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File Number **24/36403475M1**

TEST REPORT
Radiofrequency

Petitioner's Reference:	Verisure Sàrl		
Company Address:	Chemin Jean-Baptiste Vandelle 3, Versoix, Geneva, Switzerland		
Represented by:	James Barnett		
PMN:	Wi-Fi Extender		
Brand:	Verisure	HMN:	GWL-WXTND 489937
Sample #1:	3N75 UMVP	Applus Id:	25556-0001
Sample #2:	3N75 UKDZ	Applus Id:	25556-0002
Result:	**complies**		

It has been tested and complies with the applicable standard. See test result summary section.

Applicable Standard:

RF standard/s: **FCC 47 CFR Part 15 Subpart C[1]**
ANSI C63.10 (2013)

[1]*The latest modifications of the standard, published at the date of the tests reported in this document, have been considered.*

Dates and Test Site:	Applus Barcelona, Bellaterra
Equipment Reception Date	December 12, 2023
Test Initial Date:	January 17, 2024
Test Final Date:	February 9, 2024
Modification Description:	M1

This report replaces and supersedes the report 24/36403475 dated on September 18, 2024.

Modifications performed: Version of ANSI C63.10:2013 is specified in applicable standard. Page 1.
It is responsibility of the petitioner to replace the previous version with this one.

Test Manager: Javier Miguel Nadales Lisbona
Date of issue: Bellaterra, October 17, 2024

JORGE GEIS ESTRADA
Firmado digitalmente por JORGE GEIS ESTRADA
Fecha: 2024.10.22 14:54:01 +02'00'

EMC & Wireless Technical Manager
Electrical and Electronics
LGAI Technological Center S.A.

ENSAYO ISO 17025 Nº9 / LE894

1 TEST RESULTS SUMMARY

Test Description	Sample #	DUT Test Modes	Results	Criteria Note
ANTENNA REQUIEREMENTS (FCC Part 15.203)	#1, #2	Mode 1	PASS	N/A
OCCUPIED BANDWIDTH (99%) & EMISSION BANDWIDTH 20 dB (FCC Part 15.247 (a))	#1	Mode 1	PASS	CN4
6 dB BANDWITDH (FCC Part 15.247 (a))	#1	Mode 1	PASS	CN4
MAXIMUM PEAK CONDUCTED OUTPUT POWER (FCC Part 15.247 (c))	#1	Mode 1	PASS	CN4
POWER SPECTRAL DENSITY (FCC Part 15.247 (b))	#1	Mode 1	PASS	CN4
BAND EDGE (FCC Part 15.247 (d))	#1	Mode 1	PASS	CN4
RADIOFREQUENCY RADIATED EMISSIONS (FCC Part 15.247 (d))	#2	Mode 1	PASS	CN3

Table 1: Test description

The test results are shown in detail on the following pages.

The criteria to give conformity in those cases where it is not implicit in the standard or specification will be, for EMC emissions tests, a non-simple binary decision rule will be followed with a safety zone equal to the value of the uncertainty (w = U).

In this case, the upper limit of the value of the probability of false acceptance, according to ILAC G8, is 2.5 % and the criteria notes are:

CN1: The measured results are above the upper limit, even considering the uncertainty interval.
CN2: The measured results are above the specified limits, but within the uncertainty interval. It is therefore not possible to state compliance based on the 95% level of confidence. However, the results indicate that non-compliance is more probable than compliance.
CN3: The measured results are below the specified limits, but within the uncertainty interval. It is therefore not possible to state compliance based on the 95% level of confidence. However, the results indicate that compliance is more probable than non-compliance.
CN4: The measured results are within the limits, including the uncertainty interval.

2 INDEX

3 GENERAL DESCRIPTION OF TEST ITEMS

3.1 EQUIPMENT DESCRIPTION

This information has been provided by the customer and it is not covered by the accreditation. LGAI does not assume any responsibility from it.

EQUIPMENT DESCRIPTION			
Description	Wi-Fi Extender which can also be controlled and monitored over our proprietary radio protocol over Sub-GHz ISM (SRD).		
EUT Version	**FVIN**	**HVIN**	
	1.0.6	A1	
Power supply	1 PH + N	120 V	60 Hz
Equipment Size	**Length**	**Width**	**Height**
	17.5 cm	10.5 cm	2 cm
Modulation	B, G & N20		
Operating Frequency Band	2400 MHz – 2483.5 MHz		
Maximum RF Output Power [dBm]	20		
Operating Channel(s) Width(s) [MHz]	20		
Equipment Type	DTS		
Number of Hopping Channels	N/A		
Emission Designator			
FCC ID	2A93W-GWL-WXTND		

Table 2: Equipment description

RF FEATURES					
Description	**Communication Technology**	**Radio Chipset**	**Brand**	**Module Model**	**Antenna Gain – MIMO[1][dBi]**
	WiFi 2G4	SYN4375B4XKFFBG/ BCM4375B4XKFFBG[2]	Synaptics / Broadcom[2]	N/A	+2.57

Table 3: RF Features

Note [1]: For MIMO transmission mode, antenna gain calculations are based on KDB 662911 D01 Multiple Transmitter Output v02r01. Considering that the customer has declared Cyclic Delay Diversity mode.

Note [2]: This is not dual source, just that Synaptics purchased this business line from Broadcom and the PN is renamed, some documentation may refer to those 2 PN

3.2 TEST CONFIGURATION

DUT Operation Modes			
Mode #	**Description**		
1	The customer provides test guidance. Equipment under test is connected to an Rpi. Use the Rpi to set up continuous modulated transmission on individual channels on the EUT. For MIMO transmission mode chain 3 has been selected on *config.ini* file.		
	Modulation	**Frequency [MHz]**	**Script**
	Mode B	2412	python wltx.py -- Ch 1 -- Rate 1 -- Bw 20
		2437	python wltx.py -- Ch 6 -- Rate 1 -- Bw 20
		2462	python wltx.py -- Ch 11 -- Rate 1 -- Bw 20
	Mode G	2412	python wltx.py -- Ch 1 -- Rate 6 -- Bw 20
		2437	python wltx.py -- Ch 6 -- Rate 6 -- Bw 20
		2462	python wltx.py -- Ch 11 -- Rate 6 -- Bw 20
	Mode N20	2412	python wltx.py -- Ch 1 – MCS 0 -- Bw 20
		2437	python wltx.py -- Ch 6 – MCS 0 -- Bw 20
		2462	python wltx.py -- Ch 11 – MCS 0 -- Bw 20

Table 4. Test Configuration

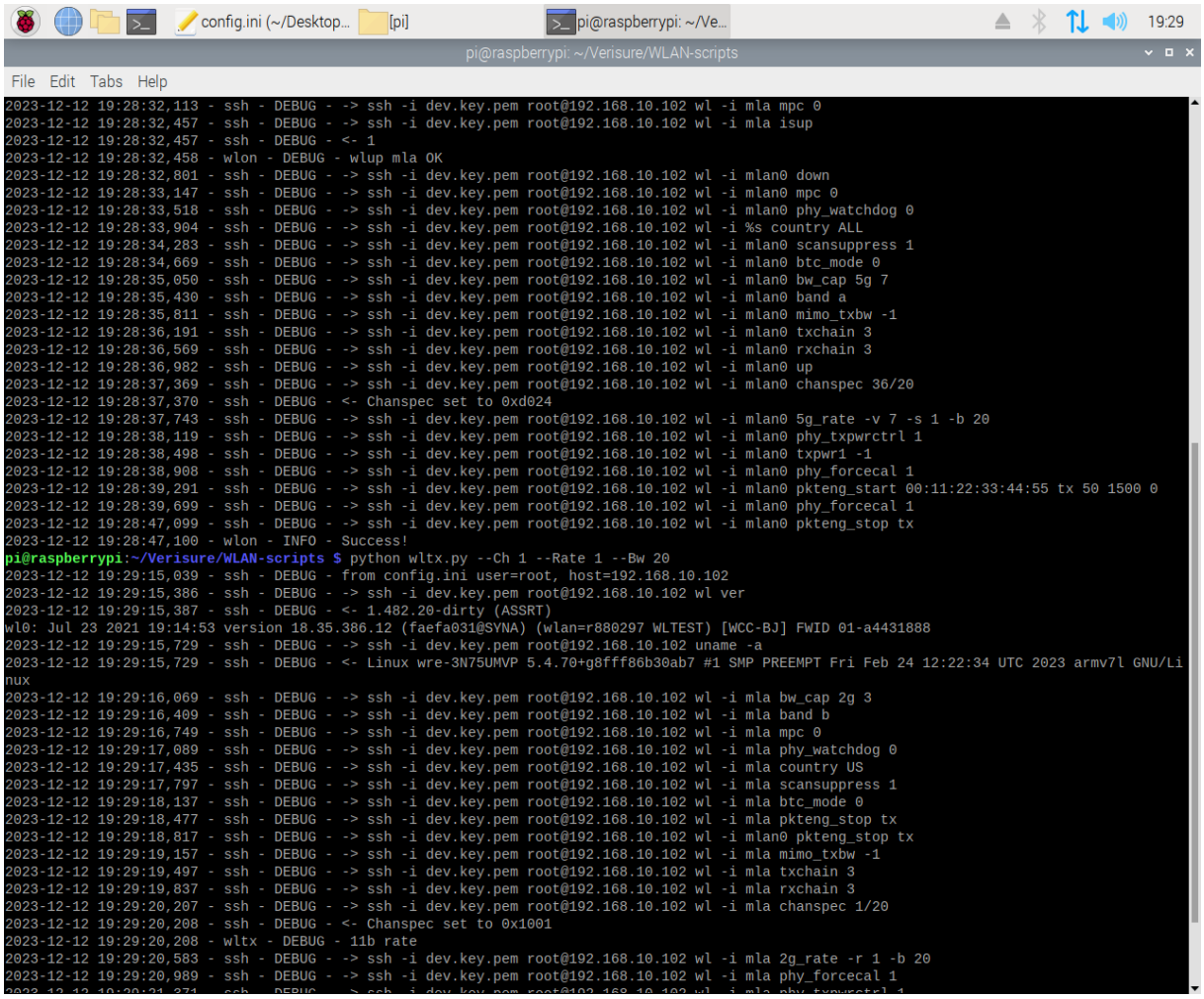

Fig. 1: Sample Configuration

3.3 PHOTOGRAPHS

Photographs identifying the equipment under test and its auxiliaries, as well as assembly photographs for radiated and conducted tests, can be found in the document with ID: 24/36403478M2

3.4 TEST FACILITIES ID

TEST FACILITIES ID	
FCC Test Firm Registration Number:	507478
ISED Assigned Code:	5766A
CABID	ES0001

Table 5: Test facilities ID

3.5 COMPETENCES AND GUARANTEES

LGAI Technological Center, S.A. is a testing laboratory accredited by the National Accreditation Body (ENAC -Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 9/LE894.
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4 TEST RESULTS

4.1 ANTENNA REQUIREMENT

4.1.1 Requirements

For intentional device, according to FCC 47 CFR, 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. 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, 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.

For intentional device, according to RSS-Gen, the applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

4.1.2 Summary Test Results

The laboratory checks that the sample has an internal antenna, so that no hardware modifications are possible. Complying with the requirements of this section.

4.2 OCCUPIED CHANNEL BANDWIDTH (99%) & 20 dB BANDWIDTH

4.2.1 Test Setup Required

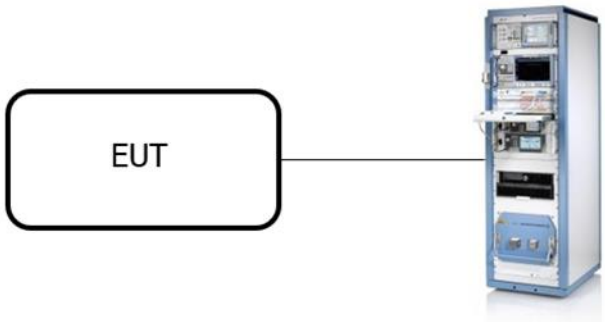

Fig. 2: Set-Up - Occupied Channel Bandwidth & Occupied Channel Bandwidth 99% & Emission Bandwidth 20dB

4.2.2 Requirements

The frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission. In some cases, for example multichannel frequency-division systems, the percentage of 0.5 percent may lead to certain difficulties in the practical application of the definitions of occupied and necessary bandwidth; in such cases a different percentage may prove useful

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

4.2.3 EMI Receiver configuration

During the conducted test, the EMI receiver was set with the following configurations:

Central frequency [MHz]	Span [MHz]	Detector	Trace Mode	RBW [kHz]	VBW [kHz]
Channel frequency	40	Peak	Max Hold	200	1000

Table 6: EMI Receiver configuration – Occupied Channel Bandwidth 99% & Emission Bandwidth 20dB

4.2.4 Test Environmental Conditions

Test Date	Technician	Supervisor	Temperature [ºC]	Humidity [%]	Atm. Pressure [mbar]
17/01/2024	Javier M. Nadales	-	21.4	44.7	998.1

Table 7: Test environmental conditions – Occupied Channel Bandwidth 99% & Emission Bandwidth 20dB

4.2.5 Summary Test Results

Modulation	Operating Frequency [MHz]	99% Bandwidth [MHz]	20 dB Bandwidth [MHz]	Results
Mode B	2412	11.1	13.3	PASS
	2437	11.3	13.4	PASS
	2462	11.2	13.3	PASS
Mode G	2412	16.6	18.9	PASS
	2437	16.8	19.9	PASS
	2462	16.5	18.9	PASS
Mode N20	2412	17.8	20.2	PASS
	2437	18.1	20.7	PASS
	2462	17.7	19.9	PASS

Table 8: Summary Test Results – Occupied Channel Bandwidth 99% & Emission Bandwidth 20dB

