



FCC LISTED, REGISTRATION
 NUMBER: 2764.01

ISED LISTED REGISTRATION
 NUMBER: 23595-1

Test Report No:

4158ERM.008

Partial Test Report

USA FCC Part 15.247, 15.209, 15.207; & CANADA RSS-247, RSS-Gen
 Radio Frequency Devices. Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz

Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices.

(*) Identification of item tested	Infotainment Head Unit
(*) Trademark	Garmin
(*) Model and /or type reference	IDC23 High 8185
Other identification of the product	HW version: AA3911 FCC ID: IPH-03911 IC: 1792A-03911
(*) Features	Bluetooth classic; BLE; Wi-Fi 2.4GHz; Wi-Fi 5GHz; GNSS
Manufacturer	Garmin International, Inc. 1200 E. 151st Street, Olathe, Kansas 66062, USA
Test method requested, standard	USA FCC Part 15.247 (10-1-20 Edition): Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz USA FCC Part 15.209 (10-1-20 Edition): Radiated emission limits; general requirements. CANADA RSS-247 Issue 2 (February 2017). CANADA RSS-Gen Issue 5 amendment 1 (March 2019). Guidance for Performing Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid Systems Devices Operating Under Section 15.247 of the FCC Rules. 558074 D01 Meas Guidance v05r02 dated April 2, 2019. ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Summary	See Appendix A, B & C
Approved by (name / position & signature)	Domingo Galvez EMC&RF Lab Manager
Date of issue	10-10-2023
Report template No	FDT08_23 (*) "Data provided by the client"

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Acronyms

Acronym ID	Acronym Description
	Emission Bandwidth
# of Tx Chains	Number of Transmission Chains
Equipment	Equipment Type
Freq	Frequency
In band Peak Lvl	In band Peak Level
Lvl	Level
MP	Measurement Point
Mod	Modulation
Occ Ch BW	Occupied Channel Bandwidth
PSD	Power Spectrum Density
Peak Power	Maximum Peak Conducted Output Power
Port	Active Port

Competences and guarantees

DEKRA Certification Inc. is a testing laboratory accredited by A2LA (The American Association for Laboratory Accreditation), to perform the tests indicated in the Certificate 2764.01

DEKRA Certification Inc. is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA Certification Inc. has a calibration and maintenance program for its measurement equipment.

DEKRA Certification Inc. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Certification at the time of performance of the test.

DEKRA Certification Inc. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Certification Inc.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Certification Inc. and the Accreditation Bodies.

Uncertainty

Uncertainty (factor k=2) was calculated according to the DEKRA Certification internal document PODT000.

Test case	Frequency (MHz)	U (k=2)	Units
RF Power and PSD	2402-2483	0.88	dB
Occupied Bandwidth		1.87	%
Dwell Time		0.01	%
Band Edge		0.64	dB
Radiated Spurious Emission	30-180	4.27	dB
	180-1000	3.14	dB
	1000-18000	3.30	dB
	18000-40000	3.49	dB

Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").
2. The sample consists of Infotainment Head Unit to be installed in cars with the following features: Navigation, USB, voice recognition and several interfaces to the vehicle and Bluetooth / WLAN. The Head-unit provides different interfaces like: AR-CAM input, Video-out APIX3 (for the connection of an external Display), 3 USB interfaces.

DEKRA declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Usage of samples

Samples used for test have been selected by: The client.

Sample S/01 is composed of the following elements:

Id	Control Number	Description	Model	Serial N°	Date of Reception	Application
S/01	4158/01	Automotive infotainment head unit	IDC23 HIGH 8185	GAB429P0001748	6/14/2023	Element Under Test
S/01	3428/32	BMW Antenna-DA Fakra 5G-GNSS		6520 8705915-04	06/01/2022	Element Under Test

Sample S/01 is composed of the following accessories:

Id	Control Number	Description	Model	Serial N°	Date of Reception	Application
S/01	2874/11	Fakra to SMA Connector	-	-	03/26/2021	Accessory
S/01	2874/13	OABR Connector cable	-	-	03/26/2021	Accessory
S/01	3428/08	Ethernet Cable (1.8m)	NA / 5E	-	06/01/2022	Accessory
S/01	3428/10	USB-3.0 to Gigabit Ethernet Adapter	Trendnet / TU3-ETG	RA9AU31003569	06/01/2022	Accessory
S/01	3428/33	Fakra to Fakra Cable	-	-	06/01/2022	Accessory
S/01	3428/41	WLAN/Bluetooth Antena with Fakra SF connector	$\lambda/4$ coax cable antenna BMW 9.289.029.3	-	06/01/2022	Accessory
S/01	3428/42	USB to Fakra cable 1	-	-	06/01/2022	Accessory
S/01	3428/51	OABR to OABR cable	-	-	06/01/2022	Accessory
S/01	3582/20	Harness	-	-	03/03/2022	Accessory

1. Sample S/01 was used for the test(s): All Radiated indicated in appendix A, B and C.

Test sample description

Test Sample description (compulsory information for EMC and RF testing services)

Ports..... :	Port name and description		Cable				
			Specified length [m]	Attached during test	Shielded	Coupled to patient	
	BT/Wi-Fi Antenna		2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	USB 2/3		2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Power		2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	CID		2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	AR-Cam		2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	100 Base T1		2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	1G Base T1		2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	GPS		2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	DCS		2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	HUD		2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DFE		2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Supplementary information to the ports..... :	No Data Provided						
Rated power supply :	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/>	DC: : 8 - 16 Vdc					
<input type="checkbox"/>	DC:						
Rated Power..... :	No Data Provided						
Clock frequencies..... :	No Data Provided						
Other parameters..... :	No Data Provided						
Software version..... :	No Data Provided						
Hardware version..... :	No Data Provided						
Dimensions in cm (W x H x D)..... :	No Data Provided						
Mounting position..... :	<input type="checkbox"/>	Table top equipment					
	<input type="checkbox"/>	Wall/Ceiling mounted equipment					
	<input type="checkbox"/>	Floor standing equipment					
	<input type="checkbox"/>	Hand-held equipment					
	<input checked="" type="checkbox"/>	Other: Automotive					
Modules/parts..... :	Module/parts of test item	Type			Manufacturer		
	No Data Provided						

Accessories (not part of the test item)	Description	Type	Manufacturer
..... :	No Data Provided		
Documents as provided by the applicant	Description	File name	Issue date
..... :	Declaration Equipment Data	FDT30_18 Declaration Equipment Data_IDC23 High 8185 signed	August 23, 2023

Copy of marking plate:

Product Name: Automotive Infotainment Head Unit
 產品名稱: 汽車資訊娛樂主機
 Manufactured by: 佳明 **GARMIN**.
 Model / 型號: IDC23 High 8185
 Made in / 製造: Taiwan
 Input / 輸入: 12V 12A
 FCC ID: IPH-03911 IC: 1792A-03911 M/N: AA3911

161-06307-0B
 XX X-XX XXXXXXXX
 XXXXXXXX/XX/XXXX/XX/XX

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 NCA APPROVED: XXX-XX-XXXX-XXX
 CMIIT ID: XXXXXXXXXXXX

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES, AND ISED CANADA LICENSE-EXEMPT RSS STANDARD (S). OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:
 (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND
 (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

AGREE PAR LE MCPT (REPUBLIQUE DE DJIBOUTI)
 Numero d'agrément: XXXXXXXXXXXXXXXX
 Date d'agrément: XXXXX/XXXXX

Agreed par l'ANRT Maroc
 Numero d'agrément: XXXXXXXXXXXXXXXX
 Date d'agrément: XXXXX/XXXXX

AGREE PAR L'ARE MAURITANIE
 Numero d'agrément: XXXXXXXXXXXXXXXX
 Date d'agrément: XXXXX/XXXXX

AGREE PAR ARTP SENEGAL
 Numero d'agrément: XXXXXXXXXXXXXXXX

Connection and use of this communications equipment is permitted by the Nigerian Communications Commission

BOCRA REGISTERED No: XXXXXXXXXXXXXXXX
 Homologue par l'ARPC XXXXXXXX

GARMIN (Europe) Ltd. Liberty House Hounsdown Business Park Southampton, SO40 9LR, U.K.
 GARMIN WURZBURG GMBH BEETHOVENSTRASSE 1A 97080 WURZBURG, GERMANY

OMAN - TRA
 XXXXXXXX
 XXX/XX - X/XXXXX/XX

Identification of the client

Garmin International, Inc.
1200 E. 151st Street
Olathe, Kansas 66062
USA

Testing period and place

Test Location	DEKRA Certification Inc.
Date (start)	07-17-2023
Date (finish)	09-29-2023

Document history

Report number	Date	Description
4158ERM.008	10-10-2023	First release.

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860mbar Max. = 1060mbar

In the semianechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860mbar Max. = 1060mbar

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860mbar Max. = 1060mbar

Remarks and comments

The tests have been performed by the technical personnel: Juliana Cherry, Qi Zhang and Yuri Barone.

List of equipment used during the test

Radiated Measurements

CONTROL NUMBER	DESCRIPTION	Serial No	LAST CALIBRATION	NEXT CALIBRATION
878	Power supply (AMETEK / PROG-DC-PS)	1707A01783	N/A	N/A
1012	ESR26 Emi Test Receiver	101478	2022-04-12	2024-04-12
1014	FSV40 Signal Analyzer 40ghz	101626	2022-08-01	2024-08-01
1056	3116C Double-Ridged Waveguide Horn Antenna 18-40 GHz	213179	2023-02-23	2026-02-23
1058	3115 Double-Ridged Waveguide Horn Antenna 1-18 GHz	211373	2023-06-26	2026-06-26
1064	3142E Biconilog Antenna	208600	2021-12-13	2024-12-13
1108	Ethernet SNMP Thermometer- CR Room	60038026954	2022-10-18	2024-10-18
1111	Ethernet SNMP Thermometer	60038026577	2022-10-18	2024-10-18
1179	SEMI-ANECHOIC CHAMBER	F169021	N/A	N/A
1314	Wireless Measurement Software R&S Emc32	1040-OT102236	N/A	N/A
1461	Low Noise Preamplifier (1-18GHz)	2213857B	2022-06-01	2024-06-01

Testing verdicts

Fail	F
Not applicable	N/A
Not measured	N/M
Pass	P

Summary

Bluetooth Low Energy

Requirement – Test case	FCC PART 15 PARAGRAPH / RSS-247	Verdict	Remark
RSS-247 5.2 (a) / FCC 15.247 (a) (2) 6 dB Bandwidth		N/M	Refer 1
RSS-247 5.2 (b) / FCC 15.247 (e) Power spectral density		N/M	Refer 1
RSS-247 5.4 (d) / FCC 15.247 (b) (3) Maximum Peak Conducted output power		N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d) Band-edge emissions compliance (Transmitter) - Conducted		N/M	Refer 1
FCC 2.1049 / 99dBw Occupied Channel Bandwidth 99%		N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Conducted		P	Refer 2
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Radiated		N/M	Refer 1
Supplementary information and remarks:			
<ol style="list-style-type: none"> Only Partial testing has been requested. The results show the worst case 2 Mbps 			

Bluetooth EDR

Requirement – Test case	FCC PART 15 PARAGRAPH / RSS-247	Verdict	Remark
RSS-247 5.1 (b) / FCC 15.247 (a) (1) 20 dB Bandwidth		N/M	Refer 1
RSS-247 5.1 (b) / FCC 15.247 (a) (1) Carrier Frequency Separation		N/M	Refer 1
RSS-247 5.1 (d) / FCC 15.247 (a) (1) (iii) Time of Occupancy (Dwell Time)		N/M	Refer 1
RSS-247 5.1 (d) / FCC 15.247 (a) (1) (iii) Number of hopping channels		N/M	Refer 1
RSS-247 5.4 (b) / FCC 15.247 (b) (1) Maximum Peak Conducted output power & Antenna gain		P	N/A
RSS-247 5.5 / FCC 15.247 (d) Band-edge emissions compliance (Transmitter) - Conducted		N/M	Refer 1
FCC 2.1049 / 99dBw Occupied Channel Bandwidth 99%		N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Conducted		N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Radiated		P	Refer 2
Supplementary information and remarks:			
<ol style="list-style-type: none"> Only Partial testing has been requested The results show the worst case 8-DPSK modulation 			

Wi-Fi 2.4GHz

Requirement – Test case	FCC PART 15 PARAGRAPH / RSS-247	Verdict	Remark
RSS-247 5.2 (a) / FCC 15.247 (a) (2) 6 dB Bandwidth		N/M	Refer 1
RSS-247 5.2 (b) / FCC 15.247 (e) Power spectral density		N/M	Refer 1
RSS-247 5.4 (d) e.i.r.p		N/M	Refer 1
RSS-247 5.4 (d) / FCC 15.247 (b) (1) Maximum Average Conducted output Power		P	N/A
RSS-247 5.5 / FCC 15.247 (d) Band-edge emissions compliance (Transmitter) - Conducted		N/M	Refer 1
FCC 2.1049 / Occupied Channel Bandwidth 99%		N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Conducted		N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Radiated		P	Refer 2
Supplementary information and remarks:			
<ol style="list-style-type: none"> Only Partial testing has been requested The results show the worst case 802.11b mode 			

Appendix A: Test results. Bluetooth Low Energy 5.0 (2M)

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RSS-247 5.5 / FCC 15.247 (D) EMISSION LIMITATIONS RADIATED (TRANSMITTER) - RADIATED	17

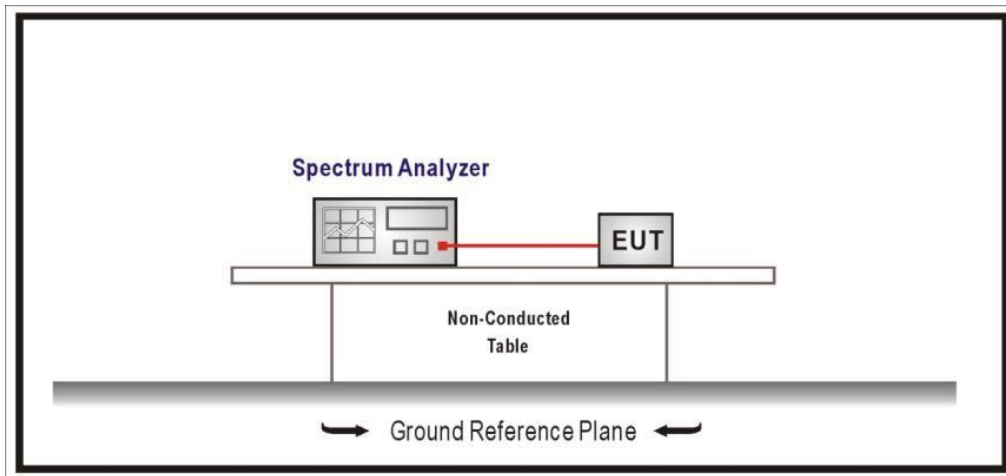
PRODUCT INFORMATION

Information	Description
Modulation	BR/EDR: GFSK, $\pi/4$ -DQPSK, 8-DPSK
Operation mode 1: Single Antenna	
Equipment	
- Operating Frequency Range	BR/EDR: 2400 - 2483.5 MHz
- Nominal Channel Bandwidth	BR/EDR: 1/ 1.5 MHz
- RF Output Power	BR/EDR: 4 dBm
Antenna type	1/4 wave coax
Antenna gain	-2.5 dBi
Nominal Voltage	
- Supply Voltage	12 Vdc
- Type of power source	DC voltage
Equipment type	Bluetooth
Geo-location capability	No

TEST CONDITIONS

TEST CONDITIONS	DESCRIPTION
TC#01 (2 Mbps)	<p><u>Power supply (V):</u> $V_{\text{nominal}} = 12 \text{ V dc}$</p> <p>Data Rate: 2 Mbps Bandwidth: 2 MHz</p> <p><u>Test Frequencies for Conducted/ Radiated tests:</u> Lowest channel: 2402 MHz Middle channel: 2440 MHz Highest channel: 2480 MHz</p>

CONDUCTED MEASUREMENTS:



RADIATED MEASUREMENTS:

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at 3 m for the frequency range 30-1000 MHz (Bilog antenna) and 1-18 GHz (Double ridge horn antenna), and 1m for the frequency range 18 GHz- 26 GHz (Double ridge horn antenna).

For radiated emissions in the range 18 - 26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

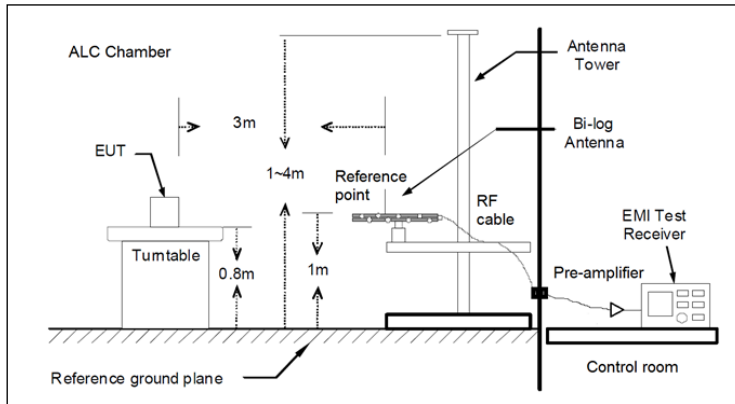


Fig A1: Radiated measurements Setup $f < 1$ GHz

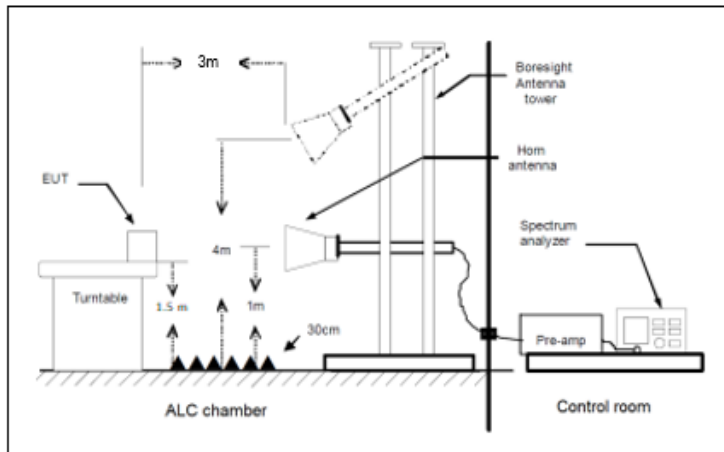


Fig A2: Radiated measurements setup $f > 1-18$ GHz

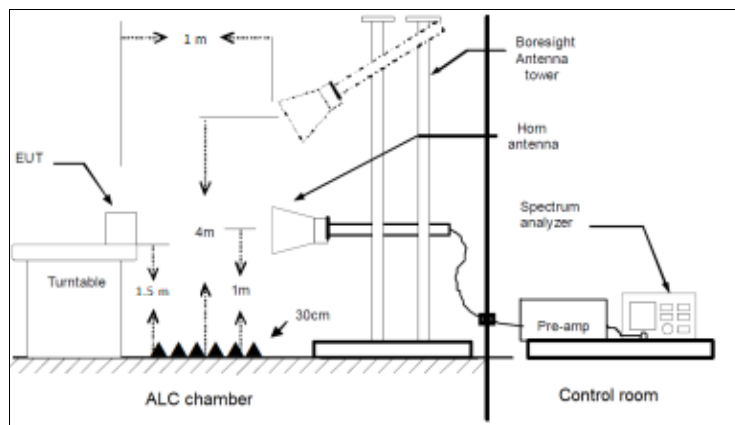


Fig A3: Radiated measurements setup $f > 18$ GHz

TEST CASE DETAILS

RSS-247 5.5 / FCC 15.247 (d) EMISSION LIMITATIONS RADIATED (Transmitter) - Radiated

Limits

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) / RSS-Gen):

Frequency Range (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 25000	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RSS-247. Attenuation below the general field strength limits specified in RSS-Gen is not required

Test Setup:

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at 3 m for the frequency range 30-1000 MHz (Bilog antenna) and 1-18 GHz Double ridge horn antennas, and 1m for the frequency range 18 GHz- 26 GHz Double ridge horn antenna.

For radiated emissions in the range 18 - 26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization. The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

Verdict

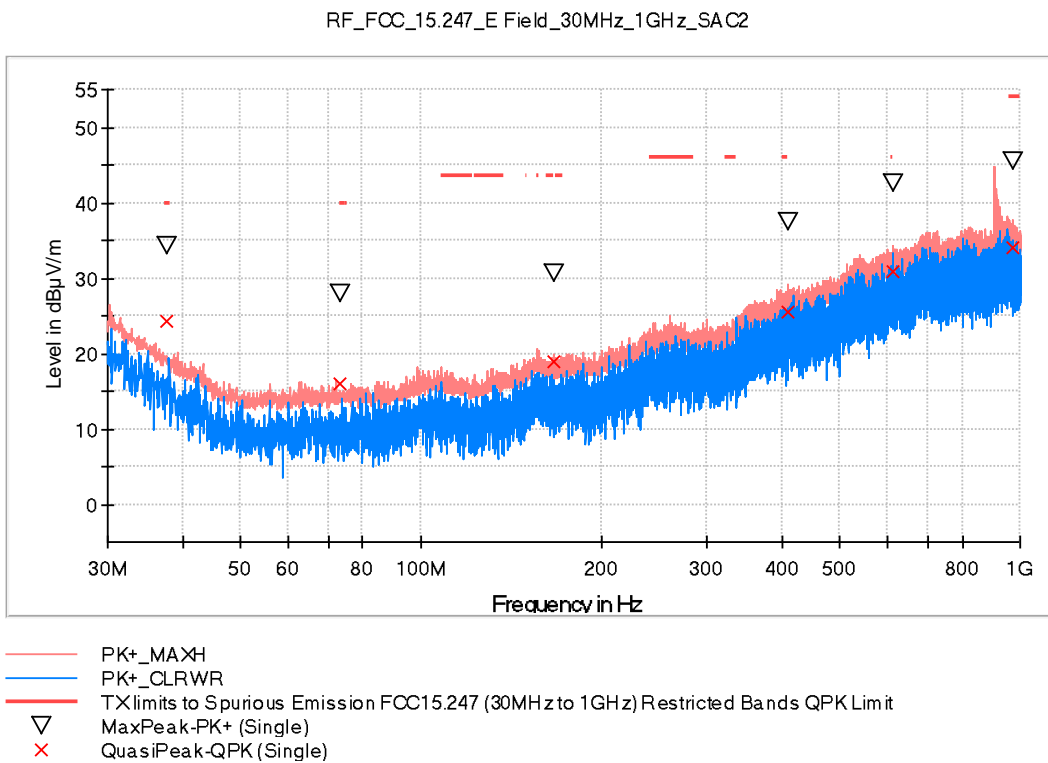
Pass

Results

Frequency range 30 MHz – 1000 MHz

The spurious emissions below 1 GHz do not depend on the operating channel selected in the EUT.

Middle Channel



Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Margin - QPK (dB)	Limit - QPK (dBµV/m)
37.614500	34.3	24.3	H	15.7	40.0
73.116500	28.0	16.0	H	24.0	40.0
166.382000	30.5	19.0	V	24.6	43.5
408.736500	37.3	25.6	V	20.4	46.0
612.824500	42.6	31.0	V	15.0	46.0
970.948500	45.6	34.0	V	20.0	54.0

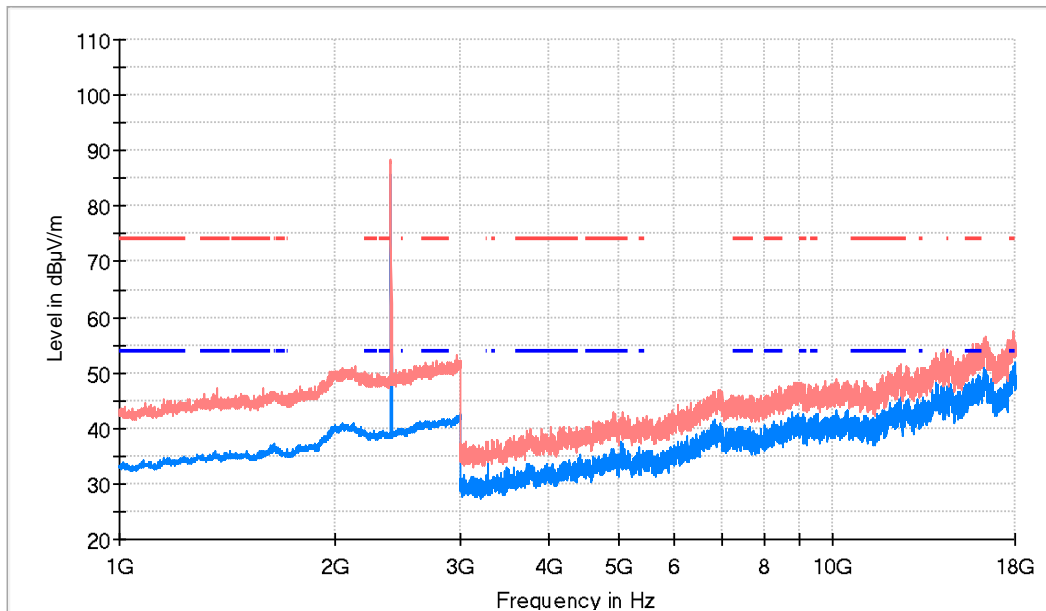
Frequency range 1 GHz – 26 GHz

The results in the next tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz (see next plots).

