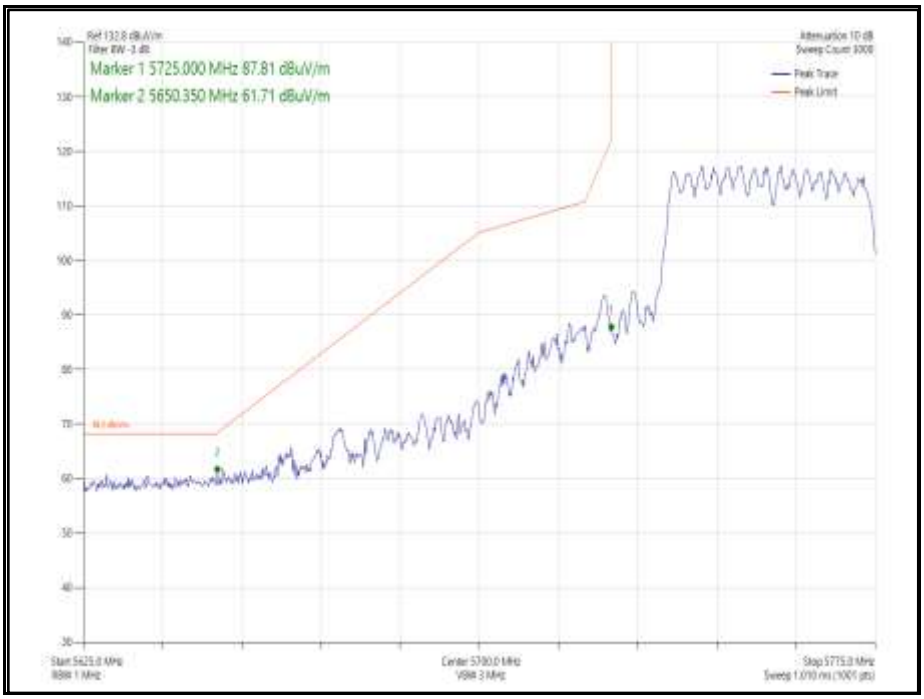

Figure 1001 - 802.11ax HE40 CDD, Cores 0-1, SU - 5755 MHz Band Edge Frequency 5725 MHz

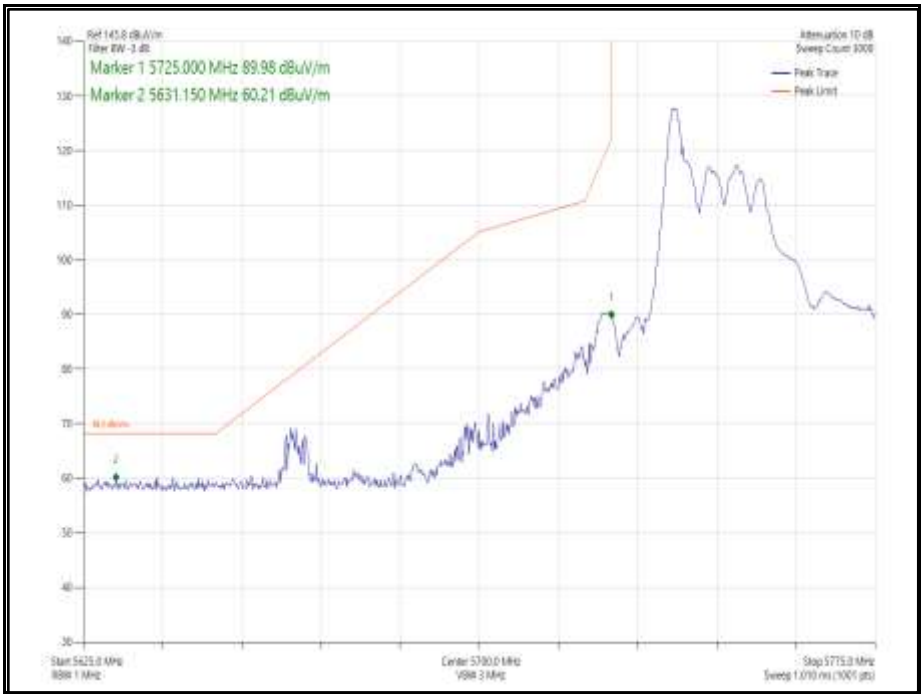

Figure 1002 - 802.11ax HE40 CDD, Cores 0-1, 26-0 - 5755 MHz Band Edge Frequency 5725 MHz

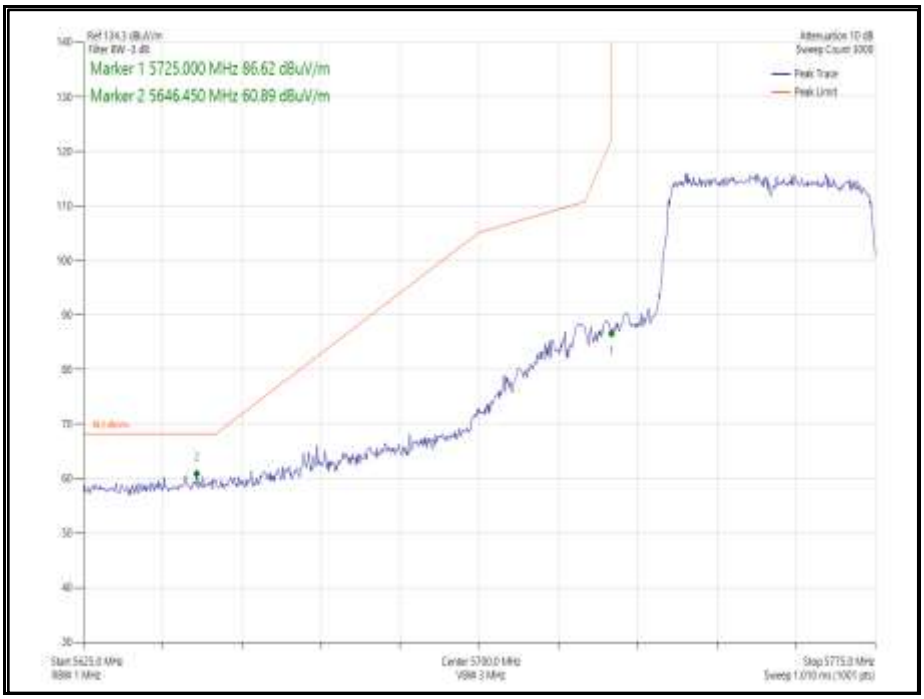

Figure 1003 - 802.11ax HE40 SDM, Cores 0-1, SU - 5755 MHz Band Edge Frequency 5725 MHz

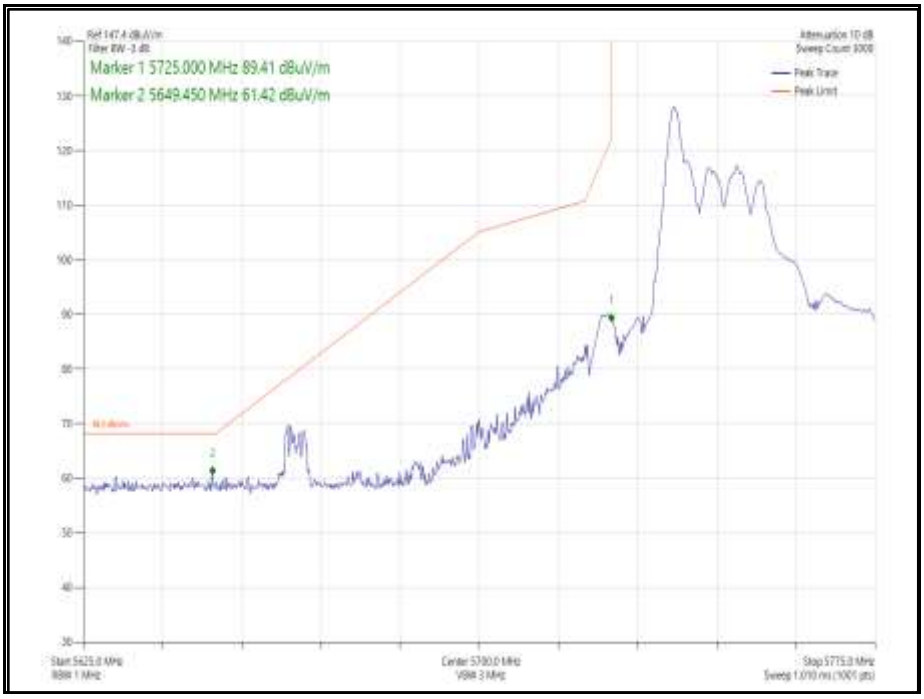

Figure 1004 - 802.11ax HE40 SDM, Cores 0-1, 26-0 - 5755 MHz Band Edge Frequency 5725 MHz

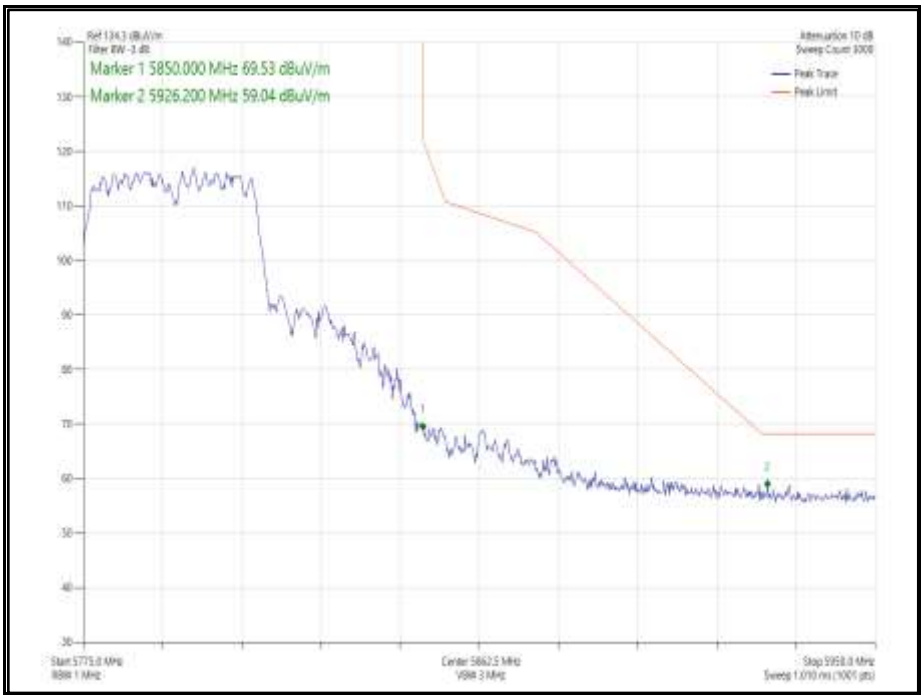

Figure 1005 - 802.11n HT40 CDD, Cores 0-1 - 5795 MHz
Band Edge Frequency 5850 MHz

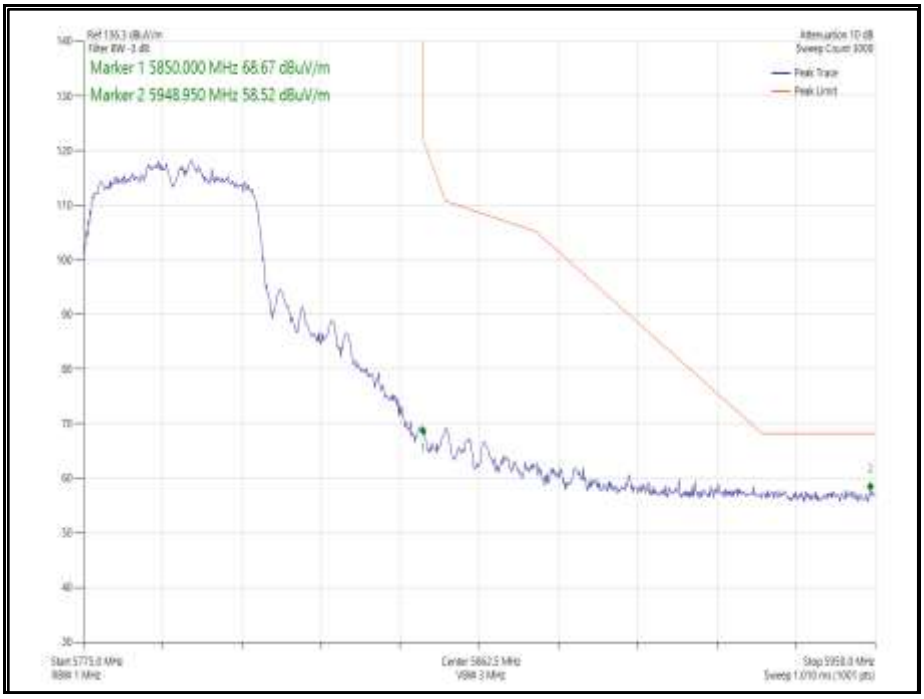

Figure 1006 - 802.11n HT40 SDM, Cores 0-1 - 5795 MHz
Band Edge Frequency 5850 MHz

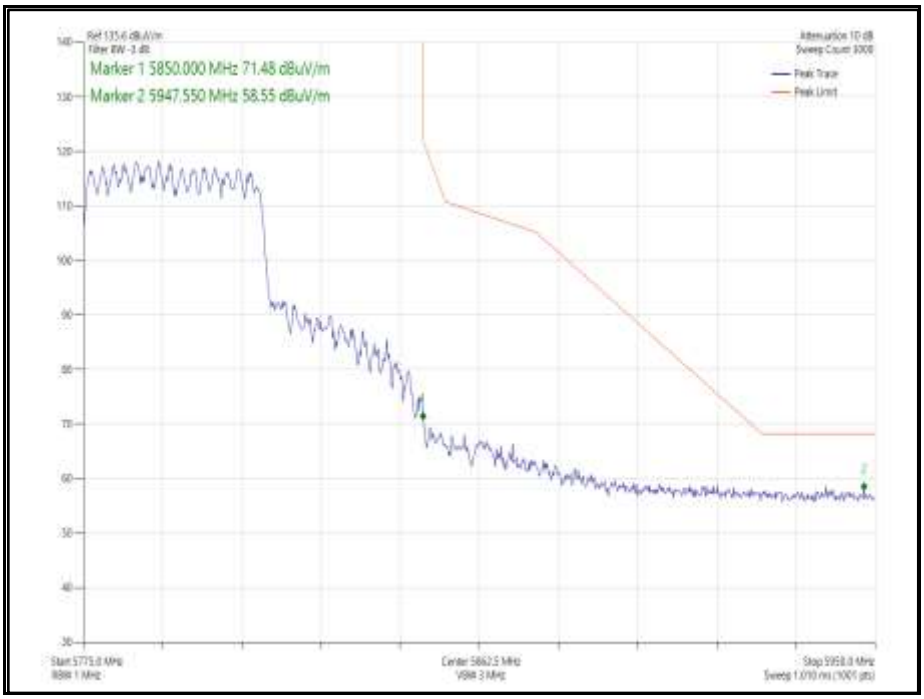

Figure 1007 - 802.11ax HE40 CDD, Cores 0-1, SU - 5795 MHz Band Edge Frequency 5850 MHz

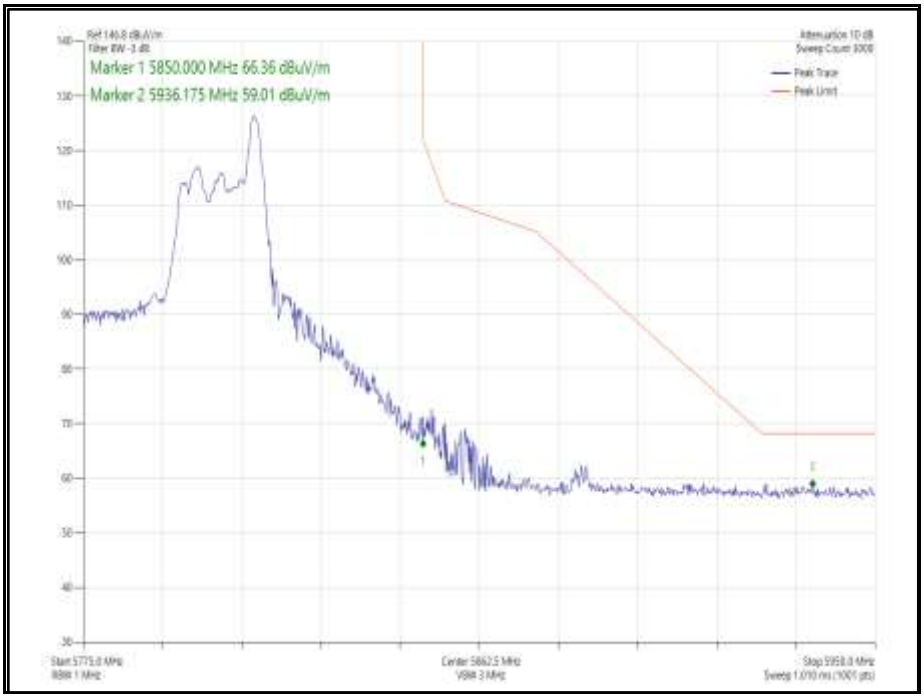

Figure 1008 - 802.11ax HE40 CDD, Cores 0-1, 26-17 - 5795 MHz Band Edge Frequency 5850 MHz

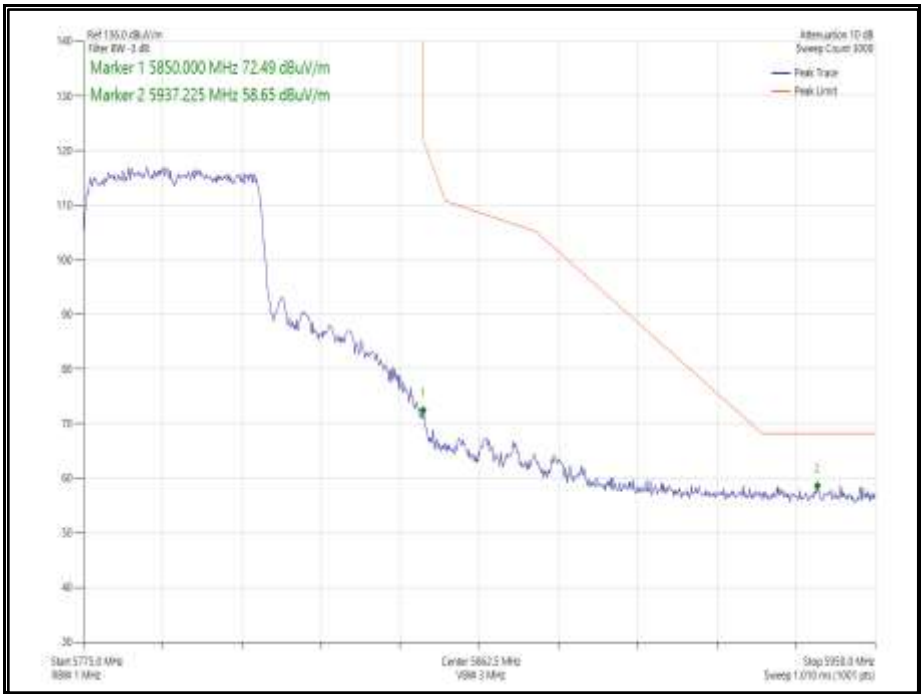

Figure 1009 - 802.11ax HE40 SDM, Cores 0-1, SU - 5795 MHz Band Edge Frequency 5850 MHz

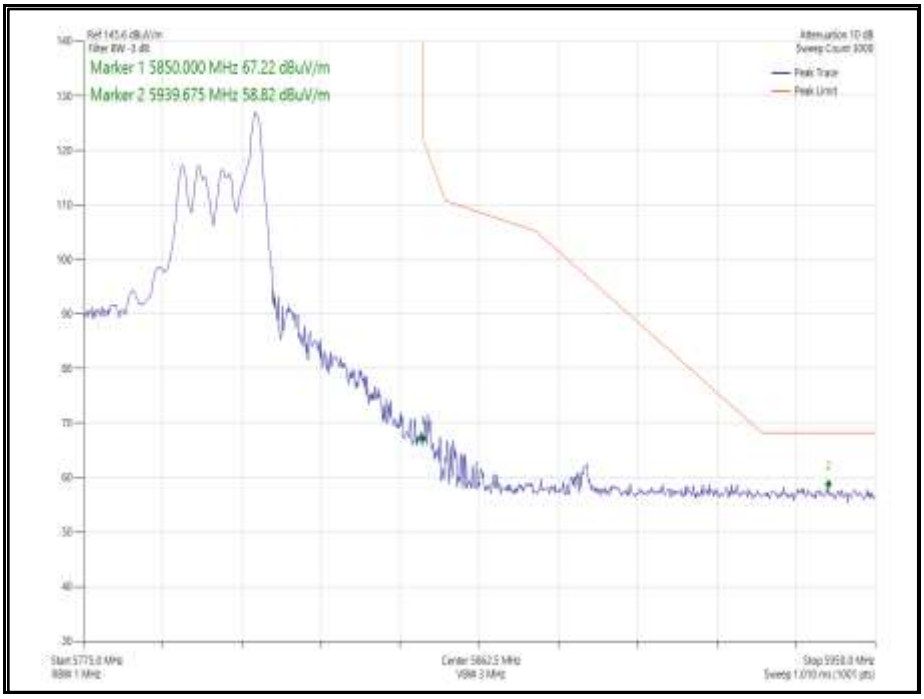

Figure 1010 - 802.11ax HE40 SDM, Cores 0-1, 26-17 - 5795 MHz Band Edge Frequency 5850 MHz

Mode	Data Rate /MCS	Resource size	Resource Index	TX Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBuV/m
802.11ac VHT80, Core 1	MCS2x1	-	-	5530	5470	62.94
802.11ac VHT80, Core 1	MCS4x1	-	-	5610	5725	61.92
802.11ac VHT80, Core 1	MCS7x1	-	-	5775	5725	62.90
802.11ac VHT80, Core 1	MCS7x1	-	-	5775	5850	60.21
802.11ax HE80, Core 1	MCS11x1	SU	-	5530	5470	61.28
802.11ax HE80, Core 1	MCS11x1	52	37	5530	5470	62.86
802.11ax HE80, Core 1	MCS4x1	SU	-	5610	5725	62.88
802.11ax HE80, Core 1	MCS11x1	52	52	5610	5725	62.66
802.11ax HE80, Core 1	MCS11x1	SU	-	5775	5725	63.14
802.11ax HE80, Core 1	MCS11x1	26	0	5775	5725	59.91
802.11ax HE80, Core 1	MCS11x1	SU	-	5775	5850	62.10
802.11ax HE80, Core 1	MCS11x1	26	36	5775	5850	61.08

