



A part of



# Radio Test Report

## Salunda

### 6870 GW Module

### C6

47 CFR Part 15.250 Effective Date 1st October 2021  
WBT: Wideband Transmitter  
Test Date: 10th March 2023 to 16th March 2023  
Report Number: 03-13422-1-23 Issue 01

The testing was carried out by RN Electronics Ltd, an independent test house, at their test facility located at:

***R.N. Electronics Ltd.***

Arnolds Court  
Arnolds Farm  
Lane  
Mountnessing  
Essex  
CM13 1UT  
U.K.

[www.RNelectronics.com](http://www.RNelectronics.com)

Telephone: +44 (0) 1277 352219  
Email: [sales@RNelectronics.com](mailto:sales@RNelectronics.com)

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Arnolds Court, Arnolds Farm Lane, Mountnessing, Brentwood Essex, CM13 1UT

### Certificate of Test 13422-1

The equipment noted below has been fully tested by R.N. Electronics Limited and, where appropriate, conforms to the relevant subpart of 47 CFR Part 15C. This is a certificate of test only and should not be confused with an equipment authorisation. Other standards may also apply.

Equipment:	6870 GW Module
Model Number:	C6
Unique Serial Number:	40000001 (Radiated unit) 41000244 (Conducted unit)
Applicant:	Salunda Ltd Unit 6 Avonbury Business Park Bicester Oxon OX26 2UA
Proposed FCC ID	2ALTW18016870
Full measurement results are detailed in Report Number:	03-13422-1-23 Issue 01
Test Standards:	47 CFR Part 15.250 Effective Date 1st October 2021 WBT: Wideband Transmitter

NOTE: This report pertains to UWB operation, for 2.4GHz ZigBee operation please refer to RN report 03-13422-2-23.

DEVIATIONS:  
No deviations have been applied.

This certificate relates only to the unit tested as identified by a unique serial number and in the condition at the time it was tested. It does not relate to any other similar equipment and performance of the product before or after the test cannot be guaranteed. Whilst every effort is made to assure quality of testing, type tests are not exhaustive and although no non-conformances may be found, this doesn't exclude the possibility of unit not meeting the intentions of the standard or the requirements of the Federal Regulations, particularly under different conditions to those during testing. Any compliance statements are made reliant on (a) the application of the product and use of the assigned band being acceptable to the FCC and (b) the modes of operation as instructed to us by the Customer based on their specific knowledge of the application and functionality of the EUT. Statements of compliance, where measurements were made, do not include the measurement uncertainty. The measurement uncertainty, where stated, is the expanded uncertainty based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Date of Test:	10th March 2023 to 16th March 2023
Test Engineer: Graham Blake	<input type="text"/>
Approved By: Test Development Engineer	<input type="text"/>
Customer Representative:	<input type="text"/>



# 1 Contents

1	Contents	3
2	Equipment under test (EUT)	4
2.1	Equipment specification	4
2.2	Configurations for testing	4
2.3	Functional description	5
2.4	Modes of operation	5
2.5	Emissions configuration	6
3	Summary of test results	7
4	Specifications	8
4.1	Relevant standards	8
4.2	Deviations	8
4.3	Tests at extremes of temperature & voltage	8
4.4	Test fixtures	8
5	Tests, methods and results	9
5.1	10dB Bandwidth	9
5.2	Peak & Average EIRP	11
5.3	Radiated emissions 30 – 960 MHz	13
5.4	Radiated emissions above 960 MHz	15
5.5	Radiated emissions 150 kHz - 30 MHz	18
5.6	Radiated emissions 9 - 150 kHz	19
5.7	AC power line conducted emissions	20
6	Plots/Graphical results	22
6.1	10dB Bandwidth	22
6.2	Peak & Average EIRP	34
6.3	Radiated emissions 30 MHz -1 GHz	36
6.4	Radiated emissions above 1 GHz	38
6.5	Radiated emissions 150 kHz - 30 MHz	61
6.6	Radiated emissions 9 - 150 kHz	62
6.7	AC power line conducted emissions	63
7	Explanatory Notes	65
7.1	Explanation of Table of Signals Measured	65
7.2	Explanation of limit line calculations for radiated measurements	66
8	Photographs	68
8.1	Radiated emission diagrams	68
8.2	AC powerline conducted emission diagram	69
9	Test equipment calibration list	70
10	Auxiliary and peripheral equipment	71
10.1	Customer supplied equipment	71
10.2	RN Electronics supplied equipment	71
11	Condition of the equipment tested	72
11.1	Modifications before test	72
11.2	Modifications during test	72
12	Description of test sites	73
13	Abbreviations and units	74

## 2 Equipment under test (EUT)

### 2.1 Equipment specification

Applicant	Salunda Ltd Unit 6 Avonbury Business Park Bicester Oxon OX26 2UA	
Manufacturer of EUT	Salunda Ltd	
Full Name of EUT	6870 GW Module	
Model Number of EUT	C6	
Serial Number of EUT	40000001 (Radiated unit) 41000244 (Conducted unit)	
Date Received	3rd March 2023	
Date of Test:	10th March 2023 to 16th March 2023	
Purpose of Test	To demonstrate design compliance to the relevant rules of Chapter 47 of the Code of Federal Regulations.	
Date Report Issued	5th September 2023	
Main Function	Personal/Equipment Locating	
Information Specification	Height	10 mm
	Width	100 mm
	Depth	100 mm
	Weight	0.2 kg
	Voltage	32 - 50 VDC
	Current	0.05 Amps
Power supply	Manufacturer	MeanWell
	Model	GST25B48
	Serial Number	EB91I28048
	Input	100 – 240 VAC 50 / 60 Hz
	Current	0.6A
	Output	48VDC 520mA 25 Watt

### 2.2 Configurations for testing

General Parameters	
EUT Normal use position	Body worn
Choice of model(s) for type tests	Sample
Antenna details	Integral. Taoglas UWCCP.01
Antenna port	No
Baseband Data port (yes/no)?	No
Highest Signal generated in EUT	6.5 GHz
Lowest Signal generated in EUT	12 MHz
Hardware Version (HVIN)	C
Software Version	Android App 1.8
Firmware Version (FVIN)	RF – 5.7, UWB 5.10
Type of Equipment	Personal/Equipment Locating
Technology Type	UWB IEEE 802.15.4
Geo-location (yes/no)	Location by radio determination
TX Parameters	
Alignment range – transmitter	6.5GHz

EUT Declared Modulation Parameters	802.15.4
EUT Declared Power level	-41.3 dBm/MHz
EUT Declared Signal Bandwidths	500 MHz
EUT Declared Channel Spacing's	Single channel
EUT Declared Duty Cycle	10 %
Unmodulated carrier available?	Yes
Declared frequency stability	0.5ppm
<b>RX Parameters</b>	
Alignment range – receiver	6.5GHz
EUT Declared RX Signal Bandwidth	500 MHz
<b>FCC Parameters</b>	
FCC Transmitter Class	WBT: Wideband Transmitter

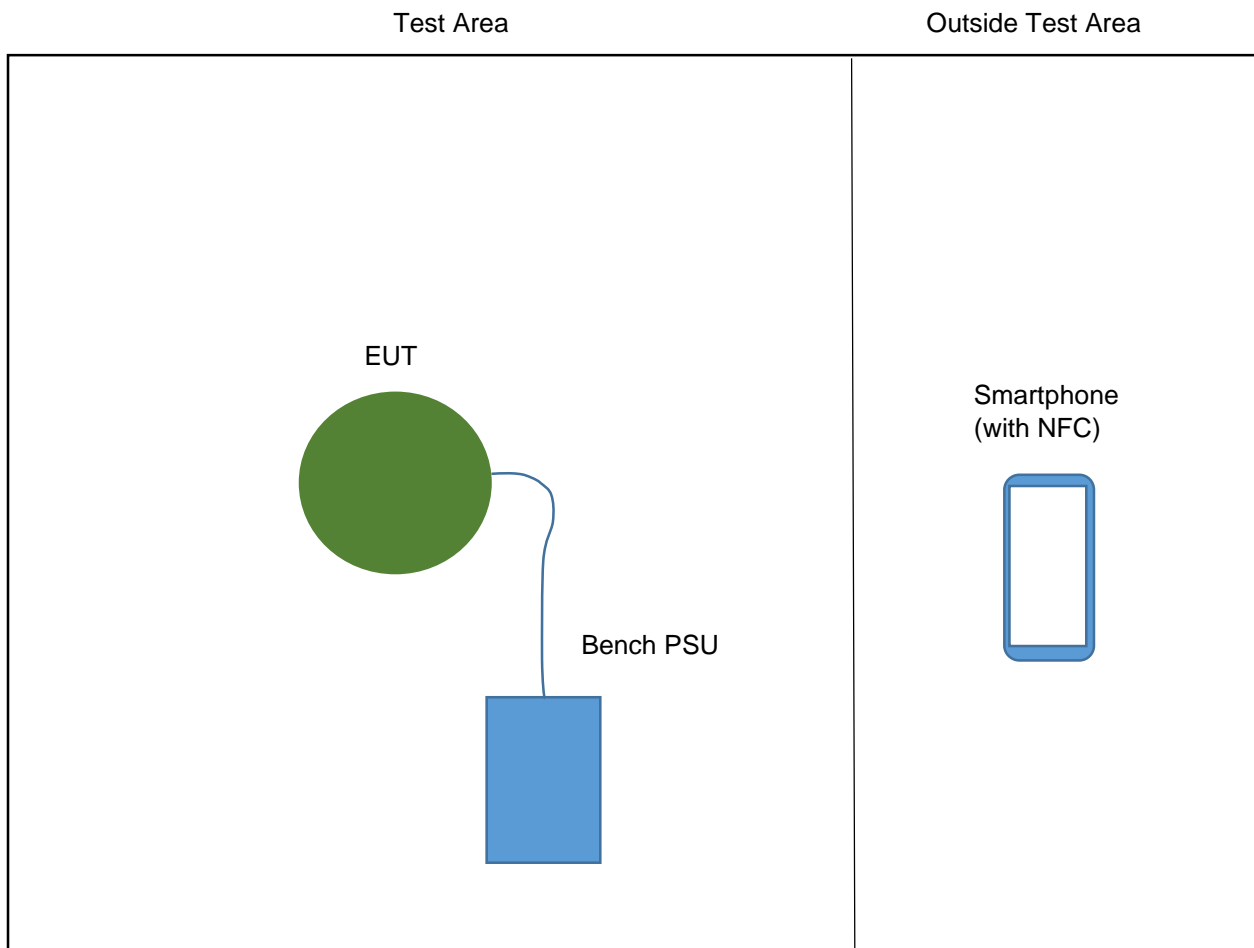
### 2.3 Functional description

Locates via UWB and sends location back to server, configuration over the 2.4GHz network, can also operate as gateway which responds to request to range. The 6870 GW Module also has NFC (13.56MHz) although the NFC tag is connected to the internal electronics of the EUT, it is a passive tag and does not generate its own electromagnetic field.

### 2.4 Modes of operation

Mode Reference	Description	Used for testing
TX1	Transmitting continuously at 6489 MHz with system modulation. Tested in conjunction with the 2.4 GHz radio transmitting at 2440 MHz.	Yes
TX2	Transmitting at maximum declared duty cycle at 6489 MHz with system modulation. Tested in conjunction with the 2.4 GHz radio transmitting at 2440 MHz.	Yes

## 2.5 Emissions configuration



The unit was powered from a bench power supply. For conducted tests a separate test unit was provided where the internal antenna had been removed and an SMA semi-rigid cable assembly was fitted in its place. For AC conducted emissions the EUT was connected to a mains powered 48 VDC PSU provide by the applicant. The unit was configured using a Smartphone running Salunda NFC Lite engineering software. The relevant radio settings were configured in the app and then the setting was transmitted to the EUT using NFC (13.56MHz). Refer to section 2.4 for the modes used during testing. The applicant declares that both UWB radios cannot transmit simultaneously. The transmit mode used for Peak power tests was 100% duty cycle. For Average power measurements the transmit mode was 10% duty cycle which was the worst case duty cycle declared by the applicant. The power settings provided by the applicant and used during test to give maximum output power were:-

(Radio 0) Single Channel (6489 MHz centre frequency) = Power setting UWB Power Coarse 12.5, UWB Power Fine 3

(Radio 1) Single Channel (6489 MHz centre frequency) = Power setting UWB Power Coarse 12.5, UWB Power Fine 1.5

### 2.5.1 Signal leads

Port Name	Cable Type	Connected
Power	2 x Single core	Yes

### 3 Summary of test results

The 6870 GW Module, C6 was tested for compliance to the following standard(s):

47 CFR Part 15.250 Effective Date 1st October 2021  
WBT: Wideband Transmitter

Any compliance statements are made reliant on (a) the application of the product and use of the assigned band being acceptable to the FCC and (b) the modes of operation as instructed to us by the Customer based on their specific knowledge of the application and functionality of the EUT. Whilst every effort is made to assure quality of testing, type tests are not exhaustive and although no non-conformances may be found, this doesn't exclude the possibility of equipment not meeting the intentions of the standard or the essential requirements of the directive, particularly under different conditions to those during testing. Statements of compliance, where measurements were made, do not include the measurement uncertainty. The measurement uncertainty, where stated, is the expanded uncertainty based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Title	References	Results
<b>Transmitter Tests</b>		
1. 10dB Bandwidth	47 CFR Part 15C Clause 15.250(a) / (b)	PASSED
2. Peak & Average EIRP	47 CFR Part 15C Clause 15.250(d)(3) / (d)(1)	PASSED
3. Radiated emissions 30 MHz -1 GHz	47 CFR Part 15C Clause 15.250 (d)(1) / 15.209	PASSED
4. Radiated emissions above 1 GHz	47 CFR Part 15C Clause 15.250 (d)(1) / 15.209	PASSED <sup>1</sup>
5. Radiated emissions 150 kHz - 30 MHz	47 CFR Part 15C Clause 15.209	PASSED
6. Radiated emissions 9 - 150 kHz	47 CFR Part 15C Clause 15.209	PASSED
7. Field strength of spurious emissions	47 CFR Part 15C Part 15.207	PASSED
8. AC power line conducted emissions	47 CFR Part 15C Clause 15.207	PASSED

<sup>1</sup> Spectrum investigated up to a frequency of 40GHz based on the highest channel/ signal generated in equipment of 6489MHz.

## 4 Specifications

The tests were performed and operated in accordance with R.N. Electronics Ltd procedures and the relevant standards listed below.

### 4.1 Relevant standards

Ref.	Standard Number	Version	Description
4.1.1	47 CFR Part 15C	2021	Federal Communications Commission PART 15 – RADIO FREQUENCY DEVICES
4.1.2	ANSI C63.10	2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
4.1.3	ANSI C63.4	2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

### 4.2 Deviations

No deviations were applied

### 4.3 Tests at extremes of temperature & voltage

The following test conditions were used to simulate testing at nominal or extremes.

Temperature Test Conditions		Voltage Test Conditions	
T nominal	20 °C	V nominal	120V DC
T minimum	-30 °C	V minimum	102V DC
T maximum	50 °C	V maximum	138V DC

Extremes of voltage are based on nominal +/-15%.

Extremes of temperature are based upon 47 CFR Clause 2.1055.

The ambient test conditions of humidity and pressure in the laboratory were as specified in each specific test section within this report

### 4.4 Test fixtures

In order to measure RF parameters at temperature extremes, the EUT was tested in a temperature controlled chamber as follows:

A temporary RF port was created for testing.



## 5 Tests, methods and results

### 5.1 10dB Bandwidth

#### 5.1.1 Test methods

Test Requirements: 47 CFR Part 15C Clause 15.250(a)/(b) [Reference 4.1.1 of this report]  
 Test Method: ANSI C63.10 Clause 10.1 [Reference 4.1.3 of this report]  
 Limits: 47 CFR Part 15C Clause 15.250(a)/(b) [Reference 4.1.1 of this report]

#### 5.1.2 Configuration of EUT

The EUT was placed in an environmental chamber and was connected to a spectrum analyser using suitable attenuation. Measurements were made at the temporary RF port. The EUT was powered using a bench power supply. This allowed the supply voltage to be varied during tests to the manufactures declared end-points as stated I section 4.3. The EUT was operated in TX1 mode.

#### 5.1.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment listed below. A 1MHz RBW, 3x VBW, auto sweep time and max hold settings were used for the 10 dB bandwidth. The peak of the signal was found and markers referenced to it were used to determine -10dB Bandwidth  
 Tests were performed using test Site A.

#### 5.1.4 Test equipment

E255, E412, E434, E555, E623, N579, S032, TMS38

See Section 9 for more details

#### 5.1.5 Test results

Temperature of test environment 20°C  
 Humidity of test environment 50%  
 Pressure of test environment 102kPa

Band	5925-7250 MHz
Power Level	15.5 dBm
Channel Spacing	Single Channel
Mod Scheme	UWB (Radio 0)
Single channel	6489 MHz

EUT supply voltage	FL (MHz)	FH (MHz)	OCC BW (MHz)	Calculated centre frequency FC (MHz)	Highest frequency FM (MHz)	Fractional bandwidth. $\frac{2(FH-FL)}{(FH+FL)}$
Nom Voltage	6169.2040	6835.7220	666.5180	6502.4630	6335.2950	0.102502
Plot ref	13422-1 OBW Radio 0 Tnom Vnom					
Min Voltage	6165.8020	6836.2850	670.4830	6501.0435	6335.5390	0.103135
Plot ref	13422-1 OBW Radio 0 Tnom Vmin					
Max Voltage	6145.2690	6833.2340	687.9650	6489.2515	6643.4380	0.106016
Plot ref	13422-1 OBW Radio 0 Tnom Vmax					
Nom Voltage	6101.4860	6911.3090	809.8230	6506.3975	6335.0510	0.124466
Plot ref	13422-1 OBW Radio 0 T-30 Deg C Vnom					
Nom Voltage	6147.7480	6904.7080	756.9600	6526.2280	6334.5620	0.115987
Plot ref	13422-1 OBW Radio 0 T-20 Deg C Vnom					
Nom Voltage	6103.6230	6904.2470	800.6240	6503.9350	6333.8300	0.123098
Plot ref	13422-1 OBW Radio 0 T-10 Deg C Vnom					
Nom Voltage	6144.8420	6846.3820	701.5400	6495.6120	6334.0740	0.108002
Plot ref	13422-1 OBW Radio 0 T 0 Deg C Vnom					
Nom Voltage	6144.8420	6846.3820	701.5400	6495.6120	6334.0740	0.108002

Plot ref	13422-1 OBW Radio 0 T 10 Deg C Vnom					
Nom Voltage	6169.9910	6836.5890	666.5980	6503.2900	6334.0740	0.102502
Plot ref	13422-1 OBW Radio 0 T 30 Deg C Vnom					
Nom Voltage	6169.1640	6834.7210	665.5570	6501.9425	6335.5390	0.102363
Plot ref	13422-1 OBW Radio 0 T 40 Deg C Vnom					
Nom Voltage	6174.4500	6834.5510	660.1010	6504.5005	6333.8300	0.101484
Plot ref	13422-1 OBW Radio 0 T 50 Deg C Vnom					

Band	5925-7250 MHz
Power Level	15.5 dBm
Channel Spacing	Single Channel
Mod Scheme	UWB (Radio 1)
Single channel	6489 MHz

EUT supply voltage	FL (MHz)	FH (MHz)	OCC BW (MHz)	Calculated centre frequency FC (MHz)	Highest frequency FM (MHz)	Fractional bandwidth. $\frac{2(FH-FL)}{(FH+FL)}$
Nom Voltage	6144.4990	6835.8630	691.3640	6490.1810	6644.9030	0.106525
Plot ref	13422-1 OBW Radio 1 Tnom Vnom					
Min Voltage	6145.2690	6833.2340	687.9650	6489.2515	6643.4380	0.106016
Plot ref	13422-1 OBW Radio 1 Tnom Vmin					
Max Voltage	6146.5280	6834.7640	688.2360	6490.6460	6644.4140	0.106035
Plot ref	13422-1 OBW Radio 1 Tnom Vmax					
Nom Voltage	6088.1870	6904.3130	816.1260	6496.2500	6644.4140	0.125630
Plot ref	13422-1 OBW Radio 1 T-30 Deg C Vnom					
Nom Voltage	6087.1150	6914.4910	827.3760	6500.8030	6643.6820	0.127273
Plot ref	13422-1 OBW Radio 1 T-20 Deg C Vnom					
Nom Voltage	6144.6900	6912.5380	767.8480	6528.6140	6644.9030	0.117613
Plot ref	13422-1 OBW Radio 1 T-10 Deg C Vnom					
Nom Voltage	6145.5310	6834.6990	689.1680	6490.1150	6645.3910	0.106187
Plot ref	13422-1 OBW Radio 1 T 0 Deg C Vnom					
Nom Voltage	6145.5310	6834.6990	689.1680	6490.1150	6645.3910	0.106187
Plot ref	13422-1 OBW Radio 1 T 10 Deg C Vnom					
Nom Voltage	6144.5820	6831.7810	687.1990	6488.1815	6644.9030	0.105916
Plot ref	13422-1 OBW Radio 1 T 30 Deg C Vnom					
Nom Voltage	6145.2960	6835.9530	690.6570	6490.6245	6645.8800	0.106408
Plot ref	13422-1 OBW Radio 1 T 40 Deg C Vnom					
Nom Voltage	6175.0440	6772.6900	597.6460	6473.8670	6645.6350	0.092317
Plot ref	13422-1 OBW Radio 1 T 50 Deg C Vnom					

Analysers plots can be found in Section 6 of this report.

**LIMITS:**

47 CFR Part 15C Clause 15.250(a): The -10 dB bandwidth of the fundamental emission must be contained within the 5925-7250 MHz band under all conditions of operation. 47 CFR Part 15C Clause 15.250(b): The -10 dB bandwidth of the fundamental emission shall be at least 50 MHz.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:  $<\pm 1.9\%$

## 5.2 Peak & Average EIRP

### 5.2.1 Test methods

Test Requirements:	47 CFR Part 15C Clause 15.250(d)(3) / (d)(1) [Reference 4.1.1 of this report]
Test Method:	ANSI C63.10 Clause 10.3 [Reference 4.1.3 of this report]
Limits:	47 CFR Part 15C Clause 15.250(d)(3) / (d)(1) [Reference 4.1.1 of this report]

### 5.2.2 Configuration of EUT

The EUT was placed on a 1.5 metres high turntable. The front edge of the EUT was initially positioned facing the antenna. The EUT was measured at a distance of 1 metre. The EUT was tested using a bench power supply. The transmit mode used for Peak power tests was 100% duty cycle. For Average power measurements the transmit mode was 10% duty cycle which was the worst case duty cycle declared by the applicant. The EUT was operated in TX1 mode for Peak measurements and TX2 mode for Average measurements.

### 5.2.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment listed below. For peak power measurements a 50MHz RBW, 80MHz VBW, Peak detector and max hold settings were used. The analyser was then switched to an RMS average sweep using a sweep time of 1ms per analyser point at the same frequency to determine Average EIRP.

Tests were performed using test Site M.

### 5.2.4 Test equipment

E602, E136, E268, H079

See Section 9 for more details

### 5.2.5 Test results

Temperature of test environment	12°C
Humidity of test environment	50%
Pressure of test environment	102kPa

Band	5925-7250 MHz
Power Level	15.5 dBm
Channel Spacing	Single Channel
Mod Scheme	UWB (Radio 0)
Single channel	6489 MHz

Highest detected frequency FM (from Bw Test) (MHz)	RBW used (MHz)	Results dBm
6753.120000	50	
Peak result 50MHz RBW (dBm)		-0.15
Peak Plot Max held Filename ref		13422-1 Peak Power - Radio 0 - Power setting 15.5 dBm
AV PSD result 1MHz (dBm)		-41.46
AV PSD result filename ref		13422-1 Average Power - Radio 0 - Power setting 15.5 dBm

Band	5925-7250 MHz
Power Level	15.5 dBm
Channel Spacing	Single Channel
Mod Scheme	UWB (Radio 1)
Single channel	6489 MHz

Highest detected frequency FM (from Bw Test) (MHz)	RBW used (MHz)	Results dBm
6753.120000	50	
Peak result 50MHz RBW (dBm)		-0.39
Peak Plot Max held Filename ref	13422-1 Peak Power - Radio 1 - Power setting 14.0 dBm	
AV PSD result 1MHz (dBm)		-41.84
AV PSD result filename ref	13422-1 Average Power - Radio 1 - Power setting 14.0 dBm	

Analyser plots can be found in Section 6 of this report.

**LIMITS:**

47 CFR Part 15C Clause 15.250(d)(1): The limit for operation in the 5925 to 7250 MHz band is -41.3 dBm EIRP

47 CFR Part 15C Clause 15.250(d)(3): Peak level of the emissions contained within a 50 MHz bandwidth: 0dBm EIRP

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:  
<± 3.9 dB

## 5.3 Radiated emissions 30 – 960 MHz

### 5.3.1 Test methods

Test Requirements:	47 CFR Part 15C Clause 15.250 (d)(4) / 15.209 [Reference 4.1.1 of this report]
Test Method:	ANSI C63.10 Clause 10.2 [Reference 4.1.2 of this report]
Limits:	47 CFR Part 15C Clause 15.250 (d)(4) / 15.209 [Reference 4.1.1 of this report]

### 5.3.2 Configuration of EUT

The EUT was placed on a 0.8 metres high turntable. The front edge of the EUT was initially positioned facing the antenna. The EUT was measured at a distance of 3 metres. The EUT was rotated in all three orthogonal planes. Radiated Emissions testing was performed with a fully charged battery. In a pre-test the EUT was configured to transmit on each transmitter in turn. It was found that there was no perceivable difference between the two radios and therefore for final test the EUT was assessed with Radio 0 transmitting. The EUT was operated in TX1 mode.

### 5.3.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment listed below.

Measurements were made on a site listed with the FCC. The equipment was rotated 360 degrees and the antenna scanned 1 – 4 metres in both horizontal and vertical polarisations to record the worst case emissions.

At least 6 signals within 20dB and all signals within 10dB of the limit were investigated.

Tests were performed using Test Site M.

### 5.3.4 Test equipment

LPE364, E743, NSA-M, ZSW1, E624, E411

See Section 9 for more details

### 5.3.5 Test results

Temperature of test environment	10°C
Humidity of test environment	50%
Pressure of test environment	101 kPa

Band	5925-7250 MHz
Power Level	15.5 dBm
Channel Spacing	Single Channel
Mod Scheme	UWB (Radio 0)
Single channel	6489 MHz

Plot refs
13422-1 Rad 1 VHF Horiz
13422-1 Rad 1 VHF Vert
13422-1 Rad 1 UHF Horiz
13422-1 Rad 1 UHF Vert

### Table of signals measured for Rad 1 Horizontal Signal List

Signal No.	Freq (MHz)	Peak Amp (dBuV/m)	QP Amp (dBuV/m)	QP -Lim (dB)
1	680.907	33.8	27.5	-18.5
2	749.991	35.9	31.4	-14.6
3	808.680	34.4	27.9	-18.1
4	838.658	33.3	27.2	-18.8

### Table of signals measured for Rad 1 Vertical Signal List

Signal No.	Freq (MHz)	Peak Amp (dBuV/m)	QP Amp (dBuV/m)	QP -Lim (dB)
1	72.368	28.8	26.3	-13.7
2	115.199	30.1	26.3	-17.2
3	124.999	31.6	27.0	-16.5
4	261.005	26.7	20.7	-25.3
5	374.996	31.7	28.1	-17.9
6	734.723	33.6	27.8	-18.2

Peak detector "Max held" Analyser plots against the Quasi-Peak / Average limit line(s) can be found in Section 6 of this report.

