

FCC and ISED Test Report

Apple Inc
Model: A3143



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)

Prepared for: Apple Inc
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Cupertino
California
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FCC ID: BCGA3143 IC: 579C-A3143

COMMERCIAL-IN-CONFIDENCE

Document 75961400-20 Issue 01

SIGNATURE			
NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Steve Marshall	Senior Engineer	Authorised Signatory	31 October 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	31 October 2024	

FCC Accreditation 553713/UK2026 Concorde Park, Fareham Test Laboratory	ISED Accreditation 28798/UK0003 Concorde Park, Fareham Test Laboratory
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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	31-October-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	14-August-2024
Finish of Test	18-October-2024
Name of Engineer(s)	Ian Hart, Ioan-Alexandru Bogatu, Manohar Thota, Morsalin Hossain and Thomas Randall
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: A3143			
Serial Number	Hardware Version	Software Version	Firmware
C3QWHF6CNX	REV1.0	24A62400u	WLAN: 23.30.16 BT: 22.1.65.459

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: A3143, Serial Number: C3QWHF6CNX			
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)	Ian Hart, Ioan-Alexandru Bogatu and Thomas Randall	UKAS
Configuration and Mode: 6 GHz WLAN and 2.4 GHz Bluetooth		
Radiated Spurious Emissions (Simultaneous Transmission)	Ian Hart, Ioan-Alexandru Bogatu and Thomas Randall	UKAS
Configuration and Mode: 2.4 GHz WLAN and Narrowband		
Radiated Spurious Emissions (Simultaneous Transmission)	Ioan-Alexandru Bogatu, Manohar Thota and Thomas Randall	UKAS
Configuration and Mode: 5 GHz WLAN and Thread		
Radiated Spurious Emissions (Simultaneous Transmission)	Ian Hart, Ioan-Alexandru Bogatu, Morsalin Hossain and Thomas Randall	UKAS
Configuration and Mode: 6 GHz WLAN and Thread		
Radiated Spurious Emissions (Simultaneous Transmission)	Ian Hart, Ioan-Alexandru Bogatu, Morsalin Hossain and Thomas Randall	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

A3143, S/N: C3QWHF6CNX - Modification State 0

2.1.3 Date of Test

14-August-2024 to 18-October-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.

2.1.5 Example Test Setup Diagram

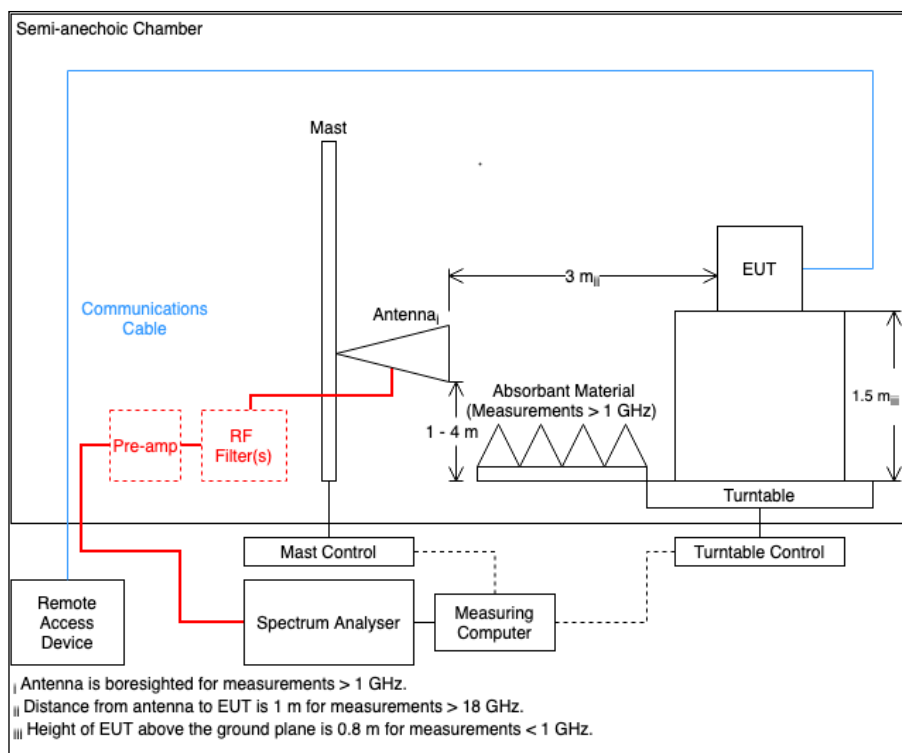


Figure 1

2.1.6 Environmental Conditions

Ambient Temperature	21.5 - 25.1 °C
Relative Humidity	40.1 - 57.7 %



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
4881.668	42.78	54.00	-11.22	CISPR Avg	279	153	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.

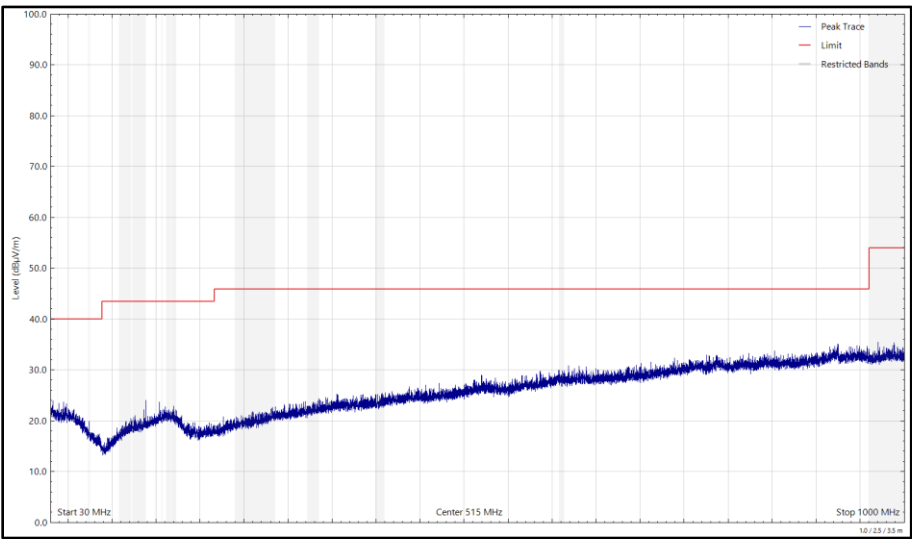


Figure 2 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Horizontal (Peak)

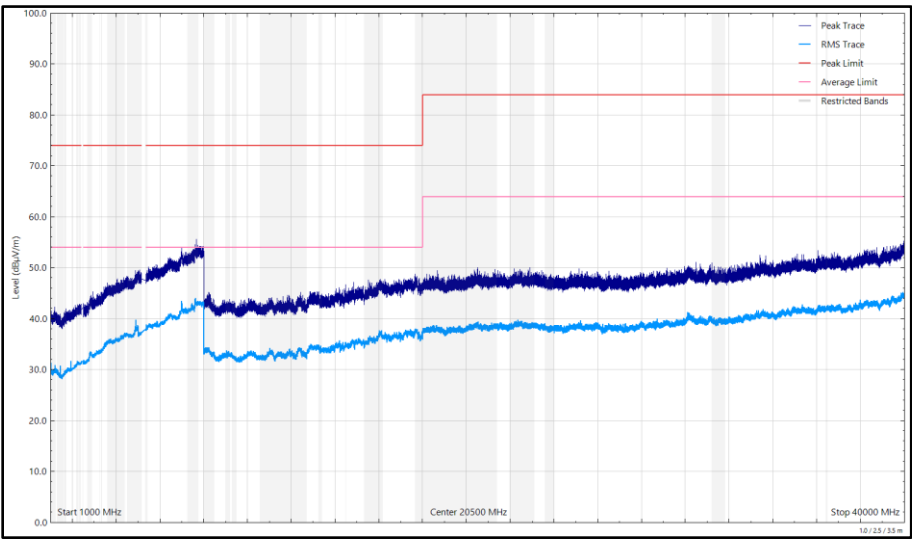


Figure 3 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Horizontal

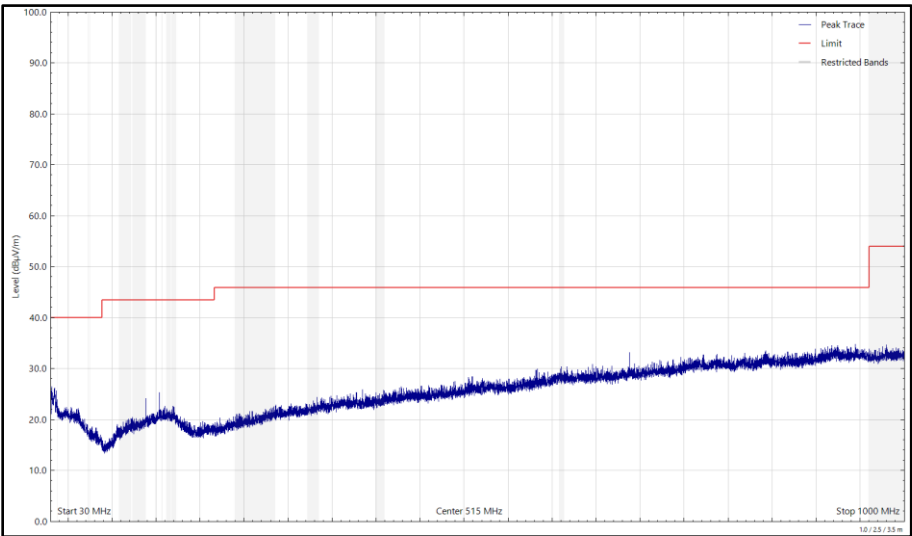


Figure 4 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Vertical (Peak)

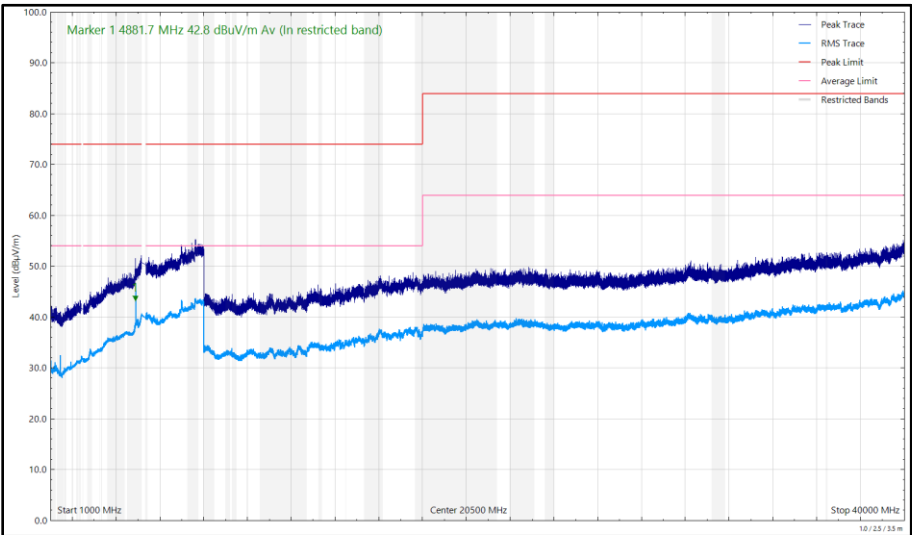


Figure 5 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
31.607	20.72	40.00	-19.28	Q-Peak	9	246	Vertical
4882.123	42.57	54.00	-11.43	CISPR Avg	281	150	Vertical
4884.862	33.53	54.00	-20.47	CISPR Avg	149	250	Horizontal
5455.270	40.32	54.00	-13.68	RMS	267	145	Vertical
11280.250	37.98	54.00	-16.02	RMS	209	102	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.

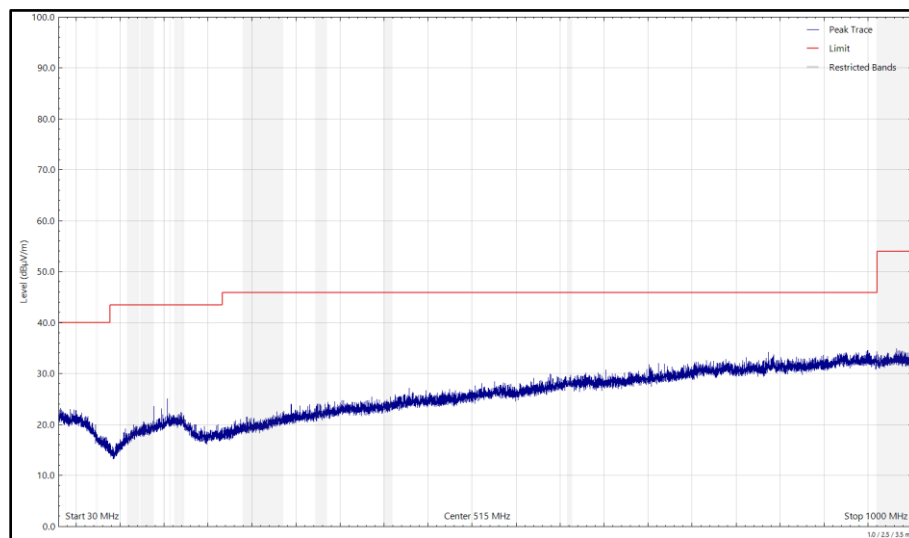


Figure 6 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Horizontal (Peak)

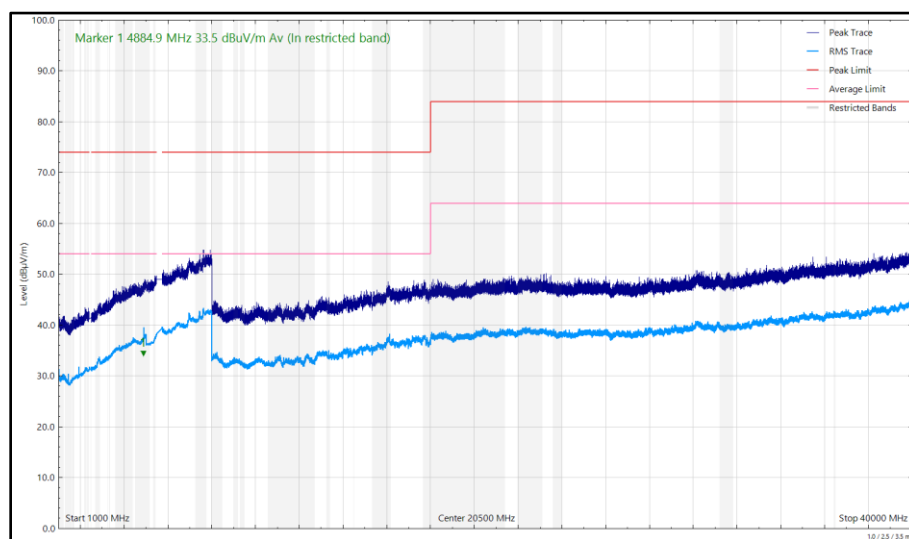


Figure 7 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Horizontal

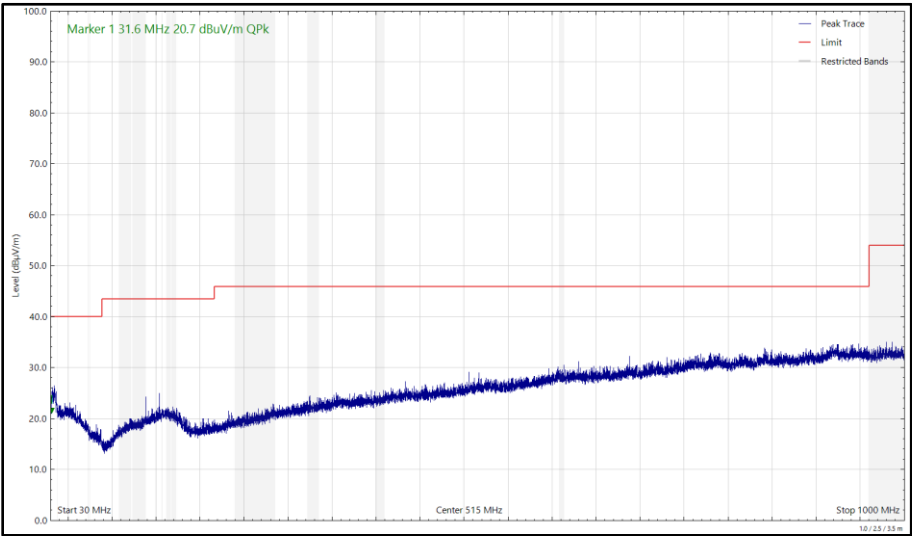


Figure 8 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Vertical (Peak)

