



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:

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;

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;

- a) 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 EMC Chamber 5.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Expiry Date
Screened Room (5)	Rainford	Rainford	1545	36	15-Apr-2024
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Mast Controller	Maturo GmbH	NCD	4810	-	TU
Tilt Antenna Mast	Maturo GmbH	TAM 4.0-P	4811	-	TU
Antenna (DRG 1-10.5GHz)	Schwarzbeck	BBHA9120B	4848	12	28-May-2023
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	17-May-2023
Emissions Software	TUV SUD	EmX V3.1.4	5125	-	Software
Preamplifier (30dB 1GHz to 18GHz)	Schwarzbeck	BBV 9718 C	5261	12	08-Apr-2023
Attenuator 5W 10dB DC-18GHz	Aaren	AT40A-4041-D18-10	5492	12	11-Apr-2023
Cable (sma to sma 1m)	Junkosha	MWX221-01000AMSAMS/A	5513	12	12-Apr-2023
Cable (SMA to SMA, 2 m)	Junkosha	MWX221-02000AMSAMS/A	5517	12	12-Apr-2023
Cable (N-Type to N-Type, 8 m)	Junkosha	MWX221-08000NMSNMS/B	5520	12	24-Mar-2023
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB 40	5604	12	22-Sep-2022

Table 486

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
ISED RSS-GEN, Clause 6.13 and 8.9

2.6.2 Equipment Under Test and Modification State

A2737, S/N: QQRXMCWXL5 - Modification State 0

2.6.3 Date of Test

07-July-2022 to 01-September-2022

2.6.4 Test Method

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

Tests were performed in HT20 CDD in 2TX MIMO mode on the Main Radio, with measurements undertaken from 30 MHz to 40 GHz, on channel 36 (5180 MHz) and channel 165 (5825 MHz).

All testing was performed using the lowest data rate/modulation scheme for the applicable mode.

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

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:
 $10^{(\text{Field Strength in dB}\mu\text{V/m}/20)}$

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

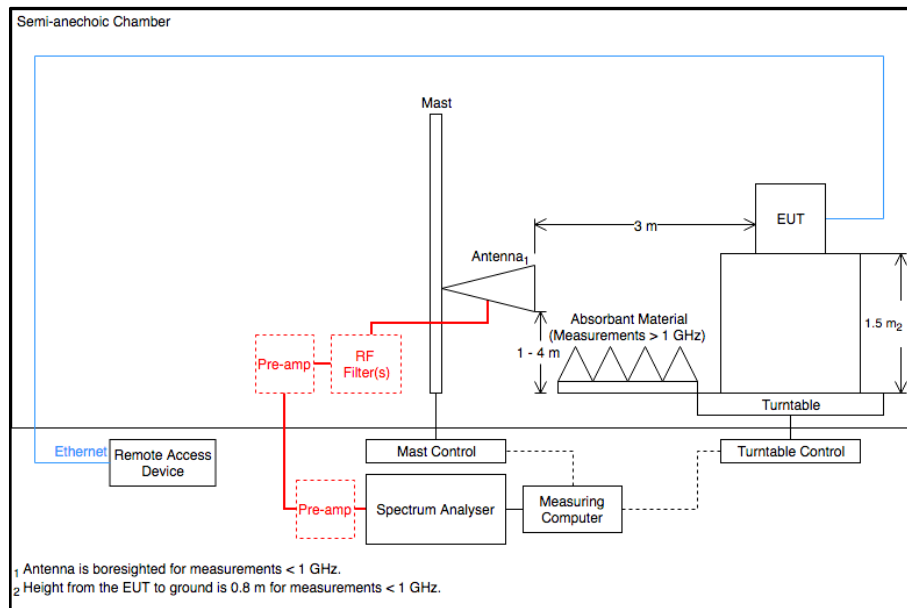


Figure 273 - Radiated Emissions Test Setup Diagram

2.6.5 Environmental Conditions

Ambient Temperature	19.3 - 24.5 °C
Relative Humidity	43.6 - 51.4 %

2.6.6 Test Results

5 GHz WLAN

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

Table 487 - U-NII-1 - 5180 MHz (CH36), 802.11a, Core 0, 30 MHz to 40 GHz

*No emissions found within 10 dB of the limit.

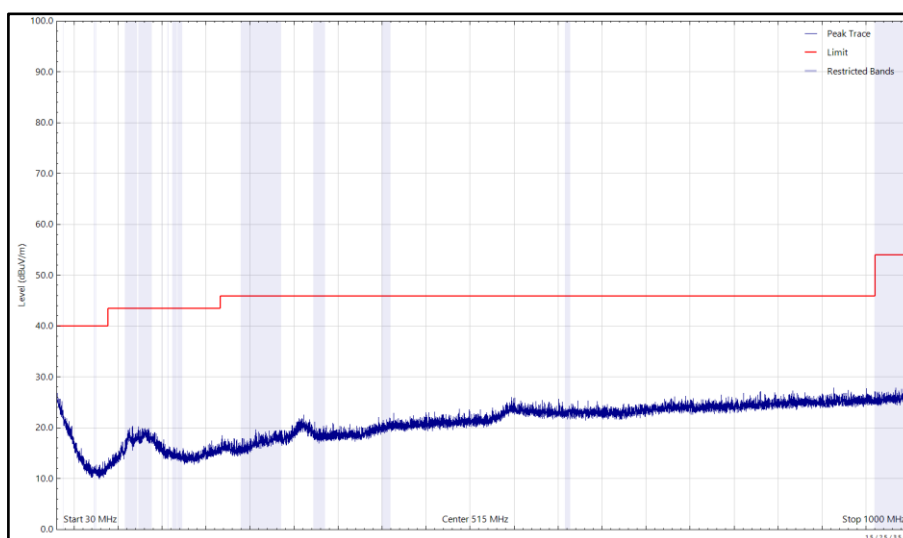


Figure 274 - U-NII-1 - 5180 MHz (CH36), 802.11a, Core 0, 30 MHz to 1 GHz, Horizontal (Peak)

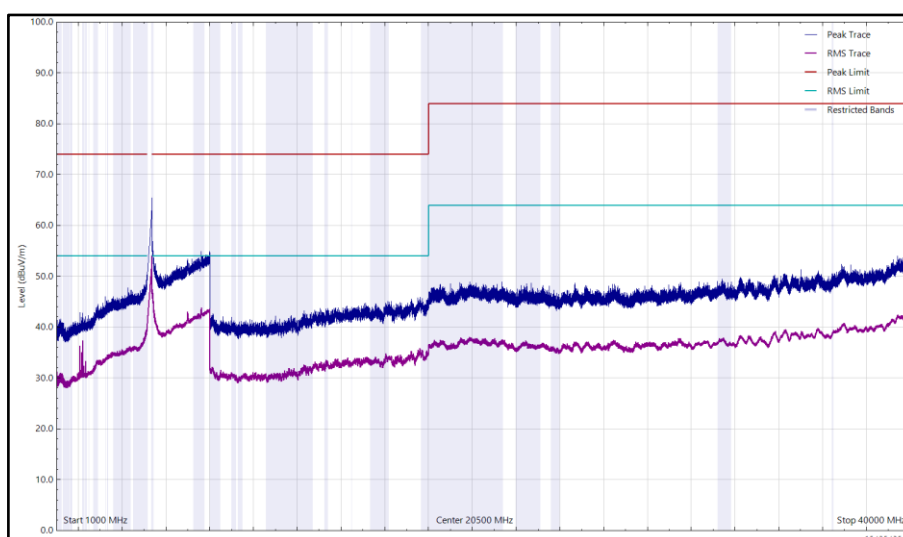


Figure 275 - U-NII-1 - 5180 MHz (CH36), 802.11a, Core 0, 1 GHz to 40 GHz, Horizontal

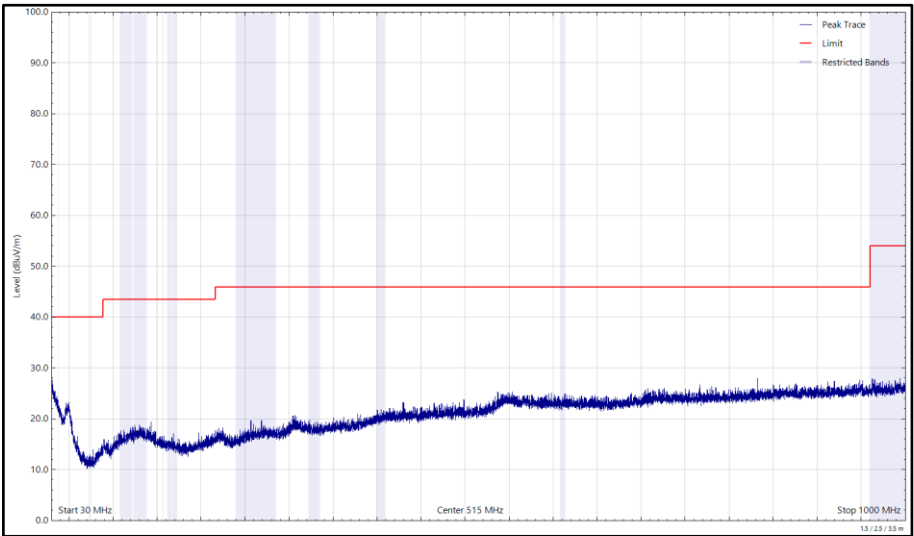


Figure 276 - U-NII-1 - 5180 MHz (CH36), 802.11a, Core 0, 30 MHz to 1 GHz, Vertical (Peak)

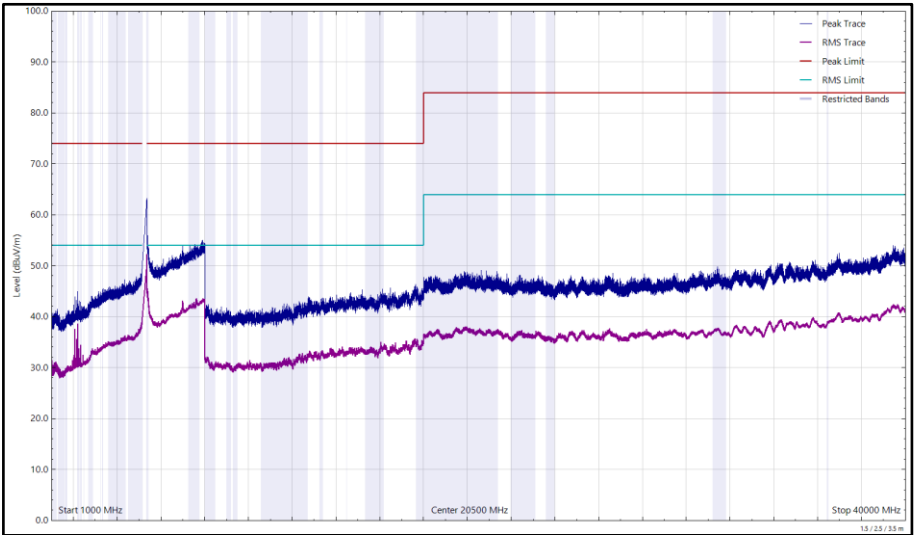


Figure 277 - U-NII-1 - 5180 MHz (CH36), 802.11a, Core 0, 1 GHz to 40 GHz, Vertical



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

Table 488 - U-NII-2A - 5320 MHz (CH64), 802.11a, Core 0, 1 to 40 GHz

*No emissions found within 10 dB of the limit.

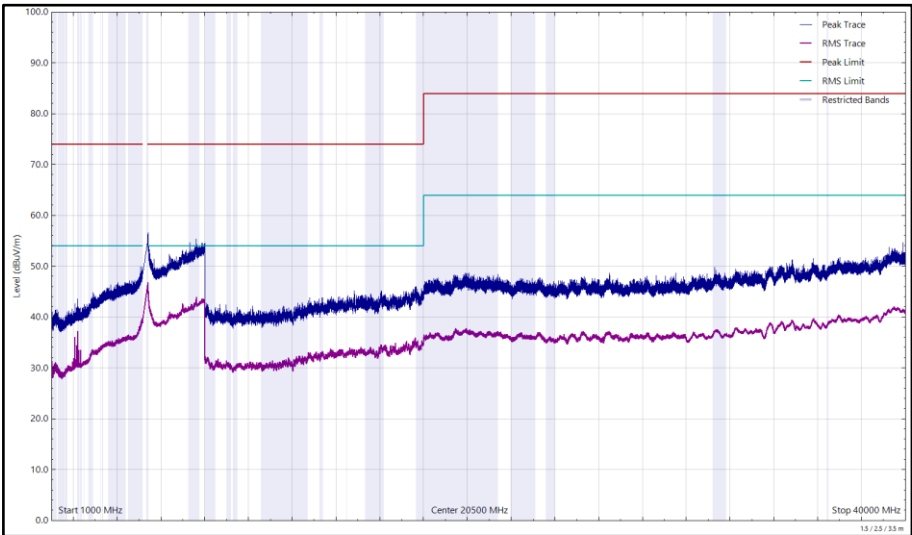


Figure 278 - U-NII-2A - 5320 MHz (CH64), 802.11a, Core 0, 1 GHz to 40 GHz, Horizontal

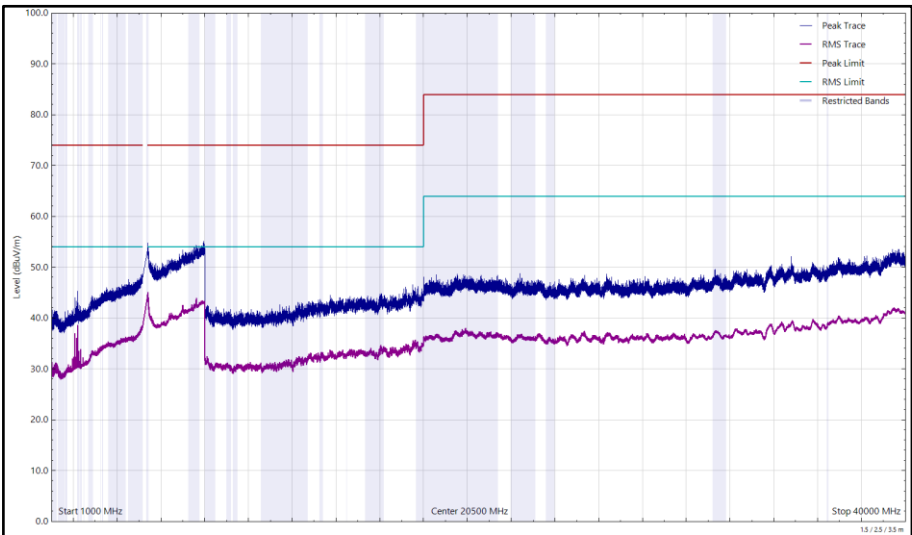


Figure 279 - U-NII-2A - 5320 MHz (CH64), 802.11a, Core 0, 1 GHz to 40 GHz, Vertical



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

Table 489 - U-NII-2C - 5500 MHz (CH100), 802.11a, Core 0, 1 GHz to 40 GHz

*No emissions found within 10 dB of the limit.

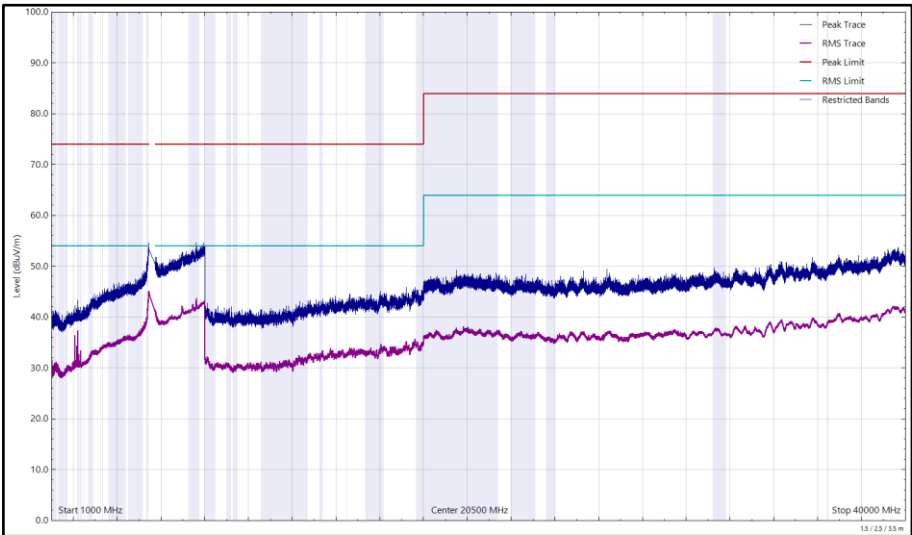


Figure 280 - U-NII-2C - 5500 MHz (CH100), 802.11a, Core 0, 1 GHz to 40 GHz, Horizontal

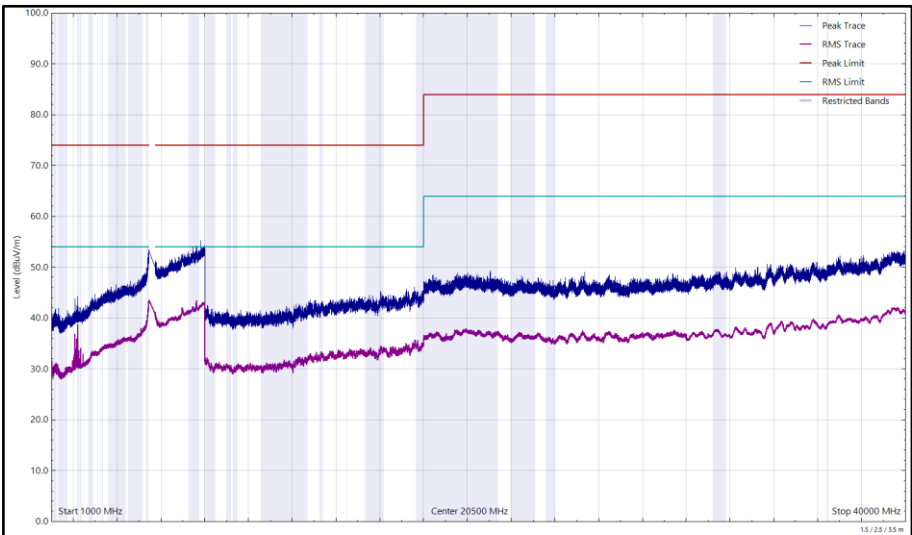


Figure 281 - U-NII-2C - 5500 MHz (CH100), 802.11a, Core 0, 1 GHz to 40 GHz, Vertical



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

Table 490 - U-NII-2C - 5700 MHz (CH140), 802.11a, Core 0, 1 GHz to 40 GHz

*No emissions found within 10 dB of the limit.