Table 663 - 80 MHz Bandwidth SISO Authorised Band Edge Results

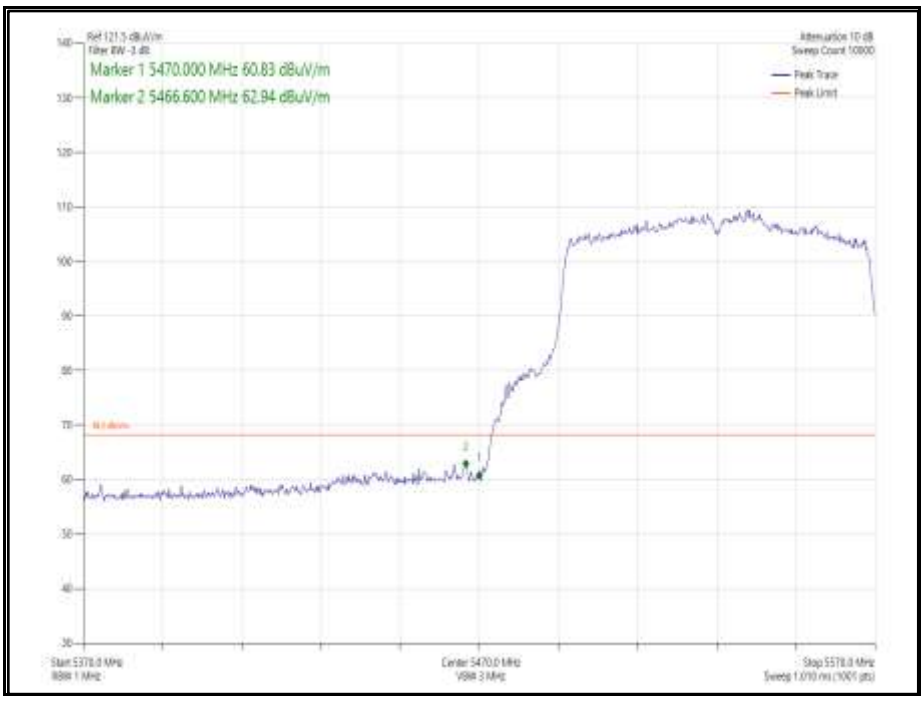

Figure 1011 - 802.11ac VHT80 Core 1 - 5530 MHz Band Edge Frequency 5470 MHz

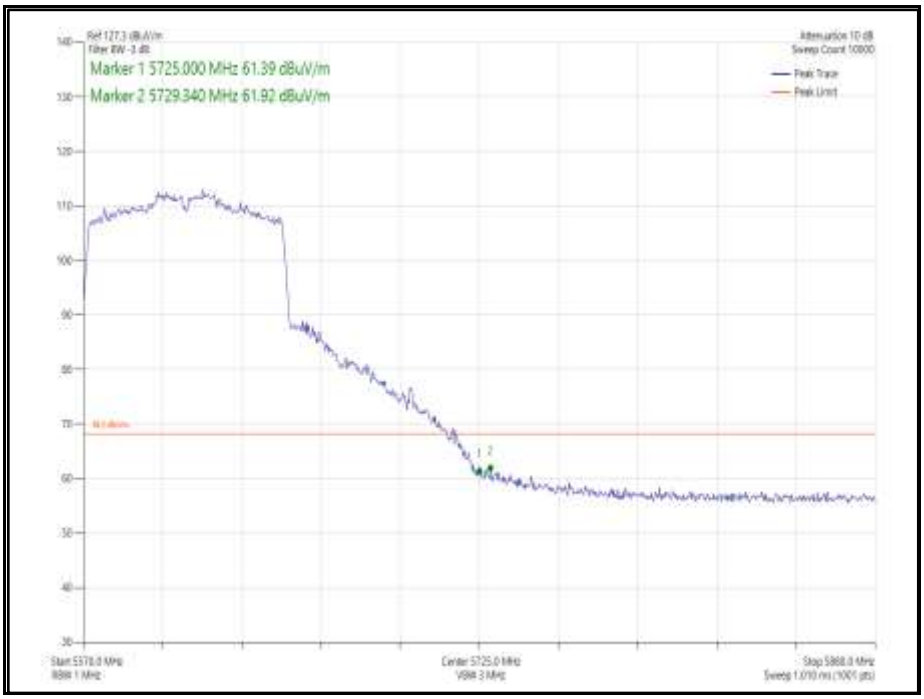

Figure 1012 - 802.11ac VHT80 Core 1 - 5610 MHz
Band Edge Frequency 5725 MHz

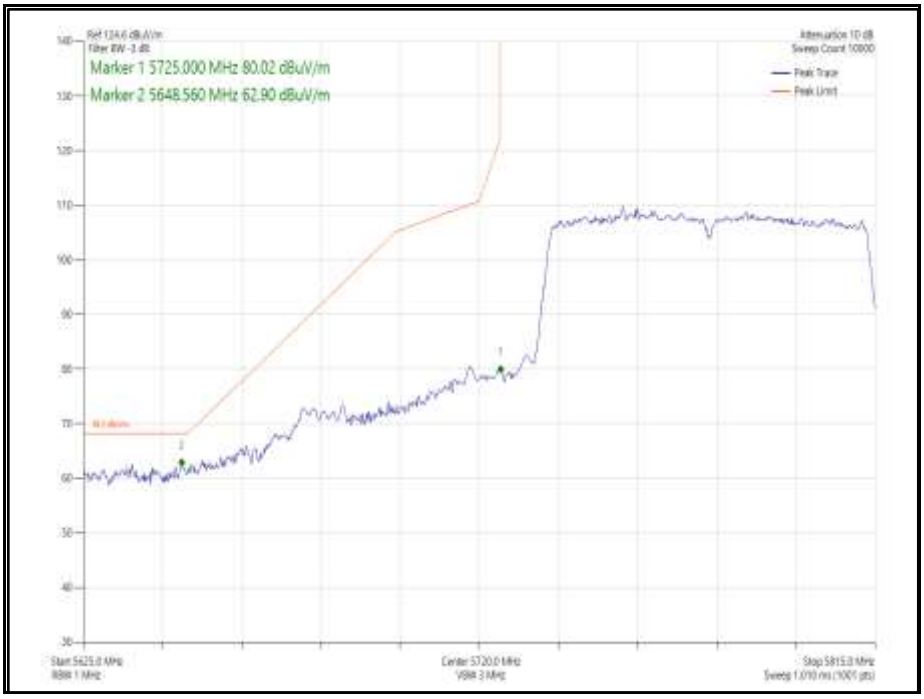

Figure 1013 - 802.11ac VHT80 Core 1 - 5775 MHz
Band Edge Frequency 5725 MHz

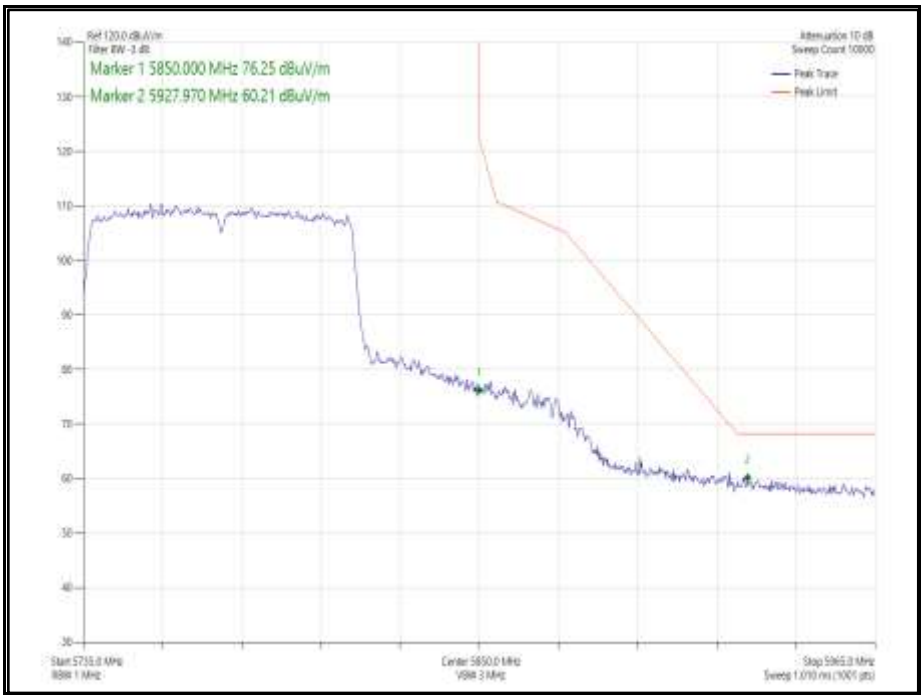

Figure 1014 - 802.11ac VHT80 Core 1 - 5775 MHz
Band Edge Frequency 5850 MHz

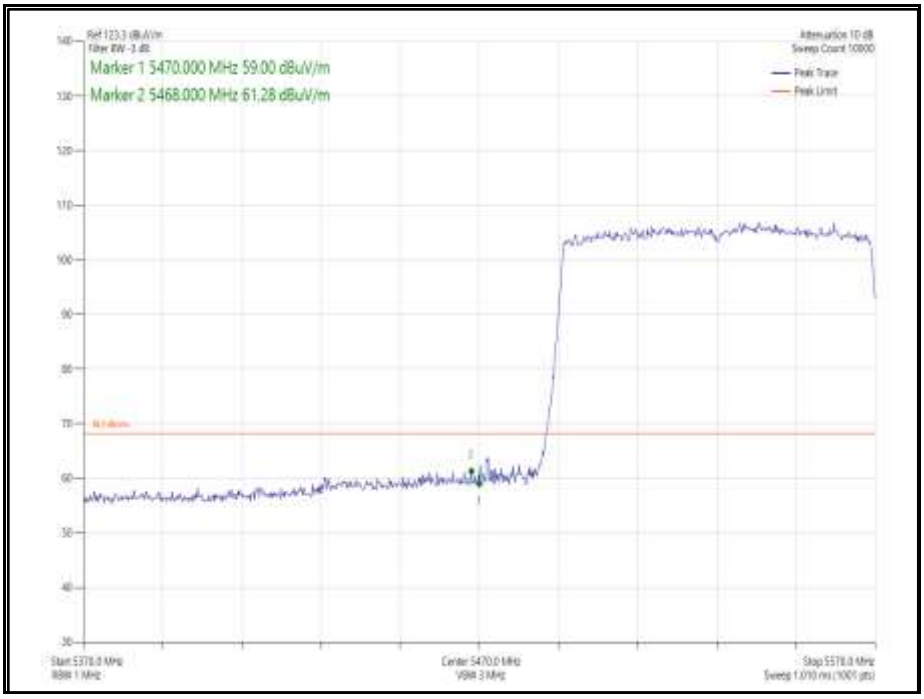

Figure 1015 - 802.11ax HE80 Core 1 SU - 5530 MHz
Band Edge Frequency 5470 MHz

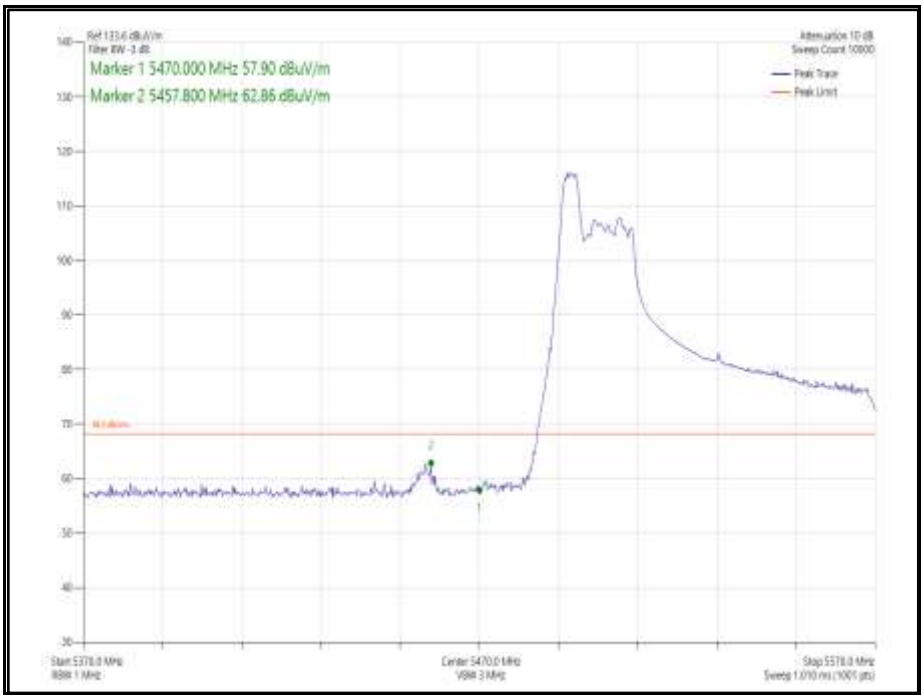

Figure 1016 - 802.11ax HE80 Core 1 52-37- 5530 MHz
Band Edge Frequency 5470 MHz

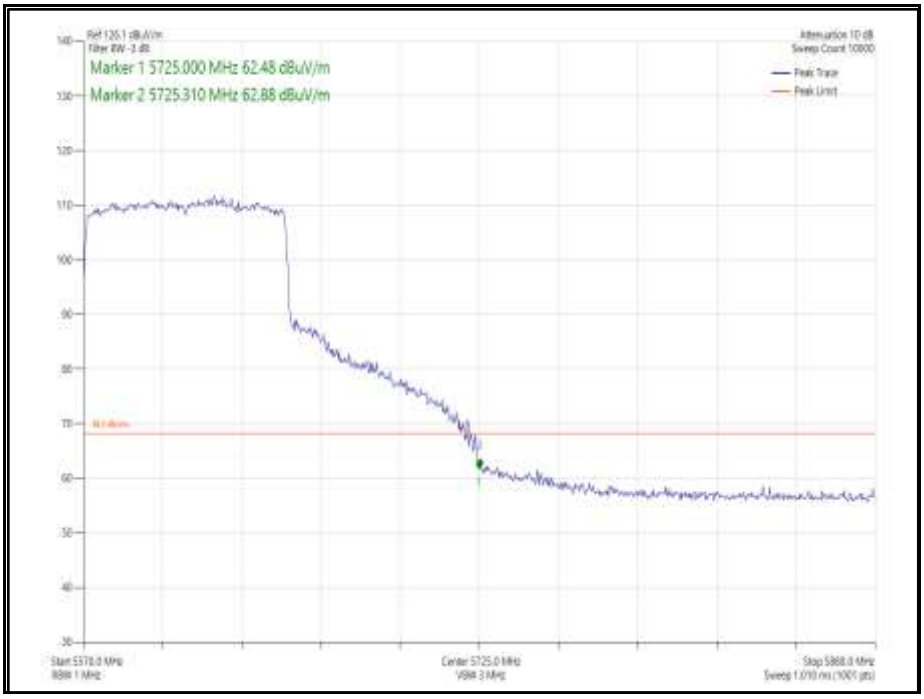

Figure 1017 - - 802.11ax HE80 Core 1 SU - 5610 MHz
Band Edge Frequency 5725 MHz

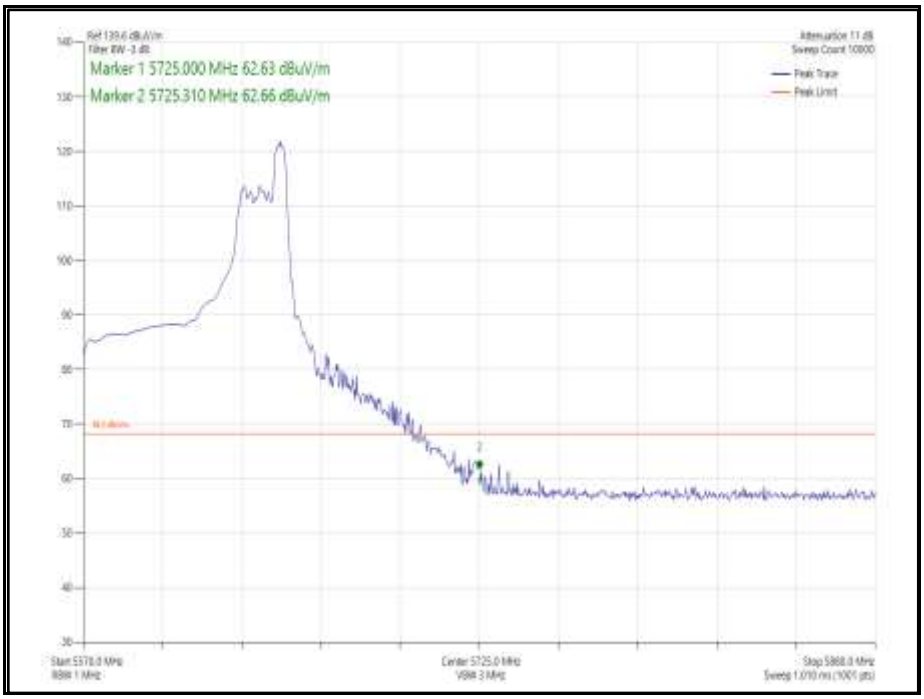

Figure 1018 - - 802.11ax HE80 Core 1 52-52 - 5610 MHz
Band Edge Frequency 5725 MHz

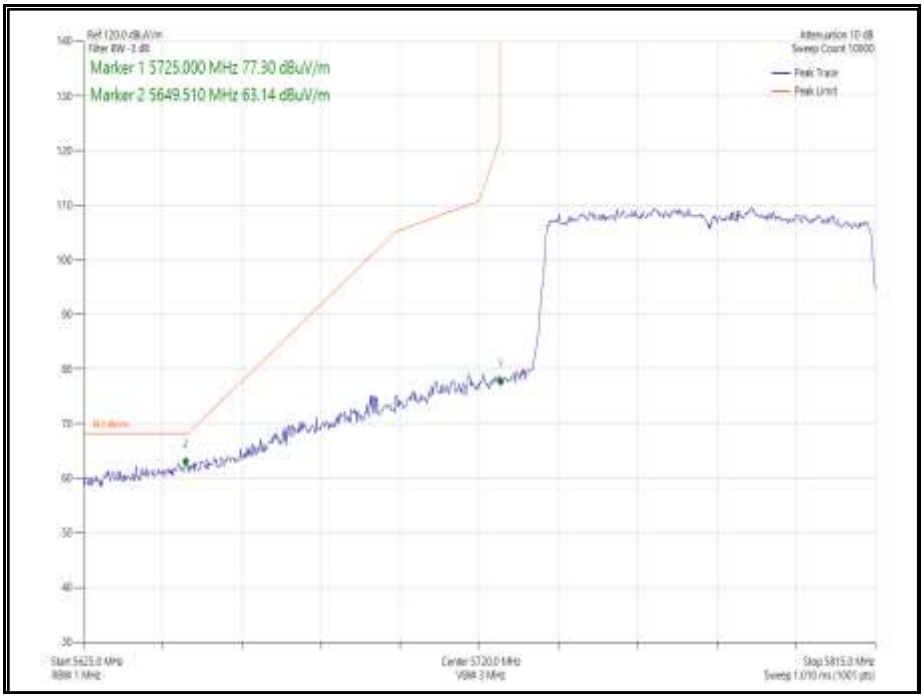

Figure 1019 - 802.11ax HE80 Core 1 SU - 5775 MHz
Band Edge Frequency 5725 MHz

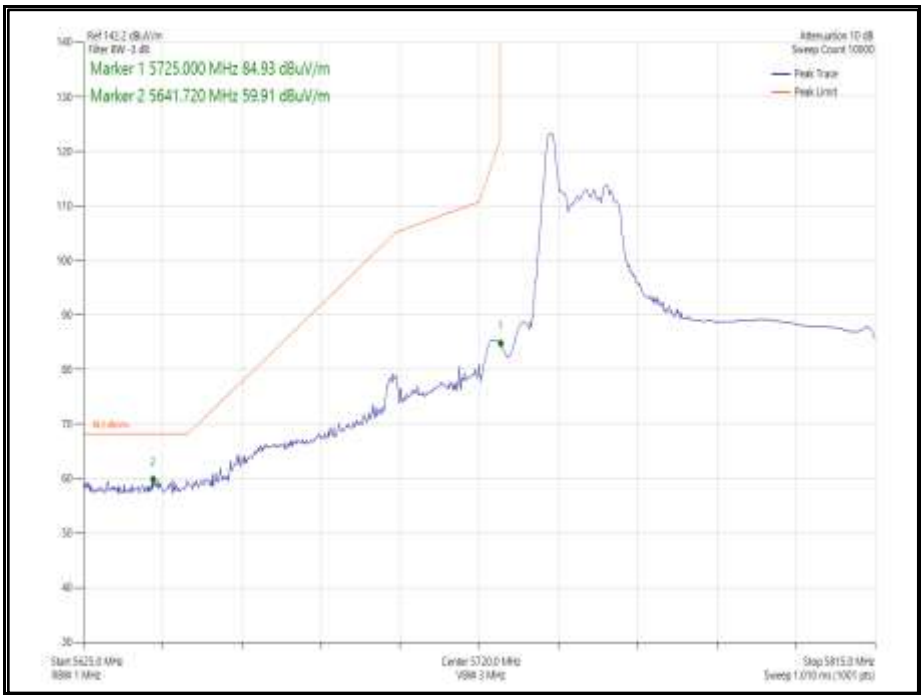

Figure 1020 - 802.11ax HE80 Core 1 26-0 - 5775 MHz
Band Edge Frequency 5725 MHz

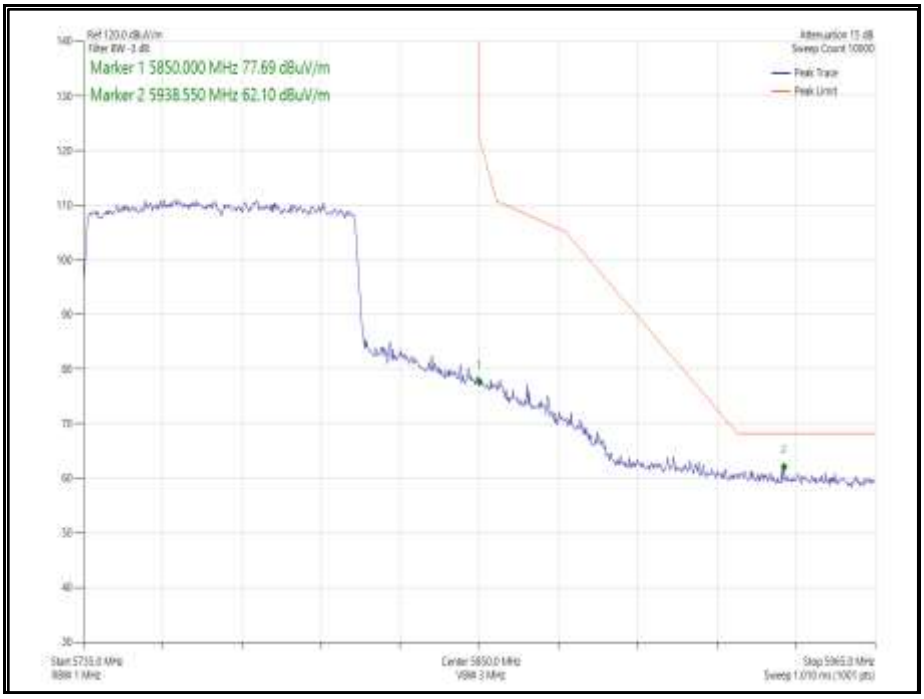

Figure 1021 - 802.11ax HE80 Core 1 SU - 5775 MHz
Band Edge Frequency 5850 MHz

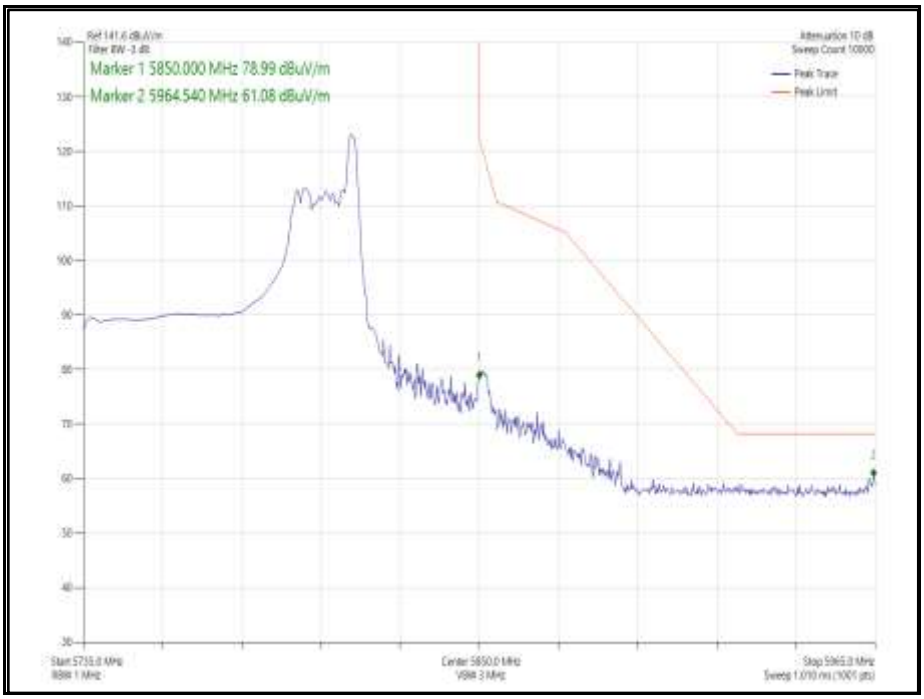

Figure 1022 - 802.11ax HE80 Core 1 26-36 - 5775 MHz Band Edge Frequency 5850 MHz

Mode	Data Rate/ MCS	Resource size	Resource Index	TX Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBuV/m)
802.11ac VHT80 CDD, Cores 0-1	MCS4	-	-	5530	5470	62.91
802.11ac VHT80 SDM, Cores 0-1	MCS15	-	-	5530	5470	62.87
802.11ax HE80 CDD, Cores 0-1	MCS 2x1	SU	-	5530	5470	62.60
802.11ax HE80 CDD, Cores 0-1	MCS11x1	52	37	5530	5470	63.06
802.11ax HE80 SDM, Cores 0-1	MCS11x2	SU	-	5530	5470	62.90
802.11ax HE80 SDM, Cores 0-1	MCS11x2	52	37	5530	5470	63.04
802.11ac VHT80 CDD, Cores 0-1	MCS4	-	-	5610	5725	62.43
802.11ac VHT80 SDM, Cores 0-1	MCS15	-	-	5610	5725	63.03
802.11ax HE80 CDD, Cores 0-1	MCS11x1	SU	-	5610	5725	62.75
802.11ax HE80 CDD, Cores 0-1	MCS11x1	52	52	5610	5725	62.30
802.11ax HE80 SDM, Cores 0-1	MCS2x2	SU	-	5610	5725	62.75
802.11ax HE80 SDM, Cores 0-1	MCS11x2	52	52	5610	5725	62.67
802.11ac VHT80 CDD, Cores 0-1	MCS7	-	-	5775	5725	62.84
802.11ac VHT80 SDM, Cores 0-1	MCS15	-	-	5775	5725	63.07
802.11ax HE80 CDD, Cores 0-1	MCS7x1	SU	-	5775	5725	62.70
802.11ax HE80 CDD, Cores 0-1	MCS11x1	26	0	5775	5725	60.72
802.11ax HE80 SDM, Cores 0-1	MCS11x2	SU	-	5775	5725	62.80
802.11ax HE80 SDM, Cores 0-1	MCS11x2	26	0	5775	5725	60.83
802.11ac VHT80 CDD, Cores 0-1	MCS7x1	-	-	5775	5850	62.84
802.11ac VHT80 SDM, Cores 0-1	MCS7x2	-	-	5775	5850	63.07
802.11ax HE80 CDD, Cores 0-1	MCS11x1	SU	-	5775	5850	60.54
802.11ax HE80 CDD, Cores 0-1	MCS11x1	26	36	5775	5850	62.37
802.11ax HE80 SDM, Cores 0-1	MCS11x2	SU	-	5775	5850	61.63
802.11ax HE80 SDM, Cores 0-1	MCS11x2	26	36	5775	5850	60.69

