




TEST REPORT

Ref. n.	FCCTR_183525BLE-0	Issue Date:	26/10/2023	Pages:	59
Test object	<i>Type test according to Standards</i> 47 CFR FCC part 15.247				
Applicant	DATALOGIC S.r.l. Via S. Vitalino 13 - 40012 Lippo Di Calderara Di Reno - Bologna - Italy Phone. +39 051 3147196 Fax +39 051 3147561				
Trade mark					
Manufacturer	DATALOGIC S.r.l.				
Product	Bluetooth radio module				
Tested model	BT-MRY-A1				
FCC Identification number	U4FBT-MRY-A1				
Date of test samples receipt	02/10/2023				
No. of tested samples	1 – Sampled by the manufacturer				
Test date	From 02/10/2023 to 10/10/2023				
Testing site	PRSLAB S.r.l. Unipersonale - Via Campagna 92 - 22020 Faloppio - Como - Italy				
FCC designation number	IT0012				
Test results	COMPLIANT				
Verifications carried out by	Daniele AOSANI Laboratory Engineer				
Approved by	Riccardo PFEIFFER Laboratory Manager				

The test results reported in this test report shall refer only to the samples tested.
The sample has been provided by the customer and the results apply to the sample as received.
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PRSLAB refuses any responsibility about information provided by the customer contained in this test report.

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0. RELEASE CONTROL RECORD

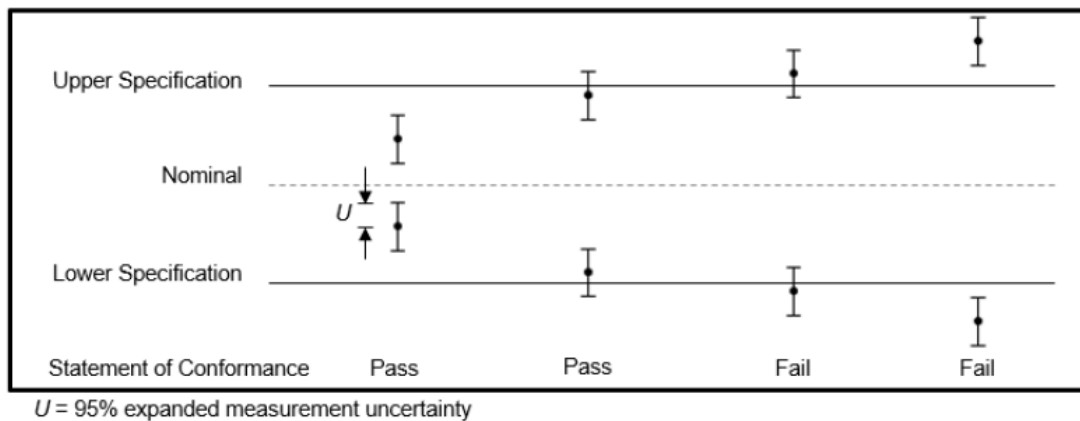
TEST REPORT NUMBER	REASON OF CHANGE	DATE OF ISSUE
FCCTR_183525BLE-0	Original release	26/10/2023

This document is valid in last revision that deletes and replaces the previous one

1. DECISION RULE

PRSLAB specifies that, if the decision rules of conformity of the test results are not indicated in detail in the standard/s object of tests, it takes as a decision rule for the declaration of conformity the simple binary system ($w = 0$) stated in the ILAC-G8-09:2019 document.

The decision rule is applicable for all parts of standard



Statements of conformity are reported as:

- Pass: the measured value is below the acceptance limit, $AL=TL$.
- Fail: the measured value is above the acceptance limit, $AL=TL$.

Definitions

- Guard Band (w): interval between a tolerance limit and a corresponding acceptance limit where length $w=|TL-AL|$.
- Tolerance Limit (TL) (Specification Limit): specified upper or lower bound of permissible values of a property.
- Acceptance Limit (AL): specified upper or lower bound of permissible measured quantity values.

2. INFORMATION PROVIDED BY CUSTOMER




- The EUT was tested inside a model **BC9600-433 Type CM9630** charging base through which it was possible to send commands to activate the radio channels.

3. GENERAL REMARKS


- None

4. TECHNICAL INFORMATION OF EQUIPMENT UNDER TEST (EUT)

4.1 EUT Identification

DESCRIPTION	Bluetooth radio module
MODEL NAME	BT-MRY-A1
FCC ID	U4FBT-MRY-A1
SERIAL NO.	B23PAAGRU
PRS LAB INTERNAL REFERENCE	BC 264/2023 3/4
TRADEMARK	
MANUFACTURER	DATALOGIC S.r.l.
COUNTRY OF MANUFACTURER	Italy
SINGLE UNIT OR SYSTEM	Single
POWER SOURCE	DC power from board
SUPPLY VOLTAGE	1.8Vdc  3.3Vdc 
MAX POWER OR MAX ABSORBED CURRENT	70mA
OPERATING TEMPERATURE	-30°C ~ +85°C
HARDWARE VERSION (Information provided by Customer)	A
FIRMWARE VERSION (Information provided by Customer)	A
DIMENSIONS	See photographic documentation
EUT STANDING	<input checked="" type="checkbox"/> WALL; <input type="checkbox"/> CEILING; <input checked="" type="checkbox"/> TABLE; <input type="checkbox"/> FLOOR; <input type="checkbox"/> RACK MOUNTED; <input type="checkbox"/> BODY WORN; <input type="checkbox"/> HANDELD; <input checked="" type="checkbox"/> PORTABLE; <input type="checkbox"/> MOBILE
HIGHEST INTERNAL FREQUENCY (Information provided by Customer)	<input type="checkbox"/> <108MHz; <input type="checkbox"/> 108MHz<F<500MHz; <input type="checkbox"/> 500MHz<F<1GHz; <input checked="" type="checkbox"/> F>1GHz; F = 2480MHz

4.2 Bluetooth Low Energy module technical data

MODULE MANUFACTURER	
CHIP MANUFACTURER	CYPRESS
CHIP TYPE	CYW20706
ETS CATEGORY	Bluetooth Low Energy
TYPE OF RADIO DEVICE	Transceiver
FREQUENCY BAND	2400 – 2483.5MHz
NUMBER OF CHANNELS	40
CHANNEL BANDWIDTH	2MHz
CHANNEL SPACING	2MHz
TYPE OF MODULATION	GFSK
SENSITIVITY	-96.5dBm
TRANSFER RATES (Mbit/s)	Up to 1
ANTENNA TYPE (Information provided by Customer)	PCB Antenna
ANTENNA GAIN (Information provided by Customer)	+0.5dBi

4.2.1 Channel List Bluetooth Low Energy

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY	CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
37	2402	9	2422	18	2442	28	2462
0	2404	10	2424	19	2444	29	2464
1	2406	38	2426	20	2446	30	2466
2	2408	11	2428	21	2448	31	2468
3	2410	12	2430	22	2450	32	2470
4	2412	13	2432	23	2452	33	2472
5	2414	14	2434	24	2454	34	2474
6	2416	15	2436	25	2456	35	2476
7	2418	16	2438	26	2458	36	2478
8	2420	17	2440	27	2460	39	2480

4.3 Ports identification

PORT	DESCRIPTION	CONNECTION	NOTES
<input type="checkbox"/> Enclosure	Electronic board	---	---
<input type="checkbox"/> AC power port	Port not present	---	---
<input checked="" type="checkbox"/> DC power port	1.8Vdc	Strip	<3m
<input type="checkbox"/> Signal/control port	Port not present	---	---
<input type="checkbox"/> Telecommunication port	Port not present	---	---
<input type="checkbox"/> Antenna port	<input checked="" type="checkbox"/> Internal; <input type="checkbox"/> External	---	---

Note: During the tests all cables must be what provided the manufacturer or the same that used in the real employment of the EUT.

4.4 Modifications incorporated in E.U.T.

The following items are the modifications introduced in the equipment under test:

- None

4.5 Auxiliary equipment

- Auxiliary laboratory laptop to set radio channels.

Auxiliary Board used to supply radio module and communicate with it

5. OPERATING MODES AND TEST CONDITIONS

In the following table there are the operating conditions adopted during tests identified by an indicator (#) at which has been referred the item "Operating condition of the equipment under test"

OPERATING CONDITION	DESCRIPTION
#1	Continuous transmission, modulated carrier, on channel 37
#2	Continuous transmission, modulated carrier, on channel 17
#3	Continuous transmission, modulated carrier, on channel 39

Special Test Software: Special software by the Applicant to operate the EUT at each channel frequency continuously. For example, the transmitter will be operated at each of the lowest, middle and highest frequencies individually continuously during testing.

Special Hardware Used: None

Transmitter Test Antenna: The EUT has been tested with the antenna fitted in a manner typical of normal intended use as integral antenna equipment as described with the test results.

6. REFERENCE STANDARDS

REFERENCE STANDARD	DESCRIPTION
Cfr 47 part 15 subpart C par. 15.247	Radio Frequency Devices – Intentional Radiators Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz
KDB 558074 D01	Guidance for performing Compliance measurements on Digital Transmission Systems (DTS) Operating under §15.247
ANSI C63.10:2013	American National Standard for Testing Unlicensed Wireless Devices
Title 47 Part 1 Subpart I § 1.1310	Procedures Implementing the National Environmental Policy Act of 1969. Radiofrequency radiation exposure limits.
Title 47 Part 2 Subpart J § 2.1091	Radiofrequency radiation exposure evaluation: mobile devices.
KDB 447498	RF Exposure procedures and equipment authorization policies for mobile and portable devices
ANSI C63.4:2014	American National Standard for Methods of Measuring of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz – 40 GHz

7. UNITS OF MEASUREMENTS

Conducted EMI Data is in dB μ V; dB referenced to one microvolt
Radiated EMI Data is in dB μ V/m; dB/m referenced to one microvolt per meter

Sample Calculation:

RFS = Radiated Field Strength,
FSM = Field Strength Measured,
A.F. = Receive antenna factor,
Gain = amplification gains and/or cable losses.

$RFS (dB\mu V/m @ 3m) = FSM (dB\mu V) + A.F. (dB/m) - Gain (dB)$

8. SUMMARY OF TEST RESULTS

EUT PORT	DESCRIPTION OF PHENOMENA	BASIC STANDARD	OPERATING CONDITION	RESULTS
Antenna port	Antenna requirement	FCC Part 15 §15.203	---	Compliant
	Maximum Peak Output Power	FCC Part 15 §15.247 (b) (3)	#1, #2, #3	Within the limits
	6 dB Bandwidth	FCC Part 15 §15.247 (a) (2)	#1, #2, #3	Within the limits
	Power Spectral Density	FCC Part 15 §15.247 €	#1, #2, #3	Within the limits
	Band-Edge	FCC Part 15 § 15.247 (d)	#1, #3	Within the limits
	RF radiated Spurious Emissions at the Transmitter Antenna Terminal	FCC Part 15 § 15.247 (d)	#1, #2, #3	Within the limits
	Transmitter Radiated Emissions <1GHz	FCC Part 15 § 15.247 (d) & § 15.249 (a)	#1, #2, #3	Within the limits
	Transmitter Radiated Emissions >1GHz	FCC Part 15 § 15.247 (d) & § 15.249 (a)	#1, #2, #3	Within the limits

Note: FCC classifies Bluetooth LE as a system using digital modulation techniques.

¹All tests are performed with the device in position shown in the photographic documentation.

¹ Ref. Tab. Of Section 5

9. TESTS RESULTS

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TEST 1.

CONDUCTED EMISSIONS

REFERENCE DOCUMENT

FCC Cfr 47 part 15 - Subpart B - §15.207

• TEST SETUP	Acc. To ref. Std.
• TEST LOCATION	Semi-anechoic chamber
• TEST EQUIPMENT USED FOR TEST	Network simulator Spitzenberger+Spies mod. PAS5000 MXE Emi Receiver Keysight mod. N9038A LISN Rohde & Schwarz mod. ESH3-Z5
• TESTED PORT	AC input power port
• FREQUENCY RANGE	150kHz - 30MHz
• LIMITS	Acc. To ref. Std.
• UNCERTAINTY OF MEASURE	Level of confidence = 95% (k=2) Expanded uncertainty 150kHz - 30MHz = 3,28 dB

TEST CONDITIONS	REQUIRED	MEASURED
Ambient temperature	23°C ± 5°C	24 °C
Ambient humidity	25 - 75%rH	45%
Pressure	85 - 106kPa (860mbar - 1060mbar)	960 mbar
Voltage		AC main through External AC/DC Power Supply: 115Vac to 1.8Vdc

OPERATING CONDITION: #1

RESULT: **WITHIN THE LIMITS**

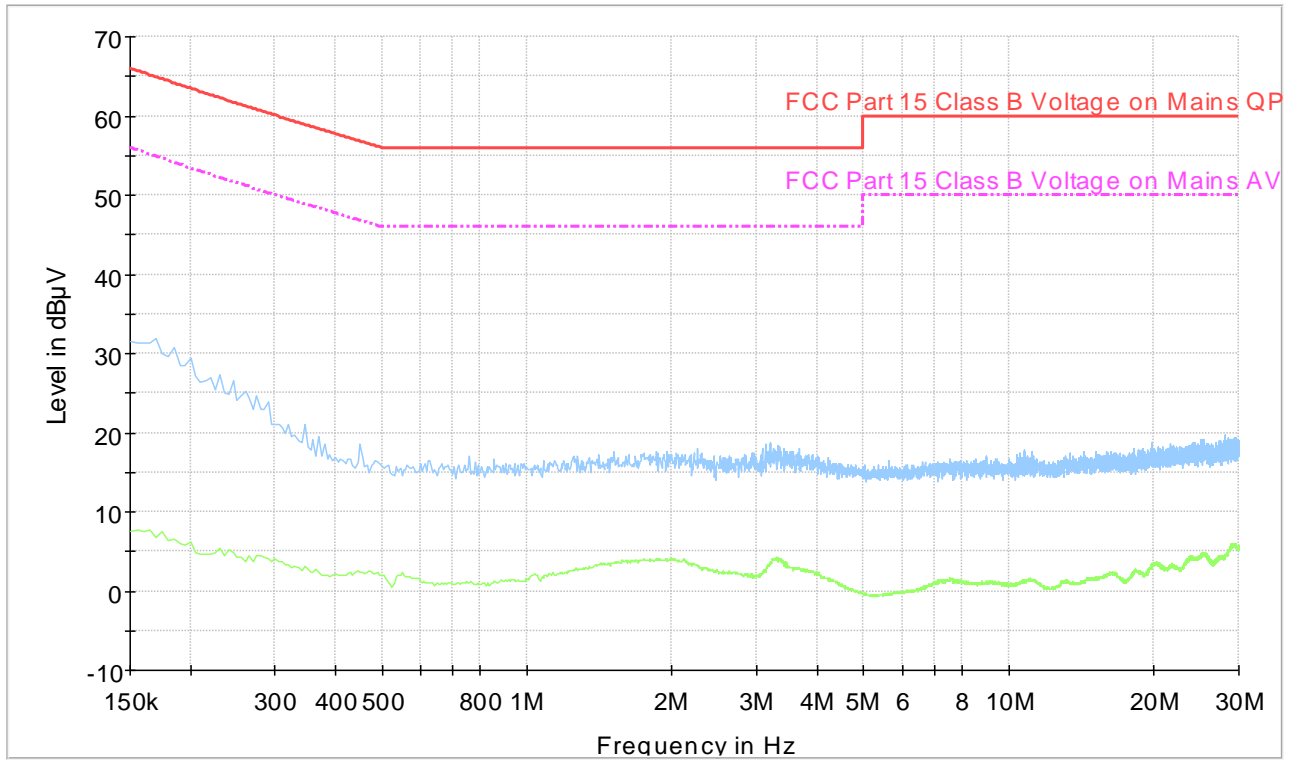
TEST RESULTS

OPERATING CONDITION #1 – 1.8Vdc to External AC/DC Power Supply

Frequency Range | 150kHz – 30MHz

Line | L+N

EN_55011_EMI_COND_3PHASE-MONO



TEST 2.

ANTENNA REQUIREMENTS

REFERENCE DOCUMENT

According to §15.203 / 15.204

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sec. 15.211, Sec. 15.213, Sec. 15.217, Sec. 15.219, or Sec. 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Sec. 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded

Antenna Requirements

The EUT has an integrated Chip antenna.

RESULT: COMPLIANT

TEST 3.

