

FCC and ISED Test Report

Apple Inc
Model: A3241



In accordance with FCC 47 CFR Part 15, ISED RSS-247, ISED RSS-248 and ISED RSS-GEN (2.4 GHz Bluetooth, 2.4 GHz WLAN, 5 GHz WLAN, 6 GHz WLAN, Narrowband and Thread)

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COMMERCIAL-IN-CONFIDENCE

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SIGNATURE

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Steve Marshall	Senior Engineer	Authorised Signatory	28 November 2024

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD document control rules.

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15, ISED RSS-247, ISED RSS-248 and ISED RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Report Generation	Lauren Walters	28 November 2024	

FCC Accreditation

553713/UK2026 Concorde Park, Fareham Test Laboratory

ISED Accreditation

28798/UK0003 Concorde Park, Fareham Test Laboratory

EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15: 2023, ISED RSS-247: Issue 3 (2023-08), ISED RSS-248: Issue 2 (2022-12) and ISED RSS-GEN: Issue 5 (2018-04) + A2 (2021-02) for the tests detailed in section 1.3.



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1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	28-November-2024

Table 1

1.2 Introduction

Applicant	Apple Inc
Manufacturer	Apple Inc
EUT/Sample Identification	Refer to section 1.6
Test Specification/Issue/Date	FCC 47 CFR Part 15: 2023 ISED RSS-247: Issue 3 (2023-08) ISED RSS-248: Issue 2 (2022-12) ISED RSS-GEN: Issue 5 (2018-04) + A2 (2021-02)
Start of Test	30-September-2024
Finish of Test	11-November-2024
Name of Engineer(s)	Akhil Rajendran Bhaskaran Nair, Thomas Randall, Tony Baby, Vineeth Nagaraj and Colin Brain
Related Document(s)	ANSI C63.4 (2014) ANSI C63.10 (2020) KDB 789033 D02 v02r01 KDB 987594 D02 v01r01



1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15, ISED RSS-247, ISED RSS-248 and ISED RSS-GEN is shown below.

Section	Specification Clause				Test Description	Result	Comments/Base Standard
	Part 15	RSS-247	RSS-248	RSS-GEN			
Configuration and Mode: 5 GHz WLAN and 2.4 GHz Bluetooth							
2.1	15.209, 15.247(d) and 15.407(b)	5.5 and 6.2	-	6.13 and 8.9	Radiated Spurious Emissions (Simultaneous Transmission)	Pass	ANSI C63.4 (2014) ANSI C63.10 (2020) KDB 789033 D02 v02r01 KDB 987594 D02 v01r01
Configuration and Mode: 6 GHz WLAN and 2.4 GHz Bluetooth							
2.1	15.209, 15.247(d) and 15.407(b)	5.5	4.6	6.13 and 8.9	Radiated Spurious Emissions (Simultaneous Transmission)	Pass	ANSI C63.4 (2014) ANSI C63.10 (2020) KDB 789033 D02 v02r01 KDB 987594 D02 v01r01
Configuration and Mode: 2.4 GHz WLAN and Narrowband							
2.1	15.209, 15.247(d) and 15.407(b)	5.5 and 6.2	-	6.13 and 8.9	Radiated Spurious Emissions (Simultaneous Transmission)	Pass	ANSI C63.4 (2014) ANSI C63.10 (2020) KDB 789033 D02 v02r01 KDB 987594 D02 v01r01
Configuration and Mode: 5 GHz WLAN and Thread							
2.1	15.209, 15.247(d) and 15.407(b)	5.5 and 6.2	-	6.13 and 8.9	Radiated Spurious Emissions (Simultaneous Transmission)	Pass	ANSI C63.4 (2014) ANSI C63.10 (2020) KDB 789033 D02 v02r01 KDB 987594 D02 v01r01
Configuration and Mode: 6 GHz WLAN and Thread							
2.1	15.209, 15.247(d) and 15.407(b)	5.5	4.6	6.13 and 8.9	Radiated Spurious Emissions (Simultaneous Transmission)	Pass	ANSI C63.4 (2014) ANSI C63.10 (2020) KDB 789033 D02 v02r01 KDB 987594 D02 v01r01

Table 2



1.4 Product Information

1.4.1 Technical Description

The equipment under test (EUT) was a portable laptop computer.

1.5 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

1.6 Identification of the EUT

The table below details identification of the EUT(s) that have been used to carry out the testing within this report.

Model: A3241		
Serial Number	Hardware Version	Software Version
K2K9N270NG	REV1.0	24A12461c
DT7LYX5QXT	REV1.0	24A12461c

Table 3

1.7 EUT Modification Record

The table below details modifications made to the EUT during the test programme.

The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
Model: A3241, Serial Number: K2K9N270NG			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3241, Serial Number: DT7LYX5QXT			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 4



1.8 Test Location

TÜV SÜD conducted the following tests at our Concorde Park Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: 5 GHz WLAN and 2.4 GHz Bluetooth		
Radiated Spurious Emissions (Simultaneous Transmission)	Akhil Rajendran Bhaskaran Nair, Thomas Randall and Vineeth Nagaraj	UKAS
Configuration and Mode: 6 GHz WLAN and 2.4 GHz Bluetooth		
Radiated Spurious Emissions (Simultaneous Transmission)	Akhil Rajendran Bhaskaran Nair, Thomas Randall, Tony Baby and Vineeth Nagaraj	UKAS
Configuration and Mode: 2.4 GHz WLAN and Narrowband		
Radiated Spurious Emissions (Simultaneous Transmission)	Akhil Rajendran Bhaskaran Nair, Colin Brain and Tony Baby	UKAS
Configuration and Mode: 5 GHz WLAN and Thread		
Radiated Spurious Emissions (Simultaneous Transmission)	Akhil Rajendran Bhaskaran Nair, Colin Brain and Vineeth Nagaraj	UKAS
Configuration and Mode: 6 GHz WLAN and Thread		
Radiated Spurious Emissions (Simultaneous Transmission)	Akhil Rajendran Bhaskaran Nair, Colin Brain and Vineeth Nagaraj	UKAS

Table 5

Office Address:

TÜV SÜD
Concorde Park
Concorde Way
Fareham
Hampshire
PO15 5FG
United Kingdom



2 Test Details

2.1 Radiated Spurious Emissions (Simultaneous Transmission)

2.1.1 Specification Reference

FCC 47 CFR Part 15, Clause 15.209, 15.247(d) and 15.407(b)
ISED RSS-247, Clause 5.5 and 6.2
ISED RSS-248, Clause 4.6
ISED RSS-GEN, Clause 6.13 and 8.9

2.1.2 Equipment Under Test and Modification State

A3241, S/N: K2K9N270NG - Modification State 0
A3241, S/N: DT7LYX5QXT - Modification State 0

2.1.3 Date of Test

30-September-2024 to 11-November-2024

2.1.4 Test Method

Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

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

Ports on the EUT were terminated with loads as described in ANSI C63.4 clause 6.2.4 for each type of port on the EUT.

For frequencies > 1 GHz, plots for average measurements were taken in accordance with ANSI C63.10, clause 4.1.4.2.5 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, 11.11, 11.12, 12.7.2 or 12.7.3 depending on the nature of the emission measured.

The plots shown are the characterisation of the EUT. The limits on the plots represent the most stringent case for restricted bands, (74/54 dBµV/m) when compared to non-restricted band limits. The limits shown have been used as a threshold to determine where further measurements are necessary. Where results are within 10 dB of the limits shown on the plots, further investigation was carried out and reported in results tables.

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

To determine the emission characteristic of the EUT above 18 GHz, the test antenna was swept over all faces of the EUT whilst observing a spectral display. The frequency of any emissions of interest was noted for formal measurement at the correct measurement distance of 1m. This procedure was repeated for all relevant transmit operating channels.

At a measurement distance of 1 meter the limit line was increased by $20 \cdot \text{LOG}(3/1) = 9.54$ dB.

2.1.5 Example Test Setup Diagram

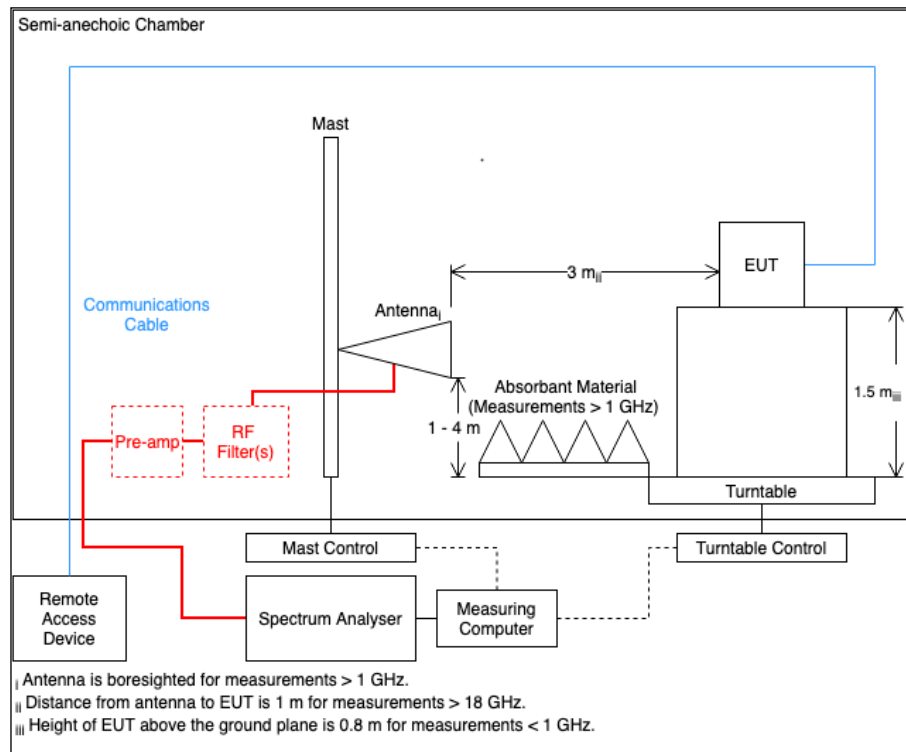


Figure 1

2.1.6 Environmental Conditions

Ambient Temperature	22.0 - 23.7 °C
Relative Humidity	40.1 - 53.1 %

2.1.7 Test Results

5 GHz WLAN and 2.4 GHz Bluetooth

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
73.054	24.90	40.00	-15.10	Q-Peak	192	109	Vertical
113.406	25.09	43.50	-18.41	Q-Peak	158	100	Vertical
114.504	31.70	43.50	-11.80	Q-Peak	341	280	Horizontal
280.943	29.77	46.00	-16.23	Q-Peak	198	113	Horizontal
330.777	28.97	46.00	-17.03	Q-Peak	219	142	Vertical
331.190	32.52	46.00	-13.48	Q-Peak	141	101	Horizontal
2800.382	32.88	54.00	-21.12	CISPR Avg	2	362	Vertical
4881.668	45.33	54.00	-8.67	CISPR Avg	353	341	Vertical
4881.668	58.33	74.00	-15.67	Peak	353	341	Vertical
4893.840	33.84	54.00	-20.16	CISPR Avg	60	400	Horizontal

Table 6 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 40 GHz

No other emissions found within 10 dB of the limit.