Table 664 - 80 MHz Bandwidth 2TX MIMO Authorised Band Edge Results

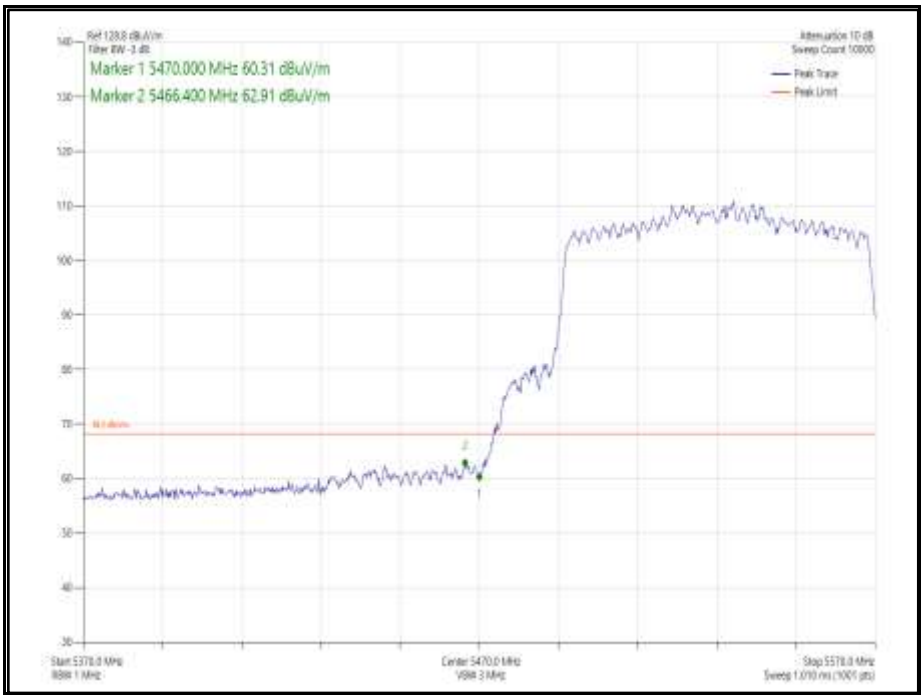

Figure 1023 - 802.11ac VHT80 CDD, Cores 0-1 - 5530 MHz Band Edge Frequency 5470 MHz

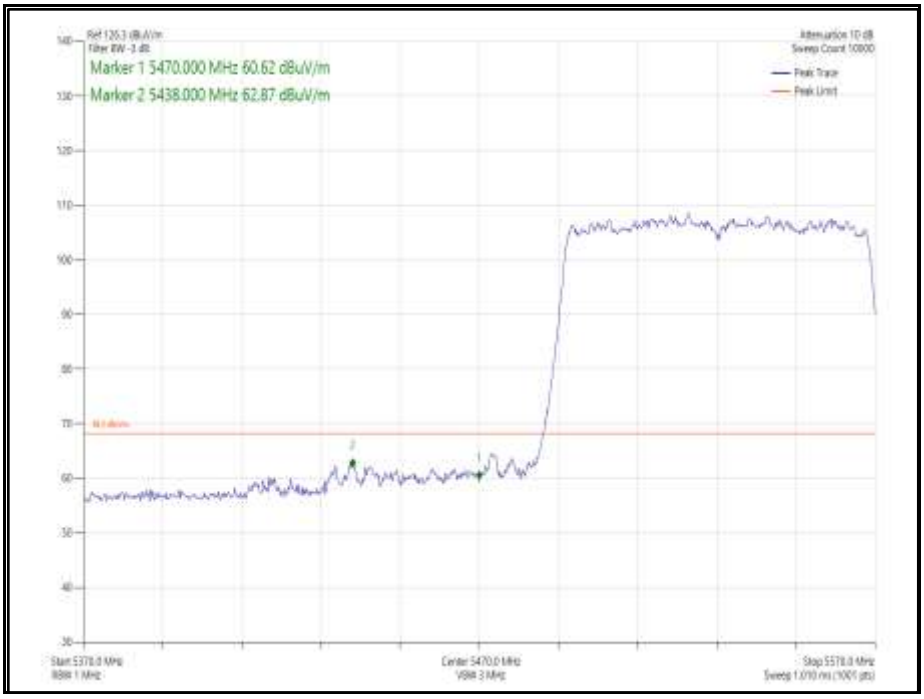

Figure 1024 - 802.11ac VHT80 SDM, Cores 0-1 - 5530 MHz Band Edge Frequency 5470 MHz

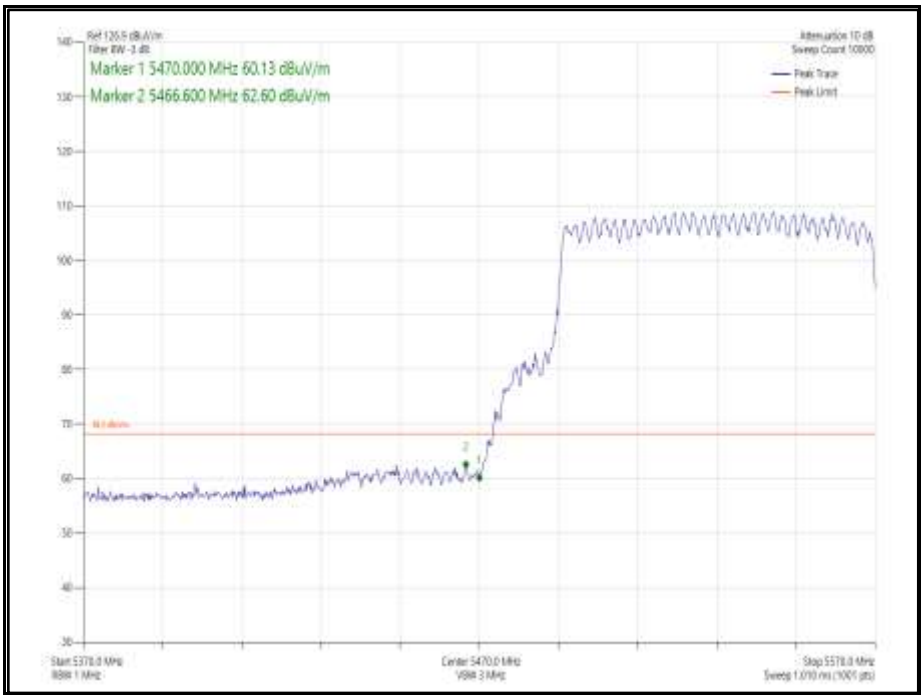

Figure 1025 - 802.11ax HE80 CDD, Cores 0-1, SU - 5530 MHz Band Edge Frequency 5470 MHz

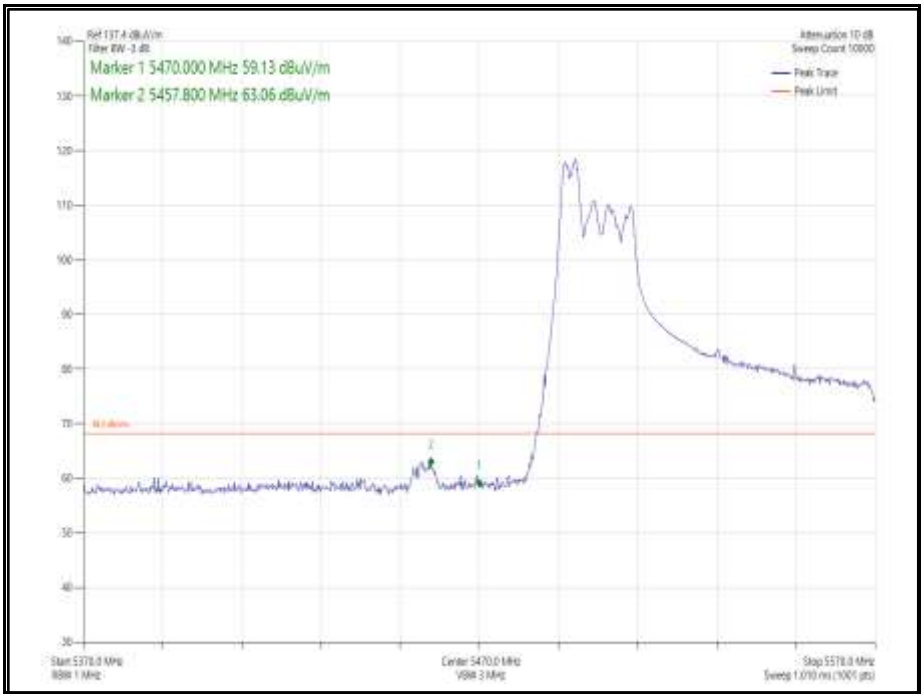

Figure 1026 - 802.11ax HE80 CDD, Cores 0-1, 52-37- 5530 MHz Band Edge Frequency 5470 MHz

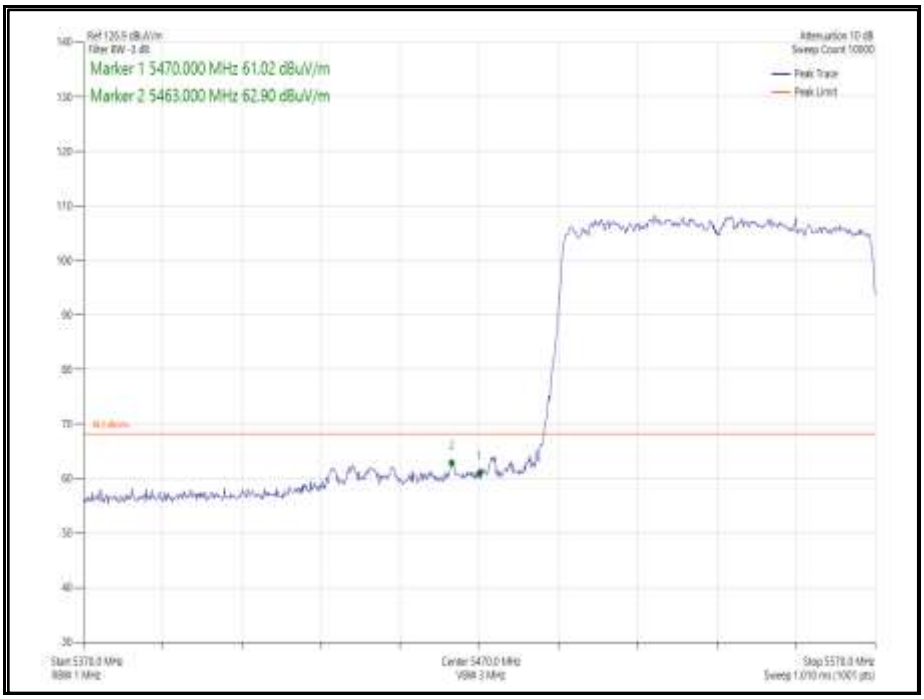

Figure 1027 - 802.11ax HE80 SDM, Cores 0-1, SU - 5530 MHz Band Edge Frequency 5470 MHz

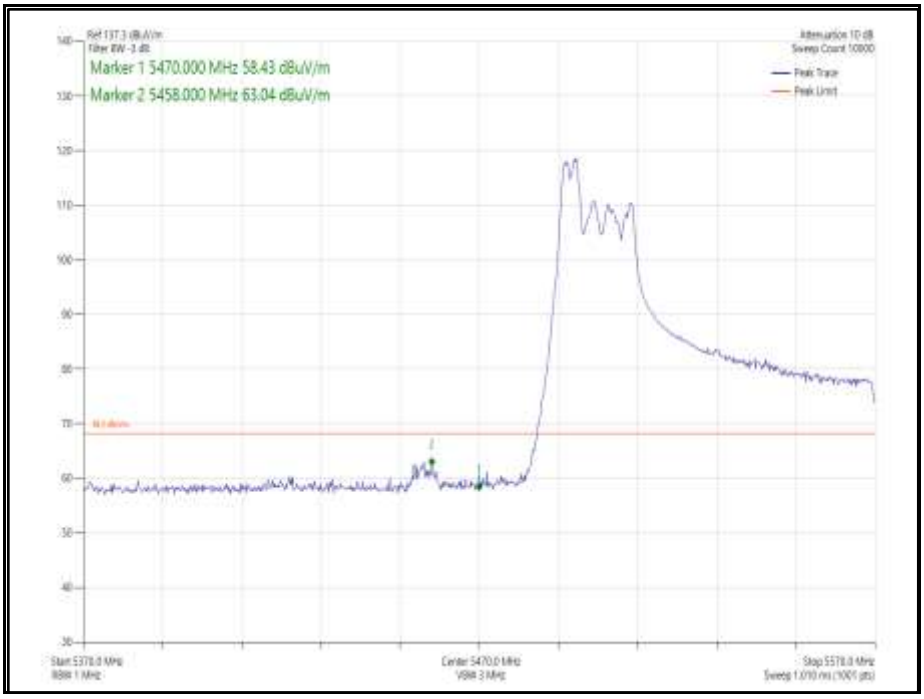

Figure 1028 - 802.11ax HE80 SDM, Cores 0-1, 52-37 - 5530 MHz Band Edge Frequency 5470 MHz

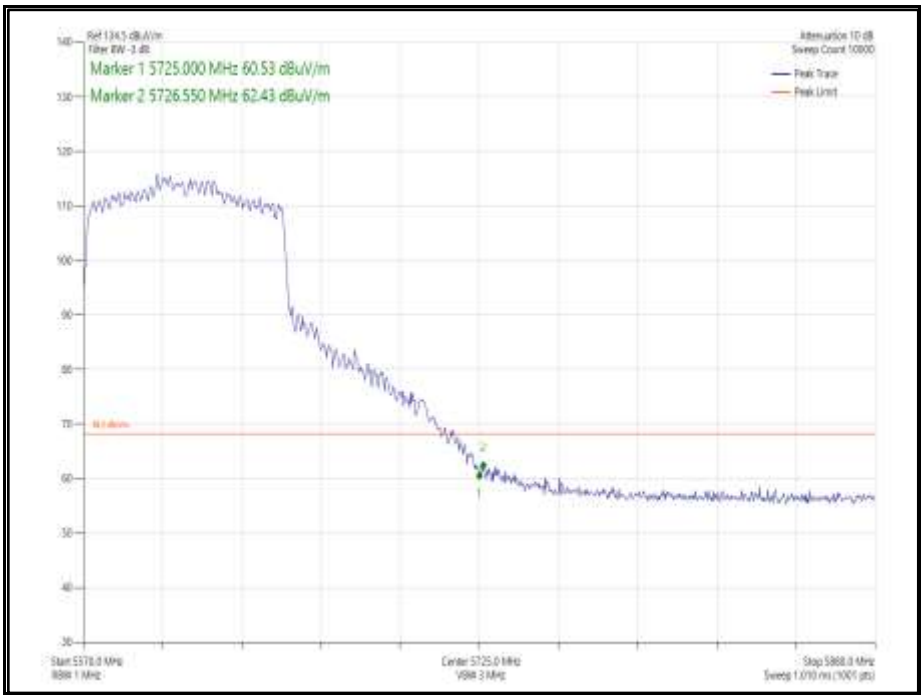

Figure 1029 - 802.11ac VHT80 CDD, Cores 0-1 - 5610 MHz
Band Edge Frequency 5725 MHz

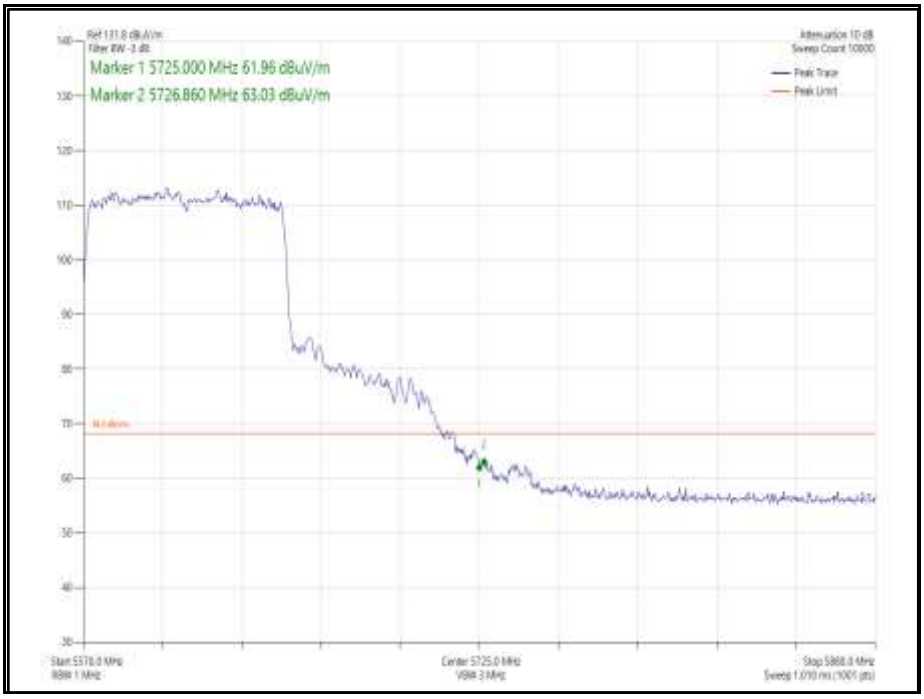

Figure 1030 - 802.11ac VHT80 SDM, Cores 0-1 - 5610 MHz
Band Edge Frequency 5725 MHz

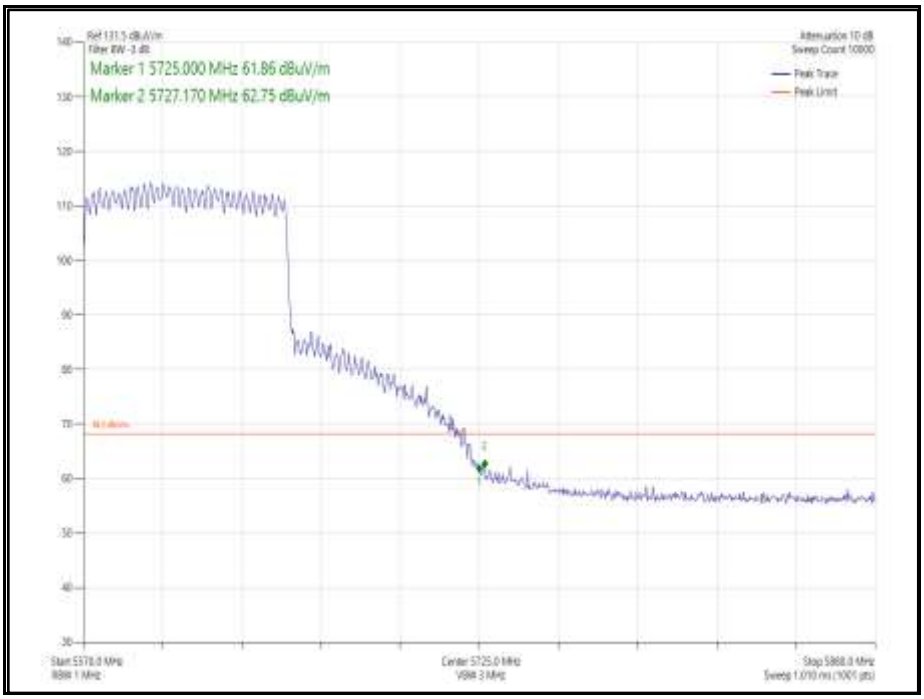

Figure 1031 - 802.11ax HE80 CDD, Cores 0-1, SU - 5610 MHz Band Edge Frequency 5725 MHz

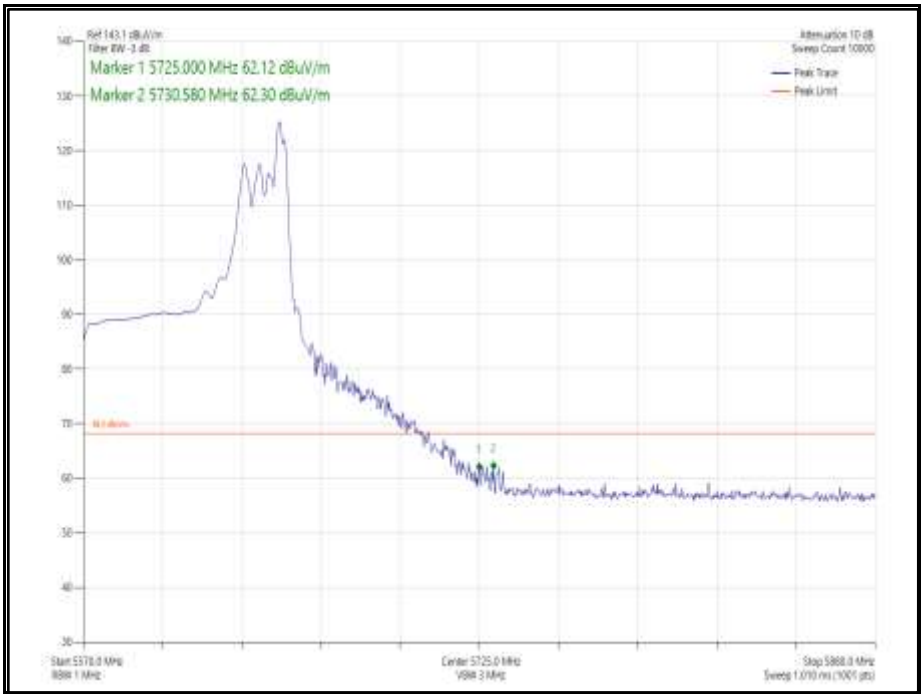

Figure 1032 - 802.11ax HE80 CDD, Cores 0-1, 52-52- 5610 MHz Band Edge Frequency 5725 MHz

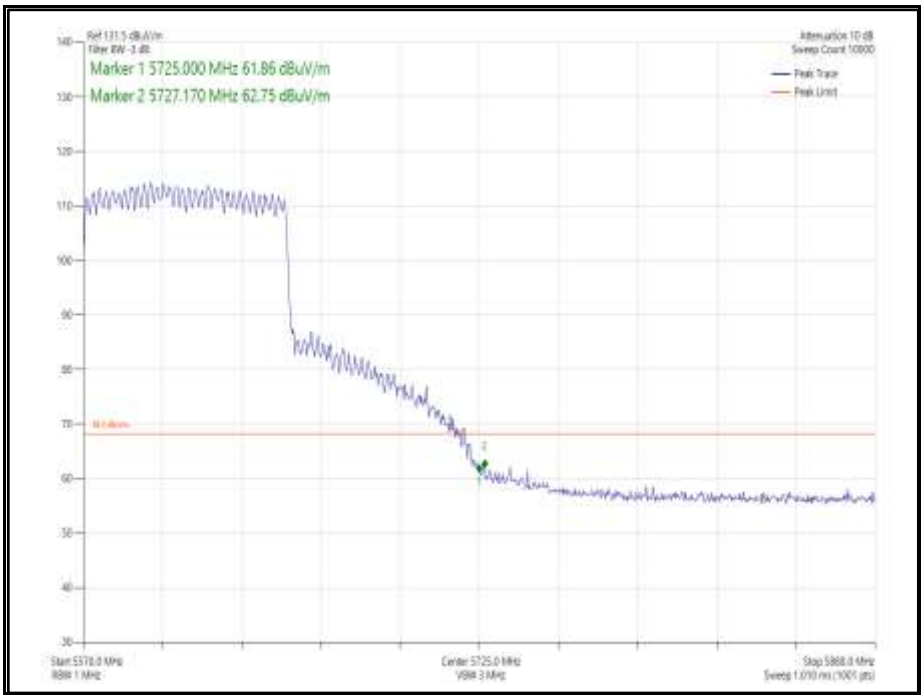

Figure 1033 - 802.11ax HE80 SDM, Cores 0-1, SU - 5610 MHz Band Edge Frequency 5725 MHz

