

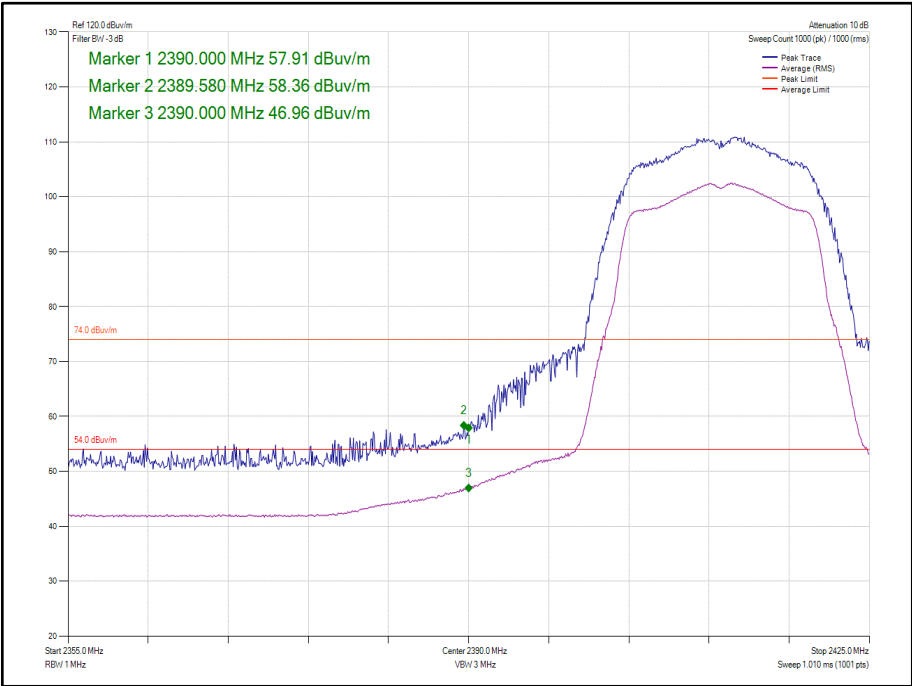


Figure 73 - 802.11g, Core 0 - 2412 MHz, Band Edge Frequency 2390.0 MHz

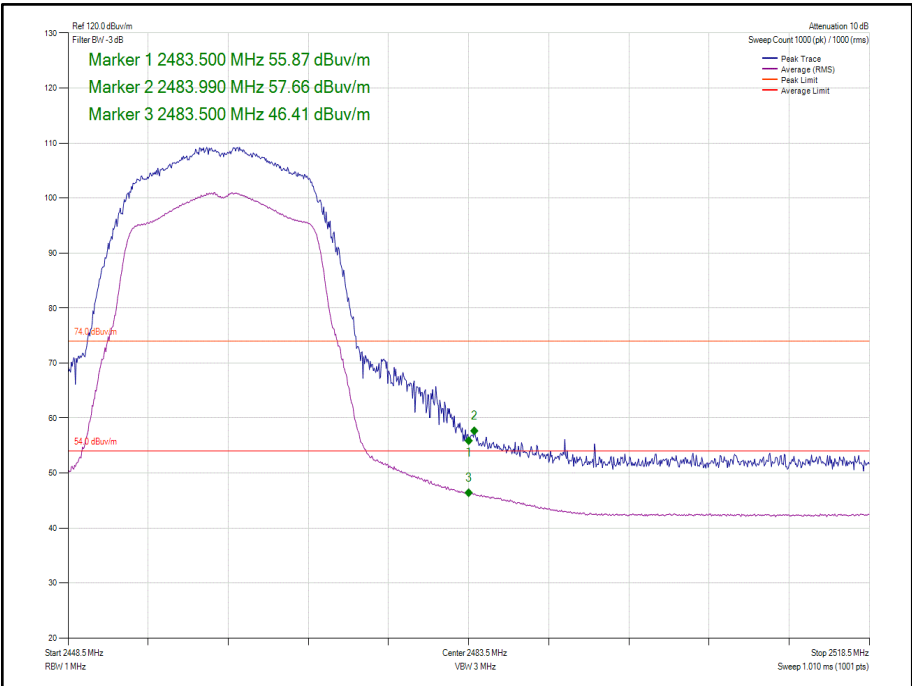


Figure 74 - 802.11g, Core 0 - 2462 MHz, Band Edge Frequency 2483.5 MHz

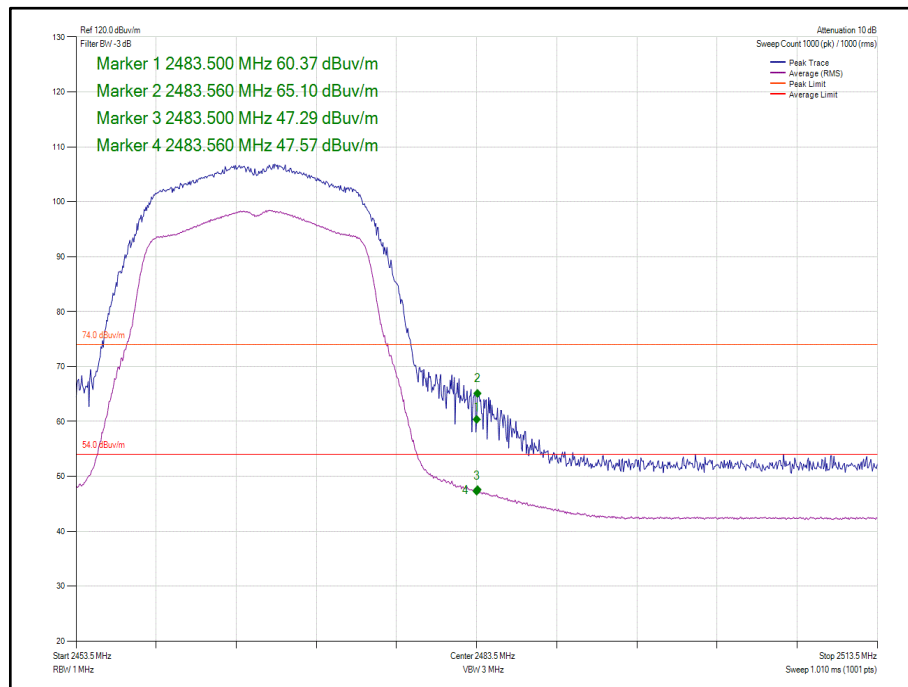


Figure 75 - 802.11g, Core 0 - 2467 MHz, Band Edge Frequency 2483.5 MHz

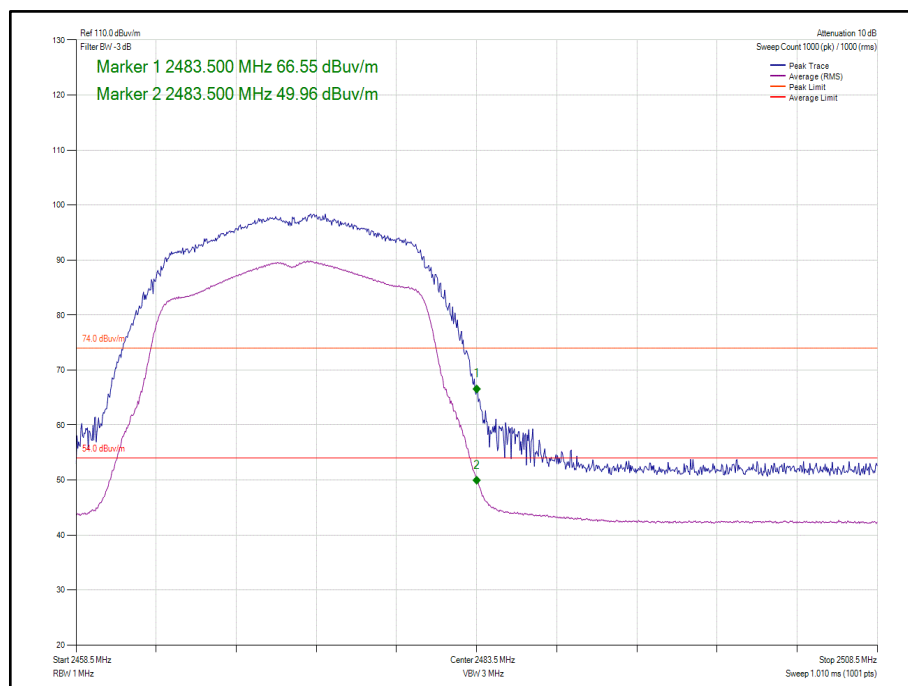


Figure 76 - 802.11g, Core 0 - 2472 MHz, Band Edge Frequency 2483.5 MHz

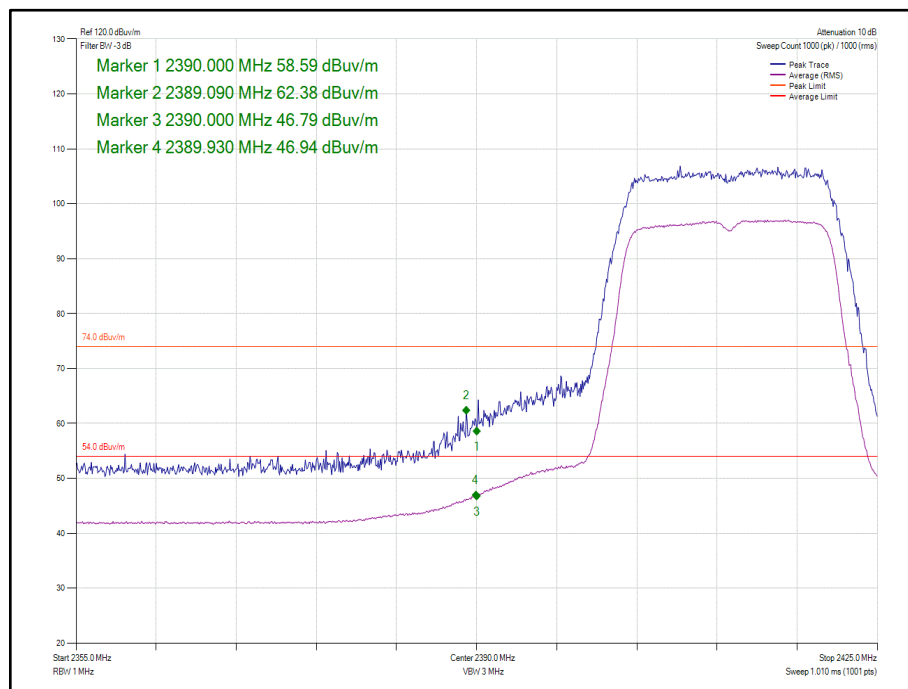


Figure 77 - 802.11n, HT20, Core 0 - 2412 MHz, Band Edge Frequency 2390 MHz

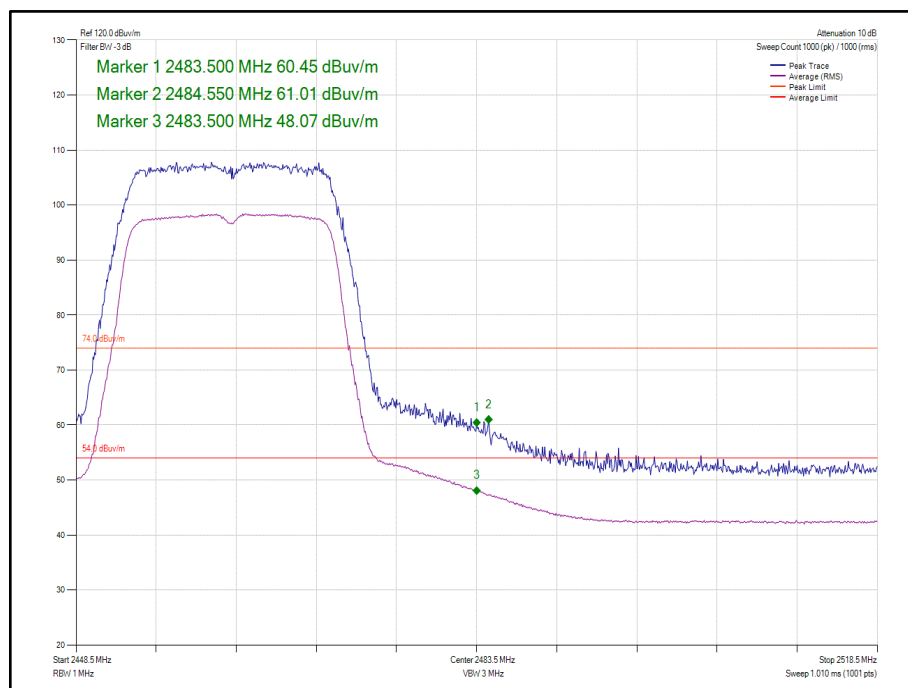


Figure 78 - 802.11n HT20, Core 0 - 2462 MHz, Band Edge Frequency 2483.5 MHz

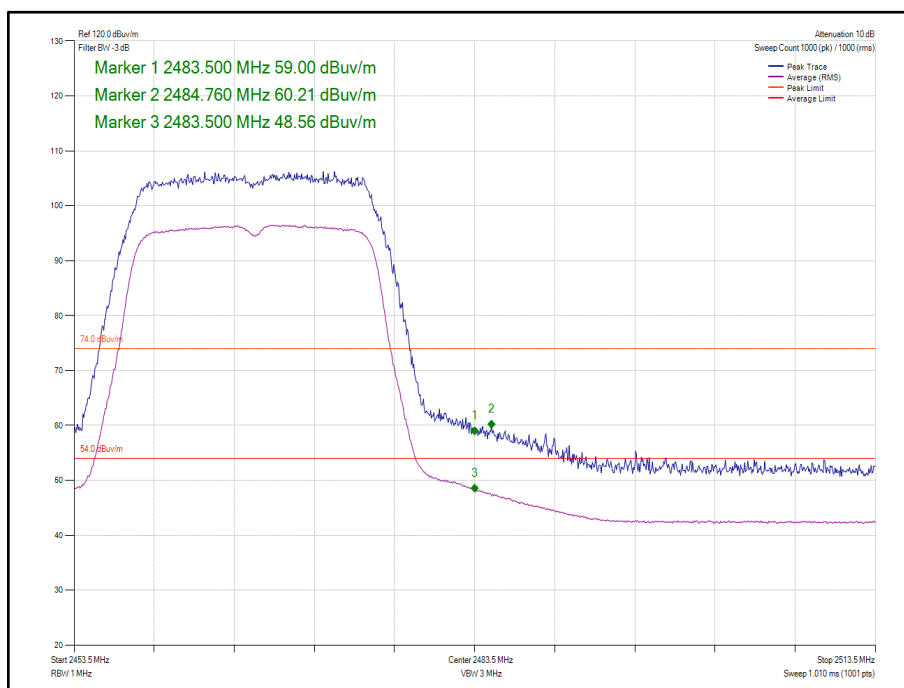


Figure 79 - 802.11n HT20, Core 0 - 2467 MHz, Band Edge Frequency 2483.5 MHz

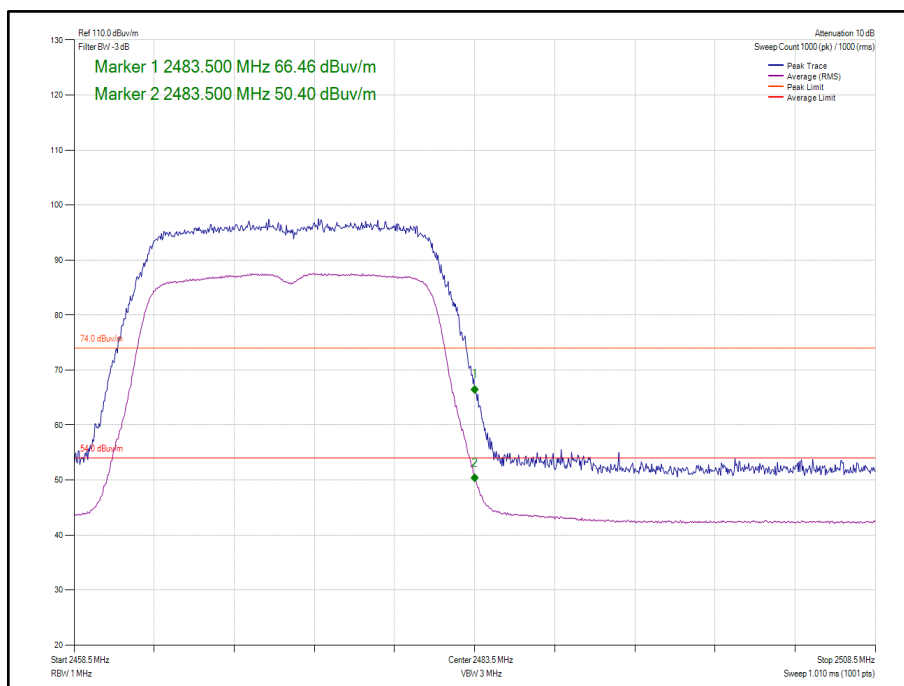


Figure 80 - 802.11n HT20, Core 0 - 2472 MHz, Band Edge Frequency 2483.5 MHz

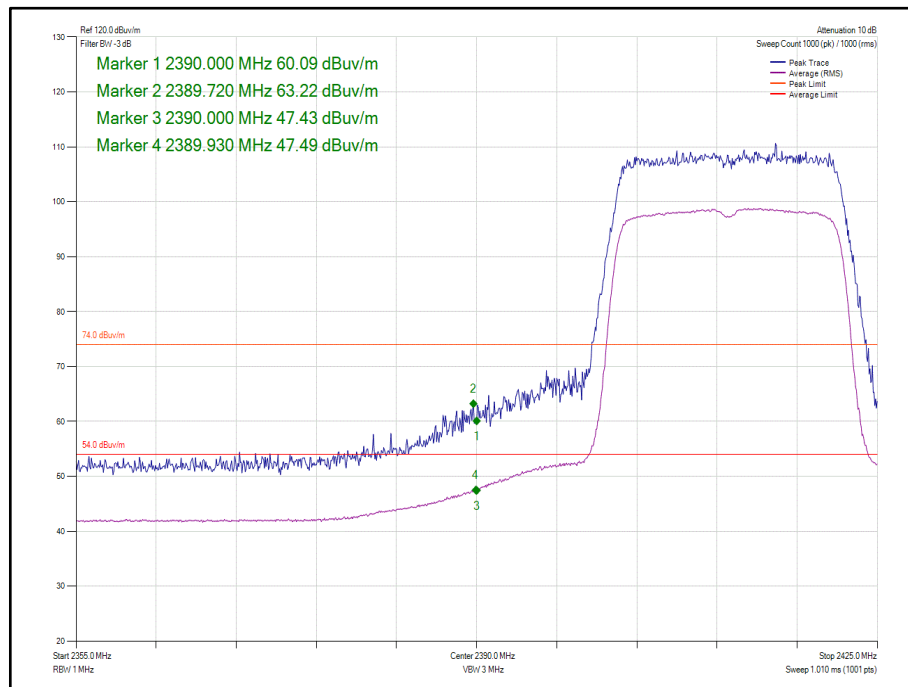


Figure 81 - 802.11ax HE20, Core 0, SU - 2412 MHz, Band Edge Frequency 2390 MHz

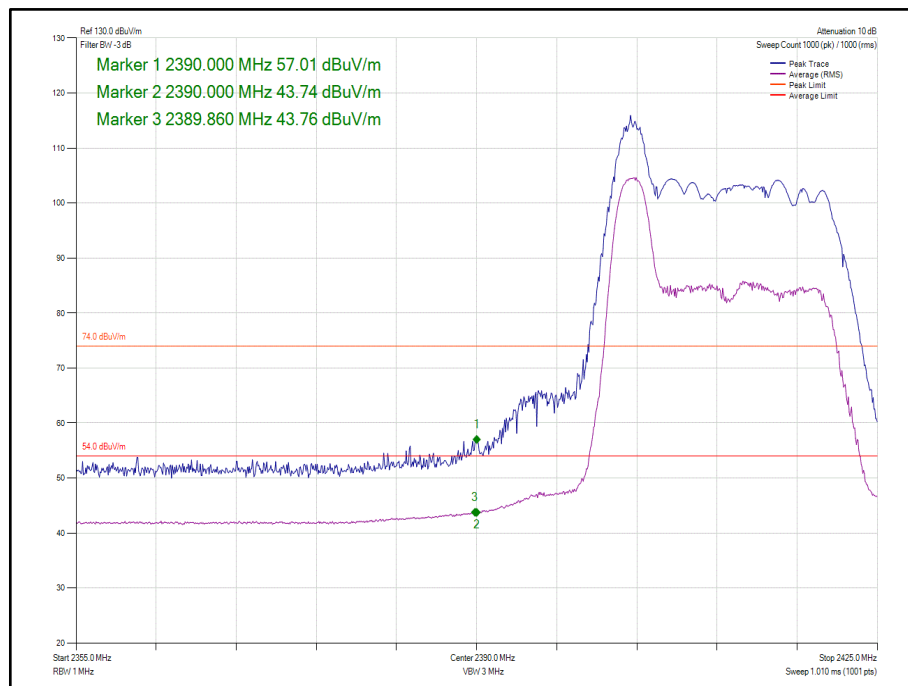


Figure 82 - 802.11ax HE20, Core 0, 26-0 - 2412 MHz, Band Edge Frequency 2390 MHz

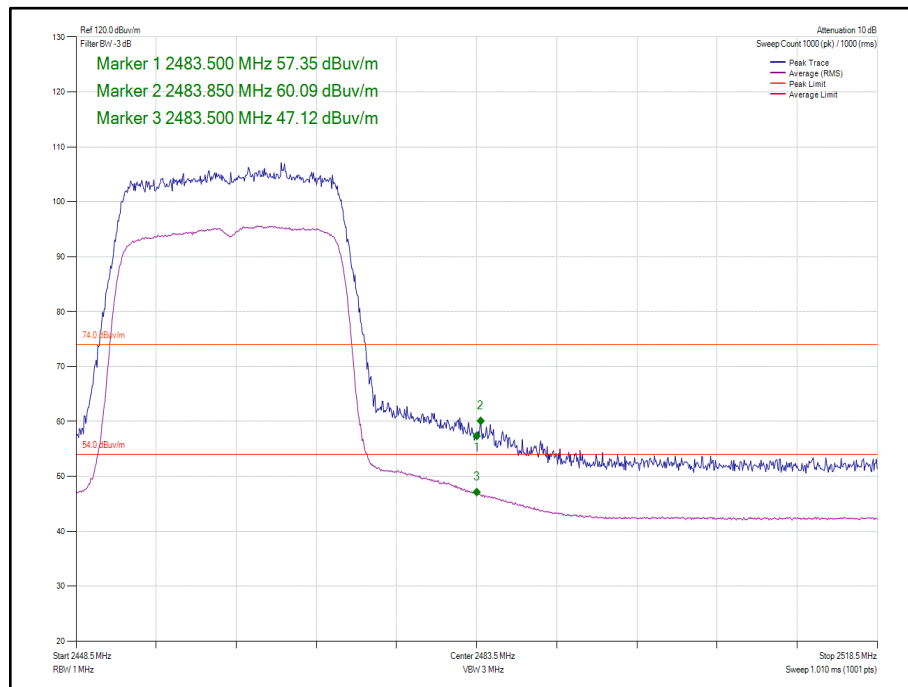


Figure 83 - 802.11ax HE20, Core 0, SU - 2462 MHz, Band Edge Frequency 2483.5 MHz

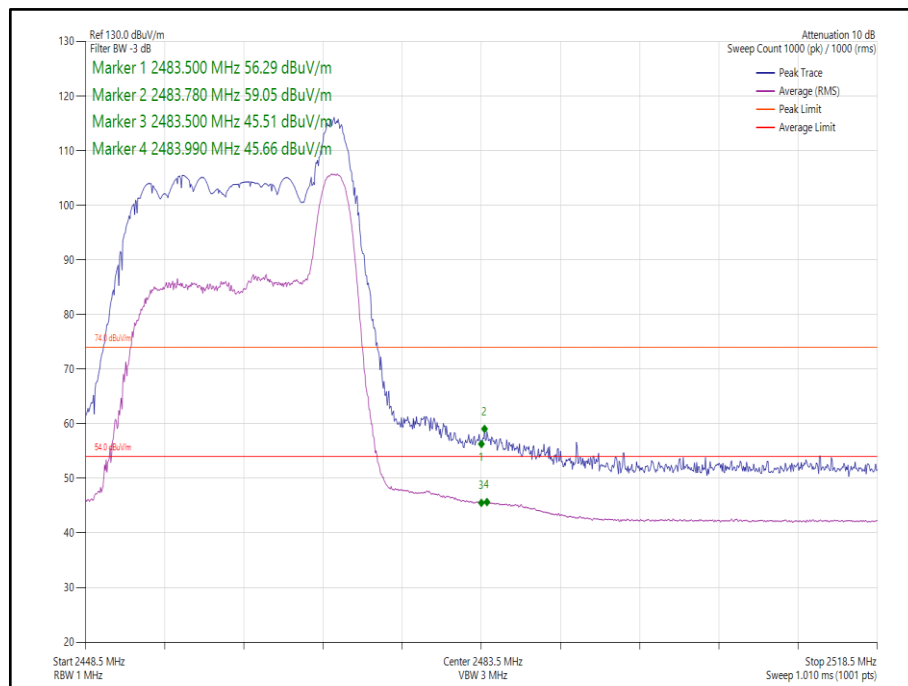


