Vertical (Peak)

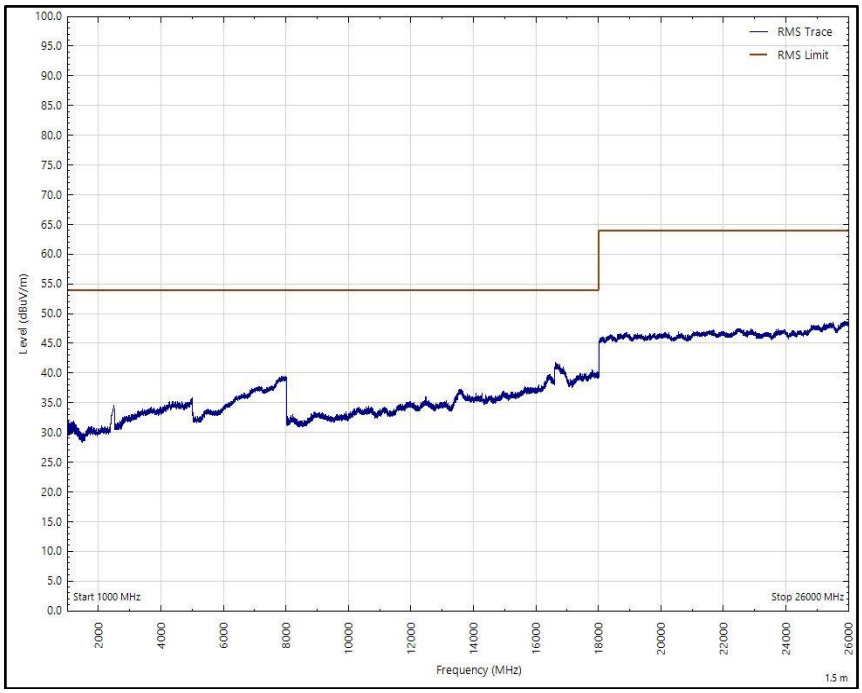

Figure 239 - 2480 MHz (CH39), LE1M, ePA, Core 1, 1 GHz to 26 GHz, Vertical (rms)

FCC 47 CFR Part 15, Limit Clause 15.247 (d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in 15.209(a)

ISED RSS-247, Limit Clause 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

2.5.8 Test Location and Test Equipment Used

This test was carried out in RF Chamber 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Power Supply Unit	Farnell	LB30-4	158	-	O/P Mon
Antenna 18-40GHz (Double Ridge Guide)	Q-Par Angus Ltd	QSH 180K	1511	24	02-Oct-2021
18GHz - 40GHz Pre-Amplifier	Phase One	PSO4-0087	1534	12	18-Feb-2021
Antenna with permanent attenuator (Bilog)	Schaffner	CBL6143	2904	24	28-Nov-2021
Multimeter	Iso-tech	IDM101	2419	12	28-Nov-2021
8 - 18 GHz pre amp	Wright Technologies	PS06-0061/PS06-0060	4971	6	05-Nov-2020
Band Reject Filter - 2.425 GHz	Wainwright	WRCGV14-2390-2400-2450-2460-50SS	5066	12	01-Oct-2020
Band Reject Filter - 2.4585 GHz	Wainwright	WRCGV14-2423.5-2433.5-2483.5-2493.5-50SS	5068	12	01-Oct-2020
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	28-Nov-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5102	12	06-Oct-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5103	12	06-Oct-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5104	12	09-Dec-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5105	12	06-Oct-2020
EmX Emissions Software	TUV SUD	EmX	5125	-	Software
Screened Room (11)	Rainford	Rainford	5136	36	01-Nov-2021
Mast	Maturo	TAM 4.0-P	5158	-	TU
Mast and Turntable Controller	Maturo	Maturo NCD	5159	-	TU
Turntable	Maturo	TT 15WF	5160	-	TU
Horn Antenna (1-10GHz)	Schwarzbeck	BBHA 9120 B	5215	12	10-Mar-2021
DRG Horn Antenna (7.5-18GHz)	Schwarzbeck	HWRD750	5216	12	10-Mar-2021
3 GHz High pass filter	Wainwright	WHKX12-2580-3000-18000-80SS	5220	12	25-Mar-2021
Pre Amp 1 - 26.5 GHz	Agilent Technologies	8449B	5445	12	06-May-2021
8m N Type Cable	Junkosha	MWX221-08000NMSNMS/B	5522	12	24-Mar-2021
2m K Type Cable	Junkosha	MWX241-02000KMSKMS/A	5524	12	03-Apr-2021
1200 MHz Low Pass Filter (02)	Mini-Circuits	VLF-1200+	5560	12	23-May-2021

