

2.4 GHz Bluetooth - BR/EDR (Dedicated Core 2)

Frequency (MHz)	20 dB Bandwidth (kHz)		
	GFSK	$\pi/4$ DQPSK	8-DPSK
2402	942.2	1350	1303
2441	940.5	1351	1303
2480	937.6	1350	1304

Table 17



Figure 48 - 2402 MHz - GFSK

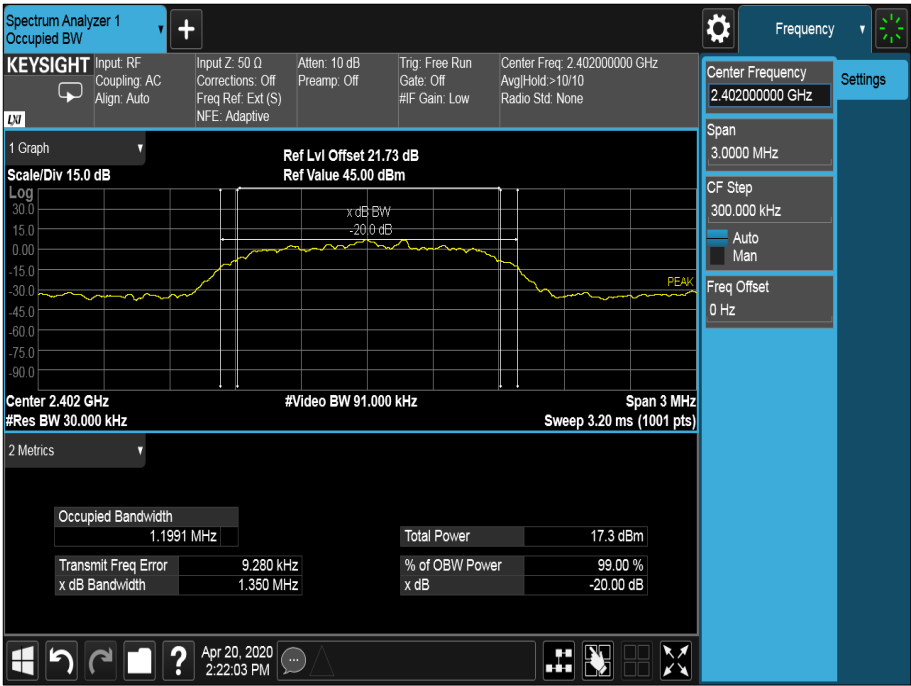


Figure 49 - 2402 MHz - $\pi/4$ DQPSK

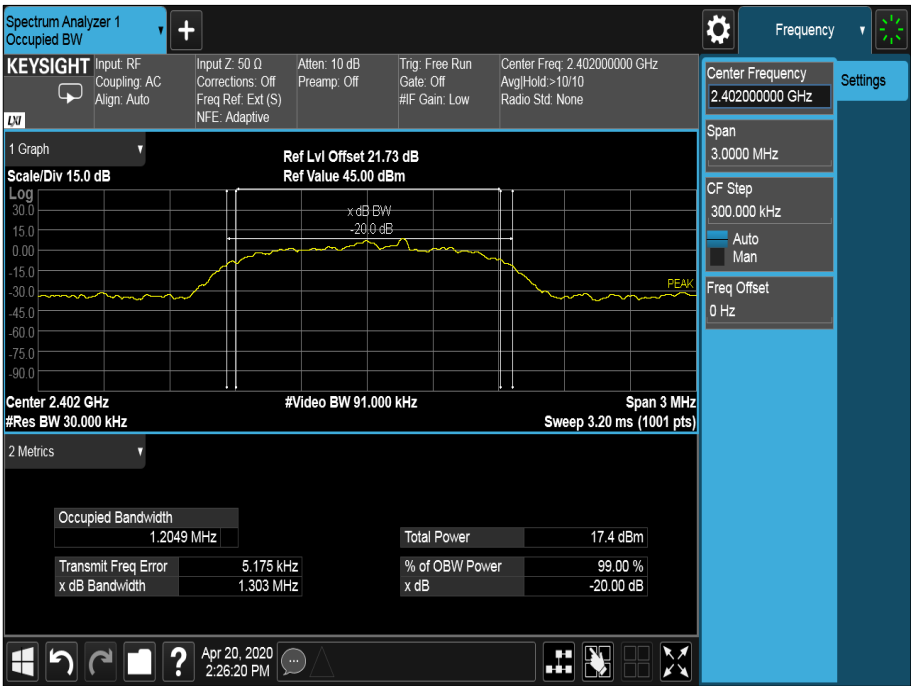


Figure 50 - 2402 MHz - 8-DPSK



Figure 51 - 2441 MHz - GFSK

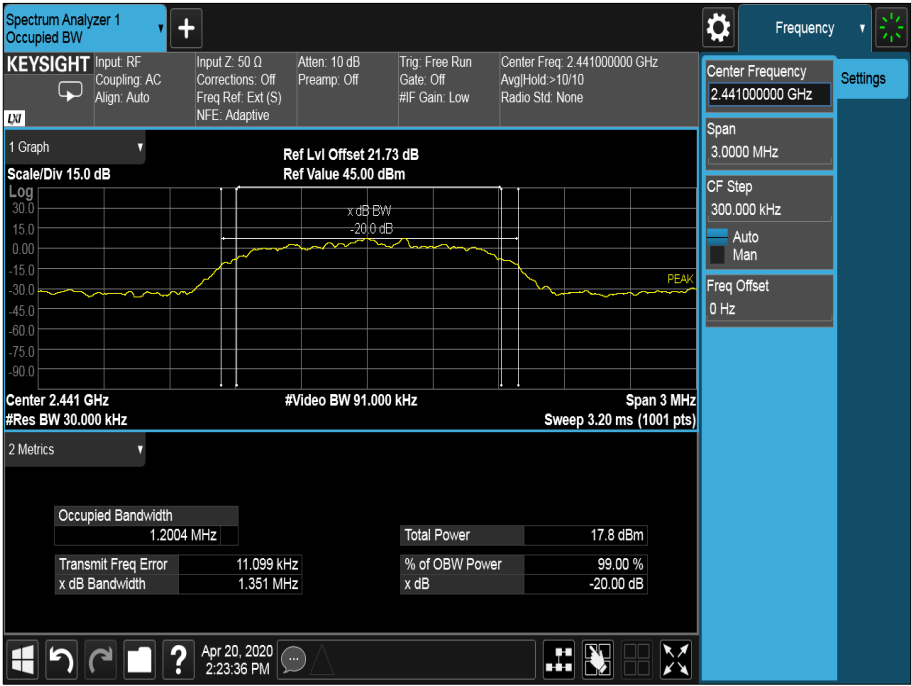


Figure 52 - 2441 MHz - $\pi/4$ DQPSK

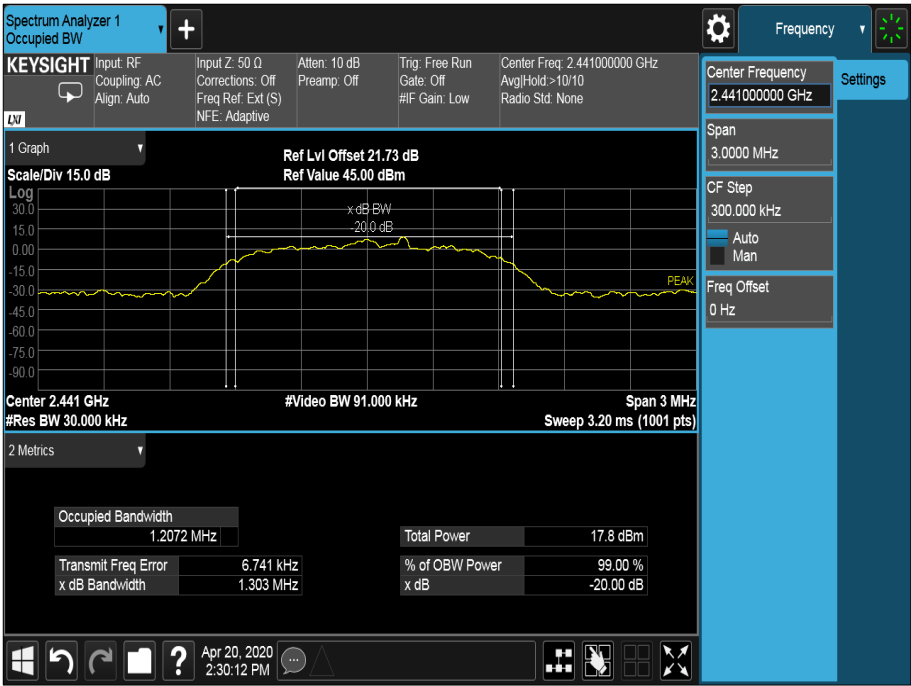


Figure 53 - 2441 MHz - 8-DPSK



Figure 54 - 2480 MHz - GFSK

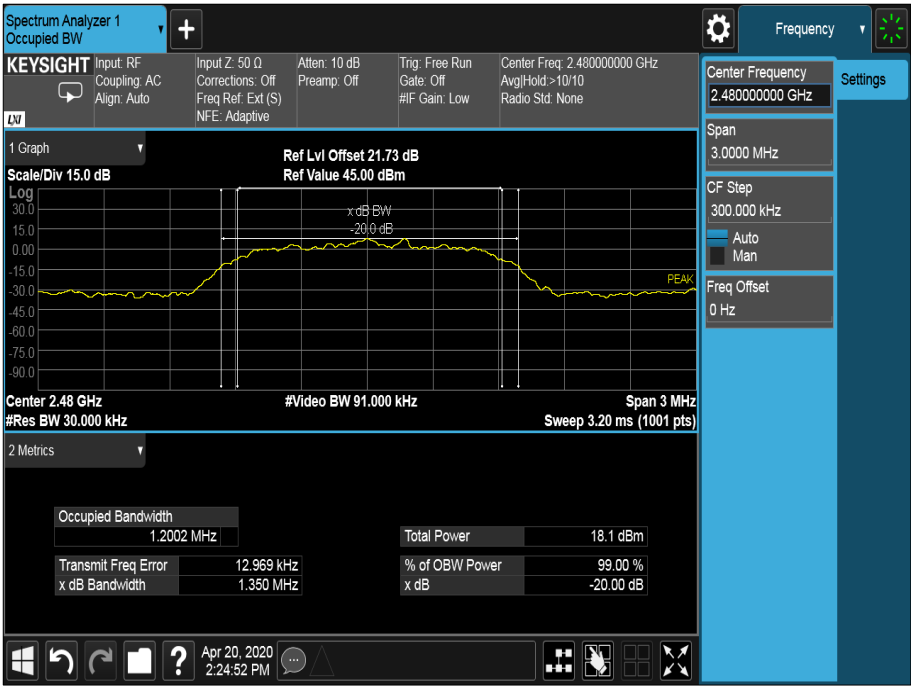


Figure 55 - 2480 MHz - $\pi/4$ DQPSK

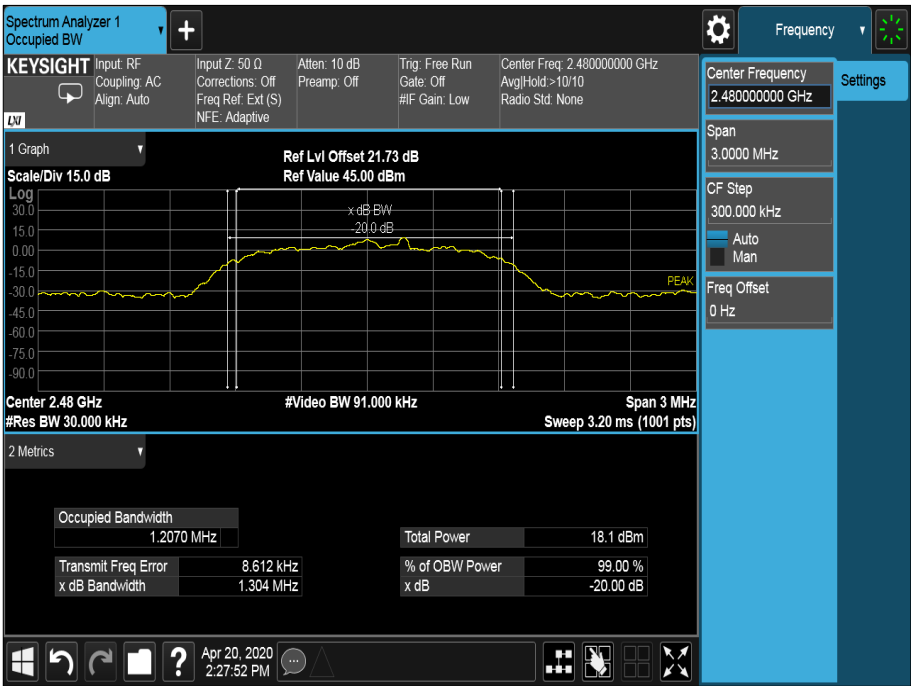


Figure 56 - 2480 MHz - 8-DPSK

FCC 47 CFR Part 15 and ISSED RSS-247 Limit Clause

None specified.



2.5.7 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
Multimeter	Iso-tech	IDM101	2424	12	12-Dec-2020
Hygrometer	Rotronic	I-1000	3220	12	25-Sep-2020
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	11-Dec-2020
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	28-Nov-2020
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	05-May-2020
EXA	Keysight Technologies	N9010B	4969	24	03-Feb-2022
AC Programmable Power Supply	iTech	IT7324	5227	-	O/P Mon
3.5 mm 2m Cable	Junkosha	MWX221-02000DMS	5424	6	13-Jun-2020
20 dB Attenuator	Sealectro	60-674 102089	N/S	-	O/P Mon

Table 18

O/P Mon – Output Monitored using calibrated equipment



2.6 Authorised Band Edges

2.6.1 Specification Reference

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

2.6.2 Equipment Under Test and Modification State

A2330, S/N: C07CF029PW92 - Modification State 0

2.6.3 Date of Test

11-April-2020 to 12-April-2020

2.6.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 6.10.4.

2.6.5 Environmental Conditions

Ambient Temperature 18.7 - 21.2 °C
Relative Humidity 35.4 - 41.2 %

2.6.6 Test Results

2.4 GHz Bluetooth - BR/EDR (Core 0)

Mode	Modulation	Packet Type	Core	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
Static	GFSK	DH5	Core 0	2402	2400.0	57.73
Static	$\pi/4$ DQPSK	2DH5	Core 0	2402	2400.0	51.96
Static	8-DPSK	3DH5	Core 0	2402	2400.0	51.44
Hopping	GFSK	DH5	Core 0	2402	2400.0	60.43
Hopping	$\pi/4$ DQPSK	2DH5	Core 0	2402	2400.0	54.85
Hopping	8-DPSK	3DH5	Core 0	2402	2400.0	54.35

Table 19 - Authorised Band Edge Results

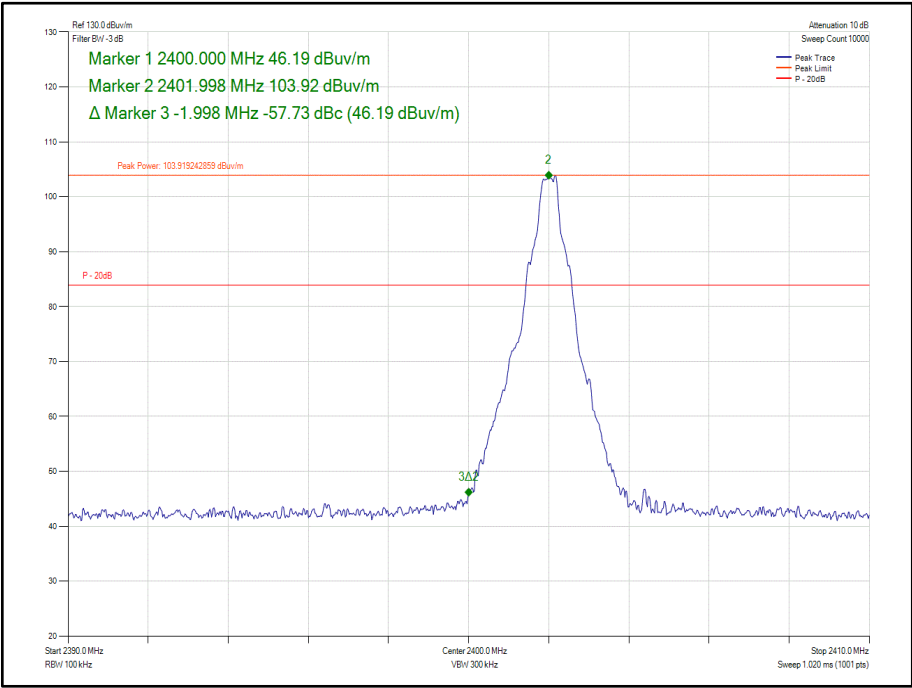


Figure 57 - Static – GFSK, DH5, Core 0 - 2402 MHz - Band Edge Frequency 2400.0 MHz

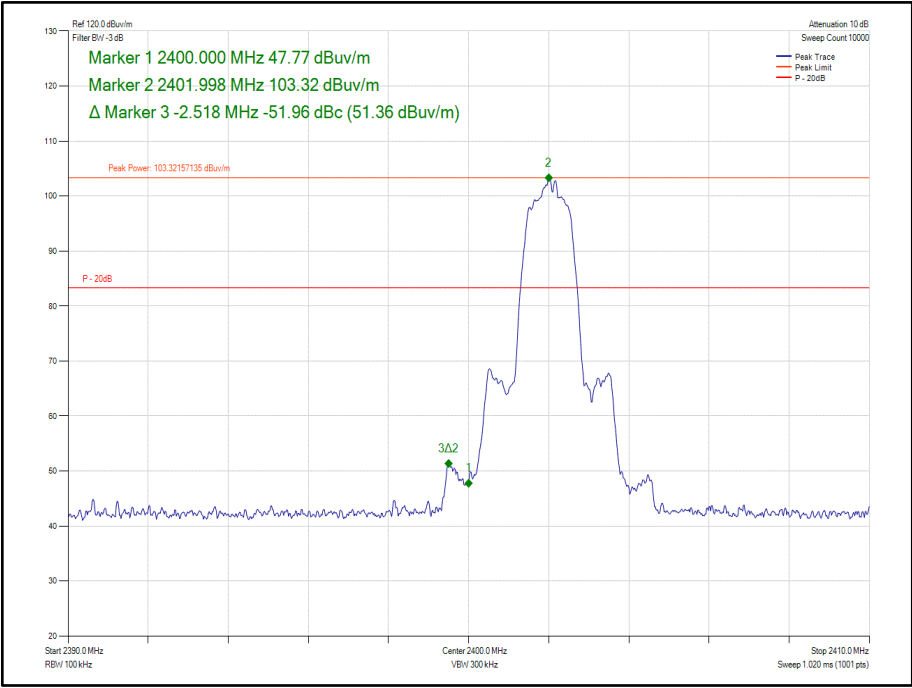


Figure 58 - Static - $\pi/4$ DQPSK, 2DH5, Core 0 - 2402 MHz - Band Edge Frequency 2400.0 MHz

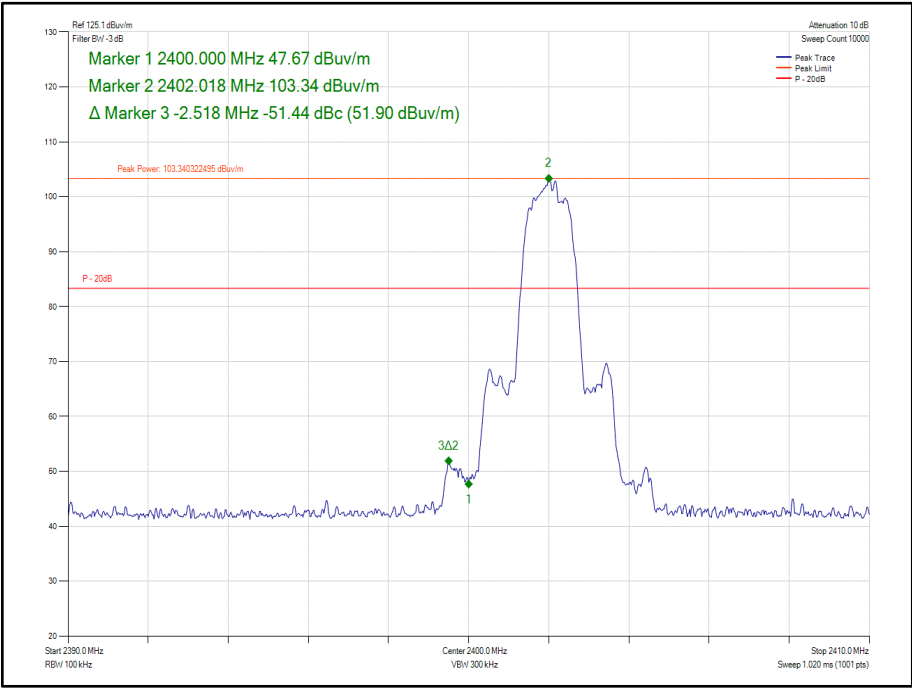


Figure 59 - Static – 8-DPSK, 3DH5, Core 0 - 2402 MHz - Band Edge Frequency 2400.0 MHz

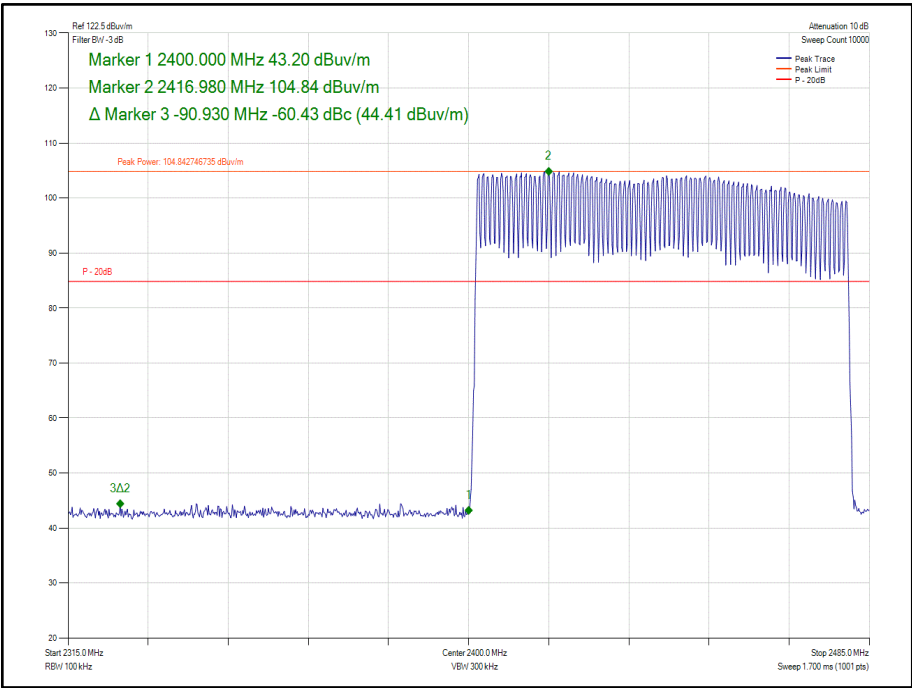


Figure 60 - Hopping – GFSK, DH5, Core 0 - Band Edge Frequency 2400.0 MHz

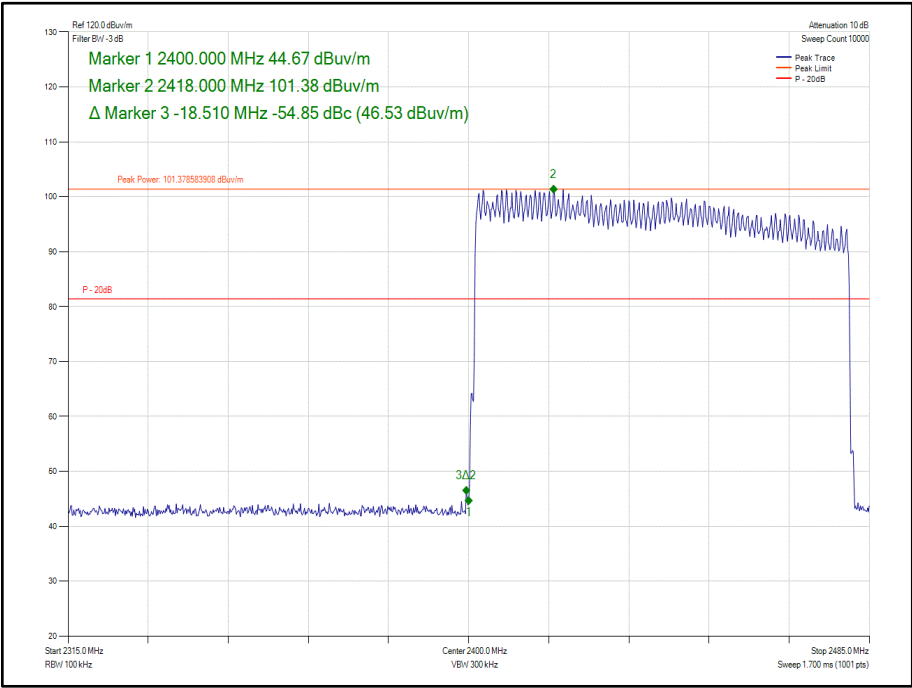


Figure 61 - Hopping - $\pi/4$ DQPSK, 2DH5, Core 0 - Band Edge Frequency 2400.0 MHz

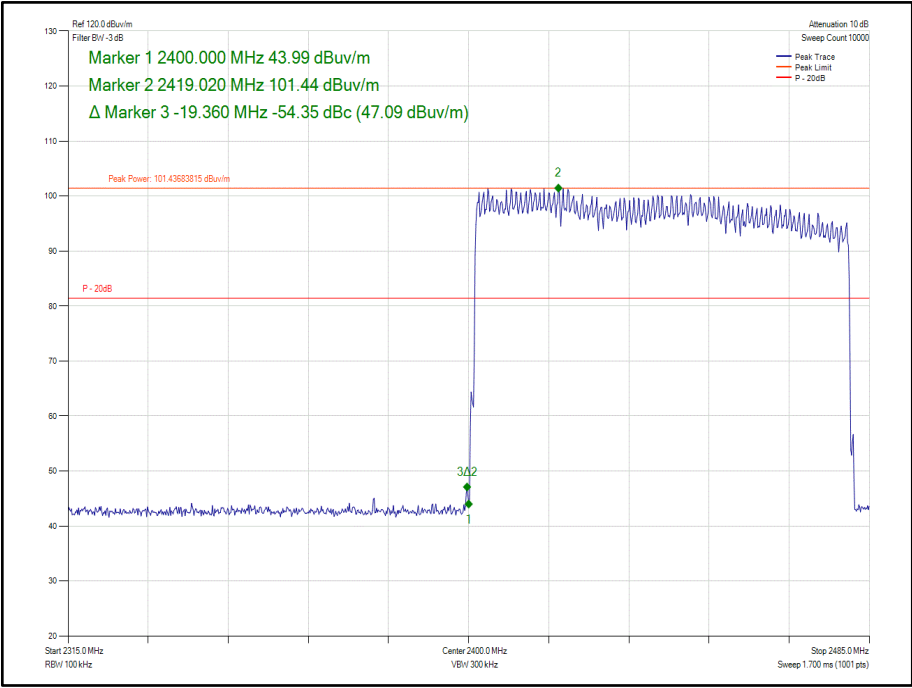


Figure 62 - Hopping - 8-DPSK, 3DH5, Core 0 - Band Edge Frequency 2400.0 MHz

2.4 GHz Bluetooth - BR/EDR (Dedicated Core 2)

Mode	Modulation	Packet Type	Core	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
Static	GFSK	DH5	Core 2	2402	2400.0	61.71
Static	$\pi/4$ DQPSK	2DH5	Core 2	2402	2400.0	51.01
Static	8-DPSK	3DH5	Core 2	2402	2400.0	51.27
Hopping	GFSK	DH5	Core 2	2402	2400.0	64.67
Hopping	$\pi/4$ DQPSK	2DH5	Core 2	2402	2400.0	57.65
Hopping	8-DPSK	3DH5	Core 2	2402	2400.0	57.09

Table 20 - Authorised Band Edge Results

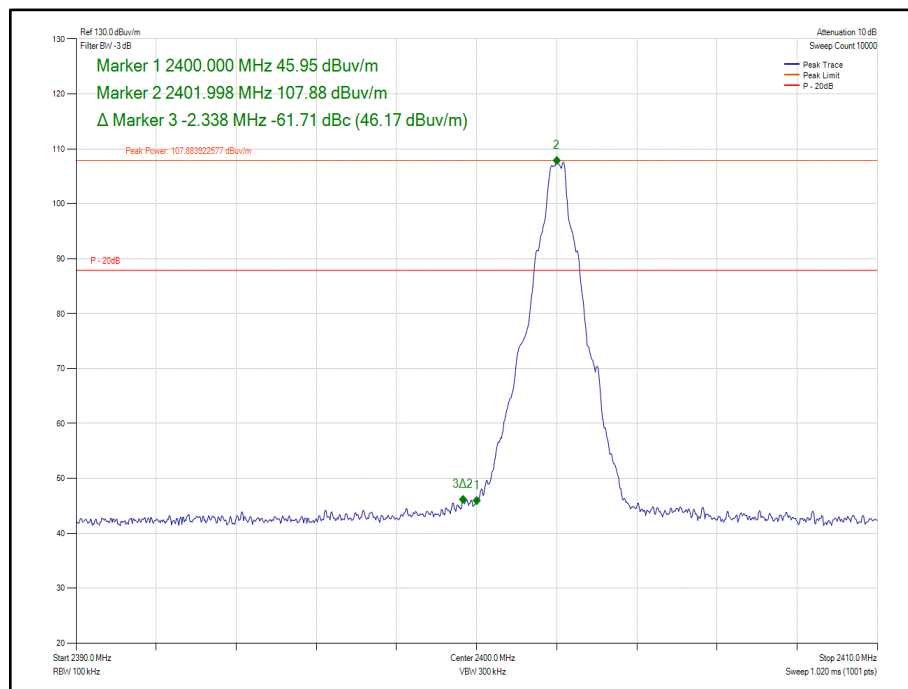


Figure 63 - Static – GFSK, DH5, Core 2 - 2402 MHz - Band Edge Frequency 2400.0 MHz

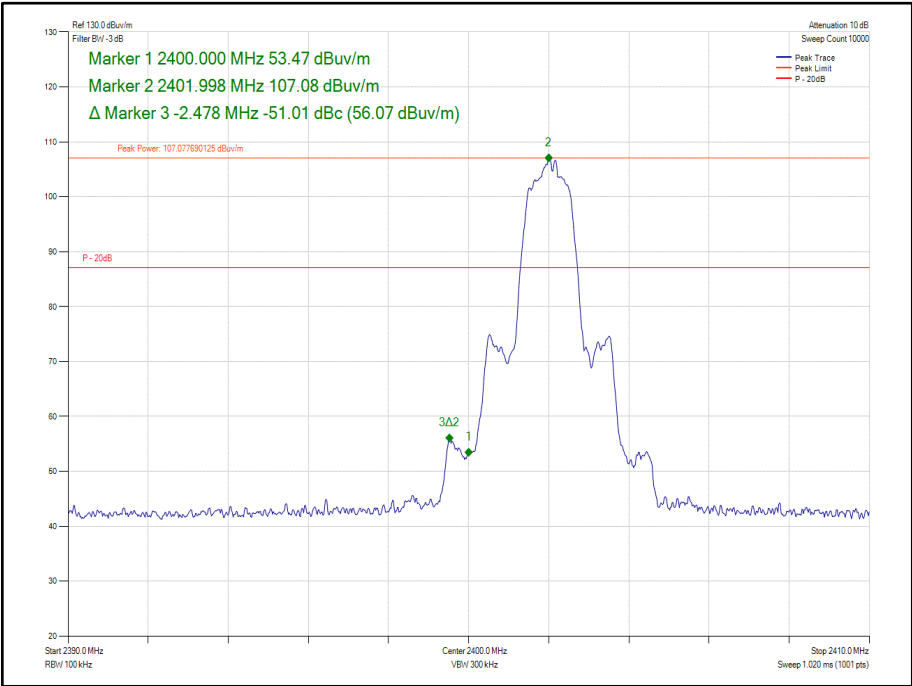


Figure 64 - Static - $\pi/4$ DQPSK, 2DH5, Core 2 - 2402 MHz - Band Edge Frequency 2400.0 MHz

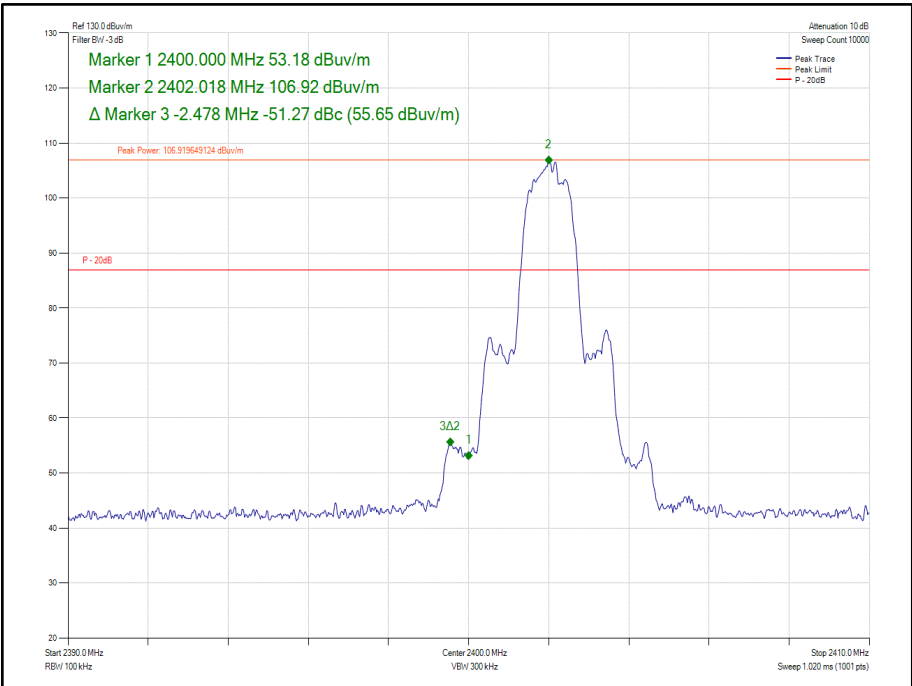
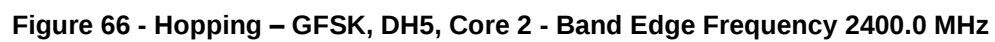


Figure 65 - Static - 8-DPSK, 3DH5, Core 2 - 2402 MHz - Band Edge Frequency 2400.0 MHz



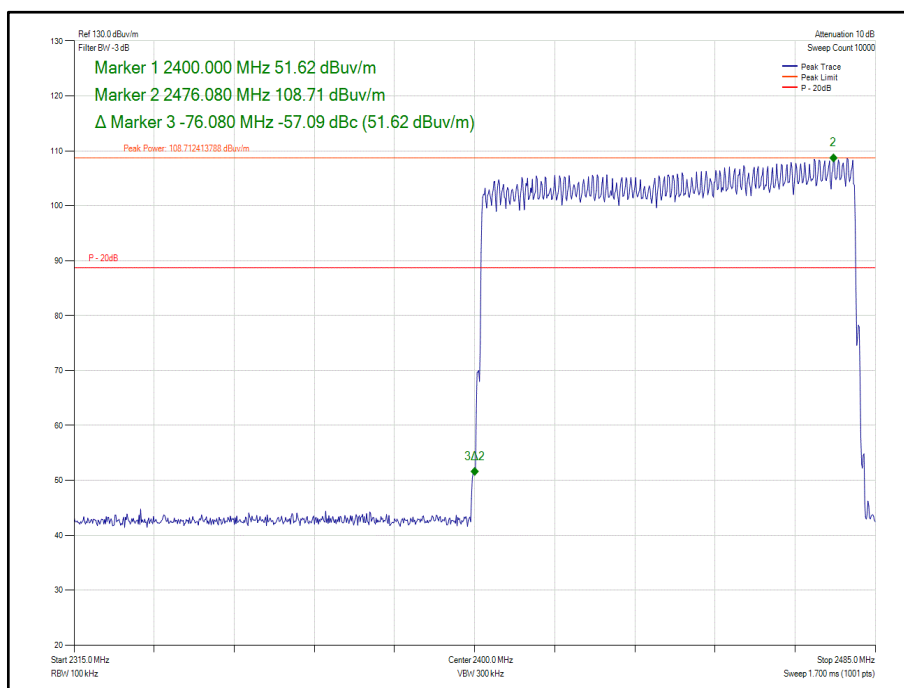


Figure 68 - Hopping - 8-DPSK, 3DH5, Core 2 - Band Edge Frequency 2400.0 MHz

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

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

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.



2.6.7 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
DC - 12.4 GHz 10 dB Attenuator	Suhner	6810.17.A	3965	12	07-Aug-2020
Cable (Yellow, Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4527	6	09-Jun-2020
Hygrometer	Rotronic	HP21	4989	12	02-May-2020
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	28-Nov-2020
8m N-Type RF Cable	Teledyne	PR90-088-8MTR	5092	12	06-Dec-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5102	12	06-Oct-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5104	12	09-Dec-2020
Cable (18 GHz)	Rosenberger	LU7-071-2000	5107	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
Pre Amp 1 - 26.5 GHz	Agilent Technologies	8449B	5445	-	O/P Mon

Table 21

TU - Traceability Unscheduled
O/P Mon – Output Monitored



2.7 Restricted Band Edges

2.7.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.205
ISED RSS-GEN, Clause 8.10

2.7.2 Equipment Under Test and Modification State

A2330, S/N: C07CF029PW92 - Modification State 0

2.7.3 Date of Test

11-April-2020 to 12-April-2020

2.7.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 6.10.5.

Plots for average measurements were taken in accordance with ANSI C63.10 clause 4.1.4.2.5. These are shown for information purposes and were used to determine the worst case measurement point. Final average measurements were then taken in accordance with ANSI C63.10 clause 4.1.4.2.2. to obtain the measurement result recorded in the test results tables.

The following conversion can be applied to convert from dBμV/m to μV/m:
 $10^{(\text{Field Strength in dB}\mu\text{V/m}/20)}$

2.7.5 Environmental Conditions

Ambient Temperature 18.7 - 21.2 °C
Relative Humidity 35.4 - 41.2 %

2.7.6 Test Results

2.4 GHz Bluetooth - BR/EDR (Core 0)

Mode	Modulation	Packet Type	Core	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
Static	GFSK	DH5	Core 0	2402	2390.0	54.04	39.54
Static	π/4 DQPSK	2DH5	Core 0	2402	2390.0	54.02	39.59
Static	8-DPSK	3DH5	Core 0	2402	2390.0	54.13	39.60
Static	GFSK	DH5	Core 0	2480	2483.5	52.67	40.48
Static	π/4 DQPSK	2DH5	Core 0	2480	2483.5	52.96	40.22
Static	8-DPSK	3DH5	Core 0	2480	2483.5	53.04	40.28

Table 22 - Restricted Band Edge Results

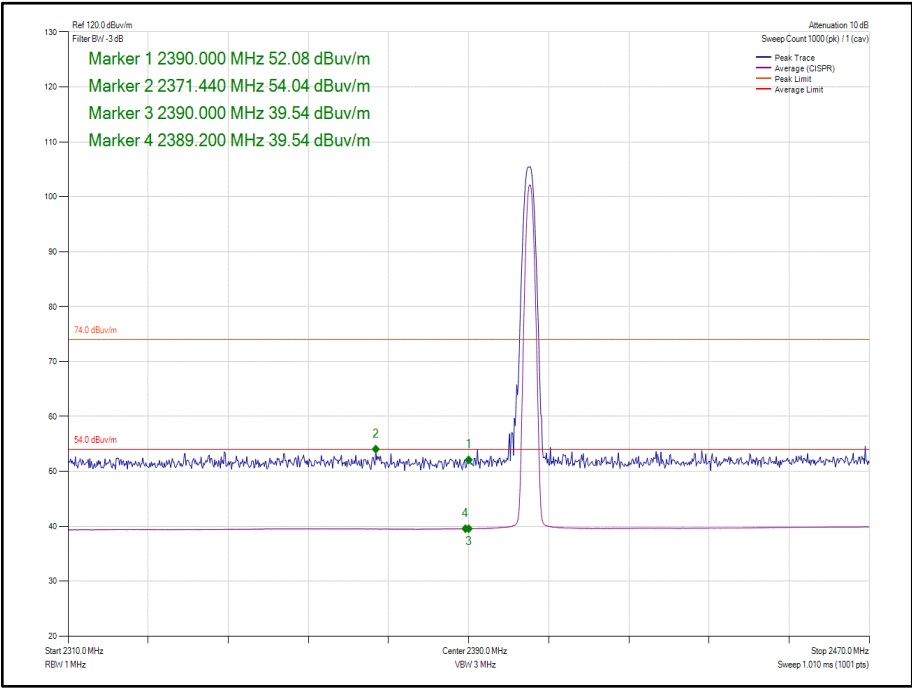


Figure 69 - Static – GFSK, DH5, Core 0 - 2402 MHz - Band Edge Frequency 2390.0 MHz

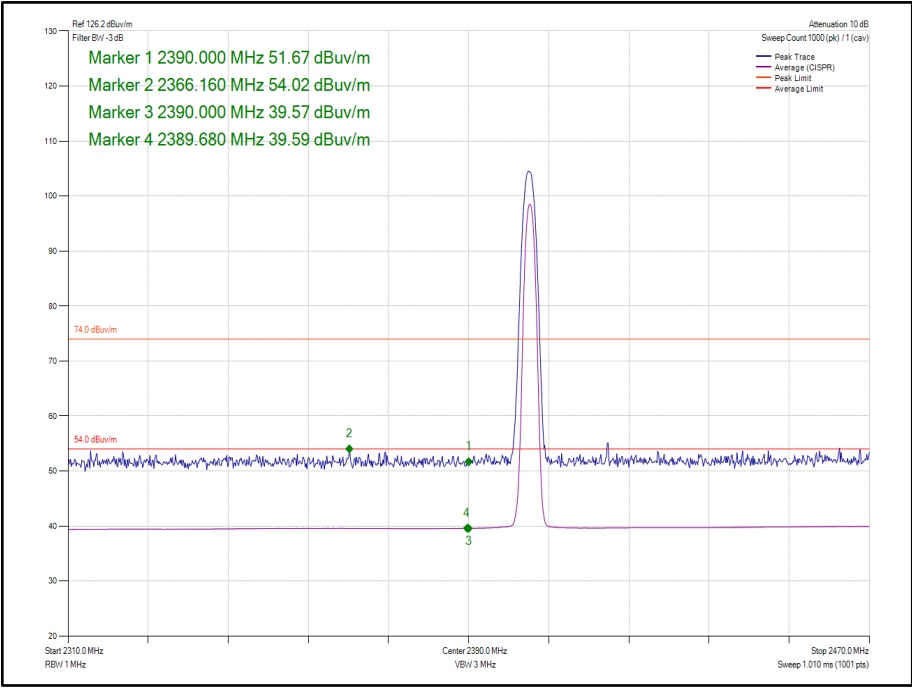


Figure 70 - Static - $\pi/4$ DQPSK, 2DH5, Core 0 - 2402 MHz - Band Edge Frequency 2390.0 MHz

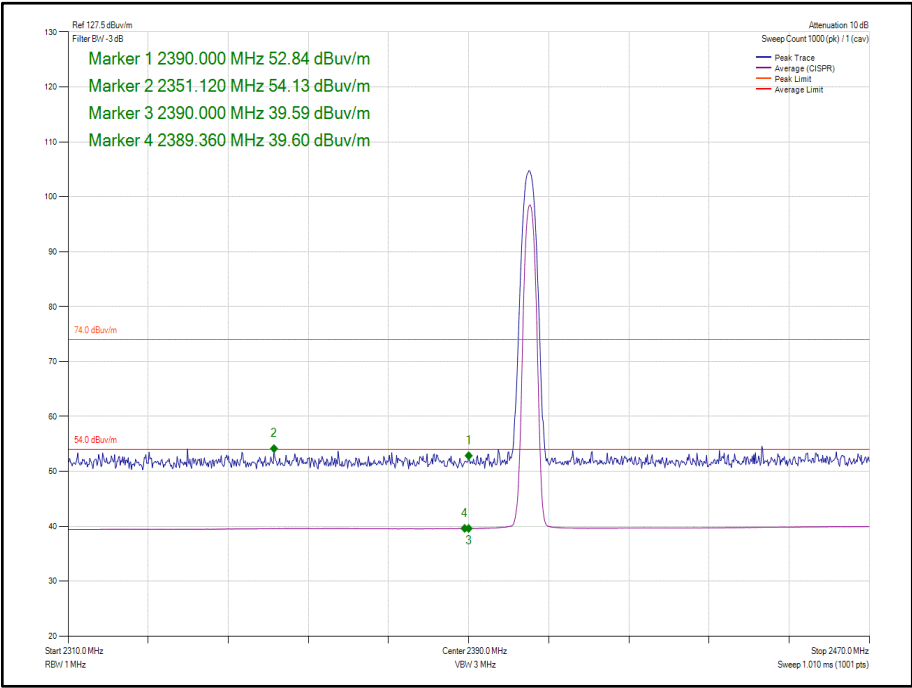


Figure 71 - Static - 8-DPSK, 3DH5, Core 0 - 2402 MHz Band Edge Frequency 2390.0 MHz

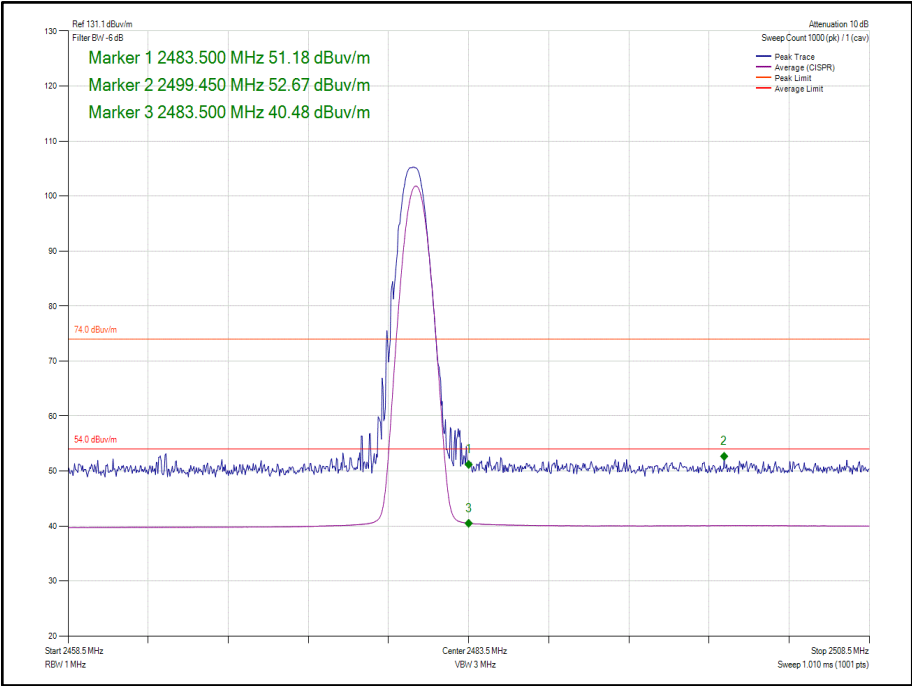


Figure 72 - Static - GFSK, DH5, Core 0 - 2480 MHz - Band Edge Frequency 2483.5 MHz

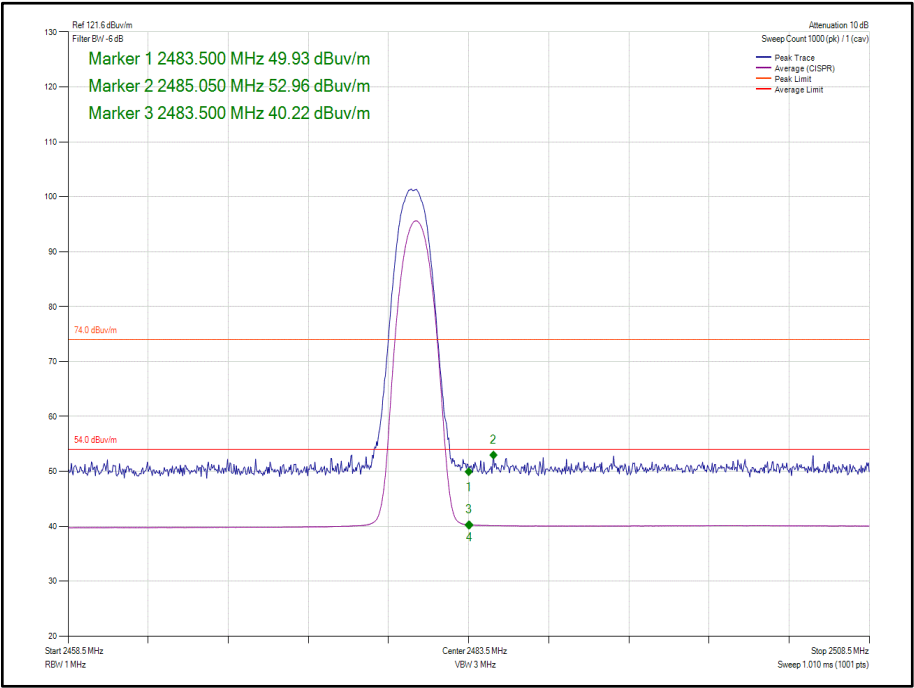


Figure 73 - Static - $\pi/4$ DQPSK, 2DH5, Core 0 - 2480 MHz - Band Edge Frequency 2483.5 MHz

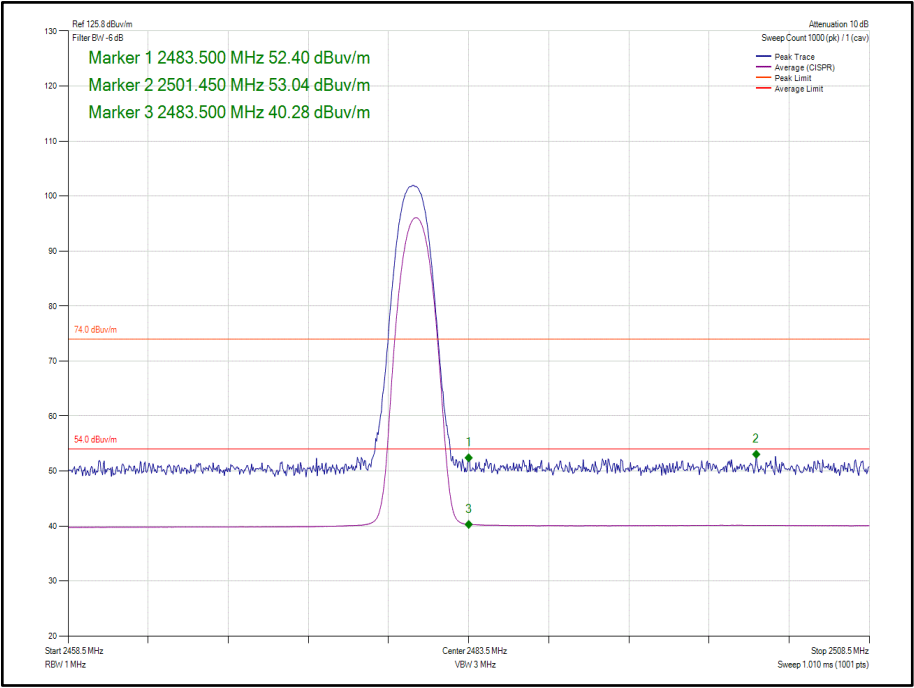


Figure 74 - Static - 8-DPSK, 3DH5, Core 0 - 2480 MHz - Band Edge Frequency 2483.5 MHz

Mode	Modulation	Packet Type	Core	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
Static	GFSK	DH5	Core 2	2402	2390.0	53.96	39.66
Static	$\pi/4$ DQPSK	2DH5	Core 2	2402	2390.0	53.50	39.66
Static	8-DPSK	3DH5	Core 2	2402	2390.0	53.94	39.64
Static	GFSK	DH5	Core 2	2480	2483.5	56.18	41.29
Static	$\pi/4$ DQPSK	2DH5	Core 2	2480	2483.5	55.30	42.42
Static	8-DPSK	3DH5	Core 2	2480	2483.5	53.94	39.64

Table 23 - Restricted Band Edge Results

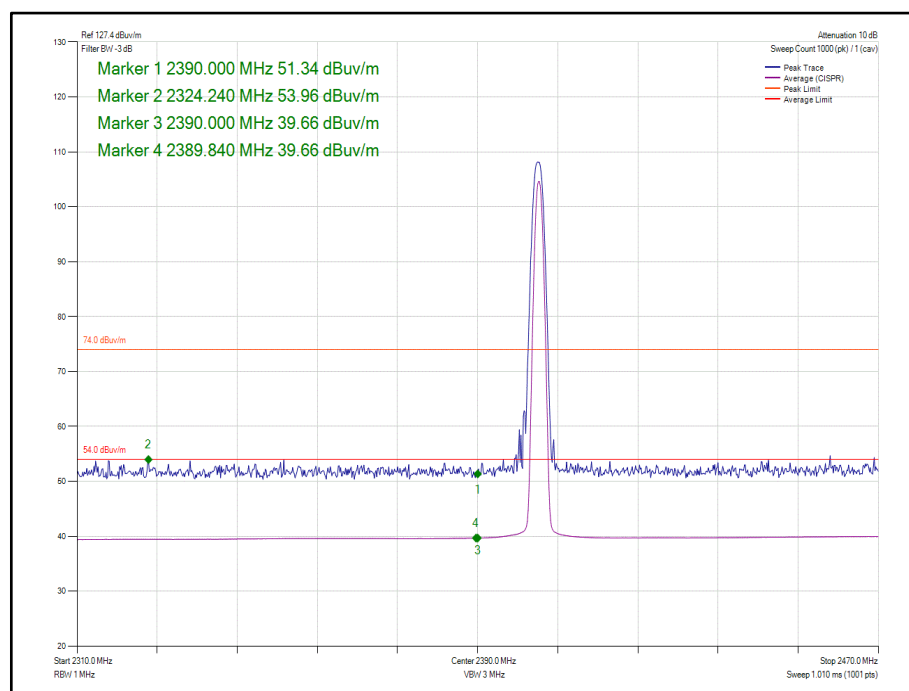


Figure 75 - Static – GFSK, DH5, Core 2 - 2402 MHz - Band Edge Frequency 2390.0 MHz

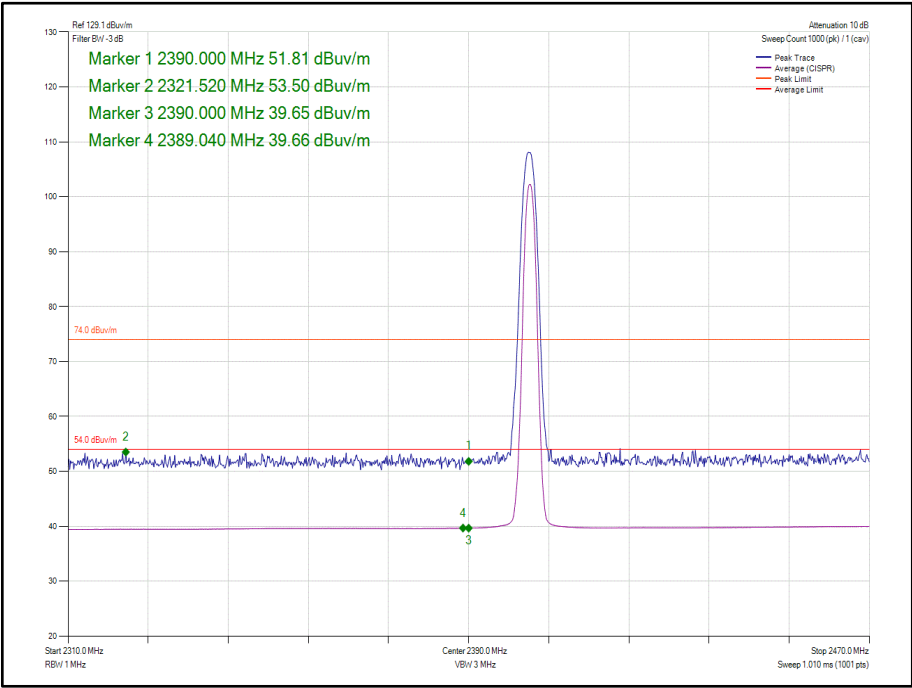


Figure 76 - Static - $\pi/4$ DQPSK, 2DH5, Core 2 - 2402 MHz - Band Edge Frequency 2390.0 MHz

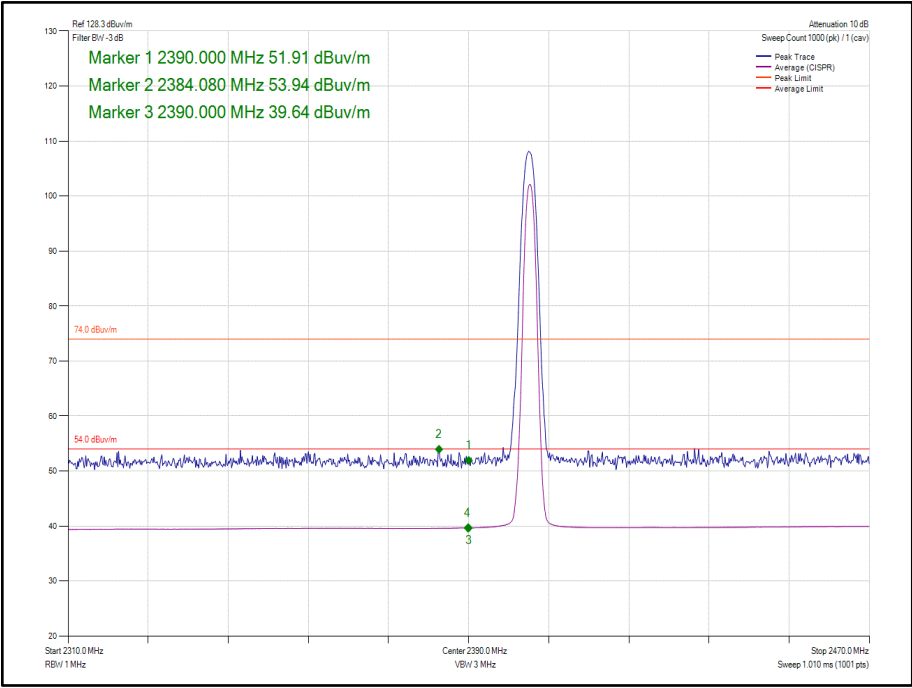


Figure 77 - Static - 8-DPSK, 3DH5, Core 2 - 2402 MHz Band Edge Frequency 2390.0 MHz

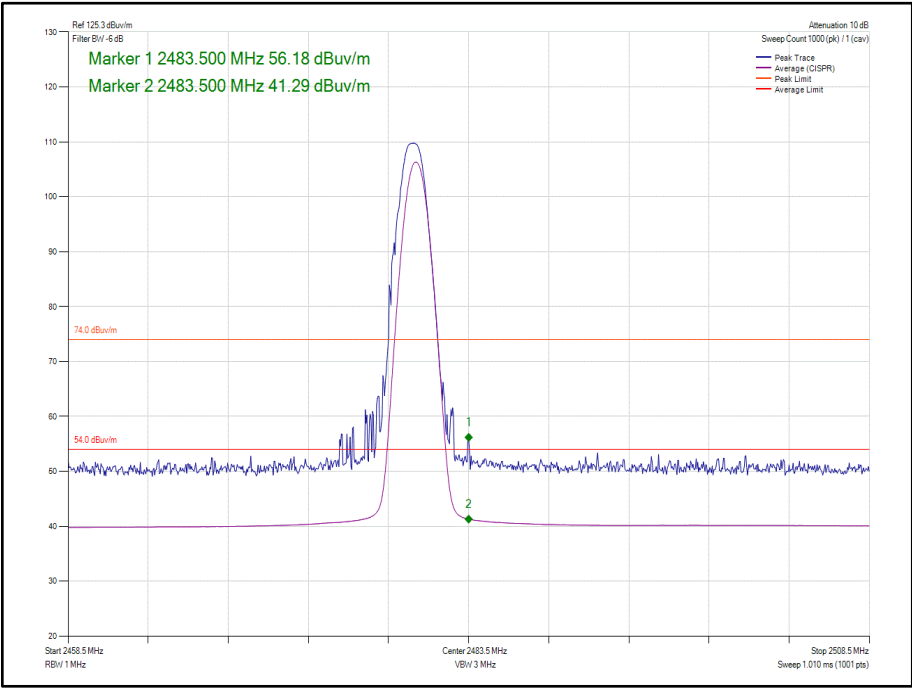


Figure 78 - Static – GFSK, DH5, Core 2 - 2480 MHz - Band Edge Frequency 2483.5 MHz

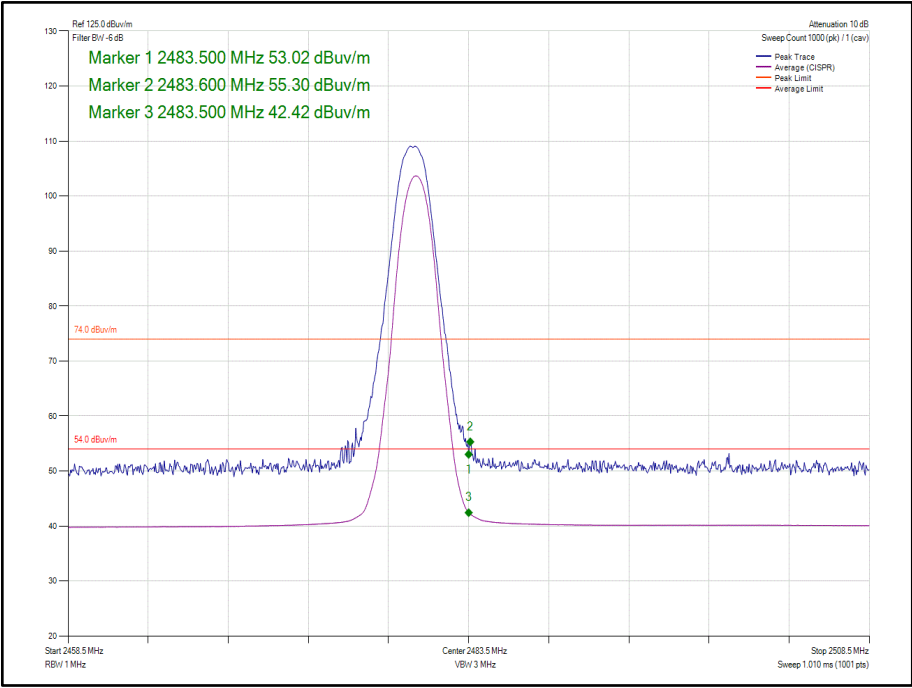


Figure 79 - Static - $\pi/4$ DQPSK, 2DH5, Core 2 - 2480 MHz - Band Edge Frequency 2483.5 MHz

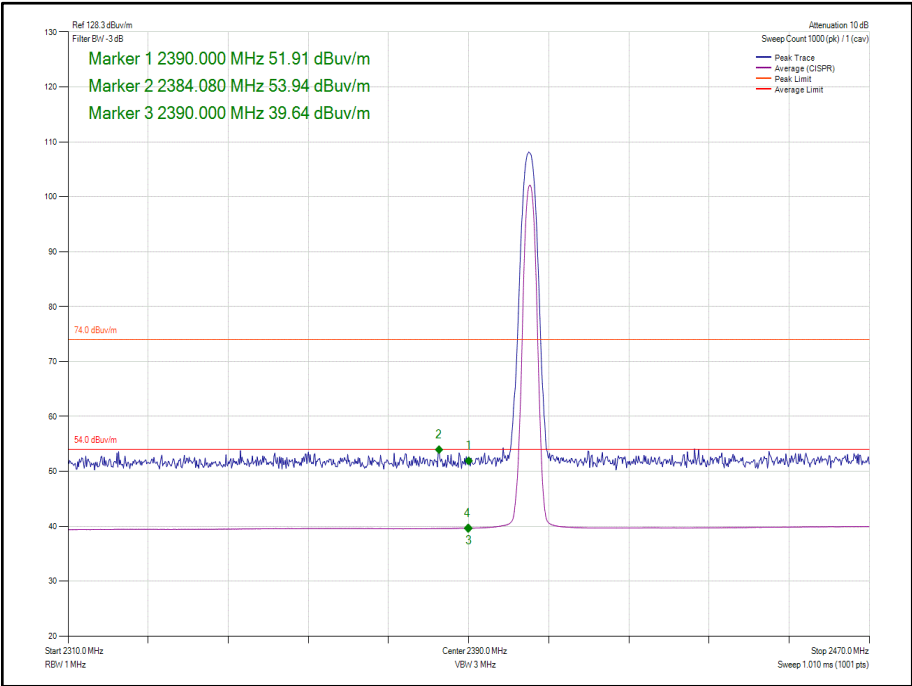


Figure 80 - Static - 8-DPSK, 3DH5, Core 2 - 2480 MHz - Band Edge Frequency 2483.5 MHz

FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength (µV/m at 3 m)
30 to 88	100
88 to 216	150
216 to 960	200
Above 960	500

Table 24

ISED RSS-GEN, Limit Clause 8.9

Frequency (MHz)	Field Strength (µV/m at 3 m)
30 to 88	100
88 to 216	150
216 to 960	200
Above 960*	500

Table 25

*Unless otherwise specified, for all frequencies greater than 1 GHz, the radiated emission limits for licence-exempt radio apparatus stated in applicable RSSs (including RSS-Gen) are based on measurements using a linear average detector function having a minimum resolution bandwidth of 1 MHz. If an average limit is specified for the EUT, then the peak emission shall also be measured with instrumentation properly adjusted for such factors as pulse desensitization to ensure the peak emission is less than 20 dB above the average limit.



2.7.7 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
DC - 12.4 GHz 10 dB Attenuator	Suhner	6810.17.A	3965	12	07-Aug-2020
Cable (Yellow, Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4527	6	09-Jun-2020
Hygrometer	Rotronic	HP21	4989	12	02-May-2020
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	28-Nov-2020
8m N-Type RF Cable	Teledyne	PR90-088-8MTR	5092	12	06-Dec-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5102	12	06-Oct-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5104	12	09-Dec-2020
Cable (18 GHz)	Rosenberger	LU7-071-2000	5107	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
Pre Amp 1 - 26.5 GHz	Agilent Technologies	8449B	5445	-	O/P Mon

Table 26

TU - Traceability Unscheduled
O/P Mon – Output Monitored



2.8 Spurious Radiated Emissions

2.8.1 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

2.8.2 Equipment Under Test and Modification State

A2330, S/N: C07CF029PW92 - Modification State 0
A2330, S/N: C07CG05KPW8V - Modification State 0

2.8.3 Date of Test

18-April-2020 to 06 June-2020

2.8.4 Test Method

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

In the 30 MHz to 1 GHz range pre-scans were only performed on the middle channel (2441 MHz).

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

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.

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

The following conversion can be applied to convert from dBμV/m to μV/m:
 $10^{(\text{Field Strength in dB}\mu\text{V/m}/20)}$

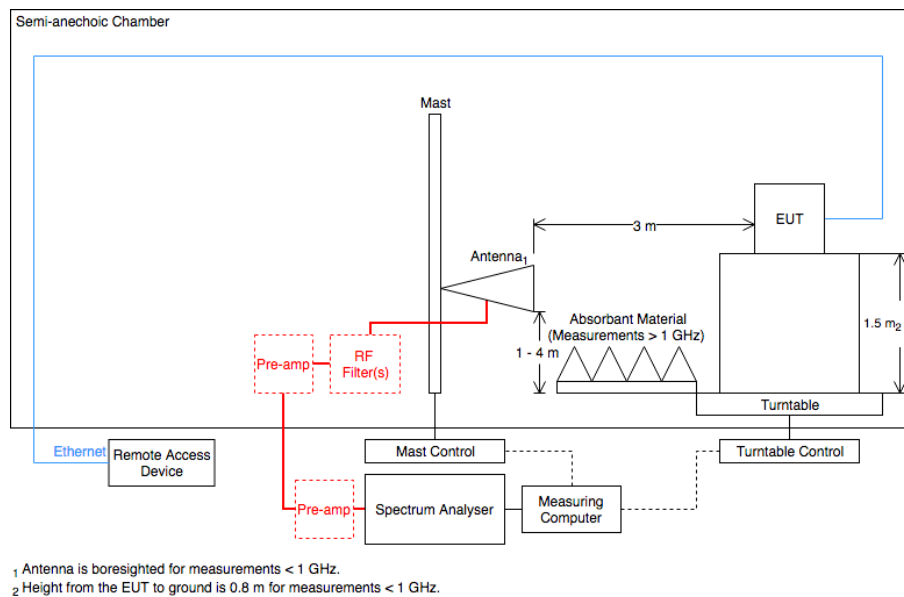


Figure 81 - Radiated Emissions Test Setup Diagram

2.8.5 Environmental Conditions

Ambient Temperature	19.2 - 23.6 °C
Relative Humidity	32.5 - 46.1 %



2.8.6 Test Results

2.4 GHz Bluetooth - BR/EDR (Core 0)

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
1601.5	36.1	54.0	-17.9	CAV	80	117	Vertical

Table 27 - Channel 0 (2402 MHz), DH5, iPA, Core 0, 1 GHz to 26 GHz

* No other emissions found within 10 dB of the limit.

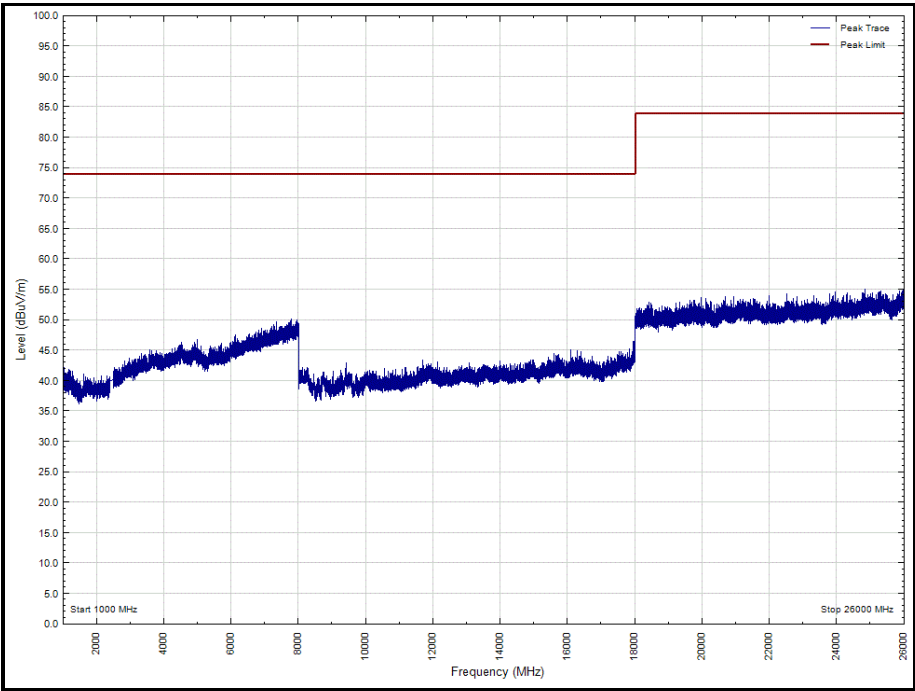


Figure 82 - Channel 0 (2402 MHz), DH5, iPA, Core 0, 1 GHz to 26 GHz, Horizontal (Peak)

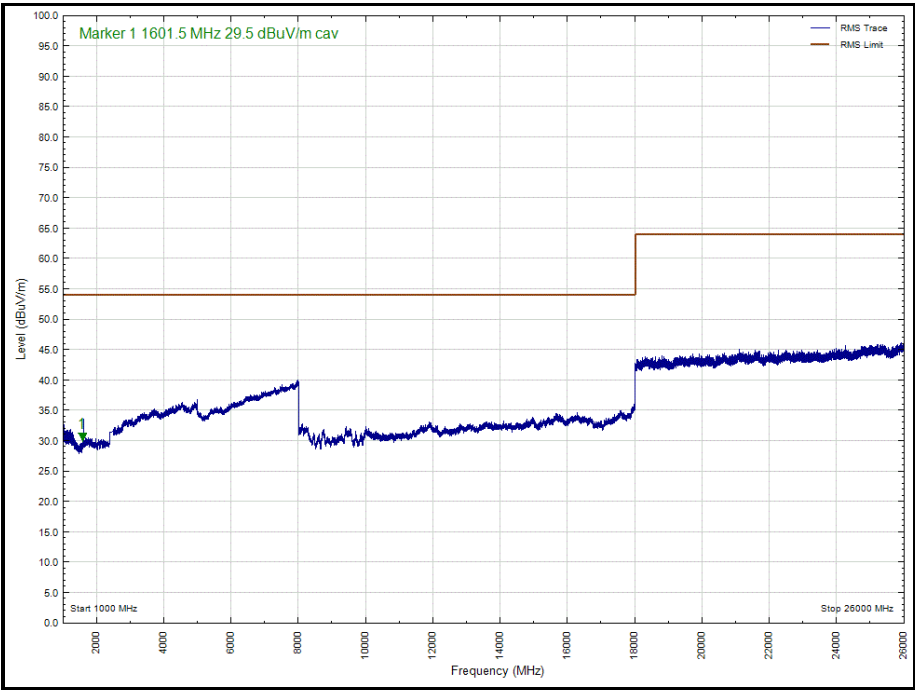


Figure 83 - Channel 0 (2402 MHz), DH5, iPA, Core 0, 1 GHz to 26 GHz, Horizontal (rms)

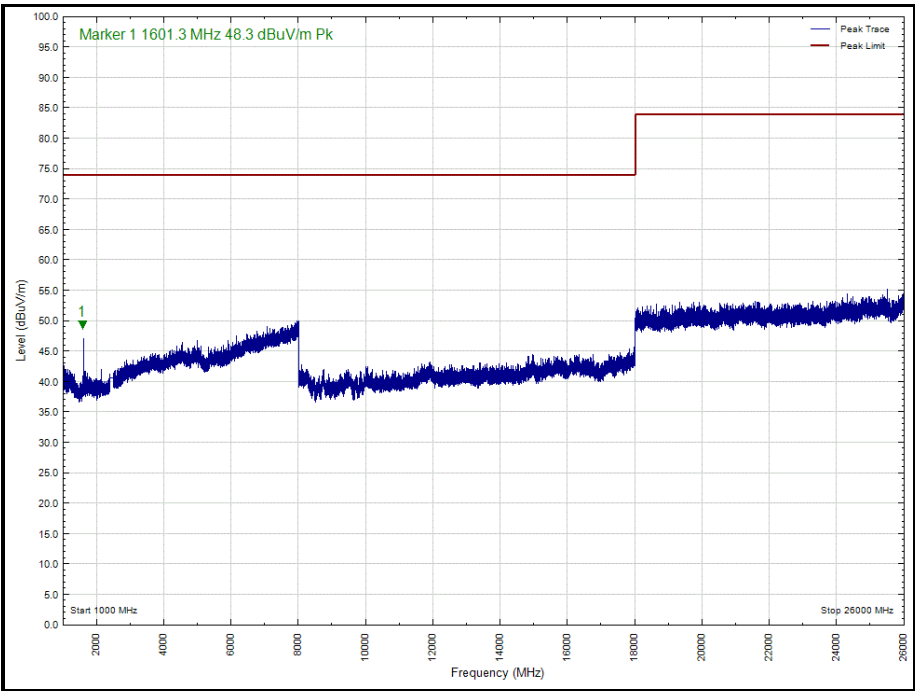


Figure 84 - Channel 0 (2402 MHz), DH5, iPA, Core 0, 1 GHz to 26 GHz, Vertical (Peak)

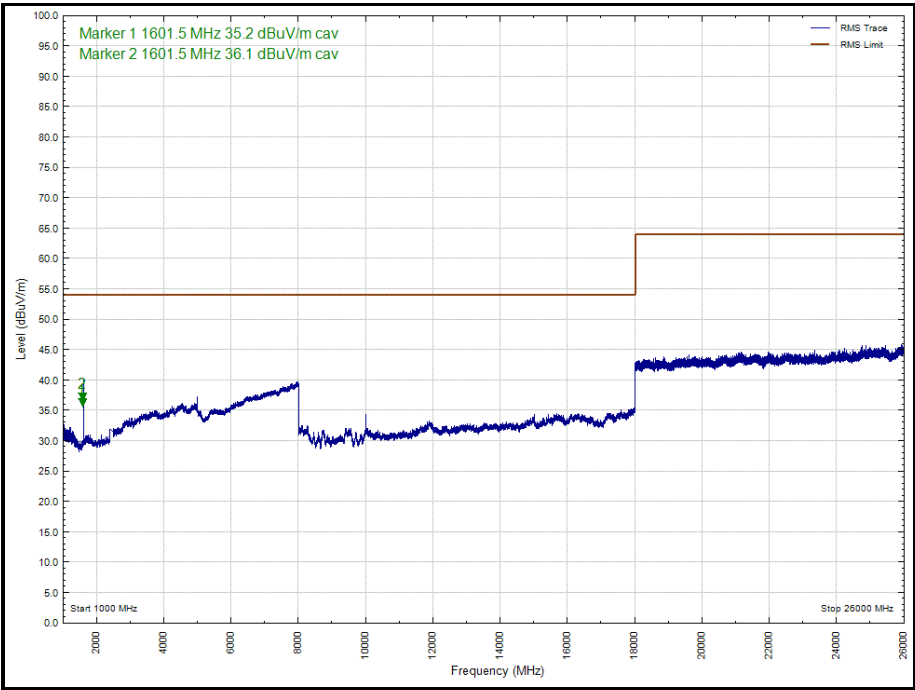


Figure 85 - Channel 0 (2402 MHz), DH5, iPA, Core 0, 1 GHz to 26 GHz, Vertical (rms)

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
30.0	23.3	40.0	-16.7	QP	88	186	Horizontal
31.7	33.4	40.0	-6.6	QP	81	379	Vertical

Table 28 - Channel 39 (2441 MHz), DH5, iPA, Core 0, 30 MHz to 26 GHz

*No other emissions found within 10 dB of the limit.

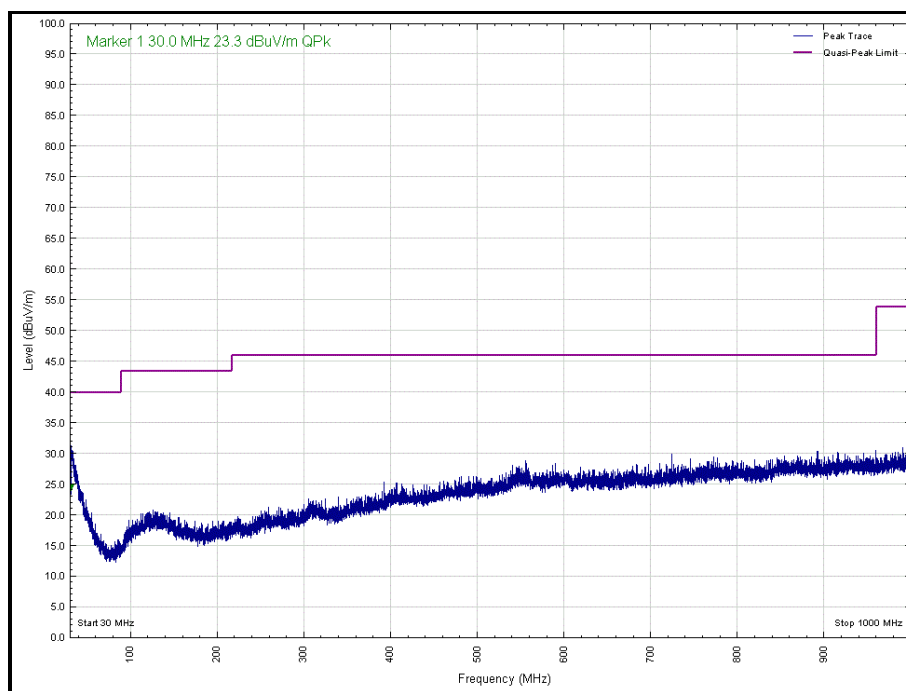


Figure 86 - Channel 39 (2441 MHz), DH5, iPA, Core 0, 30 to 1000 MHz, Horizontal (Peak)

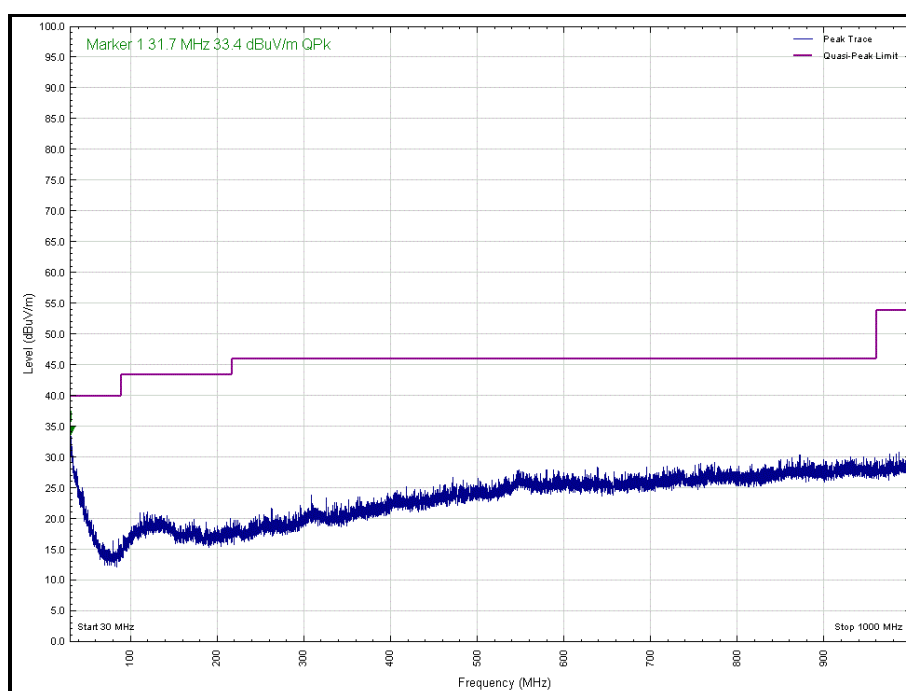


Figure 87 - Channel 39 (2441 MHz), DH5, iPA, Core 0, 30 to 1000 MHz, Vertical (Peak)

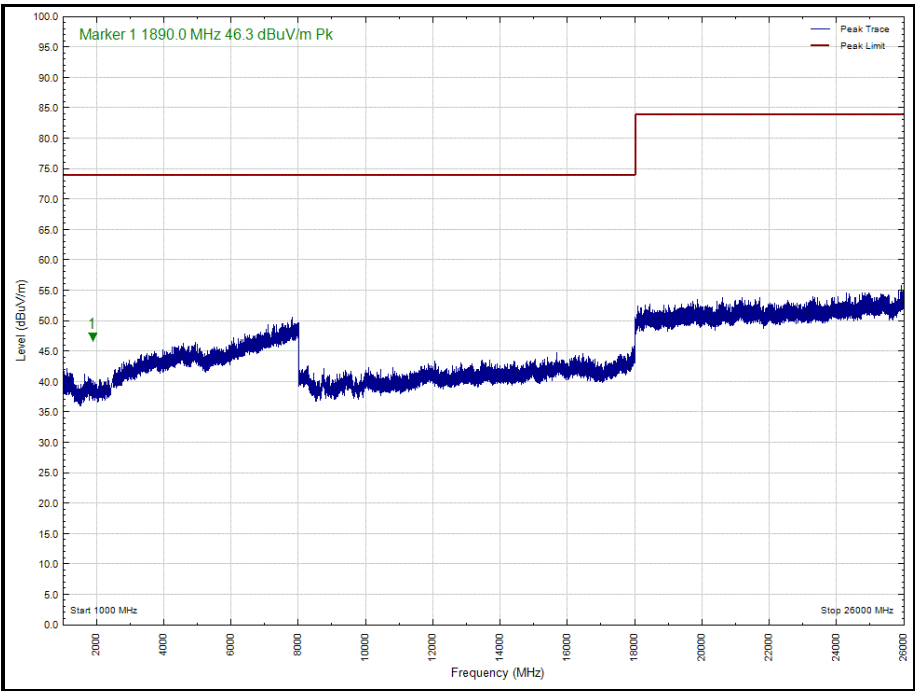


Figure 88 - Channel 39 (2441 MHz), DH5, iPA, Core 0, 1 GHz to 26 GHz, Horizontal (Peak)

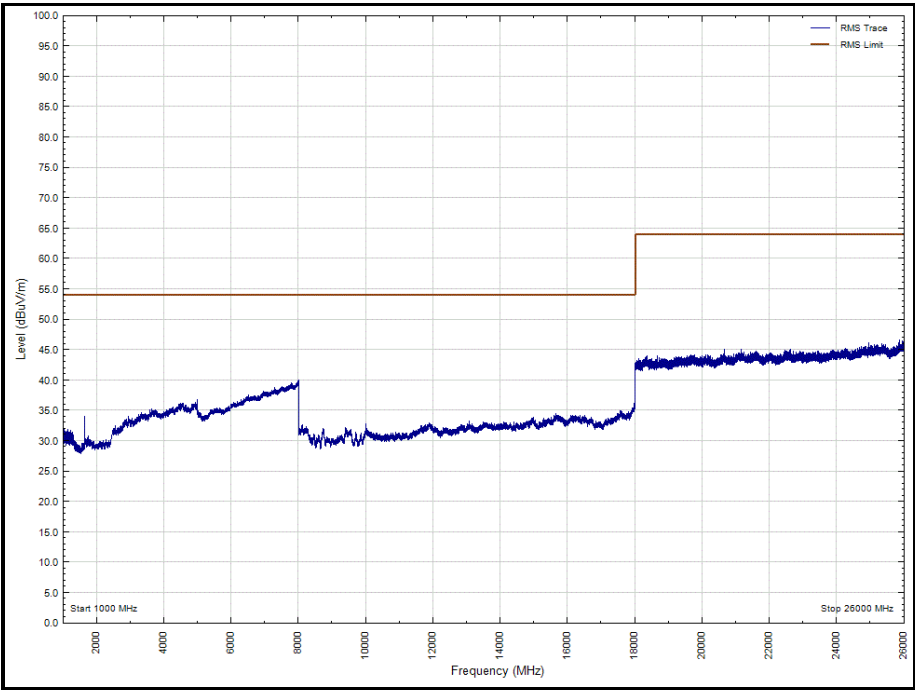


Figure 89 - Channel 39 (2441 MHz), DH5, iPA, Core 0, 1 GHz to 26 GHz, Horizontal (rms)

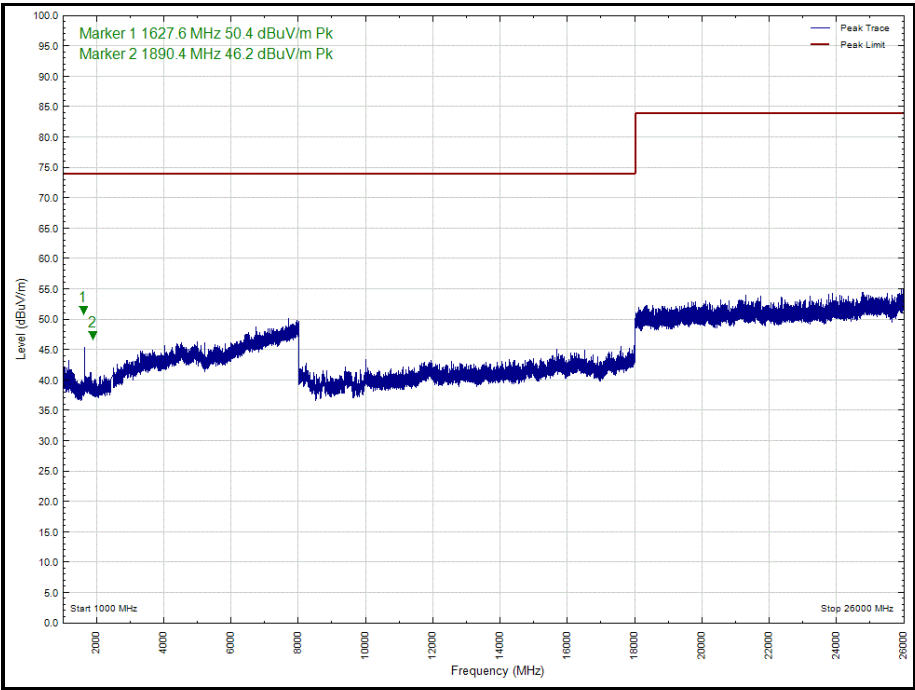


Figure 90 - Channel 39 (2441 MHz), DH5, iPA, Core 0, 1 GHz to 26 GHz, Vertical (Peak)

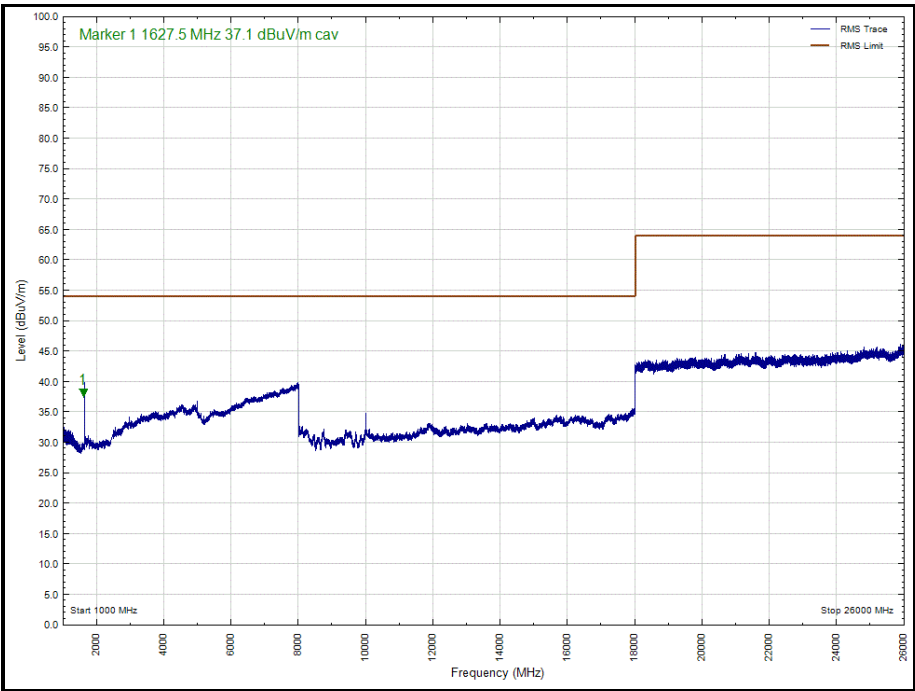


Figure 91 - Channel 39 (2441 MHz), DH5, iPA, Core 0, 1 GHz to 26 GHz, Vertical (rms)



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

Table 29 - Channel 78 (2480 MHz), DH5, iPA, Core 0, 1 GHz to 26 GHz

No emissions were found within 6 dB of the limit.

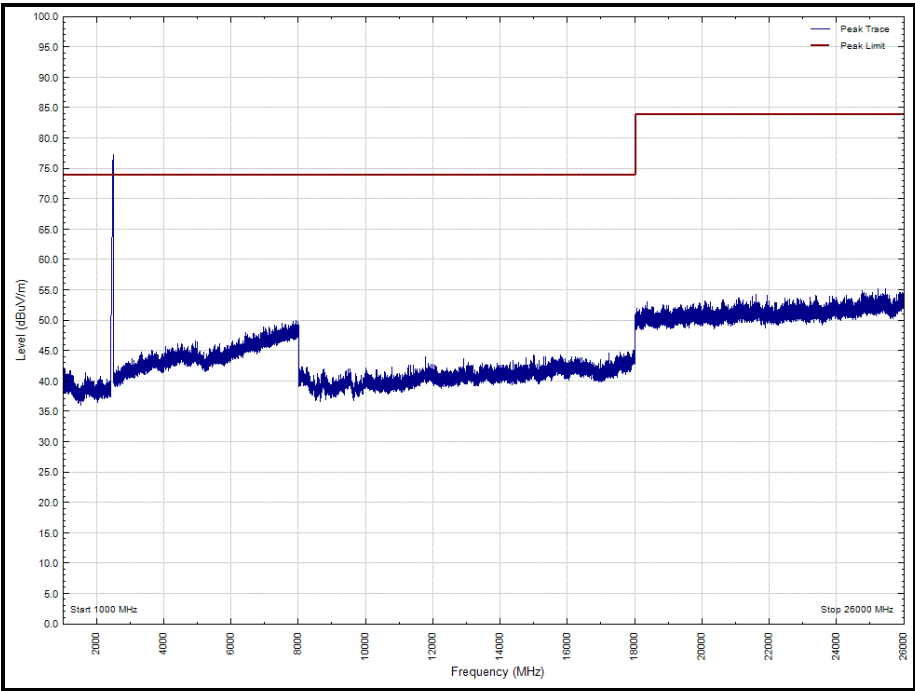


Figure 92 - Channel 78 (2480 MHz), DH5, iPA, Core 0, 1 GHz to 26 GHz, Horizontal (Peak)

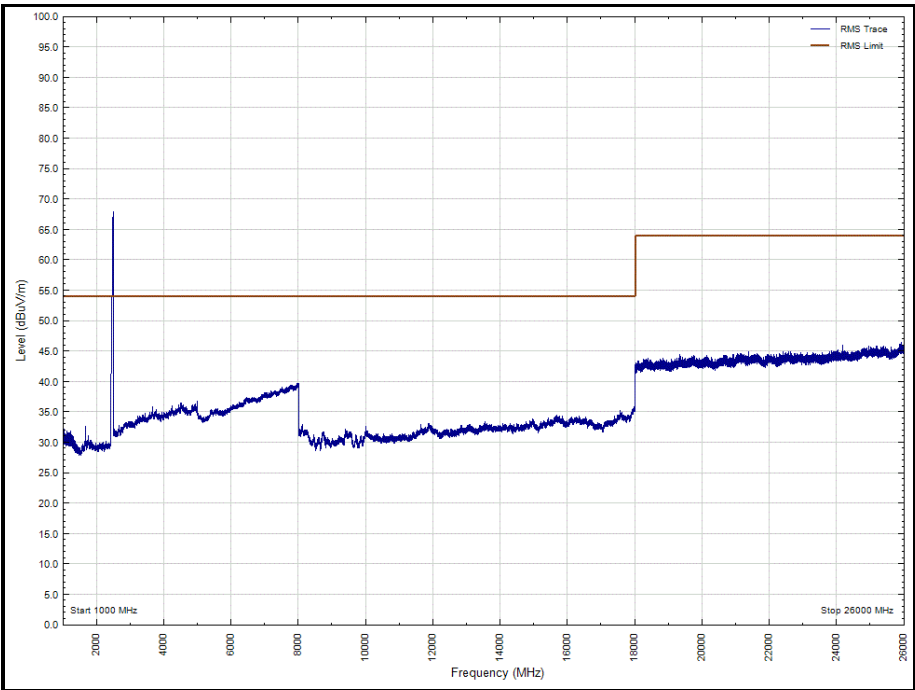


Figure 93 - Channel 78 (2480 MHz), DH5, iPA, Core 0, 1 GHz to 26 GHz, Horizontal (rms)

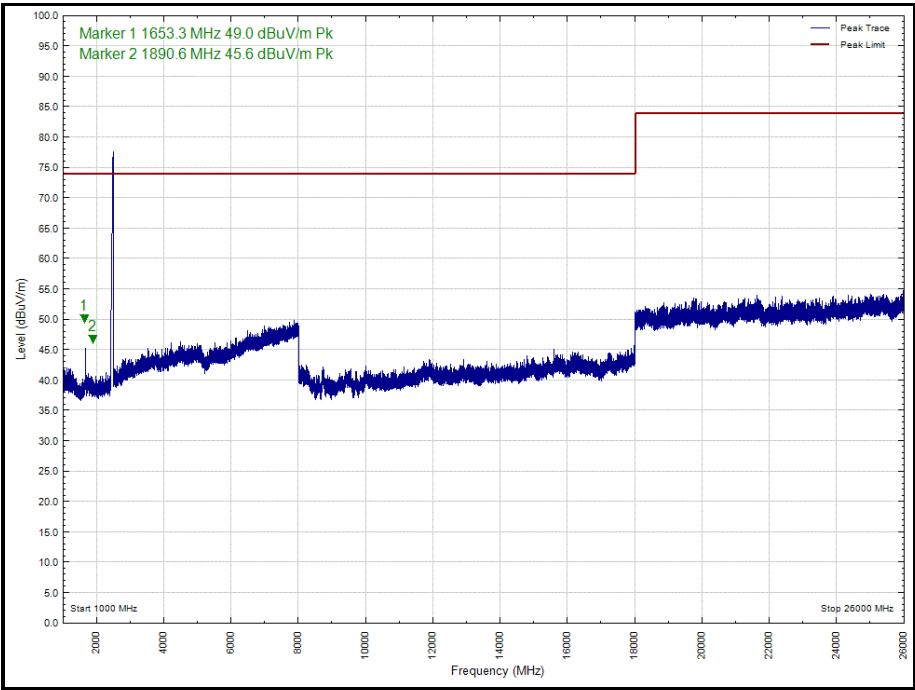


Figure 94 - Channel 78 (2480 MHz), DH5, iPA, Core 0, 1 GHz to 26 GHz, Vertical (Peak)

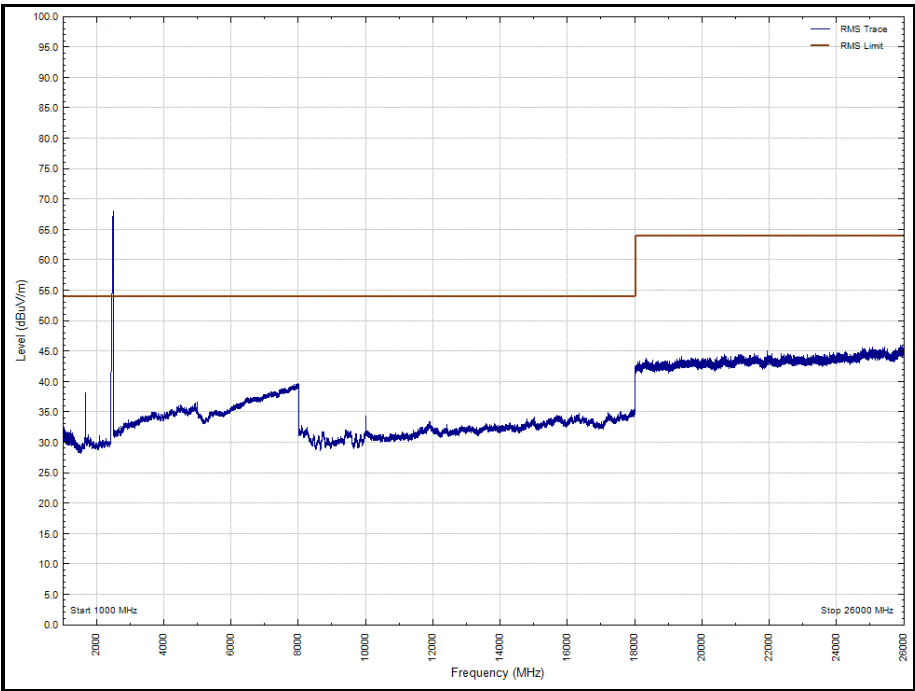


Figure 95 - Channel 78 (2480 MHz), DH5, iPA, Core 0, 1 GHz to 26 GHz, Vertical (rms)

2.4 GHz Bluetooth - BR/EDR (Core 1)

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

Table 30 - Channel 0 (2402 MHz), DH5, iPA, Core 1, 1 GHz to 26 GHz

* No emissions found within 10 dB of the limit.

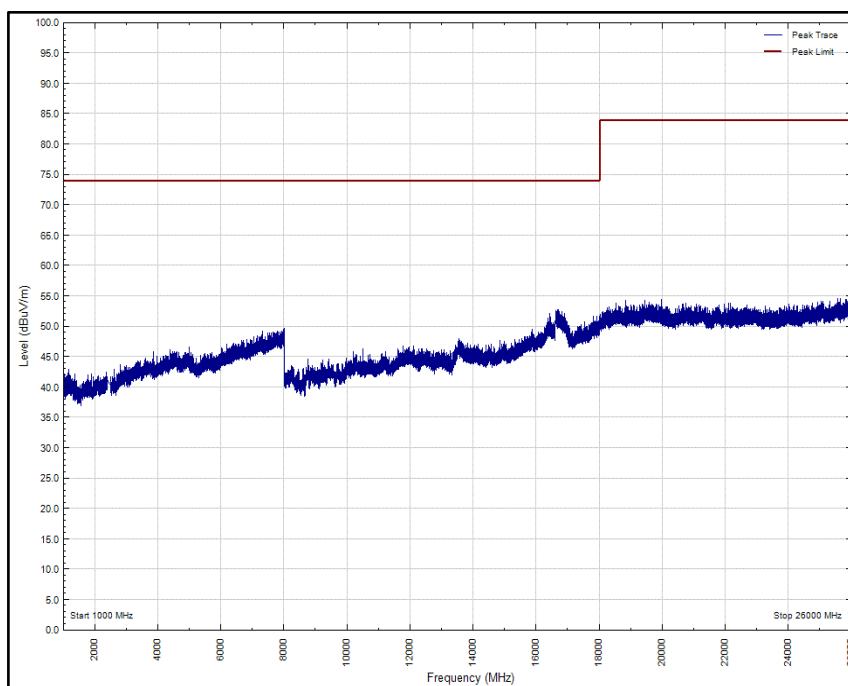


Figure 96 - Channel 0 (2402 MHz), DH5, iPA, Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

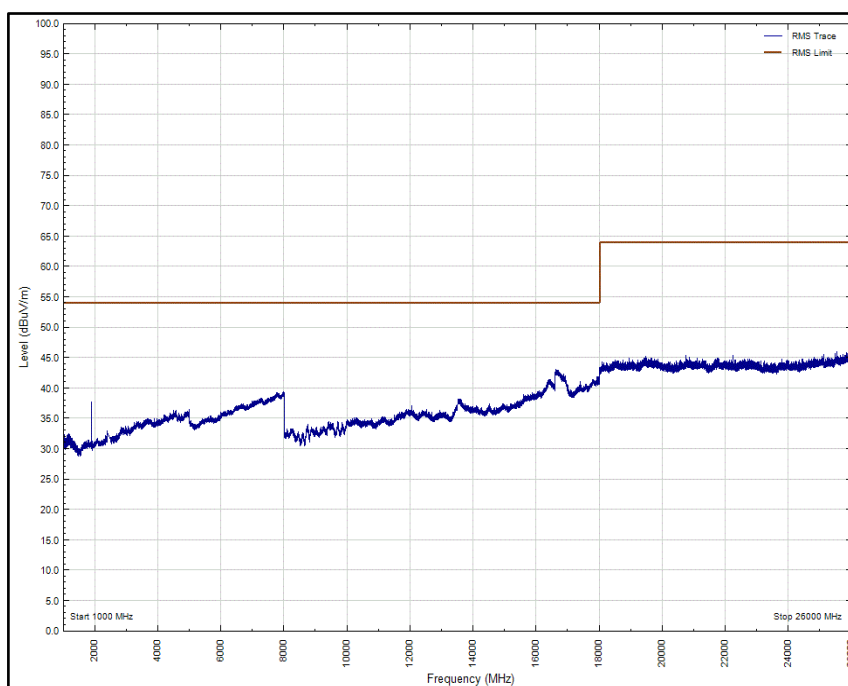


Figure 97- Channel 0 (2402 MHz), DH5, iPA, Core 1, 1 GHz to 26 GHz, Horizontal (rms)

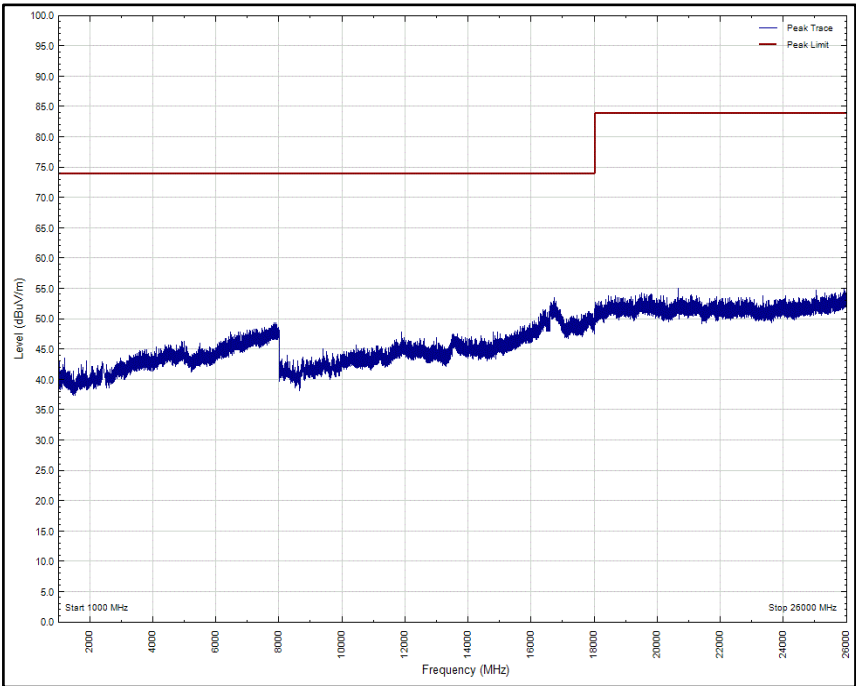


Figure 98 - Channel 0 (2402 MHz), DH5, iPA, Core 1, 1 GHz to 26 GHz, Vertical (Peak)

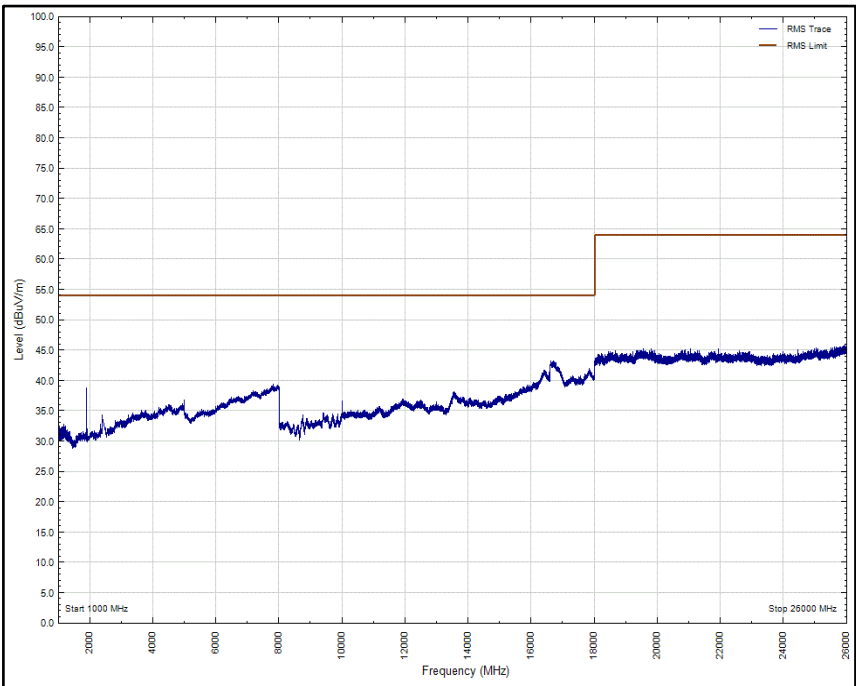


Figure 99 - Channel 0 (2402 MHz), DH5, iPA, Core 1, 1 GHz to 26 GHz, Vertical (rms)

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
34.900	25.4	40.0	-14.6	Q-Peak	67	363	Vertical
48.089	31.2	40.0	-8.9	Q-Peak	274	108	Vertical
92.883	34.8	43.5	-8.7	Q-Peak	95	102	Vertical
120.270	32.8	43.5	-10.8	Q-Peak	186	101	Vertical

Table 31 - Channel 39 (2441 MHz), DH5, iPA, Core 1, 30 MHz to 26 GHz

No other emissions found within 10 dB of the limit.

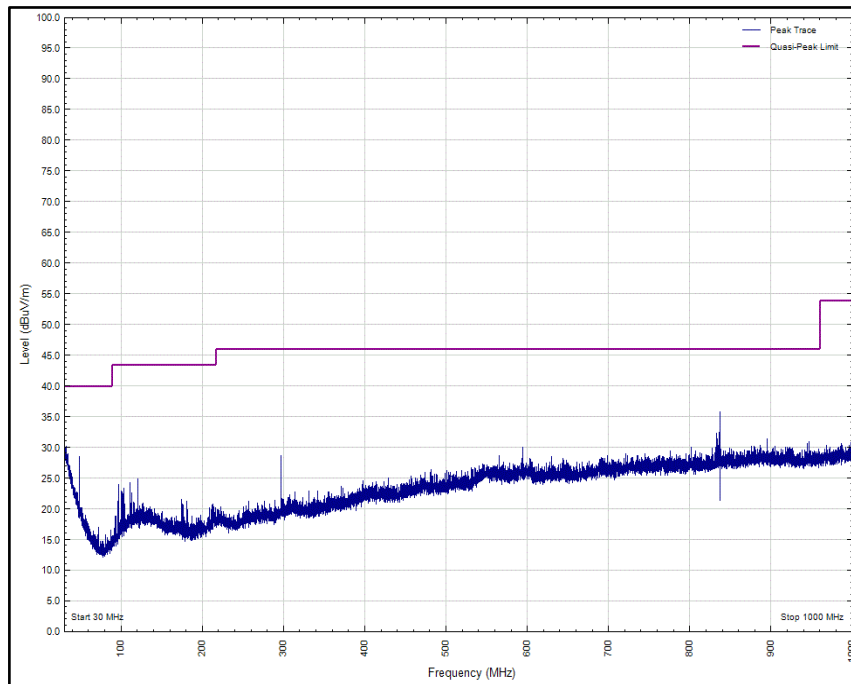


Figure 100 - Channel 39 (2441 MHz), DH5, iPA, Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

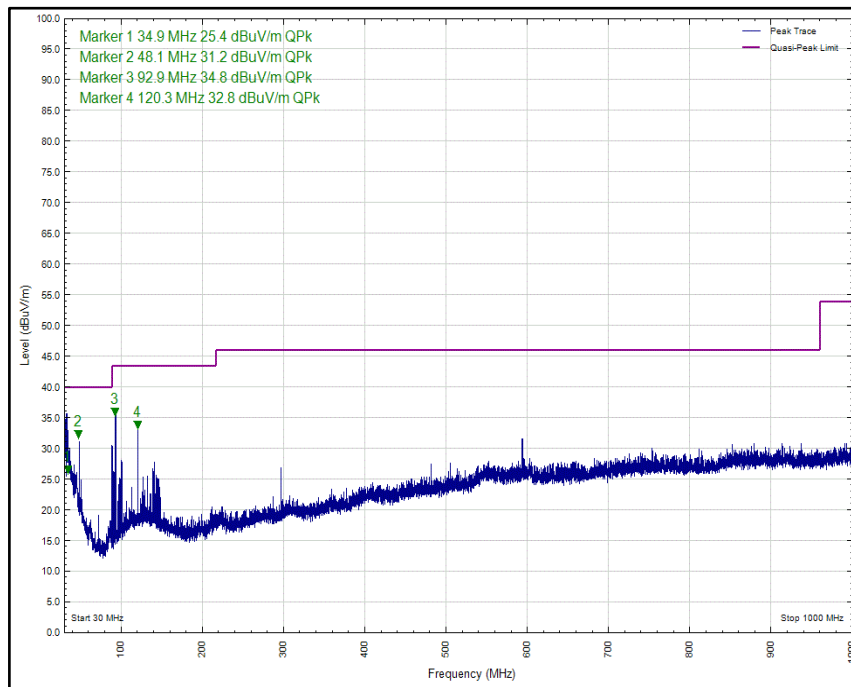


Figure 101 - Channel 39 (2441 MHz), DH5, iPA, Core 1, 30 MHz to 1 GHz, Vertical (Peak)

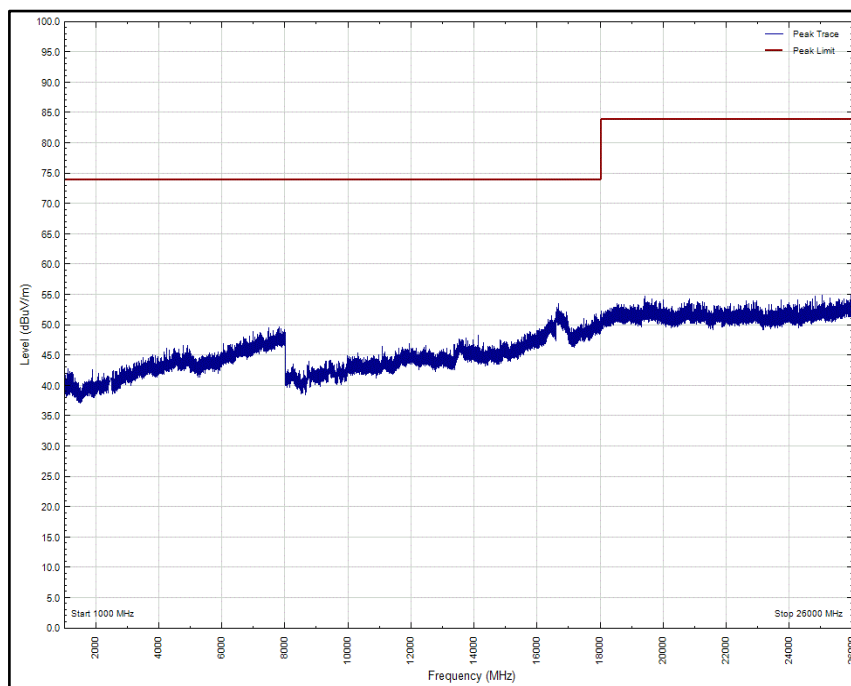


Figure 102 - Channel 39 (2441 MHz), DH5, iPA, Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

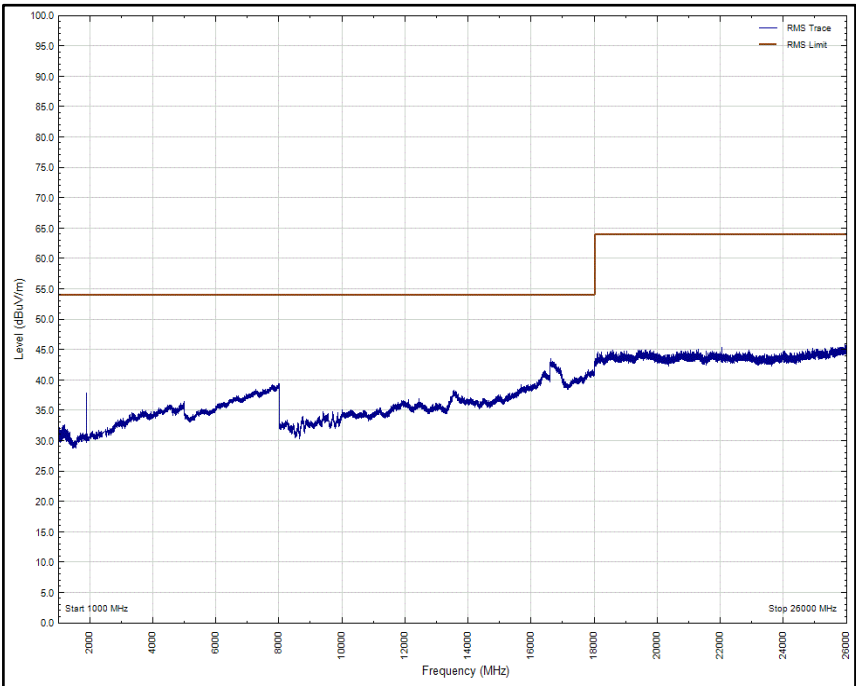


Figure 103 - Channel 39 (2441 MHz), DH5, iPA, Core 1, 1 GHz to 26 GHz, Horizontal (rms)

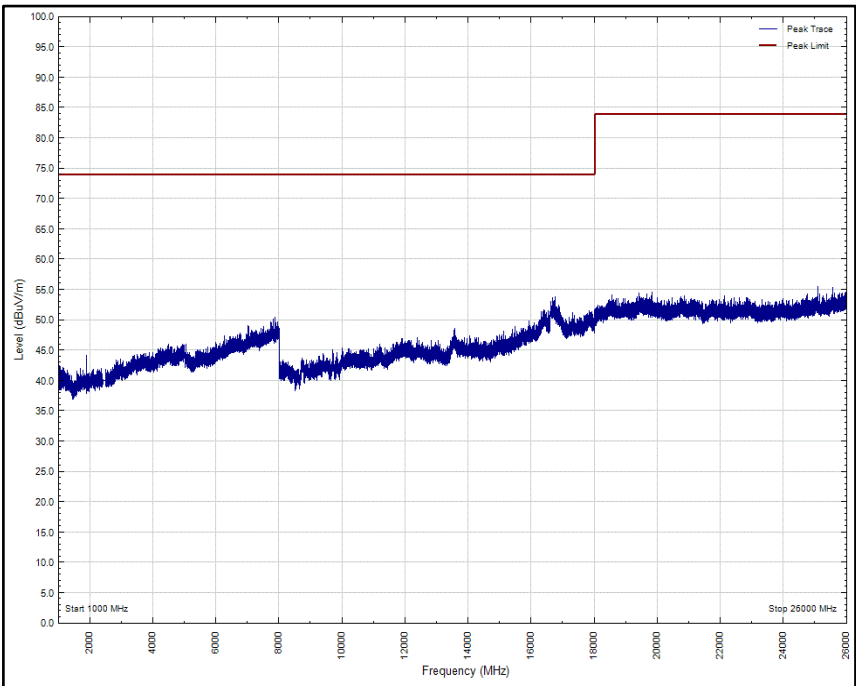


Figure 104 - Channel 39 (2441 MHz), DH5, iPA, Core 1, 1 GHz to 26 GHz, Vertical (Peak)

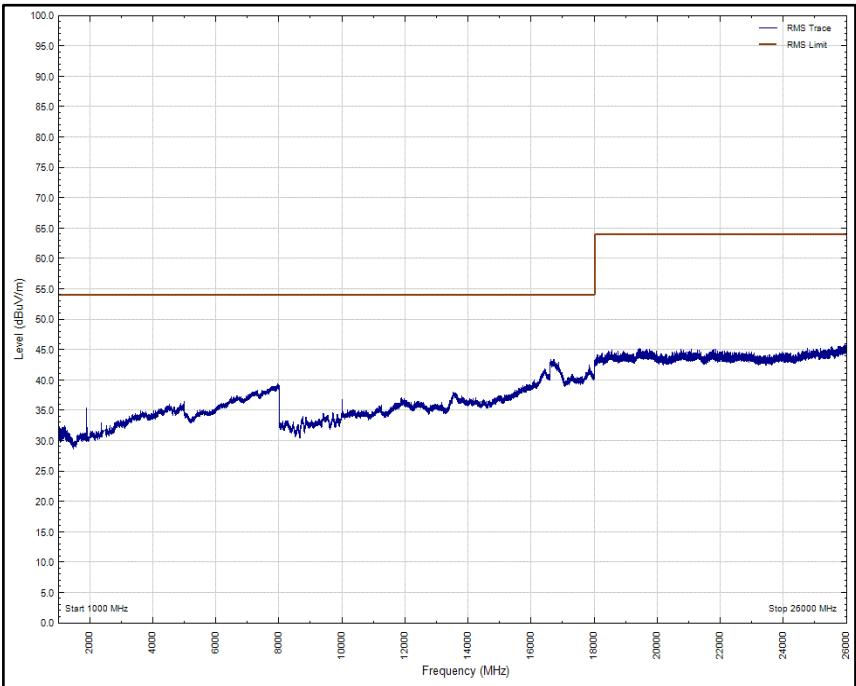


Figure 105 - Channel 39 (2441 MHz), DH5, iPA, Core 1, 1 GHz to 26 GHz, Vertical (rms)



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

Table 32 - Channel 78 (2480 MHz), DH5, iPA, Core 1, 1 GHz to 26 GHz

* No emissions found within 10 dB of the limit.

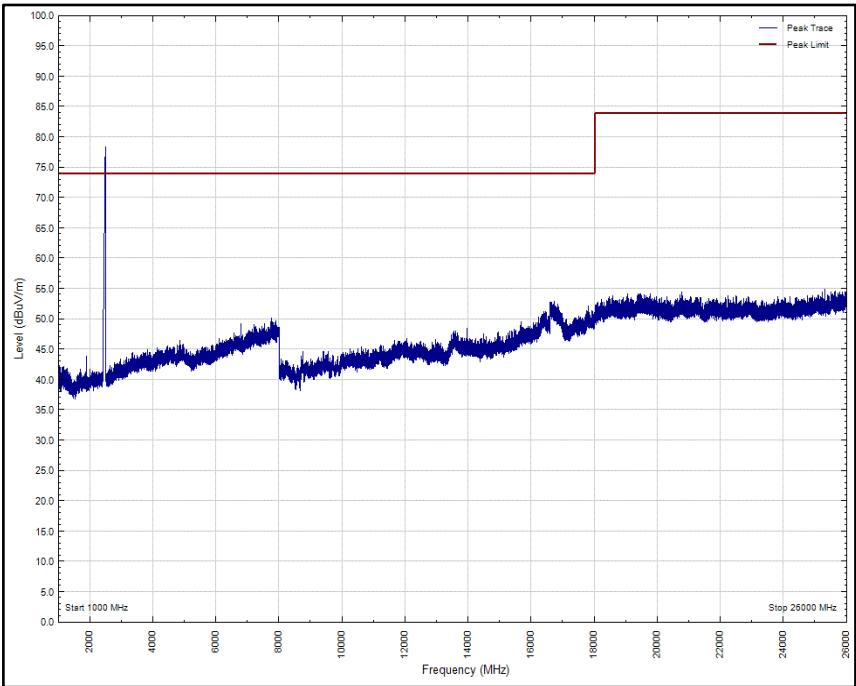


Figure 106 - Channel 78 (2480 MHz), DH5, iPA, Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

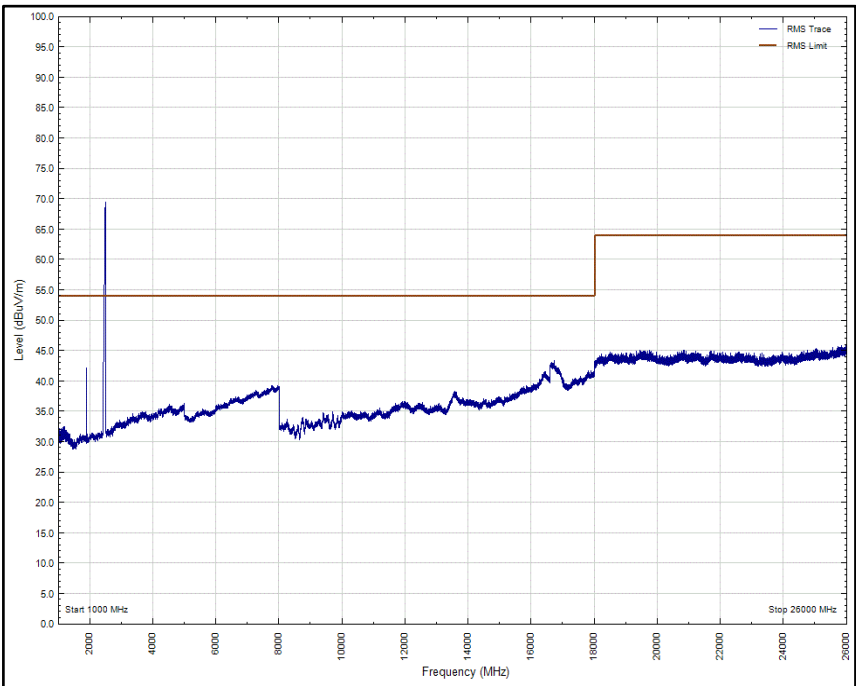


Figure 107 - Channel 78 (2480 MHz), DH5, iPA, Core 1, 1 GHz to 26 GHz, Horizontal (rms)

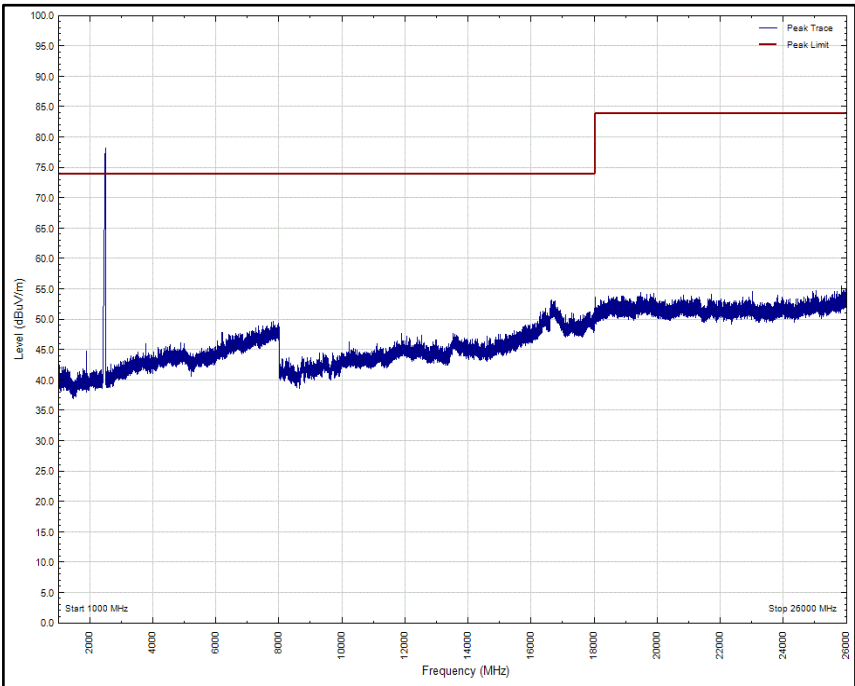


Figure 108 - Channel 78 (2480 MHz), DH5, iPA, Core 1, 1 GHz to 26 GHz, Vertical (Peak)

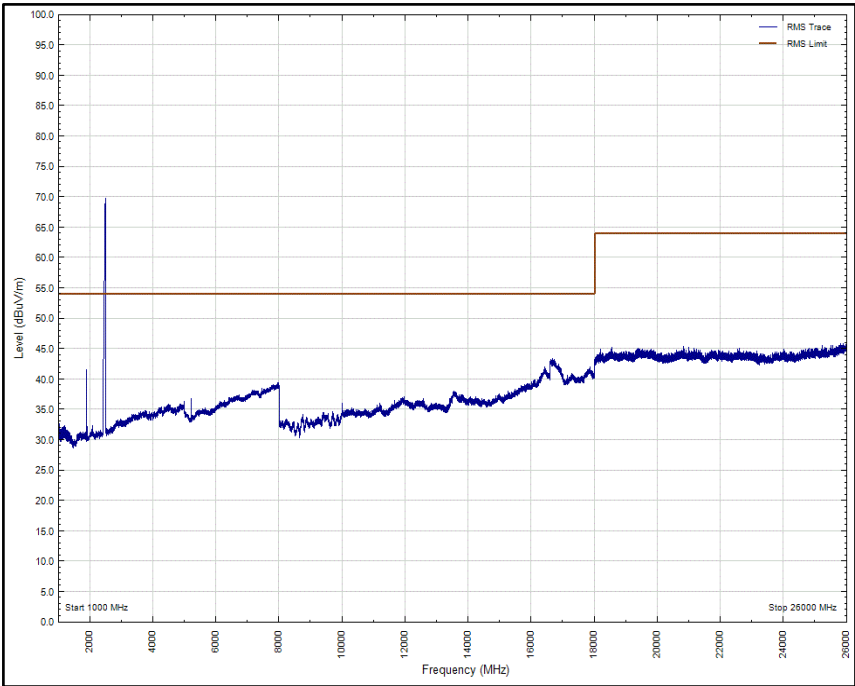


Figure 109 - Channel 78 (2480 MHz), DH5, iPA, Core 1, 1 GHz to 26 GHz, Vertical (rms)



2.4 GHz Bluetooth - BR/EDR (Dedicated Core 2)

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

Table 33 - Channel 0 (2402 MHz), DH5, iPA, Core 2, 1 GHz to 26 GHz

* No emissions found within 10 dB of the limit.

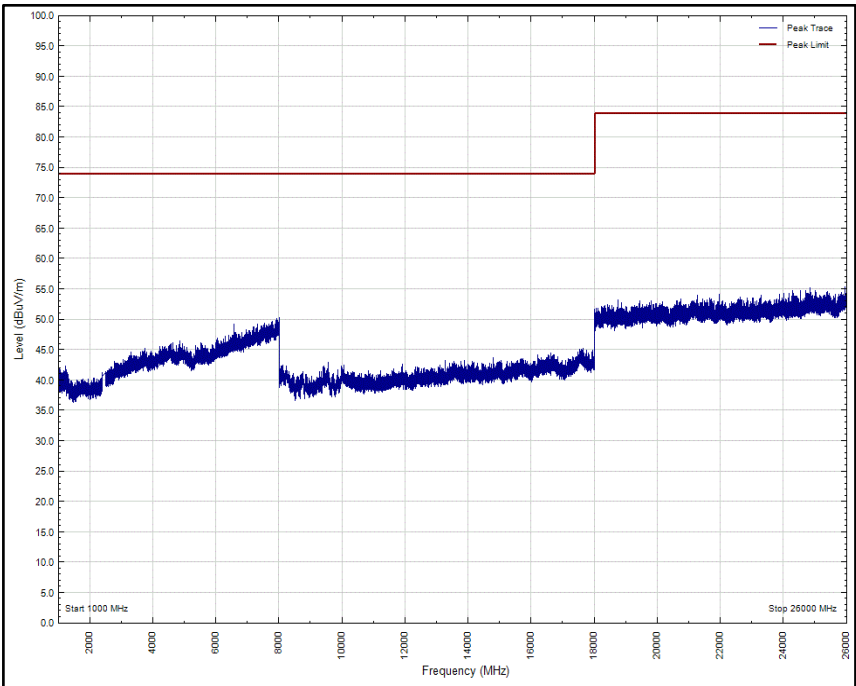


Figure 110 - Channel 0 (2402 MHz), DH5, iPA, Core 2, 1 GHz to 26 GHz, Horizontal (Peak)

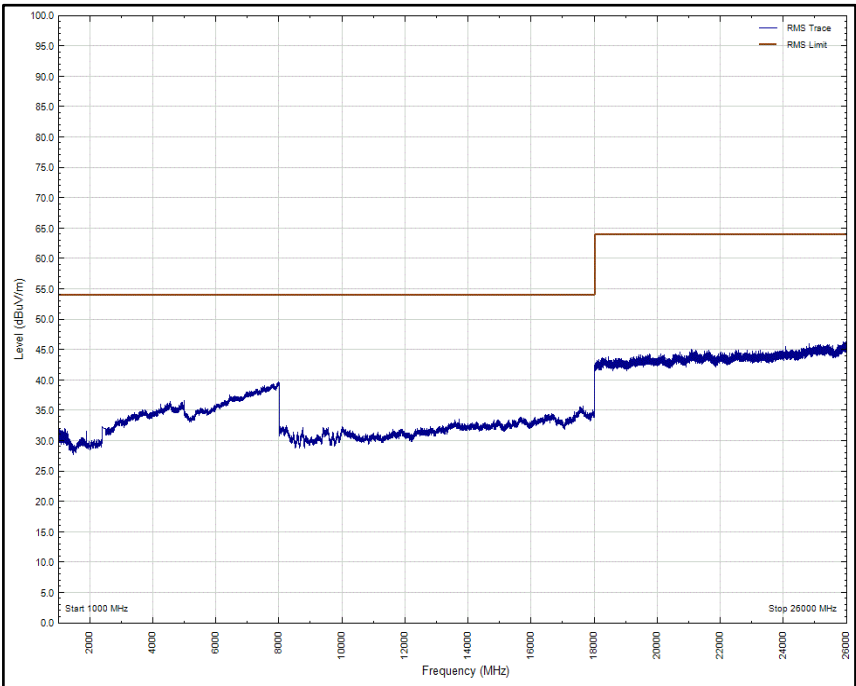


Figure 111 - Channel 0 (2402 MHz), DH5, iPA, Core 2, 1 GHz to 26 GHz, Horizontal (rms)

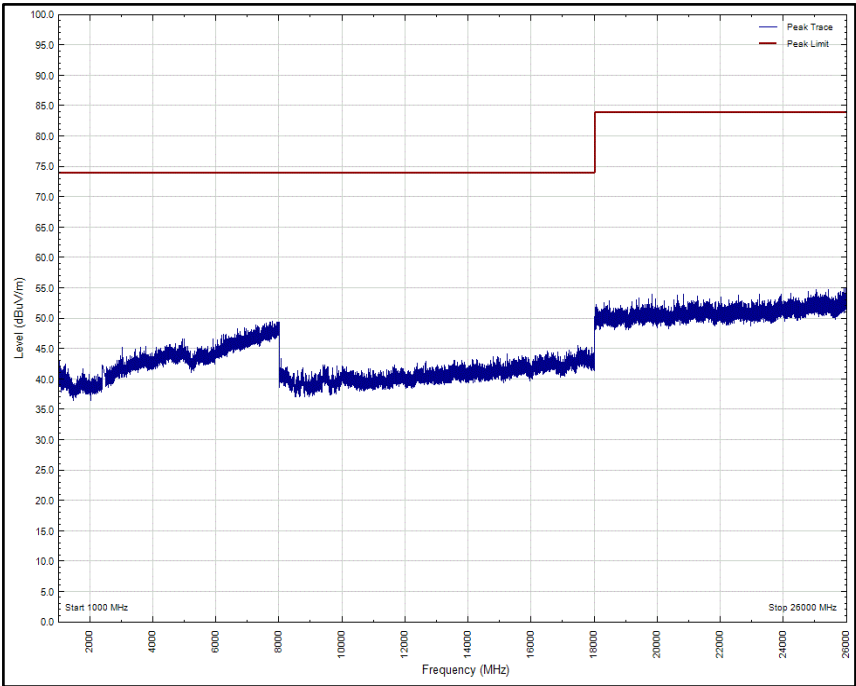


Figure 112 - Channel 0 (2402 MHz), DH5, iPA, Core 2, 1 GHz to 26 GHz, Vertical (Peak)

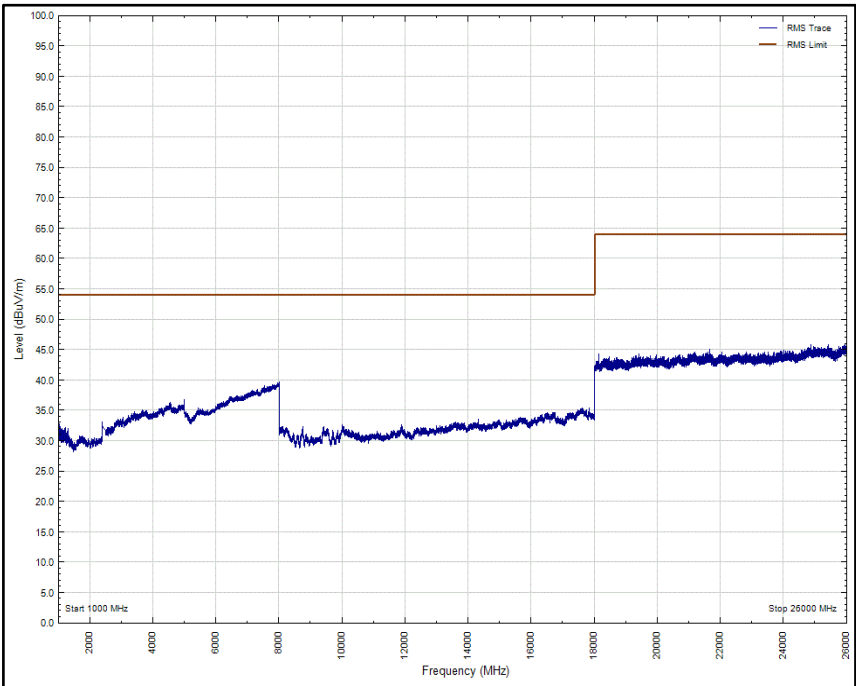


Figure 113 - Channel 0 (2402 MHz), DH5, iPA, Core 2, 1 GHz to 26 GHz, Vertical (rms)

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
112.965	27.6	43.5	-15.9	Q-Peak	358	393	Horizontal
118.886	32.3	43.5	-11.3	Q-Peak	122	103	Vertical
166.435	27.4	43.5	-16.1	Q-Peak	20	103	Vertical

Table 34 - Channel 39 (2441 MHz), DH5, iPA, Core 2, 30 MHz to 26 GHz

No other emissions found within 10 dB of the limit.

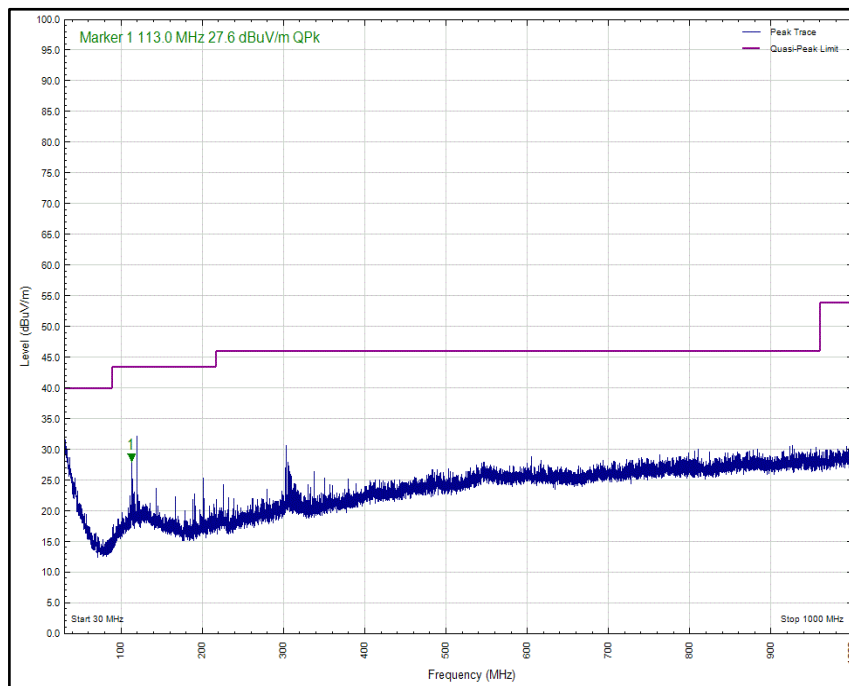


Figure 114 - Channel 39 (2441 MHz), DH5, iPA, Core 2, 30 MHz to 1 GHz, Horizontal (Peak)

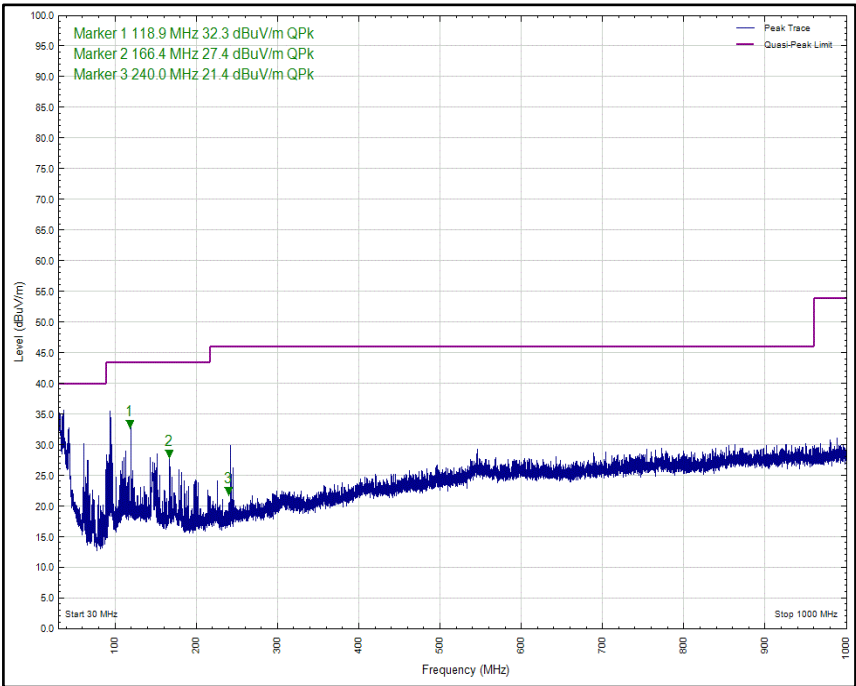


Figure 115 - Channel 39 (2441 MHz), DH5, iPA, Core 2, 30 MHz to 1 GHz, Vertical (Peak)

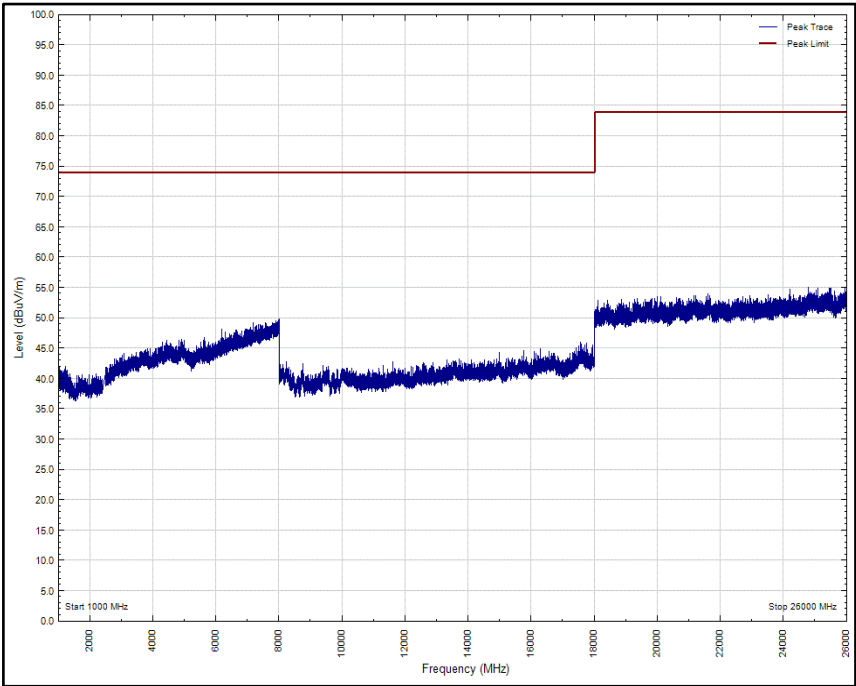


Figure 116 - Channel 39 (2441 MHz), DH5, iPA, Core 2, 1 GHz to 26 GHz, Horizontal (Peak)

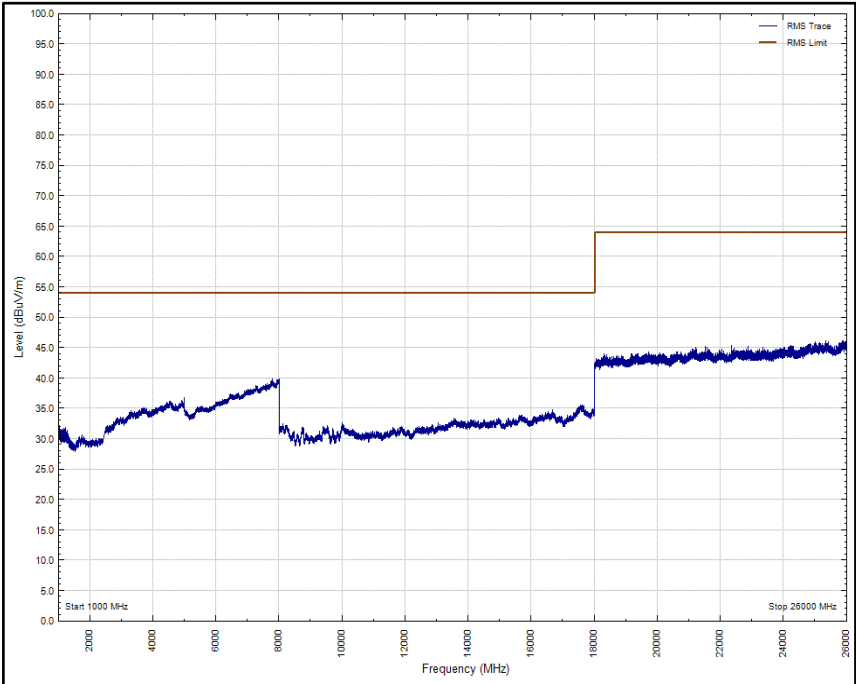


Figure 117 - Channel 39 (2441 MHz), DH5, iPA, Core 2, 1 GHz to 26 GHz, Horizontal (rms)

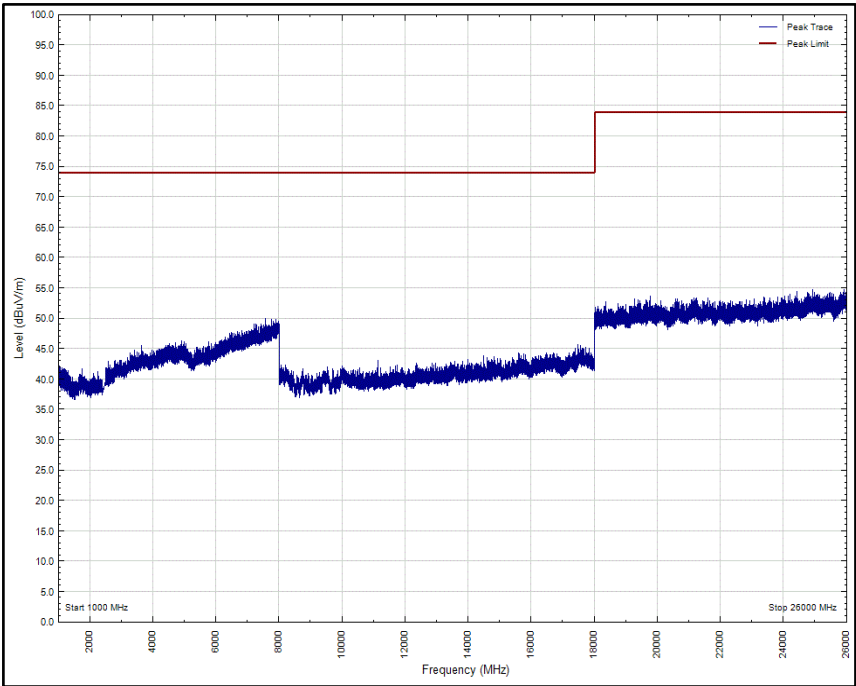


Figure 118 - Channel 39 (2441 MHz), DH5, iPA, Core 2, 1 GHz to 26 GHz, Vertical (Peak)

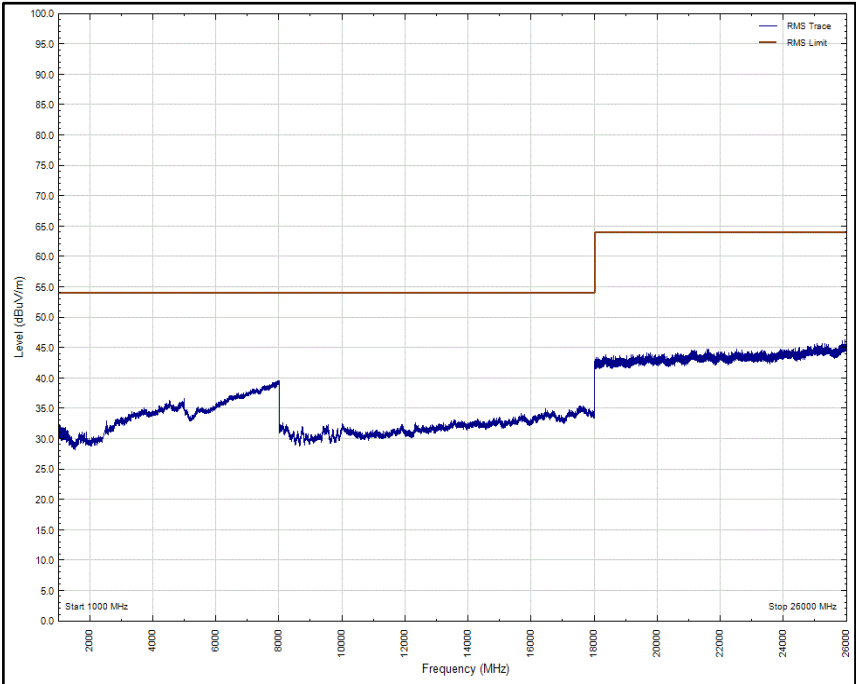


Figure 119 - Channel 39 (2441 MHz), DH5, iPA, Core 2, 1 GHz to 26 GHz, Vertical (rms)



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

Table 35 - Channel 78 (2480 MHz), DH5, iPA, Core 2, 1 GHz to 26 GHz

* No emissions found within 10 dB of the limit.

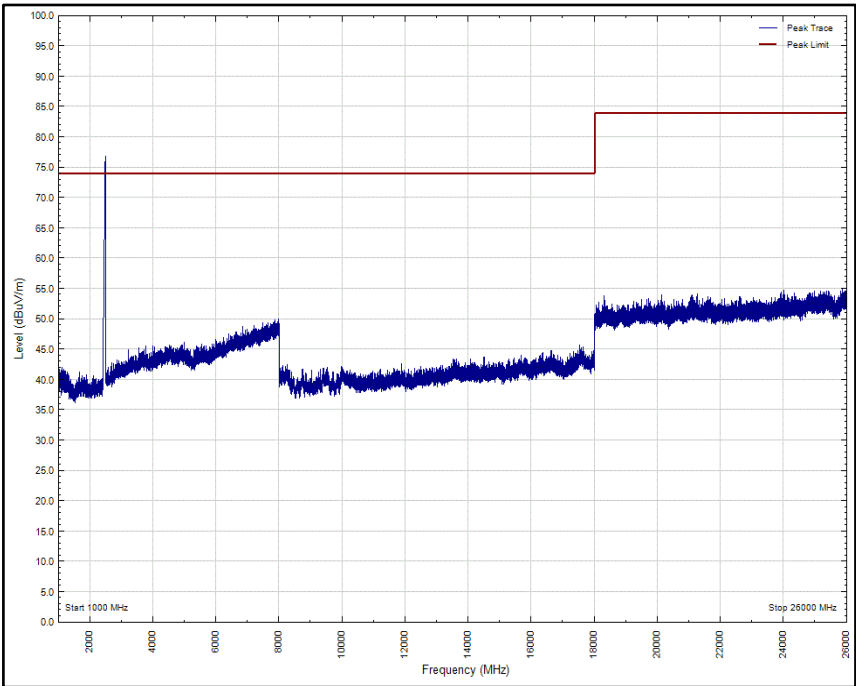


Figure 120 - Channel 78 (2480 MHz), DH5, iPA, Core 2, 1 GHz to 26 GHz, Horizontal (Peak)

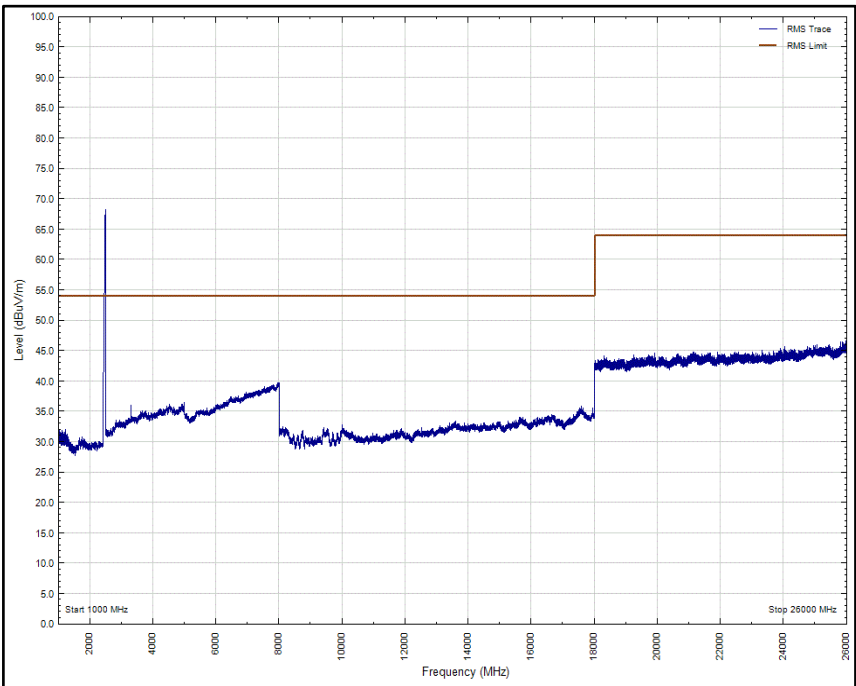


Figure 121 - Channel 78 (2480 MHz), DH5, iPA, Core 2, 1 GHz to 26 GHz, Horizontal (rms)

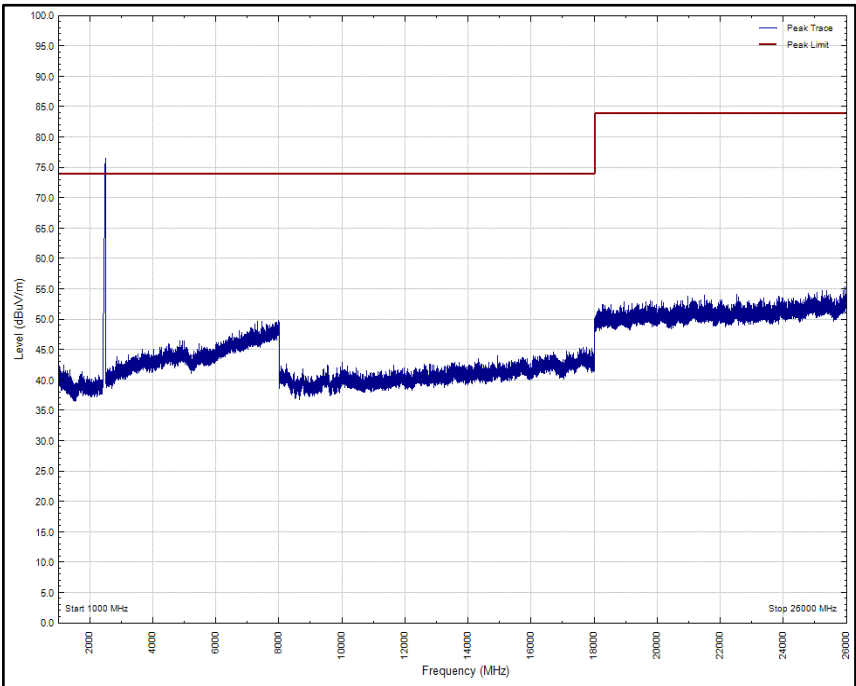


Figure 122 - Channel 78 (2480 MHz), DH5, iPA, Core 2, 1 GHz to 26 GHz, Vertical (Peak)

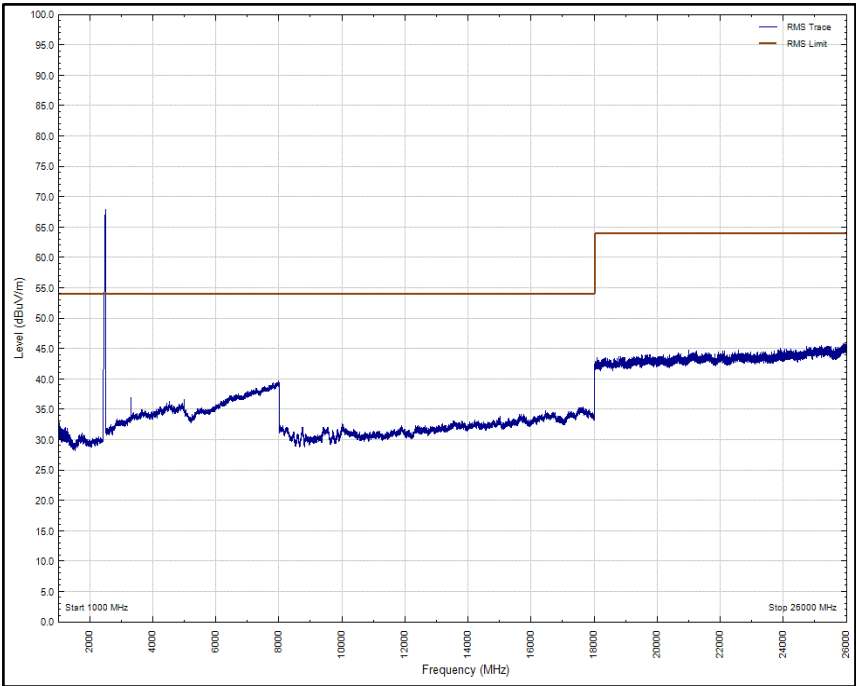


Figure 123 - Channel 78 (2480 MHz), DH5, iPA, Core 2, 1 GHz to 26 GHz, Vertical (rms)



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.



2.8.7 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
Antenna with permanent attenuator (Bilog)	Schaffner	CBL6143	287	24	15-July-2020
Pre-Amplifier	Phase One	PS04-0086	1533	12	04-Aug-2020
DC - 12.4 GHz 10 dB Attenuator	Suhner	6810.17.A	3965	12	07-Aug-2020
Hygrometer	Rotronic	HP21	4989	12	02-May-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
8m N-Type RF Cable	Teledyne	PR90-088-8MTR	5092	12	06-Dec-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	LU7-071-2000	5107	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
Horn Antenna (15-40GHz)	Schwarzbeck	BBHA 9170	5217	12	09-Jul-2020
Preamplifier (30dB 18-40GHz)	Schwarzbeck	BBV 9721	5218	12	09-Jul-2020
3 GHz High pass filter	Wainwright	WHKX12-2580-3000-18000-80SS	5219	12	11-Jan-2021
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5475	12	17-Mar-2021

Table 36

TU - Traceability Unscheduled



3 Measurement Uncertainty

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

Test Name	Measurement Uncertainty
Maximum Conducted Output Power	± 3.2 dB
Frequency Hopping Systems - Average Time of Occupancy	-
Frequency Hopping Systems - Channel Separation	± 30.43 kHz
Frequency Hopping Systems - Number of Hopping Channels	-
Frequency Hopping Systems - 20 dB Bandwidth	± 30.43 kHz
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
Spurious Radiated Emissions	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB

Table 37

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.