MAXIMUM PEAK OUTPUT POWER

REFERENCE DOCUMENT

According to §15.247(b) (3)

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signalling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

• TEST LOCATION	Semi-Anechoic Chamber					
• DISTANCE OF MEASUREMENT	3m					
• TYPE OF MEASUREMENT	Radiated					
• TEST EQUIPMENT USED FOR TEST	Instrument	Manufacturer	Model	Serial n°	Calibrated On	Due to
	Emi Receiver	Rohde & Schwarz	ESU 40	100111	03/2023	03/2024
	Semi-Anechoic Chamber	Siemens	B83117-D6019-T232	003-005-134/94C	02/2022	02/2023
	Horn antenna	Electro Metrics	EM-6961	100437	10/2020	10/2023
	Software EMC	Rohde & Schwarz	EMC32-E	V 8.40.0	N.A.	
• TESTED PORT	Antenna					
• TEST METHOD	ANSI C63.10:2013 section 11.9					
• FREQUENCY RANGE	Carrier					
• UNCERTAINTY OF MEASURE	Level of confidence = 95% (k=2) Expanded uncertainty = 5,15 dB					

TEST CONDITIONS	REQUIRED	MEASURED
Ambient temperature	23°C ± 5°C	24 °C
Ambient humidity	25 - 75%rH	45%
Pressure	85 - 106kPa (860mbar - 1060mbar)	960 mbar

OPERATING CONDITION :#1, #2, #3

RESULT: **WITHIN THE LIMITS**

MEASUREMENT PARAMETER

Resolution bandwidth	RBW \geq DTS bandwidth
Video bandwidth	VBW \geq 3 x RBW
Span	span \geq 3 x RBW
Sweep time	Auto couple
Detector	Peak
Trace-Mode	Max. hold

TEST DESCRIPTION

Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously - rotating, remotely - controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency.

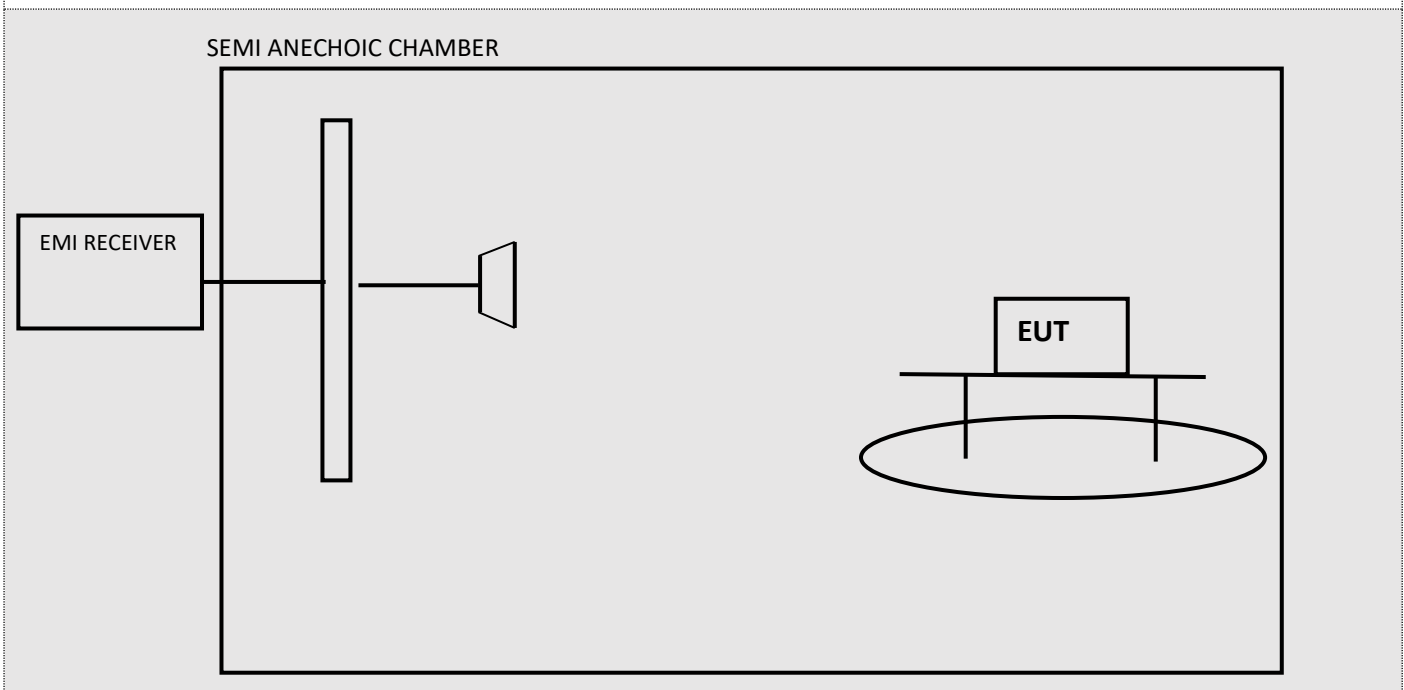
The EUT is placed at test table.

For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m

Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m~4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3m.

This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

TEST SETUP BLOCK DIAGRAM



TEST RESULTS

Channel	Frequency (MHz)	EIRP (dBm)	Antenna Gain (dBi)	Max Conducted Output power	Limit (dBm)	Result
37	2402	4.111	-0.5	4.611	30	WITHIN THE LIMITS
17	2440	4.908	-0.5	5.408		
39	2480	3.964	-0.5	4.464		

Note: ---

TEST 4.

6dB CHANNEL BANDWIDTH

REFERENCE DOCUMENT

According to §15,247(a)(2)

Systems using digital modulation techniques may operate in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands, The minimum 6 dB bandwidth shall be at least 500 kHz.

• TEST LOCATION	Radio test area					
• TYPE OF MEASUREMENT	Radiated					
• TEST EQUIPMENT USED FOR TEST	Instrument	Manufacturer	Model	Serial n°	Calibrated On	Due to
	Emi Receiver	Rohde & Schwarz	ESU 40	100111	03/2023	03/2024
• TESTED PORT	Antenna					
• TEST METHOD	ANSI C63.10:2013 section 6.9					
• FREQUENCY RANGE	Carrier					

TEST CONDITIONS	REQUIRED	MEASURED
Ambient temperature	23°C ± 5°C	24 °C
Ambient humidity	25 - 75%rH	45%
Pressure	85 - 106kPa (860mbar - 1060mbar)	960 mbar

OPERATING CONDITION :#1, #2, #3

RESULT: **COMPLIANT**

MEASUREMENT PARAMETER – 6dB Bandwidth

Resolution bandwidth	100kHz
Video bandwidth	300kHz
Span	5MHz
Sweep time	Auto couple
Detector	Peak
Trace-Mode	Max. hold

TEST DESCRIPTION

Allow the trace to stabilize.

Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

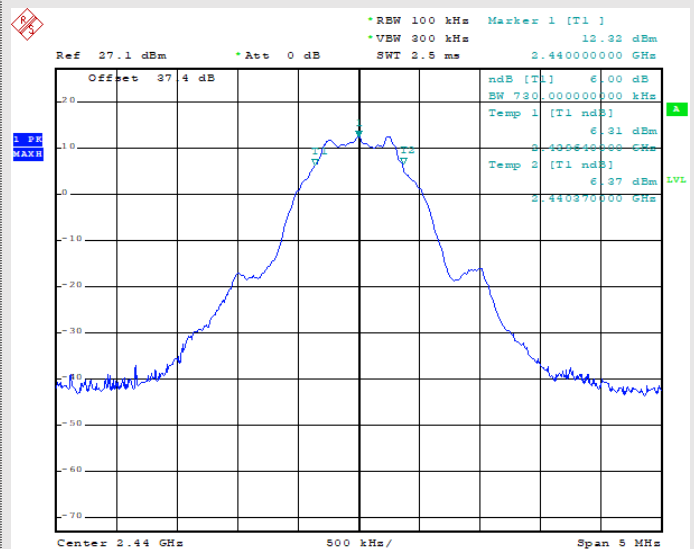
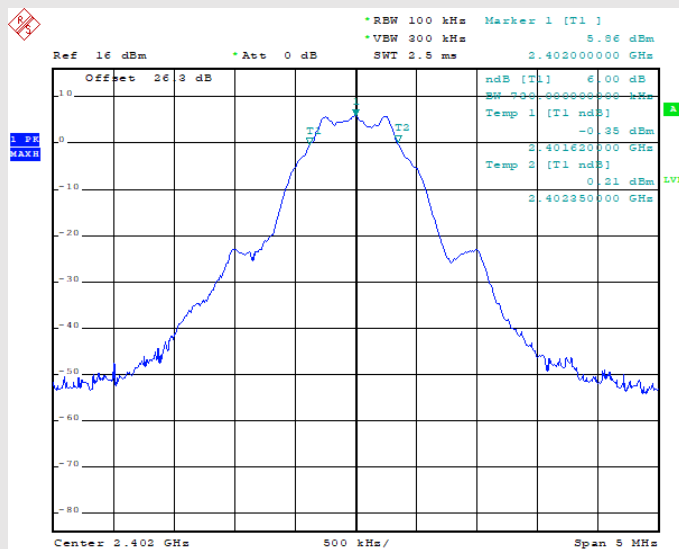
Measurement Result

Channel	Frequency (MHz)	6dB Bandwidth (kHz)	Limits (kHz)	Verdict
37	2402	700	>500	Within the limits
17	2440	730	>500	
39	2480	730	>500	

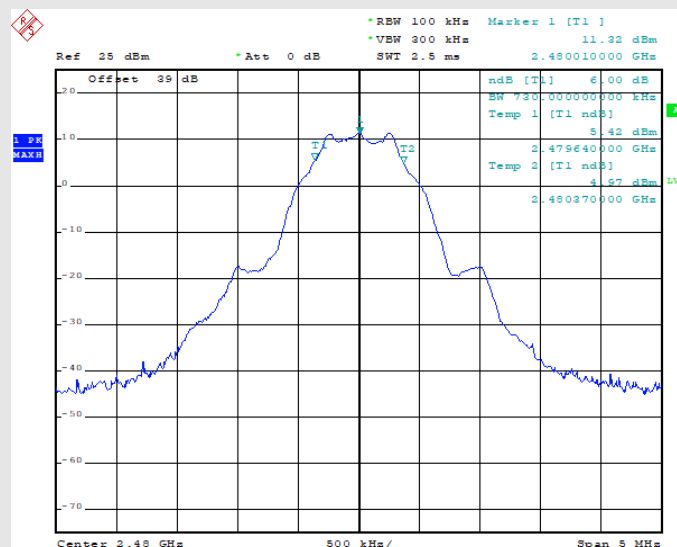
6dB Bandwidth

Channel 37

Channel 17



Channel 39



TEST 5.

BAND EDGE

REFERENCE DOCUMENT

According to §15,247(d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Sec. 15,209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Sec. 15,205(a), must also comply with the radiated emission limits specified in Sec. 15,209(a) (see Sec. 15,205(c)).

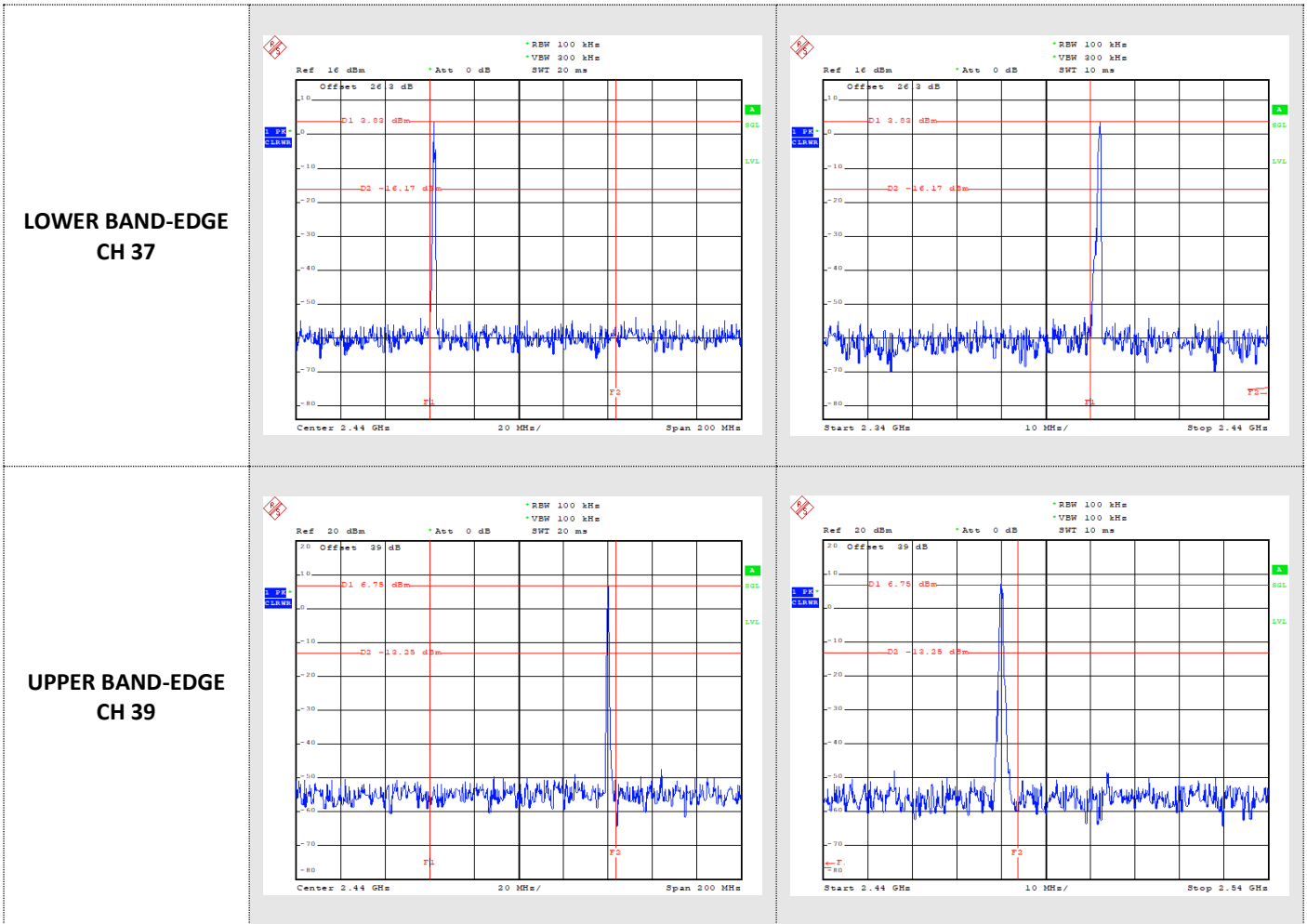
• TEST LOCATION	Radio test area					
• TYPE OF MEASUREMENT	Radiated					
• TEST EQUIPMENT USED FOR TEST	Instrument	Manufacturer	Model	Serial n°	Calibrated On	Due to
	Emi Receiver	Rohde & Schwarz	ESU 40	100111	03/2023	03/2024
• TESTED PORT	Antenna					
• TEST METHOD	ANSI C63.10:2013 section 6.10					
• FREQUENCY RANGE	Carrier					

TEST CONDITIONS	REQUIRED	MEASURED
Ambient temperature	23°C ± 5°C	24 °C
Ambient humidity	25 - 75%rH	45%
Pressure	85 - 106kPa (860mbar - 1060mbar)	960 mbar

OPERATING CONDITION :#1, #3

RESULT: **COMPLIANT**

TEST RESULTS



TEST 6.