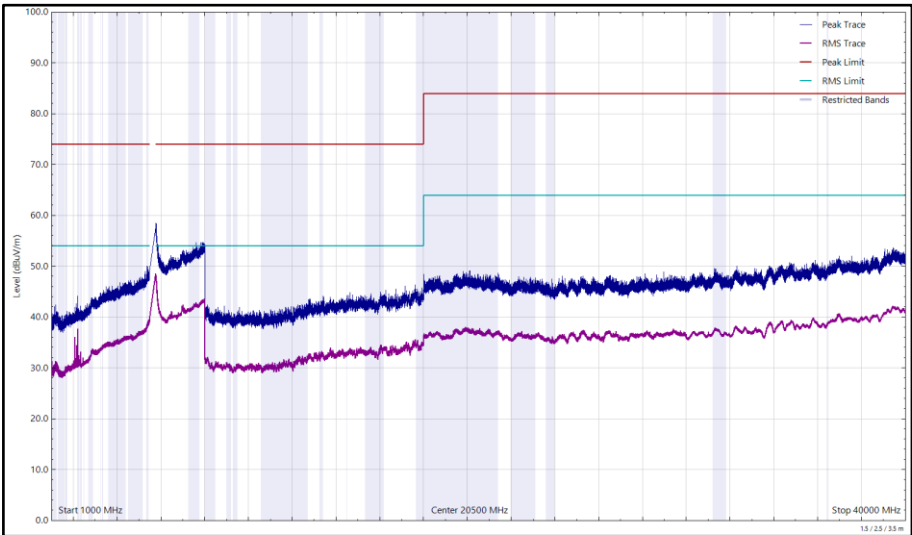


Figure 282 - U-NII-2C - 5700 MHz (CH140), 802.11a, Core 0, 1 GHz to 40 GHz, Horizontal

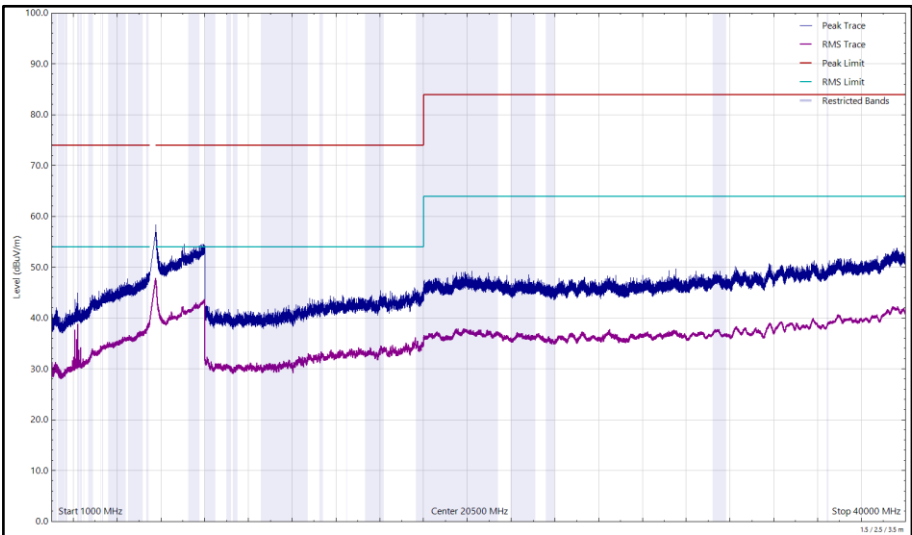


Figure 283 - U-NII-2C - 5700 MHz (CH140), 802.11a, Core 0, 1 GHz to 40 GHz, Vertical



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

Table 491 - U-NII-3 - 5745 MHz (CH149), 802.11a, Core 0, 1 GHz to 40 GHz

*No emissions found within 10 dB of the limit.

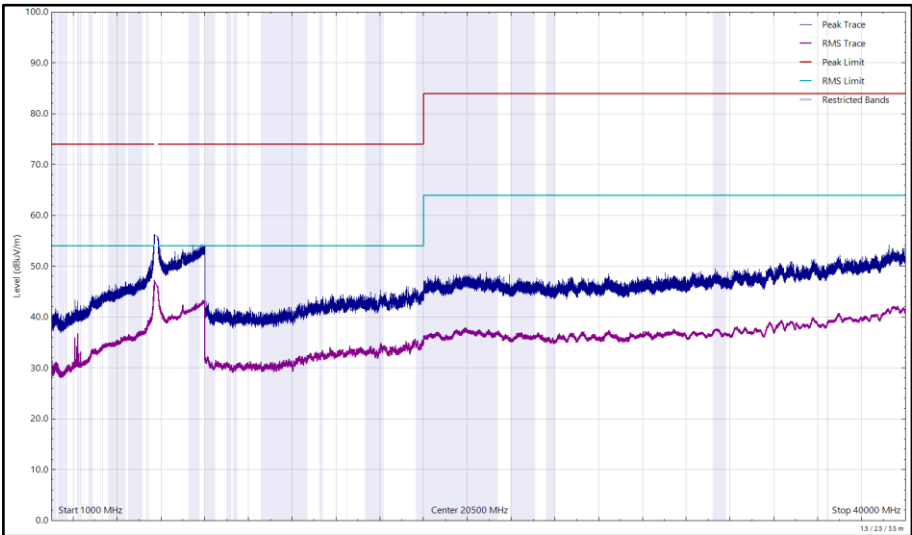


Figure 284 - U-NII-3 - 5745 MHz (CH149), 802.11a, Core 0, 1 GHz to 40 GHz, Horizontal

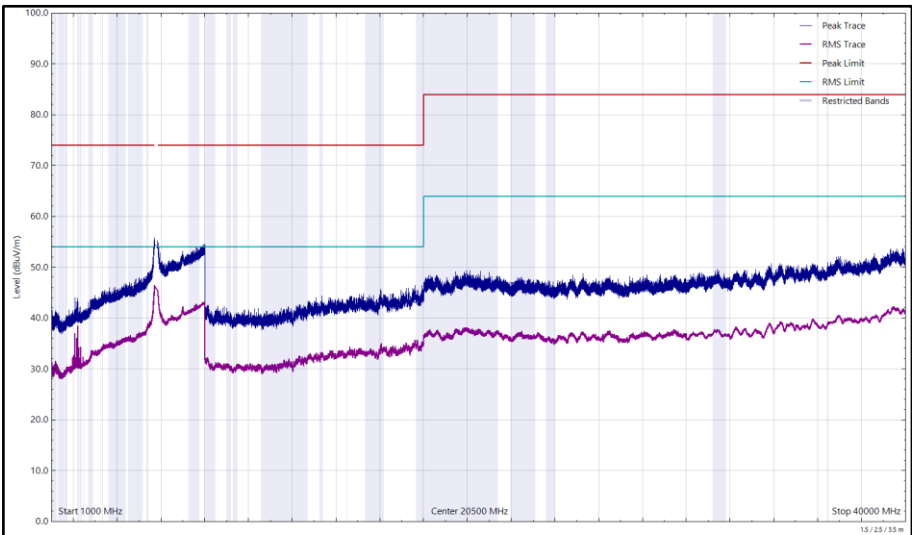


Figure 285 - U-NII-3 - 5745 MHz (CH149), 802.11a, Core 0, 1 GHz to 40 GHz, Vertical



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

Table 492 - U-NII-3 - 5825 MHz (CH165), 802.11a, Core 0, 30 MHz to 40 GHz

*No emissions found within 10 dB of the limit.

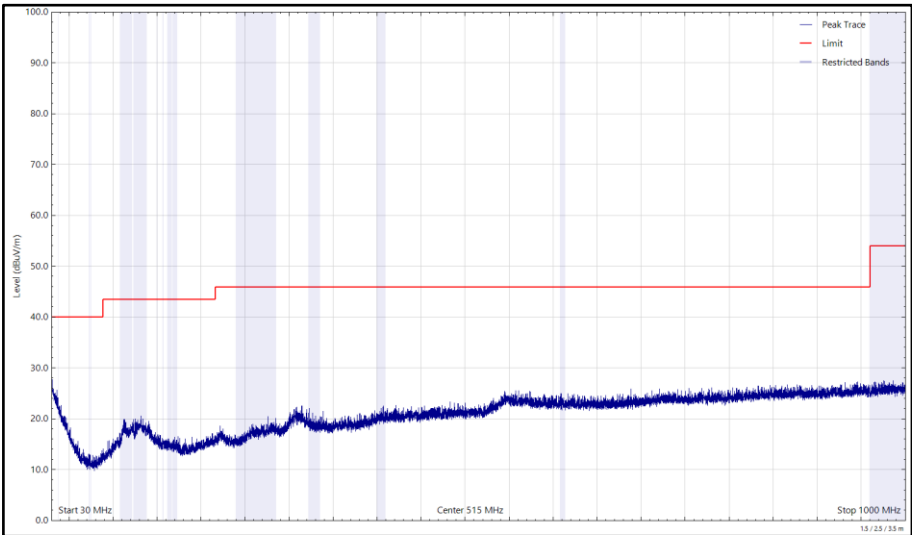


Figure 286 - U-NII-3 - 5825 MHz (CH165), 802.11a, Core 0, 30 MHz to 1 GHz, Horizontal (Peak)

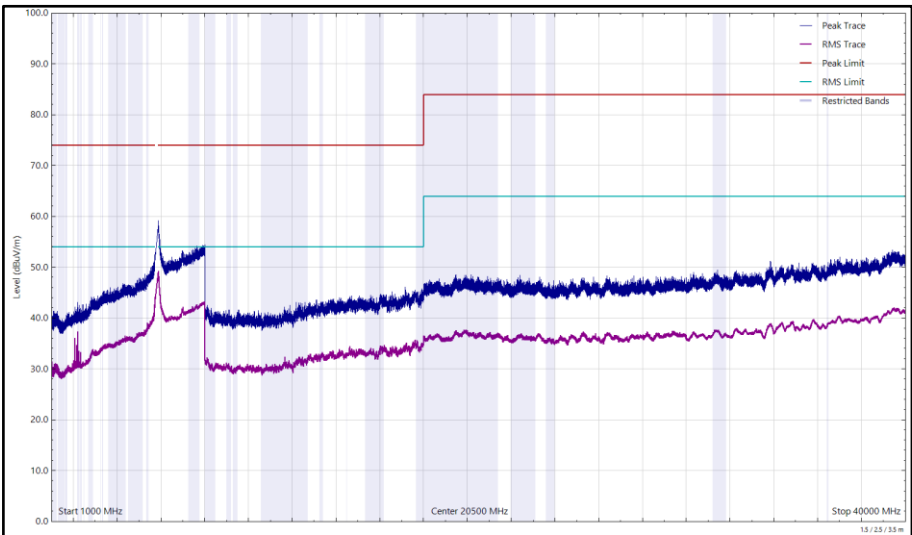


Figure 287 - U-NII-3 - 5825 MHz (CH165), 802.11a, Core 0, 1 GHz to 40 GHz, Horizontal

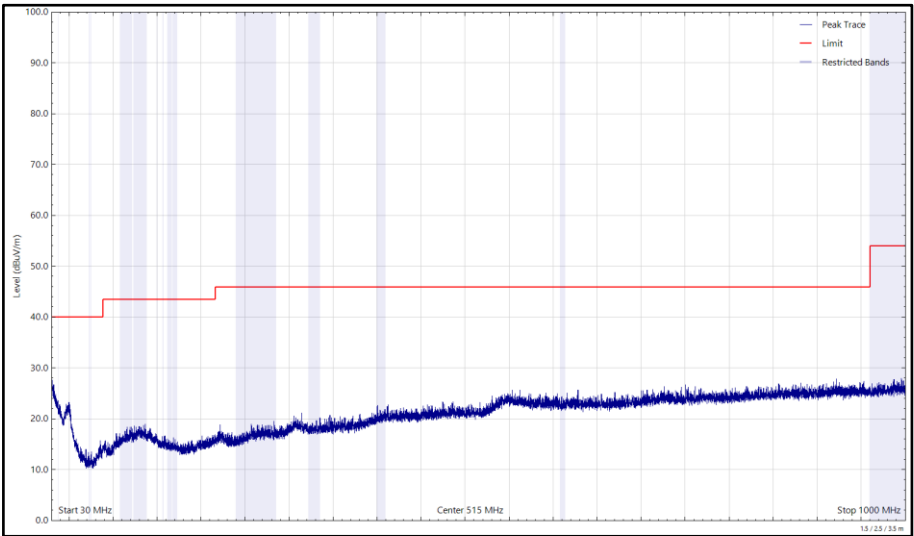


Figure 288 - U-NII-3 - 5825 MHz (CH165), 802.11a, Core 0, 30 MHz to 1 GHz, Vertical (Peak)

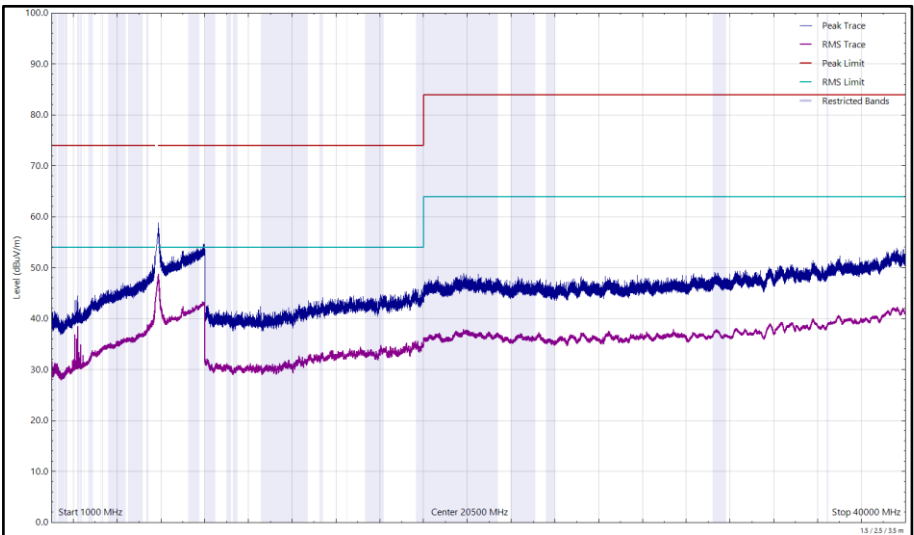


Figure 289 - U-NII-3 - 5825 MHz (CH165), 802.11a, Core 0, 1 GHz to 40 GHz, Vertical



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

Table 493 - U-NII-1 - 5180 MHz (CH36), 802.11a, Core 1, 30 MHz to 40 GHz

*No emissions found within 10 dB of the limit.

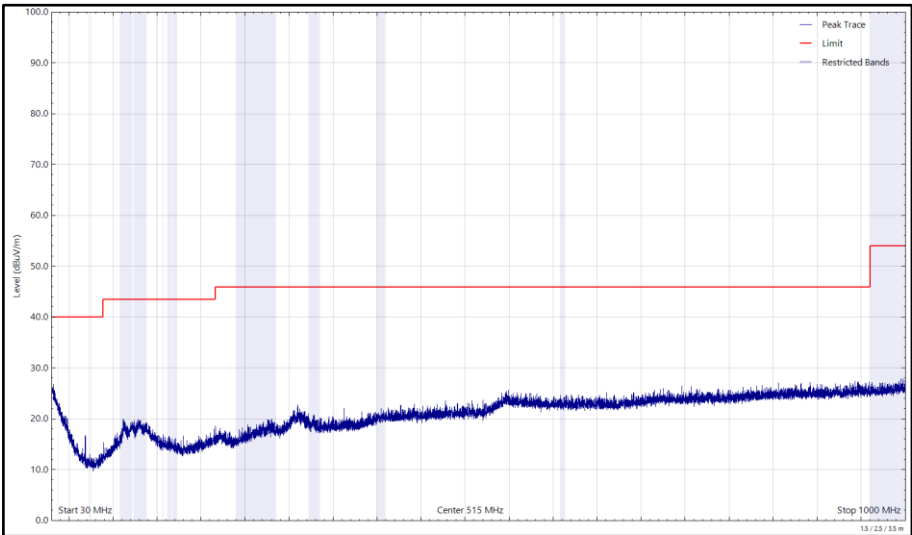


Figure 290 - U-NII-1 - 5180 MHz (CH36), 802.11a, Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

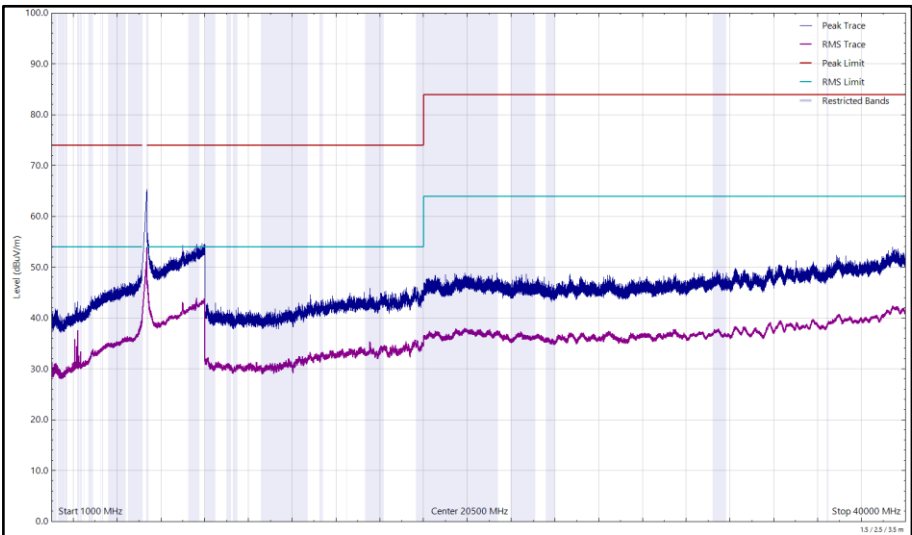


Figure 291 - U-NII-1 - 5180 MHz (CH36), 802.11a, Core 1, 1 GHz to 40 GHz, Horizontal

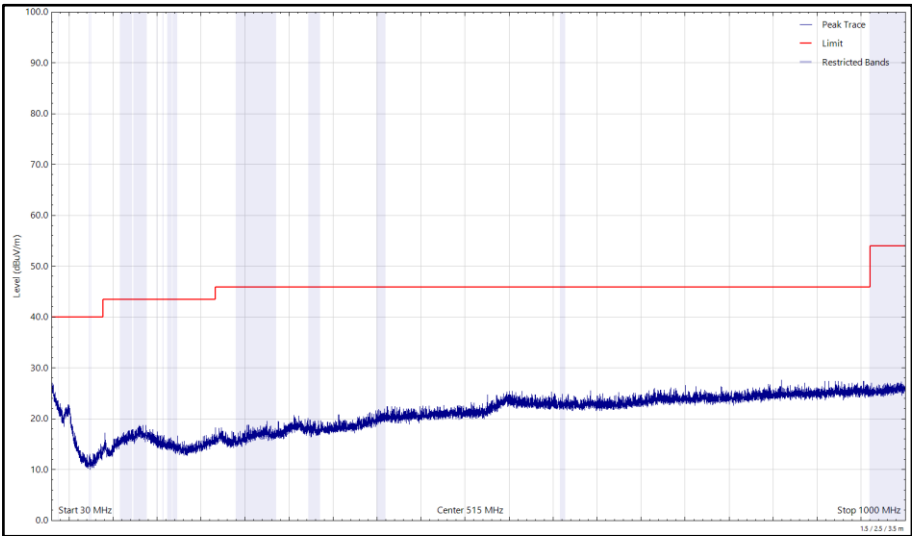


Figure 292 - U-NII-1 - 5180 MHz (CH36), 802.11a, Core 1, 30 MHz to 1 GHz, Vertical (Peak)

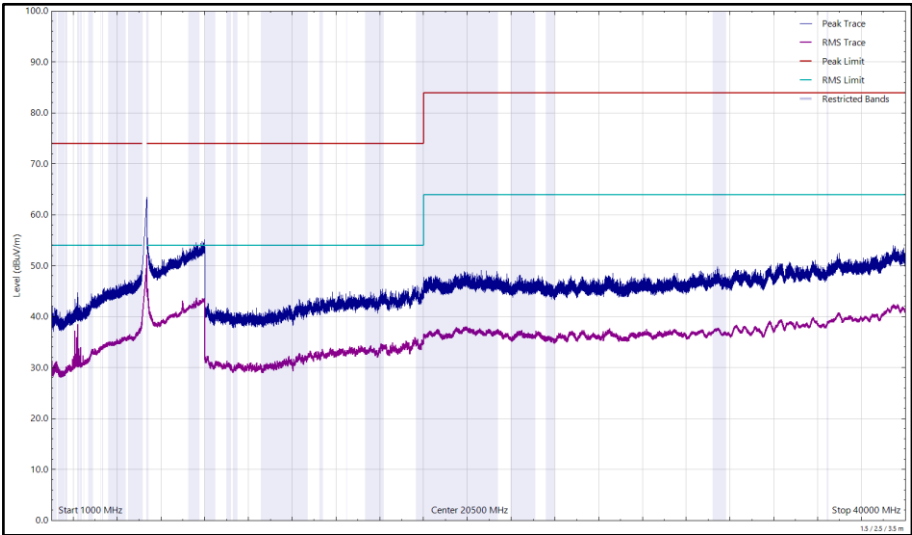


Figure 293 - U-NII-1 - 5180 MHz (CH36), 802.11a, Core 1, 1 GHz to 40 GHz, Vertical



Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
15960.714	34.70	54.0	-19.30	RMS	298	361	Horizontal

Table 494 - U-NII-2A - 5320 MHz (CH64), 802.11a, Core 1, 1 GHz to 40 GHz

No other emissions found within 10 dB of the limit.