Please see the following results for worst operation mode selected for this range (2 Mbps).

Frequency range 1 - 18 GHz

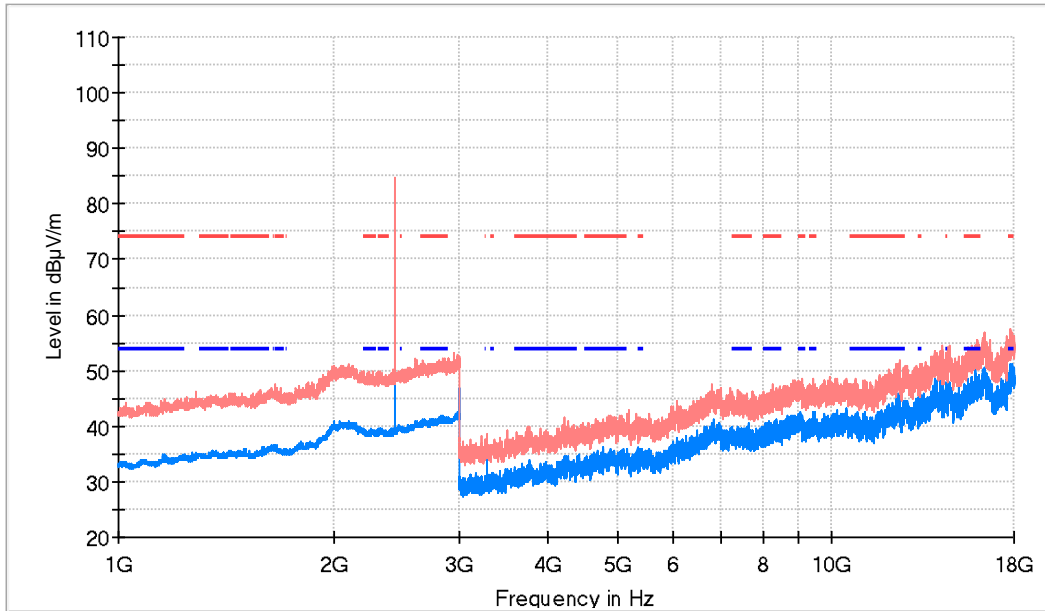
Lowest Channel



- AVG_MAXH
- PK+_MAXH
- - - TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- - - TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2402.500000	88.3	85.4	H	---	---	Fundamental
2776.500000	52.1	40.6	H	13.4	54.0	
15697.000000	55.3	47.6	H	6.4	54.0	
17848.000000	57.6	48.9	H	5.1	54.0	

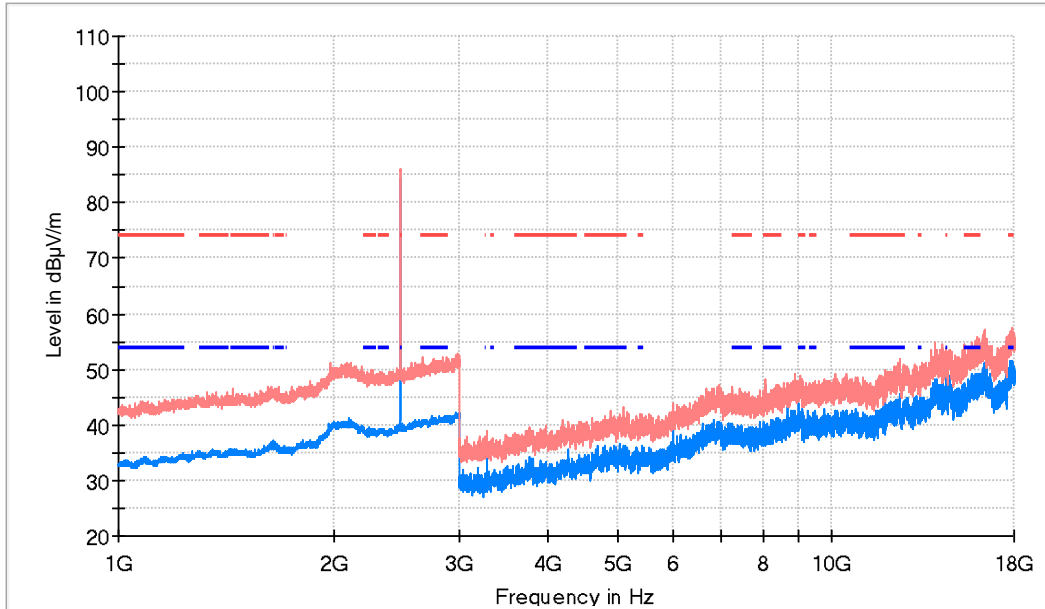
Middle Channel



- AVG_MAXH
- PK+_MAXH
- - - TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- - - TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2439.500000	84.6	80.2	H	---	---	Fundamental
2847.500000	52.3	40.9	V	13.1	54.0	
16002.500000	55.7	47.2	V	6.8	54.0	
17771.000000	57.5	51.3	H	2.7	54.0	

Highest Channel

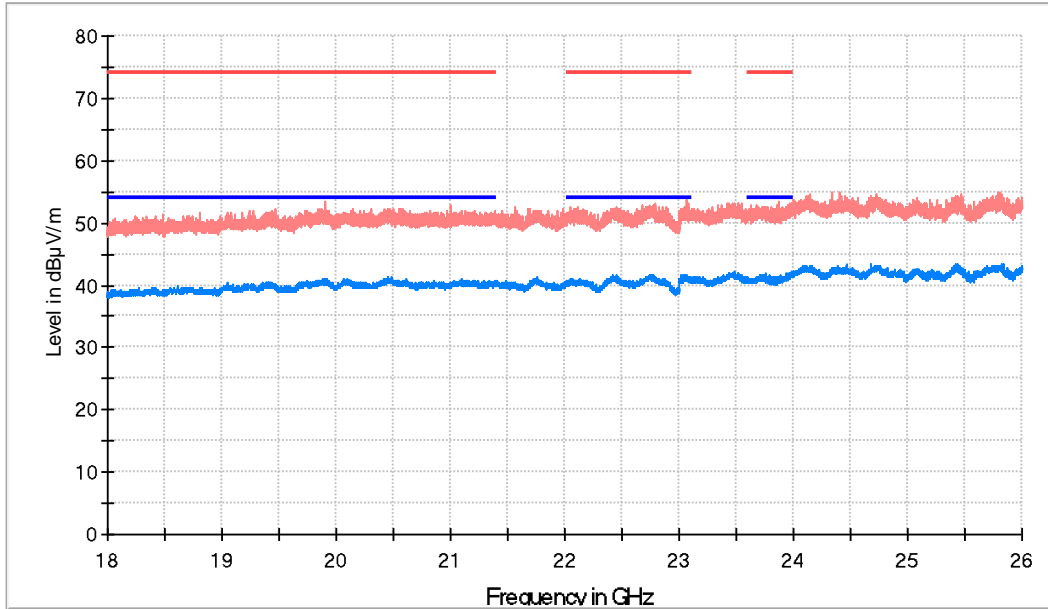


- AVG_MAXH
- PK+_MAXH
- - - TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- - - TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2480.500000	86.1	82.9	H	---	---	Fundamental
2852.500000	52.3	41.3	V	12.7	54.0	
16000.000000	55.6	47.6	V	6.4	54.0	
17941.500000	57.7	50.1	V	3.9	54.0	

Frequency range 18 - 26 GHz

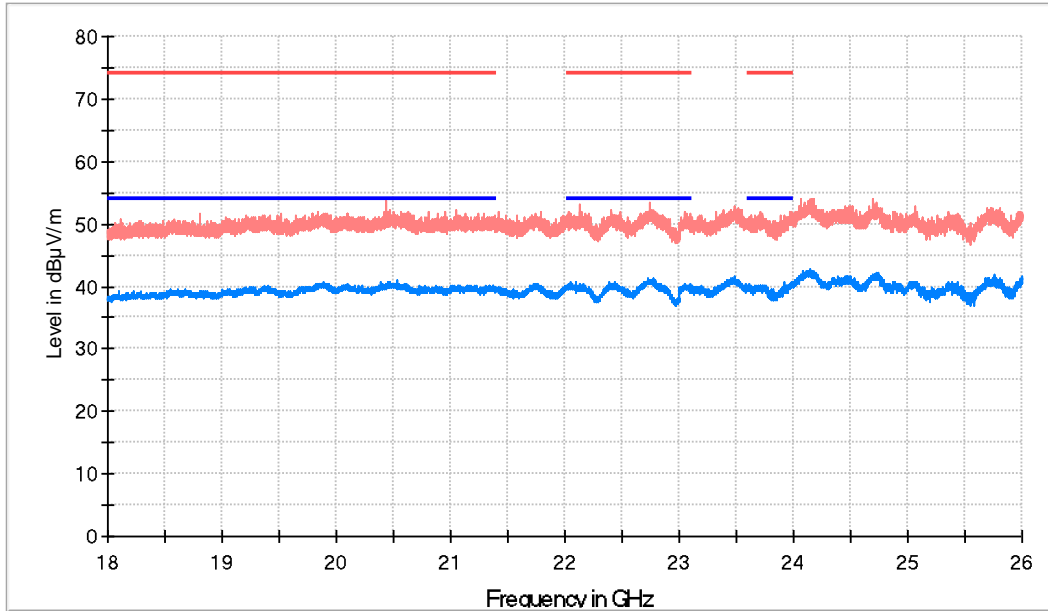
Lowest Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
20481.000000	50.3	41.4		12.6	54.0
22763.500000	51.6	41.7		12.3	54.0
23987.000000	52.0	42.2		11.8	54.0

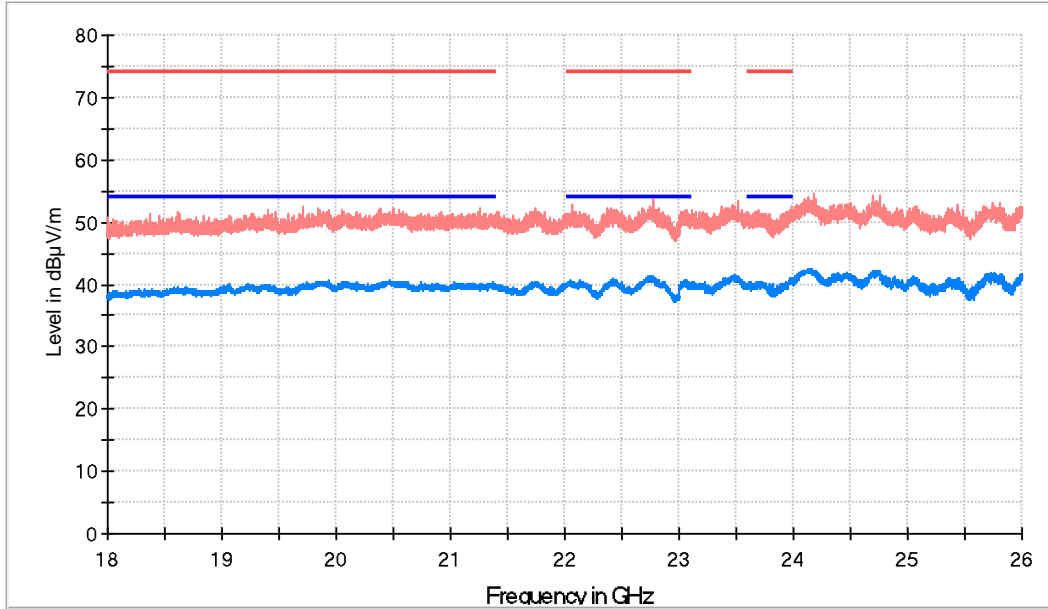
Middle Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
20535.000000	51.3	40.9		13.1	54.0
22719.500000	51.3	41.2		12.8	54.0
23983.000000	50.5	40.8		13.2	54.0

Highest Channel

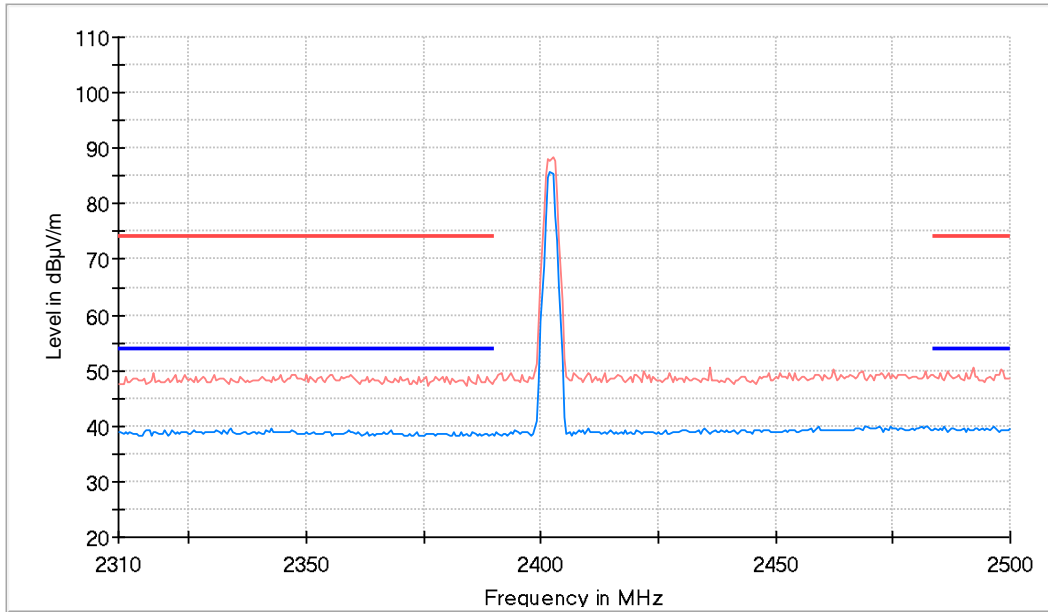


- AVG_MAXH
- PK+_MAXH
- TXlimits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TXlimits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
20473.000000	50.3	40.8		13.2	54.0
22725.000000	51.9	41.3		12.7	54.0
23992.000000	51.5	41.2		12.8	54.0

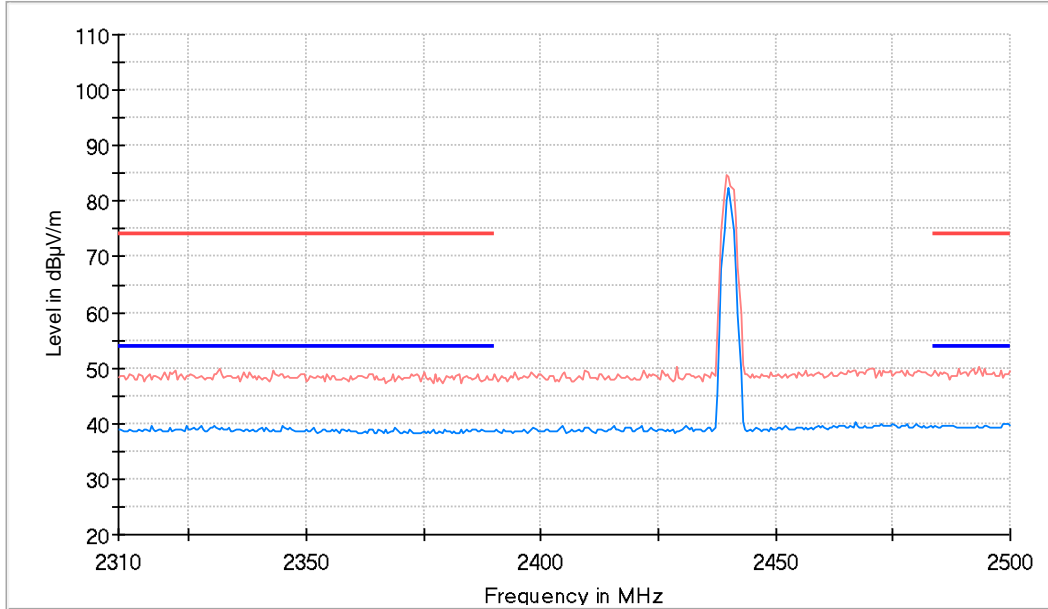
Restricted Bands (2.31 GHz - 2.5 GHz)

Lowest Channel



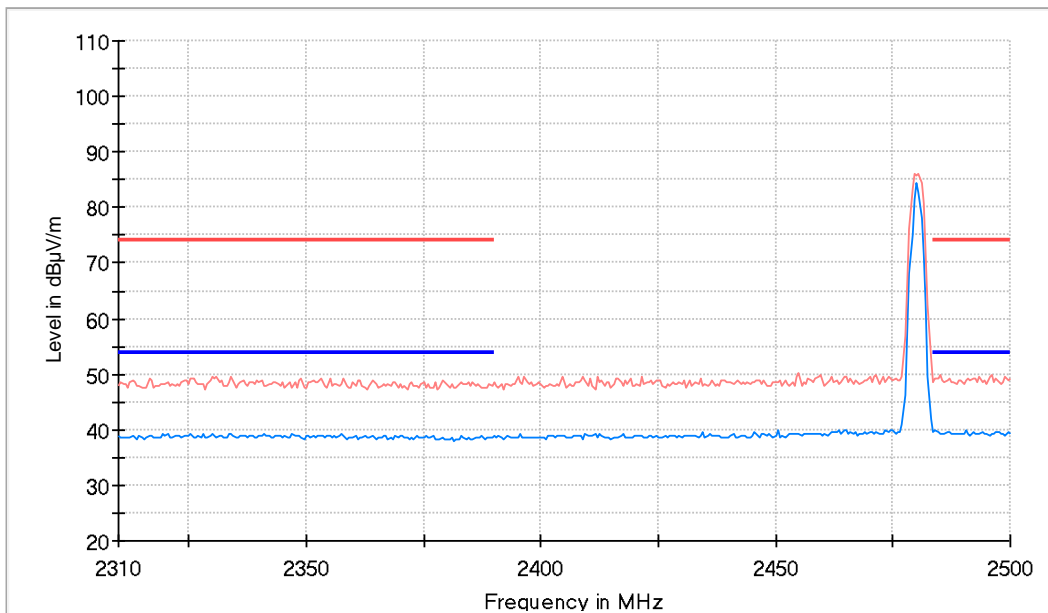
- AVG_MAXH
- PK+ MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Middle Channel



- AVG_MAXH
- PK+ MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Highest Channel



- AVG_MAXH
- PK+ MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Appendix B: Test results. Bluetooth EDR

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Emission Limitations Radiated (Transmitter) - Radiated	34

PRODUCT INFORMATION

Information	Description
Modulation	FHSS
Adaptive	Non-Adaptive Equipment
Operation mode 1:	
Operating Frequency Range	2400 – 2483.5 MHz
Nominal Channel Bandwidth	2 MHz
RF Output Power	4 dBm
Extreme operating conditions	-40 °C to +65 °C
- Temperature range	
Antenna type	
Antenna gain	-2.5 dBi
Nominal Voltage	
- Supply Voltage	12 Vdc
- Type of power source	DC voltage
Equipment type	Bluetooth Classic
Geo-location capability	No

TEST CONDITIONS

TEST CONDITIONS	DESCRIPTION
TC#01	<p><u>Power supply (V):</u> $V_{\text{nominal}} = 12 \text{ Vdc}$</p> <p><u>Modulation:</u> GFSK</p> <p><u>Test Frequencies for conducted/Radiated tests:</u> Lowest range: 2402 MHz Middle channel: 2441 MHz Highest range: 2480 MHz</p>
TC#02	<p><u>Power supply (V):</u> $V_{\text{nominal}} = 12 \text{ Vdc}$</p> <p><u>Modulation:</u> $\pi/4$-DQPSK</p> <p><u>Test Frequencies for Conducted/Radiated tests:</u> Lowest range: 2402 MHz Middle channel: 2441 MHz Highest range: 2480 MHz</p>
TC#03	<p><u>Power supply (V):</u> $V_{\text{nominal}} = 12 \text{ Vdc}$</p> <p><u>Modulation:</u> 8-DPSK</p> <p><u>Test Frequencies for Conducted/Radiated tests:</u> Lowest range: 2402 MHz Middle channel: 2441 MHz Highest range: 2480 MHz</p>

See below the comparison table between previous test results (test report 3967ERM.015A1) and test results with the new sample shown in this test report:

Modulation	Frequency (MHz)	Maximum conducted power (dBm)		Delta
		IDC23 - 3967 (test report 3967ERM.015A1)	IDC23 - 4158	
GFSK	2402	3.3	1.9	-1.4
$\pi/4$ -DQPSK	2402	5.2	4.0	-1.2
8-DPSK	2402	5.5	4.3	-1.2

TEST CASE DETAILS

RSS-247 5.4 (b) / FCC 15.247 (b) (1) Maximum Peak Conducted & Antenna Gain

Limits

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels: 1 watt (30 dBm). The e.i.r.p. shall not exceed 4 W (RSS-247).

Maximum declared antenna gain: -2.5 dBi

Modulation: BT (GFSK 1-DH5)

Results

Freq (MHz)	# of Tx Chains	Port	Peak Power (dBm)	Maximum EIRP power (dBm)
2402.00000	1	1	3.3	-0.6

Modulation: BT ($\pi/4$ DQPSK 2-DH5)

Results

Freq (MHz)	# of Tx Chains	Port	Peak Power (dBm)	Maximum EIRP power (dBm)
2402.00000	1	1	4.0	1.5

Modulation: BT (8DPSK 3-DH5)

Results

Freq (MHz)	# of Tx Chains	Port	Peak Power (dBm)	Maximum EIRP power (dBm)
2402.00000	1	1	4.3	1.8

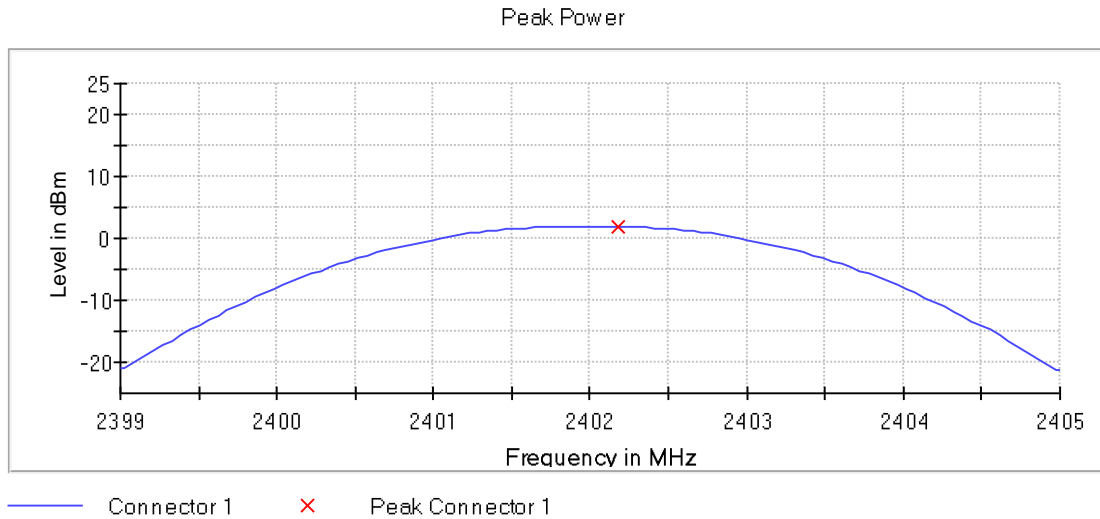
Verdict

Pass

Attachments

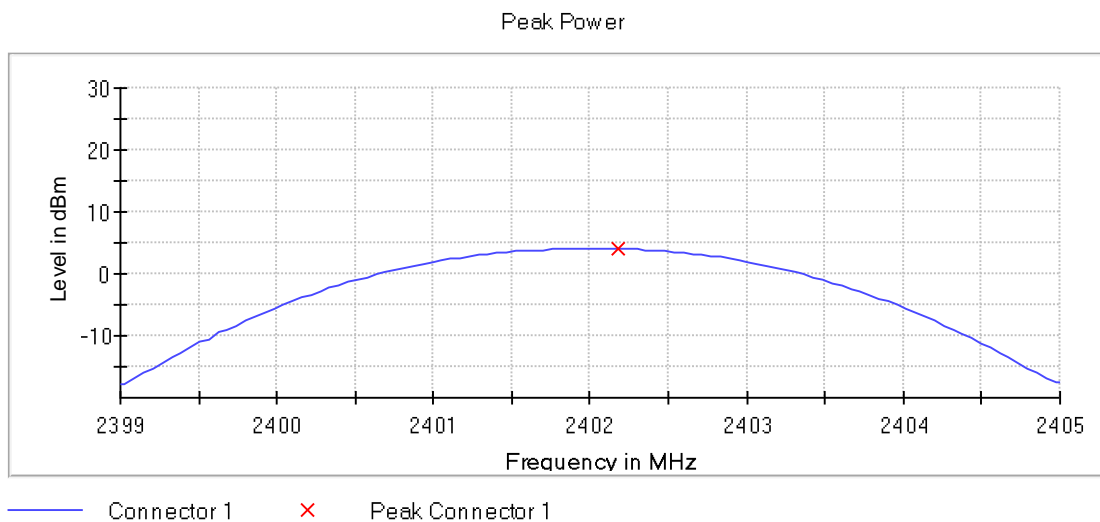
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (GFSK 1-DH5), Number of Transmission Chains = 1,