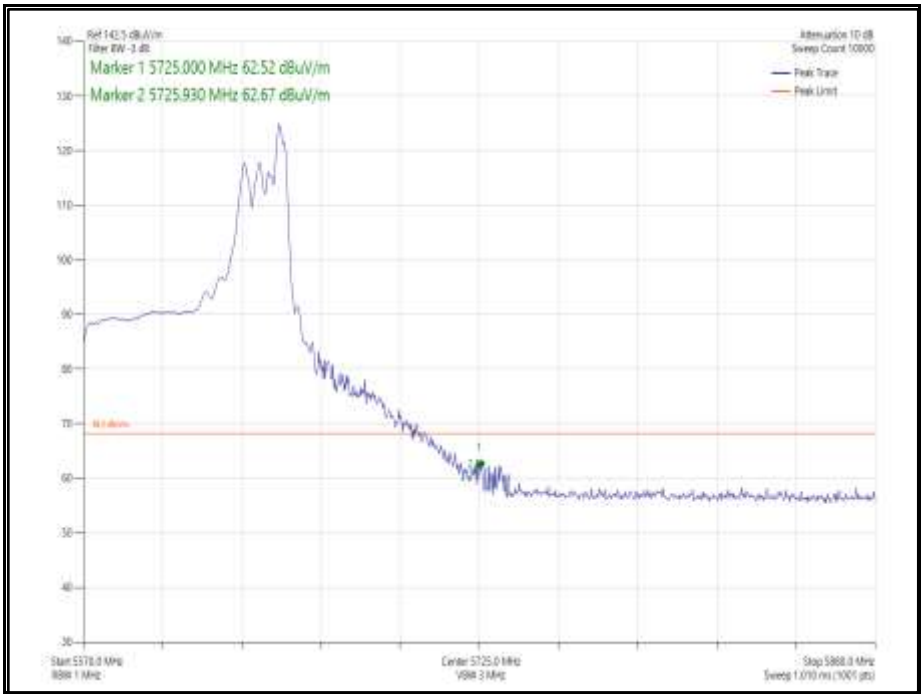

Figure 1034 - 802.11ax HE80 SDM, Cores 0-1, 26-36 - 5610 MHz Band Edge Frequency 5725 MHz

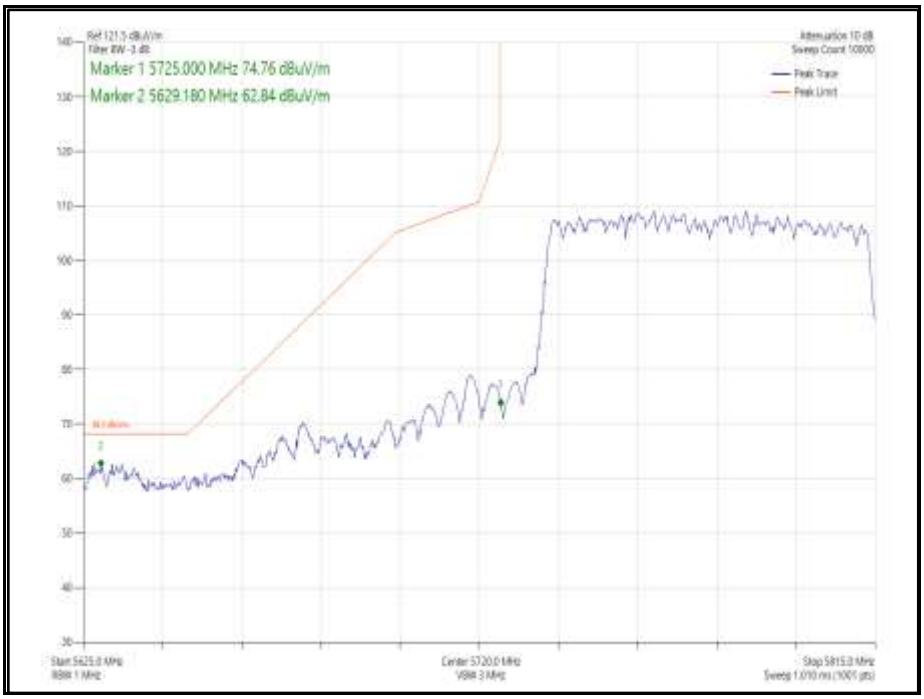

Figure 1035 - 802.11ac VHT80 CDD, Cores 0-1 - 5775 MHz Band Edge Frequency 5725 MHz

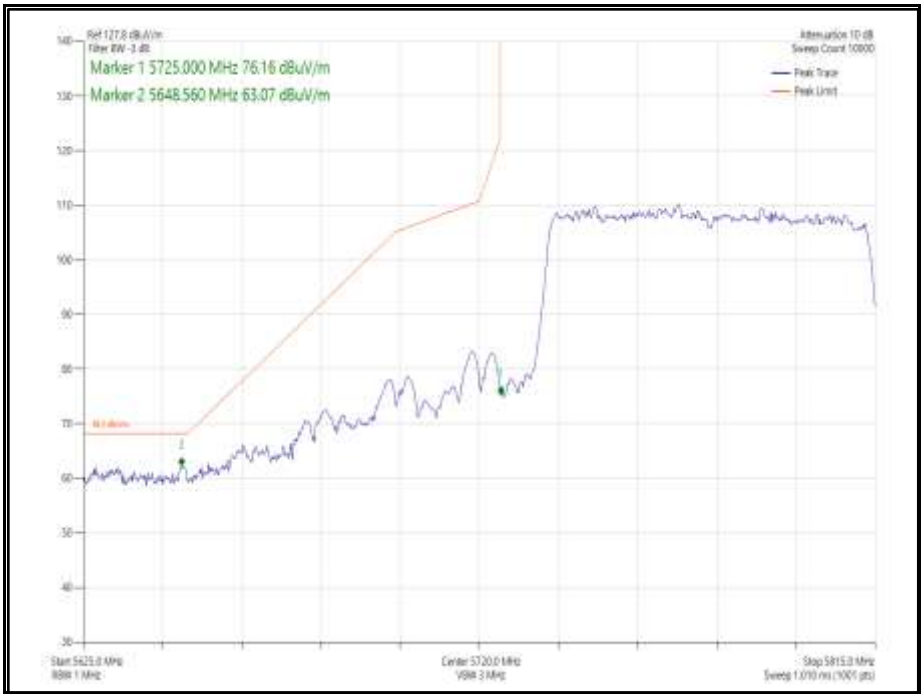

Figure 1036 - 802.11ac VHT80 SDM, Cores 0-1 - 5775 MHz Band Edge Frequency 5725 MHz

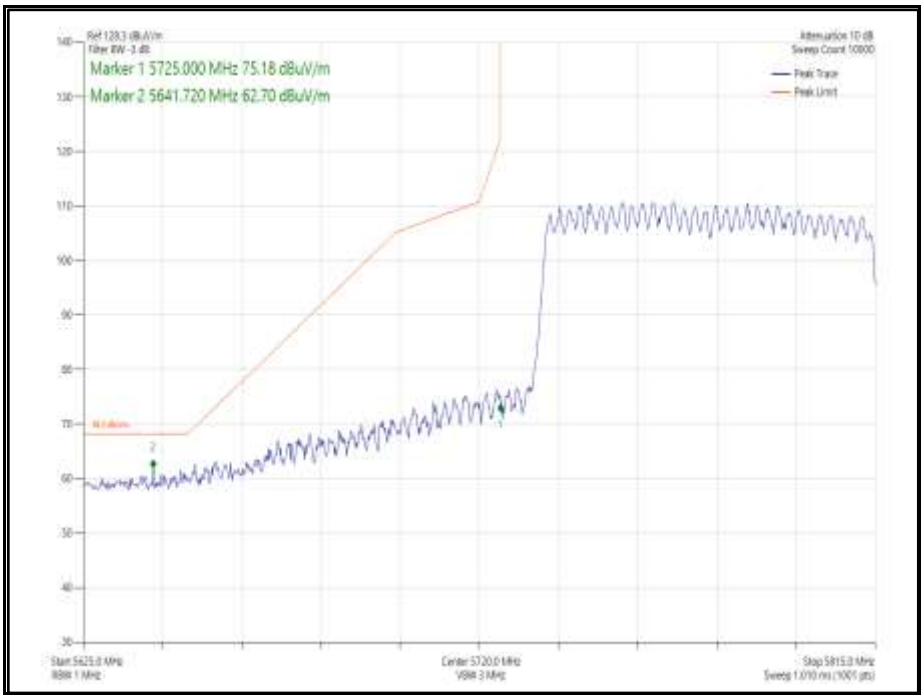

Figure 1037 - 802.11ax HE80 CDD, Cores 0-1, SU - 5775 MHz Band Edge Frequency 5725 MHz

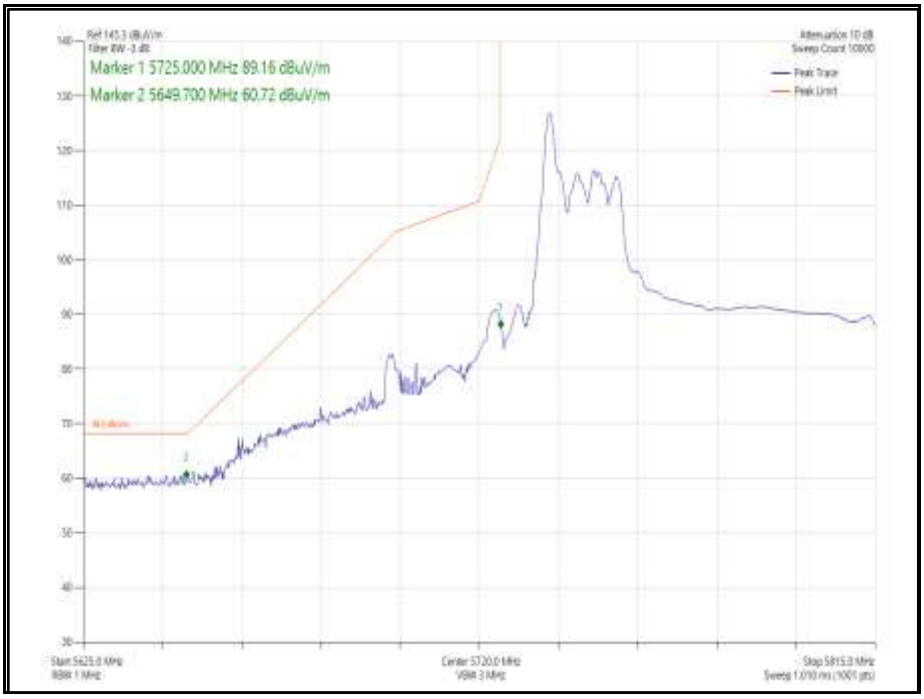

Figure 1038 - 802.11ax HE80 CDD, Cores 0-1, 26-0 - 5775 MHz Band Edge Frequency 5725 MHz

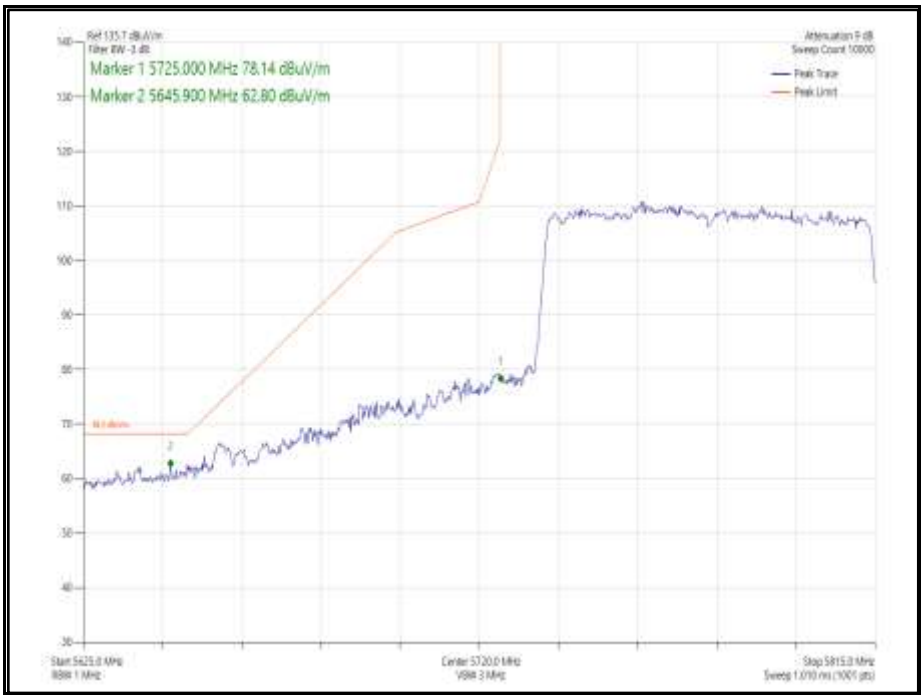

Figure 1039 - 802.11ax HE80 SDM, Cores 0-1, SU - 5775 MHz Band Edge Frequency 5725 MHz

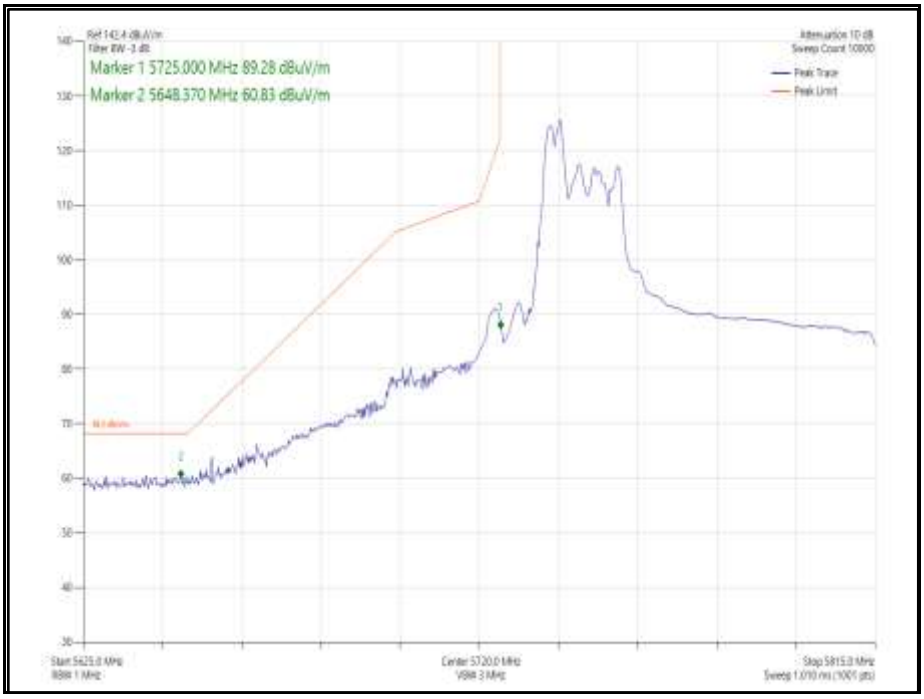

Figure 1040 - 802.11ax HE80 SDM, Cores 0-1, 26-0 - 5775 MHz Band Edge Frequency 5725 MHz

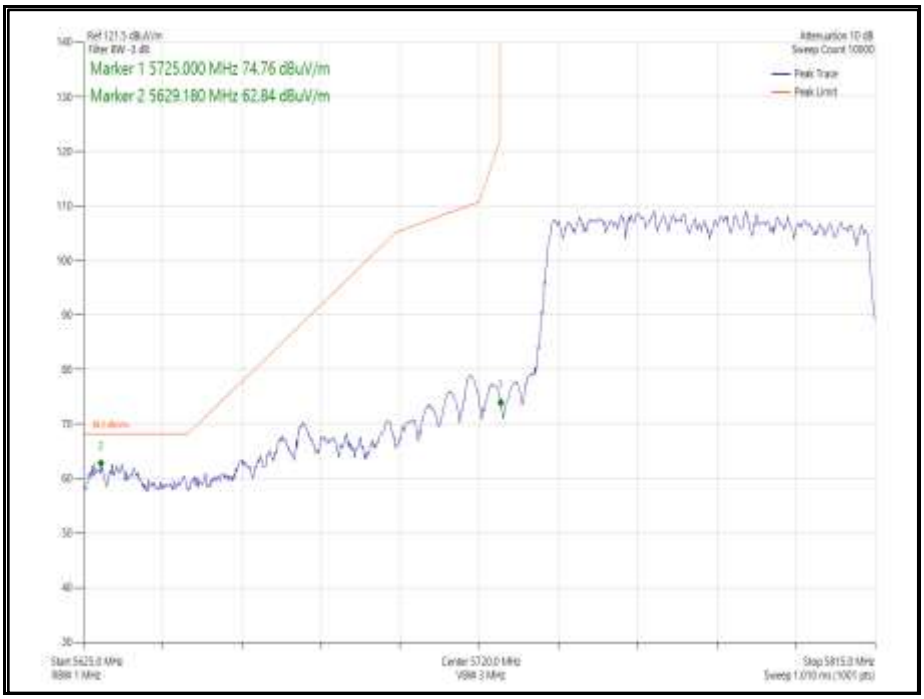

Figure 1041 - 802.11ac VHT80 CDD, Cores 0-1 - 5775 MHz Band Edge Frequency 5850 MHz

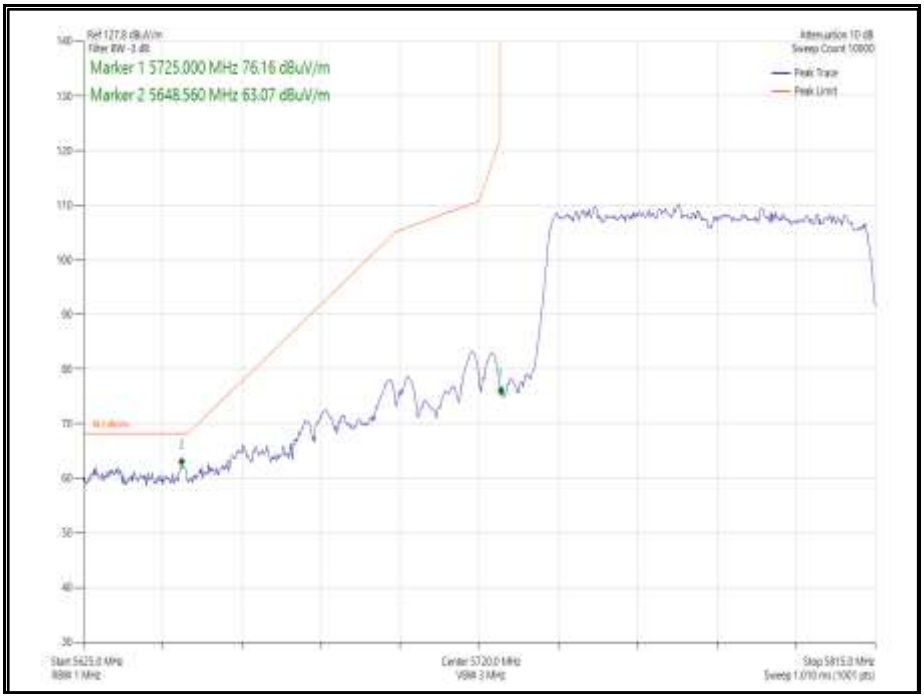

Figure 1042 - 802.11ac VHT80 SDM, Cores 0-1 - 5775 MHz Band Edge Frequency 5850 MHz

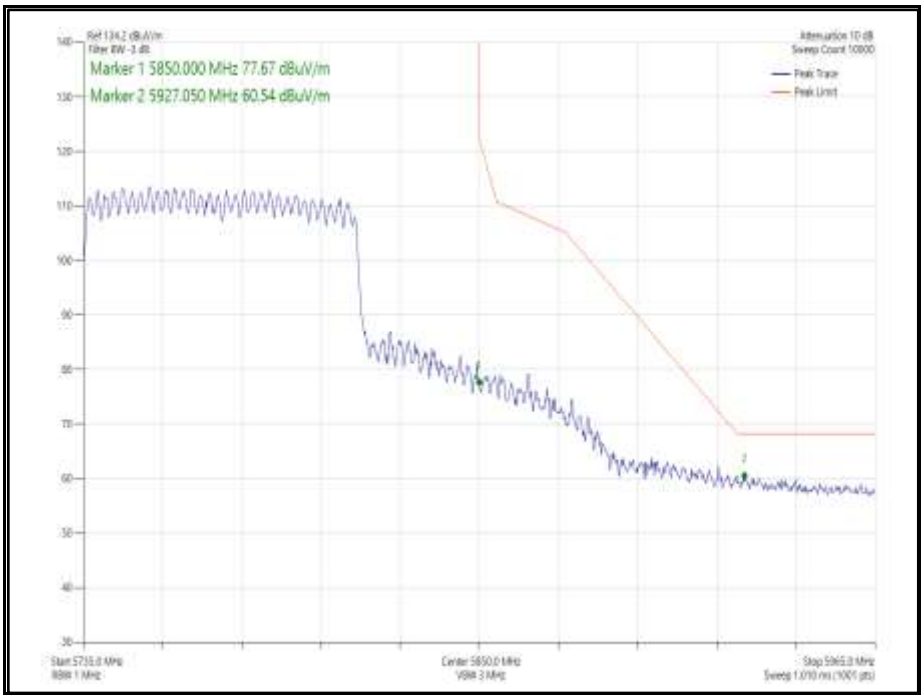

Figure 1043 - 802.11ax HE80 CDD, Cores 0-1, SU - 5775 MHz Band Edge Frequency 5850 MHz

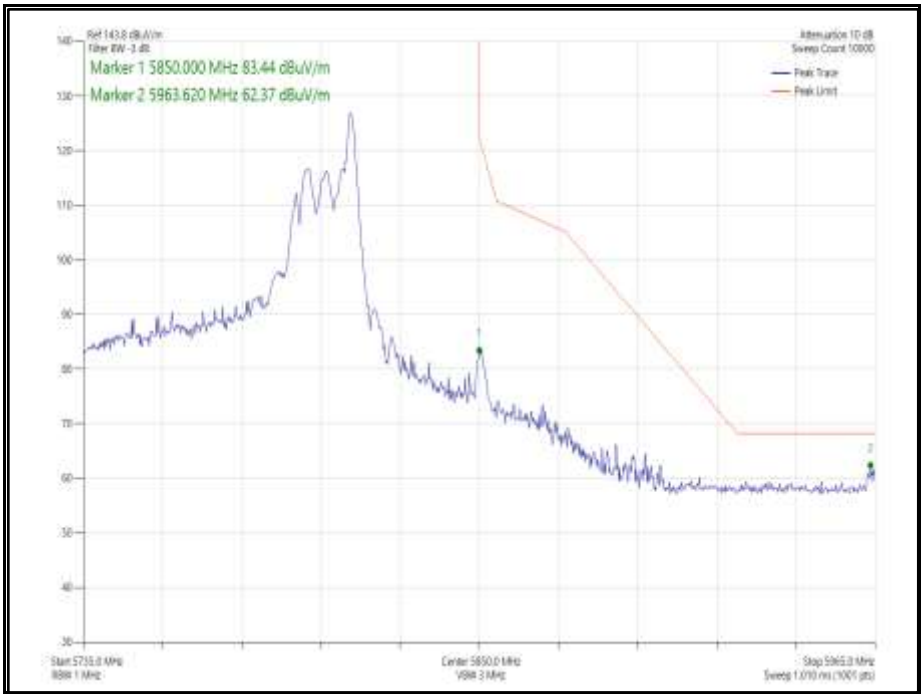

Figure 1044 - 802.11ax HE80 CDD, Cores 0-1, 2d 6-36 - 5775 MHz Band Edge Frequency 5850 MHz

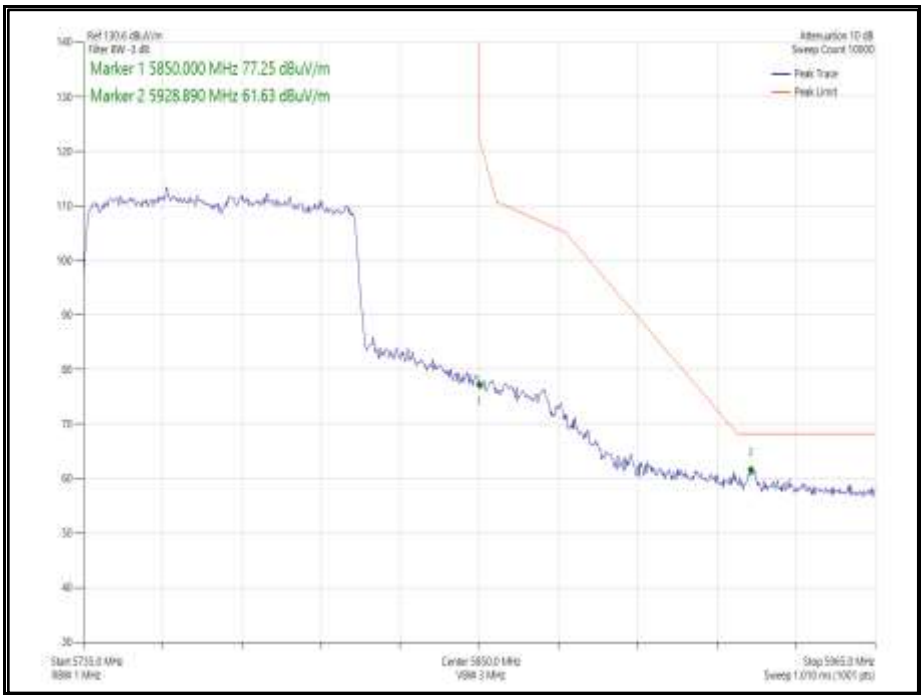

Figure 1045 - 802.11ax HE80 SDM, Cores 0-1, SU -- 5775 MHz Band Edge Frequency 5850 MHz

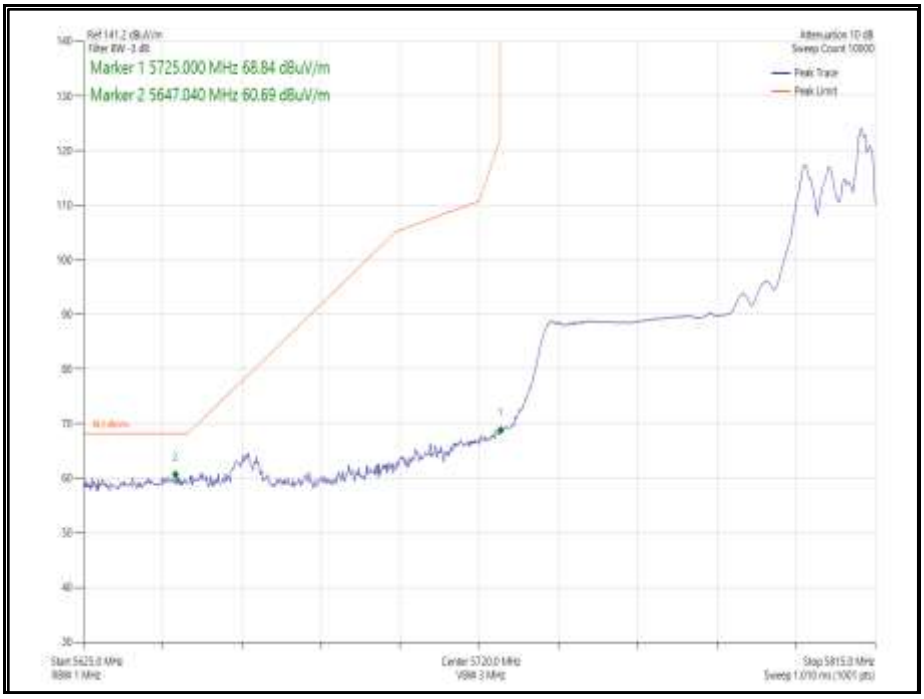

Figure 1046 - 802.11ax HE80 SDM, Cores 0-1, 26-36 - 5775 MHz Band Edge Frequency 5850 MHz

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

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.

