



FCC LISTED, REGISTRATION
NUMBER: 2764.01

ISED LISTED REGISTRATION
NUMBER: 23595-1

Test Report No:

3956ERM.003

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	Display Audio Infotainment Unit 10"TP
(*) Trademark	Visteon
(*) Model and /or type reference	VW MIB Regio
Other identification of the product	VW C4 HW version: 02 SW version: 0700 FCC ID: NT8-VWMIBREGIO IC ID: 3043A-VWMIBREGIO
(*) Features	Bluetooth EDR 2,4 GHz, Version 4.2 Audio BT streaming music, control and browsing Wireless 2,4 GHz and 5 GHz bands GNSS Receiver - GLONASS, GPS AM/FM single tuner, Seek, Scan and Manual Tuning Bluetooth EDR 2,4 GHz, Version 4.2
Manufacturer	VISTEON CORPORATION One Village Center Drive, Van Buren Township, MI 48111, 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	IN COMPLIANCE
Approved by (name / position & signature)	Domingo Galvez EMC&RF Lab Manager
Date of issue	06-02-2023
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.

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The results presented in this Test Report apply only to the 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.
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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	5150-5850	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:

- Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").
- The sample consists of VW MIB Regio is a Display Audio Infotainment Unit with capacitive 10" TP touch screen with following functionalities:
 - USB 3.0/USB Video, USB Video, USB Hub
 - Bluetooth EDR 2,4 GHz, Version 4.2
 - Audio BT streaming music, control and browsing
 - Wireless 2,4 GHz and 5 GHz bands
 - GNSS Receiver - GLONASS, GPS
 - AM/FM single tuner, Seek, Scan and Manual Tuning
 - Smartphone integration (Apple Car Play and Android Auto), Capability to run local APPs, e-Call.

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 undergoing test have been selected by: The client.

Sample S/01 is composed of the following elements, accessories and auxiliary equipment:

Id	Control Number	Description	Manufacturer / Model	Serial N°	Date of Reception	Application
S/01	3956/10	Infotainment Unit 10"	Visteon / VW MIB Regio - VW	VWZ7Z2B2200063	2023-01-04	Element Under Test
S/01	2501/24	Harness Cable	Visteon	-	2020-02-24	Accessory
S/01	2501/33	Fakra - USB Cable	-	-	2020-02-24	Accessory

1. Sample S/01, was used for the following test(s): All Conducted tests indicated in appendix A.

Sample S/02 is composed of the following elements, accessories and auxiliary equipment:

Id	Control Number	Description	Manufacturer / Model	Serial N°	Date of Reception	Application
S/02	3956/07	Infotainment Unit 10"	Visteon / VW MIB Regio - VW	VWZ7Z2B2200063	2023-01-04	Element Under Test
S/02	2501/18	Harness	Visteon	-	2020-02-24	Accessory
S/02	2501/36	Fakra - USB Cable	-	-	2020-02-24	Accessory
S/02	3492/38	Antenna (GNSS & FM/AM tune)	ASK / 6C0.035.501.G 5FQ	02S UA7PL	2020-02-24	Accessory

1. Sample S/02, was used for the following test(s): All Radiated tests indicated in appendix A.

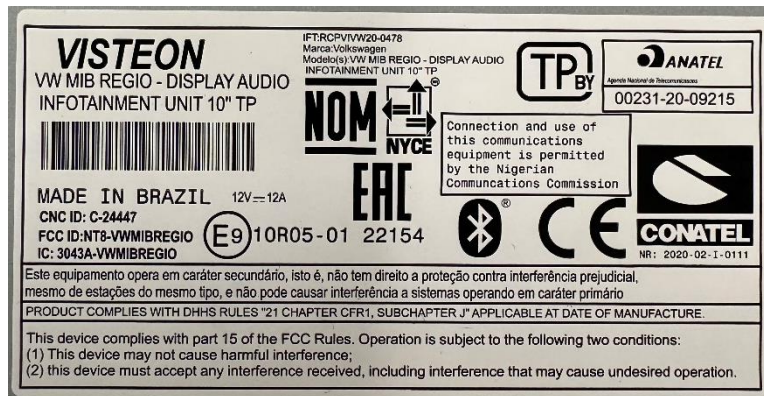
Test sample description

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		
	AM/FM Antenna connector (FAKRA)	1.5	☐	☐	☐		
	GPS Antenna Connector (FAKRA)	0.1	☐	☐	☐		
	USB Video port	0.1	☐	☐	☐		
	USB 3.0	0.1	☐	☐	☐		
Main connector			☐	☐	☐		
Supplementary information to the ports..... :	No Data Provided						
Rated power supply :	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	☐	AC:	☐	☐	☐	☐	☐
	☐	AC:	☐	☐	☐	☐	☐
	☒	DC: 13.5 V (vehicle battery)					
☐	DC:						
Rated Power..... :	Current in sleep mode: less than 300 µA Current in normal mode: 3 A Maximum current in normal mode						
Clock frequencies..... :	LVDS/TFT: 76,8 MHz LPDDR4: 1,333 GHz eMMC: 197 MHz						
Other parameters..... :	No Data Provided						
Software version..... :	SW 0700						
Hardware version..... :	HW 02						
Dimensions (W x H x D)..... :	VW MIB Regio India Dimensions: 269,80 mm x 153,9 mm x 130,72 mm Weight: 1,680 kg						
Mounting position..... :	☐	Tabletop equipment					
	☐	Wall/Ceiling mounted equipment					
	☐	Floor standing equipment					
	☐	Hand-held equipment					
	☒	Other: Built into vehicle					
Modules/parts..... :	Module/parts of test item	Type		Manufacturer			
	No Data Provided						
Accessories (not part of the test item)..... :	Description	Type		Manufacturer			
	AM/FM/GPS Antenna						
	SMA connector						

	USB cable		
	Harnesses		
Documents as provided by the applicant	Description	File name	Issue date
	Declaration Equipment Data	FDT30_18 Declaration Equipment Data_rev1	04/10/2023

Copy of marking plate:



Identification of the client

Visteon Corporation
One Village Center Drive,
Van Buren Township, MI 48111
USA

Testing period and place

Test Location	DEKRA Certification Inc.
Date (start)	04-27-2023
Date (finish)	05-12-2023

Document history

Report number	Date	Description
3956ERM.003	06-02-2023	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 %

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

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 75 %

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 %

Remarks and comments

The tests have been performed by the technical personnel: Lakshmi Gollamudi, Juliana Cherry, Qi Zhang and Koji Nishimoto.

List of equipment used during the test

FCC 47 CFR Part 15.247 / RSS-247

Conducted Measurements

CONTROL NUMBER	DESCRIPTION	Serial No	LAST CALIBRATION	NEXT CALIBRATION
897	Power supply (AMETEK / PROG-DC-PS)	1707A01906	N/A	N/A
710	WIFI R&S CMW500 Tester	151743	2020-07-01	2023-07-01
1039	FSV40 Signal Analyzer 40GHz	101627	2022-11-01	2024-11-01
1042	SMBV 100A Vector Signal Generator	262575	2022-03-16	2024-03-16
1107	Ethernet SNMP Thermometer- RF1 Room	60038026952	2022-10-18	2024-10-18
1313	Wireless Measurement Software R&S EMC32	-	N/A	N/A

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
1055	3115 Double-Ridged Waveguide Horn Antenna 1-18 GHz	211394	2023-02-06	2026-02-06
1057	3115 Double-Ridged Waveguide Horn Antenna 1-18 GHz	211373	2020-06-03	2023-06-03
1065	3142E Biconilog Antenna	208587	2020-08-13	2023-08-13
1108	Ethernet SNMP Thermometer- CR Room	60038026954	2022-10-18	2024-10-18
1111	Ethernet SNMP Thermometer- SAC	60038026577	2022-10-18	2024-10-18
1179	Semi anechoic Absorber Lined Chamber	F169021	N/A	N/A
1314	Wireless Measurement Software R&S EMC32	1040-OT102236	N/A	N/A
1461	Low Noise Preamplifier (0.1-18GHz)	BLMA0118-4A	2022-06-01	2024-06-01

Testing verdicts

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

Summary

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
FCC 2.1049 / 99dBw Occupied Channel Bandwidth 99%		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
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Conducted		N/A	Refer 2
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Radiated		P	N/A
Supplementary information and remarks: - Test not evaluated for this partial testing report (variant of 2501BERM.007) - Device has internal antenna			

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
FCC 2.1049 / Occupied Channel Bandwidth 99%		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) (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
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Conducted		N/A	Refer 2
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Radiated		P	N/A
Supplementary information and remarks: - Test not evaluated for this partial testing report (variant of 2501BERM.007) - Device has internal antenna			

Appendix A: Test results

Appendix A

APPENDIX A.1: TEST RESULTS. BLUETOOTH EDR.....13

APPENDIX A.2: TEST RESULTS. WI-FI 2.4GHZ.....49

Appendix A.1: Test results. Bluetooth EDR

Appendix A.1

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PRODUCT INFORMATION

The following information is provided by the supplier

Information	Description
Modulation	GFSK, $\pi/4$ -DQPSK, 8-DPSK
Operation mode 1:	
Operating Frequency Range	2402 – 2480 MHz
Nominal Channel Bandwidth	1 MHz
RF Output Power	5.4 dBm
Antenna type	Internal Antenna
Antenna gain	-4 dBi
Nominal Voltage	
- Supply Voltage	13.5 Vdc
- Type of power source	DC power supply
Equipment type	Bluetooth Classic

TEST CONDITIONS

(*): Data provided by the client.

TEST CONDITIONS	DESCRIPTION
TC/01	<u>Power supply (V):</u> V_{nominal}: 13.5 Vdc <u>Temperature:</u> T_{nominal}: +15 to +35 °C <u>Modulation:</u> GFSK <u>Test Frequencies for conducted/Radiated tests:</u> Lowest channel: 2402 MHz Middle channel: 2441 MHz Highest channel: 2480 MHz
TC/02	<u>Power supply (V):</u> V_{nominal}: 13.5 Vdc <u>Temperature:</u> T_{nominal}: +15 to +35 °C <u>Modulation:</u> π/4-DQPSK <u>Test Frequencies for Conducted/Radiated tests:</u> Lowest channel: 2402 MHz Middle channel: 2441 MHz Highest channel: 2480 MHz
TC/03	<u>Power supply (V):</u> V_{nominal}: 13.5 Vdc <u>Temperature:</u> T_{nominal}: +15 to +35 °C <u>Modulation:</u> 8-DPSK <u>Test Frequencies for Conducted/Radiated tests:</u> Lowest channel: 2402 MHz Middle channel: 2441 MHz Highest channel: 2480 MHz

TEST CASES DETAILS

RSS-247 5.4 (b) / FCC 15.247 (b) (1) - Maximum Peak Conducted output power & 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). (Part 15 Subpart C §15.247). The e.i.r.p. shall not exceed 4 W (RSS-247).

Sample ID: S/01
Maximum declared antenna gain: -4.0 dBi

Modulation: BT (GFSK 1-DH5)

Results

Freq (MHz)	Peak Power (dBm)	Maximum EIRP power (dBm)
2402.00000	3.9	-0.1
2441.00000	4.3	0.3
2480.00000	5.1	1.1

Modulation: BT (Π/4 DQPSK 2-DH5)

Results

Freq (MHz)	Peak Power (dBm)	Maximum EIRP power (dBm)
2402.00000	3.5	-0.5
2441.00000	4.8	0.8
2480.00000	5.3	1.3

Modulation: BT (8DPSK 3-DH5)

Results

Freq (MHz)	Peak Power (dBm)	Maximum EIRP power (dBm)
2402.00000	3.3	-0.7
2441.00000	4.4	0.4
2480.00000	5.5	1.5

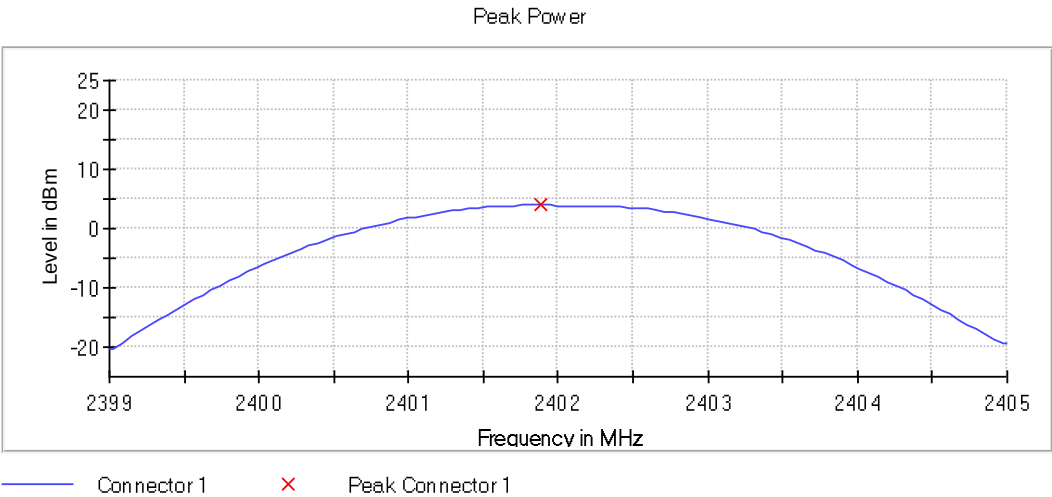
Verdict

Pass

Attachments

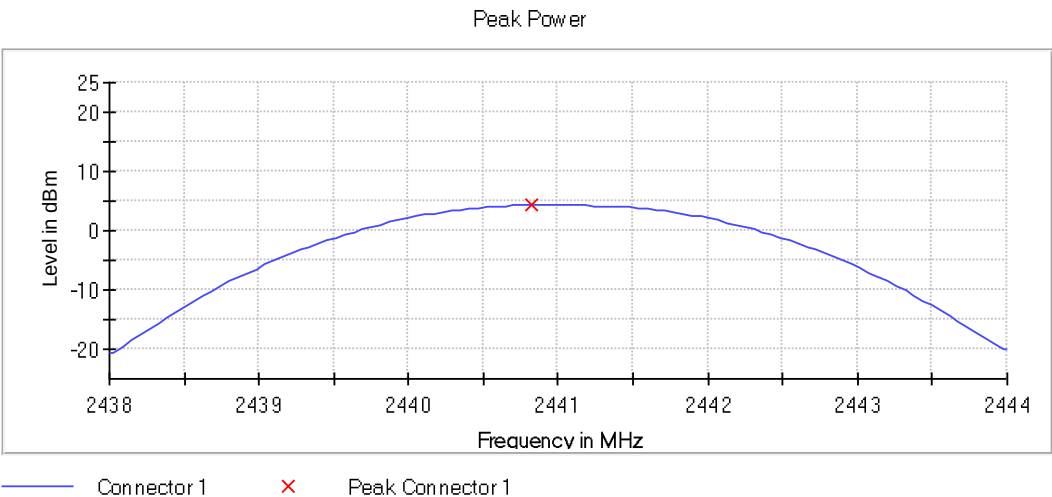
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Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5),

Images:



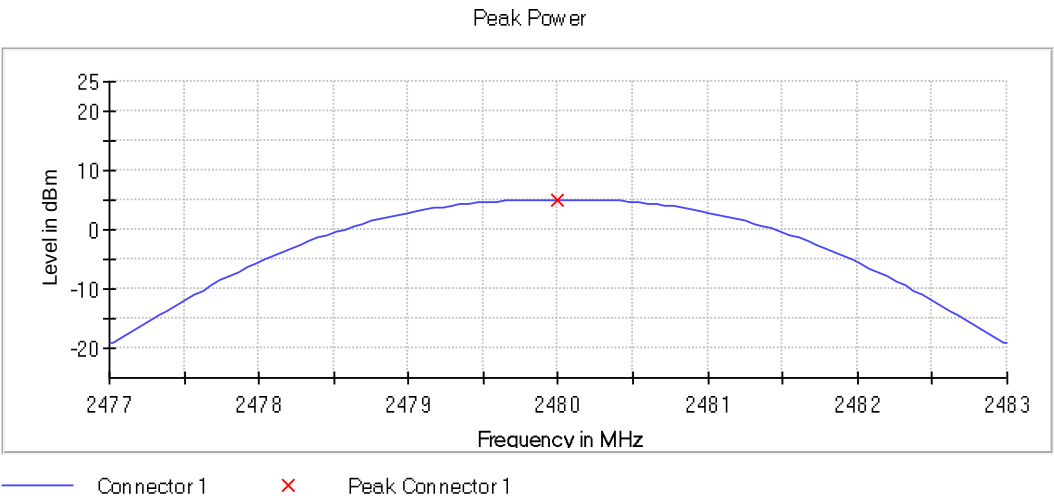
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Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5),

Images:



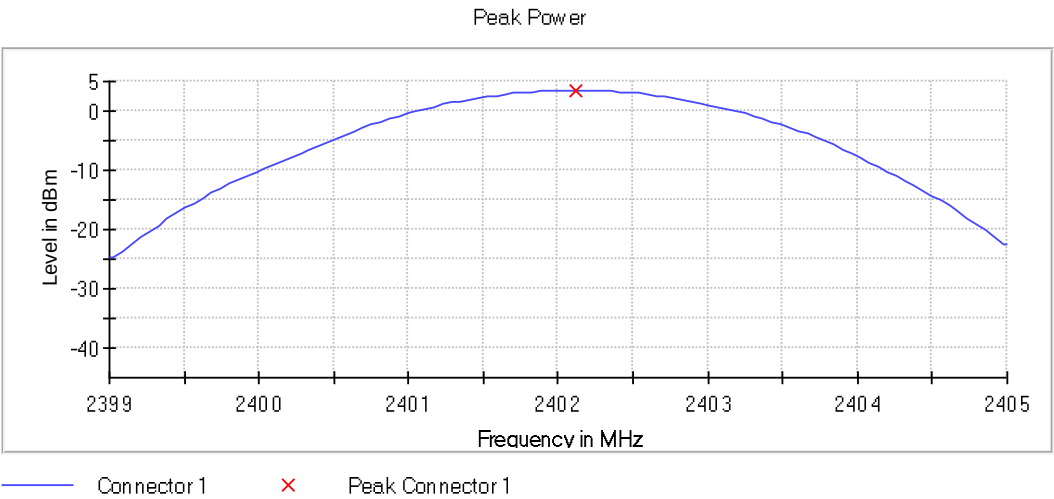
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Bandwidth MHz = 1, Modulation = BT (GFSK 1-DH5),

Images:



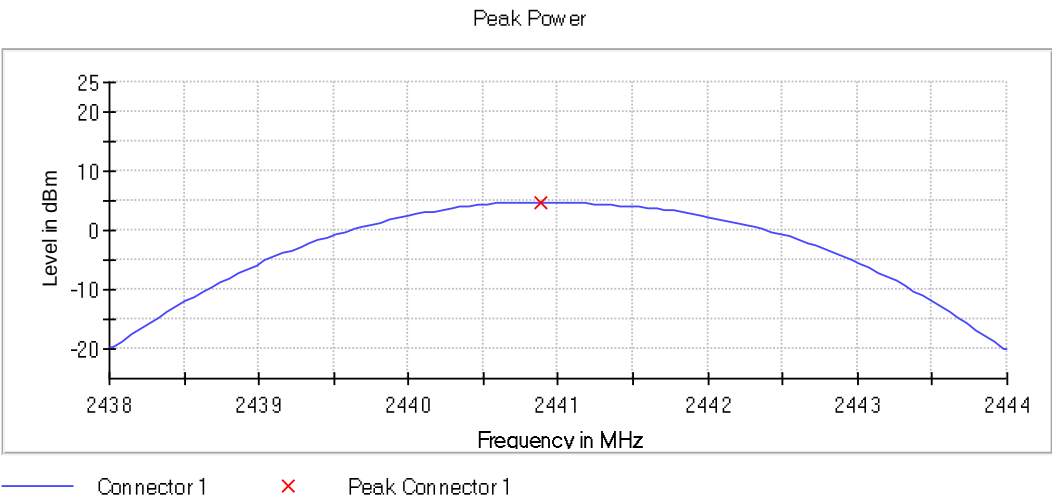
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT ($\pi/4$ DQPSK 2-DH5),

Images:



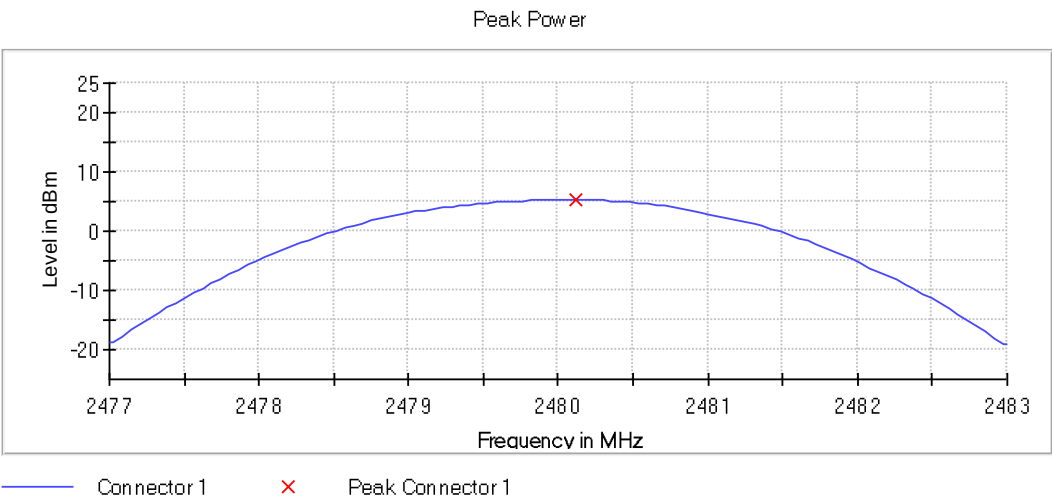
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT ($\pi/4$ DQPSK 2-DH5),

Images:



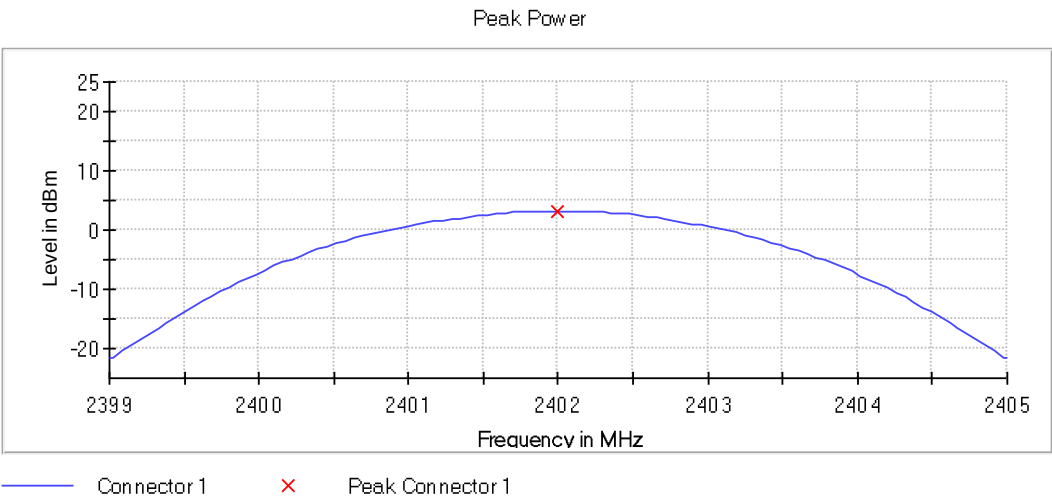
Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT ($\pi/4$ DQPSK 2-DH5),

Images:



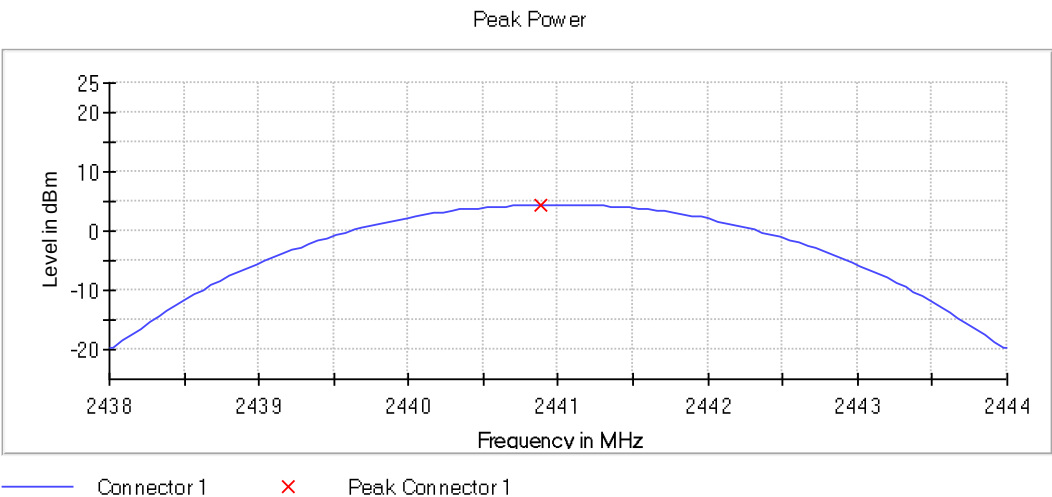
Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5),

Images:



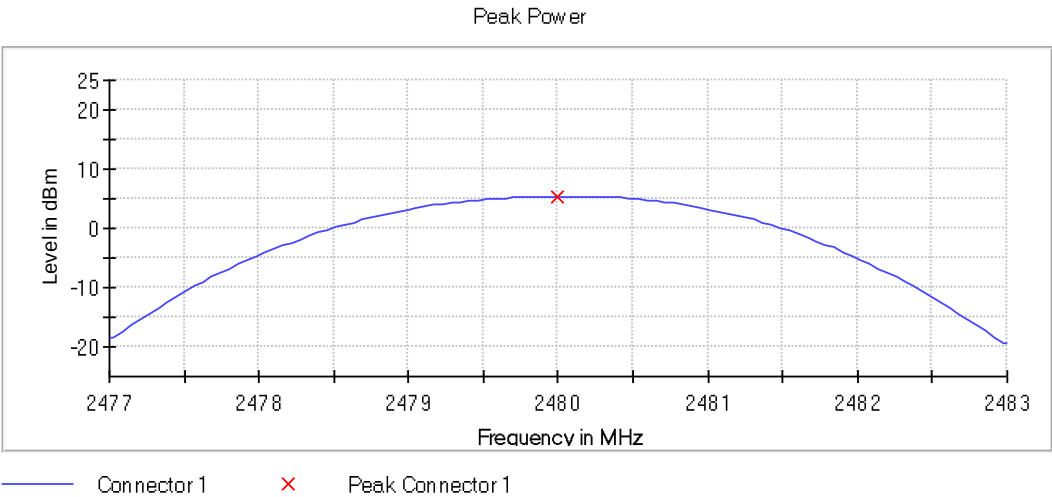
Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5),

Images:



Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Bandwidth MHz = 1, Modulation = BT (8DPSK 3-DH5),

Images:



Spectrum Analyzer Parameters

Setting	Instrument Value
Start Frequency	2.39900 GHz
Stop Frequency	2.40500 GHz
Span	6.000 MHz
RBW	2.000 MHz
VBW	10.000 MHz
Sweep Points	101
Sweep time	953.450 ns
Reference Level	10.000 dBm
Attenuation	30.000 dB
Detector	MaxPeak
Sweep Count	100
Filter	3 dB
Trace Mode	Max Hold
Sweep type	FFT
Preamplifier	off
Stable mode	Trace
Stable value	0.50 dB
Run	5 / max. 150
Stable	3 / 3
Max Stable Difference	0.01 dB

RSS-247 5.5 / FCC 15.247 (d) - Emissions compliance (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

The following tables and plots show the results for the worst case

Verdict

Pass

Spurious levels operating (Radiated).