Table 139

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment

2.6 Power Spectral Density

2.6.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (e)
ISED RSS-247, Clause 5.2
ISED RSS-GEN, Clause 6.12

2.6.2 Equipment Under Test and Modification State

A2348, S/N: C07D100D02DH - Modification State 0

2.6.3 Date of Test

30-September-2020

2.6.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 11.10.5

MIMO output port summing was performed in accordance with KDB 662911 D01, E)2)a.

2.6.5 Environmental Conditions

Ambient Temperature	22.4 °C
Relative Humidity	48.7 %

2.6.6 Test Results

2.4 GHz Bluetooth Low Energy (DTS)

iPA

Antenna Port Configuration: SISO

Modulation: 8-DPSK (HDR4)

Test Frequency (MHz)	RBW (kHz)	DCCF (dB)	PSD (dBm)	
			Core 0	Core 2
2404	3.0	1.1	-15.4	-16.3
2441	3.0	1.1	-15.8	-16.3
2478	3.0	1.1	-15.5	-16.7

Table 140 - Maximum Power Spectral Density Results

Modulation: 8-DPSK (HDR8)

Test Frequency (MHz)	RBW (kHz)	DCCF (dB)	PSD (dBm)	
			Core 0	Core 2
2404	3.0	1.1	-17.2	-18.0
2441	3.0	1.1	-18.5	-18.0
2478	3.0	1.1	-17.6	-18.4

Table 141 - Maximum Power Spectral Density Results

Modulation: GFSK (LE 1M)

Test Frequency (MHz)	RBW (kHz)	DCCF (dB)	PSD (dBm)	
			Core 0	Core 2
2402	3.0	2.2	-5.3	-5.6
2440	3.0	2.2	-5.5	-5.9
2480	3.0	2.2	-4.7	-5.5

Table 142 - Maximum Power Spectral Density Results

Modulation: GFSK (LE 2M)

Test Frequency (MHz)	RBW (kHz)	DCCF (dB)	PSD (dBm)	
			Core 0	Core 2
2402	3.0	5.0	-6.2	-6.2
2440	3.0	5.0	-5.6	-6.7
2480	3.0	5.0	-5.4	-5.7

Table 143 - Maximum Power Spectral Density Results

Antenna Port Configuration: Beamforming

Modulation: 8-DPSK (HDR4)

Test Frequency (MHz)	RBW (kHz)	DCCF (dB)	PSD (dBm)		
			Core 0	Core 1	∑
2404	3.0	1.1	-28.7	-16.3	-16.0
2441	3.0	1.1	-16.0	-14.7	-12.3
2478	3.0	1.1	-20.9	-15.3	-14.3

Table 144 - Maximum Power Spectral Density Results

Modulation: 8-DPSK (HDR8)

Test Frequency (MHz)	RBW (kHz)	DCCF (dB)	PSD (dBm)		
			Core 0	Core 1	∑
2404	3.0	1.1	-20.2	-18.4	-16.2
2441	3.0	1.1	-16.6	-17.4	-14.0
2478	3.0	1.1	-16.4	-17.6	-13.9

Table 145 - Maximum Power Spectral Density Results

Modulation: GFSK (LE 1M)

Test Frequency (MHz)	RBW (kHz)	DCCF (dB)	PSD (dBm)		
			Core 0	Core 1	∑
2402	3.0	2.2	-5.1	-4.3	-1.7
2440	3.0	2.2	-5.1	-4.9	-2.0
2480	3.0	2.2	-5.0	-5.2	-2.1

Table 146 - Maximum Power Spectral Density Results

Modulation: GFSK (LE 2M)

Test Frequency (MHz)	RBW (kHz)	DCCF (dB)	PSD (dBm)		
			Core 0	Core 1	∑
2402	3.0	5.0	-5.7	-5.7	-2.7
2440	3.0	5.0	-5.2	-5.6	-2.4
2480	3.0	5.0	-5.2	-5.5	-2.3

