

FCC and ISED Test Report

Apple Inc
Model: A3238

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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SIGNATURE

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Steve Marshall	Senior Engineer	Authorised Signatory	16 August 2024

Signatures in this approval box have checked this document in line with the requirements of TUV SUD 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	16 August 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	16-August-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	21-June-2024
Finish of Test	04-July-2024
Name of Engineer(s)	Ahmed Al Derdiri, Colin Brain, Ian Hart, Ioan-Alexandru Bogatu, Manohar Thota and Tony Baby
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, ISSED RSS-247, ISSED RSS-248 and ISSED 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 desktop 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: A3238			
Serial Number	Hardware Version	Software Version	Firmware
NQMK2V7Q9C	REV1.0	24A42070q	WLAN: 23.30.16 Bluetooth: 22.1.80.569 Thread: 22.1.80.569 Narrowband: 22.1.80.569

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: A3238, Serial Number: NQMK2V7Q9C			
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)	Ahmed Al Derdiri, Colin Brain, Manohar Thota and Tony Baby	UKAS
Configuration and Mode: 6 GHz WLAN and 2.4 GHz Bluetooth		
Radiated Spurious Emissions (Simultaneous Transmission)	Ahmed Al Derdiri, Colin Brain, Ian Hart, Manohar Thota and Tony Baby	UKAS
Configuration and Mode: 2.4 GHz WLAN and Narrowband		
Radiated Spurious Emissions (Simultaneous Transmission)	Ahmed Al Derdiri, Colin Brain, Manohar Thota and Tony Baby	UKAS
Configuration and Mode: 5 GHz WLAN and Thread		
Radiated Spurious Emissions (Simultaneous Transmission)	Ahmed Al Derdiri, Colin Brain, Ioan-Alexandru Bogatu, Manohar Thota and Tony Baby	UKAS
Configuration and Mode: 6 GHz WLAN and Thread		
Radiated Spurious Emissions (Simultaneous Transmission)	Ahmed Al Derdiri, Colin Brain, Manohar Thota and Tony Baby	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

A3238, S/N: NQMK2V7Q9C - Modification State 0

2.1.3 Date of Test

21-June-2024 to 04-July-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 dBuV/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 dBuV/m to uV/m:
 $10^{(\text{Field Strength in dBuV/m}/20)}$

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.

During the assessment of 2.4 GHz WLAN and Narrowband. Radiated spurious emissions tests have been conducted in DH5 (high power) mode, as this represents worst case with respect to Power and PSD.

2.1.5 Example Test Setup Diagram

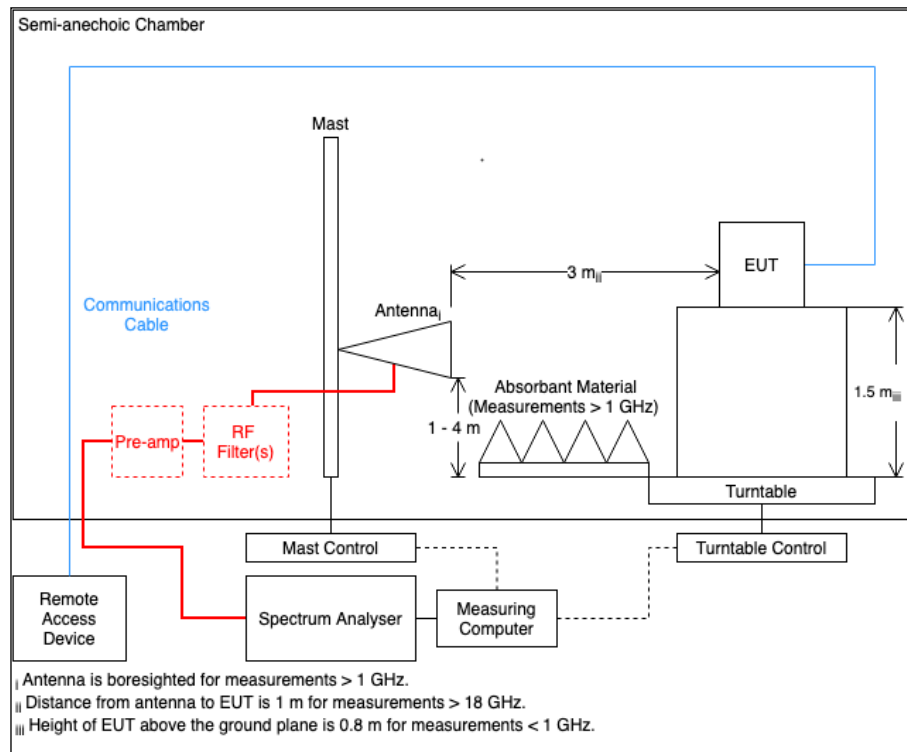


Figure 1

2.1.6 Environmental Conditions

Ambient Temperature	20.6 - 25.1 °C
Relative Humidity	37.0 - 48.1 %

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
337.799	28.27	46.00	-17.73	Q-Peak	127	101	Vertical
343.451	26.99	46.00	-19.01	Q-Peak	52	104	Horizontal
391.557	27.90	46.00	-18.10	Q-Peak	325	100	Horizontal
400.556	26.14	46.00	-19.86	Q-Peak	179	100	Vertical
4881.843	43.17	54.00	-10.83	CISPR Avg	77	171	Vertical
4882.357	35.11	54.00	-18.89	CISPR Avg	235	207	Horizontal
5144.364	38.24	54.00	-15.76	RMS	15	171	Horizontal
5145.952	42.24	54.00	-11.76	RMS	108	153	Vertical
5352.343	43.88	54.00	-10.12	RMS	273	142	Vertical
5352.617	40.07	54.00	-13.93	RMS	147	270	Horizontal
5366.956	55.17	74.00	-18.83	Peak	219	149	Vertical
7626.759	54.94	74.00	-19.06	Peak	285	350	Horizontal
7627.215	55.16	74.00	-18.84	Peak	166	202	Vertical
7628.974	42.88	54.00	-11.12	RMS	190	388	Horizontal
7633.135	42.91	54.00	-11.09	RMS	228	134	Vertical

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

No other emissions found within 10 dB of the limit.

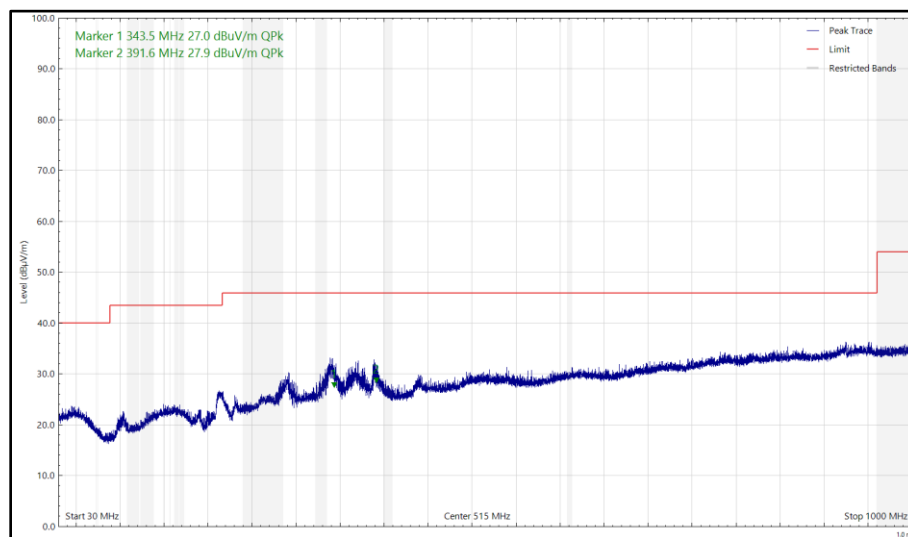


Figure 2 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Horizontal (Peak)

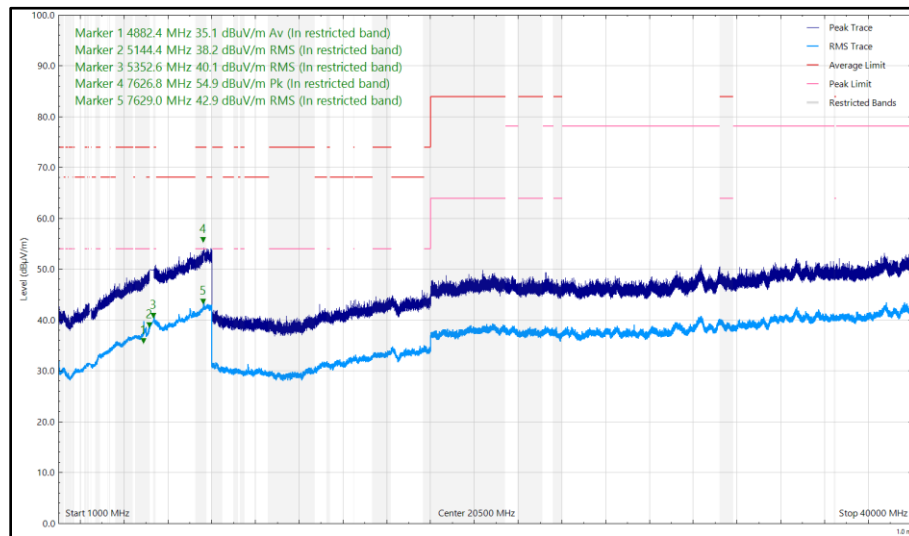


Figure 3 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Horizontal

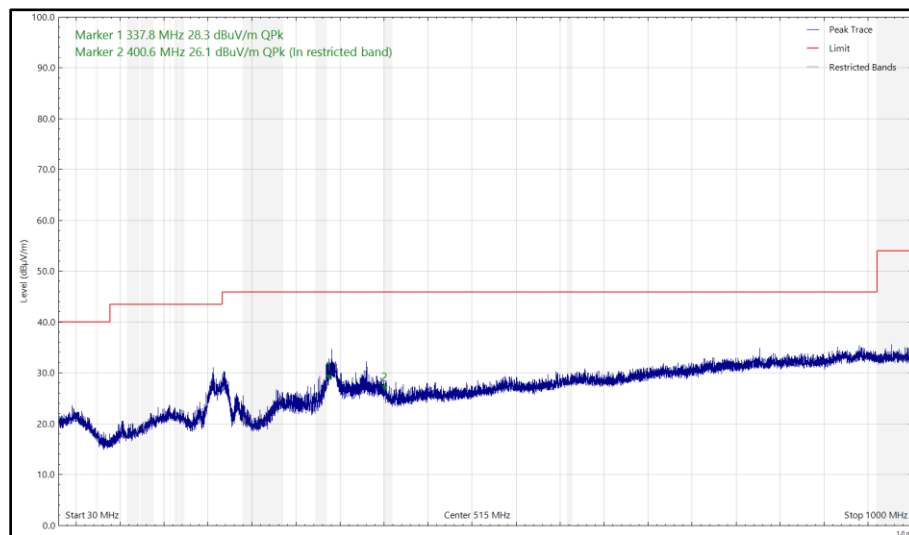


Figure 4 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Vertical (Peak)

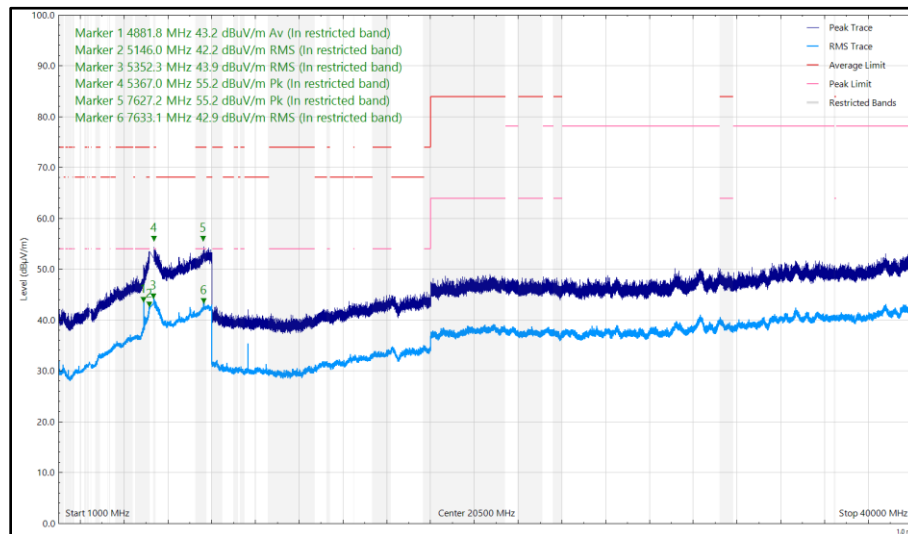


Figure 5 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, IPA, Core 2, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
335.322	27.24	46.00	-18.76	Q-Peak	115	107	Vertical
339.119	29.72	46.00	-16.28	Q-Peak	142	106	Horizontal
373.244	30.25	46.00	-15.75	Q-Peak	318	102	Horizontal
4871.245	33.26	54.00	-20.74	CISPR Avg	118	358	Horizontal
4882.123	42.93	54.00	-11.07	CISPR Avg	107	156	Vertical
5439.961	42.17	54.00	-11.83	RMS	272	126	Vertical
5456.438	38.34	54.00	-15.66	RMS	204	205	Horizontal
7637.336	42.50	54.00	-11.50	RMS	128	258	Horizontal
7637.875	42.47	54.00	-11.53	RMS	166	254	Vertical
7643.288	54.94	74.00	-19.06	Peak	41	319	Horizontal
7649.256	54.02	74.00	-19.98	Peak	2	110	Vertical

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

No other emissions found within 10 dB of the limit.