The level of spurious emissions was measured as their effective radiated power when radiated by cabinet and antenna.

Modulation: BT (GFSK DH5)

Sample ID: S/02

The result for worst operation is shown below

Results

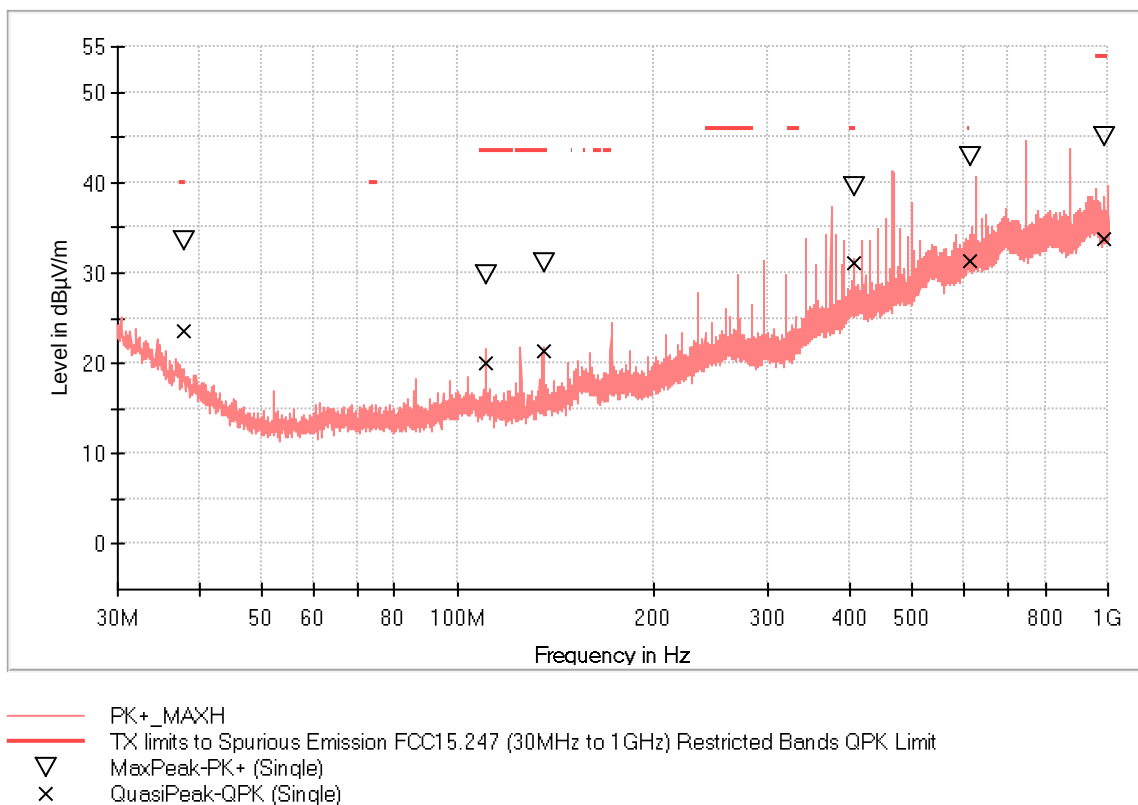
Frequency range 0.03 - 1 GHz

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

Middle Channel

**Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT (GFSK DH5), Frequency Range GHz = [0.03, 1]**

Images:



Frequency (MHz)	MaxPeak (dBμV/m)	QuasiPeak (dBμV/m)	Pol	Margin - QPK (dB)	Limit - QPK (dBμV/m)
37.857000	33.5	23.6	H	16.5	40.0
110.558500	29.8	20.1	V	23.4	43.5
135.196500	31.2	21.3	V	22.2	43.5
405.487000	39.5	31.1	V	14.9	46.0
612.776000	42.9	31.3	H	14.7	46.0
988.263000	44.9	33.7	V	20.4	54.0

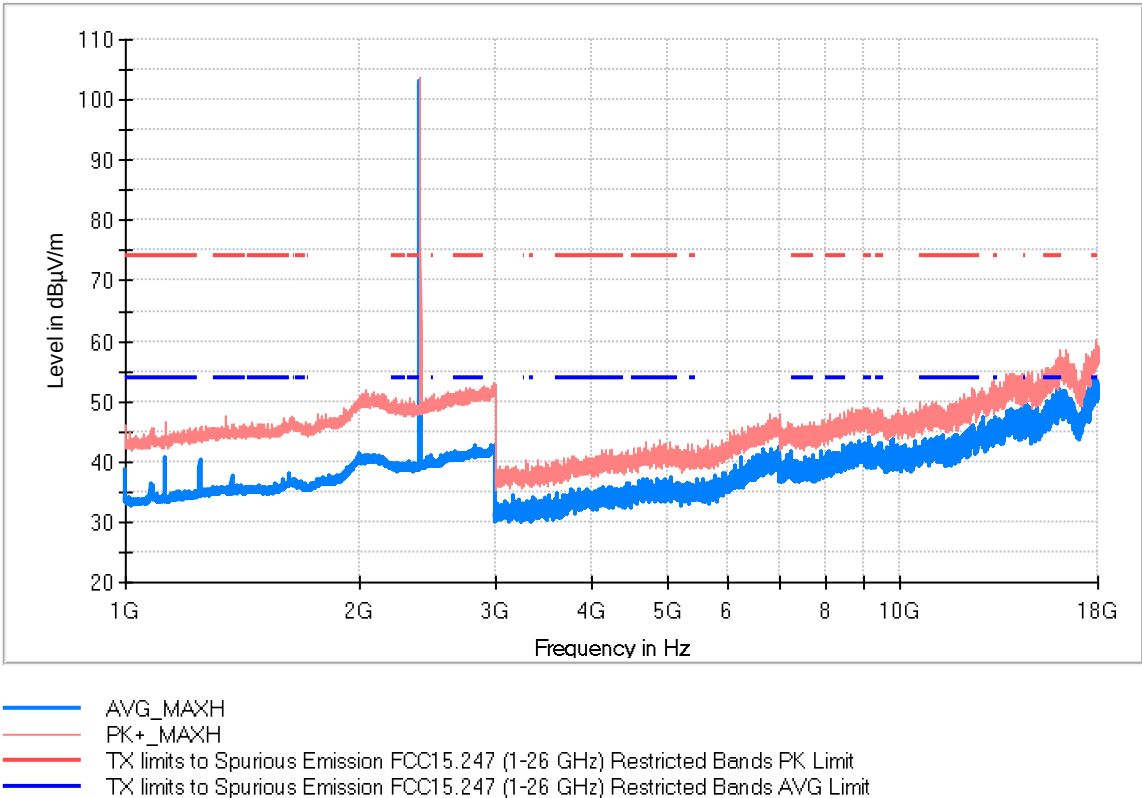
Modulation: BT (GFSK DH5)

Frequency range 1 – 18 GHz

Lowest Channel

Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT (GFSK DH5), Frequency Range GHz = [1, 18]

Images:

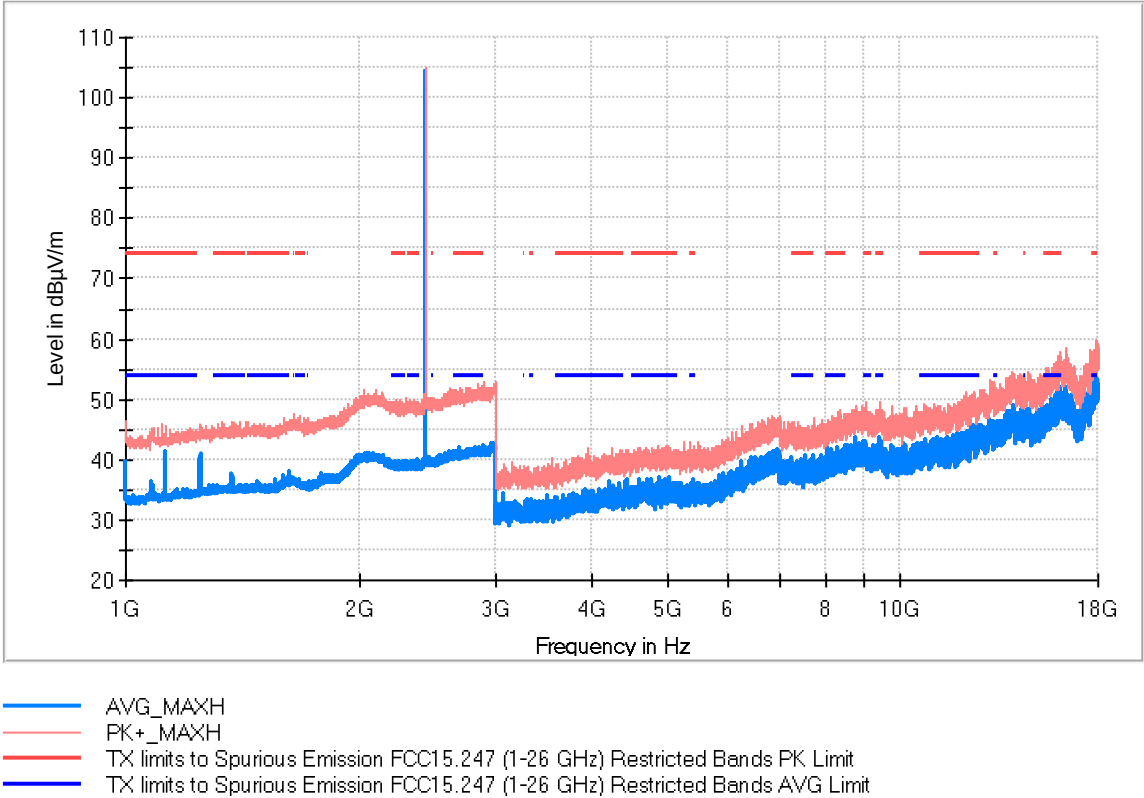


Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
1125.000000	46.6	40.6	V	13.4	54.0	
2402.000000	103.6	103.0	H	---	---	Fundamental
16087.500000	56.7	52.0	H	2.0	54.0	
17938.000000	58.0	53.5	H	0.5	54.0	

Middle Channel

Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT (GFSK DH5), Frequency Range GHz = [1, 18]

Images:

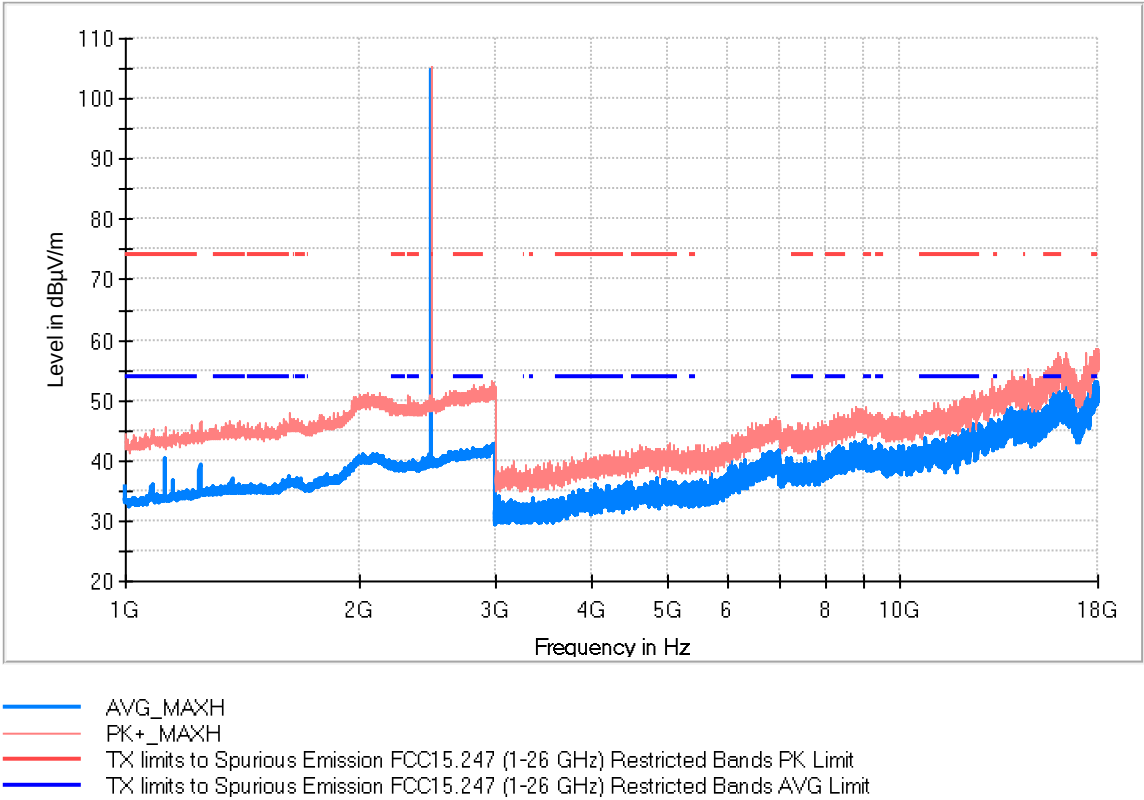


Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
1125.000000	45.5	41.1	V	12.9	54.0	
2441.000000	104.9	104.3	H	---	---	Fundamental
16072.500000	56.8	51.9	H	2.1	54.0	
17959.000000	56.0	53.4	V	0.6	54.0	

Highest Channel

Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT (GFSK DH5), Frequency Range GHz = [1, 18]

Images:



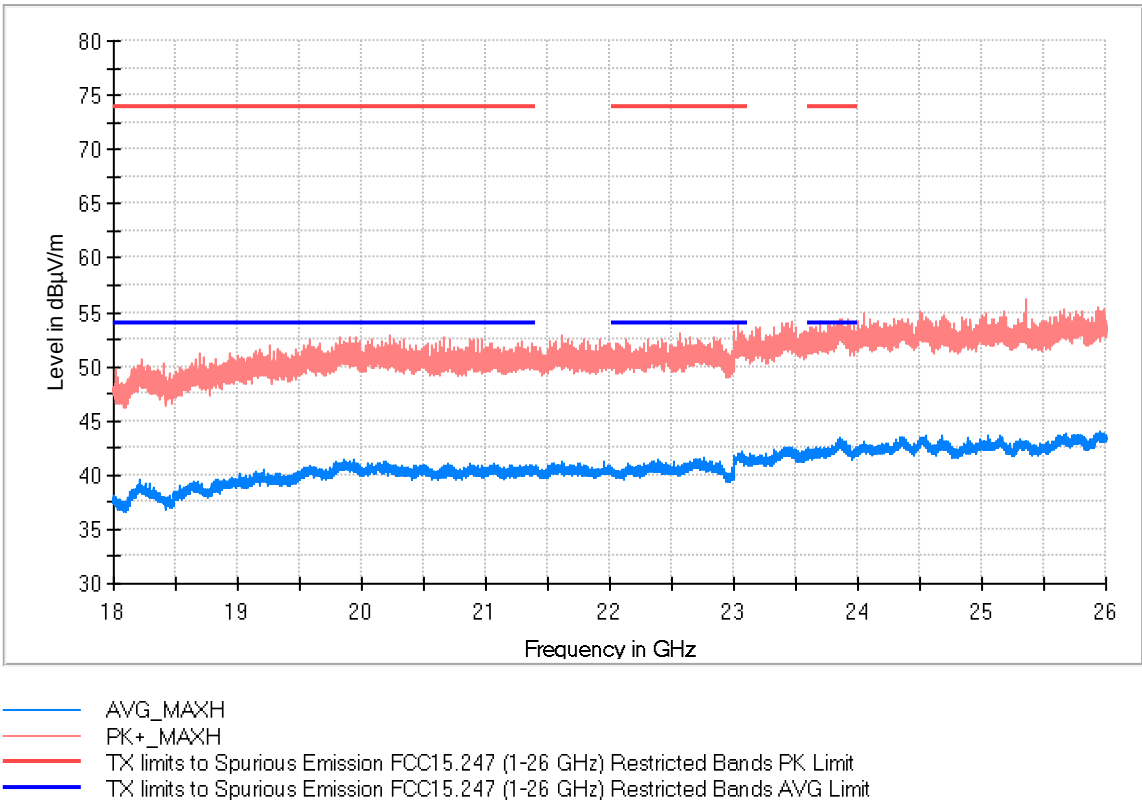
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
1124.500000	45.7	40.4	V	13.6	54.0	
2480.000000	105.4	104.8	H	---	---	Fundamental
16077.000000	57.3	51.3	V	2.7	54.0	
17968.500000	58.6	52.9	V	1.1	54.0	

Frequency range 18 - 26 GHz

Lowest Channel

Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT (GFSK DH5), Frequency Range GHz = [18, 26]

Images:



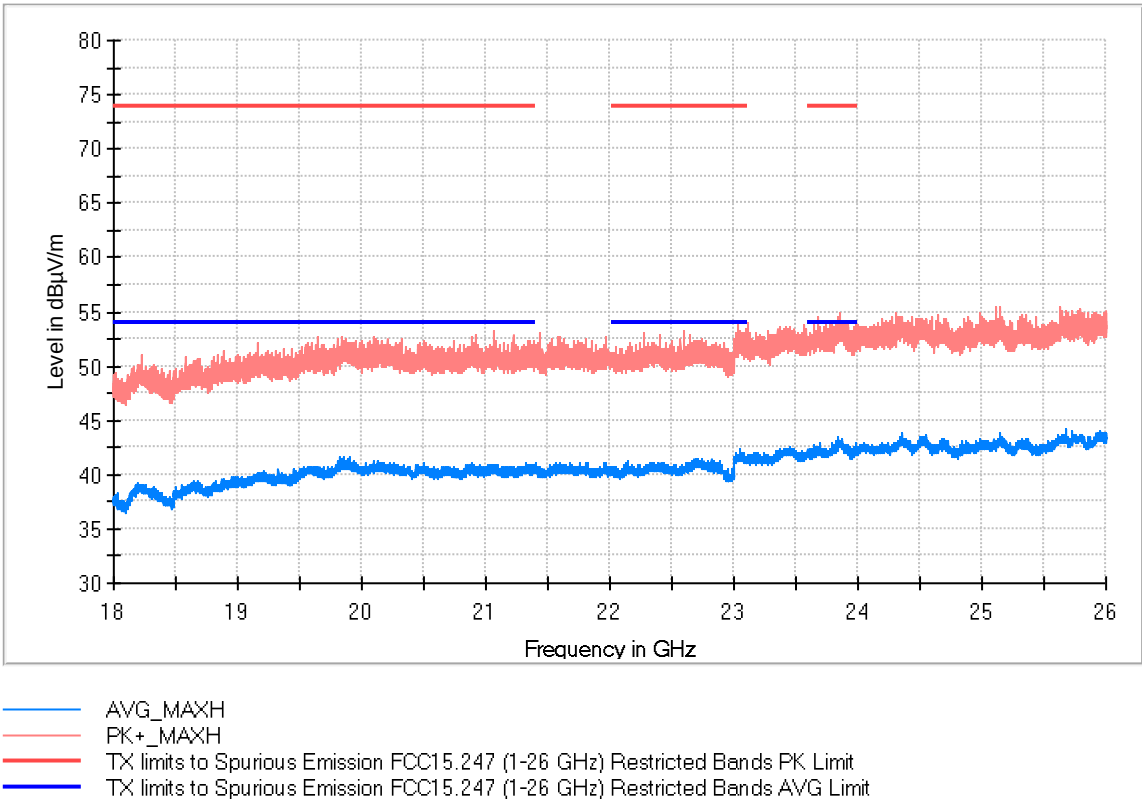
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
20231.000000	53.0	40.7	H	13.3	54.0
23027.000000	53.7	41.6	V	12.4	54.0
23857.000000	54.4	43.0	V	11.0	54.0

Frequency range 18 - 26 GHz

Middle Channel

Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT (GFSK DH5), Frequency Range GHz = [18, 26]

Images:



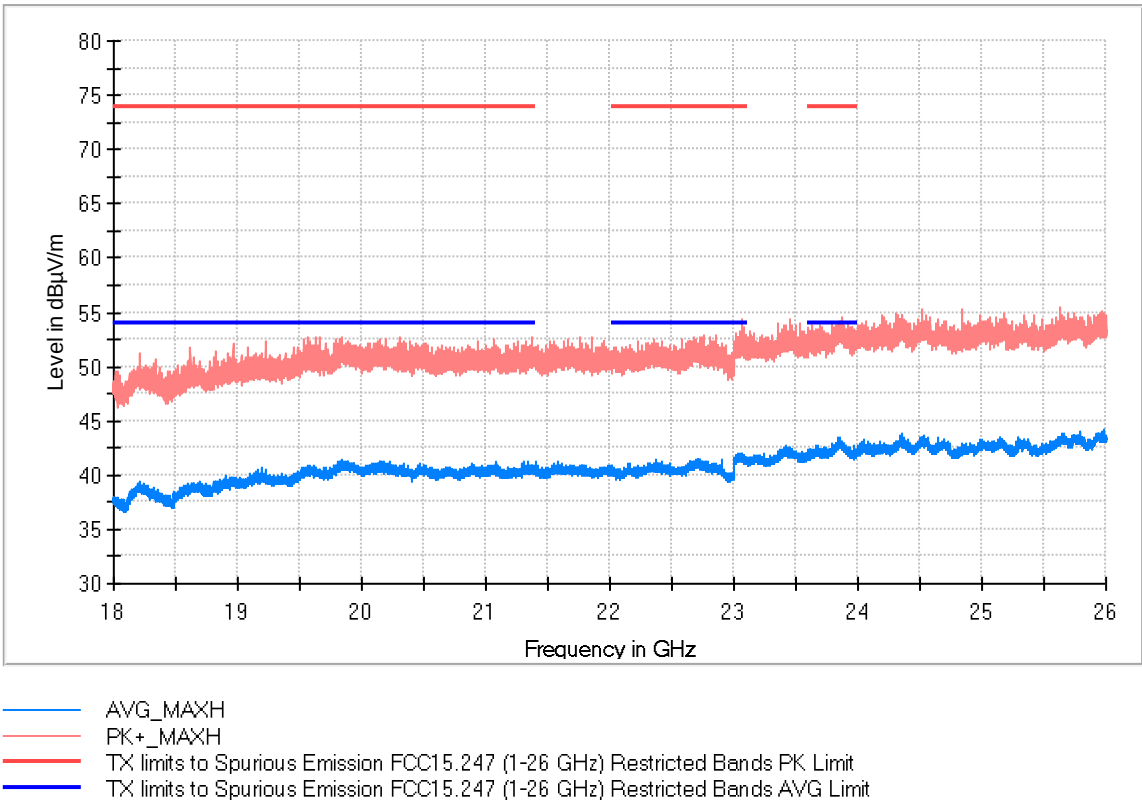
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
21058.000000	53.2	40.8	H	13.2	54.0
23112.000000	53.9	41.3	V	12.7	54.0
23853.000000	54.9	42.7	V	11.3	54.0

Frequency range 18 - 26 GHz

Highest Channel

Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT (GFSK DH5), Frequency Range GHz = [18, 26]

Images:

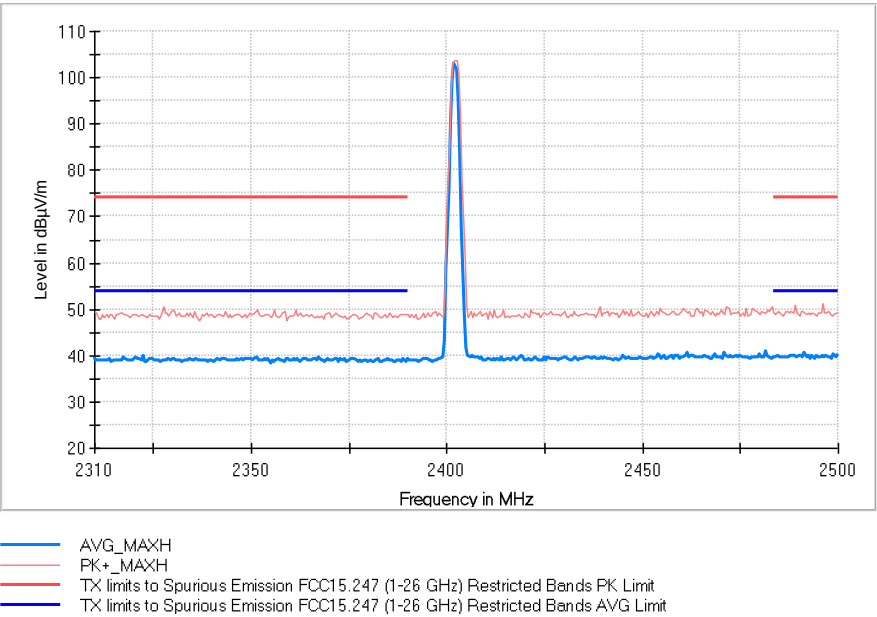


Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19831.000000	51.2	41.4	H	12.6	54.0
23070.000000	52.3	42.0	H	12.0	54.0
23843.000000	52.5	43.5	V	10.5	54.0