Table 147 - Maximum Power Spectral Density Results

ePA

Antenna Port Configuration: SISO

Modulation: 8-DPSK (HDR4)

Test Frequency (MHz)	RBW (kHz)	DCCF (dB)	PSD (dBm)
			Core 0
2404	3.0	1.1	-8.5
2441	3.0	1.1	-8.8
2478	3.0	1.1	-9.5

Table 148 - Maximum Power Spectral Density Results

Modulation: 8-DPSK (HDR8)

Test Frequency (MHz)	RBW (kHz)	DCCF (dB)	PSD (dBm)
			Core 0
2404	3.0	1.1	-11.0
2441	3.0	1.1	-11.2
2478	3.0	1.1	-11.1

Table 149 - Maximum Power Spectral Density Results

Modulation: GFSK (LE 1M)

Test Frequency (MHz)	RBW (kHz)	DCCF (dB)	PSD (dBm)
			Core 0
2402	3.0	2.2	2.5
2440	3.0	2.2	2.1
2480	3.0	2.2	2.2

Table 150 - Maximum Power Spectral Density Results

Modulation: GFSK (LE 2M)

Test Frequency (MHz)	RBW (kHz)	DCCF (dB)	PSD (dBm)
			Core 0
2402	3.0	5.0	2.0
2440	3.0	5.0	1.4
2480	3.0	5.0	2.5

Table 151 - Maximum Power Spectral Density Results

Antenna Port Configuration: Beamforming

Modulation: 8-DPSK (HDR4)

Test Frequency (MHz)	RBW (kHz)	DCCF (dB)	PSD (dBm)		
			Core 0	Core 1	∑
2404	3.0	1.1	-9.4	-7.3	-5.2
2441	3.0	1.1	-15.2	-6.3	-5.8
2478	3.0	1.1	-20.8	-15.4	-14.3

Table 152 - Maximum Power Spectral Density Results

Modulation: 8-DPSK (HDR8)

Test Frequency (MHz)	RBW (kHz)	DCCF (dB)	PSD (dBm)		
			Core 0	Core 1	∑
2404	3.0	1.1	-17.8	-10.0	-9.3
2441	3.0	1.1	-20.6	-9.5	-9.2
2478	3.0	1.1	-17.1	-10.1	-9.3

Table 153 - Maximum Power Spectral Density Results

Modulation: GFSK (LE 1M)

Test Frequency (MHz)	RBW (kHz)	DCCF (dB)	PSD (dBm)		
			Core 0	Core 1	∑
2402	3.0	2.2	-3.8	-3.4	-0.6
2440	3.0	2.2	-3.7	-3.4	-0.5
2480	3.0	2.2	-3.7	-3.9	-0.8

Table 154 - Maximum Power Spectral Density Results

Modulation: GFSK (LE 2M)

Test Frequency (MHz)	RBW (kHz)	DCCF (dB)	PSD (dBm)		
			Core 0	Core 1	∑
2402	3.0	5.0	-4.2	-4.1	-1.2
2440	3.0	5.0	-4.5	-4.7	-1.6
2480	3.0	5.0	-4.5	-4.1	-1.3

Table 155 - Maximum Power Spectral Density Results

FCC 47 CFR Part 15, Limit Clause 15.247 (e)

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

ISED RSS-247, Limit Clause 5.2(b)

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission

2.6.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 1.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	08-Nov-2020
Multimeter	Iso-tech	IDM101	2424	12	12-Dec-2020
Hygrometer	Rotronic	A1	2760	12	02-Jan-2021
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	08-Nov-2020
AC Programmable Power Supply	iTech	IT7324	5225	-	O/P Mon
MXA Signal Analyser	Keysight Technologies	N9020B	5528	24	04-Mar-2022
Signal Commissioning Unit	TUV SUD	SCU001	5546	12	15-Apr-2021

Table 156

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment

3 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty
Emission Bandwidth	± 44.732 kHz
Maximum Conducted Output Power	± 3.2 dB
Authorised Band Edges	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB
Restricted Band Edges	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB
Power Spectral Density	± 3.2 dB
Spurious Radiated Emissions	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB

Table 157

Measurement Uncertainty Decision Rule

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2007, clause 4.4.3 and 4.5.1.