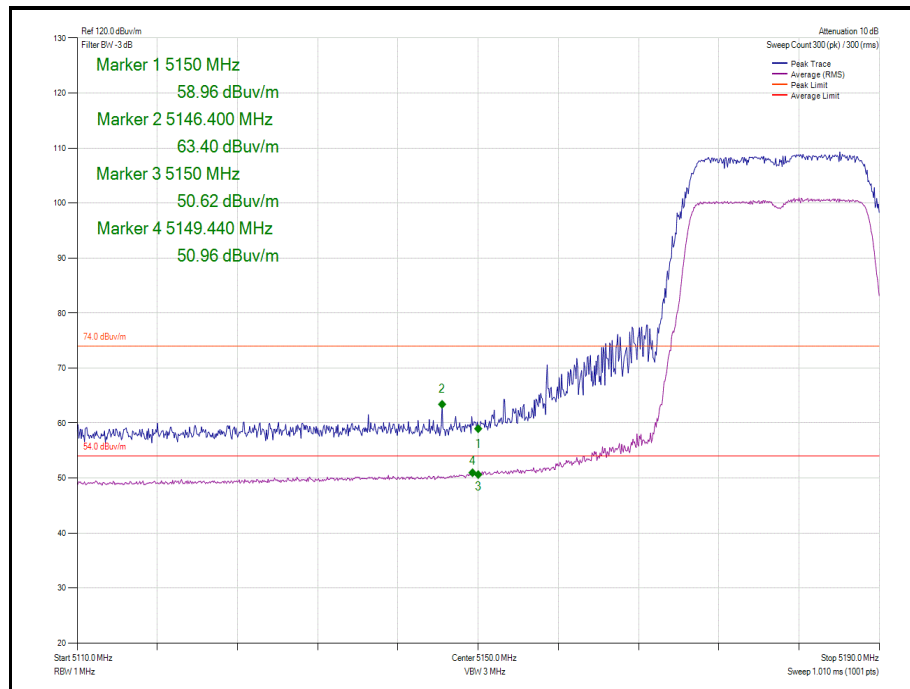
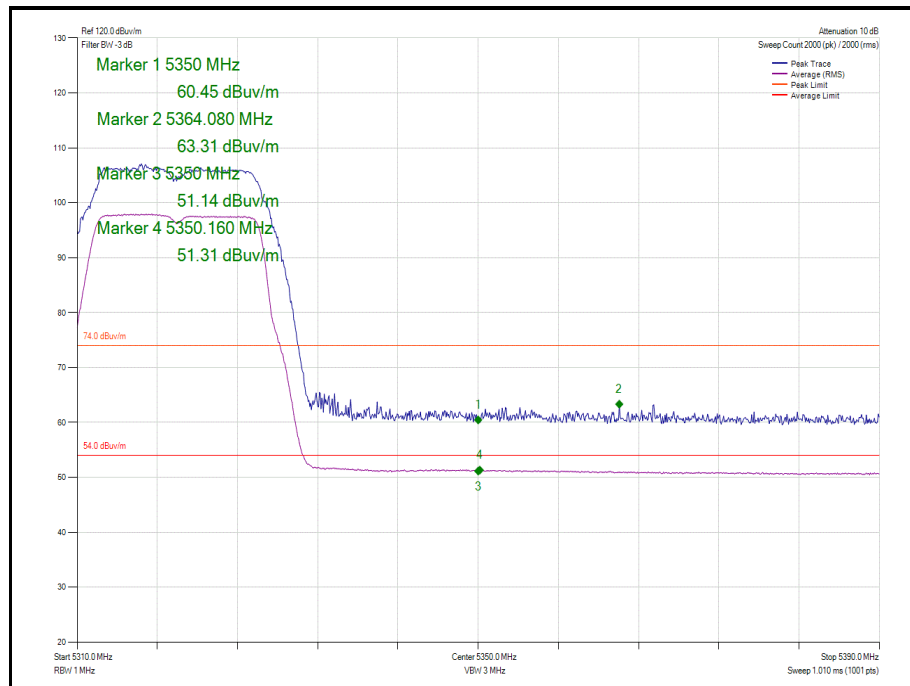




**Figure 844 - 802.11n HT20 Core Aux - 5180 MHz
Band Edge Frequency 5150 MHz**



**Figure 845 - 802.11a Core Aux - 5320 MHz
Band Edge Frequency 5350 MHz**

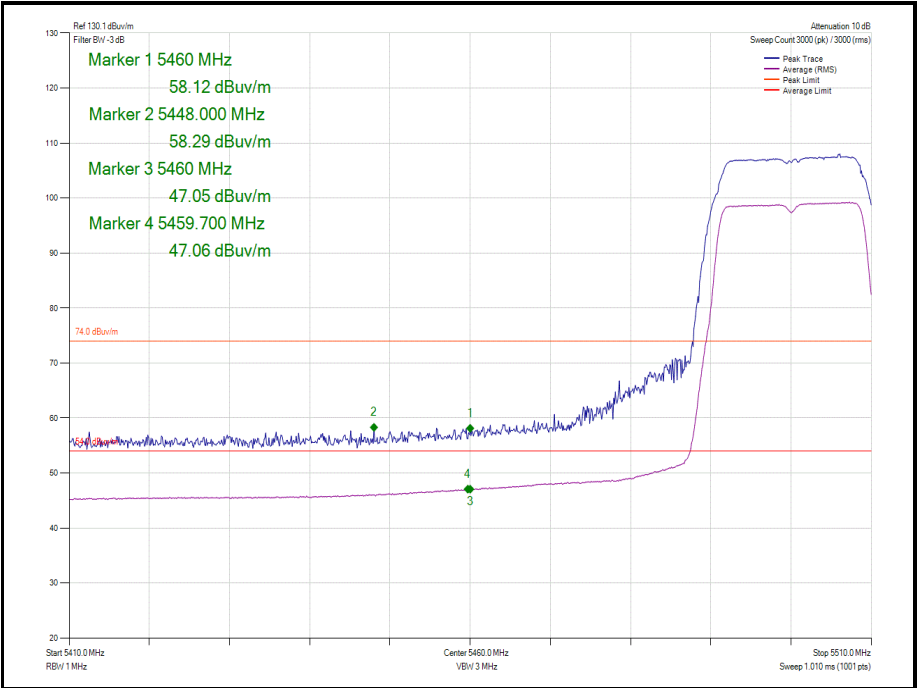


Figure 846 - 802.11n HT20 Core Aux - 5320 MHz
Band Edge Frequency 5350 MHz

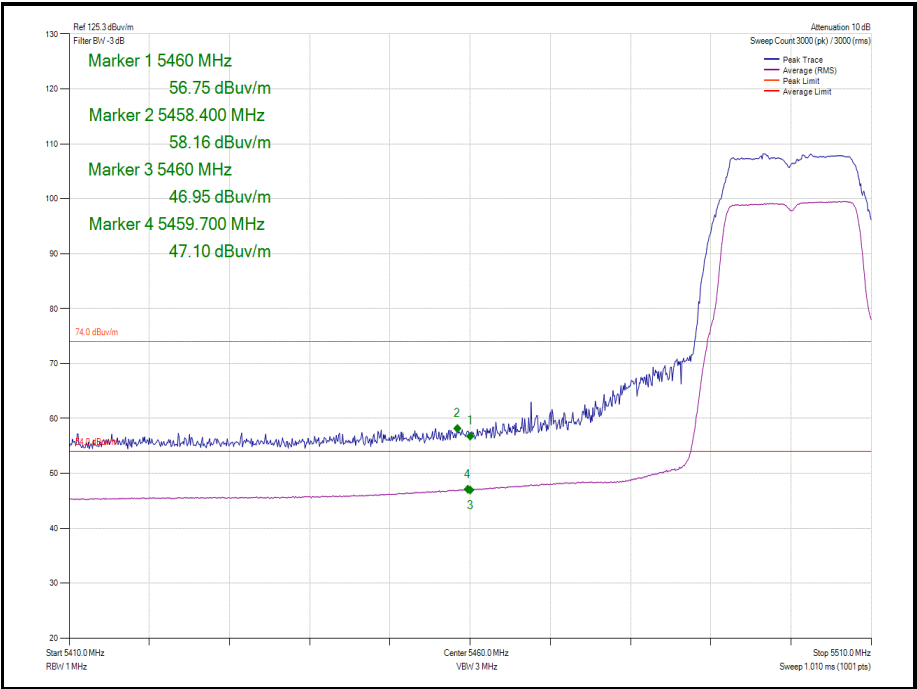


Figure 847 - 802.11a Core Aux - 5500 MHz
Band Edge Frequency 5460 MHz

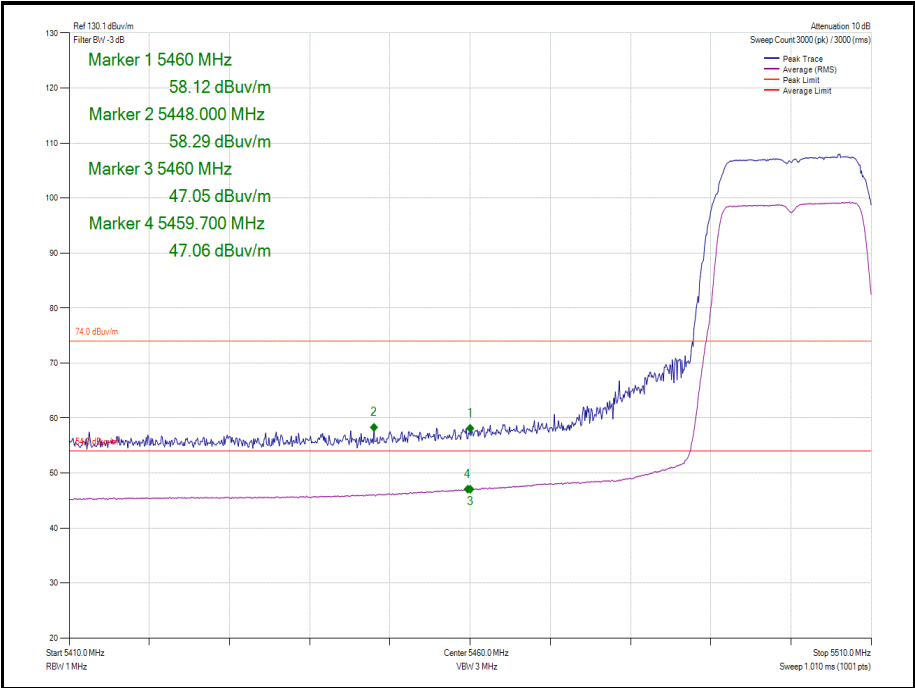


Figure 848 - 802.11n HT20 Core Aux - 5500 MHz
Band Edge Frequency 5460 MHz



Main - 20 MHz Bandwidth (2TX MIMO)

Mode	Data Rate	Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
802.11n HT20 CDD Cores 1-2	MCS0	5180	5150	67.39	51.56
802.11n HT20 SDM Cores 1-2	MCS0	5180	5150	67.3	51.66
802.11n HT20 CDD Cores 1-2	MCS0	5320	5350	65.22	51.41
802.11n HT20 SDM Cores 1-2	MCS0	5320	5350	66.14	51.23
802.11n HT20 CDD Cores 1-2	MCS0	5500	5460	58.32	46.41
802.11n HT20 SDM Cores 1-2	MCS0	5500	5460	58.14	46.61

Table 421

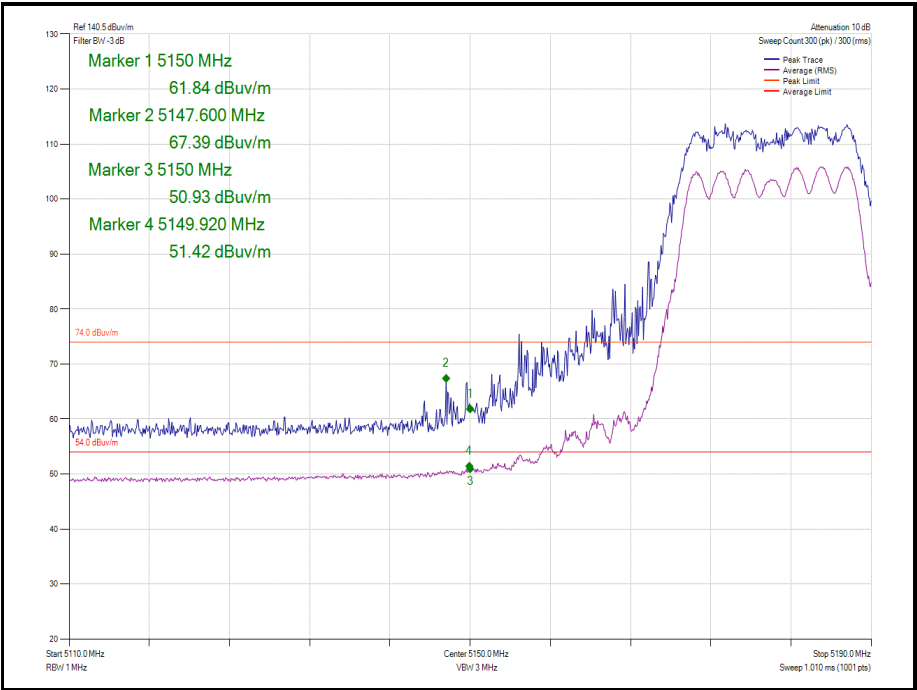
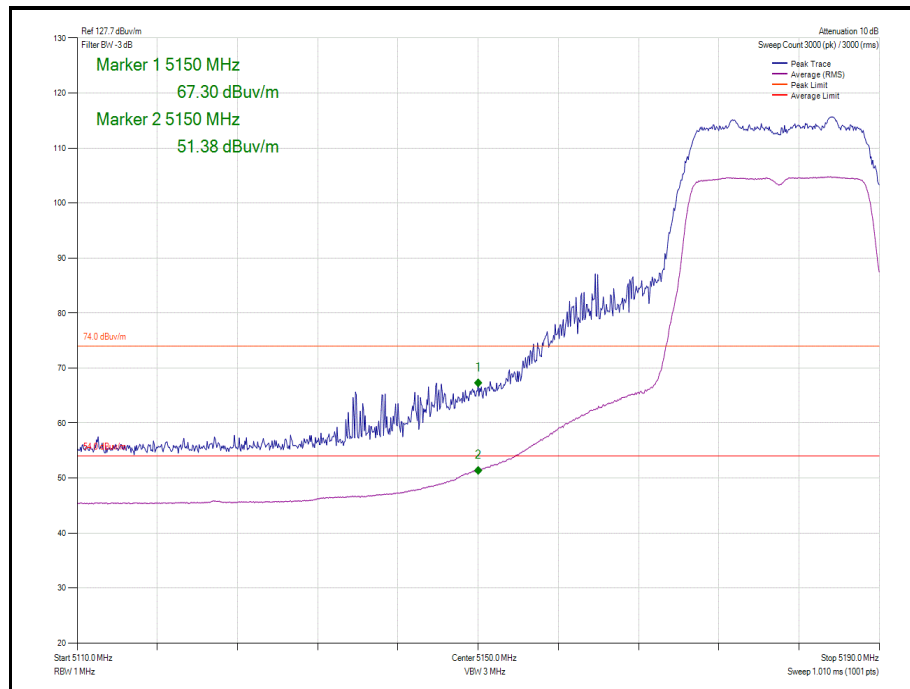
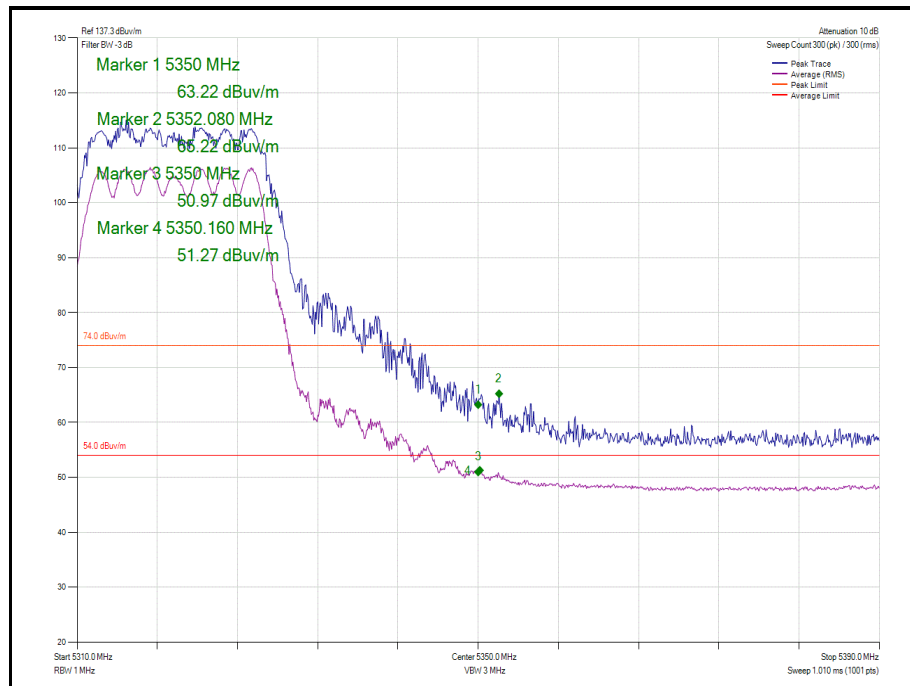


Figure 849 - 802.11n HT20 CDD Cores 1-2 - 5180 MHz
Band Edge Frequency 5150 MHz



**Figure 850 - 802.11n HT20 SDM Cores 1-2 - 5180 MHz
Band Edge Frequency 5150 MHz**



**Figure 851 - 802.11n HT20 CDD Cores 1-2 - 5320 MHz
Band Edge Frequency 5350 MHz**

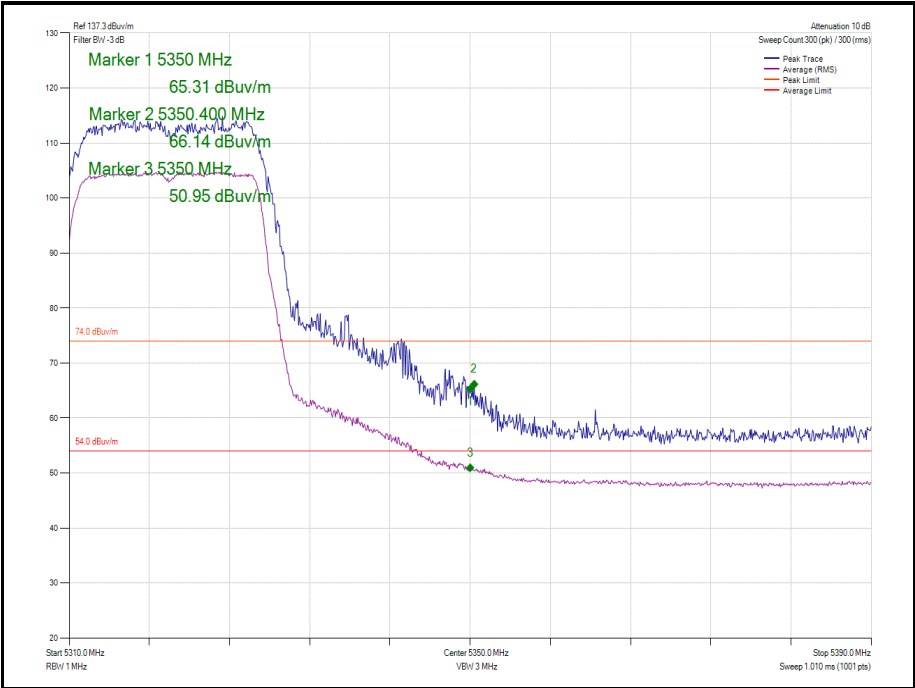


Figure 852 - 802.11n HT20 SDM Cores 1-2 - 5320 MHz
Band Edge Frequency 5350 MHz

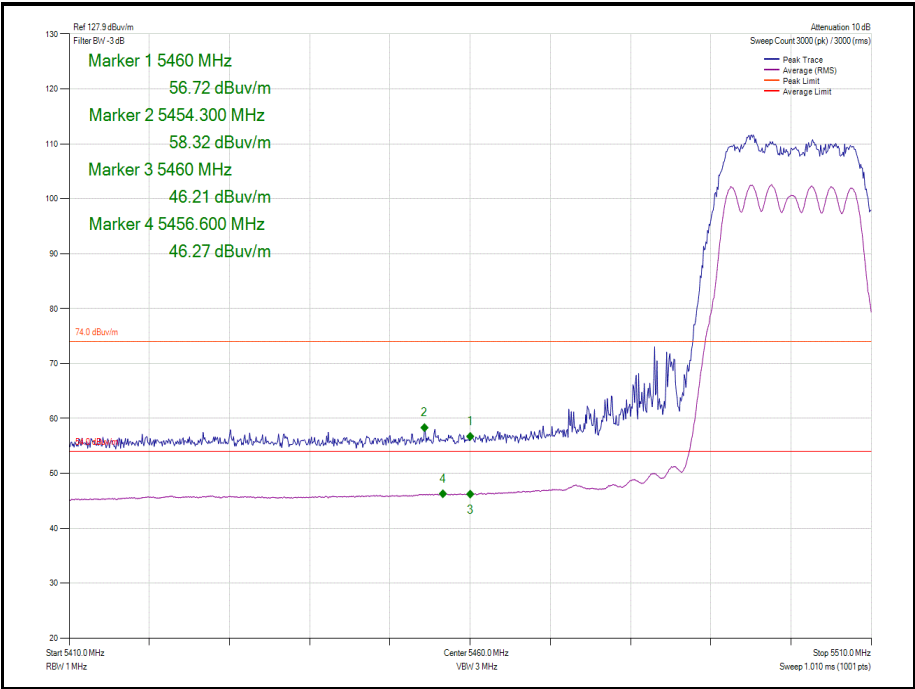


Figure 853 - 802.11n HT20 CDD Cores 1-2 - 5500 MHz
Band Edge Frequency 5460 MHz

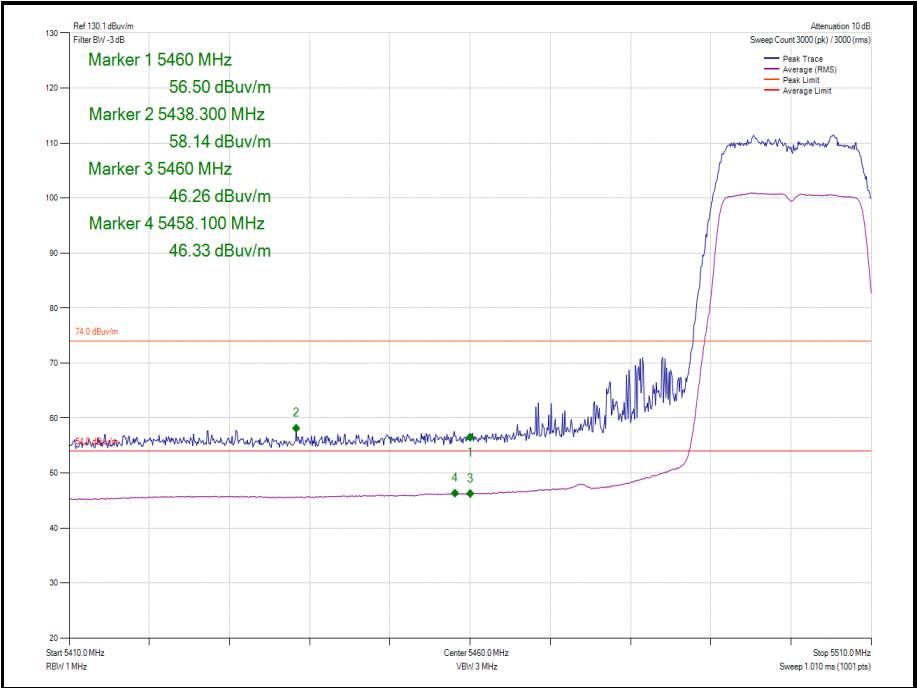


Figure 854 - 802.11n HT20 SDM Cores 1-2 - 5500 MHz
Band Edge Frequency 5460 MHz



Main - 20 MHz Bandwidth (3TX MIMO)

Mode	Data Rate	Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
802.11n HT20 CDD Cores 0-1-2	MCS0	5180	5150	64.3	50.77
802.11n HT20 SDM Cores 0-1-2	MCS0	5180	5150	67.59	51.2
802.11n HT20 CDD Cores 0-1-2	MCS0	5320	5350	69.85	51.5
802.11n HT20 SDM Cores 0-1-2	MCS0	5320	5350	63.39	51.04
802.11n HT20 CDD Cores 0-1-2	MCS0	5500	5460	58.82	47.09
802.11n HT20 SDM Cores 0-1-2	MCS0	5500	5460	58.65	46.88

Table 422

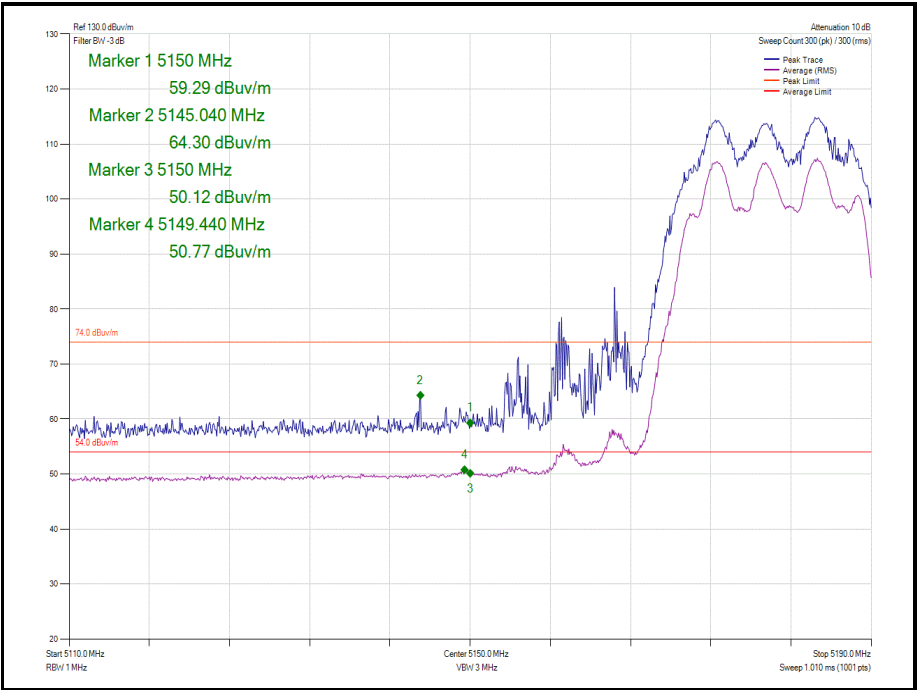
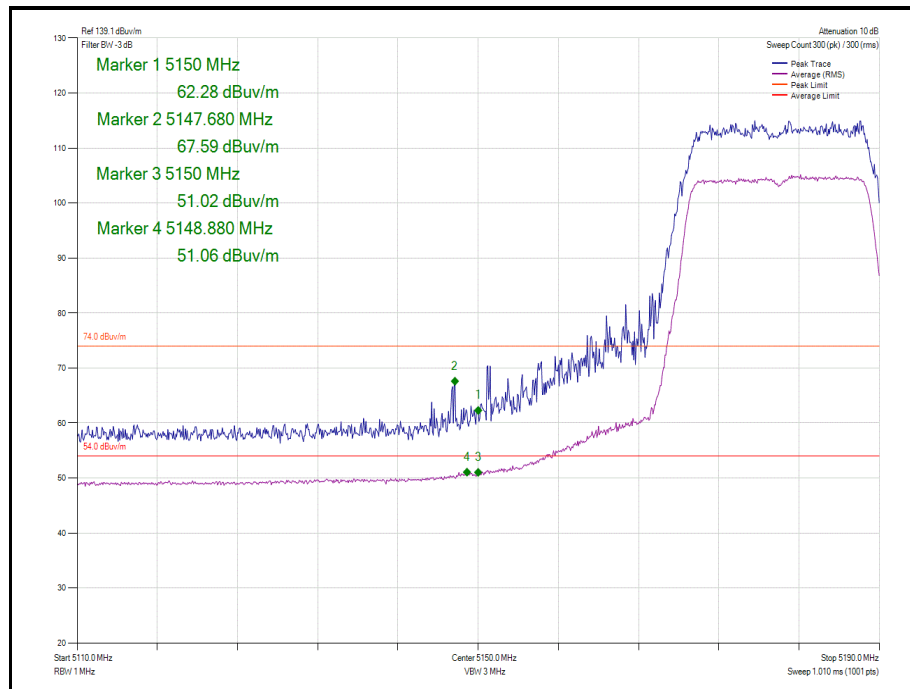
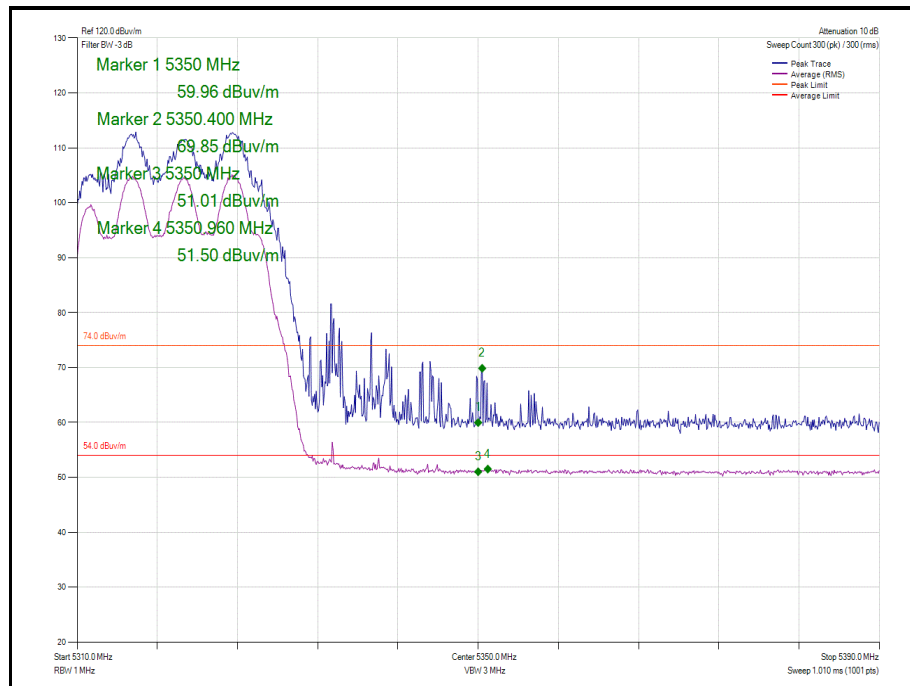


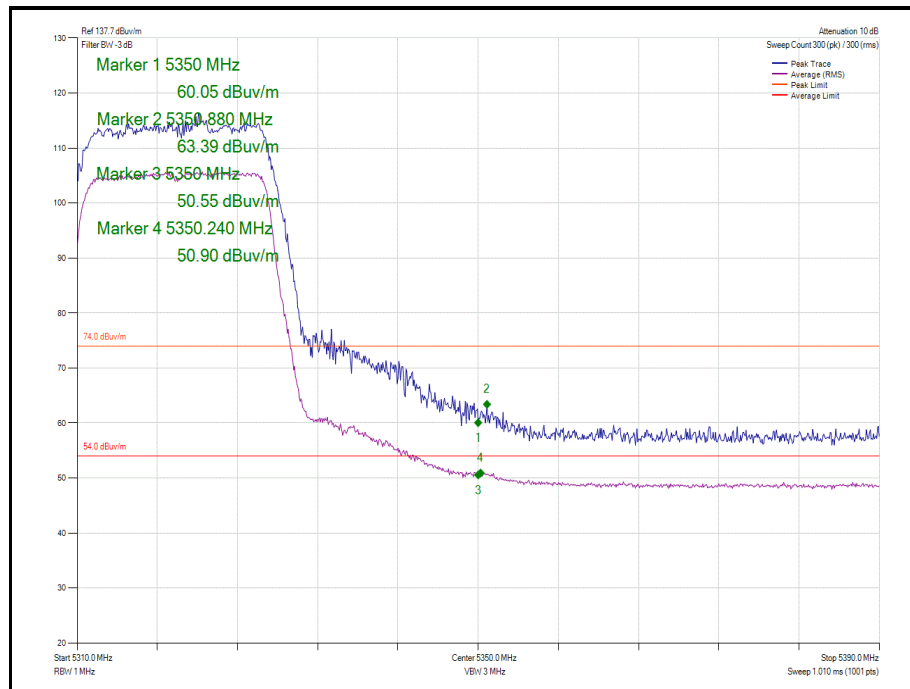
Figure 855 - 802.11n HT20 CDD Cores 0-1-2 - 5180 MHz
Band Edge Frequency 5150 MHz



