

ePA

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
Static	GFSK	0	DH5	2402	2400.0	-66.17
Static	$\pi/4$ DQPSK	0	2DH5	2402	2400.0	-64.09
Static	8-DPSK	0	3DH5	2402	2400.0	-64.57
Hopping	GFSK	0	DH5	2402	2400.0	-65.28
Hopping	$\pi/4$ DQPSK	0	2DH5	2402	2400.0	-64.52
Hopping	8-DPSK	0	3DH5	2402	2400.0	-67.41

Table 42 - Authorised Band Edge Results

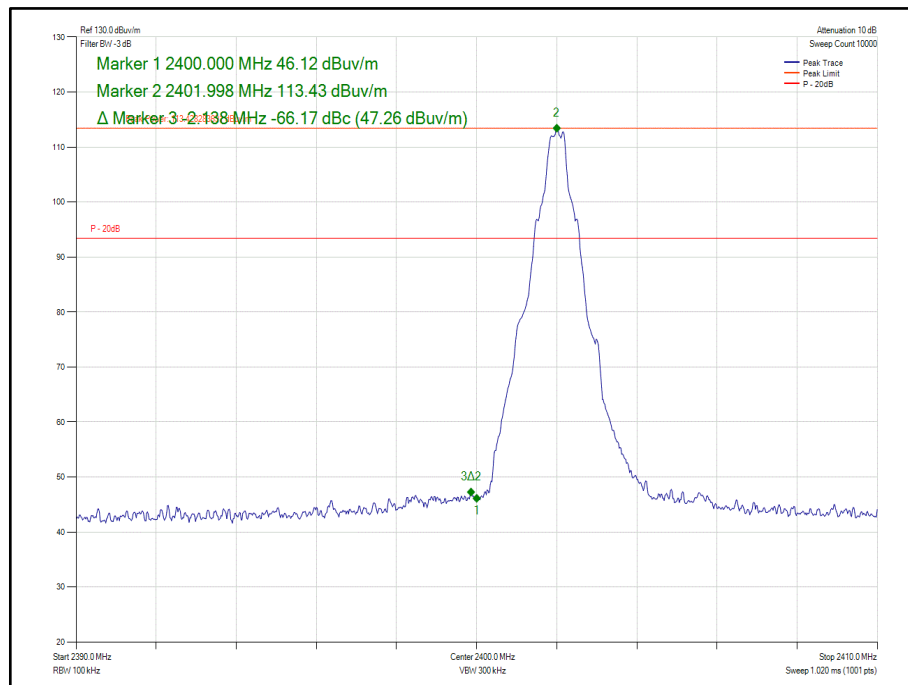
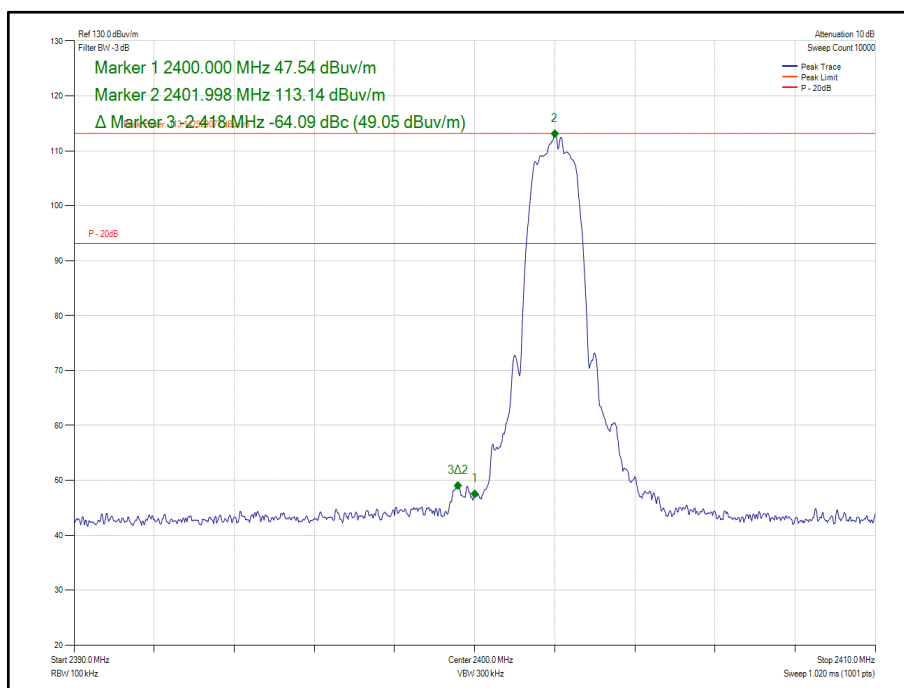
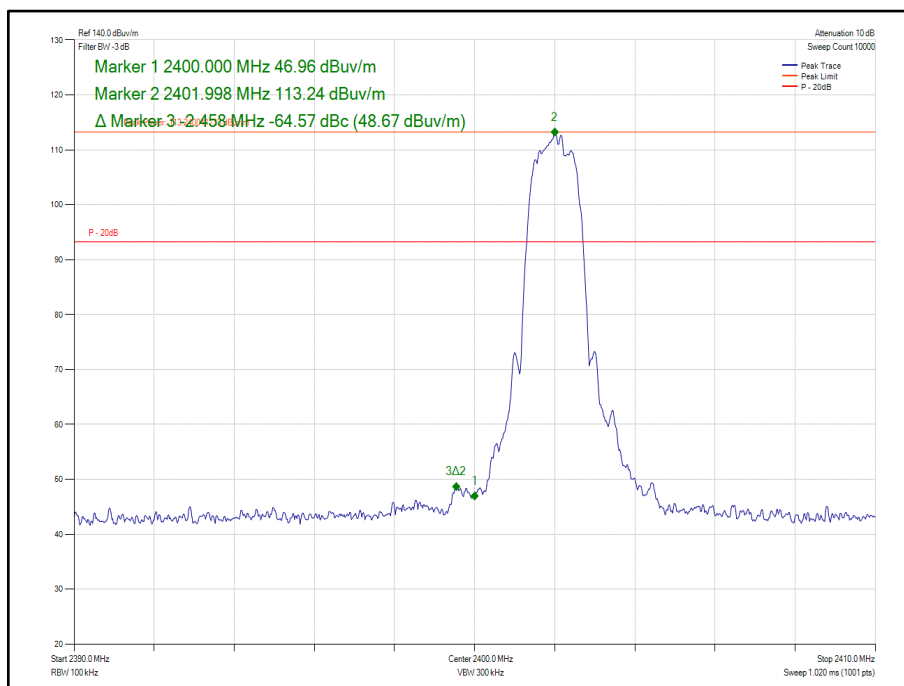


Figure 83 - Static - Core 0 - GFSK/DH5 - 2402 MHz - Band Edge Frequency 2400.0 MHz



**Figure 84 - Static - Core 0 - $\pi/4$ DQPSK/2DH5 - 2402 MHz -
Band Edge Frequency 2400.0 MHz**



**Figure 85 - Static - Core 0 - 8-DPSK/3DH5 - 2402 MHz -
Band Edge Frequency 2400.0 MHz**

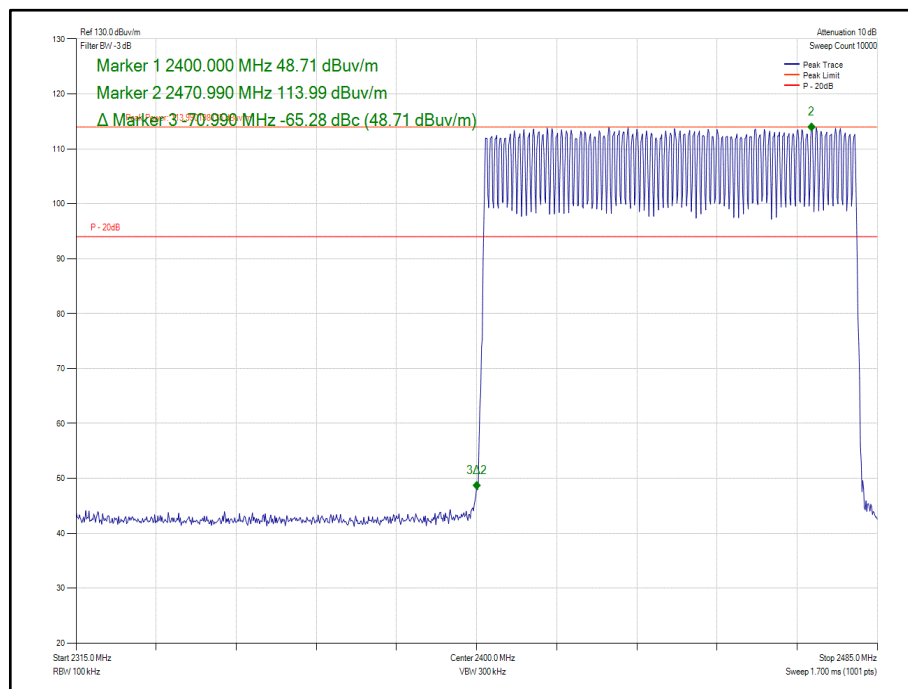


Figure 86 - Hopping - Core 0 - GFSK/DH5 - Band Edge Frequency 2400.0 MHz

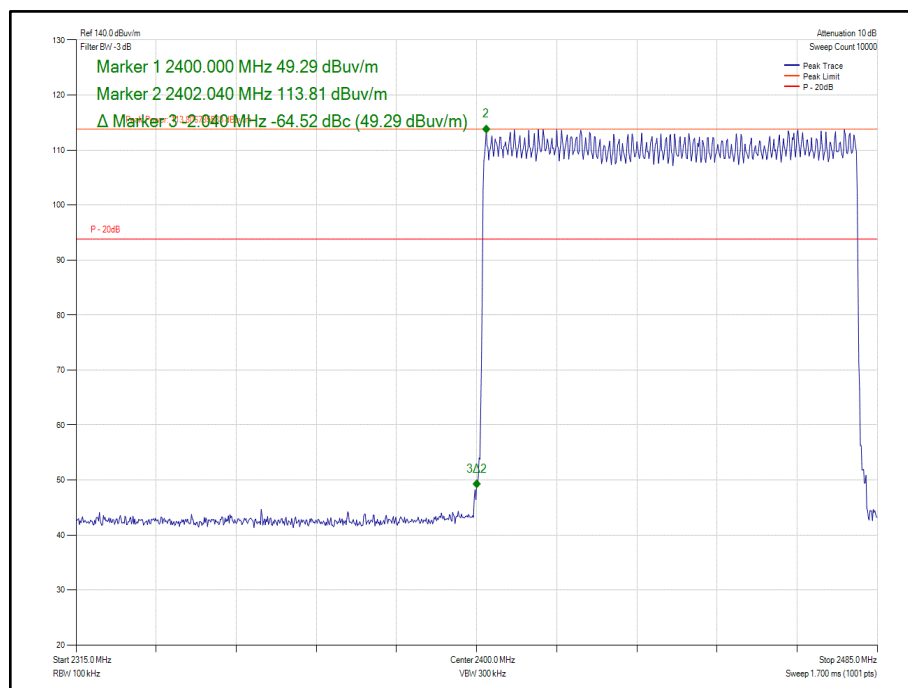


Figure 87 - Hopping - Core 0 - $\pi/4$ DQPSK/2DH5 - Band Edge Frequency 2400.0 MHz

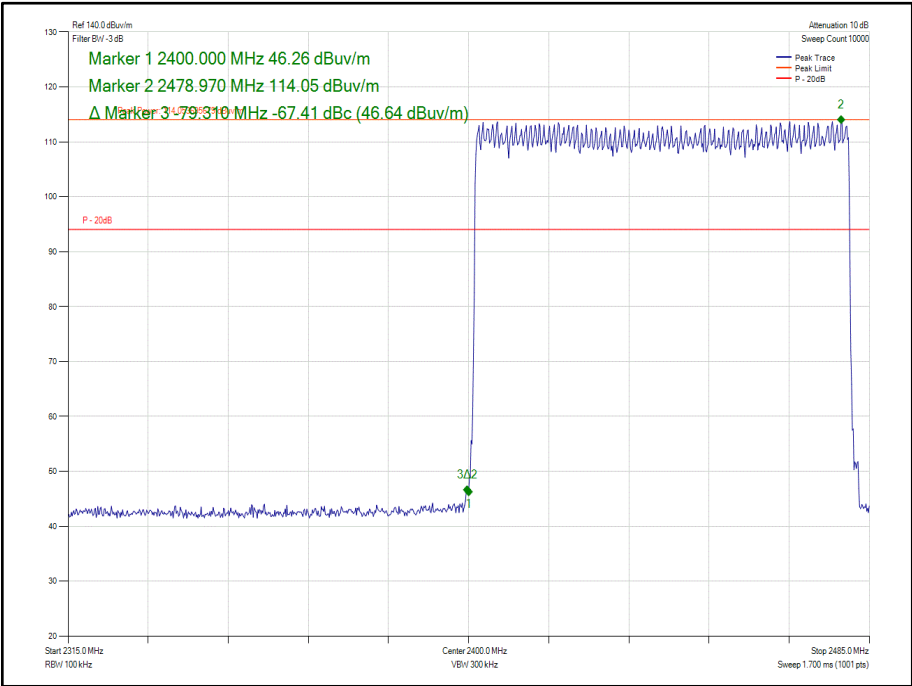


Figure 88 - Hopping - Core 0 - 8-DPSK/3DH5 - Band Edge Frequency 2400.0 MHz

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
Static	GFSK	1	DH5	2402	2400.0	-66.53
Static	$\pi/4$ DQPSK	1	2DH5	2402	2400.0	-64.20
Static	8-DPSK	1	3DH5	2402	2400.0	-65.04
Hopping	GFSK	1	DH5	2402	2400.0	-67.69
Hopping	$\pi/4$ DQPSK	1	2DH5	2402	2400.0	-67.03
Hopping	8-DPSK	1	3DH5	2402	2400.0	-65.67

Table 43 - Authorised Band Edge Results

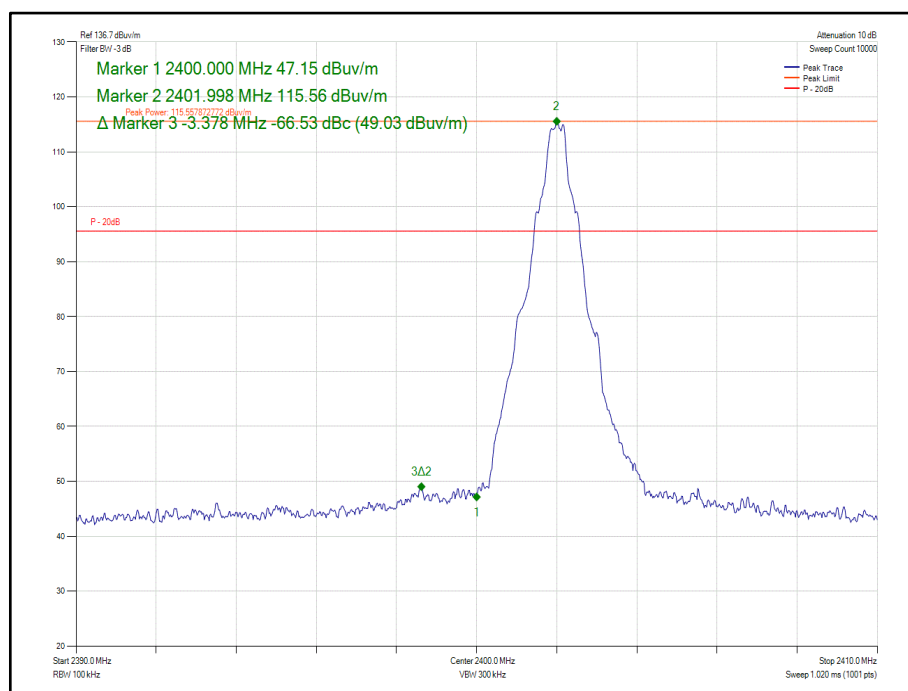


Figure 89 - Static - Core 1 - GFSK/DH5 - 2402 MHz - Band Edge Frequency 2400.0 MHz

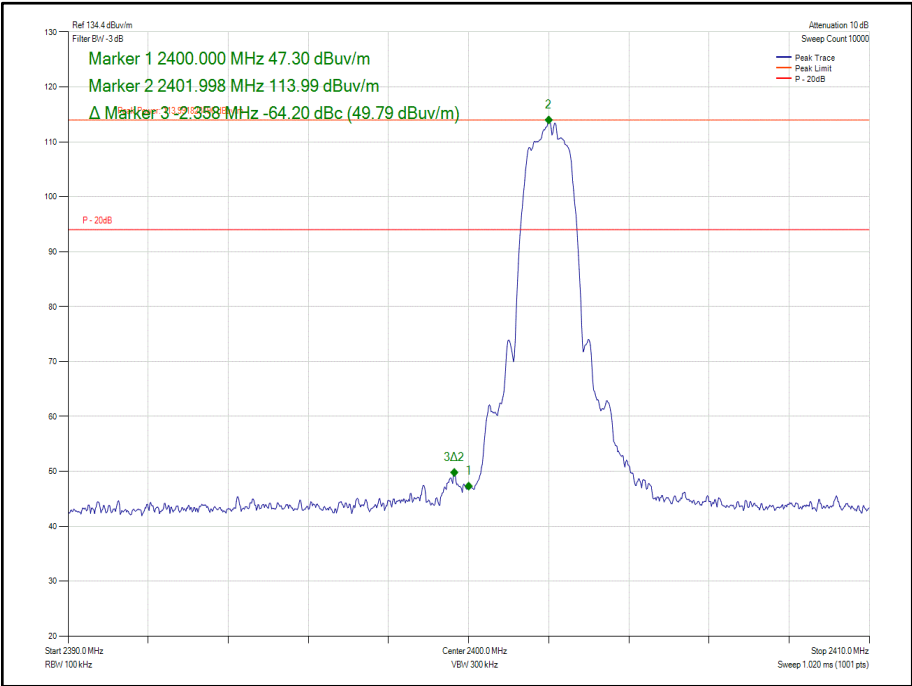


Figure 90 - Static - Core 1 - $\pi/4$ DQPSK/2DH5 - 2402 MHz -
Band Edge Frequency 2400.0 MHz

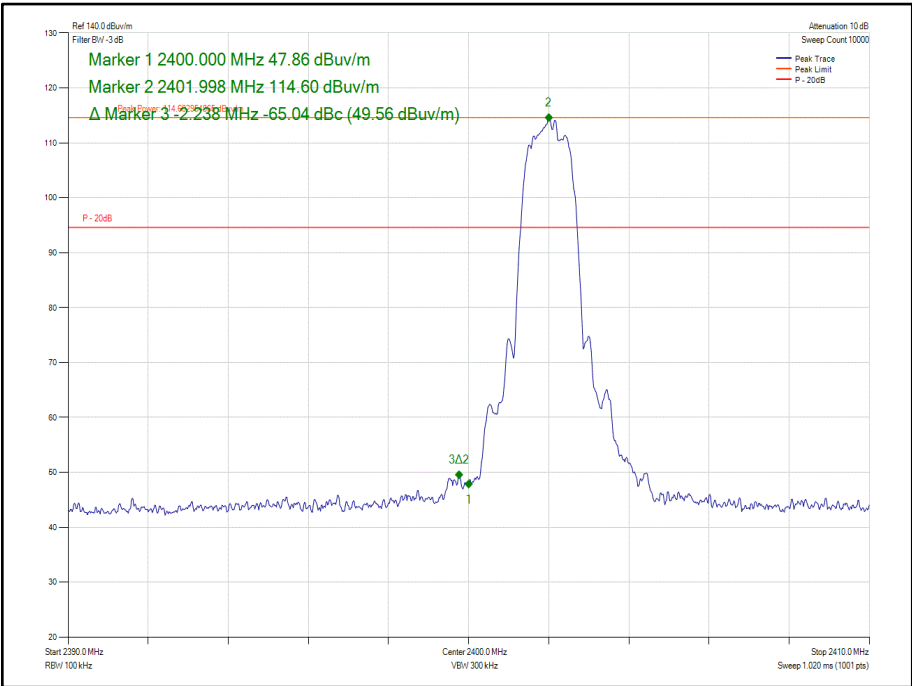


Figure 91 - Static - Core 1 - 8-DPSK/3DH5 - 2402 MHz -
Band Edge Frequency 2400.0 MHz

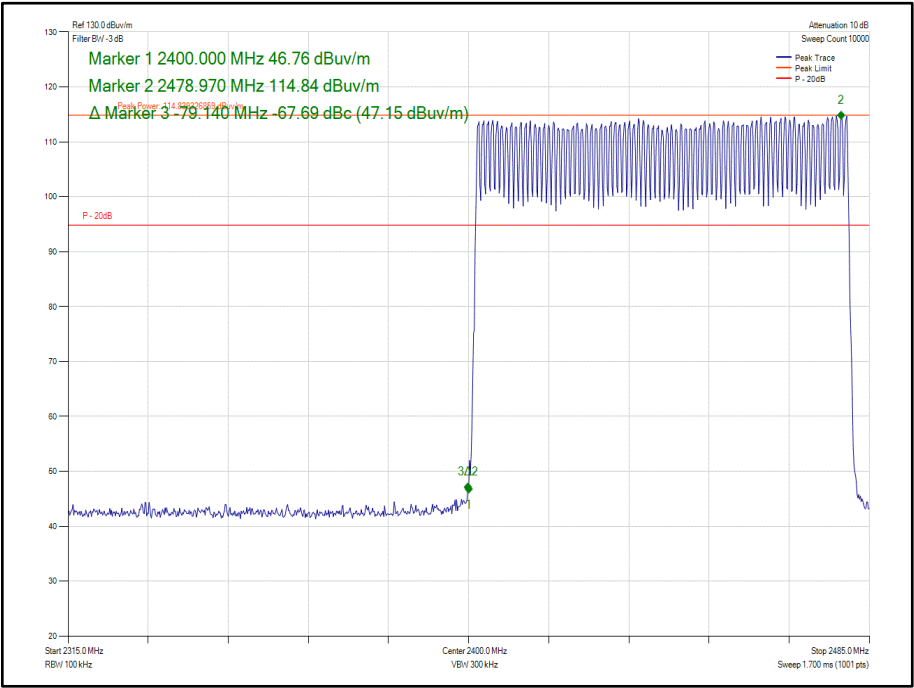


Figure 92 - Hopping - Core 1 - GFSK/DH5 - Band Edge Frequency 2400.0 MHz

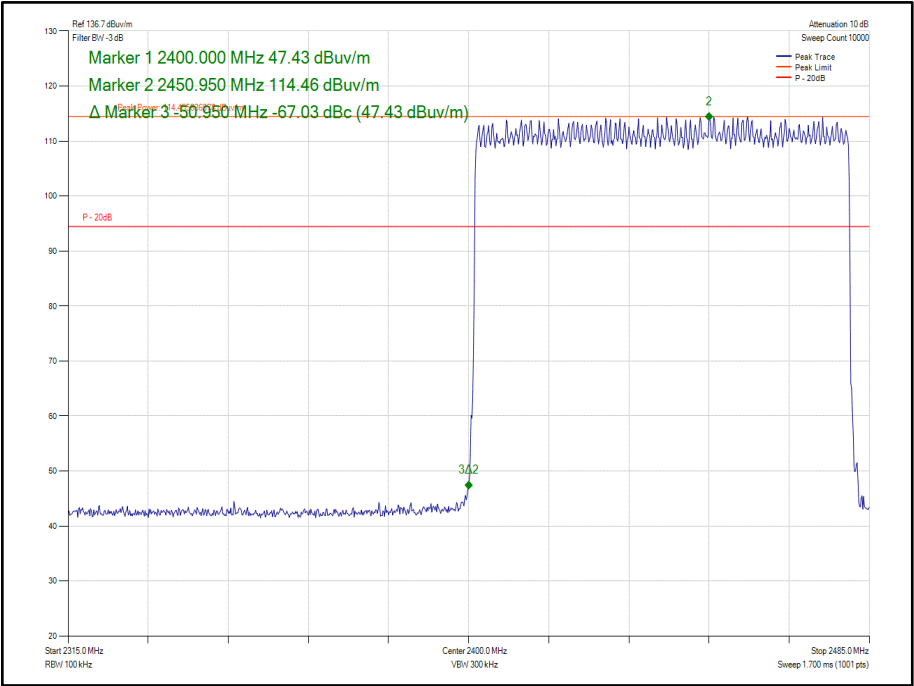


Figure 93 - Hopping - Core 1 - $\pi/4$ DQPSK/2DH5 - Band Edge Frequency 2400.0 MHz

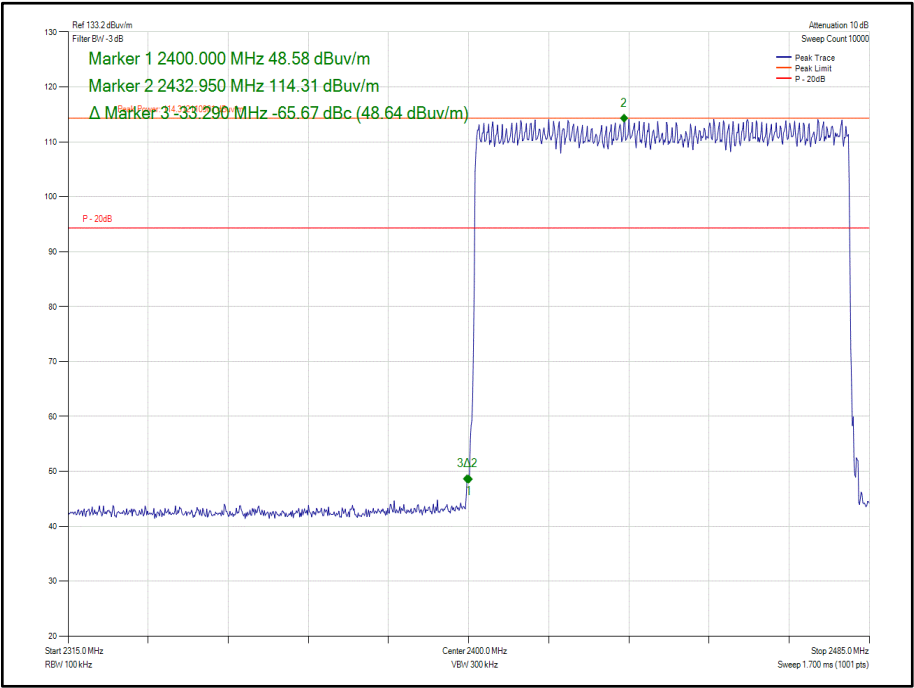
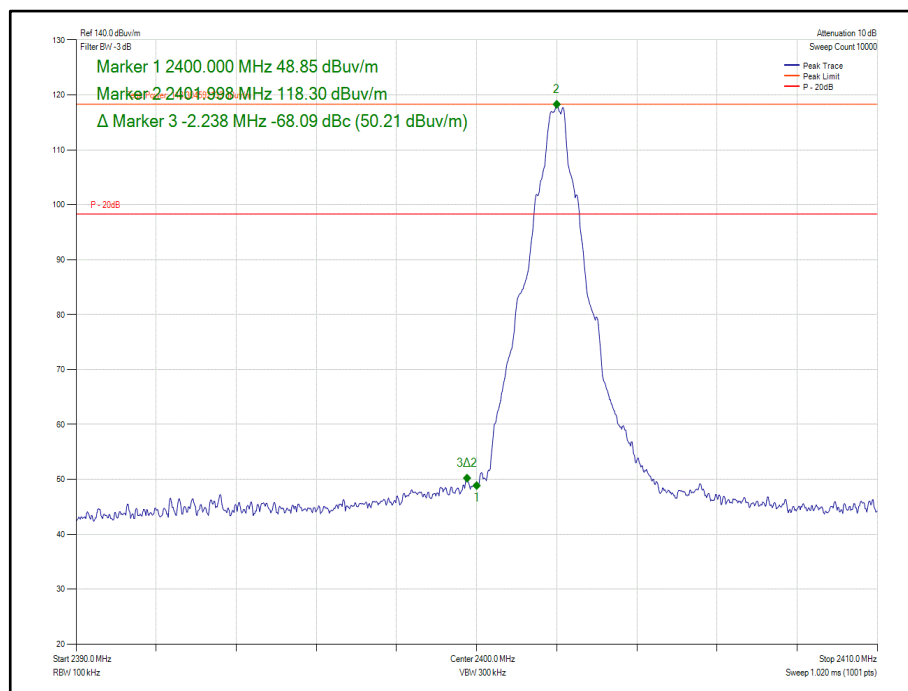