Figure 84 - 802.11ax HE20, Core 0, 26-8 - 2462 MHz, Band Edge Frequency 2483.5 MHz

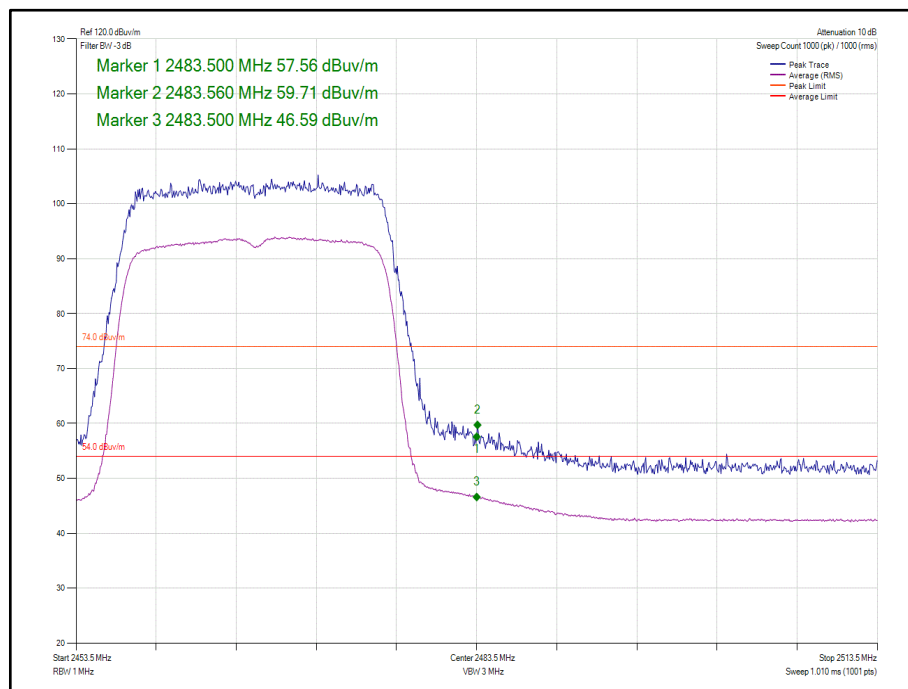


Figure 85 - 802.11ax HE20, Core 0, SU - 2467 MHz, Band Edge Frequency 2483.5 MHz

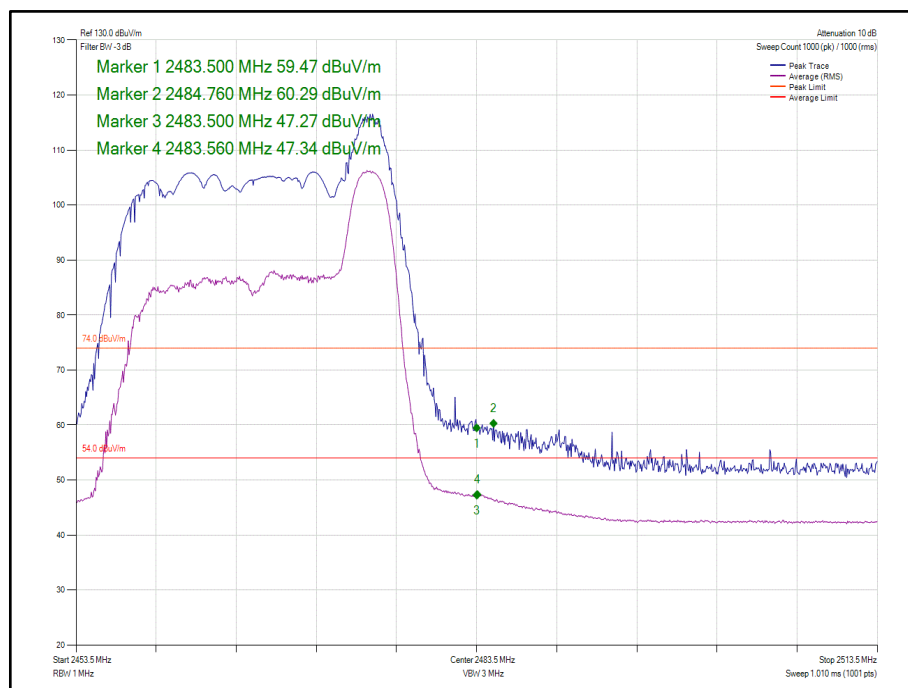


Figure 86 - 802.11ax HE20, Core 0, 26-8 - 2467 MHz, Band Edge Frequency 2483.5 MHz

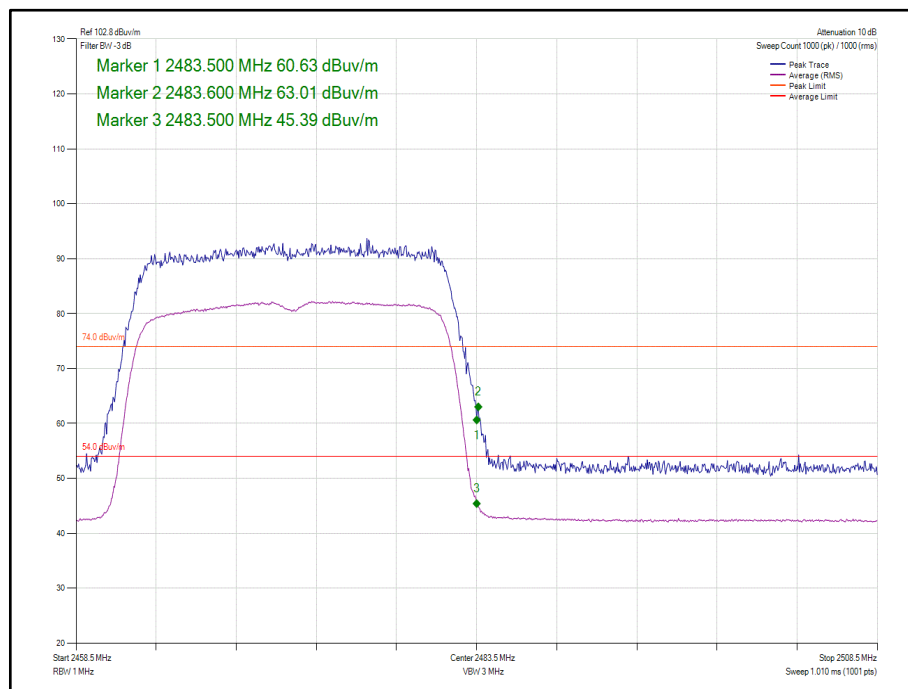


Figure 87 - 802.11ax HE20, Core 0, SU - 2472 MHz, Band Edge Frequency 2483.5 MHz

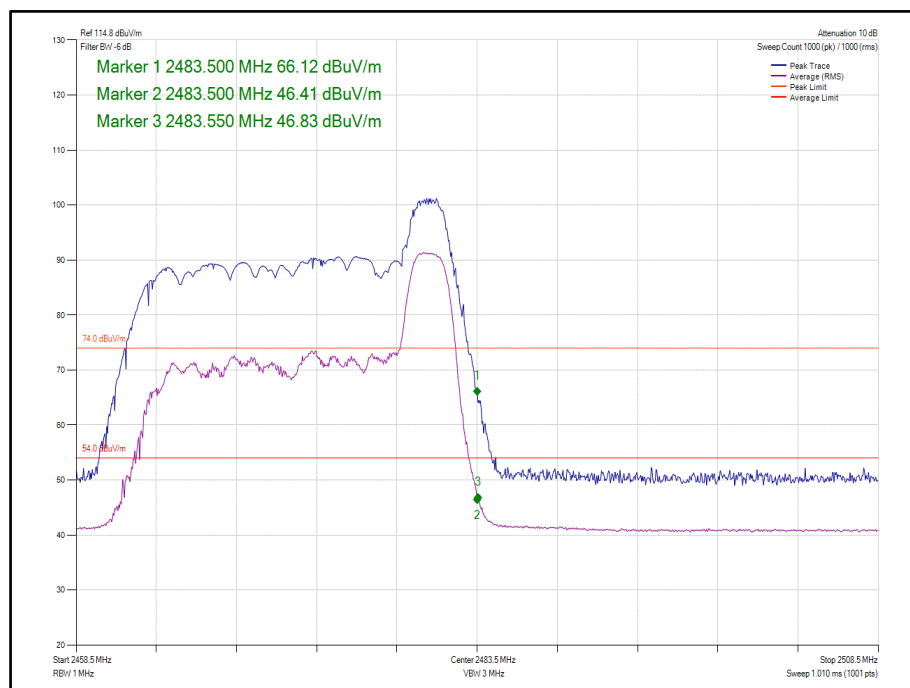


Figure 88 - 802.11ax HE20, Core 0, 26-8 - 2472 MHz, Band Edge Frequency 2483.5 MHz



Mode	Data Rate/MCS	Resource Size	Resource Index	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
802.11n HT20, Core 0-1	MCS7	-	-	2412	2390.0	61.17	47.90
802.11n HT20, Core 0-1	MCS7	-	-	2462	2483.5	60.20	47.47
802.11n HT20, Core 0-1	MCS7	-	-	2467	2483.5	63.65	49.11
802.11n HT20, Core 0-1	MCS7	-	-	2472	2483.5	65.63	49.81
802.11ax HE20, Core 0-1	MCS7	SU	-	2412	2400	61.25	46.55
802.11ax HE20, Core 0-1	MCS7	26	0	2412	2400	59.13	44.89
802.11ax HE20, Core 0-1	MCS7	SU	-	2462	2483.5	62.78	48.52
802.11ax HE20, Core 0-1	MCS7	26	8	2462	2483.5	62.50	47.78
802.11ax HE20, Core 0-1	MCS7	SU	-	2467	2483.5	62.66	47.34
802.11ax HE20, Core 0-1	MCS7	26	8	2467	2483.5	67.52	50.97
802.11ax HE20, Core 0-1	MCS7	SU	-	2472	2483.5	64.05	47.43
802.11ax HE20, Core 0-1	MCS7	26	8	2472	2483.5	69.18	50.19