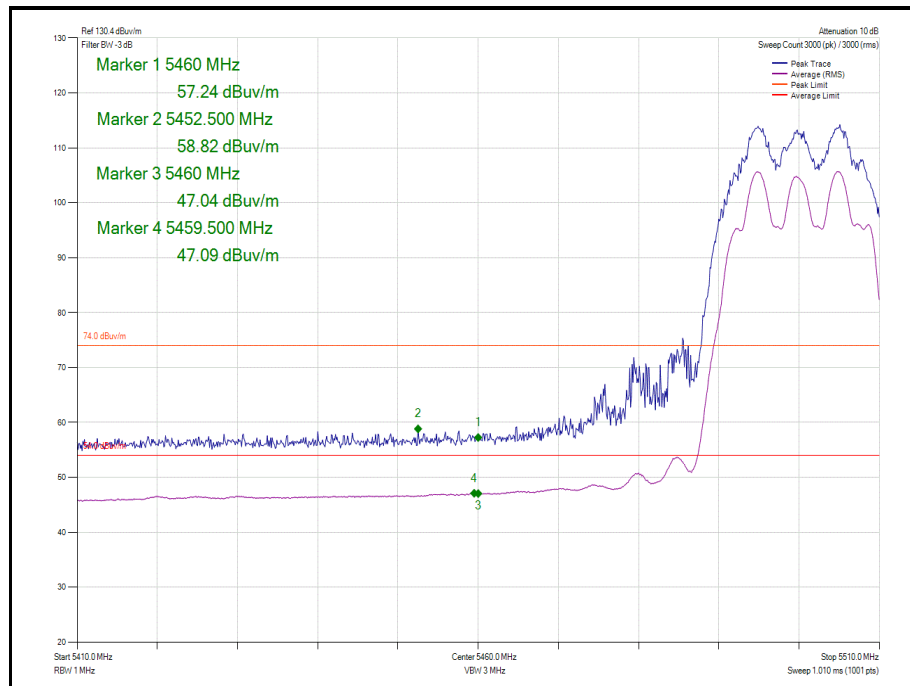
**Figure 856 - 802.11n HT20 SDM Cores 0-1-2 - 5180 MHz
Band Edge Frequency 5150 MHz**



**Figure 857 - 802.11n HT20 CDD Cores 0-1-2 - 5320 MHz
Band Edge Frequency 5350 MHz**



**Figure 858 - 802.11n HT20 SDM Cores 0-1-2 - 5320 MHz
Band Edge Frequency 5350 MHz**



**Figure 859 - 802.11n HT20 CDD Cores 0-1-2 - 5500 MHz
Band Edge Frequency 5460 MHz**

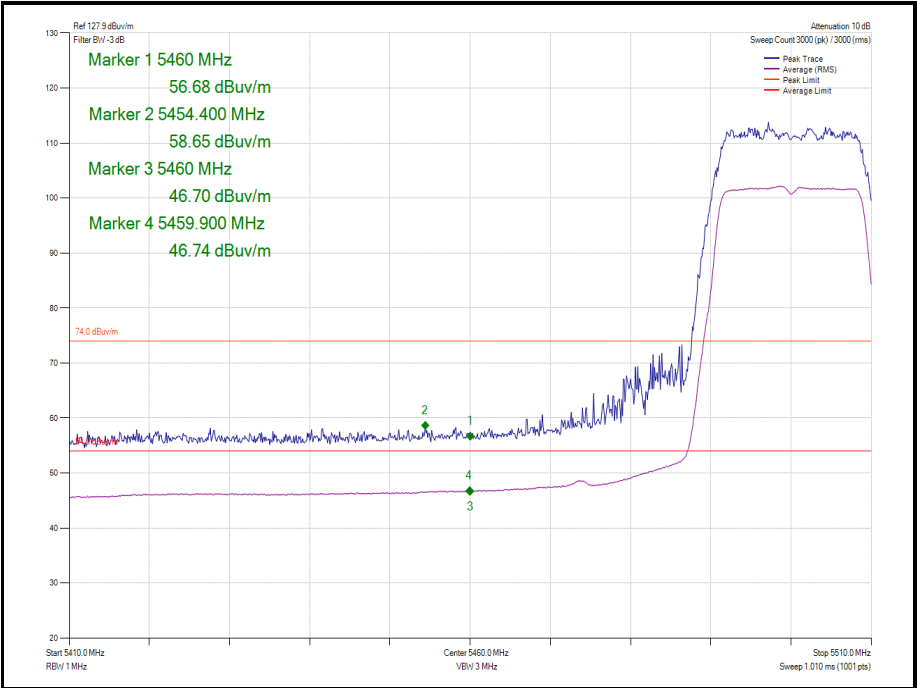


Figure 860 - 802.11n HT20 SDM Cores 0-1-2 - 5500 MHz
Band Edge Frequency 5460 MHz



Main - 40 MHz Bandwidth (SISO)

Mode	Data Rate	Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
802.11n HT40 Core 1	MCS0	5190	5150	69.48	49.77
802.11n HT40 Core 1	MCS0	5310	5350	62.96	47.01
802.11n HT40 Core 1	MCS0	5510	5460	56.76	45.37

Table 423

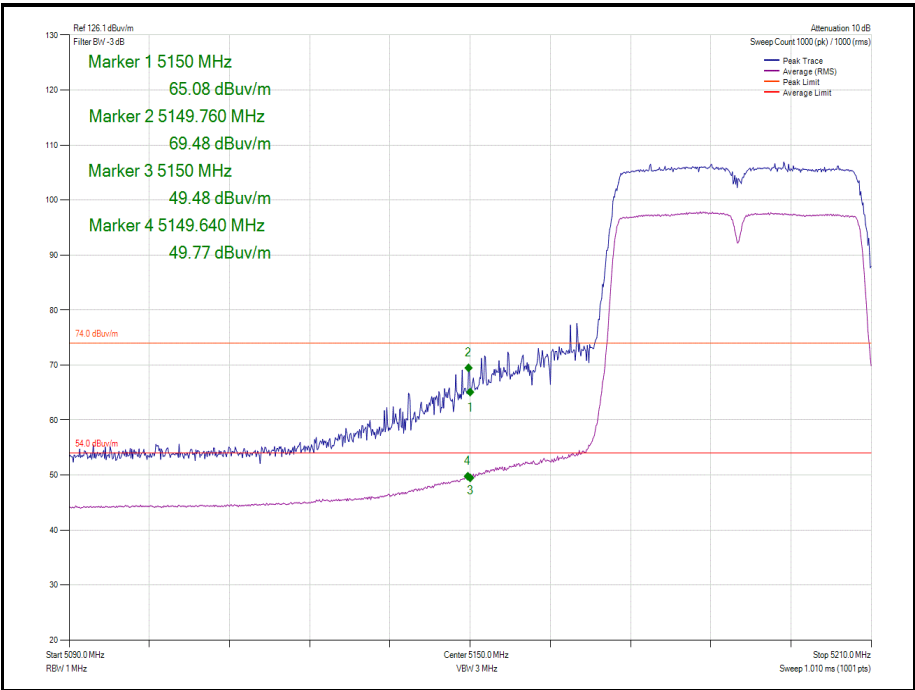
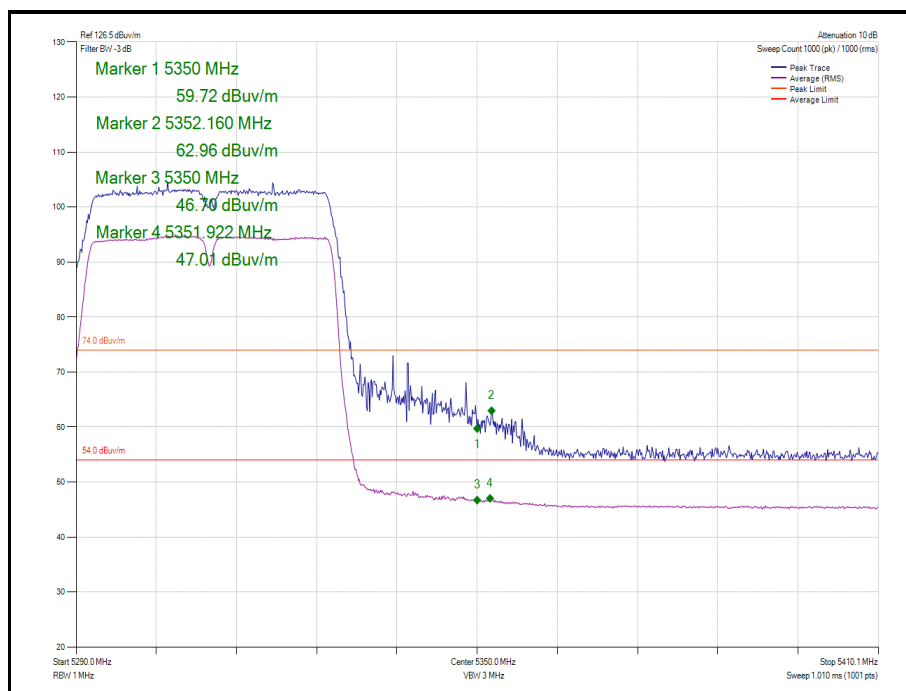
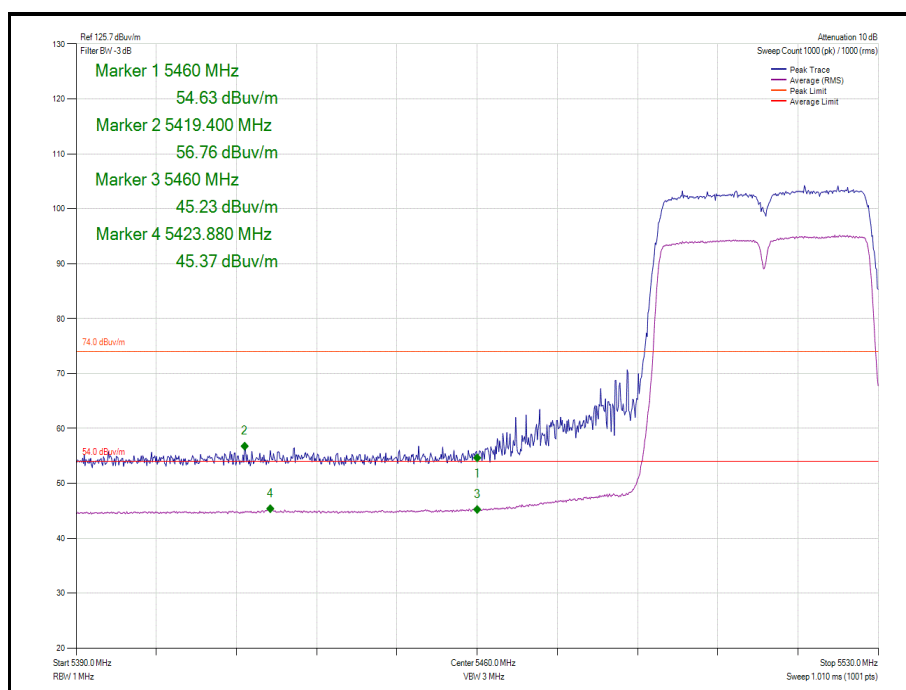


Figure 861 - 802.11n HT40 Core 1 - 5190 MHz
Band Edge Frequency 5150 MHz



**Figure 862 - 802.11n HT40 Core 1 - 5310 MHz
Band Edge Frequency 5350 MHz**



**Figure 863 - 802.11n HT40 Core 1 - 5510 MHz
Band Edge Frequency 5460 MHz**



Aux - 40 MHz Bandwidth

Mode	Data Rate	Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
802.11n HT40 Core Aux	MCS0	5190	5150	66.85	50.82
802.11n HT40 Core Aux	MCS0	5310	5350	65.66	51.5
802.11n HT40 Core Aux	MCS0	5510	5460	57.2	46.26

Table 424

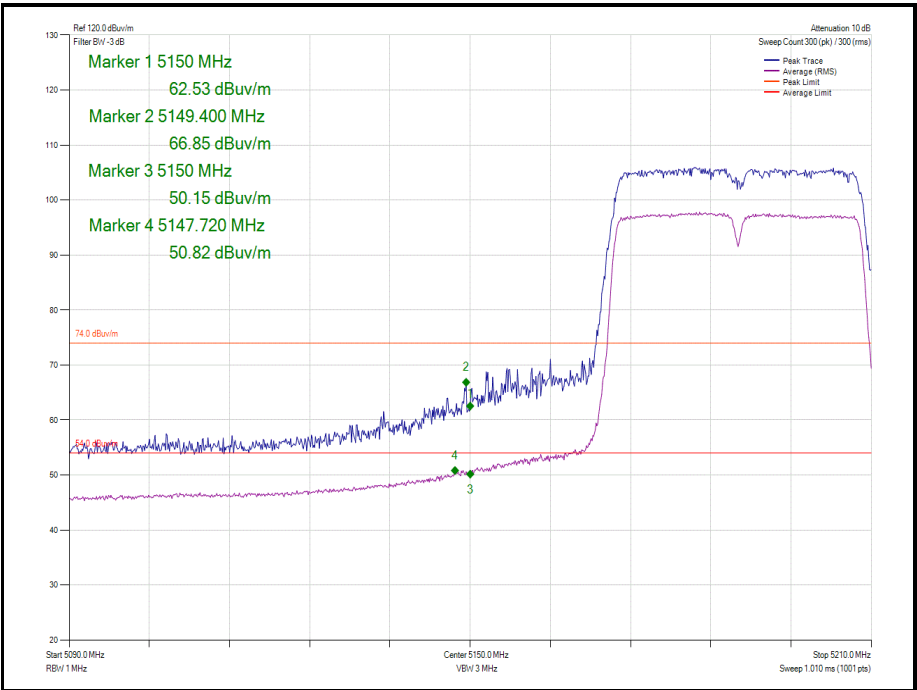


Figure 864 - 802.11n HT40 Core Aux - 5190 MHz
Band Edge Frequency 5150 MHz

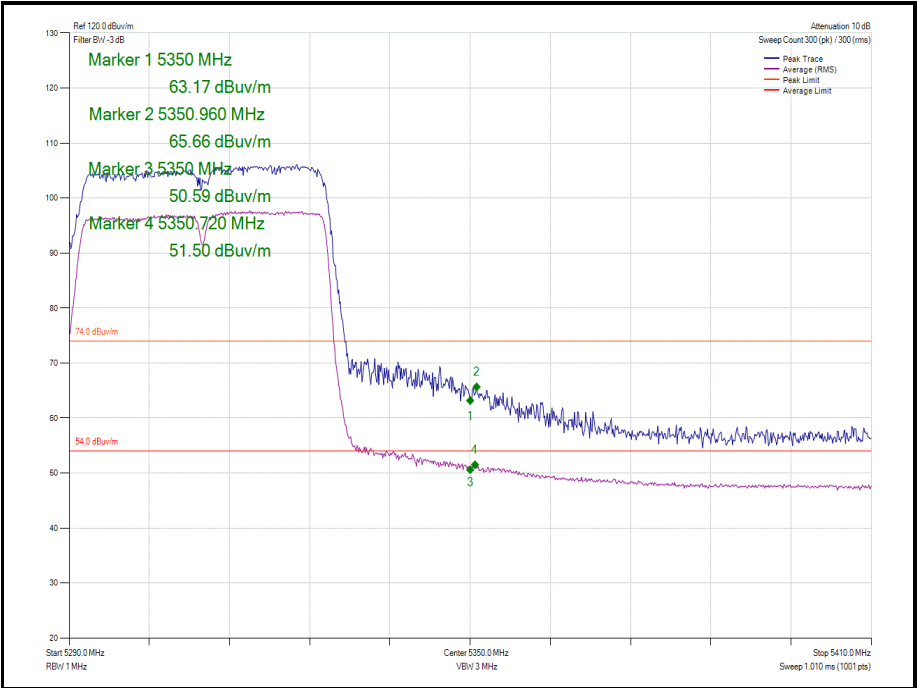


Figure 865 - 802.11n HT40 Core Aux - 5310 MHz
Band Edge Frequency 5350 MHz

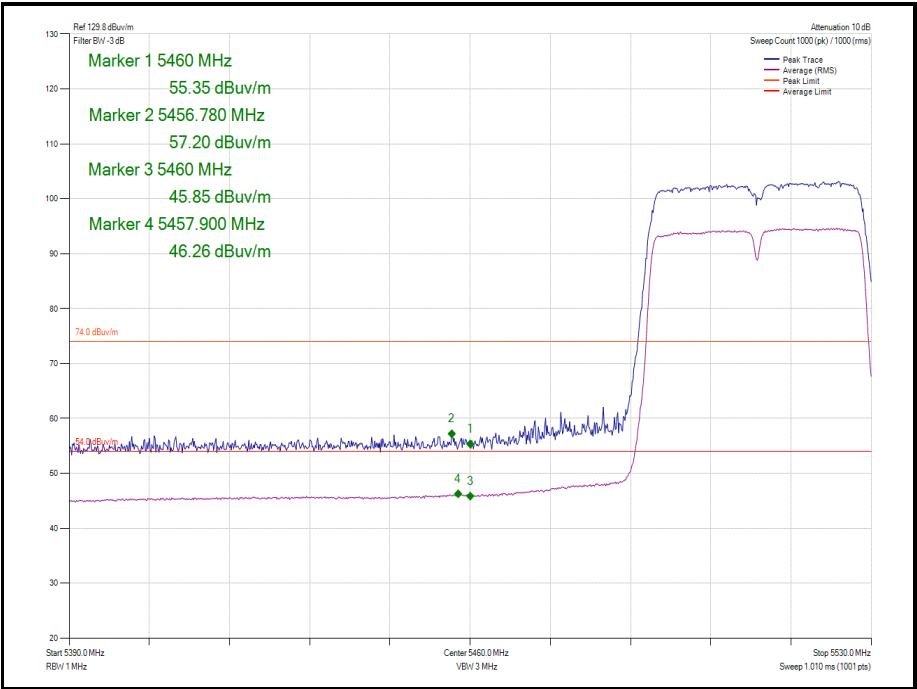
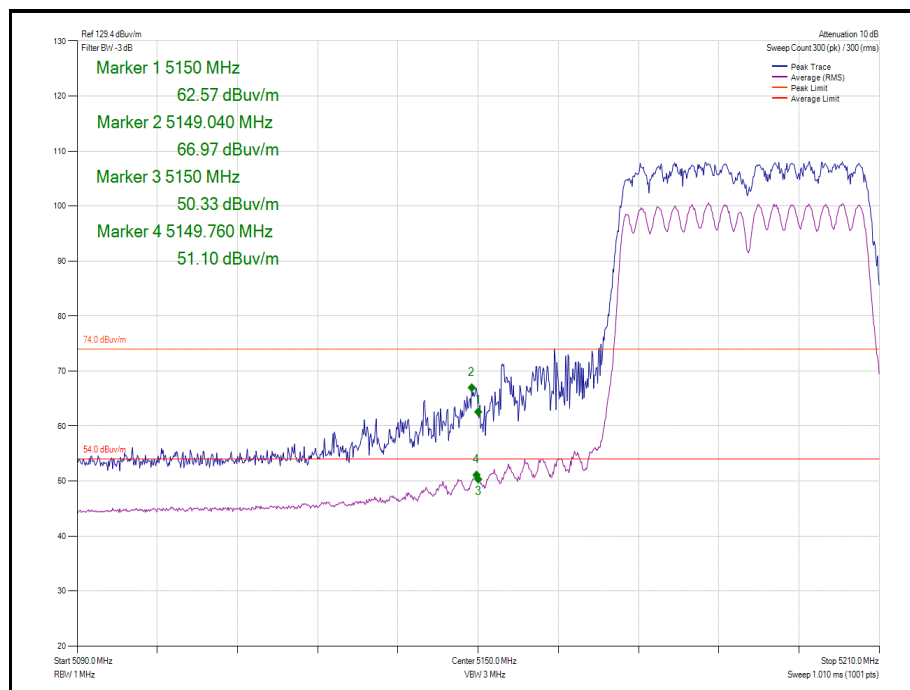


Figure 866 - 802.11n HT40 Core Aux - 5510 MHz
Band Edge Frequency 5460 MHz

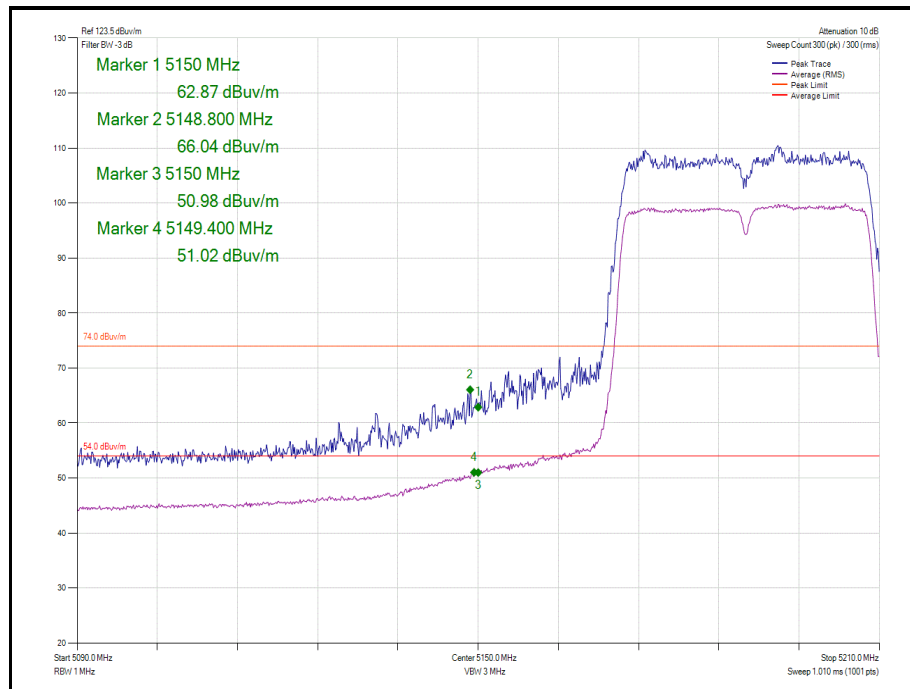
Main - 40 MHz Bandwidth (2TX)

Mode	Data Rate	Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
802.11n HT40 CDD Cores 1-2	MCS0	5190	5150	66.97	51.19
802.11n HT40 SDM Cores 1-2	MCS0	5190	5150	66.04	51.19
802.11n HT40 CDD Cores 1-2	MCS0	5310	5350	69.26	51.06
802.11n HT40 SDM Cores 1-2	MCS0	5310	5350	65.86	51.28
802.11n HT40 CDD Cores 1-2	MCS0	5510	5460	59.32	46.98
802.11n HT40 SDM Cores 1-2	MCS0	5510	5460	57.64	46.93

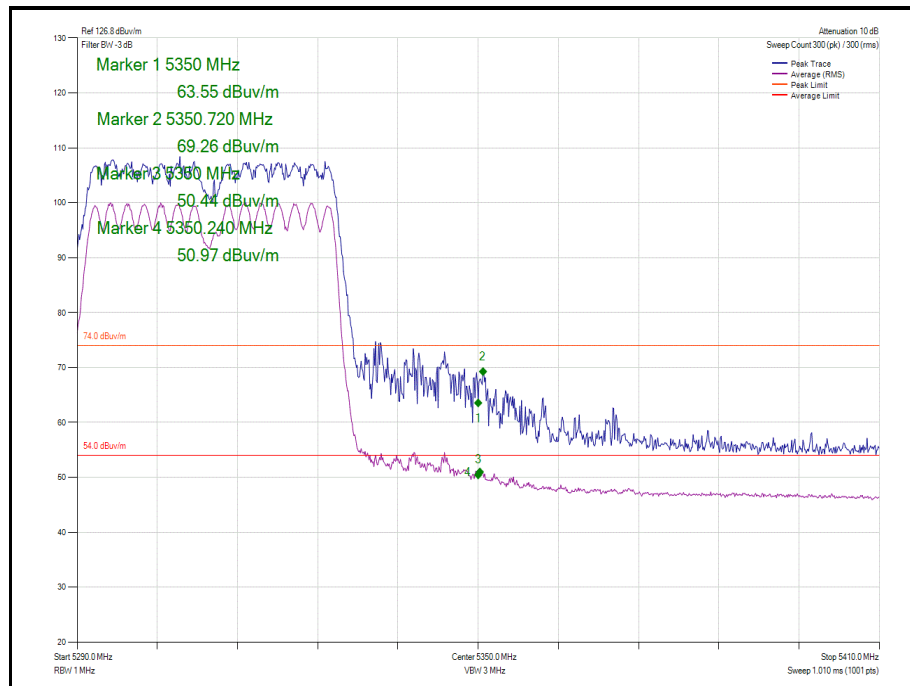
Table 425



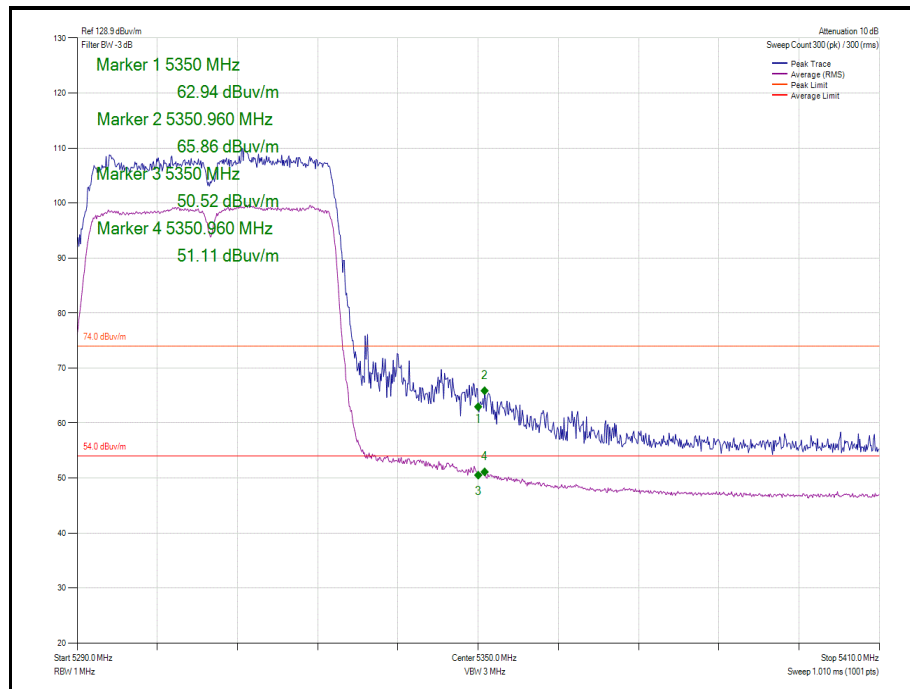
**Figure 867 - 802.11n HT40 CDD Cores 1-2 - 5190 MHz
Band Edge Frequency 5150 MHz**



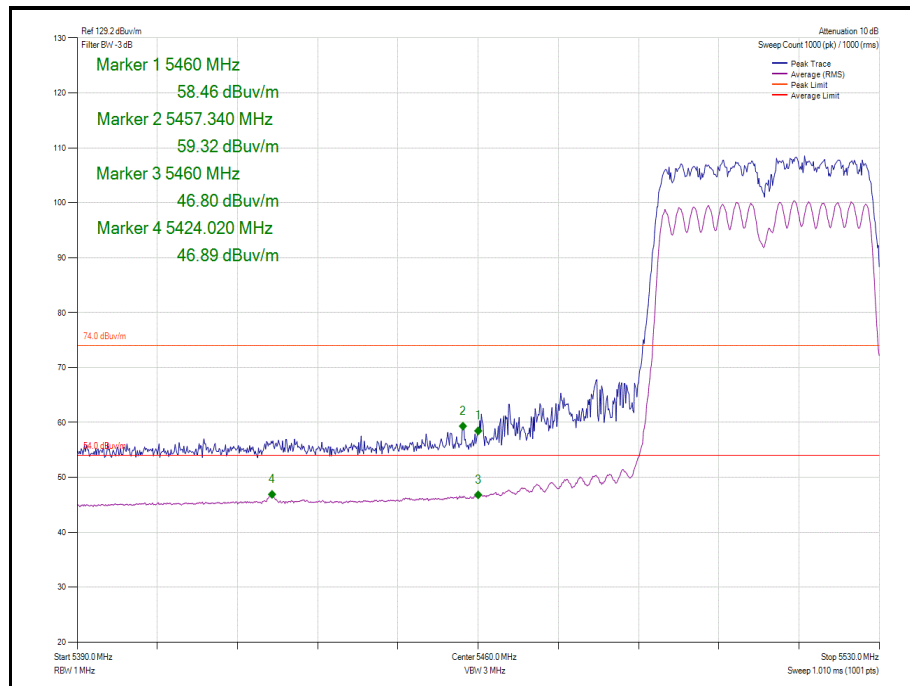
**Figure 868 - 802.11n HT40 SDM Cores 1-2 - 5190 MHz
Band Edge Frequency 5150 MHz**



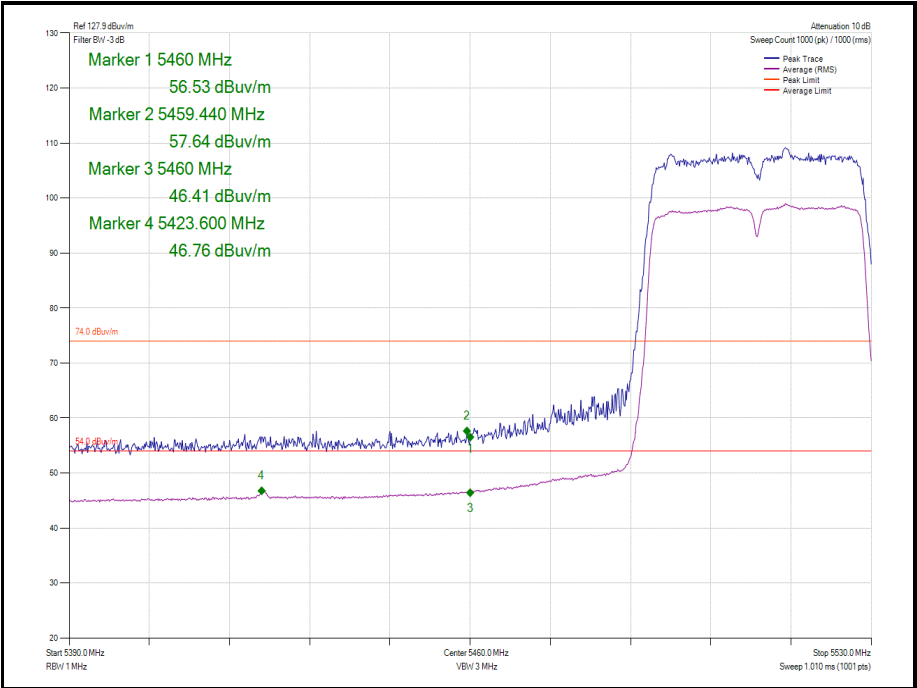
**Figure 869 - 802.11n HT40 CDD Cores 1-2 - 5310 MHz
Band Edge Frequency 5350 MHz**



