



20 MHz Bandwidth

Measurement Configuration	Mode	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)
SISO	802.11n	100	5470.0	63.54
SISO	802.11n	140	5725.0	63.60
SISO	802.11n	144	5850.0	58.73
SISO	802.11n	149	5725.0	61.82
SISO	802.11n	165	5850.0	60.84

Table 213 - Authorised Band Edge Results

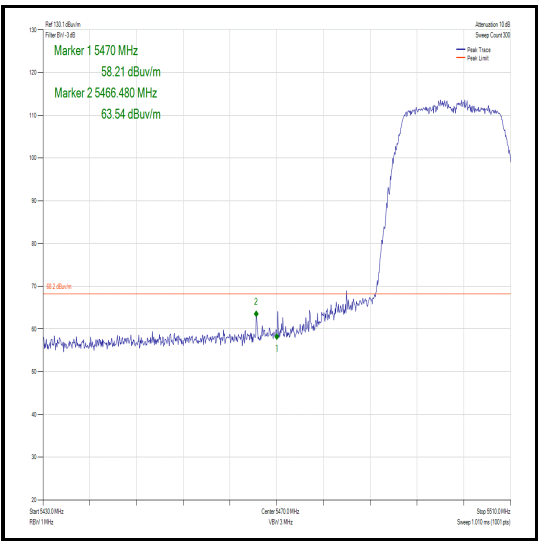


Figure 386 – Channel 100 - Authorised Band Edge

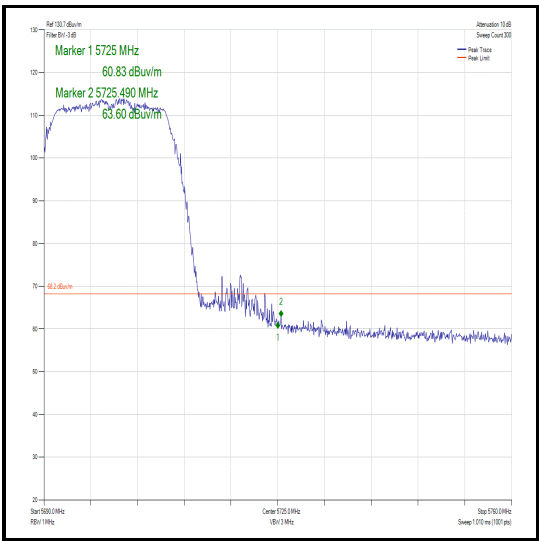


Figure 387 – Channel 140 - Authorised Band Edge

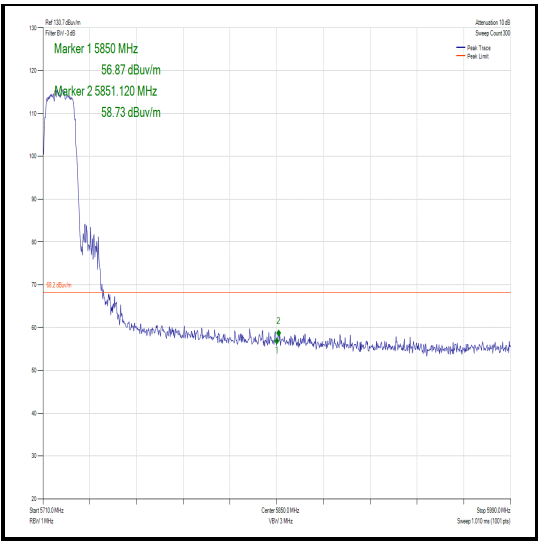


Figure 388 – Channel 144 - Authorised Band Edge

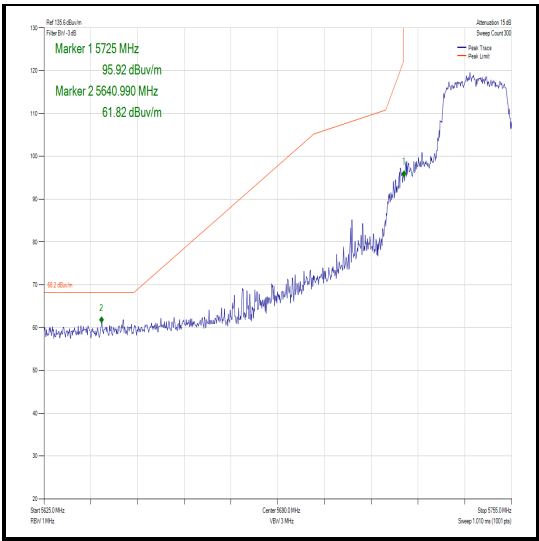


Figure 389 – Channel 149 - Authorised Band Edge

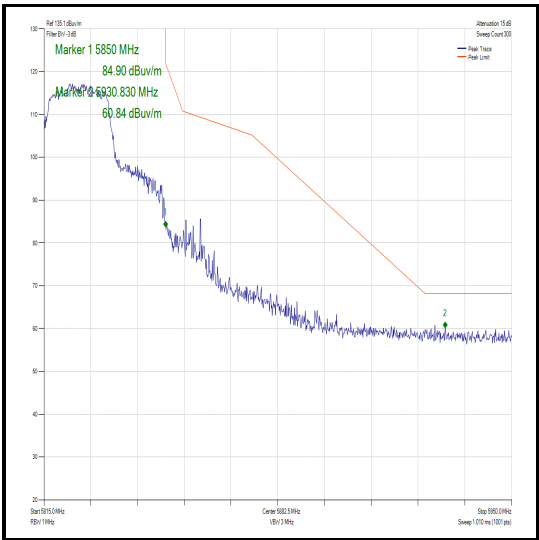


Figure 390 – Channel 165 - Authorised Band Edge



20 MHz Bandwidth

Measurement Configuration	Mode	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)
MIMO 2TX TXBF	802.11n	100	5470.0	63.15
MIMO 2TX SDM	802.11n	140	5725.0	62.88
MIMO 2TX TXBF	802.11n	144	5850.0	63.07
MIMO 2TX TXBF	802.11n	149	5725.0	63.73
MIMO 2TX TXBF	802.11n	165	5850.0	63.39

Table 214 - Authorised Band Edge Results

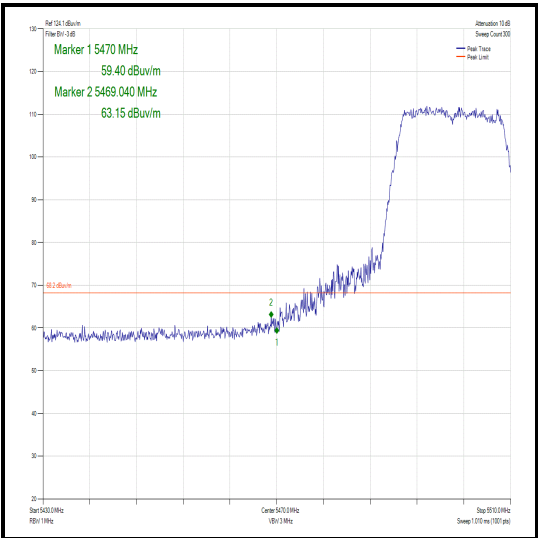


Figure 391 – Channel 100 - Authorised Band Edge

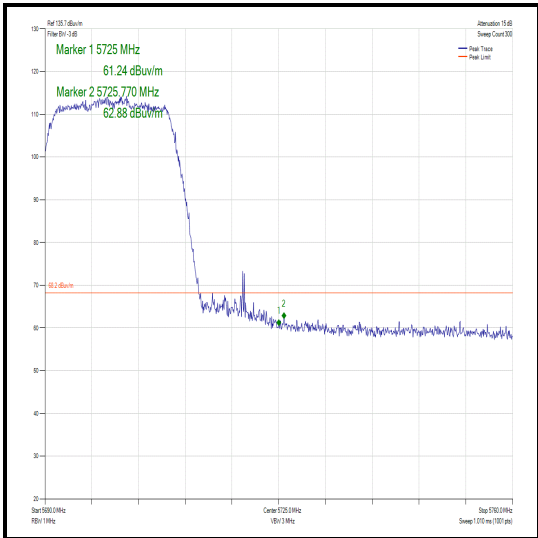


Figure 392 – Channel 140 - Authorised Band Edge

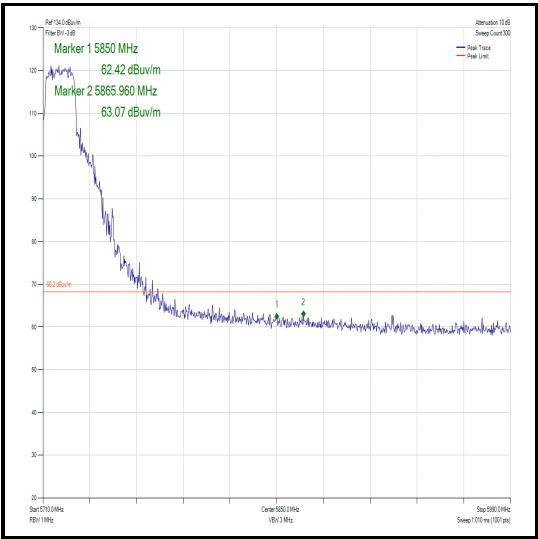


Figure 393 – Channel 144 - Authorised Band Edge

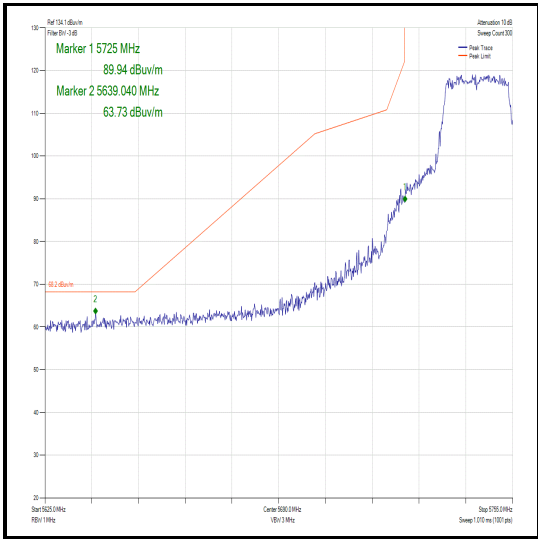


Figure 394 – Channel 149 - Authorised Band Edge

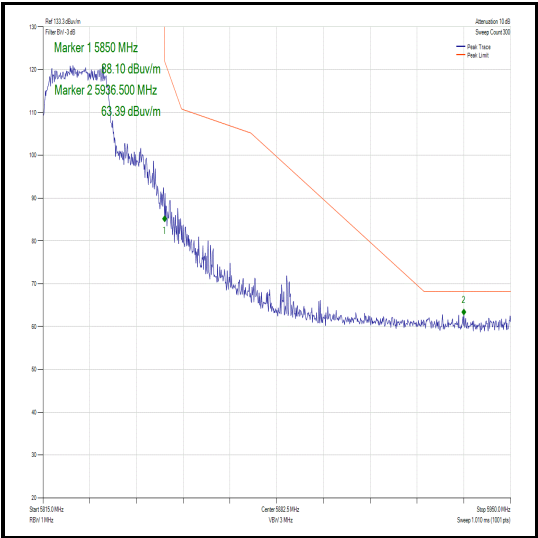


Figure 395 – Channel 165 - Authorised Band Edge



40 MHz Bandwidth

Measurement Configuration	Mode	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)
SISO	802.11n	102	5470.0	60.54
SISO	802.11n	134	5725.0	63.37
SISO	802.11n	142	5850.0	60.87
SISO	802.11n	151	5725.0	63.59
SISO	802.11n	159	5850.0	62.87

Table 215 - Authorised Band Edge Results

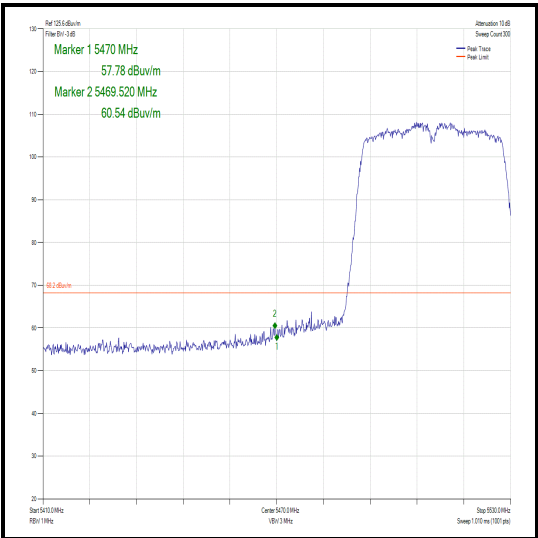


Figure 396 – Channel 102 - Authorised Band Edge

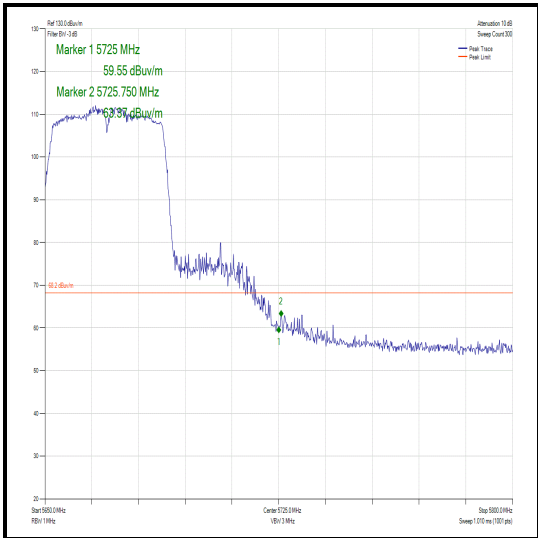


Figure 397 – Channel 134 - Authorised Band Edge

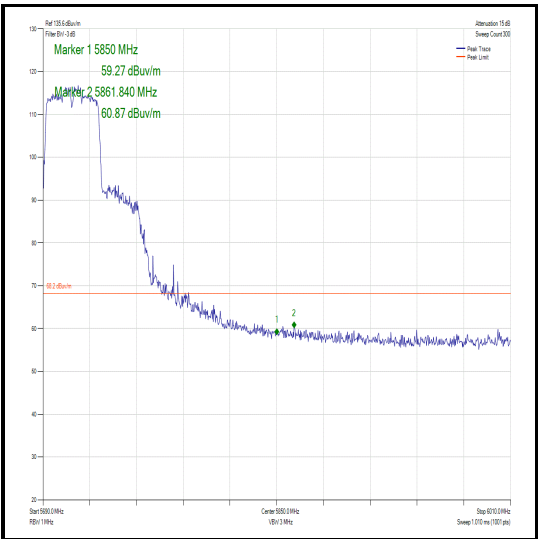


Figure 398 – Channel 142 - Authorised Band Edge

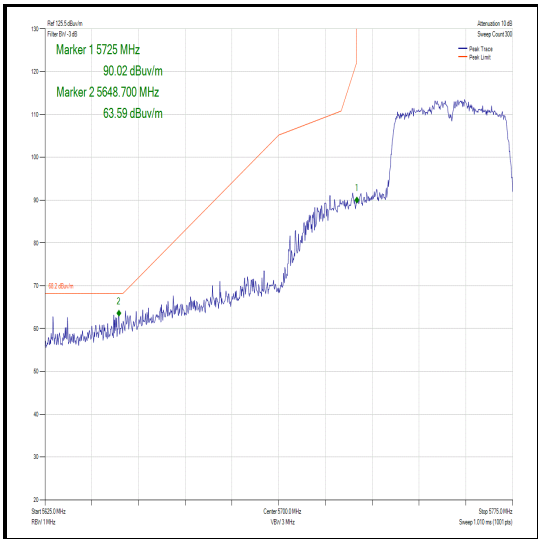


Figure 399 – Channel 151 - Authorised Band Edge

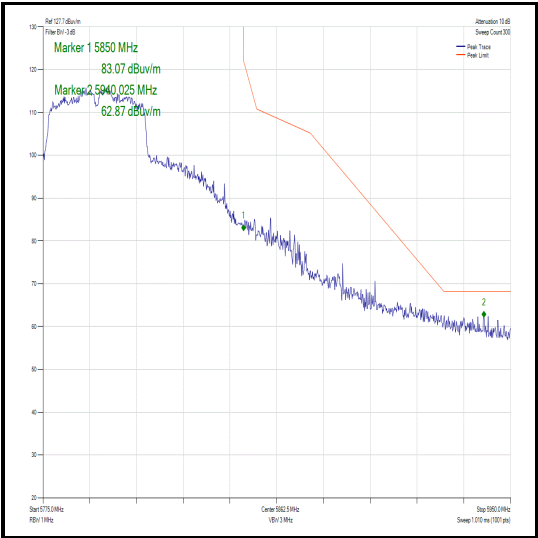


Figure 400 – Channel 159 - Authorised Band Edge



40 MHz Bandwidth

Measurement Configuration	Mode	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)
MIMO 2TX TXBF	802.11n	102	5470.0	63.68
MIMO 2TX TXBF	802.11n	134	5725.0	63.69
MIMO 2TX TXBF	802.11n	142	5850.0	63.56
MIMO 2TX CDD	802.11n	151	5725.0	63.19
MIMO 2TX TXBF	802.11n	159	5850.0	63.63