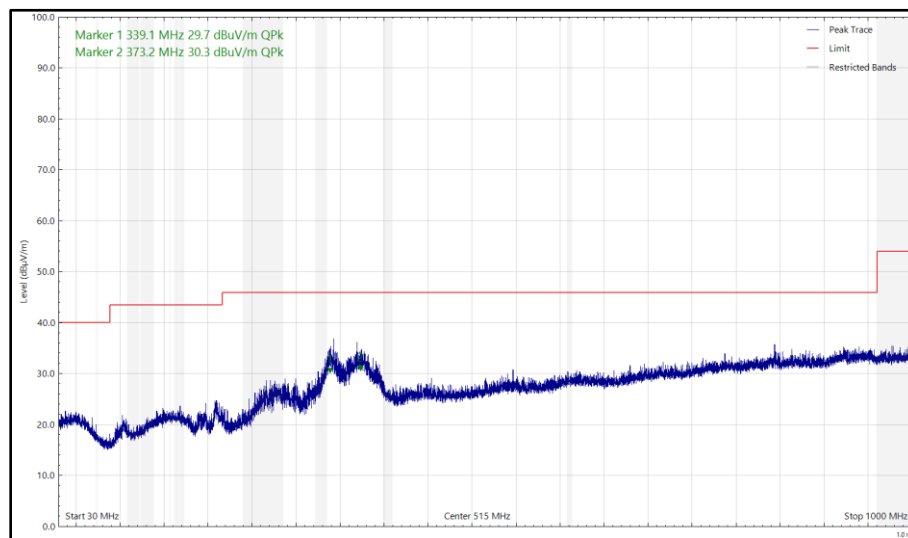


Figure 6 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Horizontal (Peak)

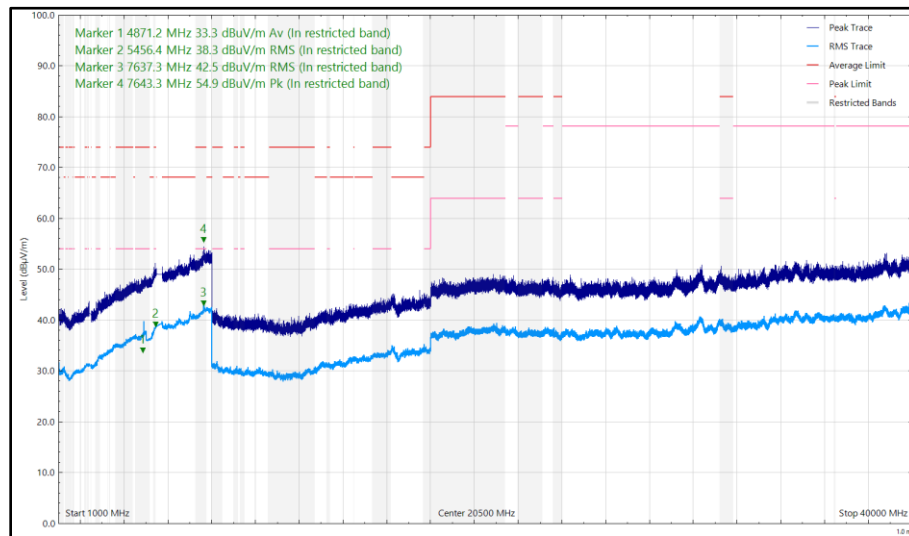


Figure 7 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Horizontal

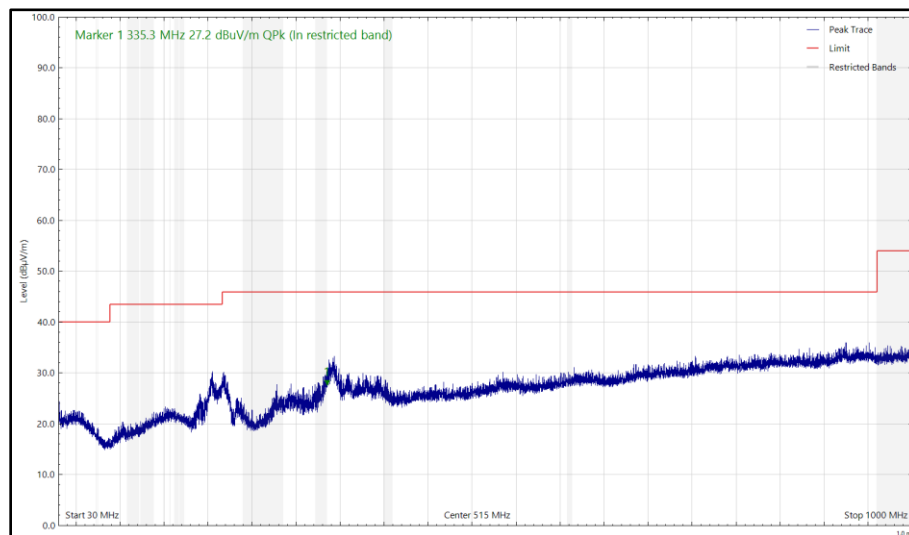


Figure 8 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Vertical (Peak)

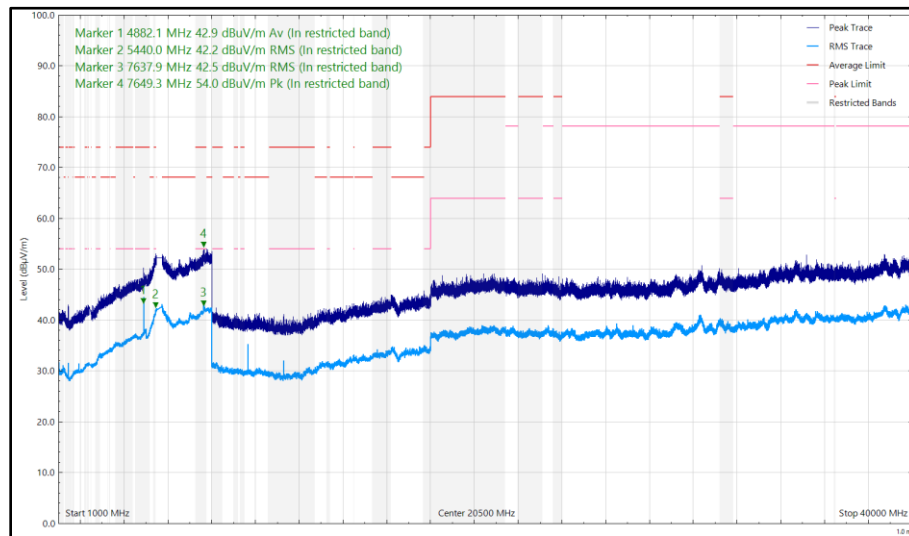


Figure 9 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
214.715	24.44	43.50	-19.06	Q-Peak	85	100	Vertical
334.843	27.05	46.00	-18.95	Q-Peak	122	100	Vertical
335.398	28.72	46.00	-17.28	Q-Peak	137	110	Horizontal
390.091	29.31	46.00	-16.69	Q-Peak	303	100	Horizontal
4881.538	35.52	54.00	-18.48	CISPR Avg	349	231	Horizontal
4882.357	41.84	54.00	-12.16	CISPR Avg	77	151	Vertical
5429.349	40.60	54.00	-13.40	RMS	272	147	Vertical
7627.999	54.63	74.00	-19.37	Peak	245	352	Horizontal
7632.046	42.66	54.00	-11.34	RMS	30	133	Vertical
7632.689	42.66	54.00	-11.34	RMS	217	196	Horizontal
7638.148	54.71	74.00	-19.29	Peak	252	118	Vertical

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

No other emissions found within 10 dB of the limit.

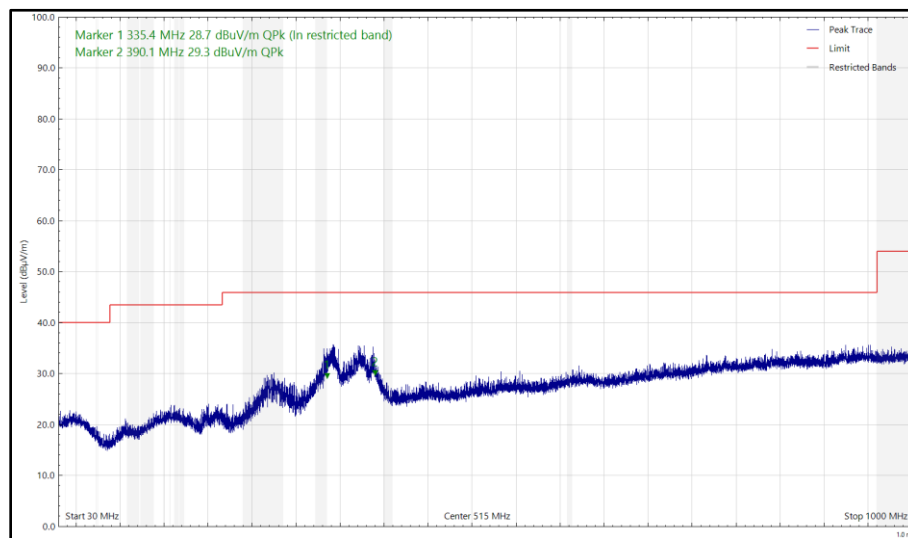


Figure 10 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Horizontal (Peak)

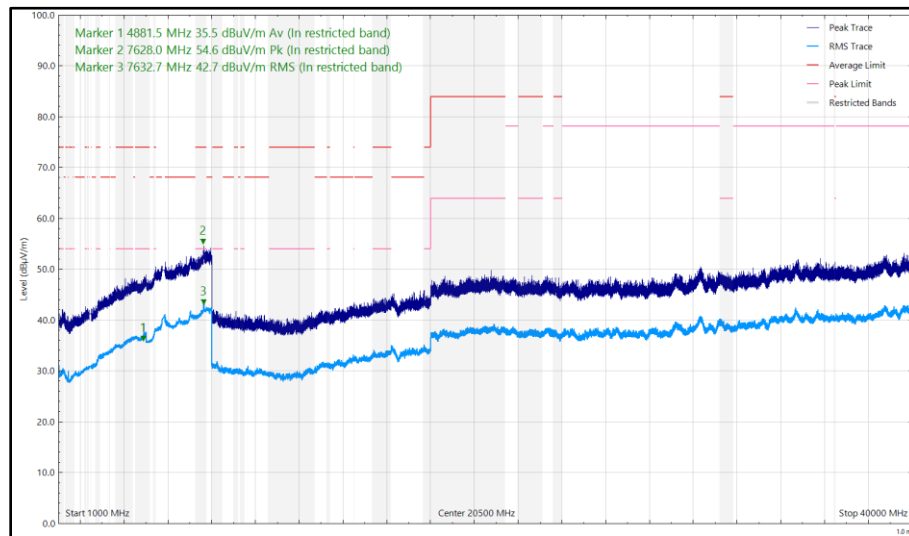


Figure 11 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Horizontal

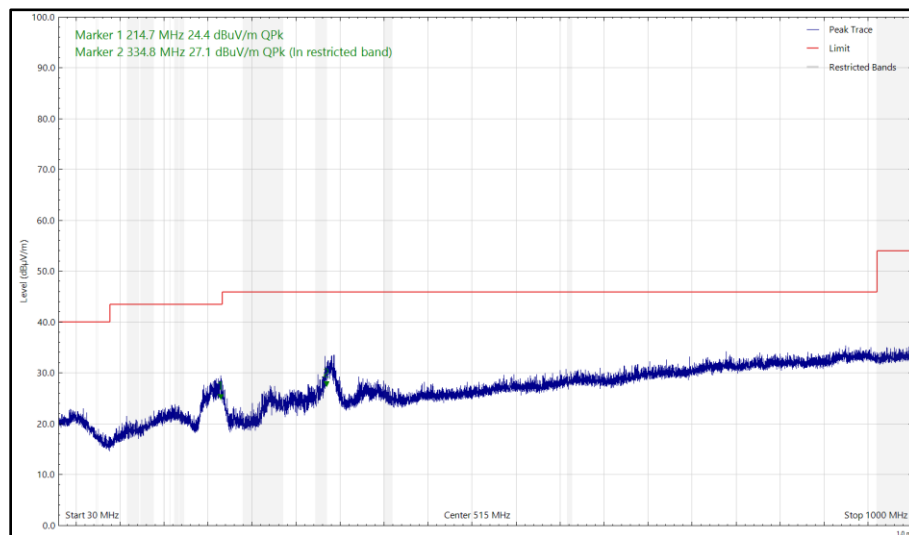


Figure 12 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Vertical (Peak)

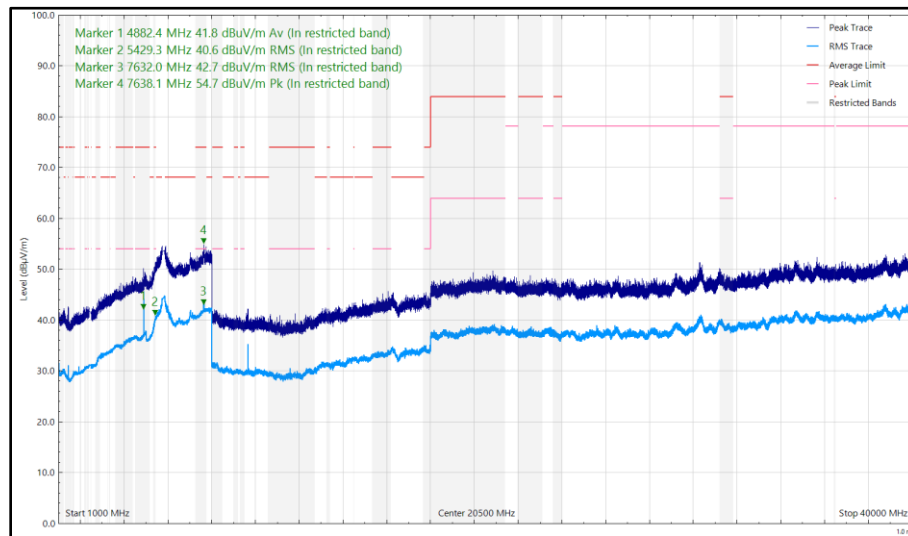


Figure 13 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
204.044	25.33	43.50	-18.17	Q-Peak	360	105	Vertical
334.608	27.26	46.00	-18.74	Q-Peak	119	100	Vertical
335.628	27.51	46.00	-18.49	Q-Peak	149	105	Horizontal
4881.668	37.96	54.00	-16.04	CISPR Avg	92	369	Vertical
4978.748	37.17	54.00	-16.83	RMS	123	110	Horizontal
5149.882	41.22	54.00	-12.78	RMS	118	100	Vertical
5352.041	41.88	54.00	-12.12	RMS	99	146	Vertical
5379.838	38.03	54.00	-15.97	RMS	140	200	Horizontal
5479.341	53.69	74.00	-20.31	Peak	118	100	Vertical
7627.411	55.60	74.00	-18.40	Peak	108	387	Horizontal
7627.411	43.04	54.00	-10.96	RMS	108	387	Horizontal
7638.094	43.04	54.00	-10.96	RMS	305	247	Vertical
7638.094	54.90	74.00	-19.10	Peak	305	247	Vertical

Table 9 - 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.