**Figure 870 - 802.11n HT40 SDM Cores 1-2 - 5310 MHz
Band Edge Frequency 5350 MHz**



**Figure 871 - 802.11n HT40 CDD Cores 1-2 - 5510 MHz
Band Edge Frequency 5460 MHz**

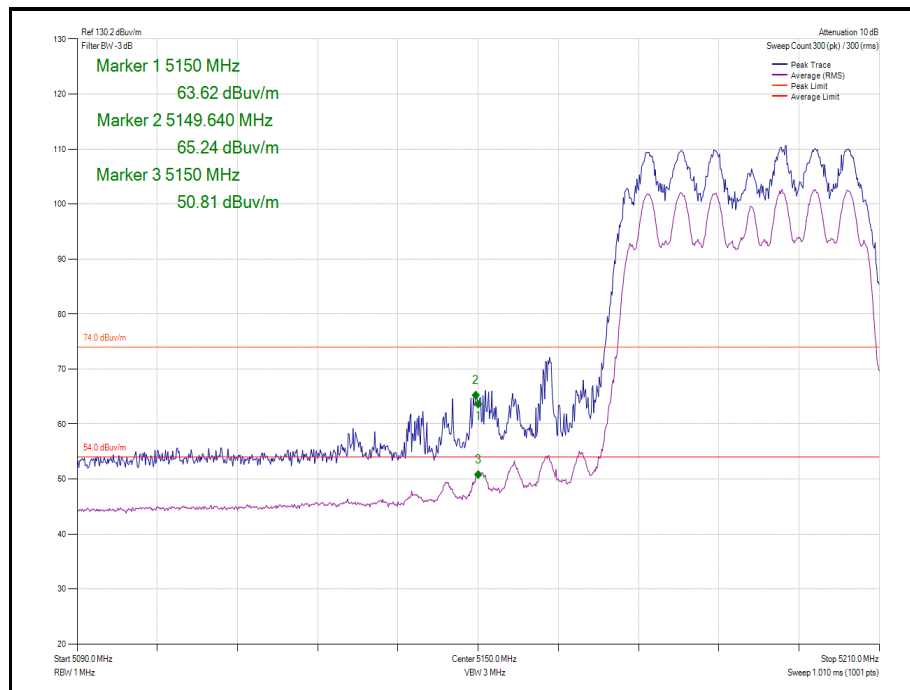


**Figure 872 - 802.11n HT40 SDM Cores 1-2 - 5510 MHz
Band Edge Frequency 5460 MHz**

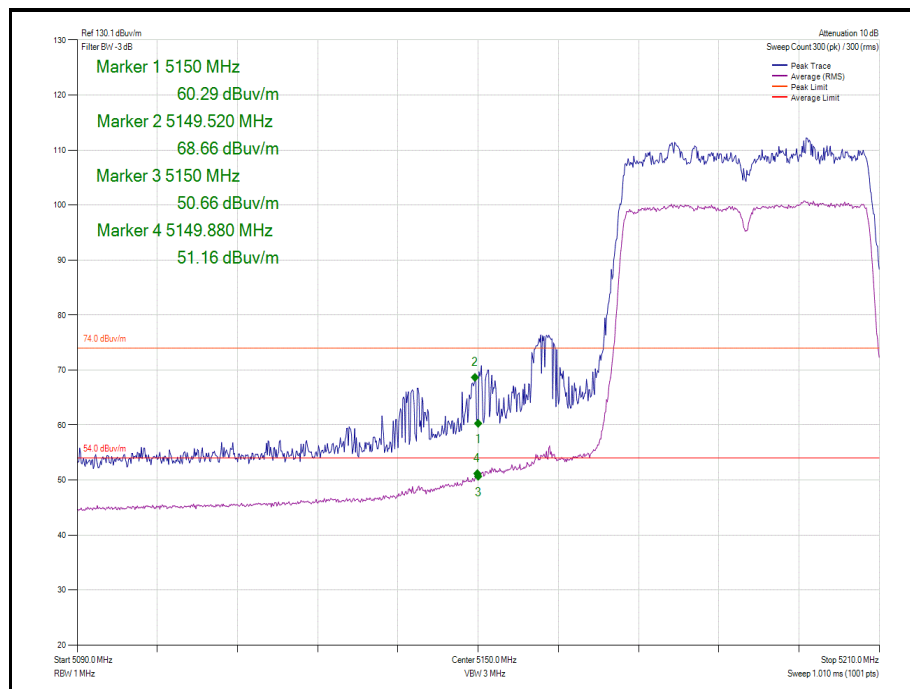
Main - 40 MHz Bandwidth (3TX)

Mode	Data Rate	Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
802.11n HT40 CDD Cores 0-1-2	MCS0	5190	5150	65.24	50.9
802.11n HT40 SDM Cores 0-1-2	MCS0	5190	5150	68.66	51.39
802.11n HT40 CDD Cores 0-1-2	MCS0	5310	5350	69.24	50.87
802.11n HT40 SDM Cores 0-1-2	MCS0	5310	5350	68.67	51.03
802.11n HT40 CDD Cores 0-1-2	MCS0	5510	5460	62.78	47.45
802.11n HT40 SDM Cores 0-1-2	MCS0	5510	5460	61.15	48.13

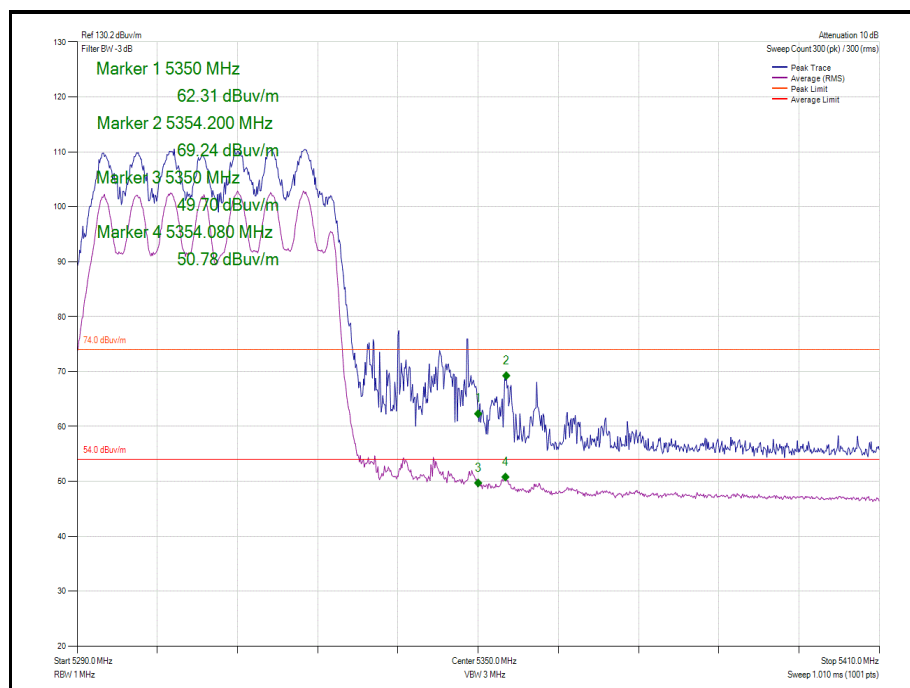
Table 426



**Figure 873 - 802.11n HT40 CDD Cores 0-1-2 - 5190 MHz
Band Edge Frequency 5150 MHz**



**Figure 874 - 802.11n HT40 SDM Cores 0-1-2 - 5190 MHz
Band Edge Frequency 5150 MHz**



**Figure 875 - 802.11n HT40 CDD Cores 0-1-2 - 5310 MHz
Band Edge Frequency 5310 MHz**

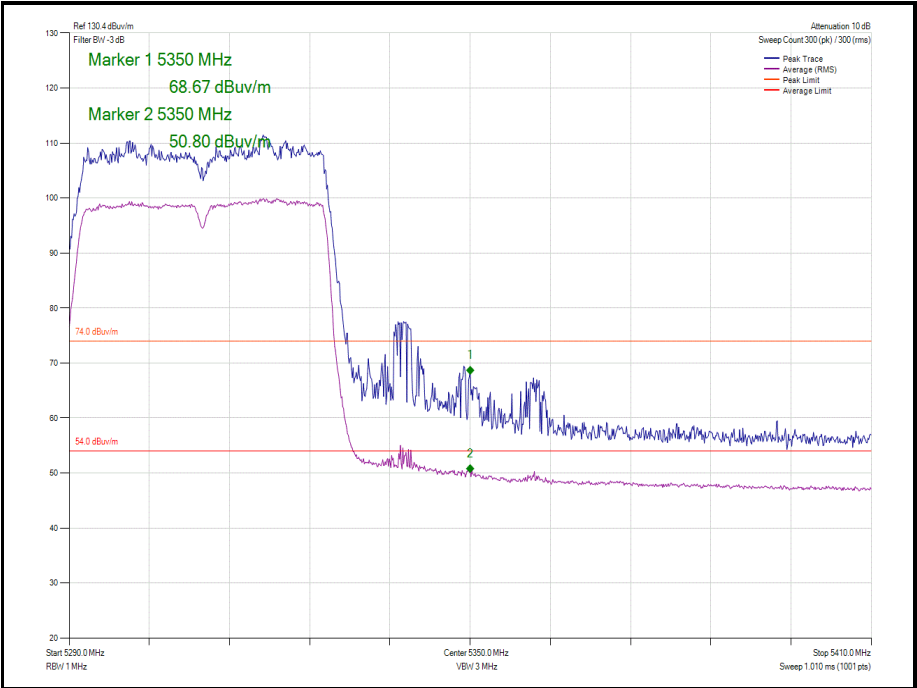


Figure 876 - 802.11n HT40 SDM Cores 0-1-2 - 5310 MHz
Band Edge Frequency 5350 MHz

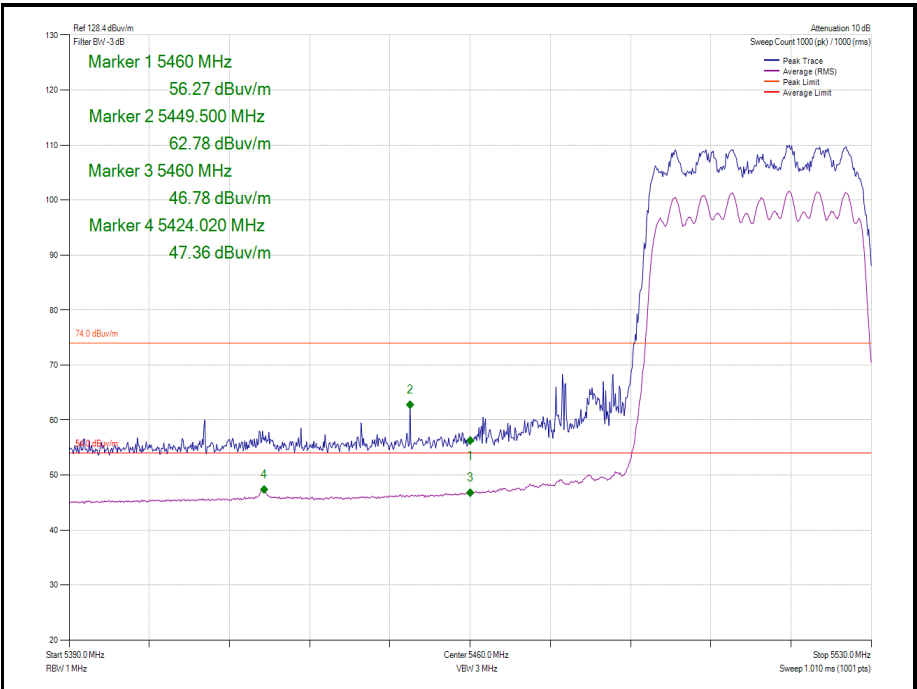


Figure 877 - 802.11n HT40 CDD Cores 0-1-2 - 5510 MHz
Band Edge Frequency 5460 MHz

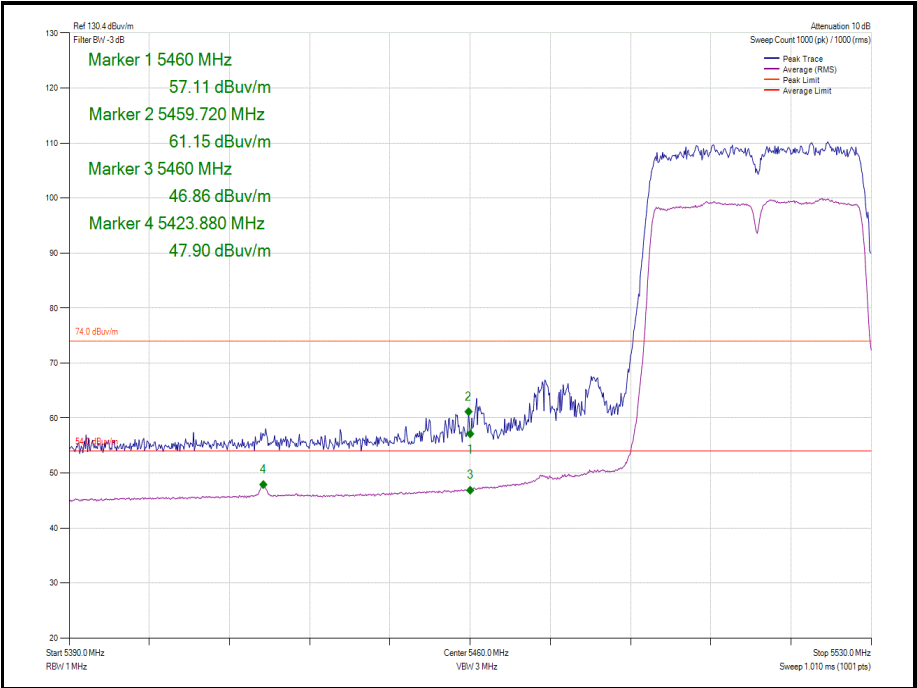


Figure 878 - 802.11n HT40 SDM Cores 0-1-2 - 5510 MHz
Band Edge Frequency 5460 MHz



Main - 80 MHz Bandwidth (SISO)

Mode	Data Rate	Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
802.11ac VHT80 Core 1	MCS0	5210	5150	70.65	50.89
802.11ac VHT80 Core 1	MCS0	5290	5350	66.71	49.29
802.11ac VHT80 Core 1	MCS0	5530	5460	57.85	45.95

Table 427

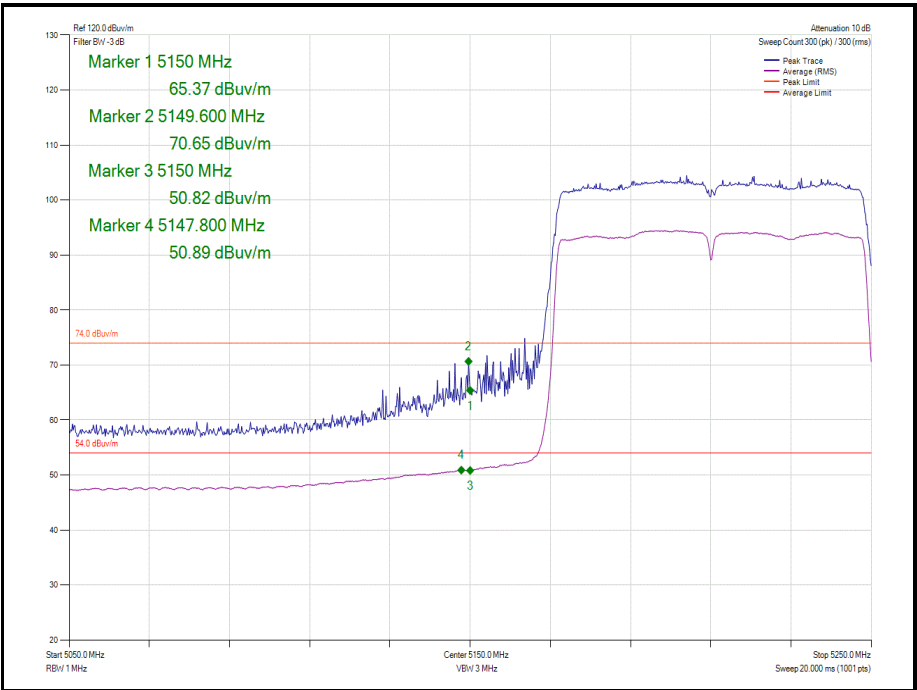


Figure 879 - 802.11ac VHT80 Core 1 - 5210 MHz
Band Edge Frequency 5150 MHz

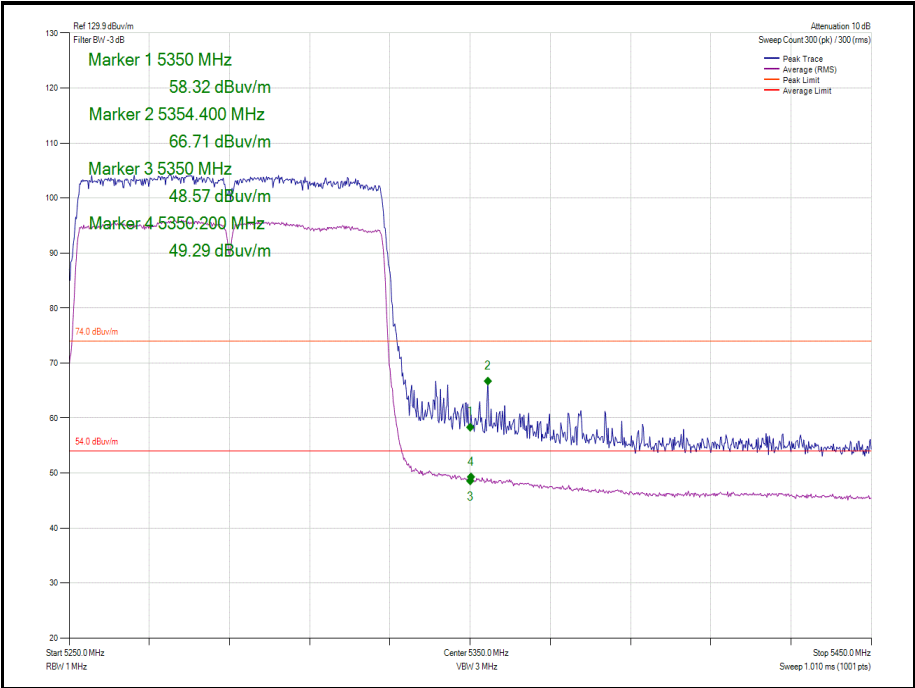


Figure 880 - 802.11ac VHT80 Core 1 - 5290 MHz
Band Edge Frequency 5350 MHz

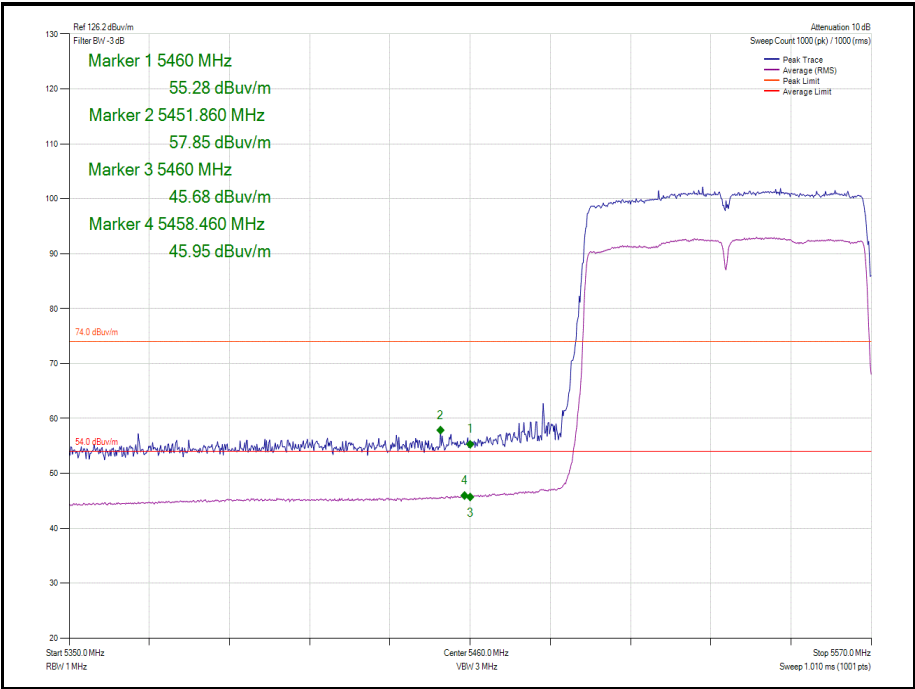


Figure 881 - 802.11ac VHT80 Core 1 - 5530 MHz
Band Edge Frequency 5350 MHz



Aux- 80 MHz Bandwidth

Mode	Data Rate	Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
802.11ac VHT80 Core Aux	MCS0	5210	5150	64.19	51.32
802.11ac VHT80 Core Aux	MCS0	5290	5350	65.92	51.13
802.11ac VHT80 Core Aux	MCS0	5530	5460	58.53	47.27

Table 428

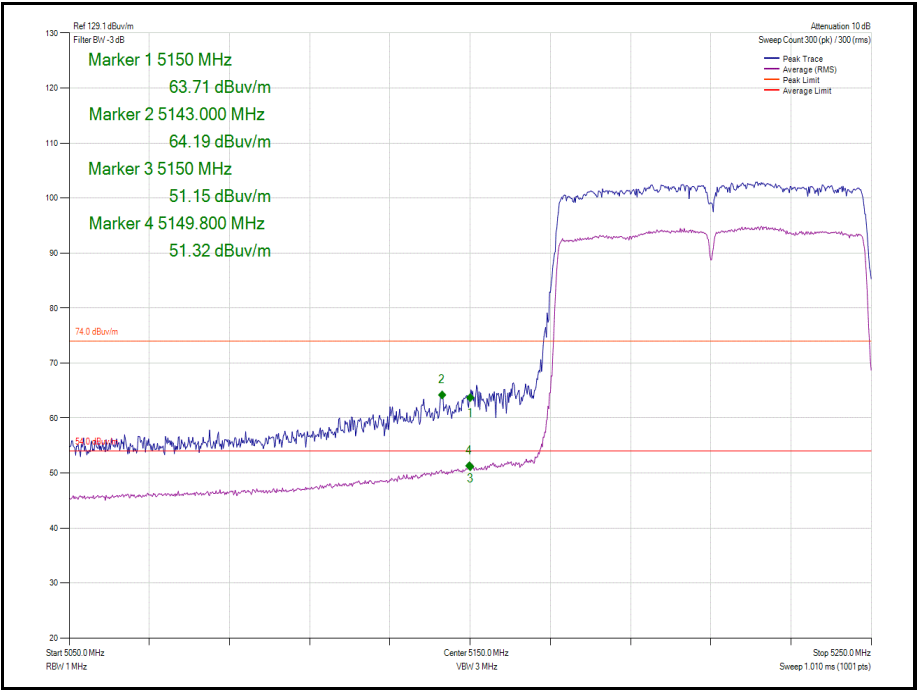


Figure 882 - 802.11ac VHT80 Core Aux - 5210 MHz
Band Edge Frequency 5150 MHz

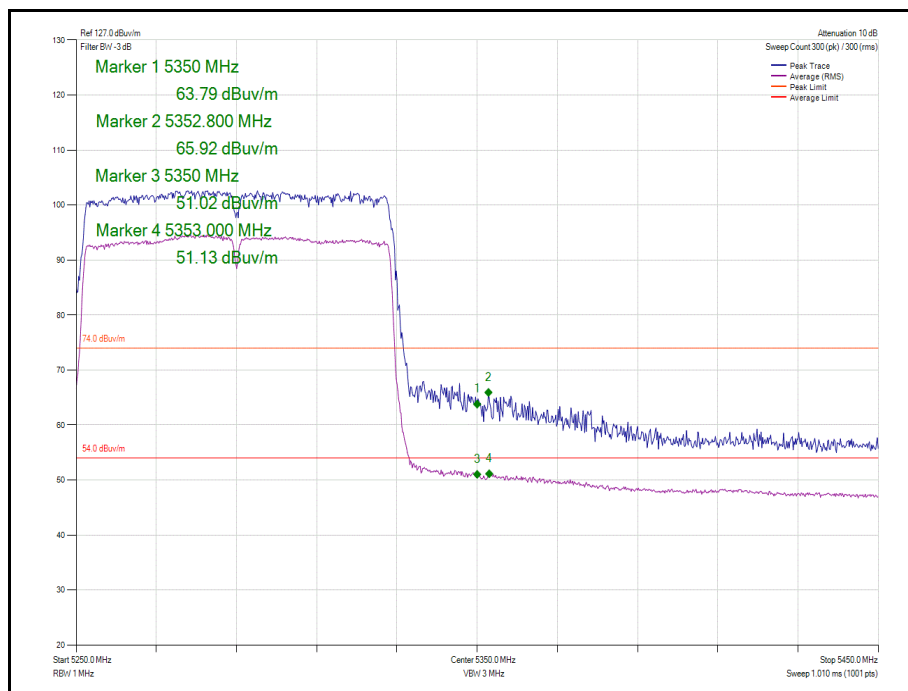


Figure 883 - 802.11ac VHT80 Core Aux - 5290 MHz
Band Edge Frequency 5350 MHz

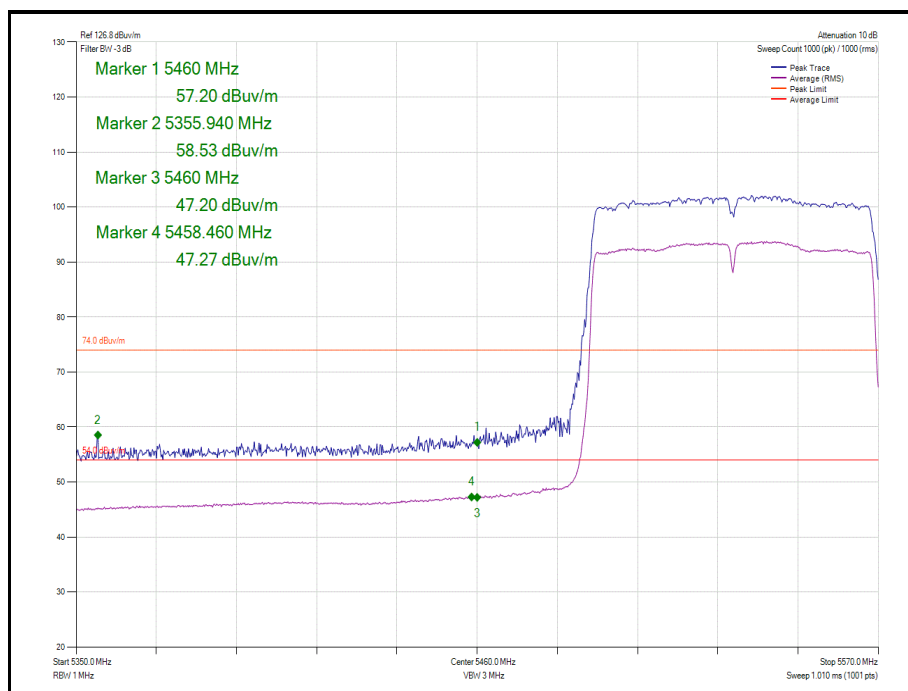


Figure 884 - 802.11ac VHT80 Core Aux - 5530 MHz
Band Edge Frequency 5350 MHz



Main - 80 MHz Bandwidth (2TX)

Mode	Data Rate	Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
802.11ac VHT80 CDD Cores 1-2	MCS0	5210	5150	69.27	51.9
802.11ac VHT80 SDM Cores 1-2	MCS0	5210	5150	66.73	48.85
802.11ac VHT80 CDD Cores 1-2	MCS0	5290	5350	65.2	49.23
802.11ac VHT80 SDM Cores 1-2	MCS0	5290	5350	69.29	51.77
802.11ac VHT80 CDD Cores 1-2	MCS0	5530	5460	58.67	47.88
802.11ac VHT80 SDM Cores 1-2	MCS0	5530	5460	57.47	46.71

Table 429

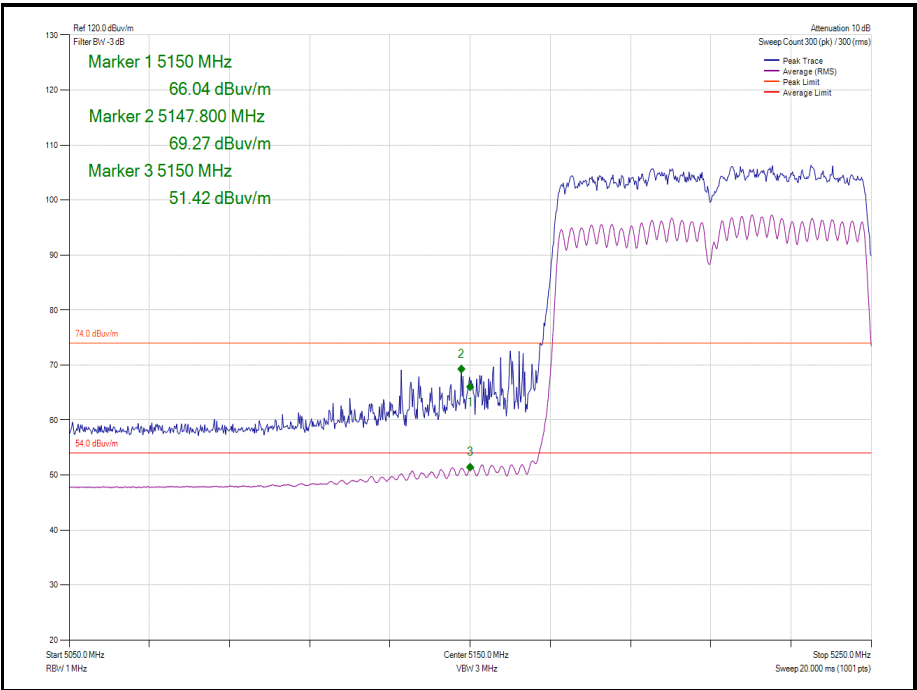
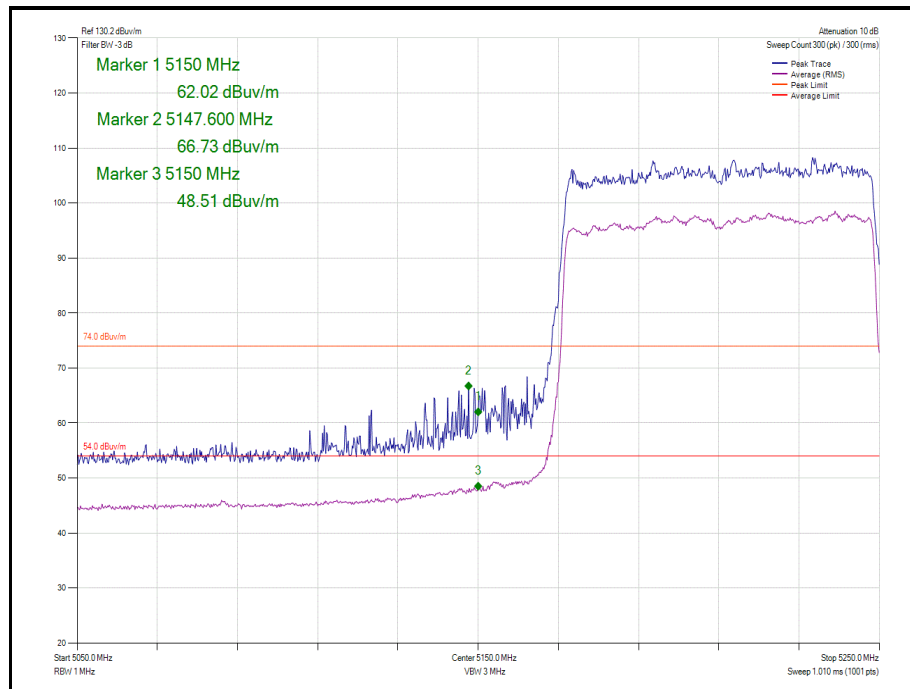
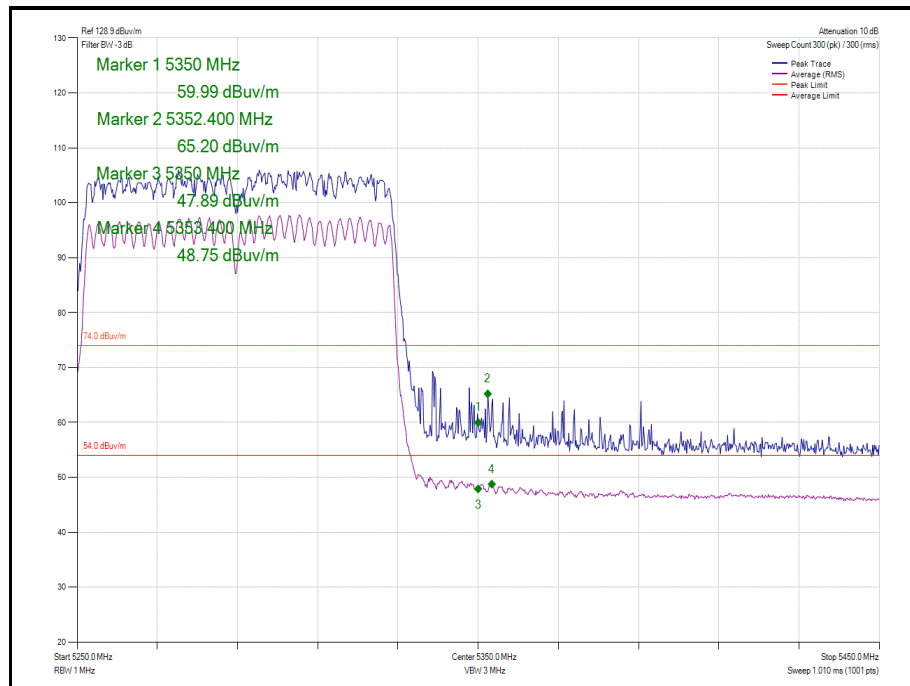