Table 216 - Authorised Band Edge Results

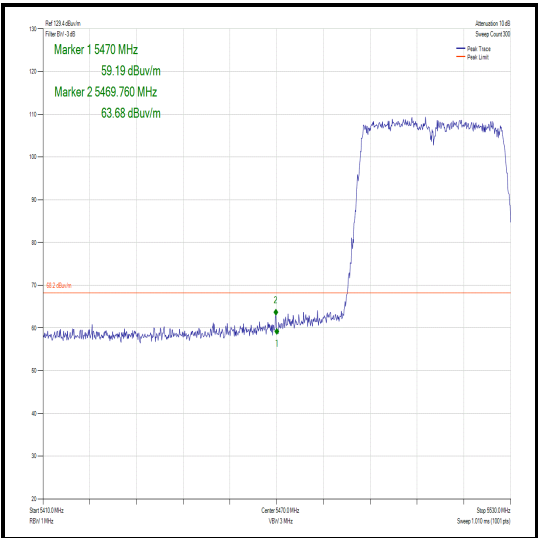


Figure 401 – Channel 102 - Authorised Band Edge

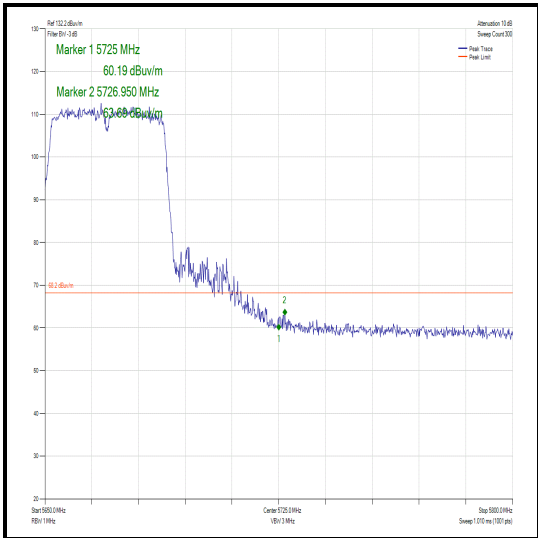


Figure 402 – Channel 134 - Authorised Band Edge

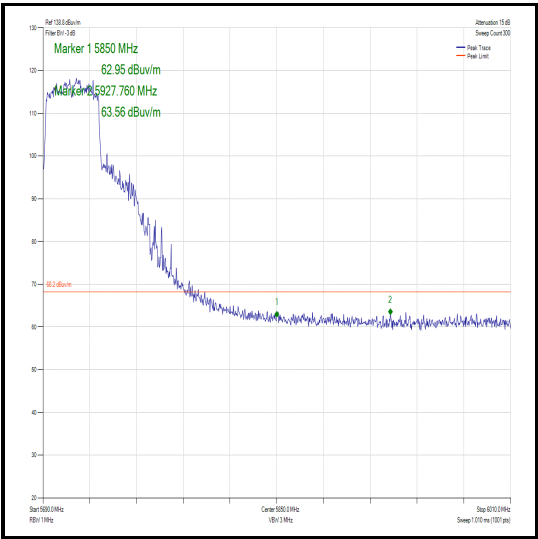


Figure 403 – Channel 142 - Authorised Band Edge

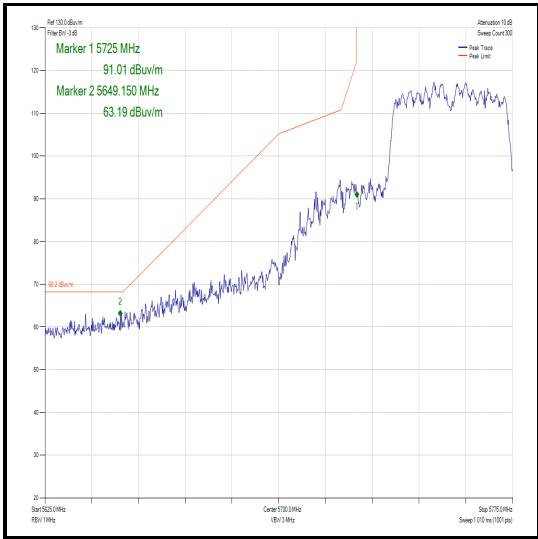


Figure 404 – Channel 151 - Authorised Band Edge

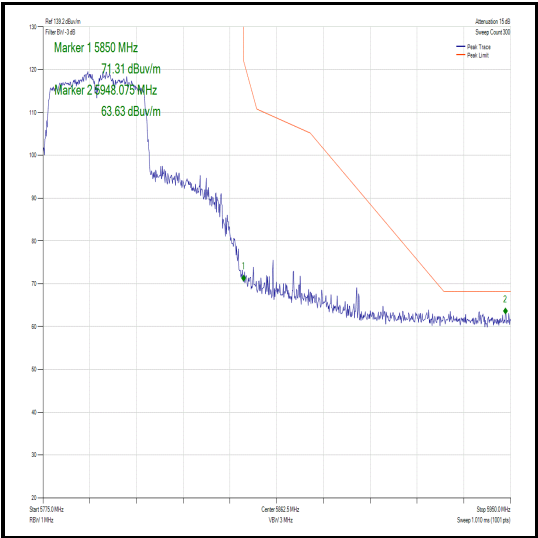


Figure 405 – Channel 159 - Authorised Band Edge



80 MHz Bandwidth

Measurement Configuration	Mode	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)
SISO	802.11ac	106	5470.00	61.07
SISO	802.11ac	122	5725.00	62.45
SISO	802.11ac	138	5850.00	63.27
SISO	802.11ac	155	5725.00	63.74
SISO	802.11ac	155	5850.00	64.75

Table 217 - Authorised Band Edge Results

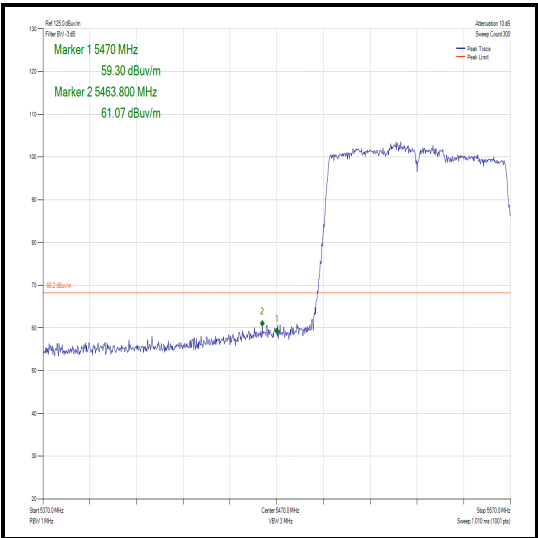


Figure 406 – Channel 106 - Authorised Band Edge

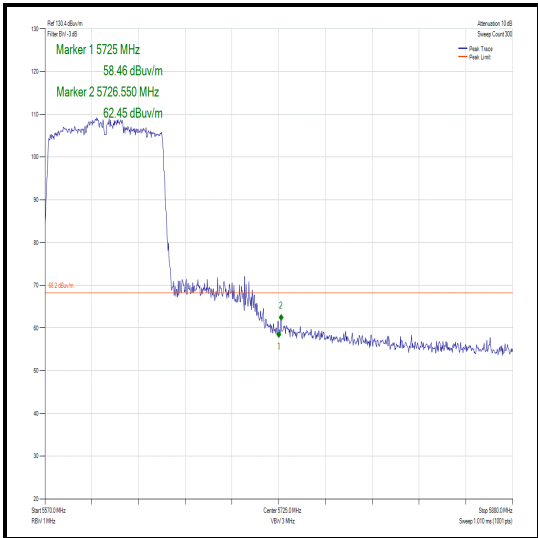


Figure 407 – Channel 122 - Authorised Band Edge

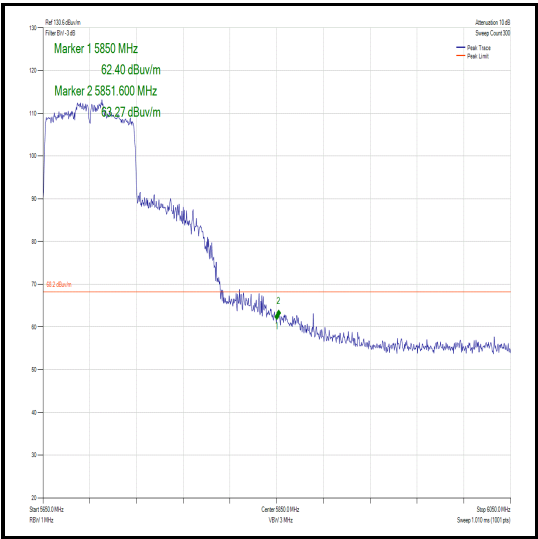


Figure 408 – Channel 138 - Authorised Band Edge

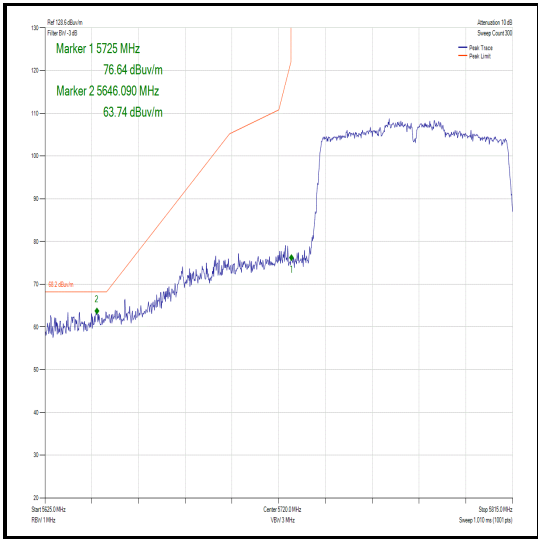


Figure 409 – Channel 155 - Authorised Lower Band Edge

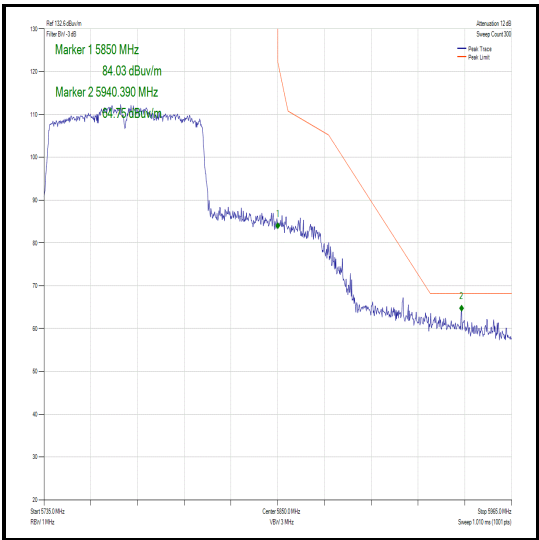


Figure 410 – Channel 155 - Authorised Upper Band Edge

80 MHz Bandwidth

Measurement Configuration	Mode	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)
MIMO 2TX TXBF	802.11ac	106	5470.00	63.59
MIMO 2TX TXBF	802.11ac	122	5725.00	63.41
MIMO 2TX TXBF	802.11ac	138	5850.00	63.41
MIMO 2TX TXBF	802.11ac	155	5725.00	63.00
MIMO 2TX SDM	802.11ac	155	5850.00	62.99

Table 218 - Authorised Band Edge Results

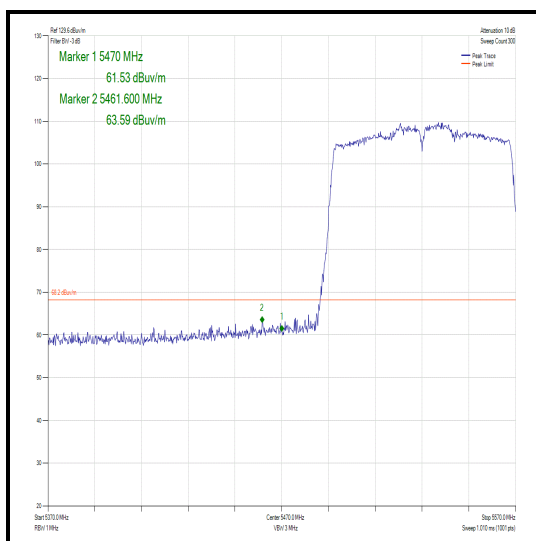


Figure 411 – Channel 106 - Authorised Band Edge

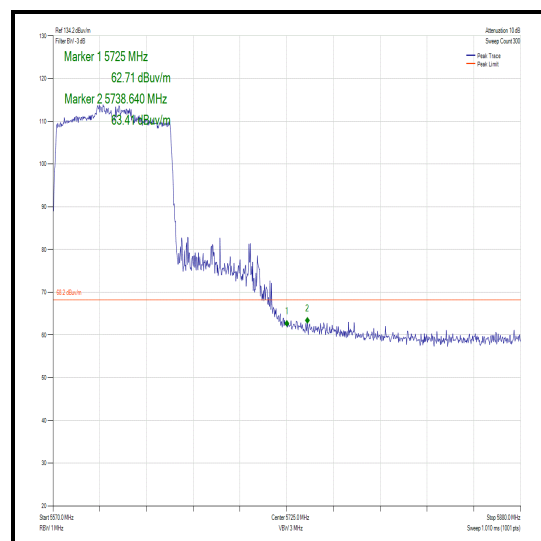


Figure 412 – Channel 122 - Authorised Band Edge

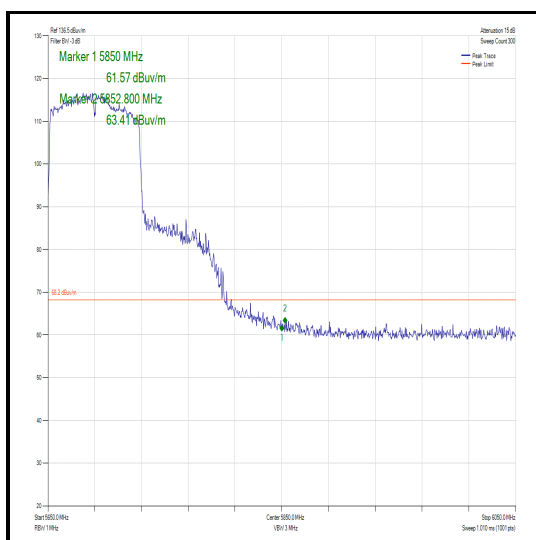


Figure 413 – Channel 138 - Authorised Band Edge

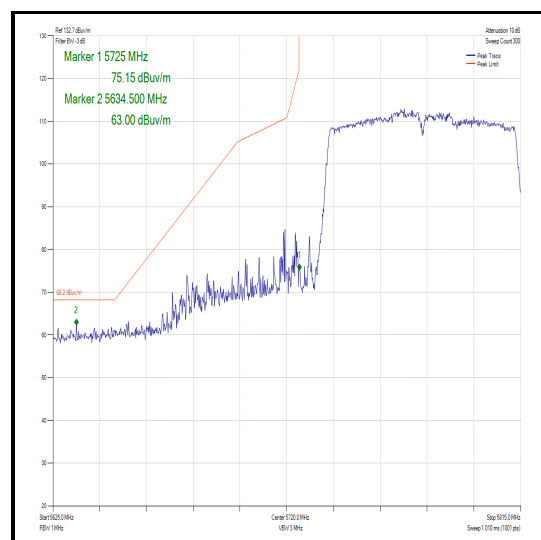


Figure 414 – Channel 155 - Authorised Lower Band Edge

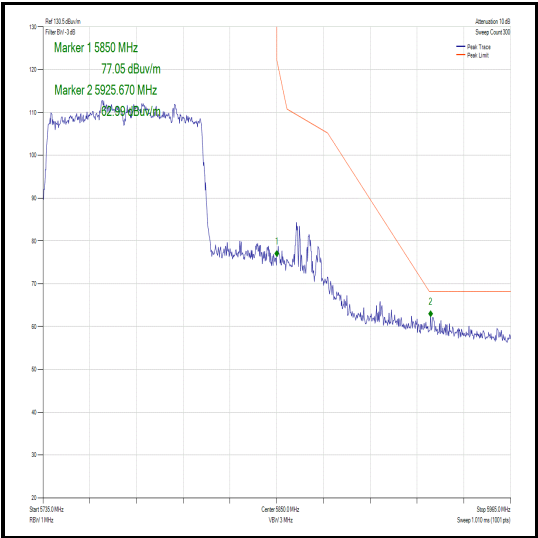


Figure 415 – Channel 155 - Authorised Upper Band Edge



2.4.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 11

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Hygromer	Rotronic	Hygropalm	2404	12	26-Apr-2019
Multimeter	Iso-tech	IDM101	2424	12	12-Dec-2019
Double Ridge Broadband Horn Antenna	Schwarzbeck	BBHA 9120 B	4848	12	26-Apr-2019
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	12-Sep-2019
8m N-Type RF Cable	Teledyne	PR90-088-8MTR	5095	12	12-Sep-2019
Cable (18GHz)	Rosenberger	LU7-071-2000	5107	12	4-Oct-2019
EmX Software	TUV SUD	EmX V.1.4.4	5125	-	Software
Screened Room (11)	Rainford	Rainford	5136	36	05-Oct-2019
Mast	Maturo	TAM 4.0-P	5158	-	TU
Mast and Turntable Controller	Maturo	Maturo NCD	5159	-	TU
Turntable	Maturo	TT 15WF	5160	-	TU

Table 219

TU – Traceability Unscheduled.



2.5 Spurious Radiated Emissions

2.5.1 Specification Reference

FCC 47 CFR Part 15E, Clause 15.407 (b) and 15.205
Industry Canada RSS-247, Clause 6.2
Industry Canada RSS-GEN, Clause 6.13

2.5.2 Equipment Under Test and Modification State

C02Y4006L59F, S/N: TBC - Modification State 0

2.5.3 Date of Test

06-February-2019 to 12-March-2019

2.5.4 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 2TX MIMO mode

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 C63.10-2013 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 @ 3m 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 10 dB of the limits shown on the plots, further investigation was carried out and reported in results tables.