Table 28 – MIMO 2TX Restricted Band Edge Results

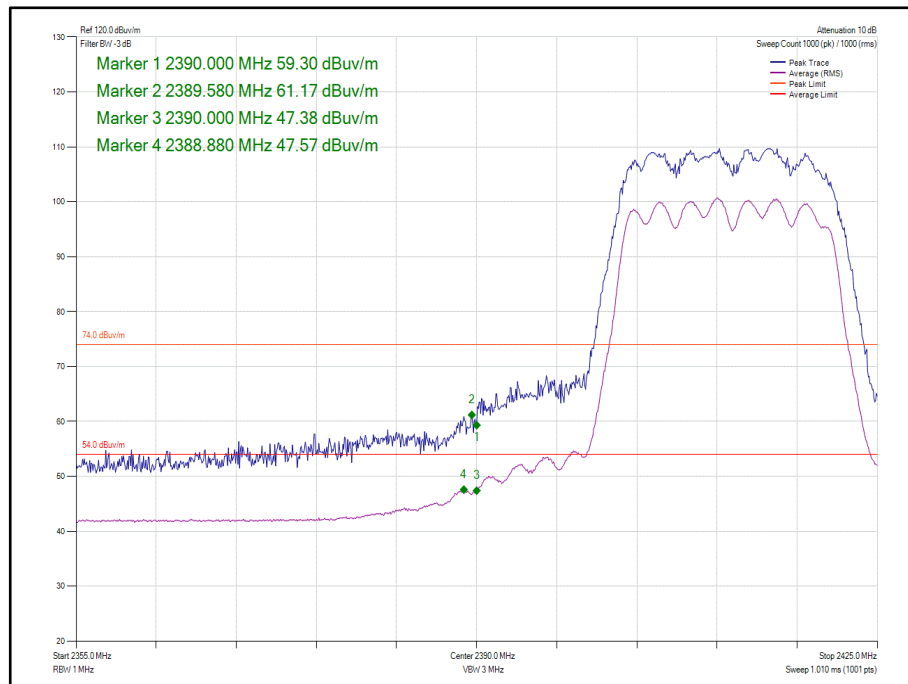


Figure 89 - 802.11n HT20, Core 0-1 - 2412 MHz, Band Edge Frequency 2390 MHz

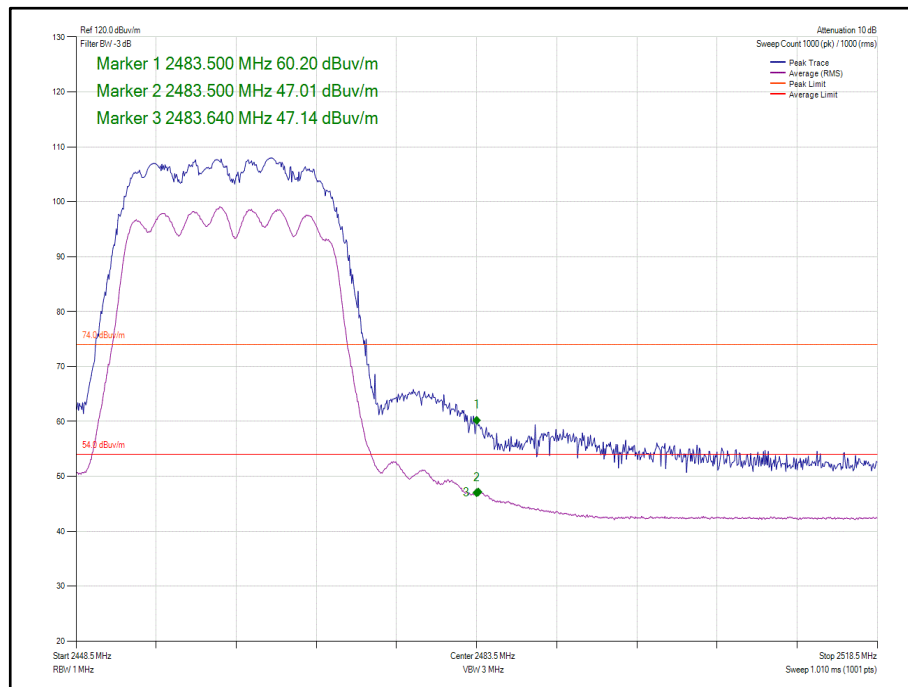


Figure 90 - 802.11n HT20, Core 0-1 - 2462 MHz, Band Edge Frequency 2483.5 MHz

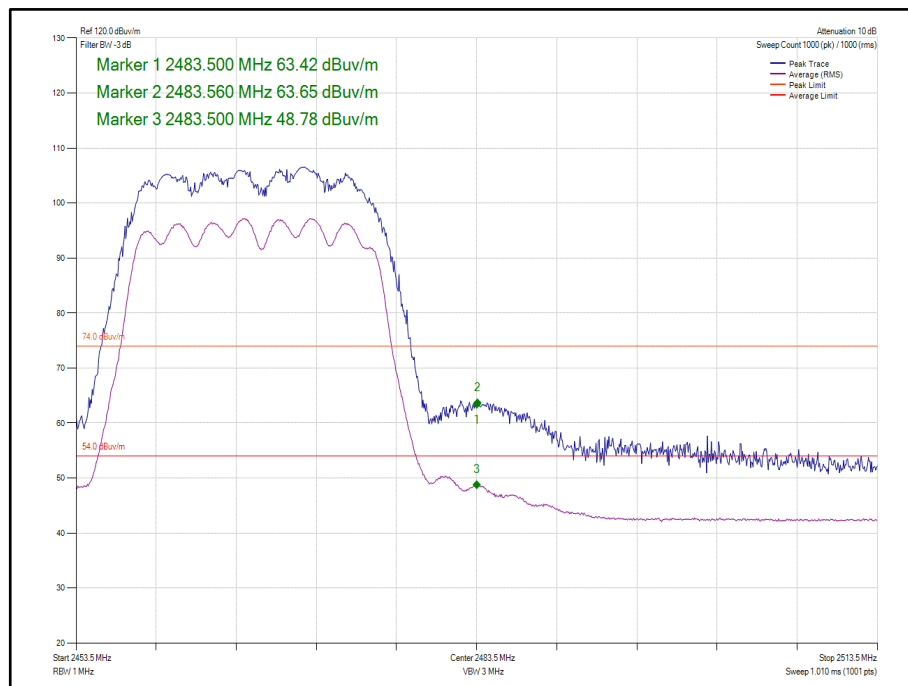


Figure 91 - 802.11n HT20, Core 0-1 - 2467 MHz, Band Edge Frequency 2483.5 MHz

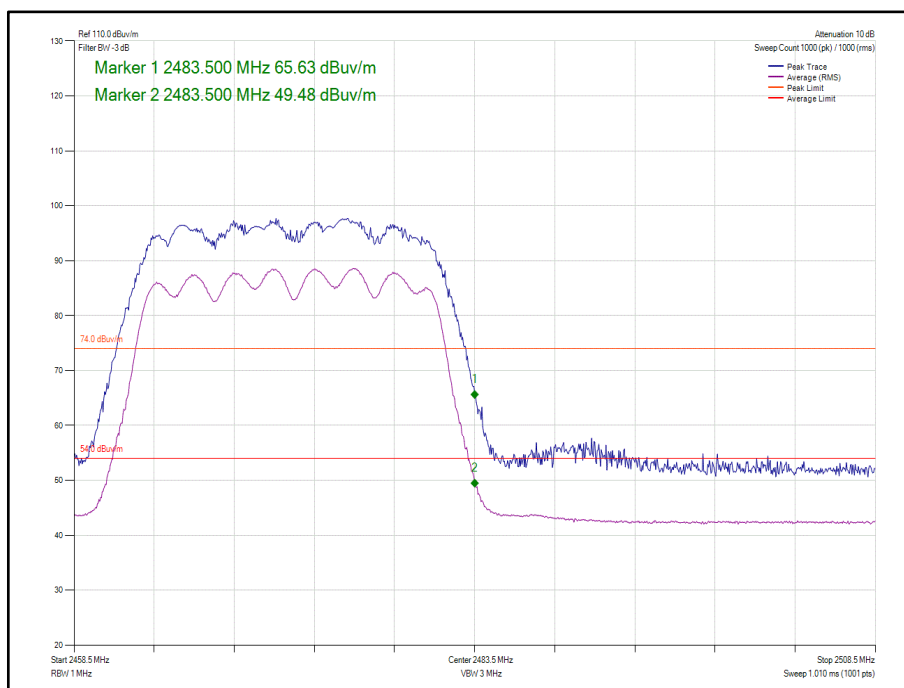


Figure 92 - 802.11n HT20, Core 0-1 - 2472 MHz, Band Edge Frequency 2483.5 MHz

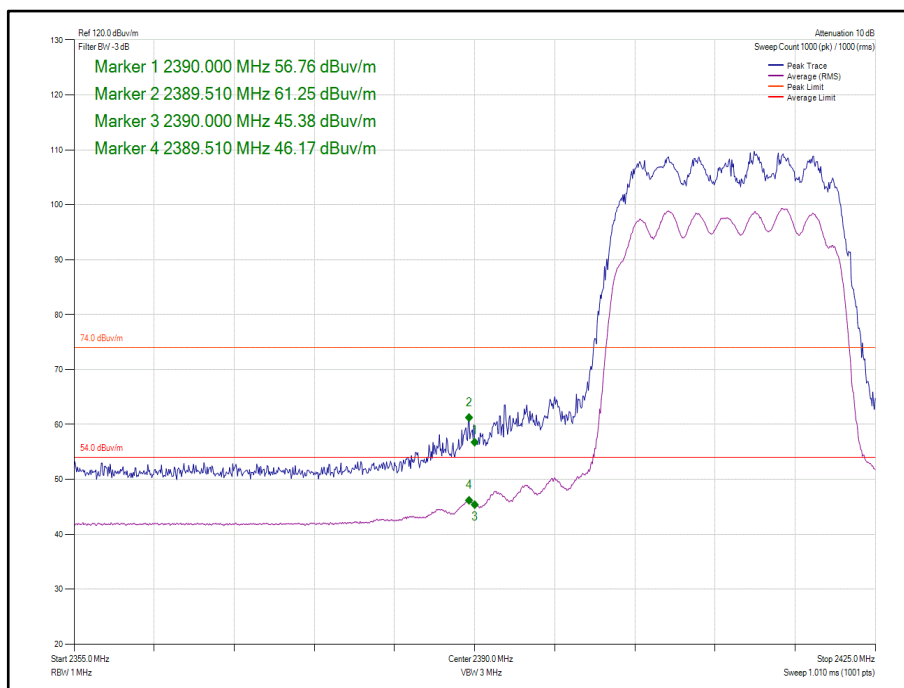


Figure 93 - 802.11ax HE20, Core 0-1, SU - 2412 MHz, Band Edge Frequency 2390 MHz

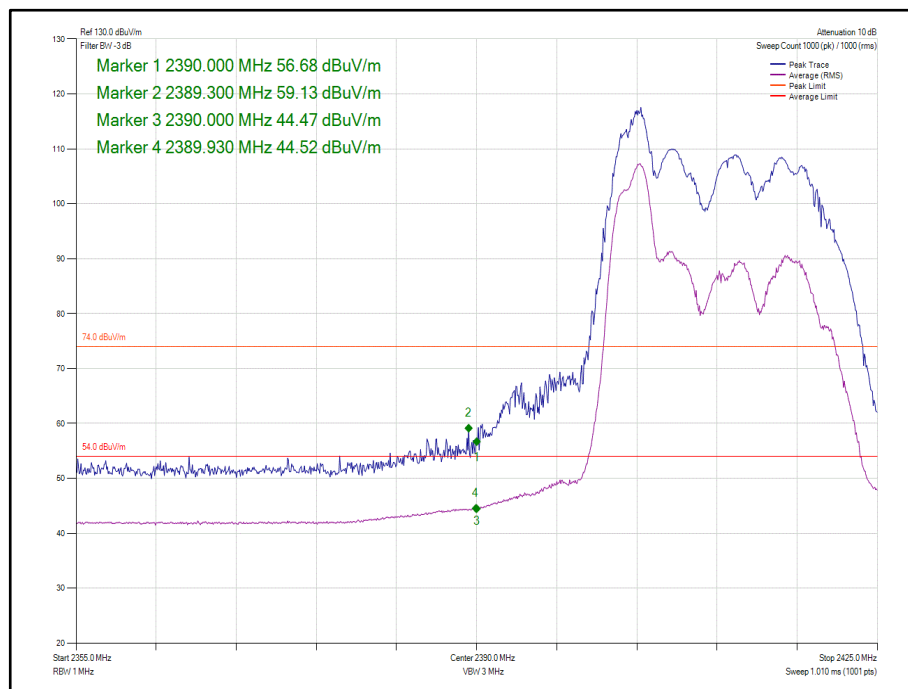


Figure 94 - 802.11ax HE20, Core 0-1, 26-0 - 2412 MHz, Band Edge Frequency 2390 MHz

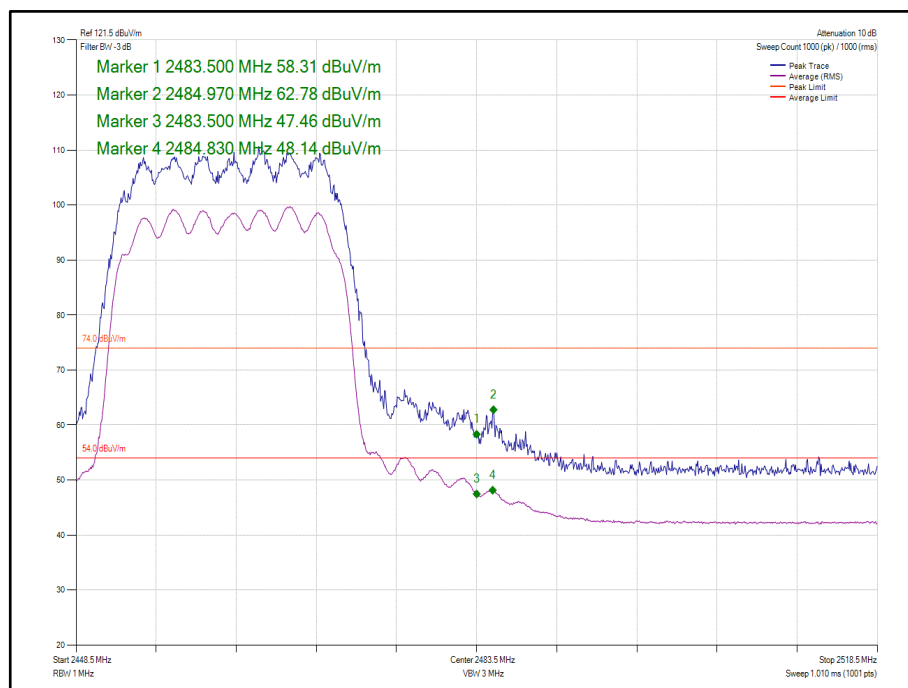


Figure 95 - 802.11ax HE20, Core 0-1, SU - 2462 MHz, Band Edge Frequency 2483.5 MHz

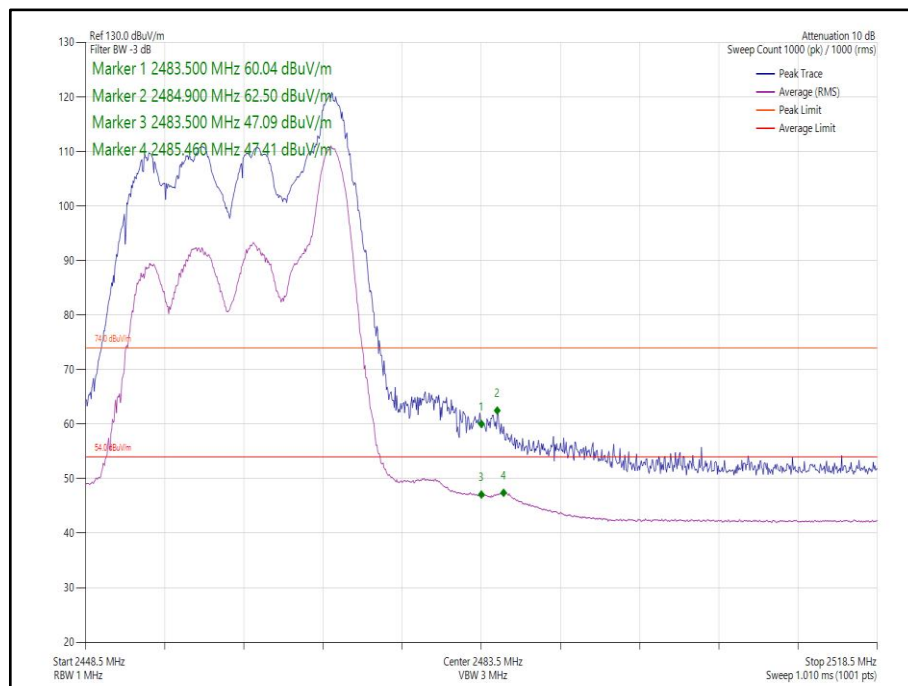


Figure 96 - 802.11ax HE20, Core 0-1, 26-8 - 2462 MHz, Band Edge Frequency 2483.5 MHz

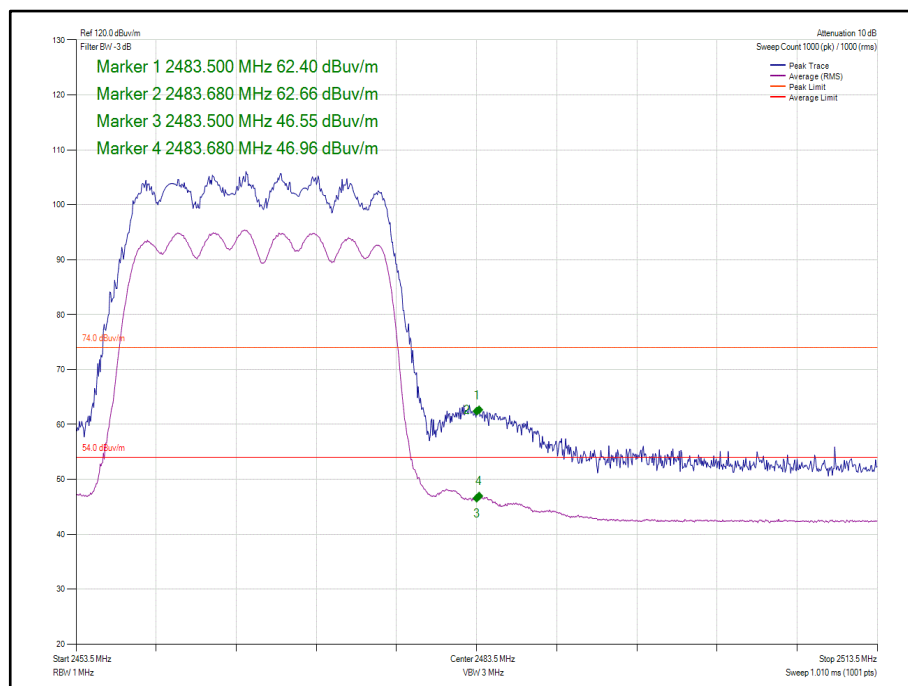


Figure 97 - 802.11ax HE20, Core 0-1, SU - 2467 MHz, Band Edge Frequency 2483.5 MHz

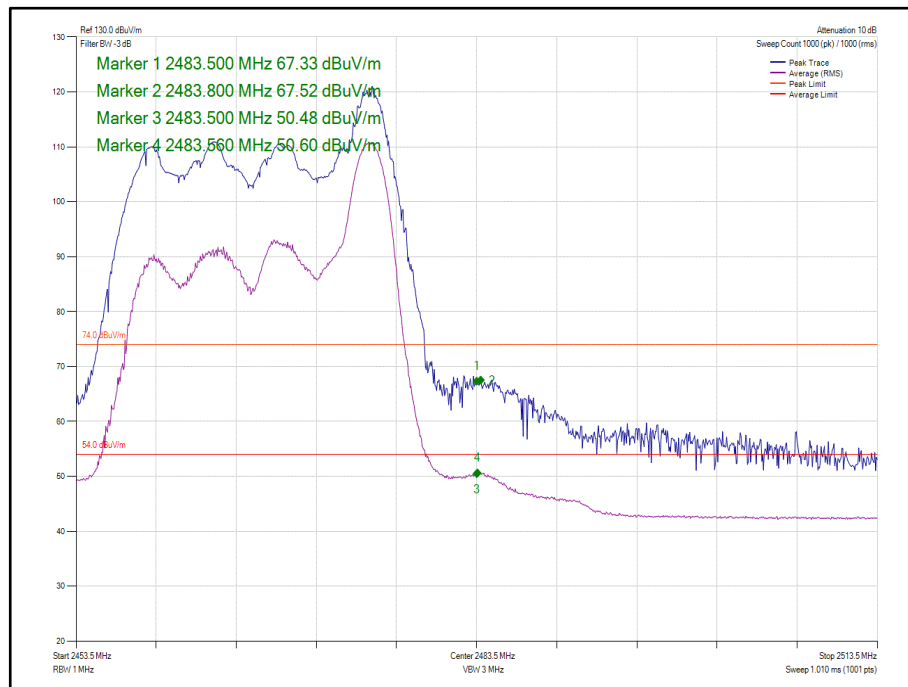


Figure 98 - 802.11ax HE20, Core 0-1, 26-8 - 2467 MHz, Band Edge Frequency 2483.5 MHz

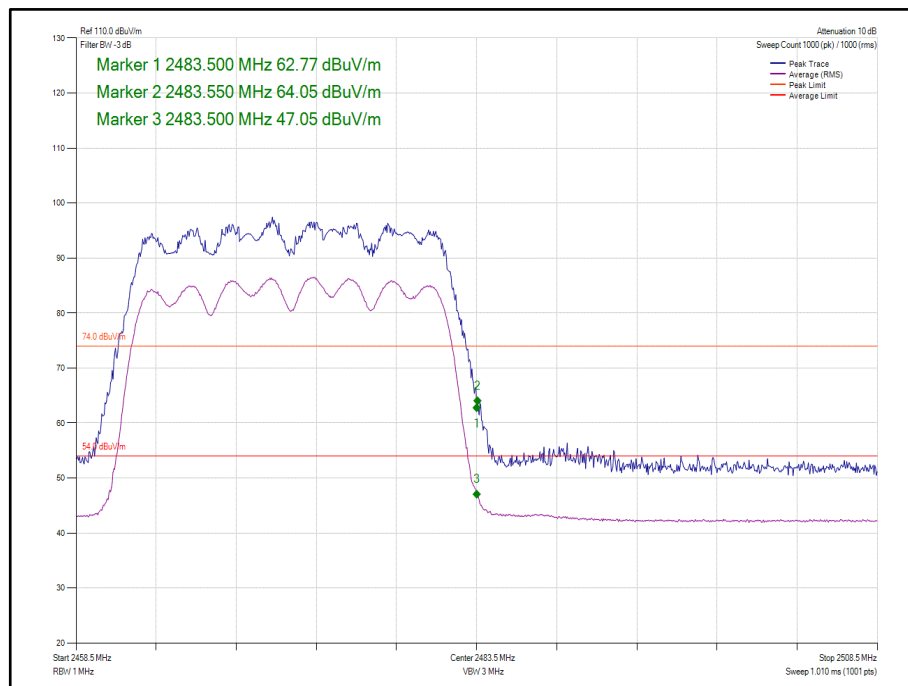


Figure 99 - 802.11ax HE20, Core 0-1, SU - 2472 MHz, Band Edge Frequency 2483.5 MHz

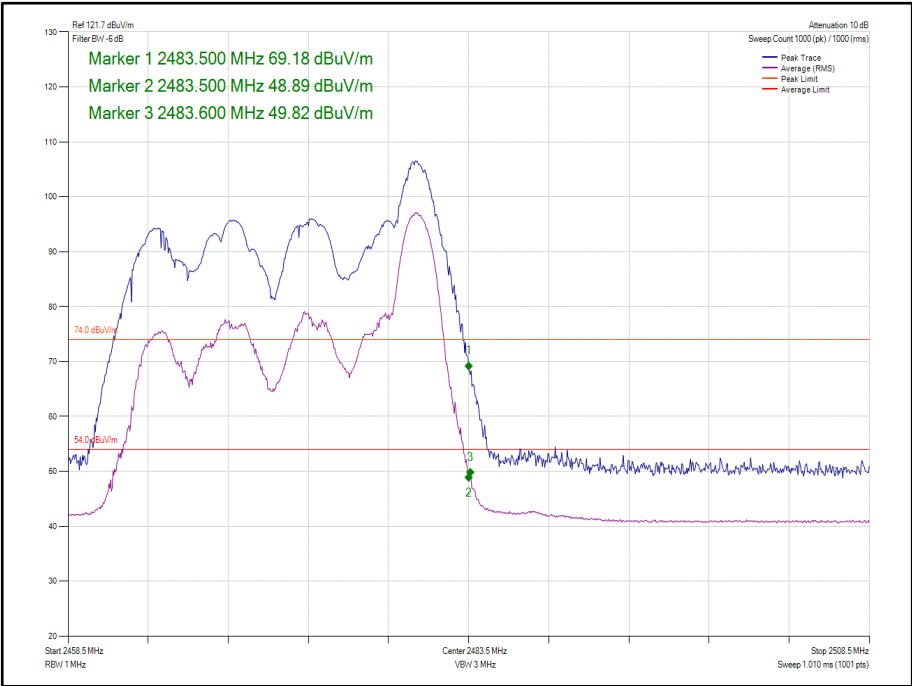


Figure 100 - 802.11ax HE20, Core 0-1, 26-8 - 2472 MHz, Band Edge Frequency 2483.5 MHz
FCC 47 CFR Part 15, Limit Clause 15.209

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 29

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 30

*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.



2.4.7 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
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
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 31

TU - Traceability Unscheduled



2.5 Spurious Radiated Emissions

2.5.1 Specification Reference

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

2.5.2 Equipment Under Test and Modification State

A2338, S/N: C02CX02PQC36 - Modification State 0

2.5.3 Date of Test

23-August-2020 to 28-August-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. One port of each type was loaded.

For frequencies > 1 GHz, plots for average measurements were taken in accordance with ANSI C63.10, clause 11.12.2.5.2.

Where duty cycle corrections were required for average results, these are included in the result tables but are not shown on the plots.

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.

Note the edges of the fundamental may be visible and in some cases appear to exceed the limit in these pre-scans. These band edge emissions were not measured in this section and are investigated fully in sections 2.3 and 2.4.

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.

Where formal measurements have been necessary, the results have been presented in the emissions table.

In the 30 MHz to 1 GHz range pre-scans were only performed on the main radio mid channel (2440 MHz).

2.5.5 Example Test Setup Diagram

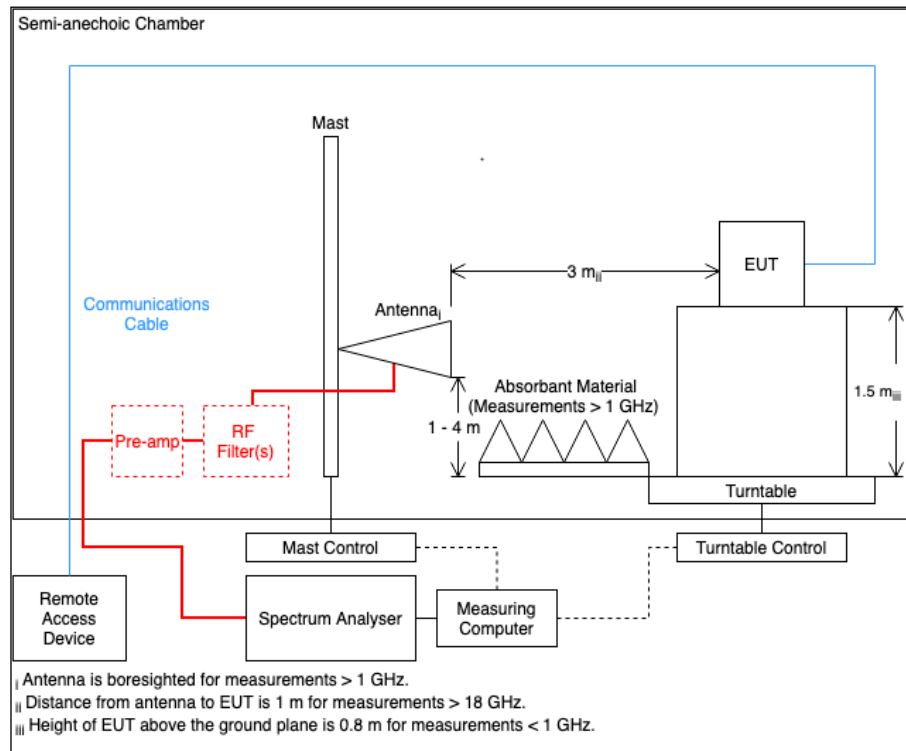


Figure 101

2.5.6 Environmental Conditions

Ambient Temperature	18.9 - 24.2 °C
Relative Humidity	53.8 - 75.4 %



2.5.7 Test Results

2.4 GHz WLAN

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

Table 32 - 2412 MHz (CH1), HT20, CDD, Core 0 + Core 1, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

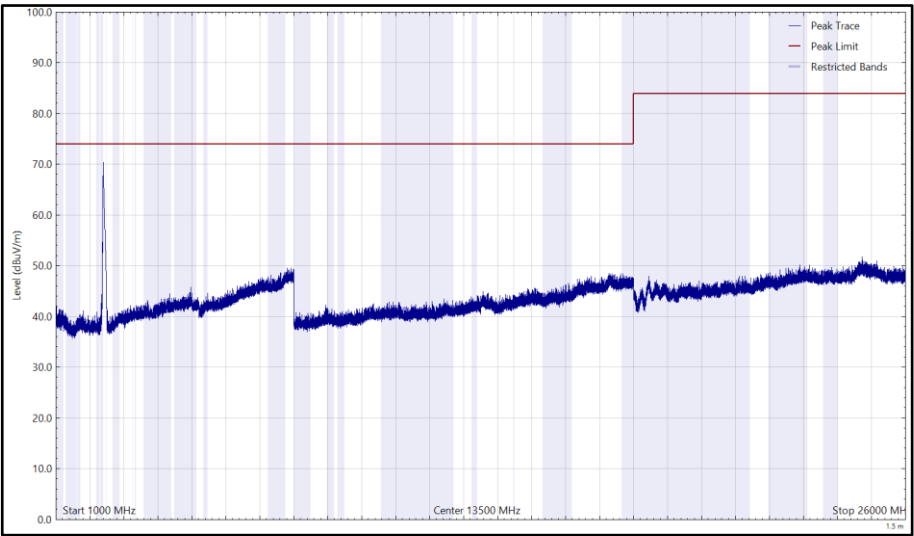


Figure 102 - 2412 MHz (CH1), HT20, CDD, Core 0 + Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