Figure 885 - 802.11ac VHT80 CDD Cores 1-2- 5210 MHz
Band Edge Frequency 5150 MHz



**Figure 886 - 802.11ac VHT80 SDM Cores 1-2- 5210 MHz
Band Edge Frequency 5150 MHz**



**Figure 887 - 802.11ac VHT80 CDD Cores 1-2- 5290 MHz
Band Edge Frequency 5350 MHz**

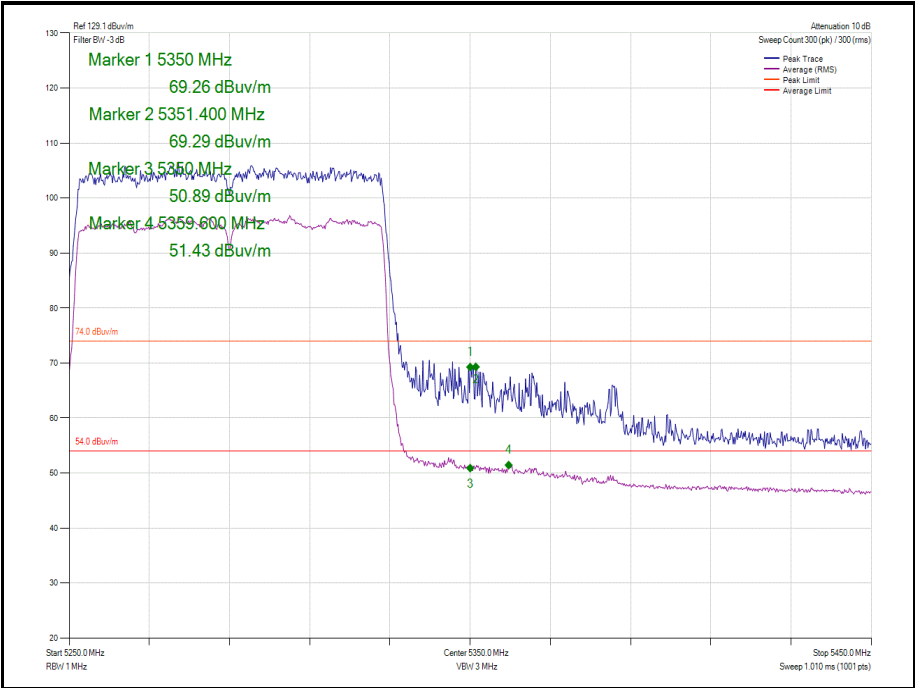


Figure 888 - 802.11ac VHT80 SDM Cores 1-2- 5290 MHz
Band Edge Frequency 5350 MHz

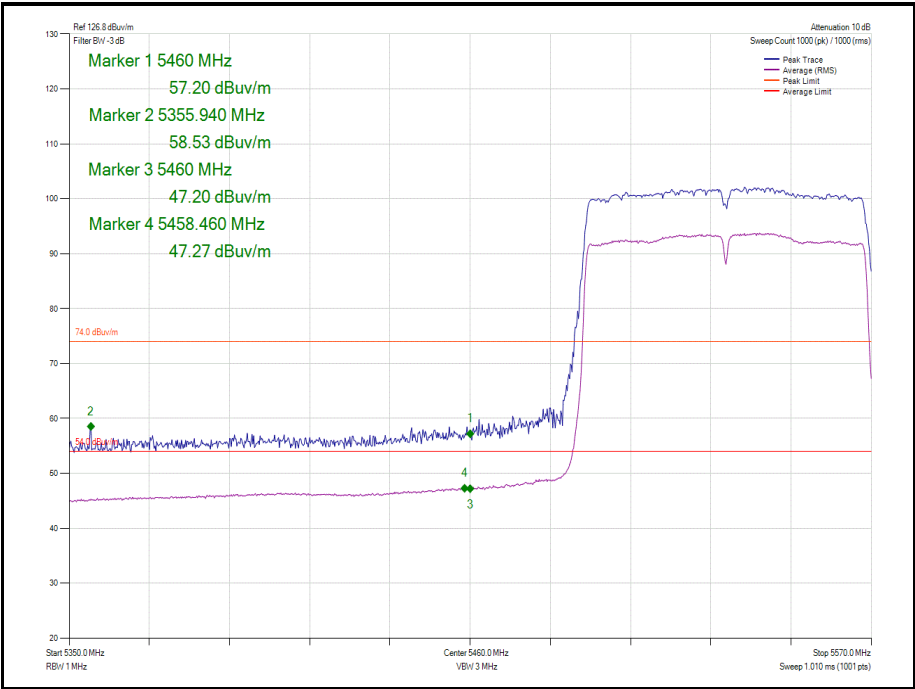


Figure 889 - 802.11ac VHT80 CDD Cores 1-2- 5530 MHz
Band Edge Frequency 5460 MHz

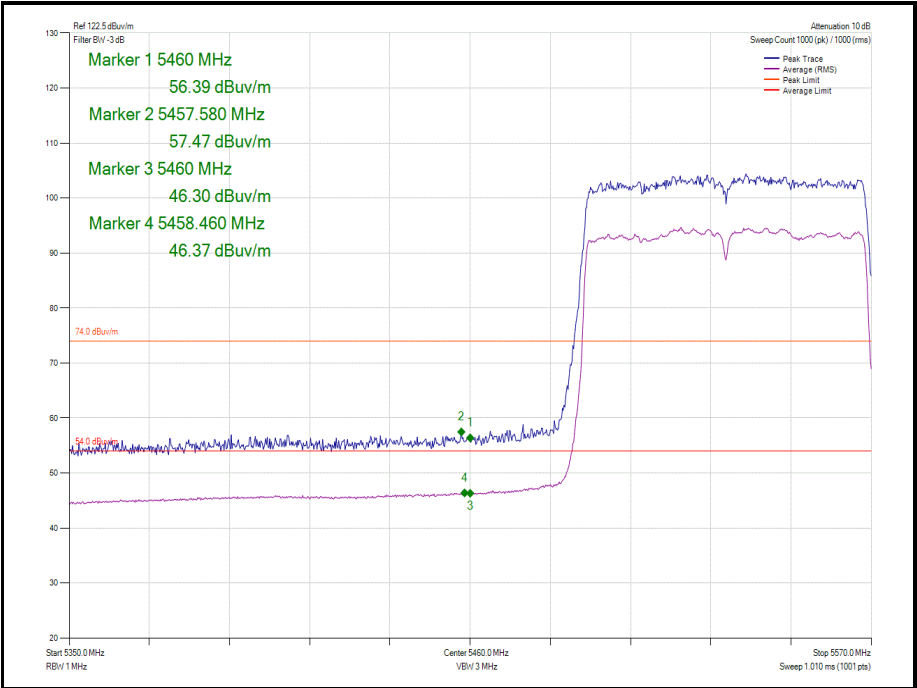


Figure 890 - 802.11ac VHT80 SDM Cores 1-2- 5530 MHz
Band Edge Frequency 5460 MHz



Main - 80 MHz Bandwidth (3TX)

Mode	Data Rate	Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
802.11ac VHT80 CDD Cores 0-1-2	MCS0	5210	5150	64.41	51.65
802.11ac VHT80 SDM Cores 0-1-2	MCS0	5210	5150	64.93	51.61
802.11ac VHT80 CDD Cores 0-1-2	MCS0	5290	5350	69.71	51.51
802.11ac VHT80 SDM Cores 0-1-2	MCS0	5290	5350	66.28	51.54
802.11ac VHT80 CDD Cores 0-1-2	MCS0	5530	5460	60.77	47.31
802.11ac VHT80 SDM Cores 0-1-2	MCS0	5530	5460	58.8	47.34

Table 430

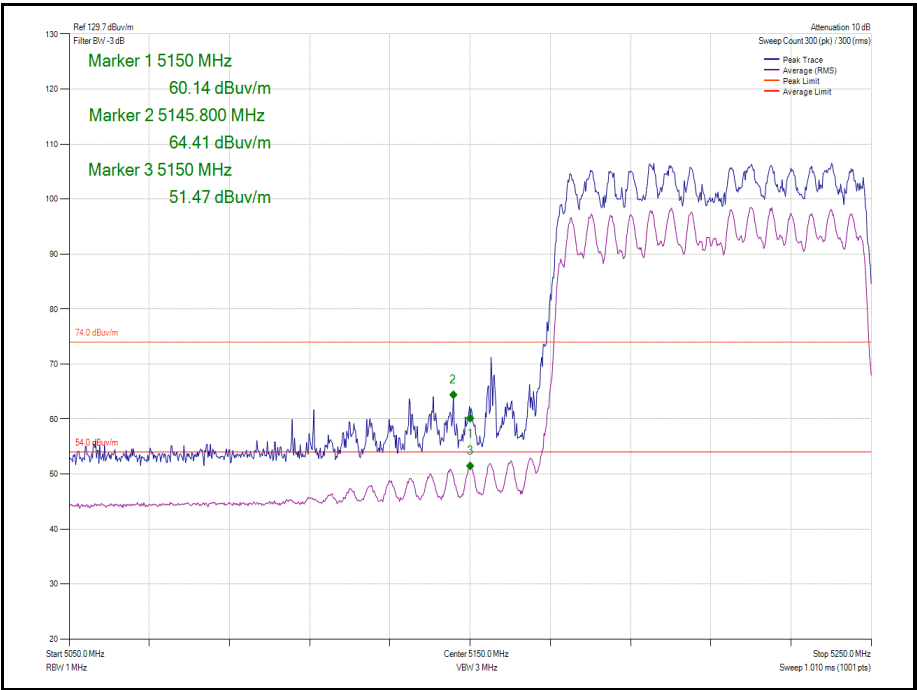
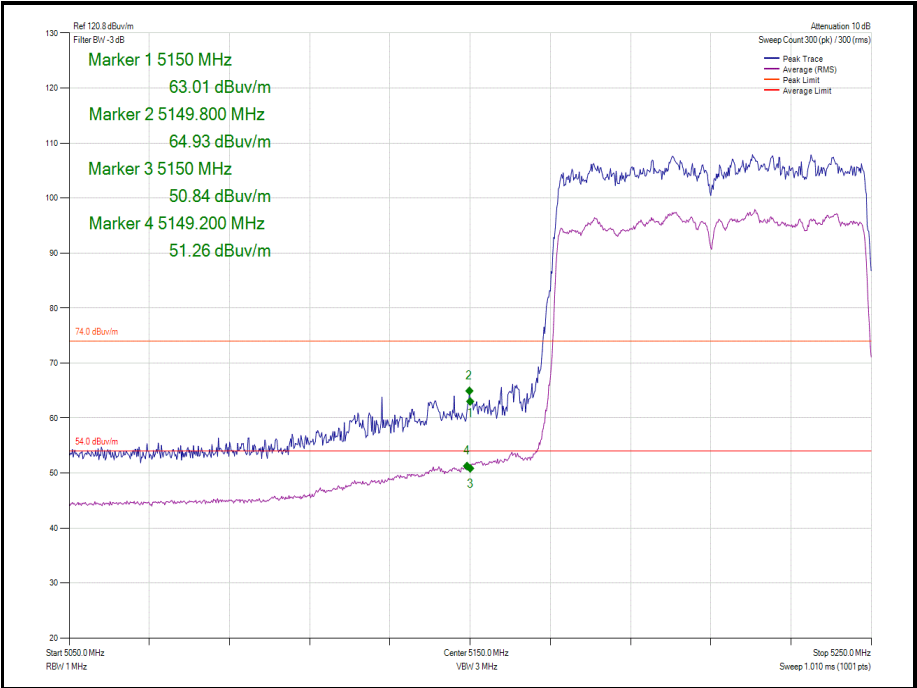
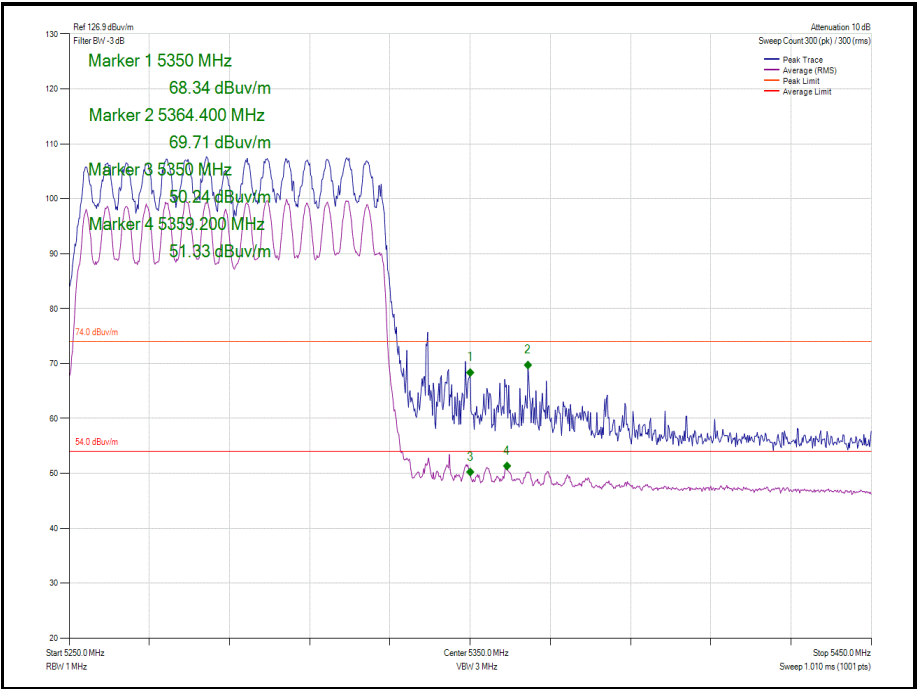


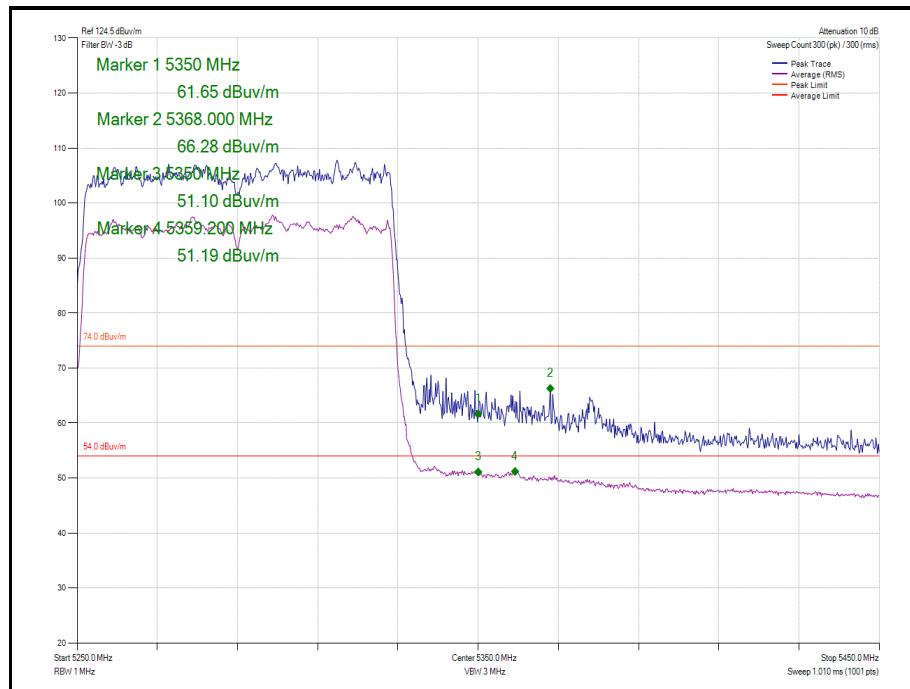
Figure 891 - 802.11ac VHT80 CDD Cores 0-1-2 - 5210 MHz
Band Edge Frequency 5150 MHz



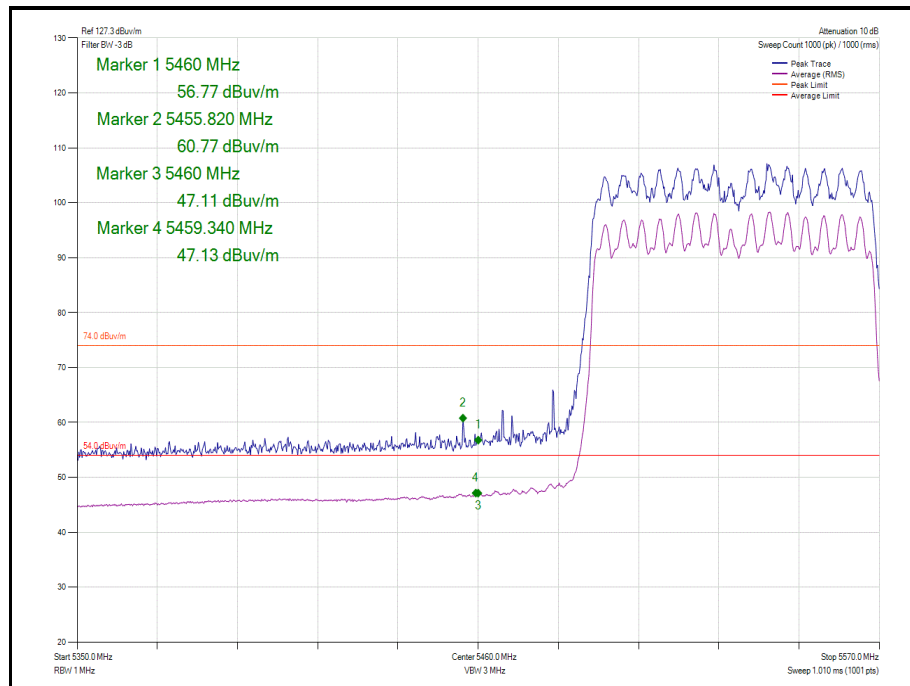
**Figure 892 - 802.11ac VHT80 SDM Cores 0-1-2 - 5210 MHz
Band Edge Frequency 5150 MHz**



**Figure 893 - 802.11ac VHT80 CDD Cores 0-1-2 - 5290 MHz
Band Edge Frequency 5350 MHz**



**Figure 894 - 802.11ac VHT80 SDM Cores 0-1-2 - 5290 MHz
Band Edge Frequency 5350 MHz**



**Figure 895 - 802.11ac VHT80 CDD Cores 0-1-2 - 5530 MHz
Band Edge Frequency 5460 MHz**

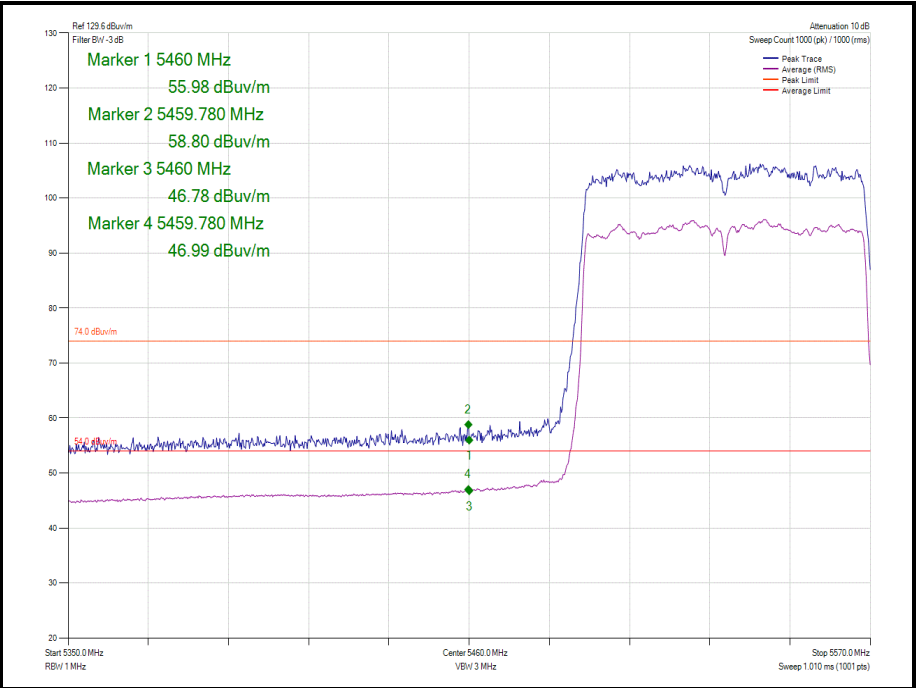


Figure 896 - 802.11ac VHT80 SDM Cores 0-1-2 - 5530 MHz
Band Edge Frequency 5460 MHz

FCC 47 CFR Part 15, Limit Clause 15.205 and ISEDC RSS-GEN Limit Clause 8.10

	Peak (dBμV/m)	Average (dBμV/m)
Restricted Bands of Operation	74	54

Table 431 - Restricted Band Edge Limit Table



2.5.7 Test Location and Test Equipment Used

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

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
Screened Room (5)	Rainford	Rainford	1545	36	23-Jan-2021
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Hygrometer	Rotronic	HYGROPALM 1	2338	12	15-Nov-2019
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	17-Dec-2019
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	25-Oct-2019
Cable (Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4526	6	11-Dec-2019
Mast Controller	Maturo GmbH	NCD	4810	-	TU
Tilt Antenna Mast	Maturo GmbH	TAM 4.0-P	4811	-	TU
Double Ridge Broadband Horn Antenna	Schwarzbeck	BBHA 9120 B	4848	12	11-Mar-2020
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	11-Nov-2019
8m N-Type RF Cable	Teledyne	PR90-088-8MTR	5095	12	04-Dec-2019
Cable (18 GHz)	Rosenberger	LU7-071-1000	5103	12	06-Oct-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5104	12	05-Dec-2019
Cable (18 GHz)	Rosenberger	LU7-071-2000	5107	12	06-Oct-2020
EmX Emissions Software	TUV SUD	EmX	5125	-	N/A - Software
1.5m 40GHz RF Cable	Scott Cables	KPS-1501-2000-KPS	5127	6	11-Dec-2019
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
8 Meter Cable	Teledyne	PR90-088-8MTR	5212	12	30-Aug-2020
Horn Antenna (1-10GHz)	Schwarzbeck	BBHA 9120 B	5215	12	11-Mar-2020
DRG Horn Antenna (7.5-18GHz)	Schwarzbeck	HWRD750	5216	12	11-Mar-2020
3 GHz High pass filter	Wainwright	WHKX12-2580-3000-18000-80SS	5219	12	15-Feb-2020

Table 432

TU – Traceability Unscheduled



2.6 Spurious Radiated Emissions

2.6.1 Specification Reference

FCC 47 CFR Part 15E, Clause 15.407 (b) and 15.205
ISED RSS-247, Clause 6.2

2.6.2 Equipment Under Test and Modification State

A2304, S/N: C02Z1006N5VL - Modification State 0

2.6.3 Date of Test

18-October-2019 to 29-October-2019

2.6.4 Test Method

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

Tests were performed in HT20 CDD in 3TX MIMO mode on the Main Radio, with measurements undertaken from 30 MHz to 40 GHz, on channel 36 (5180 MHz) and channel 165 (5825 MHz).

All testing was performed using the lowest data rate/modulation scheme for the applicable mode since this was declared worst case by the customer.

For the purpose of this testing, spurious emissions were limited to 1 GHz to 40 GHz on all other test channels.

Tests on the AUX radio were limited to 1 GHz to 40 GHz, as measurement's below 1 GHz on the main radio were considered to be worst case.

Plots for average measurements were taken in accordance with ANSI C63.10, clause 12.7.7.2 with max-hold trace 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 characterization of the EUT. The limits on the plots represent the most stringent case for restricted bands, (54/74 dBuV/m @ 3 m and 64/84 dBuV/m @ 1m) when compared to -27 dBm/MHz EIRP outside restricted bands. The limits shown have been used as a threshold to determine where further measurements are necessary. Where results are within 10dB 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 dBuV/m to uV/m:
 $10^{(\text{Field Strength in dBuV/m}/20)}$

EIRP was converted to field strength at 3m using the following formula:
 $\text{Field Strength (dBuV/m at 3 m)} = \text{EIRP (dBm)} + 95.2 \text{ dB}$

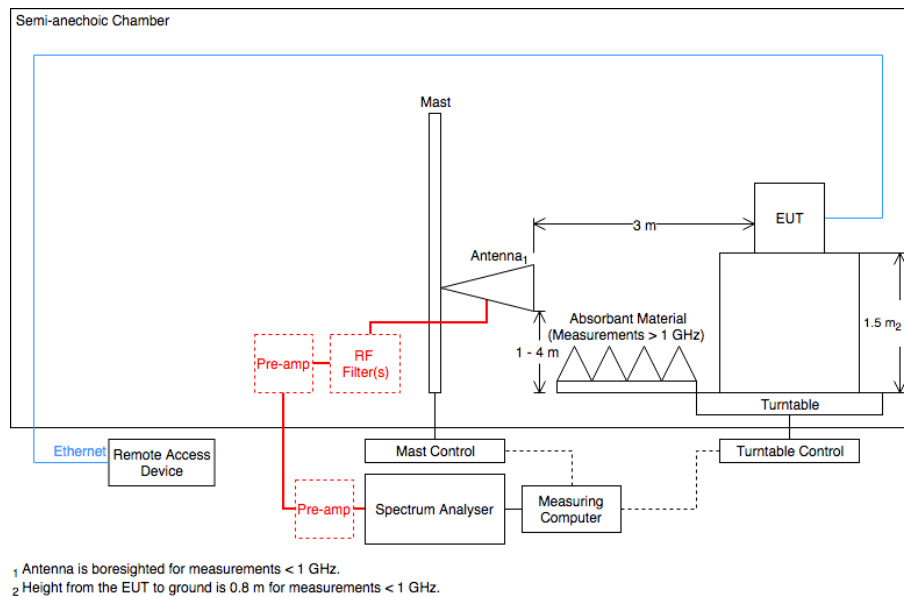


Figure 897 - Radiated Emissions Test Setup Diagram

2.6.5 Environmental Conditions

Ambient Temperature	15.8 - 27.0 °C
Relative Humidity	35.0 - 40.3 %



2.6.6 Test Results

5 GHz WLAN

Main - 20 MHz Bandwidth

Testing was performed with the device operating at maximum output power, HT20 CDD MIMO 3TX, as this was deemed to be worst case.

Frequency (MHz)	QP Level (dBuV/m)	QP Limit (dBuV/m)	QP Margin (dB)	Angle (Deg)	Height(m)	Polarisation
33.9	35.2	40.0	4.8	4	230	Vertical
36.0	37.5	40.0	2.5	270	371	Vertical
44.1	21.6	40.0	18.4	160	275	Vertical
52.5	26.4	40.0	13.6	200	100	Vertical
75.5	27.5	40.0	12.5	337	103	Vertical
86.0	26.6	40.0	13.4	252	111	Vertical
113.3	31.3	43.5	12.2	356	103	Vertical
120.0	35.5	43.5	8.0	259	100	Vertical
165.5	16.4	43.5	27.1	318	100	Vertical
288.4	33.6	46.0	12.5	288	104	Horizontal

Table 433 –30 MHz to 1 GHz – Radiated - U-NII 1 - 5180 MHz

No other emissions were detected within 10 dB of the limit.

Frequency (MHz)	QP Level (dBuV/m)	QP Limit (dBuV/m)	QP Margin (dB)	Angle (Deg)	Height(m)	Polarisation
40.8	33.8	40	6.24	283	100	Vertical
60.9	22.6	40	17.45	285	110	Vertical
168.1	36.9	43.5	6.6	10	144	Horizontal

Table 434 –30 MHz to 1 GHz – Radiated - U-NII 3 - 5825 MHz

No other emissions were detected within 10 dB of the limit.

Frequency (MHz)	Result (dBμV/m)		Limit (dBμV/m)		Margin (dB)	
	Peak	Average	Peak	Average	Peak	Average
4748.4	-	35.6	74.0	54.0	-	18.4

Table 435 - 1 GHz to 40 GHz - Emissions Results U-NII 1 - 5180 MHz

No other emissions were detected within 10 dB of the limit.



Frequency (MHz)	Result (dBµV/m)		Limit (dBµV/m)		Margin (dB)	
	Peak	Average	Peak	Average	Peak	Average
1181.8	-	32.1	74.0	54.0	-	21.9
1703.8	48.7	-	74.0	54.0	25.3	-
1705.8	-	31.5	74.0	54.0	-	22.5
1707.9	-	31.9	74.0	54.0	-	22.1

Table 436 - 1 GHz to 40 GHz - Emissions Results U-NII 2a - 5320 MHz

No other emissions were detected within 10 dB of the limit.

Frequency (MHz)	Result (dBµV/m)		Limit (dBµV/m)		Margin (dB)	
	Peak	Average	Peak	Average	Peak	Average
*						

Table 437 - 1 GHz to 40 GHz - Emissions Results U-NII 2c - 5500 MHz

*No emissions were detected within 10 dB of the limit.

Frequency (MHz)	Result (dBµV/m)		Limit (dBµV/m)		Margin (dB)	
	Peak	Average	Peak	Average	Peak	Average
5066.7	-	39.9	-	54.0	-	14.1

Table 438 - 1 GHz to 40 GHz - Emissions Results U-NII 3 - 5700 MHz

No other emissions were detected within 10 dB of the limit.

Frequency (MHz)	Result (dBµV/m)		Limit (dBµV/m)		Margin (dB)	
	Peak	Average	Peak	Average	Peak	Average
4893.8	-	38.7	74.0	54.0	-	54.0

Table 439 - 1 GHz to 40 GHz - Emissions Results - U-NII 2c - 5745 MHz

No other emissions were detected within 10 dB of the limit.

Frequency (MHz)	Result (dBµV/m)		Limit (dBµV/m)		Margin (dB)	
	Peak	Average	Peak	Average	Peak	Average
5393.5	-	46.7	74.0	54.0	-	7.3

Table 440 - 1 GHz to 40 GHz - Emissions Results - U-NII 3 - 5825 MHz

No other emissions were detected within 10 dB of the limit.

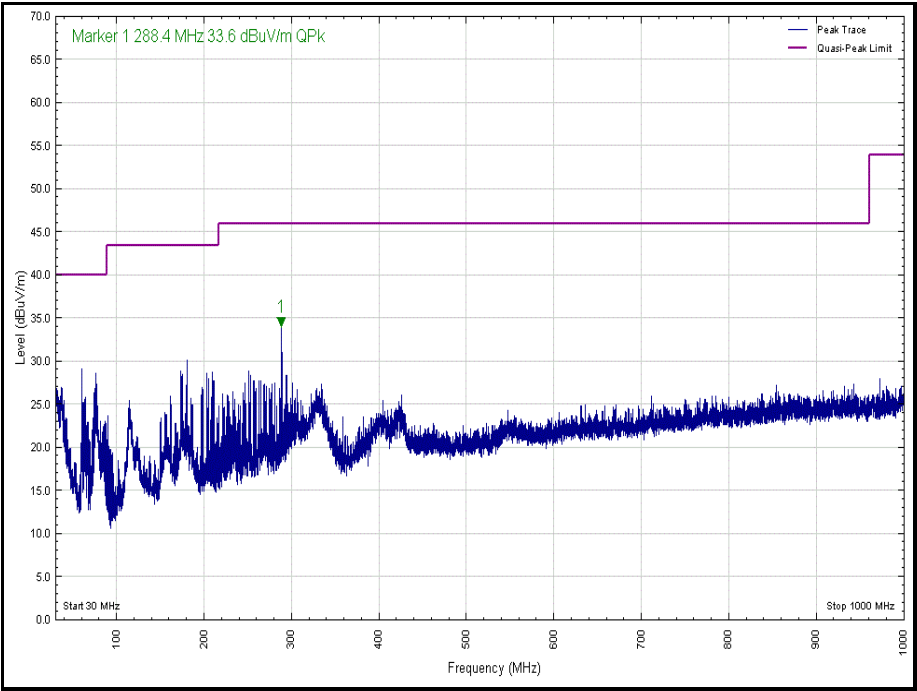


Figure 898 - U-NII 1 - 5180 MHz - 30 MHz to 1 GHz - Polarisation: Horizontal (Peak)

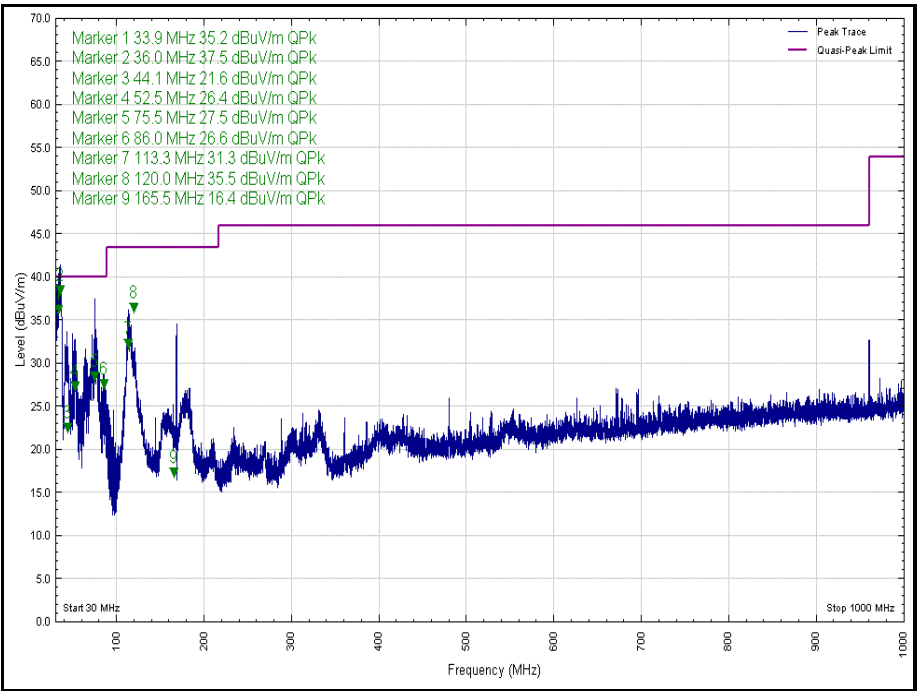


Figure 899 - U-NII 1 - 5180 MHz - 30 MHz to 1 GHz - Polarisation: Vertical (Peak)

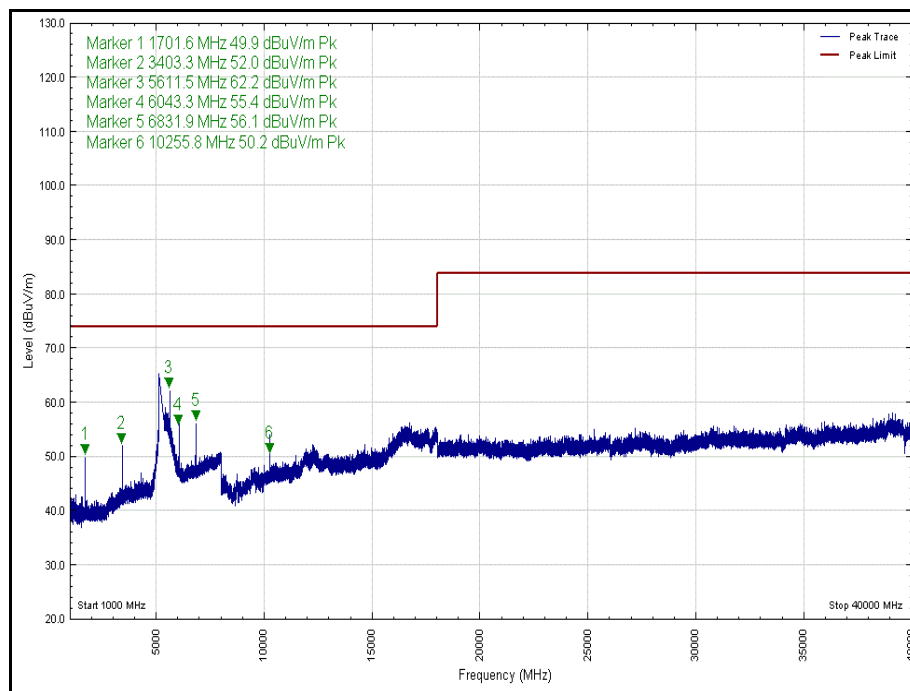


Figure 900 - U-NII 1 - 5180 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Peak)

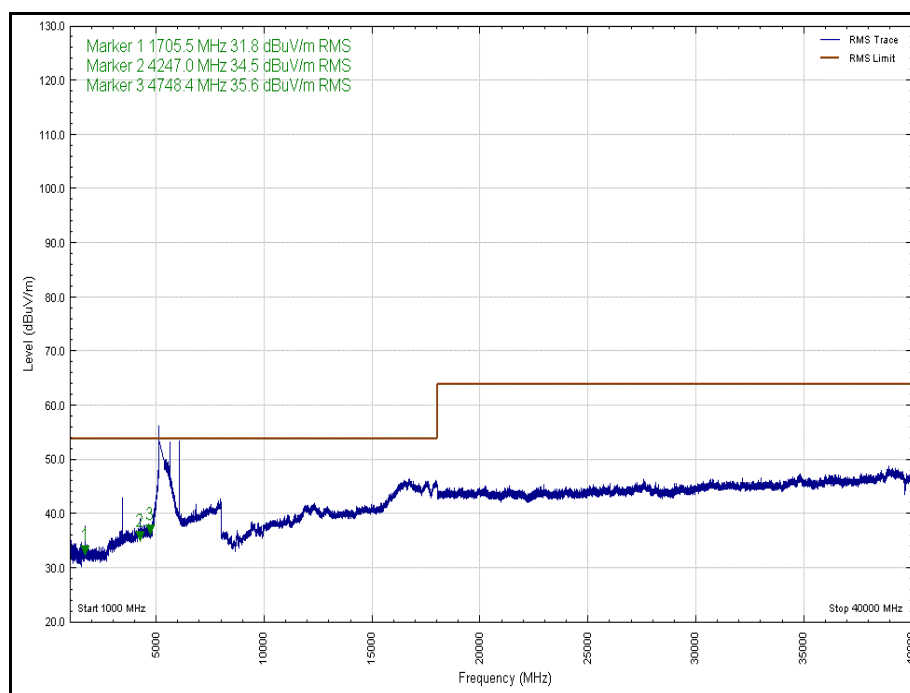


Figure 901 - U-NII 1 - 5180 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Average)

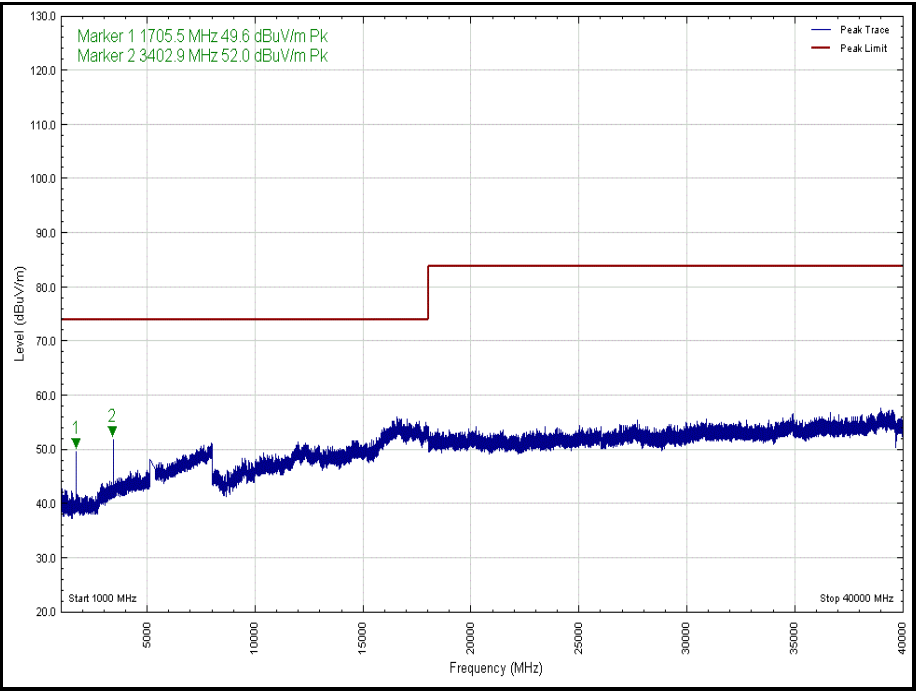


Figure 902 - U-NII 1 - 5180 MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Peak)

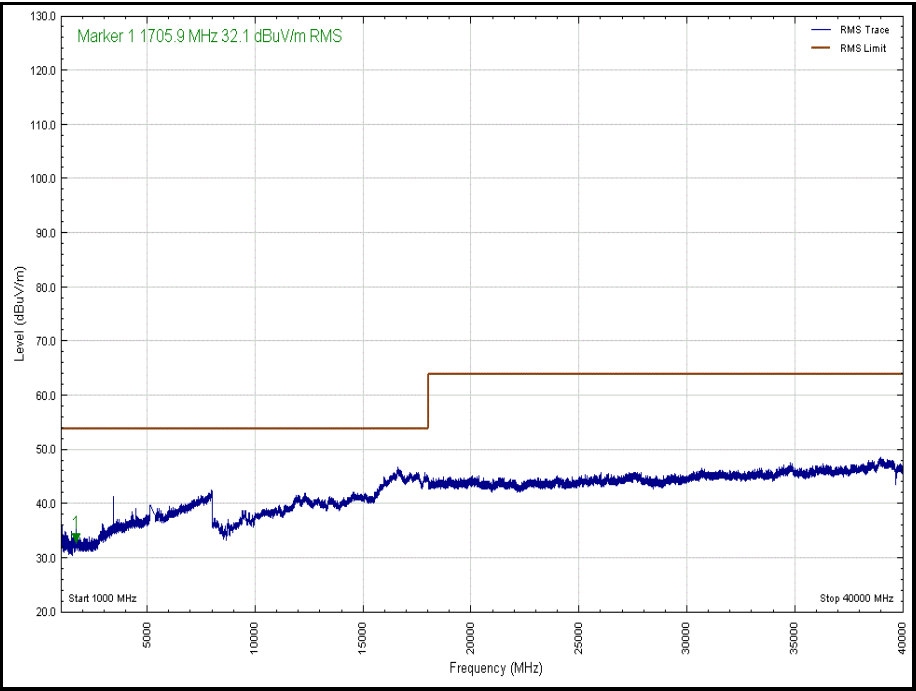


Figure 903 - U-NII 1 - 5180 MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Average)

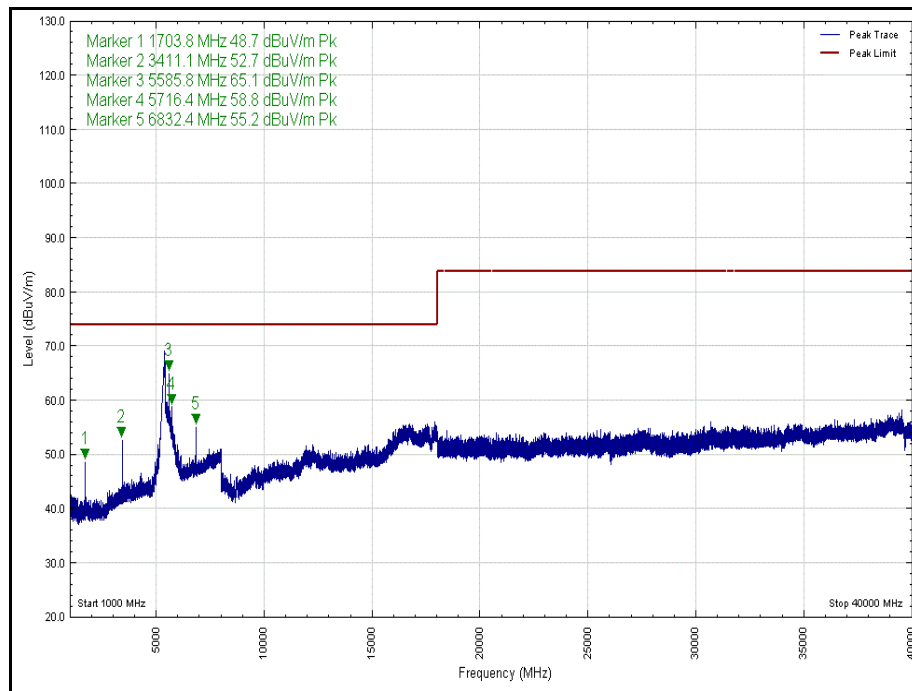


Figure 904 - U-NII 2a - 5320 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Peak)

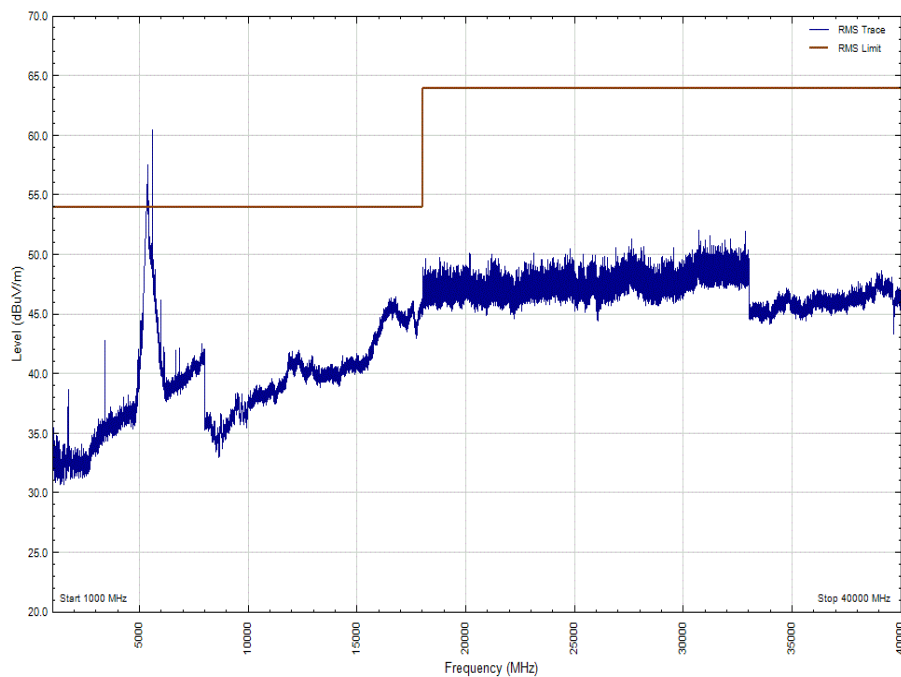


Figure 905 - U-NII 2a - 5320 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Average)

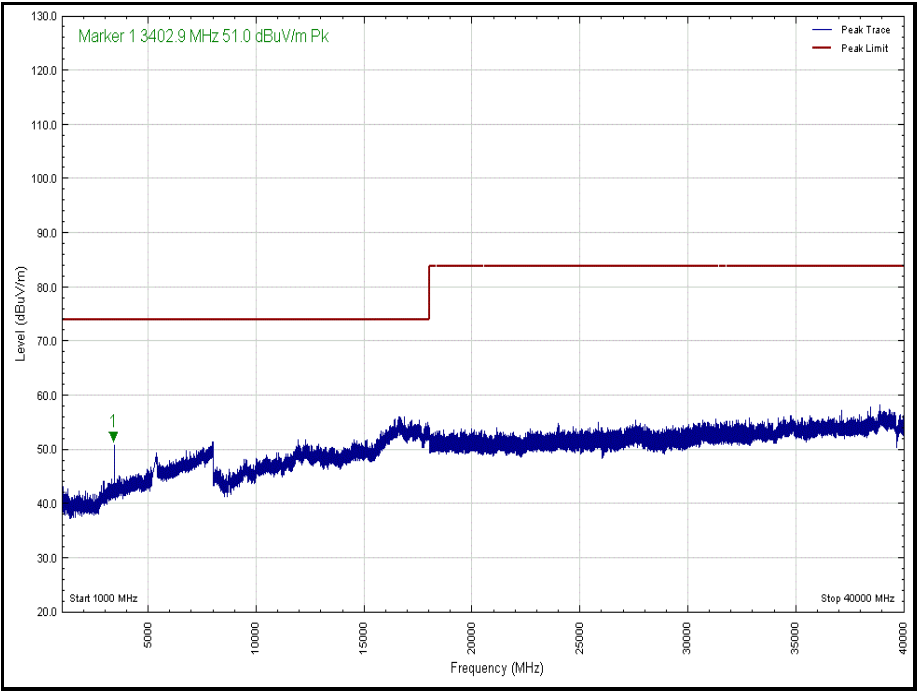


Figure 906 - U-NII 2a - 5320 MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Peak)

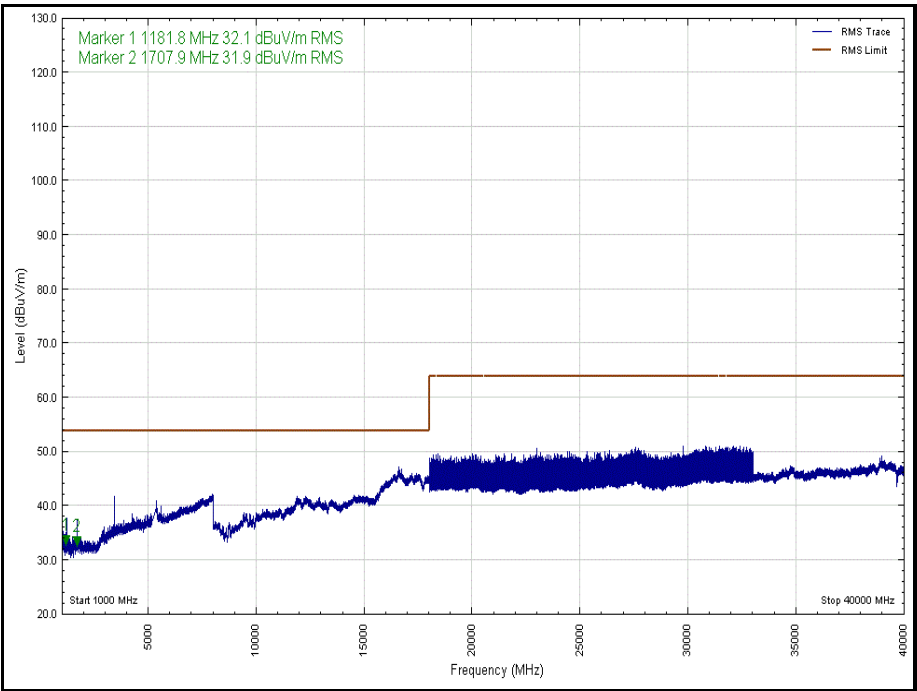


Figure 907 - U-NII 2a - 5320 MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Average)

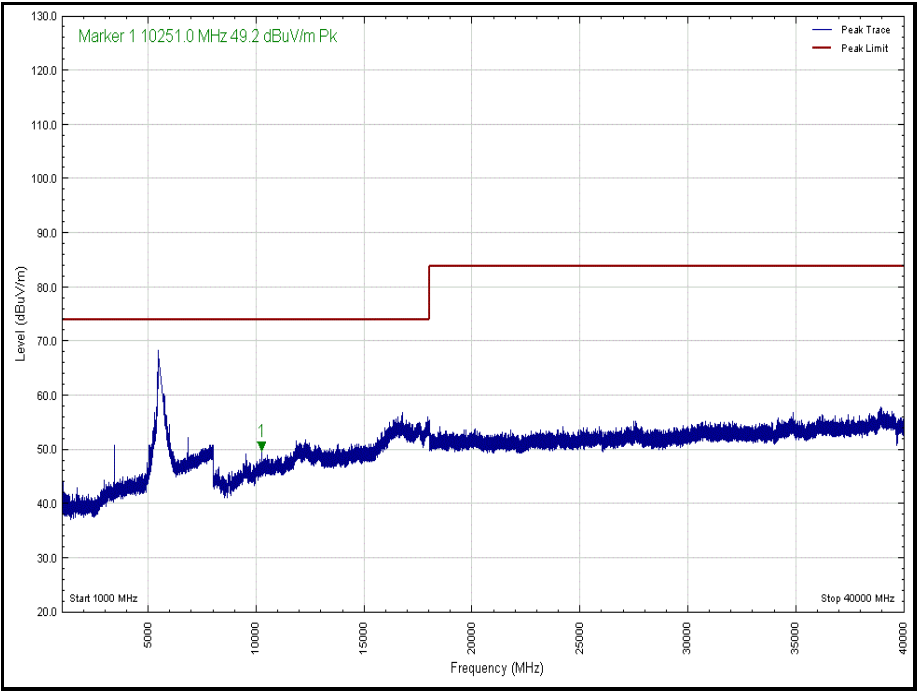


Figure 908 - U-NII 2c - 5500 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Peak)

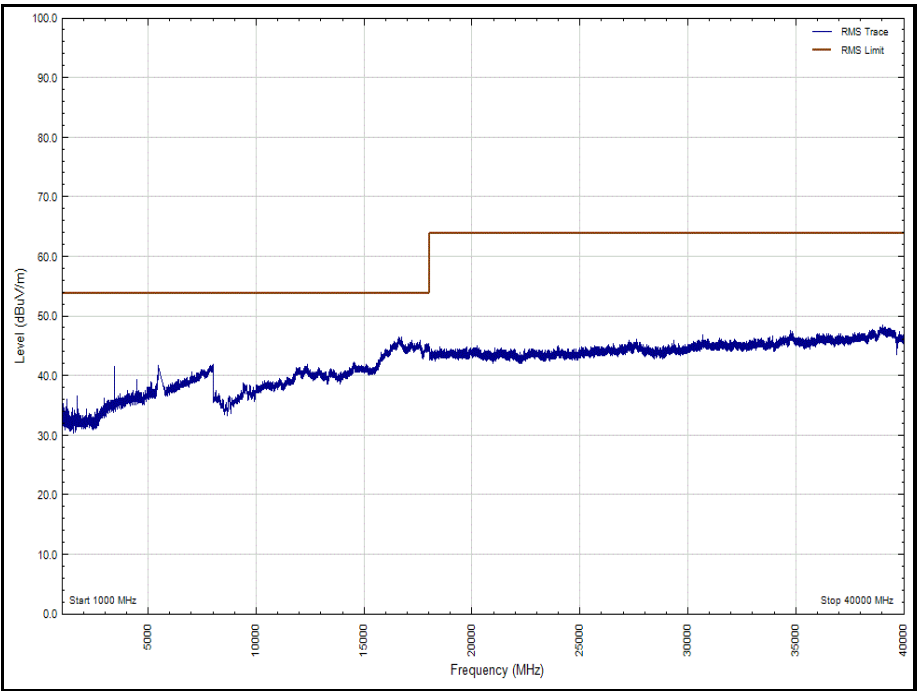


Figure 909 - U-NII 2c - 5500 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Average)

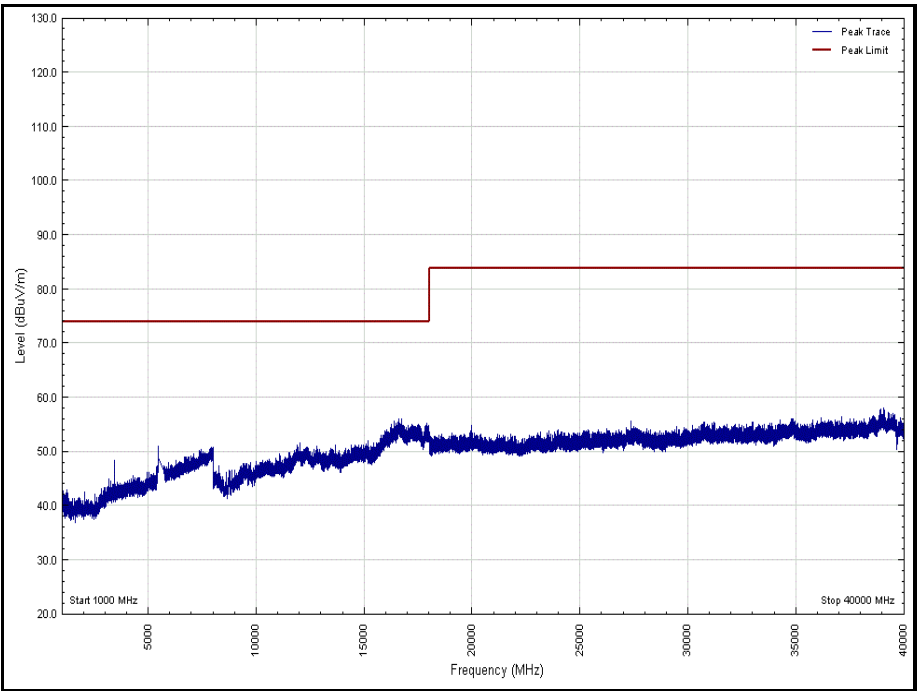


Figure 910 - U-NII 2c - 5500 MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Peak)

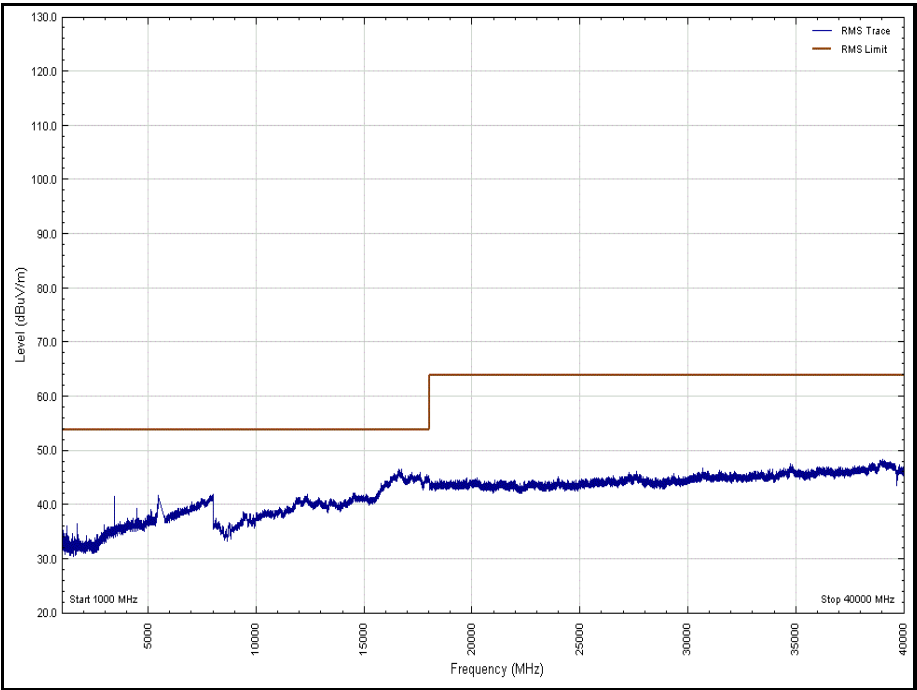


Figure 911 - U-NII 2c - 5500 MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Average)

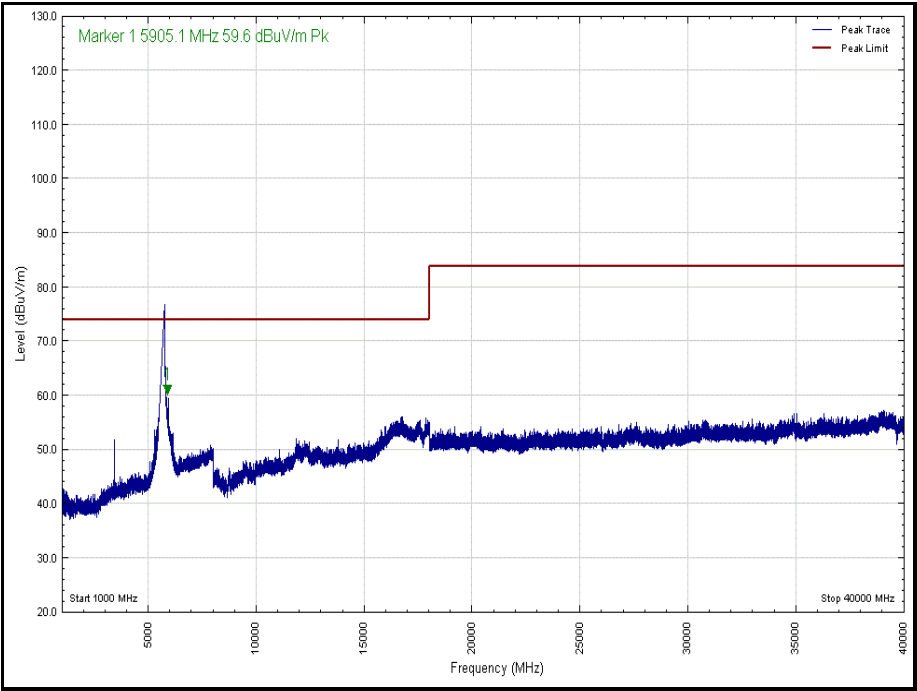


Figure 912 - U-NII 2c - 5700 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Peak)

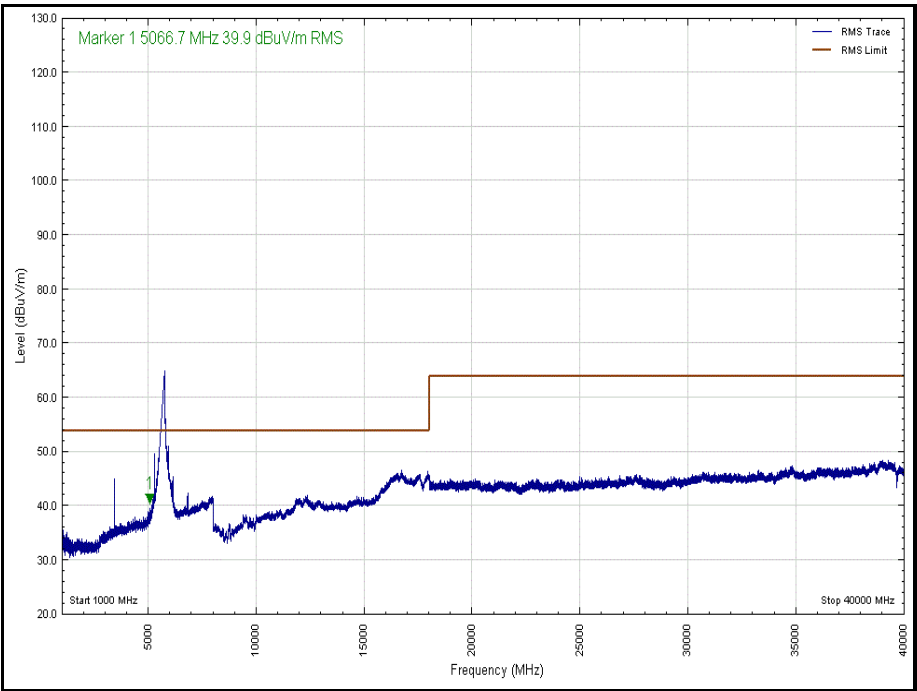


Figure 913 - U-NII 2c - 5700 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Average)