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

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

2.5.5 Environmental Conditions

Ambient Temperature	21.7 - 29.4 °C
Relative Humidity	22.5 – 45.0 %



2.5.6 Test Results

Testing was performed with the device operating at maximum output power, HT20 CDD MIMO 2TX, 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)	Polarity
*						

Table 220 –30 MHz to 1 GHz – Radiated

*No emissions were detected within 10 dB of the limit

Frequency (GHz)	Result (μV/m)		Limit (μV/m)		Margin (dB)	
	Peak	Average	Peak	Average	Peak	Average
10.6385	-	44.25	74.0	54.0	-	9.75
11.1607	-	45.72	74.0	54.0	-	8.28

Table 221 – 1 GHz to 40 GHz - Emissions Results

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

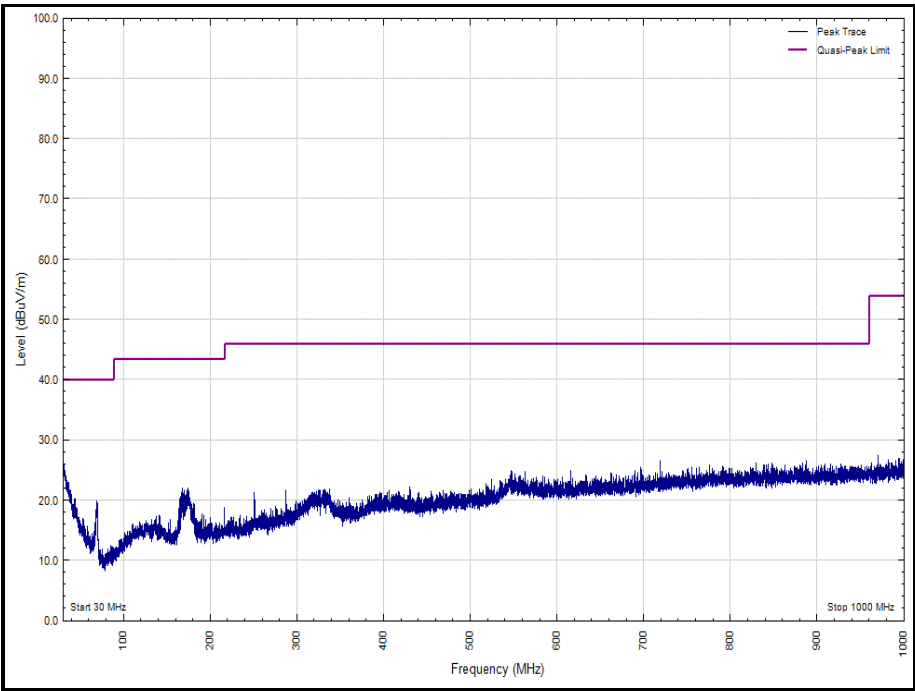


Figure 416 - U-NII 1 - 5180 MHz - 30 MHz to 1 GHz - Polarity: Horizontal

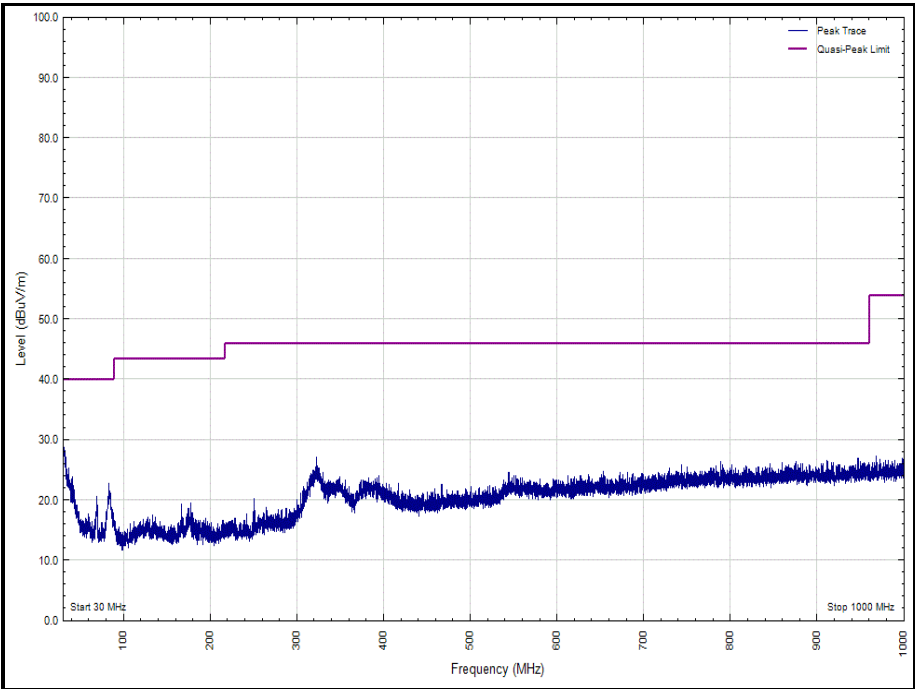


Figure 417 - U-NII 1 - 5180 MHz - 30 MHz to 1 GHz - Polarity: Vertical

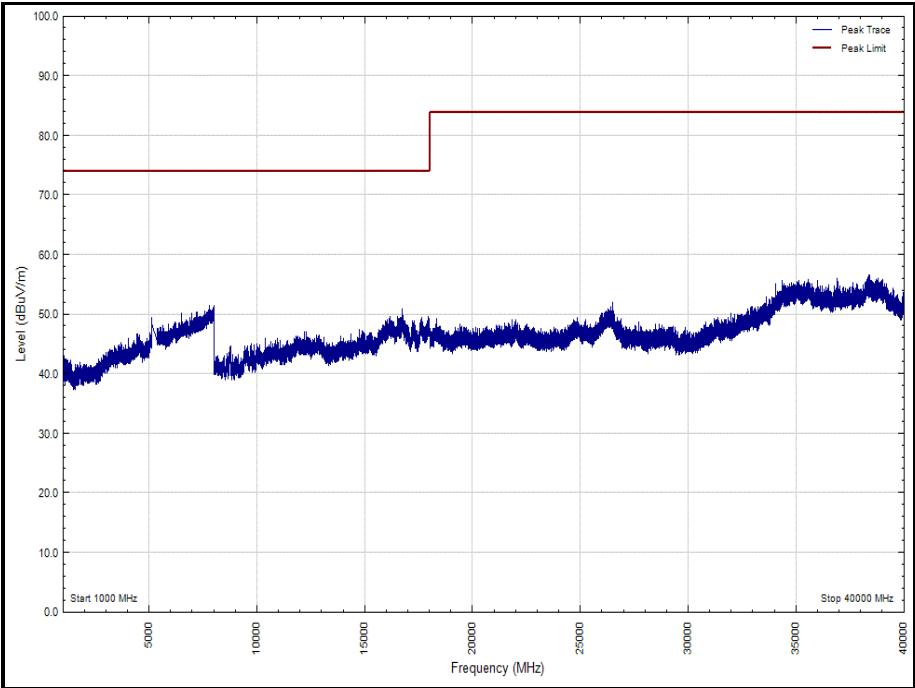


Figure 418 - U-NII 1 - 5180 MHz - 1 GHz to 40 GHz - Polarity: Horizontal (Peak)

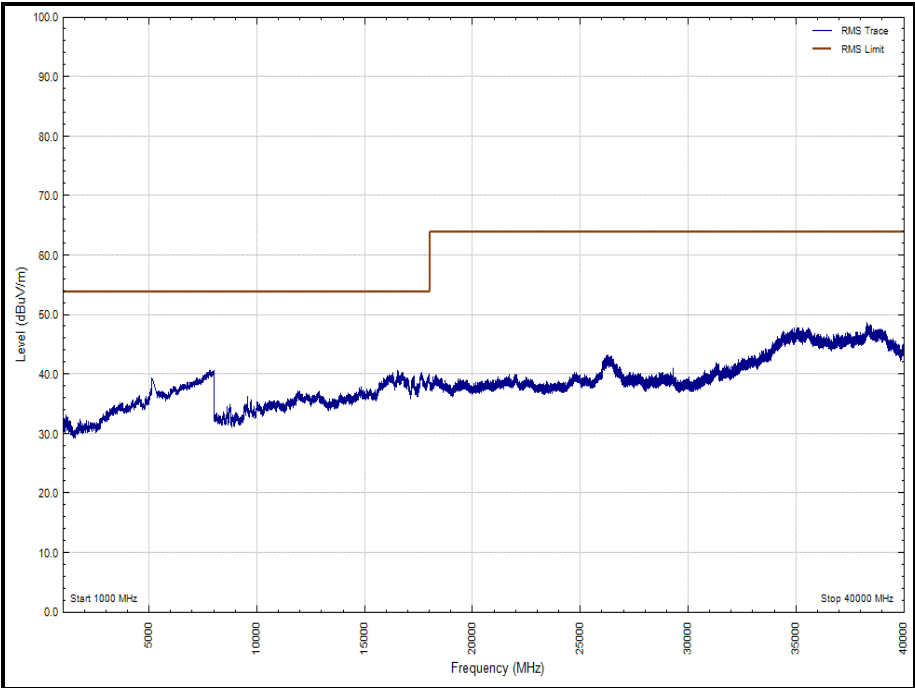


Figure 419 - U-NII 1 - 5180 MHz - 1 GHz to 40 GHz - Polarity: Horizontal (Average)

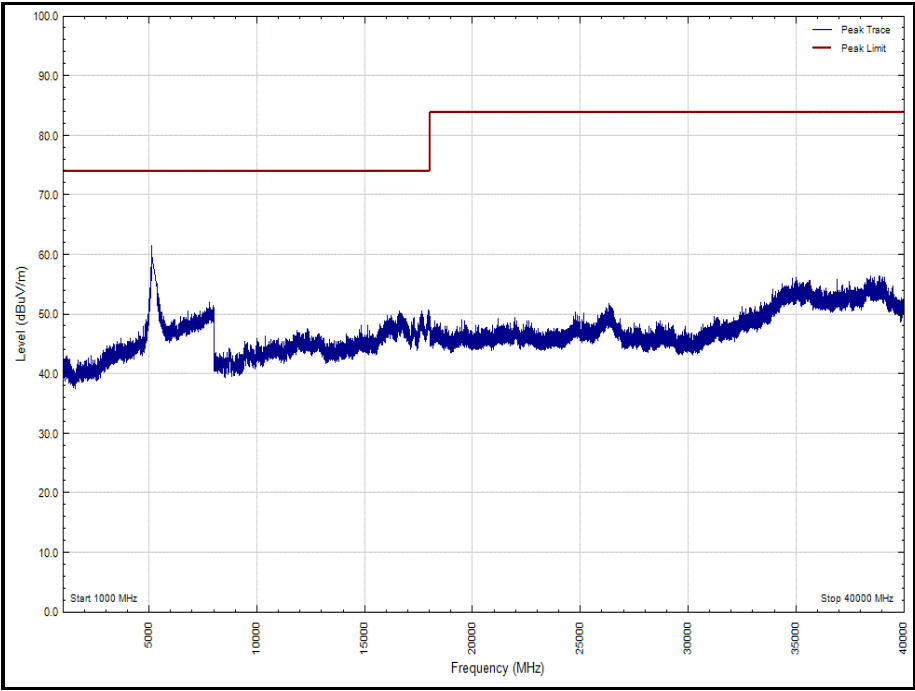


Figure 420 - U-NII 1 - 5180 MHz - 1 GHz to 40 GHz - Polarity: Vertical (Peak)

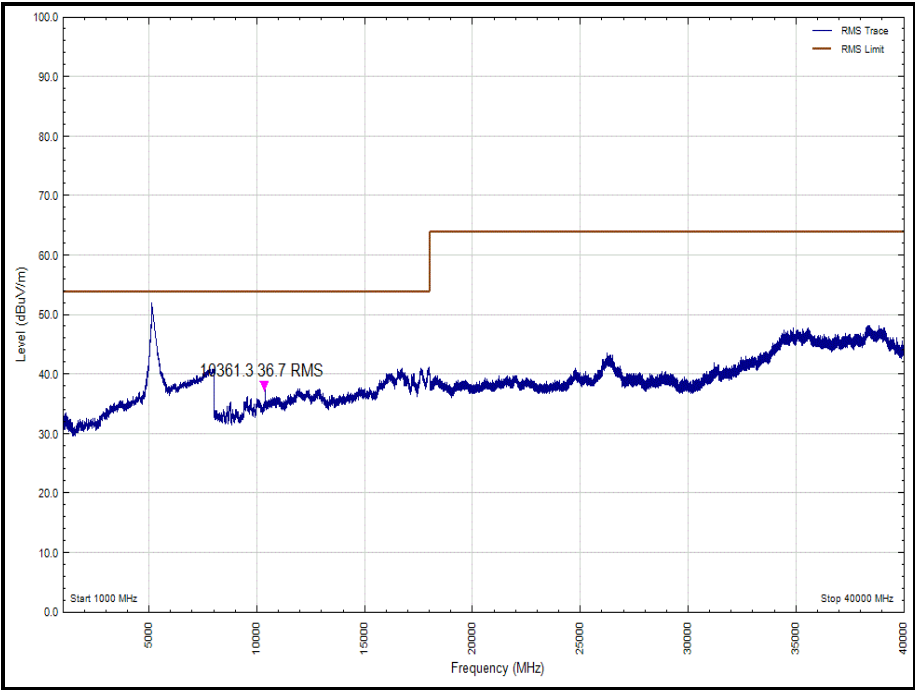


Figure 421 - U-NII 1 - 5180 MHz - 1 GHz to 40 GHz - Polarity: Vertical (Average)

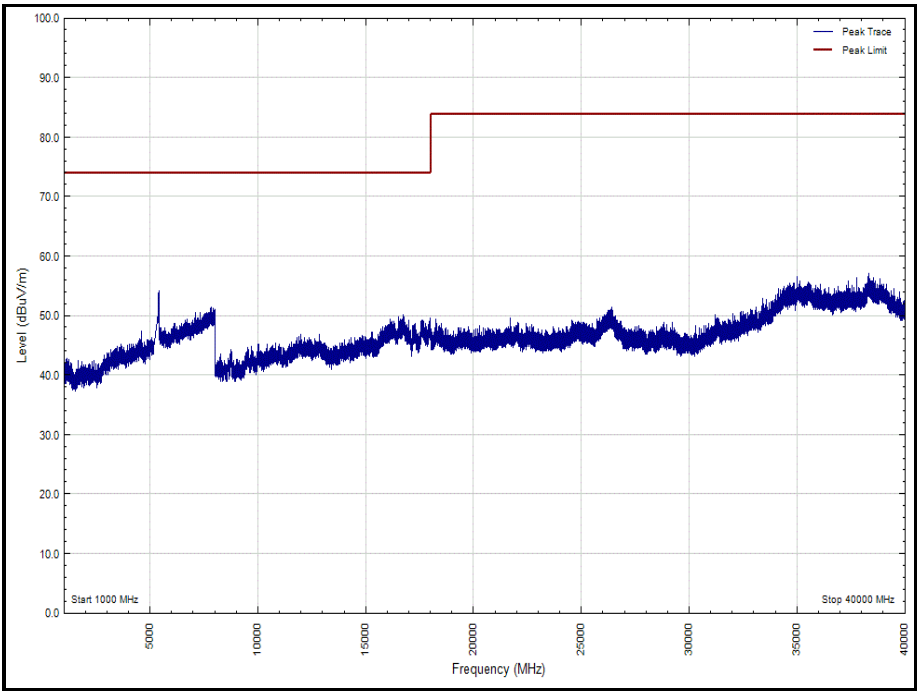


Figure 422 - U-NII 2a - 5320 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Peak)

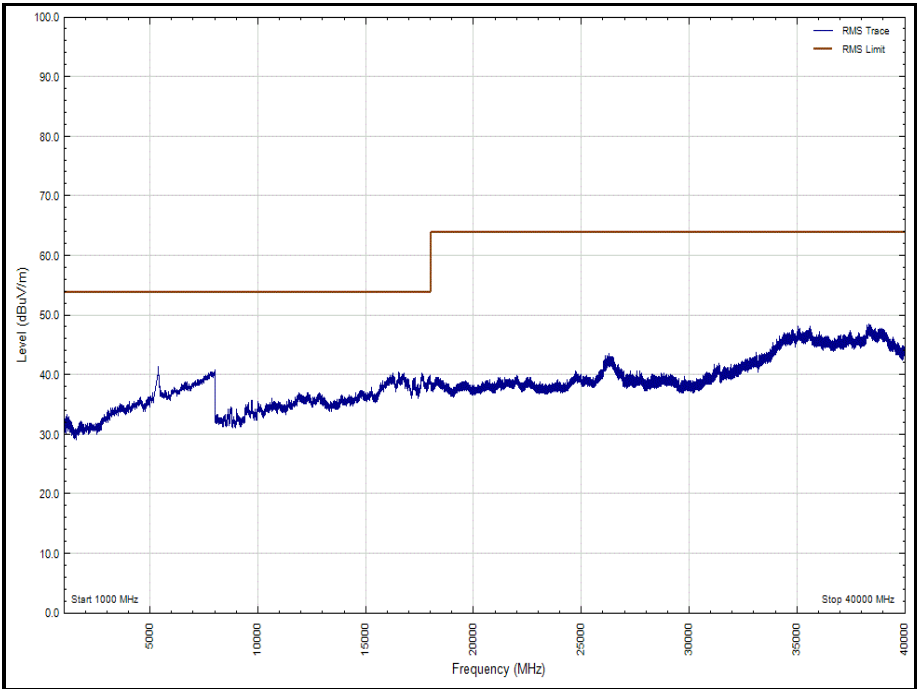


Figure 423 - U-NII 2a - 5320 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Average)

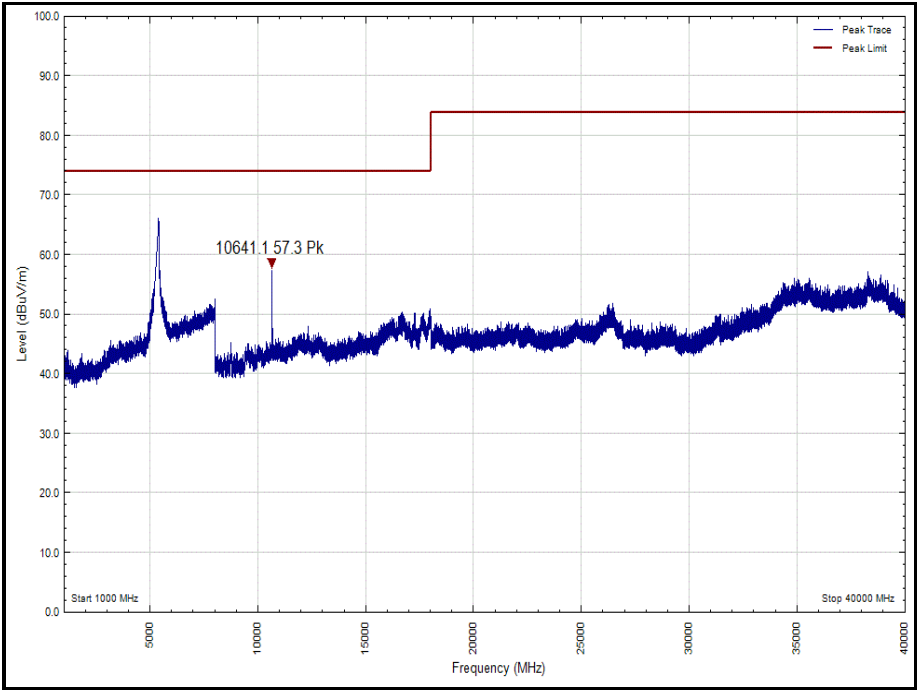


Figure 424 - U-NII 2a - 5320 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Peak)

