EMC Test Report	
For:	**Zwift Inc**
Product:	**Play Controller**
Model:	**Z003**
FCC ID:	**2A4DF-Z003**

Project Engineer:	**Richard Pennell**
Approval Signatory:	**Dan Tiroke**

Document Reference:	**4315 FR**

Issue Number:	Date:	Test Report Revisions History:
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Contents

1.0 OVERVIEW

1.1 Introduction

The equipment under test (EUT) as described within this document was submitted for testing as agreed with the customer.

1.2 Objective

The purpose of the test was to measure and report the EUT against limits and methods of the requested standards as listed in section 2.0 Test Summary.

1.3 Product Modifications

None to sample submitted.

1.4 Conclusion

The EUT met the emission requirements of the tests defined in section 2.0 Test Summary.

This report relates to the sample tested and may not represent the entire population. It is valid only for the product identified, either in part or in full, to the standards and/or tests covered in this document.

1.5 EMC Test Lab Reference

Eurofins E&E Hursley File: 4315

1.6 Test Deviations

None.

2.0 TEST SUMMARY

2.1 Summary

The EUT, as described and reported within this document, complies with the applied requested sections of the standards listed below.

The EUT met the **emissions** test requirements of the following standards:			
Description	**General Standard**	**Referenced Standard**	**Status**
Radiated Emissions	FCC/CFR 47:Part 15B 15.109 and 15.107 FCC/CFR 47:Part 15C 15.247 and 15.209	ANSI C63.4:2014, Class B ANSI C63.10:2013, Class B	Pass
Conducted Emissions			

Note(s):

- The highest internal operating frequency declared by the manufacturer is 2480MHz.

3.0 EQUIPMENT AND TEST DETAILS

3.1 General

Product (EUT):	Play Controller		
Models:	Z003 (right)	**Serial Numbers:**	AC2DVT300129 (conducted) AC2DVT300074 (radiated)
	Z003 (left)		AD2DVT300033 (radiated)
Sample Build:	Production Sample		
EUT Power:	Battery Powered 110V/60Hz (Charger)		
Customer Test Plan:	Not Applicable		
Alternate Models:	Not Applicable		
EUT Manufacturer:	Zwift Inc		
Customer Name:	Zwift Inc		
Customer Address:	111 W. Ocean Blvd Suite 1800		
	Long Beach		
	CA90802		
	USA		
Test Commissioned By:	Charlie Blackham, Sulis Consultants Limited		
Date EUT Received:	22nd September 2022		
Test Date(s):	22nd September 2022		
EMC Measurement Site:	Eurofins E&E Hursley Limited		
	Trafalgar Close, Chandlers Ford, Hampshire, United Kingdom		
Product Category:	Radio Equipment and Services		

3.2 EUT Description

The EUT is a Bluetooth enabled play controller.

3.3 Support Equipment

Description	Manufacturer	Model	Serial Number
Tablet	Samsung	Not Applicable	Not Applicable
Mains – DC PSU	Samsung	ETA0U83UWE	SC2HC07BS/A

3.4 EUT Test Exerciser

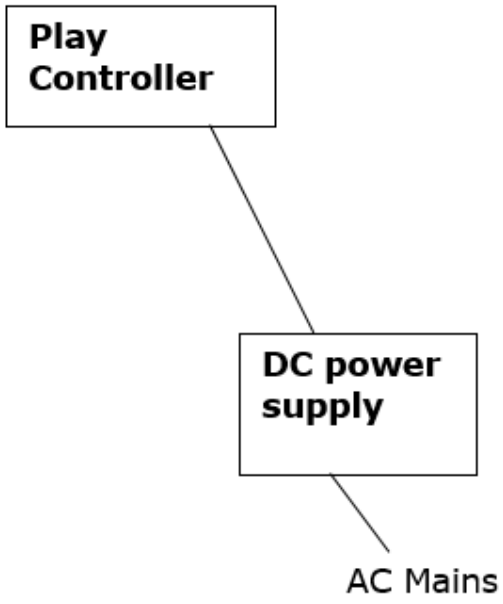
The EUT was powered on and put into testing mode. It was tested in three separate modes:

1. Top Channel; 2480MHz
2. Middle Channel; 2440MHz
3. Bottom Channel; 2402MHz

The EUT was tested in three axes and the worst-case results are shown below.

The Middle Channel was also tested in three different axes to find the worst case axis. Pre-scans were taken of all channels on the worst axis to find the worst case; final testing were performed on the worst case.

3.5 EUT Test Configuration #1



4.0 TEST RESULTS

4.1 Radiated Emissions; Left Controller

4.1.1 Test Parameters

A profile scan was taken using an EMI receiver at a distance of three metres on eight azimuths of the EUT in both the vertical and horizontal polarisation of the field in a semi-anechoic chamber.

Using the pre-scan results as a guide, each emission from the EUT was maximised. Measurements were carried out at a distance of three metres using the specified detector in a CISPR 16-1-4 semi-anechoic chamber. Cable positions were then finally adjusted to produce the maximum emission levels. The worst-case results are reported below.

Test Equipment						
#ID	CP	Manufacturer	Type	Serial Number	Description	Calibration Due Date
750	1	Global	CISPR16	1	11 x 7 x 6.2m, chamber	14/12/2022
672	1	HP	8491B	4596	3dB pad	Internal
788	1	Rohde & Schwarz	ESW 44	101799	EMI test receiver (44GHz)	09/08/2023
877	1	Huber & Suhner	SUCOTEST_18A	602608/18A	ST_18A/Nm/Nm/3m	19/04/2023
073	3	Schwarzbeck	BBHA9120B	237	Horn Antenna (1-10GHz)	20/05/2024
399	3	Q-par Angus	WBH18-40k	10300	Horn Antenna (18-40GHz)	18/12/2022
086a	3	GORE	0K0CQ0CQ120.0	05609131	K' Cable (26.5-40GHz)	Internal
Test Equipment Software						
#ID	CP	Manufacturer	Type		Description	Calibration Due Date
856	0	Rohde & Schwarz	Software	0	EMC32 v10.50.10	Not required

Environmental Test Conditions	
Temperature	23.3° Celsius
Relative Humidity	46%
Atmospheric Pressure	1021.4 millibars
Test Date:	22nd September 2022
Test Engineer:	Richard Pennell

Note: “Calibration due date” means the instrument is certified within UKAS or traceable calibration certificate. “Internal” means the instrument is calibrated using Eurofins Hursley procedures. “Not required” means the asset does not require calibration. “CP” is the interval period [year] prescribed for external calibration.

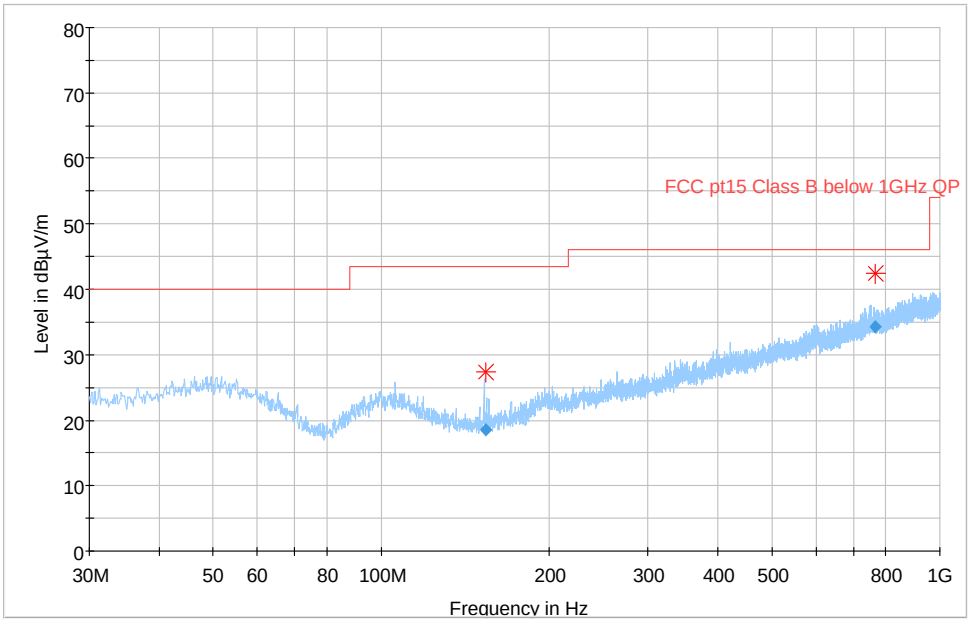
4.1.2 Test Configuration

Please refer to EUT Test Configuration #1.

4.1.3 Profile; 30MHz to 1GHz, Tx Power, Left, Middle Channel, Y-Axis

Maximum peak hold trace with quasi-peak values (◆)
Peak measurements (✳)

30MHz to 1GHz, Tx Power, Left, Middle Channel, Y-Axis



4.1.4 Data; 30MHz to 1GHz, Tx Power, Left, Middle Channel, Y-Axis

Emission Frequency	Measured Quasi-Peak Value	Class B Specified Quasi-Peak Limit	Pass Margin	Antenna Polarisation	Antenna Height	Turntable Azimuth	
MHz	dBµV/m	dBµV/m	dB	H/V	cm	deg	Status
153.783444	18.50	43.50	25.00	V	162.0	103.0	Pass
765.916772	34.26	46.00	11.74	V	168.0	55.0	Pass

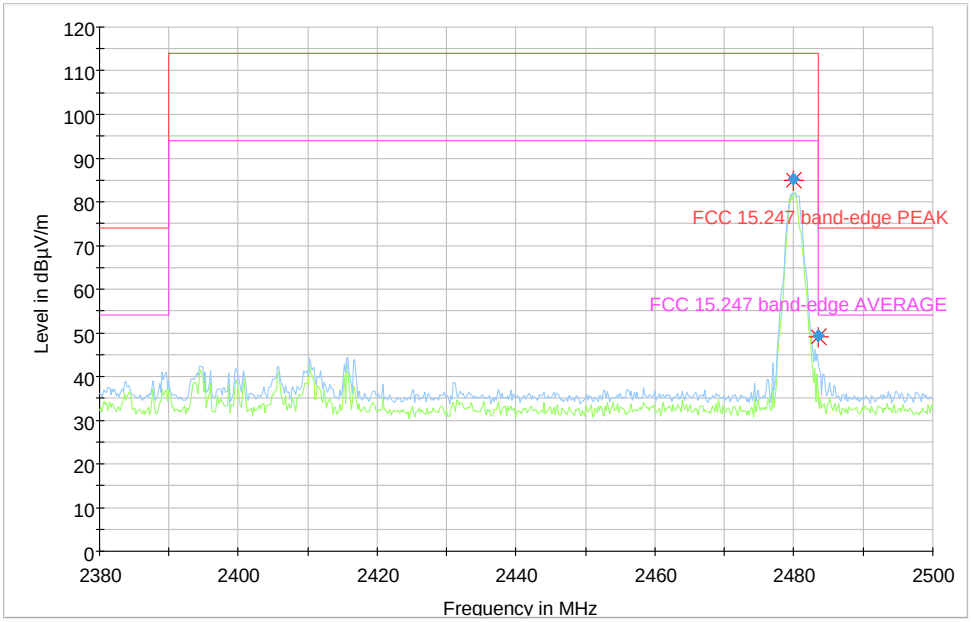
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC Class B limits and take into account the correction factor*. Measurements made according to the ANSI C63.4 test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: Path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.1.5 Profile; 2380 to 2500MHz, Tx Power, Left, Top Channel, X-Axis, Band Edge Charging

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

2380 to 2500MHz, Tx Power, Left, Top Channel, X-Axis, Band Edge Charging



4.1.6 Data; 2380 to 2500MHz, Tx Power, Left, Top Channel, X-Axis, Band Edge Charging

Frequency	Peak	CISPR Average	Average Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
2480.000000	85.18	---	94.00	8.82	105.0	H	188.0	-7.6	Pass
2483.500000	49.44	---	54.00	4.56	169.0	H	187.0	-7.6	Pass

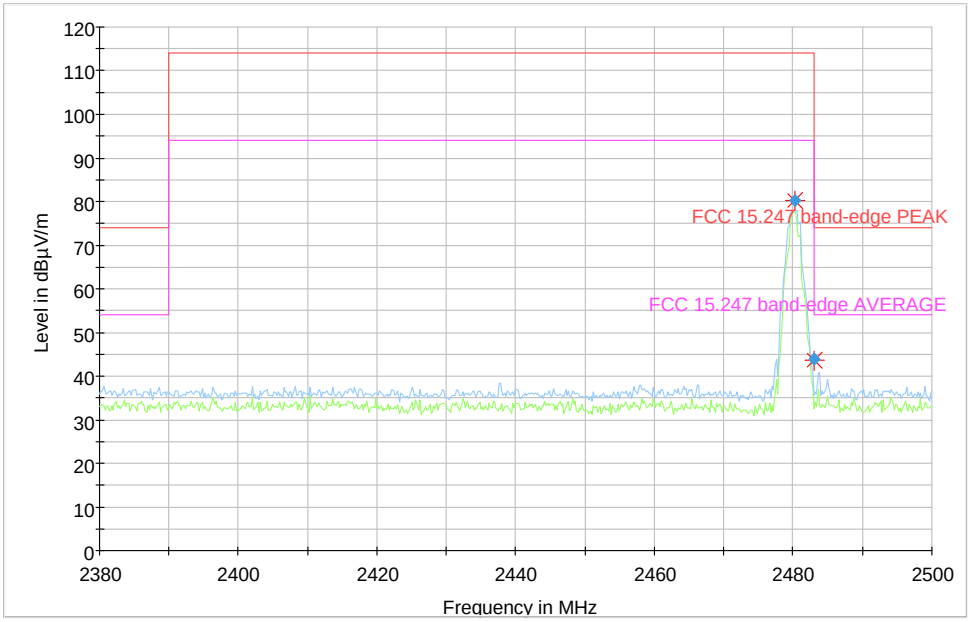
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.1.7 Profile; 2380 to 2500MHz, Tx Power, Left, Top Channel, X-Axis, Band Edge

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

2380 to 2500MHz, Tx Power, Left, Top Channel, X-Axis, Band Edge



4.1.8 Data; 2380 to 2500MHz, Tx Power, Left Controller, Top Channel, X-Axis, Band Edge

Frequency	Peak	CISPR Average	Average Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
2480.200000	80.16	---	94.00	13.84	183.0	V	18.0	-6.6	Pass
2483.000000	43.95	---	54.00	10.05	382.0	H	77.0	-6.6	Pass

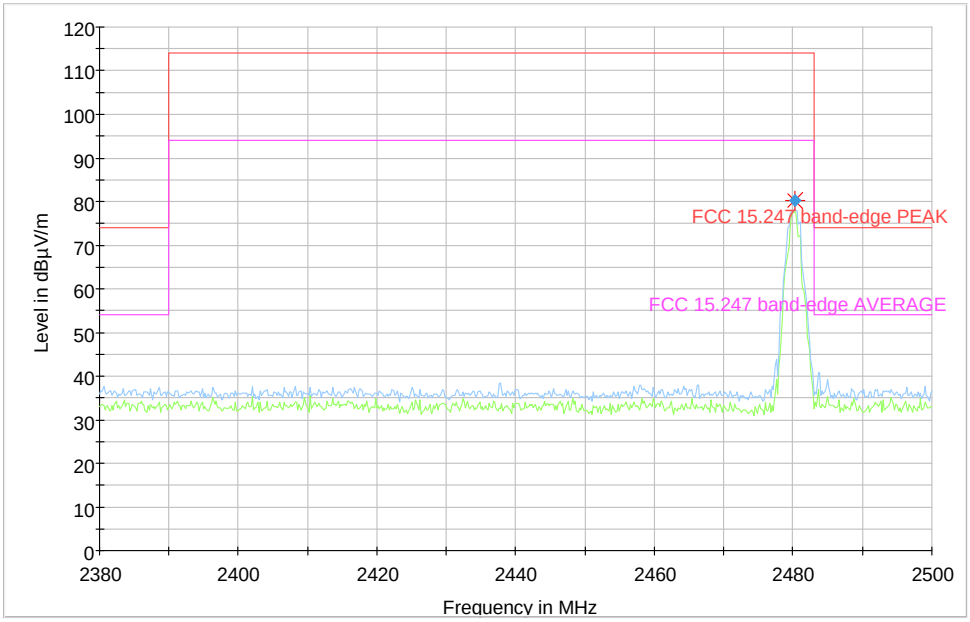
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.1.9 Profile; 2380 to 2500MHz, Tx Power, Left Controller, Top Channel, X-Axis

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

2380 to 2500MHz, Tx Power, Left Controller, Top Channel, X-Axis



4.1.10 Data; 2380 to 2500MHz, Tx Power, Left Controller, Top Channel, X-Axis

Frequency	Peak	CISPR Average	Average Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
2480.200000	80.16	---	94.00	13.84	183.0	V	18.0	-6.6	Pass

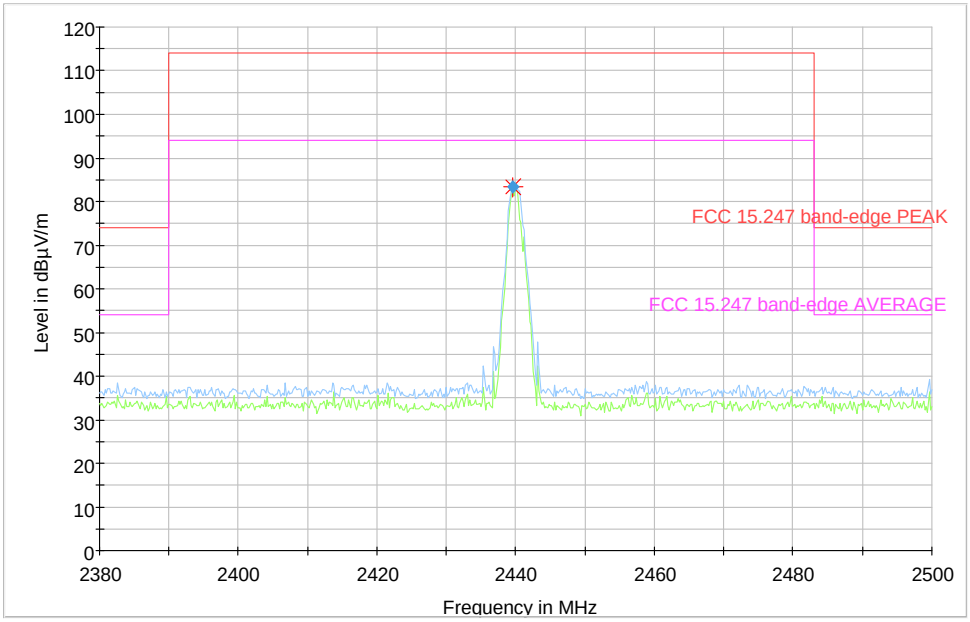
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.1.11 Profile; 2380 to 2500MHz, Tx Power, Left Controller, Middle Channel, X-Axis

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

2380 to 2500MHz, Tx Power, Left Controller, Middle Channel, X-Axis



4.1.12 Data; 2380 to 2500MHz, Tx Power, Left Controller, Middle Channel, X-Axis

Frequency	Peak	CISPR Average	Average Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
2439.600000	83.44	---	94.00	10.56	200.0	V	14.0	-6.7	Pass

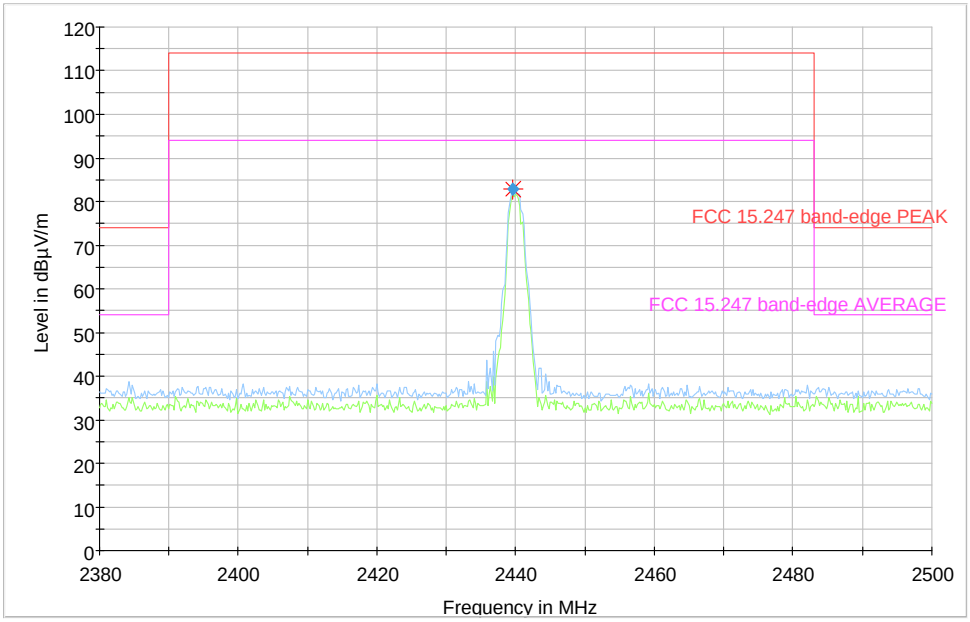
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.1.13 Profile; 2380 to 2500MHz, Tx Power, Left Controller, Middle Channel, Y-Axis