4.2.6 Test Results

4.2.6.1 Sample #1. Mode #1. Modulation B

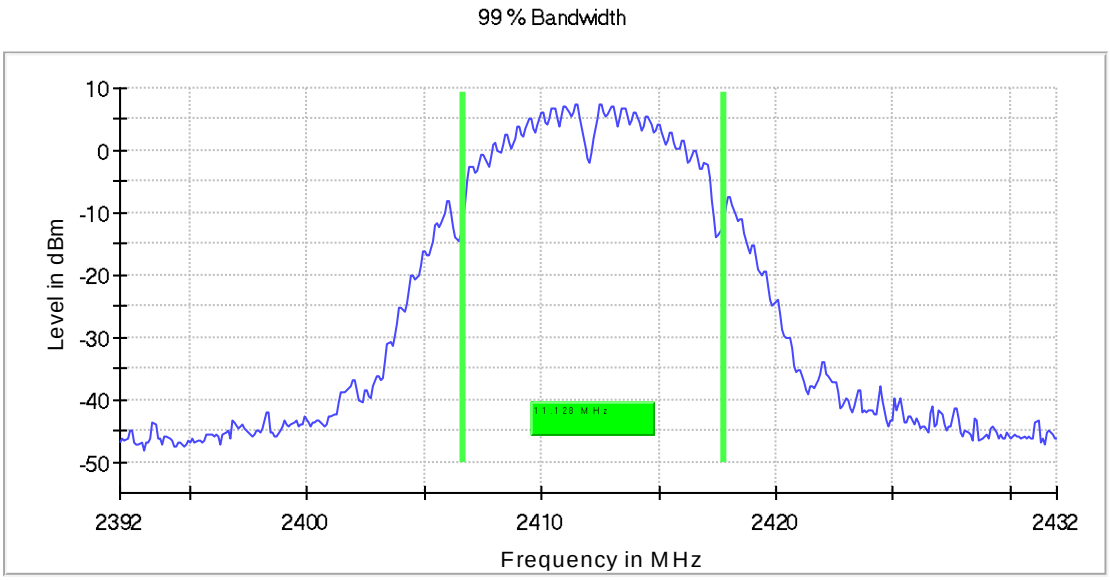

Fig. 3: Low Channel - 99% Occupied Channel Bandwidth

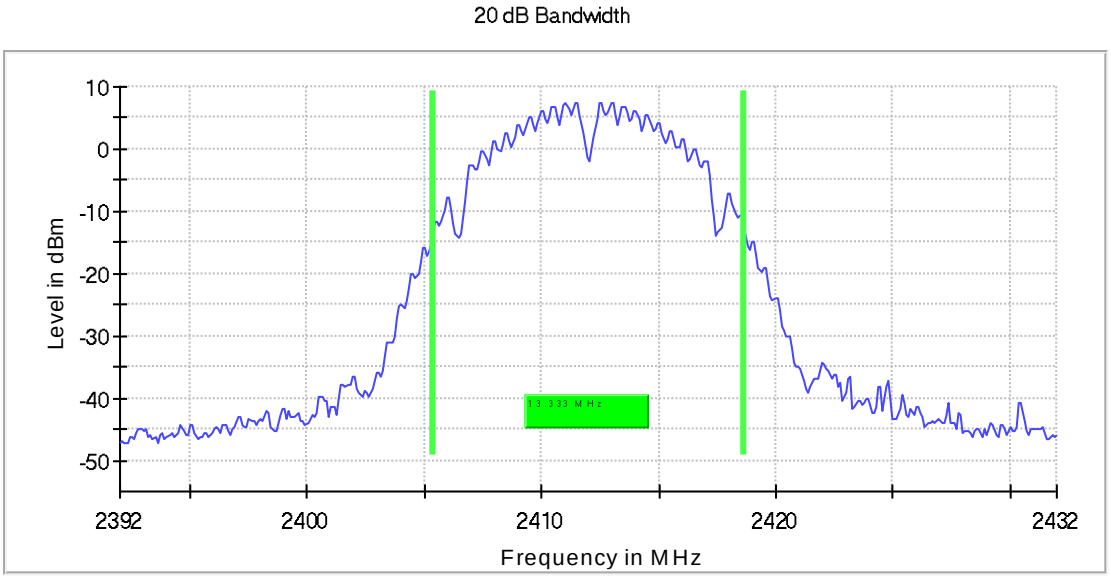

Fig. 4: Low Channel - Emission Bandwidth 20dB

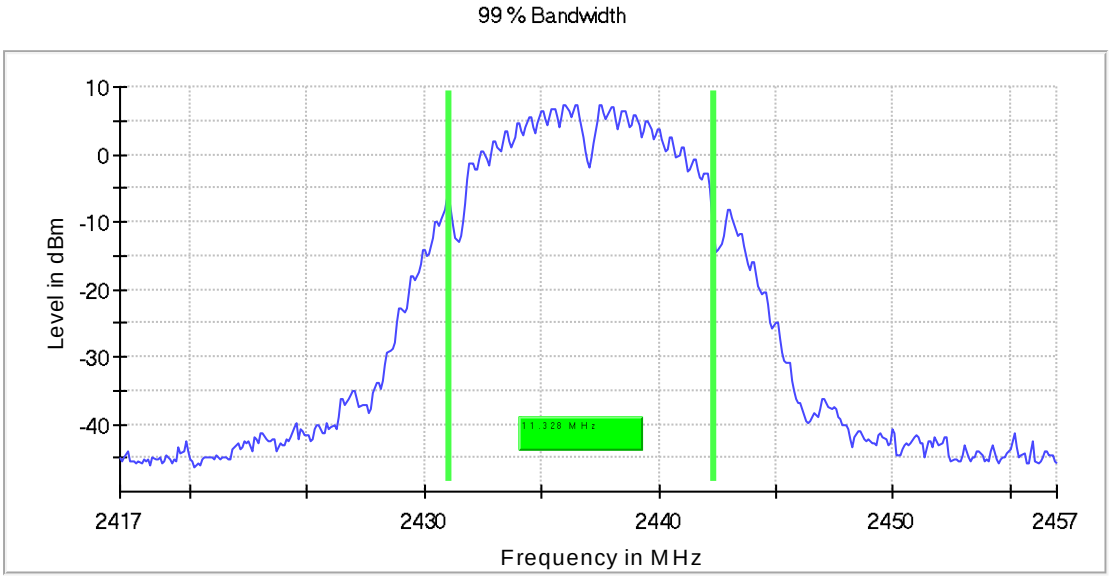

Fig. 5: Middle Channel - 99% Occupied Channel Bandwidth

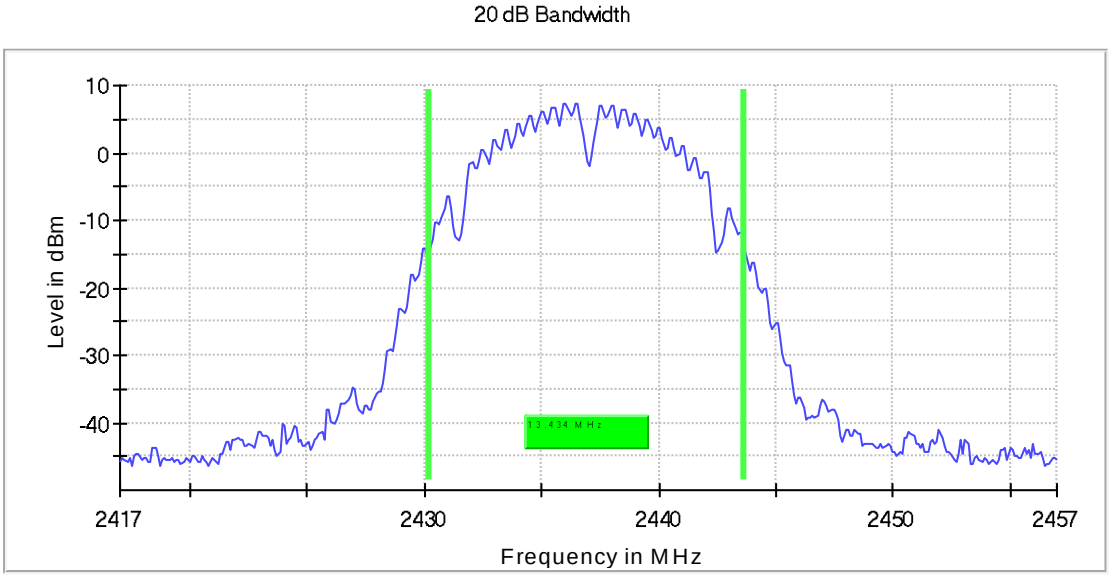

Fig. 6: Middle Channel - Emission Bandwidth 20dB

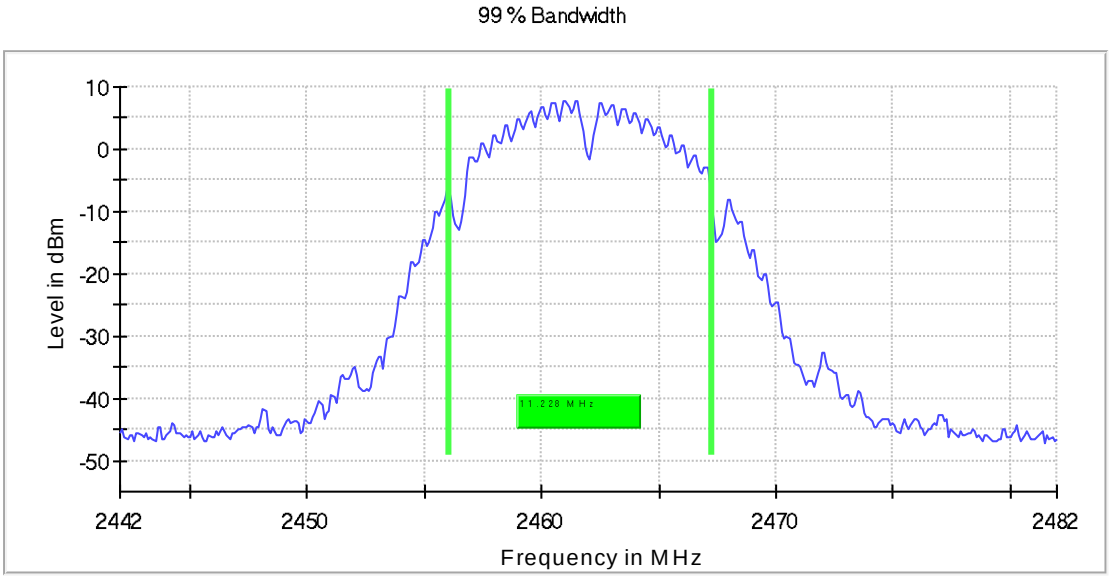

Fig. 7: High Channel - 99% Occupied Channel Bandwidth

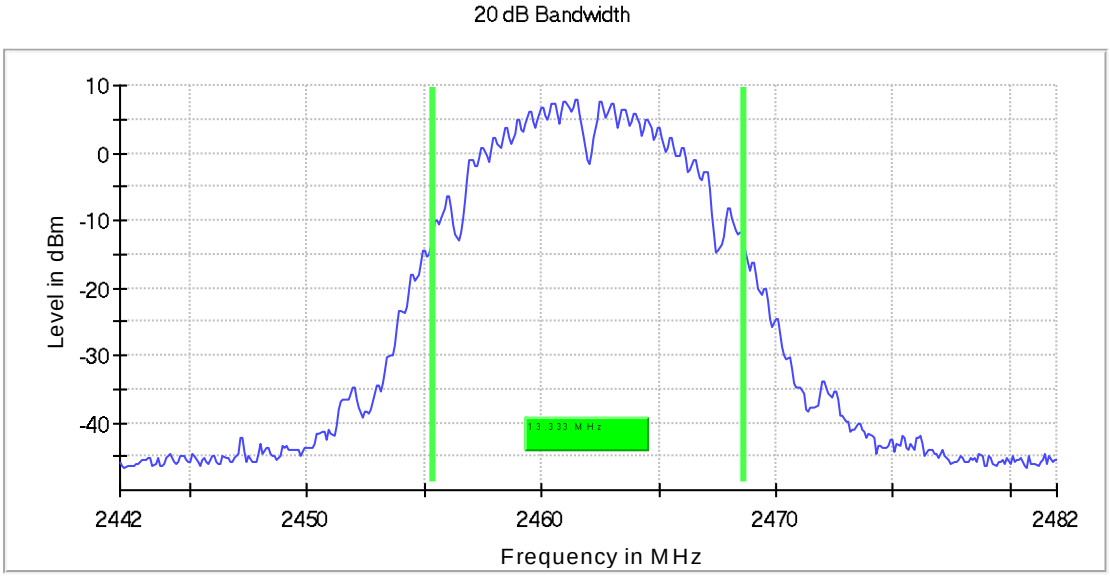

Fig. 8: High Channel - Emission Bandwidth 20dB

4.2.6.2 Sample #1. Mode #1. Modulation G

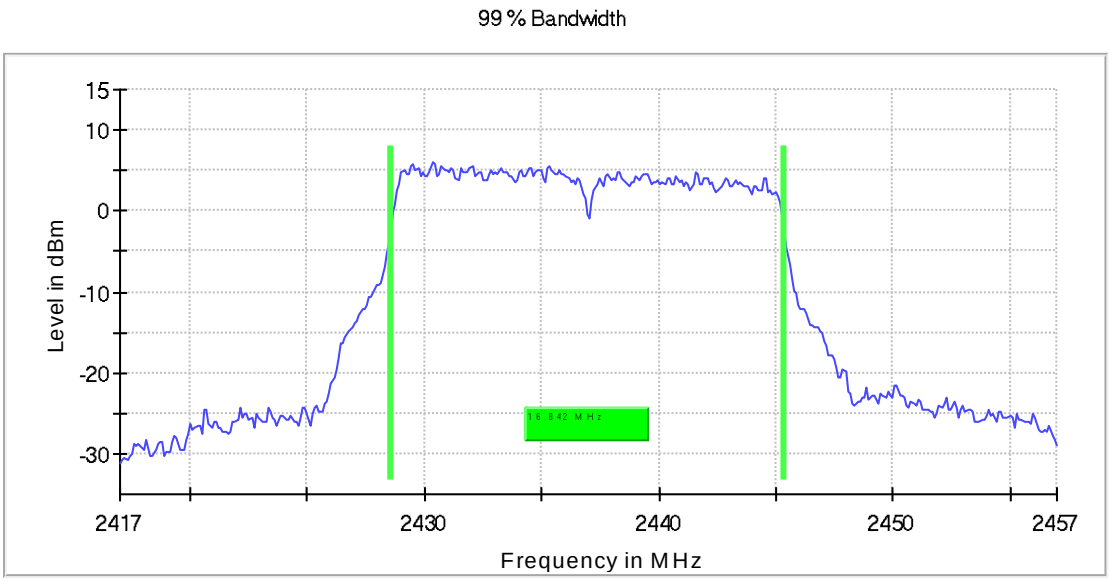

Fig. 9: Low Channel - 99% Occupied Channel Bandwidth

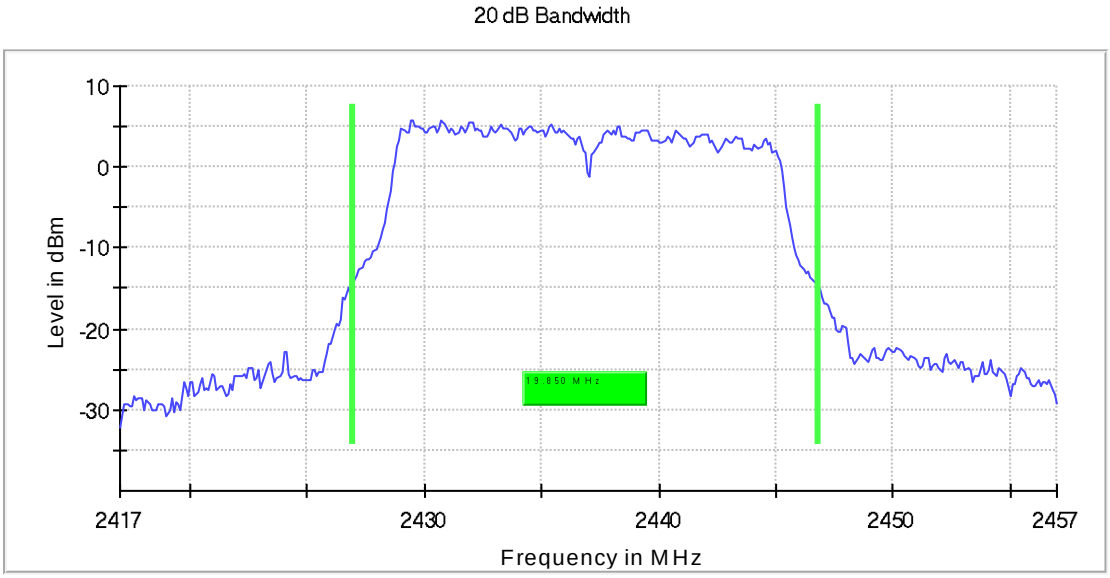

Fig. 10: Low Channel - Emission Bandwidth 20dB

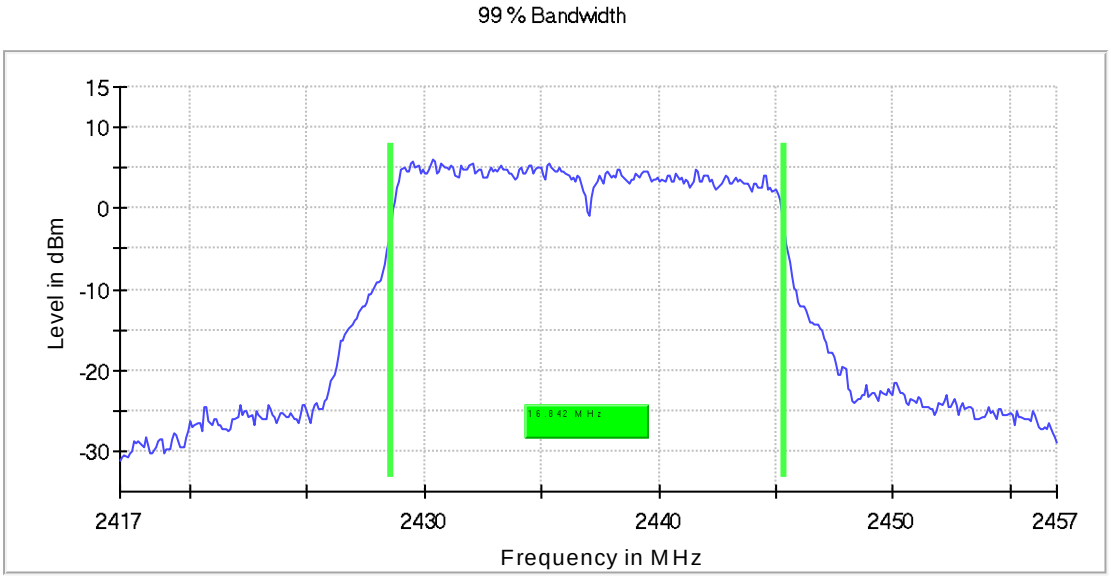

Fig. 11: Middle Channel - 99% Occupied Channel Bandwidth

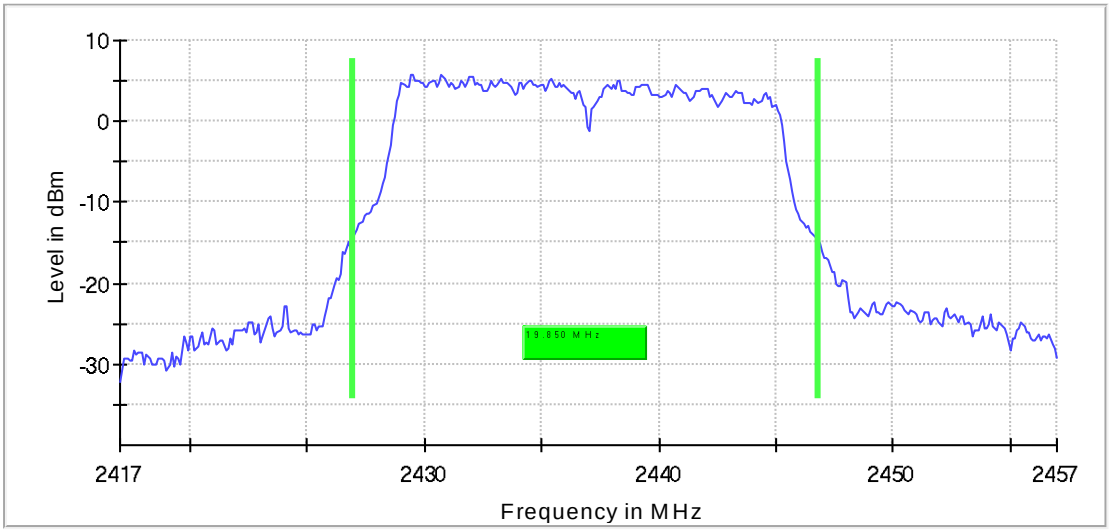

Fig. 12: Middle Channel - Emission Bandwidth 20dB

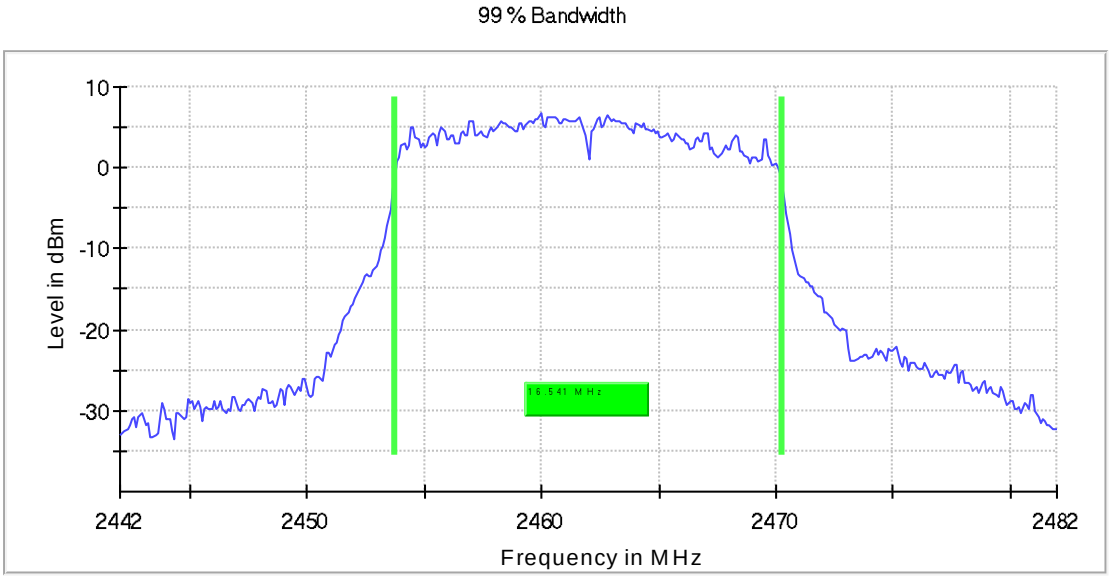

Fig. 13: High Channel - 99% Occupied Channel Bandwidth

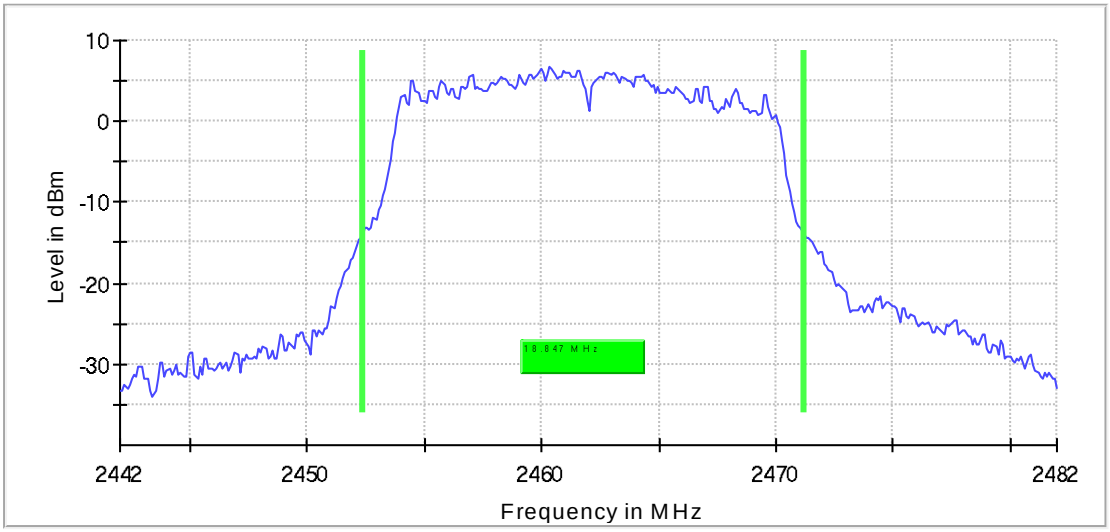

Fig. 14: High Channel - Emission Bandwidth 20dB

4.2.6.3 Sample #1. Mode #1. Modulation N20

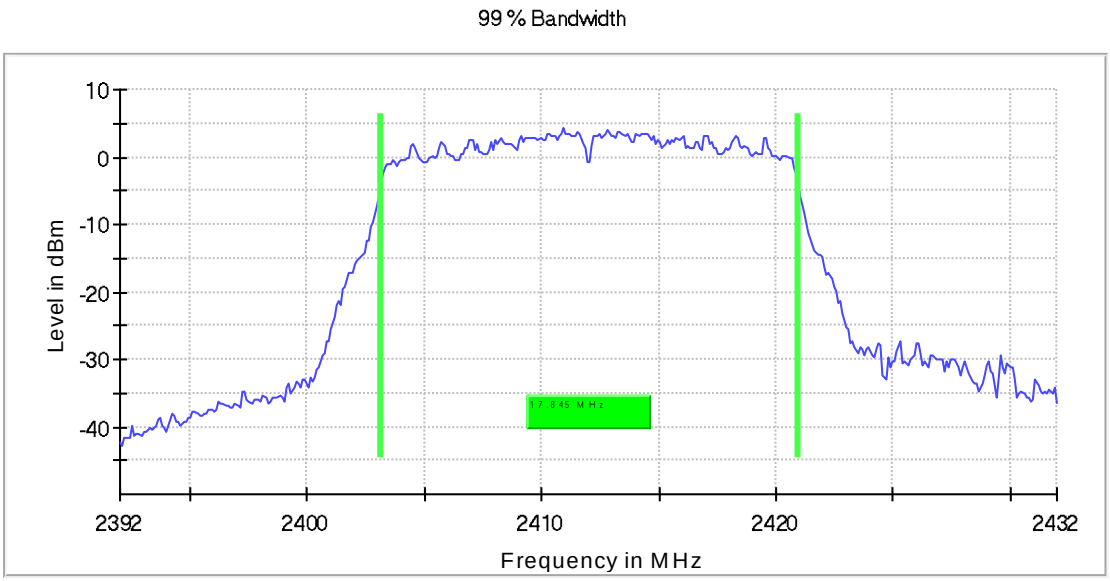

Fig. 15: Low Channel - 99% Occupied Channel Bandwidth

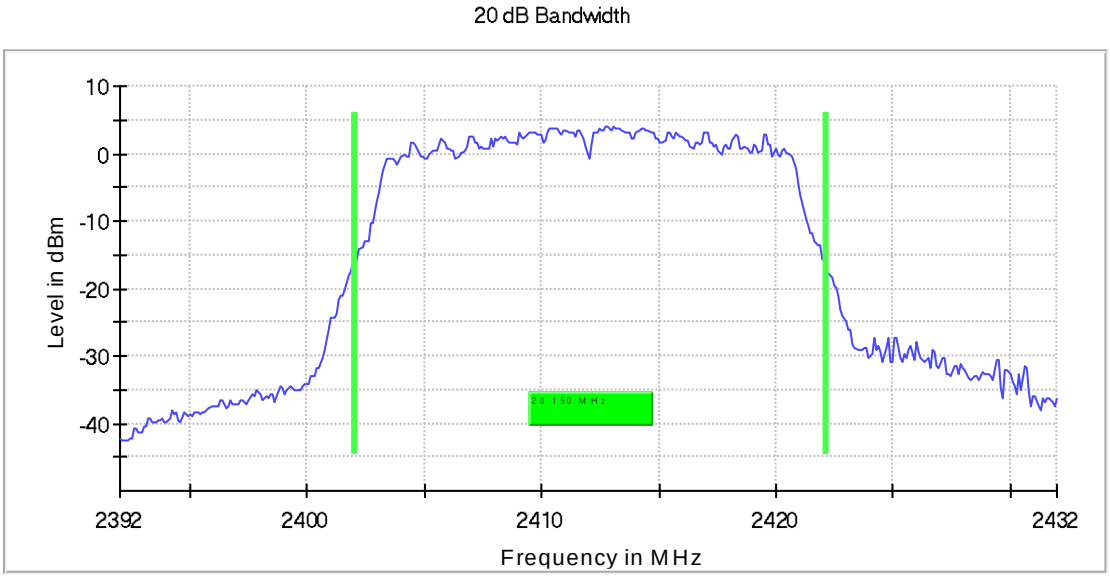

Fig. 16: Low Channel - Emission Bandwidth 20dB

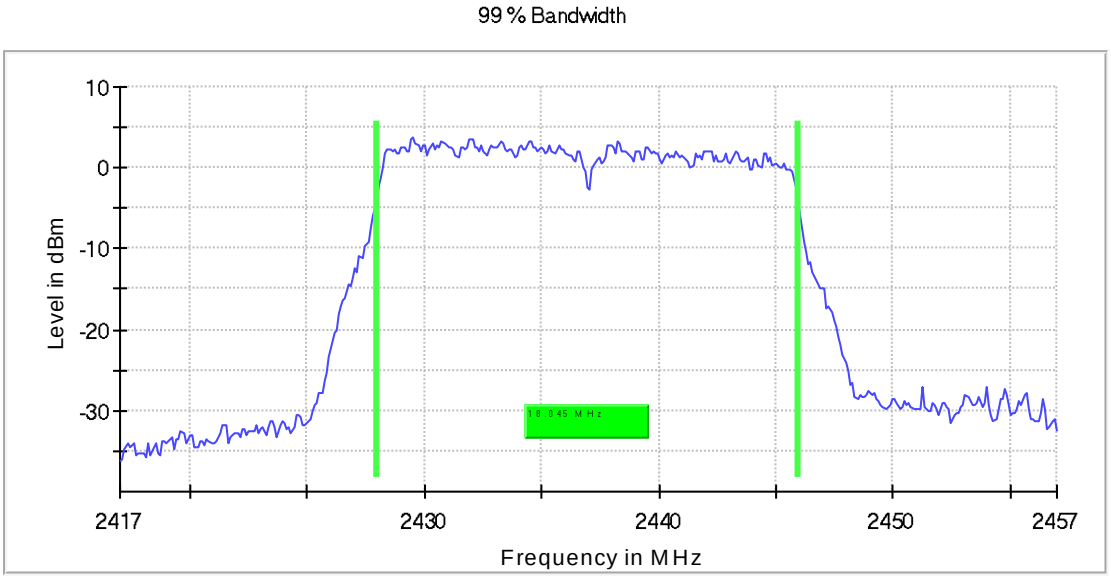

Fig. 17: Middle Channel - 99% Occupied Channel Bandwidth

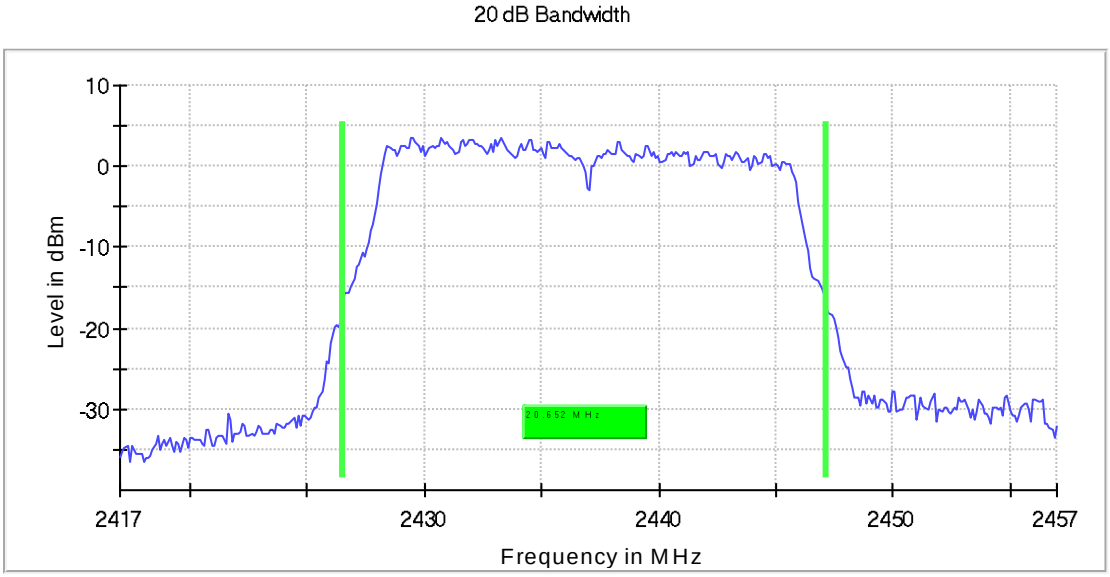

Fig. 18: Middle Channel - Emission Bandwidth 20dB

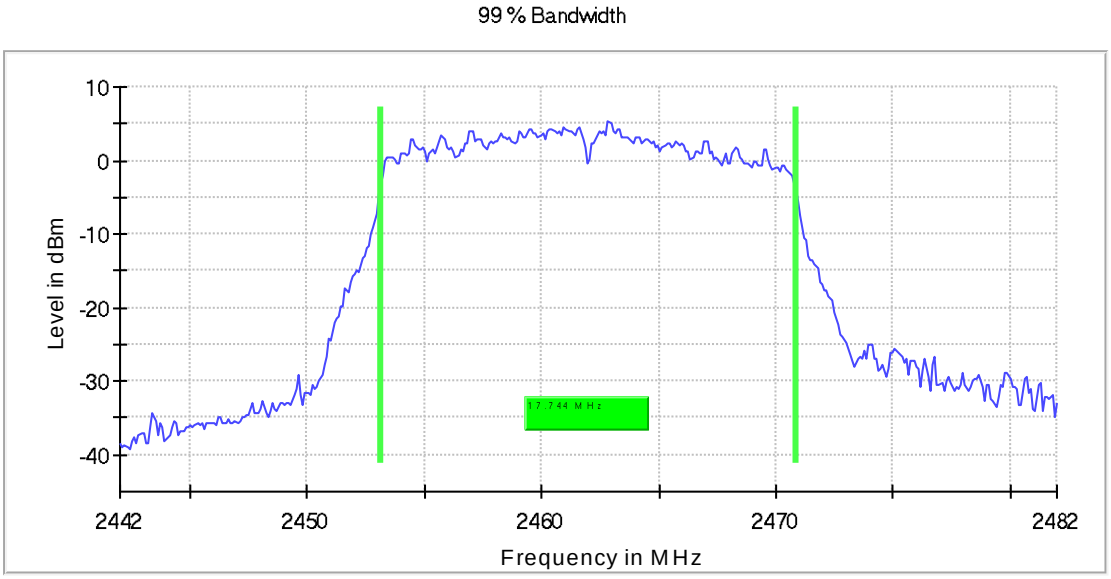

Fig. 19: High Channel - 99% Occupied Channel Bandwidth

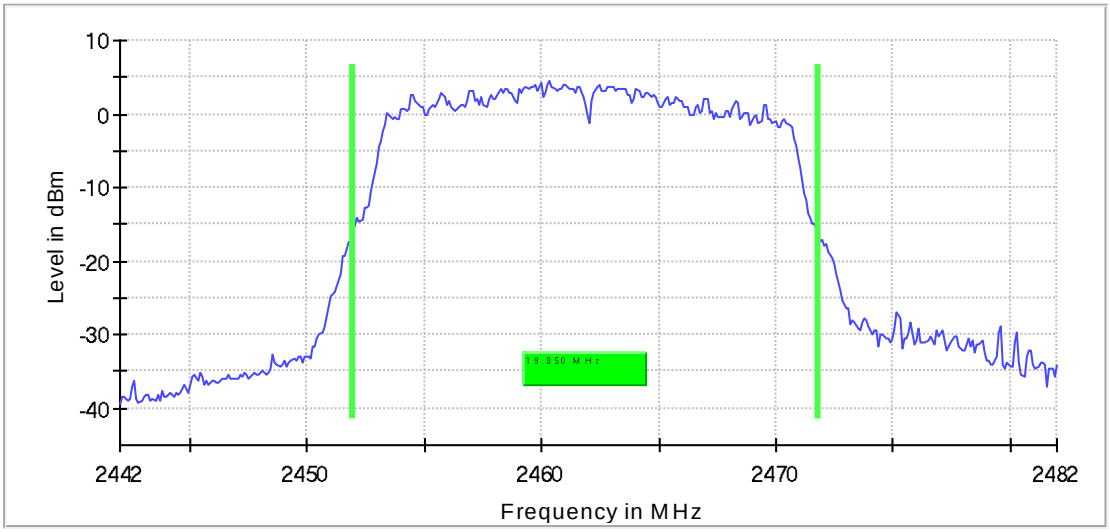

Fig. 20: High Channel - Emission Bandwidth 20dB

4.2.7 Test Equipment Used

Equipment	Brand	Model	Applus Ref.	Last Calibration	Next Calibration
SIGNAL SPECTRUM ANALYZER	ROHDE & SCHWARZ	FSVA3044	1042700	23/02/2022	15/11/2024
RF SWICTH	ROHDE & SCHWARZ	OSP120 + OSPB157W8	1042701	24/03/2022	24/03/2024
RF CABLE 40 GHz	HUBERSUHNER	SF102	1042545	18/05/2023	18/05/2024
RF CABLE 40 GHz	HUBERSUHNER	SF102	1042546	18/05/2023	18/05/2024
RF CABLE	ASTROLAB	32026-29094-29094-24TC	1041565	16/05/2023	16/05/2024
EMC32. EMC MEASUREMENT SOFTWARE	ROHDE & SCHWARZ	R&S. EMC32	104624	-	-
DIGITAL THERMO-HYGROMETER	TESTO	608-H1	1041916	09/02/2024	09/02/2025
SHIELDED CHAMBER SR0	ALBATROSS	SR	1042267	-	-

Table 9: Test Instruments – 99% Occupied Channel Bandwidth & Emission Bandwidth 20dB

4.2.8 Uncertainty

Test Type	Test Description	Uncertainty
Emission	RF bandwidth measurements	±76.0 Hz

Table 10: Uncertainties - 99% Occupied Channel Bandwidth & Emission Bandwidth 20dB

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by a coverage factor k=2, which for normal distribution corresponds to a coverage probability of approximately 95%.

4.3 DTS BANDWIDTH

4.3.1 Test Setup Required

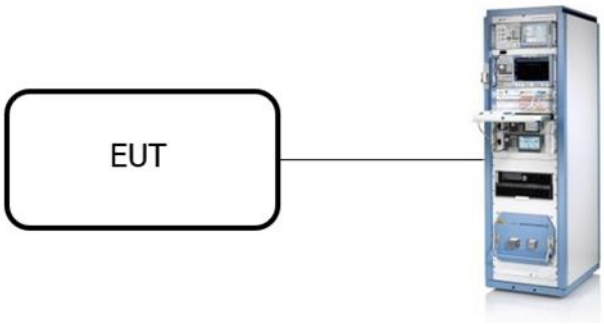

Fig. 21: Set-Up - DTS Bandwidth

4.3.2 Requirements

The frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission. In some cases, for example multichannel frequency-division systems, the percentage of 0.5 percent may lead to certain difficulties in the practical application of the definitions of occupied and necessary bandwidth; in such cases a different percentage may prove useful

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

4.3.3 EMI Receiver configuration

During the conducted test, the EMI receiver was set with the following configurations:

Central frequency [MHz]	Span [MHz]	Detector	Trace Mode	RBW [kHz]	VBW [kHz]
Channel frequency	40	Peak	Max Hold	100	300

Table 11: EMI Receiver configuration – DTS Bandwidth

4.3.4 Test Environmental Conditions

Test Date	Technician	Supervisor	Temperature [ºC]	Humidity [%]	Atm. Pressure [mbar]
17/01/2024	Javier M. Nadales	-	21.4	44.7	998.1

Table 12: Test environmental conditions – DTS Bandwidth

4.3.5 Summary Test Results

Modulation	Operating Frequency [MHz]	DTS Bandwidth [MHz]	Results
Mode B	2412	7.7	PASS
	2437	7.6	PASS
	2462	7.2	PASS
Mode G	2412	16.2	PASS
	2437	16.5	PASS
	2462	15.8	PASS
Mode N20	2412	17.0	PASS
	2437	17.7	PASS
	2462	16.0	PASS

Table 13: Summary Test Results – DTS Bandwidth

4.3.6 Test Results

4.3.6.1 Sample #1. Mode #1. Modulation B

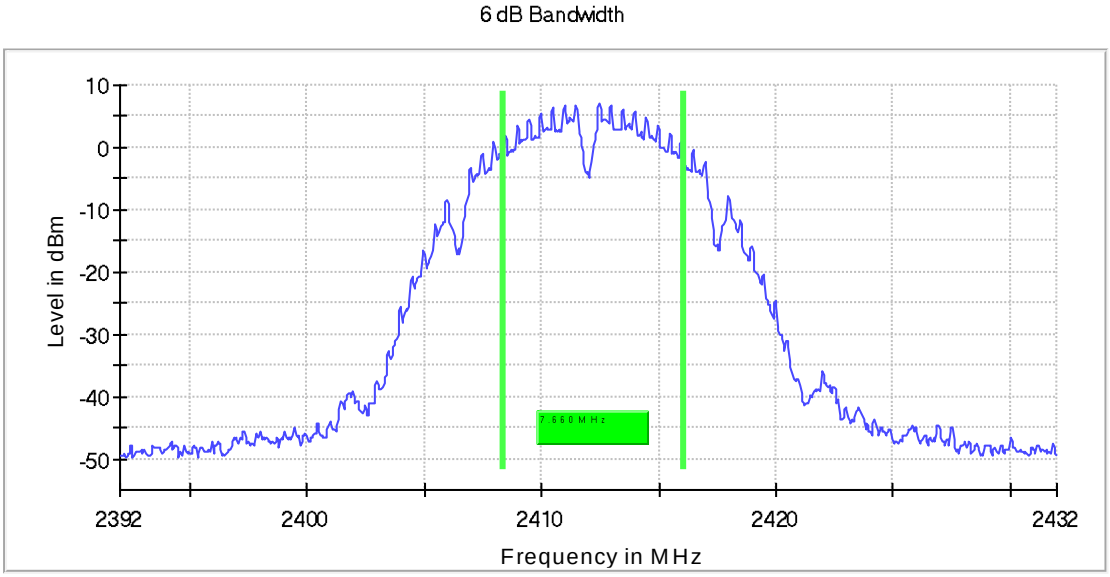

Fig. 22: Low Channel - DTS Bandwidth

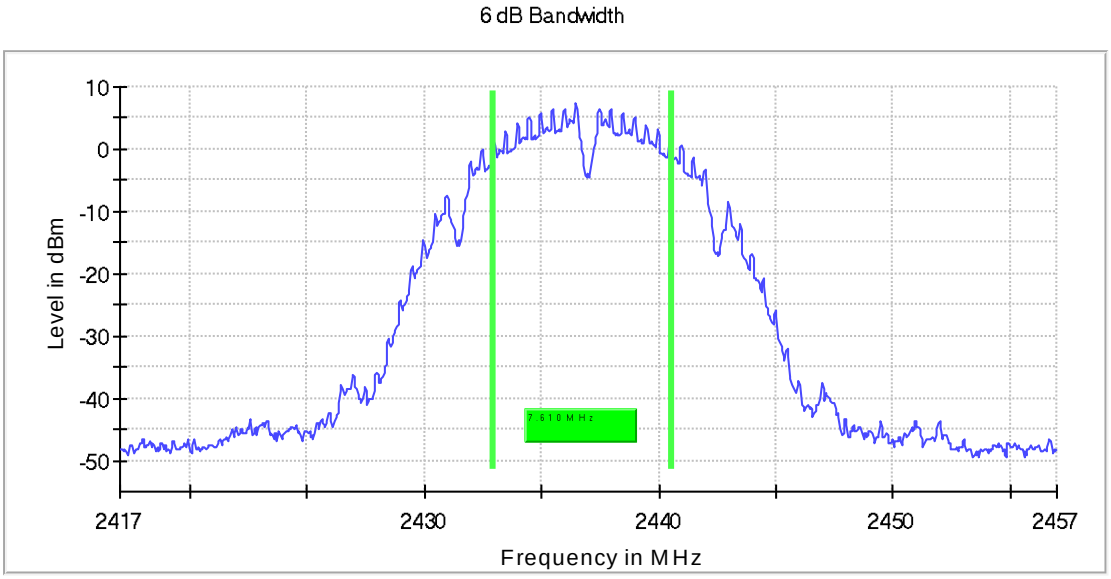

Fig. 23: Middle Channel -DTS Bandwidth

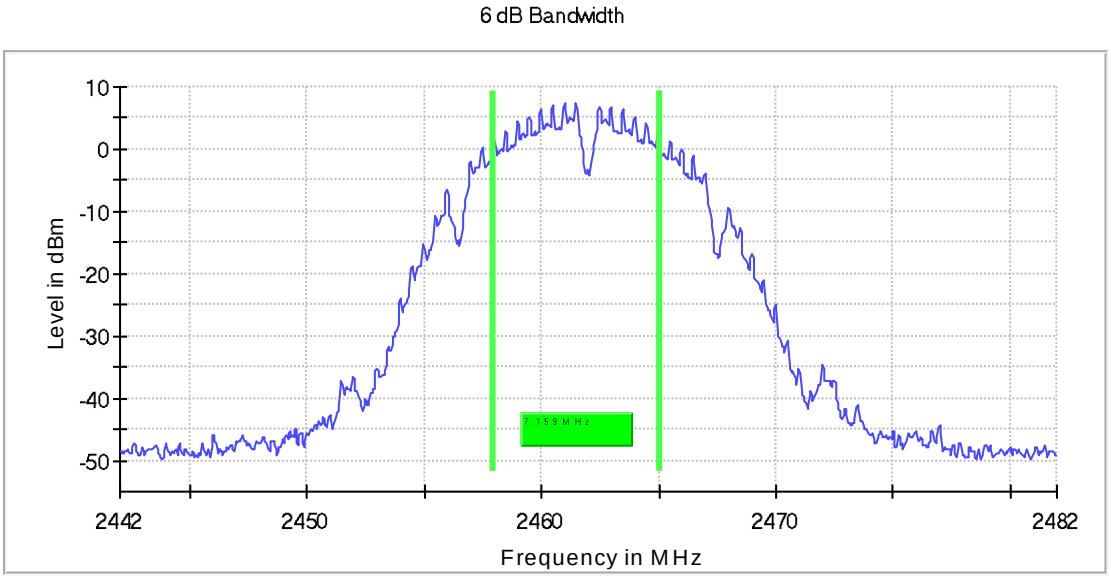

Fig. 24: High Channel - DTS Bandwidth

4.3.6.2 Sample #1. Mode #1. Modulation G

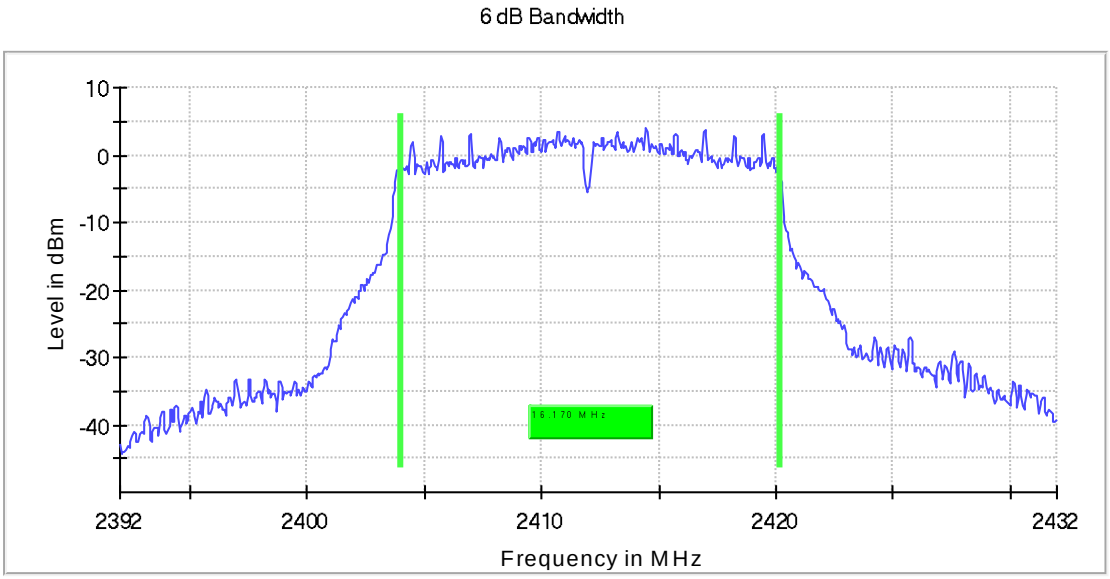

Fig. 25: Low Channel - DTS Bandwidth

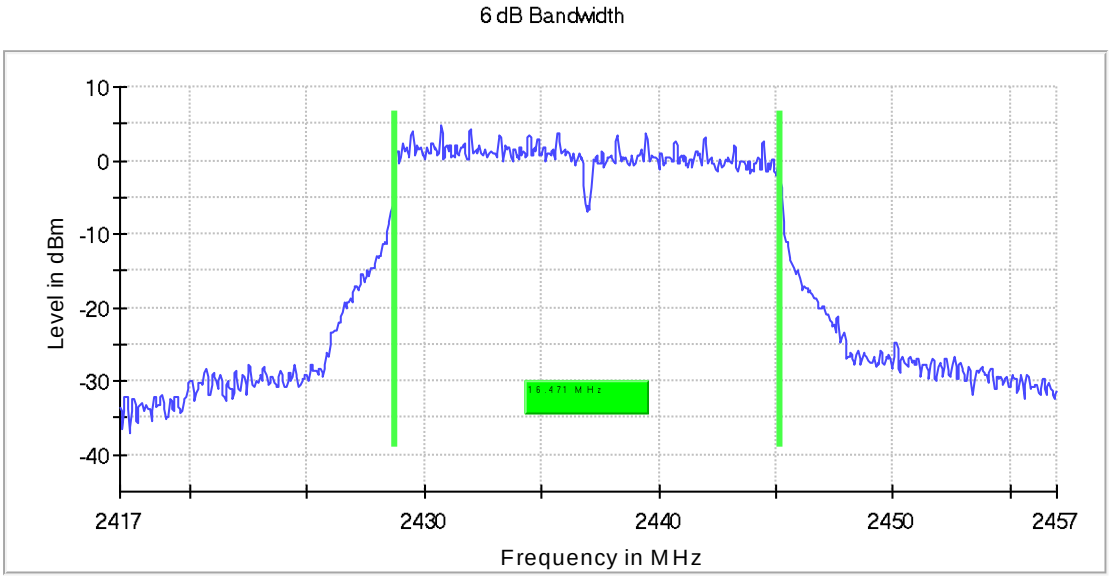

Fig. 26: Middle Channel -DTS Bandwidth

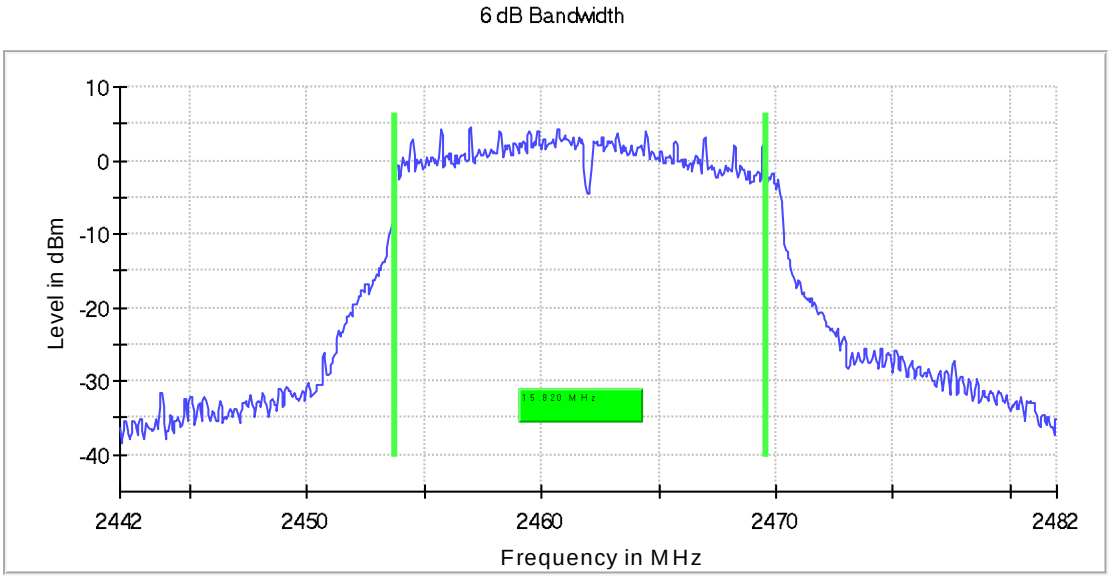

Fig. 27: High Channel - DTS Bandwidth

4.3.6.3 Sample #1. Mode #1. Modulation N20

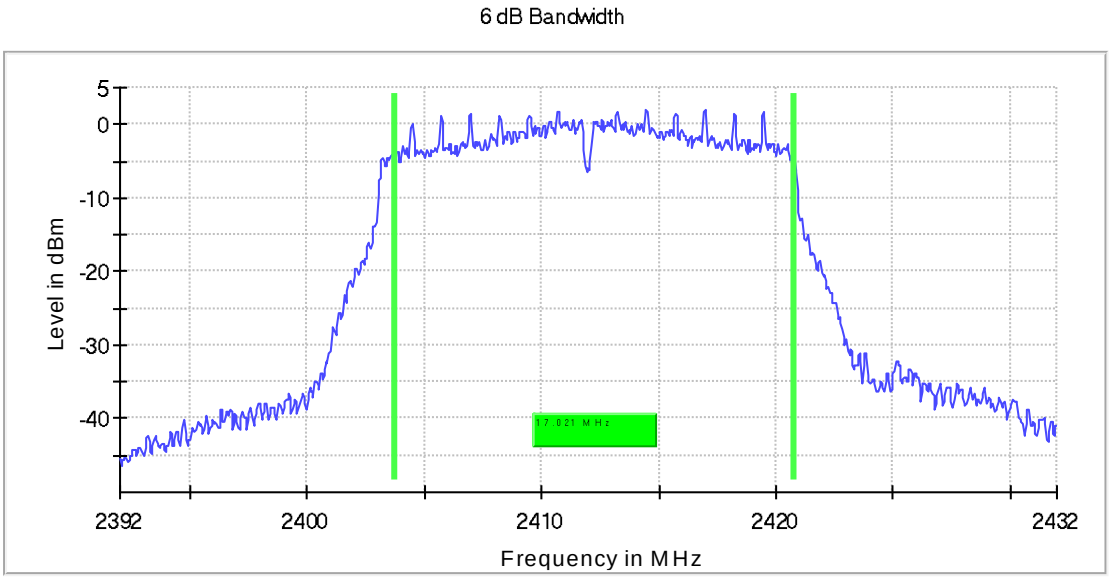

Fig. 28: Low Channel - DTS Bandwidth

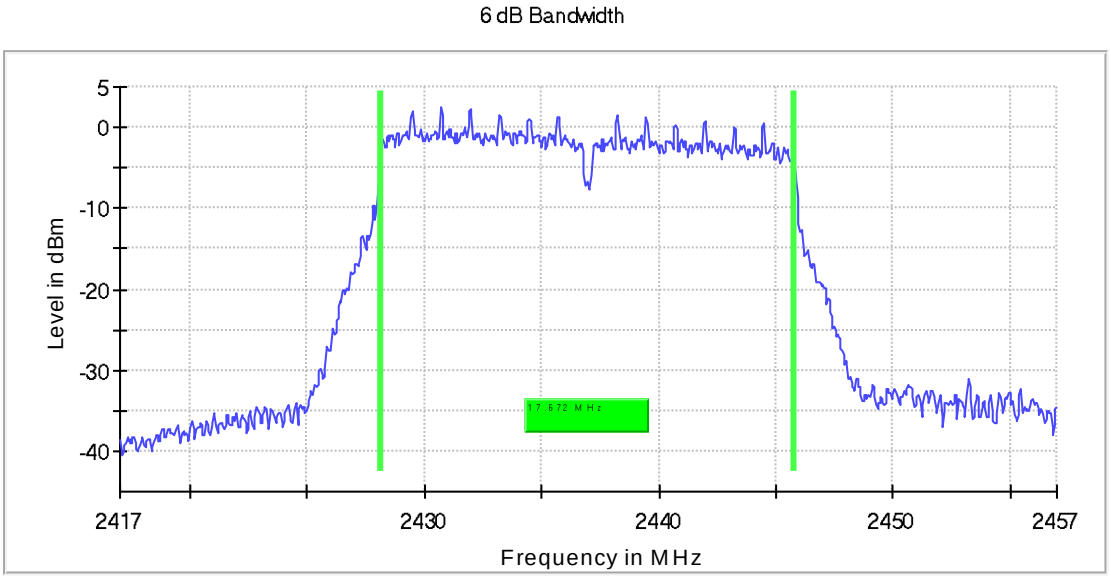

Fig. 29: Middle Channel -DTS Bandwidth

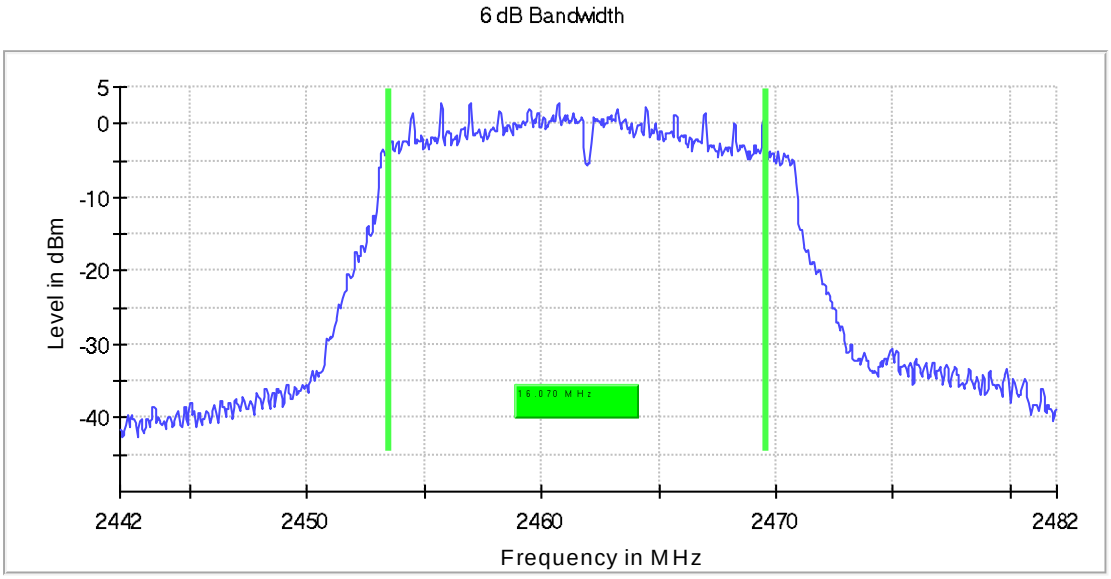

Fig. 30: High Channel - DTS Bandwidth

4.3.7 Test Equipment Used

Equipment	Brand	Model	Applus Ref.	Last Calibration	Next Calibration
SIGNAL SPECTRUM ANALYZER	ROHDE & SCHWARZ	FSVA3044	1042700	23/02/2022	15/11/2024
RF SWICTH	ROHDE & SCHWARZ	OSP120 + OSPB157W8	1042701	24/03/2022	24/03/2024
RF CABLE 40 GHz	HUBERSUHNER	SF102	1042545	18/05/2023	18/05/2024
RF CABLE 40 GHz	HUBERSUHNER	SF102	1042546	18/05/2023	18/05/2024
RF CABLE	ASTROLAB	32026-29094-29094-24TC	1041565	16/05/2023	16/05/2024
EMC32. EMC MEASUREMENT SOFTWARE	ROHDE & SCHWARZ	R&S. EMC32	104624	-	-
DIGITAL THERMO-HYGROMETER	TESTO	608-H1	1041916	09/02/2024	09/02/2025
SHIELDED CHAMBER SR0	ALBATROSS	SR	1042267	-	-

Table 14: Test Instruments – DTS Bandwidth

4.3.8 Uncertainty

Test Type	Test Description	Uncertainty
Emission	RF bandwidth measurements	±76.0 Hz

Table 15: Uncertainties - DTS Bandwidth

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by a coverage factor k=2, which for normal distribution corresponds to a coverage probability of approximately 95%.

4.4 MAXIMUM CONDUCTED OUTPUT POWER

4.4.1 Test Setup Required

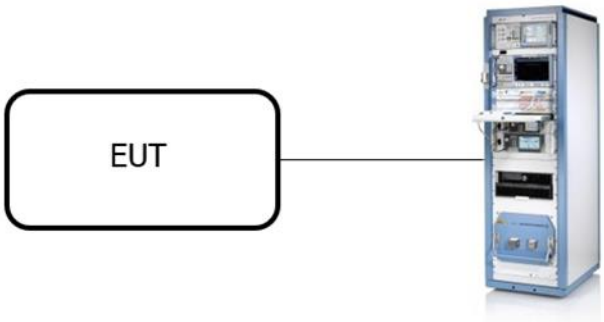

Fig. 31: Set-Up - Maximum Conducted Output Power

4.4.2 Requirements

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 signaling 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.

The conducted output power limit is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.4.3 Test Environmental Conditions

Test Date	Technician	Supervisor	Temperature [ºC]	Humidity [%]	Atm. Pressure [mbar]
17/01/2024	Javier M. Nadales	-	21.4	44.7	998.1

Table 16: Test environmental conditions – Maximum Conducted Output Power

4.4.4 Test Results

Measurement using a RF average power meter.

Modulation	Operating Frequency [MHz]	Gated RMS [dBm]	Duty Cycle [%]	Results
Mode B	2412	17.5	99.6	PASS
	2437	17.1	99.6	PASS
	2462	16.8	99.6	PASS
Mode G	2412	18.2	97.7	PASS
	2437	18.4	97.7	PASS
	2462	18.4	97.7	PASS
Mode N20	2412	16.4	95.4	PASS
	2437	16.7	93.2	PASS
	2462	16.6	95.4	PASS

Table 17: Summary Test Results – Maximum Conducted Output Power

4.4.5 Test Equipment Used

Equipment	Brand	Model	Applus Ref.	Last Calibration	Next Calibration
SIGNAL SPECTRUM ANALYZER	ROHDE & SCHWARZ	FSVA3044	1042700	23/02/2022	15/11/2024
RF SWICTH	ROHDE & SCHWARZ	OSP120 + OSPB157W8	1042701	24/03/2022	24/03/2024
RF CABLE 40 GHz	HUBERSUHNER	SF102	1042545	18/05/2023	18/05/2024
RF CABLE 40 GHz	HUBERSUHNER	SF102	1042546	18/05/2023	18/05/2024
RF CABLE	ASTROLAB	32026-29094-29094-24TC	1041565	16/05/2023	16/05/2024
EMC32. EMC MEASUREMENT SOFTWARE	ROHDE & SCHWARZ	R&S. EMC32	104624	-	-
DIGITAL THERMO-HYGROMETER	TESTO	608-H1	1041916	09/02/2024	09/02/2025
SHIELDED CHAMBER SR0	ALBATROSS	SR	1042267	-	-

Table 18: Test Instruments – Maximum Conducted Output Power

4.4.6 Uncertainty

Test Type	Test Description	Uncertainty
Emissions	RF output power measurements [Conducted]	±1.3 dB

Table 19: Uncertainties - Maximum Conducted Output Power

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by a coverage factor k=2, which for normal distribution corresponds to a coverage probability of approximately 95%.

4.5 POWER SPECTRAL DENSITY

4.5.1 Test Setup Required

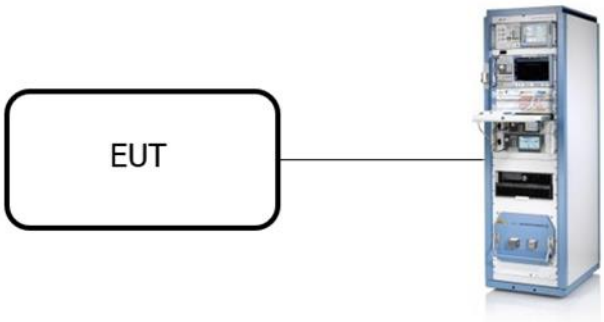

Fig. 32: Power Spectral Density setup of table top equipment.

4.5.2 Requirements

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. The same method of determining the conducted output power shall be used to determine the power spectral density.

4.5.3 EMI Receiver configuration

During the conducted test, the EMI receiver was set with the following configurations:

Central frequency [MHz]	Span [MHz]	Detector	Trace Mode	Resolution Bandwidth [kHz]	Video Bandwidth [kHz]
Channel frequency	30	RMS	Average Power	100	300

Table 20: EMI Receiver configuration – Power Spectral Density

4.5.4 Test Environmental Conditions

Test Date	Technician	Supervisor	Temperature [ºC]	Humidity [%]	Atm. Pressure [mbar]
17/01/2024	Javier M. Nadales	-	21.4	44.7	998.1

Table 21: Test environmental conditions – Power Spectral Density

4.5.5 Summary Test Results

Modulation	Operating Frequency [MHz]	PSD [dBm]	Limit [dBm]	Results
Mode B	2412	-2.2	8.0	PASS
	2437	-2.4	8.0	PASS
	2462	-2.5	8.0	PASS
Mode G	2412	-1.5	8.0	PASS
	2437	-2.9	8.0	PASS
	2462	-1.4	8.0	PASS
Mode N20	2412	-3.5	8.0	PASS
	2437	-4.8	8.0	PASS
	2462	-3.2	8.0	PASS

Table 22: Summary Test Results – Power Spectral Density

4.5.6 Test Results

4.5.6.1 Sample #1. Mode #1. Modulation B

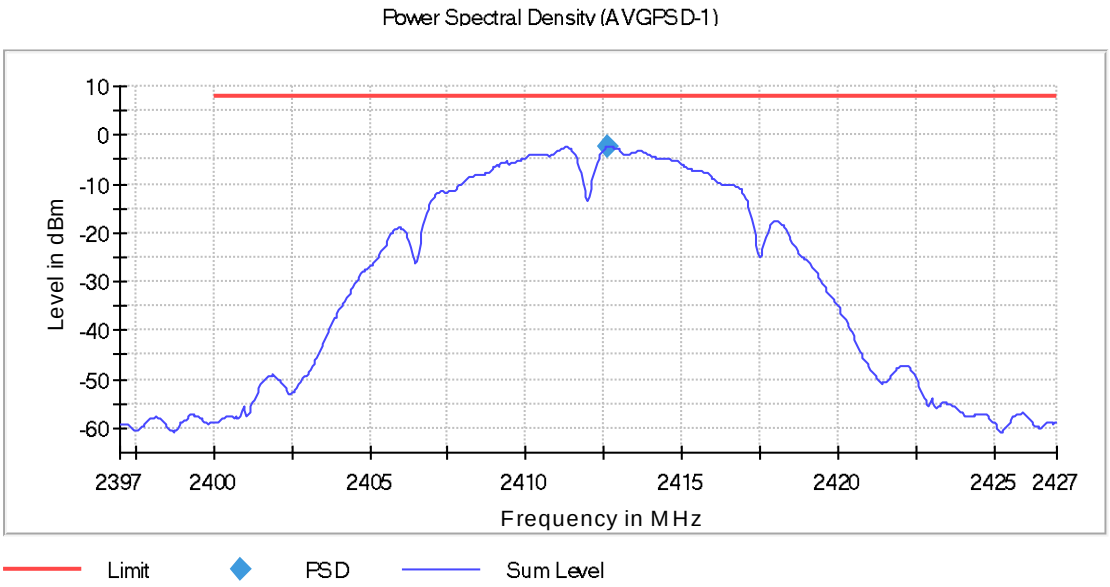

Fig. 33: Low Channel - Power Spectral Density

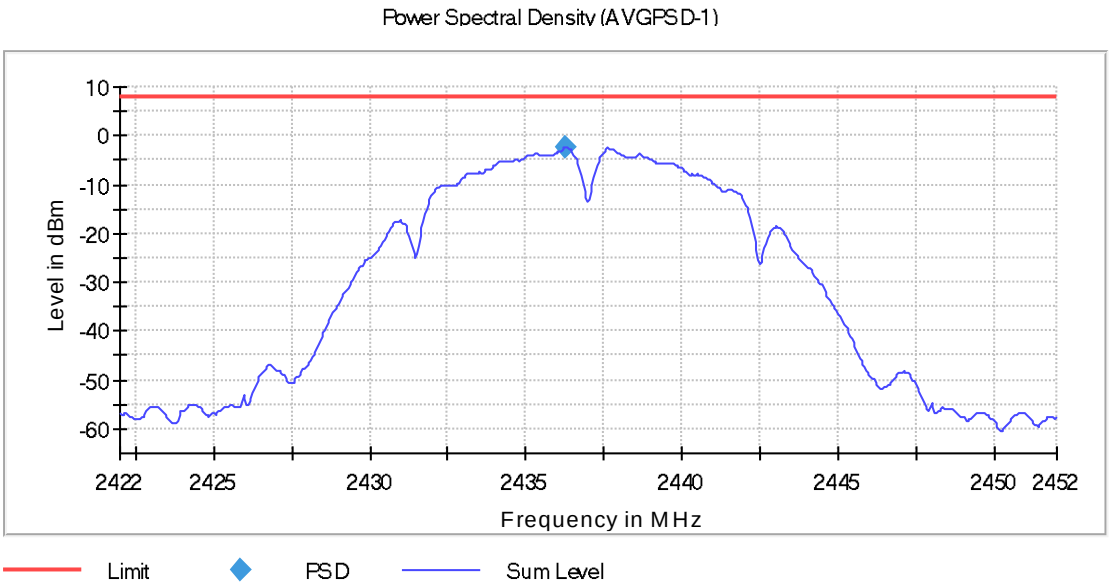

Fig. 34: Middle Channel - Power Spectral Density

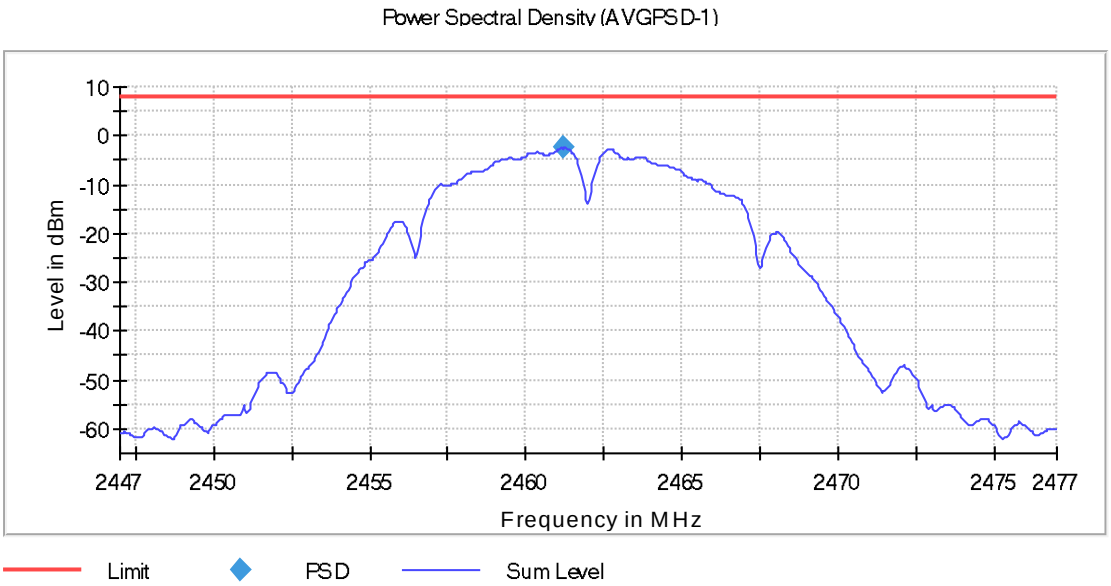

Fig. 35: High Channel - Power Spectral Density

4.5.6.2 Sample #1. Mode #1. Modulation G

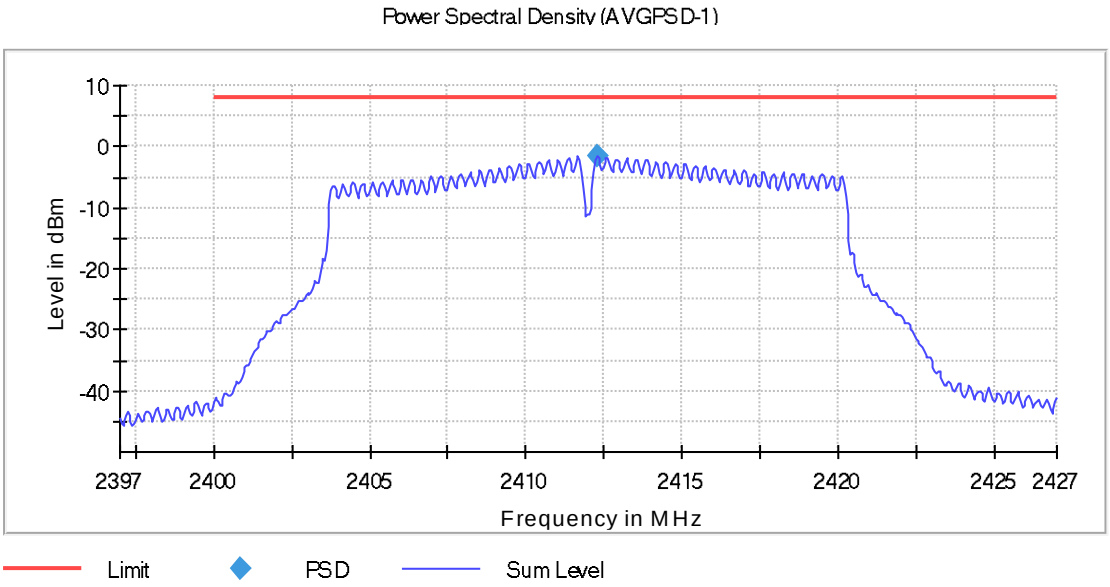

Fig. 36: Low Channel - Power Spectral Density

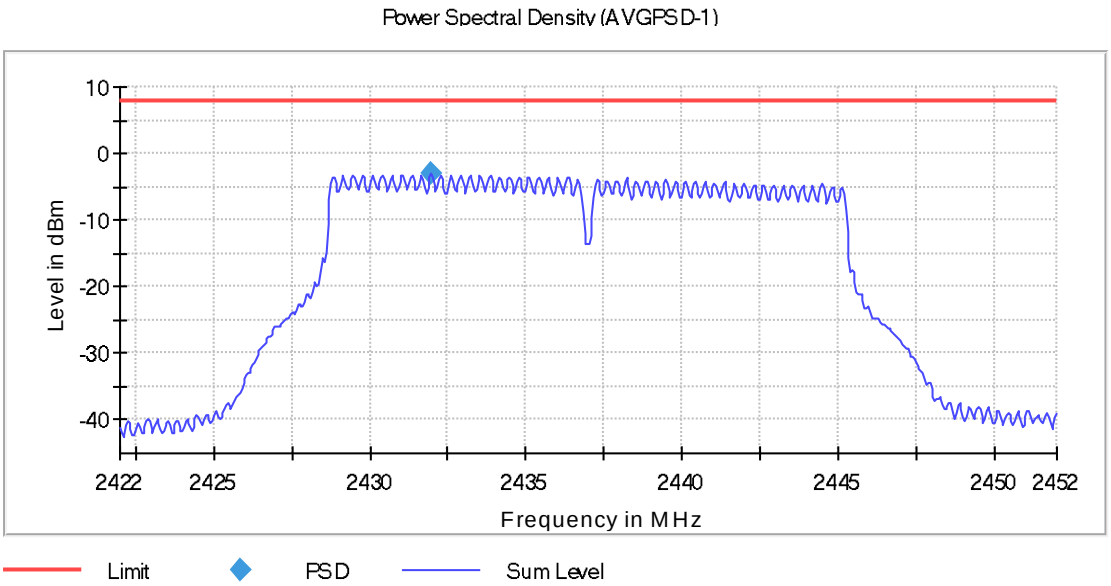

Fig. 37: Middle Channel - Power Spectral Density

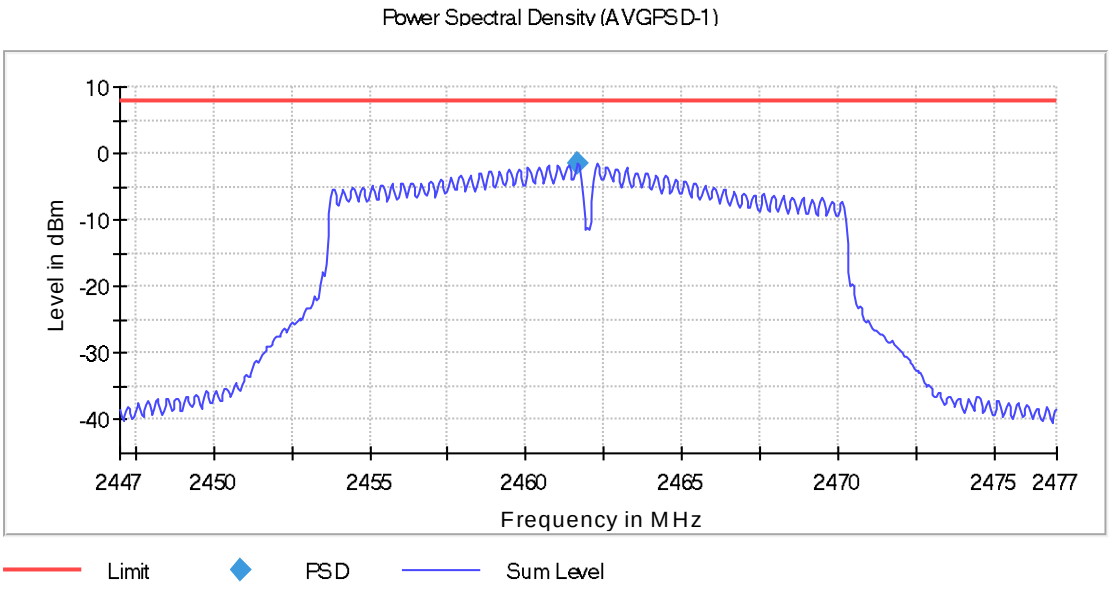

Fig. 38: High Channel - Power Spectral Density

4.5.6.3 Sample #1. Mode #1. Modulation N20

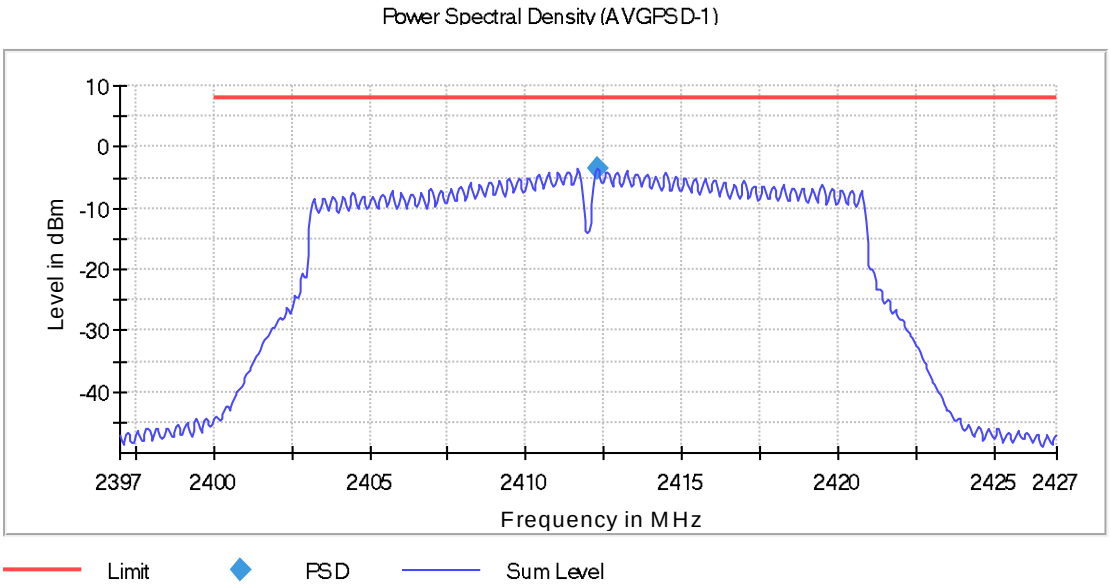

Fig. 39: Low Channel - Power Spectral Density

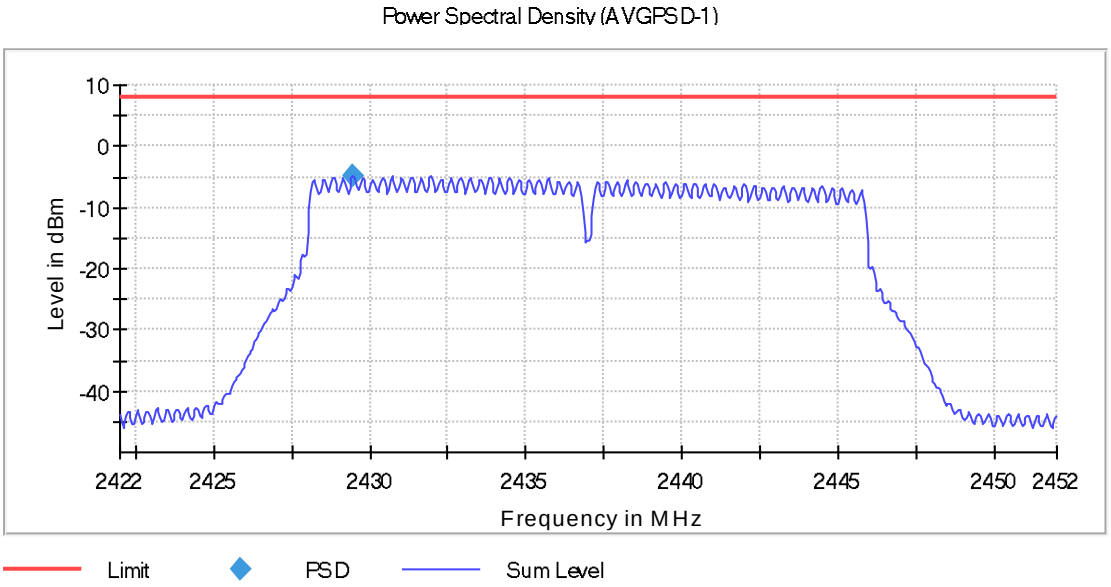

Fig. 40: Middle Channel - Power Spectral Density

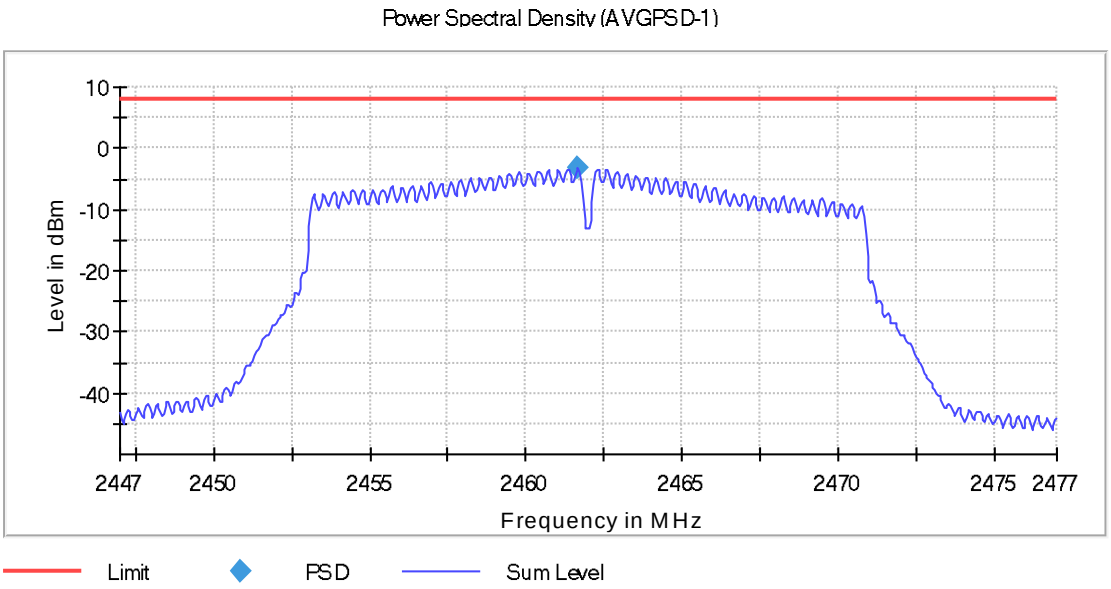

Fig. 41: High Channel - Power Spectral Density

4.5.7 Test Equipment Used

Equipment	Brand	Model	Applus Ref.	Last Calibration	Next Calibration
SIGNAL SPECTRUM ANALYZER	ROHDE & SCHWARZ	FSVA3044	1042700	23/02/2022	15/11/2024
RF SWICTH	ROHDE & SCHWARZ	OSP120 + OSPB157W8	1042701	24/03/2022	24/03/2024
RF CABLE 40 GHz	HUBERSUHNER	SF102	1042545	18/05/2023	18/05/2024
RF CABLE 40 GHz	HUBERSUHNER	SF102	1042546	18/05/2023	18/05/2024
RF CABLE	ASTROLAB	32026-29094-29094-24TC	1041565	16/05/2023	16/05/2024
EMC32. EMC MEASUREMENT SOFTWARE	ROHDE & SCHWARZ	R&S. EMC32	104624	-	-
DIGITAL THERMO-HYGROMETER	TESTO	608-H1	1041916	09/02/2024	09/02/2025
SHIELDED CHAMBER SR0	ALBATROSS	SR	1042267	-	-

Table 23: Test Instruments – Power Spectral Density

4.5.8 Uncertainty

Test Type	Test Description	Uncertainty
Emissions	Power spectral density measurements [Conducted]	±2.6 dB

Table 24: Uncertainties - Power Spectral Density

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by a coverage factor k=2, which for normal distribution corresponds to a coverage probability of approximately 95%.

4.6 BAND EDGE

4.6.1 Test Setup Required

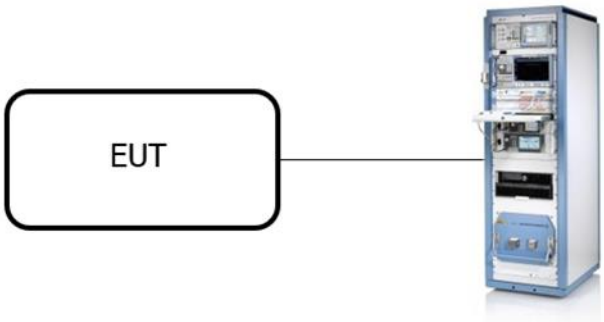

Fig. 42: Band Edge setup of table top equipment.

4.6.2 Requirements

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, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

4.6.3 EMI Receiver configuration

During the conducted test, the EMI receiver was set with the following configurations:

Central frequency [MHz]	Span [MHz]	Detector	Trace Mode	RBW [kHz]	VBW [kHz]
Channel frequency	173.5	Peak	Max Hold	100	300

Table 25: EMI Receiver configuration – Band Edge – Measurement 1

Central frequency [MHz]	Span [MHz]	Detector	Trace Mode	RBW [kHz]	VBW [kHz]
Channel frequency	100	Peak	Max Hold	100	300

Table 26: EMI Receiver configuration –Band Edge – Measurement 2

4.6.4 Test Environmental Conditions

Test Date	Technician	Supervisor	Temperature [ºC]	Humidity [%]	Atm. Pressure [mbar]
17/01/2024	Javier M. Nadales	-	21.4	44.7	998.1

Table 27: Test environmental conditions – Band Edge

4.6.5 Summary Test Results

Modulation	Operating Frequency [MHz]	Band Edge	Limit [dBm]	Results
Mode B	2412	PK < Limit - I	-18.7	PASS
	2462	PK < Limit - I	-19.1	PASS
Mode G	2412	PK < Limit - I	-21.5	PASS
	2462	PK < Limit - I	-21.3	PASS
Mode N20	2412	PK < Limit - I	-22.9	PASS
	2462	PK < Limit - I	-23.2	PASS

Table 28: Summary Test Results – Band Edge

4.6.6 Test Results

4.6.6.1 Sample #1. Mode #1. Modulation B

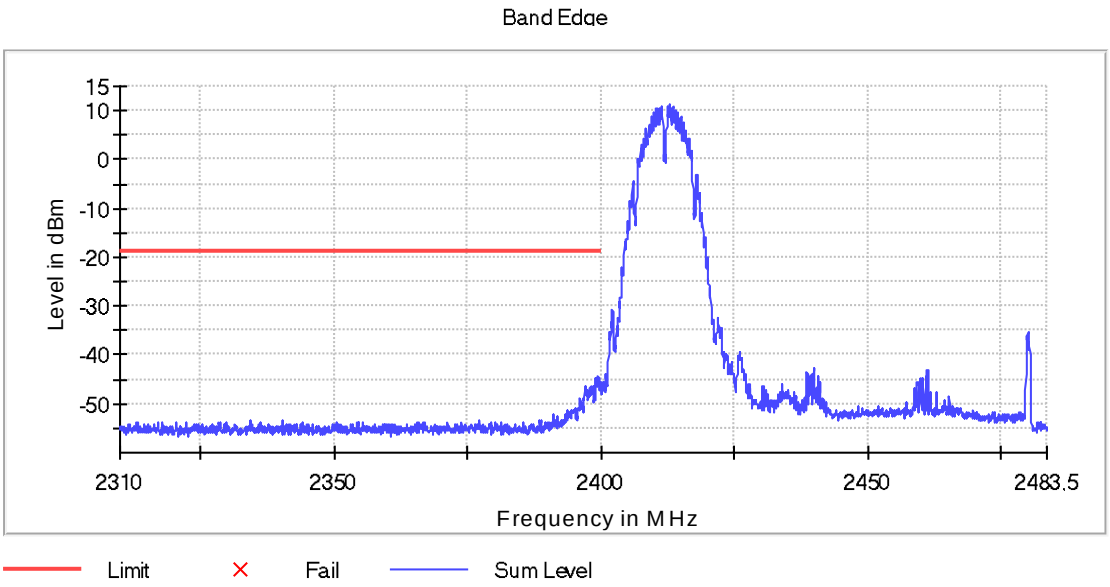

Fig. 43: Low Channel - Band Edge

FINAL MEASUREMENTS

Frequency [MHz]	Max amplitude Level [dBm]	Margin [dB]	Result
2399.5	-44.4	25.6	PASS

Table 29: Low Channel - Band Edge

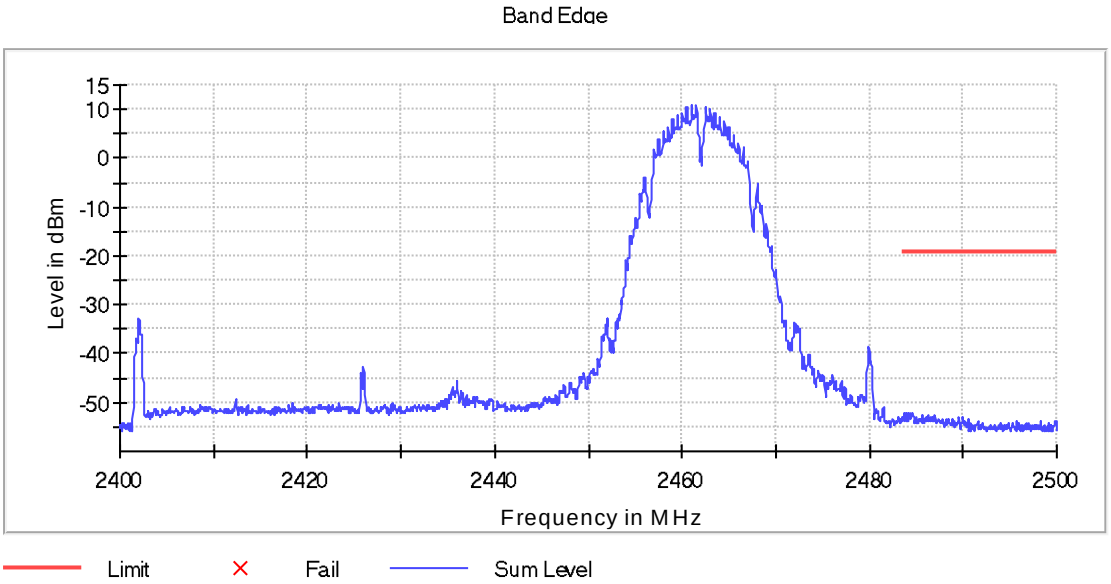

Fig. 44: High Channel - Band Edge

FINAL MEASUREMENTS

Frequency [MHz]	Max amplitude Level [dBm]	Margin [dB]	Result
2484.4	-52.1	33.0	PASS

Table 30. High Channel - Band Edge

4.6.6.2 Sample #1. Mode #1. Modulation G

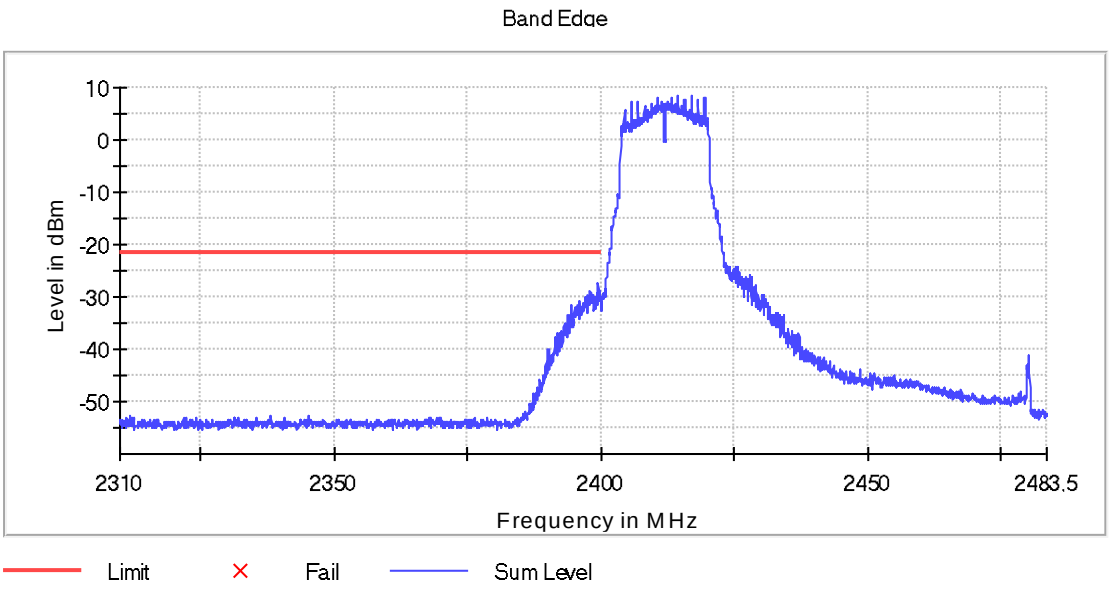

Fig. 45: Low Channel - Band Edge

FINAL MEASUREMENTS

Frequency [MHz]	Max amplitude Level [dBm]	Margin [dB]	Result
2399.5	-27.5	5.9	PASS

Table 31: Low Channel - Band Edge

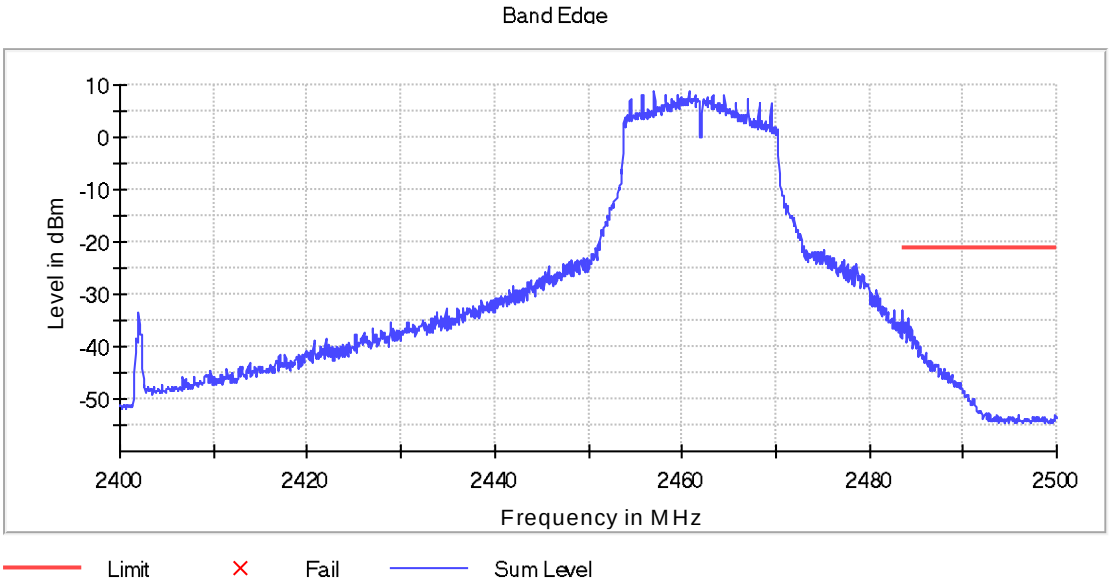

Fig. 46: High Channel - Band Edge

FINAL MEASUREMENTS

Frequency [MHz]	Max amplitude Level [dBm]	Margin [dB]	Result
2483.6	-33.2	11.9	PASS

Table 32. High Channel - Band Edge

4.6.6.3 Sample #1. Mode #1. Modulation N20

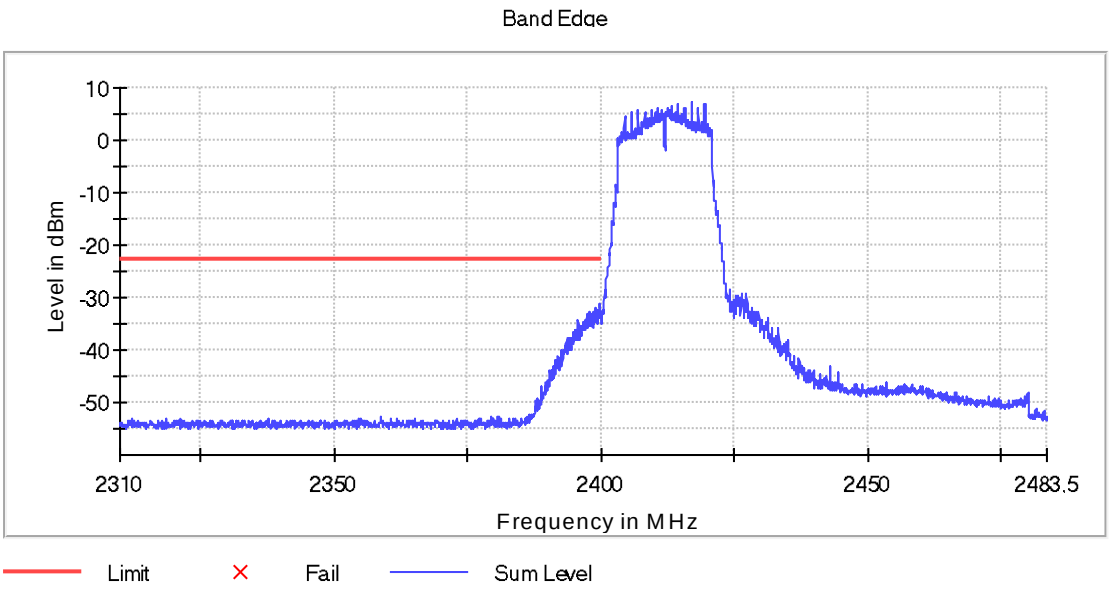

Fig. 47: Low Channel - Band Edge

FINAL MEASUREMENTS

Frequency [MHz]	Max amplitude Level [dBm]	Margin [dB]	Result
2399.8	-31.3	8.5	PASS

Table 33: Low Channel - Band Edge

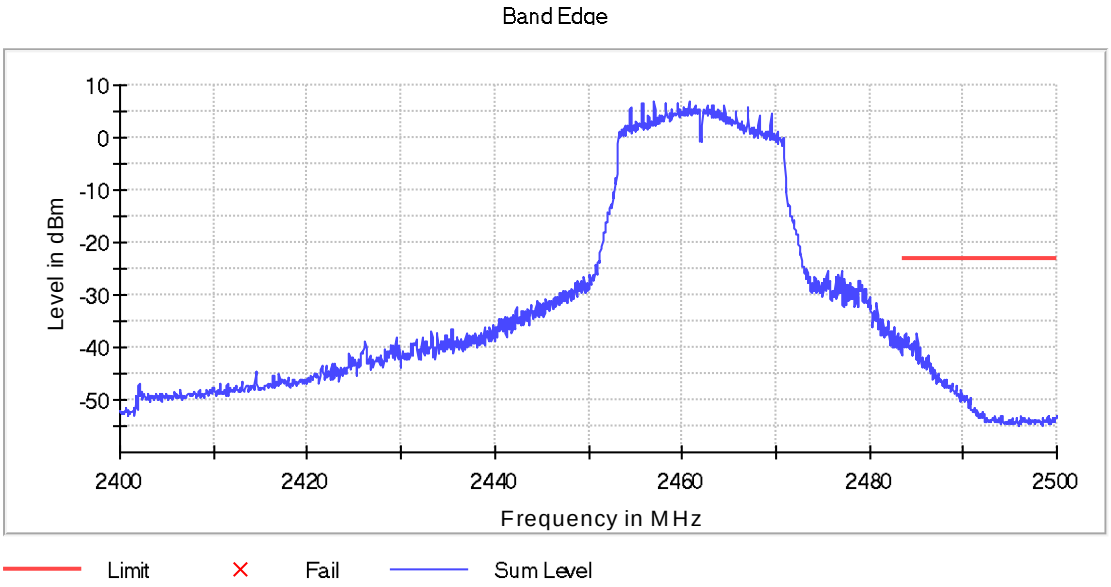

Fig. 48: High Channel - Band Edge

FINAL MEASUREMENTS

Frequency [MHz]	Max amplitude Level [dBm]	Margin [dB]	Result
2483.9	--37.4	14.2	PASS

Table 34. High Channel - Band Edge

4.6.7 Test Equipment Used

Equipment	Brand	Model	Applus Ref.	Last Calibration	Next Calibration
SIGNAL SPECTRUM ANALYZER	ROHDE & SCHWARZ	FSVA3044	1042700	23/02/2022	15/11/2024
RF SWICTH	ROHDE & SCHWARZ	OSP120 + OSPB157W8	1042701	24/03/2022	24/03/2024
RF CABLE 40 GHz	HUBERSUHNER	SF102	1042545	18/05/2023	18/05/2024
RF CABLE 40 GHz	HUBERSUHNER	SF102	1042546	18/05/2023	18/05/2024
RF CABLE	ASTROLAB	32026-29094-29094-24TC	1041565	16/05/2023	16/05/2024
EMC32. EMC MEASUREMENT SOFTWARE	ROHDE & SCHWARZ	R&S. EMC32	104624	-	-
DIGITAL THERMO-HYGROMETER	TESTO	608-H1	1041916	09/02/2024	09/02/2025
SHIELDED CHAMBER SR0	ALBATROSS	SR	1042267	-	-

Table 35: Test Instruments – Band Edge

4.6.8 Uncertainty

Test Type	Test Description	Uncertainty
Emissions	Adjacent channels power measurement	1.3 dB

Table 36: Uncertainties - Band Edge

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by a coverage factor k=2, which for normal distribution corresponds to a coverage probability of approximately 95%.

4.7 RADIO-FREQUENCY RADIATED EMISSIONS

4.7.1 Test Setup Required

4.7.1.1 Tabletop equipment

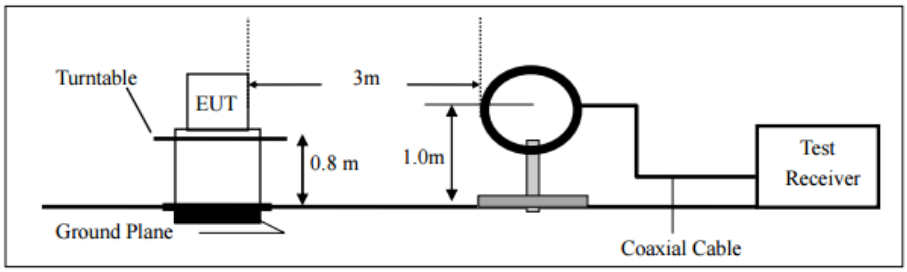

Fig. 49: Radio-frequency radiated emissions of table top equipment from 9 kHz to 30 MHz

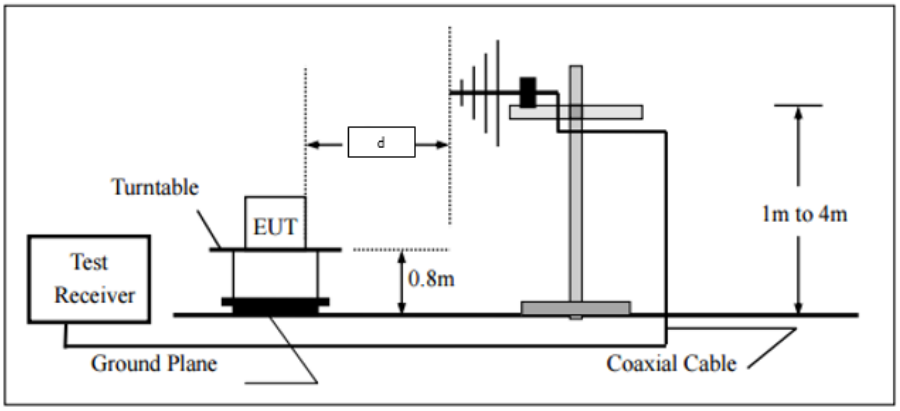

Fig. 50: Radio-frequency radiated emissions of table top equipment from 30 MHz to 1000 MHz

Distance "d" depends on test chamber.

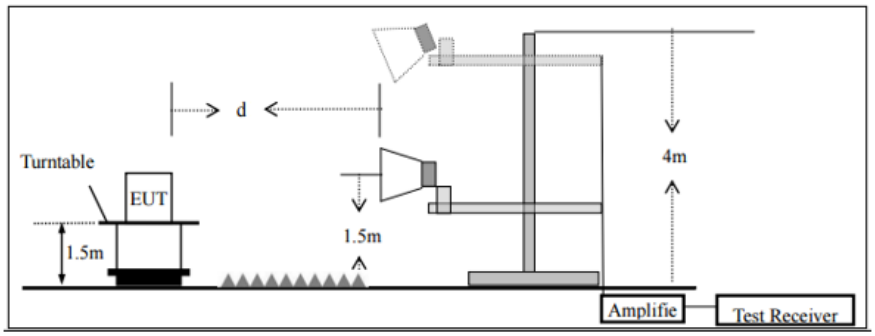

Fig. 51: Radio-frequency radiated emissions setup of table top equipment above 1 GHz

Distance "d" depends on test chamber.

4.7.2 Requirements

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, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Only spurious emissions are permitted in any of the frequency bands listed below:

Frequency [MHz]	Frequency [MHz]	Frequency [MHz]	Frequency [GHz)]
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
(1)0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	(2)
13.36–13.41			

Table 37. Restricted bands of operation

Note 1: Until February 1, 1999, this restricted band shall be 0.490–0.510 MHz.
Note 2: Above 38.6

According to § 15.209(a) and RSS-Gen section 8.9, the radiated emission limits for restricted bands are:

Frequency Range [MHz]	Quasi-peak detector (QP) [dBµV/m]	Peak detector (PK) [dBµV/m]		Average detector (AVG) [dBµV/m]	
	3 m measuring distance	3 m measuring distance	1 m measuring distance[1]	3 m measuring distance	1 m measuring distance[1]
0.009 – 0.490	20log(2400/F[kHz]) + 80	N/A	N/A	N/A	N/A
0.490 – 1.705	20log(24000/F[kHz]) + 40	N/A	N/A	N/A	N/A
1.705 - 30	20log(24000/F[kHz]) + 40	N/A	N/A	N/A	N/A
30 – 88	40.0	N/A	N/A	N/A	N/A
88 – 216	43.5	N/A	N/A	N/A	N/A
216 – 960	46.0	N/A	N/A	N/A	N/A
960 – 1000	54.0	N/A	N/A	N/A	N/A
1000 – 18000	N/A	68.23	N/A	54	N/A
18000 - 40000	N/A	N/A	77.77	N/A	63.54

Table 38: Radio-frequency radiated emissions requirements

Note 1: The limits has been modified according to the applicable standard applying the formula: $L_2 = L_1 - 20log\,(d_2/d_1)$*, where:*
L_2: New Limit.
L_1: Limit at 3 meters.
d_1: 3 meters (standard distance).
d_2: 1 meter (new measurement distance).

According to FCC Part 15 Subpart E FCC 15.407(d), the limits for unrestricted bands are:

Frequency Range [MHz]	Test Mode	Measurement distance [m]
30 – 88	QPK	3
88 – 216		
216 – 960		
Above 960	Peak power	
Above 18000		1

Table 39. Radiated Emission limits. Unrestricted bands

4.7.2.1 Receiver Parameters

According to standard ANSI C63.4-2014:

Frequency Range [MHz]	Detector	Resolution Bandwidth [MHz]	Video Bandwidth [MHz]
0.009 – 0.15	Quasi-peak (QP)	$200 \cdot 10^{-6}$	$1 \cdot 10^{-3}$
0.15 – 30	Quasi-peak (QP)	$9 \cdot 10^{-3}$	$30 \cdot 10^{-3}$
30 – 1000	Quasi-peak (QP)	0.12	0.30
Above 1000	Peak (PK)	1	3
	Average (AVG)	1	10

Table 40: Receiver parameters – Radio-frequency radiated emissions

4.7.3 Test Environmental Conditions

Test Date	Technician	Supervisor	Temperature [ºC]	Humidity [%]	Atm. Pressure [mbar]
06/02/2024	G. Ballesteros	Javier Miguel Nadales	23.3	43.1	1017
06/02/2024	O. Merchán	--	23.7	44-3	998
07/02/2024	O. Merchán	--	21.3	47.3	1011
08/02/2024	O. Merchán	--	22.7	44.6	1008
08/02/2024	J.M LLauradó	--	21.1	46.8	1012
09/02/2024	J.M LLauradó	--	20.9	47.2	1011

Table 41: Test environmental conditions – Radio-frequency radiated emissions

4.7.4 Summary Test Results

Frequency Range [MHz]	Test Area	Distance [m]	Emissions	Results
9 kHz – 30 MHz	SAC 1	3 m	QP < Limit - I	N/A[1]
30 MHz – 1 GHz	SAC 1	3 m	Limit - I <= QP < Limit	PASS
1 GHz – 3.5 GHz	SAC 1	3 m	PK < Limit - I AVG < Limit - I	PASS
3.5 GHz – 8 GHz	SAC 1	3 m	PK < Limit - I AVG < Limit - I	PASS
8 GHz – 18 GHz	SAC 1	3 m	PK < Limit - I AVG < Limit - I	PASS
18 GHz – 26 GHz	SAC 1	1 m	PK < Limit - I AVG < Limit - I	PASS

Table 42: Summary test results – Radio-frequency radiated emissions

4.7.5 Test Results

4.7.5.1 Ambient Levels. Frequency range: 9 kHz – 30 MHz

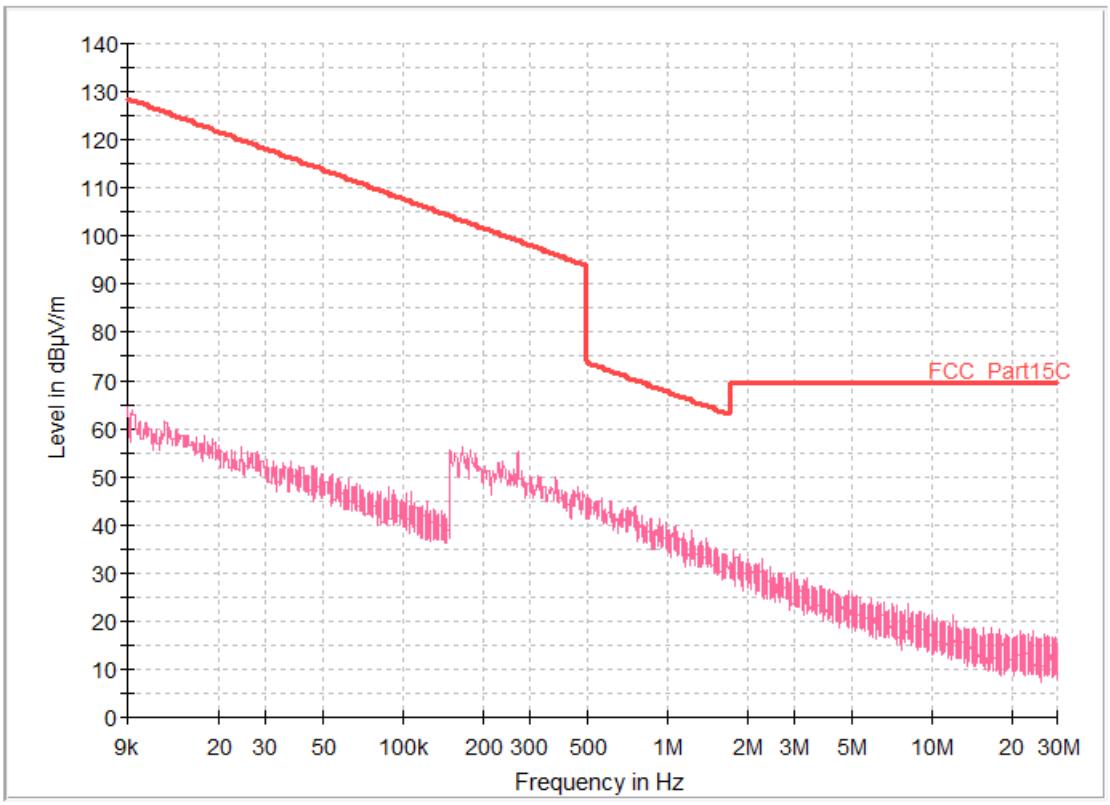

Fig. 52: Ambient level. Frequency range: 9 kHz – 30 MHz - Axis X

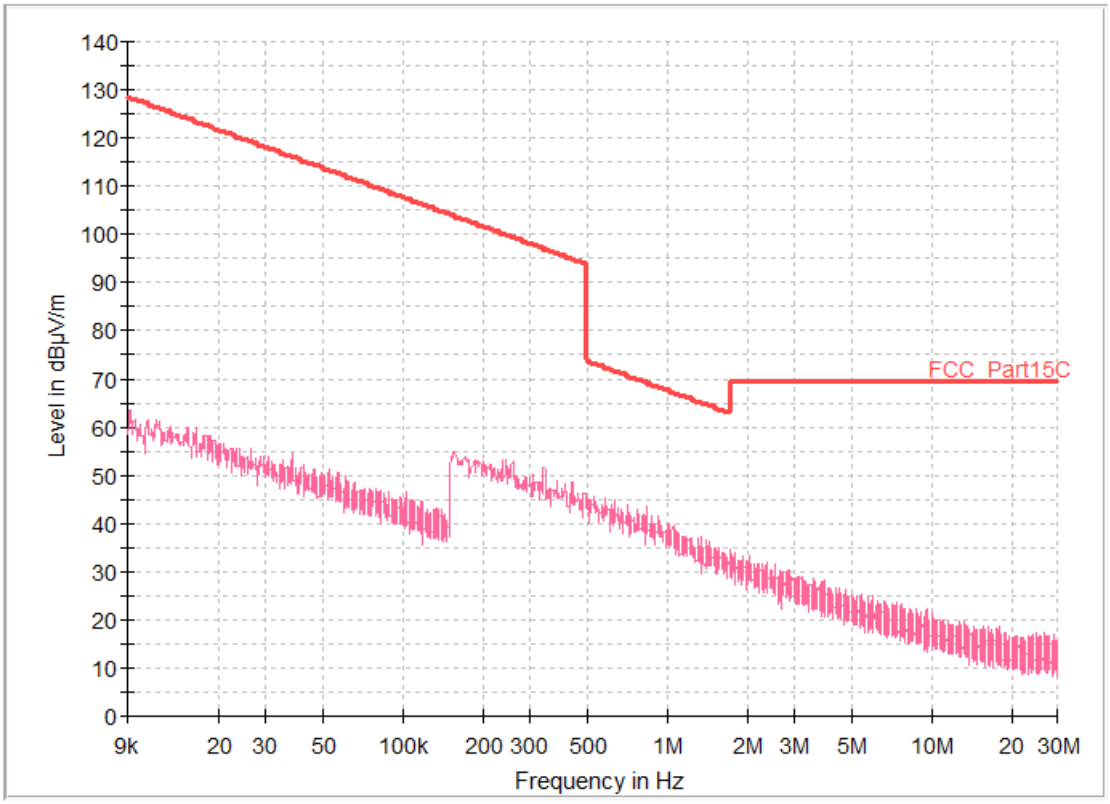

Fig. 53: Ambient level. Frequency range: 9 kHz – 30 MHz - Axis Y

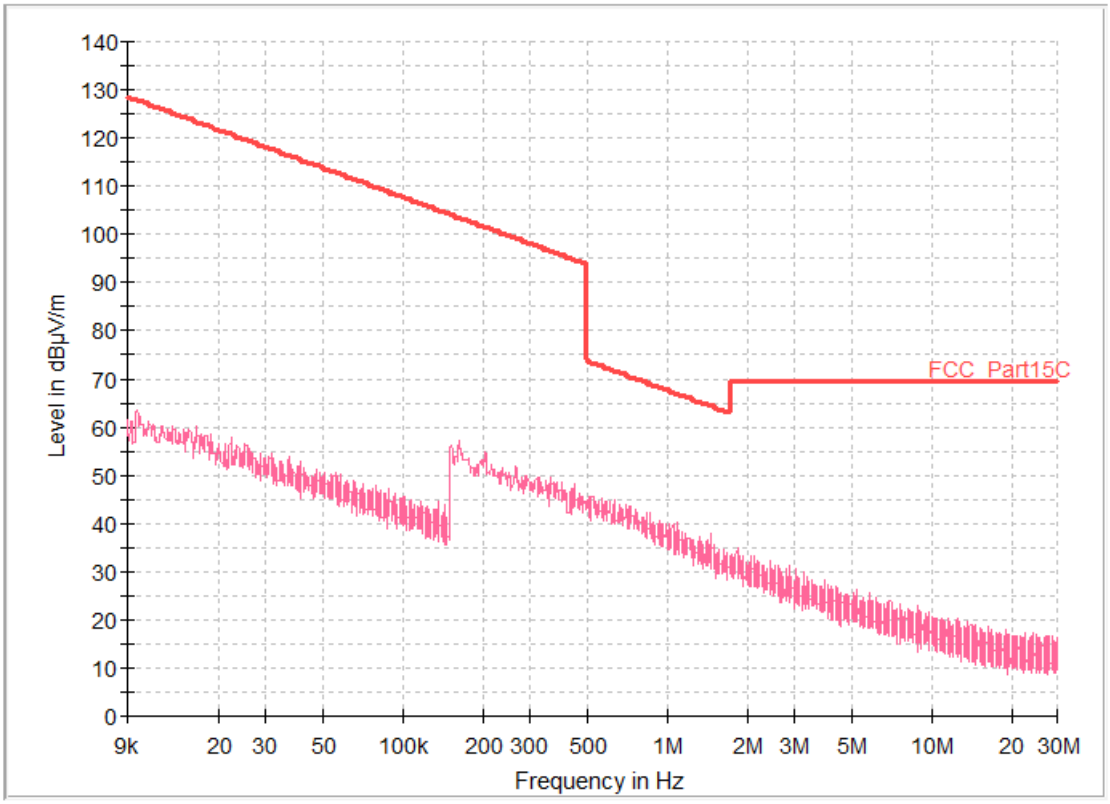

Fig. 54: Ambient level. Frequency range: 9 kHz – 30 MHz - Axis Z

4.7.5.2 Ambient Levels. Frequency range: 30 MHz – 1 GHz

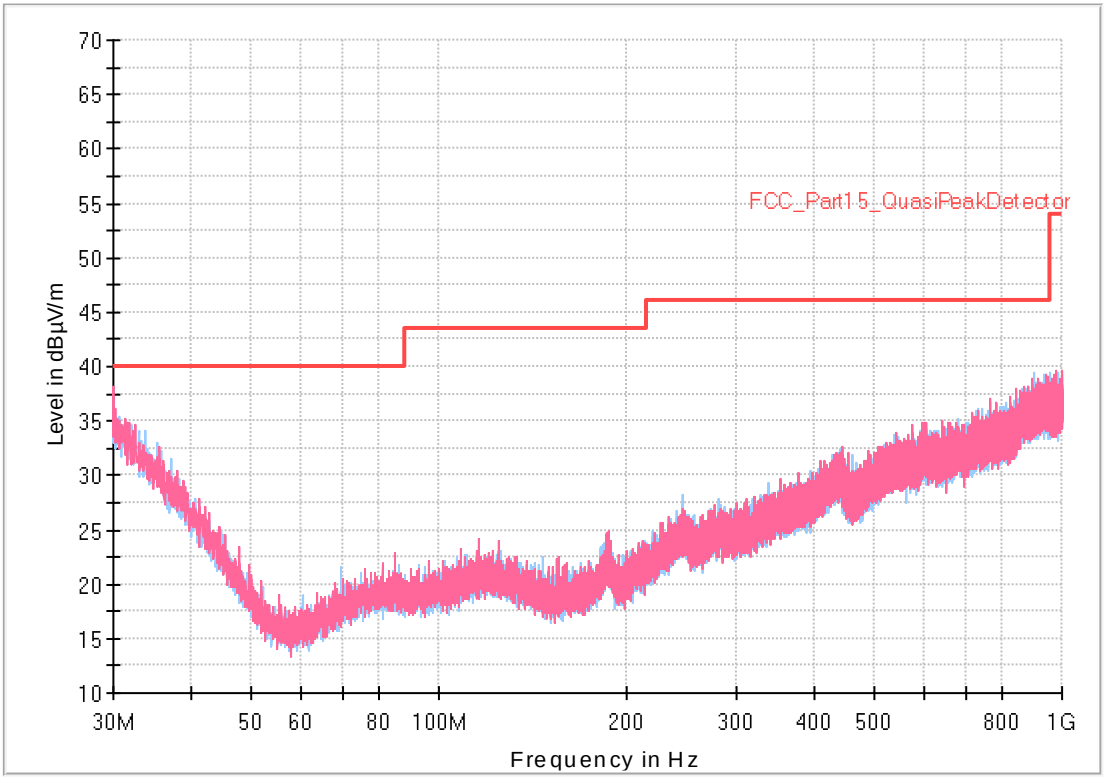

Fig. 55: Ambient level. Frequency range: 30 MHz – 1 GHz

4.7.5.3 Ambient Levels. Frequency range: 1 GHz – 3.5 GHz

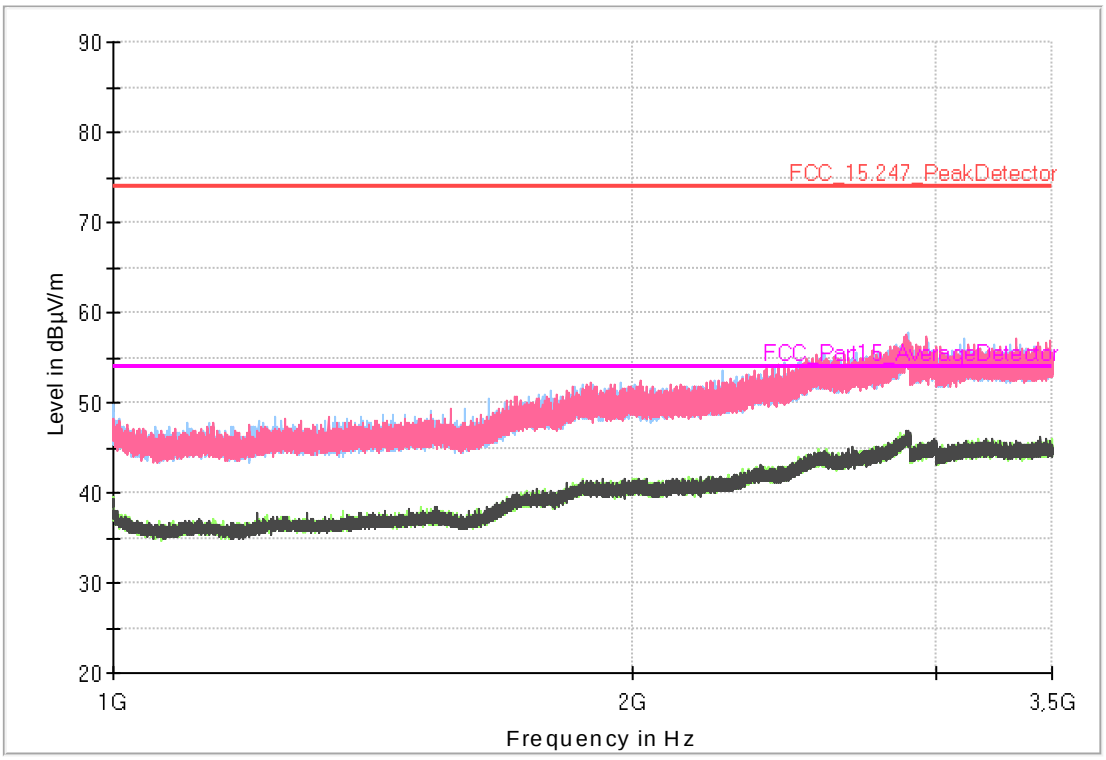

Fig. 56: Ambient level. Frequency range: 1 GHz – 3.5 GHz

4.7.5.4 Ambient Levels. Frequency range: 3.5 GHz – 18 GHz

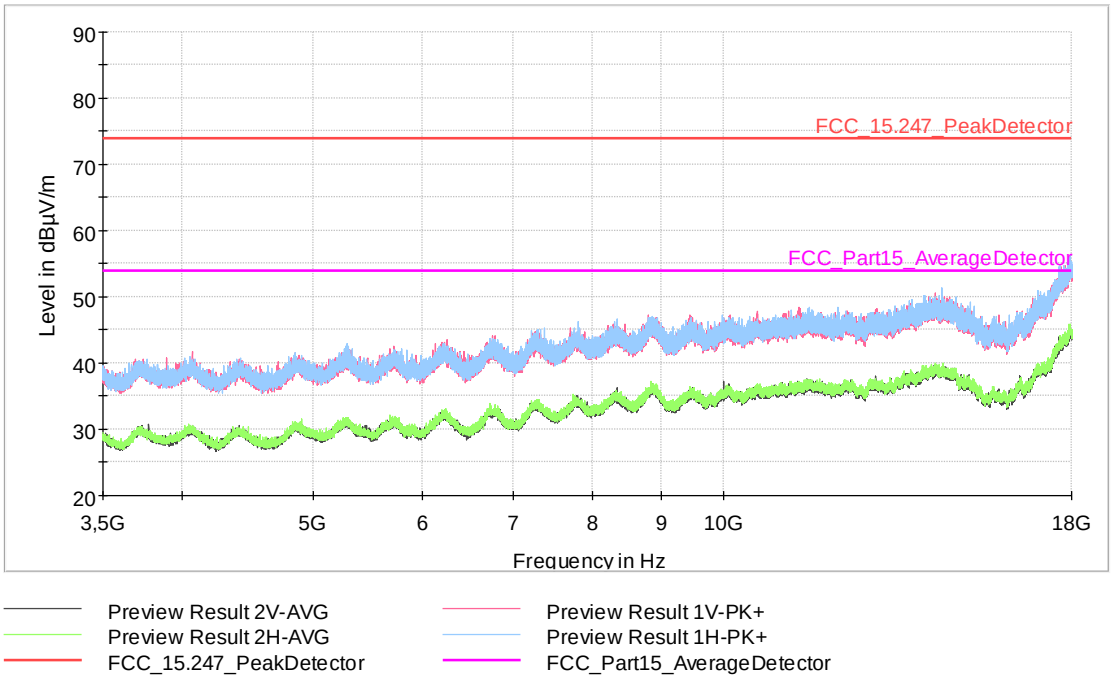

Fig. 57: Ambient level. Frequency range: 3.5 GHz – 18 GHz

4.7.5.5 Ambient Levels. Frequency range: 18 GHz – 26 GHz

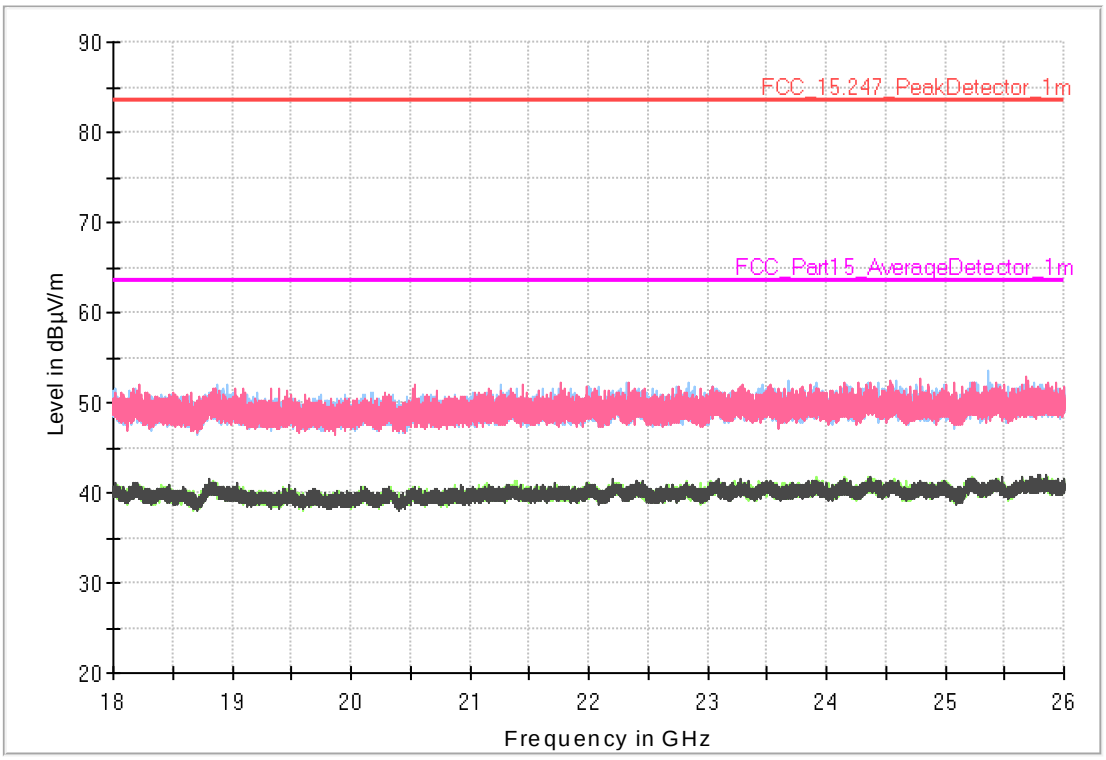

Fig. 58: Ambient level. Frequency range: 18 GHz – 26 GHz

4.7.5.6 Sample #2. Mode 1. All Modulation/All Channel[1]. Frequency range: 9 kHz – 30 MHz

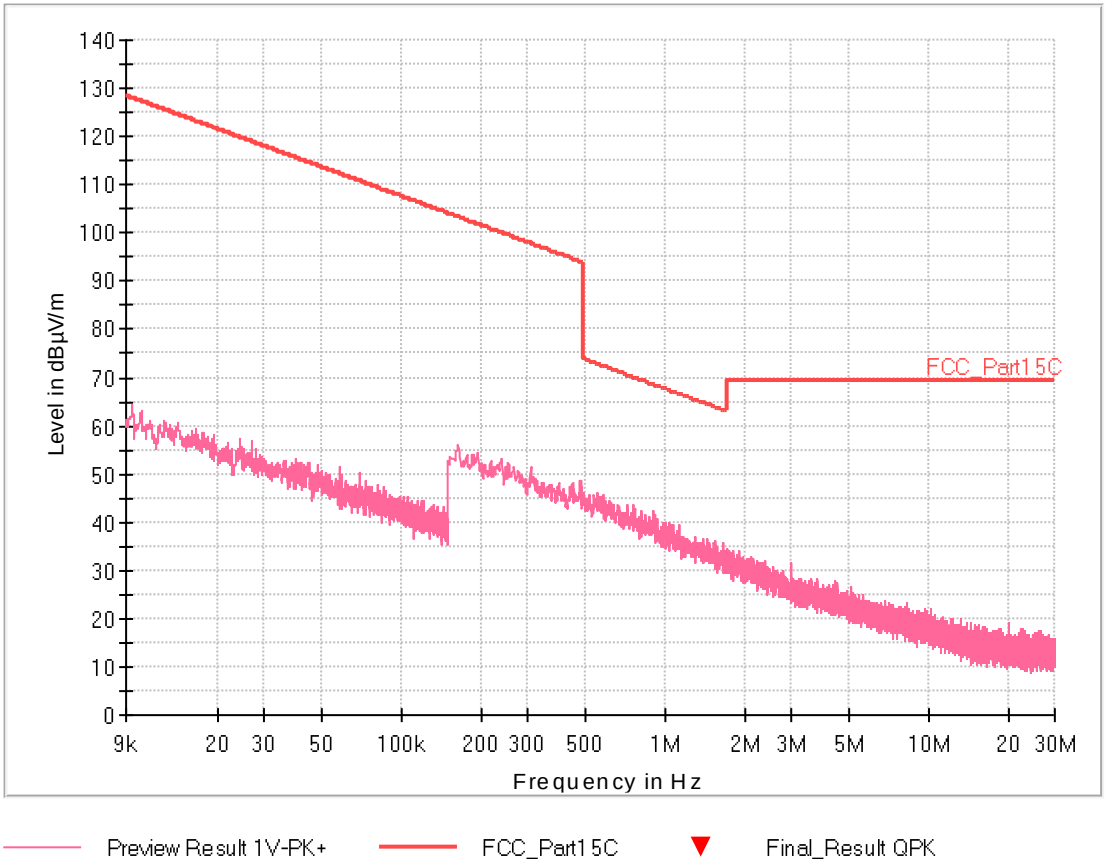

Fig. 59: All Modulation/All Channel. Frequency range: 9 kHz – 30 MHz – Axis X

FINAL MEASUREMENTS

No spurious detected. All emissions are below of the QPK limit

Note [1]: This frequency range has been measured in different channels and modulations and the results obtained are very similar between them. Therefore, the radiated emissions in this frequency range do not depend on the channel and modulation configure d The above graph is taken as the most representative result.

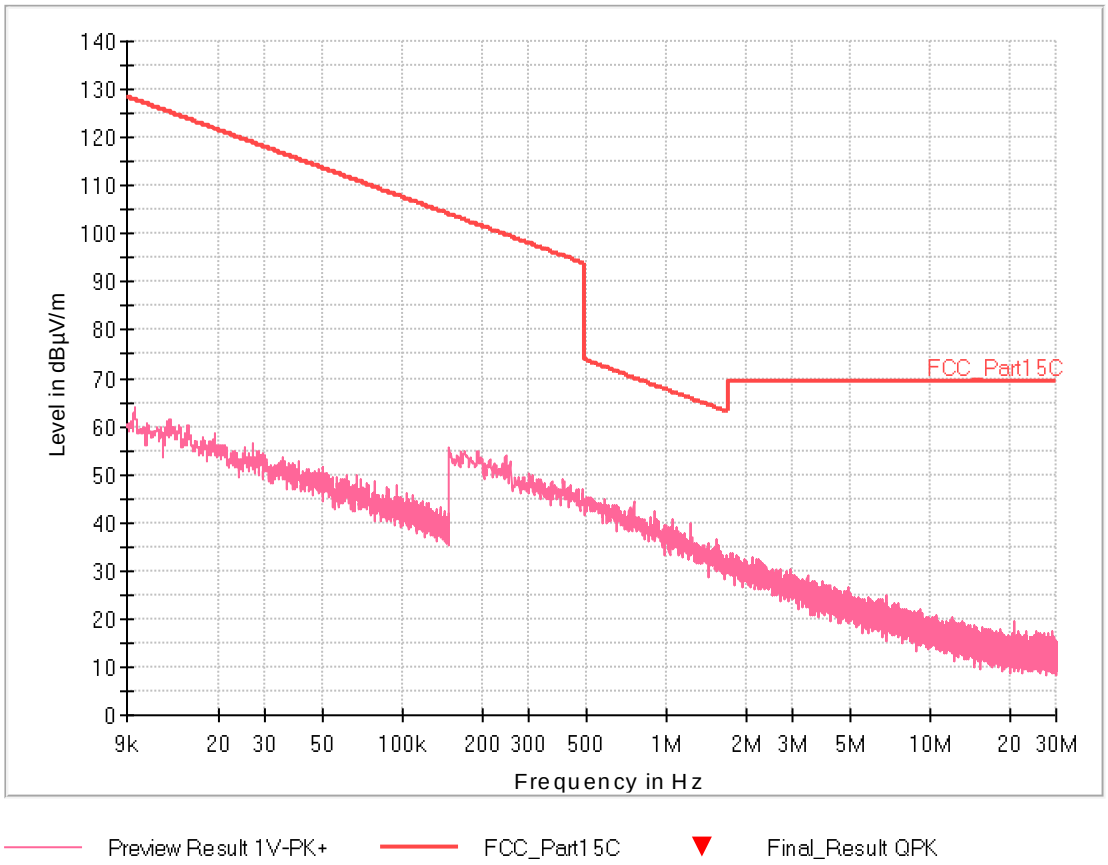

Fig. 60: All Modulation/All Channel. Frequency range: 9 kHz – 30 MHz – Axis Y

FINAL MEASUREMENTS

No spurious detected. All emissions are below of the QPK limit

Note [1]: This frequency range has been measured in different channels and modulations and the results obtained are very similar between them. Therefore, the radiated emissions in this frequency range do not depend on the channel and modulation configured The above graph is taken as the most representative result.

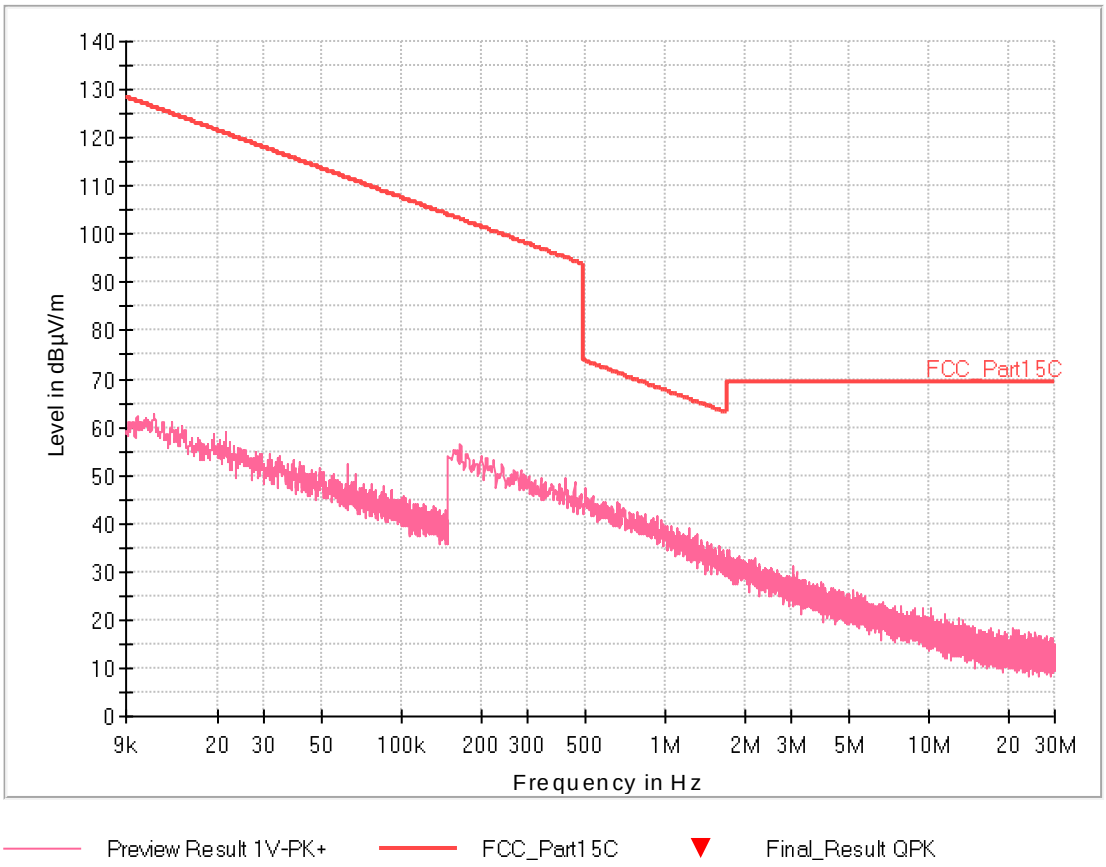

Fig. 61: All Modulation/All Channel. Frequency range: 9 kHz – 30 MHz – Axis Z

FINAL MEASUREMENTS

No spurious detected. All emissions are below of the QPK limit

Note [1]: This frequency range has been measured in different channels and modulations and the results obtained are very similar between them. Therefore, the radiated emissions in this frequency range do not depend on the channel and modulation configure d The above graph is taken as the most representative result.

4.7.5.7 Sample #2. Mode 1. All Modulation/All Channel[1]. Frequency range: 30 MHz – 1 GHz

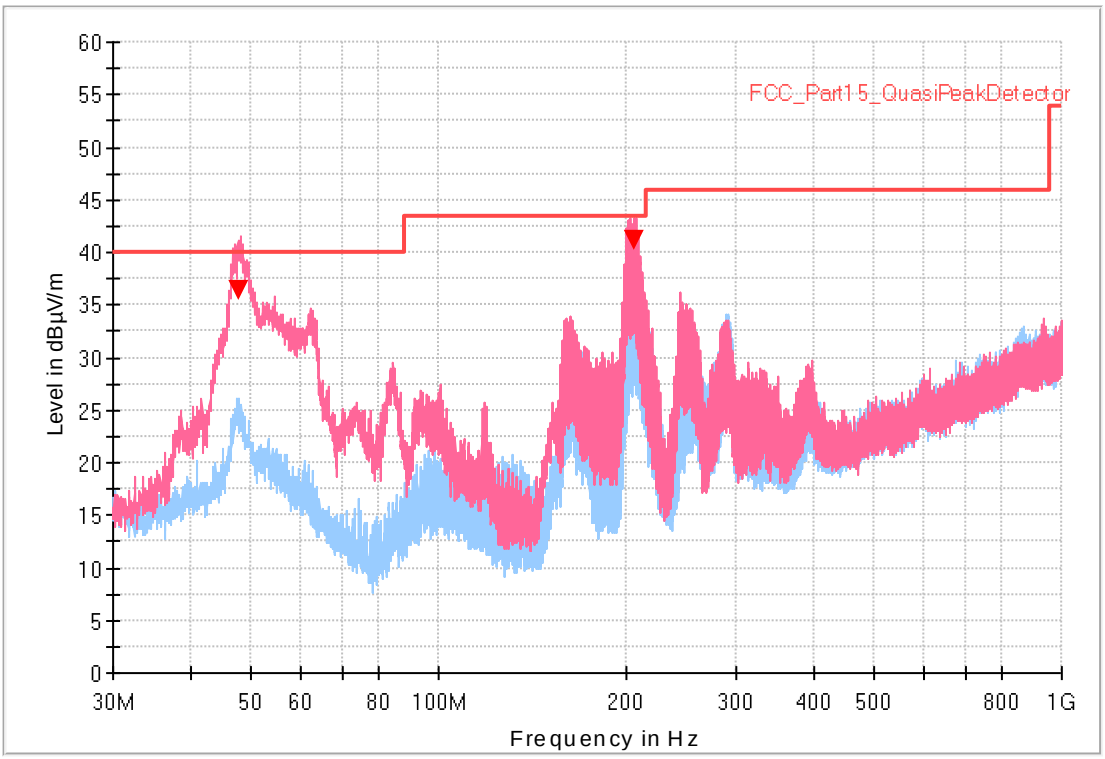

Fig. 62: All Modulation/All Channel - Frequency range: 30 MHz – 1GHz

FINAL MEASUREMENTS

Frequency [MHz]	QuasiPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Corr. [dB/m]
48.139	35.9	40.0	4.1	100.0	V	297.0	18.0
206.831	40.5	43.5	3.0	100.0	V	150.0	15.5

Table 43: All Modulation/All Channel - Frequency range: 30 MHz – 1GHz

Note [1]: This frequency range has been measured in different channels and modulations and the results obtained are very similar between them. Therefore, the radiated emissions in this frequency range do not depend on the channel and modulation configure d The above graph is taken as the most representative result.

4.7.5.8 Sample #2. Mode 1. Modulation B. Frequency range: 1 GHz – 3.5 GHz

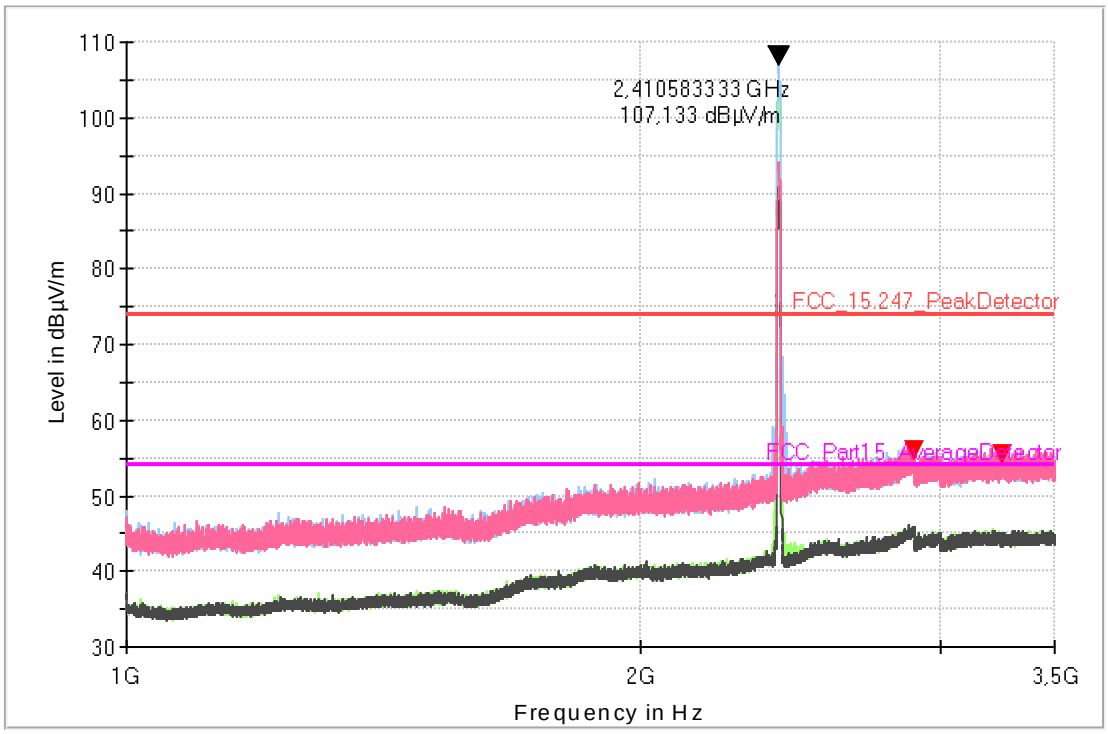

Fig. 63: Low Channel - Frequency range: 1 GHz – 3.5 GHz

FINAL MEASUREMENTS

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Corr. [dB/m]
2894.920[1]	56.0	74.0	18.0	266.0	V	126.0	33.0
3264.830[1]	55.6	74.0	18.4	172.0	V	235.0	34.8

Table 44: Low Channel - Frequency range: 1 GHz – 3.5 GHz

Note [1]: The final frequency measurements within the restricted band correspond to the ambient level as can be seen in the graphs above. Therefore, a maximization with peak detector as worst case is performed.

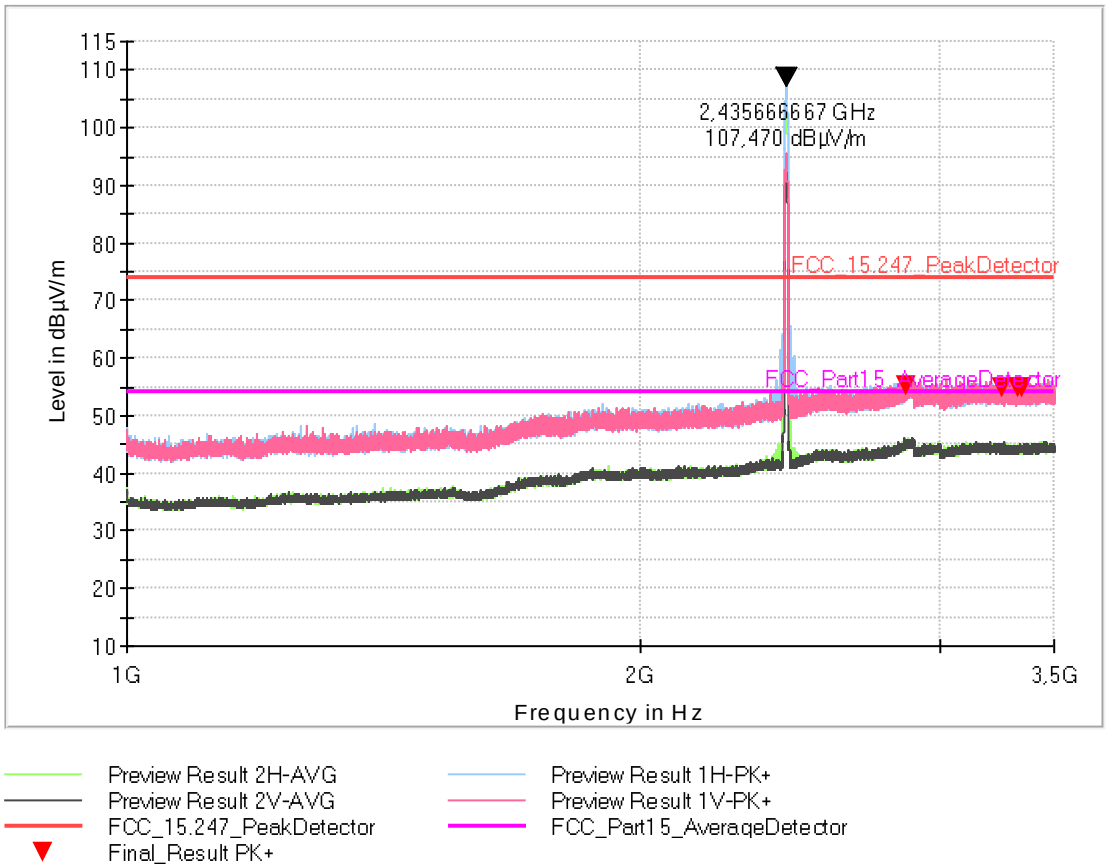

Fig. 64: Middle Channel - Frequency range: 1 GHz – 3.5 GHz

FINAL MEASUREMENTS

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Corr. [dB/m]
2863.750[1]	55.3	74.00	18.7	135.0	H	3.0	32.9
3263.330[1]	54.8	74.00	19.2	185.0	V	93.0	34.8
3333.750[1]	55.0	74.00	19.0	336.0	V	-1.0	34.9
3353.170[1]	55.0	74.00	19.0	350.0	V	-1.0	34.9

Table 45: Middle Channel - Frequency range: 1 GHz – 3.5 GHz

Note [1]: The final frequency measurements within the restricted band correspond to the ambient level as can be seen in the graphs above. Therefore, a maximization with peak detector as worst case is performed.

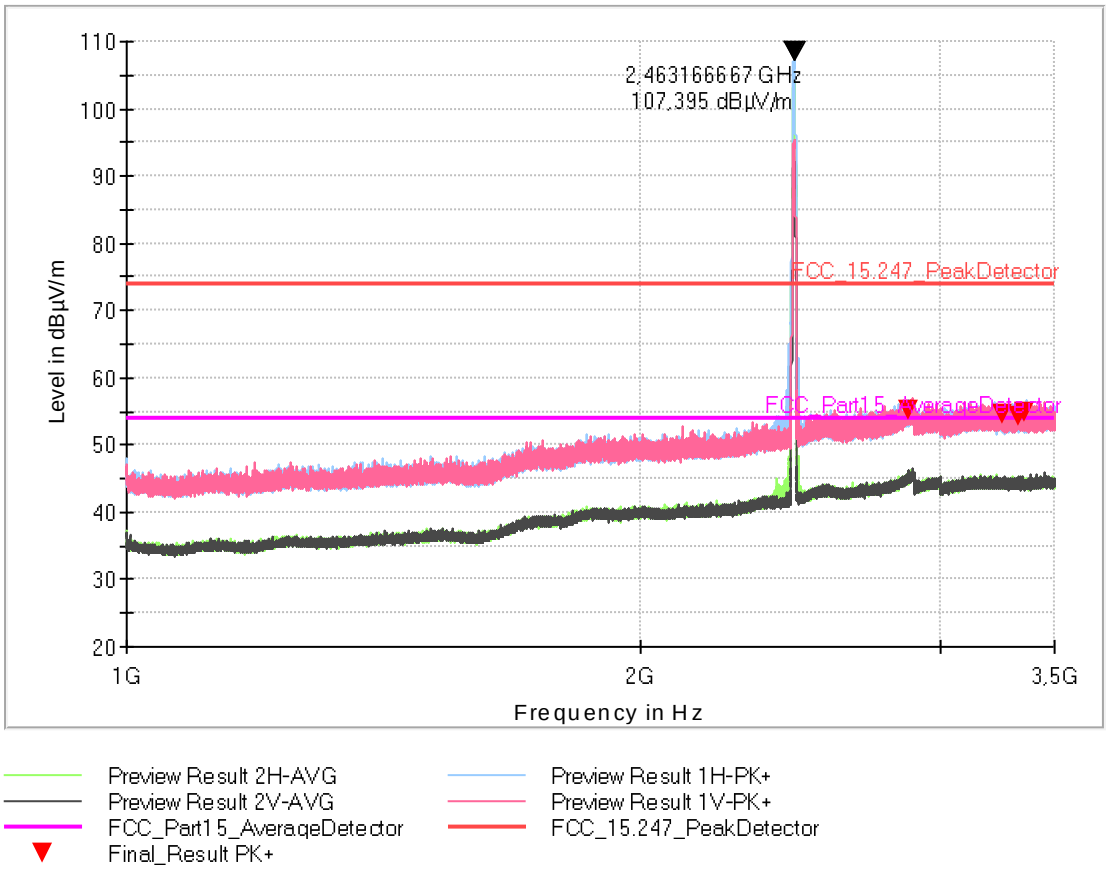

Fig. 65: High Channel - Frequency range: 1 GHz – 3.5 GHz

FINAL MEASUREMENTS

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Corr. [dB/m]
2871.080[1]	55.2	74.0	18.8	293.0	V	349.0	32.9
3260.330[1]	54.6	74.0	19.4	147.0	V	0.0	34.8
3330.330[1]	54.4	74.0	19.6	232.0	V	36.0	34.9
3356.920[1]	56.0	74.0	18.0	271.0	H	146.0	34.9

Table 46: High Channel - Frequency range: 1 GHz – 3.5 GHz

Note [1]: The final frequency measurements within the restricted band correspond to the ambient level as can be seen in the graphs above. Therefore, a maximization with peak detector as worst case is performed.

4.7.5.9 Sample #2. Mode 1. Modulation B. Frequency range: 3.5 GHz – 18 GHz

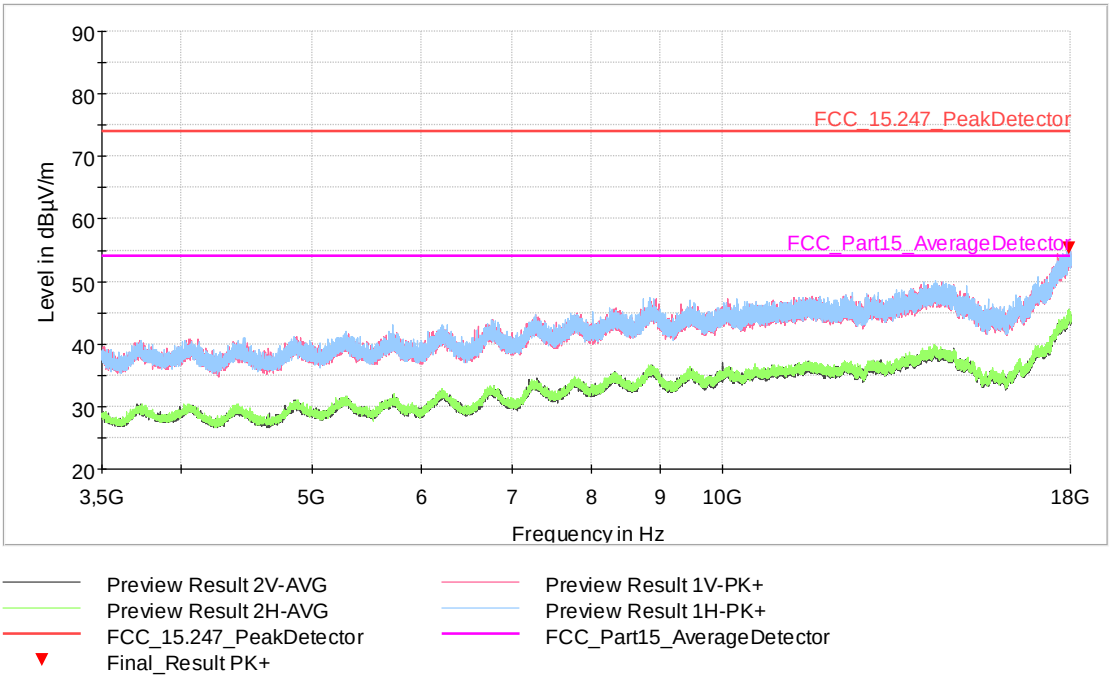

Fig. 66: Low Channel - Frequency range: 3.5 GHz – 18 GHz

FINAL MEASUREMENTS

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Corr. [dB/m]
17966.650[1]	55.4	74.0	18.6	151.0	H	0.0	8.0

Table 47: Low Channel - Frequency range: 3.5 GHz – 18 GHz

Note [1]: The final frequency measurements within the restricted band correspond to the ambient level as can be seen in the graphs above. Therefore, a maximization with peak detector as worst case is performed.

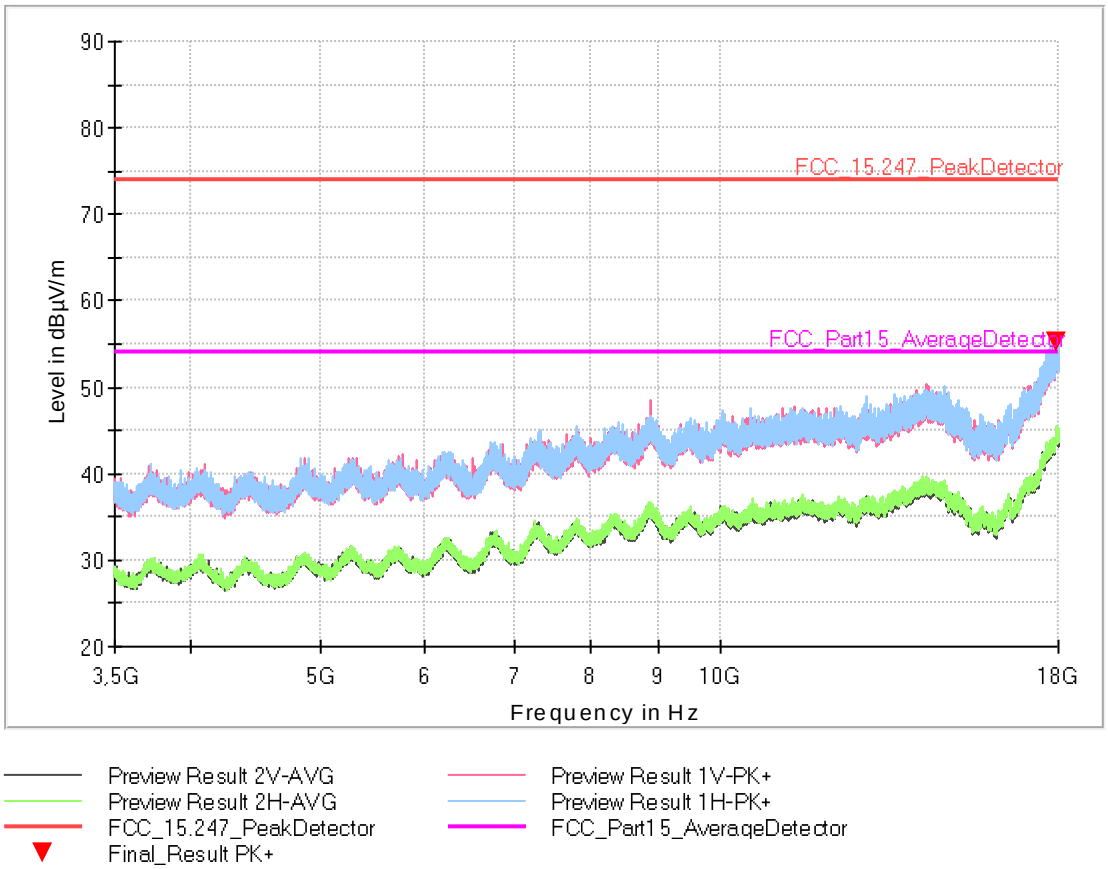

Fig. 67: Middle Channel - Frequency range: 3.5 GHz – 18 GHz

FINAL MEASUREMENTS

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Corr. [dB/m]
17943.450[1]	55.3	74.0	18.7	146.0	H	53.0	7.9

Table 48: Middle Channel - Frequency range: 3.5 GHz – 18 GHz

Note [1]: The final frequency measurements within the restricted band correspond to the ambient level as can be seen in the graphs above. Therefore, a maximization with peak detector as worst case is performed.

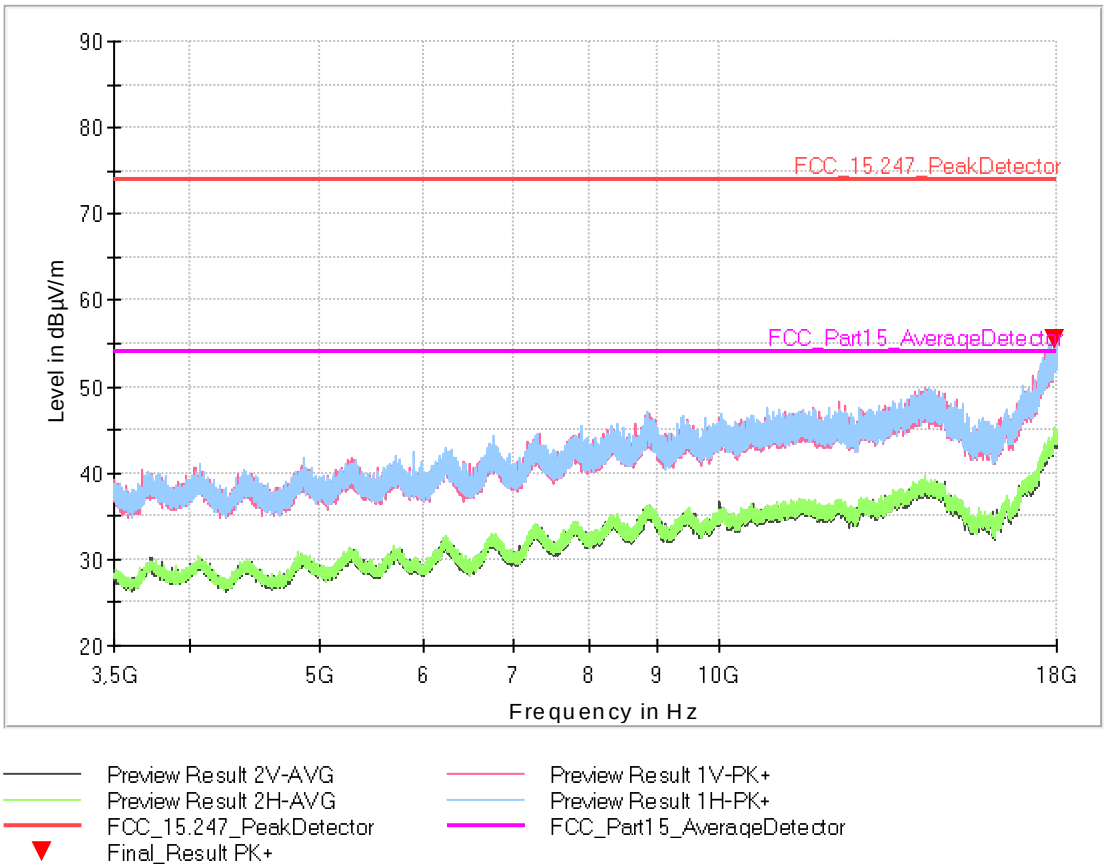

Fig. 68: High Channel - Frequency range: 3.5 GHz – 18 GHz

FINAL MEASUREMENTS

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Corr. [dB/m]
17954.570[1]	55.5	74.0	18.5	151.0	H	205.0	8.0

Table 49: High Channel - Frequency range: 3.5 GHz – 18 GHz

Note [1]: The final frequency measurements within the restricted band correspond to the ambient level as can be seen in the graphs above. Therefore, a maximization with peak detector as worst case is performed.

4.7.5.10 Sample #2. Mode 1. Modulation G. Frequency range: 1 GHz – 3.5 GHz

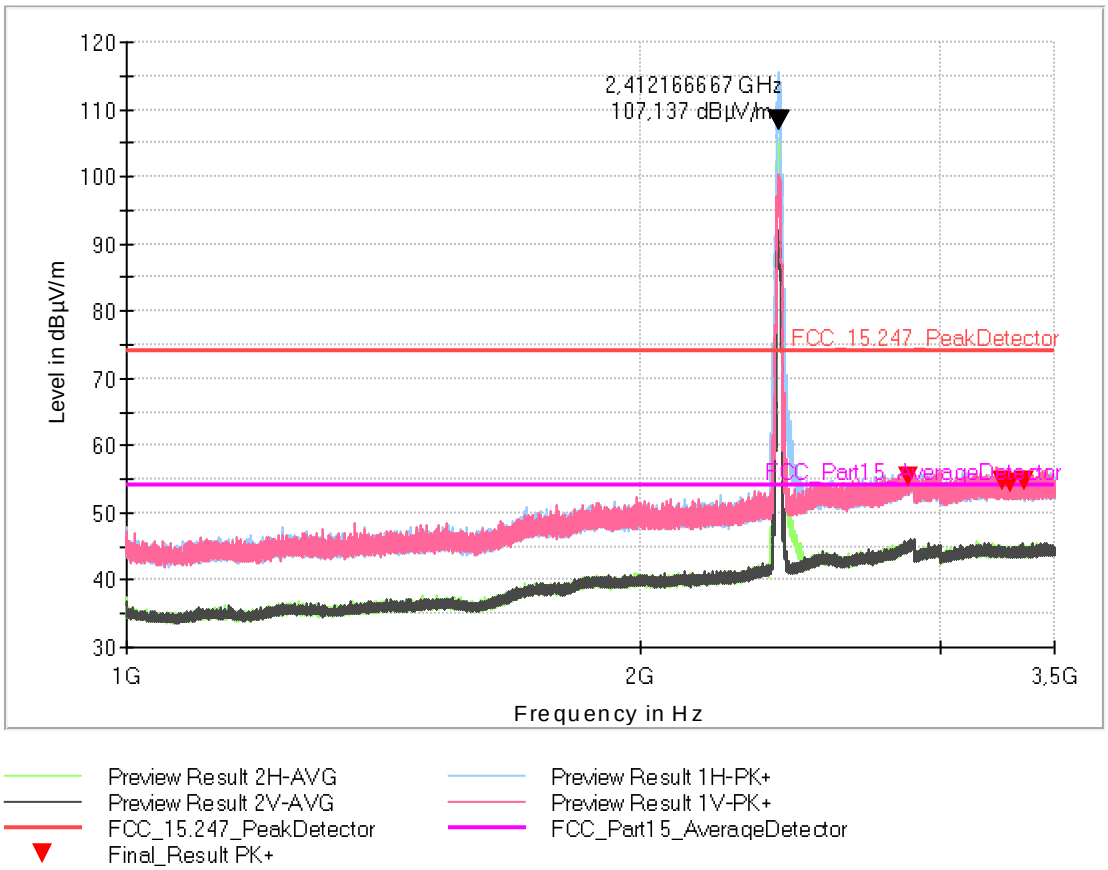

Fig. 69: Low Channel - Frequency range: 1 GHz – 3.5 GHz

FINAL MEASUREMENTS

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Corr. [dB/m]
2871.670[1]	55.4	74.0	18.6	100.0	H	96.0	32.9
3261.170[1]	54.7	74.0	19.3	289.0	V	171.0	34.8
3300.420[1]	54.6	74.0	19.4	104.0	V	72.0	34.8
3356.580[1]	54.8	74.0	19.2	288.0	V	10.0	34.9

Table 50: Low Channel - Frequency range: 1 GHz – 3.5 GHz

Note [1]: The final frequency measurements within the restricted band correspond to the ambient level as can be seen in the graphs above. Therefore, a maximization with peak detector as worst case is performed.

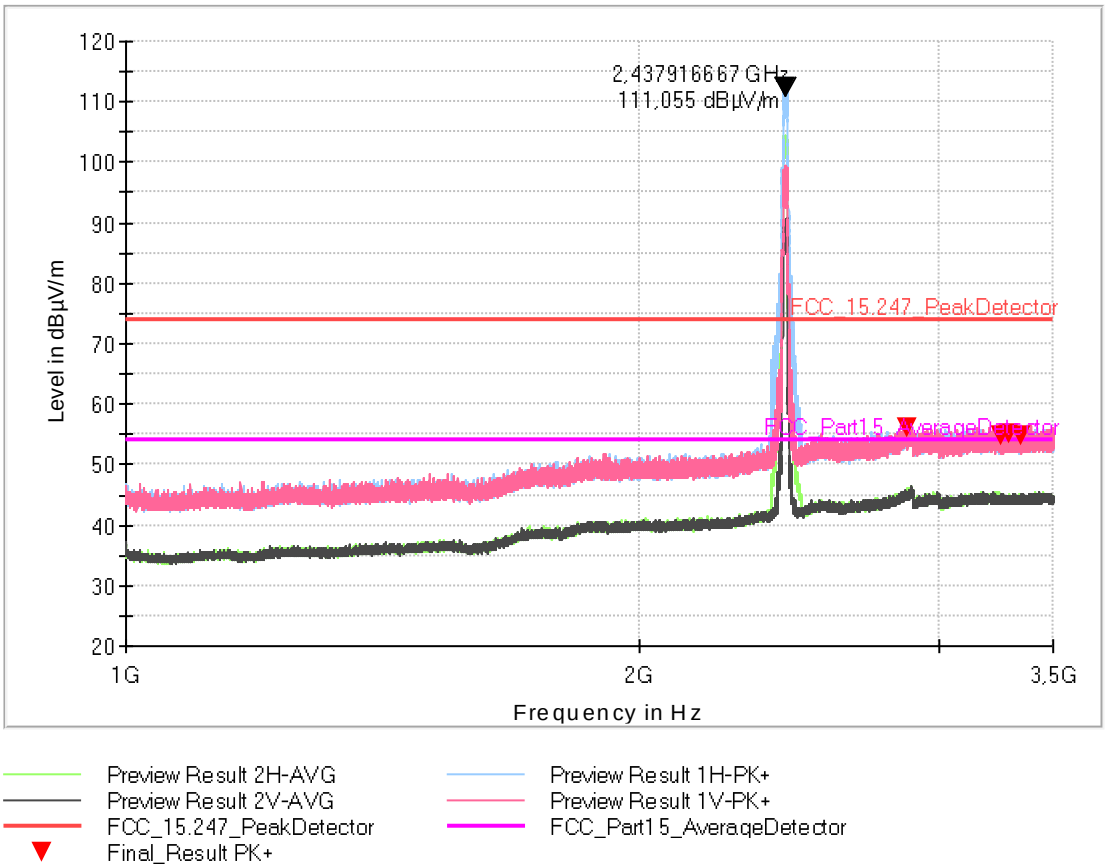

Fig. 70: Middle Channel - Frequency range: 1 GHz – 3.5 GHz

FINAL MEASUREMENTS

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Corr. [dB/m]
2875.250[1]	56.0	74.0	18.0	350.0	H	102.0	32.9
3266.170[1]	54.6	74.0	19.4	350.0	H	182.0	34.8
3301.330[1]	55.1	74.0	18.9	320.0	H	135.0	34.8
3352.830[1]	54.8	74.0	19.2	323.0	V	256.0	34.9

Table 51: Middle Channel - Frequency range: 1 GHz – 3.5 GHz

Note [1]: The final frequency measurements within the restricted band correspond to the ambient level as can be seen in the graphs above. Therefore, a maximization with peak detector as worst case is performed.

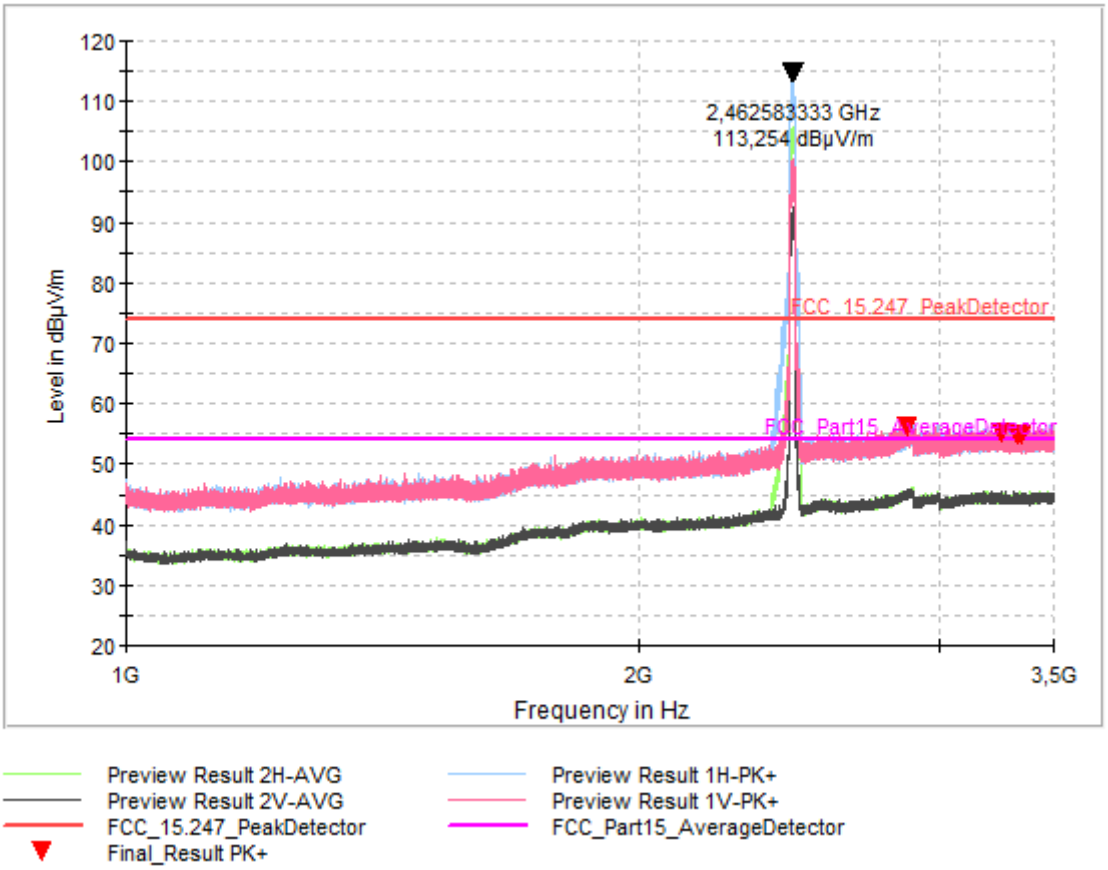

Fig. 71: High Channel - Frequency range: 1 GHz – 3.5 GHz

FINAL MEASUREMENTS

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Corr. [dB/m]
2875.080[1]	55.9	74.0	18.1	251.0	H	97.0	32.9
3265.420[1]	55.2	74.0	18.8	189.0	V	337.0	34.8
3334.670[1]	54.7	74.0	19.3	225.0	V	176.0	34.9
3355.170[1]	54.9	74.0	19.1	102.0	H	352.0	34.9

Table 52: High Channel - Frequency range: 1 GHz – 3.5 GHz

Note [1]: The final frequency measurements within the restricted band correspond to the ambient level as can be seen in the graphs above. Therefore, a maximization with peak detector as worst case is performed.

4.7.5.11 Sample #2. Mode 1. Modulation G. Frequency range: 3.5 GHz – 18 GHz

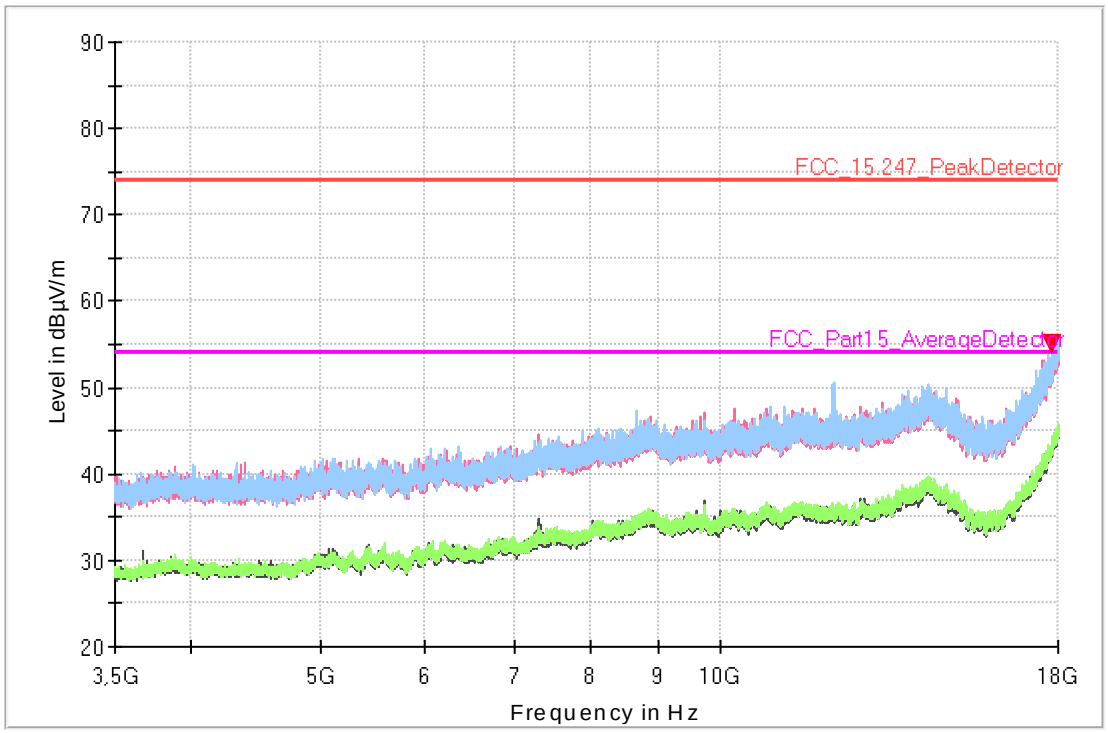

Fig. 72: Low Channel - Frequency range: 3.5 GHz – 18 GHz

FINAL MEASUREMENTS

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Corr. [dB/m]
17835.670[1]	55.0	74.0	19.0	343.0	H	142.0	7.1

Table 53: Low Channel - Frequency range: 3.5 GHz – 18 GHz

Note [1]: The final frequency measurements within the restricted band correspond to the ambient level as can be seen in the graphs above. Therefore, a maximization with peak detector as worst case is performed.

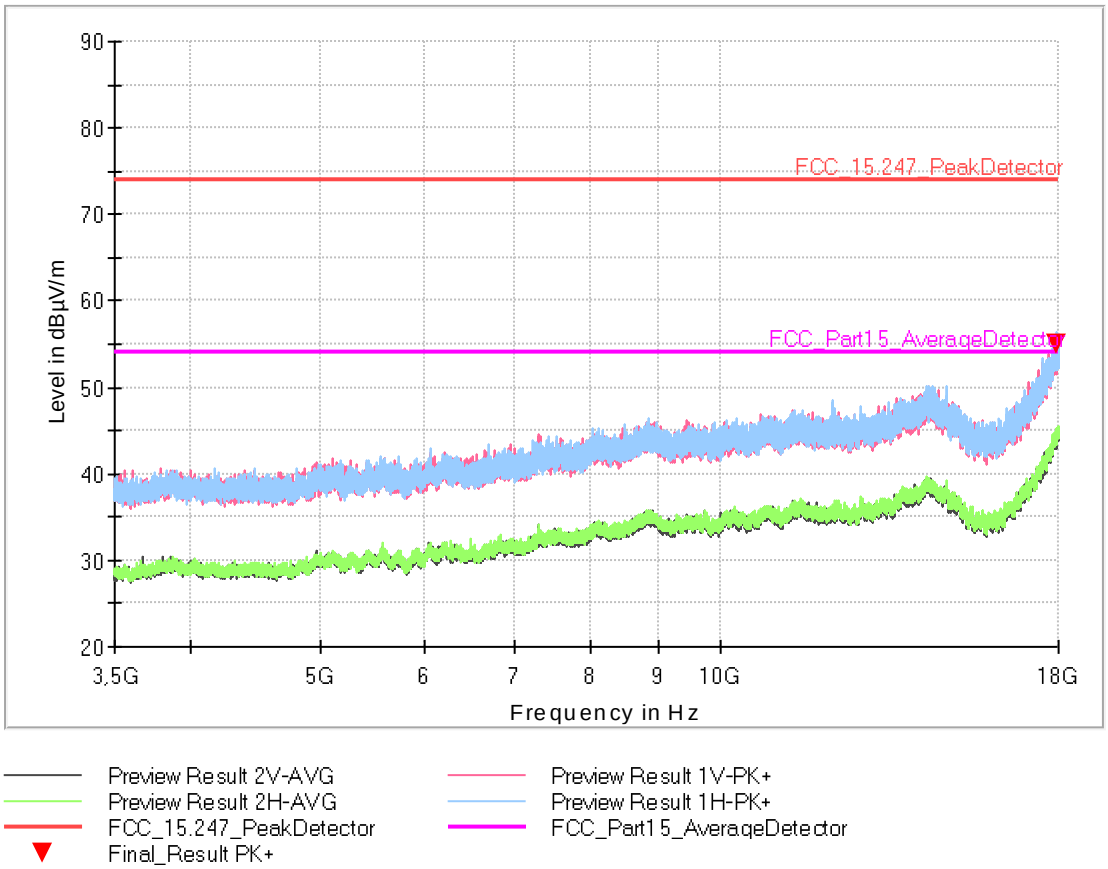

Fig. 73: Middle Channel - Frequency range: 3.5 GHz – 18 GHz

FINAL MEASUREMENTS

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Corr. [dB/m]
17948.280[1]	55.0	74.0	19.0	323.0	H	0.0	7.9

Table 54: Middle Channel - Frequency range: 3.5 GHz – 18 GHz

Note [1]: The final frequency measurements within the restricted band correspond to the ambient level as can be seen in the graphs above. Therefore, a maximization with peak detector as worst case is performed.

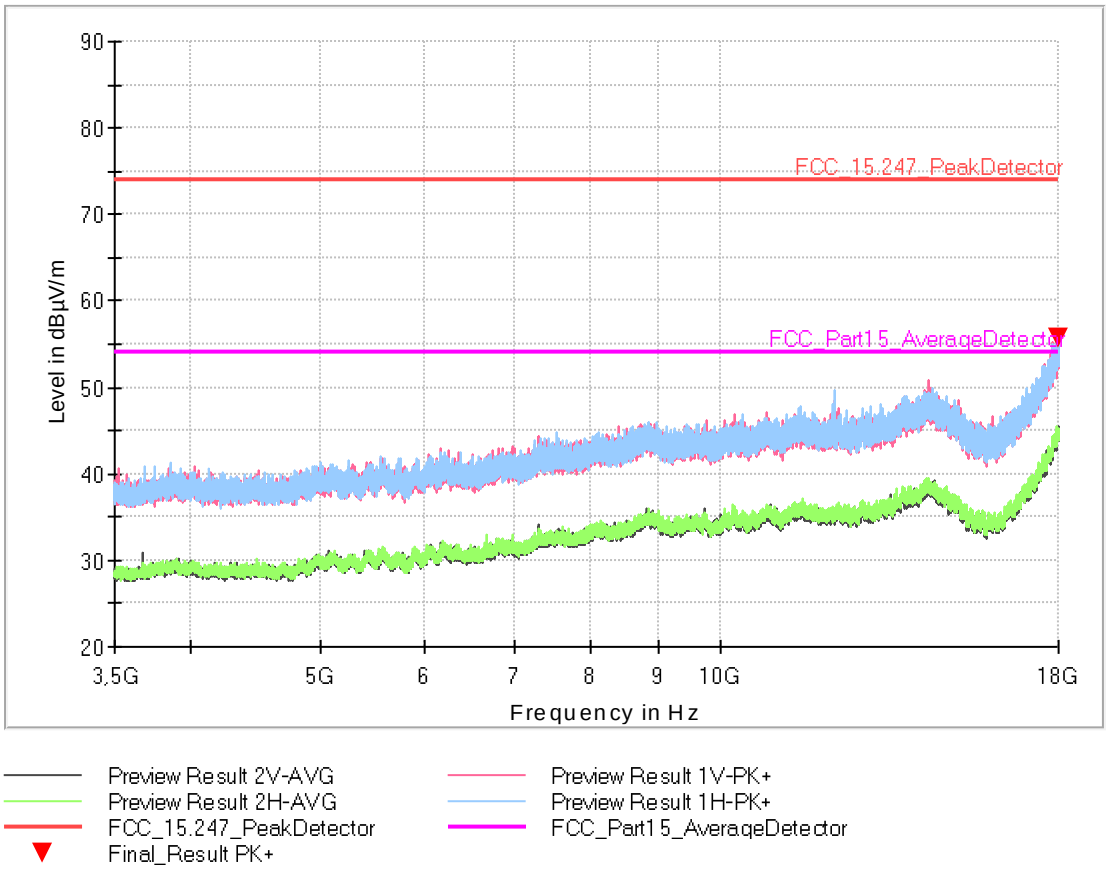

Fig. 74: High Channel - Frequency range: 3.5 GHz – 18 GHz

FINAL MEASUREMENTS

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Corr. [dB/m]
17996.130[1]	55.6	74.0	18.4	312.0	V	44.0	8.3

Table 55: High Channel - Frequency range: 3.5 GHz – 18 GHz

Note [1]: The final frequency measurements within the restricted band correspond to the ambient level as can be seen in the graphs above. Therefore, a maximization with peak detector as worst case is performed.

4.7.5.12 Sample #2. Mode 1. Modulation N20. Frequency range: 1 GHz – 3.5 GHz

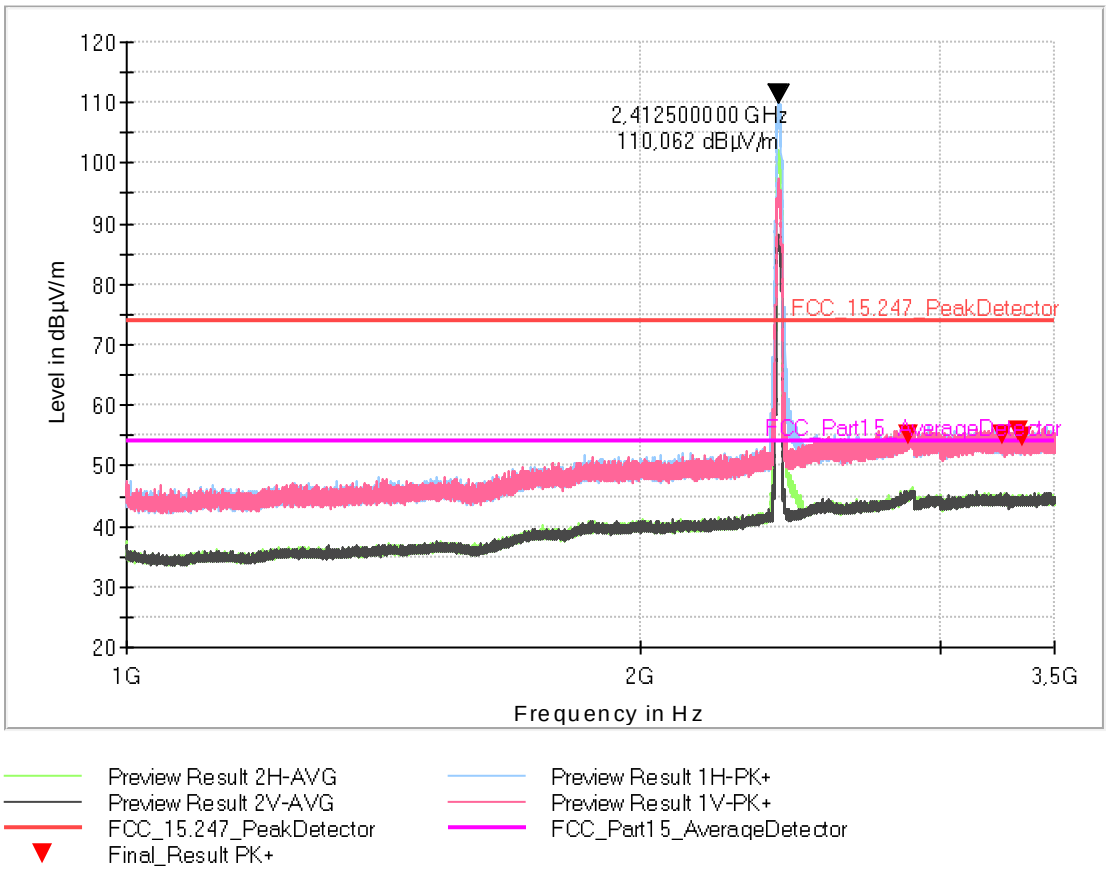

Fig. 75: Low Channel - Frequency range: 1 GHz – 3.5 GHz

FINAL MEASUREMENTS

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Corr. [dB/m]
2875.330[1]	55.2	74.00	18.8	206.0	V	8.0	32.9
3265.330[1]	54.9	74.00	19.1	124.0	H	209.0	34.8
3336.250[1]	55.6	74.00	18.4	313.0	H	296.0	34.9
3355.330[1]	54.6	74.00	19.4	294.0	V	159.0	34.9

Table 56: Low Channel - Frequency range: 1 GHz – 3.5 GHz

Note [1]: The final frequency measurements within the restricted band correspond to the ambient level as can be seen in the graphs above. Therefore, a maximization with peak detector as worst case is performed.

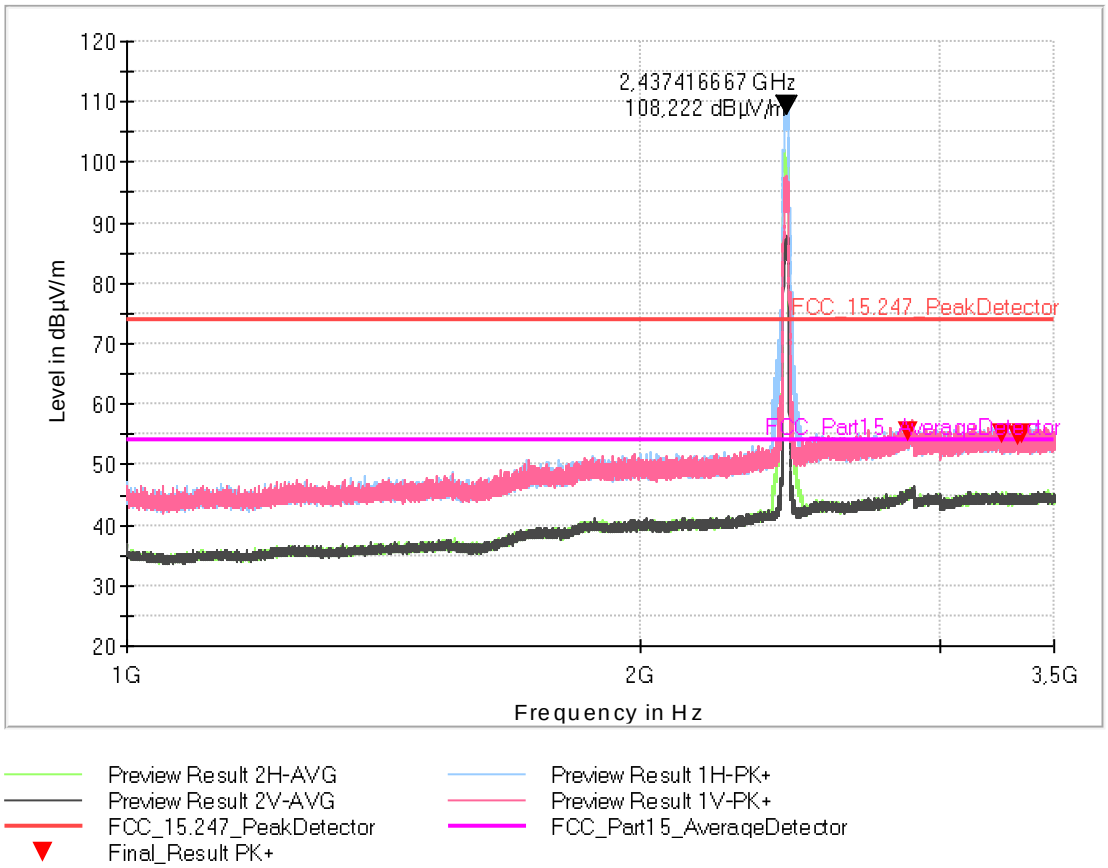

Fig. 76: Middle Channel - Frequency range: 1 GHz – 3.5 GHz

FINAL MEASUREMENTS

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Corr. [dB/m]
2875.000[1]	55.5	74.0	18.5	340.0	H	99.0	32.9
3265.670[1]	55.0	74.0	19.0	119.0	V	284.0	34.8
3335.830[1]	54.8	74.0	19.2	158.0	H	68.0	34.9
3355.170[1]	54.9	74.0	19.1	100.0	V	0.0	34.9

Table 57: Middle Channel - Frequency range: 1 GHz – 3.5 GHz

Note [1]: The final frequency measurements within the restricted band correspond to the ambient level as can be seen in the graphs above. Therefore, a maximization with peak detector as worst case is performed.

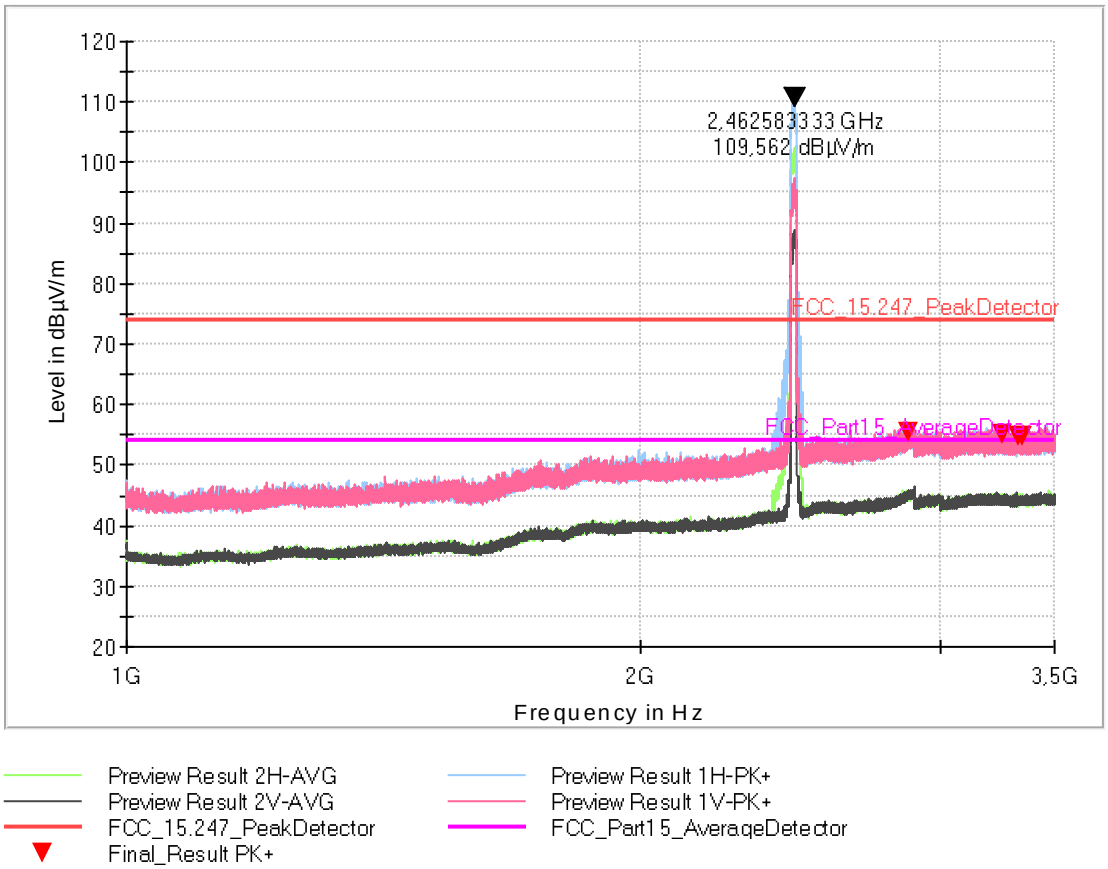

Fig. 77: High Channel - Frequency range: 1 GHz – 3.5 GHz

FINAL MEASUREMENTS

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Corr. [dB/m]
2875.420[1]	55.3	74.0	18.7	122.0	H	194.0	32.9
3265.412[1]	55.0	74.0	19.0	267.0	H	218.0	34.8
3335.750[1]	54.7	74.0	19.3	100.0	V	0.0	34.9
3355.000[1]	54.7	74.0	19.3	253.0	H	0.0	34.9

Table 58: High Channel - Frequency range: 1 GHz – 3.5 GHz

Note [1]: The final frequency measurements within the restricted band correspond to the ambient level as can be seen in the graphs above. Therefore, a maximization with peak detector as worst case is performed.

4.7.5.13 Sample #2. Mode 1. Modulation N20. Frequency range: 3.5 GHz – 18 GHz

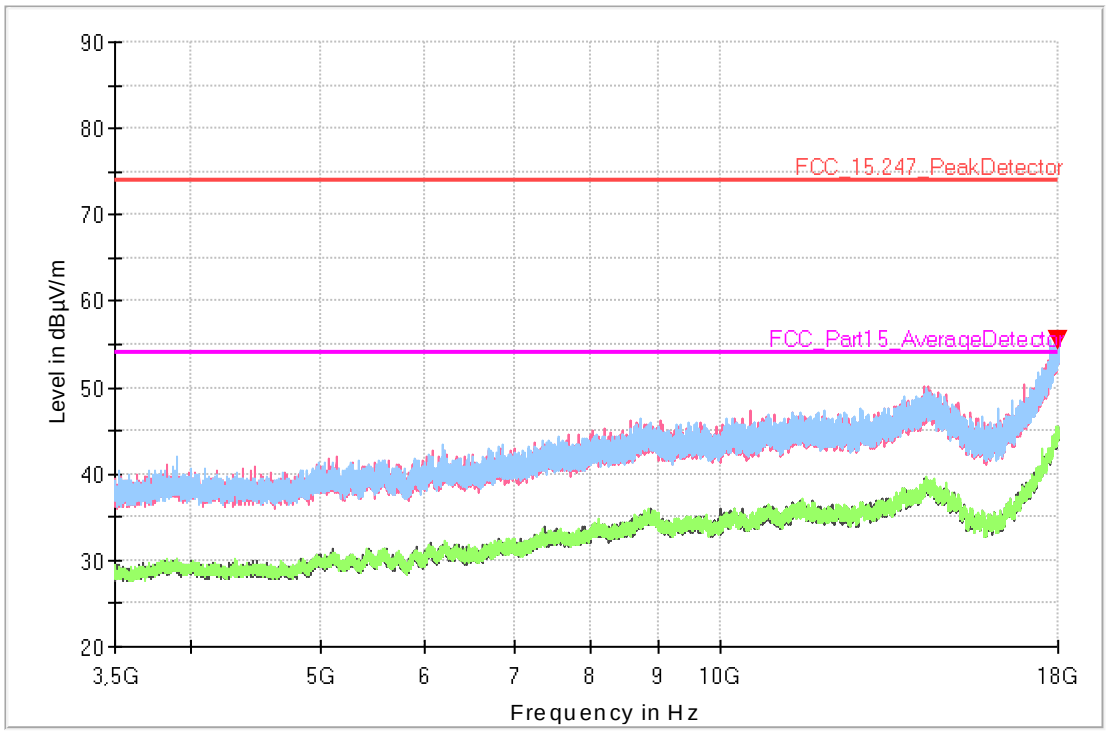

Fig. 78: Low Channel - Frequency range: 3.5 GHz – 18 GHz

FINAL MEASUREMENTS

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Corr. [dB/m]
17978.250[1]	55.5	74.0	18.5	162.0	V	97.0	8.1

Table 59: Low Channel - Frequency range: 3.5 GHz – 18 GHz

Note [1]: The final frequency measurements within the restricted band correspond to the ambient level as can be seen in the graphs above. Therefore, a maximization with peak detector as worst case is performed.

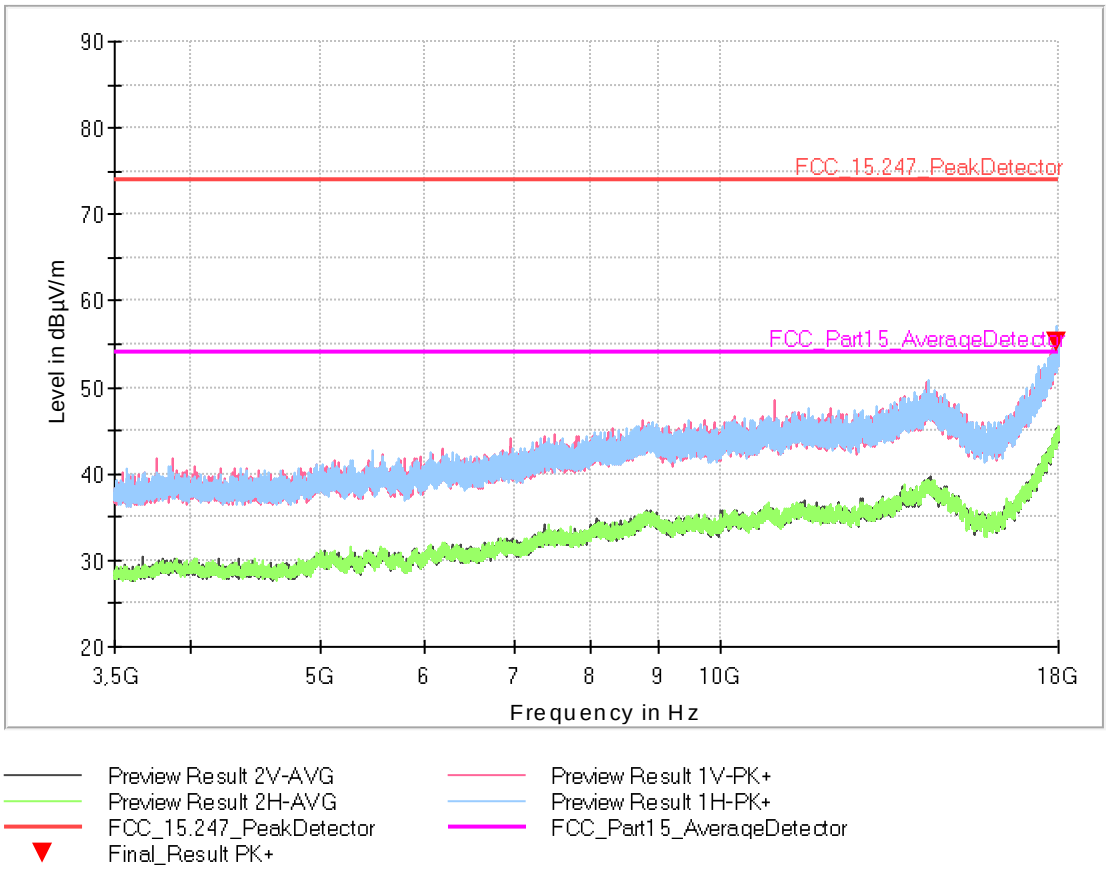

Fig. 79: Middle Channel - Frequency range: 3.5 GHz – 18 GHz

FINAL MEASUREMENTS

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Corr. [dB/m]
17953.120[1]	55.2	74.0	18.8	238.0	H	268.0	7.9

Table 60: Middle Channel - Frequency range: 3.5 GHz – 18 GHz

Note [1]: The final frequency measurements within the restricted band correspond to the ambient level as can be seen in the graphs above. Therefore, a maximization with peak detector as worst case is performed.

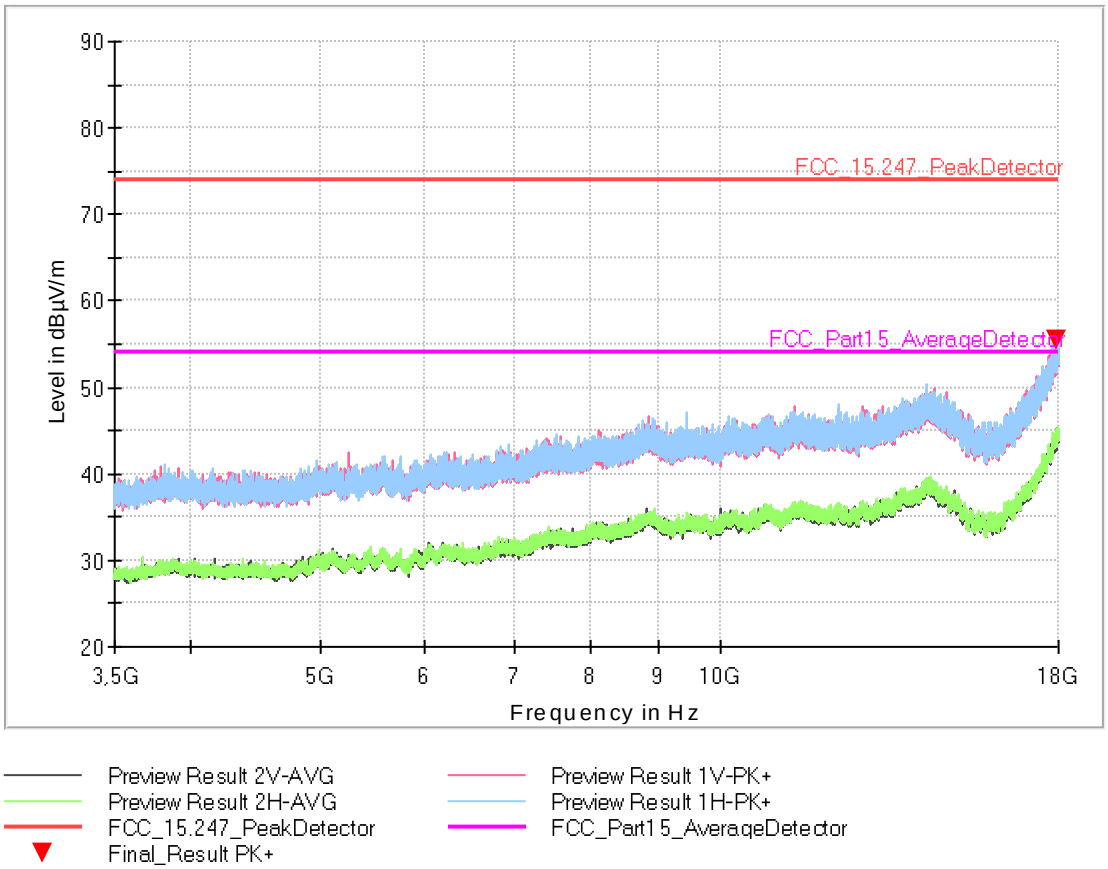

Fig. 80: High Channel - Frequency range: 3.5 GHz – 18 GHz

FINAL MEASUREMENTS

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Corr. [dB/m]
17967.130[1]	55.5	74.0	18.5	193.0	H	156.0	8.0

Table 61: High Channel - Frequency range: 3.5 GHz – 18 GHz

Note [1]: The final frequency measurements within the restricted band correspond to the ambient level as can be seen in the graphs above. Therefore, a maximization with peak detector as worst case is performed.

4.7.5.14 Sample #2. Mode 1. All Modulation/All Channel[1]. Frequency range: 18 GHz – 26 GHz

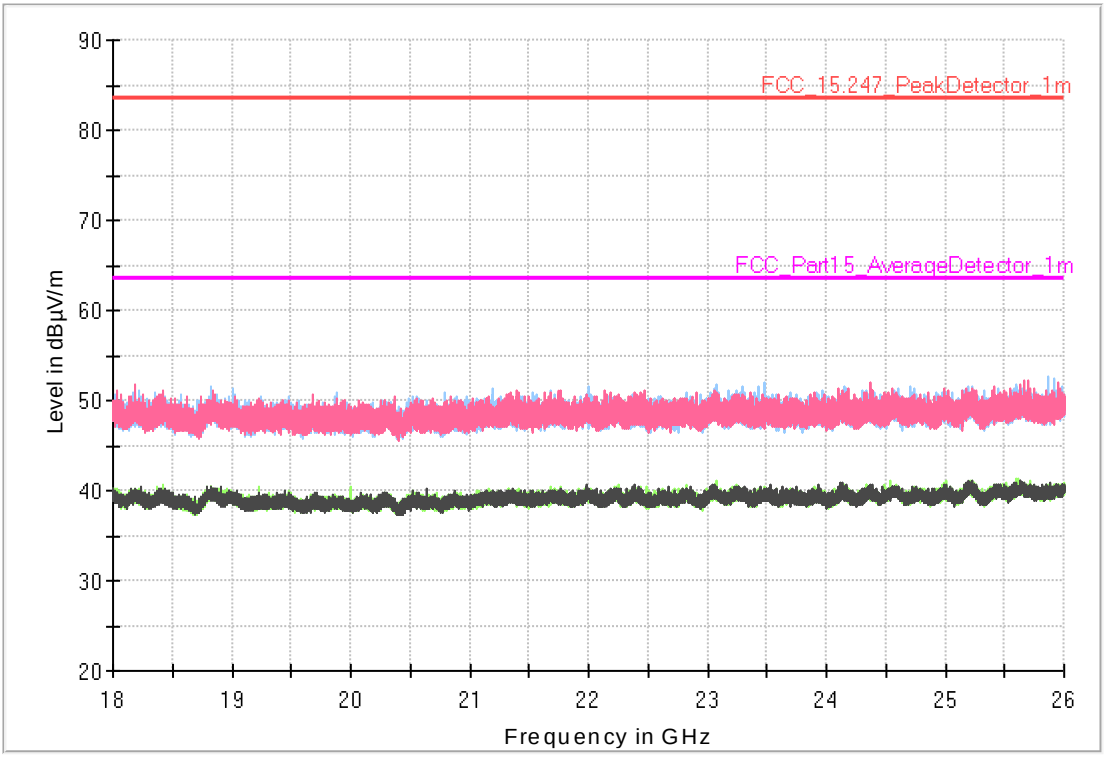

Fig. 81: All Modulation/All Channel. Frequency range:18 GHz -26 GHz

FINAL MEASUREMENTS

No spurious detected. All emissions are 20 dB below the peak limit

Note [1]: This frequency range has been measured in different channels and modulations and the results obtained are very similar between them. Therefore, the radiated emissions in this frequency range do not depend on the channel and modulation configure d The above graph is taken as the most representative result.

4.7.6 Test Equipment Used

Equipment	Brand	Model	Applus Ref.	Last Calibration	Next Calibration
ACTIVE LOOP ANTENNA	EMCO	6502	05-ER-019	04/10/2023	04/10/2024
BILOG ANTENNA	SCHWARZBECK	VULB 9162	1042740	08/11/2023	08/11/2024
HORN ANTENNA	EMCO	3115	05-ER-017	06/12/2023	06/12/2024
HORN ANTENNA	MVG	EH 1840	1042685	14/04/2022	14/04/2024
RF CABLE	HUBER+SUHNER	SF126E	1042728	21/08/2023	21/08/2024
3 DB ATTENUATOR	HUBER+SUHNER	6803.17.B	1042021	25/05/2023	25/05/2024
RF CABLE	RHODE & SCHWARZ	NA	1041502	09/10/2023	09/10/2024
RF CABLE	HUBER+SUHNER	SF104	1041964	22/06/2023	22/06/2024
HIGHPASS FILTER	WAINWRIGHT INSTRUMENTS	WHNX6-2765-3500-26500-40CC	1042511	12/05/2023	12/05/2024
RF CABLE	HUBER+SUHNER	SF104/11N/11N	1042585	12/05/2023	12/05/2024
RF AMPLIFIER	BONN ELEKTRONIK	BLMA 0118-M	1041733	12/05/2023	12/05/2024
RF CABLE	HUBER+SUHNER	SF102	1042546	18/05/2023	18/05/2024
RF CABLE	ASTROLAB	32026-29094-29094-24TC	1041565	16/05/2023	16/05/2024
EMI RECEIVER	R&S	ESW 26	1041791	14/11/2023	14/11/2024
THERMOHIGROMETER	PCE IBERICA	THB 40	1042022	07/11/2023	07/11/2024
TEST SOFTWARE	ROHDE & SCHWARZ	EMC32 v.10.50.00	104624	--	--
MAST-TABLE CONTROLLER	MATURO	NCD	1042758	--	--

Table 62: Test Instruments – Radio-frequency radiated emissions

4.7.7 Uncertainty

Test Type	Test Description	Uncertainty
Emissions	RADIO-FREQUENCY RADIATED EMISSIONS 9 kHz – 30 MHz	± 3.9 dB
Emissions	RADIO-FREQUENCY RADIATED EMISSIONS 30 MHz – 1 GHz	± 5.3 dB
Emissions	RADIO-FREQUENCY RADIATED EMISSIONS 1 GHz – 6 GHz	± 5.3 dB
Emissions	RADIO-FREQUENCY RADIATED EMISSIONS 6 GHz – 18 GHz	± 5.5 dB
Emissions	RADIO-FREQUENCY RADIATED EMISSIONS 18 GHz – 26 GHz	± 5.1 dB

Table 63: Radio-frequency radiated emissions measuring Uncertainties

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by a coverage factor k=2, which for normal distribution corresponds to a coverage probability of approximately 95%.