Images:



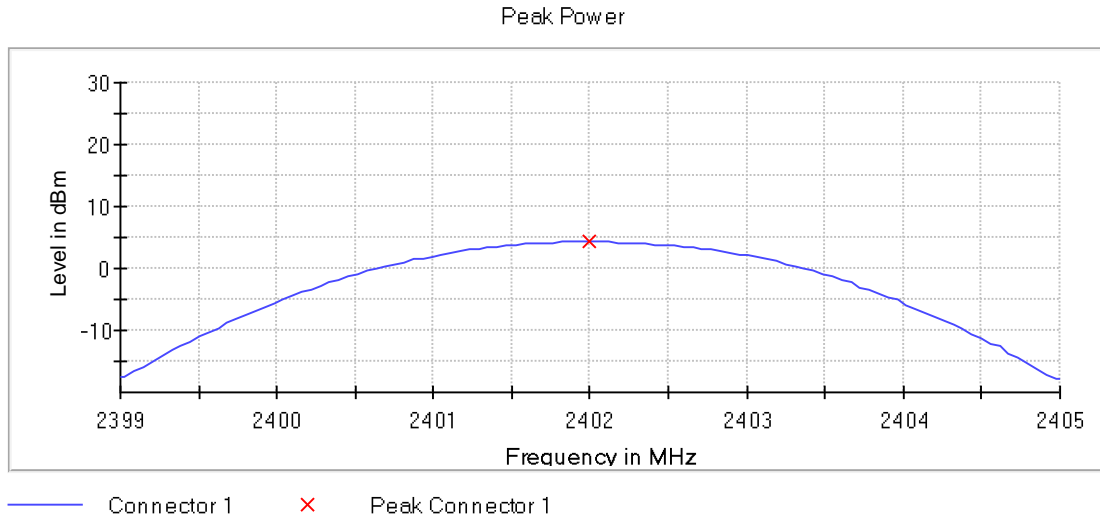
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT ($\pi/4$ DQPSK 2-DH5), Number of Transmission Chains = 1,

Images:



Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT (8DPSK 3-DH5), Number of Transmission Chains = 1,

Images:



RSS-247 5.5 / FCC 15.247 (d) EMISSION LIMITATIONS RADIATED (TRANSMITTER) - Radiated

Limits

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) / RSS-Gen):

Frequency Range (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 25000	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RSS-247. Attenuation below the general field strength limits specified in RSS-Gen is not required

Verdict

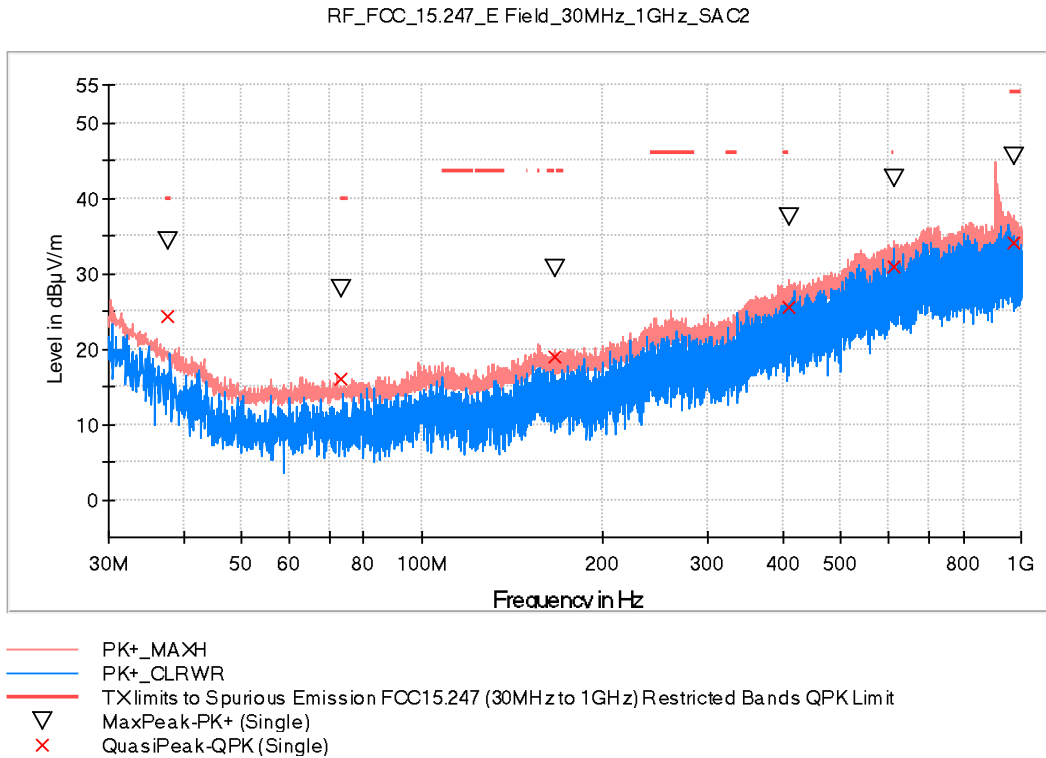
Pass

Results

Frequency range 30 MHz – 1000 MHz

The spurious emissions below 1 GHz do not depend on the operating channel selected in the EUT.

Middle Channel



Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Margin - QPK (dB)	Limit - QPK (dBµV/m)
37.614500	34.3	24.3	H	15.7	40.0
73.116500	28.0	16.0	H	24.0	40.0
166.382000	30.5	19.0	V	24.6	43.5
408.736500	37.3	25.6	V	20.4	46.0
612.824500	42.6	31.0	V	15.0	46.0
970.948500	45.6	34.0	V	20.0	54.0

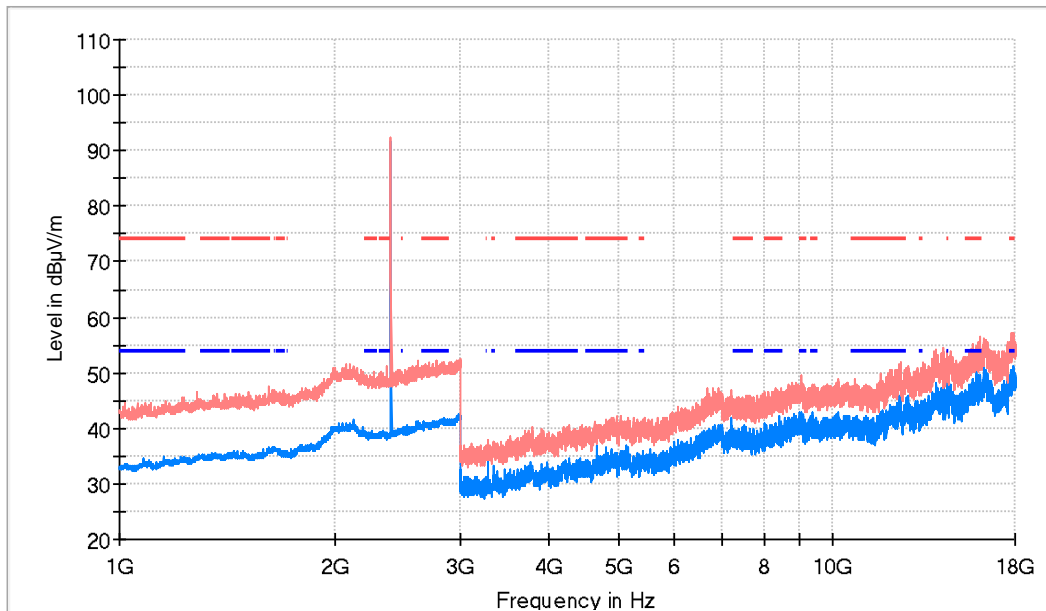
Frequency range 1 GHz – 26 GHz

The results in the following plots and tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31-2.5 GHz.

Modulation: BT (GFSK 1-DH5)

Frequency range 1 - 18 GHz

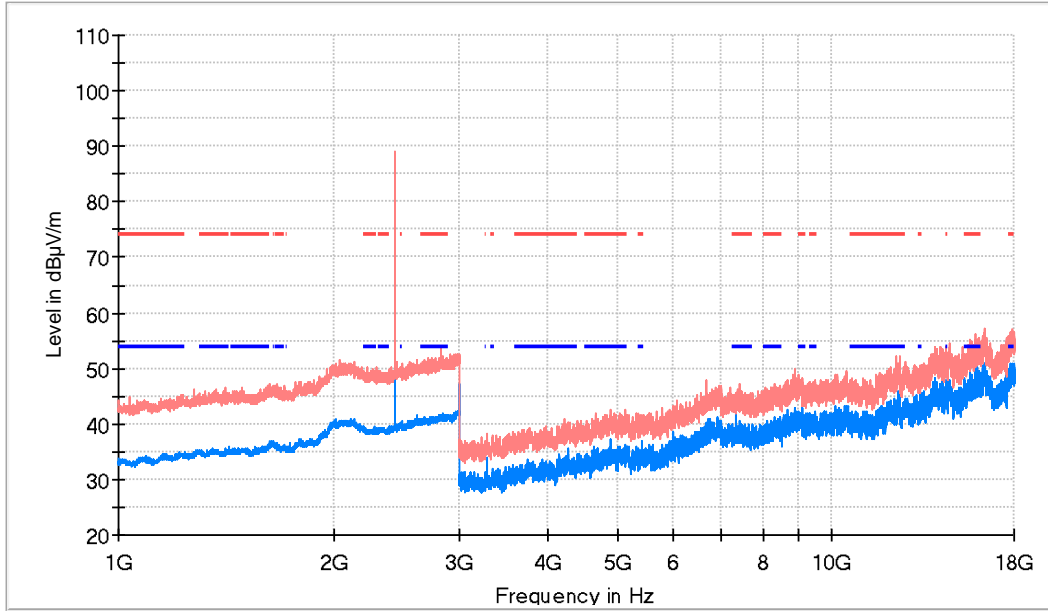
Lowest Channel



- AVG_MAXH
- PK+_MAXH
- - - TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- - - TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2402.500000	92.3	90.5	H	---	---	Fundamental
2789.500000	52.1	40.7	H	13.3	54.0	
16071.500000	56.4	49.4	V	4.6	54.0	
17838.000000	57.3	50.4	V	3.6	54.0	

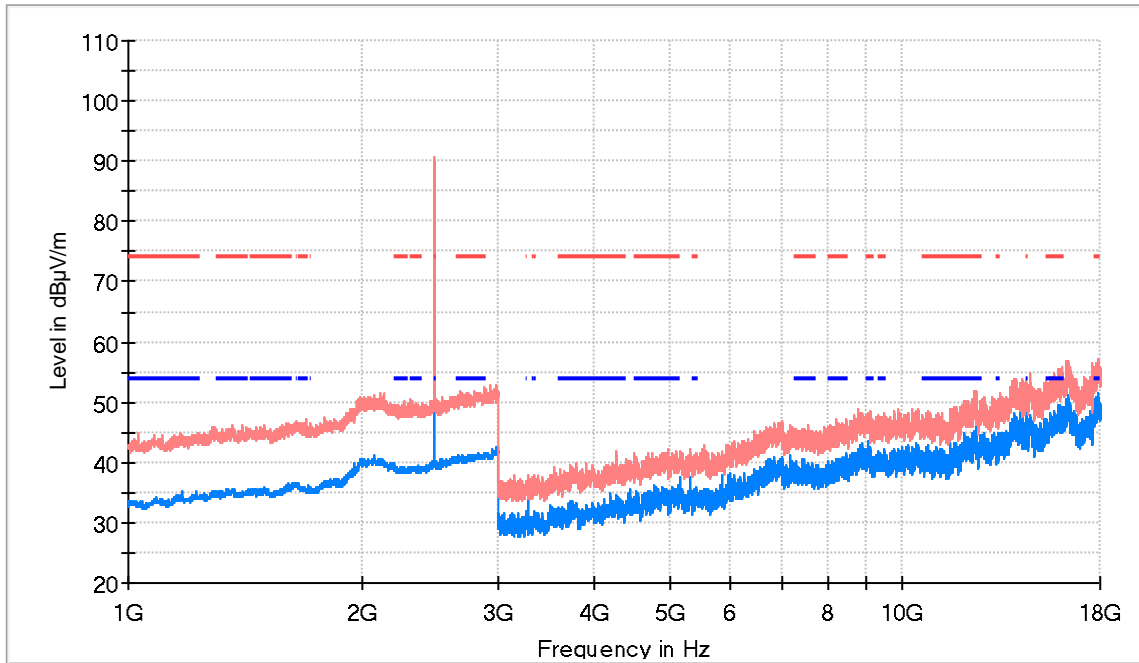
Middle Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2441.000000	89.0	88.5	H	---	---	Fundamental
2826.500000	53.5	41.1	H	12.9	54.0	
15900.000000	56.1	48.9	H	5.1	54.0	
17914.500000	57.0	50.4	H	3.6	54.0	

Highest Channel

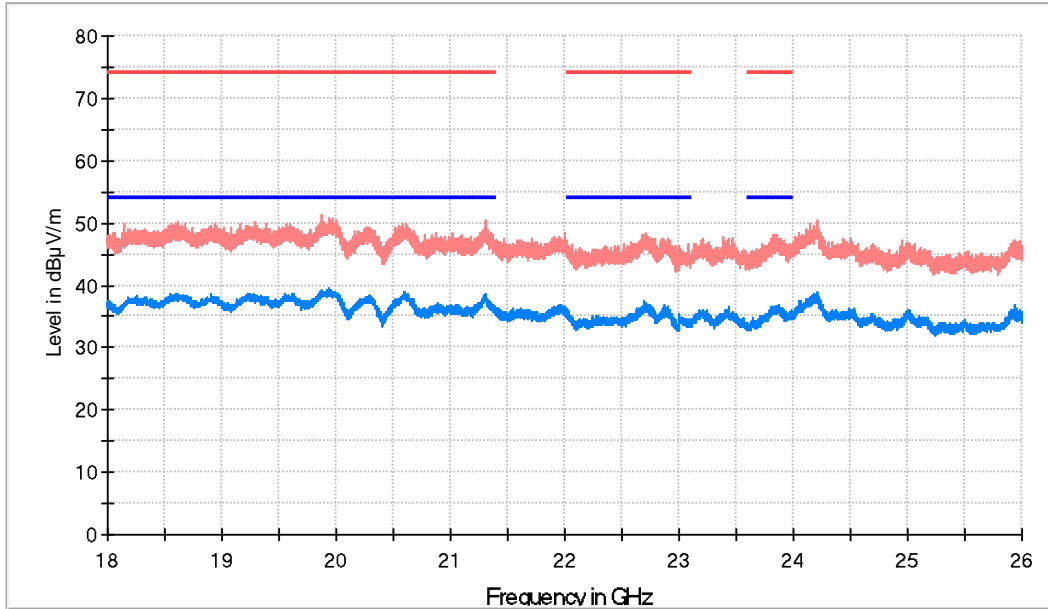


- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2480.000000	90.7	90.2	H	---	---	Fundamental
2887.000000	52.4	41.7	H	12.3	54.0	
16073.000000	55.8	47.9	V	6.1	54.0	
17911.000000	57.1	49.6	V	4.4	54.0	

Frequency range 18 - 26 GHz

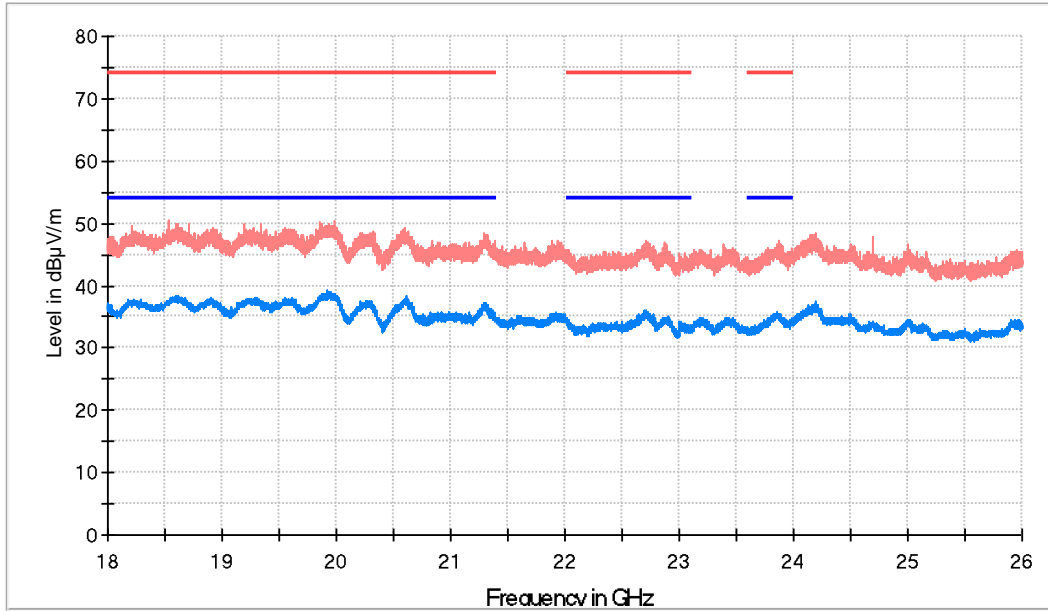
Lowest Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19939.500000	48.8	39.4		14.6	54.0
21300.000000	48.4	38.8		15.2	54.0
23871.000000	47.2	36.8		17.2	54.0

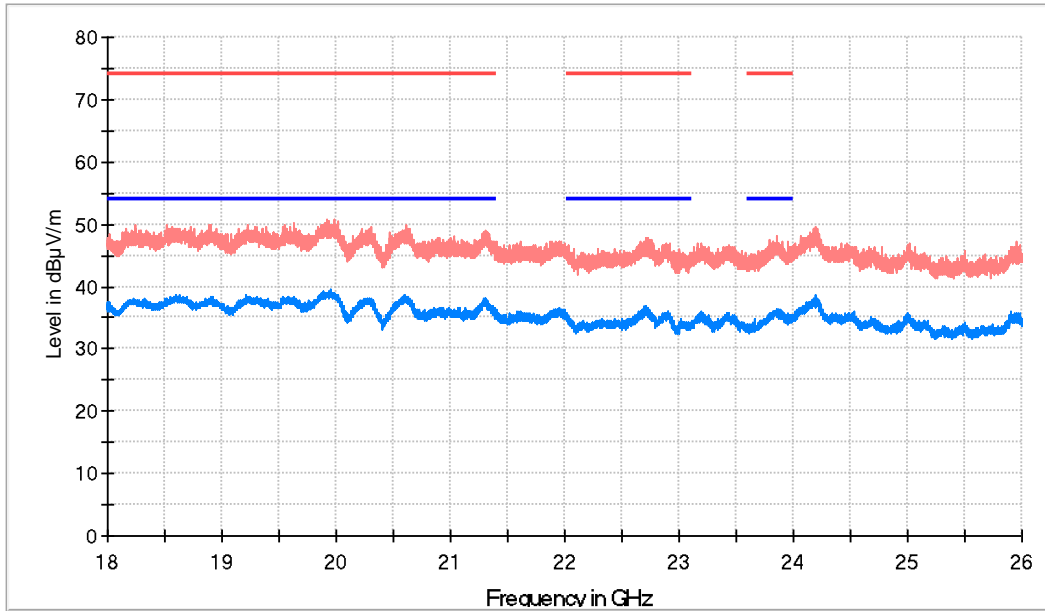
Middle Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19913.500000	47.9	39.1		14.9	54.0
21297.500000	47.9	37.3		16.7	54.0
23849.500000	45.3	35.8		18.2	54.0

Highest Channel

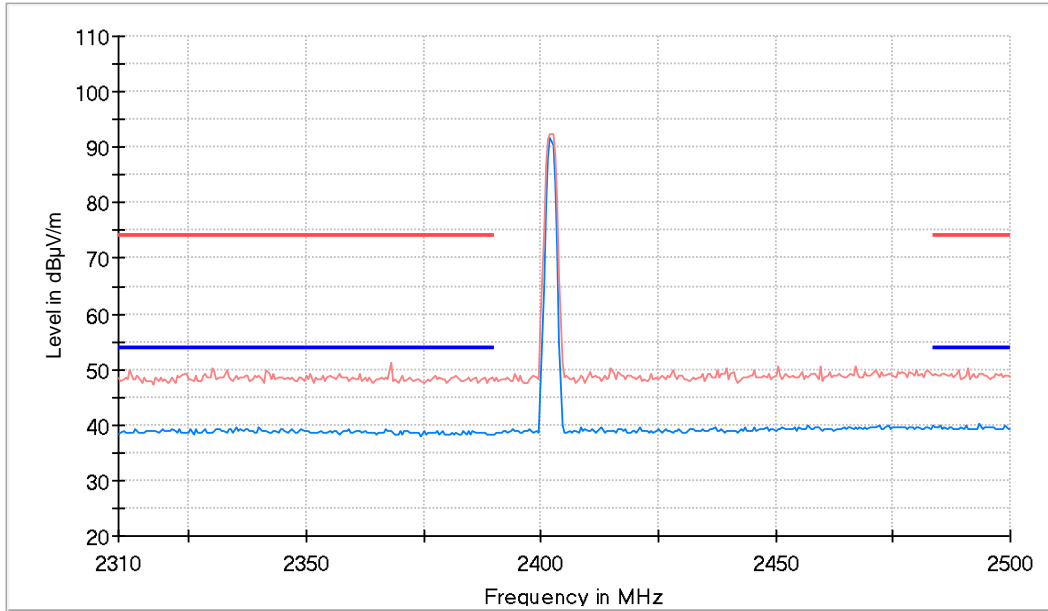


- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19947.500000	49.3	39.6		14.4	54.0
21300.500000	47.7	38.2		15.8	54.0
23849.500000	46.0	36.4		17.6	54.0

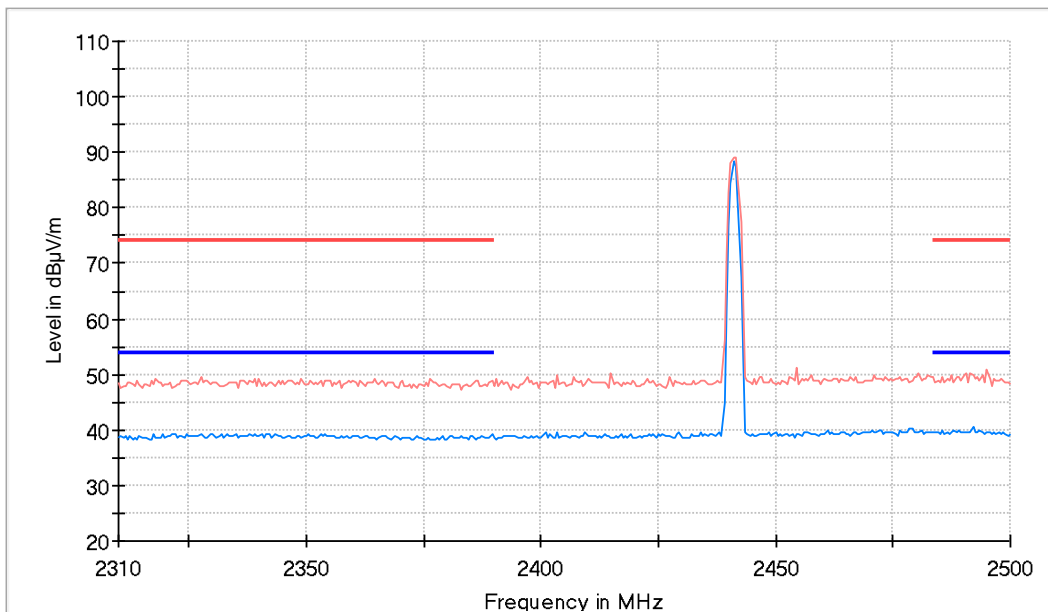
Restricted Bands (2.31 GHz - 2.5 GHz)

