Radio Test Report

Sound Devices LLC

A20-SuperNexus

28303

47 CFR Part 15.247 Effective Date 1st October 2023
DTS, Digital Transmission System
Test Date: 2nd April 2024 to 8th April 2024
Report Number: 04-14508-4-24 Issue 01

The testing was carried out by Kiwa Ltd t/a Kiwa Electrical Compliance, an independent test house, at their test facility located at:

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This laboratory is accredited in accordance with the recognised International Standard ISO/IEC 17025. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer joint ISO-ILAC-IAF communiqué dated April 2017).

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

Certificate of Test 14508-4

The equipment noted below has been fully tested by Kiwa Electrical Compliance 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:	A20-SuperNexus
Model Number:	28303
Unique Serial Number:	VZ0023254011
Applicant:	Sound Devices LLC E7556 State Road 23 and 33 Reedsburg Wisconsin 53959
Proposed FCC ID	2AKLX-28303
Full measurement results are detailed in Report Number:	04-14508-4-24 Issue 01
Test Standards:	47 CFR Part 15.247 Effective Date 1st October 2023 DTS, Digital Transmission System

NOTE:
This report covers Bluetooth operation only.
Certain tests were not performed based upon applicant's declarations. Certain other requirements are subject to applicant's declaration only and have not been tested/verified. For details refer to section 3 of this report.

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:	2nd April 2024 to 8th April 2024
Test Engineer: Jack Chilvers	
Approved By: Radio Approvals Manager	Digitally signed by: Daniel Sims DN: CN = Daniel Sims email = Daniel.Sims@kiwa.com C = GB O = Kiwa Electrical Compliance - Brentwood Date: 2024.07.19 11:06:12 Z
Customer Representative:	

ilac-MRA UKAS TESTING 2360

1 Contents

2 Equipment under test (EUT)

2.1 Equipment specification

Applicant	Sound Devices LLC E7556 State Road 23 and 33 Reedsburg Wisconsin 53959	
Manufacturer of EUT	Sound Devices LLC	
Full Name of EUT	A20-SuperNexus	
Model Number of EUT	28303	
Serial Number of EUT	VZ0023254011	
Date Received	2nd April 2024	
Date of Test:	2nd April 2024 to 8th April 2024	
Purpose of Test	To demonstrate design compliance to the relevant rules of Chapter 47 of the Code of Federal Regulations.	
Date Report Issued	17th July 2024	
Main Function	Multi-Channel Wireless Microphone Receiver	
Information Specification	Height	42 mm
	Width	446 mm
	Depth	310 mm
	Weight	4 kg
	Voltage	DC: 10-18 VDC AC: 230 VAC
	Current	DC: 5A AC: 5A

2.2 Configurations for testing

General Parameters	
EUT Normal use position	Rack Mounted
Choice of model(s) for type tests	Engineering production sample
Antenna details	External
Antenna port	External
Baseband Data port (yes/no)?	no
Highest Signal generated in EUT	2480 MHz
Lowest Signal generated in EUT	2402 MHz
Hardware Version (HVIN)	28303
Software Version	Not Applicable
Firmware Version (FVIN)	v0.01
Type of Equipment	Multi-Channel Wireless Microphone Receiver
Technology Type	BLE
Geo-location (yes/no)	no
TX Parameters	
Alignment range – transmitter	2400 – 2483.5 MHz
EUT Declared Modulation Parameters	GFSK
EUT Declared Power level	+6dBm
EUT Declared Signal Bandwidths	1Mbs
EUT Declared Channel Spacing's	2MHz
EUT Declared Duty Cycle	10-15%
Unmodulated carrier available?	no
Declared frequency stability	<50kHz
RX Parameters	
Alignment range – receiver	2400 – 2483.5 MHz
EUT Declared RX Signal Bandwidth	1Mbs
Receiver Signal Level (RSL)	-96dBm
Method of Monitoring Receiver BER	RX test with Companion TX
FCC Parameters	
FCC Transmitter Class	DTS, Digital Transmission System

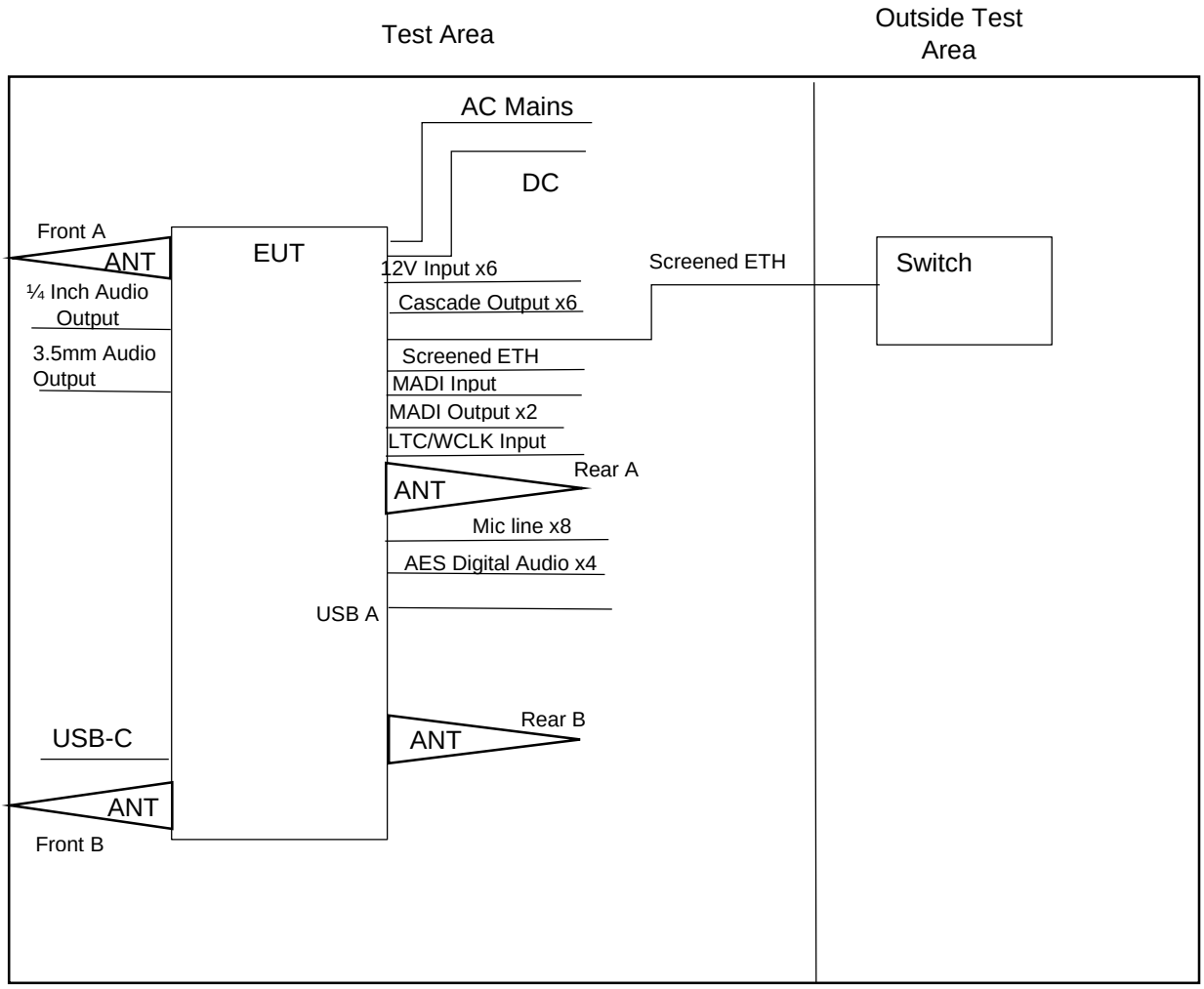
2.3 Functional description

The A20-SuperNexus is a professional 32-channel digital wireless microphone receiver
Intended for PSME (Professional Programme Making and Special Events) applications.
It is compatible with A10-TX, A20-MINI, and A20-TX wireless microphone transmitters from Sound Devices. It has a very wide tuning range of 169-1525 MHz for accessing new wireless microphone spectrum allocations in Europe, Asia, Japan, United States and Canada.
The receiver is intended for 19-inch rack mounting, and measures 1.75 inches (1U) in height. It includes Dante and Ethernet interfaces; USB-C, USB-A; x32 AES outputs; x32 Mic/Line analogue inputs; x3 MADI interfaces; x3 BNC diversity antenna inputs with 12V antenna powering and support for Smart antennas; antenna cascade outputs for looping through to other receivers; long-range proprietary 2.4 GHz wireless back-link ("NexLink") and Bluetooth LE for remote control of microphone transmitters; ¼-inch and 3.5 mm headphone jacks; OLED touchscreens and a built-in web server for setup, control, and monitoring via phone, tablet, or computer.
The receiver is powered from 10-18V DC, or 100-240V AC mains, it will also support PoE+
Powered peripherals from Sound Devices.

2.4 Modes of operation

Mode Reference	Description	Used for testing
Mode 1	Constant Transmit BLE Channel 0 (2402MHz) Antenna Port: Front A	Yes
Mode 2	Constant Transmit BLE Channel 19 (2440MHz) Antenna Port: Front A	Yes
Mode 3	Constant Transmit BLE Channel 39 (2480MHz) Antenna Port: Front A	Yes
Mode 4	Constant Transmit BLE Channel 0 (2402MHz) Antenna Port: Front B	Yes
Mode 5	Constant Transmit BLE Channel 19 (2440MHz) Antenna Port: Front B	Yes
Mode 6	Constant Transmit BLE Channel 39 (2480MHz) Antenna Port: Front B	Yes
Mode 7	Constant Transmit BLE Channel 0 (2402MHz) Antenna Port: Rear A	Yes
Mode 8	Constant Transmit BLE Channel 19 (2440MHz) Antenna Port: Rear A	Yes
Mode 9	Constant Transmit BLE Channel 39 (2480MHz) Antenna Port: Rear A	Yes
Mode 10	Constant Transmit BLE Channel 0 (2402MHz) Antenna Port: Rear B	Yes
Mode 11	Constant Transmit BLE Channel 19 (2440MHz) Antenna Port: Rear B	Yes
Mode 12	Constant Transmit BLE Channel 39 (2480MHz) Antenna Port: Rear B	Yes

2.5 Emissions configuration



The EUT is primarily be powered from 120VAC 60Hz via the customers supplied mains lead but it also has a back-up power option via a 5 pin DC port at 12VDC.

The +12V Inputs were terminated with a 60 Ohm DC loads, the Cascade Outputs were terminated with 50 Ohm RF loads, the USB was unterminated, One Ethernet was terminated into a switch, the MADI inputs' and outputs were terminated with 75 Ohm loads, the LTC/WCLK Input was terminated with 75 Ohm load, the AES ports were terminated with 110 Ohm loads, the Mic/Line Analogue Audio ports were terminated with 600 Ohm loads, the 3.5 mm audio output was terminated with an 100 Ohm load and the ¼ Inch audio output was terminated with a 100 Ohm load.

For AC conducted emissions the EUT was tested powered from a 1 meter mains lead to test the AC port. To Test the DC port it was powered via a typical off the shelf AC/DC adaptor, this can be found in section 10.2 of this report.

For conducted tests the external antenna SMA ports were used. The unit was configured with engineering menus in software to allow permanent transmit modes of device on the top, middle and bottom channels as stated within section 2.4 of this report. The Transmit modes were set using the engineering mode provided within the unit. The transmit mode was repeatedly transmitting with approximately 50% duty cycle. The power settings for each channel were as stated below:-

Low Channel (2402 MHz) = Power Setting:8 (Declared Maximum)
Mid Channel (2440 MHz) only = Power Setting:8 (Declared Maximum)
High Channel (2480 MHz) only = Power Setting:8 (Declared Maximum)

Unless stated all results are using the worst-case AC powered configuration/set-up.

2.5.1 Signal leads

Port Name	Cable Type	Connected
AC Mains	3 Core	Yes
DC	2 Core	Yes
Antenna Front A	SMA Coax	Yes
Antenna Front B	SMA Coax	Yes
Antenna Rear A	SMA Coax	Yes
Antenna Rear B	SMA Coax	Yes
A1+12V Input	BNC 50 Ohm Coax	Yes
A2+12V Input	BNC 50 Ohm Coax	Yes
A3+12V Input	BNC 50 Ohm Coax	Yes
B1+12V Input	BNC 50 Ohm Coax	Yes
B2+12V Input	BNC 50 Ohm Coax	Yes
B3+12V Input	BNC 50 Ohm Coax	Yes
A1 Cascade Output	BNC 50 Ohm Coax	Yes
A2 Cascade Output	BNC 50 Ohm Coax	Yes
A3 Cascade Output	BNC 50 Ohm Coax	Yes
B1 Cascade Output	BNC 50 Ohm Coax	Yes
B2 Cascade Output	BNC 50 Ohm Coax	Yes
B3 Cascade Output	BNC 50 Ohm Coax	Yes
Eth 1 POE Output	Screened	Yes
Eth 2	Screened	Yes
Optical 1	Fibre	No
Optical 2	Fibre	No
MADI Input	BNC 75 Ohm Coax	Yes
MADI Output 1	BNC 75 Ohm Coax	Yes
MADI Output 2	BNC 75 Ohm Coax	Yes
LTC/WCLK Input	BNC 75 Ohm Coax	Yes
AES 1-8 Digital Audio	Eth	Yes
AES 9-16 Digital Audio	Eth	Yes
AES 17-24 Digital Audio	Eth	Yes
AES 25-32 Digital Audio	Eth	Yes
Mic/Line 1-4 Analogue Audio	Eth	Yes
Mic/Line 5-8 Analogue Audio	Eth	Yes
Mic/Line 9-12 Analogue Audio	Eth	Yes
Mic/Line 13-16 Analogue Audio	Eth	Yes
Mic/Line 17-20 Analogue Audio	Eth	Yes
Mic/Line 21-24 Analogue Audio	Eth	Yes
Mic/Line 25-28 Analogue Audio	Eth	Yes
Mic/Line 29-32 Analogue Audio	Eth	Yes
3.5 mm audio output	Audio Lead	Yes
¼ Inch audio output	Audio Lead	Yes
USB-A	USB	Yes
USB-C	USB	Yes
USB-A	For Engineering use only	No

3 Summary of test results

The A20-SuperNexus was tested for compliance to the following standard(s):

47 CFR Part 15.247 Effective Date 1st October 2023
DTS, Digital Transmission System

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
Transmitter Tests		
1. AC power line conducted emissions	47 CFR Part 15C Part 15.207	PASSED
2. Radiated emissions 9 - 150 kHz	47 CFR Part 15C Part 15.209	PASSED
3. Radiated emissions 150 kHz - 30 MHz	47 CFR Part 15C Part 15.209	PASSED
4. Radiated emissions 30 MHz -1 GHz	47 CFR Part 15C Part 15.247(d) & 15.209	PASSED
5. Radiated emissions above 1 GHz	47 CFR Part 15C Part 15.247(d) & 15.209	PASSED
6. Effective radiated power field strength	47 CFR Part 15C Part 15.247(d)	PASSED
7. Band Edge Compliance	47 CFR Part 15C Part 15.215 & 15.247(d)	PASSED
8. Occupied bandwidth	47 CFR Part 15C Part 15.247(a)(2)/15.215	PASSED
9. Maximum Average conducted output power	47 CFR Part 15C Part 15.247(b3)	NOT APPLICABLE[1]
10. Maximum Peak conducted output power	47 CFR Part 15C Part 15.247(b)(3)	PASSED
11. Maximum Power Spectral Density	47 CFR Part 15C Part 15.247(e)	PASSED
12. Antenna power conducted emissions	47 CFR Part 15C Part 15.247(d)	NOT APPLICABLE[3]
13. Duty cycle	47 CFR Part 15C Part 15.35(c)	PERFORMED[4]
14. FHSS carrier frequency separation	47 CFR Part 15C Part 15.247(a1)	NOT APPLICABLE[2]
15. Average time of occupancy	47 CFR Part 15C Part 15.247(a)(1)(i)/(ii)/(iii)	NOT APPLICABLE[2]
16. Number of Hop Channels	47 CFR Part 15C Part 15.247(a)(1)(i)/(ii)/(iii)	NOT APPLICABLE[2]

[1] Peak Conducted RF Power measured; therefore this test is not required.

[2] EUT does not employ FHSS technology.

[3] The EUT was tested for radiated emissions with its dedicated antennae in position.

[4] No limits apply included for reference only

[5] Spectrum investigated up to a frequency of 25GHz based on 10 times the highest channel/ signal generated in equipment of 2480MHz.

[6] Spectrum investigated below 30MHz started at a frequency of 9 kHz as no lowest frequency was declared.

4 Specifications

The tests were performed and operated in accordance with Kiwa Electrical Compliance procedures and the relevant standards listed below.

4.1 Relevant standards

Ref.	Standard Number	Version	Description
4.1.1	47 CFR Part 15C	2023	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
4.1.4	KDB 558074 D01 v05r02	2019	Federal Communications Commission Office of Engineering and Technology Laboratory Division; guidance for compliance measurements on digital transmission system, frequency hopping spread spectrum system, and hybrid system devices operating under section 15.247 of the FCC rules

4.2 Deviations

No deviations were applied.

5 Tests, methods and results

5.1 AC power line conducted emissions

5.1.1 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]

5.1.2 Configuration of EUT

The EUT was placed on a wooden table 0.8m above the ground plane and 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.

During the initial scan, no discernible difference was noted in emissions between RF channel setting or antenna port selection, therefore full tests were performed using mode 8 in both AC powered configuration and DC powered using off-the-shelf supply configuration.

5.1.3 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.

5.1.4 Test equipment

E150, E035, ZSW1, E624, E411

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

Mains powered

Band	2400-2483.5 MHz
Power Level	8 dBm set internal (Port Rear A)
Channel Spacing	2 MHz
Mod Scheme	OFDM
Mid channel	2440 MHz

Plot refs
14508-4 Cond 1 AC Live 150k-30M Average
14508-4 Cond 1 AC Live 150k-30M Quasi-Peak
14508-4 Cond 1 AC Neutral 150k-30M Average
14508-4 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	0.239	43.8	41.7	-20.4	30.7	-21.4
2	0.241	44.1	42.1	-20.0	32.0	-20.1
3	0.275	48.7	47.9	-13.1	38.3	-12.7
4	0.366	42.4	40.9	-17.7	30.5	-18.1
5	0.447	47.7	45.9	-11.0	36.1	-10.8
6	0.615	44.0	40.2	-15.8	28.0	-18.0
7	0.784	36.3	34.1	-21.9	22.4	-23.6
8	0.812	35.7	33.8	-22.2	21.1	-24.9
9	0.978	31.9	29.0	-27.0	17.0	-29.0
10	1.204	27.6	24.8	-31.2	12.9	-33.1
11	1.305	25.0	22.3	-33.7	10.4	-35.6
12	7.680	28.8	28.2	-31.8	27.7	-22.3
13	13.824	30.1	29.6	-30.4	29.1	-20.9

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	0.232	43.4	41.0	-21.4	28.8	-23.6
2	0.239	43.4	41.4	-20.7	30.6	-21.5
3	0.275	49.3	48.4	-12.6	39.2	-11.8
4	0.364	41.2	39.9	-18.7	30.7	-17.9
5	0.365	41.7	40.0	-18.6	30.2	-18.4
6	0.453	47.7	46.7	-10.1	36.1	-10.7
7	0.458	49.0	47.0	-9.7	36.8	-9.9
8	0.612	43.1	40.0	-16.0	28.8	-17.2
9	0.613	44.2	40.0	-16.0	28.5	-17.5
10	0.677	32.1	28.6	-27.4	15.9	-30.1
11	0.811	37.8	34.0	-22.0	20.8	-25.2
12	1.005	32.7	29.2	-26.8	17.2	-28.8
13	1.204	28.3	25.2	-30.8	13.5	-32.5
14	1.355	25.2	21.5	-34.5	9.7	-36.3
15	7.680	28.9	28.1	-31.9	27.7	-22.3
16	13.824	30.0	29.5	-30.5	29.0	-21.0

DC Powered

Band	2400-2483.5 MHz
Power Level	8 dBm set internal (Port Rear A)
Channel Spacing	2 MHz
Mod Scheme	OFDM
Mid channel	2440 MHz

Plot refs
14508-6 Cond 2 AC Live 150k-30M Average
14508-6 Cond 2 AC Live 150k-30M Quasi-Peak
14508-6 Cond 2 AC Neutral 150k-30M Average
14508-6 Cond 2 AC Neutral 150k-30M Quasi-Peak

Table of signals measured for Cond 1 DC Positive 150k-30M

Signal No.	Freq (MHz)	Peak Amp (dBuV)	QP Amp (dBuV)	QP -Lim (dB)	AV Amp (dBuV)	AV -Lim (dB)
1	0.169	46.4	39.3	-25.7	15.6	-39.4
2	0.175	45.6	38.7	-26.0	15.0	-39.7
3	0.190	44.7	37.6	-26.4	14.1	-39.9
4	0.298	42.1	35.2	-25.1	12.8	-37.5
5	0.354	40.2	33.7	-25.2	12.0	-36.9
6	0.641	41.8	34.9	-21.1	9.3	-36.7

Table of signals measured for Cond 1 DC Negative 150k-30M

Signal No.	Freq (MHz)	Peak Amp (dBuV)	QP Amp (dBuV)	QP -Lim (dB)	AV Amp (dBuV)	AV -Lim (dB)
1	0.173	46.5	39.5	-25.3	15.3	-39.5
2	0.197	44.9	38.0	-25.7	14.0	-39.7
3	0.337	42.8	36.9	-22.4	14.2	-35.1
4	0.617	41.5	34.6	-21.4	10.1	-35.9
5	0.698	38.5	31.5	-24.5	8.4	-37.6
6	0.738	35.5	28.6	-27.4	7.3	-38.7

No discernible difference was noted in emissions between channels (exploratory measurements); therefore, the final measurements are presented for TX mid channel mode only for antenna A rear settings.

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: UE70 9kHz to 150kHz ±3.76dB, UE71 150kHz to 30MHz ±3.4dB

5.2 Radiated emissions 9 - 150 kHz

5.2.1 Test methods

Test Requirements:	47 CFR Part 15C Part 15.209 [Reference 4.1.1 of this report]
Test Method:	ANSI C63.10 Clause 6.4 [Reference 4.1.2 of this report]
Limits:	47 CFR Part 15C Part 15.209/15.247(d) [Reference 4.1.1 of this report]

5.2.2 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 tested with it's antennas in vertical and horizontal positions.

No discernible difference was noted in emissions between channels, therefore the EUT was operated in Mode 8 for tests.

5.2.3 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.

5.2.4 Test equipment

TMS81, ZSW1, E624, E411

See Section 9 for more details

5.2.5 Test results

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

Band	2400-2483.5 MHz
Power Level	8 dBm set internal (Port Rear A)
Channel Spacing	2 MHz
Mod Scheme	OFDM
Mid channel	2440 MHz

Plot refs
14508-4 Rad 2 9k-150kHz Para
14508-4 Rad 2 9k-150kHz Perp

No discernible difference was noted in emissions between channels (exploratory measurements); therefore, the final measurements are presented for TX mid channel mode only for antenna A rear setting.
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.
15.247(d) other emissions, outside the intentional band, must be attenuated by at least 20/30dB from the level of the fundamental / meet the general limits of 15.209.
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

5.3 Radiated emissions 150 kHz - 30 MHz

5.3.1 Test methods

Test Requirements:	47 CFR Part 15C Part 15.209 [Reference 4.1.1 of this report]
Test Method:	ANSI C63.10 Clause 6.4 [Reference 4.1.2 of this report]
Limits:	47 CFR Part 15C Part 15.209/15.247(d) [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 tested with it's antennas in vertical and horizontal positions.

No discernible difference was noted in emissions between channels, therefore the EUT was operated in Mode 8 for tests.

5.3.3 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.

5.3.4 Test equipment

TMS81, ZSW1, E624, E411

See Section 9 for more details

5.3.5 Test results

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

Band	2400-2483.5 MHz
Power Level	8 dBm set internal (Port Rear A)
Channel Spacing	2 MHz
Mod Scheme	OFDM
Mid channel	2440 MHz

Plot refs
14508-4 Rad 2 150k-30MHz Para
14508-4 Rad 2 150k-30MHz Perp

No discernible difference was noted in emissions between channels (exploratory measurements); therefore, the final measurements are presented for TX mid channel mode only for antenna A rear setting.

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.
15.247(d) other emissions, outside the intentional band, must be attenuated by at least 20dB from the level of the fundamental and meet the general limits of 15.209.
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

5.4 Radiated emissions 30 MHz -1 GHz

5.4.1 Test methods

Test Requirements:	47 CFR Part 15C Part 15.247(d) & 15.209 [Reference 4.1.1 of this report]
Test Method:	ANSI C63.10 Clause 6.5 [Reference 4.1.2 of this report]
Limits:	47 CFR Part 15C Part 15.209/15.247(d) [Reference 4.1.1 of this report]

5.4.2 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 tested with its antennas in vertical and horizontal positions.
No discernible difference was noted in emissions between channel settings or antenna port settings.
The EUT was operated in Mode 8 for full tests.

5.4.3 Test procedure

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

5.4.4 Test equipment

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

See Section 9 for more details

5.4.5 Test results

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

Band	2400-2483.5 MHz
Power Level	8 dBm set internal (Port Rear A)
Channel Spacing	2 MHz
Mod Scheme	OFDM
Mid channel	2440 MHz

Plot refs
14508-4 Rad 2 VHF Horiz
14508-4 Rad 2 VHF Vert
14508-4 Rad 2 UHF Horiz
14508-4 Rad 2 UHF Vert

Table of signals measured for 2440 MHz Horizontal Sig List

Signal No.	Freq (MHz)	Peak Amp (dBuV/m)	QP Amp (dBuV/m)	QP -Lim (dB)
1	99.999	28.0	25.1	-18.4
2	124.999	32.9	29.9	-13.6
3	141.329	29.5	23.4	-20.1
4	150.857	31.7	24.5	-19.0
5	199.999	32.4	30.8	-12.7
6	266.665	34.6	32.1	-13.9
7	300.790	34.5	31.6	-14.4
8	324.206	34.8	31.8	-14.2
9	500.002	44.2	42.7	-3.3
10	625.007	39.9	36.5	-9.5
11	651.488	36.0	30.0	-16.0
12	750.003	39.1	35.8	-10.2

Table of signals measured for 2440 MHz Vertical Sig List

Signal No.	Freq (MHz)	Peak Amp (dBuV/m)	QP Amp (dBuV/m)	QP -Lim (dB)
1	50.726	27.0	21.7	-18.3
2	73.728	26.8	24.6	-15.4
3	99.999	31.6	29.1	-14.4
4	124.999	32.8	30.0	-13.5
5	141.206	37.4	32.1	-11.4
6	199.999	30.3	28.4	-15.1
7	266.658	29.7	24.7	-21.3
8	500.004	37.2	34.0	-12.0
9	625.003	39.1	35.7	-10.3

No discernible difference was noted in emissions between channels (exploratory measurements); therefore, the final measurements are presented for TX mid channel mode only for rear antenna A setting.

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.
15.247(d) other emissions, outside the intentional band, must be attenuated by at least 20/30dB from the level of the fundamental / meet the general limits of 15.209.
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 ±6.1dB

5.5 Radiated emissions above 1 GHz

5.5.1 Test methods

Test Requirements:	47 CFR Part 15C Part 15.247(d) & 15.209 [Reference 4.1.1 of this report]
Test Method:	ANSI C63.10 Clause 6.6 [Reference 4.1.2 of this report]
Limits:	47 CFR Part 15C Part 15.247(d) & 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 tested with the antennas in vertical and horizontal positions.

The EUT was operated in Mode 7, Mode 8 and Mode 9 for tests.

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 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 3m was used between the test range 1 - 6GHz, 1.2m was used in the test range 6 - 18GHz and 0.3m was used in the test range 18 - 25GHz.

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

Tests were performed using Test Site M & B.

5.5.4 Test equipment

E136, E411, E624, E856, E904, TMS78, TMS79, TMS82, VSWR-B, VSWR-M, ZSW1

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

Setup Table

Band	2400-2483.5 MHz
Power Level	8 dBm set internal (Port Rear A)
Channel Spacing	2 MHz
Mod Scheme	OFDM
Low channel	2402 MHz

Spurious Frequency (MHz)	Measured Peak Level (dBµV/m)	Difference to Peak Limit (dB)	Measured Average Level (dBµV/m)	Difference to Average Limit (dB)	EUT Polarisation	Antenna Polarisation
2500	46.6	-27.4	40.9	-13.1	Normal use	Horizontal
16120	45.9	-28.1	39.8	-14.2	Normal use	Vertical

Setup Table

Band	2400-2483.5 MHz
Power Level	8 dBm set internal (Port Rear A)
Channel Spacing	2 MHz
Mod Scheme	OFDM
Mid channel	2440 MHz

Spurious Frequency (MHz)	Measured Peak Level (dBµV/m)	Difference to Peak Limit (dB)	Measured Average Level (dBµV/m)	Difference to Average Limit (dB)	EUT Polarisation	Antenna Polarisation
2500	46.6	-27.4	40.9	-13.1	Normal use	Horizontal
16120	45.9	-28.1	39.8	-14.2	Normal use	Vertical

Plots
14508-4 Rad 1 1-2GHz Horiz
14508-4 Rad 1 1-2GHz Vert
14508-4 Rad 1 2-5GHz Horiz
14508-4 Rad 1 2-5GHz Vert
14508-4 Rad 1 5-6GHz Horiz
14508-4 Rad 1 5-6GHz Vert
14508-4 Rad 2 6upto10GHz Horiz
14508-4 Rad 2 6upto10GHz Vert
14508-4 Rad 2 10upto12_5GHz Horiz
14508-4 Rad 2 10upto12_5GHz Vert
14508-4 Rad 1 12-15GHz Horiz
14508-4 Rad 1 12-15GHz Vert
14508-4 Rad 1 15-18GHz Horiz
14508-4 Rad 1 15-18GHz Vert
14508-4 Rad 1 18-22GHz Horiz
14508-4 Rad 1 18-22GHz Vert
14508-4 Rad 1 22-25GHz Horiz
14508-4 Rad 1 22-25GHz Vert

Setup Table

Band	2400-2483.5 MHz
Power Level	8 dBm set internal (Port Rear A)
Channel Spacing	2 MHz
Mod Scheme	OFDM
High channel	2480 MHz

Spurious Frequency (MHz)	Measured Peak Level (dBµV/m)	Difference to Peak Limit (dB)	Measured Average Level (dBµV/m)	Difference to Average Limit (dB)	EUT Polarisation	Antenna Polarisation
2500	46.6	-27.4	40.9	-13.1	Normal use	Horizontal
16120	45.9	-28.1	39.8	-14.2	Normal use	Vertical

Note: Whilst Low, Mid and High channels were tested for both Bluetooth antenna ports (A & B, front and rear), plots are for illustrative purposes only and only Middle channel, Bluetooth Antenna A rear plots are shown in this report to minimise report size as no difference could be seen.