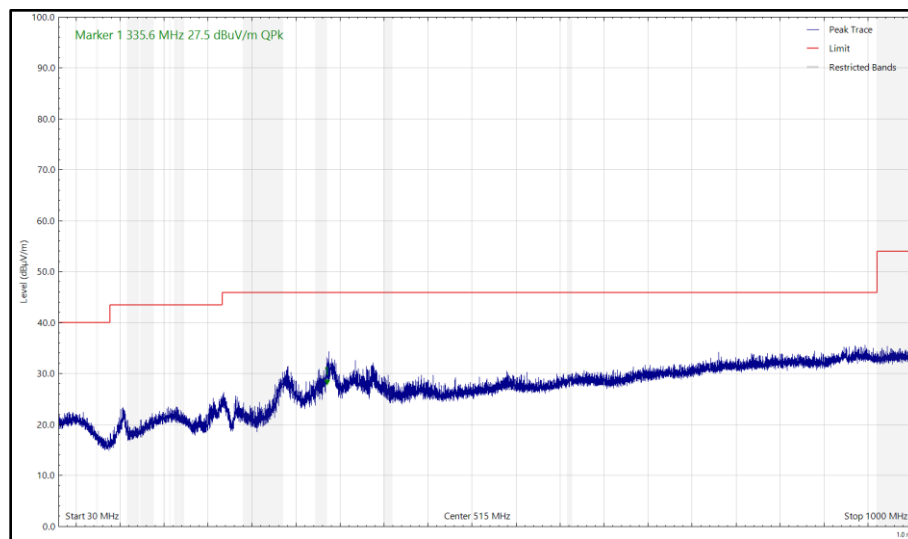


Figure 14 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

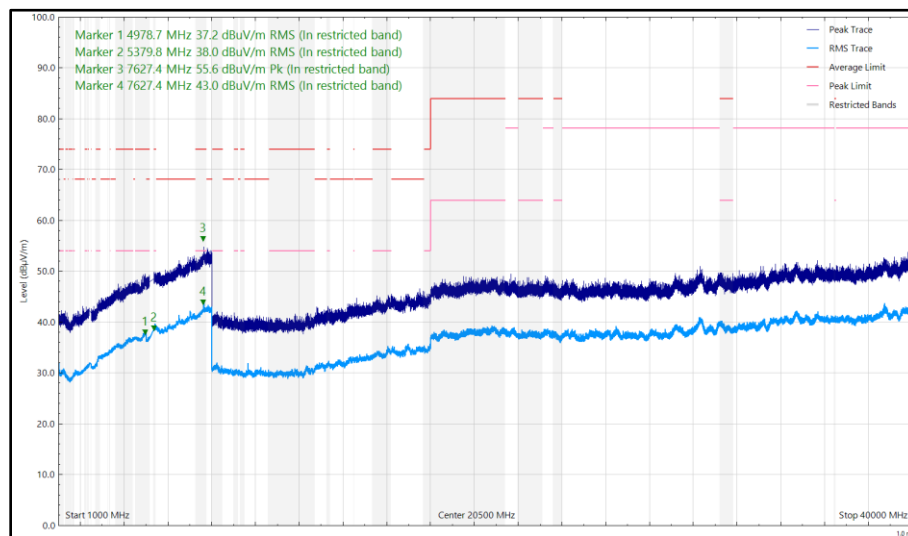


Figure 15 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

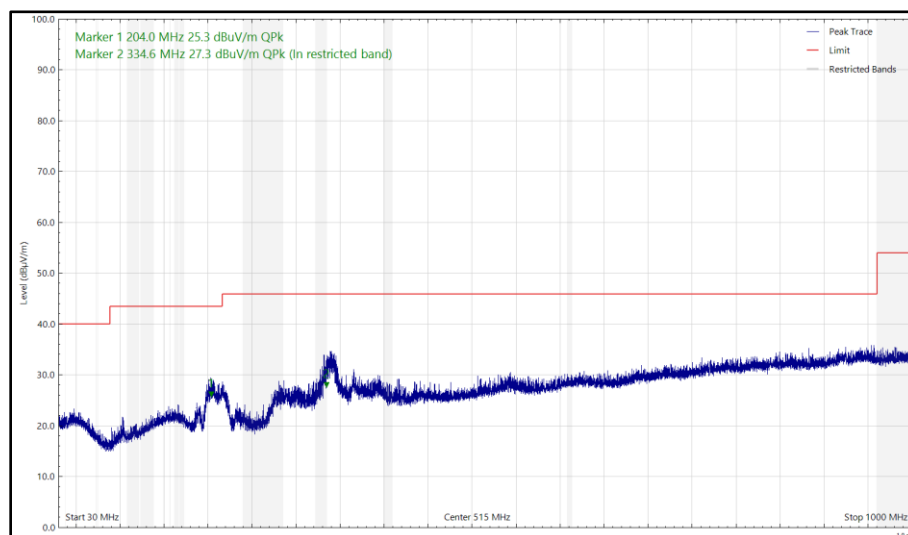


Figure 16 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

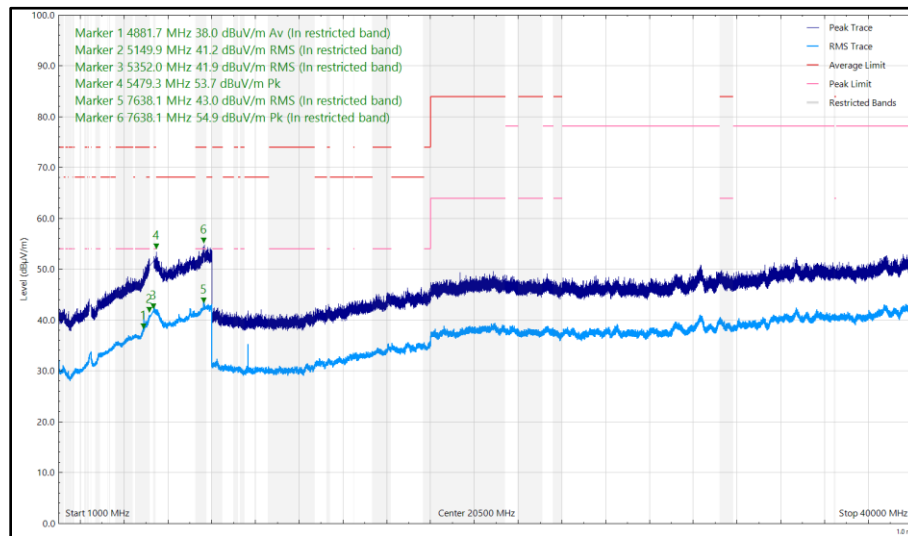


Figure 17 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
204.161	25.90	43.50	-17.60	Q-Peak	360	100	Vertical
334.376	26.78	46.00	-19.22	Q-Peak	129	113	Vertical
337.759	27.97	46.00	-18.03	Q-Peak	133	117	Vertical
369.455	29.12	46.00	-16.88	Q-Peak	309	112	Horizontal
4881.663	37.11	54.00	-16.89	CISPR Avg	83	108	Vertical
5443.271	37.82	54.00	-16.18	RMS	230	396	Horizontal
5452.325	41.03	54.00	-12.97	RMS	118	100	Vertical
5462.631	49.89	74.00	-24.11	Peak	0	395	Horizontal
5463.450	52.37	74.00	-21.63	Peak	118	115	Vertical
5731.424	54.07	74.00	-19.93	Peak	118	100	Vertical
5737.620	52.28	74.00	-21.72	Peak	148	138	Horizontal
7640.200	42.74	54.00	-11.26	RMS	152	109	Vertical
7643.369	55.05	74.00	-18.95	Peak	39	250	Horizontal
7643.369	42.74	54.00	-11.26	RMS	39	250	Horizontal
7647.294	55.14	74.00	-18.86	Peak	108	392	Vertical

Table 10 - 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.

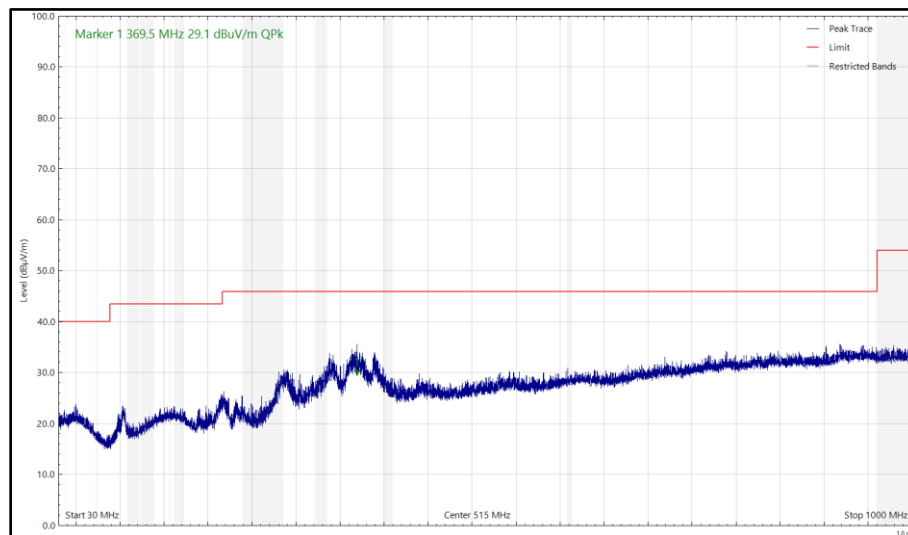


Figure 18 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

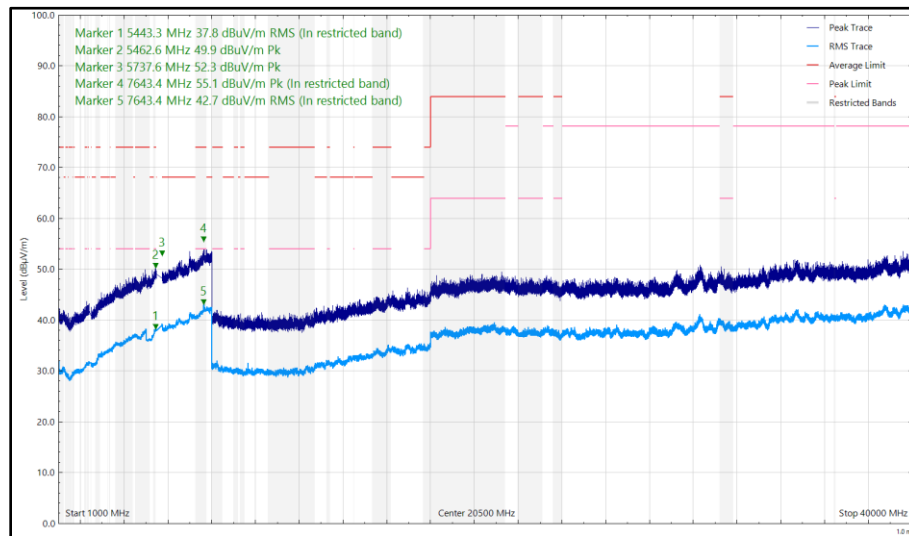


Figure 19 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

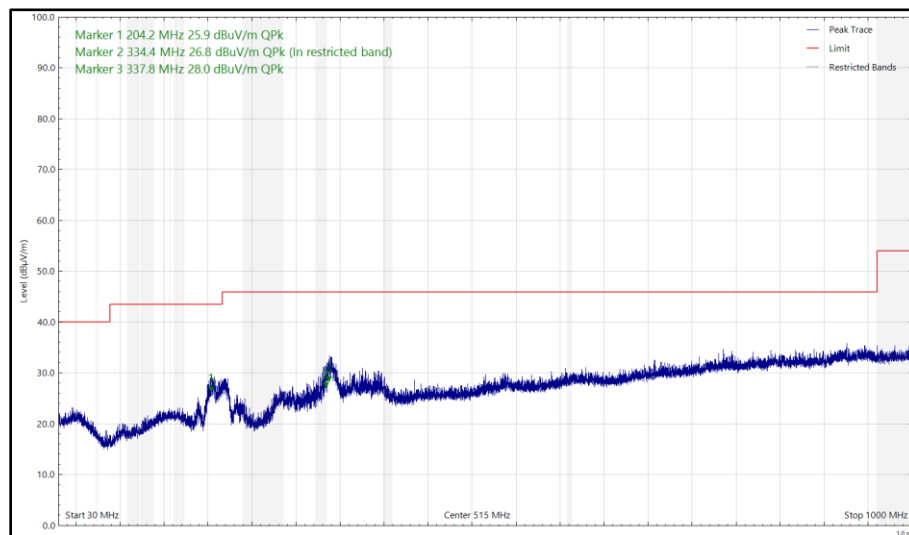


Figure 20 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

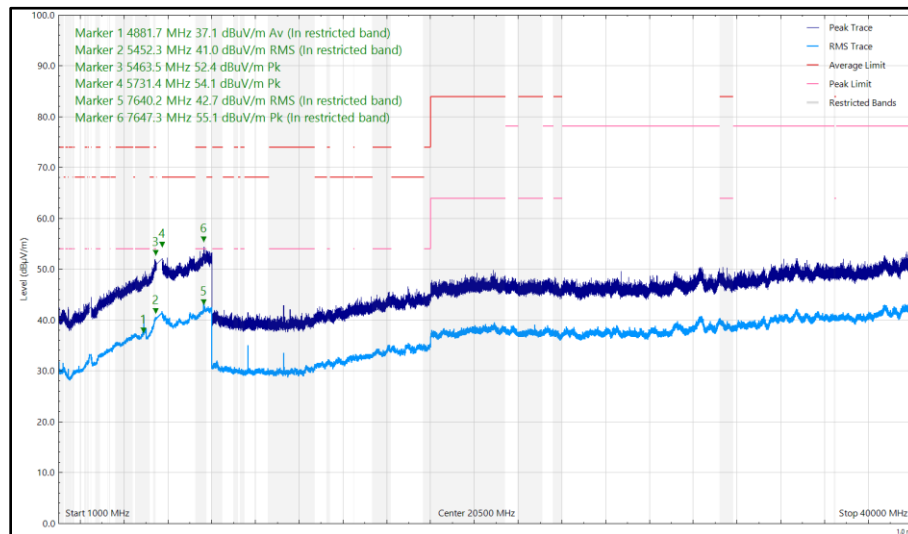


Figure 21 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
217.386	22.32	46.00	-23.68	Q-Peak	152	148	Horizontal
334.285	27.12	46.00	-18.88	Q-Peak	154	100	Horizontal
338.291	28.61	46.00	-17.39	Q-Peak	139	105	Vertical
365.712	29.73	46.00	-16.27	Q-Peak	303	108	Horizontal
4881.268	33.63	54.00	-20.37	CISPR Avg	37	106	Vertical
5455.145	40.61	54.00	-13.39	RMS	118	102	Vertical
5715.957	50.81	74.00	-23.19	Peak	139	108	Horizontal
5723.702	55.72	74.00	-18.28	Peak	118	109	Vertical
5854.017	51.51	74.00	-22.49	Peak	138	394	Horizontal
5856.412	56.87	74.00	-17.13	Peak	130	110	Vertical
7627.782	42.86	54.00	-11.14	RMS	230	102	Vertical
7627.782	54.56	74.00	-19.44	Peak	230	102	Vertical
7634.788	42.68	54.00	-11.32	RMS	118	387	Horizontal
7634.788	54.78	74.00	-19.22	Peak	118	387	Horizontal

Table 11 - 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.