Restricted Bands (2.31 GHz - 2.5 GHz)

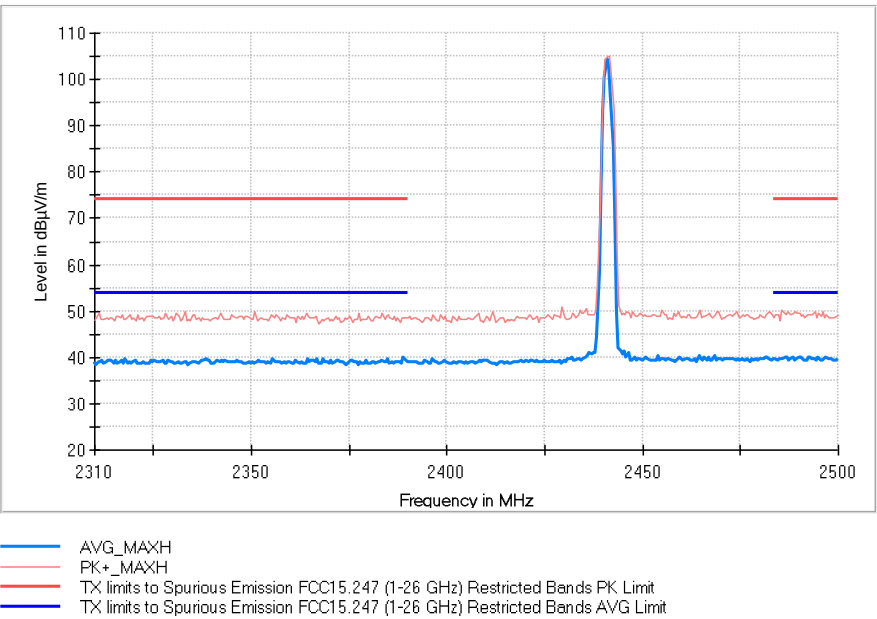
Lowest Channel

Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT (GFSK DH5), Frequency Range GHz = [1, 18]



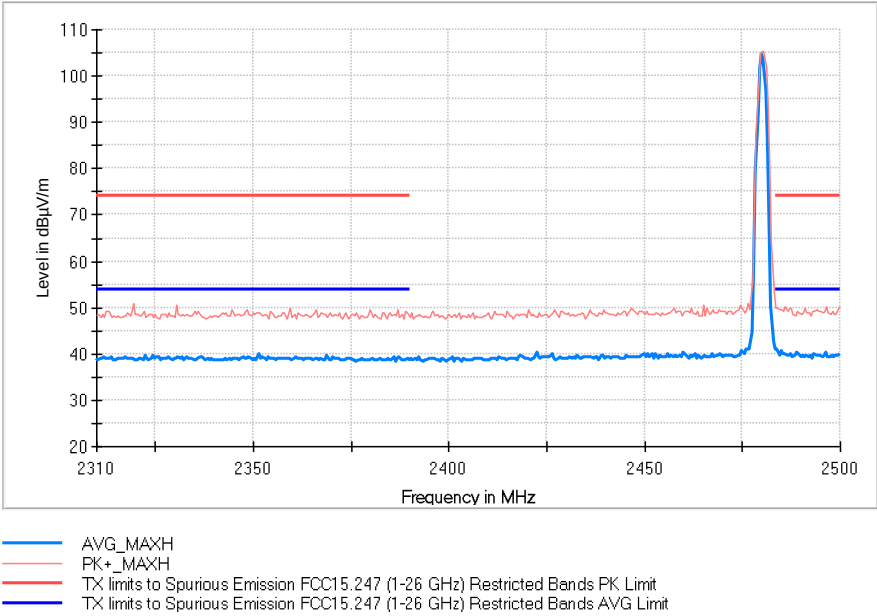
Middle Channel

Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT (GFSK DH5), Frequency Range GHz = [1, 18]



Highest Channel

Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT (GFSK DH5), Frequency Range GHz = [1, 18]



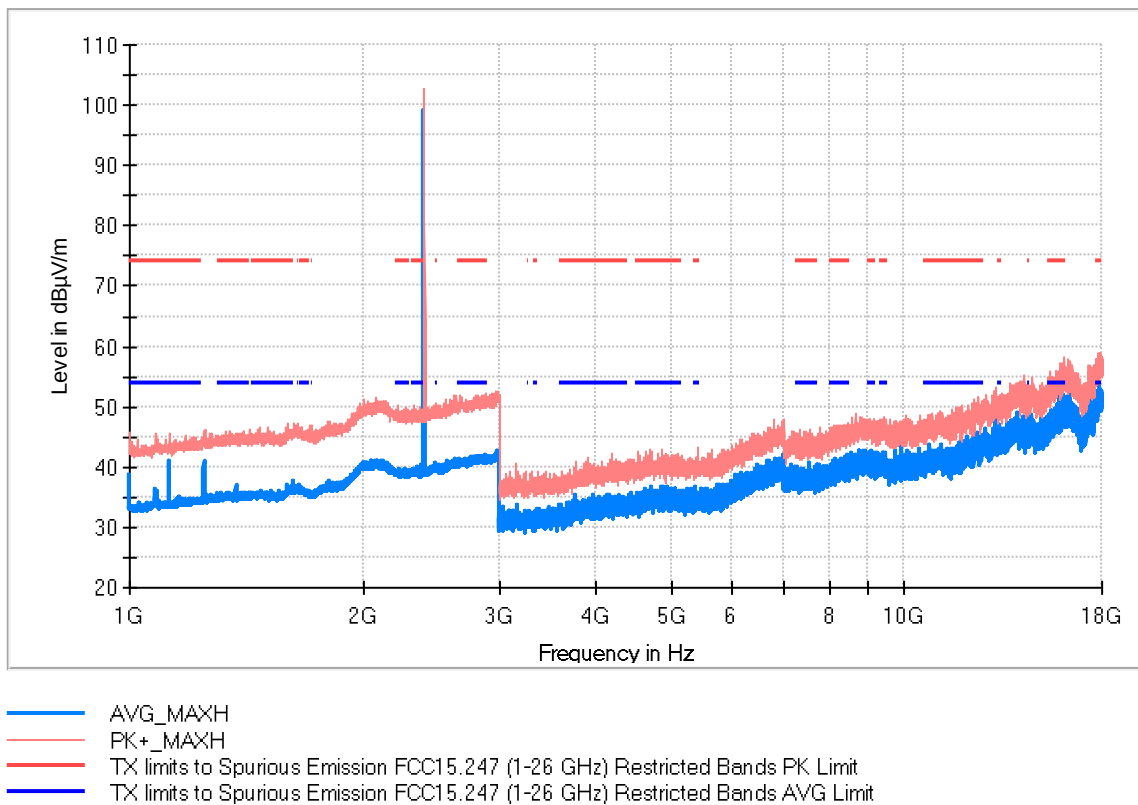
Modulation: BT ($\pi/4$ DQPSK 2-DH5)

Frequency range: 1- 18GHz

Lowest Channel

Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT ($\pi/4$ DQPSK 2-DH5), Frequency Range GHz = [1, 18]

Images:

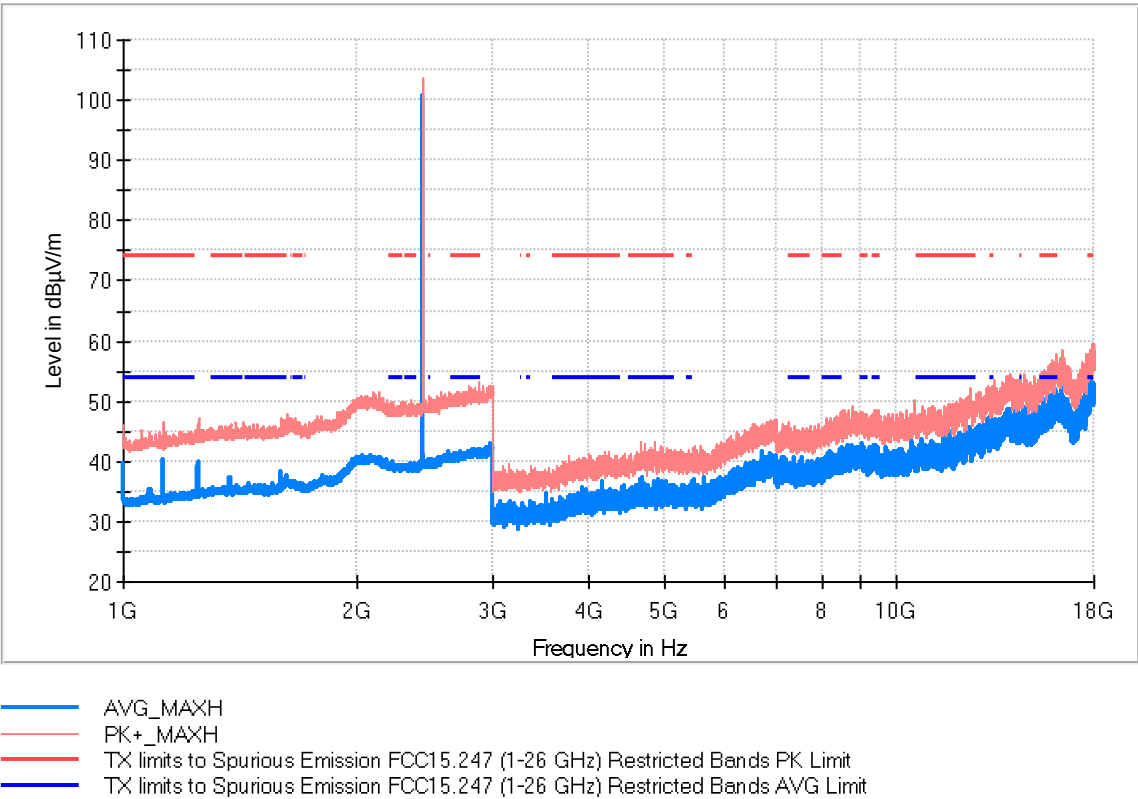


Frequency (MHz)	PK+_MAXH (dB μ V/m)	AVG_MAXH (dB μ V/m)	Pol	Margin - AVG (dB)	Limit - AVG (dB μ V/m)	Comment
1124.500000	45.4	41.0	V	13.0	54.0	
2402.000000	102.7	99.0	H	---	---	Fundamental
15927.000000	54.5	52.2	V	1.8	54.0	
17921.500000	56.7	53.2	H	0.8	54.0	

Middle Channel

Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT ($\pi/4$ DQPSK 2-DH5), Frequency Range GHz = [1, 18]

Images:

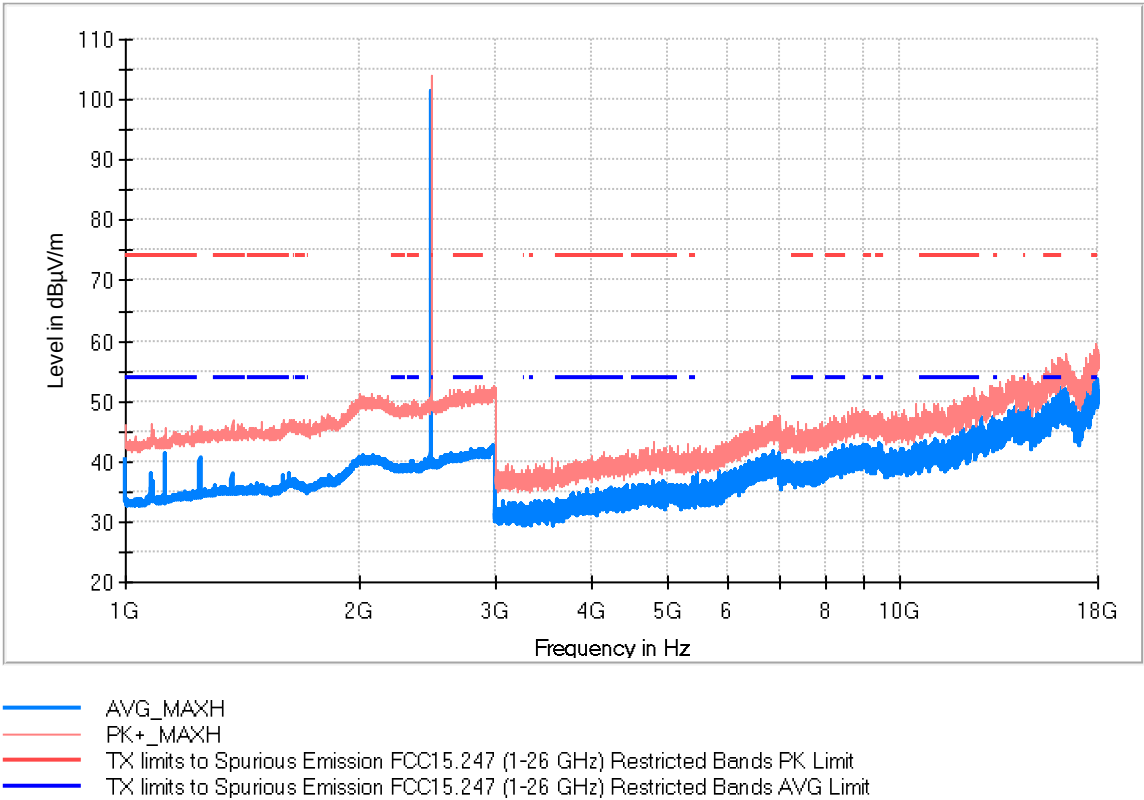


Frequency (MHz)	PK+_MAXH (dBμV/m)	AVG_MAXH (dBμV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBμV/m)	Comment
1125.000000	46.5	40.1	V	13.9	54.0	
2441.000000	103.4	100.6	H	---	---	Fundamental
16085.000000	57.8	50.6	V	3.4	54.0	
17920.000000	57.2	53.3	H	0.7	54.0	

Highest Channel

Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT ($\pi/4$ DQPSK 2-DH5), Frequency Range GHz = [1, 18]

Images:



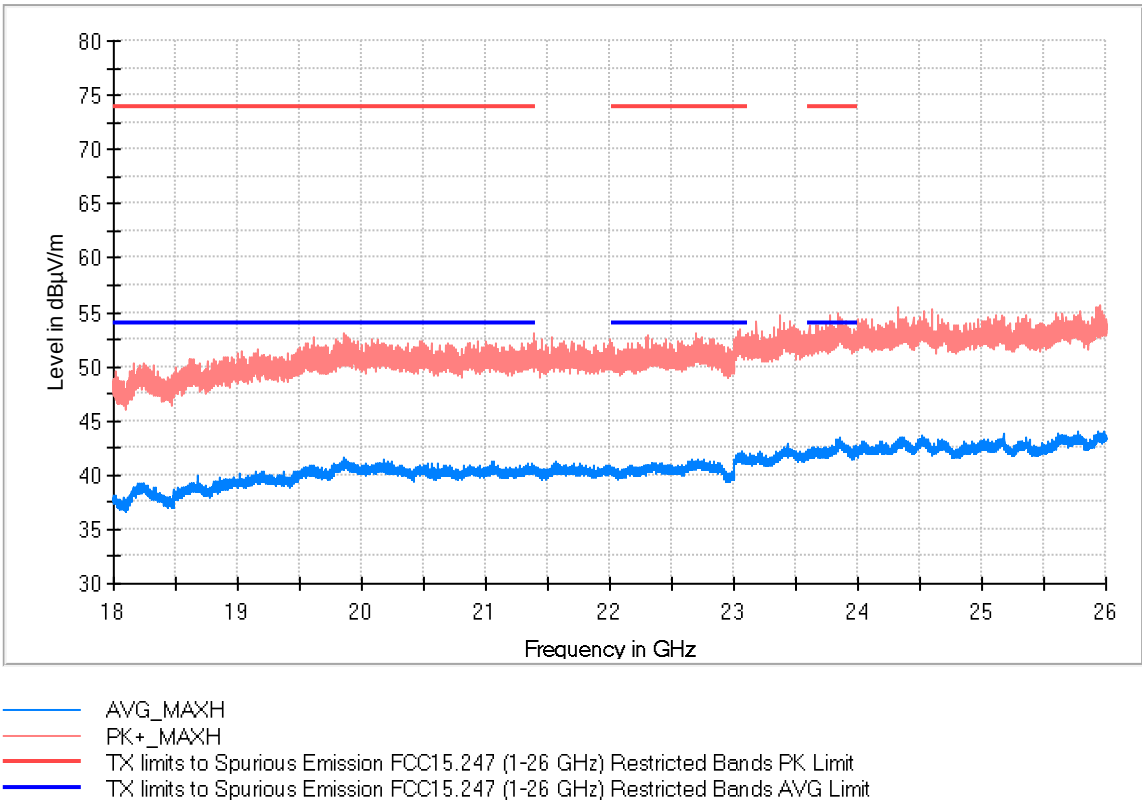
Frequency (MHz)	PK+_MAXH (dBμV/m)	AVG_MAXH (dBμV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBμV/m)	Comment
1124.500000	45.7	40.8	V	13.2	54.0	
2480.000000	104.2	101.4	H	---	---	Fundamental
16116.500000	54.7	52.1	H	1.9	54.0	
17933.000000	57.8	53.8	H	0.2	54.0	

Frequency range: 18- 26GHz

Lowest Channel

Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT ($\pi/4$ DQPSK 2-DH5), Frequency Range GHz = [18, 26]

Images:



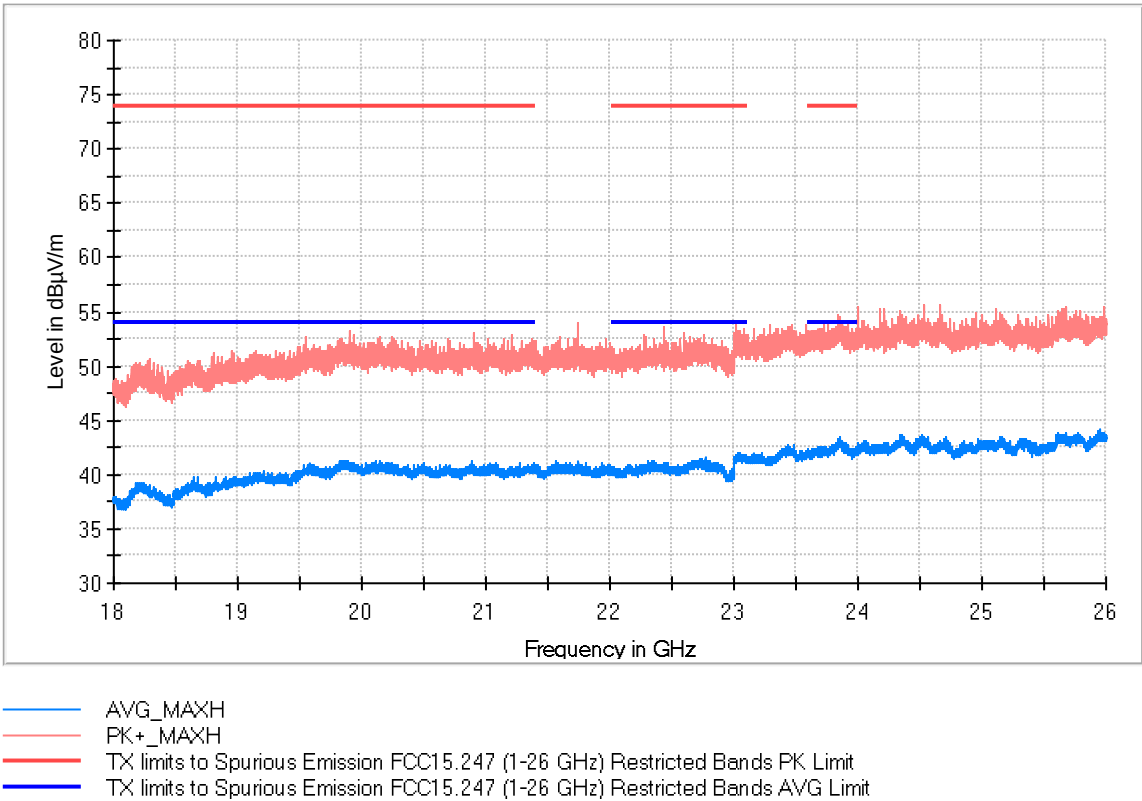
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
18674.000000	48.6	40.0	V	14.0	54.0
22695.500000	53.0	40.9	H	13.1	54.0
23834.500000	54.9	42.8	V	11.2	54.0

Frequency range 18 - 26 GHz

Middle Channel

Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT ($\pi/4$ DQPSK 2-DH5), Frequency Range GHz = [18, 26]

Images:



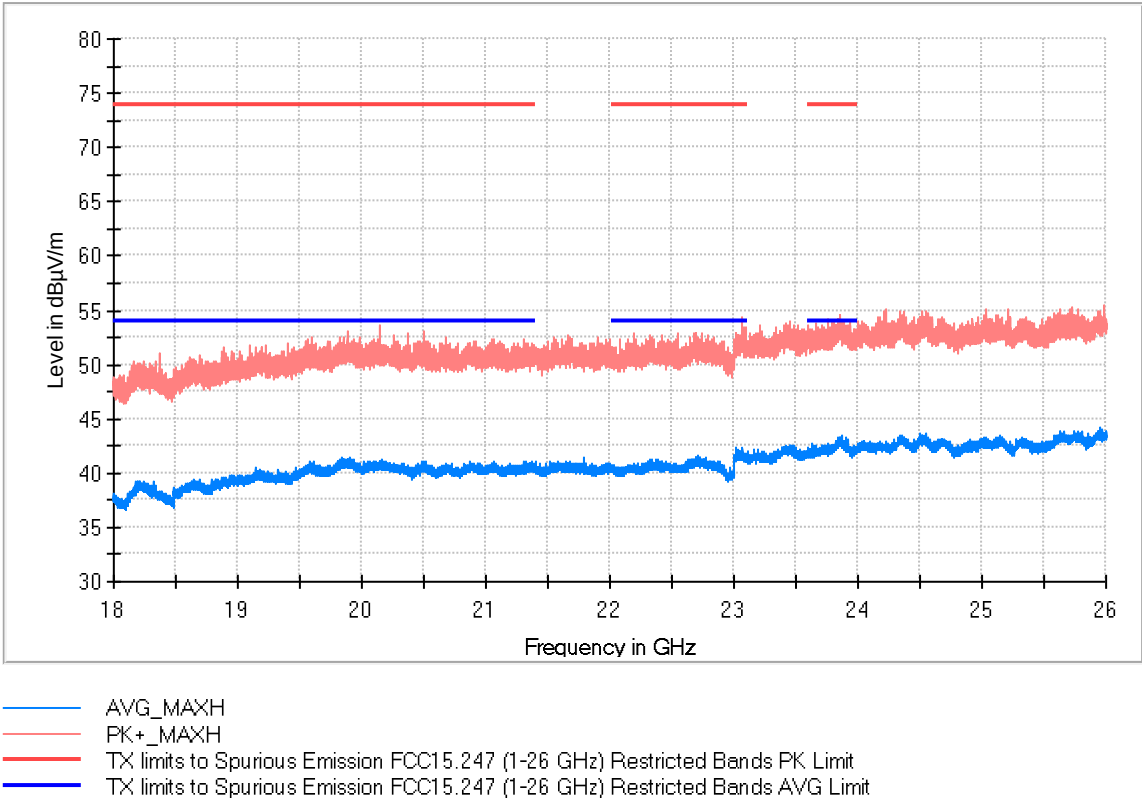
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19909.500000	53.3	40.6	H	13.4	54.0
22270.500000	53.0	40.2	H	13.8	54.0
23995.500000	55.4	41.9	H	12.1	54.0

Frequency range 18 - 26 GHz

Highest Channel

Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT ($\pi/4$ DQPSK 2-DH5), Frequency Range GHz = [18, 26]

Images:

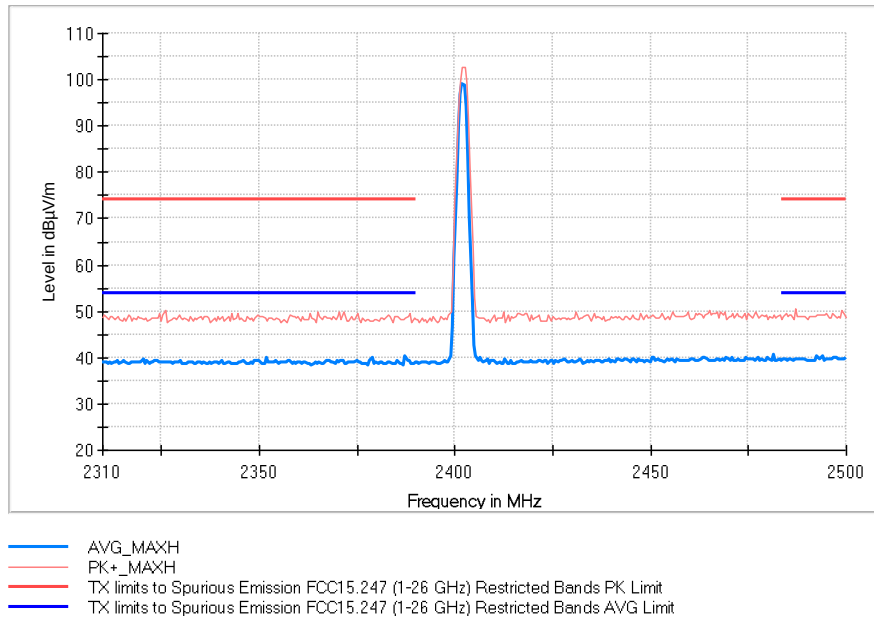


Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
20157.500000	51.8	41.2	H	12.8	54.0
23072.500000	51.7	42.4	V	11.6	54.0
23866.000000	52.5	43.5	H	10.5	54.0