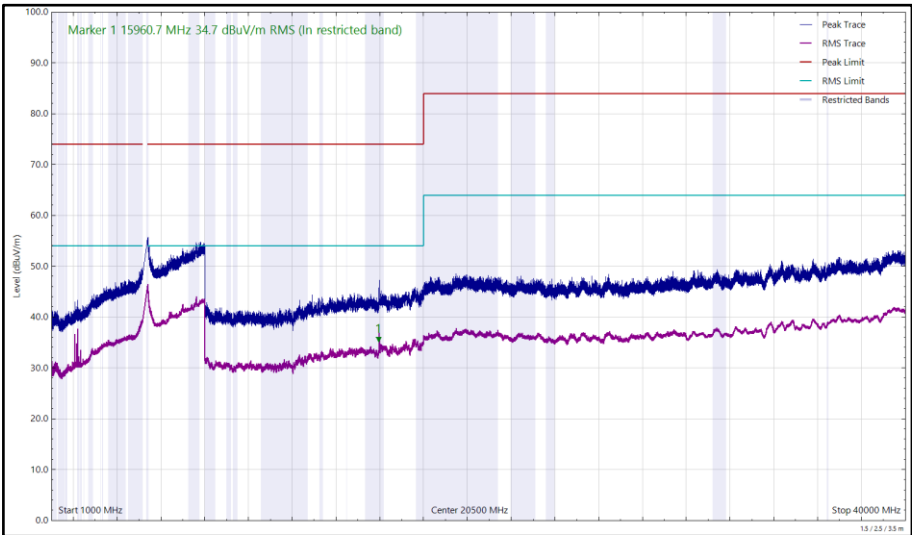


Figure 294 - U-NII-2A - 5320 MHz (CH64), 802.11a, Core 1, 1 GHz to 40 GHz, Horizontal

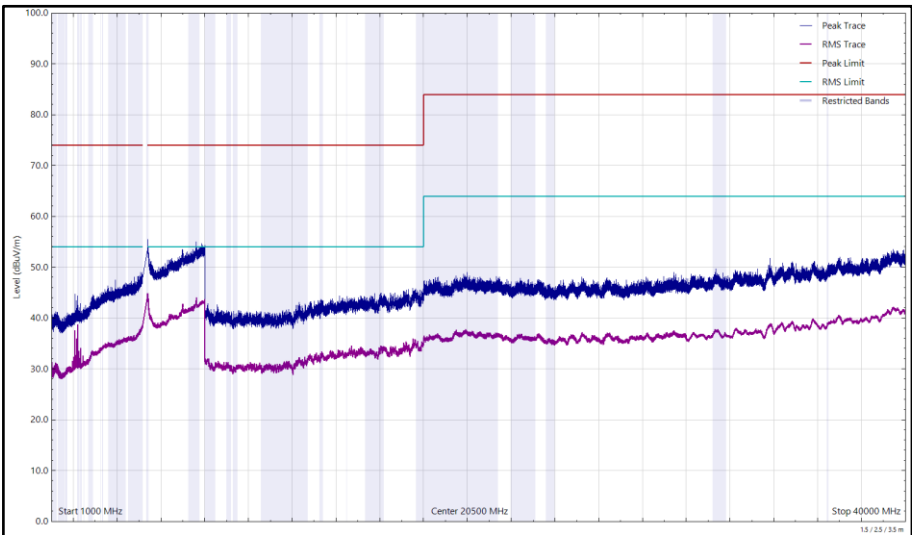


Figure 295 - U-NII-2A - 5320 MHz (CH64), 802.11a, Core 1, 1 GHz to 40 GHz, Vertical



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

Table 495 - U-NII-2C - 5500 MHz (CH100), 802.11a, Core 1, 1 GHz to 40 GHz

*No emissions found within 10 dB of the limit.

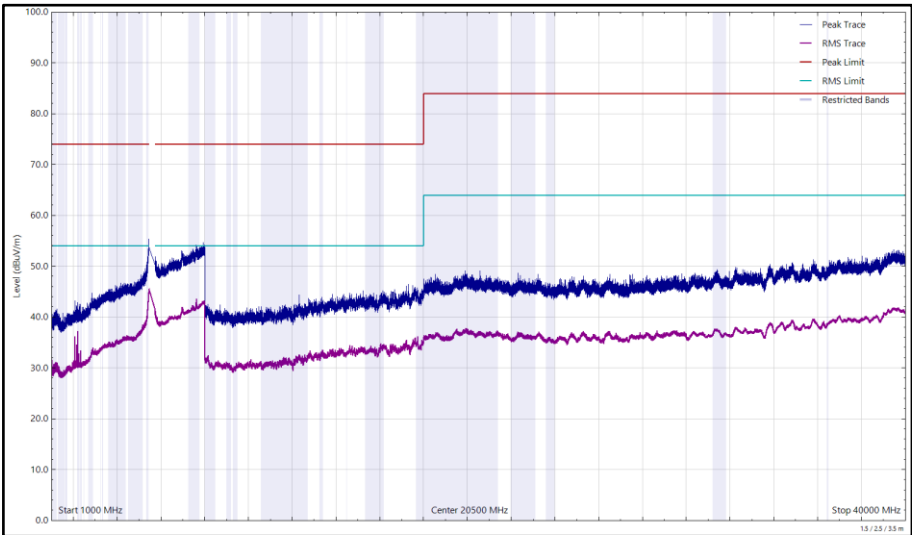


Figure 296 - U-NII-2C - 5500 MHz (CH100), 802.11a, Core 1, 1 GHz to 40 GHz, Horizontal

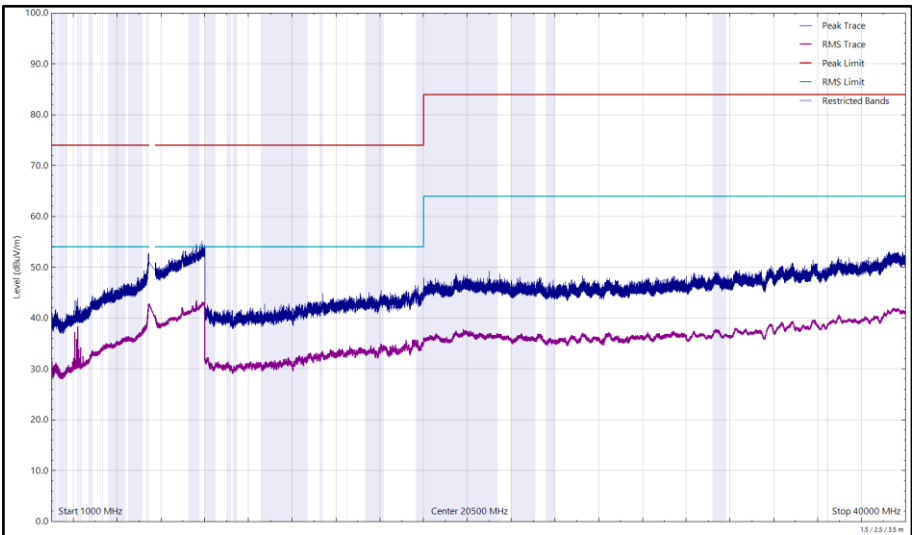


Figure 297 - U-NII-2C - 5500 MHz (CH100), 802.11a, Core 1, 1 GHz to 40 GHz, Vertical



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

Table 496 - U-NII-2C - 5700 MHz (CH140), 802.11a, Core 1, 1 GHz to 40 GHz

*No emissions found within 10 dB of the limit.

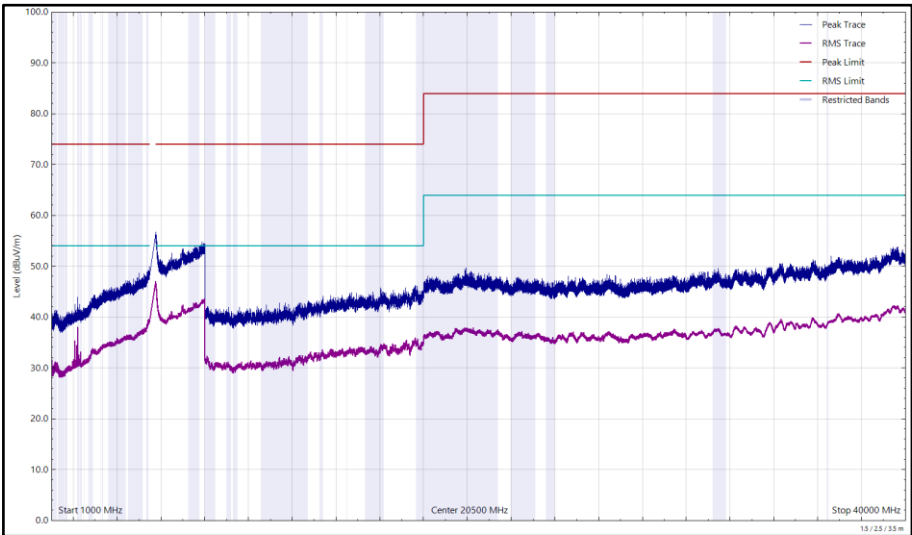


Figure 298 - U-NII-2C - 5700 MHz (CH140), 802.11a, Core 1, 1 GHz to 40 GHz, Horizontal

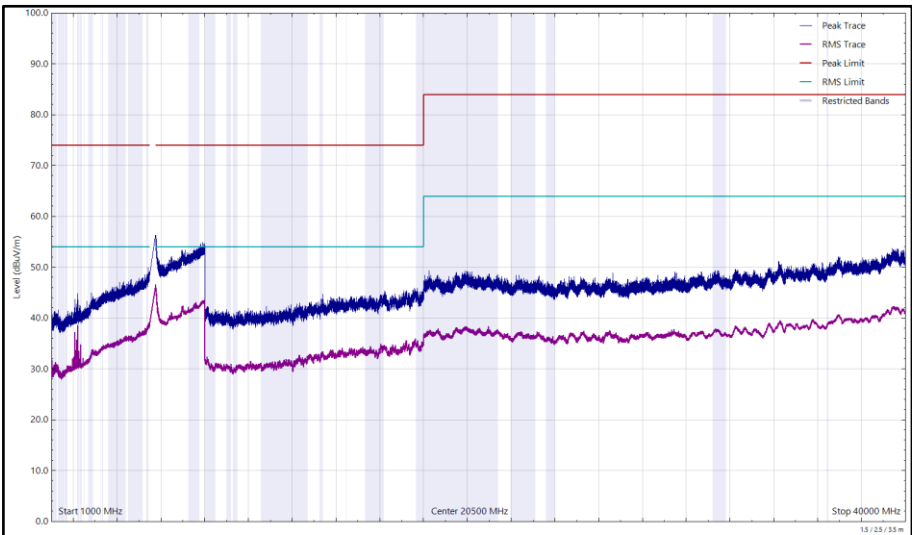


Figure 299 - U-NII-2C - 5700 MHz (CH140), 802.11a, Core 1, 1 GHz to 40 GHz, Vertical



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

Table 497 - U-NII-3 - 5745 MHz (CH149), 802.11a, Core 1, 1 GHz to 40 GHz

*No emissions found within 10 dB of the limit.

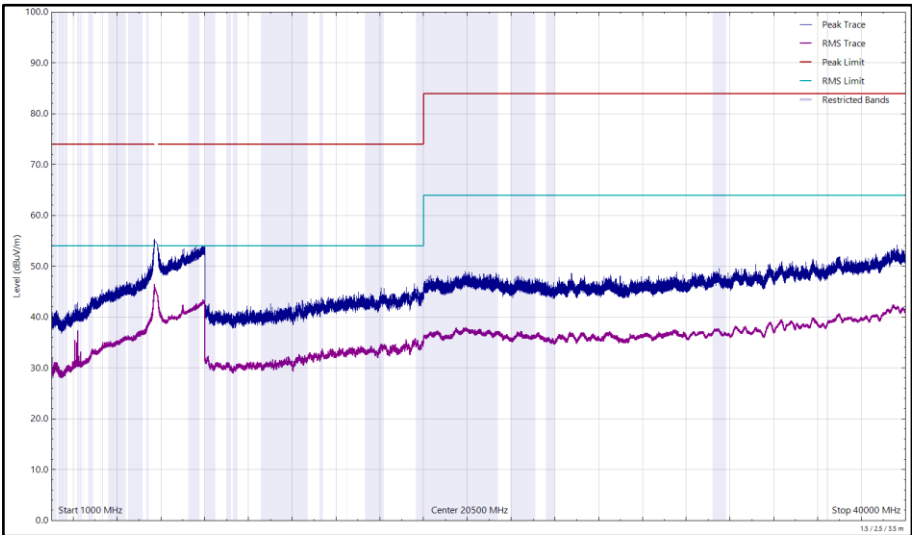


Figure 300 - U-NII-3 - 5745 MHz (CH149), 802.11a, Core 1, 1 GHz to 40 GHz, Horizontal

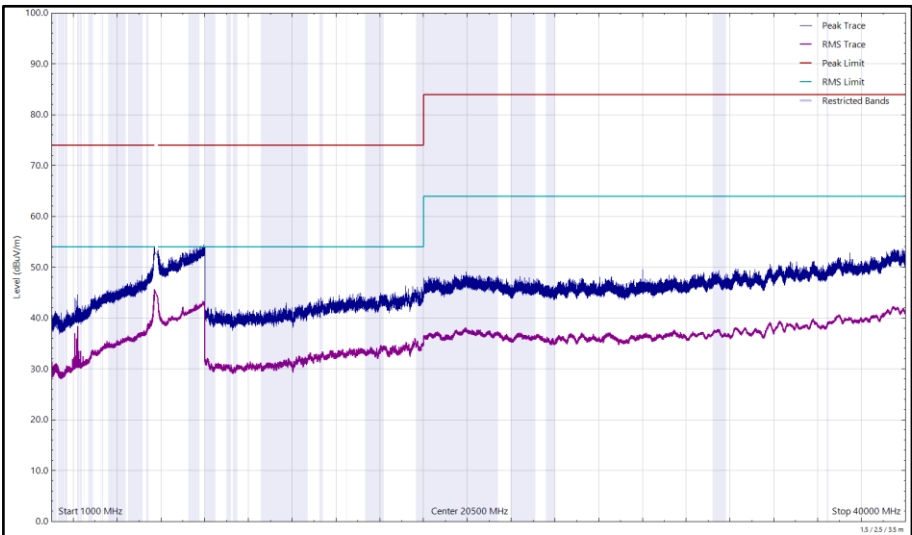


Figure 301 - U-NII-3 - 5745 MHz (CH149), 802.11a, Core 1, 1 GHz to 40 GHz, Vertical



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

Table 498 - U-NII-3 - 5825 MHz (CH165), 802.11a, Core 1, 30 MHz to 40 GHz

*No emissions found within 10 dB of the limit.