Lowest Channel



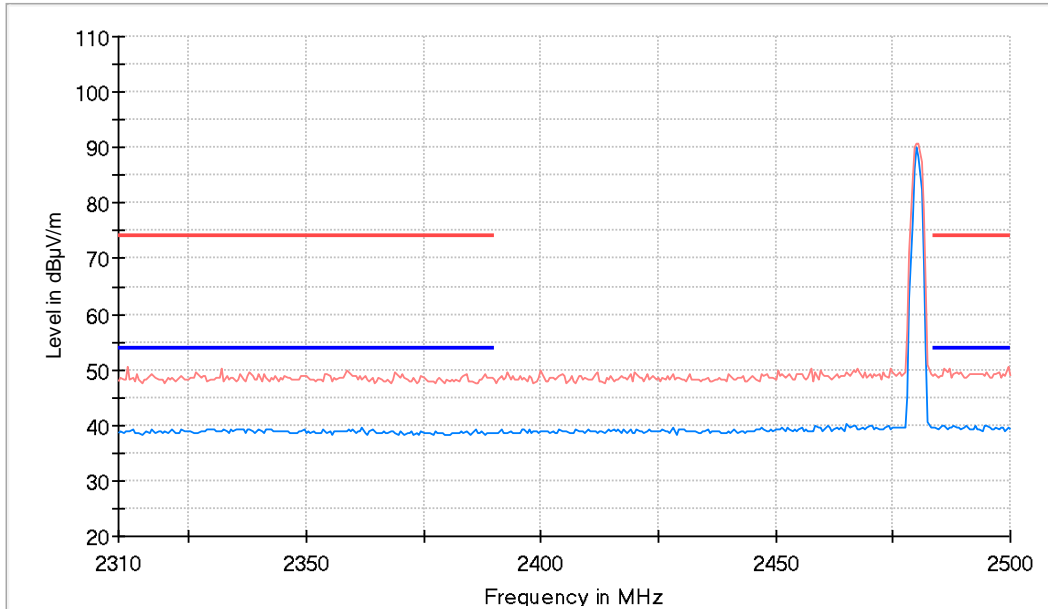
- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Middle Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Highest Channel

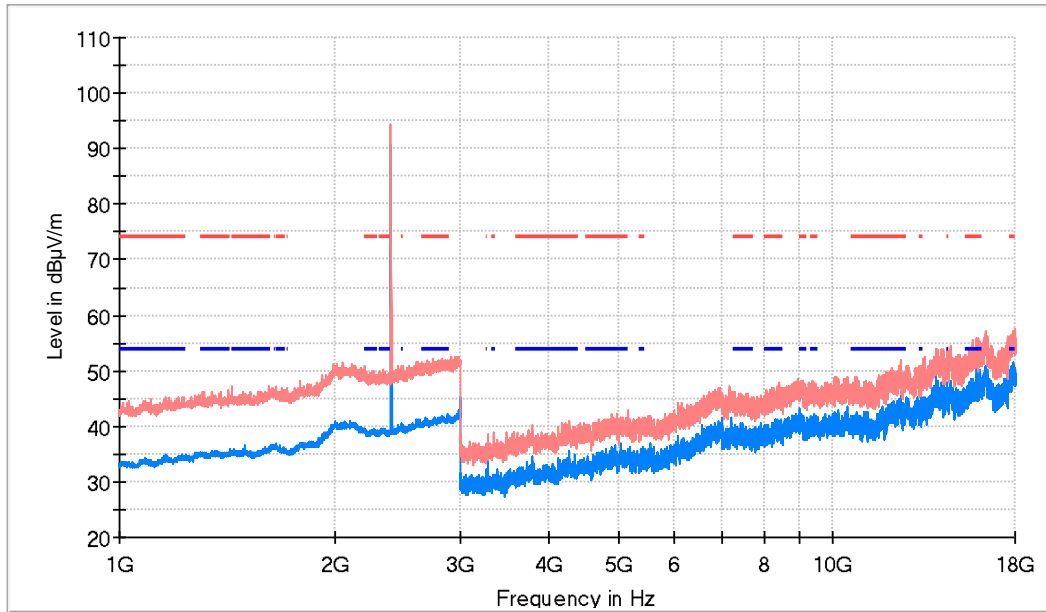


- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Modulation: BT ($\pi/4$ DQPSK 2-DH5)

Frequency range 1 - 18 GHz

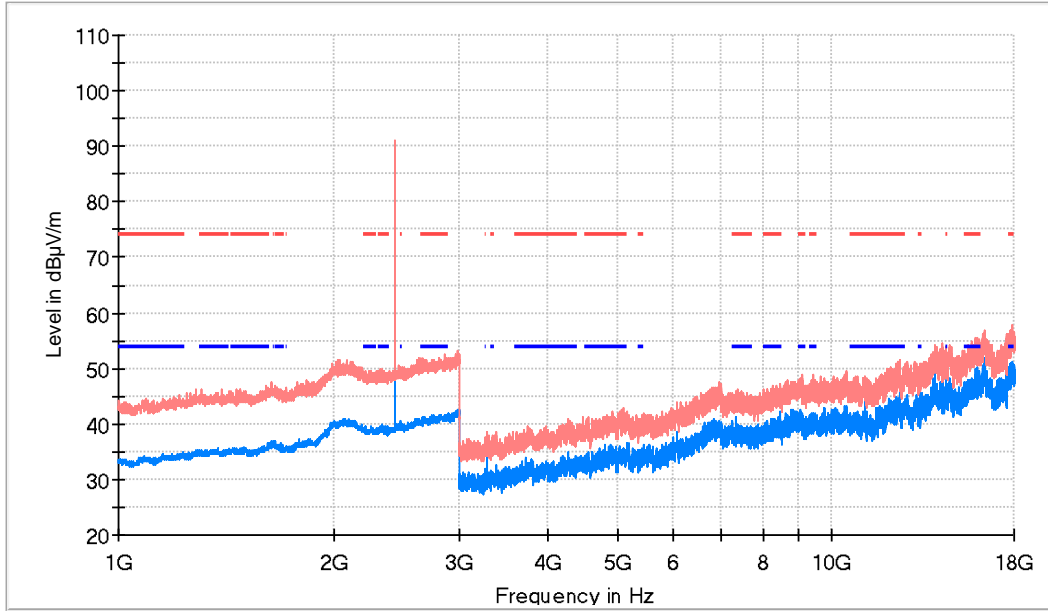
Lowest Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2402.500000	94.2	90.2	H	---	---	Fundamental
2829.000000	51.8	41.6	H	12.4	54.0	
15992.000000	55.8	49.1	H	4.9	54.0	
17997.500000	57.6	50.5	H	3.5	54.0	

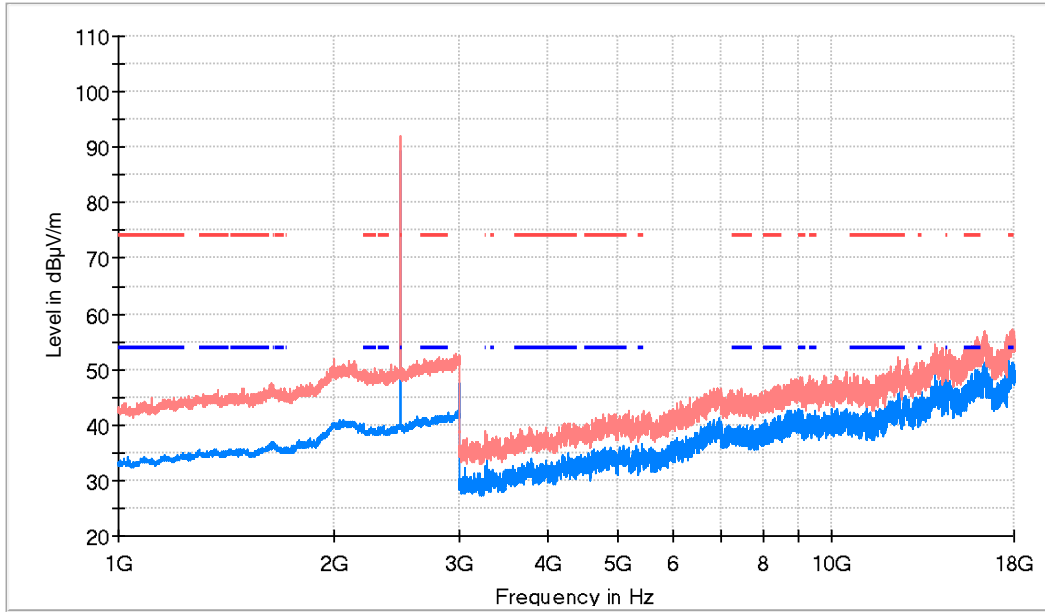
Middle Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2441.000000	91.1	88.4	H	---	---	Fundamental
2863.500000	52.4	40.5	H	13.5	54.0	
16024.500000	55.4	47.6	H	6.4	54.0	
17870.500000	57.9	49.8	V	4.2	54.0	

Highest Channel

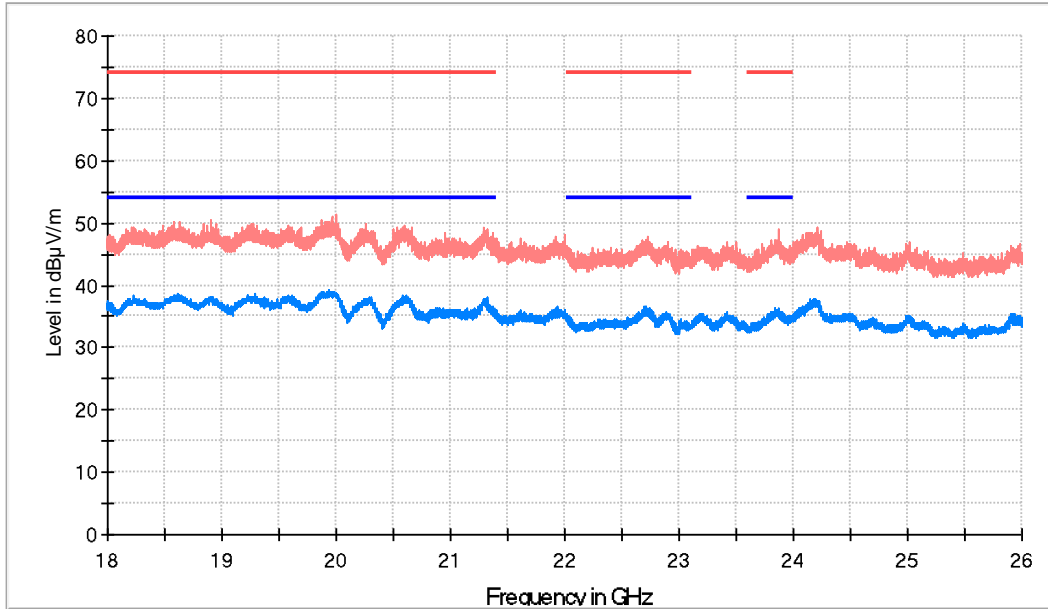


- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	PoI	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2480.500000	91.9	88.2	H	---	---	Fundamental
2820.500000	52.4	41.2	V	12.8	54.0	
15997.000000	55.8	49.8	V	4.2	54.0	
17926.000000	57.1	49.0	V	5.0	54.0	

Frequency range 18 - 26 GHz

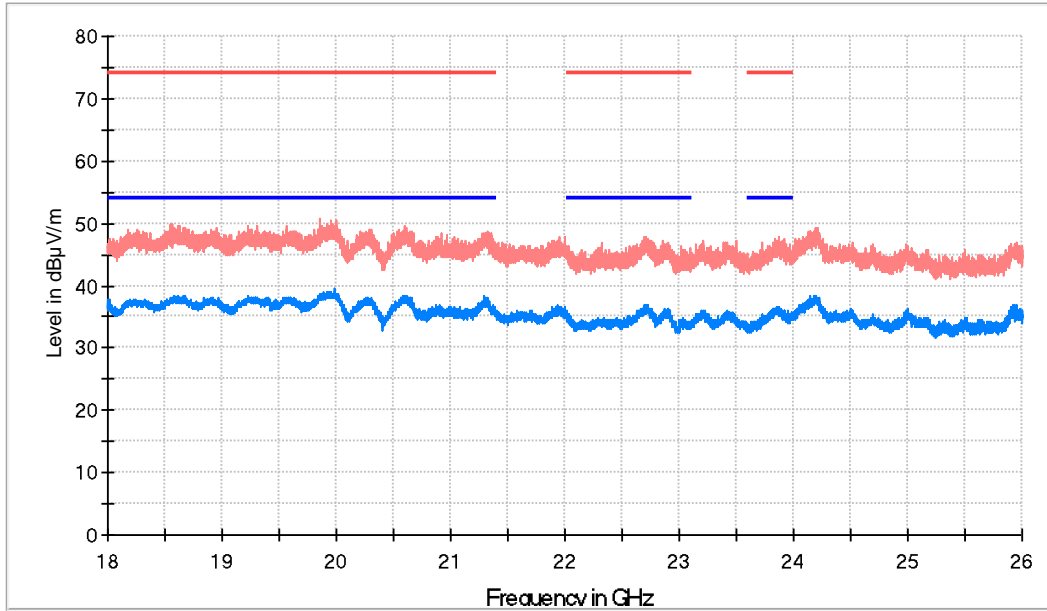
Lowest Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19943.000000	49.0	39.1		14.9	54.0
21318.500000	49.1	38.0		16.0	54.0
23863.500000	46.3	36.3		17.7	54.0

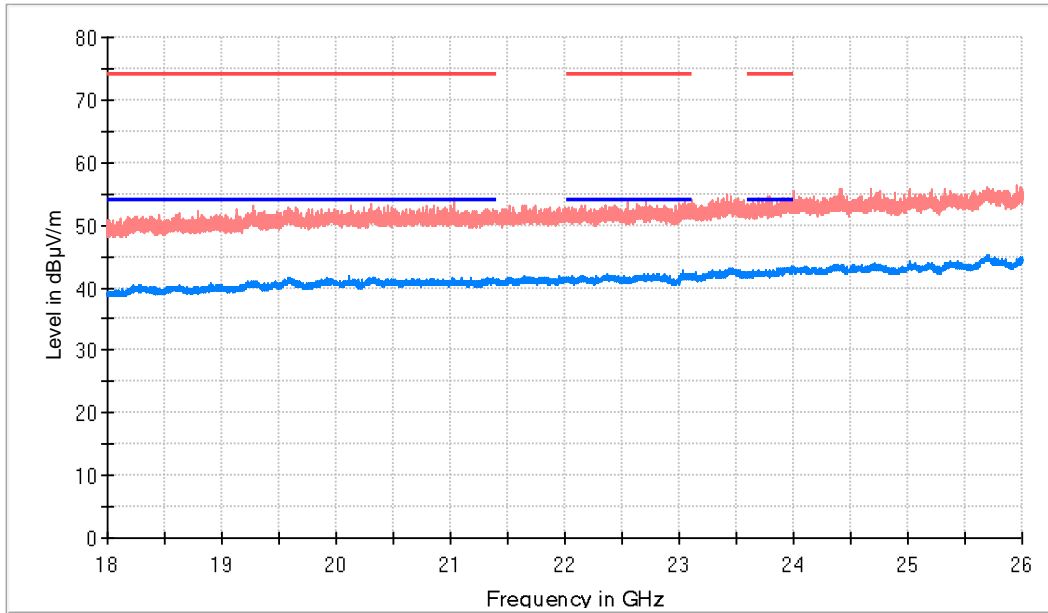
Middle Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19978.500000	48.0	39.6		14.4	54.0
21287.500000	47.7	38.3		15.7	54.0
23870.500000	45.7	36.6		17.4	54.0

Highest Channel

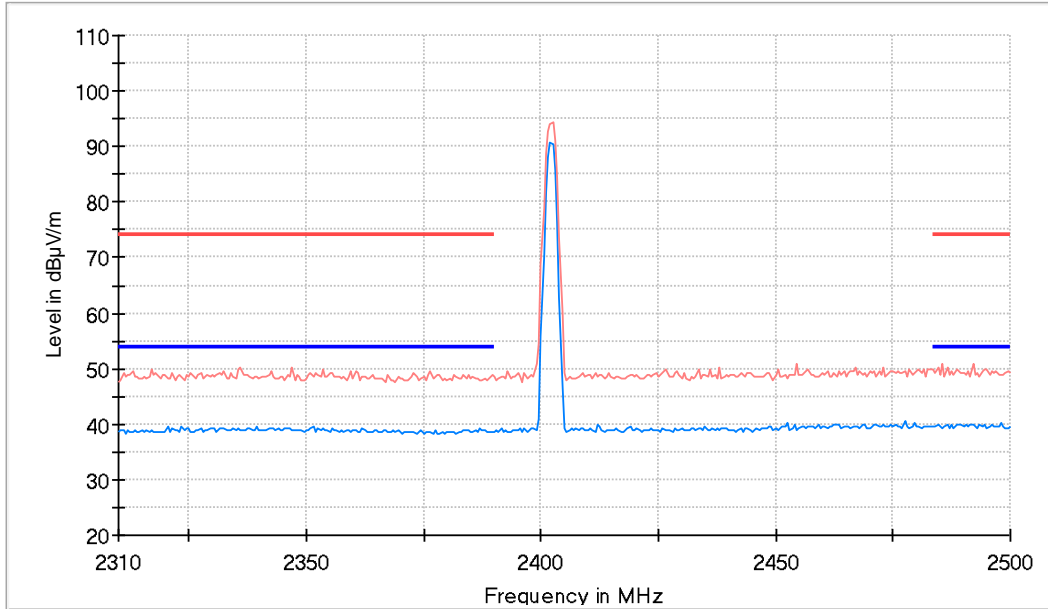


- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19920.000000	48.8	40.2		13.8	54.0
21298.000000	49.1	39.2		14.8	54.0
23864.500000	49.5	39.1		14.9	54.0

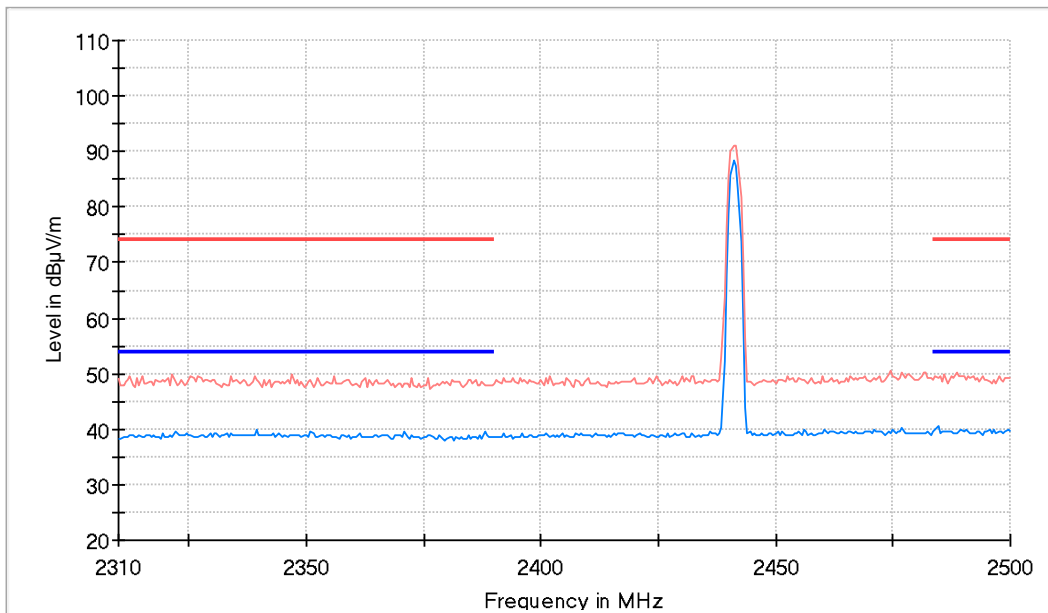
Restricted Bands (2.31 GHz - 2.5 GHz)

Lowest Channel



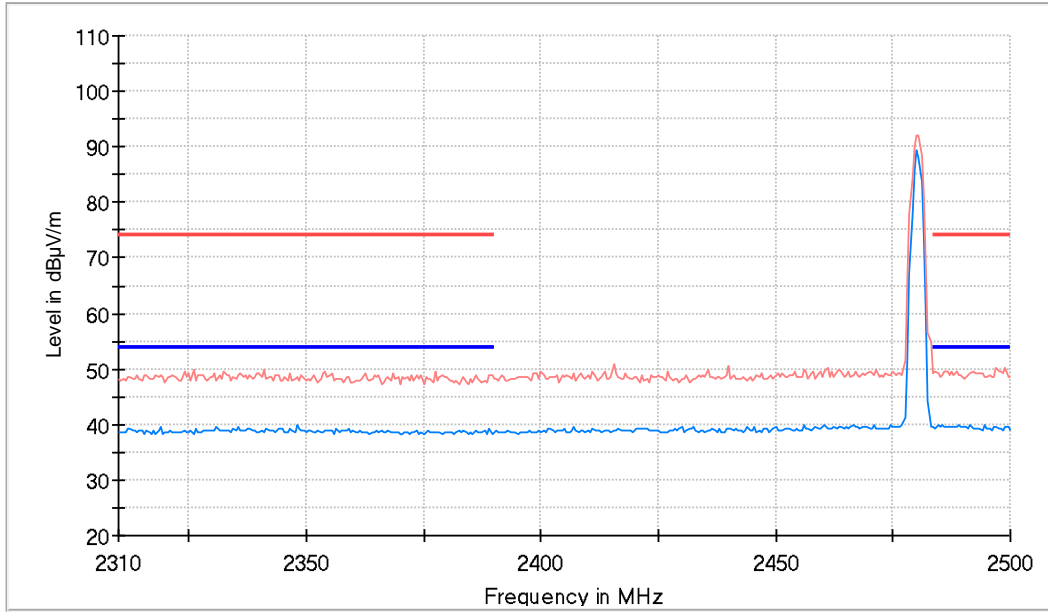
- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Middle Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Highest Channel



- AVG_MAXH
- PK+ MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

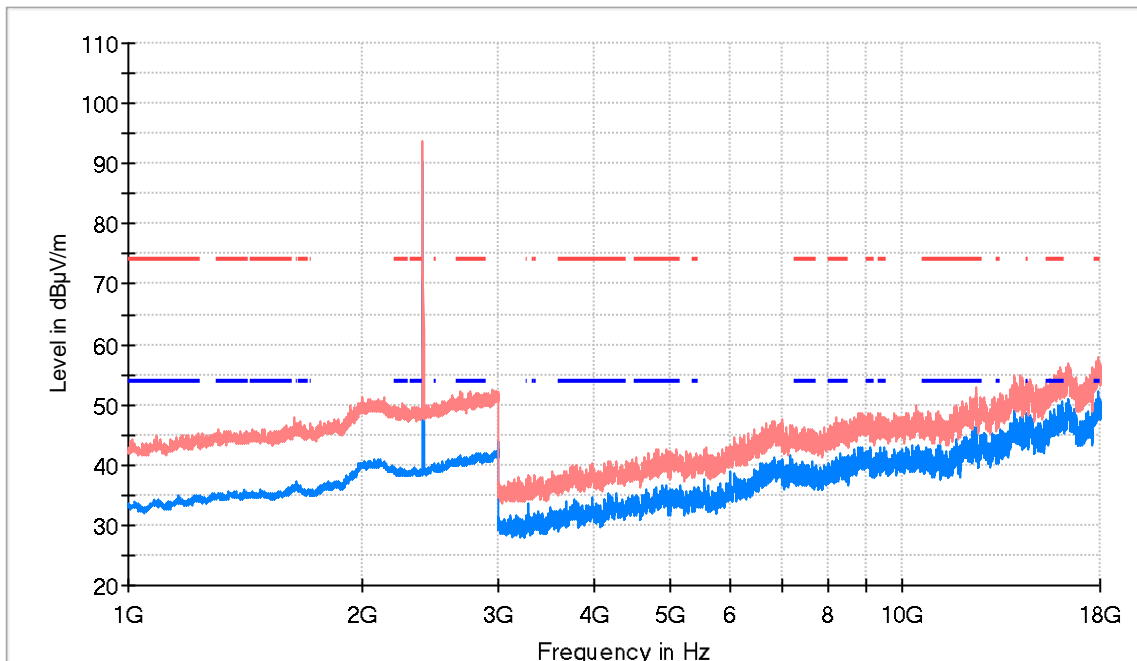
Frequency range 1 GHz – 26 GHz

The results in the following plots and tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31-2.5 GHz.