Restricted Bands (2.31 GHz - 2.5 GHz)

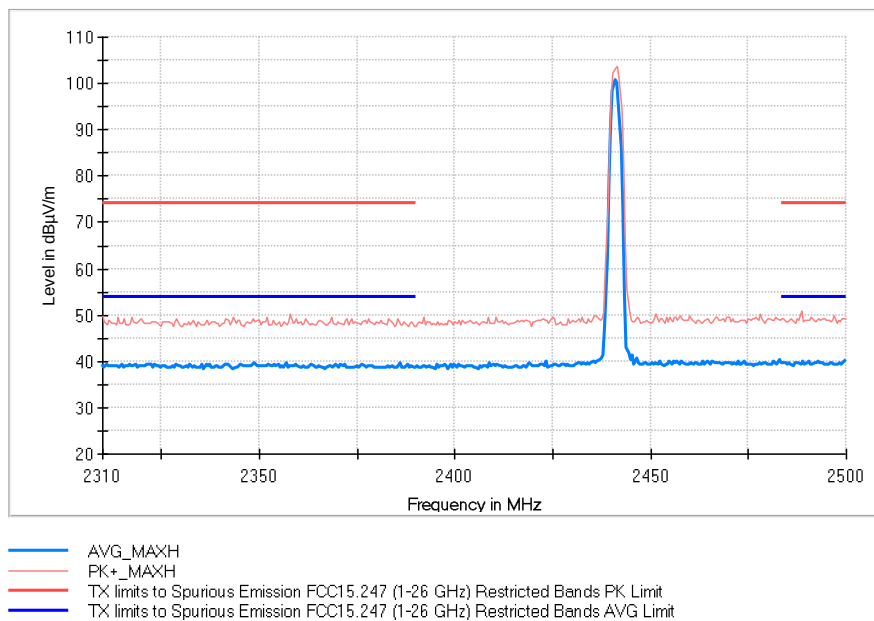
Lowest Channel

Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT ($\pi/4$ DQPSK 2-DH5), Frequency Range GHz = [1, 18]



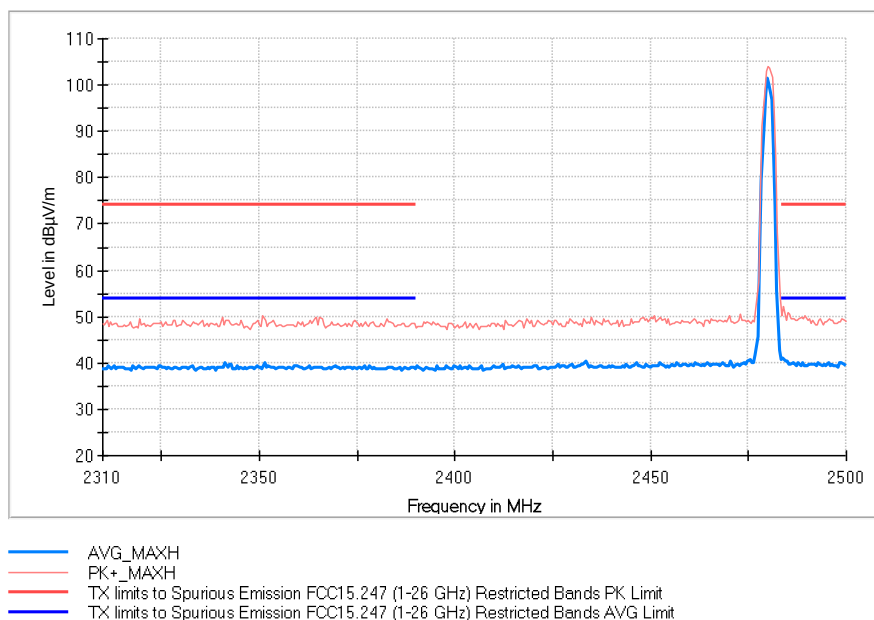
Middle Channel

Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT ($\pi/4$ DQPSK 2-DH5), Frequency Range GHz = [1, 18]



Highest Channel

Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT ($\pi/4$ DQPSK 2-DH5), Frequency Range GHz = [1, 18]



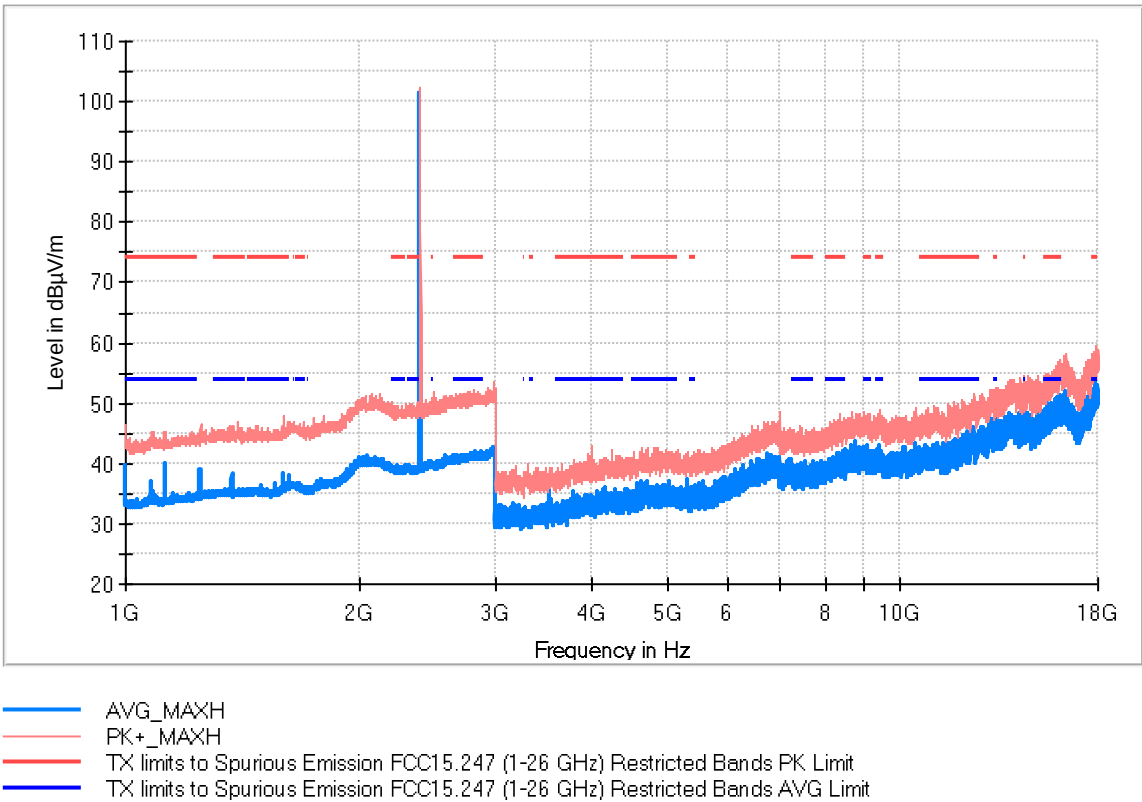
Modulation: BT (8DPSK 3-DH5)

Frequency range 1 – 18 GHz

Lowest Channel

Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS), Modulation = BT (8DPSK 3-DH5), Frequency Range GHz = [1, 18]

Images:

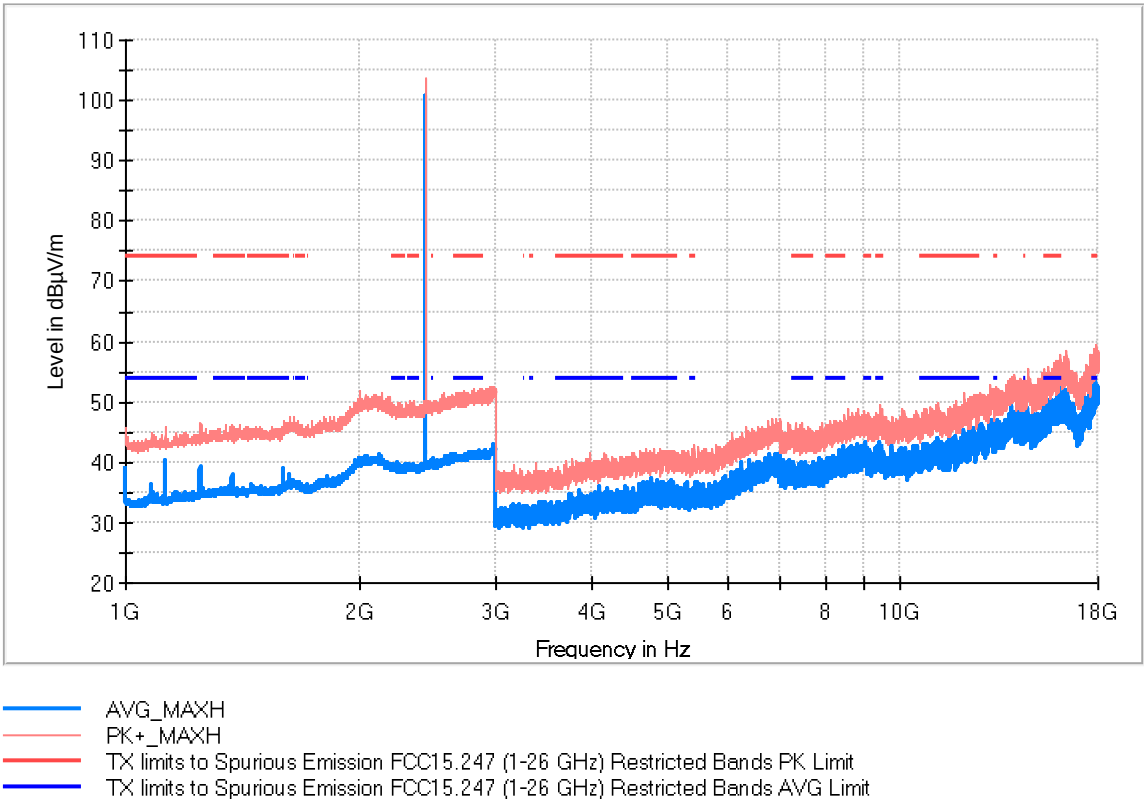


Frequency (MHz)	PK+_MAXH (dBm)	RMS_MAXH (dBm)	Pol	Margin - RMS (dB)	Limit - RMS (dBm)	Comment
1125.000000	45.1	39.7	V	14.3	54.0	
2402.000000	102.2	101.3	H	---	---	Fundamental
16068.500000	55.8	51.2	H	2.8	54.0	
17925.500000	58.2	53.3	H	0.7	54.0	

Middle Channel

Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT (8DPSK 3-DH5), Frequency Range GHz = [1, 18]

Images:

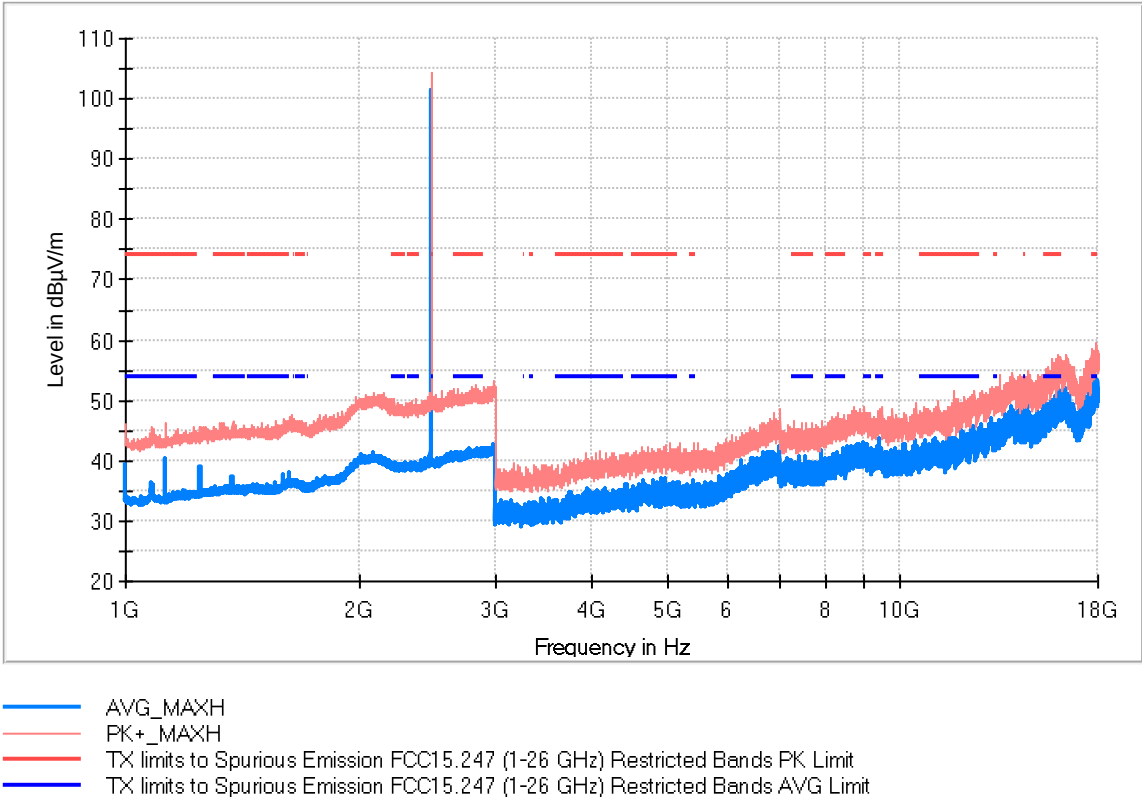


Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
1124.500000	45.4	40.1	V	13.9	54.0	
2441.000000	103.6	100.8	H	---	---	Fundamental
16076.500000	55.9	52.2	H	1.8	54.0	
17851.500000	57.4	53.2	V	0.8	54.0	

Highest Channel

Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT (8DPSK 3-DH5), Frequency Range GHz = [1, 18]

Images:



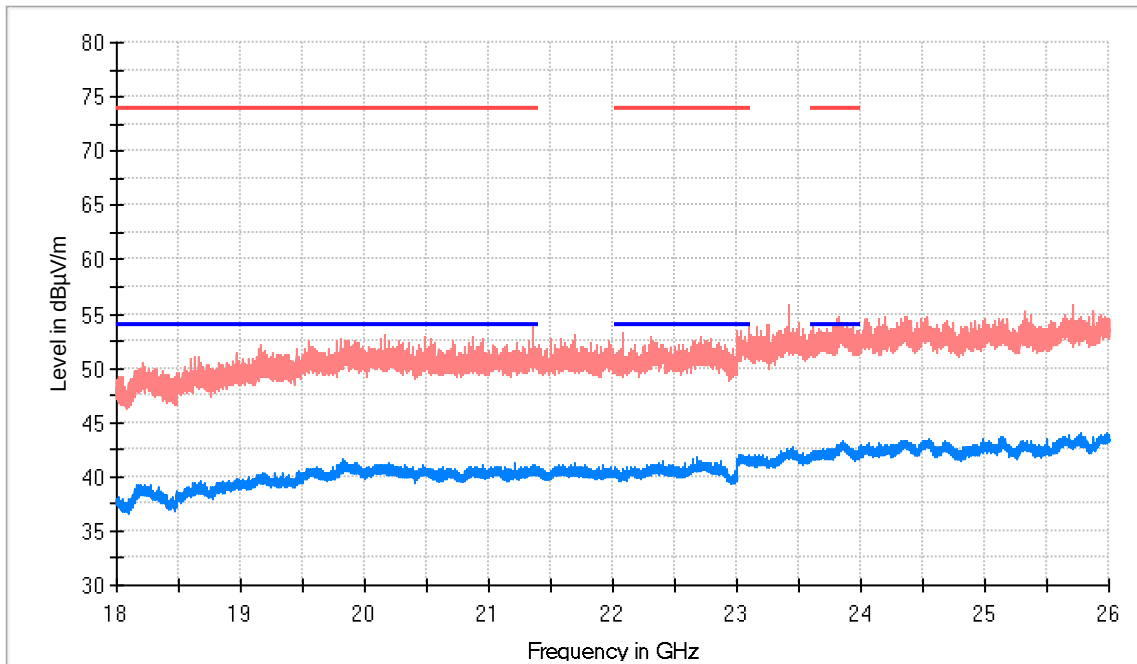
Frequency (MHz)	PK+_MAXH (dBm)	RMS_MAXH (dBm)	Pol	Margin - RMS (dB)	Limit - RMS (dBm)	Comment
1125.000000	46.1	39.3	H	14.7	54.0	
2480.000000	104.3	101.3	H	---	---	Fundamental
16076.500000	55.6	51.6	V	2.4	54.0	
17993.500000	56.9	53.3	V	0.7	54.0	

Frequency range 18 – 26 GHz

Lowest Channel

Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT (8DPSK 3-DH5), Frequency Range GHz = [18, 26]

Images:



— 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

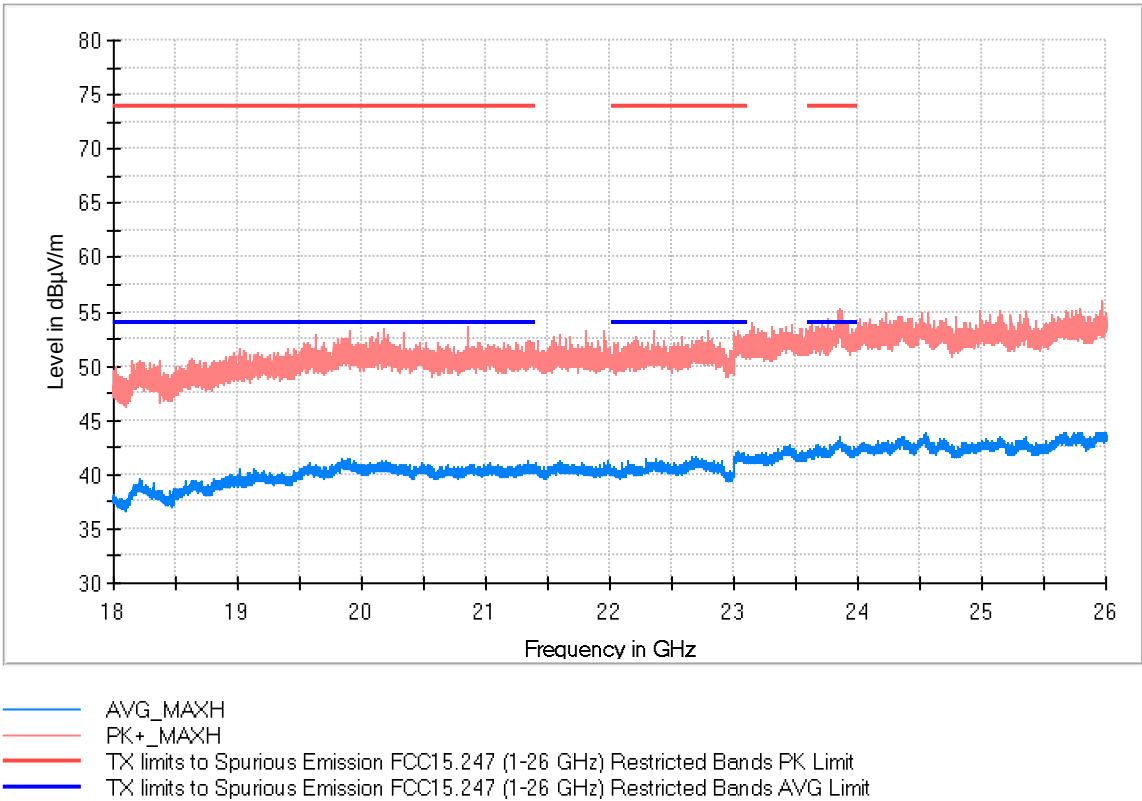
Frequency (MHz)	PK+_MAXH (dBμV/m)	AVG_MAXH (dBμV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBμV/m)
21349.000000	53.8	40.9	V	13.1	54.0
23040.500000	51.3	42.1	V	11.9	54.0
23825.500000	54.8	42.3	V	11.7	54.0

Frequency range 18 - 26 GHz

Middle Channel

Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT (8DPSK 3-DH5), Frequency Range GHz = [18, 26]

Images:



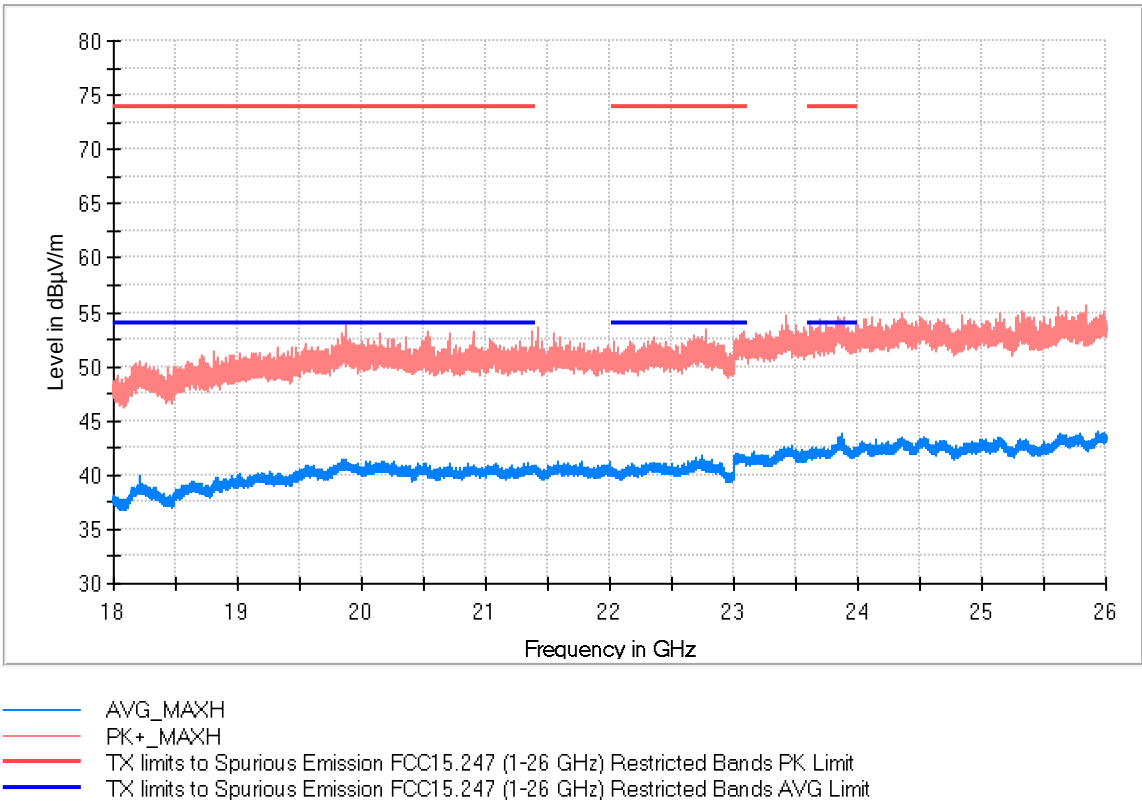
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19841.500000	51.3	41.5	V	12.5	54.0
22349.500000	53.2	40.5	V	13.5	54.0
23861.500000	53.6	43.4	H	10.6	54.0

Frequency range 18 - 26 GHz

Highest Channel

Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT (8DPSK 3-DH5), Frequency Range GHz = [18, 26]

Images:

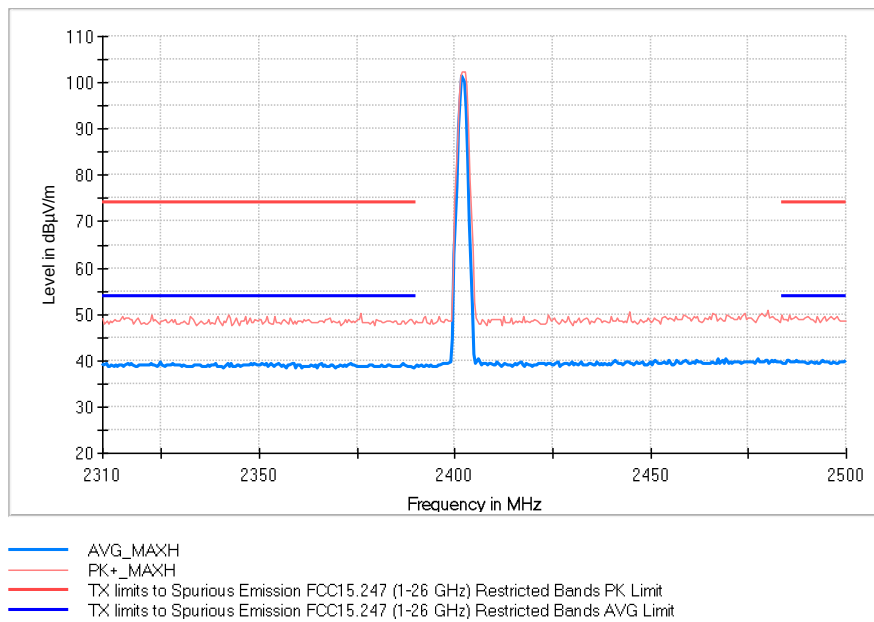


Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
18205.000000	48.8	40.0	V	14.0	54.0
20167.500000	50.1	41.3	H	12.7	54.0
23876.000000	52.4	43.8	V	10.2	54.0

Restricted Bands (2.31 GHz - 2.5 GHz)