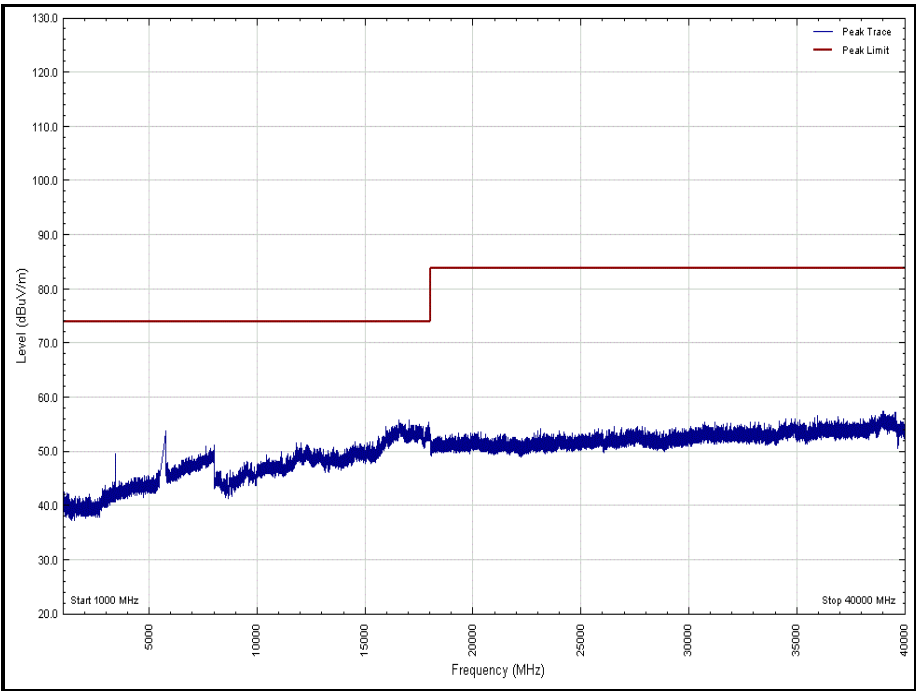


Figure 914 - U-NII 2c - 5700 MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Peak)

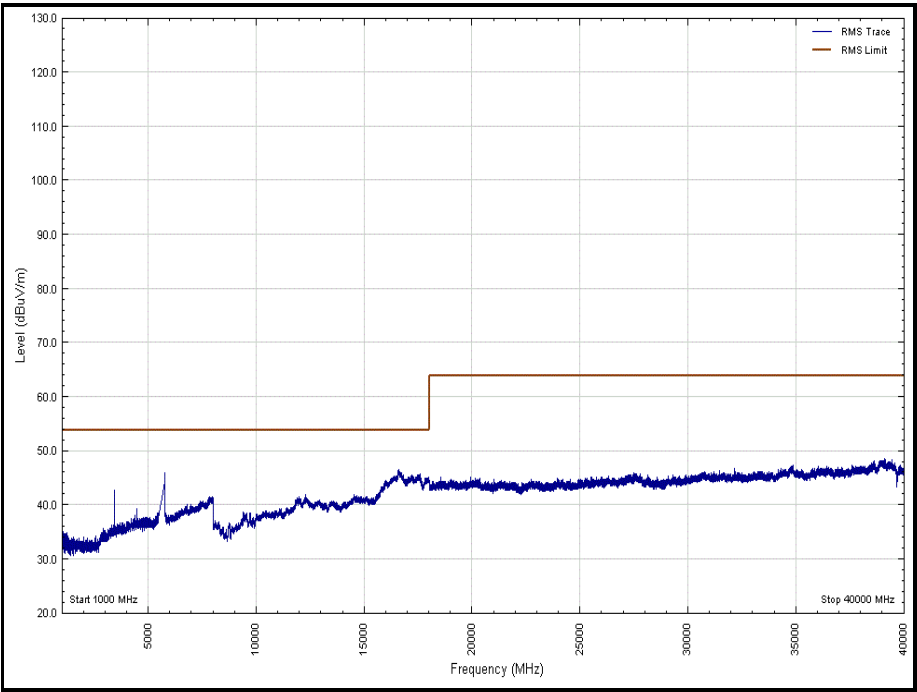


Figure 915 - U-NII 2c - 5700 MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Average)

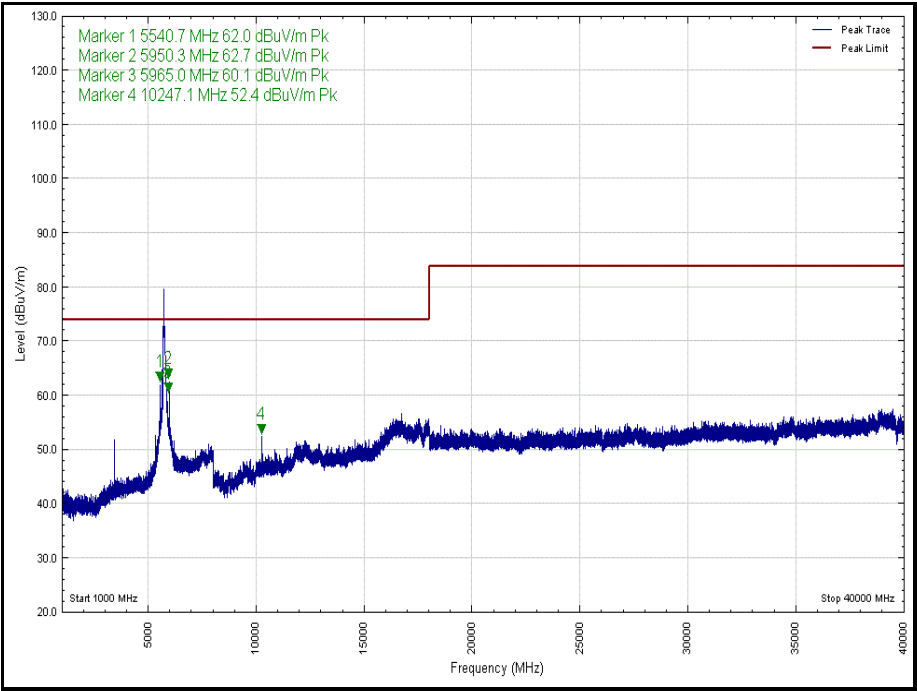


Figure 916 - U-NII 3 - 5745 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Peak)

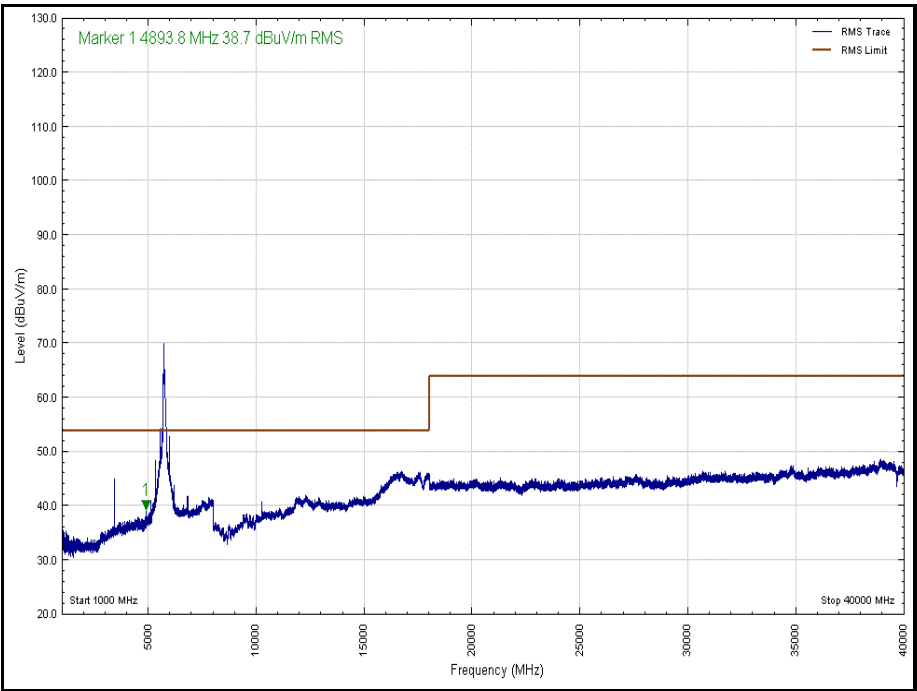


Figure 917 - U-NII 3- 5745 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Average)

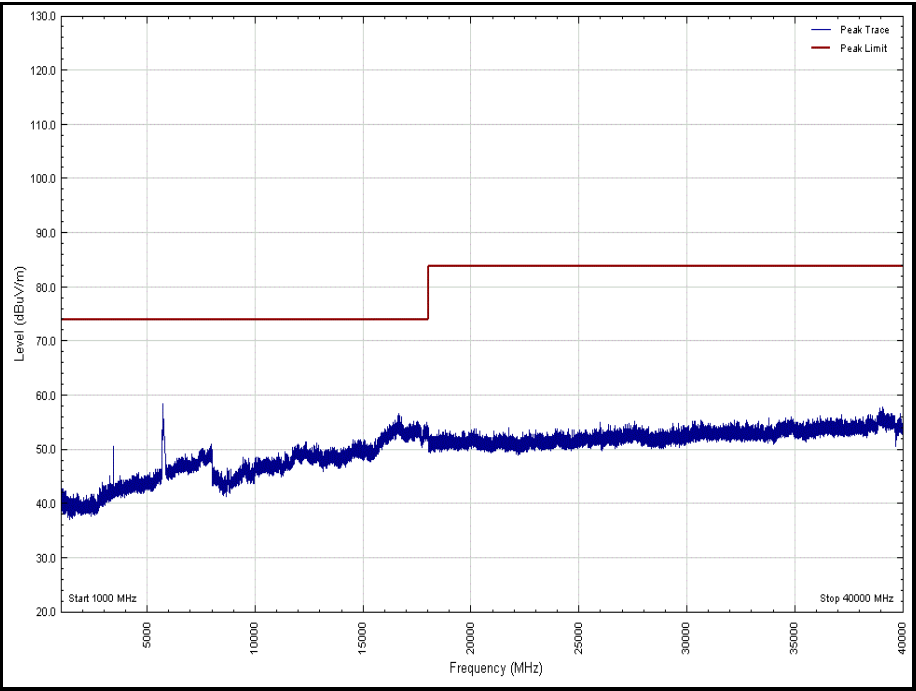


Figure 918 - U-NII 3 - 5745 MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Peak)

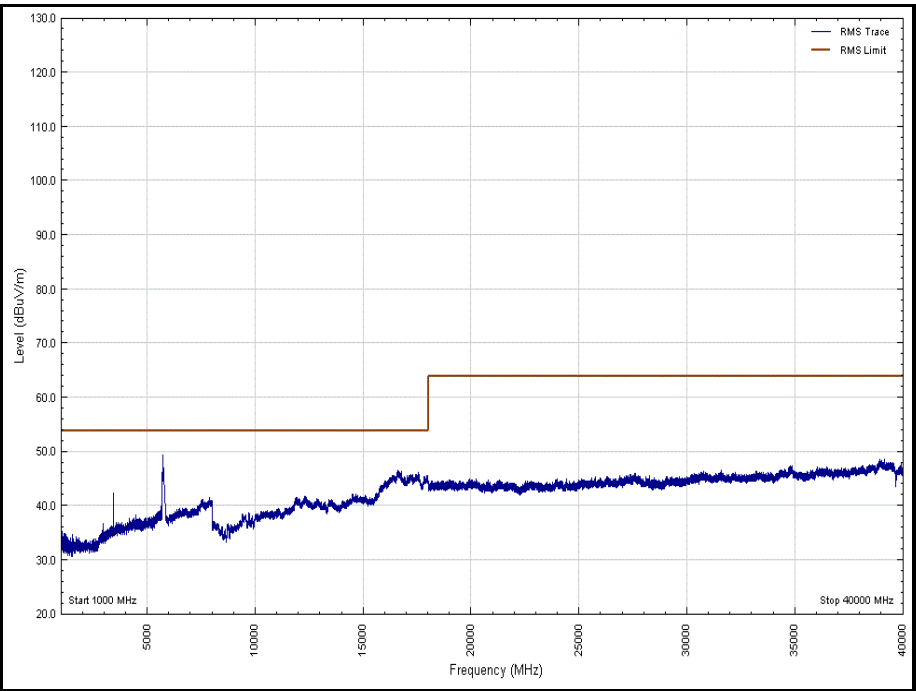


Figure 919 - U-NII 3 - 5745MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Average)

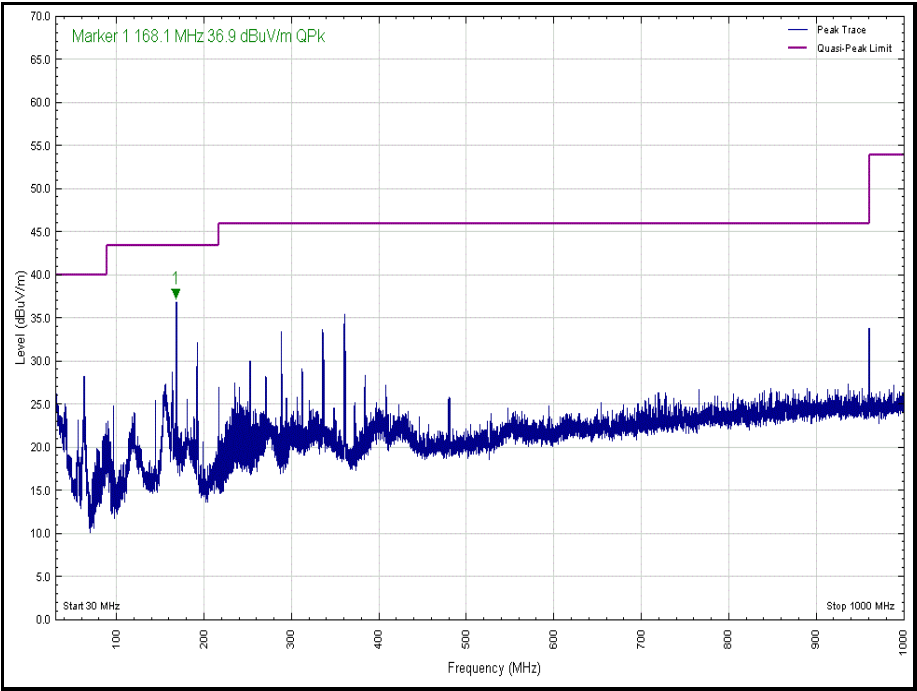


Figure 920 - U-NII 3 - 5825 MHz – 30MHz to 1 GHz - Polarisation: Horizontal (Peak)

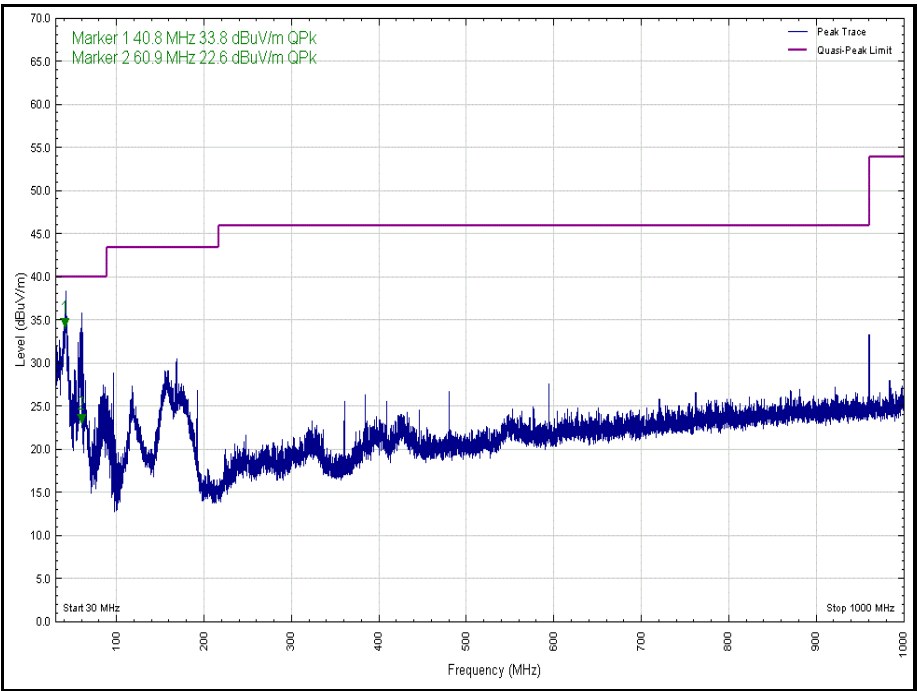


Figure 921 - U-NII 3 - 5825 MHz – 30MHz to 1 GHz - Polarisation: Vertical (Peak)

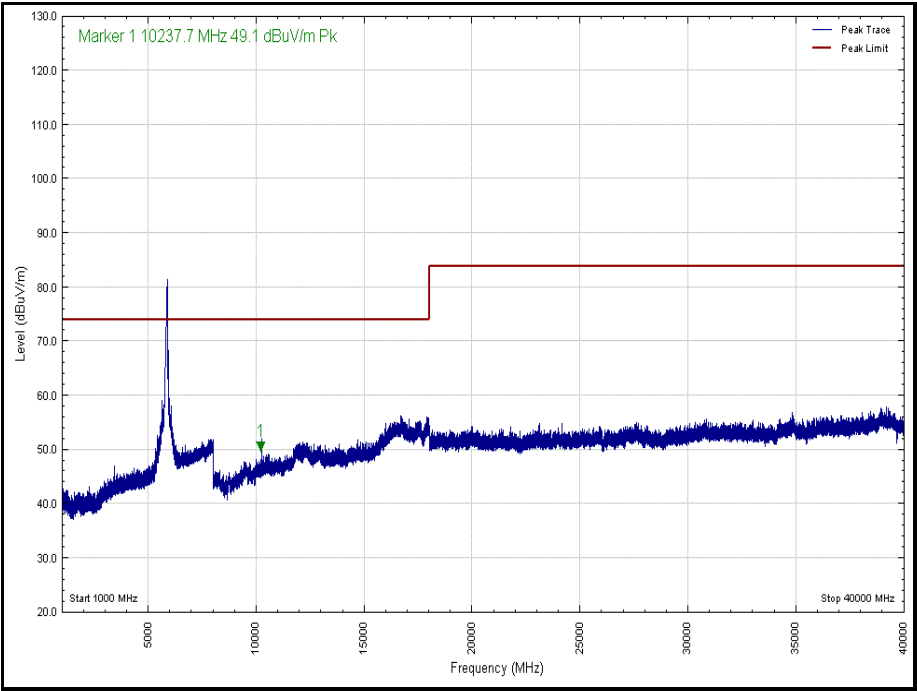


Figure 922 - U-NII 3 - 5825 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Peak)

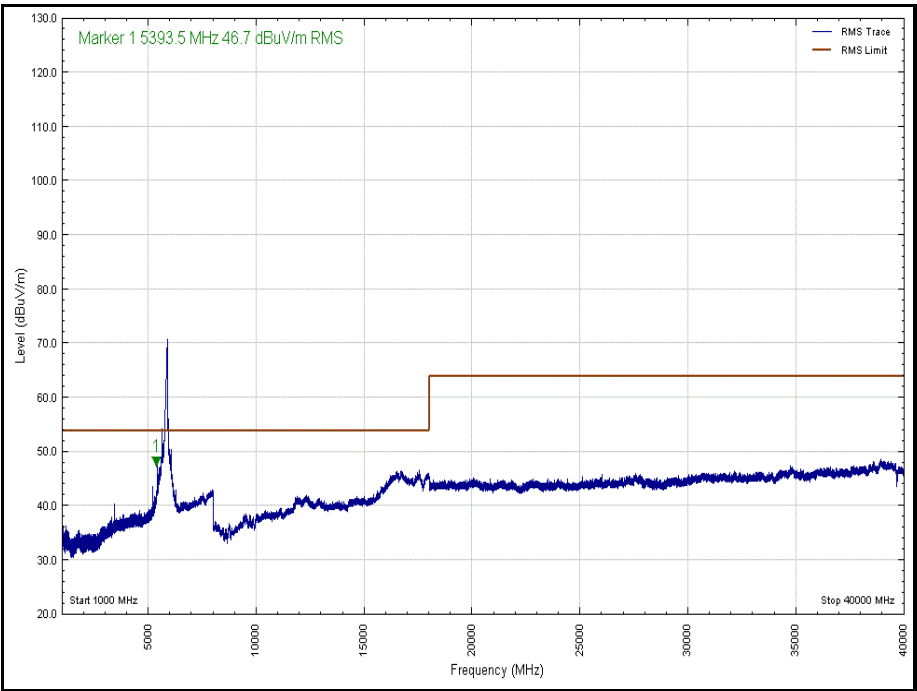


Figure 923 - U-NII 3 - 5825 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Average)

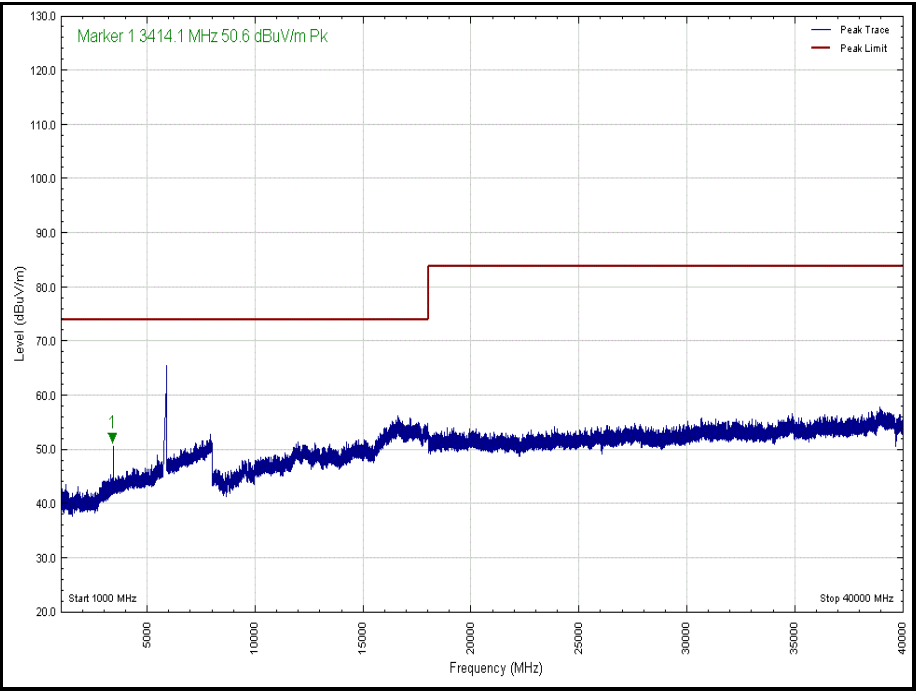


Figure 924 - U-NII 3 - 5825 MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Peak)

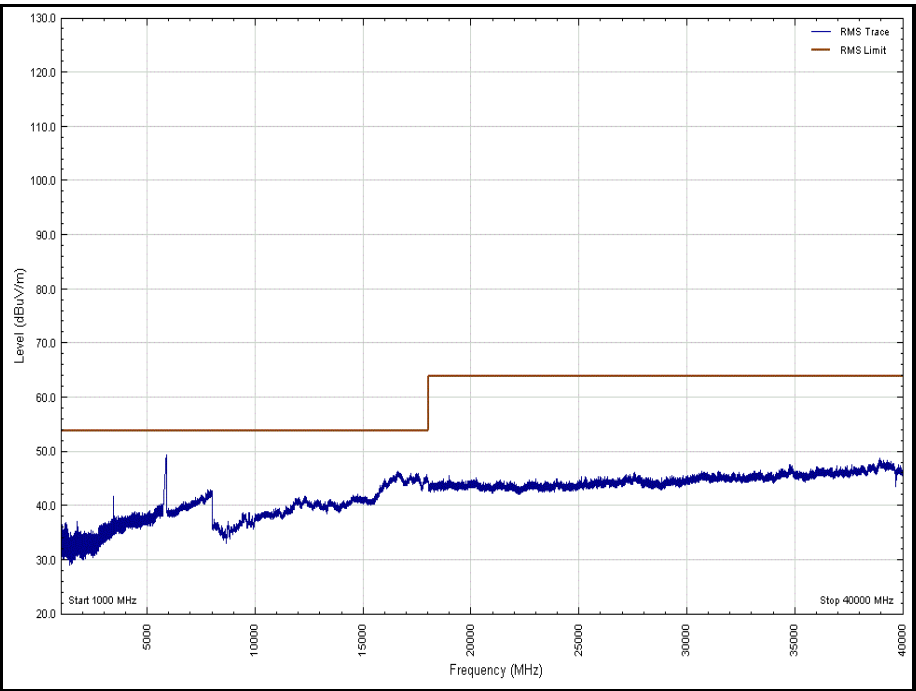


Figure 925 - U-NII 3- 5825 MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Average)



AUX- 20 MHz Bandwidth

Testing was performed with the device operating at maximum output power, HT20 1TX as this was deemed to be worst case.

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

Table 441 – 1 GHz to 40 GHz - Emissions Results- U-NII 1 - 5180 MHz

*No emissions were detected within 10 dB of the limit.

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

Table 442 – 1 GHz to 40 GHz - Emissions Results- U-NII 2a - 5320 MHz

*No emissions were detected within 10 dB of the limit.

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

Table 443 – 1 GHz to 40 GHz - Emissions Results- U-NII 2c - 5500 MHz

*No emissions were detected within 10 dB of the limit.

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

Table 444 – 1 GHz to 40 GHz - Emissions Results- U-NII 2c - 5700 MHz

*No emissions were detected within 10 dB of the limit.

Frequency (GHz)	Result (dBμV/m)		Limit (dBμV/m)		Margin (dB)	
	Peak	Average	Peak	Average	Peak	Average
4308.6		33.6	-	54	-	20.4

Table 445 – 1 GHz to 40 GHz - Emissions Results- U-NII 3 - 5745 MHz

No other emissions were detected within 10 dB of the limit.



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

Table 446 – 1 GHz to 40 GHz - Emissions Results - U-NII 3 - 5825 MHz

*No emissions were detected within 10 dB of the limit.

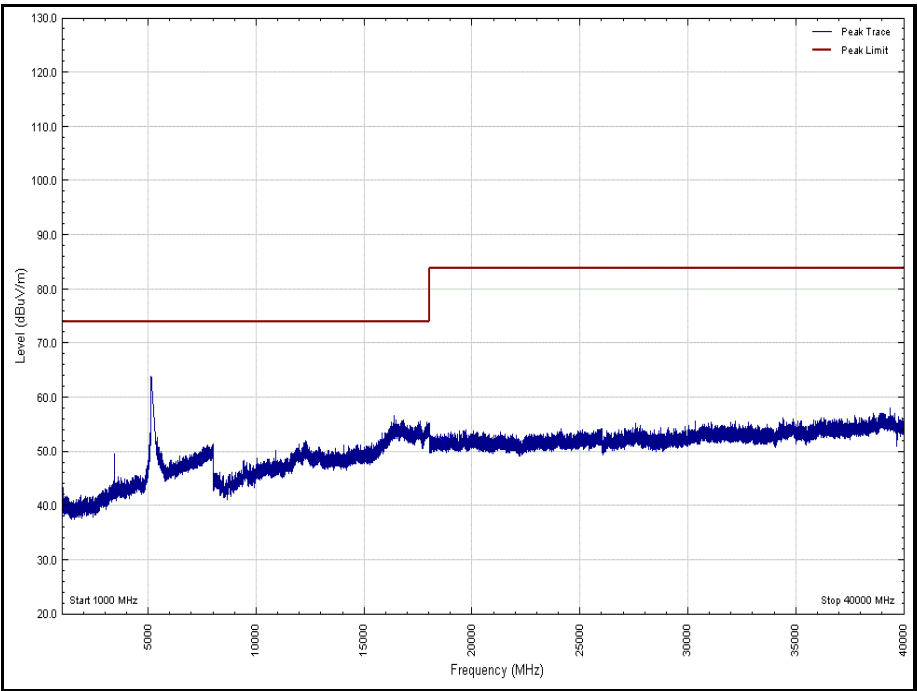


Figure 926 - U-NII 1 - 5180 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Peak)

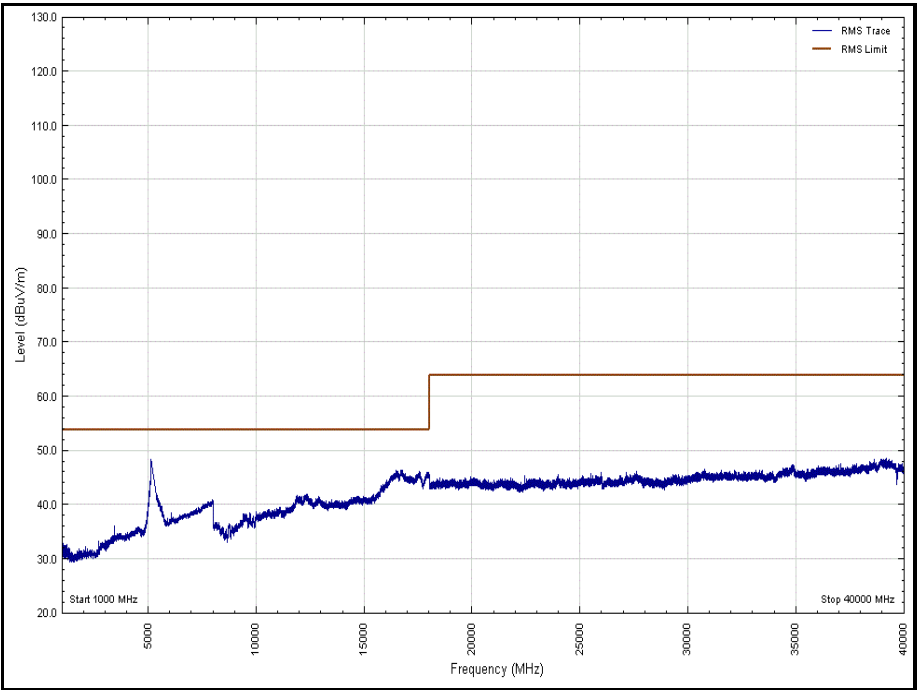


Figure 927 - U-NII 1 - 5180 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Average)

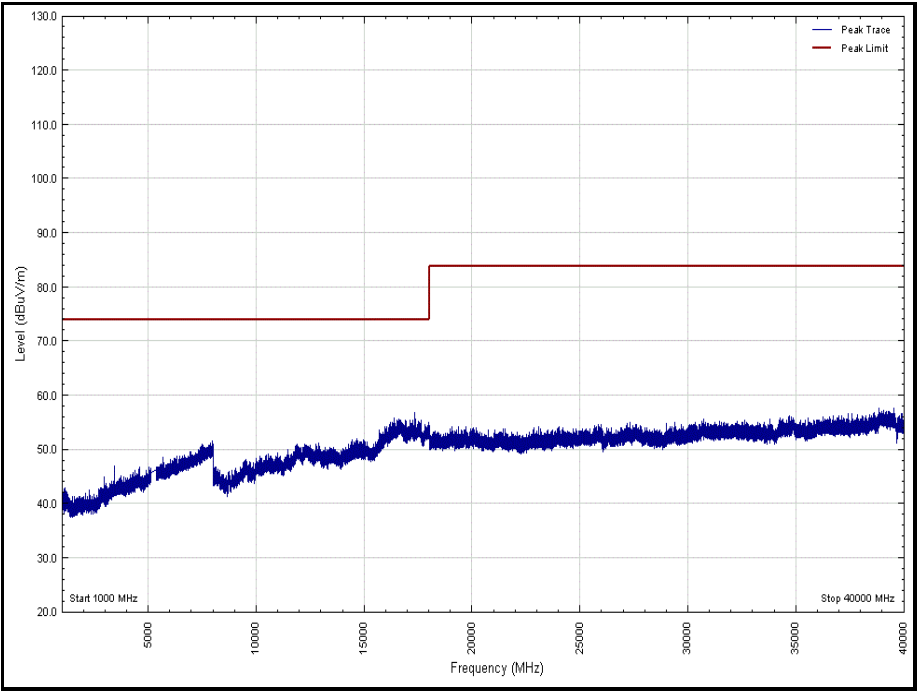


Figure 928 - U-NII 1 - 5180 MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Peak)

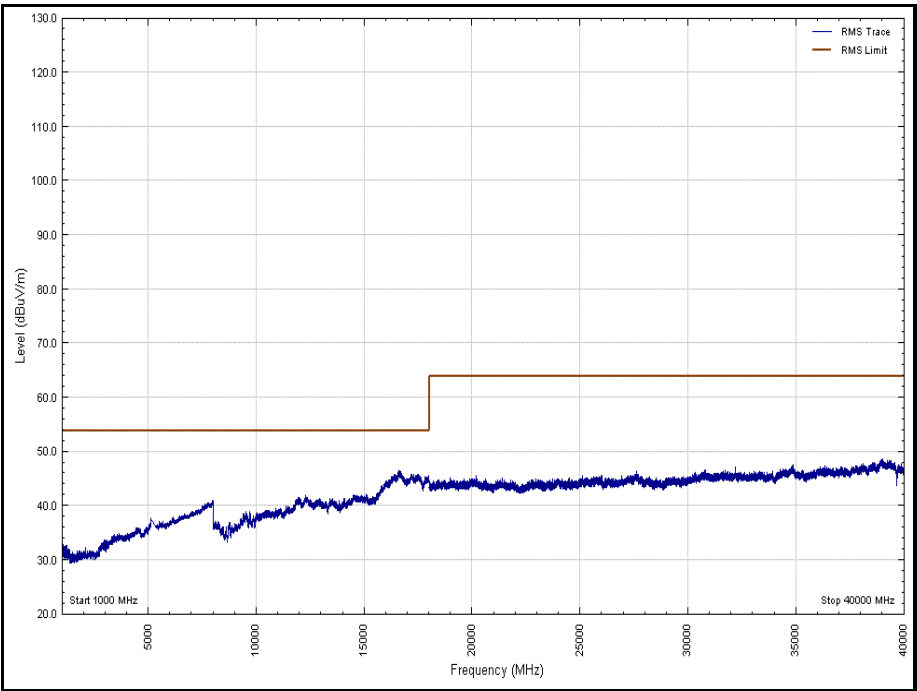


Figure 929 - U-NII 1 - 5180 MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Average)