Modulation: BT (8DPSK 3-DH5)

Frequency range 1 - 18 GHz

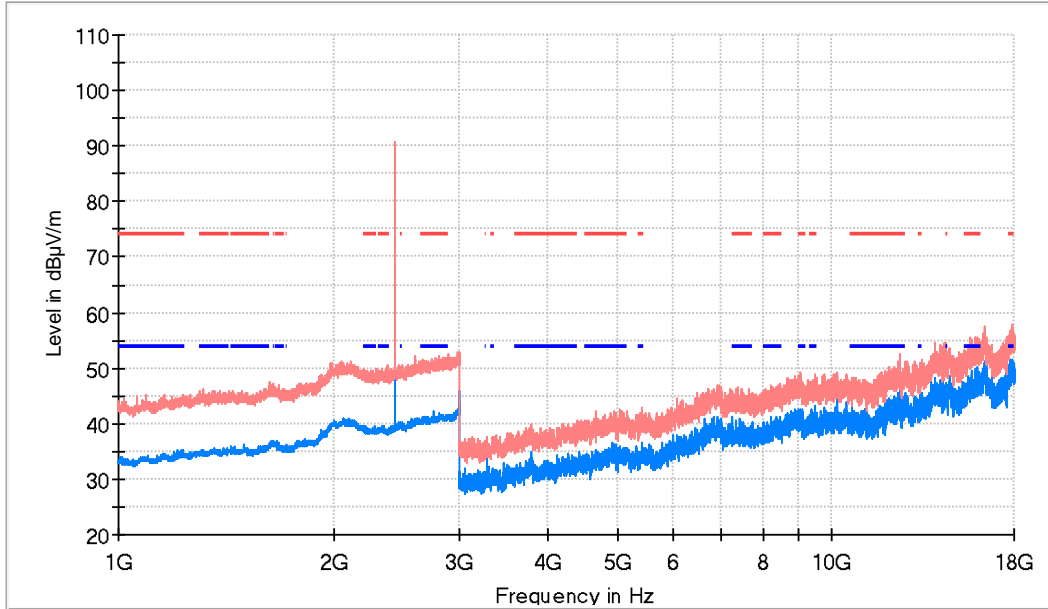
Lowest Channel



- AVG_MAXH
- PK+_MAXH
- - - TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- - - TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2402.00000	93.6	90.5	H	---	---	Fundamental
2759.00000	52.2	41.0	H	13.0	54.0	
15992.5000	55.8	49.4	H	4.6	54.0	
17930.5000	57.8	49.1	V	4.9	54.0	

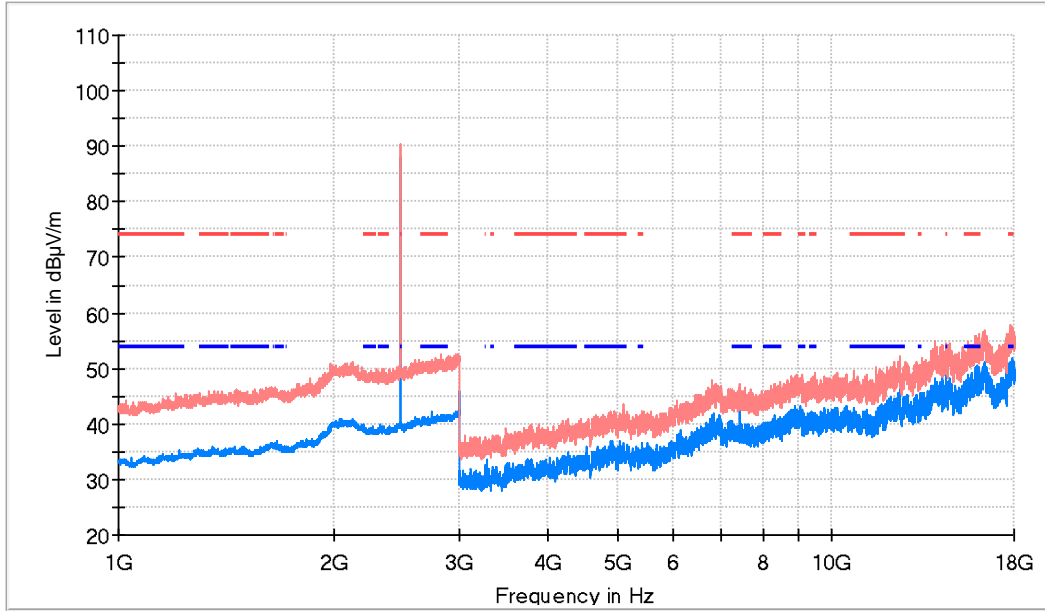
Middle Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2441.000000	90.7	87.6	H	---	---	Fundamental
2817.500000	52.1	41.0	V	13.0	54.0	
15888.500000	55.5	48.4	V	5.6	54.0	
17862.000000	57.7	49.9	H	4.1	54.0	

Highest Channel

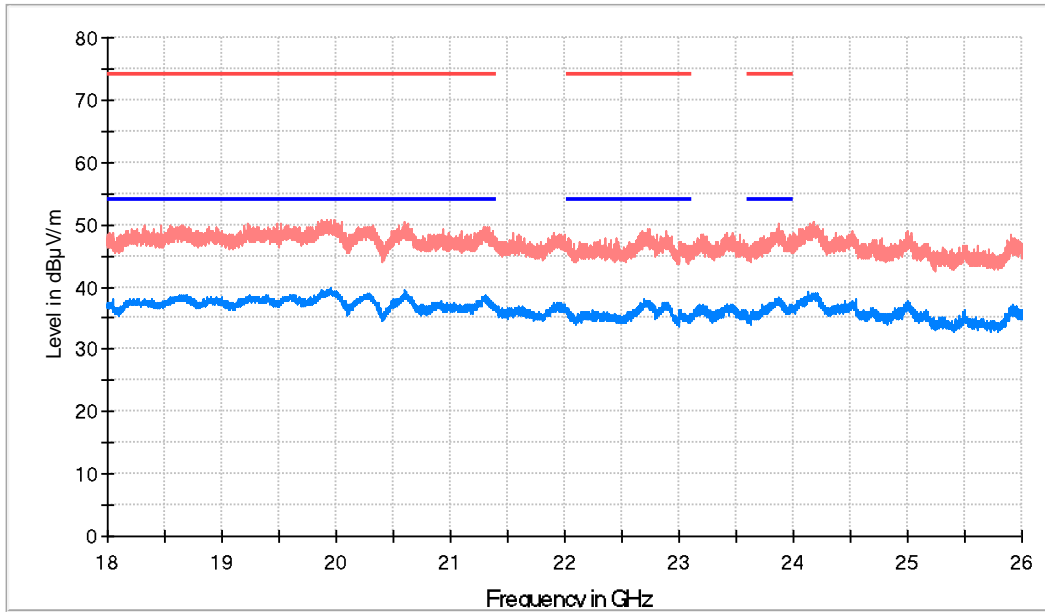


- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2480.000000	90.3	88.1	H	---	---	Fundamental
2833.000000	52.6	40.9	V	13.1	54.0	
16073.000000	56.1	48.5	H	5.5	54.0	
17778.000000	57.8	50.8	H	3.2	54.0	

Frequency range 18 - 26 GHz

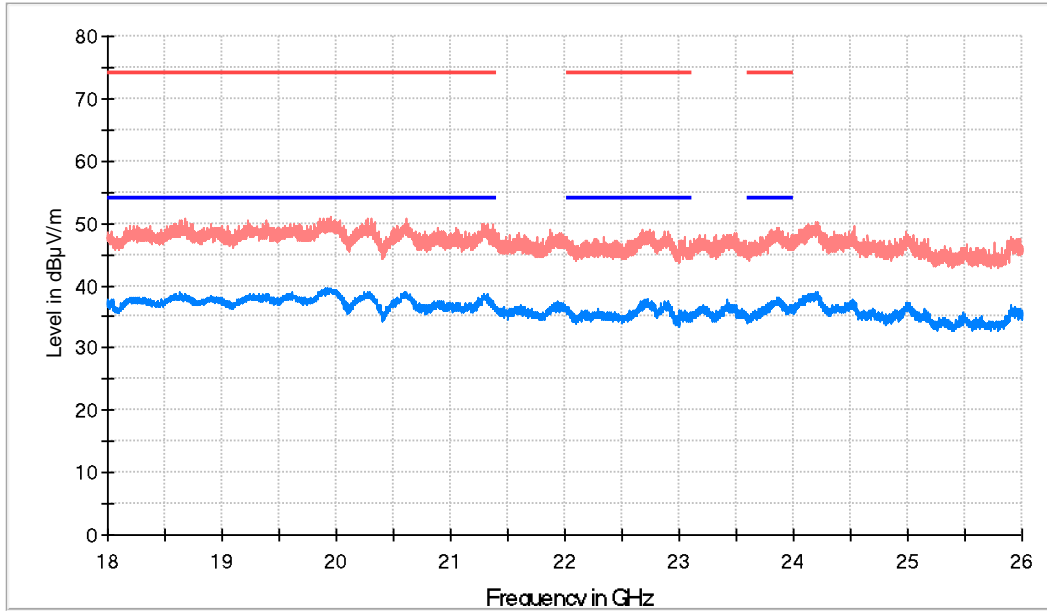
Lowest Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	PoI	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19949.500000	49.1	39.7		14.3	54.0
21301.000000	48.5	38.8		15.2	54.0
23879.000000	48.5	38.3		15.7	54.0

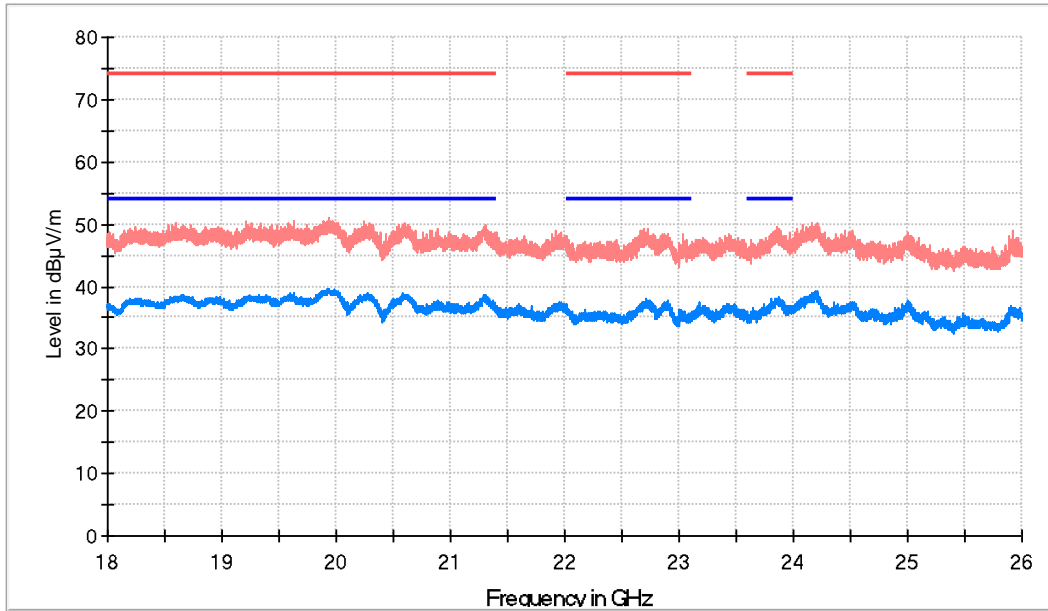
Middle Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19924.000000	49.6	39.6		14.4	54.0
21290.500000	48.7	38.6		15.4	54.0
23848.500000	48.3	38.2		15.8	54.0

Highest Channel

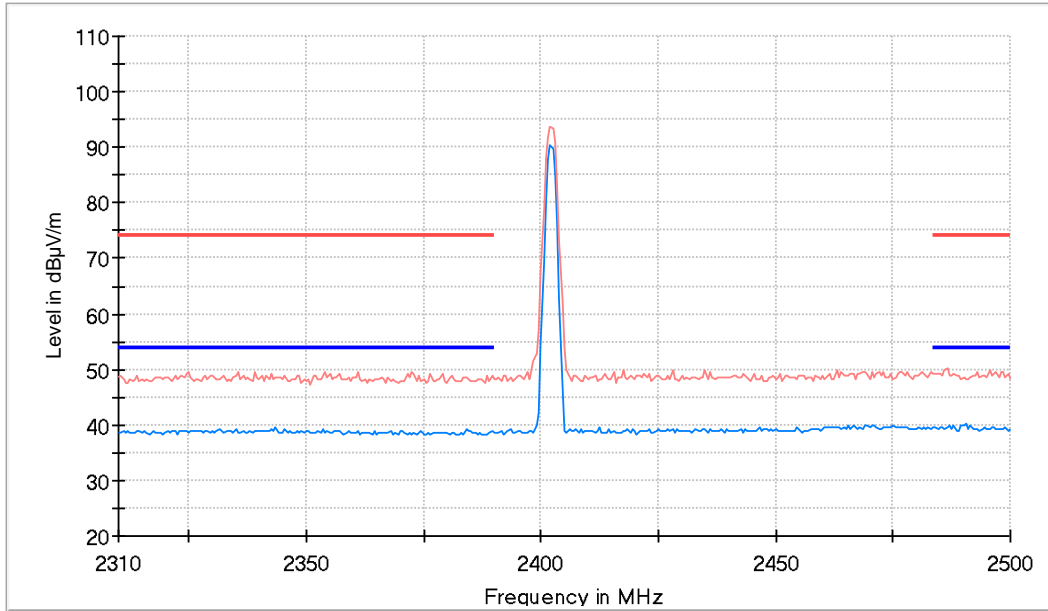


- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19979.500000	49.4	39.6		14.4	54.0
21298.000000	48.0	38.8		15.2	54.0
23879.000000	49.3	38.3		15.7	54.0

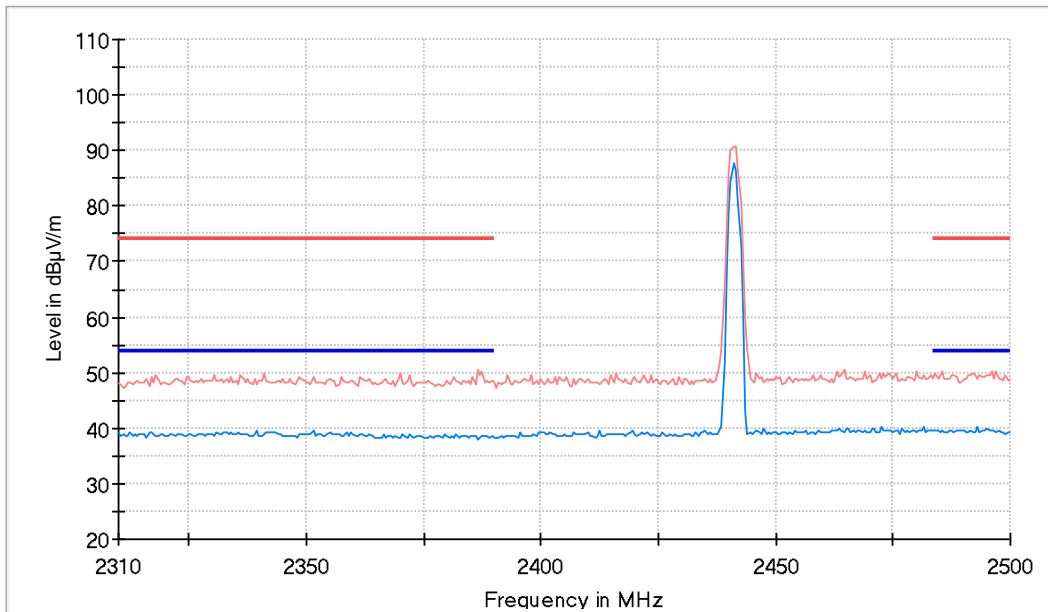
Restricted Bands (2.31 GHz - 2.5 GHz)

Lowest Channel



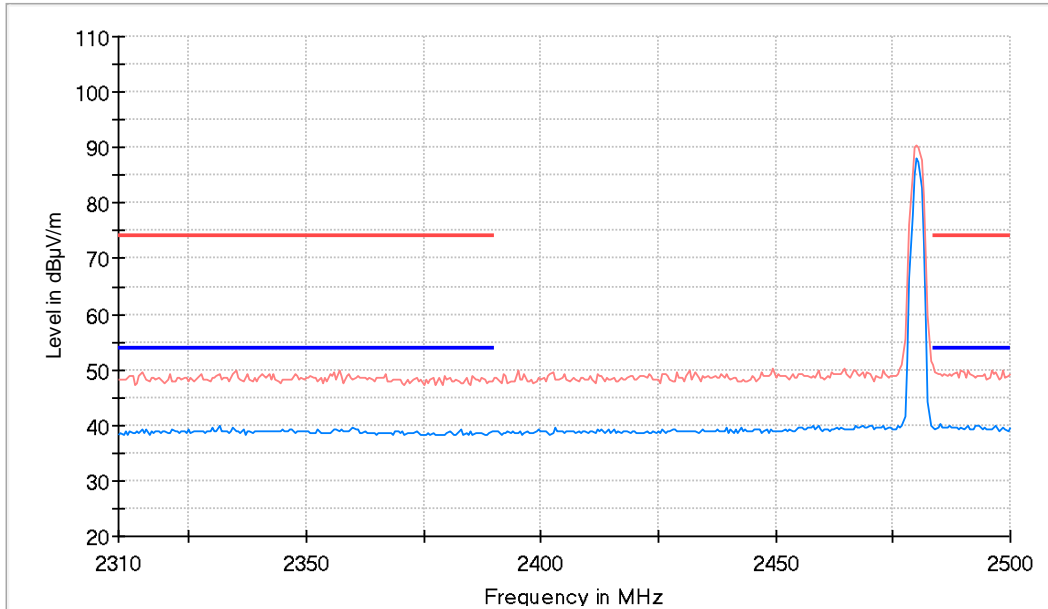
- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Middle Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Highest Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Appendix C: Test results. Wi-Fi 2.4GHz

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PRODUCT INFORMATION

Information	Description
Modulation	Other forms of modulation
Maximum RF Output Power	Adaptive Equipment without the possibility to switch to a non- adaptive mode.
Operation mode	
- Operating Frequency Range	2400 – 2483.5 MHz
- Nominal Channel Bandwidth	20 MHz 40 MHz
Extreme operating conditions	
- Temperature range	-40 °C to +65 °C
Antenna type	
Antenna gain	-2.5 dBi
Nominal Voltage	
- Supply Voltage	12 Vdc
- Type of power source	DC voltage
Equipment type	Wi-Fi 2.4 GHz b/g/n20/n40/ax20/ax40
Geo-location capability	No

TEST CONDITIONS

TEST CONDITIONS	DESCRIPTION
TC#01 ⁽¹⁾ (b mode)	<p><u>Power supply (V):</u> $V_{\text{nominal}} = 12 \text{ Vdc}$</p> <p><u>Channel Bandwidth:</u> 20 MHz</p> <p><u>Test Frequencies for Conducted/Radiated tests (Radio A & Radio B MIMO):</u> Lowest channel: 2412 MHz Middle channel: 2437 MHz Highest channel: 2462 MHz</p>
TC#02 ⁽¹⁾ (g mode)	<p><u>Power supply (V):</u> $V_{\text{nominal}} = 12 \text{ Vdc}$</p> <p><u>Channel Bandwidth:</u> 20 MHz</p> <p><u>Test Frequencies for Conducted/Radiated tests (Radio A & Radio B MIMO):</u> Lowest channel: 2412 MHz Middle channel: 2437 MHz Highest channel: 2462 MHz</p>
TC#02 ⁽¹⁾ (n mode)	<p><u>Power supply (V):</u> $V_{\text{nominal}} = 12 \text{ Vdc}$</p> <p><u>Channel Bandwidth:</u> 20 MHz</p> <p><u>Test Frequencies for Conducted/Radiated tests (Radio A & Radio B MIMO):</u> Lowest channel: 2412 MHz Middle channel: 2437 MHz Highest channel: 2462 MHz</p>

TEST CONDITIONS	DESCRIPTION
TC#04 ⁽¹⁾ (ax mode non-beam forming)	<u>Power supply (V):</u> $V_{\text{nominal}} = 12 \text{ Vdc}$ <u>Channel Bandwidth: 40 MHz</u> <u>Test Frequencies for Conducted/Radiated tests (Radio A & Radio B MIMO):</u> Lowest channel: 2422 MHz Middle channel: 2437 MHz Highest channel: 2452 MHz

Note (1): For spurious emissions for OFDM modes 802.11g, 802.11n20 and 802.11ax20 a preliminary scan was performed to determine the worst case. The following tables and plots show the results for the worst case in DSSS modulation (802.11b) and OFDM modulation (802.11g).

The data rates of 11Mb/s for 802.11b, 54Mb/s for 802.11g, MCS7 for 802.11n20, 802.11 ax were selected based on preliminary testing that identified those rates corresponding to the worst cases.

See below the comparison table between previous test results (test report 3967ERM.015A1 and test results with the new sample shown in this test report:

Bandwidth (MHz)	Mode	Frequency (MHz)	Maximum conducted power (dBm)		Delta
			IDC23 - 3967 (test report 3967ERM.015A1)	IDC23 - 4158	
20	b	2412	14.4	14.9	0.5
	g	2412	11.1	11.3	0.2
	n	2412	9.4	9.5	0.0
	ax	2412	11.5	11.4	-0.2
40	n	2422	10.7	10.4	-0.3
	ax	2422	10.7	10.7	-0.1

RADIATED MEASUREMENTS:

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at 3 m for the frequency range 30-1000 MHz (Bilog antenna) and 1-18 GHz (Double ridge horn antenna), and 1m for the frequency range 18 GHz- 26 GHz (Double ridge horn antenna).

For radiated emissions in the range 18 - 26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

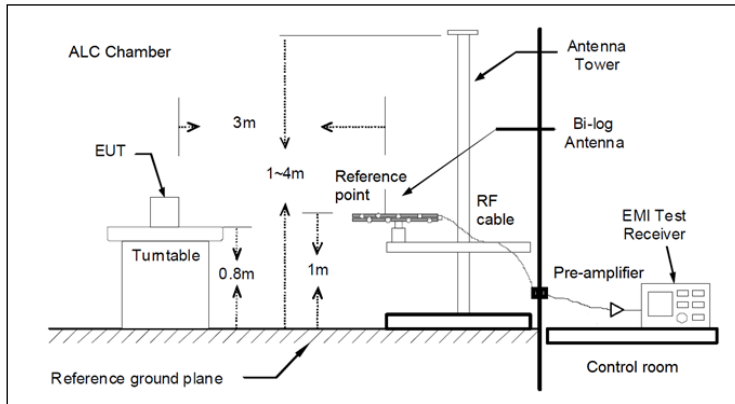


Fig A1: Radiated measurements Setup $f < 1$ GHz

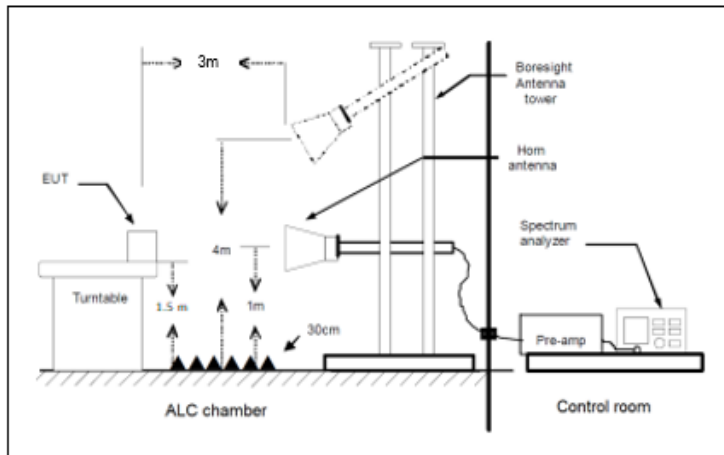


Fig A2: Radiated measurements setup $f > 1-18$ GHz

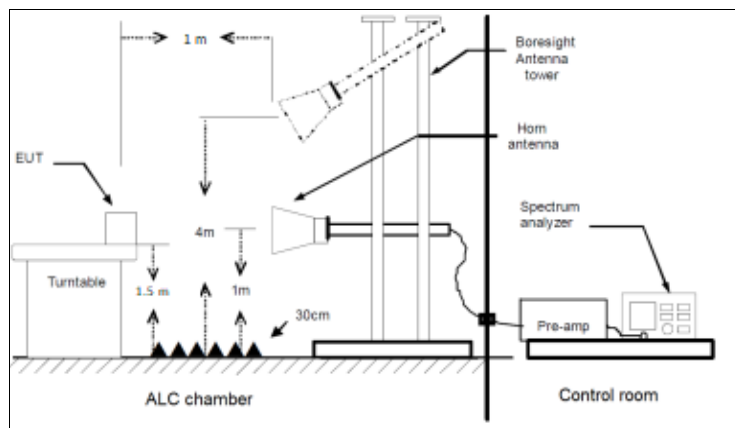


Fig A3: Radiated measurements setup $f > 18$ GHz

TEST CASE DETAILS

RSS-247 5.4 (d) / FCC 15.247 (b) (1) Maximum Average Conducted Output Power

Limits

For systems using digital modulation in the 2400 -2483.5 MHz band: 1 watt (30 dBm).

The e.i.r.p. shall not exceed 4 W (36 dBm) (RSS-247).

Note:

- 1- The following test results are shown based on KDB 662911 D01 Multiple Transmitter Output v02r01 E) 1) In-Band Power Measurements.
- 2- The e.i.r.p. levels are calculated by adding the declared maximum antenna gain (dBi).
- 3- For 2Tx CDD MIMO modes, in accordance with KDB 662911 D01 v02r01 Section F)2)f)i), directional gain for power measurements: was calculated as follows:

$$\text{Directional gain}_{\text{POWER}} = G_{\text{ANT}} \text{ dBi} (N_{\text{ANT}} < 4)$$

$$\text{Directional gain}_{\text{POWER}} = G_{\text{ANT}} = -2.5 \text{ dBi}$$

$$\text{Power Antenna Gain MIMO Chain 0 \& 1: } -2.5 \text{ dBi}$$

For MIMO CDD operation modes, the limit should be reduced by the amount in dB the antenna gain exceeds 6 dBi. In this case the limit is not reduced due to the antenna gain calculations is -2.5 dBi.