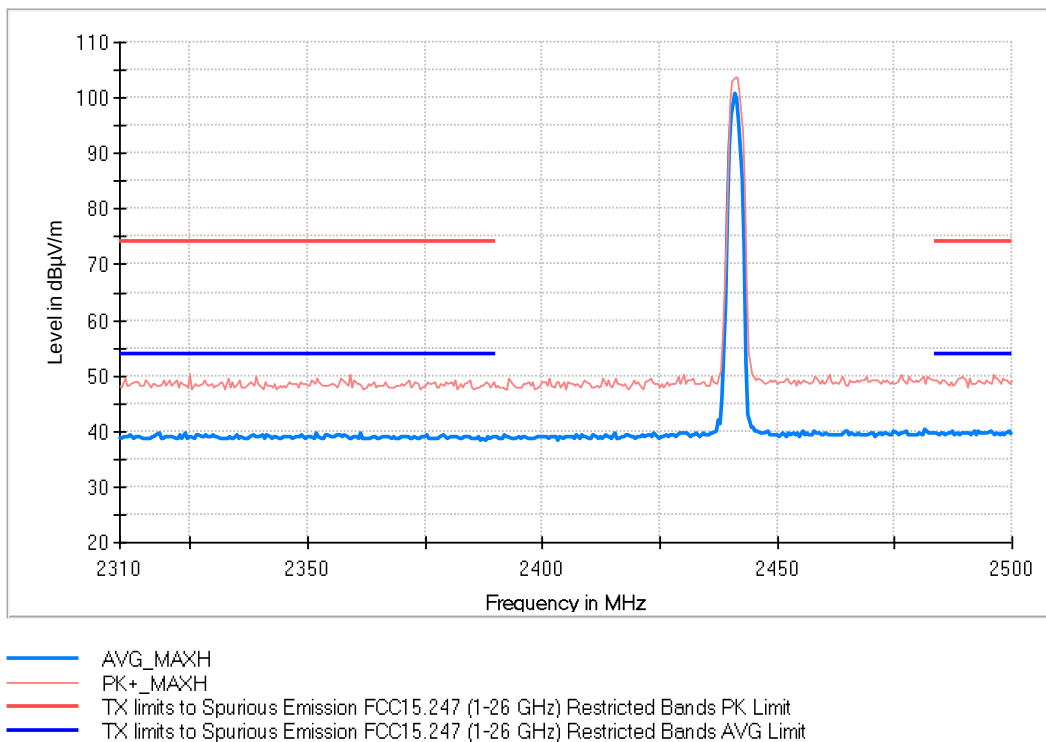
Lowest Channel

Frequency MHz = 2402.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT (8DPSK 3-DH5), Frequency Range GHz = [1, 18]



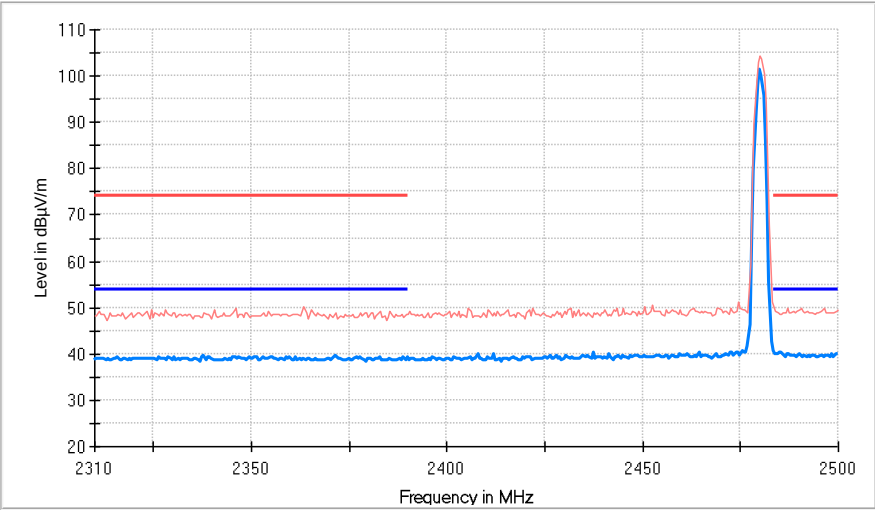
Middle Channel

Frequency MHz = 2441.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT (8DPSK 3-DH5), Frequency Range GHz = [1, 18]



Highest Channel

Frequency MHz = 2480.00000, Equipment Type = Frequency Hopping Spread Spectrum systems (DSS),
Modulation = BT (8DPSK 3-DH5), Frequency Range GHz = [1, 18]



— 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

Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time
30 MHz - 1 GHz	48.5 kHz	RMS; PK+	100 kHz	1 s

Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time
1 GHz - 3 GHz	500 kHz	PK+; AVG	1 MHz	1 s
3 GHz - 18 GHz	500 kHz	PK+; AVG	1 MHz	1 s

Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time
18 GHz - 26 GHz	500 kHz	PK+; AVG	1 MHz	1 s

Appendix A.2: Test results. Wi-Fi 2.4GHz

Appendix A.2

PRODUCT INFORMATION.....51

TEST CONDITIONS52

TEST CASES DETAILS55

 RSS-247 5.4 (d) / FCC 15.247 (b) (1) - Maximum Average Conducted Output Power55

 RSS-247 5.5 / FCC 15.247 (d) - Emissions compliance (Transmitter) - Radiated63

PRODUCT INFORMATION

The following information is provided by the supplier

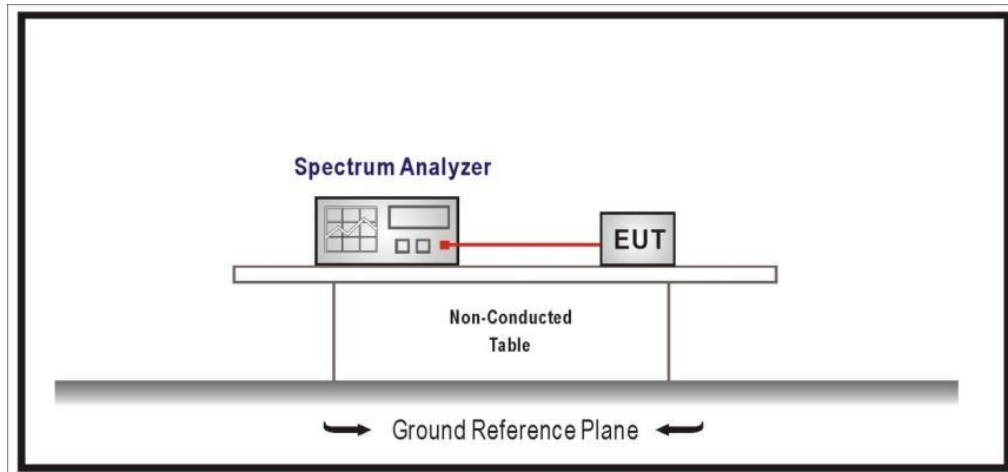
Information	Description
Modulation	DSSS, OFDM, MCS index 0-7
Maximum RF Output Power	b/g: 14 dBm e.i.r.p. n20: 8 dBm e.i.r.p. n40: 6 dBm e.i.r.p.
Operation mode	
- Operating Frequency Range	2412 – 2472 MHz
- Nominal Channel Bandwidth	20 MHz, 40MHz
Extreme operating conditions	
- Temperature range	-40 °C to +70 °C
Antenna type	Internal antenna
Antenna gain	-4 dBi
Nominal Voltage	
- Supply Voltage	13.5 Vdc
- Type of power source	DC voltage
Equipment type	Wi-Fi 2.4 GHz b/g/n20/n40
Geo-location capability	No

TEST CONDITIONS

(*): Data provided by the client.

TEST CONDITIONS	DESCRIPTION								
TC/01 (b mode)	<u>Power supply (V):</u> V_{nominal}: 13.5 Vdc <u>Temperature:</u> T_{nominal}: +15 to +35 °C <u>Channel Bandwidth:</u> 20 MHz <u>Test Frequencies for Conducted/Radiated tests:</u> Lowest channel: 2412 MHz Middle channel: 2437 MHz Highest channel: 2462 MHz								
TC/02 (g mode)	<u>Power supply (V):</u> V_{nominal}: 13.5 Vdc <u>Temperature:</u> T_{nominal}: +15 to +35 °C <u>Channel Bandwidth:</u> 20 MHz <u>Test Frequencies for Conducted/Radiated tests:</u> Lowest channel: 2412 MHz Middle channel: 2437 MHz Highest channel: 2462 MHz								
TC/03 (n mode)	<u>Power supply (V):</u> V_{nominal}: 13.5 Vdc <u>Temperature:</u> T_{nominal}: +15 to +35 °C <u>Channel Bandwidth:</u> 20/40 MHz <u>Test Frequencies for Conducted/Radiated tests:</u> <table> <tr> <td>20 MHz</td><td>40 MHz</td></tr> <tr> <td>Lowest channel: 2412 MHz</td><td>Lowest channel: 2422 MHz</td></tr> <tr> <td>Middle channel: 2437 MHz</td><td>Middle channel: 2437 MHz</td></tr> <tr> <td>Highest channel: 2462 MHz</td><td>Highest channel: 2452 MHz</td></tr> </table>	20 MHz	40 MHz	Lowest channel: 2412 MHz	Lowest channel: 2422 MHz	Middle channel: 2437 MHz	Middle channel: 2437 MHz	Highest channel: 2462 MHz	Highest channel: 2452 MHz
20 MHz	40 MHz								
Lowest channel: 2412 MHz	Lowest channel: 2422 MHz								
Middle channel: 2437 MHz	Middle channel: 2437 MHz								
Highest channel: 2462 MHz	Highest channel: 2452 MHz								

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 (Bi-log 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.

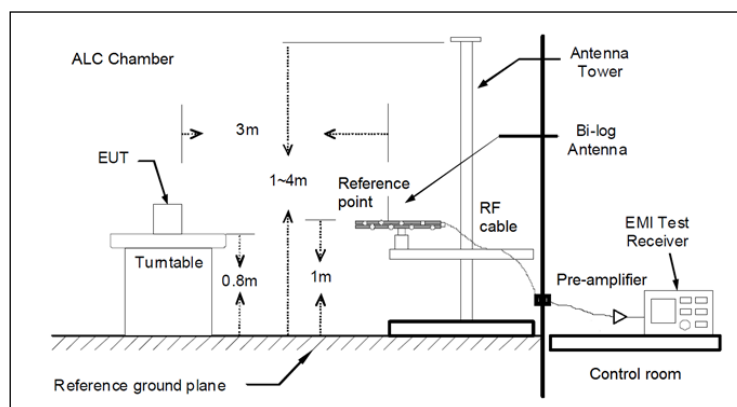


Fig A1: Radiated measurements Setup $f < 1$ GHz

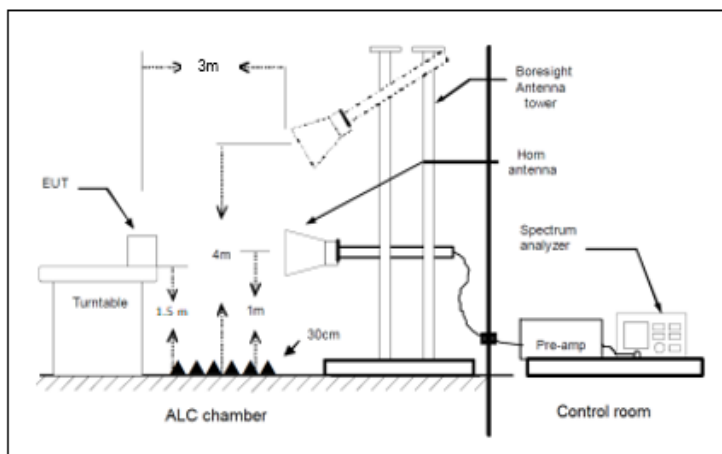


Fig A2: Radiated measurements setup $f > 1-18$ GHz

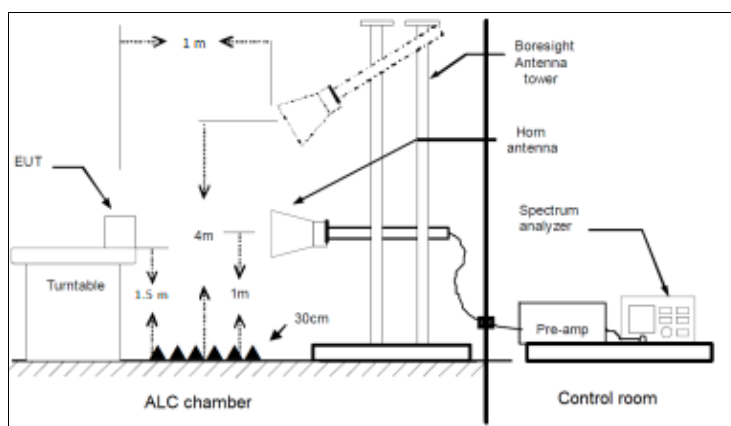


Fig A3: Radiated measurements setup $f > 18$ GHz

TEST CASES DETAILS

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

Limits

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).

Sample ID: S/01

Maximum declared antenna gain: -4.0 dBi

Modulation: 802.11b

Results

Freq (MHz)	BW (MHz)	Avg Power (dBm)	E.I.R.P. (dBm)
2412.00000	20	14.6	10.6
2437.00000	20	14.5	10.5
2462.00000	20	14.9	10.9

Modulation: 802.11g

Results

Freq (MHz)	BW (MHz)	Avg Power (dBm)	E.I.R.P. (dBm)
2412.00000	20	14.2	10.2
2437.00000	20	14.4	10.4
2462.00000	20	14.9	10.9

Modulation: 802.11n HT20

Results

Freq (MHz)	BW (MHz)	Avg Power (dBm)	E.I.R.P. (dBm)
2412.00000	20	9.1	5.1
2437.00000	20	9.0	5.0
2462.00000	20	9.0	5.0

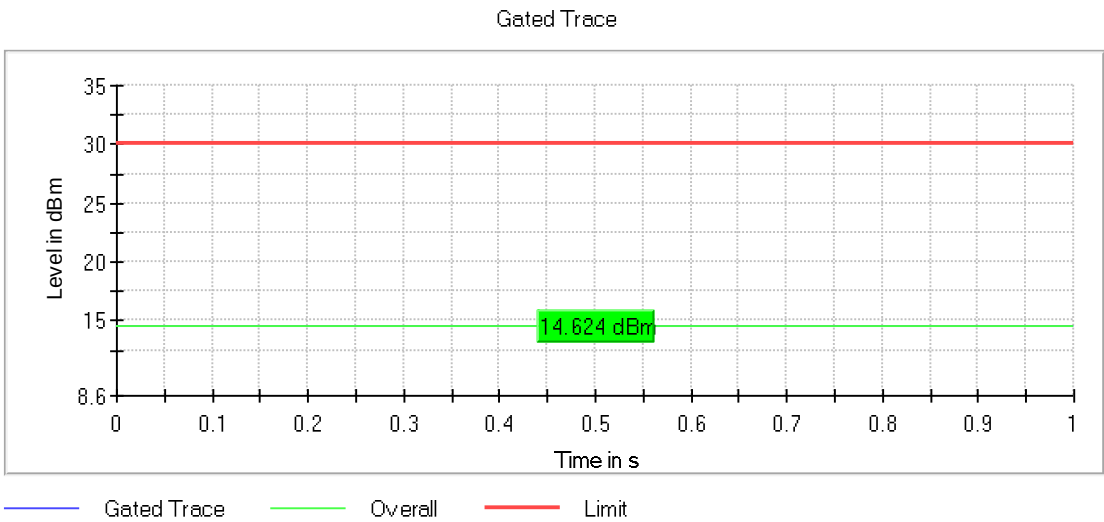
Modulation: 802.11n HT40
Results

Freq (MHz)	BW (MHz)	Avg Power (dBm)	E.I.R.P. (dBm)
2412.00000	40	7.2	3.2
2437.00000	40	7.4	3.4
2462.00000	40	7.5	3.5

Attachments

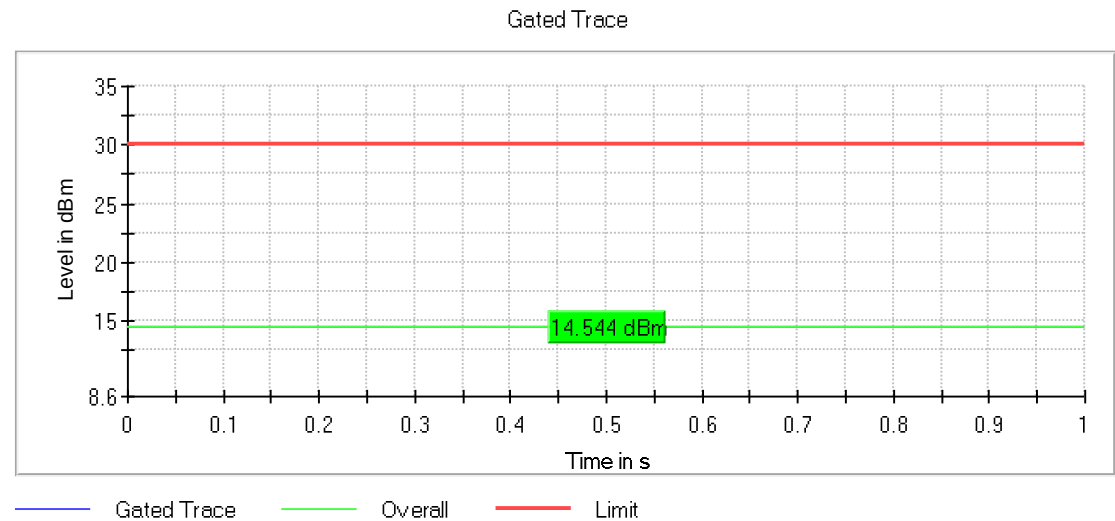
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11b, Number of Transmission Chains = 1, Active Port = 1

Images:



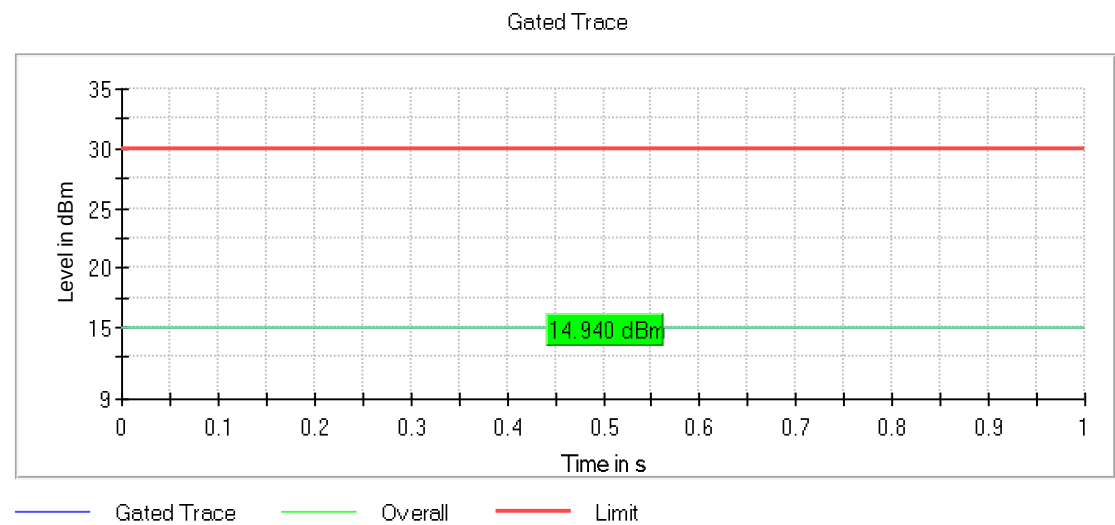
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11b, Number of Transmission Chains = 1, Active Port = 1

Images:



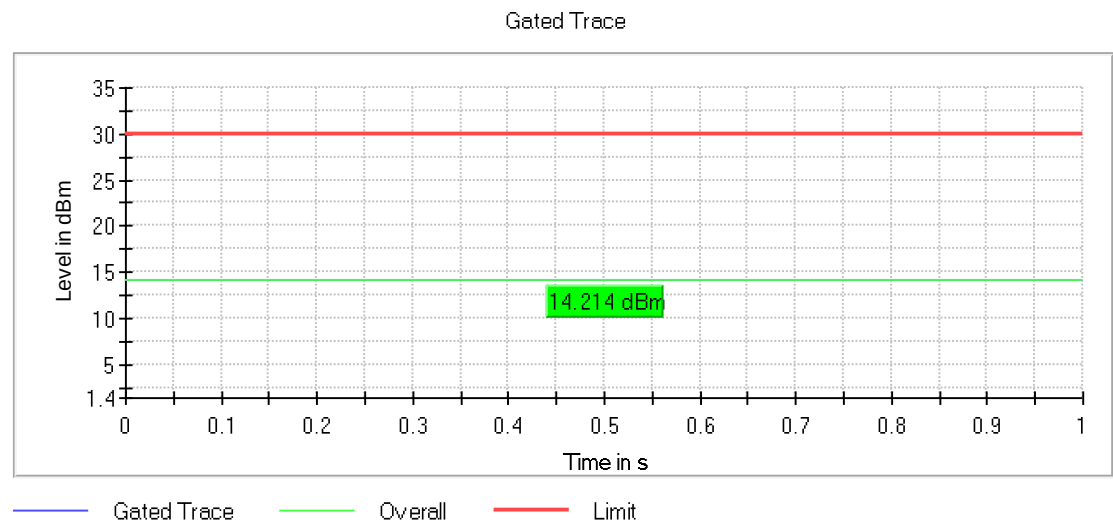
Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11b, Number of Transmission Chains = 1, Active Port = 1

Images:



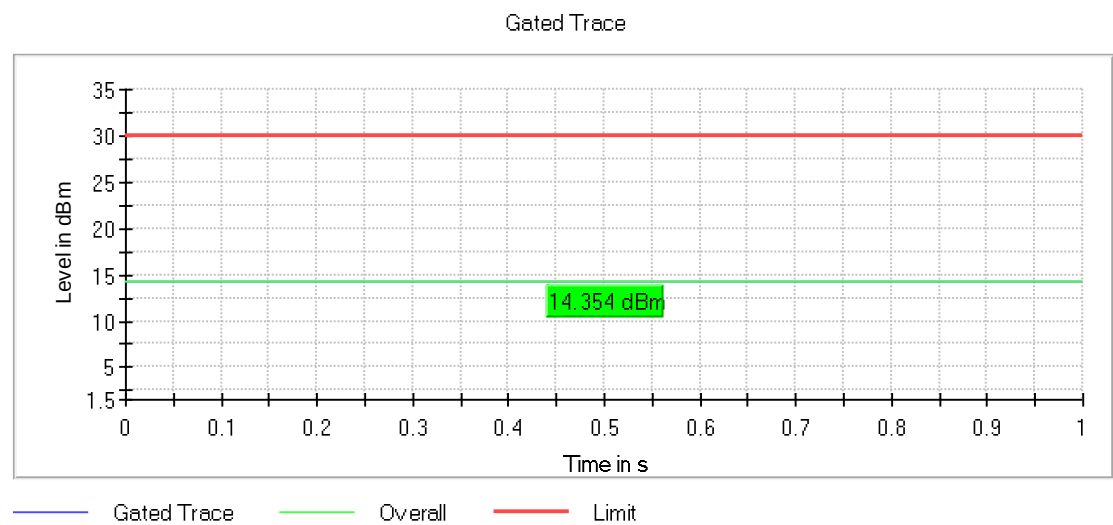
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11g, Number of Transmission Chains = 1, Active Port = 1

Images:



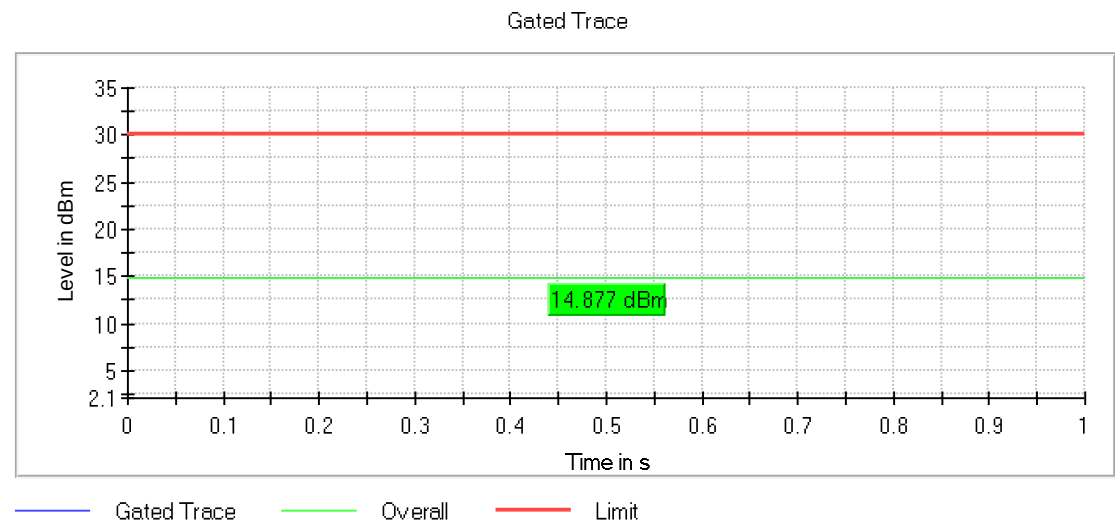
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11g, Number of Transmission Chains = 1, Active Port = 1

Images:



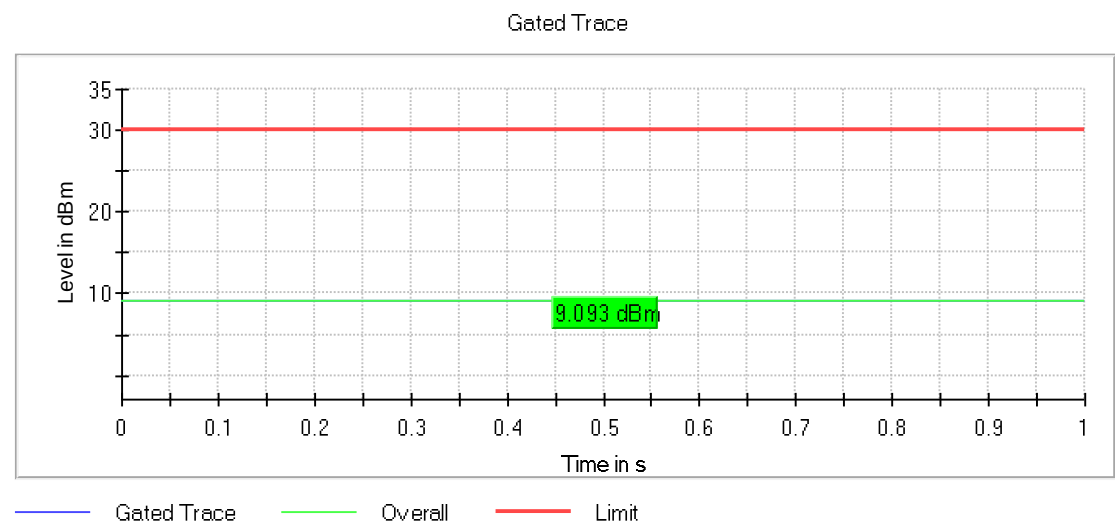
Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11g, Number of Transmission Chains = 1, Active Port = 1