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

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

-27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.

2.5.7 Test Location and Test Equipment Used

This test was carried out in RF Chamber 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Double Ridge Broadband Horn Antenna	Schwarzbeck	BBHA 9120 B	4848	12	01-Apr-2022
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	08-Mar-2022
EmX Emissions Software	TUV SUD	V2.1.11	5125	-	Software
Mast	Maturo	TAM 4.0-P	5158	-	TU
Mast and Turntable Controller	Maturo	Maturo NCD	5159	-	TU
Turntable	Maturo	TT 15WF	5160	-	TU
Preamplifier (30dB 1GHz to 18GHz)	Schwarzbeck	BBV 9718 C	5261	12	08-Apr-2022
Attenuator 5W 10dB DC-18GHz	Aaren	AT40A-4041-D18-10	5495	12	14-Apr-2022
1m SMA Cable	Junkosha	MWX221-01000AMSAMS/A	5513	12	09-Apr-2022
2m SMA Cable	Junkosha	MWX221-02000AMSAMS/A	5517	12	09-Apr-2022
2m SMA Cable	Junkosha	MWX221-02000AMSAMS/A	5518	12	09-Apr-2022
8m N Type Cable	Junkosha	MWX221-08000NMSNMS/B	5520	12	24-Mar-2022
8m N Type Cable	Junkosha	MWX221-08000NMSNMS/B	5522	12	24-Mar-2022
2m K Type Cable	Junkosha	MWX241-02000KMSKMS/A	5524	12	24-Mar-2022

Table 665

TU - Traceability Unscheduled

2.6 Spurious Radiated Emissions

2.6.1 Specification Reference

FCC 47 CFR Part 15E Clause 15.407 (b) and 15.209
ISED RSS-247, Clause 6.2 and 6.13
ISED RSS-GEN, Clause 8.9

2.6.2 Equipment Under Test and Modification State

A2485, S/N: HV9QMW620K - Modification State 0

2.6.3 Date of Test

21-July-2021 to 02-August-2021

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 from 30 MHz to 1 GHz on channel 36 (5180 MHz) and channel 165 (5825 MHz) only. Spurious emissions from 1 GHz to 40 GHz was performed on all test channels.

All testing, regardless of channel or mode, was performed at the EUT's maximum output power specified for any channel, mode and/or bandwidth given in the customer's power table. Therefore, due to some modes and channels in the final product being limited to lower output powers, these spurious emissions results are deemed "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 dBµV/m to µV/m:
10^(Field Strength in dBµV/m/20).

EIRP was converted to field strength at 3m using the following formula:
Field Strength (dBµV/m at 3 m) = EIRP (dBm) + 95.2 dB

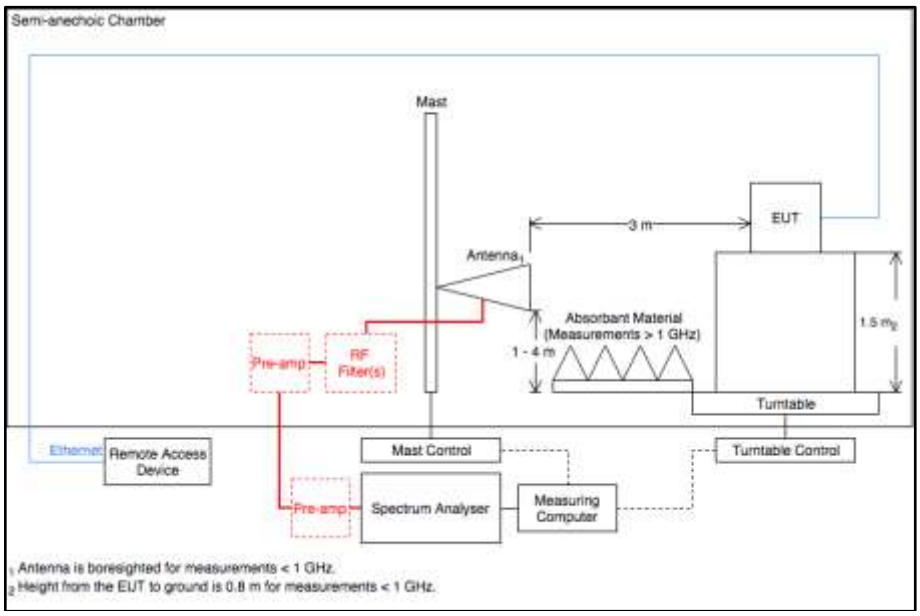

Table 666 - Radiated Emissions Test Setup Diagram

2.6.5 Environmental Conditions

Ambient Temperature	21.1 - 23.3 °C
Relative Humidity	39.2 - 44.2 %

2.6.6 Test Results

5 GHz WLAN

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

Table 667 - U-NII-1 - 5180 MHz (CH36), HT20, CDD, Core 0 + Core 1, 30 MHz to 40 GHz

*No emissions found within 6 dB of the limit.

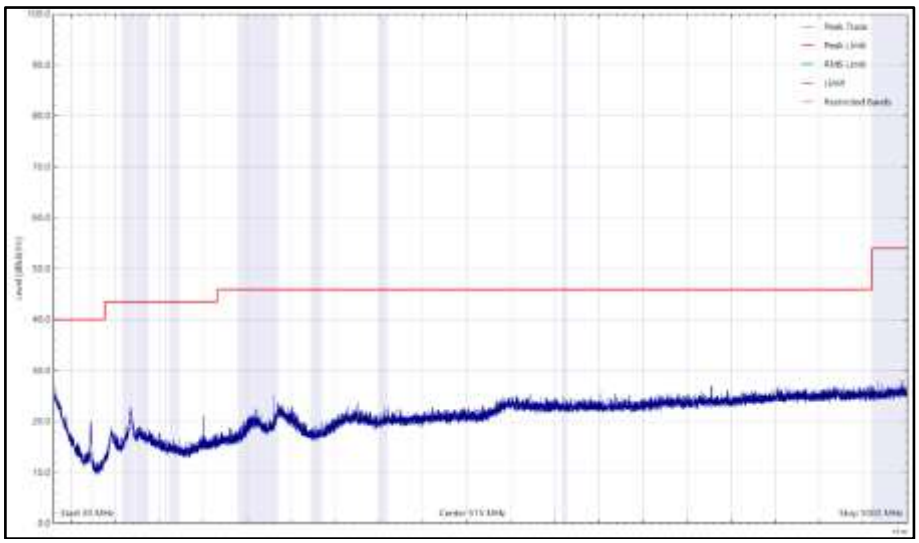

Figure 1047 - U-NII-1 - 5180 MHz (CH36), HT20, CDD, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal

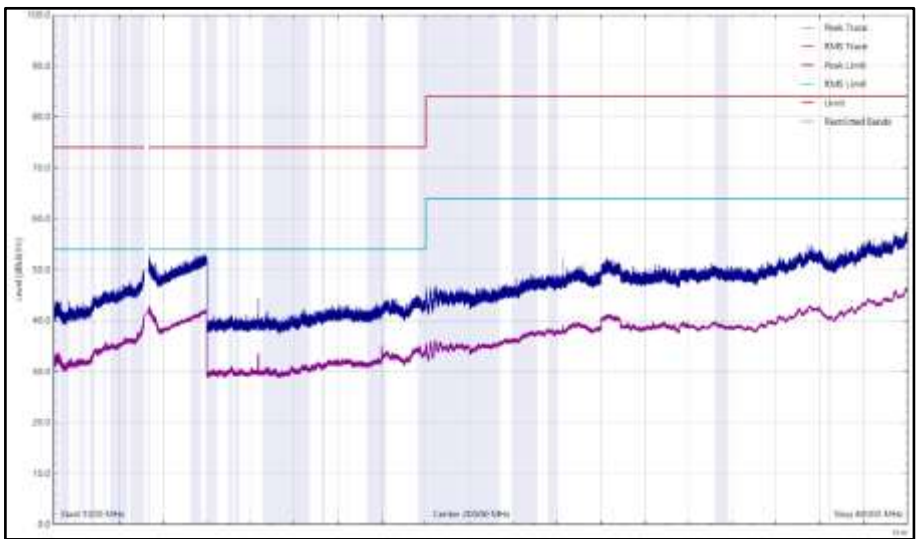

Figure 1048 - U-NII-1 - 5180 MHz (CH36), HT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

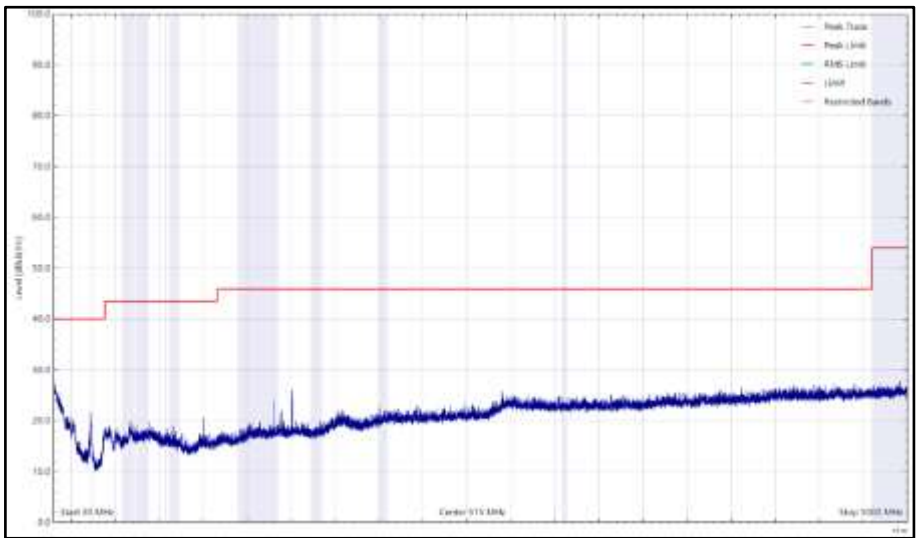

Figure 1049 - U-NII-1 - 5180 MHz (CH36), HT20, CDD, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical

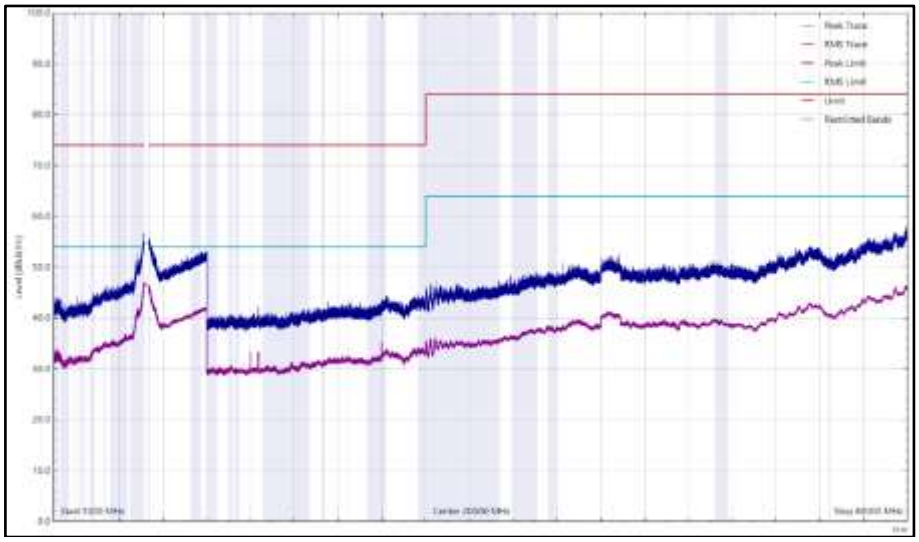

Figure 1050 - U-NII-1 - 5180 MHz (CH36), HT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

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

Table 668 - U-NII-2A - 5320 MHz (CH64), HT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz

*No emissions found within 6 dB of the limit.

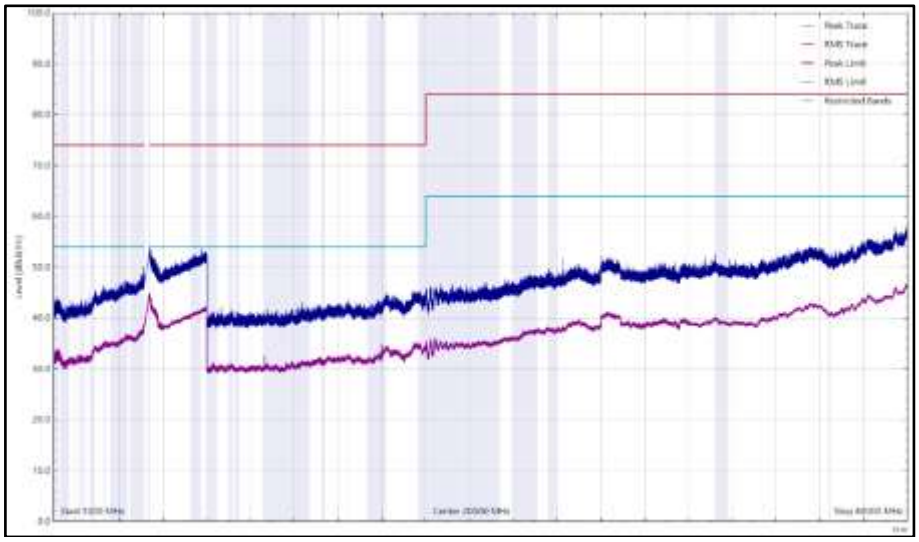

Figure 1051 - U-NII-2A - 5320 MHz (CH64), HT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

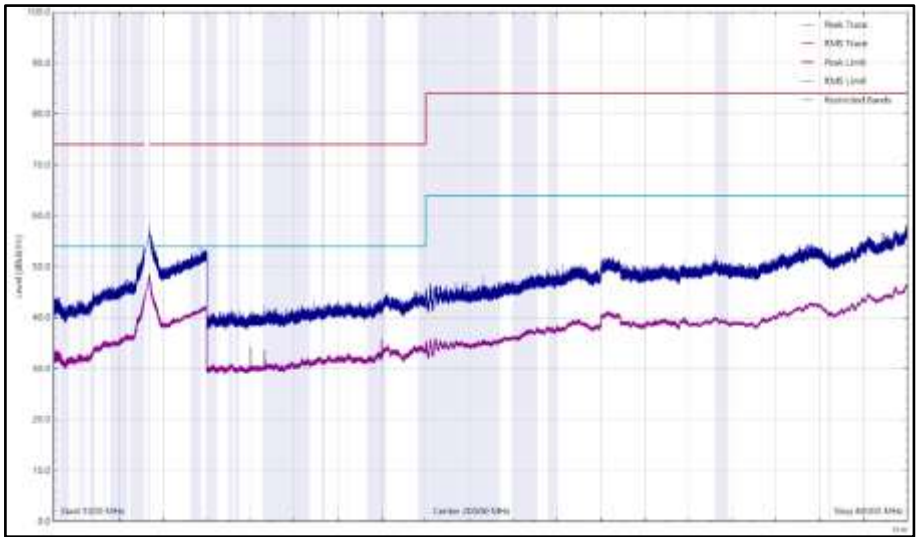

Figure 1052 - U-NII-2A - 5320 MHz (CH64), HT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

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

Table 669 - U-NII-2C - 5500 MHz (CH100), HT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz

*No emissions found within 6 dB of the limit.

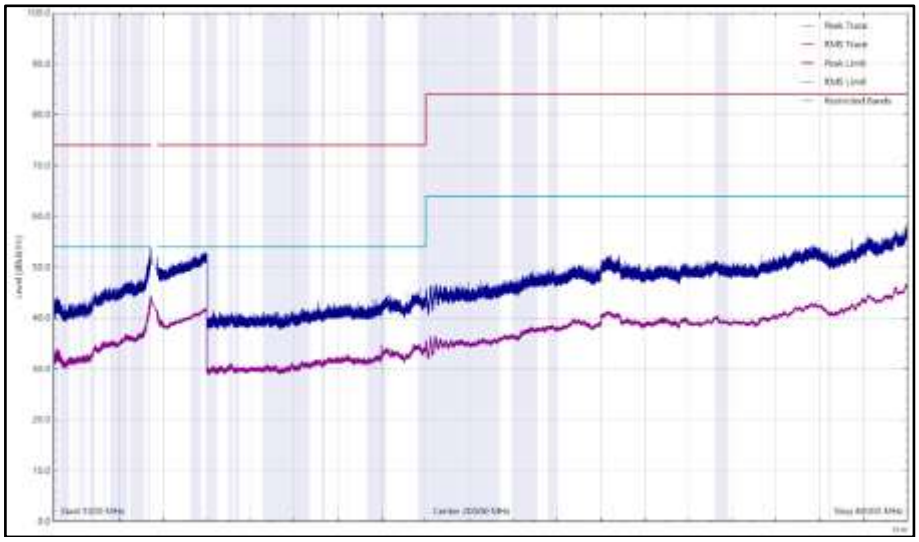

Figure 1053 - U-NII-2C - 5500 MHz (CH100), HT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

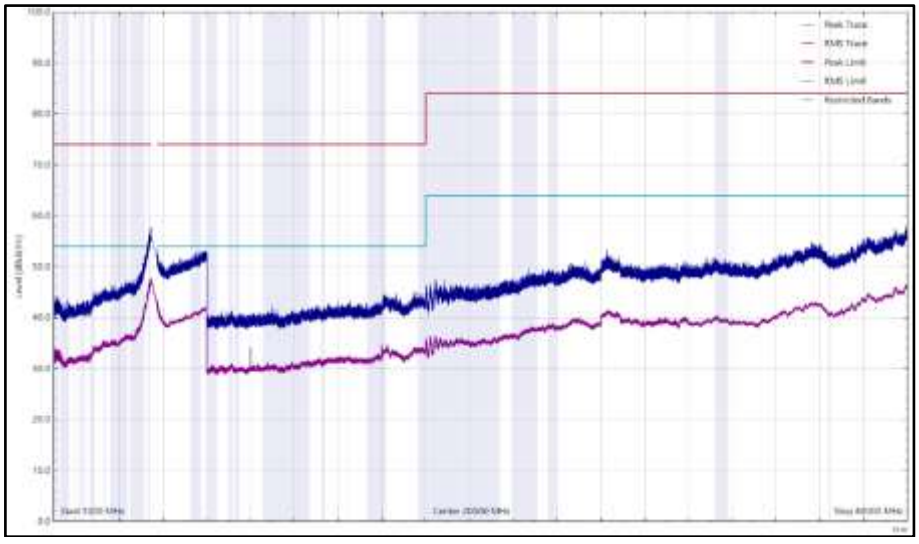

Figure 1054 - U-NII-2C - 5500 MHz (CH100), HT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

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

Table 670 - U-NII-2C - 5700 MHz (CH140), HT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz

*No emissions found within 6 dB of the limit.

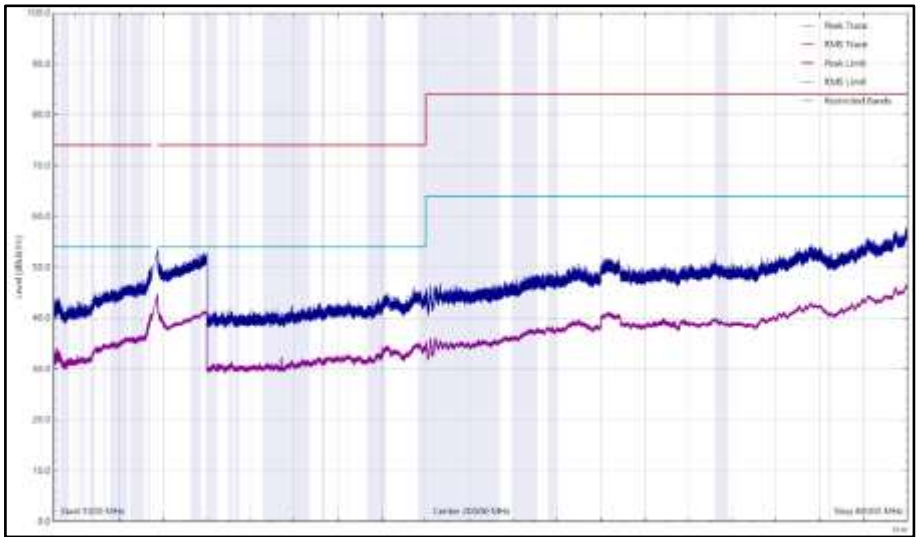

Figure 1055 - U-NII-2C - 5700 MHz (CH140), HT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

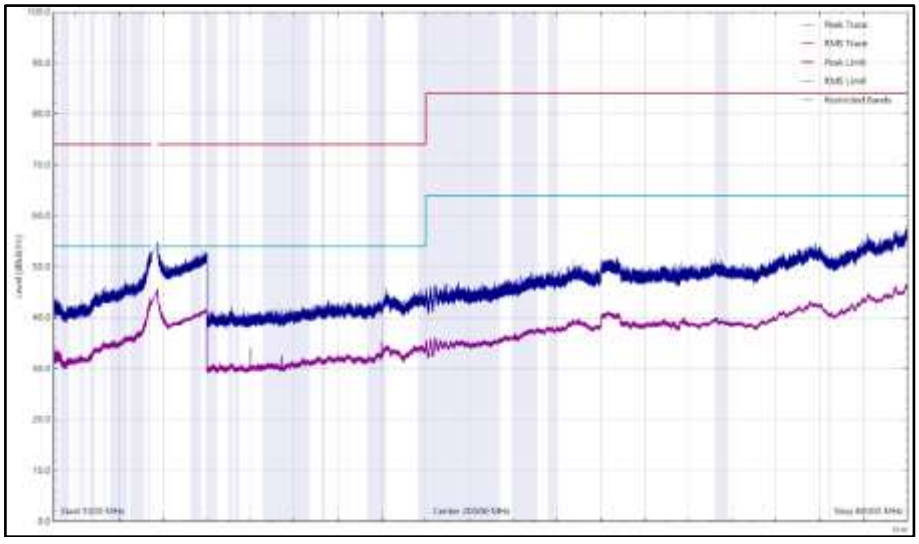

Figure 1056 - U-NII-2C - 5700 MHz (CH140), HT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

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

Table 671 - U-NII-3 - 5745 MHz (CH149), HT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz

*No emissions found within 6 dB of the limit.