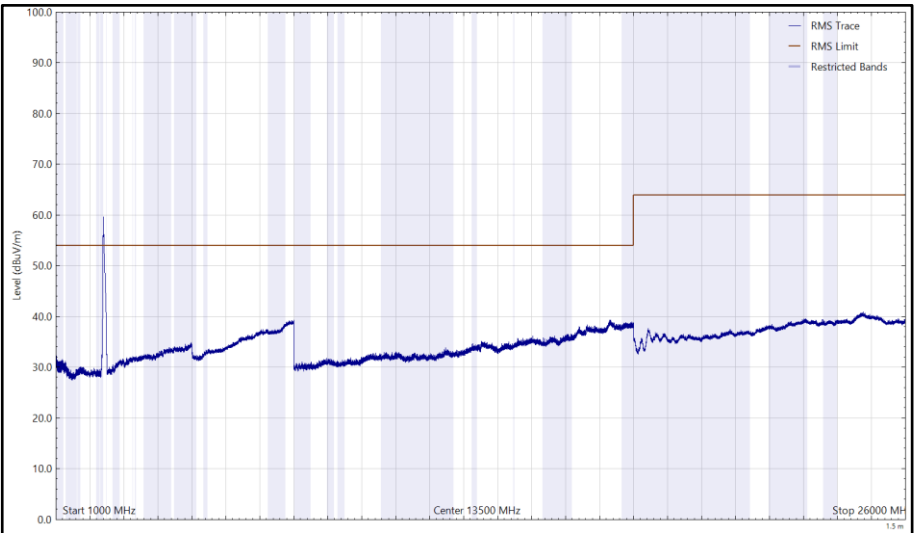


Figure 103 - 2412 MHz (CH1), HT20, CDD, Core 0 + Core 1, 1 GHz to 26 GHz, Horizontal (RMS)

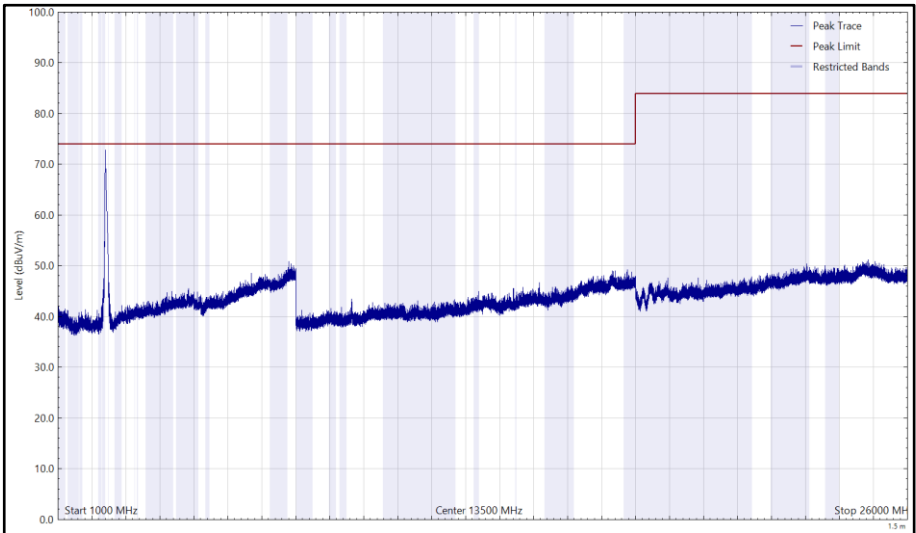


Figure 104 - 2412 MHz (CH1), HT20, CDD, Core 0 + Core 1, 1 GHz to 26 GHz, Vertical (Peak)

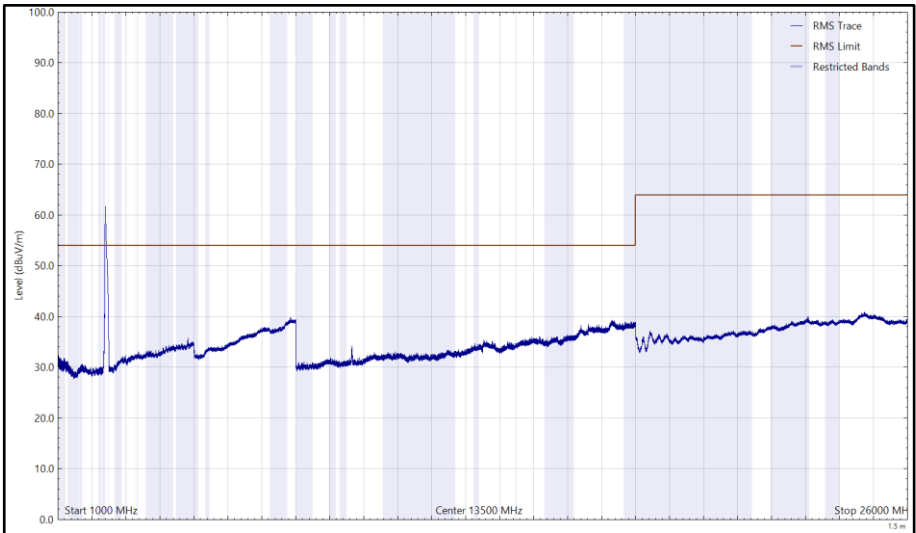


Figure 105 - 2412 MHz (CH1), HT20, CDD, Core 0 + Core 1, 1 GHz to 26 GHz, Vertical (RMS)

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
70.616	22.3	40.0	-17.7	Q-Peak	138	100	Vertical

Table 33 - 2437 MHz (CH6), HT20, CDD, Core 0 + Core 1, 30 MHz to 26 GHz

No other emissions found within 6 dB of the limit.

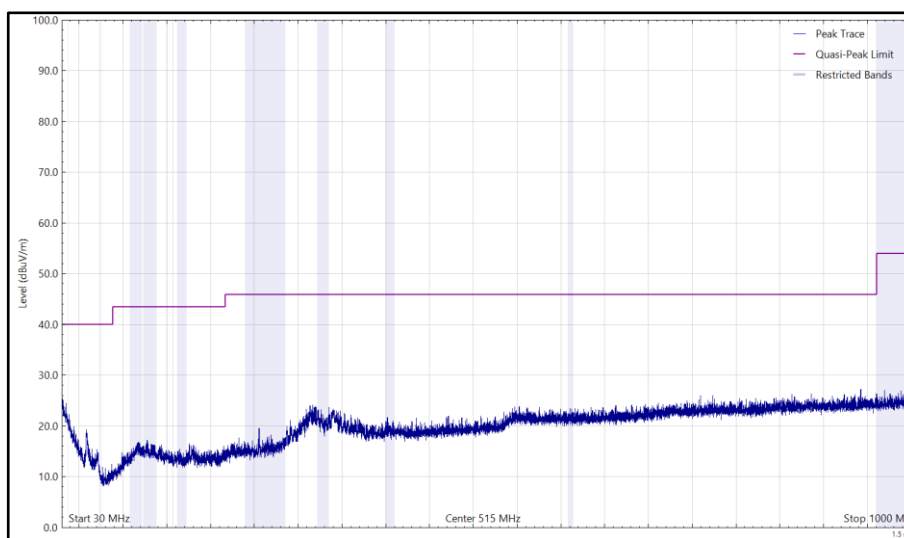


Figure 106 - 2437 MHz (CH6), HT20, CDD, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

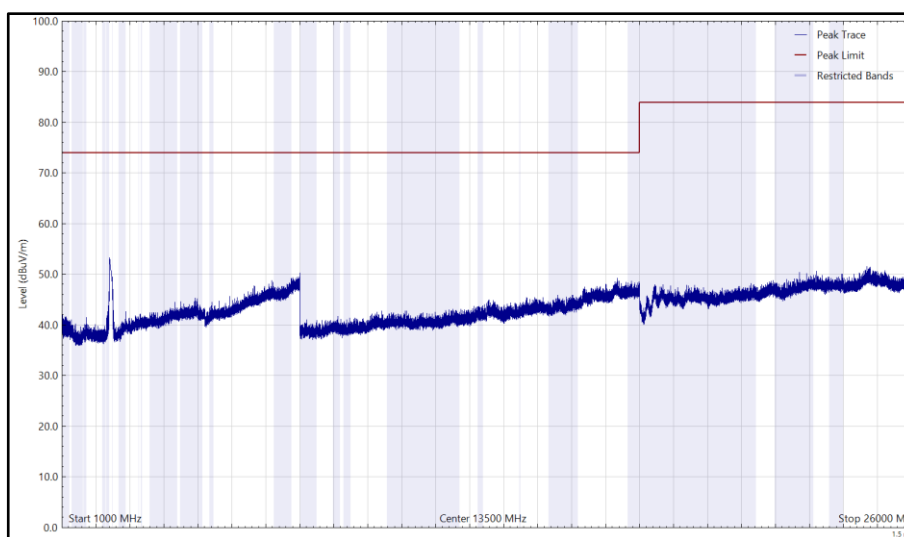


Figure 107 - 2437 MHz (CH6), HT20, CDD, Core 0 + Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

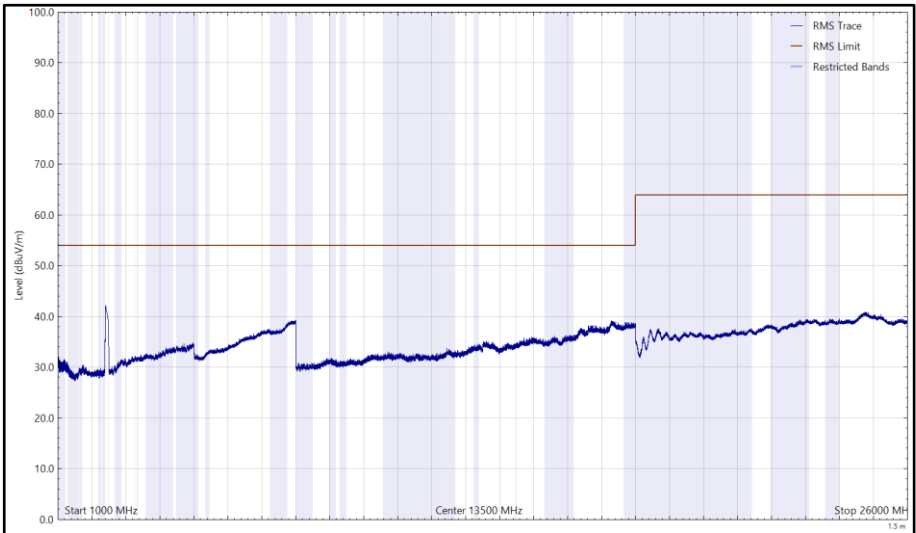


Figure 108 - 2437 MHz (CH6), HT20, CDD, Core 0 + Core 1, 1 GHz to 26 GHz, Horizontal (RMS)

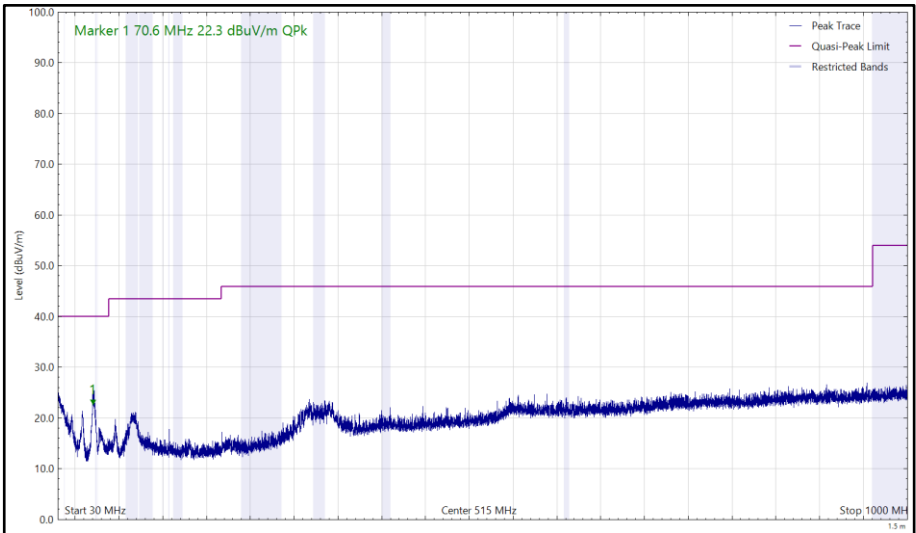


Figure 109 - 2437 MHz (CH6), HT20, CDD, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

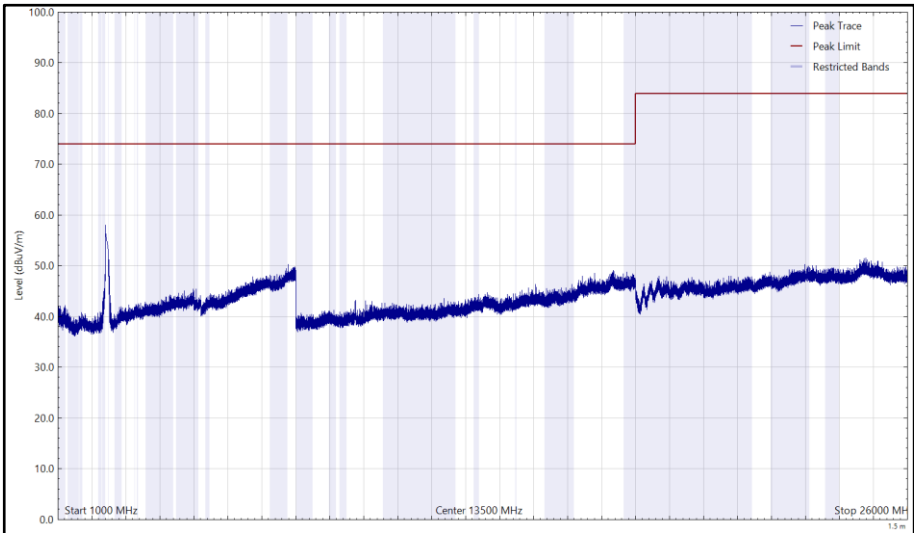


Figure 110 - 2437 MHz (CH6), HT20, CDD, Core 0 + Core 1, 1 GHz to 26 GHz, Vertical (Peak)

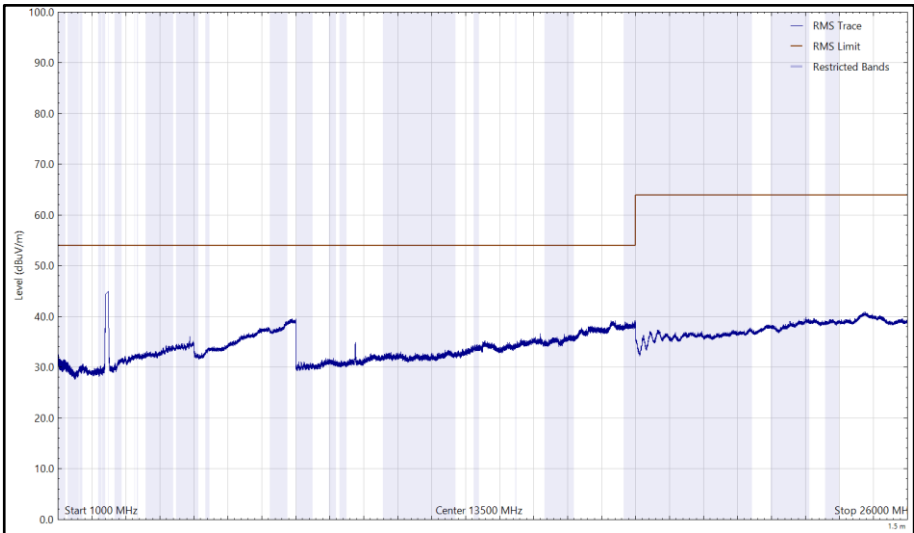


Figure 111 - 2437 MHz (CH6), HT20, CDD, Core 0 + Core 1, 1 GHz to 26 GHz, Vertical (RMS)



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

Table 34 - 2472 MHz (CH13), HT20, CDD, Core 0 + Core 1, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

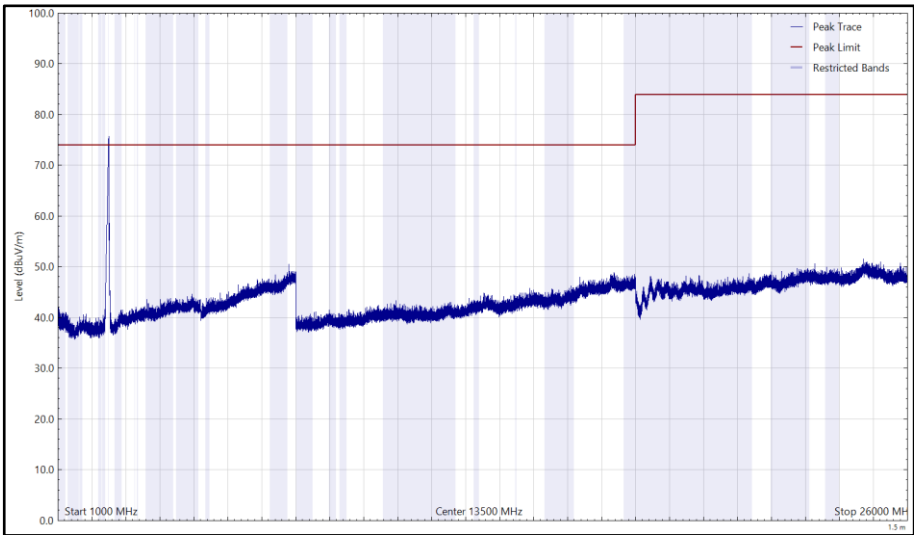


Figure 112 - 2472 MHz (CH13), HT20, CDD, Core 0 + Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

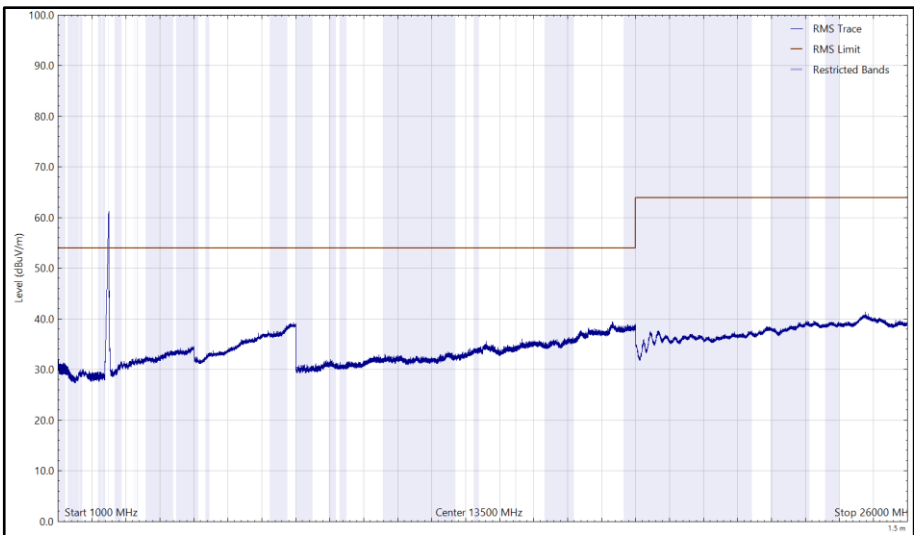


Figure 113 - 2472 MHz (CH13), HT20, CDD, Core 0 + Core 1, 1 GHz to 26 GHz, Horizontal (RMS)

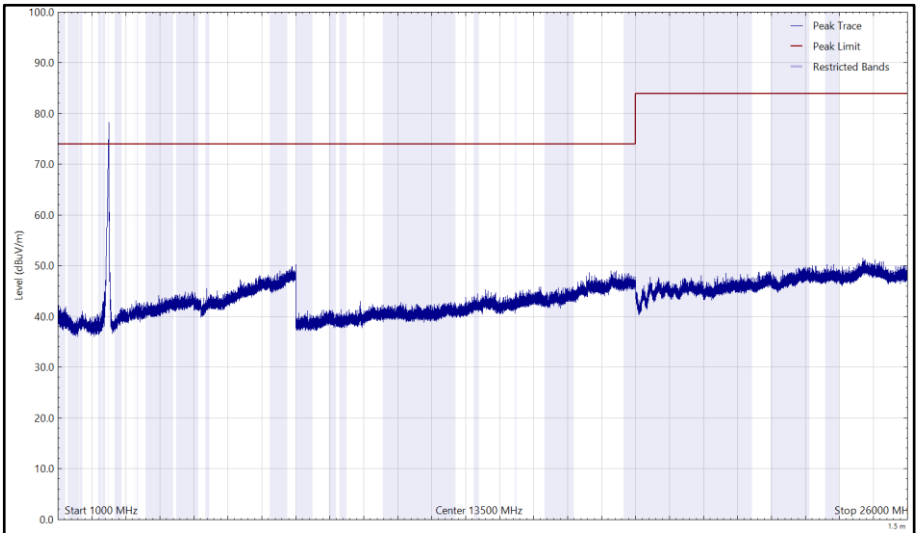


Figure 114 - 2472 MHz (CH13), HT20, CDD, Core 0 + Core 1, 1 GHz to 26 GHz, Vertical (Peak)

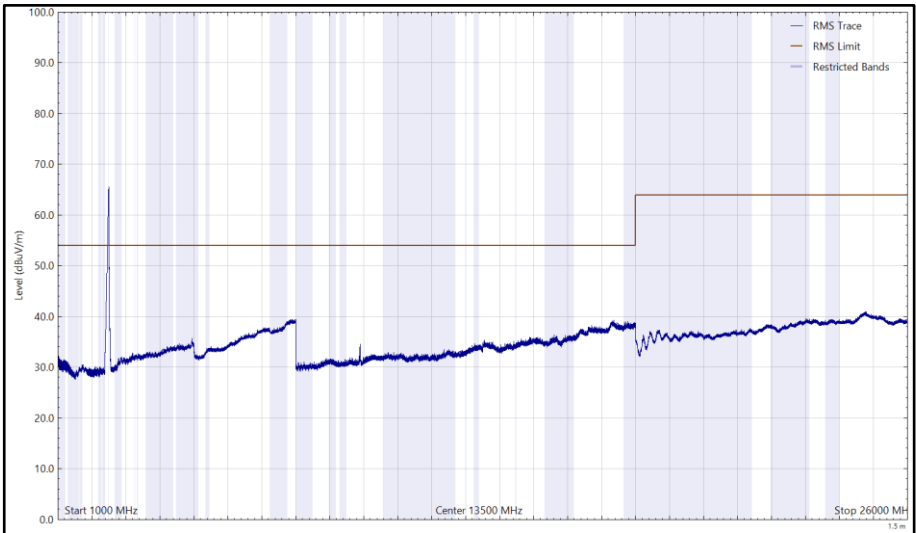


Figure 115 - 2472 MHz (CH13), HT20, CDD, Core 0 + Core 1, 1 GHz to 26 GHz, Vertical (RMS)



Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
4824.005	40.8	54.0	-13.2	RMS	12	324	Vertical

Table 35 - 2412 MHz (CH1), 802.11b, Core 0, 1 GHz to 26 GHz

No other emissions found within 6 dB of the limit.