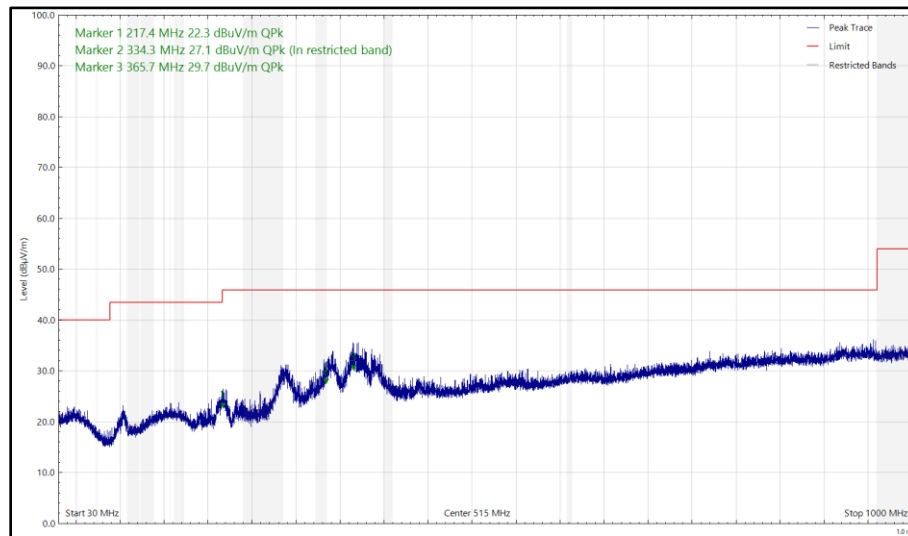


Figure 22 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

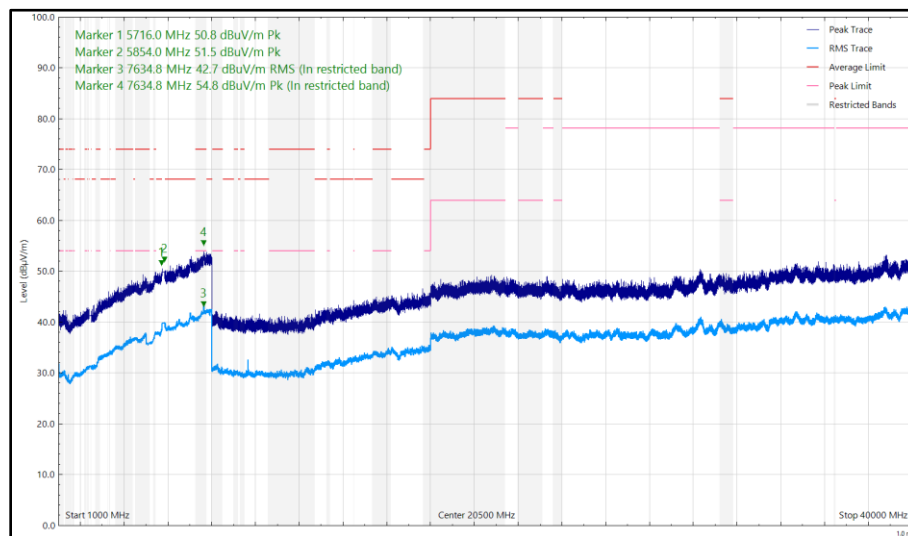


Figure 23 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

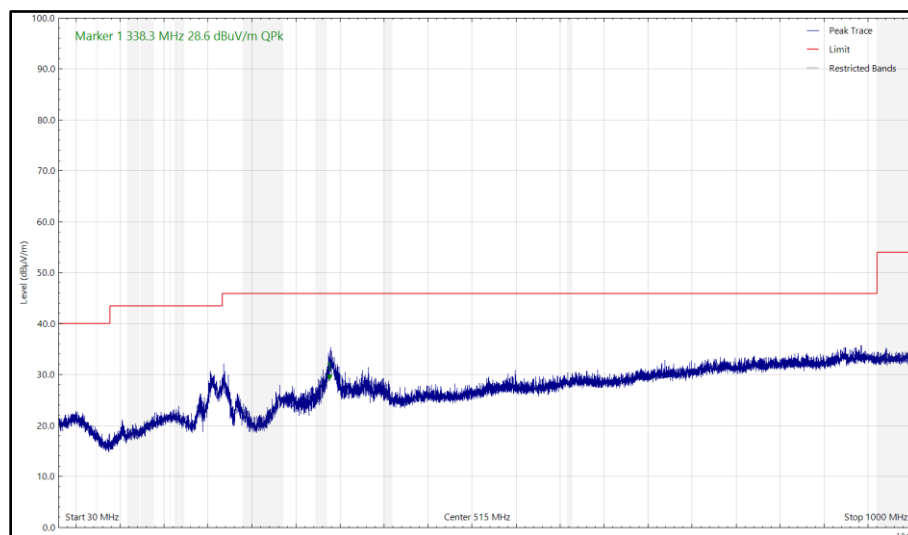


Figure 24 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

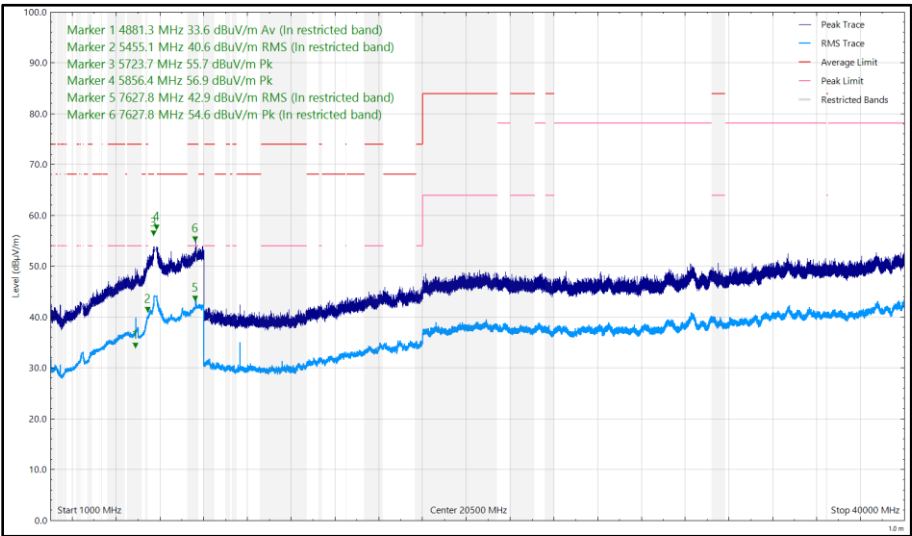


Figure 25 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

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 12

6 GHz WLAN and 2.4 GHz Bluetooth

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
196.935	24.16	43.50	-19.34	Q-Peak	249	108	Vertical
334.058	26.51	46.00	-19.49	Q-Peak	134	118	Vertical
341.274	28.47	46.00	-17.53	Q-Peak	120	105	Vertical
370.713	30.38	46.00	-15.62	Q-Peak	307	100	Horizontal
405.814	27.95	46.00	-18.05	Q-Peak	48	105	Horizontal
5904.805	53.94	74.00	-20.06	Peak	57	110	Horizontal
5902.418	55.87	74.00	-18.13	Peak	127	110	Vertical
7322.483	38.47	54.00	-15.53	CISPR Avg	38	108	Vertical

Table 13 - 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.

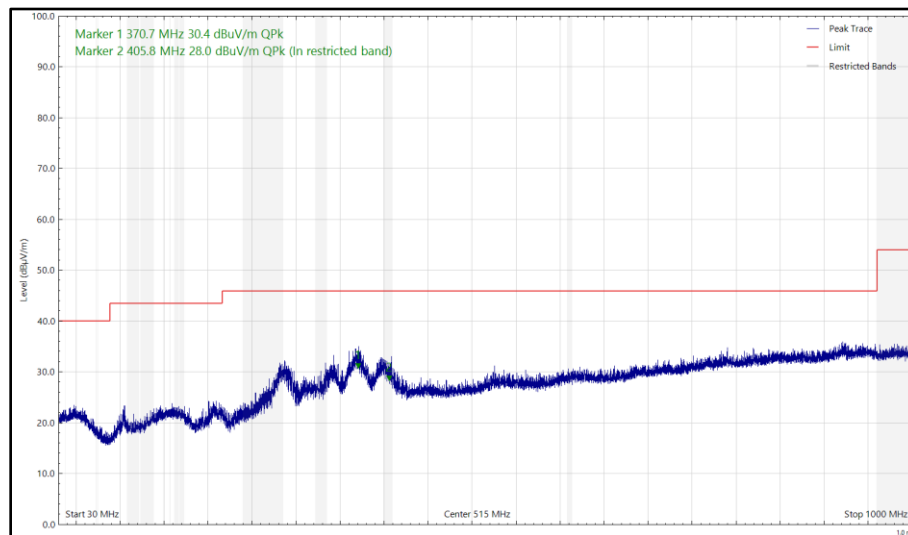


Figure 26 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

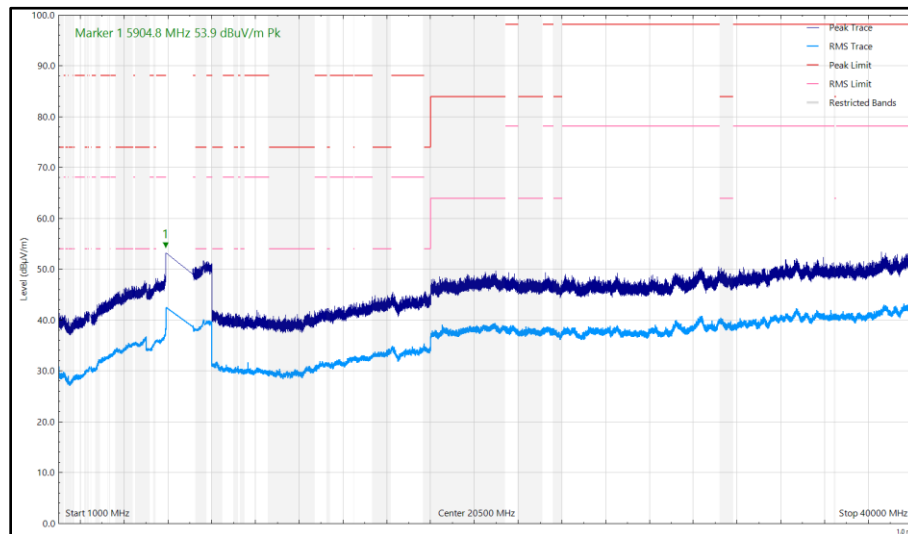


Figure 27 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

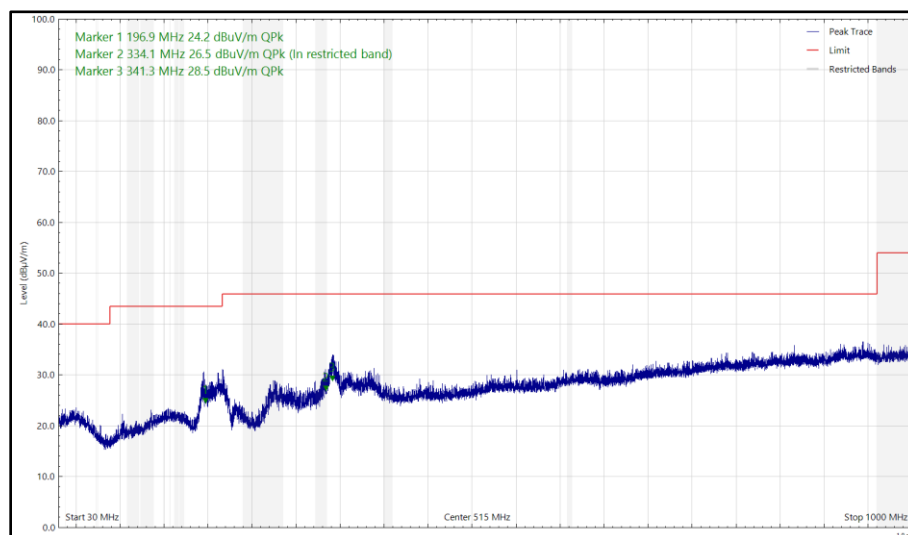


Figure 28 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

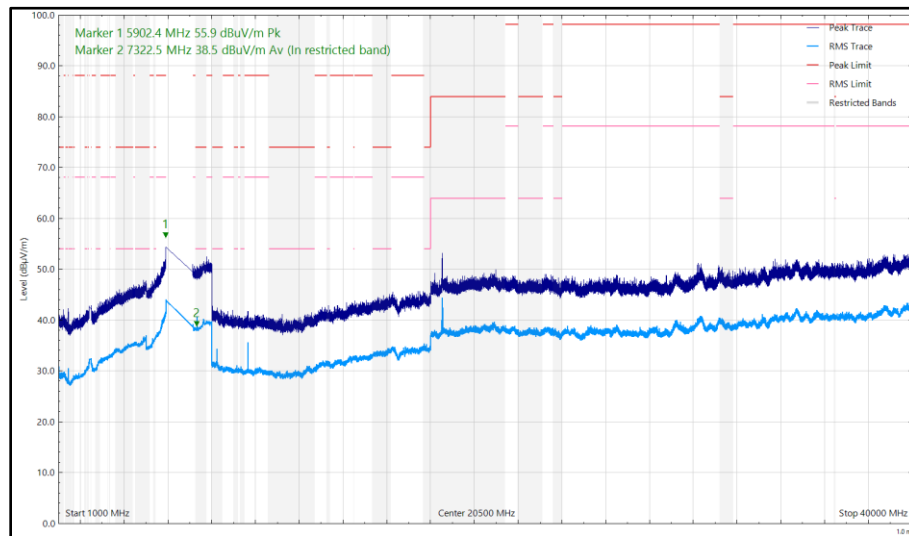


Figure 29 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
212.010	24.23	43.50	-19.27	Q-Peak	96	100	Vertical
334.878	27.42	46.00	-18.58	Q-Peak	133	105	Vertical
341.857	29.35	46.00	-16.65	Q-Peak	134	104	Vertical
366.794	30.73	46.00	-15.27	Q-Peak	328	100	Horizontal
401.641	28.70	46.00	-17.30	Q-Peak	50	100	Horizontal
7156.807	55.10	74.00	-18.90	Peak	38	106	Vertical
7322.468	38.81	54.00	-15.19	CISPR Avg	315	102	Vertical

Table 14 - 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.