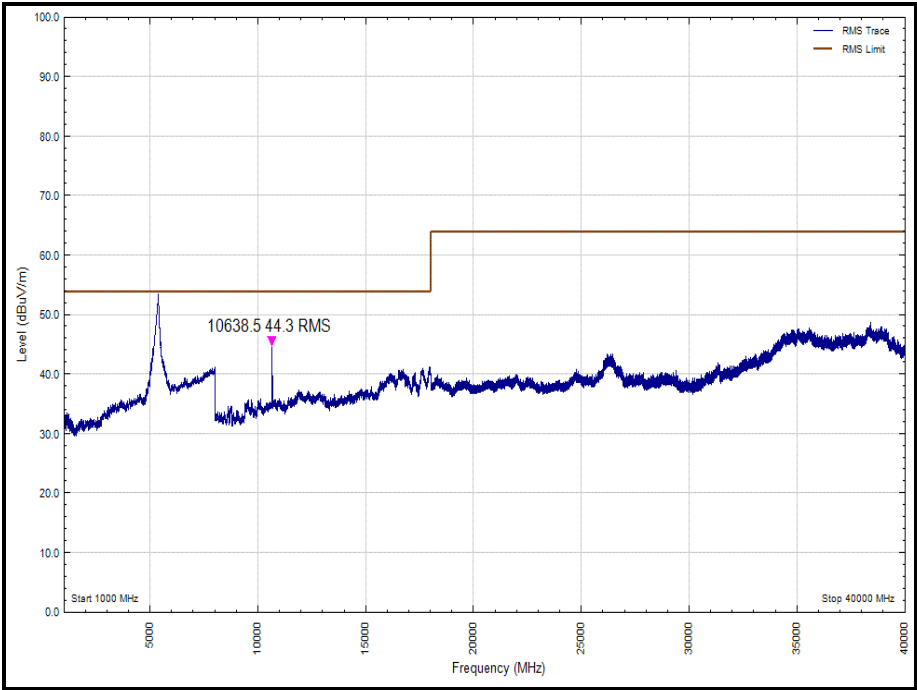


Figure 425 - U-NII 2a - 5320 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Average)

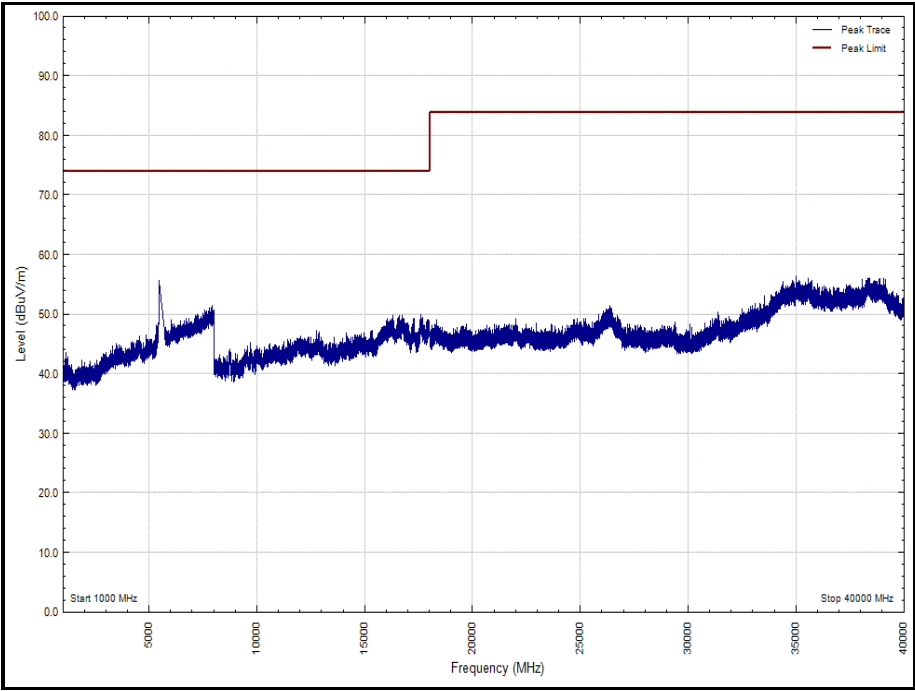


Figure 426 - U-NII 2c - 5500 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Peak)

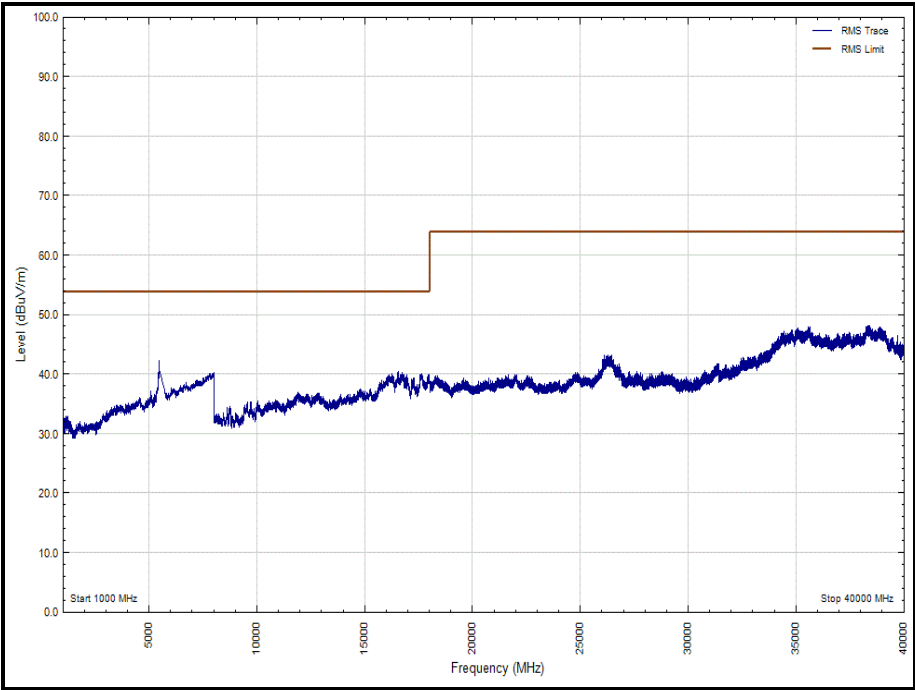


Figure 427 - U-NII 2c - 5500 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Average)

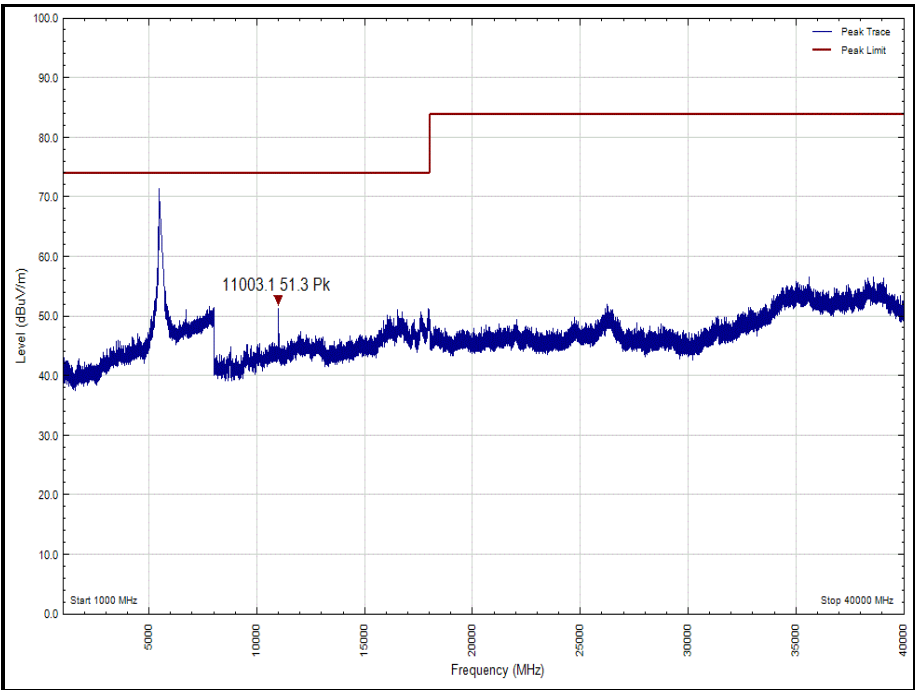


Figure 428 - U-NII 2c - 5500 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Peak)

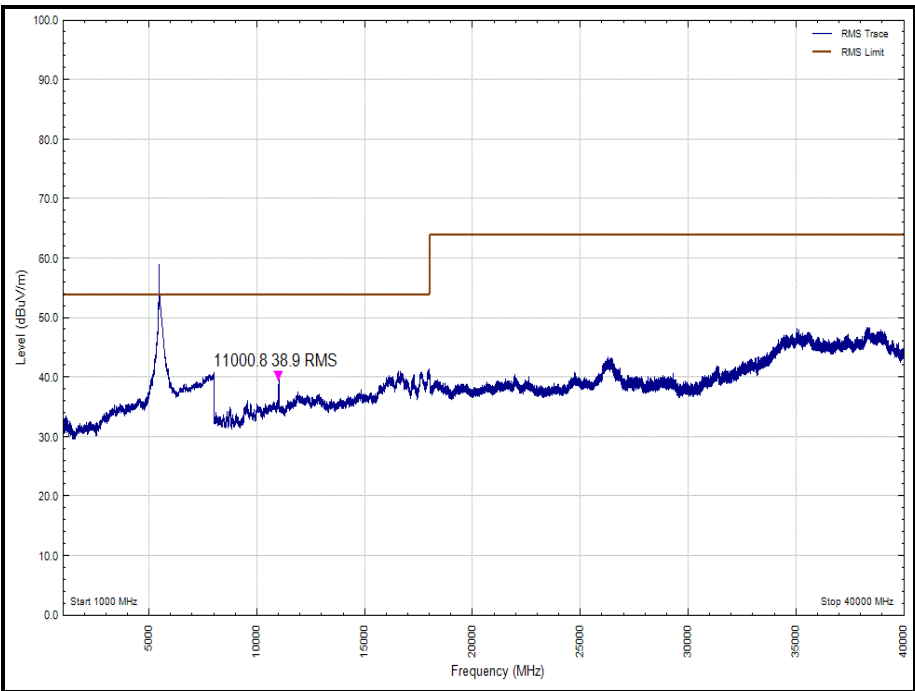


Figure 429 - U-NII 2c - 5500 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Average)

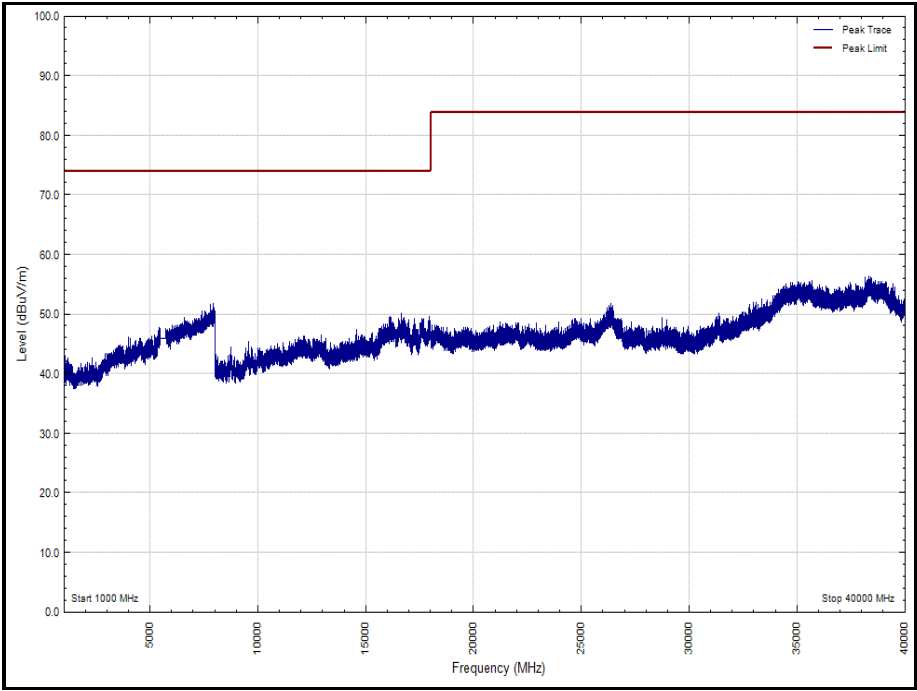


Figure 430 - U-NII 2c - 5580 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Peak)

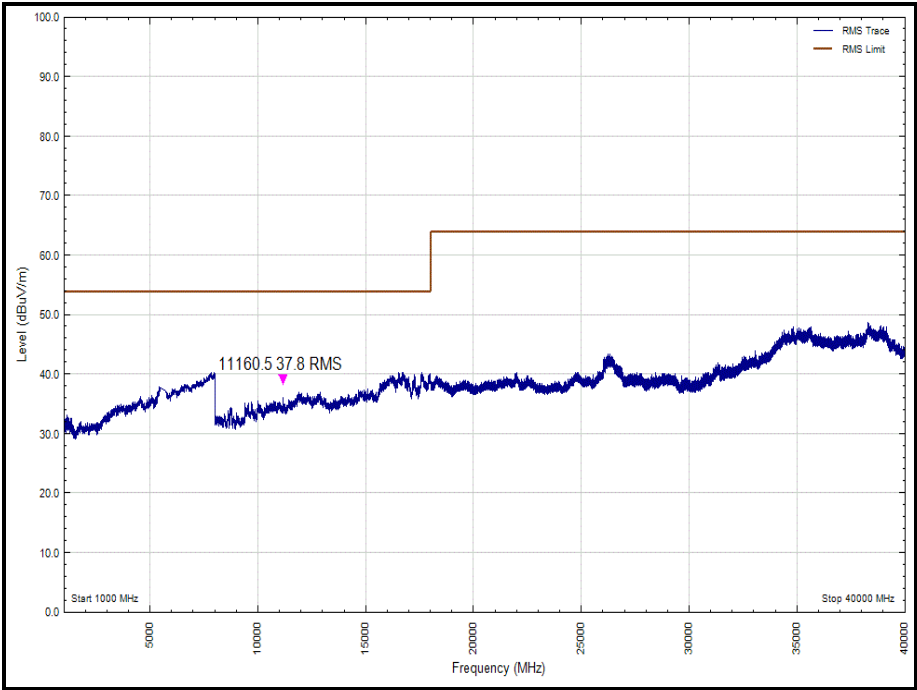


Figure 431 - U-NII 2c - 5580 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Average)

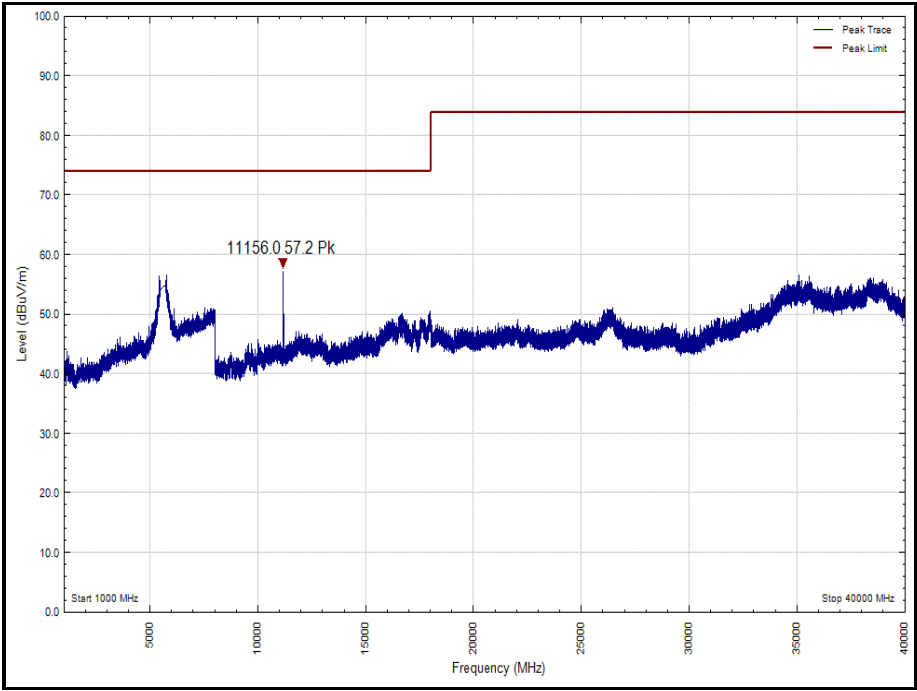


Figure 432 - U-NII 2c - 5580 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Peak)

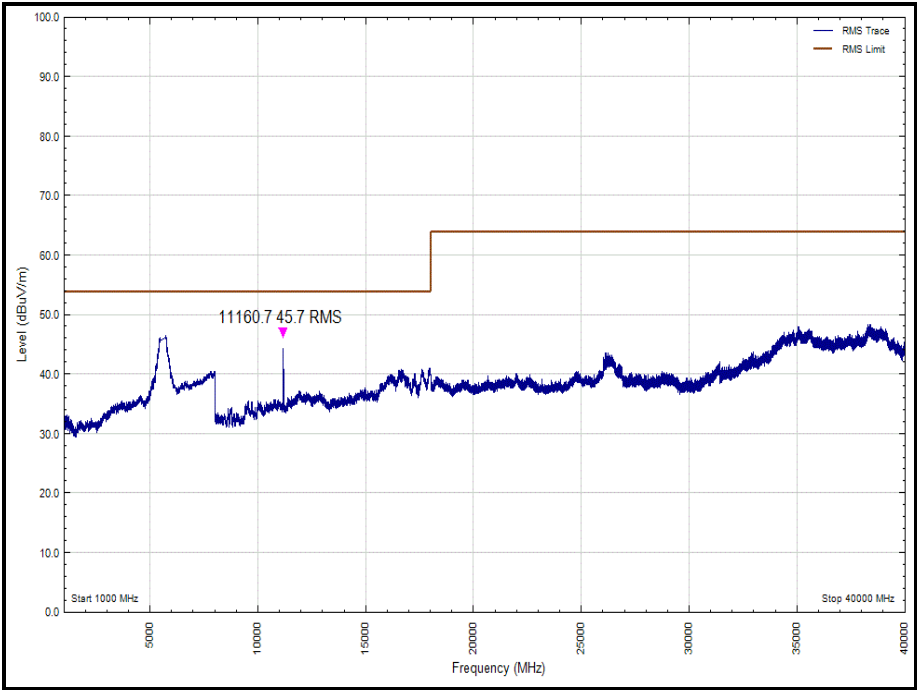


Figure 433 - U-NII 2c - 5580 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Average)