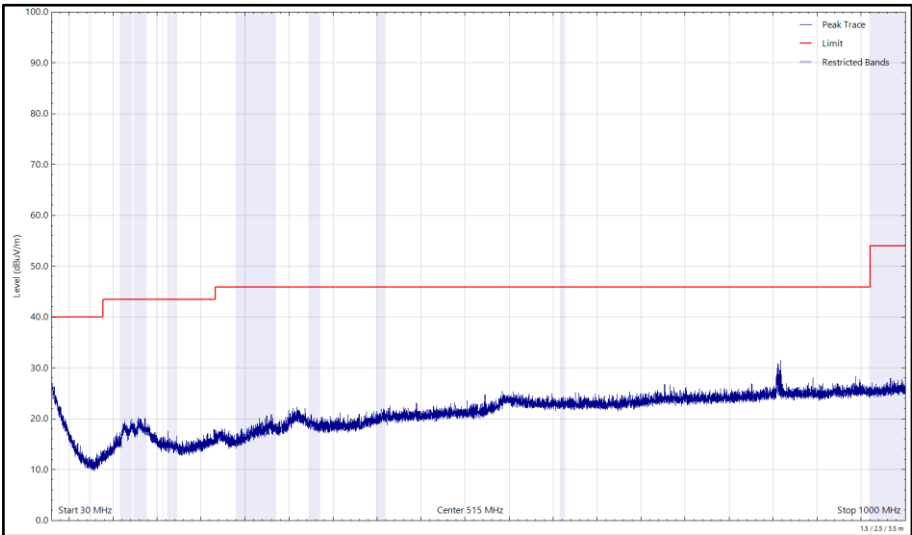


Figure 302 - U-NII-3 - 5825 MHz (CH165), 802.11a, Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

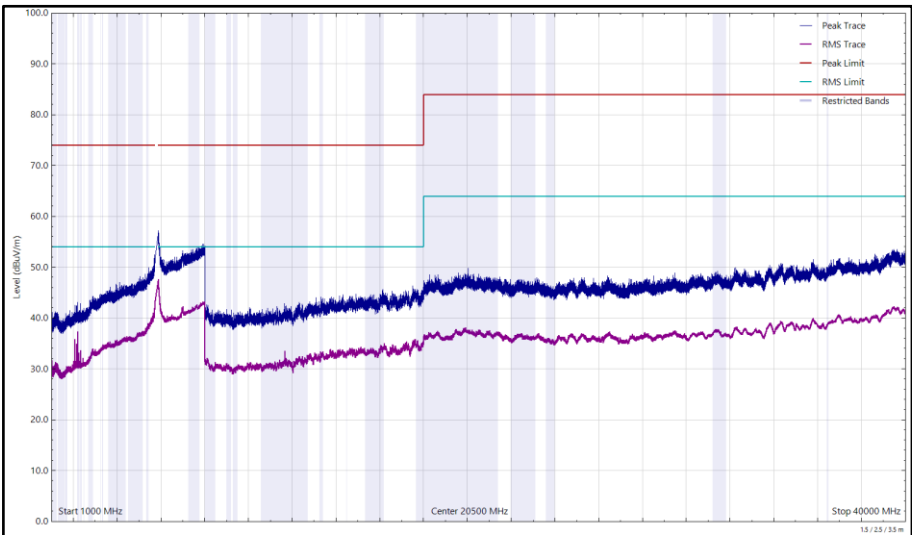


Figure 303 - U-NII-3 - 5825 MHz (CH165), 802.11a, Core 1, 1 GHz to 40 GHz, Horizontal

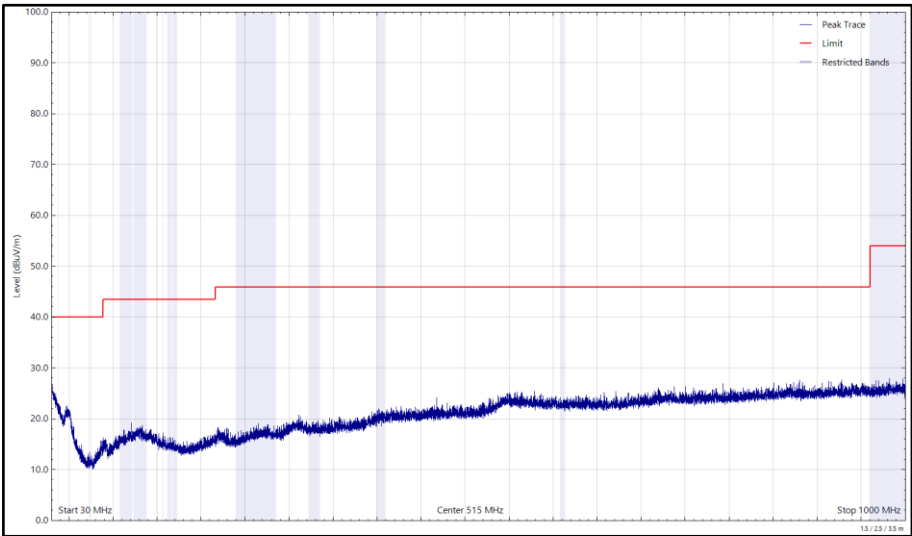


Figure 304 - U-NII-3 - 5825 MHz (CH165), 802.11a, Core 1, 30 MHz to 1 GHz, Vertical (Peak)

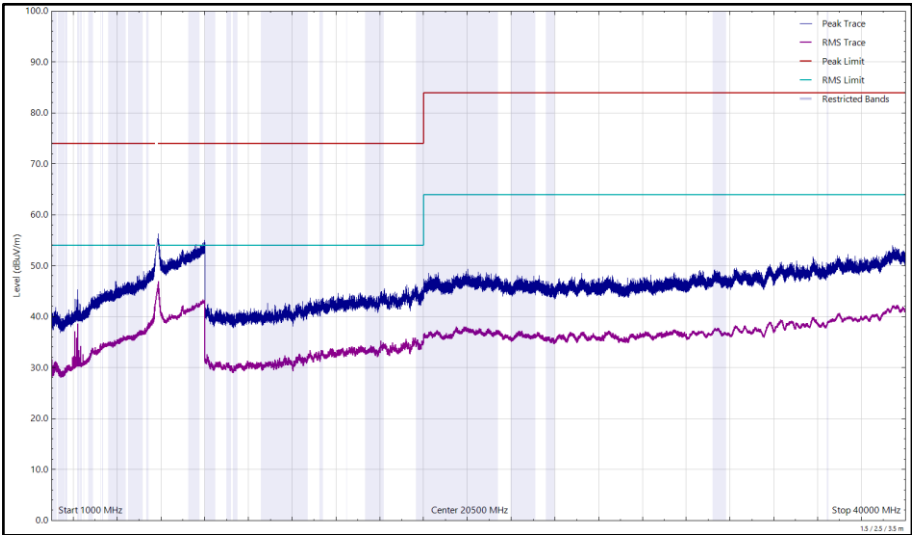


Figure 305 - U-NII-3 - 5825 MHz (CH165), 802.11a, Core 1, 1 GHz to 40 GHz, Vertical



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

Table 499 - U-NII-1 - 5180 MHz (CH36), VHT20, CDD, Core 0 + Core 1, 30 MHz to 40 GHz

*No emissions found within 10 dB of the limit.

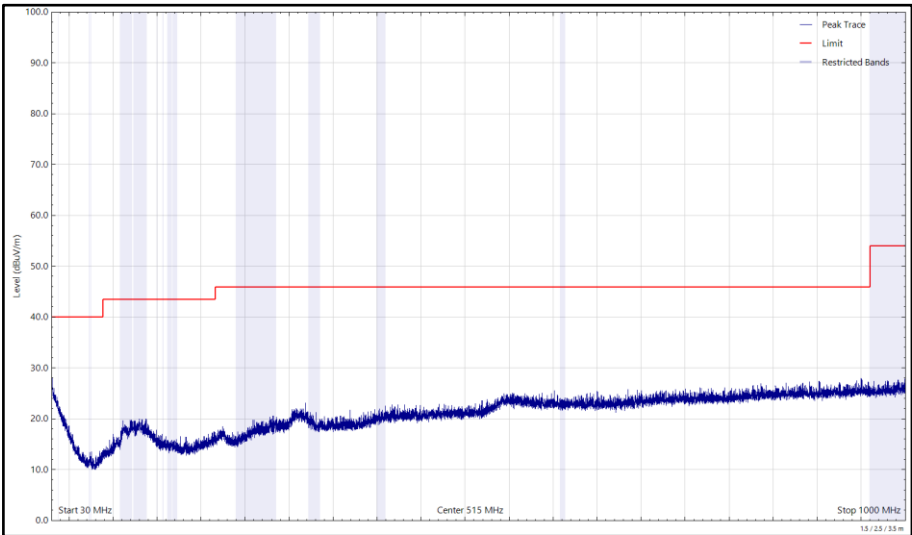


Figure 306 - U-NII-1 - 5180 MHz (CH36), VHT20, CDD, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

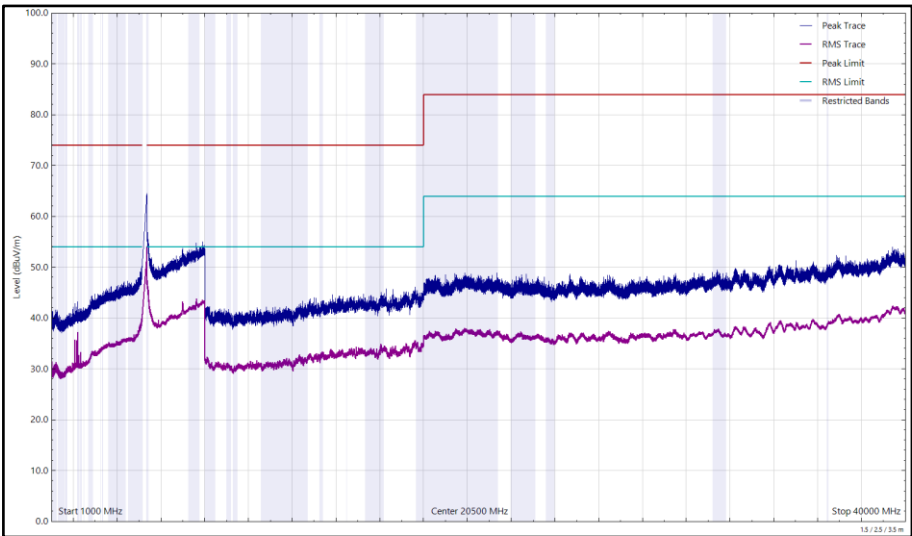


Figure 307 - U-NII-1 - 5180 MHz (CH36), VHT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

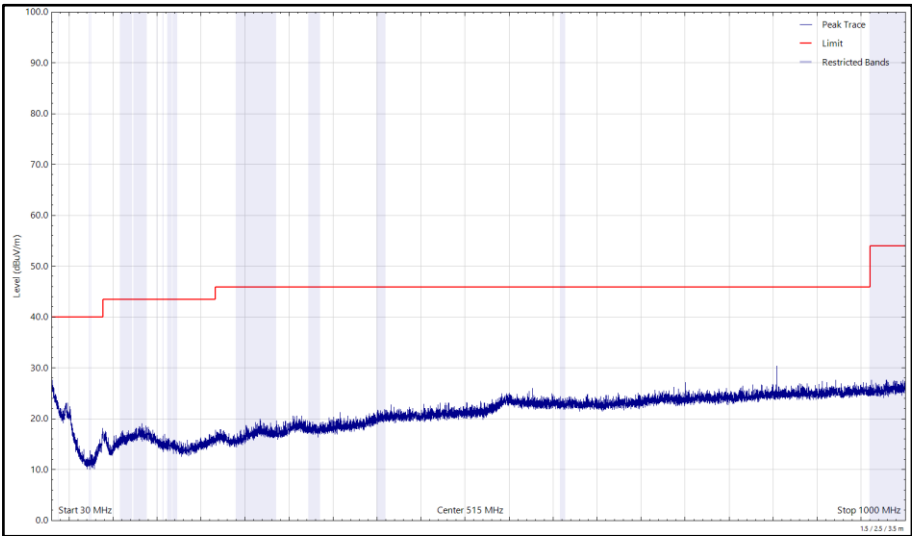


Figure 308 - U-NII-1 - 5180 MHz (CH36), VHT20, CDD, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

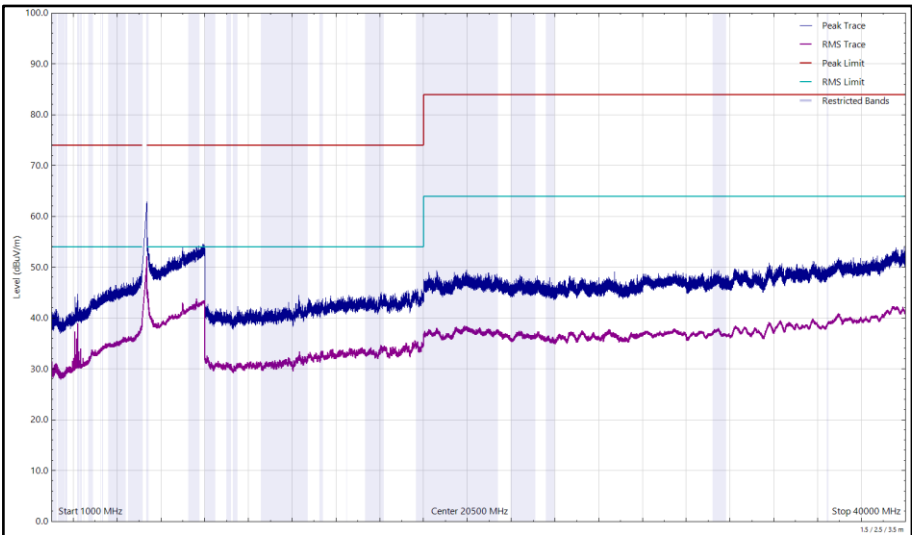


Figure 309 - U-NII-1 - 5180 MHz (CH36), VHT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical



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

Table 500 - U-NII-2A - 5320 MHz (CH64), VHT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz

*No emissions found within 10 dB of the limit.

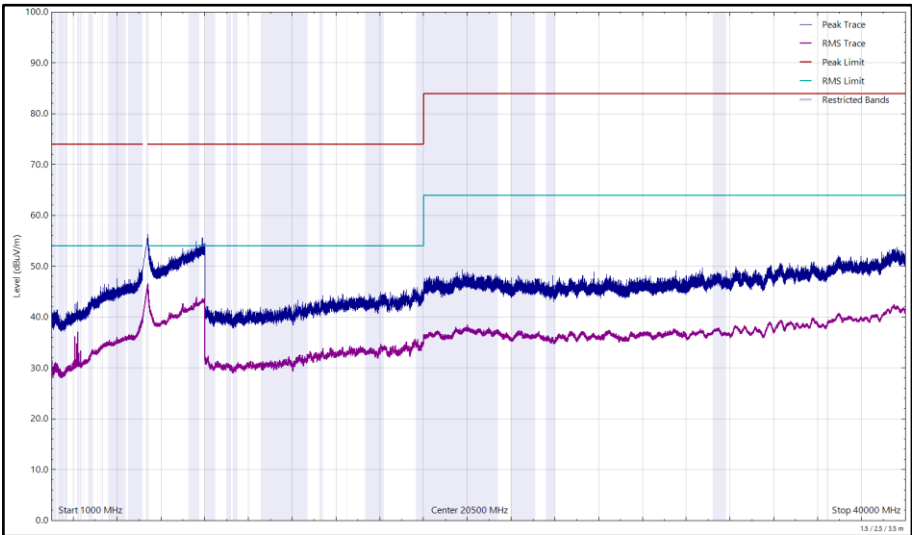


Figure 310 - U-NII-2A - 5320 MHz (CH64), VHT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

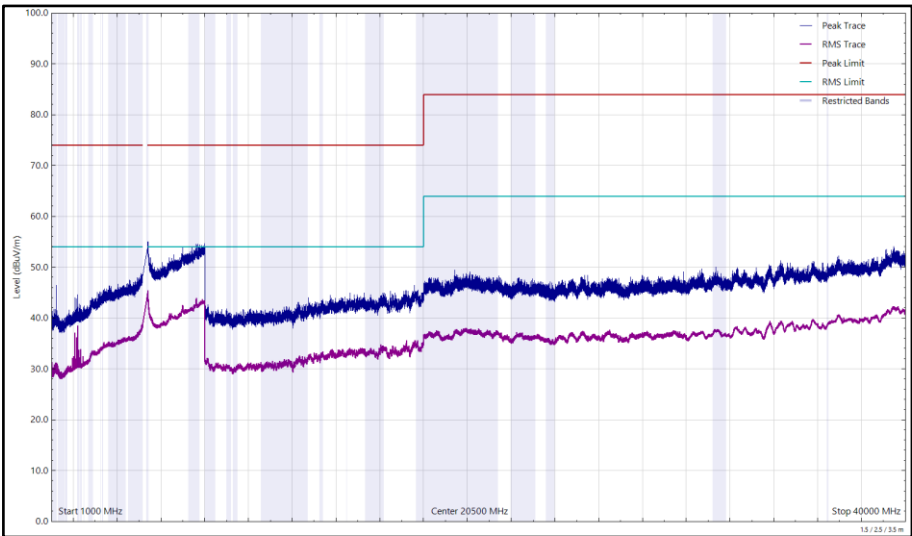


Figure 311 - U-NII-2A - 5320 MHz (CH64), VHT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical



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

Table 501 - U-NII-2C - 5500 MHz (CH100), VHT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz

*No emissions found within 10 dB of the limit.

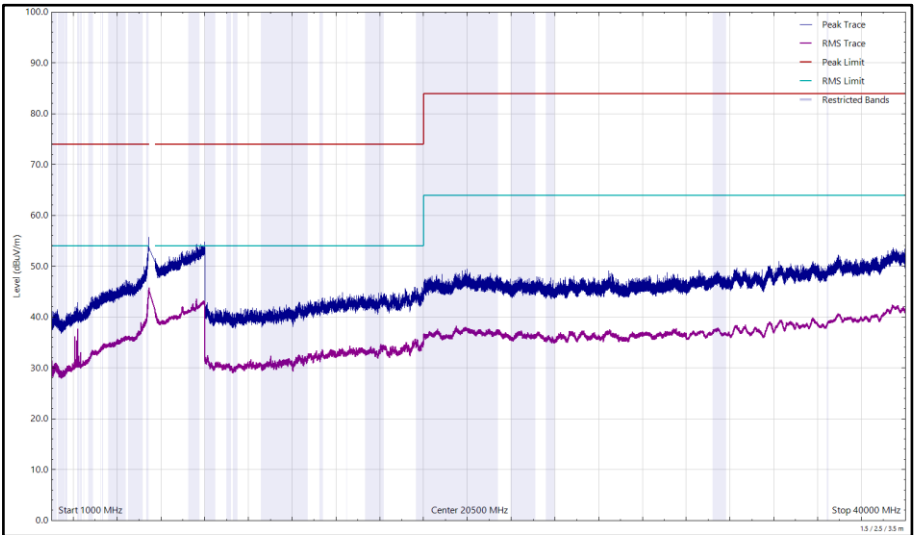


Figure 312 - U-NII-2C - 5500 MHz (CH100), VHT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

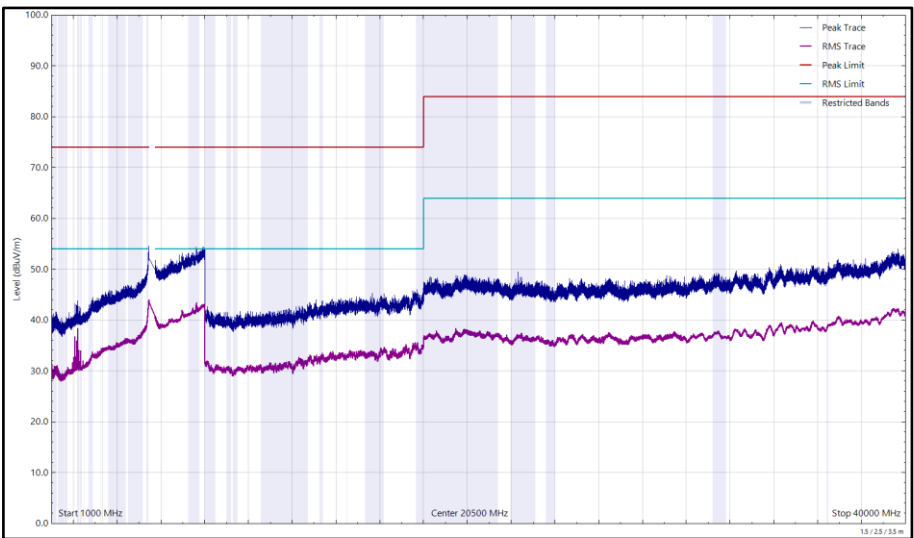


Figure 313 - U-NII-2C - 5500 MHz (CH100), VHT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical



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

Table 502 - U-NII-2C - 5700 MHz (CH140), VHT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz

*No emissions found within 10 dB of the limit.