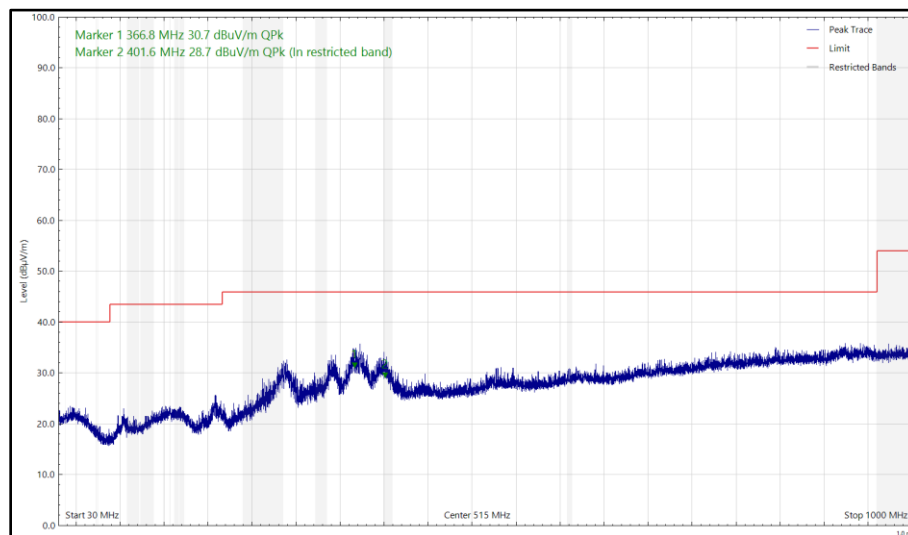


Figure 30 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

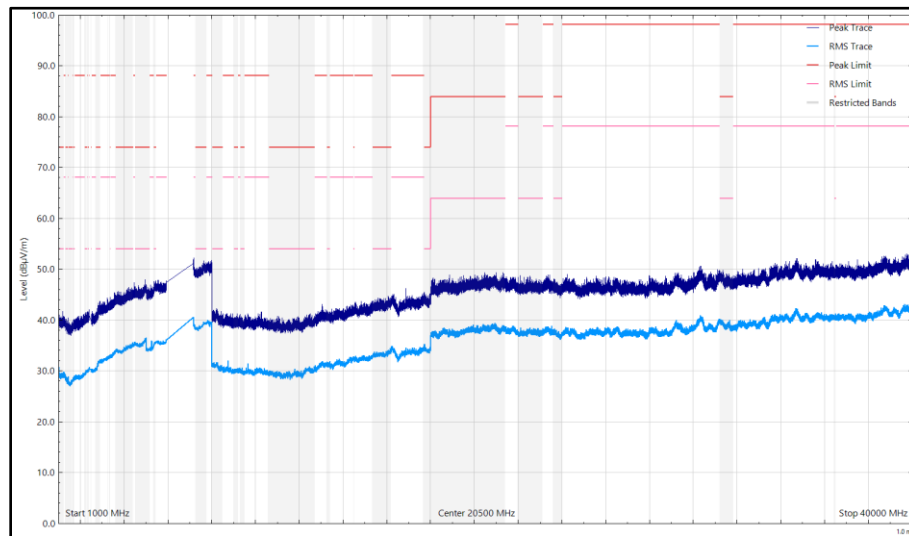


Figure 31 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

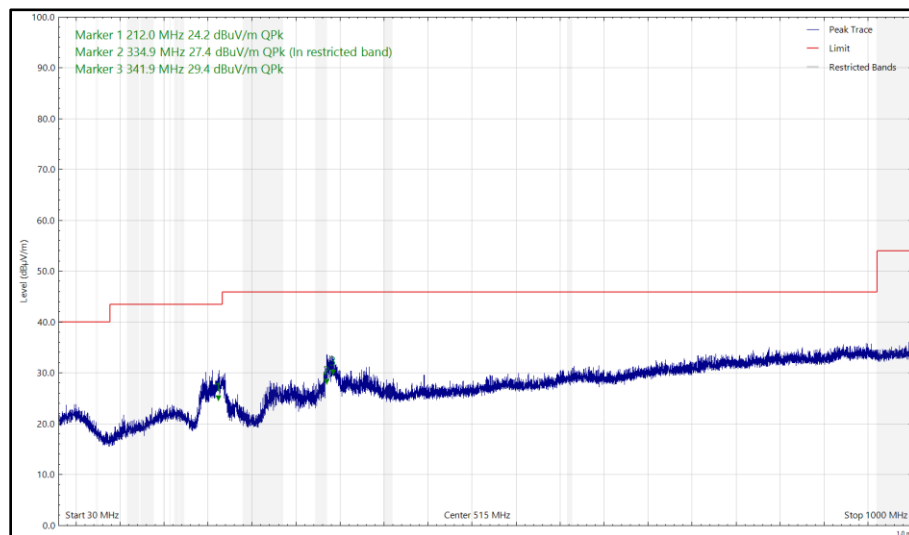


Figure 32 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

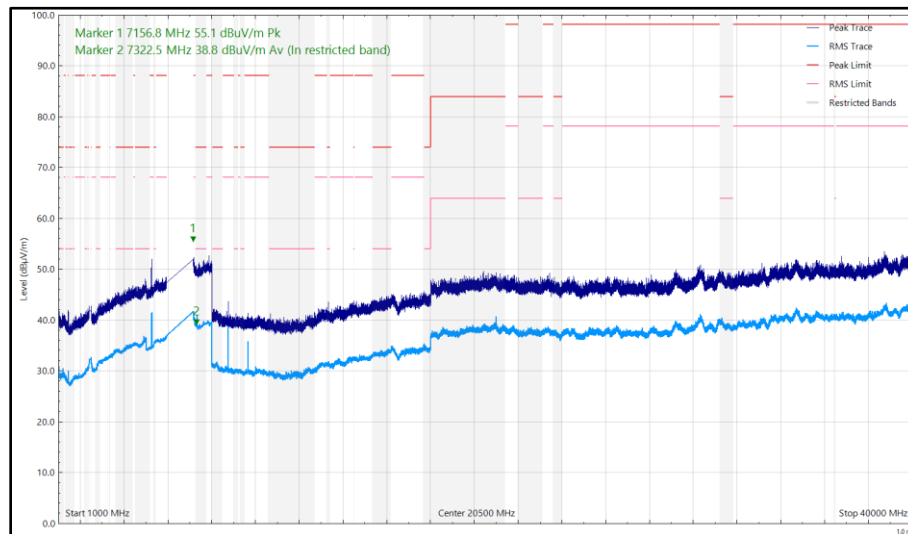


Figure 33 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
206.758	23.94	43.50	-19.56	Q-Peak	24	110	Vertical
340.329	28.42	46.00	-17.58	Q-Peak	137	119	Vertical
368.216	29.52	46.00	-16.48	Q-Peak	303	113	Horizontal
401.715	28.50	46.00	-17.50	Q-Peak	43	102	Horizontal
4882.347	37.63	54.00	-16.37	CISPR Avg	74	389	Vertical
7323.000	38.94	54.00	-15.06	CISPR Avg	326	102	Vertical
8233.400	35.08	54.00	-18.92	RMS	60	106	Vertical

Table 15 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 40 GHz

No other emissions found within 10 dB of the limit.

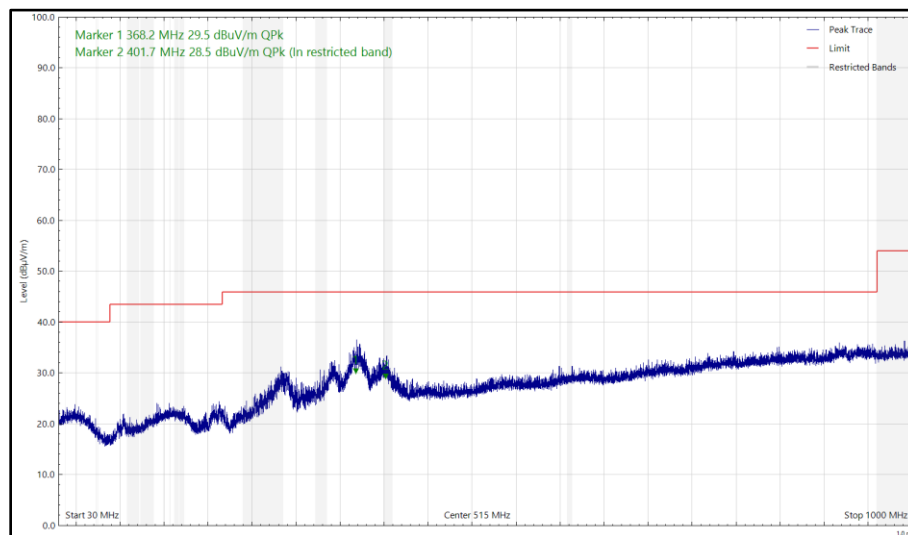


Figure 34 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Horizontal (Peak)

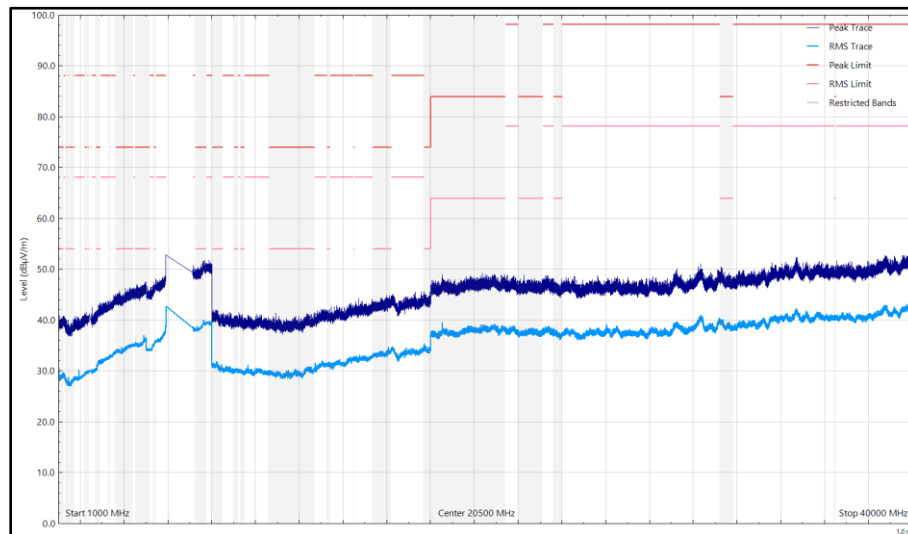


Figure 35 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Horizontal

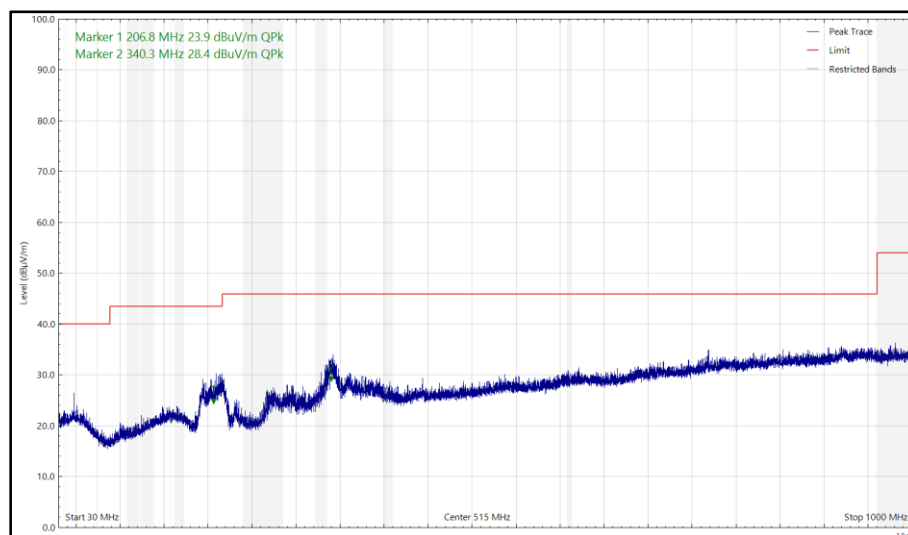


Figure 36 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Vertical (Peak)

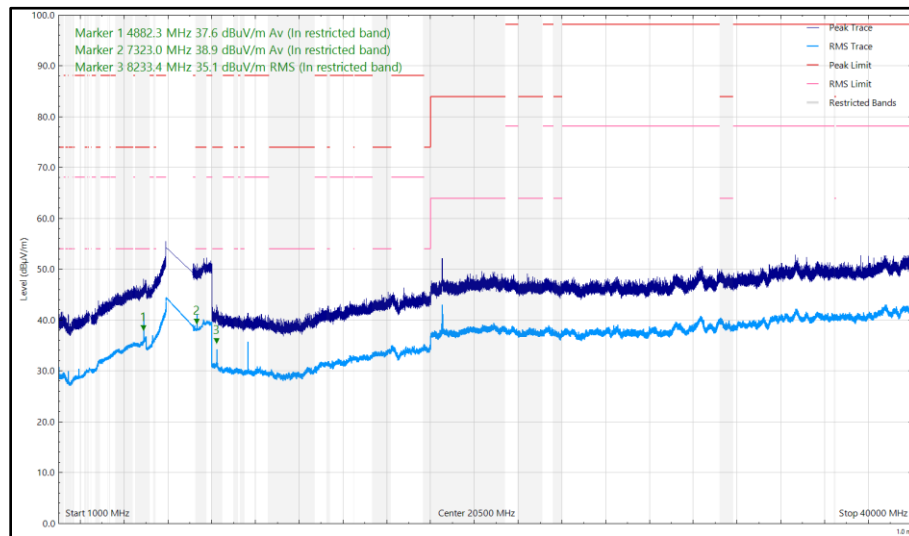


Figure 37 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
216.765	23.99	46.00	-22.01	Q-Peak	92	107	Vertical
340.935	27.94	46.00	-18.06	Q-Peak	143	143	Vertical
373.880	30.45	46.00	-15.55	Q-Peak	314	110	Horizontal
403.171	28.11	46.00	-17.89	Q-Peak	59	103	Horizontal
4881.786	39.48	54.00	-14.52	CISPR Avg	122	145	Vertical
4882.018	32.21	54.00	-21.79	CISPR Avg	70	140	Horizontal
7323.313	38.89	54.00	-15.11	CISPR Avg	55	104	Vertical

Table 16 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 40 GHz

No other emissions found within 10 dB of the limit.