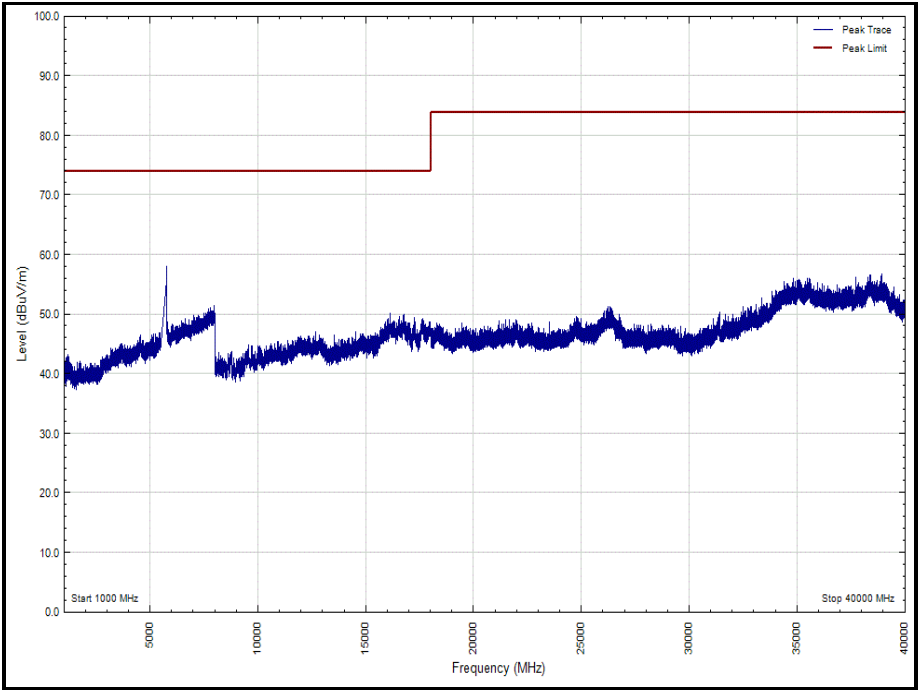


Figure 434 - U-NII 2c - 5700 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Peak)

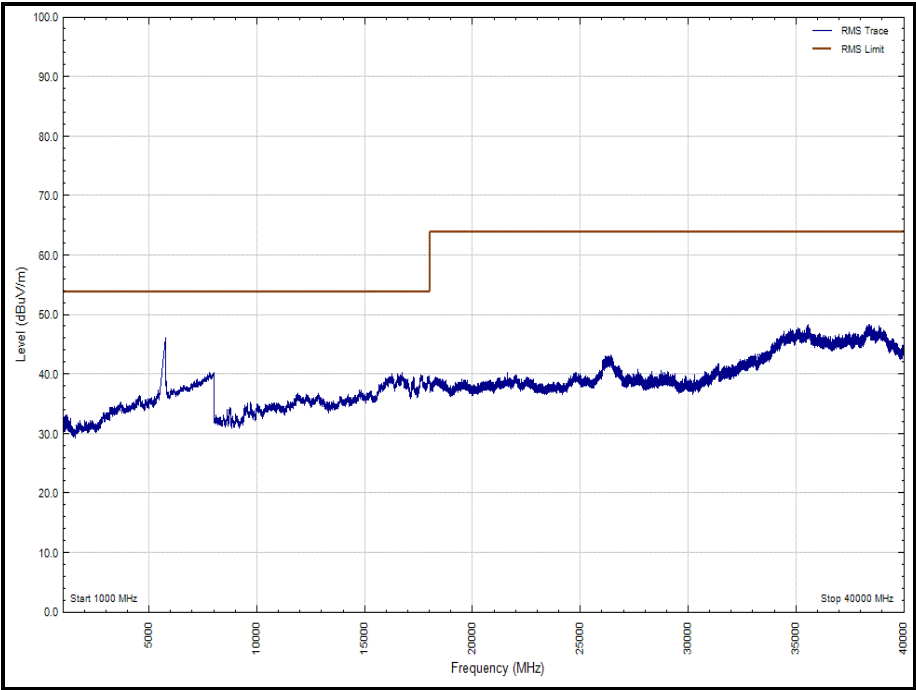


Figure 435 - U-NII 2c - 5700 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Average)

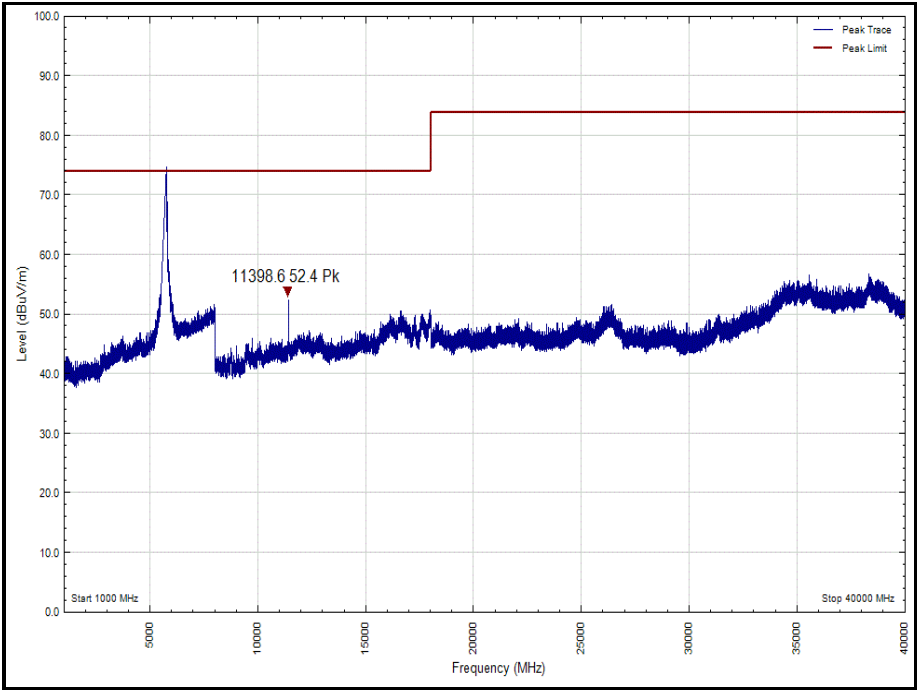


Figure 436 - U-NII 2c - 5700 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Peak)

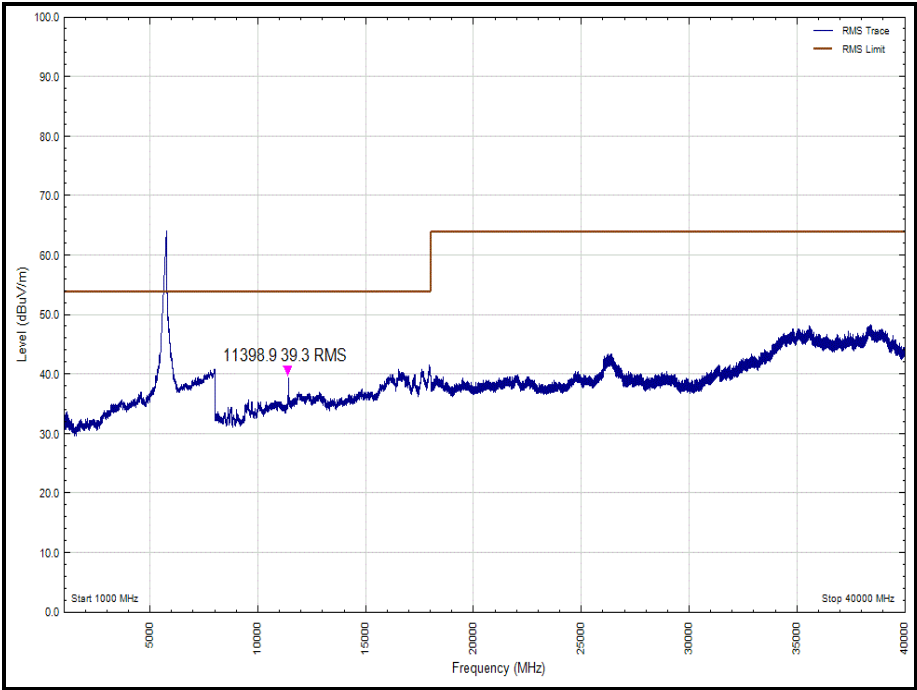


Figure 437 - U-NII 2c - 5700 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Average)

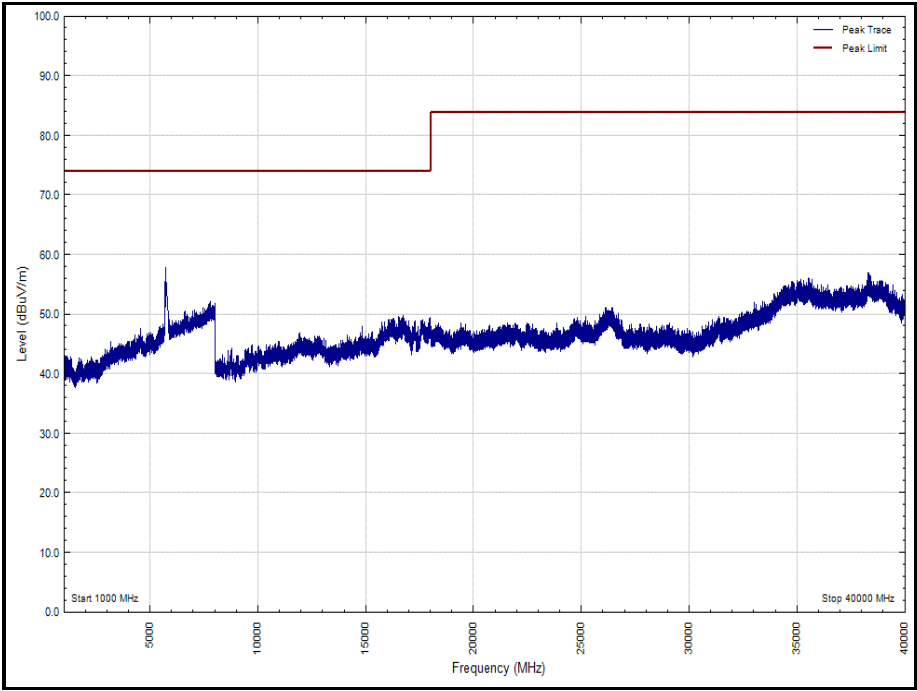


Figure 438 - U-NII 3 - 5745 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Peak)

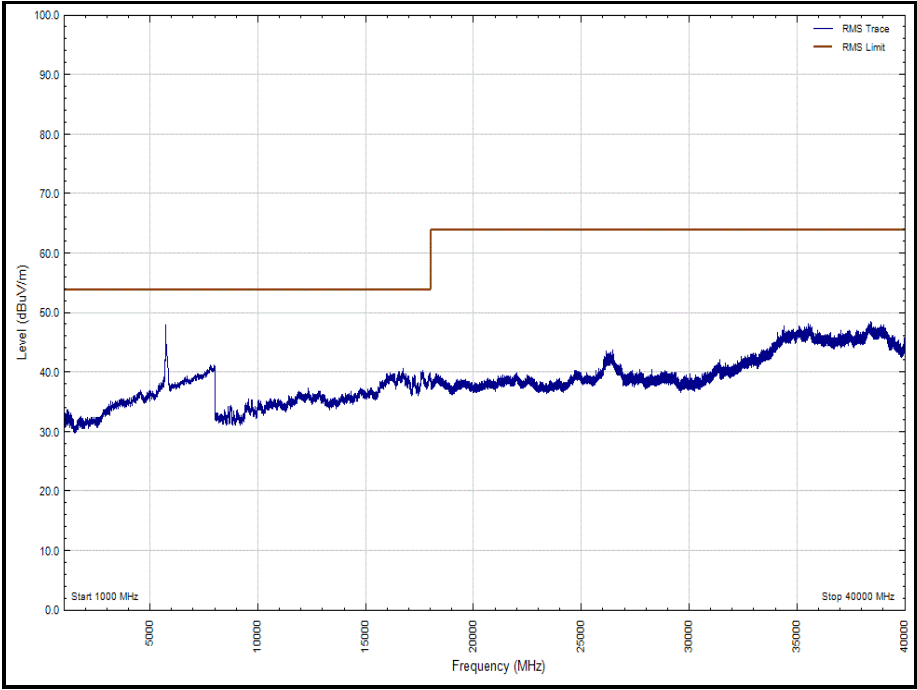


Figure 439 - U-NII 3 - 5745 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Average)

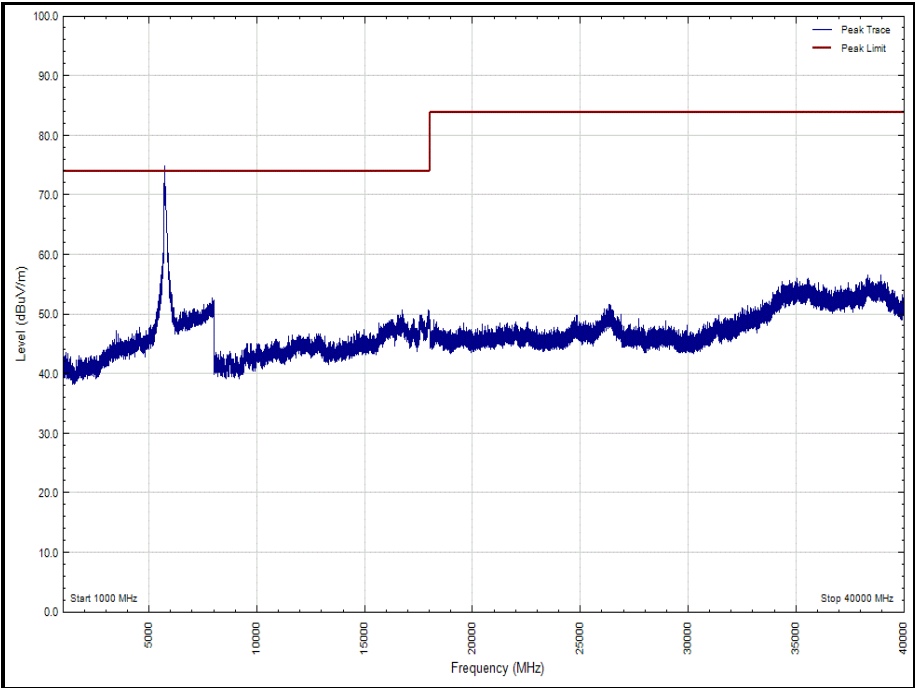


Figure 440 - U-NII 3 - 5745 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Peak)

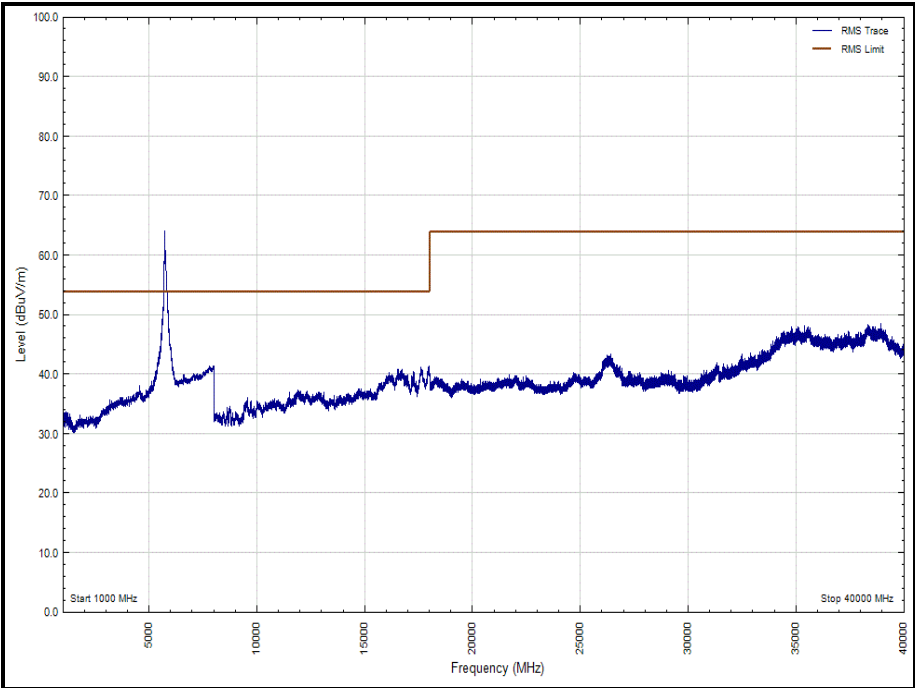


Figure 441 - U-NII 3 - 5745 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Average)