#### LIMITS:

15.209 limits are applicable in the restricted bands of 15.205 with the relevant detector.

The general limits of 15.209 are as drawn on the respective plots.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:

30MHz - 1000MHz  $\pm 5.6$ dB

## 5.4 Radiated emissions above 960 MHz

### 5.4.1 Test methods

Test Requirements:	47 CFR Part 15C Clause 15.250 (d)(1) / 15.250 (d)(2) / 15.209 [Reference 4.1.1 of this report]
Test Method:	ANSI C63.10 Clause 10.3 [Reference 4.1.3 of this report]
Limits:	47 CFR Part 15C Clause 15.250 (d)(1) / 15.250 (d)(2) / 15.209 [Reference 4.1.1 of this report]

### 5.4.2 Configuration of EUT

The EUT was placed on a 1.5 metres high turntable. The front edge of the EUT was initially positioned facing the antenna. The EUT was measured at a distance of 1 metre. The EUT was rotated in all three orthogonal planes. Radiated Emissions testing was performed with the EUT powered from a bench power supply.

The EUT was operated in TX1 mode.

### 5.4.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment listed below.

Measurements were made in a semi-anechoic chamber with appropriate absorbing material for use in this range. Horn antennas were used at heights where the whole of the EUT was contained within the main beam. The EUT was rotated through 360 degrees to record the worst case emissions. A measurement distance of 1m was used between the test range 960MHz and 12.5GHz and a 0.3m distance was used in the test range 12.5 and 40GHz. Measurements were made using an RMS detector and a 1 MHz RBW was used except in the frequency ranges of 1164 – 1240 MHz and 1559 – 1610 MHz where a 1 kHz RBW was used as per 47 CFR Part 15C Clause 15.250(d)(2).

Note: As per CFR Part 15C Clause 15.250(d)(5), Emissions from digital circuitry used to enable the operation of the transmitter may comply with the limits in CFR Part 15C Clause 15.209.

During emissions tests over the frequency range 960 – 1990 MHz the limit was approached / exceeded. In order to demonstrate the emissions were associated to the digital circuitry and not radiated from the transmitter, the UWB antenna was unsoldered from the board and a second measurement was performed. Where no different in the emission profile was observed the emissions were assessed to 15.209 Limits. Please refer to the plots in section 6.

At least 6 signals within 20dB and all signals within 10dB of the limit were investigated.

Tests were performed using test Site B.

### 5.4.4 Test equipment

E136, E296-2, E330, E520, E755, E904, F360, TMS78, TMS79

See Section 9 for more details

**5.4.5 Test results**

Temperature of test environment	15°C
Humidity of test environment	50%
Pressure of test environment	101kPa

Setup Table

Band	5925-7250 MHz
Power Level	15.5 dBm
Channel Spacing	Single Channel
Mod Scheme	UWB (Radio 0)
Single channel	6489 MHz

Spurious Frequency (MHz)	Applicable FCC 15.250 Limit (dBuV/m)	Measured Average Level (dBuV/m)	Difference to Average Limit (dB)	EUT Polarisation	Antenna Polarisation
2125	33.9	14.7	-19.2	Side	Horizontal
12980	33.9	23.82	-10.08	Side	Horizontal
12980	33.9	23.25	-10.65	Side	Vertical

Only emissions within 20dB of the CFR Part 15C Clause 15.250 Limit (or where appropriate the CFR Part 15C Clause 15.209 limits) have been included.

Setup Table

Band	5925-7250 MHz
Power Level	15.5 dBm
Channel Spacing	Single Channel
Mod Scheme	UWB (Radio 1)
Single channel	6489 MHz

Spurious Frequency (MHz)	Applicable FCC 15.250 Limit (dBuV/m)	Measured Average Level (dBuV/m)	Difference to Average Limit (dB)	EUT Polarisation	Antenna Polarisation
2000	33.9	14.8	-19.1	Side	Horizontal
2125	33.9	16.7	-17.2	Side	Horizontal
12980	33.9	22.21	-11.69	Side	Horizontal
12980	33.9	26.41	-7.49	Side	Vertical

Only emissions within 20dB of the CFR Part 15C Clause 15.250 Limit (or where appropriate the CFR Part 15C Clause 15.209 limits) have been included.

Plots	
13422-1 Radiated Emissions 960 - 1610 MHz Ant1 Horiz	
13422-1 Radiated Emissions 960 - 1610 MHz Ant1 Vert	
13422-1 Radiated Emissions 1610 - 1990 MHz Ant1 Horiz	
13422-1 Radiated Emissions 1610 - 1990 MHz Ant1 Vert	
13422-1 Radiated Emissions 1990 - 3100 MHz Ant1 Horiz	
13422-1 Radiated Emissions 1990 - 3100 MHz Ant1 Vert	
13422-1 Radiated Emissions 3100 - 4000 MHz Ant1 Horiz	
13422-1 Radiated Emissions 3100 - 4000 MHz Ant1 Vert	
13422-1 Radiated Emissions 4000 - 5925 MHz Ant1 Horiz	
13422-1 Radiated Emissions 4000 - 5925 MHz Ant1 Vert	
13422-1 Radiated Emissions 5925 - 7250 MHz Ant1 Horiz	
13422-1 Radiated Emissions 5925 - 7250 MHz Ant1 Vert	
13422-1 Radiated Emissions 7250 - 10600 MHz Ant1 Horiz	
13422-1 Radiated Emissions 7250 - 10600 MHz Ant1 Vert	
13422-1 Radiated Emissions 10.6 - 12.5 GHz Ant1 Horiz	
13422-1 Radiated Emissions 10.6 - 12.5 GHz Ant1 Vert	



13422-1 Radiated Emissions 12.5 - 15 GHz Ant1 Horiz @0.3m
13422-1 Radiated Emissions 12.5 - 15 GHz Ant1 Vert @0.3m
13422-1 Radiated Emissions 15 - 18 GHz Ant1 Horiz @0.3m
13422-1 Radiated Emissions 15 - 18 GHz Ant1 Vert @0.3m
13422-1 Radiated Emissions 18 - 23 GHz Ant1 Horiz @0.3m
13422-1 Radiated Emissions 18 - 23 GHz Ant1 Vert @0.3m
13422-1 Radiated Emissions 23 - 26.5 GHz Ant1 Horiz @0.3m
13422-1 Radiated Emissions 23 - 26.5 GHz Ant1 Vert @0.3m
13422-1 Radiated Emissions 26.5 - 31.5 GHz Ant1 Horiz @0.3m
13422-1 Radiated Emissions 26.5 - 31.5 GHz Ant1 Vert @0.3m
13422-1 Radiated Emissions 31.5 - 35 GHz Ant1 Horiz @0.3m
13422-1 Radiated Emissions 31.5 - 35 GHz Ant1 Vert @0.3m
13422-1 Radiated Emissions 35 - 40 GHz Ant1 Horiz @0.3m
13422-1 Radiated Emissions 35 - 40 GHz Ant1 Vert @0.3m
13422-1 Radiated Emissions 1164 - 1202 MHz Ant1 Horiz
13422-1 Radiated Emissions 1164 - 1202 MHz Ant1 Vert
13422-1 Radiated Emissions 1202 - 1240 MHz Ant1 Horiz
13422-1 Radiated Emissions 1202 - 1240 MHz Ant1 Vert
13422-1 Radiated Emissions 1559 - 1610 MHz Ant1 Horiz
13422-1 Radiated Emissions 1559 - 1610 MHz Ant1 Vert

To reduce report size only plots for Radio 1 are included.

**LIMITS:**

47 CFR Part 15C Clause 15.250 (d)(1)

Frequency in MHz	EIRP in dBm	Equivalent in dBuV/m @ 3 metres
960-1610	-75.3	19.9
1610-1990	-63.3	31.9
1990-3100	-61.3	33.9
3100-5925	-51.3	43.9
5925-7250	-41.3	53.9
7250-10600	-51.3	43.9
Above 10600	-61.3	33.9

In addition to the radiated emission limits specified in the table in paragraph (above), transmitters operating under the provisions of this section shall not exceed the following RMS average limits when measured using a resolution bandwidth of no less than 1 kHz:

Frequency in MHz	EIRP in dBm	Equivalent in dBuV/m @ 3 metres
1164-1240	-85.3	9.9
1559-1610	-85.3	9.9

47 CFR Part 15C Clause 15.209 Average Limit: 54dBuV/m at 3m.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows: 960 – 18 GHz ±3.5dB, 18 – 26.5 GHz ±3.9dB, 26.5 – 40 GHz ±3.9dB

## 5.5 Radiated emissions 150 kHz - 30 MHz

### 5.5.1 Test methods

Test Requirements: 47 CFR Part 15C Clause 15.209 [Reference 4.1.1 of this report]  
 Test Method: ANSI C63.10 Clause 6.4 [Reference 4.1.3 of this report]  
 Limits: 47 CFR Part 15C Clause 15.209 [Reference 4.1.1 of this report]

### 5.5.2 Configuration of EUT

The EUT was placed on a 0.8 metres high turntable. The front edge of the EUT was initially positioned facing the antenna. The EUT was measured at a distance of 3 metres. The EUT was rotated in all three orthogonal planes. Radiated Emissions testing was performed with the EUT powered from a bench power supply. In a pre-test the EUT was configured to transmit on each transmitter in turn. It was found that there was no perceivable difference between the two radios and therefore for final test the EUT was assessed with Radio 0 transmitting. The EUT was operated in TX1 mode.

### 5.5.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below.

Measurements were made in a semi-anechoic chamber (pre-scan) with any final measurements required performed on an OATS without a ground plane. The antenna was placed 1m above the ground. The equipment was rotated 360 degrees to record the worst case emissions.

At least 6 signals within 20dB and all signals within 10dB of the limit were investigated.

Tests were performed using Test Site M.

### 5.5.4 Test equipment

TMS81, ZSW1, E624, E411

See Section 9 for more details

### 5.5.5 Test results

Temperature of test environment 20°C  
 Humidity of test environment 50%  
 Pressure of test environment 102kPa

Band	5925-7250 MHz
Power Level	15.5 dBm
Channel Spacing	Single Channel
Mod Scheme	UWB (Radio 0)
Single channel	6489 MHz

Plot refs
13422-1 Rad 1 150k-30MHz Para
13422-1 Rad 1 150k-30MHz Perp

Peak detector "Max held" Analyser plots against the Quasi-Peak / Average limit line(s) can be found in Section 6 of this report.

#### LIMITS:

15.209 limits are applicable in the restricted bands of 15.205 with the relevant detector.  
 The general limits of 15.209 are as drawn on the respective plots.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:  
 9kHz - 30MHz ±3.9dB

## 5.6 Radiated emissions 9 - 150 kHz

### 5.6.1 Test methods

Test Requirements:	47 CFR Part 15C Clause 15.209 [Reference 4.1.1 of this report]
Test Method:	ANSI C63.10 Clause 6.4 [Reference 4.1.3 of this report]
Limits:	47 CFR Part 15C Clause 15.209 [Reference 4.1.1 of this report]

### 5.6.2 Configuration of EUT

The EUT was placed on a 0.8 metres high turntable. The front edge of the EUT was initially positioned facing the antenna. The EUT was measured at a distance of 3 metres. The EUT was rotated in all three orthogonal planes. Radiated Emissions testing was performed with the EUT powered from a bench power supply. In a pre-test the EUT was configured to transmit on each transmitter in turn. It was found that there was no perceivable difference between the two radios and therefore for final test the EUT was assessed with Radio 0 transmitting. The EUT was operated in TX1 mode.

### 5.6.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below. Measurements were made in a semi-anechoic chamber (pre-scan) with any final measurements required performed on an OATS without a ground plane. The antenna was placed 1m above the ground. The equipment was rotated 360 degrees to record the worst case emissions. At least 6 signals within 20dB and all signals within 10dB of the limit were investigated. Tests were performed using Test Site M.

### 5.6.4 Test equipment

E411, E624, TMS81, ZSW1

See Section 9 for more details

### 5.6.5 Test results

Temperature of test environment	10°C
Humidity of test environment	50%
Pressure of test environment	102kPa

Band	5925-7250 MHz
Power Level	15.5 dBm
Channel Spacing	Single Channel
Mod Scheme	UWB (Radio 0)
Single channel	6489 MHz

Plot refs
13422-1 Rad 1 9k-150kHz Para
13422-1 Rad 1 9k-150kHz Perp

Peak detector "Max held" Analyser plots against the Quasi-Peak / Average limit line(s) can be found in Section 6 of this report.

#### LIMITS:

15.209 limits are applicable in the restricted bands of 15.205 with the relevant detector. The general limits of 15.209 are as drawn on the respective plots.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows: UE70 9kHz to 150kHz ±3.76dB

## 5.7 AC power line conducted emissions

### 5.7.1 Test methods

Test Requirements: 47 CFR Part 15C Part 15.207 [Reference 4.1.1 of this report]  
 Test Method: ANSI C63.10 Clause 6.2 [Reference 4.1.2 of this report]  
 Limits: 47 CFR Part 15C Part 15.207 [Reference 4.1.1 of this report]

### 5.7.2 Configuration of EUT

The EUT was powered using the provided power supply and the equipment was placed on a wooden table 0.8m above the ground plane. The power supply was connected to a LISN via a 1m mains cable.

Details of the Peripheral and Ancillary Equipment connected for this test are listed in section 10.

In a pre-test the EUT was configured to transmit on each transmitter in turn. It was found that there was no perceivable difference between the two radios and therefore for final test the EUT was assessed with Radio 0 transmitting.

For final test the EUT was operated in mode TX1.

### 5.7.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment listed in the 'Test Equipment' Section. Measurements were made on the live and neutral conductors using both average and quasi-peak detection.

At least 6 signals within 20dB and/or all signals within 10dB of the limit were investigated.

Tests were performed in Test Site F.

### 5.7.4 Test equipment

E150, E035, ZSW1, E624, E411, E465

See Section 9 for more details

### 5.7.5 Test results

Temperature of test environment 15°C  
 Humidity of test environment 50%  
 Pressure of test environment 101 kPa

Band	5925-7250 MHz
Power Level	15.5 dBm
Channel Spacing	Single Channel
Mod Scheme	UWB (Radio 0)
Single channel	6489 MHz

Plot refs
13422-1 Cond 1 AC Live 150k-30M Average
13422-1 Cond 1 AC Live 150k-30M Quasi-Peak
13422-1 Cond 1 AC Neutral 150k-30M Average
13422-1 Cond 1 AC Neutral 150k-30M Quasi-Peak

**Table of signals measured for Cond 1 AC Live 150k-30M**

Signal No.	Freq (MHz)	Peak Amp (dBuV)	QP Amp (dBuV)	QP -Lim (dB)	AV Amp (dBuV)	AV -Lim (dB)
1	0.155	47.7	43.4	-22.3	25.2	-30.5
2	0.160	46.6	43.1	-22.4	25.9	-29.6
3	0.204	41.1	37.1	-26.3	20.9	-32.5
4	0.265	36.3	31.7	-29.6	18.8	-32.5
5	0.612	31.0	29.0	-27.0	24.6	-21.4
6	28.298	31.3	28.1	-31.9	21.6	-28.4

**Table of signals measured for Cond 1 AC Neutral 150k-30M**

Signal No.	Freq (MHz)	Peak Amp (dBuV)	QP Amp (dBuV)	QP -Lim (dB)	AV Amp (dBuV)	AV -Lim (dB)
1	0.180	44.0	40.2	-24.3	23.8	-30.7
2	0.203	41.9	37.8	-25.7	21.9	-31.6
3	0.362	37.5	34.4	-24.3	26.5	-22.2
4	0.612	31.1	29.2	-26.8	24.6	-21.4
5	1.654	26.0	23.2	-32.8	15.7	-30.3
6	1.835	31.9	29.8	-26.2	24.9	-21.1

Peak detector "Max held" Analyser plots against the Quasi-Peak / Average limit line(s) can be found in Section 6 of this report./ Only results within 20dB of limits have been reported.

**LIMITS:**

15.207: as given in the above tables / drawn on the respective plots.

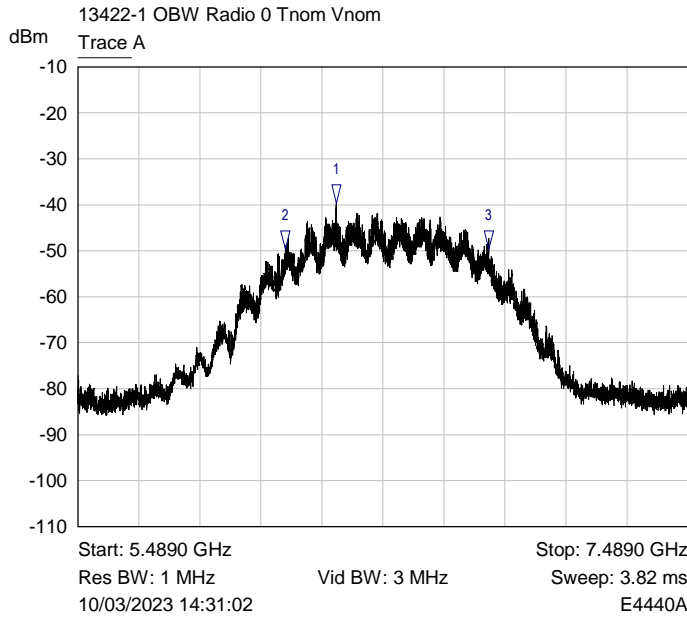
These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows: UE71 150kHz to 30MHz ±3.4dB

## 6 Plots/Graphical results

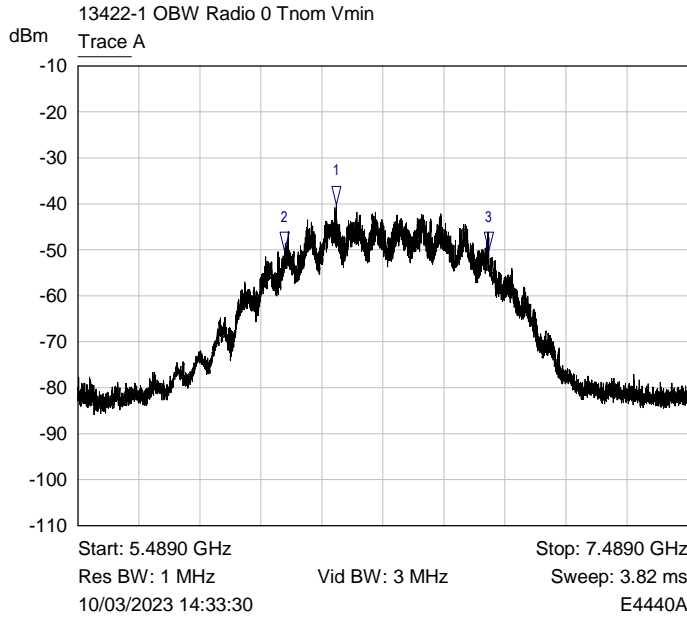
### 6.1 10dB Bandwidth

RF Parameters: Band 5925-7250 MHz, Power 15.5 dBm, Channel Spacing Single Channel, Modulation UWB (Radio 0), Channel 6489 MHz



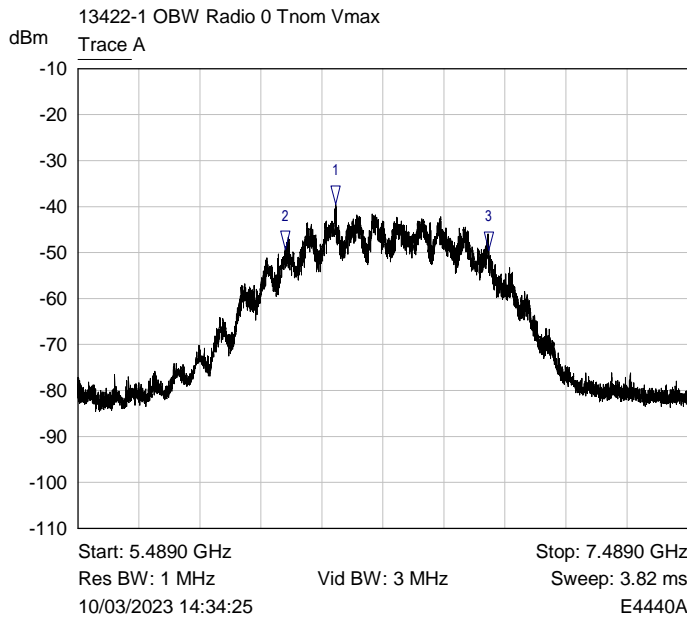
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	6.3353 GHz	-39.63 dBm	
2 ▽	Trace A	6.1692 GHz	-49.63 dBm	
3 ▽	Trace A	6.8357 GHz	-49.63 dBm	

Nom temp (20°C) Nom Voltage



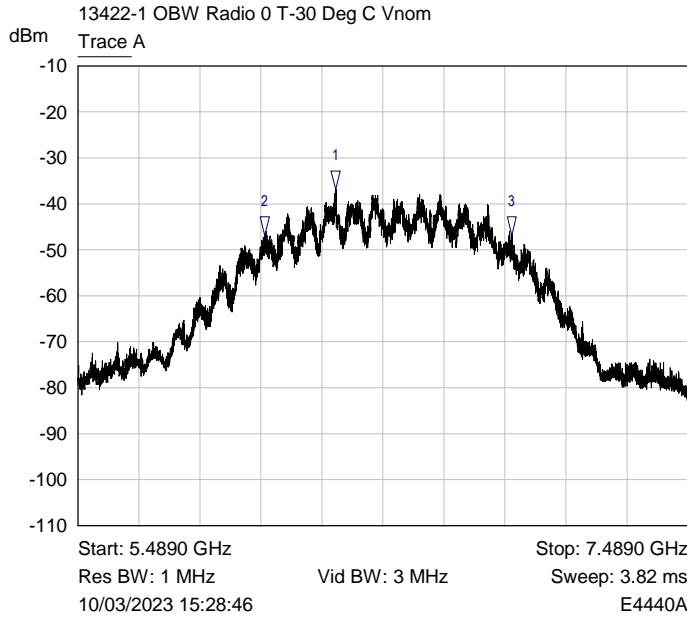
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	6.3355 GHz	-40.22 dBm	
2 ▽	Trace A	6.1658 GHz	-50.22 dBm	
3 ▽	Trace A	6.8363 GHz	-50.22 dBm	

Nom temp (20°C) Min Voltage



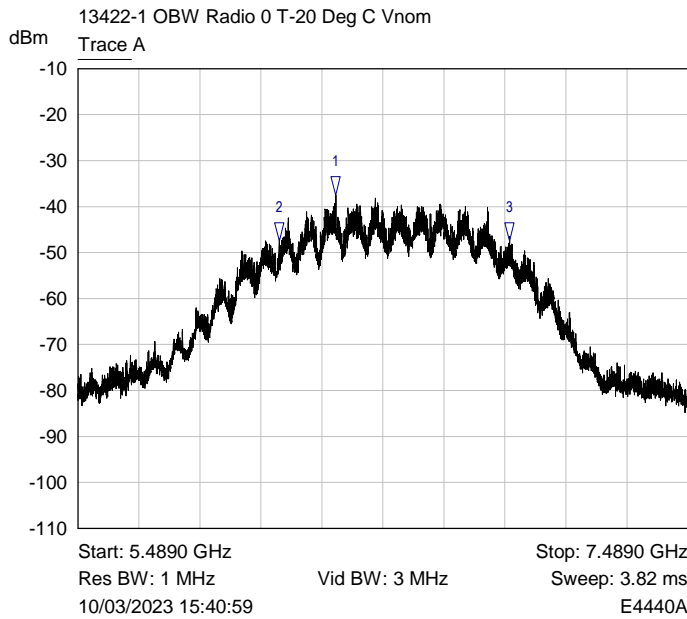
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	6.3348 GHz	-39.43 dBm	
2 ▽	Trace A	6.1677 GHz	-49.43 dBm	
3 ▽	Trace A	6.8363 GHz	-49.43 dBm	

Nom temp (20°C) Max Voltage



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	6.3351 GHz	-36.78 dBm	
2 ▽	Trace A	6.1015 GHz	-46.78 dBm	
3 ▽	Trace A	6.9113 GHz	-46.78 dBm	

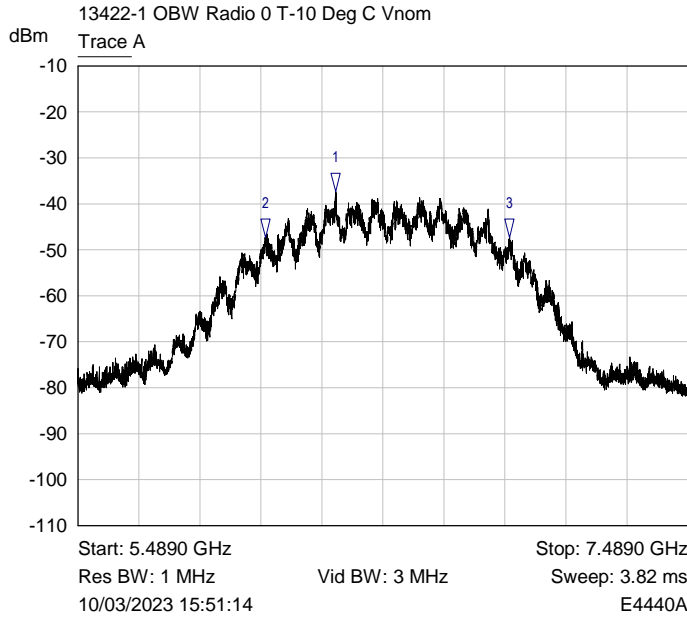
-30°C Nom Voltage



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	6.3346 GHz	-37.47 dBm	
2 ▽	Trace A	6.1477 GHz	-47.47 dBm	
3 ▽	Trace A	6.9047 GHz	-47.46 dBm	

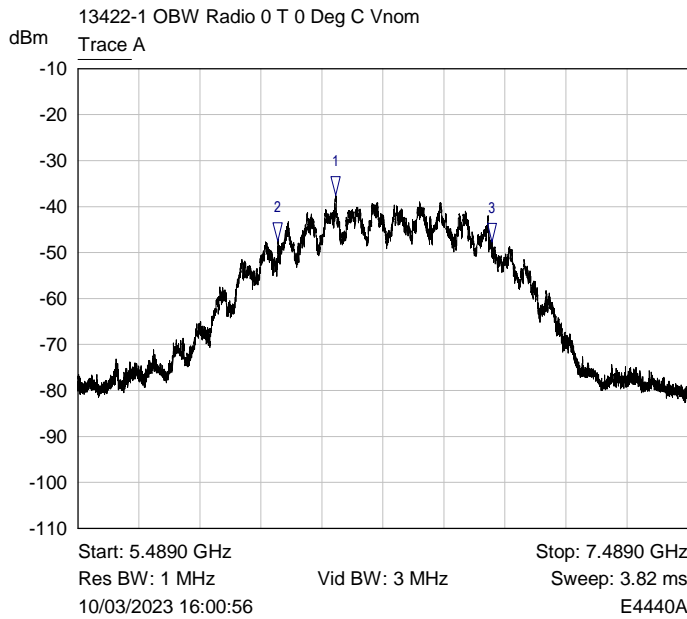
-20°C Nom Voltage





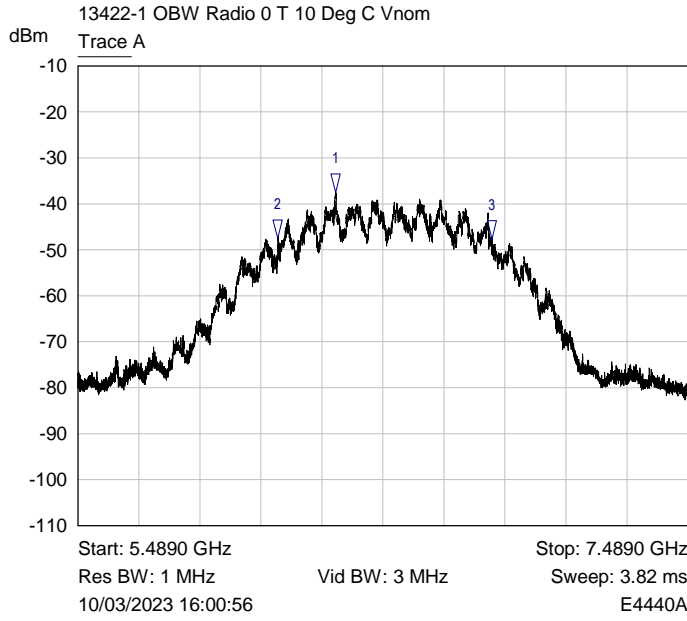
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	6.3338 GHz	-37.33 dBm	
2 ▽	Trace A	6.1036 GHz	-47.33 dBm	
3 ▽	Trace A	6.9042 GHz	-47.33 dBm	