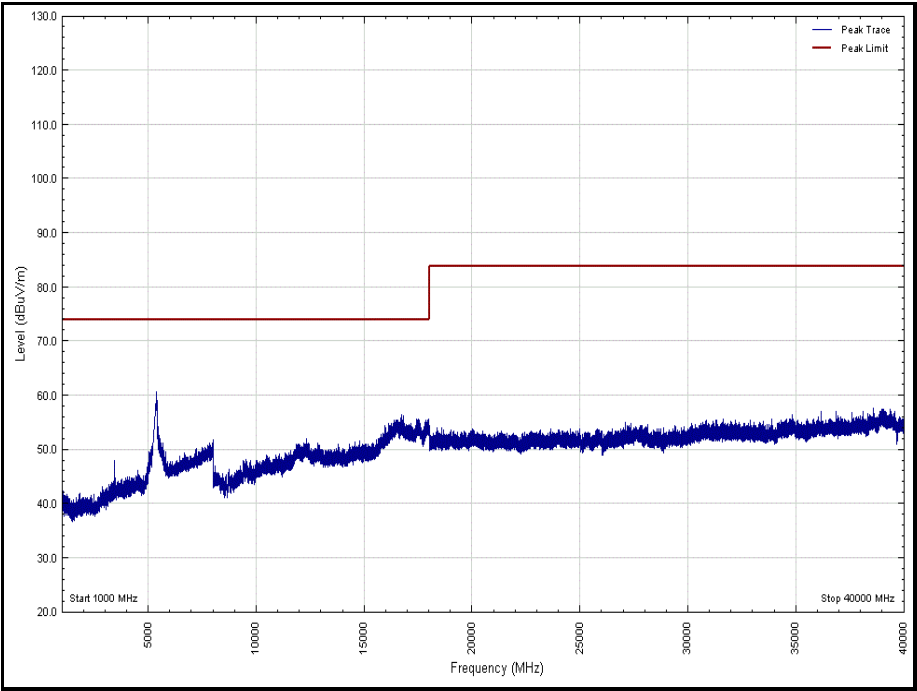


Figure 930 - U-NII 2a - 5320 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Peak)

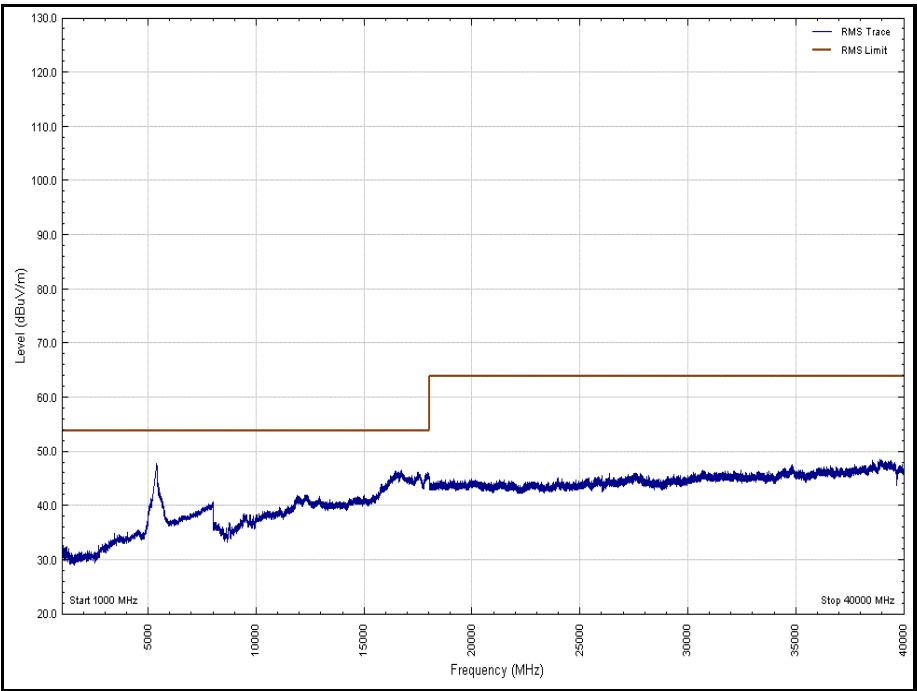


Figure 931 - U-NII 2a - 5320 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Average)

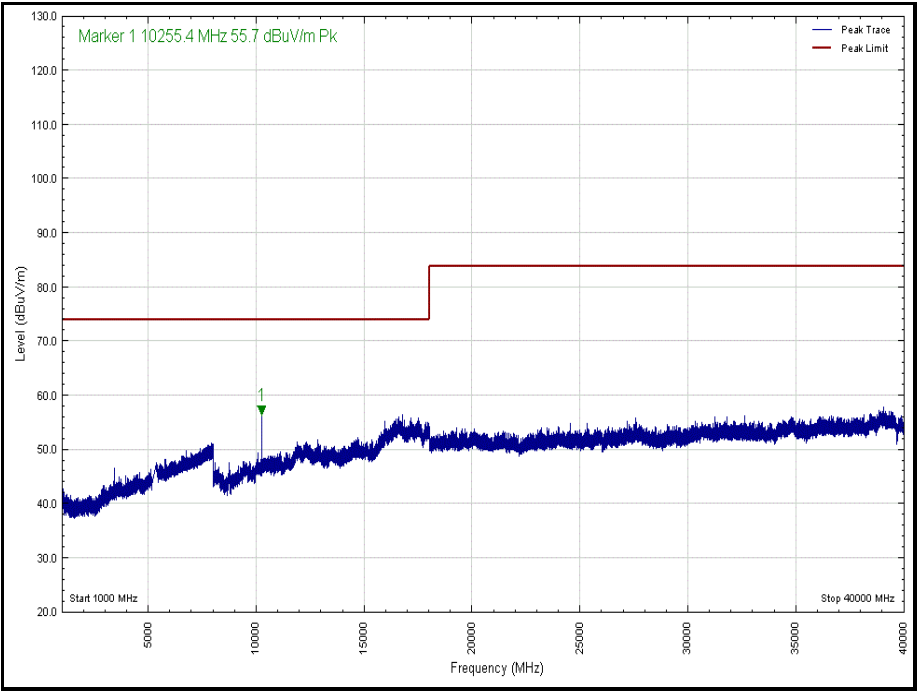


Figure 932 - U-NII 2a - 5320 MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Peak)

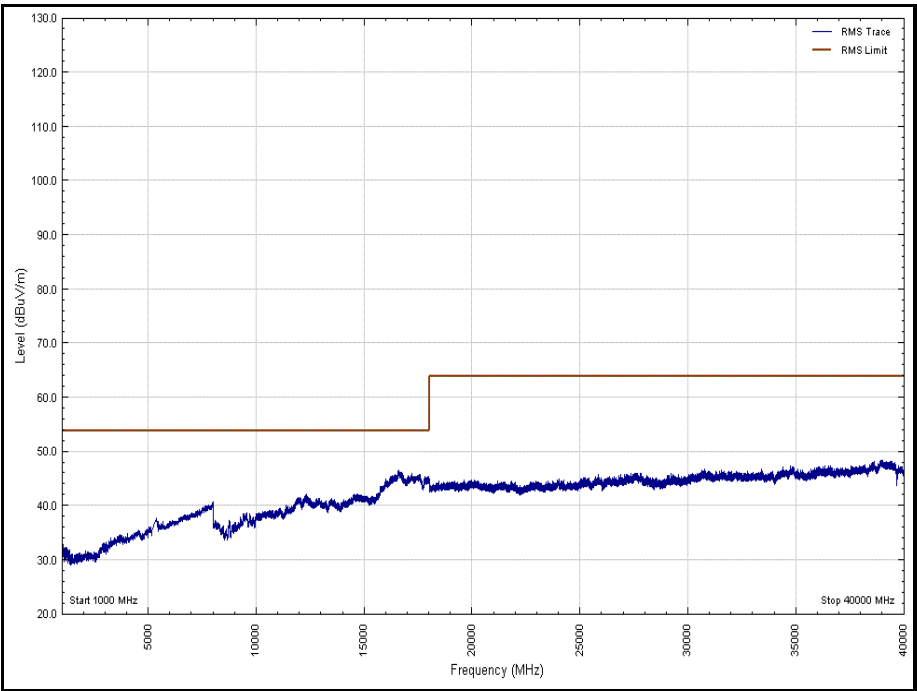


Figure 933 - U-NII 2a - 5320 MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Average)

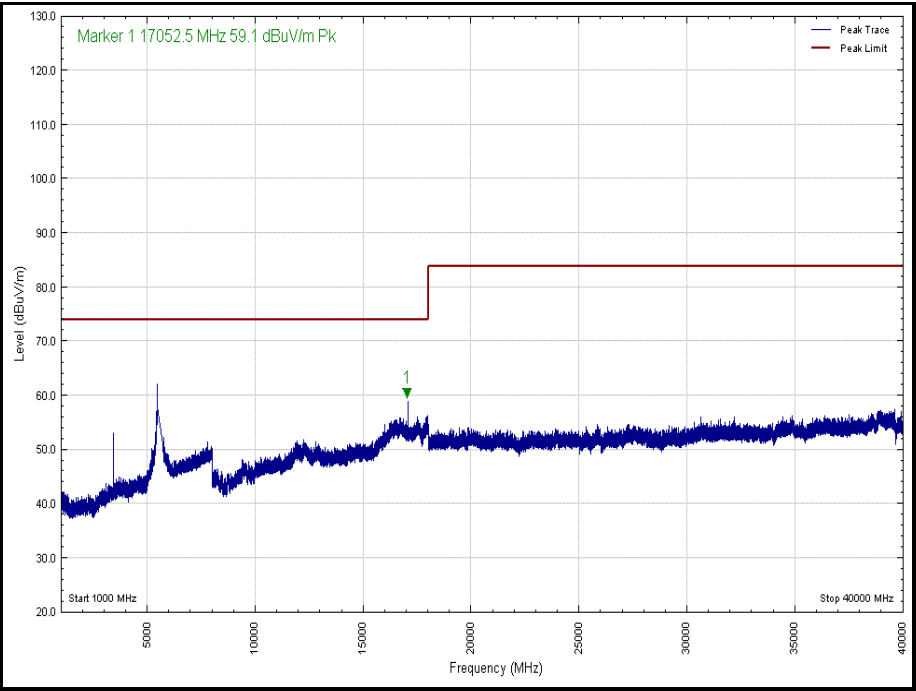


Figure 934 - U-NII 2c - 5500 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Peak)

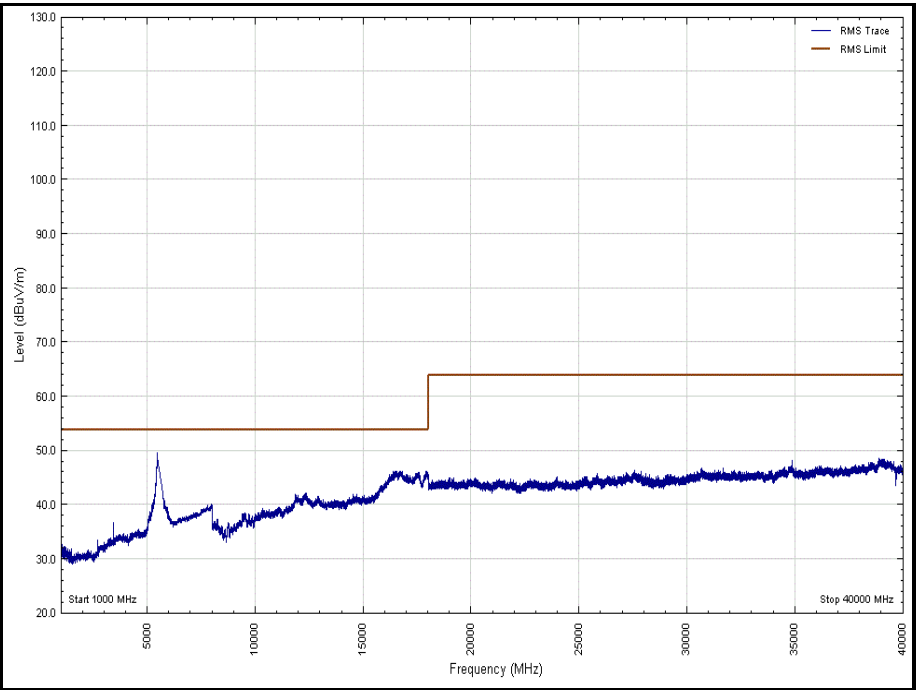


Figure 935 - U-NII 2c - 5500 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Average)

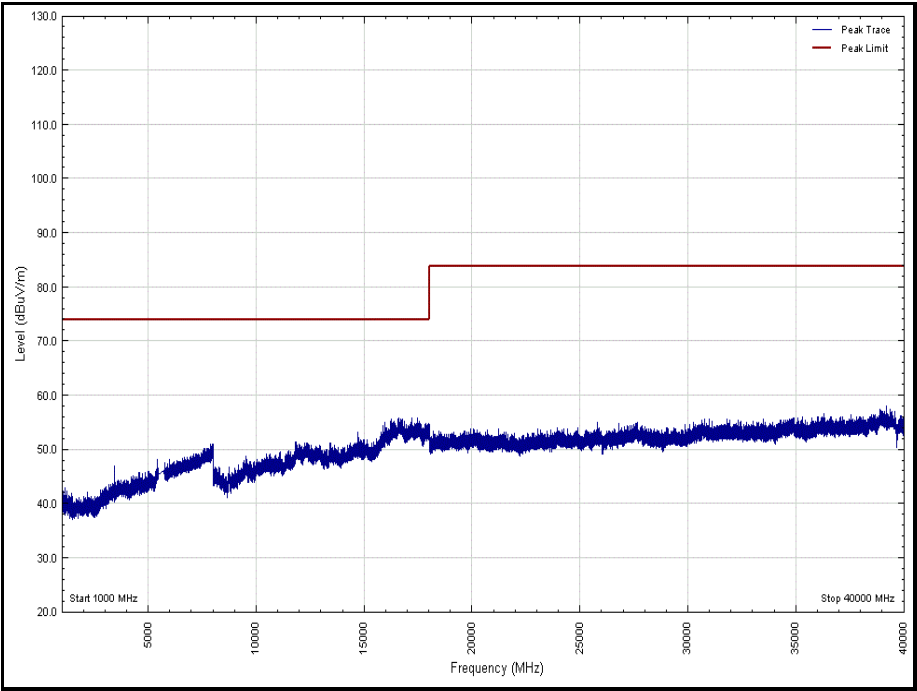


Figure 936 - U-NII 2c - 5500 MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Peak)

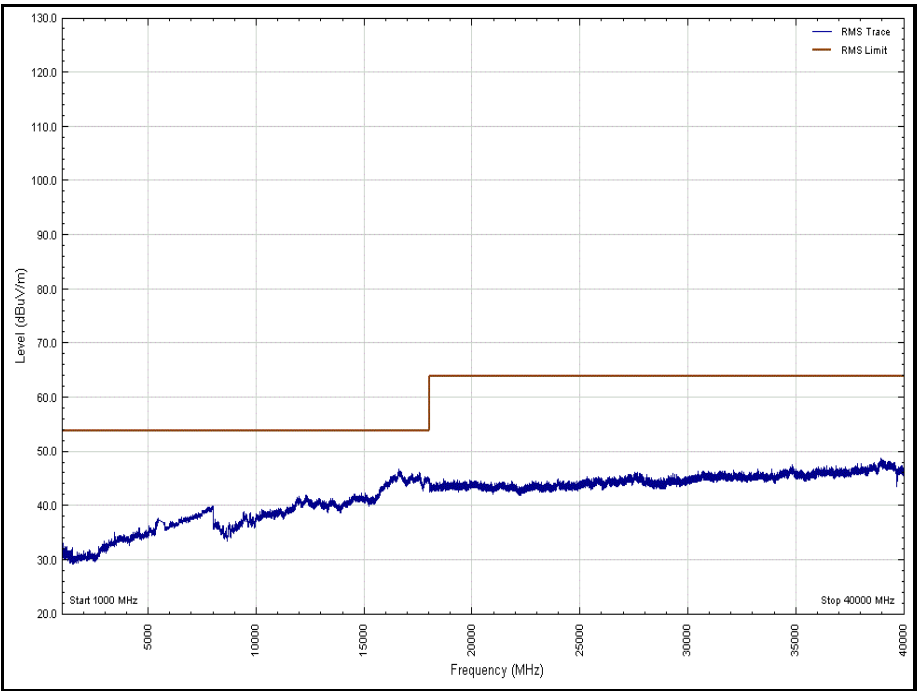


Figure 937 - U-NII 2c - 5500 MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Average)

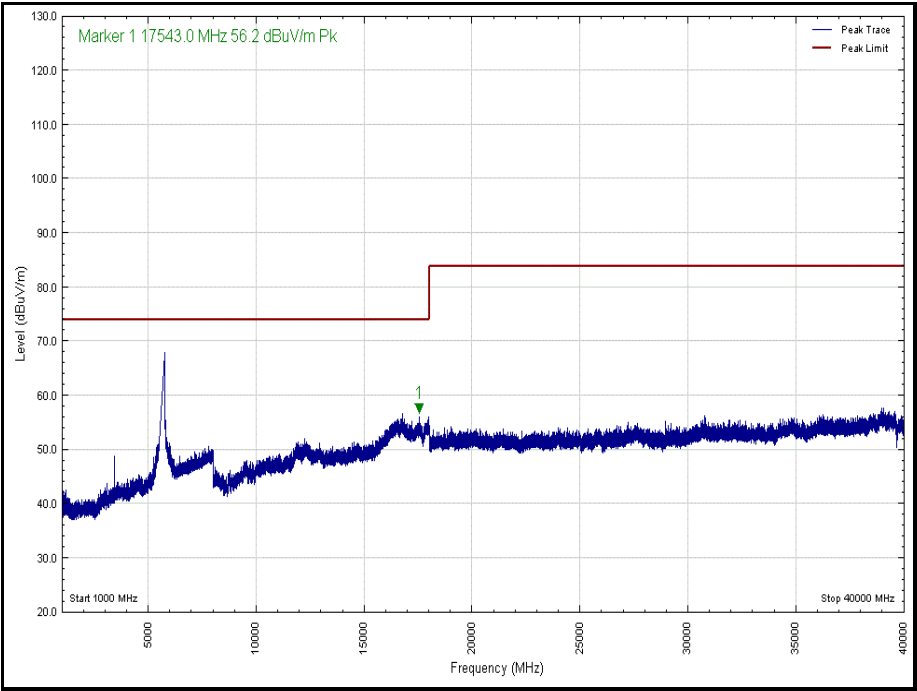


Figure 938 - U-NII 2c - 5700 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Peak)

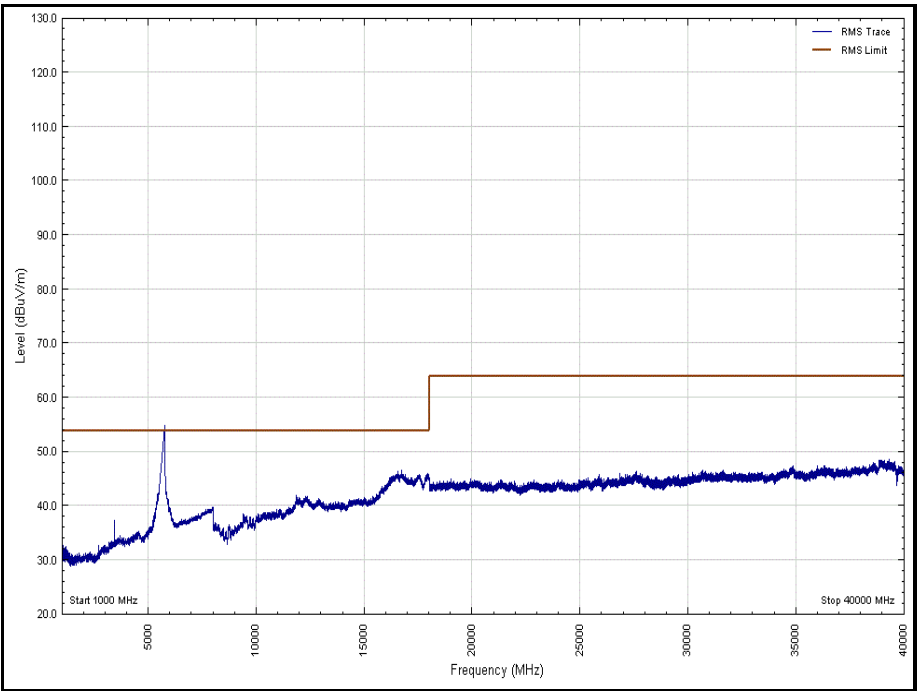


Figure 939 - U-NII 2c - 5700 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Average)

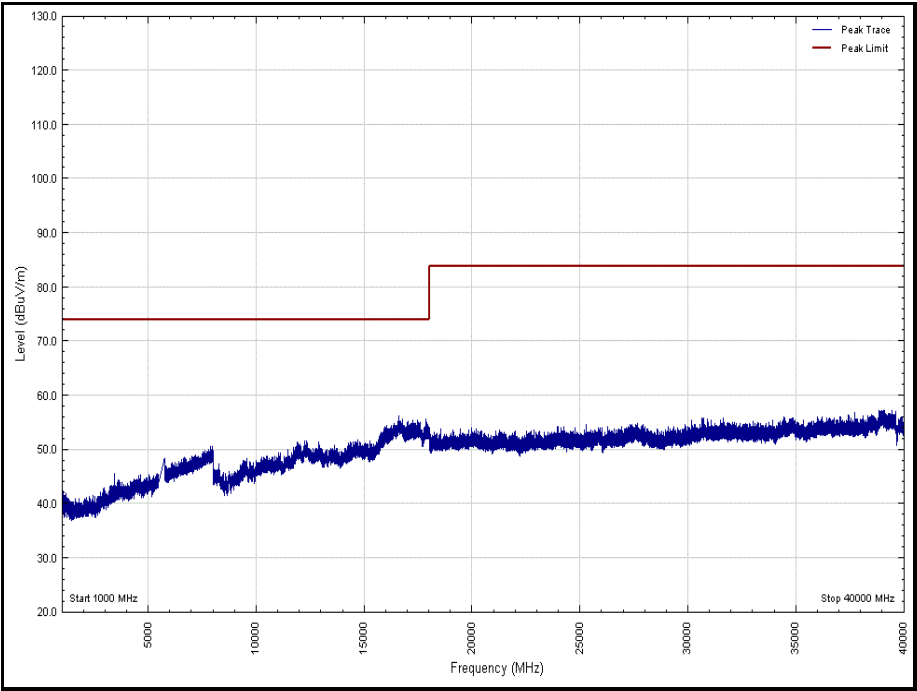


Figure 940 - U-NII 2c - 5700 MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Peak)

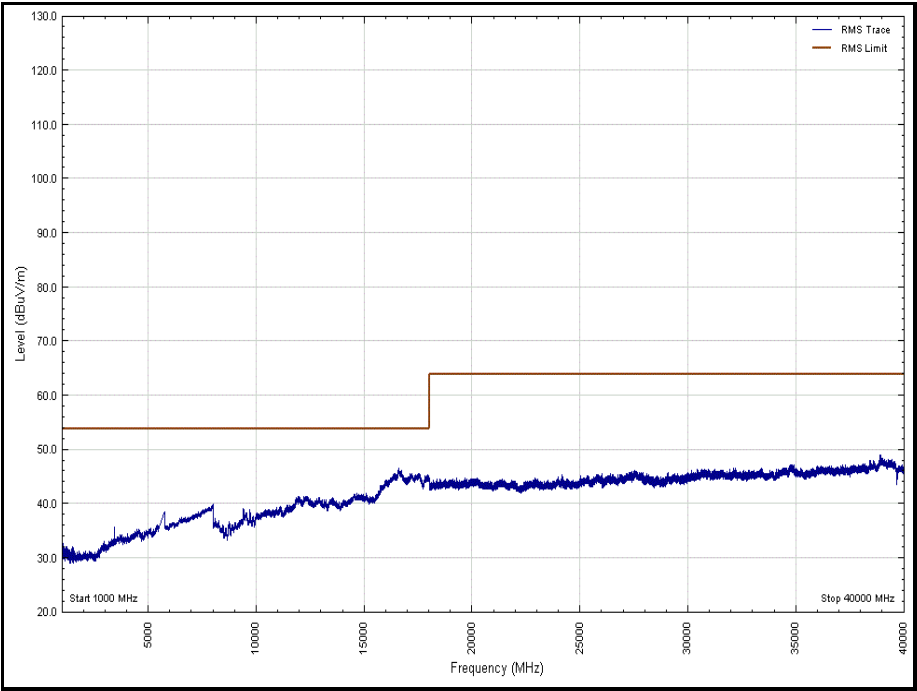


Figure 941 - U-NII 2c - 5700 MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Average)

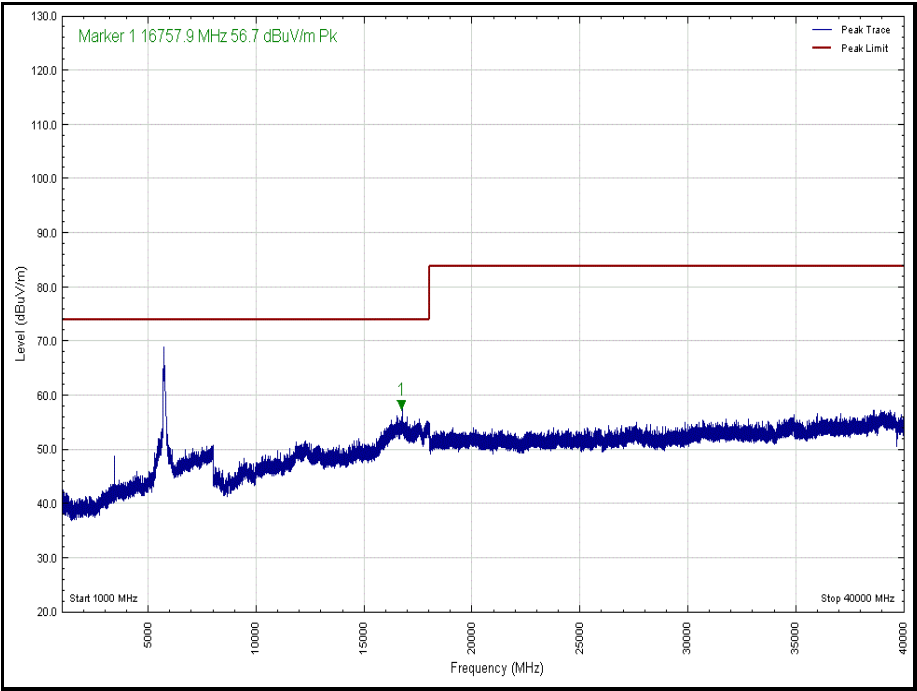


Figure 942 - U-NII 3 - 5745 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Peak)

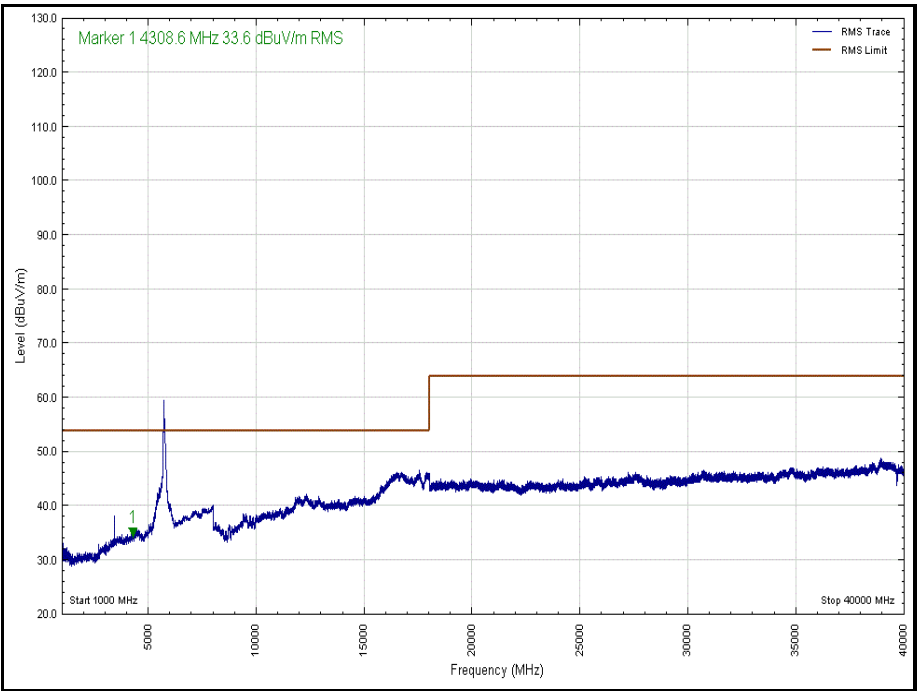


Figure 943 - U-NII 3- 5745 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Average)

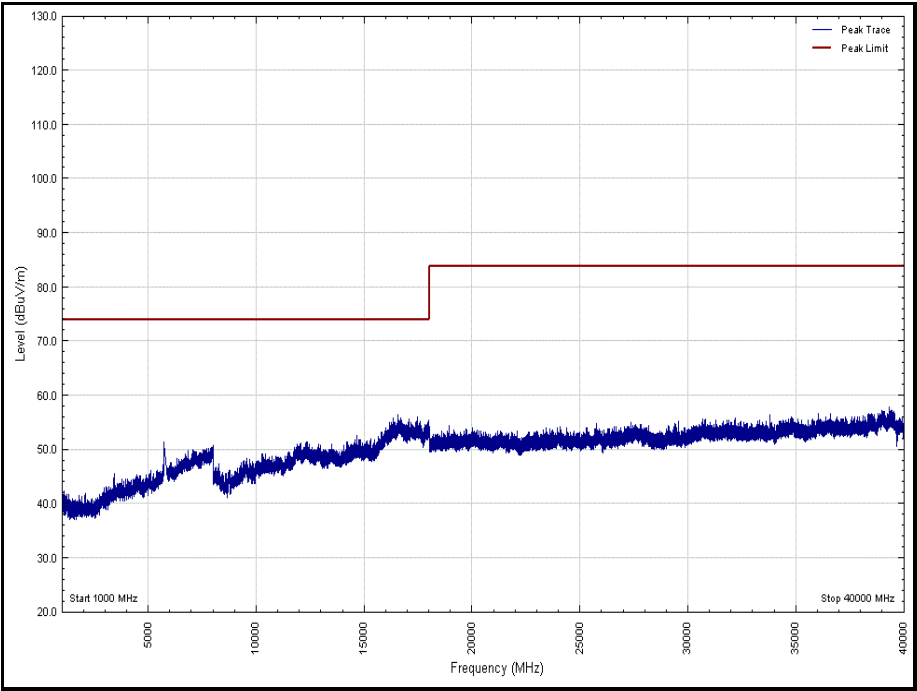


Figure 944 - U-NII 3 - 5745 MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Peak)