Images:



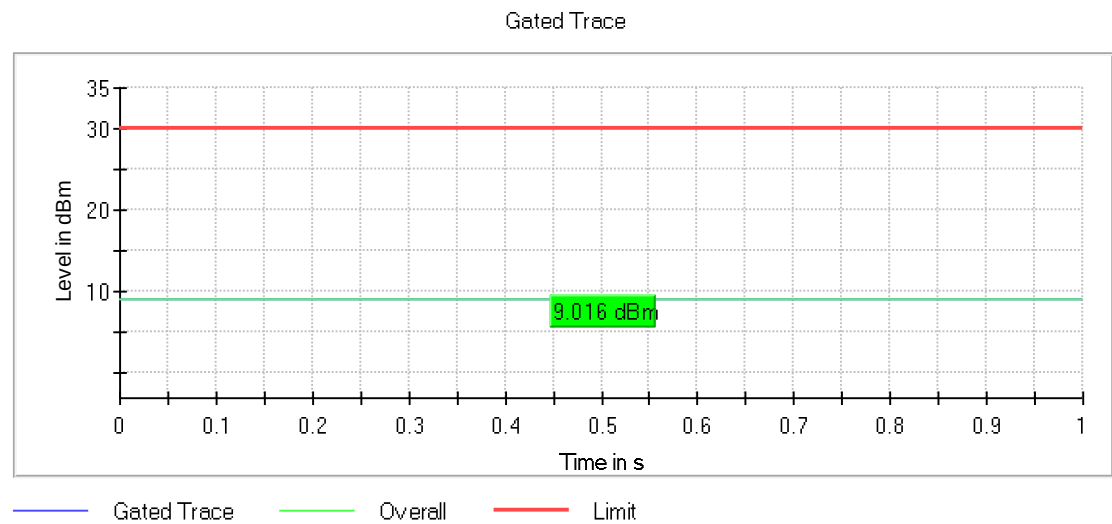
Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11n, Number of Transmission Chains = 1, Active Port = 1

Images:



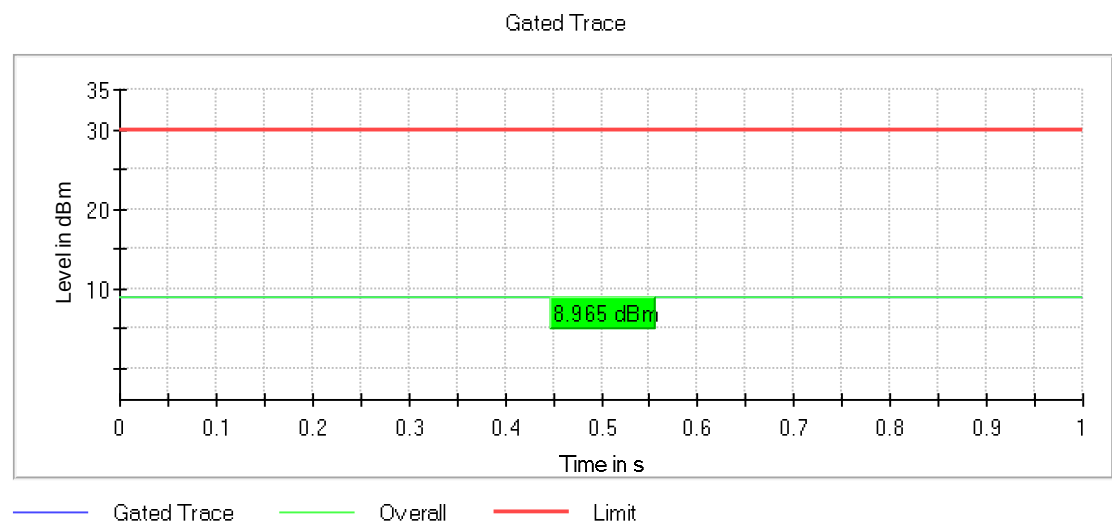
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11n, Number of Transmission Chains = 1, Active Port = 1

Images:



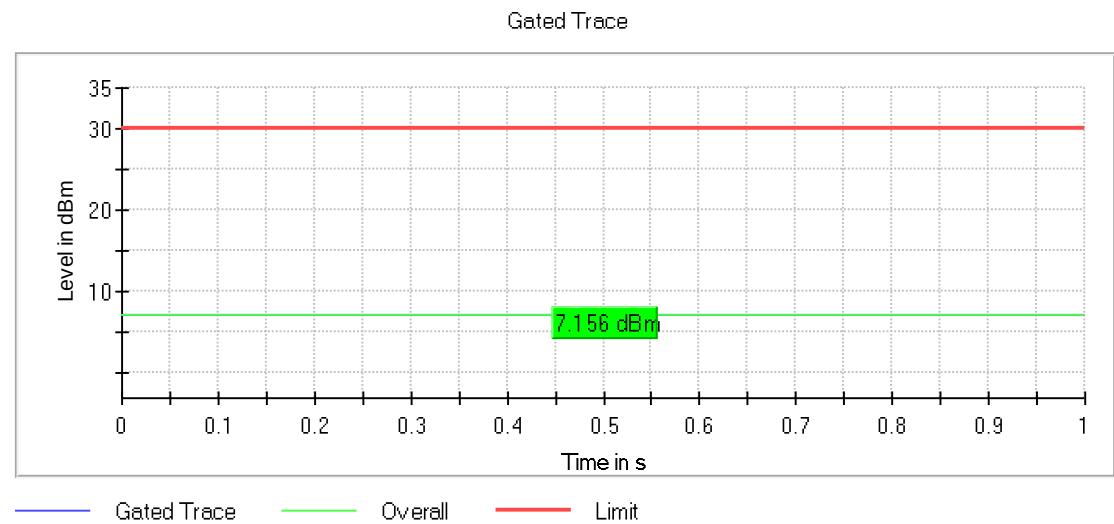
Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11n HT20, Number of Transmission Chains = 1, Active Port = 1

Images:



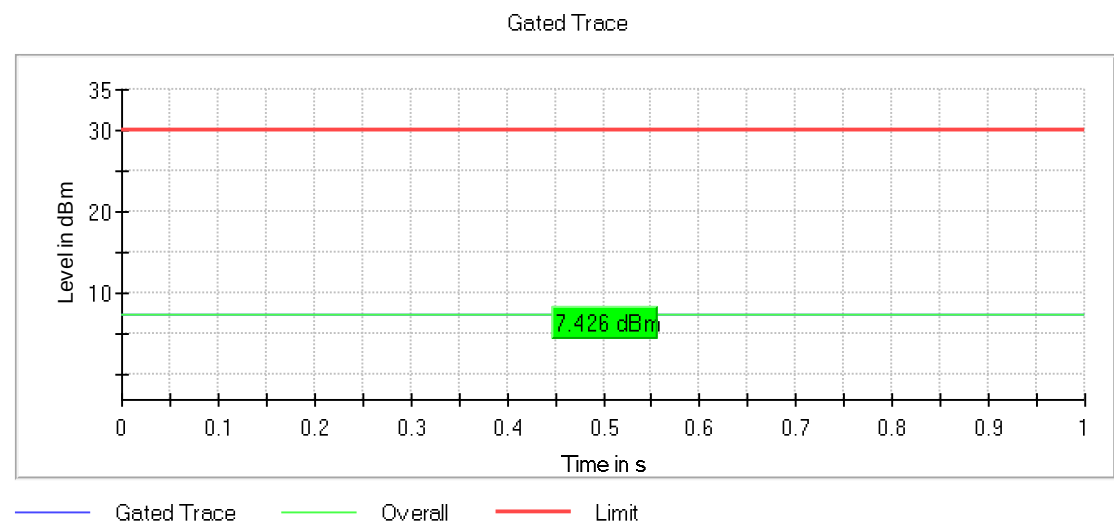
Frequency MHz = 2422.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40,
Modulation = 802.11n HT40, Number of Transmission Chains = 1, Active Port = 1

Images:



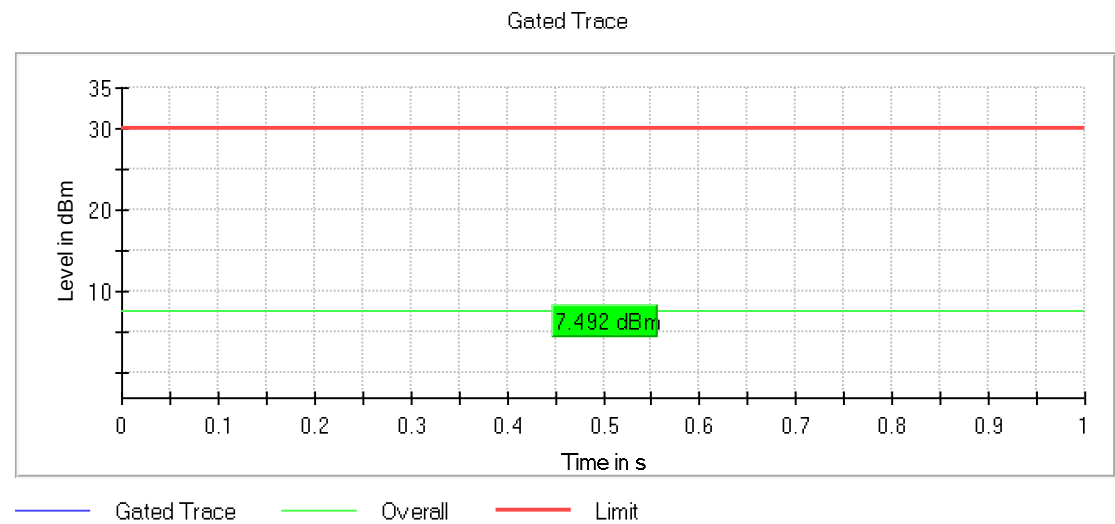
Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40,
Modulation = 802.11n HT40, Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2452.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11n HT40, Number of Transmission Chains = 1, Active Port = 1

Images:



Spectrum Analyzer Parameters

Setting	Instrument Value
Measurement Time	1.000 s
Points	1000000
Time resolution	1.000 μs

RSS-247 5.5 / FCC 15.247 (d) - Emissions compliance (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

The following tables and plots show the results for the worst case

Verdict

Pass

Spurious levels operating (Radiated).
The level of spurious emissions was measured as their effective radiated power when radiated by cabinet and antenna.

Modulation: 802.11b
Sample ID: S/02
The result for worst operation is shown below.

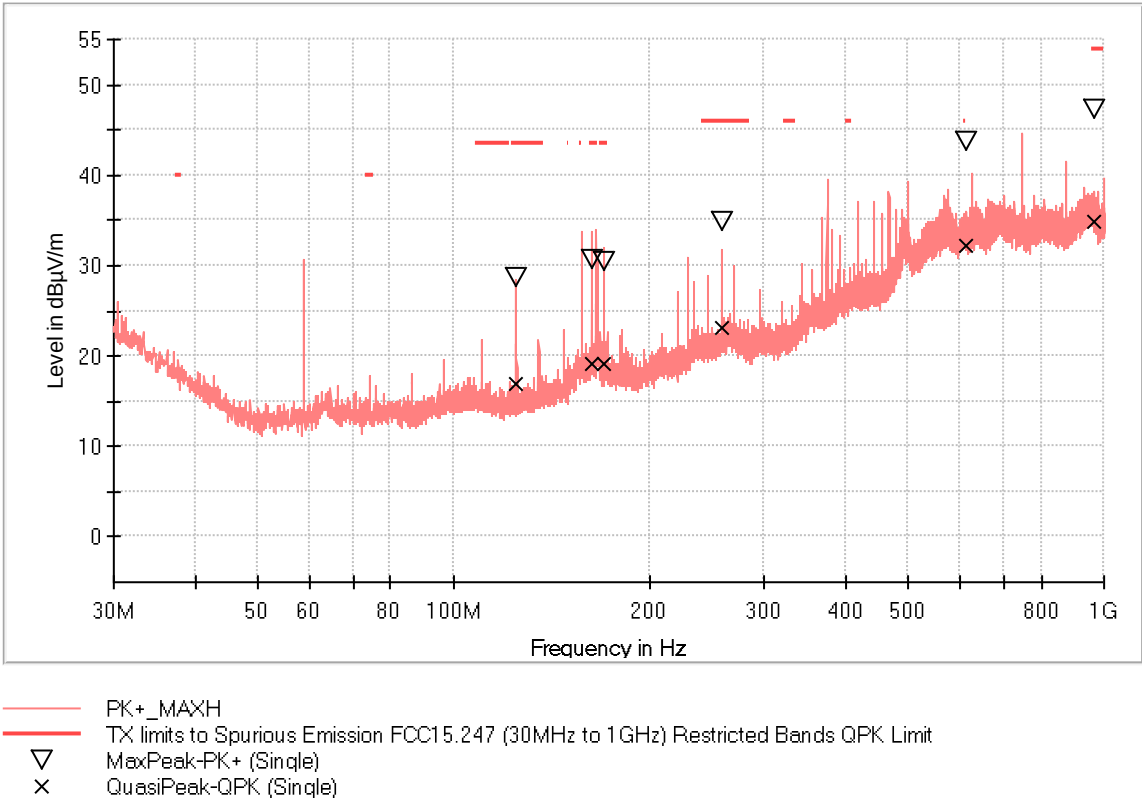
Results

Frequency range 0.03 - 1 GHz
The spurious emissions below 1 GHz do not depend on the operating channel selected in the EUT.

Middle Channel

Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11b, Frequency Range GHz = [0.03, 1]

Images:



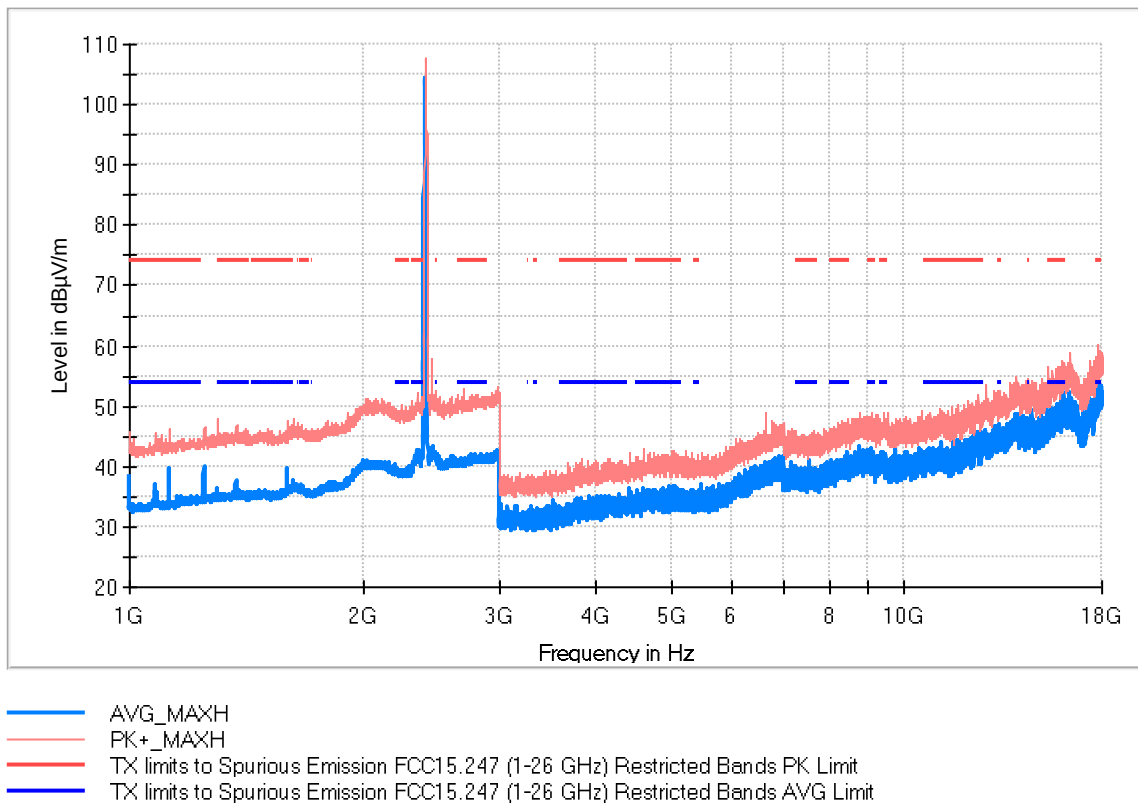
Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Margin - QPK (dB)	Limit - QPK (dBµV/m)
124.575000	28.6	17.0	V	26.5	43.5
163.326500	30.5	19.1	H	24.4	43.5
169.728500	30.3	19.0	H	24.5	43.5
258.483500	34.8	23.2	H	22.8	46.0
612.242500	43.8	32.2	H	13.8	46.0
964.110000	47.3	34.9	V	19.1	54.0

Frequency range 1 - 18 GHz

Lowest Channel

Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11b, Frequency Range GHz = [1, 18]

Images:



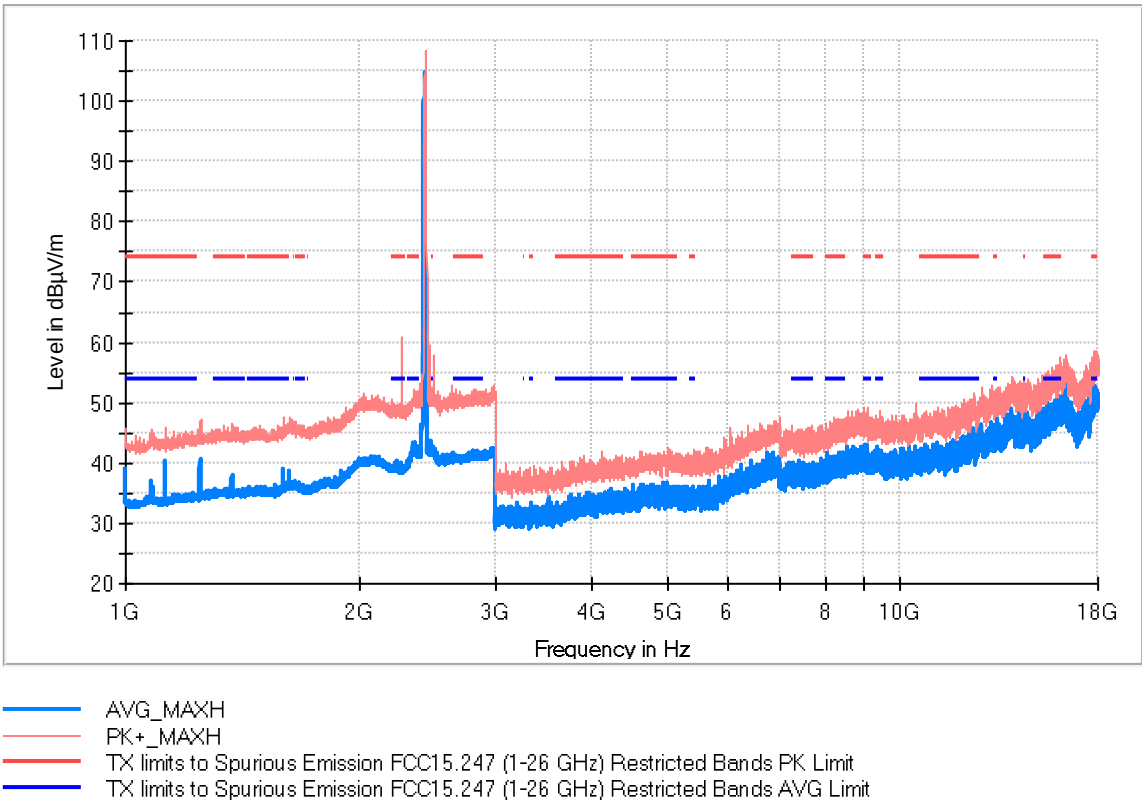
Frequency (MHz)	PK+_MAXH (dBμV/m)	AVG_MAXH (dBμV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBμV/m)	Comment
1124.500000	46.2	39.6	V	14.4	54.0	
2413.500000	107.7	103.9	H	---	---	Fundamental
16069.50000	56.4	52.3	H	1.7	54.0	
17803.50000	60.0	53.6	H	0.4	54.0	

Frequency range 1 - 18 GHz

Middle Channel

Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11b, Frequency Range GHz = [1, 18]

Images:



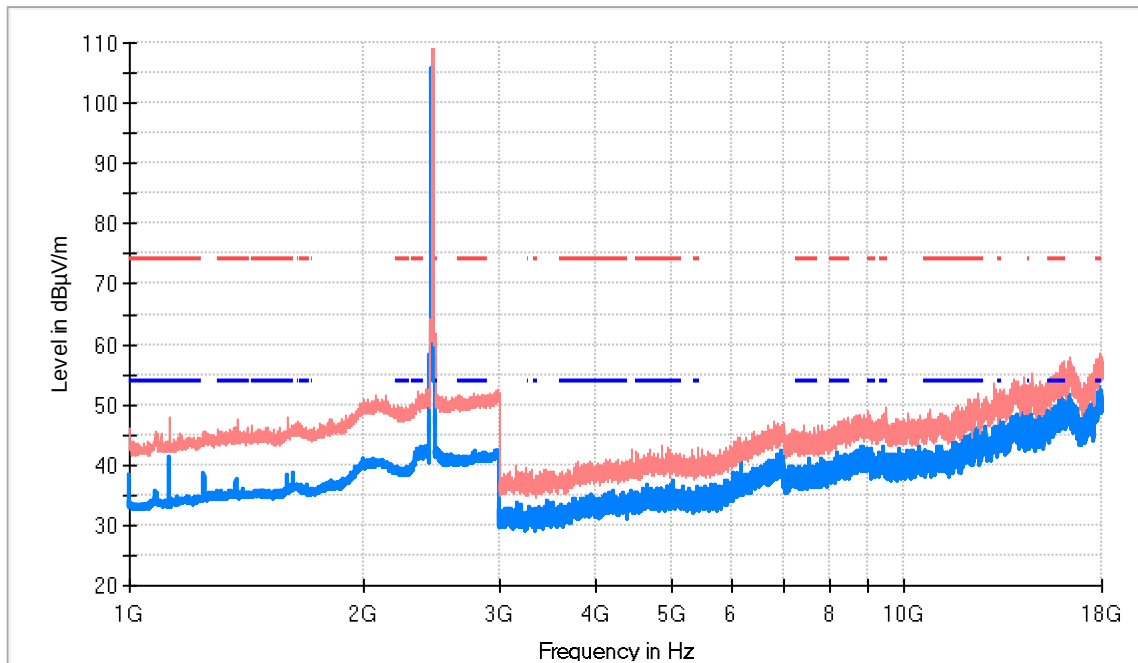
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2274.50000	61.0	39.8	V	14.2	54.0	
2436.00000	108.3	104.7	H	---	---	Fundamental
16117.5000	57.5	47.8	V	6.2	54.0	
17859.0000	58.6	52.6	V	1.4	54.0	

Frequency range 1 - 18 GHz

Highest Channel

Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11b, Frequency Range GHz = [1, 18]

Images:



— 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

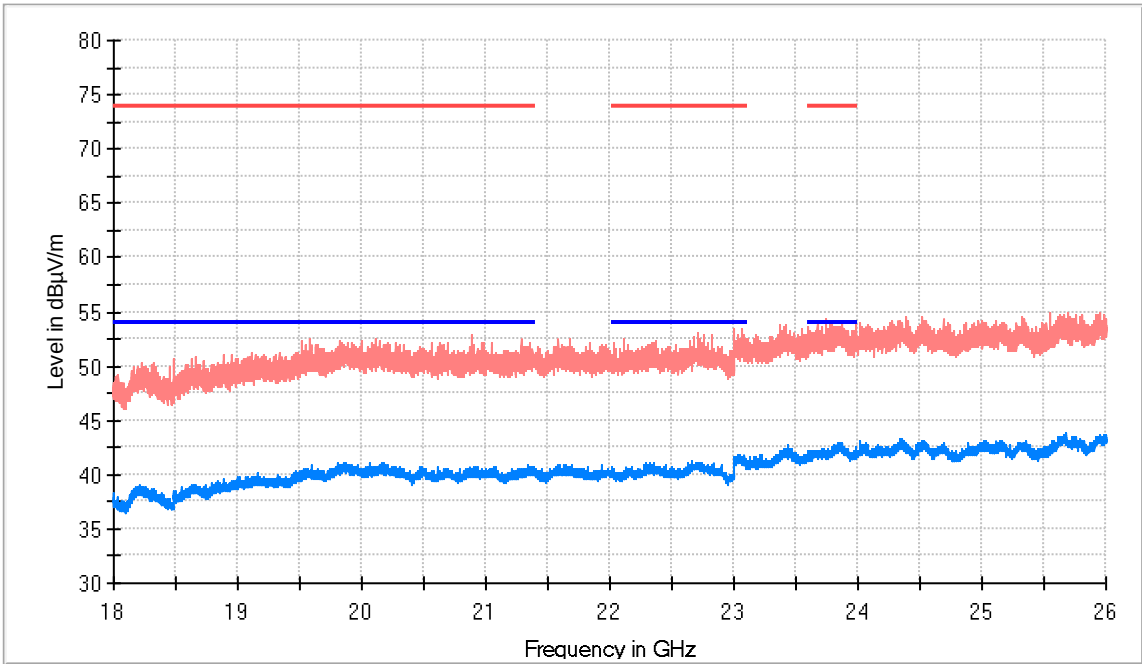
Frequency (MHz)	PK+_MAXH (dBμV/m)	AVG_MAXH (dBμV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBμV/m)	Comment
1124.500000	47.8	41.1	V	12.9	54.0	
2461.000000	109.0	105.4	H	---	---	Fundamental
16001.000000	56.8	51.4	V	2.6	54.0	
17853.000000	56.6	52.7	H	1.3	54.0	