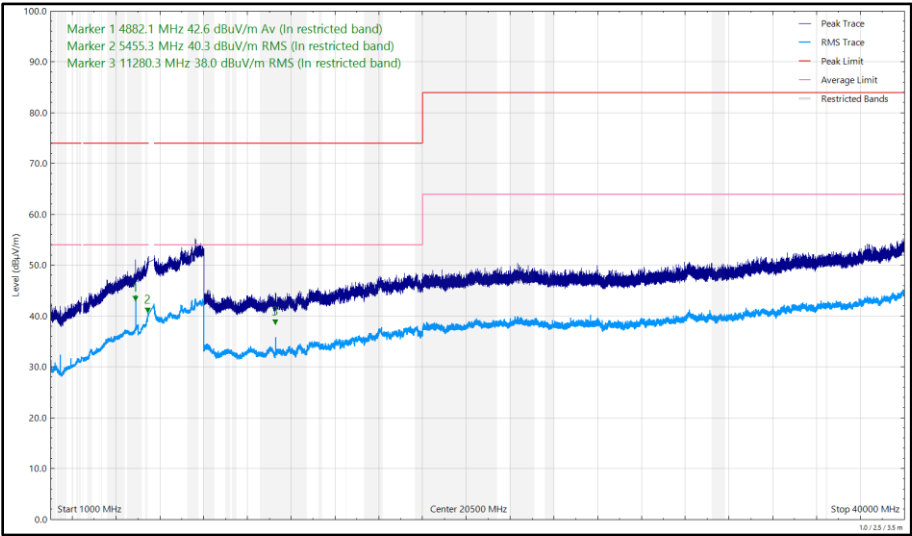


Figure 9 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
4881.943	42.05	54.00	-11.95	CISPR Avg	289	149	Vertical
5456.966	39.06	54.00	-14.94	RMS	353	100	Vertical
11569.450	37.45	54.00	-16.55	RMS	207	117	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.

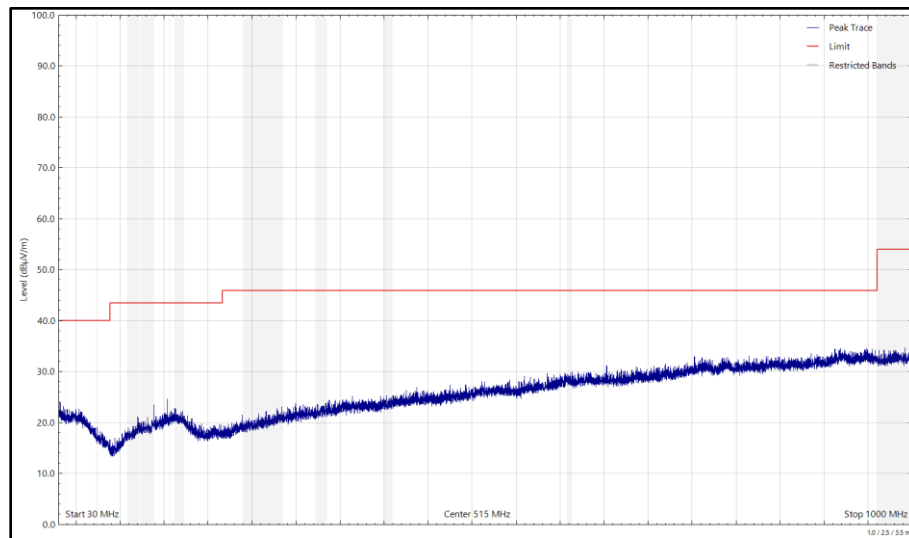


Figure 10 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Horizontal (Peak)

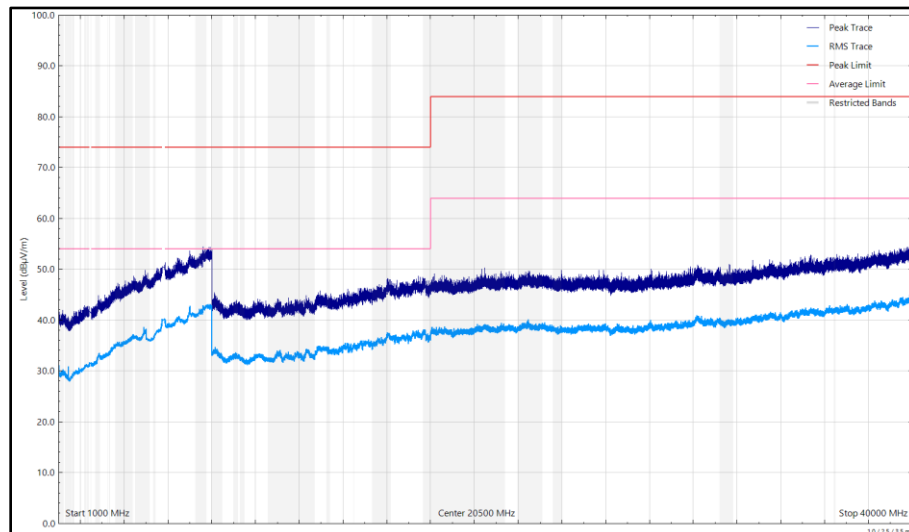


Figure 11 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Horizontal

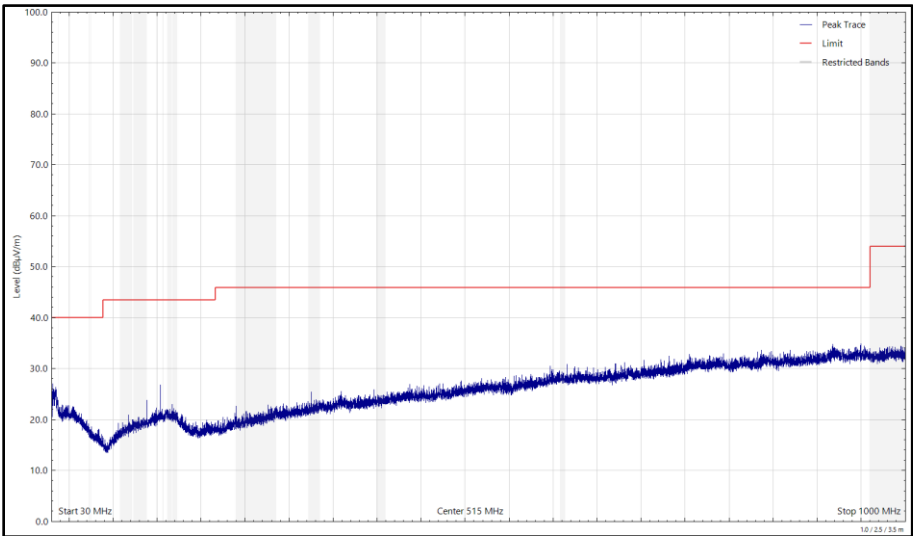


Figure 12 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Vertical (Peak)

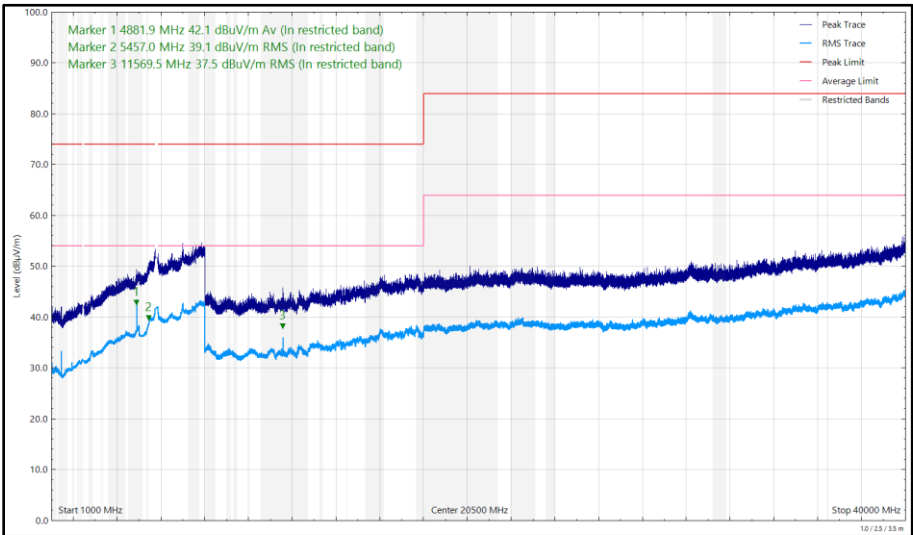


Figure 13 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
2386.397	30.20	54.00	-23.80	CISPR Avg	4	386	Vertical
2483.884	31.25	54.00	-22.75	CISPR Avg	360	400	Vertical
4881.893	41.46	54.00	-12.54	CISPR Avg	314	381	Horizontal
4882.267	44.13	54.00	-9.87	CISPR Avg	275	118	Vertical
4882.267	55.17	74.00	-18.83	Peak	275	118	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.

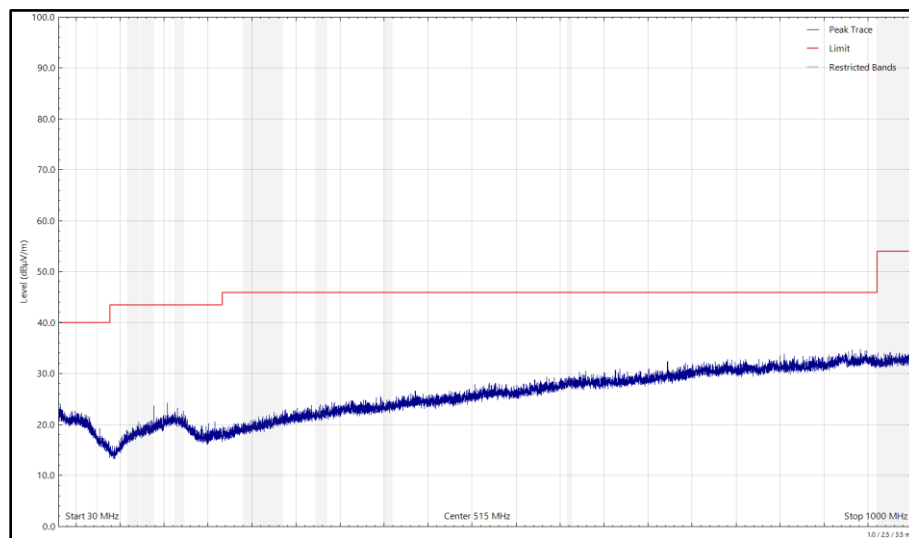


Figure 14 - U-NII-1 - v5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

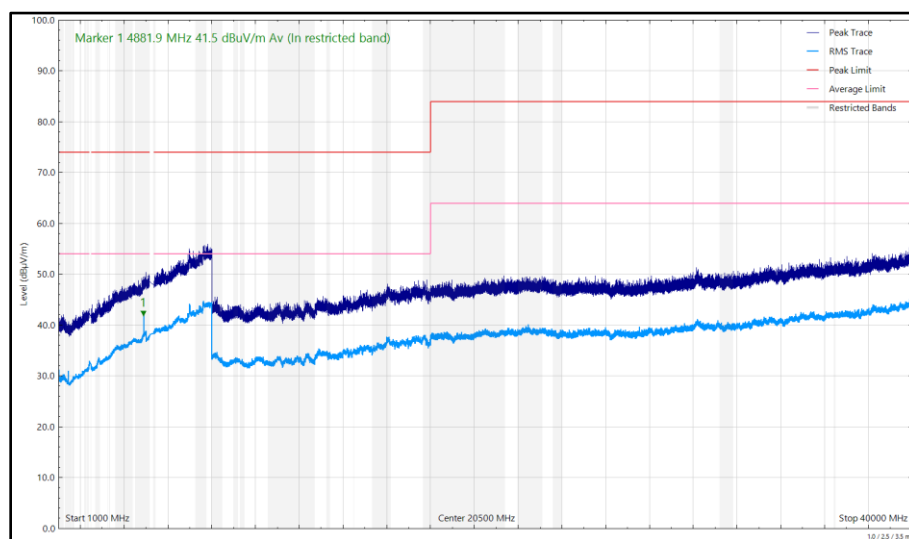


Figure 15 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

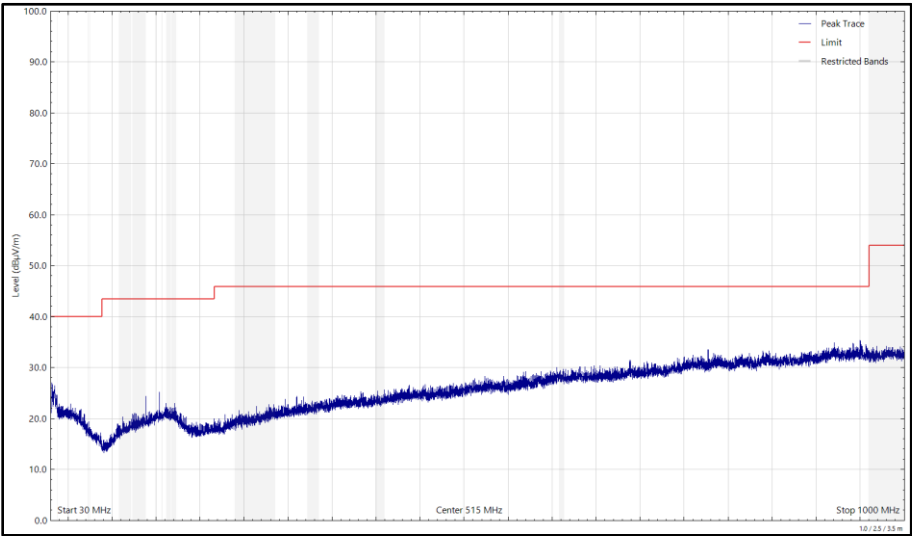


Figure 16 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

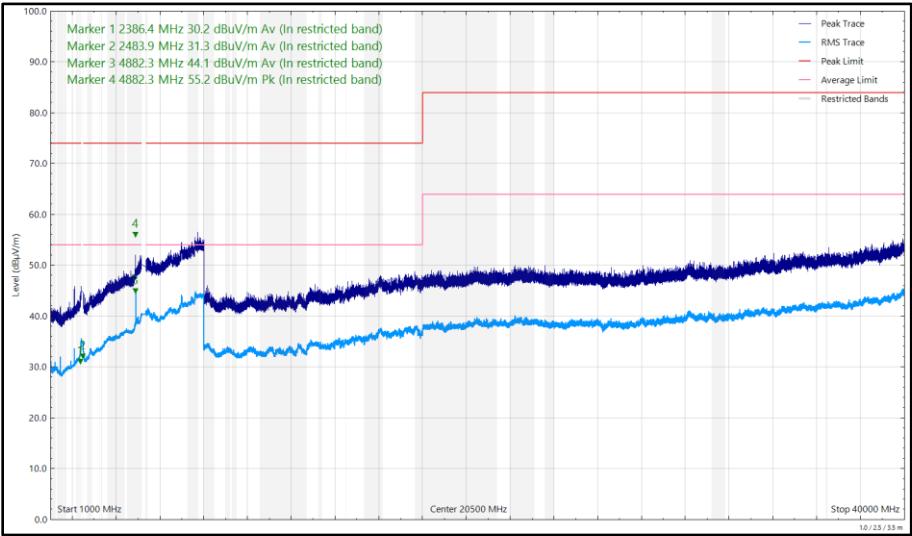


Figure 17 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
31.598	22.10	40.00	-17.90	Q-Peak	174	240	Vertical
2387.703	30.89	54.00	-23.11	CISPR Avg	284	187	Vertical
2483.869	30.96	54.00	-23.04	CISPR Avg	358	400	Vertical
4881.703	37.77	54.00	-16.23	CISPR Avg	167	368	Horizontal
4882.282	41.33	54.00	-12.67	CISPR Avg	272	169	Vertical
5456.659	41.70	54.00	-12.30	RMS	10	109	Vertical
11280.285	38.35	54.00	-15.65	RMS	208	110	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.

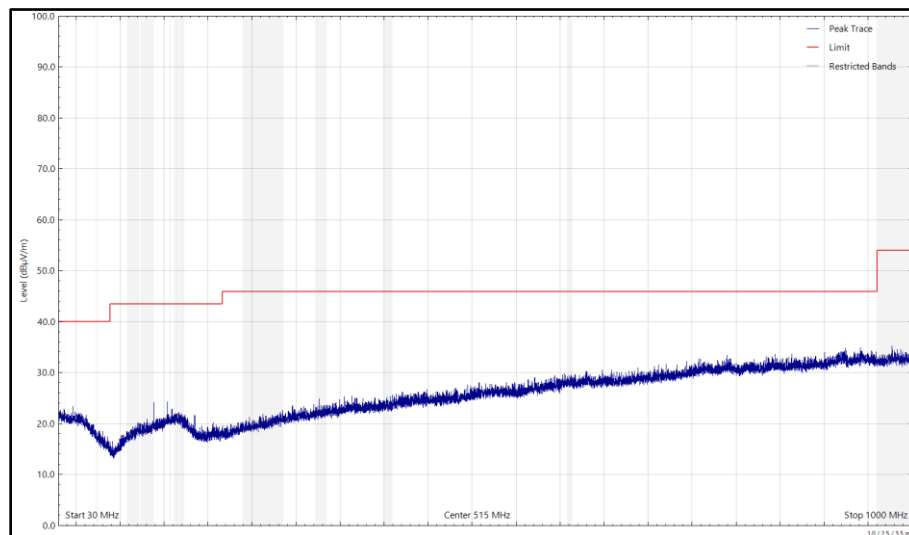


Figure 18 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

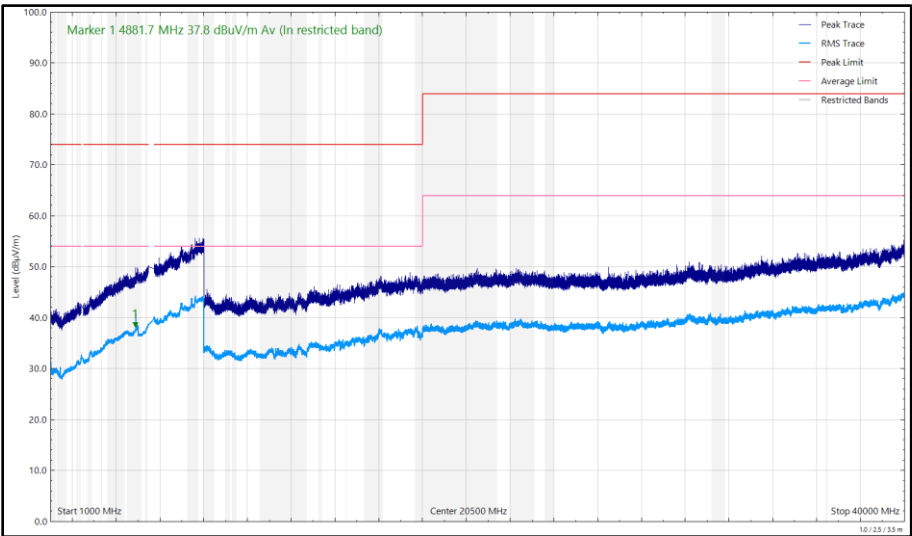


Figure 19 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

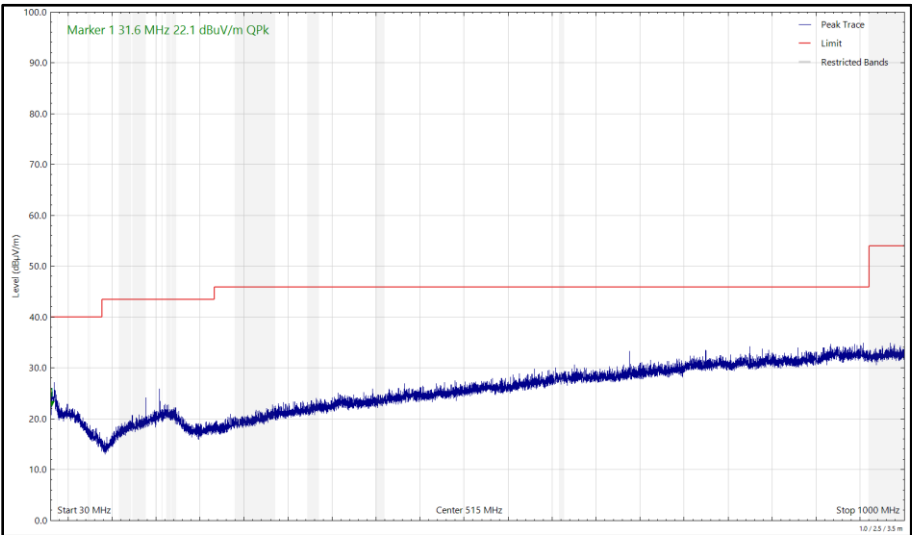


Figure 20 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

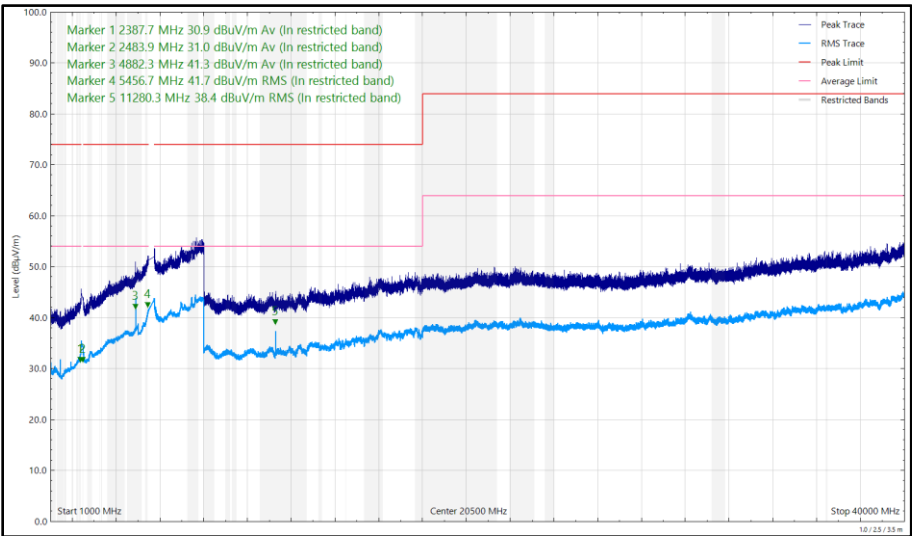


Figure 21 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
4881.423	37.55	54.00	-16.45	CISPR Avg	319	235	Horizontal
4882.478	40.68	54.00	-13.32	CISPR Avg	300	130	Vertical
5446.176	37.61	54.00	-16.39	RMS	20	369	Horizontal
5459.948	39.73	54.00	-14.27	RMS	354	107	Vertical
11569.560	36.43	54.00	-17.57	RMS	204	120	Vertical

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.

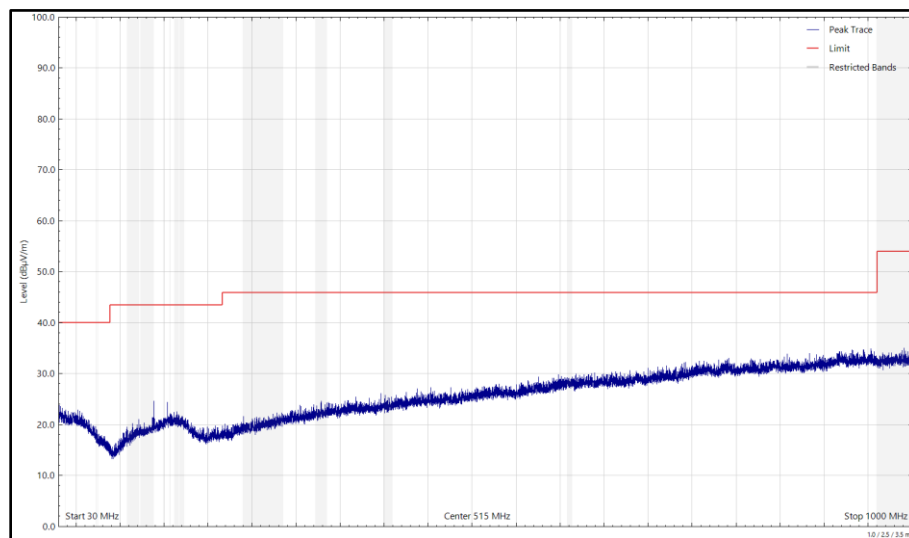


Figure 22 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

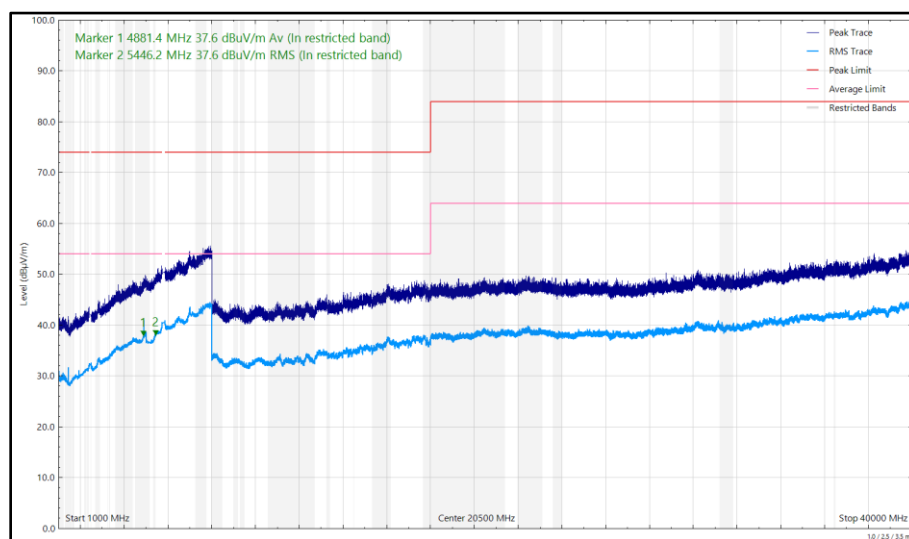


Figure 23 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

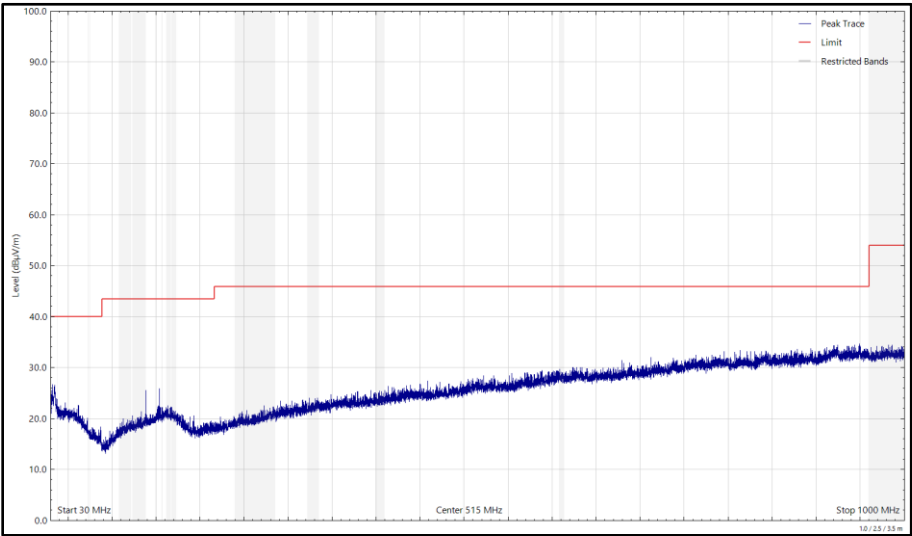


Figure 24 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

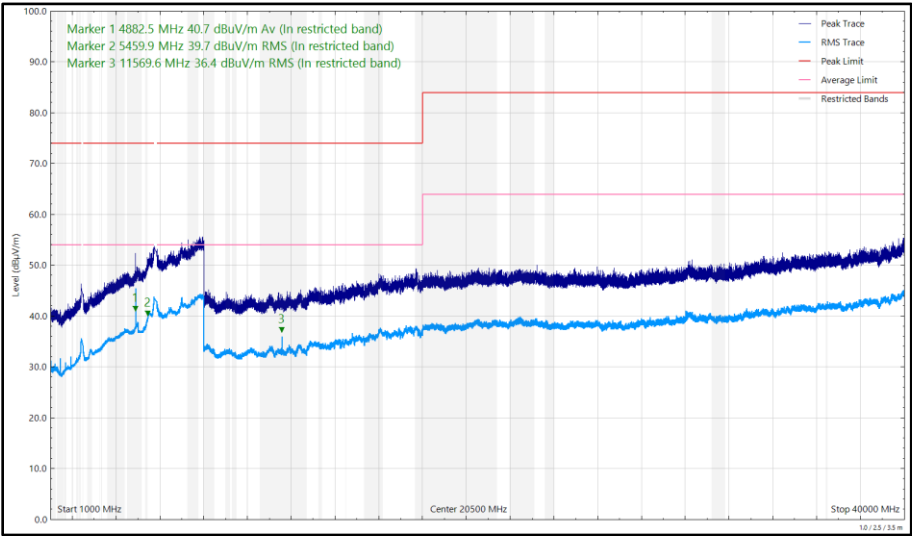


Figure 25 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical



FCC 47 CFR Part 15, 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	-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 dB μ V/m at 3m, Average 54 dB μ V/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
4881.923	36.09	54.00	-17.91	CISPR Avg	264	181	Vertical
4889.101	32.43	54.00	-21.57	CISPR Avg	13	399	Horizontal
7323.394	43.37	54.00	-10.63	CISPR Avg	308	147	Vertical
7323.637	37.89	54.00	-16.11	CISPR Avg	303	233	Horizontal

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.

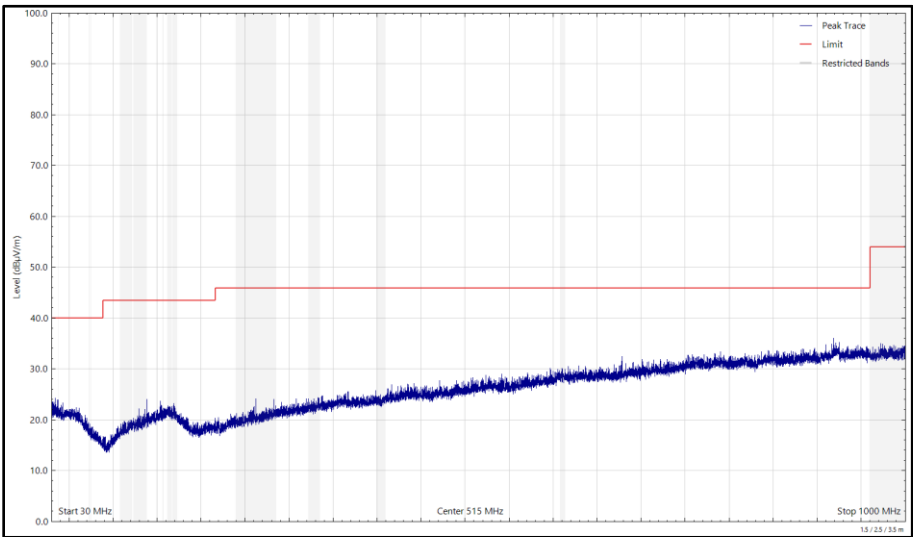


Figure 26 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

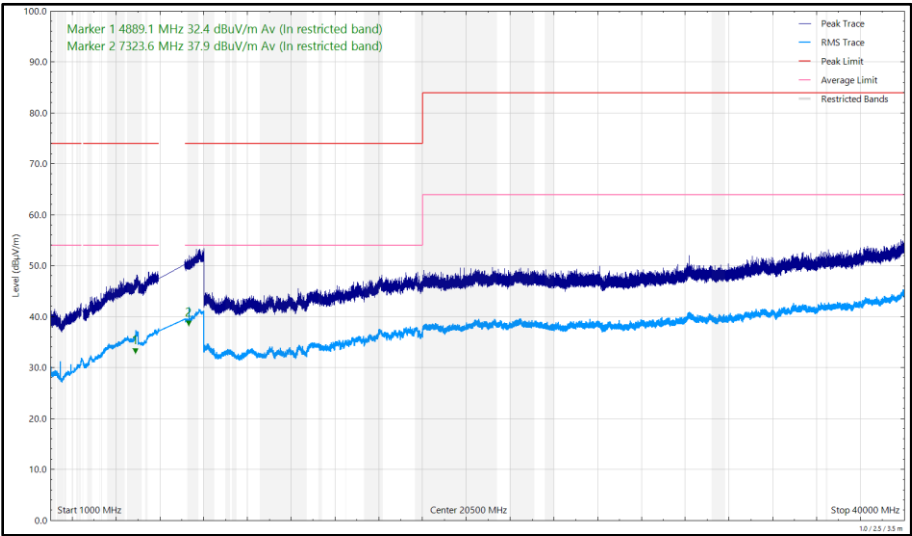


Figure 27 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

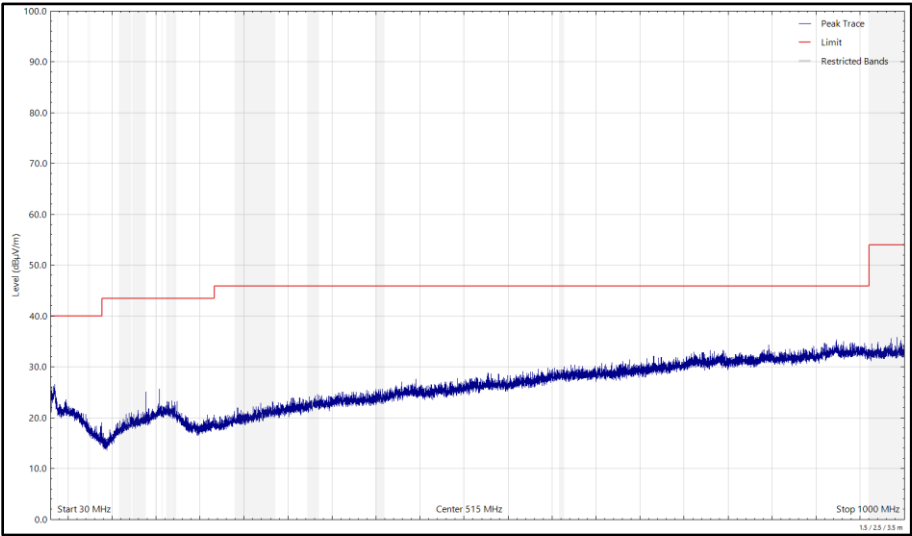


Figure 28 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

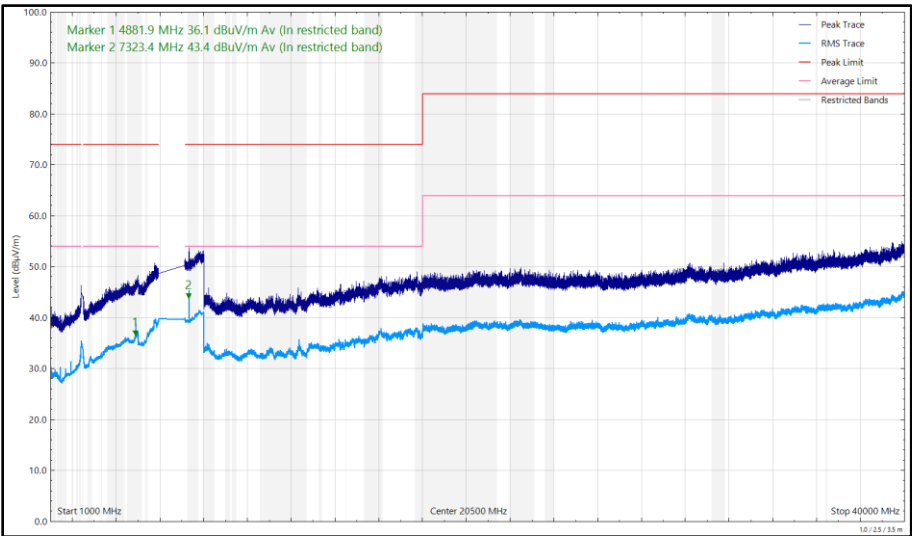


Figure 29 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
4882.203	34.83	54.00	-19.17	CISPR Avg	250	100	Vertical
7322.277	38.91	54.00	-15.09	CISPR Avg	328	271	Horizontal
7322.623	41.09	54.00	-12.91	CISPR Avg	325	133	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.

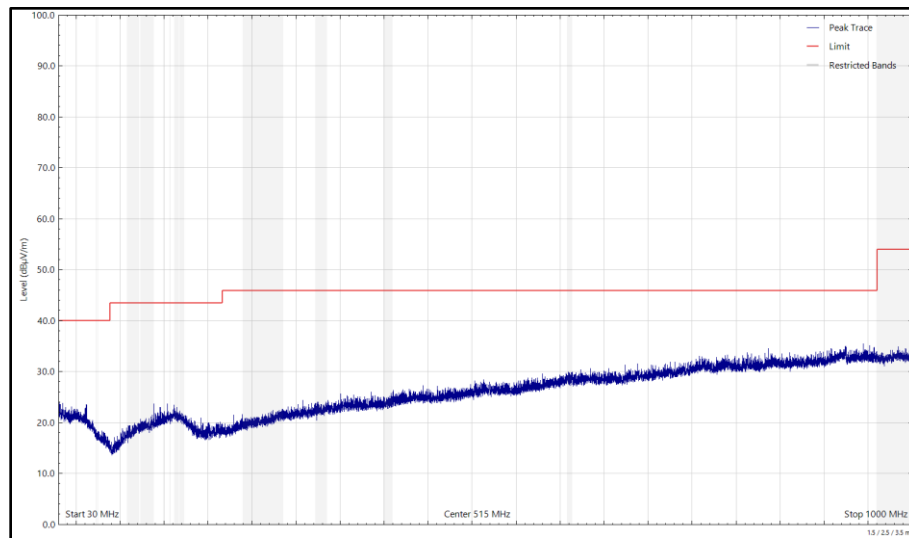


Figure 30 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

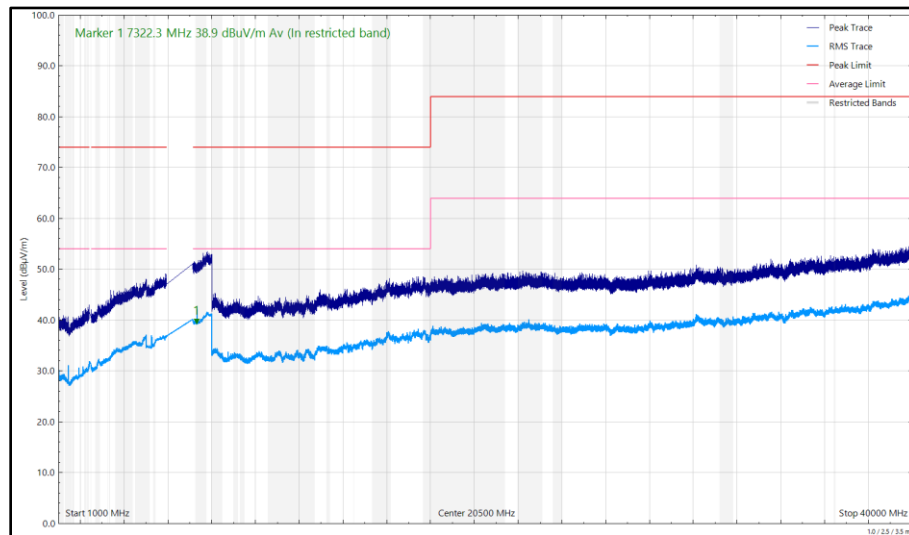


Figure 31 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

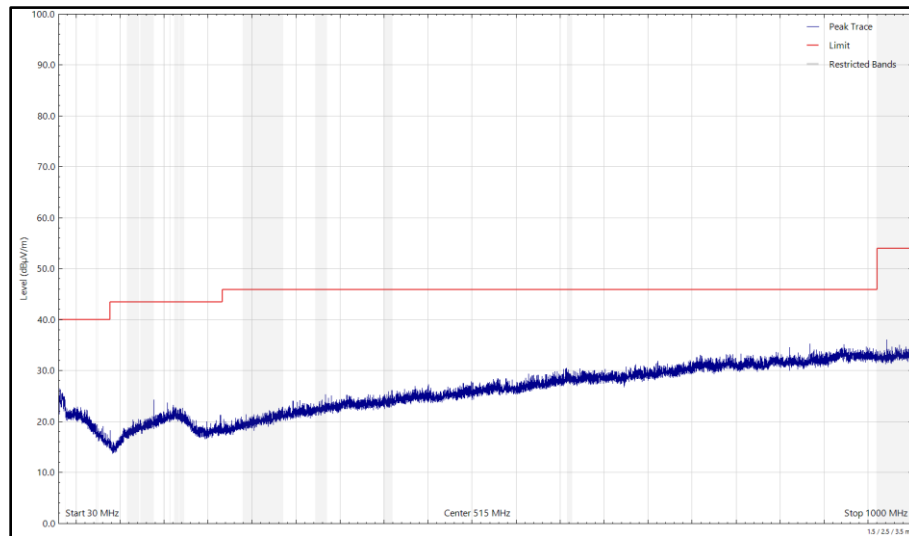


Figure 32 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

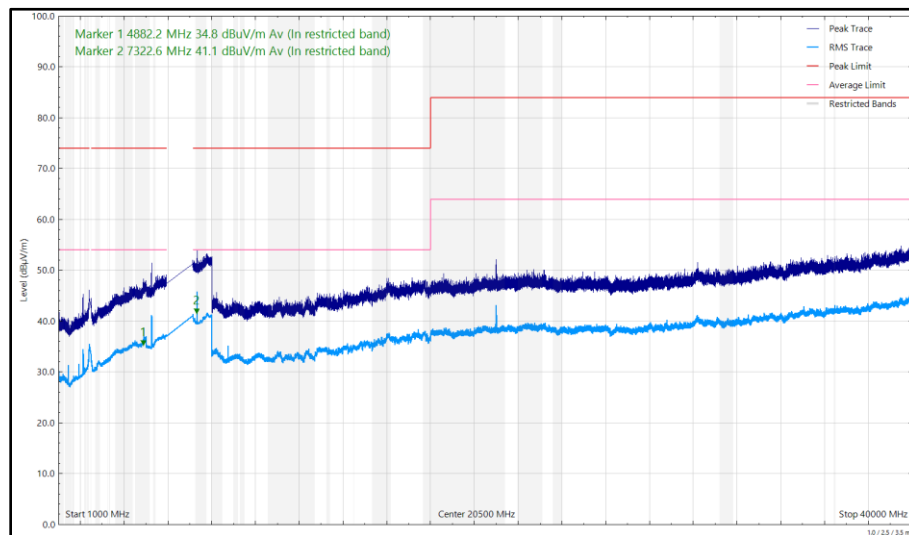


Figure 33 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
31.721	21.85	40.00	-18.15	Q-Peak	10	240	Vertical
4881.968	39.51	54.00	-14.49	CISPR Avg	284	100	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.

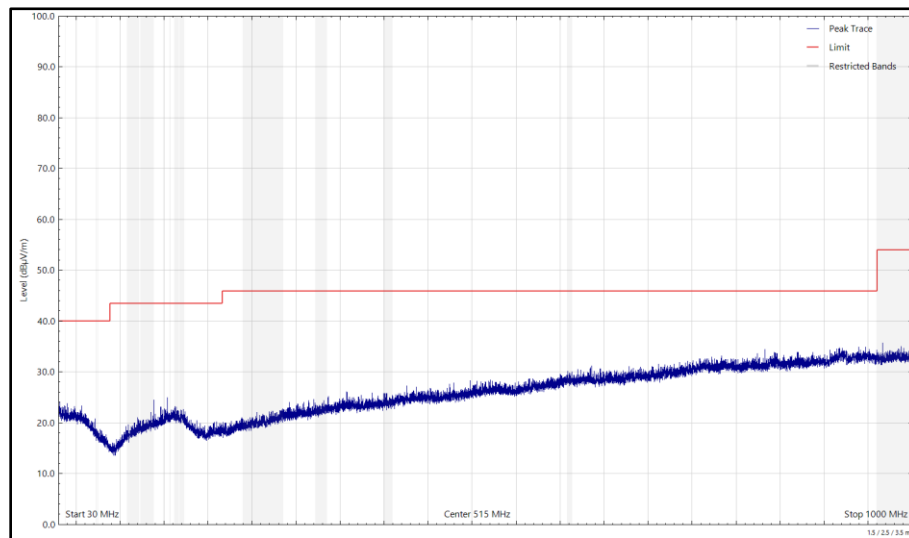


Figure 34 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Horizontal (Peak)

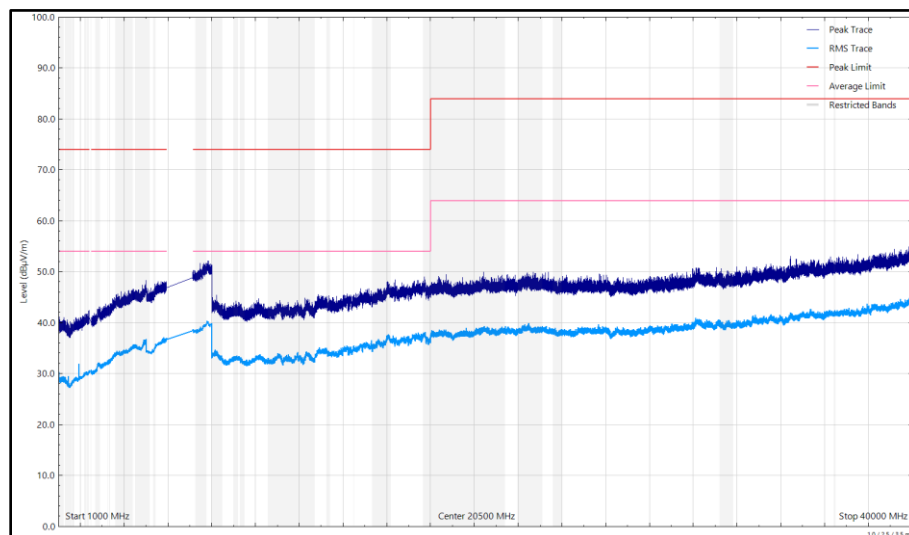


Figure 35 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Horizontal

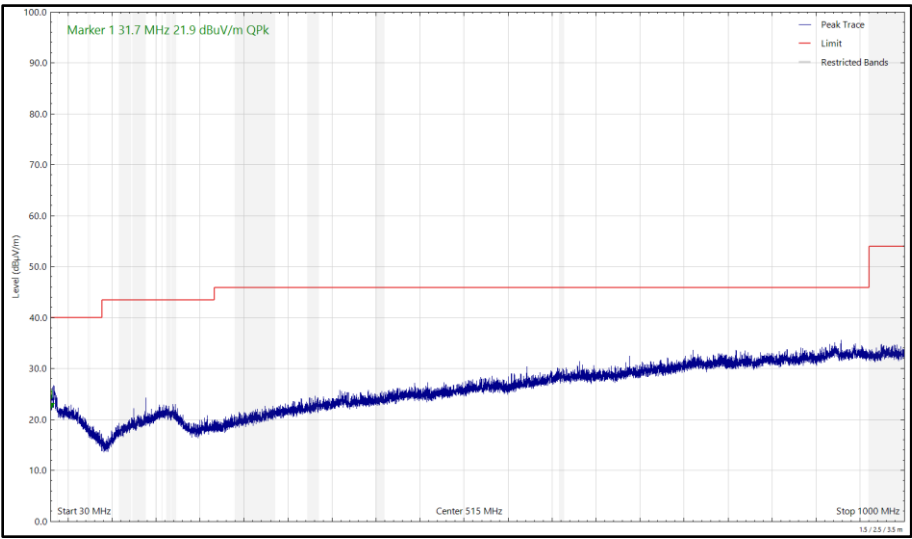


Figure 36 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Vertical (Peak)

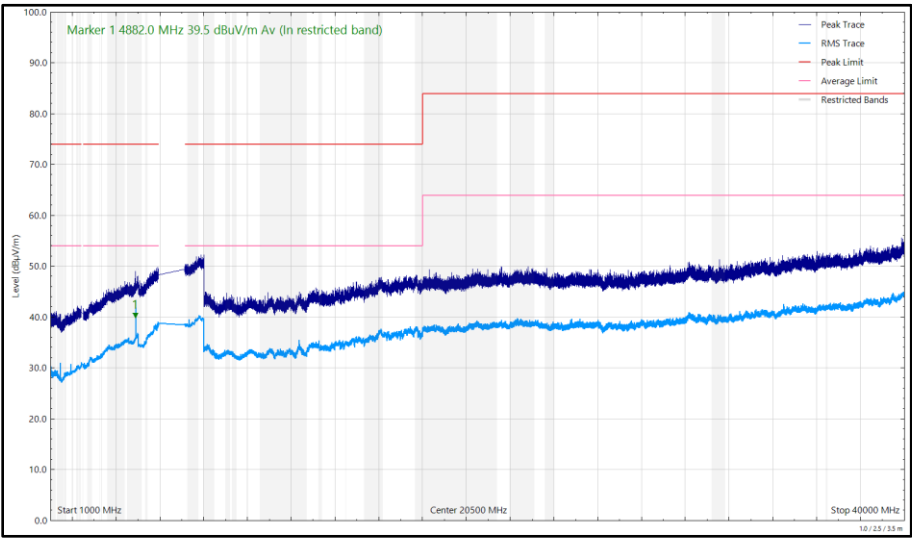


Figure 37 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Vertical



Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
4881.588	38.00	54.00	-16.00	CISPR Avg	283	100	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.

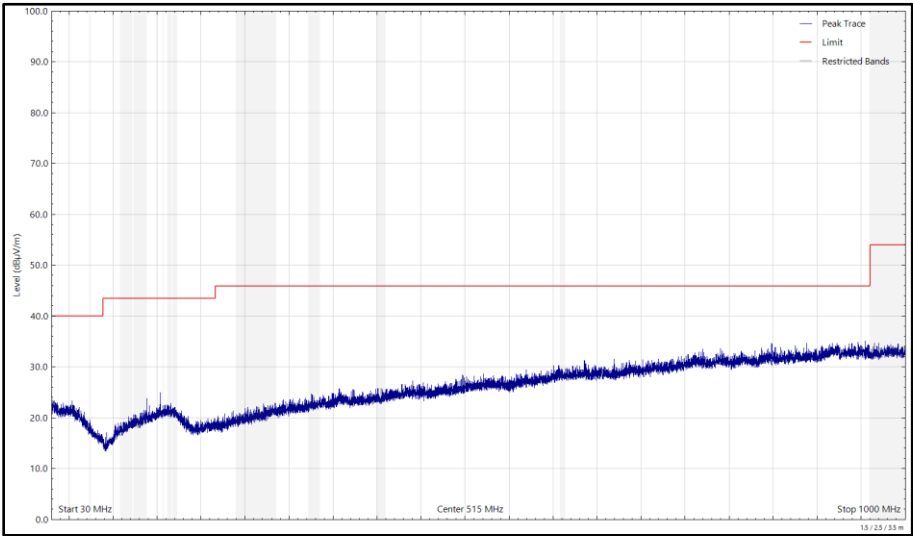


Figure 38 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Horizontal (Peak)

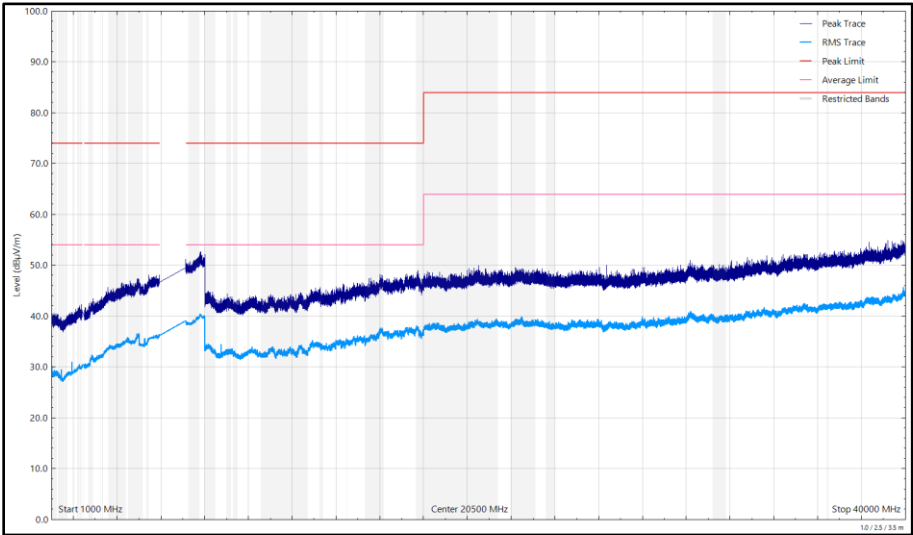


Figure 39 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Horizontal

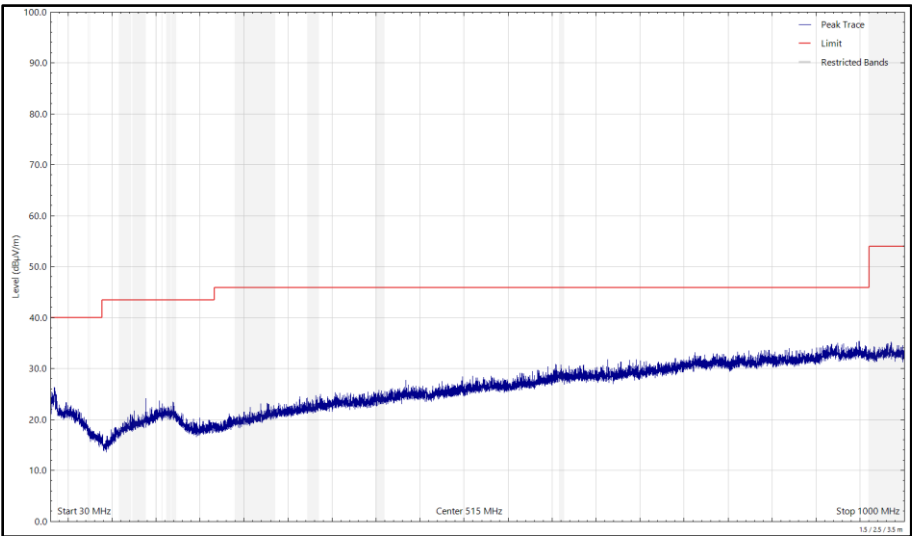


Figure 40 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Vertical (Peak)

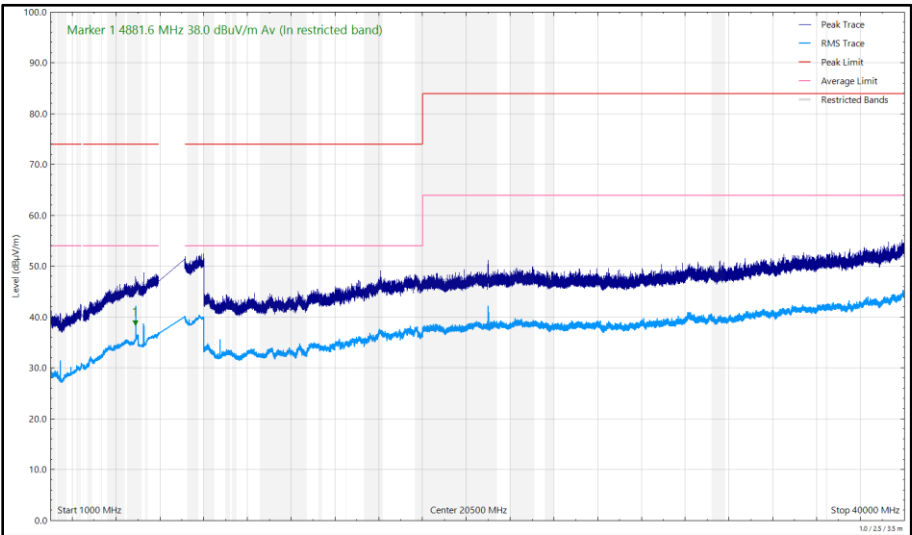


Figure 41 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Vertical



FCC 47 CFR Part 15, ISED RSS-247, ISED RSS-248 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	-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 dB μ V/m at 3m, Average 54 dB μ V/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
2389.977	36.97	54.00	-17.03	RMS	10	100	Vertical
2483.506	42.40	54.00	-11.60	RMS	360	320	Vertical
2483.551	59.18	74.00	-14.82	Peak	359	321	Vertical
2483.621	35.59	54.00	-18.41	RMS	146	108	Horizontal
4881.188	37.97	54.00	-16.03	RMS	280	166	Vertical

Table 18 - 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.

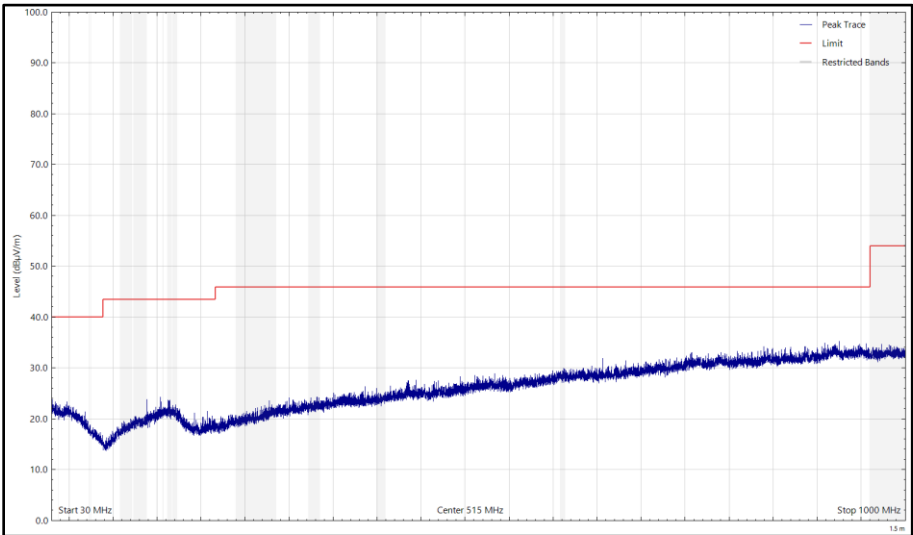


Figure 42 - 2442 (CH7), HT20, Core 0 and 5204 MHz, DH5, ePA, Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

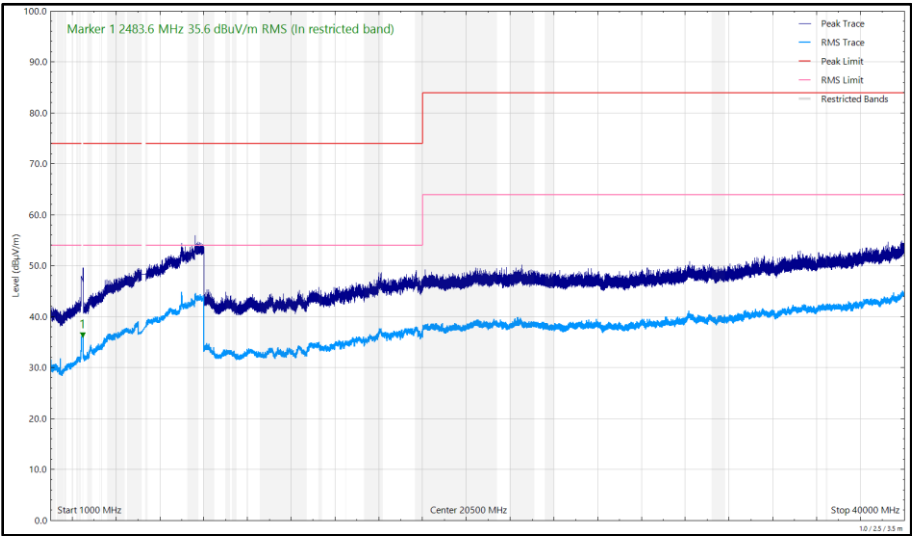


Figure 43 - 2442 MHz (CH7), HT20, Core 0 and 5204 MHz, DH5, ePA, Core 1, 1 GHz to 40 GHz, Horizontal

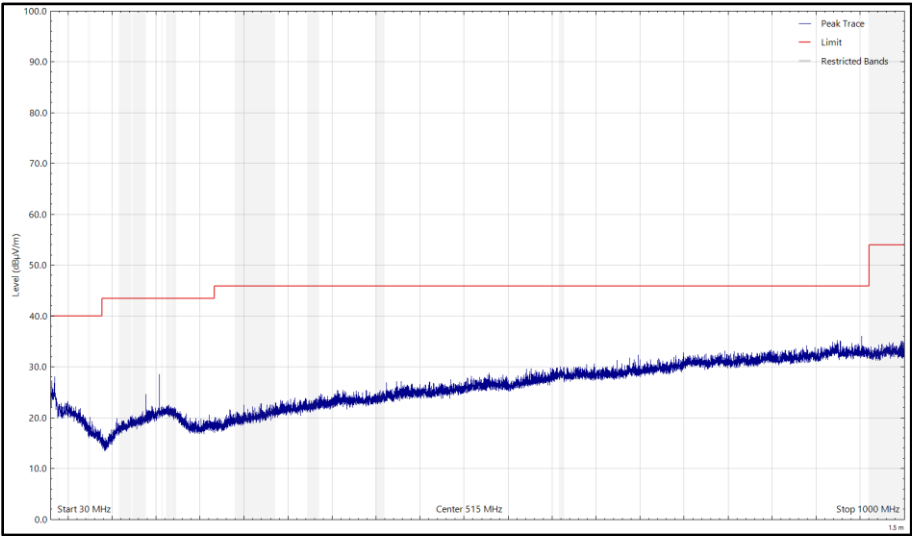


Figure 44 - 2442 (CH7), HT20, Core 0 and 5204 MHz, DH5, ePA, Core 1, 30 MHz to 1 GHz, Vertical (Peak)

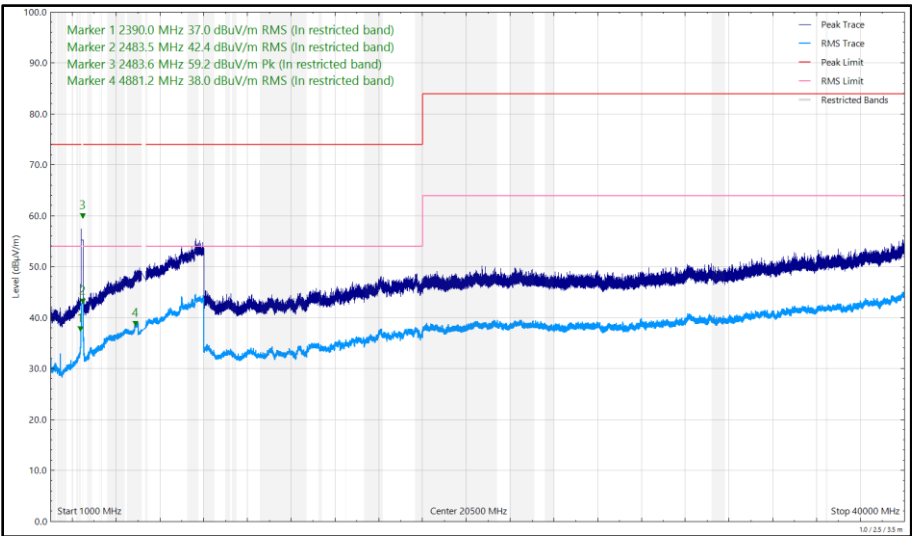


Figure 45 - 2442 MHz (CH7), HT20, Core 0 and 5204 MHz, DH5, ePA, Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
2399.631	57.44	74.00	-16.56	Peak	6	147	Vertical
2483.501	40.74	54.00	-13.26	RMS	349	144	Vertical
2483.527	36.04	54.00	-17.96	RMS	148	100	Horizontal
2484.965	59.05	74.00	-14.95	Peak	0	324	Vertical
5379.373	36.49	54.00	-17.51	RMS	173	100	Vertical

Table 19 - 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.

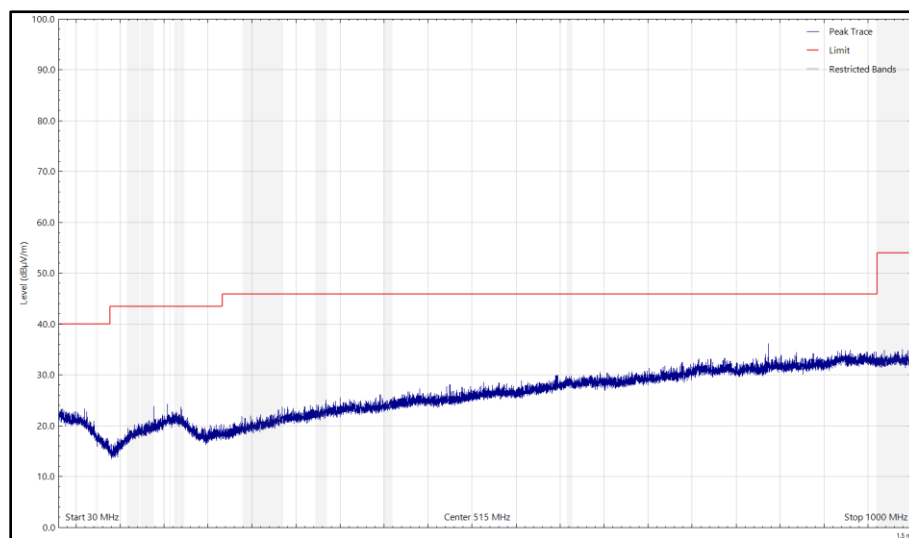


Figure 46 - 2442 MHz (CH7), HT20, Core 0 and 5788 MHz, DH5, ePA, Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

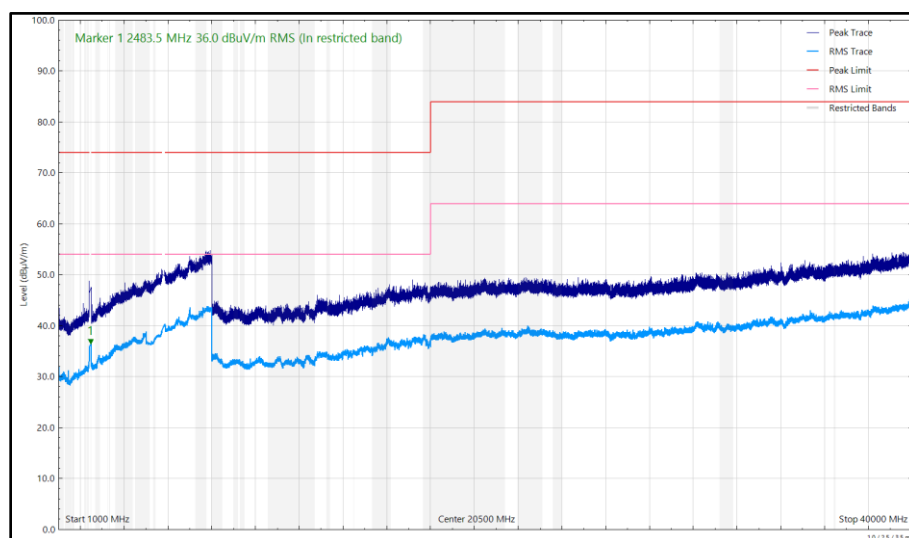


Figure 47 - 2442 MHz (CH7), HT20, Core 0 and 5788 MHz, DH5, ePA, Core 1, 1 GHz to 40 GHz, Horizontal

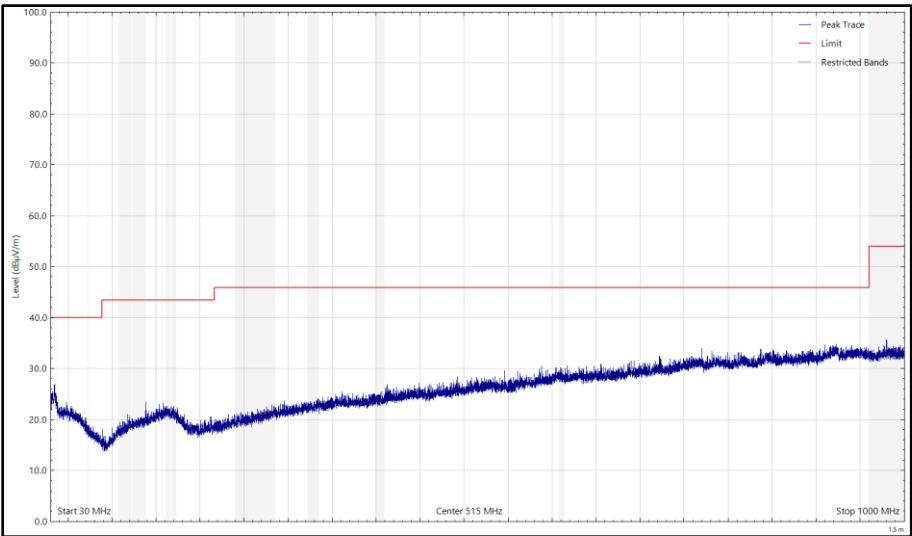


Figure 48 - 2442 MHz (CH7), HT20, Core 0 and 5788 MHz, DH5, ePA, Core 1, 30 MHz to 1 GHz, Vertical (Peak)

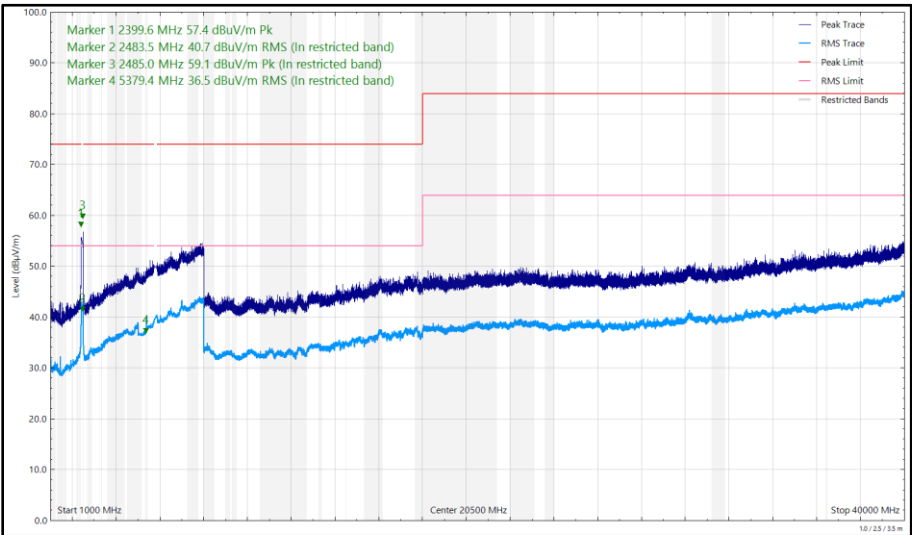


Figure 49 - 2442 MHz (CH7), HT20, Core 0 and 5788 MHz, DH5, ePA, Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
2389.851	37.20	54.00	-16.80	RMS	250	279	Vertical
2483.509	41.95	54.00	-12.05	RMS	250	291	Vertical
2483.606	36.62	54.00	-17.38	RMS	4	294	Horizontal
2484.726	58.50	74.00	-15.50	Peak	249	279	Vertical
4341.171	35.76	54.00	-18.24	RMS	350	219	Horizontal

Table 20 - 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.

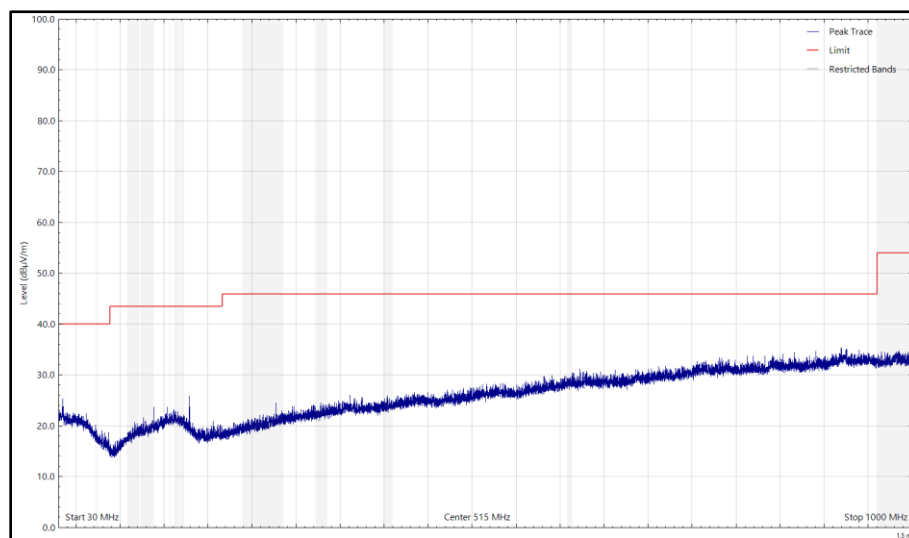


Figure 50 - 2442 MHz (CH7), HT20, Core 1 and 5204 MHz, DH5, ePA, Core 0, 30 MHz to 1 GHz, Horizontal (Peak)

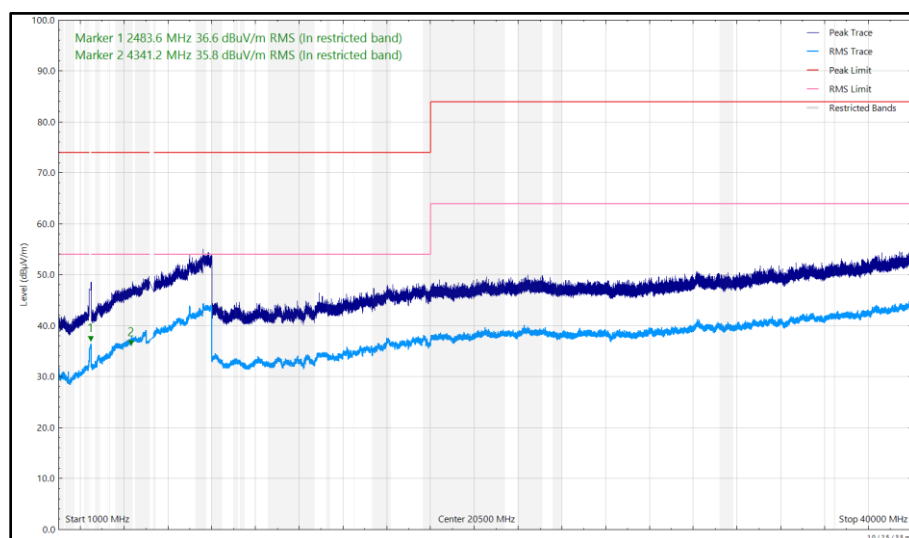


Figure 51 - 2442 MHz (CH7), HT20, Core 1 and 5204 MHz, DH5, ePA, Core 0, 1 GHz to 40 GHz, Horizontal

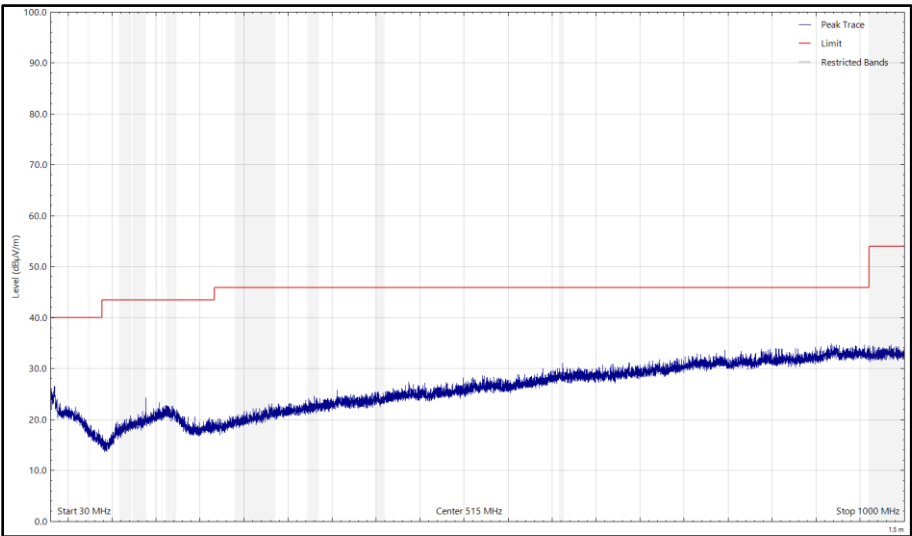


Figure 52 - 2442 MHz (CH7), HT20, Core 1 and 5204 MHz, DH5, ePA, Core 0, 30 MHz to 1 GHz, Vertical (Peak)

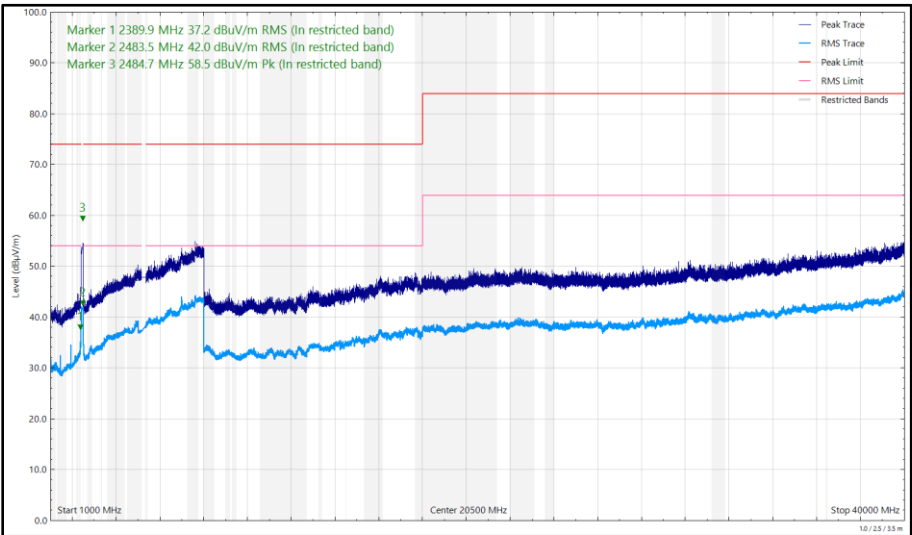


Figure 53 - 2442 MHz (CH7), HT20, Core 1 and 5204 MHz, DH5, ePA, Core 0, 1 GHz to 40 GHz, Vertical



Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
2389.664	37.50	54.00	-16.50	RMS	278	166	Vertical
2483.501	41.26	54.00	-12.74	RMS	272	203	Vertical
4883.812	36.88	54.00	-17.12	RMS	188	100	Vertical
4975.392	37.04	54.00	-16.96	RMS	100	100	Horizontal

Table 21 - 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.

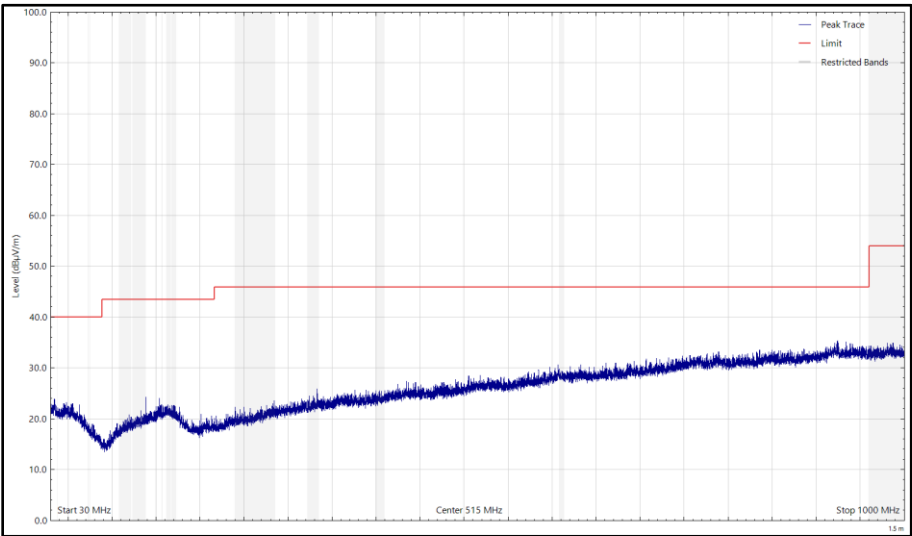


Figure 54 - 2442 MHz (CH7), HT20, Core 1 and 5788 MHz, DH5, ePA, Core 0, 30 MHz to 1 GHz, Horizontal (Peak)

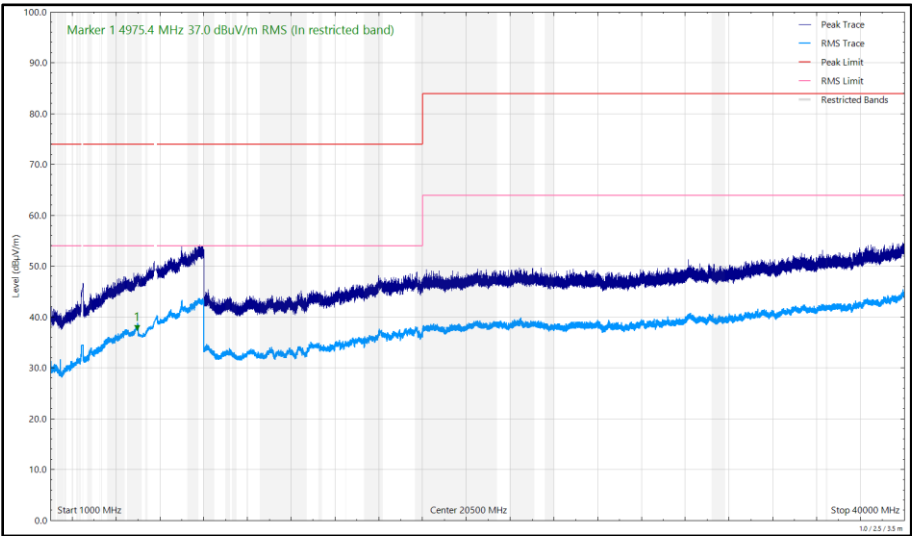


Figure 55 - 2442 MHz (CH7), HT20, Core 1 and 5788 MHz, DH5, ePA, Core 0, 1 GHz to 40 GHz, Horizontal

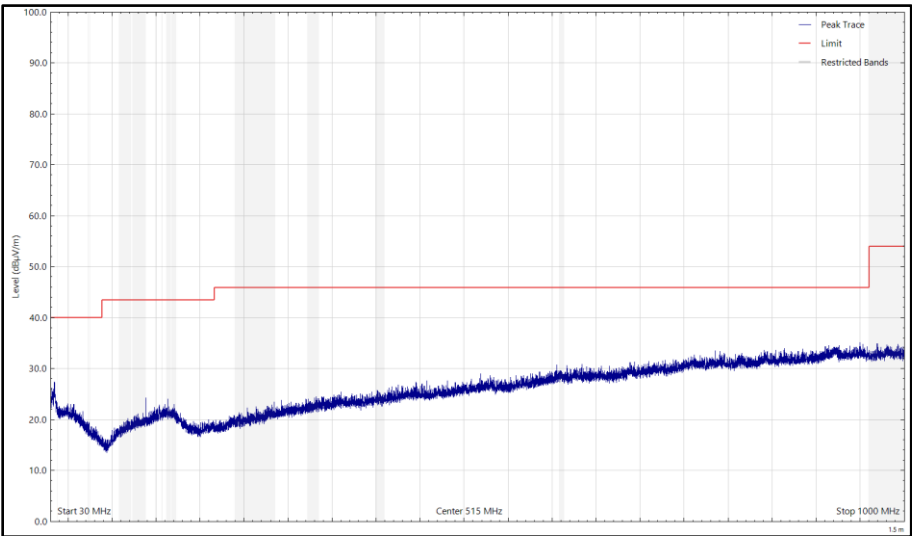


Figure 56 - 2442 MHz (CH7), HT20, Core 1 and 5788 MHz, DH5, ePA, Core 0, 30 MHz to 1 GHz, Vertical (Peak)

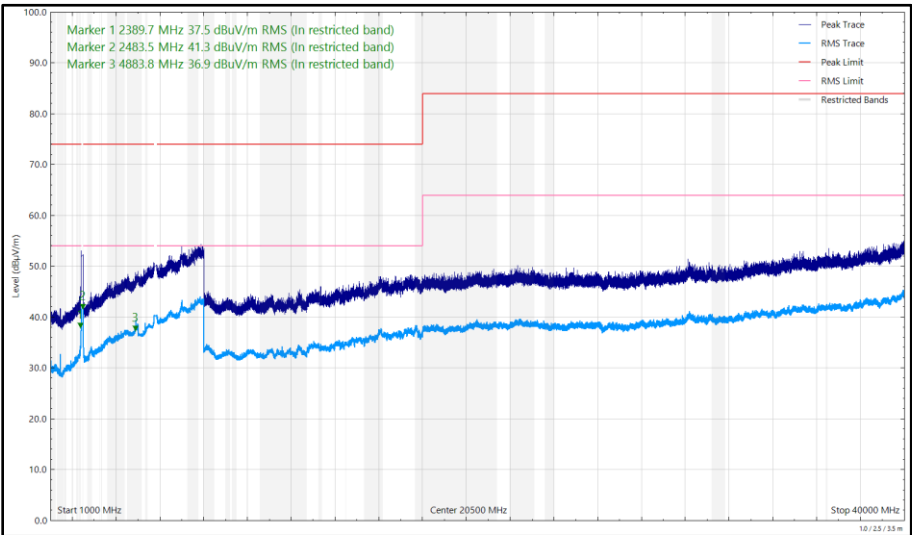


Figure 57 - 2442 MHz (CH7), HT20, Core 1 and 5788 MHz, DH5, ePA, Core 0, 1 GHz to 40 GHz, Vertical



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 6.2	-27 dBm e.i.r.p
Part 15.209 / RSS-GEN Clause 8.9	Peak: 74 dB μ V/m at 3m, Average 54 dB μ V/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
2386.158	33.52	54.00	-20.48	RMS	3	351	Vertical
2483.641	34.89	54.00	-19.11	RMS	6	112	Vertical
4880.943	43.06	54.00	-10.94	RMS	342	169	Vertical
4881.032	38.00	54.00	-16.00	RMS	144	317	Horizontal
5385.154	39.73	54.00	-14.27	RMS	357	113	Vertical

Table 23 - 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.

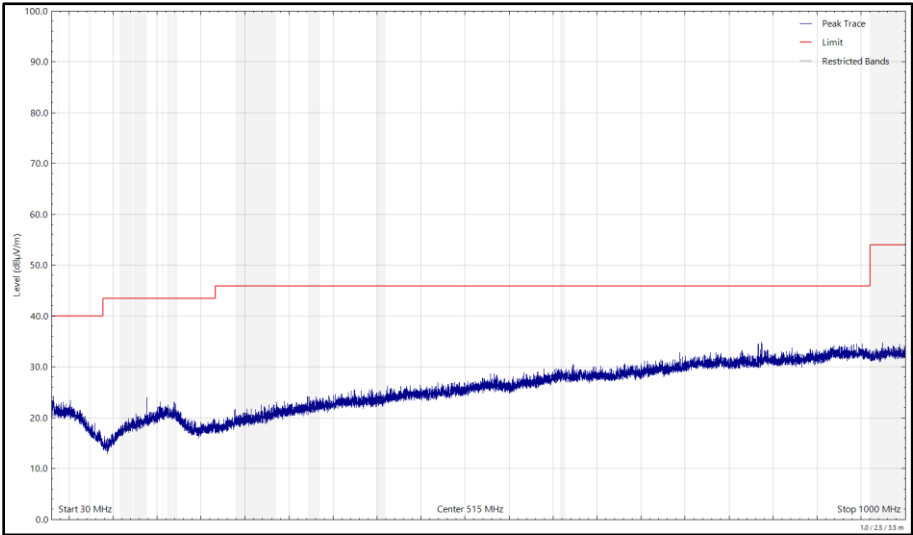


Figure 58 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 0, 30 MHz to 1 GHz, Horizontal (Peak)

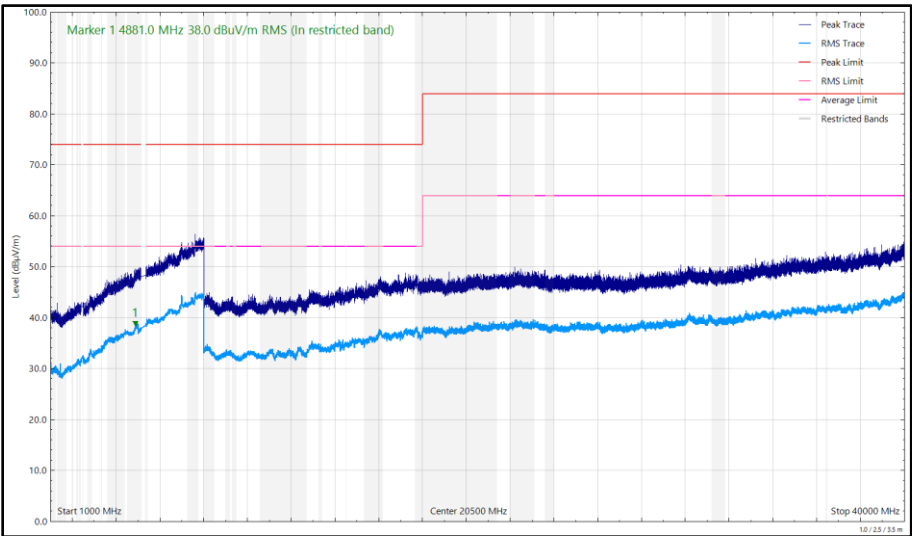


Figure 59 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 0, 1 GHz to 40 GHz, Horizontal

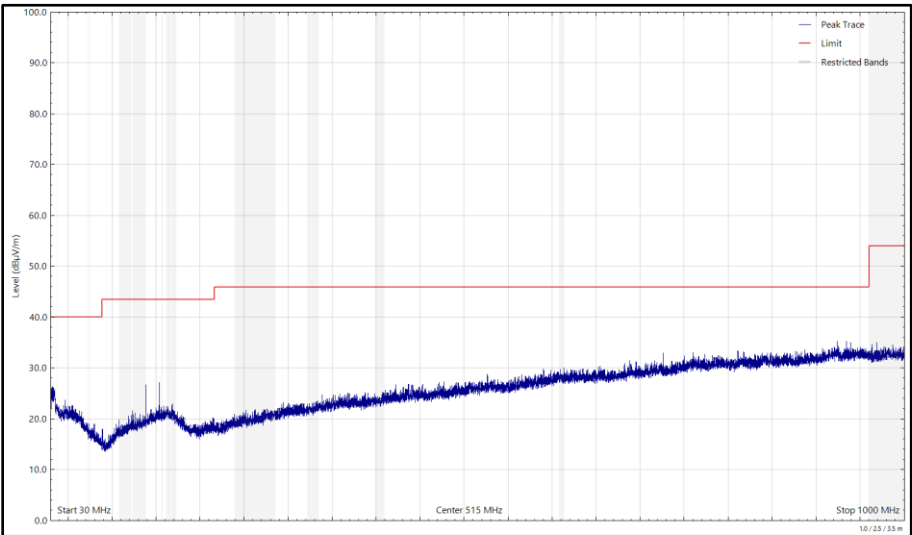


Figure 60 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 0, 30 MHz to 1 GHz, Vertical (Peak)

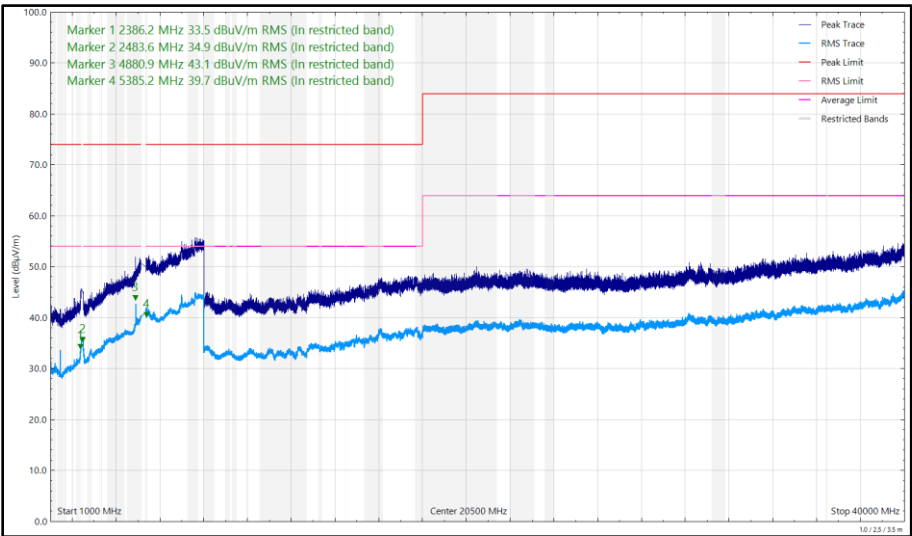


Figure 61 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 0, 1 GHz to 40 GHz, Vertical



Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
34.327	18.73	40.00	-21.27	Q-Peak	4	240	Vertical
2389.910	35.14	54.00	-18.86	RMS	285	149	Vertical
2483.721	34.69	54.00	-19.31	RMS	277	148	Vertical
4879.058	38.54	54.00	-15.46	RMS	308	309	Horizontal
4880.877	43.33	54.00	-10.67	RMS	273	155	Vertical
5358.569	41.49	54.00	-12.51	RMS	261	149	Vertical

Table 24 - 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.

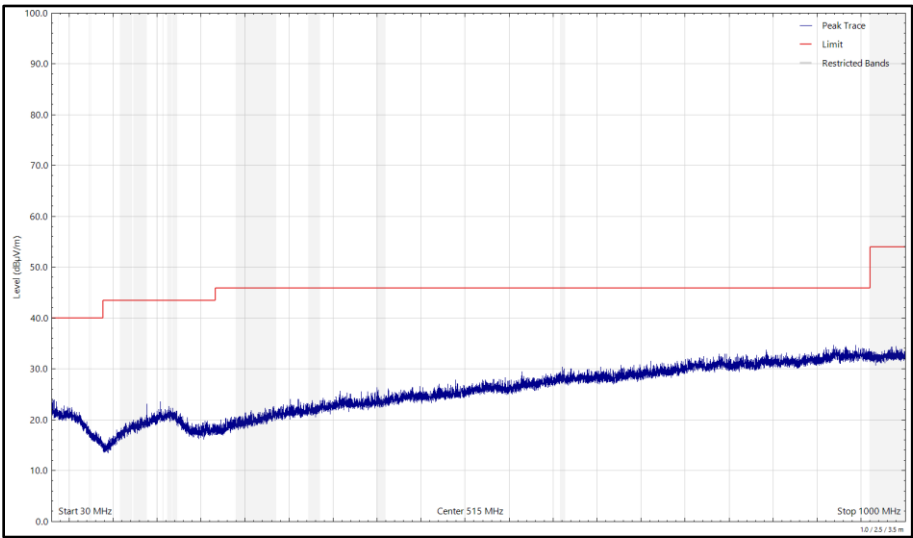


Figure 62 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

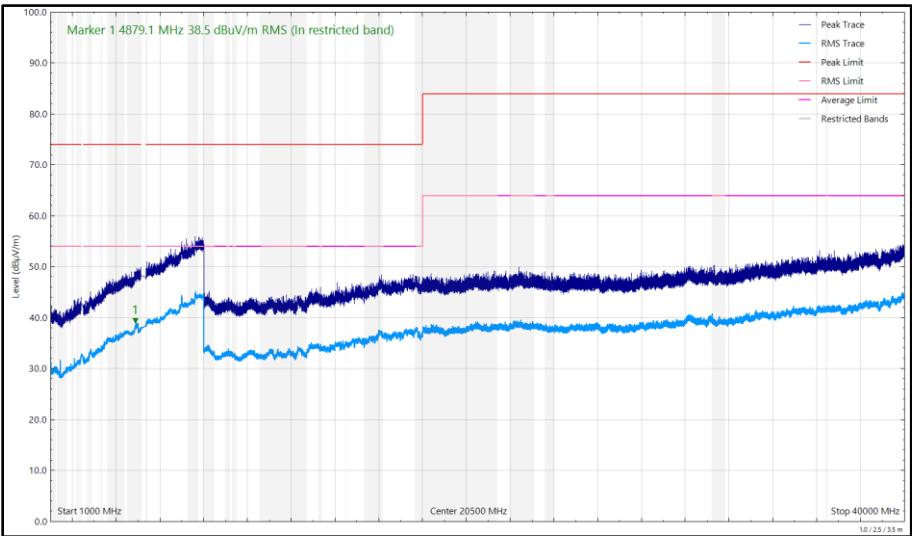


Figure 63 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 1, 1 GHz to 40 GHz, Horizontal

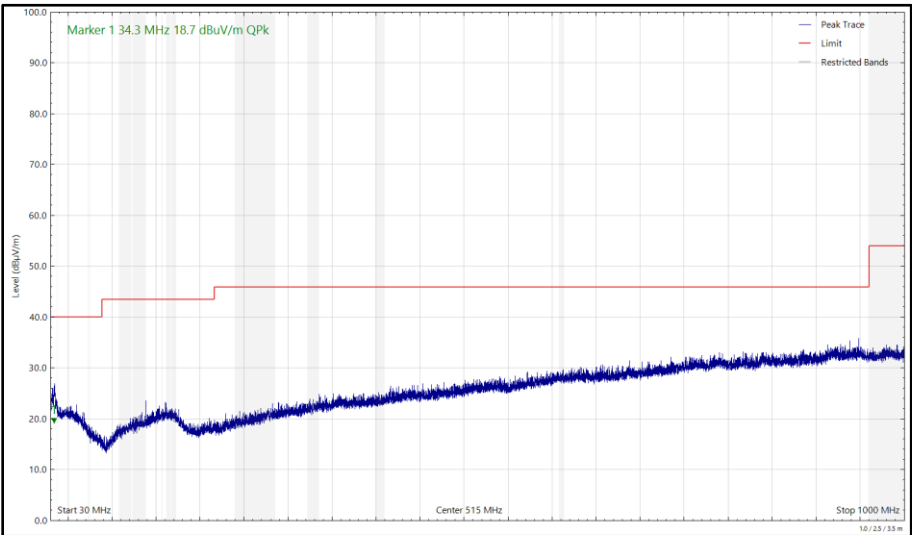


Figure 64 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 1, 30 MHz to 1 GHz, Vertical (Peak)

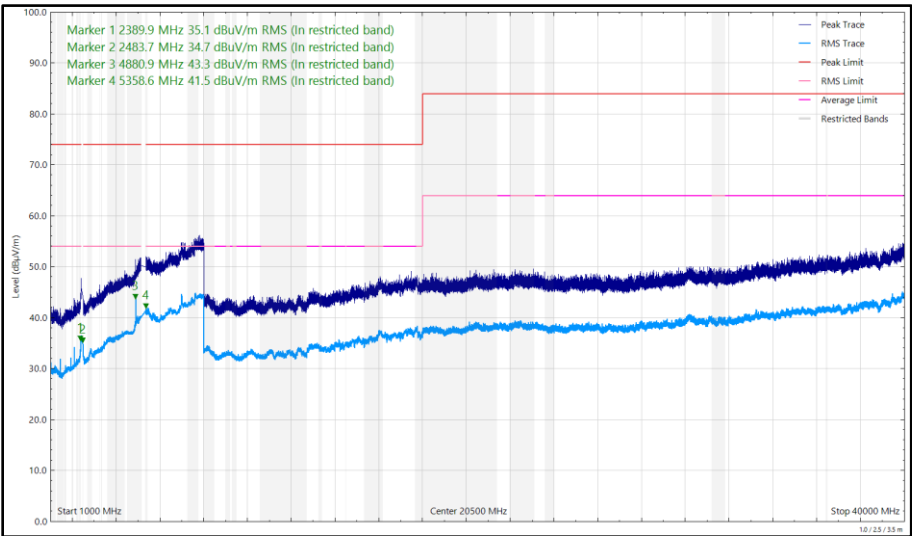


Figure 65 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
31.419	22.52	40.00	-17.48	Q-Peak	1	240	Vertical
4087.241	35.18	54.00	-18.82	RMS	249	113	Vertical
4879.018	41.86	54.00	-12.14	RMS	284	157	Vertical
4879.018	38.15	54.00	-15.85	RMS	240	159	Horizontal

Table 25 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), iPA, Core 2, 30 MHz to 40 GHz

No other emissions found within 10 dB of the limit.

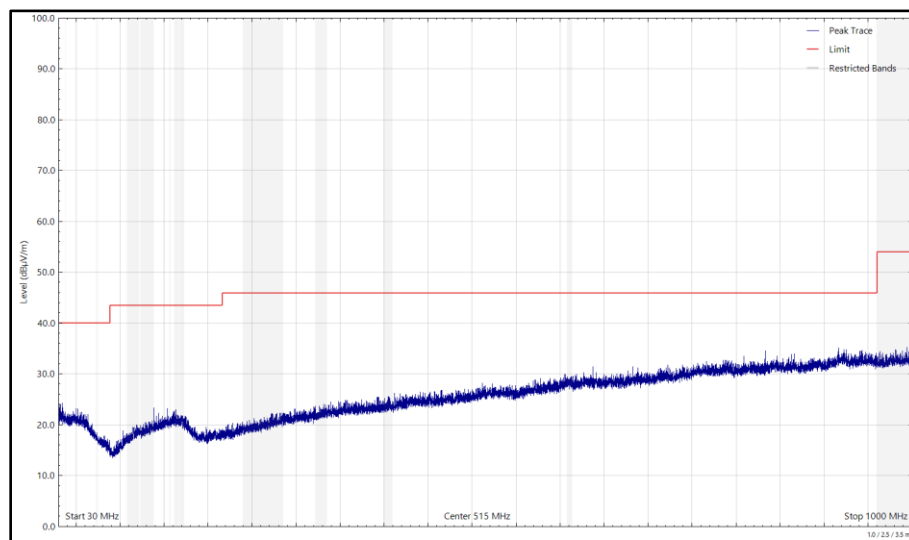


Figure 66 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), iPA, Core 2, 30 MHz to 1 GHz, Horizontal (Peak)

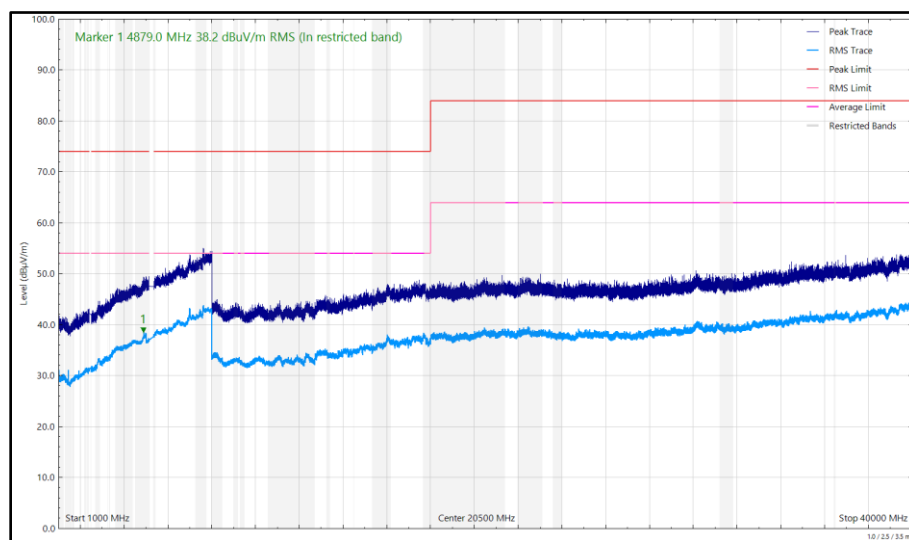


Figure 67 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), iPA, Core 2, 1 GHz to 40 GHz, Horizontal