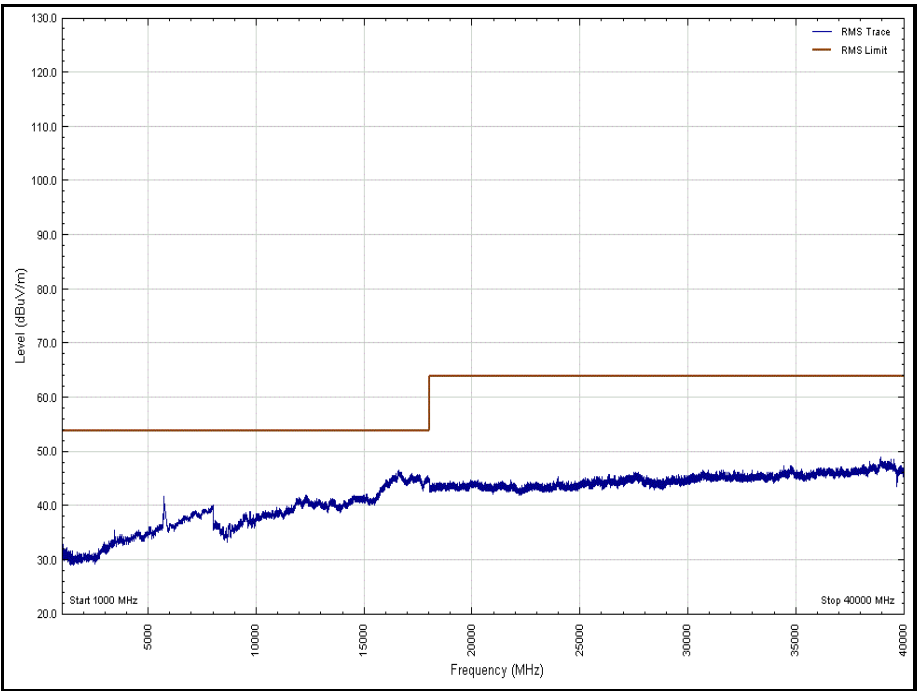


Figure 945 - U-NII 3 - 5745MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Average)

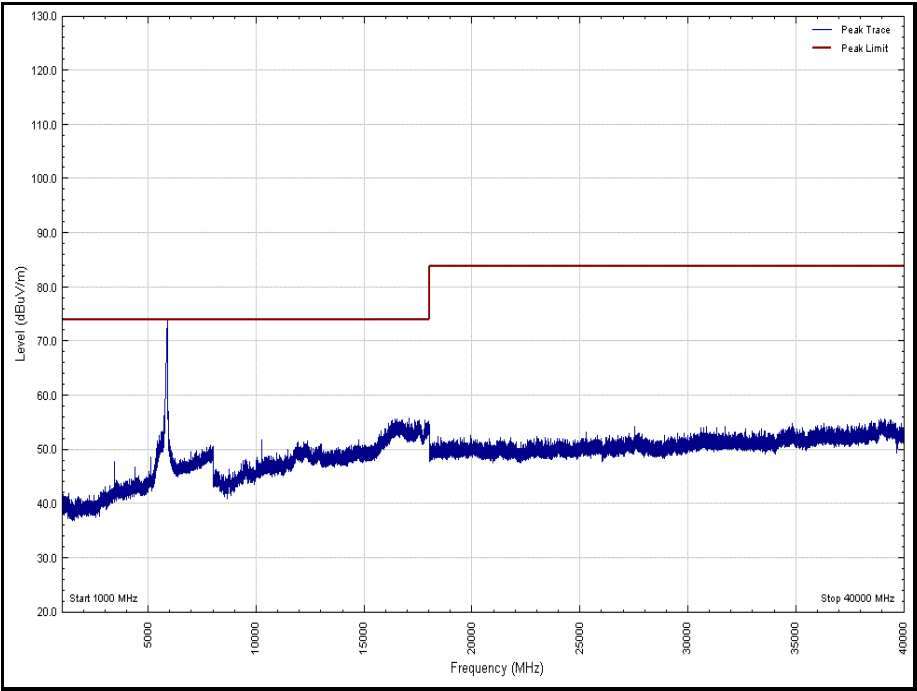


Figure 946 - U-NII 3 - 5825 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Peak)

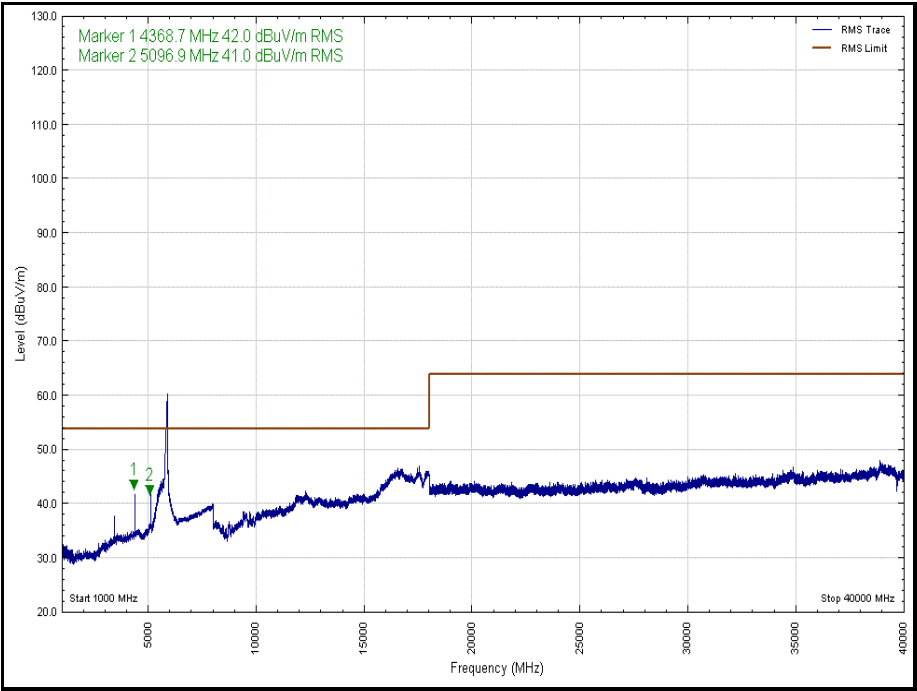


Figure 947 - U-NII 3 - 5825 MHz - 1 GHz to 40 GHz - Polarisation: Horizontal (Average)

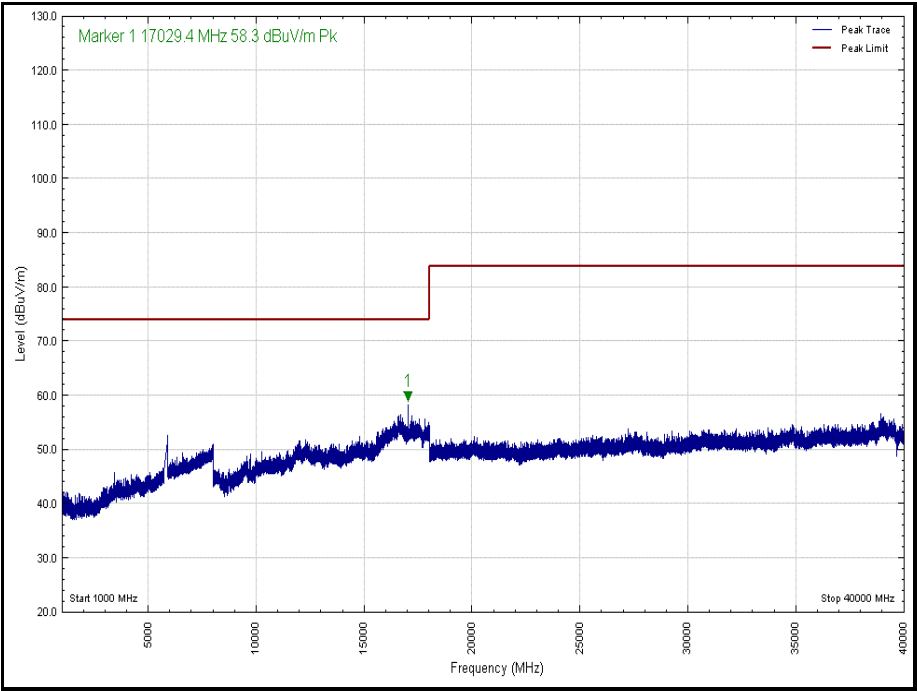


Figure 948 - U-NII 3 - 5825 MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Peak)

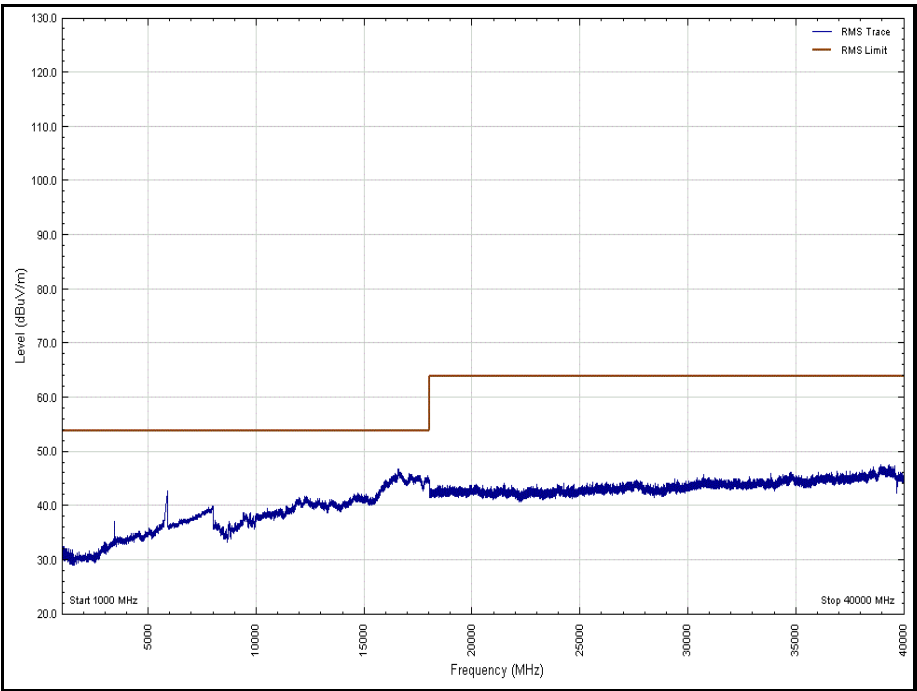


Figure 949 - U-NII 3- 5825 MHz - 1 GHz to 40 GHz - Polarisation: Vertical (Average)



FCC 47 CFR Part 15, Limit Clause 15.407(b)(1)(2)(3)(4)

Emissions not falling within the restricted bands listed in FCC 47 CFR Part 15.209:

For transmitters operating in the 5.15-5.25 GHz band: ≤ -27 dBm/MHz outside 5150-5350 MHz.

For transmitters operating in the 5.25-5.35 GHz band: ≤ -27 dBm/MHz outside 5150-5350 MHz.

For transmitters operating in the 5.47-5.725 GHz band: ≤ -27 dBm/MHz outside 5470-5725 MHz

For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Emissions within the restricted bands listed in FCC 47 CFR Part 15.209:

Frequency (MHz)	Field Strength (μ V/m)	Measurement Distance (m)
0.009 to 0.490	2400/F(kHz)	300
0.490 to 1.705	24000/F(kHz)	30
1.705 to 30	30	30
30 to 88	100	3
88 to 216	150	3
216 to 960	200	3
Above 960	500	3

Table 447 - Radiated Emissions Limit Table (FCC)



ISED RSS-247, Limit Clause 6.2.1.2, 6.2.2.2, 6.2.3.2 and 6.2.4.2 and ISED RSS-GEN, Limit Clause 8.9

Emissions not falling within the restricted bands listed in ISED RSS-GEN, Clause 8.10:

For transmitters with operating frequencies in the band 5150-5250 MHz, all emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. Any unwanted emissions that fall into the band 5250-5350 MHz shall be attenuated below the channel power by at least 26 dB.

For transmitters with operating frequencies in the bands 5250-5350 MHz and 5470-5725 MHz, all emissions outside the band 5250-5350 MHz and 5470-5725 MHz shall not exceed -27 dBm/MHz e.i.r.p.

Devices operating in the band 5725-5850 MHz shall have e.i.r.p. of unwanted emissions comply with the following:

- a) 27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges;
- b) 15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;
- c) 10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and
- d) -27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.

Emissions not falling within the restricted bands listed in ISED RSS-GEN, Clause 8.10:

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)
0.009 to 0.490	2400/F(kHz)
0.490 to 1.705	24000/F(kHz)
1.705 to 30	30
30 to 88	100
88 to 216	150
216 to 960	200
Above 960	500

Table 448 - Radiated Emissions Limit Table (ISED)



2.6.7 Test Location and Test Equipment Used

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

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Antenna with permanent attenuator (Bilog)	Schaffner	CBL6143	287	24	15-May-2020
10dB/1W SMA Attenuator dc - 18GHz	Sealectro	60-674-1010-89	395	-	O/P Mon
Pre-Amplifier	Phase One	PS04-0086	1533	12	08-Feb-2020
Screened Room (5)	Rainford	Rainford	1545	36	23-Jan-2021
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Hygrometer	Rotronic	HYGROPALM 1	2338	12	15-Nov-2019
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	17-Dec-2019
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	14-Nov-2020
Cable (Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4526	6	11-Dec-2019
High Pass Filter (4GHz)	K&L Microwave	11SH10-4000/X18000-0/0	4599	12	05-Sep-2020
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	05-Mar-2020
Mast Controller	Maturo GmbH	NCD	4810	-	TU
Tilt Antenna Mast	Maturo GmbH	TAM 4.0-P	4811	-	TU
Double Ridge Broadband Horn Antenna	Schwarzbeck	BBHA 9120 B	4848	12	11-Mar-2020
8 - 18 GHz pre amp	Wright Technologies	PS06-0061	4971	12	07-Dec-2019
Band Reject Filter - 2.425 GHz	Wainwright	WRCGV14-2390-2400-2450-2460-50SS	5066	12	01-Oct-2020
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	5068	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
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	11-Nov-2019

Table 449



Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
8m N-Type RF Cable	Teledyne	PR90-088-8MTR	5093	12	06-Oct-2020
8m N-Type RF Cable	Teledyne	PR90-088-8MTR	5095	12	04-Dec-2019
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	05-Dec-2019
Cable (18 GHz)	Rosenberger	LU7-071-1000	5105	12	06-Oct-2020
Cable (18 GHz)	Rosenberger	LU7-071-2000	5107	12	06-Oct-2020
EmX Emissions Software	TUV SUD	EmX	5125	-	N/A - Software
1.5m 40GHz RF Cable	Scott Cables	KPS-1501-2000-KPS	5127	6	11-Dec-2019
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
8 Meter Cable	Teledyne	PR90-088-8MTR	5212	12	30-Aug-2020
Horn Antenna (1-10GHz)	Schwarzbeck	BBHA 9120 B	5215	12	11-Mar-2020
DRG Horn Antenna (7.5-18GHz)	Schwarzbeck	HWRD750	5216	12	11-Mar-2020
3 GHz High pass filter	Wainwright	WHKX12-2580-3000-18000-80SS	5219	12	15-Feb-2020

Table 450

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



2.7 Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period

2.7.1 Specification Reference

FCC 47 CFR Part 15E, Clause 15.407 (h)(2)(iii)(iv)
ISED RSS-247, Clause 6.3.2(c)(d)(e)

2.7.2 Equipment Under Test and Modification State

A2304, S/N: C02Z1008N0GT - Modification State 0

2.7.3 Date of Test

07-November-2019 to 08-November-2019

2.7.4 Test Method

This test was performed in accordance with FCC KDB 905462 D02, clause 7.8.3.

A computer was connected via an Ethernet cable to the Master device and iperf was used to load the channels under test.

Radar Pulse Type 0 was then transmitted, and the Spectrum monitored. The transmissions from the UUT were observed for a period of 12 seconds after the final injected Radar Pulse.

It was checked that all transmissions stopped within the 10 second period defined from the point of the end of the final Radar pulse + 10 seconds. In addition, the aggregate on time during the first 200ms and the following 9.8 seconds of the Channel Move Time was computed by the Aeroflex DFS Software.

The markers on the trace data correspond to the following time periods:

Red - End of Radar Burst, (T0)
Purple - End of 200ms Period, (T0 + 200 ms)
Orange - End of Channel Move Time, (T0 + 10 seconds)

To verify the non-occupancy period, the PXI digitiser was replaced with a Spectrum Analyser. The external trigger from the Aeroflex DFS test system was used to trigger a 30-minute sweep from the moment the radar burst sequence was injected. It was verified that no transmissions occurred on the test channel during this time period.

2.7.5 Environmental Conditions

Ambient Temperature	24.2 °C
Relative Humidity	30.7 %

2.7.6 Test Results

5 GHz WLAN - 802.11ac VHT80

The equipment was set up as shown in the diagram below. The EUT was configured to run iPerf, transmitting UDP to the client laptop. The channel loading was set to >17 % by adjusting the bandwidth specified in the iPerf UDP transfer.

To calibrate the level of the radar at the input to the companion device, the companion device was replaced by the spectrum analyser and the output of the PXI RF generator adjusted to give -61 dBm.

Radar Type	Pulse Width (μ s)	PRI (μ s)	Number of Pulses
0	1	1428	18

Table 451 - Radar Pulse Type 0 Characteristics

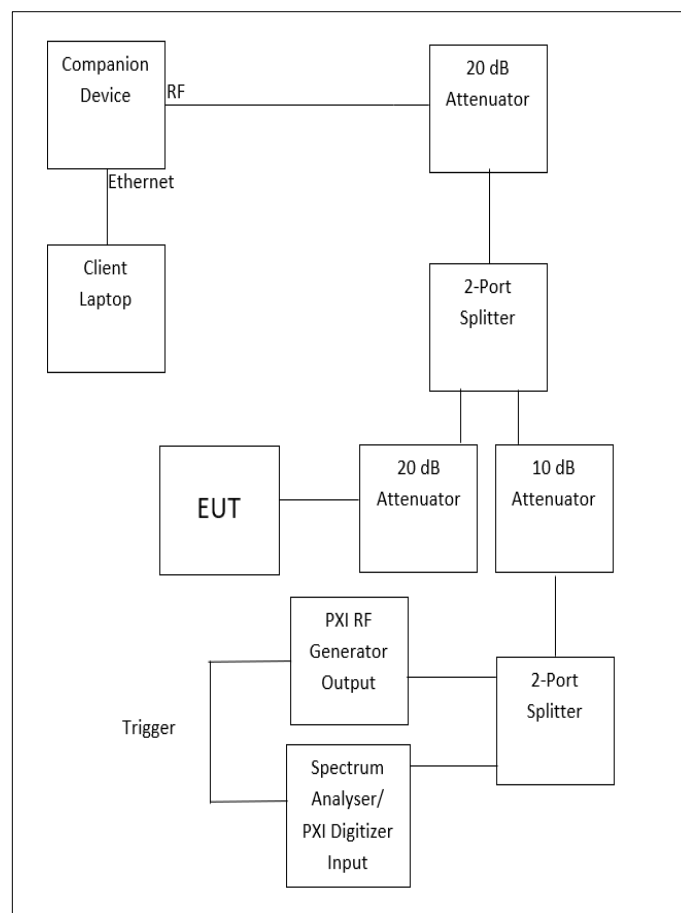


Figure 950 - Test Equipment Setup Diagram for Client without Radar Detection with Injection at the Master

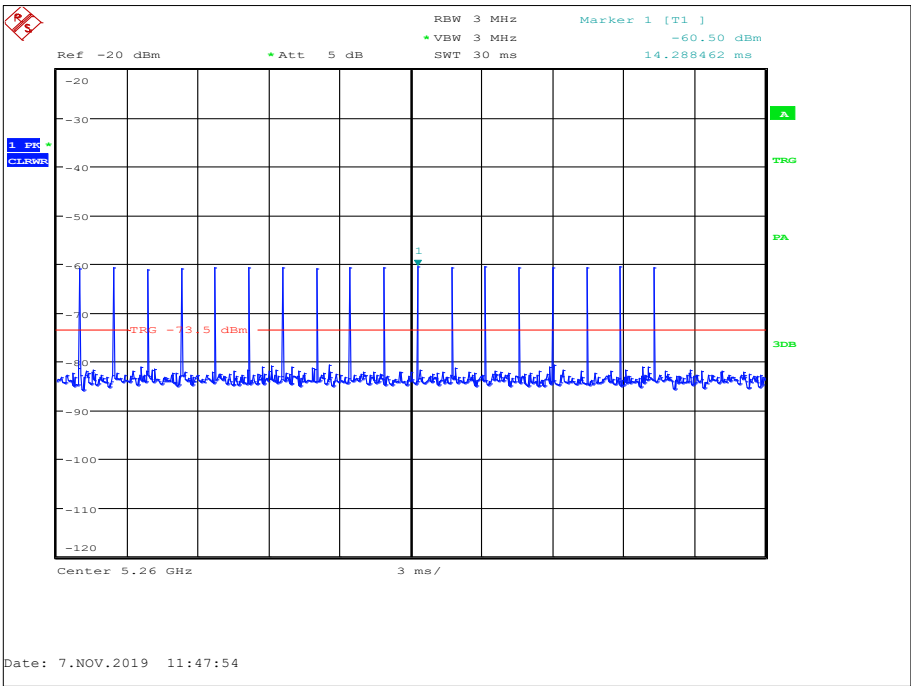


Figure 951 - Verification of Radar Type 0

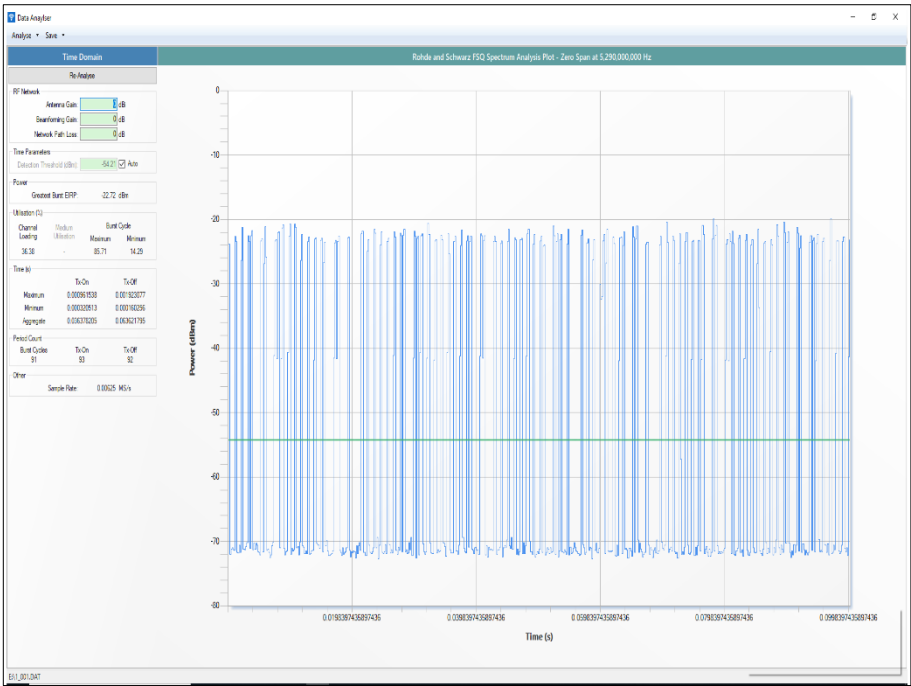


Figure 952 - Channel Loading

The channel loading was 36.38%

Maximum Transmit Power	Value (Notes 1 and 2)
≥ 200 milliwatt	-64 dBm
< 200 milliwatt	-62 dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna. Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.	

Table 452 - DFS Detection Thresholds for Master Devices and Client Devices with Radar Detection

Test Parameter	Result
Channel Move Time	4.09 s
Channel Closing Time (Aggregate Time During 200 ms)	7.89 ms
Channel Closing Time (Aggregate Time During 200 ms to 10 s)	16.11 ms
Channel Closing Time (Aggregate Time During 10 s)	24.00 ms
Transmission Observed During Non-Occupancy Period	none

Table 453 - In-Service Monitoring Test Results

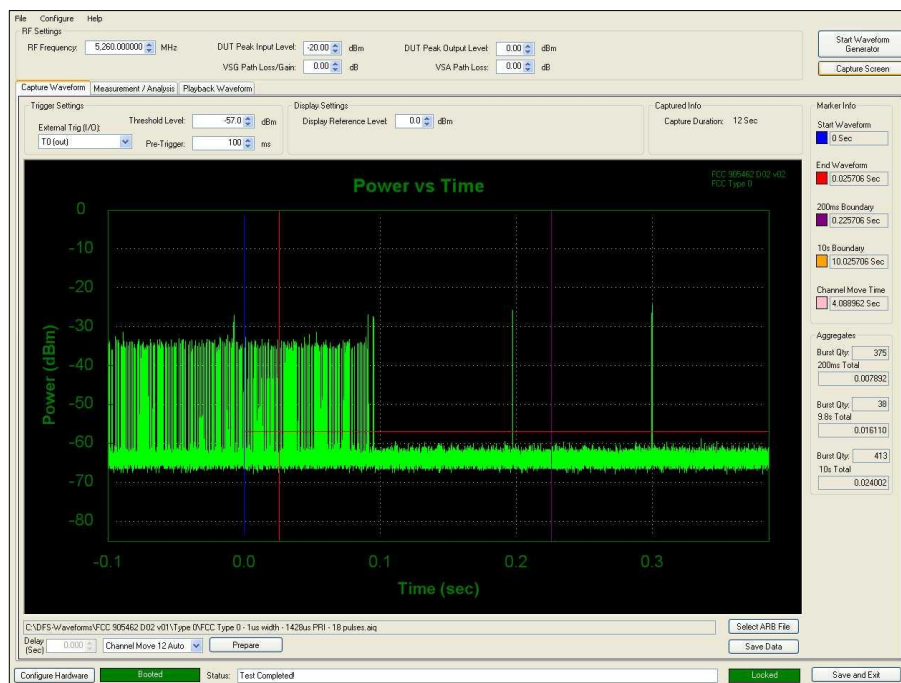


Figure 953 - First 200 ms of Channel Shutdown Period

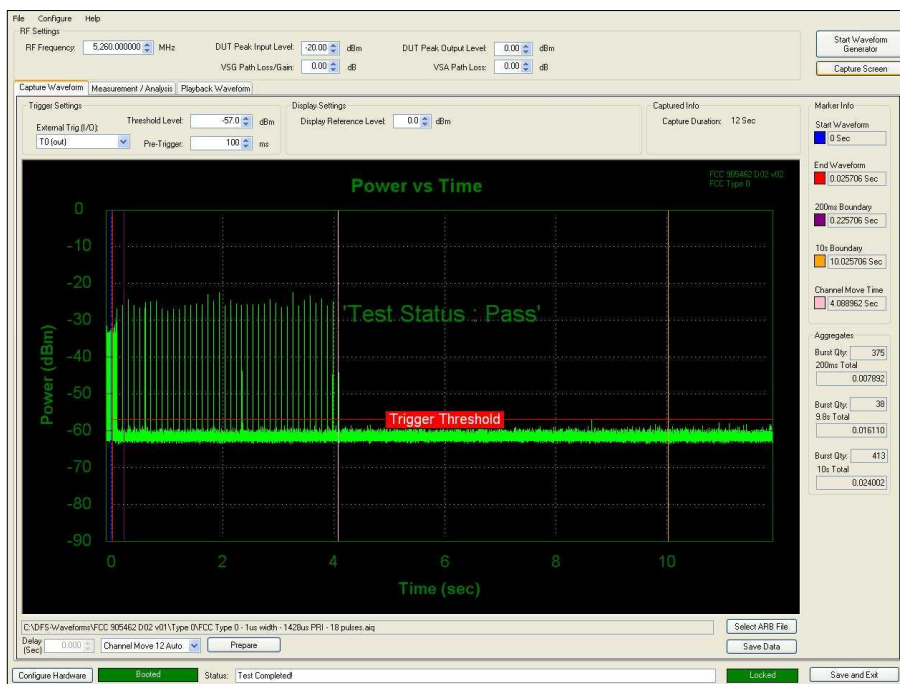


Figure 954 - First 12 s of Channel Shutdown Period

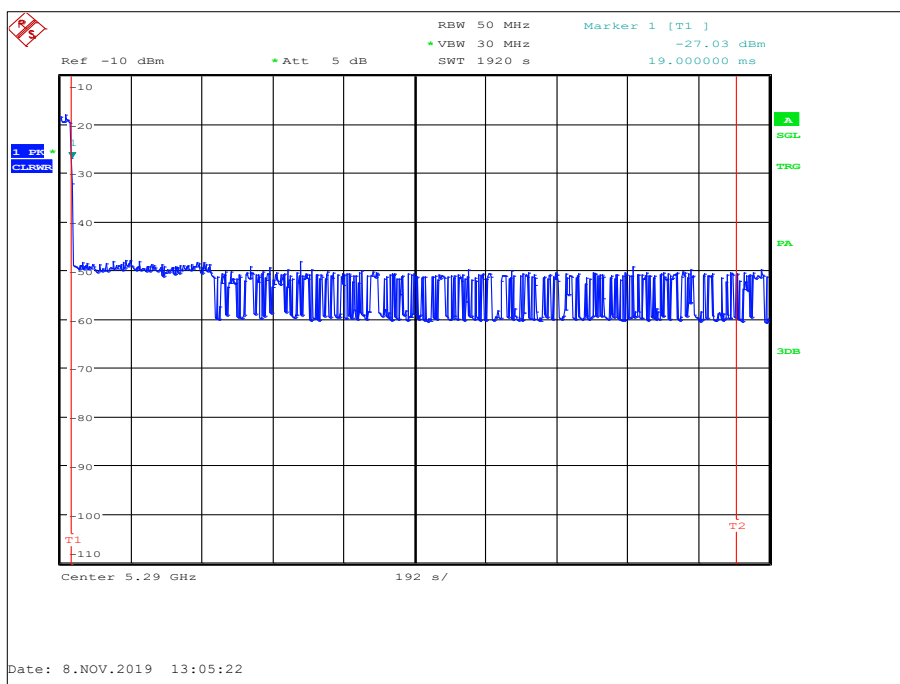


Figure 955 - 30 minute Non-Occupancy Period



FCC 47 CFR Part 15, Limit Clause 15.407 (h)(2)(iii)

Channel Move Time	<10 seconds
Channel Closing Time (Aggregate Time During 200ms)	<200 ms
Channel Closing Time (Aggregate Time During +200ms to 10s)	<60 ms

Table 454 - Channel Move Time and Channel Closing Transmission Time Limit

FCC 47 CFR Part 15, Limit Clause 15.407 (h)(2)(iv)

Non-occupancy Period	> 30 minutes
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Table 455 - Non-Occupancy Limit

2.7.7 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
20dB/2W Attenuator	Narda	4772-20	462	-	TU
Hygrometer	Rotronic	I-1000	3220	12	25-Sep-2020
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	18-Mar-2020
AC Programmable Power Supply	iTech	IT7324	5227	-	O/P Mon
Multimeter	Fluke	79 Series III	611	12	11-Sep-2020
PXI RF Digitizer	Aeroflex	3035	4012	24	15-Mar-2020
Cable (18 GHz)	Rosenberger	LU7-071-2000	5107	12	06-Oct-2020
Power Splitter, 2 way	Mini-Circuits	ZN2PD2-63-S+	5237	-	O/P Mon
Power Splitter, 2 way	Mini-Circuits	ZN2PD2-63-S+	5238	-	O/P Mon

Table 456

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
Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period	Time: $\pm 0.47 \%$ Power: $\pm 1.29 \text{ dB}$
Spurious Radiated Emissions	30 MHz to 1 GHz: $\pm 5.2 \text{ dB}$ 1 GHz to 40 GHz: $\pm 6.3 \text{ dB}$
Restricted Band Edges	$\pm 6.3 \text{ dB}$
Authorised Band Edges	$\pm 6.3 \text{ dB}$
Emission Bandwidth	20 MHz: $\pm 530.037 \text{ kHz}$ to 575.440 kHz 40 MHz: $\pm 1044.487 \text{ kHz}$ to 1280.229 kHz 80 MHz: $\pm 2073.403 \text{ kHz}$ to 2402.476 kHz
Maximum Conducted Power Spectral Density	$\pm 3.2 \text{ dB}$
Maximum Conducted Output Power	$\pm 3.2 \text{ dB}$

Table 457

Measurement Uncertainty Decision Rule

Determination of conformity with the specification limits is based on the result of the compliance measurement and does not take into account measurement instrumentation uncertainty. Measurement system uncertainty is calculated, as indicated above, in accordance with the appropriate guidelines detailed within the specification of test.