Peak detector “Max held” Analyser plots against the Average limit line 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.
15.247(d) other emissions, outside the intentional band, must be attenuated by at least 20/30dB from the level of the fundamental / meet the general limits of 15.209.
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:
1 – 18 GHz ±3.5dB, 18 – 25 GHz ±3.9dB

5.6 Effective radiated power field strength

5.6.1 Test methods

Test Requirements: 47 CFR Part 15C Part 15.247(d) [Reference 4.1.1 of this report]
Test Method: ANSI C63.10 Clause 6.5/6.6 [Reference 4.1.2 of this report]
Limits: 47 CFR Part 15C Part 15.247(d) & 15.209(a) [Reference 4.1.1 of this report]

5.6.2 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 tested with the antennas in vertical and horizontal positions. Final measurements were taken at 3m. The EUT was operated in Mode 7, Mode 8 and Mode 9.

5.6.3 Test procedure

Tests were made in accordance with the Test Method noted above using the measuring equipment listed in the 'Test Equipment used' section. The power stated is Peak field strength. Field strength was maximised before plots were taken. Tests were performed in test site M.

5.6.4 Test equipment

E136, TMS82, VSWR-M, ZSW1, E624, E411

See Section 9 for more details

5.6.5 Test results

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

Band	2400-2483.5 MHz
Power Level	8 dBm set internal (Rear A)
Channel Spacing	2 MHz
Mod Scheme	OFDM
Low channel	2402 MHz
Mid channel	2440 MHz
High channel	2480 MHz

	Low channel	Mid channel	High channel
Peak Level (dBµV/m)	98.06	97.75	99.14
Plot reference	Vert, 2402 MHz, EUT ant Vert, Rear A	Vert, 2440 MHz, EUT ant Vert, Rear A	Vert, 2480 MHz, EUT ant Vert, Rear A
Antenna Polarisation	Horiz	Horiz	Horiz
EUT Polarisation	Flat	Flat	Flat

Note: only the antenna port providing maximum peak conducted power (see section 5.10 within this report) was used for the ERP field strength test.

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

LIMITS:
The maximum output power in all cases is 30dBm/ 1watt.

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

5.7 Band Edge Compliance

5.7.1 Test methods

Test Requirements:	47 CFR Part 15C Part 15.215 & 15.247(d) [Reference 4.1.1 of this report]
Test Method:	ANSI C63.10 Clause 6.10 [Reference 4.1.2 of this report]
Limits:	47 CFR Part 15C Part 15.209(a) & 15.247(d) [Reference 4.1.1 of this report]

5.7.2 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 3 metres.

The EUT was operated in Mode 7 and Mode 9 for this test.

5.7.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below. The emission from the EUT was maximised before taking the plots. Maximised Peak emissions at the restricted and authorised band edges were measured, Peak results complied with average limits therefore, Average measurements were not required.
Tests were performed using Test Site A.

5.7.4 Test equipment

E136, TMS82, VSWR-M, ZSW1, E624, E411

See Section 9 for more details

5.7.5 Test results

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

Band	2400-2483.5 MHz
Power Level	8 dBm set internal (Port Rear A)
Channel Spacing	2 MHz
Mod Scheme	OFDM
Low channel	2402 MHz
Mid channel	2440 MHz
High channel	2480 MHz

Restricted Band Edges	Low channel	High channel
Restricted Peak Level measured (dBuV/m)	39.45	46.88
Restricted band edge Peak Plot	Restricted Band Edge BLE Channel 0 (2402 MHz) Flat Position, Rear A ant, Peak Det	Restricted Band Edge BLE Channel 39 (2480 MHz) Flat Position, Rear A an,t Peak Det
Restricted Average Level measured (dBuV/m)	Peak complies to average	Peak complies to average

Authorised Band Edges	Low channel	High channel
Authorised Band Edge (dBc) value measured	51.99	61.94
Authorised Band Edge Plot	Authorised Band Edge BLE Channel 0 (2402 MHz) Flatt Position, Rear A ant	Authorised Band Edge BLE Channel 39 (2480 MHz) Flat Position, Rear A an,t Peak Det

Note: Only worst-case highest-powered port with antenna in place was tested for band edge compliance. Analyser plots for the Band Edge Compliance can be found in Section 6 of this report. These show the 20/30dBc requirement of 15.247(d) are met at the band edges of 2400 and 2483.5 MHz, Restricted band edge plots are also shown in section 6.

The tables list the field strengths observed in the adjacent restricted bands, which are required to meet the tighter 15.209 limits.

LIMITS:
AV = 54dBuV/m at restricted band edges
PK = 74dBuV/m at restricted band edges
20dBc authorised band edges

The restricted band edges closest to the EUT frequency of 2400-2483.5MHz are 2390 & 2483.5MHz.

Further wider span plots have been taken to show the fact that there are no spurious emissions above the restricted limits of 15.209.

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

5.8 Occupied bandwidth

5.8.1 Test methods

Test Requirements: 47 CFR Part 15C Part 15.247(a)(2) [Reference 4.1.1 of this report]
Test Method: ANSI C63.10 Clause 6.9 [Reference 4.1.2 of this report]
Limits: 47 CFR Part 15C Part 15.247(a)(2) [Reference 4.1.1 of this report]

5.8.2 Configuration of EUT

The EUT was measured on a bench using a spectrum analyser connected to the external RF port. The EUT was operated in Modes 1-12 for this test.

5.8.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below. A 100kHz RBW, 3x VBW, auto sweep time and max hold settings were used for the 6dB bandwidth.

Tests were performed using Test Site A.

5.8.4 Test equipment

E755, P240

See Section 9 for more details

5.8.5 Test results

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

Band	2400-2483.5 MHz
Power Level	8 dBm set internal (Port Front A)
Channel Spacing	2 MHz
Mod Scheme	OFDM
Low channel	2402 MHz
Mid channel	2440 MHz
High channel	2480 MHz

	Low channel	Mid channel	High channel
6 dB Bandwidth Result (kHz)	819.85	855.6	849.2
Plot for 6 dB Bandwidth Result (MHz)	6dB OBW BLE Low Channel (2402MHz) Ant Front A	6dB OBW BLE Low Channel (2440MHz) Ant Front A	6dB OBW BLE High Channel (2480MHz) Ant Front A
Operating frequency (MHz)	2402	2440	2480
6 dB FLOW Worst case (MHz)	2401.590075	2439.5722	2479.5754
6 dB FHIGH Worst case (MHz)	2402.409925	2440.4278	2480.4246

Band	2400-2483.5 MHz
Power Level	8 dBm set internal (Port Front B)
Channel Spacing	2 MHz
Mod Scheme	OFDM
Low channel	2402 MHz
Mid channel	2440 MHz
High channel	2480 MHz

	Low channel	Mid channel	High channel
6 dB Bandwidth Result (kHz)	815.45	856.5	841.8

Plot for 6 dB Bandwidth Result (MHz)	6dB OBW BLE Low Channel (2402MHz) Ant Front B	6dB OBW BLE Low Channel (2440MHz) Ant Front B	6dB OBW BLE High Channel (2480MHz) Ant Front B
Operating frequency (MHz)	2402	2440	2480
6 dB FLOW Worst case (MHz)	2401.592275	2439.57175	2479.5791
6 dB FHIGH Worst case (MHz)	2402.407725	2440.42825	2480.4209

Band	2400-2483.5 MHz
Power Level	8 dBm set internal (Port Rear A)
Channel Spacing	2 MHz
Mod Scheme	OFDM
Low channel	2402 MHz
Mid channel	2440 MHz
High channel	2480 MHz

	Low channel	Mid channel	High channel
6 dB Bandwidth Result (kHz)	850.95	890.2	884.9
Plot for 6 dB Bandwidth Result (MHz)	6dB OBW BLE Low Channel (2402MHz) Ant Rear A	6dB OBW BLE Low Channel (2440MHz) Ant Rear A	6dB OBW BLE High Channel (2480MHz) Ant Rear A
Operating frequency (MHz)	2402	2440	2480
6 dB FLOW Worst case (MHz)	2401.574525	2439.5549	2479.55755
6 dB FHIGH Worst case (MHz)	2402.425475	2440.4451	2480.44245

Band	2400-2483.5 MHz
Power Level	8 dBm set internal (Port Rear B)
Channel Spacing	2 MHz
Mod Scheme	OFDM
Low channel	2402 MHz
Mid channel	2440 MHz
High channel	2480 MHz

	Low channel	Mid channel	High channel
6 dB Bandwidth Result (kHz)	849.45	892.35	880.75
Plot for 6 dB Bandwidth Result (MHz)	6dB OBW BLE Low Channel (2402MHz) Ant Rear B	6dB OBW BLE Low Channel (2440MHz) Ant Rear B	6dB OBW BLE High Channel (2480MHz) Ant Rear B
Operating frequency (MHz)	2402	2440	2480
6 dB FLOW Worst case (MHz)	2401.575275	2439.553825	2479.559625
6 dB FHIGH Worst case (MHz)	2402.424725	2440.446175	2480.440375

Analyser plots for the 26dB bandwidth can be found in Section 6 of this report.

LIMITS:
15.247(a)(2) The minimum 6dB bandwidth shall be at least 500kHz.

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:
<± 1.9 %

5.9 Maximum Average conducted output power

NOT APPLICABLE: Peak Conducted RF Power measured therefore this test is not required

5.10 Maximum Peak conducted output power

5.10.1 Test methods

Test Requirements: 47 CFR Part 15C Part 15.247(b)(3) [Reference 4.1.1 of this report]
Test Method: ANSI C63.10 Clause [Reference 4.1.2 of this report]
Limits: 47 CFR Part 15C Part 15.247(b)(3) [Reference 4.1.1 of this report]

5.10.2 Configuration of EUT

The EUT was measured on a bench using a spectrum analyser connected to the external RF port.
The EUT was set to each mode and test signal in turn (see section 2.4) and highest power levels recorded.
The EUT was operated in Modes 1-12 for this test.

5.10.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment listed below.
Peak stated reading is maximum power observed using a spectrum analyser RBW > 6dB BW of the EUT.

Measurements were made on a test bench in site A.

5.10.4 Test equipment

E755, P240

See Section 9 for more details

5.10.5 Test results

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

Band	2400-2483.5 MHz
Power Level	8 dBm set internal (Port Front A)
Channel Spacing	2 MHz
Mod Scheme	OFDM
Low channel	2402 MHz
Mid channel	2440 MHz
High channel	2480 MHz

Nominal voltage result (dBm)	2.51	3.10	2.83
Single port Plot reference	PWR Front A 2402 MHz	PWR Front A 2440 MHz	PWR Front A 2480 MHz
85% of voltage result (dBm)	2.51	3.10	2.83
115% voltage result (dBm)	2.51	3.10	2.83
Limit in dBm	30.00	30.00	30.00
Maximum result (dBm)	2.51	3.10	2.83
Margin to Limit (dB)	-27.49	-26.90	-27.17
Result in (W)	0.002	0.002	0.002

Band	2400-2483.5 MHz
Power Level	8 dBm set internal (Port Front B)
Channel Spacing	2 MHz
Mod Scheme	OFDM
Low channel	2402 MHz
Mid channel	2440 MHz
High channel	2480 MHz

Nominal voltage result (dBm)	2.55	3.08	2.75

Single port Plot reference	PWR Front B 2402 MHz	PWR Front B 2440 MHz	PWR Front B 2480 MHz
85% of voltage result (dBm)	2.55	3.08	2.75
115% voltage result (dBm)	2.55	3.08	2.75
Limit in dBm	30.00	30.00	30.00
Maximum result (dBm)	2.55	3.08	2.75
Margin to Limit (dB)	-27.45	-26.92	-27.25
Result in (W)	0.002	0.002	0.002

Band	2400-2483.5 MHz
Power Level	8 dBm set internal (Port Rear A)
Channel Spacing	2 MHz
Mod Scheme	OFDM
Low channel	2402 MHz
Mid channel	2440 MHz
High channel	2480 MHz

Nominal voltage result (dBm)	2.95	3.8	3.36
Single port Plot reference	PWR Rear A 2402 MHz	PWR Rear A 2440 MHz	PWR Rear A 2480 MHz
85% of voltage result (dBm)	2.95	3.75	3.36
115% voltage result (dBm)	2.95	3.75	3.36
Limit in dBm	30.00	30.00	30.00
Maximum result (dBm)	2.95	3.75	3.36
Margin to Limit (dB)	-27.05	-26.25	-26.64
Result in (W)	0.002	0.002	0.002

Band	2400-2483.5 MHz
Power Level	8 dBm set internal (Port Rear B)
Channel Spacing	2 MHz
Mod Scheme	OFDM
Low channel	2402 MHz
Mid channel	2440 MHz
High channel	2480 MHz

Nominal voltage result (dBm)	2.95	3.75	3.35
Single port Plot reference	PWR Rear B 2402 MHz	PWR Rear B 2440 MHz	PWR Rear B 2480 MHz
85% of voltage result (dBm)	2.95	3.80	3.35
115% voltage result (dBm)	2.95	3.80	3.35
Limit in dBm	30.00	30.00	30.00
Maximum result (dBm)	2.95	3.80	3.35
Margin to Limit (dB)	-27.05	-26.20	-26.65
Result in (W)	0.002	0.002	0.002

LIMITS:
15.247(b)(3)
For systems using digital modulation in the 902-928, 2400-2483.5 or 5725-5850 MHz bands 1 Watt.

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:
<± 1.0 dB

5.11 Maximum Power Spectral Density

5.11.1 Test methods

Test Requirements:	47 CFR Part 15C Part 15.247(e) [Reference 4.1.1 of this report]
Test Method:	ANSI C63.10 Clause 10.10 [Reference 4.1.2 of this report]
Limits:	47 CFR Part 15C Part 15.247(e) [Reference 4.1.1 of this report]

5.11.2 Configuration of EUT

The EUT was configured as for the Average conducted power test. The EUT was operated in Modes 1-12 for this test.

5.11.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below. The emission from the EUT was maximised before taking any plots. Measurements & plots were taken with the span set to 1.5 times the measured DTS bandwidth for each modulation scheme setting.

Tests were performed using Test Site A.

5.11.4 Test equipment

E755, P240

See Section 9 for more details

5.11.5 Test results

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

Band	2400-2483.5 MHz
Power Level	8 dBm set internal (Port Front A)
Channel Spacing	2 MHz
Mod Scheme	OFDM
Low channel	2402 MHz
Mid channel	2440 MHz
High channel	2480 MHz

	Low channel	Mid channel	High channel
RF Ant port 1 Measured PSD conducted (dBm/3kHz)	-13.04	-12.75	-12.80
PSD Limit (dBm/3kHz)	8	8	8
RF Ant port 1 Margin (dB)	-21.04	-20.75	-20.80
RF Ant port 1 PSD Plot reference	PSD Front A 2402 MHz	PSD Front A 2440 MHz	PSD Front A 2480 MHz

Band	2400-2483.5 MHz
Power Level	8 dBm set internal (Port Front B)
Channel Spacing	2 MHz
Mod Scheme	OFDM
Low channel	2402 MHz
Mid channel	2440 MHz
High channel	2480 MHz

	Low channel	Mid channel	High channel
RF Ant port 1 Measured PSD conducted (dBm/3kHz)	-13.20	-12.68	-12.90
PSD Limit (dBm/3kHz)	8	8	8
RF Ant port 1 Margin (dB)	-21.20	-20.68	-20.90
RF Ant port 1 PSD Plot reference	PSD Front B 2402 MHz	PSD Front B 2440 MHz	PSD Front B 2480 MHz

Band	2400-2483.5 MHz
Power Level	8 dBm set internal (Port Rear A)
Channel Spacing	2 MHz
Mod Scheme	OFDM
Low channel	2402 MHz
Mid channel	2440 MHz
High channel	2480 MHz

	Low channel	Mid channel	High channel
RF Ant port 1 Measured PSD conducted (dBm/3kHz)	-12.83	-11.89	-12.29
PSD Limit (dBm/3kHz)	8	8	8
RF Ant port 1 Margin (dB)	-20.83	-19.89	-20.29
RF Ant port 1 PSD Plot reference	PSD Rear A 2402 MHz	PSD Rear A 2440 MHz	PSD Rear A 2480 MHz

Band	2400-2483.5 MHz
Power Level	8 dBm set internal (Port Rear B)
Channel Spacing	2 MHz
Mod Scheme	OFDM
Low channel	2402 MHz
Mid channel	2440 MHz
High channel	2480 MHz

	Low channel	Mid channel	High channel
RF Ant port 1 Measured PSD conducted (dBm/3kHz)	-12.76	-11.86	-12.21
PSD Limit (dBm/3kHz)	8	8	8
RF Ant port 1 Margin (dB)	-20.76	-19.86	-20.21
RF Ant port 1 PSD Plot reference	PSD Rear B 2402 MHz	PSD Rear B 2440 MHz	PSD Rear B 2480 MHz

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

LIMITS:
15.247(e) +8dBm/3kHz.

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:
<± 2 dB

5.12 Antenna power conducted emissions

NOT APPLICABLE: The EUT was tested for radiated emissions with its dedicated antenna in position.

5.13 Duty cycle

5.13.1 Test methods

Test Requirements: 47 CFR Part 15C Part 15.35(c) [Reference 4.1.1 of this report]
Test Method: ANSI C63.10 Clause 7.5 [Reference 4.1.2 of this report]
Limits: 47 CFR Part 15C Part 15.35c [Reference 4.1.1 of this report]

5.13.2 Configuration of EUT

The EUT was measured on a bench using a spectrum analyser connected to the external RF port. The EUT was operated in Mode 7, Mode 8 and Mode 9 for tests.

5.13.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below. The centre frequency of the analyser was set to that of the transmitter, and the span set to zero. The sweep time was adjusted so that either the pulse width or the periodic operation could be observed.
Measurements were performed test in site A.

5.13.4 Test equipment

E755, P240

See Section 9 for more details

5.13.5 Test results

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

Band	2400-2483.5 MHz
Power Level	8 dBm set internal (Port Rear A)
Channel Spacing	2 MHz
Mod Scheme	OFDM
Low channel	2402 MHz
Mid channel	2440 MHz
High channel	2480 MHz

	Low channel	Mid channel	High channel
TX on time (mS)	0.6026667	0.6026667	0.6026667
TX on Plot filename	On Time Low Chan	On Time Mid Chan	On Time High Chan
TX repetition time (S)	0.00125	0.00125	0.00125
TX repetition Plot filename	Cycle Time Low Chan	Cycle Time Mid Chan	Cycle Time High Chan
Calculated TX Duty cycle (%)	48.213336	48.213336	48.213336

Analyser plots for the duty cycle can be found in Section 6 of this report.

LIMITS:

No limits apply. These results have been included for reference only.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:
PXA, ±0.026 % (UR71B)

5.14 FHSS carrier frequency separation

NOT APPLICABLE: EUT does not employ FHSS technology.

5.15 Average time of occupancy

NOT APPLICABLE: EUT does not employ FHSS technology.

5.16 Number of Hop Channels

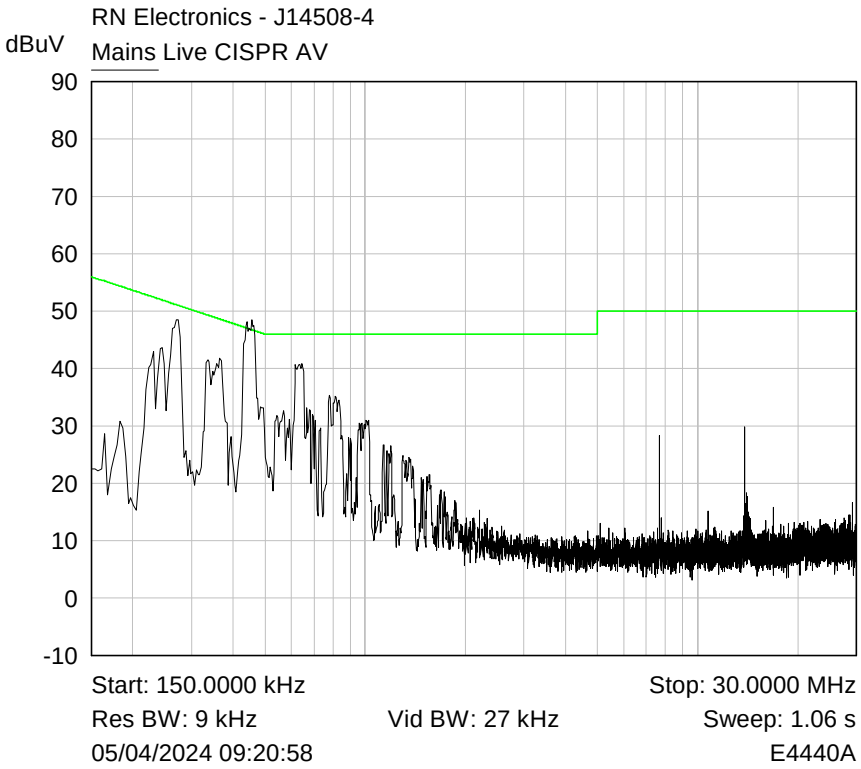
NOT APPLICABLE: EUT does not employ FHSS technology.

6 Plots/Graphical results

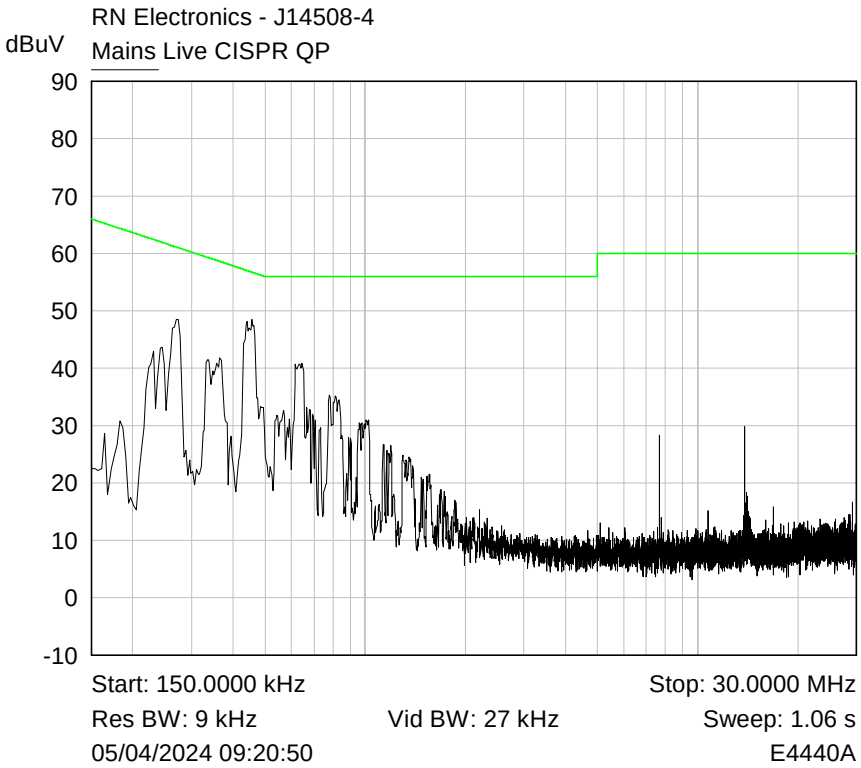
6.1 AC power line conducted emissions

Mains Power

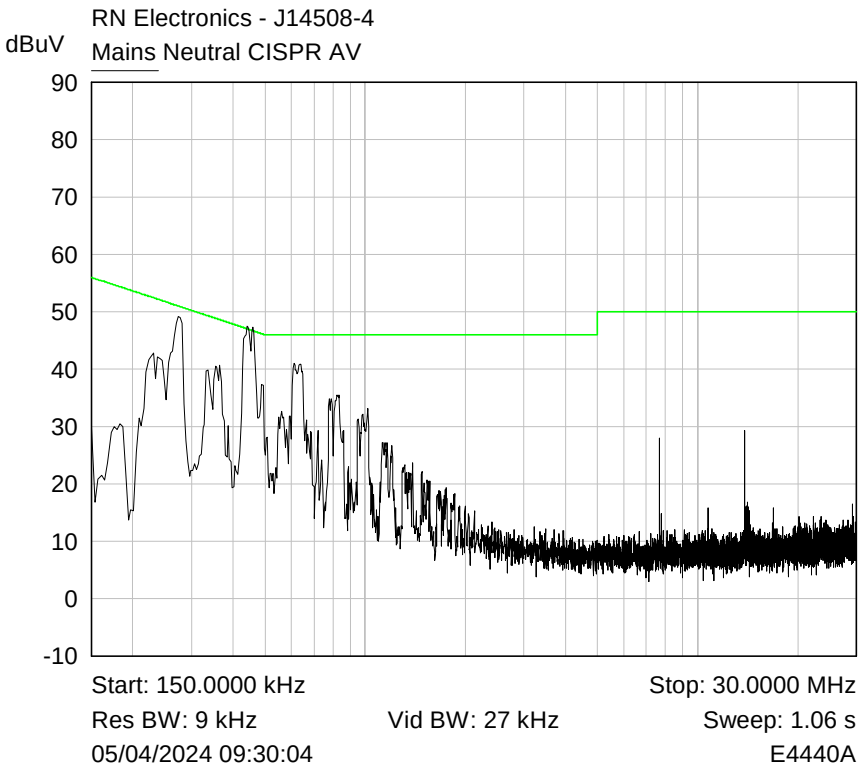
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2402 MHz



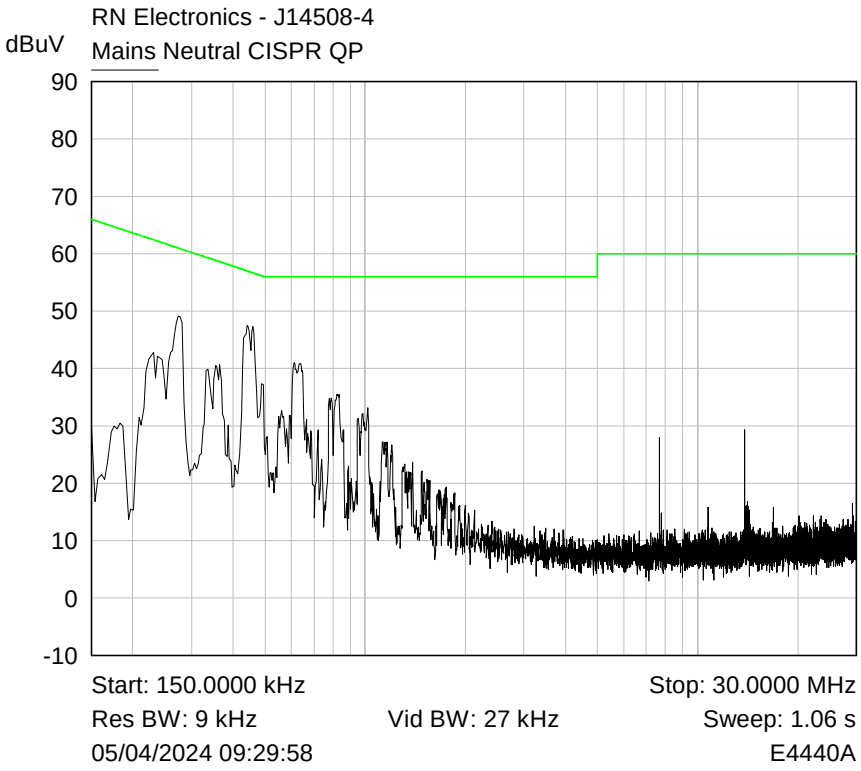
Plot of Live150k-30M Average



Plot of Live150k-30M Quasi-Peak

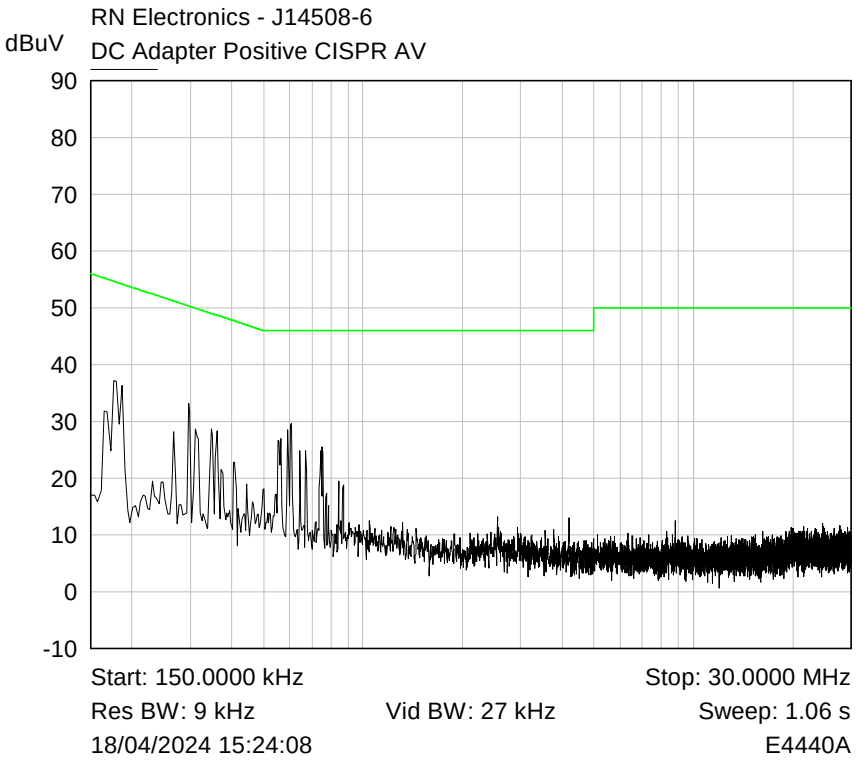


Plot of Neutral150k-30M Average

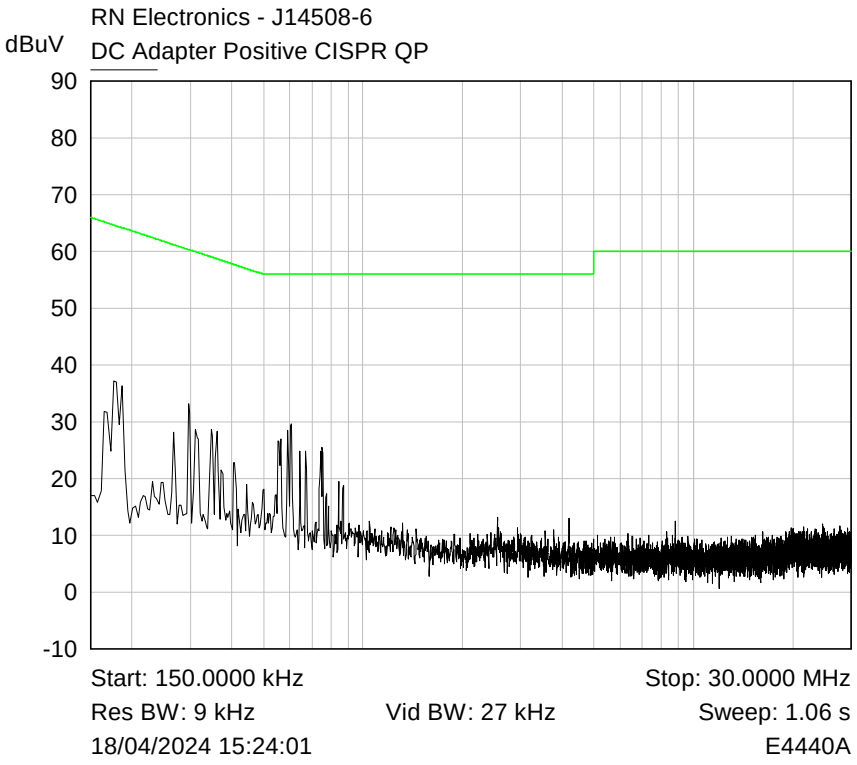


Plot of Neutral150k-30M Quasi-Peak

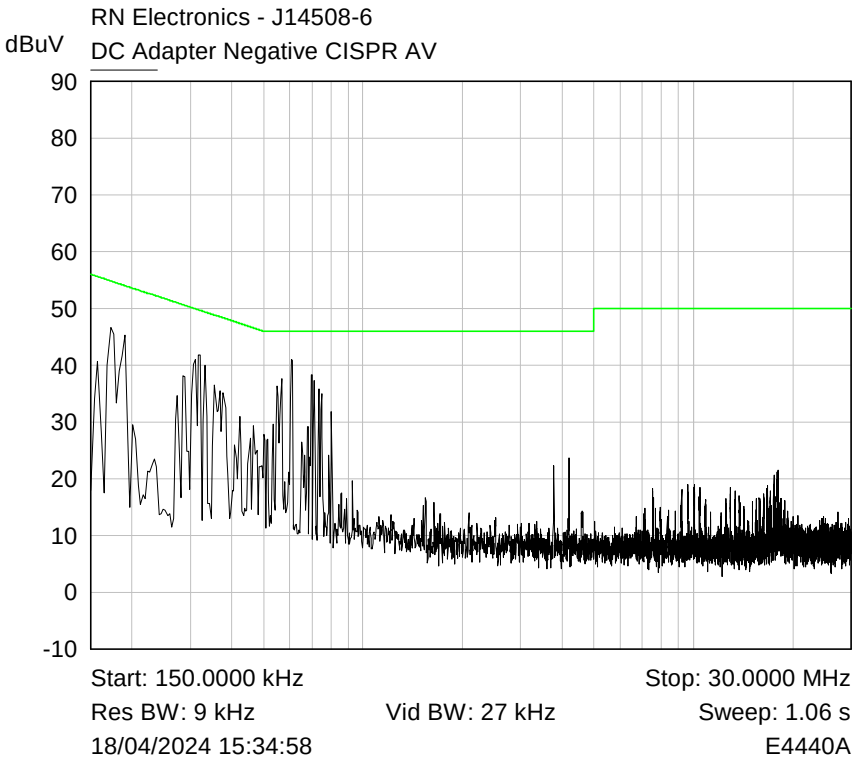
DC Power port from off-the-shelf PSU
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2402 MHz