-10°C Nom Voltage



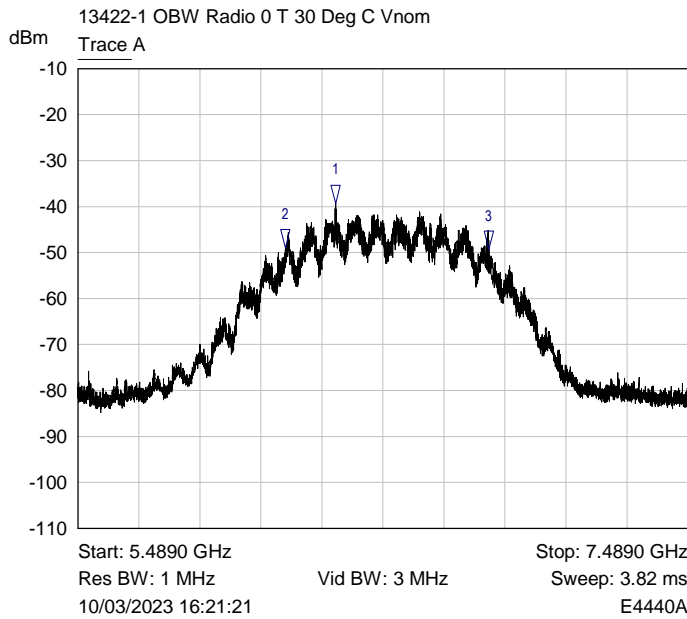
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	6.3341 GHz	-37.58 dBm	
2 ▽	Trace A	6.1448 GHz	-47.58 dBm	
3 ▽	Trace A	6.8464 GHz	-47.58 dBm	

0°C Nom Voltage



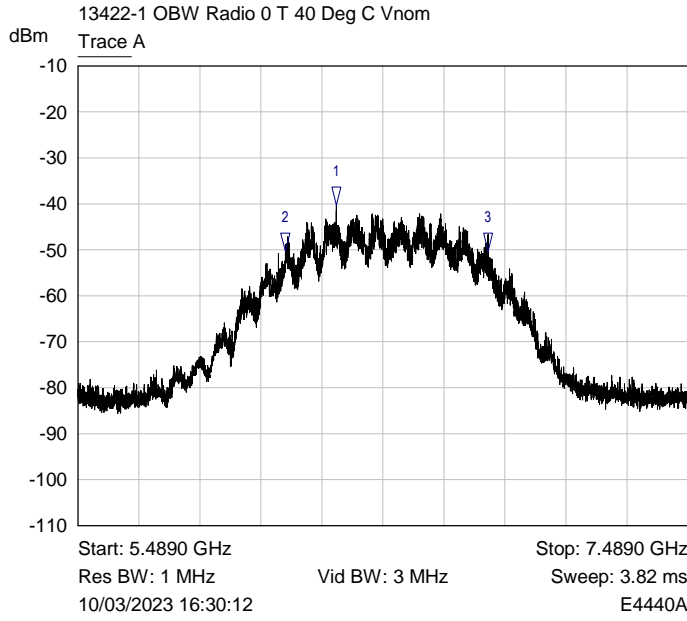
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	6.3341 GHz	-37.58 dBm	
2 ▽	Trace A	6.1448 GHz	-47.58 dBm	
3 ▽	Trace A	6.8464 GHz	-47.58 dBm	

10°C Nom Voltage



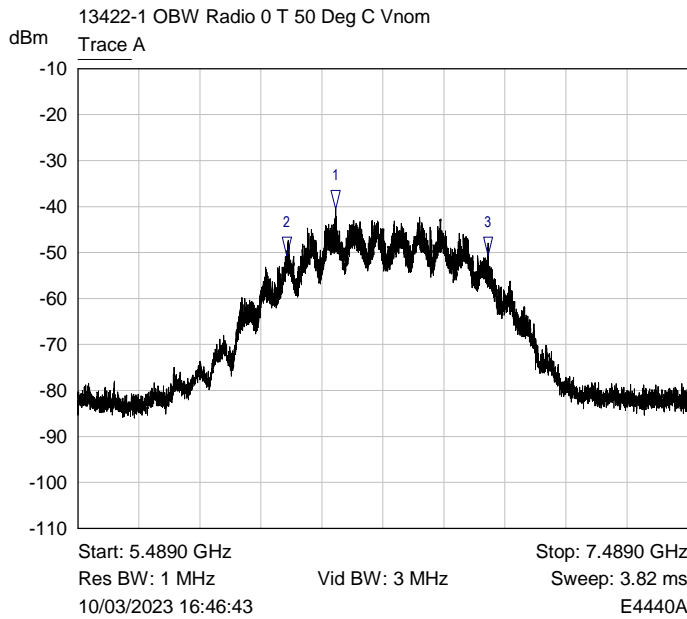
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	6.3341 GHz	-39.26 dBm	
2 ▽	Trace A	6.1700 GHz	-48.97 dBm	
3 ▽	Trace A	6.8366 GHz	-49.26 dBm	

30°C Nom Voltage



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	6.3355 GHz	-40.37 dBm	
2 ▽	Trace A	6.1692 GHz	-50.37 dBm	
3 ▽	Trace A	6.8347 GHz	-50.37 dBm	

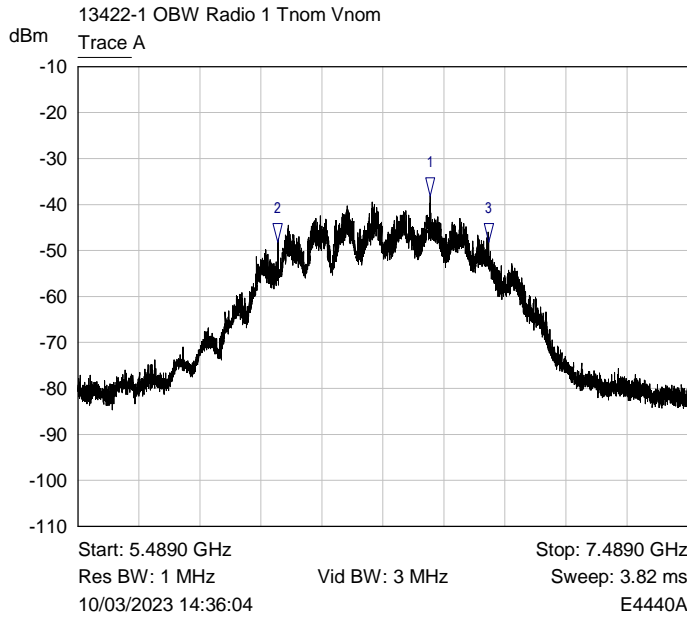
40°C Nom Voltage



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	6.3338 GHz	-40.58 dBm	
2 ▽	Trace A	6.1744 GHz	-50.58 dBm	
3 ▽	Trace A	6.8346 GHz	-50.58 dBm	

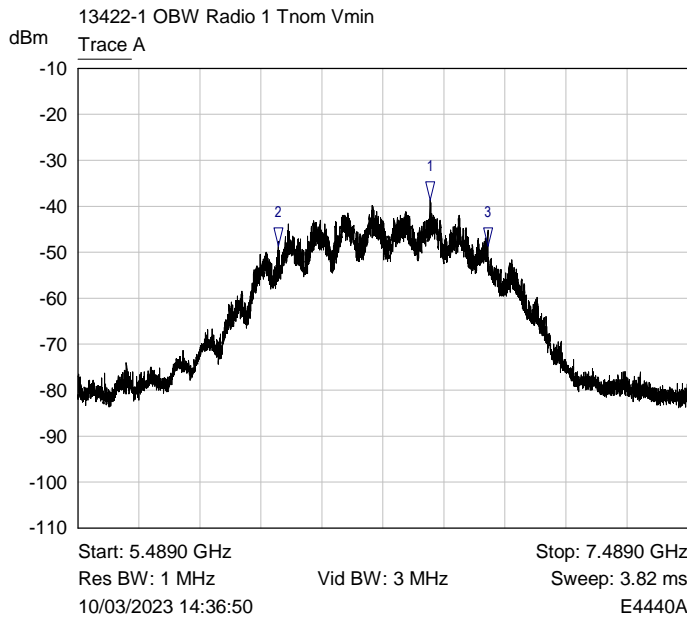
50°C Nom Voltage

RF Parameters: Band 5925-7250 MHz, Power 15.5 dBm, Channel Spacing Single Channel,  
 Modulation UWB (Radio 1), Channel 6489 MHz



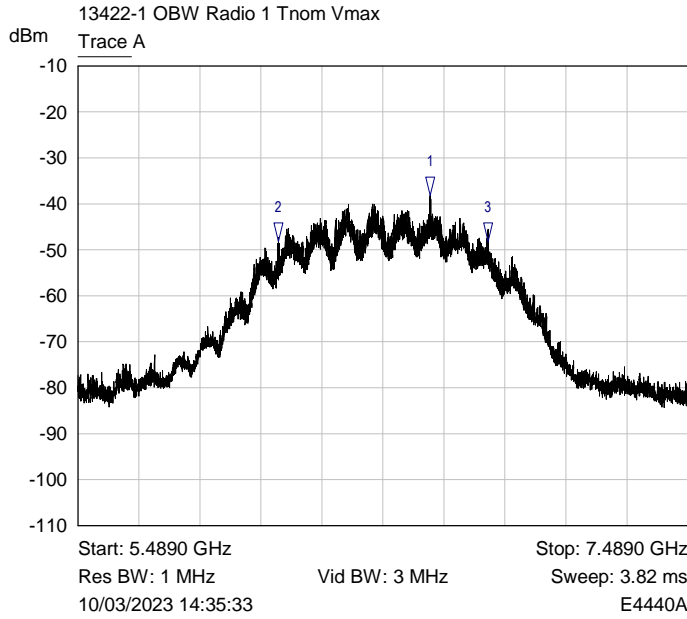
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	6.6449 GHz	-38.18 dBm	
2 ▽	Trace A	6.1445 GHz	-48.18 dBm	
3 ▽	Trace A	6.8359 GHz	-48.18 dBm	

Nom temp (20°C) Nom Voltage



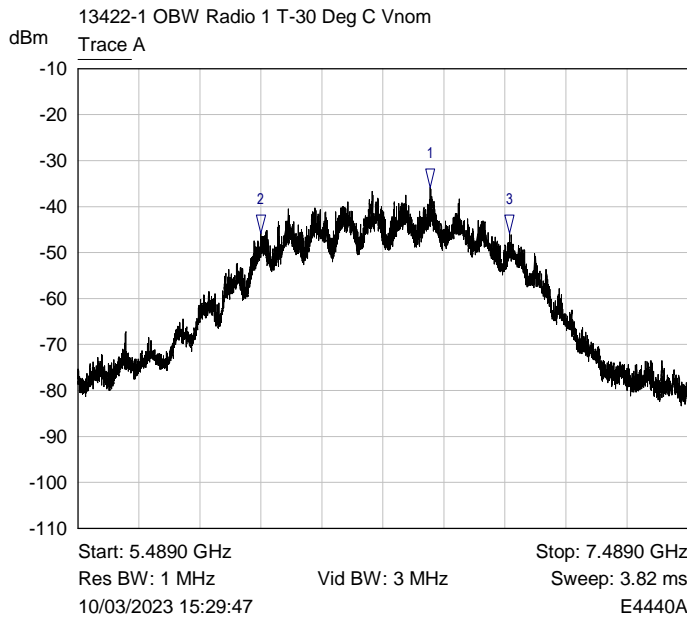
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	6.6434 GHz	-38.66 dBm	
2 ▽	Trace A	6.1453 GHz	-48.66 dBm	
3 ▽	Trace A	6.8332 GHz	-48.66 dBm	

Nom temp (20°C) Min Voltage



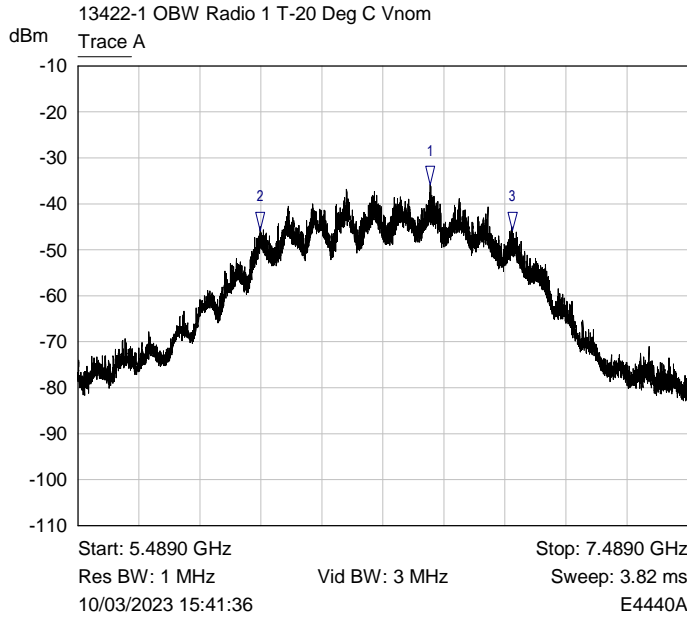
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	6.6444 GHz	-38.17 dBm	
2 ▽	Trace A	6.1465 GHz	-48.17 dBm	
3 ▽	Trace A	6.8348 GHz	-48.17 dBm	

Nom temp (20°C) Max Voltage



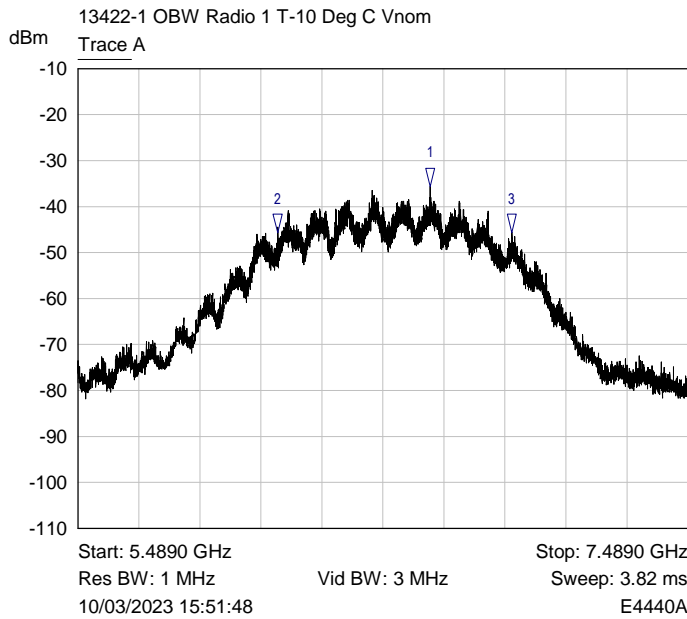
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	6.6444 GHz	-35.86 dBm	
2 ▽	Trace A	6.0882 GHz	-45.86 dBm	
3 ▽	Trace A	6.9043 GHz	-45.86 dBm	

-30°C Nom Voltage



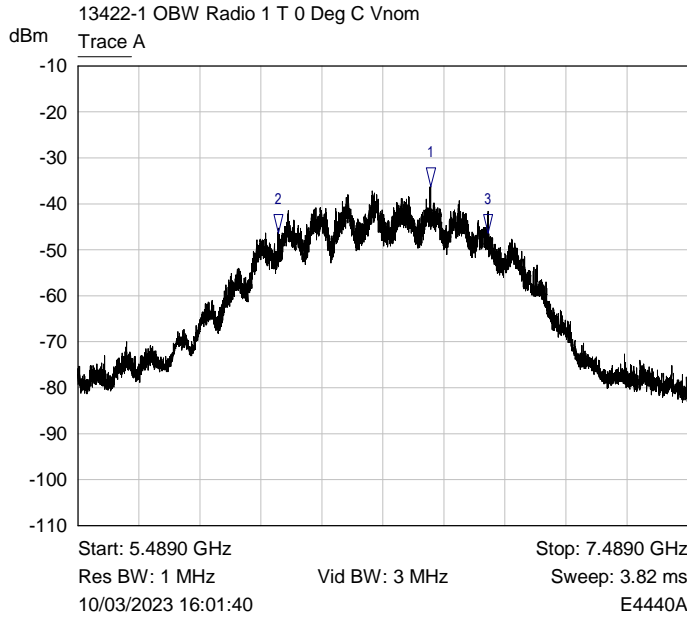
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	6.6437 GHz	-35.79 dBm	
2 ▽	Trace A	6.0871 GHz	-45.79 dBm	
3 ▽	Trace A	6.9145 GHz	-45.79 dBm	

-20°C Nom Voltage



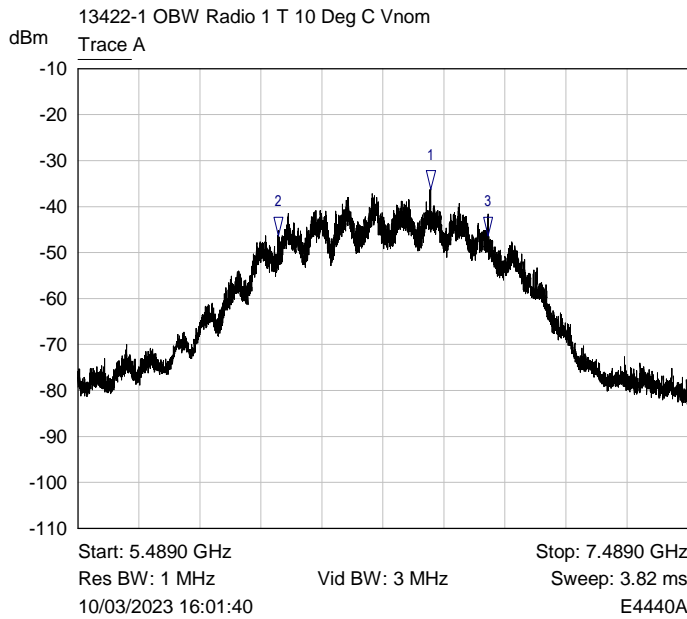
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	6.6449 GHz	-35.70 dBm	
2 ▽	Trace A	6.1447 GHz	-45.70 dBm	
3 ▽	Trace A	6.9125 GHz	-45.70 dBm	

-10°C Nom Voltage



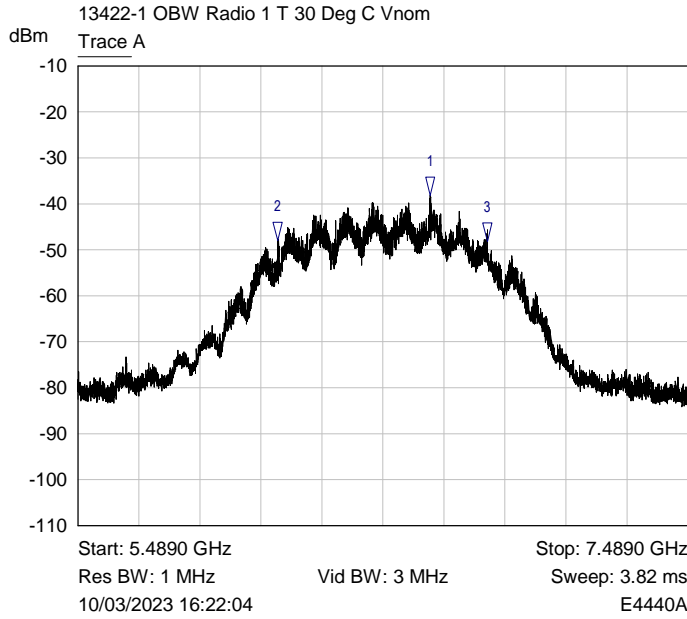
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	6.6454 GHz	-36.24 dBm	
2 ▽	Trace A	6.1455 GHz	-46.24 dBm	
3 ▽	Trace A	6.8347 GHz	-46.24 dBm	

0°C Nom Voltage



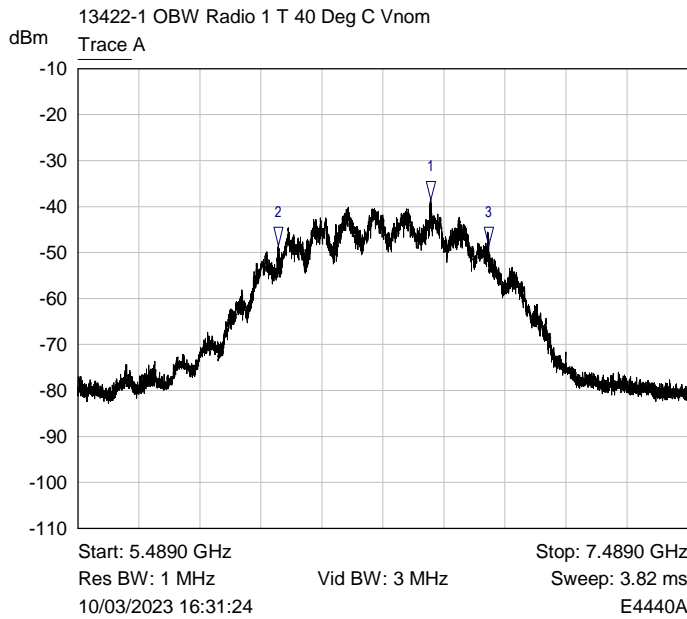
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	6.6454 GHz	-36.24 dBm	
2 ▽	Trace A	6.1455 GHz	-46.24 dBm	
3 ▽	Trace A	6.8347 GHz	-46.24 dBm	

10°C Nom Voltage



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	6.6449 GHz	-38.08 dBm	
2 ▽	Trace A	6.1446 GHz	-48.08 dBm	
3 ▽	Trace A	6.8318 GHz	-48.08 dBm	

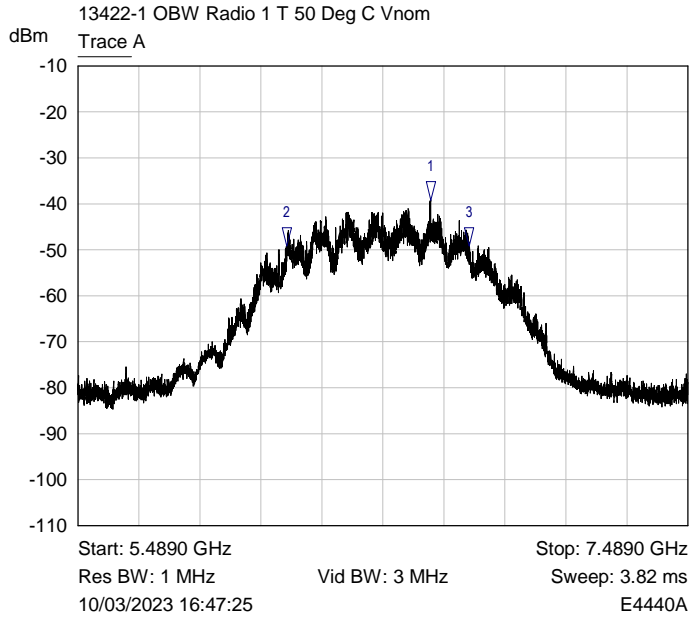
30°C Nom Voltage



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	6.6459 GHz	-38.52 dBm	
2 ▽	Trace A	6.1453 GHz	-48.52 dBm	
3 ▽	Trace A	6.8360 GHz	-48.51 dBm	

40°C Nom Voltage



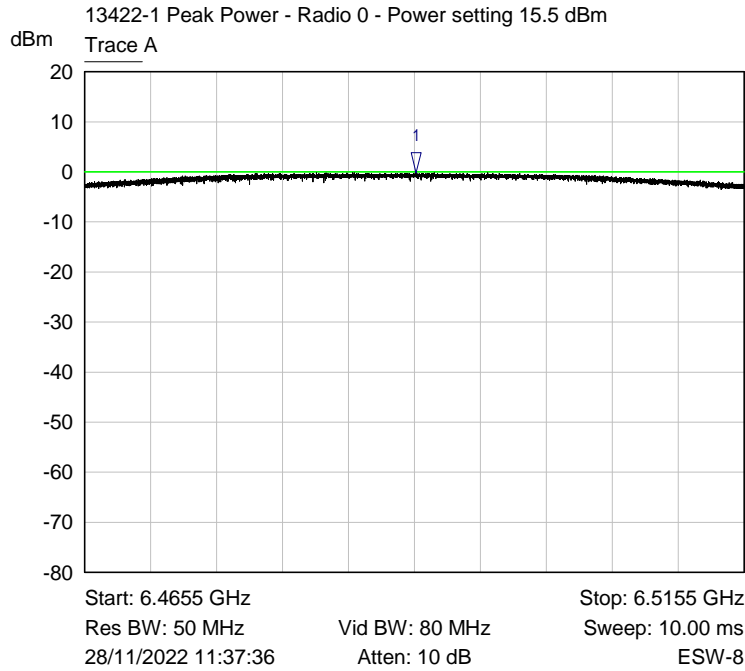


Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	6.6456 GHz	-39.21 dBm	
2 ▽	Trace A	6.1750 GHz	-49.21 dBm	
3 ▽	Trace A	6.7727 GHz	-49.21 dBm	

50°C Nom Voltage

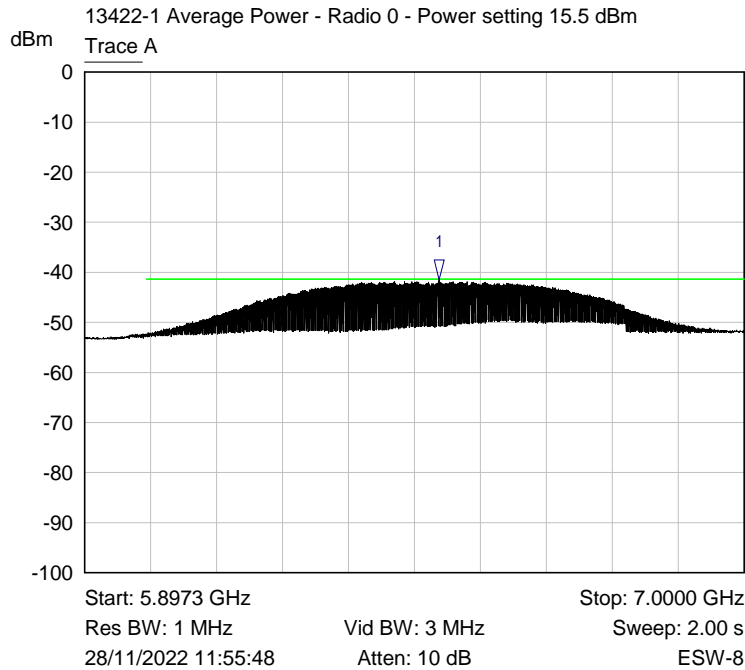
## 6.2 Peak & Average EIRP

RF Parameters: Band 5925-7250 MHz, Power 15.5 dBm, Channel Spacing Single Channel, Modulation UWB (Radio 0), Channel 6489 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	6.4906 GHz	-0.15 dBm	