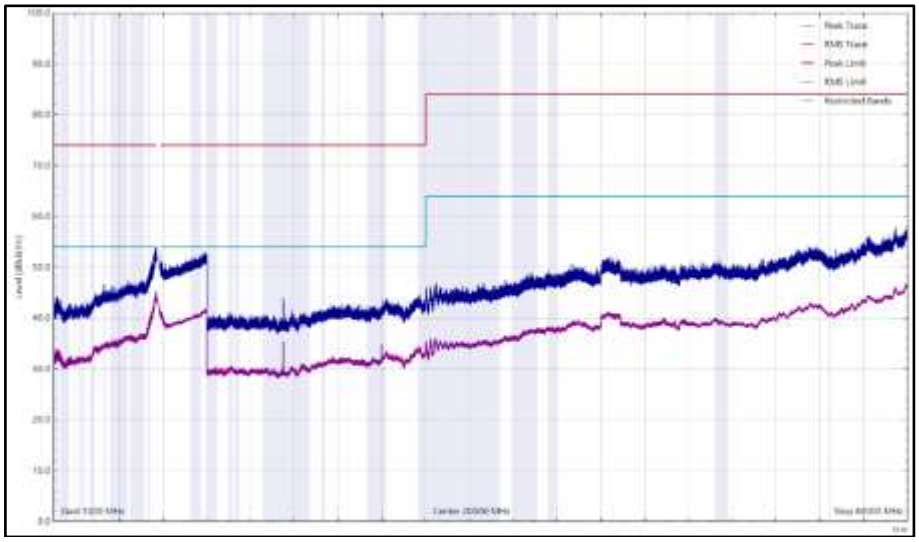

Figure 1057 - U-NII-3 - 5745 MHz (CH149), HT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

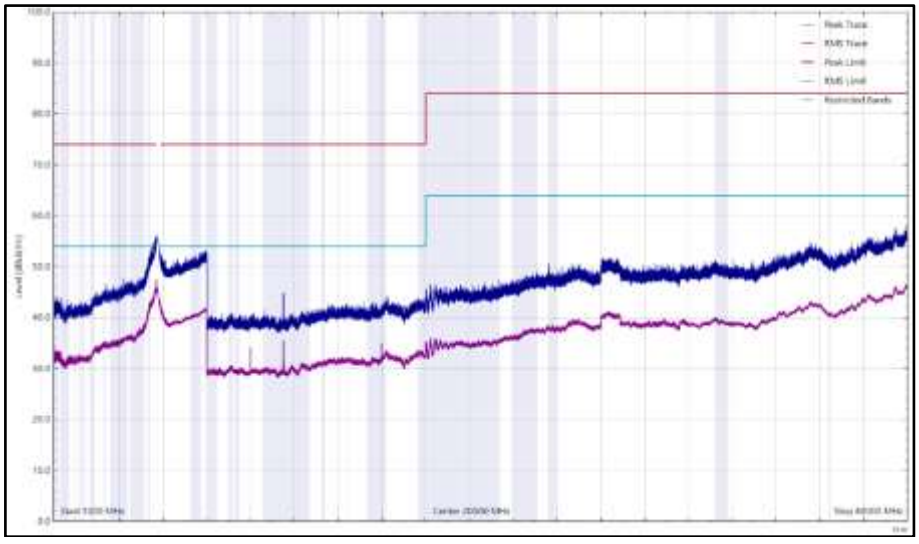

Figure 1058 - U-NII-3 - 5745 MHz (CH149), HT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
11649.804	36.3	54.0	-17.7	RMS	76	363	Horizontal
11649.860	35.9	54.0	-18.1	RMS	241	105	Vertical
15983.982	34.6	54.0	-19.4	RMS	85	400	Horizontal

Table 672 - U-NII-3 - 5825 MHz (CH165), HT20, CDD, Core 0 + Core 1, 30 MHz to 40 GHz

No other emissions found within 6 dB of the limit.

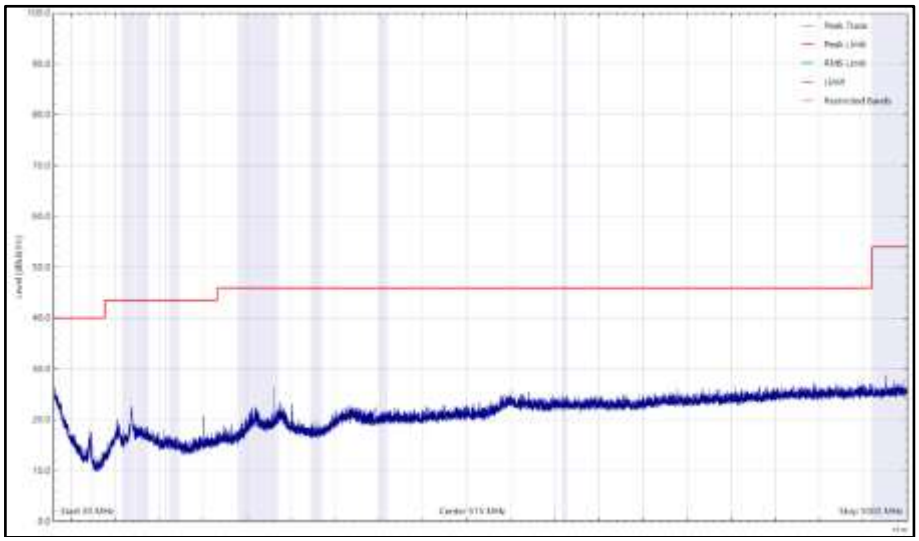

Figure 1059 - U-NII-3 - 5825 MHz (CH165), HT20, CDD, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal

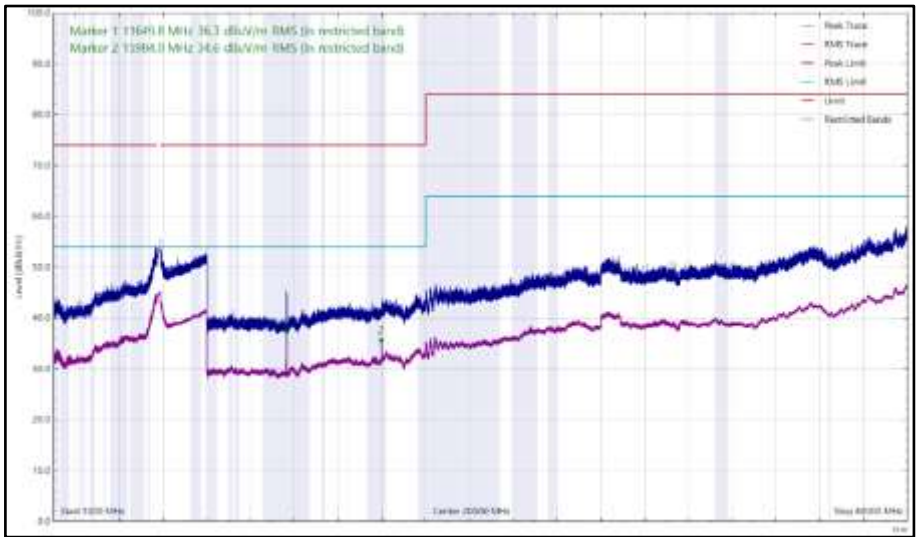

Figure 1060 - U-NII-3 - 5825 MHz (CH165), HT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

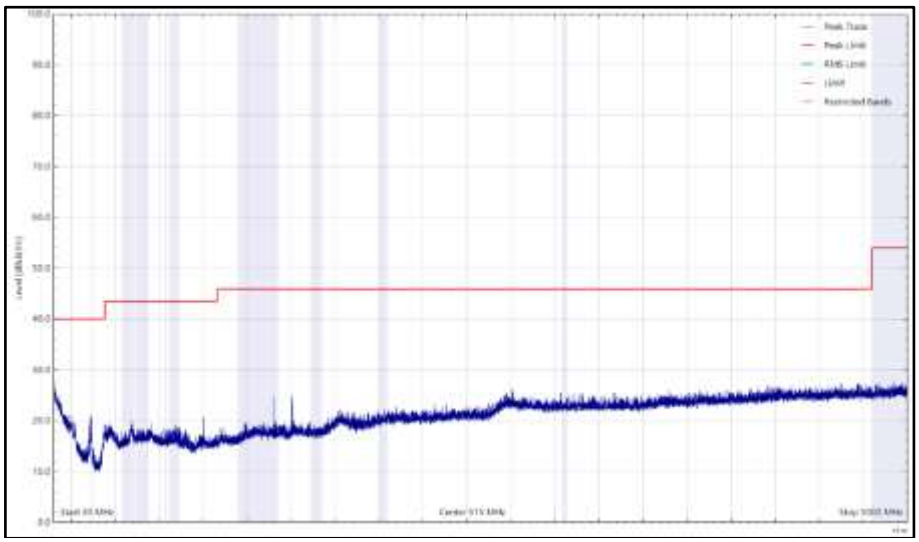

Figure 1061 - U-NII-3 - 5825 MHz (CH165), HT20, CDD, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical

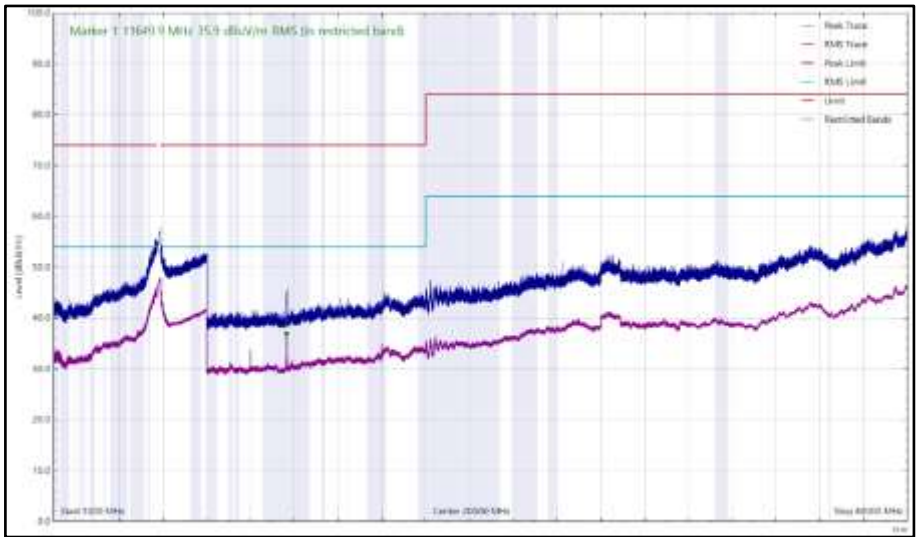

Figure 1062 - U-NII-3 - 5825 MHz (CH165), HT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

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

Table 673 - 5180 MHz (CH36), HE20, RU26-0, Core 0 + Core 1, 30 MHz to 40 GHz

*No emissions found within 6 dB of the limit.

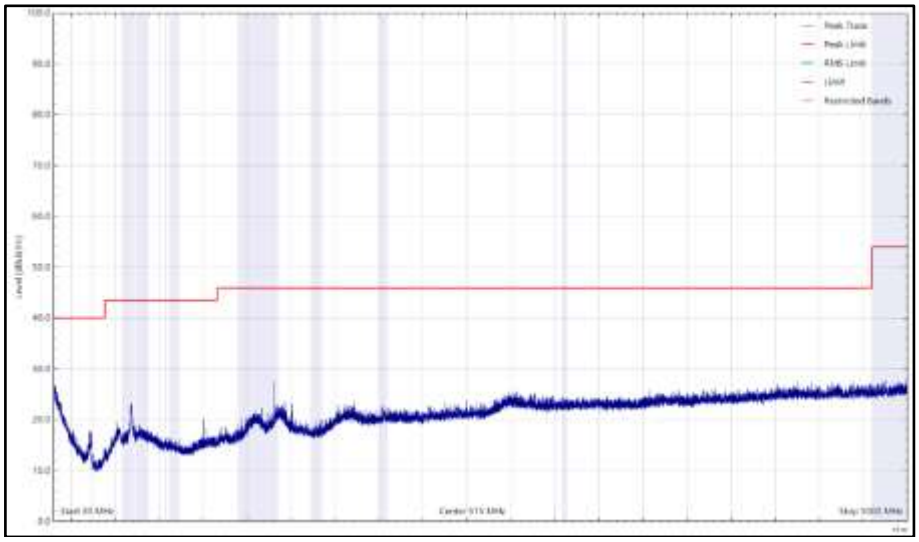

Figure 1063 - 5180 MHz (CH36), HE20, RU26-0, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal

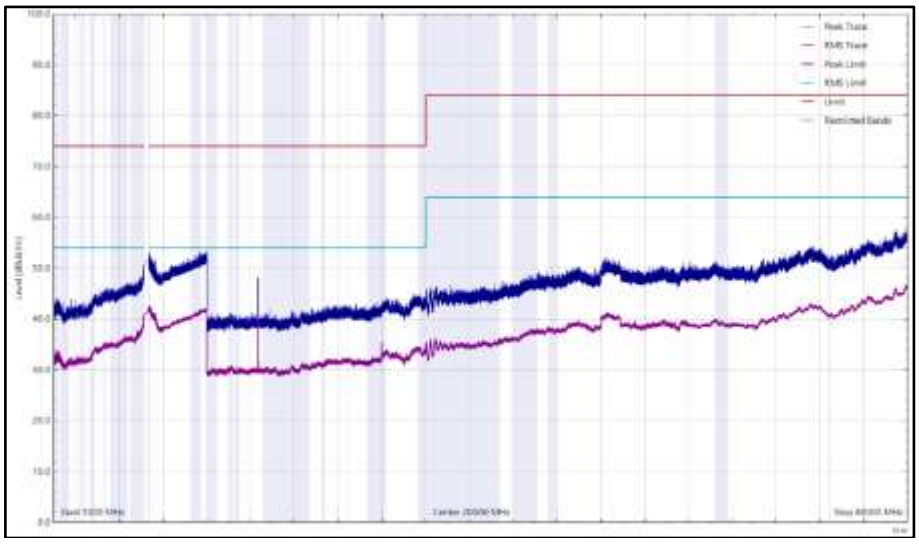

Figure 1064 - 5180 MHz (CH36), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

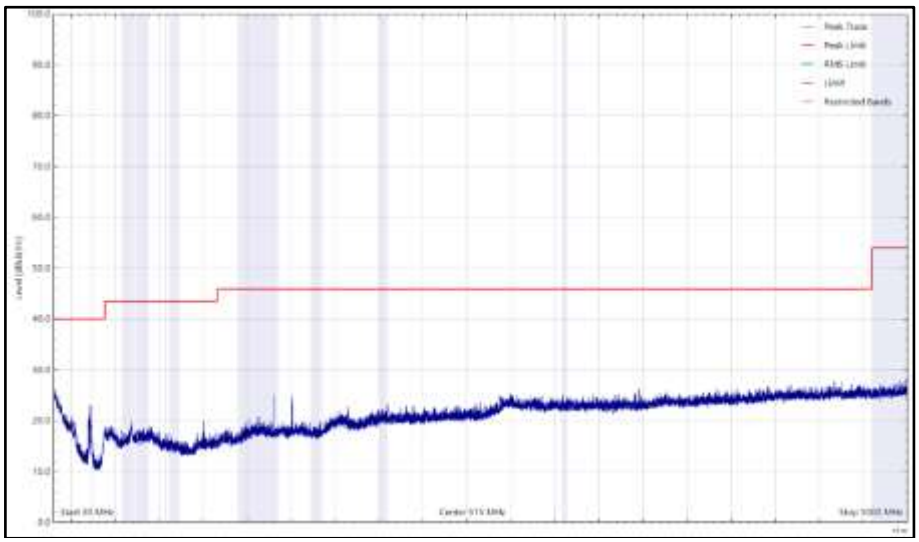

Figure 1065 - 5180 MHz (CH36), HE20, RU26-0, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical

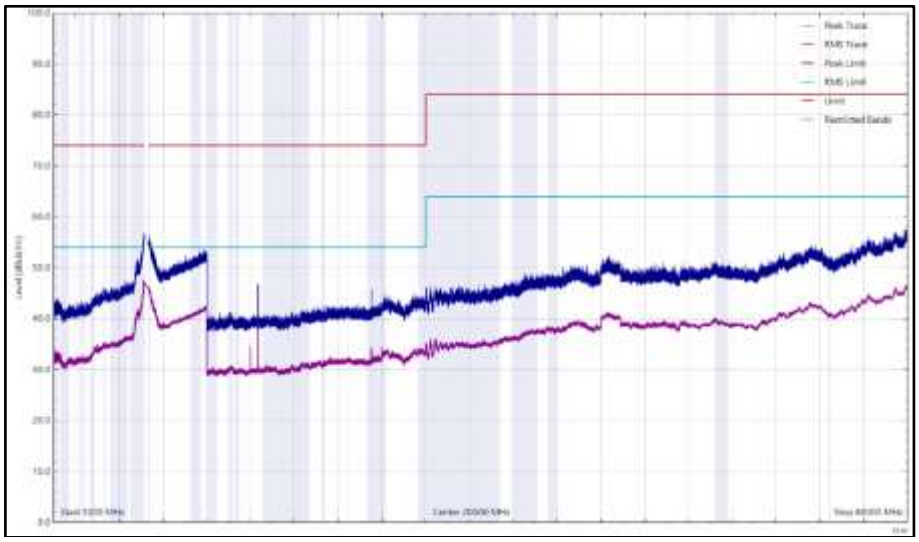

Figure 1066 - 5180 MHz (CH36), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
10624.583	35.1	54.0	-18.9	RMS	302	237	Vertical
10626.801	34.4	54.0	-19.6	RMS	272	397	Horizontal

Table 674 - 5320 MHz (CH64), HE20, RU52-37, Core 0 + Core 1, 1 GHz to 40 GHz

No other emissions found within 6 dB of the limit.

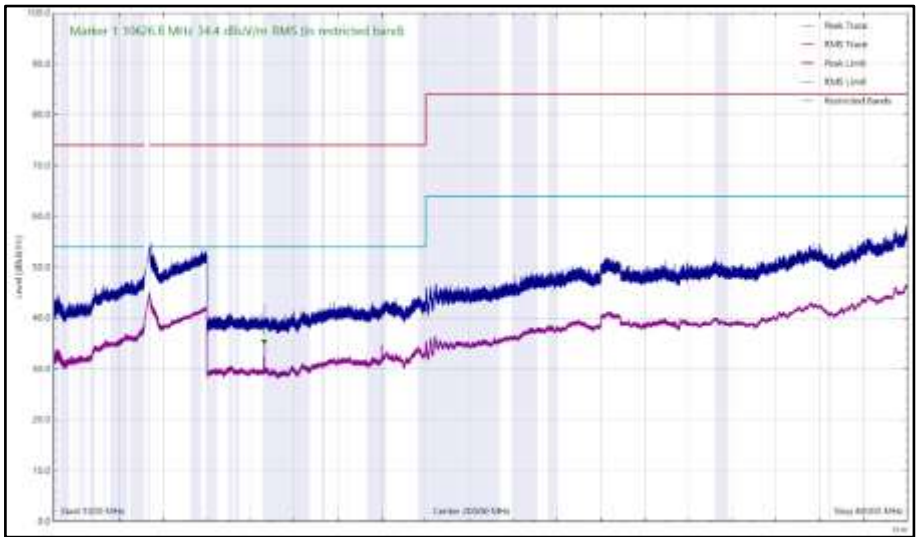

Figure 1067 - 5320 MHz (CH64), HE20, RU52-37, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

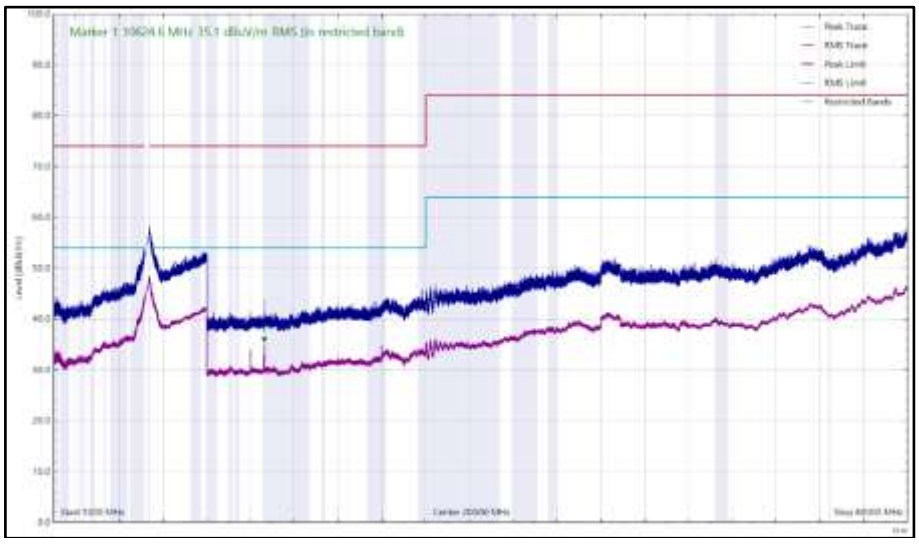

Figure 1068 - 5320 MHz (CH64), HE20, RU52-37, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

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

Table 675 - 5500 MHz (CH100), HE20, RU52-37, Core 0 + Core 1, 1 GHz to 40 GHz

*No emissions found within 6 dB of the limit.

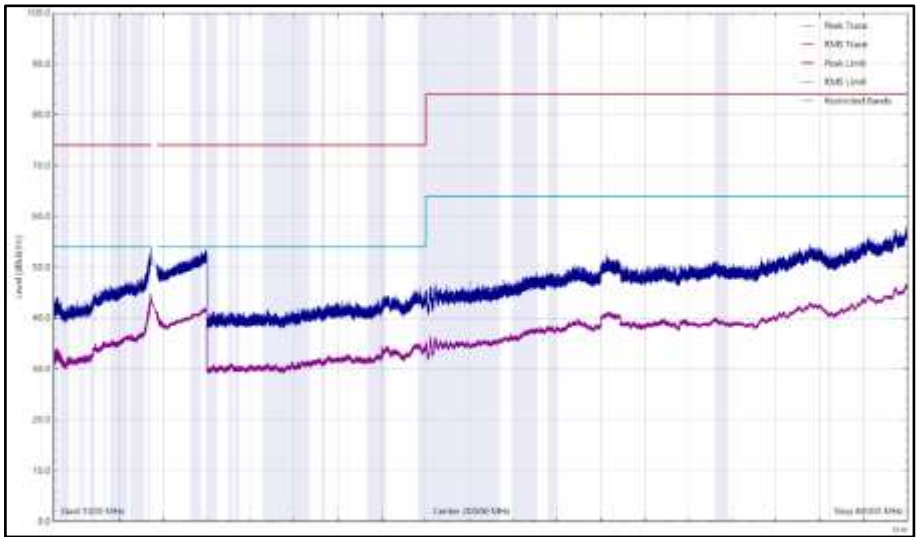

Figure 1069 - 5500 MHz (CH100), HE20, RU52-37, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

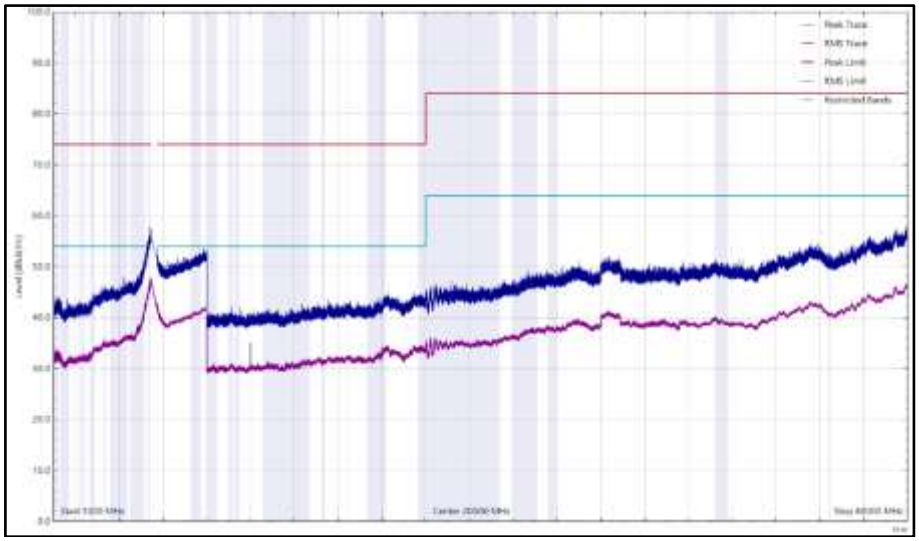

Figure 1070 - 5500 MHz (CH100), HE20, RU52-37, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

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

Table 676 - 5700 MHz (CH140), HE20, RU52-37, Core 0 + Core 1, 1 GHz to 40 GHz

*No emissions found within 6 dB of the limit.