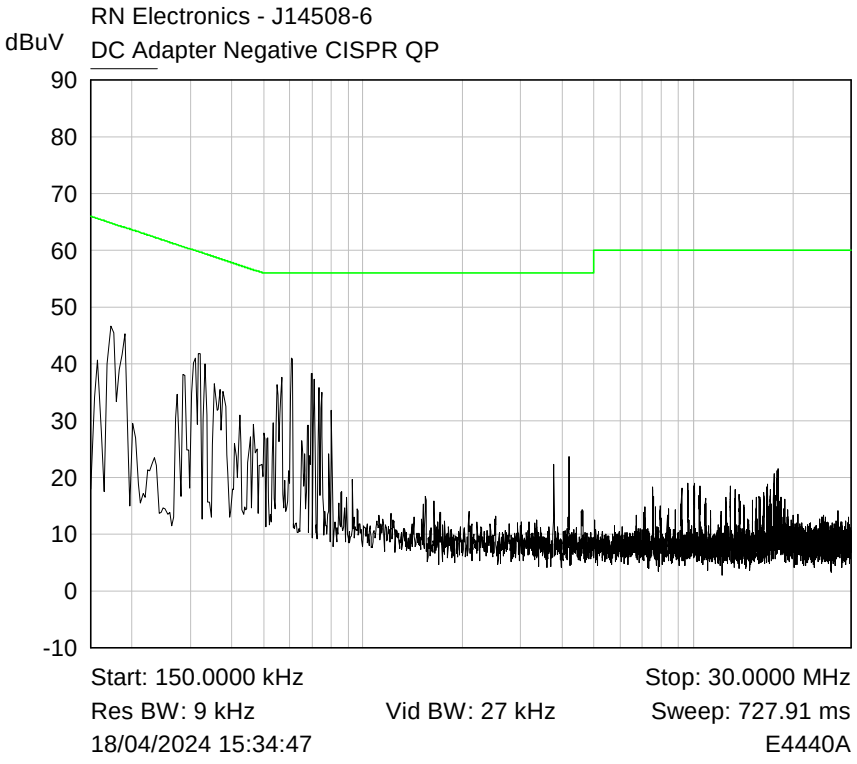
Plot of DC Positive 150k-30M Average



Plot of DC Positive 150k-30M Quasi-Peak



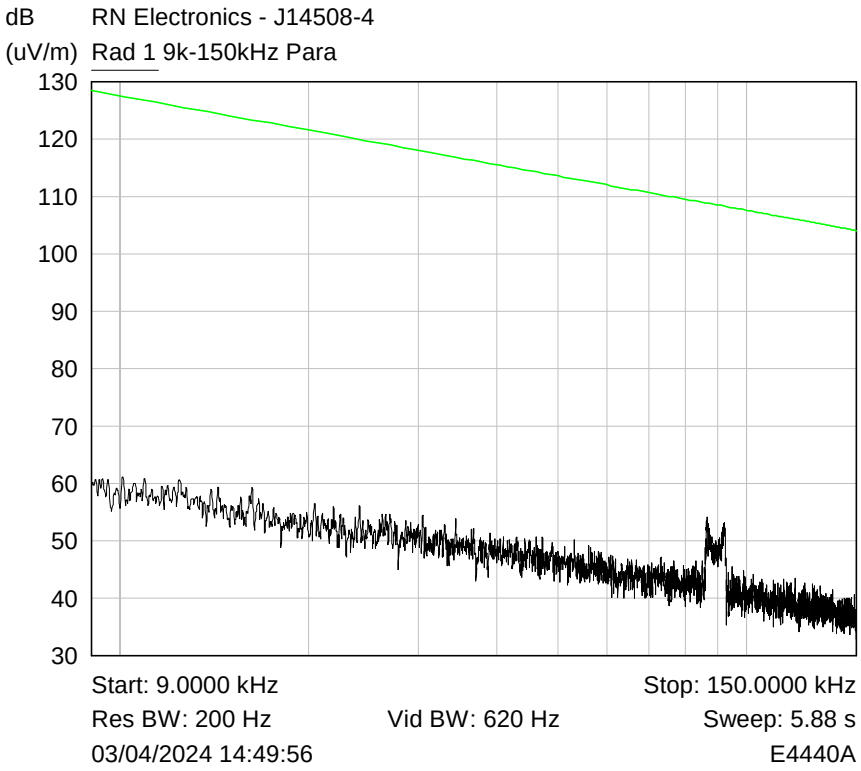
Plot of DC Negative 150k-30M Average



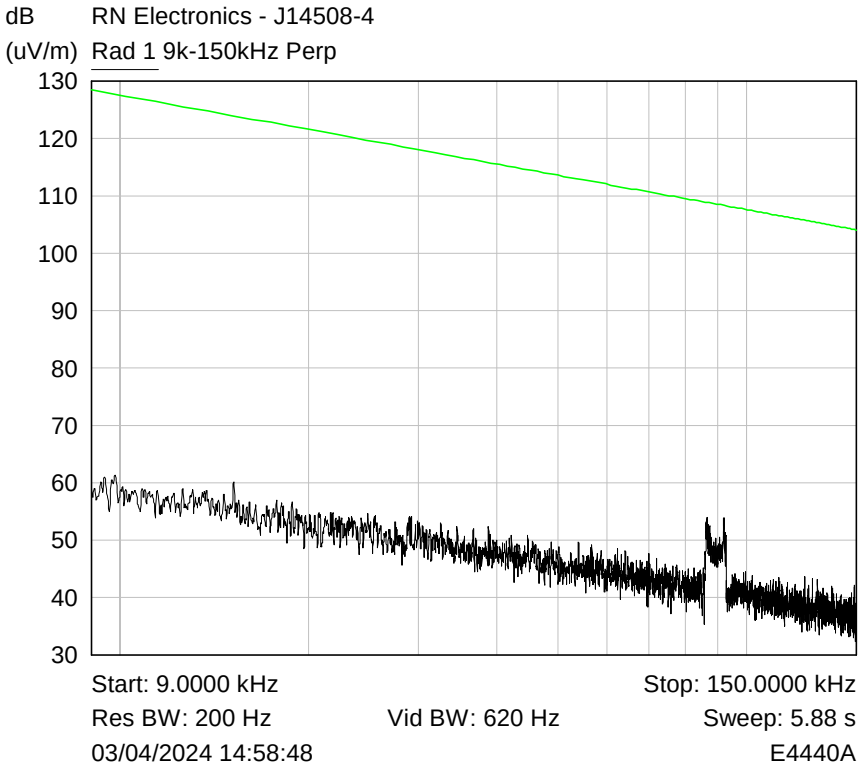
Plot of DC Negative 150k-30M Quasi-Peak

6.2 Radiated emissions 9 - 150 kHz

RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2402 MHz



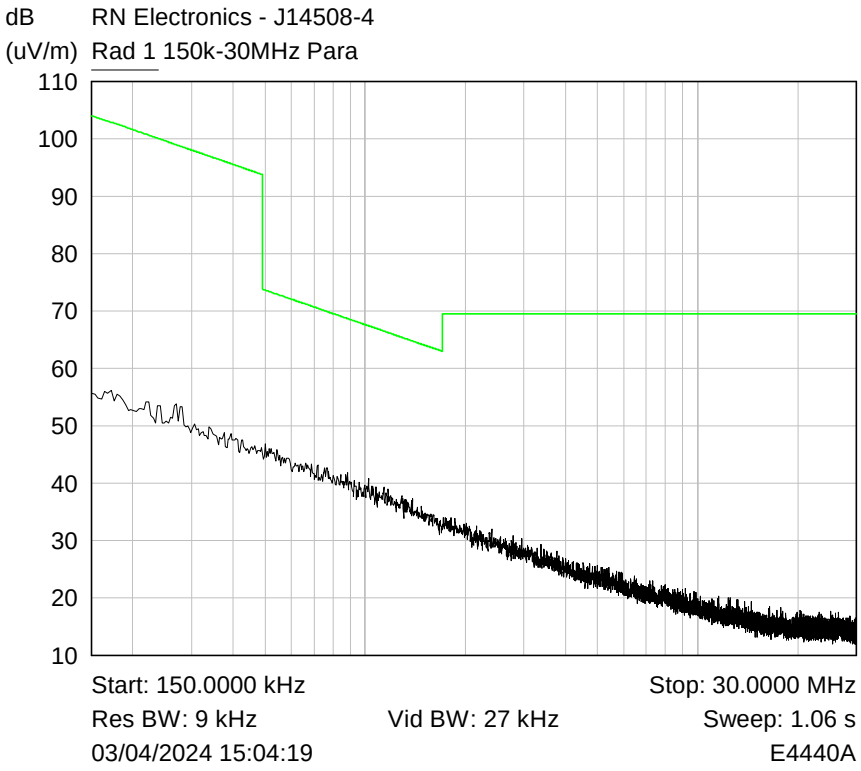
Plot of 9k-150kHz Parallel



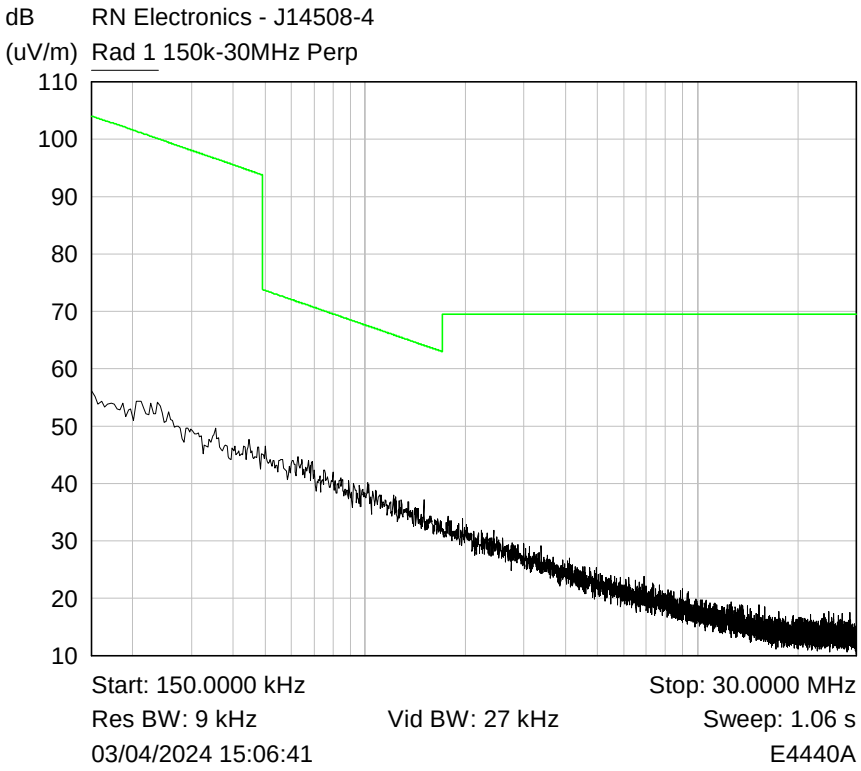
Plot of 9k-150kHz Perpendicular

6.3 Radiated emissions 150 kHz - 30 MHz

RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2402 MHz



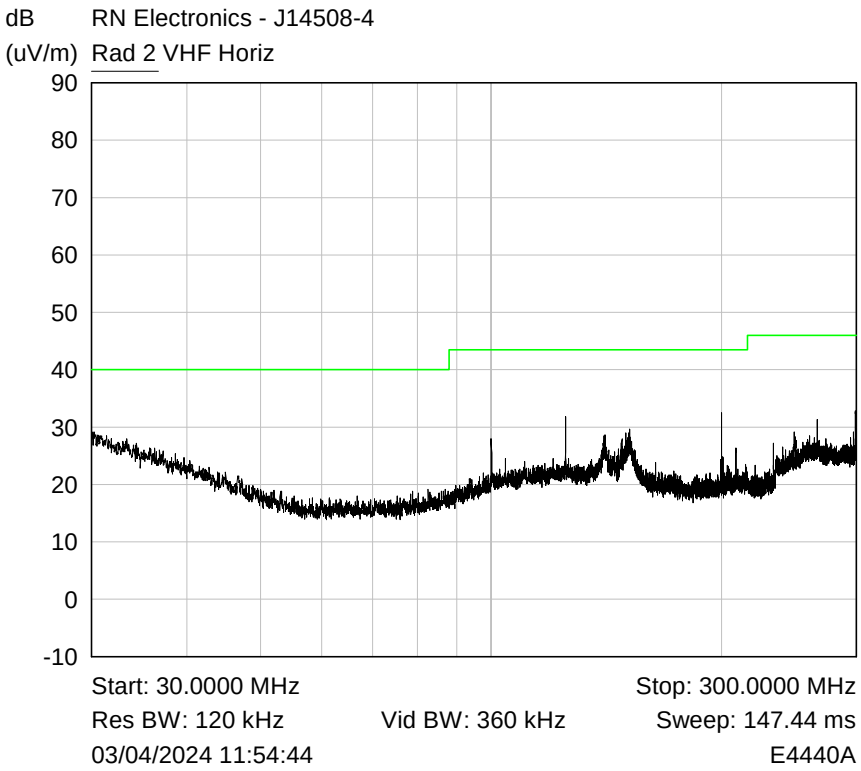
Plot of 150kHz-30MHz Parallel



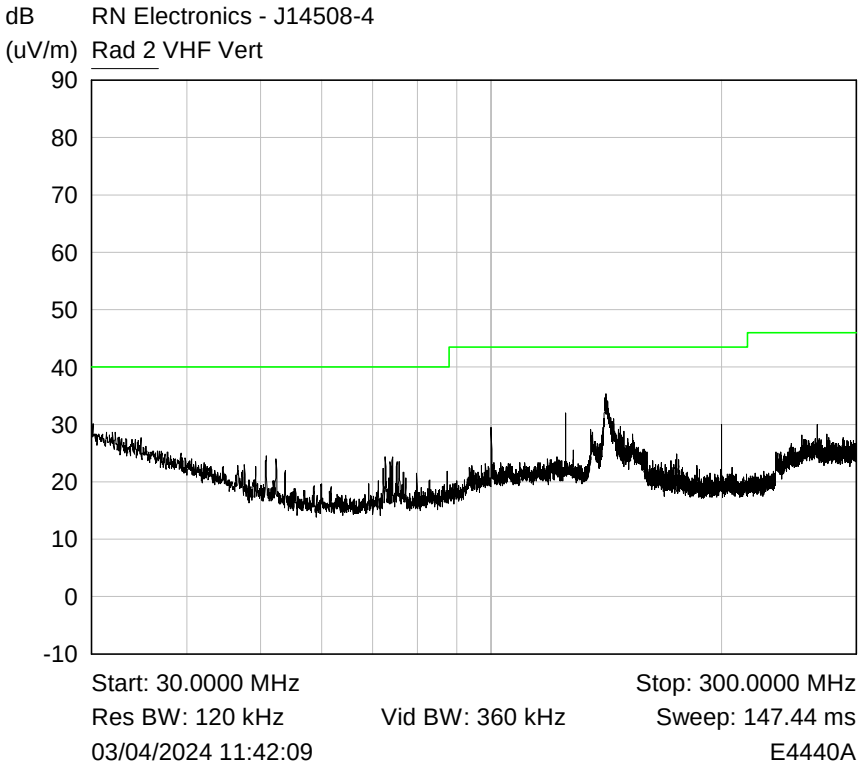
Plot of 150kHz-30MHz Perpendicular

6.4 Radiated emissions 30 MHz -1 GHz

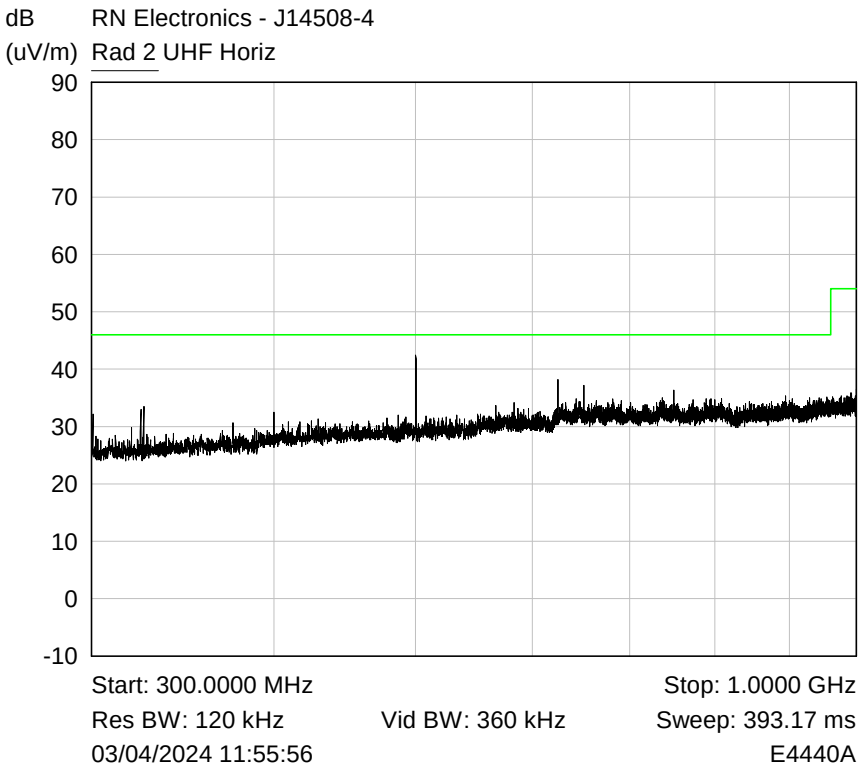
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2440 MHz



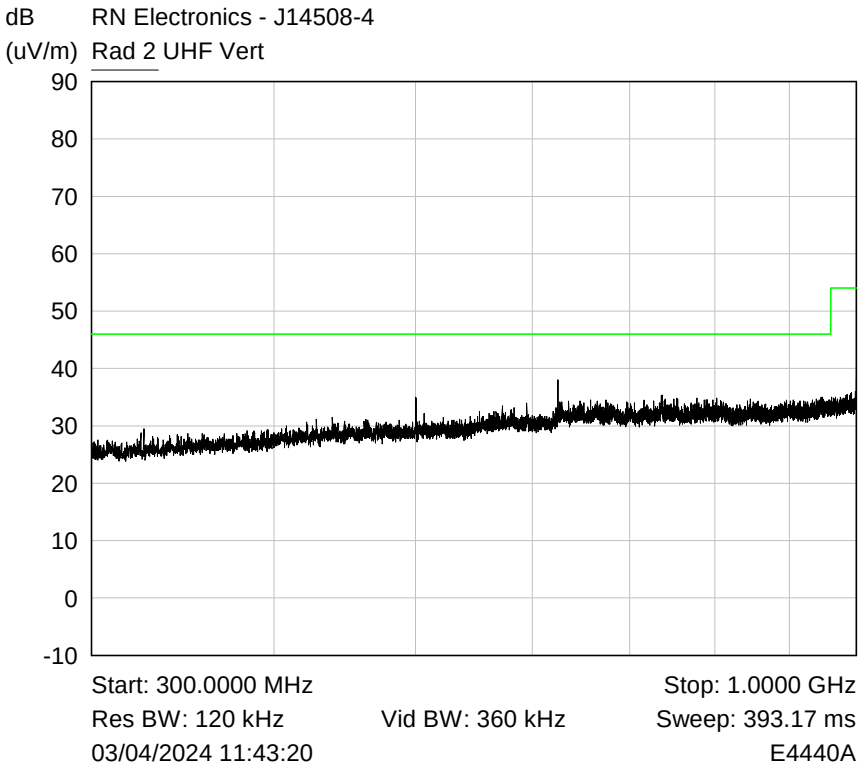
Plot of Peak emissions for VHF Horizontal against the QP limit line.



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



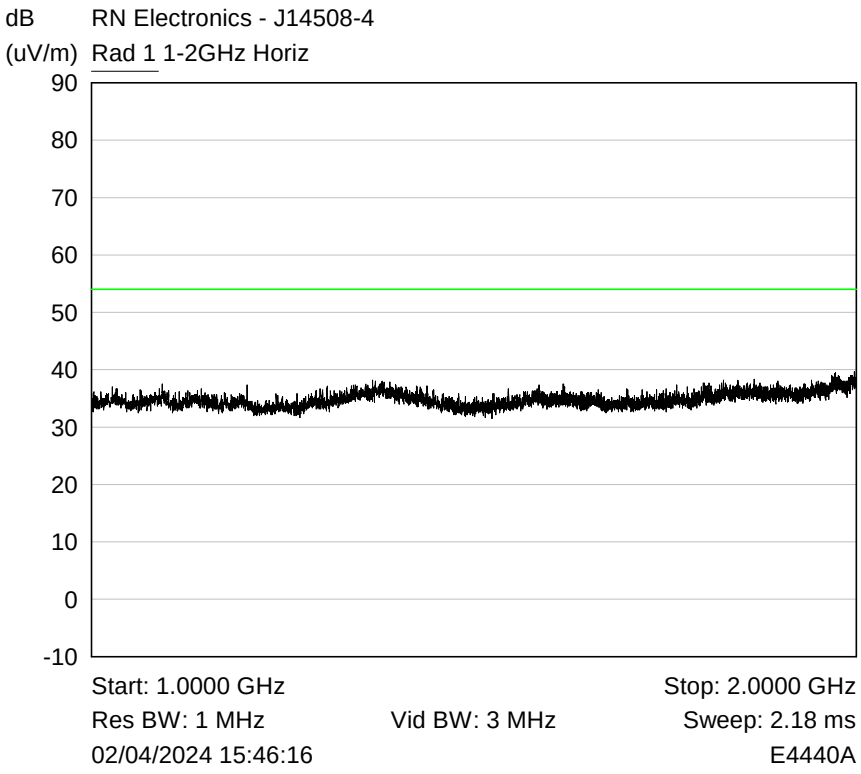
Plot of Peak emissions for UHF Horizontal against the QP limit line.

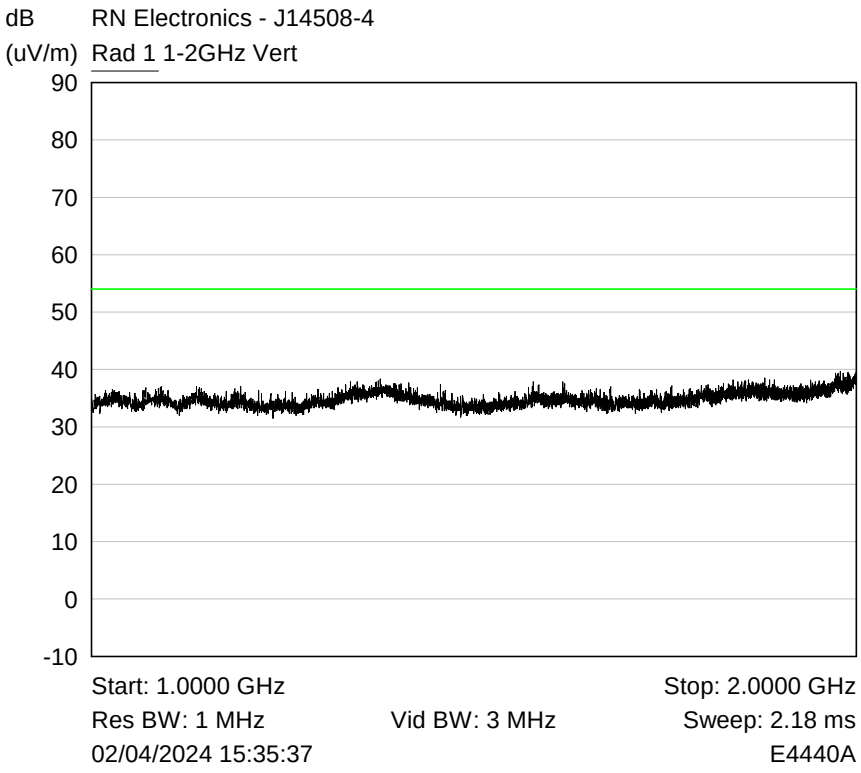


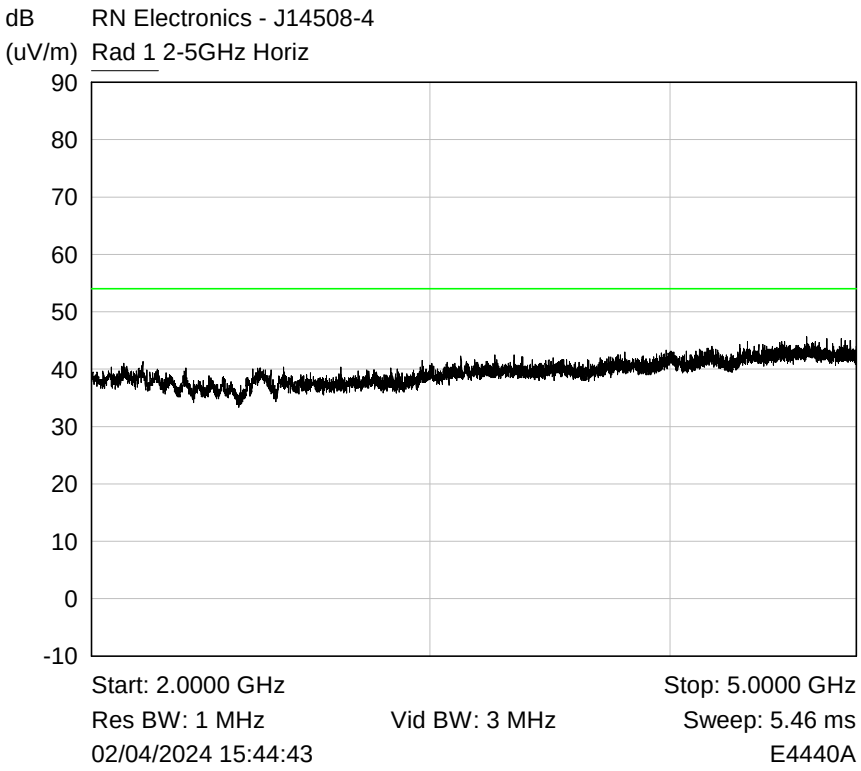
Plot of Peak emissions for UHF Vertical against the QP limit line.