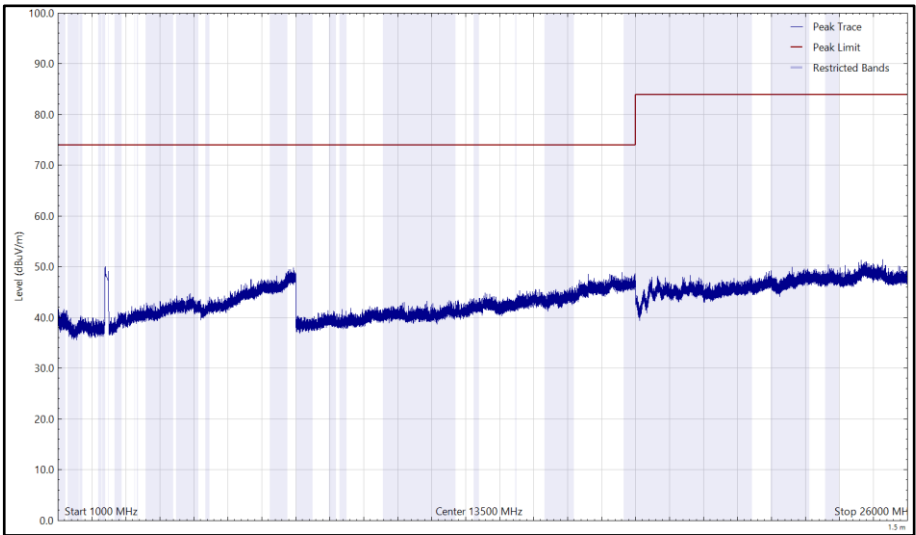


Figure 116 - 2412 MHz (CH1), 802.11b, Core 0, 1 GHz to 26 GHz, Horizontal (Peak)

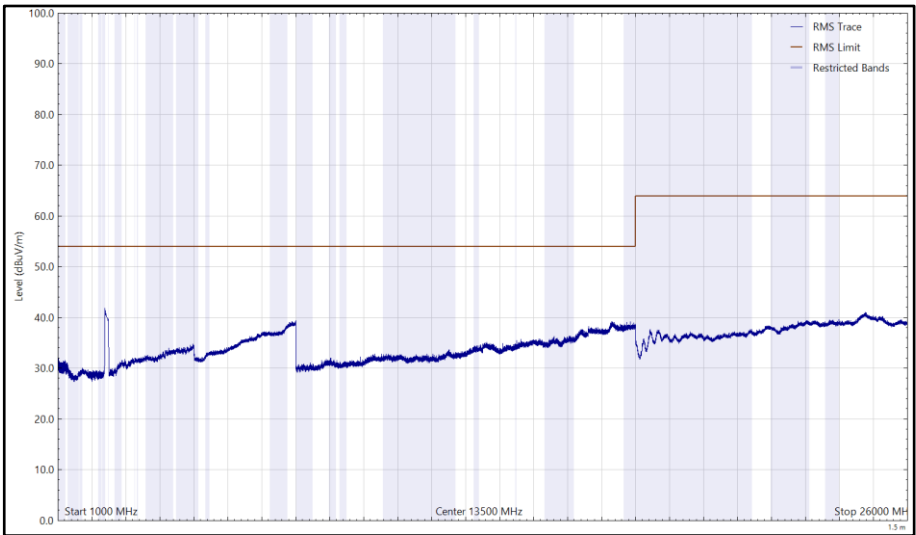


Figure 117 - 2412 MHz (CH1), 802.11b, Core 0, 1 GHz to 26 GHz, Horizontal (RMS)

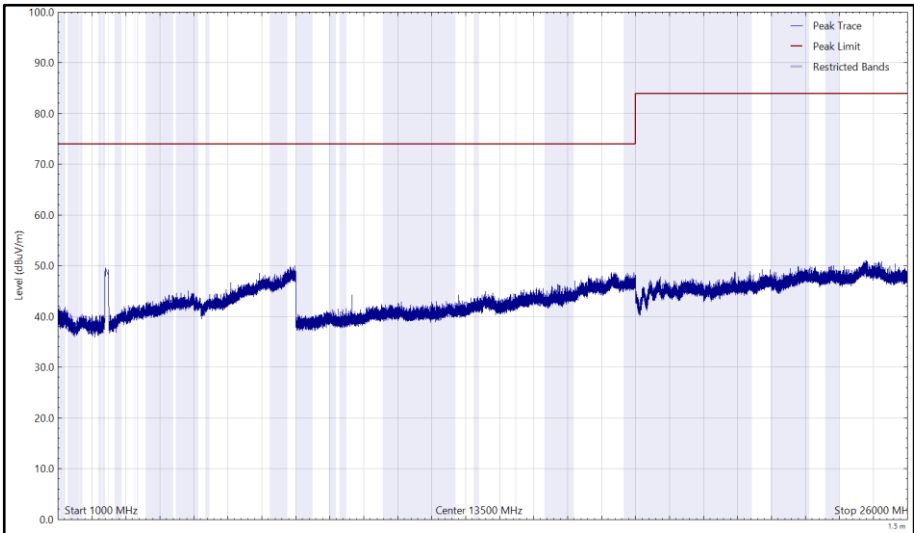


Figure 118 - 2412 MHz (CH1), 802.11b, Core 0, 1 GHz to 26 GHz, Vertical (Peak)

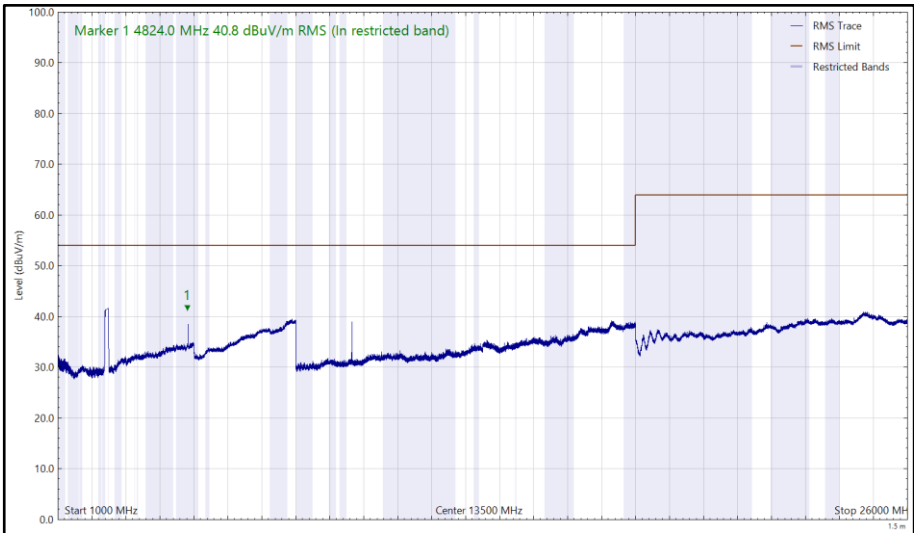


Figure 119 - 2412 MHz (CH1), 802.11b, Core 0, 1 GHz to 26 GHz, Vertical (RMS)

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
4874.050	44.0	54.0	-10.0	RMS	10	328	Vertical

Table 36 - 2437 MHz (CH6), 802.11b, Core 0, 30 MHz to 26 GHz

No other emissions found within 6 dB of the limit.

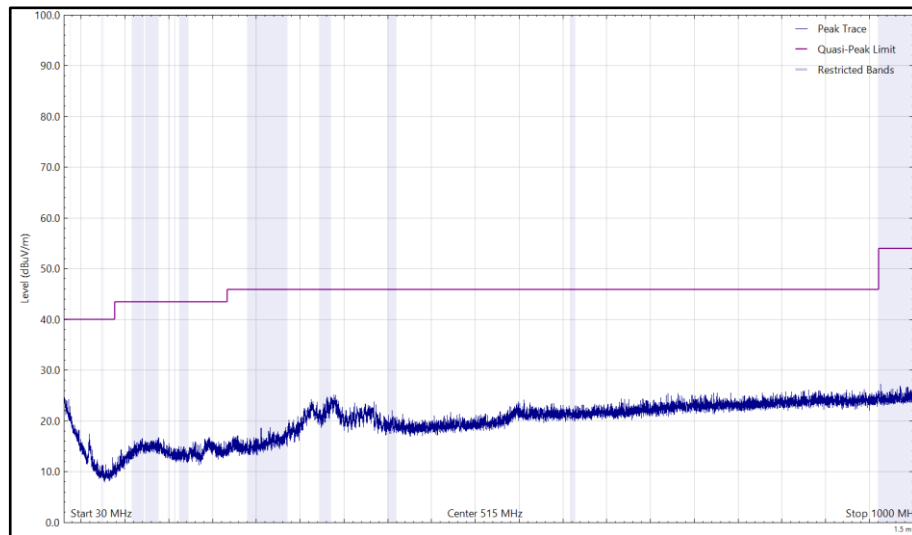


Figure 120 - 2437 MHz (CH6), 802.11b, Core 0, 30 MHz to 1 GHz, Horizontal (Peak)

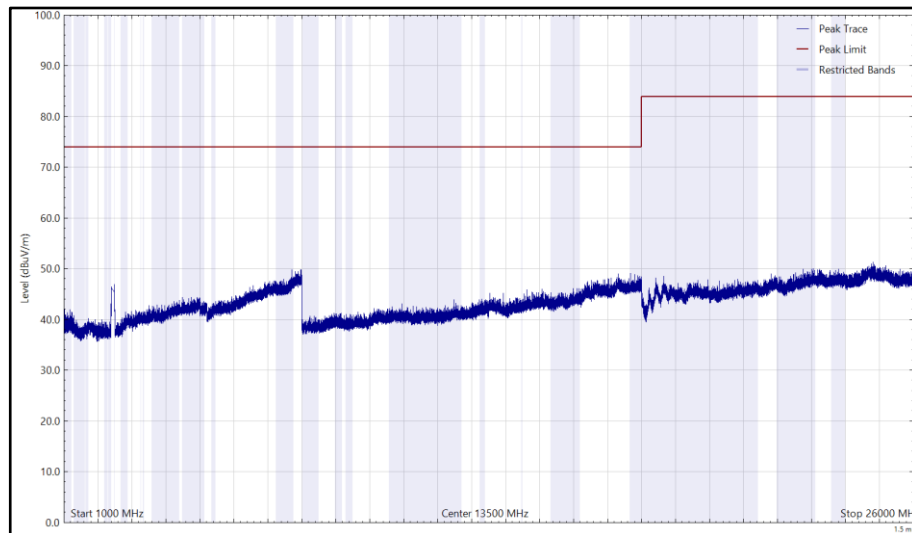


Figure 121 - 2437 MHz (CH6), 802.11b, Core 0, 1 GHz to 26 GHz, Horizontal (Peak)

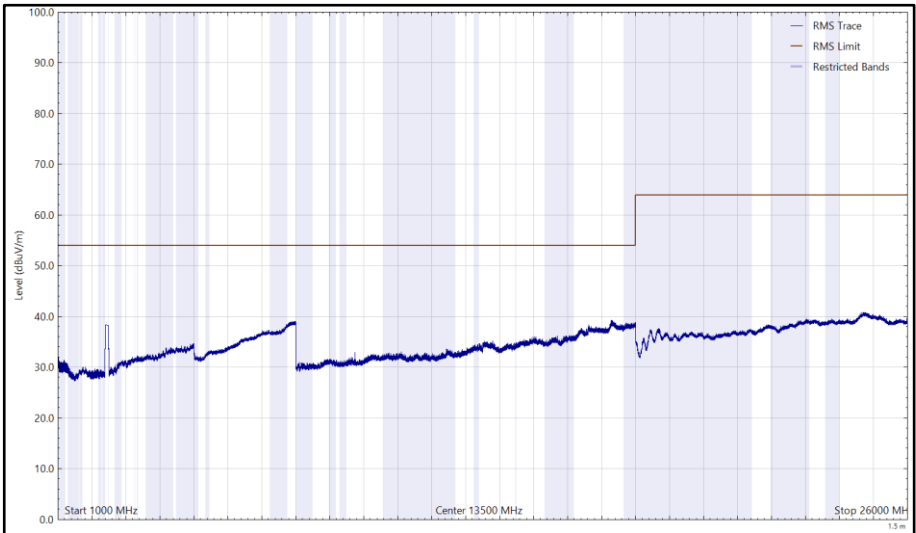


Figure 122 - 2437 MHz (CH6), 802.11b, Core 0, 1 GHz to 26 GHz, Horizontal (RMS)

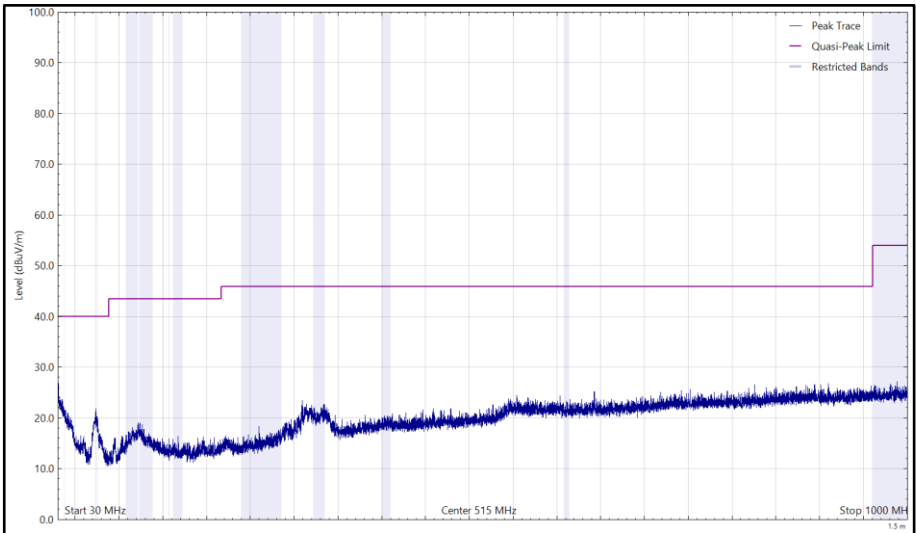


Figure 123 - 2437 MHz (CH6), 802.11b, Core 0, 30 MHz to 1 GHz, Vertical (Peak)

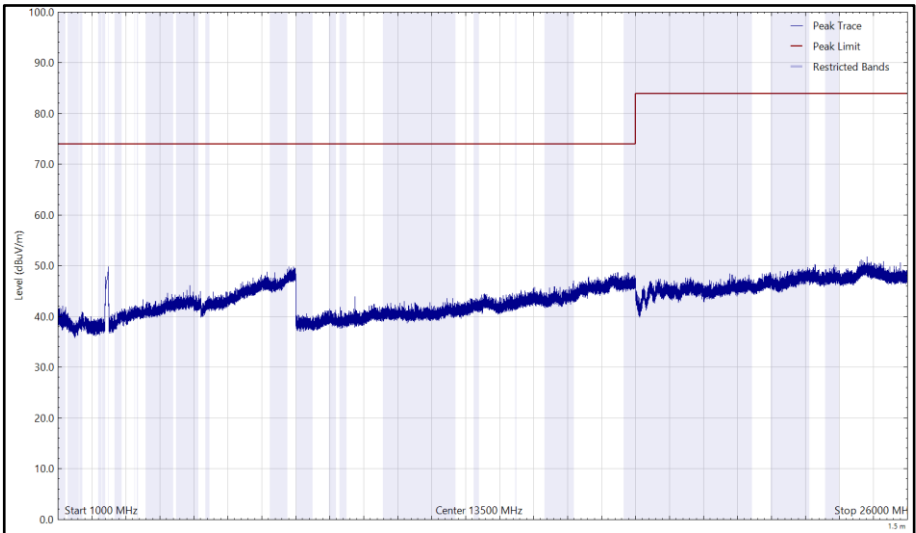


Figure 124 - 2437 MHz (CH6), 802.11b, Core 0, 1 GHz to 26 GHz, Vertical (Peak)

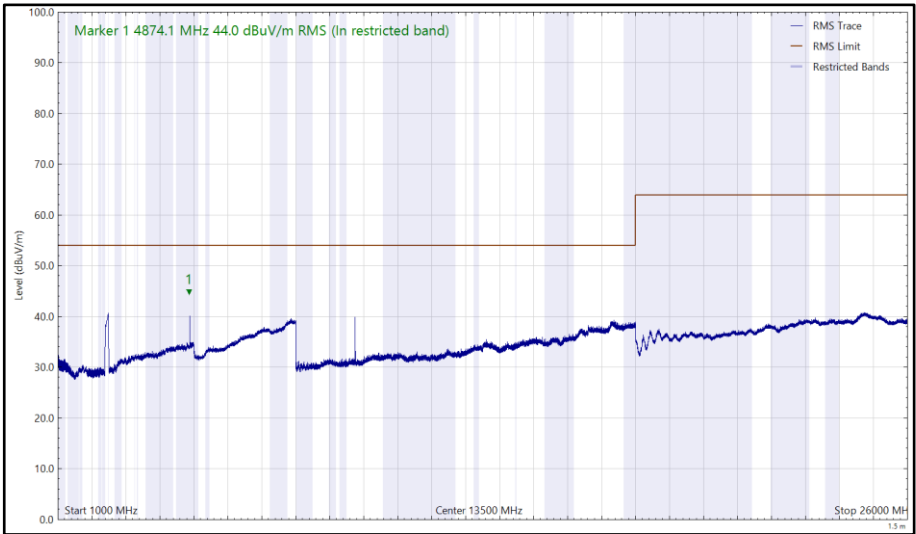


Figure 125 - 2437 MHz (CH6), 802.11b, Core 0, 1 GHz to 26 GHz, Vertical (RMS)

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
4943.979	45.1	54.0	-9.0	RMS	9	323	Vertical

Table 37 - 2472 MHz (CH13), 802.11b, Core 0, 1 GHz to 26 GHz

No other emissions found within 6 dB of the limit.