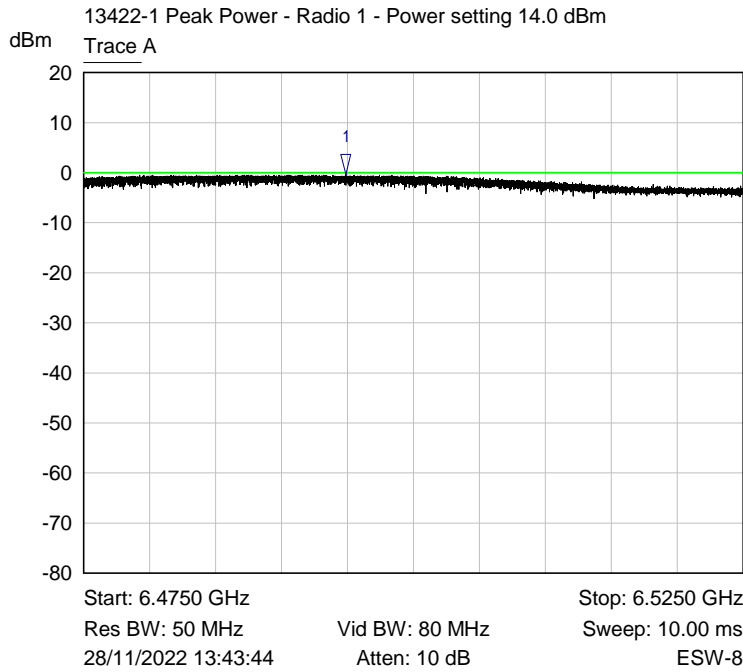
Peak Plot Max held



Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	6.4897 GHz	-41.46 dBm	

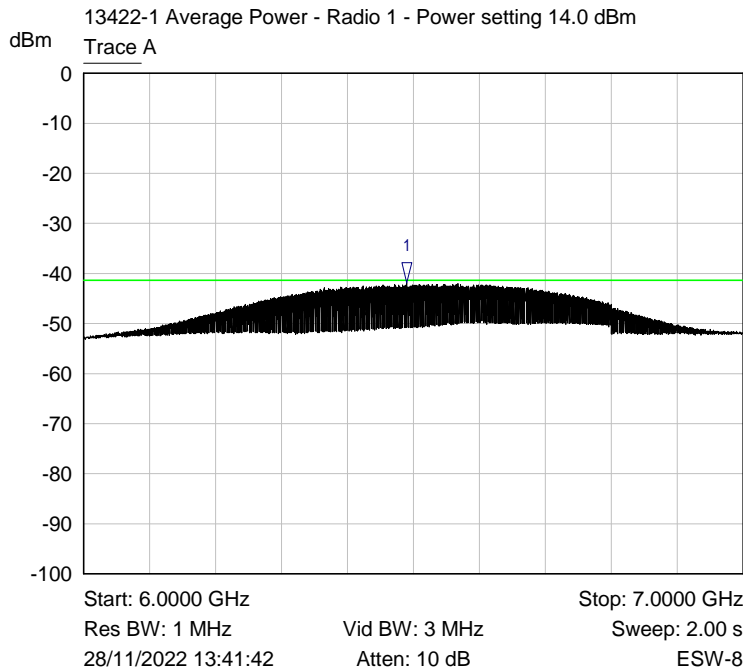
AV RMS plot 1ms per point sweep time

RF Parameters: Band 5925-7250 MHz, Power 15.5 dBm, Channel Spacing Single Channel,  
 Modulation UWB (Radio 1), Channel 6489 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	6.4949 GHz	-0.39 dBm	

Peak Plot Max held

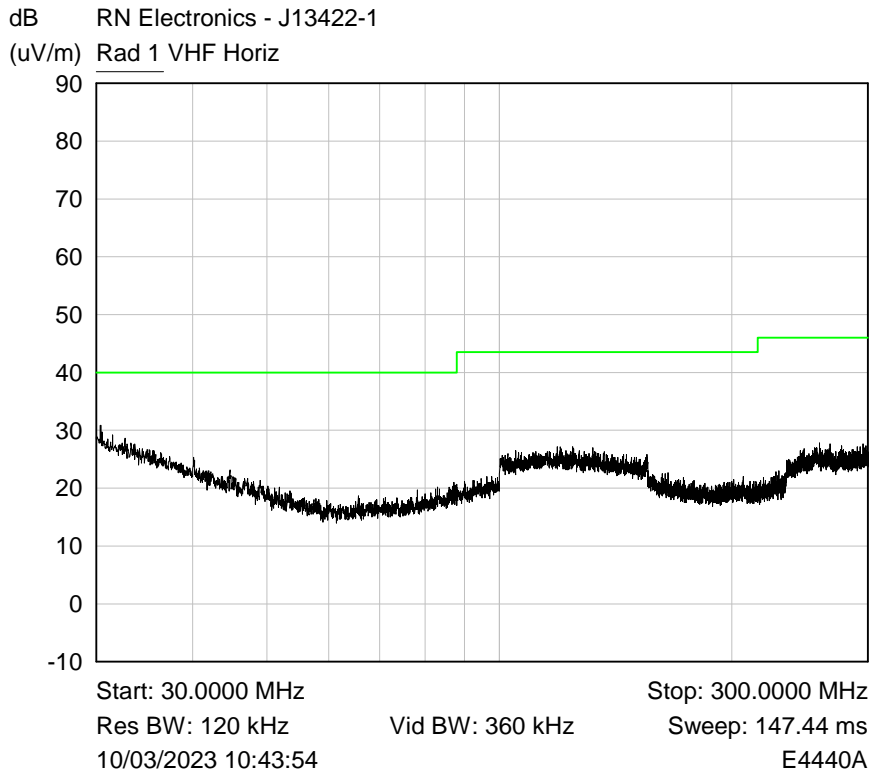


Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	6.4897 GHz	-41.84 dBm	

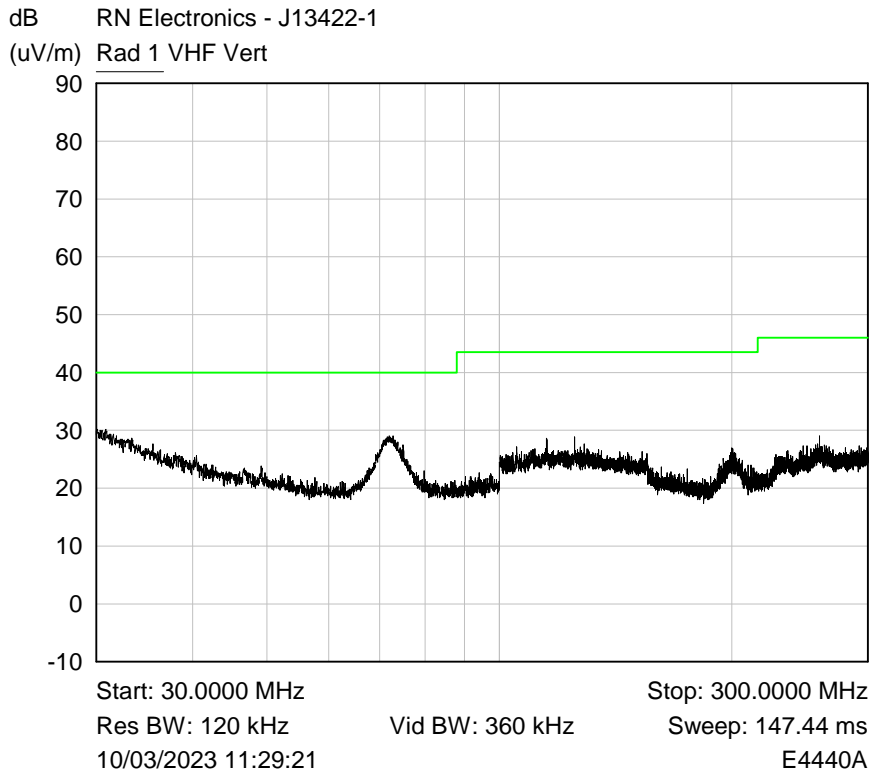
AV RMS plot 1ms per point sweep time

### 6.3 Radiated emissions 30 MHz -1 GHz

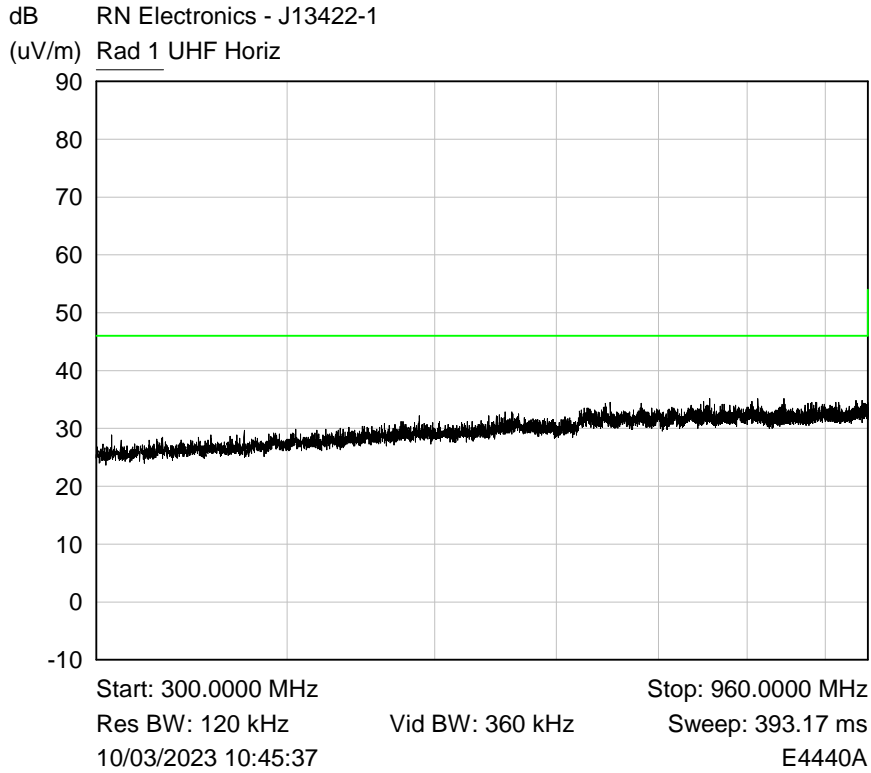
RF Parameters: Band 5925-7250 MHz, Power 15.5 dBm, Channel Spacing Single Channel, Modulation UWB (Radio 0), Channel 6489 MHz



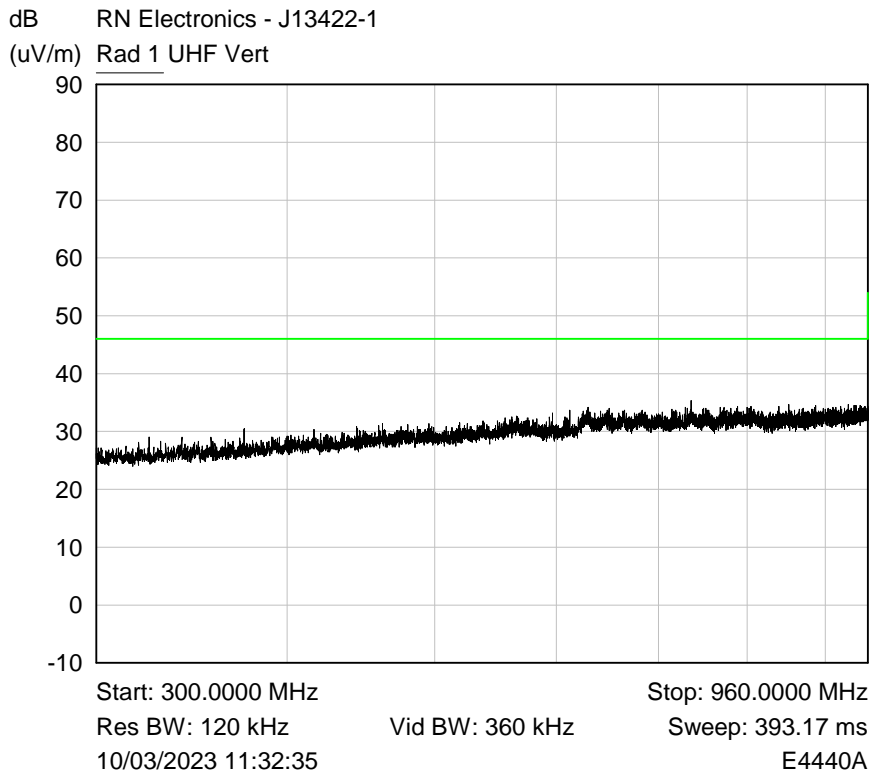
Plot of Peak emissions for VHF Horizontal against the QP limit line.



Plot of Peak emissions for VHF Vertical against the QP limit line.



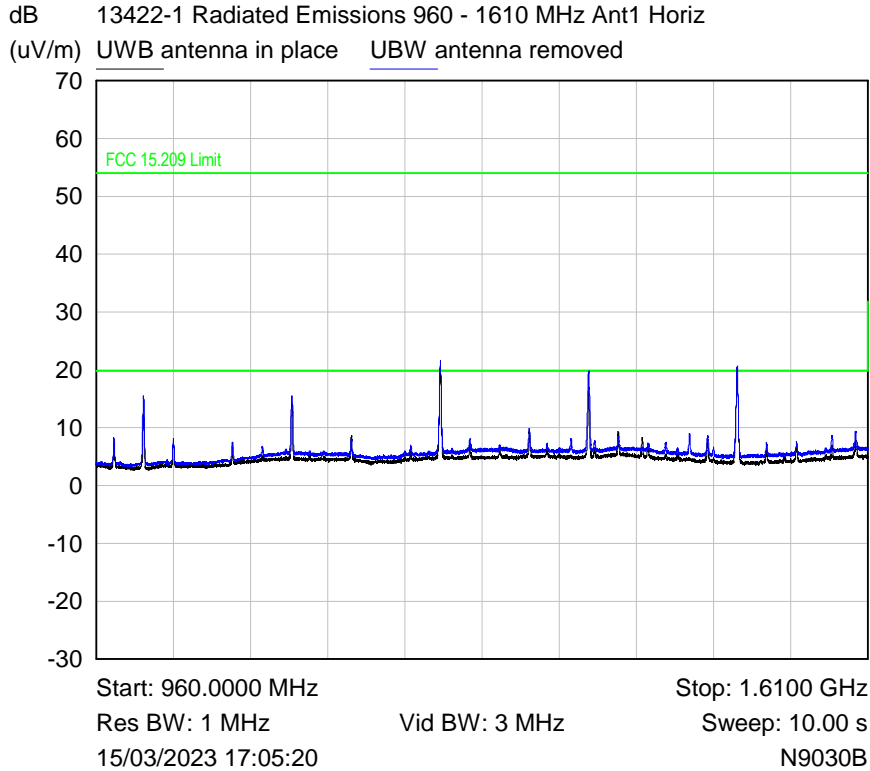
Plot of Peak emissions for UHF Horizontal against the QP limit line.



Plot of Peak emissions for UHF Vertical against the QP limit line.

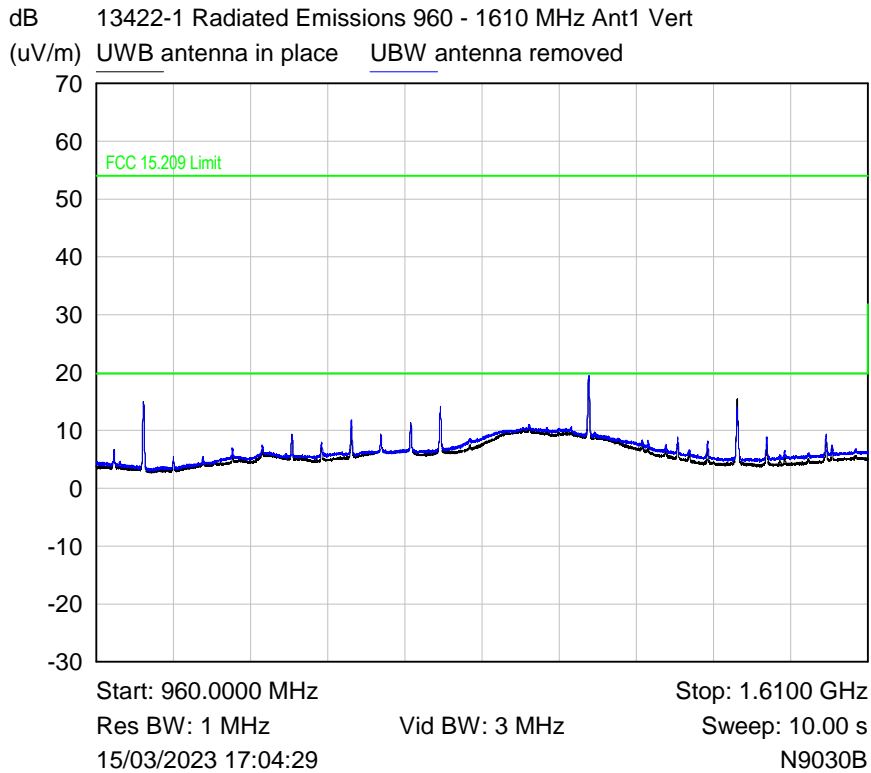
## 6.4 Radiated emissions above 1 GHz

RF Parameters: Band 5925-7250 MHz, Power 15.5 dBm, Channel Spacing Single Channel,  
Modulation UWB (Radio 1), Channel 6489 MHz  
(To reduce report size only plots for Radio 1 are included.)



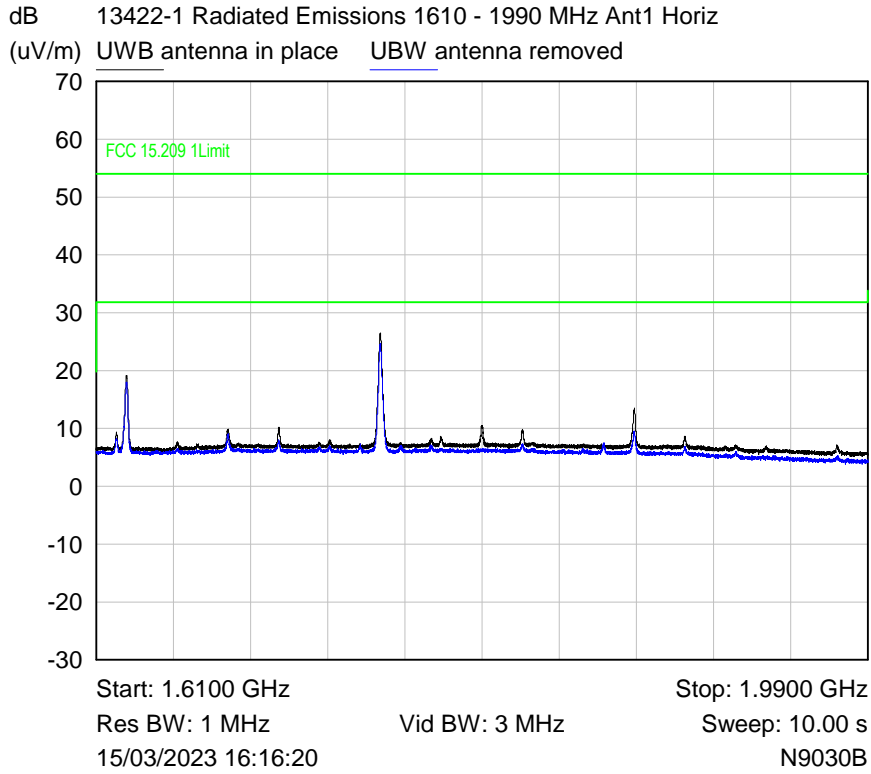
Note: As per 47 CFR Part 15C Clause 15.250(d)(5), Emissions from digital circuitry used to enable the operation of the transmitter may comply with the limits in 47 CFR Part 15C Clause 15.209.

During emissions tests over the frequency range 960 – 1610 MHz the limit was approached / exceeded. In order to demonstrate the emissions were associated to the digital circuitry and not radiated from the transmitter, the UWB antenna was unsoldered from the board and a second measurement was performed. Where no difference in the emission profile was observed the emissions were assessed to 15.209 Limits.



Note: As per 47 CFR Part 15C Clause 15.250(d)(5), Emissions from digital circuitry used to enable the operation of the transmitter may comply with the limits in 47 CFR Part 15C Clause 15.209.

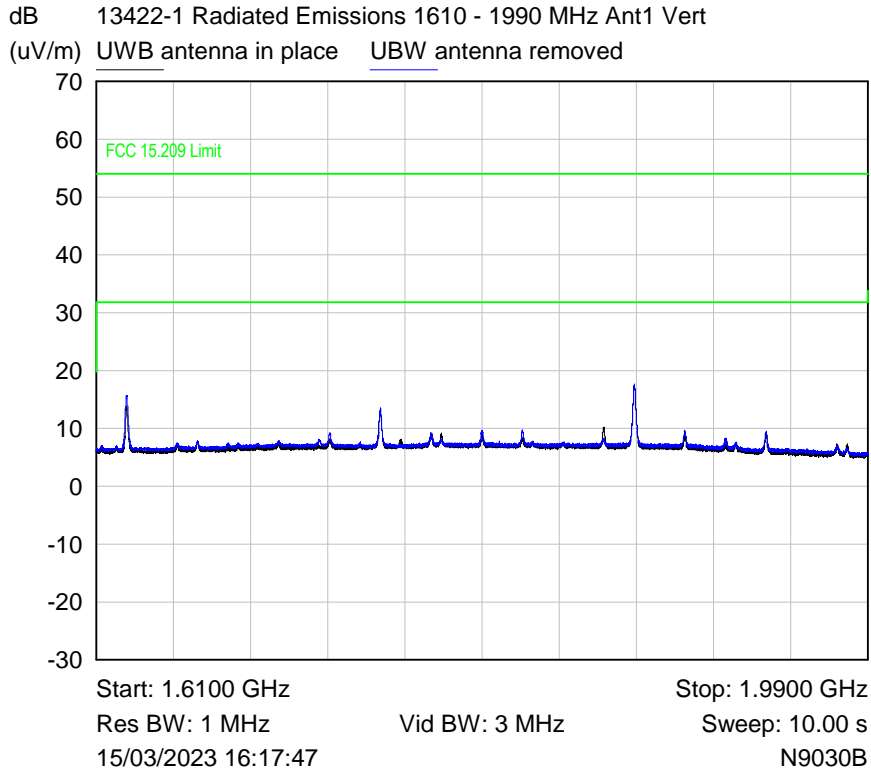
During emissions tests over the frequency range 960 – 1610 MHz the limit was approached / exceeded. In order to demonstrate the emissions were associated to the digital circuitry and not radiated from the transmitter, the UWB antenna was unsoldered from the board and a second measurement was performed. Where no difference in the emission profile was observed the emissions were assessed to 15.209 Limits.



Note: As per 47 CFR Part 15C Clause 15.250(d)(5), Emissions from digital circuitry used to enable the operation of the transmitter may comply with the limits in 47 CFR Part 15C Clause 15.209.

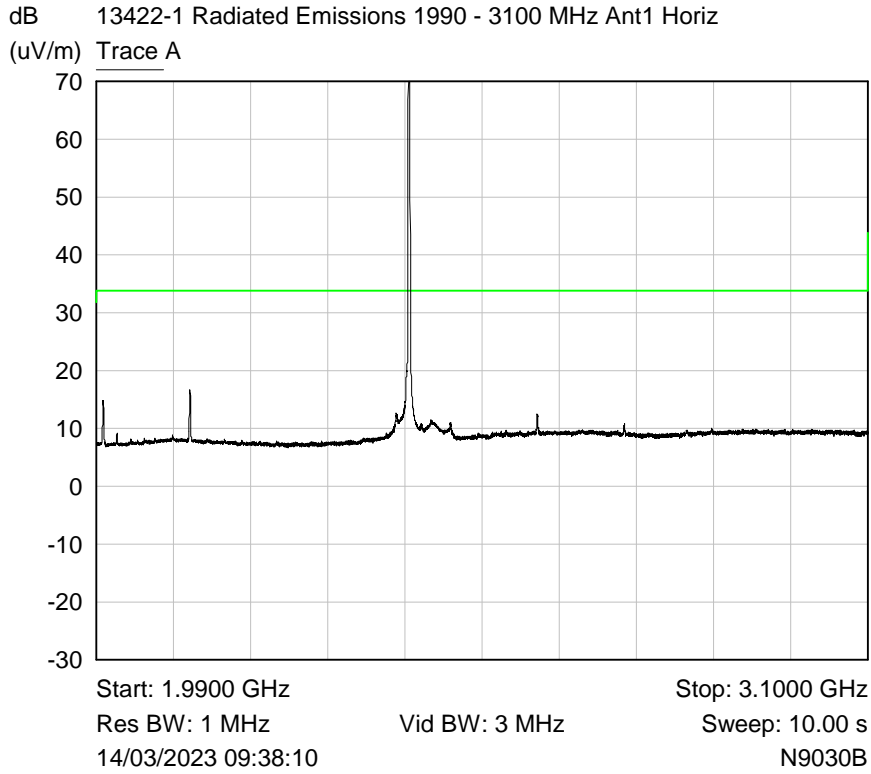
During emissions tests over the frequency range 1610 – 1990 MHz the limit was approached / exceeded. In order to demonstrate the emissions were associated to the digital circuitry and not radiated from the transmitter, the UWB antenna was unsoldered from the board and a second measurement was performed. Where no difference in the emission profile was observed the emissions were assessed to 15.209 Limits.



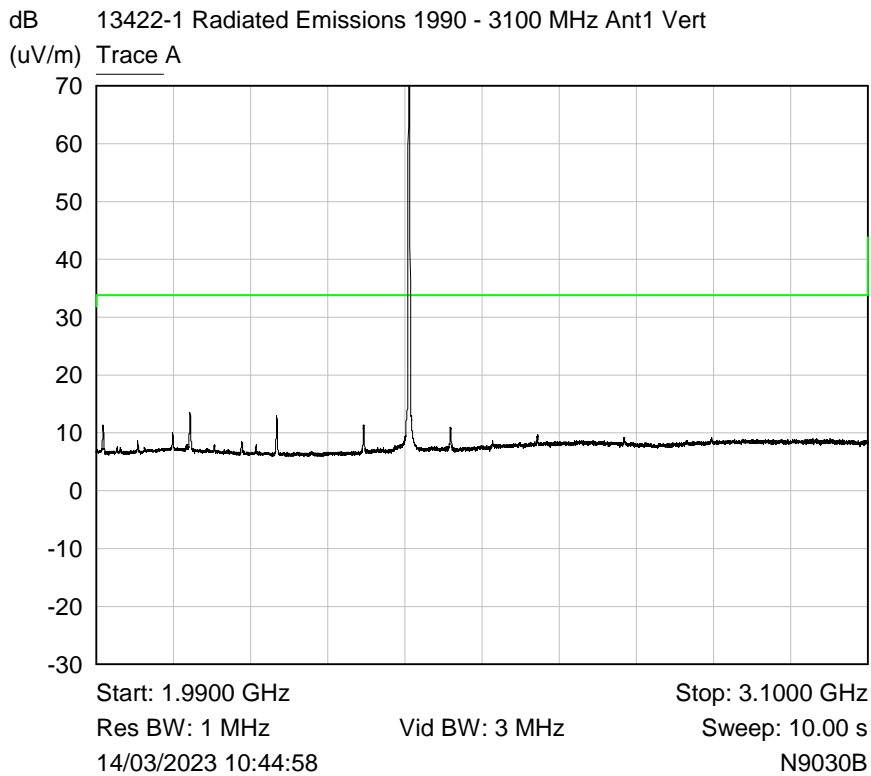


Note: As per 47 CFR Part 15C Clause 15.250(d)(5), Emissions from digital circuitry used to enable the operation of the transmitter may comply with the limits in 47 CFR Part 15C Clause 15.209.