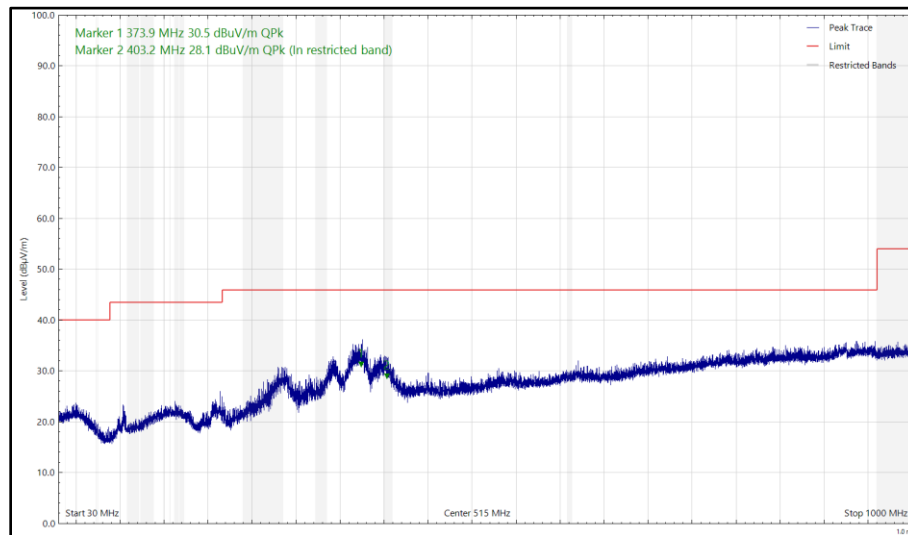


Figure 38 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Horizontal (Peak)

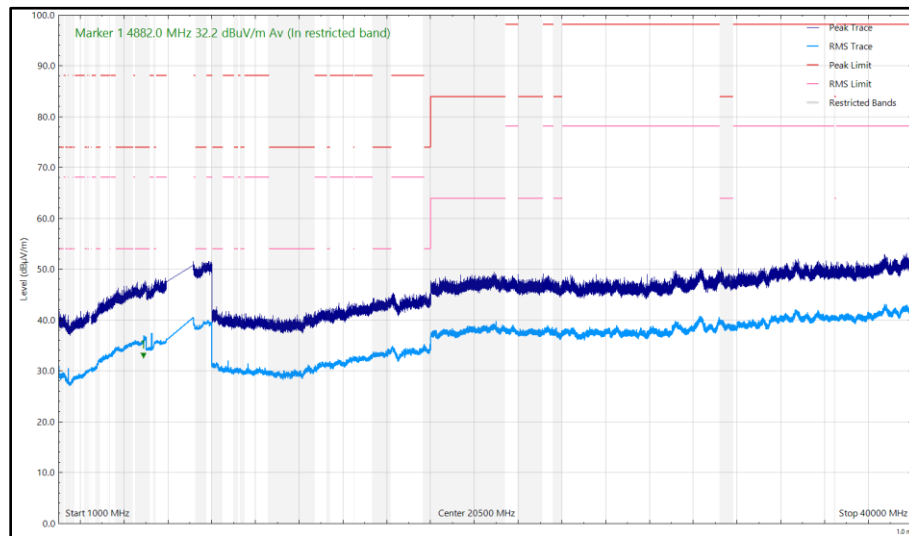


Figure 39 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Horizontal

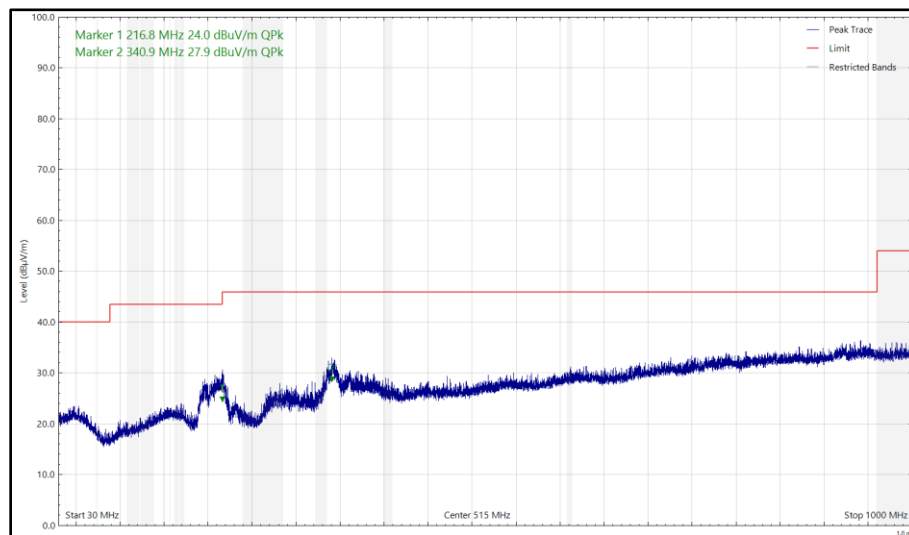


Figure 40 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Vertical (Peak)

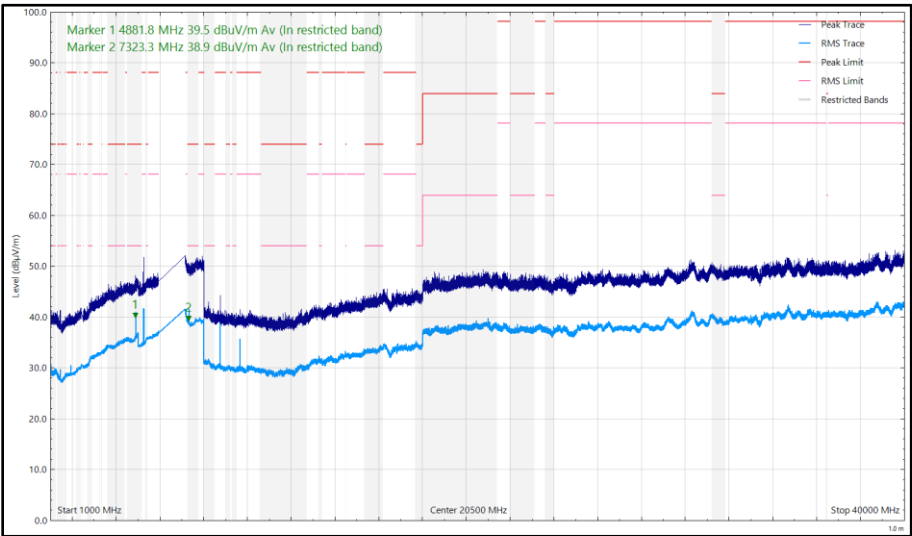


Figure 41 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Vertical

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 17

2.4 GHz WLAN and Narrowband

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
333.767	27.84	46.00	-18.16	Q-Peak	324	100	Horizontal
334.977	27.68	46.00	-18.32	Q-Peak	136	110	Vertical
2389.801	36.99	54.00	-17.01	RMS	118	110	Vertical
2483.506	39.15	54.00	-14.85	RMS	69	117	Horizontal
2483.633	41.79	54.00	-12.21	RMS	118	116	Vertical
2486.513	57.47	74.00	-16.53	Peak	301	150	Vertical

Table 18 - 2442 MHz (CH7), HT20, Core 0 and 5204 MHz, DH5, Core 1, ePA, 30 MHz to 40 GHz

No other emissions found within 10 dB of the limit.

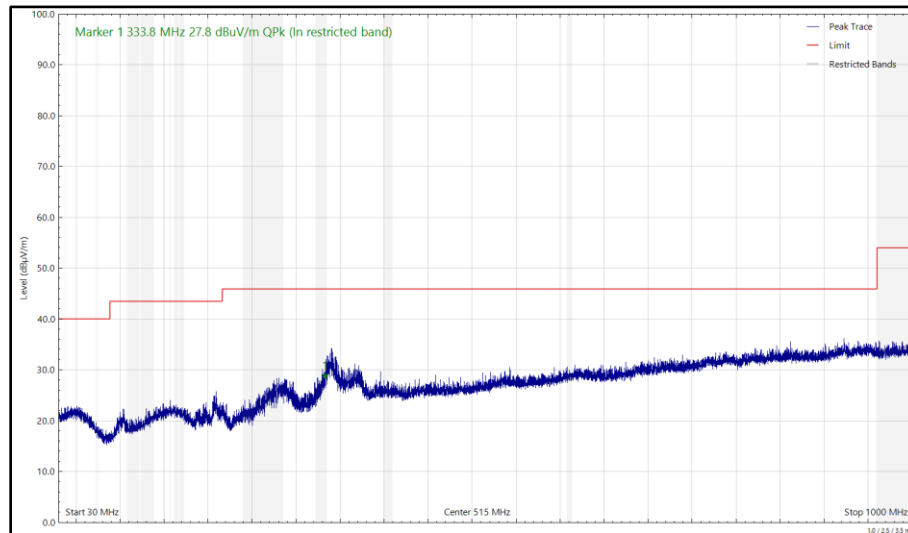


Figure 42 - 2442 MHz (CH7), HT20, Core 0 and 5204 MHz, DH5, Core 1, ePA, 30 MHz to 1 GHz, Horizontal (Peak)

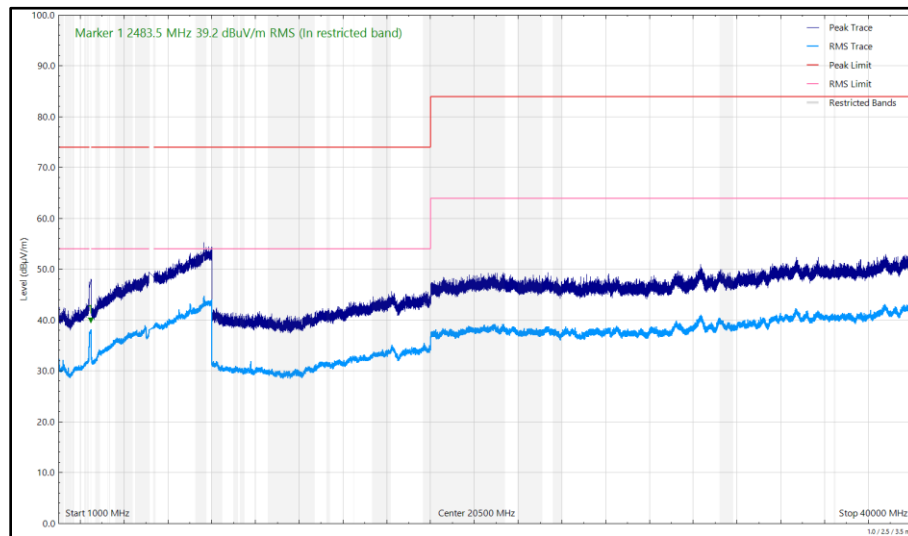


Figure 43 - 2442 MHz (CH7), HT20, Core 0 and 5204 MHz, DH5, Core 1, ePA, 1 GHz to 40 GHz, Horizontal