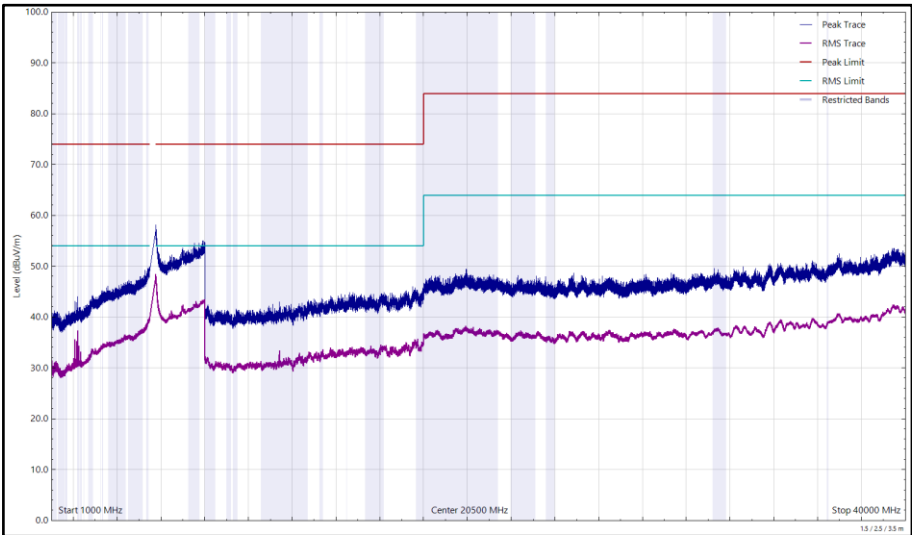


Figure 314 - U-NII-2C - 5700 MHz (CH140), VHT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

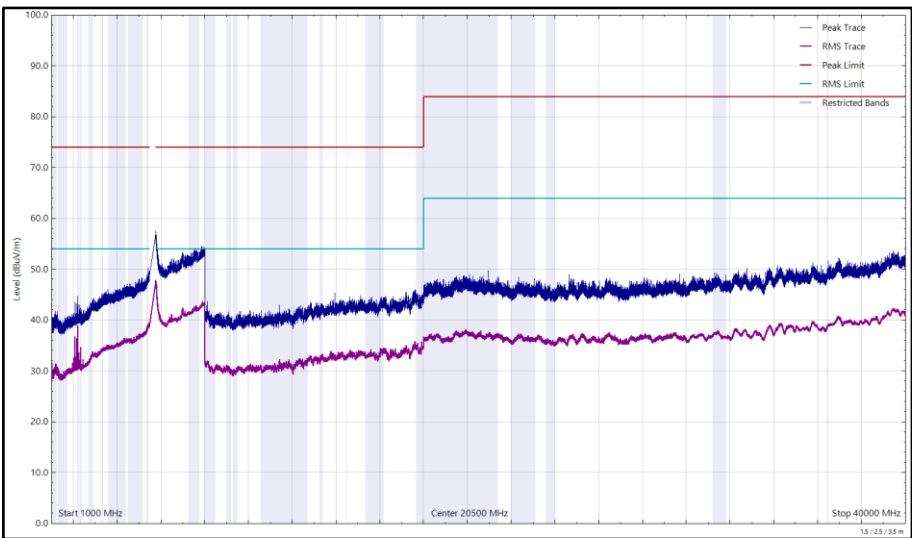


Figure 315 - U-NII-2C - 5700 MHz (CH140), VHT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical



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

Table 503 - U-NII-3 - 5745 MHz (CH149), VHT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz

*No emissions found within 10 dB of the limit.

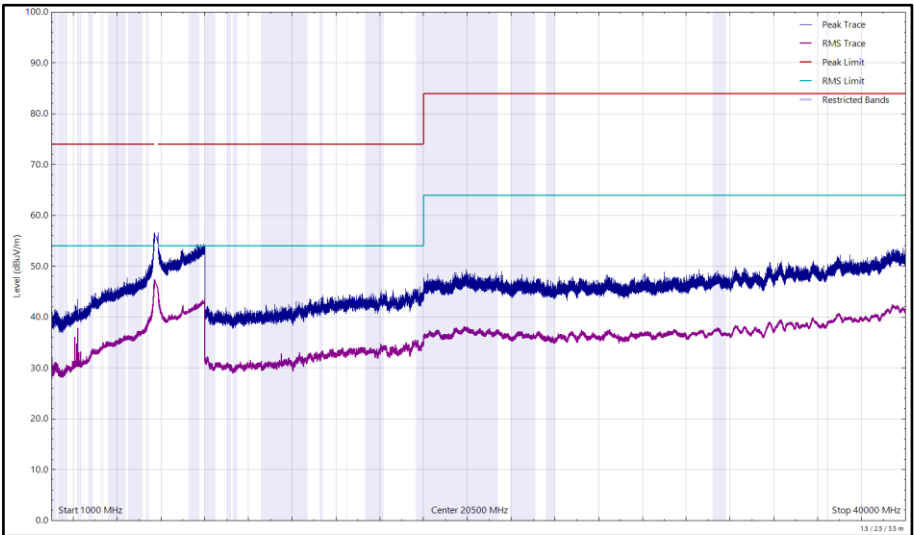


Figure 316 - U-NII-3 - 5745 MHz (CH149), VHT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

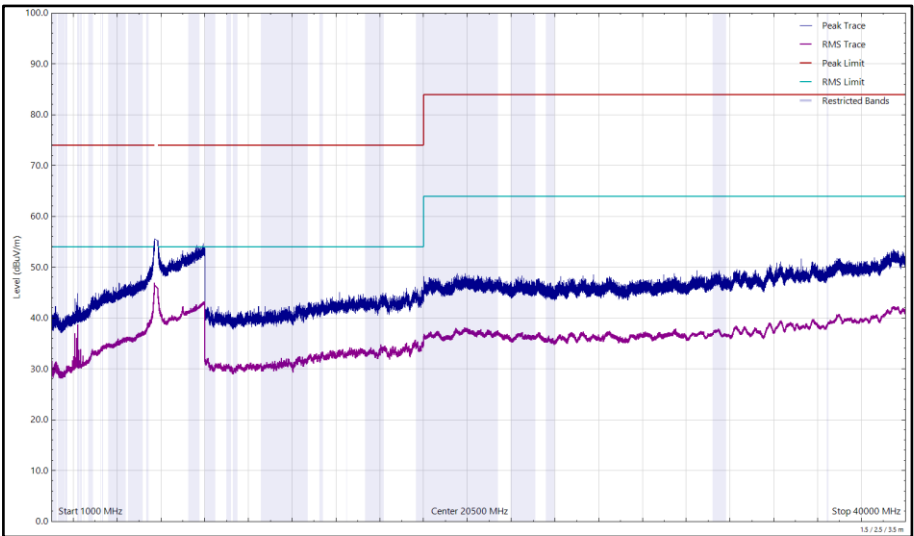


Figure 317 - U-NII-3 - 5745 MHz (CH149), VHT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical



Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
11650.530	34.60	54.0	-19.50	RMS	164	221	Horizontal

Table 504 - U-NII-3 - 5825 MHz (CH165), VHT20, CDD, Core 0 + Core 1, 30 MHz to 40 GHz

No other emissions found within 10 dB of the limit.

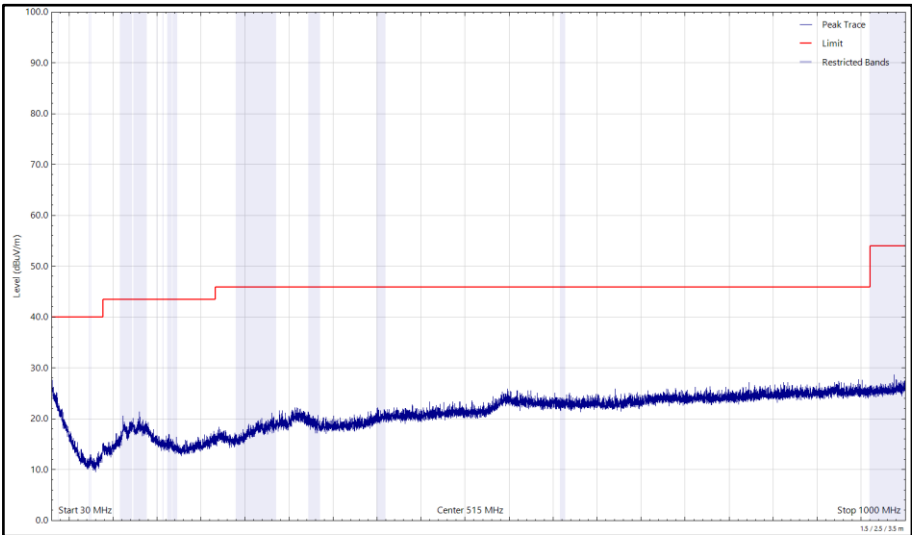


Figure 318 - U-NII-3 - 5825 MHz (CH165), VHT20, CDD, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

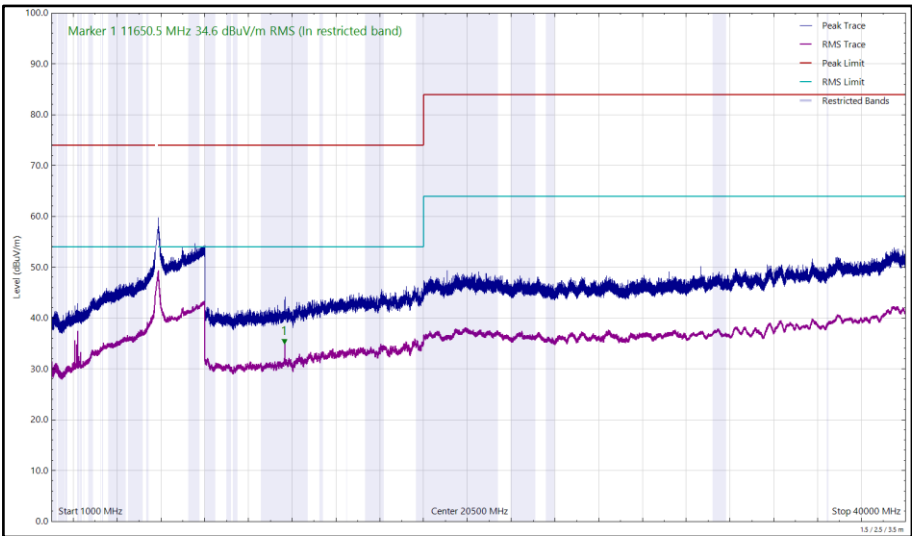


Figure 319 - U-NII-3 - 5825 MHz (CH165), VHT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

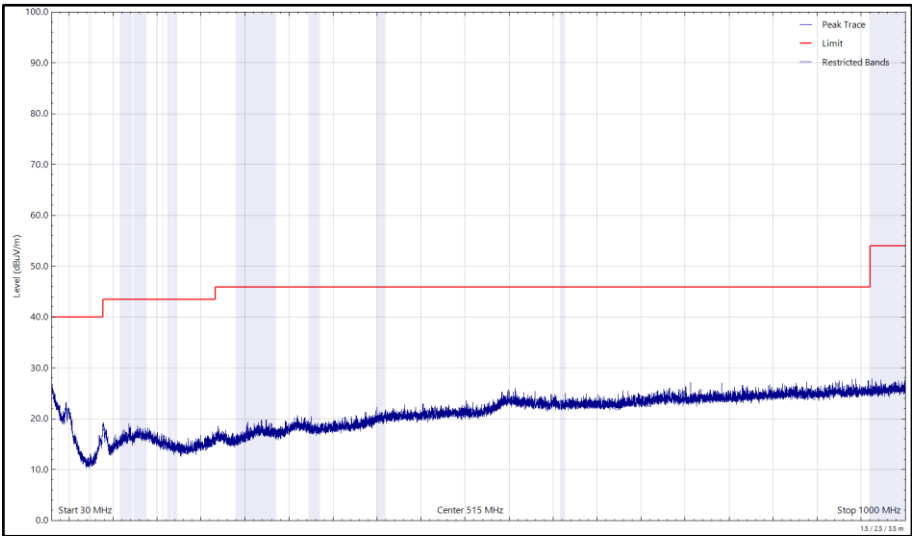


Figure 320 - U-NII-3 - 5825 MHz (CH165), VHT20, CDD, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

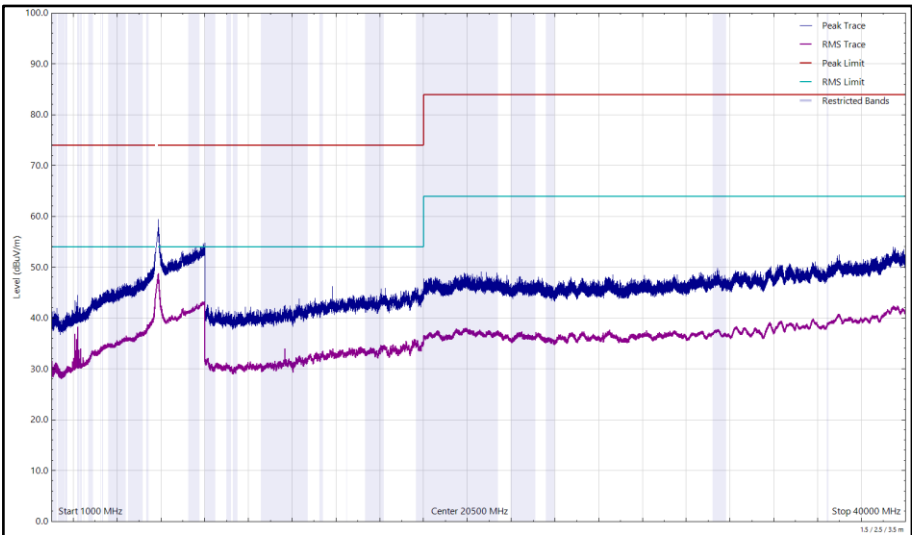


Figure 321 - U-NII-3 - 5825 MHz (CH165), VHT20, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical



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

Table 505 - U-NII-1 - 5180 MHz (CH36), HE20, RU26-0, CDD, Core 0 + Core 1, 30 MHz to 40 GHz

*No emissions found within 10 dB of the limit.

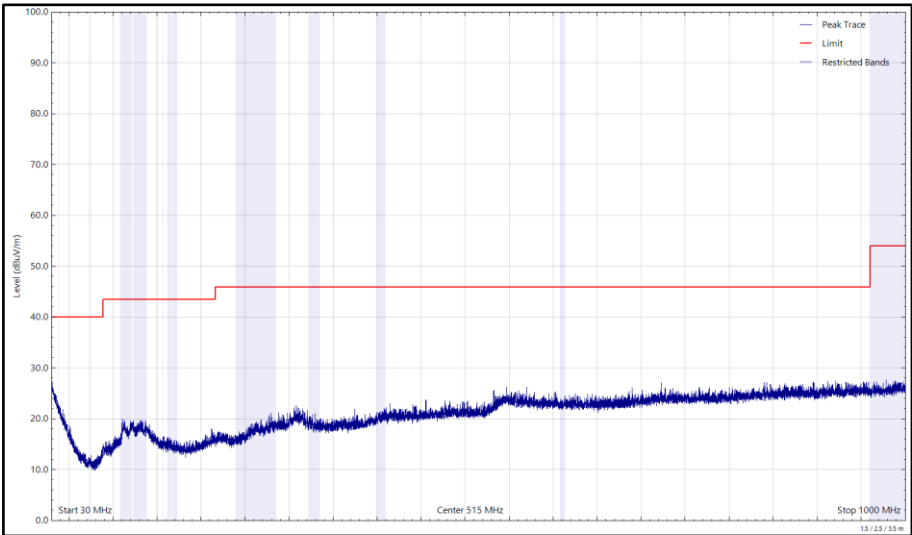


Figure 322 - U-NII-1 - 5180 MHz (CH36), HE20, RU26-0, CDD, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

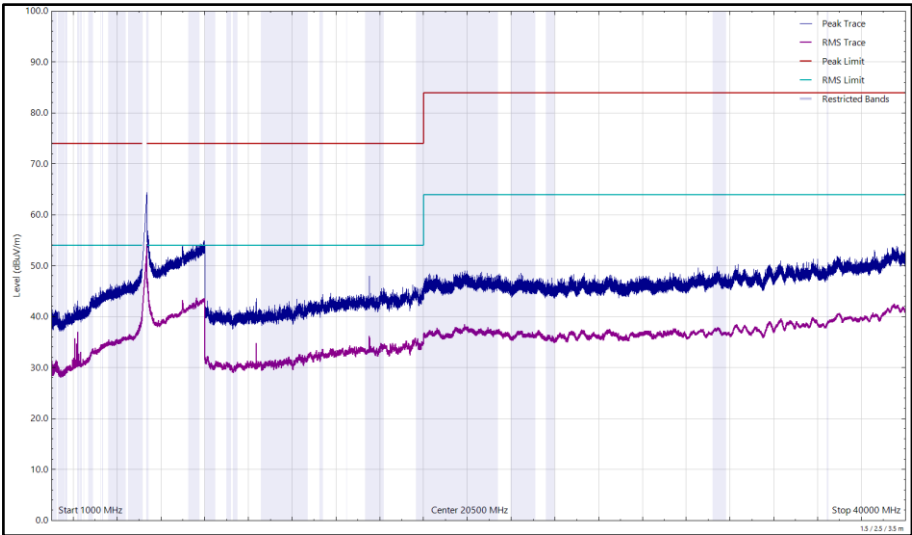


Figure 323 - U-NII-1 - 5180 MHz (CH36), HE20, RU26-0, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

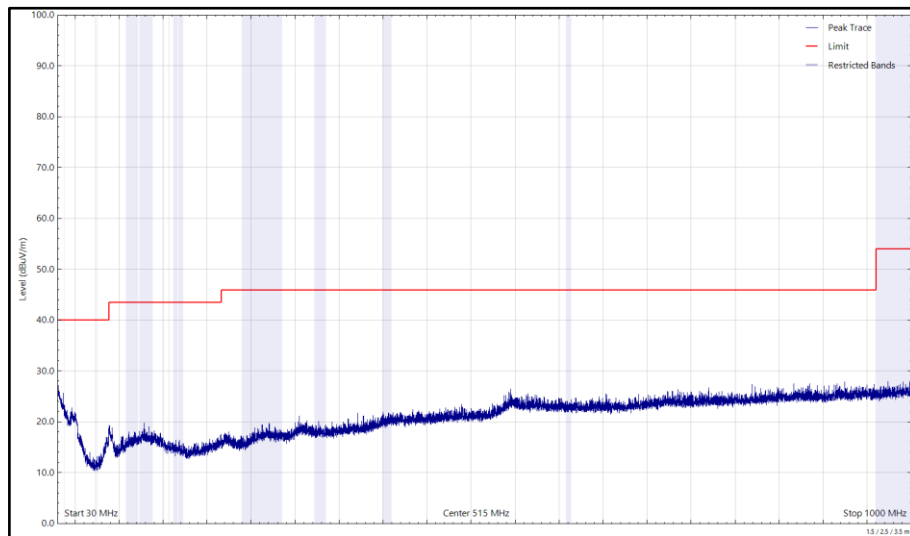


Figure 324 - U-NII-1 - 5180 MHz (CH36), HE20, RU26-0, CDD, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

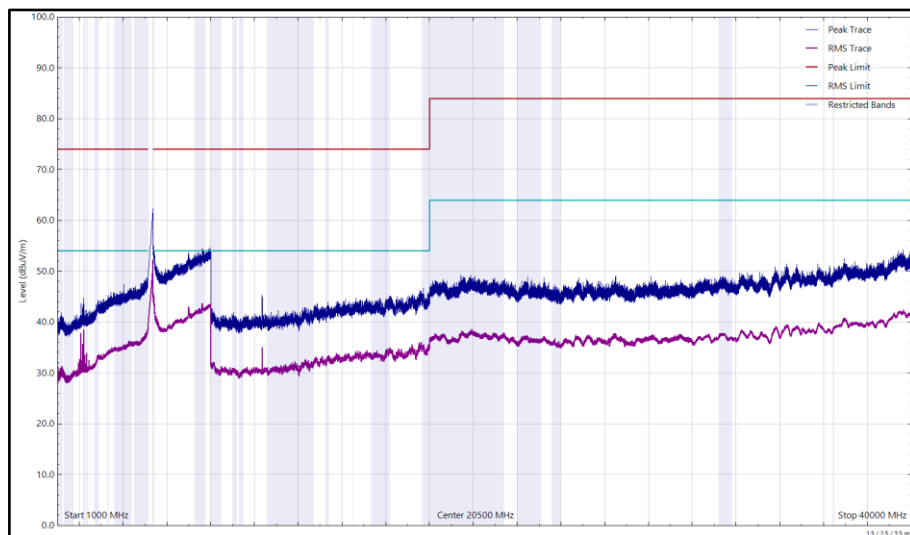


Figure 325 - U-NII-1 - 5180 MHz (CH36), HE20, RU26-0, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
15936.989	35.90	54.0	-18.20	RMS	305	176	Horizontal

Table 506 - U-NII-2A - 5320 MHz (CH64), HE20, RU52-37, CDD, Core 0 + Core 1, 1 to 40 GHz

No other emissions found within 10 dB of the limit.