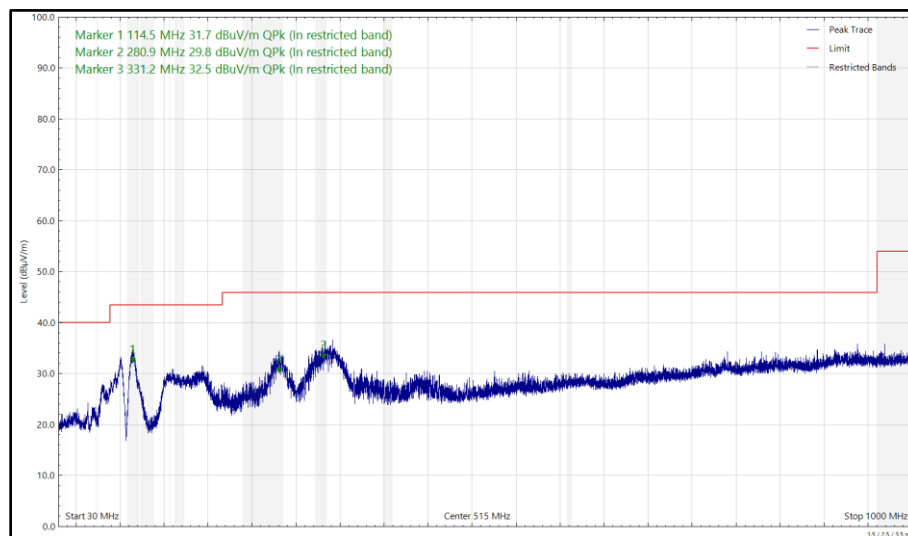


Figure 2 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

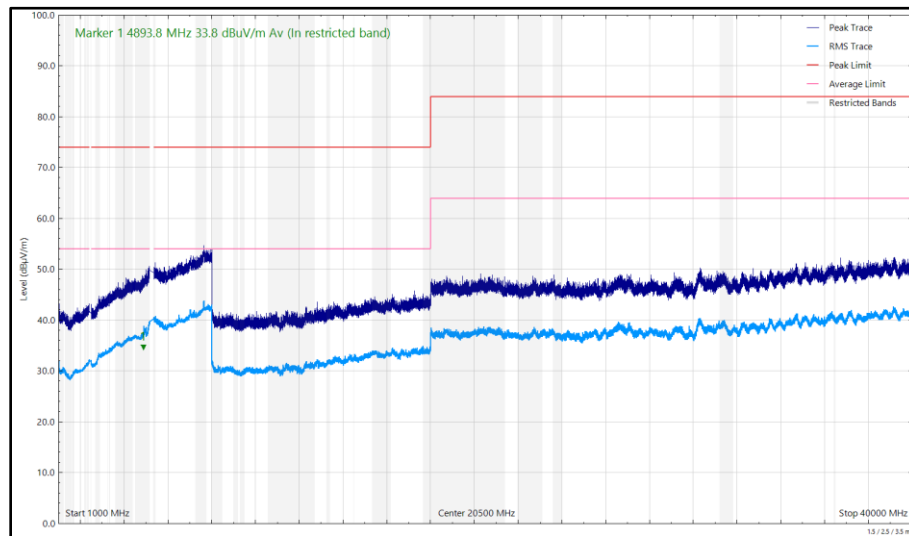


Figure 3 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

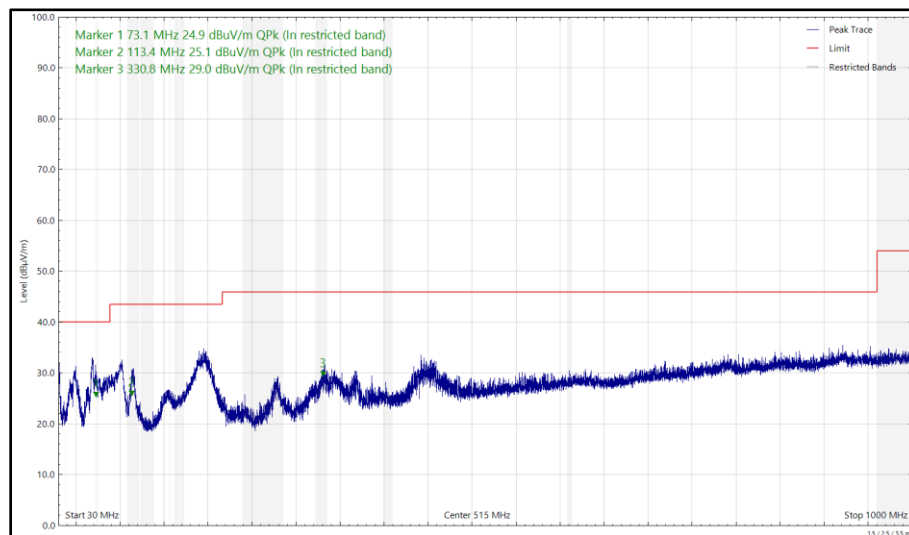


Figure 4 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

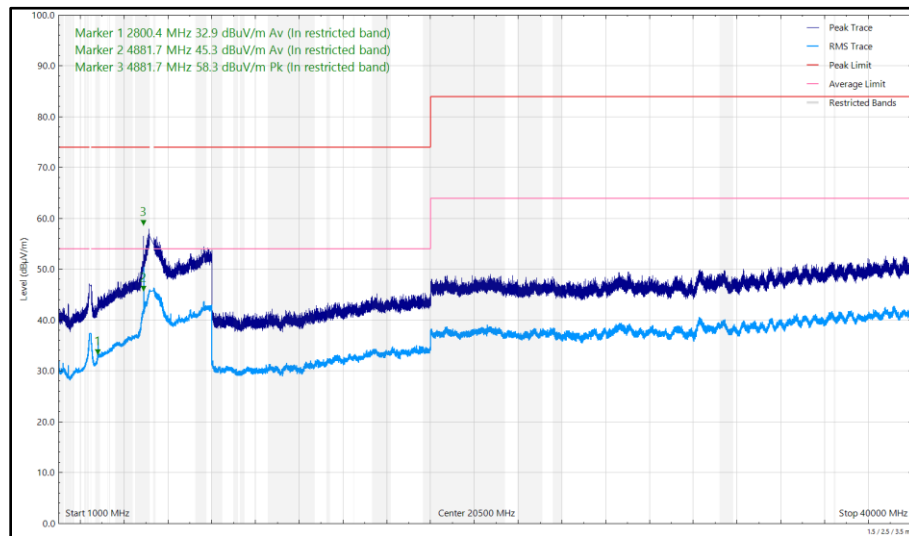


Figure 5 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
30.106	26.10	40.00	-13.90	Q-Peak	350	107	Vertical
73.173	24.33	40.00	-15.67	Q-Peak	181	104	Vertical
113.212	24.60	43.50	-18.90	Q-Peak	140	103	Vertical
114.619	30.02	43.50	-13.48	Q-Peak	175	267	Horizontal
165.762	25.98	43.50	-17.52	Q-Peak	5	243	Horizontal
279.381	30.98	46.00	-15.02	Q-Peak	295	114	Horizontal
329.835	32.91	46.00	-13.09	Q-Peak	138	100	Horizontal
330.718	29.25	46.00	-16.75	Q-Peak	235	139	Vertical
4881.558	57.50	74.00	-16.50	Peak	354	317	Vertical
4881.823	44.50	54.00	-9.50	CISPR Avg	350	320	Vertical
4891.146	33.37	54.00	-20.63	CISPR Avg	114	317	Horizontal
11279.930	34.82	54.00	-19.18	RMS	347	238	Vertical

Table 7 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 40 GHz

No other emissions found within 10 dB of the limit.

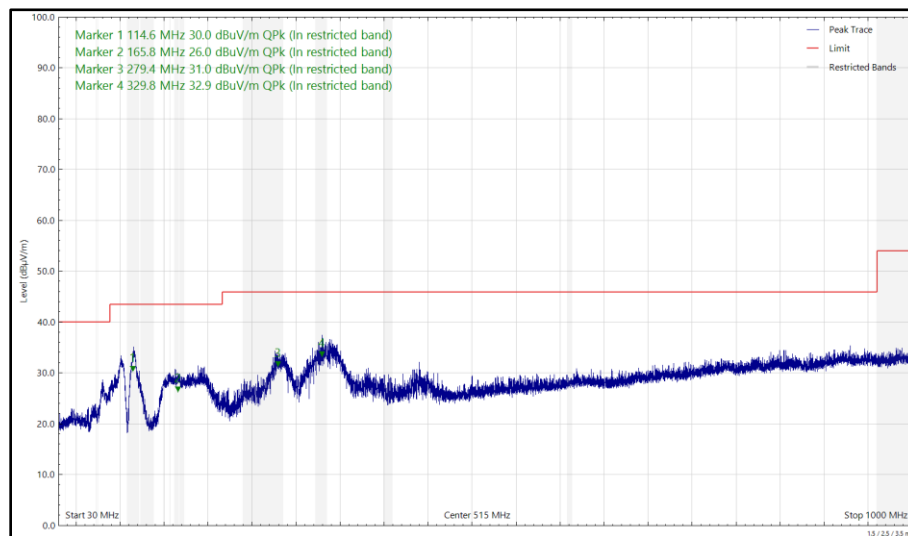


Figure 6 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

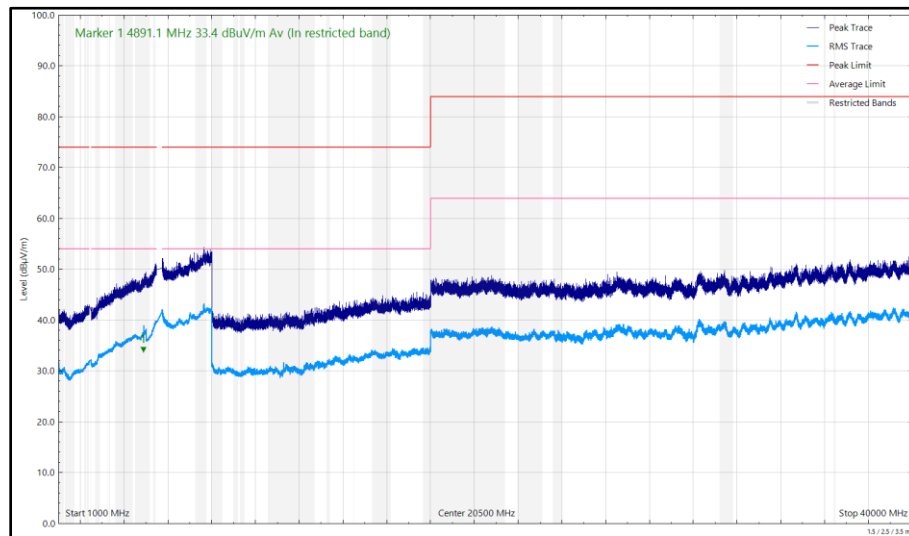


Figure 7 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

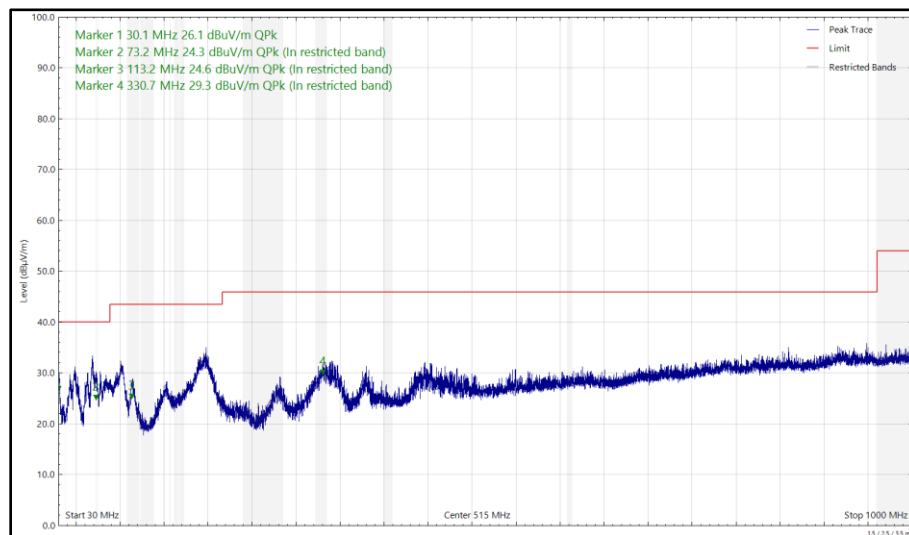


Figure 8 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

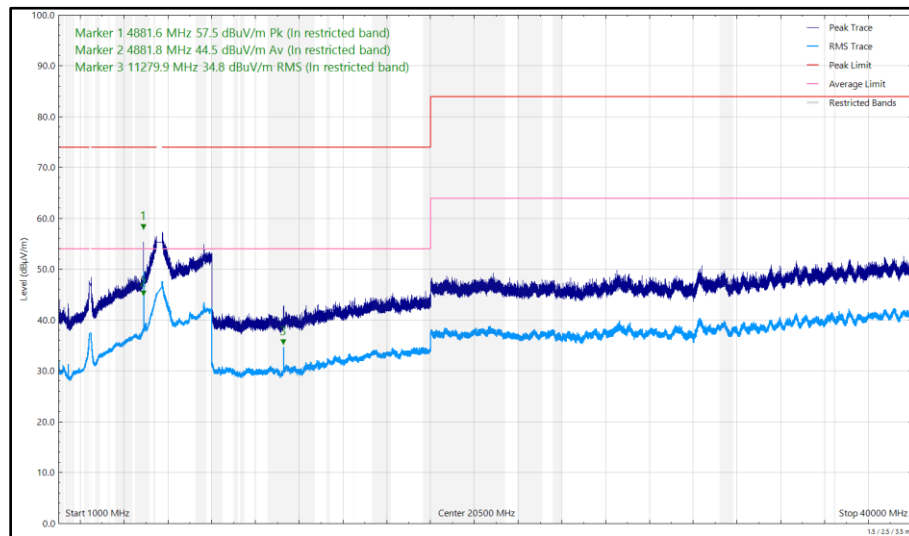


Figure 9 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
73.023	24.48	40.00	-15.52	Q-Peak	182	113	Vertical
116.237	27.81	43.50	-15.69	Q-Peak	133	100	Vertical
117.595	30.80	43.50	-12.70	Q-Peak	350	265	Horizontal
166.131	25.84	43.50	-17.66	Q-Peak	0	240	Horizontal
280.722	32.10	46.00	-13.90	Q-Peak	310	113	Horizontal
332.325	33.04	46.00	-12.96	Q-Peak	138	100	Horizontal
333.479	29.96	46.00	-16.04	Q-Peak	222	151	Vertical
4881.773	44.73	54.00	-9.27	CISPR Avg	20	310	Vertical
4882.163	36.72	54.00	-17.28	CISPR Avg	58	381	Horizontal
4882.173	57.73	74.00	-16.27	Peak	352	339	Vertical

Table 8 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 40 GHz

No other emissions found within 10 dB of the limit.