POWER SPECTRAL DENSITY

REFERENCE DOCUMENT

According to §15,247) (e)

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

• TEST LOCATION	Radio test area					
• TYPE OF MEASUREMENT	Radiated					
• TEST EQUIPMENT USED FOR TEST	Instrument	Manufacturer	Model	Serial n°	Calibrated On	Due to
	Emi Receiver	Rohde & Schwarz	ESU 40	100111	03/2023	03/2024
• TESTED PORT	Antenna					
• TEST METHOD	ANSI C63.10:2013 section 11.10					
• FREQUENCY RANGE	Carrier					

TEST CONDITIONS	REQUIRED	MEASURED
Ambient temperature	23°C ± 5°C	24 °C
Ambient humidity	25 - 75%rH	45%
Pressure	85 - 106kPa (860mbar - 1060mbar)	960 mbar

OPERATING CONDITION :#1, #2, #3

RESULT: **COMPLIANT**

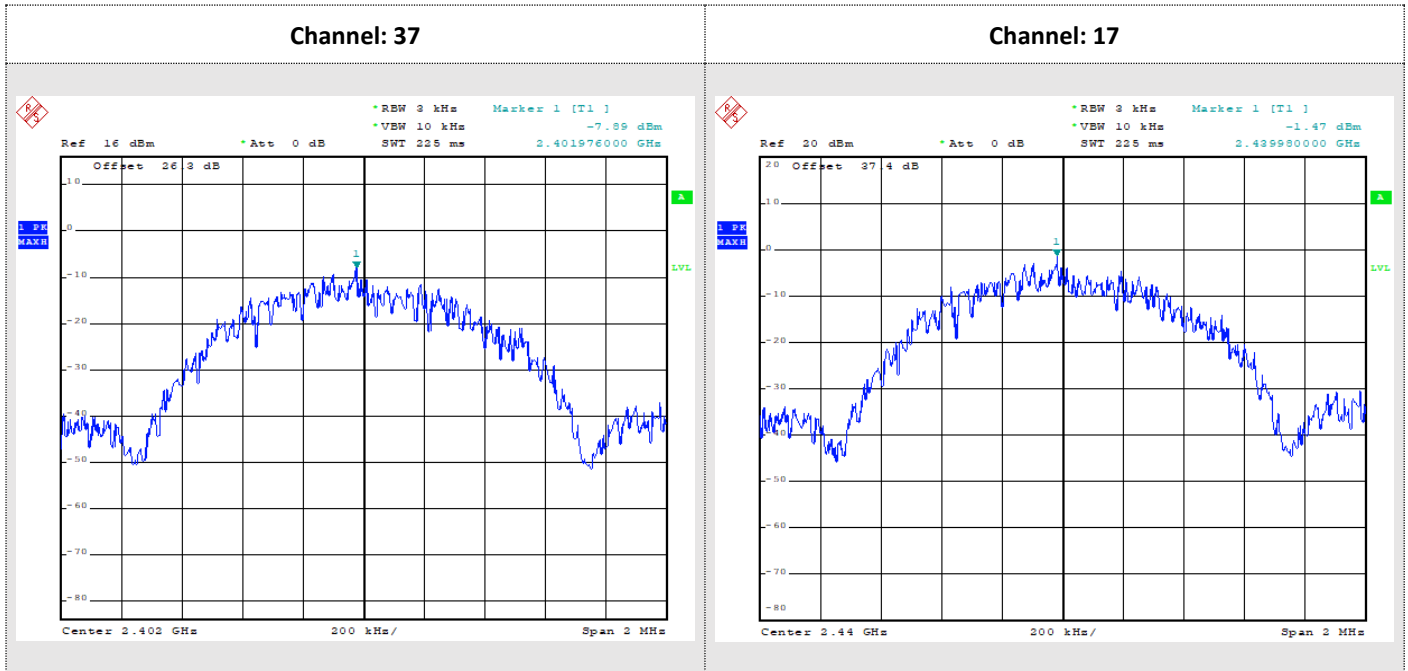
MEASUREMENT PARAMETER

Resolution bandwidth	3kHz
Video bandwidth	10kHz
Span	2MHz
Sweep time	Auto couple
Detector	Peak
Trace-Mode	Max. hold

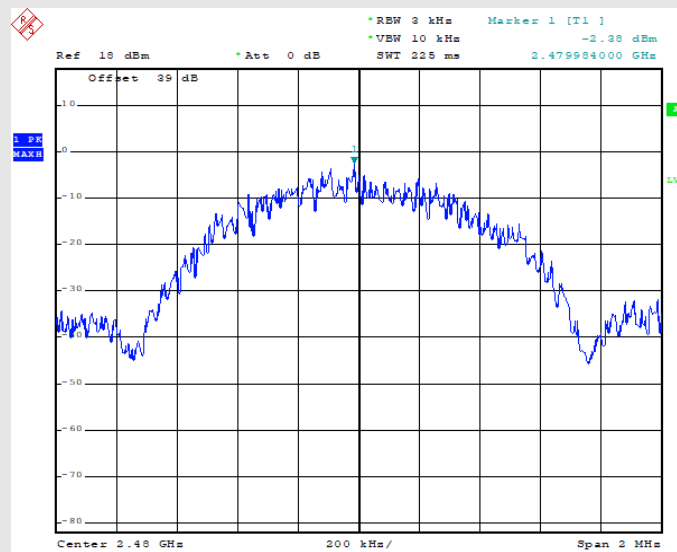
TEST DESCRIPTION

Allow trace to fully stabilize.
Use the peak marker function to determine the maximum amplitude level within the RBW.
If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat

TEST RESULTS



Channel: 39



Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)	Result
37	2402	-7.89	8	15.89	COMPLIANT
17	2440	-1.47	8	9.47	COMPLIANT
39	2480	-2.38	8	9.38	COMPLIANT

TEST 7.

RF RADIATED SPURIOUS EMISSIONS AT THE TRANSMITTER ANTENNA TERMINAL

REFERENCE DOCUMENT

According to § 15.247 (d) and § 15.209 (a)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 Db below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 Db instead of 20 Db. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

• TEST LOCATION	Radio test area					
• TYPE OF MEASUREMENT	Radiated					
• TEST EQUIPMENT USED FOR TEST	Instrument	Manufacturer	Model	Serial n°	Calibrated On	Due to
	Emi Receiver	Rohde & Schwarz	ESU 40	100111	03/2023	03/2024
• TESTED PORT	Enclosure					
• TEST METHOD	ANSI C63.10:2013 section 6.5 and 6.6					
• FREQUENCY RANGE	9kHz – 1GHz					
• LIMITS	Acc. To ref. Std.					

TEST CONDITIONS	REQUIRED	MEASURED
Ambient temperature	23°C ± 5°C	24 °C
Ambient humidity	25 - 75%rH	45%
Pressure	85 - 106kPa (860mbar - 1060mbar)	960 mbar

OPERATING CONDITION :#1, #2, #3

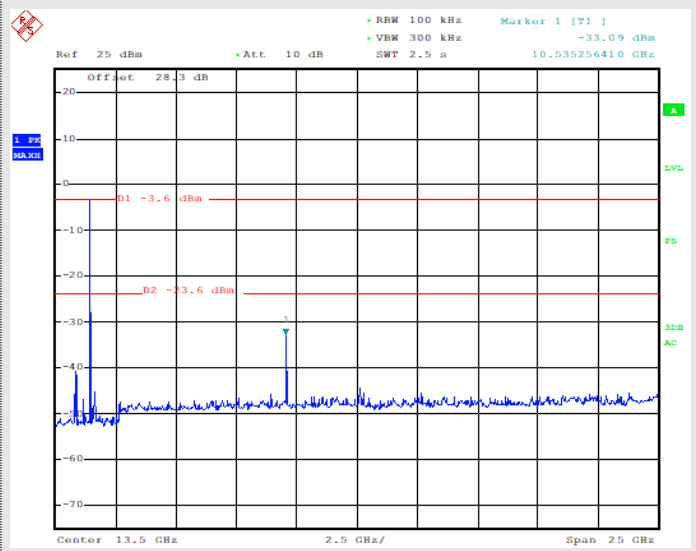
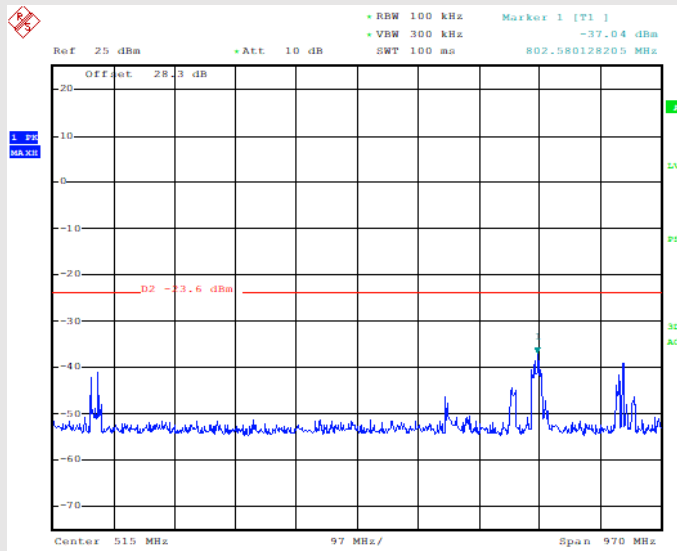
RESULT: **WITHIN THE LIMITS**

TEST RESULTS

Channel: 37

Frequency range: 30MHz – 1GHz

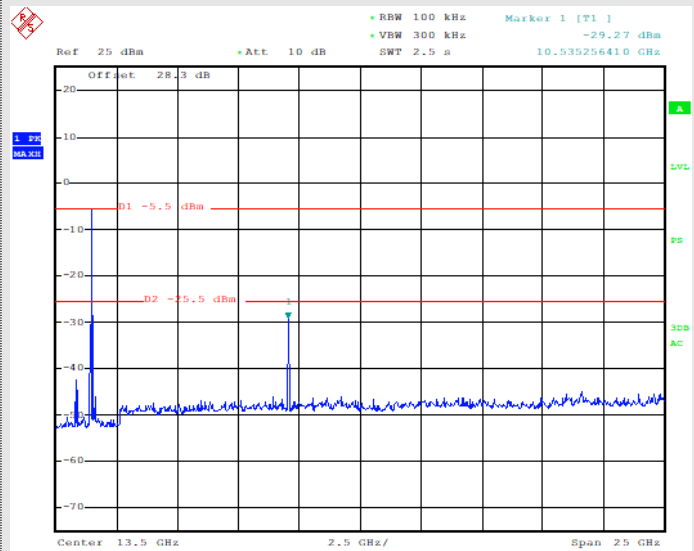
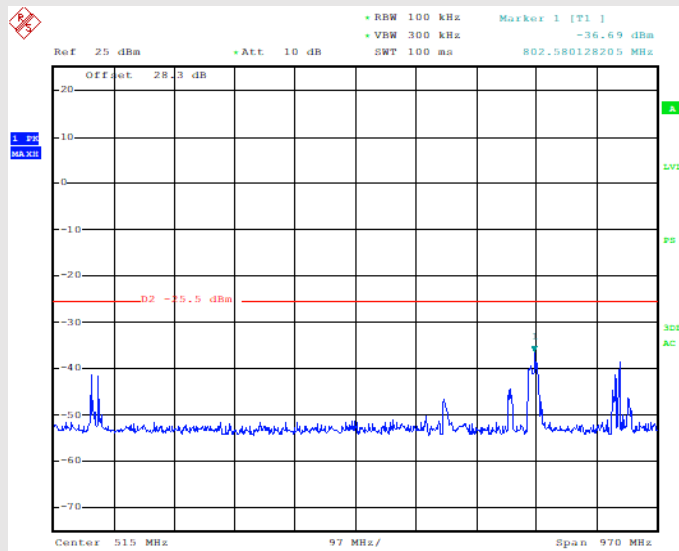
Frequency range: 1GHz – 26GHz



Channel: 17

Frequency range: 30MHz – 1GHz

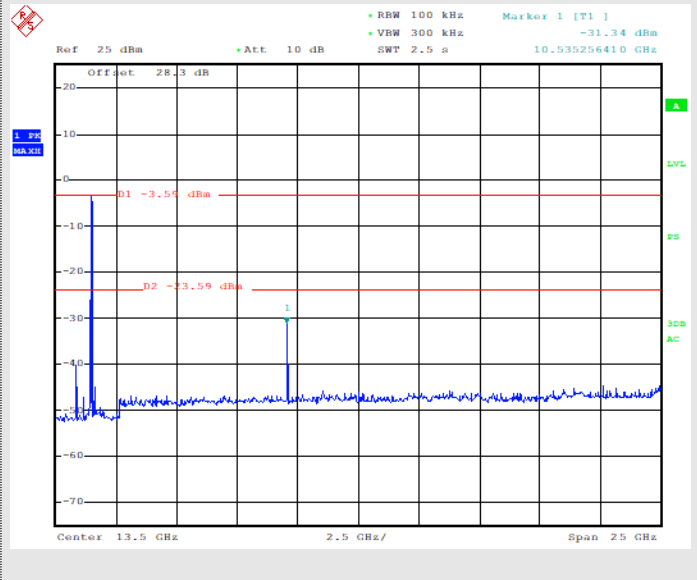
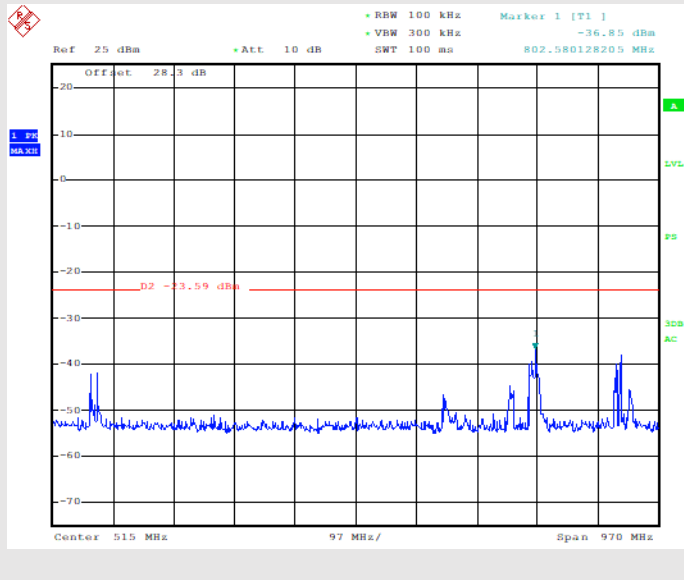
Frequency range: 1GHz – 26GHz



Channel: 39

Frequency range: 30MHz – 1GHz

Frequency range: 1GHz – 26GHz



TEST 8.

TRANSMITTER RADIATED EMISSIONS < 1GHZ

REFERENCE DOCUMENT

According to § 15.247 (d) and § 15.209 (a)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 Db below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 Db instead of 20 Db. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

• TEST LOCATION	Semi-Anechoic Chamber					
• DISTANCE OF MEASUREMENT	3m					
• TYPE OF MEASUREMENT	Radiated					
• TEST EQUIPMENT USED FOR TEST	Instrument	Manufacturer	Model	Serial n°	Calibrated On	Due to
	Emi Receiver	Rohde & Schwarz	ESU 40	100111	03/2023	03/2024
	Semi-Anechoic Chamber	Siemens	B83117-D6019-T232	003-005-134/94C	02/2023	02/2024
	Loop antenna	Rohde & Schwarz	HFH 2-Z2	841801/012	03/2020	03/2023
	Bi-log antenna	Chase	CBL6111C	2717	03/2022	03/2025
	Software EMC	Rohde & Schwarz	EMC32-E	V 8.40.0	N.A.	
• TESTED PORT	Enclosure					
• TEST METHOD	ANSI C63.10:2013 section 6.5					
• FREQUENCY RANGE	9kHz – 1GHz					
• LIMITS	Acc. To ref. Std.					
• UNCERTAINTY OF MEASURE	Level of confidence = 95% (k=2) Expanded uncertainty 9kHz – 30MHz = 4,24 dB Expanded uncertainty 30MHz – 1GHz = 5,72 dB					

TEST CONDITIONS	REQUIRED	MEASURED
Ambient temperature	23°C ± 5°C	24 °C
Ambient humidity	25 - 75%rH	45%
Pressure	85 - 106kPa (860mbar - 1060mbar)	960 mbar

OPERATING CONDITION :#1, #2, #3

RESULT: **WITHIN THE LIMITS**

MEASUREMENT PARAMETER

Frequency Range:	9kHz – 30MHz	30MHz – 1GHz
Resolution bandwidth:	200Hz	100kHz
Video bandwidth:	1kHz	300kHz
Span:	See plots below	See plots below
Sweep time	Auto couple	Auto couple
Detector:	Peak	Peak
Trace-Mode:	Max. hold	Max. hold

TEST DESCRIPTION

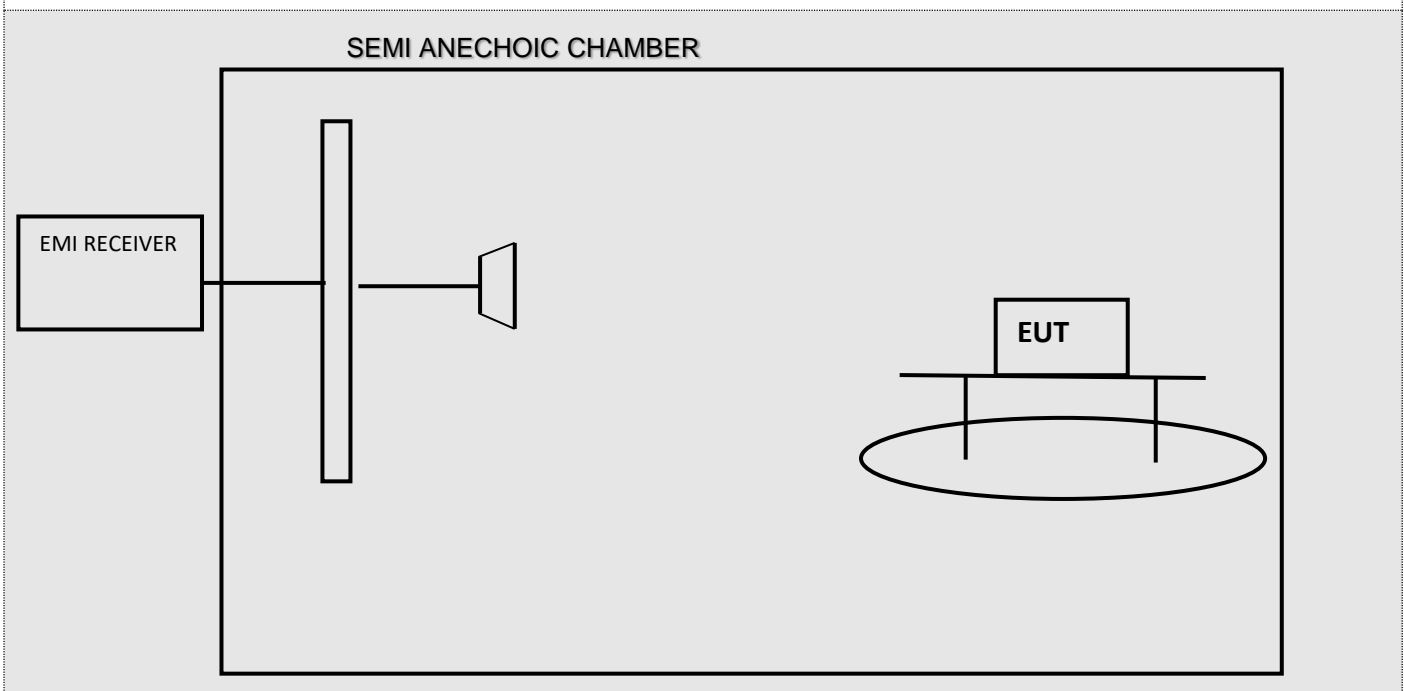
Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously - rotating, remotely - controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency.