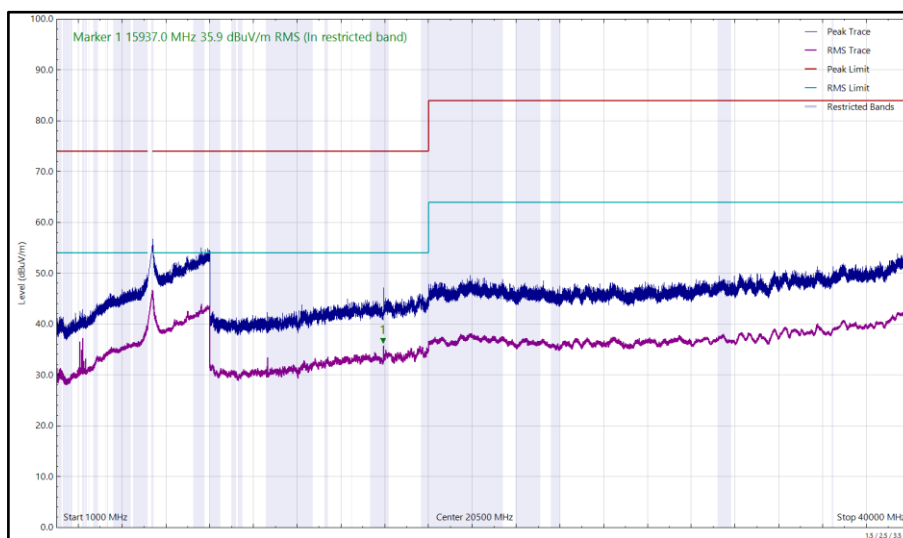


Figure 326 - U-NII-2A - 5320 MHz (CH64), HE20, RU52-37, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

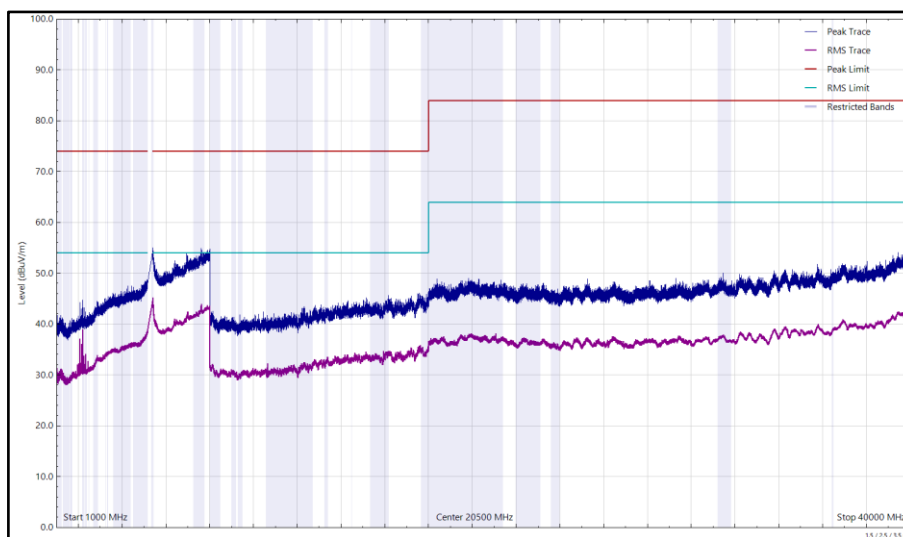


Figure 327 - U-NII-2A - 5320 MHz (CH64), HE20, RU52-37, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical



Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
10985.409	34.20	54.0	-19.80	RMS	151	225	Horizontal

Table 507 - U-NII-2C - 5500 MHz (CH100), HE20, RU52-37, CDD, Core 0 + Core 1,
1 GHz to 40 GHz

No other emissions found within 10 dB of the limit.

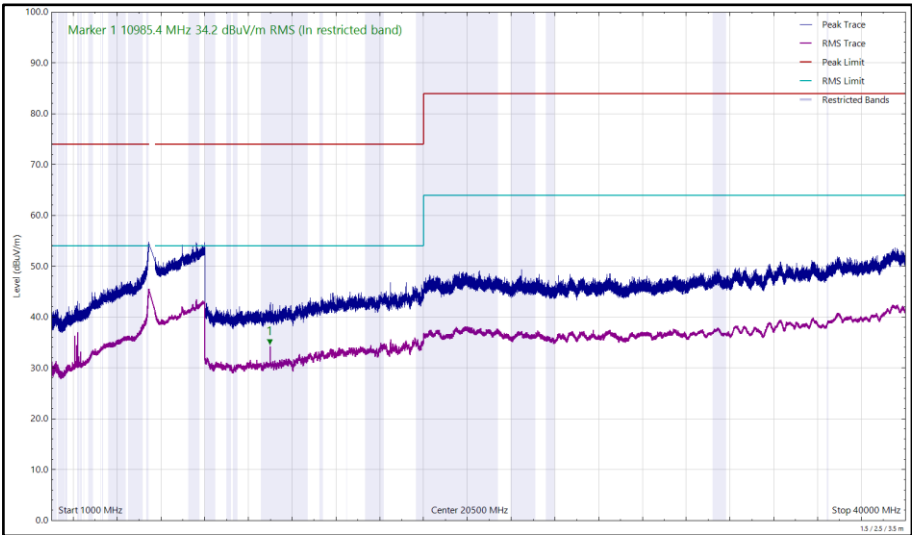


Figure 328 - U-NII-2C - 5500 MHz (CH100), HE20, RU52-37, CDD, Core 0 + Core 1,
1 GHz to 40 GHz, Horizontal

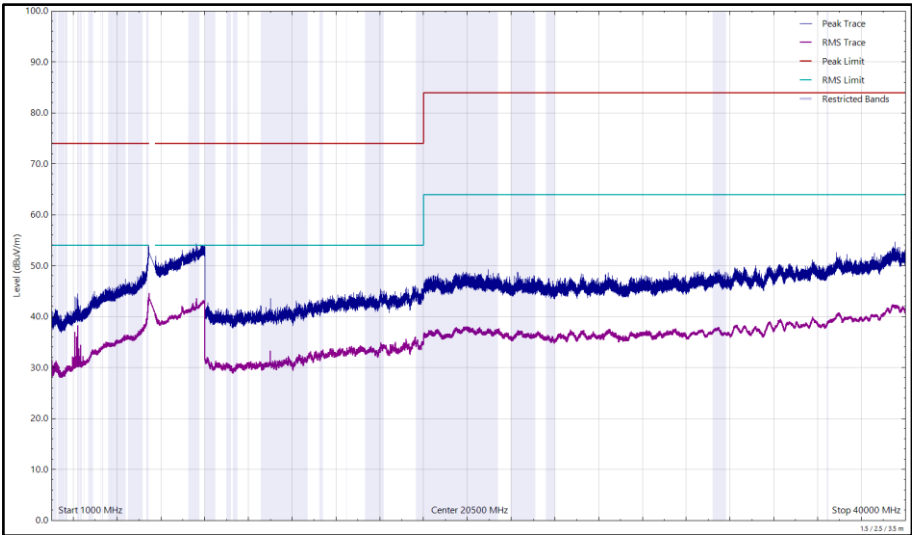


Figure 329 - U-NII-2C - 5500 MHz (CH100), HE20, RU52-37, CDD, Core 0 + Core 1,
1 GHz to 40 GHz, Vertical



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

Table 508 - U-NII-2C - 5700 MHz (CH140), HE20, RU52-37, CDD, Core 0 + Core 1,
1 GHz to 40 GHz

*No emissions found within 10 dB of the limit.

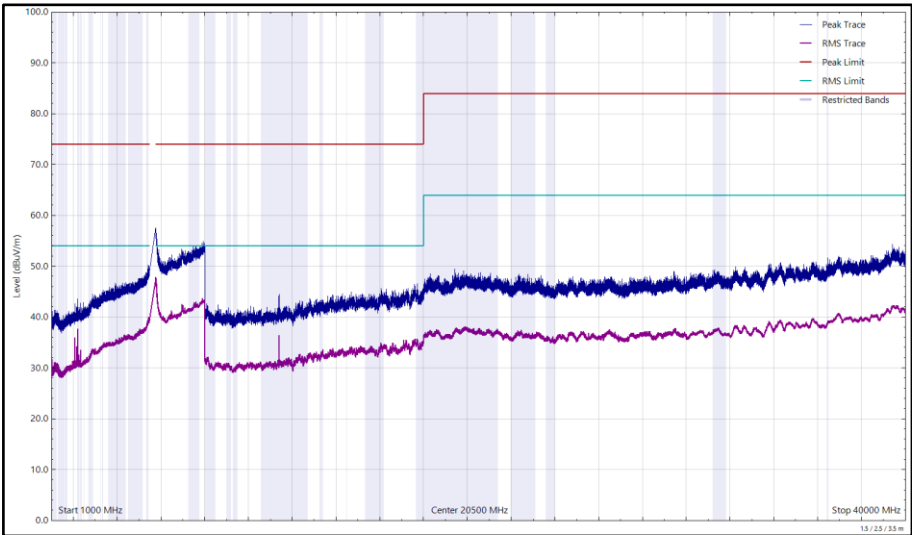


Figure 330 - U-NII-2C - 5700 MHz (CH140), HE20, RU52-37, CDD, Core 0 + Core 1,
1 GHz to 40 GHz, Horizontal

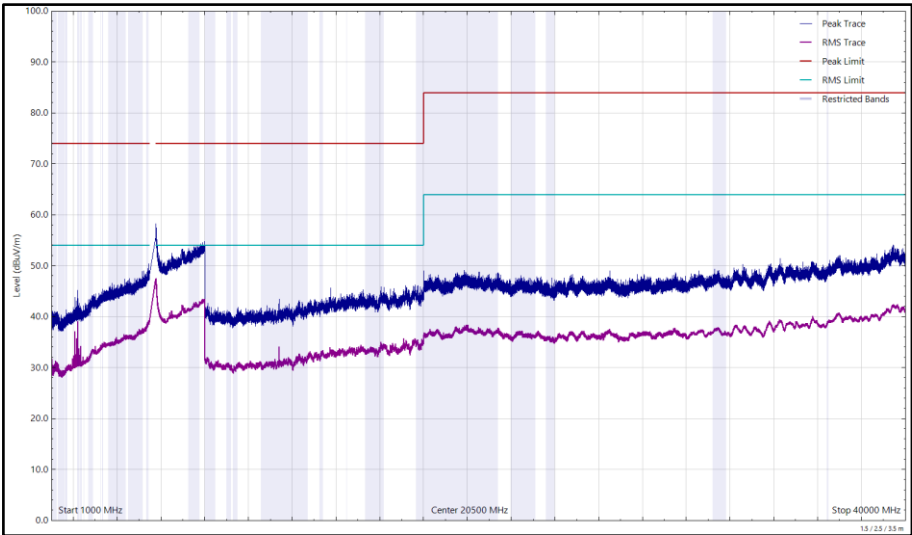


Figure 331 - U-NII-2C - 5700 MHz (CH140), HE20, RU52-37, CDD, Core 0 + Core 1,
1 GHz to 40 GHz, Vertical



Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
11473.017	38.90	54.0	-15.20	RMS	154	198	Horizontal

Table 509 - U-NII-3 - 5745 MHz (CH149), HE20, RU26-0, CDD, Core 0 + Core 1, 1 GHz to 40 GHz

No other emissions found within 10 dB of the limit.

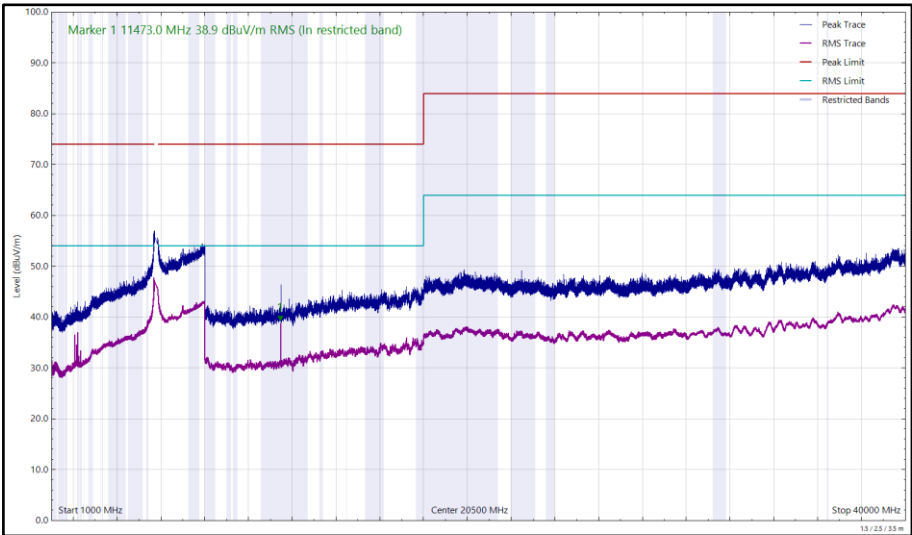


Figure 332 - U-NII-3 - 5745 MHz (CH149), HE20, RU26-0, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

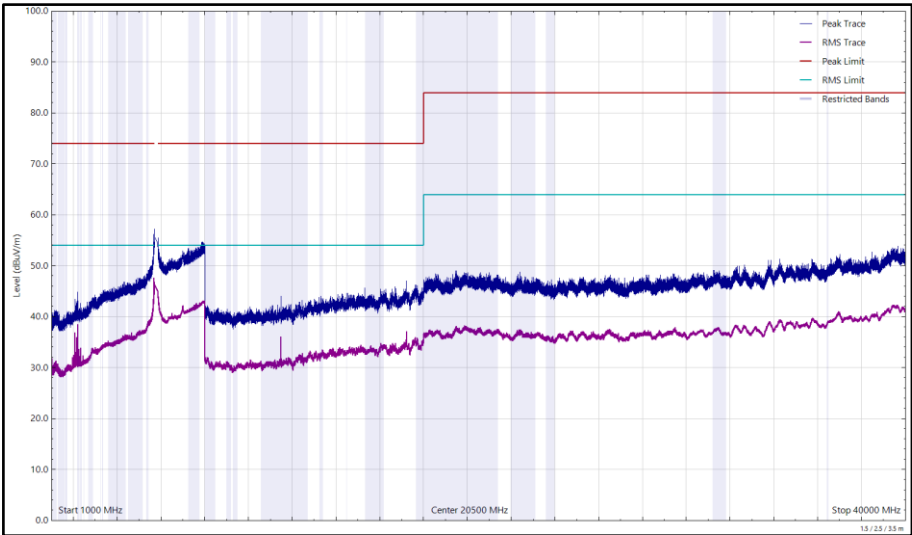
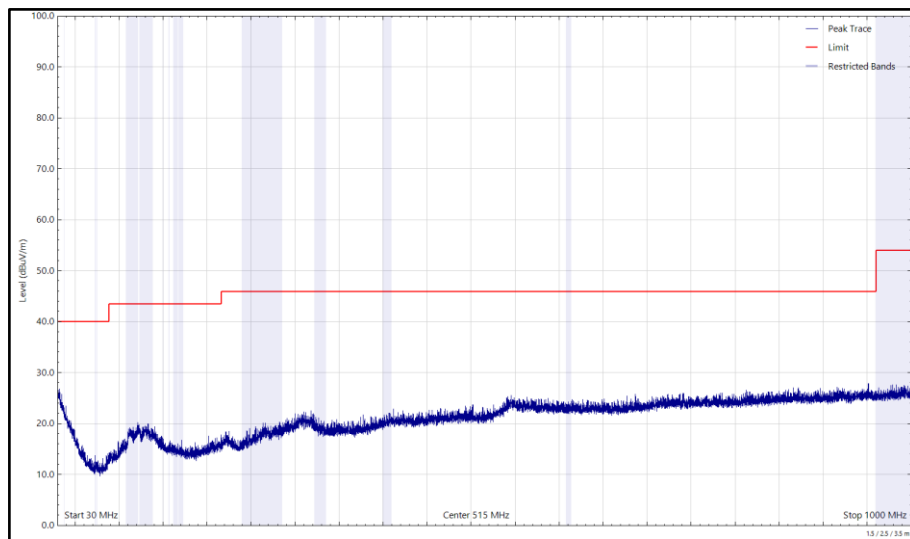


Figure 333 - U-NII-3 - 5745 MHz (CH149), HE20, RU26-0, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

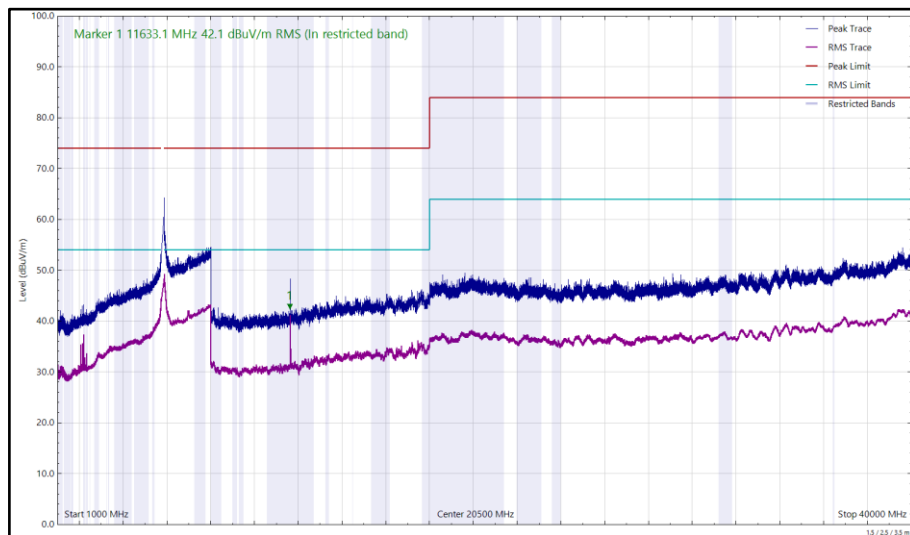
Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
11633.013	39.00	54.0	-15.00	RMS	150	197	Vertical
11633.090	42.10	54.0	-11.90	RMS	153	216	Horizontal

**Table 510 - U-NII-3 - 5825 MHz (CH165), HE20, RU26-0, CDD, Core 0 + Core 1,
30 MHz to 40 GHz**

No other emissions found within 10 dB of the limit.