Frequency range 18 - 26 GHz

Lowest Channel

Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11b, Frequency Range GHz = [18, 26]

Images:



- 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

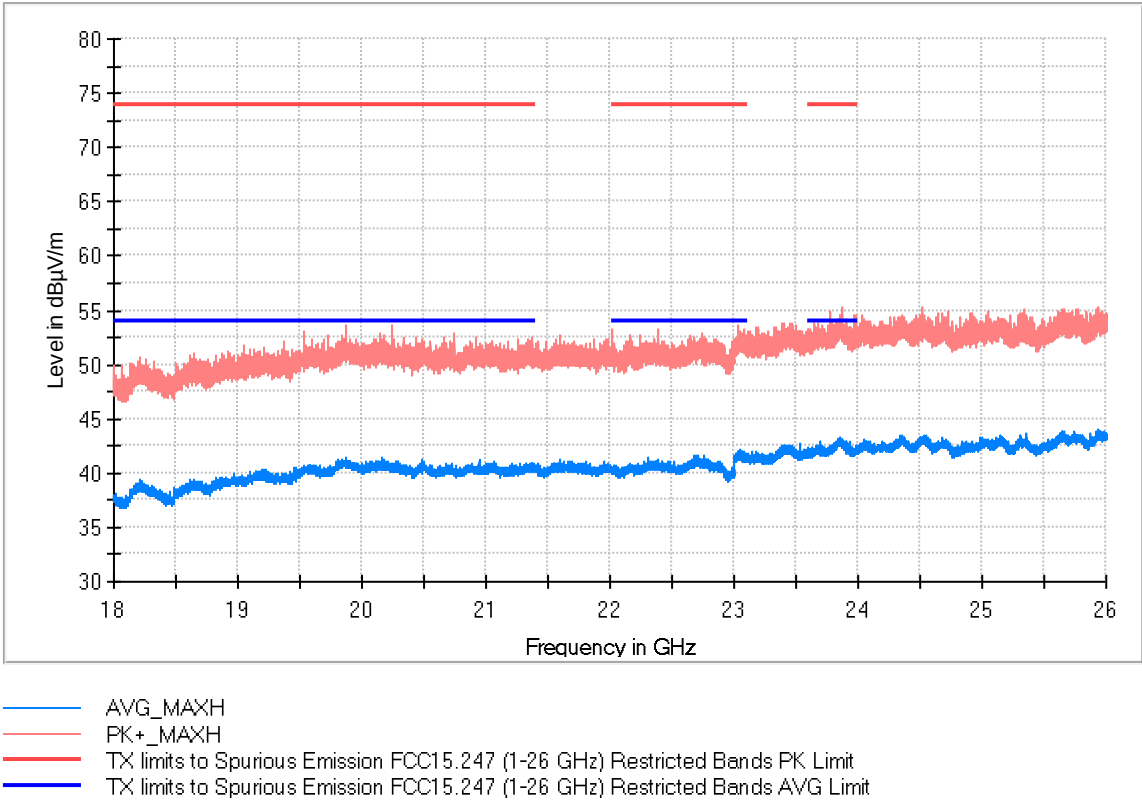
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
20880.500000	52.8	40.2	H	13.8	54.0
23006.500000	53.4	41.1	H	12.9	54.0
23746.500000	54.4	41.7	H	12.3	54.0

Frequency range 18 - 26 GHz

Middle Channel

Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11b, Frequency Range GHz = [18, 26]

Images:



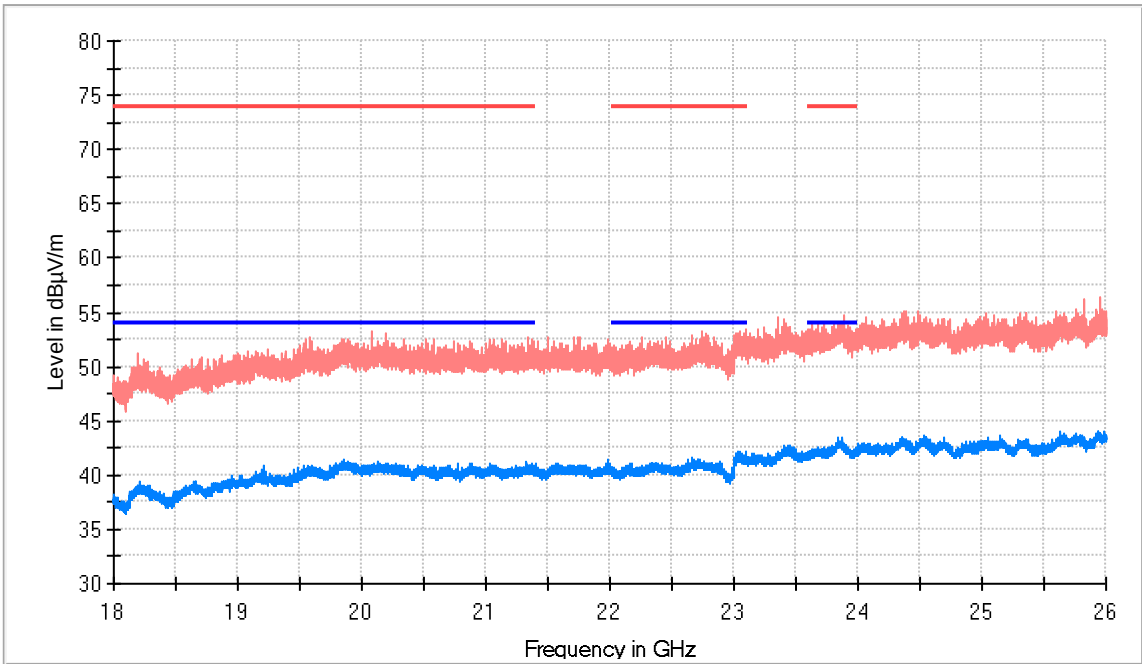
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19876.000000	53.6	40.8	V	13.2	54.0
23036.000000	53.6	41.7	V	12.3	54.0
23875.000000	55.3	42.7	H	11.3	54.0

Frequency range 18 - 26 GHz

Highest Channel

Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11b, Frequency Range GHz = [18, 26]

Images:



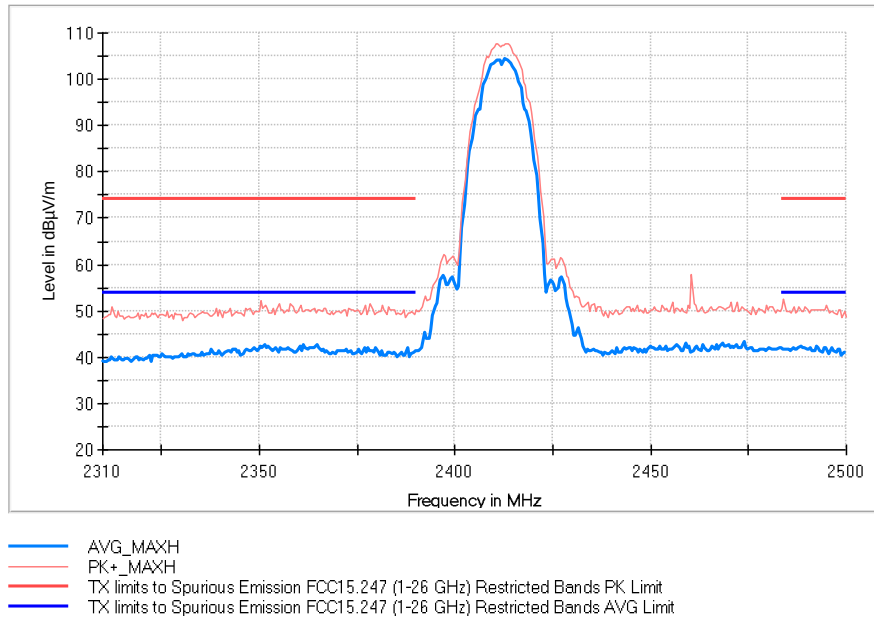
- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
20087.000000	53.3	40.6	H	13.4	54.0
22740.500000	53.3	40.8	H	13.2	54.0
23891.500000	54.8	42.5	H	11.5	54.0

Restricted Bands (2.31 GHz - 2.5 GHz)

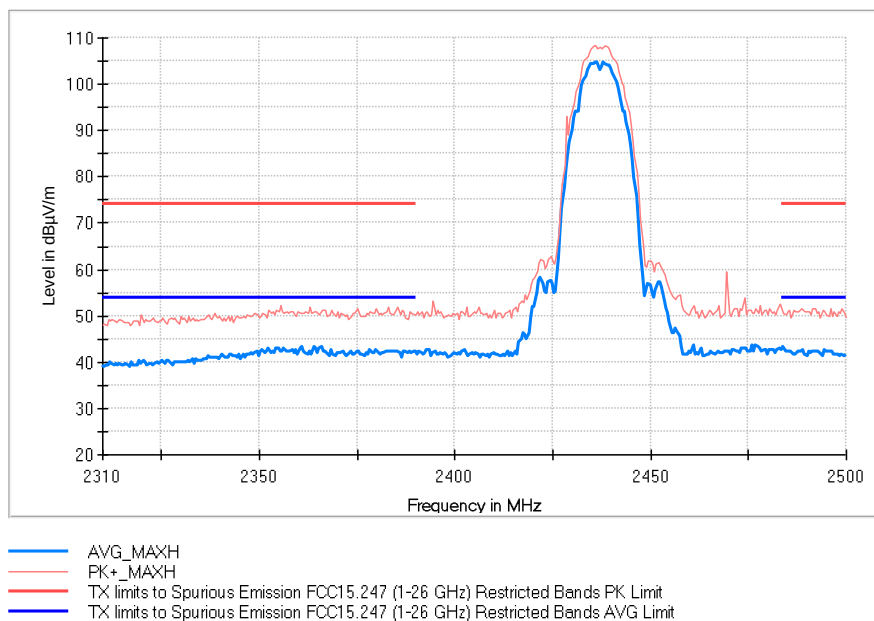
Lowest Channel

Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11b, Frequency Range GHz = [1, 18]

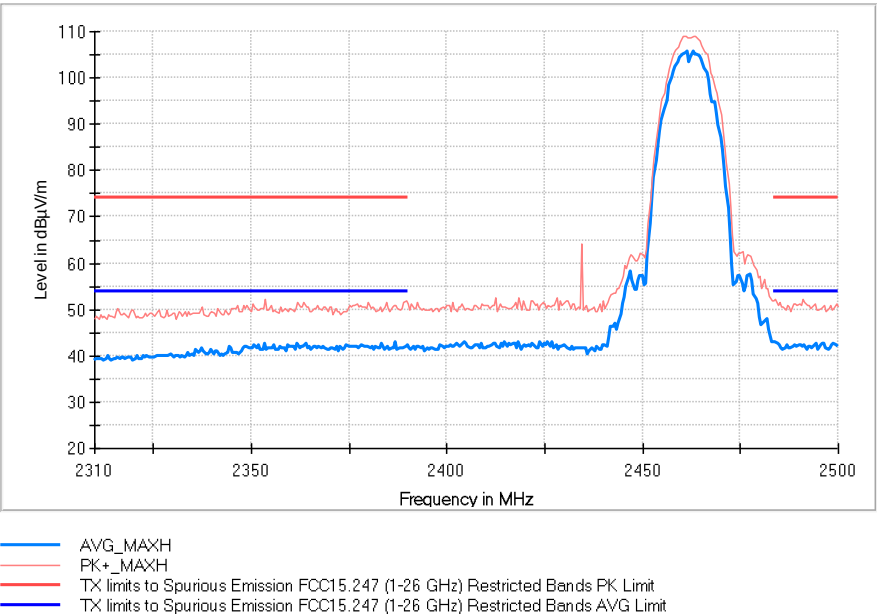


Middle Channel

Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11b, Frequency Range GHz = [1, 18]



Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11b, Frequency Range GHz = [1, 18]



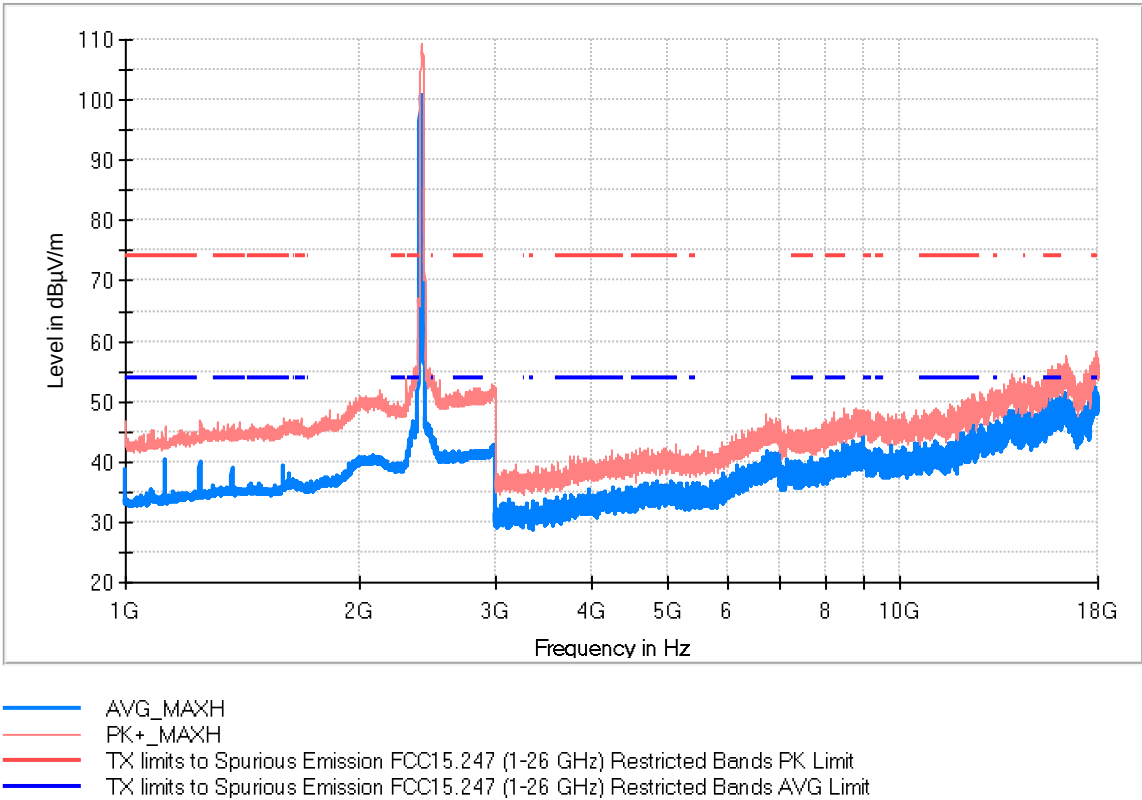
Modulation: 802.11g
Results

Frequency range 1 - 18 GHz

Lowest Channel

Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11g, Frequency Range GHz = [1, 18]

Images:



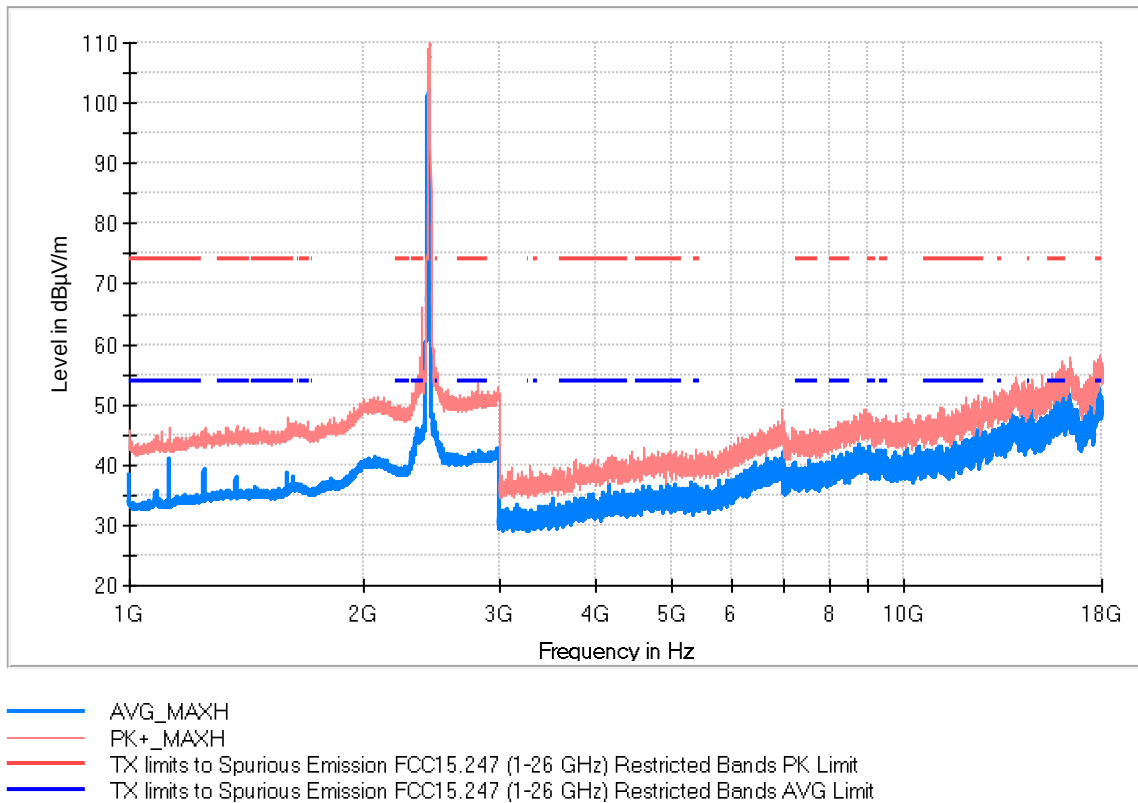
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
1124.500000	45.9	40.2	V	13.8	54.0	
2413.000000	109.0	100.8	H	---	---	Fundamental
15684.50000	55.8	51.1	V	2.9	54.0	
17775.50000	56.1	52.2	V	1.8	54.0	

Frequency range 1 - 18 GHz

Middle Channel

Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11g, Frequency Range GHz = [1, 18]

Images:



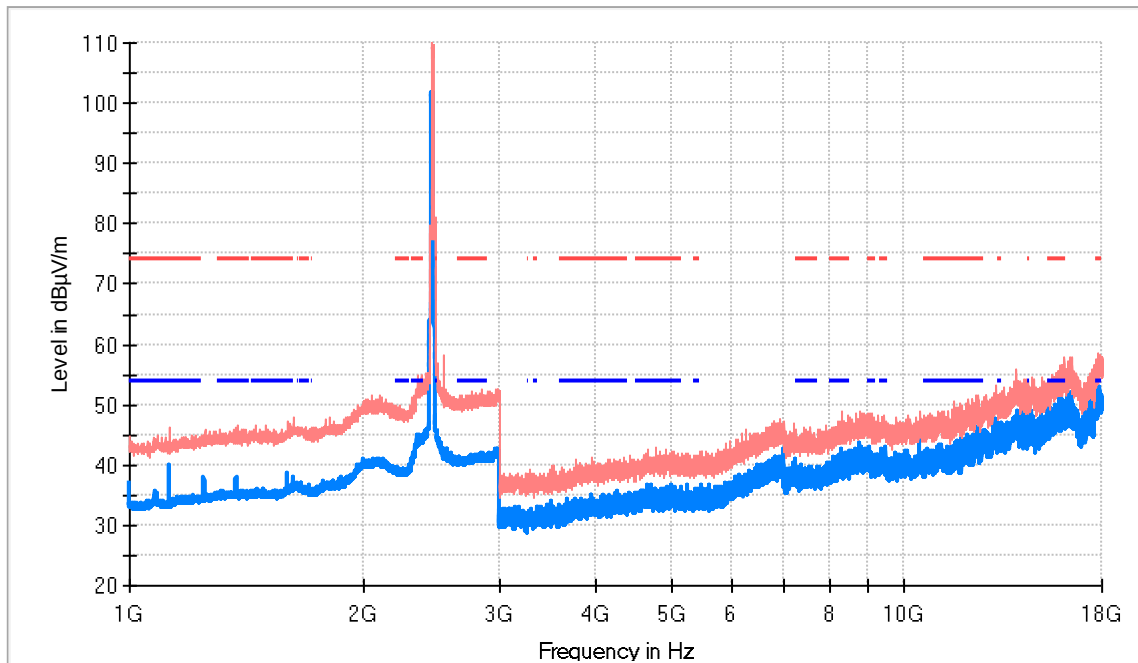
Frequency (MHz)	PK+_MAXH (dBμV/m)	AVG_MAXH (dBμV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBμV/m)	Comment
1124.500000	45.9	39.7	V	14.3	54.0	
2439.000000	110.2	101.8	H	---	---	Fundamental
15989.000000	54.0	51.0	V	3.0	54.0	
17893.500000	56.5	52.6	H	1.4	54.0	

Frequency range 1 - 18 GHz

Highest Channel

Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11g, Frequency Range GHz = [1, 18]

Images:



— 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

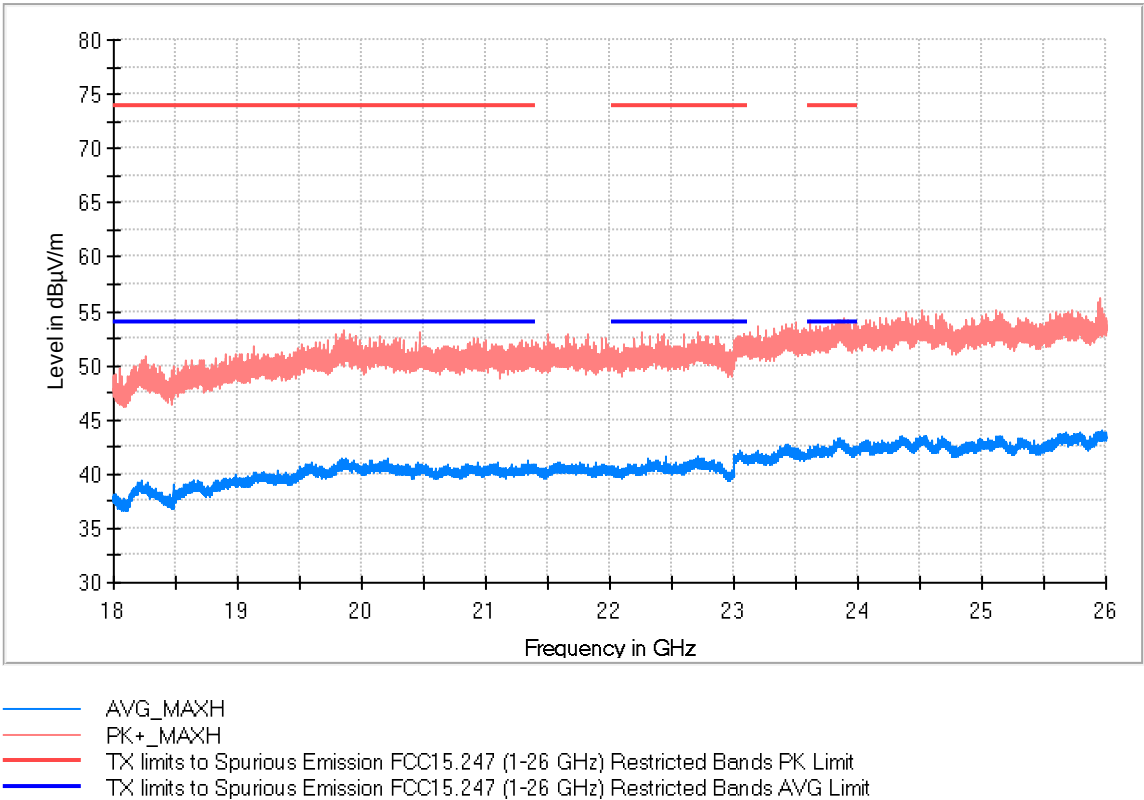
Frequency (MHz)	PK+_MAXH (dBμV/m)	AVG_MAXH (dBμV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBμV/m)	Comment
1125.000000	45.2	39.8	H	14.2	54.0	
2461.000000	110.0	101.4	H	---	---	Fundamental
15979.500000	54.4	51.1	H	2.9	54.0	
17921.000000	57.7	52.7	H	1.3	54.0	

Frequency range 18 - 26 GHz

Lowest Channel

Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11g, Frequency Range GHz = [18, 26]

Images:



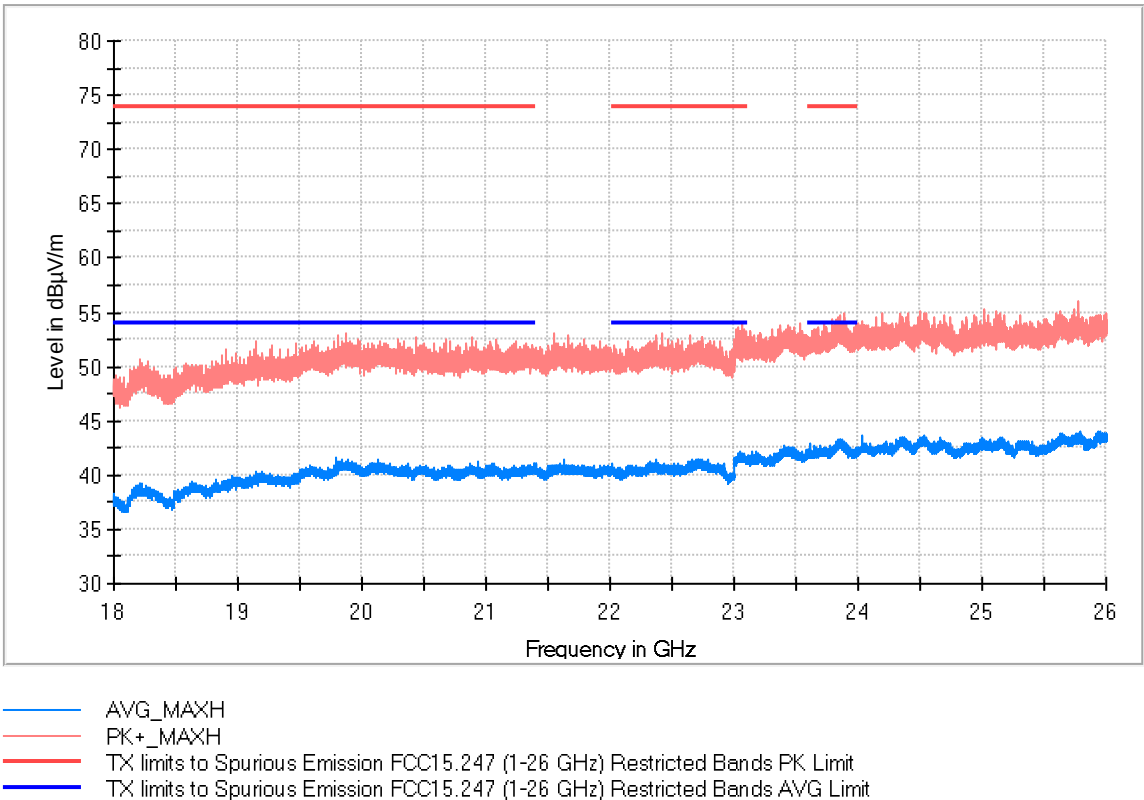
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19850.500000	53.3	41.0	V	13.0	54.0
22263.500000	53.1	40.3	V	13.7	54.0
23889.000000	54.3	42.6	H	11.4	54.0