- 4- For all operation modes, the antenna gain is less than 6 dBi.

Results

Antenna gain: -2.5 dBi

Modulation: 802.11b

Freq (MHz)	BW (MHz)	E.I.R.P. (dBm)
2412.00000	20	12.4

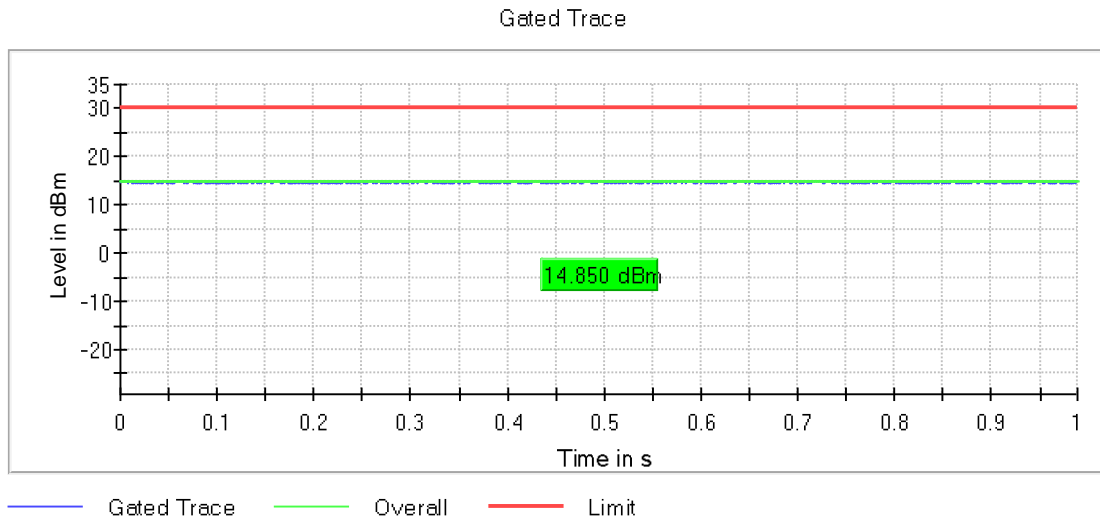
Verdict

Pass

Attachments

Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = 802.11b , Number of Transmission Chains = 2,

Images:



Antenna gain: -2.5 dBi

Modulation: 802.11g

Results

Freq (MHz)	BW (MHz)	E.I.R.P. (dBm)
2412.00000	20	8.8

Verdict

Pass

Attachments

Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = 802.11g , Number of Transmission Chains = 2,

Images:



Antenna gain: -2.5 dBi

Modulation: 802.11n20

Results

Freq (MHz)	BW (MHz)	E.I.R.P. (dBm)
2412.00000	20	7.0

Modulation: 802.11n40

Results

Freq (MHz)	BW (MHz)	E.I.R.P. (dBm)
2422.00000	40	7.9

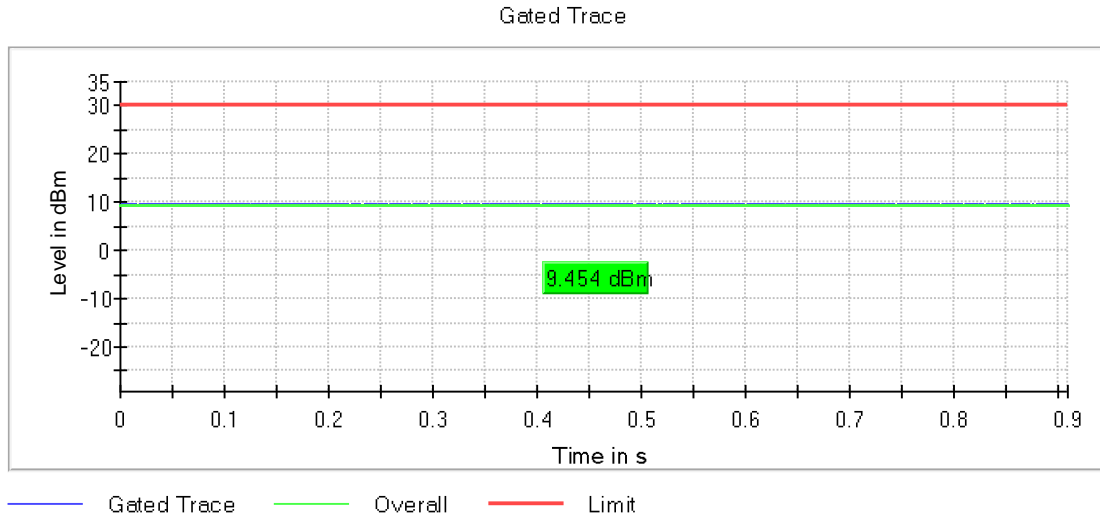
Verdict

Pass

Attachments

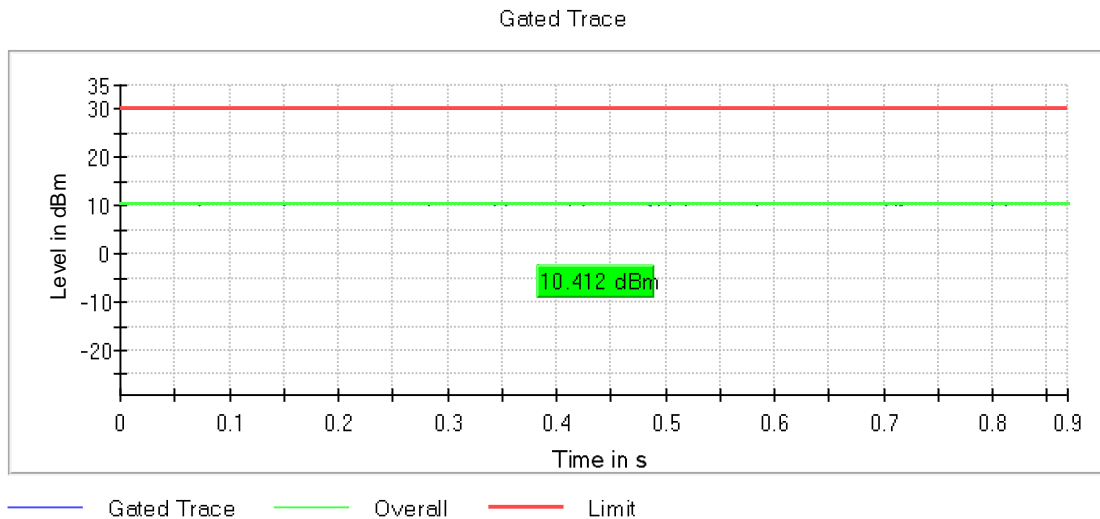
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = 802.11n , Number of Transmission Chains = 2,

Images:



Frequency MHz = 2422.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = 802.11n , Number of Transmission Chains = 2,

Images:



Antenna gain: -2.5 dBi

Modulation: 802.11ax HE20 – Full RU

Results

Freq (MHz)	BW (MHz)	E.I.R.P. (dBm)
2412.00000	20	8.9

Modulation: 802.11ax HE40 – Full RU

Results

Freq (MHz)	BW (MHz)	E.I.R.P. (dBm)
2422.00000	40	8.2

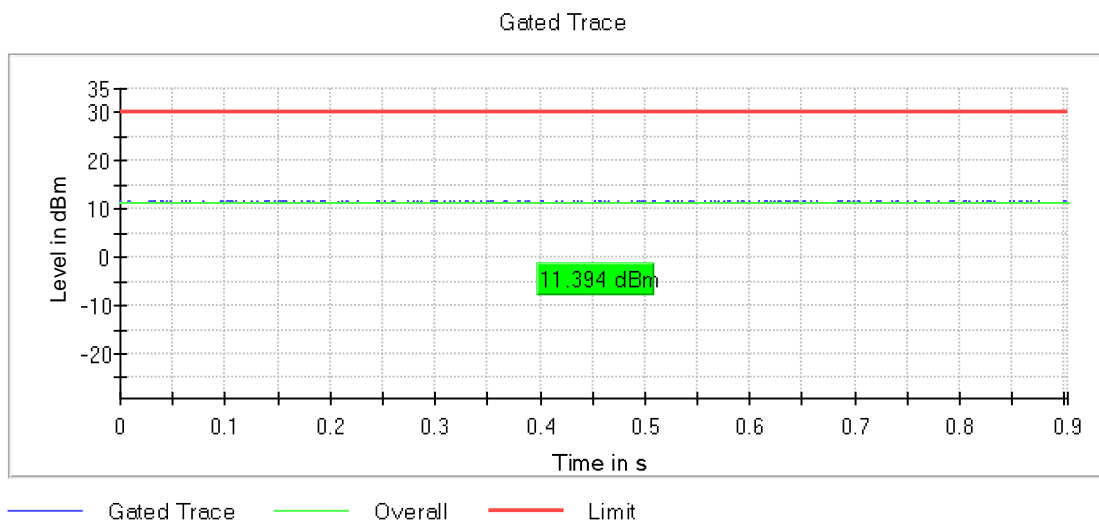
Verdict

Pass

Attachments

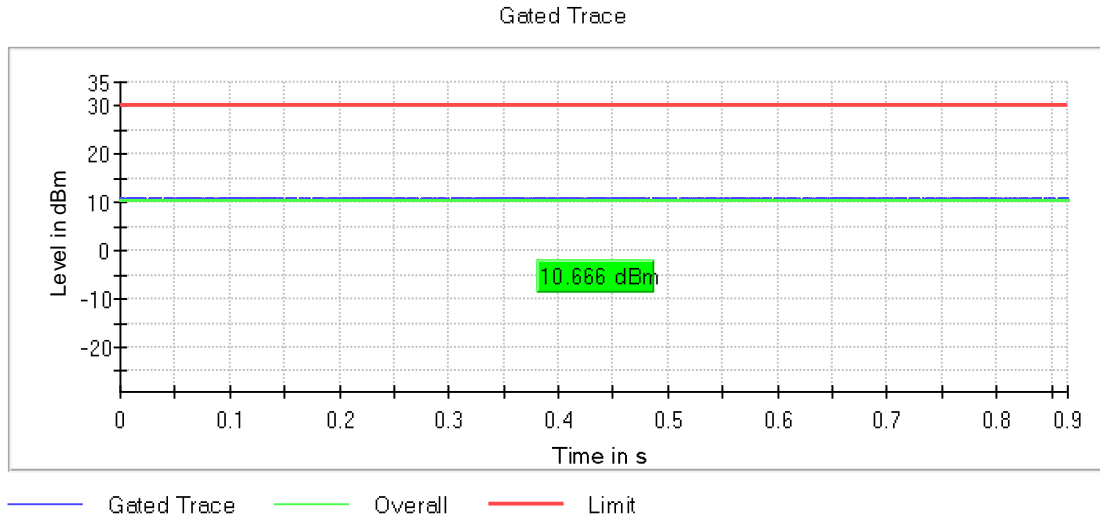
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 1, Modulation = 802.11ax HE SS1 MCS 8 (OFDM MCS8), Number of Transmission Chains = 2,

Images:



Frequency MHz = 2422.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40,
 Modulation = 802.11ax HE SS1 MCS 8, Number of Transmission Chains = 2,

Images:



OSP PowerMeter settings

Setting	Instrument Value
Measurement Time	1.000 s
Points	100000
Time resolution	1.000 µs

RSS-247 5.5 / FCC 15.247 (d) EMISSION LIMITATIONS RADIATED (TRANSMITTER)

Limits

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) / RSS-Gen):

Frequency Range (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 25000	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RSS-247. Attenuation below the general field strength limits specified in RSS-Gen is not required

Verdict

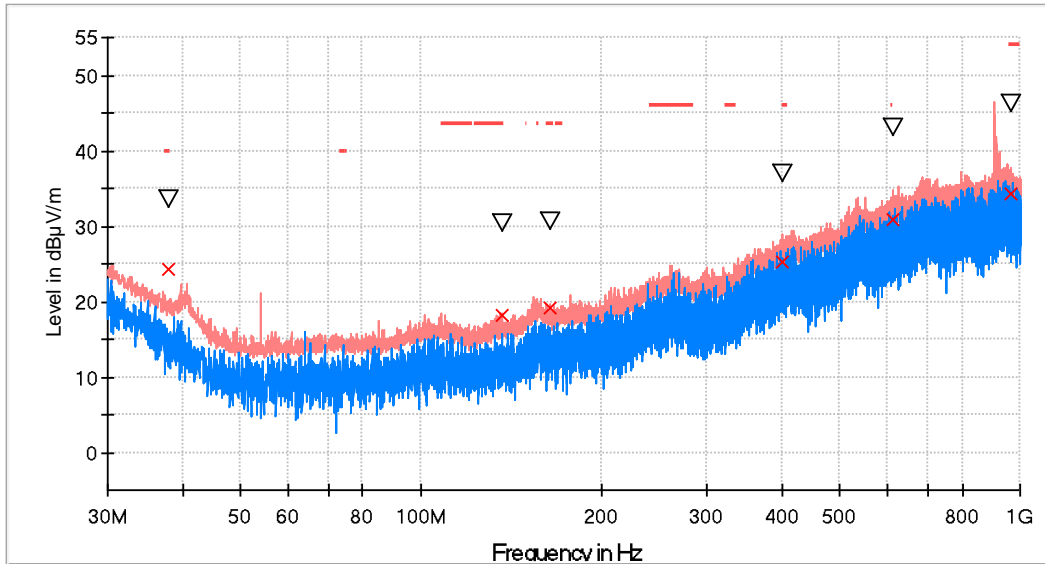
Pass

Results

Frequency range 30 MHz – 1000 MHz

The spurious emissions below 1 GHz do not depend on the operating channel and mode selected in the EUT.

RF_FCC_15.247_E Field_30MHz_1GHz_SAC2



- PK+_MAXH
- PK+_CLRWR
- TX limits to Spurious Emission FCC15.247 (30MHz to 1GHz) Restricted Bands QPK Limit
- ▽ MaxPeak-PK+ (Single)
- × QuasiPeak-QPK (Single)

Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Margin - QPK (dB)	Limit - QPK (dBµV/m)
37.857000	33.6	24.2	V	15.8	40.0
136.845500	30.3	18.3	H	25.3	43.5
164.199500	30.7	19.1	H	24.4	43.5
400.637000	36.9	25.1	V	20.9	46.0
612.824500	43.1	31.0	V	15.1	46.0
964.595000	46.3	34.3	H	19.7	54.0

Frequency range 1 GHz – 26 GHz

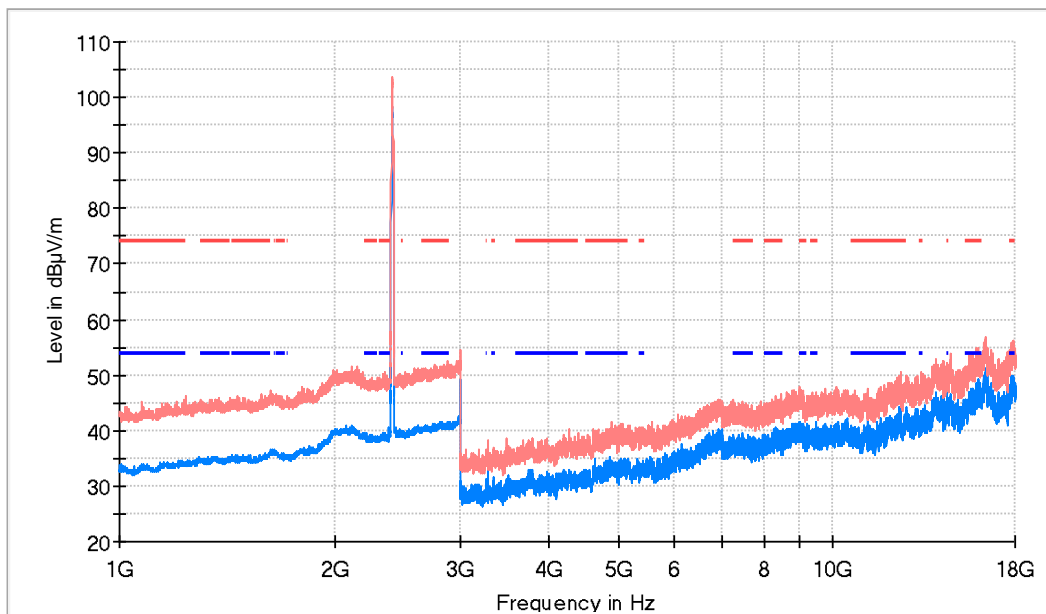
The results for the 802.11b worst operation mode selected for this range are shown below.

The results in the next tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz (see next plots). Please see the following results for worst operation mode selected for this range (1 Mbps).

Modulation: 802.11b

Frequency range: 1 – 18 GHz

Lowest Channel

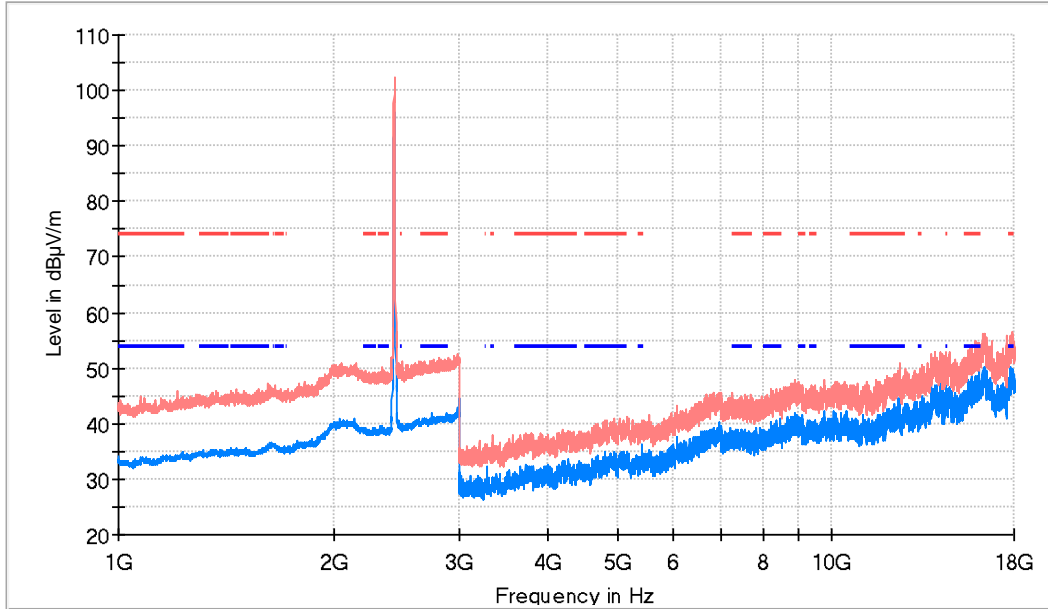


- AVG_MAXH
- PK+ MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+ MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2412.500000	103.6	96.7	H	---	---	Fundamental
2885.000000	52.5	40.7	H	13.3	54.0	
15997.500000	54.9	49.1	V	4.9	54.0	
17875.500000	56.3	48.2	V	5.8	54.0	

Frequency range: 1 – 18 GHz

Middle Channel

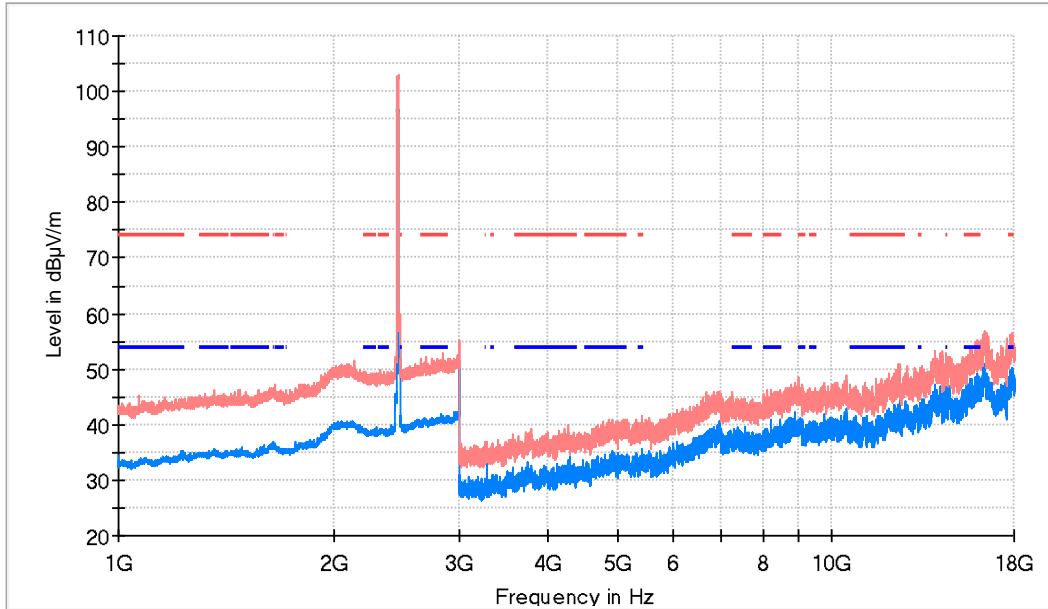


- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2437.000000	101.5	96.0	H	---	---	Fundamental
2815.500000	51.8	40.9	V	13.1	54.0	
15900.000000	54.7	47.6	V	6.4	54.0	
17878.500000	56.4	48.6	H	5.4	54.0	

Frequency range: 1 – 18 GHz

Highest Channel

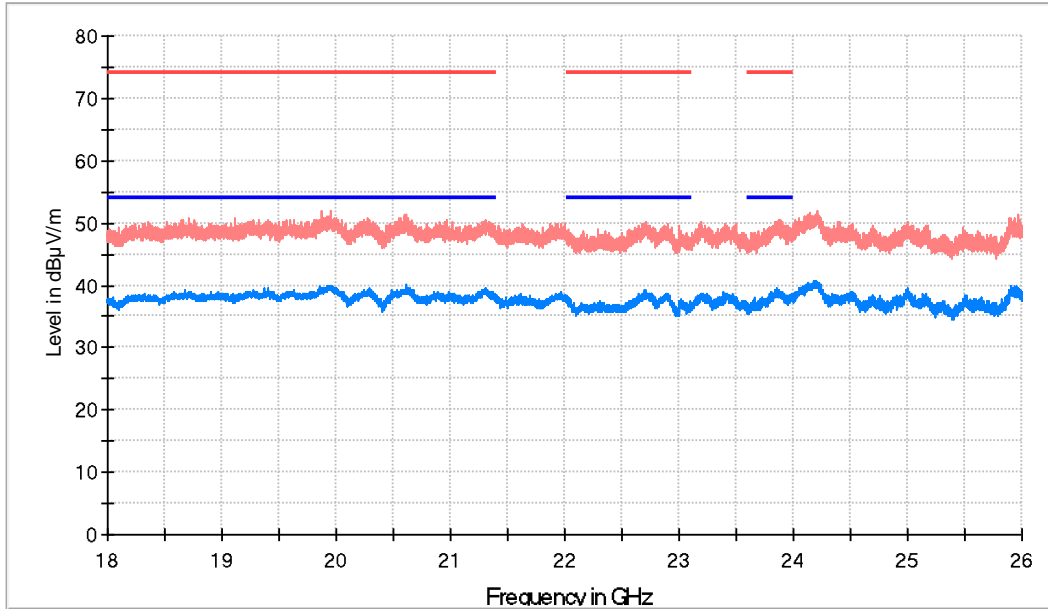


- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2460.000000	102.7	96.9	H	---	---	Fundamental
2843.000000	52.7	40.7	H	13.3	54.0	
16007.500000	55.2	47.0	H	7.0	54.0	
17846.000000	56.4	48.4	V	5.6	54.0	