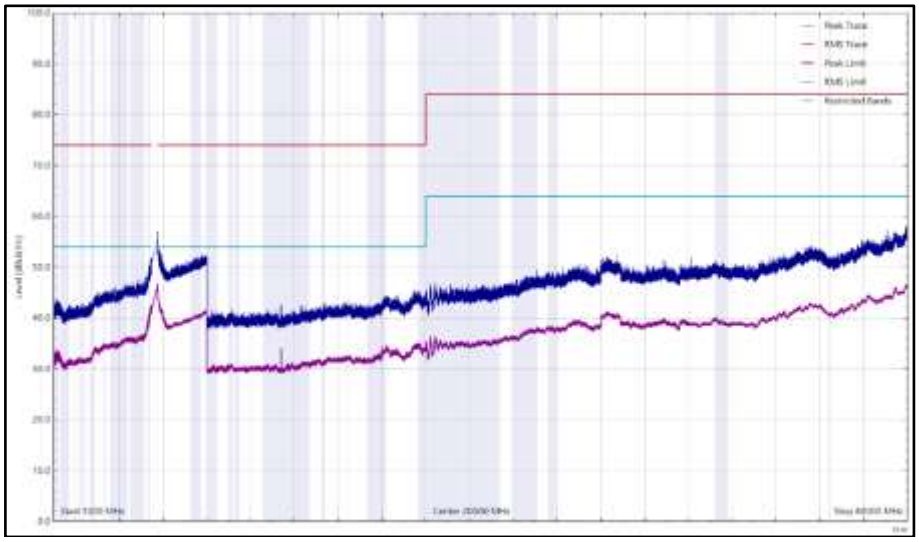

Figure 1071 - 5700 MHz (CH140), HE20, RU52-37, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

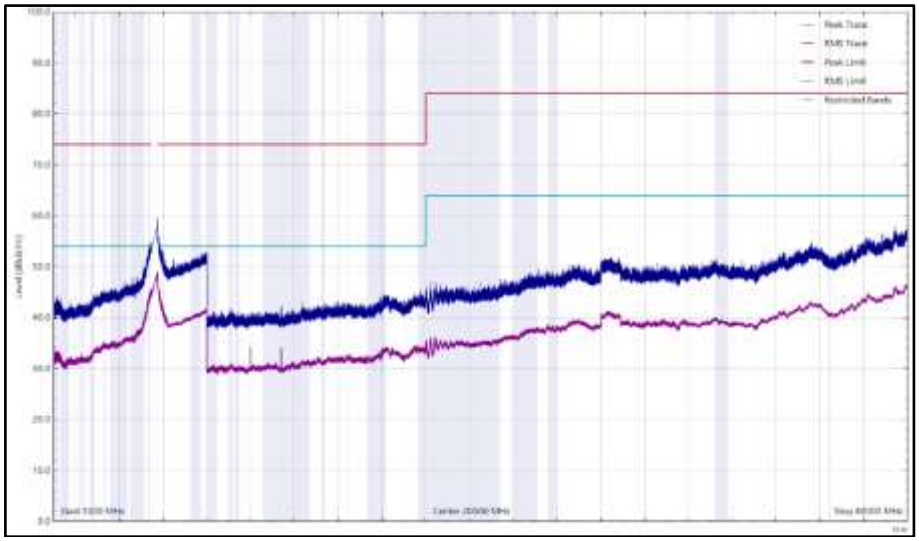

Figure 1072 - 5700 MHz (CH140), HE20, RU52-37, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
11472.432	53.0	74.0	-21.0	Peak	282	386	Horizontal
11472.577	31.8	54.0	-22.2	RMS	297	284	Horizontal
11472.647	39.2	54.0	-14.9	RMS	239	143	Vertical

Table 677 - 5745 MHz (CH149), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 40 GHz

No other emissions found within 6 dB of the limit.

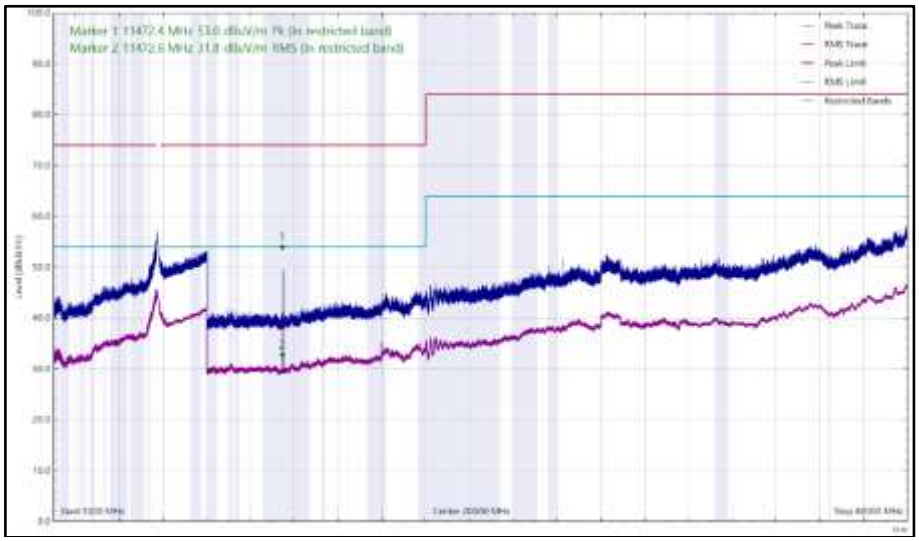

Figure 1073 - 5745 MHz (CH149), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

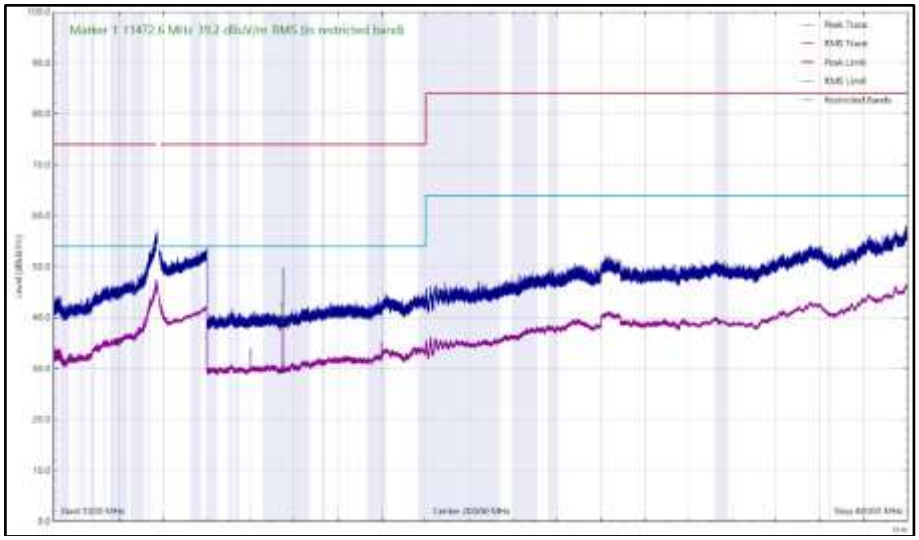

Figure 1074 - 5745 MHz (CH149), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
11632.368	56.8	74.0	-17.2	Peak	283	380	Horizontal
11632.475	45.5	54.0	-8.5	RMS	303	251	Vertical
11632.563	44.3	54.0	-9.7	RMS	258	391	Horizontal

Table 678 - 5825 MHz (CH165), HE20, RU26-0, Core 0 + Core 1, 30 MHz to 40 GHz

No other emissions found within 6 dB of the limit.

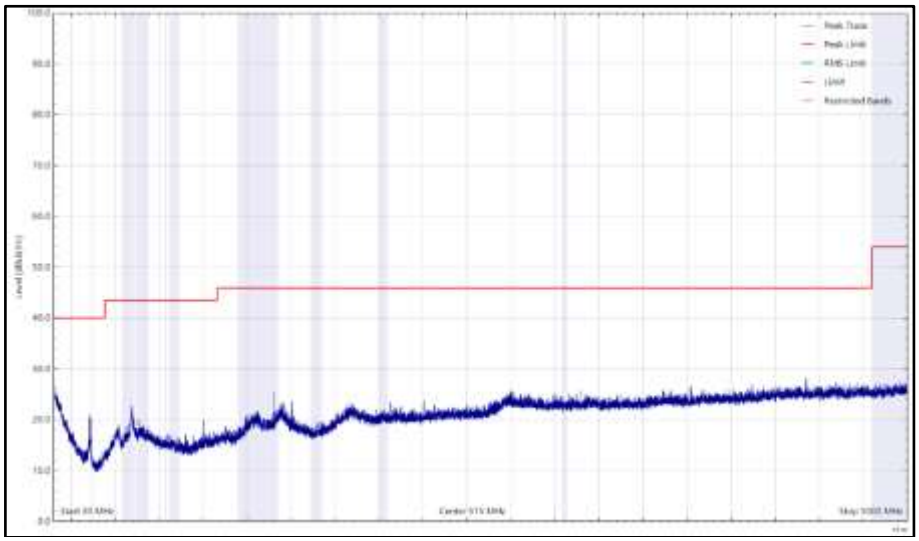

Figure 1075 - 5825 MHz (CH165), HE20, RU26-0, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal

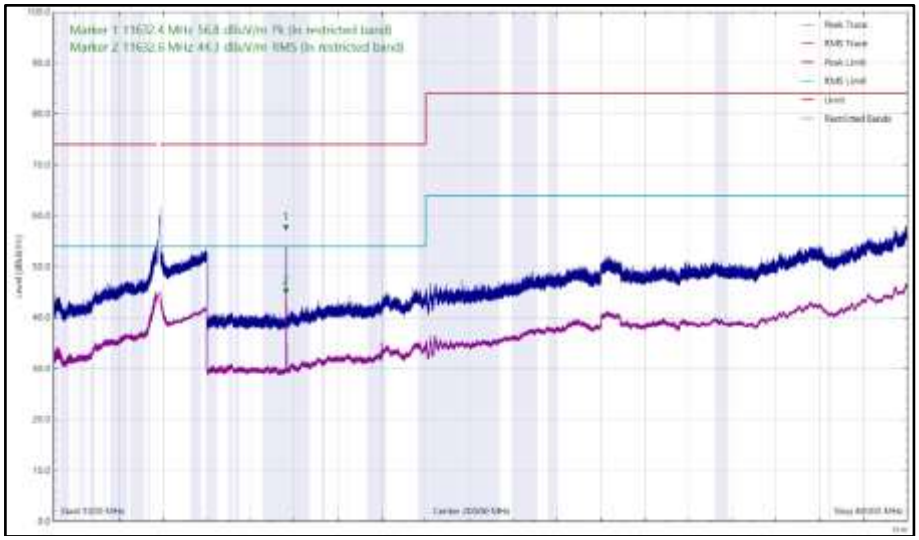

Figure 1076 - 5825 MHz (CH165), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

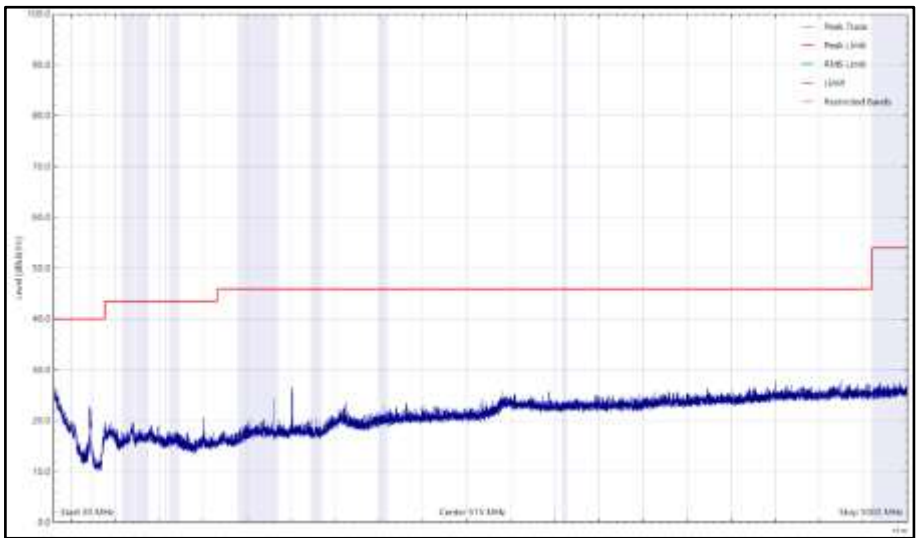

Figure 1077 - 5825 MHz (CH165), HE20, RU26-0, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical

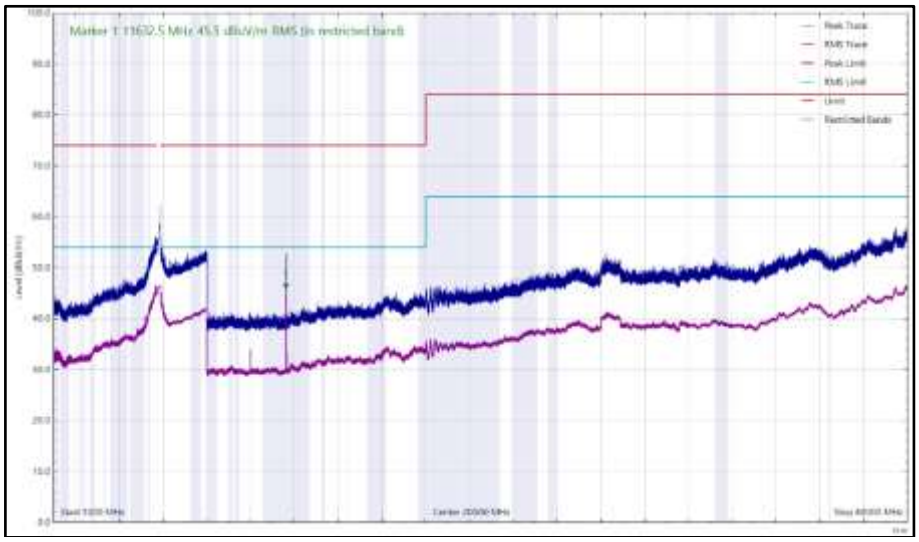

Figure 1078 - 5825 MHz (CH165), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

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 (µV/m)at 3m	Field Strength Limit (dBµV/m) at 3m
30 to 88	100	40.00
88 to 216	150	43.52
216 to 960	200	46.02
Above 960	500	53.98

Table 679 - 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 (µV/m)at 3m	Field Strength Limit (dBµV/m) at 3m
30 to 88	100	40.00
88 to 216	150	43.52
216 to 960	200	46.02
Above 960	500	53.98

Table 680 - Radiated Emissions Limit Table (ISED)

2.6.7 Test Location and Test Equipment Used

This test was carried out in RF Chamber 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Antenna with permanent attenuator (Bilog)	Schaffner	CBL6143	287	12	14-Oct-2022
Programmable Power Supply	Iso-tech	IPS 2010	2437	-	O/P Mon
True RMS Multimeter	Fluke	179	4007	12	29-Oct-2021
Band Reject Filter - 5.795GHz	Wainwright	WRCJV10-5725-5755-5835-5865-50SS	5070	12	30-Sep-2021
Band Reject Filter - 5.22 GHz	Wainwright	WRCJV12-5120-5150-5290-5320-50SS	5072	12	02-Oct-2021
Band Reject Filter - 5.775 GHz	Wainwright	WRCJV10-5700-5735-5815-5850-50SS	5076	12	12-Oct-2021
Band Reject Filter - 5.690 GHz	Wainwright	WRCJV8-5635-5670-5710-5745-50SS	5080	12	02-Oct-2021
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	08-Mar-2022
Cable (18 GHz)	Rosenberger	LU7-071-1000	5102	12	12-Oct-2021
Cable (18 GHz)	Rosenberger	LU7-071-1000	5103	12	12-Oct-2021
EmX Emissions Software	TUV SUD	V2.1.11	5125	-	Software
Screened Room (11)	Rainford	Rainford	5136	36	01-Nov-2021
Mast and Turntable Controller	Maturo	Maturo NCD	5159	-	TU
Turntable	Maturo	TT 15WF	5160	-	TU
Horn Antenna (1-10GHz)	Schwarzbeck	BBHA 9120 B	5215	12	01-Apr-2022
DRG Horn Antenna (7.5-18GHz)	Schwarzbeck	HWRD750	5216	12	01-Apr-2022
Horn Antenna (15-40GHz)	Schwarzbeck	BBHA 9170	5217	12	14-Oct-2021
Preamplifier (30dB 18-40GHz)	Schwarzbeck	BBV 9721	5218	12	14-Oct-2021
Preamp 1 - 26.5 GHz	Agilent Technologies	8449B	5445	12	06-May-2022

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
2m SMA Cable	Junkosha	MWX221-02000AMSAMS/A	5518	12	09-Apr-2022
8m N Type Cable	Junkosha	MWX221-08000NMSNMS/B	5522	12	24-Mar-2022
2m K Type Cable	Junkosha	MWX241-02000KMSKMS/A	5524	12	24-Mar-2022
7 GHz High pass Filter	Wainwright	WHKX12-5850-6800-18000-80SS	5550	12	20-May-2022
Band Reject Filter - 5.57 GHz	Wainwright	WRCJV10-5440-5490-5650-5700-50SS	5556	12	07-May-2022
1200 MHz Low Pass Filter (02)	Mini-Circuits	VLF-1200+	5560	12	24-May-2022
8 - 18 GHz Amplifier	Wright Technologies	APS06-0061	5595	12	25-Aug-2021
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB 40	5604	12	08-Sep-2021

Table 681

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

A2485, S/N: C02DX02Q03G7 - Modification State 0

2.7.3 Date of Test

16-August-2021 to 31-August-2021

2.7.4 Test Method

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

The EUT was a Client Device without Radar Detection.

A computer was connected via an Ethernet cable to the Master device and a video file was streamed from the Client device to another Client device ensuring the Channel Loading was >17%.

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	22.0 - 22.9 °C
Relative Humidity	46.7 - 57.2 %

2.7.6 Test Results

5 GHz WLAN - Master to Client

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 DFS Master, the DFS Master was replaced by the spectrum analyser and the output of the PXI RF generator adjusted to give -62 dBm + 1dB.

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

Table 682 - Radar Pulse Type 0 Characteristics

Manufacturer	Model	Serial Number	FCC ID
TP-Link Technologies Co	AX3000 Gigabit Wi-Fi 6 Router AX50	22151C8002486	TE7AX50

Table 683 - Details of Master Device used to support testing

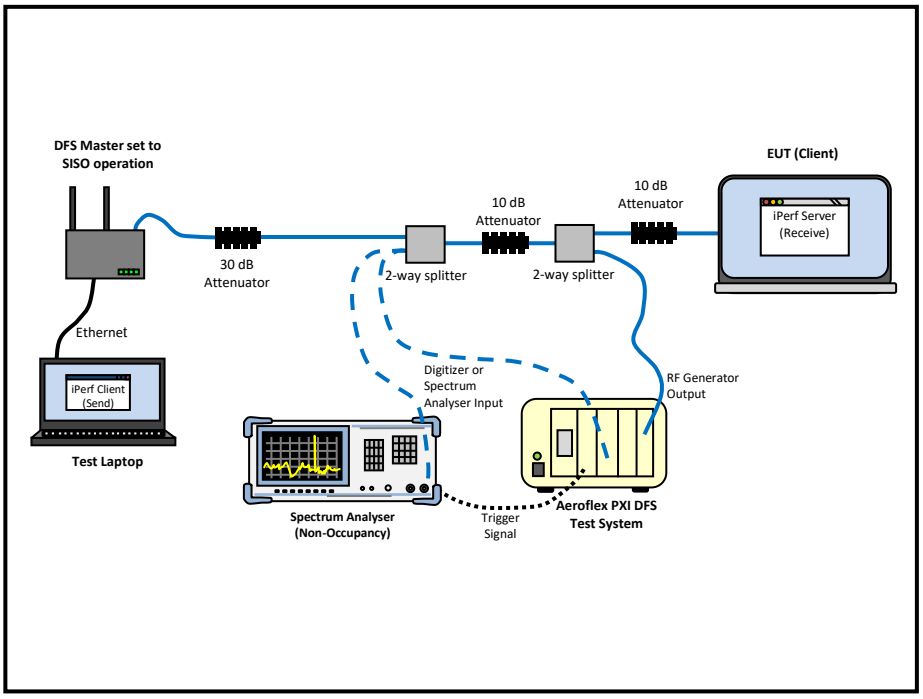

Figure 1079 - Test Equipment Setup Diagram for Client without Radar Detection with Injection at the Master

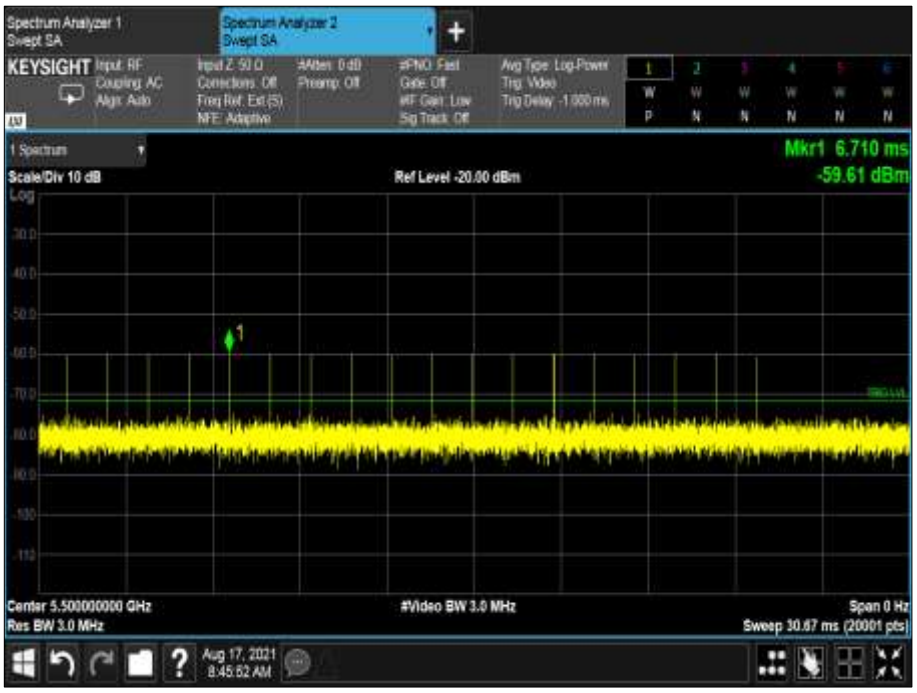

Figure 1080 - Verification of Radar Type 0

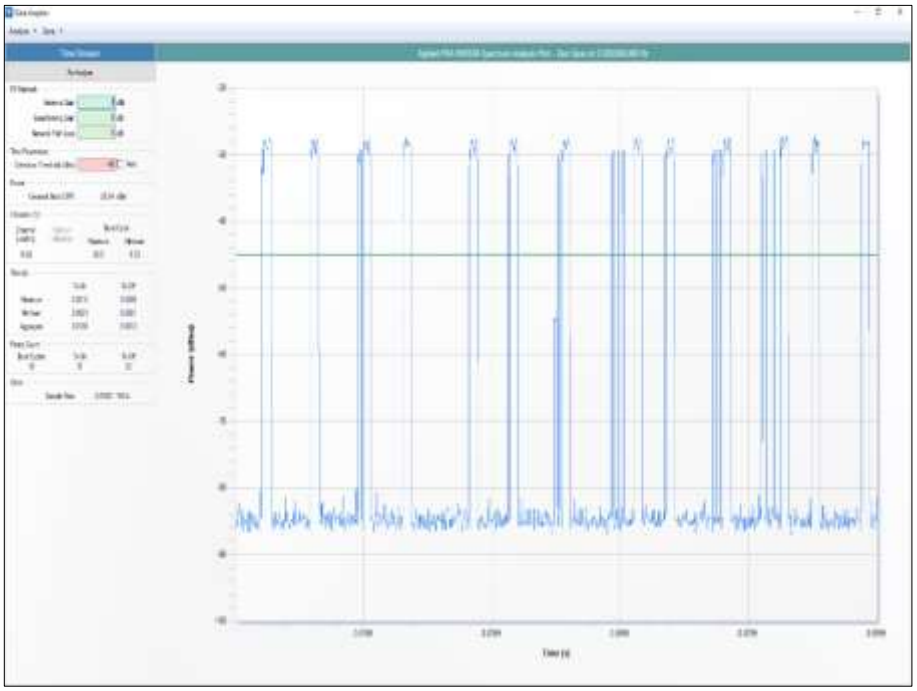

Figure 1081 - Channel Loading

The channel loading was 18.8 %

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 684 - DFS Detection Thresholds for Master Devices and Client Devices with Radar Detection

Test Parameter	Result
Test Channel	CH106 (5530 MHz), Control CH100 (5500 MHz)
Channel Move Time	0.283 s
Channel Closing Time (Aggregate Time During 200 ms)	7.054 ms
Channel Closing Time (Aggregate Time During 200 ms to 10 s)	0.113 ms
Channel Closing Time (Aggregate Time During 10 s)	7.167 ms
Transmission Observed During Non-Occupancy Period	0