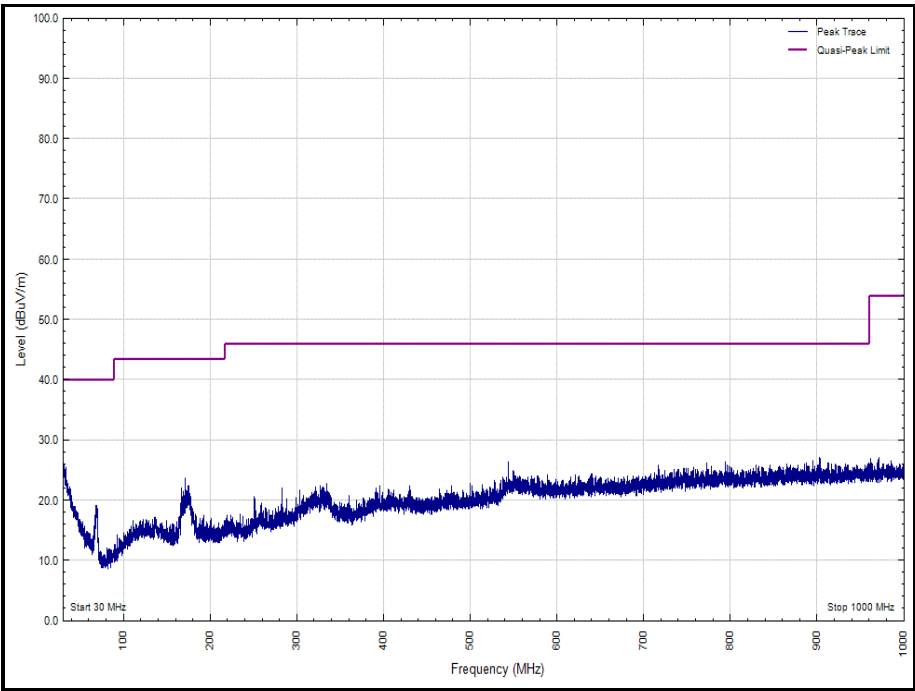


Figure 442 - U-NII 3 - 5825 MHz - 30 MHz to 1 GHz - Polarity: Horizontal

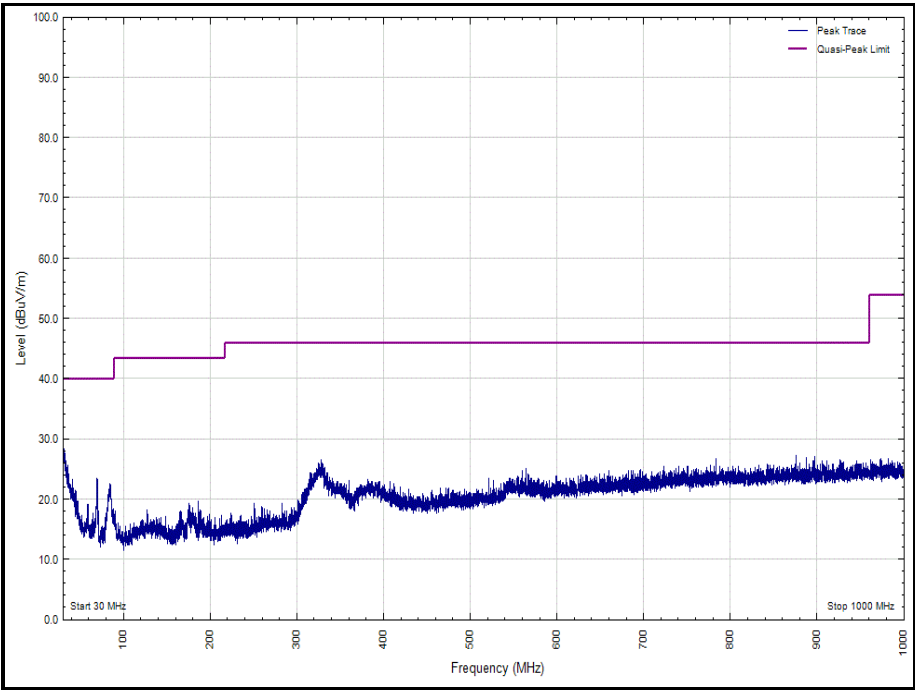


Figure 443 - U-NII 3 - 5825 MHz - 30 MHz to 1 GHz - Polarity: Vertical

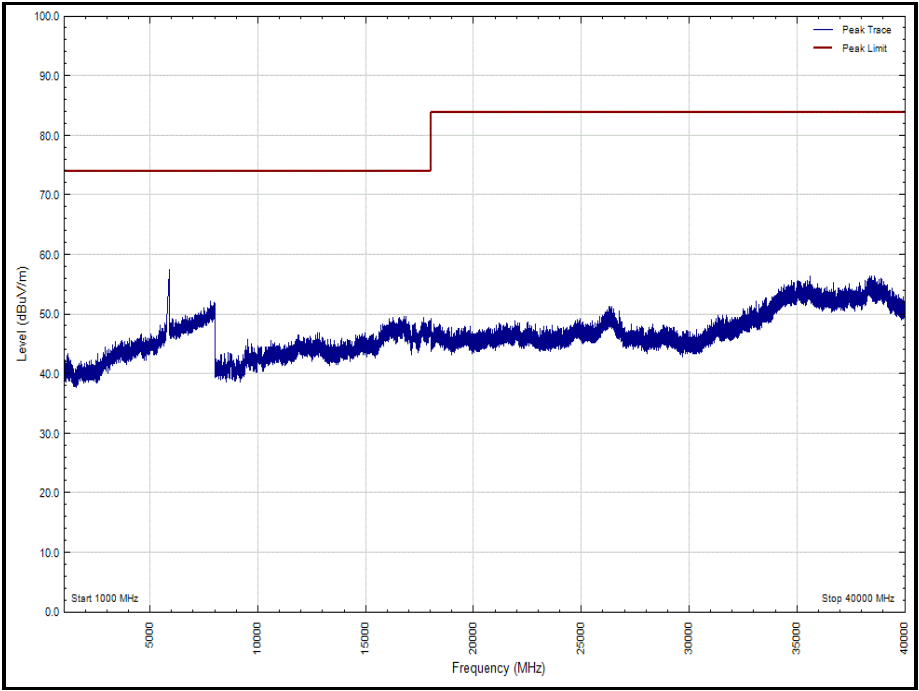


Figure 444 - U-NII 3 - 5825 MHz - 1 GHz to 40 GHz - Polarity: Horizontal (Peak)

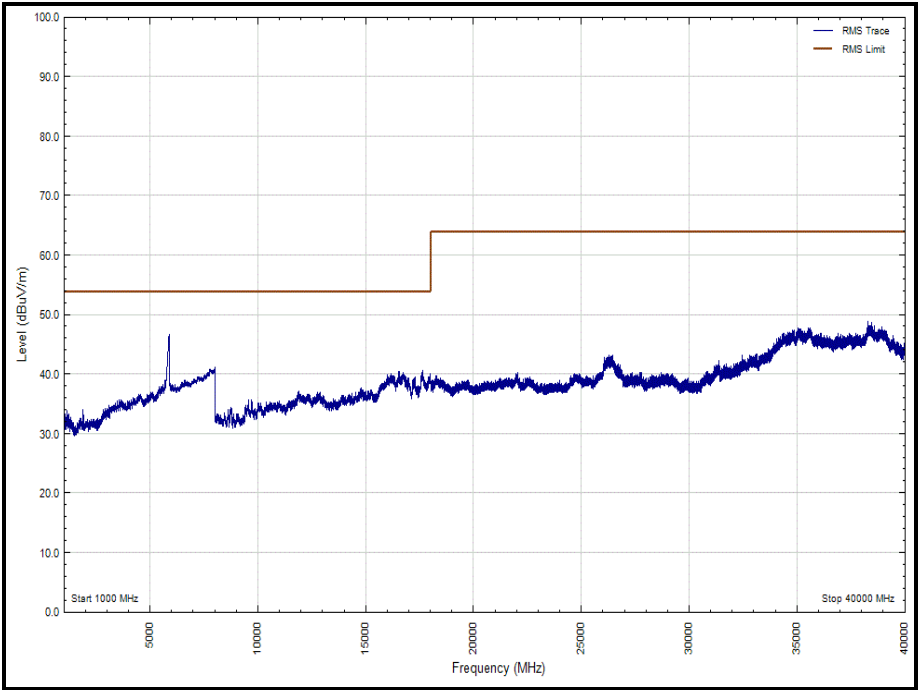


Figure 445 - U-NII 3 - 5825 MHz - 1 GHz to 40 GHz - Polarity: Horizontal (Average)

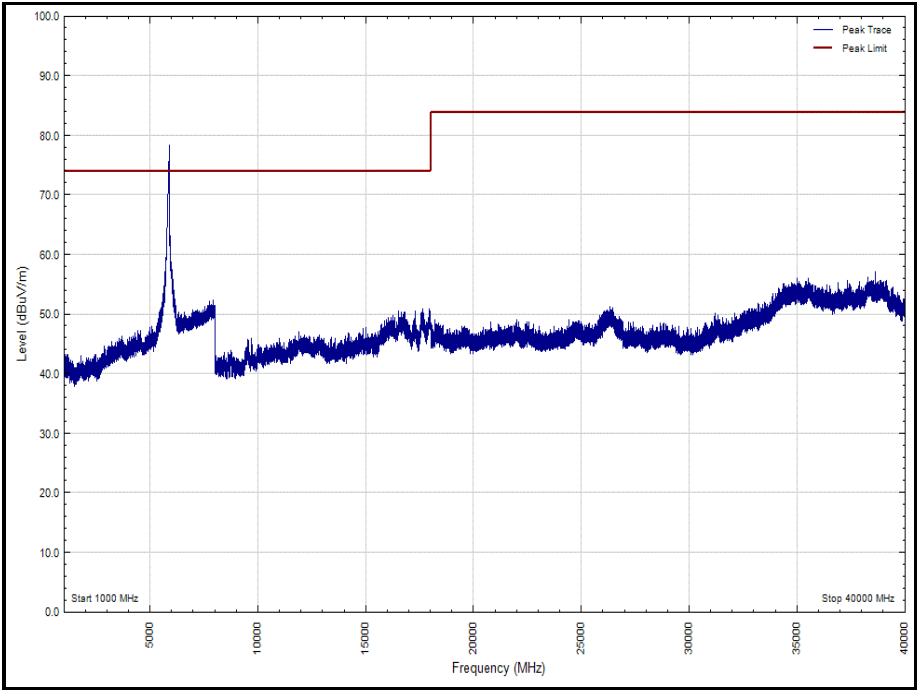


Figure 446 - U-NII 3 - 5825 MHz - 1 GHz to 40 GHz - Polarity: Vertical (Peak)

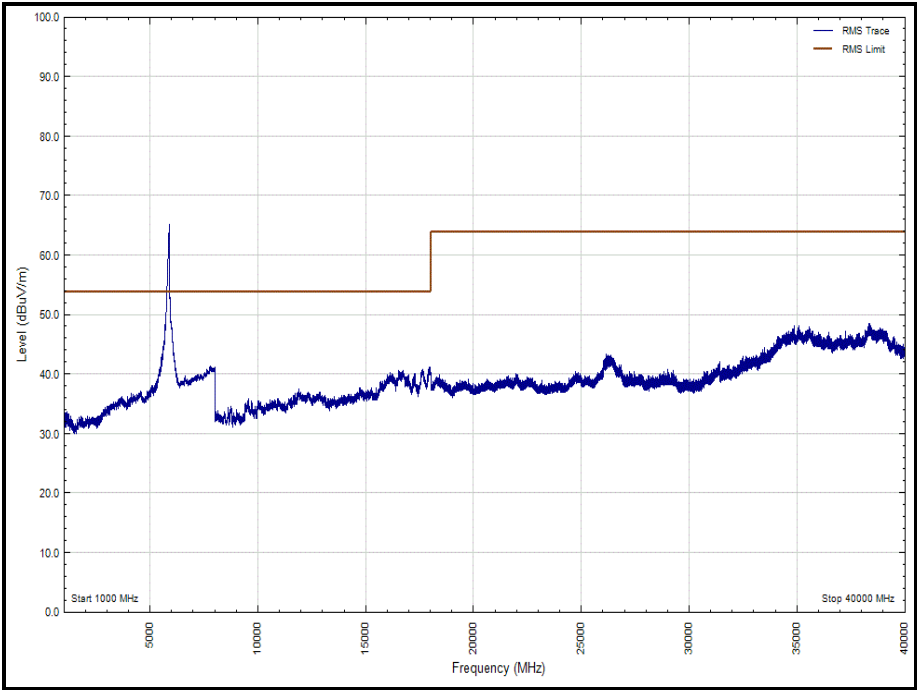


Figure 447 - U-NII 3 - 5825 MHz - 1 GHz to 40 GHz - Polarity: Vertical (Average)



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 ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 to 0.490	$2400/F(\text{kHz})$	300
0.490 to 1.705	$24000/F(\text{kHz})$	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 222



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

Emissions not falling within the restricted bands listed in Industry Canada 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 Industry Canada 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 223



2.5.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Antenna 18-40GHz (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	24	02-May-2020
Antenna with permanent attenuator (Bilog)	Schaffner	CBL6143	287	24	15-May-2020
Filter (High Pass)	Lorch	SHP7-7000-SR	566	12	10-May-2019
Pre-Amplifier	Phase One	PS04-0086	1533	12	08-Feb-2020
Hygrometer	Rotronic	Hygropalm	2404	12	26-Apr-2019
Multimeter	Iso-tech	IDM101	2424	12	12-Dec-2019
Cable 1503 2M 2.92(P)m 2.92(P)m	Rhophase	KPS-1503A-2000-KPS	4293	12	26-Oct-2019
Cable (Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4526	6	26-Apr-2019
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	05-Mar-2020
4dB Attenuator	Pasternack	PE7047-4	4935	24	28-Nov-2019
Band Reject Filter - 5.795GHz	Wainwright	WRCJV10-5725-5755-5835-5865-50SS	5070	12	01-Oct-2019
Band Reject Filter - 5.22 GHz	Wainwright	WRCJV12-5120-5150-5290-5320-50SS	5072	12	28-Sep-2019
Band Reject Filter - 5.28 GHz	Wainwright	WRCJV12-5180-5210-5350-5380-50SS	5074	12	27-Sep-2019
Band Reject Filter - 5.775 GHz	Wainwright	WRCJV10-5700-5735-5815-5850-50SS	5076	12	01-Oct-2019
Band Reject Filter - 5.570 GHz	Wainwright	WRCJV10-5440-5490-5650-5700-50SS	5078	12	28-Sep-2019
Band Reject Filter - 5.690 GHz	Wainwright	WRCJV8-5635-5670-5710-5745-50SS	5080	12	27-Sep-2019
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	12-Sep-2019
8m N-Type RF Cable	Teledyne	PR90-088-8MTR	5095	12	04-Oct-2019
Cable (18GHz)	Rosenberger	LU7-071-1000	5101	12	04-Oct-2019
Cable (18GHz)	Rosenberger	LU7-071-1000	5102	12	04-Oct-2019
Cable (18GHz)	Rosenberger	LU7-071-1000	5104	12	05-Oct-2019
EmX Software	TUV SUD	EmX V.1.4.4	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
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Table 224

TU – Traceability Unscheduled



2.6 Restricted Band Edges

2.6.1 Specification Reference

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

2.6.2 Equipment Under Test and Modification State

C02Y4006L59F, S/N: TBC - Modification State 0

2.6.3 Date of Test

06-February-2019 to 12-March-2019

2.6.4 Test Method

The test was performed in accordance with ANSI C63.10 clause 6.10.5.

Restricted band edge measurements were performed while operating in multiple SISO and MIMO modes supported by the device.

The measurements displayed within this report, have been limited to those modes which have been shown to be worst case.

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

2.6.5 Environmental Conditions

Ambient Temperature	21.7 - 29.4 °C
Relative Humidity	22.5 – 45.0 %



2.6.6 Test Results

20 MHz Bandwidth

Measurement Configuration	Mode/Data Rate	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)
SISO	802.11a / 6 Mbps	36	5150.0	60.42	50.58
SISO	802.11a / 6 Mbps	64	5350.0	61.76	51.01
SISO	802.11a / 6 Mbps	100	5460.0	59.47	48.22

Table 225 – Restricted Band Edge Results

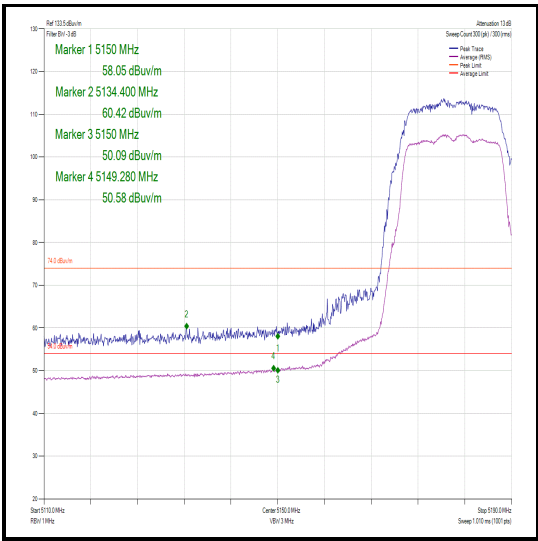


Figure 448 – Channel 36 – Restricted Band Edge

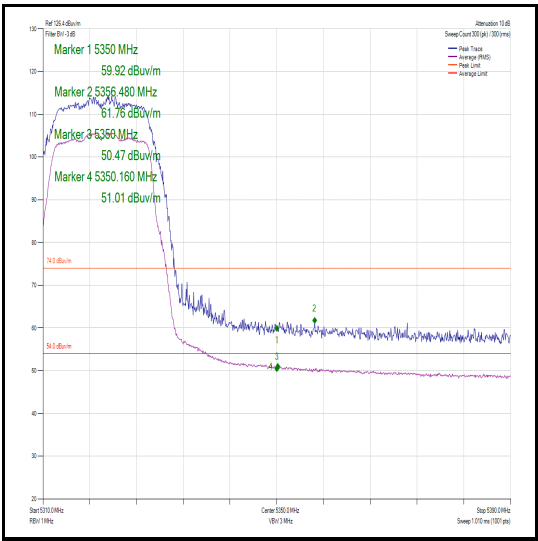


Figure 449 – Channel 64 - Restricted Band Edge

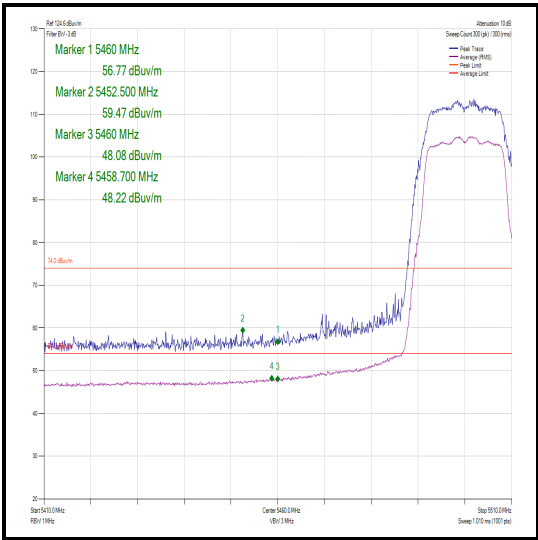


Figure 450 – Channel 100 - Restricted Band Edge



20 MHz Bandwidth

Measurement Configuration	Mode/Data Rate	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)
SISO	802.11n / MCS0	36	5150.0	60.47	50.53
SISO	802.11n / MCS0	64	5350.0	64.5	50.83
SISO	802.11n / MCS0	100	5460.0	59.17	48.89

Table 226 – Restricted Band Edge Results

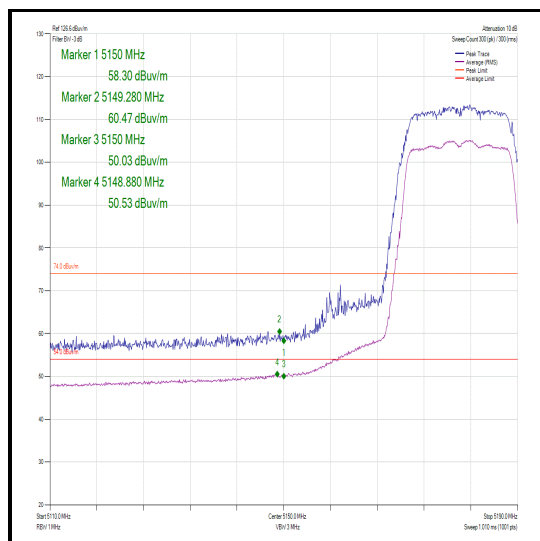


Figure 451 – Channel 36 – Restricted Band Edge

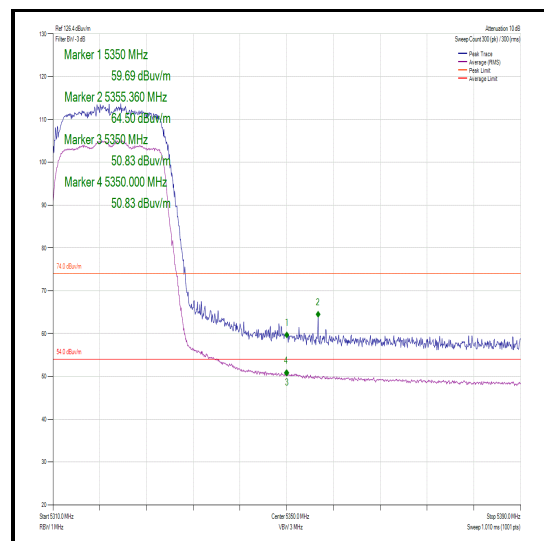


Figure 452 – Channel 64 - Restricted Band Edge

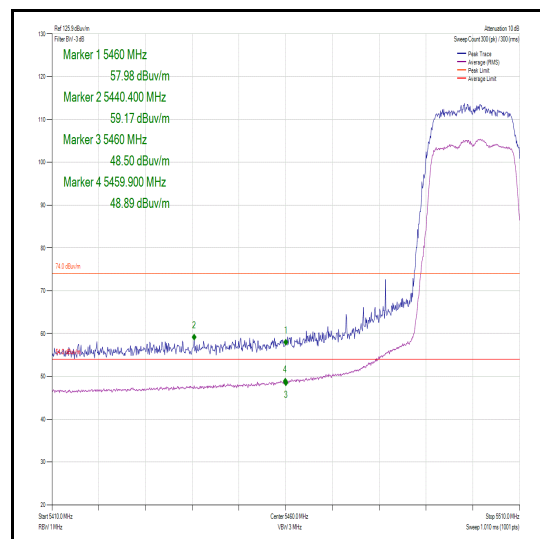


Figure 453 – Channel 100 – Restricted Band Edge



20 MHz Bandwidth

Measurement Configuration	Mode/Data Rate	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)
MIMO 2TX TxBF	802.11ac / MCS0x1	36	5150.0	61.12	50.86
MIMO 2TX SDM	802.11n / MCS8	64	5350.0	62.06	50.8
MIMO 2TX TxBF	802.11ac / MCS0x1	100	5460.0	60.83	50.38

Table 227 – Restricted Band Edge Results

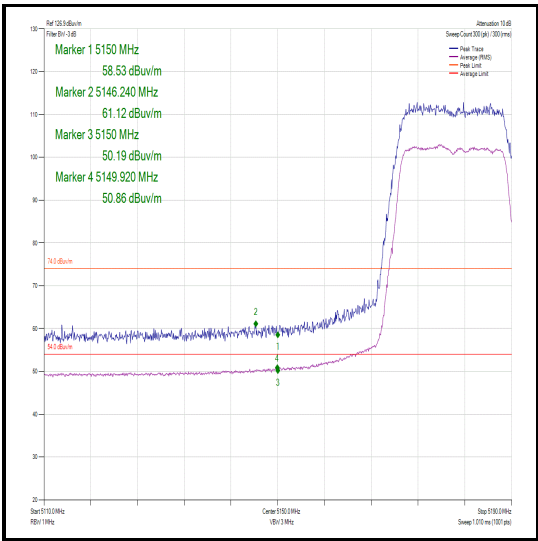


Figure 454 – Channel 36 – Restricted Band Edge

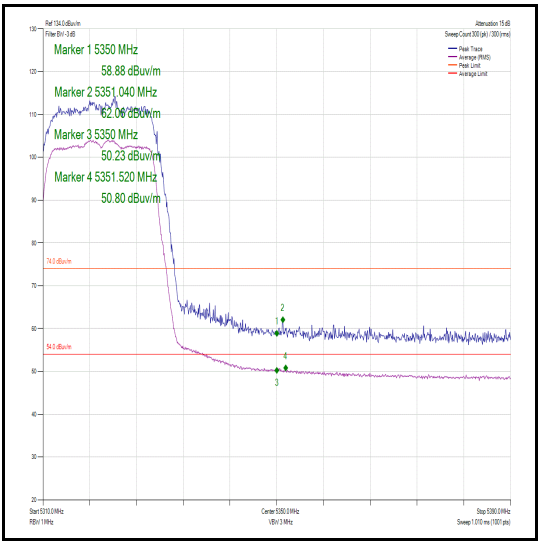


Figure 455 – Channel 64 - Restricted Band Edge

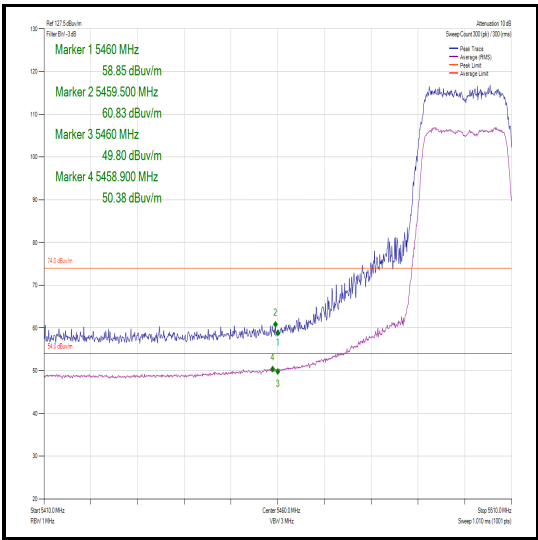


Figure 456 – Channel 100 – Restricted Band Edge



40 MHz Bandwidth

Measurement Configuration	Mode/Data Rate	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)
SISO	802.11n / MCS0	38	5150.0	66.2	51.46
SISO	802.11n / MCS0	62	5350.0	62.39	51.04
SISO	802.11n / MCS0	102	5460.0	58.09	47.37

Table 228 – Restricted Band Edge Results

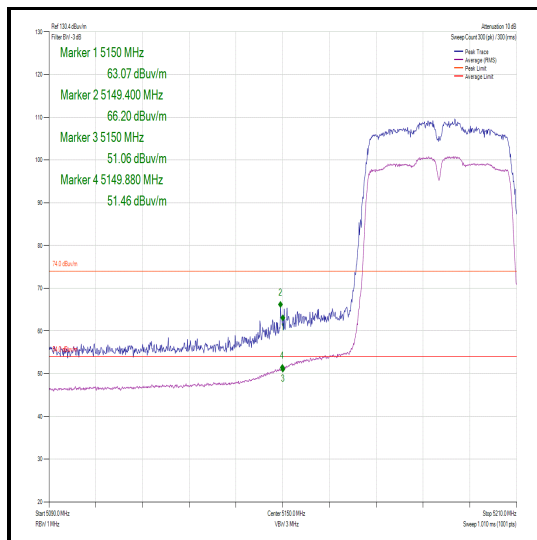


Figure 457 – Channel 38 – Restricted Band Edge

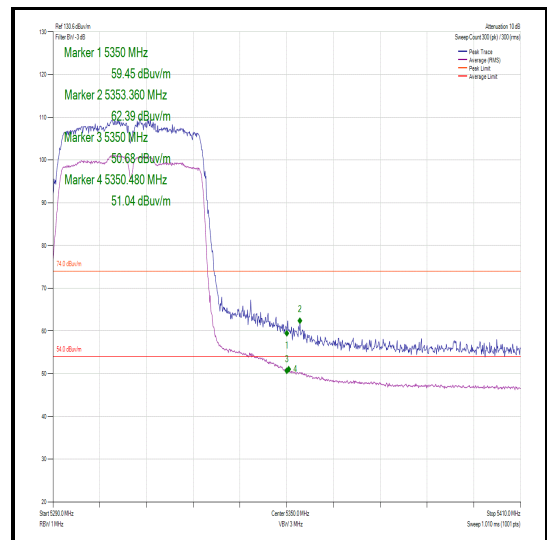


Figure 458 – Channel 62 - Restricted Band Edge

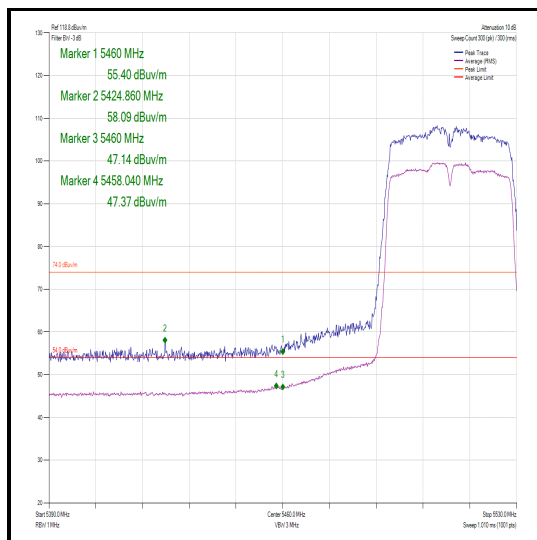


Figure 459 – Channel 102 – Restricted Band Edge



40 MHz Bandwidth

Measurement Configuration	Mode/Data Rate	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)
MIMO 2TX SDM	802.11n / MCS8	38	5150.0	63.79	51.41
MIMO 2TX TxBF	802.11ac / MCS0x1	62	5350.0	62.40	51.31
MIMO 2TX TxBF	802.11ac / MCS0x1	102	5460.0	59.81	48.53

Table 229 – Restricted Band Edge Results

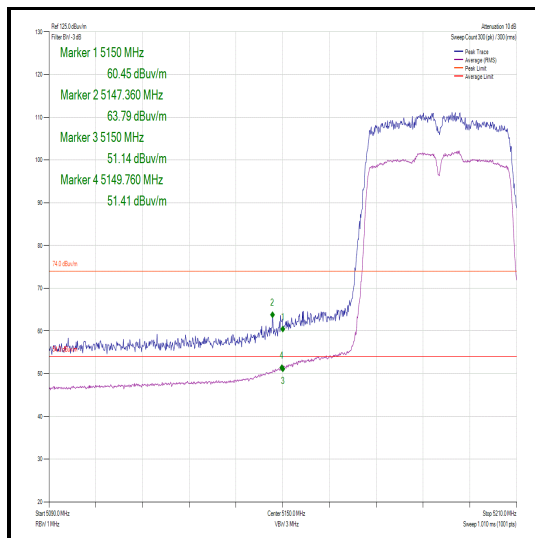


Figure 460 – Channel 38 – Restricted Band Edge

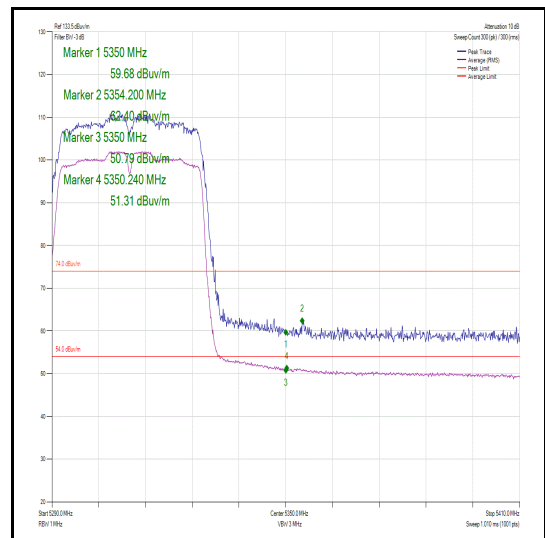


Figure 461 – Channel 62 - Restricted Band Edge

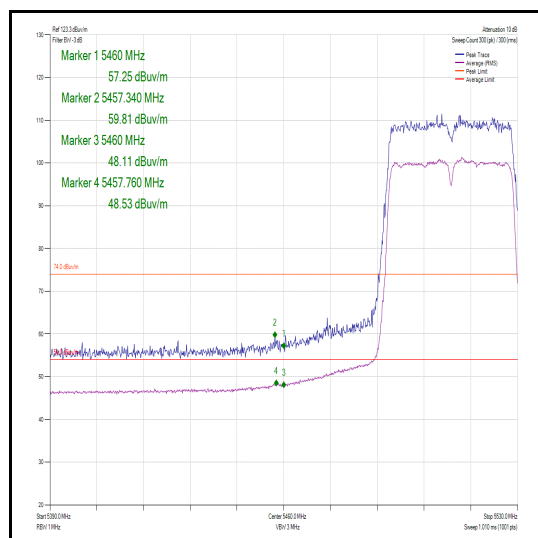


Figure 462 – Channel 102 – Restricted Band Edge



80 MHz Bandwidth

Measurement Configuration	Mode/Data Rate	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)
SISO	802.11ac / MCS0x1	42	5150.0	62.19	51.03
SISO	802.11ac / MCS0x1	58	5350.0	61.91	51.41
SISO	802.11ac / MCS0x1	106	5460.0	59.86	47.86

Table 230 – Restricted Band Edge Results

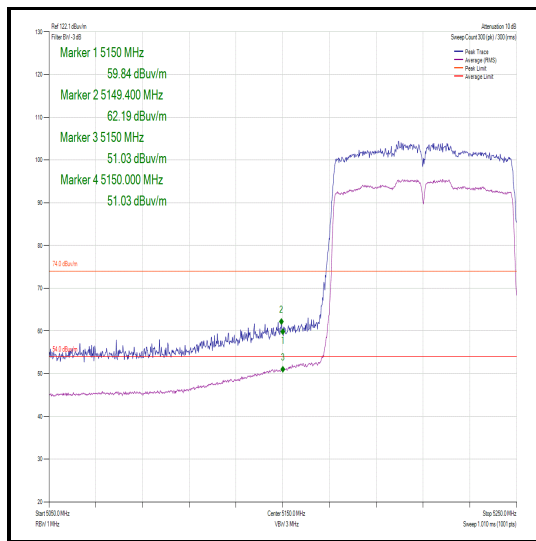


Figure 463 – Channel 42 – Restricted Band Edge

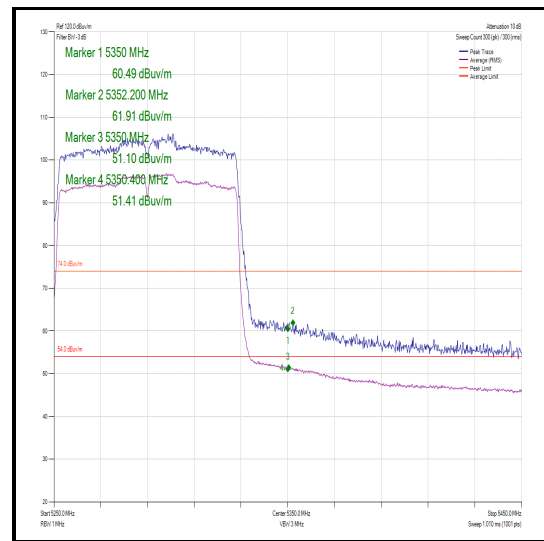


Figure 464 – Channel 58 - Restricted Band Edge

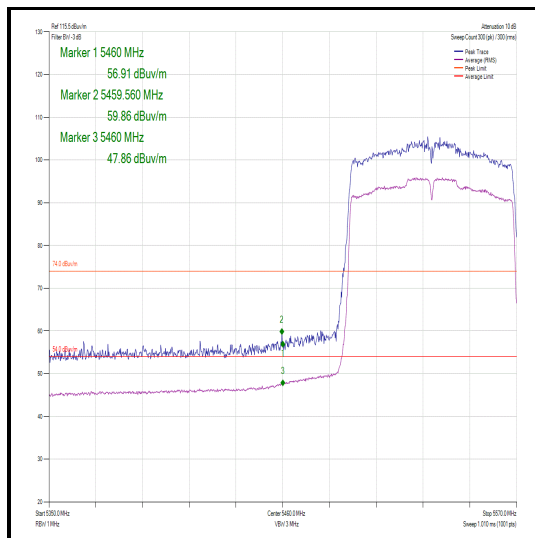


Figure 465 – Channel 106 – Restricted Band Edge



80 MHz Bandwidth

Measurement Configuration	Mode/Data Rate	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)
MIMO 2TX TxBF	802.11ac / MCS0x1	42	5150.0	61.97	51.1
MIMO 2TX CDD	802.11ac / MCS0x1	58	5350.0	61.08	51.31
MIMO 2TX TxBF	802.11ac / MCS0x1	106	5460.0	66.29	49.57