Figure 94 - Hopping - Core 1 - 8-DPSK/3DH5 - Band Edge Frequency 2400.0 MHz

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
Static	GFSK	0-1	DH5	2402	2400.0	-68.09
Static	$\pi/4$ DQPSK	0-1	2DH5	2402	2400.0	-67.98
Static	8-DPSK	0-1	3DH5	2402	2400.0	-68.29
Hopping	GFSK	0-1	DH5	2402	2400.0	-69.13
Hopping	$\pi/4$ DQPSK	0-1	2DH5	2402	2400.0	-67.91
Hopping	8-DPSK	0-1	3DH5	2402	2400.0	-67.50

Table 44 - MIMO 2TX Authorised Band Edge Results



**Figure 95 - Static - Core 0-1- GFSK/DH5 - 2402 MHz -
Band Edge Frequency 2400.0 MHz**

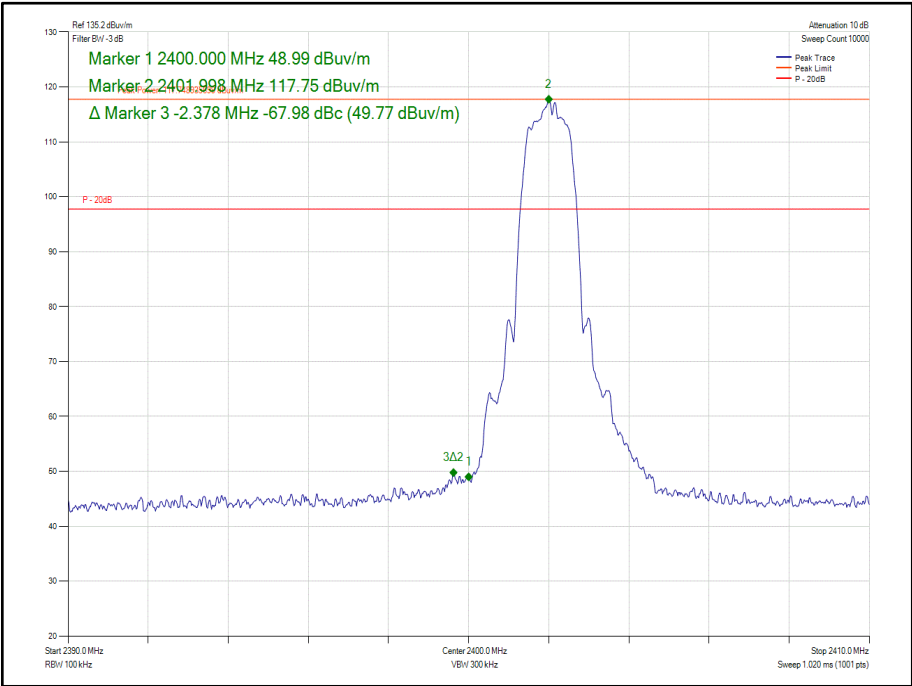


Figure 96 - Static - Core 0-1- $\pi/4$ DQPSK/2DH5 - 2402 MHz -
Band Edge Frequency 2400.0 MHz

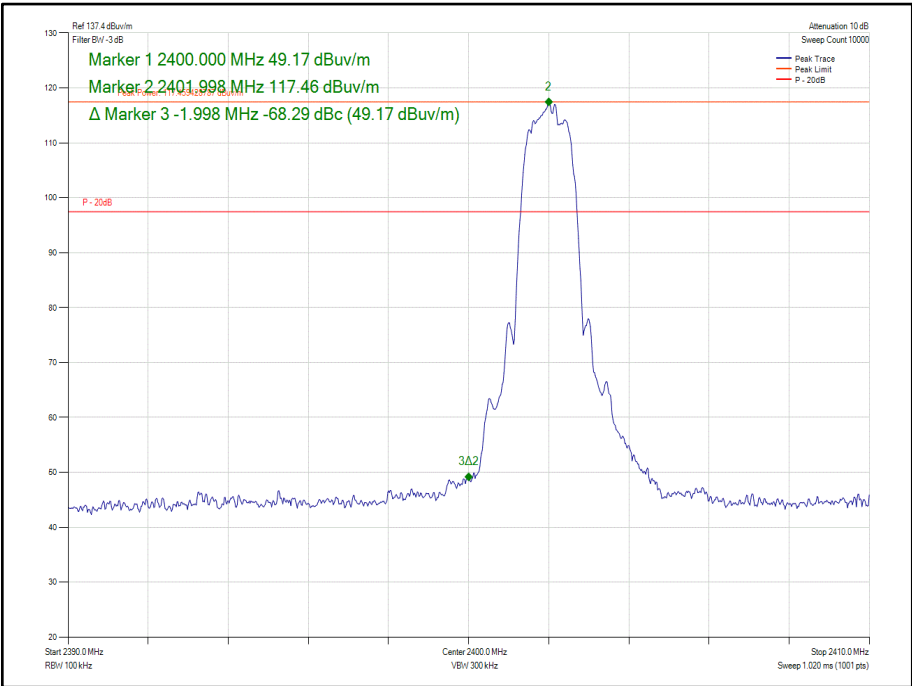


Figure 97 - Static Core 0-1- 8-DPSK/3DH5 - 2402 MHz -
Band Edge Frequency 2400.0 MHz

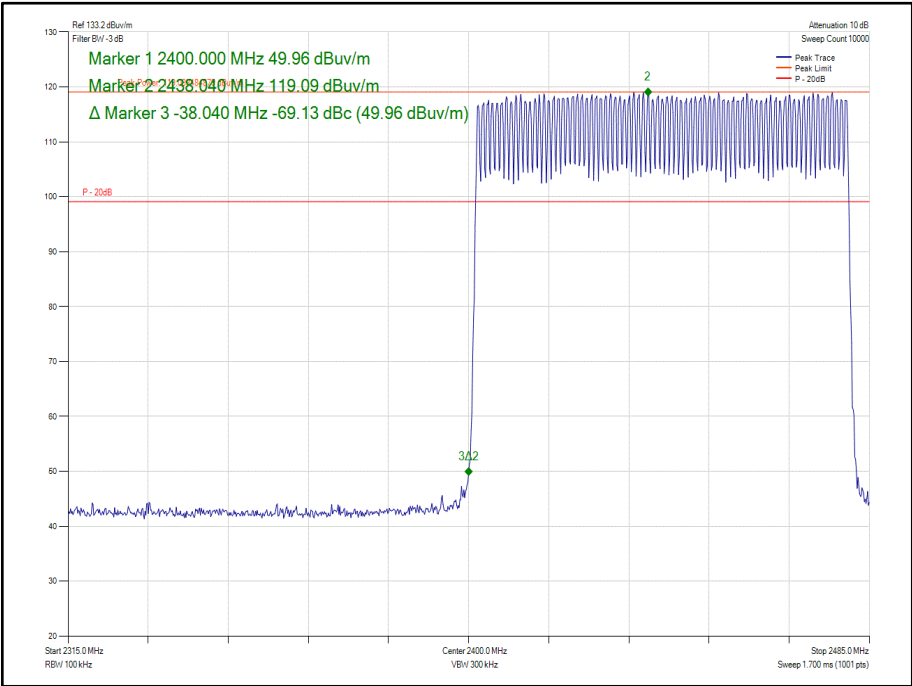


Figure 98 - Hopping - Core 0-1- GFSK/DH5 - Band Edge Frequency 2400.0 MHz

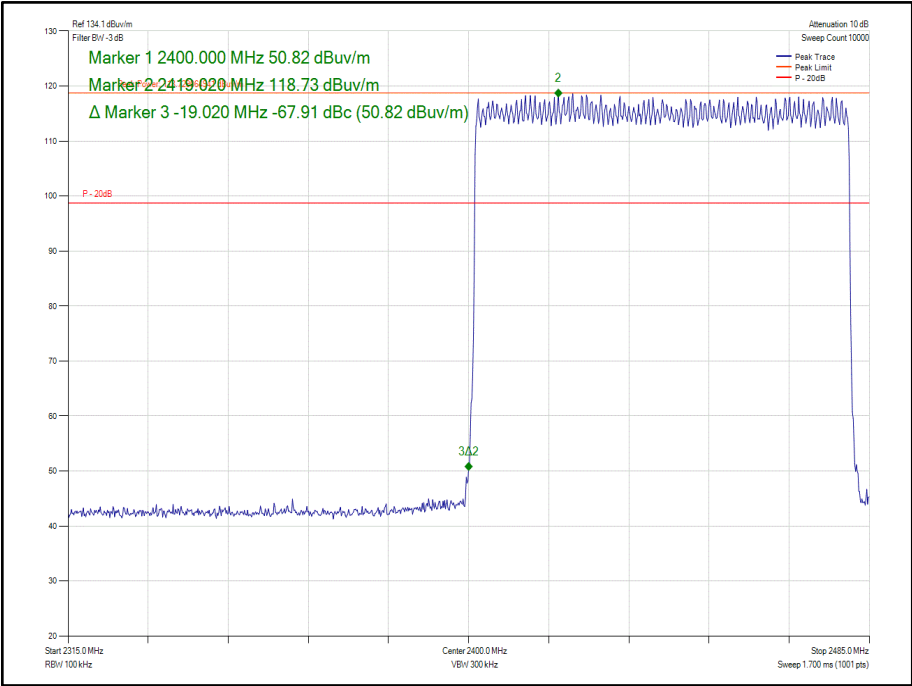


Figure 99 - Hopping - Core 0-1- $\pi/4$ DQPSK/2DH5 - Band Edge Frequency 2400.0 MHz

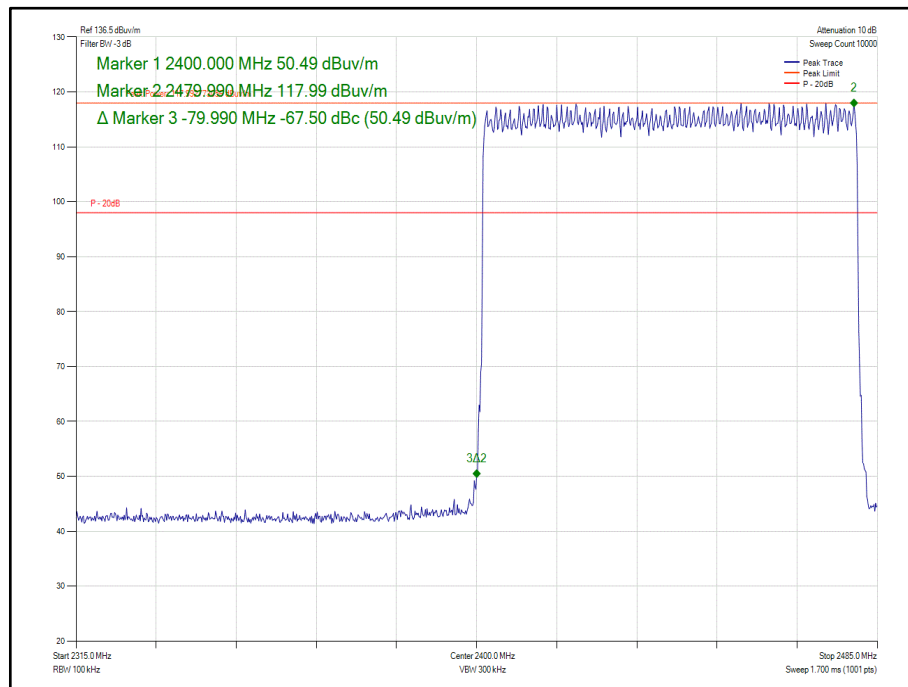


Figure 100 - Hopping - Core 0-1- 8-DPSK/3DH5 - Band Edge Frequency 2400.0 MHz

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
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	5475	12	17-Mar-2021
Attenuator 5W 10dB DC-18GHz	Aaren	AT40A-4041-D18-10	5494	12	14-Apr-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

Table 45

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment



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

A2337, S/N: C02D200EQ9MQ - Modification State 0

2.7.3 Date of Test

03-August-2020 to 06-August-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 20.7-23.2 °C
Relative Humidity 48.1-56.8 %

2.7.6 Test Results

2.4 GHz Bluetooth (FHSS)

iPA

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
Static	GFSK	0	DH5	2402	2390.0	53.37	39.45
Static	π/4 DQPSK	0	2DH5	2402	2390.0	54.21	39.37
Static	8-DPSK	0	3DH5	2402	2390.0	53.35	39.38
Static	GFSK	0	DH5	2480	2483.5	55.93	41.43
Static	π/4 DQPSK	0	2DH5	2480	2483.5	52.78	40.70
Static	8-DPSK	0	3DH5	2480	2483.5	53.64	40.64

Table 46 - Restricted Band Edge Results

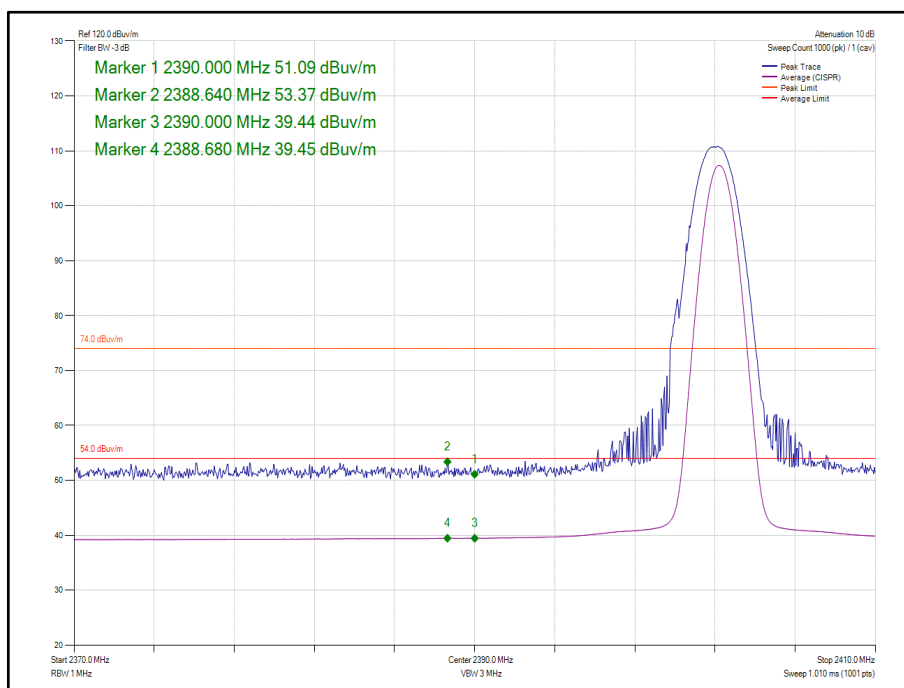


Figure 101 - Core 0 - GFSK/DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

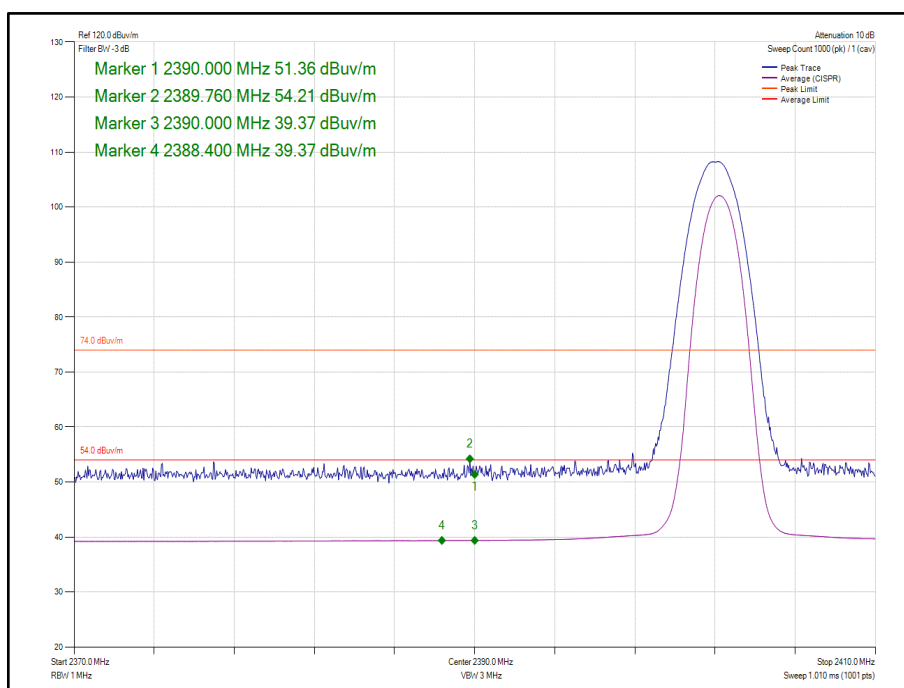


Figure 102 - Core 0 - $\pi/4$ DQPSK/2DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

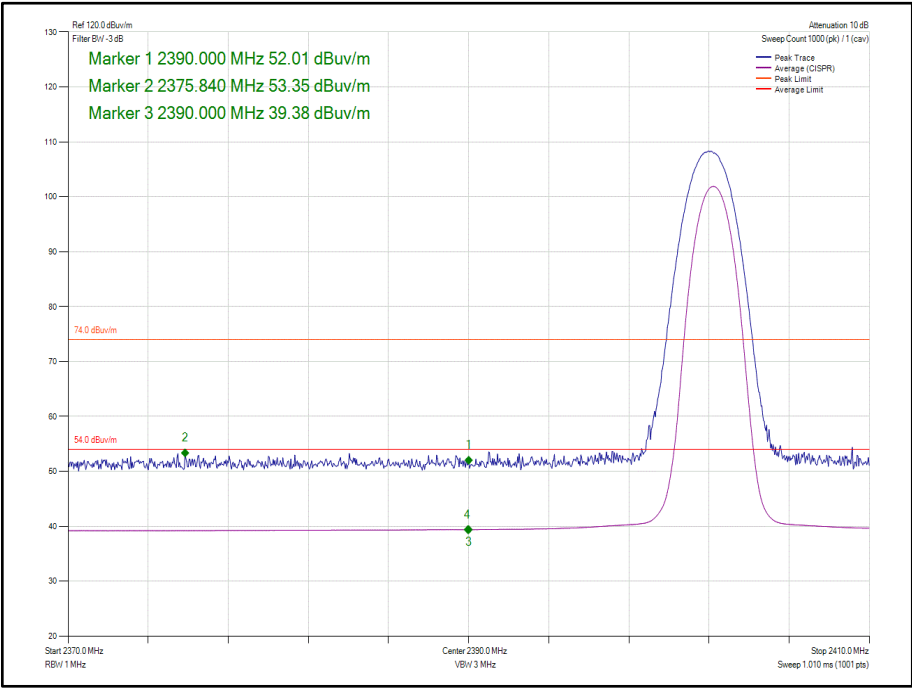


Figure 103 - Core 0 - 8-DPSK/3DH5 - 2402 MHz Band Edge Frequency 2390.0 MHz

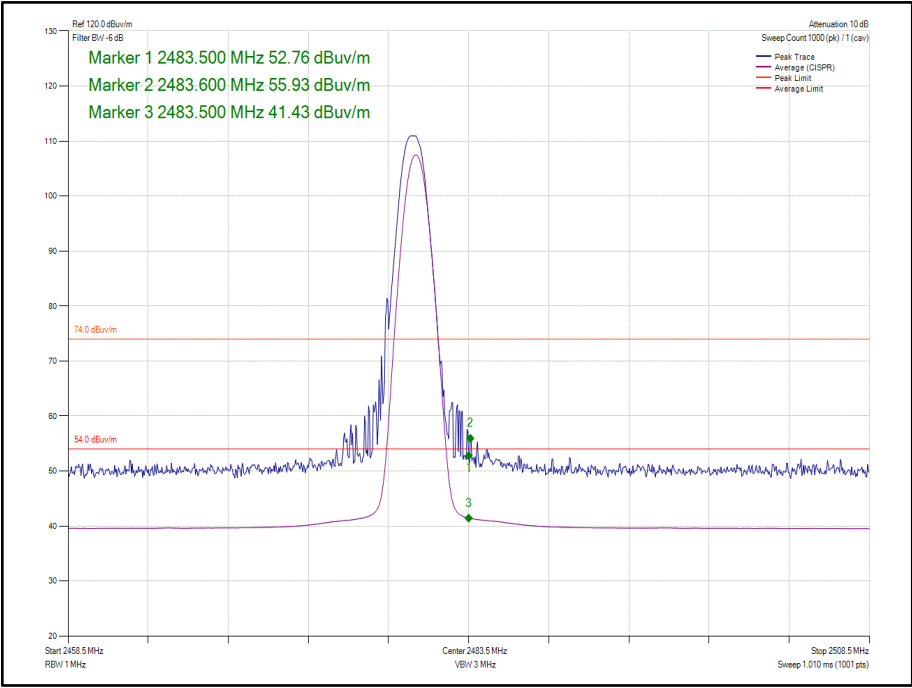


Figure 104 - Core 0 - GFSK/DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

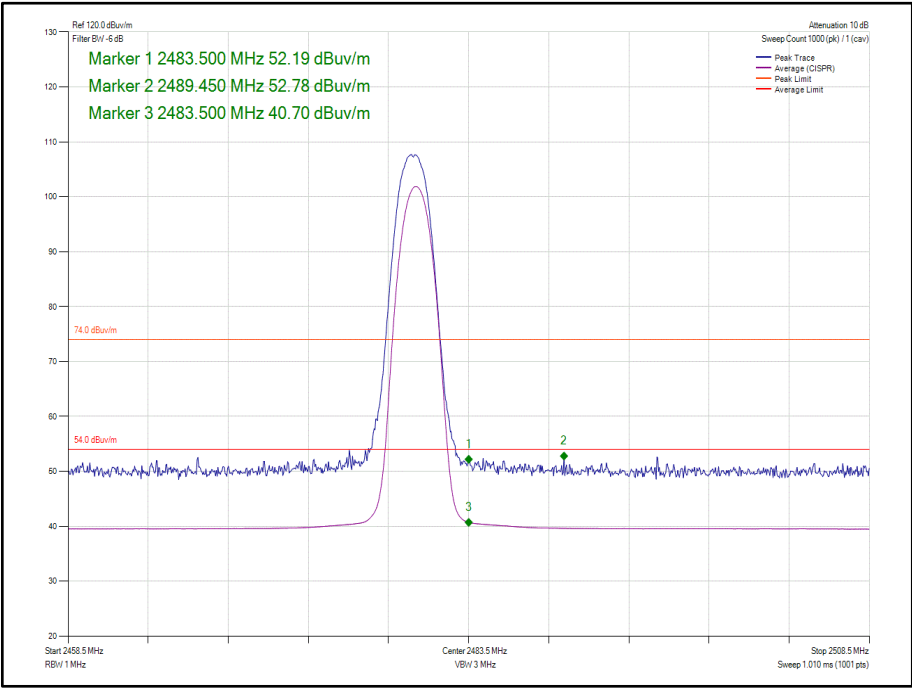


Figure 105 - Core 0 - $\pi/4$ DQPSK/2DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

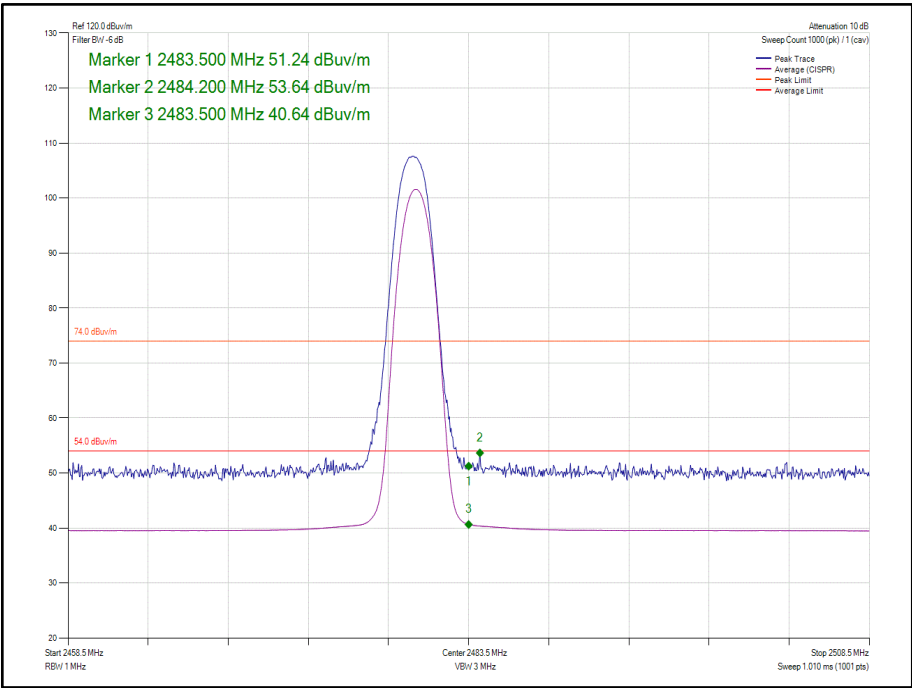


Figure 106 - Core 0 - 8-DPSK/3DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
Static	GFSK	1	DH5	2402	2390.0	53.36	39.42
Static	$\pi/4$ DQPSK	1	2DH5	2402	2390.0	53.51	39.39
Static	8-DPSK	1	3DH5	2402	2390.0	53.35	39.36
Static	GFSK	1	DH5	2480	2483.5	60.33	41.82
Static	$\pi/4$ DQPSK	1	2DH5	2480	2483.5	52.57	41.05
Static	8-DPSK	1	3DH5	2480	2483.5	53.94	40.98

Table 47 - Restricted Band Edge Results

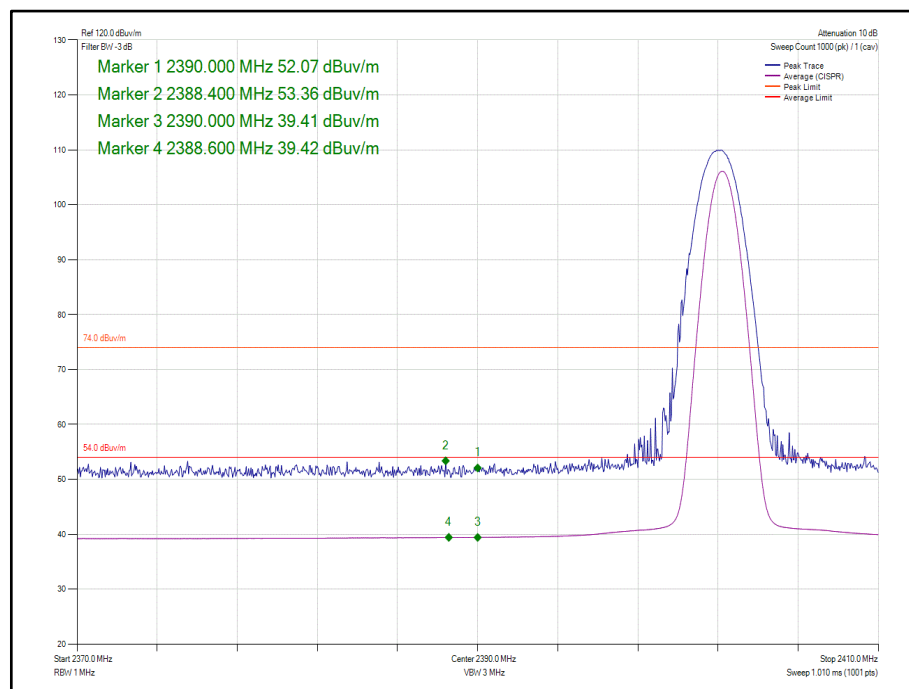


Figure 107 - Core 1 - GFSK/DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