The EUT is placed at test table height is 80 cm above the reference ground plane.

Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m~4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3m.

This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

TEST SETUP BLOCK DIAGRAM

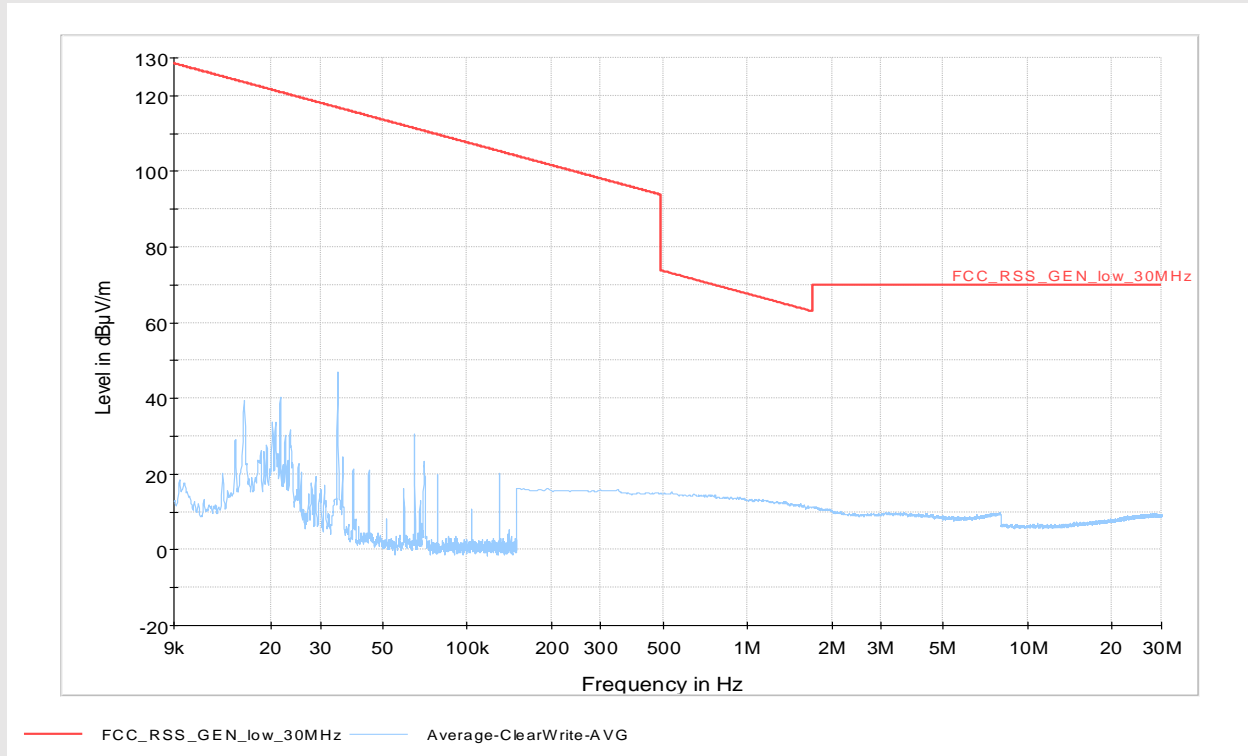


TEST RESULTS

Channel 37

RX Antenna Polarization: ---

Frequency Range: 9kHz – 30MHz

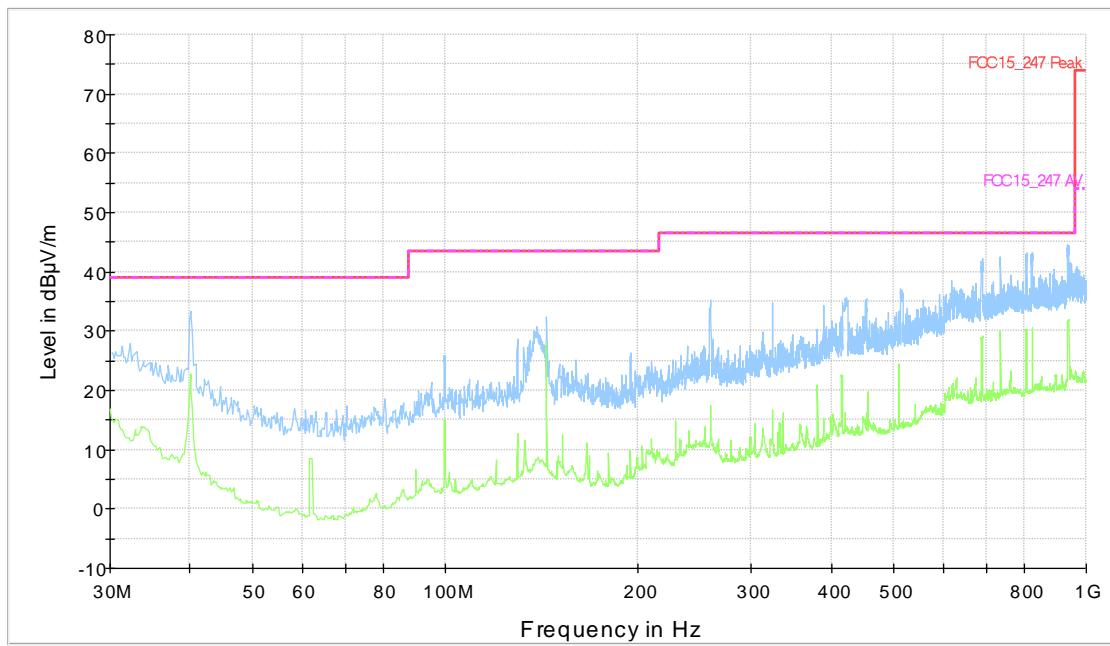


Final Result:

All emissions are below 10dB from the limit, for this reason no further assessments were carried out on the individual points

RX Antenna Polarization: Vertical

Frequency Range: 30MHz – 1GHz

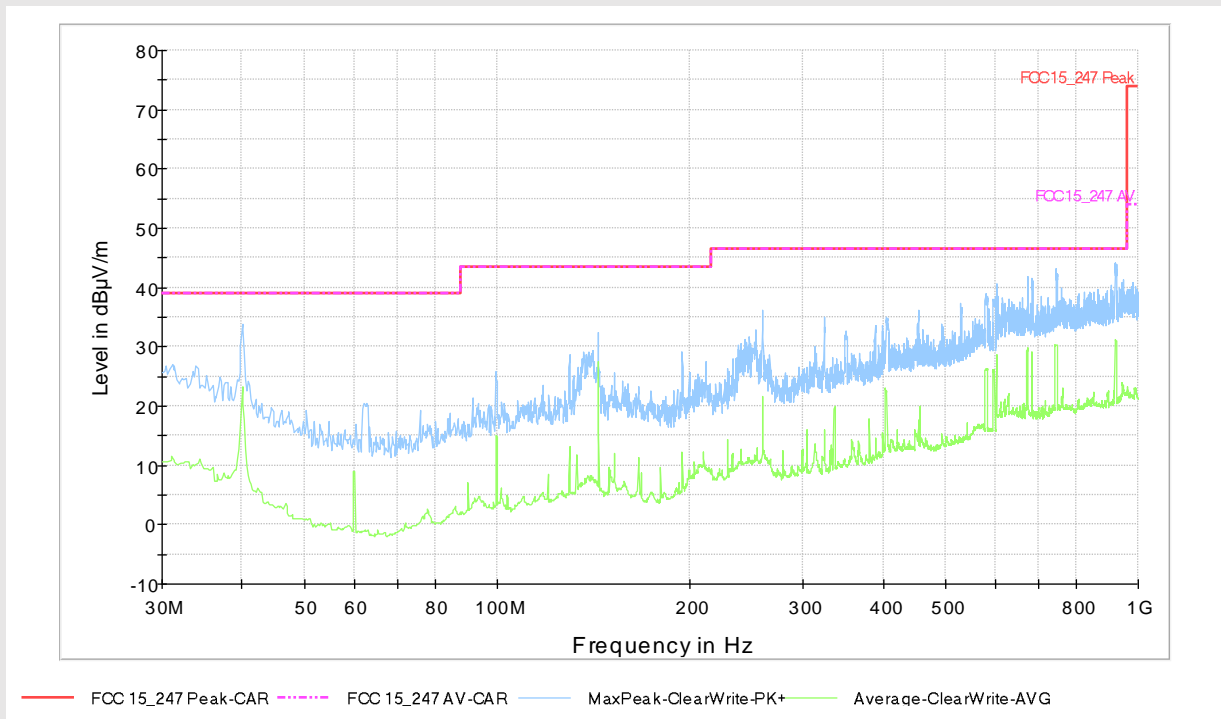


— FCC 15_247 Peak-CAR - - - - FCC 15_247 AV-CAR — MaxPeak-ClearWrite-PK+ — Average-ClearWrite-AVG

Final Result:

RX Antenna Polarization: Horizontal

Frequency Range: 30MHz – 1GHz

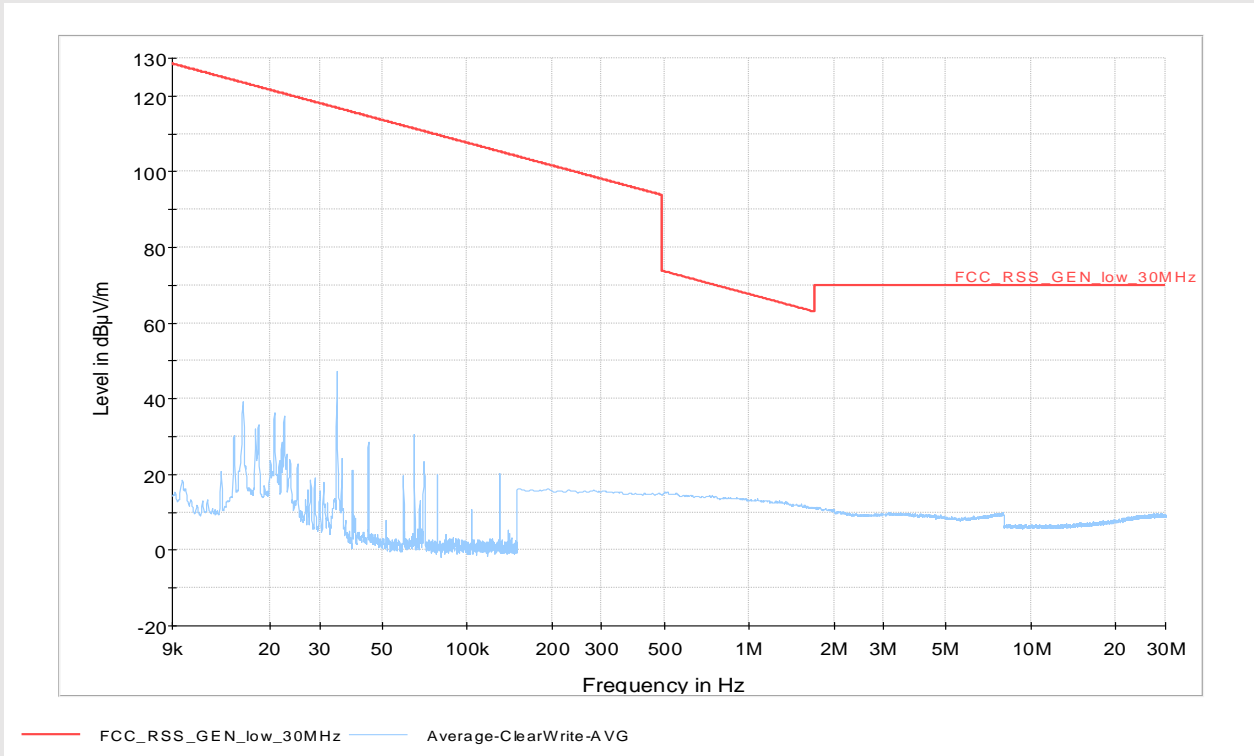


Final Result:

Channel 17

RX Antenna Polarization: ---

Frequency Range: 9kHz – 30MHz

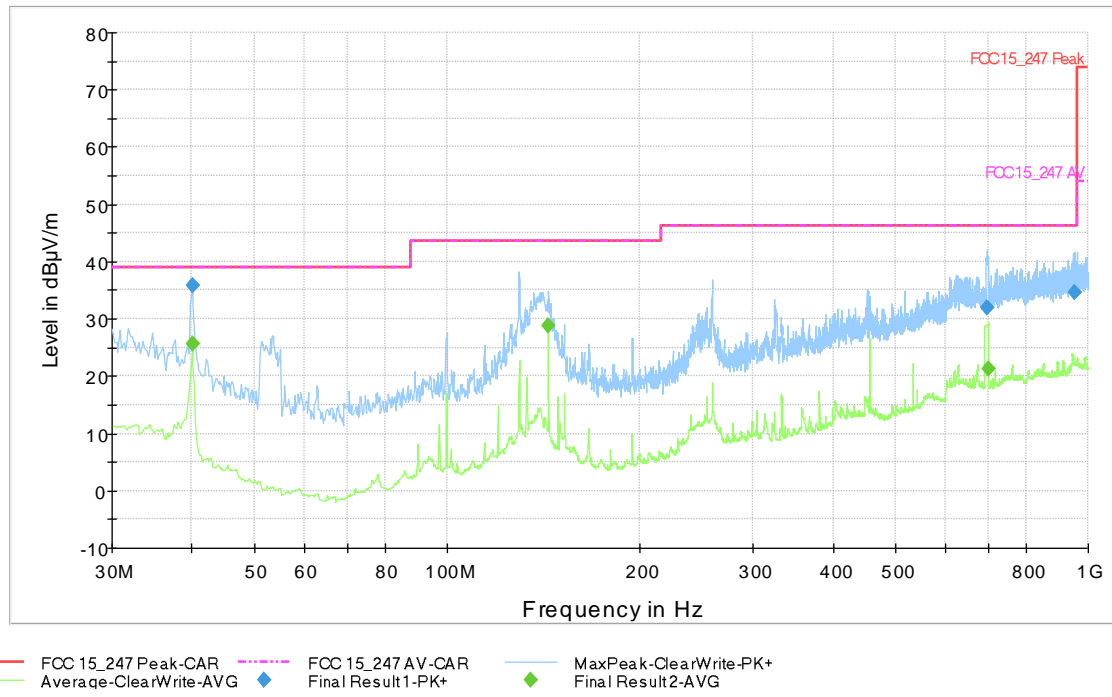


Final Result:

All emissions are below 10dB from the limit, for this reason no further assessments were carried out on the individual points

RX Antenna Polarization: Vertical

Frequency Range: 30MHz – 1GHz



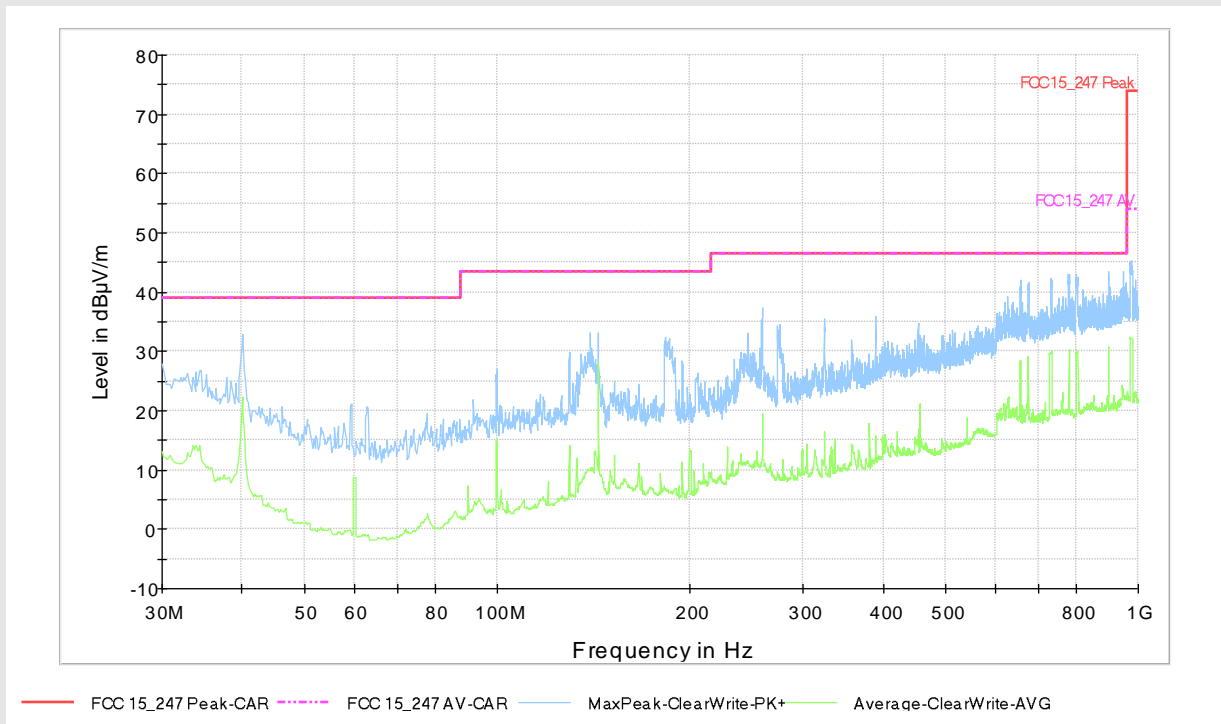
Final Result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Height (cm)	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
40.020000	35.8	99.8	97.0	3.20	39.00
697.230000	32.0	153.8	97.0	14.40	46.40
953.130000	34.5	179.9	97.0	11.90	46.40

Frequency (MHz)	Average (dBµV/m)	Height (cm)	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
40.050000	25.7	99.8	97.0	13.30	39.00
144.000000	28.9	99.7	262.0	14.60	43.50
699.030000	21.3	99.9	86.0	25.10	46.40

RX Antenna Polarization: Horizontal

Frequency Range: 30MHz – 1GHz

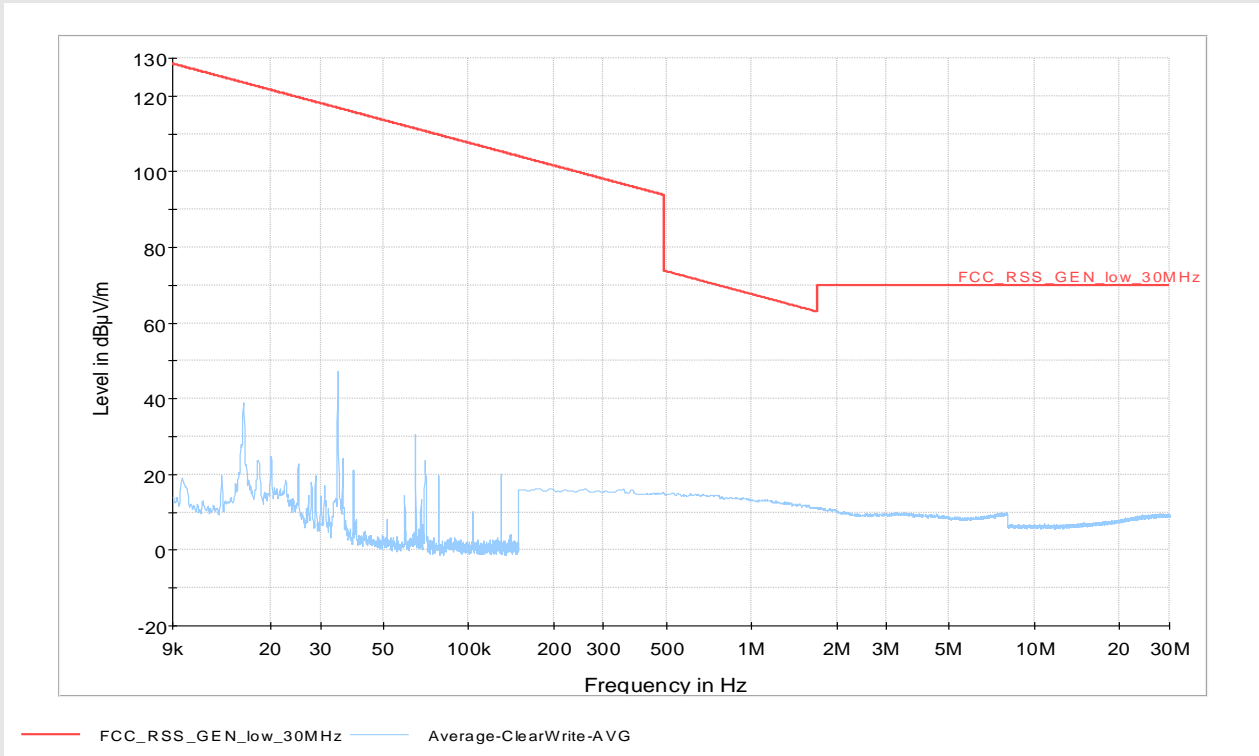


Final Result:

Channel 39

RX Antenna Polarization: ---

Frequency Range: 9kHz – 30MHz

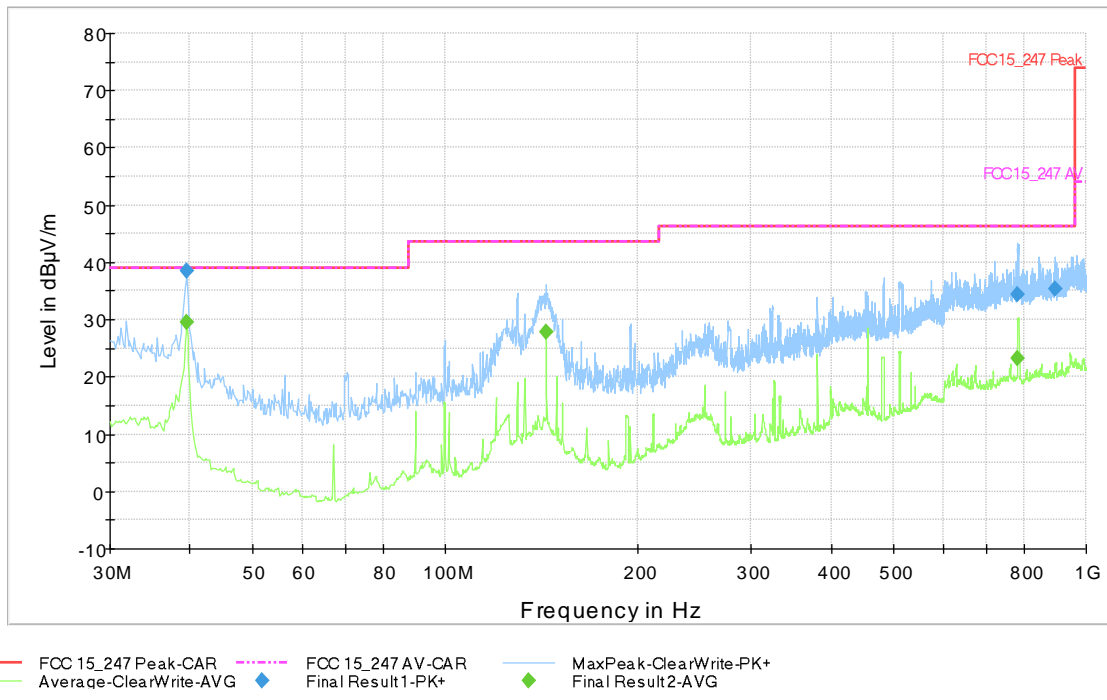


Final Result:

All emissions are below 10dB from the limit, for this reason no further assessments were carried out on the individual points

RX Antenna Polarization: Vertical

Frequency Range: 30MHz – 1GHz



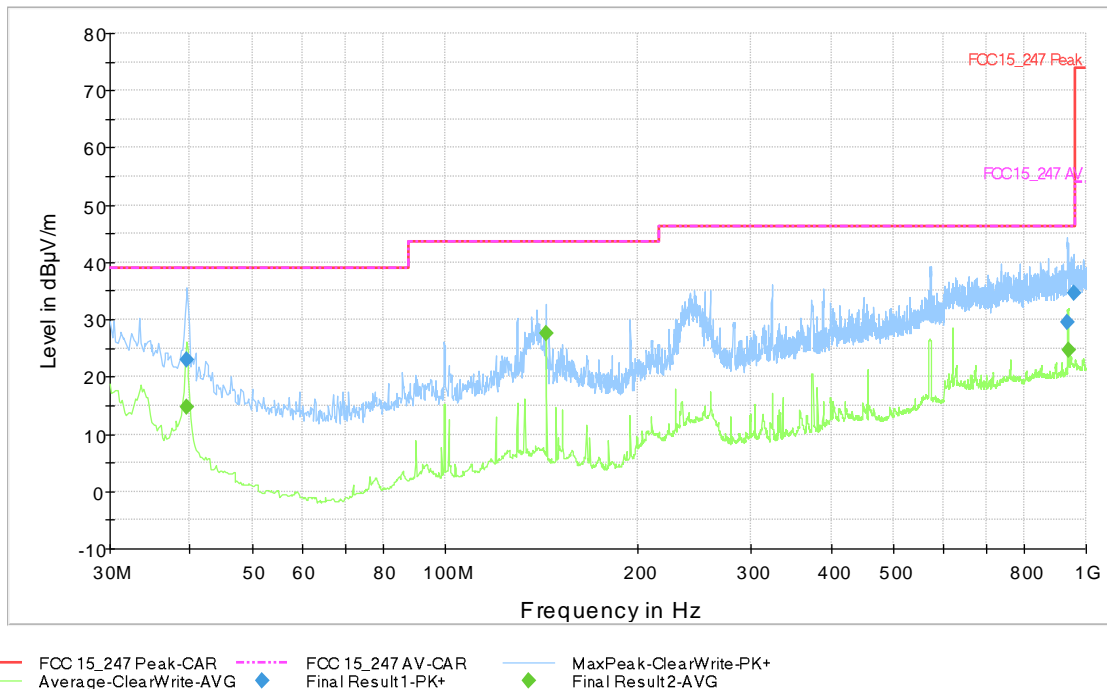
Final Result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Height (cm)	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
39.600000	38.4	99.9	97.0	0.60	39.00
780.810000	34.3	317.8	97.0	12.10	46.40
895.560000	35.3	179.8	177.0	11.10	46.40

Frequency (MHz)	Average (dBµV/m)	Height (cm)	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
39.450000	29.6	99.8	97.0	9.40	39.00
144.000000	28.0	99.8	262.0	15.50	43.50
781.620000	23.2	179.7	97.0	23.20	46.40

RX Antenna Polarization: Horizontal

Frequency Range: 30MHz – 1GHz



Final Result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Height (cm)	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
39.570000	23.1	258.8	-6.0	15.90	39.00
933.840000	29.6	99.8	187.0	16.80	46.40
957.840000	34.5	330.0	84.0	11.90	46.40

Frequency (MHz)	Average (dBµV/m)	Height (cm)	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
39.450000	14.9	257.8	7.0	24.10	39.00
144.000000	27.6	125.9	172.0	15.90	43.50
940.350000	24.7	154.7	180.0	21.70	46.40

TEST 9.

TRANSMITTER RADIATED EMISSIONS > 1GHZ

REFERENCE DOCUMENT

According to § 15.247 (d) and § 15.209 (a)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 Db below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 Db instead of 20 Db. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

• TEST SETUP	Acc. To ref. Std.					
• TEST LOCATION	Semi-Anechoic Chamber					
• DISTANCE OF MEASUREMENT	3m					
• TYPE OF MEASUREMENT	Radiated					
• TEST EQUIPMENT USED FOR TEST	Instrument	Manufacturer	Model	Serial n°	Calibrated On	Due to
	Emi Receiver	Rohde & Schwarz	ESU 40	100111	03/2023	03/2024
	Semi-Anechoic Chamber	Siemens	B83117-D6019-T232	003-005-134/94C	02/2023	02/2024
	Horn antenna	Electro Metrics	EM-6961	100437	10/2020	10/2023
	Horn antenna + Low Noise Preamplifier	Bonn Elektronik	BLMA 1840-1A	262WL80452	04/2023	04/2025
	High pass filter	Waineright	WHK 2,8/15G	1	10/2021	10/2023
	Software EMC	Rohde & Schwarz	EMC32-E	V 8.40.0	N.A.	
• TESTED PORT	Antenna					
• TEST METHOD	ANSI C63.10:2013 section 6.6					
• FREQUENCY RANGE	1GHz – 10GHz					
• LIMITS	Acc. To ref. Std.					
• UNCERTAINTY OF MEASURE	Level of confidence = 95% (k=2) Expanded uncertainty 1GHz – 18GHz = 5,15 dB Expanded uncertainty 18GHz – 26GHz = 5,82 dB					

TEST CONDITIONS	REQUIRED	MEASURED
Ambient temperature	23°C ± 5°C	24 °C
Ambient humidity	25 - 75%rH	45%
Pressure	85 - 106kPa (860mbar - 1060mbar)	960 mbar

OPERATING CONDITION: #1, #2, #3

RESULT: **WITHIN THE LIMITS**

MEASUREMENT PARAMETER 1GHz - 10GHz

Resolution bandwidth:	1MHz
Video bandwidth:	3MHz
Span:	See plots below
Sweep time	Auto couple
Detector:	Peak
Trace-Mode:	Max. hold

TEST DESCRIPTION

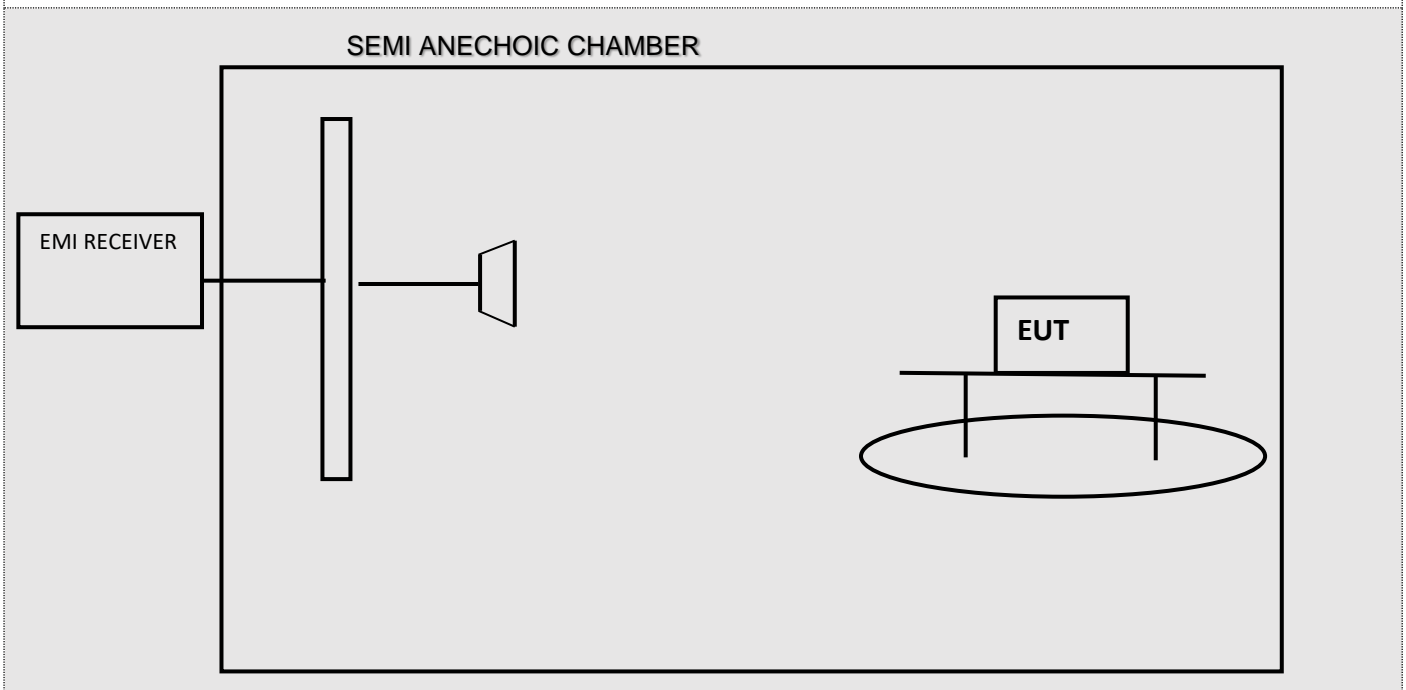
Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously - rotating, remotely - controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency.

The EUT is placed at test table height is 1.5 m

Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m~4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3m.

This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

TEST SETUP BLOCK DIAGRAM

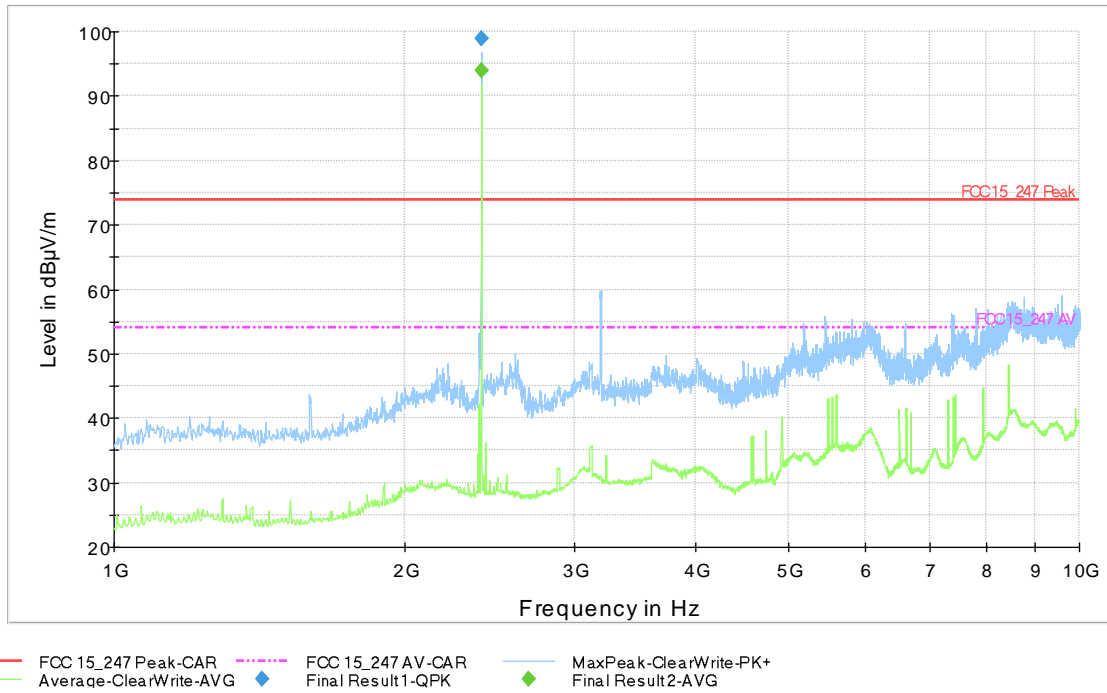


TEST RESULTS

Channel 37

RX Antenna Polarization: Vertical

Frequency Range: 1GHz – 10GHz



Final Result:

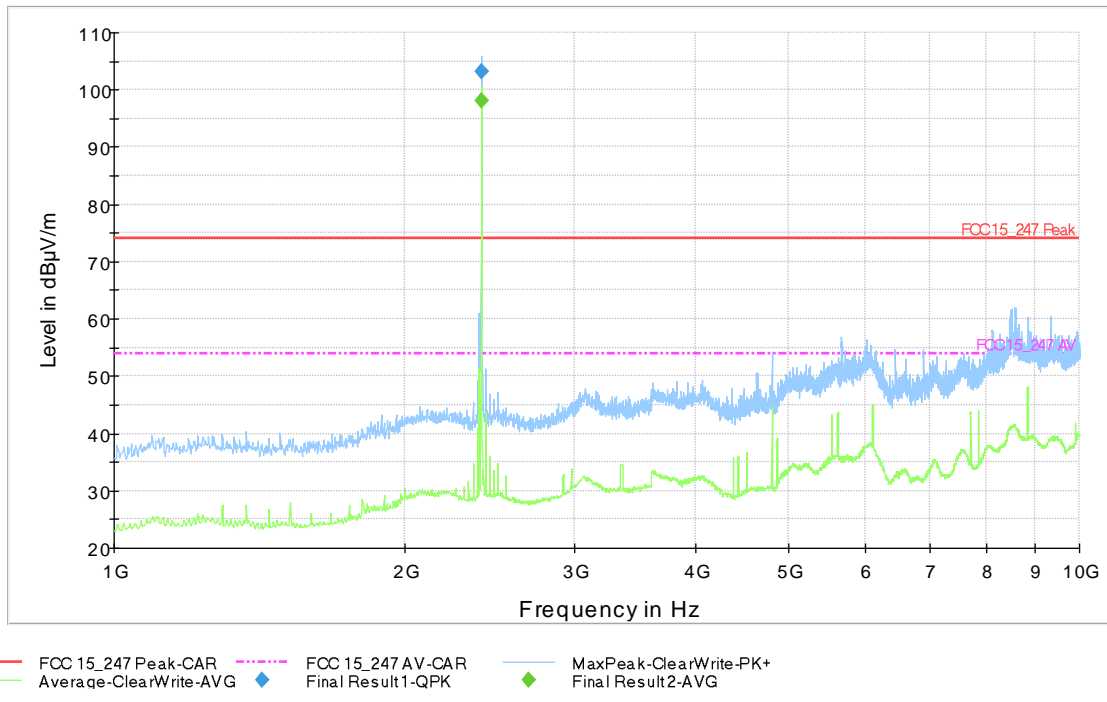
Frequency (MHz)	Peak (dBµV/m)	Height (cm)	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
2401.750000	99.0	99.8	181.0	-25.00	74.00

Frequency (MHz)	Average (dBµV/m)	Height (cm)	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
2402.000000	93.9	99.8	180.0	-39.90	54.00

NOTE: Peaks out of limits are due to BLE carrier and are not evaluated in this test.

RX Antenna Polarization: Horizontal

Frequency Range: 1GHz – 10GHz



Final Result:

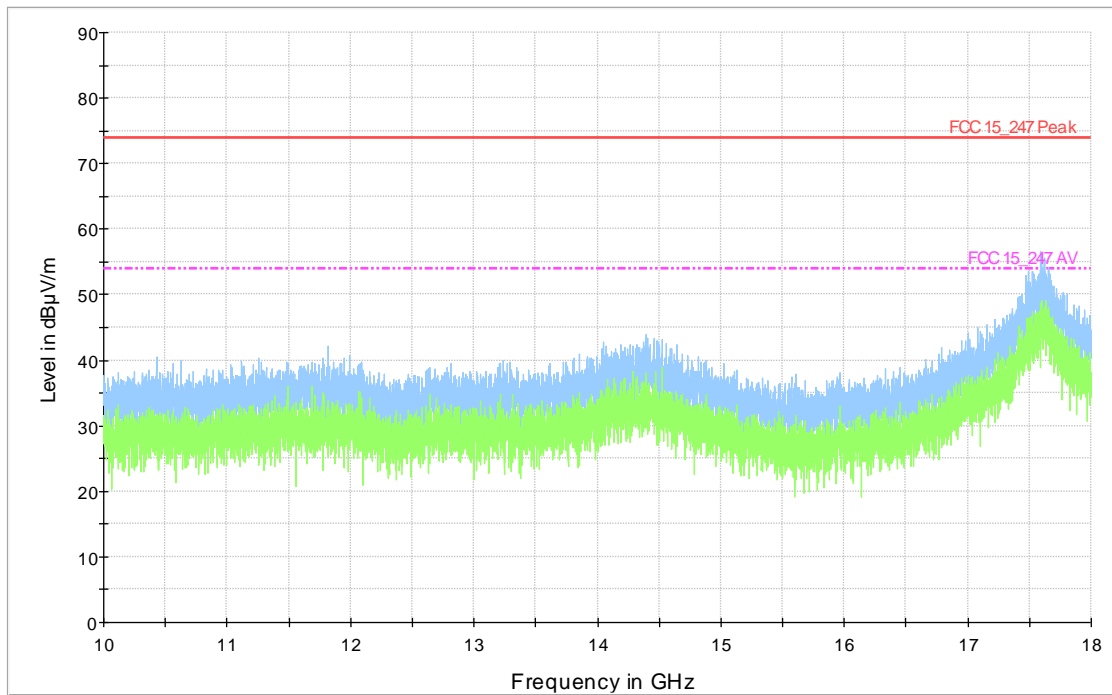
Frequency (MHz)	Peak (dBµV/m)	Height (cm)	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
2402.250000	103.2	99.8	262.0	-29.20	74.00

Frequency (MHz)	Average (dBµV/m)	Height (cm)	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
2402.000000	98.1	99.9	262.0	-44.10	54.00

NOTE: Peaks out of limits are due to BLE carrier and are not evaluated in this test.

RX Antenna Polarization: Vertical

Frequency Range: 10GHz – 18GHz

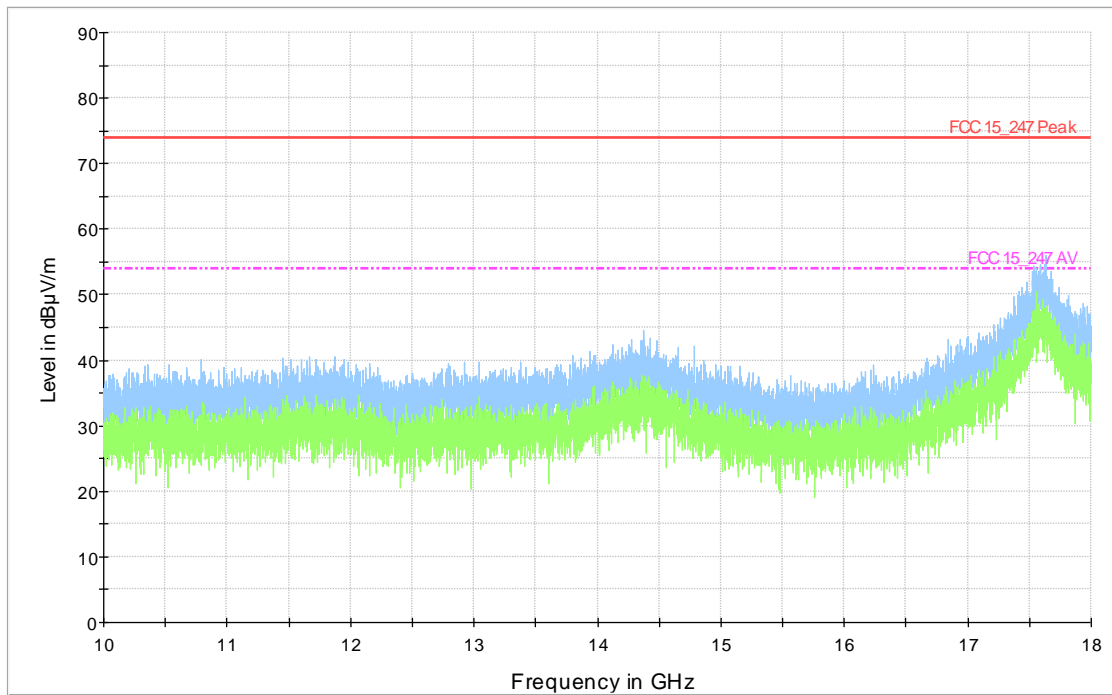


Final Result:

All emissions are below 10dB from the limit, for this reason no further assessments were carried out on the individual points

RX Antenna Polarization: Horizontal

Frequency Range: 10GHz – 18GHz

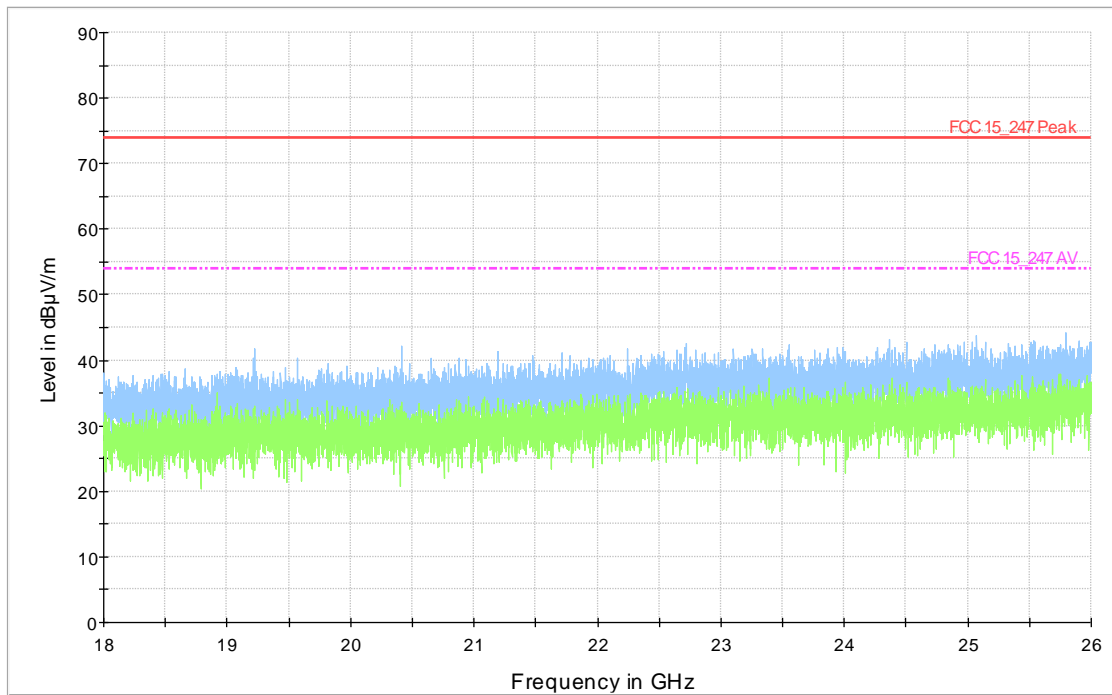


Final Result:

All emissions are below 10dB from the limit, for this reason no further assessments were carried out on the individual points

RX Antenna Polarization: Vertical

Frequency Range: 18GHz – 26GHz

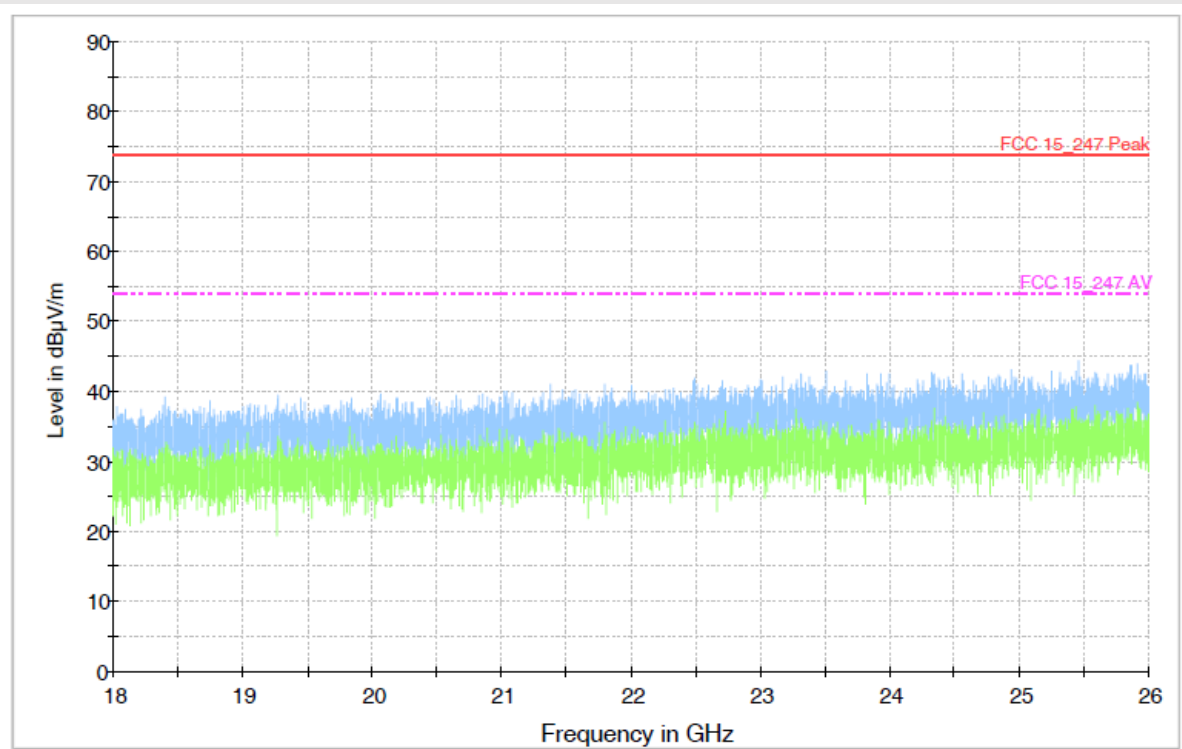


Final Result:

All emissions are below 10dB from the limit, for this reason no further assessments were carried out on the individual points

RX Antenna Polarization: Horizontal

Frequency Range: 18GHz – 26GHz



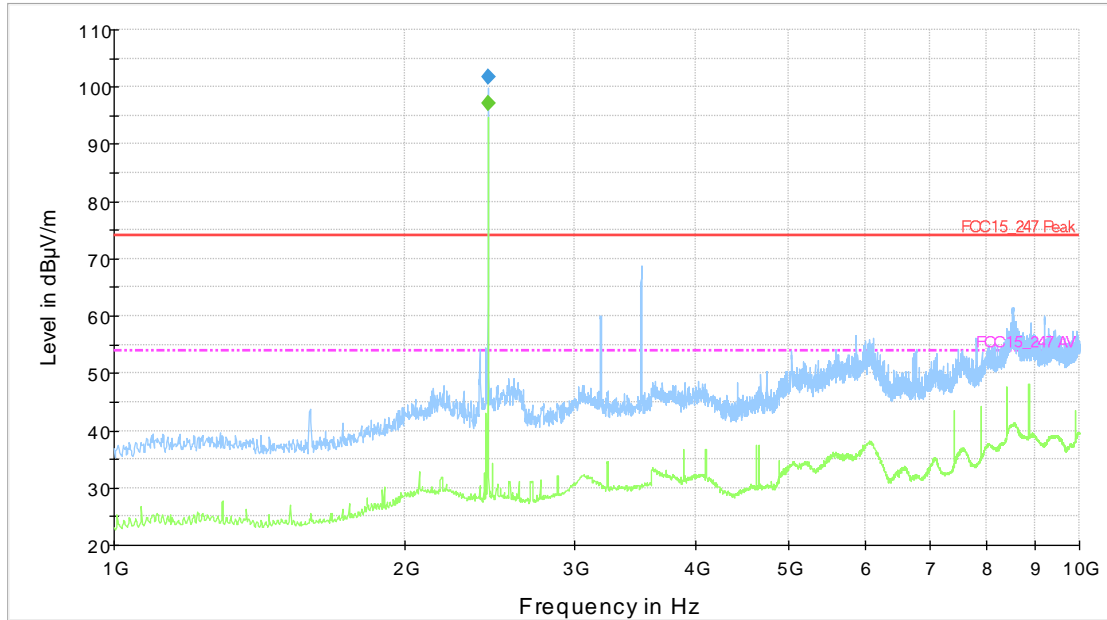
Final Result:

All emissions are below 10dB from the limit, for this reason no further assessments were carried out on the individual points

Channel 17

RX Antenna Polarization: Vertical

Frequency Range: 1GHz – 10GHz



— FCC15_247 Peak-CAR - - - - FCC15_247 AV-CAR — MaxPeak-ClearWrite-PK+
— Average-ClearWrite-AVG ◆ Final Result1-QPK ◆ Final Result2-AVG

Final Result:

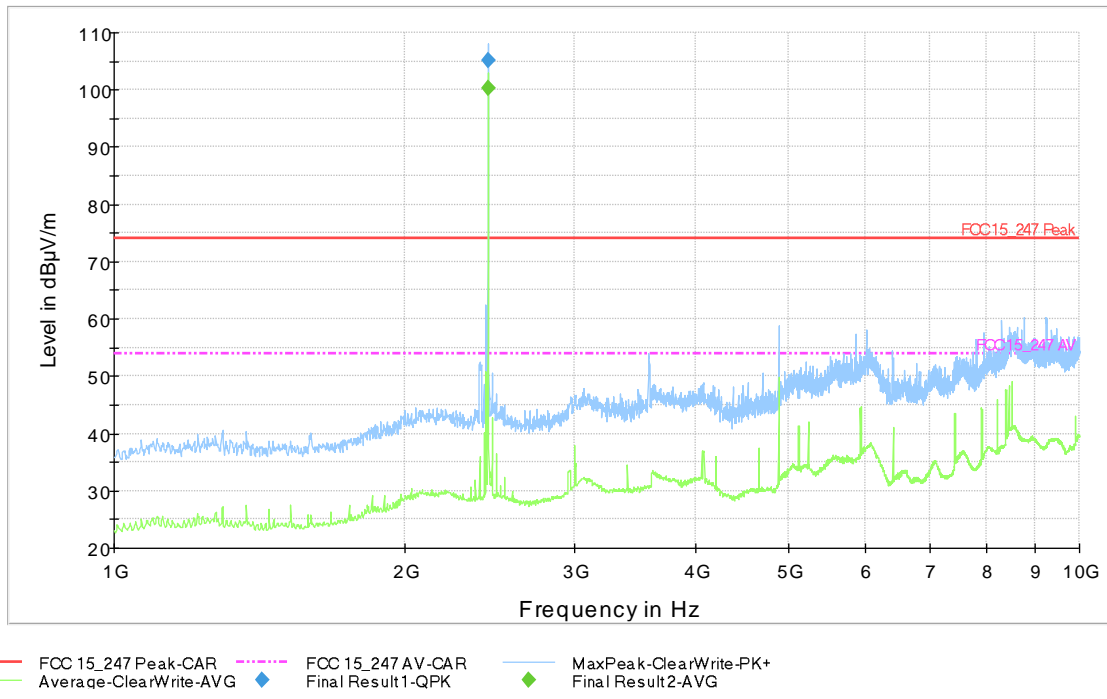
Frequency (MHz)	Peak (dBµV/m)	Height (cm)	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
2439.750000	101.8	99.7	87.0	-27.80	74.00

Frequency (MHz)	Average (dBµV/m)	Height (cm)	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
2440.000000	97.1	99.8	84.0	-43.10	54.00

NOTE: Peaks out of limits are due to BLE carrier and are not evaluated in this test.

RX Antenna Polarization: Horizontal

Frequency Range: 1GHz – 10GHz



Final Result:

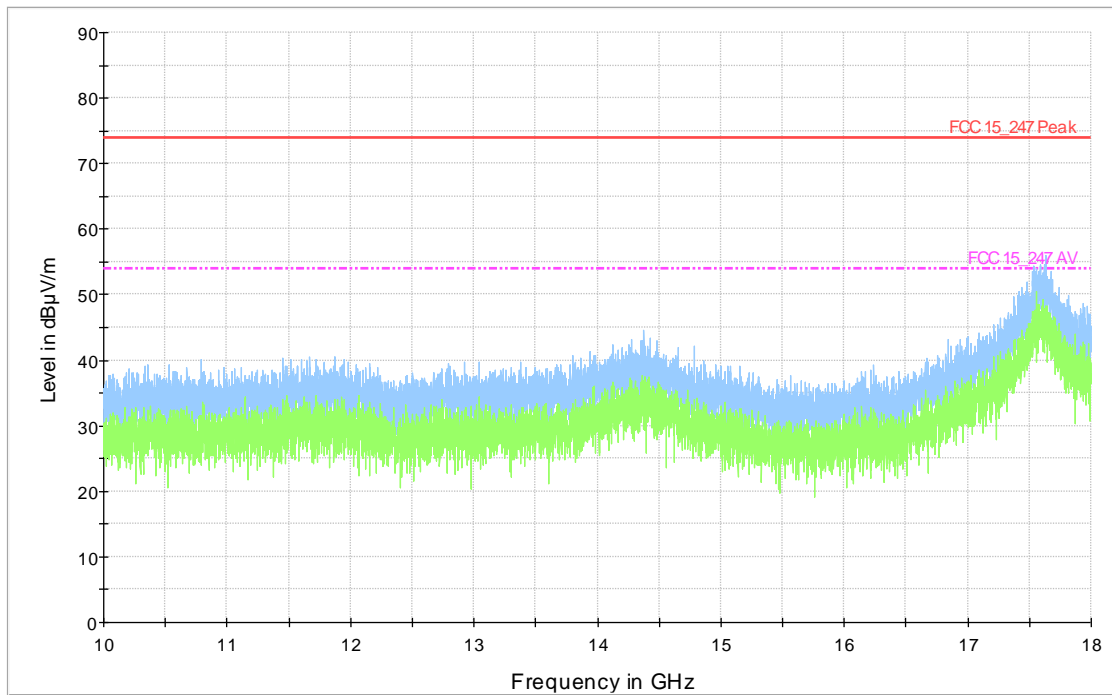
Frequency (MHz)	Peak (dBµV/m)	Height (cm)	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
2439.750000	105.2	99.8	262.0	-31.20	74.00

Frequency (MHz)	Average (dBµV/m)	Height (cm)	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
2440.000000	100.2	99.9	262.0	-46.20	54.00

NOTE: Peaks out of limits are due to BLE carrier and are not evaluated in this test.

RX Antenna Polarization: Vertical

Frequency Range: 10GHz – 18GHz

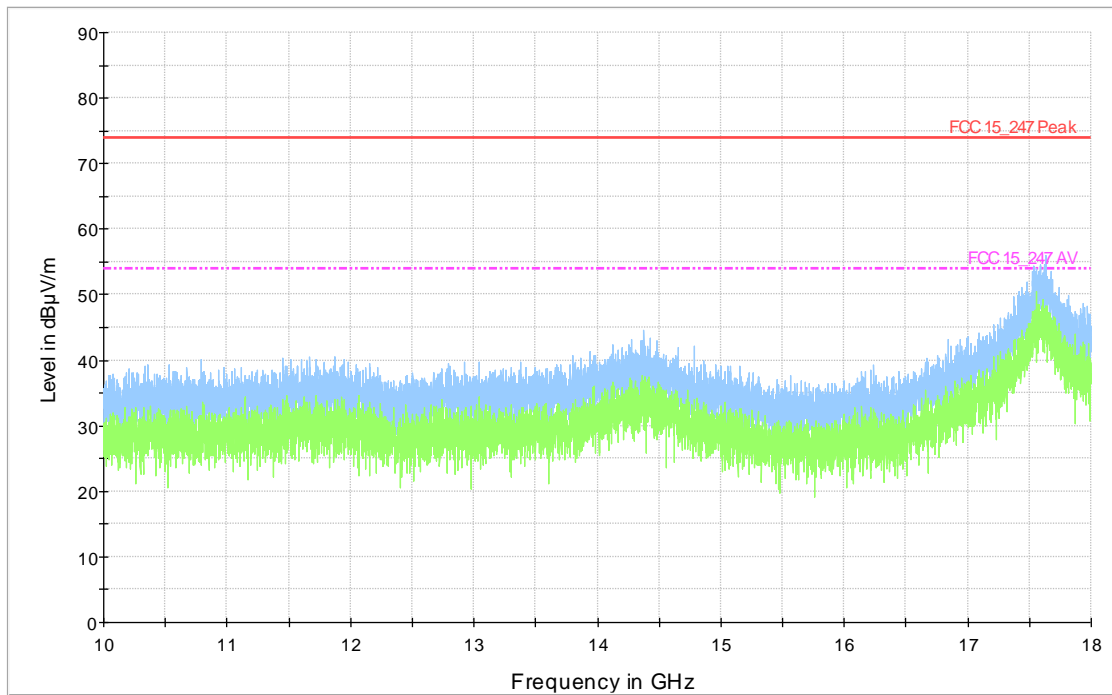


Final Result:

All emissions are below 10dB from the limit, for this reason no further assessments were carried out on the individual points

RX Antenna Polarization: Horizontal

Frequency Range: 10GHz – 18GHz

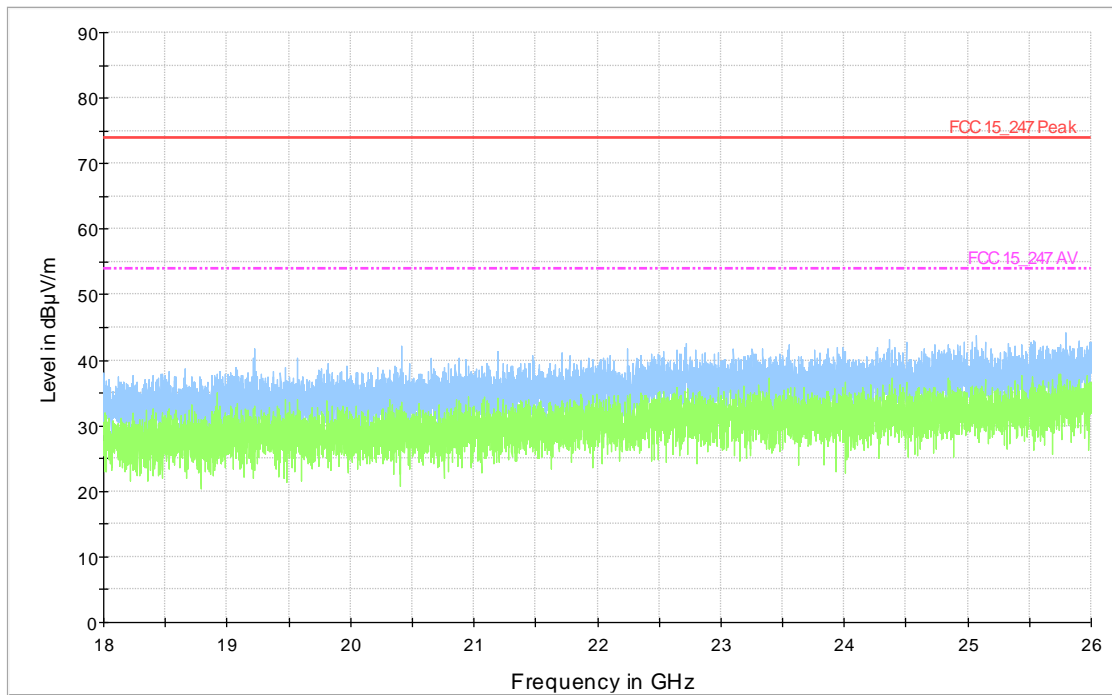


Final Result:

All emissions are below 10dB from the limit, for this reason no further assessments were carried out on the individual points

RX Antenna Polarization: Vertical

Frequency Range: 18GHz – 26GHz

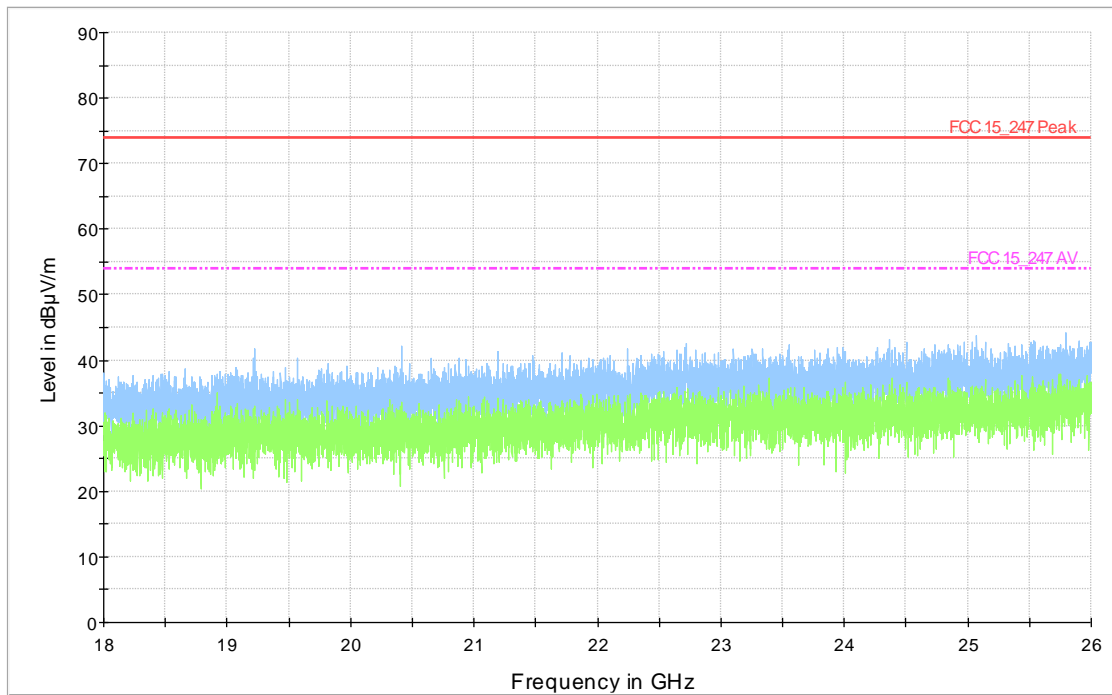


Final Result:

All emissions are below 10dB from the limit, for this reason no further assessments were carried out on the individual points