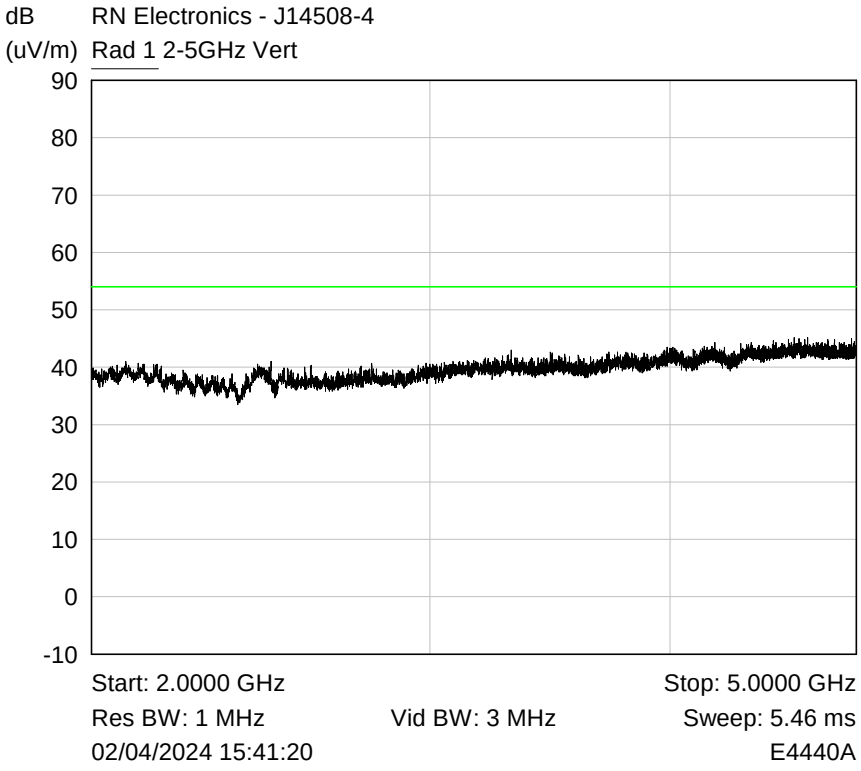
6.5 Radiated emissions above 1 GHz

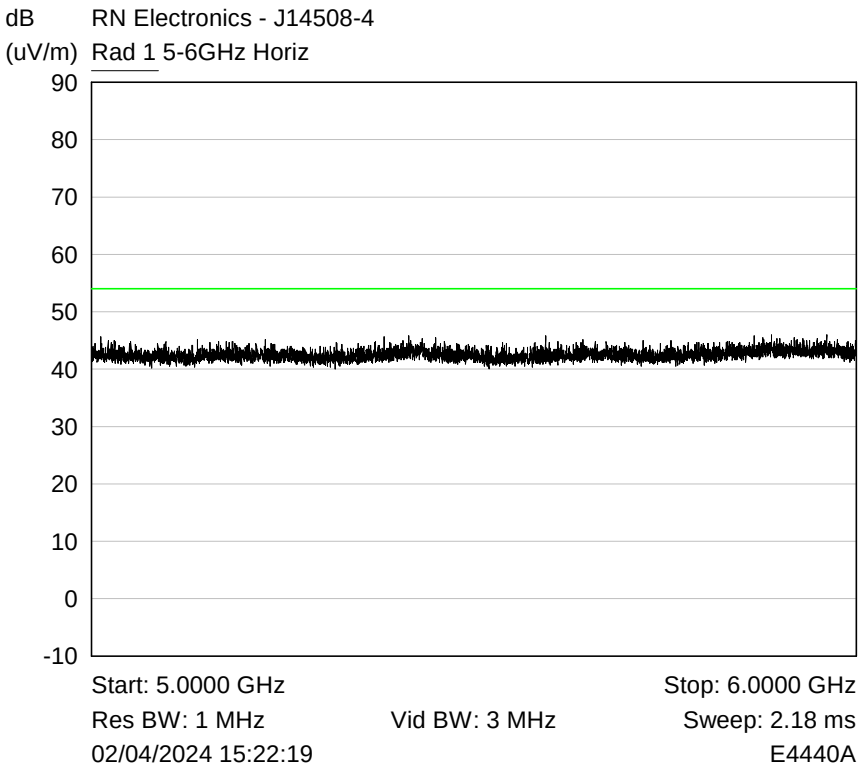
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2440 MHz

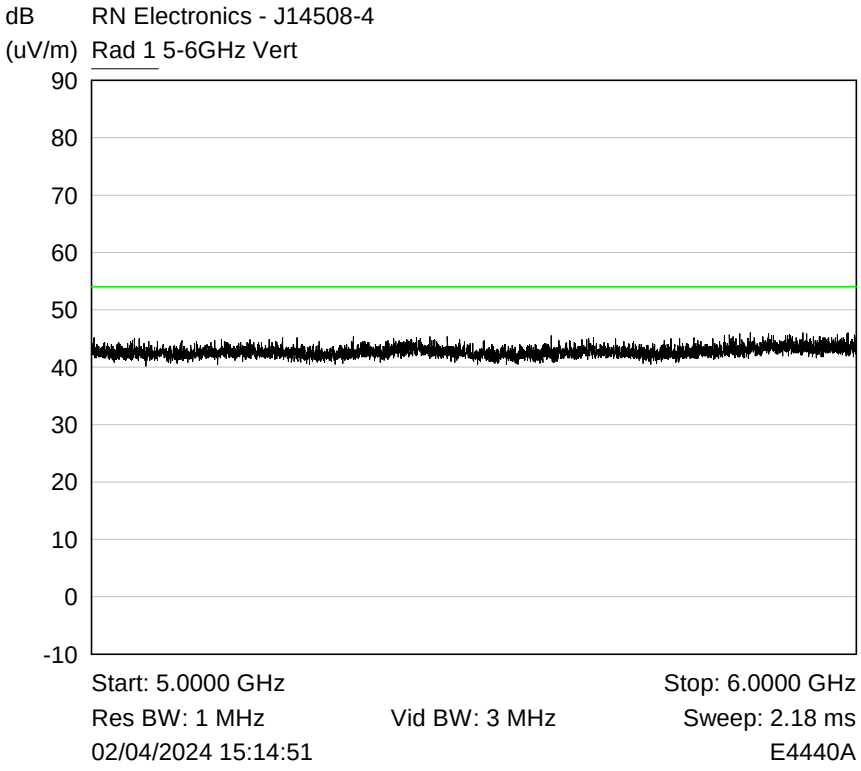


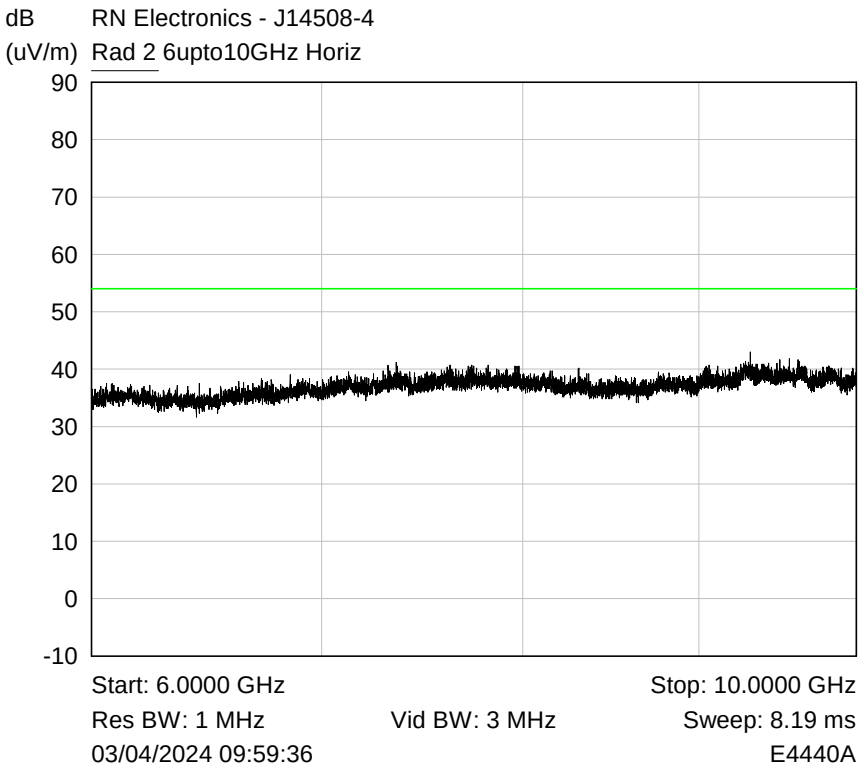


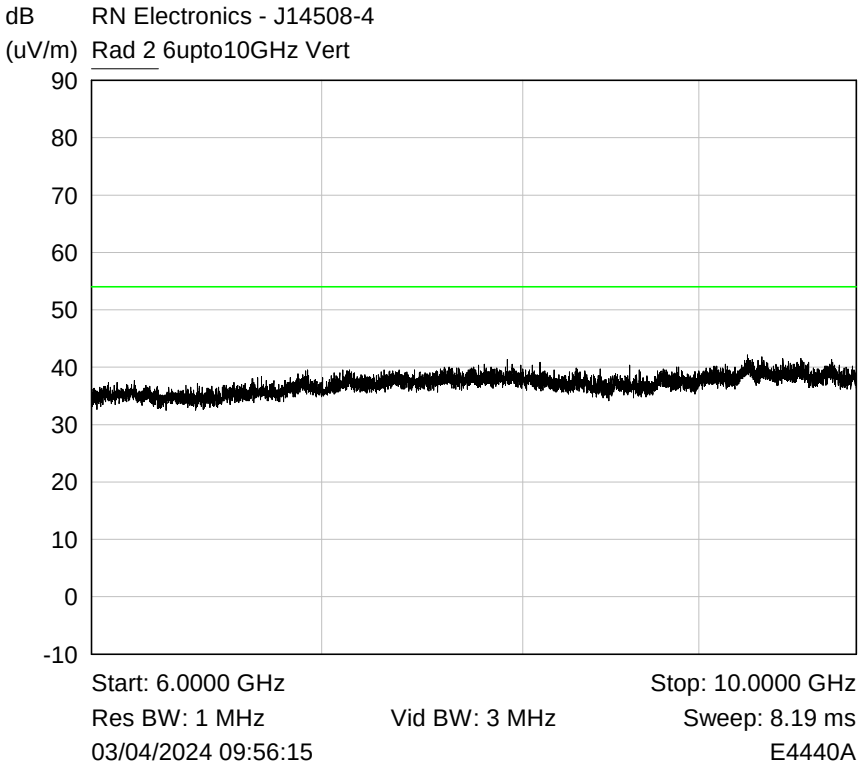

dB
(uV/m)
RN Electronics - J14508-4
Rad 1 2-5GHz Horiz
90
80
70
60
50
40
30
20
10
0
-10
Start: 2.0000 GHz
Stop: 5.0000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 5.46 ms
02/04/2024 15:44:43
E4440A

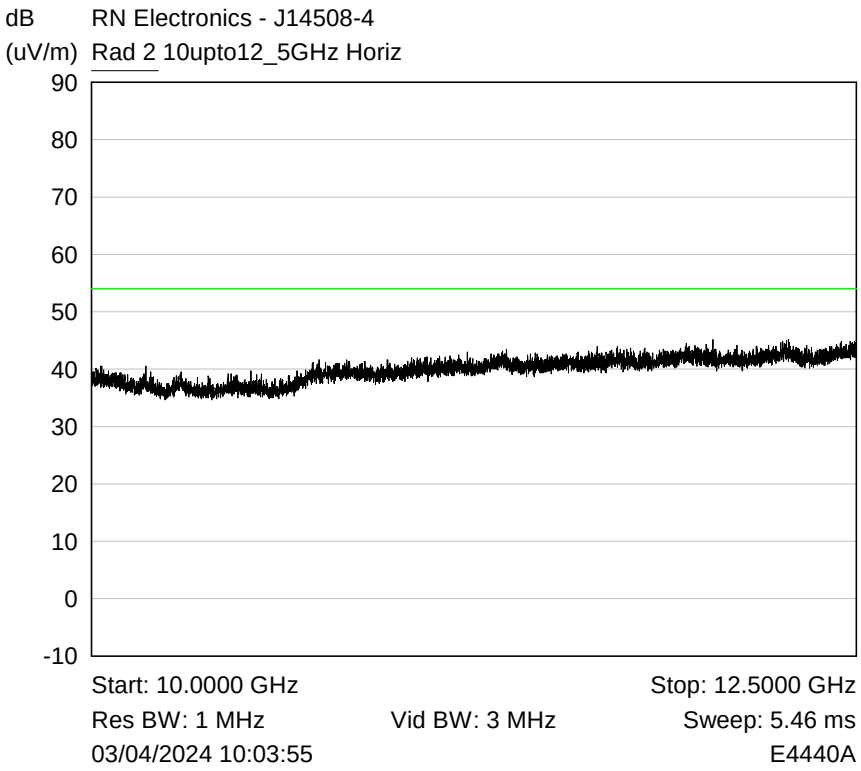

dB
(uV/m)
RN Electronics - J14508-4
Rad 1 2-5GHz Vert
90
80
70
60
50
40
30
20
10
0
-10
Start: 2.0000 GHz
Stop: 5.0000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 5.46 ms
02/04/2024 15:41:20
E4440A

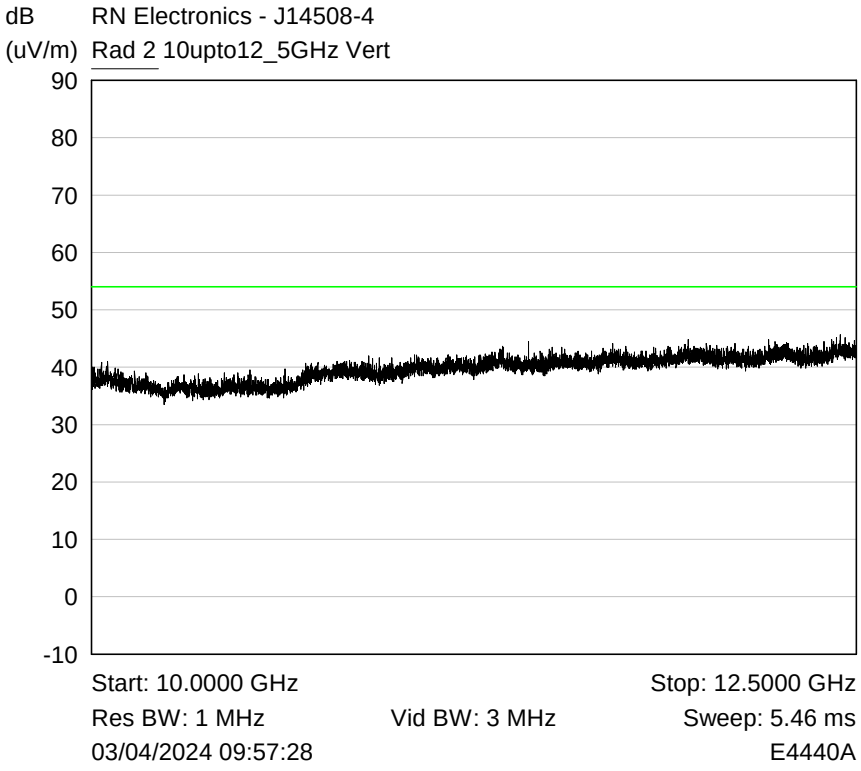


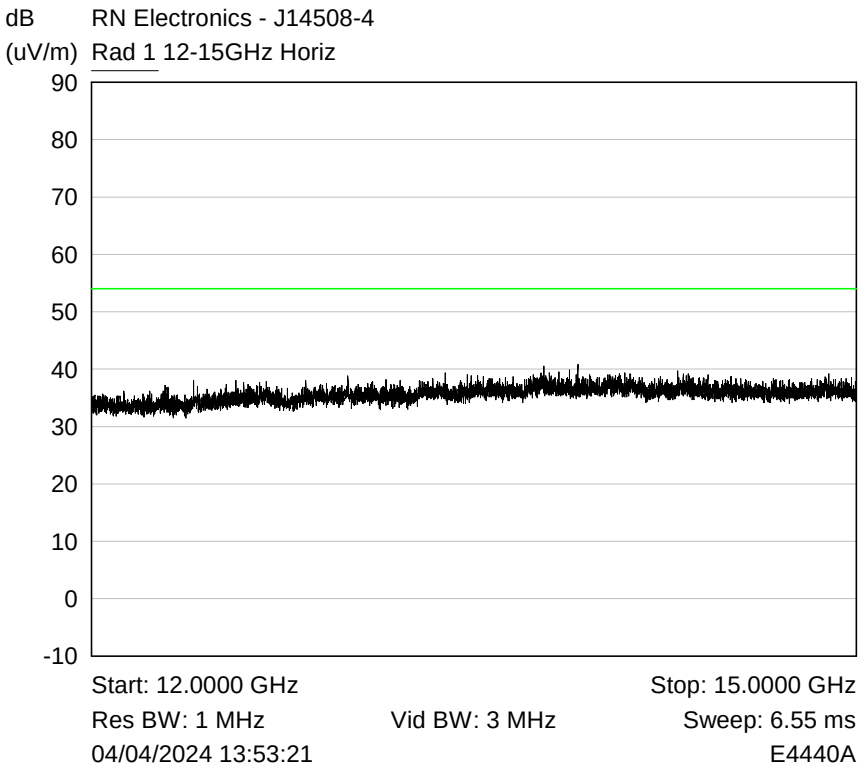


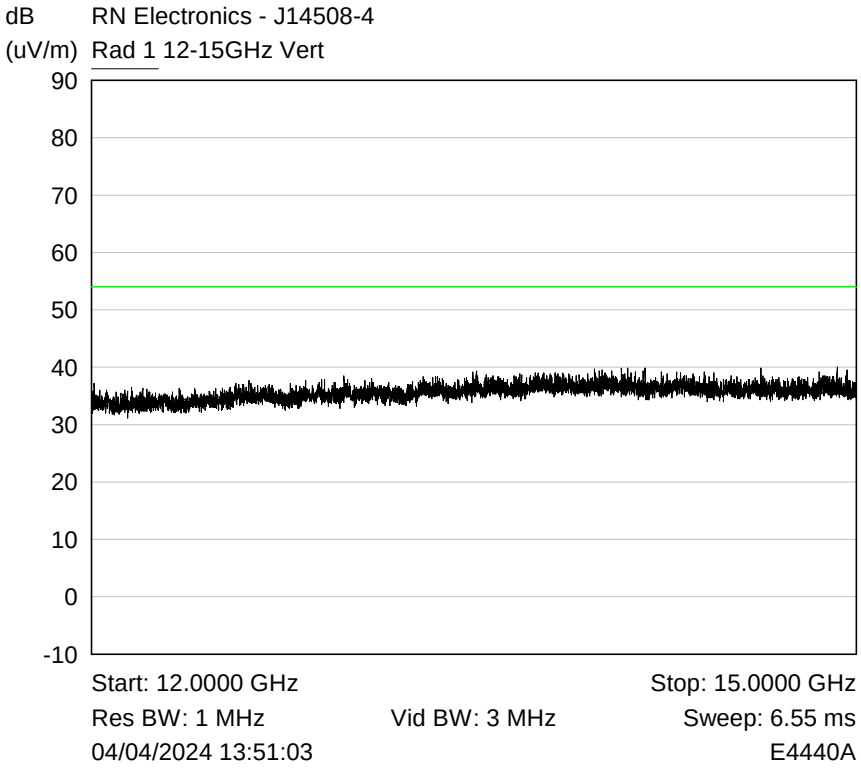

dB
(uV/m)
RN Electronics - J14508-4
Rad 2 6upto10GHz Horiz
90
80
70
60
50
40
30
20
10
0
-10
Start: 6.0000 GHz
Stop: 10.0000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 8.19 ms
03/04/2024 09:59:36
E4440A

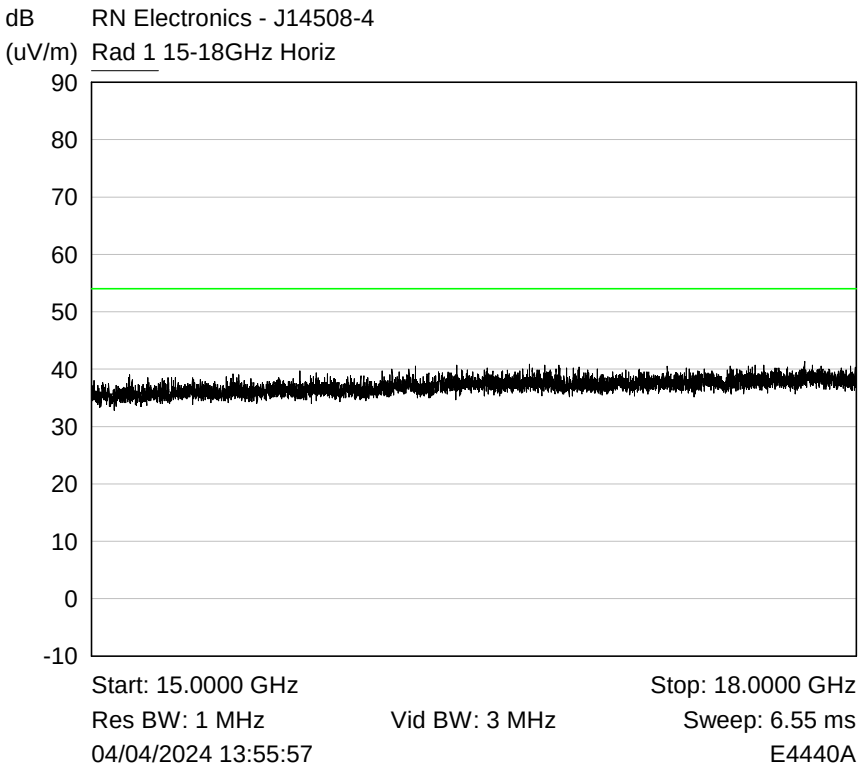

dB
(uV/m)
RN Electronics - J14508-4
Rad 2 6upto10GHz Vert
90
80
70
60
50
40
30
20
10
0
-10
Start: 6.0000 GHz
Stop: 10.0000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 8.19 ms
03/04/2024 09:56:15
E4440A

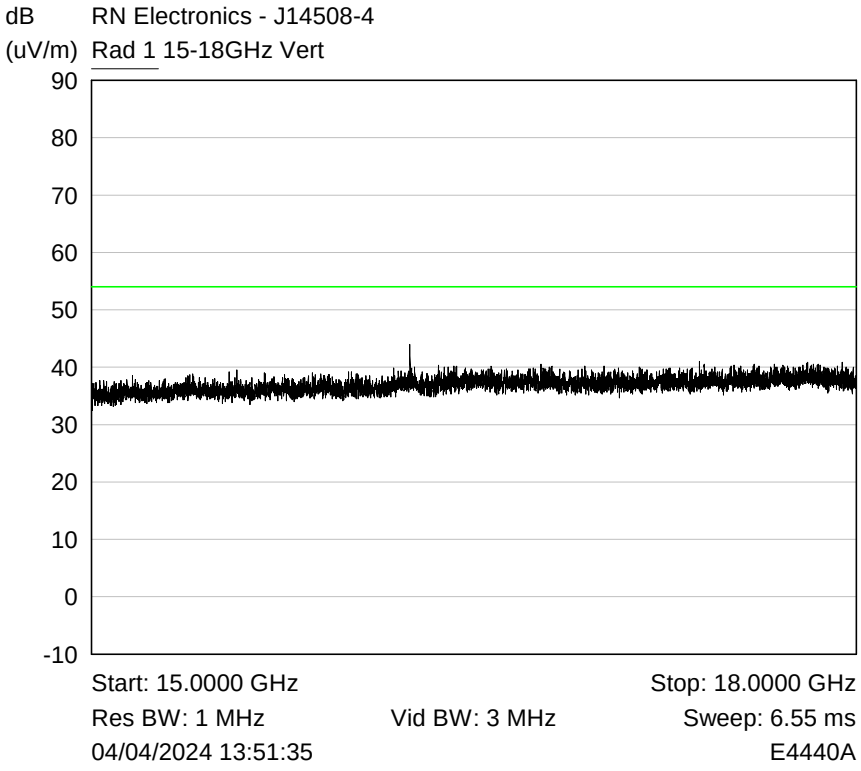

dB
(uV/m)
RN Electronics - J14508-4
Rad 2 10upto12_5GHz Horiz
90
80
70
60
50
40
30
20
10
0
-10
Start: 10.0000 GHz
Stop: 12.5000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 5.46 ms
03/04/2024 10:03:55
E4440A

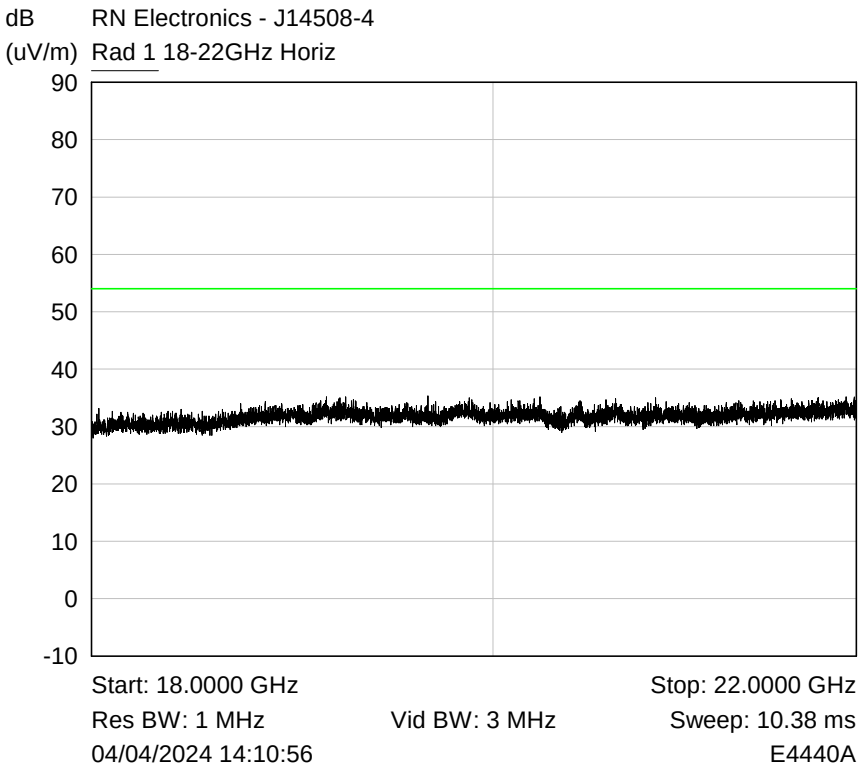

dB
(uV/m)
RN Electronics - J14508-4
Rad 2 10upto12_5GHz Vert
90
80
70
60
50
40
30
20
10
0
-10
Start: 10.0000 GHz
Stop: 12.5000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 5.46 ms
03/04/2024 09:57:28
E4440A

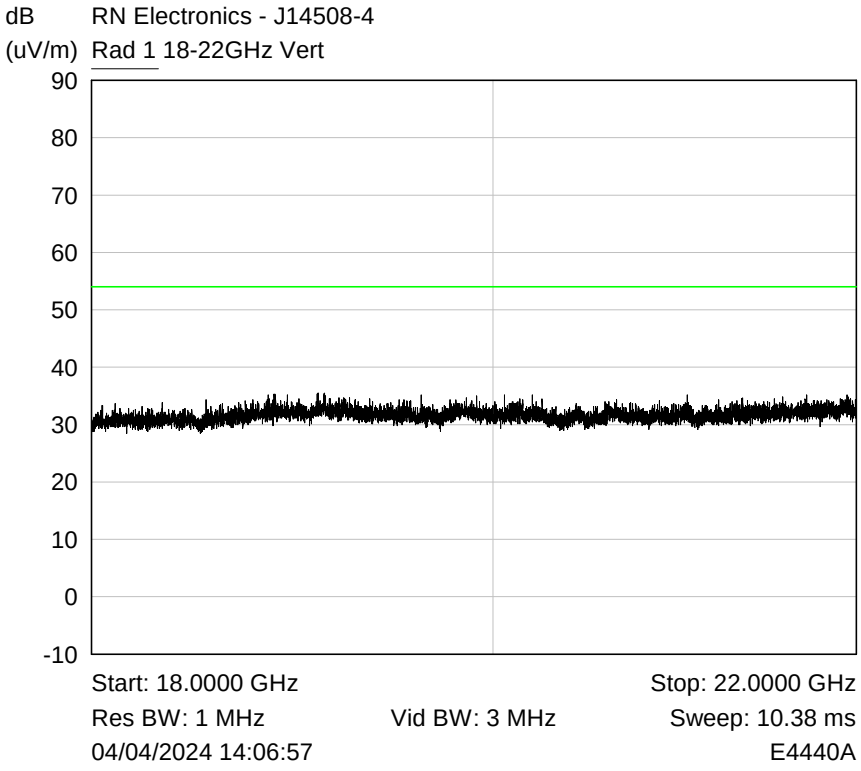

dB
(uV/m)
RN Electronics - J14508-4
Rad 1 12-15GHz Horiz
90
80
70
60
50
40
30
20
10
0
-10
Start: 12.0000 GHz
Stop: 15.0000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 6.55 ms
04/04/2024 13:53:21
E4440A

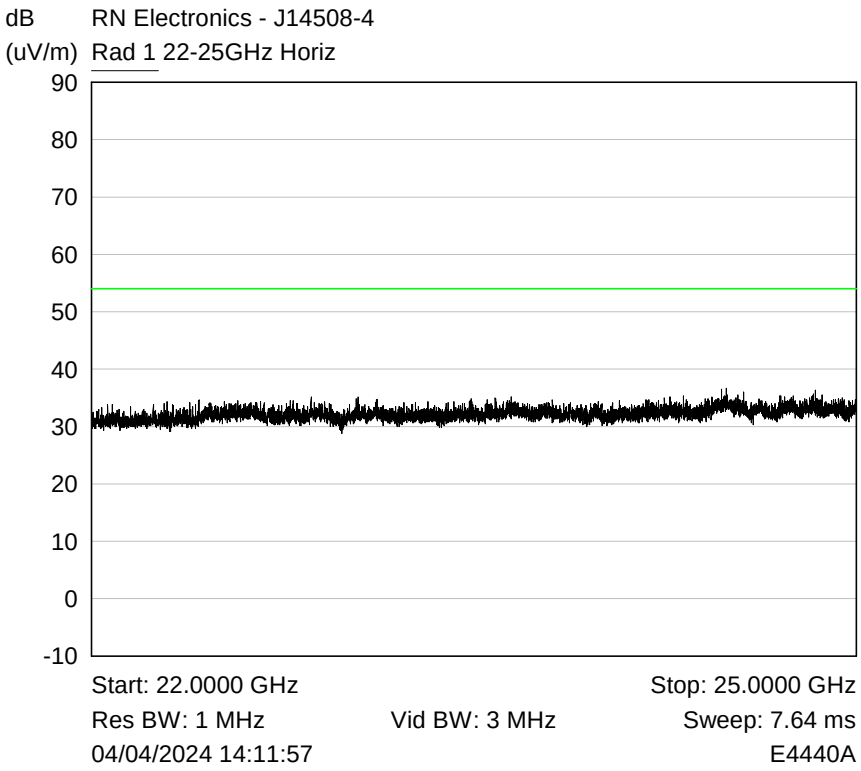

dB
(uV/m)
RN Electronics - J14508-4
Rad 1 12-15GHz Vert
90
80
70
60
50
40
30
20
10
0
-10
Start: 12.0000 GHz
Stop: 15.0000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 6.55 ms
04/04/2024 13:51:03
E4440A

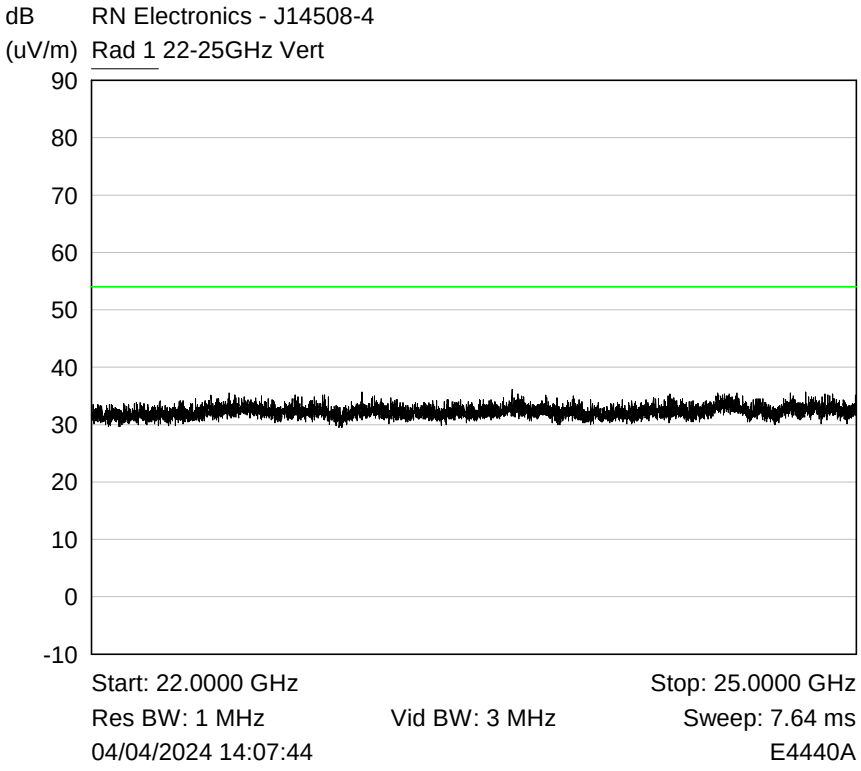

dB
(uV/m)
RN Electronics - J14508-4
Rad 1 15-18GHz Horiz
90
80
70
60
50
40
30
20
10
0
-10
Start: 15.0000 GHz
Stop: 18.0000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 6.55 ms
04/04/2024 13:55:57
E4440A


dB
(uV/m)
RN Electronics - J14508-4
Rad 1 15-18GHz Vert
90
80
70
60
50
40
30
20
10
0
-10
Start: 15.0000 GHz
Stop: 18.0000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 6.55 ms
04/04/2024 13:51:35
E4440A


dB
(uV/m)
RN Electronics - J14508-4
Rad 1 18-22GHz Horiz
90
80
70
60
50
40
30
20
10
0
-10
Start: 18.0000 GHz
Stop: 22.0000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 10.38 ms
04/04/2024 14:10:56
E4440A