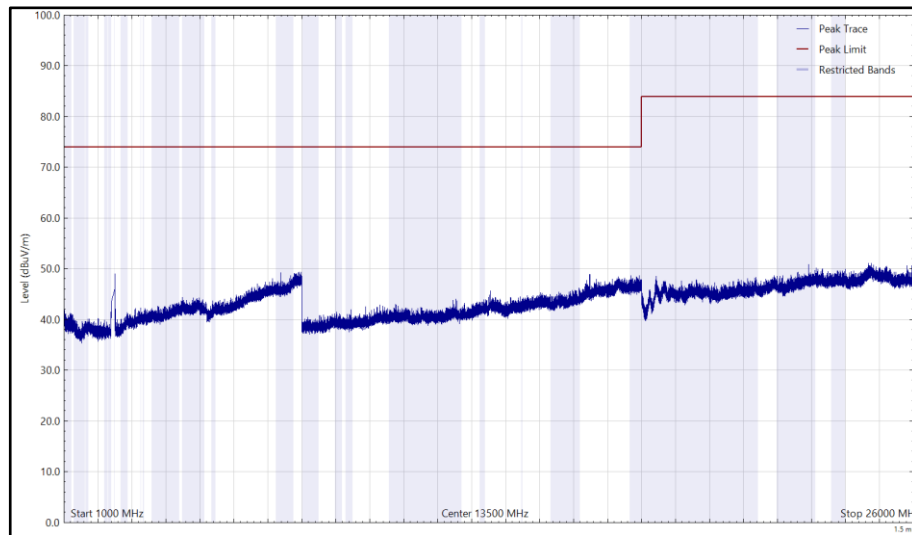


Figure 126 - 2472 MHz (CH13), 802.11b, Core 0, 1 GHz to 26 GHz, Horizontal (Peak)

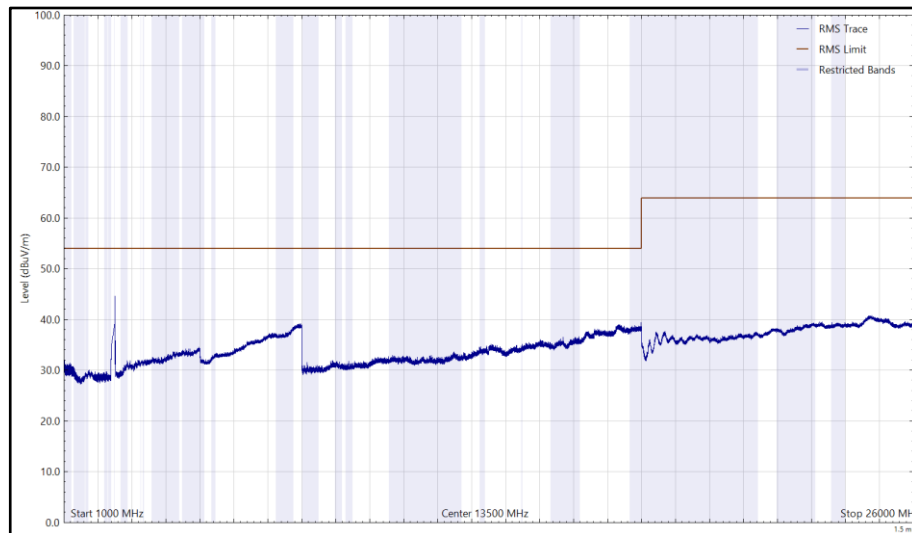


Figure 127 - 2472 MHz (CH13), 802.11b, Core 0, 1 GHz to 26 GHz, Horizontal (RMS)

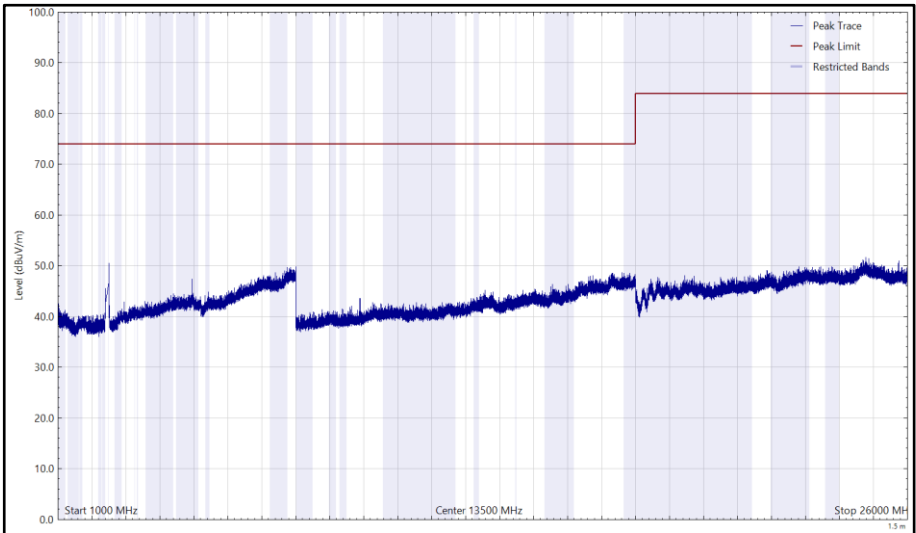


Figure 128 - 2472 MHz (CH13), 802.11b, Core 0, 1 GHz to 26 GHz, Vertical (Peak)

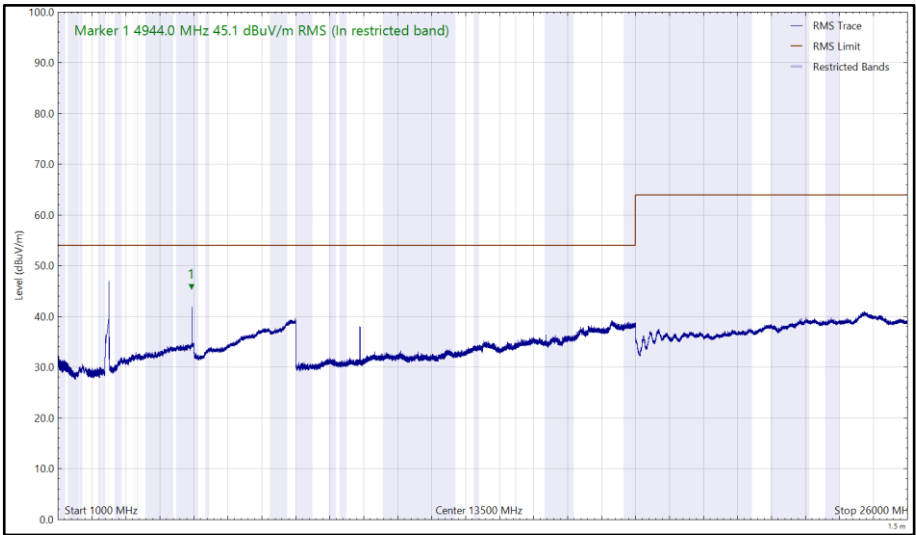


Figure 129 - 2472 MHz (CH13), 802.11b, Core 0, 1 GHz to 26 GHz, Vertical (RMS)

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
4824.075	42.0	54.0	-12.0	RMS	351	291	Vertical

Table 38 - 2412 MHz (CH1), 802.11b, Core 1, 1 GHz to 26 GHz

No other emissions found within 6 dB of the limit.

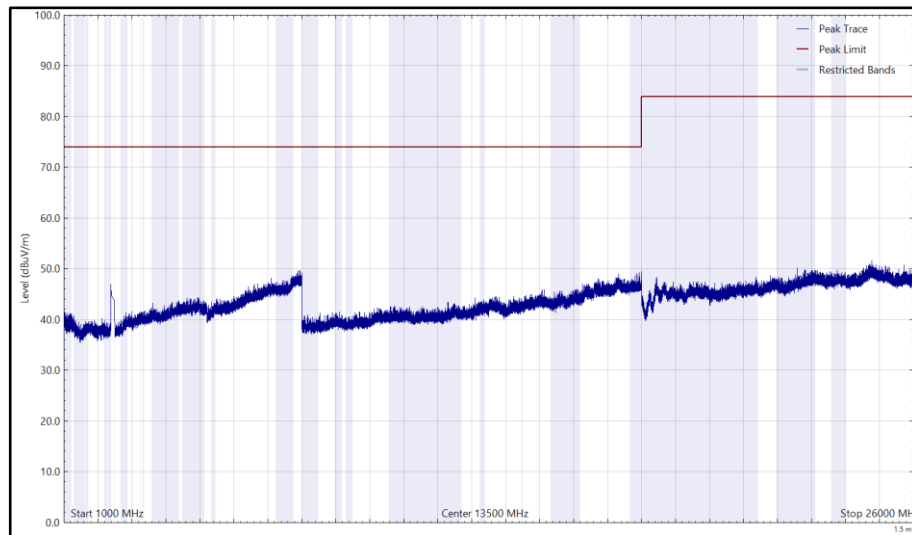


Figure 130 - 2412 MHz (CH1), 802.11b, Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

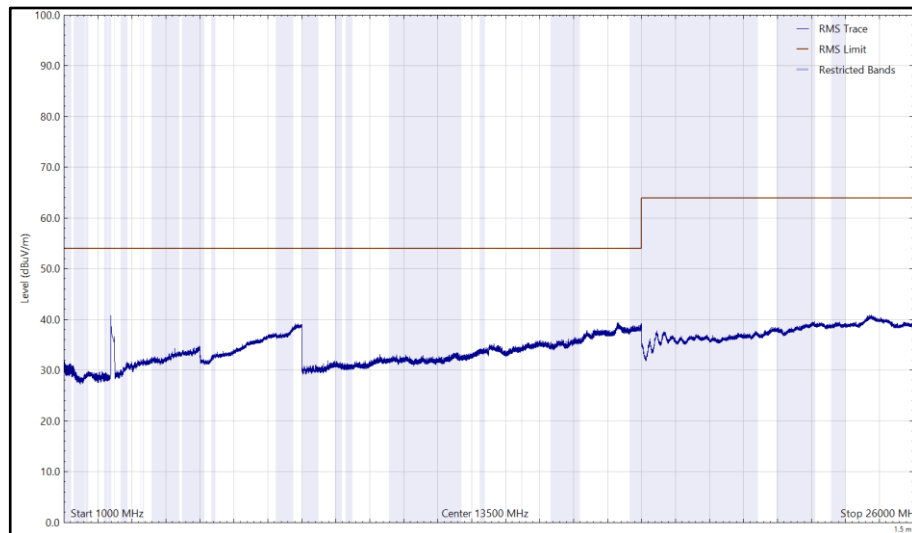


Figure 131 - 2412 MHz (CH1), 802.11b, Core 1, 1 GHz to 26 GHz, Horizontal (RMS)

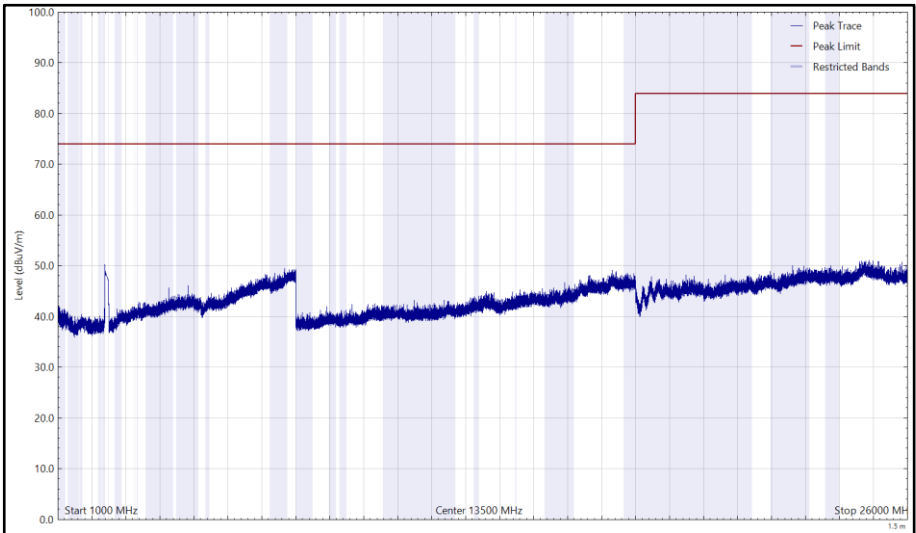


Figure 132 - 2412 MHz (CH1), 802.11b, Core 1, 1 GHz to 26 GHz, Vertical (Peak)

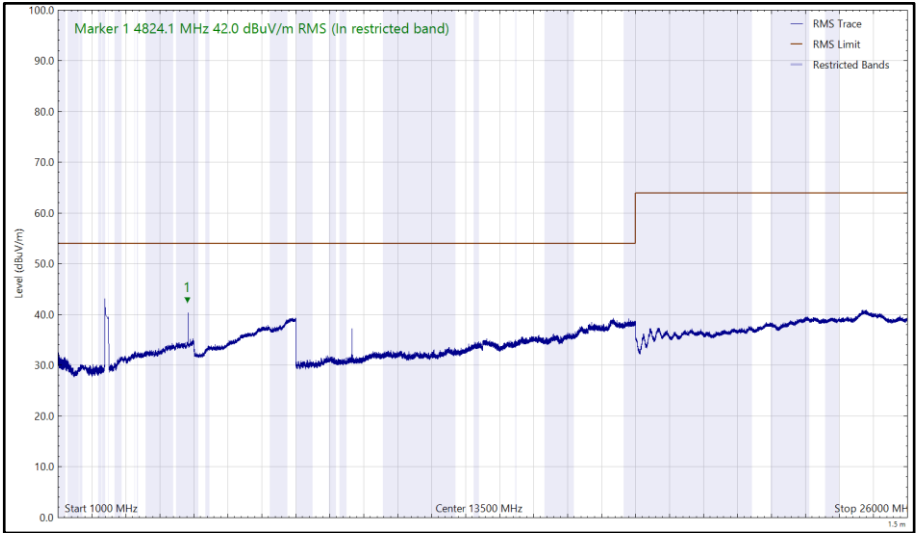


Figure 133 - 2412 MHz (CH1), 802.11b, Core 1, 1 GHz to 26 GHz, Vertical (RMS)

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
4874.020	39.4	54.0	-14.6	RMS	350	189	Vertical

Table 39 - 2437 MHz (CH6), 802.11b, Core 1, 30 MHz to 26 GHz

No other emissions found within 6 dB of the limit.

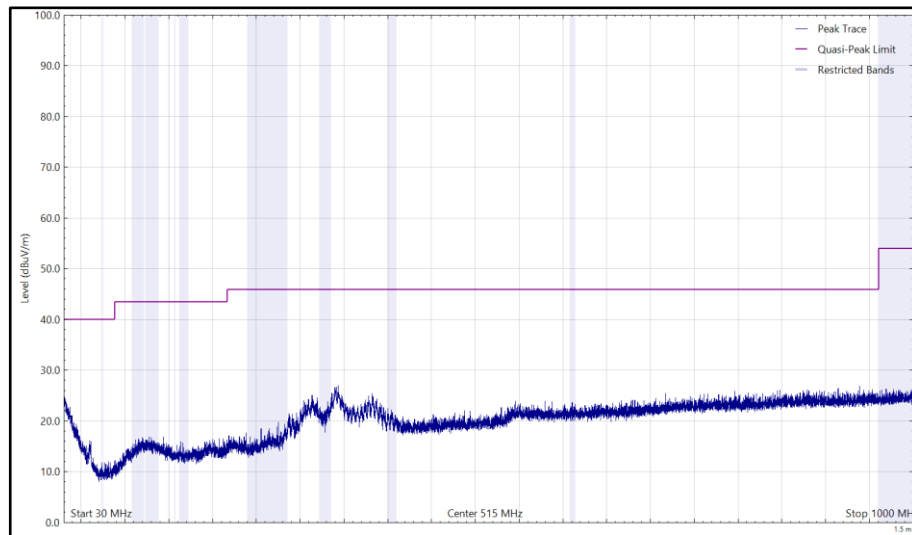


Figure 134 - 2437 MHz (CH6), 802.11b, Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

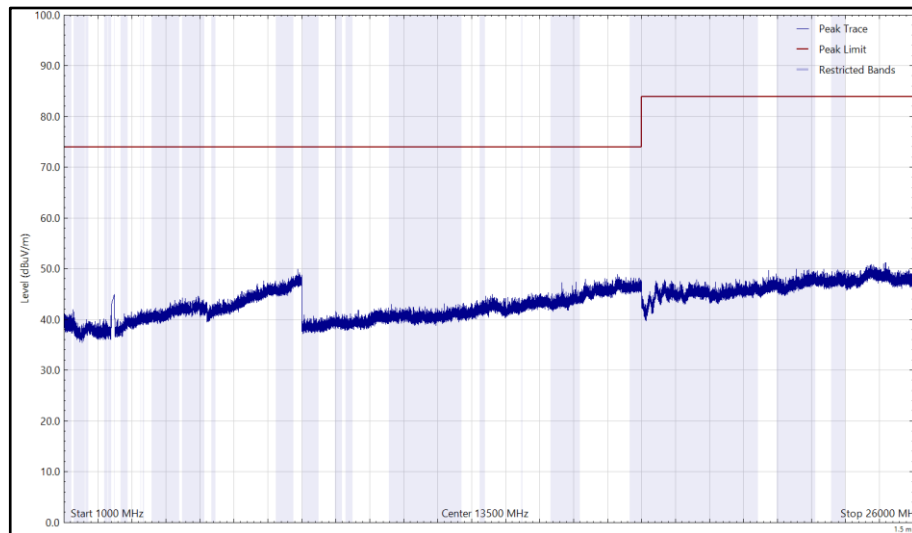


Figure 135 - 2437 MHz (CH6), 802.11b, Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

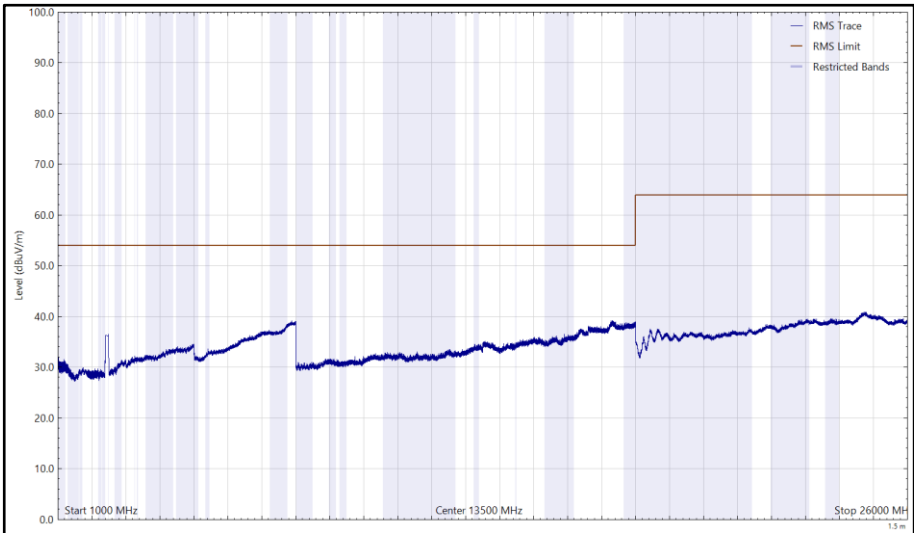


Figure 136 - 2437 MHz (CH6), 802.11b, Core 1, 1 GHz to 26 GHz, Horizontal (RMS)

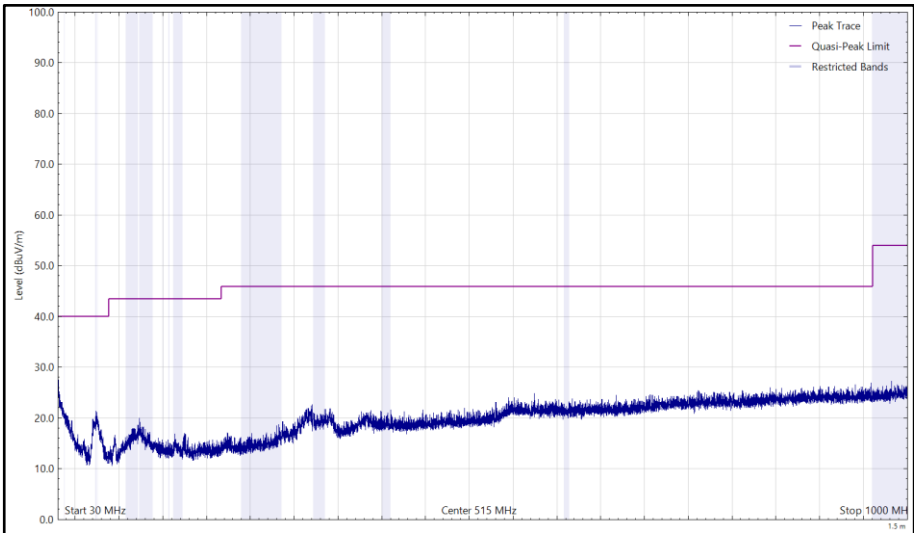


Figure 137 - 2437 MHz (CH6), 802.11b, Core 1, 30 MHz to 1 GHz, Vertical (Peak)

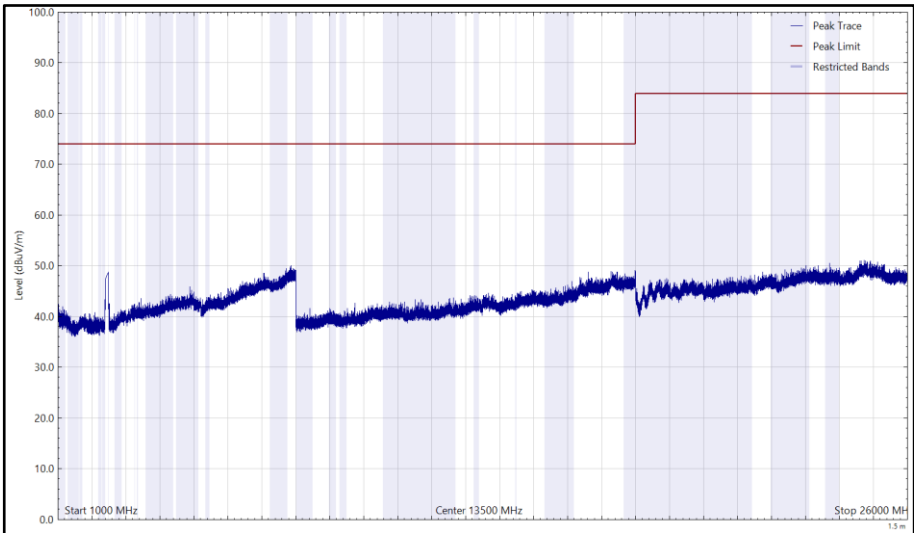


Figure 138 - 2437 MHz (CH6), 802.11b, Core 1, 1 GHz to 26 GHz, Vertical (Peak)

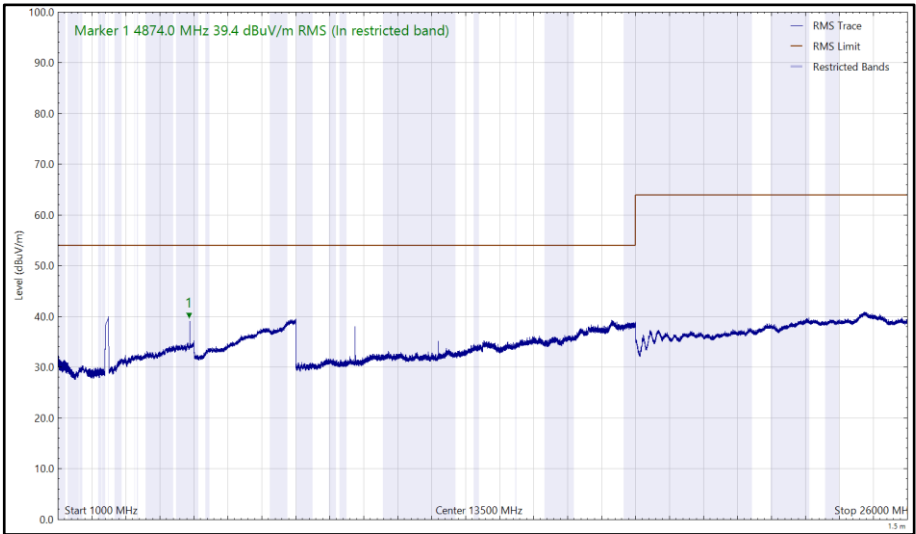


Figure 139 - 2437 MHz (CH6), 802.11b, Core 1, 1 GHz to 26 GHz, Vertical (RMS)



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

Table 40 - 2472 MHz (CH13), 802.11b, Core 1, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

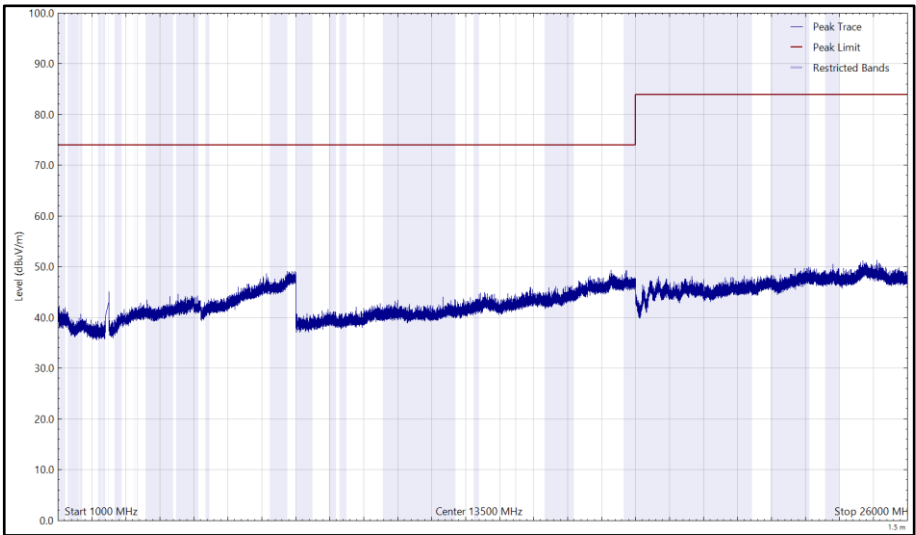


Figure 140 - 2472 MHz (CH13), 802.11b, Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

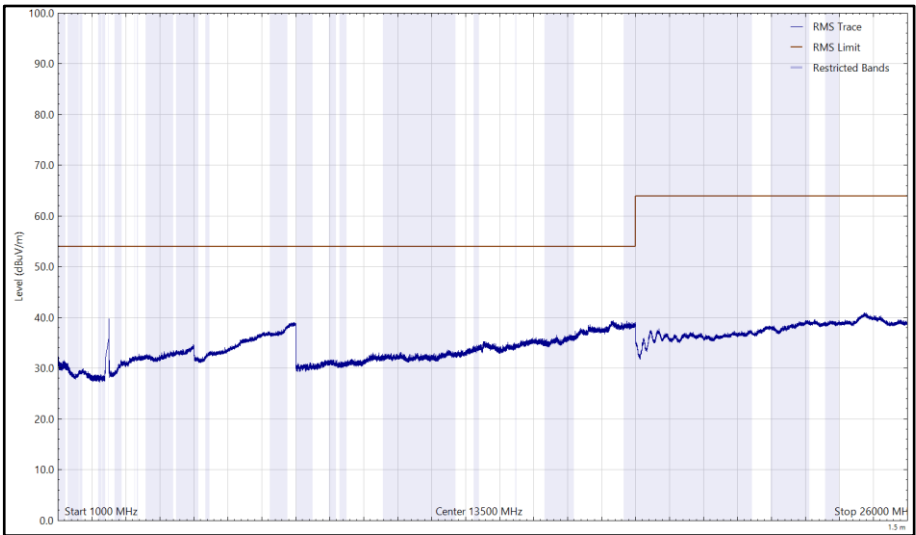


Figure 141 - 2472 MHz (CH13), 802.11b, Core 1, 1 GHz to 26 GHz, Horizontal (RMS)

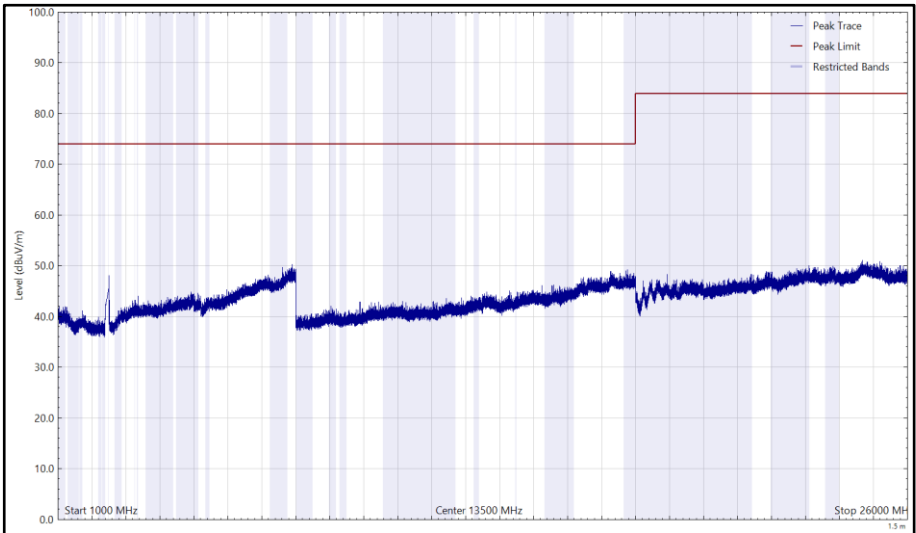


Figure 142 - 2472 MHz (CH13), 802.11b, Core 1, 1 GHz to 26 GHz, Vertical (Peak)

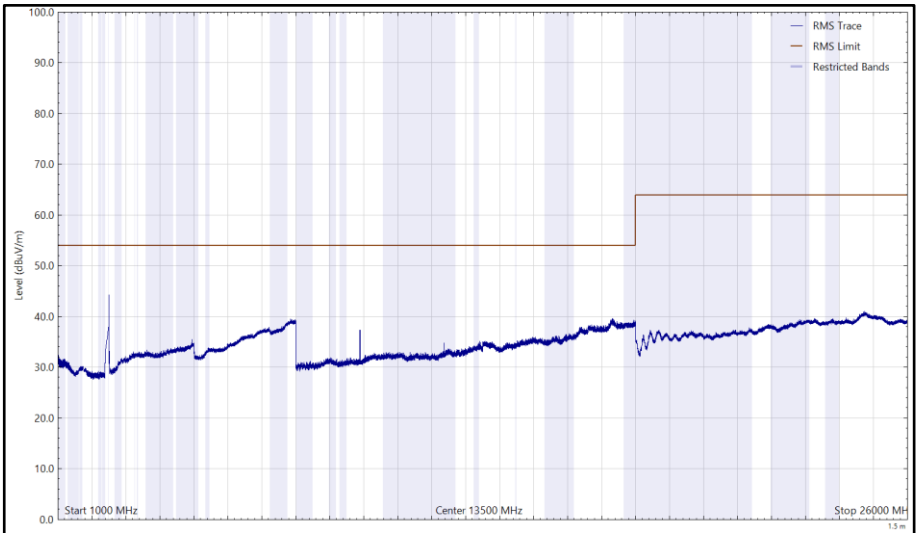


Figure 143 - 2472 MHz (CH13), 802.11b, Core 1, 1 GHz to 26 GHz, Vertical (RMS)

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
4807.877	38.5	54.0	-15.5	RMS	349	280	Vertical

Table 41 - 2412 MHz (CH1), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 26 GHz

No other emissions found within 6 dB of the limit.

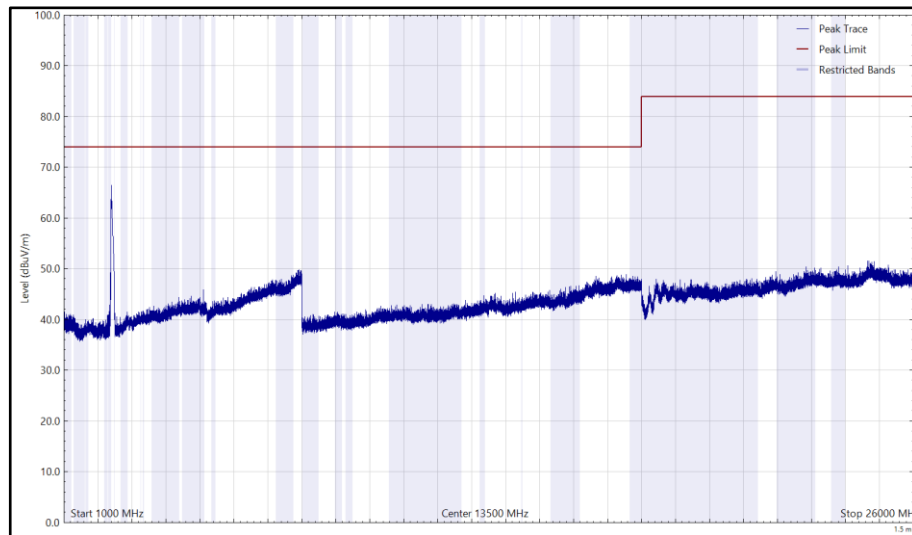


Figure 144 - 2412 MHz (CH1), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

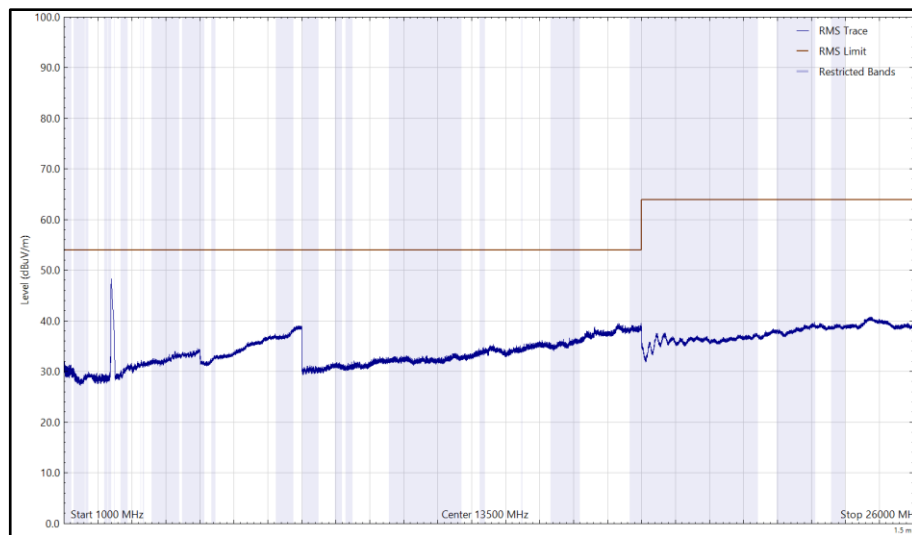


Figure 145 - 2412 MHz (CH1), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 26 GHz, Horizontal (RMS)

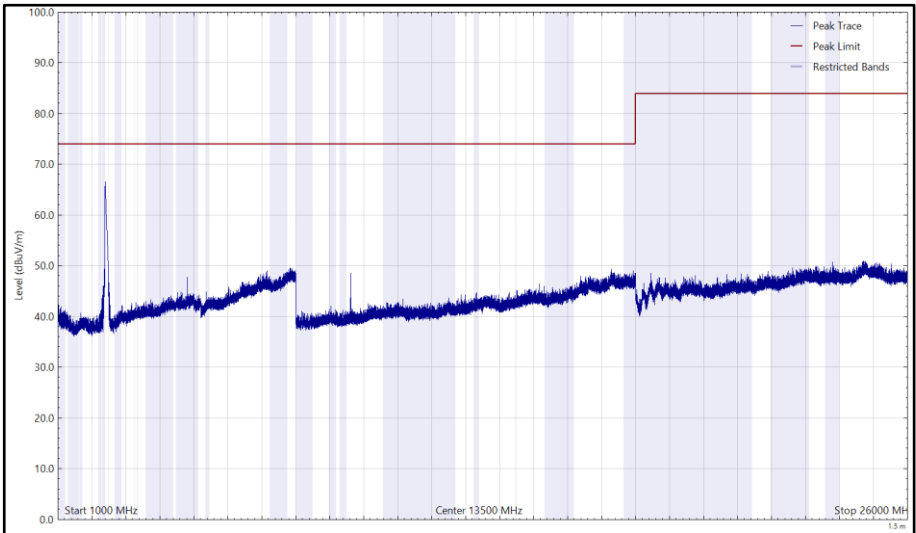


Figure 146 - 2412 MHz (CH1), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 26 GHz, Vertical (Peak)

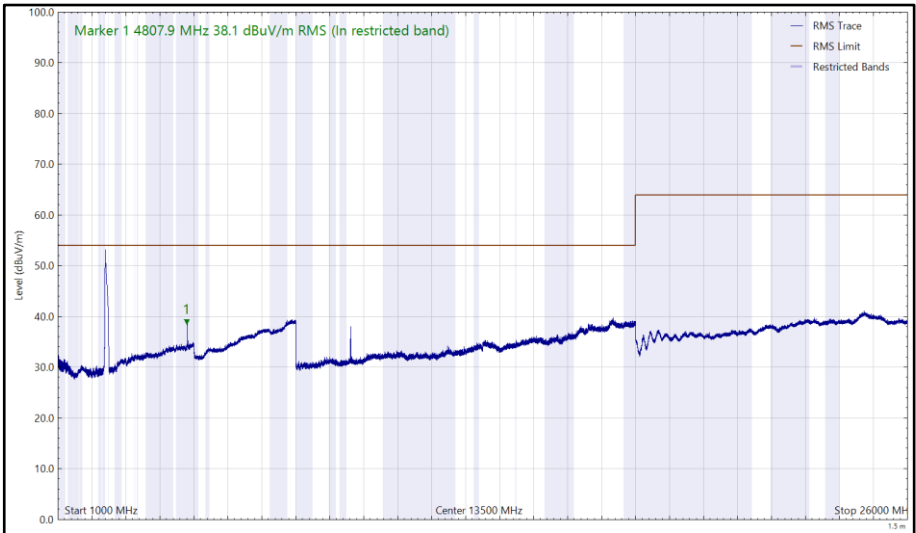


Figure 147 - 2412 MHz (CH1), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 26 GHz, Vertical (RMS)

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
339.406	24.2	46.0	-21.8	Q-Peak	339	103	Horizontal
4857.552	38.6	54.0	-15.4	RMS	346	292	Vertical

Table 42 - 2437 MHz (CH6), HE20, RU26-0, Core 0 + Core 1, 30 MHz to 26 GHz

No other emissions found within 6 dB of the limit.

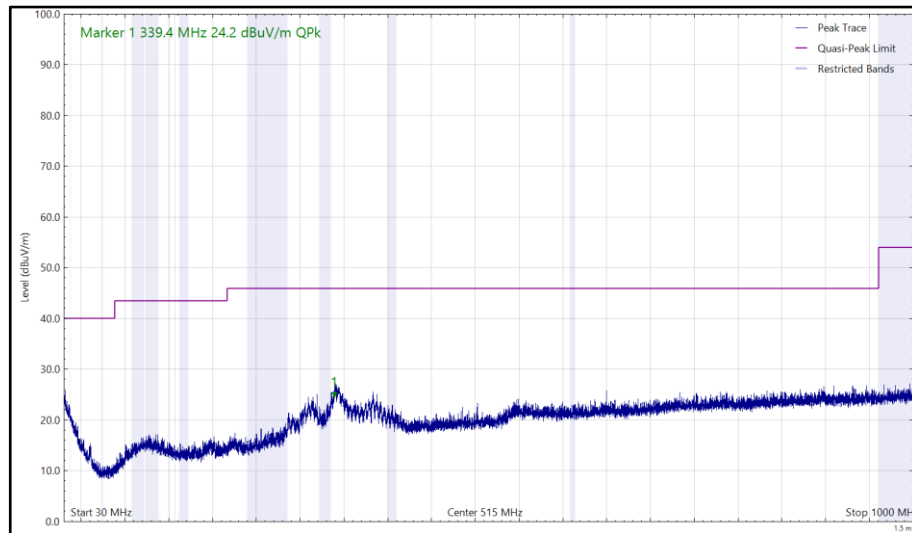


Figure 148 - 2437 MHz (CH6), HE20, RU26-0, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

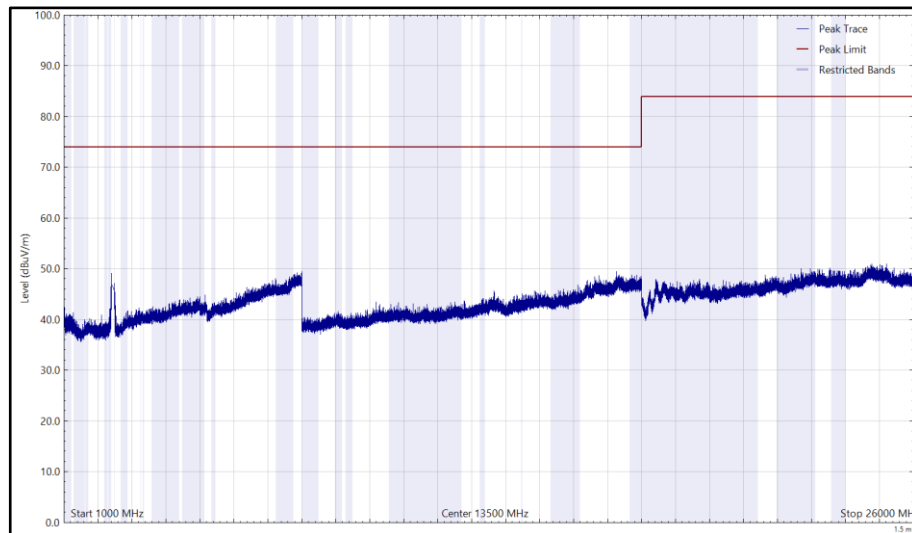


Figure 149 - 2437 MHz (CH6), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

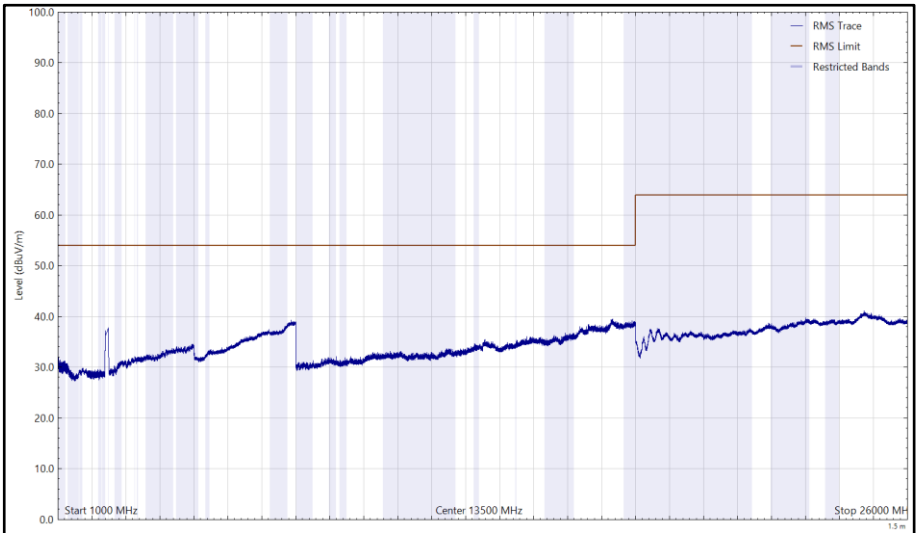


Figure 150 - 2437 MHz (CH6), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 26 GHz, Horizontal (RMS)

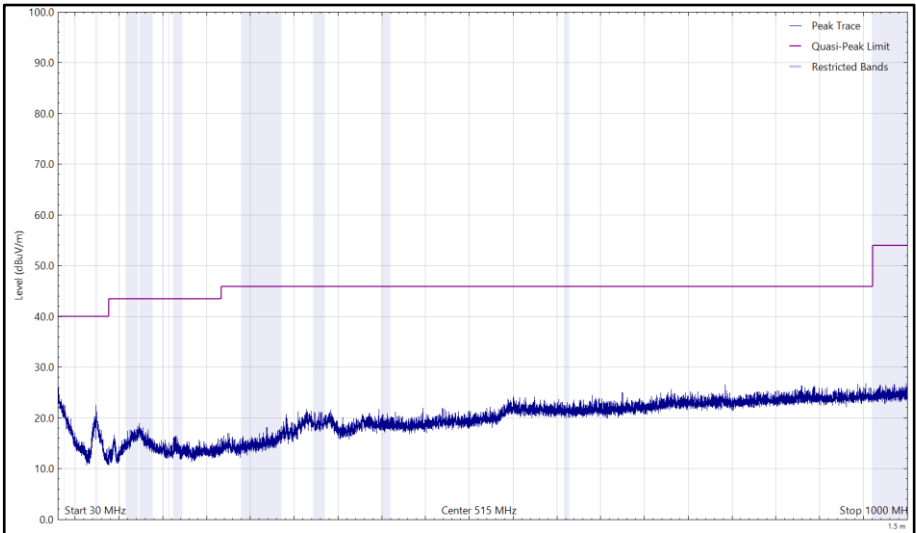


Figure 151 - 2437 MHz (CH6), HE20, RU26-0, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

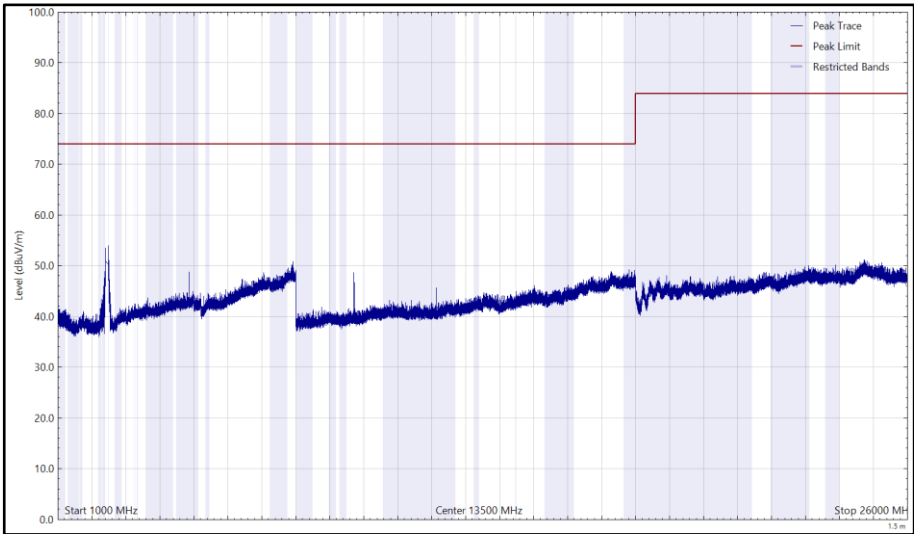


Figure 152 - 2437 MHz (CH6), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 26 GHz, Vertical (Peak)

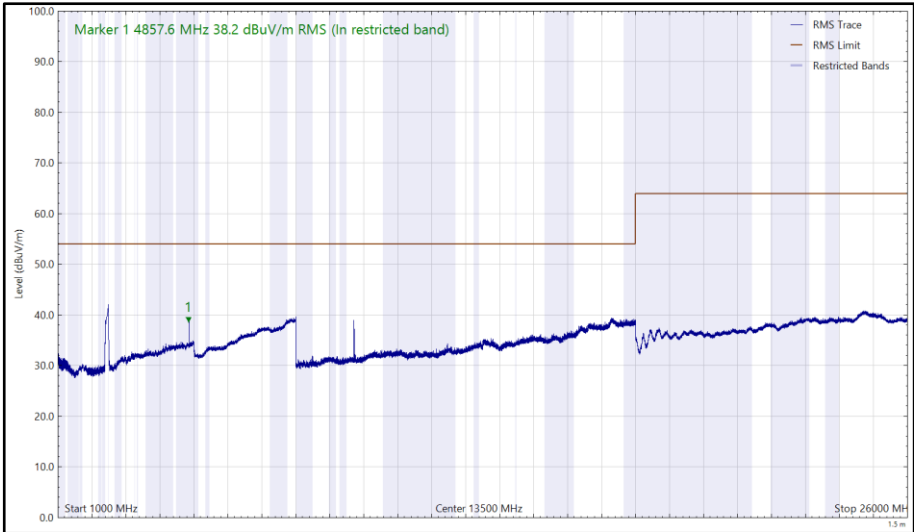


Figure 153 - 2437 MHz (CH6), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 26 GHz, Vertical (RMS)

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
4927.846	38.7	54.0	-15.3	RMS	349	298	Vertical
12317.972	35.6	54.0	-18.4	RMS	125	116	Vertical

Table 43 - 2472 MHz (CH13), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 26 GHz

No other emissions found within 6 dB of the limit.