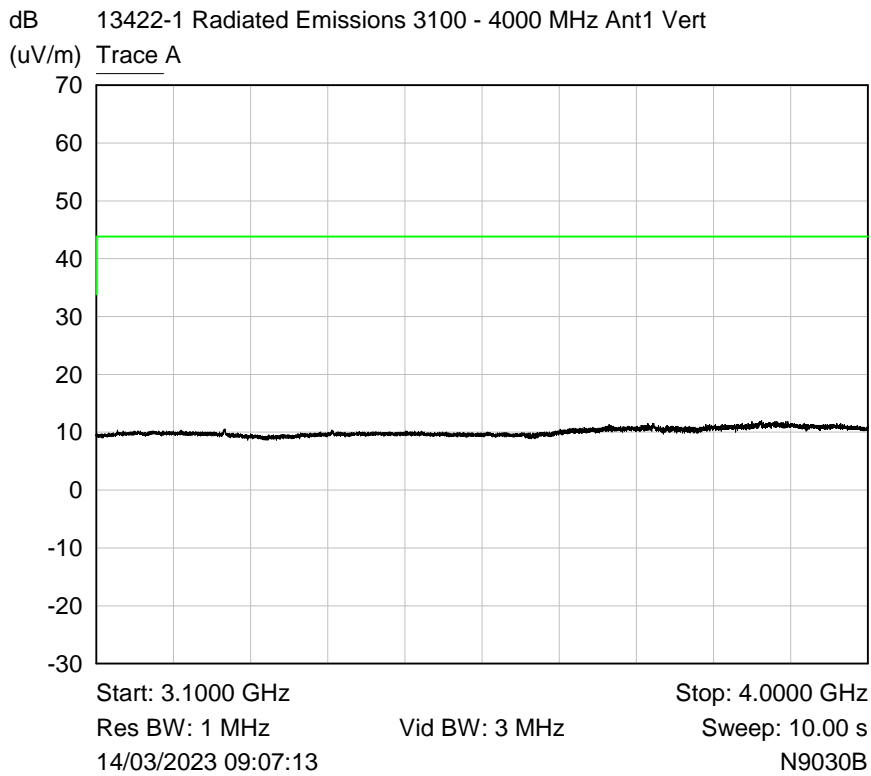
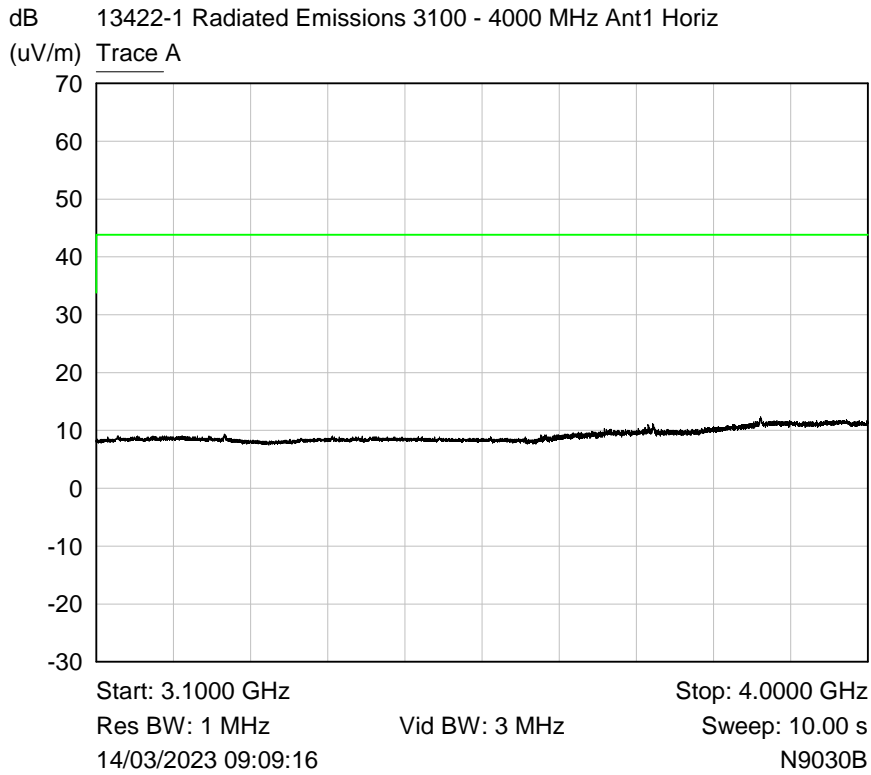
During emissions tests over the frequency range 1610 – 1990 MHz the limit was approached / exceeded. In order to demonstrate the emissions were associated to the digital circuitry and not radiated from the transmitter, the UWB antenna was unsoldered from the board and a second measurement was performed. Where no difference in the emission profile was observed the emissions were assessed to 15.209 Limits.

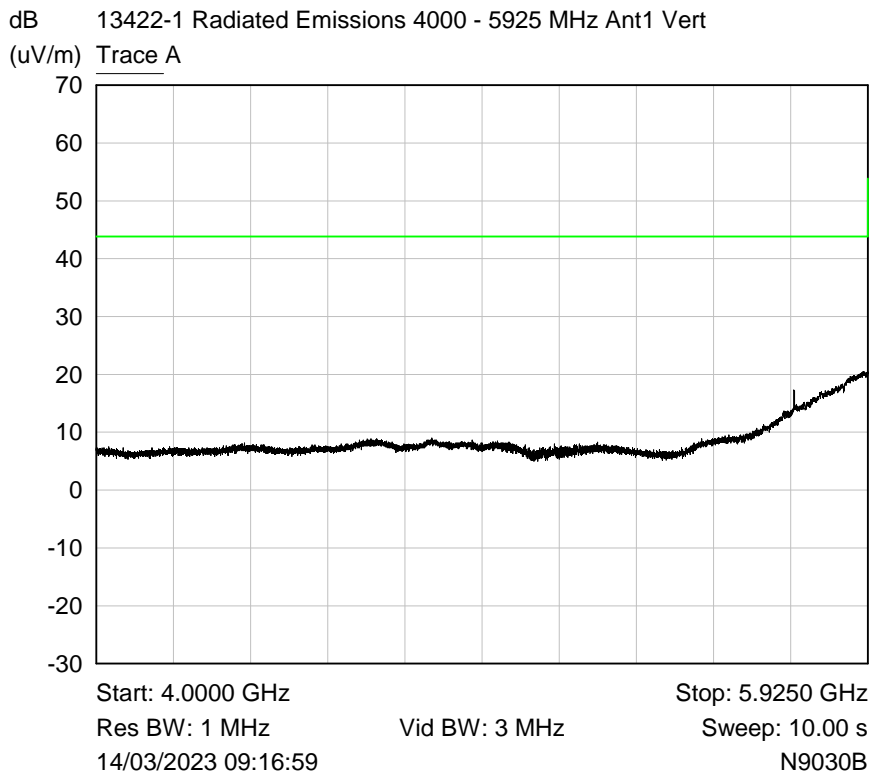
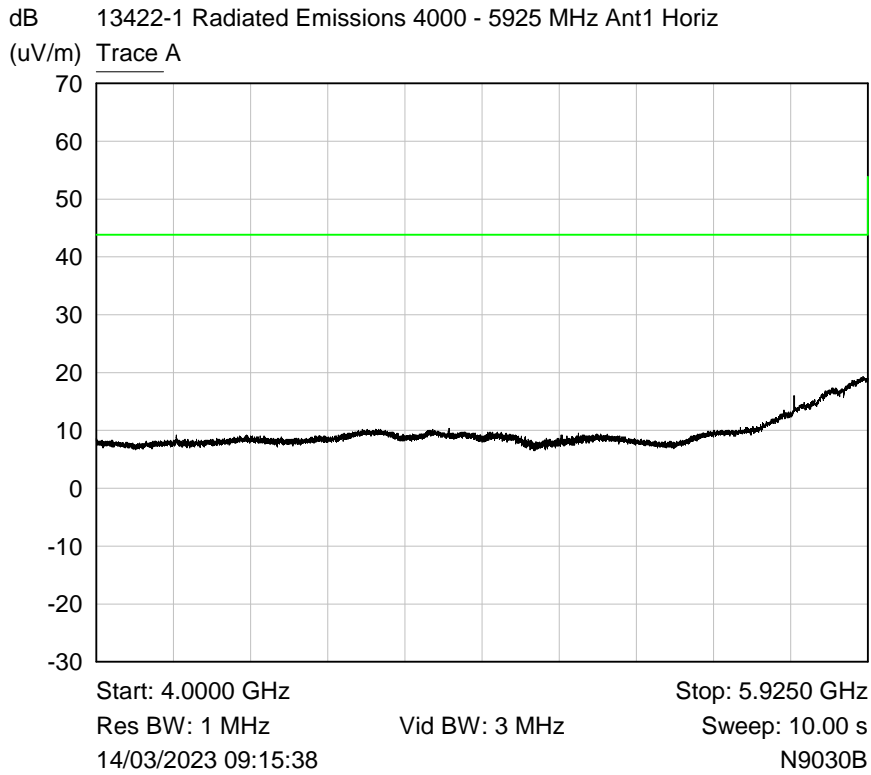


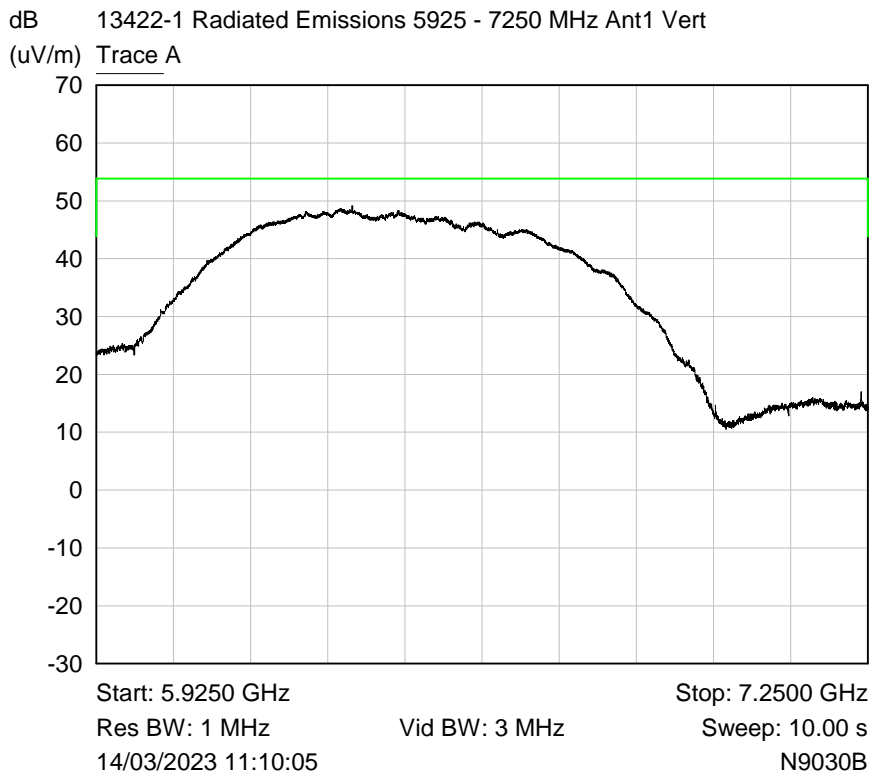
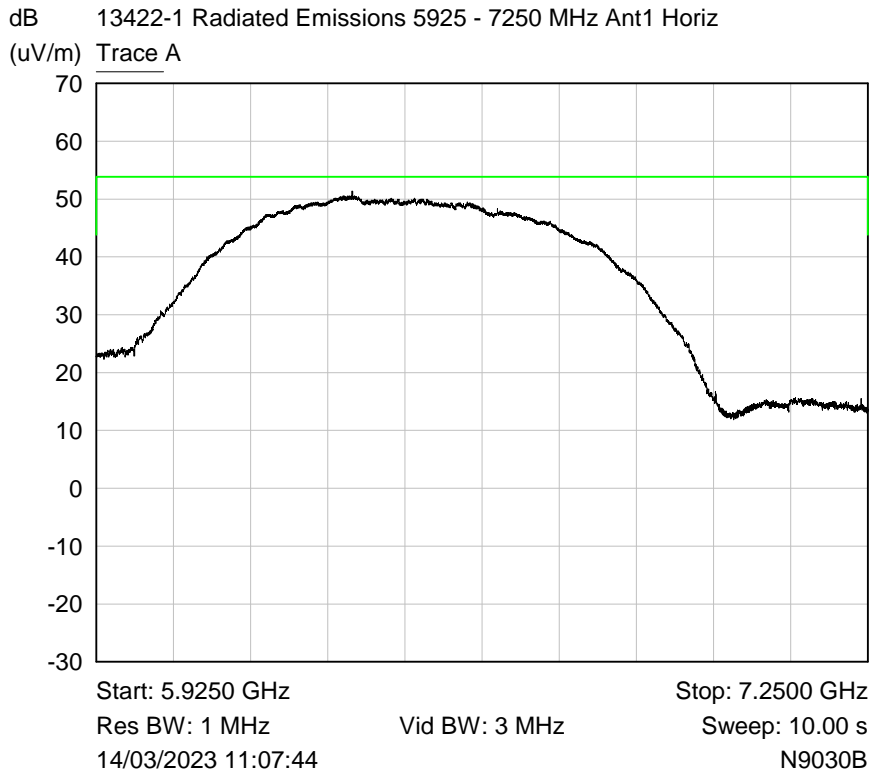
The emission that exceeds the limit line is the EUTs 2.4 GHz radio fundamental TX carrier

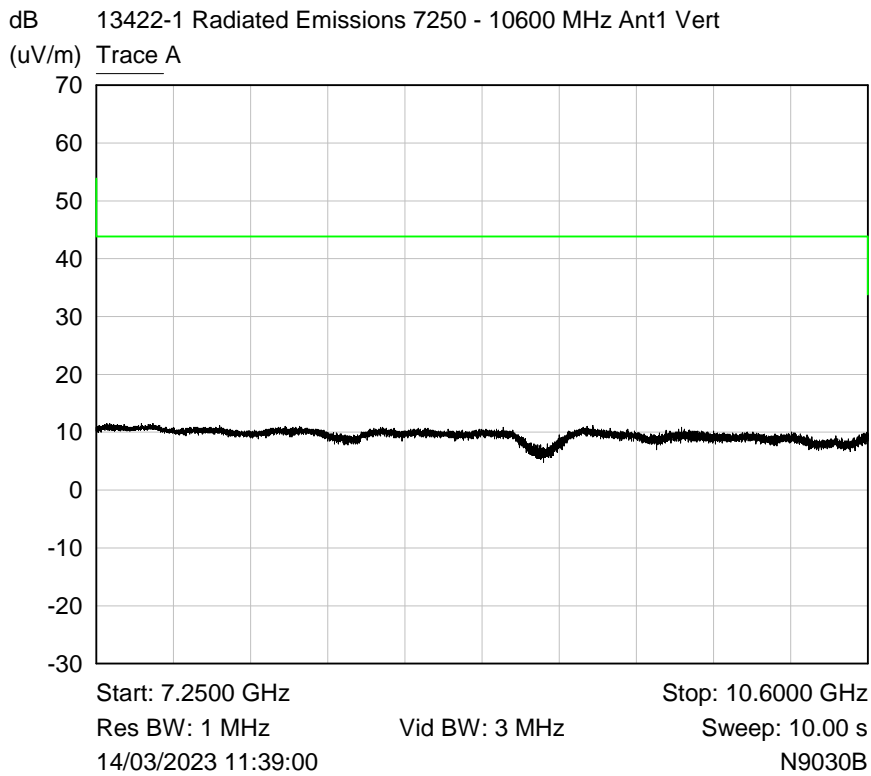
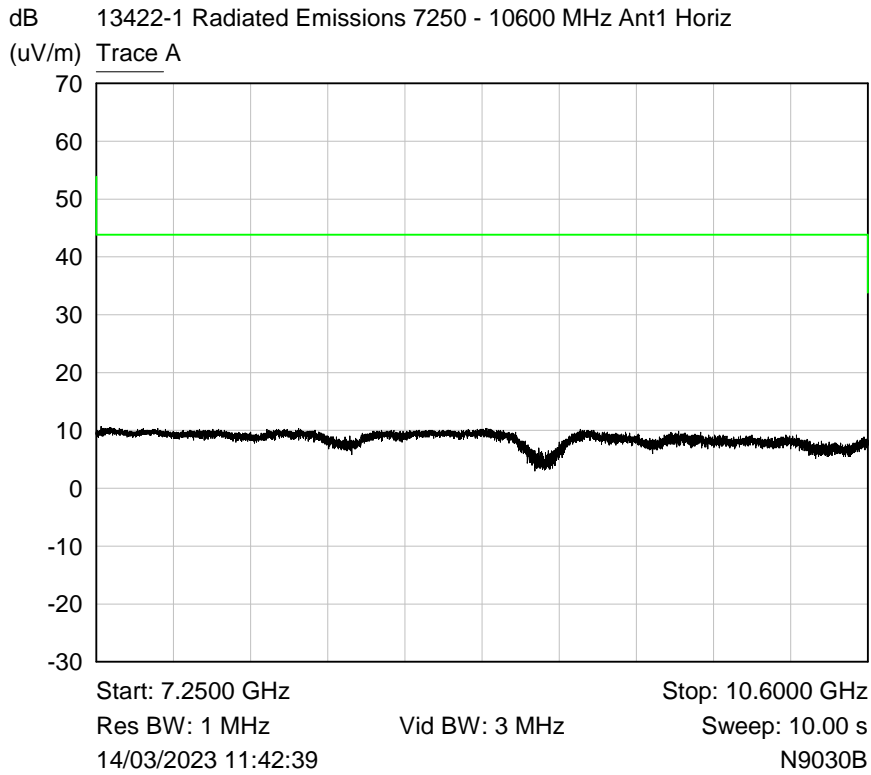


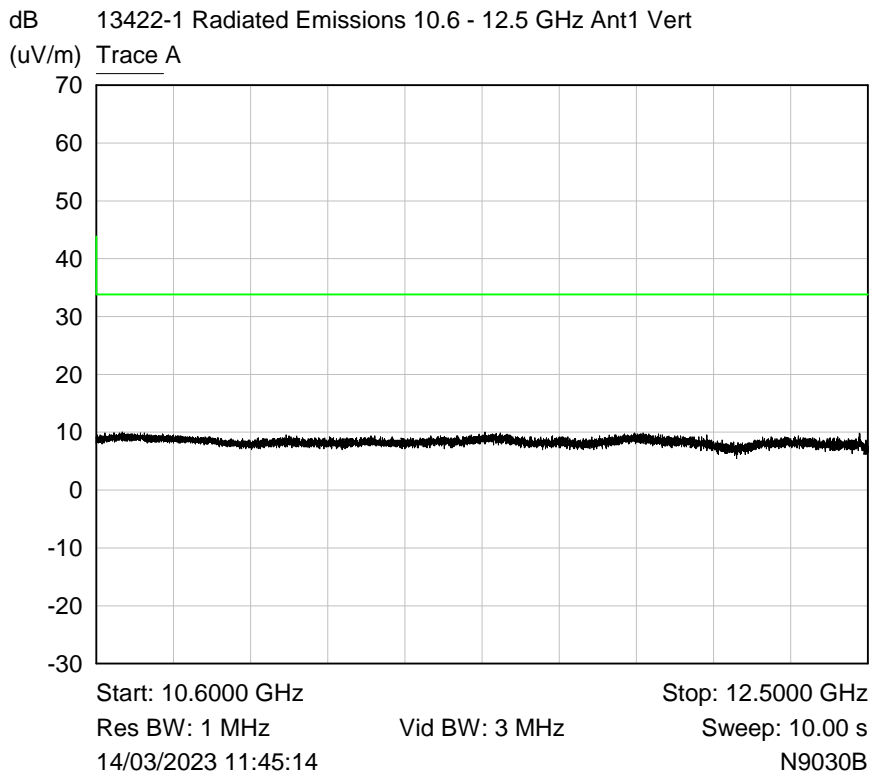
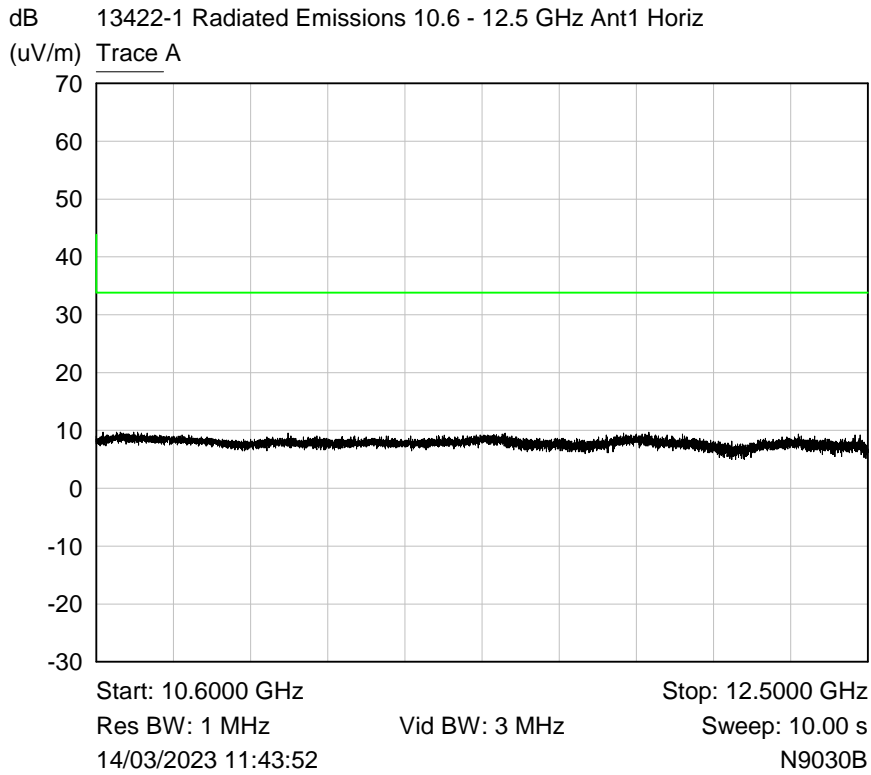
The emission that exceeds the limit line is the EUTs 2.4 GHz radio fundamental TX carrier

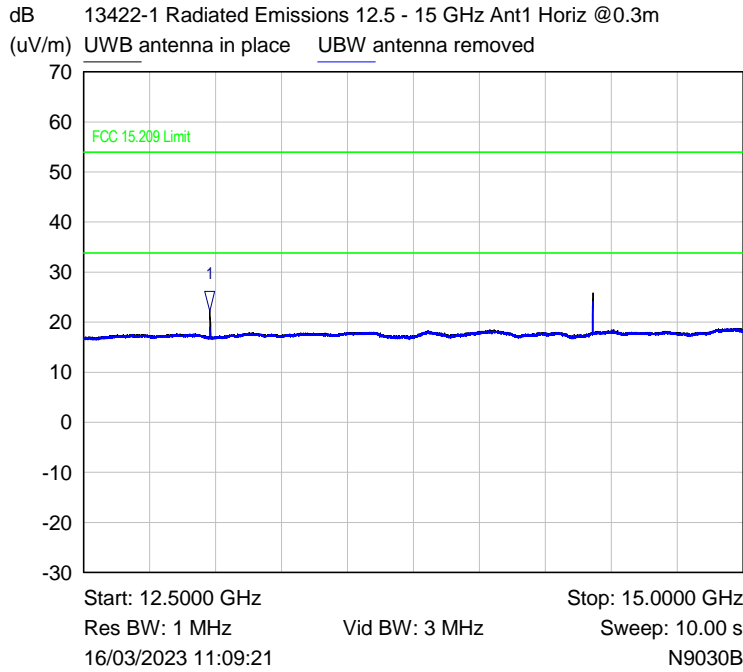










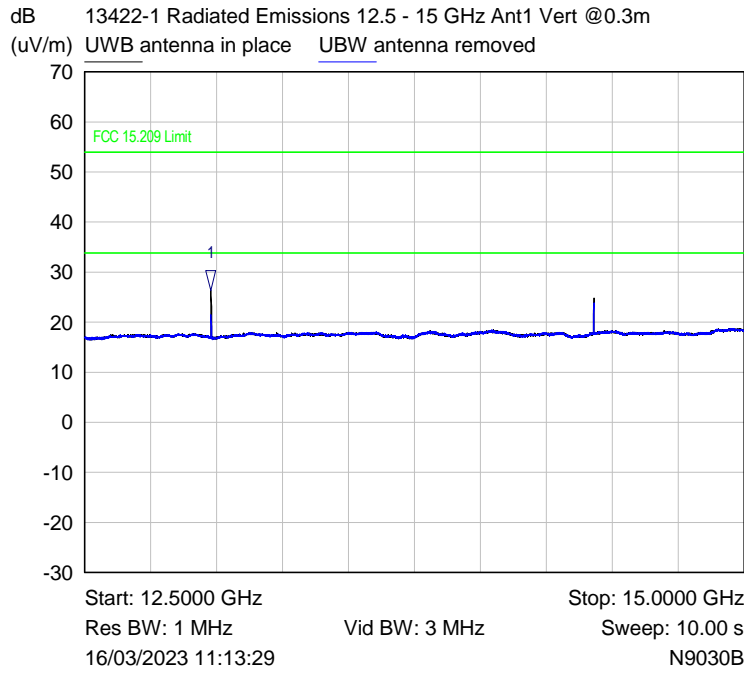


Mkr	Trace	X-Axis	Value	Notes
1 ▾	UWB antenna in place	12.793 GHz	22.21 dB(uV/m)	TX Related

Note: As per CFR Part 15C Clause 15.250(d)(5), Emissions from digital circuitry used to enable the operation of the transmitter may comply with the limits in CFR Part 15C Clause 15.209.

During emissions tests over the frequency range 12.5 – 15 GHz the limit was approached / exceeded. In order to demonstrate the emissions were associated to the digital circuitry and not radiated from the transmitter, the UWB antenna was unsoldered from the board and a second measurement was performed. Where no difference in the emission profile was observed the emissions were assessed to 15.209 Limits.