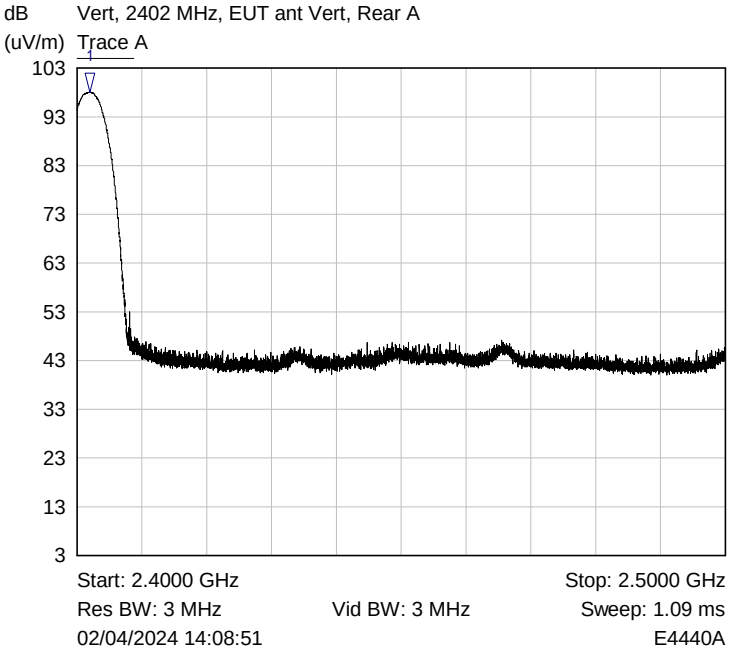

dB
(uV/m)
RN Electronics - J14508-4
Rad 1 18-22GHz Vert
90
80
70
60
50
40
30
20
10
0
-10
Start: 18.0000 GHz
Stop: 22.0000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 10.38 ms
04/04/2024 14:06:57
E4440A


dB
(uV/m)
RN Electronics - J14508-4
Rad 1 22-25GHz Horiz
90
80
70
60
50
40
30
20
10
0
-10
Start: 22.0000 GHz
Stop: 25.0000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 7.64 ms
04/04/2024 14:11:57
E4440A


dB
(uV/m)
RN Electronics - J14508-4
Rad 1 22-25GHz Vert
90
80
70
60
50
40
30
20
10
0
-10
Start: 22.0000 GHz
Stop: 25.0000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 7.64 ms
04/04/2024 14:07:44
E4440A

6.6 Effective radiated power field strength

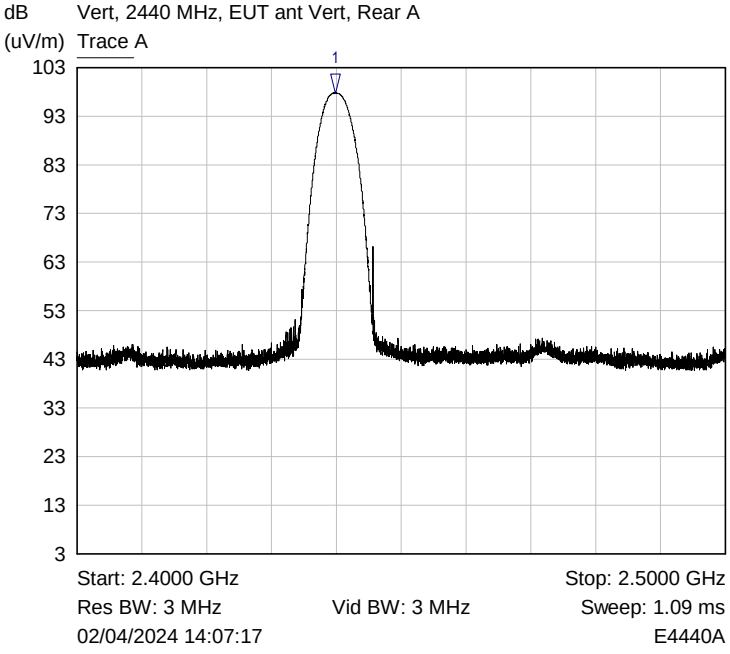
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal, Channel Spacing 2 MHz, Modulation OFDM, Channel 2402 MHz



Mkr	Trace	X-Axis	Value	Notes
1	Trace A	2.4020 GHz	98.06 dB(uV/m)	

Plot of Horiz polarisation and EUT in Flat position

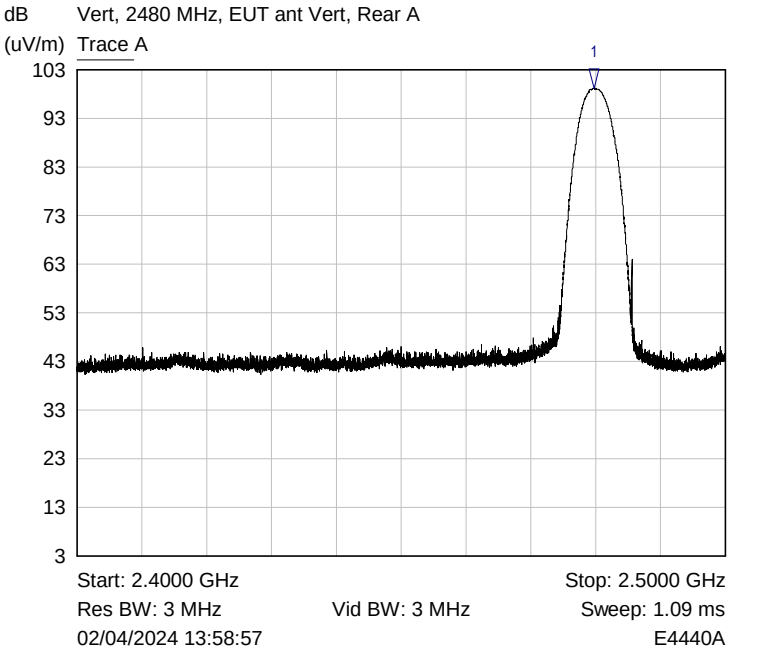
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal, Channel Spacing 2 MHz, Modulation OFDM, Channel 2440 MHz



Mkr	Trace	X-Axis	Value	Notes
1	Trace A	2.4398 GHz	97.75 dB(uV/m)	

Plot of Horiz polarisation and EUT in Flat position

RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal, Channel Spacing 2 MHz, Modulation OFDM, Channel 2480 MHz

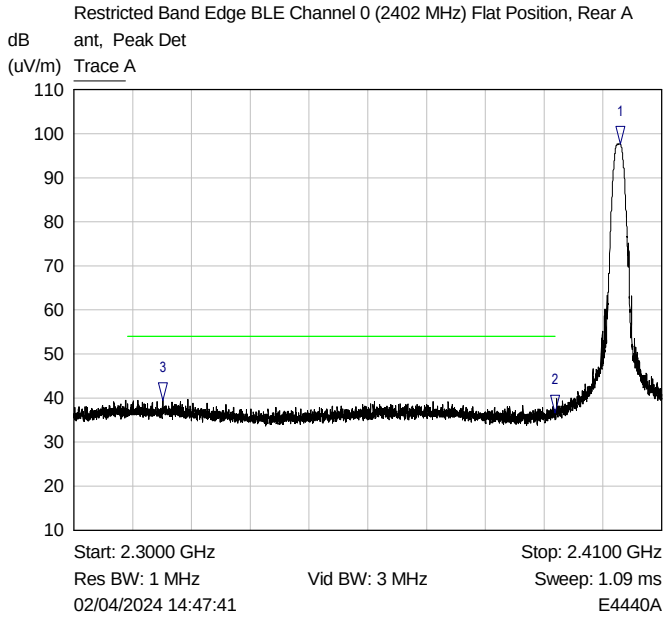


Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4798 GHz	99.14 dB(uV/m)	

Plot of Horiz polarisation and EUT in Flat position

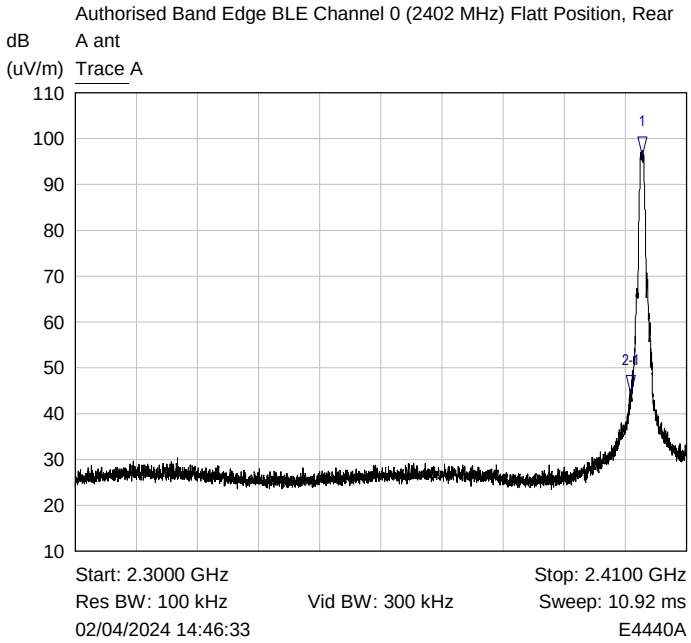
6.7 Band Edge Compliance

RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2402 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4022 GHz	97.66 dB(uV/m)	
2 ▽	Trace A	2.3900 GHz	36.75 dB(uV/m)	
3 ▽	Trace A	2.3166 GHz	39.45 dB(uV/m)	

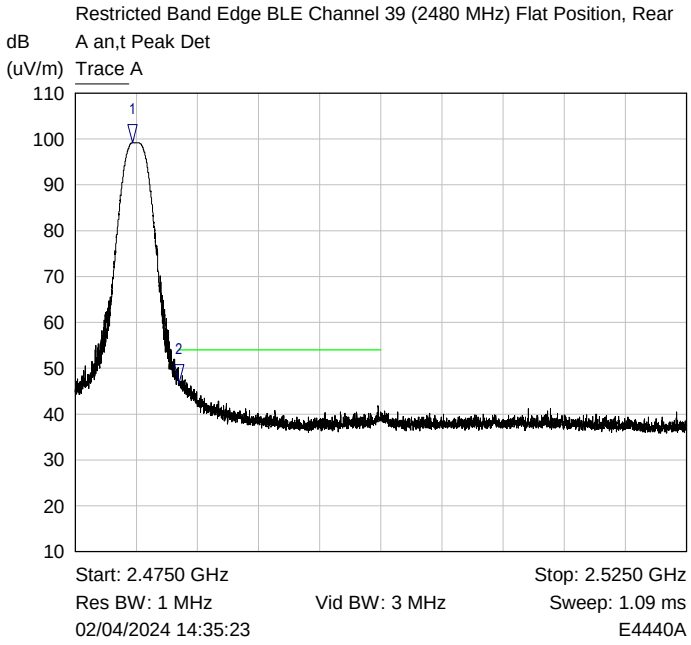
Restricted band edge Peak Plot



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4021 GHz	96.27 dB(uV/m)	
2-1 ▽	Trace A	2.4000 GHz	-51.99 dB	

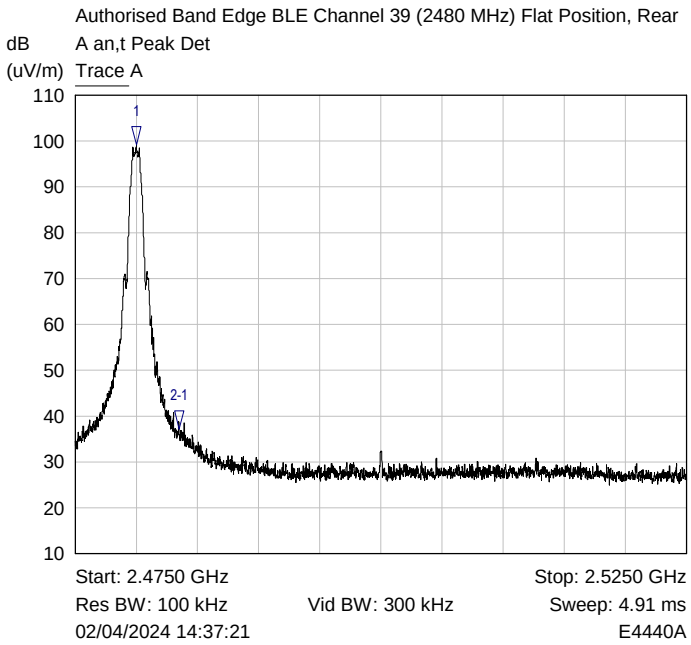
Authorised Band Edge Plot

RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2480 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4797 GHz	99.23 dB(uV/m)	
2 ▽	Trace A	2.4835 GHz	46.88 dB(uV/m)	

Restricted band edge Peak Plot

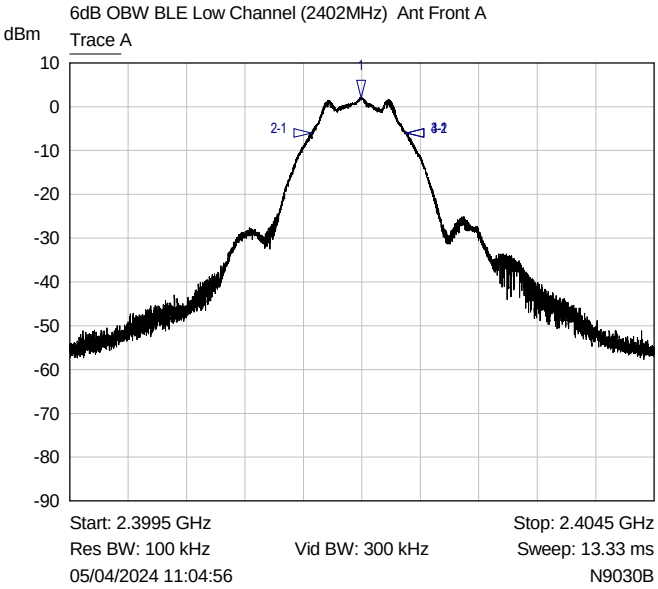


Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4800 GHz	99.09 dB(uV/m)	
2-1 ▽	Trace A	2.4835 GHz	-61.94 dB	

Authorised Band Edge Plot

6.8 Occupied bandwidth

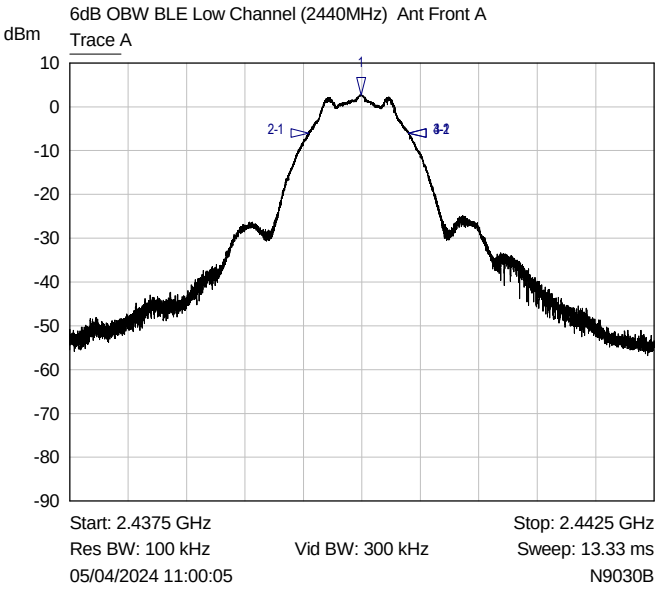
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Front A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2402 MHz



Mkr	Trace	X-Axis	Value	Notes
1	Trace A	2.4020 GHz	2.03 dBm	
2-1	Trace A	-424.0500 kHz	-6.00 dBm	
3-1	Trace A	386.1500 kHz	-5.99 dBm	
4-2	Trace A	810.2000 kHz	0.00 dB	

Plot for 6 dB Bandwidth Result (kHz)

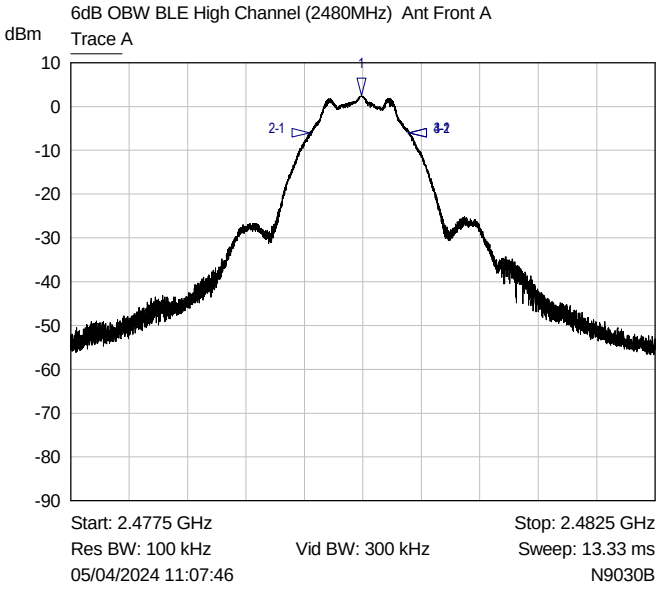
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Front A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2440 MHz



Mkr	Trace	X-Axis	Value	Notes
1	Trace A	2.4400 GHz	2.73 dBm	
2-1	Trace A	-449.2000 kHz	-5.99 dBm	
3-1	Trace A	406.4000 kHz	-6.01 dBm	
4-2	Trace A	855.6000 kHz	-0.02 dB	

Plot for 6 dB Bandwidth Result (kHz)

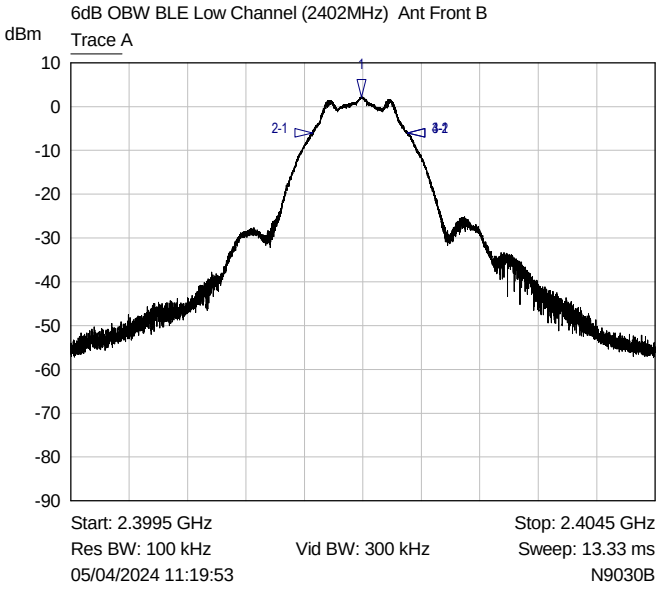
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Front A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2480 MHz



Mkr	Trace	X-Axis	Value	Notes
1	Trace A	2.4800 GHz	2.42 dBm	
2-1	Trace A	-442.3500 kHz	-6.01 dBm	
3-1	Trace A	406.8500 kHz	-6.01 dBm	
4-2	Trace A	849.2000 kHz	-0.00 dB	

Plot for 6 dB Bandwidth Result (kHz)

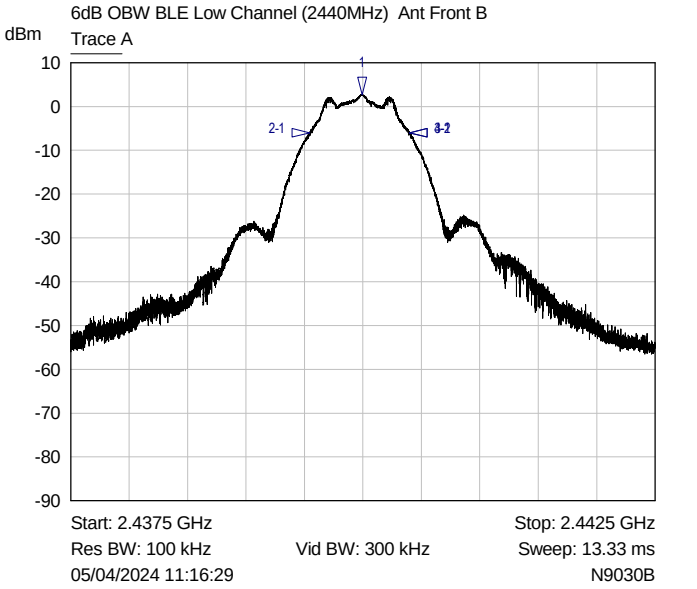
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Front B), Channel Spacing 2 MHz, Modulation OFDM, Channel 2402 MHz



Mkr	Trace	X-Axis	Value	Notes
1	Trace A	2.4020 GHz	2.13 dBm	
2-1	Trace A	-422.1500 kHz	-5.99 dBm	
3-1	Trace A	393.3000 kHz	-6.00 dBm	
4-2	Trace A	815.4500 kHz	-0.01 dB	

Plot for 6 dB Bandwidth Result (kHz)

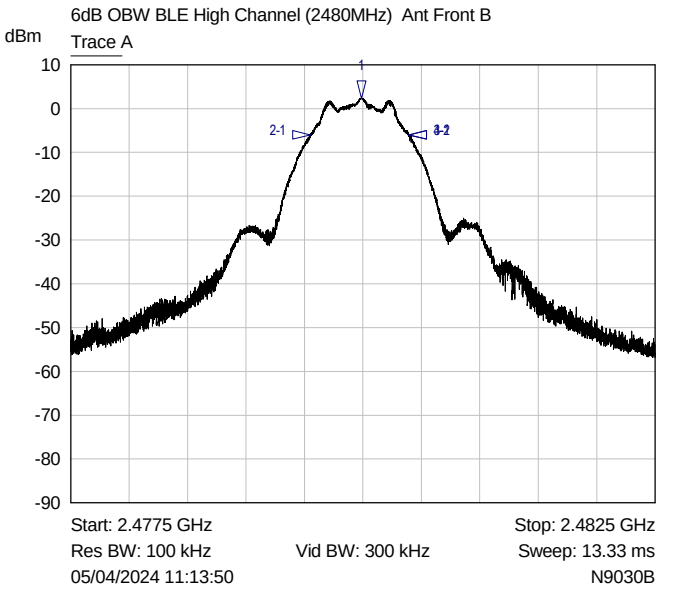
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Front B), Channel Spacing 2 MHz, Modulation OFDM, Channel 2440 MHz



Mkr	Trace	X-Axis	Value	Notes
1	Trace A	2.4400 GHz	2.72 dBm	
2-1	Trace A	-445.2500 kHz	-6.00 dBm	
3-1	Trace A	411.2500 kHz	-5.99 dBm	
4-2	Trace A	856.5000 kHz	0.01 dB	

Plot for 6 dB Bandwidth Result (kHz)

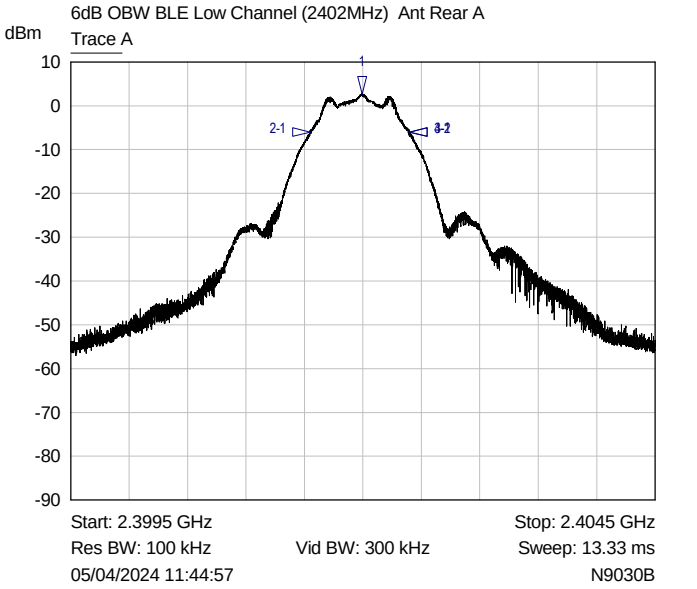
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Front B), Channel Spacing 2 MHz, Modulation OFDM, Channel 2480 MHz



Mkr	Trace	X-Axis	Value	Notes
1	Trace A	2.4800 GHz	2.38 dBm	
2-1	Trace A	-437.4500 kHz	-6.00 dBm	
3-1	Trace A	404.3500 kHz	-6.00 dBm	
4-2	Trace A	841.8000 kHz	0.00 dB	

Plot for 6 dB Bandwidth Result (kHz)

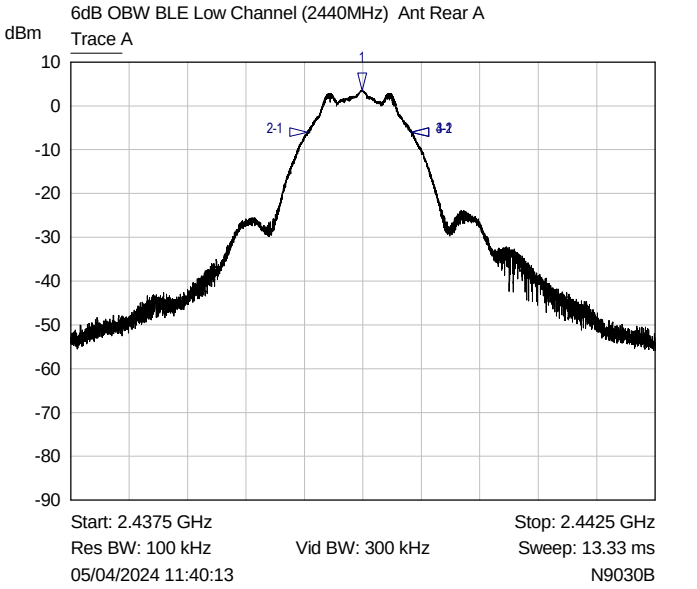
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2402 MHz



Mkr	Trace	X-Axis	Value	Notes
1	Trace A	2.4020 GHz	2.64 dBm	
2-1	Trace A	-441.9000 kHz	-6.01 dBm	
3-1	Trace A	409.0500 kHz	-6.01 dBm	
4-2	Trace A	850.9500 kHz	0.00 dB	

Plot for 6 dB Bandwidth Result (kHz)

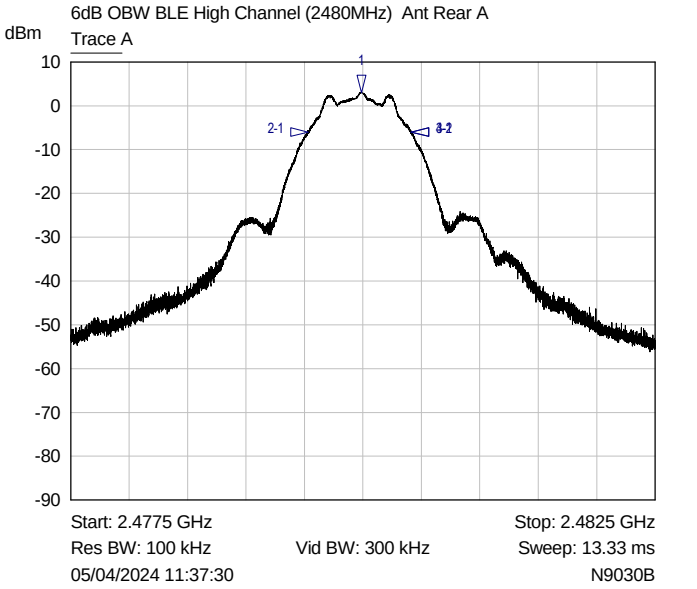
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2440 MHz



Mkr	Trace	X-Axis	Value	Notes
1	Trace A	2.4400 GHz	3.48 dBm	
2-1	Trace A	-467.3000 kHz	-6.01 dBm	
3-1	Trace A	422.9000 kHz	-5.99 dBm	
4-2	Trace A	890.2000 kHz	0.02 dB	

Plot for 6 dB Bandwidth Result (kHz)

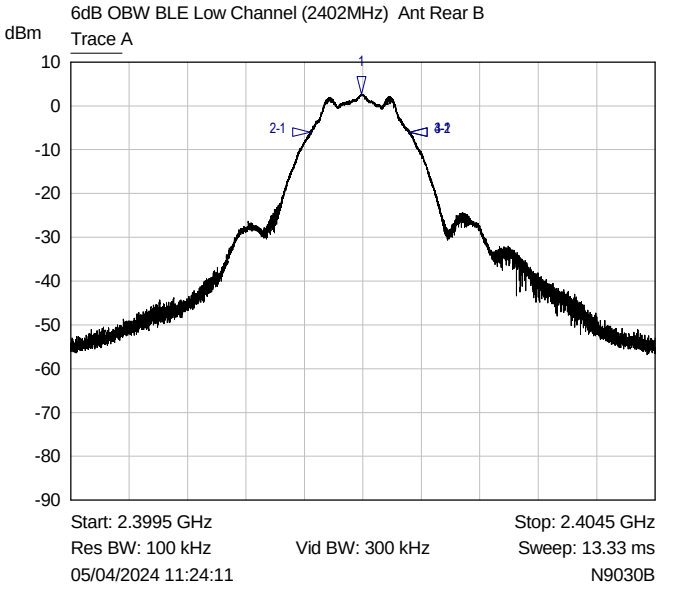
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2480 MHz



Mkr	Trace	X-Axis	Value	Notes
1	Trace A	2.4800 GHz	3.07 dBm	
2-1	Trace A	-458.7500 kHz	-5.99 dBm	
3-1	Trace A	426.1500 kHz	-6.01 dBm	
4-2	Trace A	884.9000 kHz	-0.01 dB	

Plot for 6 dB Bandwidth Result (kHz)

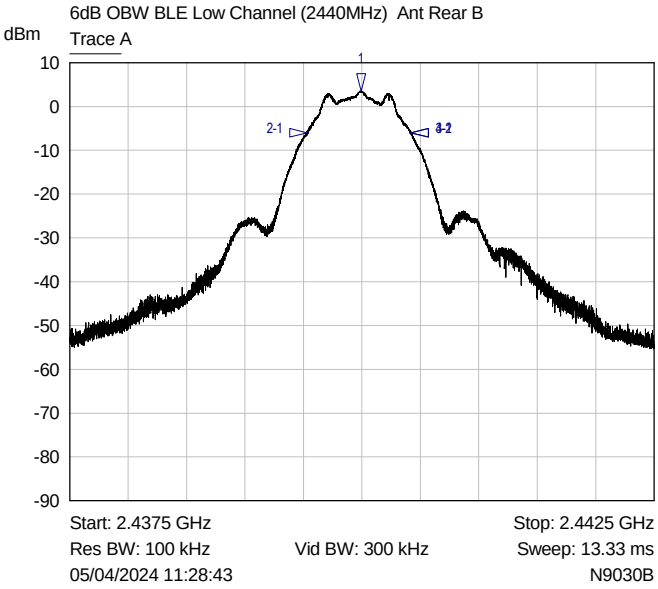
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear B), Channel Spacing 2 MHz, Modulation OFDM, Channel 2402 MHz