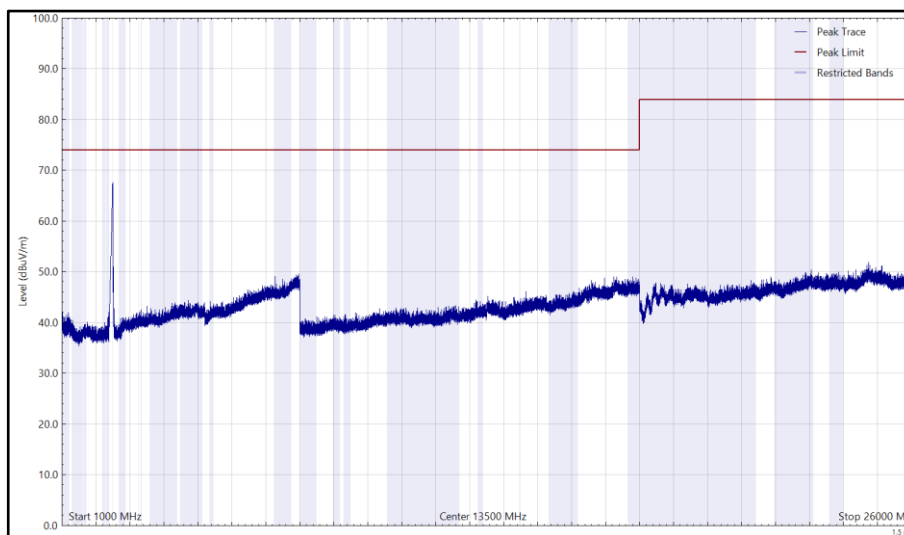


Figure 154 - 2472 MHz (CH13), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

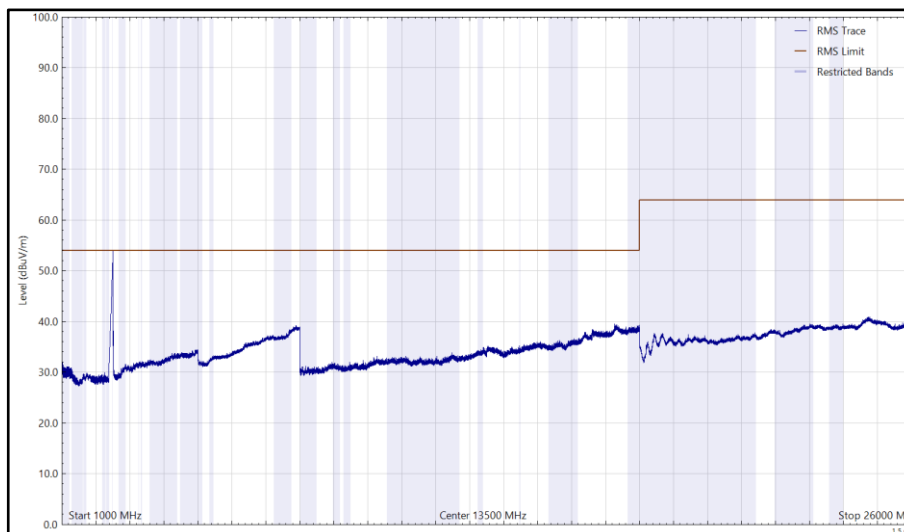


Figure 155 - 2472 MHz (CH13), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 26 GHz, Horizontal (RMS)

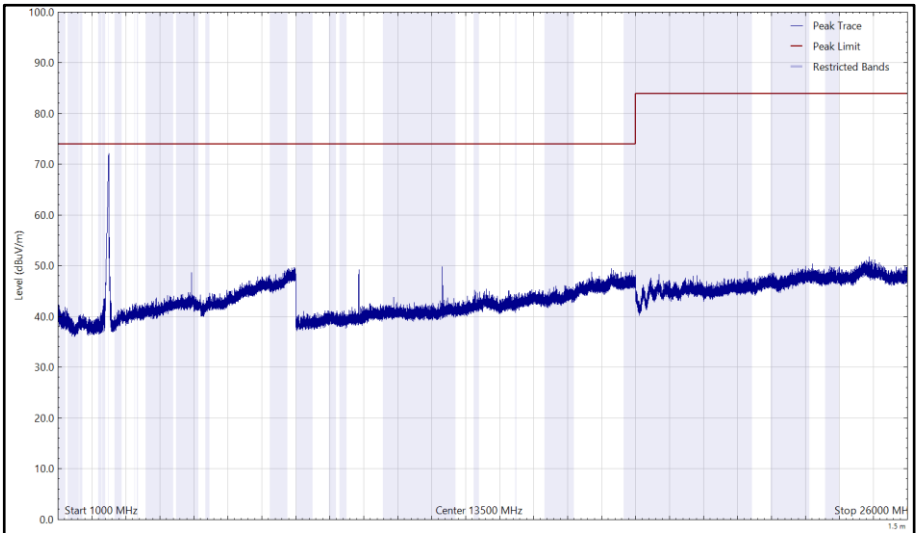


Figure 156 - 2472 MHz (CH13), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 26 GHz, Vertical (Peak)

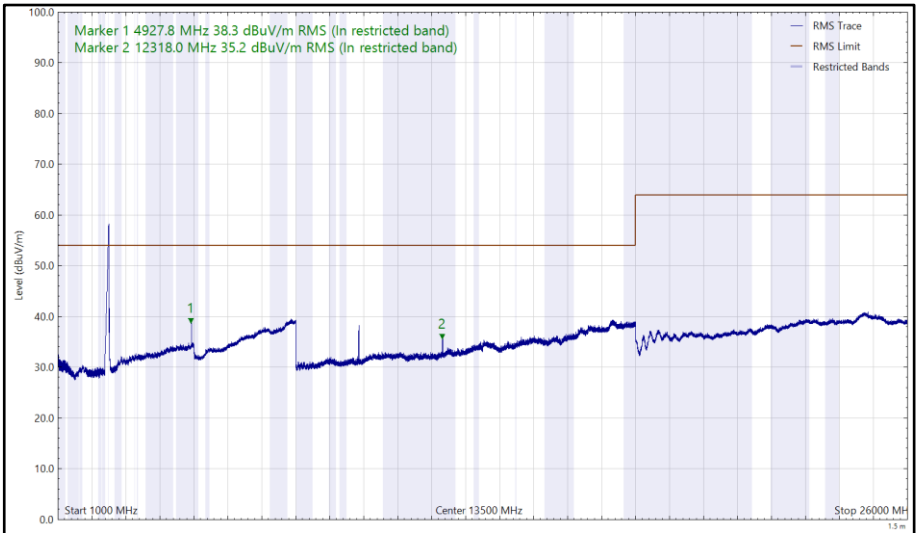


Figure 157 - 2472 MHz (CH13), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 26 GHz, Vertical (RMS)



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 EMC Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Power Supply Unit	Farnell	LB30-4	158	-	O/P Mon
Screened Room (5)	Rainford	Rainford	1545	36	23-Jan-2021
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna with permanent attenuator (Bilog)	Chase	CBL6143	2904	24	30-Sep-2021
Tilt Antenna Mast	Maturo GmbH	TAM 4.0-P	4811	-	TU
Double Ridge Broadband Horn Antenna	Schwarzbeck	BBHA 9120 B	4848	12	10-Mar-2021
Cable (18 GHz)	Rosenberger	LU7-036-1000	5031	12	22-Jul-2021
Band Reject Filter - 2.425 GHz	Wainwright	WRCGV14-2390-2400-2450-2460-50SS	5067	12	01-Oct-2020
Band Reject Filter - 2.4585 GHz	Wainwright	WRCGV14-2423.5-2433.5-2483.5-2493.5-50SS	5069	12	01-Oct-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5103	12	06-Oct-2020
EmX Emissions Software	TUV SUD	EmX	5125	-	Software
DRG Horn Antenna (7.5-18GHz)	Schwarzbeck	HWRD750	5216	12	10-Mar-2021
Horn Antenna (15-40GHz)	Schwarzbeck	BBHA 9170	5217	12	12-Oct-2020
Preamplifier (30 dB 18-40GHz)	Schwarzbeck	BBV 9721	5218	12	12-Oct-2020
Preamplifier (30dB 1GHz to 18GHz)	Schwarzbeck	BBV 9718 C	5261	12	07-Apr-2021
1m SMA Cable	Junkosha	MWX221-01000AMSAMS/A	5513	12	01-Apr-2021
1m SMA Cable	Junkosha	MWX221-01000AMSAMS/A	5515	12	01-Apr-2021
2m SMA Cable	Junkosha	MWX221-02000AMSAMS/A	5517	12	01-Apr-2021
8m N-Type Cable	Junkosha	MWX221-08000NMSNMS/B	5520	12	24-Mar-2021
2 m K Type Cable	Junkosha	MWX241-02000KMSKMS/A	5523	12	03-Apr-2021
EMI Test Receiver	Rohde & Schwarz	ESW44	5527	12	06-Feb-2021
3 GHz High pass Filter	Wainwright	WHKX12-2580-3000-18000-80SS	5548	12	05-May-2021
8 - 18 GHz Amplifier	Wright Technologies	APS06-0061	5596	12	25-Aug-2021

Table 44

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

A2338, S/N: C02CX01FQC36 - Modification State 0

2.6.3 Date of Test

10-September-2020 to 21-September-2020

2.6.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 11.10.3 (AVG PSD-1) or 11.10.5 (AVG PSD-2).

Where the EUT duty cycle was $< 98\%$ and repeatable within 2%, the spectrum analyser was set to trace (power) averaging and a duty cycle correction was added as calculated in the result tables below (Method AVG PSD-2). Where the duty cycle was $\geq 98\%$ the spectrum analyser was set to trace (power) averaging and no duty cycle correction made (Method AVG PSD-1).

The output power was verified as being the same from each transmit core (within negligible tolerances), but the antenna gains were not identical. Therefore, the modes reported here for SISO or 2x2 MIMO operation are those giving the highest EIRP and/or lowest conducted limit based on the combination of antennas giving highest total directional gain.

MIMO output port summing was performed in accordance with KDB 662911 D01. For the CDD results the Directional Gain was calculated in accordance with the equation given in clause F2)f)(ii) summed for a single spatial stream.

2.6.5 Environmental Conditions

Ambient Temperature	21.6 - 23.5 °C
Relative Humidity	39.8 - 60.7 %



2.6.6 Test Results

2.4 GHz WLAN

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Raw Conducted PSD (dBm/30kHz)	-3.53	-3.79	-9.26
Duty Cycle Correction (dB)	N/A SA-1	N/A SA-1	N/A SA-1
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-3.53	-3.79	-9.26

Table 45 - 802.11b / 1 Mbps / SISO / Core 0

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Raw Conducted PSD (dBm/30kHz)	-9.02	-4.85	-22.39
Duty Cycle Correction (dB)	N/A SA-1	N/A SA-1	N/A SA-1
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-9.02	-4.85	-22.39

Table 46 - 802.11g / 6 Mbps / SISO / Core 0

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Raw Conducted PSD (dBm/30kHz)	-9.41	-5.44	-23.66
Duty Cycle Correction (dB)	0.36	0.36	0.37
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-9.05	-5.08	-23.30

Table 47 - 802.11n / HT20 MCS7 / SISO / Core 0

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Conducted PSD Core 0 (dBm/30kHz)	-9.76	-5.02	-22.75
Conducted PSD Core 1 (dBm/30kHz)	-9.50	-4.72	-23.03
Duty Cycle Correction (dB)	0.36	0.35	0.37
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-6.26	-1.51	-19.51

Table 48 - 802.11n / HT20 MCS7 / MIMO CDD / Cores 0+1



Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Raw Conducted PSD (dBm/30kHz)	-11.16	-6.13	-23.11
Duty Cycle Correction (dB)	0.41	0.41	0.42
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-10.75	-5.72	-22.69

Table 49 - 802.11ax / HE20 MCS7x1 / SU / SISO / Core 0

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Raw Conducted PSD (dBm/30kHz)	-3.88	-3.94	-18.34
Duty Cycle Correction (dB)	0.37	0.37	0.38
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-3.51	-3.56	-17.96

Table 50 - 802.11ax / HE20 MCS7x1 / RU 26-0 / SISO / Core 0

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Raw Conducted PSD (dBm/30kHz)	-3.90	-3.92	-17.86
Duty Cycle Correction (dB)	0.37	0.37	0.38
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-3.52	-3.54	-17.49

Table 51 - 802.11ax / HE20 MCS7x1 / RU 26-8 / SISO / Core 0

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Raw Conducted PSD (dBm/30kHz)	-2.98	-3.25	-21.01
Duty Cycle Correction (dB)	0.40	0.40	0.40
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-2.58	-2.85	-20.61

Table 52 - 802.11ax / HE20 MCS7x1 / RU 52-37 / SISO / Core 0



Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Raw Conducted PSD (dBm/30kHz)	-2.97	-2.83	-21.39
Duty Cycle Correction (dB)	0.40	0.40	0.40
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-2.57	-2.43	-20.99

Table 53 - 802.11ax / HE20 MCS7x1 / RU 52-40 / SISO / Core 0

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Raw Conducted PSD (dBm/30kHz)	-5.25	-5.24	-23.12
Duty Cycle Correction (dB)	0.21	0.21	0.21
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-5.04	-5.03	-22.91

Table 54 - 802.11ax / HE20 MCS7x1 / RU 106-53 / SISO / Core 0

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Raw Conducted PSD (dBm/30kHz)	-5.59	-4.55	-22.60
Duty Cycle Correction (dB)	0.21	0.21	0.21
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-5.38	-4.34	-22.39

Table 55 - 802.11ax / HE20 MCS7x1 / RU 106-54 / SISO / Core 0

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Conducted PSD Core 0 (dBm/30kHz)	-11.86	-5.65	-24.21
Conducted PSD Core 1 (dBm/30kHz)	-11.82	-5.80	-23.64
Duty Cycle Correction (dB)	0.40	0.40	0.42
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-8.43	-2.32	-20.49

Table 56 - 802.11ax / HE20 MCS7x1 / SU / MIMO CDD / Cores 0+1



Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Conducted PSD Core 0 (dBm/30kHz)	-3.60	-3.87	-18.16
Conducted PSD Core 1 (dBm/30kHz)	-3.81	-3.75	-18.02
Duty Cycle Correction (dB)	0.37	0.37	0.38
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-0.33	-0.43	-14.70

Table 57 - 802.11ax / HE20 MCS7x1 / RU 26-0 / MIMO CDD / Cores 0+1

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Conducted PSD Core 0 (dBm/30kHz)	-3.76	-4.06	-17.86
Conducted PSD Core 1 (dBm/30kHz)	-4.03	-3.90	-17.76
Duty Cycle Correction (dB)	0.37	0.37	0.38
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-0.51	-0.60	-14.42

Table 58 - 802.11ax / HE20 MCS7x1 / RU 26-8 / MIMO CDD / Cores 0+1

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Conducted PSD Core 0 (dBm/30kHz)	-3.65	-2.93	-21.25
Conducted PSD Core 1 (dBm/30kHz)	-4.40	-3.49	-21.41
Duty Cycle Correction (dB)	0.39	0.39	0.40
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-0.60	0.20	-17.92

Table 59 - 802.11ax / HE20 MCS7x1 / RU 52-37 / MIMO CDD / Cores 0+1

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Conducted PSD Core 0 (dBm/30kHz)	-4.32	-3.25	-21.46
Conducted PSD Core 1 (dBm/30kHz)	-4.52	-3.46	-21.53
Duty Cycle Correction (dB)	0.39	0.39	0.40
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-1.01	0.05	-18.08

Table 60 - 802.11ax / HE20 MCS7x1 / RU 52-40 / MIMO CDD / Cores 0+1



Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Conducted PSD Core 0 (dBm/30kHz)	-8.34	-4.78	-23.71
Conducted PSD Core 1 (dBm/30kHz)	-8.38	-4.89	-23.18
Duty Cycle Correction (dB)	0.21	0.21	0.21
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-5.15	-1.62	-20.22

Table 61 - 802.11ax / HE20 MCS7x1 / RU 106-53 / MIMO CDD / Cores 0+1

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Conducted PSD Core 0 (dBm/30kHz)	-8.61	-5.05	-22.62
Conducted PSD Core 1 (dBm/30kHz)	-8.44	-4.96	-22.58
Duty Cycle Correction (dB)	0.21	0.21	0.21
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-5.31	-1.79	-19.38

Table 62 - 802.11ax / HE20 MCS7x1 / RU 106-54 / MIMO CDD / Cores 0+1

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
10dB/1W SMA Attenuator DC - 18GHz	Sealectro	60-674-1010-89	395	-	O/P Mon
Attenuator (10dB, 1W)	Sealectro	60-674-1010-89	1224	-	O/P Mon
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	08-Nov-2020
Attenuator (20dB, 1W)	Sealectro	60-674-1020-89	1520	-	O/P Mon
Hygrometer	Rotronic	I-1000	3220	12	25-Sep-2020
1800-6000 MHz Power Splitter	Mini-Circuits	ZN2PD-63-S+	4055	-	O/P Mon
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	08-Nov-2020
2 metre SMA Cable	Florida Labs	SMS-235SP-78.8-SMS	4517	12	22-Jun-2021
Power splitter - 2 port	Mini-Circuits	ZN2PD-63-S+	4742	12	29-Nov-2020
Power splitter - 2 port	Mini-Circuits	ZN2PD-63-S+	4743	12	23-Sep-2020
Wireless Cable & Fibre Router - AC 1900, Dual-band	Asus	RT-AC68U	4881	-	TU
EXA	Keysight Technologies	N9010B	4968	24	23-Dec-2021
AC Programmable Power Supply	iTech	IT7324	5225	-	O/P Mon
Power Splitter, 4 way	Mini-Circuits	ZN4PD1-63-S+	5236	-	O/P Mon
Power Splitter, 2 way	Mini-Circuits	ZN2PD2-63-S+	5238	-	O/P Mon
3.5 mm 1m Cable	Junkosha	MWX221-01000DMS	5418	12	22-Jun-2021
3.5 mm 2m Cable	Junkosha	MWX221-02000DMS	5425	12	22-Jun-2021
3.5 mm 2m Cable	Junkosha	MWX221-02000DMS	5426	12	22-Jun-2021
Attenuator 5W 10dB DC-18GHz	Aaren	AT40A-4041-D18-10	5493	12	14-Apr-2021
MXA Signal Analyser	Keysight Technologies	N9020B	5529	24	04-Mar-2022
Attenuator 2W 10dB DC-10GHz	Telegartner	J01156A0031	5579	-	O/P Mon
Attenuator 2W 10dB DC-10GHz	Telegartner	J01156A0031	5580	-	O/P Mon

Table 63

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	± 279.049 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
Power Spectral Density	± 3.2 dB

Table 64

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.