

2.5 Restricted Band Edges

2.5.1 Specification Reference

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

2.5.2 Equipment Under Test and Modification State

A1993, S/N: C07WT00HK2V0 - Modification State 0

2.5.3 Date of Test

09-August-2018 to 10-August-2018

2.5.4 Test Method

Testing was performed in accordance with ANSI C63.10, clause 6.10.5 and 11.12.1.

The following conversion can be applied to convert from dB μ V/m to μ V/m:
 $10^{\frac{1}{2}}(\text{Field Strength in dB}\mu\text{V/m}/20)$.

2.5.5 Reported Measurements

Restricted band edge measurements were performed, with the device operating in SISO, MIMO and TxBF, across the various modes supported by the device.

The measurements displayed within this report, have been limited to those modes which have been shown to be worst case. Further measurements are held on file by TÜV SÜD, and are available if required

2.5.6 Environmental Conditions

Ambient Temperature 20.0 - 23.0 °C
Relative Humidity 44.0 - 61.5 %

2.5.7 Test Results

Main - (SISO)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11b	1 Mbps	2462	2483.5	60.05	51.07
802.11b	1 Mbps	2412	2390.0	55.18	45.57

Table 53

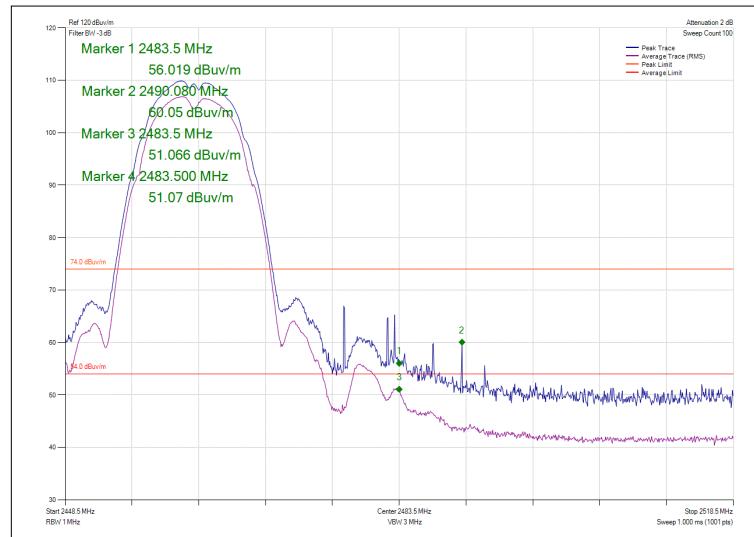


Figure 43 - 2462 MHz - Measured Frequency 2483.5 MHz

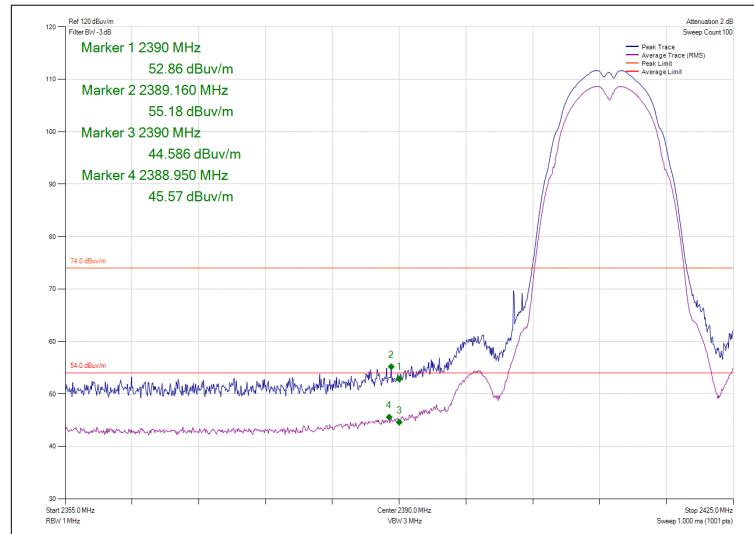


Figure 44 - 2412 MHz - Measured Frequency 2390.0 MHz

Main - (SISO)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11b	1 Mbps	2467	2483.5	55.61	45.83
802.11b	1 Mbps	2472	2483.5	56.05	45.64

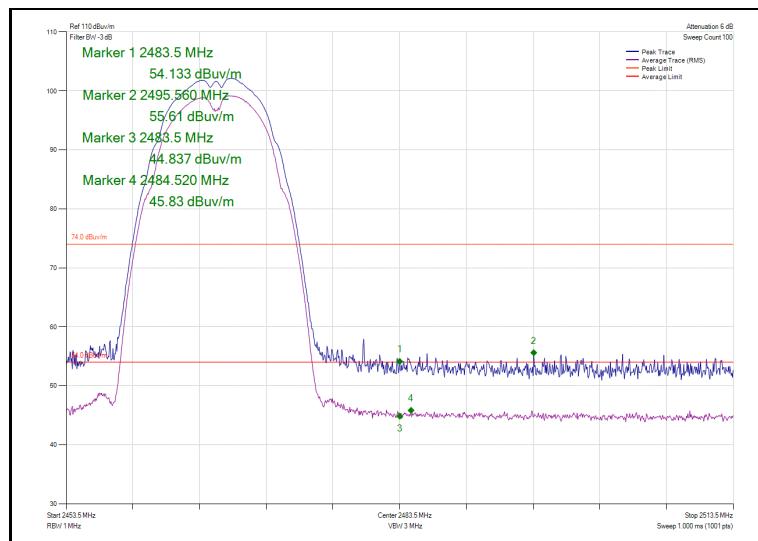


Figure 45 - 2467 MHz - Measured Frequency 2483.5 MHz

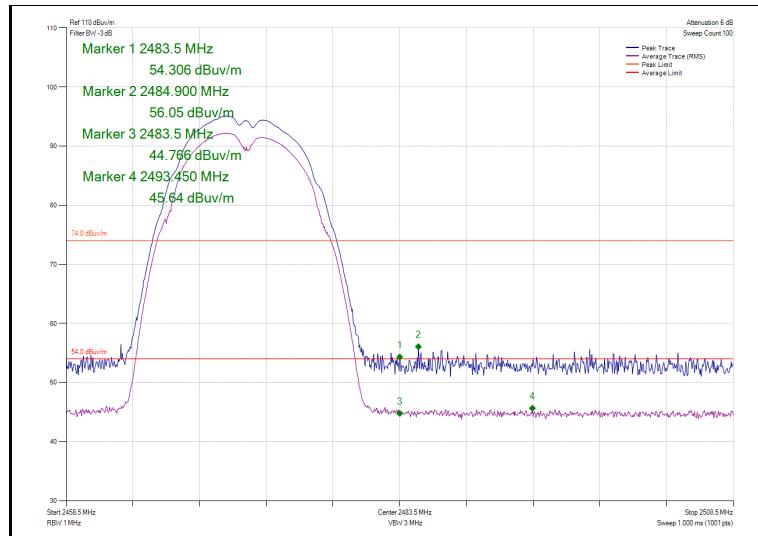


Figure 46 - 2472 MHz - Measured Frequency 2483.5 MHz

Main - (SISO)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11g	6 Mbps	2462	2483.5	64.23	51.48
802.11g	6 Mbps	2412	2390.0	54.91	45.85

Table 54

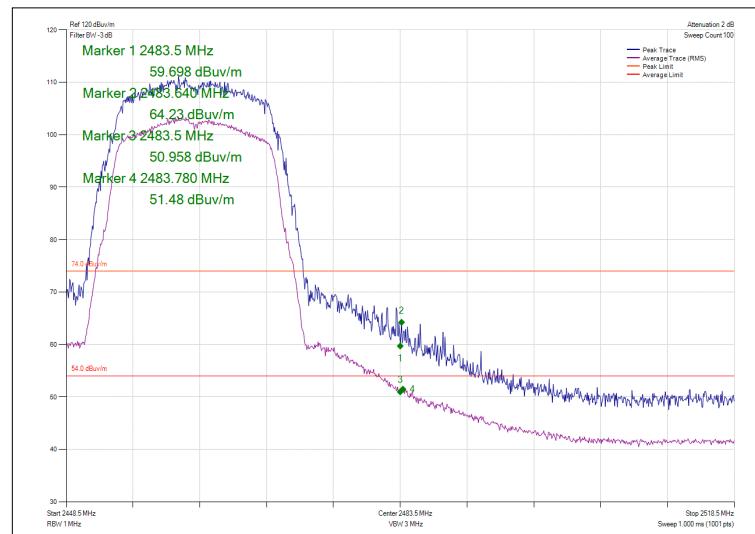


Figure 47 - 2462 MHz - Measured Frequency 2483.5 MHz

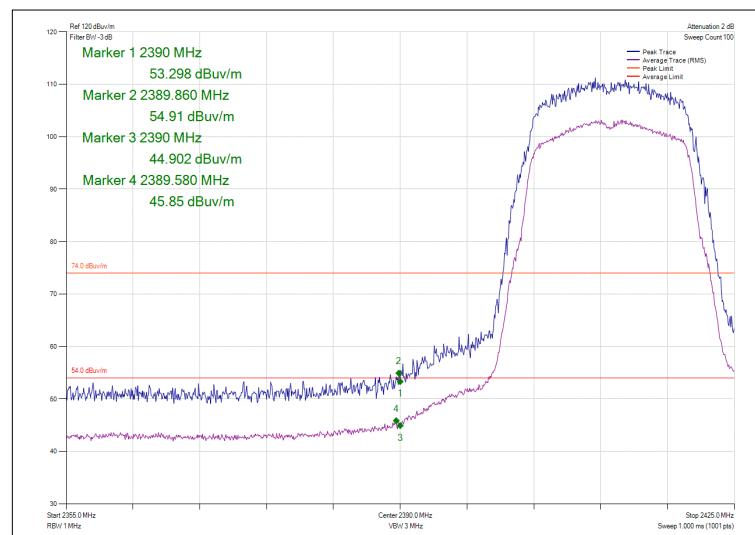


Figure 48 - 2412 MHz - Measured Frequency 2390.0 MHz

Main - (SISO)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11g	6 Mbps	2467	2483.5	56.67	47.15
802.11g	6 Mbps	2472	2483.5	59.52	49.44

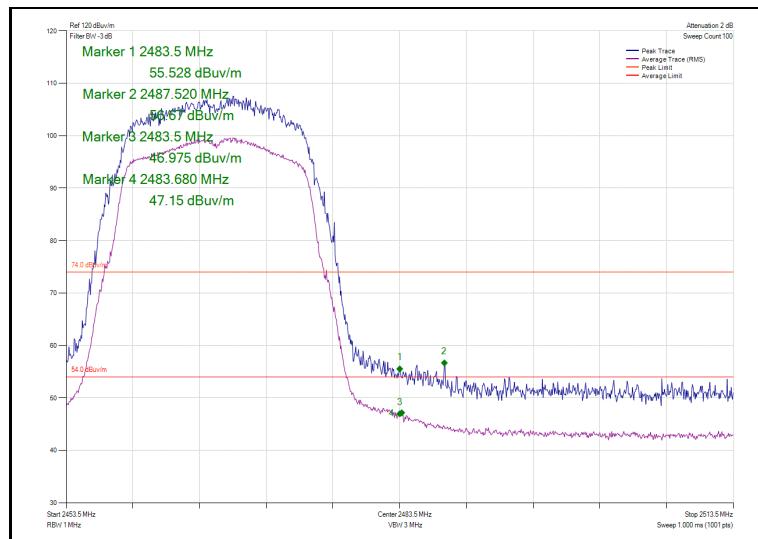


Figure 49 - 2467 MHz - Measured Frequency 2483.5 MHz

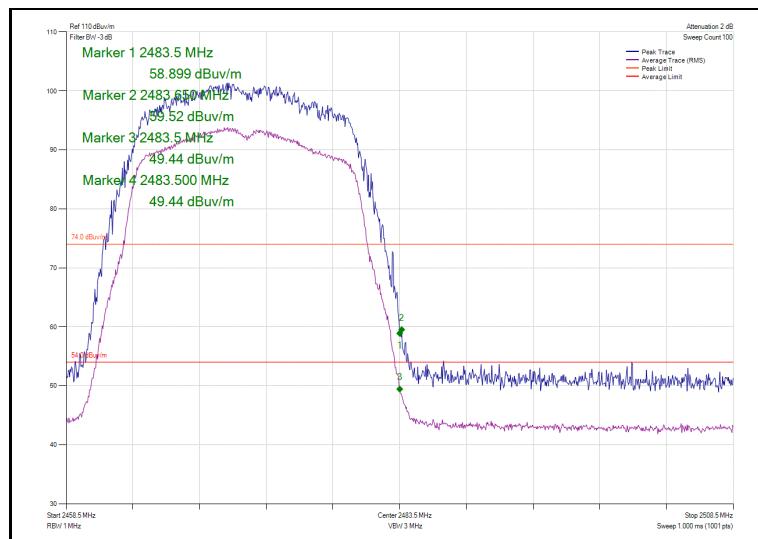


Figure 50 - 2472 MHz - Measured Frequency 2483.5 MHz

Main (SISO)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11n	MCS0	2462	2483.5	66.00	51.42
802.11n	MCS0	2412	2390.0	55.42	46.07

Table 55

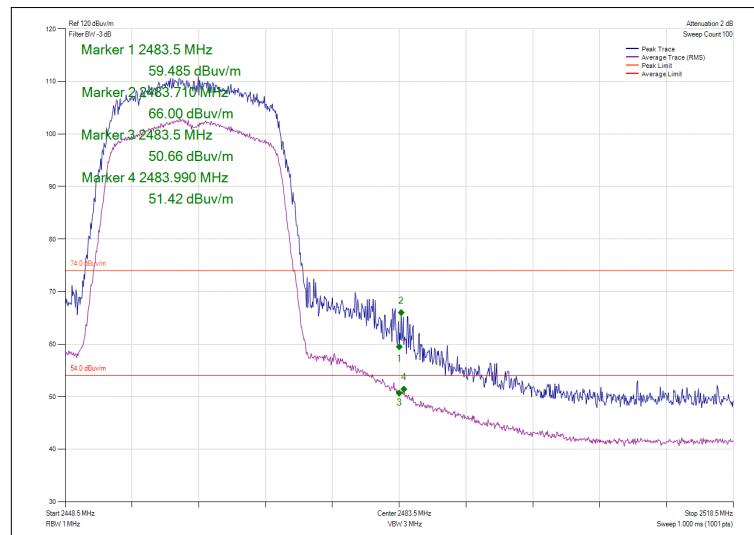


Figure 51 - 2462 MHz - Measured Frequency 2483.5 MHz

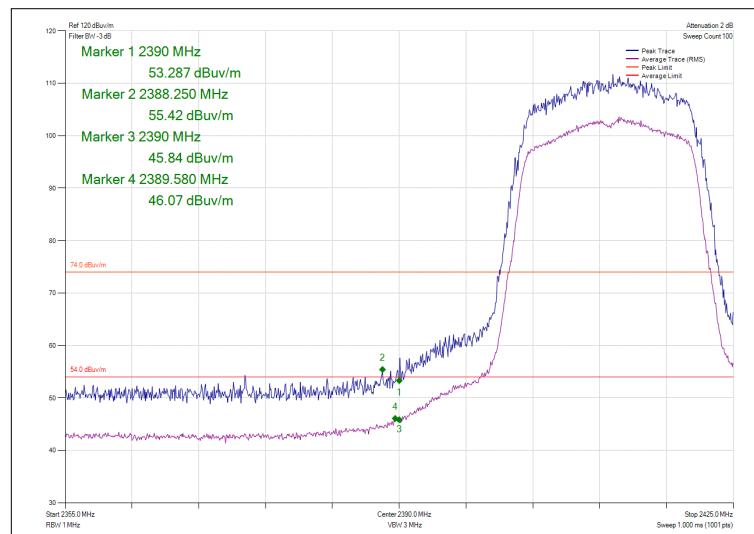


Figure 52 - 2412 MHz - Measured Frequency 2390.0 MHz

Main (SISO)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11n	MCS0	2467	2483.5	55.88	46.22
802.11n	MCS0	2472	2483.5	61.59	50.45