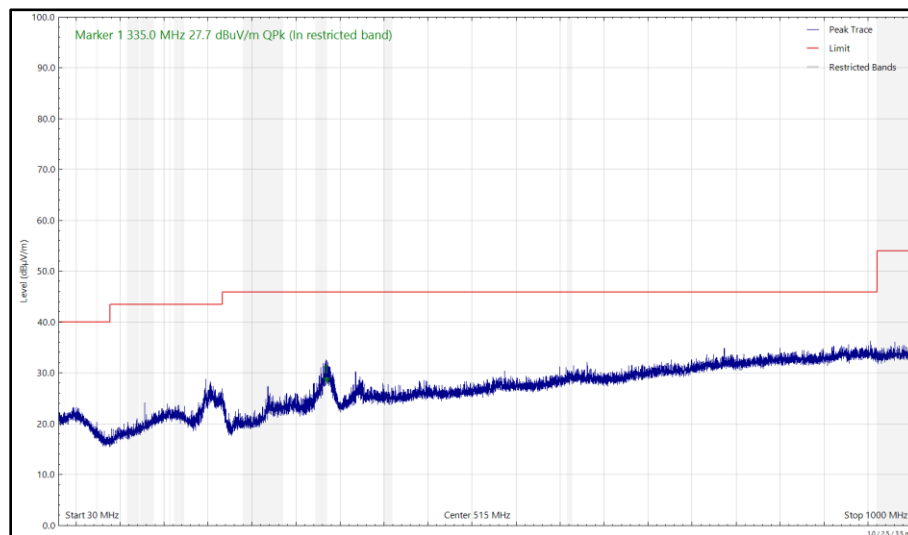
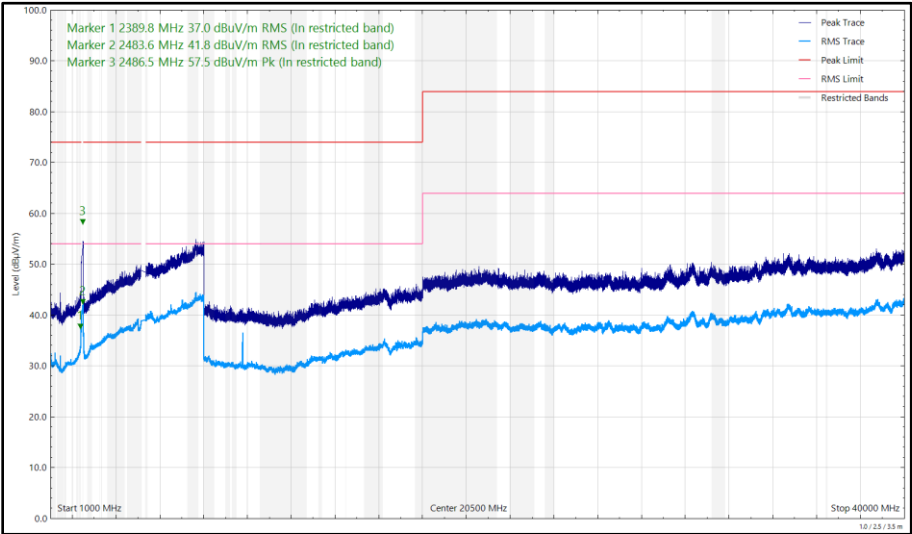


Figure 44 - 2442 MHz (CH7), HT20, Core 0 and 5204 MHz, DH5, Core 1, ePA, 30 MHz to 1 GHz, Vertical (Peak)



**Figure 45 - 2442 MHz (CH7), HT20, Core 0 and 5204 MHz, DH5, Core 1, ePA,
1 GHz to 40 GHz, Vertical**

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
334.364	25.87	46.00	-20.13	Q-Peak	155	121	Vertical
335.203	28.17	46.00	-17.83	Q-Peak	318	100	Horizontal
2389.948	36.33	54.00	-17.67	RMS	106	162	Vertical
2483.506	36.21	54.00	-17.79	RMS	11	168	Horizontal
2483.634	42.50	54.00	-11.50	RMS	115	155	Vertical
2484.780	57.69	74.00	-16.31	Peak	117	156	Vertical
5374.528	38.75	54.00	-15.25	RMS	118	257	Vertical

Table 19 - 2442 MHz (CH7), HT20, Core 0 and 5788 MHz, DH5, Core 1, ePA, 30 MHz to 40 GHz

No other emissions found within 10 dB of the limit.

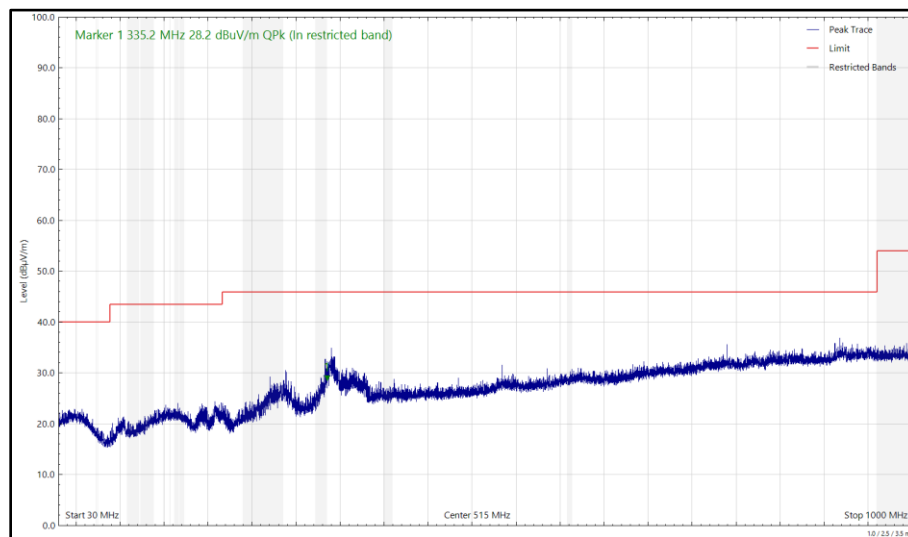


Figure 46 - 2442 MHz (CH7), HT20, Core 0 and 5788 MHz, DH5, Core 1, ePA, 30 MHz to 1 GHz, Horizontal (Peak)

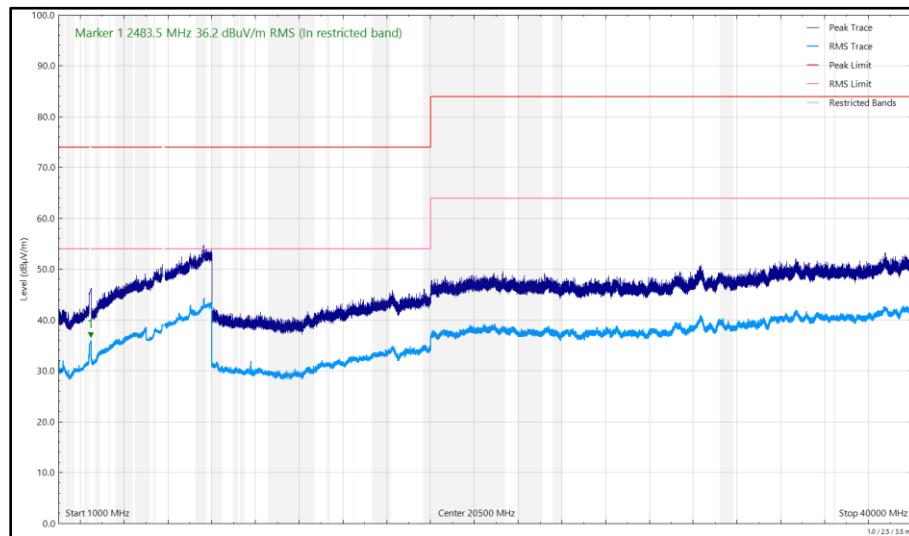


Figure 47 - 2442 MHz (CH7), HT20, Core 0 and 5788 MHz, DH5, Core 1, ePA, 1 GHz to 40 GHz, Horizontal

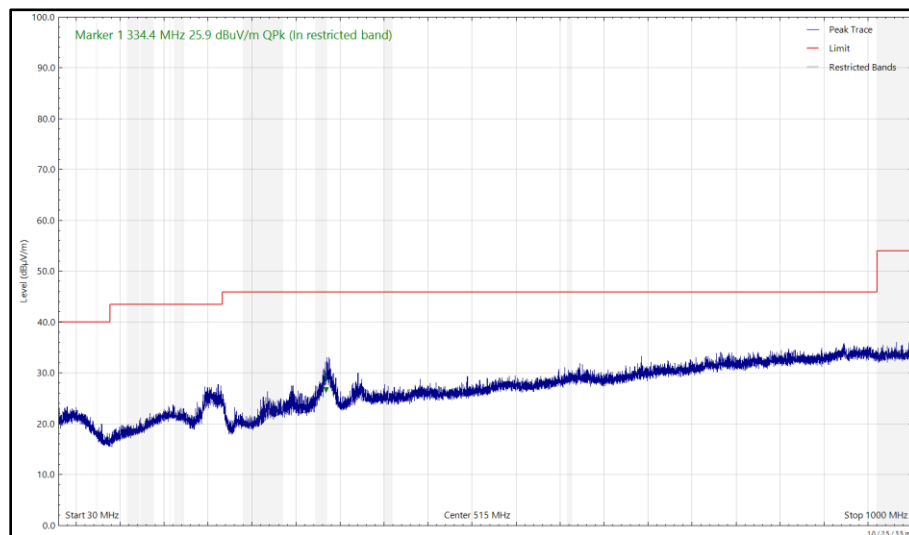


Figure 48 - 2442 MHz (CH7), HT20, Core 0 and 5788 MHz, DH5, Core 1, ePA, 30 MHz to 1 GHz, Vertical (Peak)

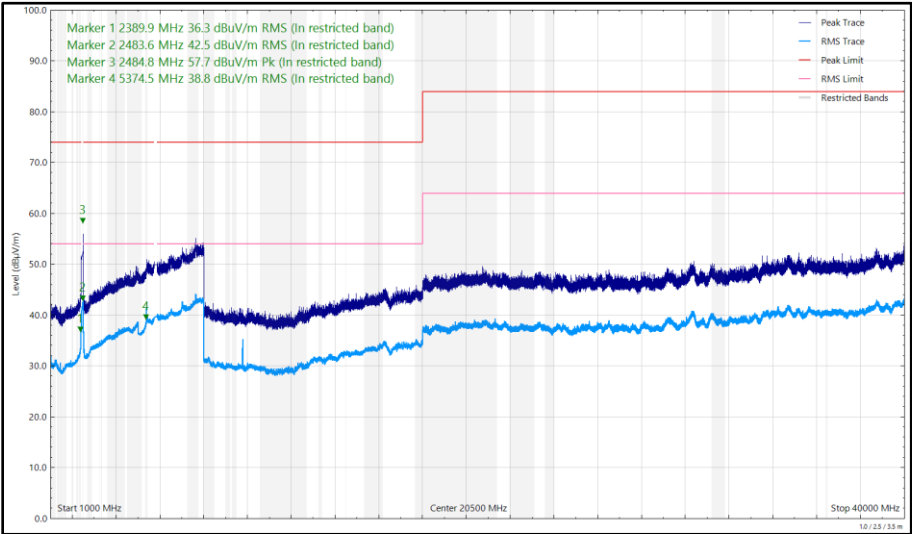


Figure 49 - 2442 MHz (CH7), HT20, Core 0 and 5788 MHz, DH5, Core 1, ePA, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
334.166	27.25	46.00	-18.75	Q-Peak	313	107	Horizontal
335.197	26.64	46.00	-19.36	Q-Peak	151	137	Vertical
2389.758	36.06	54.00	-17.94	RMS	69	100	Vertical
2483.546	41.23	54.00	-12.77	RMS	99	182	Vertical
2483.569	37.00	54.00	-17.00	RMS	324	118	Horizontal
2483.888	56.88	74.00	-17.12	Peak	59	151	Vertical
4882.757	41.43	54.00	-12.57	RMS	265	103	Vertical
5365.075	40.39	54.00	-13.61	RMS	257	129	Vertical

Table 20 - 2442 MHz (CH7), HT20, Core 1 and 5204 MHz, DH5, Core 0, ePA, 30 MHz to 40 GHz

No other emissions found within 10 dB of the limit.

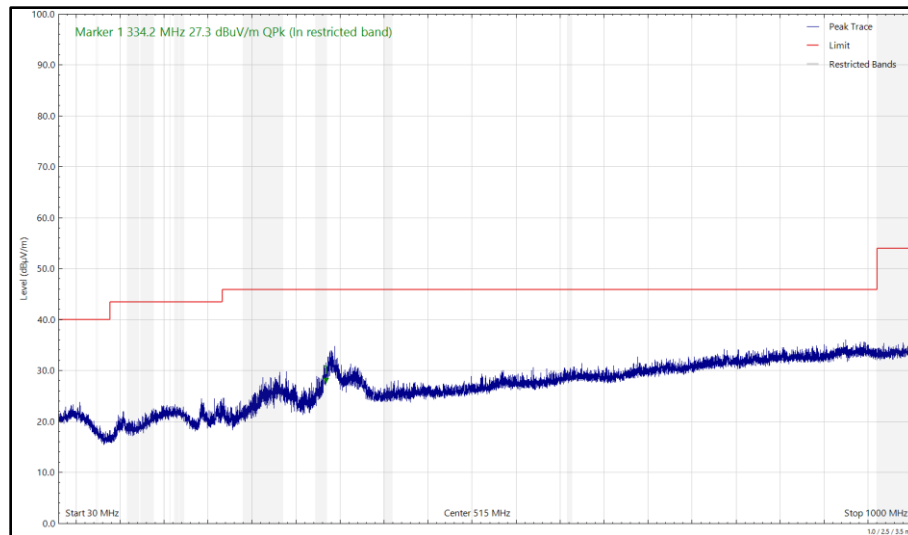


Figure 50 - 2442 MHz (CH7), HT20, Core 1 and 5204 MHz, DH5, Core 0, ePA, 30 MHz to 1 GHz, Horizontal (Peak)

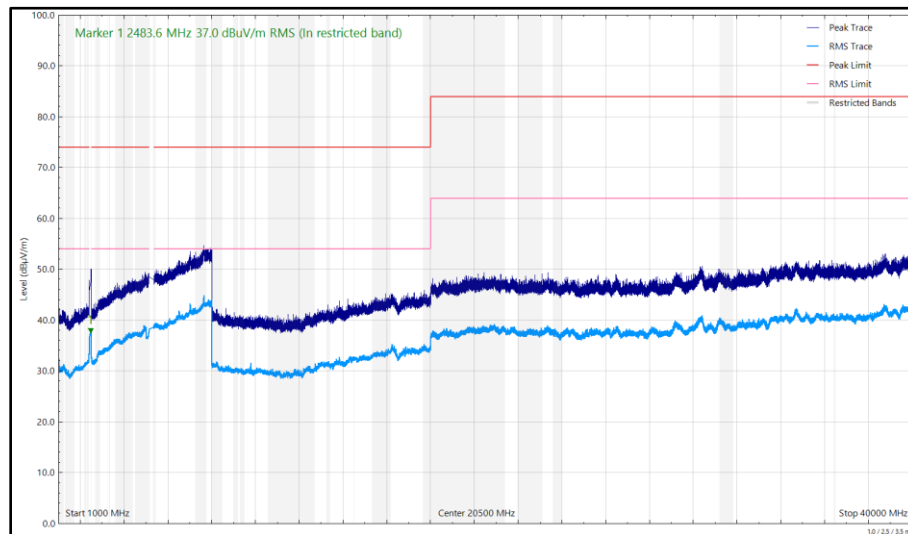


Figure 51 - 2442 MHz (CH7), HT20, Core 1 and 5204 MHz, DH5, Core 0, ePA, 1 GHz to 40 GHz, Horizontal