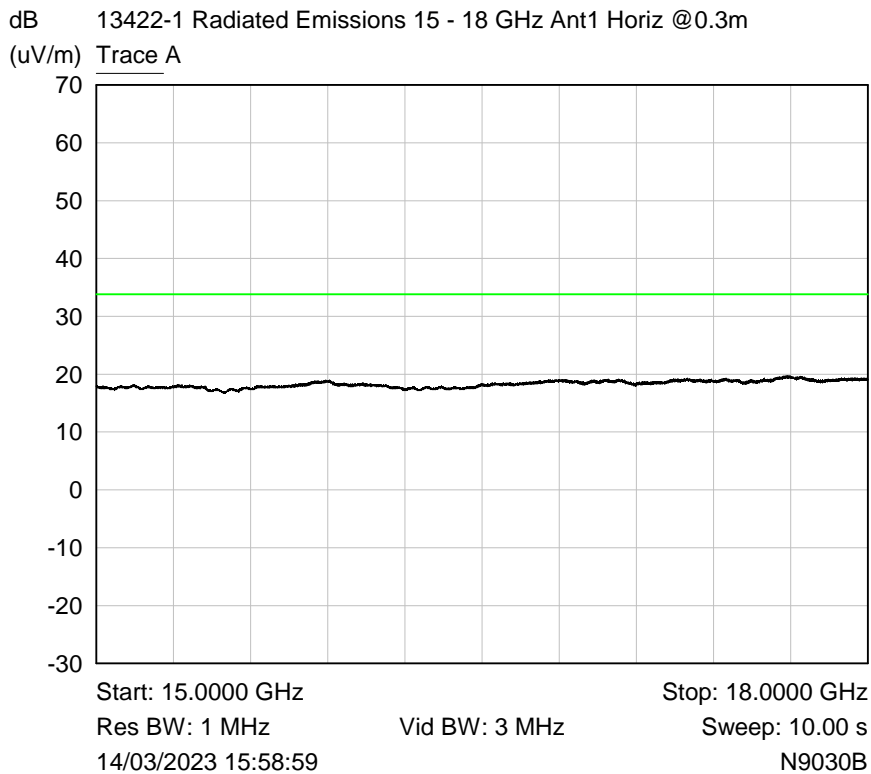


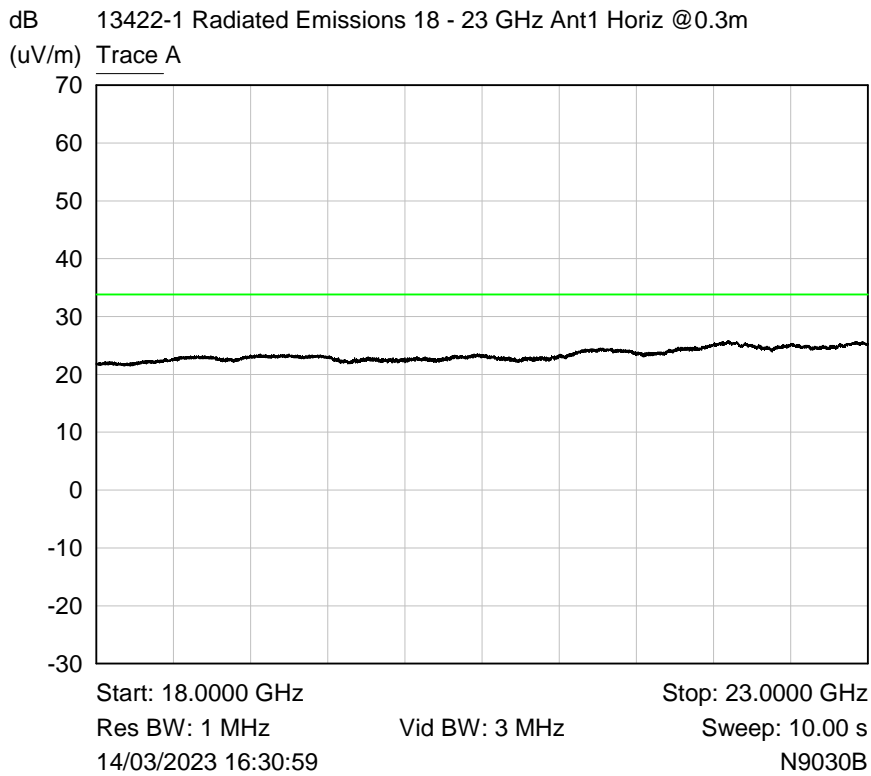
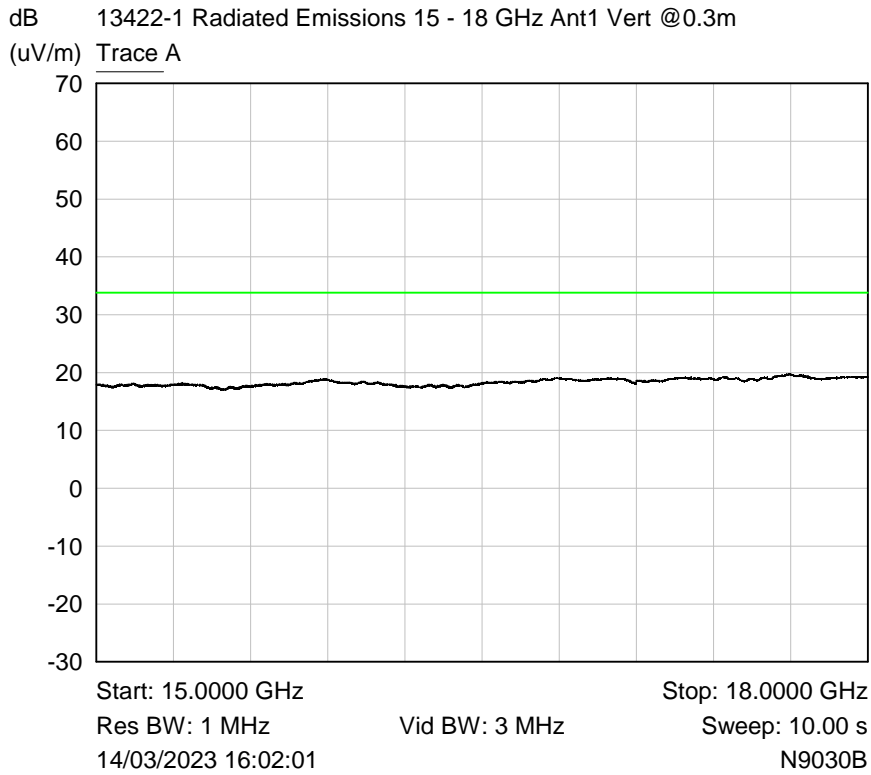


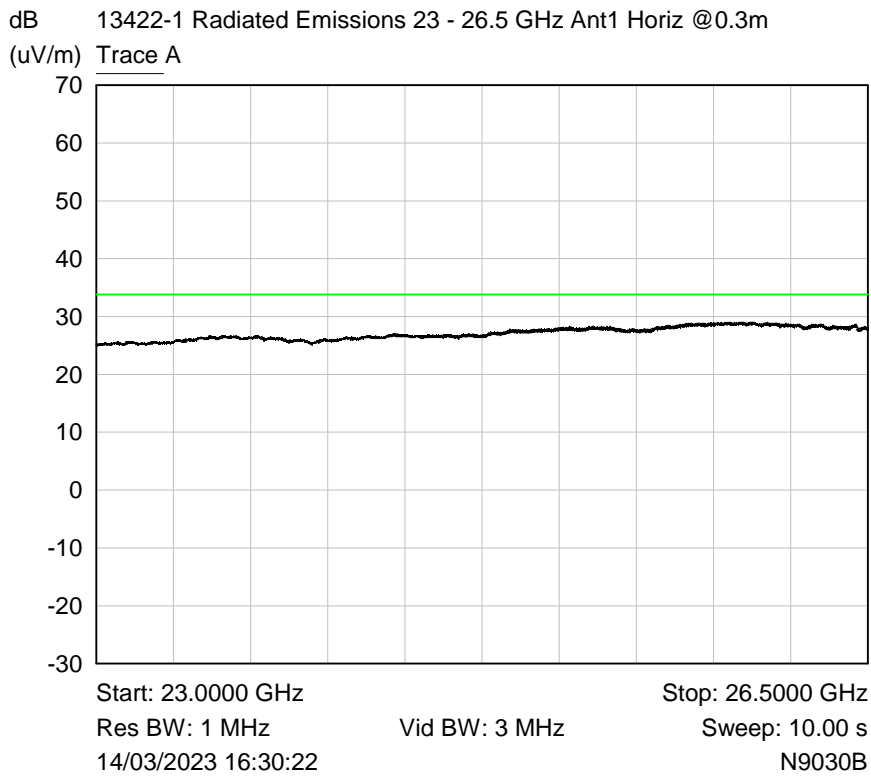
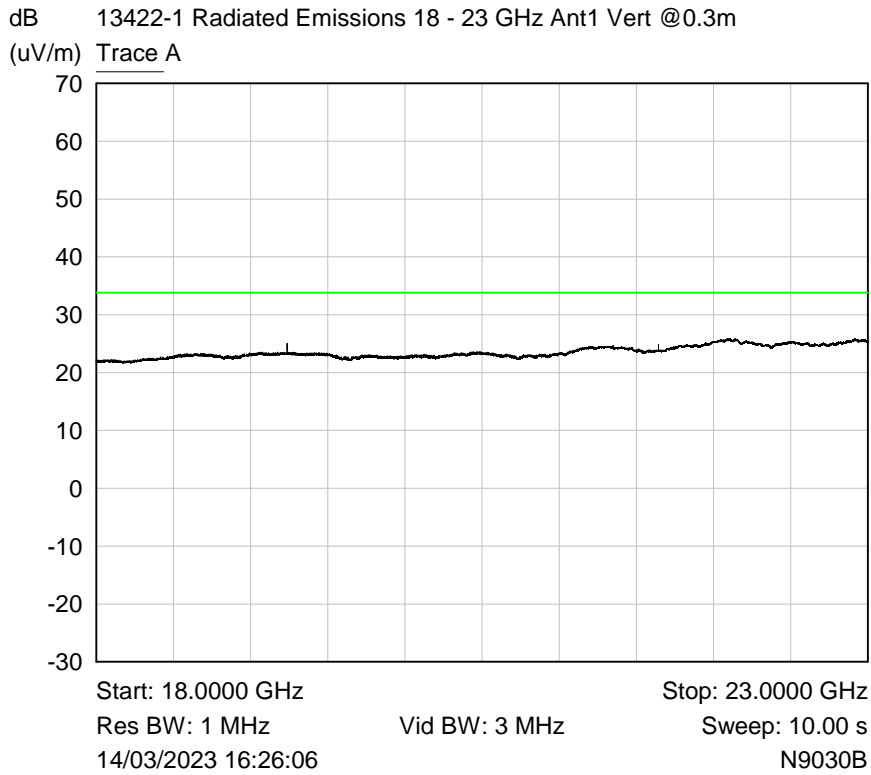
Mkr	Trace	X-Axis	Value	Notes
1 ▽	UWB antenna in place	12.6790 GHz	26.41 dB(uV/m)	TX Related

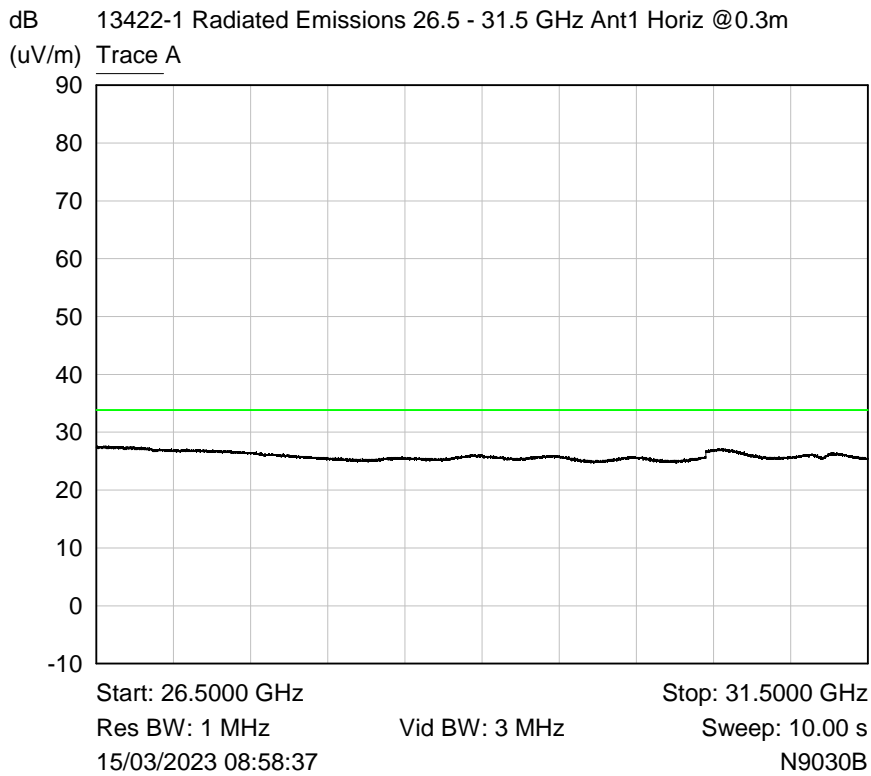
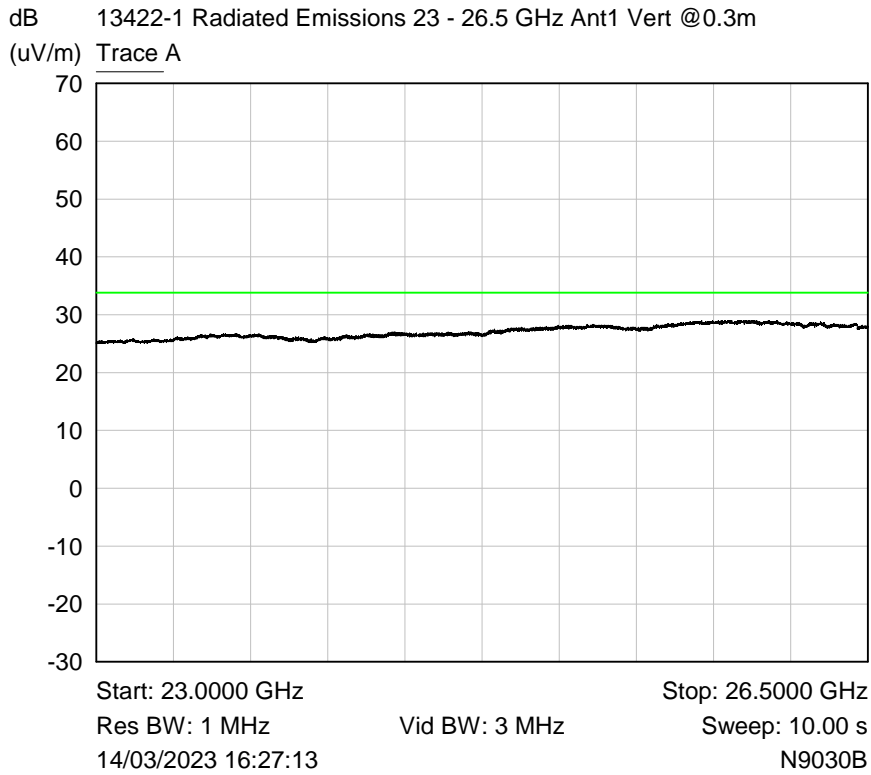
Note: As per CFR Part 15C Clause 15.250(d)(5), Emissions from digital circuitry used to enable the operation of the transmitter may comply with the limits in CFR Part 15C Clause 15.209.

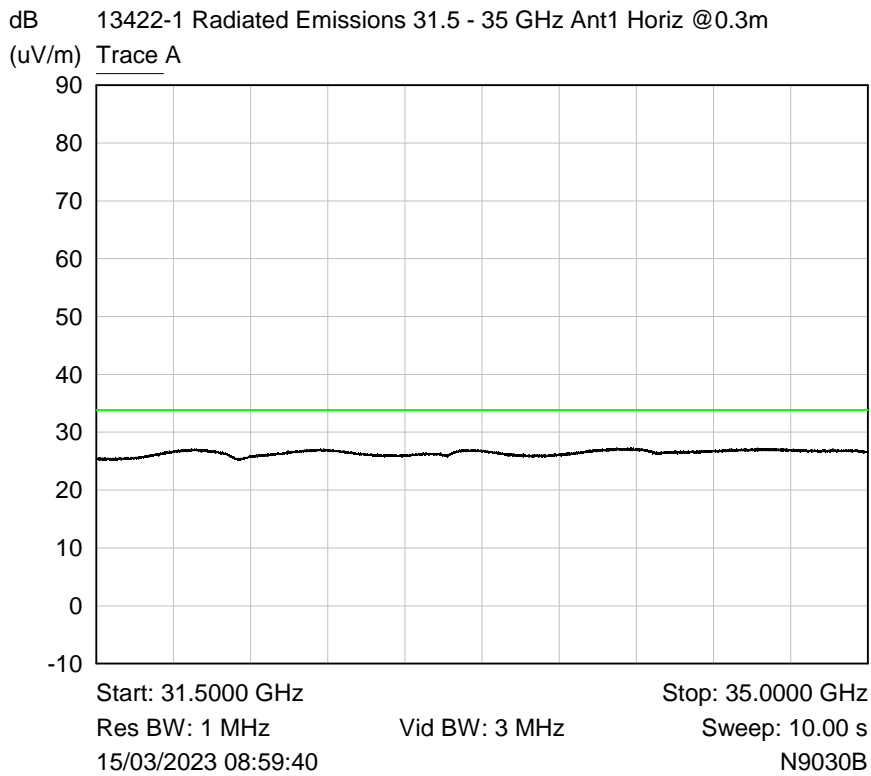
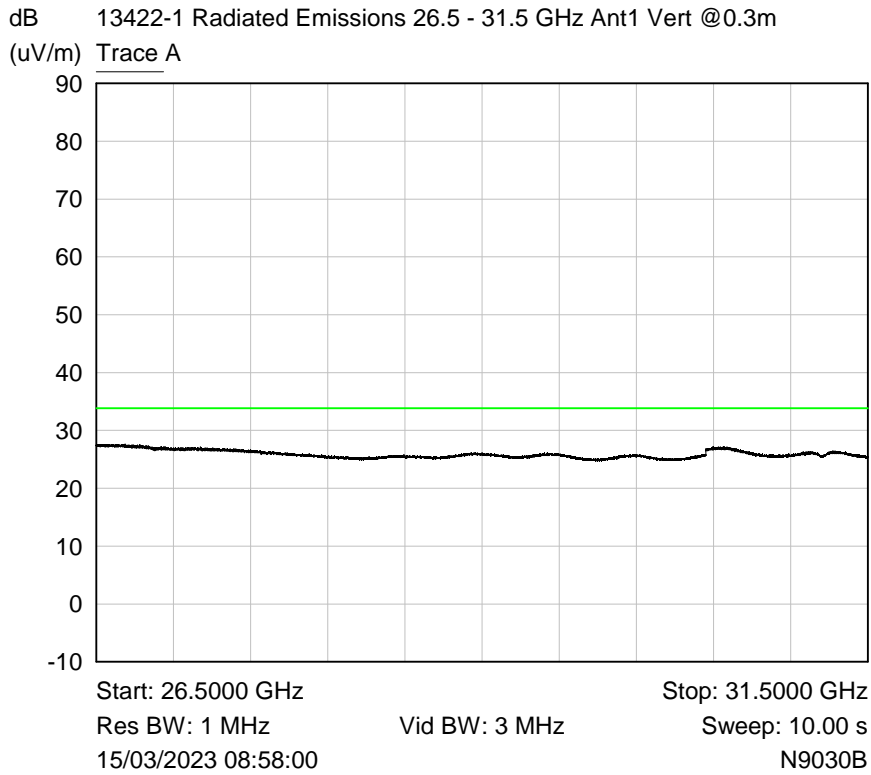
During emissions tests over the frequency range 12.5 – 15 GHz the limit was approached / exceeded. In order to demonstrate the emissions were associated to the digital circuitry and not radiated from the transmitter, the UWB antenna was unsoldered from the board and a second measurement was performed. Where no difference in the emission profile was observed the emissions were assessed to 15.209 Limits.

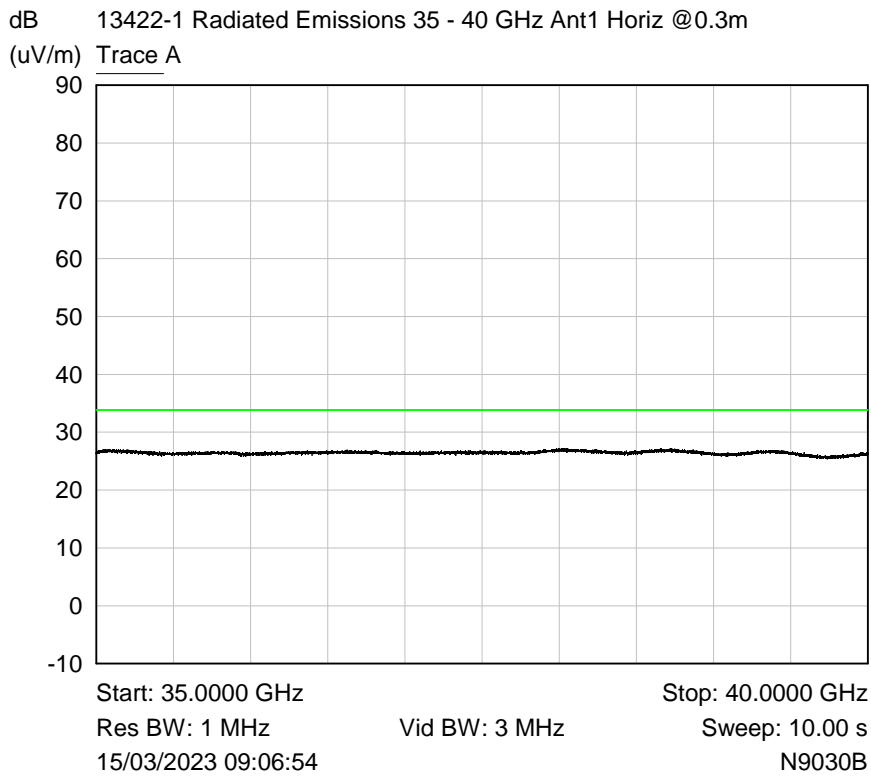
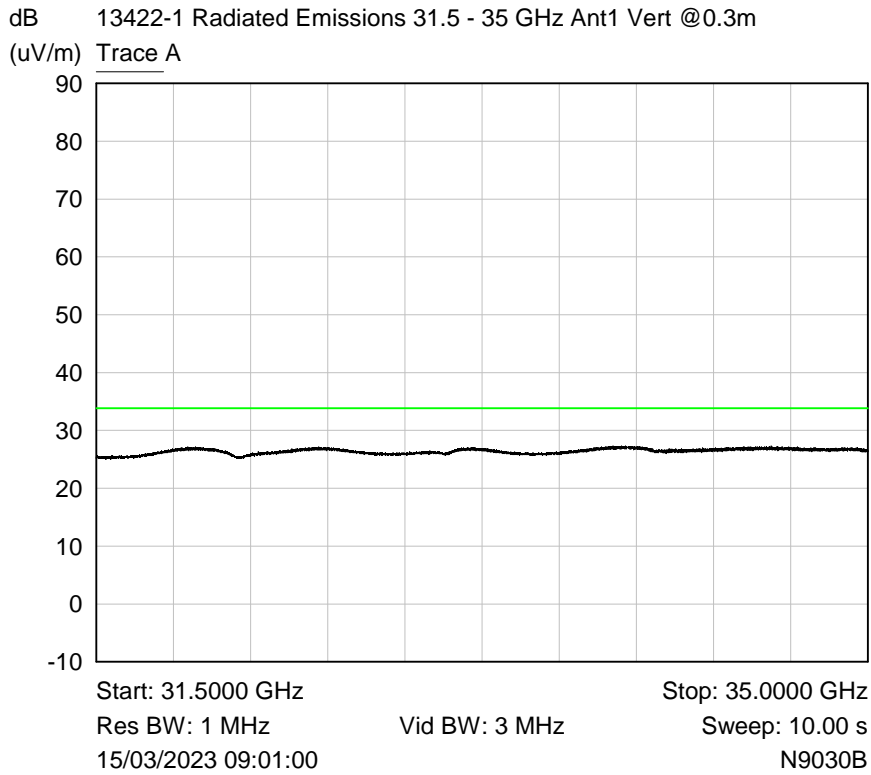


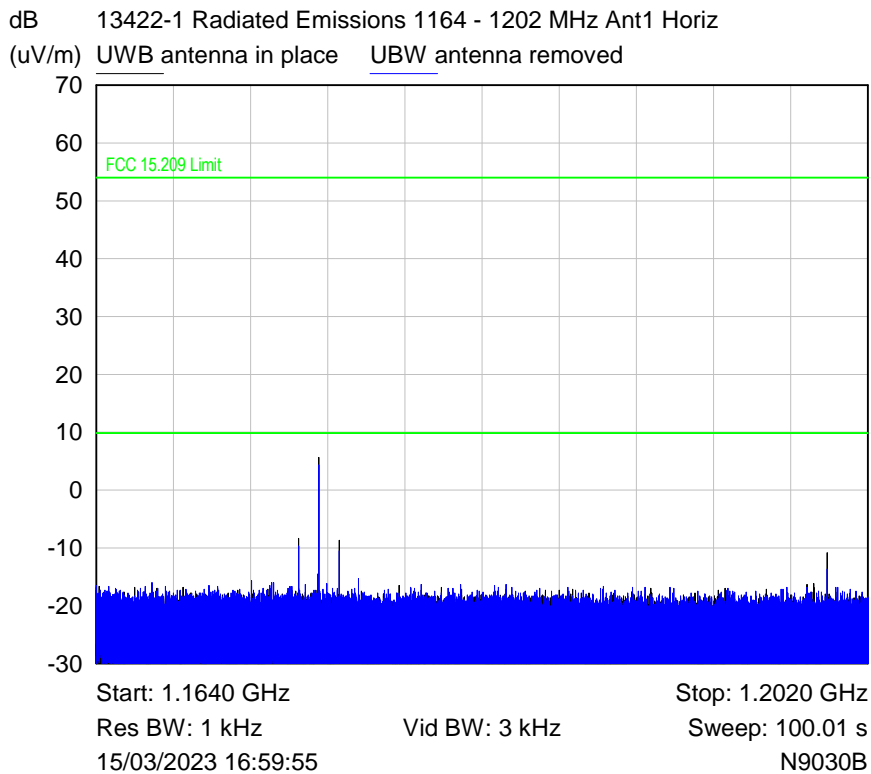
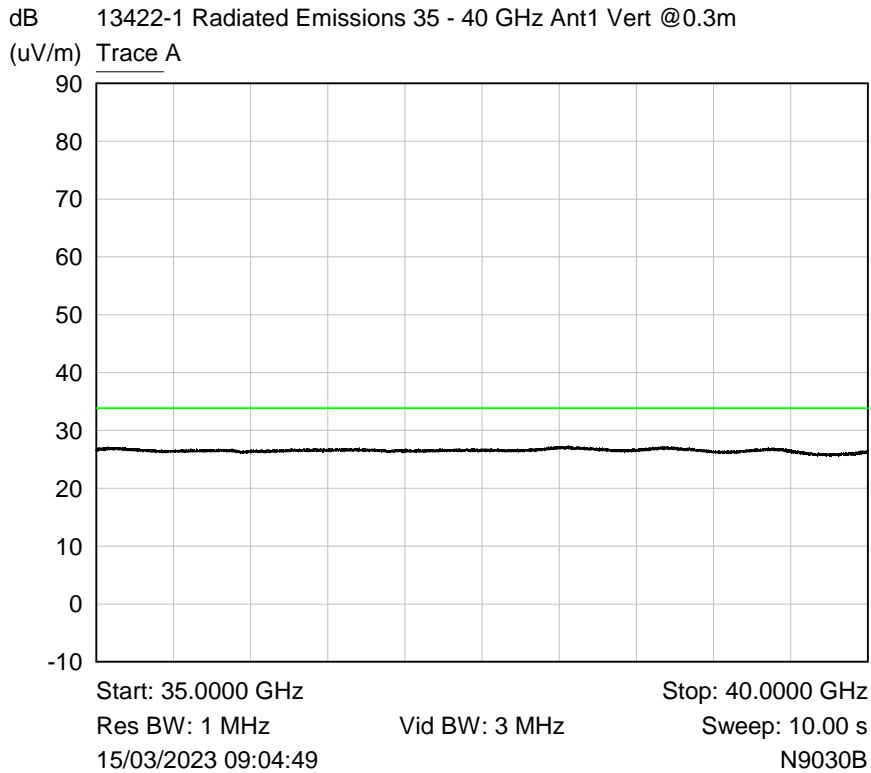