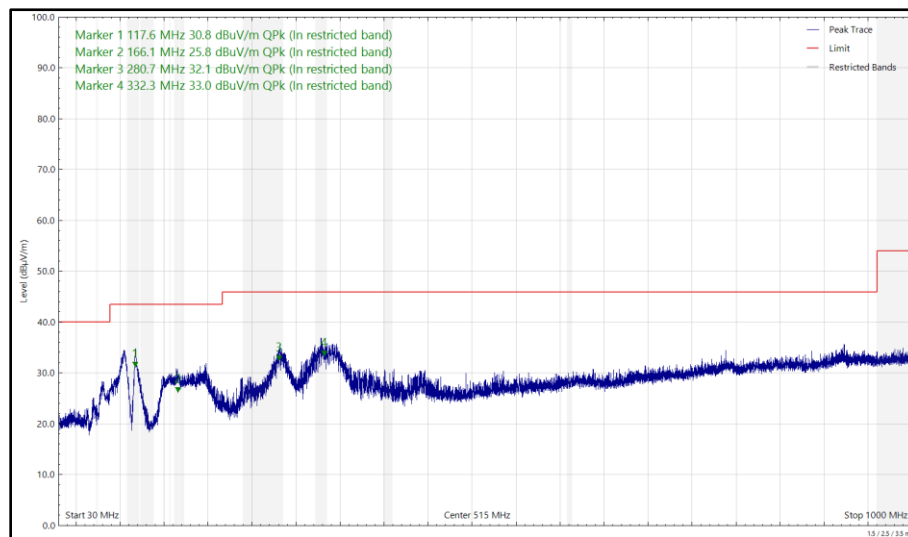


Figure 10 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

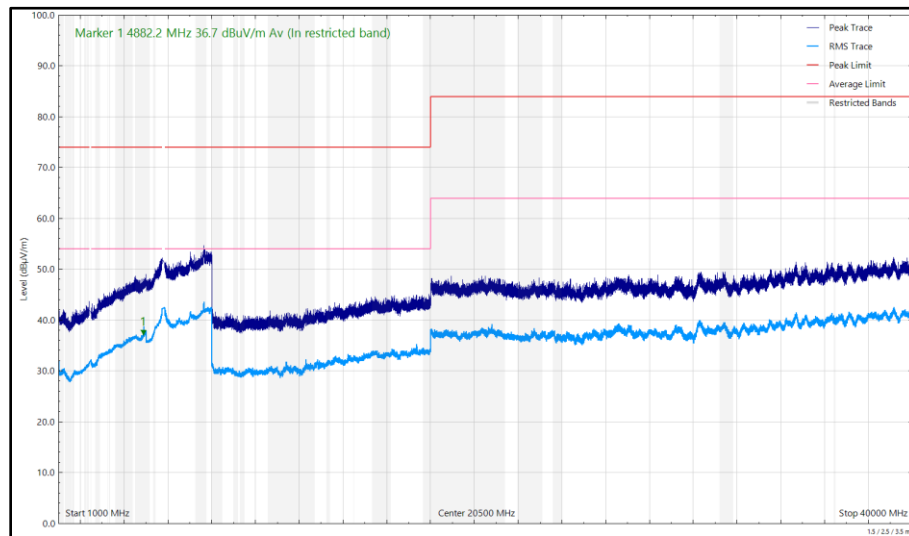


Figure 11 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

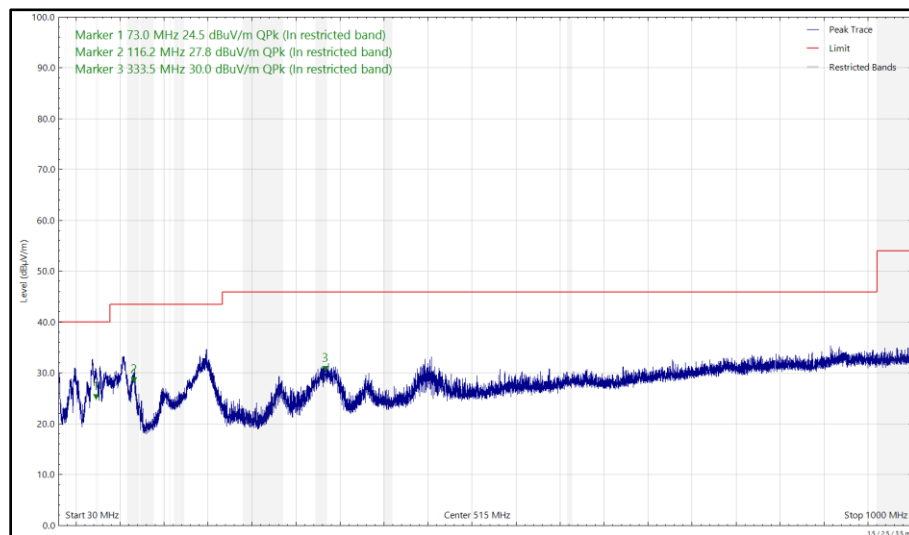


Figure 12 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

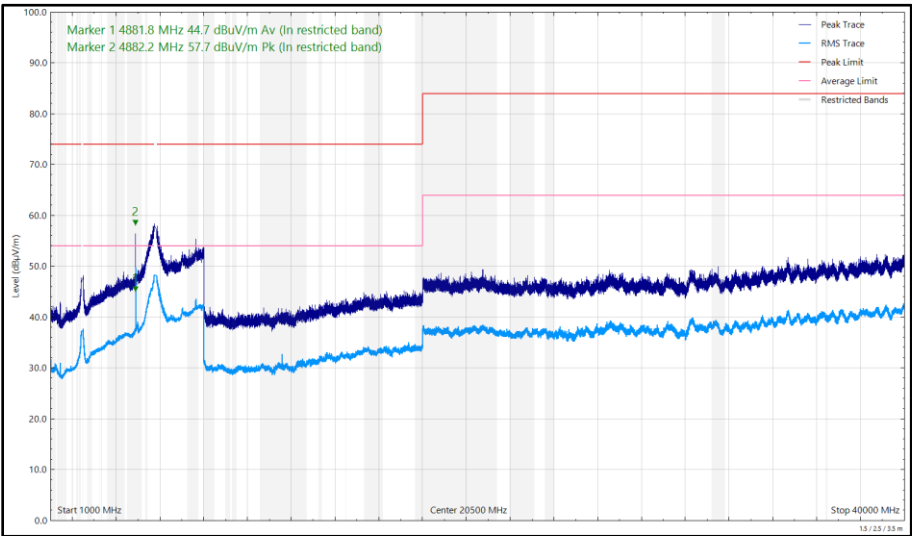


Figure 13 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

FCC 47 CFR Part 15, ISSED RSS-247 and ISSED RSS-GEN

The least stringent limit from the applicable rule parts was used to determine compliance for Radiated Emissions testing of multiple transmission sources.

The least stringent applicable limit was:

Clause	Limit
Part 15 247 (d) / RSS-247 Clause 5.5	-20 dBc
Part 15.407 (b) / RSS-247 Clause 6.2	-27 dBm e.i.r.p
Part 15.209 / RSS-GEN Clause 8.9	Peak: 74 dBμV/m at 3m, Average 54 dBμV/m at 3m (Restricted bands > 1 GHz)

Table 9

6 GHz WLAN and 2.4 GHz Bluetooth

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
73.059	24.18	40.00	-15.82	Q-Peak	110	100	Vertical
108.177	28.66	43.50	-14.84	Q-Peak	360	390	Horizontal
117.936	30.20	43.50	-13.30	Q-Peak	115	111	Vertical
120.242	28.41	43.50	-15.09	Q-Peak	4	286	Horizontal
166.384	25.95	43.50	-17.55	Q-Peak	16	252	Horizontal
283.287	31.30	46.00	-14.70	Q-Peak	295	126	Horizontal
332.491	31.20	46.00	-14.80	Q-Peak	214	148	Vertical
333.204	34.37	46.00	-11.63	Q-Peak	146	100	Horizontal
4882.297	39.79	54.00	-14.21	CISPR Avg	17	332	Vertical
7322.252	43.74	54.00	-10.26	CISPR Avg	289	395	Horizontal
7322.515	46.19	54.00	-7.81	CISPR Avg	305	239	Vertical
7323.563	60.21	74.00	-13.79	Peak	305	268	Vertical
7323.791	58.34	74.00	-15.66	Peak	284	351	Horizontal
8233.105	33.96	54.00	-20.04	CISPR Avg	57	390	Horizontal
8233.265	39.49	54.00	-14.51	CISPR Avg	314	249	Vertical

Table 10 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 40 GHz

No other emissions found within 10 dB of the limit.

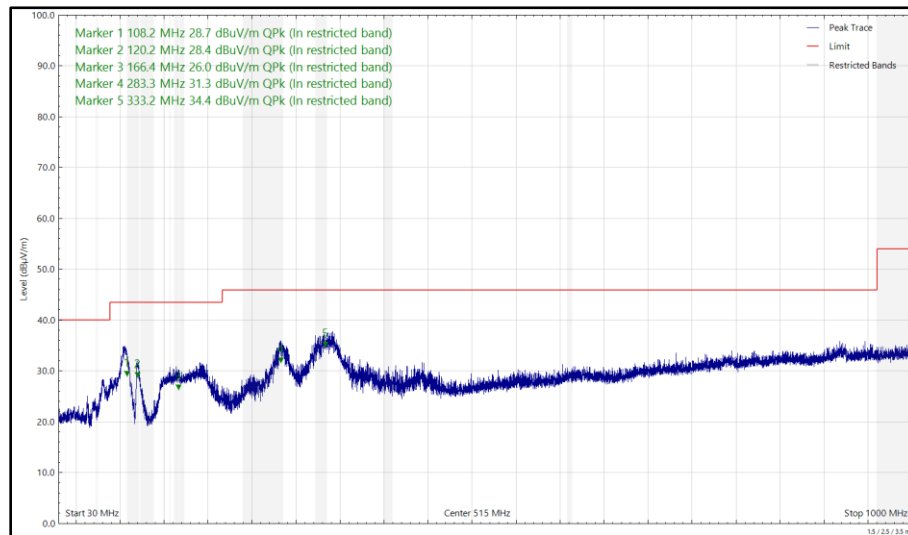


Figure 14 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

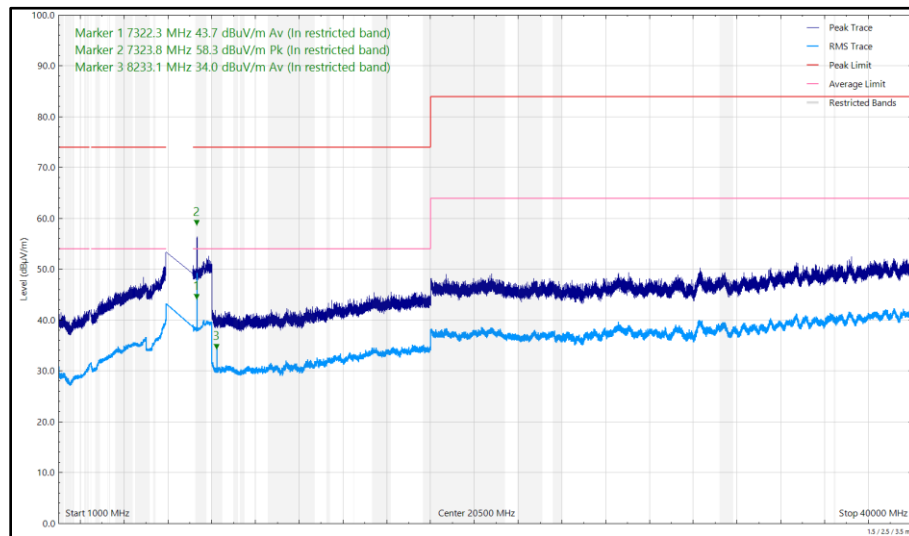


Figure 15 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

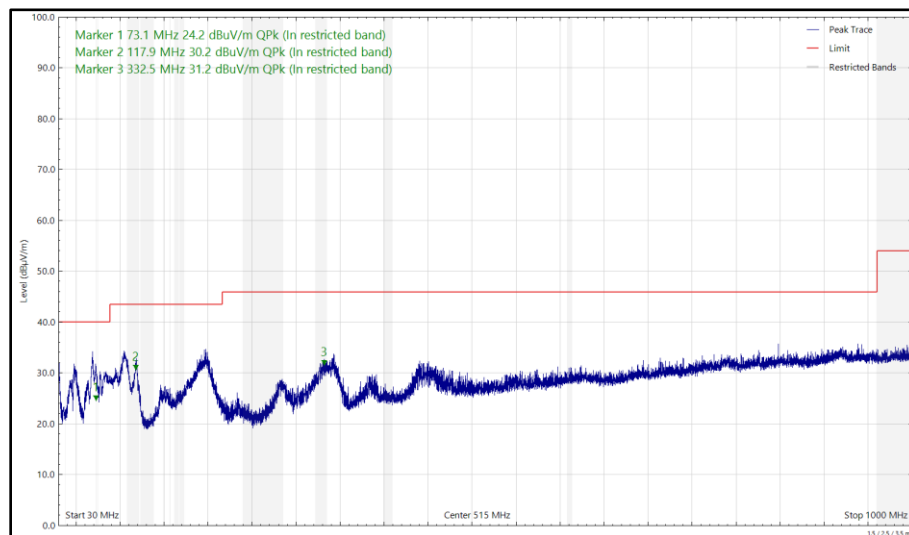


Figure 16 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

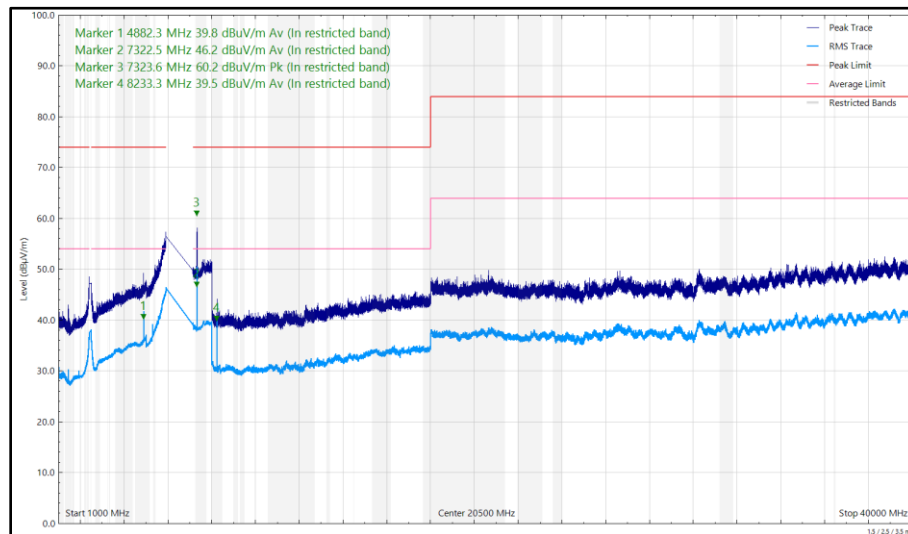


Figure 17 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
30.271	27.24	40.00	-12.76	Q-Peak	311	100	Vertical
73.028	24.57	40.00	-15.43	Q-Peak	160	100	Vertical
108.192	31.28	43.50	-12.22	Q-Peak	350	307	Horizontal
108.463	28.80	43.50	-14.70	Q-Peak	24	114	Vertical
121.476	28.10	43.50	-15.40	Q-Peak	128	103	Vertical
123.043	23.92	43.50	-19.58	Q-Peak	2	312	Horizontal
166.503	25.26	43.50	-18.24	Q-Peak	24	240	Horizontal
284.626	31.52	46.00	-14.48	Q-Peak	302	100	Horizontal
331.200	35.74	46.00	-10.26	Q-Peak	139	100	Horizontal
333.049	30.75	46.00	-15.25	Q-Peak	141	121	Vertical
4881.508	37.46	54.00	-16.54	CISPR Avg	350	267	Vertical
7322.206	59.61	74.00	-14.39	Peak	300	260	Vertical
7323.326	45.89	54.00	-8.11	CISPR Avg	307	231	Vertical
7323.505	44.27	54.00	-9.73	CISPR Avg	290	379	Horizontal
7323.682	57.96	74.00	-16.04	Peak	285	366	Horizontal
11549.400	34.45	54.00	-19.55	CISPR Avg	293	247	Vertical
11552.180	33.76	54.00	-20.24	CISPR Avg	283	340	Horizontal

Table 11 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 40 GHz

No other emissions found within 10 dB of the limit.