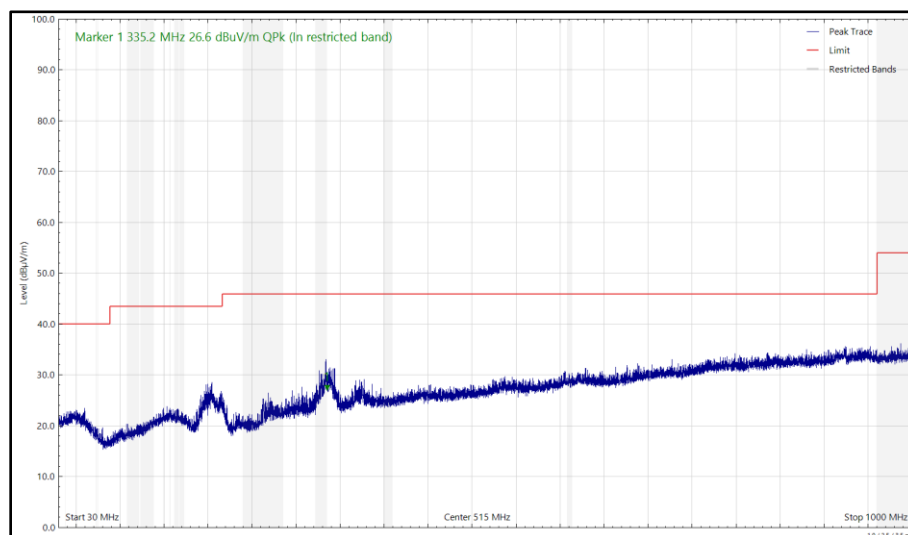
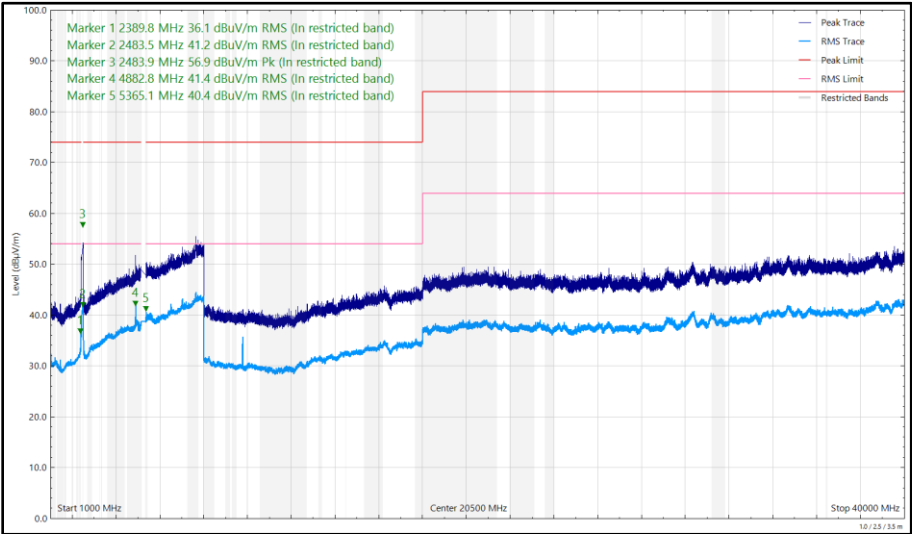


Figure 52 - 2442 MHz (CH7), HT20, Core 1 and 5204 MHz, DH5, Core 0, ePA, 30 MHz to 1 GHz, Vertical (Peak)



**Figure 53 - 2442 MHz (CH7), HT20, Core 1 and 5204 MHz, DH5, Core 0, ePA,
1 GHz to 40 GHz, Vertical**

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
332.380	26.53	46.00	-19.47	Q-Peak	137	110	Vertical
335.172	27.86	46.00	-18.14	Q-Peak	318	103	Horizontal
2389.914	34.99	54.00	-19.01	RMS	86	132	Vertical
2483.662	38.07	54.00	-15.93	RMS	325	142	Horizontal
2483.671	40.90	54.00	-13.10	RMS	94	174	Vertical
4883.742	39.09	54.00	-14.91	RMS	139	100	Vertical
5374.576	41.31	54.00	-12.69	RMS	265	116	Vertical

Table 21 - 2442 MHz (CH7), HT20, Core 1 and 5788 MHz, DH5, Core 0, ePA, 30 MHz to 40 GHz

No other emissions found within 10 dB of the limit.

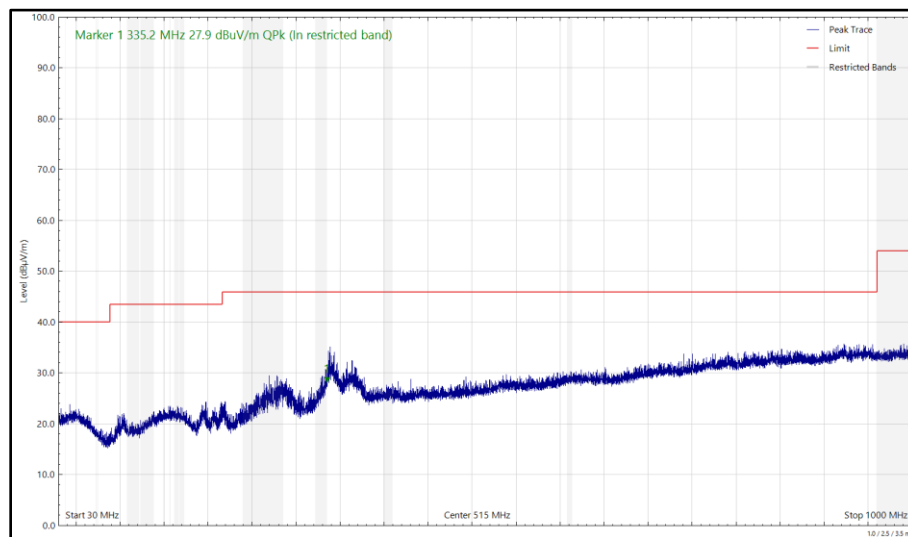


Figure 54 - 2442 MHz (CH7), HT20, Core 1 and 5788 MHz, DH5, Core 0, ePA, 30 MHz to 1 GHz, Horizontal (Peak)

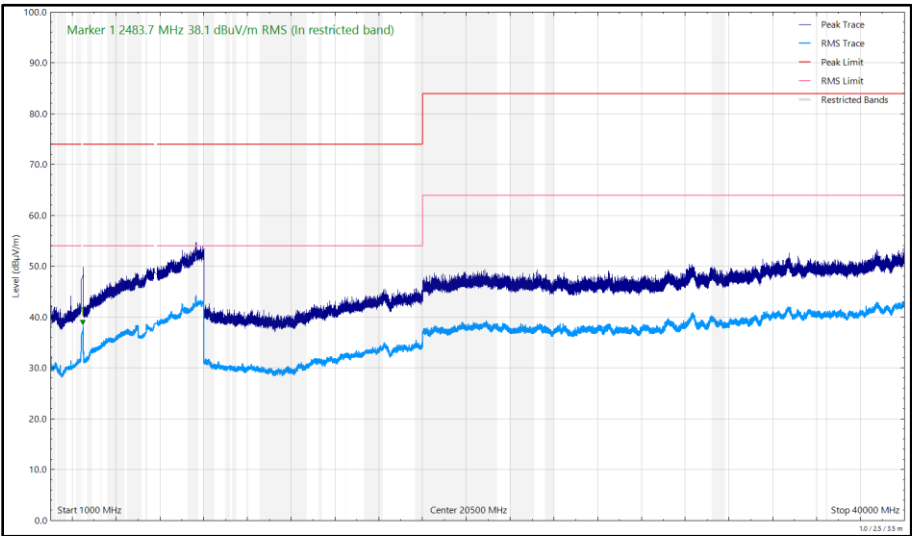


Figure 55 - 2442 MHz (CH7), HT20, Core 1 and 5788 MHz, DH5, Core 0, ePA, 1 GHz to 40 GHz, Horizontal

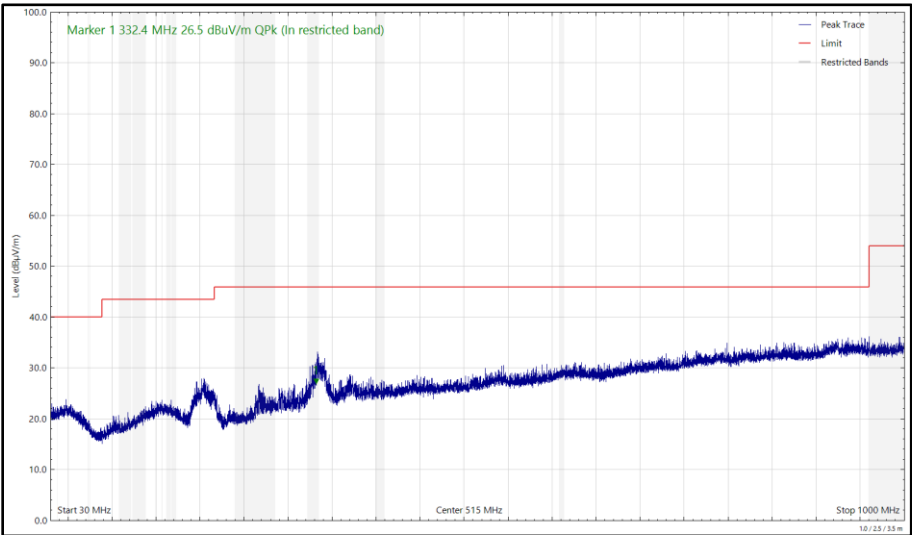


Figure 56 - 2442 MHz (CH7), HT20, Core 1 and 5788 MHz, DH5, Core 0, ePA, 30 MHz to 1 GHz, Vertical (Peak)

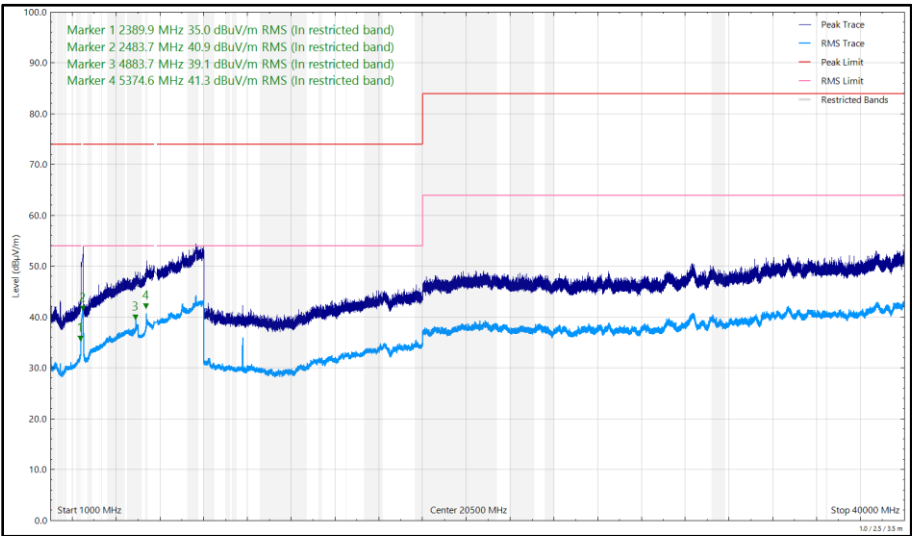


Figure 57 - 2442 MHz (CH7), HT20, Core 1 and 5788 MHz, DH5, Core 0, ePA, 1 GHz to 40 GHz, Vertical

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	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 22

5 GHz WLAN and Thread

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
209.110	24.64	43.50	-18.86	Q-Peak	88	111	Vertical
336.573	29.15	46.00	-16.85	Q-Peak	153	109	Horizontal
2368.769	59.40	74.00	-14.60	Peak	124	105	Vertical
4880.972	41.35	54.00	-12.65	RMS	143	130	Vertical
5357.102	40.65	54.00	-13.35	RMS	131	144	Horizontal
5357.934	43.07	54.00	-10.93	RMS	253	149	Vertical

Table 23 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), Core 0, ePA, 30 MHz to 40 GHz

No other emissions found within 10 dB of the limit.

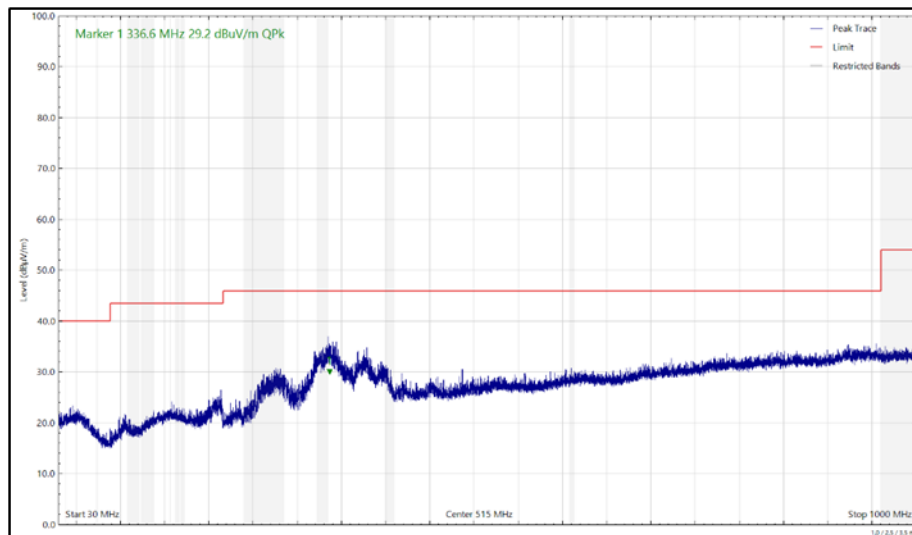


Figure 58 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), Core 0, ePA, 30 MHz to 1 GHz, Horizontal (Peak)