Mkr	Trace	X-Axis	Value	Notes
1	Trace A	2.4020 GHz	2.58 dBm	
2-1	Trace A	-441.4500 kHz	-6.00 dBm	
3-1	Trace A	408.0000 kHz	-6.00 dBm	
4-2	Trace A	849.4500 kHz	0.00 dB	

Plot for 6 dB Bandwidth Result (kHz)

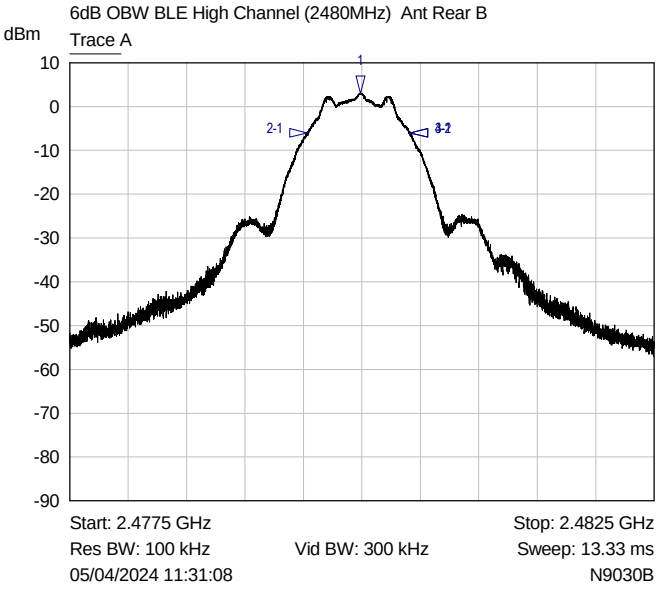
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear B), Channel Spacing 2 MHz, Modulation OFDM, Channel 2440 MHz



Mkr	Trace	X-Axis	Value	Notes
1	Trace A	2.4400 GHz	3.50 dBm	
2-1	Trace A	-464.9000 kHz	-6.00 dBm	
3-1	Trace A	427.4500 kHz	-5.99 dBm	
4-2	Trace A	892.3500 kHz	0.01 dB	

Plot for 6 dB Bandwidth Result (kHz)

RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear B), Channel Spacing 2 MHz, Modulation OFDM, Channel 2480 MHz

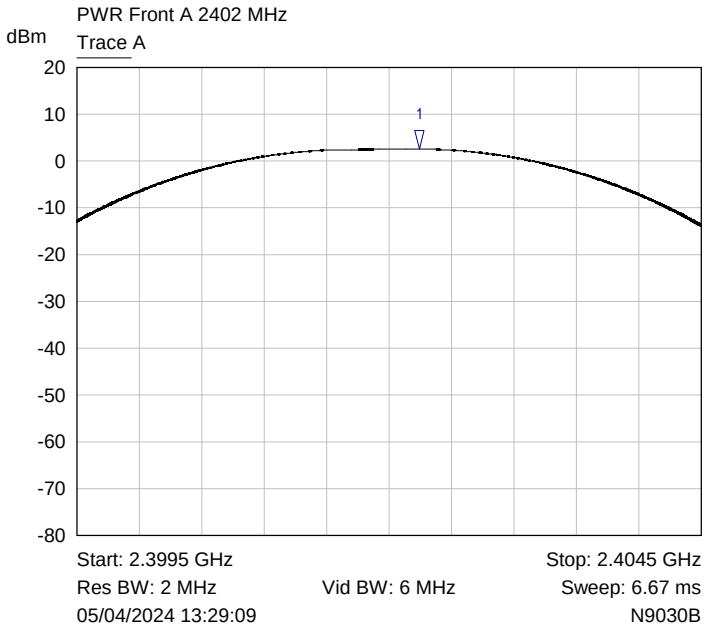


Mkr	Trace	X-Axis	Value	Notes
1	Trace A	2.4800 GHz	3.05 dBm	
2-1	Trace A	-457.0000 kHz	-6.01 dBm	
3-1	Trace A	423.7500 kHz	-6.00 dBm	
4-2	Trace A	880.7500 kHz	0.01 dB	

Plot for 6 dB Bandwidth Result (kHz)

6.9 Maximum Peak conducted output power

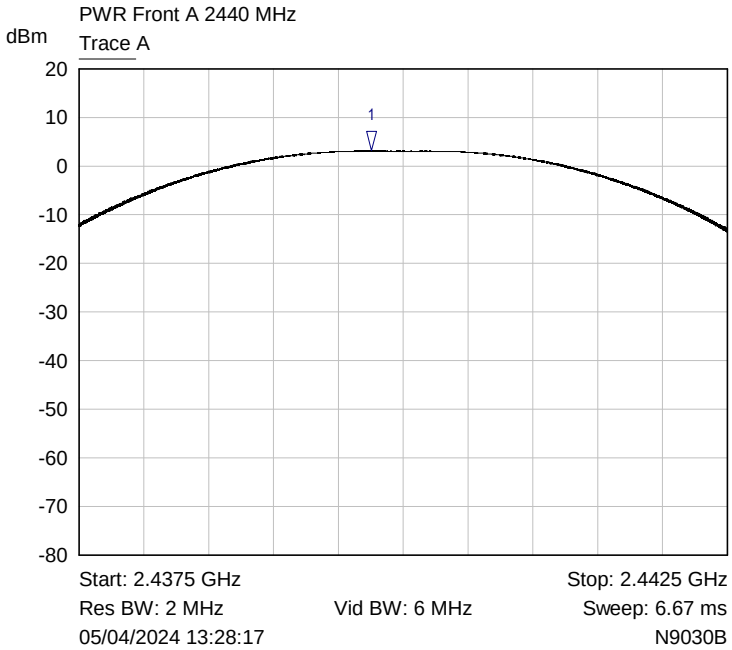
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Front A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2402 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4022 GHz	2.51 dBm	

Single port Plot reference

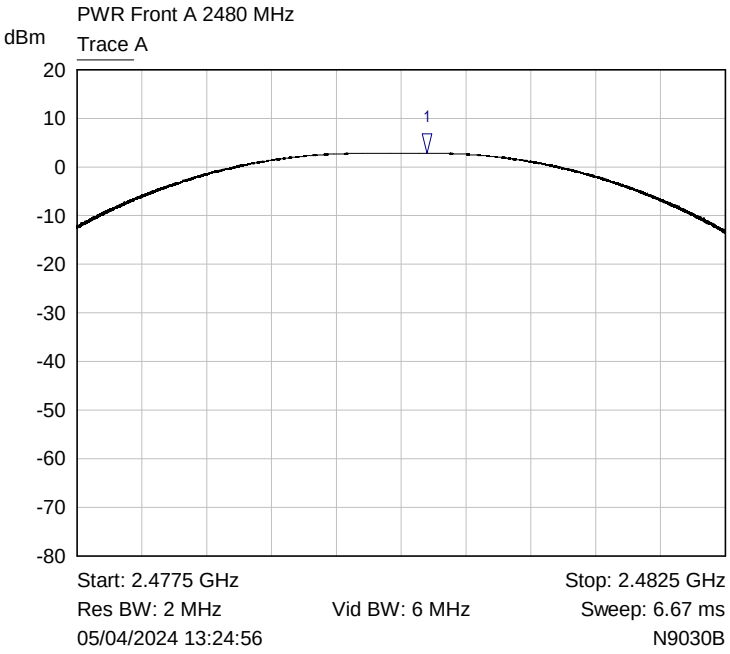
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Front A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2440 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4398 GHz	3.10 dBm	

Single port Plot reference

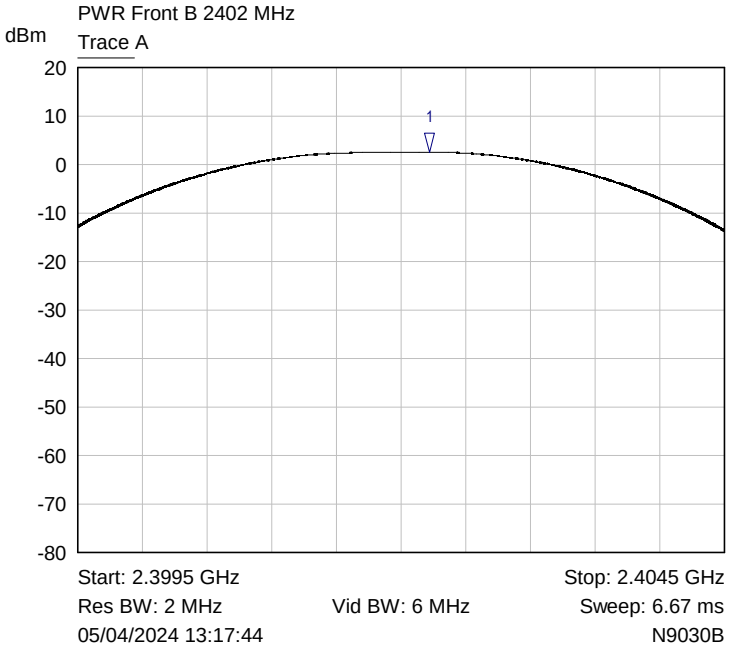
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Front A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2480 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4802 GHz	2.83 dBm	

Single port Plot reference

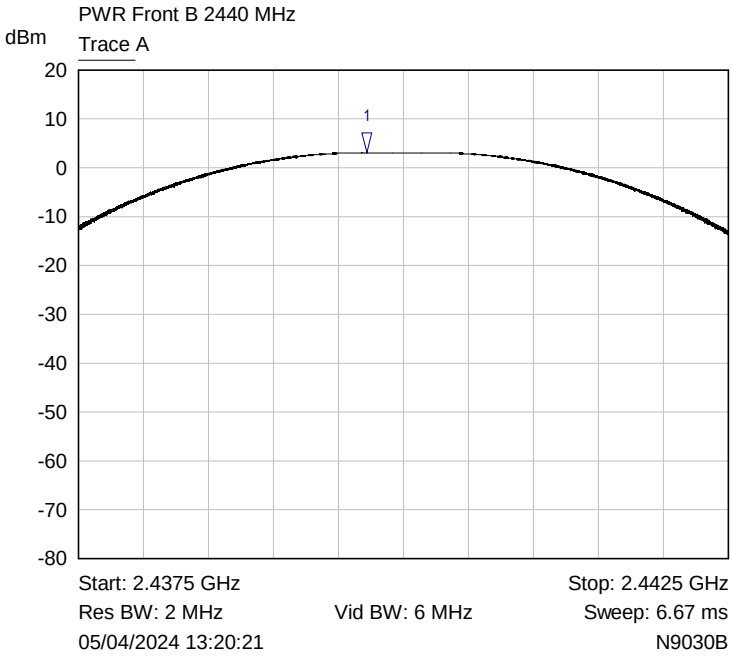
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Front B), Channel Spacing 2 MHz, Modulation OFDM, Channel 2402 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4022 GHz	2.55 dBm	

Single port Plot reference

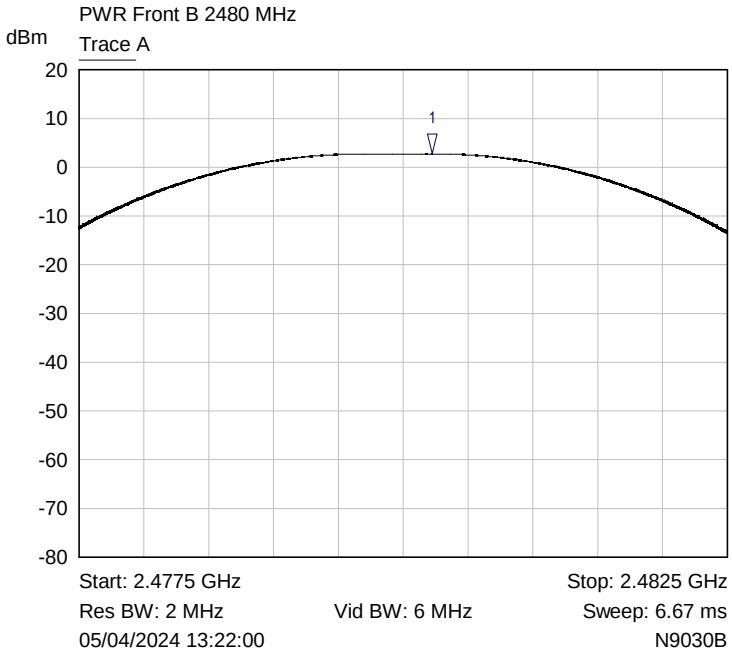
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Front B), Channel Spacing 2 MHz, Modulation OFDM, Channel 2440 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4397 GHz	3.08 dBm	

Single port Plot reference

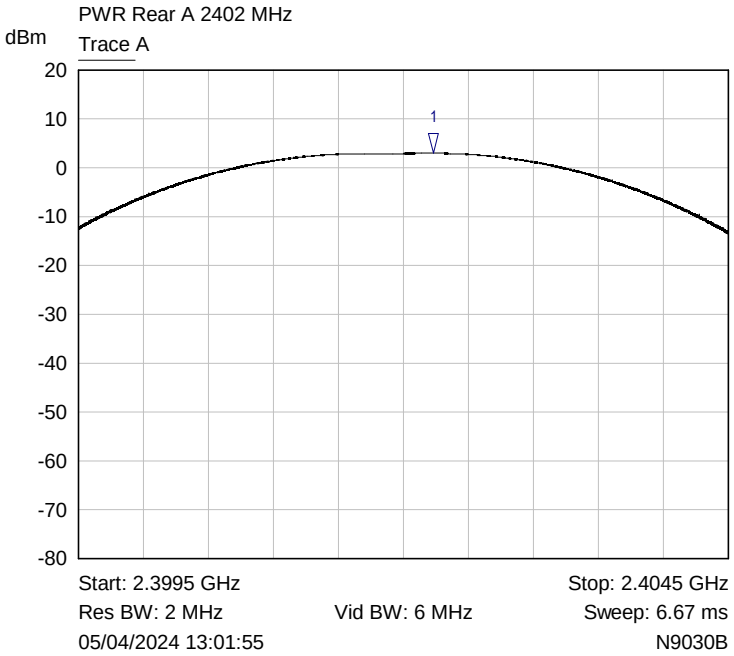
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Front B), Channel Spacing 2 MHz, Modulation OFDM, Channel 2480 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4802 GHz	2.75 dBm	

Single port Plot reference

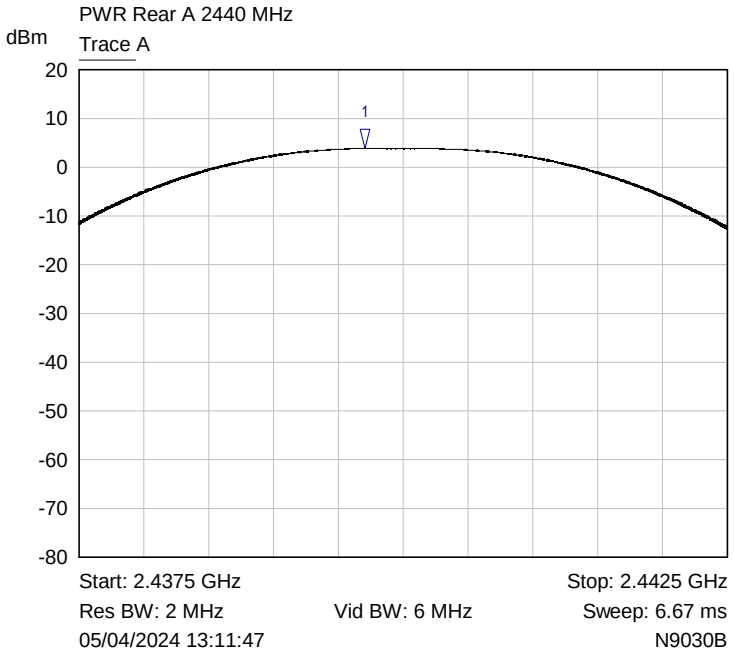
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2402 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4022 GHz	2.95 dBm	

Single port Plot reference

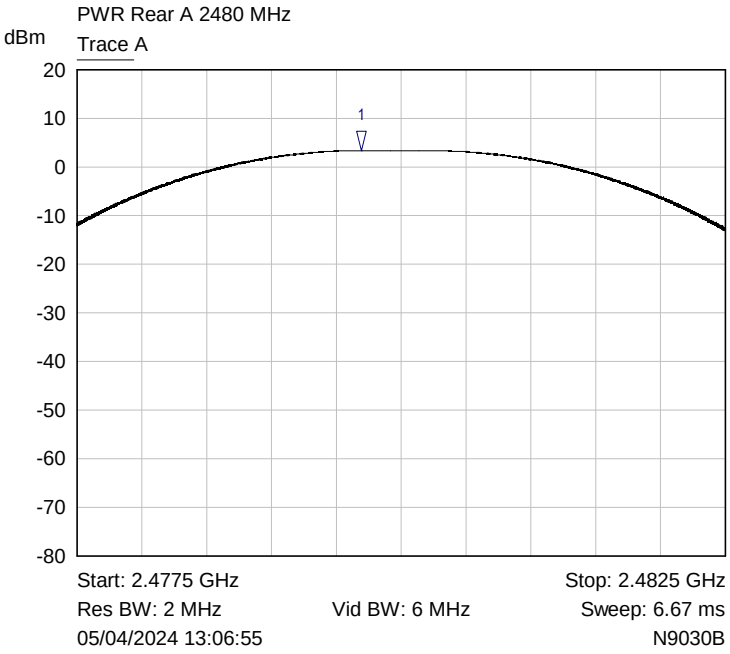
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2440 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4397 GHz	3.80 dBm	

Single port Plot reference

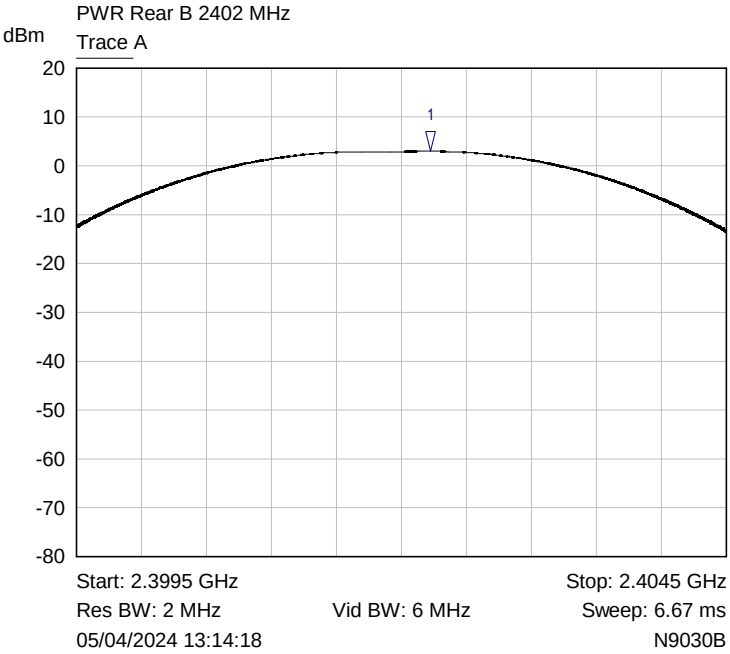
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2480 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4797 GHz	3.36 dBm	

Single port Plot reference

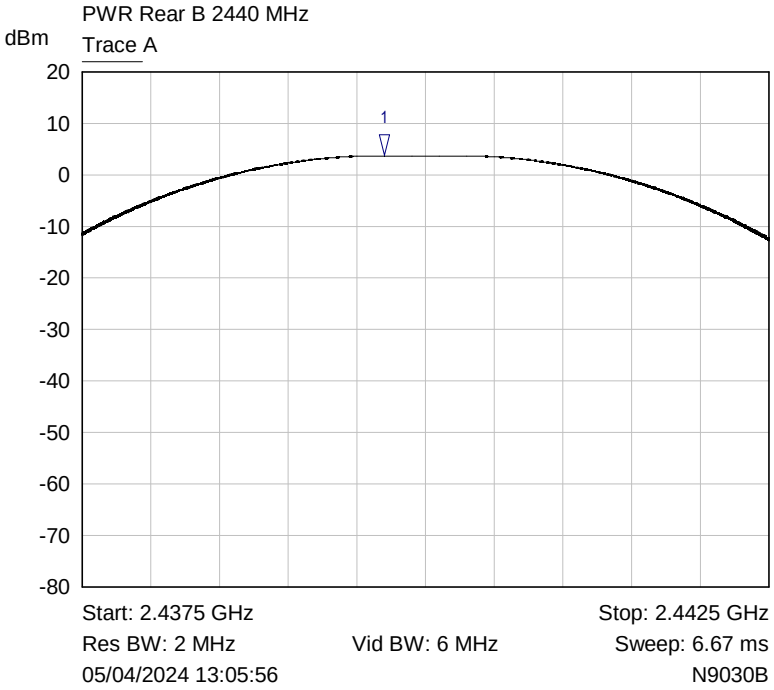
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear B), Channel Spacing 2 MHz, Modulation OFDM, Channel 2402 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4022 GHz	2.95 dBm	

Single port Plot reference

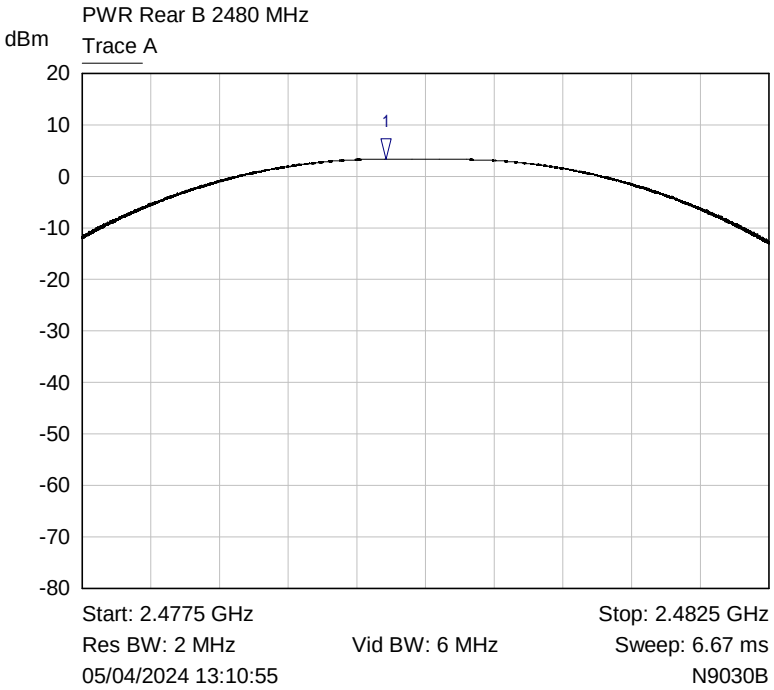
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear B), Channel Spacing 2 MHz, Modulation OFDM, Channel 2440 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4397 GHz	3.75 dBm	

Single port Plot reference

RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear B), Channel Spacing 2 MHz, Modulation OFDM, Channel 2480 MHz

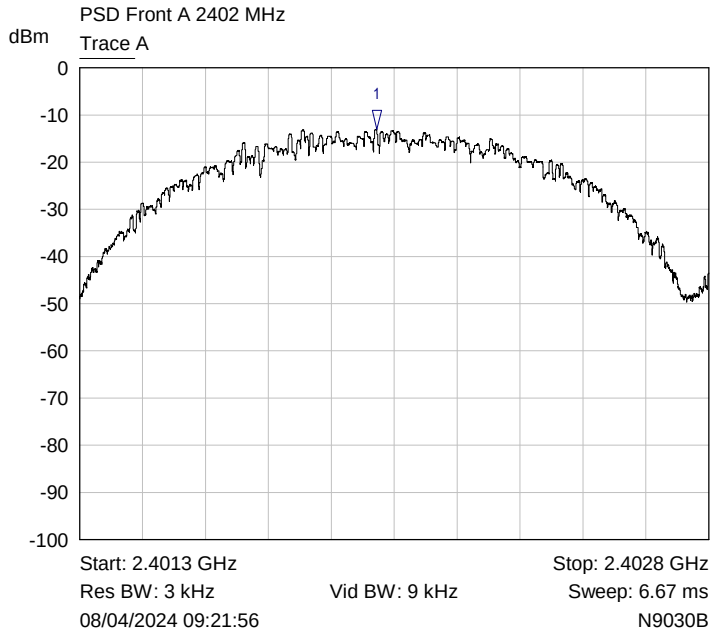


Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4797 GHz	3.35 dBm	

Single port Plot reference

6.10 Maximum Power Spectral Density

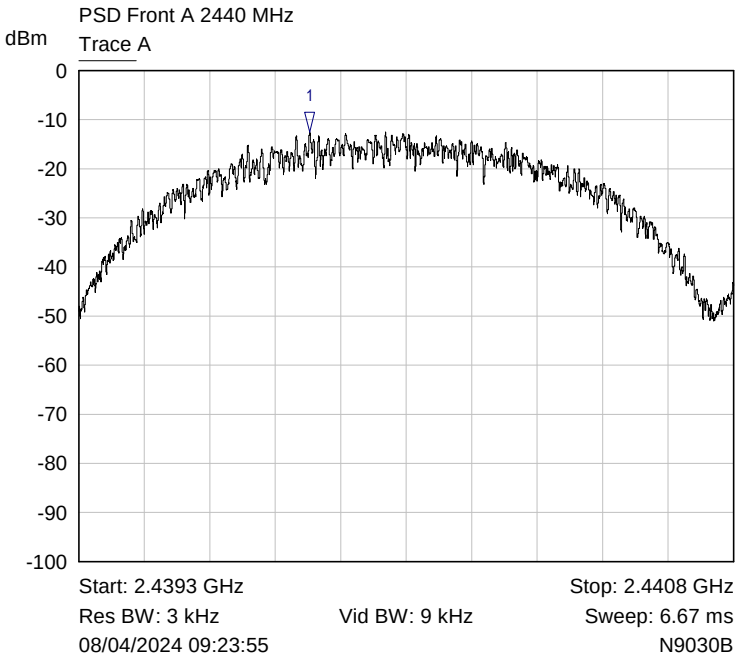
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Front A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2402 MHz



Mkr	Trace	X-Axis	Value	Notes
1	Trace A	2.4020 GHz	-13.04 dBm	

RF Ant port 1 PSD Plot reference

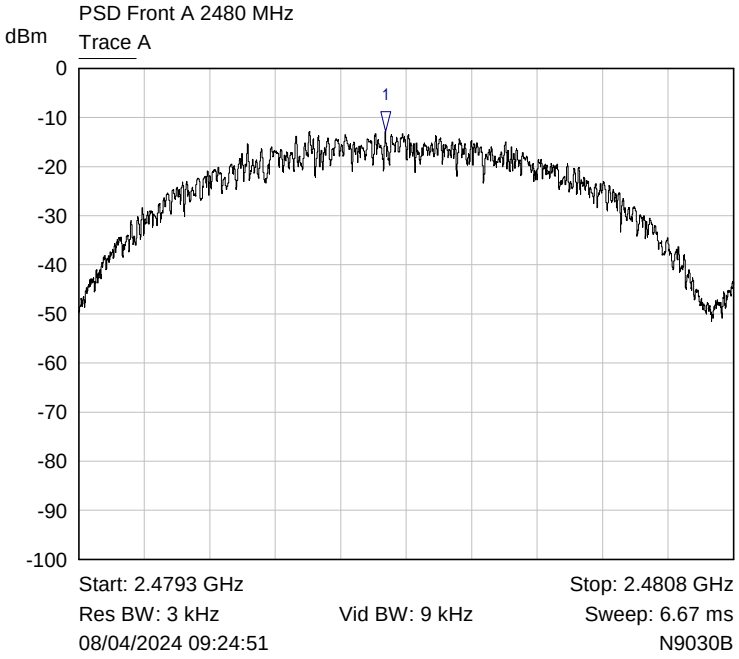
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Front A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2440 MHz



Mkr	Trace	X-Axis	Value	Notes
1	Trace A	2.4398 GHz	-12.57 dBm	

RF Ant port 1 PSD Plot reference

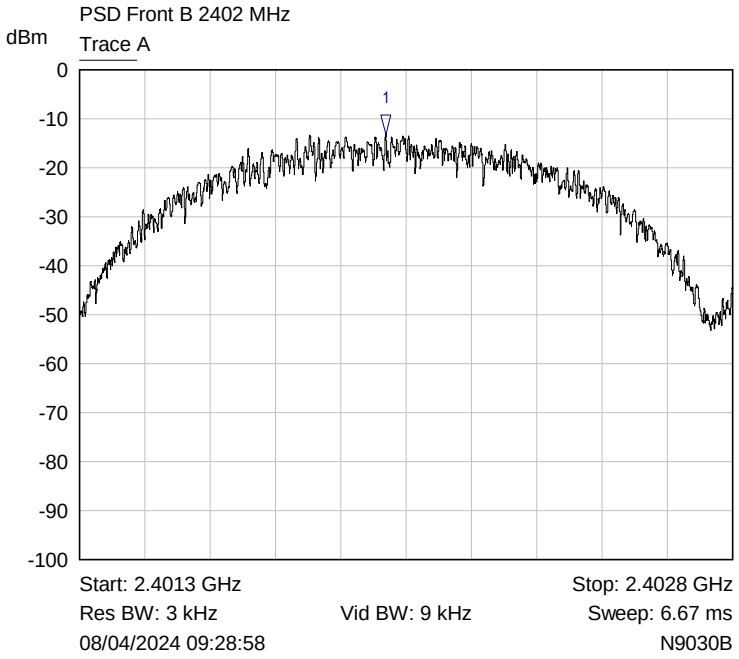
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Front A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2480 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4800 GHz	-12.80 dBm	

RF Ant port 1 PSD Plot reference

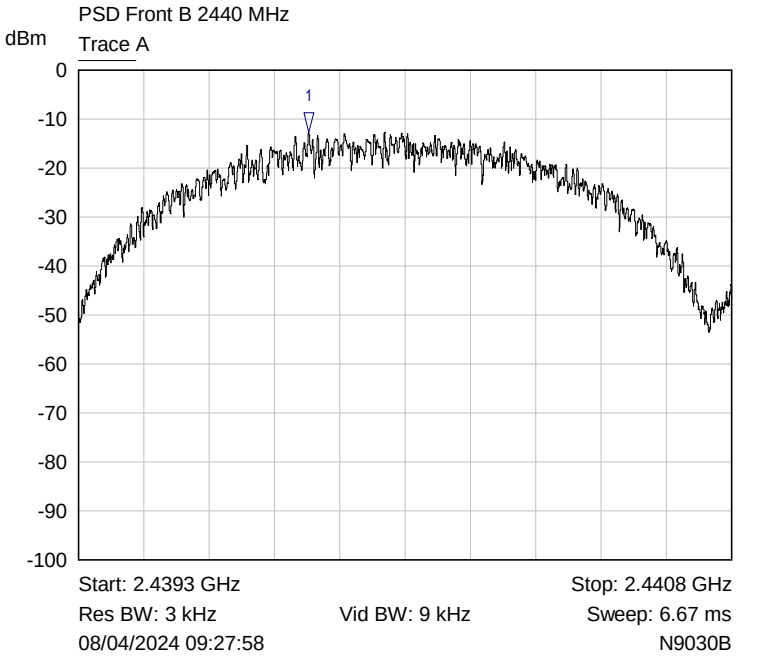
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Front B), Channel Spacing 2 MHz, Modulation OFDM, Channel 2402 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4020 GHz	-13.20 dBm	