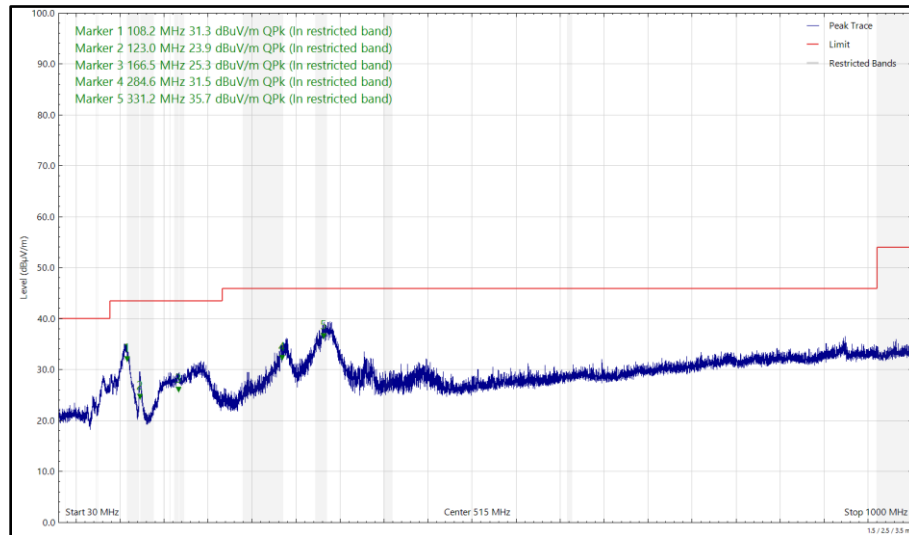


Figure 18 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

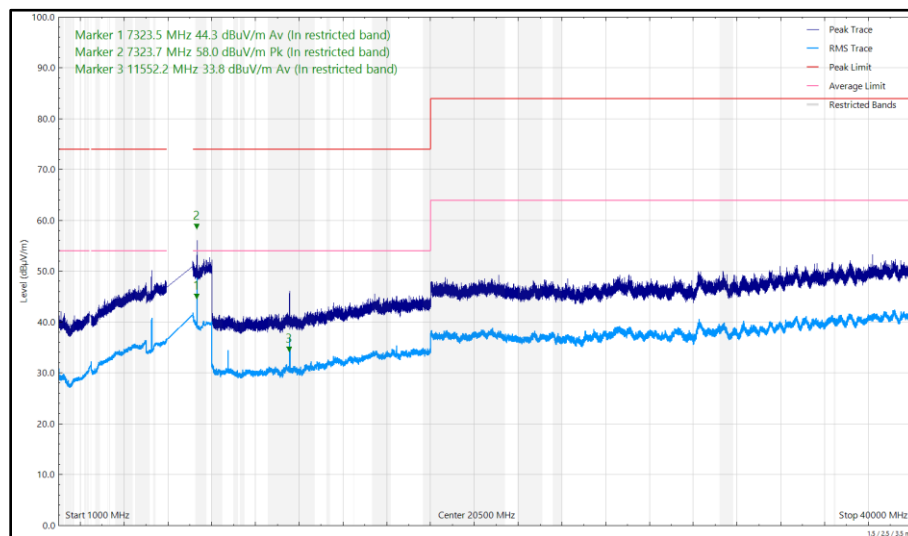


Figure 19 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

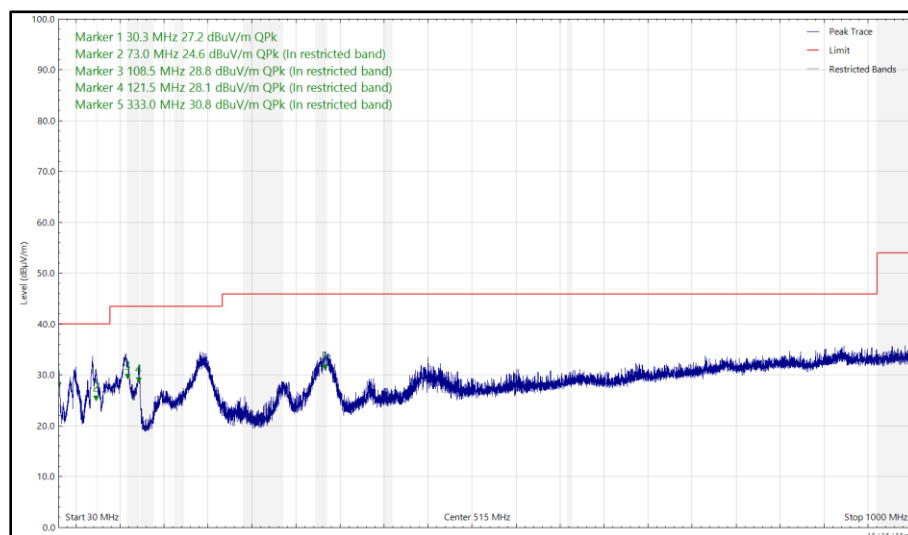


Figure 20 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

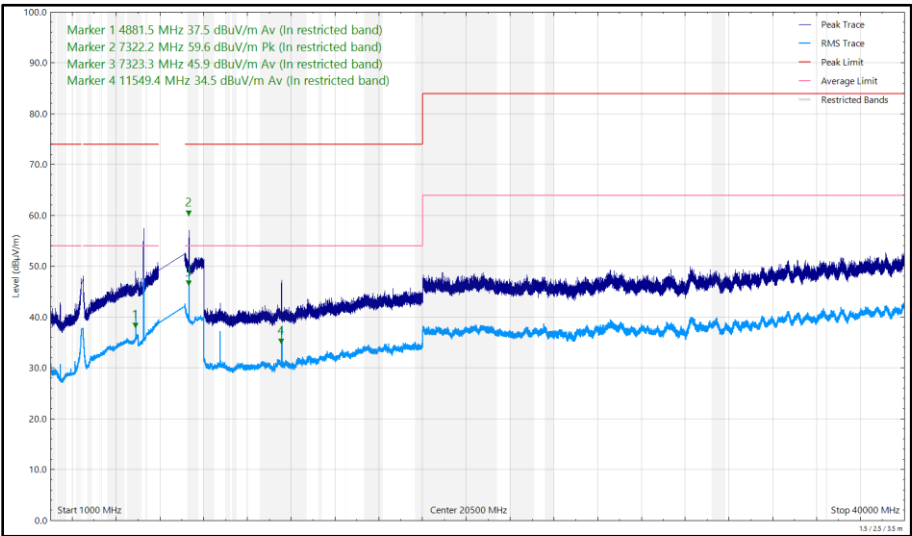


Figure 21 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

FCC 47 CFR Part 15, ISSED RSS-247, ISSED RSS-248 and ISSED RSS-GEN

The least stringent limit from the applicable rule parts was used to determine compliance for Radiated Emissions testing of multiple transmission sources.

The least stringent applicable limit was:

Clause	Limit
Part 15 247 (d) / RSS-247 Clause 5.5	-20 dBc
Part 15.407 (b) / RSS-248 Clause 4.7.2	Peak: -7 dBm/MHz e.i.r.p, Average: -27 dBm/MHz e.i.r.p.
Part 15.209 / RSS-GEN Clause 8.9	Peak: 74 dBμV/m at 3m, Average 54 dBμV/m at 3m (Restricted bands > 1 GHz)

Table 12

2.4 GHz WLAN and Narrowband

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
73.122	25.67	40.00	-14.33	Q-Peak	155	100	Vertical
108.298	32.10	43.50	-11.40	Q-Peak	0	287	Horizontal
108.746	30.64	43.50	-12.86	Q-Peak	7	103	Vertical
123.192	25.13	43.50	-18.37	Q-Peak	2	261	Horizontal
164.528	24.77	43.50	-18.73	Q-Peak	33	249	Horizontal
284.839	31.39	46.00	-14.61	Q-Peak	293	118	Horizontal
329.771	34.33	46.00	-11.67	Q-Peak	217	140	Vertical
331.898	38.50	46.00	-7.50	Q-Peak	138	100	Horizontal
2389.991	40.06	54.00	-13.94	RMS	357	386	Vertical
2483.551	44.15	54.00	-9.85	RMS	342	356	Vertical
2483.583	35.96	54.00	-18.04	RMS	306	317	Horizontal
2483.668	60.30	74.00	-13.70	Peak	356	361	Vertical
4883.672	40.77	54.00	-13.23	RMS	20	315	Vertical

Table 13 - 2442 MHz (CH7), HT20, Core 0 and 5204 MHz, DH5, ePA, Core 1, 30 MHz to 40 GHz

No other emissions found within 10 dB of the limit.

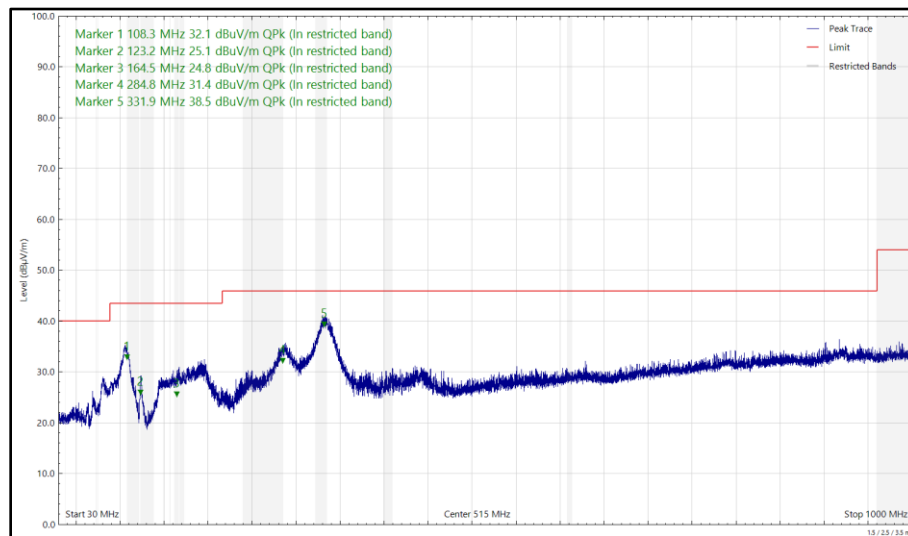


Figure 22 - 2442 MHz (CH7), HT20, Core 0 and 5204 MHz, DH5, ePA, Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

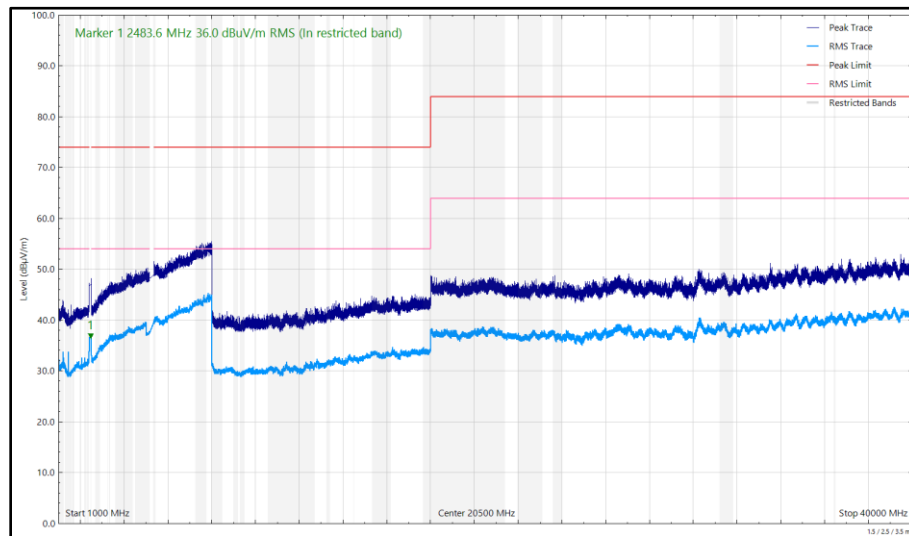


Figure 23 - 2442 MHz (CH7), HT20, Core 0 and 5204 MHz, DH5, ePA, Core 1, 1 GHz to 40 GHz, Horizontal

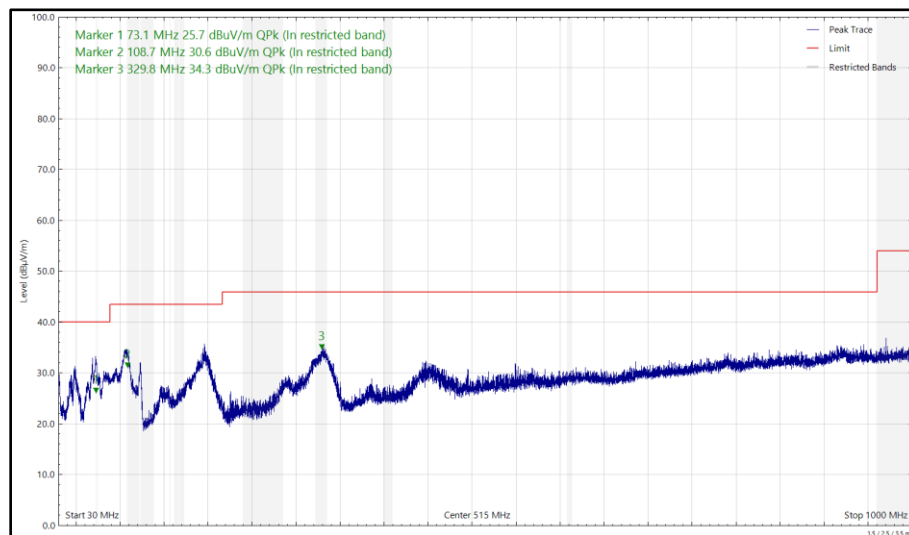


Figure 24 - 2442 MHz (CH7), HT20, Core 0 and 5204 MHz, DH5, ePA, Core 1, 30 MHz to 1 GHz, Vertical (Peak)

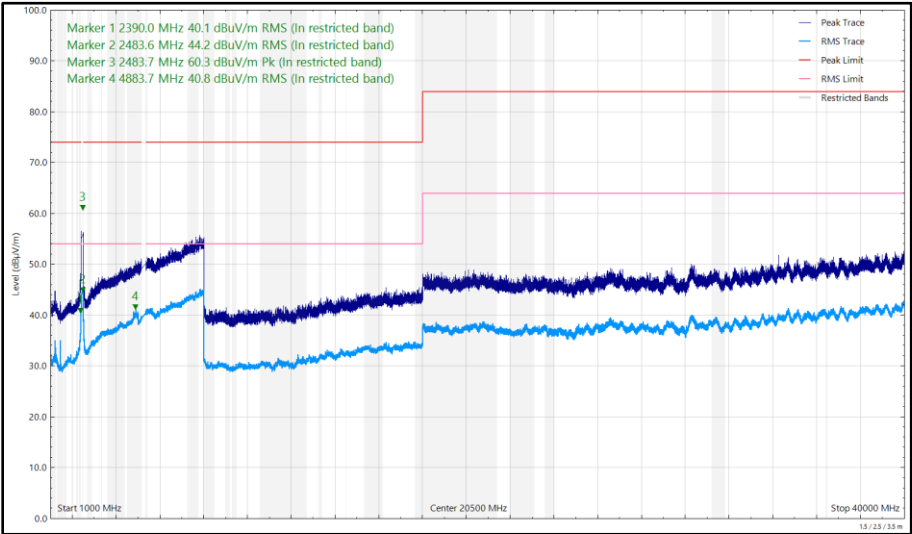


Figure 25 - 2442 MHz (CH7), HT20, Core 0 and 5204 MHz, DH5, ePA, Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
73.009	25.65	40.00	-14.35	Q-Peak	194	106	Vertical
108.171	30.85	43.50	-12.65	Q-Peak	50	100	Vertical
108.361	31.77	43.50	-11.73	Q-Peak	3	293	Horizontal
123.021	23.77	43.50	-19.73	Q-Peak	261	100	Vertical
166.512	25.13	43.50	-18.37	Q-Peak	10	262	Horizontal
284.629	31.40	46.00	-14.60	Q-Peak	287	111	Horizontal
329.028	38.78	46.00	-7.22	Q-Peak	142	100	Horizontal
330.204	34.40	46.00	-11.60	Q-Peak	222	122	Vertical
2388.977	56.75	74.00	-17.25	Peak	354	394	Vertical
2389.919	40.13	54.00	-13.87	RMS	354	394	Vertical
2389.976	33.71	54.00	-20.29	RMS	61	398	Horizontal
2397.971	61.98	74.00	-12.02	Peak	1	388	Vertical
2483.501	35.91	54.00	-18.09	RMS	308	400	Horizontal
2483.728	59.62	74.00	-14.38	Peak	350	328	Vertical
2483.736	44.51	54.00	-9.49	RMS	344	291	Vertical
4961.183	39.41	54.00	-14.59	RMS	20	348	Vertical
5374.672	43.16	54.00	-10.84	RMS	17	340	Vertical
5377.946	38.10	54.00	-15.90	RMS	341	392	Horizontal

Table 14 - 2442 MHz (CH7), HT20, Core 0 and 5788 MHz, DH5, ePA, Core 1, 30 MHz to 40 GHz

No other emissions found within 10 dB of the limit.

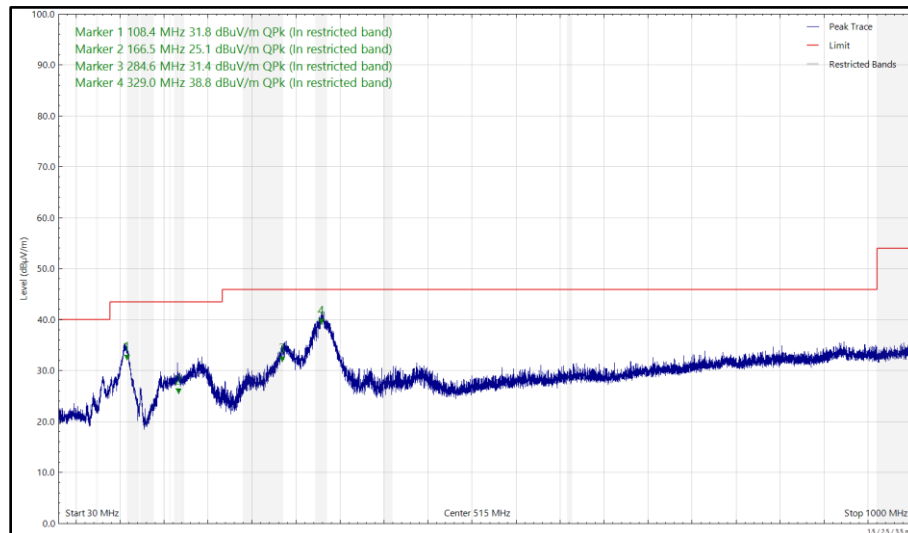


Figure 26 - 2442 MHz (CH7), HT20, Core 0 and 5788 MHz, DH5, ePA, Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

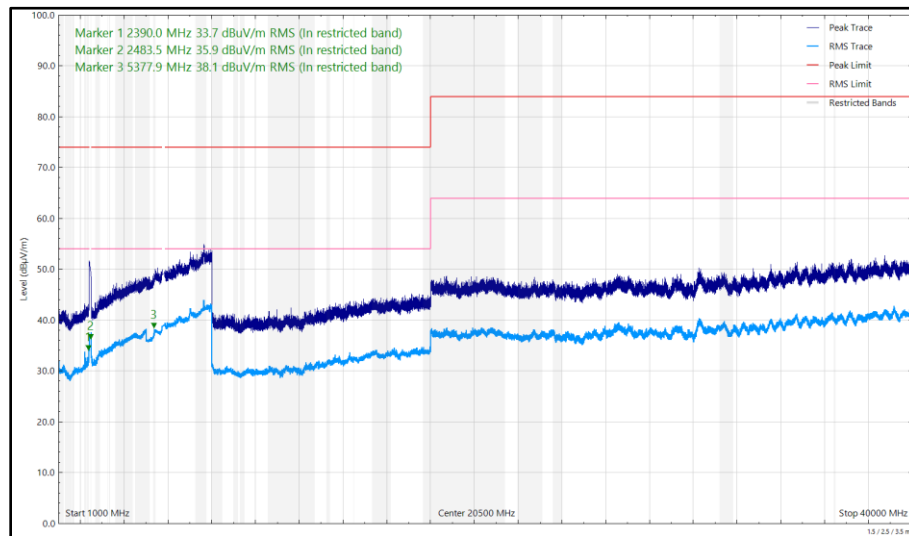


Figure 27 - 2442 MHz (CH7), HT20, Core 0 and 5788 MHz, DH5, ePA, Core 1, 1 GHz to 40 GHz, Horizontal

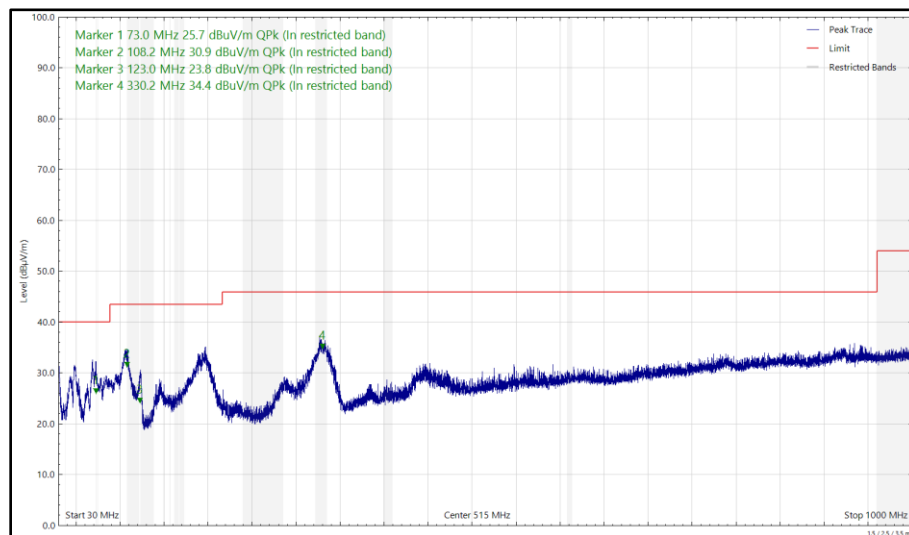


Figure 28 - 2442 MHz (CH7), HT20, Core 0 and 5788 MHz, DH5, ePA, Core 1, 30 MHz to 1 GHz, Vertical (Peak)

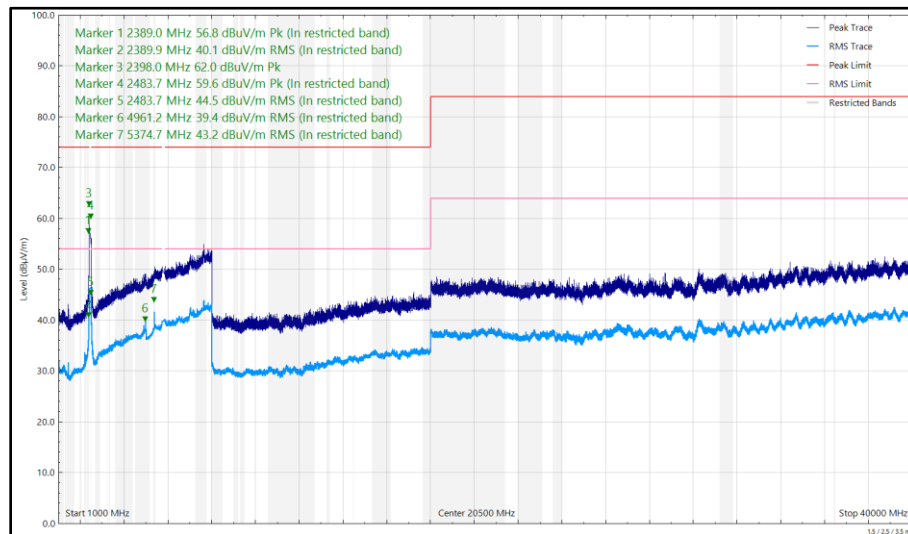


Figure 29 - 2442 MHz (CH7), HT20, Core 0 and 5788 MHz, DH5, ePA, Core 1, 1 GHz to 40 GHz, Vertical



Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
73.299	27.39	40.00	-12.61	Q-Peak	231	123	Vertical
108.194	30.44	43.50	-13.06	Q-Peak	37	107	Vertical
125.488	30.96	43.50	-12.54	Q-Peak	0	256	Horizontal
165.699	24.12	43.50	-19.38	Q-Peak	341	241	Horizontal
280.020	30.41	46.00	-15.59	Q-Peak	4	129	Horizontal
327.955	34.08	46.00	-11.92	Q-Peak	226	116	Vertical
329.371	31.47	46.00	-14.53	Q-Peak	156	100	Horizontal
2389.706	38.10	54.00	-15.90	RMS	22	390	Vertical
2483.509	43.16	54.00	-10.84	RMS	24	279	Vertical
2483.642	61.39	74.00	-12.61	Peak	24	279	Vertical
2483.654	36.04	54.00	-17.96	RMS	39	392	Horizontal
4882.527	42.79	54.00	-11.21	RMS	0	310	Vertical

Table 15 - 2442 MHz (CH7), HT20, Core 1 and 5204 MHz, DH5, ePA, Core 0, 30 MHz to 40 GHz

No other emissions found within 10 dB of the limit.

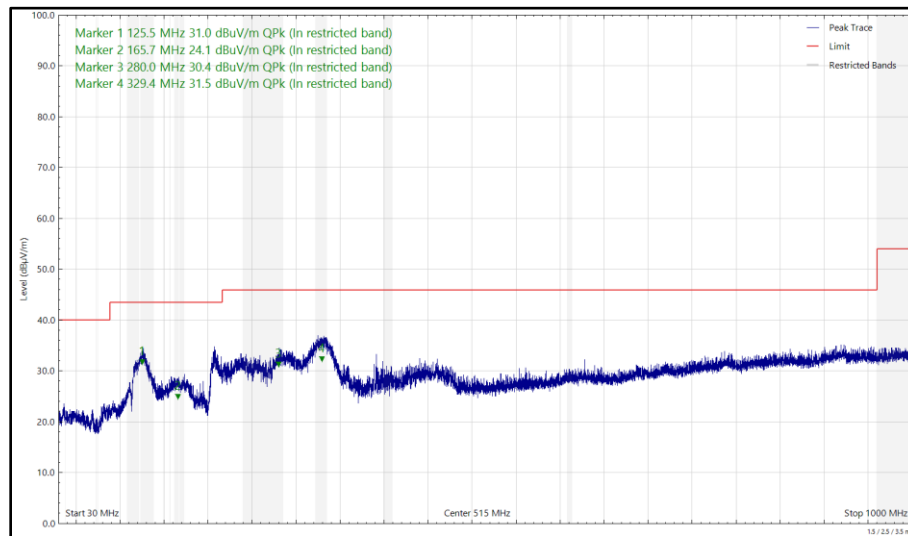


Figure 30 - 2442 MHz (CH7), HT20, Core 1 and 5204 MHz, DH5, ePA, Core 0, 30 MHz to 1 GHz, Horizontal (Peak)

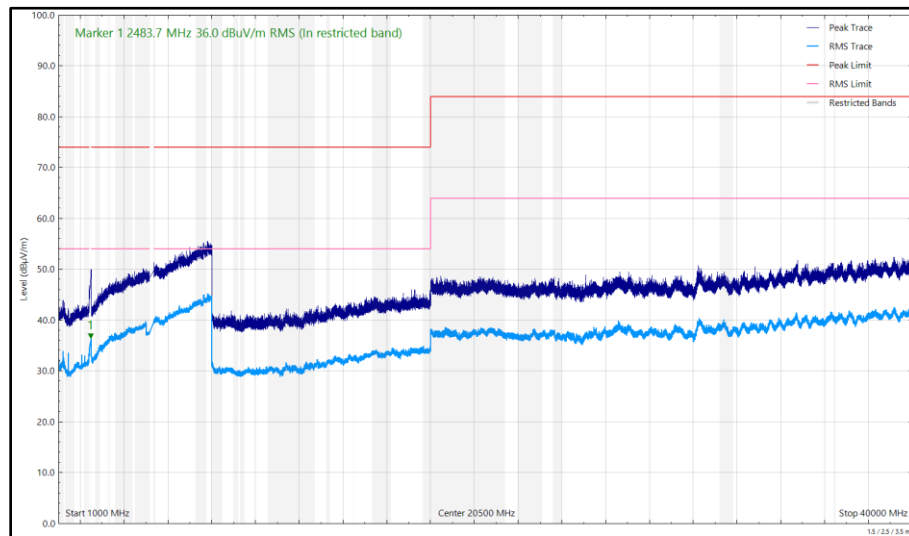


Figure 31 - 2442 MHz (CH7), HT20, Core 1 and 5204 MHz, DH5, ePA, Core 0, 1 GHz to 40 GHz, Horizontal

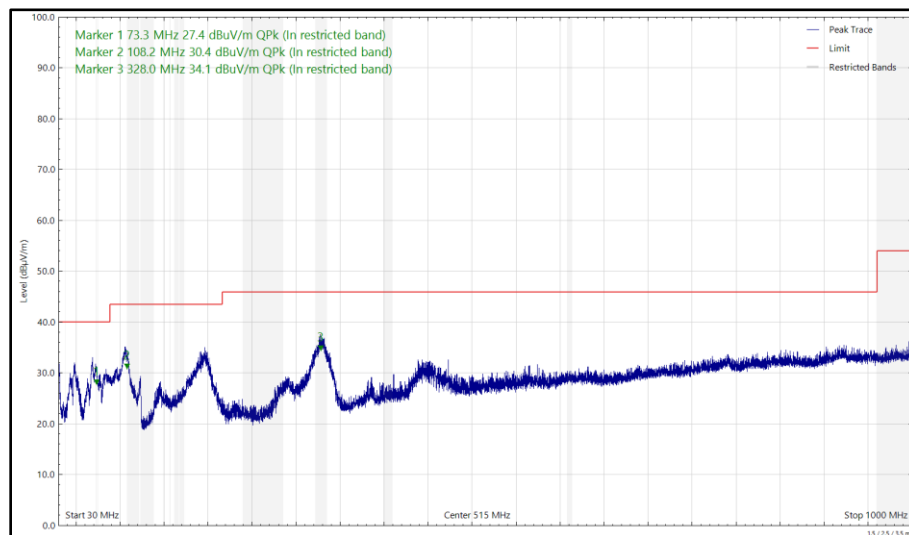


Figure 32 - 2442 MHz (CH7), HT20, Core 1 and 5204 MHz, DH5, ePA, Core 0, 30 MHz to 1 GHz, Vertical (Peak)

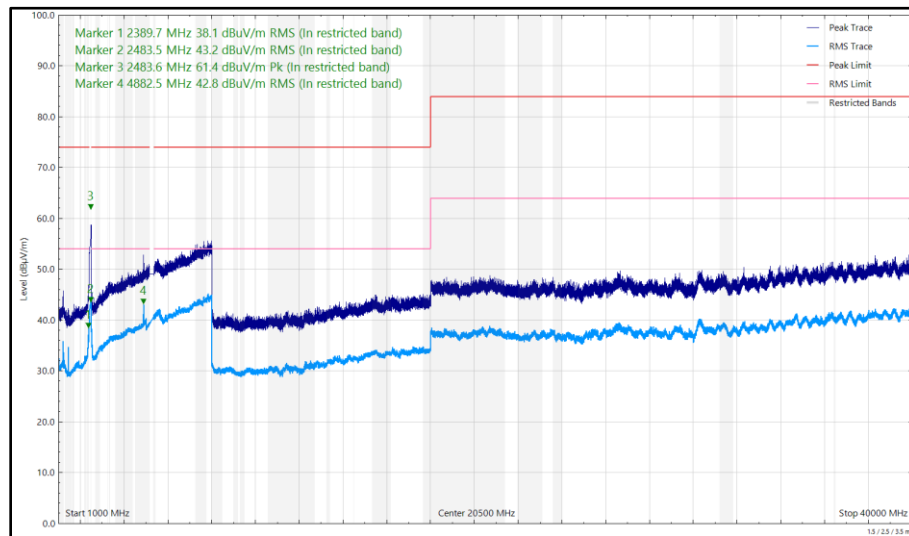


Figure 33 - 2442 MHz (CH7), HT20, Core 1 and 5204 MHz, DH5, ePA, Core 0, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
37.546	27.77	40.00	-12.23	Q-Peak	19	105	Vertical
73.088	23.54	40.00	-16.46	Q-Peak	262	101	Vertical
118.170	28.66	43.50	-14.84	Q-Peak	331	267	Horizontal
125.421	30.46	43.50	-13.04	Q-Peak	7	100	Vertical
126.637	30.14	43.50	-13.36	Q-Peak	6	260	Horizontal
283.947	30.40	46.00	-15.60	Q-Peak	6	144	Horizontal
329.126	34.49	46.00	-11.51	Q-Peak	0	100	Horizontal
334.049	29.23	46.00	-16.77	Q-Peak	103	139	Vertical
2389.912	39.31	54.00	-14.69	RMS	11	390	Vertical
2398.220	57.07	74.00	-16.93	Peak	357	393	Vertical
2483.501	44.53	54.00	-9.47	RMS	2	321	Vertical
2483.514	36.55	54.00	-17.45	RMS	40	400	Horizontal
2483.685	60.27	74.00	-13.73	Peak	23	318	Vertical
4883.263	41.32	54.00	-12.68	RMS	353	297	Vertical
5374.587	43.41	54.00	-10.59	RMS	336	313	Vertical
5374.782	38.29	54.00	-15.71	RMS	317	204	Horizontal

Table 16 - 2442 MHz (CH7), HT20, Core 1 and 5788 MHz, DH5, ePA, Core 0, 30 MHz to 40 GHz

No other emissions found within 10 dB of the limit.

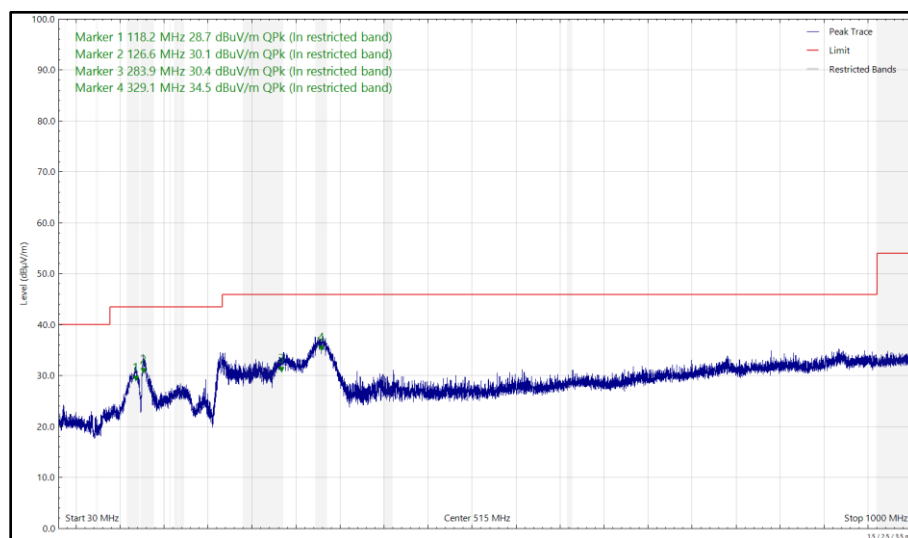


Figure 34 - 2442 MHz (CH7), HT20, Core 1 and 5788 MHz, DH5, ePA, Core 0, 30 MHz to 1 GHz, Horizontal (Peak)

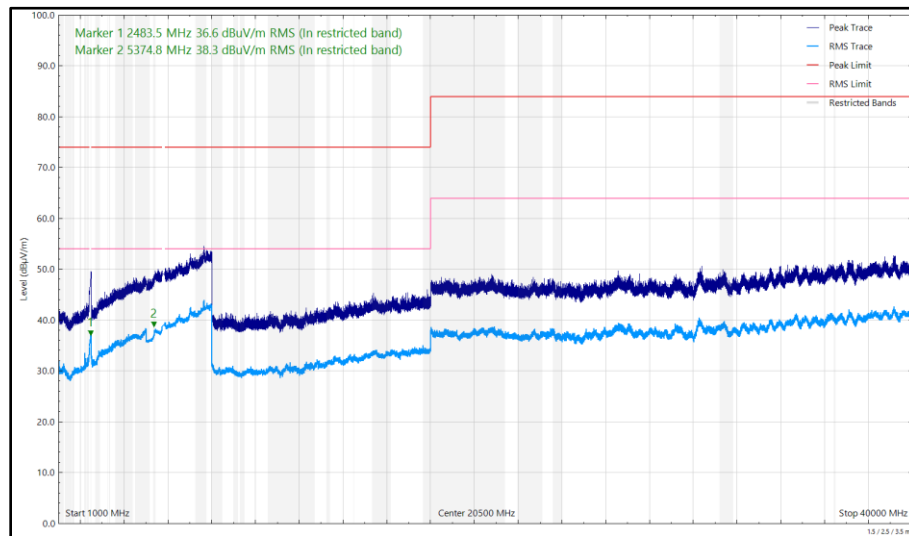


Figure 35 - 2442 MHz (CH7), HT20, Core 1 and 5788 MHz, DH5, ePA, Core 0, 1 GHz to 40 GHz, Horizontal

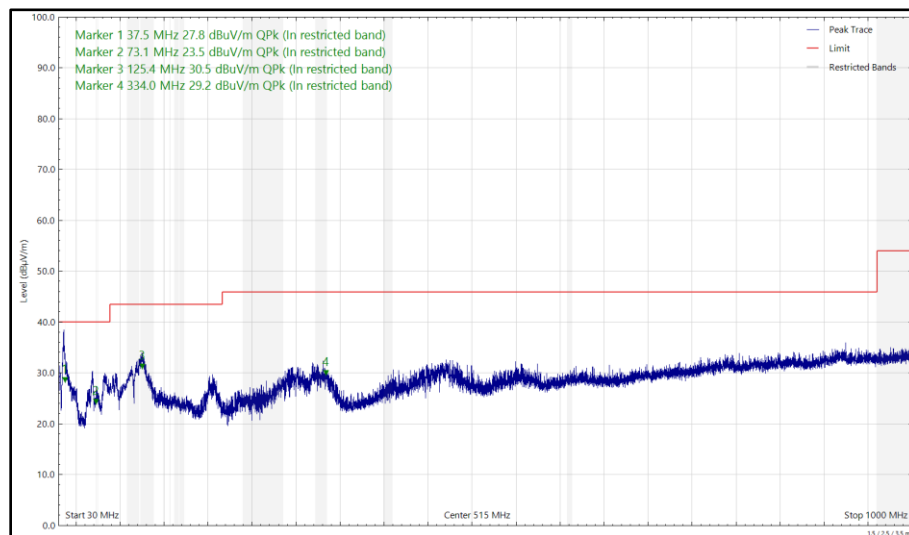


Figure 36 - 2442 MHz (CH7), HT20, Core 1 and 5788 MHz, DH5, ePA, Core 0, 30 MHz to 1 GHz, Vertical (Peak)

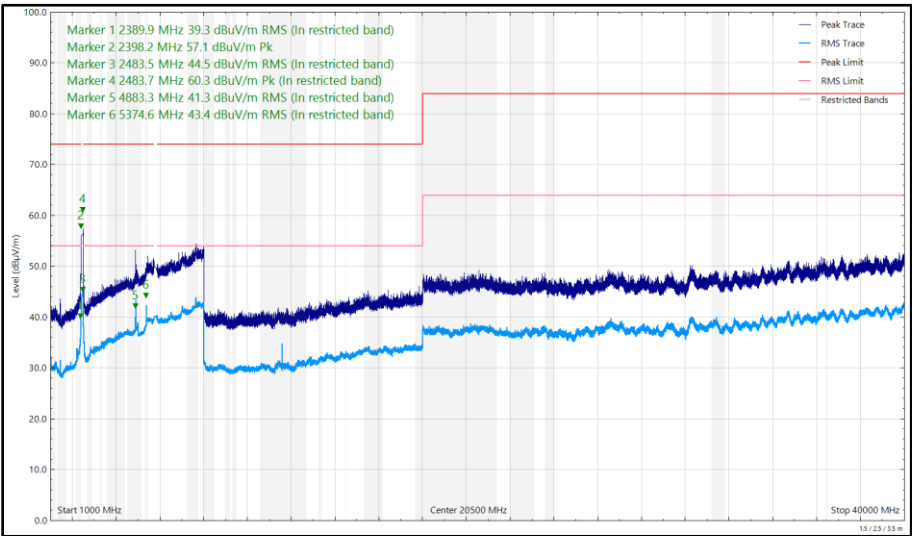


Figure 37 - 2442 MHz (CH7), HT20, Core 1 and 5788 MHz, DH5, ePA, Core 0, 1 GHz to 40 GHz, Vertical

FCC 47 CFR Part 15, ISED RSS-247 and ISED RSS-GEN

The least stringent limit from the applicable rule parts was used to determine compliance for Radiated Emissions testing of multiple transmission sources.

The least stringent applicable limit was:

Clause	Limit
Part 15 247 (d) / RSS-247 Clause 5.5	30 dBc
Part 15.407 (b) / RSS-247 Clause 4.6.1.2	-27 dBm/MHz e.i.r.p.
Part 15.209 / RSS-GEN Clause 8.9	Peak: 74 dBμV/m at 3m, Average 54 dBμV/m at 3m (Restricted bands > 1 GHz)

Table 17

5 GHz WLAN and Thread

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
37.501	25.69	40.00	-14.31	Q-Peak	50	119	Vertical
73.173	23.56	40.00	-16.44	Q-Peak	216	108	Vertical
112.518	30.20	43.50	-13.30	Q-Peak	228	100	Vertical
117.743	28.53	43.50	-14.97	Q-Peak	0	269	Horizontal
127.441	25.18	43.50	-18.32	Q-Peak	168	260	Horizontal
325.812	28.29	46.00	-17.71	Q-Peak	261	103	Vertical
326.706	33.25	46.00	-12.75	Q-Peak	156	100	Horizontal
4879.143	44.48	54.00	-9.52	RMS	349	293	Vertical
4983.132	56.08	74.00	-17.92	Peak	13	315	Vertical
5352.843	47.33	54.00	-6.67	RMS	321	267	Vertical
5421.168	59.16	74.00	-14.84	Peak	328	287	Vertical

Table 18 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 0, 30 MHz to 40 GHz

No other emissions found within 10 dB of the limit.

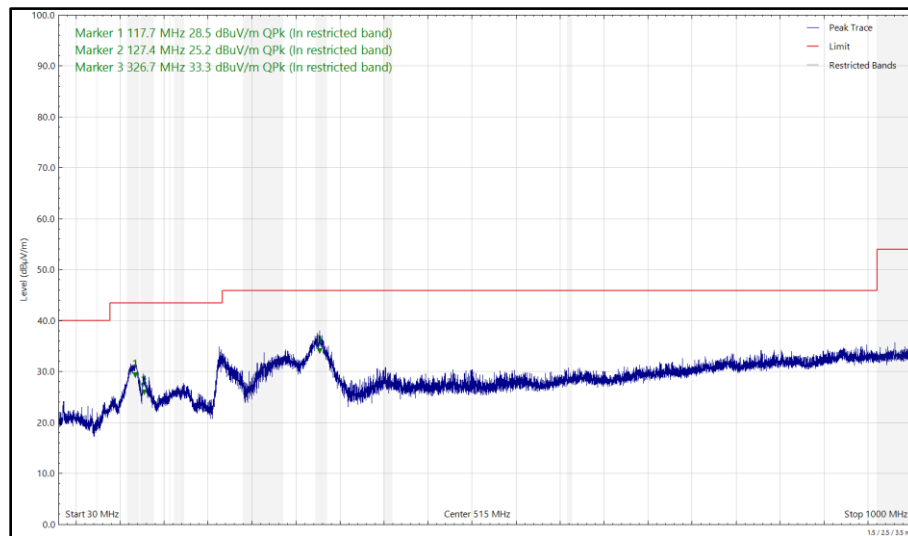


Figure 38 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 0, 30 MHz to 1 GHz, Horizontal (Peak)

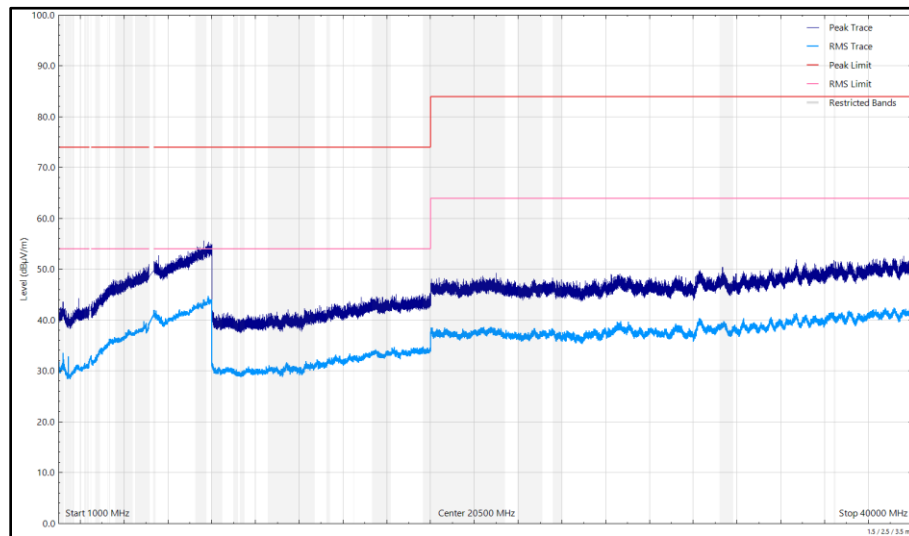


Figure 39 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 0, 1 GHz to 40 GHz, Horizontal

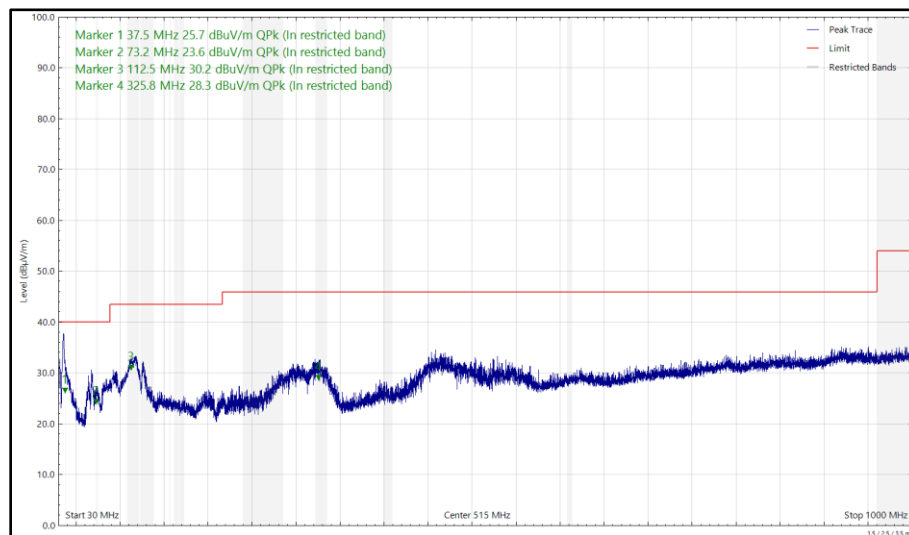


Figure 40 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 0, 30 MHz to 1 GHz, Vertical (Peak)

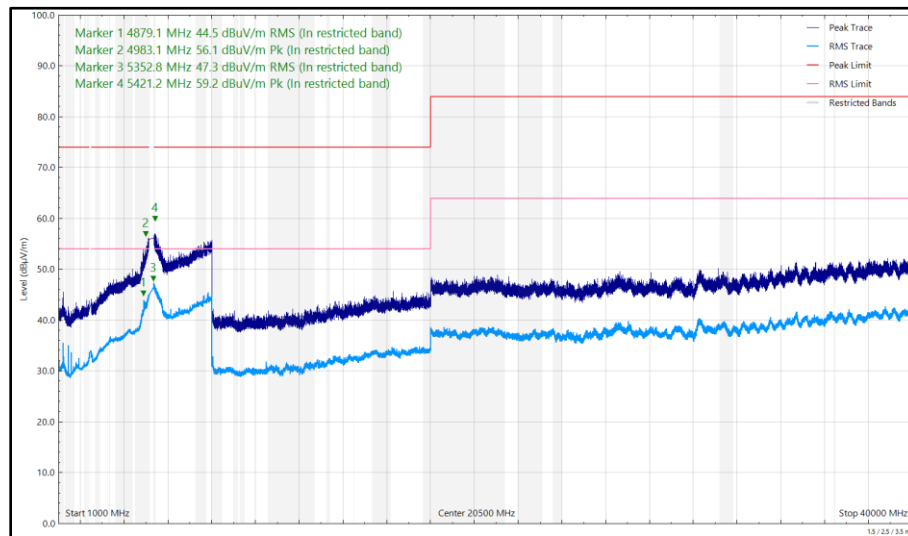


Figure 41 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 0, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
74.513	26.93	40.00	-13.07	Q-Peak	7	105	Vertical
117.235	32.52	43.50	-10.98	Q-Peak	357	100	Vertical
117.443	31.11	43.50	-12.39	Q-Peak	146	280	Horizontal
156.879	27.48	43.50	-16.02	Q-Peak	0	241	Horizontal
172.361	27.63	43.50	-15.87	Q-Peak	4	259	Horizontal
172.630	27.78	43.50	-15.72	Q-Peak	29	100	Vertical
257.198	31.24	46.00	-14.76	Q-Peak	88	100	Horizontal
4878.673	44.52	54.00	-9.48	RMS	342	287	Vertical
4879.183	40.94	54.00	-13.06	RMS	40	357	Horizontal
4996.450	56.98	74.00	-17.02	Peak	15	307	Vertical
5350.900	46.68	54.00	-7.32	RMS	35	279	Vertical
5383.967	59.58	74.00	-14.42	Peak	324	287	Vertical

Table 19 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 1, 30 MHz to 40 GHz

No other emissions found within 10 dB of the limit.

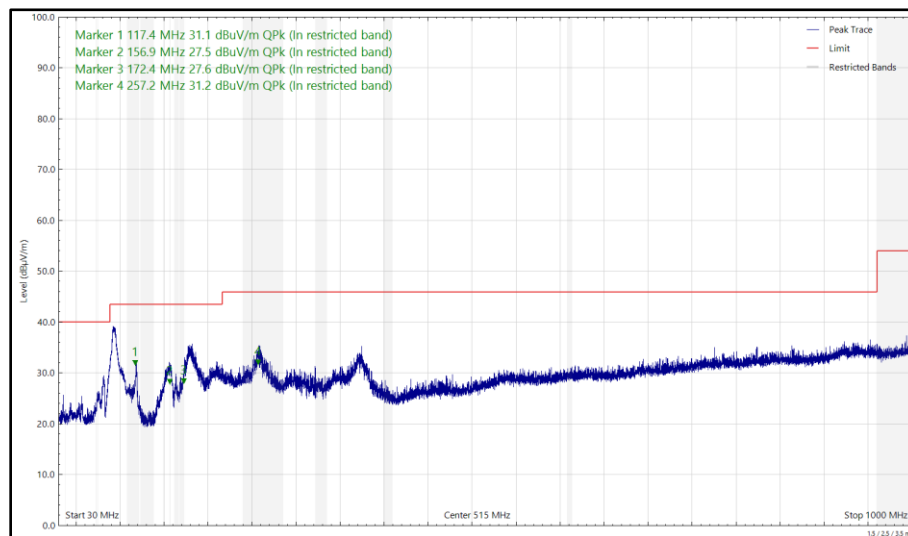


Figure 42 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

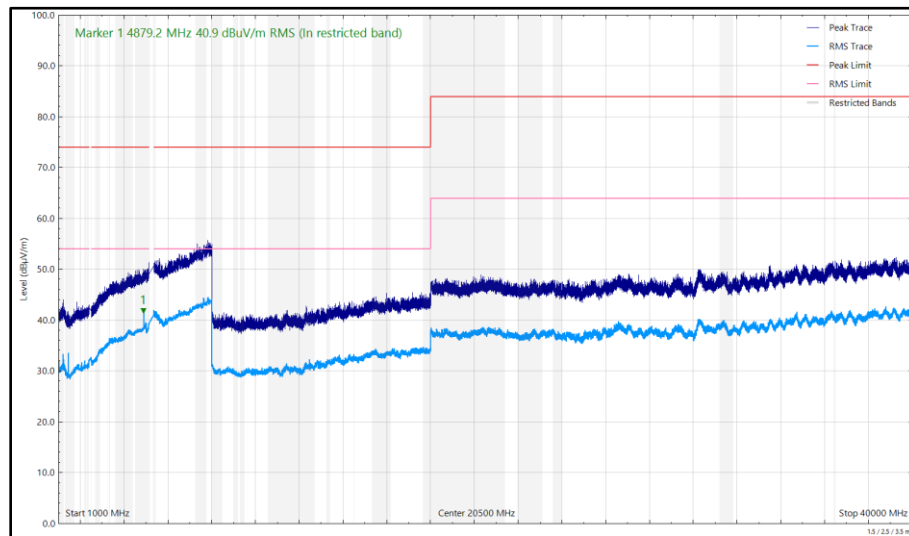


Figure 43 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 1, 1 GHz to 40 GHz, Horizontal

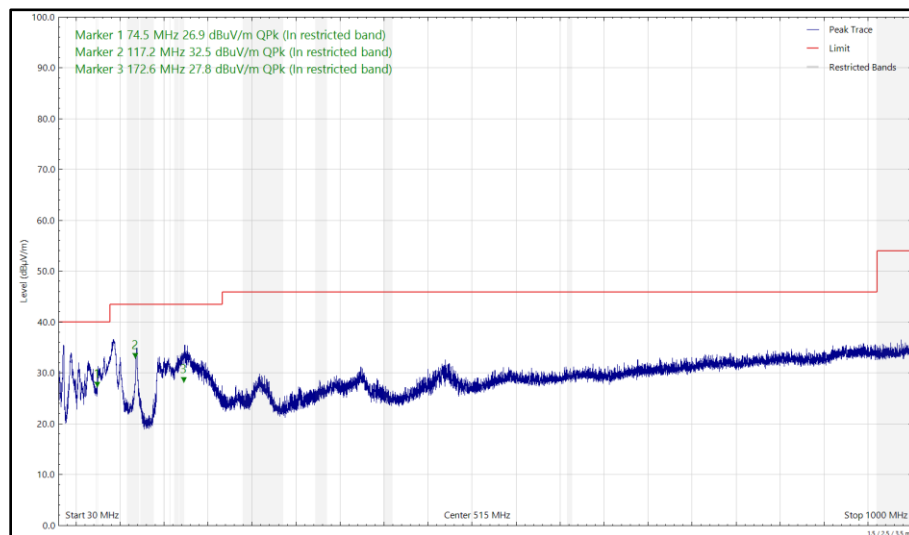


Figure 44 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 1, 30 MHz to 1 GHz, Vertical (Peak)

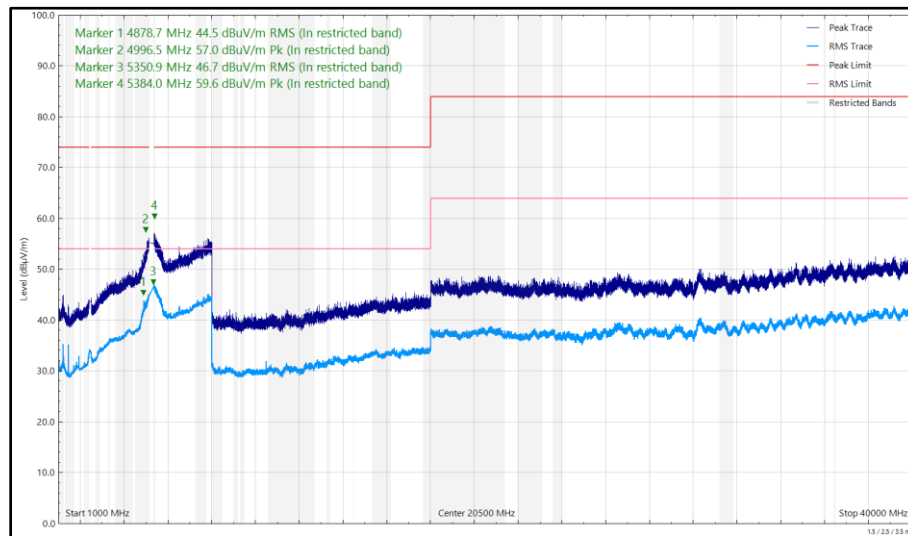


Figure 45 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
117.585	31.63	43.50	-11.87	Q-Peak	115	100	Vertical
117.860	29.05	43.50	-14.45	Q-Peak	237	271	Horizontal
173.104	25.97	43.50	-17.53	Q-Peak	158	100	Horizontal
257.211	30.35	46.00	-15.65	Q-Peak	315	100	Horizontal
4879.178	44.08	54.00	-9.92	RMS	357	325	Vertical
5445.506	46.25	54.00	-7.75	RMS	332	280	Vertical
5459.203	58.39	74.00	-15.61	Peak	324	278	Vertical
5750.175	57.86	74.00	-16.14	Peak	336	235	Vertical
11280.035	35.06	54.00	-18.94	RMS	335	213	Vertical

Table 20 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 0, 30 MHz to 40 GHz

No other emissions found within 10 dB of the limit.

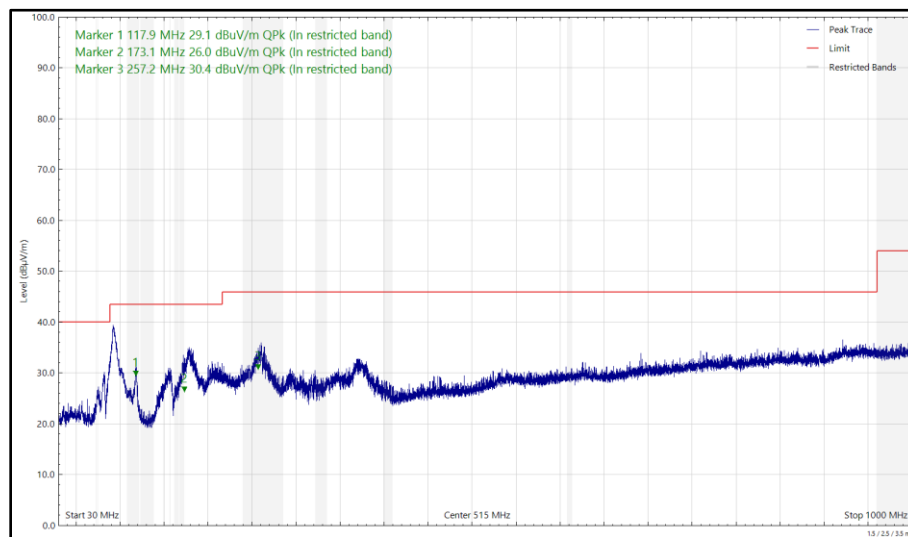


Figure 46 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 0, 30 MHz to 1 GHz, Horizontal (Peak)

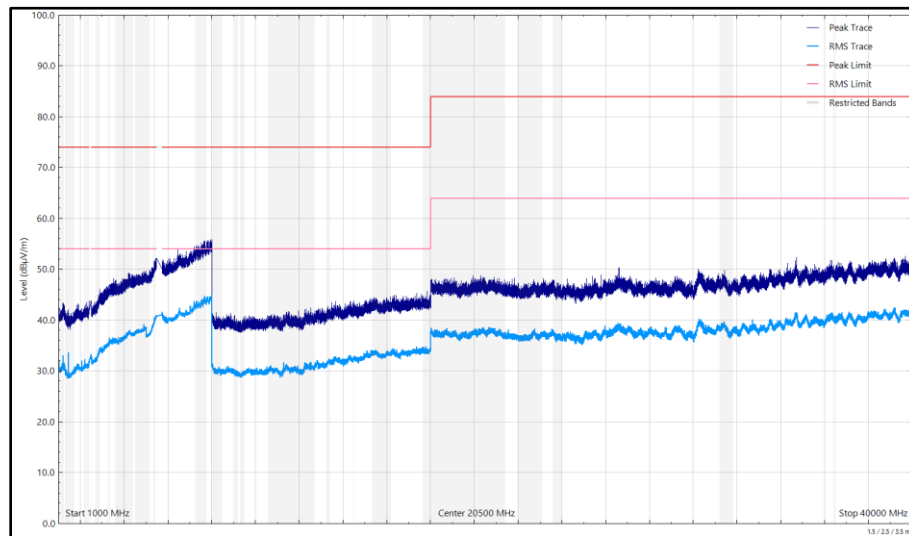


Figure 47 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 0, 1 GHz to 40 GHz, Horizontal

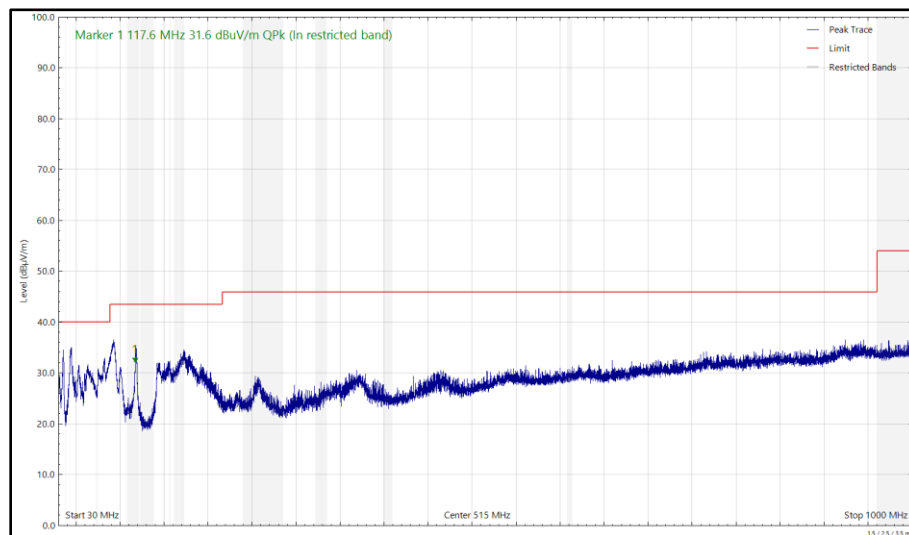


Figure 48 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 0, 30 MHz to 1 GHz, Vertical (Peak)

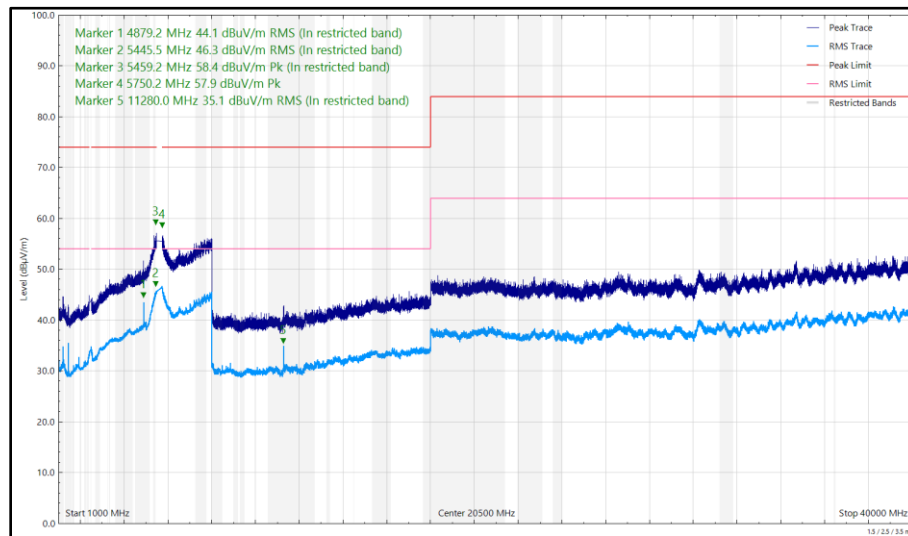


Figure 49 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 0, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
117.449	32.14	43.50	-11.36	Q-Peak	118	102	Vertical
117.532	28.91	43.50	-14.59	Q-Peak	238	251	Horizontal
171.621	29.74	43.50	-13.76	Q-Peak	205	110	Vertical
257.228	30.49	46.00	-15.51	Q-Peak	302	114	Horizontal
4879.088	41.54	54.00	-12.46	RMS	19	306	Vertical
4879.138	40.35	54.00	-13.65	RMS	41	277	Horizontal
5450.993	57.22	74.00	-16.78	Peak	337	325	Vertical
5459.800	45.73	54.00	-8.27	RMS	332	285	Vertical
11280.380	34.57	54.00	-19.43	RMS	332	230	Vertical

Table 21 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 1, 30 MHz to 40 GHz

No other emissions found within 10 dB of the limit.

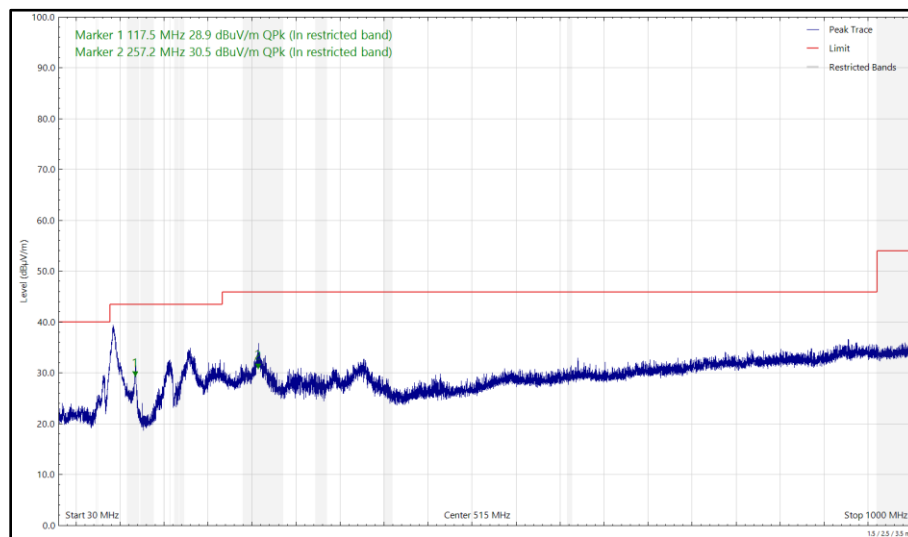


Figure 50 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

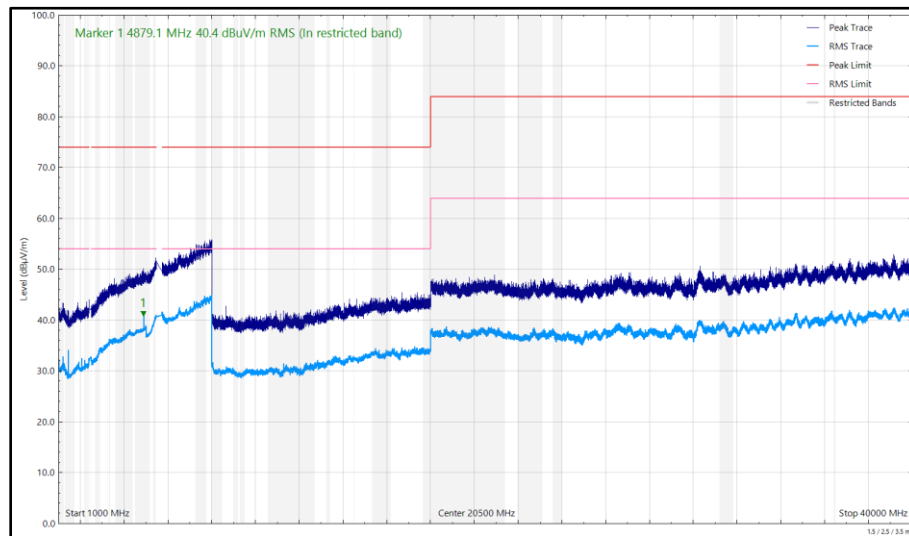


Figure 51 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 1, 1 GHz to 40 GHz, Horizontal

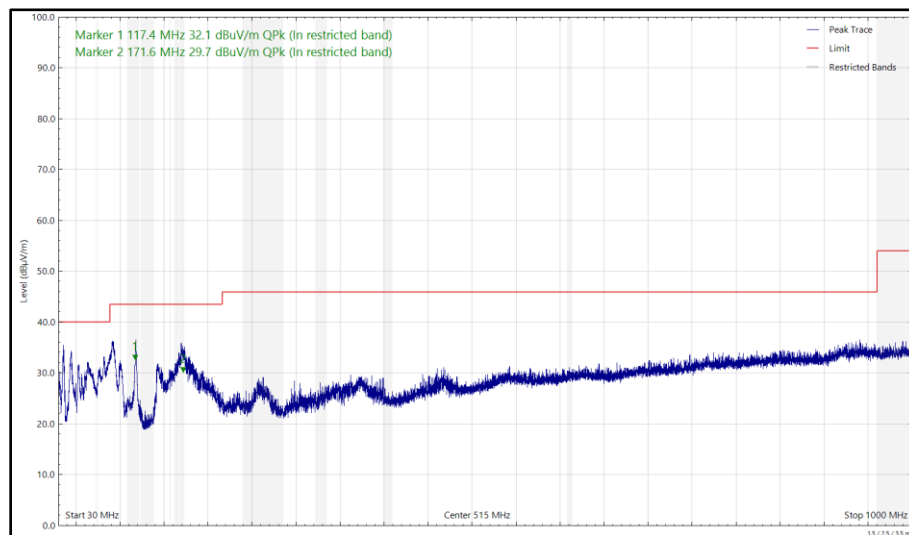


Figure 52 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 1, 30 MHz to 1 GHz, Vertical (Peak)

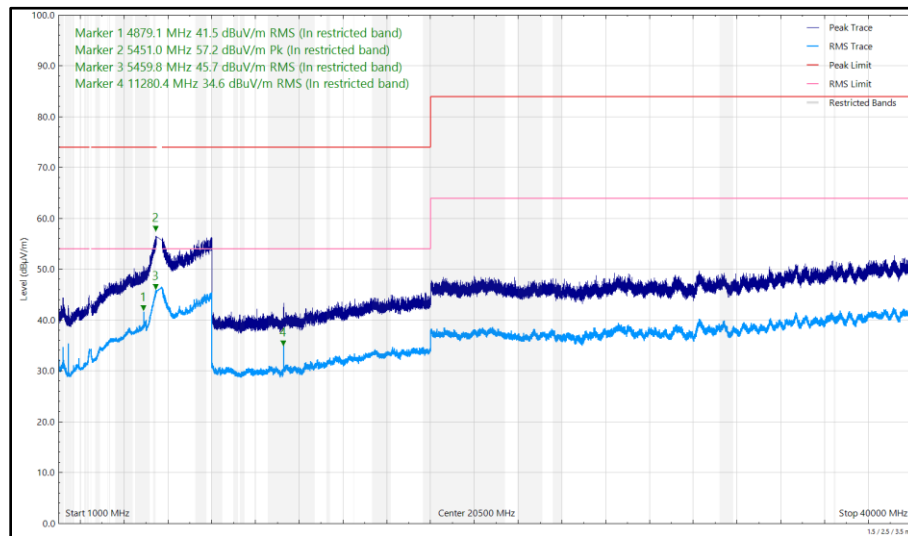


Figure 53 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
117.856	33.27	43.50	-10.23	Q-Peak	112	102	Vertical
118.287	27.97	43.50	-15.53	Q-Peak	135	152	Horizontal
172.067	29.51	43.50	-13.99	Q-Peak	0	100	Vertical
257.083	31.39	46.00	-14.61	Q-Peak	76	101	Horizontal
4879.123	38.79	54.00	-15.21	RMS	301	391	Horizontal
4879.123	41.37	54.00	-12.63	RMS	16	287	Vertical
5454.233	39.29	54.00	-14.71	RMS	68	389	Horizontal
5458.856	43.66	54.00	-10.34	RMS	334	315	Vertical
5720.935	60.02	74.00	-13.98	Peak	325	295	Vertical
5853.470	58.73	74.00	-15.27	Peak	19	269	Vertical

Table 22 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 0, 30 MHz to 40 GHz

No other emissions found within 10 dB of the limit.

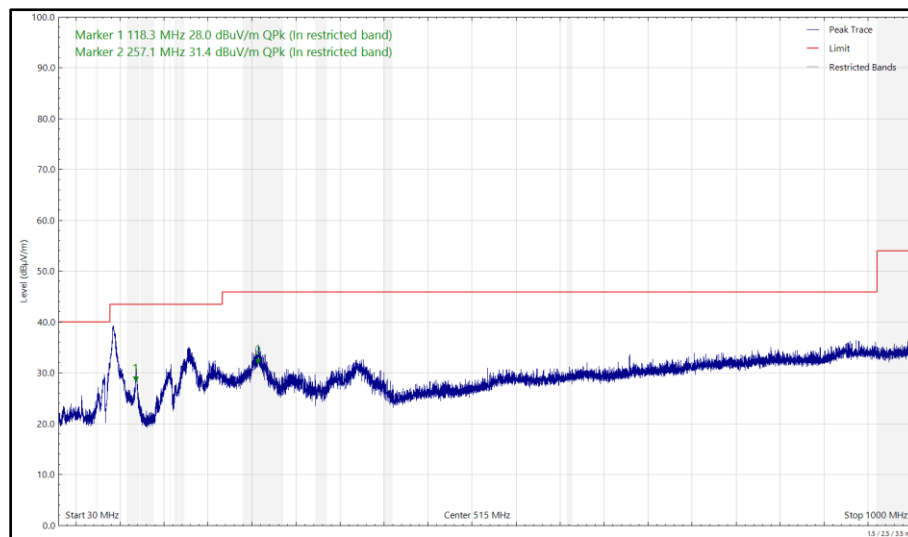


Figure 54 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 0, 30 MHz to 1 GHz, Horizontal (Peak)