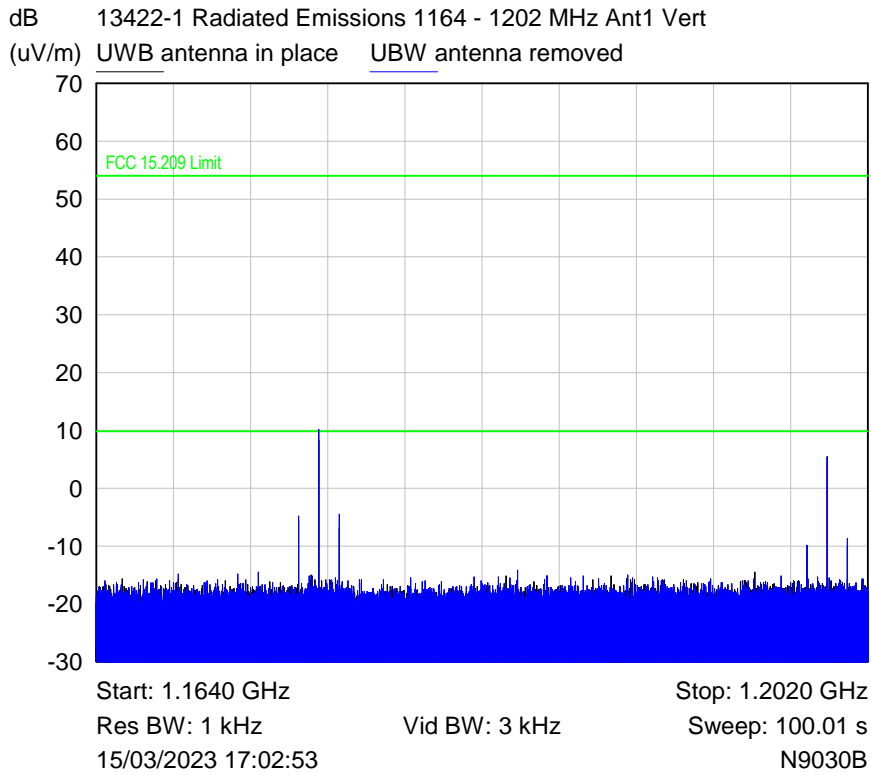






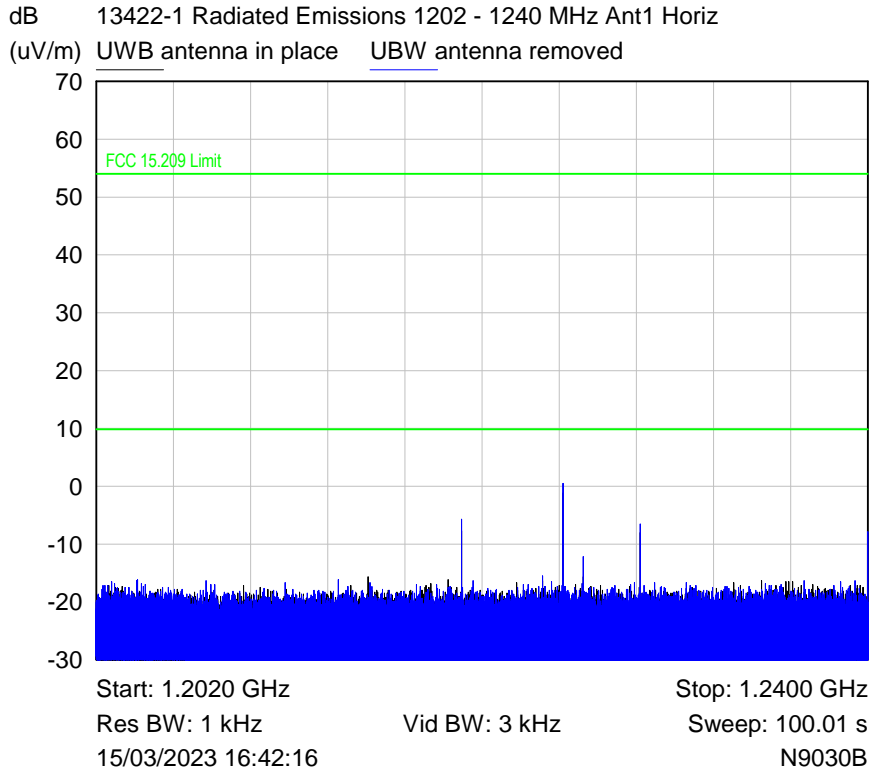


Note: As per 47 CFR Part 15C Clause 15.250(d)(5), Emissions from digital circuitry used to enable the operation of the transmitter may comply with the limits in CFR Part 15C Clause 15.209. During emissions tests over the frequency range 1164 – 1202 MHz the limit was approached / exceeded. In order to demonstrate the emissions were associated to the digital circuitry and not radiated from the transmitter, the UWB antenna was unsoldered from the board and a second measurement was performed. Where no difference in the emission profile was observed the emissions were assessed to 15.209 Limits.

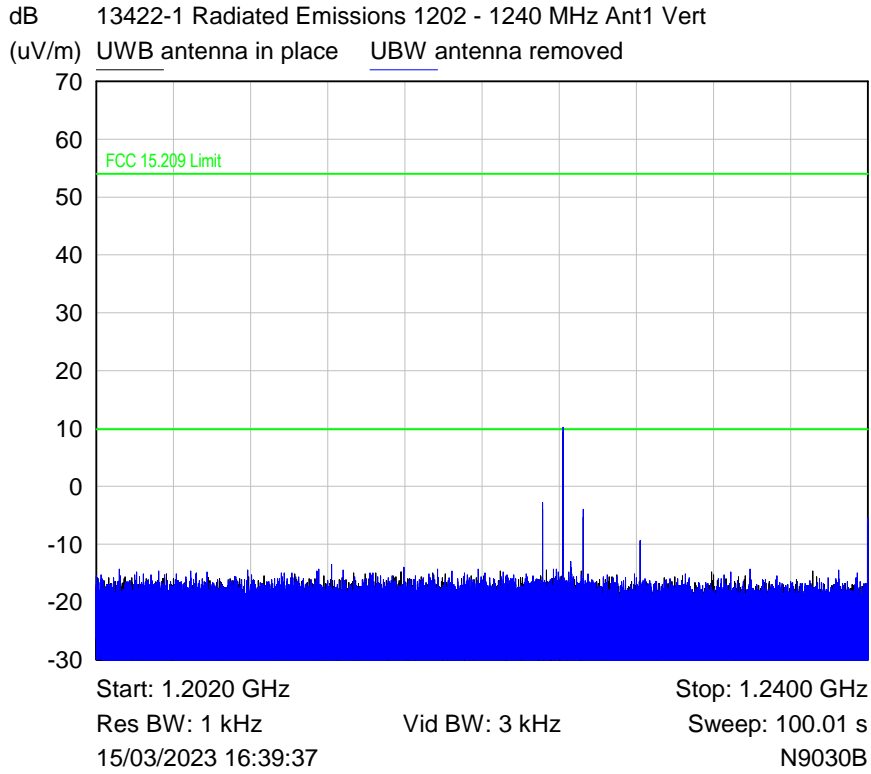


Note: As per 47 CFR Part 15C Clause 15.250(d)(5), Emissions from digital circuitry used to enable the operation of the transmitter may comply with the limits in CFR Part 15C Clause 15.209. During emissions tests over the frequency range 1640 – 1202 MHz the limit was approached / exceeded. In order to demonstrate the emissions were associated to the digital circuitry and not radiated from the transmitter, the UWB antenna was unsoldered from the board and a second measurement was performed. Where no difference in the emission profile was observed the emissions were assessed to 15.209 Limits.

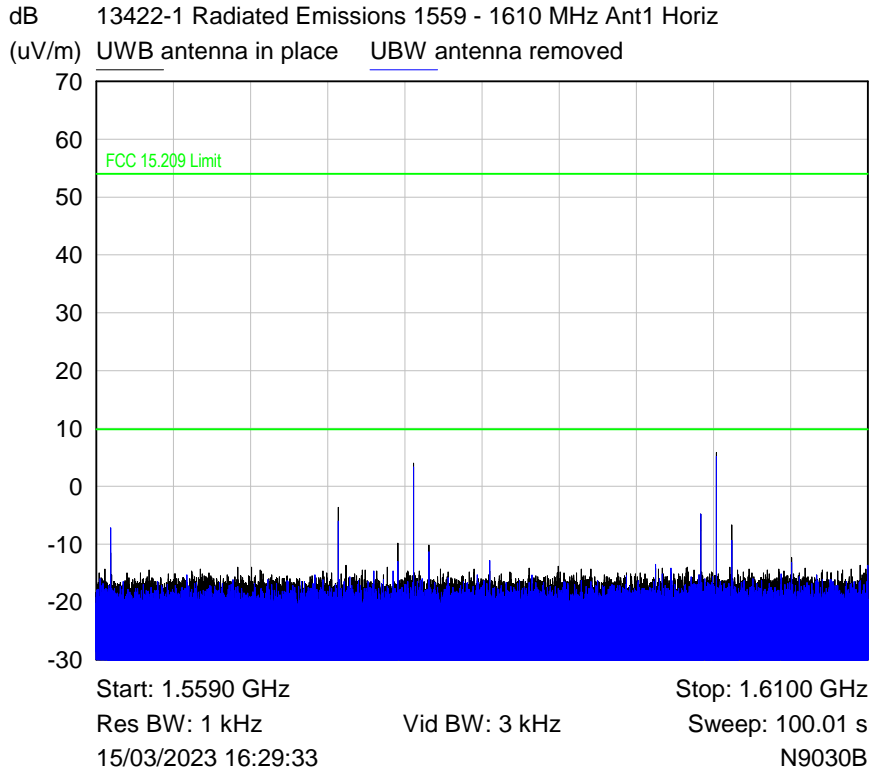




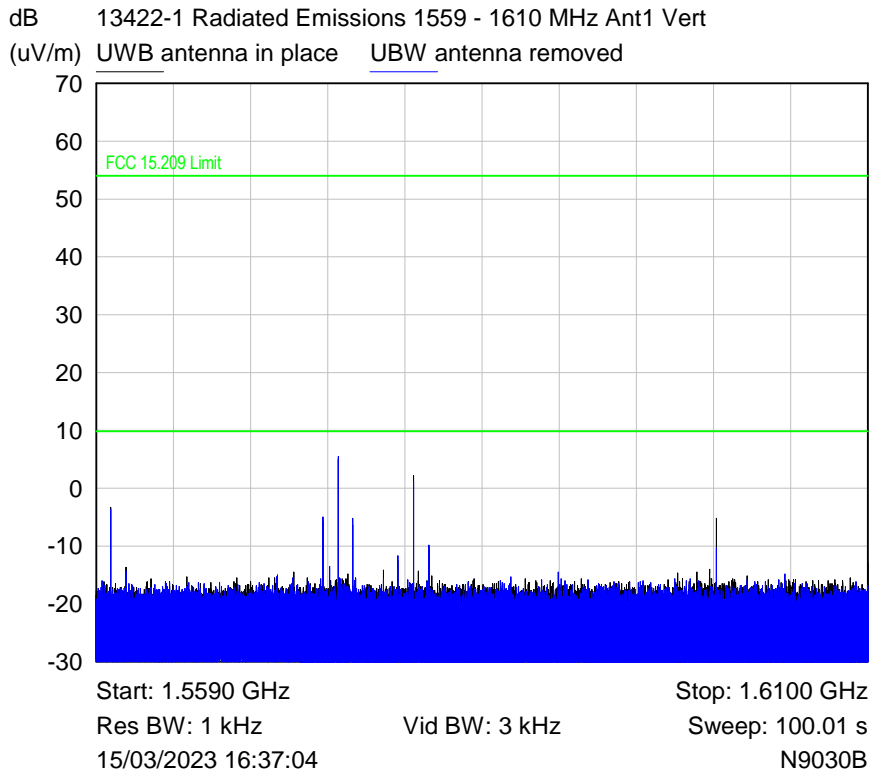
Note: As per 47 CFR Part 15C Clause 15.250(d)(5), Emissions from digital circuitry used to enable the operation of the transmitter may comply with the limits in CFR Part 15C Clause 15.209. During emissions tests over the frequency range 1202 – 1240 MHz the limit was approached / exceeded. In order to demonstrate the emissions were associated to the digital circuitry and not radiated from the transmitter, the UWB antenna was unsoldered from the board and a second measurement was performed. Where no difference in the emission profile was observed the emissions were assessed to 15.209 Limits.



Note: As per 47 CFR Part 15C Clause 15.250(d)(5), Emissions from digital circuitry used to enable the operation of the transmitter may comply with the limits in CFR Part 15C Clause 15.209. During emissions tests over the frequency range 1202 – 1240 MHz the limit was approached / exceeded. In order to demonstrate the emissions were associated to the digital circuitry and not radiated from the transmitter, the UWB antenna was unsoldered from the board and a second measurement was performed. Where no difference in the emission profile was observed the emissions were assessed to 15.209 Limits.



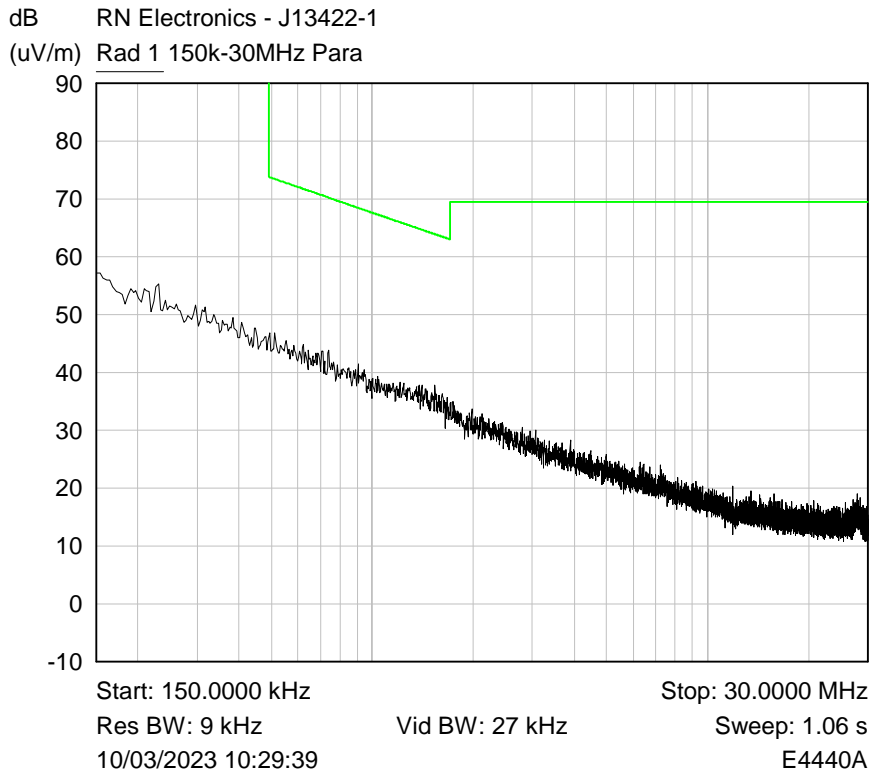
Note: As per 47 CFR Part 15C Clause 15.250(d)(5), Emissions from digital circuitry used to enable the operation of the transmitter may comply with the limits in CFR Part 15C Clause 15.209. During emissions tests over the frequency range 1559 – 1610 MHz the limit was approached / exceeded. In order to demonstrate the emissions were associated to the digital circuitry and not radiated from the transmitter, the UWB antenna was unsoldered from the board and a second measurement was performed. Where no difference in the emission profile was observed the emissions were assessed to 15.209 Limits.



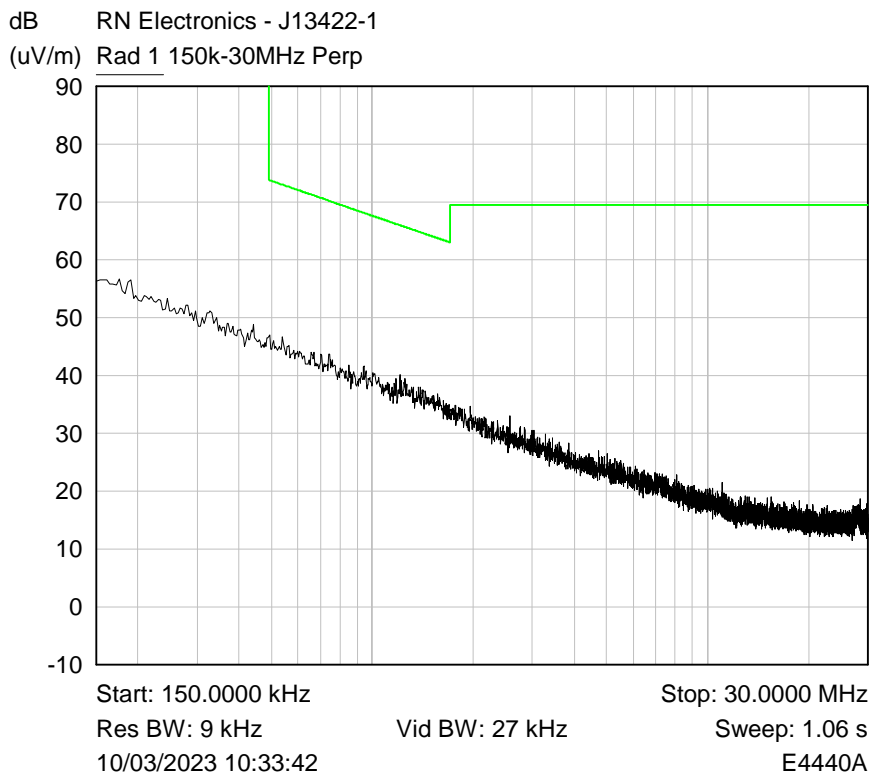
Note: As per 47 CFR Part 15C Clause 15.250(d)(5), Emissions from digital circuitry used to enable the operation of the transmitter may comply with the limits in CFR Part 15C Clause 15.209. During emissions tests over the frequency range 1559 – 1610 MHz the limit was approached / exceeded. In order to demonstrate the emissions were associated to the digital circuitry and not radiated from the transmitter, the UWB antenna was unsoldered from the board and a second measurement was performed. Where no difference in the emission profile was observed the emissions were assessed to 15.209 Limits.

## 6.5 Radiated emissions 150 kHz - 30 MHz

RF Parameters: Band 5925-7250 MHz, Power 15.5 dBm, Channel Spacing Single Channel, Modulation UWB (Radio 0), Channel 6489 MHz



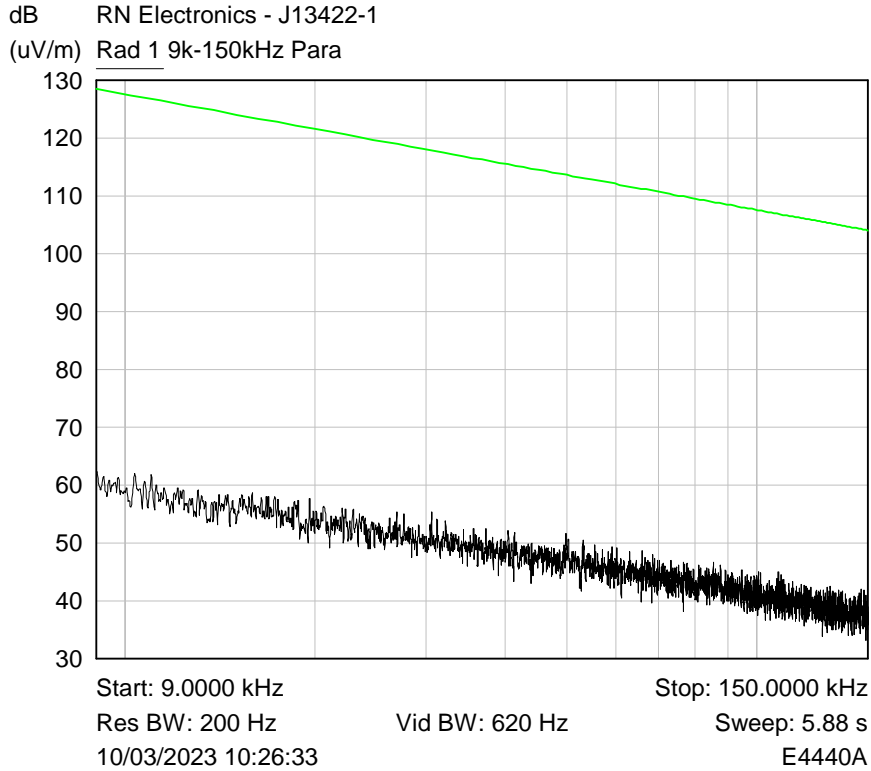
Plot of 150kHz-30MHz Parallel



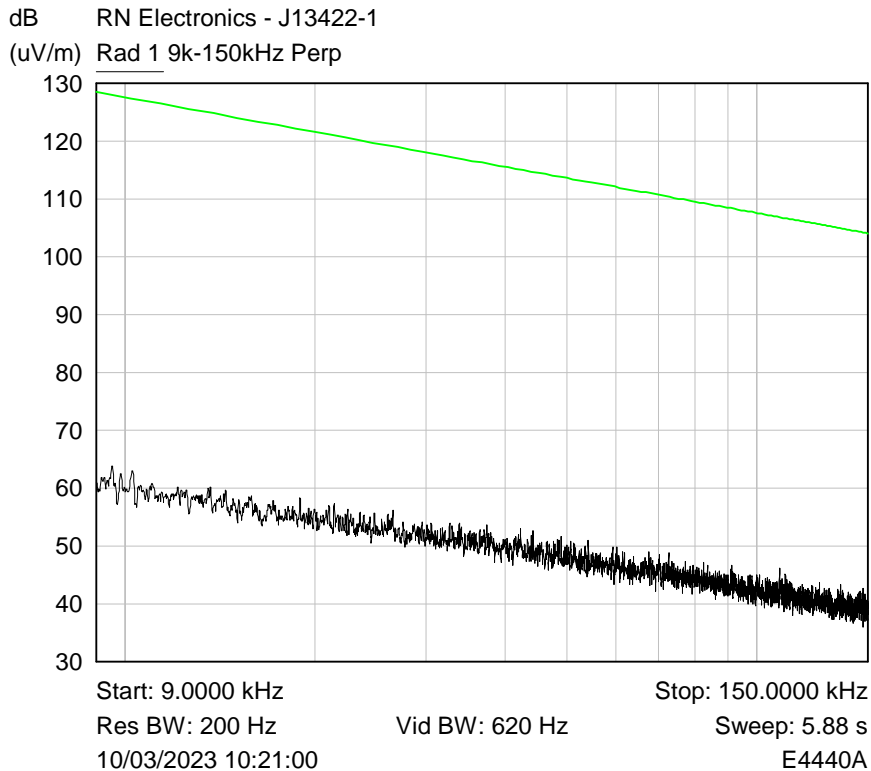
Plot of 150kHz-30MHz Perpendicular

## 6.6 Radiated emissions 9 - 150 kHz

RF Parameters: Band 5925-7250 MHz, Power 15.5 dBm, Channel Spacing Single Channel, Modulation UWB (Radio 0), Channel 6489 MHz



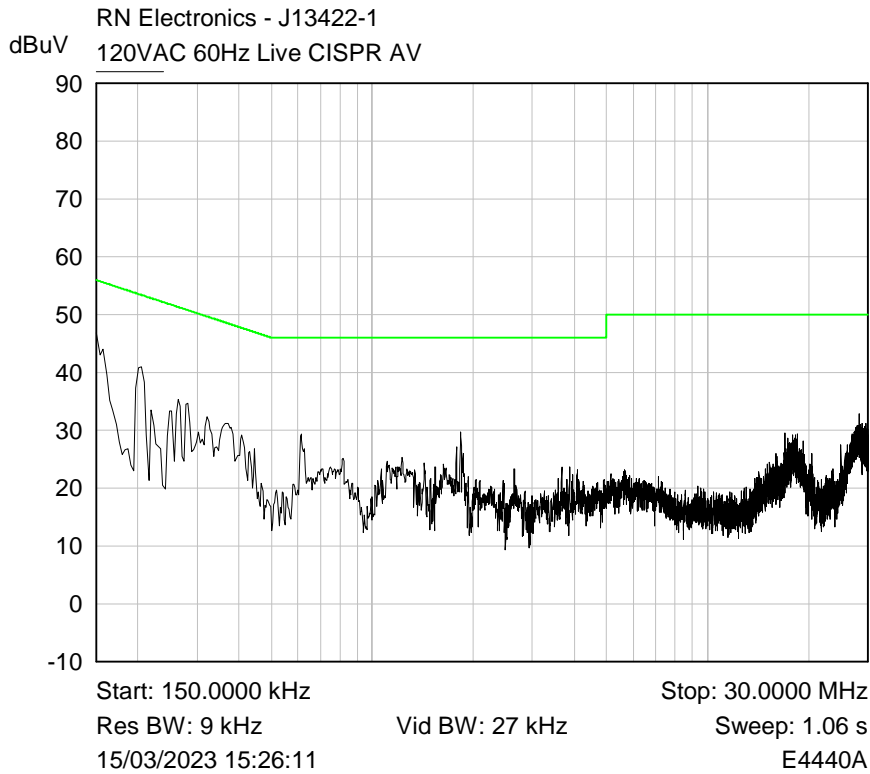
Plot of 9k-150kHz Parallel



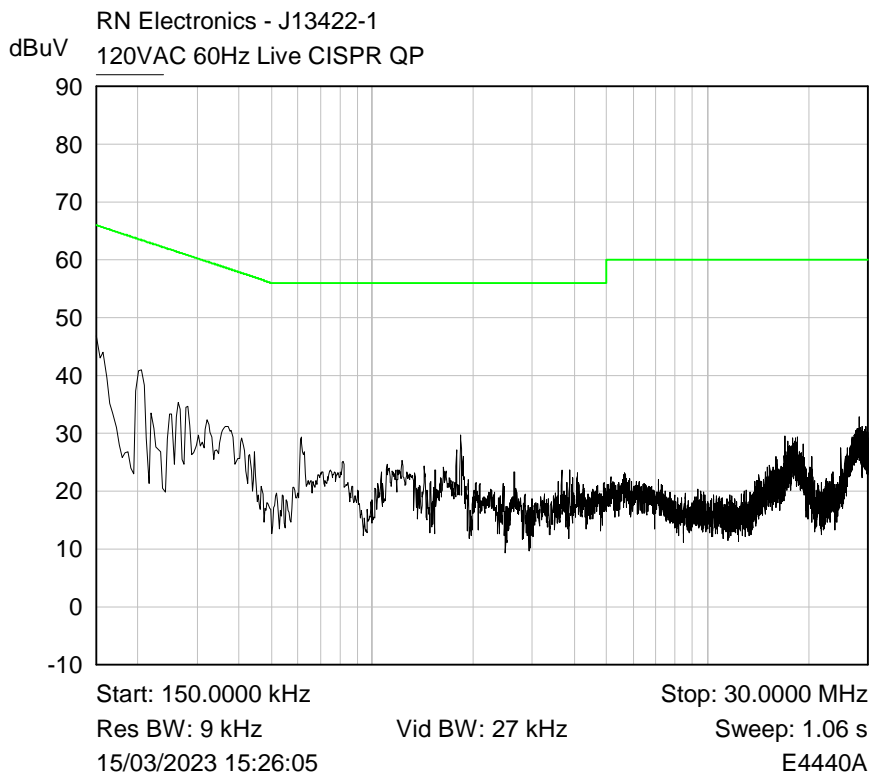
Plot of 9k-150kHz Perpendicular

## 6.7 AC power line conducted emissions

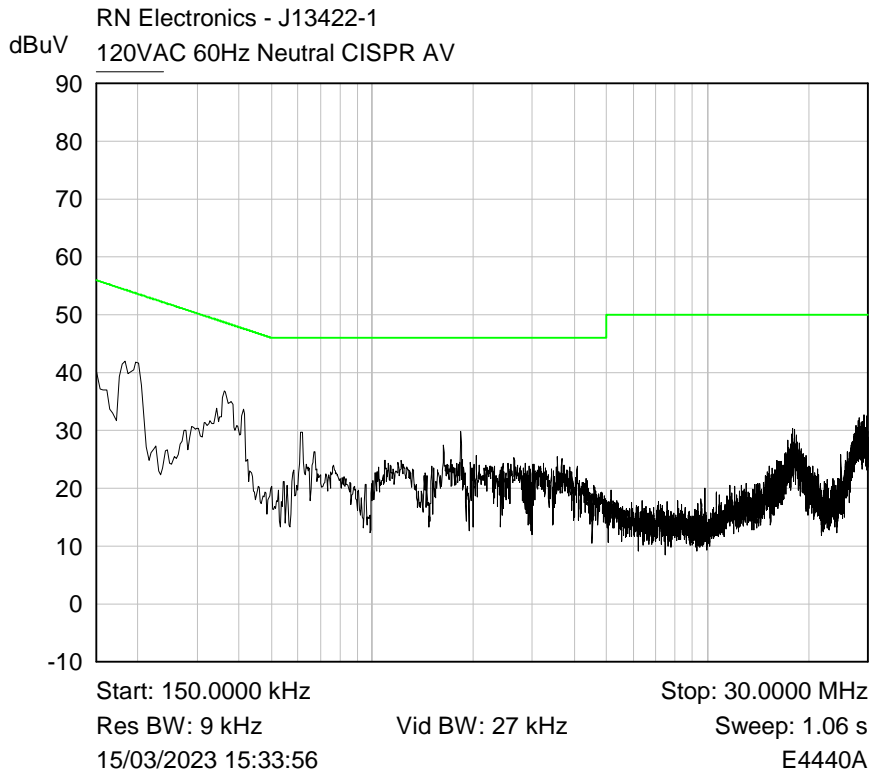
RF Parameters: Band 5925-7250 MHz, Power 15.5 dBm, Channel Spacing Single Channel, Modulation UWB (Radio 0), Channel 6489 MHz