RF Ant port 1 PSD Plot reference

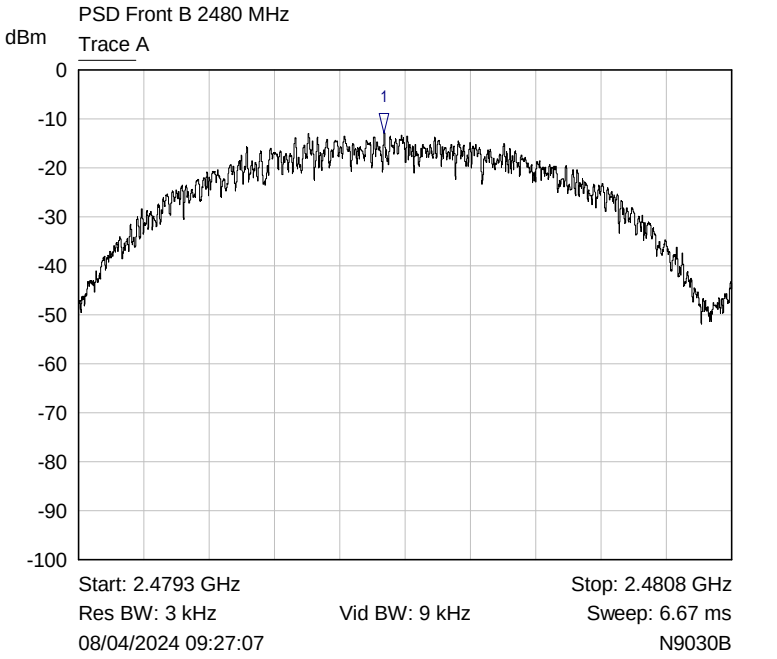
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Front B), Channel Spacing 2 MHz, Modulation OFDM, Channel 2440 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4398 GHz	-12.68 dBm	

RF Ant port 1 PSD Plot reference

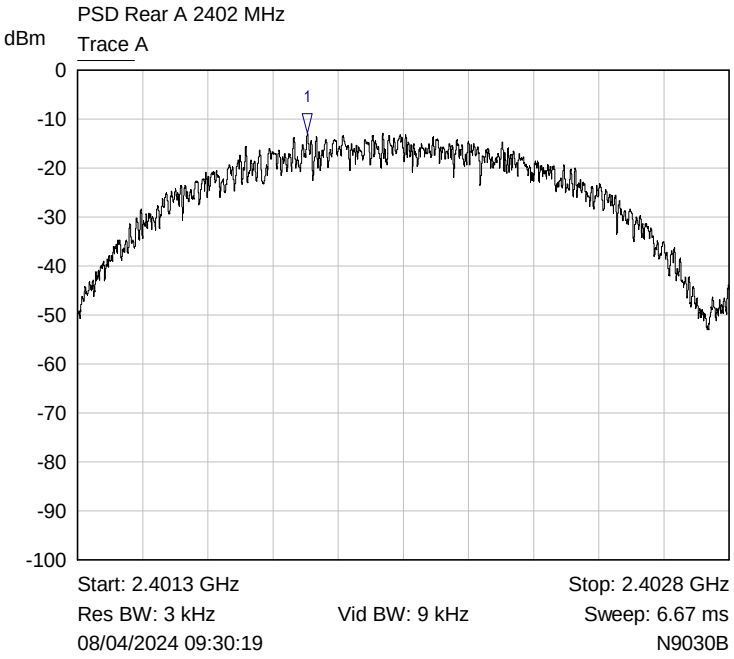
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Front B), Channel Spacing 2 MHz, Modulation OFDM, Channel 2480 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4800 GHz	-12.90 dBm	

RF Ant port 1 PSD Plot reference

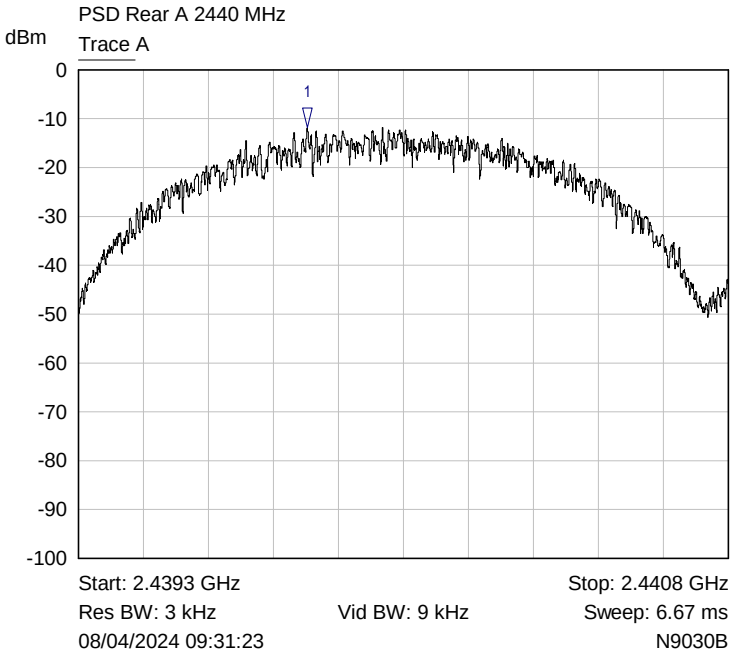
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2402 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4018 GHz	-12.83 dBm	

RF Ant port 1 PSD Plot reference

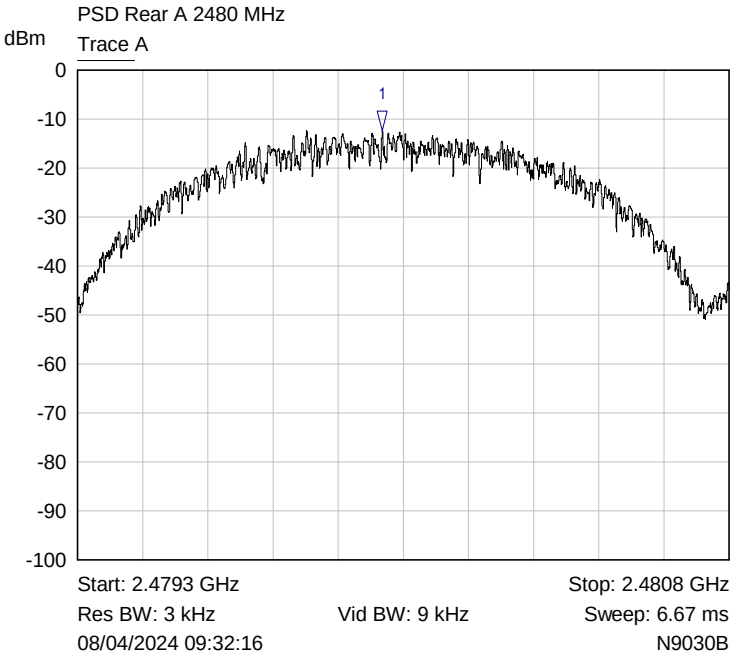
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2440 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4398 GHz	-11.89 dBm	

RF Ant port 1 PSD Plot reference

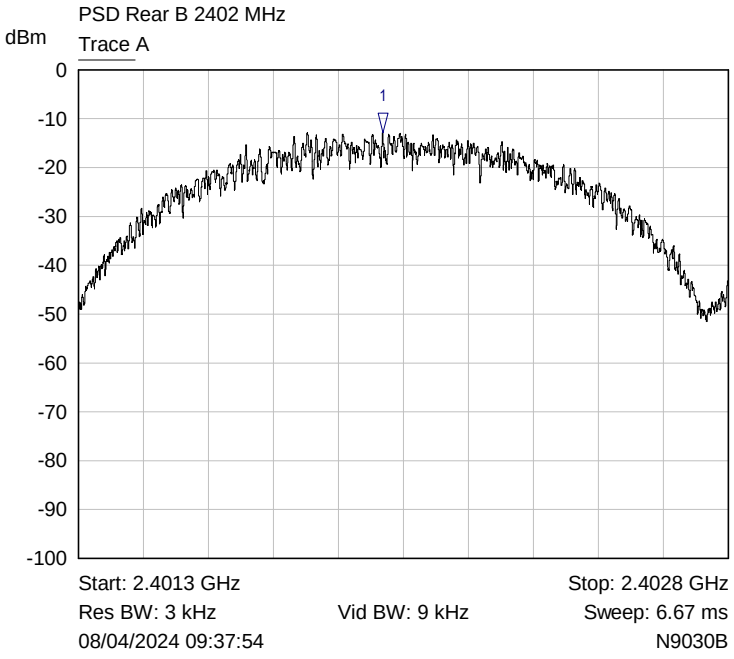
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear A), Channel Spacing 2 MHz, Modulation OFDM, Channel 2480 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4800 GHz	-12.29 dBm	

RF Ant port 1 PSD Plot reference

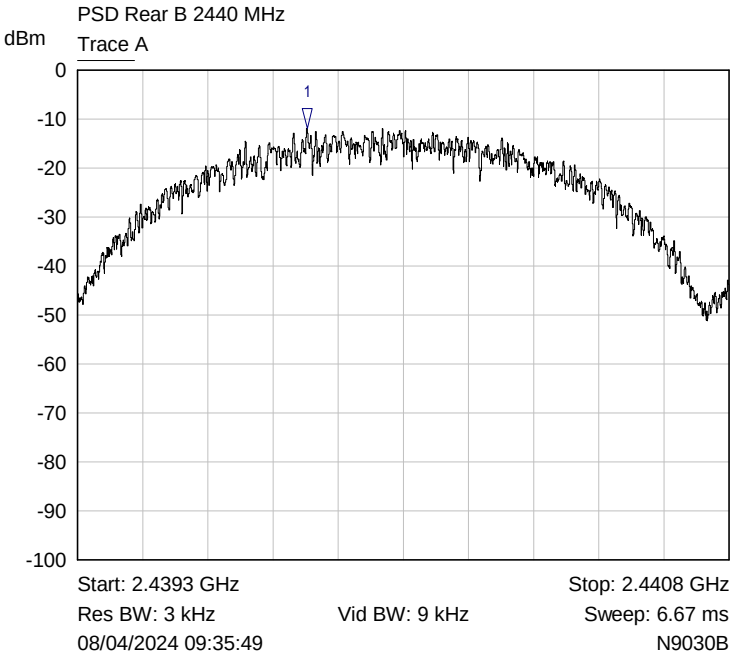
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear B), Channel Spacing 2 MHz, Modulation OFDM, Channel 2402 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4020 GHz	-12.76 dBm	

RF Ant port 1 PSD Plot reference

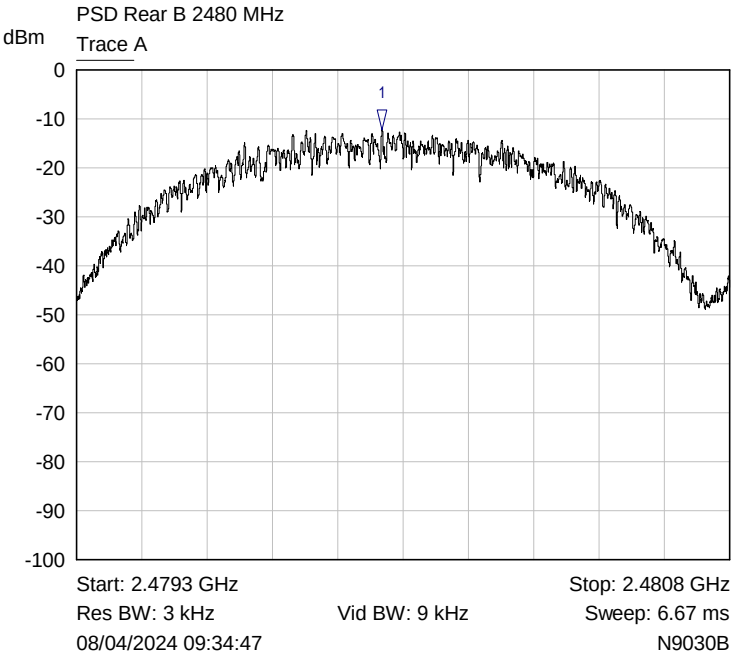
RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear B), Channel Spacing 2 MHz, Modulation OFDM, Channel 2440 MHz



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4398 GHz	-11.86 dBm	

RF Ant port 1 PSD Plot reference

RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear B), Channel Spacing 2 MHz, Modulation OFDM, Channel 2480 MHz

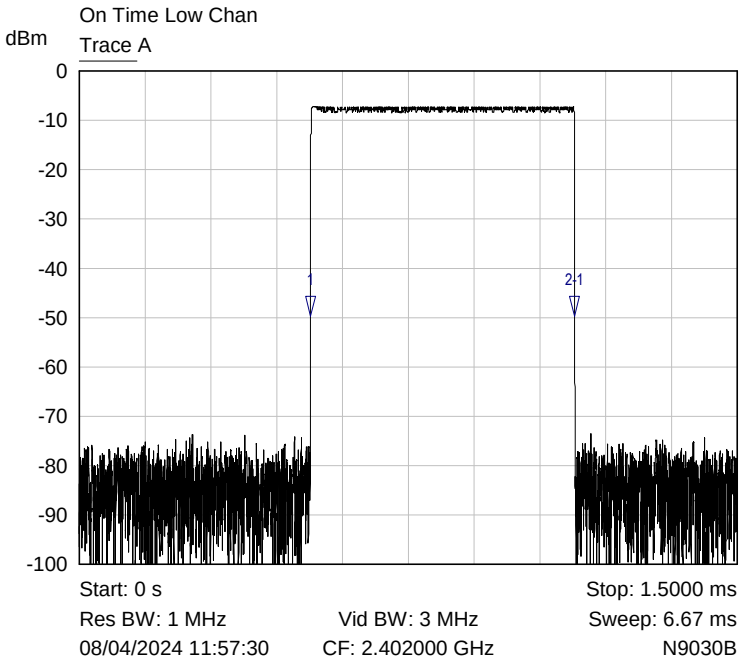


Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4800 GHz	-12.21 dBm	

RF Ant port 1 PSD Plot reference

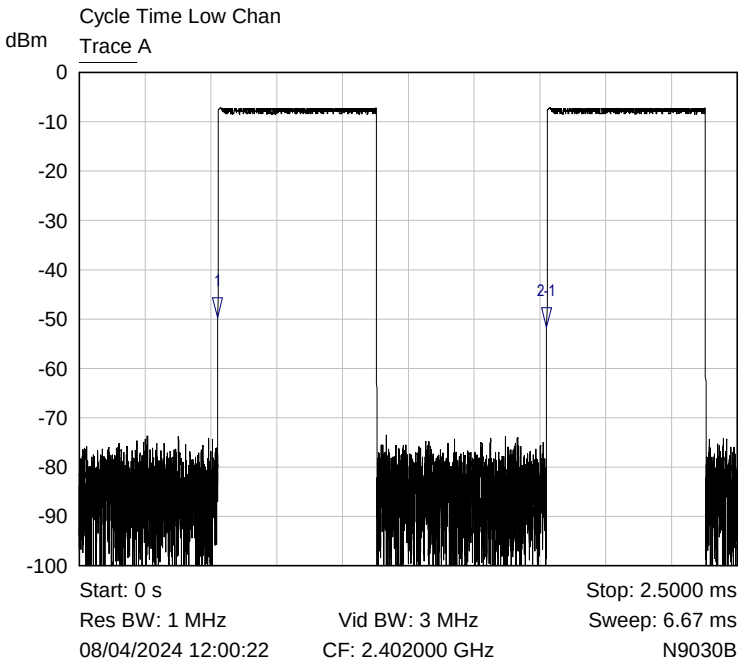
6.11 Duty cycle

RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear A), Channel Spacing 2 MHz, Modulation OFDM



Mkr	Trace	X-Axis	Value	Notes
1	Trace A	526.5333 us	-49.66 dBm	
2-1	Trace A	602.6667 us	-49.62 dBm	

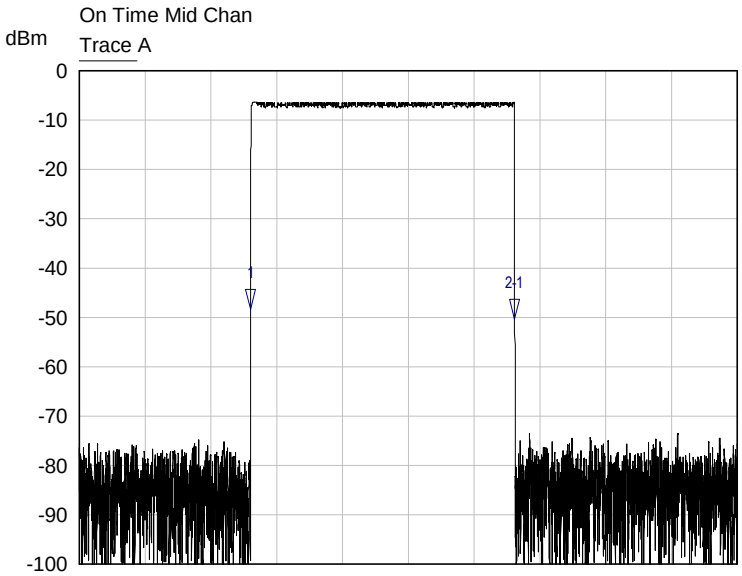
TX on time (ms)



Mkr	Trace	X-Axis	Value	Notes
1	Trace A	526.5333 us	-49.66 dBm	
2-1	Trace A	1.2500 ms	-51.65 dBm	

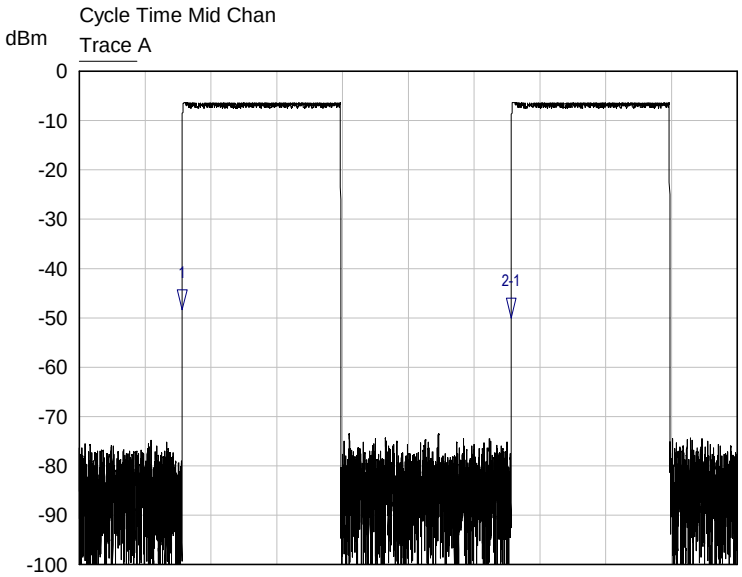
TX repetition time (S)

RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear A), Channel Spacing 2 MHz, Modulation OFDM



Mkr	Trace	X-Axis	Value	Notes
1	Trace A	390.0667 us	-48.29 dBm	
2-1	Trace A	602.6667 us	-50.38 dBm	

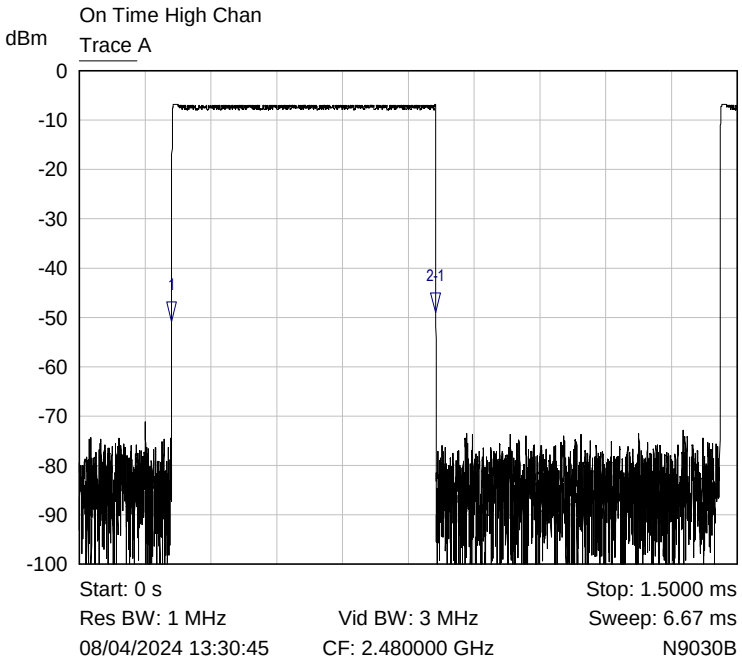
TX on time (ms)



Mkr	Trace	X-Axis	Value	Notes
1	Trace A	390.0667 us	-48.29 dBm	
2-1	Trace A	1.2500 ms	-49.97 dBm	

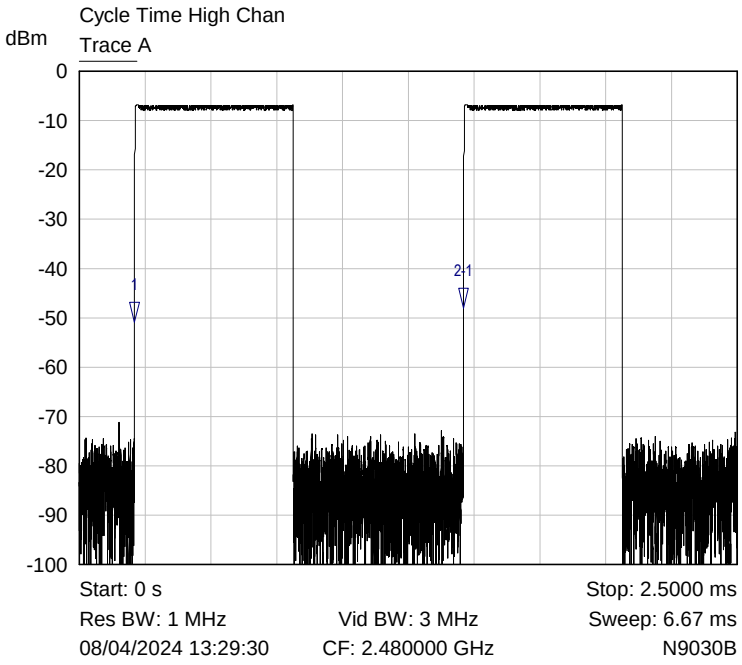
TX repetition time (S)

RF Parameters: Band 2400-2483.5 MHz, Power 8 dBm set internal (Port Rear A), Channel Spacing 2 MHz, Modulation OFDM



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	210.0667 us	-50.88 dBm	
2-1 ▽	Trace A	602.6667 us	-49.07 dBm	

TX on time (ms)



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	210.0667 us	-50.88 dBm	
2-1 ▽	Trace A	1.2501 ms	-47.97 dBm	

TX repetition time (S)

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 (dBuV)	Pk – Lim 1 (dB)	QP Amp (dBuV)	QP - Lim1 (dB)	Av Amp (dBuV)	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 (dBμV) is the level of received signal that was measured in dB above 1μV 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 (dBμV) is the level of received signal that was measured in dB above 1μV 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 (dBμV) is the level of received signal that was measured in dB above 1μV 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 μV/m at a specified distance), whereas the measured values are expressed as peak, quasi peak or average values in dBμV/m referenced to the measuring instrument inputs. Kiwa Electrical Compliance 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 μV/m equates to 20.log (500) = 54 dB μV/m.

(b) limit of 300 μV/m at 10m equates to 20.log (300 . 10/3) = 60 dB μV/m at 3m

(c) limit of 30 μV/m at 30m, but below 30MHz, equates to 20.log(30) + 40.log(30/3) = 69.5 dBμV/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: $E_{Linear} = 10^{((E_{log}-120)/20)}$
And therefore equation 21 transposed is: $E_{Log} = 20xLog(E_{Linear}) +120$
Where:
E_{Linear} is the field strength of the emission in V/m
E_{Log} is the field strength of the emissions in dBµV/m

Equation 22: $EIRP = E_{Meas} + 20log(d_{Meas}) -104.7$
Where:
EIRP is equivalent isotropically radiated power in dBm
E_{Meas} is the field strength of the emission at the measurement distance in dBµV/m
d_{Meas} is the measurement distance in metres

Equation 25: $PD = EIRP_{Linear} / 4\pi d^2$
And therefore equation 25 transposed is: $EIRP_{Linear} = PD \times 4\pi d^2$
Where:
PD is the power density at distance specified by the limit, in W/m^2
$EIRP_{Linear}$ is the equivalent isotropically radiated power in Watts
d is the distance at which the power density limit is specified in metres

Equation 26: $PD = E^2_{Speclimit} / 377$
And therefore equation 26 transposed is: $E_{Spec\ limit} = \sqrt{(PD \times 377)}$
Where:
PD is the power density at distance specified by the limit, in W/m^2
$E_{spec\ limit}$ is the field strength at the distance specified by the limit in V/m

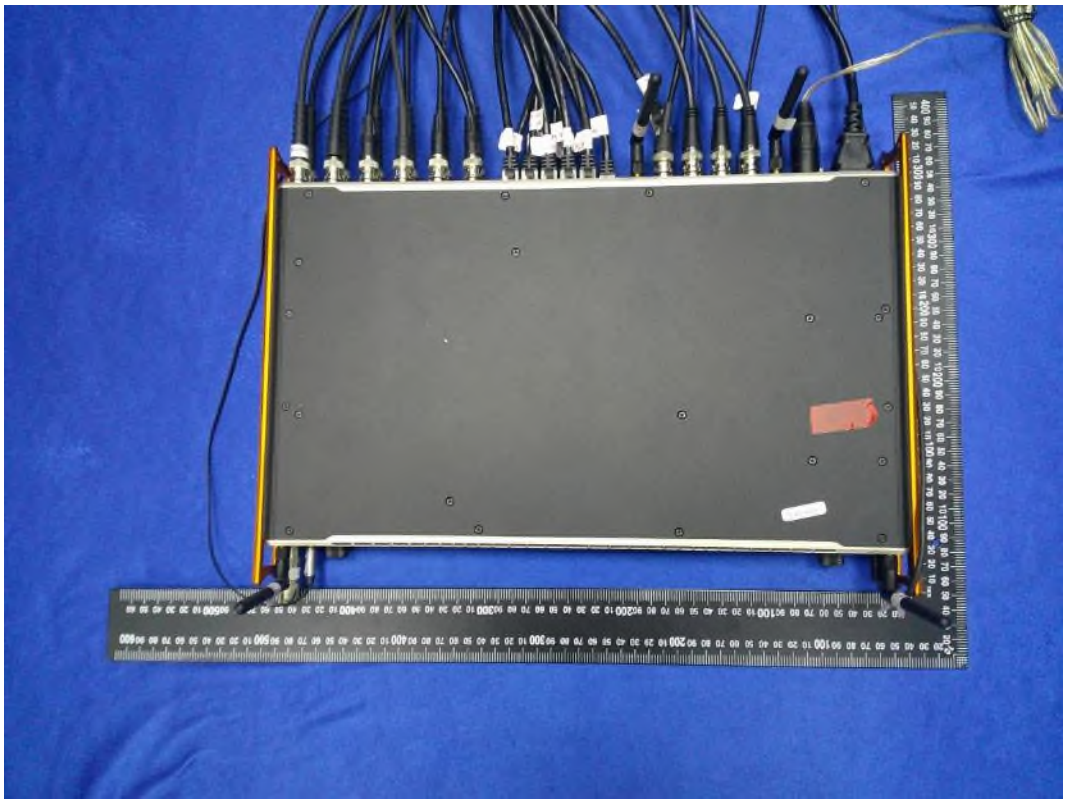
Example:
Radiated spurious emissions limit at 3metres of $90pW/cm^2$.

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

Equation 25 transposed: $0.9 \times 10^{-6} \times 4 \times \pi \times 3^2 = 0.0001017876$ W
And
Equation 26 transposed: $E_{Spec\ limit} = \sqrt{(0.9x10^{-6} \times 377)} = 0.01842$ V/m.
And
Equation 21 transposed: $E_{Log} = 20Log(0.01842) +120 = 85.3dB\mu V/m$ @ 3m.

8 Photographs

8.1 EUT Front View



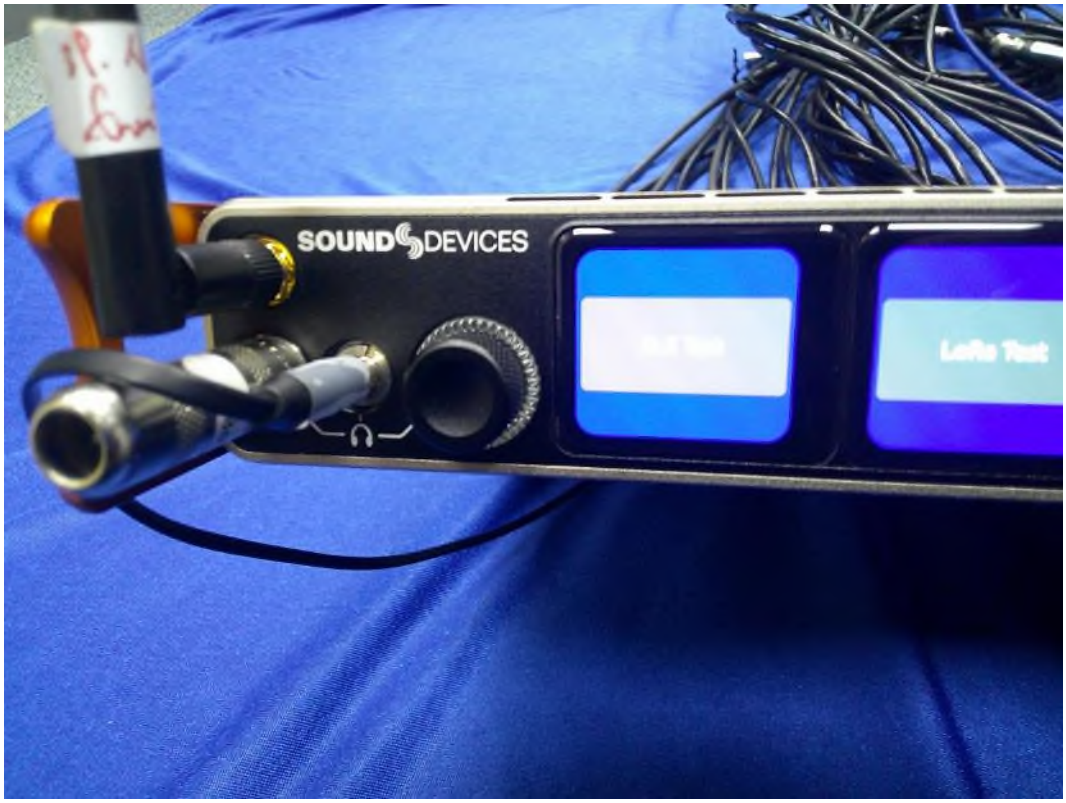
8.2 EUT Reverse Angle

8.3 EUT Left side View

8.4 EUT Right side View

8.5 EUT Antenna

8.6 EUT Display & Controls

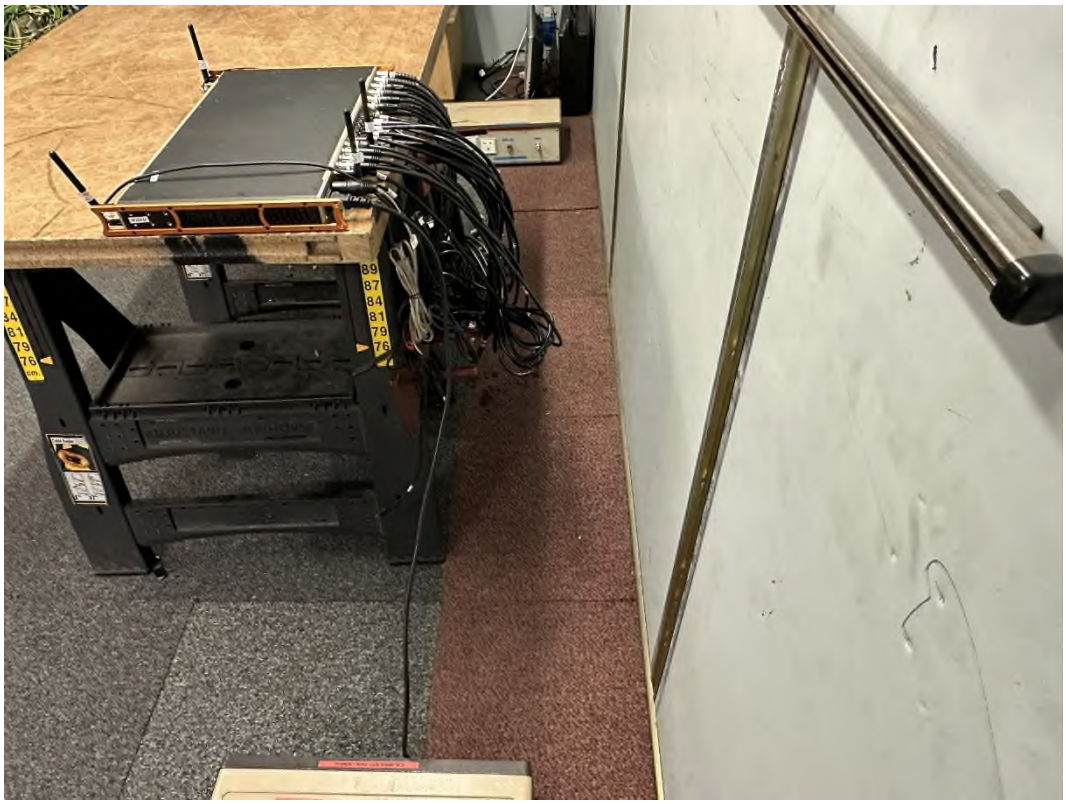


8.7 EUT Internal photos

Due to the complexity of the EUT no internal photographs were taken.