Table 685 - In-Service Monitoring Test Results

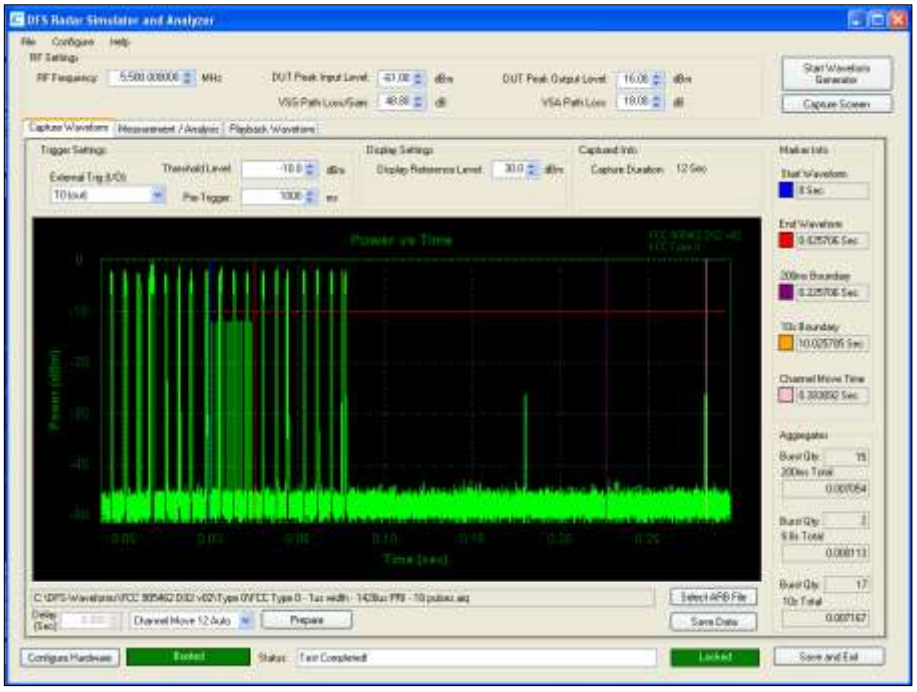

Figure 1082 - First 200 ms of Channel Shutdown Period

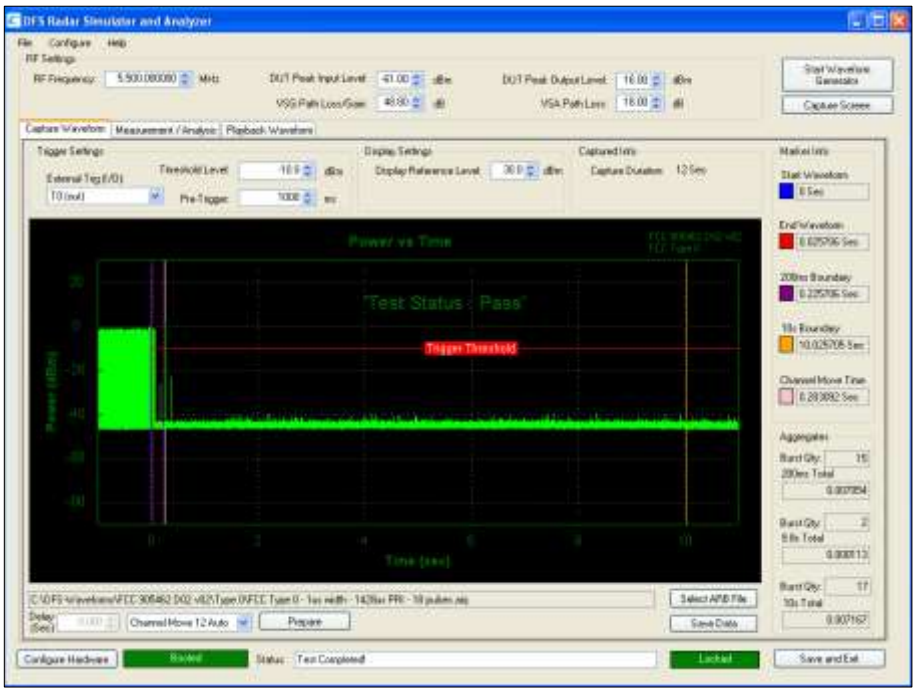

Figure 1083 - First 12 s of Channel Shutdown Period

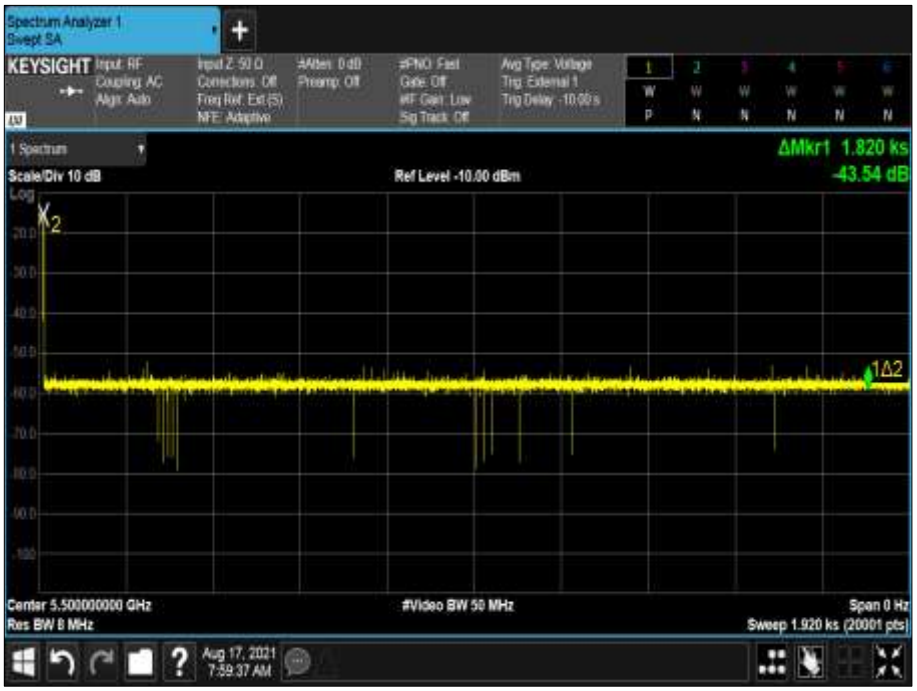

Figure 1084 - 30 minute Non-Occupancy Period

5 GHz WLAN - Client to Client

802.11ac VHT80

The EUT could operate a direct client-to-client mode and so this was also tested as required by KDB 905462 D03 v01r02 clause (b)3.

The equipment was set up as shown in the diagram below. The EUT was configured to screencast its display (showing video playback), directly to the Apple TV box using the AirPlay transfer protocol. A spectrum analyser was used to measure the channel loading was >17 %. It was also used to verify the EUT mode of operation was correctly transmitting directly to the other client, with the DFS Master only doing occasional signalling and not re-transmitting the data.

To calibrate the level of the radar at the input to the DFS Master, the DFS Master was replaced by the spectrum analyser and the output of the PXI RF generator adjusted to give -61 dBm + 1 dB.

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

Table 686 - Radar Pulse Type 0 Characteristics

Manufacturer	Model	Serial Number	FCC ID
ASUS	RT-AC68U	GAIU0H002628	MSQ-RTAC68U

Table 687 - Details of Master Device used to support testing

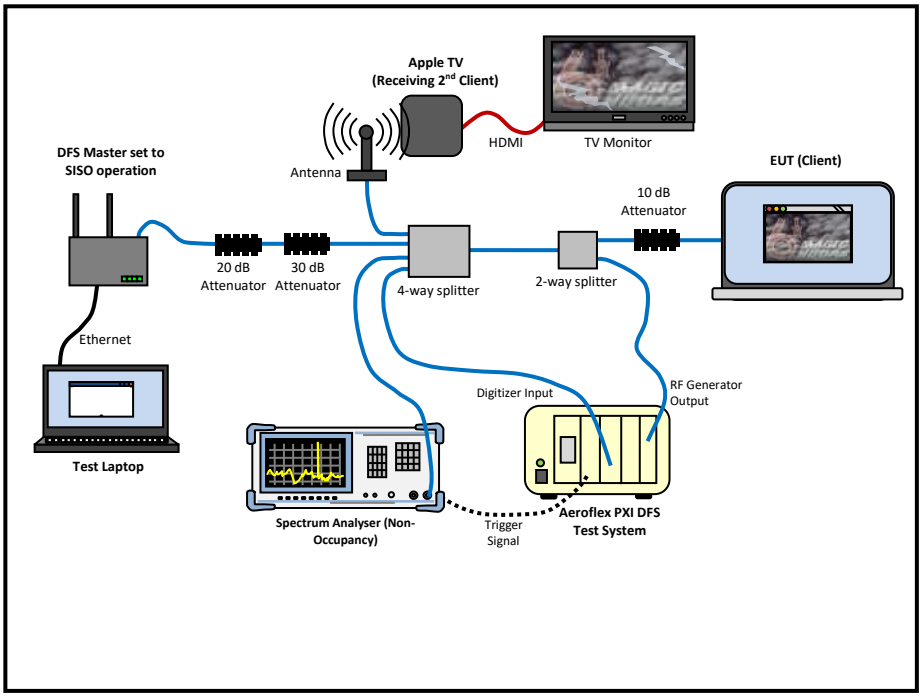

Figure 1085 - Test Equipment Setup Diagram for Client without Radar Detection with Injection at the Master

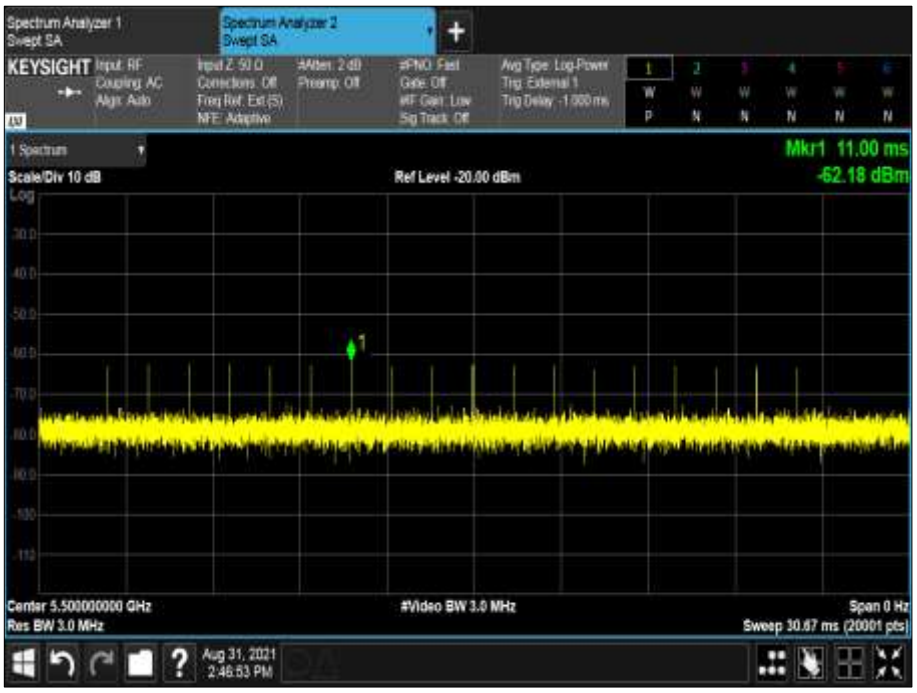

Figure 1086 - Verification of Radar Type 0

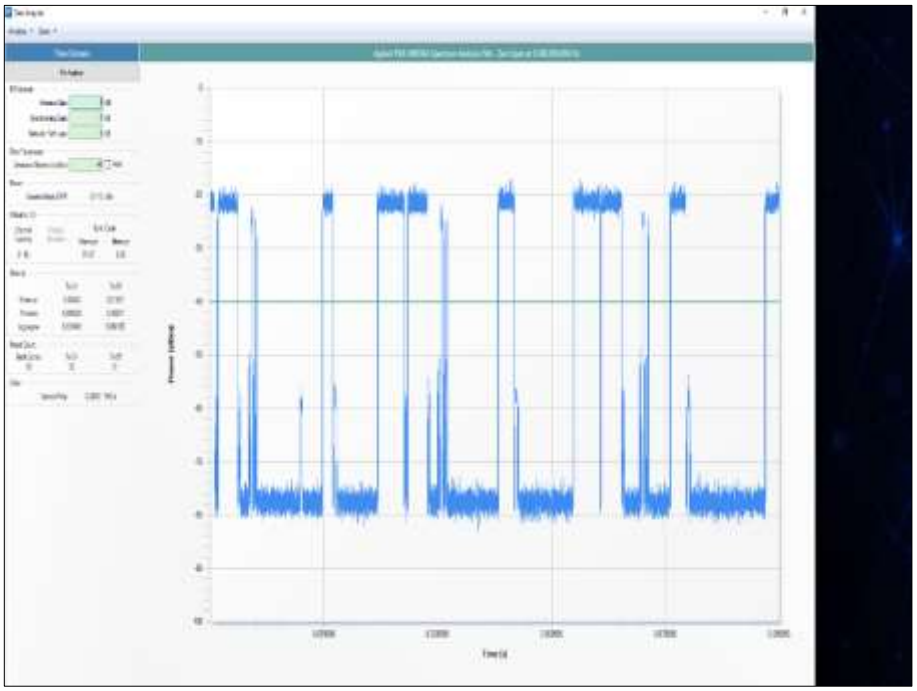

Figure 1087 - Channel Loading

The channel loading was 31.85 %

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 688 - DFS Detection Thresholds for Master Devices and Client Devices with Radar Detection

Test Parameter	Result
Test Channel	CH106 (5530 MHz), Control CH100 (5500 MHz)
Channel Move Time	0.125 s
Channel Closing Time (Aggregate Time During 200 ms)	58.806 ms
Channel Closing Time (Aggregate Time During 200 ms to 10 s)	0 ms
Channel Closing Time (Aggregate Time During 10 s)	58.806 ms
Transmission Observed During Non-Occupancy Period	0

Table 689 - In-Service Monitoring Test Results

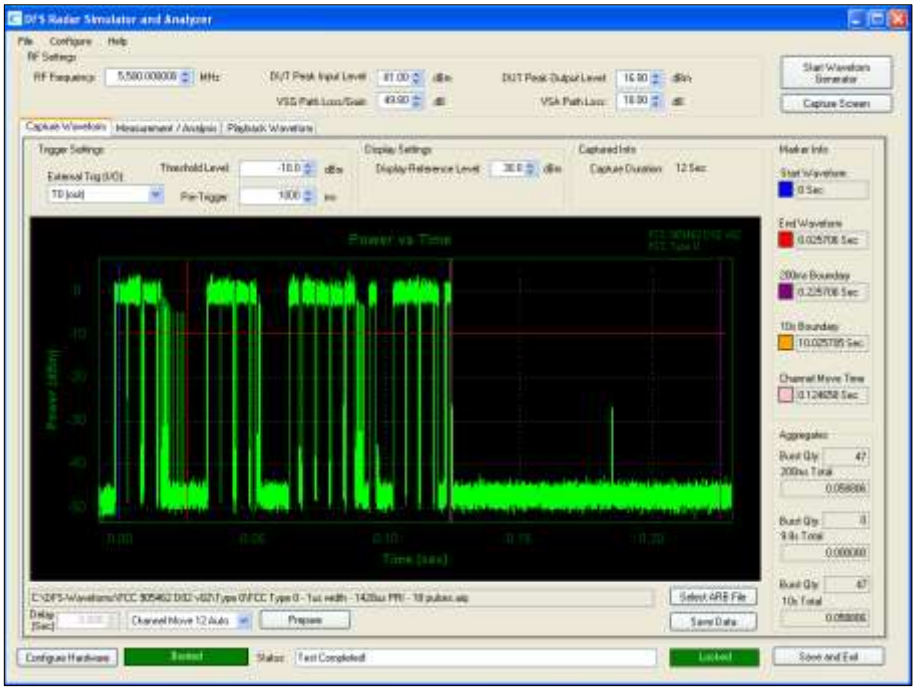

Figure 1088 - First 200 ms of Channel Shutdown Period

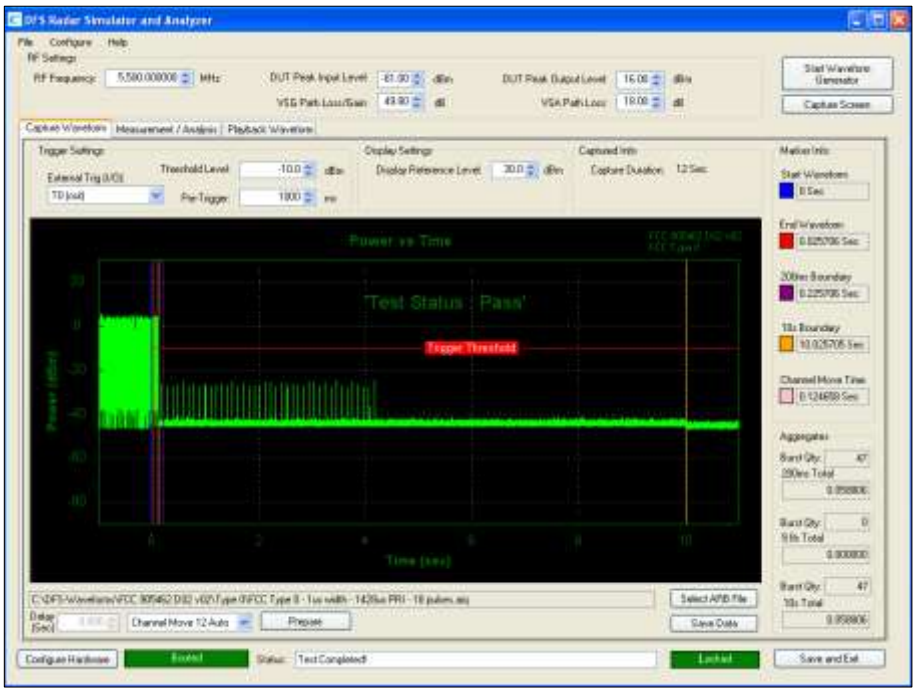

Figure 1089 - First 12 s of Channel Shutdown Period

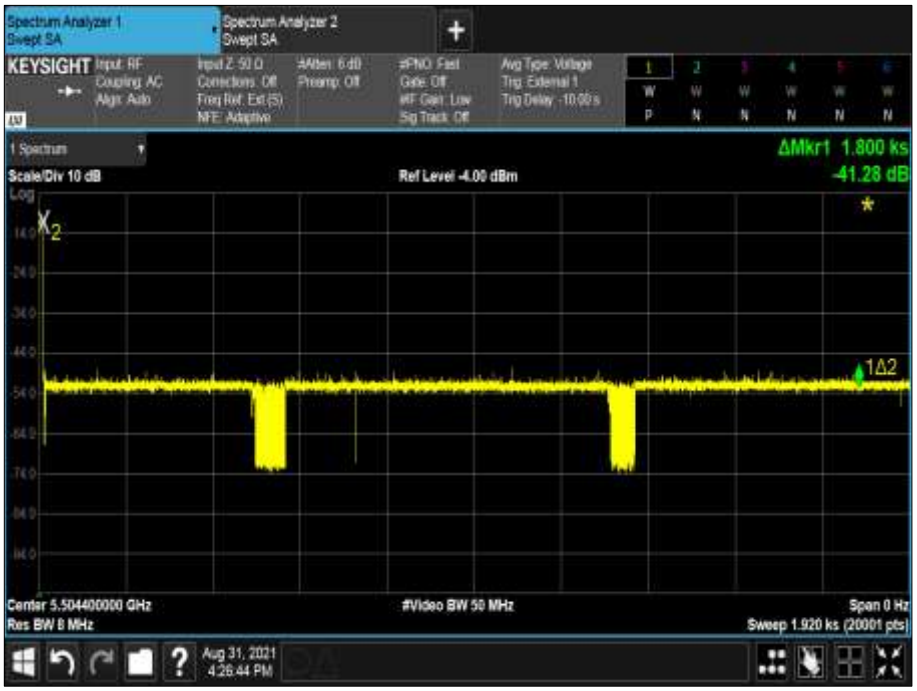

Figure 1090 - 30 minute Non-Occupancy Period

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 690 - 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

Table 691 - Non-Occupancy Limit

ISED RSS-247, Limit Clause 6.3.2

Devices shall comply with the following requirements, however, the requirement for in-service monitoring does not apply to slave devices without radar detection.

In-service monitoring: an LE-LAN device shall be able to monitor the operating channel to check that a co-channel radar has not moved or started operation within range of the LE-LAN device. During in-service monitoring, the LE-LAN radar detection function continuously searches for radar signals between normal LE-LAN transmissions.

Channel availability check time: the device shall check whether there is a radar system already operating on the channel before it initiates a transmission on a channel and when it moves to a channel. The device may start using the channel if no radar signal with a power level greater than the interference threshold value specified in Section 6.3.1 above is detected within 60 seconds. This requirement only applies in the master operational mode.

Channel move time: after a radar signal is detected, the device shall cease all transmissions on the operating channel within 10 seconds.

Channel closing transmission time: is comprised of 200 ms starting at the beginning of the channel move time plus any additional intermittent control signals required to facilitate a channel move (an aggregate of 60 ms) over the remaining 10-second period of the channel move time.

Non-occupancy period: a channel that has been flagged as containing a radar signal, either by a channel availability check or in-service monitoring, is subject to a 30-minute non-occupancy period where the channel cannot be used by the LE-LAN device. The non-occupancy period starts from the time that the radar signal is detected

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 Expires
Attenuator (10dB, 1W)	Sealectro	60-674-1010-89	1224	-	O/P Mon
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	03-Dec-2021
Hygrometer	Rotronic	I-1000	3220	12	16-Oct-2021
PXI RF Digitizer	Aeroflex	3035	4012	24	12-Nov-2022
PXI RF Synthesizer	Aeroflex	3010	4013	24	12-Nov-2022
PXI RF Synthesizer	Aeroflex	3011	4014	24	12-Nov-2022
PXI Digital RF Signal Generator	Aeroflex	3025	4015	24	12-Nov-2022
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	03-Dec-2021
Wireless Cable & Fibre Router - AC 1900, Dual-band	Asus	RT-AC68U	4881	-	TU
EXA	Keysight Technologies	N9010B	4968	24	23-Dec-2021
Cable (40 GHz)	Rosenberger	LU1-001-2000	5024	-	O/P Mon
Power Splitter, 4 way	Mini-Circuits	ZN4PD1-63-S+	5236	-	O/P Mon
Power Splitter, 2 way	Mini-Circuits	ZN2PD2-63-S+	5238	-	O/P Mon
Power Splitter, 2 way	Mini-Circuits	ZN2PD2-63-S+	5239	-	O/P Mon
Cable 2.92m	Junkosha	MWX241/B	5411	12	23-Jun-2022
Cable 2.92m	Junkosha	MWX241-01000KMS	5413	12	23-Jul-2022
Cable 2.92mm 1m	Junkosha	MWX241-01000KMS	5414	12	23-Jun-2022
2.92mm 1m cable	Junkosha	MWX211/B	5415	12	23-Jul-2022
3.5 mm 1m Cable	Junkosha	MWX221-01000DMS	5416	12	09-Jul-2022
3.5 mm 1m Cable	Junkosha	MWX221-01000DMS	5417	12	23-Jun-2022
3.5 mm 2m Cable	Junkosha	MWX221-02000DMS	5429	12	23-Jun-2022
10dB/5W Attenuator	Aaren	AT40A-404-D18-10	5486	12	14-Apr-2022
Attenuator 5W 10dB DC-18GHz	Aaren	AT40A-4041-D18-10	5493	12	14-Apr-2022
Attenuator 5W 30dB DC-18GHz	Aaren	AT40A-4041-D18-30	5502	12	14-Apr-2022
2-Way Power Divider (2 to 8 GHz)	Aaren	AT30A-TE0208-2-AF	5684	12	18-Dec-2021
2-Way Power Divider (2-8 GHz)	Aaren	AT30A-TE0208-2-AF	5685	12	18-Dec-2021

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
2-Way Power Divider (2-8 GHz)	Aaren	AT30A-TE0208-2-AF	5687	12	18-Dec-2021
3.5mm Cable (1m)	Junkosha	MWX221/B	5838	12	23-Jul-2022

Table 692

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
Restricted Band Edges	± 6.3 dB
Maximum Conducted Output Power	± 3.2 dB
Maximum Conducted Power Spectral Density	± 3.2 dB
Emission Bandwidth	± 974.922 kHz
Authorised Band Edges	± 6.3 dB
Spurious Radiated Emissions	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB
Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period	Time: ± 0.47 % Power: ± 1.29 dB

Table 693

Measurement Uncertainty Decision Rule

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2007, clause 4.4.3 and 4.5.1.