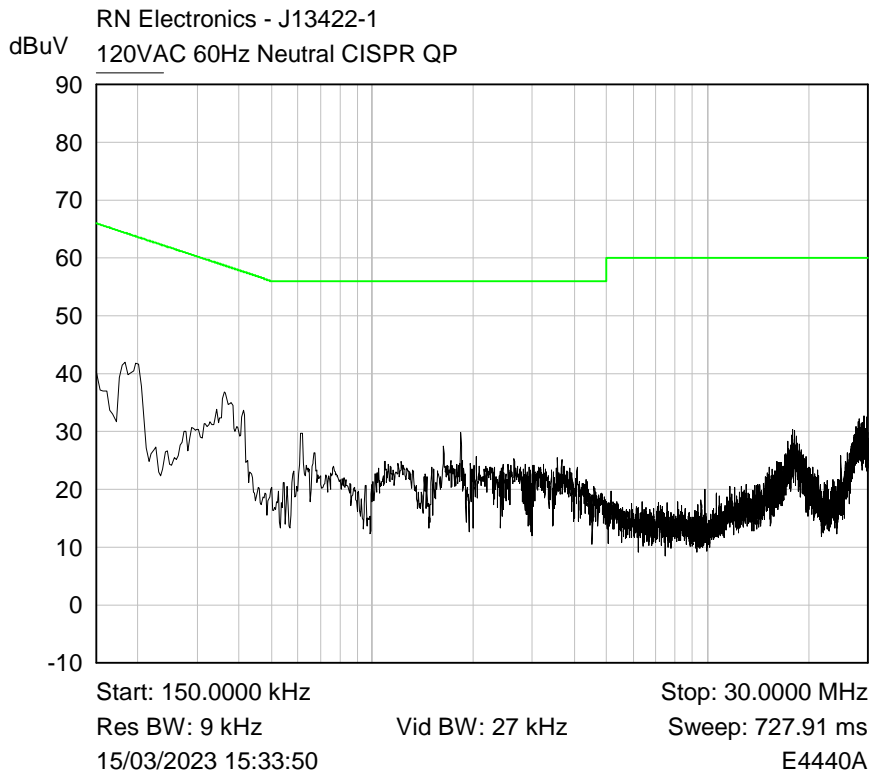
Plot of Live150k-30M Average



Plot of Live150k-30M Quasi-Peak



Plot of Neutral150k-30M Average



Plot of Neutral150k-30M Quasi-Peak



## 7 Explanatory Notes

### 7.1 Explanation of Table of Signals Measured

Measurements are made as required by the standard. These measurements are made and recorded using detectors, either peak, quasi peak or average dependant on the test. A table of results has been given following the relevant plots. This table looks similar to the one illustrated below dependant on the measurements required by the test: -

Signal No.	Freq (MHz)	Peak Amp (dB $\mu$ V)	Pk – Lim 1 (dB)	QP Amp (dB $\mu$ V)	QP - Lim1 (dB)	Av Amp (dB $\mu$ V)	Av - Lim1 (dB)
1	12345	54.9	-10.5	48	-12.6	37.6	-14.4

Column One - Labelled Signal No. is an incremental number that the receiver has given to each signal that has been measured.

Column Two - Labelled Freq (MHz) is the approximate frequency of the signal received.

Column Three - Labelled Peak Amp (dB $\mu$ V) is the level of received signal that was measured in dB above 1 $\mu$ V using the peak detector.

Column Four - Labelled Pk - Lim1 (dB) is the difference in level from the peak signal given to the active limit line. If this column appears in the table the peak detector measurement is required by the standard for this test. The results entered in this column indicate the signal level relative to the compliance limit required. Negative numbers indicate that the product is compliant.

Column Five - Labelled QP Amp (dB $\mu$ V) is the level of received signal that was measured in dB above 1 $\mu$ V using the quasi-peak detector.

Column Six - Labelled QP - Lim1 (dB) is the difference in level from the quasi-peak signal given to the active limit line. If this column appears in the table the quasi-peak detector measurement is required by the standard for this test. The results entered in this column indicate the signal level relative to the compliance limit required. Negative numbers indicate that the product is compliant.

Column Seven - Labelled Av Amp (dB $\mu$ V) is the level of received signal that was measured in dB above 1 $\mu$ V using the average detector.

Column Eight - Labelled Av - Lim1 (dB) is the difference in level from the average signal given to the active limit line. If this column appears in the table the average detector measurement is required by the standard for this test. The results entered in this column indicate the signal level relative to the compliance limit required. Negative numbers indicate that the product is compliant.

Only signals highlighted in red are deemed to exceed the limit of the detector required.

## 7.2 Explanation of limit line calculations for radiated measurements

The limits given in the test standard are normally expressed as absolute values (e.g. in  $\mu\text{V}/\text{m}$  at a specified distance), whereas the measured values are expressed as peak, quasi peak or average values in  $\text{dB}\mu\text{V}/\text{m}$  referenced to the measuring instrument inputs. RN Electronics calibrate the test set-up to account for any path losses, antenna gains, etc. so that the value read at the receiver relates directly to the absolute value required, except that it is expressed in dB relative to one microVolt and may need to take account of any alternative measuring distance used. Examples:

(a) limit of  $500 \mu\text{V}/\text{m}$  equates to  $20.\log(500) = 54 \text{ dB } \mu\text{V}/\text{m}$ .

(b) limit of  $300 \mu\text{V}/\text{m}$  at 10m equates to  $20.\log(300 \cdot 10/3) = 60 \text{ dB } \mu\text{V}/\text{m}$  at 3m

(c) limit of  $30 \mu\text{V}/\text{m}$  at 30m, but below 30MHz, equates to  $20.\log(30) + 40.\log(30/3) = 69.5 \text{ dB}\mu\text{V}/\text{m}$  at 3m, as extrapolation factor below 30MHz is 40dB/decade per  $15.31(f)^2$ .

The measurement receiver used for emissions testing, performs the field strength (FS) calculations automatically. The receiver combines the signal amplitude (RA), Antenna Factor (AF) and Cable Loss (CL) factors for the frequency to be measured.

Example calculation: - FS = RA + AF + CL.

Receiver amplitude (RA)	Antenna factor (3m) (AF)	Cable loss (CL)	Field strength result (3m) (FS)
20dBuV	25 dB	3 dB	48dBuV/m

**Additional calculation examples per ANSI C63.10 clause 9.4 – 9.6 equations 21, 22, 25 & 26:**

**Equation 21:**  $E_{\text{Linear}} = 10^{((E_{\text{Log}} - 120)/20)}$

And therefore equation 21 transposed is:  $E_{\text{Log}} = 20 \times \text{Log}(E_{\text{Linear}}) + 120$

Where:

$E_{\text{Linear}}$  is the field strength of the emission in V/m

$E_{\text{Log}}$  is the field strength of the emissions in  $\text{dB}\mu\text{V}/\text{m}$

**Equation 22:**  $\text{EIRP} = E_{\text{Meas}} + 20\log(d_{\text{Meas}}) - 104.7$

Where:

EIRP is equivalent isotropically radiated power in dBm

$E_{\text{Meas}}$  is the field strength of the emission at the measurement distance in  $\text{dB}\mu\text{V}/\text{m}$

$d_{\text{Meas}}$  is the measurement distance in metres

**Equation 25:**  $\text{PD} = \text{EIRP}_{\text{Linear}} / 4\pi d^2$

And therefore equation 25 transposed is:  $\text{EIRP}_{\text{Linear}} = \text{PD} \times 4\pi d^2$

Where:

PD is the power density at distance specified by the limit, in  $\text{W}/\text{m}^2$

$\text{EIRP}_{\text{Linear}}$  is the equivalent isotropically radiated power in Watts

d is the distance at which the power density limit is specified in metres

**Equation 26:**  $\text{PD} = E_{\text{Spec limit}}^2 / 377$

And therefore equation 26 transposed is:  $E_{\text{Spec limit}} = \sqrt{(\text{PD} \times 377)}$

Where:

PD is the power density at distance specified by the limit, in  $\text{W}/\text{m}^2$

$E_{\text{Spec limit}}$  is the field strength at the distance specified by the limit in V/m

**Example:**

Radiated spurious emissions limit at 3metres of 90pW/cm<sup>2</sup>.

$$90\text{pW/cm}^2 \times 100^2 = 0.9 \mu\text{W/m}^2 = (\text{EIRP Linear})$$

$$\text{Equation 25 transposed: } 0.9 \times 10^{-6} \times 4 \times \pi \times 3^2 = 0.0001017876 \text{ W}$$

And

$$\text{Equation 26 transposed: } E_{\text{Spec limit}} = \sqrt{(0.9 \times 10^{-6} \times 377)} = 0.01842 \text{ V/m.}$$

And

$$\text{Equation 21 transposed: } E_{\text{Log}} = 20\text{Log}(0.01842) + 120 = 85.3\text{dB}\mu\text{V/m @ 3m.}$$

## 8 Photographs

No photos included due to confidentiality requested by client towards FCC certification.

### 8.1 Radiated emission diagrams

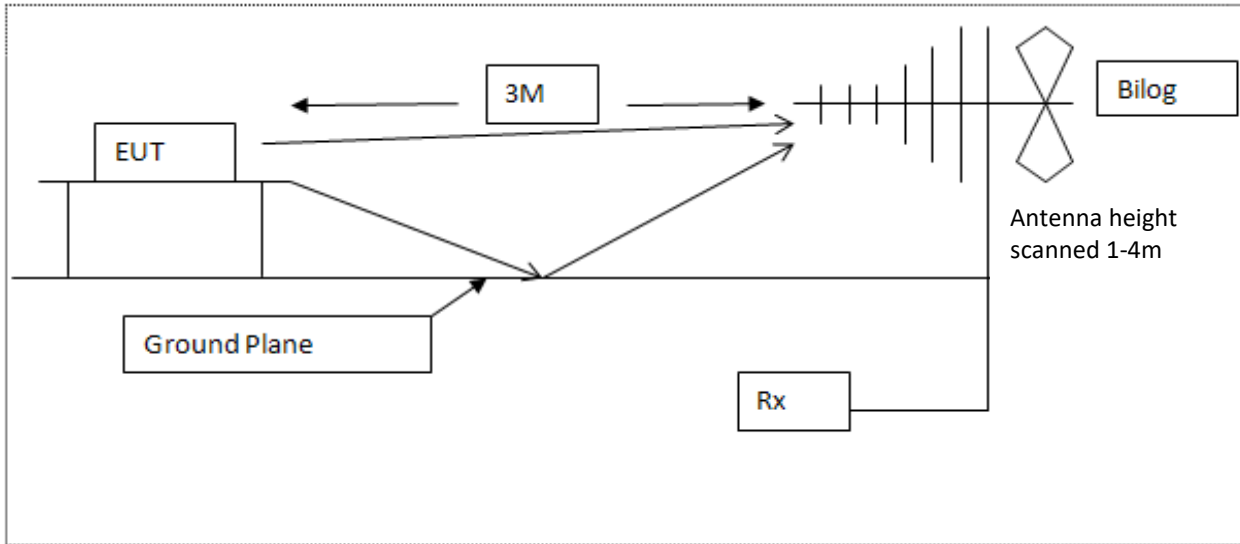


Diagram of the radiated emissions test setup 30 - 1000 MHz

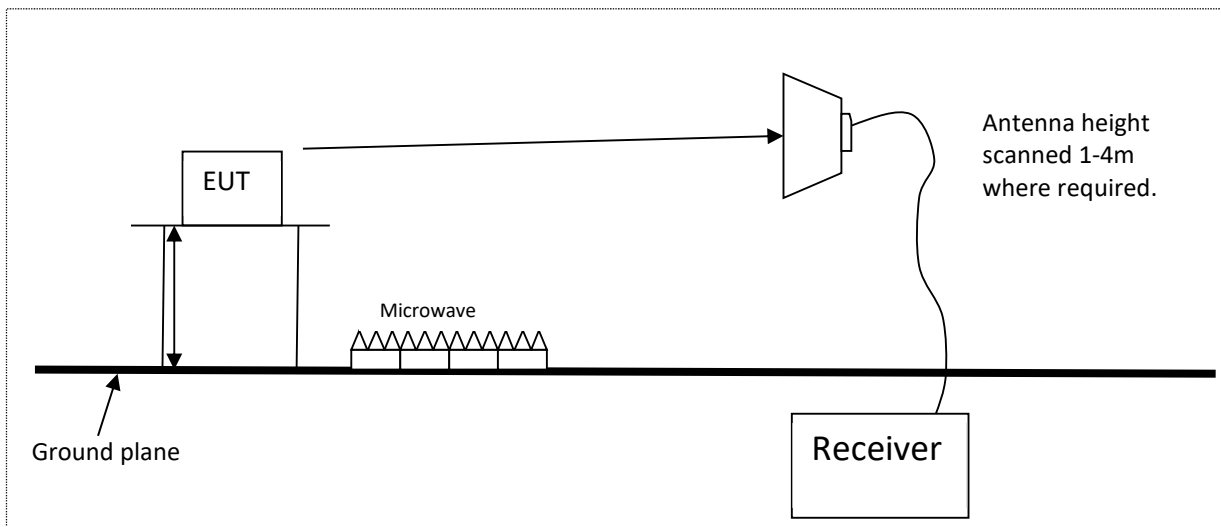


Diagram of the radiated emissions test setup above 1GHz

## 8.2 AC powerline conducted emission diagram

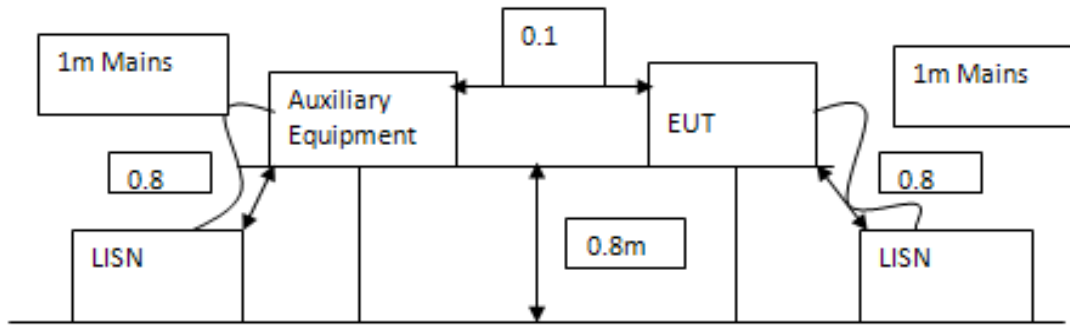


Diagram of the AC conducted emissions test setup

## 9 Test equipment calibration list

The following is a list of the test equipment used by R.N. Electronics Ltd to test the unit detailed within this report. In line with our procedures, the equipment was within calibration for the period during which testing was carried out.

RN No.	Model No.	Description	Manufacturer	Calibration date	Cal period
E035	11947A	Transient Limiter 9kHz - 200MHz	Hewlett Packard	16-Dec-2022	12 months
E136	3105	Horn Antenna 1 - 12.5 GHz	EMCO	02-Apr-2022	12 months
E150	MN2050	LISN 13A	Chase	25-Apr-2022	12 months
E255	779	Attenuator 6dB 18GHz	Narda	09-Nov-2022	12 months
E268	BHA 9118	Horn Antenna 1 - 18 GHz	Schaffner	02-Apr-2022	12 months
E296-2	11970A	Harmonic Mixer 26.5-40GHz	Hewlett Packard	27-Jun-2022	12 months
E330	2224-20	Horn Antenna 26.5-40GHz	Flann (FMI)	22-Apr-2022	12 months
E411	N9039A	9 kHz - 1 GHz RF Filter Section	Agilent Technologies	07-Jul-2022	12 months
E412	E4440A	PSA 3 Hz - 26.5 GHz	Agilent Technologies	21-Jun-2022	24 months
E434	G3RUH	10 MHz GPS Disciplined Oscillator	G3RUH - James Miller	06-Mar-2023	12 months
E465	PCR2000LA	AC Power Source 2kVA	Kikusui	10-Nov-2022	12 months
E520	MD4A	Diplexor IF DC-2.5GHz, LO 5-20GHz	Pacific Millimeter Products	#15-Mar-2023	12 months
E555	CMV 5E-1	Variac 5A	Carroll & Meynell Ltd	19-Dec-2022	12 months
E602	MG3692A	Signal Generator 10 MHz - 20 GHz	Anritsu	02-Mar-2023	12 months
E623	72-7715	Thermometer	Tenma	05-Apr-2022	12 months
E624	E4440A	PSA 3 Hz - 26.5 GHz	Agilent Technologies	06-Jul-2022	24 months
E743	2017 4/2dB	Attenuator 4/2dB 30-1000MHz	RN Electronics	#15-Mar-2023	12 months
E755	N9030B	PXA Signal Analyser 3 Hz to 50 GHz	Keysight Technologies	03-Aug-2022	12 months
E904	5089-7805	Pre-Amplifier 1GHz – 26.5GHz	Hewlett Packard	#03-May 2023	12 months
F360	ERZ-LNA-0200-1800-30-2	Low noise amplifier	ERZIA	28-Apr-2022	12 months
H079	ESW8	Spectrum Analyser	Rohde & Schwarz	25-Nov-2022	12 months
LPE364	CBL6112A	Antenna BiLog 30MHz - 2GHz	Chase Electronics Ltd	28-Mar-2022	24 months
N579	71043	Frequency Standard Distribution	-	19-Dec-2022	12 months
NSA-M	NSA - M	NSA - Site M	RN Electronics	29-Nov-2021	36 months
S032	177	True RMS Multimeter	Fluke	09-May-2022	12 months
TMS38	VMT04/140	Environmental Oven	Heraeus Votsch	#13-Mar-2023	12 months
TMS78	3160-08	Horn Std Gain 12.4 - 18 GHz	ETS Systems	30-Sep-2022	12 months
TMS79	3160-09	Horn Std Gain 18 - 26.5 GHz	ETS Systems	25-May-2022	12 months
TMS81	6502	Antenna Active Loop	EMCO	22-Jul-2021	24 months
ZSW1	V2.5.2	Measurement Software Suite	RN Electronics	Not applicable	

# Equipment was within calibration dates for tests and has been re-calibrated since/during date of tests.

## 10 Auxiliary and peripheral equipment

### 10.1 Customer supplied equipment

Item No.	Model No.	Description	Manufacturer	Serial No.
1	XT2173-3	Smartphone	Motorola	ZY22FCH44T
2	GST25B48	48VDC PSU	Mean Well	Not stated

### 10.2 RN Electronics supplied equipment

No RN Electronics Ltd supplied equipment was used.

## 11 Condition of the equipment tested

In order for the EUT to produce the results shown within this report the following modifications, if any, were implemented.

### 11.1 Modifications before test

No modifications were made before test by RN Electronics Ltd.

### 11.2 Modifications during test

No modifications were made during test by RN Electronics Ltd.



## 12 Description of test sites

Site A	Radio Laboratory and Anechoic Chamber
Site B	Semi-Anechoic Chamber and Control Room FCC Registration No. 293246, ISED Registration No. 5612A-4
Site C	Transient Laboratory
Site D	Screened Room (Conducted Immunity)
Site E	Screened Room (Control Room for Site D)
Site F	Screened Room (Conducted Emissions)
Site G	Screened Room (Control Room for Site H)
Site H	3m Semi-Anechoic Chamber (indoor OATS) FCC Registration No. 293246, ISED Registration No. 5612A-2, VCCI Registration No. 4065
Site J	Transient Laboratory
Site K	Screened Room (Control Room for Site M)
Site M	3m Semi-Anechoic Chamber (indoor OATS) FCC Registration No. 293246, ISED Registration No. 5612A-3
Site N	Radio Laboratory
Site Q	Fully-Anechoic Chamber
Site OATS	3m and 10m Open Area Test Site FCC Registration No. 293246, ISED Registration No. 5612A-1
Site R	Screened Room (Conducted Immunity)
Site S	Safety Laboratory
Site T	Transient Laboratory

RN Electronics CAB identifier as issued by Innovation, Science and Economic Development Canada is UK0002  
RN Electronics CAB identifier as issued by FCC is UK0015

## 13 Abbreviations and units

%	Percent	dB $\mu$ V	deciBels relative to 1 $\mu$ V
$\lambda$	Wavelength	dB $\mu$ V/m	deciBels relative to 1 $\mu$ V/m
$\mu$ A/m	microAmps per metre	dBc	deciBels relative to Carrier
$\mu$ V	microVolts	dBd	deciBels relative to dipole gain
$\mu$ W	microWatts	dB $i$	deciBels relative to isotropic gain
AC	Alternating Current	dBm	deciBels relative to 1mW
ACK	ACKnowledgement	dB $r$	deciBels relative to a maximum value
ACP	Adjacent Channel Power	dBW	deciBels relative to 1W
AFA	Adaptive Frequency Agility	DC	Direct Current
ALSE	Absorber Lined Screened Enclosure	DFS	Dynamic Frequency Selection
AM	Amplitude Modulation	DMO	Dynamic Modulation Order
Amb	Ambient	DSSS	Direct Sequence Spread Spectrum
ANSI	American National Standards Institute	DTA	Digital Transmission Analyser
ATPC	Automatic Transmit Power Control	EIRP	Equivalent Isotropic Radiated Power
AVG	Average	emf	electromotive force
AWGN	Additive White Gaussian Noise	ERC	European Radiocommunications Committee
BER	Bit Error Rate	ERP	Effective Radiated Power
BPSK	Binary Phase Shift Keying	ETSI	European Telecommunications Standards Institute
BT	BlueTooth	EU	European Union
BLE	BlueTooth Low Energy	EUT	Equipment Under Test
BW	Bandwidth	FCC	Federal Communications Commission
°C	Degrees Celsius	FER	Frame Error Rate
C/I	Carrier / Interferer	FHSS	Frequency Hopping Spread Spectrum
CAC	Channel Availability Check	FM	Frequency Modulation
CCA	Clear Channel Assessment	FSK	Frequency Shift Keying
CEPT	European Conference of Postal and Telecommunications Administrations	FSS	Fixed Satellite Service
CFR	Code of Federal Regulations	g	Grams
CISPR	Comité International Spécial des Perturbations Radioélectriques	GHz	GigaHertz
cm	centimetre	GNSS	Global Navigation Satellite System
COFDM	Coherent OFDM	GPS	Global Positioning System
COT	Channel Occupancy Time	Hz	Hertz
CS	Channel Spacing	IEEE	Institute of Electrical and Electronics Engineers
CW	Continuous Wave	IF	Intermediate Frequency
DAA	Detect And Avoid	ISED	Innovation Science and Economic Development
dB	deciBels	ITU	International Telecommunications Union
dB $\mu$ A/m	deciBels relative to 1 $\mu$ A/m	KDB	Knowledge DataBase

kg	kilogram	pW	picoWatts
kHz	kiloHertz	QAM	Quadrature Amplitude Modulation
kPa	Kilopascal	QP	Quasi Peak
LBT	Listen Before Talk	QPSK	Quadrature Phase Shift Keying
LISN	Line Impedance Stabilisation Network	RBW	Resolution Band Width
LNA	Low Noise Amplifier	RED	Radio Equipment Directive
LNB	Low Noise Block	R&TTE	Radio and Telecommunication Terminal Equipment
LO	Local Oscillator	Ref	Reference
m	metre	RF	Radio Frequency
mA	milliAmps	RFC	Remote Frequency Control
max	maximum	RFID	Radio Frequency IDentification
Mbit/s	MegaBits per second	RLAN	Radio Local Area Network
MCS	Modulation and Coding Scheme	RMS	Root Mean Square
MHz	MegaHertz	RNSS	Radio Navigation Satellite Service
mic	Microphone	RSL	Received Signal Level
MIMO	Multiple Input, Multiple Output	RSSI	Received Signal Strength Indicator
min	minimum	RTP	Room Temperature and Pressure
mm	millimetres	RTPC	Remote Transmit Power Control
ms	milliseconds	Rx	Receiver
mW	milliWatts	s	Seconds
NA	Not Applicable	SINAD	Signal to Noise And Distortion
NFC	Near Field Communications	SRD	Short Range Device
nom	Nominal	Tx	Transmitter
nW	nanoWatt	UKAS	United Kingdom Accreditation Service
OATS	Open Area Test Site	UKCA	United Kingdom Conformity Assessed
OBW	Occupied Band Width	UKRER	United Kingdom Radio Equipment Regulations
OCW	Occupied Channel Width	UHF	Ultra High Frequency
OFDM	Orthogonal Frequency Division Multiplexing	U-NII	Unlicensed National Information Infrastructure
OOB	Out Of Band	USB	Universal Serial Bus
ppm	Parts per million	UWB	Ultra Wide Band
PER	Packet Error Rate	V	Volts
PK	Peak	V/m	Volts per metre
PMR	Private Mobile Radio	VBW	Video Band Width
PRBS	Pseudo Random Bit Sequence	VHF	Very High Frequency
PRF	Pulse Repitition Frequency	VSAT	Very Small Aperture Terminal
PSD	Power Spectral Density	W	Watts
PSU	Power Supply Unit		

===== END OF TEST REPORT =====