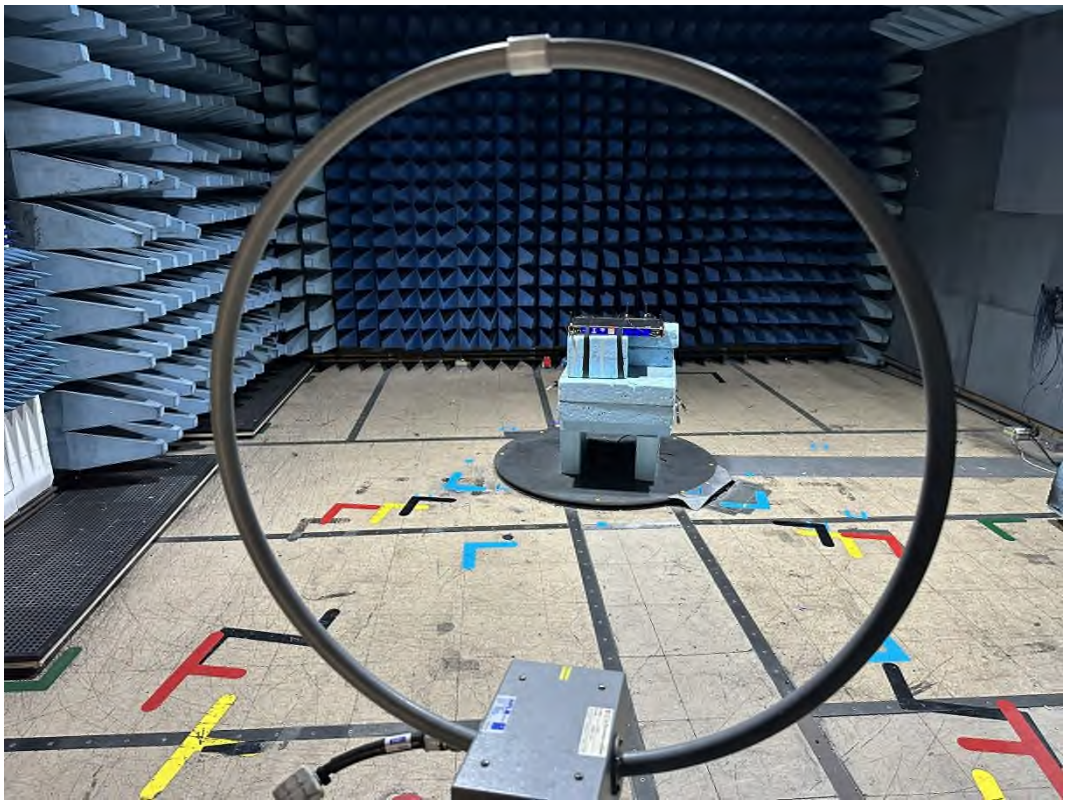
8.8 EUT ID Label

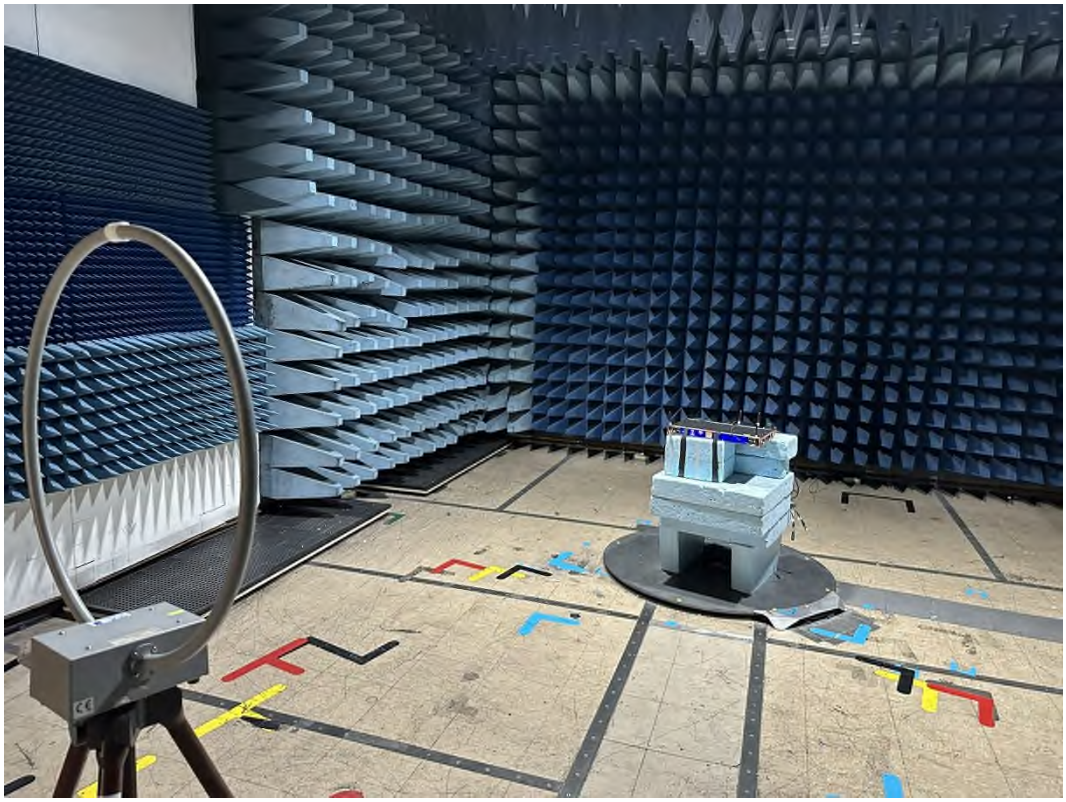
8.9 AC power line conducted emissions



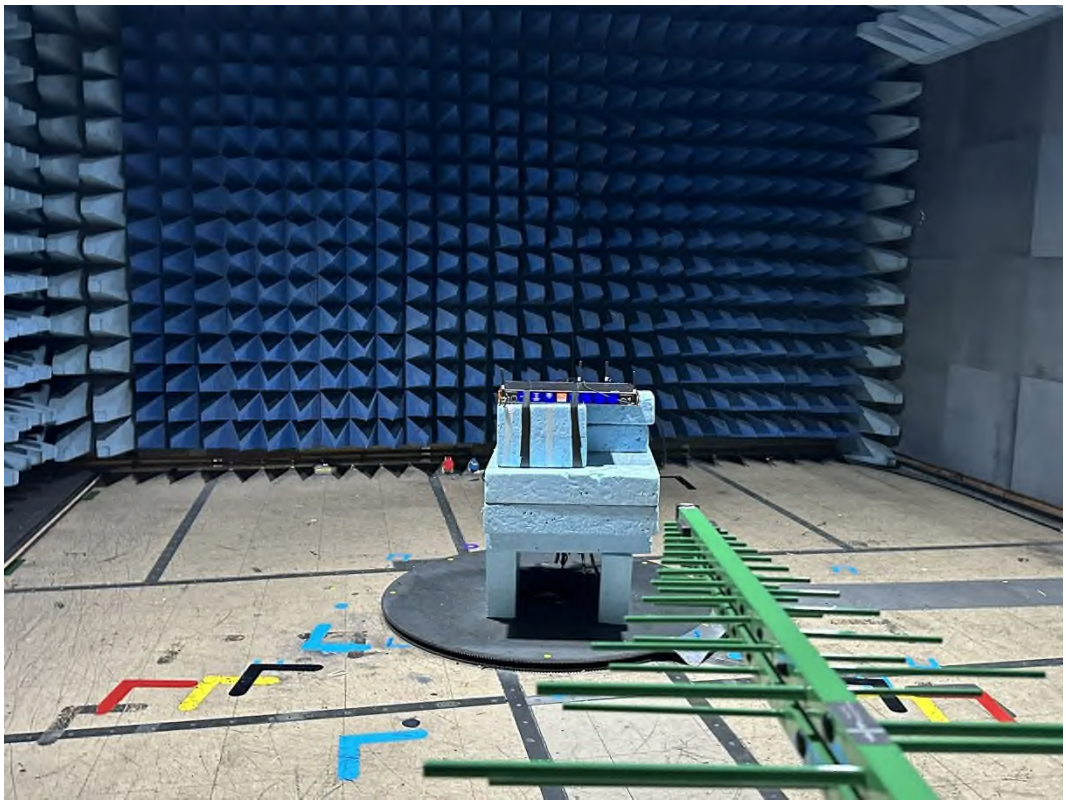
EUT powered via DC port using a bench power supply

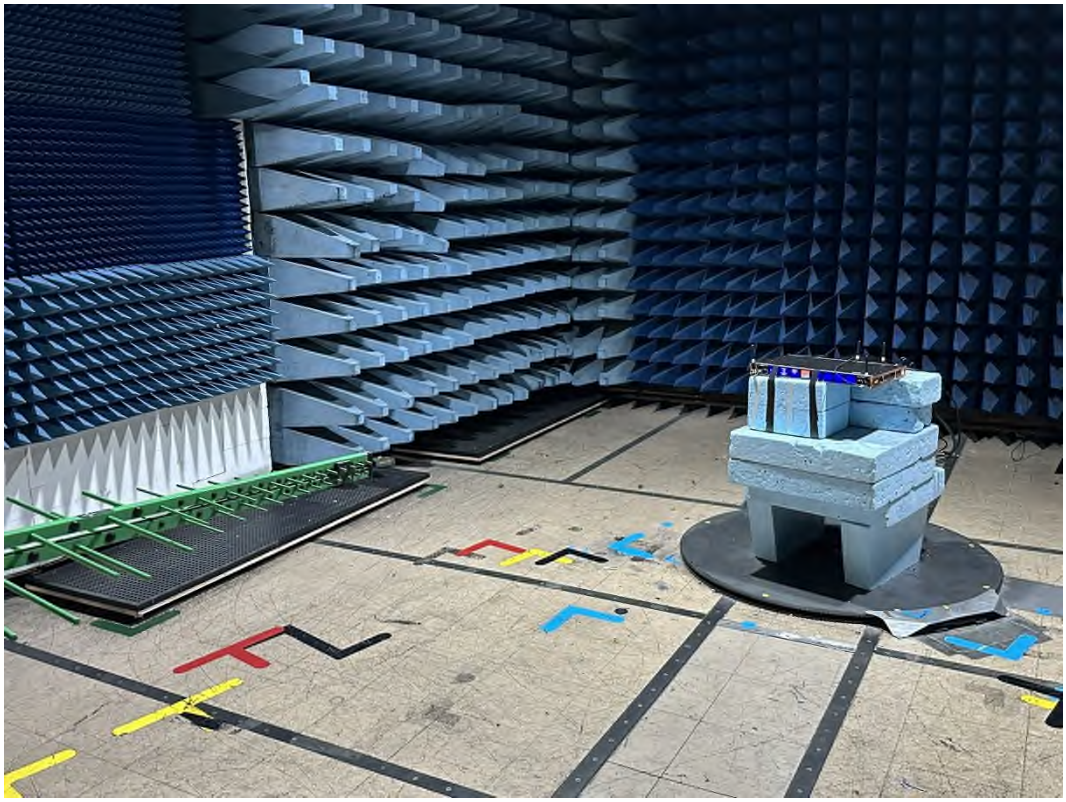
8.10 Radiated emissions 150 kHz - 30 MHz



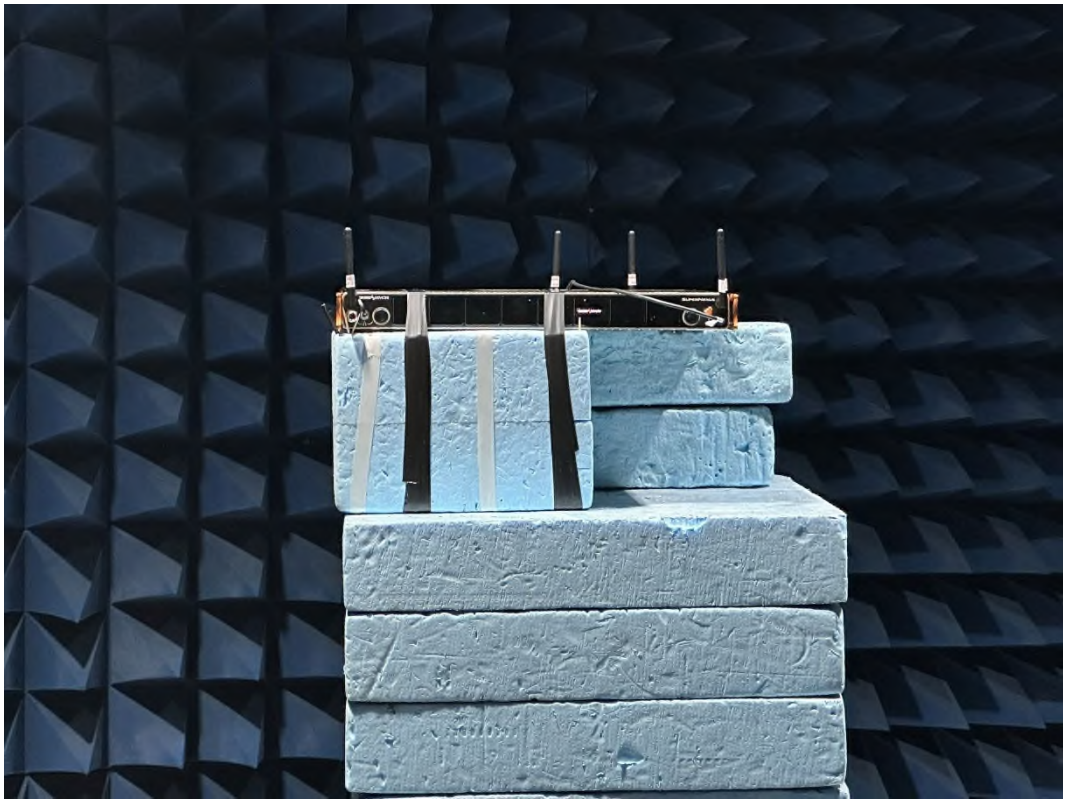


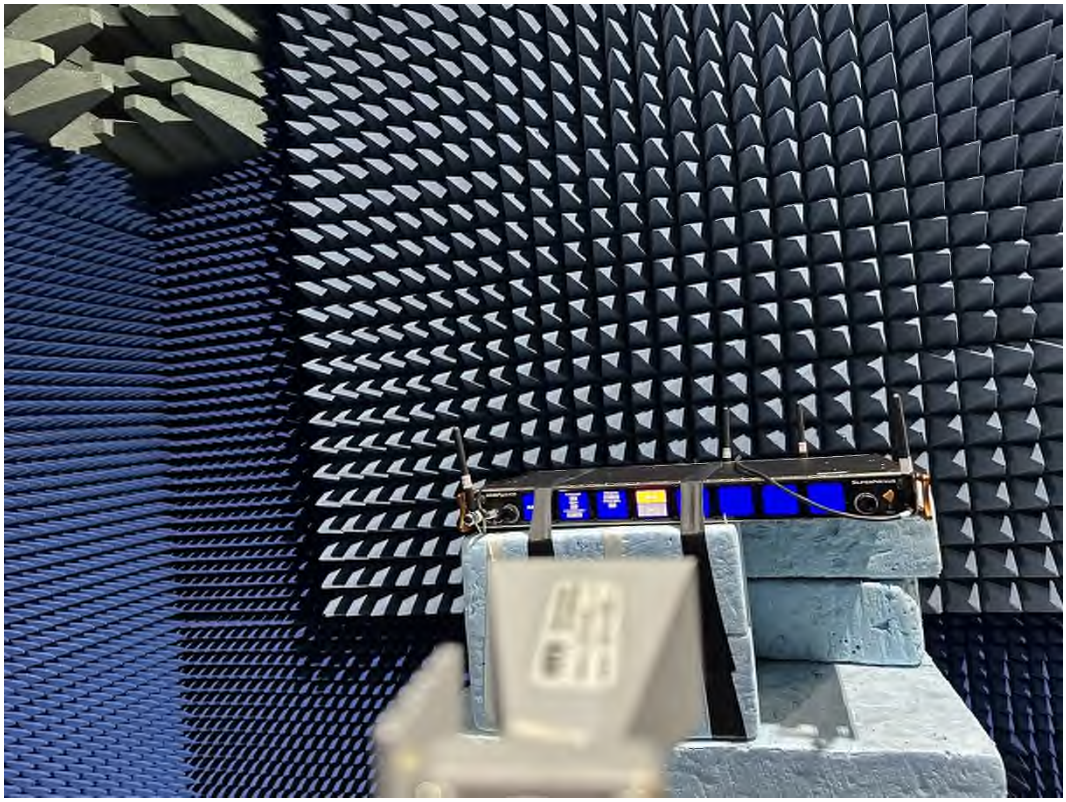
8.11 Radiated emissions 30 MHz -1 GHz

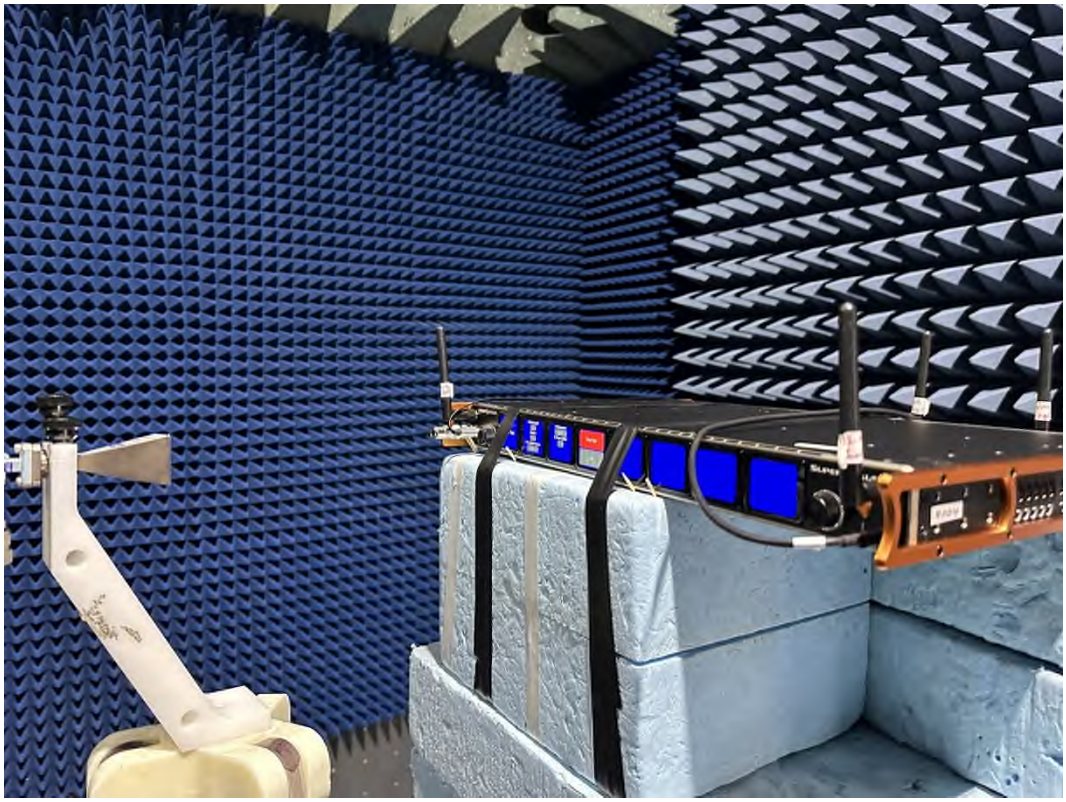




8.12 Radiated emissions above 1 GHz







8.13 Radiated emission diagrams

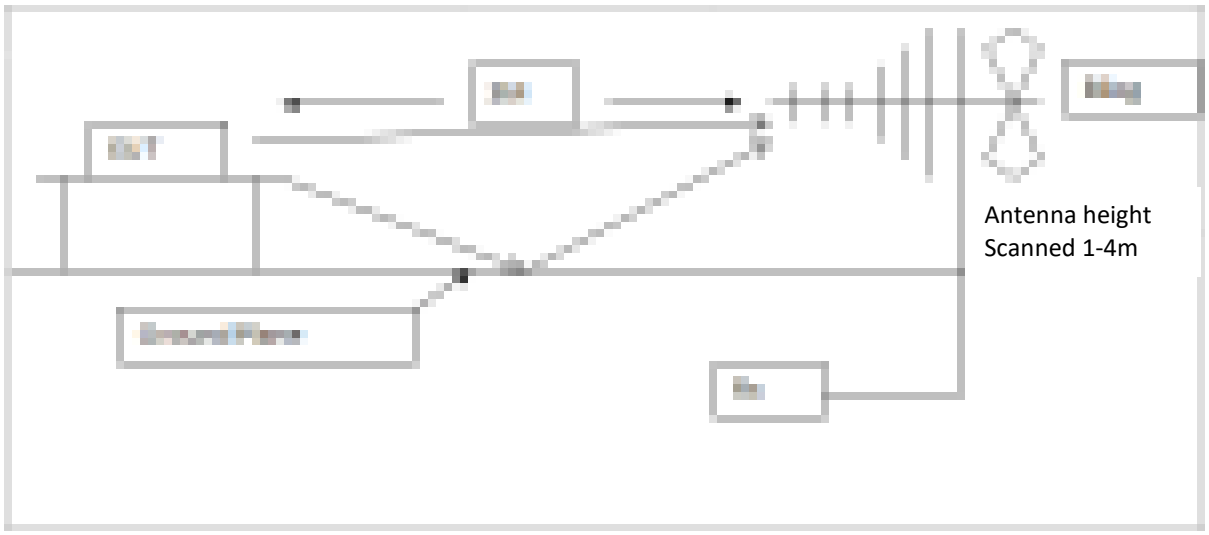


Diagram of the radiated emissions test setup 30 - 1000 MHz

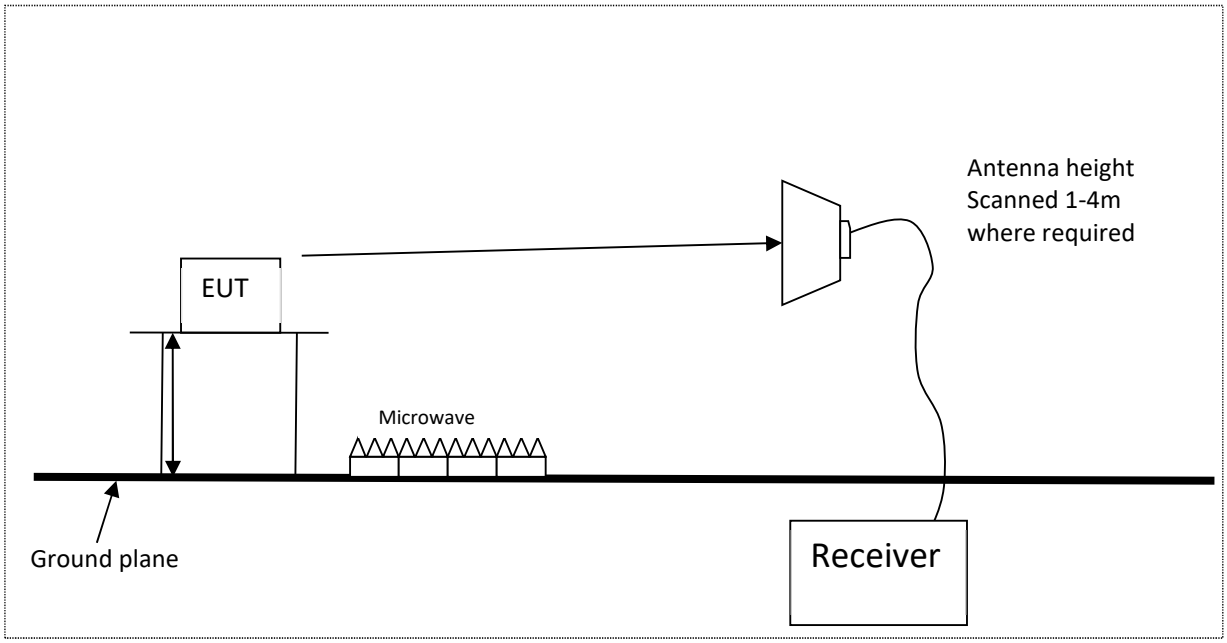


Diagram of the radiated emissions test setup above 1GHz

8.14 AC powerline conducted emission diagram

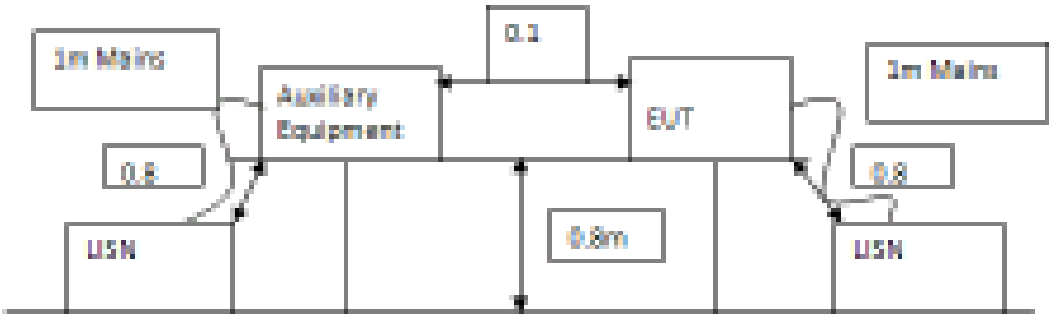


Diagram of the AC conducted emissions test setup

9 Test equipment calibration list

The following is a list of the test equipment used by Kiwa Electrical Compliance 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	03-Jan-2024	12 months
E136	3105	Horn Antenna 1 - 12.5 GHz	EMCO	#02-Apr-2023	12 months
E150	MN2050	LISN 13A	Chase	03-May-2023	12 months
E411	N9039A	9 kHz - 1 GHz RF Filter Section	Agilent Technologies	05-Jul-2023	12 months
E624	E4440A	PSA 3 Hz - 26.5 GHz	Agilent Technologies	06-Jul-2023	24 months
E743	2017 4/2dB	Attenuator 4/2dB 30-1000MHz	RN Electronics	22-Feb-2024	12 months
E755	N9030B	PXA Signal Analyser 3 Hz to 50 GHz	Keysight Technologies	14-Aug-2023	12 months
E856	N9039A	9 kHz - 1 GHz RF Filter Section	Agilent Technologies	22-Mar-2024	12 months
E904	5086-7805	Pre-Amplifier 1GHz - 26.5GHz	Hewlett Packard	03-May-2023	12 months
LPE364	CBL6112A	Antenna BiLog 30MHz - 2GHz	Chase Electronics Ltd	28-Mar-2022	36 months
NSA-M	NSA - M	NSA - Site M	RN Electronics	29-Nov-2021	36 months
P240	290-10dB	Attenuator 10dB 18GHz	Midwest Microwave	04-Jul-2023	12 months
TMS78	3160-08	Horn Std Gain 12.4 - 18 GHz	ETS Systems	05-Oct-2023	12 months
TMS79	3160-09	Horn Std Gain 18 - 26.5 GHz	ETS Systems	23-May-2023	12 months
TMS81	6502	Antenna Active Loop	EMCO	17-Aug-2023	24 months
TMS82	8449B	Pre-Amplifier 1GHz - 26.5GHz	Agilent Technologies	08-Jan-2024	12 months
VSWR-B	VSWR	VSWR 1-18GHz	RN Electronics	09-Feb-2022	36 months
VSWR-M	VSWR	VSWR 1-18GHz	RN Electronics	24-Nov-2021	36 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	A20-Mini	Audio Transmitter	Sound Devices LLC	GE0822350072

10.2 Kiwa Electrical Compliance supplied equipment

KEC No.	Model No.	Description	Manufacturer	Serial No
E465	PCR2000LA	AC Power Source 2kVA	Kikusui	HJ000995
N450	EN106TP	6 Port Ethernet Hub	Netgear	ENT6006298
P274	TPS2000	PSU 15V 10A	TOPWARD ELECTRIC INSTRUMENTS	920243

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 Kiwa Electrical Compliance.

11.2 Modifications during test

No modifications were made during test by Kiwa Electrical Compliance.

12 Description of test sites

Site A Radio Laboratory and Anechoic Chamber

Site B Semi-Anechoic Chamber and Control Room
FCC Registration No. 654321, 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. 654321, 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. 654321, 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. 654321, ISED Registration No. 5612A-1

Site R Screened Room (Conducted Immunity)

Site S Safety Laboratory

Site T Transient Laboratory

CAB identifier as issued by Innovation, Science and Economic Development Canada is UK0002
CAB identifier as issued by FCC is UK2015

13 Abbreviations and units

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

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

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