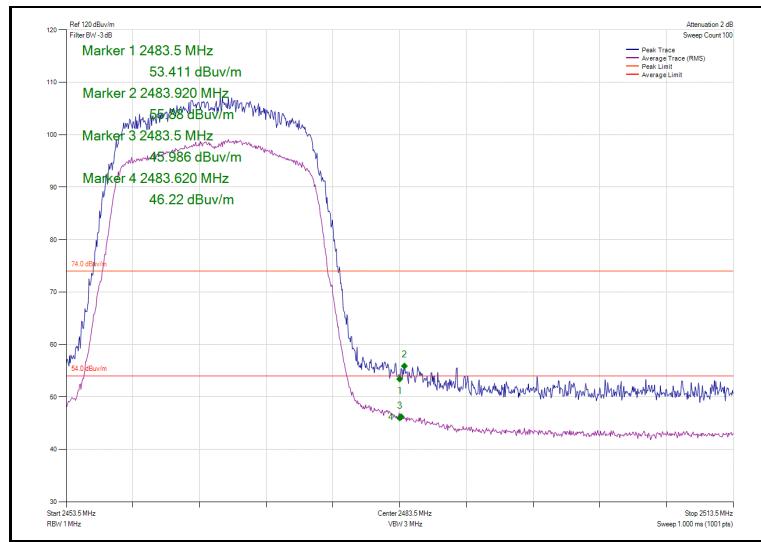


Figure 53 - 2467 MHz - Measured Frequency 2483.5 MHz

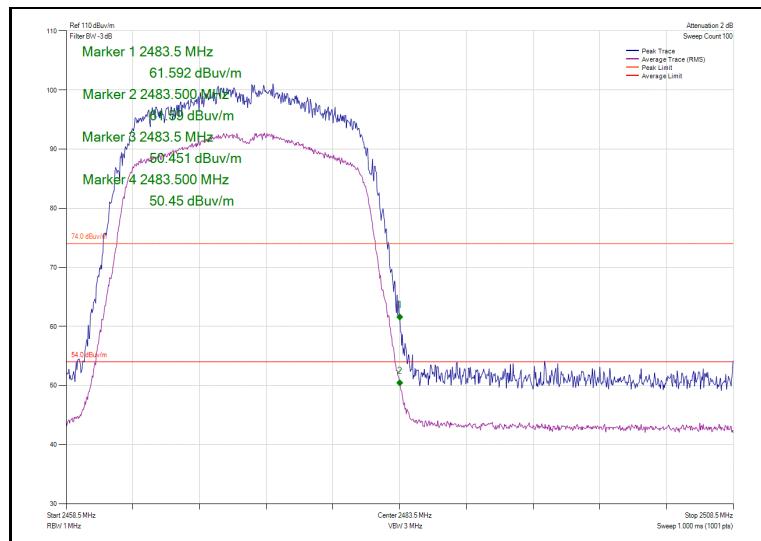


Figure 54 - 2472 MHz - Measured Frequency 2483.5 MHz

Main - (MIMO 2 Tx, TXBF)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11n	MCS0	2462	2483.5	56.75	46.32
802.11n	MCS0	2412	2390.0	54.54	44.62

Table 56

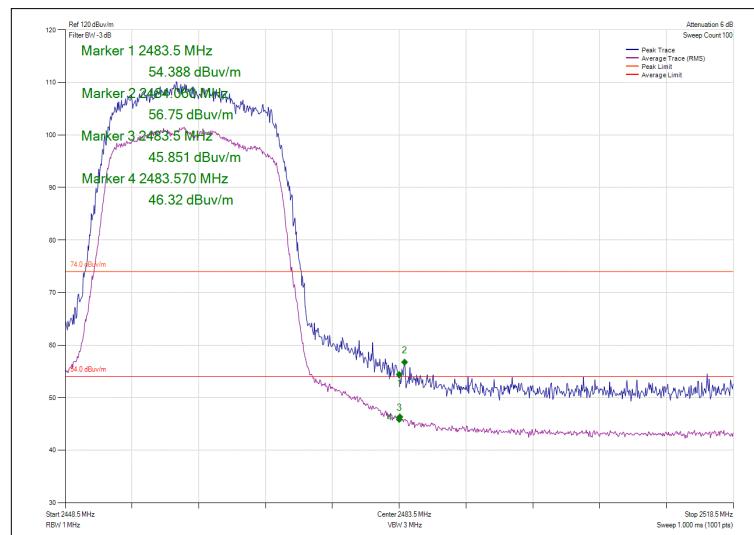


Figure 55 - 2462 MHz - Measured Frequency 2483.5 MHz

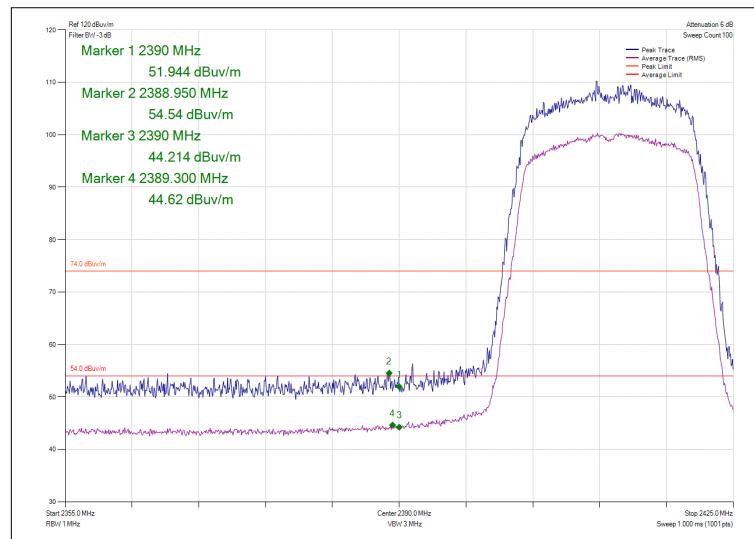


Figure 56 - 2412 MHz - Measured Frequency 2390.0 MHz

Main - (MIMO 2 Tx, TXBF)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11n	MCS0	2467	2483.5	55.29	44.56
802.11n	MCS0	2472	2483.5	58.20	45.89

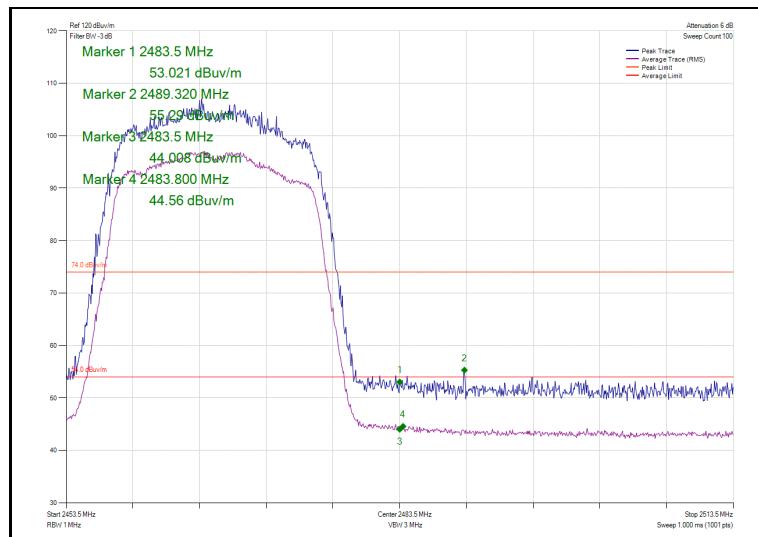


Figure 57 - 2467 MHz - Measured Frequency 2483.5 MHz

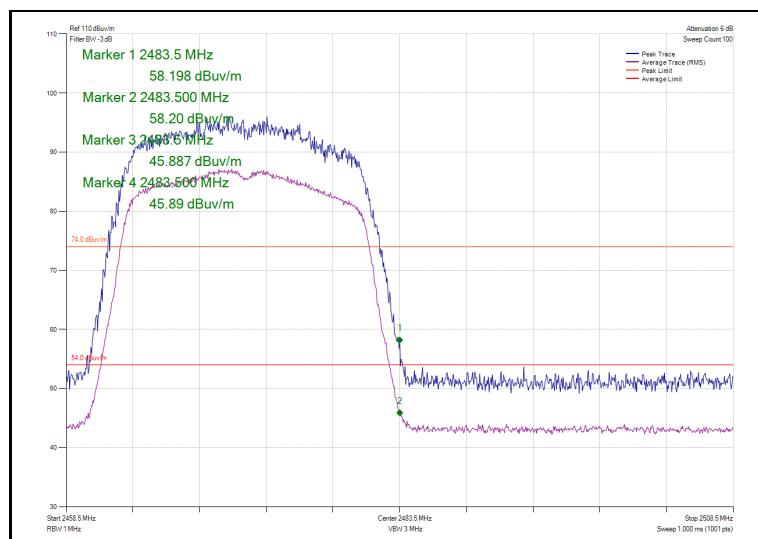


Figure 58 - 2472 MHz - Measured Frequency 2483.5 MHz

Main - (MIMO 3Tx, CDD)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11b	1 Mbps	2462	2483.5	60.30	51.23
802.11b	1 Mbps	2412	2390.0	55.54	47.22

Table 57

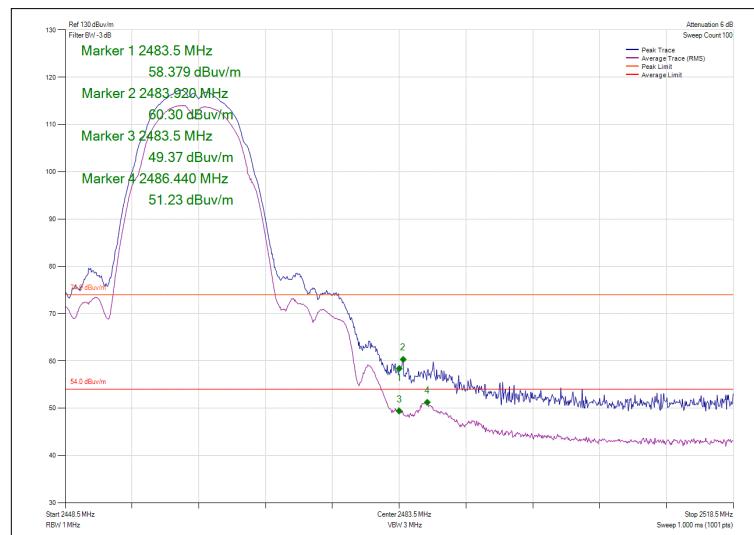


Figure 59 - 2462 MHz - Measured Frequency 2483.5 MHz

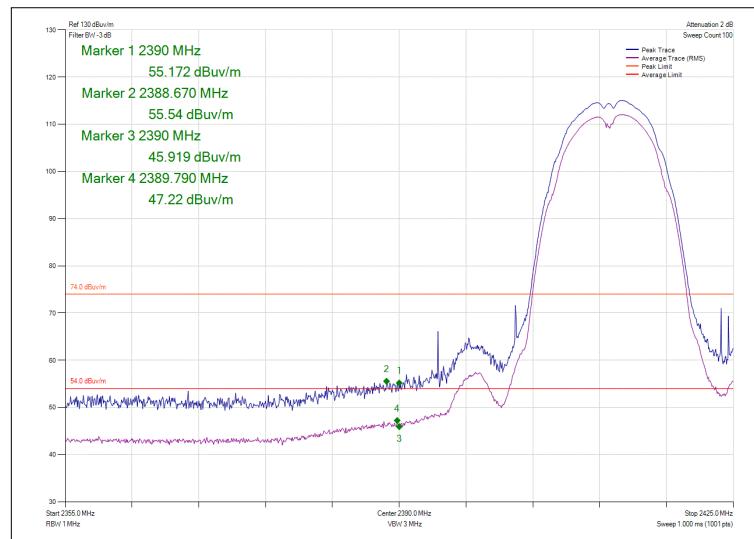


Figure 60 - 2412 MHz - Measured Frequency 2390.0 MHz

Main - (MIMO 3Tx, CDD)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11b	1 Mbps	2467	2483.5	54.01	44.77
802.11b	1 Mbps	2472	2483.5	53.89	44.29

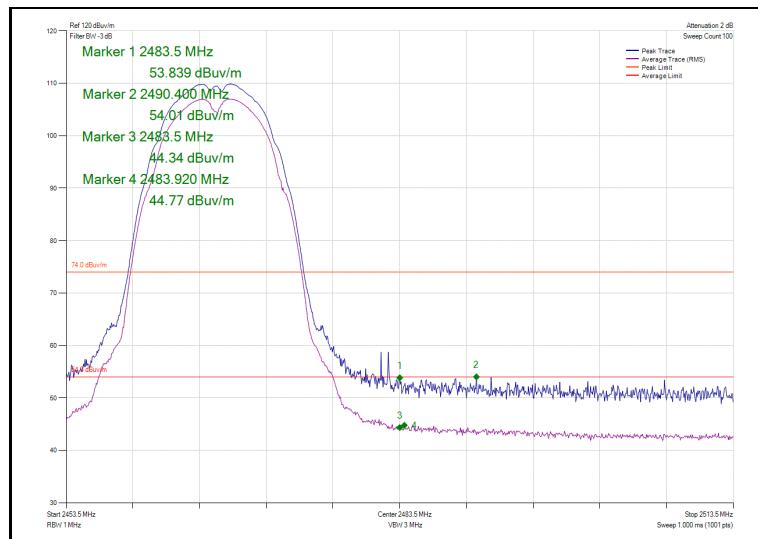


Figure 61 - 2467 MHz - Measured Frequency 2483.5 MHz

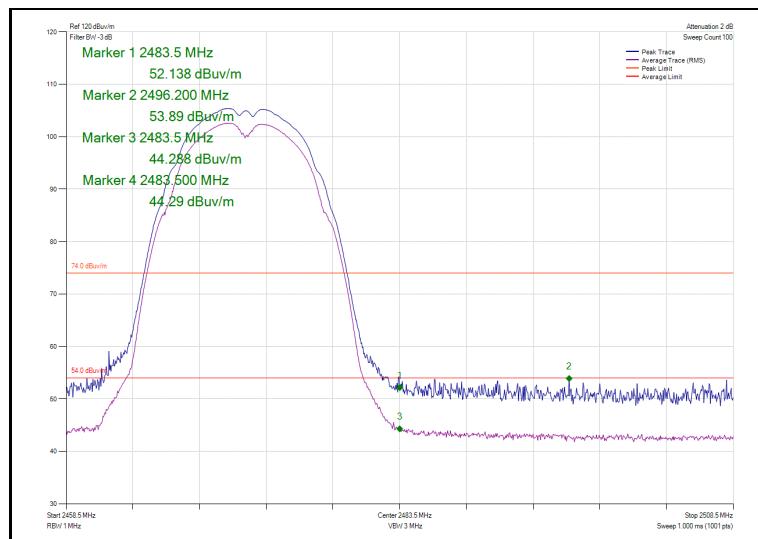


Figure 62 - 2472 MHz - Measured Frequency 2483.5 MHz

Main - (MIMO 2Tx, CDD)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11b	1 Mbps	2462	2483.5	58.22	51.09
802.11b	1 Mbps	2412	2390.0	55.83	46.45

Table 58

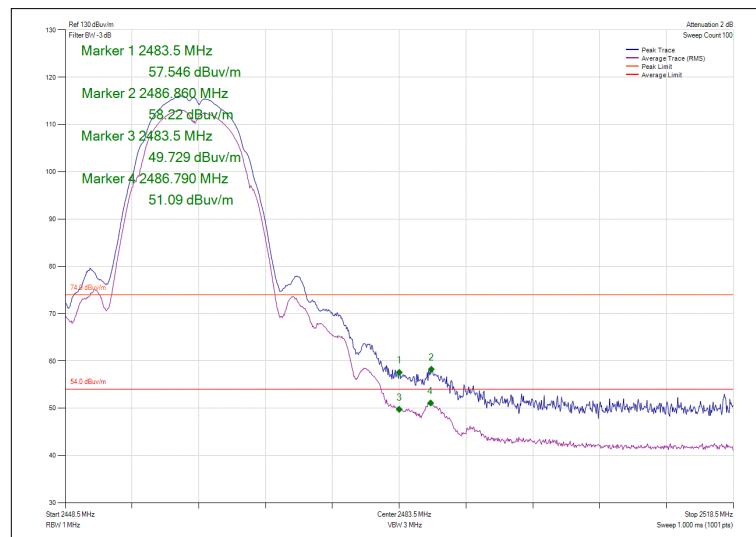


Figure 63 - 2462 MHz - Measured Frequency 2483.5 MHz

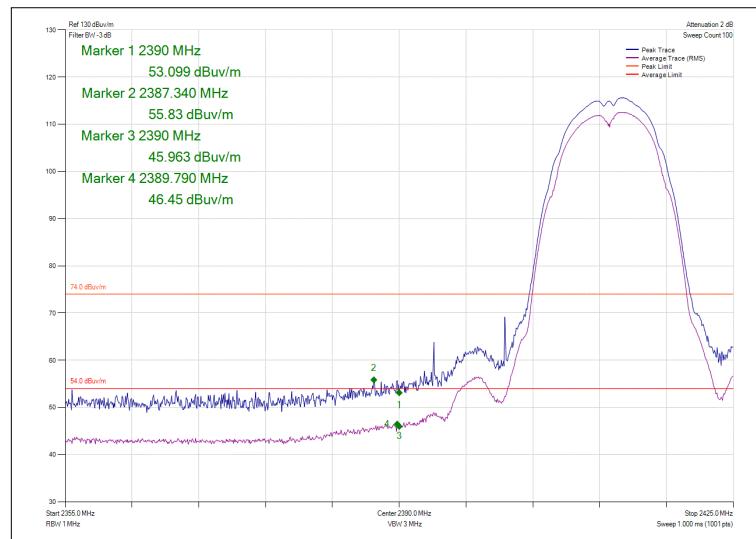


Figure 64 - 2412 MHz - Measured Frequency 2390.0 MHz

Main - (MIMO 2Tx, CDD)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11b	1 Mbps	2467	2483.5	54.90	45.44
802.11b	1 Mbps	2472	2483.5	54.72	45.43

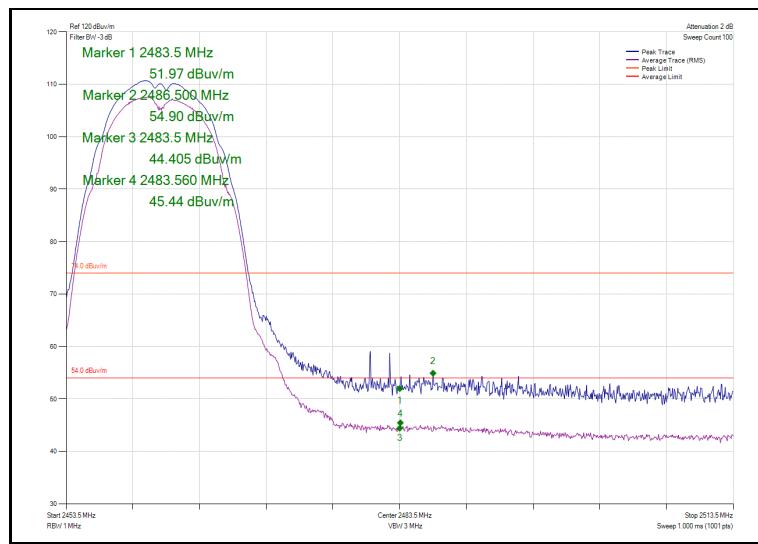


Figure 65 - 2467 MHz - Measured Frequency 2483.5 MHz

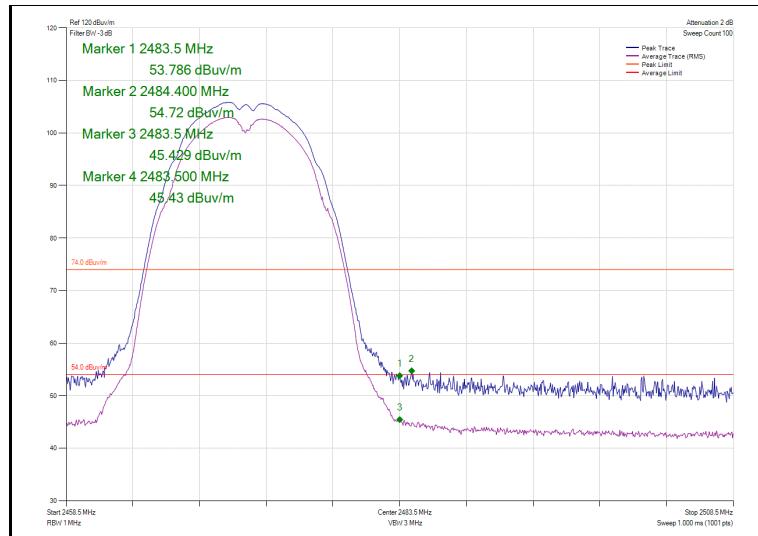


Figure 66 - 2472 MHz - Measured Frequency 2483.5 MHz

Main - (MIMO 2Tx, CDD)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11n	MCS0	2462	2483.5	62.11	51.14
802.11n	MCS0	2412	2390.0	55.36	44.94

Table 59

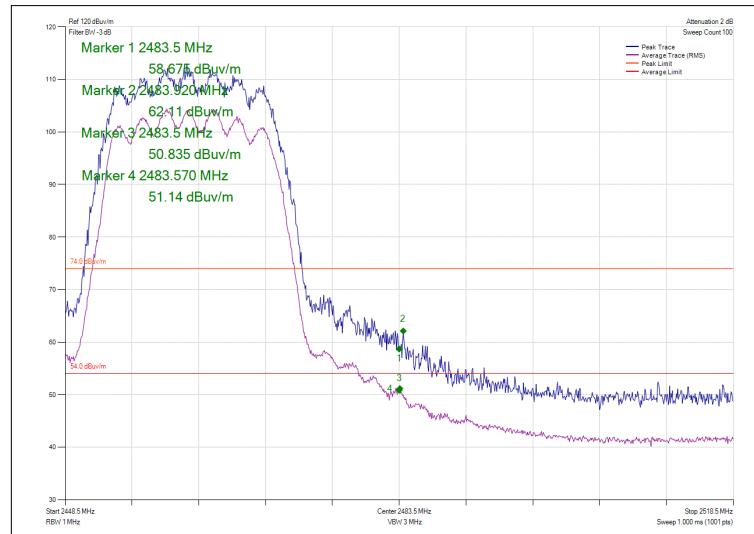


Figure 67 - 2462 MHz - Measured Frequency 2483.5 MHz

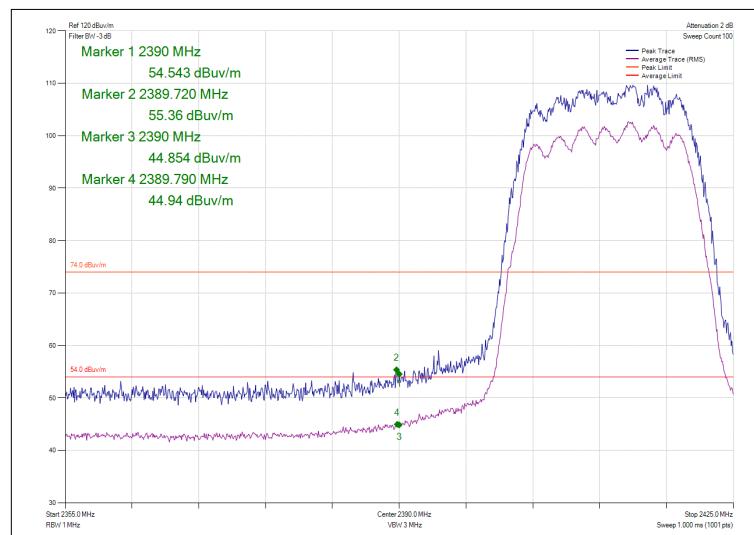


Figure 68 - 2412 MHz - Measured Frequency 2390.0 MHz

Main - (MIMO 2Tx, CDD)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11n	MCS0	2467	2483.5	58.27	45.26
802.11n	MCS0	2472	2483.5	60.47	49.38

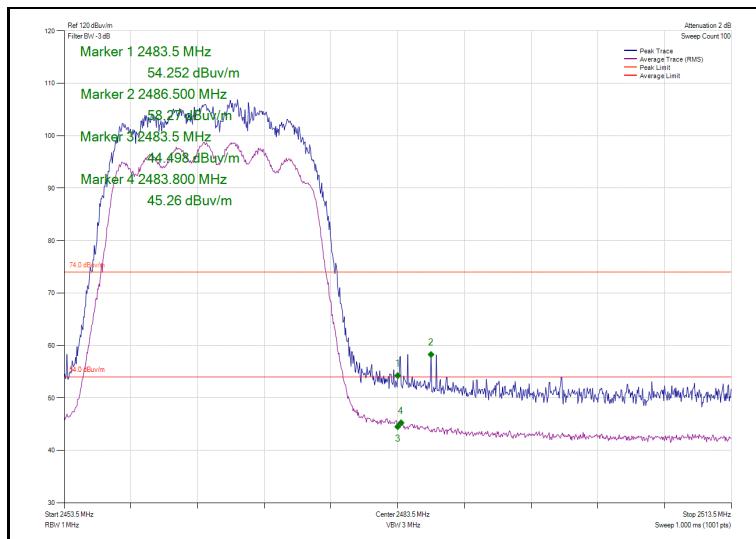


Figure 69 - 2467 MHz - Measured Frequency 2483.5 MHz

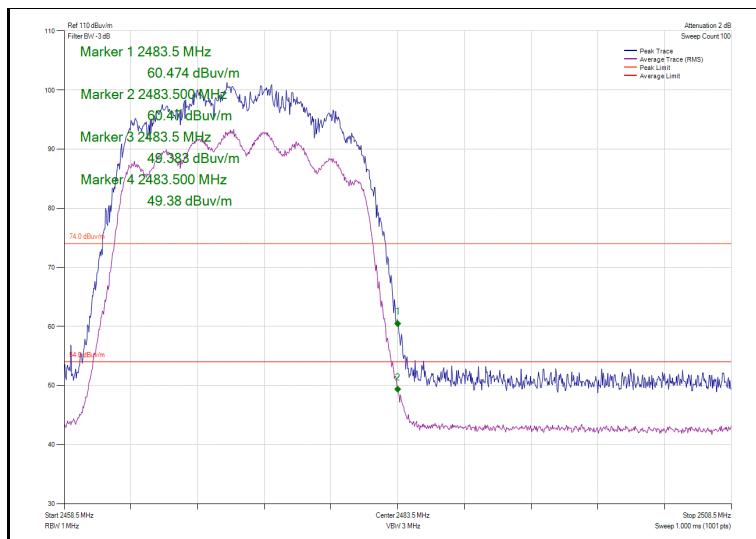


Figure 70 - 2472 MHz - Measured Frequency 2483.5 MHz

Main - (MIMO 3Tx, CDD)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11n	MCS0	2462	2483.5	62.85	50.96
802.11n	MCS0	2412	2390.0	56.59	45.21

Table 60

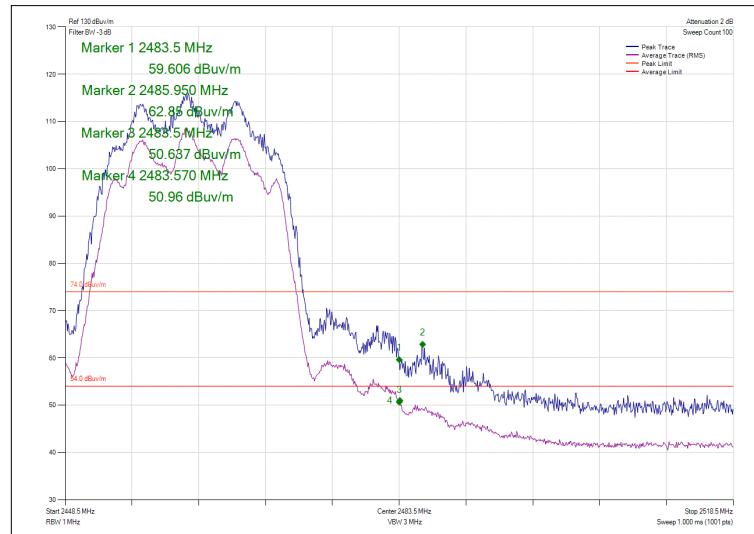


Figure 71 - 2462 MHz - Measured Frequency 2483.5 MHz

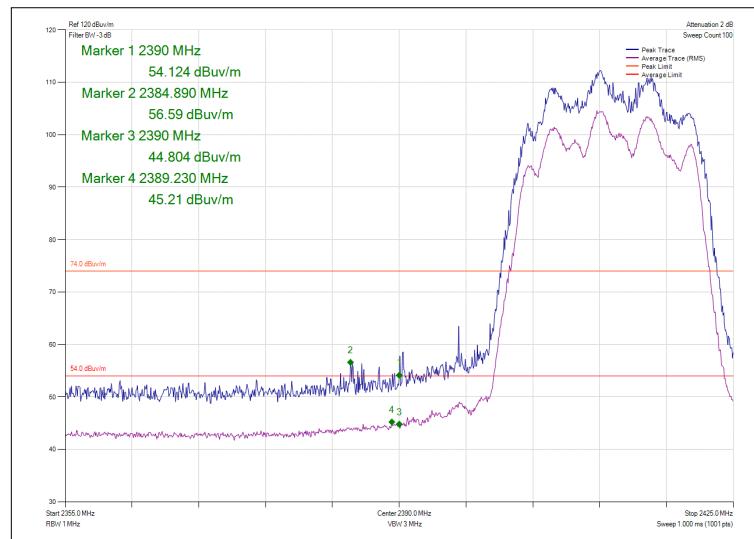


Figure 72 - 2412 MHz - Measured Frequency 2390.0 MHz - Peak

Main - (MIMO 3Tx, CDD)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11n	MCS0	2467	2483.5	59.39	45.18
802.11n	MCS0	2472	2483.5	57.42	46.12

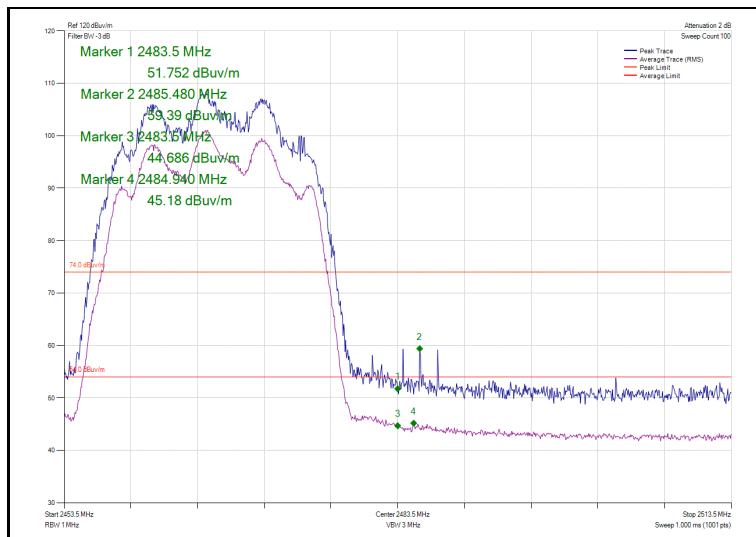


Figure 73 - 2467 MHz - Measured Frequency 2483.5 MHz

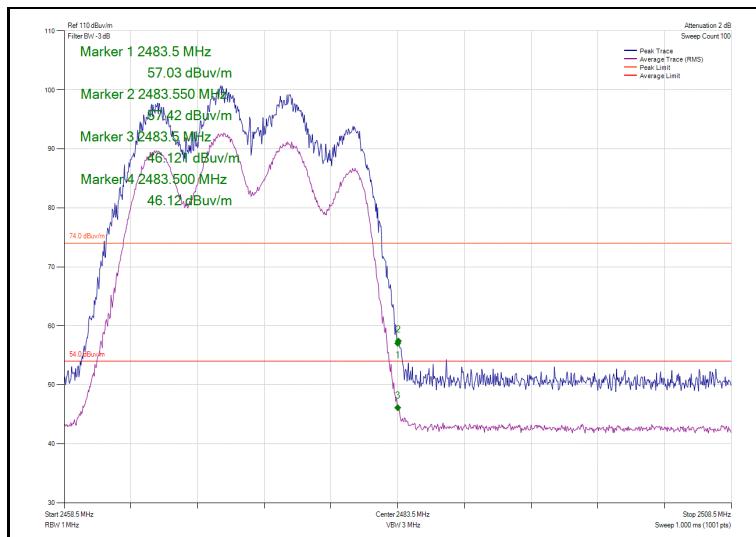


Figure 74 - 2472 MHz - Measured Frequency 2483.5 MHz

Main - (MIMO 3Tx, TXBF)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11n	MCS0	2462	2483.5	58.07	48.13
802.11n	MCS0	2412	2390.0	52.74	43.47

Table 61

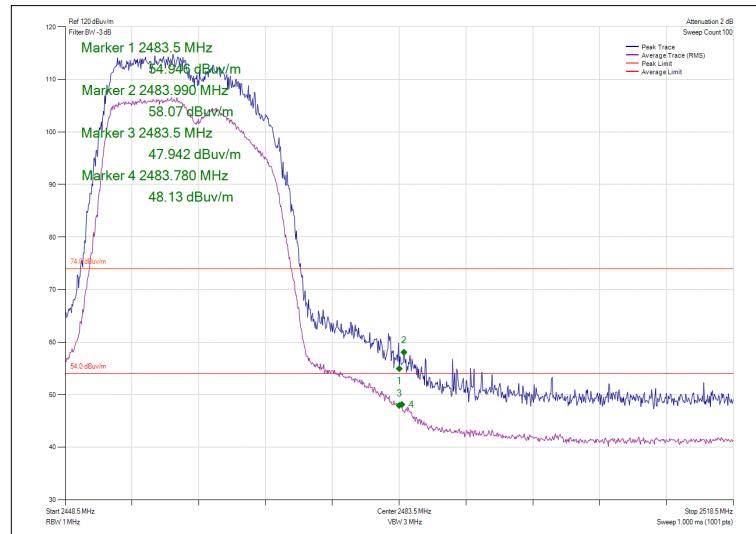


Figure 75 - 2462 MHz - Measured Frequency 2483.5 MHz

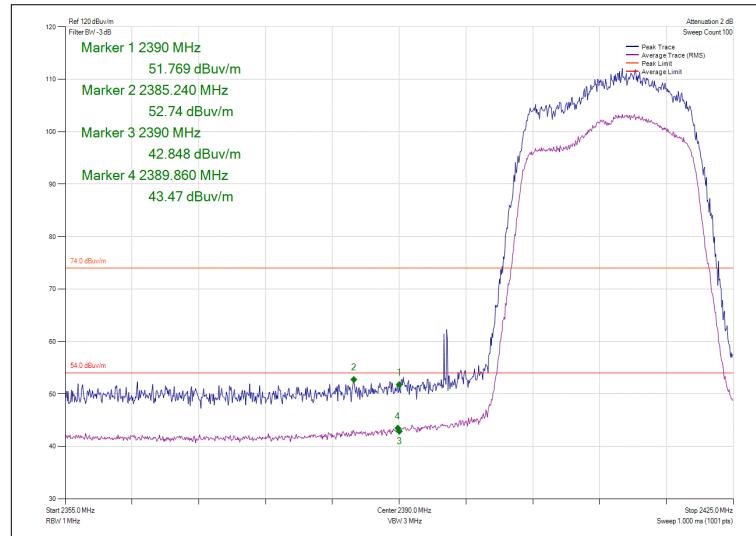


Figure 76 - 2412 MHz - Measured Frequency 2390.0 MHz

Main - (MIMO 3Tx, TXBF)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11n	MCS0	2467	2483.5	56.11	43.85
802.11n	MCS0	2472	2483.5	55.76	47.23

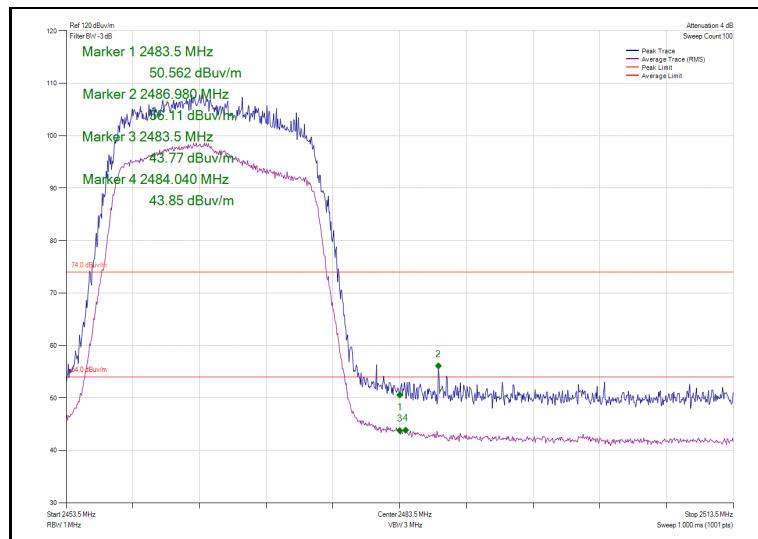


Figure 77 - 2467 MHz - Measured Frequency 2483.5 MHz

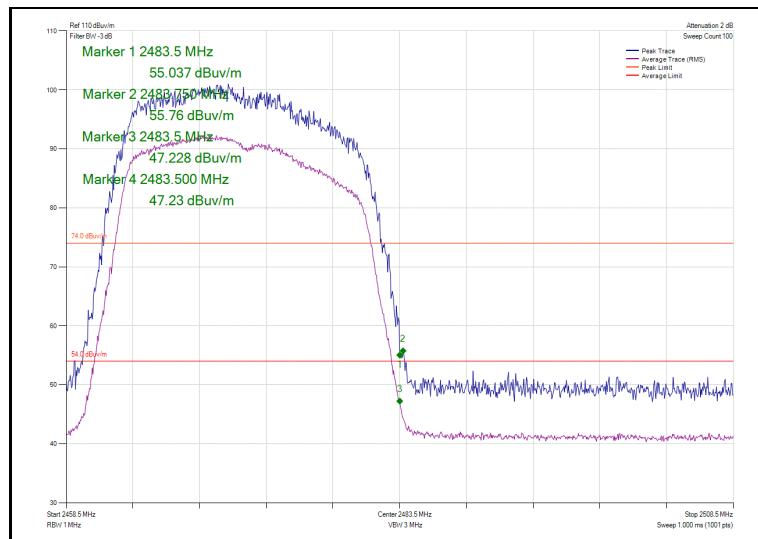


Figure 78 - 2472 MHz - Measured Frequency 2483.5 MHz

Aux - (SISO)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11b	1 Mbps	2462	2483.5	59.97	51.13
802.11b	1 Mbps	2412	2390.0	54.91	46.28

Table 62

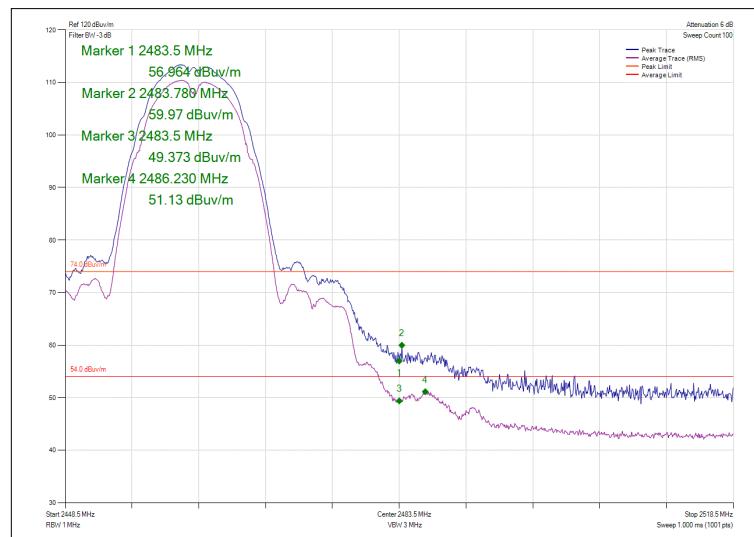


Figure 79 - 2462 MHz - Measured Frequency 2483.5 MHz

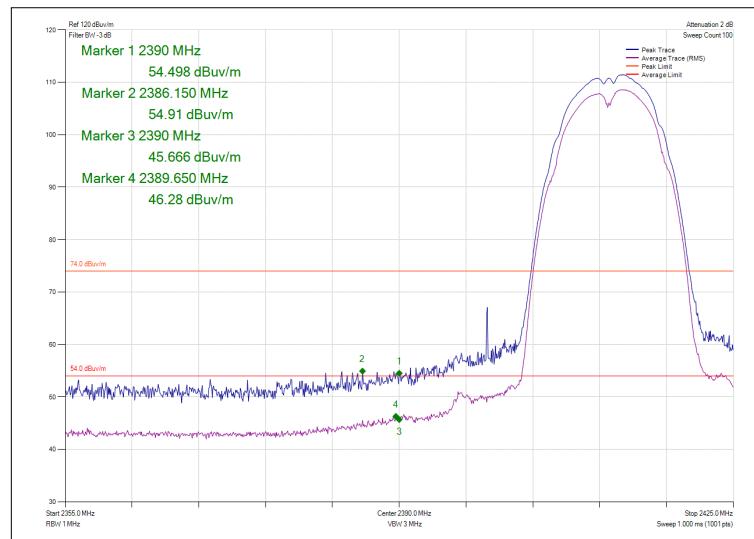


Figure 80 - 2412 MHz - Measured Frequency 2390.0 MHz

Aux - (SISO)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11b	1 Mbps	2467	2483.5	54.65	45.48
802.11b	1 Mbps	2472	2483.5	55.03	45.64

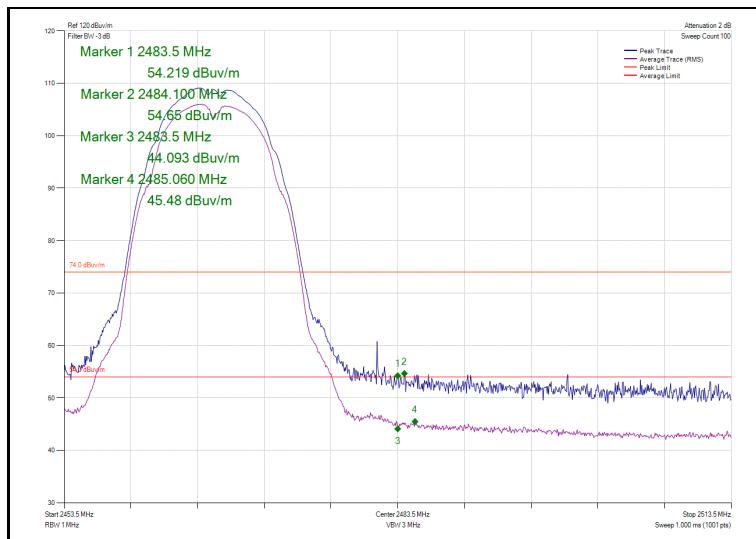


Figure 81 - 2467 MHz - Measured Frequency 2483.5 MHz

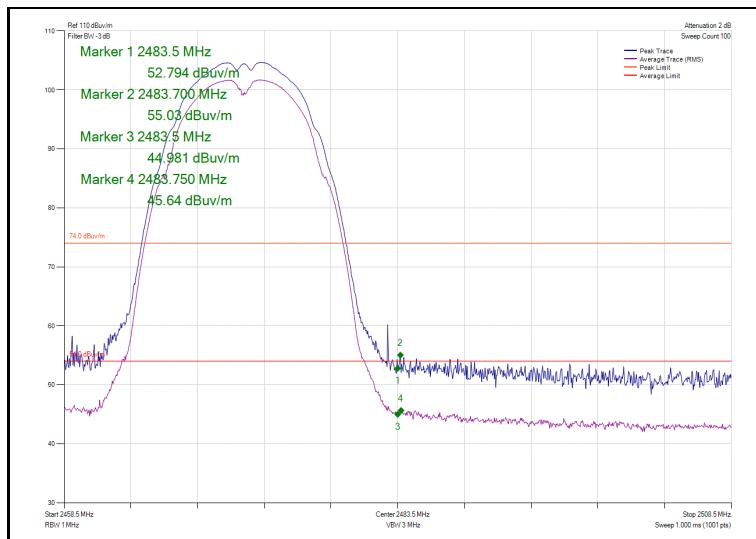


Figure 82 - 2472 MHz - Measured Frequency 2483.5 MHz

Aux - (SISO)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11g	6 Mbps	2462	2483.5	65.93	50.91
802.11g	6 Mbps	2412	2390.0	65.04	48.67

Table 63

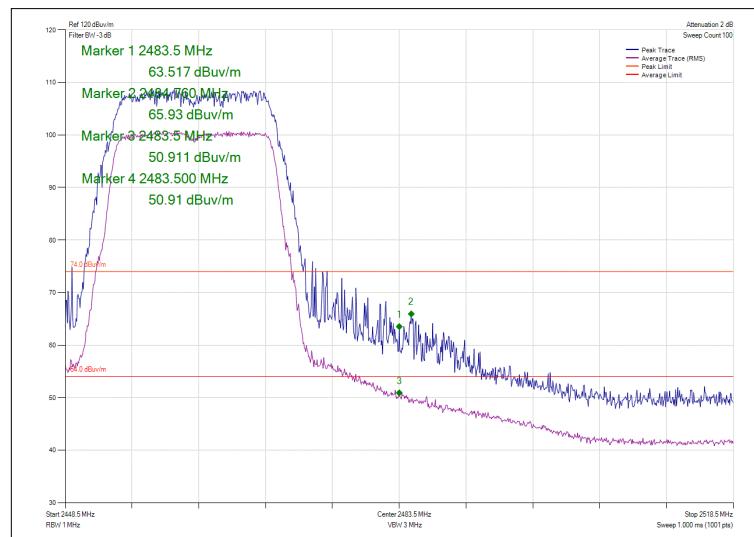


Figure 83 - 2462 MHz - Measured Frequency 2483.5 MHz

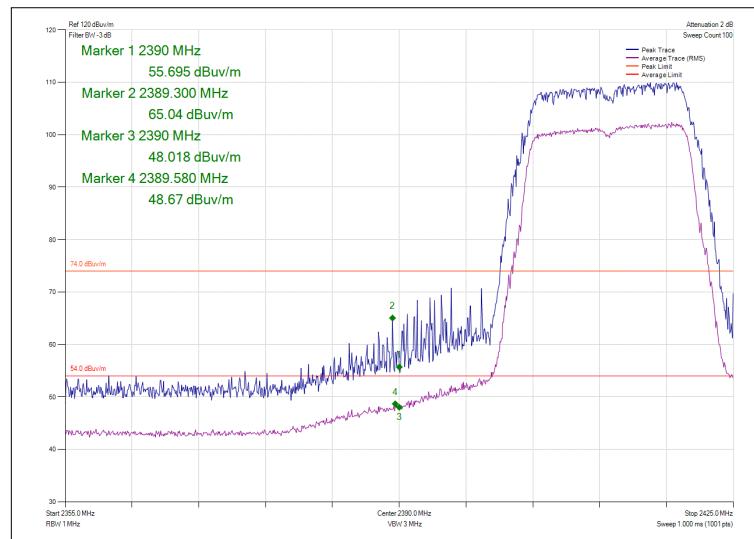


Figure 84 - 2412 MHz - Measured Frequency 2390.0 MHz

Aux - (SISO)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11g	6 Mbps	2467	2483.5	59.42	47.96
802.11g	6 Mbps	2472	2483.5	62.30	48.09

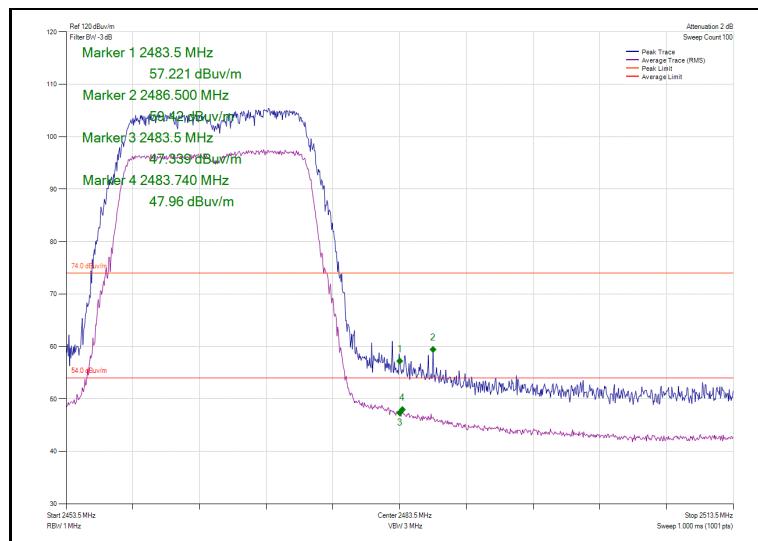


Figure 85 - 2467 MHz - Measured Frequency 2483.5 MHz

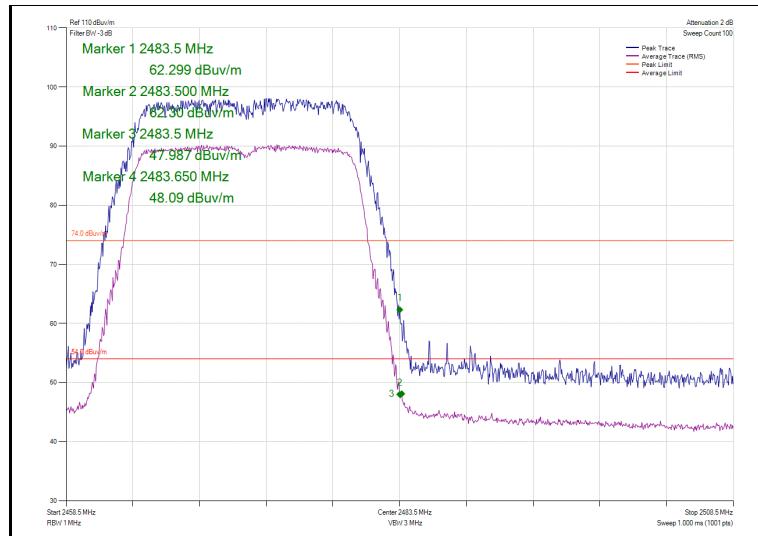


Figure 86 - 2472 MHz - Measured Frequency 2483.5 MHz

Aux (SISO)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11n	MCS0	2462	2483.5	69.43	51.19
802.11n	MCS0	2412	2390.0	63.73	49.32

Table 64

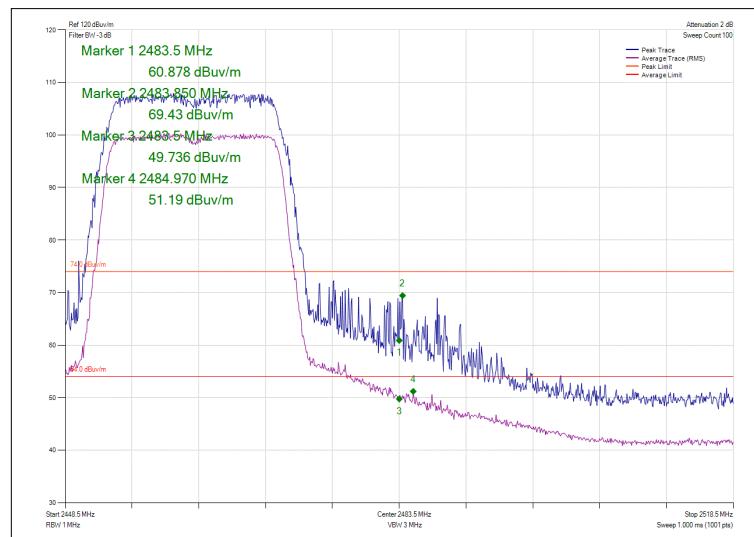


Figure 87 - 2462 MHz - Measured Frequency 2483.5 MHz

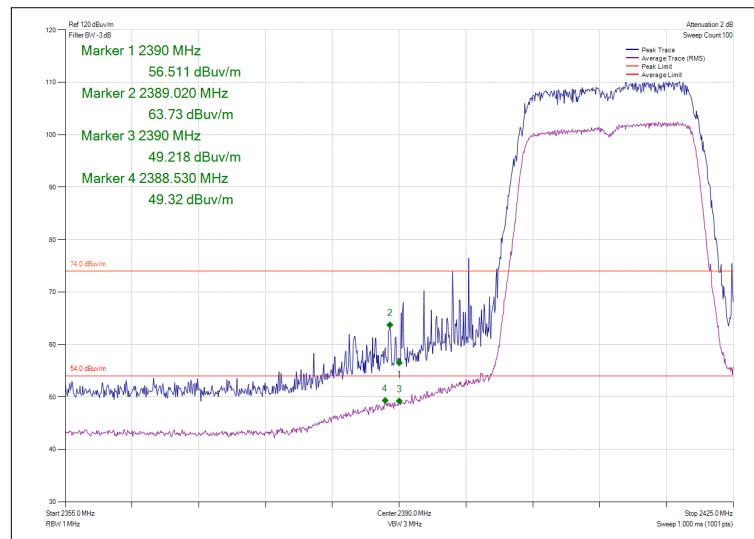


Figure 88 - 2412 MHz - Measured Frequency 2390.0 MHz

Aux (SISO)

Mode	Data Rate/MCS	Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11n	MCS0	2467	2483.5	57.89	48.40
802.11n	MCS0	2472	2483.5	64.09	49.90

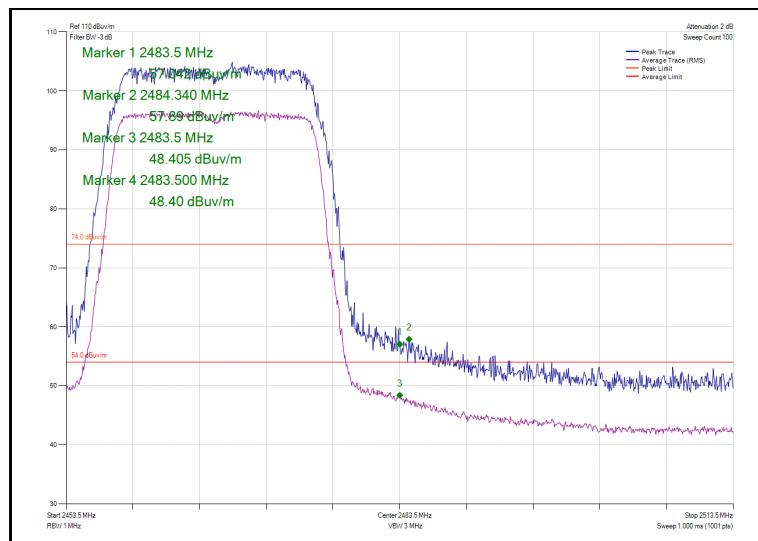


Figure 89 - 2467 MHz - Measured Frequency 2483.5 MHz

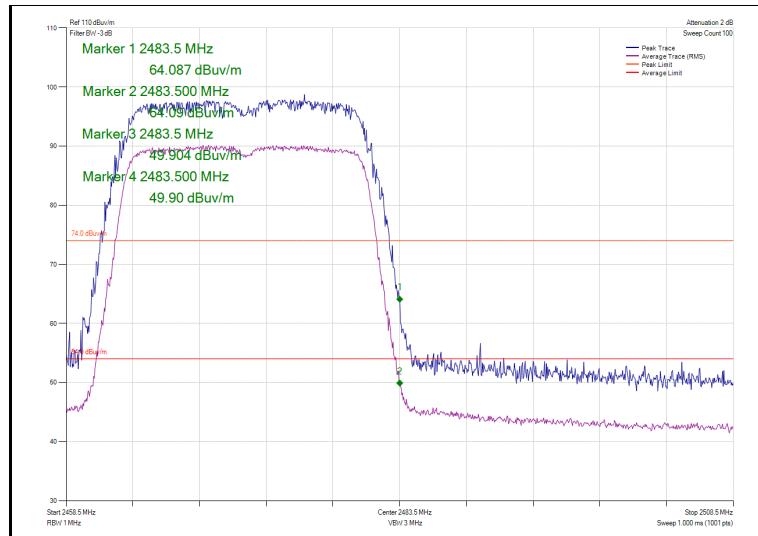


Figure 90 - 2472 MHz - Measured Frequency 2483.5 MHz

FCC 47 CFR Part 15, Limit Clause 15.209

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

Table 65
Industry Canada RSS-GEN, Limit Clause 8.9

Frequency (MHz)	Field Strength (μ V/m at 3 metres)
30-88	100
88-216	150
216-960	200
Above 960*	500

Table 66

*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.

2.5.8 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
10dB/1W SMA Attenuator dc - 18GHz	Sealectro	60-674-1010-89	3	12	31-Aug-2018
Screened Room (5)	Rainford	Rainford	1545	36	23-Jan-2021
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Nov-2018
1 Metre SMA Cable	Rhophase	3PS-1801A-1000-3PS	4099	12	19-Sep-2018
Cable (Rx, Nm-Nm, 7m)	Scott Cables	SLU18-NMNM-07.00M	4498	-	O/P Mon
Cable (Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4526	6	31-Aug-2018
EMI Receiver	Keysight Technologies	N9038A MXE	4628	12	4-Jul-2019
EMI Receiver	Keysight Technologies	N9038A MXE	4629	12	13-Sep-2018
Mast Controller	Maturo GmbH	NCD	4810	-	TU
Tilt Antenna Mast	Maturo GmbH	TAM 4.0-P	4811	-	TU
9m N type RF cable	Rosenberger	2303-0 9.0m PNm PNm	4827	6	4-Jan-2019
Double Ridge Broadband Horn Antenna	Schwarzbeck	BBHA 9120 B	4848	12	12-Feb-2019
Hygrometer	Rotronic	HP21	4989	12	26-Apr-2019

Table 67

TU – Traceability Unscheduled

O/P Mon – Output Monitored using Calibrated Equipment

2.6 Spurious Radiated Emissions

2.6.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (d) & 15.205
Industry Canada RSS-247 Clause 5.5
Industry Canada RSS-GEN Clause 6.13

2.6.2 Equipment Under Test and Modification State

A1993, S/N: C07WT00HK2V0 - Modification State 0

2.6.3 Date of Test

07-August-2018

2.6.4 Test Method

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

In the 30MHz to 1GHz range pre scans were only performed on mid channel (2441 MHz) and any emissions identified then measured on bottom (2402 MHz) and top (2480 MHz).

The plots shown are the characterization of the EUT. The limits on the plots represent the most stringent case for restricted bands, (54/74 dB_uV/m @ 3m and 64/84 dB_uV/m @ 1m) 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 dB_uV/m to μ V/m:
 $10^{\alpha}(\text{Field Strength in dB}_{\mu}\text{V/m}/20)$.

2.6.5 Reported Measurements

Spurious Radiated Emissions measurements were performed, with the device operating in MIMO 3TX during tests on the Main Radio as this was defined as worst case.

Tests on the Aux radio were limited to the SISO mode supported.

Measurements displayed within this report, have been limited to one mode only for each radio, as tests on other modes have been shown to provide a similar emissions profile.

Further measurements are held on file by TÜV SÜD, and are available if required

2.6.6 Environmental Conditions

Ambient Temperature 19.2 - 21.0 °C
Relative Humidity 57.0 - 57.3 %

2.6.7 Test Results

Main - (MIMO 3Tx, CDD)

Frequency (GHz)	Result (µV/m)		Limit (µV/m)		Margin (µV/m)	
	Peak	Average	Peak	Average	Peak	Average
*						

Table 68 – 2412 MHz - 1 GHz to 26 GHz – Radiated

*No emissions were detected within 10 dB of the limit

Frequency (MHz)	QP Level (dBuV/m)	QP Limit (dBuV/m)	QP Margin (dBuV/m)	Angle(Deg)	Height(m)	Polarity
*						

Table 69 – 2442 MHz - 30 MHz to 1 GHz – Radiated

*No emissions were detected within 10 dB of the limit

Frequency (GHz)	Result (µV/m)		Limit (µV/m)		Margin (µV/m)	
	Peak	Average	Peak	Average	Peak	Average
*						

Table 70 – 2442 MHz - 1 GHz to 26 GHz – Radiated

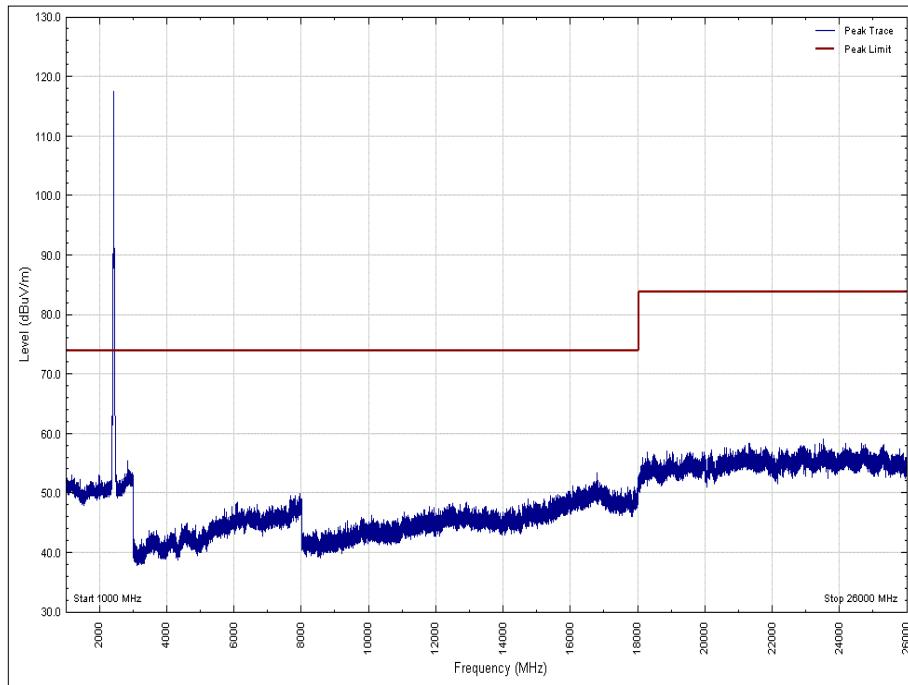
*No emissions were detected within 10 dB of the limit

Frequency (GHz)	Result (µV/m)		Limit (µV/m)		Margin (µV/m)	
	Peak	Average	Peak	Average	Peak	Average
*						

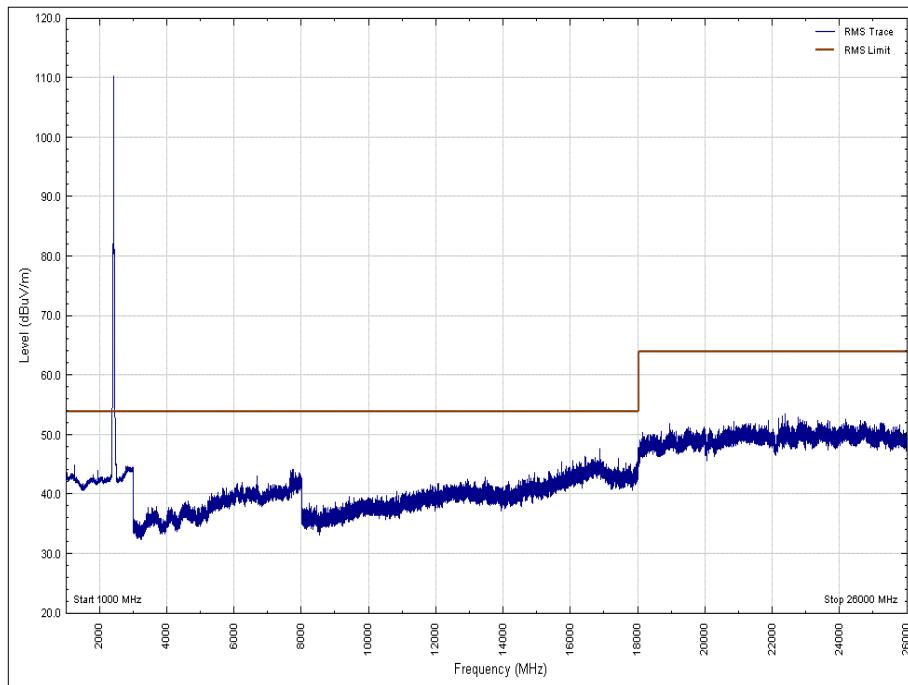
Table 71 - 2472 MHz - 1 GHz to 26 GHz – Radiated

*No emissions were detected within 10 dB of the limit

Main - (MIMO 3Tx, CDD)



**Figure 91 - 2412 MHz - 1 GHz to 26 GHz (Peak)
Polarity: Horizontal**



**Figure 92 - 2412 MHz - 1 GHz to 26 GHz (Average)
Polarity: Horizontal**

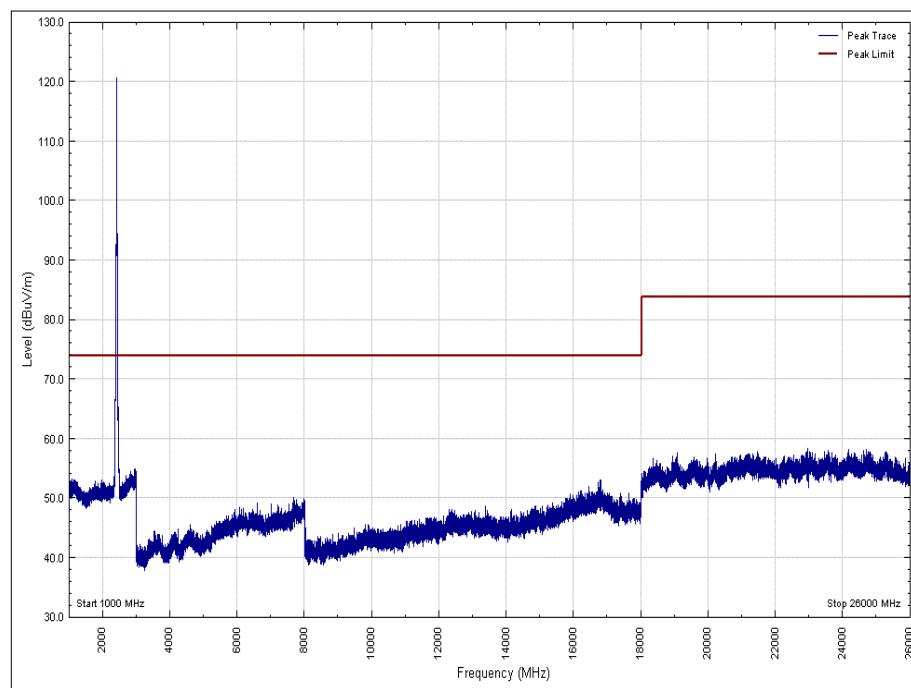


Figure 93 - 2412 MHz - 1 GHz to 26 GHz (Peak)
Polarity: Vertical

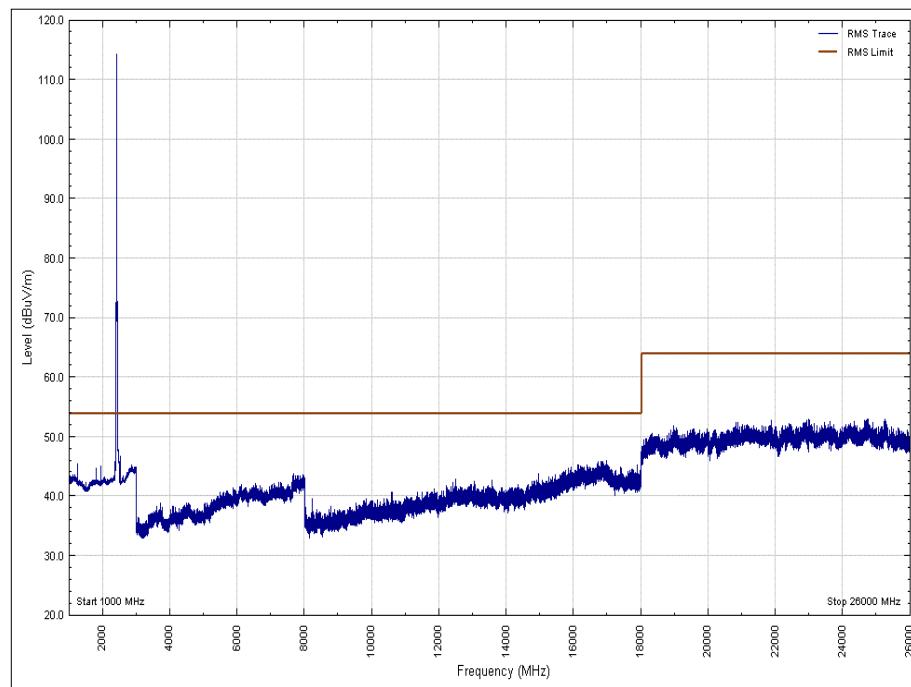
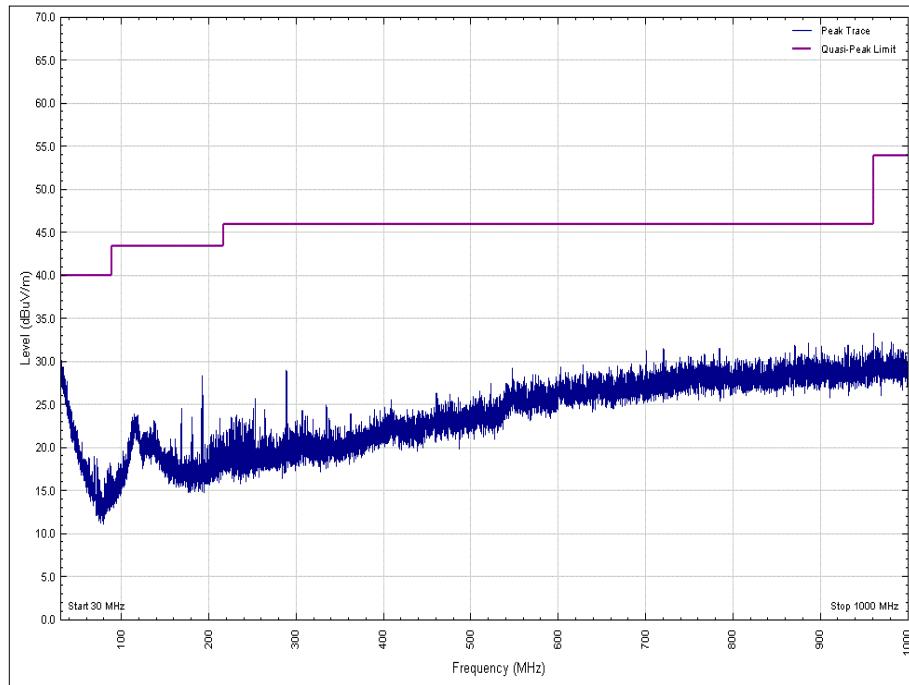
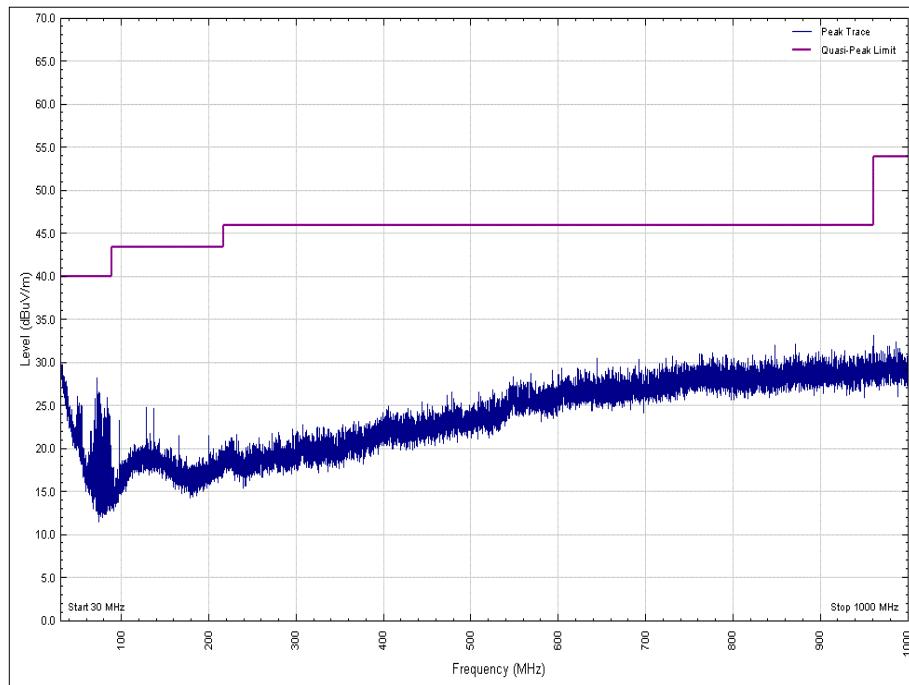


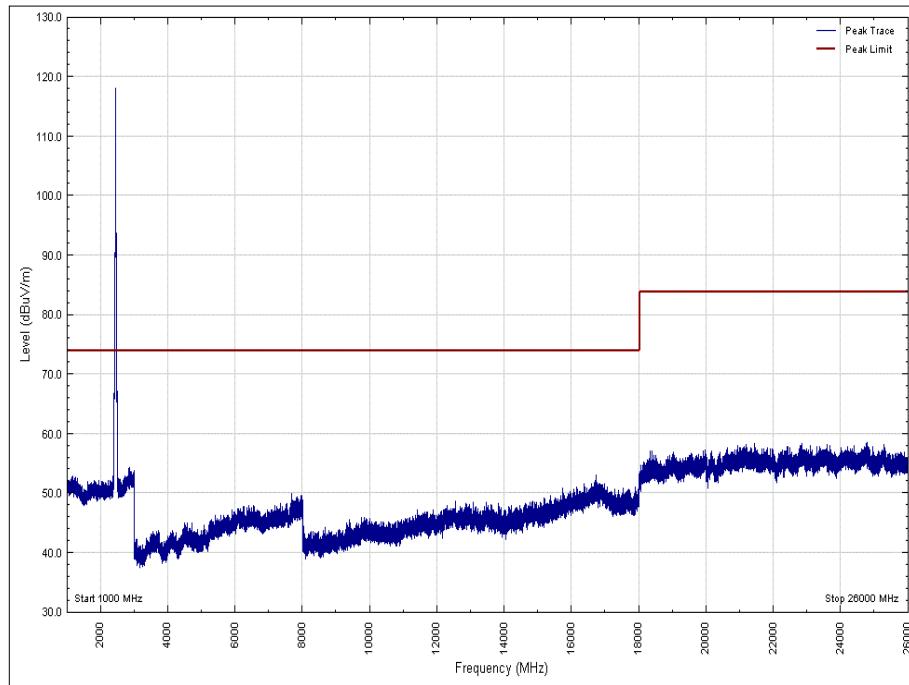
Figure 94 - 2412 MHz - 1 GHz to 26 GHz (Average)
Polarity: Vertical



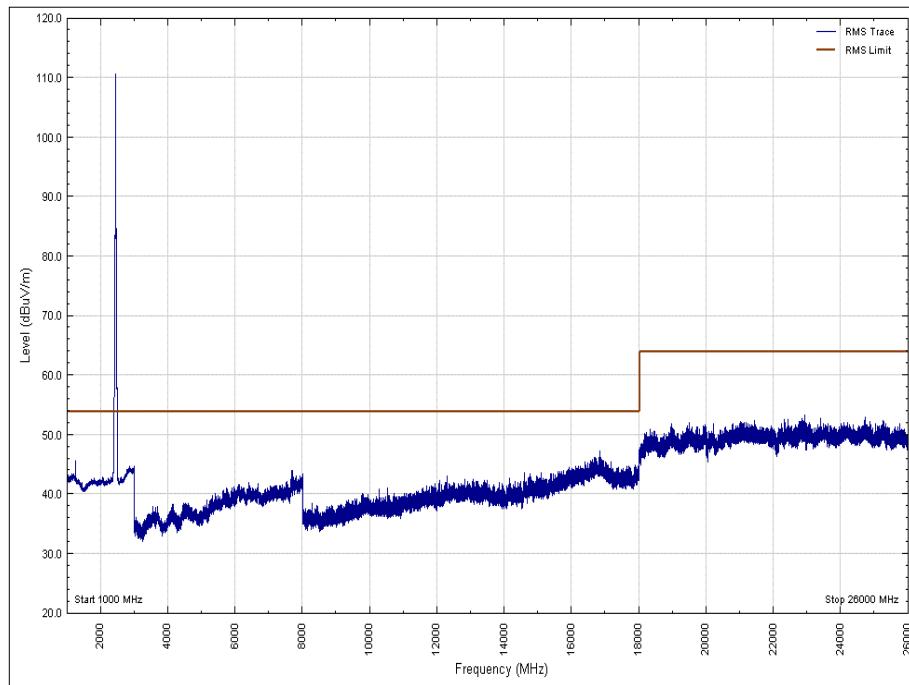
**Figure 95 - 2442 MHz - 30 MHz to 1 GHz
Polarity: Horizontal**



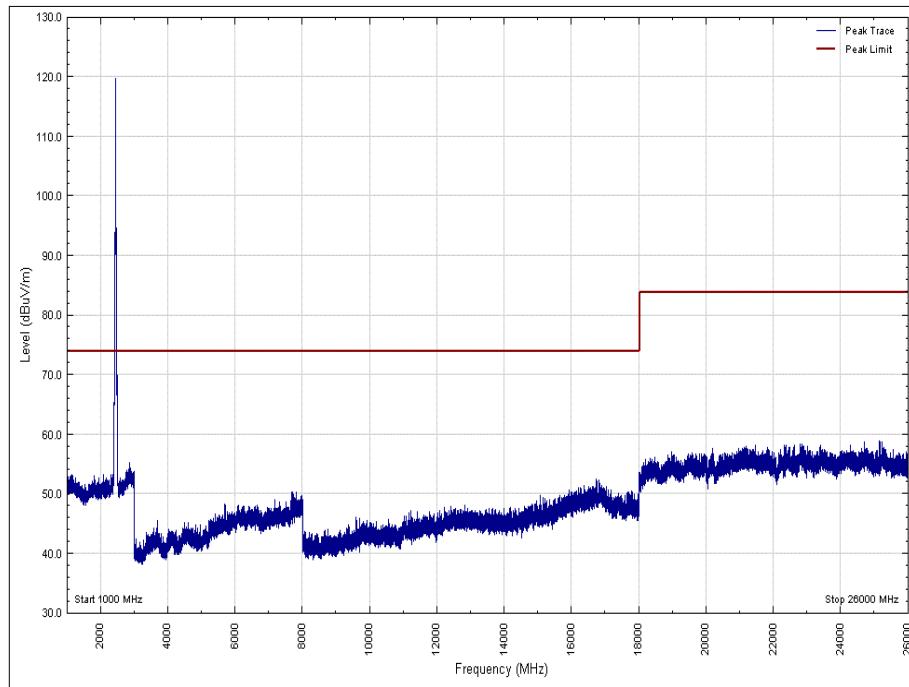
**Figure 96 - 2442 MHz - 30 MHz to 1 GHz
Polarity: Vertical**



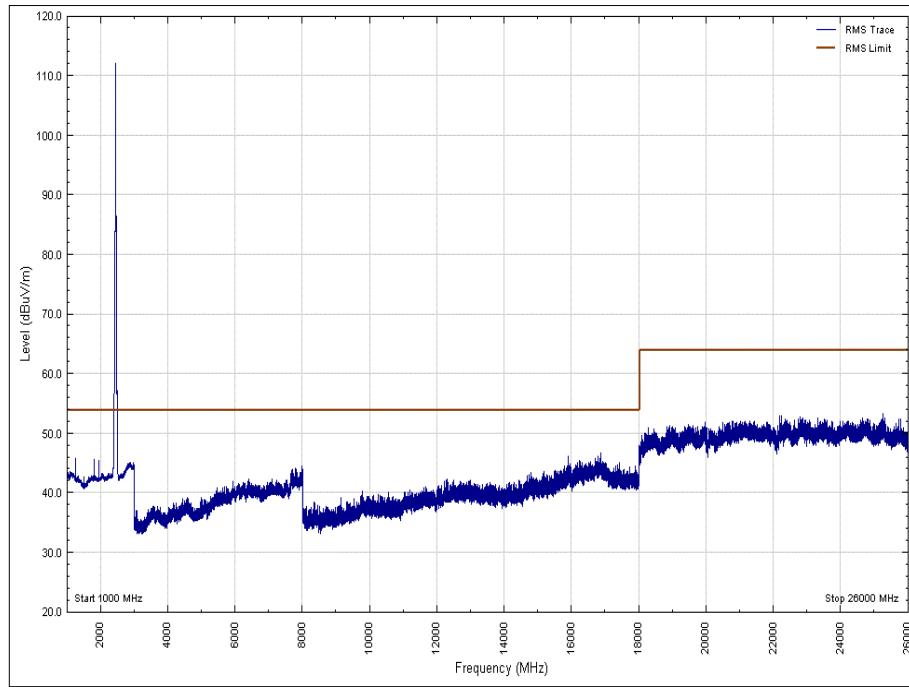
**Figure 97 - 2442 MHz - 1 GHz to 26 GHz
Polarity: Horizontal (Peak)**



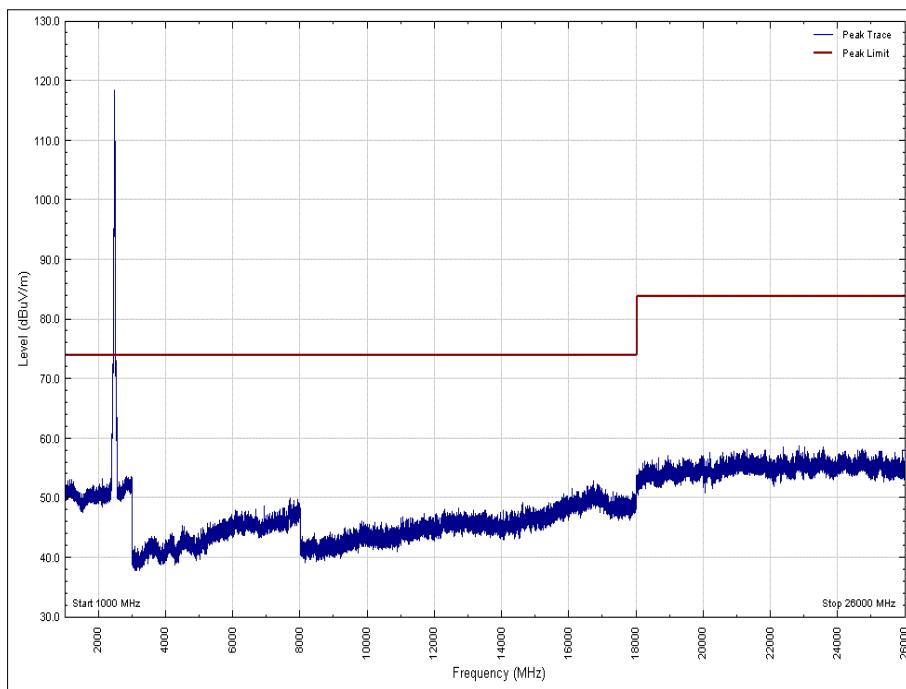
**Figure 98 - 2442 MHz - 1 GHz to 26 GHz
Polarity: Horizontal (Average)**



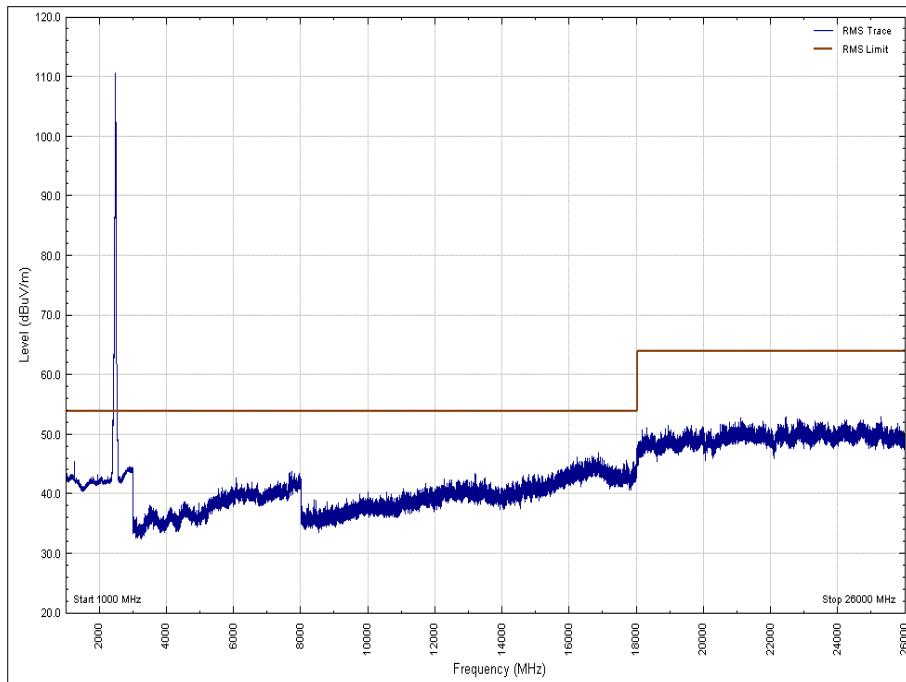
**Figure 99 - 2442 MHz - 1 GHz to 26 GHz
Polarity: Vertical (Peak)**



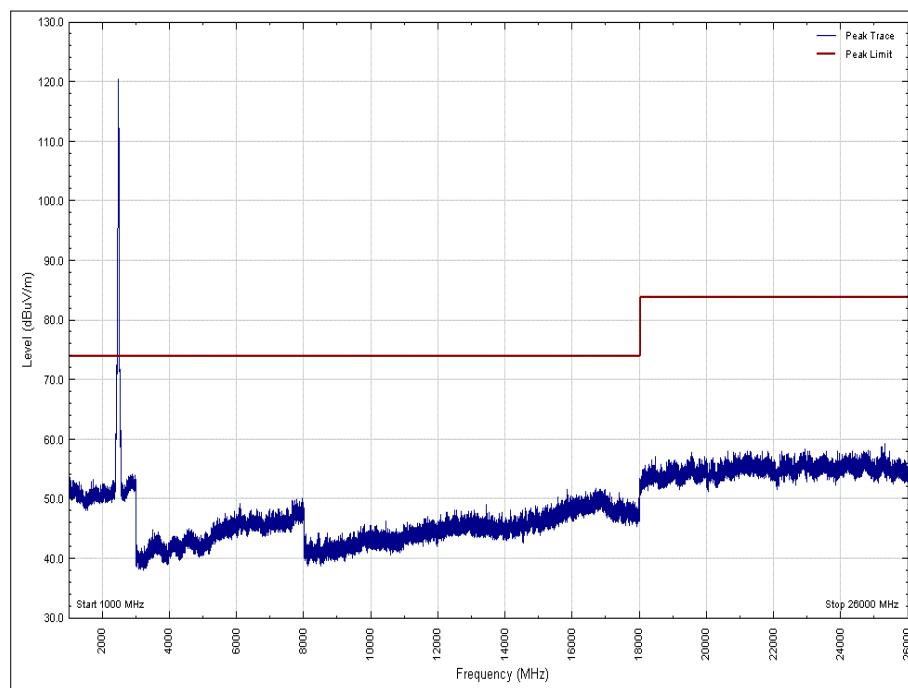
**Figure 100 - 2442 MHz - 1 GHz to 26 GHz
Polarity: Vertical (Average)**



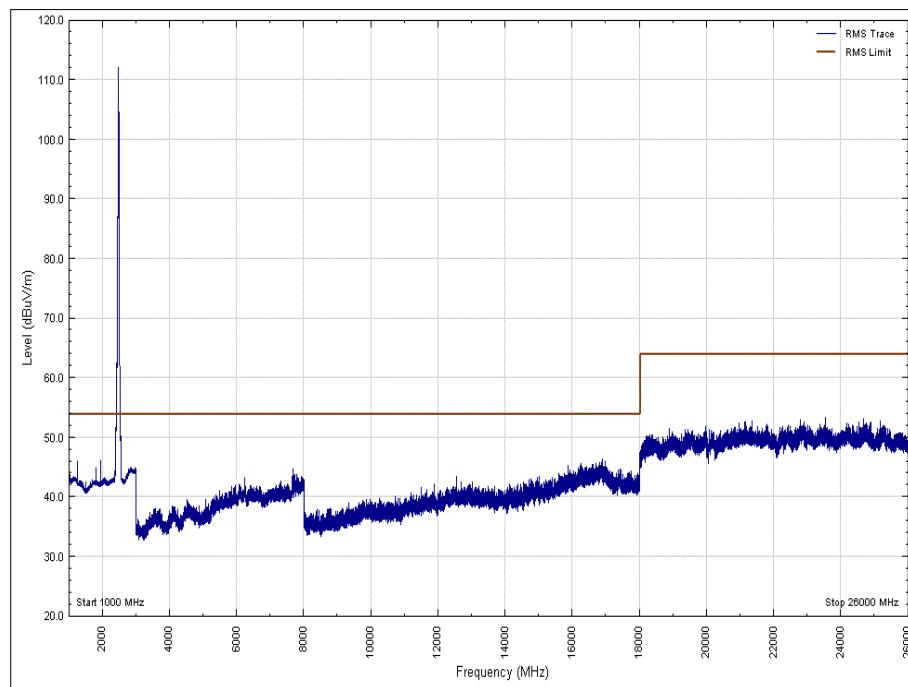
**Figure 101 - 2472 MHz 1 GHz to 26 GHz
Polarity: Horizontal (Peak)**



**Figure 102 - 2472 MHz - 1 GHz to 26 GHz
Polarity: Horizontal (Average)**



**Figure 103 - 2472 MHz 1 GHz to 26 GHz
Polarity: Vertical (Peak)**



**Figure 104 - 2472 MHz - 1 GHz to 26 GHz
Polarity: Vertical (Average)**

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)

Industry Canada 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.

Aux (b SISO)

Frequency (GHz)	Result (μ V/m)		Limit (μ V/m)		Margin (μ V/m)	
	Peak	Average	Peak	Average	Peak	Average
*						

Table 72 – 2412 MHz - 1 GHz to 26 GHz – Radiated

*No emissions were detected within 10 dB of the limit

Frequency (GHz)	Result (dB μ V/m)		Limit (dB μ V/m)		Margin (dB μ V/m)	
	Peak	Average	Peak	Average	Peak	Average
*						

Table 73 – 2442 MHz - 30 MHz to 1 GHz – Radiated

*No emissions were detected within 10 dB of the limit

Frequency (GHz)	Result (μ V/m)		Limit (μ V/m)		Margin (μ V/m)	
	Peak	Average	Peak	Average	Peak	Average
*						

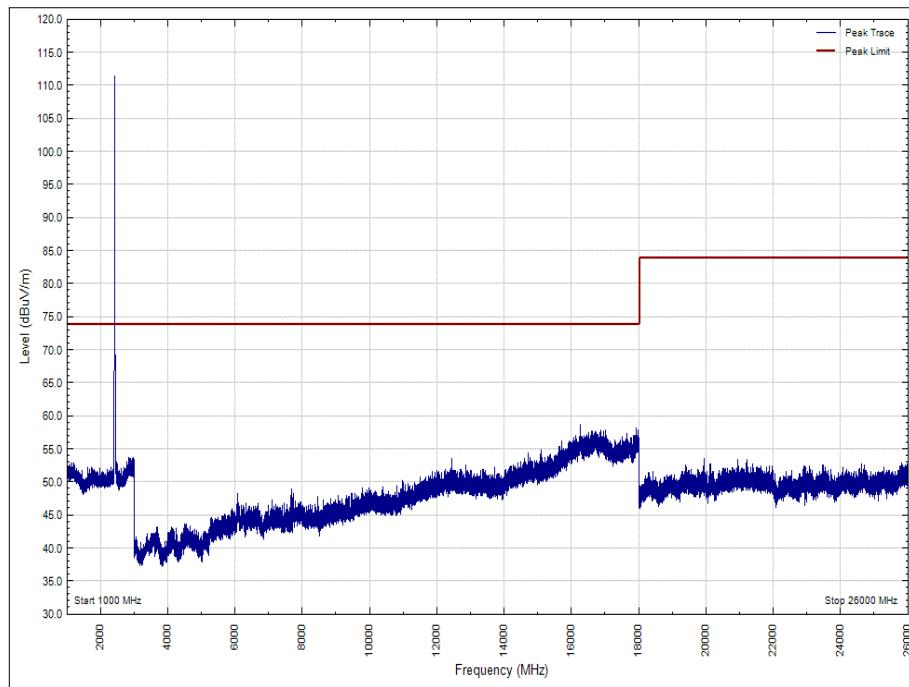
Table 74 – 2442 MHz - 1 GHz to 26 GHz – Radiated

*No emissions were detected within 10 dB of the limit

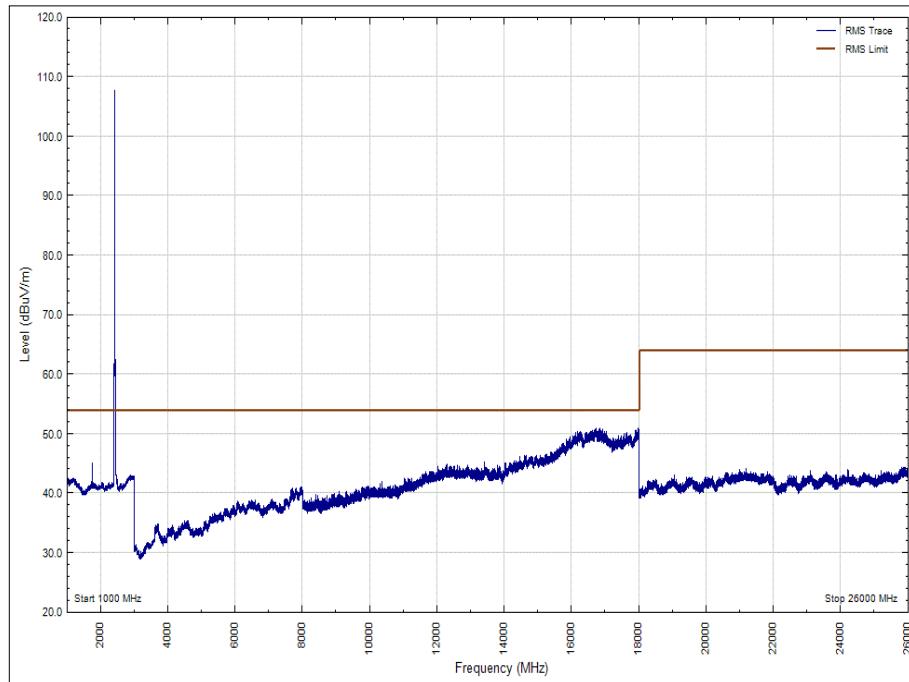
Frequency (GHz)	Result (μ V/m)		Limit (μ V/m)		Margin (μ V/m)	
	Peak	Average	Peak	Average	Peak	Average
*						

Table 75 – 2472 MHz - 1 GHz to 26 GHz – Radiated

*No emissions were detected within 10 dB of the limit



**Figure 105 - 2412 MHz - 1 GHz to 26 GHz (Peak)
Polarity: Horizontal**



**Figure 106 - 2412 MHz - 1 GHz to 26 GHz (Average)
Polarity: Horizontal**

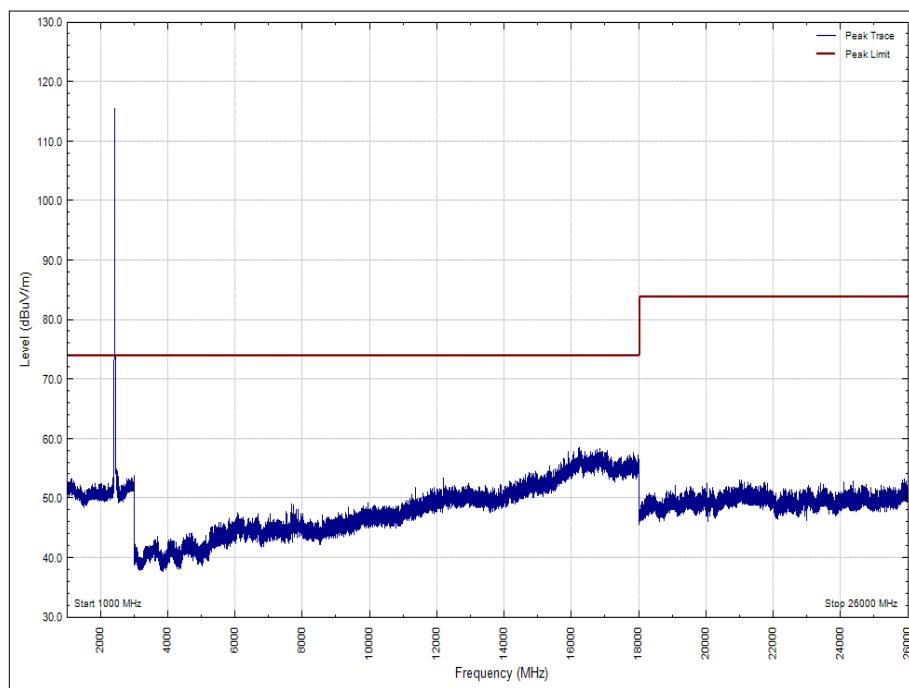


Figure 107 - 2412 MHz - 1 GHz to 26 GHz (Peak)
Polarity: Vertical

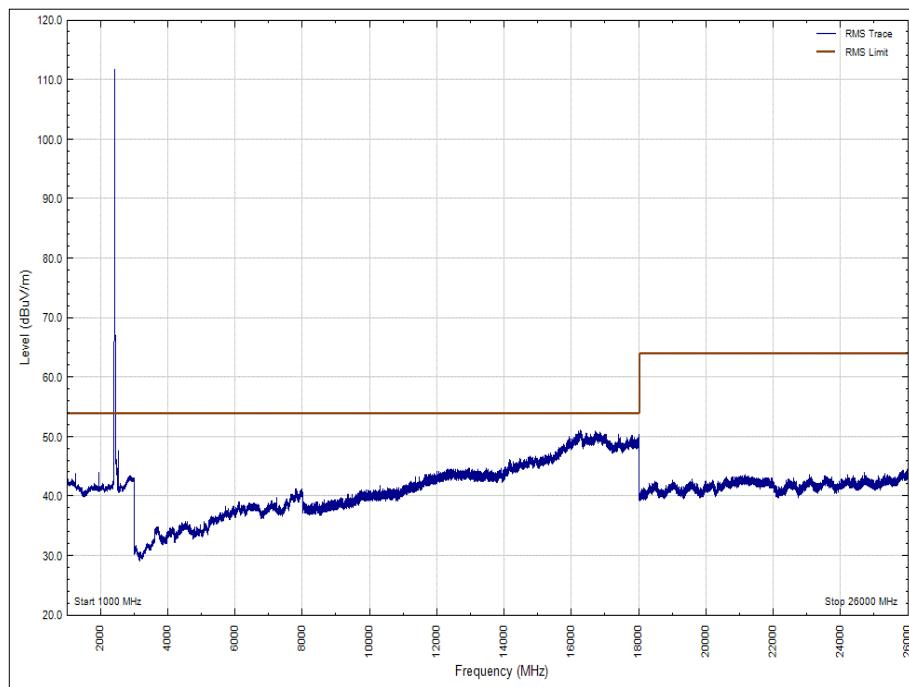
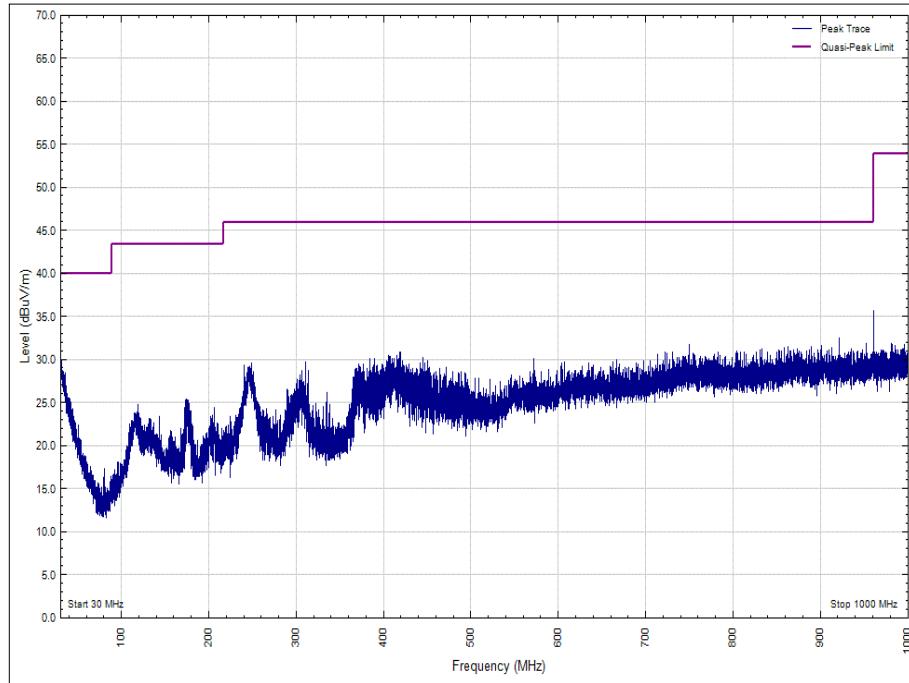
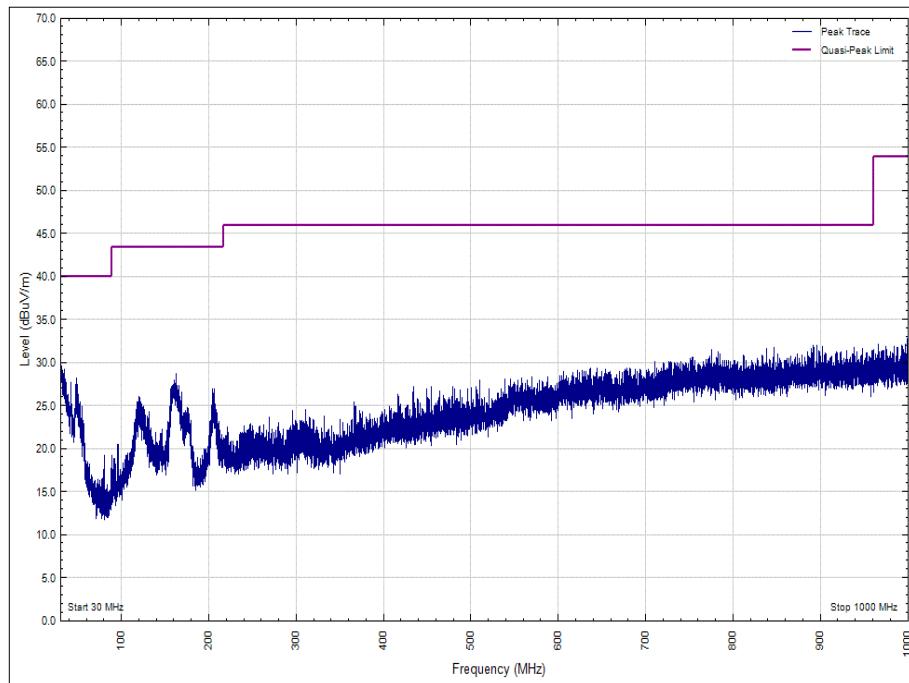


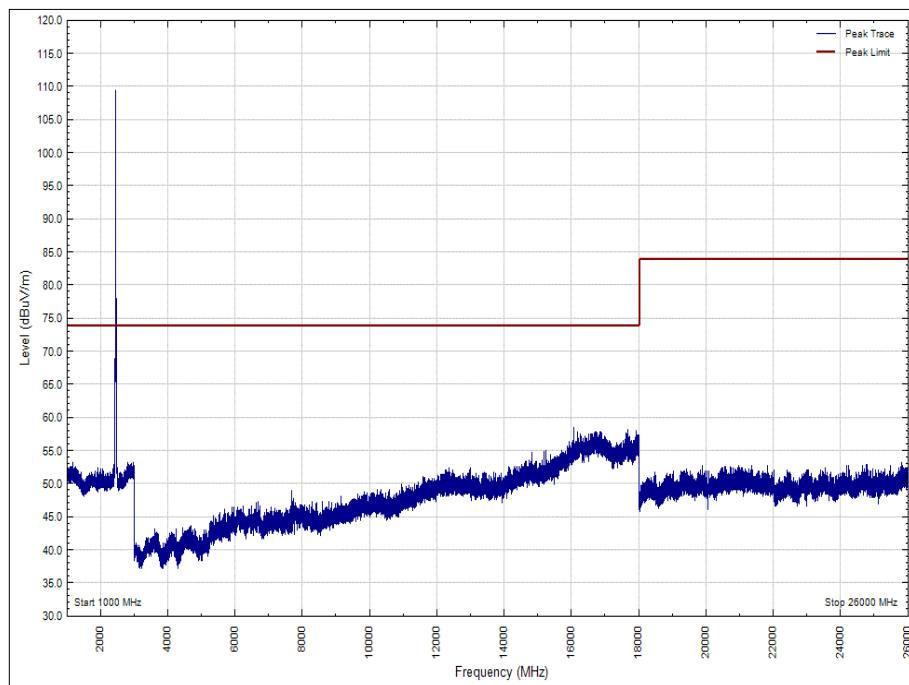
Figure 108 - 2412 MHz - 1 GHz to 26 GHz (Average)
Polarity: Vertical