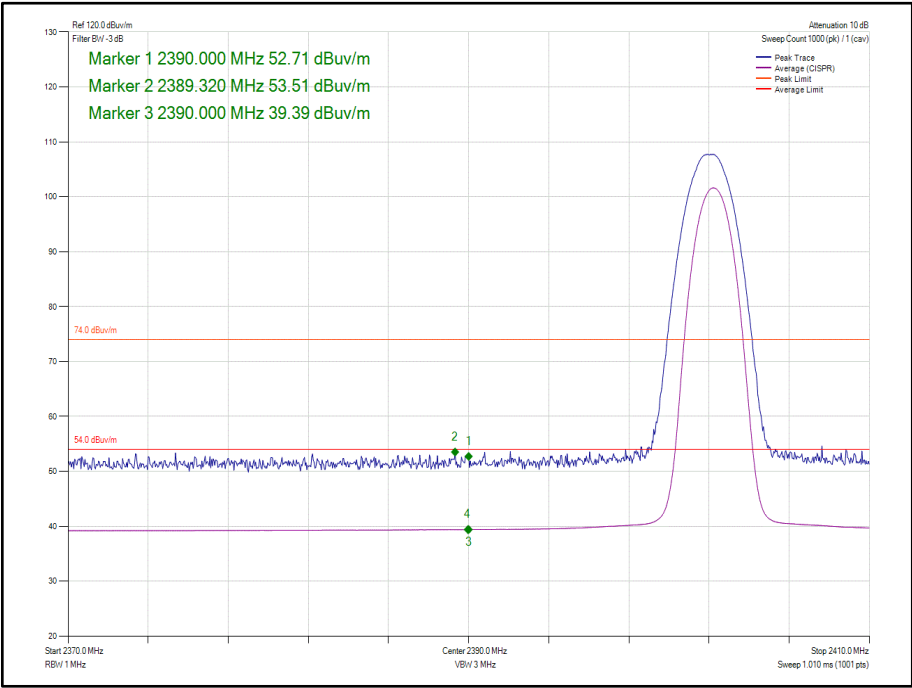


Figure 108 - Core 1 - $\pi/4$ DQPSK/2DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

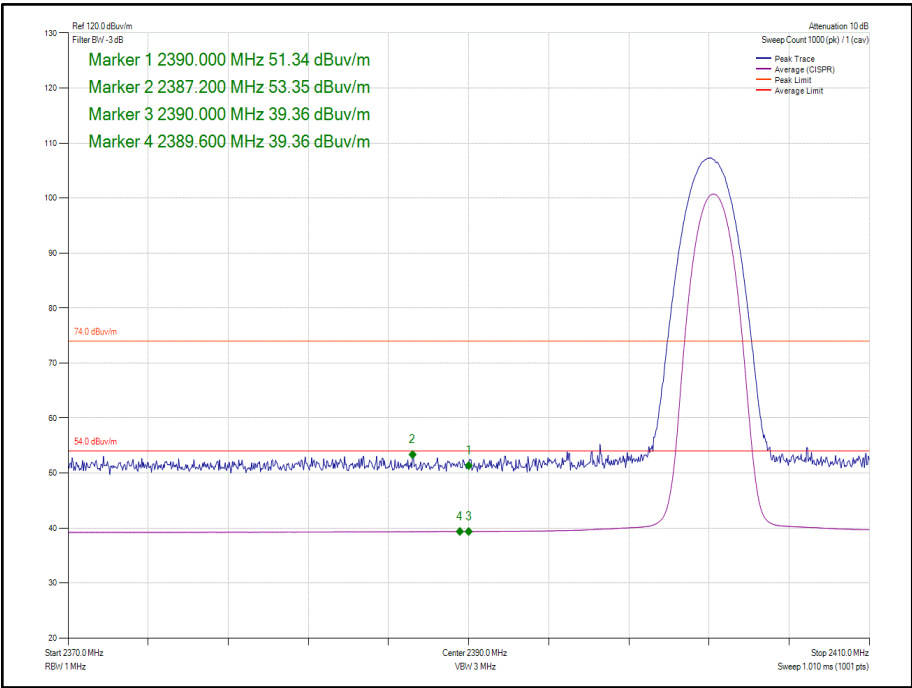


Figure 109 - Core 1 - 8-DPSK/3DH5 - 2402 MHz Band Edge Frequency 2390.0 MHz

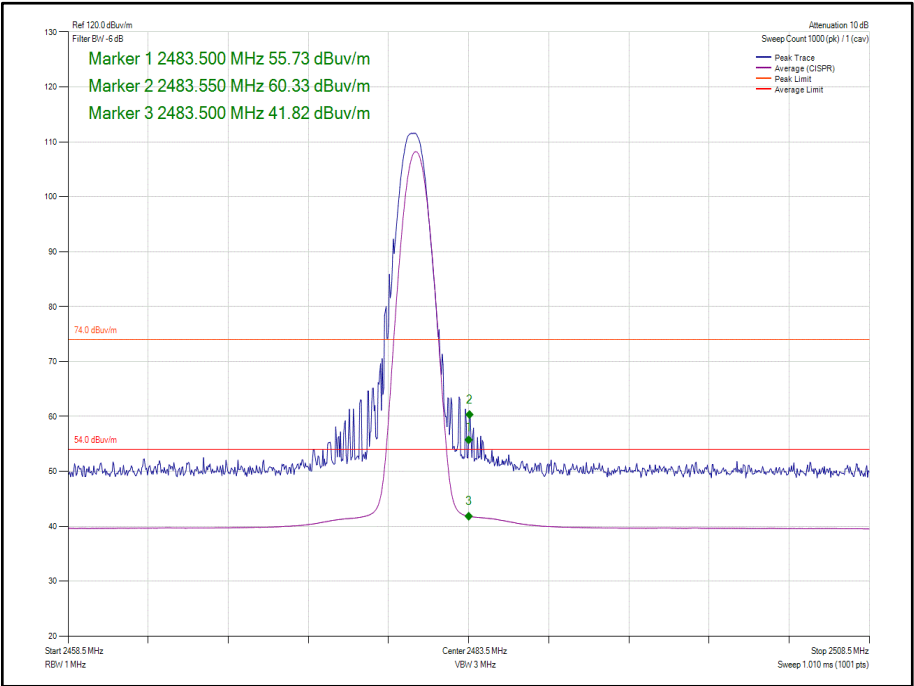


Figure 110 - Core 1 - GFSK/DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

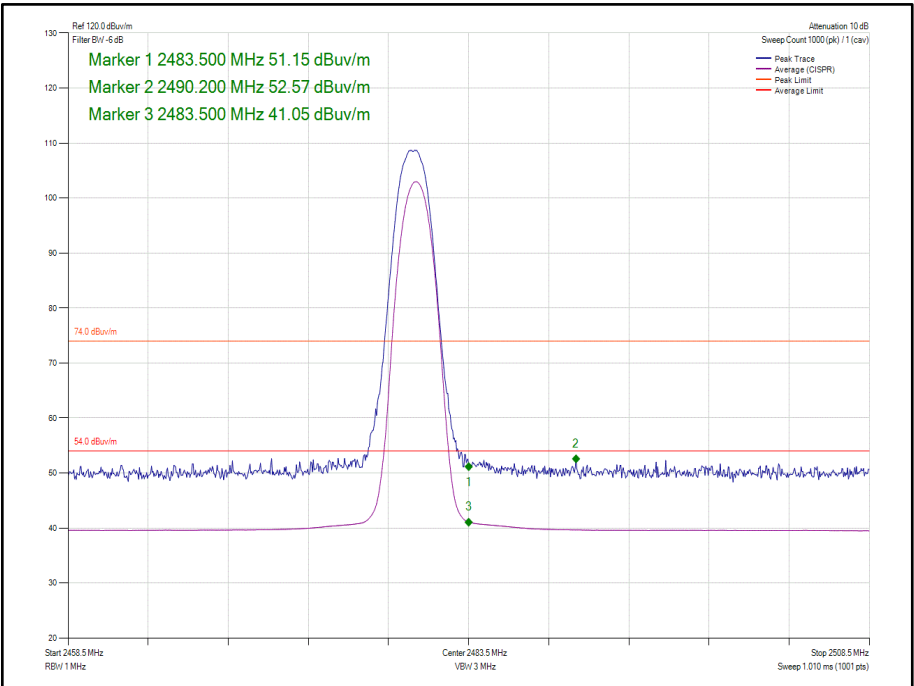


Figure 111 - Core 1 - $\pi/4$ DQPSK/2DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

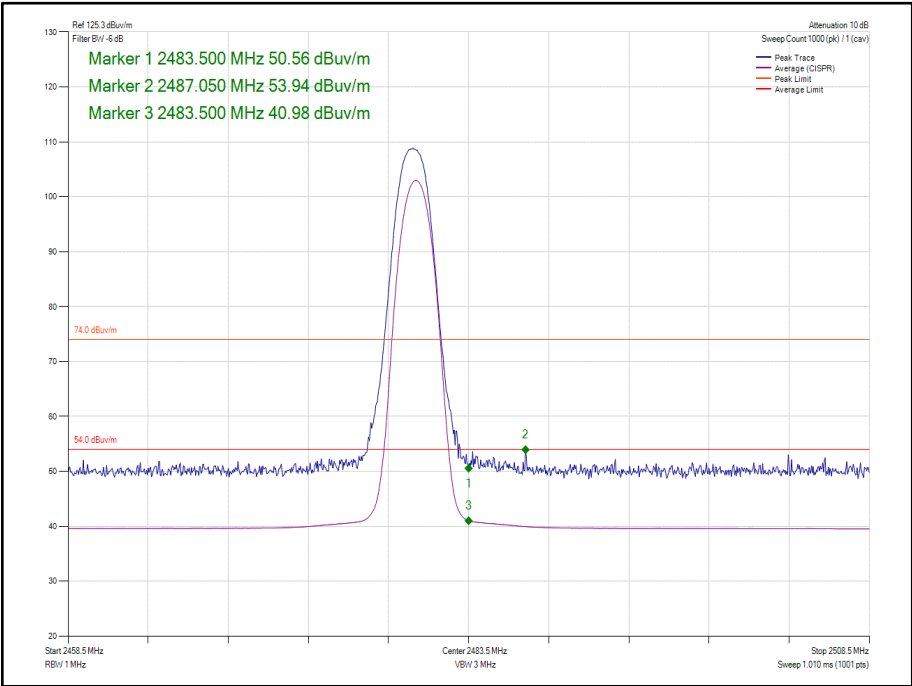


Figure 112 - Core 1 - 8-DPSK/3DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
Static	GFSK	0-1	DH5	2402	2390.0	53.85	39.45
Static	$\pi/4$ DQPSK	0-1	2DH5	2402	2390.0	53.67	39.40
Static	8-DPSK	0-1	3DH5	2402	2390.0	53.43	39.40
Static	GFSK	0-1	DH5	2480	2483.5	60.10	41.30
Static	$\pi/4$ DQPSK	0-1	2DH5	2480	2483.5	52.53	41.01
Static	8-DPSK	0-1	3DH5	2480	2483.5	52.72	41.12

Table 48 - MIMO 2Tx Restricted Band Edge Results

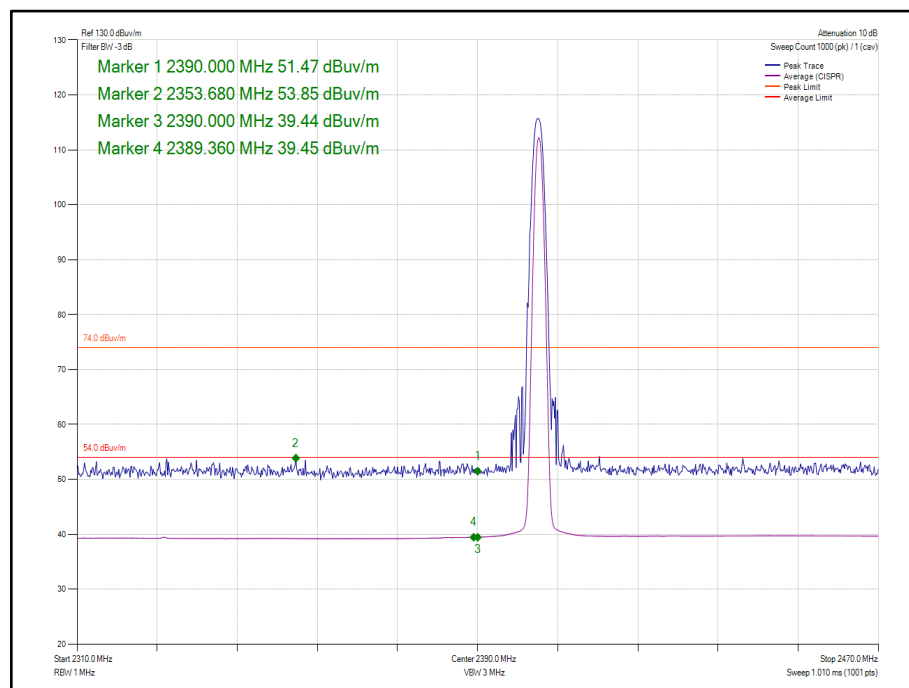


Figure 113 - Core 0-1- GFSK/DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

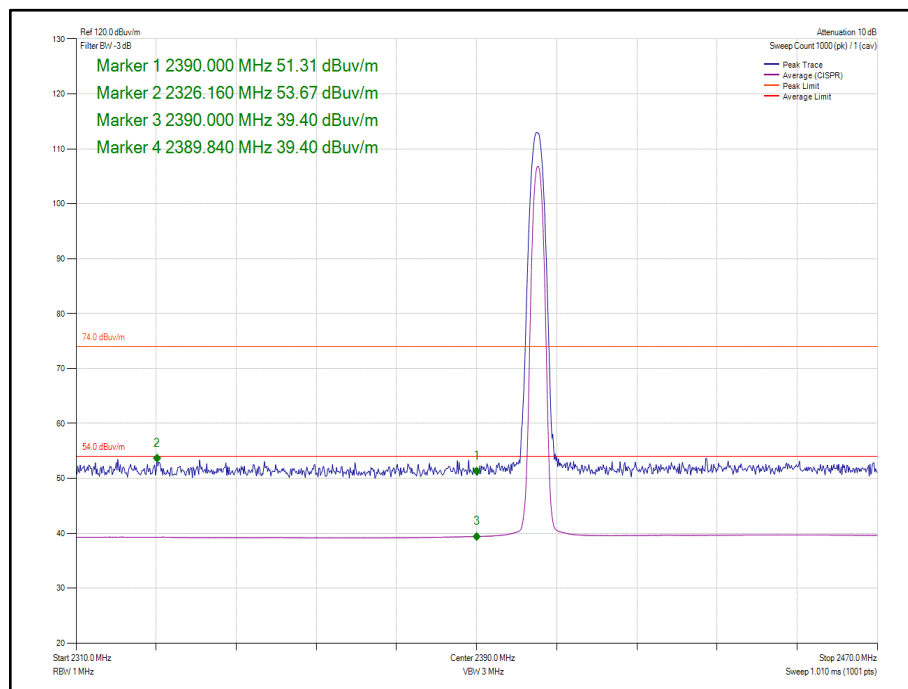


Figure 114 - Core 0-1- $\pi/4$ DQPSK/2DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

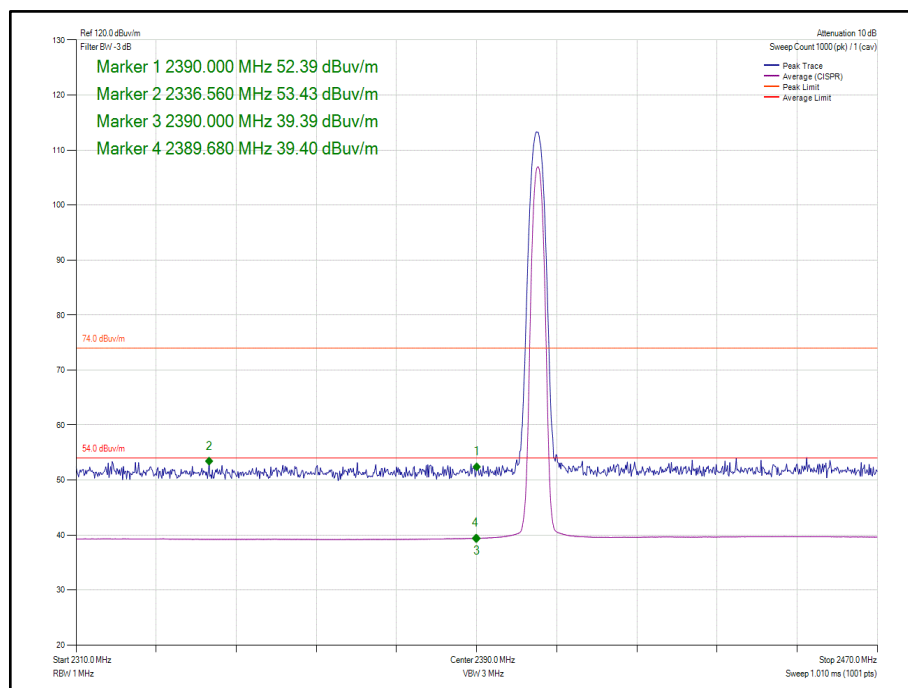


Figure 115 - Core 0-1- 8-DPSK/3DH5 - 2402 MHz Band Edge Frequency 2390.0 MHz

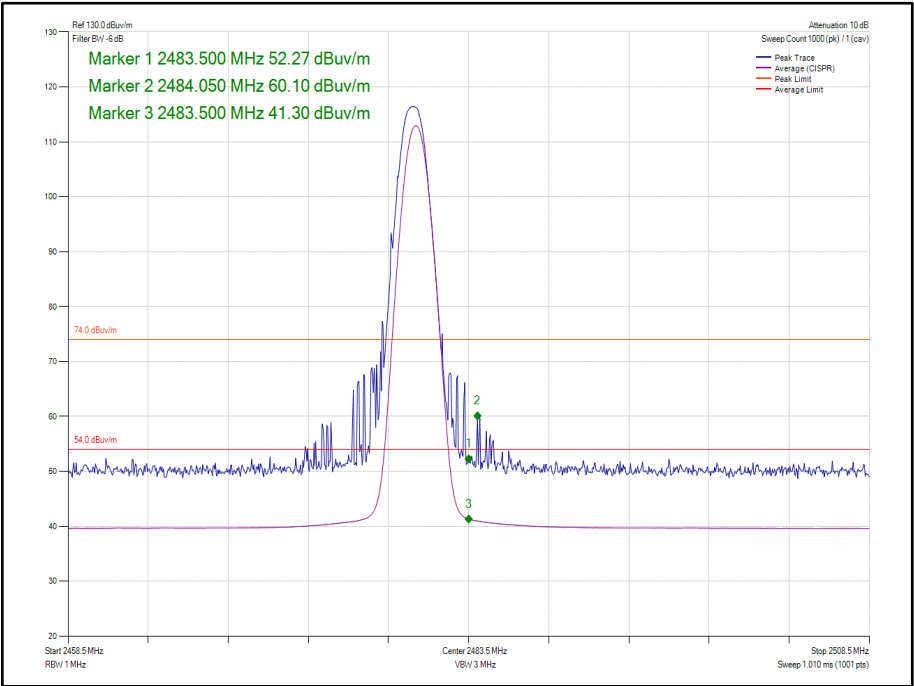


Figure 116 - Core 0-1- GFSK/DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

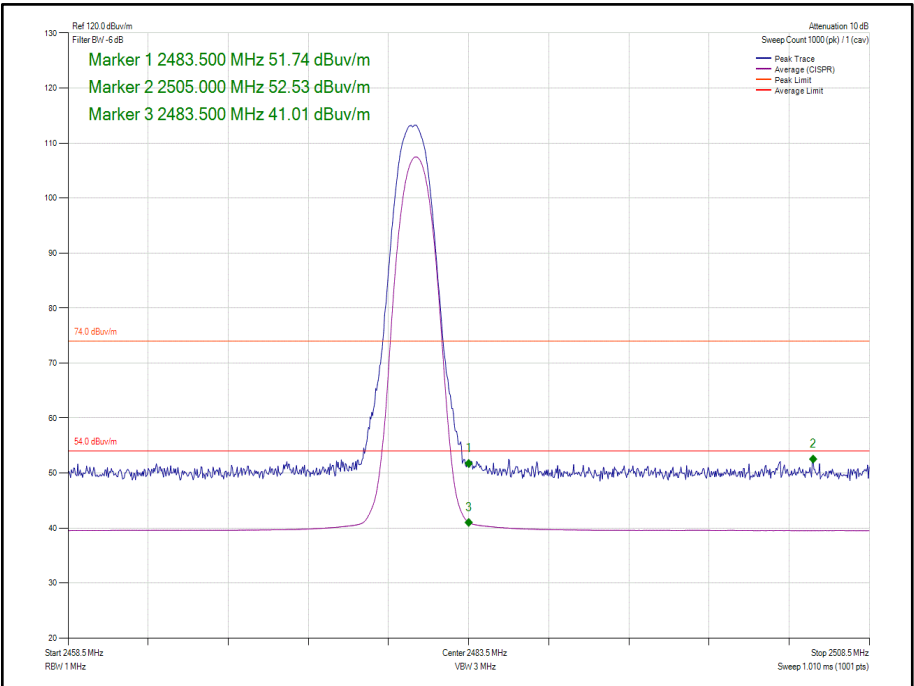


Figure 117 - Core 0-1- $\pi/4$ DQPSK/2DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

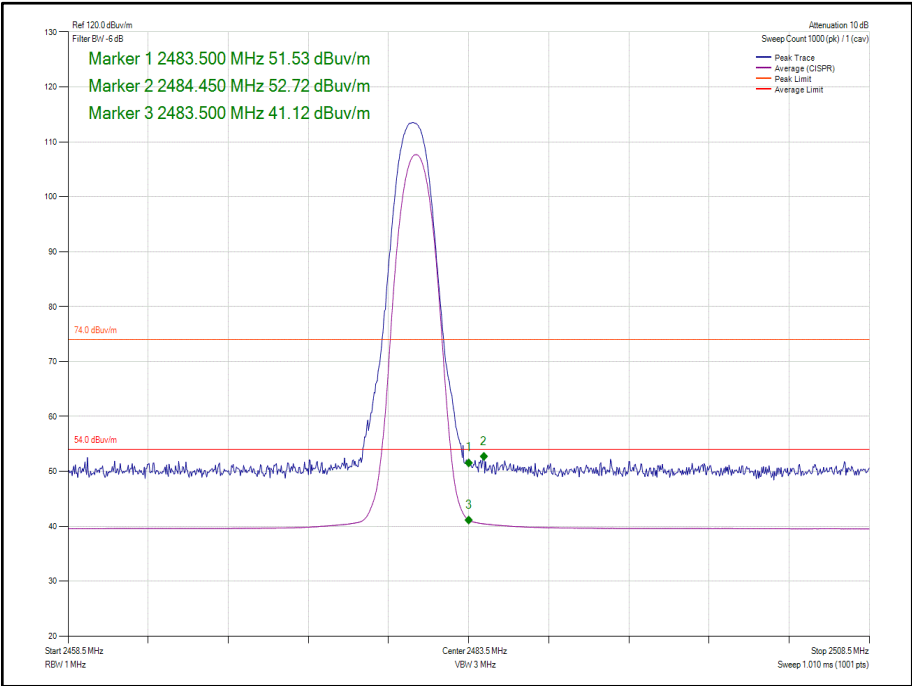


Figure 118 - Core 0-1- 8-DPSK/3DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

ePA

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
Static	GFSK	0	DH5	2402	2390.0	55.62	39.78
Static	$\pi/4$ DQPSK	0	2DH5	2402	2390.0	54.72	40.02
Static	8-DPSK	0	3DH5	2402	2390.0	55.62	40.04
Static	GFSK	0	DH5	2480	2483.5	55.63	43.04
Static	$\pi/4$ DQPSK	0	2DH5	2480	2483.5	54.79	42.46
Static	8-DPSK	0	3DH5	2480	2483.5	54.17	42.39

Table 49 - Restricted Band Edge Results

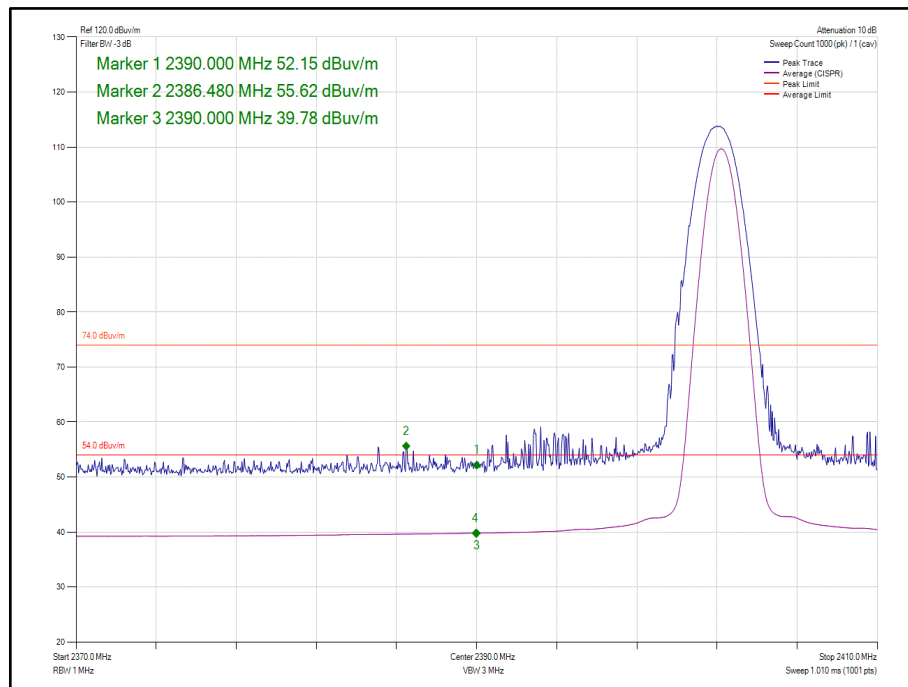


Figure 119 - Core 0 - GFSK/DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

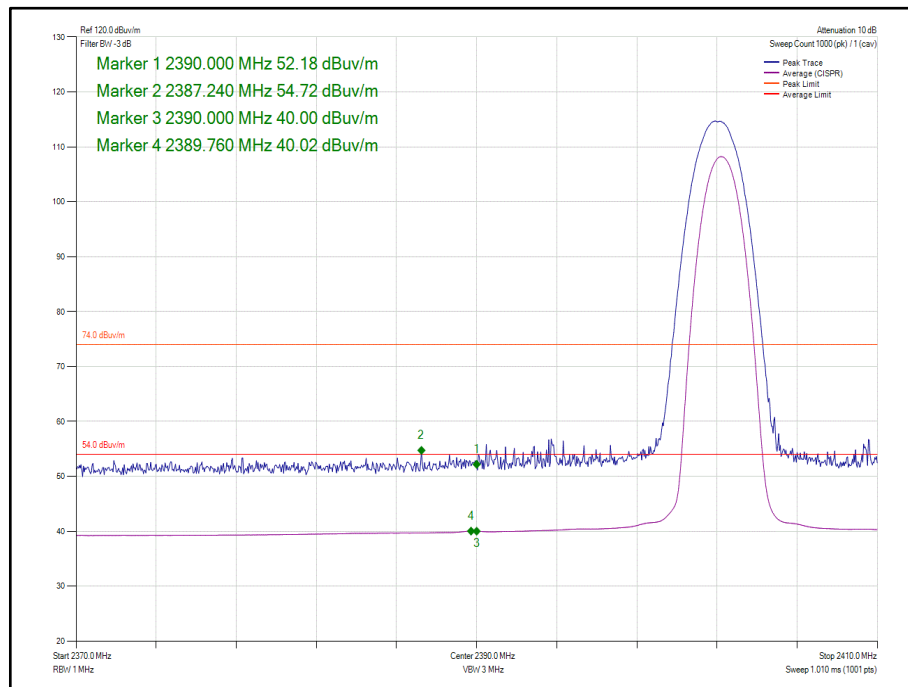


Figure 120 - Core 0 - $\pi/4$ DQPSK/2DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

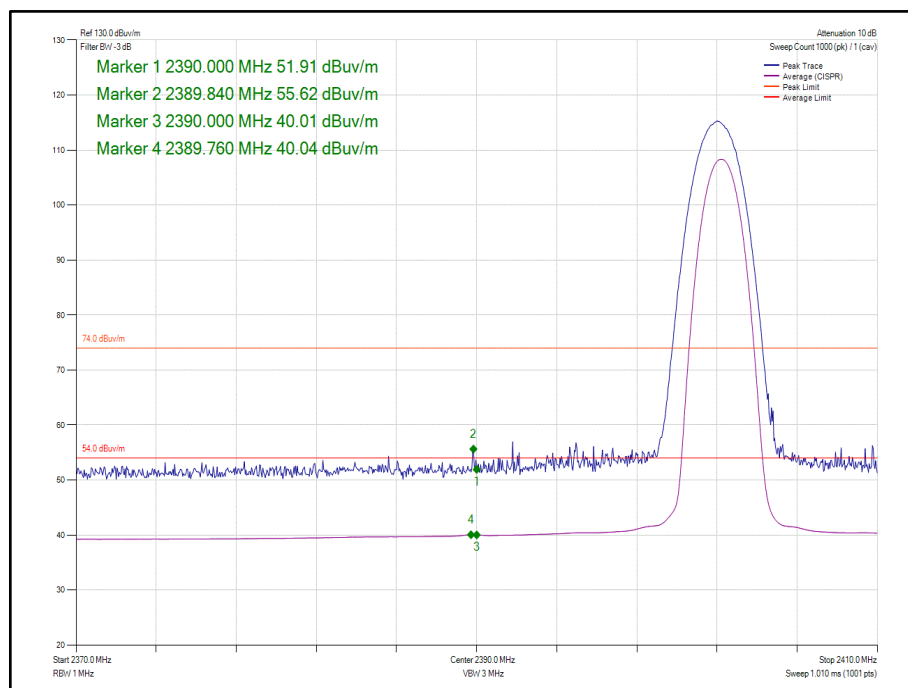


Figure 121 - Core 0 - 8-DPSK/3DH5 - 2402 MHz Band Edge Frequency 2390.0 MHz

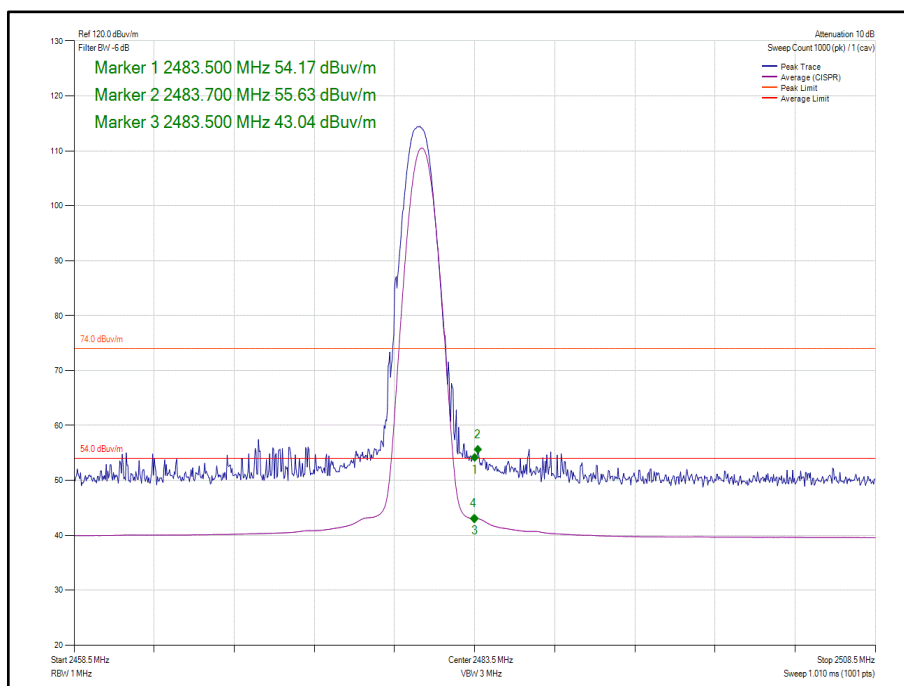


Figure 122 - Core 0 - GFSK/DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

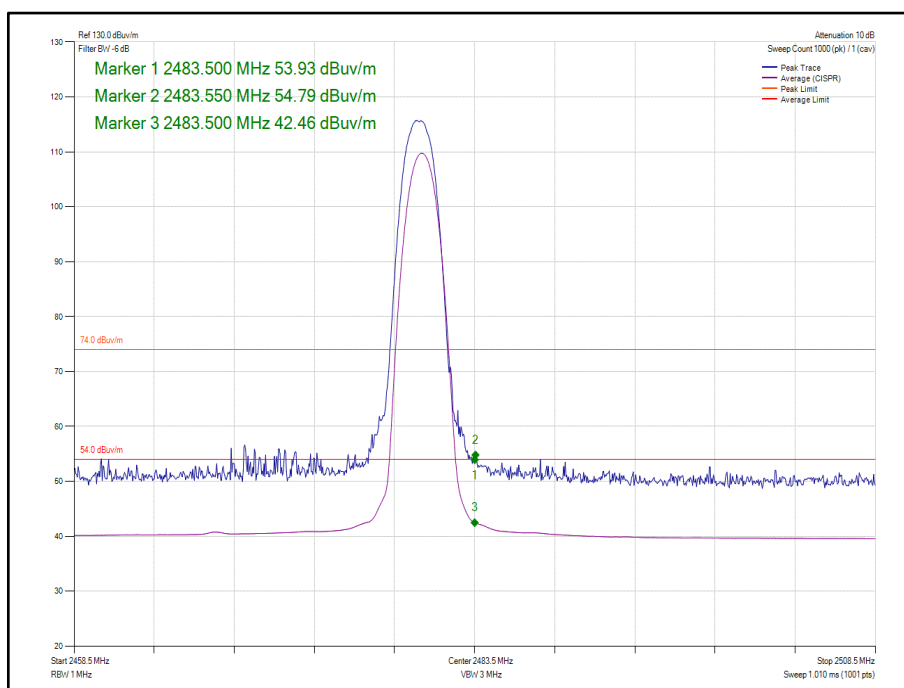


Figure 123 - Core 0 - $\pi/4$ DQPSK/2DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

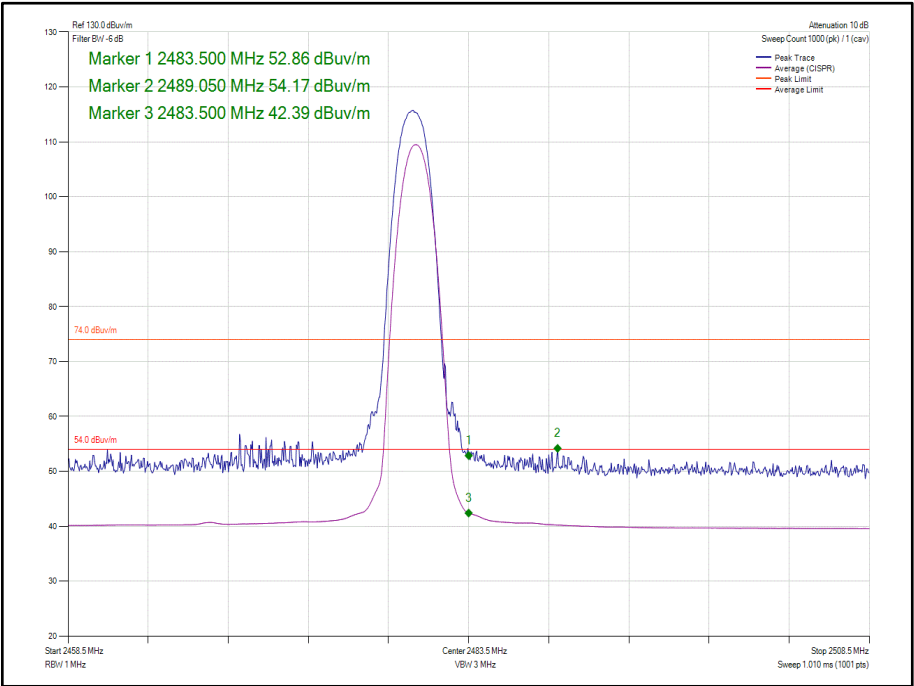


Figure 124 - Core 0 - 8-DPSK/3DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
Static	GFSK	1	DH5	2402	2390.0	57.45	40.16
Static	$\pi/4$ DQPSK	1	2DH5	2402	2390.0	54.37	40.23
Static	8-DPSK	1	3DH5	2402	2390.0	57.66	40.60
Static	GFSK	1	DH5	2480	2483.5	56.66	43.99
Static	$\pi/4$ DQPSK	1	2DH5	2480	2483.5	54.26	42.63
Static	8-DPSK	1	3DH5	2480	2483.5	55.77	42.71

Table 50 - Restricted Band Edge Results

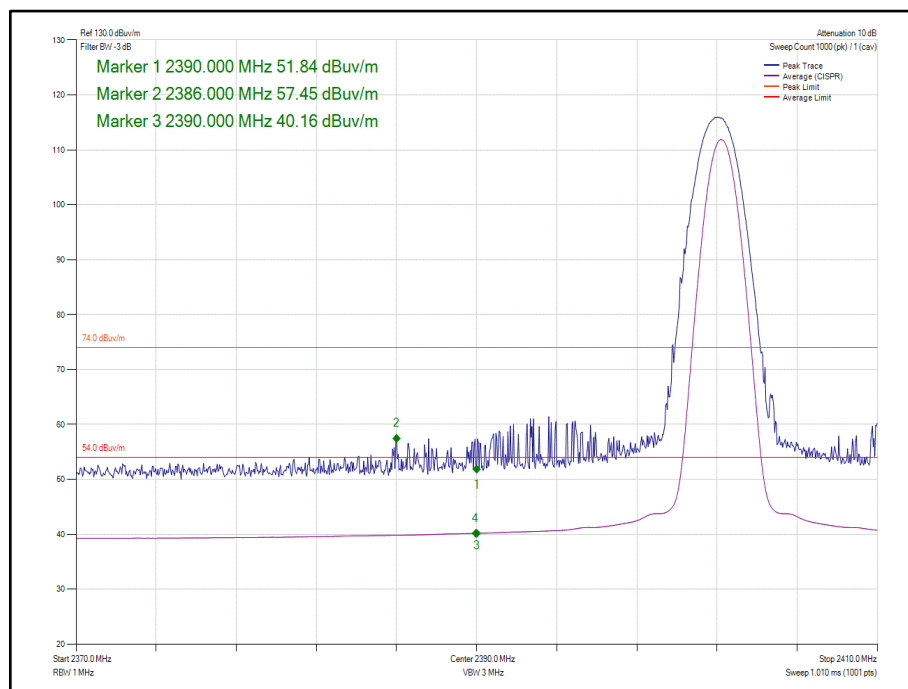


Figure 125 - Core 1 - GFSK/DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

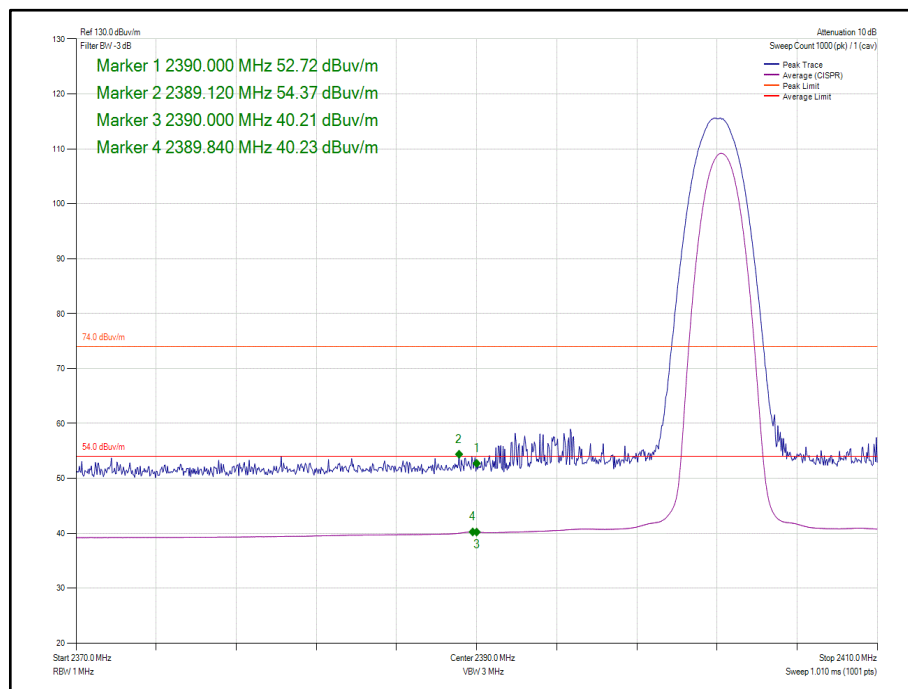


Figure 126 - Core 1 - $\pi/4$ DQPSK/2DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

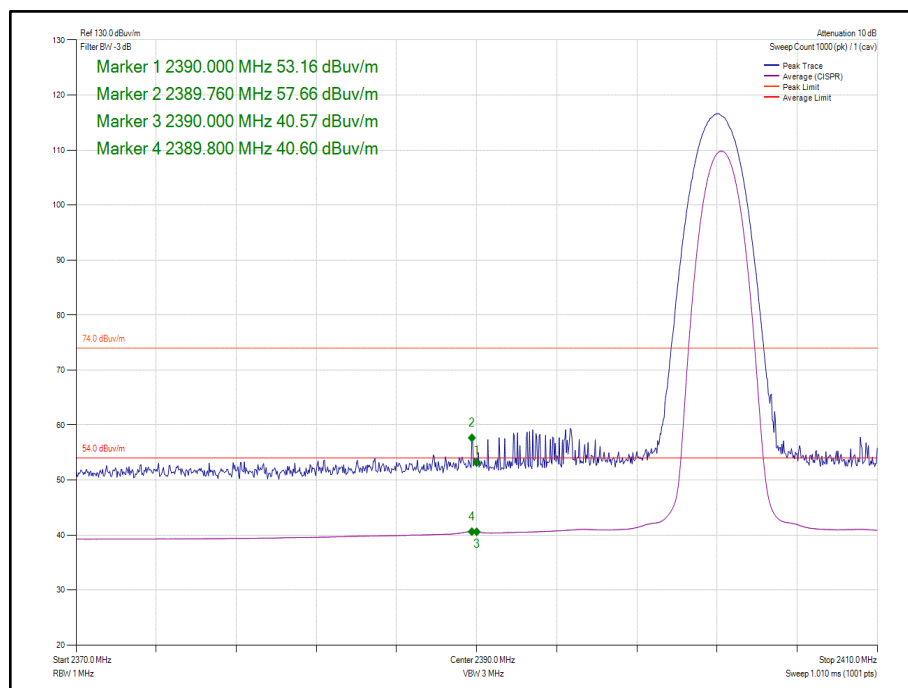


Figure 127 - Core 1 - 8-DPSK/3DH5 - 2402 MHz Band Edge Frequency 2390.0 MHz

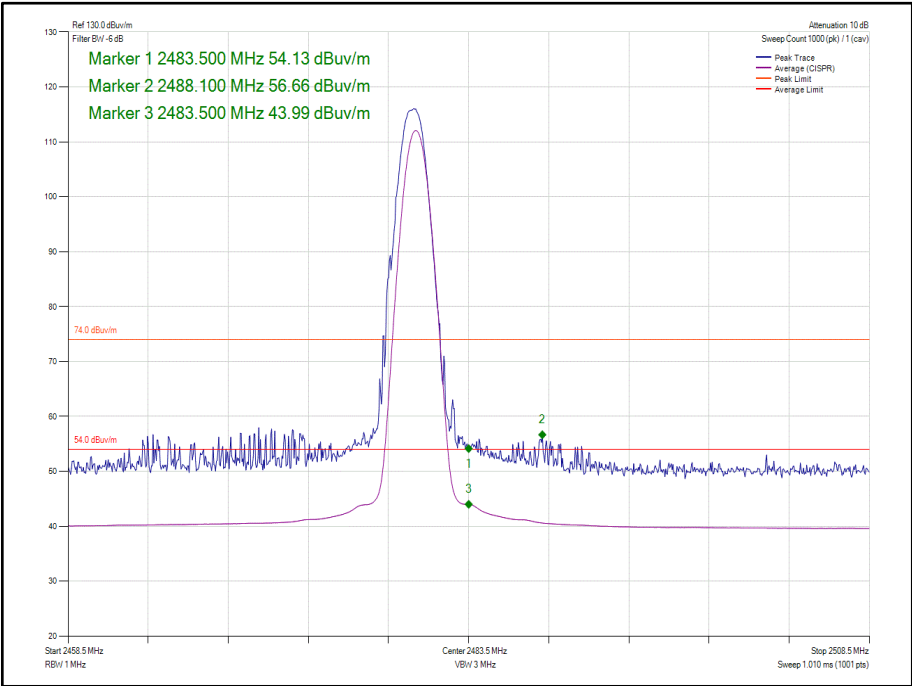


Figure 128 - Core 1 - GFSK/DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

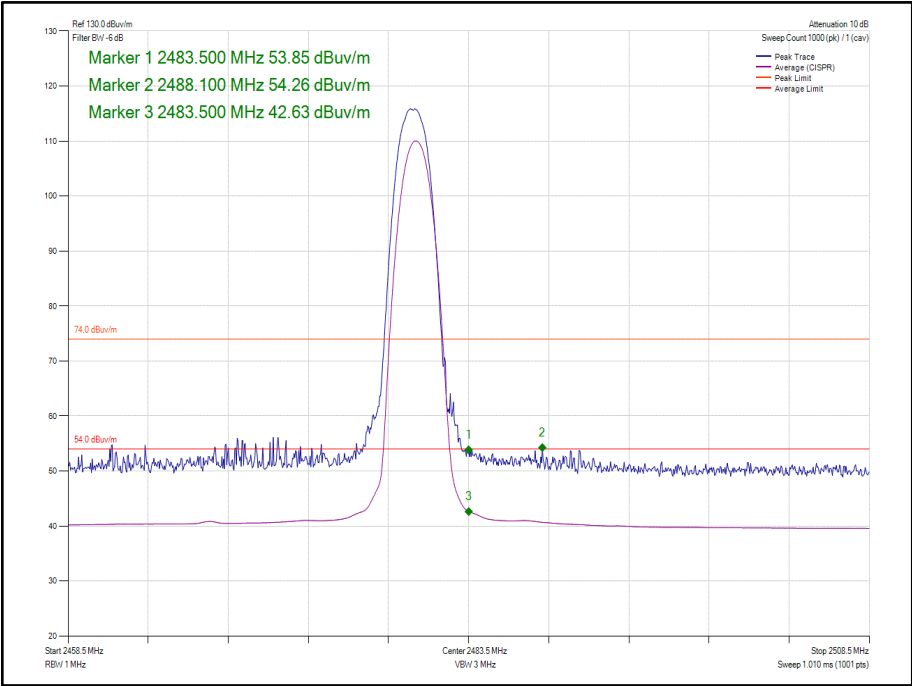


Figure 129 - Core 1 - $\pi/4$ DQPSK/2DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

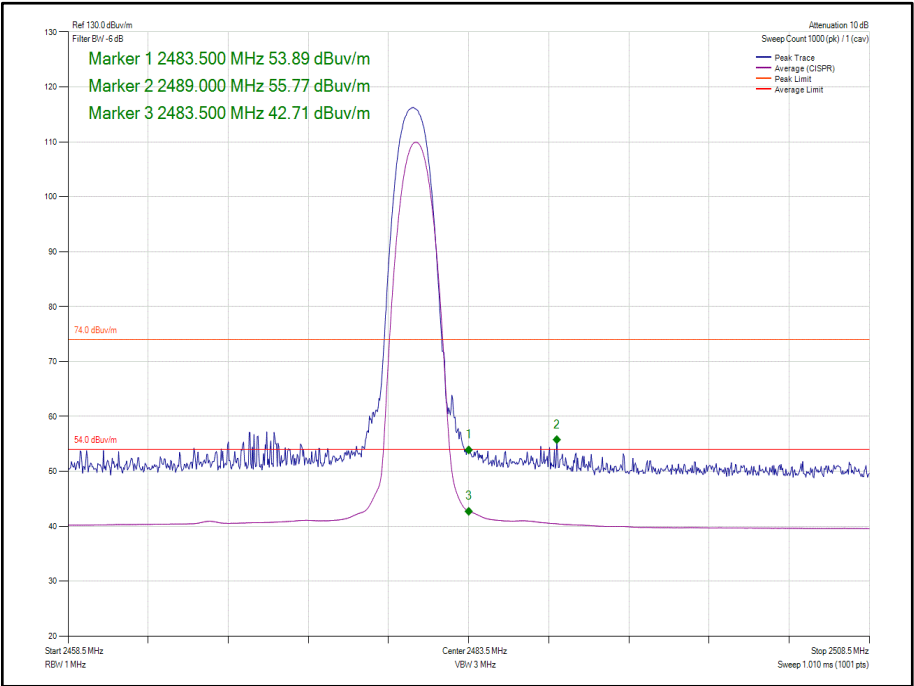


Figure 130 - Core 1 - 8-DPSK/3DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
Static	GFSK	0-1	DH5	2402	2390.0	57.70	40.25
Static	$\pi/4$ DQPSK	0-1	2DH5	2402	2390.0	59.13	40.92
Static	8-DPSK	0-1	3DH5	2402	2390.0	57.50	40.93
Static	GFSK	0-1	DH5	2480	2483.5	59.10	44.73
Static	$\pi/4$ DQPSK	0-1	2DH5	2480	2483.5	56.89	43.43
Static	8-DPSK	0-1	3DH5	2480	2483.5	58.40	43.41

Table 51 - MIMO 2Tx Restricted Band Edge Results

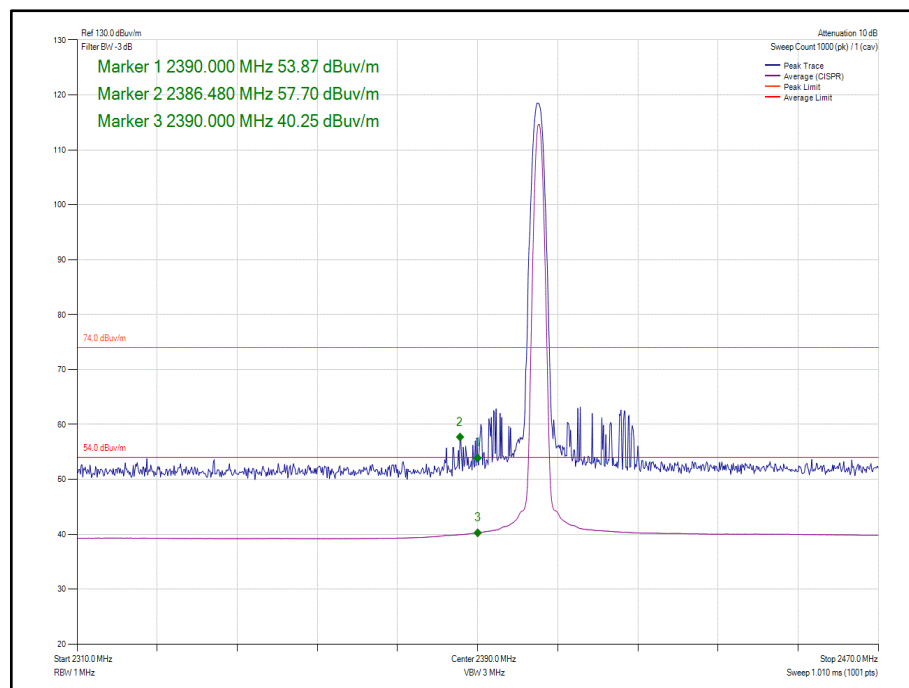


Figure 131 - Core 0-1- GFSK/DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

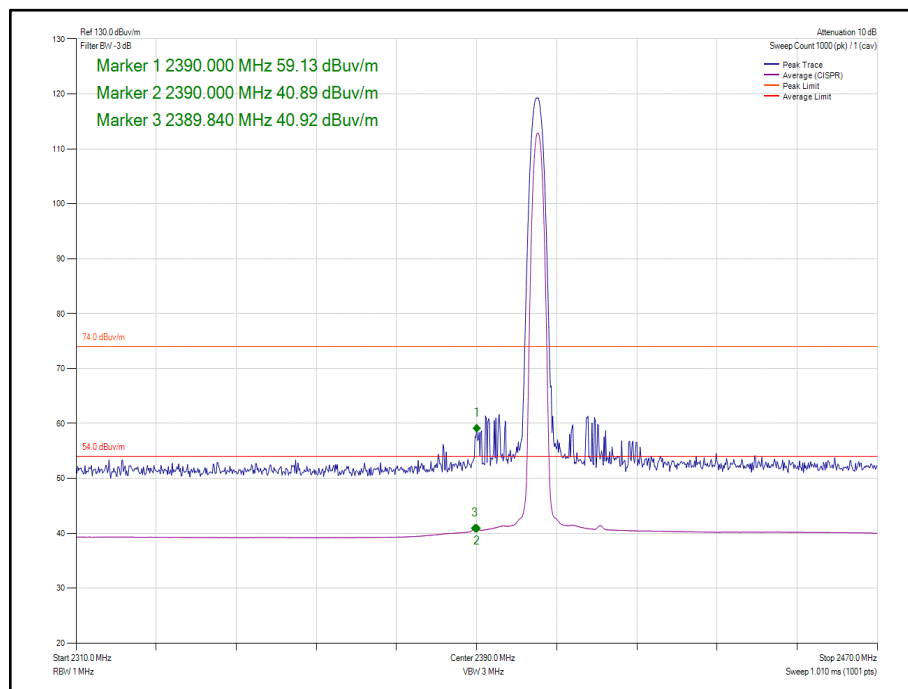


Figure 132 - Core 0-1- $\pi/4$ DQPSK/2DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

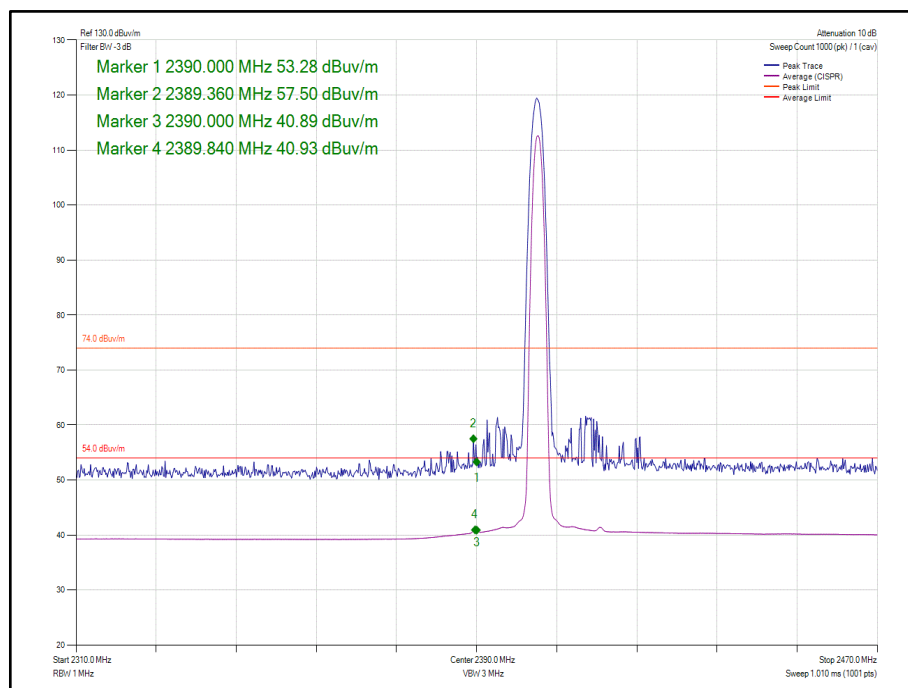


Figure 133 - Core 0-1- 8-DPSK/3DH5 - 2402 MHz Band Edge Frequency 2390.0 MHz

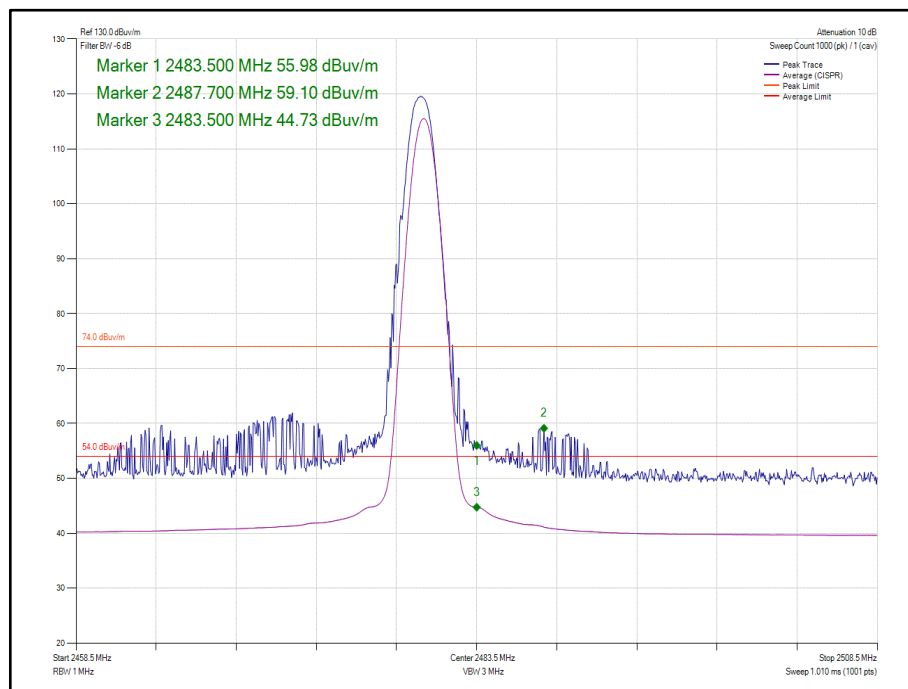


Figure 134 - Core 0-1- GFSK/DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

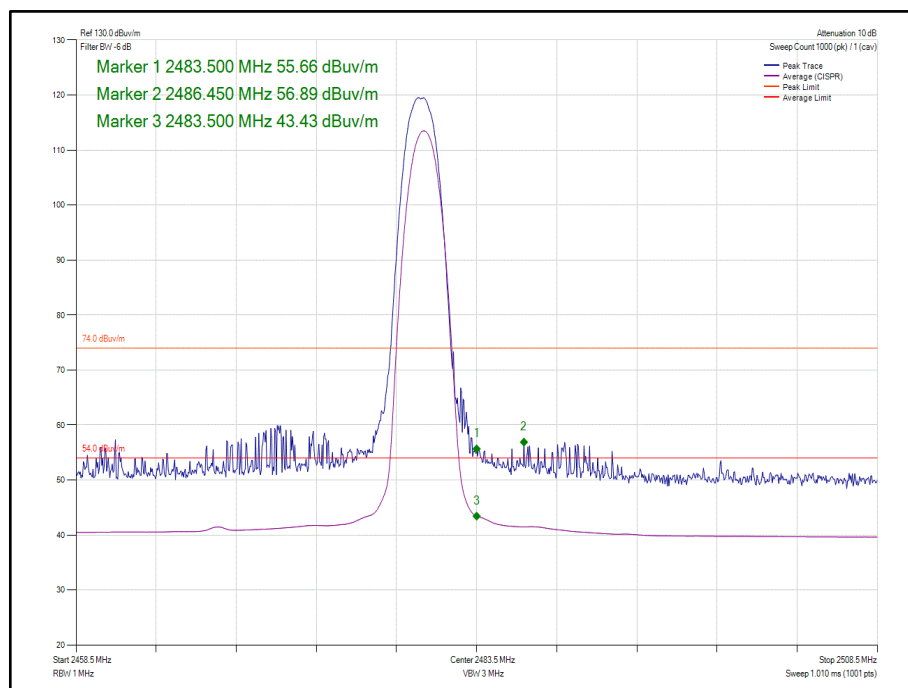


Figure 135 - Core 0-1- $\pi/4$ DQPSK/2DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

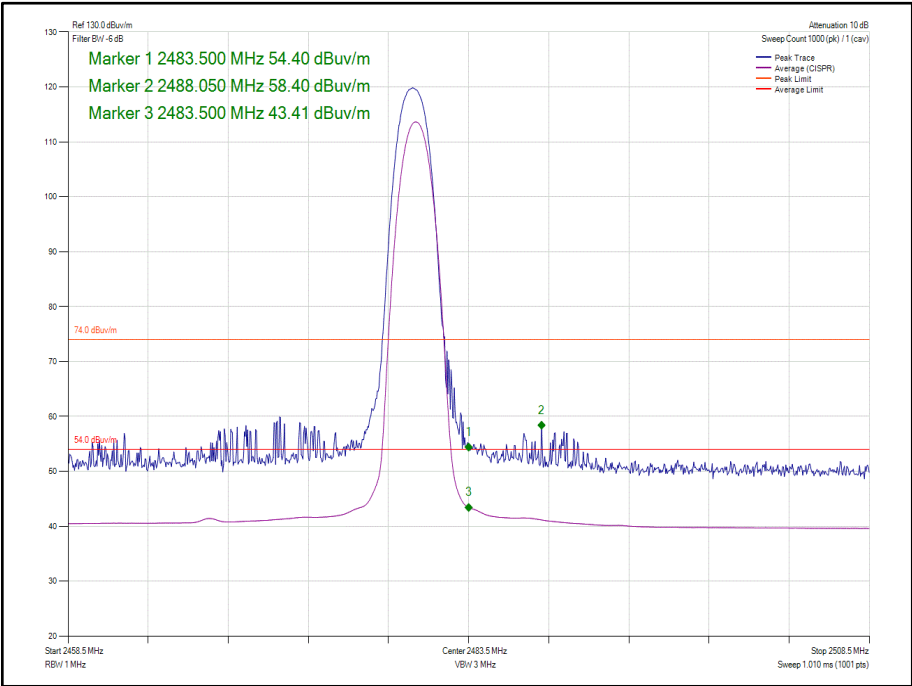


Figure 136 - Core 0-1- 8-DPSK/3DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

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 52

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 53

*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
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	5475	12	17-Mar-2021
Attenuator 5W 10dB DC-18GHz	Aaren	AT40A-4041-D18-10	5494	12	14-Apr-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

Table 54

TU - Traceability Unscheduled



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

A2337, S/N: C02D200EQ9MQ - Modification State 0

2.8.3 Date of Test

30-August-2020 to 09-September-2020

2.8.4 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 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 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:
 $10^{(\text{Field Strength in dB}\mu\text{V/m}/20)}$

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 $20 \cdot \text{LOG}(3/1) = 9.54$ dB.

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

2.8.5 Example Test Setup Diagram

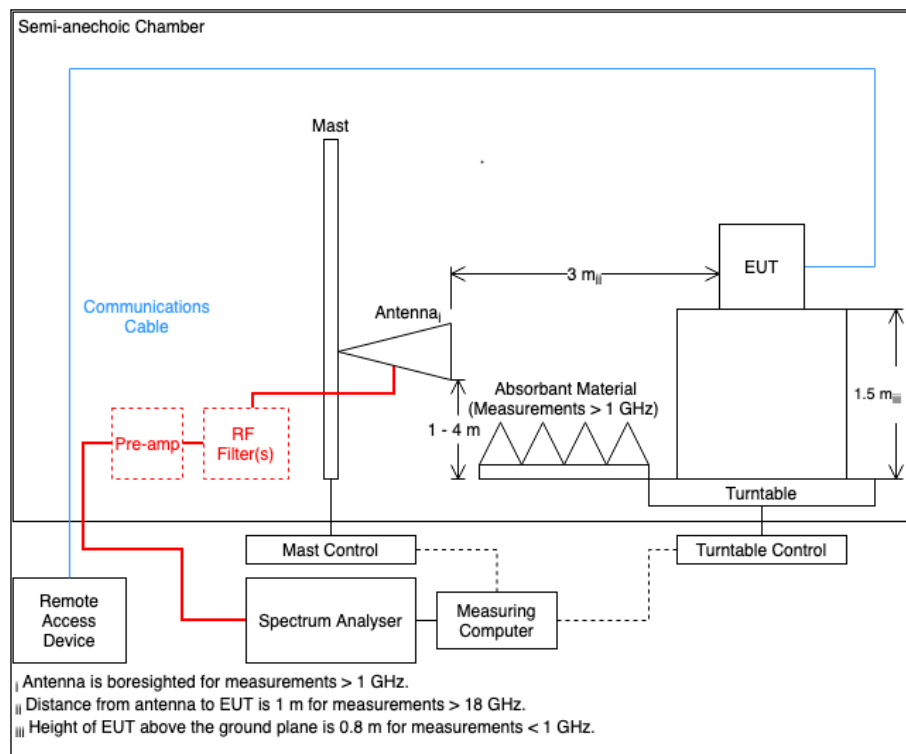


Figure 137

2.8.6 Environmental Conditions

Ambient Temperature	21.4 - 28.1 °C
Relative Humidity	38.9 - 51.5 %

2.8.7 Test Results

2.4 GHz Bluetooth (FHSS)

iPA

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
4804.256	39.7	54.0	-14.3	CISPR Avg	42	293	Vertical

Table 55 - 2402 MHz (CH0), DH5, iPA, Core 0, 1 to 26 GHz

No other emissions found within 6 dB of the limit.

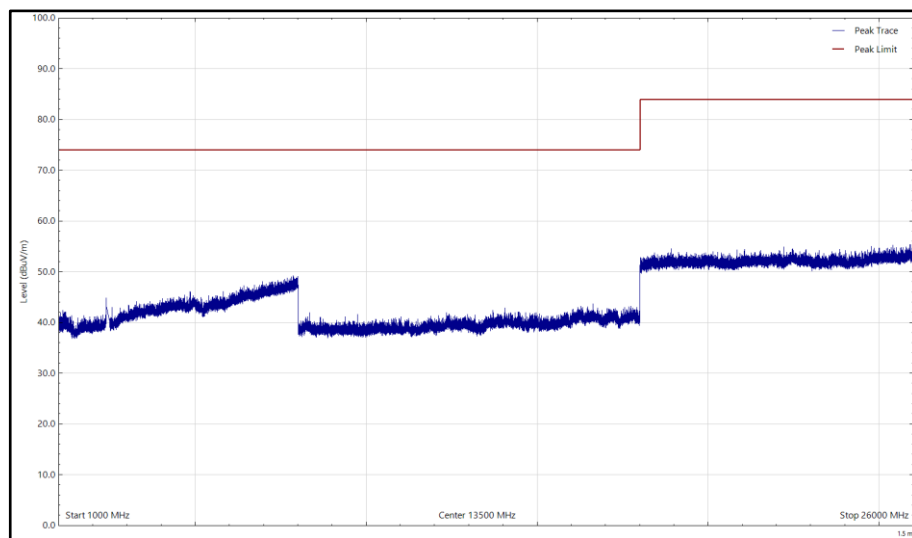


Figure 138 - 2402 MHz (CH0), DH5, iPA, Core 0, 1 GHz to 26 GHz, Horizontal (Peak)

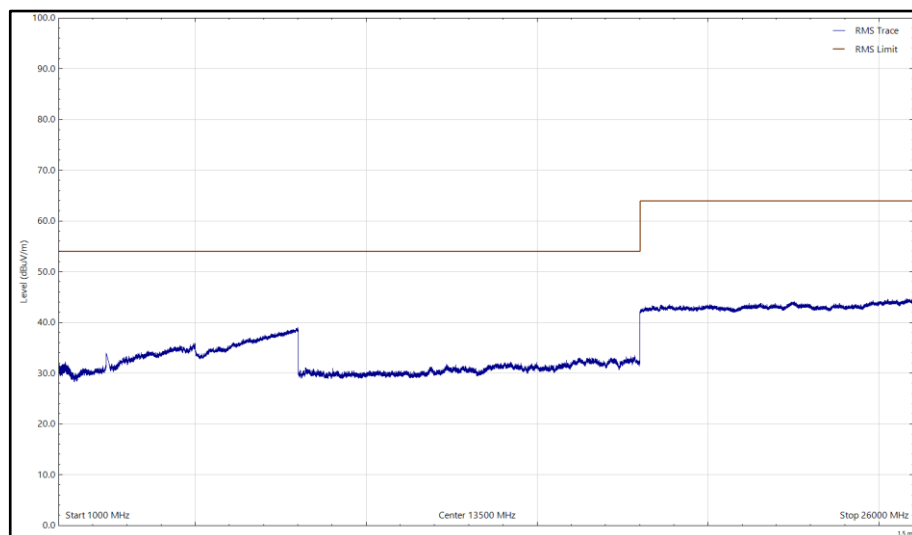


Figure 139 - 2402 MHz (CH0), DH5, iPA, Core 0, 1 GHz to 26 GHz, Horizontal (rms)

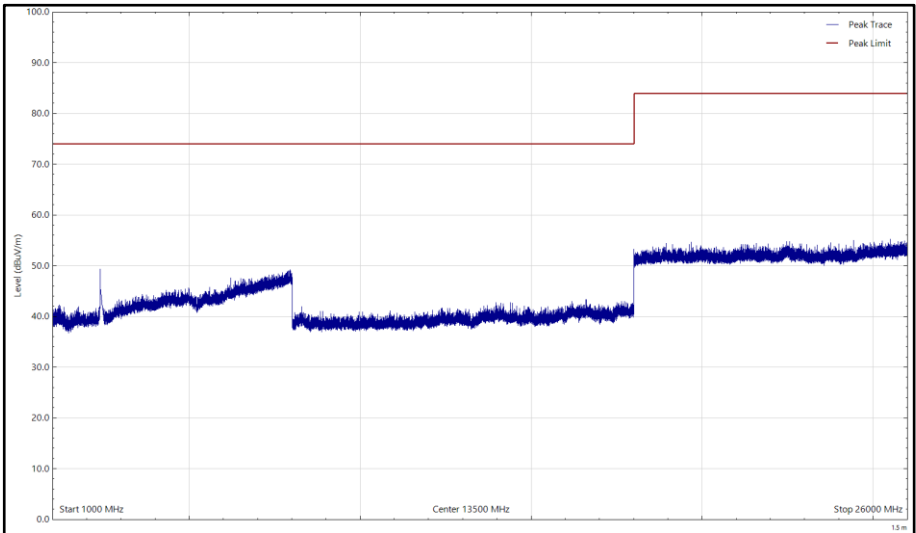


Figure 140 - 2402 MHz (CH0), DH5, iPA, Core 0, 1 GHz to 26 GHz, Vertical (Peak)

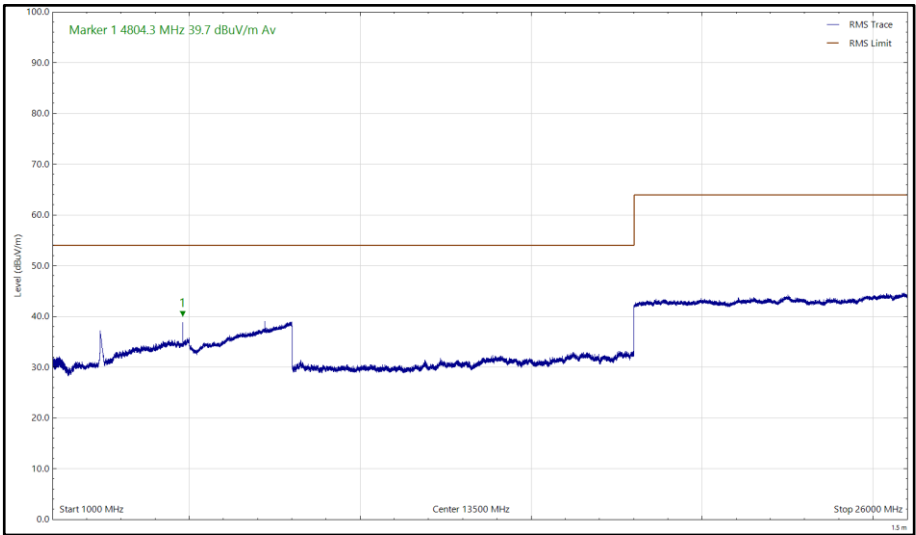


Figure 141 - 2402 MHz (CH0), DH5, iPA, Core 0, 1 GHz to 26 GHz, Vertical (rms)

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
31.554	27.3	40.0	-12.7	Q-Peak	7	110	Vertical
187.693	32.1	43.5	-11.4	Q-Peak	84	100	Vertical
193.952	31.5	43.5	-12.0	Q-Peak	281	100	Horizontal
289.783	33.3	46.0	-12.8	Q-Peak	205	111	Horizontal
4881.837	41.1	54.0	-12.9	CISPR Avg	42	315	Vertical

Table 56 - 2441 MHz (CH39), DH5, iPA, Core 0, 30 MHz to 26 GHz

No other emissions found within 6 dB of the limit.

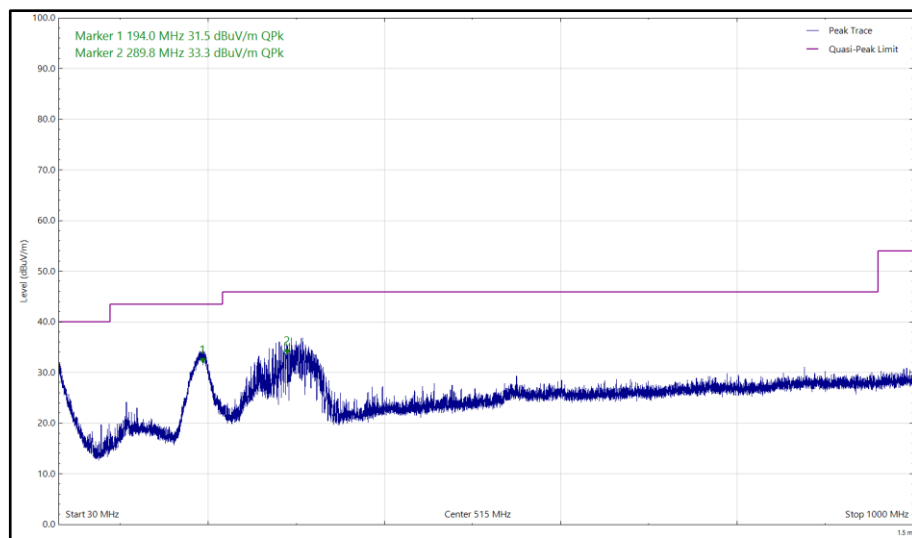


Figure 142 - 2441 MHz (CH39), DH5, iPA, Core 0, 30 MHz to 1 GHz, Horizontal (Peak)

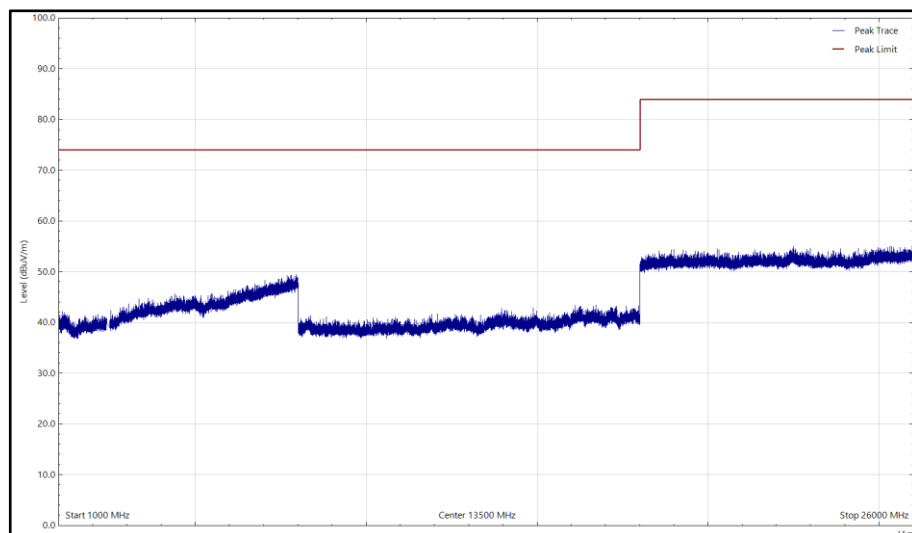


Figure 143 - 2441 MHz (CH39), DH5, iPA, Core 0, 1 GHz to 26 GHz, Horizontal (Peak)

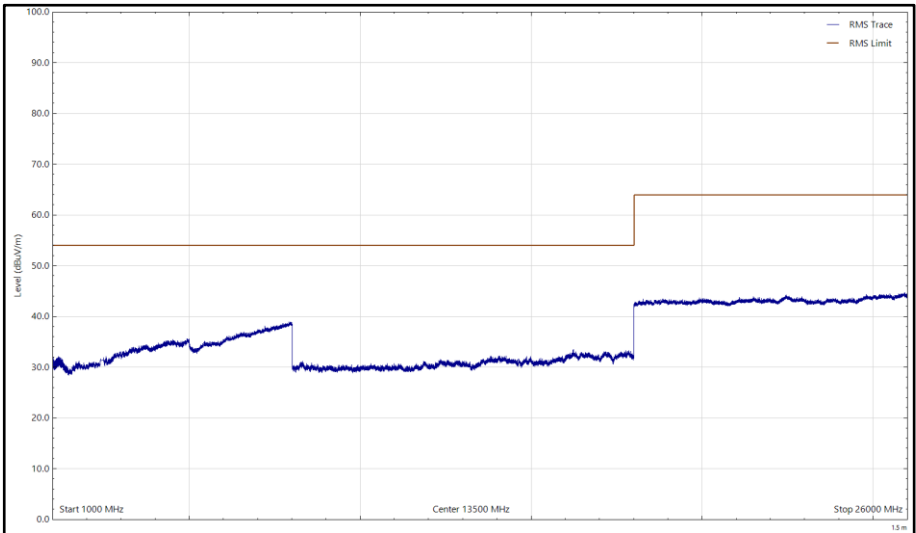


Figure 144 - 2441 MHz (CH39), DH5, iPA, Core 0, 1 GHz to 26 GHz, Horizontal (rms)

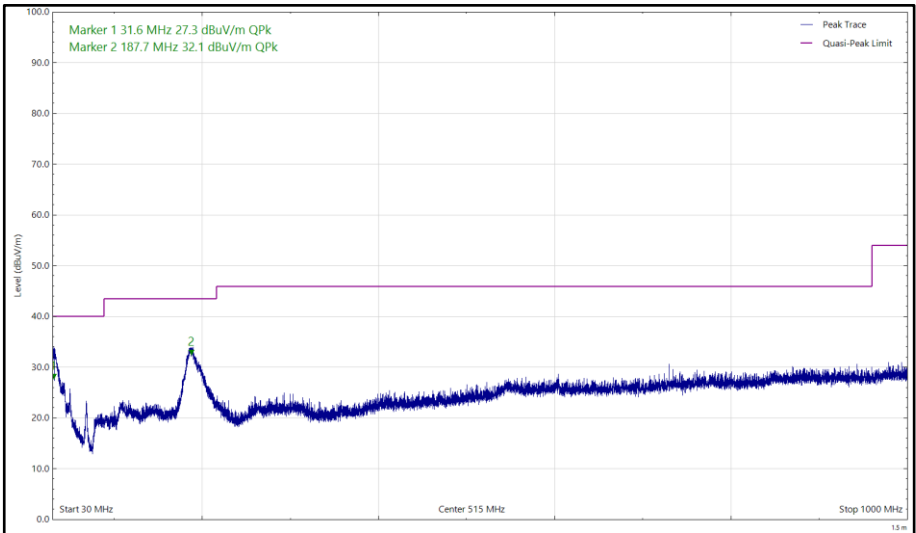


Figure 145 - 2441 MHz (CH39), DH5, iPA, Core 0, 30 MHz to 1 GHz, Vertical (Peak)

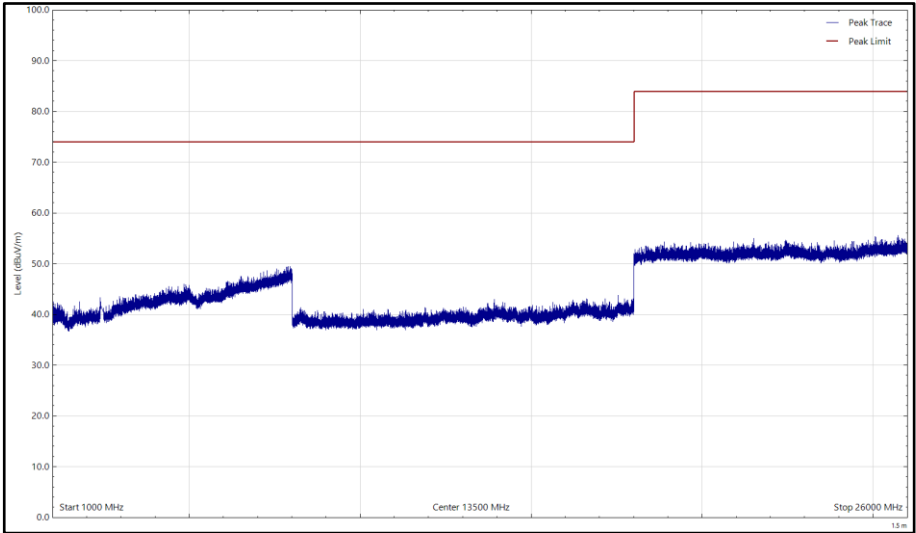


Figure 146 - 2441 MHz (CH39), DH5, iPA, Core 0, 1 GHz to 26 GHz, Vertical (Peak)

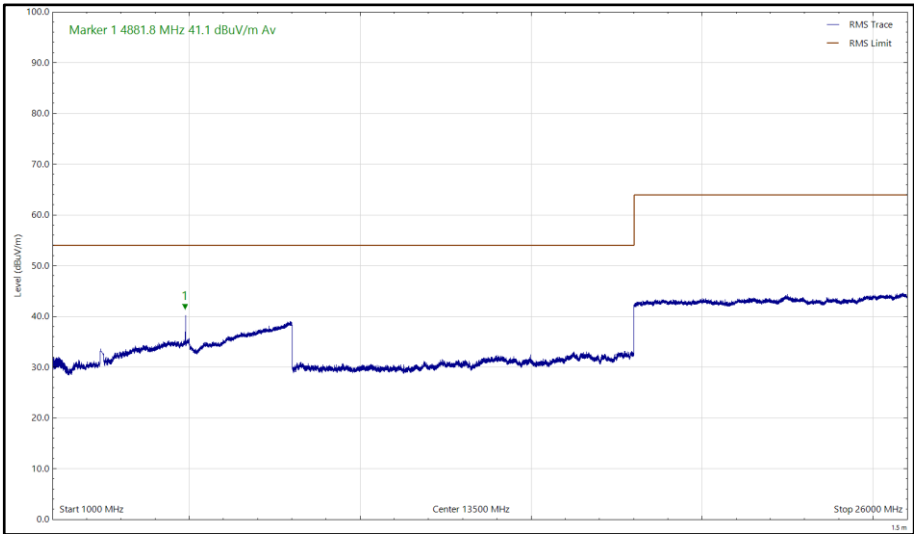


Figure 147 - 2441 MHz (CH39), DH5, iPA, Core 0, 1 GHz to 26 GHz, Vertical (rms)



Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
4959.722	39.8	54.0	-14.2	CISPR Avg	38	310	Vertical

Table 57 - 2480 MHz (CH78), DH5, iPA, Core 0, 1 to 26 GHz

No other emissions found within 6 dB of the limit.

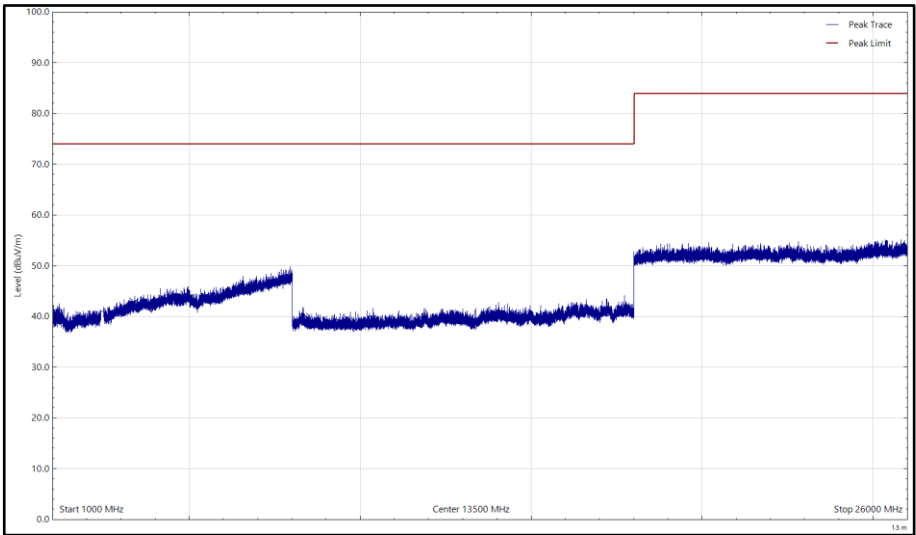


Figure 148 - 2480 MHz (CH78), DH5, iPA, Core 0, 1 GHz to 26 GHz, Horizontal (Peak)

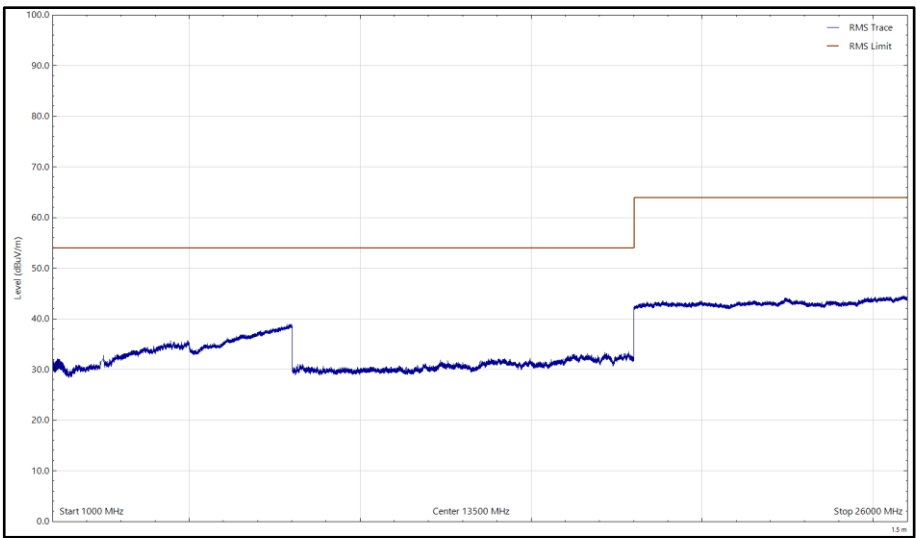


Figure 149 - 2480 MHz (CH78), DH5, iPA, Core 0, 1 GHz to 26 GHz, Horizontal (rms)

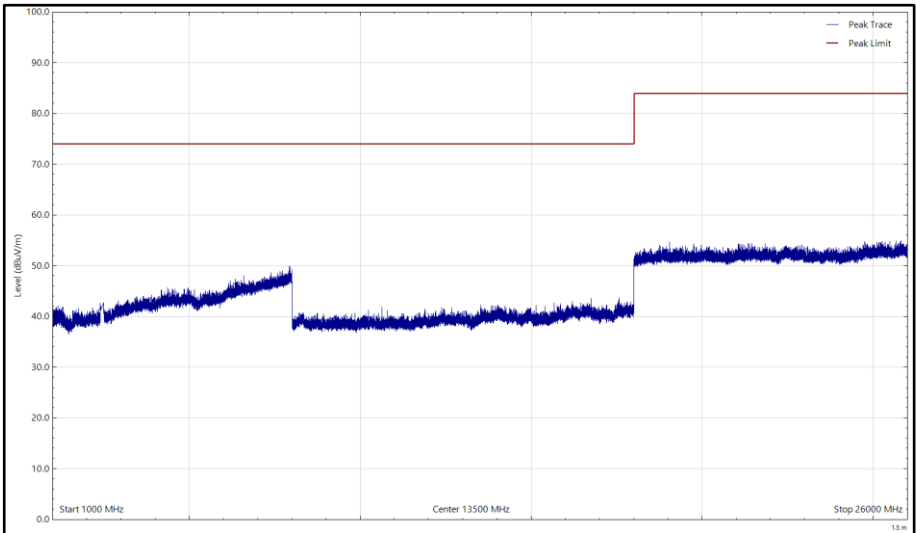


Figure 150 - 2480 MHz (CH78), DH5, iPA, Core 0, 1 GHz to 26 GHz, Vertical (Peak)

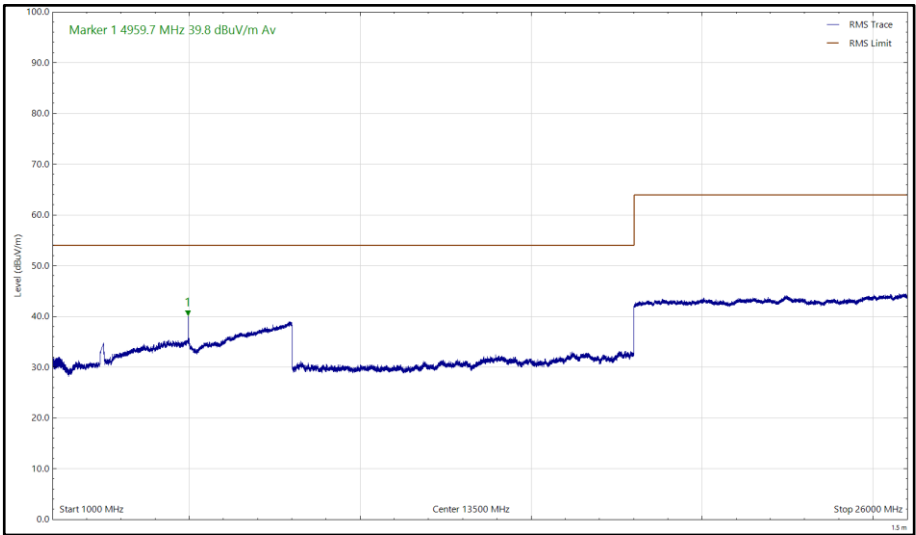


Figure 151 - 2480 MHz (CH78), DH5, iPA, Core 0, 1 GHz to 26 GHz, Vertical (rms)



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

Table 58 - 2402 MHz (CH0), DH5, iPA, Core 1, 1 to 26 GHz

*No emissions found within 6 dB of the limit.

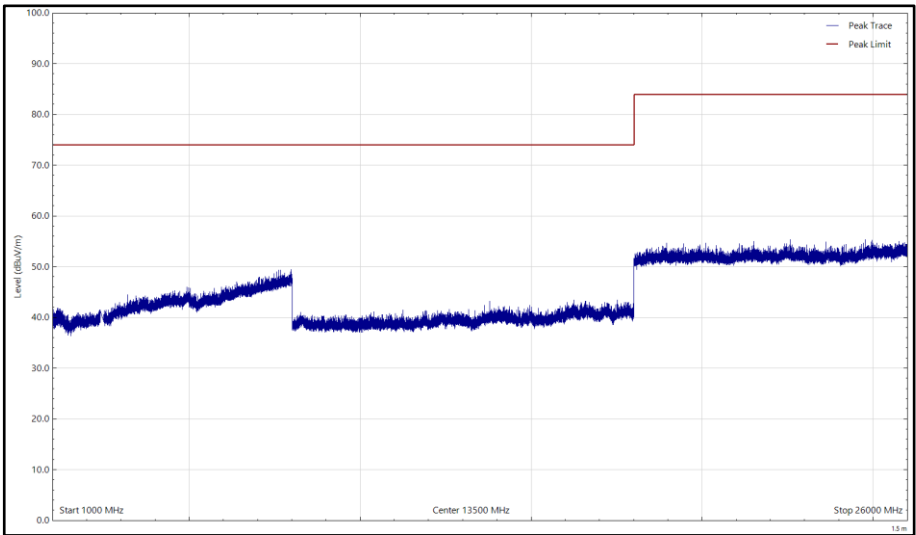


Figure 152 - 2402 MHz (CH0), DH5, iPA, Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

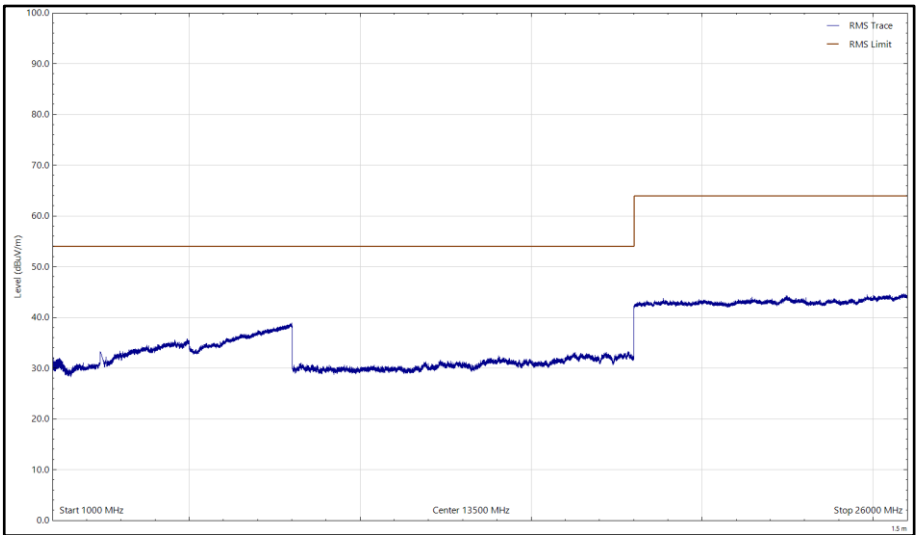


Figure 153 - 2402 MHz (CH0), DH5, iPA, Core 1, 1 GHz to 26 GHz, Horizontal (rms)

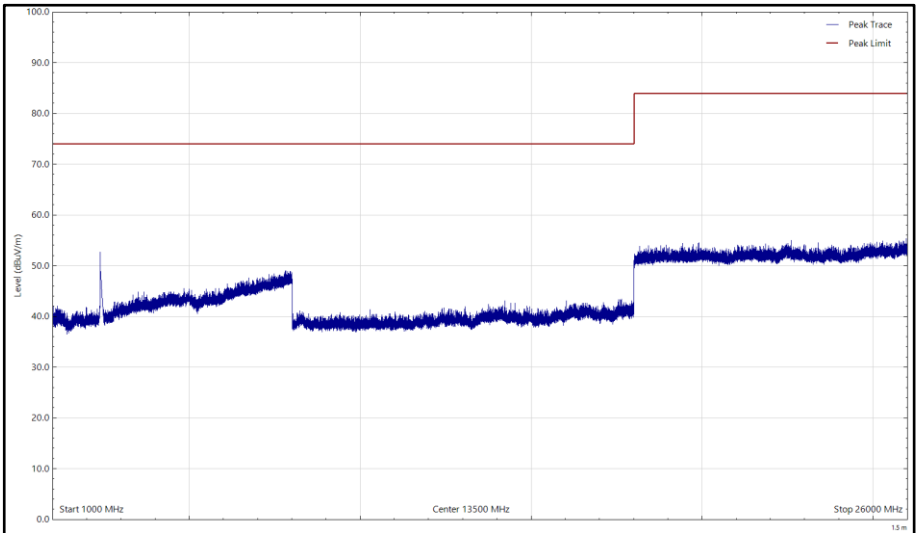


Figure 154 - 2402 MHz (CH0), DH5, iPA, Core 1, 1 GHz to 26 GHz, Vertical (Peak)

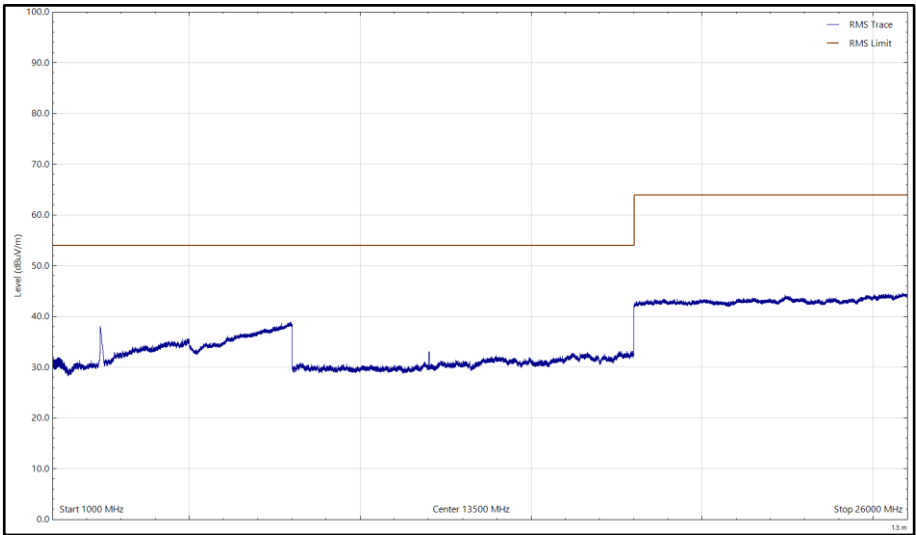


Figure 155 - 2402 MHz (CH0), DH5, iPA, Core 1, 1 GHz to 26 GHz, Vertical (rms)

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
30.848	23.6	40.0	-16.4	Q-Peak	5	290	Horizontal
31.831	30.0	40.0	-10.0	Q-Peak	20	152	Vertical
69.551	33.2	40.0	-6.8	Q-Peak	305	100	Vertical
185.405	30.7	43.5	-12.8	Q-Peak	86	101	Vertical
195.266	32.5	43.5	-11.0	Q-Peak	274	100	Horizontal
289.135	34.7	46.0	-11.3	Q-Peak	216	107	Horizontal
307.348	33.3	46.0	-12.7	Q-Peak	244	100	Vertical
4882.026	38.1	54.0	-15.9	CISPR Avg	310	311	Vertical

Table 59 - 2441 MHz (CH39), DH5, iPA, Core 1, 30 MHz to 26 GHz

No other emissions found within 6 dB of the limit.

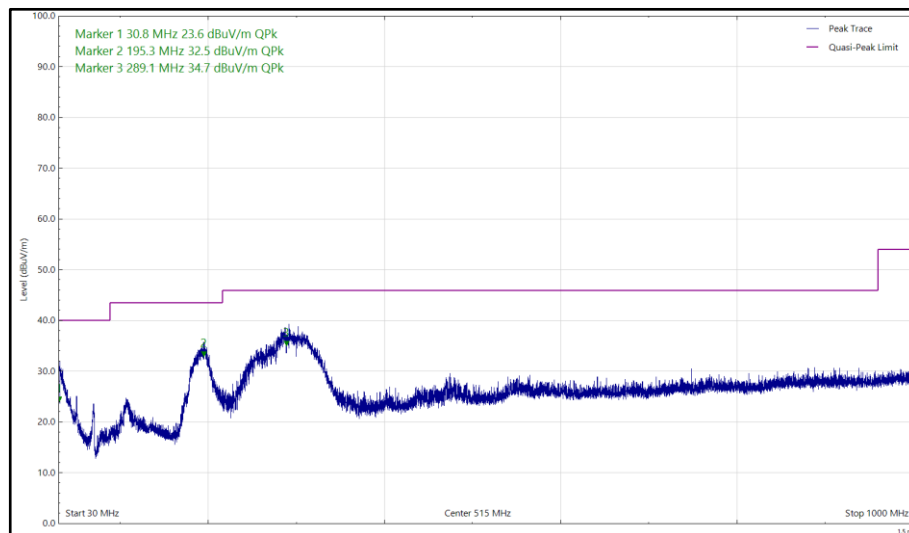


Figure 156 - 2441 MHz (CH39), DH5, iPA, Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

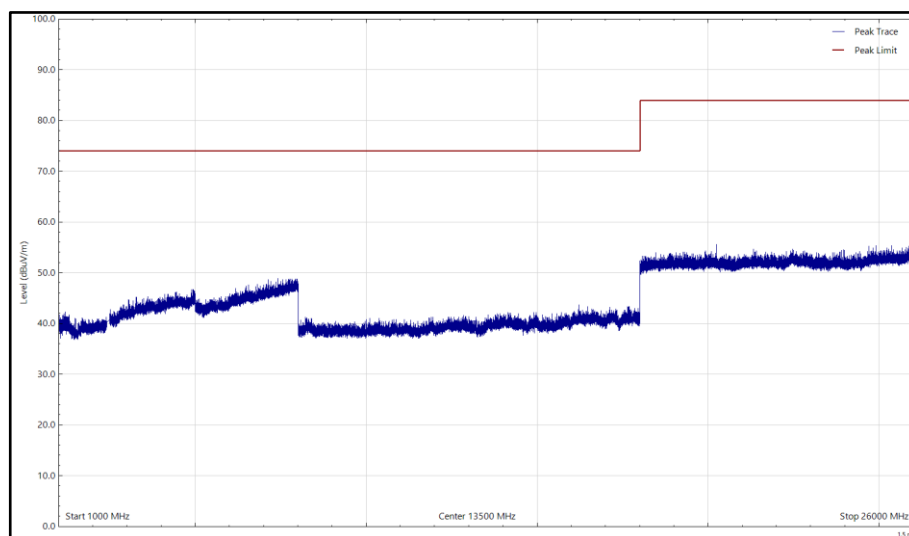


Figure 157 - 2441 MHz (CH39), DH5, iPA, Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

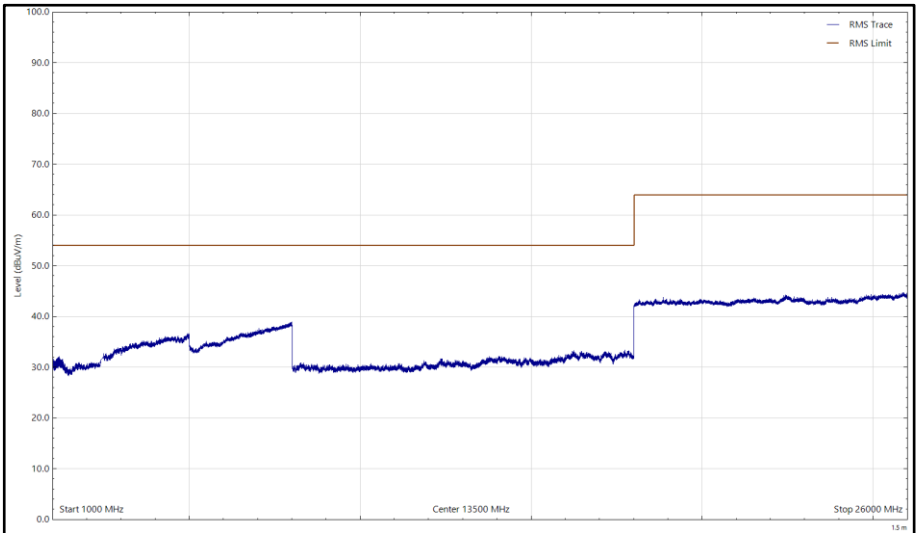


Figure 158 - 2441 MHz (CH39), DH5, iPA, Core 1, 1 GHz to 26 GHz, Horizontal (rms)

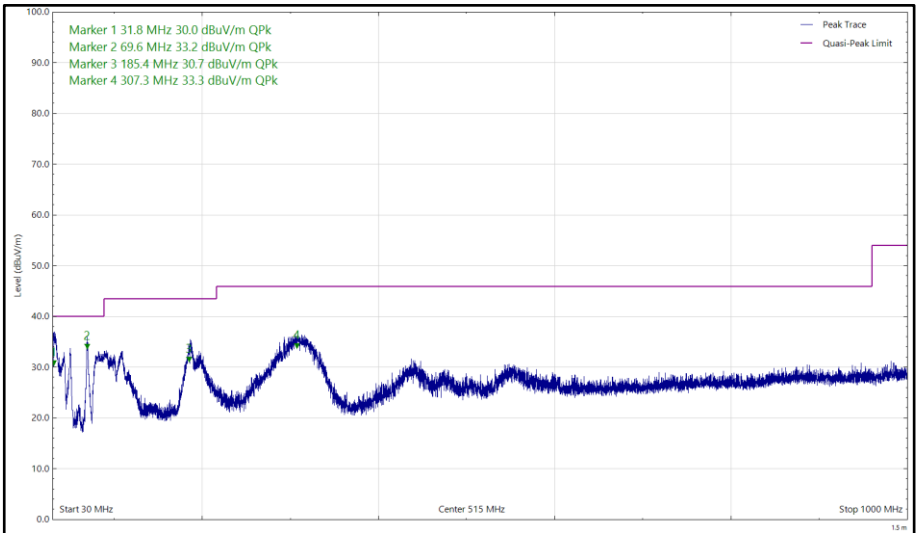


Figure 159 - 2441 MHz (CH39), DH5, iPA, Core 1, 30 MHz to 1 GHz, Vertical (Peak)

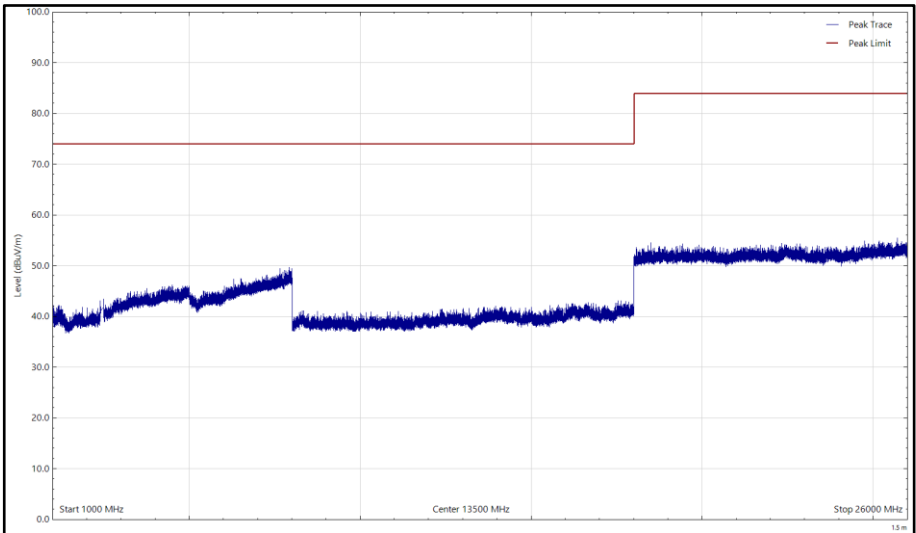


Figure 160 - 2441 MHz (CH39), DH5, iPA, Core 1, 1 GHz to 26 GHz, Vertical (Peak)

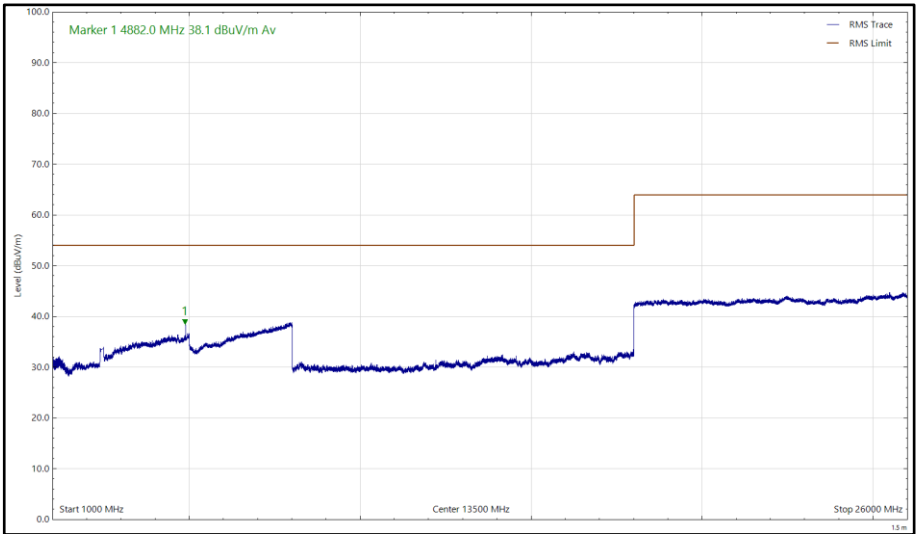


Figure 161 - 2441 MHz (CH39), DH5, iPA, Core 1, 1 GHz to 26 GHz, Vertical (rms)

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
4960.077	43.2	54.0	-10.8	CISPR Avg	11	284	Vertical

Table 60 - 2480 MHz (CH78), DH5, iPA, Core 1, 1 to 26 GHz

No other emissions found within 6 dB of the limit.

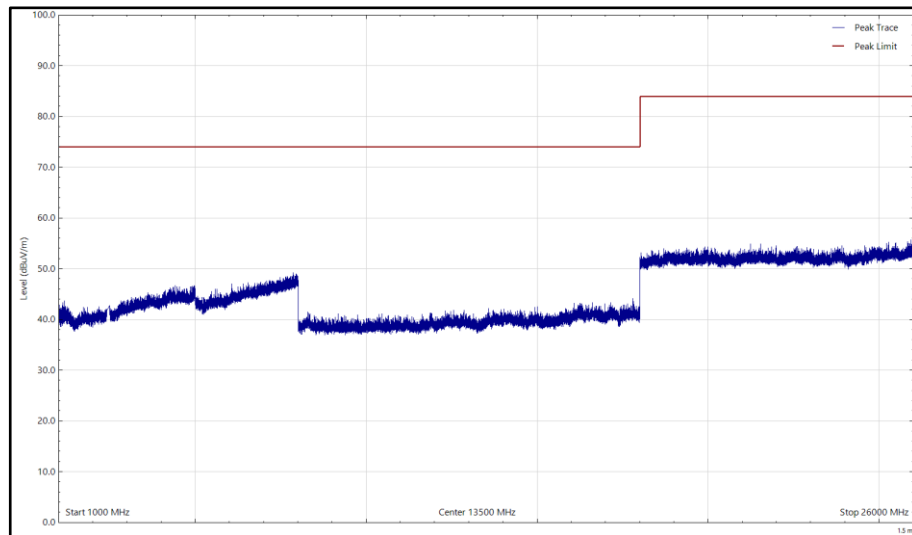


Figure 162 - 2480 MHz (CH78), DH5, iPA, Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

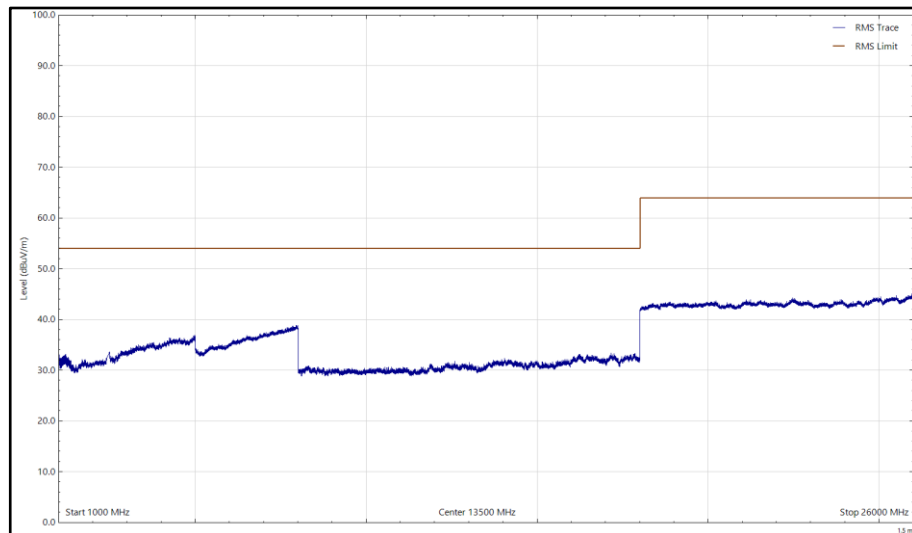


Figure 163 - 2480 MHz (CH78), DH5, iPA, Core 1, 1 GHz to 26 GHz, Horizontal (rms)

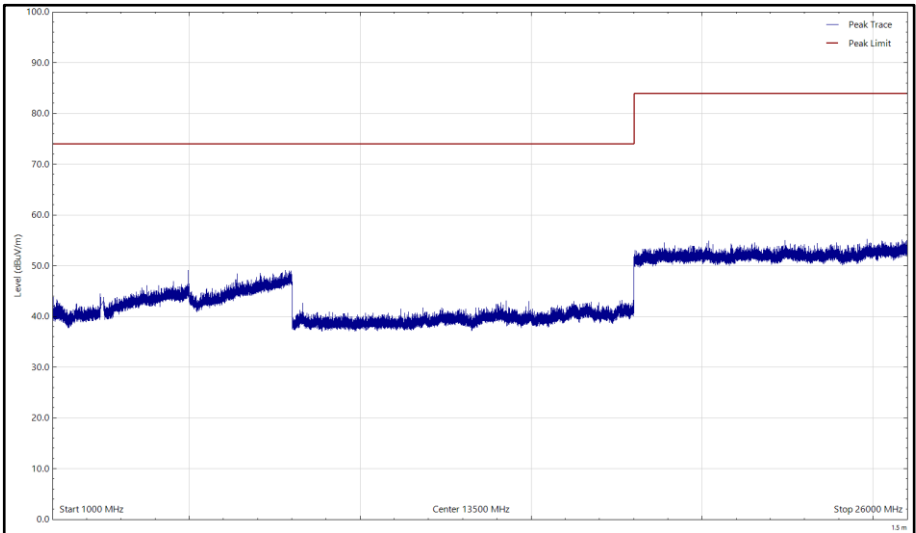


Figure 164 - 2480 MHz (CH78), DH5, iPA, Core 1, 1 GHz to 26 GHz, Vertical (Peak)

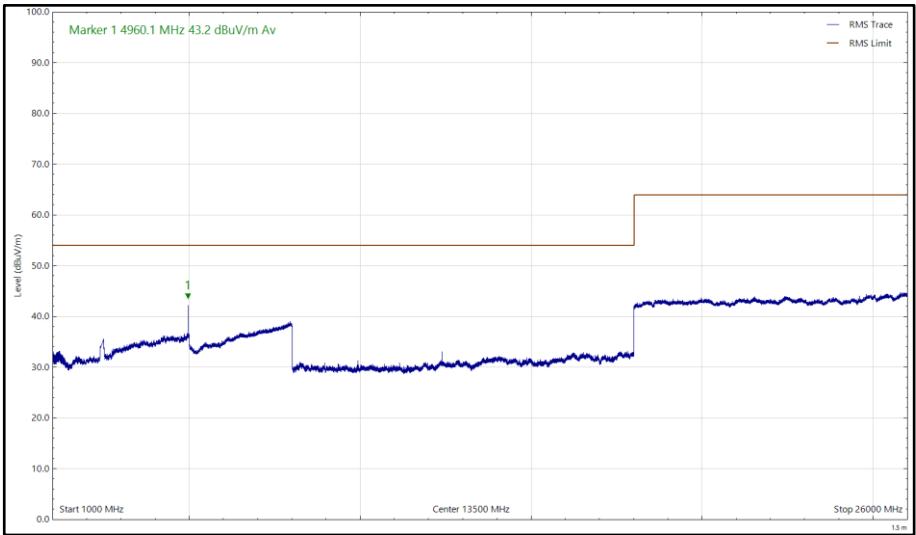


Figure 165 - 2480 MHz (CH78), DH5, iPA, Core 1, 1 GHz to 26 GHz, Vertical (rms)

ePA

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
4804.186	39.4	54.0	-14.6	CISPR Avg	38	301	Vertical

Table 61 - 2402 MHz (CH0), DH5, ePA, Core 0, 1 to 26 GHz

No other emissions found within 6 dB of the limit.

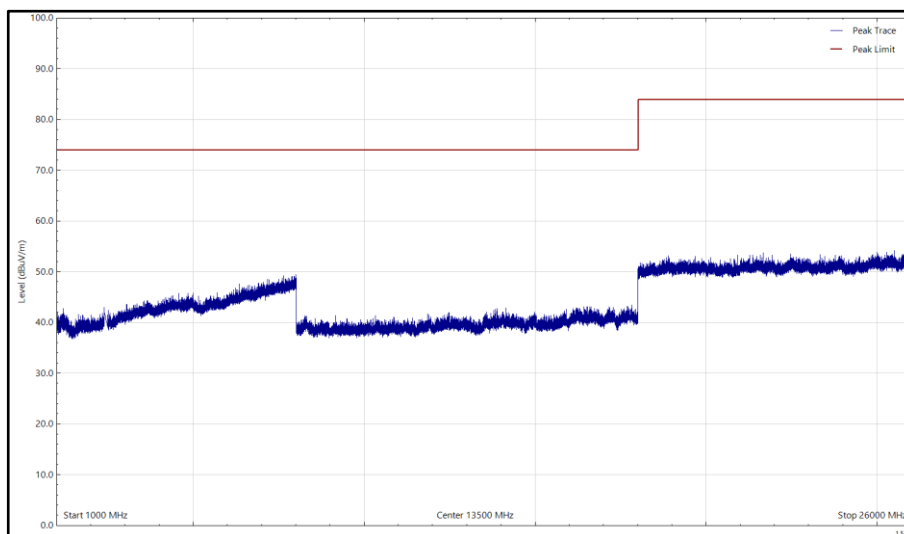


Figure 166 - 2402 MHz (CH0), DH5, ePA, Core 0, 1 GHz to 26 GHz, Horizontal (Peak)

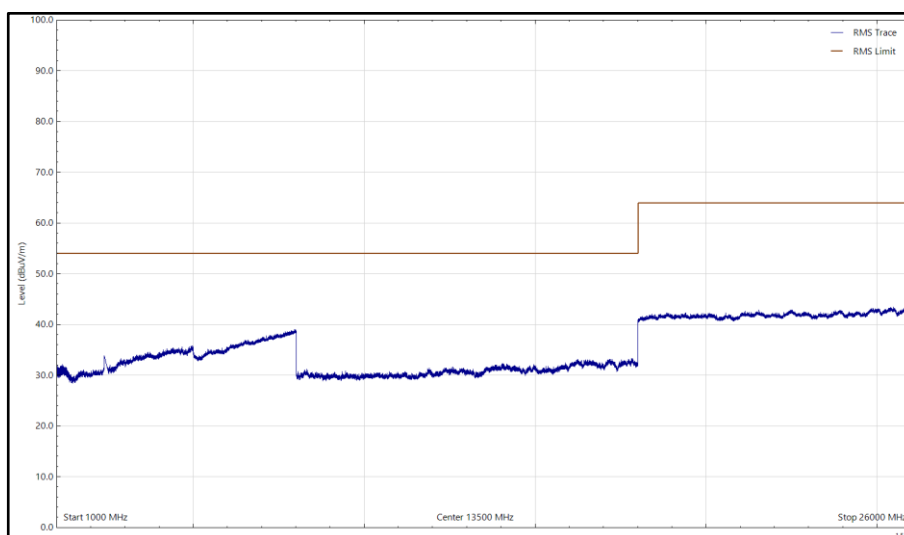


Figure 167 - 2402 MHz (CH0), DH5, ePA, Core 0, 1 GHz to 26 GHz, Horizontal (rms)

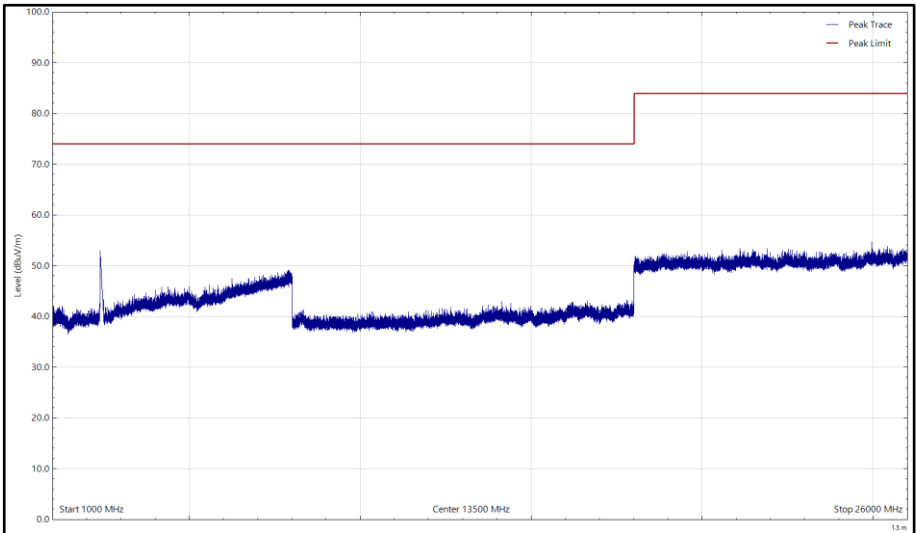


Figure 168 - 2402 MHz (CH0), DH5, ePA, Core 0, 1 GHz to 26 GHz, Vertical (Peak)

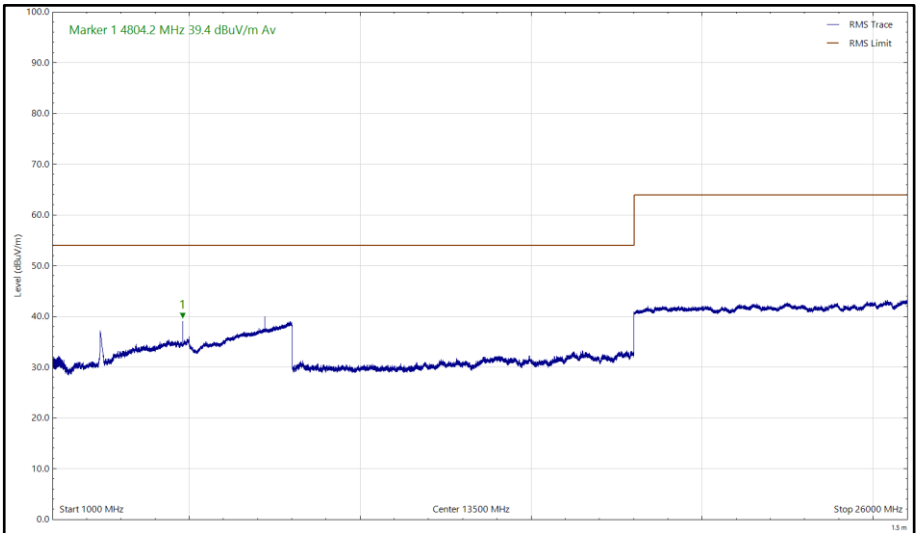


Figure 169 - 2402 MHz (CH0), DH5, ePA, Core 0, 1 GHz to 26 GHz, Vertical (rms)

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
30.001	23.5	40.0	-16.5	Q-Peak	144	104	Horizontal
31.920	26.2	40.0	-13.8	Q-Peak	9	109	Vertical
67.246	29.3	40.0	-10.7	Q-Peak	276	100	Vertical
190.873	30.9	43.5	-12.6	Q-Peak	67	103	Vertical
192.372	29.1	43.5	-14.4	Q-Peak	311	100	Horizontal
288.397	30.0	46.0	-16.0	Q-Peak	216	109	Horizontal
312.525	27.2	46.0	-18.8	Q-Peak	182	100	Vertical
4882.127	40.4	54.0	-13.6	CISPR Avg	46	326	Vertical
7323.450	39.0	54.0	-15.0	CISPR Avg	4	273	Vertical

Table 62 - 2441 MHz (CH39), DH5, ePA, Core 0, 30 MHz to 26 GHz

No other emissions found within 6 dB of the limit.

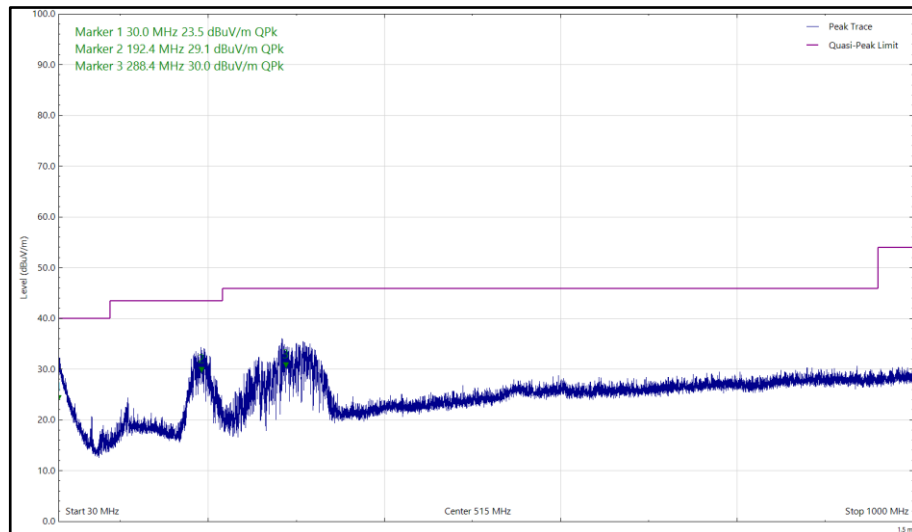


Figure 170 - 2441 MHz (CH39), DH5, ePA, Core 0, 30 MHz to 1 GHz, Horizontal (Peak)

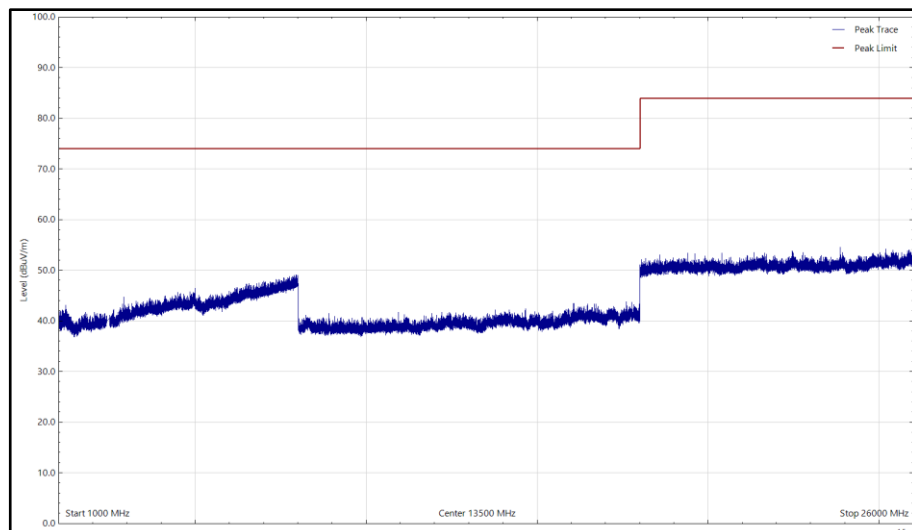


Figure 171 - 2441 MHz (CH39), DH5, ePA, Core 0, 1 GHz to 26 GHz, Horizontal (Peak)

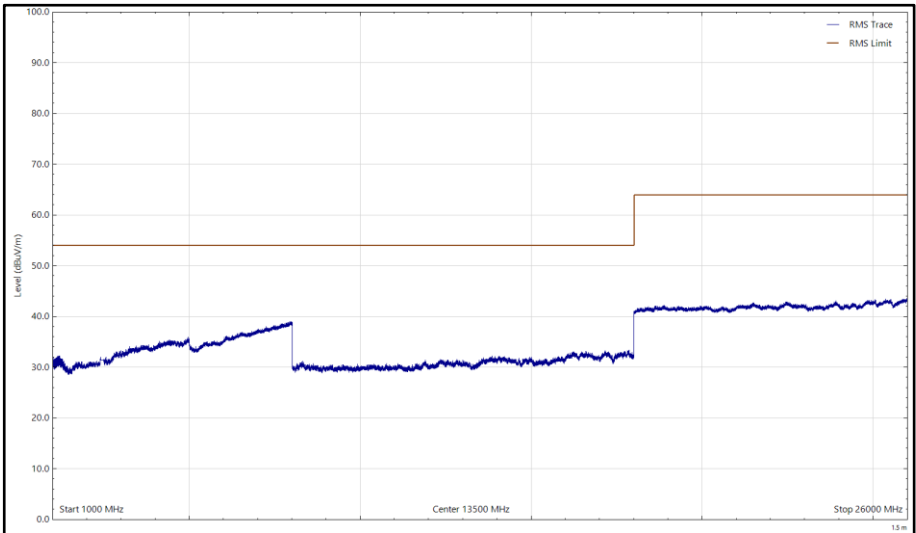


Figure 172 - 2441 MHz (CH39), DH5, ePA, Core 0, 1 GHz to 26 GHz, Horizontal (rms)

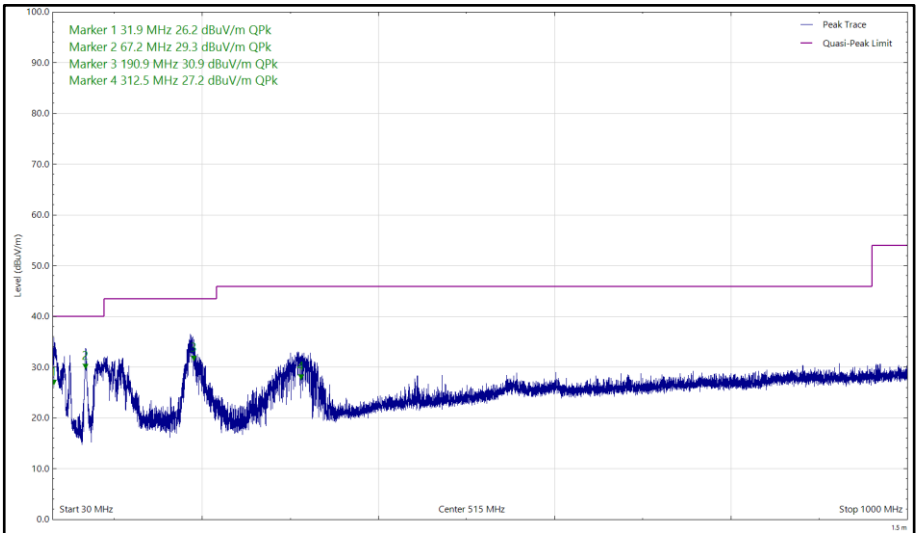


Figure 173 - 2441 MHz (CH39), DH5, ePA, Core 0, 30 MHz to 1 GHz, Vertical (Peak)

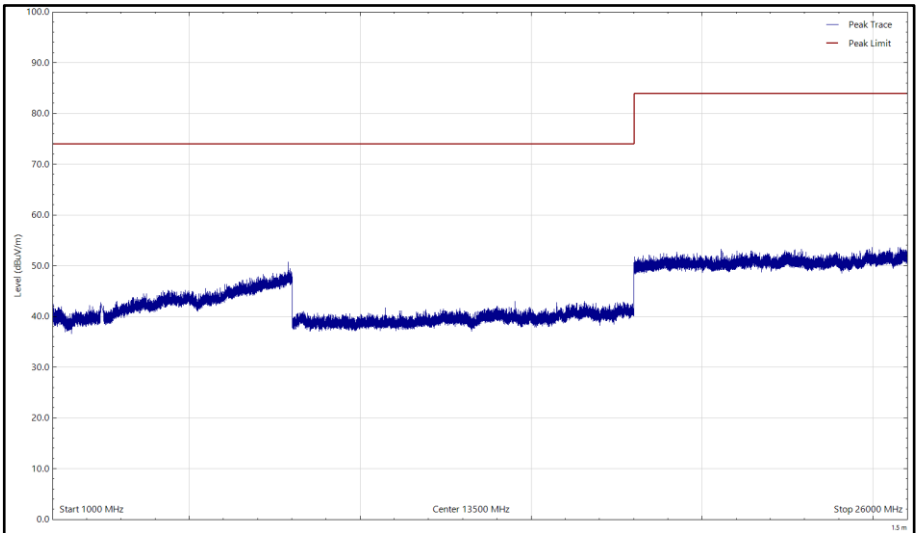


Figure 174 - 2441 MHz (CH39), DH5, ePA, Core 0, 1 GHz to 26 GHz, Vertical (Peak)

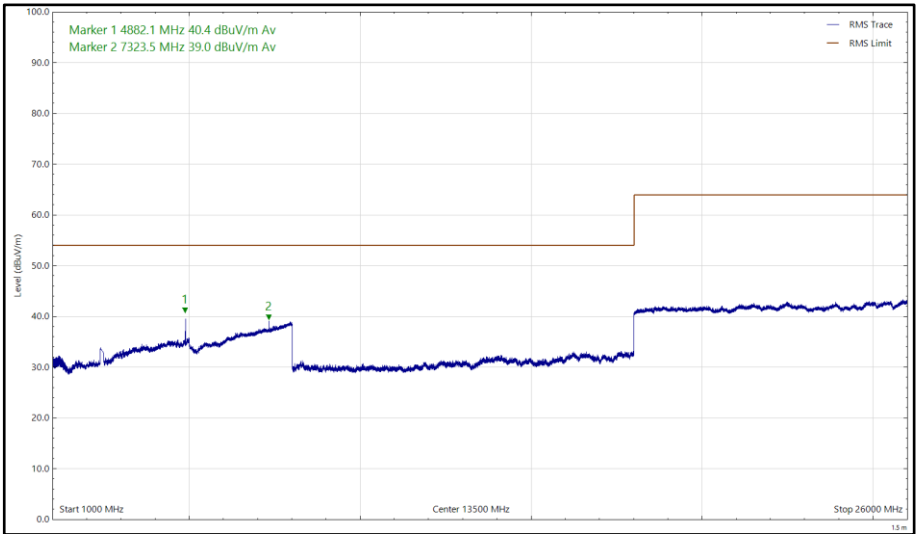


Figure 175 - 2441 MHz (CH39), DH5, ePA, Core 0, 1 GHz to 26 GHz, Vertical (rms)

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
4960.207	39.8	54.0	-14.2	CISPR Avg	49	319	Vertical
7439.404	37.9	54.0	-16.1	CISPR Avg	348	248	Vertical

Table 63 - 2480 MHz (CH78), DH5, ePA, Core 0, 1 to 26 GHz

No other emissions found within 6 dB of the limit.

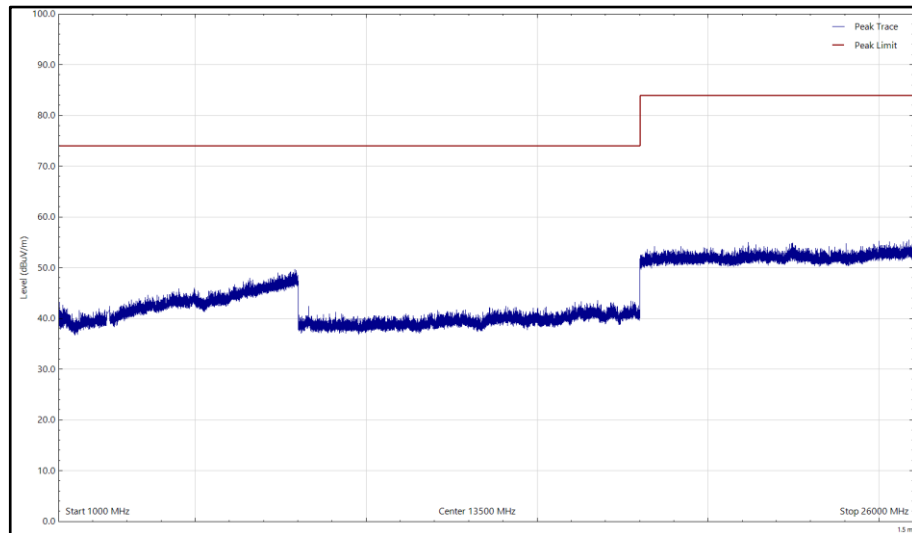


Figure 176 - 2480 MHz (CH78), DH5, ePA, Core 0, 1 GHz to 26 GHz, Horizontal (Peak)

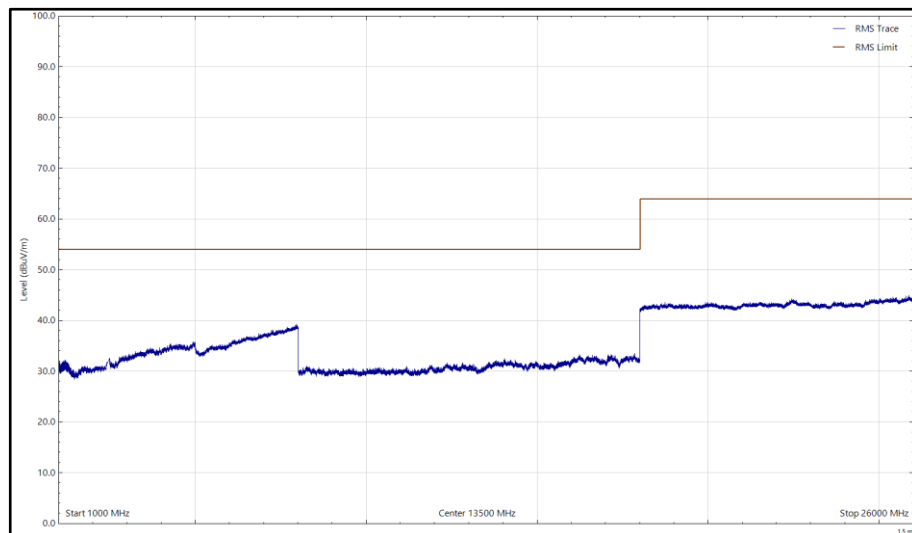


Figure 177 - 2480 MHz (CH78), DH5, ePA, Core 0, 1 GHz to 26 GHz, Horizontal (rms)

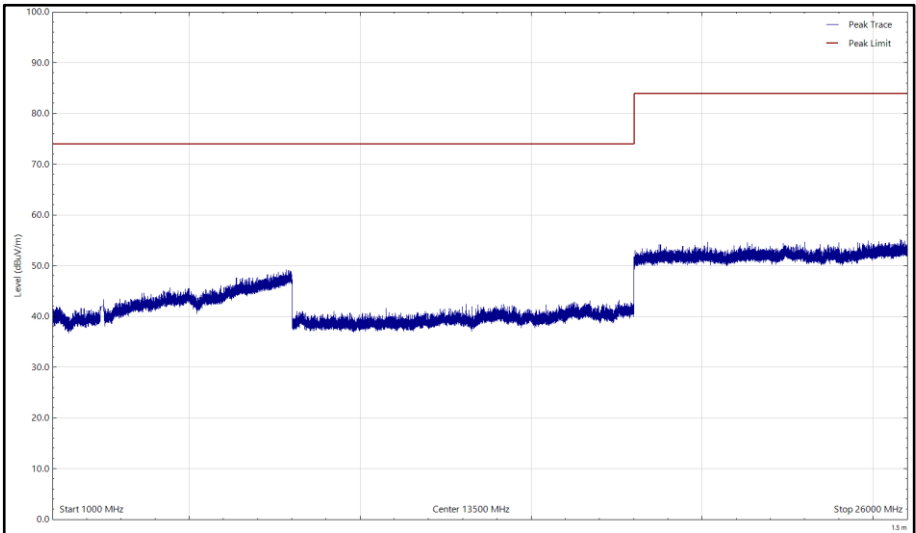


Figure 178 - 2480 MHz (CH78), DH5, ePA, Core 0, 1 GHz to 26 GHz, Vertical (Peak)

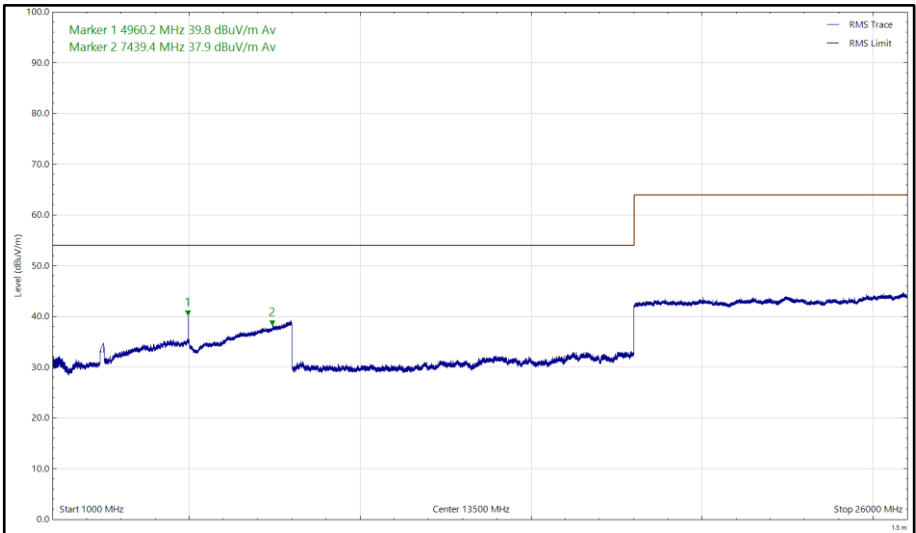


Figure 179 - 2480 MHz (CH78), DH5, ePA, Core 0, 1 GHz to 26 GHz, Vertical (rms)



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

Table 64 - 2402 MHz (CH0), DH5, ePA, Core 1, 1 to 26 GHz

*No emissions found within 6 dB of the limit.

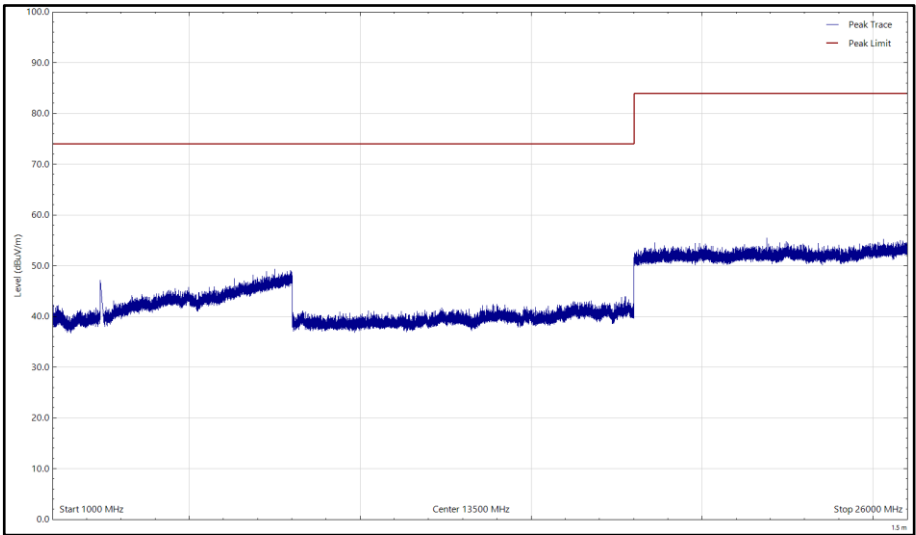


Figure 180 - 2402 MHz (CH0), DH5, ePA, Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

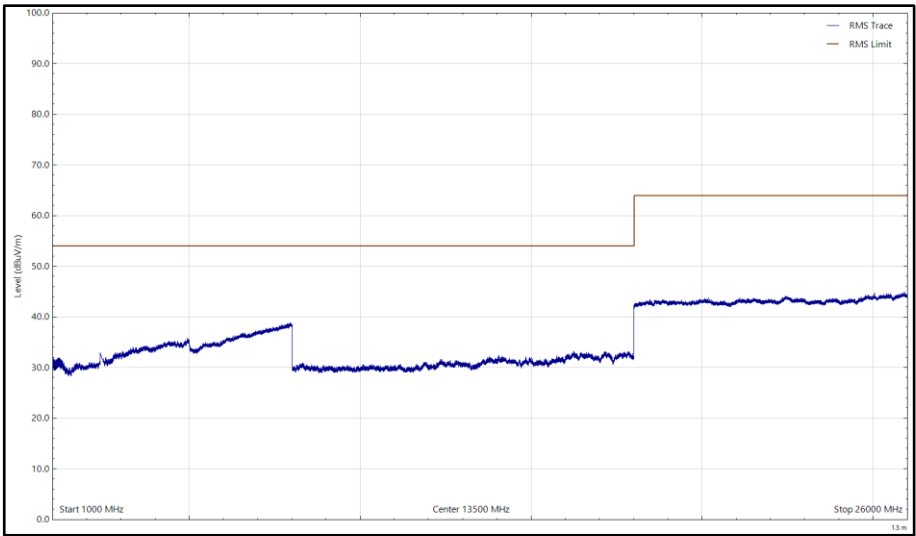


Figure 181 - 2402 MHz (CH0), DH5, ePA, Core 1, 1 GHz to 26 GHz, Horizontal (rms)

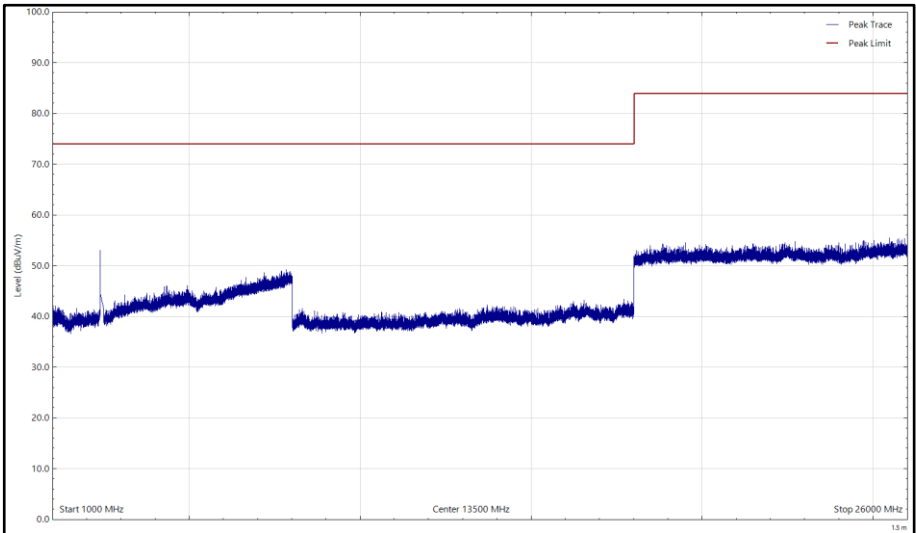


Figure 182 - 2402 MHz (CH0), DH5, ePA, Core 1, 1 GHz to 26 GHz, Vertical (Peak)

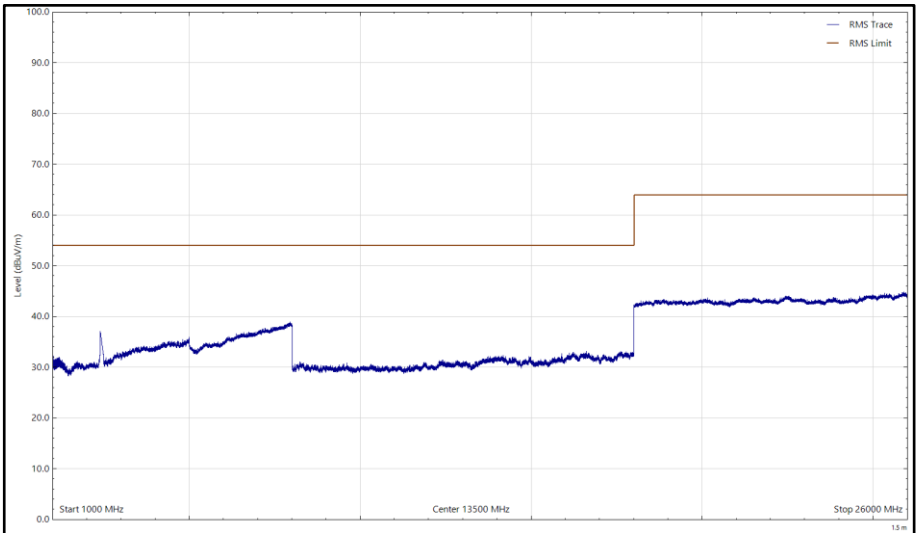


Figure 183 - 2402 MHz (CH0), DH5, ePA, Core 1, 1 GHz to 26 GHz, Vertical (rms)

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
31.385	31.2	40.0	-8.8	Q-Peak	84	101	Vertical
68.482	32.7	40.0	-7.3	Q-Peak	319	100	Vertical
186.495	32.2	43.5	-11.3	Q-Peak	84	100	Vertical
194.838	32.8	43.5	-10.7	Q-Peak	280	110	Horizontal
288.641	35.1	46.0	-10.9	Q-Peak	210	110	Horizontal
307.234	32.2	46.0	-13.8	Q-Peak	241	102	Vertical
4881.617	36.6	54.0	-17.4	CISPR Avg	12	288	Vertical

Table 65 - 2441 MHz (CH39), DH5, ePA, Core 1, 30 MHz to 26 GHz

No other emissions found within 6 dB of the limit.

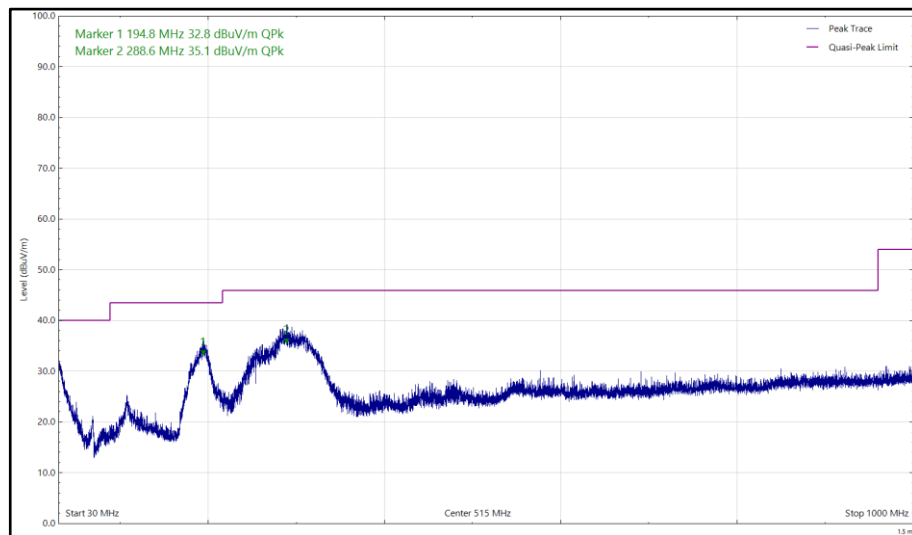


Figure 184 - 2441 MHz (CH39), DH5, ePA, Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

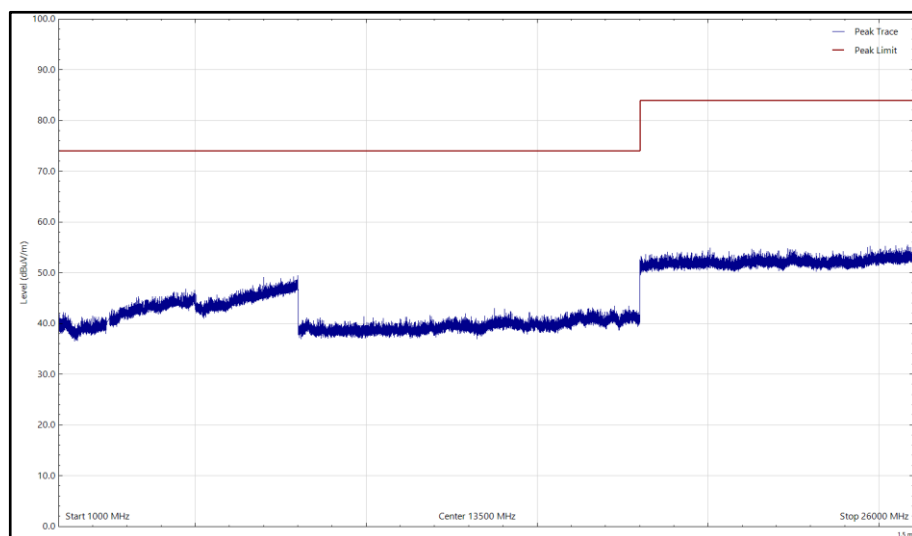


Figure 185 - 2441 MHz (CH39), DH5, ePA, Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

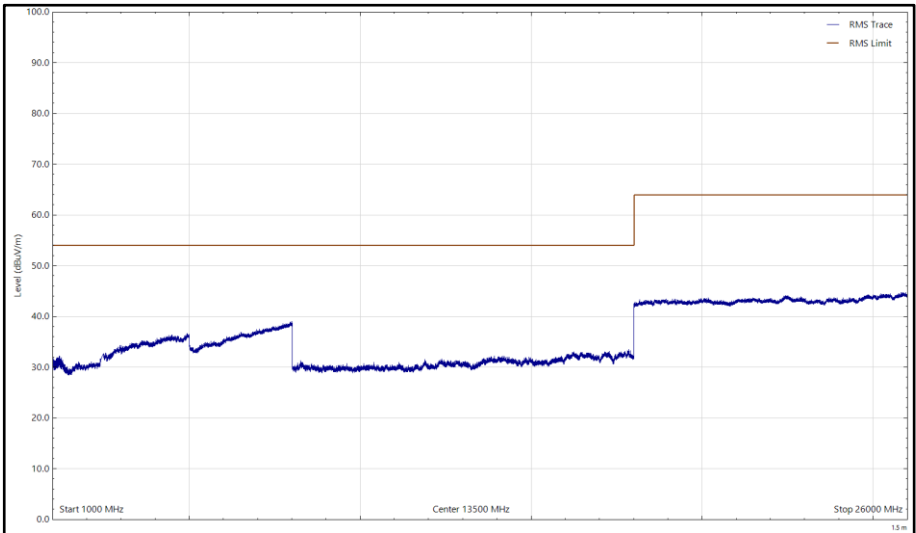


Figure 186 - 2441 MHz (CH39), DH5, ePA, Core 1, 1 GHz to 26 GHz, Horizontal (rms)

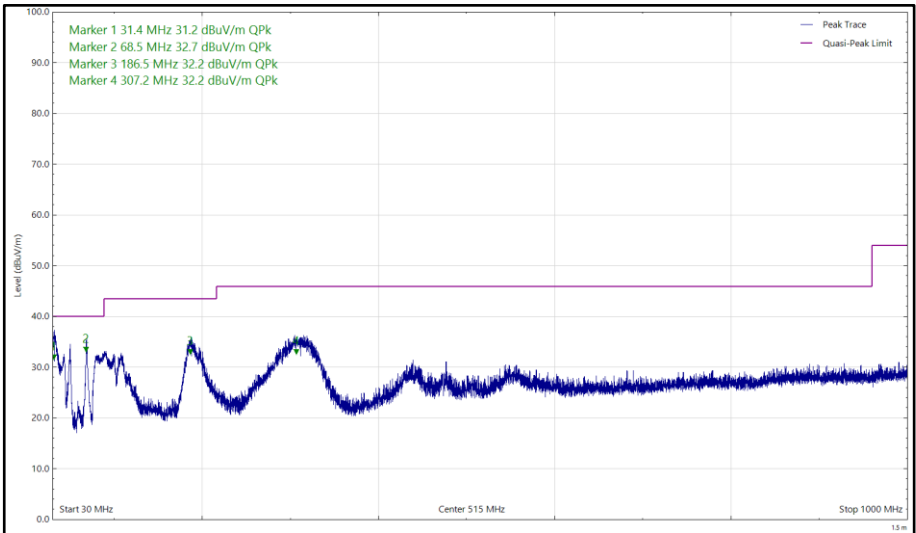


Figure 187 - 2441 MHz (CH39), DH5, ePA, Core 1, 30 MHz to 1 GHz, Vertical (Peak)

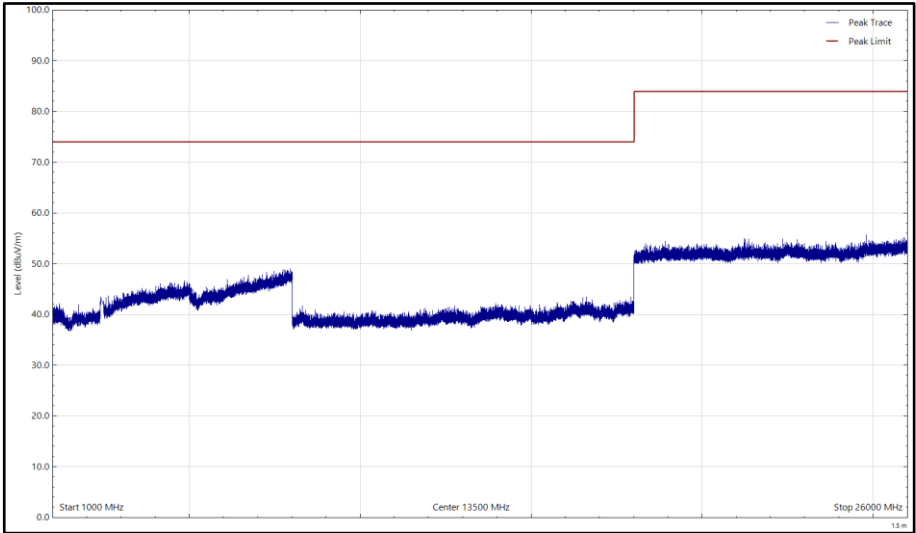


Figure 188 - 2441 MHz (CH39), DH5, ePA, Core 1, 1 GHz to 26 GHz, Vertical (Peak)

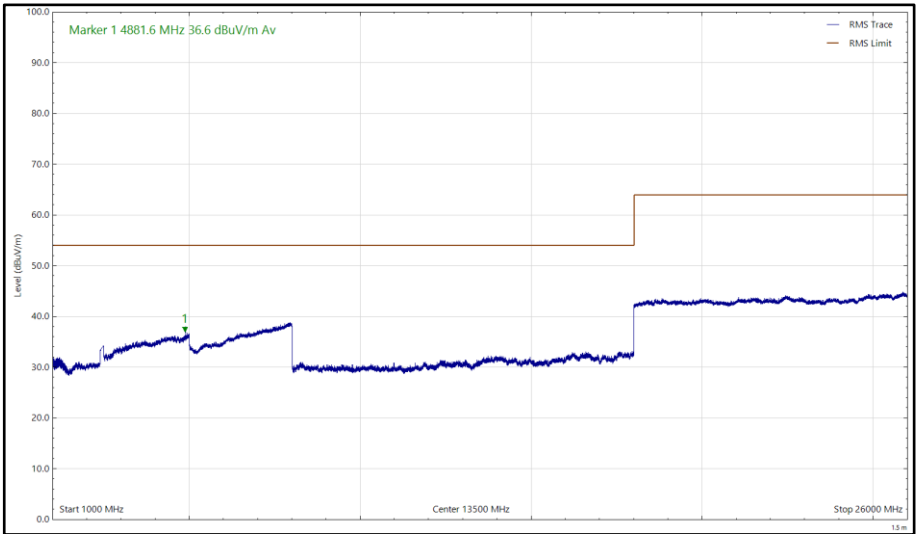


Figure 189 - 2441 MHz (CH39), DH5, ePA, Core 1, 1 GHz to 26 GHz, Vertical (rms)

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
4960.242	41.6	54.0	-12.4	CISPR Avg	4	267	Vertical

Table 66 - 2480 MHz (CH78), DH5, ePA, Core 1, 1 to 26 GHz

No other emissions found within 6 dB of the limit.

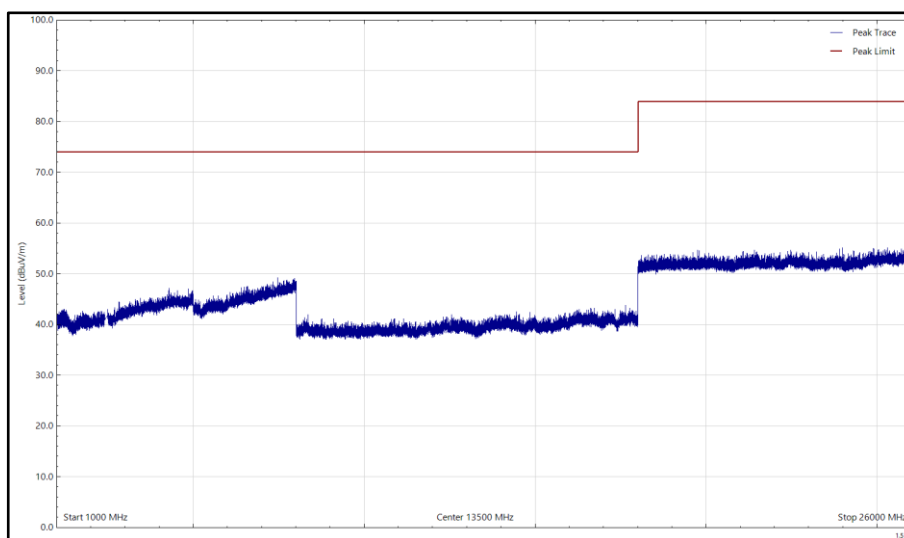


Figure 190 - 2480 MHz (CH78), DH5, ePA, Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

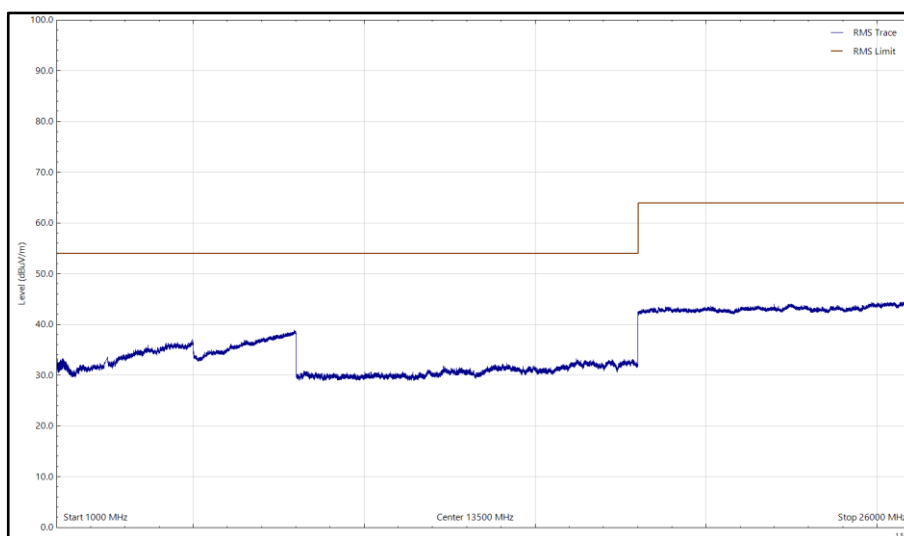


Figure 191 - 2480 MHz (CH78), DH5, ePA, Core 1, 1 GHz to 26 GHz, Horizontal (rms)

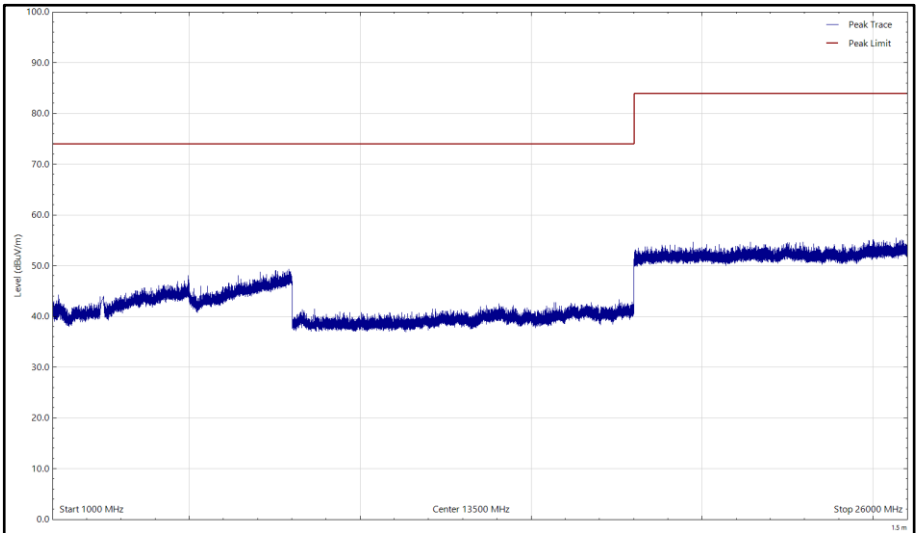


Figure 192 - 2480 MHz (CH78), DH5, ePA, Core 1, 1 GHz to 26 GHz, Vertical (Peak)

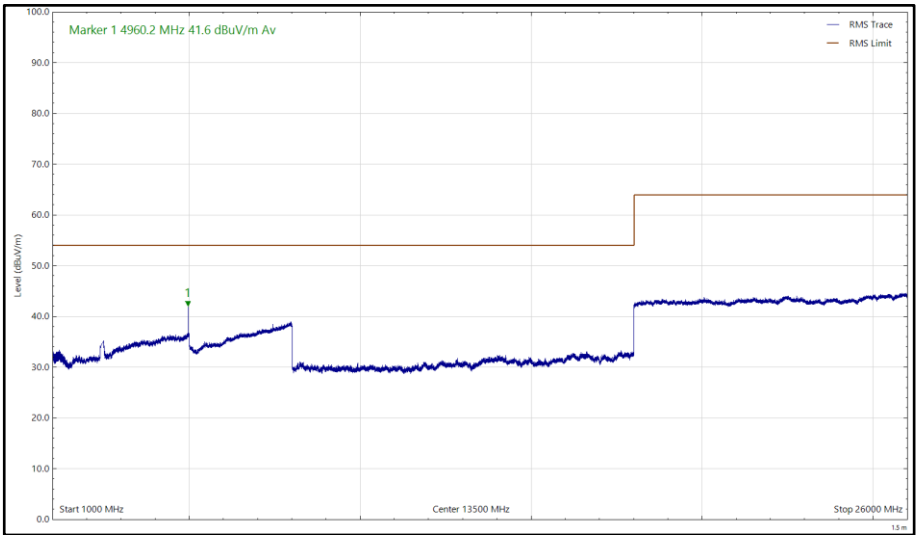


Figure 193 - 2480 MHz (CH78), DH5, ePA, Core 1, 1 GHz to 26 GHz, Vertical (rms)



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.



2.8.8 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	12	O/P Mon
Screened Room (11)	Rainford	Rainford	5136	36	01-Nov-2021
Antenna 18-40GHz (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	24	27-Jul-2022
Antenna 18-40GHz (Double Ridge Guide)	Q-Par Angus Ltd	QSH 180K	1511	24	02-Oct-2021
18GHz – 40GHz Pre-Amplifier	Phase One	PS04-0087	1534	12	18-Feb-2021
Multimeter	Iso-tech	IDM101	2419	12	28-Nov-2020
Antenna with permanent attenuator (Bilog)	Schaffner	CBL6143	2904	24	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
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
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5475	12	17-Mar-2021
Attenuator 5W 10dB DC-18GHz	Aaren	AT40A-4041-D18-10	5494	12	14-Apr-2021
1m K-Type Cable	Junkosha	MWX241-01000KMSKMS/A	5512	12	03-Apr-2021
2m SMA Cable	Junkosha	MWX221-02000AMSAMS/A	5518	12	01-Apr-2021



Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
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
8 - 18 GHz Amplifier	Wright Technologies	APS06-0061	5595	12	25-Aug-2021

Table 67

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
Frequency Hopping Systems - Average Time of Occupancy	-
Frequency Hopping Systems - Channel Separation	± 14.709 kHz
Frequency Hopping Systems - Number of Hopping Channels	-
Frequency Hopping Systems - 20 dB Bandwidth	± 13.893 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
Spurious Radiated Emissions	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB

Table 68

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.