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

2380 to 2500MHz, Tx Power, Left Controller, Middle Channel, Y-Axis



4.1.14 Data; 2380 to 2500MHz, Tx Power, Left Controller, Middle Channel, Y-Axis

Frequency	Peak	CISPR Average	Average Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
2439.600000	82.82	---	94.00	11.18	214.0	V	215.0	-6.7	Pass

V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

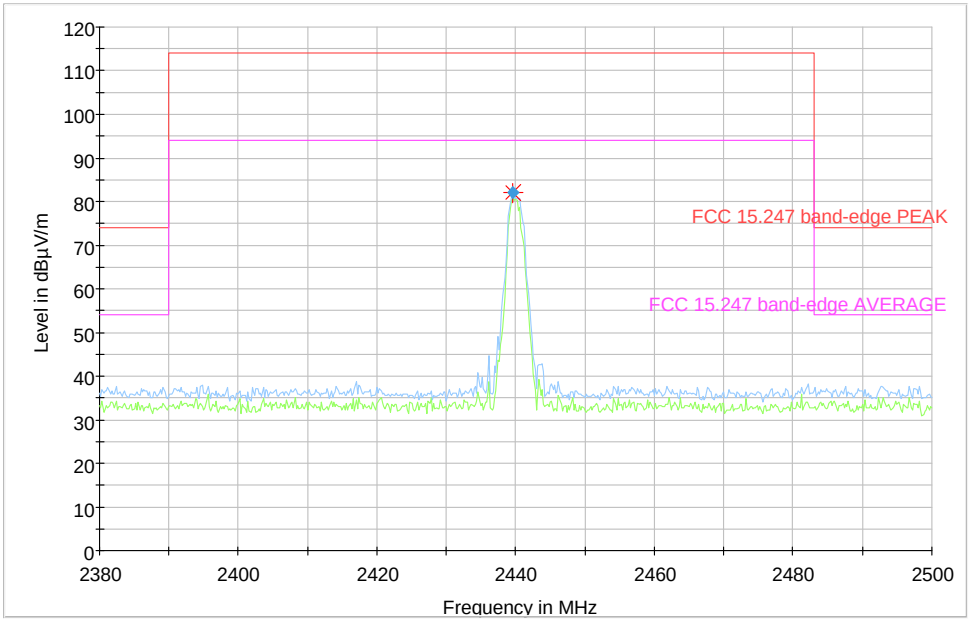
4.1.15 Profile; 2380 to 2500MHz, Tx Power, Left Controller, Middle Channel, Z-Axis

Maximum hold trace with peak values (◆)

Peak measurements (✳)

Average measurements (◆)

2380 to 2500MHz, Tx Power, Left Controller, Middle Channel, Z-Axis



4.1.16 Data; 2380 to 2500MHz, Tx Power, Left Controller, Middle Channel, Z-Axis

Frequency	Peak	CISPR Average	Average Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
2439.600000	82.02	---	94.00	11.98	184.0	H	292.0	-6.7	Pass

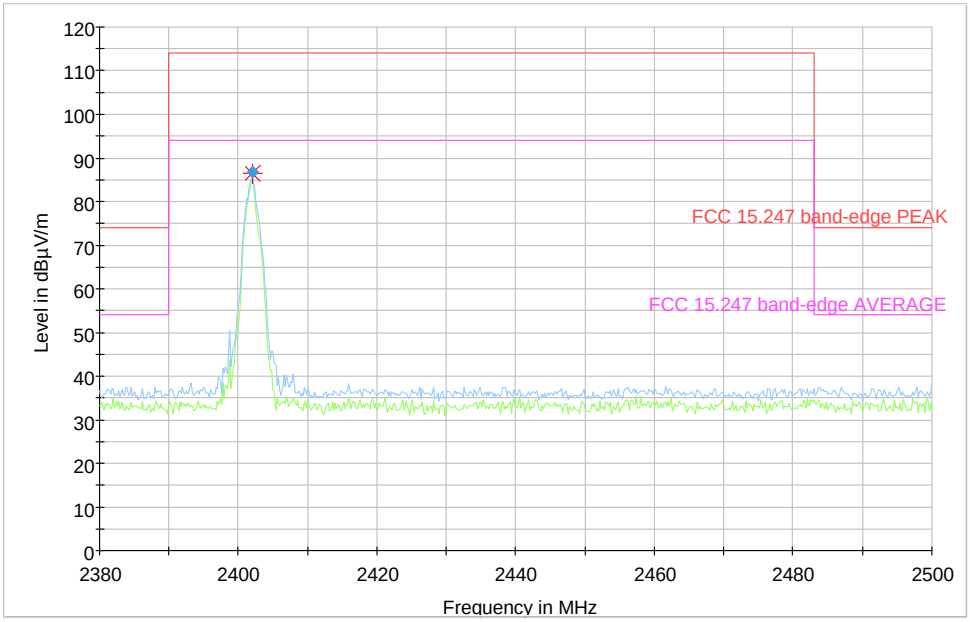
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.1.17 Profile; 2380 to 2500MHz, Tx Power, Left Controller, Bottom Channel, X-Axis

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

2380 to 2500MHz, Tx Power, Left Controller, Bottom Channel, X-Axis



4.1.18 Data; 2380 to 2500MHz, Tx Power, Left Controller, Bottom Channel, X-Axis

Frequency	Peak	CISPR Average	Average Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
2402.000000	86.67	---	94.00	7.33	202.0	V	8.0	-6.7	Pass

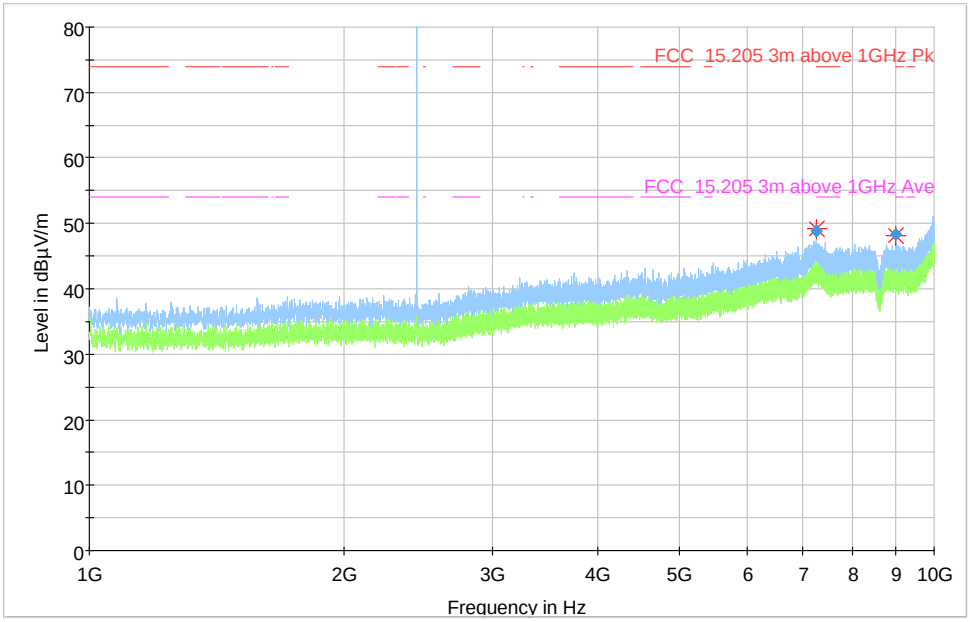
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.1.19 Profile; 1 to 10GHz, Tx Power, Left Controller, Middle Channel, X-Axis

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

1 to 10GHz, Tx Power, Left Controller, Middle Channel, X-Axis



4.1.20 Data; 1 to 10GHz, Tx Power, Left Controller, Middle Channel, X-Axis

Frequency	Peak	CISPR Average	Average Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
7261.750000	48.87	---	54.00	5.13	381.0	V	244.0	5.0	Pass
9016.750000	48.28	---	54.00	5.72	185.0	V	336.0	3.0	Pass

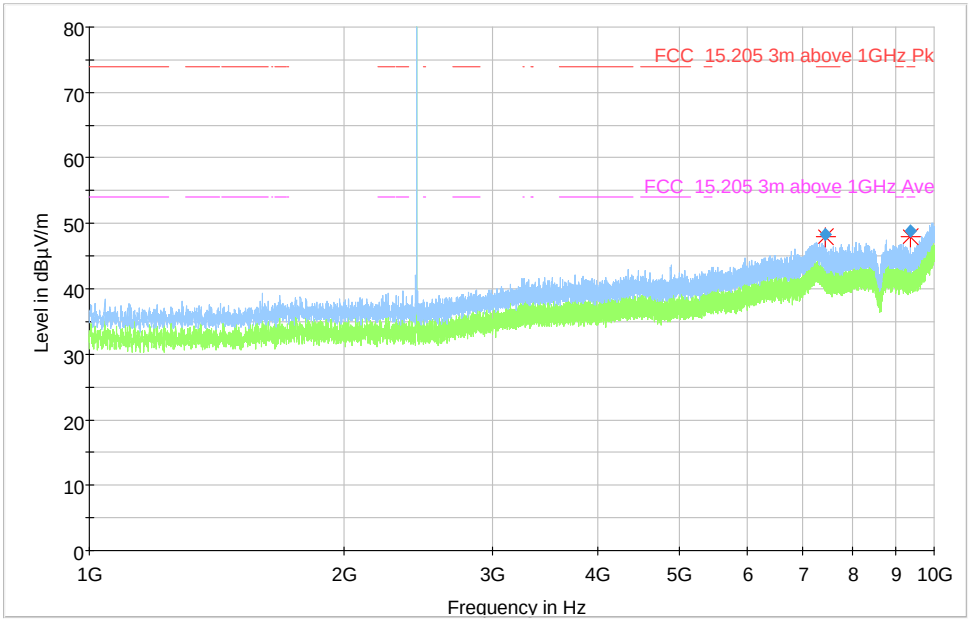
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.1.21 Profile; 1 to 10GHz, Tx Power, Left Controller, Middle Channel, Y-Axis

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

1 to 10GHz, Tx Power, Left Controller, Middle Channel, Y-Axis



4.1.22 Data; 1 to 10GHz, Tx Power, Left Controller, Middle Channel, Y-Axis

Frequency	Peak	CISPR Average	Average Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
7439.950000	48.33	---	54.00	5.67	243.0	V	108.0	3.6	Pass
9386.200000	48.79	---	54.00	5.21	238.0	V	330.0	2.7	Pass

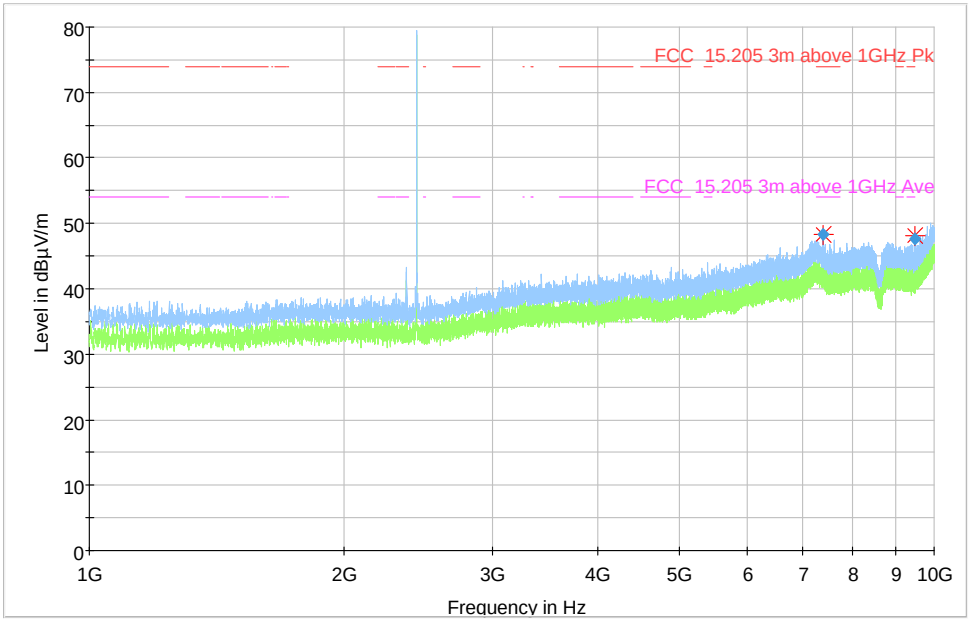
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.1.23 Profile; 1 to 10GHz, Tx Power, Left Controller, Middle Channel, Z-Axis

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

1 to 10GHz, Tx Power, Left Controller, Middle Channel, Z-Axis



4.1.24 Data; 1 to 10GHz, Tx Power, Left Controller, Middle Channel, Z-Axis

Frequency	Peak	CISPR Average	Average Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
7380.100000	48.24	---	54.00	5.76	187.0	H	225.0	4.1	Pass
9475.300000	47.66	---	54.00	6.34	105.0	H	0.0	2.7	Pass

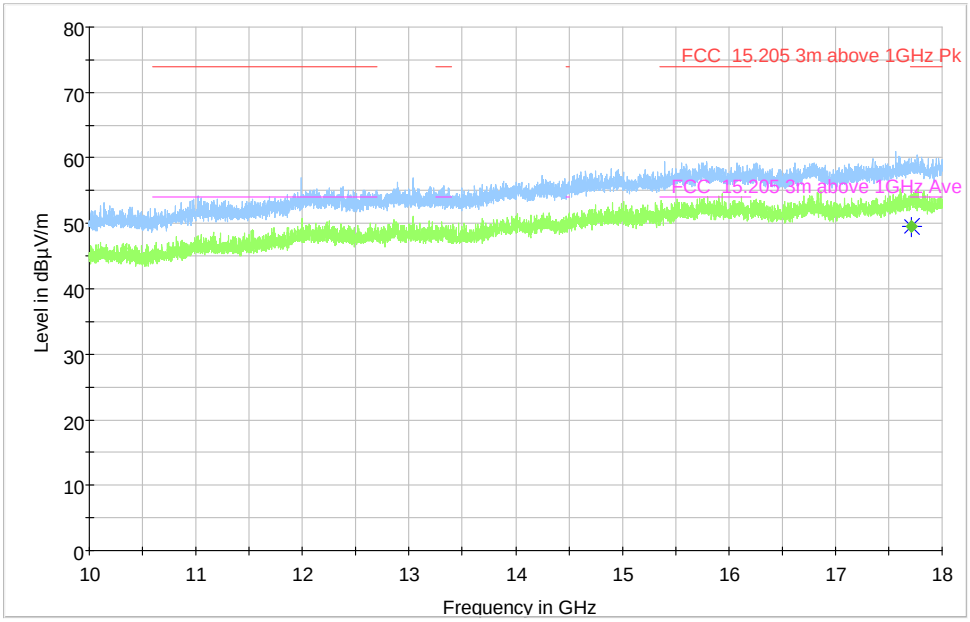
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.1.25 Profile; 10 to 18GHz, Tx Power, Left Controller, Top Channel, X-Axis

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

10 to 18GHz, Tx Power, Left Controller, Top Channel, X-Axis



4.1.26 Data; 10 to 18GHz, Tx Power, Left Controller, Top Channel, X-Axis

Frequency	Peak	CISPR Average	Average Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
17714.00000	49.51	---	54.00	4.49	396.0	V	61.0	19.1	Pass

V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

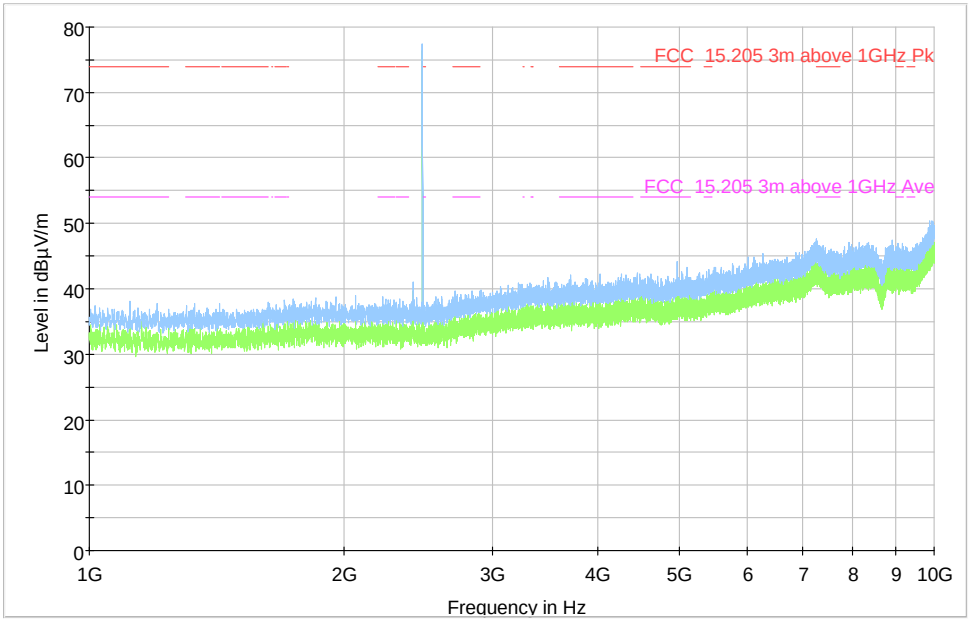
4.1.27 Profile; 10 to 18GHz, Tx Power, Left Controller, Top Channel, Y-Axis

Maximum hold trace with peak values (◆)

Peak measurements (✳)

Average measurements (◆)

10 to 18GHz, Tx Power, Left Controller, Top Channel, Y-Axis



4.1.28 Data; 10 to 18GHz, Tx Power, Left Controller, Top Channel, Y-Axis

No measurements were taken based on the max peak data values high margins relative to the limit lines.

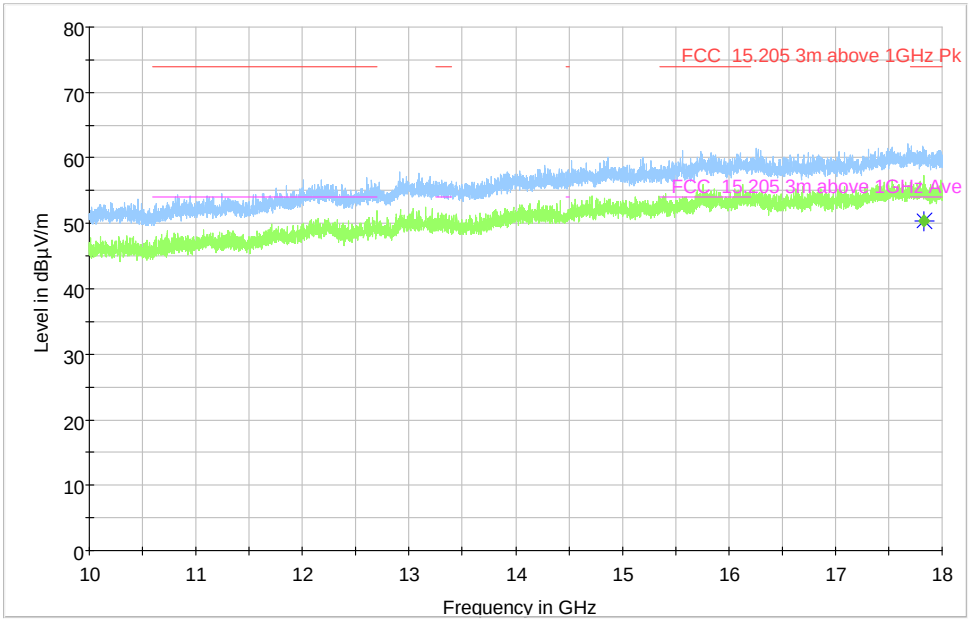
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.1.29 Profile; 10 to 18GHz, Tx Power, Left Controller, Middle Channel, X-Axis

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

10 to 18GHz, Tx Power, Left Controller, Middle Channel, X-Axis



4.1.30 Data; 10 to 18GHz, Tx Power, Left Controller, Middle Channel, X-Axis

Frequency	Peak	CISPR Average	Average Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
17833.00000	50.42	---	54.00	3.58	118.0	V	36.0	19.2	Pass

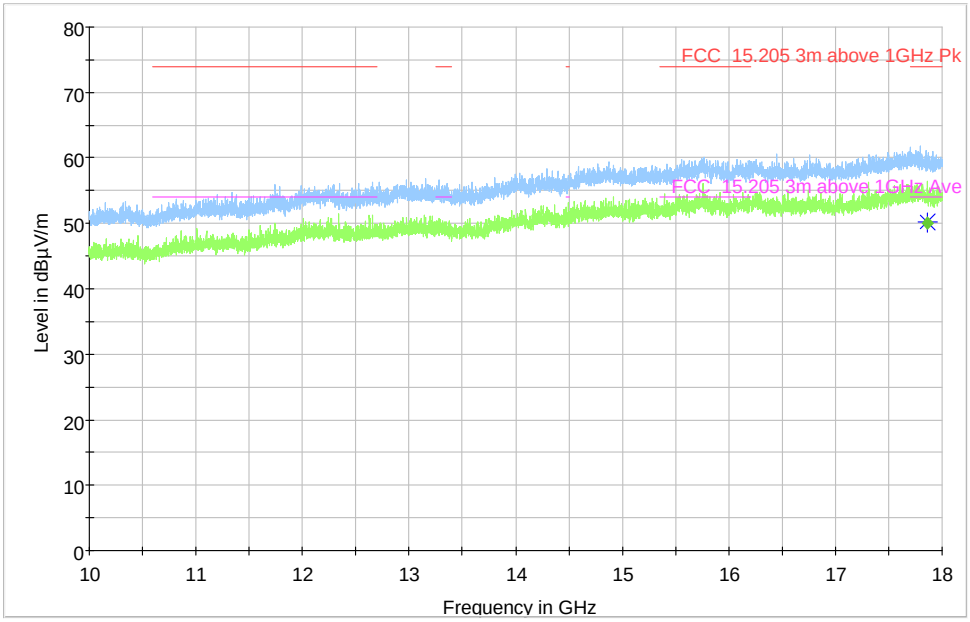
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.1.31 Profile; 10 to 18GHz, Tx Power, Left Controller, Middle Channel, Y-Axis

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

10 to 18GHz, Tx Power, Left Controller, Middle Channel, Y-Axis



4.1.32 Data; 10 to 18GHz, Tx Power, Left Controller, Middle Channel, Y-Axis

Frequency	Peak	CISPR Average	Average Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
17860.00000	---	50.09	54.00	3.91	347.0	H	32.0	19.2	Pass

V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

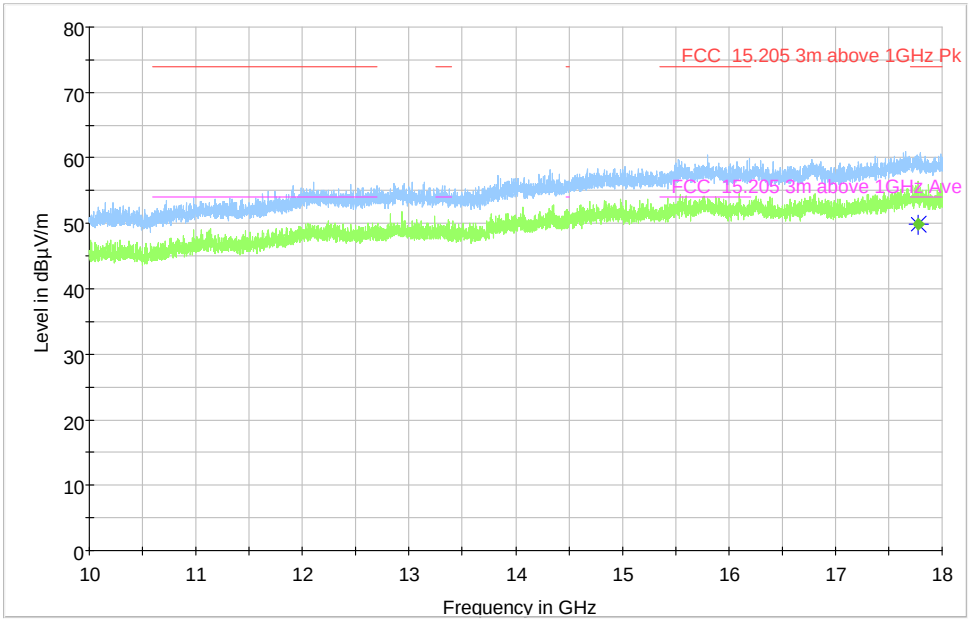
4.1.33 Profile; 10 to 18GHz, Tx Power, Left Controller, Middle Channel, Z-Axis

Maximum hold trace with peak values (◆)

Peak measurements (✳)

Average measurements (◆)

10 to 18GHz, Tx Power, Left Controller, Middle Channel, Z-Axis



4.1.34 Data; 10 to 18GHz, Tx Power, Left Controller, Middle Channel, Z-Axis

Frequency	Peak	CISPR Average	Average Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
17781.00000	---	49.87	54.00	4.13	171.0	V	22.0	19.2	Pass

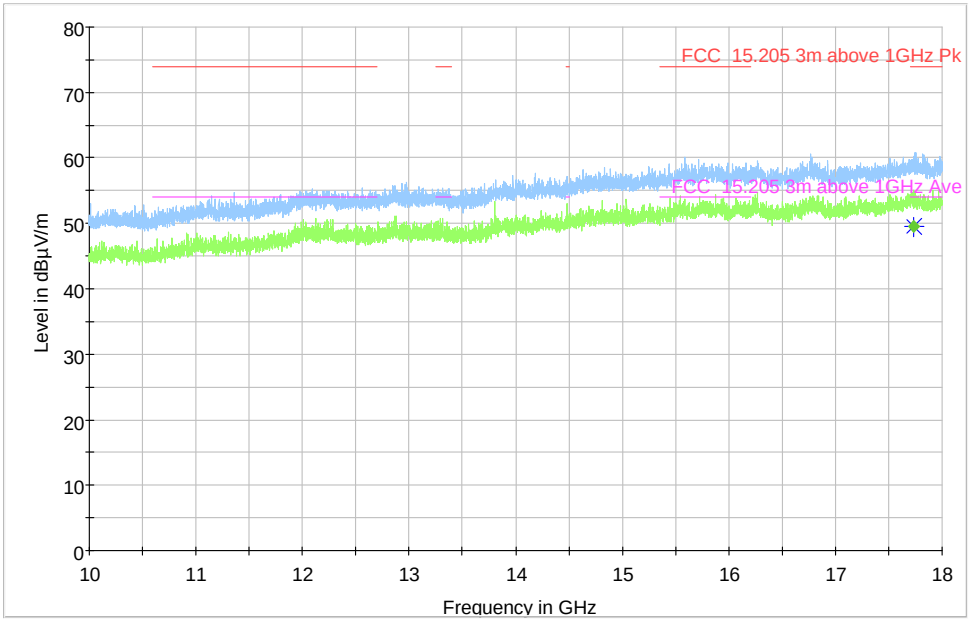
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.1.35 Profile; 10 to 18GHz, Tx Power, Left Controller, Bottom Channel, X-Axis

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

10 to 18GHz, Tx Power, Left Controller, Bottom Channel, X-Axis



4.1.36 Data; 10 to 18GHz, Tx Power, Left Controller, Bottom Channel, X-Axis

Frequency	Peak	CISPR Average	Average Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
17737.00000	---	49.56	54.00	4.44	238.0	H	63.0	19.1	Pass

V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.2 Radiated Emissions; Right Controller

4.2.1 Test Parameters

A profile scan was taken using an EMI receiver at a distance of three metres on eight azimuths of the EUT in both the vertical and horizontal polarisation of the field in a semi-anechoic chamber.

Using the pre-scan results as a guide, each emission from the EUT was maximised. Measurements were carried out at a distance of three metres using the specified detector in a CISPR 16-1-4 semi-anechoic chamber. Cable positions were then finally adjusted to produce the maximum emission levels. The worst-case results are reported below.

Test Equipment						
#ID	CP	Manufacturer	Type	Serial Number	Description	Calibration Due Date
750	1	Global	CISPR16	1	11 x 7 x 6.2m, chamber	14/12/2022
672	1	HP	8491B	4596	3dB pad	Internal
788	1	Rohde & Schwarz	ESW 44	101799	EMI test receiver (44GHz)	09/08/2023
877	1	Huber & Suhner	SUCOTEST_18A	602608/18A	ST_18A/Nm/Nm/3m	19/04/2023
073	3	Schwarzbeck	BBHA9120B	237	Horn Antenna (1-10GHz)	20/05/2024
399	3	Q-par Angus	WBH18-40k	10300	Horn Antenna (18-40GHz)	18/12/2022
086a	3	GORE	0K0CQ0CQ120.0	05609131	K' Cable (26.5-40GHz)	Internal
Test Equipment Software						
#ID	CP	Manufacturer	Type		Description	Calibration Due Date
856	0	Rohde & Schwarz	Software	0	EMC32 v10.50.10	Not required

Environmental Test Conditions	
Temperature	23.3° Celsius
Relative Humidity	46%
Atmospheric Pressure	1021.4 millibars
Test Date:	22nd September 2022
Test Engineer:	Richard Pennell

Note: “Calibration due date” means the instrument is certified within UKAS or traceable calibration certificate. “Internal” means the instrument is calibrated using Eurofins Hursley procedures. “Not required” means the asset does not require calibration. “CP” is the interval period [year] prescribed for external calibration.

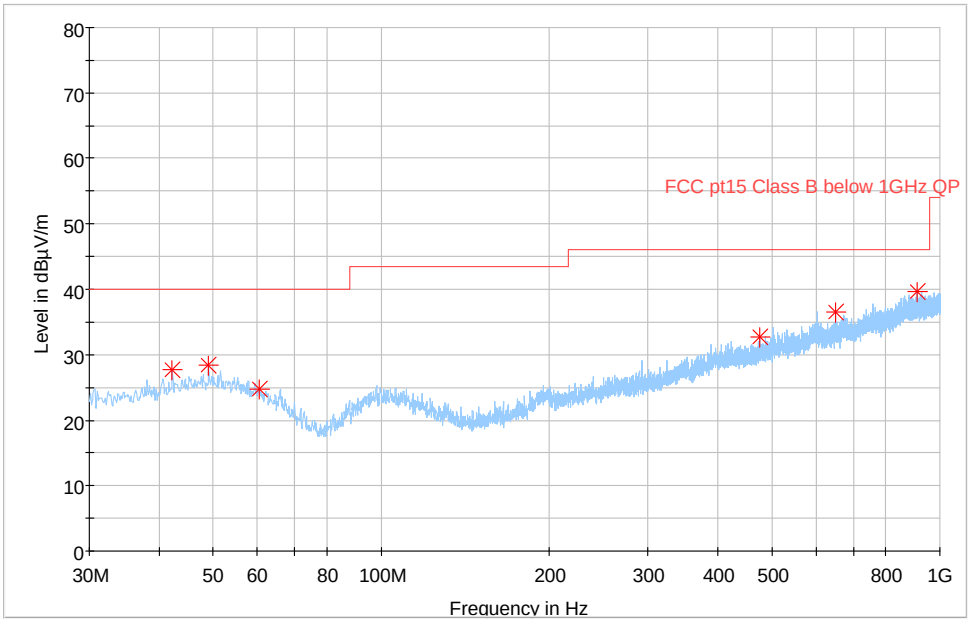
4.2.2 Test Configuration

Please refer to EUT Test Configuration #1.

4.2.3 Profile; 30MHz to 1GHz, Tx Power, Right Controller, Top Channel, Z-Axis

Maximum peak hold trace with quasi-peak values (◆)
Peak measurements (✳)

30MHz to 1GHz, Tx Power, Right Controller, Top Channel, Z-Axis



4.2.4 Data; 30MHz to 1GHz, Tx Power, Right Controller, Top Channel, Z-Axis

No measurements were taken based on the max peak data values high margins relative to the limit lines.

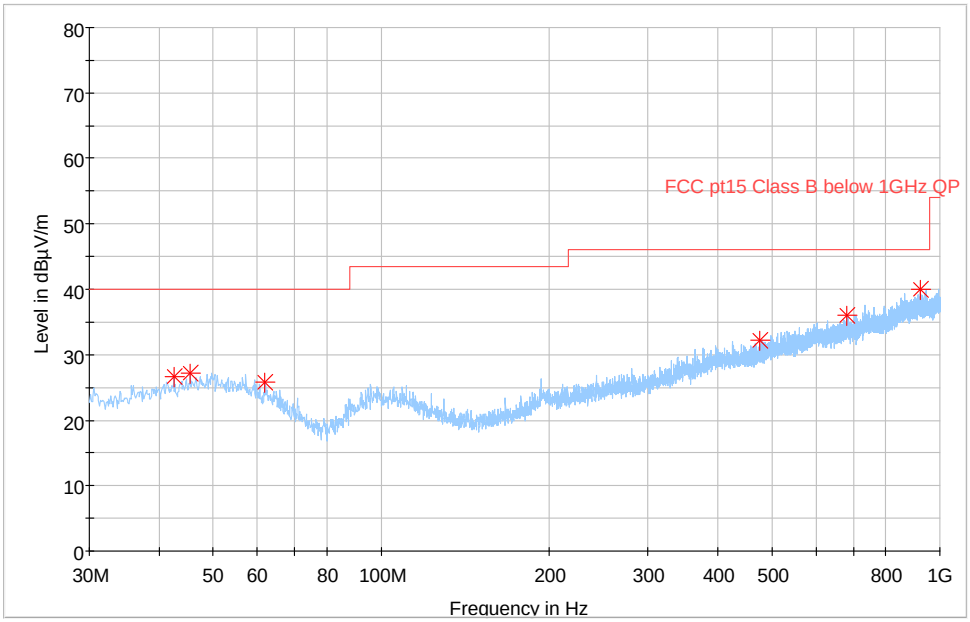
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC Class B limits and take into account the correction factor*. Measurements made according to the ANSI C63.4 test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: Path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.2.5 Profile; 30MHz to 1GHz, Tx Power, Right Controller, Middle Channel, X-Axis

Maximum peak hold trace with quasi-peak values (◆)
Peak measurements (✳)

30MHz to 1GHz, Tx Power, Right Controller, Middle Channel, X-Axis



4.2.6 Data; 30MHz to 1GHz, Tx Power, Right Controller, Middle Channel, X-Axis

No measurements were taken based on the max peak data values high margins relative to the limit lines.

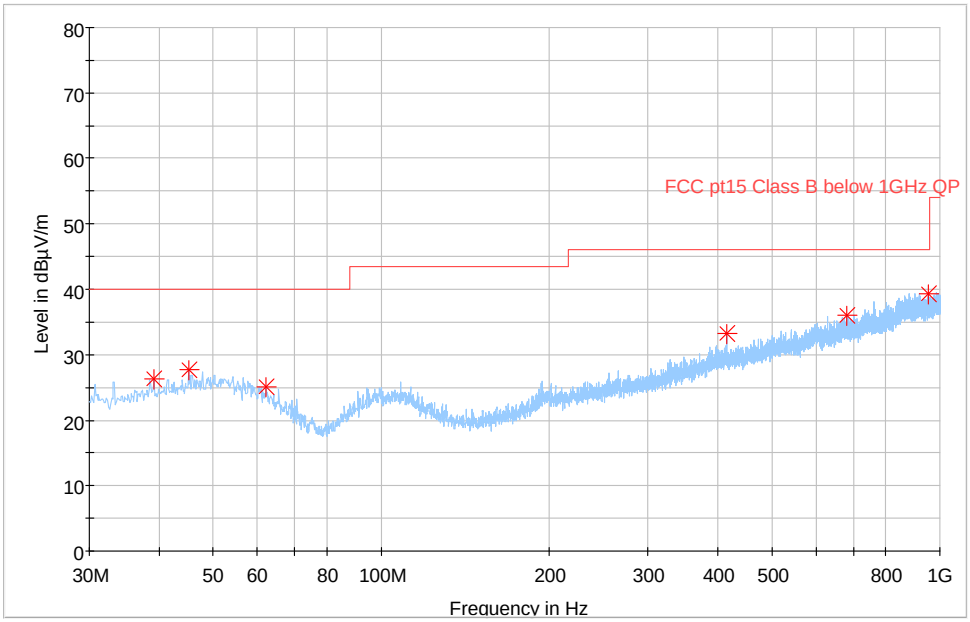
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC Class B limits and take into account the correction factor*. Measurements made according to the ANSI C63.4 test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: Path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.2.7 Profile; 30MHz to 1GHz, Tx Power, Right Controller, Middle Channel, Y-Axis

Maximum peak hold trace with quasi-peak values (◆)
Peak measurements (✳)

30MHz to 1GHz, Tx Power, Right Controller, Middle Channel, Y-Axis



4.2.8 Data; 30MHz to 1GHz, Tx Power, Right Controller, Middle Channel, Y-Axis

No measurements were taken based on the max peak data values high margins relative to the limit lines.

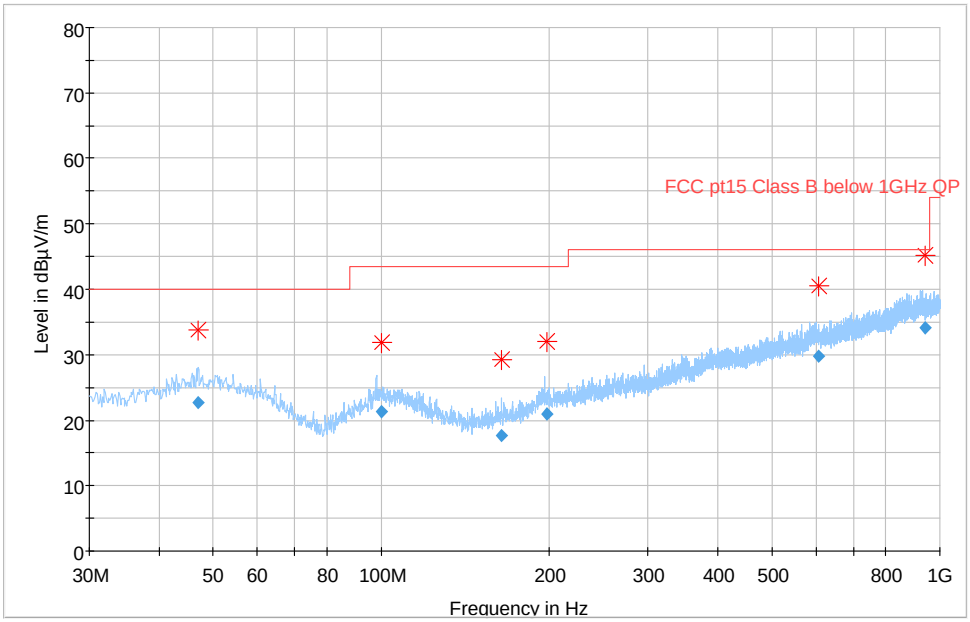
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC Class B limits and take into account the correction factor*. Measurements made according to the ANSI C63.4 test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: Path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.2.9 Profile; 30MHz to 1GHz, Tx Power, Right Controller, Middle Channel, Z-Axis

Maximum peak hold trace with quasi-peak values (◆)
Peak measurements (✳)

30MHz to 1GHz, Tx Power, Right Controller, Middle Channel, Z-Axis



4.2.10 Data; 30MHz to 1GHz, Tx Power, Right Controller, Middle Channel, Z-Axis

Emission Frequency	Measured Quasi-Peak Value	Class B Specified Quasi-Peak Limit	Pass Margin	Antenna Polarisation	Antenna Height	Turntable Azimuth	
MHz	dBµV/m	dBµV/m	dB	H/V	cm	deg	Status
46.974413	22.69	40.00	17.31	V	109.0	311.0	Pass
99.980425	21.24	43.50	22.26	V	400.0	248.0	Pass
164.432104	17.72	43.50	25.78	H	325.0	195.0	Pass
198.043802	20.94	43.50	22.56	H	278.0	100.0	Pass
606.419214	29.78	46.00	16.22	H	145.0	109.0	Pass
940.686321	34.09	46.00	11.91	H	120.0	174.0	Pass

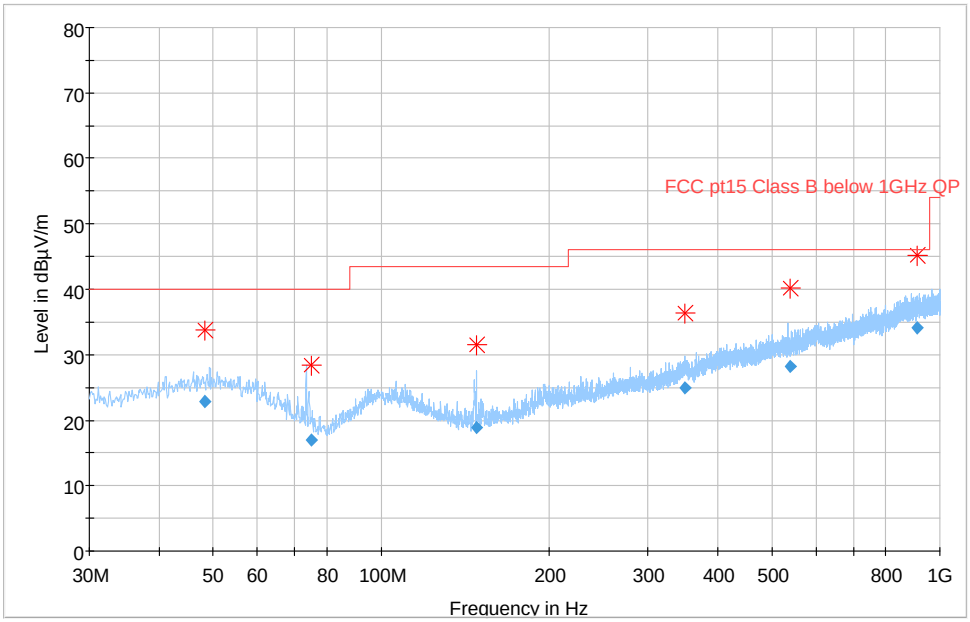
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC Class B limits and take into account the correction factor*. Measurements made according to the ANSI C63.4 test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: Path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.2.11 Profile; 30MHz to 1GHz, Tx Power, Right Controller, Middle Channel, Z-Axis, Charging

Maximum peak hold trace with quasi-peak values (◆)
Peak measurements (✳)

30MHz to 1GHz, Tx Power, Right Controller, Middle Channel, Z-Axis, Charging



4.2.12 Data; 30MHz to 1GHz, Tx Power, Right Controller, Middle Channel, Z-Axis, Charging

Emission Frequency	Measured Quasi-Peak Value	Class B Specified Quasi-Peak Limit	Pass Margin	Antenna Polarisation	Antenna Height	Turntable Azimuth	
MHz	dBµV/m	dBµV/m	dB	H/V	cm	deg	Status
48.372922	22.78	40.00	17.22	H	194.0	12.0	Pass
74.921834	16.94	40.00	23.06	V	181.0	237.0	Pass
148.141930	18.80	43.50	24.70	H	326.0	110.0	Pass
349.387785	24.87	46.00	21.13	H	269.0	337.0	Pass
539.149384	28.24	46.00	17.76	V	257.0	135.0	Pass
910.577394	34.06	46.00	11.94	V	214.0	138.0	Pass

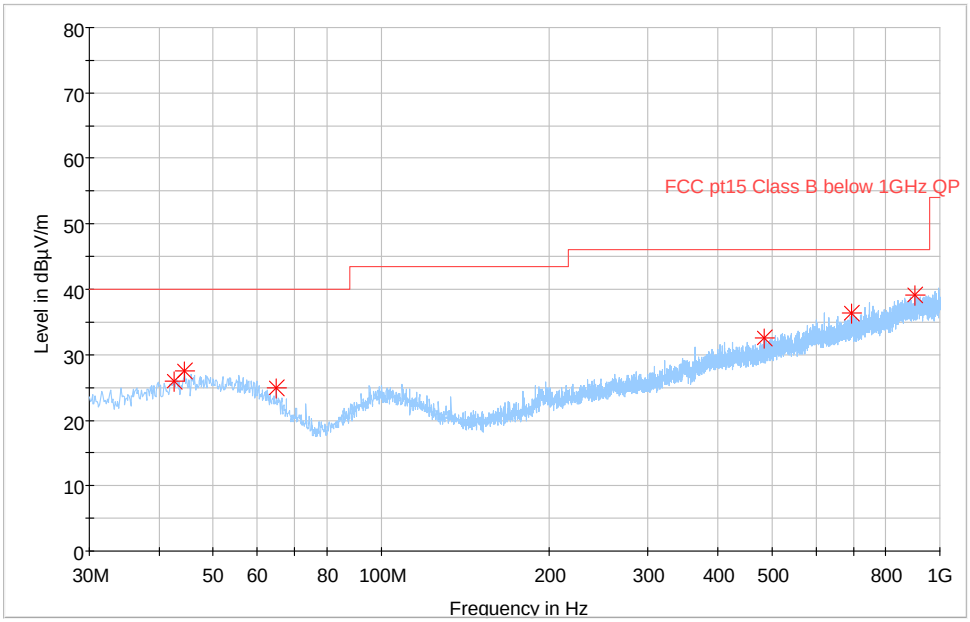
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC Class B limits and take into account the correction factor*. Measurements made according to the ANSI C63.4 test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: Path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.2.13 Profile; 30MHz to 1GHz, Tx Power, Right Controller, Bottom Channel, Z-Axis

Maximum peak hold trace with quasi-peak values (◆)
Peak measurements (✳)

30MHz to 1GHz, Tx Power, Right Controller, Bottom Channel, Z-Axis



4.2.14 Data; 30MHz to 1GHz, Tx Power, Right Controller, Bottom Channel, Z-Axis

No measurements were taken based on the max peak data values high margins relative to the limit lines.

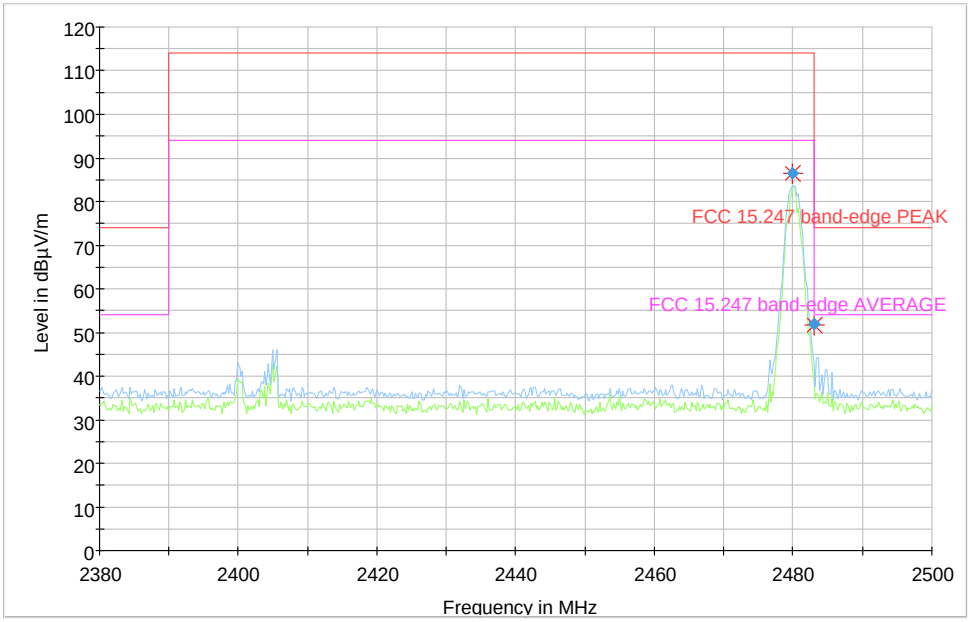
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC Class B limits and take into account the correction factor*. Measurements made according to the ANSI C63.4 test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: Path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.2.15 Profile; 2380 to 2500MHz, Tx Power, Right Controller, Top Channel, Z-Axis,

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

2380 to 2500MHz, Tx Power, Right Controller, Top Channel, Z-Axis



4.2.16 Data; 2380 to 2500MHz, Tx Power, Right Controller, Top Channel, Z-Axis

Frequency	Peak	Average Limit	Peak Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
2480.000000	86.59	94.00	---	7.41	115.0	H	89.0	-6.6	Pass
2483.000000	52.00	54.00	---	2.00	118.0	H	92.0	-6.6	Pass

V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

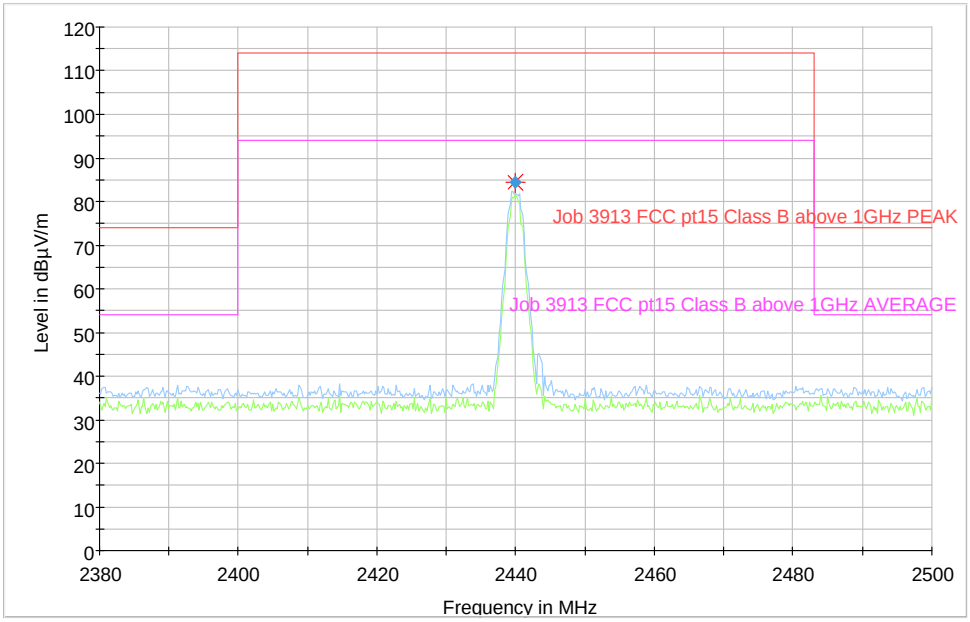
4.2.17 Profile; 2380 to 2500MHz, Tx Power, Right Controller, Middle Channel, Z-Axis

Maximum hold trace with peak values (◆)

Peak measurements (✳)

Average measurements (◆)

2380 to 2500MHz, Tx Power, Right Controller, Middle Channel, Z-Axis



4.2.18 Data; 2380 to 2500MHz, Tx Power, Right Controller, Middle Channel, Z-Axis

Frequency	Peak	CISPR Average	Average Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
2440.000000	84.36	---	94.00	9.64	288.0	V	327.0	-6.7	Pass

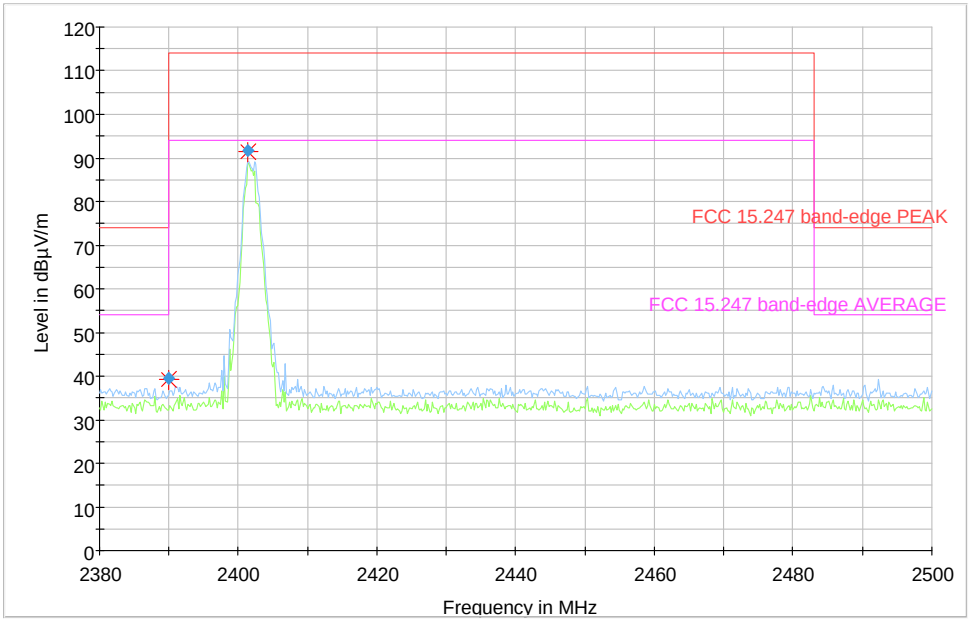
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.2.19 Profile; 2380 to 2500MHz, Tx Power, Right Controller, Bottom Channel, Z-Axis, Charging

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

2380 to 2500MHz, Tx Power, Right Controller, Bottom Channel, Z-Axis, Charging



4.2.20 Data; 2380 to 2500MHz, Tx Power, Right Controller, Bottom Channel, Z-Axis, Charging

Frequency	Peak	CISPR Average	Average Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
2390.000000	39.55	---	54.00	14.45	167.0	H	345.0	-6.7	Pass
2401.400000	91.64	---	94.00	2.36	231.0	V	107.0	-6.7	Pass

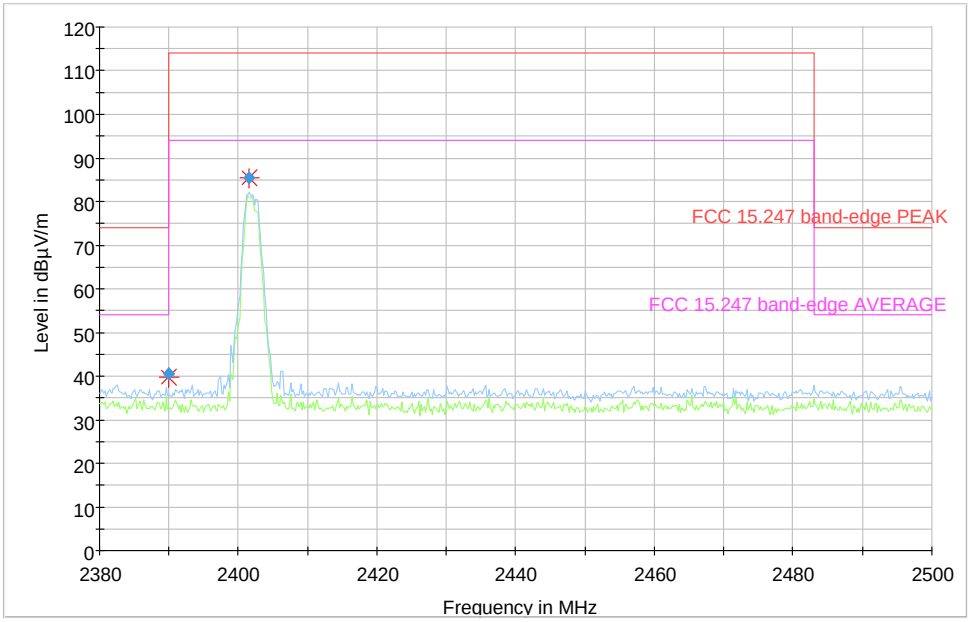
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.2.21 Profile; 2380 to 2500MHz, Tx Power, Right Controller, Bottom Channel, Z-Axis, Band Edge

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

2380 to 2500MHz, Tx Power, Right Controller, Bottom Channel, Z-Axis, Band Edge



4.2.22 Data; 2380 to 2500MHz, Tx Power, Right Controller, Bottom Channel, Z-Axis, Band Edge

Frequency	Peak	CISPR Average	Average Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
2390.000000	40.49	---	54.00	13.51	298.0	H	48.0	-6.7	Pass
2401.600000	85.56	---	94.00	8.44	261.0	H	158.0	-6.7	Pass

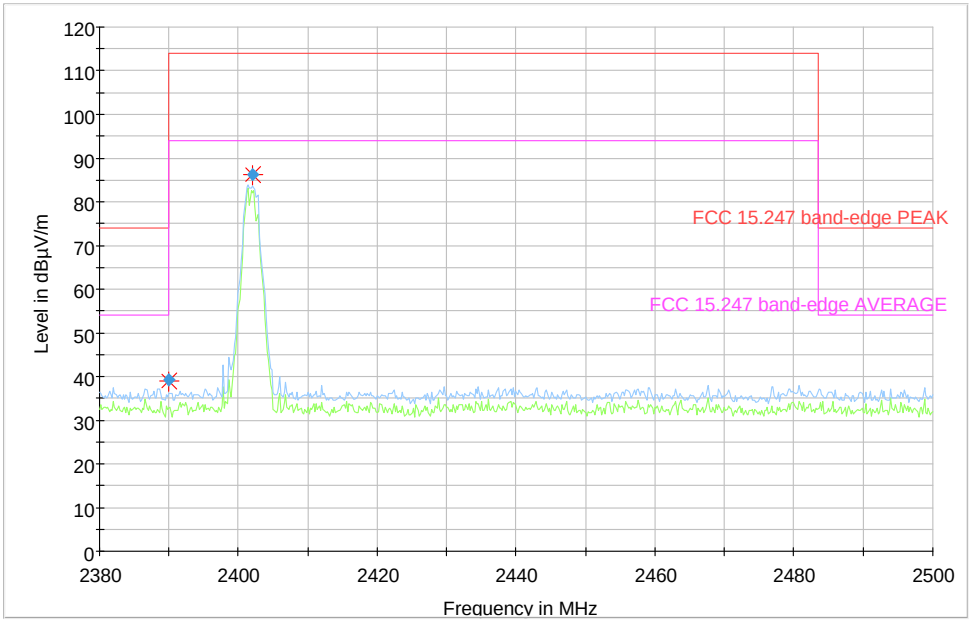
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.2.23 Profile; 2380 to 2500MHz, Rx Power, Right Controller, Bottom Channel, Z-Axis

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

2380 to 2500MHz, Rx Power, Right Controller, Bottom Channel, Z-Axis



4.2.24 Data; 2380 to 2500MHz, Rx Power, Right Controller, Bottom Channel, Z-Axis

Frequency	Peak	CISPR Average	Average Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
2390.000000	39.17	---	54.00	14.83	257.0	H	129.0	-7.7	Pass
2402.000000	86.34	---	94.00	7.66	303.0	V	79.0	-7.7	Pass

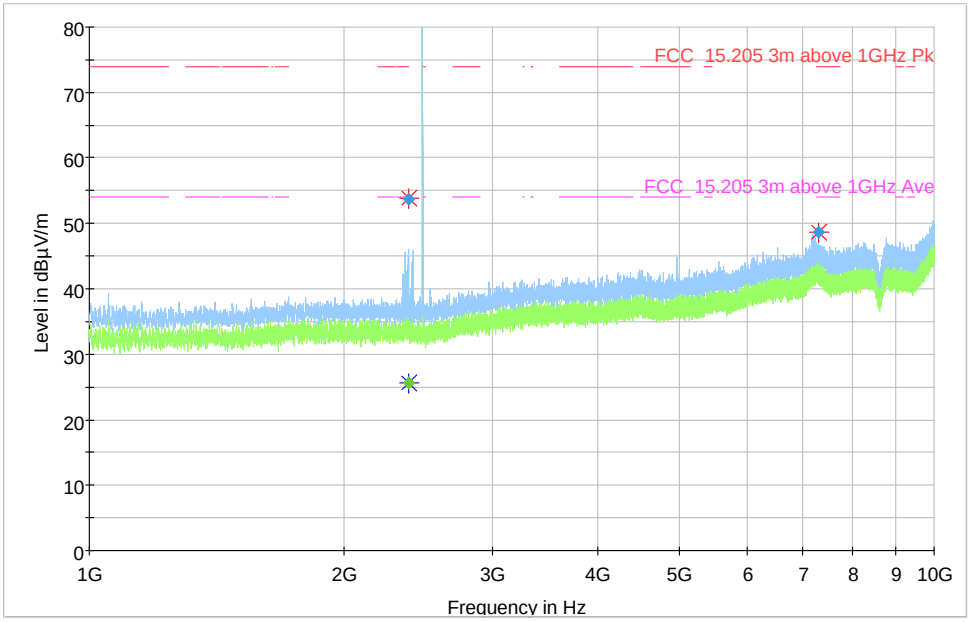
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.2.25 Profile; 1 to 10GHz, Tx Power, Right Controller, Top Channel, Y-Axis with Charging Cable

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

1 to 10GHz, Tx Power, Right Controller, Top Channel, Y-Axis with Charging Cable



4.2.26 Data; 1 to 10GHz, Tx Power, Right Controller, Top Channel, Y-Axis with Charging Cable

Frequency	Peak	CISPR Average	Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
2384.650000	---	25.62	54.00	28.38	100.0	V	290.0	-6.7	Pass
2384.650000	53.73	---	74.00	20.27	168.0	V	107.0	-6.7	Pass
7301.350000	48.60	---	54.00	5.40	136.0	V	290.0	4.7	Pass

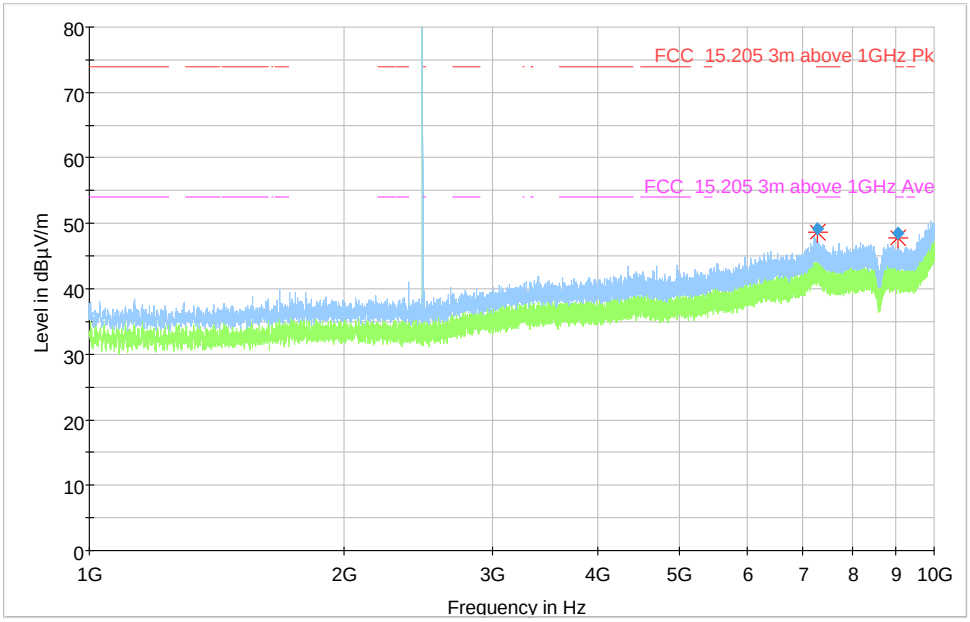
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.2.27 Profile; 1 to 10GHz, Tx Power, Right Controller, Top Channel, Y-Axis

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

1 to 10GHz, Tx Power, Right Controller, Top Channel, Y-Axis



4.2.28 Data; 1 to 10GHz, Tx Power, Right Controller, Top Channel, Y-Axis

Frequency	Peak	CISPR Average	Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
7277.950000	49.24	---	54.00	4.76	325.0	H	14.0	4.9	Pass
9062.650000	48.44	---	54.00	5.56	126.0	V	151.0	2.9	Pass

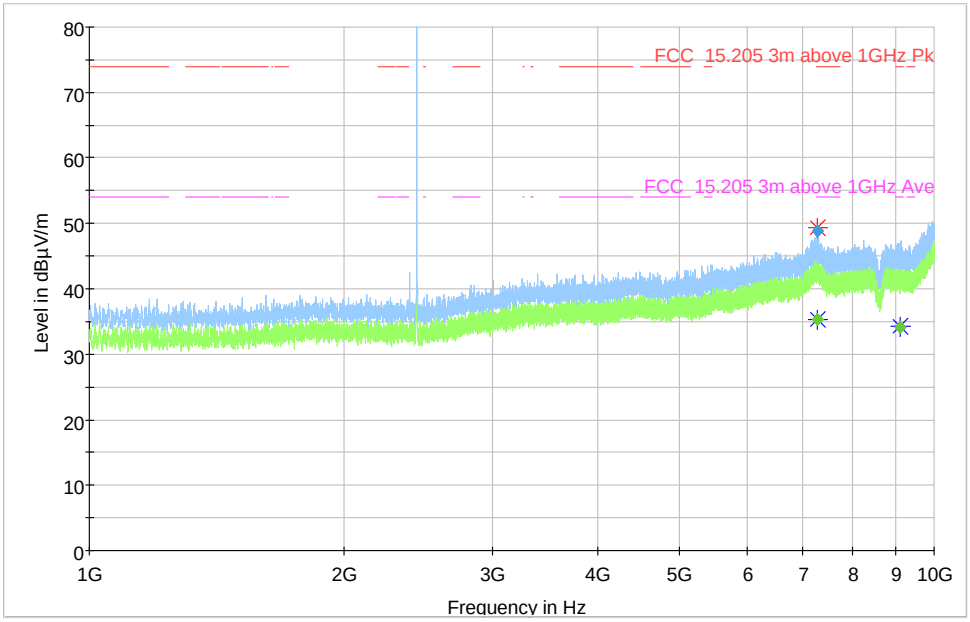
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.2.29 Profile; 1 to 10GHz, Tx Power, Right Controller, Middle Channel, X-Axis

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

1 to 10GHz, Tx Power, Right Controller, Middle Channel, X-Axis



4.2.30 Data; 1 to 10GHz, Tx Power, Right Controller, Middle Channel, X-Axis

Frequency	Peak	CISPR Average	Class B Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
7270.750000	---	35.29	54.00	18.71	368.0	H	339.0	4.9	Pass
7273.450000	48.89	---	74.00	25.11	138.0	V	66.0	4.9	Pass
9105.850000	---	34.19	54.00	19.81	263.0	V	62.0	2.9	Pass

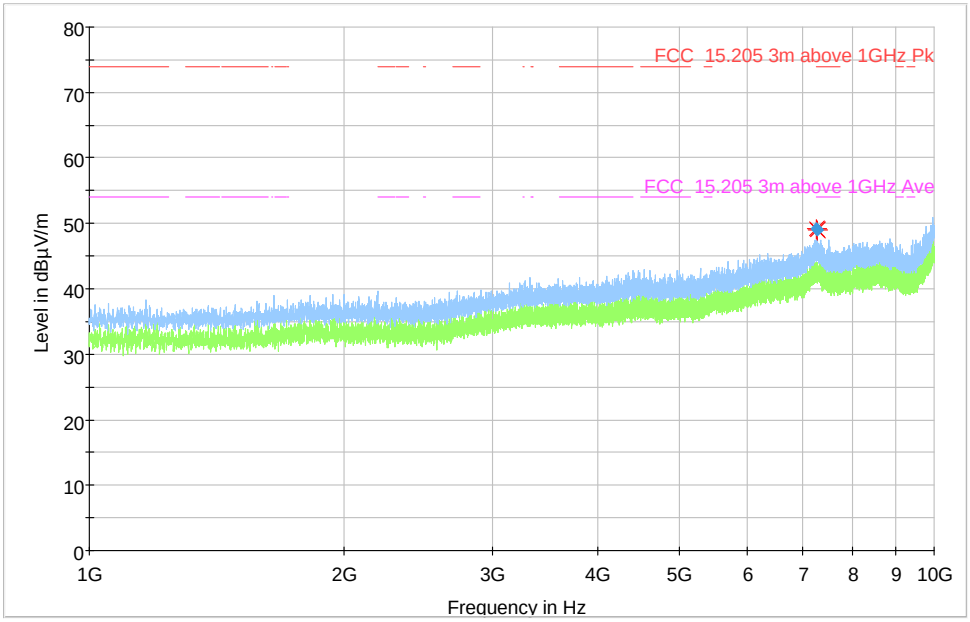
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.2.31 Profile; 1 to 10GHz, Rx Power, Right Controller, Middle Channel, Y-Axis, Charging

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

1 to 10GHz, Rx Power, Right Controller, Middle Channel, Y-Axis, Charging



4.2.32 Data; 1 to 10GHz, Rx Power, Right Controller, Middle Channel, Y-Axis, Charging

Frequency	Peak	CISPR Average	Class B Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
7263.550000	49.10	---	54.00	4.90	196.0	H	68.0	5.0	Pass
7273.900000	48.94	---	54.00	5.06	330.0	V	234.0	4.9	Pass

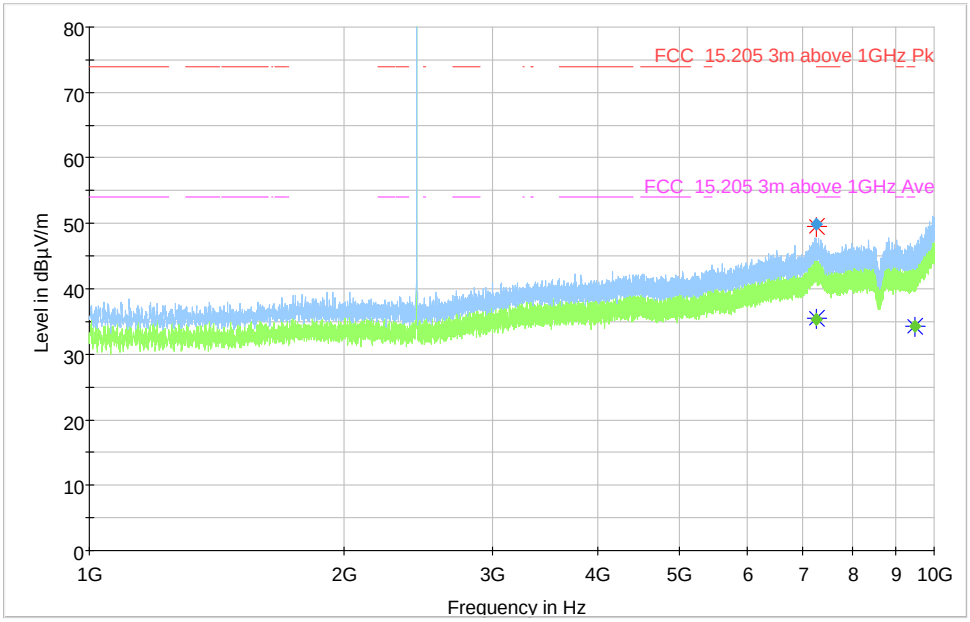
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.2.33 Profile; 1 to 10GHz, Tx Power, Right Controller, Middle Channel, Y-Axis

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

1 to 10GHz, Tx Power, Right Controller, Middle Channel, Y-Axis



4.2.34 Data; 1 to 10GHz, Tx Power, Right Controller, Middle Channel, Y-Axis

Frequency	Peak	CISPR Average	Class B Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
7253.650000	---	35.39	54.00	18.61	247.0	H	241.0	5.0	Pass
7262.200000	49.83	---	74.00	24.17	290.0	H	136.0	5.0	Pass
9498.700000	---	34.25	54.00	19.75	193.0	V	114.0	2.7	Pass

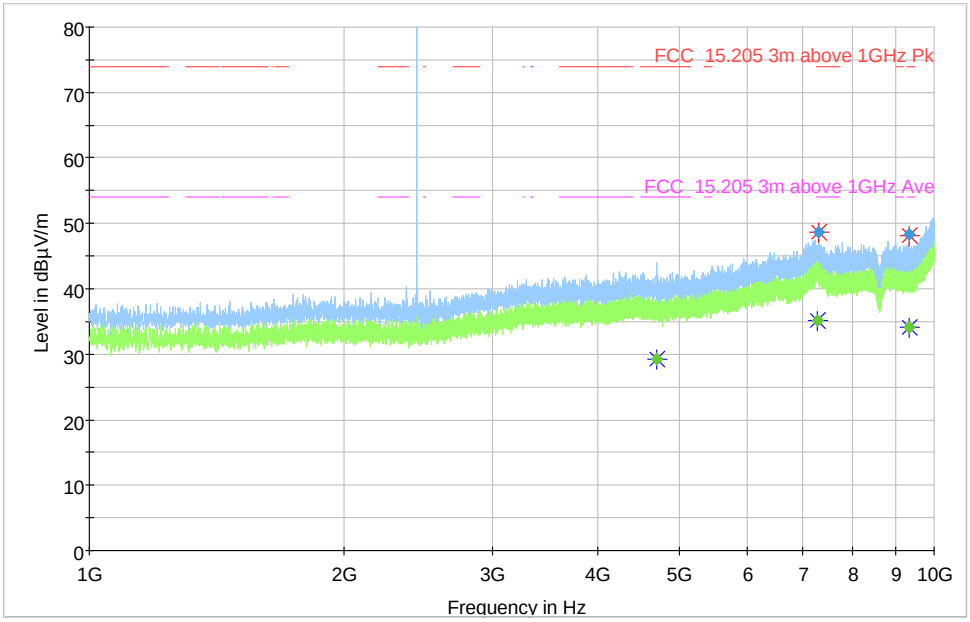
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.2.35 Profile; 1 to 10GHz, Tx Power, Right Controller, Middle Channel, Z-Axis

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

1 to 10GHz, Tx Power, Right Controller, Middle Channel, Z-Axis



4.2.36 Data; 1 to 10GHz, Tx Power, Right Controller, Middle Channel, Z-Axis

Frequency	Peak	CISPR Average	Class B Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
4690.900000	---	29.19	54.00	24.81	109.0	H	0.0	-1.4	Pass
7283.800000	---	35.15	54.00	18.85	255.0	H	103.0	4.8	Pass
7294.150000	48.73	---	74.00	25.27	354.0	V	357.0	4.7	Pass
9356.500000	---	34.17	54.00	19.83	247.0	V	263.0	2.6	Pass
9356.500000	48.37	---	74.00	25.63	304.0	V	181.0	2.6	Pass

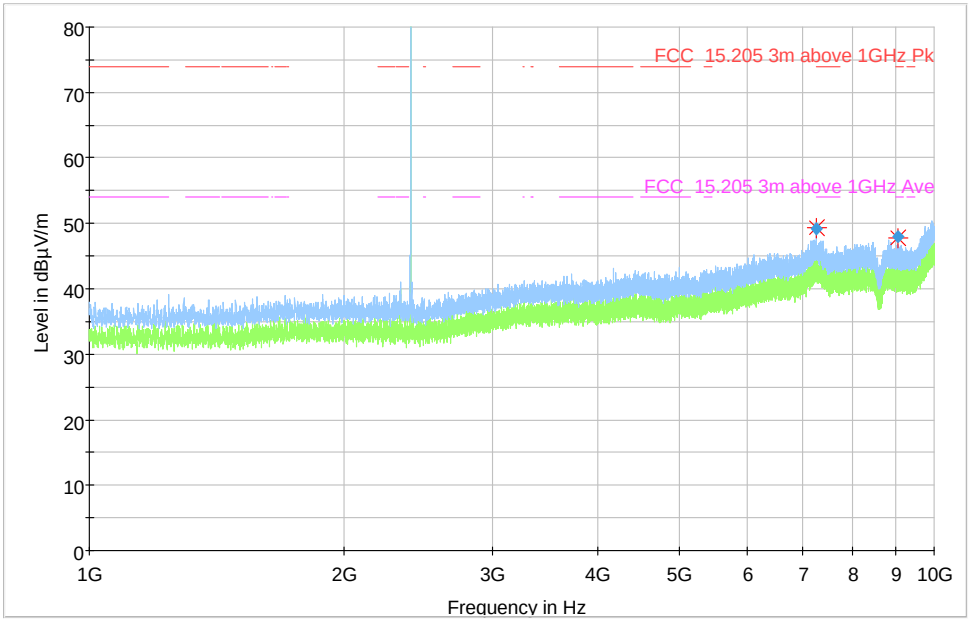
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.2.37 Profile; 1 to 10GHz, Tx Power, Right Controller, Bottom Channel, Y-Axis

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

1 to 10GHz, Tx Power, Right Controller, Bottom Channel, Y-Axis



4.2.38 Data; 1 to 10GHz, Tx Power, Right Controller, Bottom Channel, Y-Axis

Frequency	Peak	CISPR Average	Class B Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
7255.450000	49.14	---	54.00	4.86	208.0	V	10.0	5.0	Pass
9064.450000	48.04	---	54.00	5.96	165.0	V	20.0	2.9	Pass

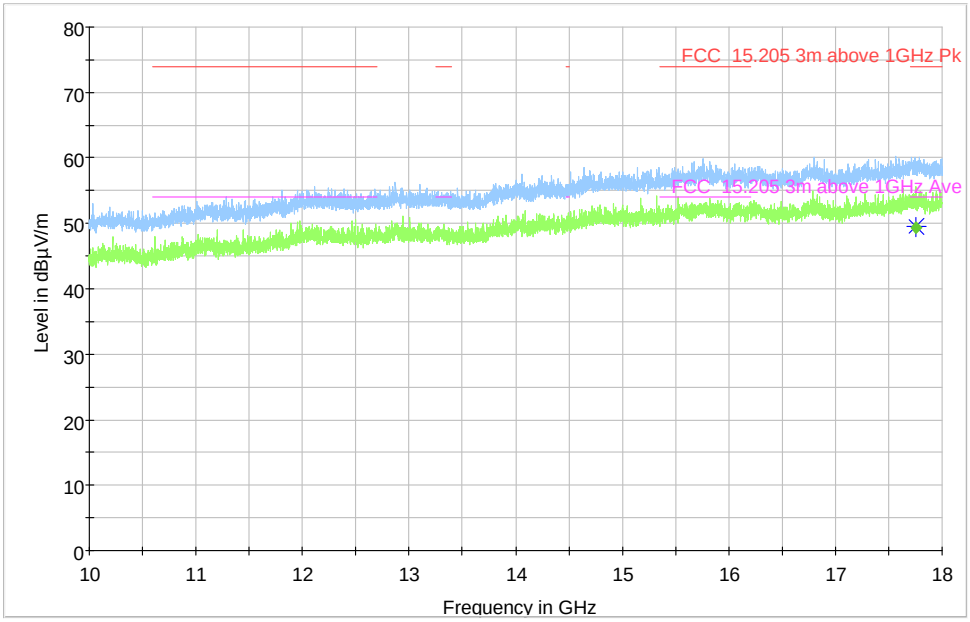
V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.2.39 Profile; 10 to 18GHz, Tx Power, Right Controller, Top Channel, Y-Axis with Charging Cable

Maximum hold trace with peak values (◆)
Peak measurements (✳)
Average measurements (◆)

10 to 18GHz, Tx Power, Right Controller, Top Channel, X-Axis with Charging Cable



4.2.40 Data; 10 to 18GHz, Tx Power, Right Controller, Top Channel, X-Axis with Charging Cable

Frequency	Peak	CISPR Average	Class B Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dBµV/m	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
17758.00000	---	49.42	54.00	4.58	400.0	V	43.0	19.1	Pass

V = Vertical / H = Horizontal

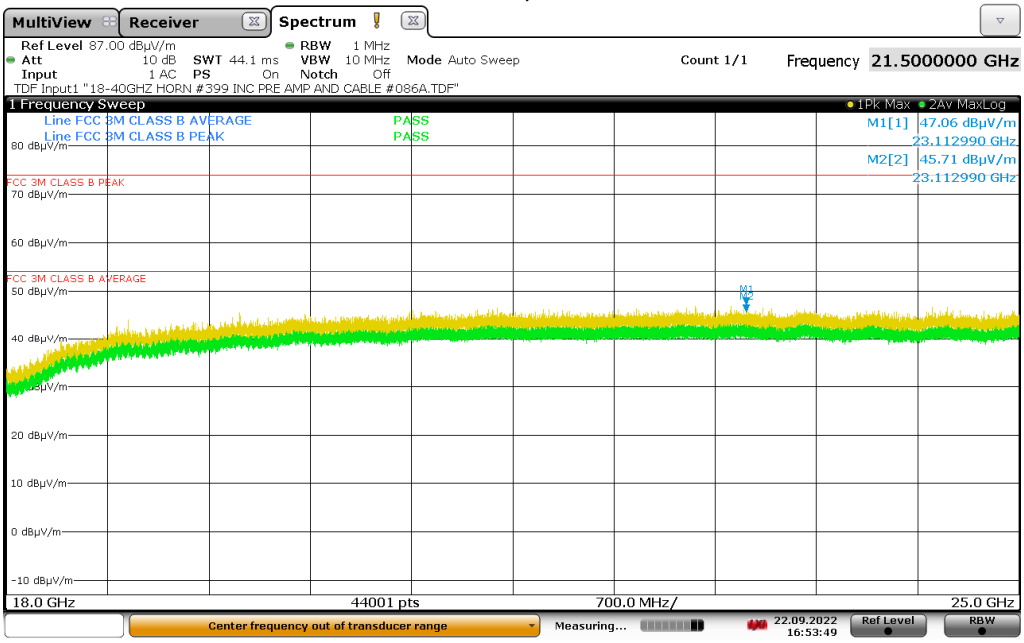
The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.2.41 Profile; 18 to 40GHz, Tx, Top Channel, Z-Axis

Maximum hold trace with peak values (▽)

Maximum hold trace with average values (▼)

18 to 40GHz, Tx, Top Channel, Z-Axis



4.2.42 Data; 18 to 40GHz, Tx, Top Channel, Z-Axis

No measurements were taken based on the max peak data values high margins relative to the limit lines.

V = Vertical / H = Horizontal

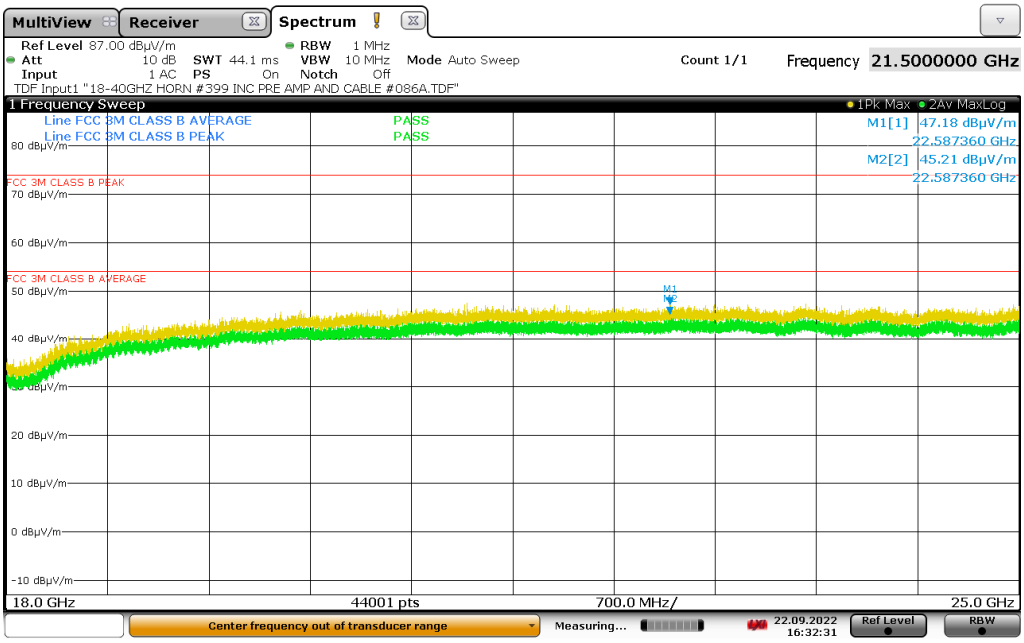
The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.2.43 Profile; 18 to 40GHz, Tx, Middle Channel, X-Axis

Maximum hold trace with peak values (▽)

Maximum hold trace with average values (▼)

18 to 40GHz, Tx, Middle Channel, X-Axis



4.2.44 Data; 18 to 40GHz, Tx, Middle Channel, X-Axis

No measurements were taken based on the max peak data values high margins relative to the limit lines.

V = Vertical / H = Horizontal

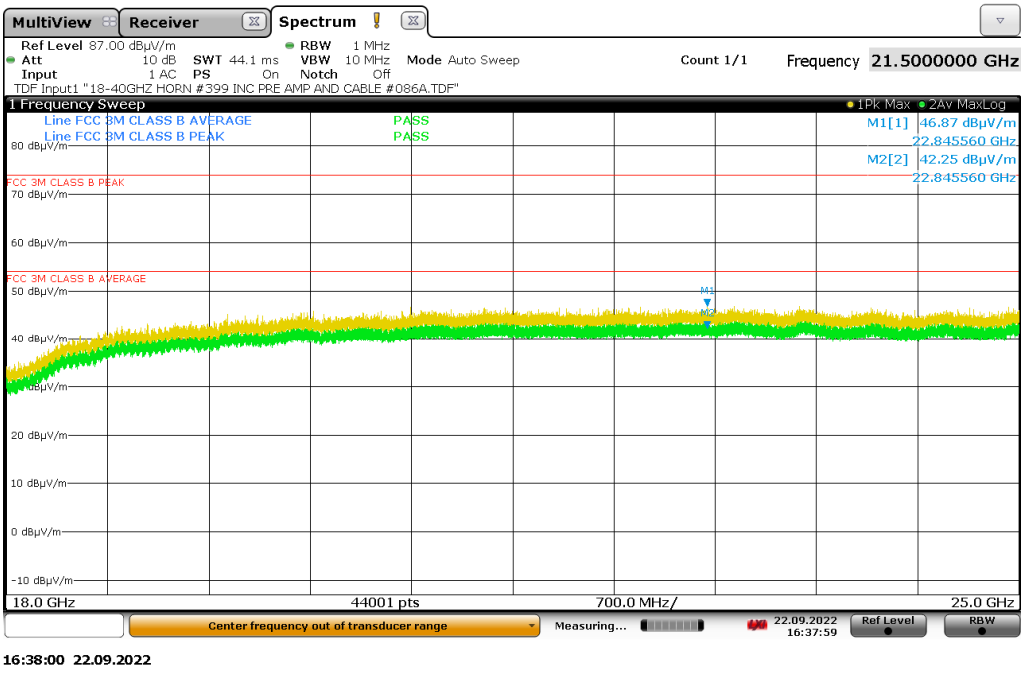
The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.2.45 Profile; 18 to 40GHz, Tx, Middle Channel, Y-Axis

Maximum hold trace with peak values (▽)

Maximum hold trace with average values (▼)

18 to 40GHz, Tx, Middle Channel, Y-Axis



4.2.46 Data; 18 to 40GHz, Tx, Middle Channel, Y-Axis

No measurements were taken based on the max peak data values high margins relative to the limit lines.

V = Vertical / H = Horizontal

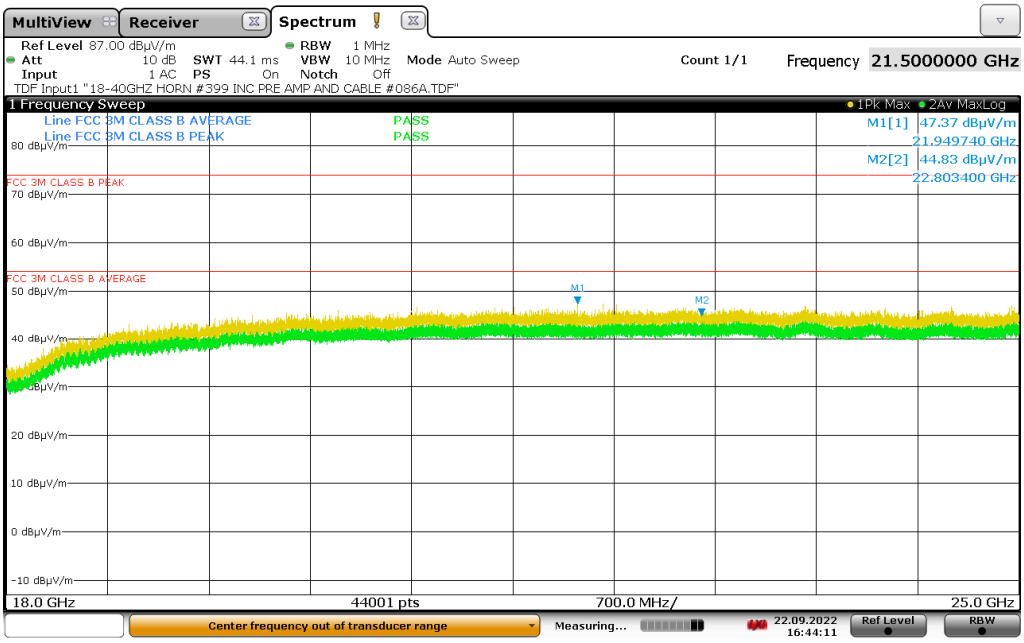
The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.2.47 Profile; 18 to 40GHz, Tx, Middle Channel, Z-Axis

Maximum hold trace with peak values (▽)

Maximum hold trace with average values (▼)

18 to 40GHz, Tx, Middle Channel, Z-Axis



4.2.48 Data; 18 to 40GHz, Tx, Middle Channel, Z-Axis

No measurements were taken based on the max peak data values high margins relative to the limit lines.

V = Vertical / H = Horizontal

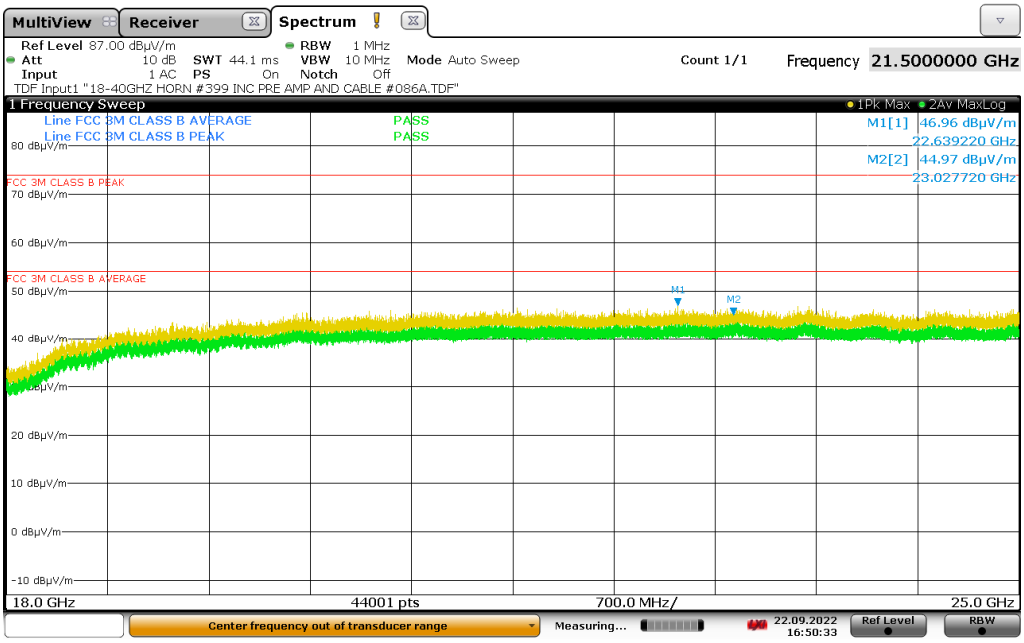
The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.2.49 Profile; 18 to 40GHz, Tx, Bottom Channel, Z-Axis

Maximum hold trace with peak values (▽)

Maximum hold trace with average values (▼)

18 to 40GHz, Tx, Bottom Channel, Z-Axis



4.2.50 Data; 18 to 40GHz, Tx, Bottom Channel, Z-Axis

No measurements were taken based on the max peak data values high margins relative to the limit lines.

V = Vertical / H = Horizontal

The measurements reported are the highest emissions relative to the FCC 15.205 limits and take into account the correction factor*. Measurements made according to the CISPR test standard and Eurofins Hursley test procedure RAD-01.
*Correction factor (dB) = cable and antenna losses as summed positive values (dB) – pre-amp gain where applicable (dB).
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).
Note: path losses are factored into the limit value, and given by the test standard. Chamber calibration data contributes to the measurement uncertainty figure.

4.3 Conducted Emissions; Top Channel (Charging mode with DC PSU at 115V/60Hz)

4.3.1 Test Parameters

A filtered supply was fed to the EUT via a 50Ω/50µH Artificial Mains Network (AMN). The AMN was bonded to a conductive ground plane. Line and neutral phases were measured separately.

An EMI receiver was set to scan between 0.15MHz and 30.0MHz with a 20s measurement time. A CISPR Average and Quasi-Peak trace was generated and compared to the limits and take into account the correction factor. Measurements made according to the test standard and Eurofins Hursley test procedure CON-02.

Test Equipment						
#ID	CP	Manufacturer	Type	Serial Number	Description	Calibration Due Date
785	0	EH	Ground plane	Neptune	Ground plane work area	Not required
162	1	Rohde & Schwarz	ESH3 Z5	829996/003	Single phase LISN / AMN ANSI&CISPR	14/12/2022
482	1	0	Cable BNC	0	Cable BNC	26/10/2022
162	1	Rohde & Schwarz	ESH3 Z5	829996/003	Single phase LISN / AMN ANSI&CISPR	14/12/2022
699	1	Gauss	TDEMI30M	1506001	Time domain conducted receiver	16/09/2023
Test Equipment Software						
#ID	CP	Manufacturer	Type		Description	Calibration Due Date
857	0	Gauss	Software	0	TDMI 30 v5.00	Not required

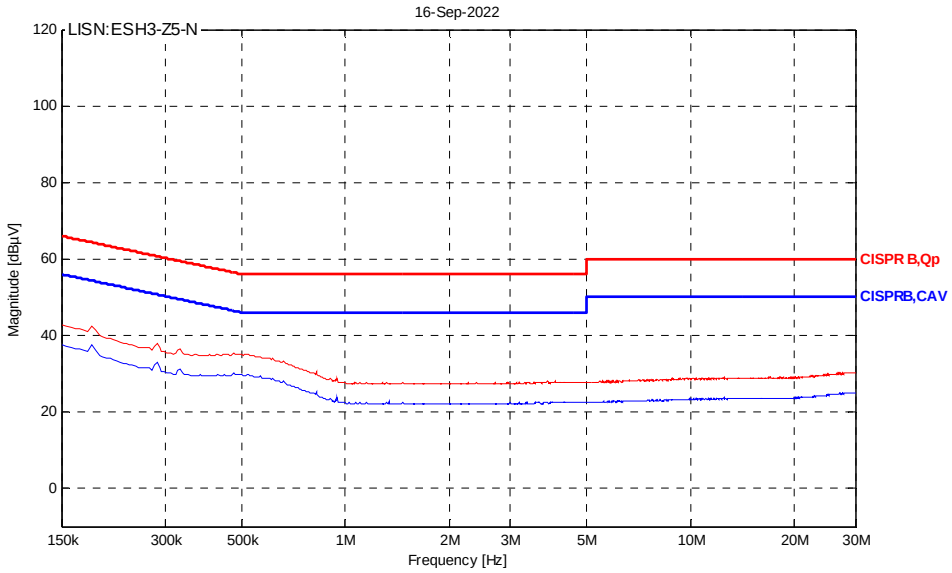
Environmental Test Conditions	
Temperature	22.4° Celsius
Relative Humidity	43%
Atmospheric Pressure	1020.3 millibars
Test Date:	16th September 2022
Test Engineer:	Rich Beckett

Note: “Calibration due date” means the instrument is certified within UKAS or traceable calibration certificate. “Internal” means the instrument is calibrated using Eurofins Hursley procedures. “Not required” means the asset does not require calibration. “CP” is the interval period [year] prescribed for external calibration.

4.3.2 Test Configuration

Please refer to EUT Test Configuration #1.

4.3.3 Profile; Mains Neutral, Top Channel (Charging mode with DC PSU at 115V/60Hz)



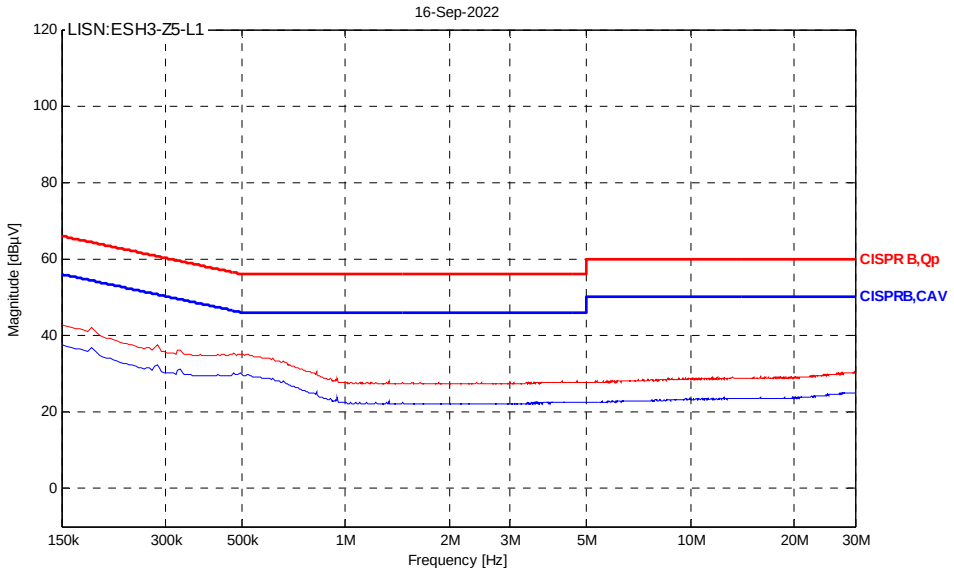
4.3.4 Data; Mains Neutral, Top Channel (Charging mode with DC PSU at 115V/60Hz)

Quasi-peak value (dBµV)				
Frequency	**Measured**	**Class B Limit**	**Margin**	**Status**
522.137 kHz	35.06	56.00	20.94	Pass
9.973 MHz	28.76	60.00	31.24	Pass
12.500 MHz	29.14	60.00	30.86	Pass
15.943 MHz	29.23	60.00	30.77	Pass
24.998 MHz	29.96	60.00	30.04	Pass
29.995 MHz	30.27	60.00	29.73	Pass

CISPR Average value (dBµV)				
Frequency	**Measured**	**Class B Limit**	**Margin**	**Status**
493.526 kHz	29.91	46.11	16.19	Pass
9.973 MHz	23.31	50.00	26.69	Pass
12.500 MHz	23.95	50.00	26.05	Pass
15.929 MHz	23.92	50.00	26.08	Pass
24.998 MHz	24.66	50.00	25.34	Pass
29.395 MHz	24.98	50.00	25.02	Pass

The measured value takes into account the correction factor.
Correction factor (dB) = cable, AMN, and pulse limiter losses as summed positive values (dB)
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).

4.3.5 Profile; Mains Line, Top Channel (Charging mode with DC PSU at 115V/60Hz)



4.3.6 Data; Mains Line, Top Channel (Charging mode with DC PSU at 115V/60Hz)

Quasi-peak value (dBµV)				
Frequency	**Measured**	**Class B Limit**	**Margin**	**Status**
517.368 kHz	35.18	56.00	20.82	Pass
9.987 MHz	28.82	60.00	31.18	Pass
12.500 MHz	29.11	60.00	30.89	Pass
15.929 MHz	29.25	60.00	30.75	Pass
24.998 MHz	29.89	60.00	30.11	Pass
29.819 MHz	30.34	60.00	29.66	Pass

CISPR Average value (dBµV)				
Frequency	**Measured**	**Class B Limit**	**Margin**	**Status**
517.368 kHz	29.87	46.00	16.13	Pass
9.987 MHz	23.38	50.00	26.62	Pass
12.500 MHz	23.98	50.00	26.02	Pass
15.938 MHz	23.90	50.00	26.10	Pass
24.998 MHz	24.66	50.00	25.34	Pass
29.876 MHz	24.98	50.00	25.02	Pass

The measured value takes into account the correction factor.
Correction factor (dB) = cable, AMN, and pulse limiter losses as summed positive values (dB)
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).

4.4 Conducted Emissions; Middle Channel (Charging mode with DC PSU at 115V/60Hz)

4.4.1 Test Parameters

A filtered supply was fed to the EUT via a 50Ω/50µH Artificial Mains Network (AMN). The AMN was bonded to a conductive ground plane. Line and neutral phases were measured separately.

An EMI receiver was set to scan between 0.15MHz and 30.0MHz with a 20s measurement time. A CISPR Average and Quasi-Peak trace was generated and compared to the limits and take into account the correction factor. Measurements made according to the test standard and Eurofins Hursley test procedure CON-02.

Test Equipment						
#ID	CP	Manufacturer	Type	Serial Number	Description	Calibration Due Date
785	0	EH	Ground plane	Neptune	Ground plane work area	Not required
162	1	Rohde & Schwarz	ESH3 Z5	829996/003	Single phase LISN / AMN ANSI&CISPR	14/12/2022
482	1	0	Cable BNC	0	Cable BNC	26/10/2022
162	1	Rohde & Schwarz	ESH3 Z5	829996/003	Single phase LISN / AMN ANSI&CISPR	14/12/2022
699	1	Gauss	TDEMI30M	1506001	Time domain conducted receiver	16/09/2023
Test Equipment Software						
#ID	CP	Manufacturer	Type		Description	Calibration Due Date
857	0	Gauss	Software	0	TDMI 30 v5.00	Not required

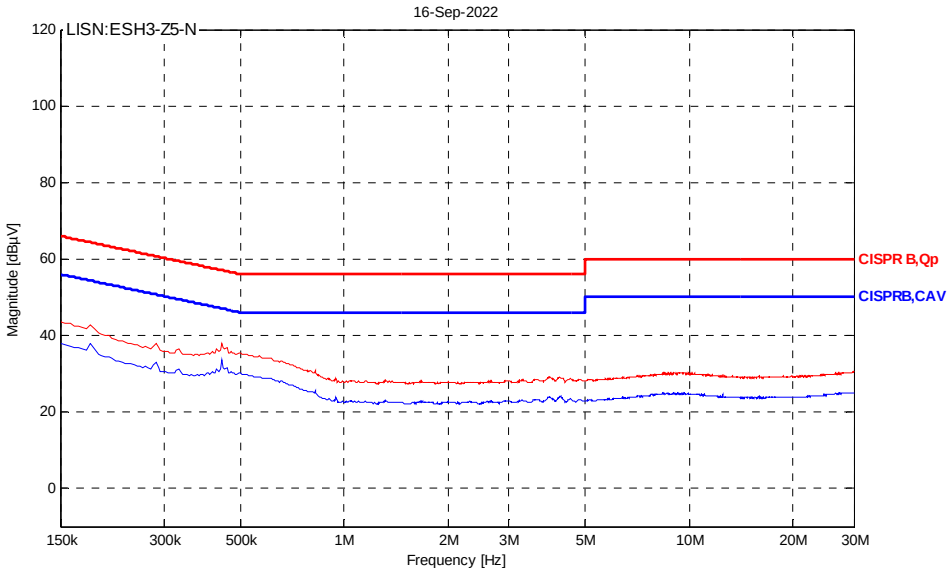
Environmental Test Conditions	
Temperature	22.4° Celsius
Relative Humidity	43%
Atmospheric Pressure	1020.3 millibars
Test Date:	16th September 2022
Test Engineer:	Rich Beckett

Note: “Calibration due date” means the instrument is certified within UKAS or traceable calibration certificate. “Internal” means the instrument is calibrated using Eurofins Hursley procedures. “Not required” means the asset does not require calibration. “CP” is the interval period [year] prescribed for external calibration.

4.4.2 Test Configuration

Please refer to EUT Test Configuration #1.

4.4.3 Profile; Mains Neutral, Middle Channel (Charging mode with DC PSU at 115V/60Hz)



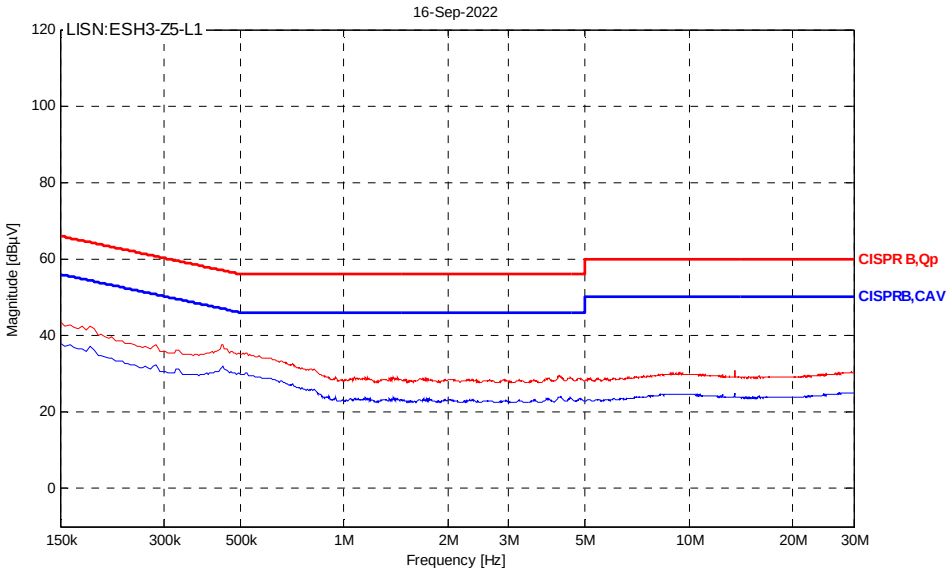
4.4.4 Data; Mains Neutral, Middle Channel (Charging mode with DC PSU at 115V/60Hz)

Quasi-peak value (dBµV)				
Frequency	**Measured**	**Class B Limit**	**Margin**	**Status**
441.074 kHz	37.89	57.04	19.15	Pass
8.738 MHz	30.21	60.00	29.79	Pass
10.126 MHz	30.03	60.00	29.97	Pass
15.991 MHz	29.29	60.00	30.71	Pass
24.998 MHz	29.92	60.00	30.08	Pass
29.995 MHz	30.36	60.00	29.64	Pass

CISPR Average value (dBµV)				
Frequency	**Measured**	**Class B Limit**	**Margin**	**Status**
441.074 kHz	33.47	47.04	13.57	Pass
8.733 MHz	24.92	50.00	25.08	Pass
10.278 MHz	24.62	50.00	25.38	Pass
15.986 MHz	24.02	50.00	25.98	Pass
24.998 MHz	24.64	50.00	25.36	Pass
29.991 MHz	25.01	50.00	24.99	Pass

The measured value takes into account the correction factor.
Correction factor (dB) = cable, AMN, and pulse limiter losses as summed positive values (dB)
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).

4.4.5 Profile; Mains Line, Middle Channel (Charging mode with DC PSU at 115V/60Hz)



4.4.6 Data; Mains Line, Middle Channel (Charging mode with DC PSU at 115V/60Hz)

Quasi-peak value (dBµV)				
Frequency	**Measured**	**Class B Limit**	**Margin**	**Status**
445.843 kHz	37.57	56.95	19.38	Pass
9.177 MHz	30.14	60.00	29.86	Pass
13.559 MHz	30.84	60.00	29.16	Pass
15.943 MHz	29.39	60.00	30.61	Pass
24.998 MHz	29.96	60.00	30.04	Pass
29.662 MHz	30.38	60.00	29.62	Pass

CISPR Average value (dBµV)				
Frequency	**Measured**	**Class B Limit**	**Margin**	**Status**
445.843 kHz	31.88	46.95	15.08	Pass
9.177 MHz	24.67	50.00	25.33	Pass
13.559 MHz	24.98	50.00	25.02	Pass
15.996 MHz	24.11	50.00	25.89	Pass
24.998 MHz	24.64	50.00	25.36	Pass
29.571 MHz	24.99	50.00	25.01	Pass

The measured value takes into account the correction factor.
Correction factor (dB) = cable, AMN, and pulse limiter losses as summed positive values (dB)
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).

4.5 Conducted Emissions; Bottom Channel (Charging mode with DC PSU at 115V/60Hz)

4.5.1 Test Parameters

A filtered supply was fed to the EUT via a 50Ω/50µH Artificial Mains Network (AMN). The AMN was bonded to a conductive ground plane. Line and neutral phases were measured separately.

An EMI receiver was set to scan between 0.15MHz and 30.0MHz with a 20s measurement time. A CISPR Average and Quasi-Peak trace was generated and compared to the limits and take into account the correction factor. Measurements made according to the test standard and Eurofins Hursley test procedure CON-02.

Test Equipment						
#ID	CP	Manufacturer	Type	Serial Number	Description	Calibration Due Date
785	0	EH	Ground plane	Neptune	Ground plane work area	Not required
162	1	Rohde & Schwarz	ESH3 Z5	829996/003	Single phase LISN / AMN ANSI&CISPR	14/12/2022
482	1	0	Cable BNC	0	Cable BNC	26/10/2022
162	1	Rohde & Schwarz	ESH3 Z5	829996/003	Single phase LISN / AMN ANSI&CISPR	14/12/2022
699	1	Gauss	TDEMI30M	1506001	Time domain conducted receiver	16/09/2023
Test Equipment Software						
#ID	CP	Manufacturer	Type		Description	Calibration Due Date
857	0	Gauss	Software	0	TDMI 30 v5.00	Not required

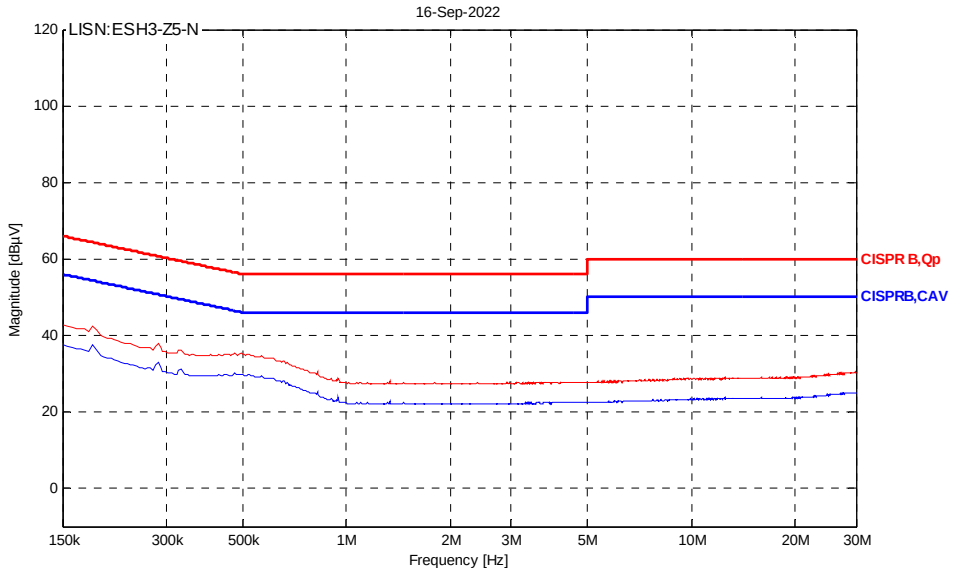
Environmental Test Conditions	
Temperature	22.4° Celsius
Relative Humidity	43%
Atmospheric Pressure	1020.3 millibars
Test Date:	16th September 2022
Test Engineer:	Rich Beckett

Note: “Calibration due date” means the instrument is certified within UKAS or traceable calibration certificate. “Internal” means the instrument is calibrated using Eurofins Hursley procedures. “Not required” means the asset does not require calibration. “CP” is the interval period [year] prescribed for external calibration.

4.5.2 Test Configuration

Please refer to EUT Test Configuration #1.

4.5.3 Profile; Mains Neutral, Bottom Channel (Charging mode with DC PSU at 115V/60Hz)



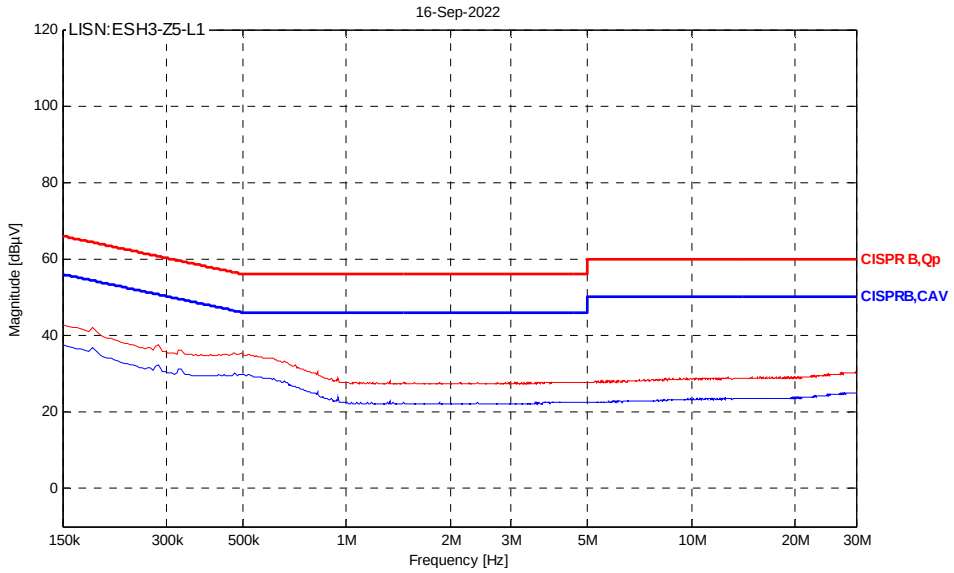
4.5.4 Data; Mains Neutral, Bottom Channel (Charging mode with DC PSU at 115V/60Hz)

Quasi-peak value (dBµV)				
Frequency	**Measured**	**Class B Limit**	**Margin**	**Status**
493.526 kHz	35.23	56.11	20.88	Pass
9.525 MHz	28.76	60.00	31.24	Pass
12.500 MHz	29.15	60.00	30.85	Pass
15.976 MHz	29.19	60.00	30.81	Pass
24.998 MHz	29.99	60.00	30.01	Pass
28.865 MHz	30.33	60.00	29.67	Pass

CISPR Average value (dBµV)				
Frequency	**Measured**	**Class B Limit**	**Margin**	**Status**
517.368 kHz	29.83	46.00	16.17	Pass
9.992 MHz	23.34	50.00	26.66	Pass
12.500 MHz	23.90	50.00	26.10	Pass
15.976 MHz	23.88	50.00	26.12	Pass
24.998 MHz	24.64	50.00	25.36	Pass
29.857 MHz	24.98	50.00	25.02	Pass

The measured value takes into account the correction factor.
Correction factor (dB) = cable, AMN, and pulse limiter losses as summed positive values (dB)
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).

4.5.5 Profile; Mains Line, Bottom Channel (Charging mode with DC PSU at 115V/60Hz)



4.5.6 Data; Mains Line, Bottom Channel (Charging mode with DC PSU at 115V/60Hz)

Quasi-peak value (dBµV)				
Frequency	**Measured**	**Class B Limit**	**Margin**	**Status**
517.368 kHz	35.16	56.00	20.84	Pass
9.716 MHz	28.83	60.00	31.17	Pass
12.500 MHz	29.18	60.00	30.82	Pass
15.986 MHz	29.19	60.00	30.81	Pass
24.998 MHz	30.01	60.00	29.99	Pass
29.752 MHz	30.33	60.00	29.67	Pass

CISPR Average value (dBµV)				
Frequency	**Measured**	**Class B Limit**	**Margin**	**Status**
517.368 kHz	29.83	46.00	16.17	Pass
9.925 MHz	23.36	50.00	26.64	Pass
12.500 MHz	23.88	50.00	26.12	Pass
15.981 MHz	23.91	50.00	26.09	Pass
24.998 MHz	24.65	50.00	25.35	Pass
29.747 MHz	25.00	50.00	25.00	Pass

The measured value takes into account the correction factor.
Correction factor (dB) = cable, AMN, and pulse limiter losses as summed positive values (dB)
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).

4.6 Conducted Emissions; RX Channel (Charging mode with DC PSU at 115V/60Hz)

4.6.1 Test Parameters

A filtered supply was fed to the EUT via a 50Ω/50µH Artificial Mains Network (AMN). The AMN was bonded to a conductive ground plane. Line and neutral phases were measured separately.

An EMI receiver was set to scan between 0.15MHz and 30.0MHz with a 20s measurement time. A CISPR Average and Quasi-Peak trace was generated and compared to the limits and take into account the correction factor. Measurements made according to the test standard and Eurofins Hursley test procedure CON-02.

Test Equipment						
#ID	CP	Manufacturer	Type	Serial Number	Description	Calibration Due Date
785	0	EH	Ground plane	Neptune	Ground plane work area	Not required
162	1	Rohde & Schwarz	ESH3 Z5	829996/003	Single phase LISN / AMN ANSI&CISPR	14/12/2022
482	1	0	Cable BNC	0	Cable BNC	26/10/2022
162	1	Rohde & Schwarz	ESH3 Z5	829996/003	Single phase LISN / AMN ANSI&CISPR	14/12/2022
699	1	Gauss	TDEMI30M	1506001	Time domain conducted receiver	16/09/2023
Test Equipment Software						
#ID	CP	Manufacturer	Type		Description	Calibration Due Date
857	0	Gauss	Software	0	TDMI 30 v5.00	Not required

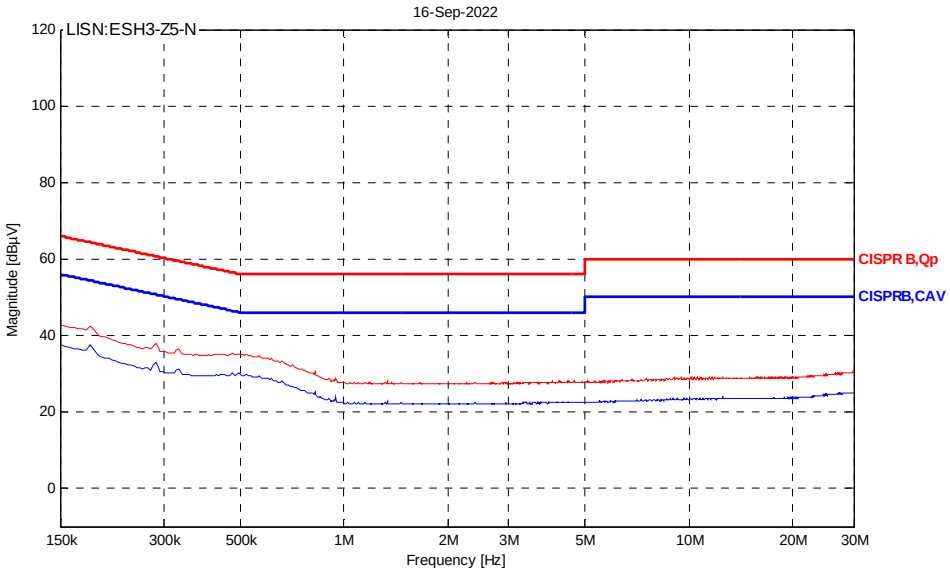
Environmental Test Conditions	
Temperature	22.4° Celsius
Relative Humidity	43%
Atmospheric Pressure	1020.3 millibars
Test Date:	16th September 2022
Test Engineer:	Rich Beckett

Note: “Calibration due date” means the instrument is certified within UKAS or traceable calibration certificate. “Internal” means the instrument is calibrated using Eurofins Hursley procedures. “Not required” means the asset does not require calibration. “CP” is the interval period [year] prescribed for external calibration.

4.6.2 Test Configuration

Please refer to EUT Test Configuration #1.

4.6.3 Profile; Mains Neutral, RX Channel (Charging mode with DC PSU at 115V/60Hz)



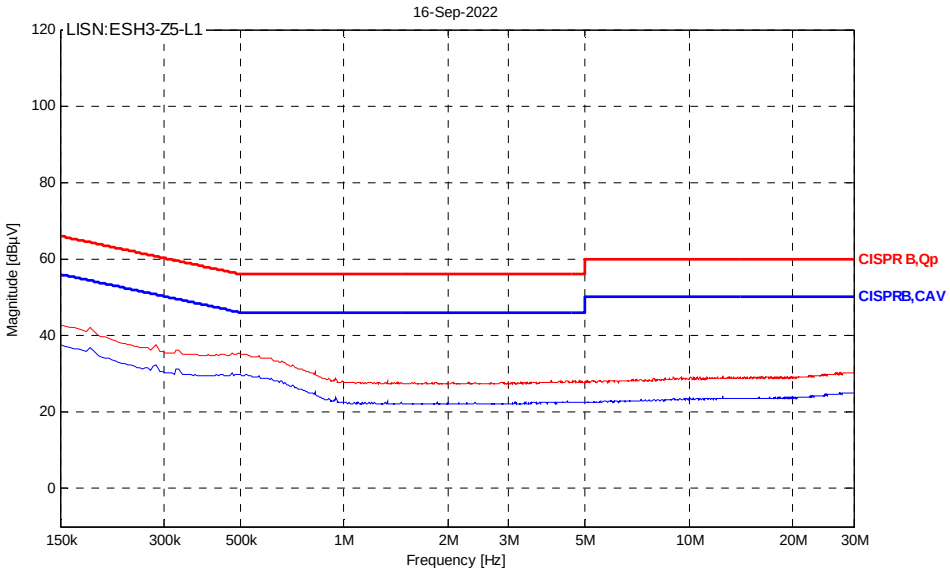
4.6.4 Data; Mains Neutral, RX Channel (Charging mode with DC PSU at 115V/60Hz)

Quasi-peak value (dBµV)				
Frequency	**Measured**	**Class B Limit**	**Margin**	**Status**
517.368 kHz	35.11	56.00	20.89	Pass
9.043 MHz	28.92	60.00	31.08	Pass
12.500 MHz	29.22	60.00	30.78	Pass
15.972 MHz	29.19	60.00	30.81	Pass
24.998 MHz	29.95	60.00	30.05	Pass
29.876 MHz	30.32	60.00	29.68	Pass

CISPR Average value (dBµV)				
Frequency	**Measured**	**Class B Limit**	**Margin**	**Status**
493.526 kHz	29.97	46.11	16.14	Pass
9.949 MHz	23.42	50.00	26.58	Pass
12.500 MHz	24.01	50.00	25.99	Pass
15.967 MHz	23.88	50.00	26.12	Pass
24.998 MHz	24.71	50.00	25.29	Pass
29.957 MHz	24.99	50.00	25.01	Pass

The measured value takes into account the correction factor.
Correction factor (dB) = cable, AMN, and pulse limiter losses as summed positive values (dB)
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).

4.6.5 Profile; Mains Line, RX Channel (Charging mode with DC PSU at 115V/60Hz)



4.6.6 Data; Mains Line, RX Channel (Charging mode with DC PSU at 115V/60Hz)

Quasi-peak value (dBµV)				
Frequency	**Measured**	**Class B Limit**	**Margin**	**Status**
517.368 kHz	35.18	56.00	20.82	Pass
9.019 MHz	28.97	60.00	31.03	Pass
12.500 MHz	29.37	60.00	30.63	Pass
15.976 MHz	29.15	60.00	30.85	Pass
24.998 MHz	29.94	60.00	30.06	Pass
29.747 MHz	30.32	60.00	29.68	Pass

CISPR Average value (dBµV)				
Frequency	**Measured**	**Class B Limit**	**Margin**	**Status**
517.368 kHz	29.85	46.00	16.15	Pass
9.682 MHz	23.47	50.00	26.53	Pass
12.500 MHz	24.06	50.00	25.94	Pass
15.986 MHz	23.85	50.00	26.15	Pass
24.998 MHz	24.62	50.00	25.38	Pass
29.991 MHz	24.98	50.00	25.02	Pass

The measured value takes into account the correction factor.
Correction factor (dB) = cable, AMN, and pulse limiter losses as summed positive values (dB)
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).

4.7 Conducted Emissions; RX Channel (Charging mode with DC PSU at 230V/50Hz)

4.7.1 Test Parameters

A filtered supply was fed to the EUT via a 50Ω/50µH Artificial Mains Network (AMN). The AMN was bonded to a conductive ground plane. Line and neutral phases were measured separately.

An EMI receiver was set to scan between 0.15MHz and 30.0MHz with a 20s measurement time. A CISPR Average and Quasi-Peak trace was generated and compared to the limits and take into account the correction factor. Measurements made according to the test standard and Eurofins Hursley test procedure CON-02.

Test Equipment						
#ID	CP	Manufacturer	Type	Serial Number	Description	Calibration Due Date
785	0	EH	Ground plane	Neptune	Ground plane work area	Not required
162	1	Rohde & Schwarz	ESH3 Z5	829996/003	Single phase LISN / AMN ANSI&CISPR	14/12/2022
482	1	0	Cable BNC	0	Cable BNC	26/10/2022
162	1	Rohde & Schwarz	ESH3 Z5	829996/003	Single phase LISN / AMN ANSI&CISPR	14/12/2022
699	1	Gauss	TDEMI30M	1506001	Time domain conducted receiver	16/09/2023
Test Equipment Software						
#ID	CP	Manufacturer	Type		Description	Calibration Due Date
857	0	Gauss	Software	0	TDMI 30 v5.00	Not required

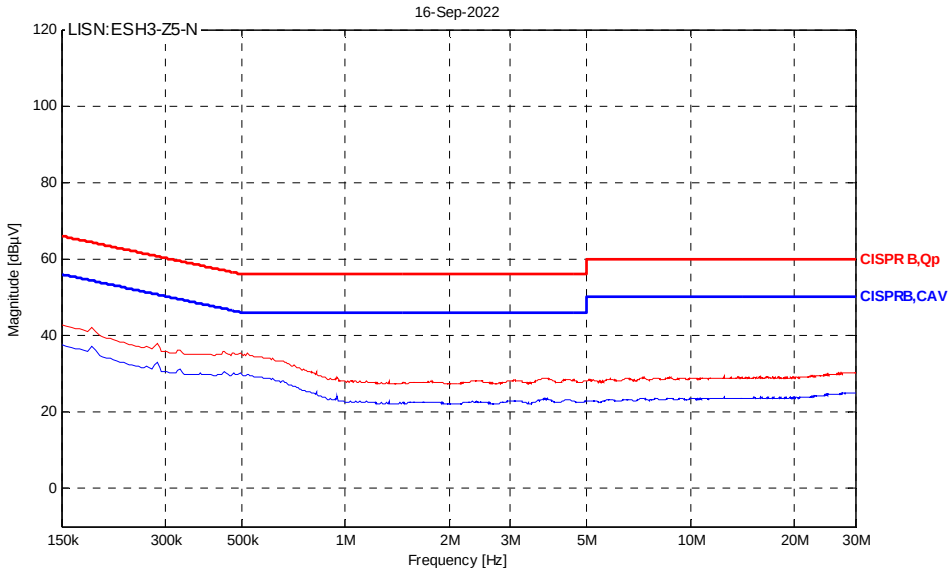
Environmental Test Conditions	
Temperature	22.4° Celsius
Relative Humidity	43%
Atmospheric Pressure	1020.3 millibars
Test Date:	16th September 2022
Test Engineer:	Rich Beckett

Note: “Calibration due date” means the instrument is certified within UKAS or traceable calibration certificate. “Internal” means the instrument is calibrated using Eurofins Hursley procedures. “Not required” means the asset does not require calibration. “CP” is the interval period [year] prescribed for external calibration.

4.7.2 Test Configuration

Please refer to EUT Test Configuration #1.

4.7.3 Profile; Mains Neutral, RX Channel (Charging mode with DC PSU at 230V/50Hz)



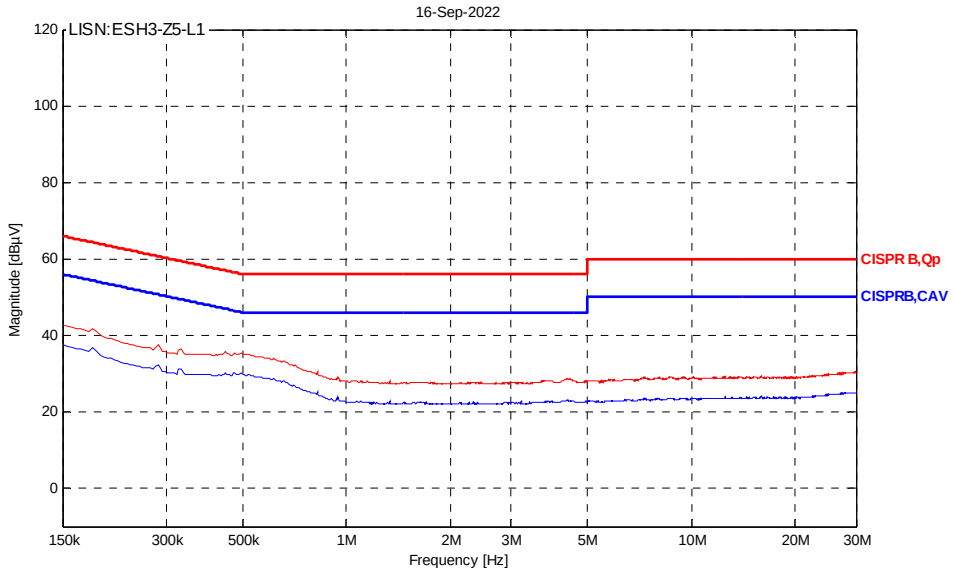
4.7.4 Data; Mains Neutral, RX Channel (Charging mode with DC PSU at 230V/50Hz)

Quasi-peak value (dBµV)				
Frequency	**Measured**	**Class B Limit**	**Margin**	**Status**
517.368 kHz	35.21	56.00	20.79	Pass
8.667 MHz	29.05	60.00	30.95	Pass
12.500 MHz	29.33	60.00	30.67	Pass
15.981 MHz	29.35	60.00	30.65	Pass
24.998 MHz	29.97	60.00	30.03	Pass
29.271 MHz	30.39	60.00	29.61	Pass

CISPR Average value (dBµV)				
Frequency	**Measured**	**Class B Limit**	**Margin**	**Status**
493.526 kHz	29.97	46.11	16.14	Pass
8.695 MHz	23.55	50.00	26.45	Pass
12.500 MHz	24.09	50.00	25.91	Pass
15.986 MHz	24.03	50.00	25.97	Pass
24.998 MHz	24.69	50.00	25.31	Pass
29.995 MHz	25.01	50.00	24.99	Pass

The measured value takes into account the correction factor.
Correction factor (dB) = cable, AMN, and pulse limiter losses as summed positive values (dB)
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).

4.7.5 Profile; Mains Line, RX Channel (Charging mode with DC PSU at 230V/50Hz)



4.7.6 Data; Mains Line, RX Channel (Charging mode with DC PSU at 230V/50Hz)

Quasi-peak value (dBµV)				
Frequency	**Measured**	**Class B Limit**	**Margin**	**Status**
493.526 kHz	35.24	56.11	20.86	Pass
8.805 MHz	29.24	60.00	30.76	Pass
12.500 MHz	29.45	60.00	30.55	Pass
15.981 MHz	29.44	60.00	30.56	Pass
24.998 MHz	30.02	60.00	29.98	Pass
29.981 MHz	30.32	60.00	29.68	Pass

CISPR Average value (dBµV)				
Frequency	**Measured**	**Class B Limit**	**Margin**	**Status**
493.526 kHz	29.99	46.11	16.12	Pass
8.729 MHz	23.65	50.00	26.35	Pass
12.500 MHz	24.17	50.00	25.83	Pass
15.986 MHz	24.13	50.00	25.87	Pass
24.998 MHz	24.66	50.00	25.34	Pass
29.809 MHz	25.03	50.00	24.97	Pass

The measured value takes into account the correction factor.
Correction factor (dB) = cable, AMN, and pulse limiter losses as summed positive values (dB)
The recorded measured value (dB) = measured receiver value (dB) + correction factor (dB).

5.0 MEASUREMENT UNCERTAINTIES

Emissions tests

For all emissions tests, measurement uncertainties have been calculated in line with the requirements of CISPR 16-4-2 to give a confidence level of greater than 95%. In all cases the laboratories calculated uncertainty values (known as Ulab) are equal to or are less than the expected uncertainty values contained in CISPR 16-4-2 (known as Ucispr). Below is a list of the laboratories calculated measurement uncertainties:

Conducted emissions:

Via AMN/LISN:	±3.27dB (9kHz – 150kHz), ±3.27dB (150kHz – 30MHz)
Via AAN/ISN:	±5.00dB (150kHz – 30MHz)
Via CVP:	±3.47dB (150kHz – 30MHz)
Via CP:	±2.69dB (150kHz – 30MHz)
Via 100 Ω:	±2.68dB (150kHz – 30MHz)
Clicks:	±2.83dB (150kHz – 30MHz)
Harmonics:	±1.42% (100Hz – 2kHz)
Flicker:	±1.76% (worst case for all parameters)

Radiated emissions:

H-Field:	±2.84dB (9kHz – 3MHz), ±2.92dB (3MHz – 30MHz)
D = 3.0 m (Horizontal):	±3.91dB (30MHz – 1GHz SAC), ±3.82dB (30MHz – 1GHz FAC)
D = 3.0 m (Vertical):	±5.22dB (30MHz – 1GHz SAC), ±3.82dB (30MHz – 1GHz FAC)
D = 3.0 m:	±5.13dB (1GHz – 6GHz SAC), ±5.15dB (1GHz – 10GHz SAC), ±3.64dB (10GHz – 18GHz SAC), ±3.10dB (18GHz – 40GHz SAC). ±3.05dB (1GHz – 6GHz FAC)

Radiated spurious emissions (RSE):

±1.71dB (30MHz – 1GHz), ±1.81dB (1 – 12.75GHz), ±2.07dB (12.75 – 18GHz)

Immunity tests

For IEC 61000-4-2, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-8, IEC 61000-4-9, IEC 61000-4-11 tests, the following applies:

Measurement uncertainty has been calculated or calibrated for the various required parameters to provide a confidence level of 95% (k=2). These parameters have been compared to the basic standard tolerance requirements for each of the various parameters.
In all cases the calculated or calibrated uncertainty meets the basic standard requirements.

For IEC 61000-4-3, IEC 61000-4-6 tests, the following applies:

Measurement uncertainty has been calculated to provide a confidence level of 95%, or k=2, but this has not been applied to the applied test level, therefore the applied test level has an uncertainty of ±50%. This is in accordance with CENELEC and other international guidance.

In the case of Maritime equipment tested to EN/IEC 60945, there is a specific requirement that the applied test level be increased by the calculated measurement uncertainty. This is done by applying a coverage factor of k=1.64, which provides a 95% confidence that the applied test level has been achieved.

Test Results - Decision Rules

As the decision is generally inherent in the standard for Commercial EMC a simple acceptance rule can be applied. The following statement will be added to EMC quotes and reports. "The Decision Rule is applied on the basis of CISPR16-4-2 and/or EN61000-4-x (TR61000-1-6) These standards provide guidance on how to calculate and apply measurement uncertainty whilst providing maximum uncertainties allowance. Due consideration will also be given to JCGM 106:2012, ILAC-G8:09/2019 and LAB 48. This laboratory has demonstrated by calibrating its equipment and facilities, and calculating its own uncertainties, that it complies with the above requirements and therefore no allowance of uncertainties has been given to the tolerances." Where a result is considered marginal in respect of its proximity to the limit line, for example, the customer would be made aware of situation so that they can make an informed decision on how to proceed.

Published 02/08/2022

6.0 ANNEX – CONDUCTED EMISSIONS RESULTS

6.1 Summary

Test	Clause	Requirement	Result
Occupied Bandwidth	None	None	Pass
Maximum Peak Conducted Output Power	FCC 15.247(b)(3)	1W	Pass
Power Spectral Density	FCC 15.247(c)	8 dBm / 3 kHz	Pass
Maximum Antenna Gain	15.247(b)(4)(11)	≤ 6dBi	Pass
Conducted AC Emissions	15.207(a)	15.207(a)	None

6.2 DTS Bandwidth

6.2.1 Measurement method

Test was conducted in accordance with ANSI C63.10 Clause 11.8 Option 1:

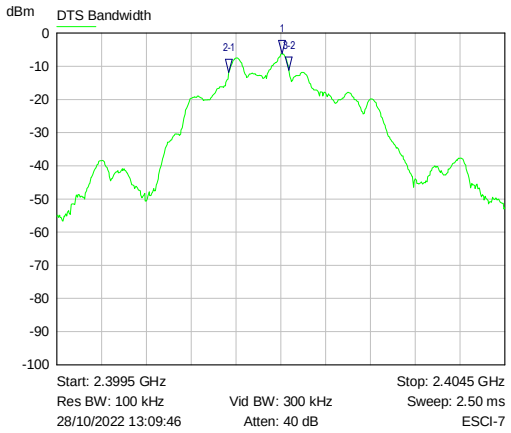
a) Set resolution bandwidth to 100 kHz
b) Set the video bandwidth to ≥ 3 x RBW
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

6.2.2 Test Results

Channel	6dB DTS Bandwidth (MHz)	Requirement	Status
Bottom	670.0	> 500 kHz	Pass
Middle	850.0	> 500 kHz	Pass
Top	860.0	> 500 kHz	Pass

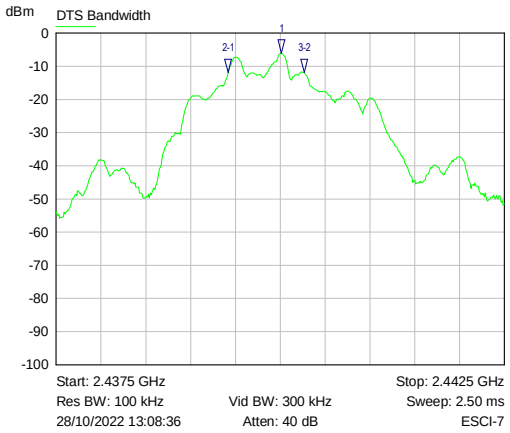
Table 6: DTS Bandwidth

6.2.3 Profile; DTS Bandwidth



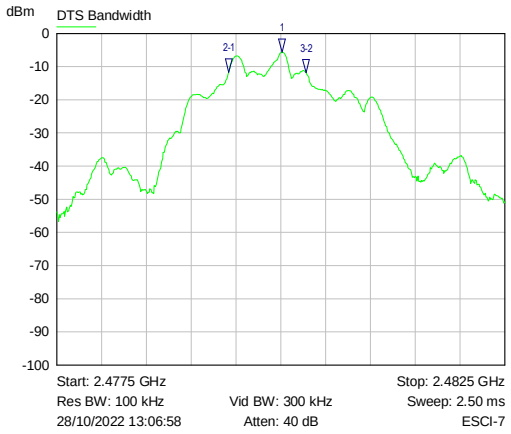
Mkr	Trace	X-Axis	Value	Notes
1	DTS Bandwidth	2.4020 GHz	-6.24 dBm	
2-1	DTS Bandwidth	-590.0000 kHz	-5.55 dB	Relative to max
3-2	DTS Bandwidth	670.0000 kHz	0.57 dB	Relative to marker 2

Bottom



Mkr	Trace	X-Axis	Value	Notes
1	DTS Bandwidth	2.4400 GHz	-6.08 dBm	
2-1	DTS Bandwidth	-590.0000 kHz	-5.83 dB	Relative to max
3-2	DTS Bandwidth	850.0000 kHz	0.10 dB	Relative to marker 2

Middle



Mkr	Trace	X-Axis	Value	Notes
1	DTS Bandwidth	2.4800 GHz	-5.65 dBm	
2-1	DTS Bandwidth	-590.0000 kHz	-6.08 dB	Relative to max
3-2	DTS Bandwidth	860.0000 kHz	-0.10 dB	Relative to marker 2

Top

Figure 1: DTS Bandwidth plots

6.3 Maximum Peak Conducted Output Power

6.3.1 Measurement method

As the analyser could be set RBW ≥ DTS bandwidth, the test was conducted in accordance with ANSI C63.10 Clause 11.9.1.1:

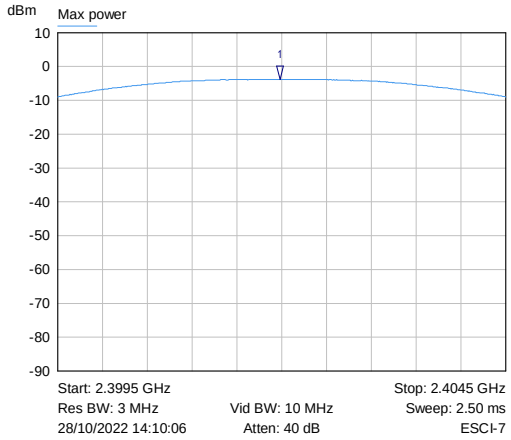
a) Set the RBW ≥ DTS bandwidth.
b) Set VBW ≥ 3 x RBW.
c) Set span ≥ 3 x RBW.
d) Sweep time = auto couple.
e) Detector = peak.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use peak marker function to determine the peak amplitude level.

6.3.2 Test Results

Channel	Channel Power (dBm)	Power (W)	Channel Power (dBm)	Status
Bottom	-3.82	0.00041	1.0	Pass
Middle	-3.51	0.00045	1.0	Pass
Top	-3.24	0.00047	1.0	Pass

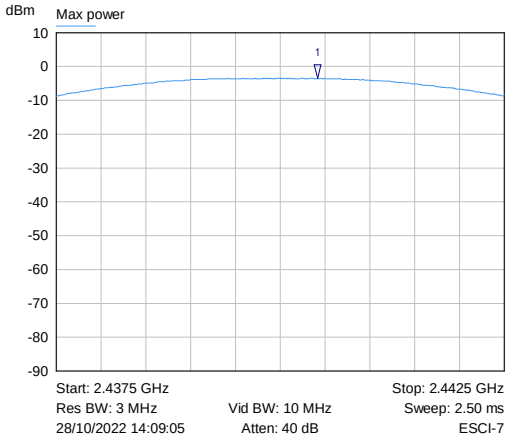
Table 1: Channel Power

6.3.3 Profile; Maximum Peak Conducted Power



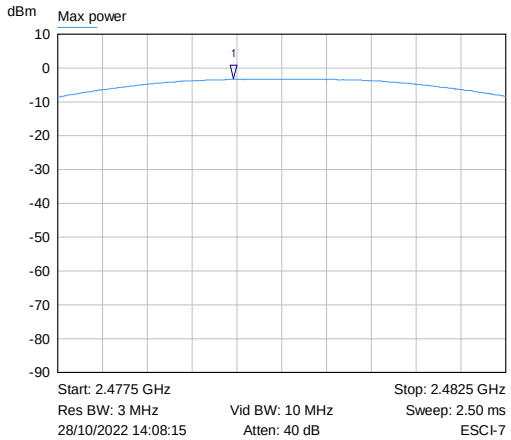
Mkr	Trace	X-Axis	Value	Notes
1	Max power	2.4020 GHz	-3.82 dBm	

Bottom



Mkr	Trace	X-Axis	Value	Notes
1	Max power	2.4404 GHz	-3.51 dBm	

Middle



Mkr	Trace	X-Axis	Value	Notes
1	Max power	2.4795 GHz	-3.24 dBm	

Top

Figure 2: Peak Conducted Power plots

6.4 Maximum Power Spectral Density

6.4.1 Measurement Method

As conducted power was measured as Maximum Peak Conducted Power, measurement was performed in accordance with ANSI C63.10 Clause 11.10.2:

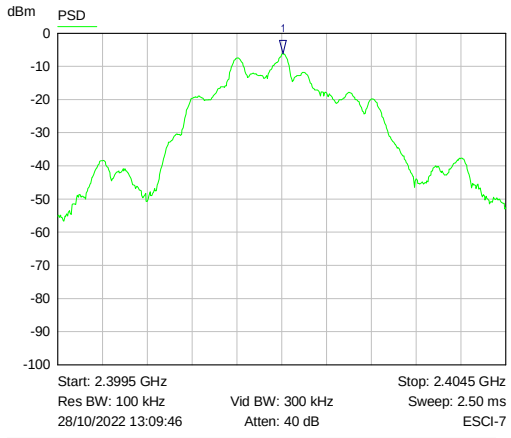
a) Set analyzer center frequency to DTS channel center frequency.
b) Set the span to 1.5 x DTS bandwidth.
c) Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d) Set the VBW ≥ 3 x RBW.
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum amplitude level within the RBW.
j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

6.4.2 Test results

Channel	Peak Marker reading (dBm)	Limit (dBm/3kHz)	Status
Bottom	-6.24	8.0	Pass
Middle	-6.08	8.0	Pass
Top	-5.65	8.0	Pass

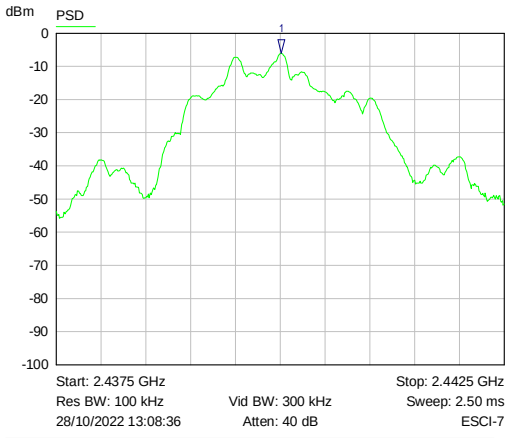
Table 8: Spectral Density results

6.4.3 Profile; Power Spectral Density



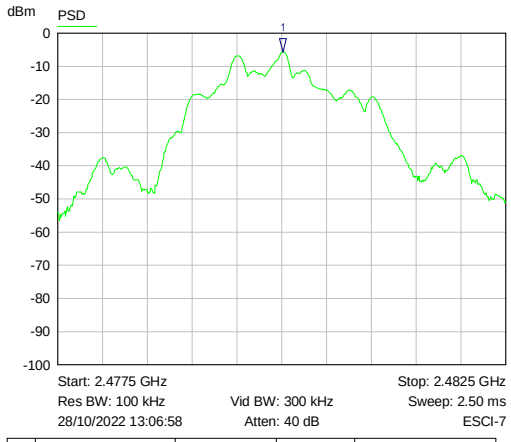
Mkr	Trace	X-Axis	Value	Notes
1	PSD	2.4020 GHz	-6.24 dBm	

Bottom



Mkr	Trace	X-Axis	Value	Notes
1	PSD	2.4400 GHz	-6.08 dBm	

Middle



Mkr	Trace	X-Axis	Value	Notes
1	PSD	2.4800 GHz	-5.65 dBm	

Top

Figure 3: Power Spectral Density plots

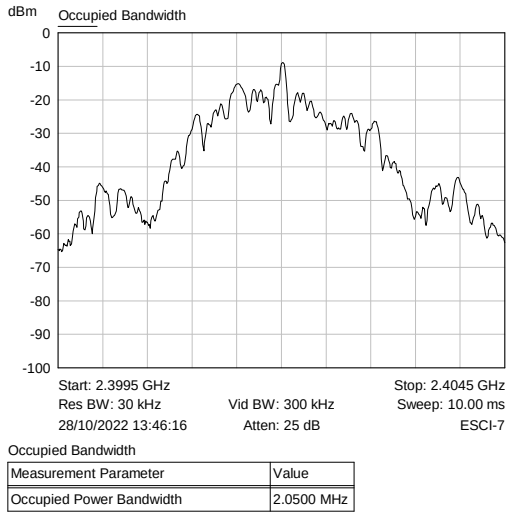
6.5 Occupied bandwidth

99% occupied bandwidth measured using the inbuilt function in the spectrum analyser

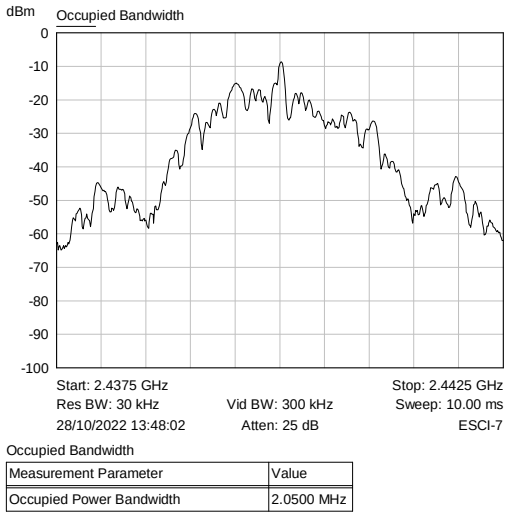
Channel	Peak limit (dBm)	Average limit (dBm)	Result
Bottom	2.050	None	For information
Middle	2.050	None	For information
Top	2.050	None	For information

Table 2: Occupied Bandwidth

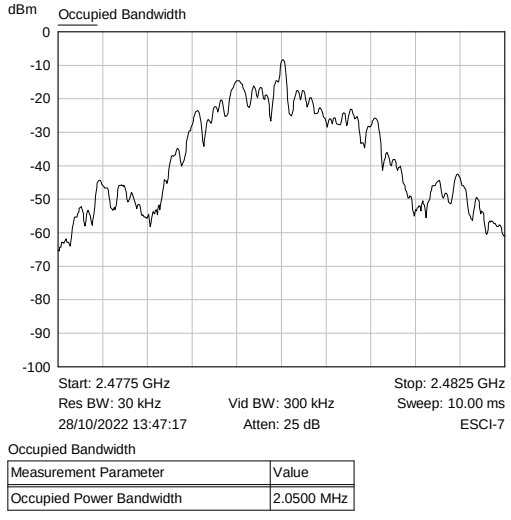
6.5.1 Profile; Occupied Bandwidth



Bottom



Middle



Top

Figure 6: Occupied Bandwidth

6.6 Test Equipment

Description	Manufacturer	Name	Serial Number	Calibration certificate Or Calibration due
Spectrum Analyser	Rohde & Schwarz	ESCI 7	HEMC #289	20/09/2023

End of Document