

Main - 20 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)
MIMO 2TX	802.11n	100	5470.0	65.17
MIMO 2TX	802.11n	140	5725.0	64.39
MIMO 2TX	802.11n	144	5850.0	59.85
MIMO 2TX	802.11n	149	5725.0	57.42
MIMO 2TX	802.11n	165	5850.0	58.00

Table 365 - Authorised Band Edge Results

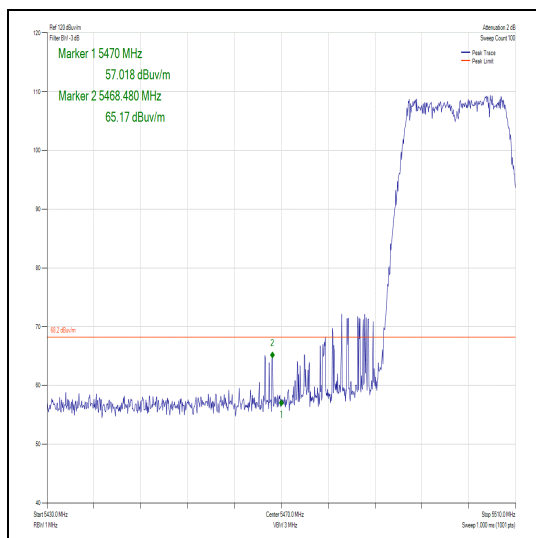


Figure 408 – Channel 100 - Authorised Band Edge

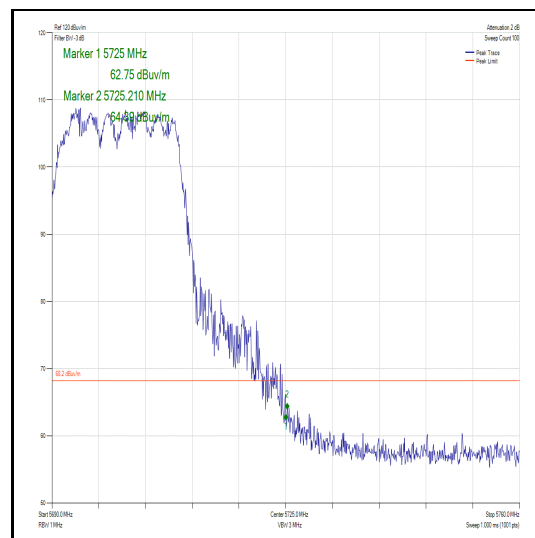


Figure 409 – Channel 140 - Authorised Band Edge

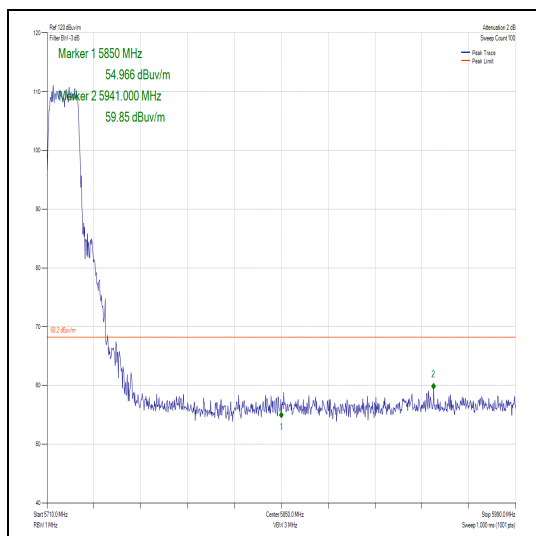


Figure 410 – Channel 144 - Authorised Band Edge

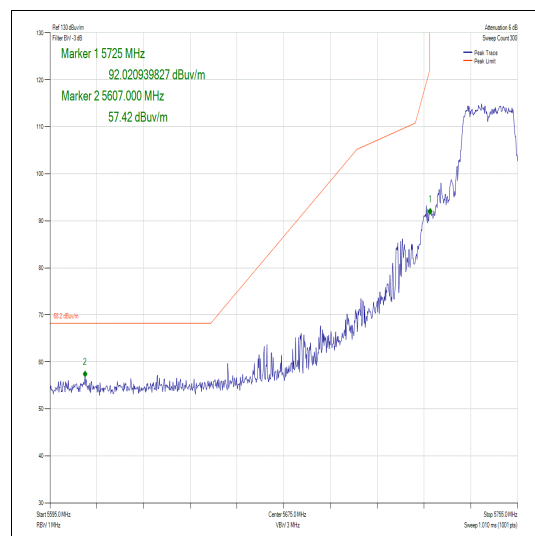


Figure 411 – Channel 149 - Authorised Band Edge

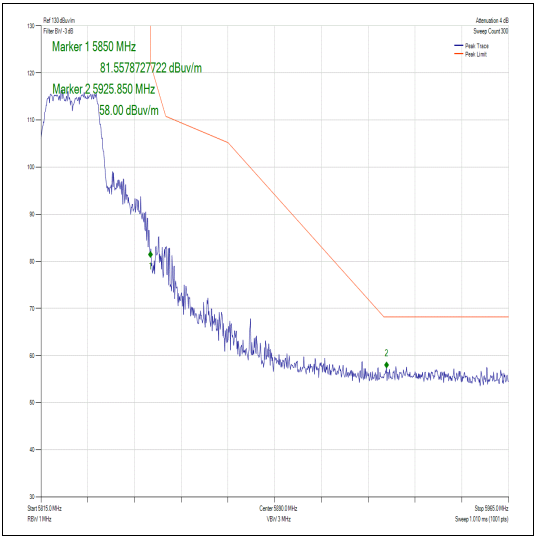


Figure 412 – Channel 165 - Authorised Band Edge

Main - 20 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)
MIMO 3TX	802.11n	100	5470.0	63.50
MIMO 3TX	802.11n	140	5725.0	65.84
MIMO 3TX	802.11n	144	5850.0	59.06
MIMO 3TX	802.11n	149	5725.0	60.23
MIMO 3TX	802.11n	165	5850.0	57.89

Table 366 - Authorised Band Edge Results

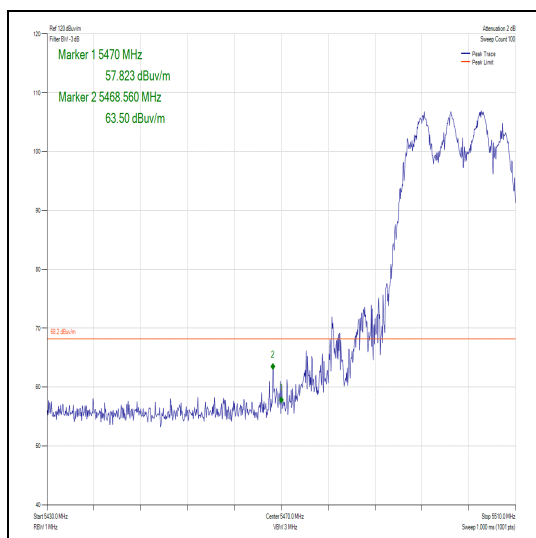


Figure 413 – Channel 100 - Authorised Band Edge

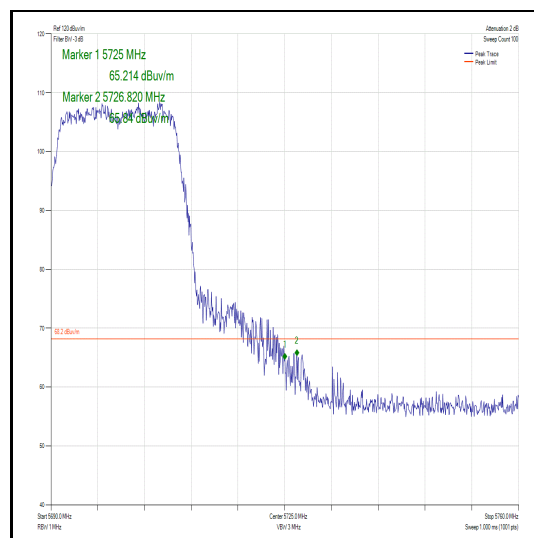


Figure 414 – Channel 140 - Authorised Band Edge

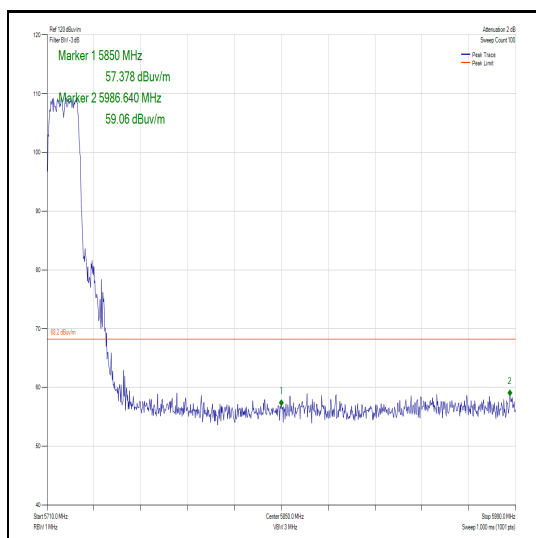


Figure 415 – Channel 144 - Authorised Band Edge

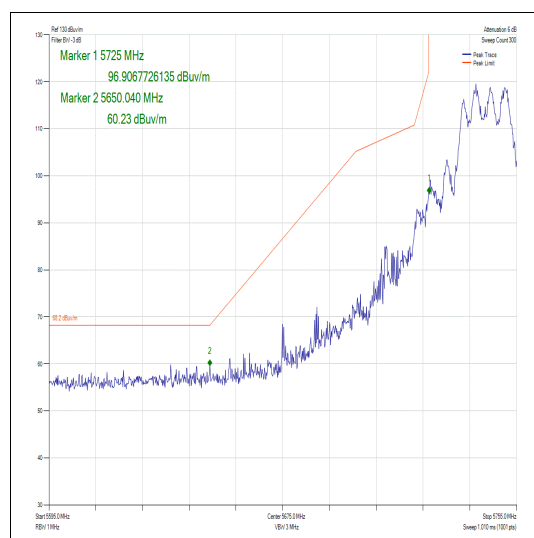


Figure 416 – Channel 149 - Authorised Band Edge

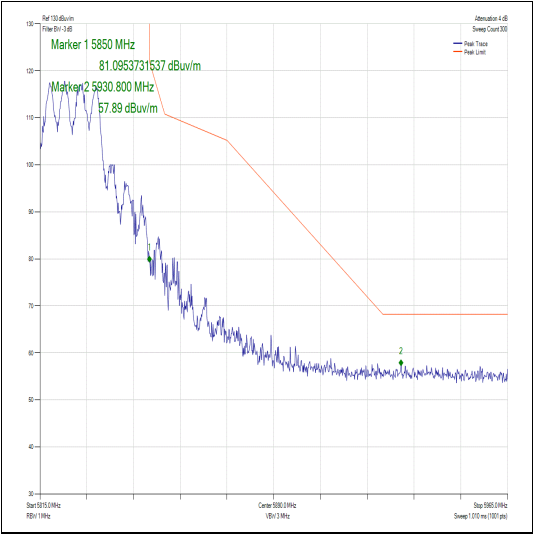


Figure 417 – Channel 165 - Authorised Band Edge

Main - 40 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)
SISO	802.11n	102	5470.0	65.55
SISO	802.11n	134	5725.0	65.80
SISO	802.11n	142	5850.0	60.35
SISO	802.11n	151	5725.0	62.89
SISO	802.11n	159	5850.0	58.91

Table 367 - Authorised Band Edge Results

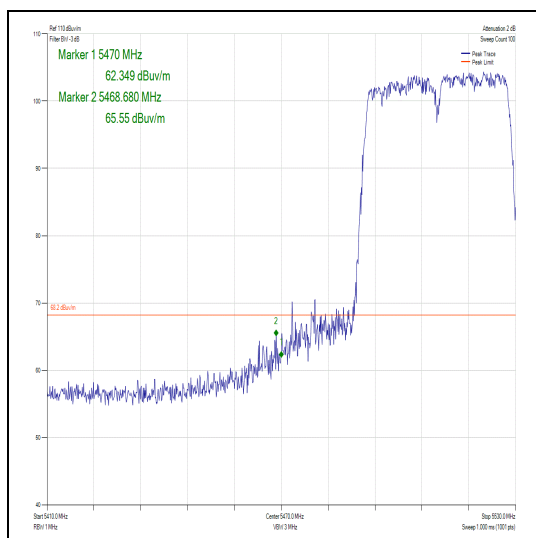


Figure 418 – Channel 102 - Authorised Band Edge

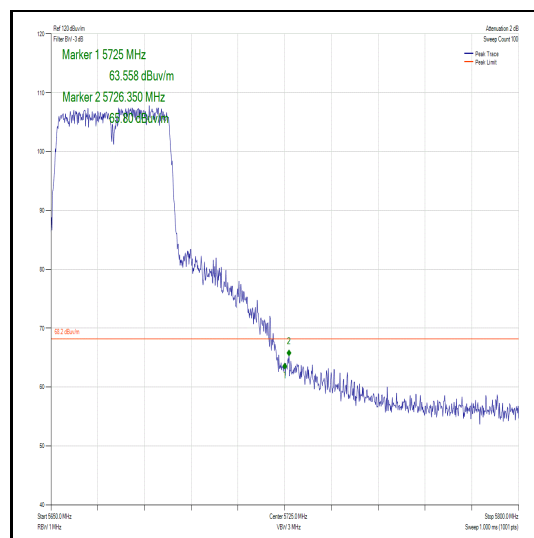


Figure 419 – Channel 134 - Authorised Band Edge

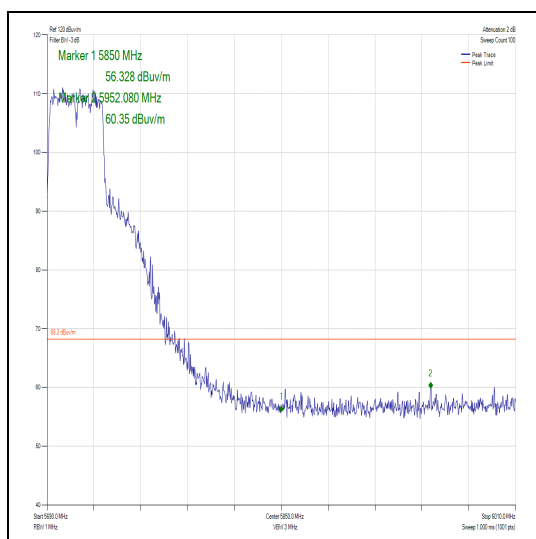


Figure 420 – Channel 142 - Authorised Band Edge

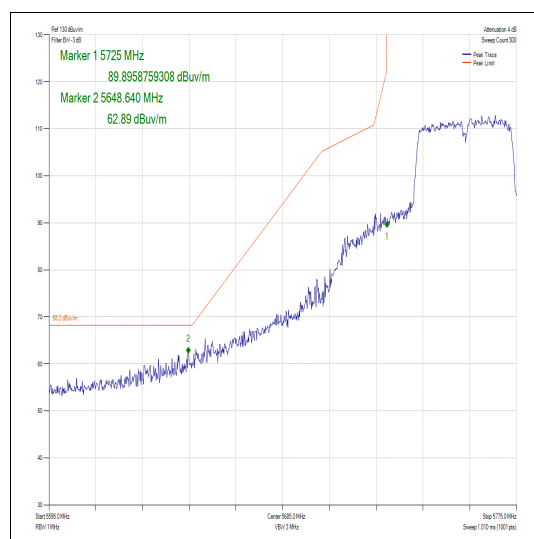


Figure 421 – Channel 151 - Authorised Band Edge

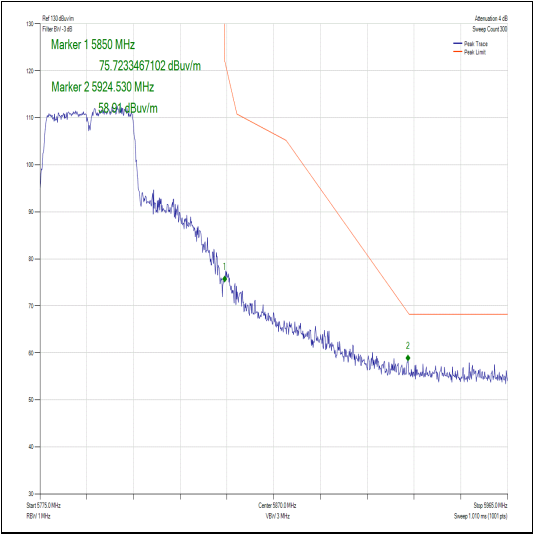


Figure 422 – Channel 159 - Authorised Band Edge

Main - 40 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)
MIMO 2TX	802.11n	102	5470.0	66.21
MIMO 2TX	802.11n	134	5725.0	65.38
MIMO 2TX	802.11n	142	5850.0	60.18
MIMO 2TX	802.11n	151	5725.0	65.71
MIMO 2TX	802.11n	159	5850.0	58.95

Table 368 - Authorised Band Edge Results

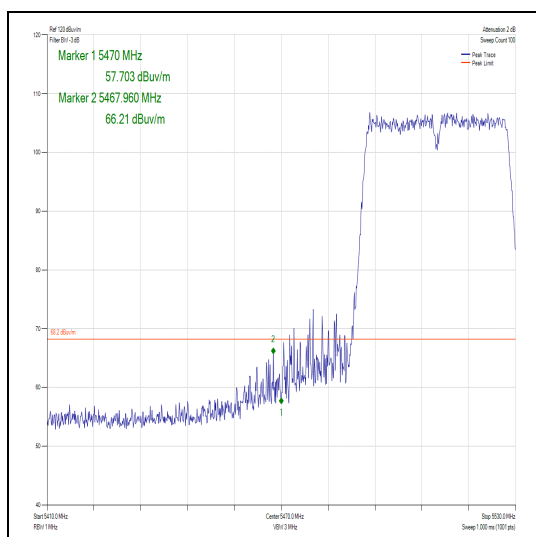


Figure 423 – Channel 102 - Authorised Band Edge

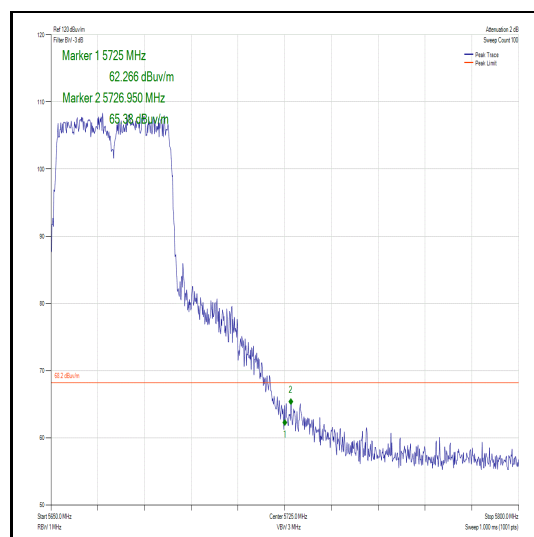


Figure 424 – Channel 134 - Authorised Band Edge

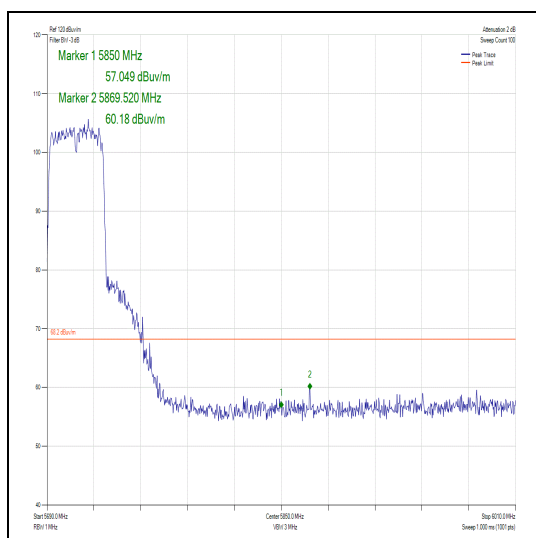


Figure 425 – Channel 142 - Authorised Band Edge

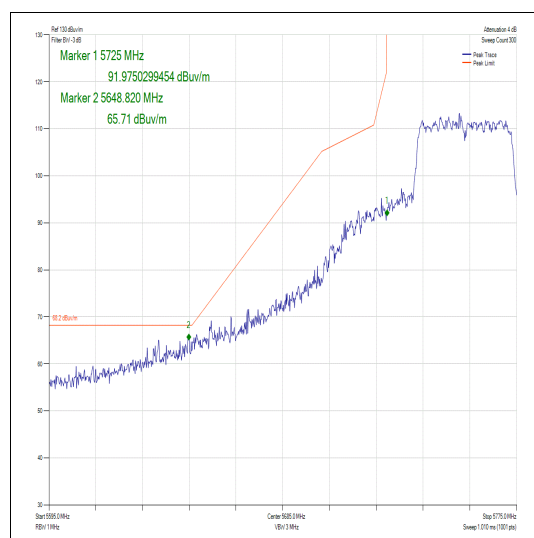


Figure 426 – Channel 151 - Authorised Band Edge



Product Service

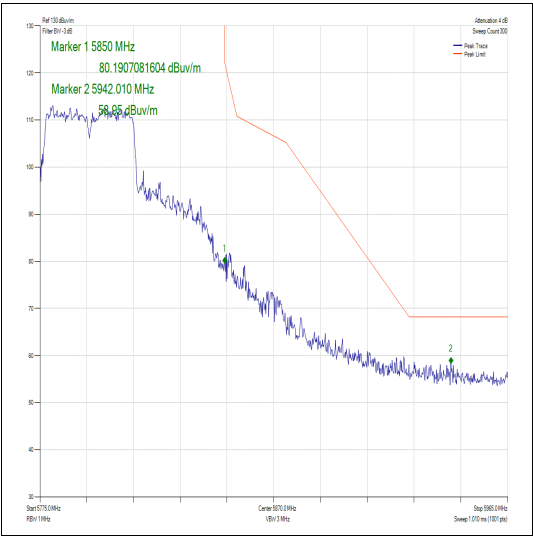


Figure 427 – Channel 159 - Authorised Band Edge

Main - 40 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)
MIMO 3TX	802.11n	102	5470.0	63.10
MIMO 3TX	802.11n	134	5725.0	65.44
MIMO 3TX	802.11n	142	5850.0	59.94
MIMO 3TX	802.11n	151	5725.0	63.62
MIMO 3TX	802.11n	159	5850.0	59.43

Table 369 - Authorised Band Edge Results

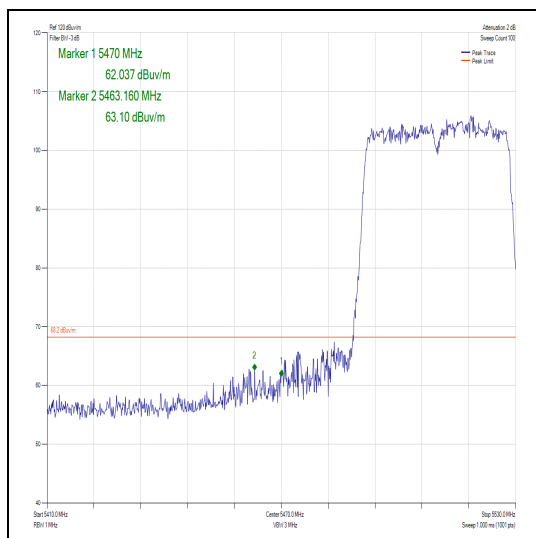


Figure 428 – Channel 102 - Authorised Band Edge

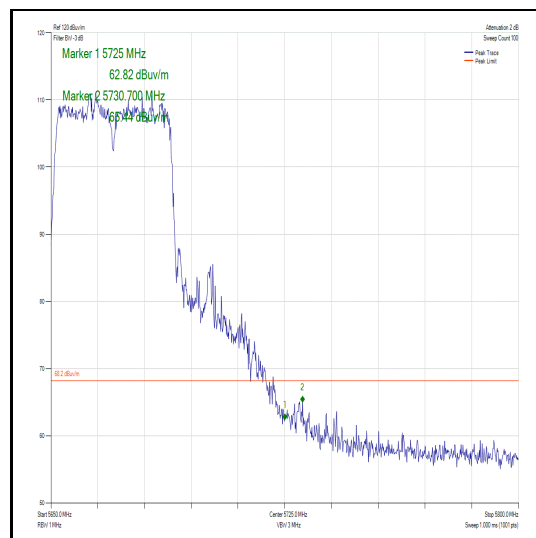


Figure 429 – Channel 134 - Authorised Band Edge

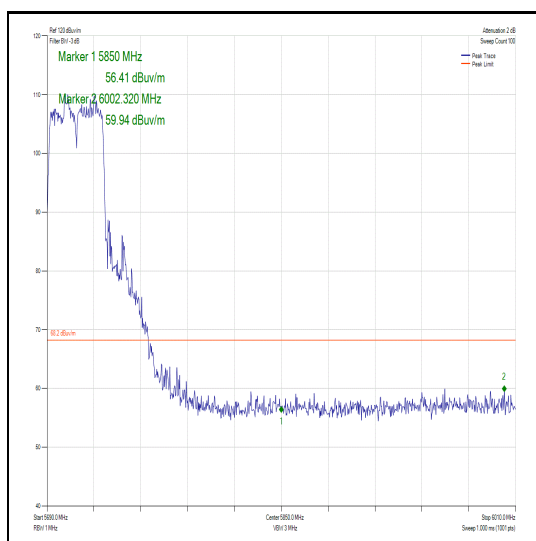


Figure 430 – Channel 142 - Authorised Band Edge

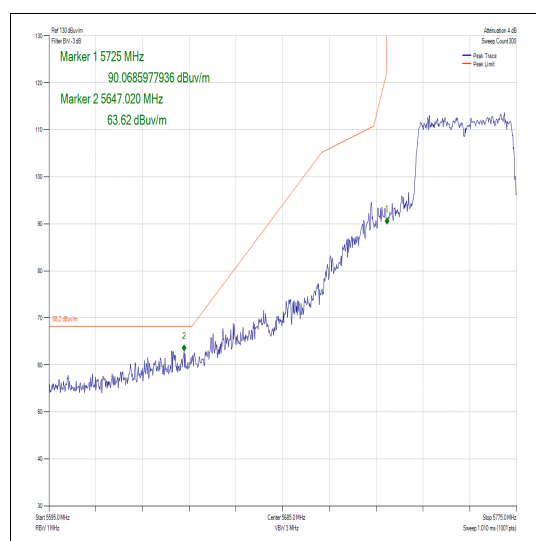


Figure 431 – Channel 151 - Authorised Band Edge



Product Service

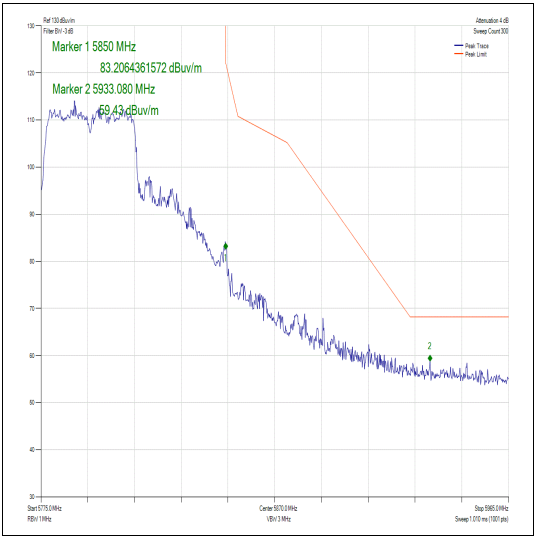


Figure 432 – Channel 159 - Authorised Band Edge

Main - 80 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)
SISO	802.11ac	106	5470.00	63.36
SISO	802.11ac	122	5725.00	63.69
SISO	802.11ac	138	5850.00	64.43
SISO	802.11ac	155	5725.00	63.70
SISO	802.11ac	155	5850.00	60.44

Table 370 - Authorised Band Edge Results

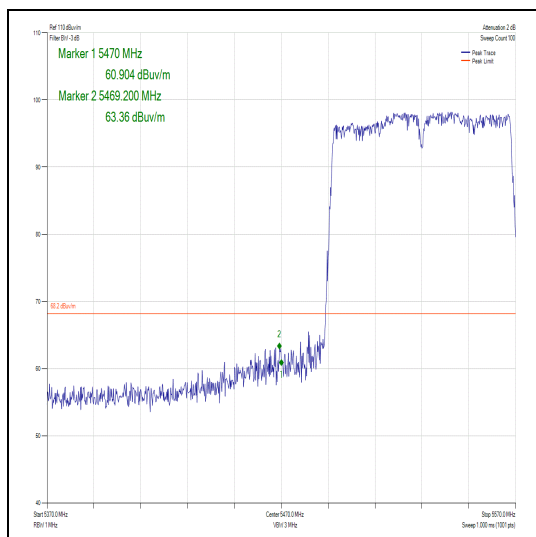


Figure 433 – Channel 106 - Authorised Band Edge

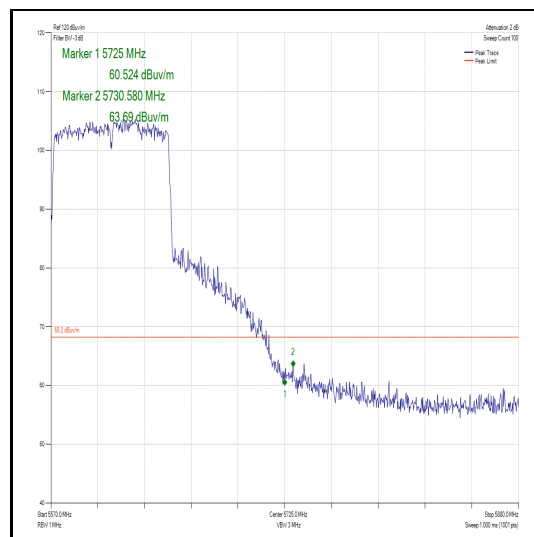


Figure 434 – Channel 122 - Authorised Band Edge

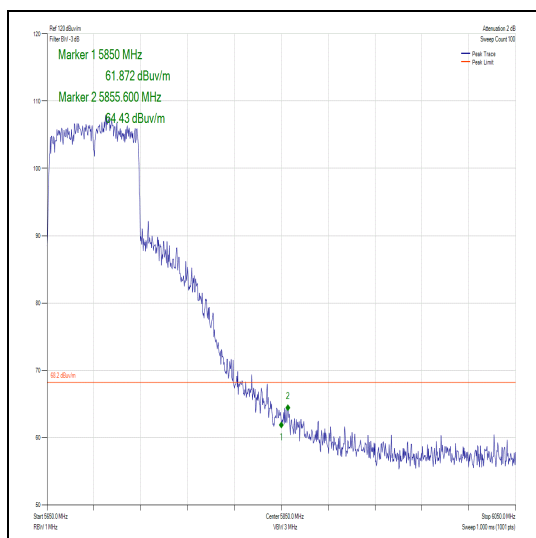


Figure 435 – Channel 138 - Authorised Band Edge

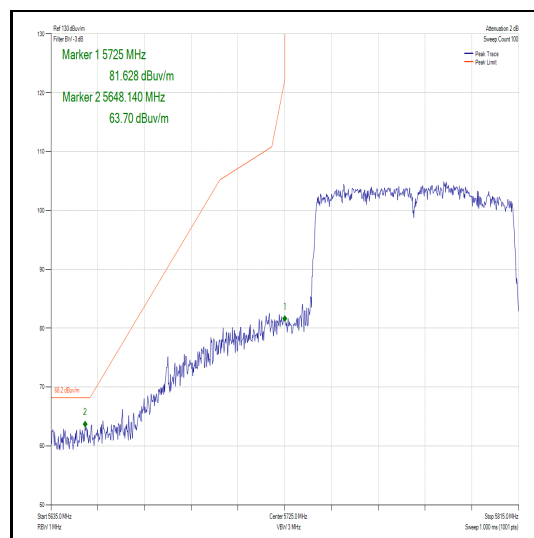


Figure 436 – Channel 155 - Authorised Lower Band Edge

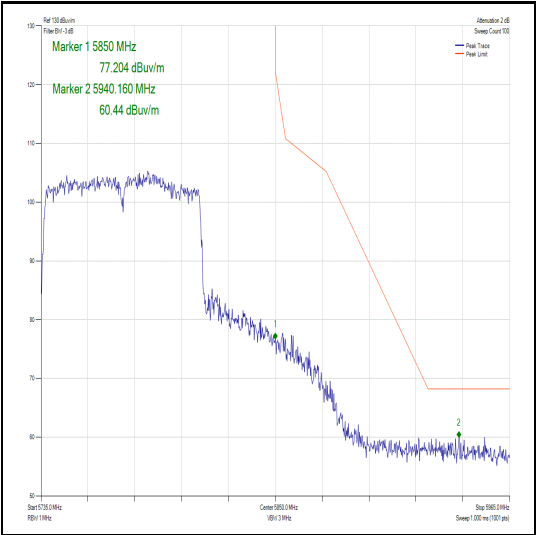


Figure 437 – Channel 155 - Authorised Upper Band Edge



Main - 80 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)
MIMO 2TX	802.11ac	106	5470.00	63.20
MIMO 2TX	802.11ac	122	5725.00	64.38
MIMO 2TX	802.11ac	138	5850.00	64.45
MIMO 2TX	802.11ac	155	5725.00	63.20
MIMO 2TX	802.11ac	155	5850.00	64.59

Table 371 - Authorised Band Edge Results

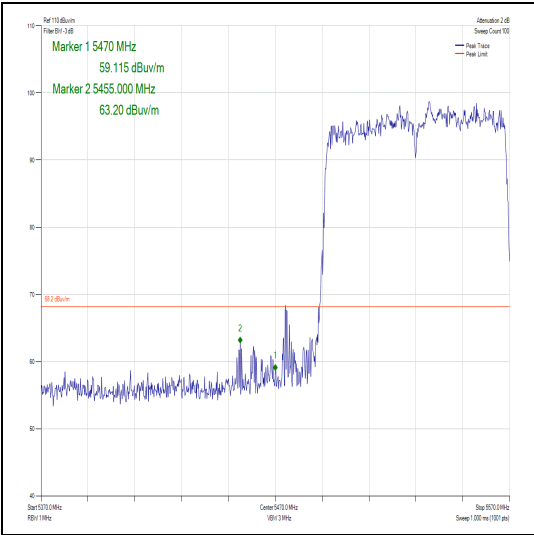


Figure 438 – Channel 106 - Authorised Band Edge

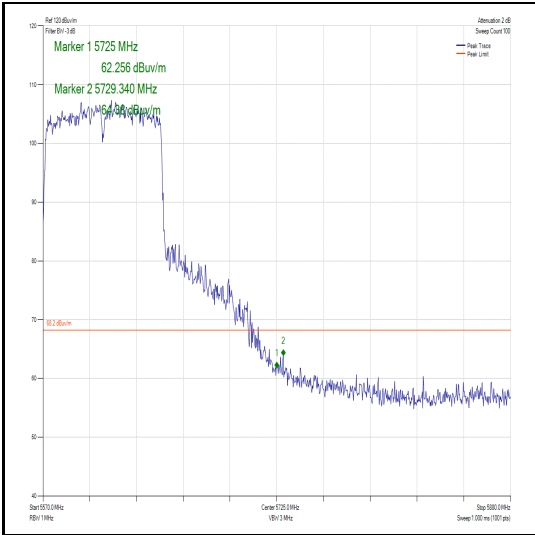


Figure 439 – Channel 122 - Authorised Band Edge

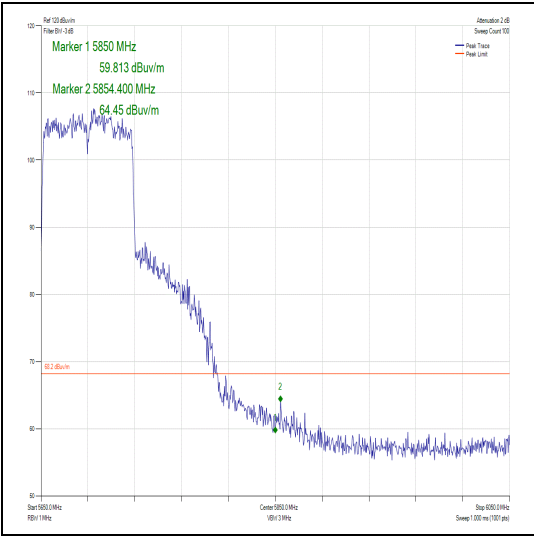


Figure 440 – Channel 138 - Authorised Band Edge

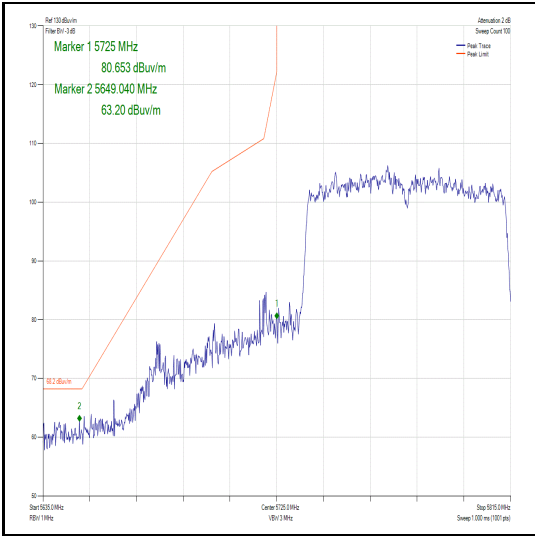


Figure 441 – Channel 155 - Authorised Lower Band Edge

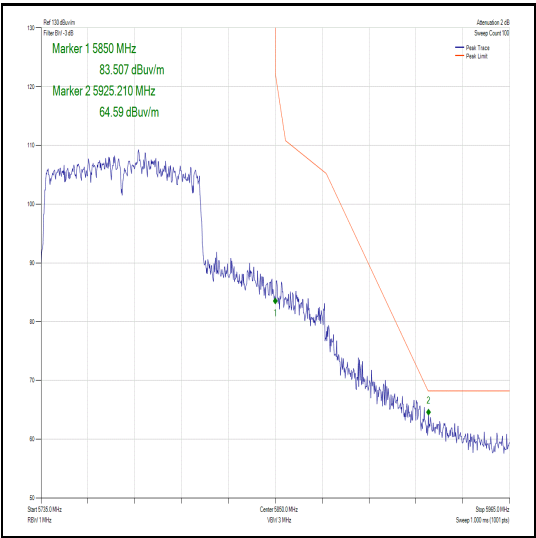


Figure 442 – Channel 155 - Authorised Upper Band Edge

Main - 80 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)
MIMO 3TX	802.11ac	106	5470.00	66.44
MIMO 3TX	802.11ac	122	5725.00	61.63
MIMO 3TX	802.11ac	138	5850.00	60.59
MIMO 3TX	802.11ac	155	5725.00	63.11
MIMO 3TX	802.11ac	155	5850.00	65.18

Table 372 - Authorised Band Edge Results

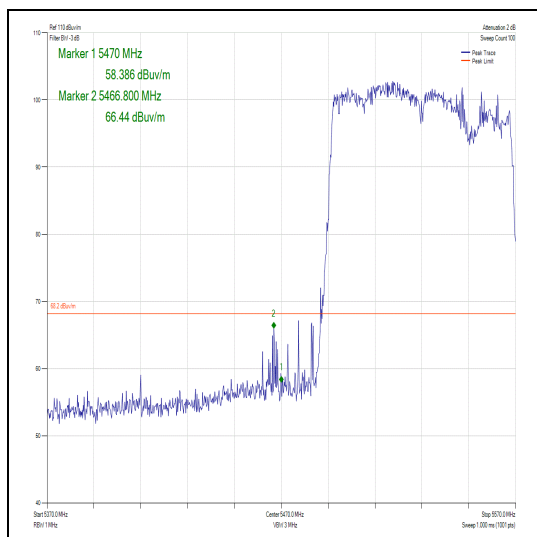


Figure 443 – Channel 106 - Authorised Band Edge

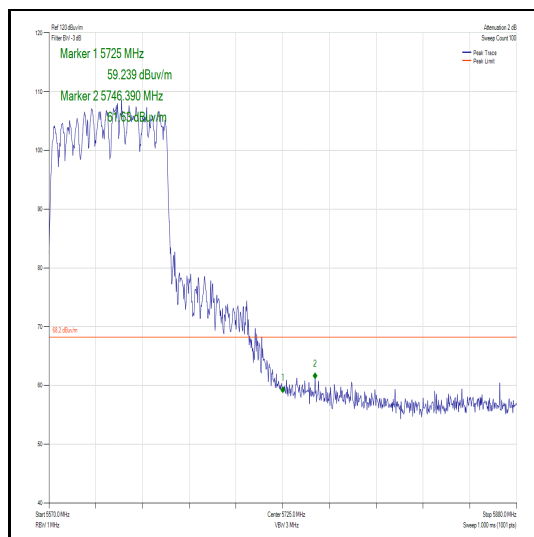


Figure 444 – Channel 122 - Authorised Band Edge

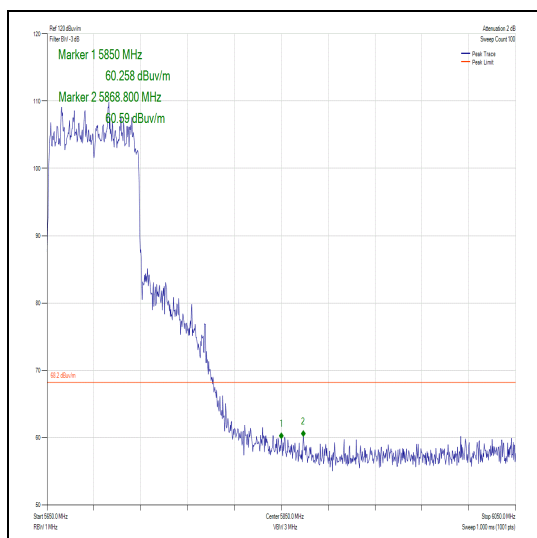


Figure 445 – Channel 138 - Authorised Band Edge

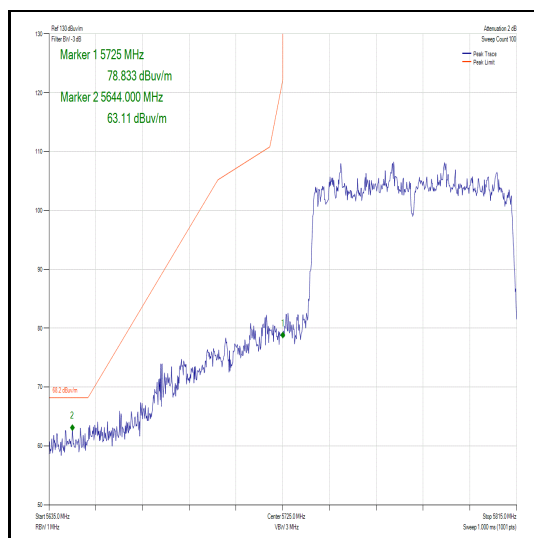


Figure 446 – Channel 155 - Authorised Lower Band Edge



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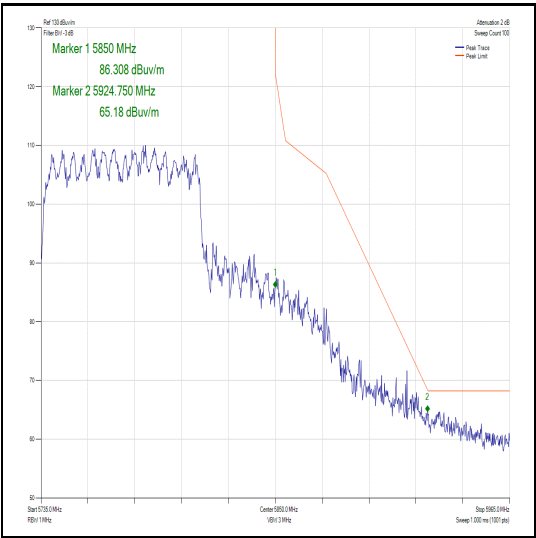


Figure 447 – Channel 155 - Authorised Upper Band Edge



Aux - 20 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)
SISO	802.11a	100	5470.0	63.56
SISO	802.11a	140	5725.0	65.94
SISO	802.11a	144	5850.0	59.89
SISO	802.11a	149	5725.0	58.44
SISO	802.11a	165	5850.0	57.21

Table 373 - Authorised Band Edge Results

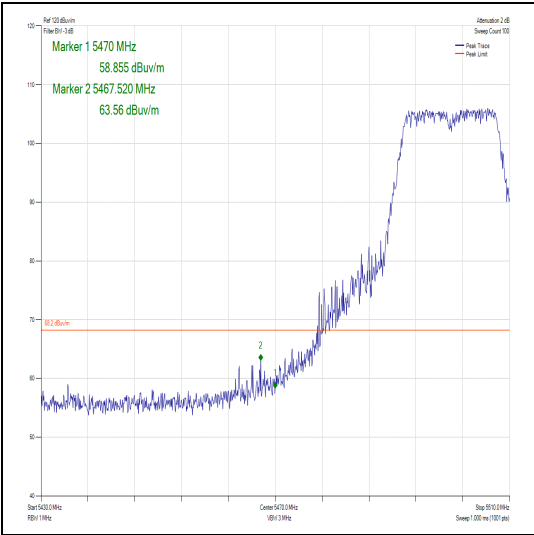


Figure 448 – Channel 100 - Authorised Band Edge

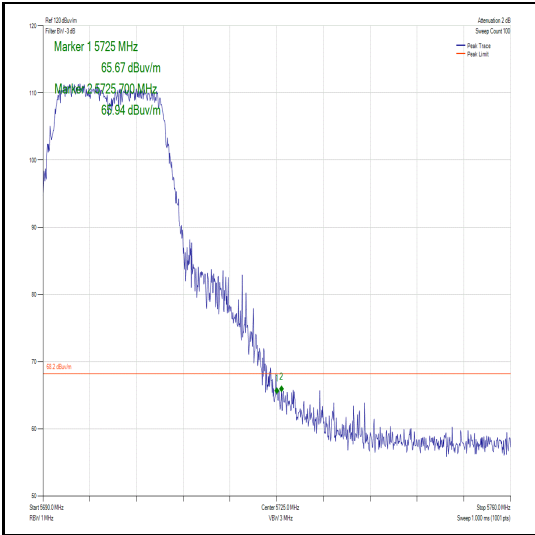


Figure 449 – Channel 140 - Authorised Band Edge

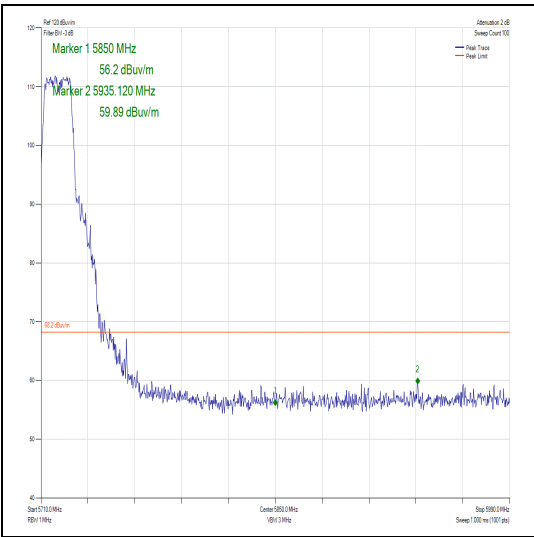


Figure 450 – Channel 144 - Authorised Band Edge

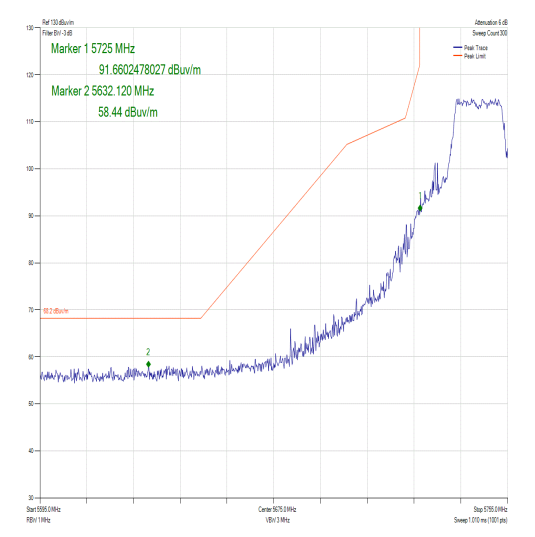


Figure 451 – Channel 149 - Authorised Band Edge



Product Service

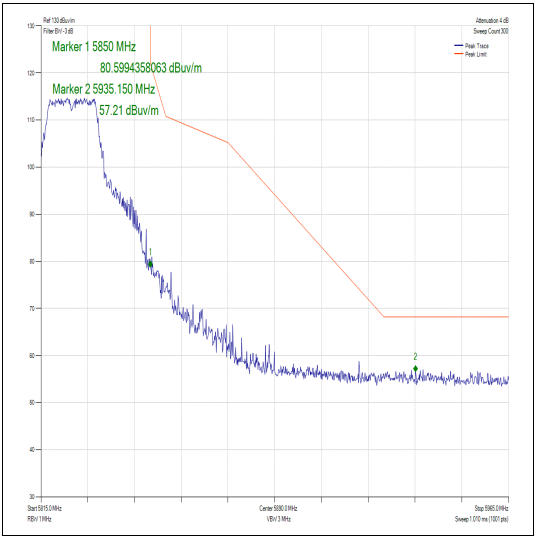


Figure 452 – Channel 165 - Authorized Band Edge

Aux - 20 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)
SISO	802.11n	100	5470.0	63.82
SISO	802.11n	140	5725.0	63.18
SISO	802.11n	144	5850.0	59.69
SISO	802.11n	149	5725.0	58.58
SISO	802.11n	165	5850.0	56.71

Table 374 - Authorised Band Edge Results

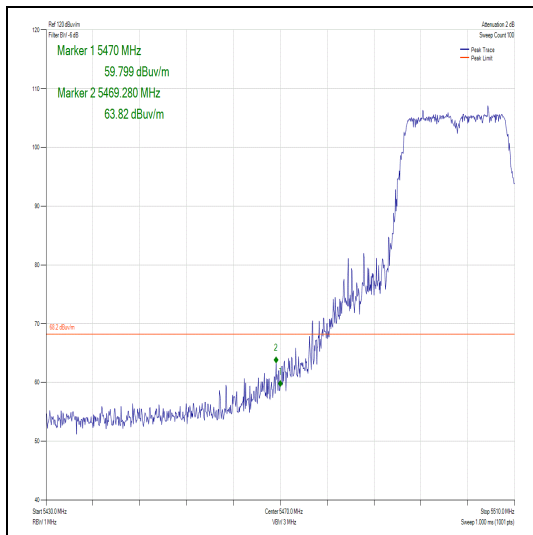


Figure 453 – Channel 100 - Authorised Band Edge

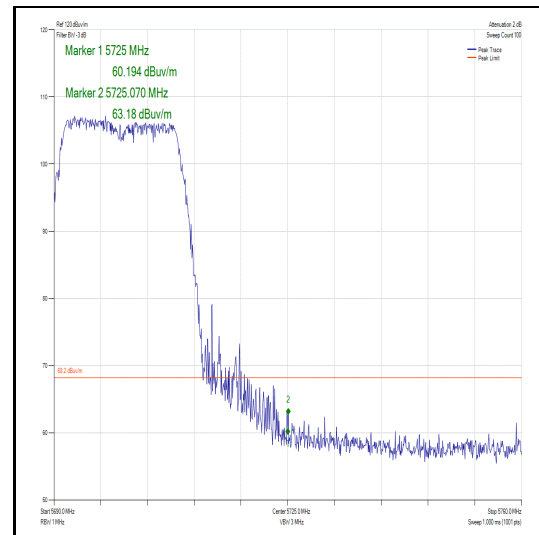


Figure 454 – Channel 140 - Authorised Band Edge

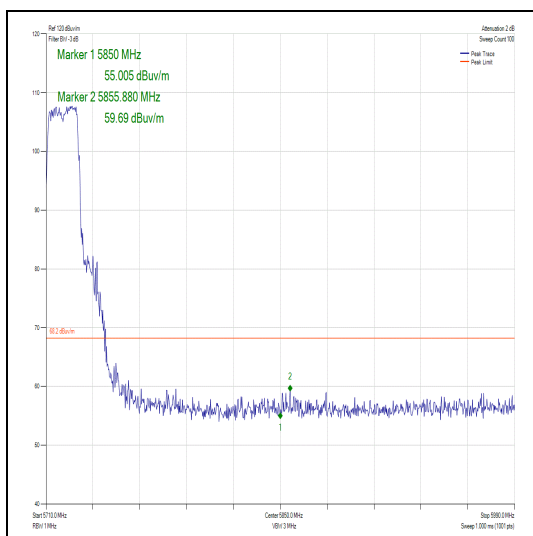


Figure 455 – Channel 144 - Authorised Band Edge

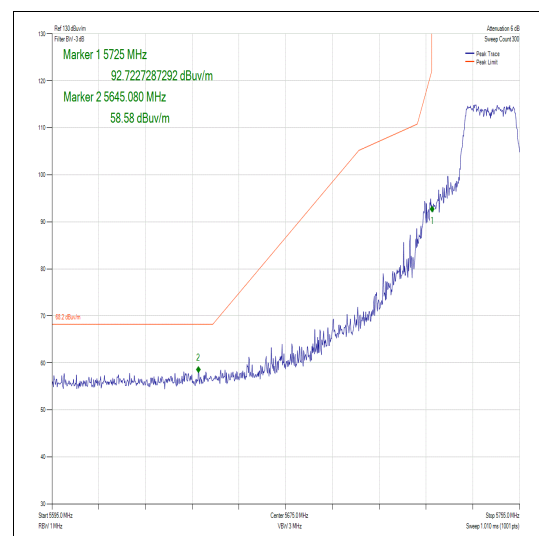


Figure 456 – Channel 149 - Authorised Band Edge

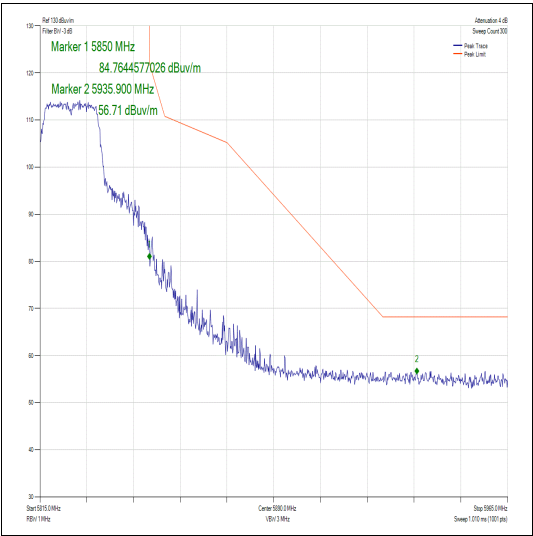


Figure 457 – Channel 165 - Authorised Band Edge



Aux - 40 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)
SISO	802.11n	102	5470.0	63.31
SISO	802.11n	134	5725.0	60.96
SISO	802.11n	142	5850.0	59.79
SISO	802.11n	151	5725.0	65.49
SISO	802.11n	159	5850.0	58.12

Table 375 - Authorised Band Edge Results

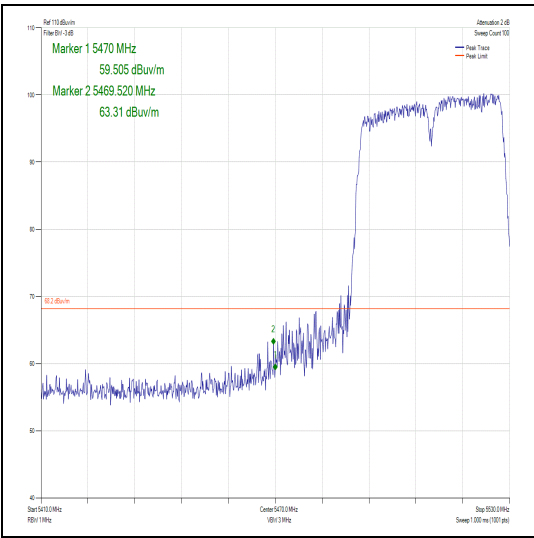


Figure 458 – Channel 102 - Authorised Band Edge

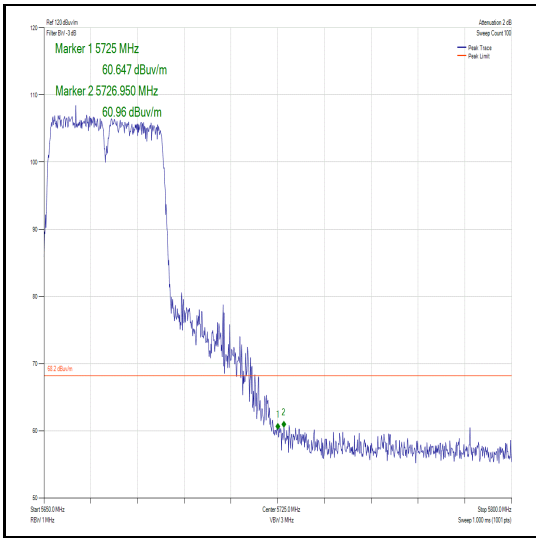


Figure 459 – Channel 134 - Authorised Band Edge

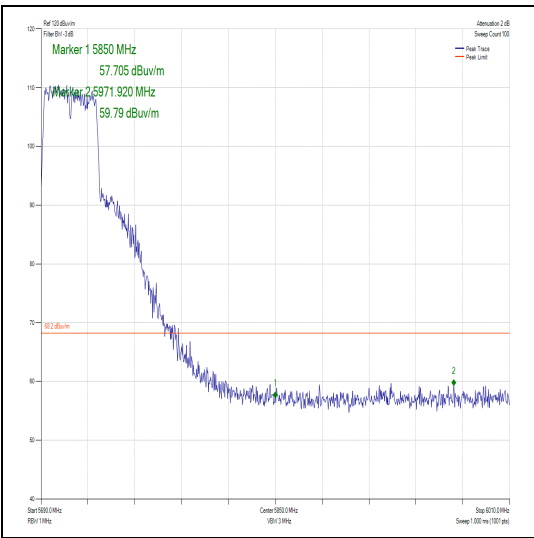


Figure 460 – Channel 142 - Authorised Band Edge

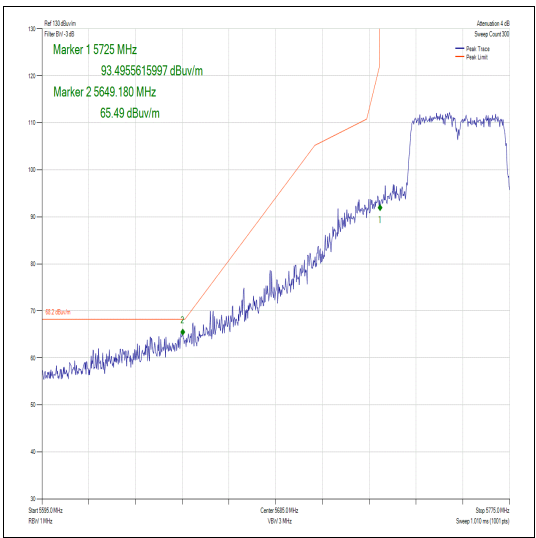


Figure 461 – Channel 151 - Authorised Band Edge

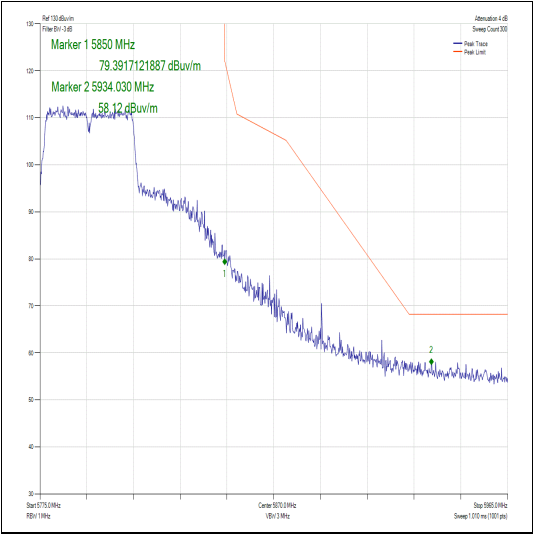


Figure 462 – Channel 159 - Authorised Band Edge



Aux - 80 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)
SISO	802.11ac	106	5470.00	63.36
SISO	802.11ac	122	5725.00	63.65
SISO	802.11ac	138	5850.00	62.01
SISO	802.11ac	155	5725.00	67.17
SISO	802.11ac	155	5850.00	63.86

Table 376 - Authorised Band Edge Results

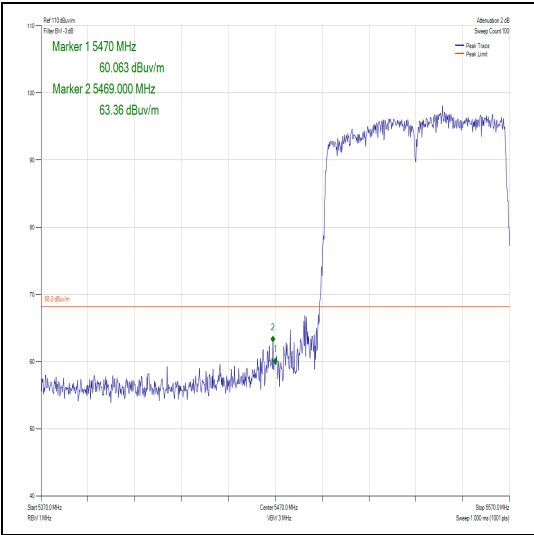


Figure 463 – Channel 106 - Authorised Band Edge

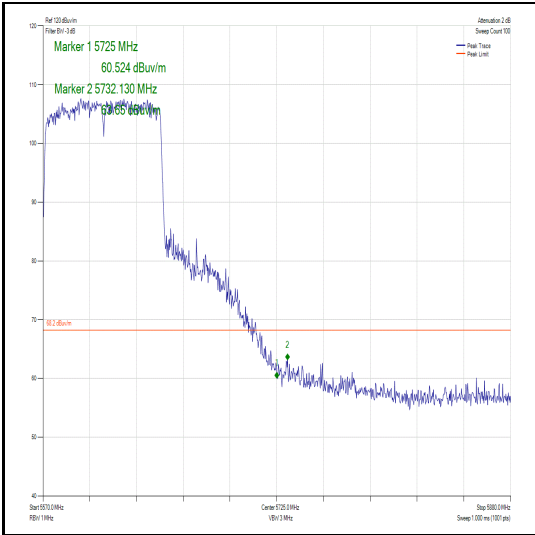


Figure 464 – Channel 122 - Authorised Band Edge

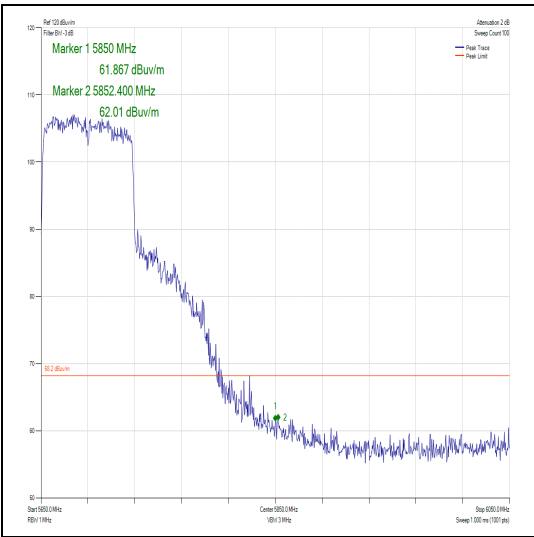


Figure 465 – Channel 138 - Authorised Band Edge

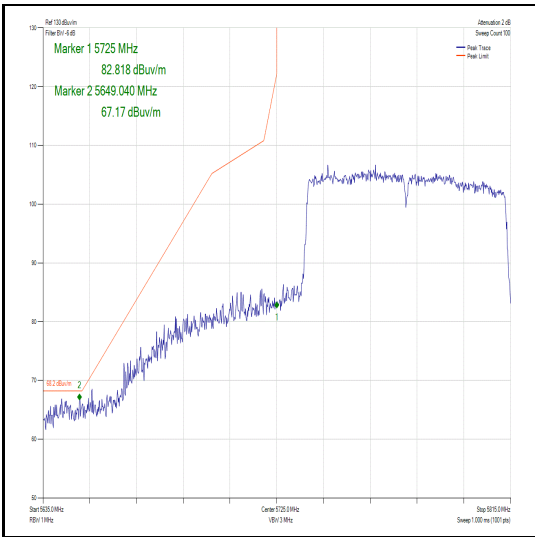


Figure 466 – Channel 155 - Authorised Lower Band Edge



Product Service

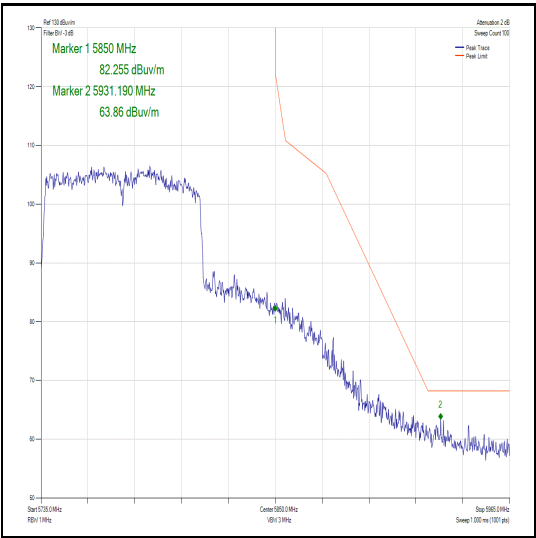


Figure 467 – Channel 155 - Authorised Upper Band Edge



2.4.7 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
10dB/1W SMA Attenuator dc - 18GHz	Sealectro	60-674-1010-89	3	12	31-Aug-2018
Cable (2m)	Rhophase	KPS-1503-2000-KPS	3965	12	12-Dec-2018
Mains Voltage Monitor	TUV SUD Product Service	MVM1	1378	12	17-Apr-2019
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Nov-2018
1 Metre SMA Cable	Rhophase	3PS-1801A-1000-3PS	4099	12	19-Sep-2018*
Pre-Amplifier	Agilent	8449B (3008A0223)	N/A	-	O/P Mon
Cable (40GHz)	Rosenberger	LU1-001-2000	5020	-	O/P Mon
Cable (Rx, Nm-Nm, 7m)	Scott Cables	SLU18-NMNM-07.00M	4498	-	O/P Mon
Cable (Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4526	6	31-Aug-2018 *
EMI Receiver	Keysight Technologies	N9038A MXE	4628	12	4-Jul-2019
EMI Receiver	Keysight Technologies	N9038A MXE	4629	12	13-Sep-2018*
Mast Controller	Maturo GmbH	NCD	4810	-	TU
Tilt Antenna Mast	Maturo GmbH	TAM 4.0-P	4811	-	TU
9m N type RF cable	Rosenberger	2303-0 9.0m PNm PNm	4827	6	4-Jan-2019
Double Ridge Broadband Horn Antenna	Schwarzbeck	BBHA 9120 B	4848	12	12-Feb-2019
Hygrometer	Rotronic	HP21	4989	12	26-Apr-2019

Table 377

TU – Traceability Unscheduled.

O/P Mon – Output Monitored using calibrated equipment.

*Testing was performed over multiple days, however it was confirmed that all equipment was in calibration at the time it was used and we hold records of this.



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

A1993, S/N: C07WT00HK2V0 - Modification State 0

2.5.3 Date of Test

07-August-2018 to 11-September-2018

2.5.4 Test Method

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

Tests were limited to HT20 CDD, on both the Main and Aux Radio's in MIMO 3TX and SISO modes respectively. Measurements were undertaken from 30MHz to 40GHz, on channel's 36 (5180MHz) and channel 165 (5825MHz). For the purpose of this test, spurious emissions testing was limited from 1GHz to 26GHz for all other test channels.

The radiated emissions plots displayed within this report are for the main radio only, tests on AUX radio having displayed a similar emissions profile.

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 dBuV/m to uV/m:
 $10^{(\text{Field Strength in dBuV/m}/20)}$

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

2.5.5 Environmental Conditions

Ambient Temperature	19.2 - 20.0 °C
Relative Humidity	57.3 - 61.0 %



2.5.6 Test Results

Main - 20 MHz Bandwidth

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

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

Table 378 –30 MHz to 1 GHz – Radiated

*No emissions were detected within 10 dB of the limit

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

Table 379 - 1GHz to 40GHz - Emissions Results

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

Aux - 20 MHz Bandwidth

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

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

Table 380 –30 MHz to 1 GHz – Radiated

*No emissions were detected within 10 dB of the limit

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

Table 381 - 1GHz to 40GHz - Emissions Results

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

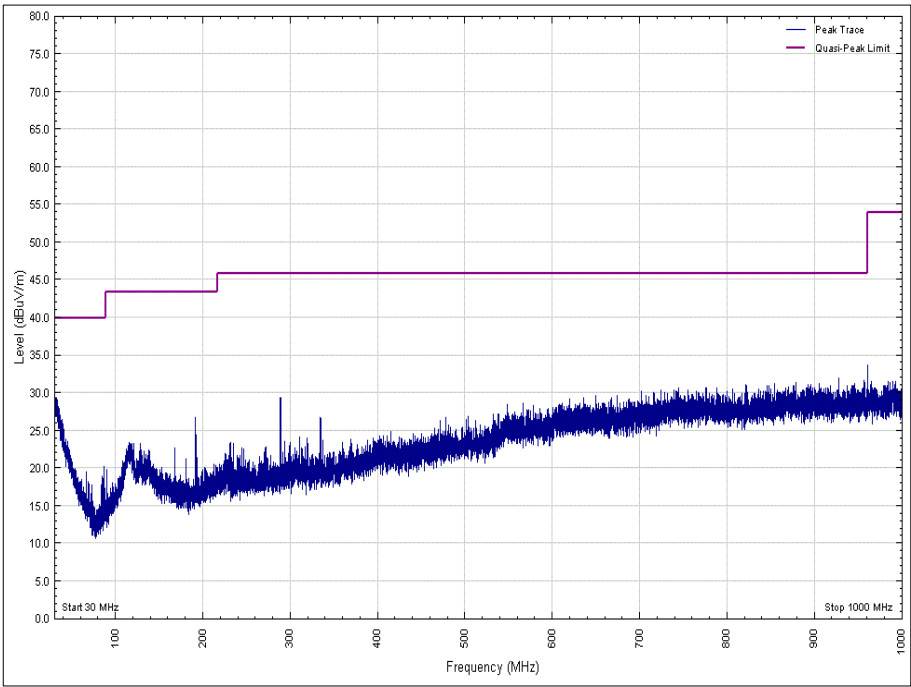


Figure 468 - U-NII 1 - 5180 MHz - 30 MHz to 1 GHz - Polarity: Horizontal

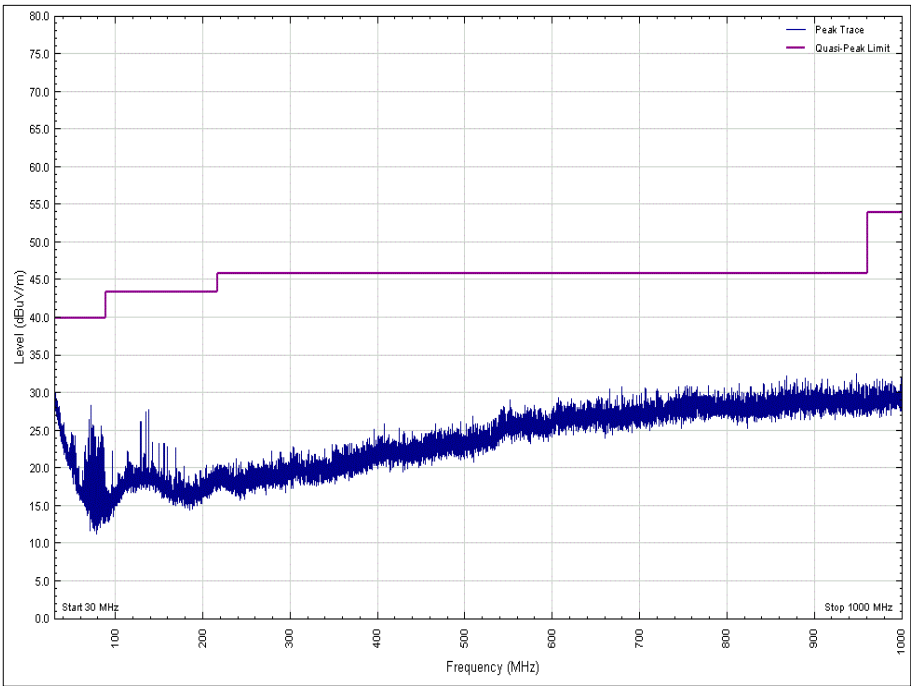


Figure 469 - U-NII 1 - 5180 MHz - 30 MHz to 1 GHz - Polarity: Vertical

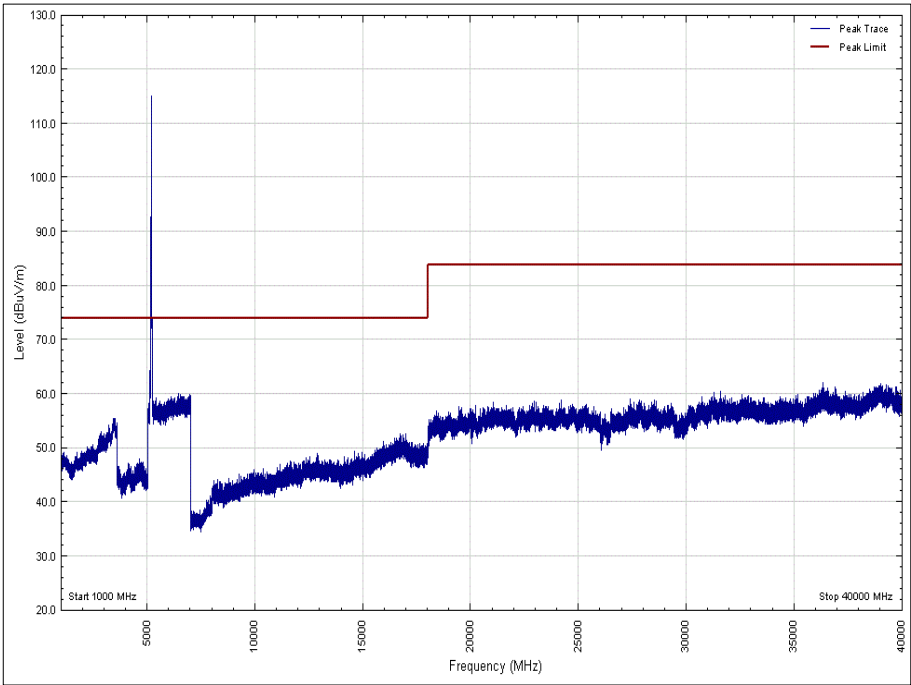


Figure 470 - U-NII 1 - 5180 MHz - 1 GHz to 40 GHz - Polarity: Horizontal (Peak)

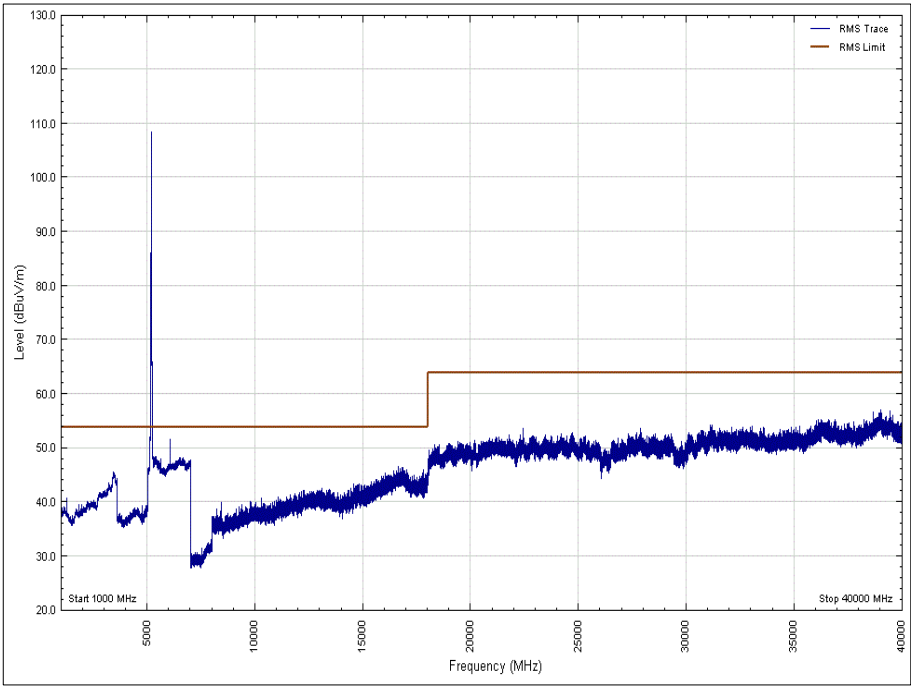


Figure 471 - U-NII 1 - 5180 MHz - 1 GHz to 40 GHz - Polarity: Horizontal (Average)