**Figure 334 - U-NII-3 - 5825 MHz (CH165), HE20, RU26-0, CDD, Core 0 + Core 1,
30 MHz to 1 GHz, Horizontal (Peak)**



**Figure 335 - U-NII-3 - 5825 MHz (CH165), HE20, RU26-0, CDD, Core 0 + Core 1,
1 GHz to 40 GHz, Horizontal**

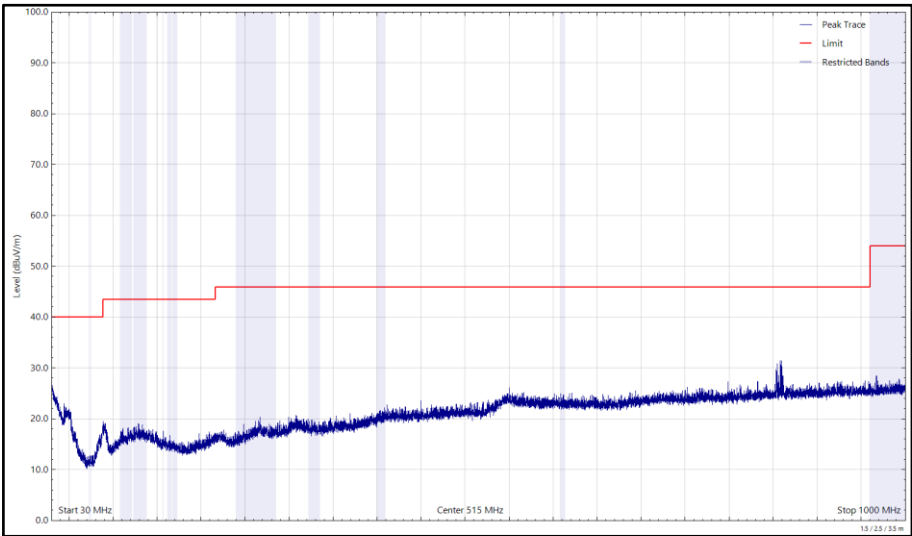


Figure 336 - U-NII-3 - 5825 MHz (CH165), HE20, RU26-0, CDD, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

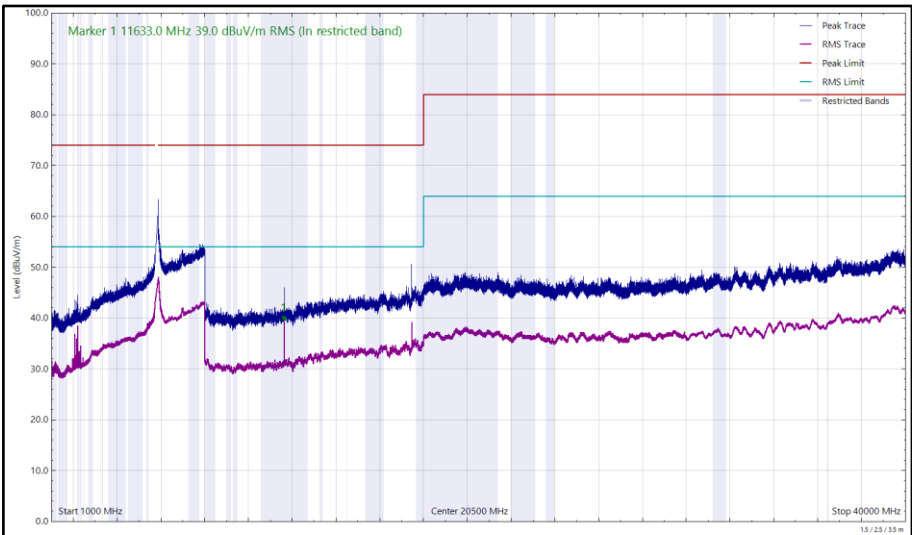


Figure 337 - U-NII-3 - 5825 MHz (CH165), HE20, RU26-0, CDD, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical



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 (μ V/m)at 3m	Field Strength Limit (dB μ V/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 511 - 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 falling within the restricted bands listed in ISED RSS-GEN, Clause 8.10:

Frequency (MHz)	Field Strength ($\mu\text{V}/\text{m}$) at 3m	Field Strength Limit ($\text{dB}\mu\text{V}/\text{m}$) 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 512 - Radiated Emissions Limit Table (ISED)



2.6.7 Test Location and Test Equipment Used

This test was carried out in RF Chamber 11 and RF Chamber 14.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Antenna (DRG, 18 GHz to 40 GHz)	Link Microtek Ltd	AM180HA-K-TU2	230	12	19-Sep-2022
Antenna with attenuator (Bilog, 30 MHz to 3 GHz)	Schaffner	CBL6143	287	24	14-Oct-2022
True RMS Multimeter	Fluke	79 Series III	411	12	13-Oct-2022
Pre-Amplifier (18 GHz to 40 GHz)	Phase One	PSO4-0087	1534	12	23-Sep-2023
Cable (40 GHz)	Rosenberger	LU1-001-500	5021	12	23-June-2022
Band Reject Filter - 5.795GHz	Wainwright	WRCJV10-5725-5755-5835-5865-50SS	5070	12	29-Sep-2022
Band Reject Filter - 5.22 GHz	Wainwright	WRCJV12-5120-5150-5290-5320-50SS	5072	12	29-Sep-2022
Band Reject Filter - 5.775 GHz	Wainwright	WRCJV10-5700-5735-5815-5850-50SS	5076	12	11-Oct-2022
Band Reject Filter - 5.690 GHz	Wainwright	WRCJV8-5635-5670-5710-5745-50SS	5080	12	29-Sep-2022
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	17-May-2023
Emissions Software	TUV SUD	EmX V3.1.4	5125	-	Software
Screened Room (11)	Rainford	Rainford	5136	36	24-Nov-2024
Mast	Maturo	TAM 4.0-P	5158	-	TU
Mast and Turntable Controller	Maturo	Maturo NCD	5159	-	TU
Turntable	Maturo	TT 15WF	5160	-	TU
Antenna (DRG 1-10.5GHz)	Schwarzbeck	BBHA9120B	5215	12	28-May-2022
1m K-Type Cable	Junkosha	MWX241-01000KMSKMS/A	5512	12	14-Apr-2022
2m SMA Cable	Junkosha	MWX221-02000AMSAMS/A	5518	12	12-Apr-2023
8m N Type Cable	Junkosha	MWX221-08000NMSNMS/B	5522	12	24-Mar-2023
Band Reject Filter - 5.28 GHz	Wainwright	WRCJV12-5180-5210-5350-5380-50SS	5555	12	07-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	23-May-2023
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB 40	5605	12	23-Sep-2022



Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
2m K-Type Cable	Junkosha	MWX241/B	5909	12	14-Apr-2023
EMI Test Receiver	Rohde & Schwarz	ESW44	5912	12	17-Feb-2023
DRG Horn Antenna (7.5-18GHz)	Schwarzbeck	HWRD750	5941	12	29-May-2023
5m Semi-Anechoic Chamber (Dual-Axis)	Albatross Projects	RF Chamber 14	5958	36	26-Apr-2025
Compact Antenna Mast	Maturo Gmbh	CAM4.0-P	5959	-	TU
Mast & Turntable Controller	Maturo Gmbh	FCU3.0	5960	-	TU
Tilt Antenna Mast	Maturo Gmbh	BAM4.5-P	5961	-	TU
Turntable	Maturo Gmbh	TT1.5SI	5962	-	TU
Cable (sma to sma 1m)	Junkosha	MWX221-01000AMSAMS/A	5997	12	06-Jun-2023
Cable (SMA to SMA 6.5m)	Junkosha	MWX221-06500AMSAMS/B	6003	12	07-Jun-2023
Cable (N to N 7m)	Junkosha	MWX221-07000NMSNMS/B	6005	12	05-Jun-2023
Cable (N to N 8m)	Junkosha	MWX221-08000NMSNMS/A	6006	12	05-Jun-2023
Cable (SMA to SMA 1m)	Junkosha	MWX221-01000AMSAMS/A	6008	12	06-Jun-2023
Cable (N to N 1m)	Junkosha	MWX221-01000NMSNMS/B	6010	12	05-Jun-2023
Horn Antenna (1-10 GHz)	Schwarzbeck	BBHA9120B	6141	12	21-Jun-2023
SAC Switch Unit	TUV SUD	SSU001	6144	12	07-Jul-2023
Humidity & Temperature meter	R.S Components	1364	6150	12	17-Jun-2023
Double Ridge Active Horn Antenna (18-40 GHz)	Com-Power	AHA-840	6187	24	02-Jun-2024
SAC Switch Unit	TUV SUD	SSU003	6191	12	15-Jul-2023
8GHz Highpass Filter	Wainwright	WHKX 7150 8000 18000 50SS	6195	12	15-Jul-2023
Pre Amp 8 - 18 GHz	Wright Technologies	APS06 0061	6199	12	19-Jul-2023
Attenuator 4dB	Pasternack	PE7074-4	6202	24	16-Jul-2024
Cable (SMA to SMA 20cm)	TUV SUD	MH-FH 8-18	6215	12	25-Jul-2023

Table 513

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)
ISED RSS-247, Clause 6.3.2(c)(d)(e)

2.7.2 Equipment Under Test and Modification State

A2737, S/N: DY36RV992R - Modification State 0
A2737, S/N: XPMX940350 - Modification State 0

2.7.3 Date of Test

22-September-2022 to 23-September-2022

2.7.4 Test Method

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

A computer was connected via an Ethernet cable to the Master device and the FCC defined audio/video file was streamed from the Client device using Windows Media Player.

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	23.0 - 24.0 °C
Relative Humidity	45.7 - 58.4 %

2.7.6 Test Results

5 GHz WLAN - 802.11ac VHT80

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

To calibrate the level of the radar at the input to the companion device, the companion device was replaced by the spectrum analyser and the output of the PXI RF generator adjusted to give -62 dBm.

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

Table 514 - Radar Pulse Type 0 Characteristics

Manufacturer	Model	Serial Number	FCC ID
ASUS	RT-AC68U	L8IUIB004830	MSQ-RTACIB00

Table 515 - Details of Master Device used to support testing

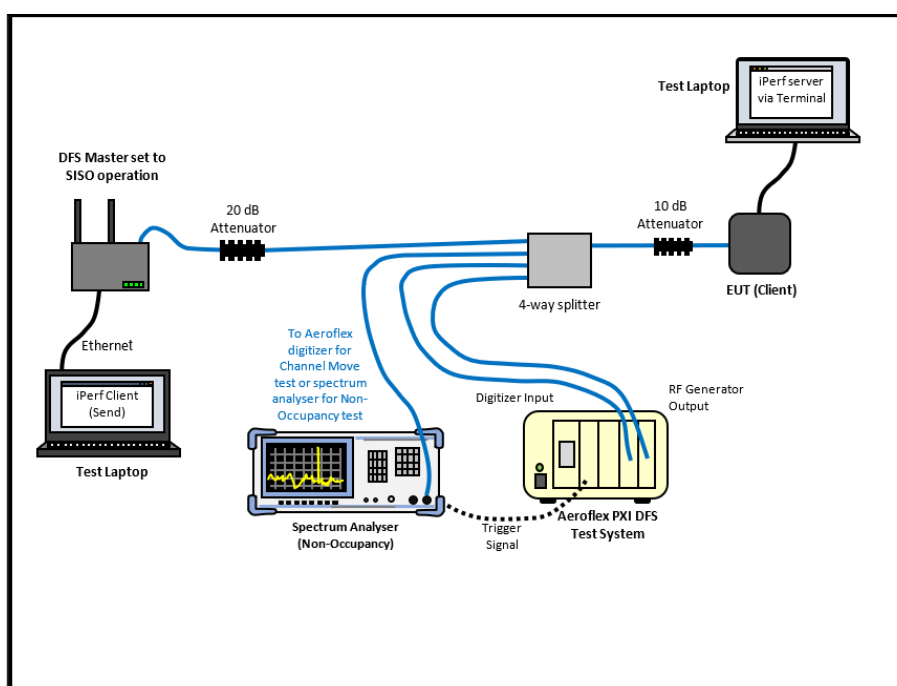


Figure 338 - Test Equipment Setup Diagram for Client without Radar Detection with Injection at the Master

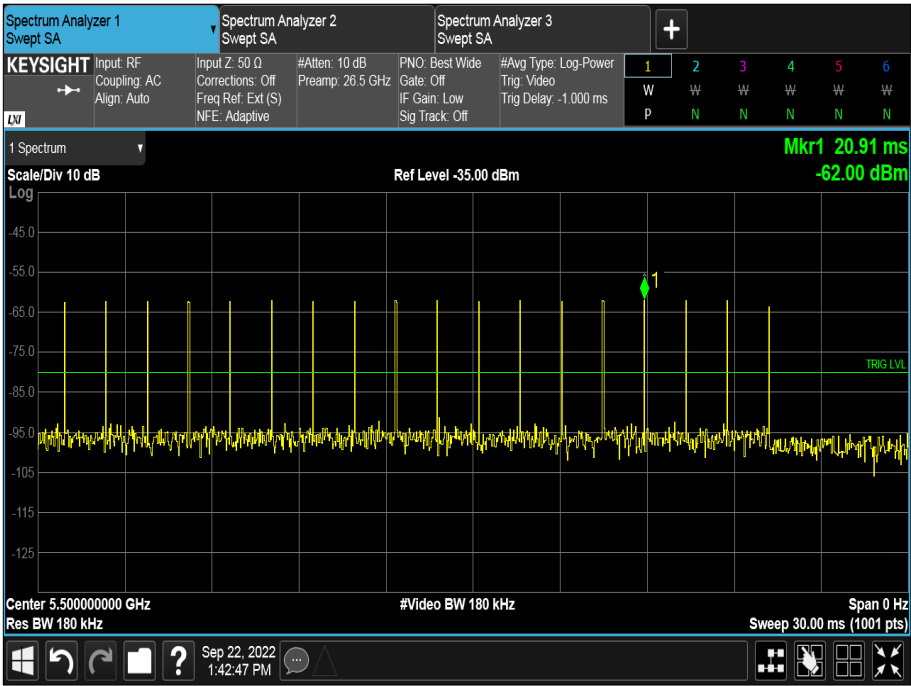


Figure 339 - Verification of Radar Type 0

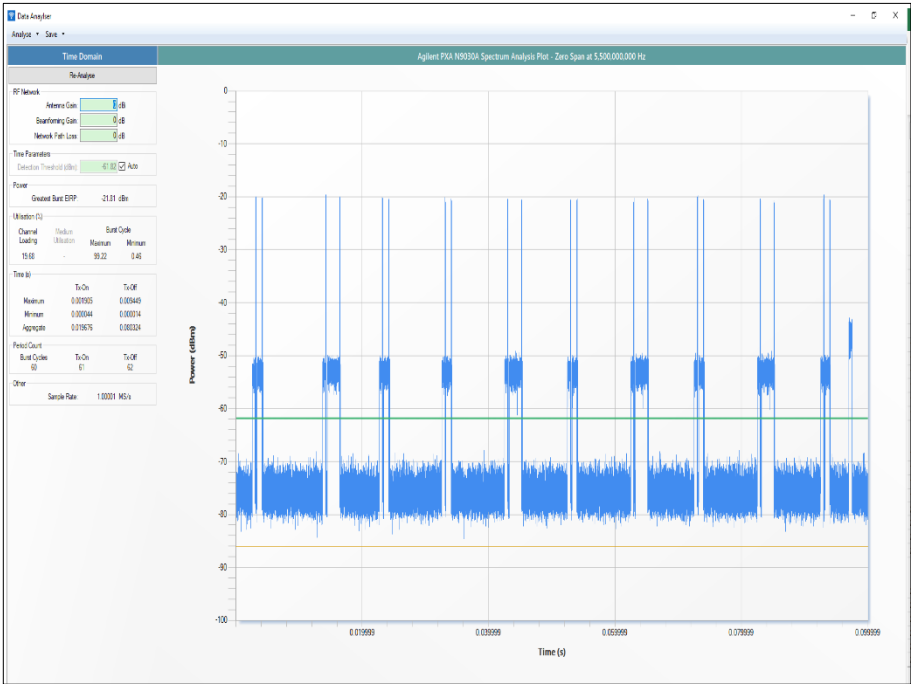


Figure 340 - Channel Loading

Remarks:

The channel loading was 19.68%

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 516 - 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	0.082 s
Channel Closing Time (Aggregate Time During 200 ms)	1.340 ms
Channel Closing Time (Aggregate Time During 200 ms to 10 s)	0.000 ms
Channel Closing Time (Aggregate Time During 10 s)	1.340 ms
Transmission Observed During Non-Occupancy Period	0