RX Antenna Polarization: Horizontal

Frequency Range: 18GHz – 26GHz



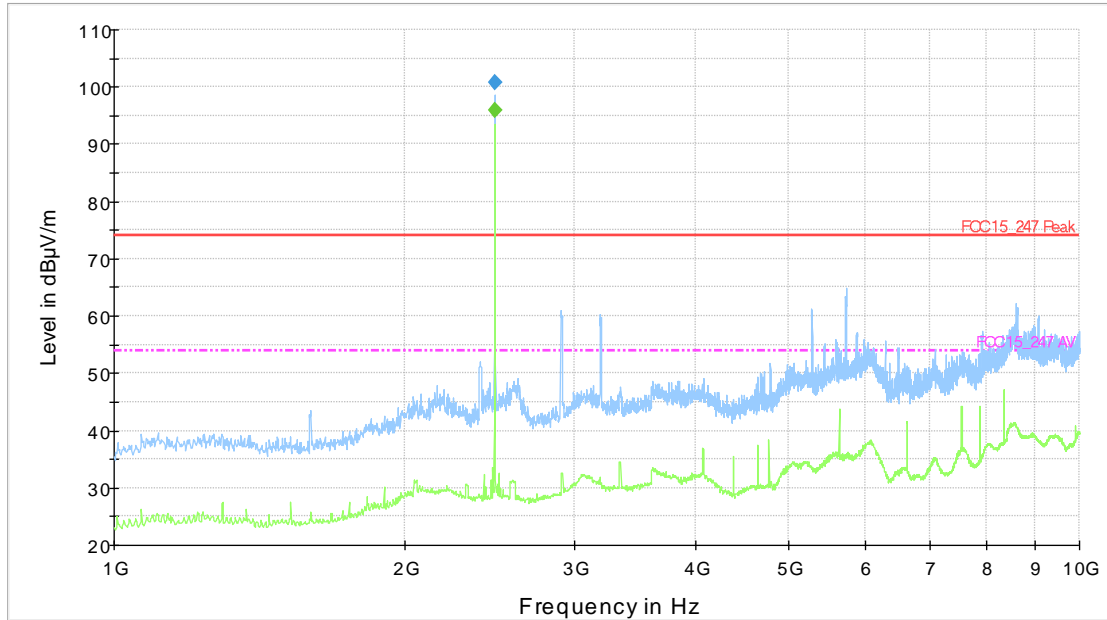
Final Result:

All emissions are below 10dB from the limit, for this reason no further assessments were carried out on the individual points

Channel 39

RX Antenna Polarization: Vertical

Frequency Range: 1GHz – 10GHz



— FCC 15_247 Peak-CAR
 - - - FCC 15_247 AV-CAR
 — MaxPeak-ClearWrite-PK+
— Average-ClearWrite-AVG
 ◆ Final Result 1-QPK
 ◆ Final Result 2-AVG

Final Result:

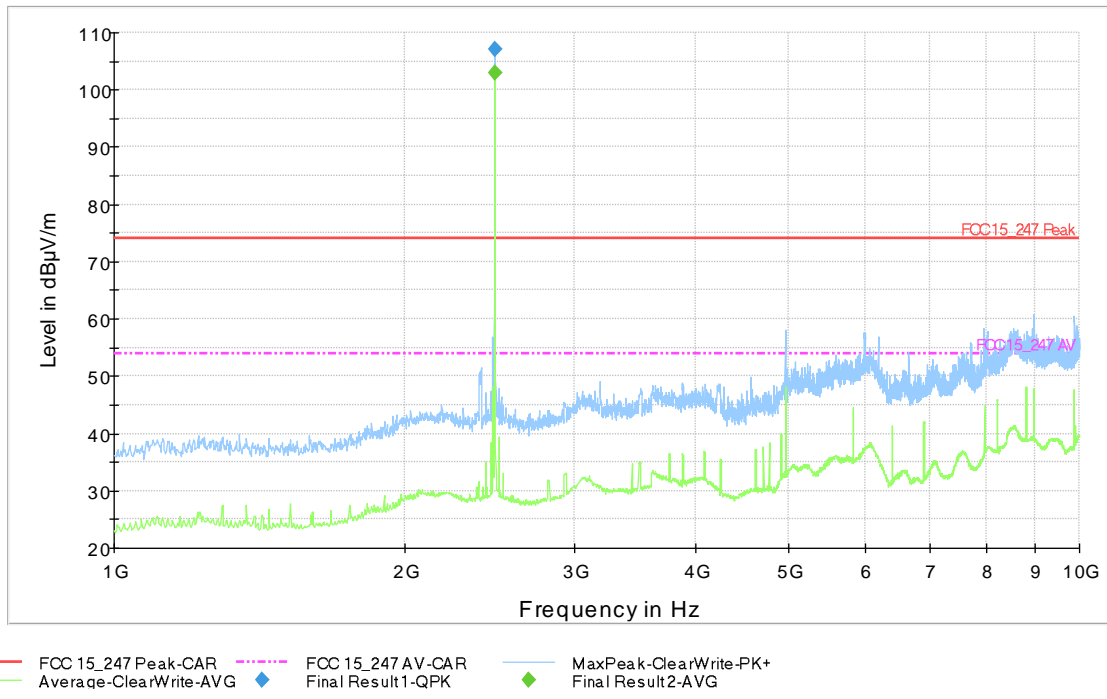
Frequency (MHz)	Peak (dBµV/m)	Height (cm)	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
2479.750000	100.7	125.9	85.0	-26.70	74.00

Frequency (MHz)	Average (dBµV/m)	Height (cm)	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
2480.000000	96.0	99.7	87.0	-42.00	54.00

NOTE: Peaks out of limits are due to BLE carrier and are not evaluated in this test.

RX Antenna Polarization: Horizontal

Frequency Range: 1GHz – 10GHz



Final Result:

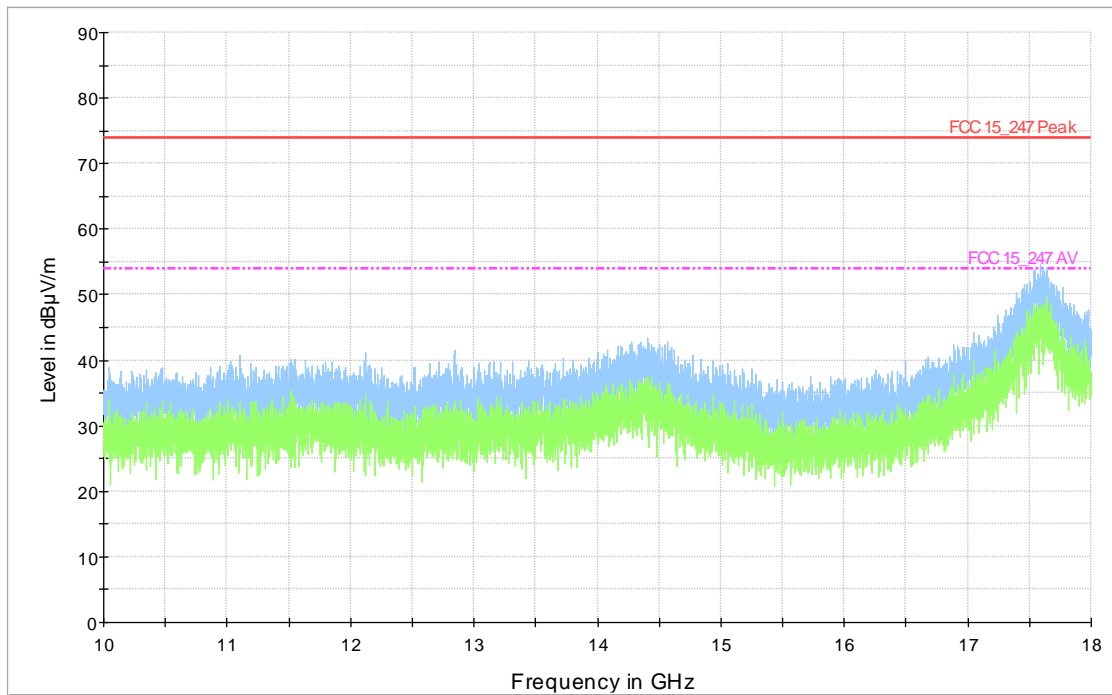
Frequency (MHz)	Peak (dBµV/m)	Height (cm)	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
2479.750000	107.1	99.7	262.0	-33.10	74.00

Frequency (MHz)	Average (dBµV/m)	Height (cm)	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
2480.000000	102.8	104.7	262.0	-48.80	54.00

NOTE: Peaks out of limits are due to BLE carrier and are not evaluated in this test.

RX Antenna Polarization: Vertical

Frequency Range: 10GHz – 18GHz

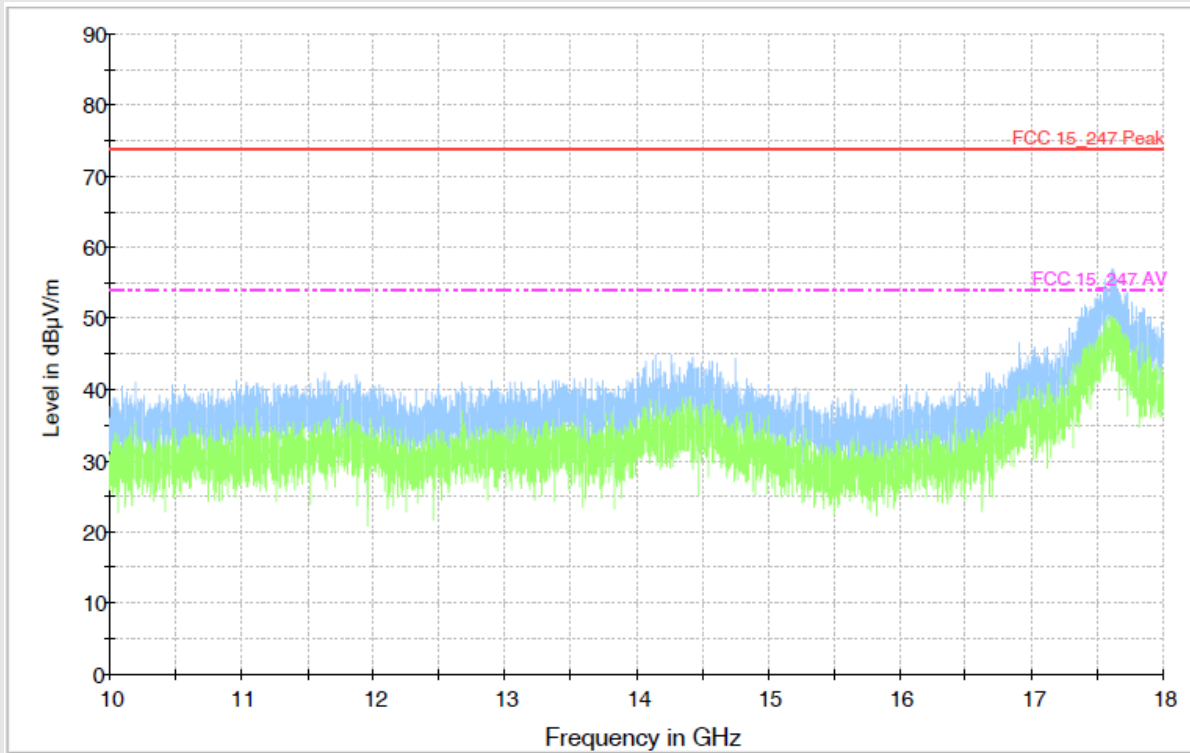


Final Result:

All emissions are below 10dB from the limit, for this reason no further assessments were carried out on the individual points

RX Antenna Polarization: Horizontal

Frequency Range: 10GHz – 18GHz

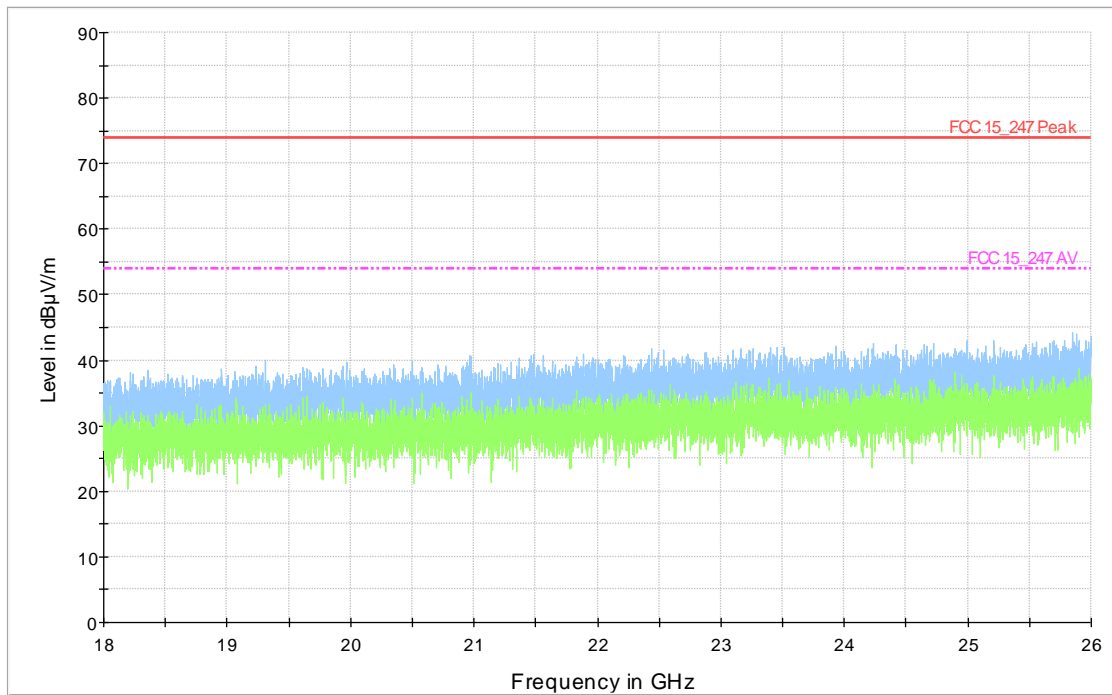


Final Result:

All emissions are below 10dB from the limit, for this reason no further assessments were carried out on the individual points

RX Antenna Polarization: Vertical

Frequency Range: 18GHz – 26GHz

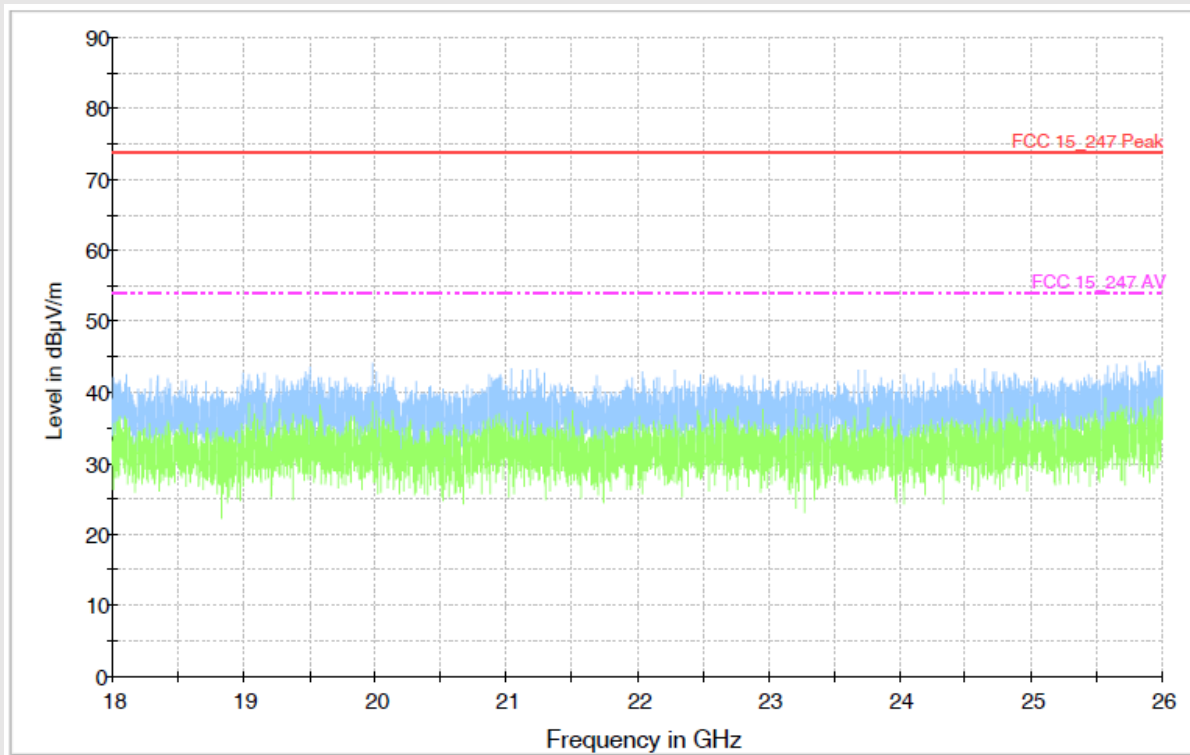


Final Result:

All emissions are below 10dB from the limit, for this reason no further assessments were carried out on the individual points

RX Antenna Polarization: Horizontal

Frequency Range: 18GHz – 26GHz



Final Result:

All emissions are below 10dB from the limit, for this reason no further assessments were carried out on the individual points

END OF TEST REPORT