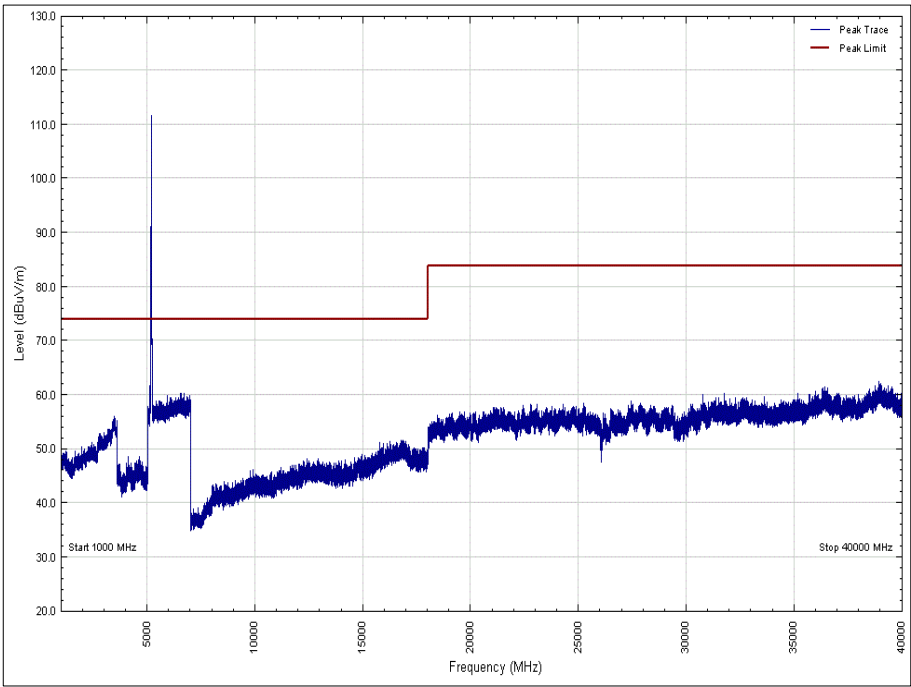


Figure 472 - U-NII 1 - 5180 MHz - 1 GHz to 40 GHz - Polarity: Vertical (Peak)

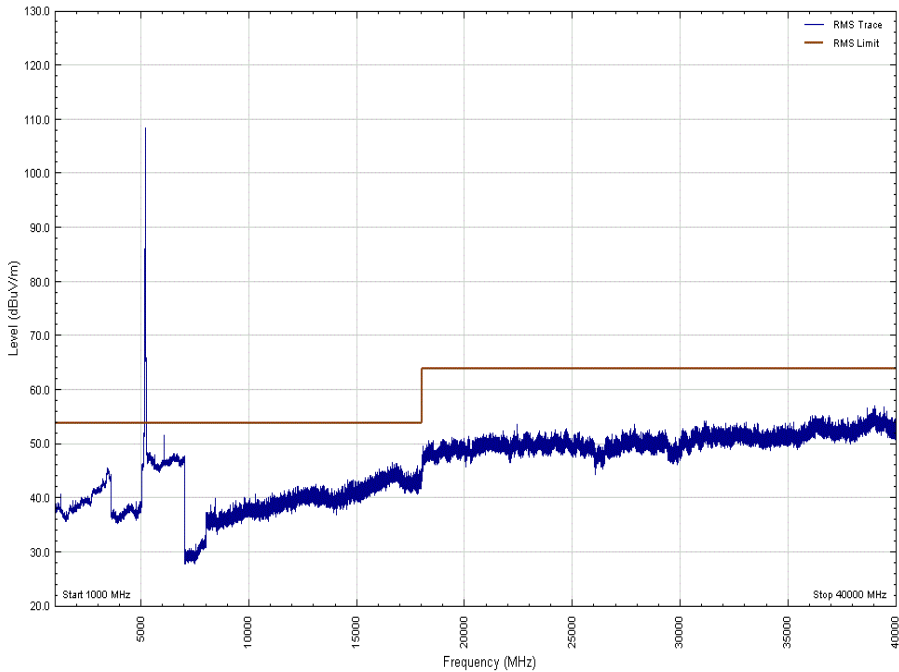


Figure 473 - U-NII 1 - 5180 MHz - 1 GHz to 40 GHz - Polarity: Vertical (Average)

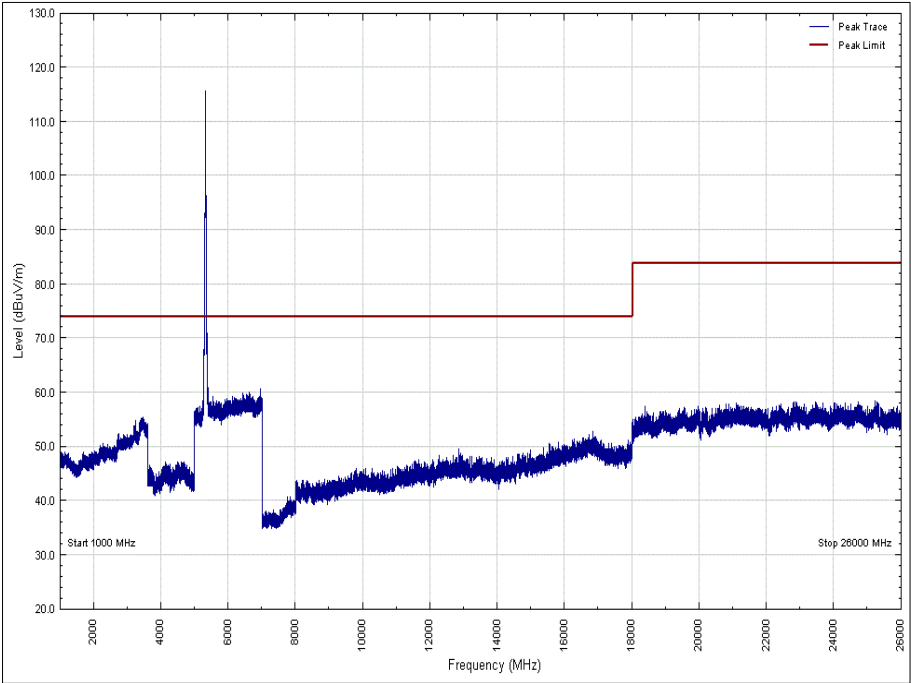


Figure 474 - U-NII 1 - 5240 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Peak)

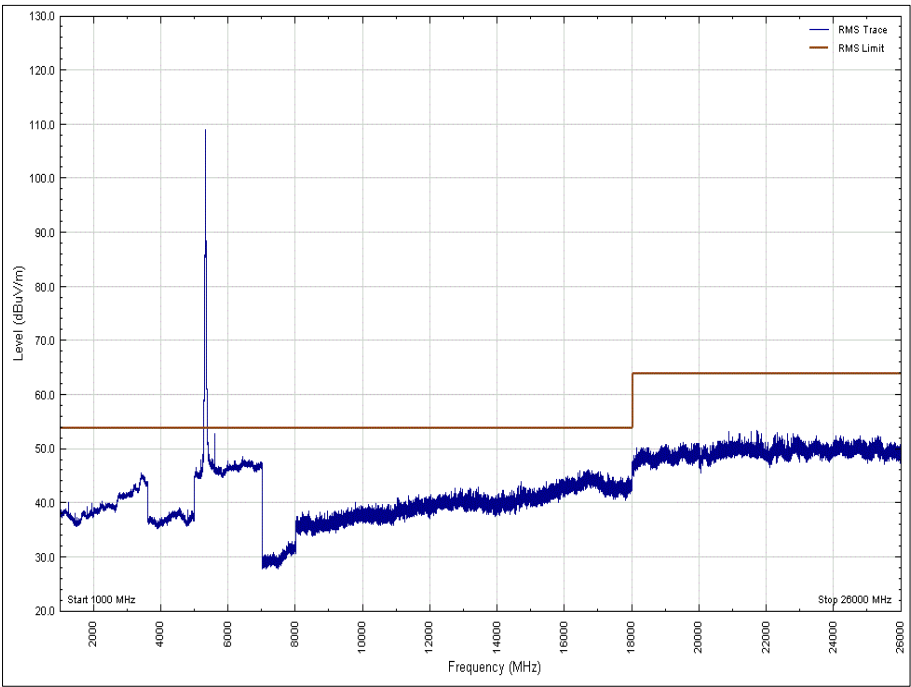


Figure 475 - U-NII 1 - 5240 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Average)

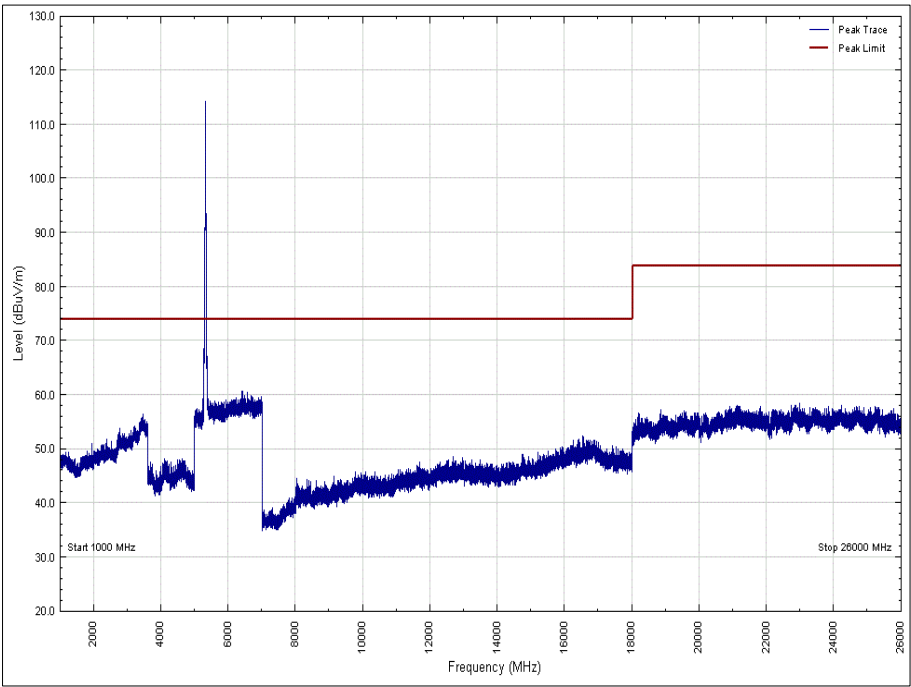


Figure 476 - U-NII 1 - 5240 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Peak)

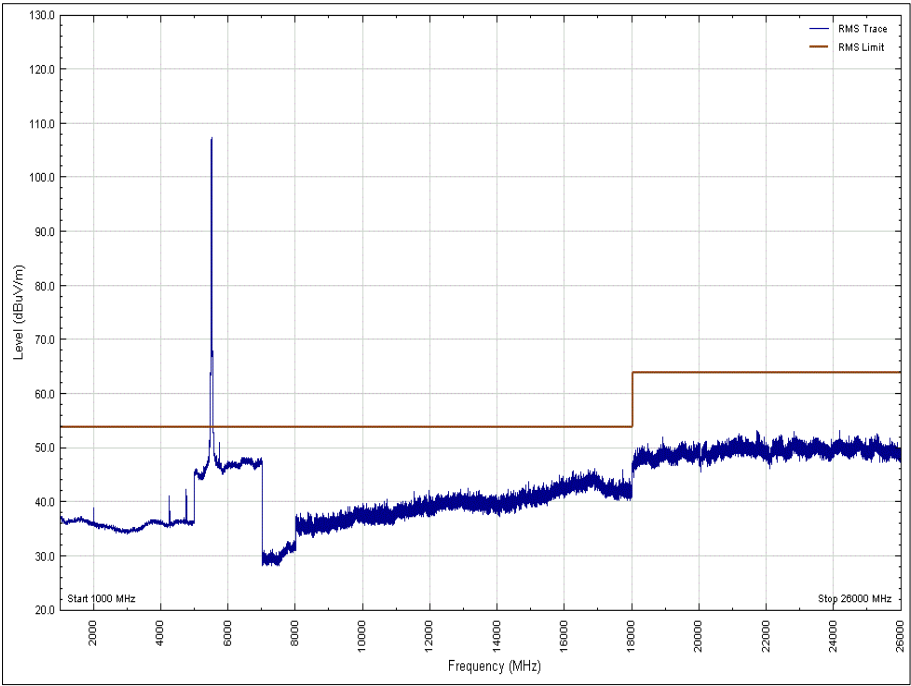


Figure 477 - U-NII 1 - 5240 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Average)

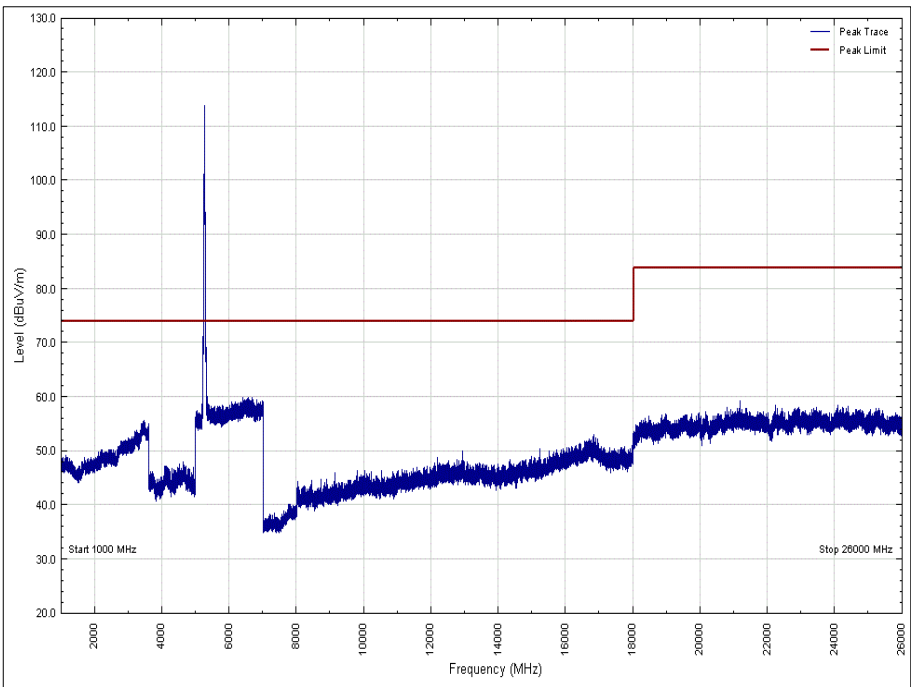


Figure 478 - U-NII 2a - 5260 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Peak)

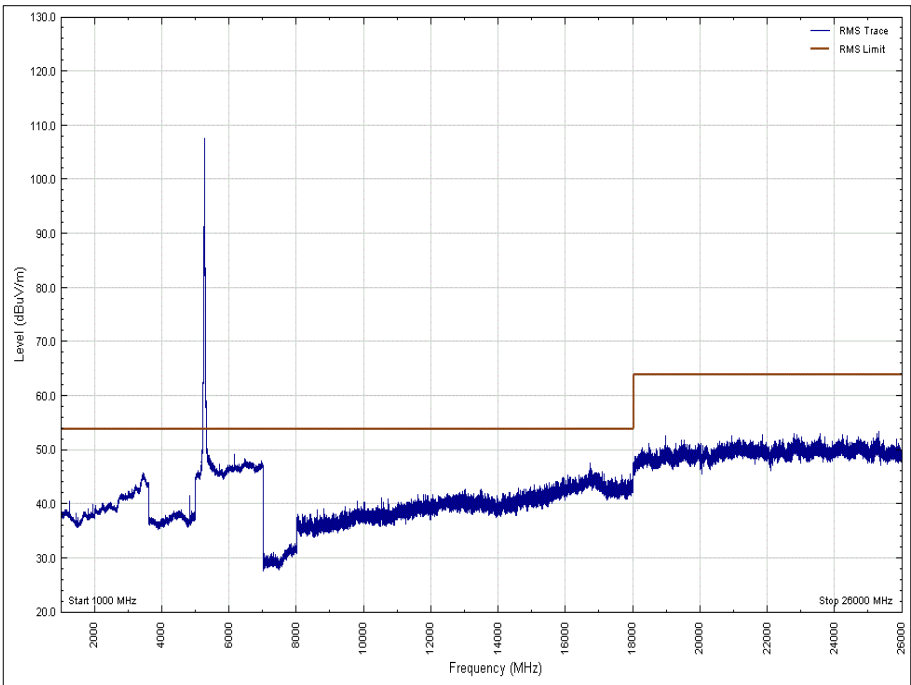


Figure 479 - U-NII 2a - 5260 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Average)

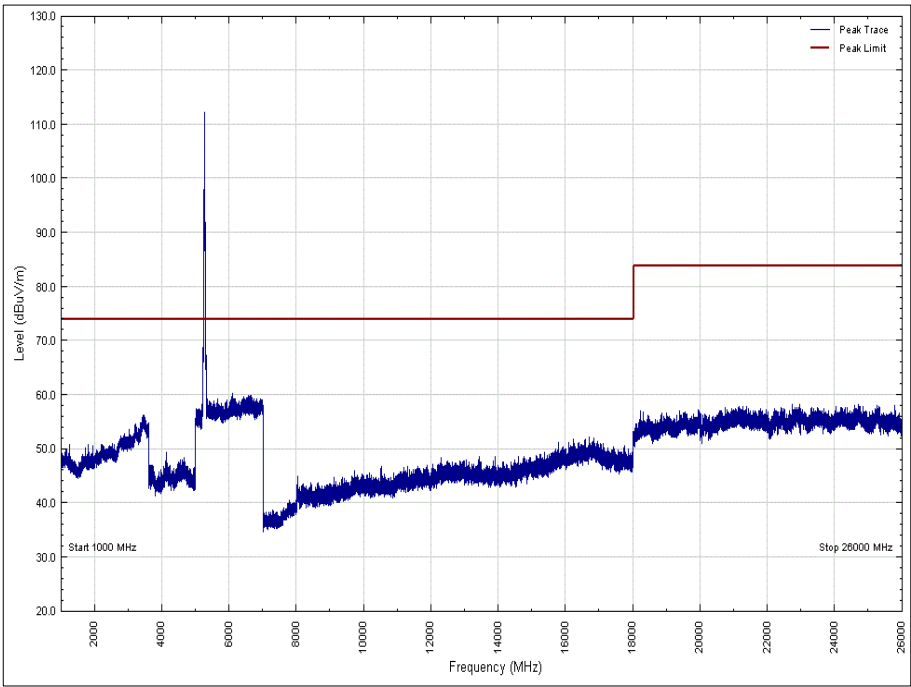


Figure 480 - U-NII 2a - 5260 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Peak)

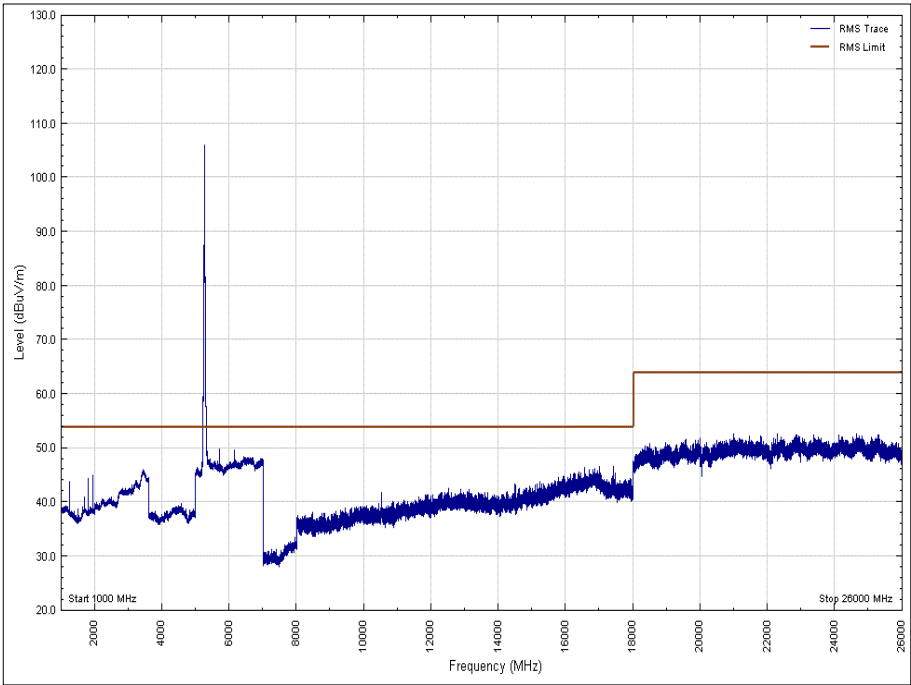


Figure 481 - U-NII 2a - 5260 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Average)

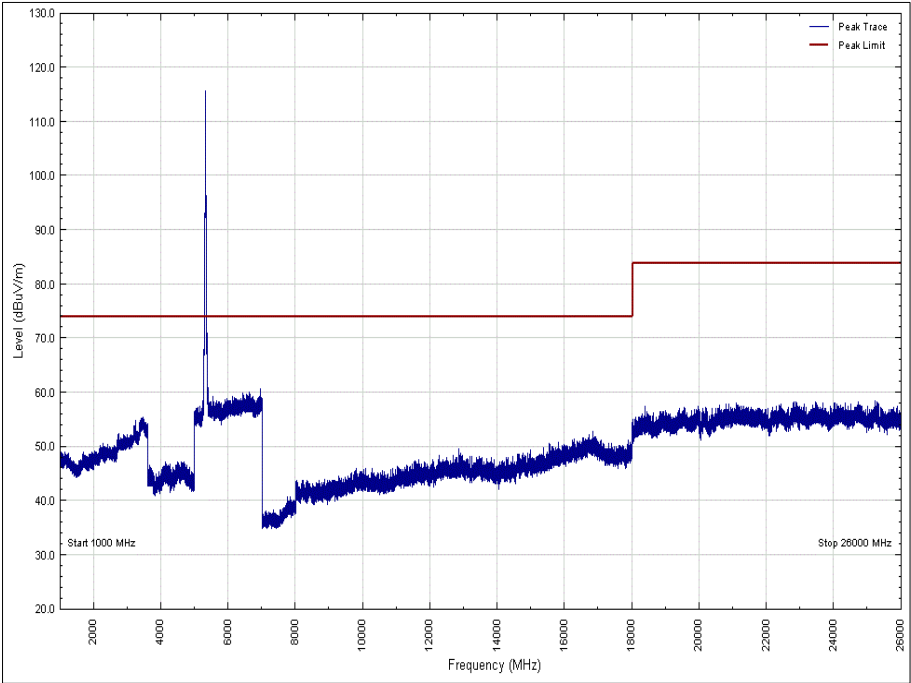


Figure 482 - U-NII 2a - 5320 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Peak)

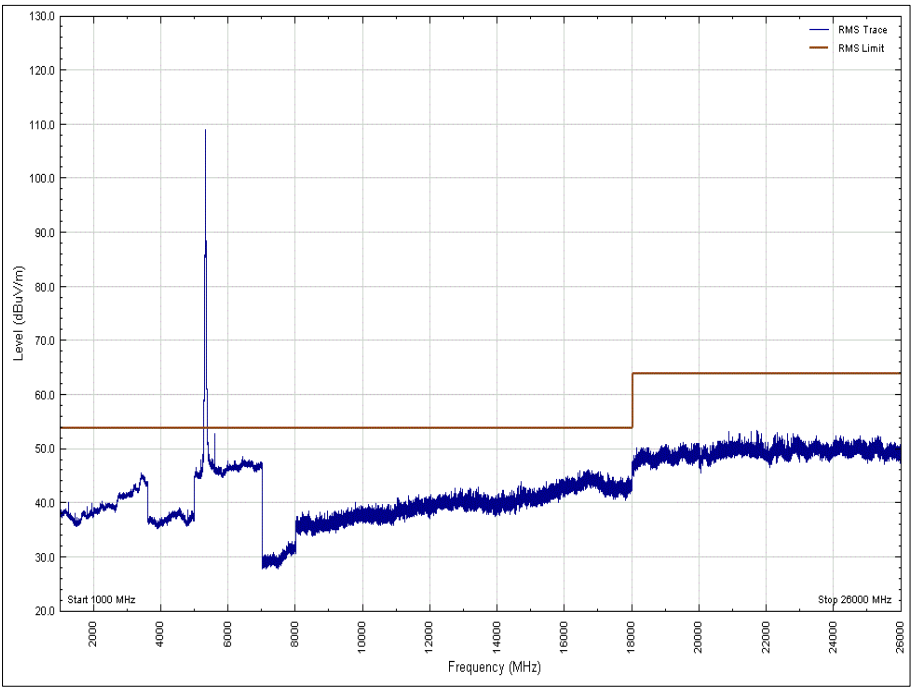


Figure 483 - U-NII 2a - 5320 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Average)

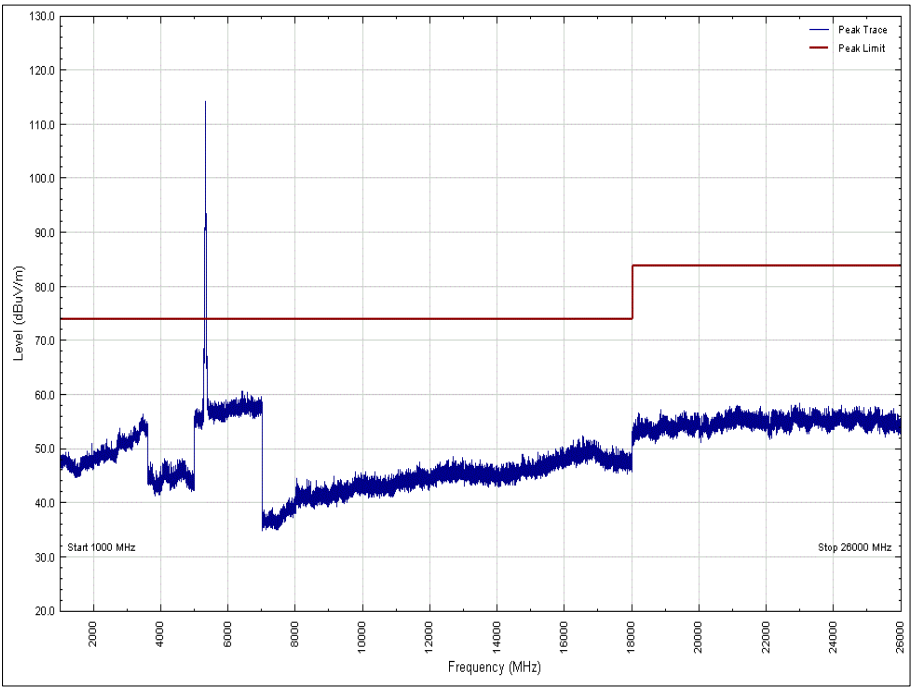


Figure 484 - U-NII 2a - 5320 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Peak)

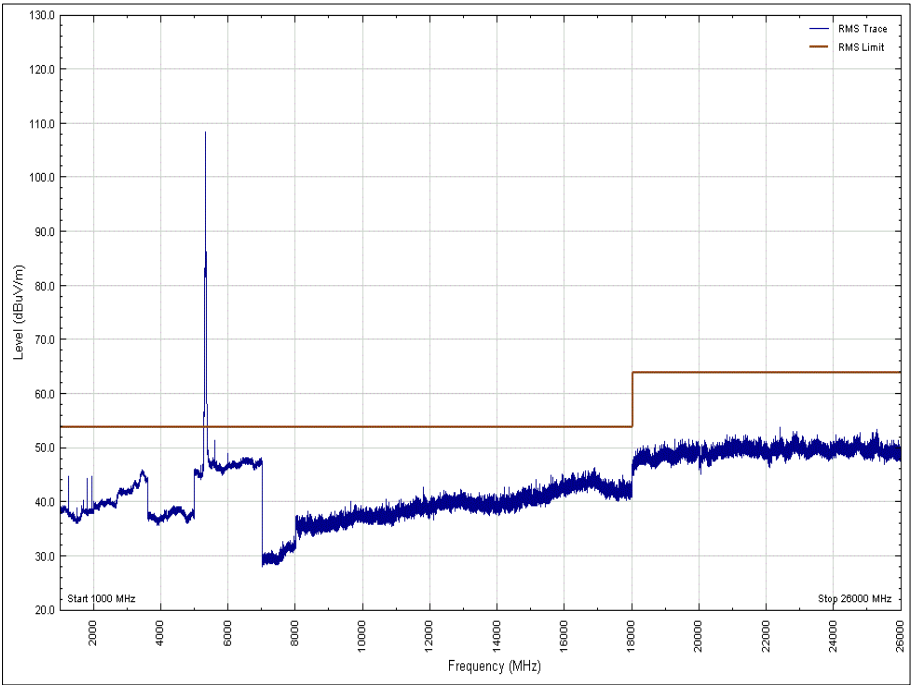


Figure 485 - U-NII 2a - 5320 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Average)

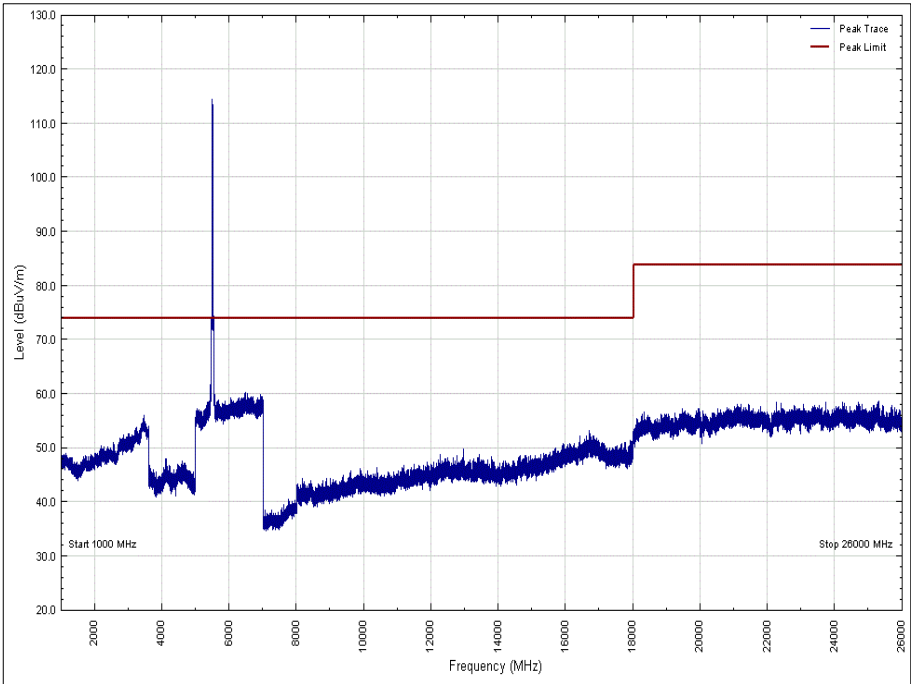


Figure 486 - U-NII 2c - 5500 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Peak)

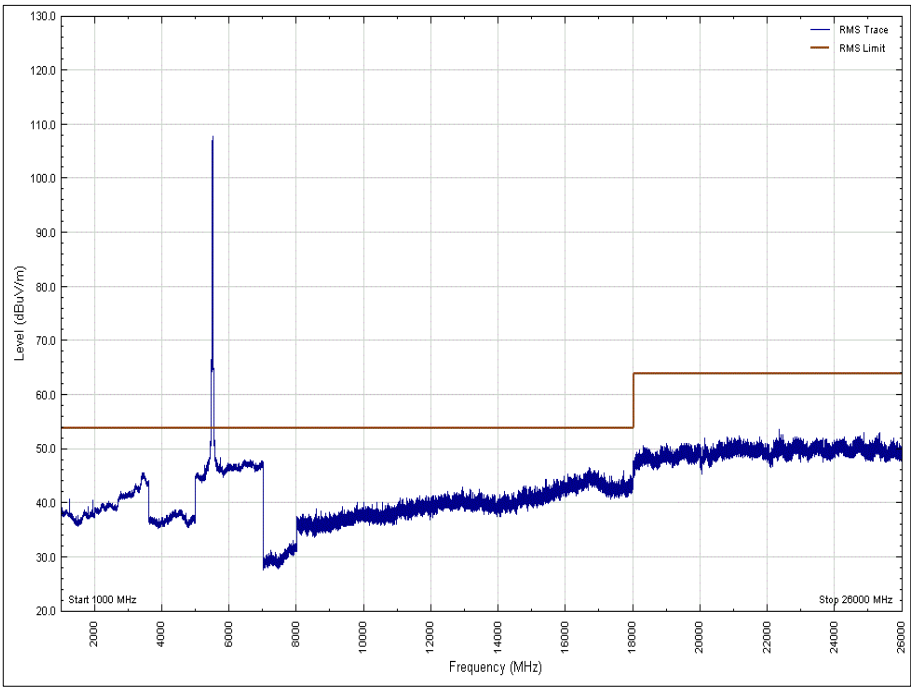


Figure 487 - U-NII 2c - 5500 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Average)

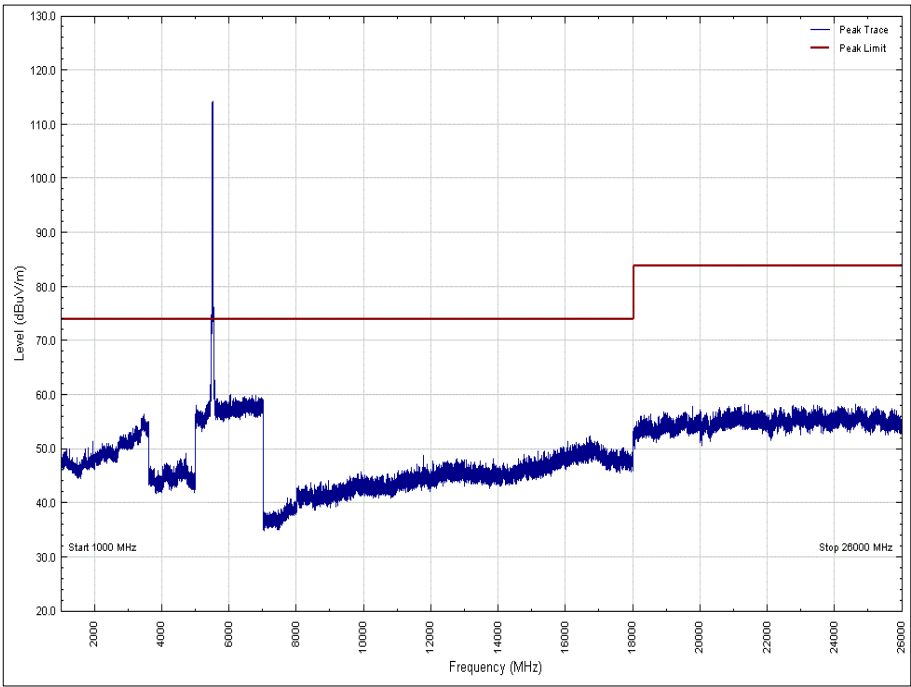


Figure 488 - U-NII 2c - 5500 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Peak)

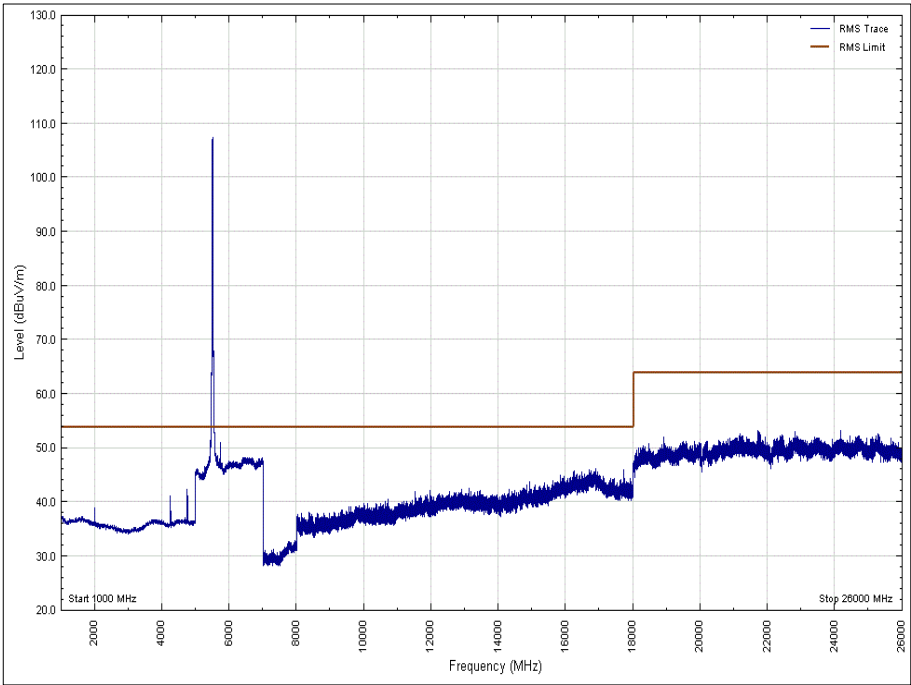


Figure 489 - U-NII 2c - 5500 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Average)

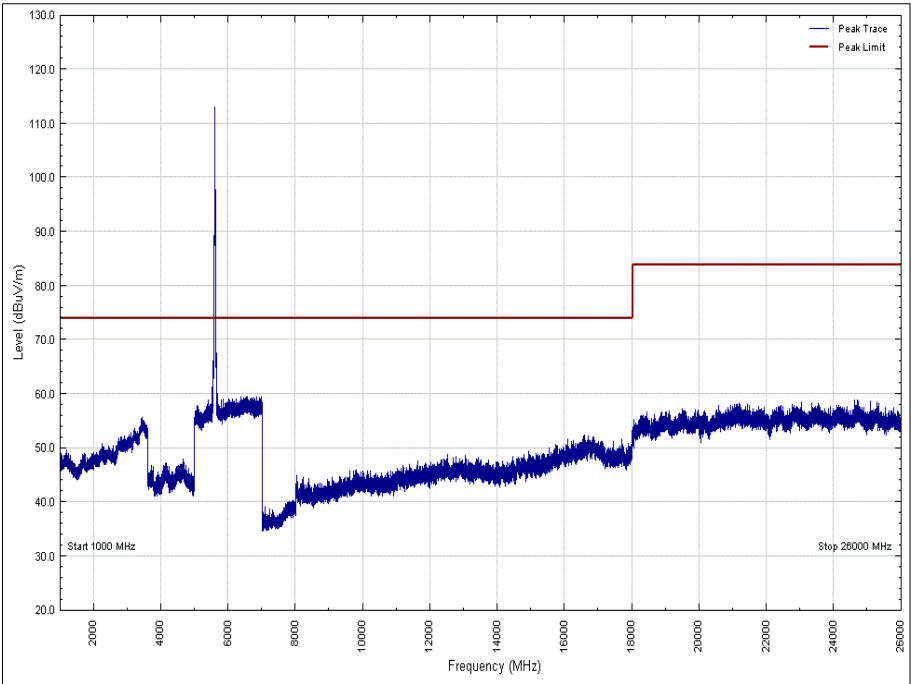


Figure 490 - U-NII 2c - 5600 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Peak)

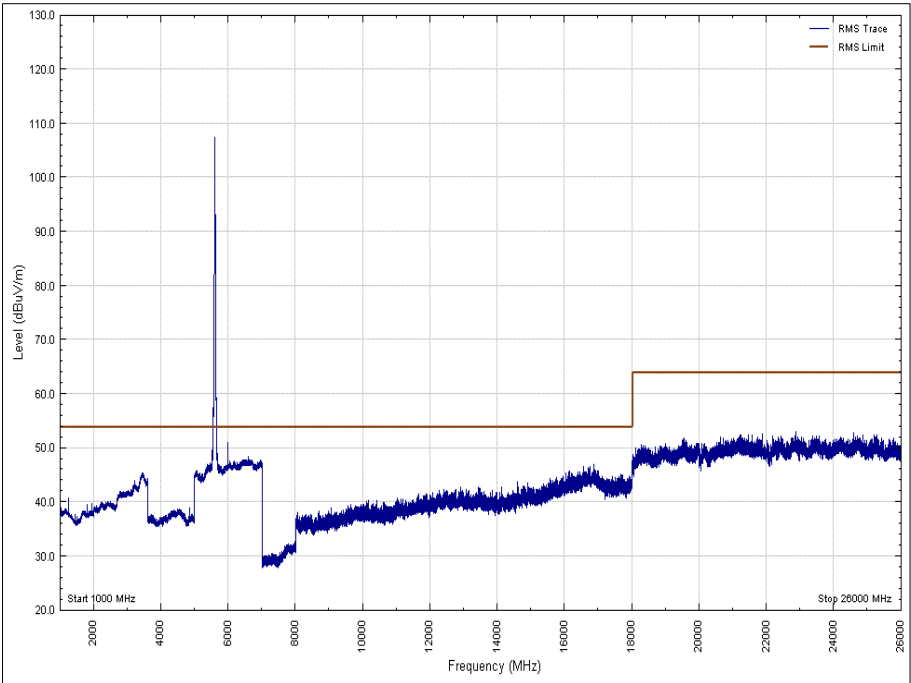


Figure 491 - U-NII 2c - 5600 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Average)

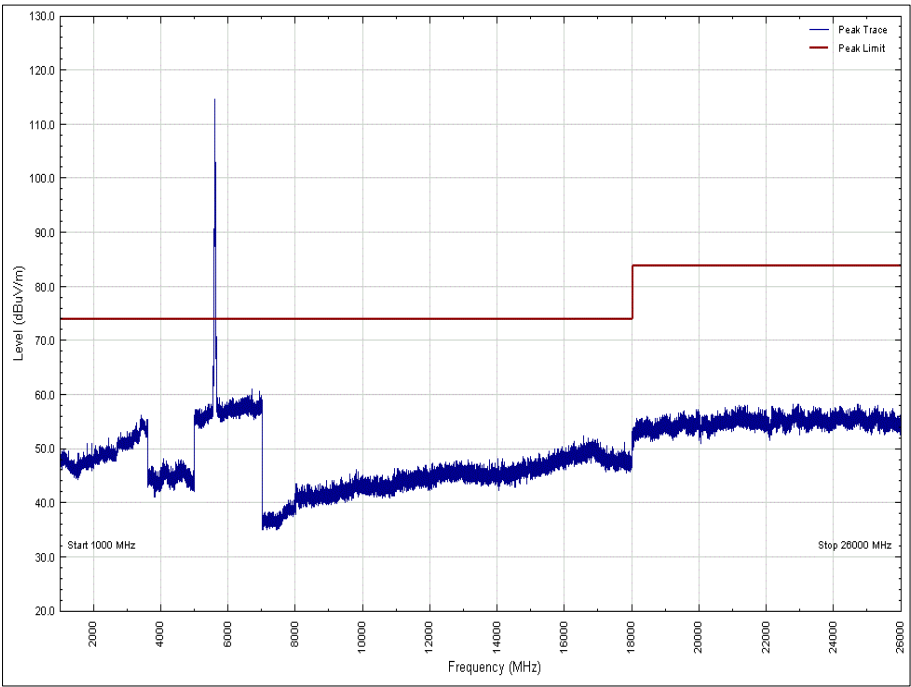


Figure 492 - U-NII 2c - 5600 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Peak)

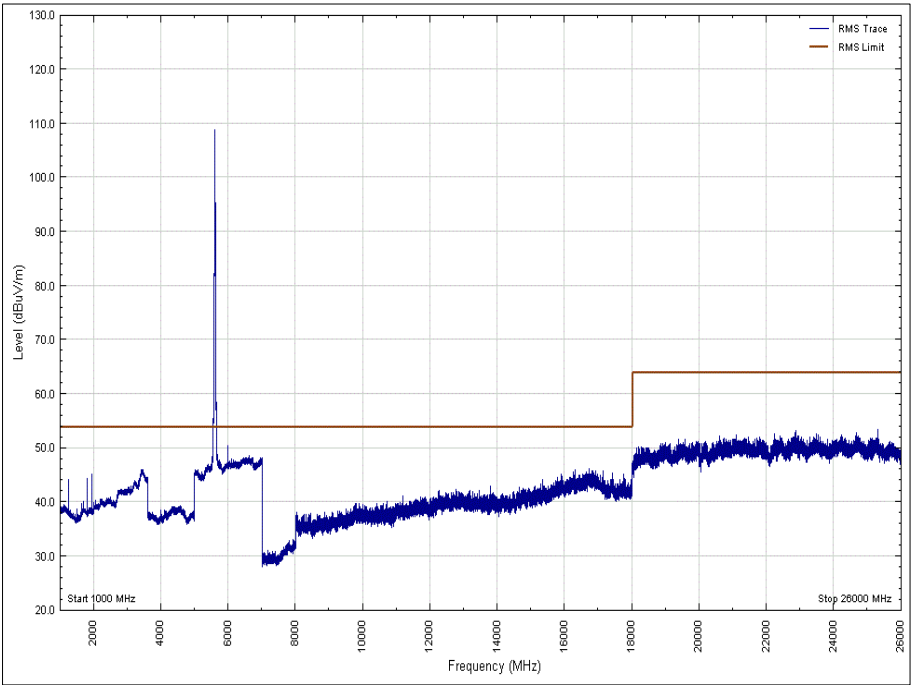


Figure 493 - U-NII 2c - 5600 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Average)

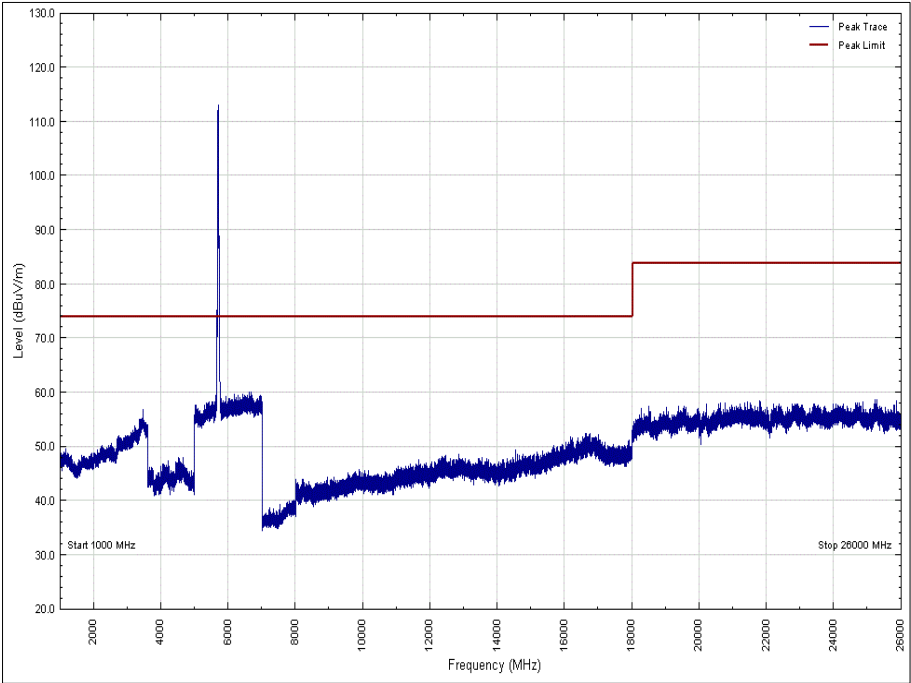


Figure 494 - U-NII 2c - 5700 MHz - 1 GHz to 26 GHz - Polarity: *Horizontal (Peak)*

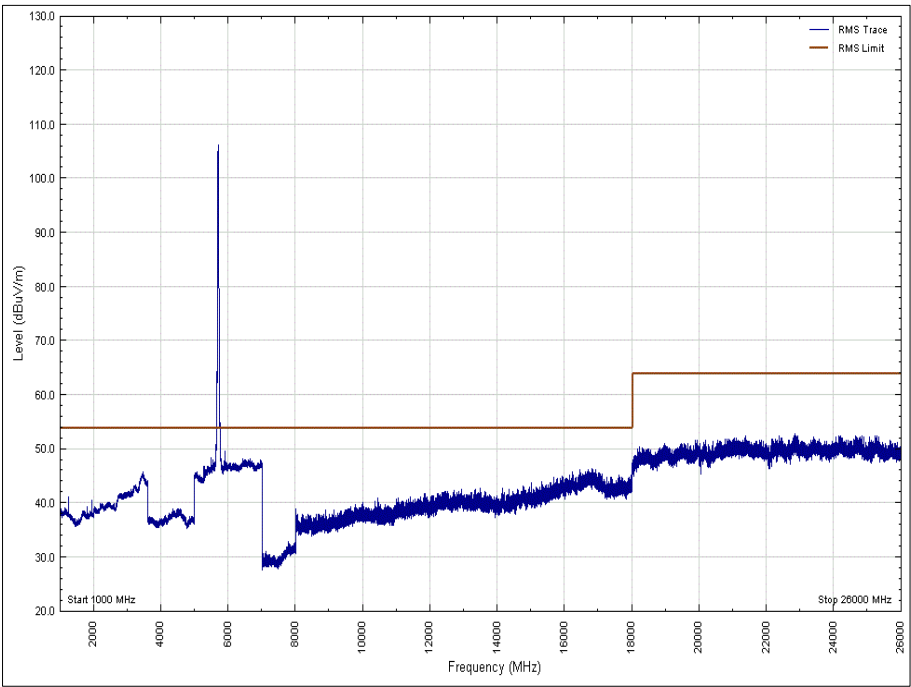


Figure 495 - U-NII 2c - 5700 MHz - 1 GHz to 26 GHz - Polarity: *Horizontal (Average)*

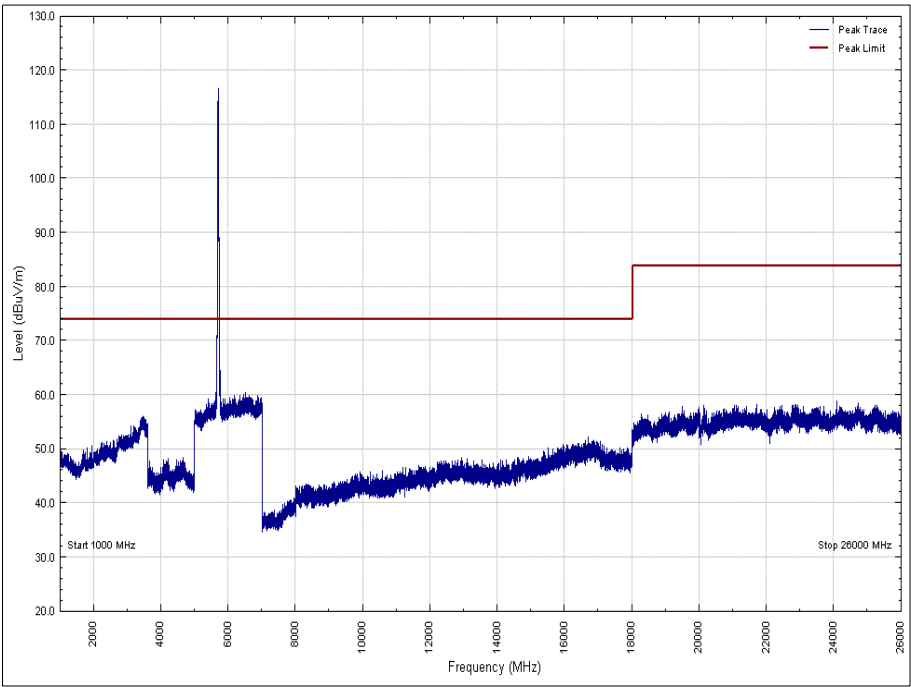


Figure 496 - U-NII 2c - 5700 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Peak)

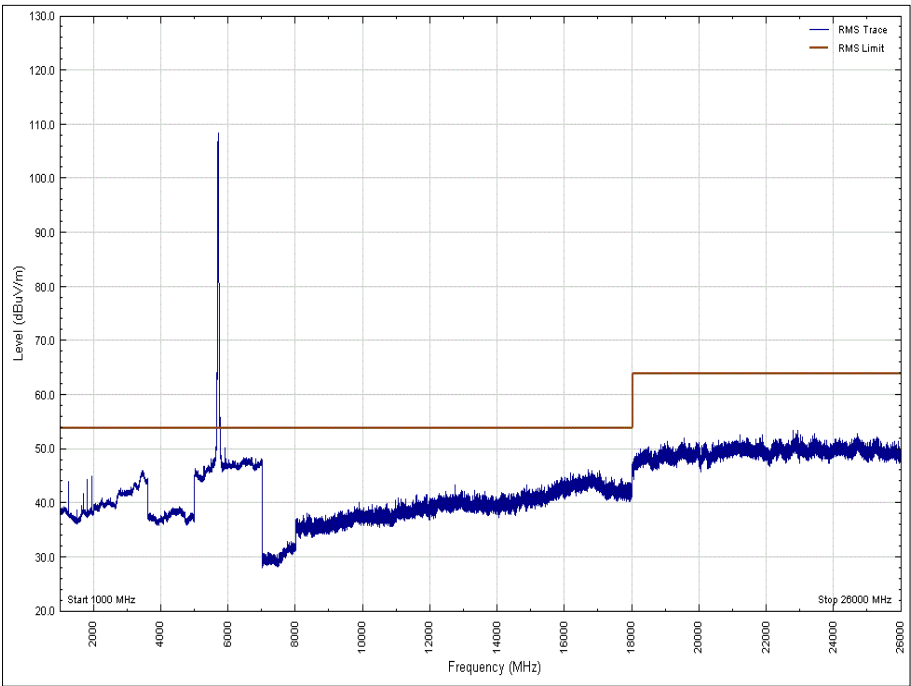


Figure 497 - U-NII 2c - 5700 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Average)

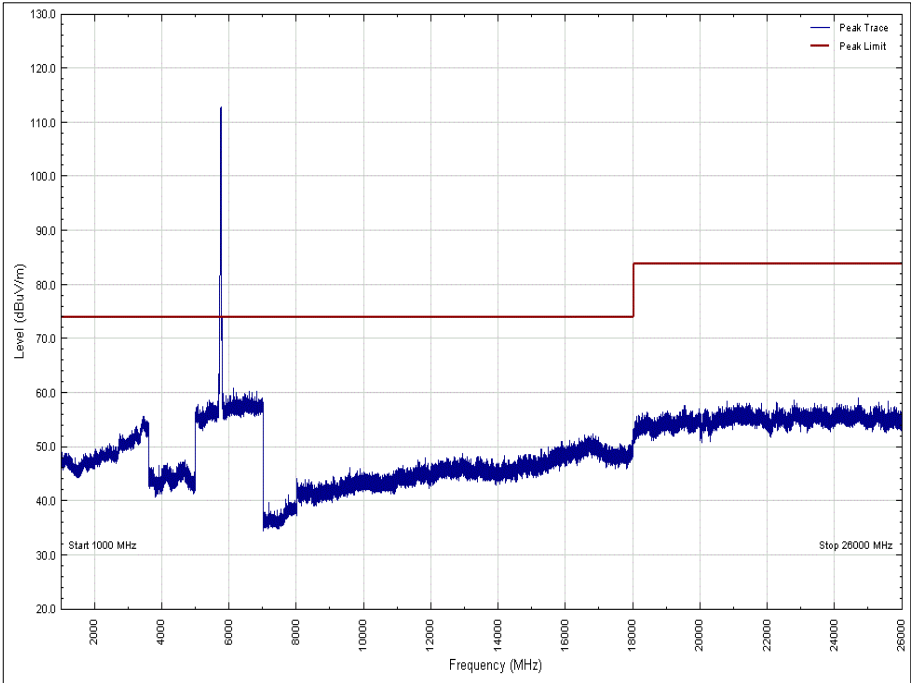


Figure 498 - U-NII 3 - 5745 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Peak)

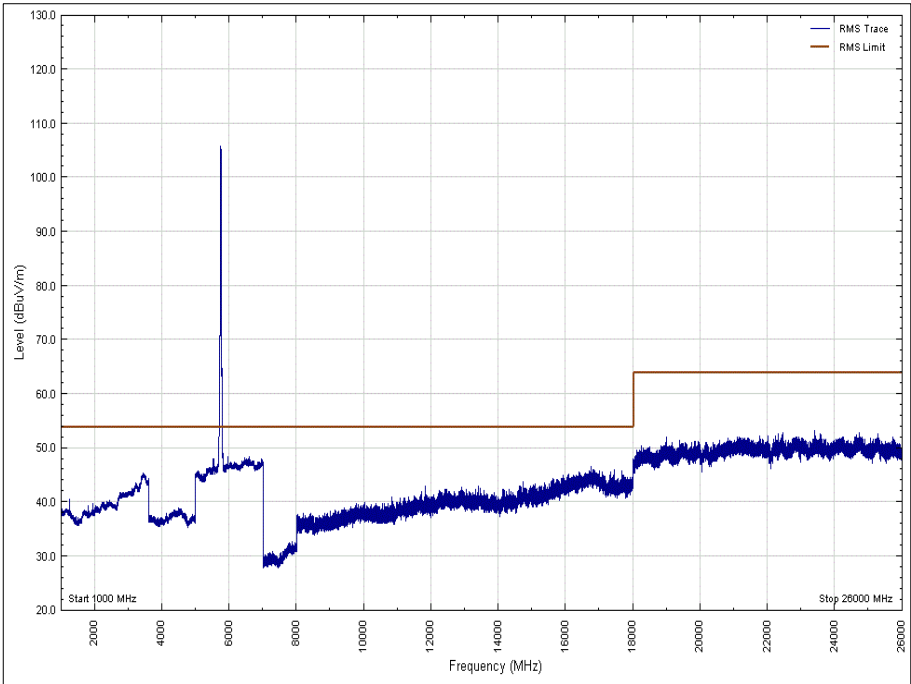


Figure 499 - U-NII 3 - 5745 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Average)

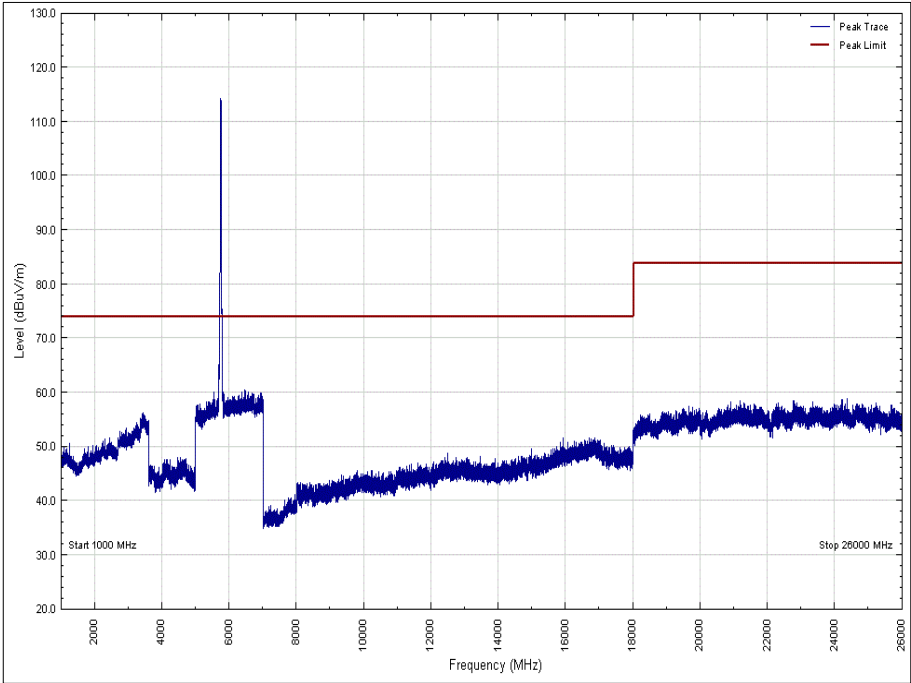


Figure 500 - U-NII 3 - 5745 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Peak)

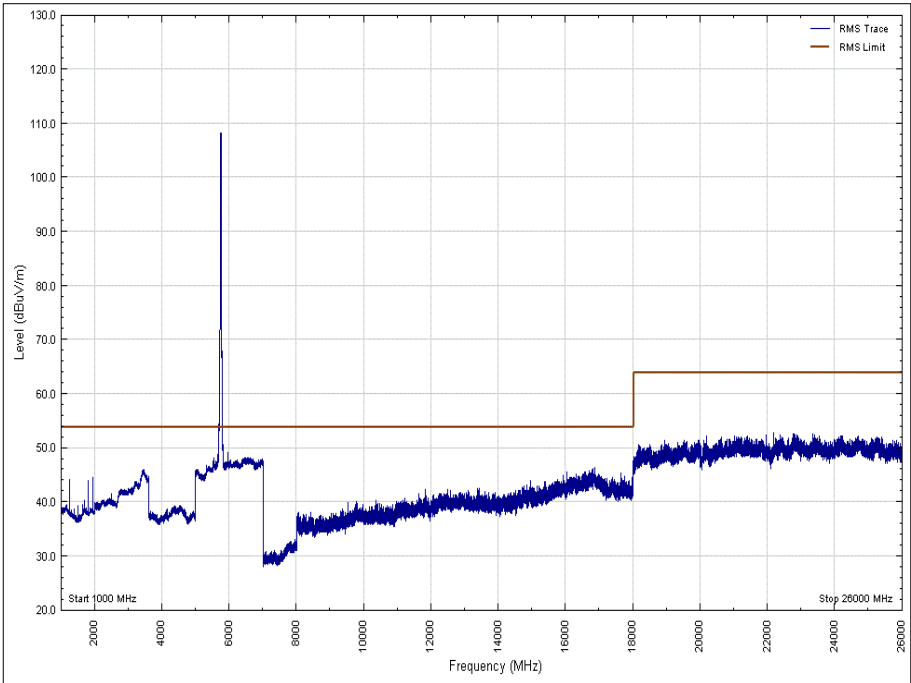


Figure 501 - U-NII 3 - 5745 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Average)

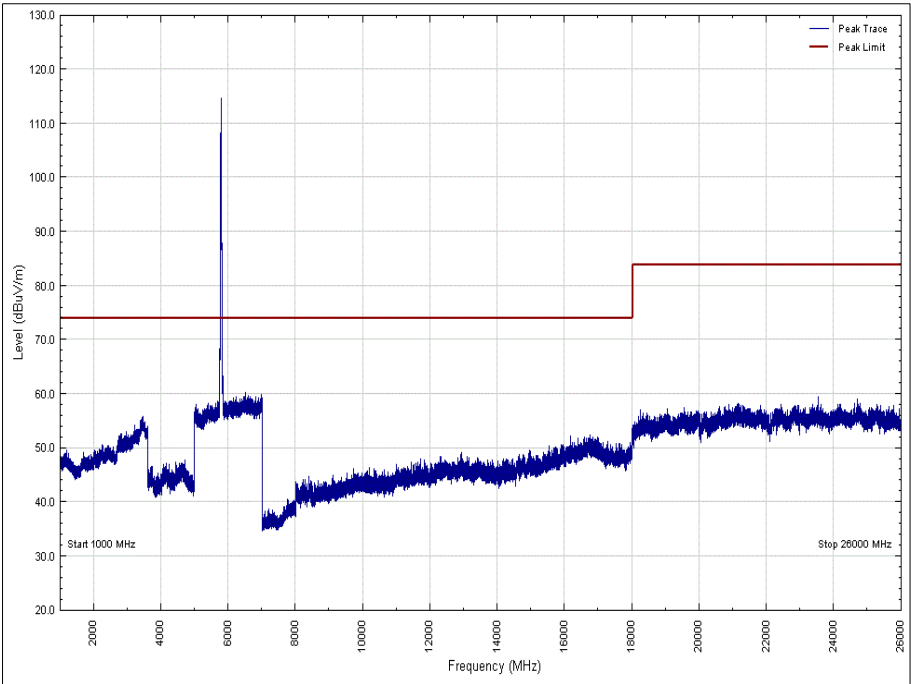


Figure 502 - U-NII 3 - 5785 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Peak)

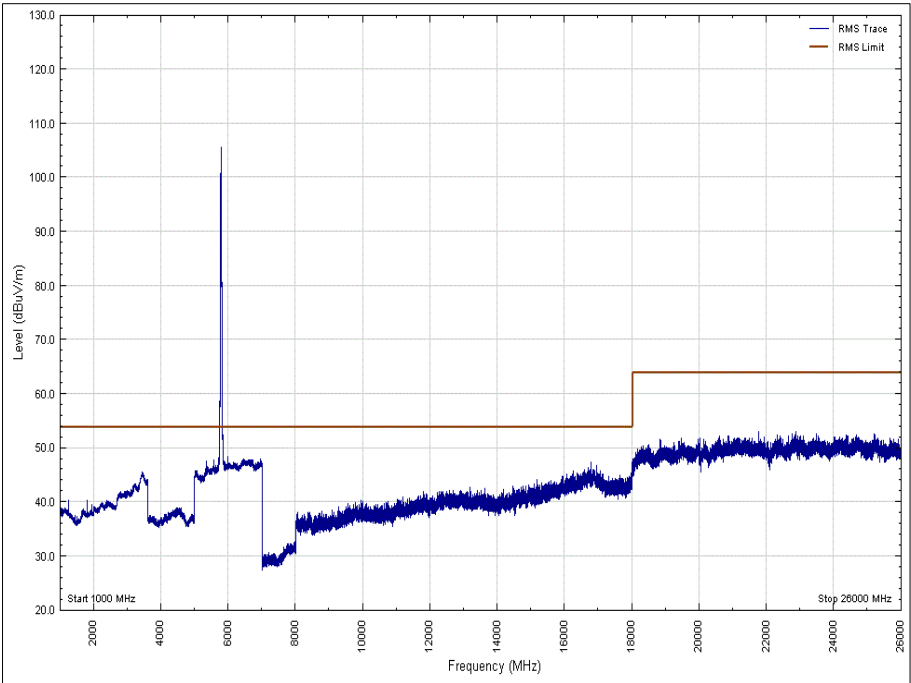


Figure 503 - U-NII 3 - 5785 MHz - 1 GHz to 26 GHz - Polarity: Horizontal (Average)

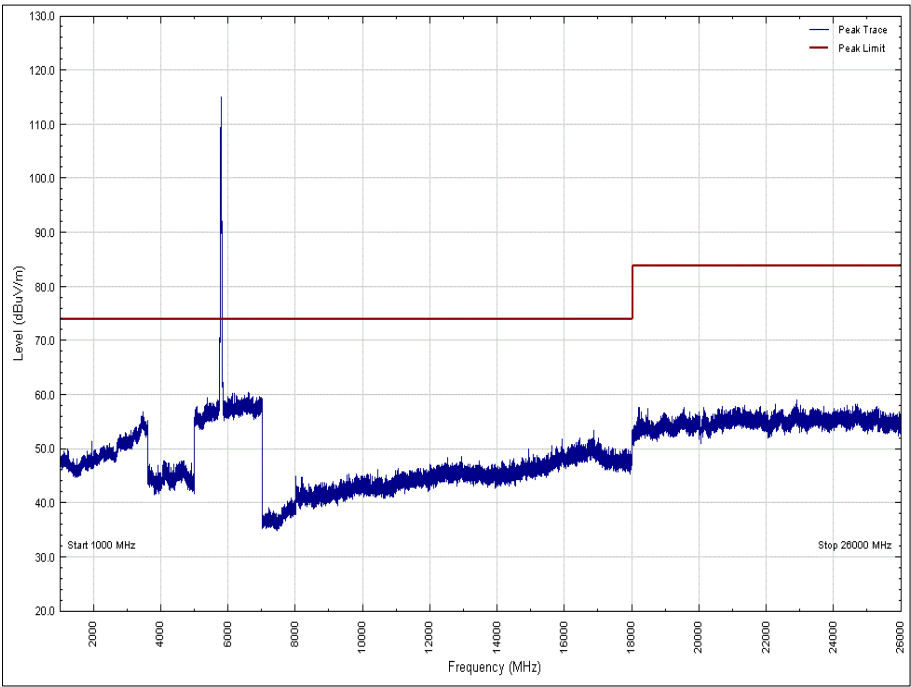


Figure 504 - U-NII 3 - 5785 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Peak)

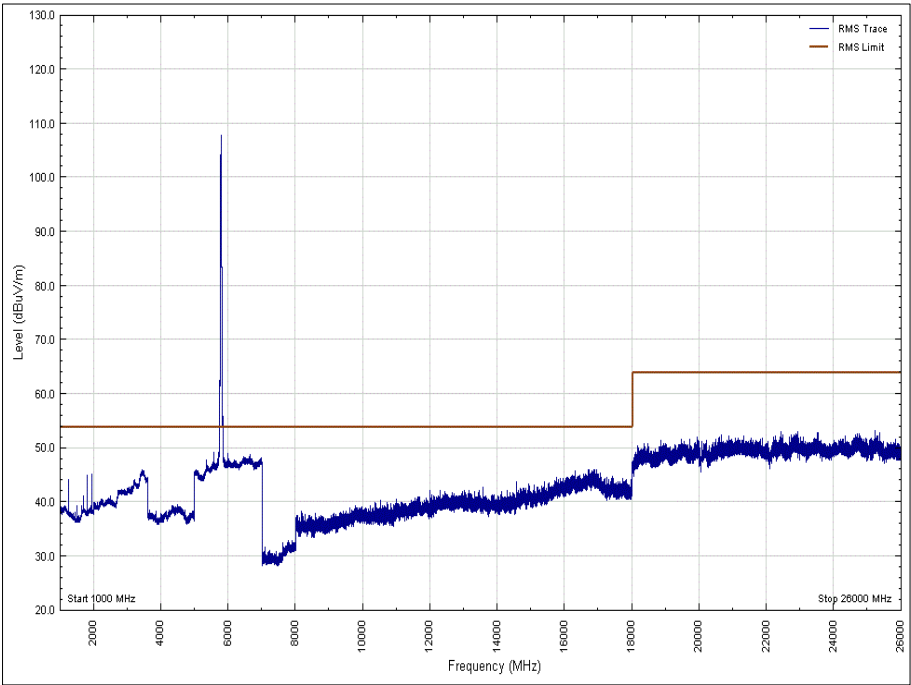


Figure 505 - U-NII 3 - 5785 MHz - 1 GHz to 26 GHz - Polarity: Vertical (Average)

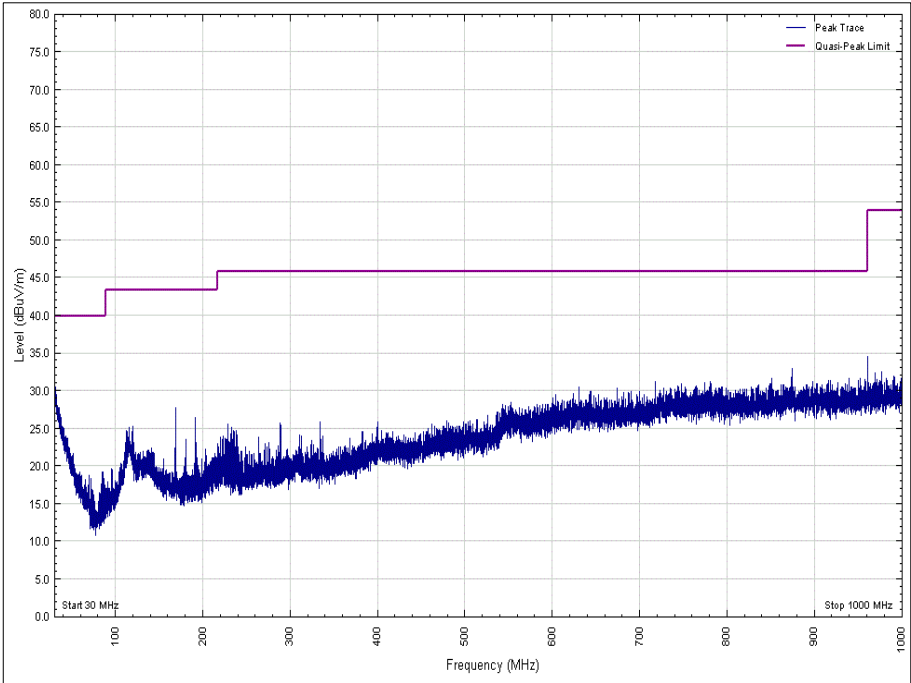


Figure 506 - U-NII 3 - 5825 MHz - 30 MHz to 1 GHz - Polarity: Horizontal

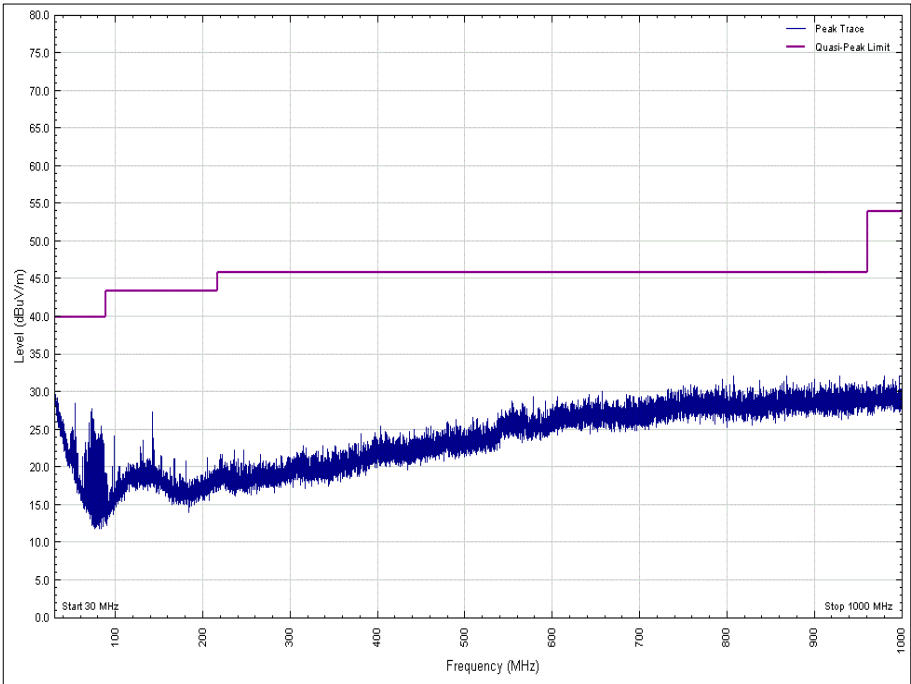


Figure 507 - U-NII 3 - 5825 MHz - 30 MHz to 1 GHz - Polarity: Vertical

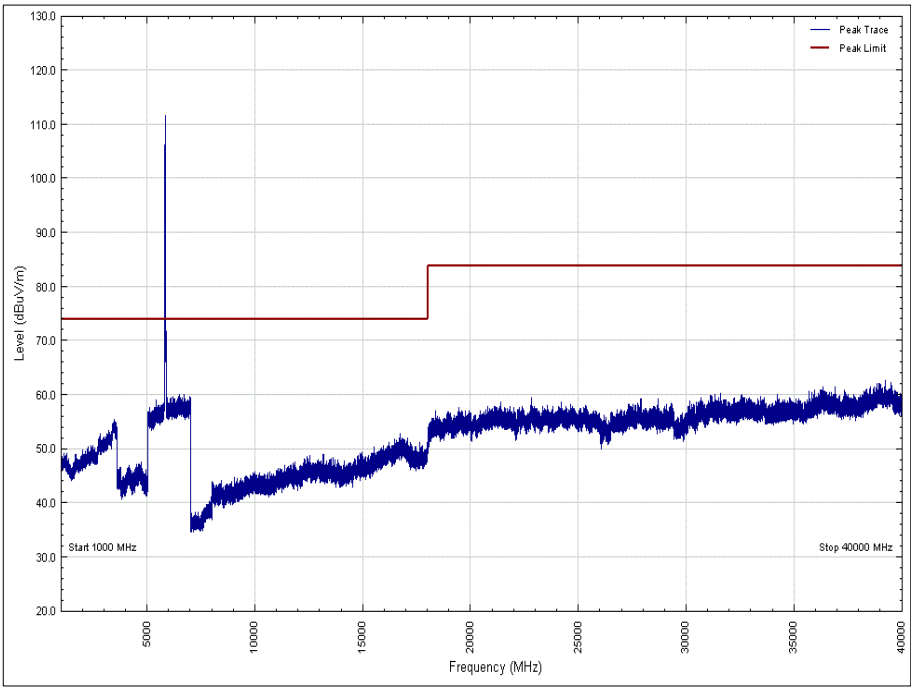


Figure 508 - U-NII 3 - 5825 MHz - 1 GHz to 40 GHz - Polarity: Horizontal (Peak)

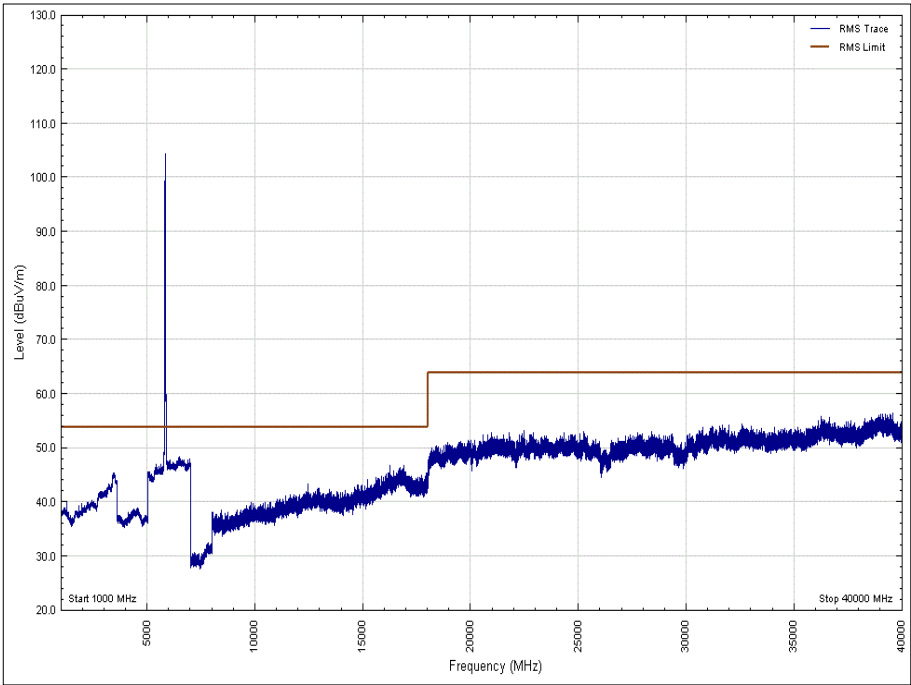


Figure 509 - U-NII 3 - 5825 MHz - 1 GHz to 40 GHz - Polarity: Horizontal (Average)

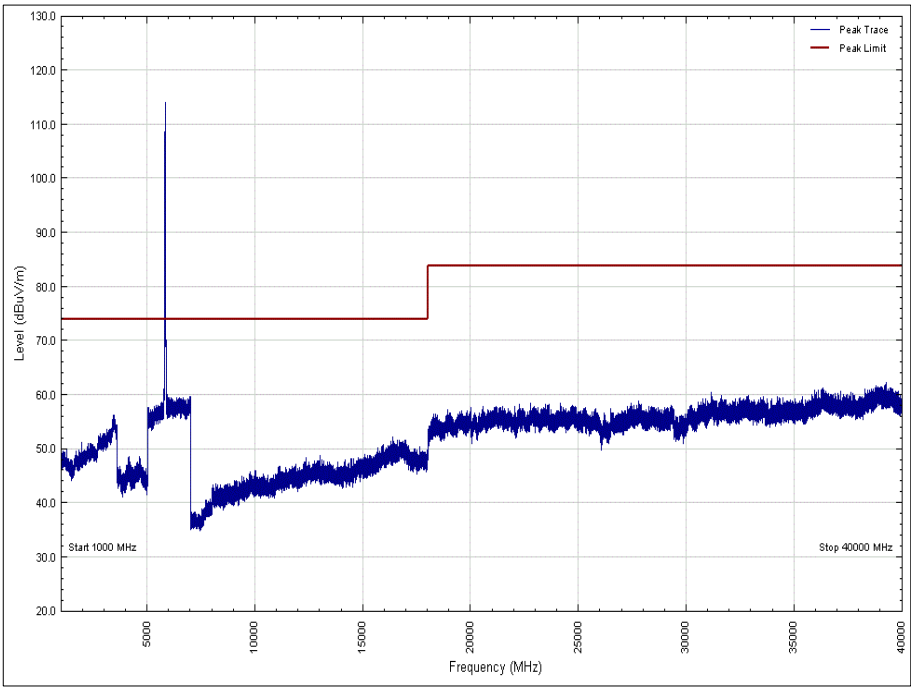


Figure 510 - U-NII 3 - 5825 MHz - 1 GHz to 40 GHz - Polarity: Vertical (Peak)

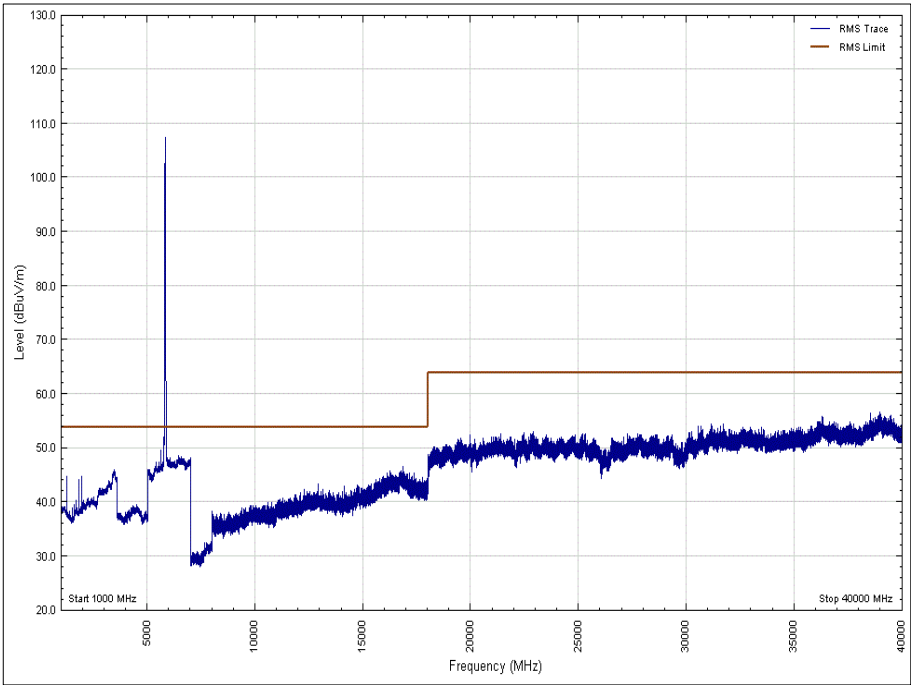


Figure 511 - U-NII 3 - 5825 MHz - 1 GHz to 40 GHz - Polarity: Vertical (Average)



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 382



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 383



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
10dB/1W SMA Attenuator dc - 18GHz	Sealectro	60-674-1010-89	3	12	31-Aug-2018*
Multimeter	White Gold	WG022	190	12	24-Nov-2018
Antenna 18-40GHz (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	24	2-May-2020
Antenna (Bilog)	Schaffner	CBL6143	287	24	15-May-2020
Dual Power Supply Unit	Thurlby	PL320	288	-	TU
Filter (High Pass)	Lorch	SHP7-7000-SR	566	12	10-May-2019
Pre-Amplifier	Phase One	PS04-0086	1533	12	12-Jan-2019
18GHz - 40GHz Pre-Amplifier	Phase One	PS04-0087	1534	12	2-Feb-2019
Screened Room (5)	Rainford	Rainford	1545	36	23-Jan-2021
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	8-Aug-2019
Cable (N-N, 8m)	Rhophase	NPS-2302-8000-NPS	3248	-	O/P Mon
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Nov-2018
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	2-Oct-2018
1 Metre SMA Cable	Rhophase	3PS-1801A-1000-3PS	4099	12	19-Sep-2018
1501A 4.0M Km Km Cable	Rhophase	KPS-1501A-4000-KPS	4301	12	19-Feb-2019
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	18-Oct-2018
Cable (Rx, Nm-Nm, 7m)	Scott Cables	SLU18-NMNM-07.00M	4498	-	O/P Mon
Cable (Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4526	6	31-Aug-2018*
Cable (Rx, SMAM-SMAM0.5m)	Scott Cables	SLSLL18-SMSM-00.50M	4528	6	15-Aug-2018*
EMI Receiver	Keysight Technologies	N9038A MXE	4628	12	04-July-2019
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	1-Mar-2019
Mast Controller	Maturo GmbH	NCD	4810	-	TU
Tilt Antenna Mast	Maturo GmbH	TAM 4.0-P	4811	-	TU
9m N type RF cable	Rosenberger	2303-0 9.0m PNm PNm	4827	6	4-Jan-2019



Double Ridge Broadband Horn Antenna	Schwarzbeck	BBHA 9120 B	4848	12	12-Feb-2019
4dB Attenuator	Pasternack	PE7047-4	4935	12	28-Nov-2018
Hygrometer	Rotronic	HP21	4989	12	26-Apr-2019
Cable (26.5GHz)	Rosenberger	LU7-133-5000	5019	-	O/P Mon
Cable (40GHz)	Rosenberger	LU1-001-2000	5020	-	O/P Mon

Table 384

TU – Traceability Unscheduled
O/P Mon – Output Monitored

*Item may appear to be out of calibration, however, testing was performed over multiple days and TUV SUD can confirm that when used the item was within its calibration period and that we hold records of this.



Product Service

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

A1993, S/N: C07WT00HK2V0 - Modification State 0

2.6.3 Date of Test

13-August-2018 to 11-September 2018

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, with the device operating in SISO, MIMO and TxBF set-up's, across the various modes supported by the device.

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

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

2.6.5 Environmental Conditions

Ambient Temperature	19.0 - 23.0 °C
Relative Humidity	38.0 - 57.0 %

2.6.6 Test Results

Main - 20 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)
SISO	802.11a	36	5150.0	71.30	51.54
SISO	802.11a	64	5350.0	65.21	51.34
SISO	802.11a	100	5460.0	58.49	47.41

Table 385

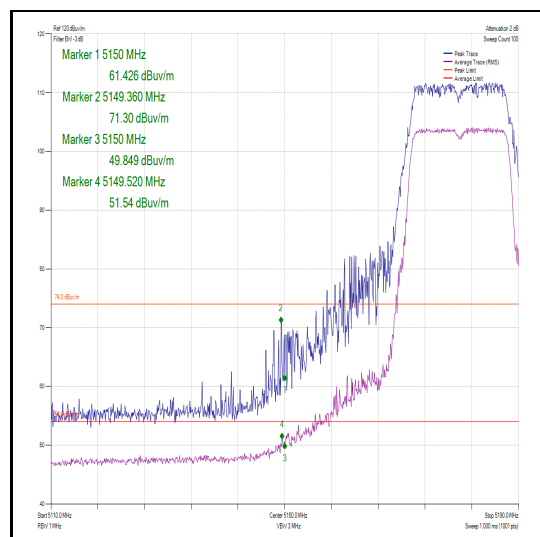


Figure 512 – Channel 36 – Restricted Band Edge

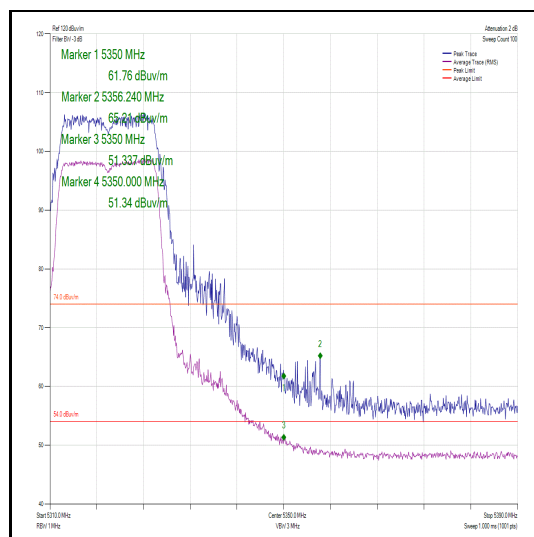


Figure 513 – Channel 64 - Restricted Band Edge

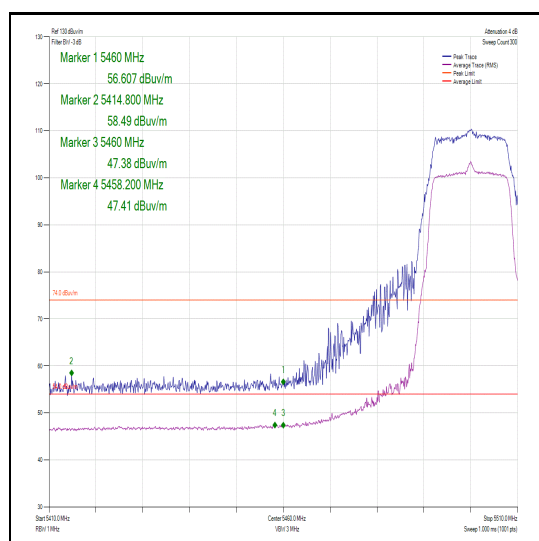


Figure 514 – Channel 100 - Restricted Band Edge



Main - 20 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)
SISO	802.11n	36	5150.0	65.91	51.78
SISO	802.11n	64	5350.0	63.62	51.20
SISO	802.11n	100	5460.0	59.32	47.60

Table 386

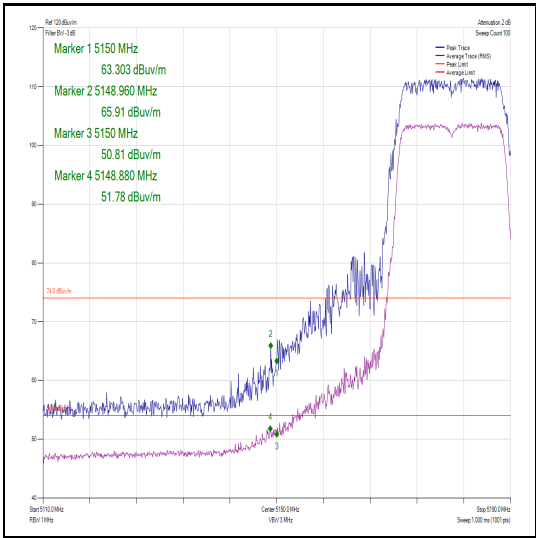


Figure 515 – Channel 36 – Restricted Band Edge

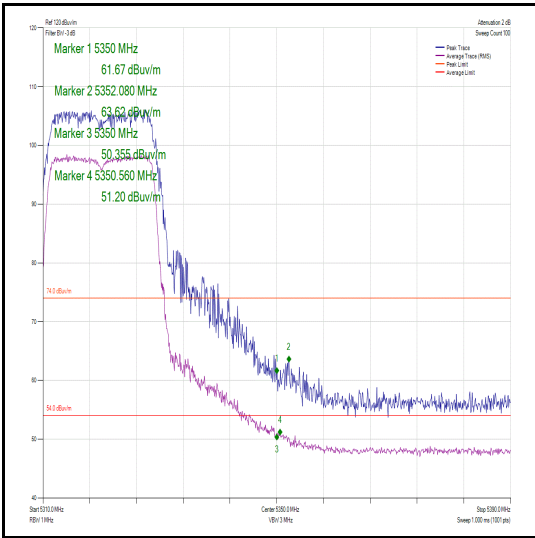


Figure 516 – Channel 64 - Restricted Band Edge

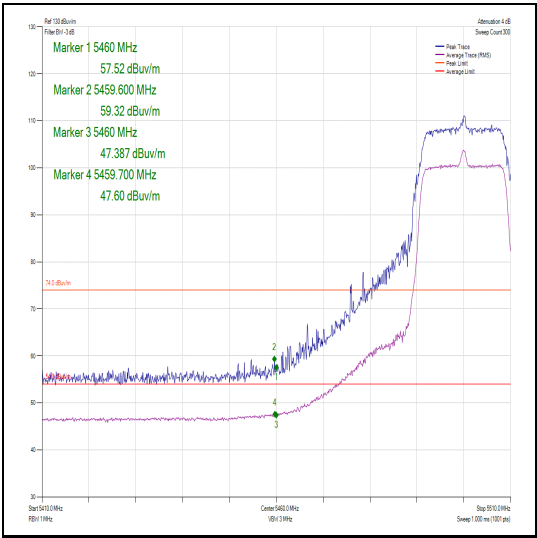


Figure 517 – Channel 100 – Restricted Band Edge

Main - 20 MHz Bandwidth



Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)
MIMO 2TX	802.11n	36	5150.0	61.90	47.27
MIMO 2TX	802.11n	64	5350.0	63.85	51.29
MIMO 2TX	802.11n	100	5460.0	57.45	47.13

Table 387

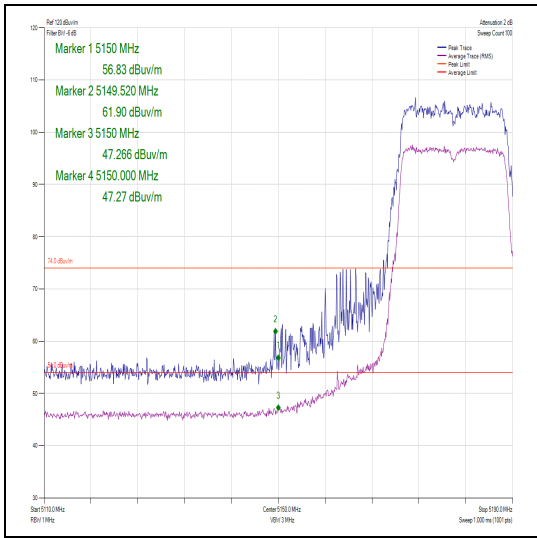


Figure 518 – Channel 36 – Restricted Band Edge

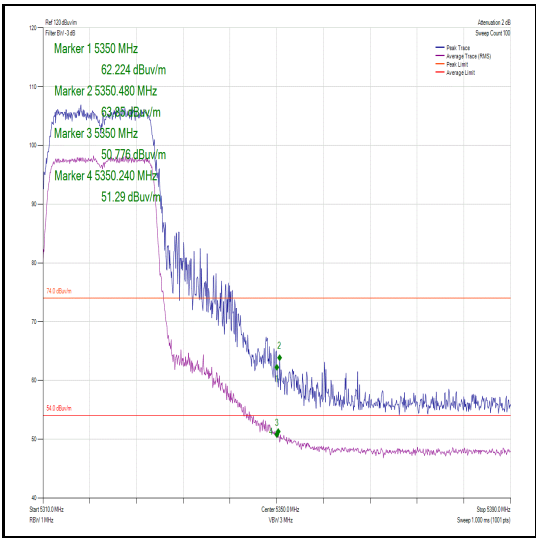


Figure 519 – Channel 64 - Restricted Band Edge

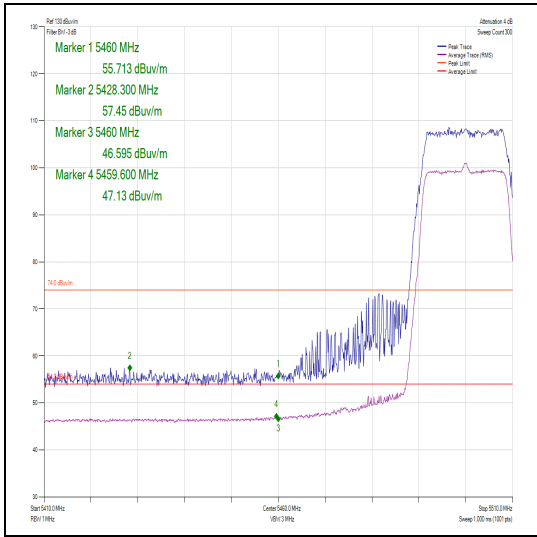


Figure 520 – Channel 100 – Restricted Band Edge



Main - 20 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)
MIMO 3TX	802.11n	36	5150.0	65.41	50.83
MIMO 3TX	802.11n	64	5350.0	65.65	51.51
MIMO 3TX	802.11n	100	5460.0	61.00	48.56

Table 388

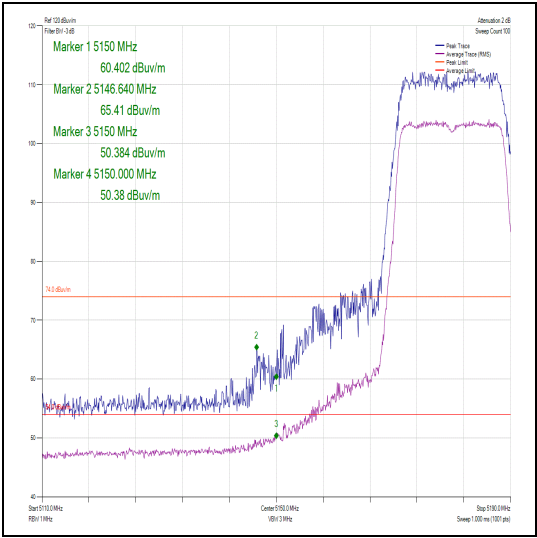


Figure 521 – Channel 36 – Restricted Band Edge

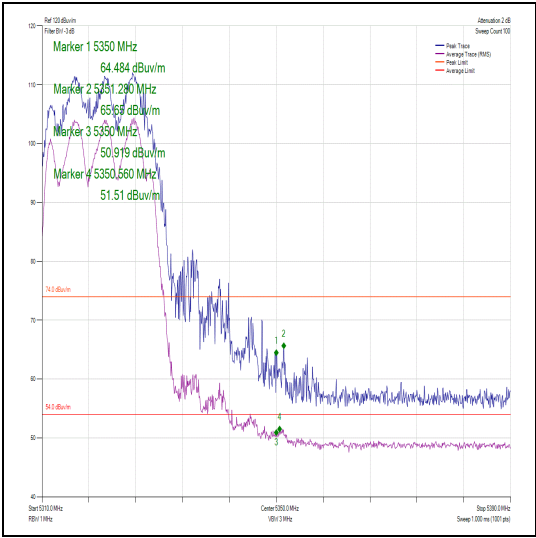


Figure 522 – Channel 64 - Restricted Band Edge

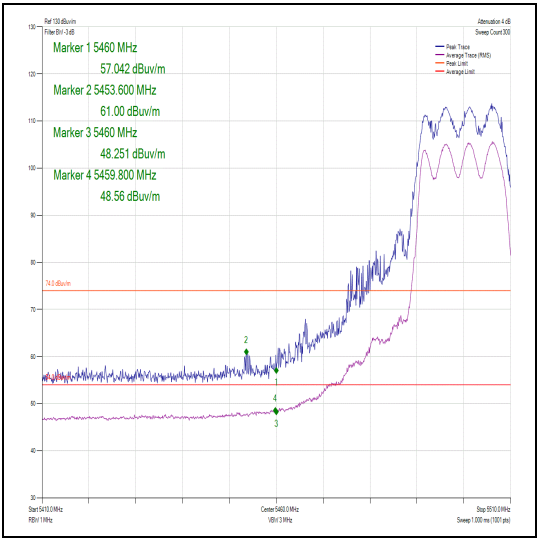


Figure 523 – Channel 100 – Restricted Band Edge



Main - 40 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)
SISO	802.11n	38	5150.0	61.38	51.31
SISO	802.11n	62	5350.0	62.73	50.80
SISO	802.11n	102	5460.0	62.42	50.22

Table 389

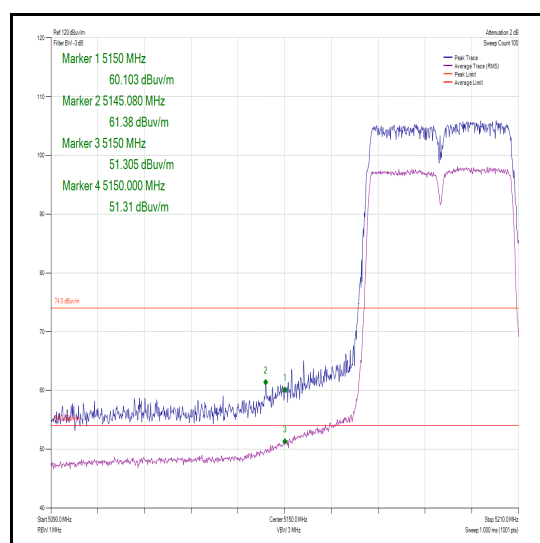


Figure 524 – Channel 38 – Restricted Band Edge

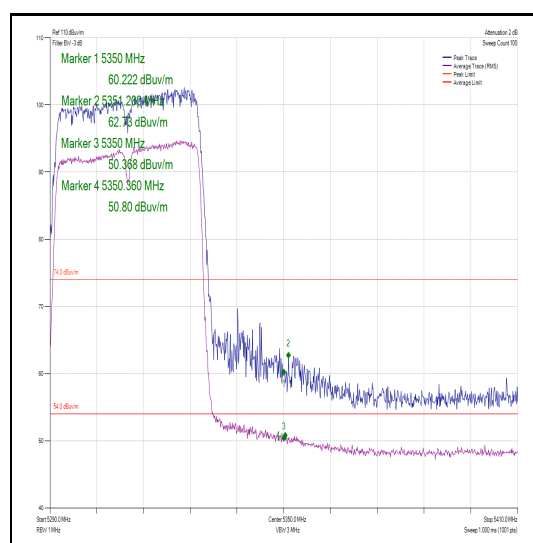


Figure 525 – Channel 62 - Restricted Band Edge

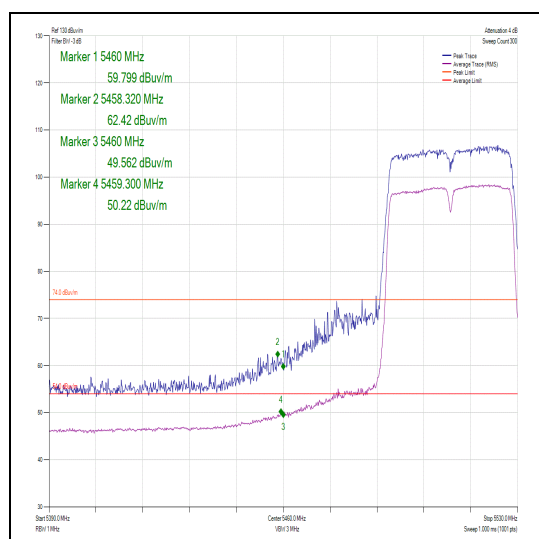


Figure 526 – Channel 102 – Restricted Band Edge



Main - 40 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)
MIMO 2TX	802.11n	38	5150.0	63.34	51.13
MIMO 2TX	802.11n	62	5350.0	71.51	51.97
MIMO 2TX	802.11n	102	5460.0	63.45	47.94

Table 390

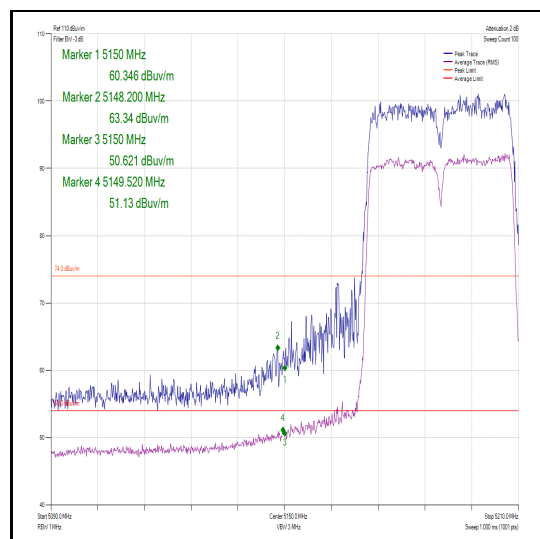


Figure 527 – Channel 38 – Restricted Band Edge

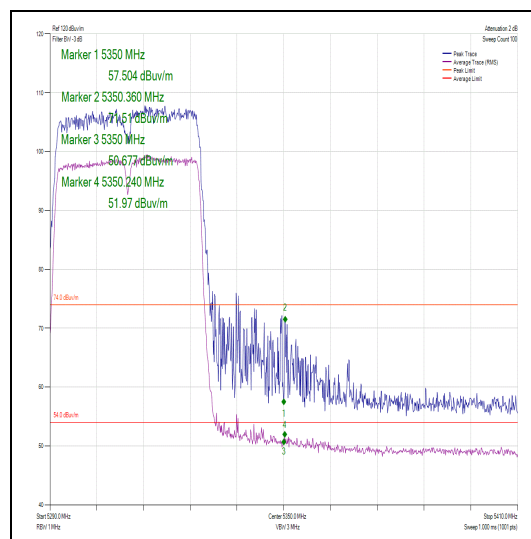


Figure 528 – Channel 62 - Restricted Band Edge

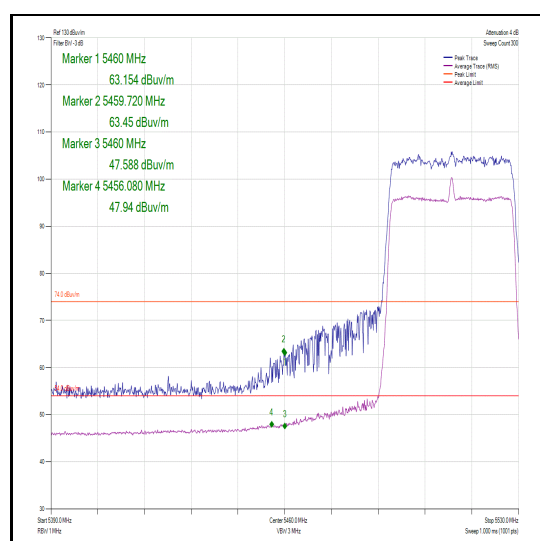


Figure 529 – Channel 102 – Restricted Band Edge



Main - 40 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)
MIMO 3TX	802.11n	38	5150.0	61.64	51.29
MIMO 3TX	802.11n	62	5350.0	62.76	50.79
MIMO 3TX	802.11n	102	5460.0	65.65	51.20

Table 391

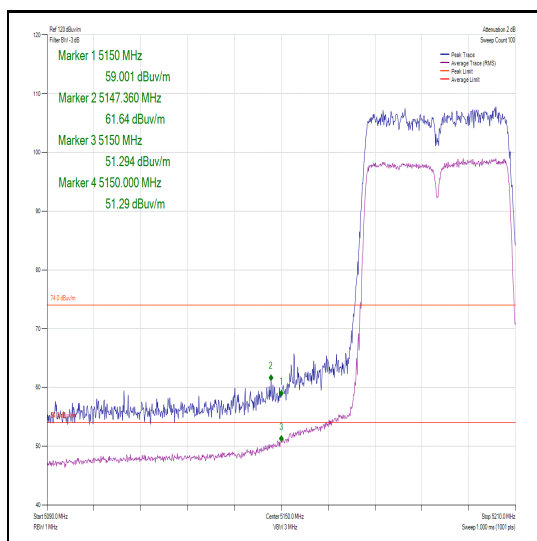


Figure 530 – Channel 38 – Restricted Band Edge

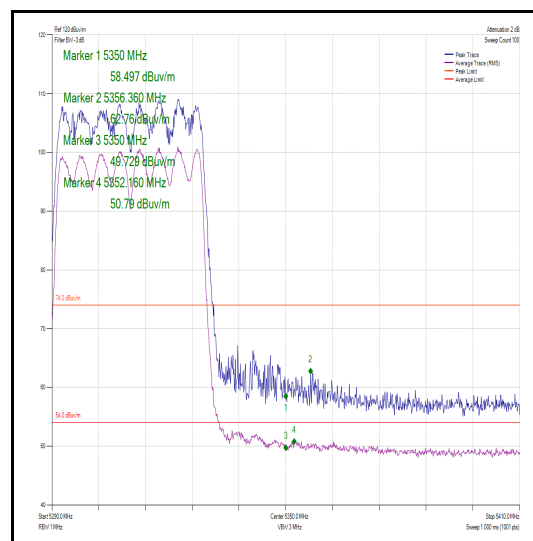


Figure 531 – Channel 62 - Restricted Band Edge

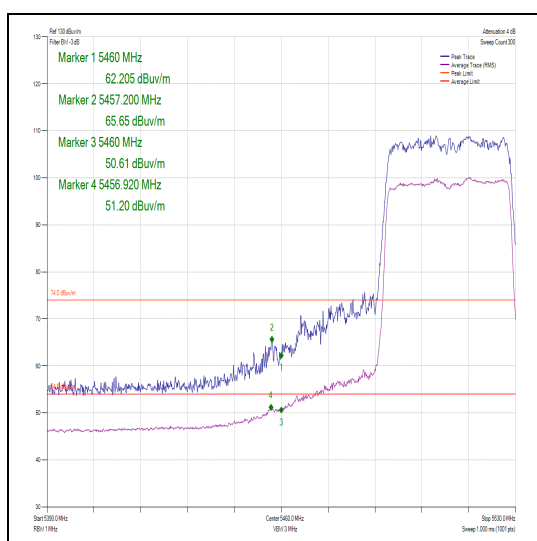


Figure 532 – Channel 102 – Restricted Band Edge



Main - 80 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)
SISO	802.11ac	42	5150.0	63.74	52.55
SISO	802.11ac	58	5350.0	63.41	50.84
SISO	802.11ac	106	5460.0	56.63	46.01

Table 392

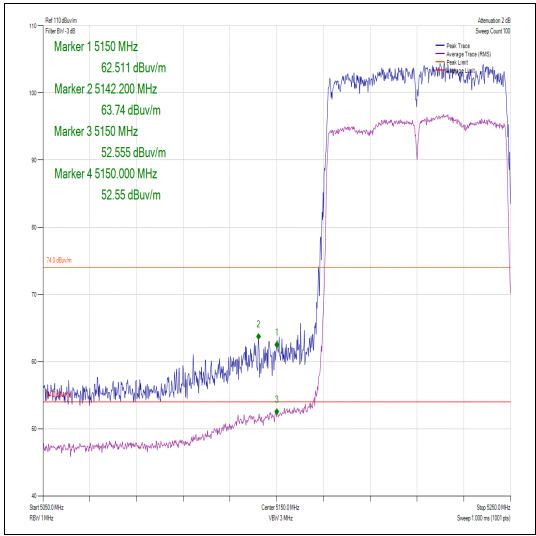


Figure 533 – Channel 42 – Restricted Band Edge

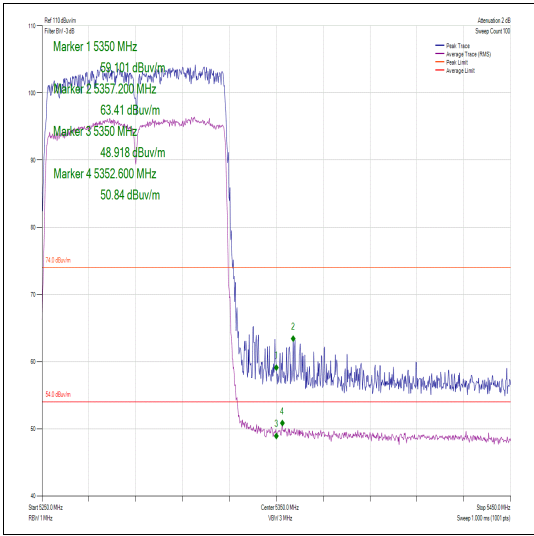


Figure 534 – Channel 58 - Restricted Band Edge

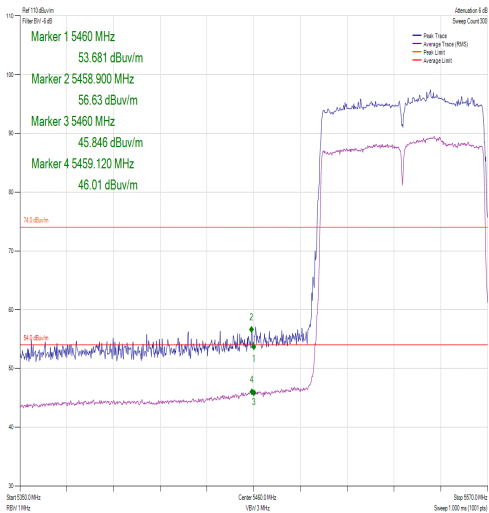


Figure 535 – Channel 106 – Restricted Band Edge

Main - 80 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)
MIMO 2TX	802.11ac	42	5150.0	65.30	51.17
MIMO 2TX	802.11ac	58	5350.0	67.85	50.92
MIMO 2TX	802.11ac	106	5460.0	70.35	51.60

Table 393

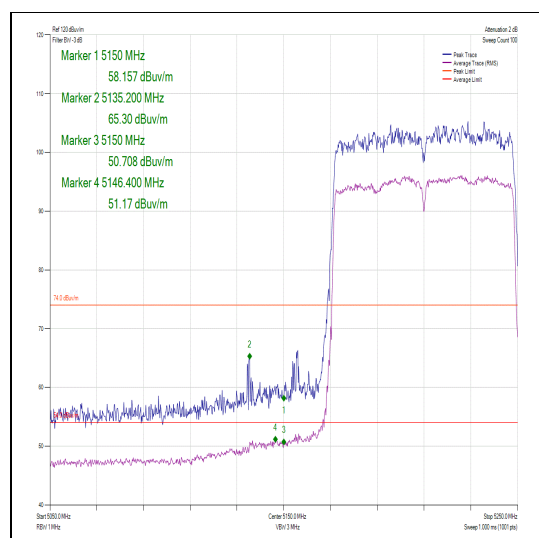


Figure 536 – Channel 42 – Restricted Band Edge

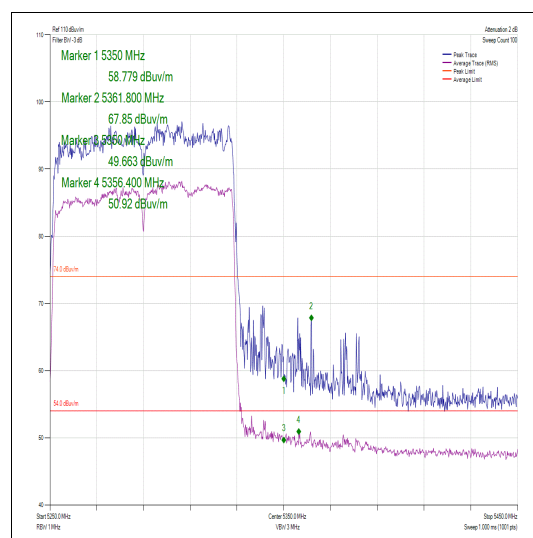


Figure 537 – Channel 58 - Restricted Band Edge

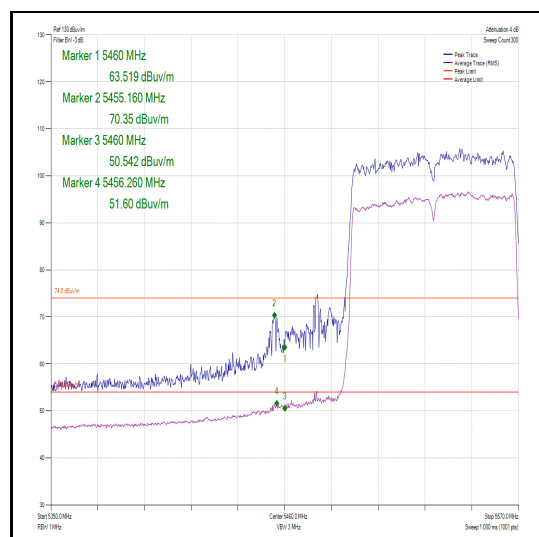


Figure 538 – Channel 106 – Restricted Band Edge



Main - 80 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)
MIMO 3TX	802.11ac	42	5150.0	60.94	50.97
MIMO 3TX	802.11ac	58	5350.0	63.36	51.26
MIMO 3TX	802.11ac	106	5460.0	56.63	46.01

Table 394

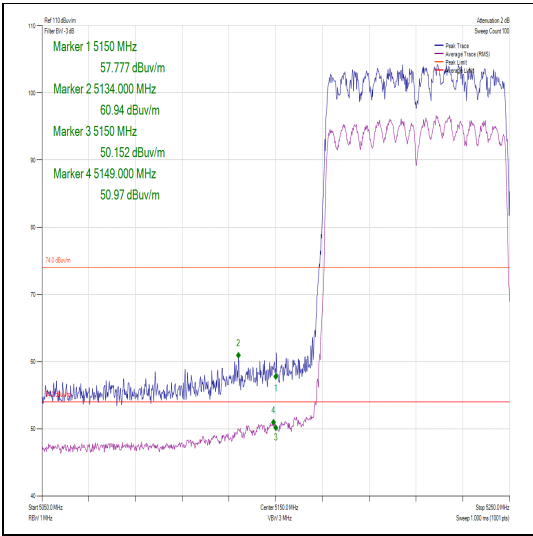


Figure 539 – Channel 42 – Restricted Band Edge

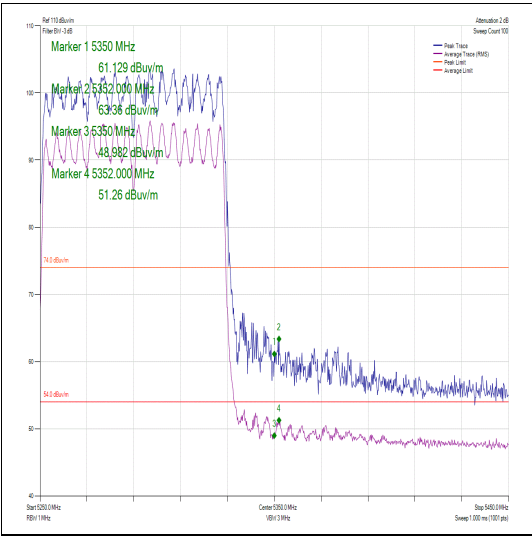


Figure 540 – Channel 58 - Restricted Band Edge

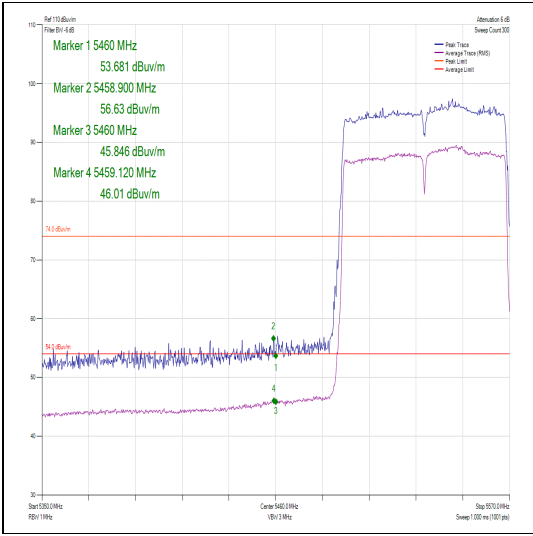


Figure 541 – Channel 106 – Restricted Band Edge

Aux - 20 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)
SISO	802.11a	36	5150.0	62.18	50.07
SISO	802.11a	64	5350.0	63.86	51.03
SISO	802.11a	100	5460.0	61.09	49.67

Table 395

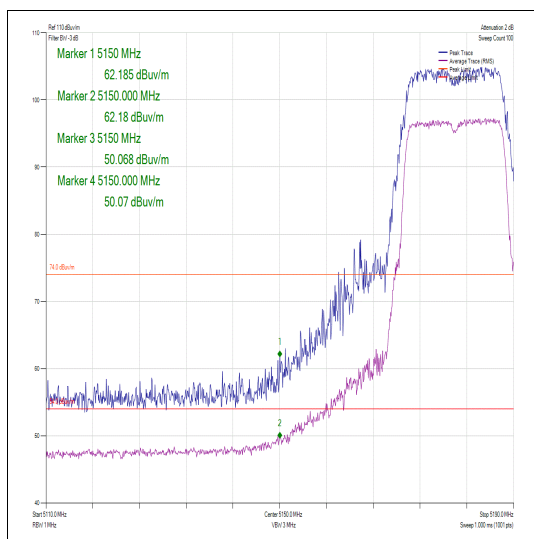


Figure 542 – Channel 36 – Restricted Band Edge

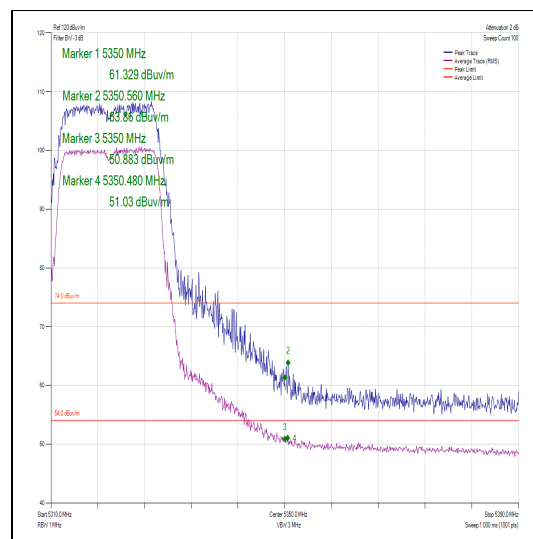


Figure 543 – Channel 64 - Restricted Band Edge

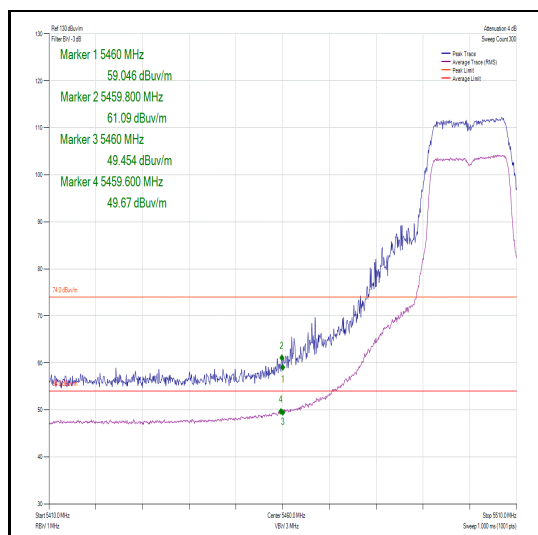


Figure 544 – Channel 100 – Restricted Band Edge



Aux - 20 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)
SISO	802.11n	36	5150.0	63.64	50.21
SISO	802.11n	64	5350.0	65.10	51.08
SISO	802.11n	100	5460.0	62.41	48.17

Table 396

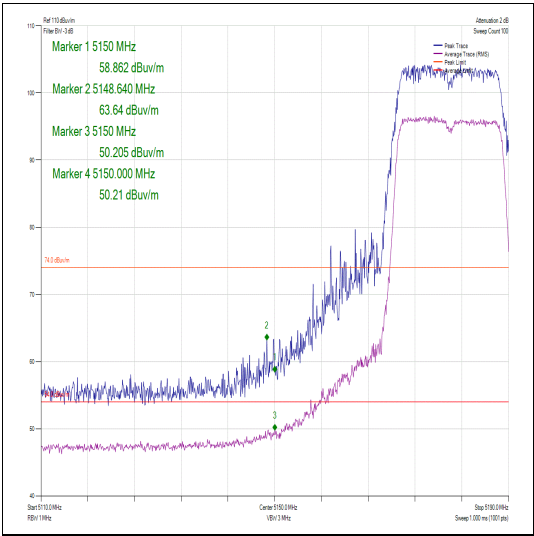


Figure 545 – Channel 36 – Restricted Band Edge

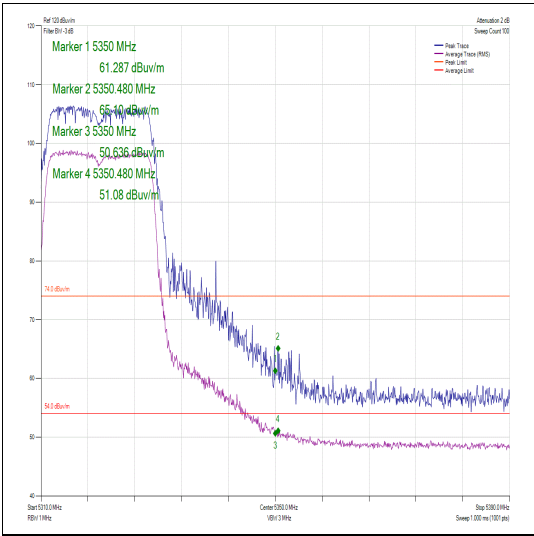


Figure 546 – Channel 64 - Restricted Band Edge

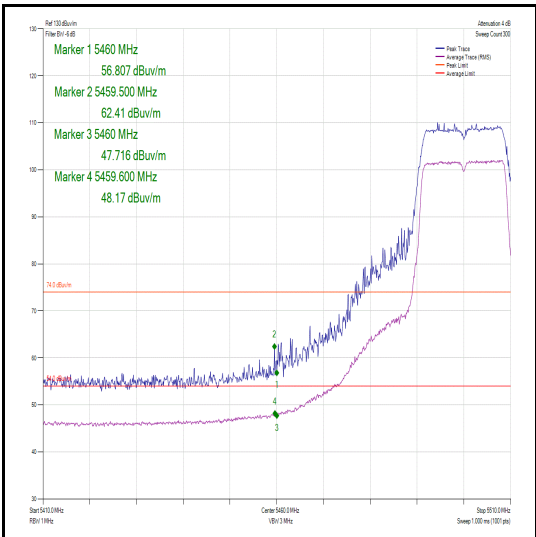


Figure 547 – Channel 100 – Restricted Band Edge



Aux - 40 MHz Bandwidth

Measurement Configuration	Data Rate/MCS	Transmitter Channel	Band Edge Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)
SISO	802.11n	38	5150.0	68.45	51.29
SISO	802.11n	62	5350.0	65.33	52.12
SISO	802.11n	102	5460.0	64.17	50.25

Table 397

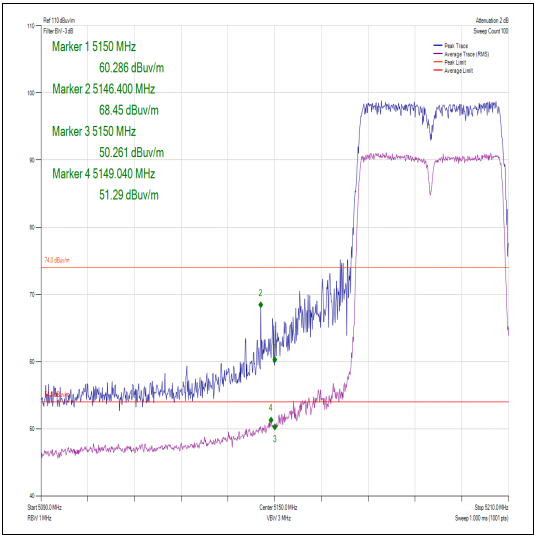


Figure 548 – Channel 38 – Restricted Band Edge

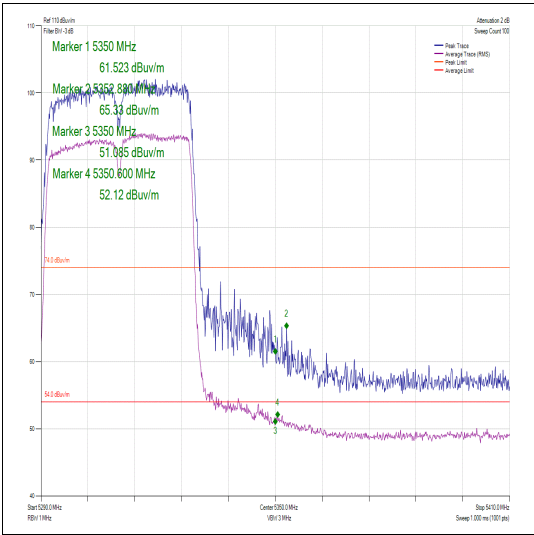


Figure 549 – Channel 62 - Restricted Band Edge

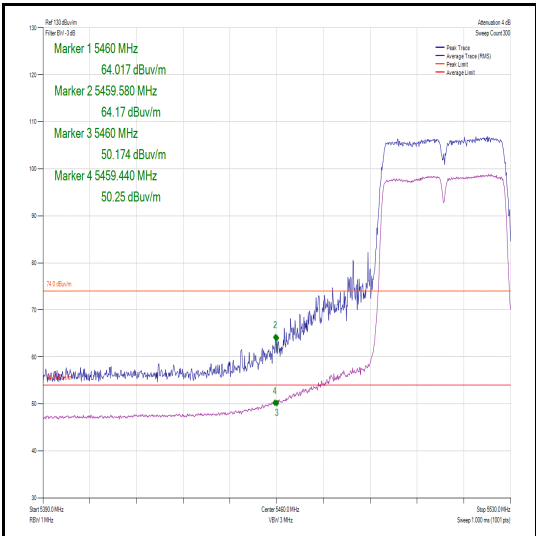


Figure 550 – Channel 102 - Restricted Band Edge