Frequency range 18 - 26 GHz

Lowest Channel

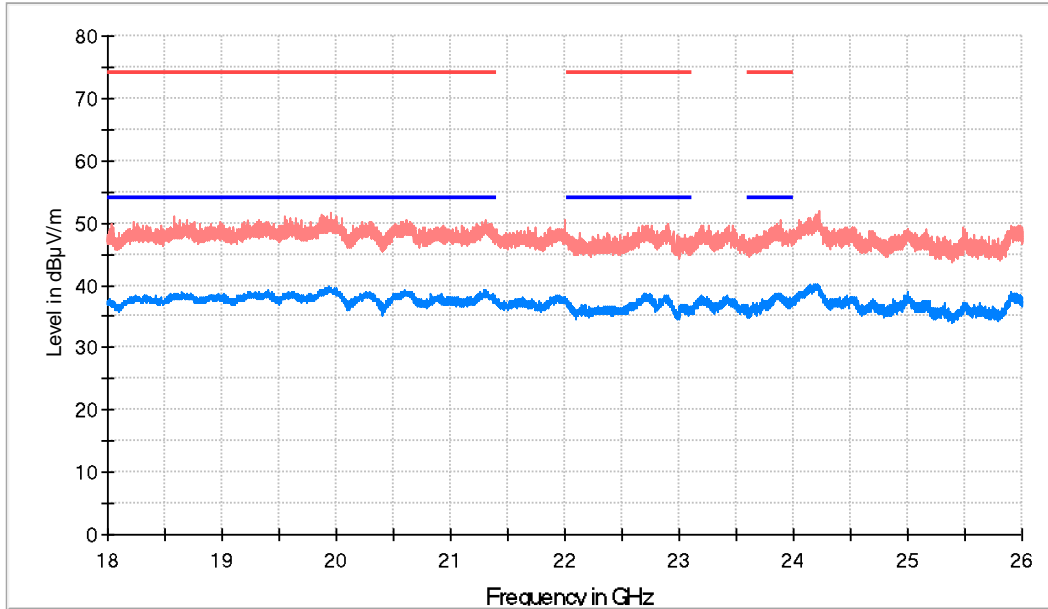


- AVG_MAXH
- PK+_MAXH
- TXlimits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TXlimits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	PoI	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19875.500000	52.1	39.2		14.8	54.0
20968.000000	50.5	38.4		15.6	54.0
23877.500000	50.6	39.3		14.7	54.0

Frequency range 18 - 26 GHz

Middle Channel

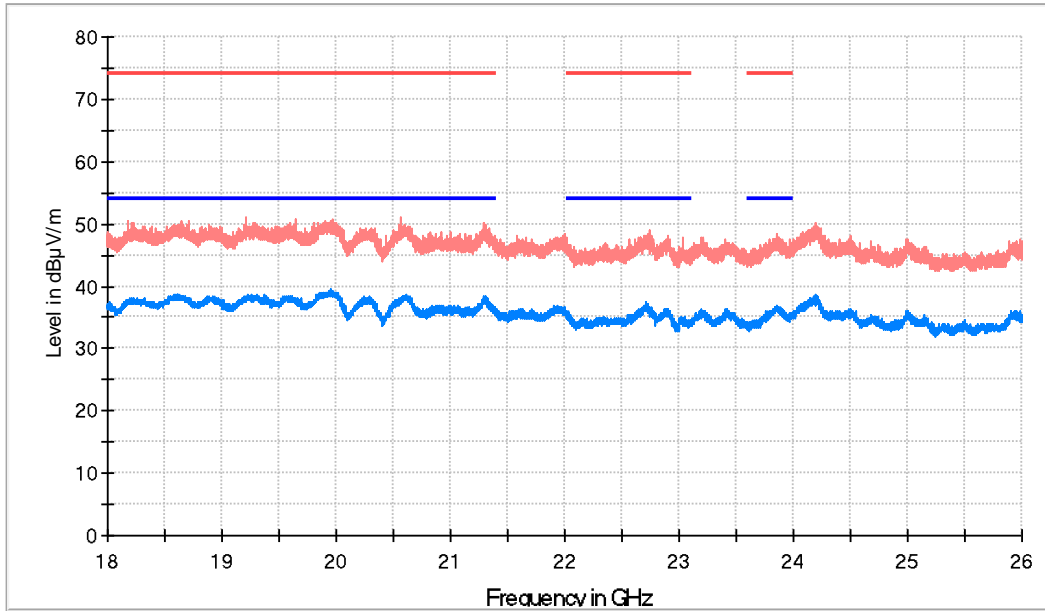


- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19940.500000	49.5	39.8		14.2	54.0
21312.000000	50.2	39.3		14.7	54.0
23878.000000	48.4	38.8		15.2	54.0

Frequency range 18 - 26 GHz

Highest Channel

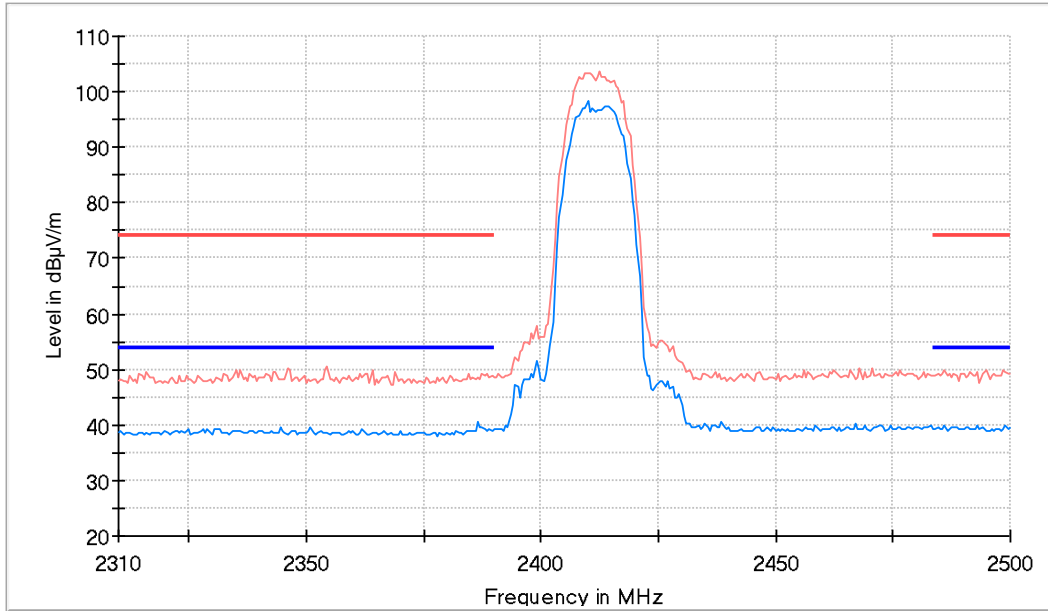


- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19947.500000	49.2	39.5		14.5	54.0
21300.000000	48.3	38.4		15.6	54.0
23849.500000	47.2	36.9		17.1	54.0

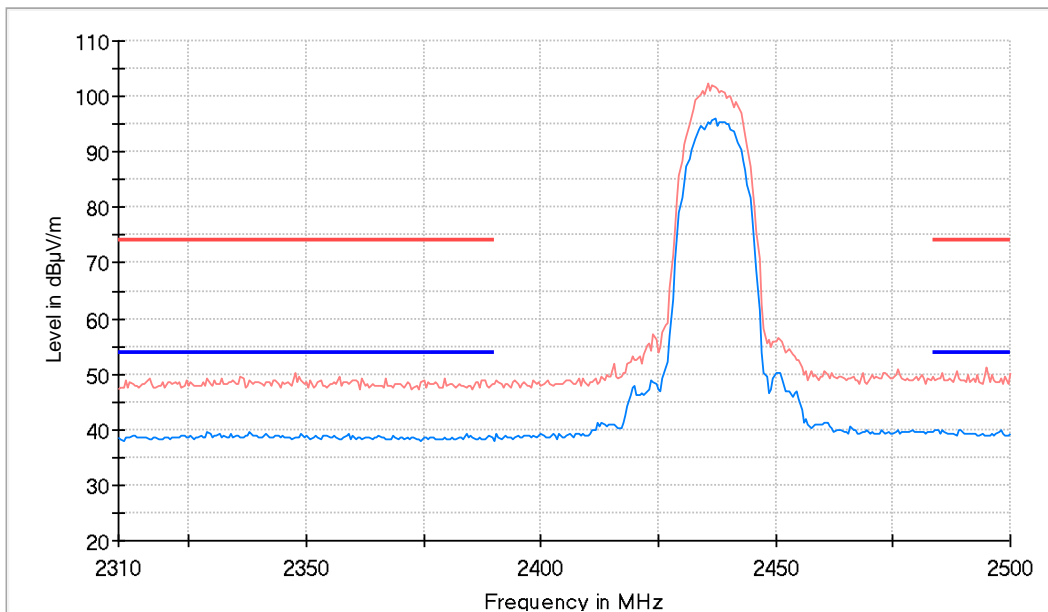
Restricted Bands (2.31 GHz - 2.5 GHz)

Lowest Channel



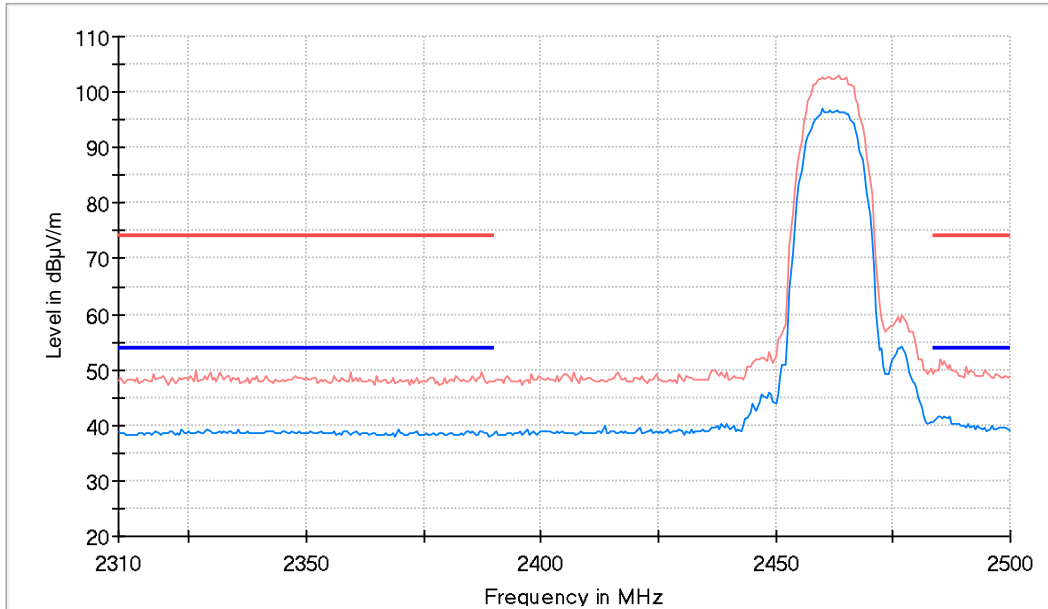
- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Middle Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Highest Channel

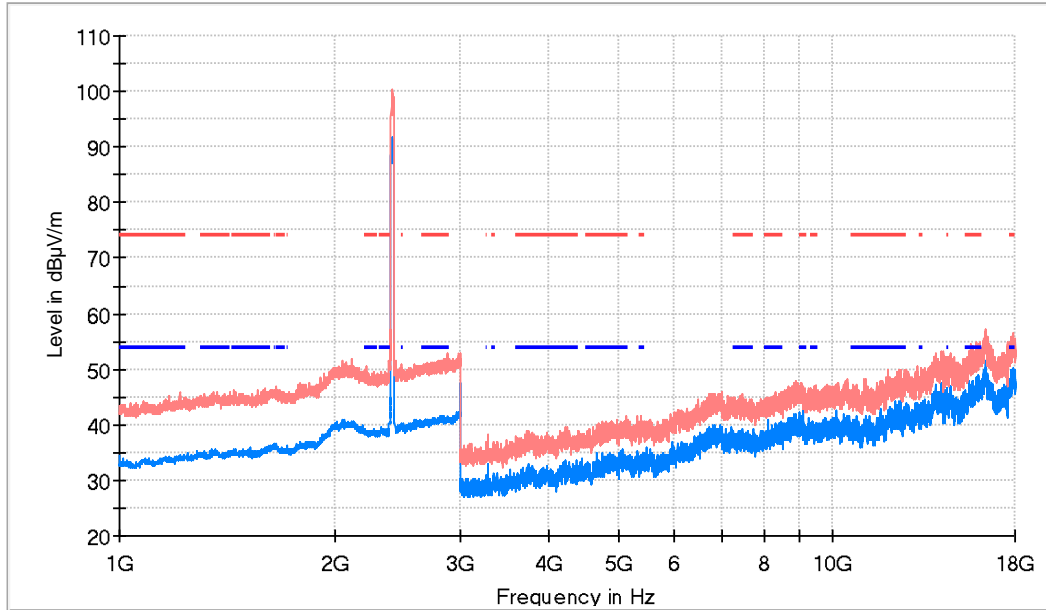


- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Modulation: 802.11g

Frequency range 1 - 18 GHz

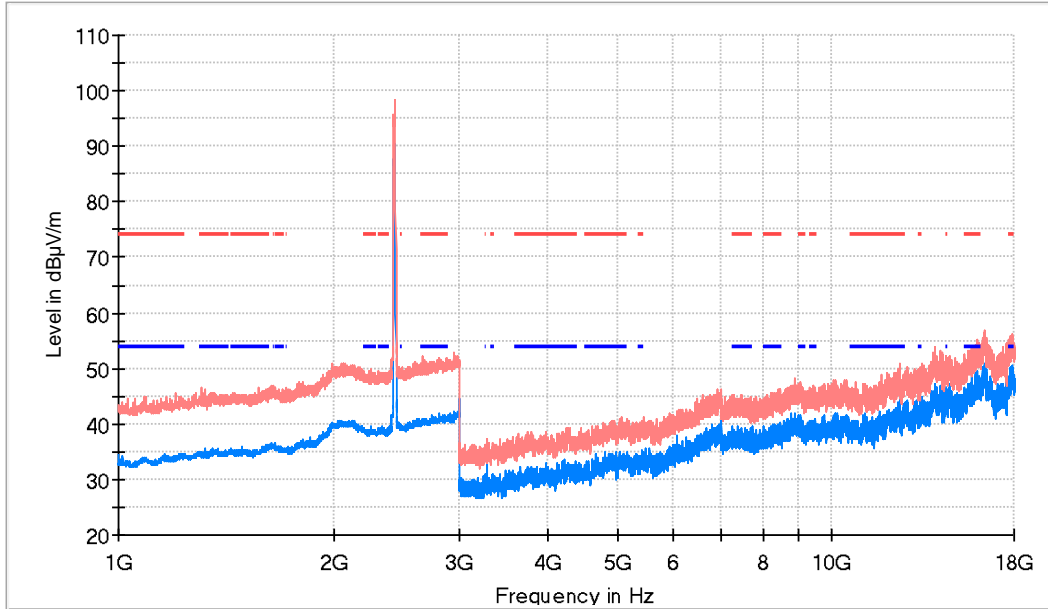
Lowest Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2411.000000	99.4	91.8	H	---	---	Fundamental
2885.000000	53.0	40.9	V	13.1	54.0	
16046.000000	54.8	47.5	H	6.5	54.0	
17870.500000	56.5	47.9	V	6.1	54.0	

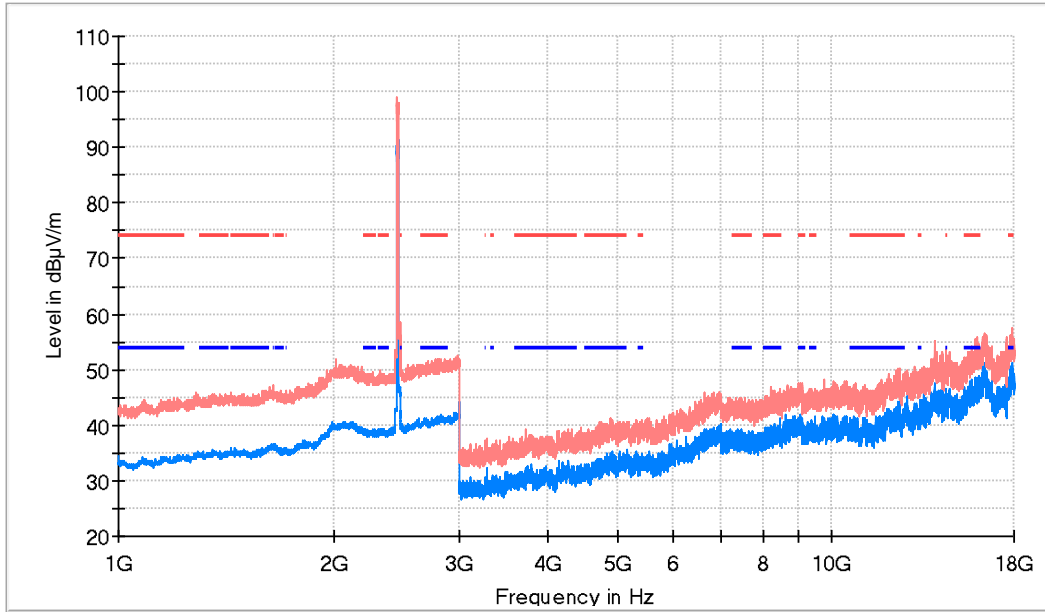
Middle Channel



- AVG_MAXH
- PK+_MAXH
- - - TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- - - TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2435.000000	96.6	90.0	H	---	---	Fundamental
2815.500000	50.5	41.9	H	12.1	54.0	
15999.500000	52.5	49.7	V	4.3	54.0	
17855.500000	54.8	50.5	H	3.5	54.0	

Highest Channel

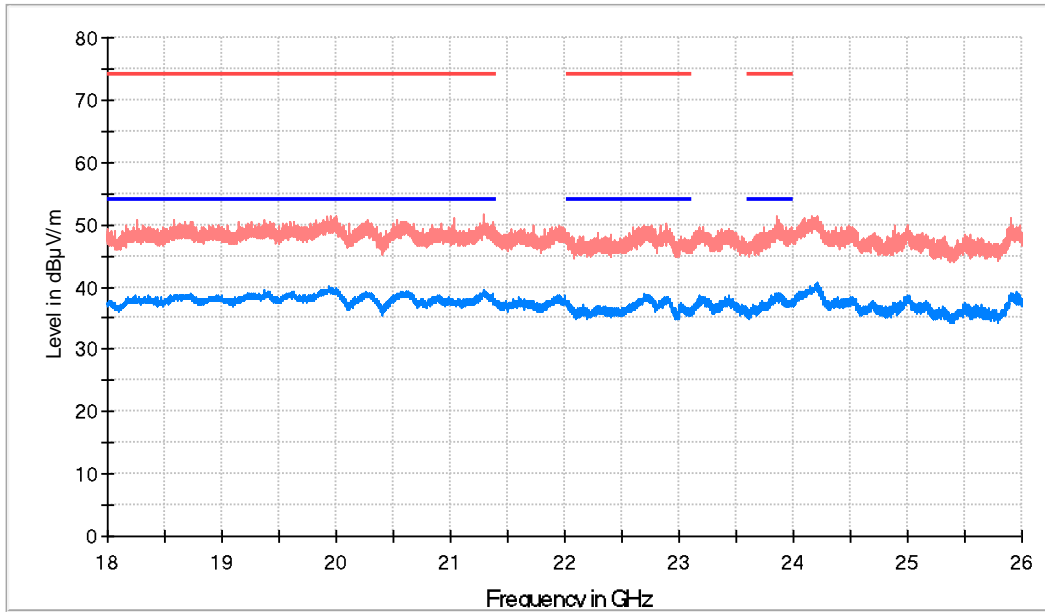


- AVG_MAXH
- PK+_MAXH
- - - TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- - - TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2465.000000	98.1	91.5	H	---	---	Fundamental
2868.000000	51.9	40.6	H	13.4	54.0	
15996.500000	55.7	47.5	H	6.5	54.0	
17855.500000	55.0	51.3	V	2.7	54.0	

Frequency range 18 - 26 GHz

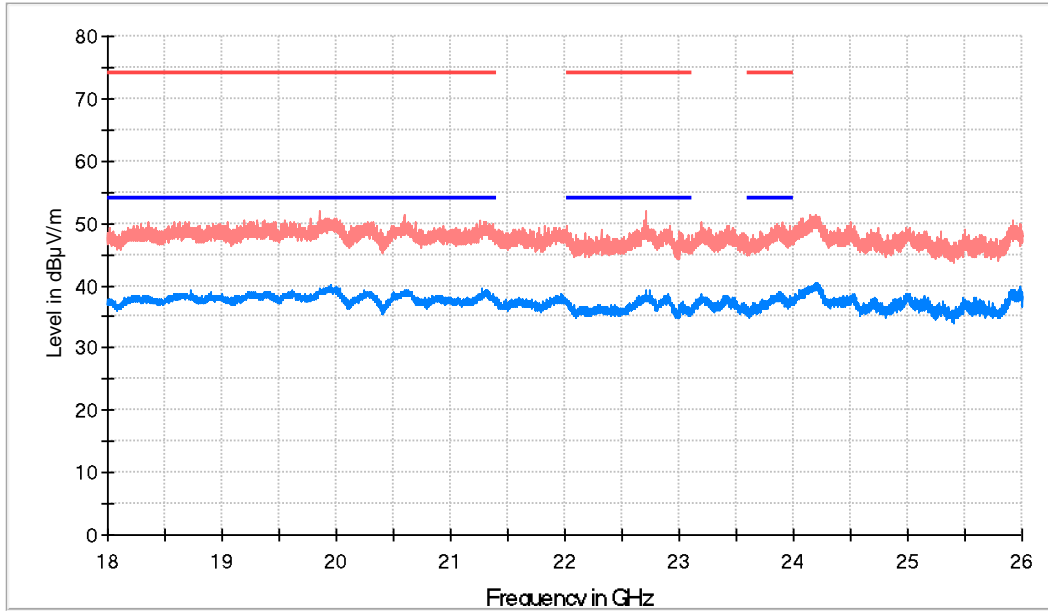
Lowest Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19929.500000	50.2	40.1		13.9	54.0
21292.000000	48.8	39.5		14.5	54.0
23890.500000	48.1	39.1		14.9	54.0

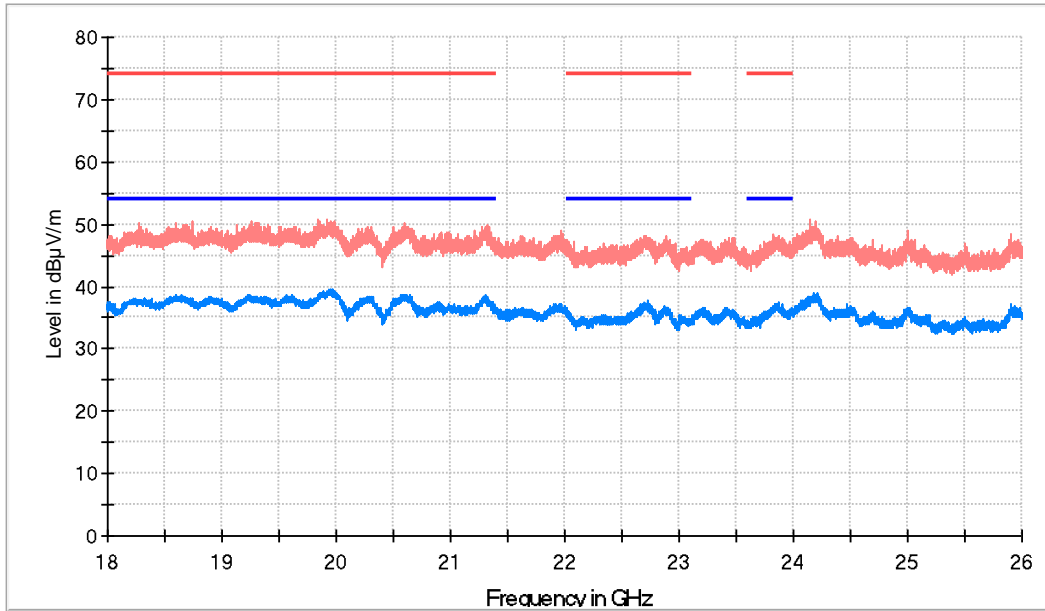
Middle Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19949.500000	49.6	40.2		13.8	54.0
21280.500000	48.9	39.5		14.5	54.0
23885.000000	47.8	39.1		14.9	54.0

Highest Channel

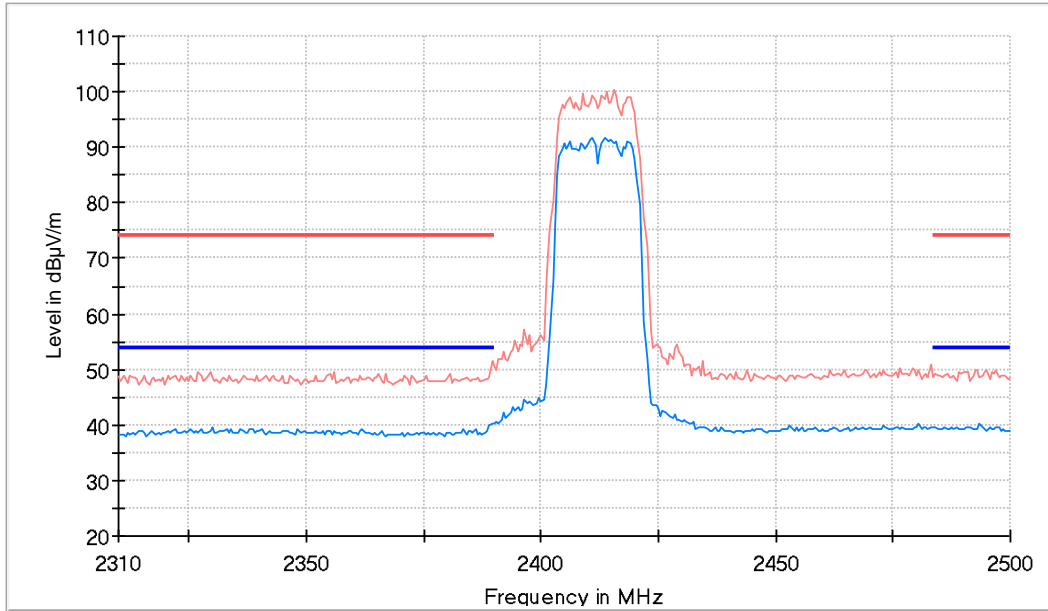


- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19943.500000	49.2	39.6		14.4	54.0
21300.500000	48.5	38.6		15.4	54.0
23865.000000	47.3	37.4		16.6	54.0