Table 231 – Restricted Band Edge Results

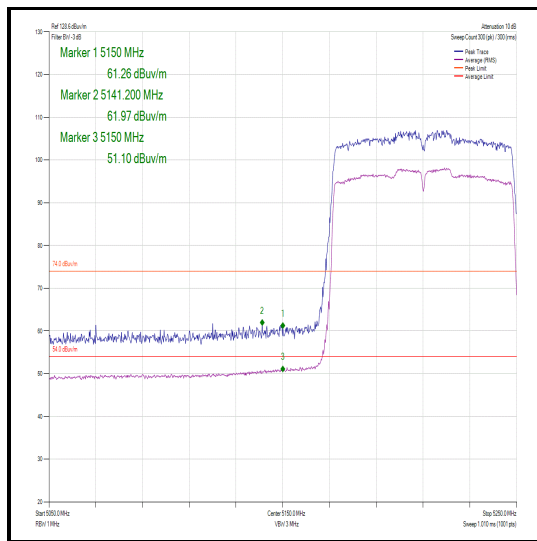


Figure 466 – Channel 42 – Restricted Band Edge

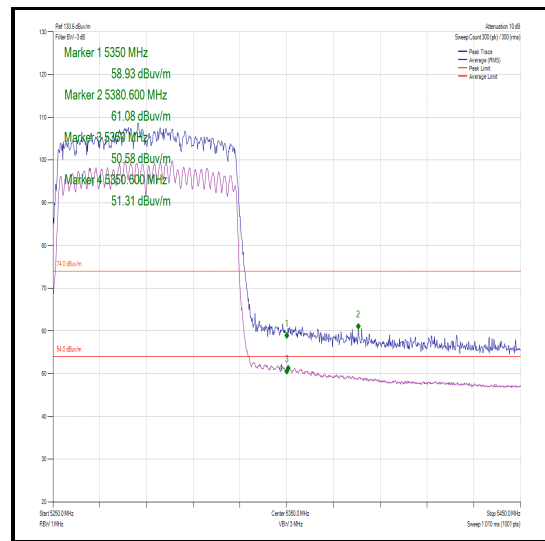


Figure 467 – Channel 58 - Restricted Band Edge

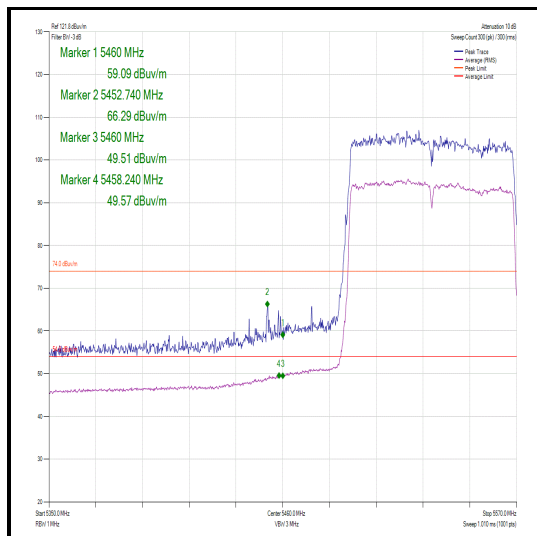


Figure 468 – Channel 106 – Restricted Band Edge



2.6.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Hygrometer	Rotronic	Hygropalm	2404	12	26 April 2019
Multimeter	Iso-tech	IDM101	2424	12	12-Dec-2019
Double Ridge Broadband Horn Antenna	Schwarzbeck	BBHA 9120 B	4848	12	12 Sept 2019
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	12 Sept 2019
8m N-Type RF Cable	Teledyne	PR90-088-8MTR	5095	12	04 Oct 2019
Cable (18GHz	Rosenberger	LU7-071-2000	5107	12	05 Oct 2019
EmX Software	TUV SUD	EmX V.1.4.4	5125	-	Software
Screened Room (11)	Rainford	Rainford	5136	12	01 Nov 2019
Mast	Maturo	TAM 4.0-P	5158	-	TU
Mast and Turntable Controller	Maturo	Maturo NCD	5159	-	TU

Table 232

TU – Traceability Unscheduled



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)
Industry Canada RSS-247, Clause 6.3.2(c)(d)(e)

2.7.2 Equipment Under Test and Modification State

A2159, S/N: C02XR00DL54Y - Modification State 0

2.7.3 Date of Test

19-March-2019 to 20-March-2019

2.7.4 Test Method

This test was performed in accordance with FCC KDB 905462 D02, clause 7.8.3. The EUT and test equipment was configured as described in the calibration setup section below.

Radar Pulse Type 0 was transmitted and the spectrum monitored. The transmissions from the EUT 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 200 ms and the following 9.8 seconds of the Channel Move Time was recorded.

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 20.8 °C
Relative Humidity 43.3 %

2.7.6 Test Results

802.11ac (80 MHz Bandwidth)

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 -62 dBm.

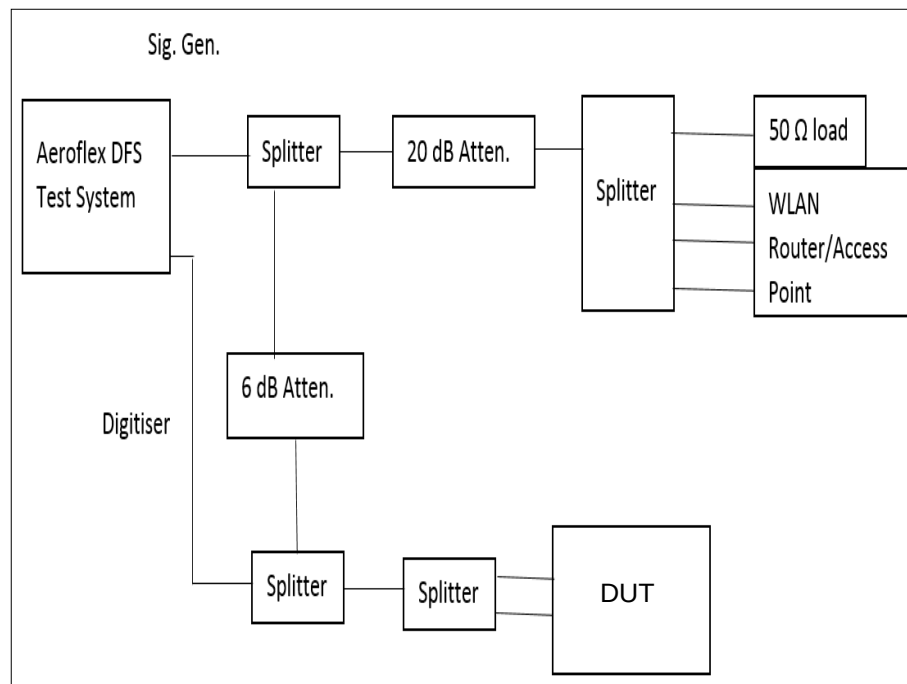


Figure 469 - Test Equipment Setup for Client Without Radar Detection with Injection at the Master



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

Table 233 - Radar Pulse Type 0 Characteristics

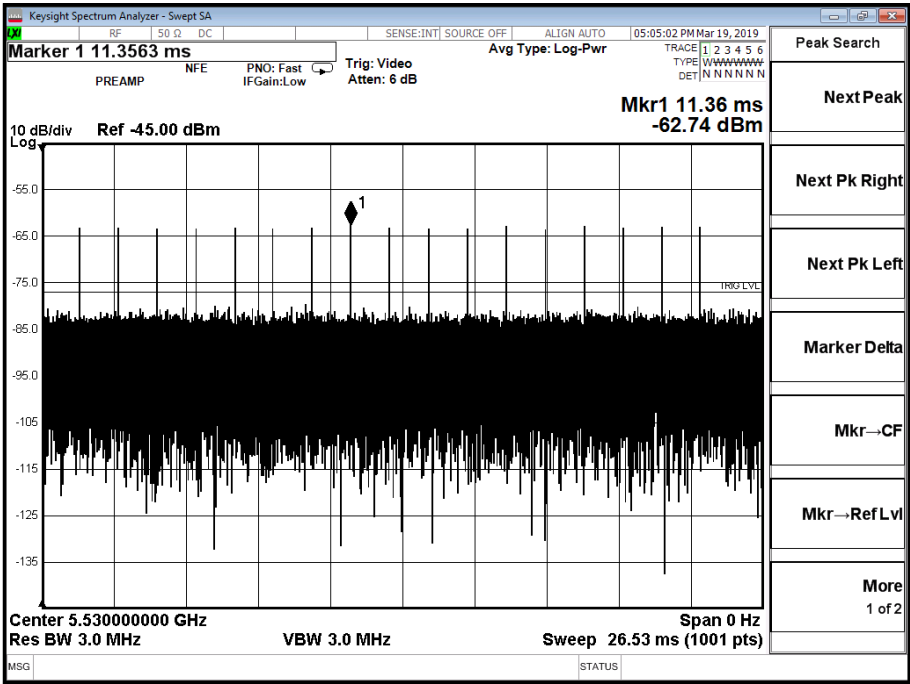


Figure 470 - Verification of Radar Type 0

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

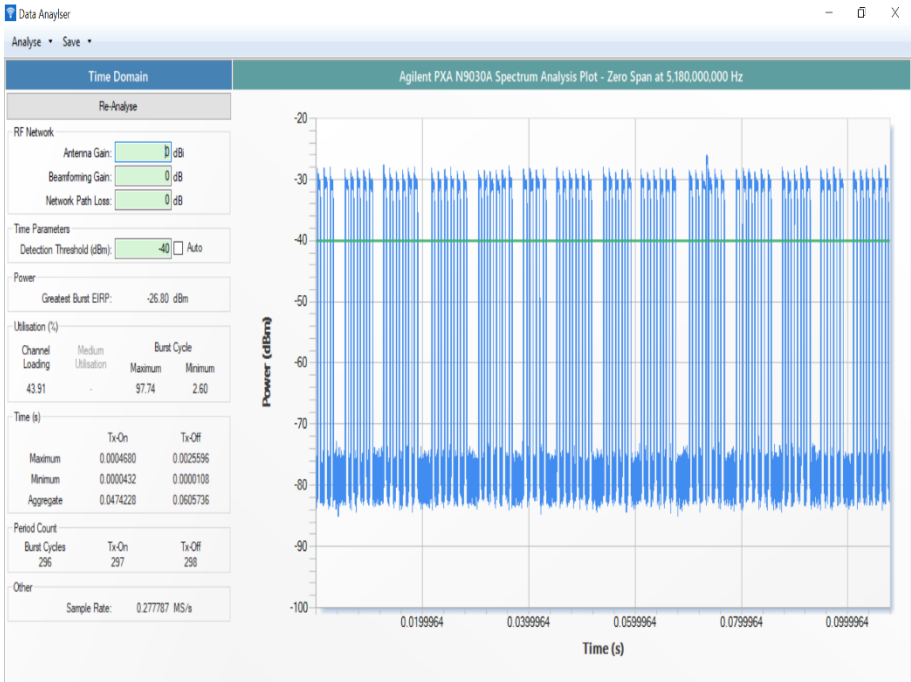


Figure 471 - Channel Loading

The channel loading was measured as 33.46%



2.7.7 Test Results

802.11ac (80 MHz Bandwidth)

Test Parameter	Result
Channel Move Time	0.159 s
Channel Closing Time (Aggregate Time During 200 ms)	9.54 ms
Channel Closing Time (Aggregate Time During 200 ms to 10 s)	0 ms
Channel Closing Time (Aggregate Time During 10 s)	9.54 ms
Transmission Observed During Non-Occupancy Period	None

Table 235 - In-Service Monitoring Test Results

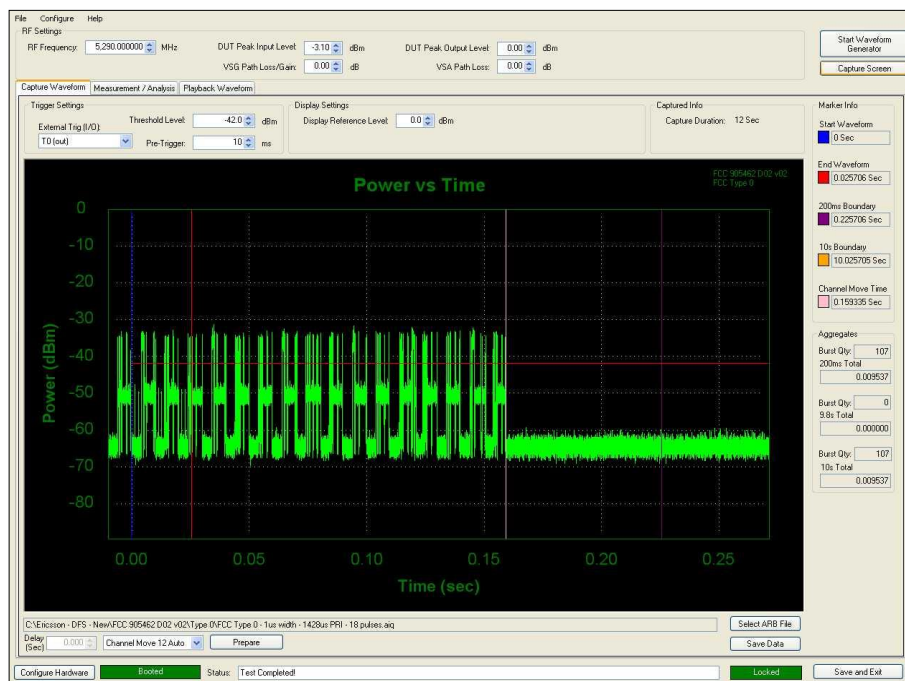


Figure 472 - First 200 ms of Channel Shutdown Period

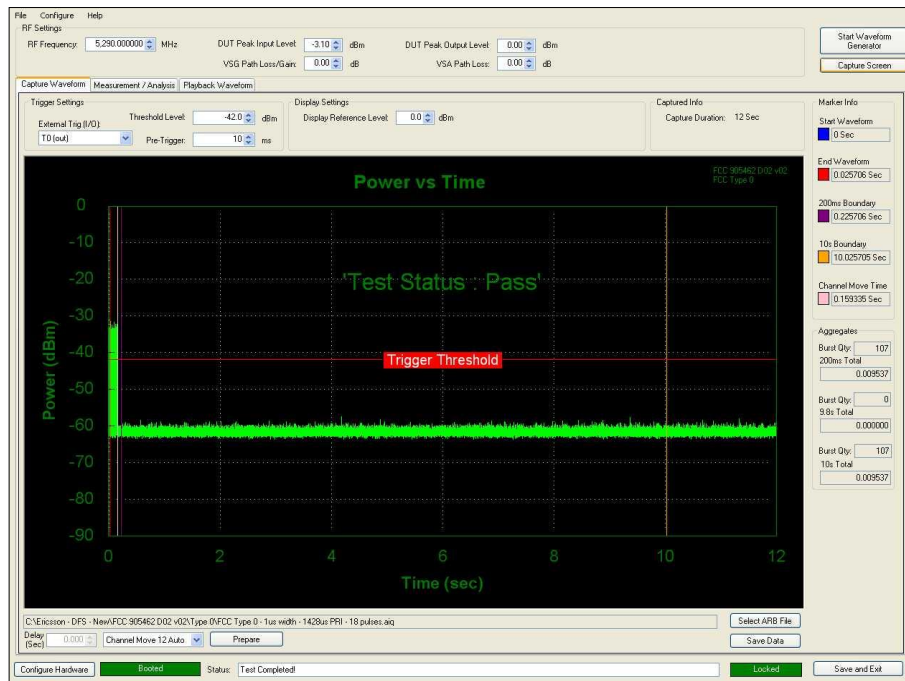


Figure 473 - 10 s Channel Shutdown

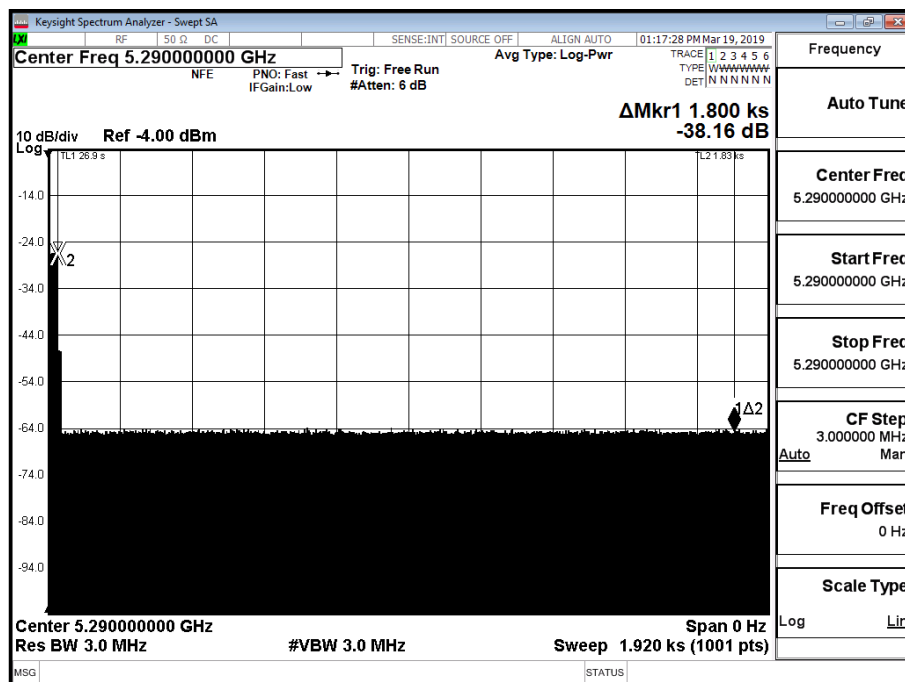


Figure 474 - Non-Occupancy Period



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

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

Non-occupancy Period	> 30 minutes
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2.7.8 Test Location and Test Equipment Used

This test was carried out in RF Chamber 10.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
20dB/2W Attenuator	Narda	4772-20	462	-	O/P Mon
Attenuator (20dB/ 2W)	Pasternack	PE7004-20	489	12	24-Oct-2019
Multimeter	Iso-tech	IDM101	2424	12	12-Dec-2019
Hygrometer	Rotronic	I-1000	3068	12	21-Jun-2019
PXI RF Digitizer	Aeroflex	3035	4012	24	15-Mar-2020
PXI RF Synthesizer	Aeroflex	3010	4013	24	15-Mar-2020
PXI RF Synthesizer	Aeroflex	3011	4014	24	15-Mar-2020
PXI Digital RF Signal Generator	Aeroflex	3025	4015	24	15-Mar-2020
1800-6000 MHz Power Splitter	Mini-Circuits	ZN2PD-63-S+	4055	-	O/P Mon
PXA Signal Analyser	Keysight Technologies	N9030A	4654	12	08-Oct-2019
Wireless Cable & Fibre Router - AC 1900, Dual-band	Asus	RT-AC68U	4881	-	TU
Cable (18GHz)	Rosenberger	LU7-071-2000	5110	12	05-Oct-2019
AC Programmable Power Supply	iTech	IT7324	5225	-	O/P Mon
Power Splitter, 4 way	Mini-Circuits	ZN4PD1-63-S+	5236	-	O/P Mon
Power Splitter, 2 way	Mini-Circuits	ZN2PD2-63-S+	5238	-	O/P Mon
Power Splitter, 2 way	Mini-Circuits	ZN2PD2-63-S+	5239	-	O/P Mon

Table 236

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment



3 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty
Maximum Conducted Output Power	± 3.2 dB
Maximum Conducted Power Spectral Density	± 3.2 dB
Emission Bandwidth	± 2.028 MHz
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
Restricted Band Edges	± 6.3 dB
Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period	Time: ± 0.47 % Power: ± 1.29 dB

Table 237