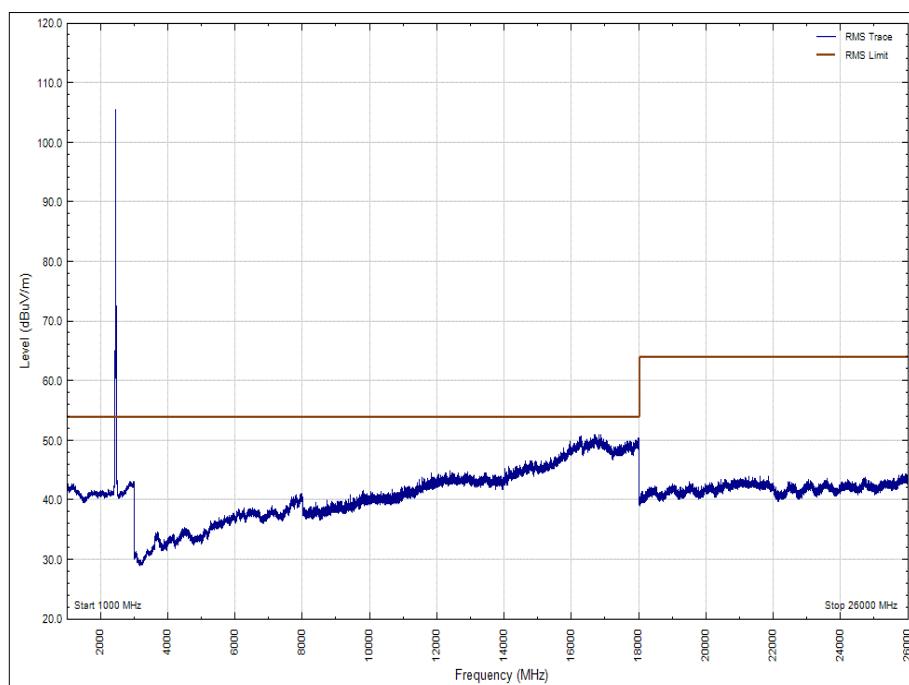
**Figure 109 - 2442 MHz - 30 MHz to 1 GHz
Polarity: Horizontal**



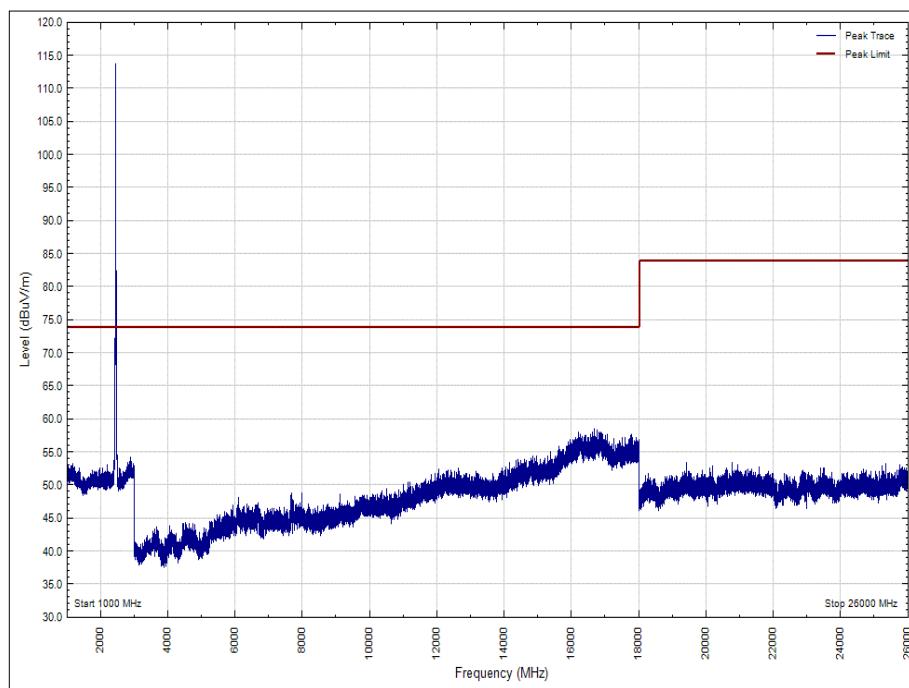
**Figure 110 - 2442 MHz - 30 MHz to 1 GHz
Polarity: Vertical**



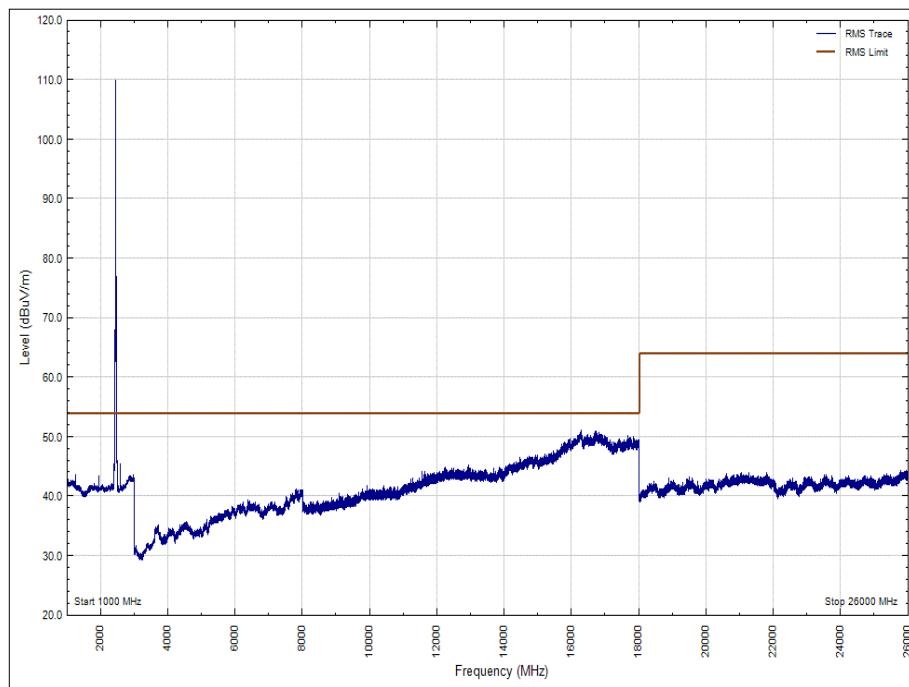
**Figure 111 - 2442 MHz - 1 GHz to 26 GHz
Polarity: Horizontal (Peak)**



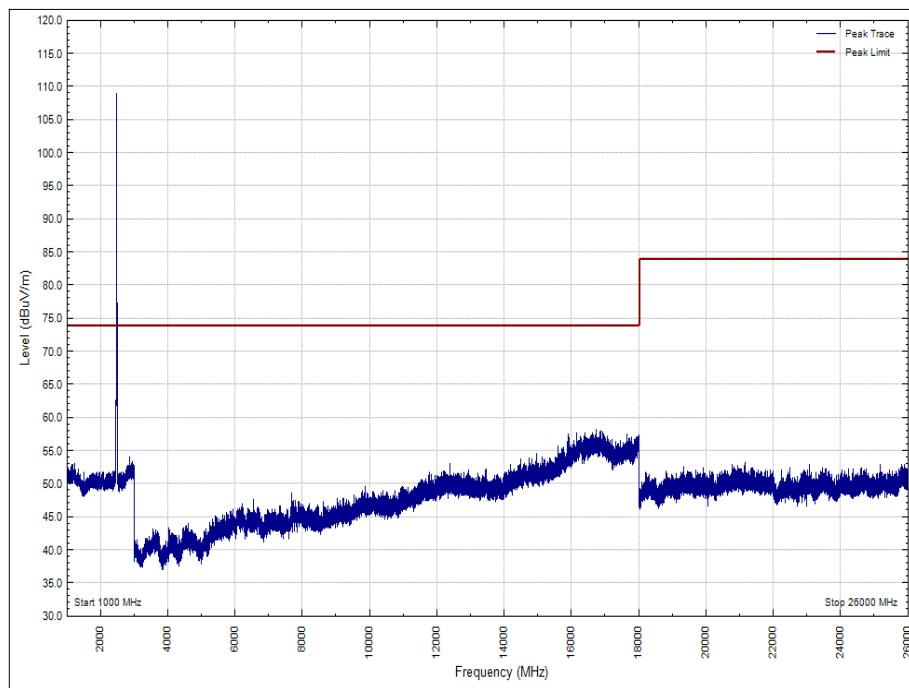
**Figure 112 - 2442 MHz - 1 GHz to 26 GHz
Polarity: Horizontal (Average)**



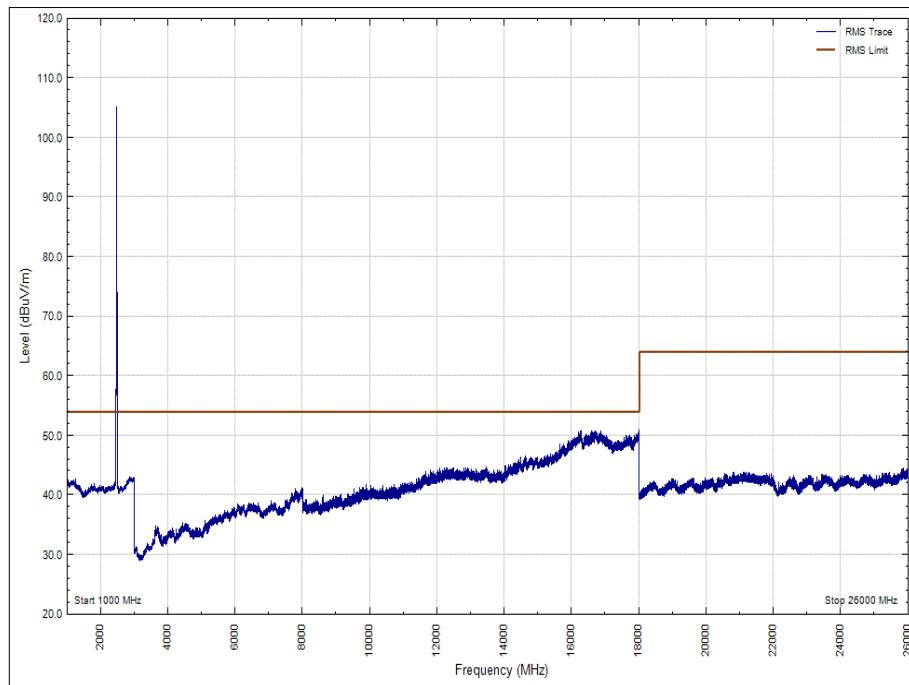
**Figure 113 - 2442 MHz - 1 GHz to 26 GHz
Polarity: Vertical (Peak)**



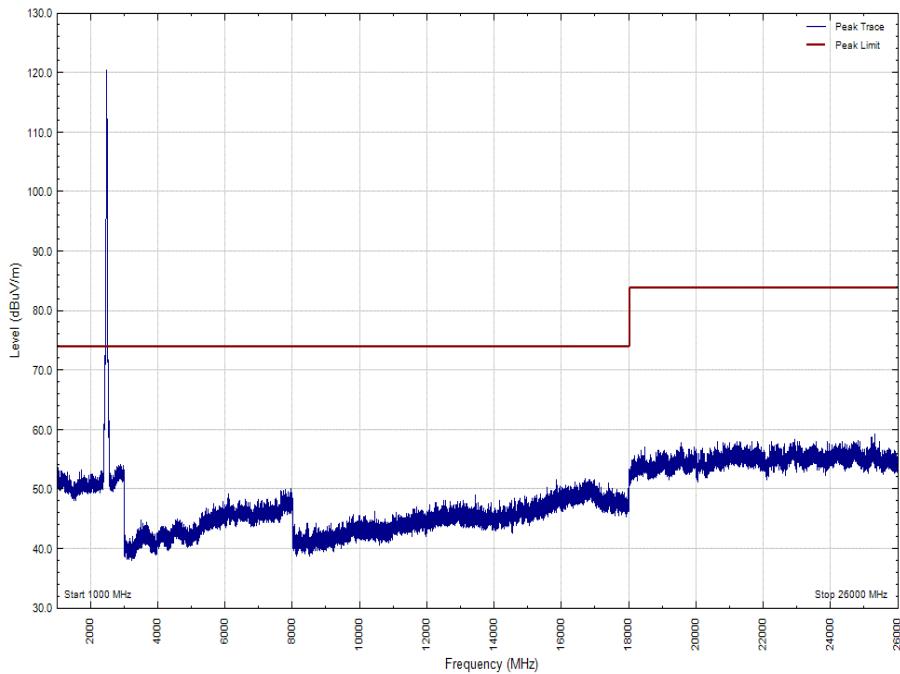
**Figure 114 - 2442 MHz - 1 GHz to 26 GHz
Polarity: Vertical (Average)**



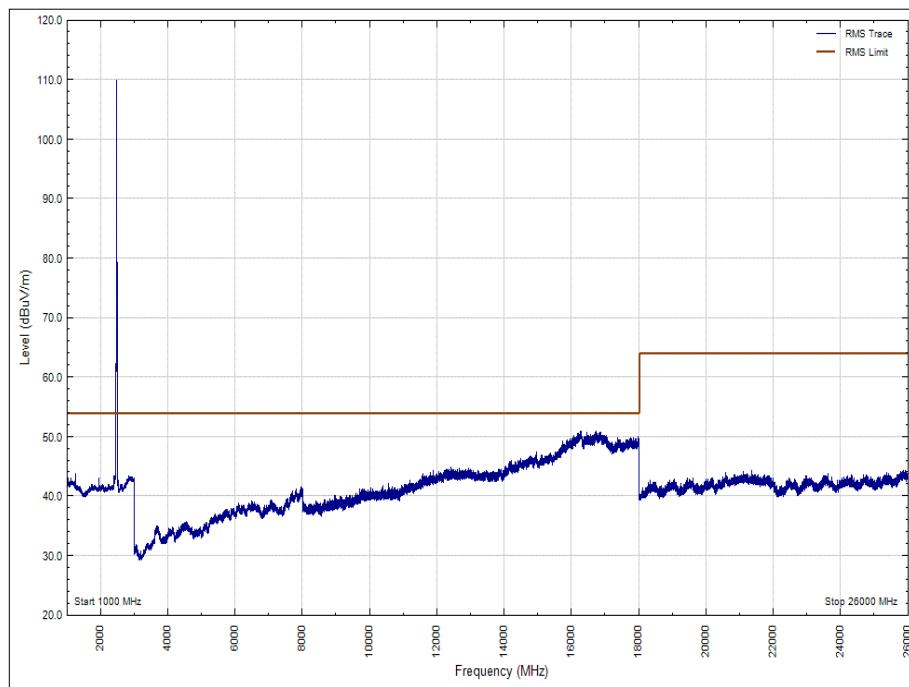
**Figure 115 - 2472 MHz - 1 GHz to 26 GHz
Polarity: Horizontal (Peak)**



**Figure 116 - 2472 MHz - 1 GHz to 26 GHz
Polarity: Horizontal (Average)**



**Figure 117 - 2472 MHz - 1 GHz to 26 GHz
Polarity: Vertical (Peak)**



**Figure 118 - 2472 MHz - 1 GHz to 26 GHz
Polarity: Vertical (Average)**



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)

Industry Canada 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.

2.6.8 Test Location and Test Equipment Used

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
10dB/1W SMA Attenuator dc -18GHz	Sealectro	60-674-1010-89	3	12	31-Aug-2018
Multimeter	White Gold	WG022	190	12	24-Nov-2018
Antenna 18-40GHz (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	24	2-May-2020
Antenna (Bilog)	Schaffner	CBL6143	287	24	15-May-2020
Dual Power Supply Unit	Thurlby	PL320	288	-	TU
Filter (High Pass)	Lorch	SHP7-7000-SR	566	12	10-May-2019
Pre-Amplifier	Phase One	PS04-0086	1533	12	12-Jan-2019
18GHz - 40GHz Pre-Amplifier	Phase One	PSO4-0087	1534	12	2-Feb-2019
Screened Room (5)	Rainford	Rainford	1545	36	23-Jan-2021
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	8-Aug-2019
Cable (N-N, 8m)	Rhophase	NPS-2302-8000-NPS	3248	-	O/P Mon
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Nov-2018
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	2-Oct-2018
1 Metre SMA Cable	Rhophase	3PS-1801A-1000-3PS	4099	12	19-Sep-2018
1501A 4.0M Km Km Cable	Rhophase	KPS-1501A-4000-KPS	4301	12	19-Feb-2019
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	18-Oct-2018
Cable (Rx, Nm-Nm, 7m)	Scott Cables	SLU18-NMNM-07.00M	4498	-	O/P Mon
Cable (Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4526	6	31-Aug-2018
Cable (Rx, SMAm-SMAm0.5m)	Scott Cables	SLSLL18-SMSM-00.50M	4528	6	15-Aug-2018
EMI Receiver	Keysight Technologies	N9038A MXE	4628	12	04-July-2019
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	1-Mar-2019
Mast Controller	Maturo GmbH	NCD	4810	-	TU
Tilt Antenna Mast	Maturo GmbH	TAM 4.0-P	4811	-	TU
9m N type RF cable	Rosenberger	2303-0 9.0m PNm PNm	4827	6	4-Jan-2019
Double Ridge Broadband Horn Antenna	Schwarzbeck	BBHA 9120 B	4848	12	12-Feb-2019

4dB Attenuator	Pasternack	PE7047-4	4935	12	28-Nov-2018
Hygrometer	Rotronic	HP21	4989	12	26-Apr-2019
Cable (26.5GHz)	Rosenberger	LU7-133-5000	5019	-	O/P Mon
Cable (40GHz)	Rosenberger	LU1-001-2000	5020	-	O/P Mon

Table 76

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
Maximum Conducted Output Power	± 3.2 dB
Power Spectral Density	± 3.2 dB
Emission Bandwidth	± 358.561 kHz
Authorised Band Edges	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB
Restricted Band Edges	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB
Spurious Radiated Emissions	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB

Table 77