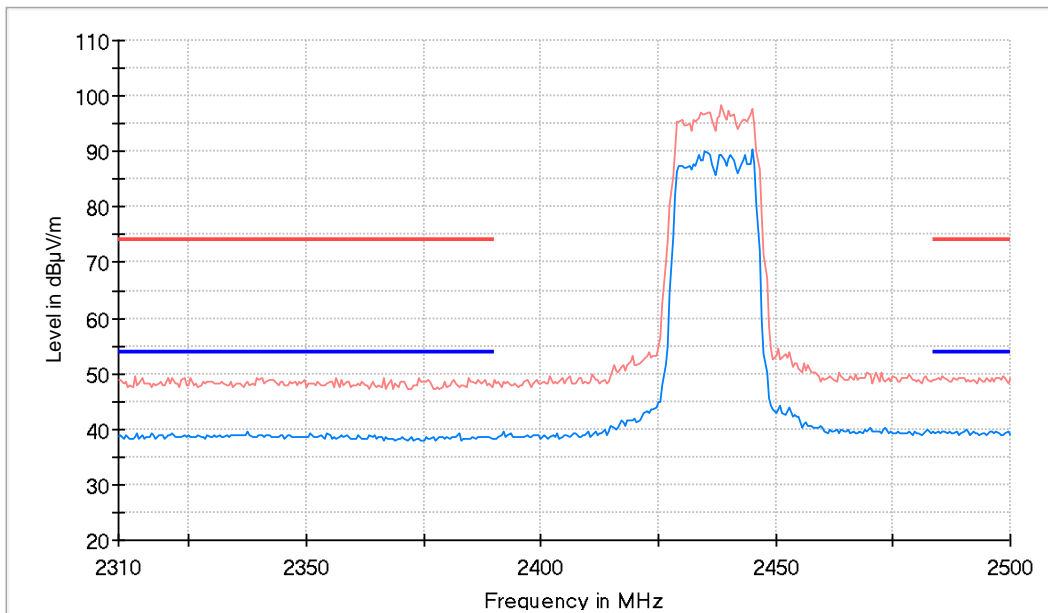
Restricted Bands (2.31 GHz - 2.5 GHz)

Lowest Channel



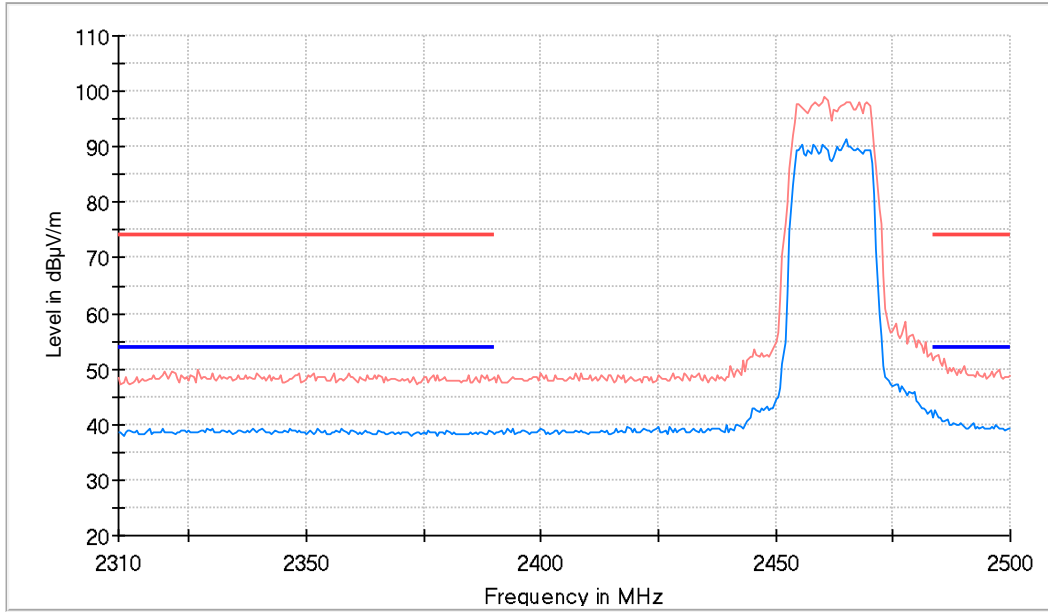
- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Middle Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Highest Channel



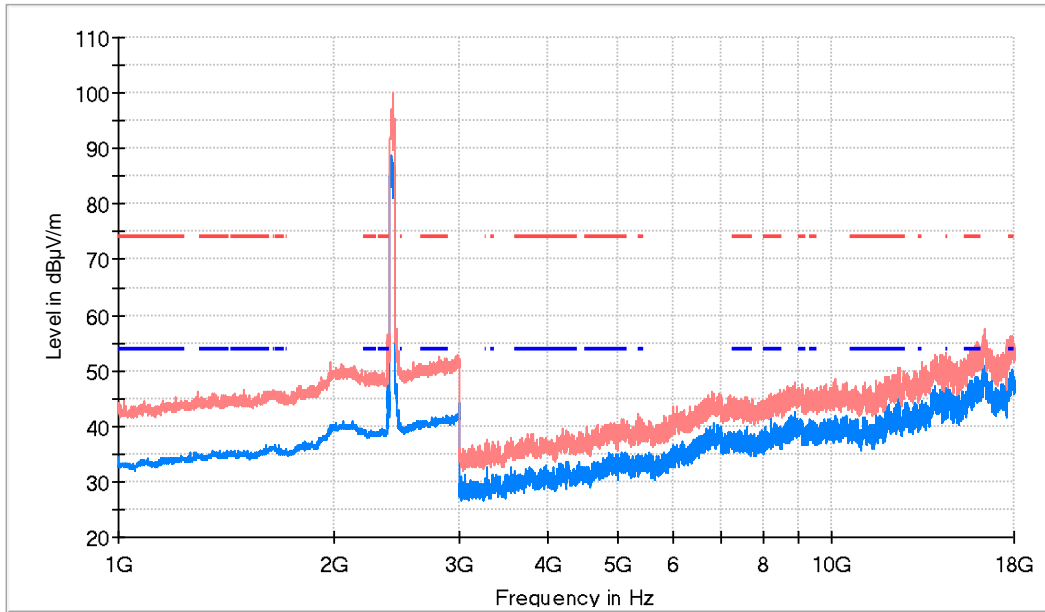
- AVG_MAXH
- PK+ MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Modulation: 802.11ax HE40

Results

Frequency range 1 - 18 GHz

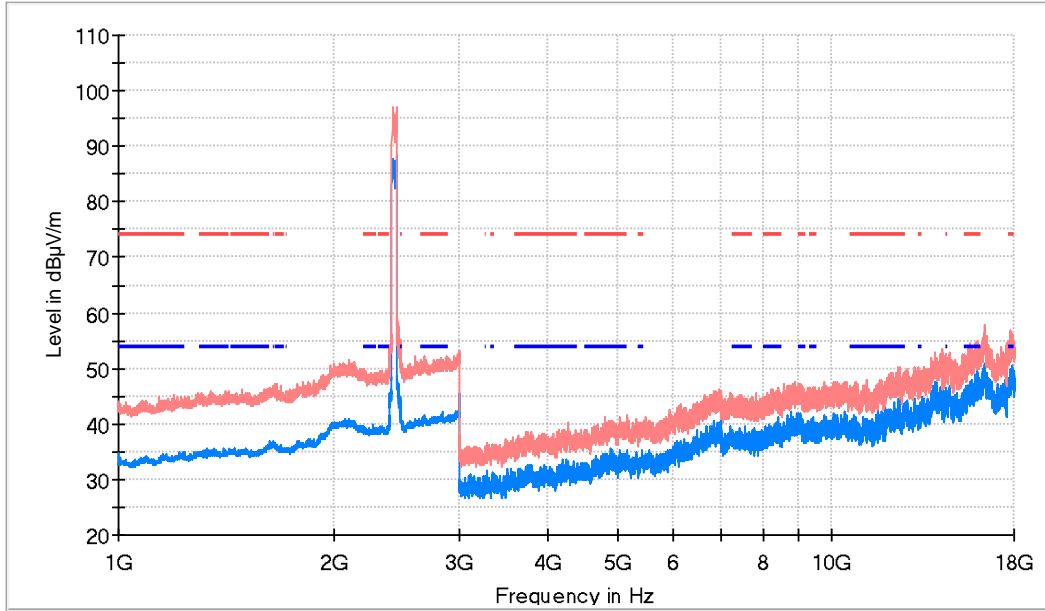
Lowest Channel



- AVG_MAXH
- PK+_MAXH
- - - TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- - - TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2418.000000	95.1	88.6	H	---	---	Fundamental
2814.000000	52.4	40.9	V	13.1	54.0	
16008.500000	55.1	48.3	H	5.7	54.0	
17847.000000	54.3	50.3	H	3.7	54.0	

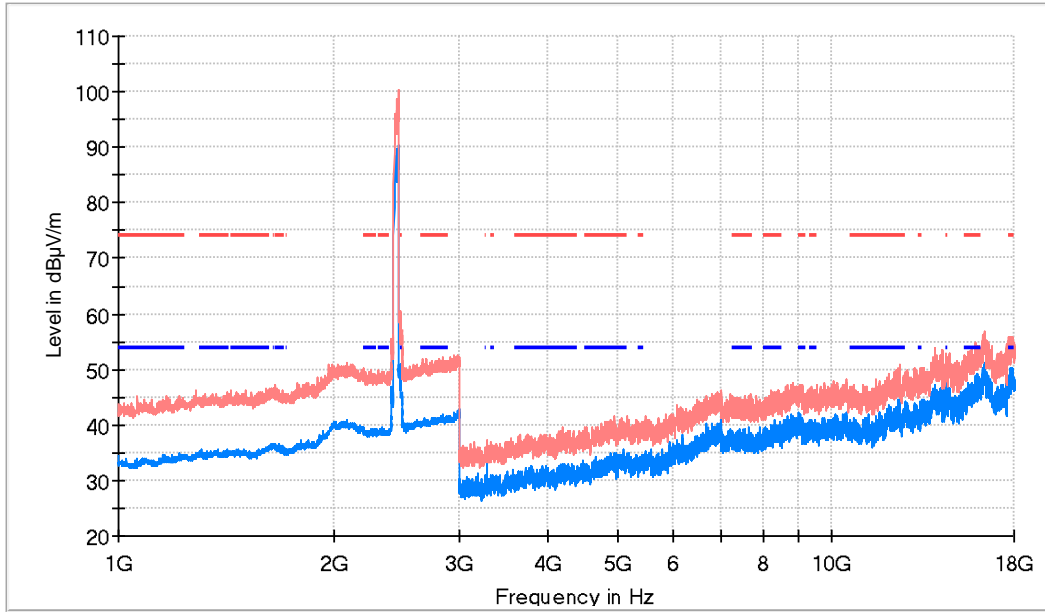
Middle Channel



- AVG_MAXH
- PK+_MAXH
- - - TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- - - TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2451.500000	96.3	88.4	H	---	---	Fundamental
2886.000000	52.1	41.0	V	13.0	54.0	
15992.000000	53.8	49.5	V	4.5	54.0	
17853.000000	55.0	50.5	H	3.5	54.0	

Highest Channel

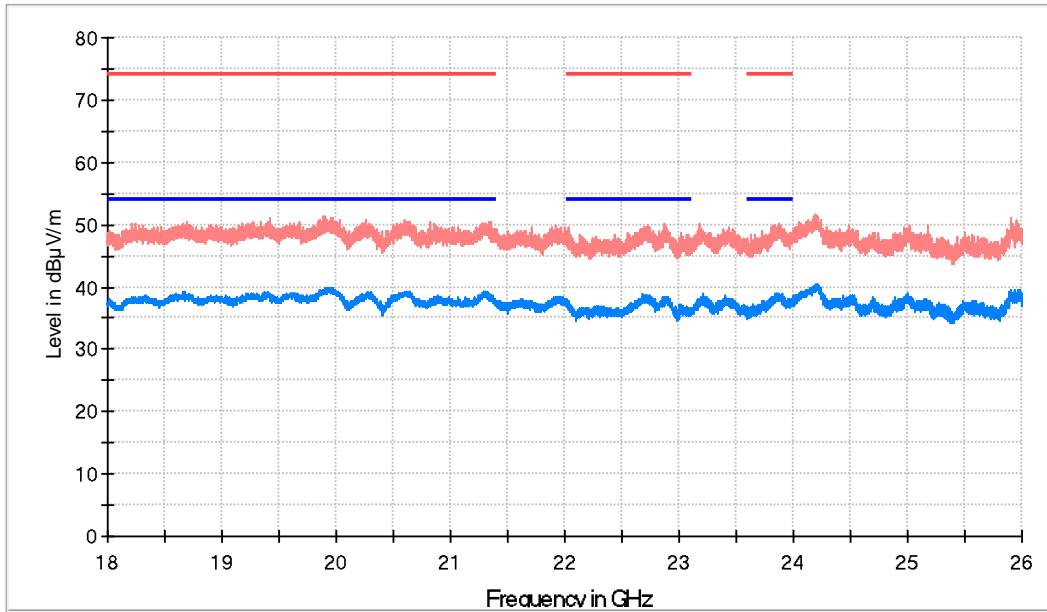


- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2458.500000	97.2	89.8	H	---	---	Fundamental
2846.500000	50.6	41.8	H	12.2	54.0	
16007.000000	52.4	49.2	H	4.8	54.0	
17925.500000	53.4	50.3	V	3.7	54.0	

Frequency range 18 - 26 GHz

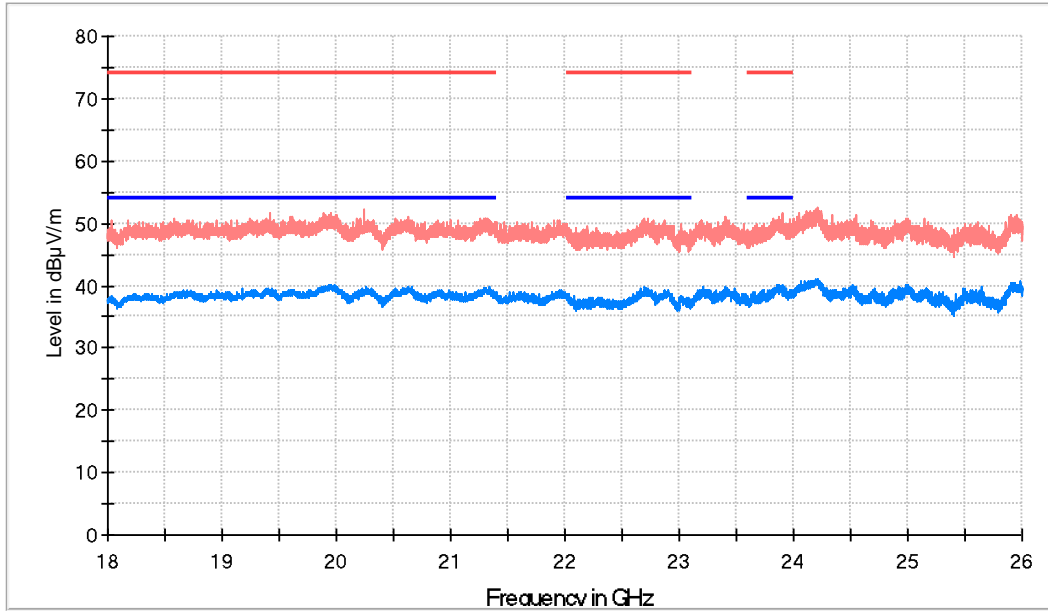
Lowest Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	PoI	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19945.500000	50.7	40.0		14.0	54.0
21307.000000	49.2	39.4		14.6	54.0
23907.000000	48.8	38.9		15.1	54.0

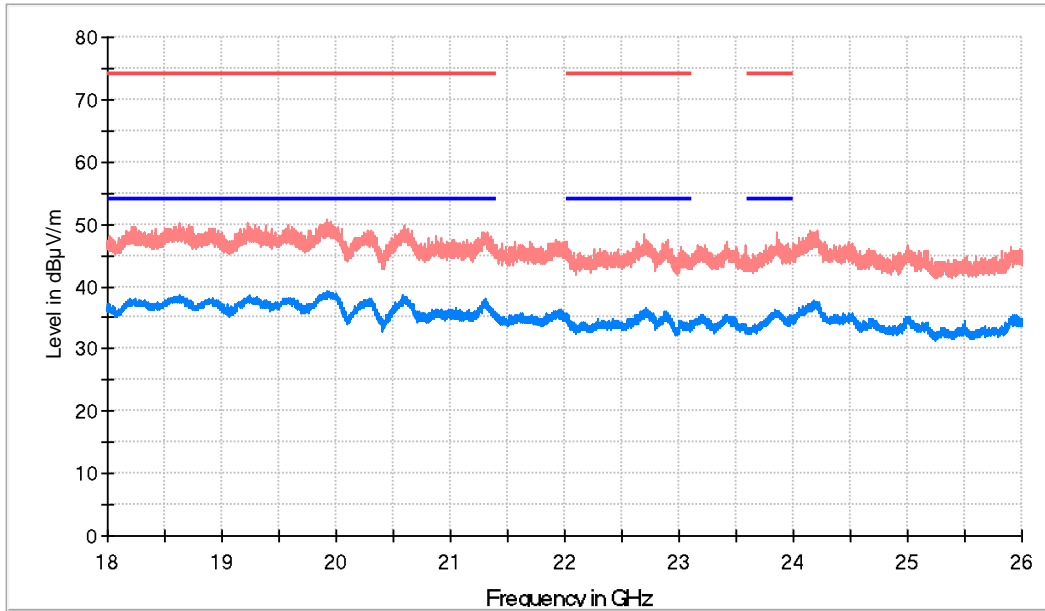
Middle Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19940.500000	50.4	40.3		13.7	54.0
22701.500000	49.6	39.8		14.2	54.0
23871.500000	50.8	40.1		13.9	54.0

Highest Channel

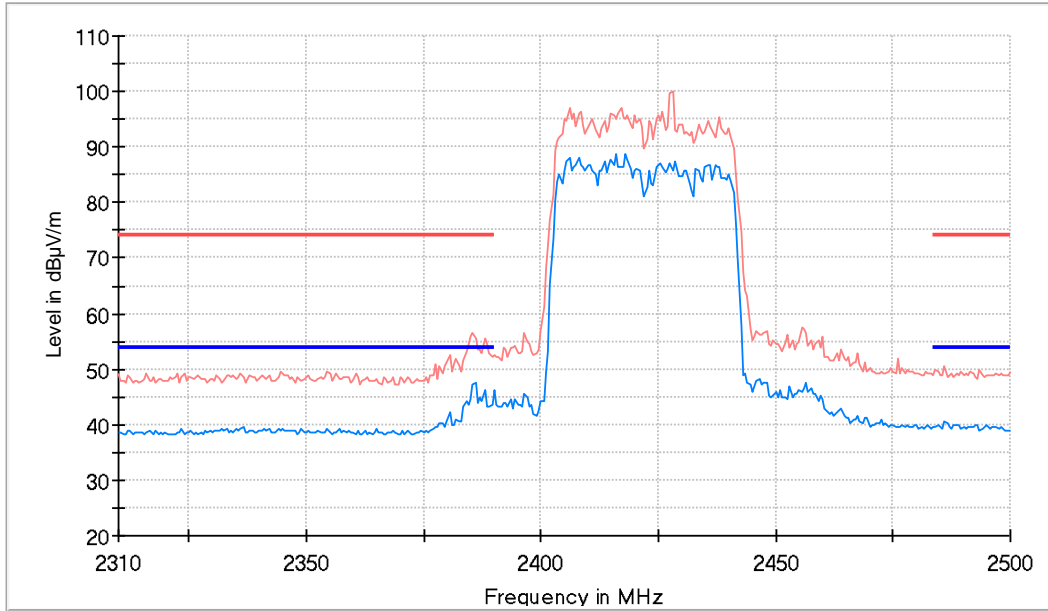


- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19943.500000	48.8	39.2		14.8	54.0
21310.500000	47.8	38.2		15.8	54.0
23833.500000	46.0	36.2		17.8	54.0

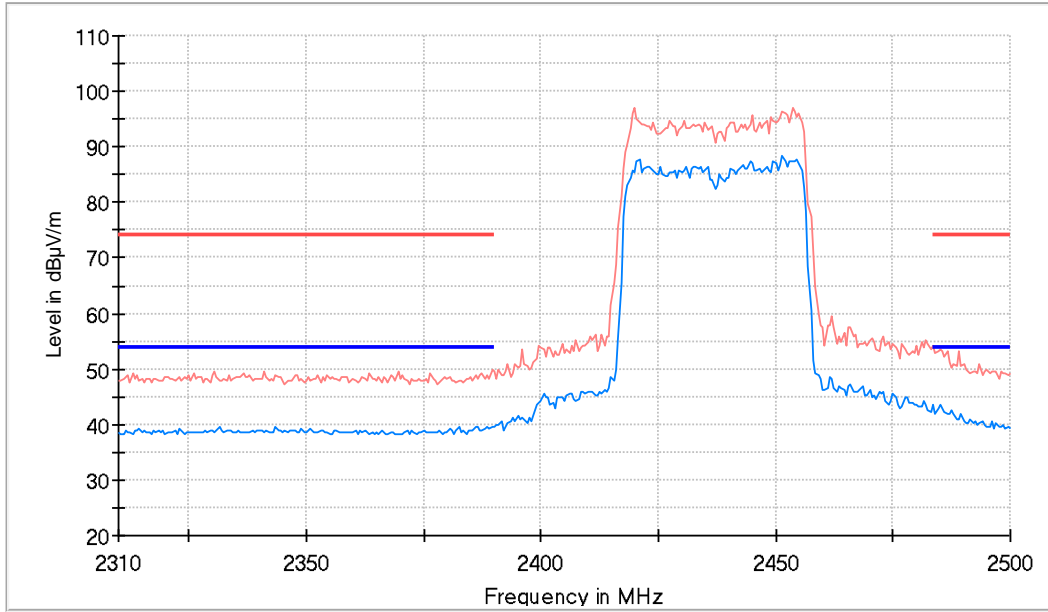
Restricted Bands (2.31 GHz - 2.5 GHz)

Lowest Channel



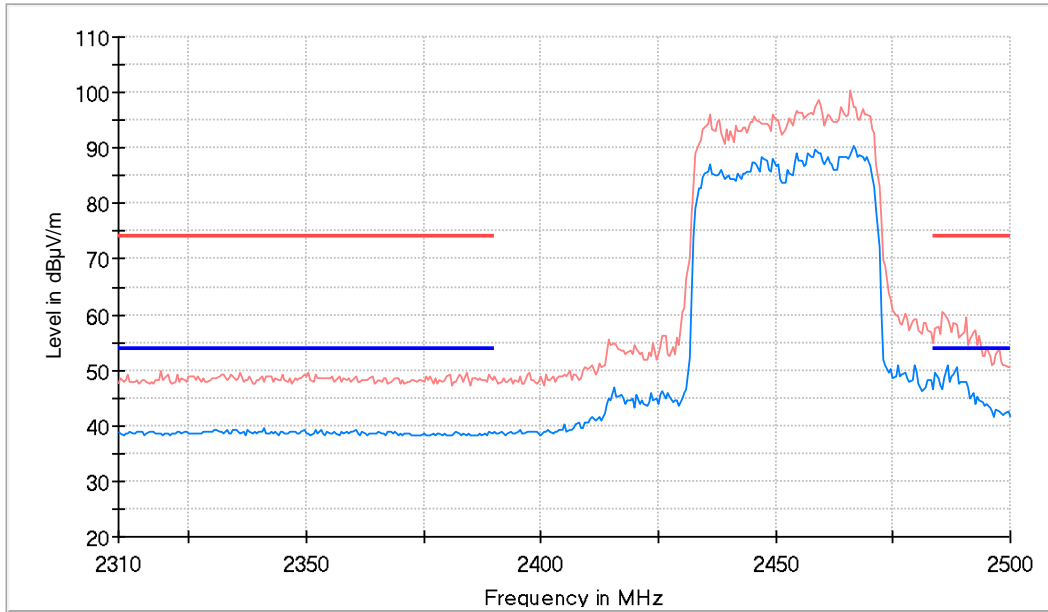
- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Middle Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Highest Channel



- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit