

FCC and ISED Test Report

Apple Inc
Model: A3389



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: BCGA3389

IC: 579C-A3389

COMMERCIAL-IN-CONFIDENCE

Document 75961400-95 Issue 01

SIGNATURE

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Steve Marshall	Senior Engineer	Authorised Signatory	12 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	12 November 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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ACCREDITATION

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation. Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited). Results of tests covered by our Flexible UKAS Accreditation Schedule are marked FS (Flexible Scope).

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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	12-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	19-October-2024
Finish of Test	26-October-2024
Name of Engineer(s)	Akhil Rajendran Bhaskaran Nair, Colin Brain, Ian Hart, James Woods, Manohar Thota, Vineeth Nagaraj and Thomas Randall
Related Document(s)	ANSI C63.4 (2014) ANSI C63.10 (2020) KDB 789033 D02 v02r01 KDB 987594 D02 v02r01



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 v02r01
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 v02r01
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 v02r01
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 v02r01
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 v02r01

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: A3389			
Serial Number	Hardware Version	Software Version	Firmware
QQHY5J5267	REV1.0	24A62401t	BT: 22.1.65.459 WLAN: 23.30.16
J7CW3WPWFV	REV1.0	24A62401j	BT: 22.1.65.459 WLAN: 23.30.16
LVV0X46J3D	REV1.0	24A62401t	23.30.16

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: A3389, Serial Number: QQHY5J5267			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3389, Serial Number: J7CW3WPWFV			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3389, Serial Number: LVV0X46J3D			
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, Colin Brain, James Woods, Manohar Thota and Vineeth Nagaraj	UKAS
Configuration and Mode: 6 GHz WLAN and 2.4 GHz Bluetooth		
Radiated Spurious Emissions (Simultaneous Transmission)	Ian Hart, James Woods and Manohar Thota	UKAS
Configuration and Mode: 2.4 GHz WLAN and Narrowband		
Radiated Spurious Emissions (Simultaneous Transmission)	Colin Brain, Ian Hart, James Woods, Manohar Thota and Vineeth Nagaraj	UKAS
Configuration and Mode: 5 GHz WLAN and Thread		
Radiated Spurious Emissions (Simultaneous Transmission)	Akhil Rajendran Bhaskaran Nair, Colin Brain, Ian Hart, James Woods and Manohar Thota	UKAS
Configuration and Mode: 6 GHz WLAN and Thread		
Radiated Spurious Emissions (Simultaneous Transmission)	Akhil Rajendran Bhaskaran Nair, Ian Hart 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

A3389, S/N: QQHY5J5267 - Modification State 0
A3389, S/N: J7CW3WPWFV - Modification State 0
A3389, S/N: LVV0X46J3D - Modification State 0

2.1.3 Date of Test

19-October-2024 to 26-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 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

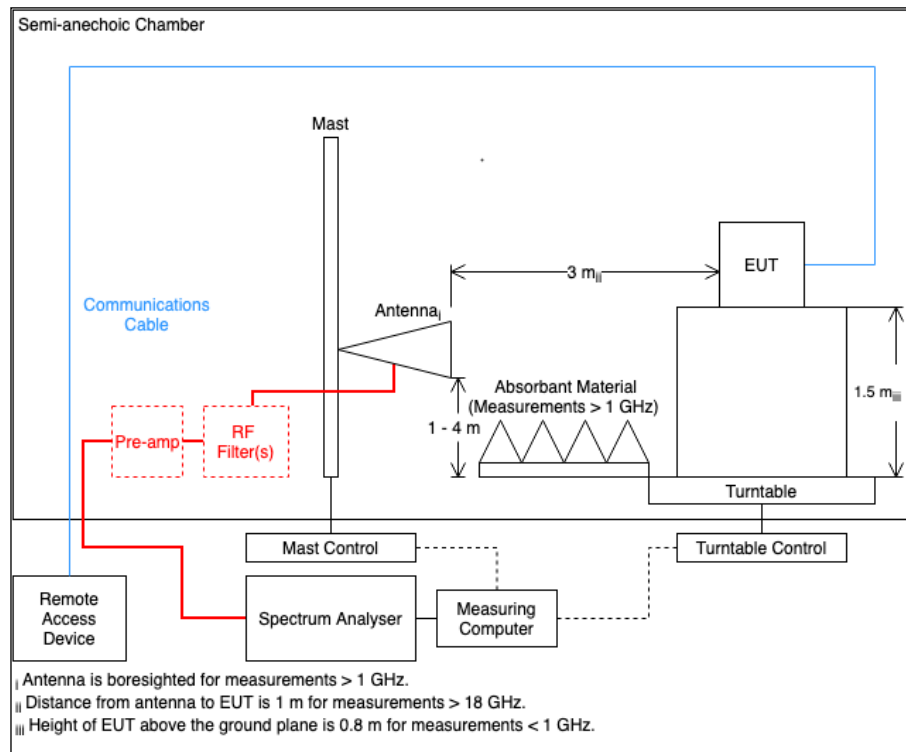


Figure 1

2.1.6 Environmental Conditions

Ambient Temperature	22.1 - 23.7 °C
Relative Humidity	41.5 - 54.1 %

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
1440.683	33.85	54.00	-20.15	RMS	218	157	Vertical
4881.758	35.77	54.00	-18.23	CISPR Avg	21	400	Horizontal
4881.953	44.79	54.00	-9.21	CISPR Avg	284	129	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 1 GHz

No other emissions found within 12 dB of the limit.

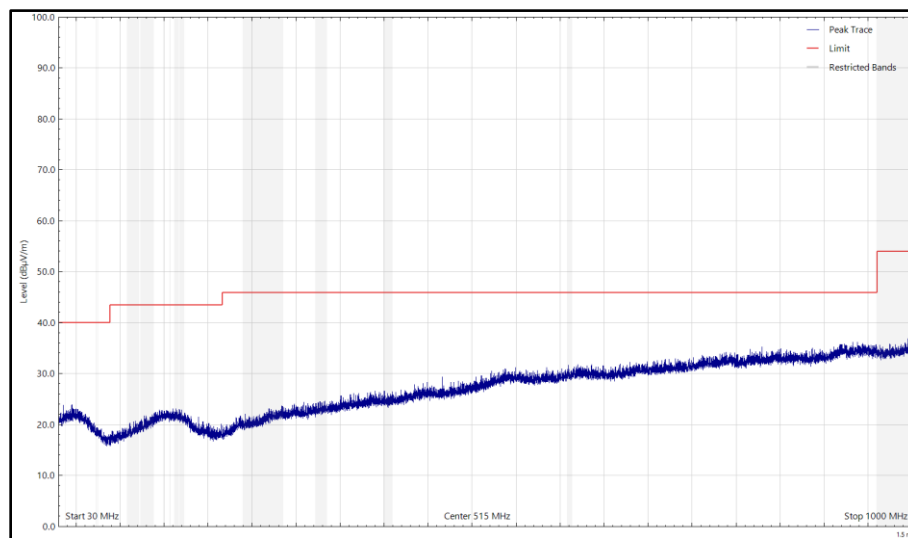


Figure 2 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Horizontal (Peak)

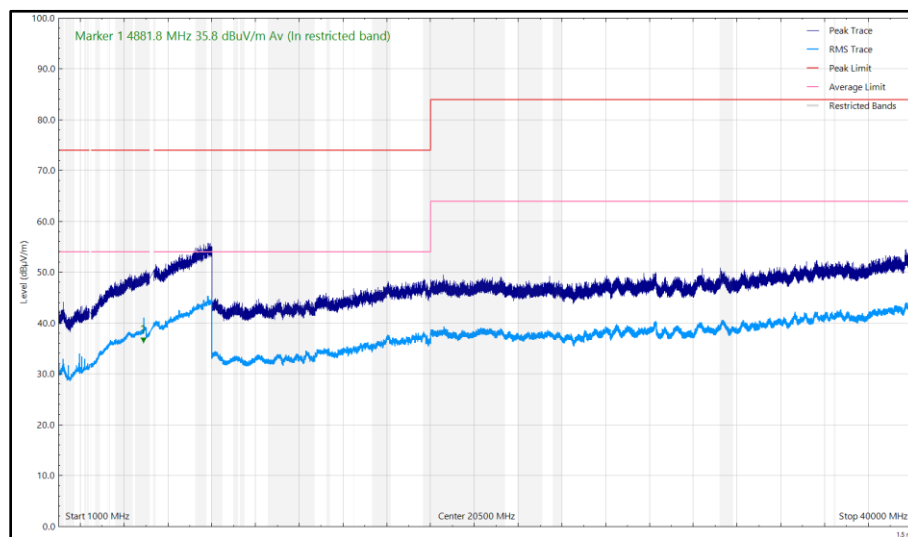


Figure 3 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Horizontal

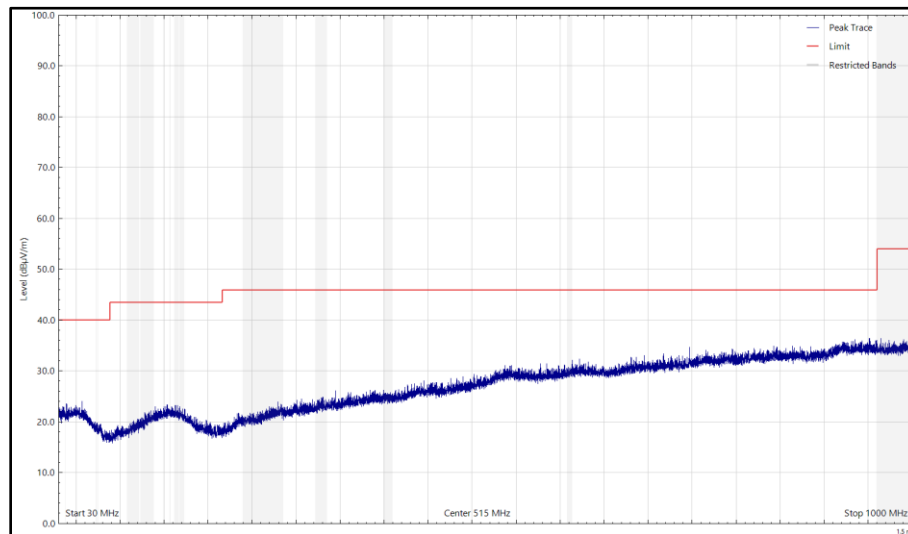


Figure 4 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Vertical (Peak)

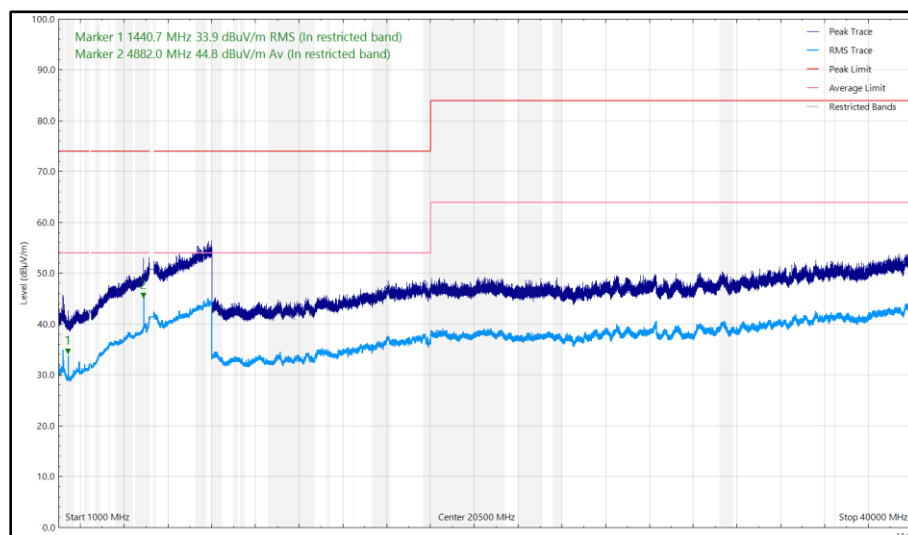


Figure 5 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
1201.050	34.83	54.00	-19.17	RMS	143	269	Vertical
1440.764	34.12	54.00	-19.88	RMS	216	146	Vertical
4882.323	42.69	54.00	-11.31	CISPR Avg	288	140	Vertical
4893.060	34.46	54.00	-19.54	CISPR Avg	37	201	Horizontal
11280.505	35.12	54.00	-18.88	RMS	206	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 1 GHz

No other emissions found within 12 dB of the limit.

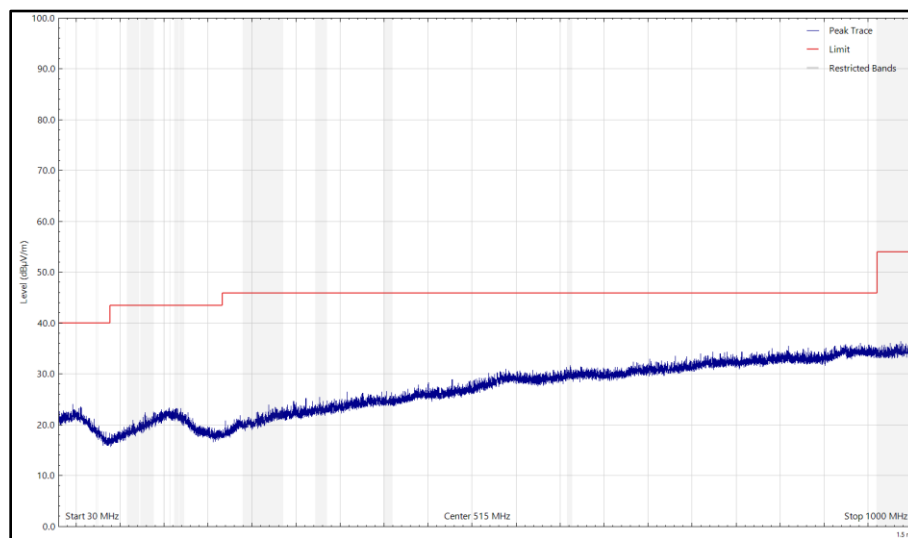


Figure 6 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Horizontal (Peak)

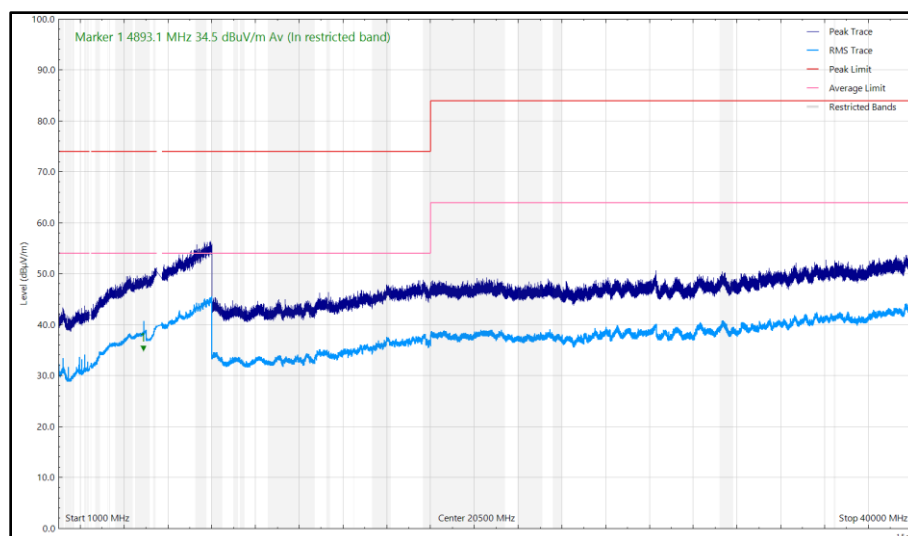


Figure 7 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Horizontal

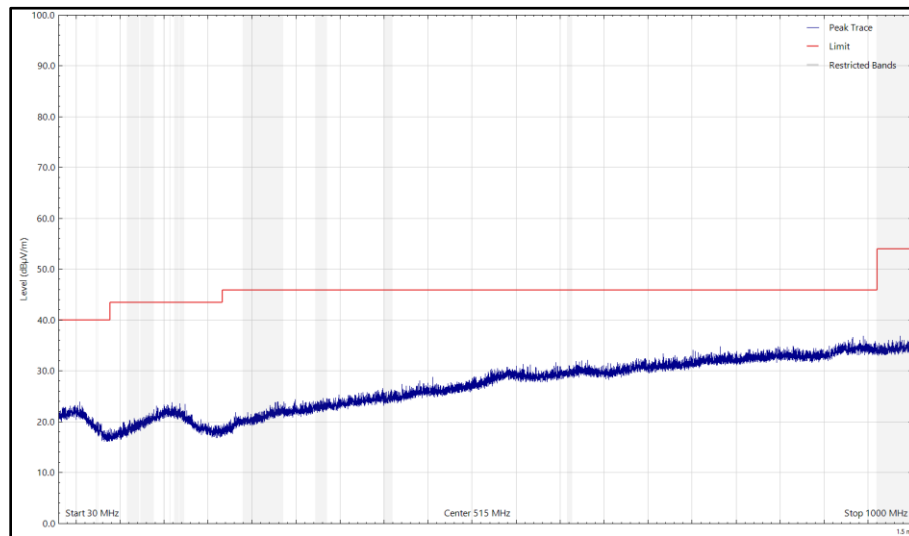


Figure 8 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Vertical (Peak)

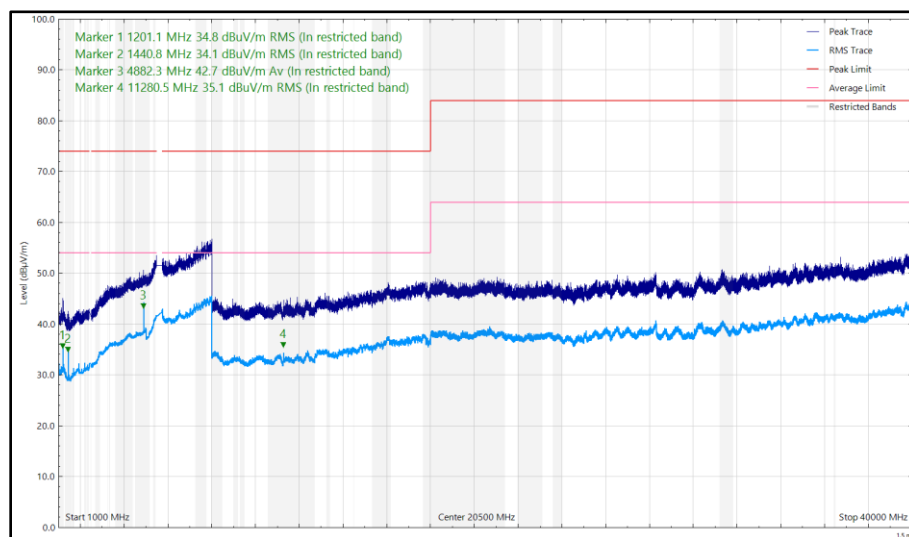


Figure 9 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
1200.805	33.98	54.00	-20.02	RMS	132	247	Vertical
4881.998	44.37	54.00	-9.63	CISPR Avg	278	161	Vertical
4885.557	34.34	54.00	-19.66	CISPR Avg	232	400	Horizontal
7613.226	55.82	74.00	-18.18	Peak	184	229	Horizontal
7619.615	43.62	54.00	-10.38	RMS	67	232	Horizontal

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 1 GHz

No other emissions found within 12 dB of the limit.

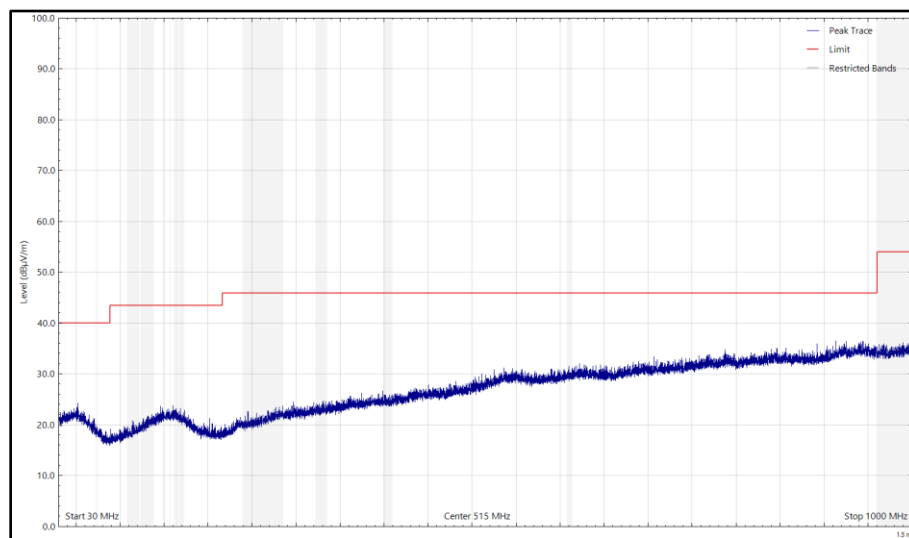


Figure 10 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Horizontal (Peak)

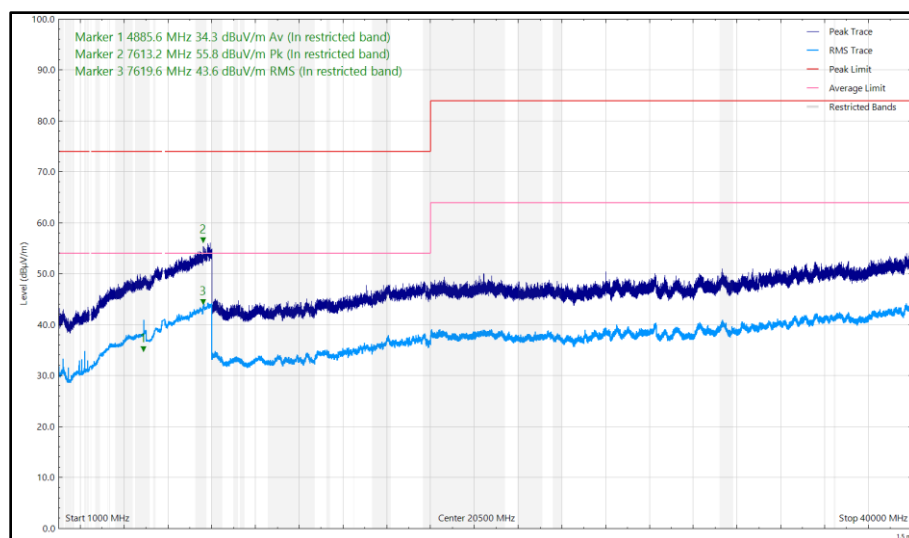


Figure 11 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Horizontal

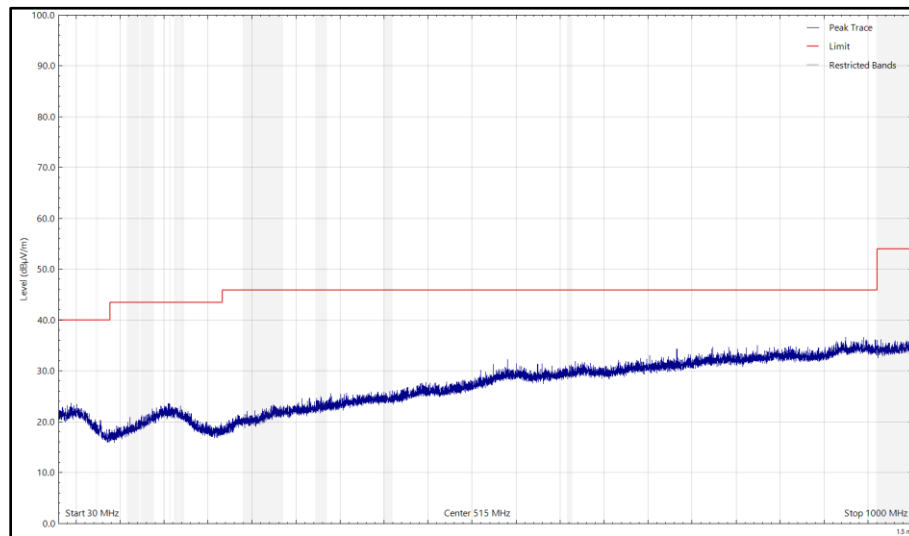


Figure 12 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Vertical (Peak)

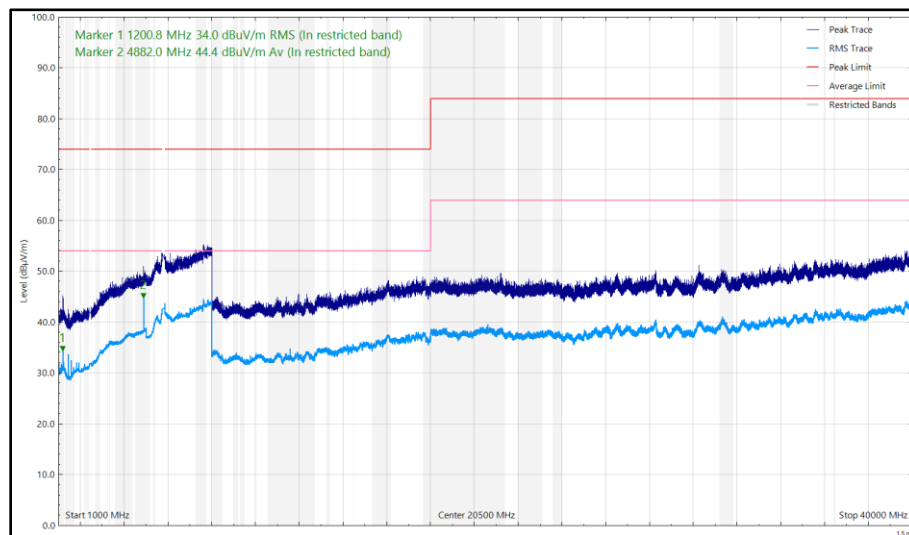


Figure 13 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
1202.111	34.69	54.00	-19.31	RMS	139	350	Vertical
2483.542	34.84	54.00	-19.16	RMS	330	112	Vertical
4881.743	44.07	54.00	-9.93	CISPR Avg	281	159	Vertical
4882.213	38.55	54.00	-15.45	CISPR Avg	209	316	Horizontal
5148.525	42.10	54.00	-11.90	RMS	85	106	Vertical
5451.827	39.38	54.00	-14.62	RMS	242	381	Horizontal
5459.846	41.24	54.00	-12.76	RMS	12	228	Vertical
7624.827	55.32	74.00	-18.68	Peak	67	355	Vertical
7625.615	55.89	74.00	-18.11	Peak	111	295	Horizontal
7629.680	43.61	54.00	-10.39	RMS	350	111	Vertical
7821.292	41.15	54.00	-12.85	CISPR Avg	286	398	Horizontal

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 12 dB of the limit.

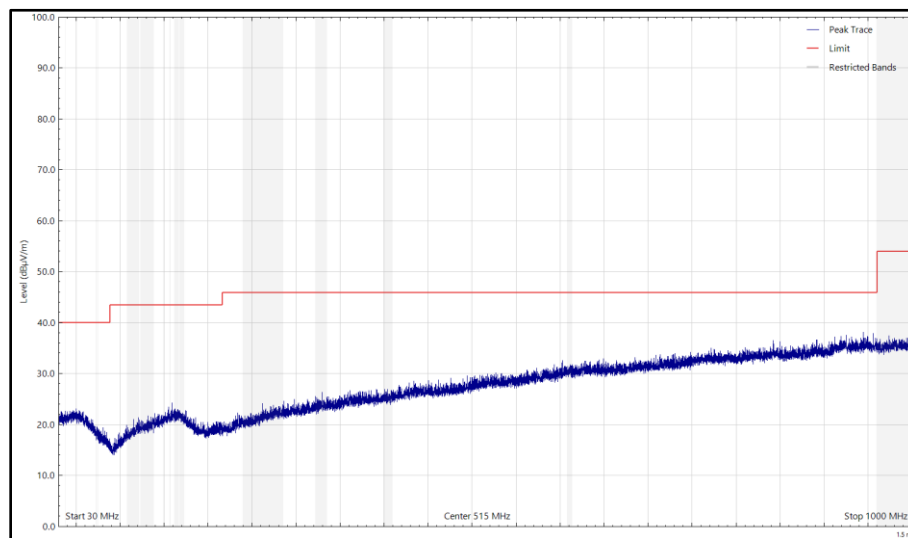


Figure 14 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

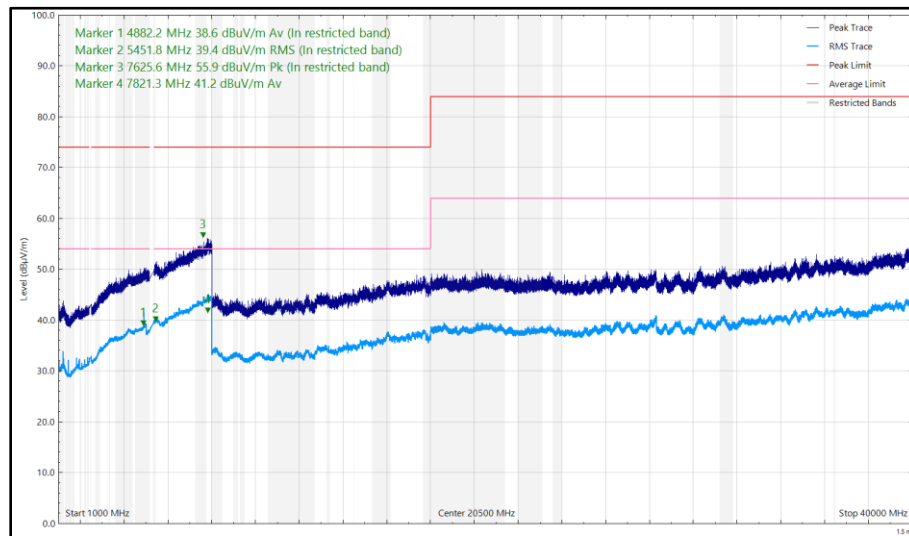


Figure 15 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

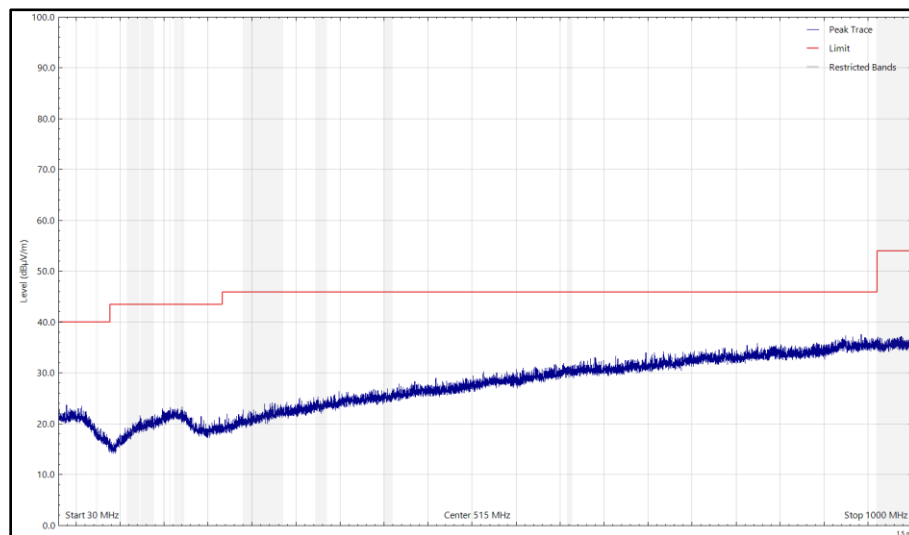


Figure 16 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

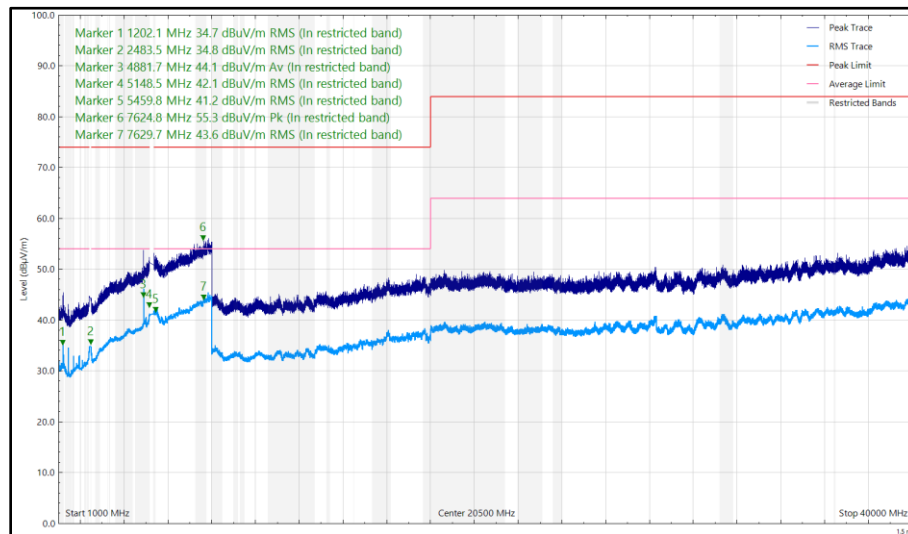


Figure 17 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
1200.111	35.22	54.00	-18.78	RMS	140	378	Vertical
1440.808	35.22	54.00	-18.78	RMS	183	201	Vertical
4882.123	35.69	54.00	-18.31	CISPR Avg	341	341	Horizontal
4882.417	41.98	54.00	-12.02	CISPR Avg	275	111	Vertical
5457.335	42.44	54.00	-11.56	RMS	2	132	Vertical
7658.546	44.04	54.00	-9.96	RMS	249	210	Vertical
7662.460	44.06	54.00	-9.94	RMS	221	242	Horizontal
7665.498	56.02	74.00	-17.98	Peak	8	262	Vertical
7679.343	55.90	74.00	-18.10	Peak	237	395	Horizontal

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 12 dB of the limit.

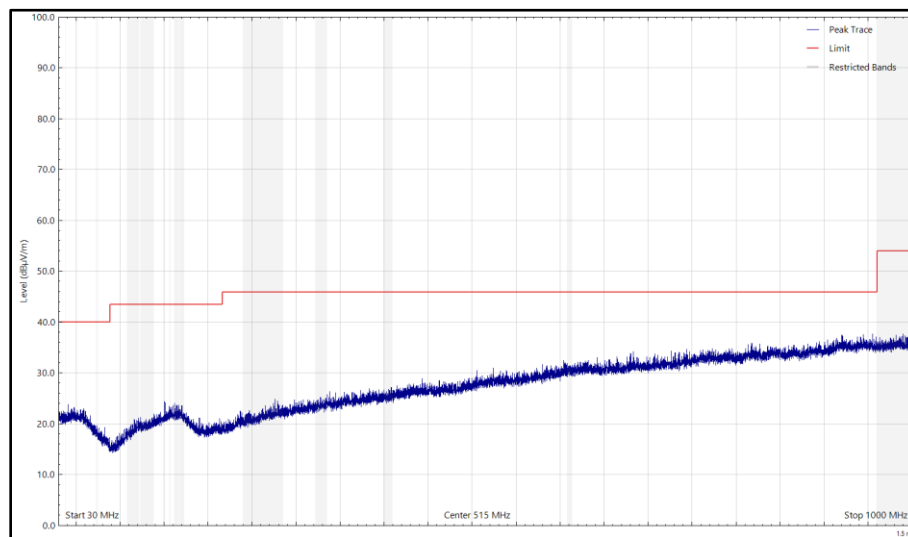


Figure 18 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

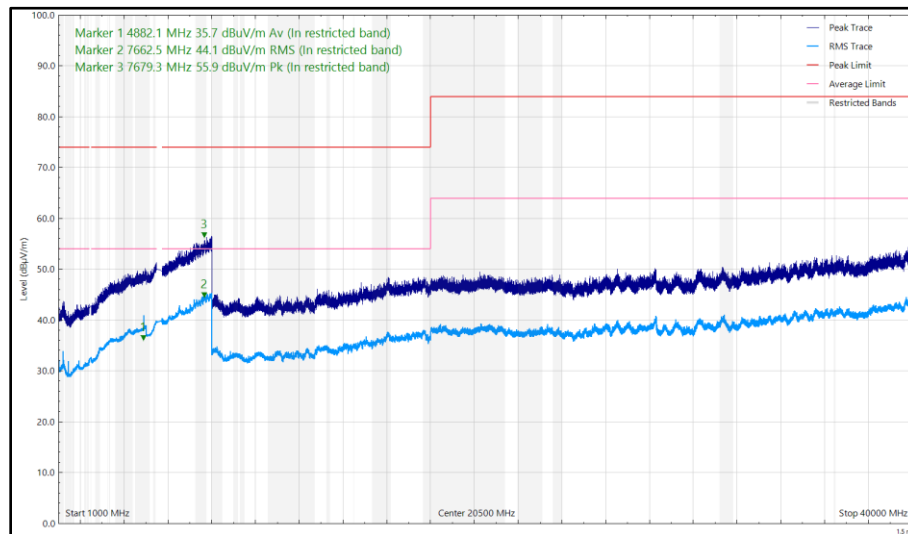


Figure 19 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

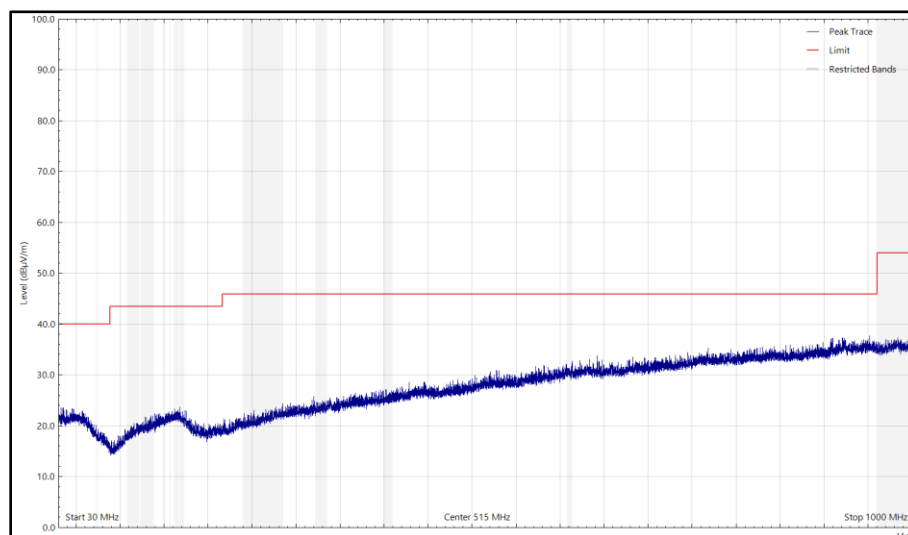


Figure 20 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

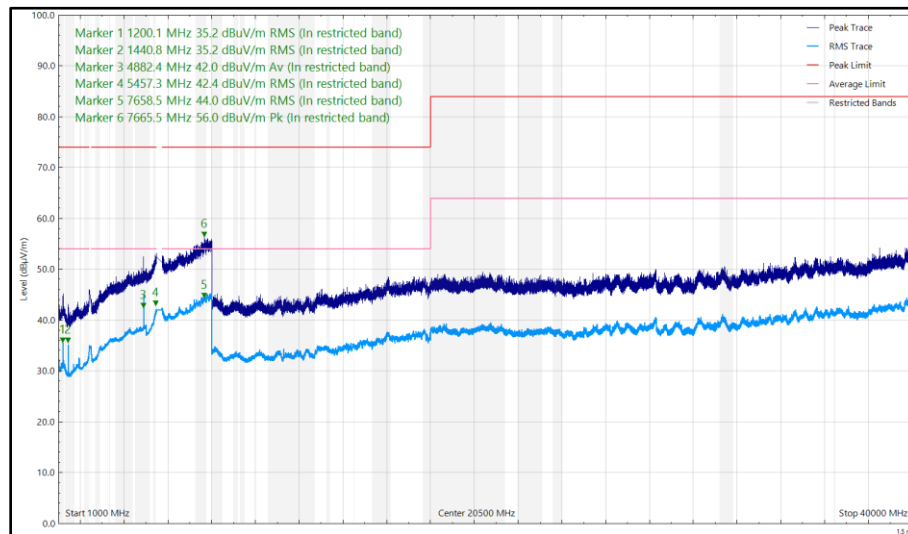


Figure 21 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
1207.193	34.45	54.00	-19.55	RMS	148	197	Vertical
1440.844	31.90	54.00	-22.10	RMS	341	360	Vertical
4881.728	53.98	74.00	-20.02	Peak	282	152	Vertical
4882.163	44.47	54.00	-9.53	CISPR Avg	277	161	Vertical
4882.228	38.84	54.00	-15.16	CISPR Avg	330	381	Horizontal
7617.815	55.54	74.00	-18.46	Peak	91	397	Horizontal
7620.841	43.62	54.00	-10.38	RMS	63	225	Vertical
7621.627	43.64	54.00	-10.36	RMS	306	191	Horizontal
7629.556	55.13	74.00	-18.87	Peak	252	234	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 12 dB of the limit.

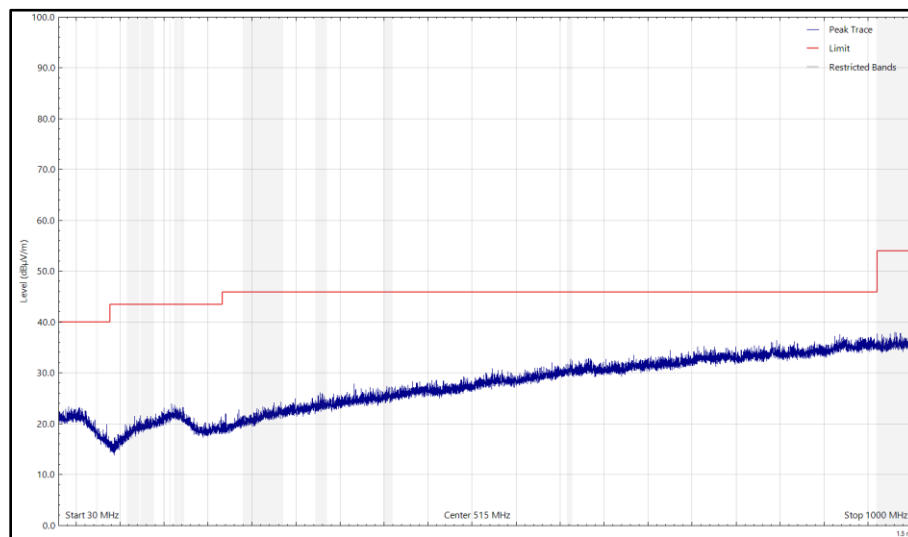


Figure 22 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

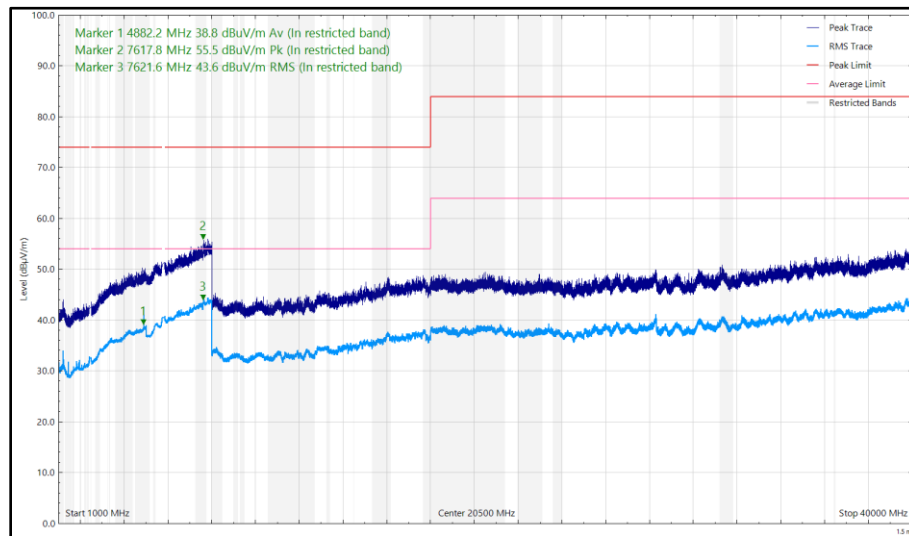


Figure 23 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

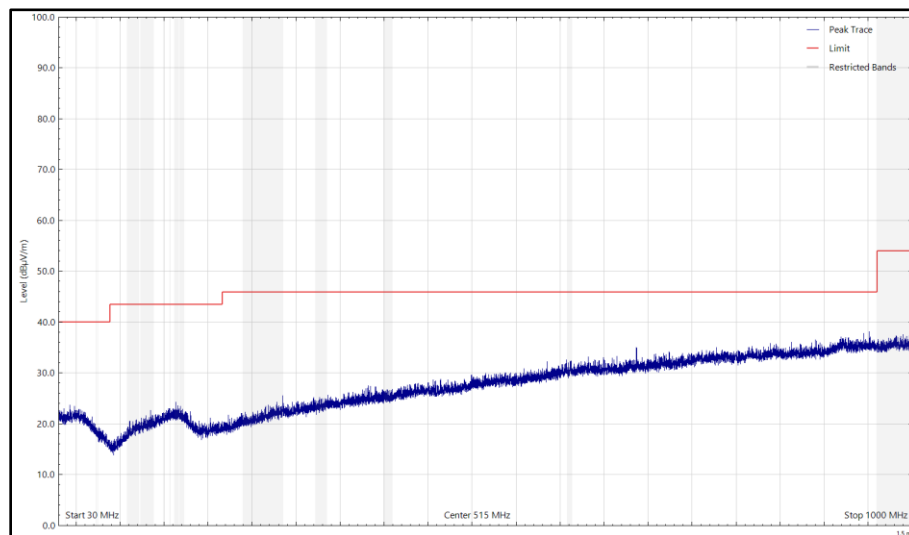


Figure 24 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

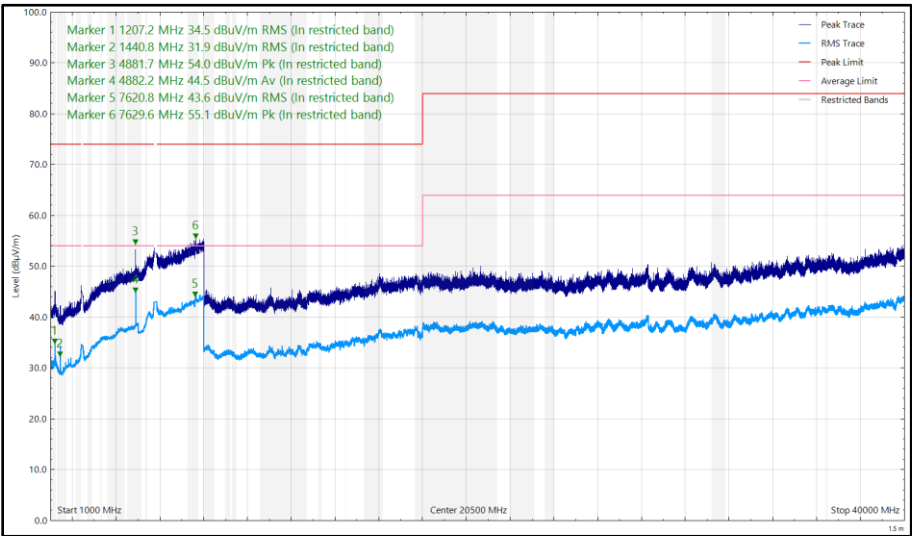


Figure 25 - U-NII-3 - 5785 MHz (CH157), HT20, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

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
2389.847	34.21	54.00	-19.79	RMS	275	149	Vertical
4881.873	34.81	54.00	-19.19	CISPR Avg	67	100	Vertical
7323.388	41.97	54.00	-12.03	CISPR Avg	324	135	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 12 dB of the limit.

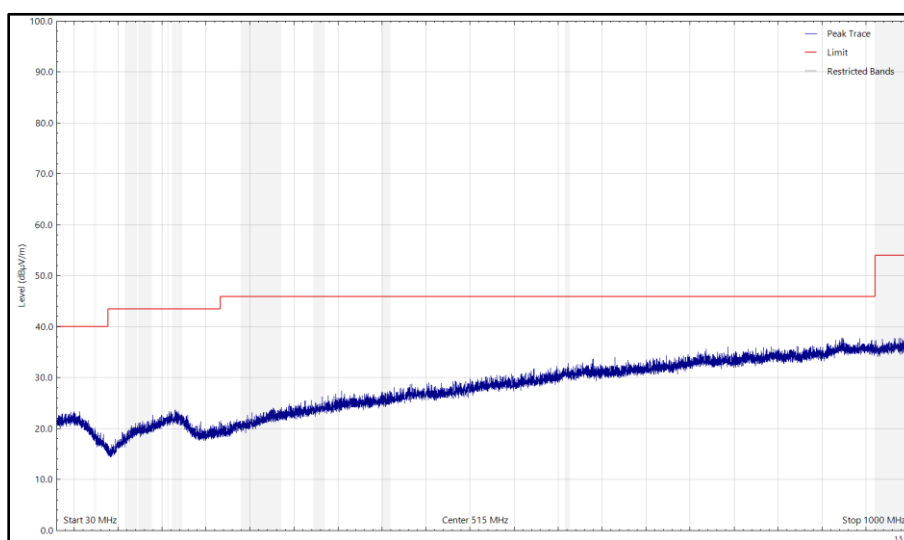


Figure 26 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

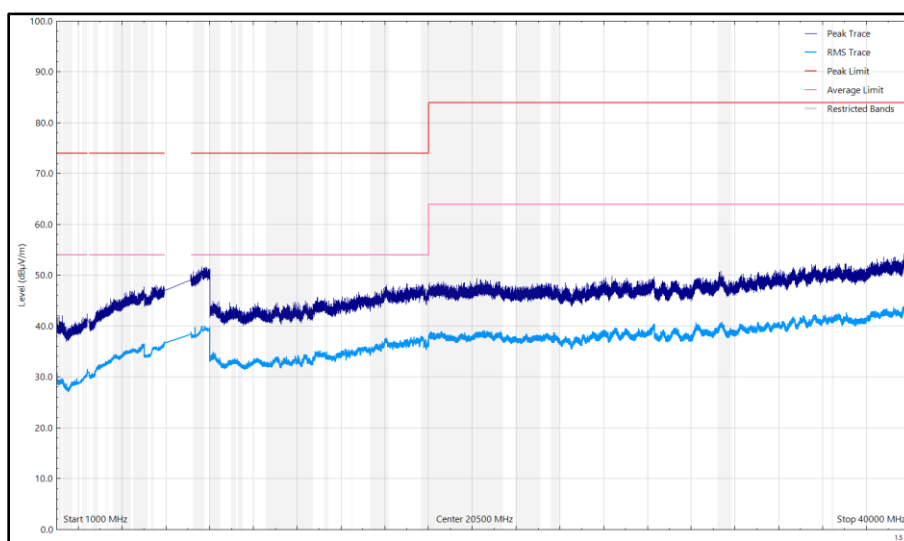


Figure 27 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

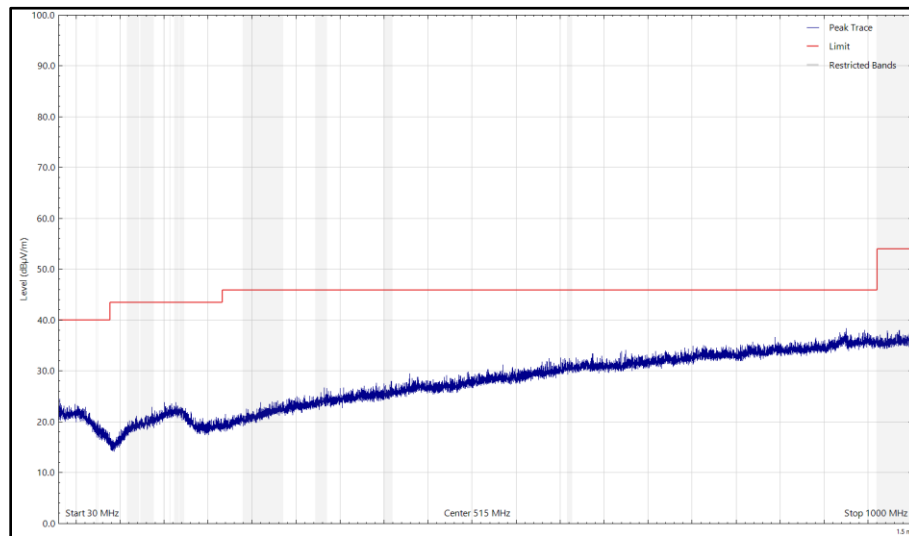


Figure 28 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

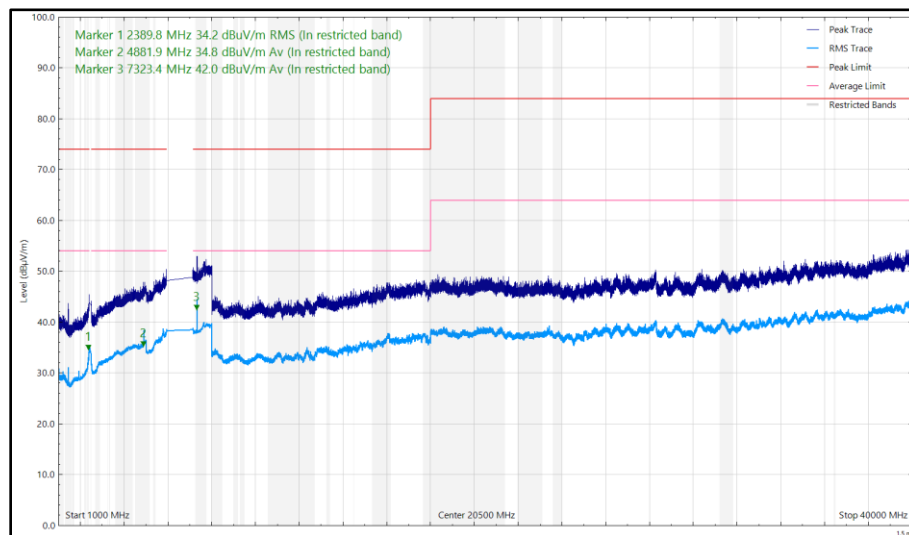


Figure 29 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
2389.987	33.30	54.00	-20.70	RMS	283	123	Vertical
7322.609	42.74	54.00	-11.26	CISPR Avg	294	159	Vertical
20981.135	41.31	63.50	-22.19	RMS	127	100	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 12 dB of the limit.

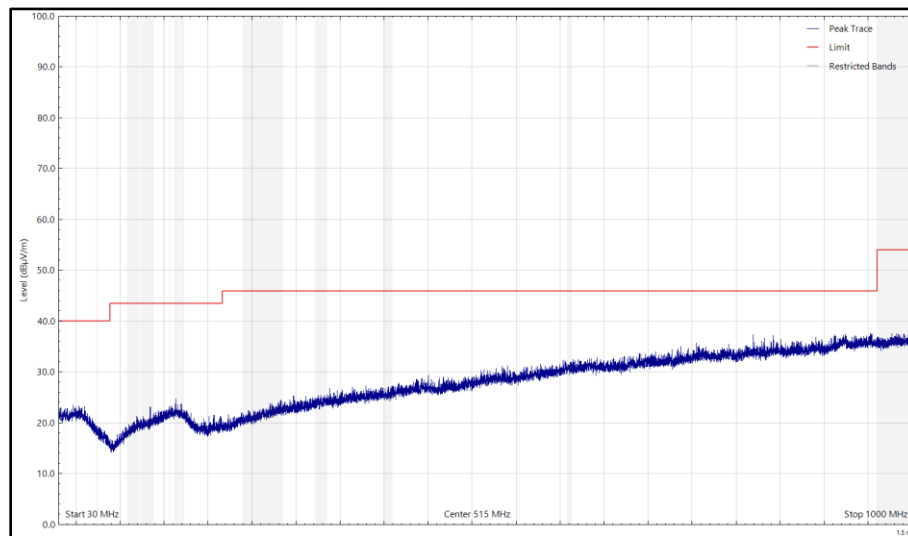


Figure 30 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

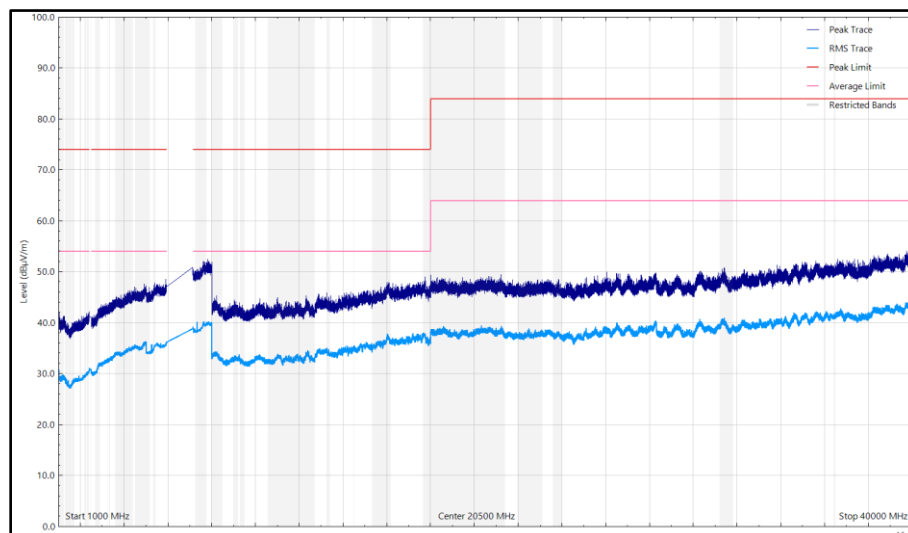


Figure 31 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Horizontal

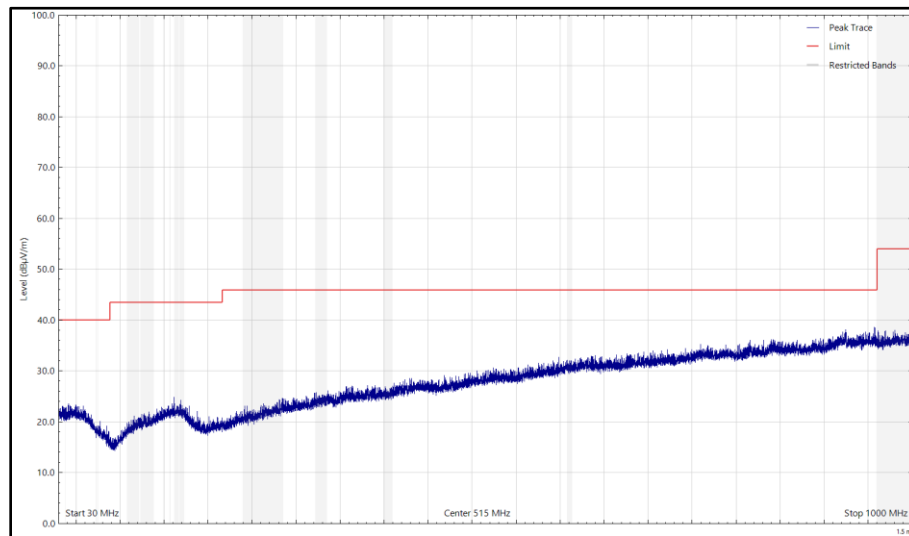


Figure 32 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

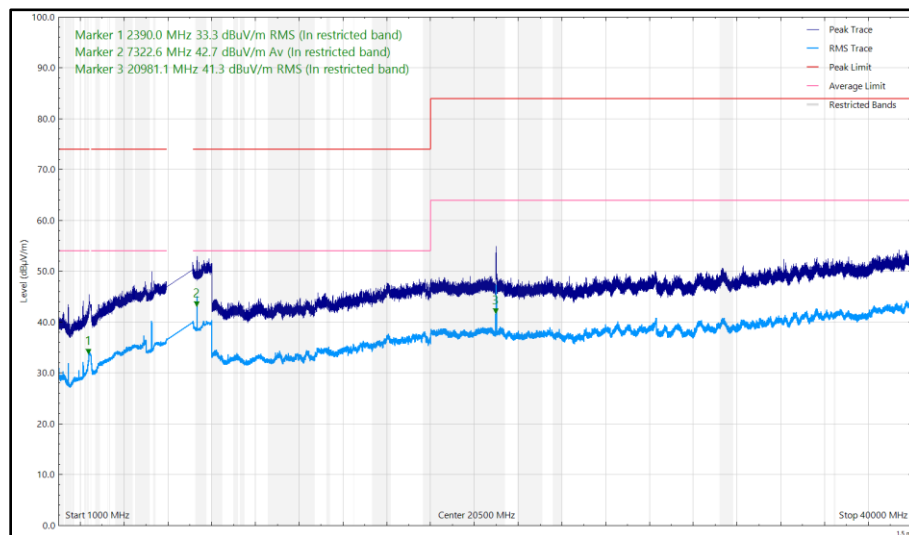


Figure 33 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), 2-DH5, ePA, Core 0 + Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
1440.326	31.07	54.00	-22.93	RMS	6	256	Vertical
4881.958	38.64	54.00	-15.36	CISPR Avg	267	104	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 12 dB of the limit.

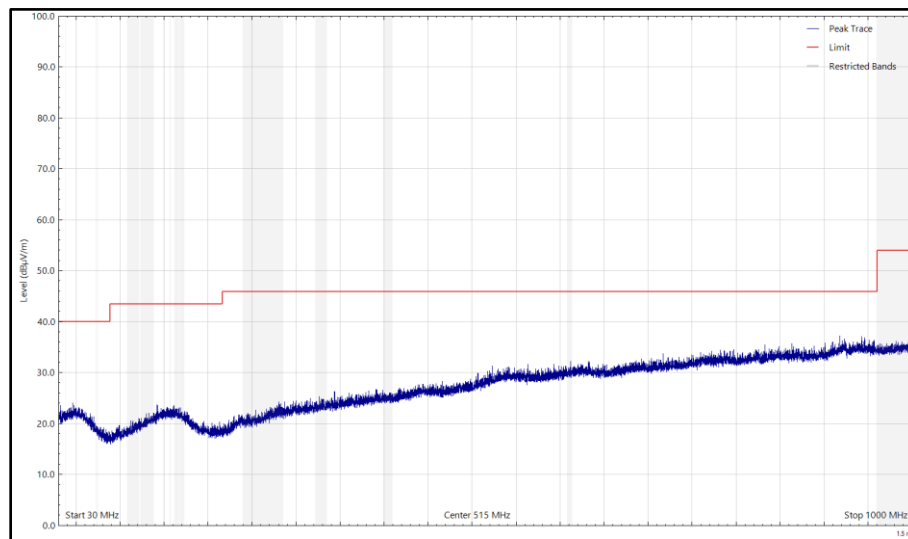


Figure 34 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Horizontal (Peak)

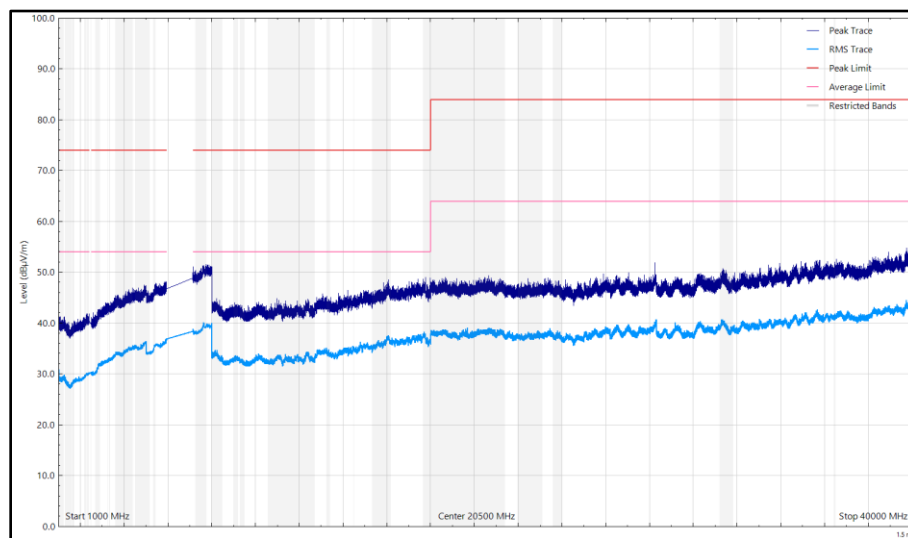


Figure 35 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Horizontal

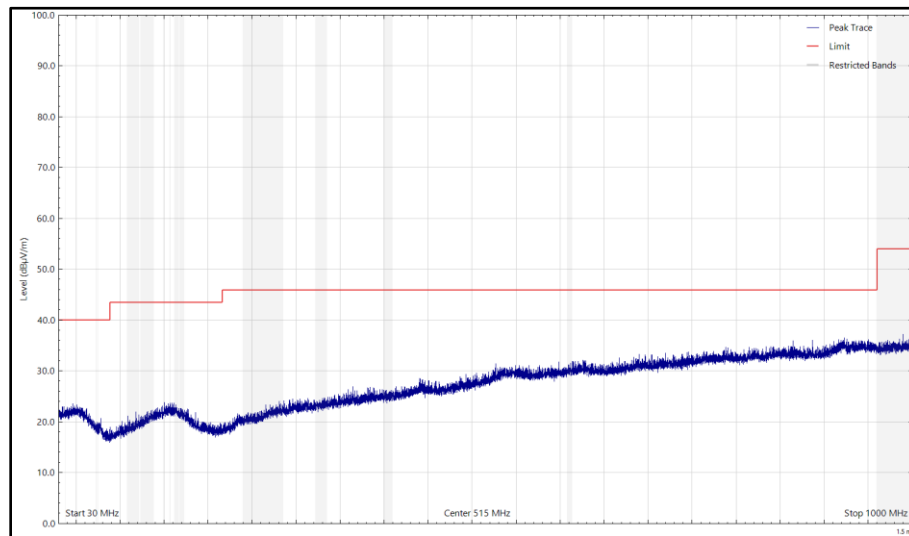


Figure 36 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Vertical (Peak)

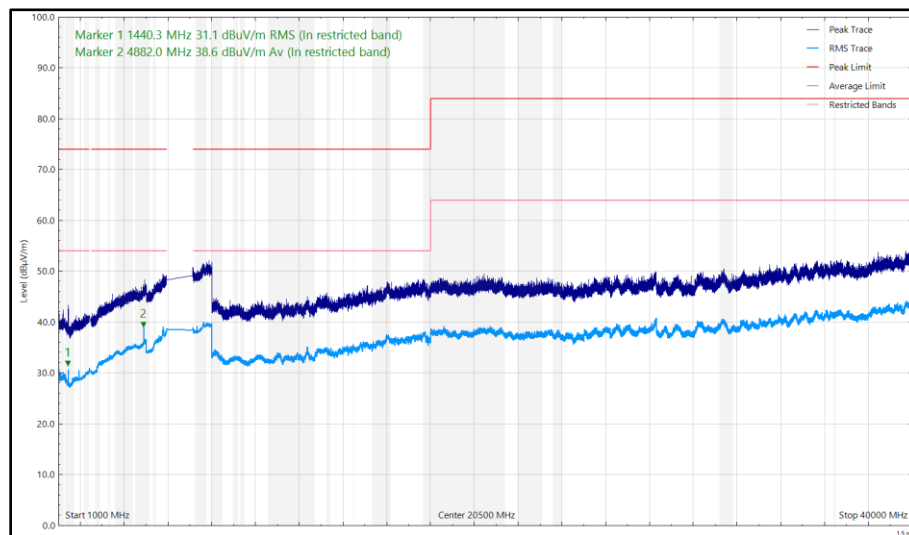


Figure 37 - U-NII-5 - 6175 MHz (CH45), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
1440.204	31.32	54.00	-22.68	RMS	6	190	Vertical
4881.743	36.67	54.00	-17.33	CISPR Avg	271	391	Vertical
20986.105	42.99	63.50	-20.51	RMS	122	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 12 dB of the limit.

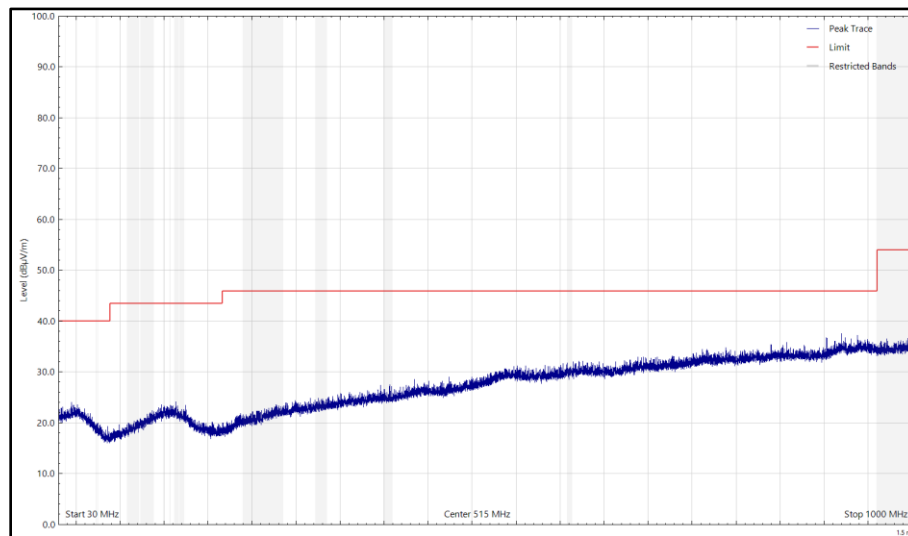


Figure 38 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Horizontal (Peak)

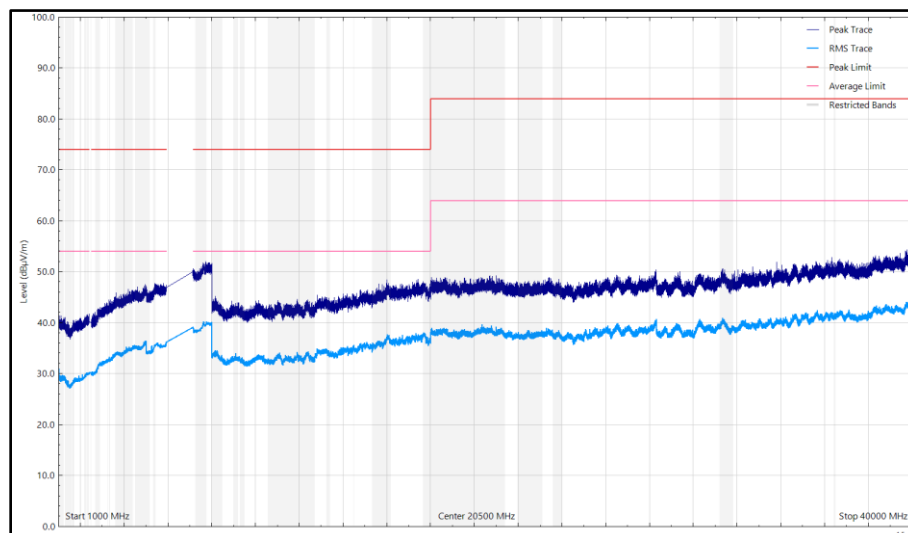


Figure 39 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Horizontal

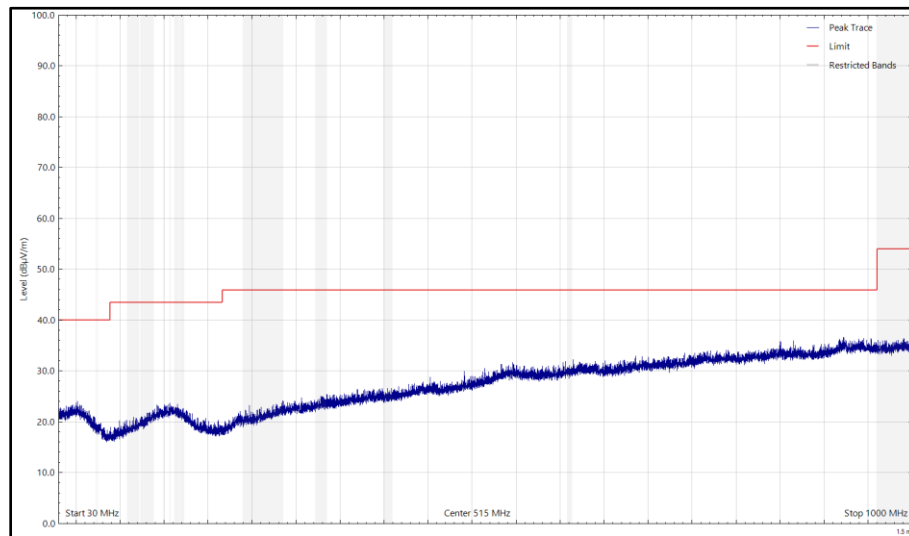


Figure 40 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 30 MHz to 1 GHz, Vertical (Peak)

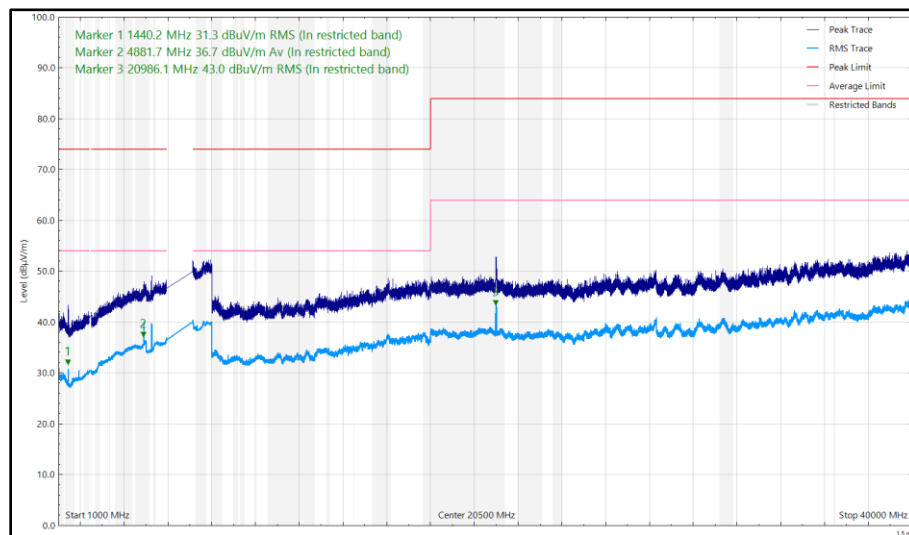


Figure 41 - U-NII-8 - 6995 MHz (CH209), HE20, SU, CDD, Core 0 + Core 1 and 2441 MHz (CH39), DH5, iPA, Core 2, 1 GHz to 40 GHz, Vertical



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 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 (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
2389.926	38.10	54.00	-15.90	RMS	7	159	Vertical
2389.975	38.13	54.00	-15.87	RMS	6	124	Vertical
2399.112	59.24	74.00	-14.76	Peak	5	287	Vertical
2483.585	35.62	54.00	-18.38	RMS	296	399	Horizontal
2483.814	58.84	74.00	-15.16	Peak	3	100	Vertical

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

No other emissions found within 10 dB of the limit.

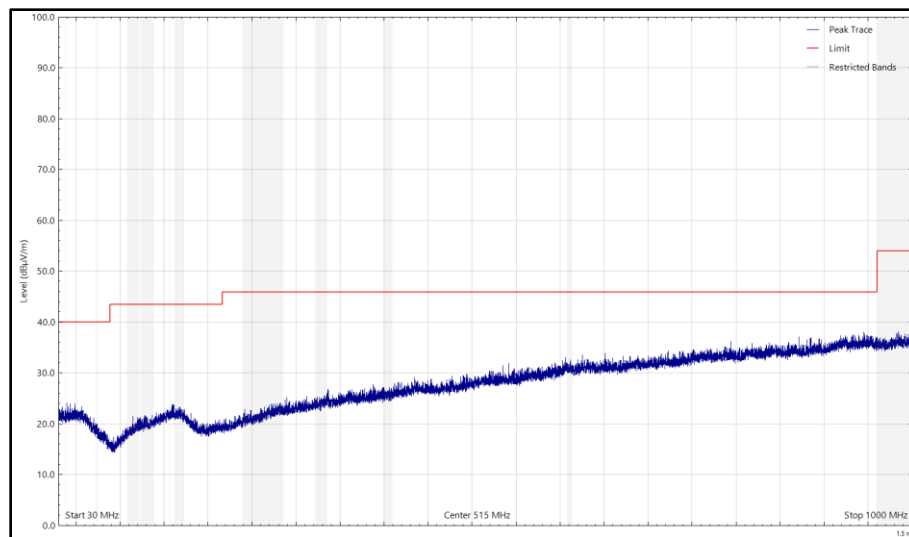


Figure 42 - 2442 MHz (CH7), HT20, Core 0 and 5204 MHz, DH5, ePA, Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

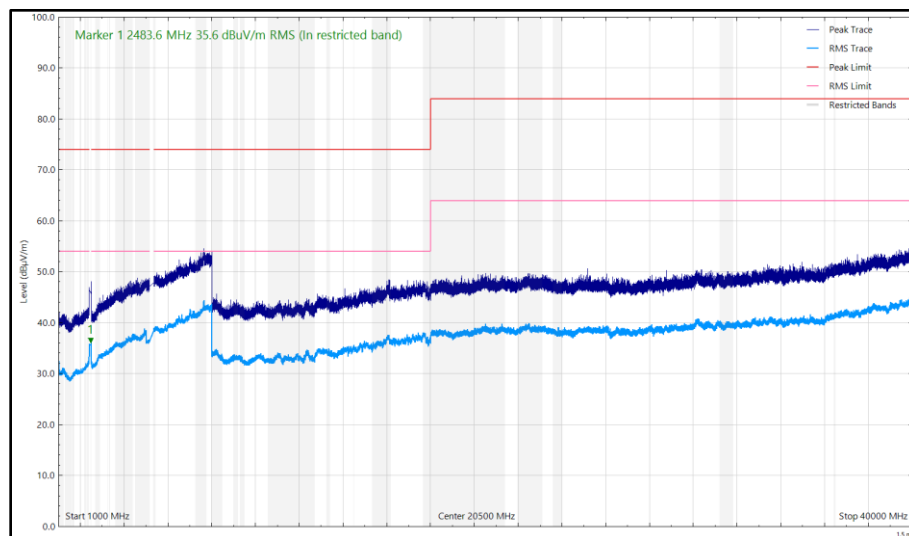


Figure 43 - 2442 MHz (CH7), HT20, Core 0 and 5204 MHz, DH5, ePA, Core 1, 1 GHz to 40 GHz, Horizontal

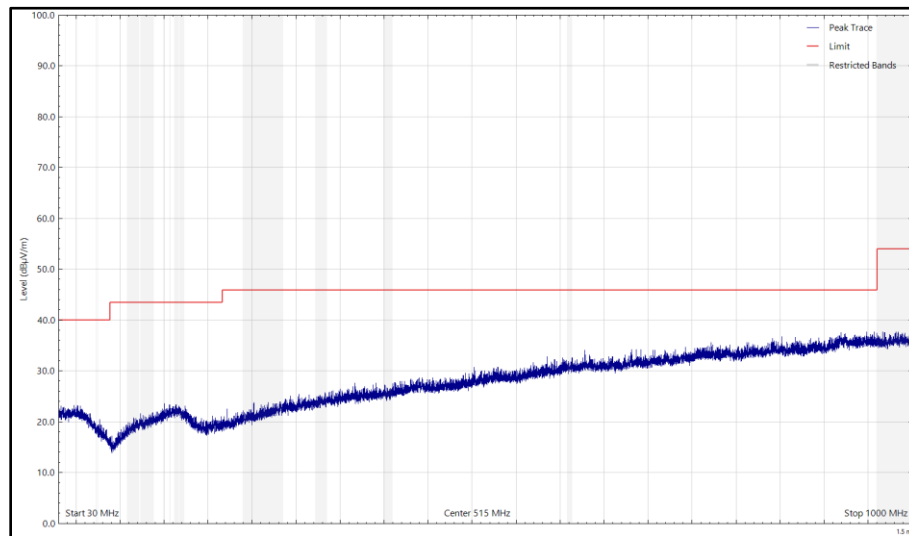


Figure 44 - 2442 MHz (CH7), HT20, Core 0 and 5204 MHz, DH5, ePA, Core 1, 30 MHz to 1 GHz, Vertical (Peak)

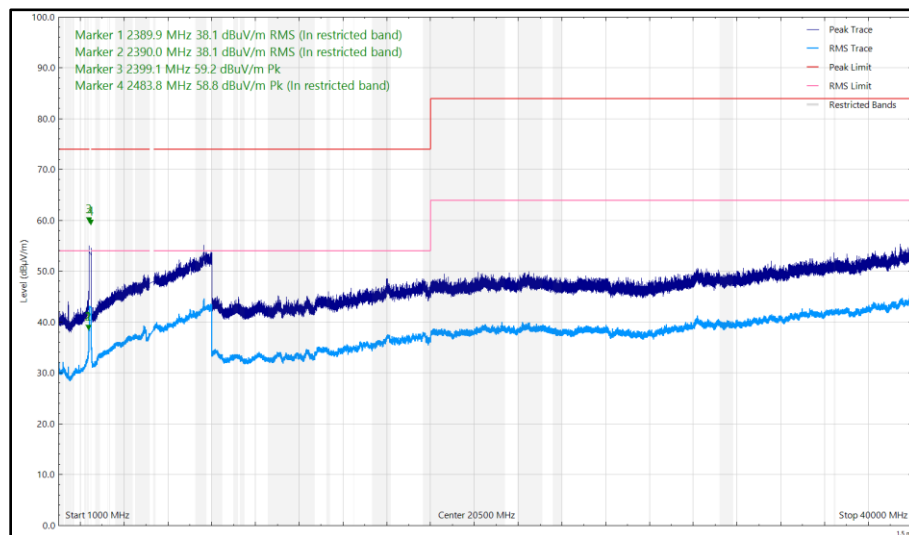


Figure 45 - 2442 MHz (CH7), HT20, Core 0 and 5204 MHz, DH5, ePA, Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
2389.924	37.98	54.00	-16.02	RMS	359	280	Vertical
2399.296	58.00	74.00	-16.00	Peak	3	126	Vertical
2483.524	35.28	54.00	-18.72	RMS	180	268	Horizontal
2483.586	41.71	54.00	-12.29	RMS	2	110	Vertical

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

No other emissions found within 10 dB of the limit.

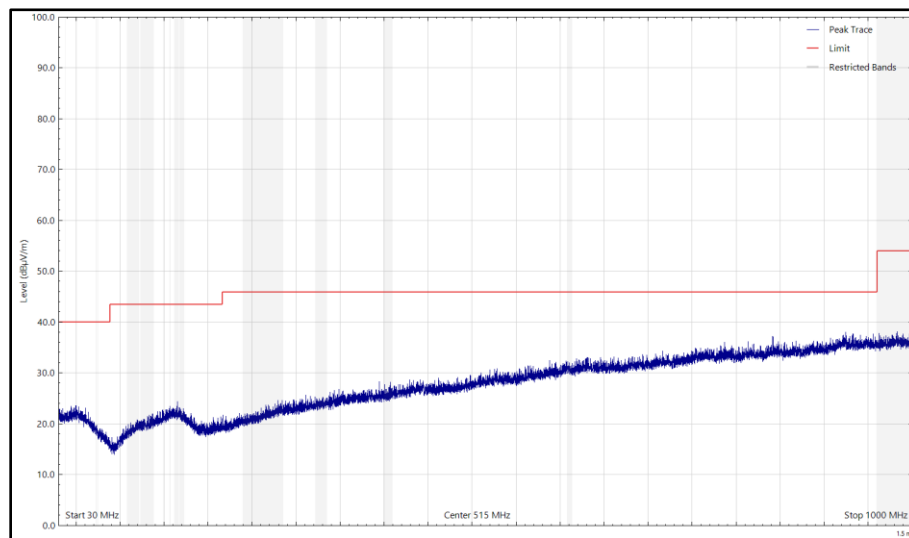


Figure 46 - 2442 MHz (CH7), HT20, Core 0 and 5788 MHz, DH5, ePA, Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

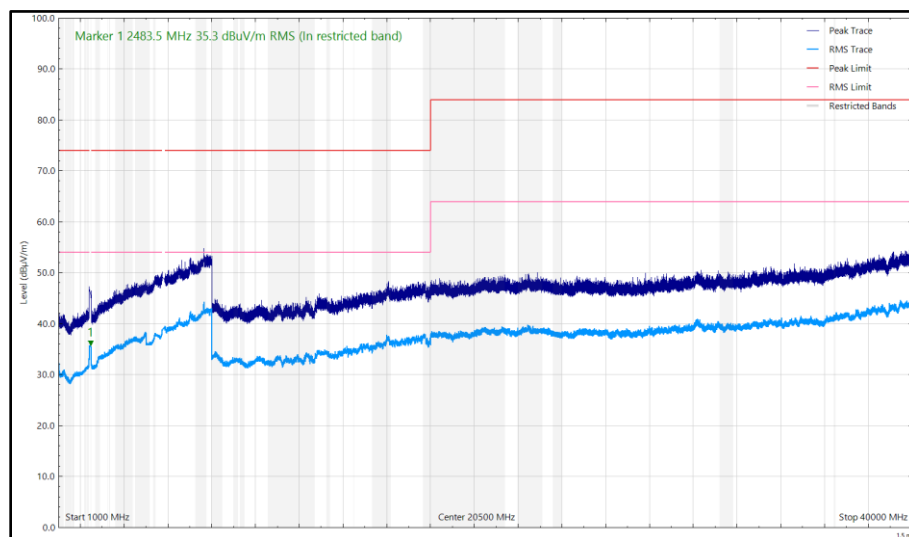


Figure 47 - 2442 MHz (CH7), HT20, Core 0 and 5788 MHz, DH5, ePA, Core 1, 1 GHz to 40 GHz, Horizontal

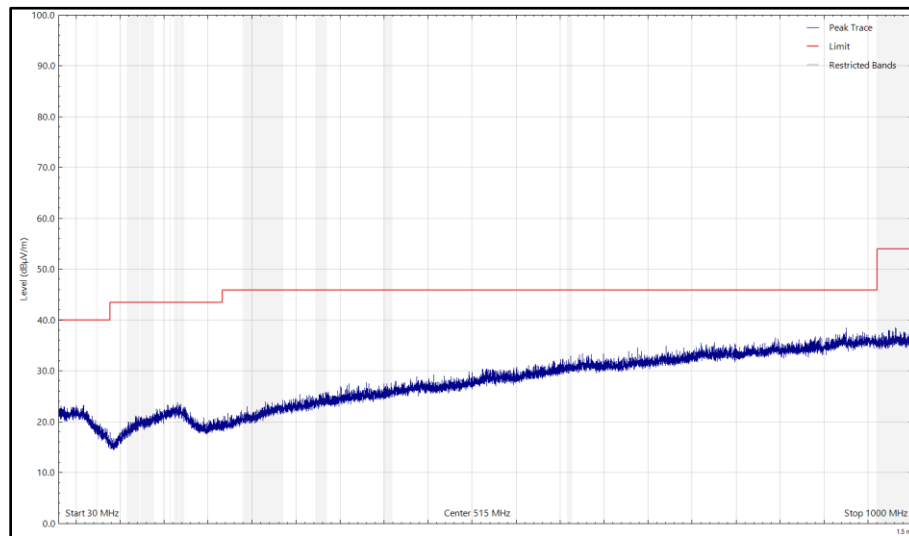


Figure 48 - 2442 MHz (CH7), HT20, Core 0 and 5788 MHz, DH5, ePA, Core 1, 30 MHz to 1 GHz, Vertical (Peak)

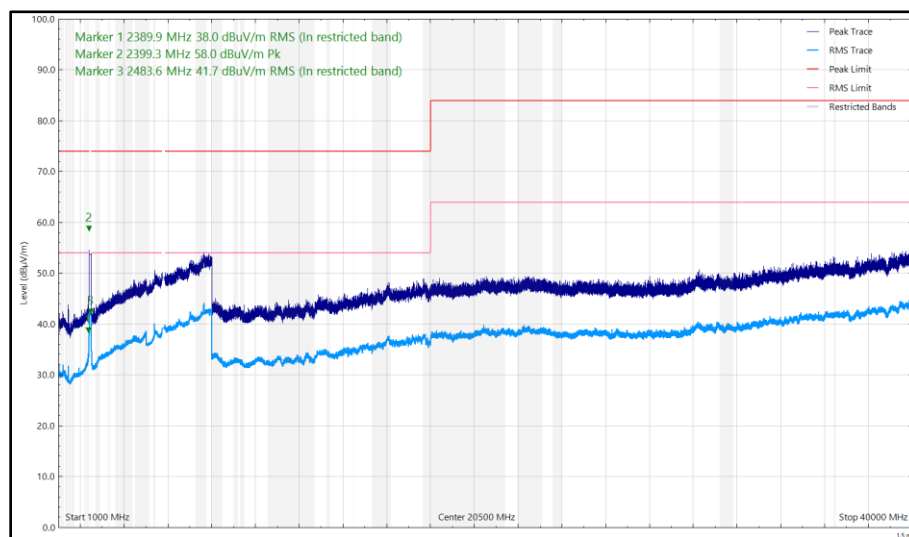


Figure 49 - 2442 MHz (CH7), HT20, Core 0 and 5788 MHz, DH5, ePA, Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
2389.841	39.31	54.00	-14.69	RMS	280	148	Vertical
2399.397	58.38	74.00	-15.62	Peak	283	146	Vertical
2483.509	36.37	54.00	-17.63	RMS	197	100	Horizontal
2483.659	41.50	54.00	-12.50	RMS	286	118	Vertical

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

No other emissions found within 10 dB of the limit.

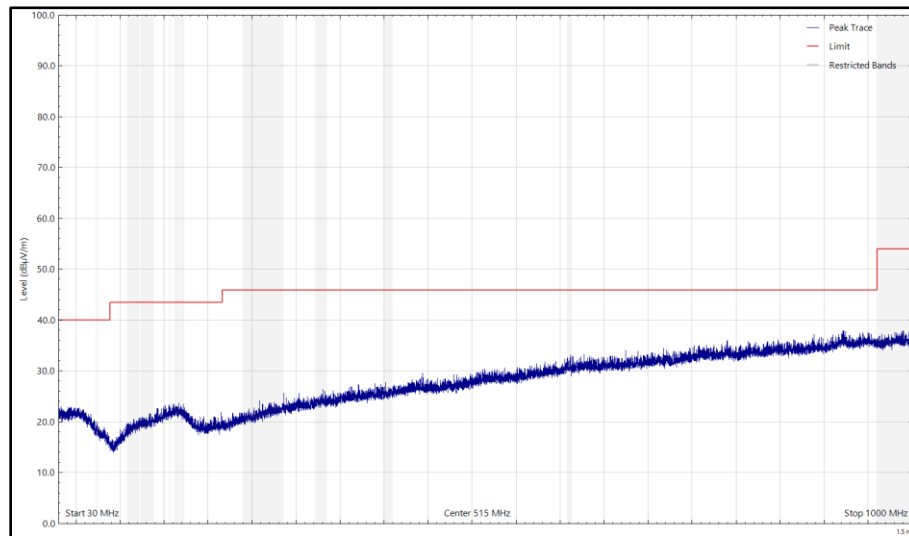


Figure 50 - 2442 MHz (CH7), HT20, Core 1 and 5204 MHz, DH5, ePA, Core 0, 30 MHz to 1 GHz, Horizontal (Peak)

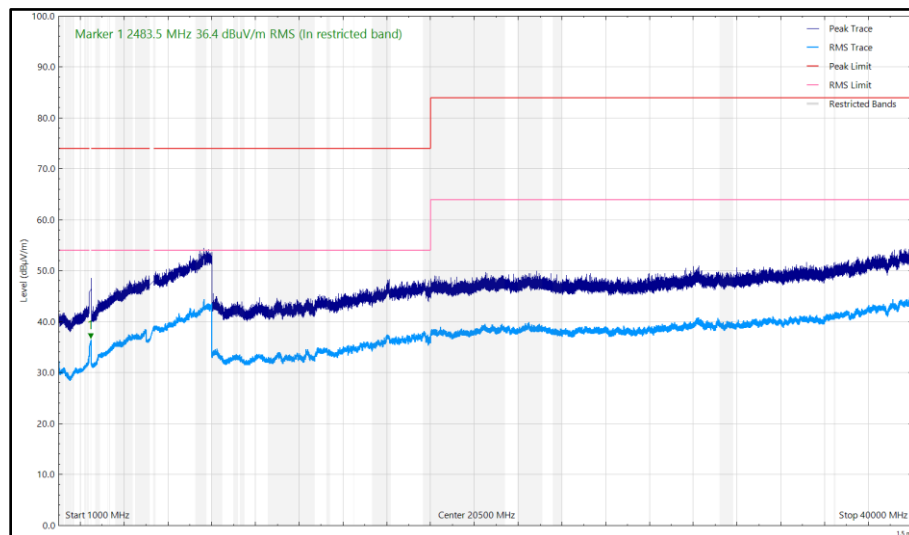


Figure 51 - 2442 MHz (CH7), HT20, Core 1 and 5204 MHz, DH5, ePA, Core 0, 1 GHz to 40 GHz, Horizontal

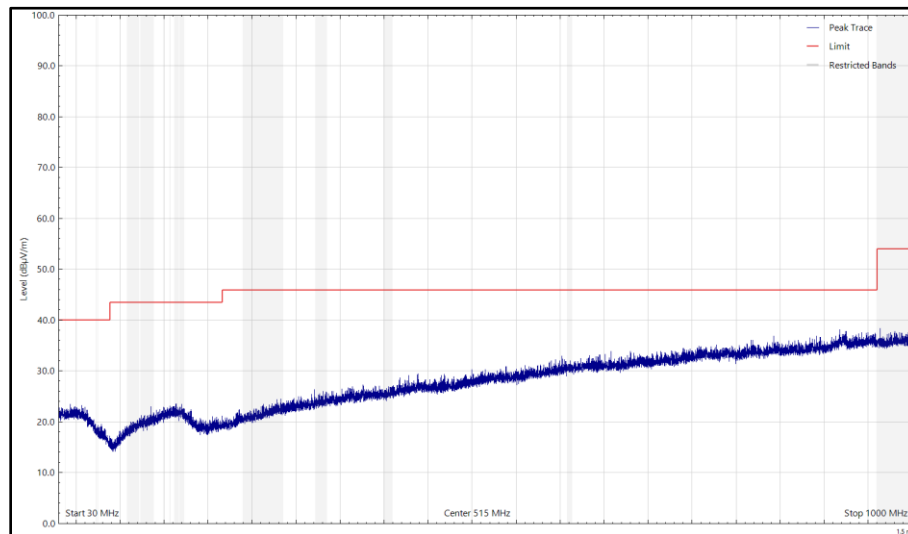


Figure 52 - 2442 MHz (CH7), HT20, Core 1 and 5204 MHz, DH5, ePA, Core 0, 30 MHz to 1 GHz, Vertical (Peak)

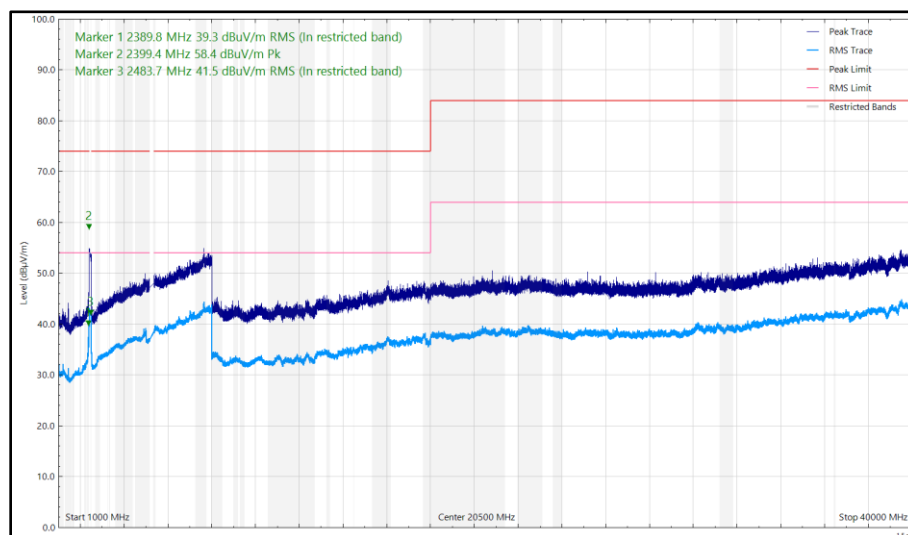


Figure 53 - 2442 MHz (CH7), HT20, Core 1 and 5204 MHz, DH5, ePA, Core 0, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
2389.999	37.79	54.00	-16.21	RMS	275	116	Vertical
2399.838	56.76	74.00	-17.24	Peak	284	100	Vertical
2483.504	40.42	54.00	-13.58	RMS	281	138	Vertical
2483.586	34.12	54.00	-19.88	RMS	299	350	Horizontal
5374.569	40.03	54.00	-13.97	RMS	9	100	Vertical

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

No other emissions found within 10 dB of the limit.

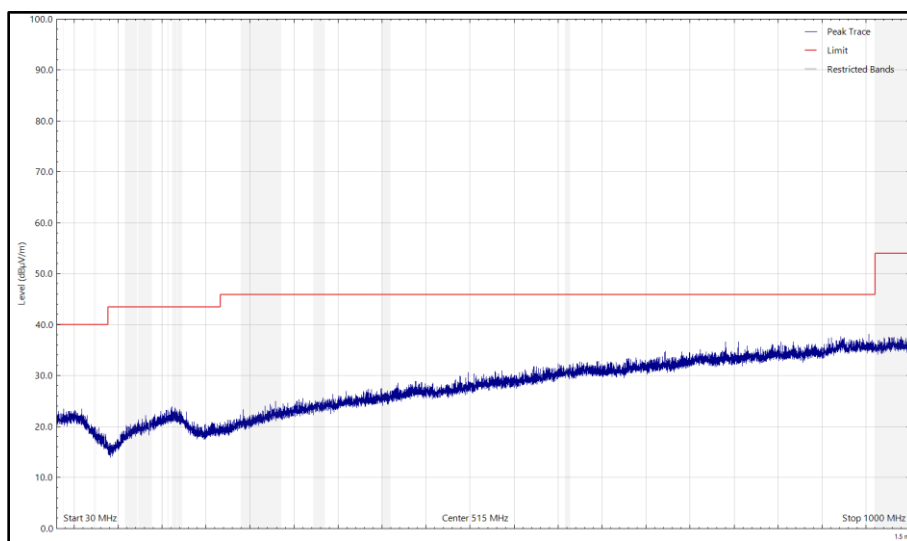


Figure 54 - 2442 MHz (CH7), HT20, Core 1 and 5788 MHz, DH5, ePA, Core 0, 30 MHz to 1 GHz, Horizontal (Peak)

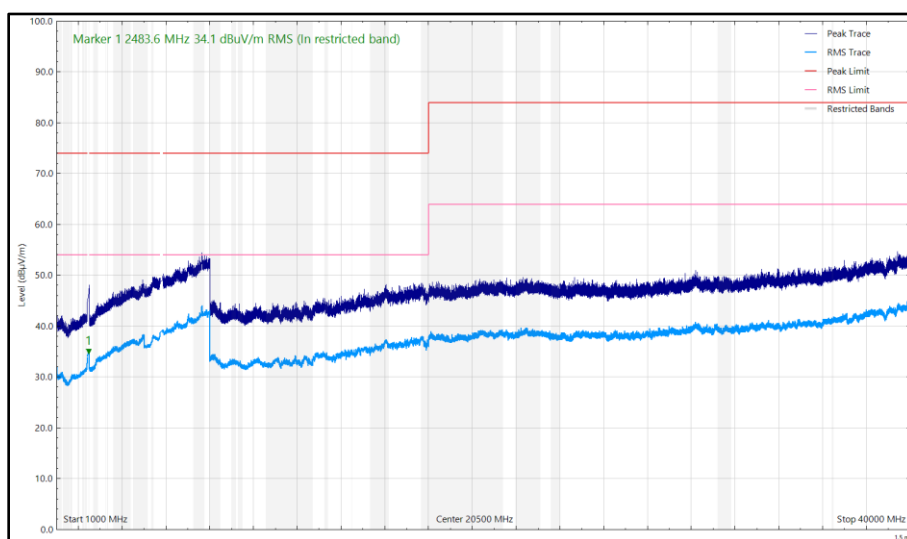


Figure 55 - 2442 MHz (CH7), HT20, Core 1 and 5788 MHz, DH5, ePA, Core 0, 1 GHz to 40 GHz, Horizontal

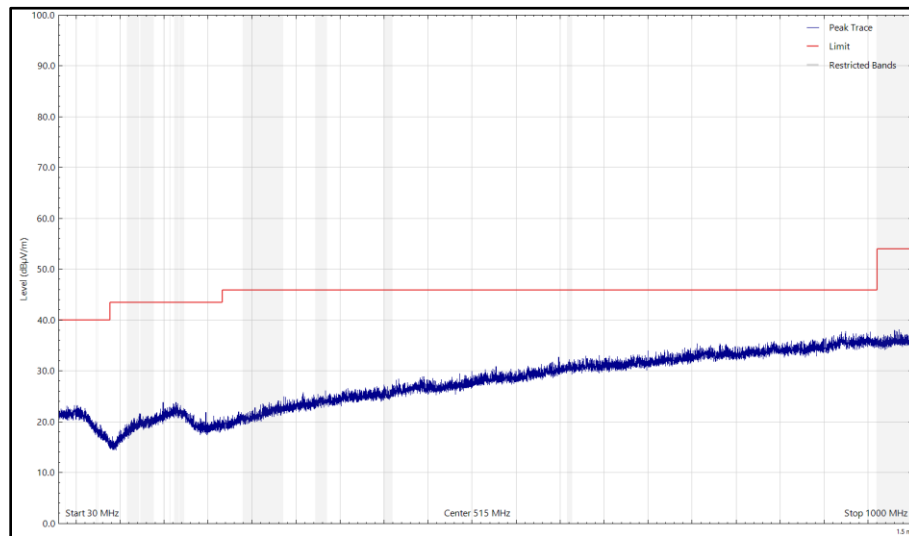


Figure 56 - 2442 MHz (CH7), HT20, Core 1 and 5788 MHz, DH5, ePA, Core 0, 30 MHz to 1 GHz, Vertical (Peak)

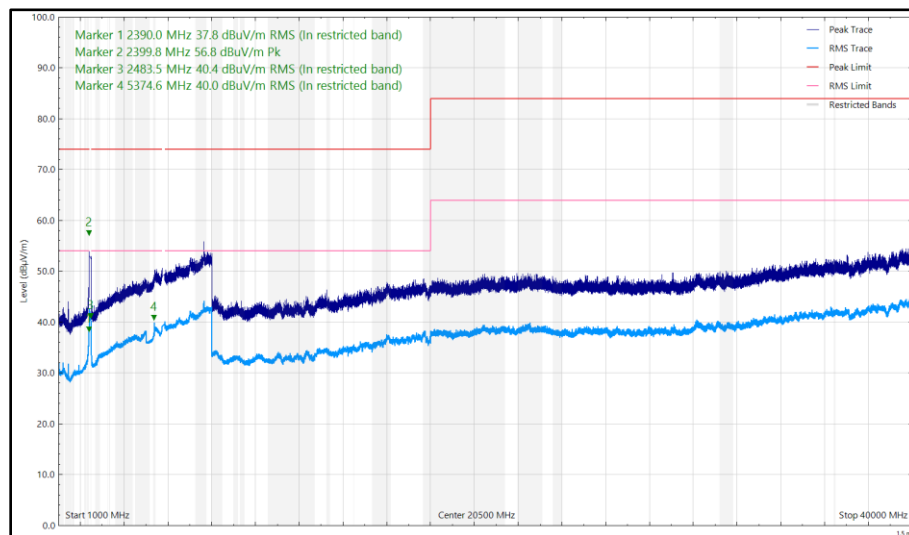


Figure 57 - 2442 MHz (CH7), HT20, Core 1 and 5788 MHz, DH5, ePA, Core 0, 1 GHz to 40 GHz, Vertical



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
1205.673	35.70	54.00	-18.30	RMS	148	262	Vertical
4879.163	44.38	54.00	-9.62	RMS	343	117	Vertical
4879.183	40.95	54.00	-13.05	RMS	205	100	Horizontal
5390.226	40.65	54.00	-13.35	RMS	331	128	Vertical
5456.172	39.42	54.00	-14.58	RMS	178	390	Horizontal

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.

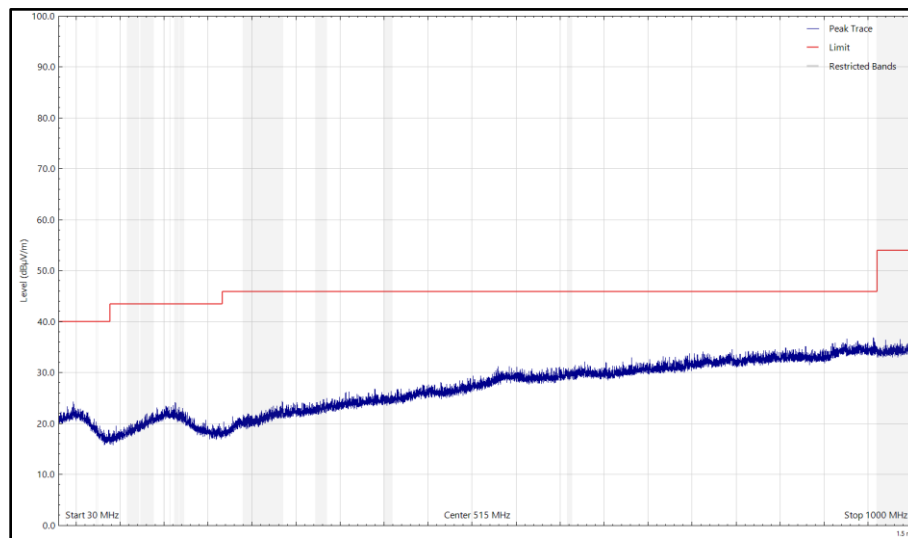


Figure 58 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 0, 30 MHz to 1 GHz, Horizontal (Peak)

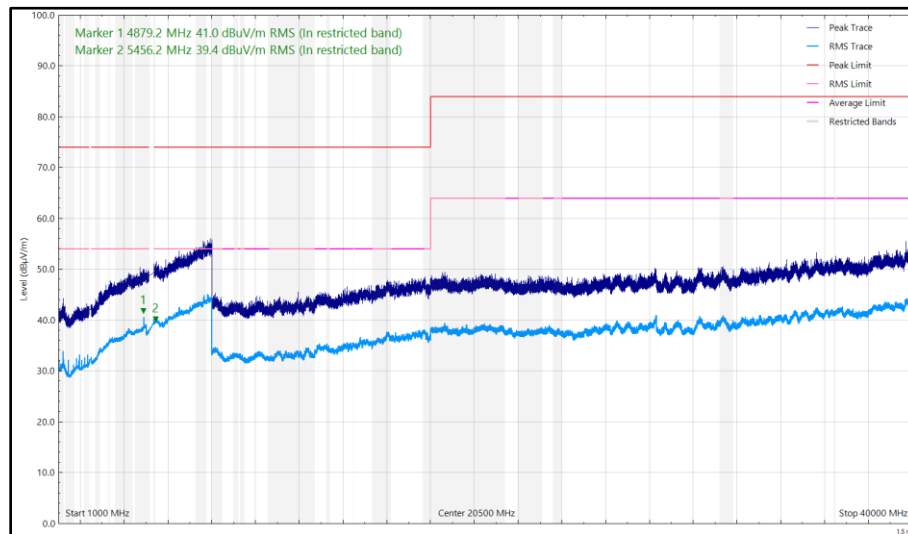


Figure 59 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 0, 1 GHz to 40 GHz, Horizontal

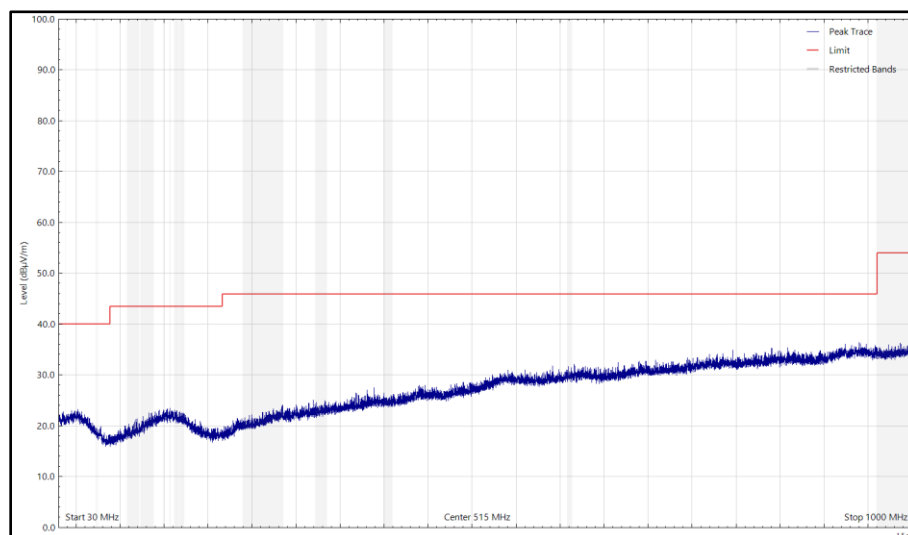


Figure 60 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 0, 30 MHz to 1 GHz, Vertical (Peak)

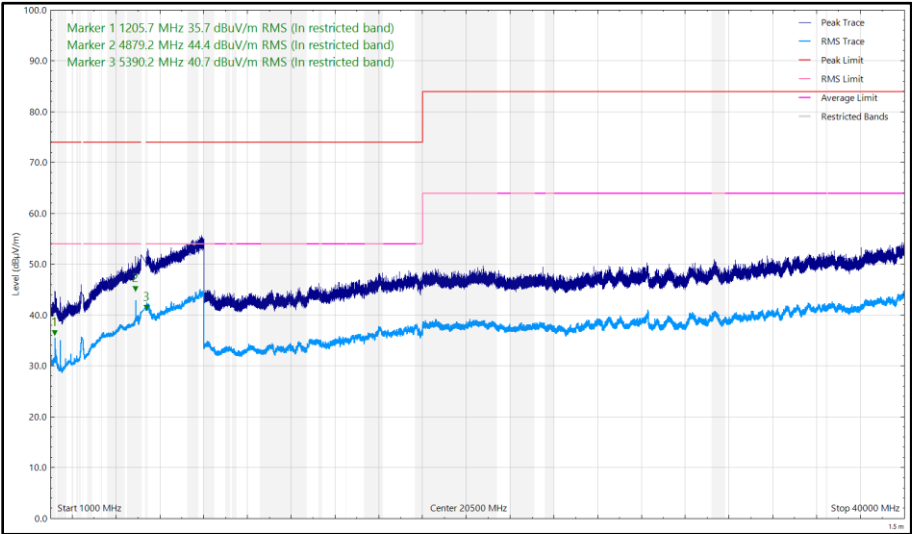


Figure 61 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 0, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
1204.704	34.52	54.00	-19.48	RMS	195	255	Vertical
2380.028	34.53	54.00	-19.47	RMS	276	255	Vertical
4879.028	40.27	54.00	-13.73	RMS	208	328	Horizontal
4879.128	45.42	54.00	-8.58	RMS	274	144	Vertical
5117.449	41.71	54.00	-12.29	RMS	90	102	Vertical
5445.675	39.58	54.00	-14.42	RMS	103	399	Horizontal

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.

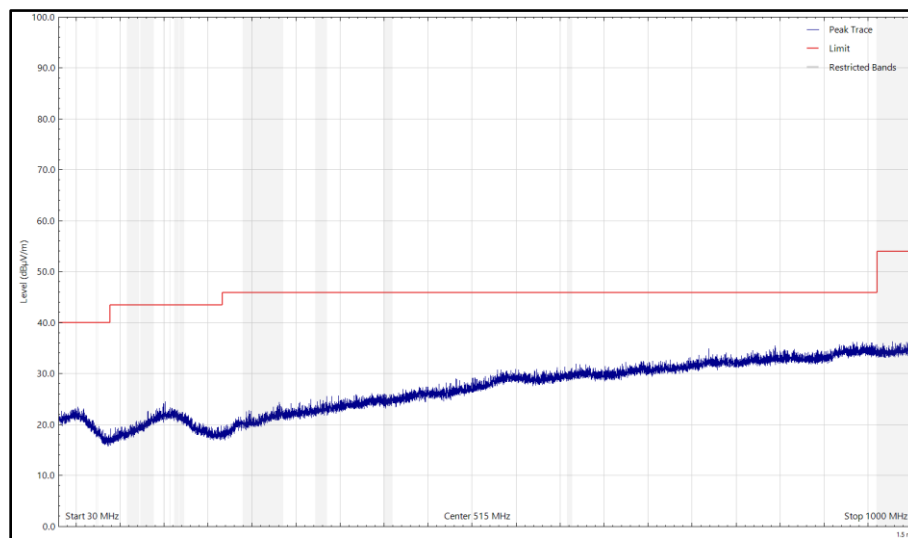


Figure 62 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

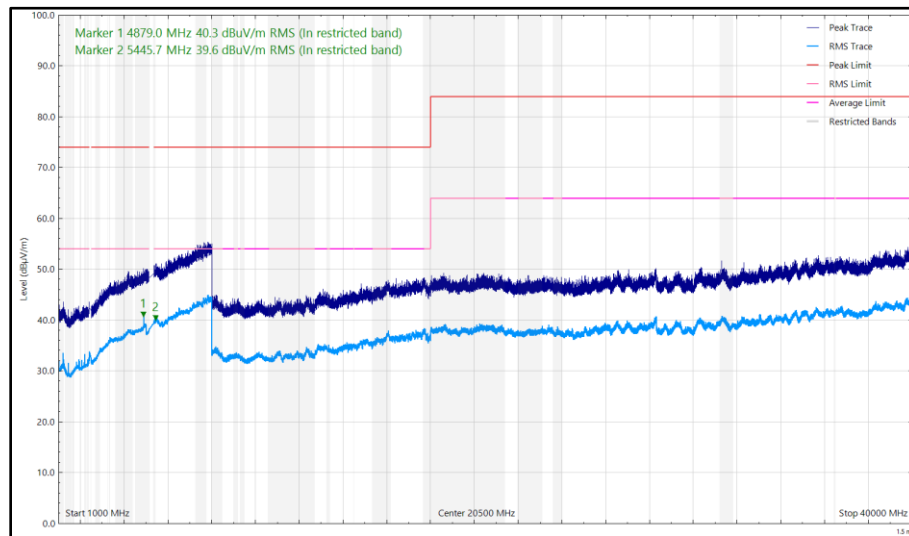


Figure 63 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 1, 1 GHz to 40 GHz, Horizontal

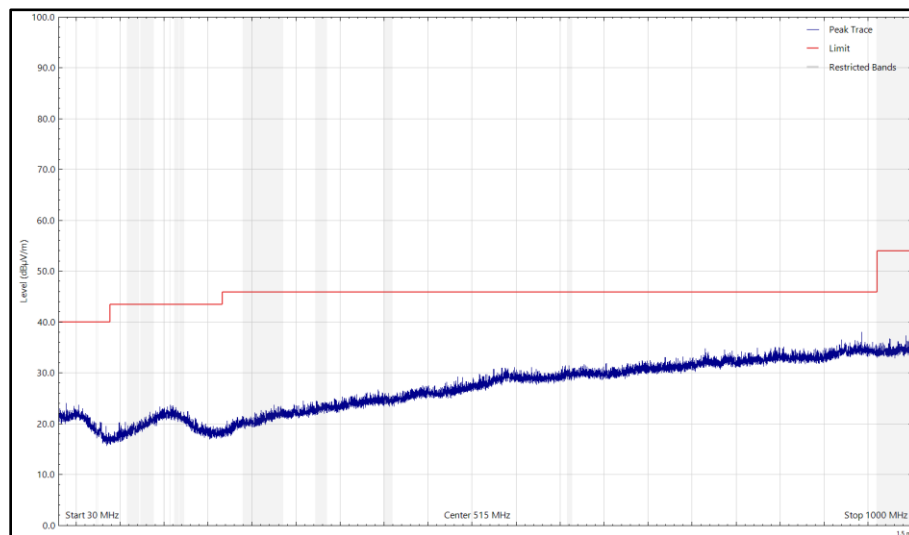


Figure 64 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 1, 30 MHz to 1 GHz, Vertical (Peak)

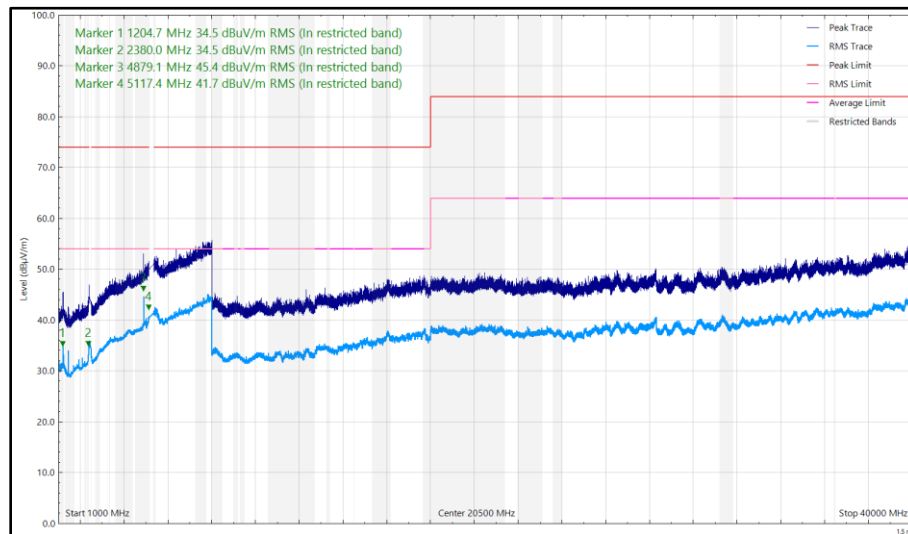


Figure 65 - U-NII-1 - 5240 MHz (CH48), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 1, 1 GHz to 40 GHz, Vertical

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
1200.420	34.55	54.00	-19.45	RMS	157	313	Vertical
1440.306	34.60	54.00	-19.40	RMS	240	329	Vertical
2483.588	35.53	54.00	-18.47	RMS	7	265	Vertical
4880.767	39.16	54.00	-14.84	RMS	206	370	Horizontal
4880.848	42.78	54.00	-11.22	RMS	323	157	Vertical
5447.824	39.14	54.00	-14.86	RMS	242	400	Horizontal
5459.541	42.88	54.00	-11.12	RMS	90	120	Vertical

Table 25 - 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.

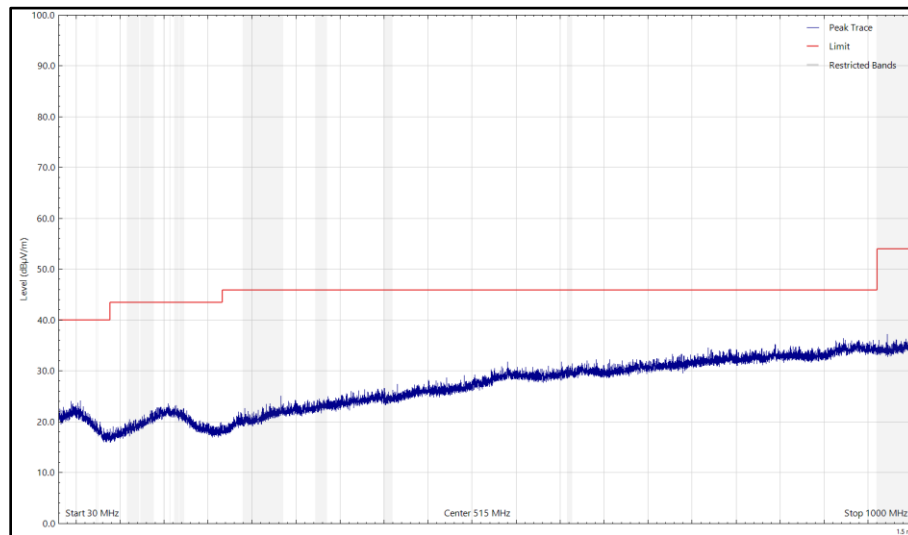


Figure 66 - U-NII-2C - 5640 MHz (CH128), HT20, CDD, Core 0 + Core 1 and 2440 MHz (CH18), ePA, Core 0, 30 MHz to 1 GHz, Horizontal (Peak)