Table 517 - In-Service Monitoring Test Results

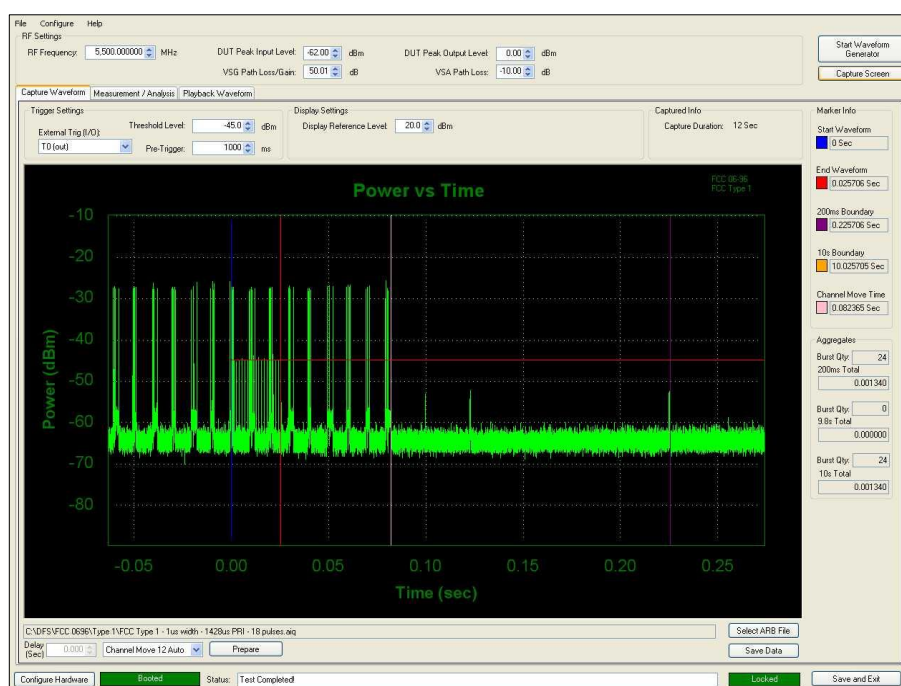


Figure 341 - First 200 ms of Channel Shutdown Period

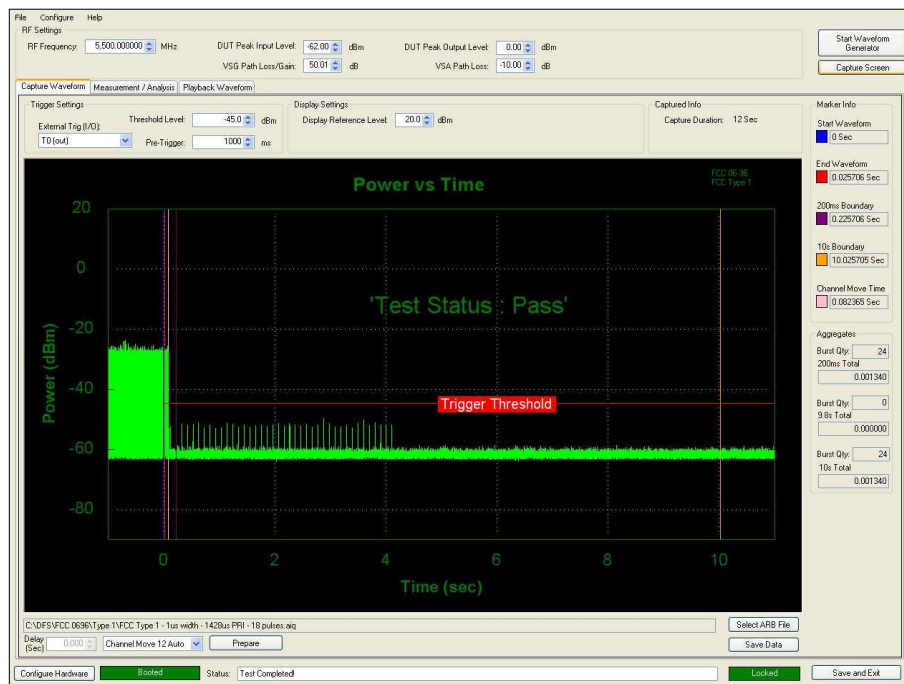


Figure 342 - First 12 s of Channel Shutdown Period

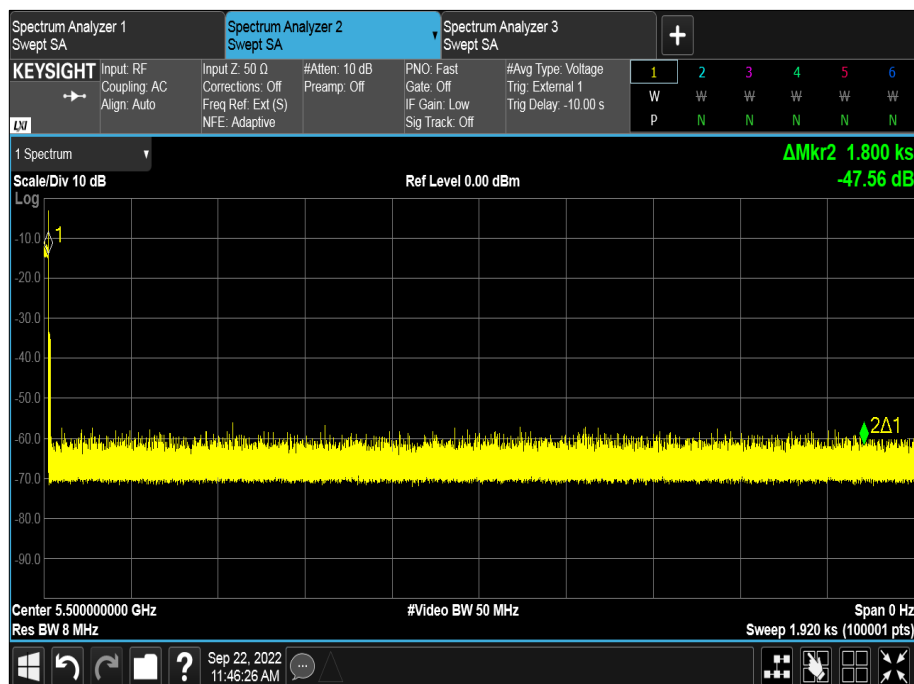


Figure 343 - 30-minute Non-Occupancy Period

5 GHz WLAN - Client to Client - 802.11ac VHT80

The equipment was set up as shown in the diagram below. The EUT was set up to receive a Client-to-Client video data transfer. The channel loading was set by the support laptop playing a video via Client-to-Client. This was confirmed to be >17% 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.

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

Table 518 - Radar Pulse Type 0 Characteristics

Manufacturer	Model	Serial Number	FCC ID
ASUS	RT-AC68U	L8IUIB004830	MSQ-RTACIB00

Table 519 - Details of Master Device used to support testing

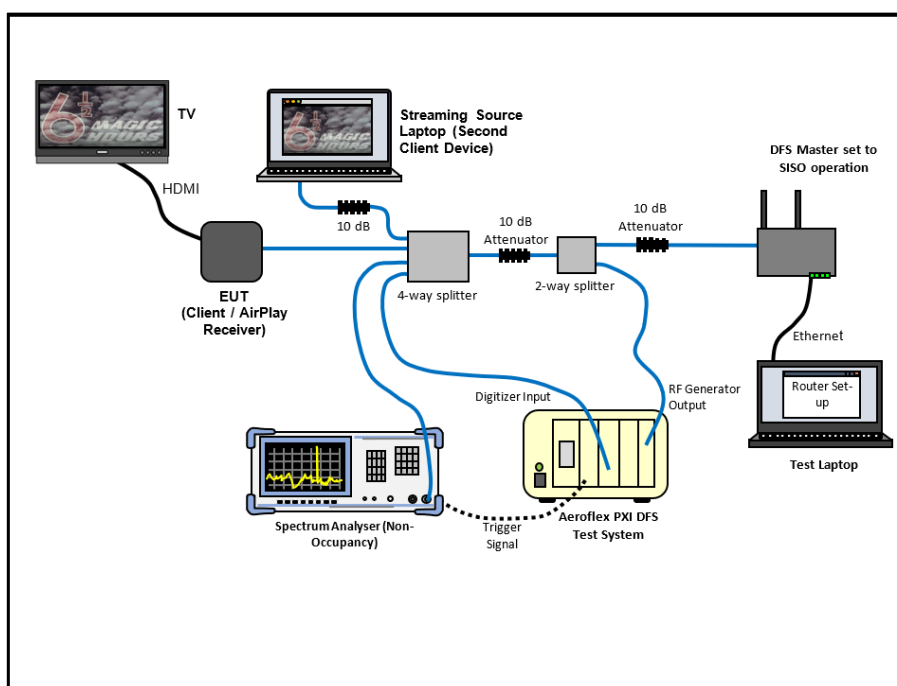


Figure 344 - Test Equipment Setup Diagram for Client without Radar Detection with Injection at the Master



Figure 345 - Verification of Radar Type 0

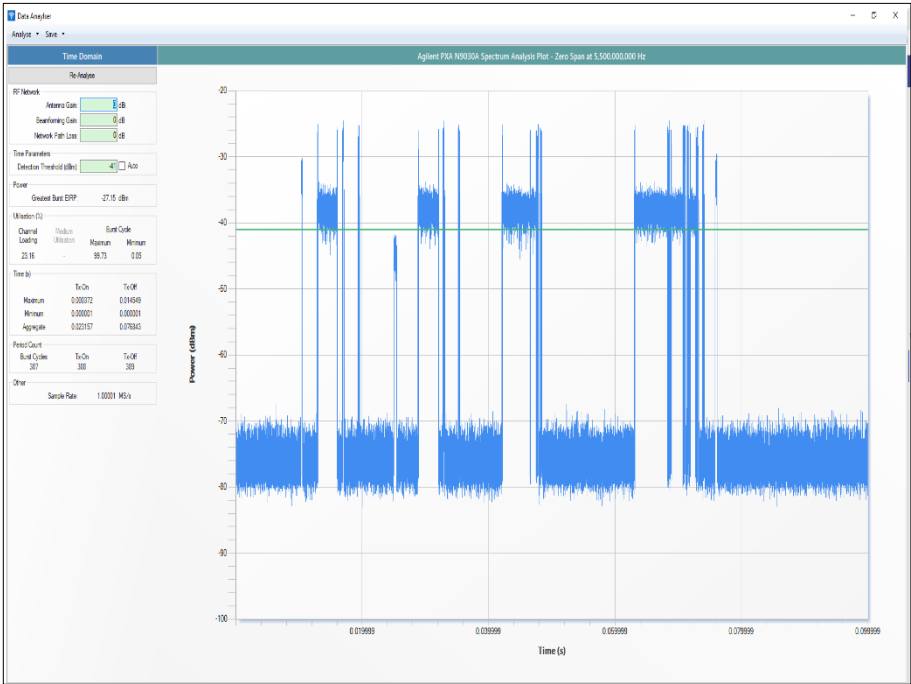


Figure 346 - Channel Loading

Remarks:

The channel loading was 23.16%

Test Parameter	Result
Test Channel	CH106 (5530 MHz), Control CH100 (5500 MHz)
Channel Move Time	4.094 s
Channel Closing Time (Aggregate Time During 200 ms)	16.964 ms
Channel Closing Time (Aggregate Time During 200 ms to 10 s)	11.009 ms
Channel Closing Time (Aggregate Time During 10 s)	27.973 ms
Transmission Observed During Non-Occupancy Period	No

Table 520 - In-Service Monitoring Test Results

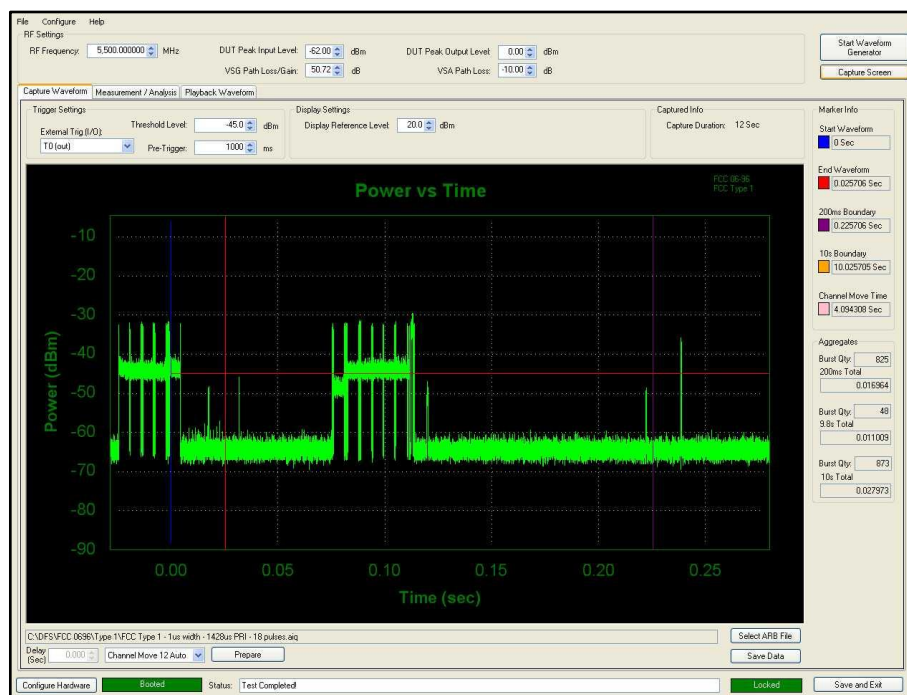


Figure 347 - First 200 ms of Channel Shutdown Period

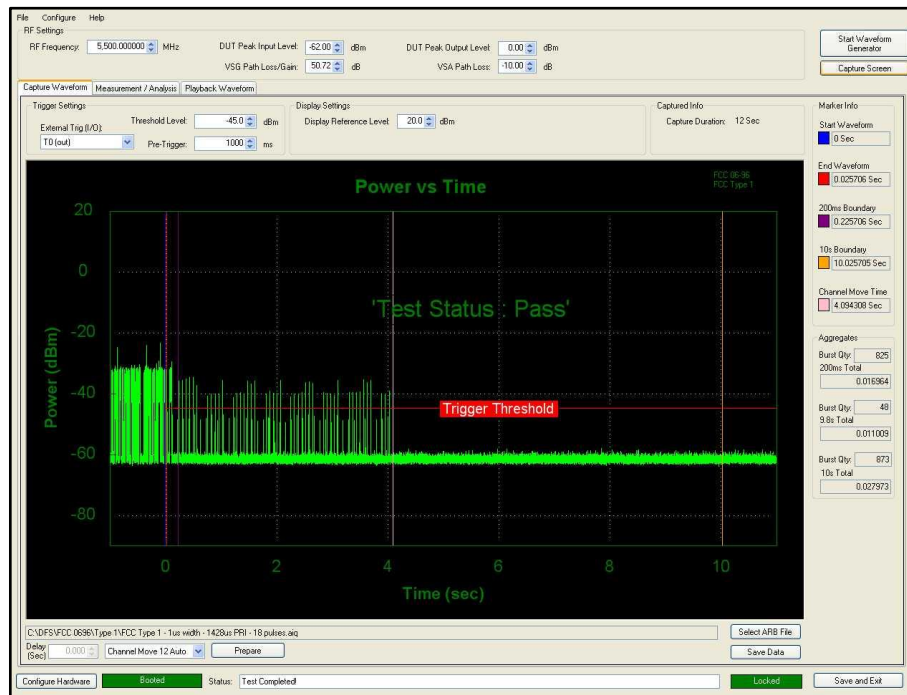


Figure 348 - First 12 s of Channel Shutdown Period

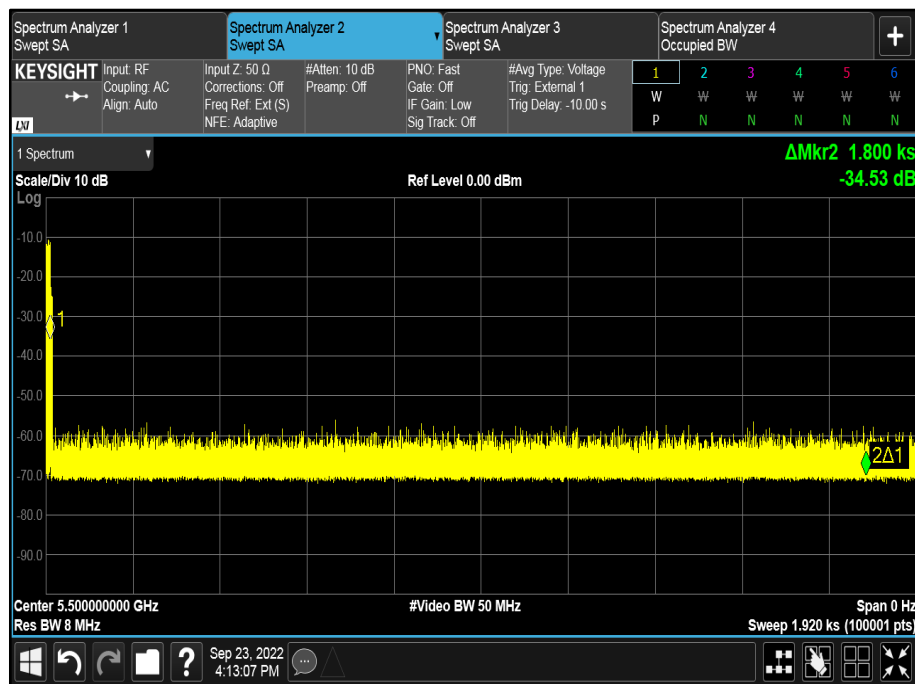


Figure 349 - 30-minute Non-Occupancy Period



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 521 - Channel Move Time and Channel Closing Transmission Time Limit

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

Non-occupancy Period	> 30 minutes
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Table 522 - 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
Hygrometer	Rotronic	I-1000	3220	12	05-Nov-2022
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
1800-6000 MHz Power Splitter	Mini-Circuits	ZN2PD-63-S+	4055	-	O/P Mon
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	01-Feb-2023
1 metre SMA Cable	Florida Labs	SMS-235SP-39.4-SMS	4512	12	29-Mar-2023
Power splitter - 4 port	Mini-Circuits	ZN4PD1-63-S+	4744	12	26-Oct-2022
EXA	Keysight Technologies	N9010B	4969	24	07-Feb-2024
Cable (18 GHz)	Rosenberger	LU7-071-1000	5100	12	20-Oct-2022
3.5 mm 1m Cable	Junkosha	MWX221-01000DMS	5418	12	25-Jun-2023
3.5 mm 2m Cable	Junkosha	MWX221-02000DMS	5423	12	25-Jun-2023
Attenuator 5W 20dB DC-18GHz	Aaren	AT40A-4041-D18-20	5498	12	16-May-2023
2-Way Power Divider (2 to 8 GHz)	Aaren	AT30A-TE0208-2-AF	5684	12	20-Dec-2022
2-Way Power Divider (2-8 GHz)	Aaren	AT30A-TE0208-2-AF	5687	12	20-Dec-2022
Wireless Cable & Fibre Router - AC 1900, Dual-band	Asus	RT-AC68U	5815	-	TU
Coaxial Fixed Attenuator DC-18GHz 5W 10dB	RF-Lambda	RFS5G18B10SMP	6176	12	17-Jul-2023
Coaxial Fixed Attenuator DC-18GHz 5W 10dB	RF-Lambda	RFS5G18B10SMP	6177	12	17-Jul-2023
Coaxial Fixed Attenuator DC-18GHz 5W 10dB	RF-Lambda	RFS5G18B10SMP	6179	12	17-Jul-2023

Table 523

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
Emission Bandwidth	$\pm 1\,901.92$ kHz
Maximum Conducted Output Power	± 3.2 dB
Maximum Conducted Power Spectral Density	± 3.2 dB
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 524

Measurement Uncertainty Decision Rule – Accuracy Method

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. (Procedure 2). The measurement results are directly compared with the test limit to determine conformance with the requirements of the standard.

Risk: The uncertainty of measurement about the measured result is negligible with regard to the final pass/fail decision. The measurement result can be directly compared with the test limit to determine conformance with the requirement (compare IEC Guide 115). The level of risk to falsely accept and falsely reject items is further described in ILAC-G8.