Frequency range 18 - 26 GHz

Middle Channel

Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11g, Frequency Range GHz = [18, 26]

Images:



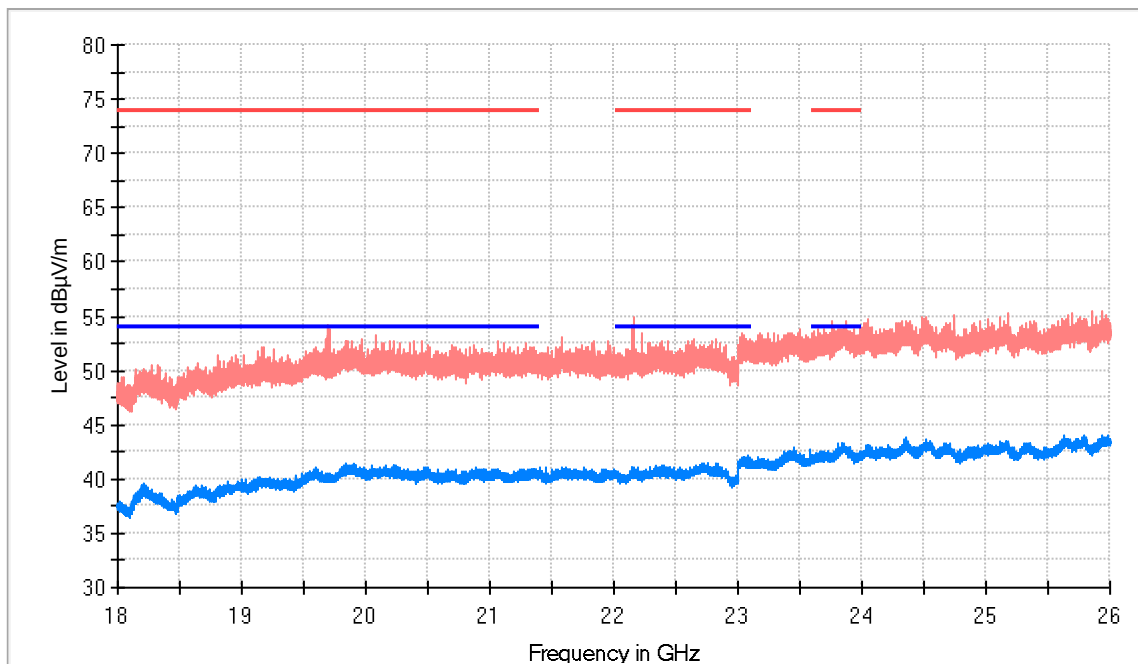
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19869.000000	53.0	40.8	H	13.2	54.0
23063.000000	54.1	41.5	H	12.5	54.0
23881.000000	54.9	42.3	H	11.7	54.0

Frequency range 18 - 26 GHz

Highest Channel

Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11g, Frequency Range GHz = [18, 26]

Images:



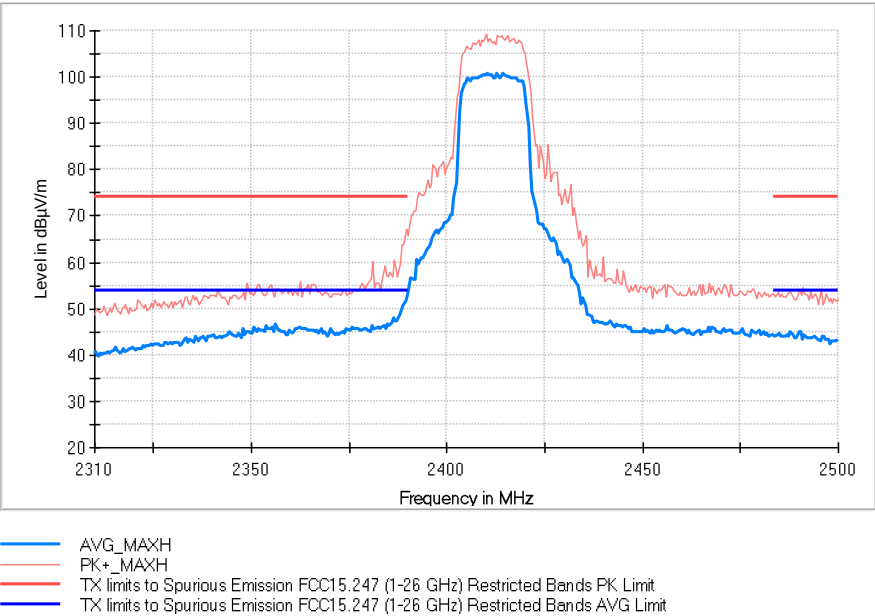
— AVG_MAXH
— PK+_MAXH
— TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
— TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBμV/m)	AVG_MAXH (dBμV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBμV/m)
19700.500000	54.1	40.2	H	13.8	54.0
22162.500000	54.9	40.4	H	13.6	54.0
23867.500000	54.5	42.7	V	11.3	54.0

Restricted Bands (2.31 GHz - 2.5 GHz)

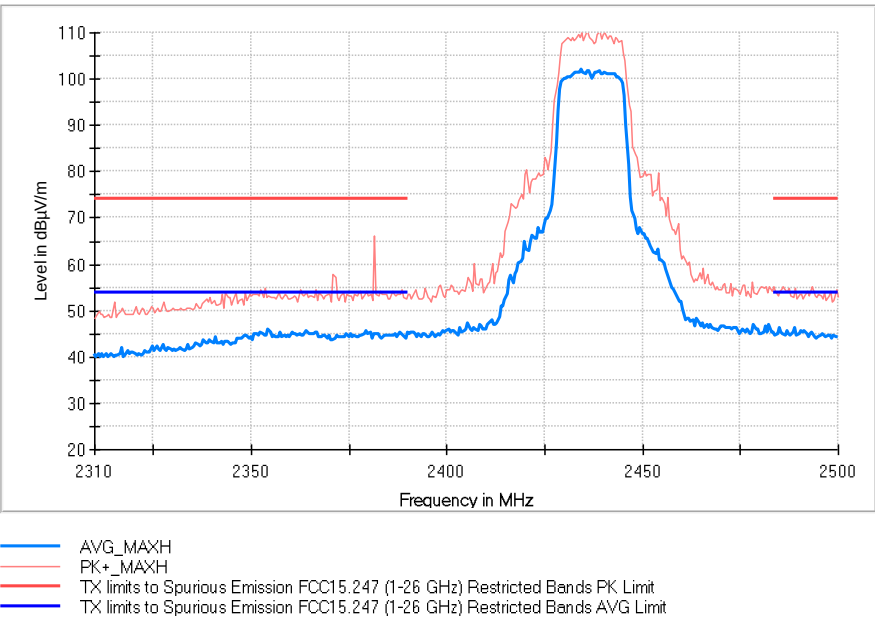
Lowest Channel

Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11g, Frequency Range GHz = [1, 18]



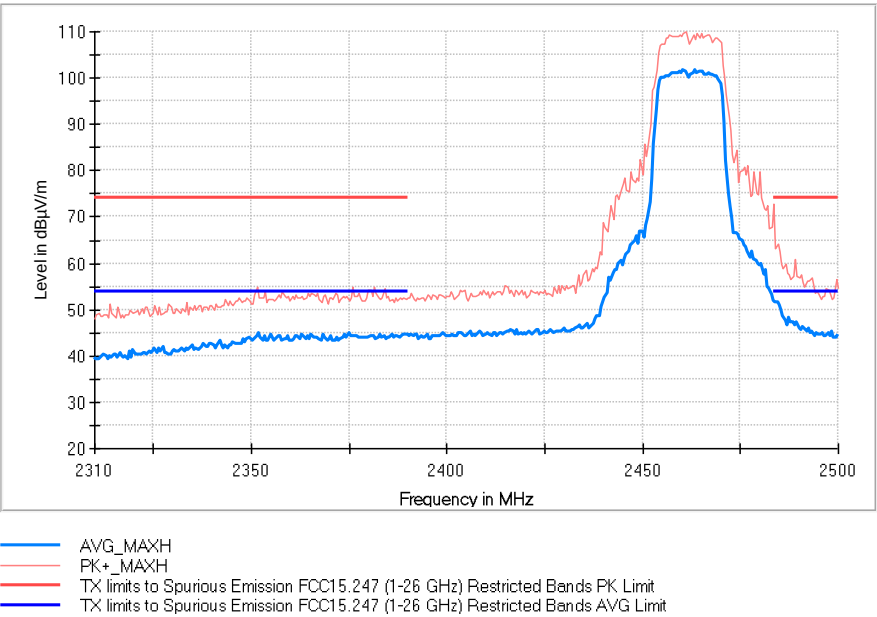
Middle Channel

Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11g, Frequency Range GHz = [1, 18]



Highest Channel

Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20,
Modulation = 802.11g, Frequency Range GHz = [1, 18]



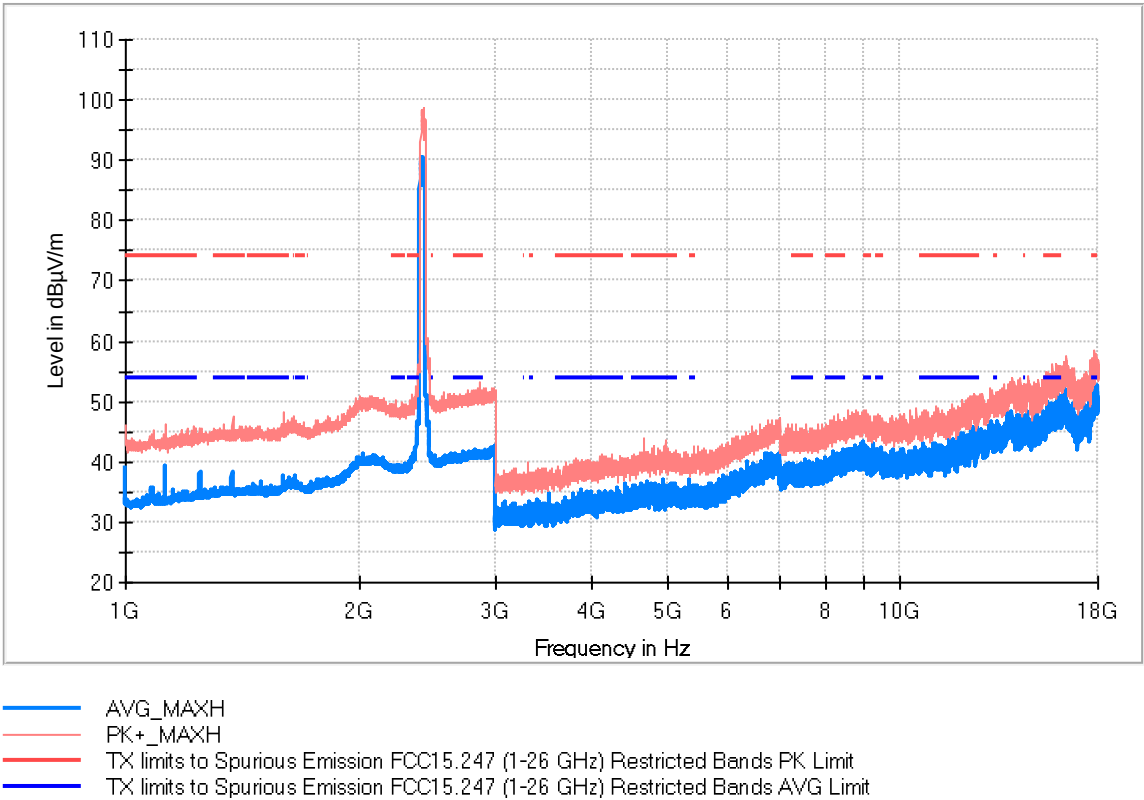
Modulation: 802.11n HT40 (OFDM MCS0)
Results

Frequency range 1 - 18 GHz

Lowest Channel

Frequency MHz = 2422.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40,
Modulation = 802.11n HT40 (OFDM MCS0), Frequency Range GHz = [1, 18]

Images:



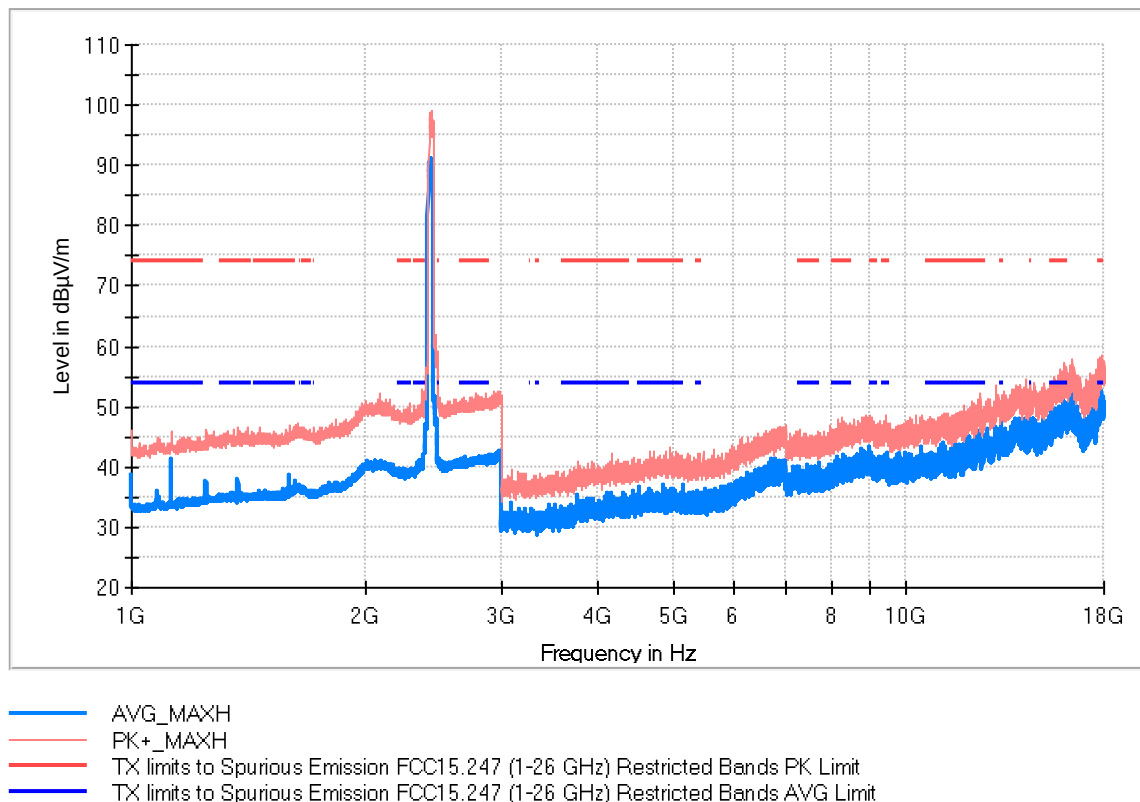
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
1125.000000	46.1	39.2	H	14.8	54.0	
2424.000000	98.6	89.9	H	---	---	Fundamental
16086.000000	53.8	50.7	H	3.3	54.0	
17948.000000	54.8	52.4	H	1.6	54.0	

Frequency range 1 - 18 GHz

Middle Channel

Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40,
Modulation = 802.11n HT40 (OFDM MCS0), Frequency Range GHz = [1, 18]

Images:



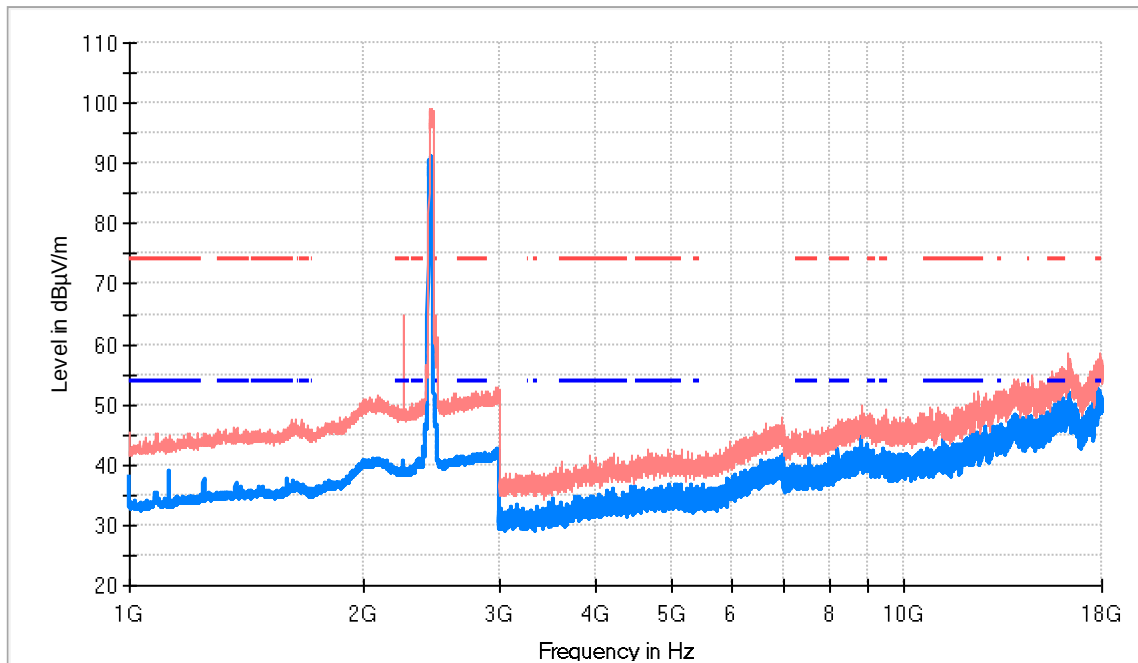
Frequency (MHz)	PK+_MAXH (dBμV/m)	AVG_MAXH (dBμV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBμV/m)	Comment
1124.500000	45.9	41.1	V	12.9	54.0	
2435.000000	99.1	90.0	H	---	---	Fundamental
16003.000000	54.9	50.7	H	3.3	54.0	
17852.500000	56.9	52.6	H	1.4	54.0	

Frequency range 1 - 18 GHz

Highest Channel

Frequency MHz = 2452.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40,
Modulation = 802.11n HT40 (OFDM MCS0), Frequency Range GHz = [1, 18]

Images:



— 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

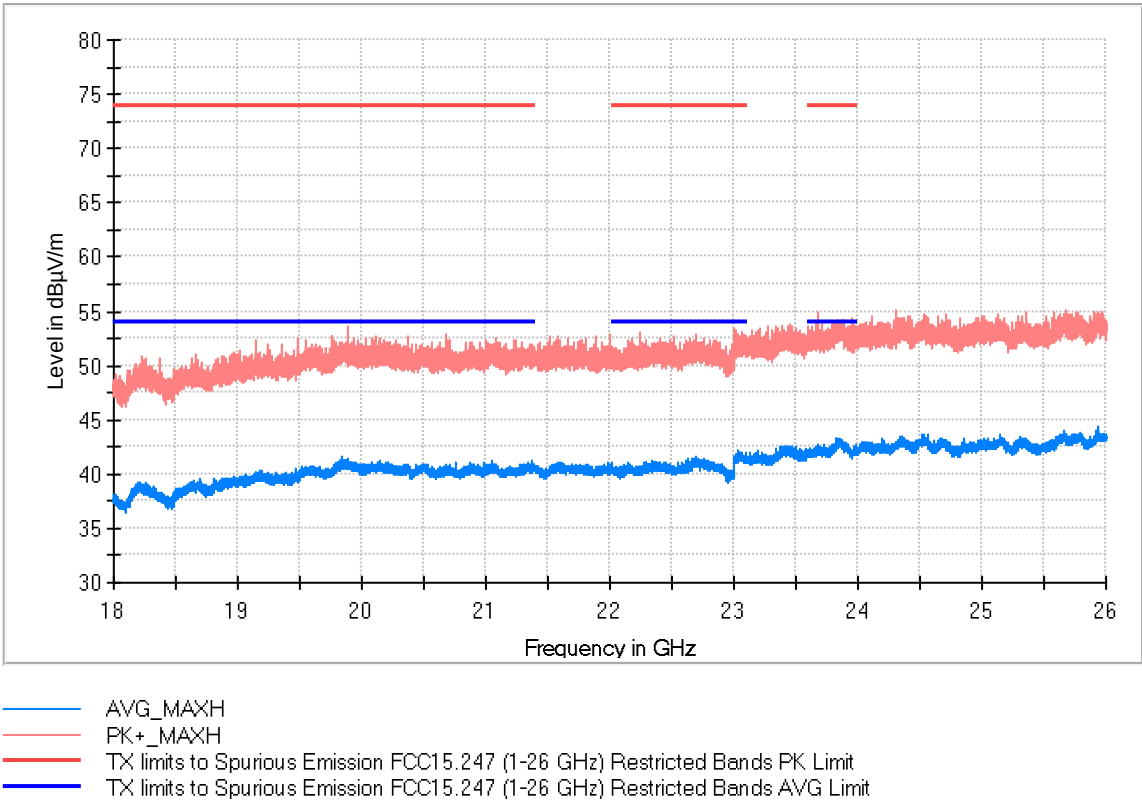
Frequency (MHz)	PK+_MAXH (dBμV/m)	AVG_MAXH (dBμV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBμV/m)	Comment
2264.500000	64.9	40.6	H	13.4	54.0	
2454.000000	99.2	91.1	H	---	---	Fundamental
15904.000000	54.5	50.9	V	3.1	54.0	
17779.500000	56.4	52.8	V	1.2	54.0	

Frequency range 18 - 26 GHz

Lowest Channel

Frequency MHz = 2422.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11n HT40 (OFDM MCS0), Frequency Range GHz = [18, 26]

Images:



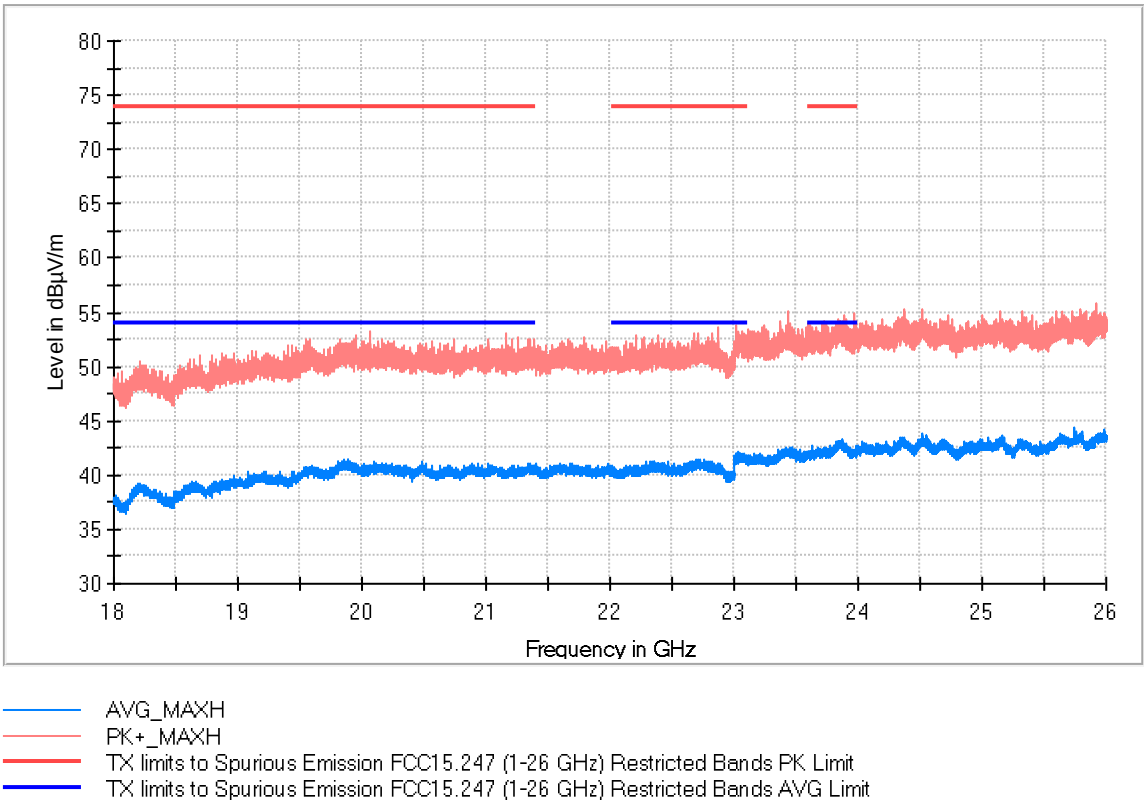
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19887.000000	53.6	40.9	H	13.1	54.0
23000.500000	53.5	41.5	V	12.5	54.0
23678.500000	54.9	42.4	H	11.6	54.0

Frequency range 18 - 26 GHz

Middle Channel

Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11n HT40 (OFDM MCS0), Frequency Range GHz = [18, 26]

Images:



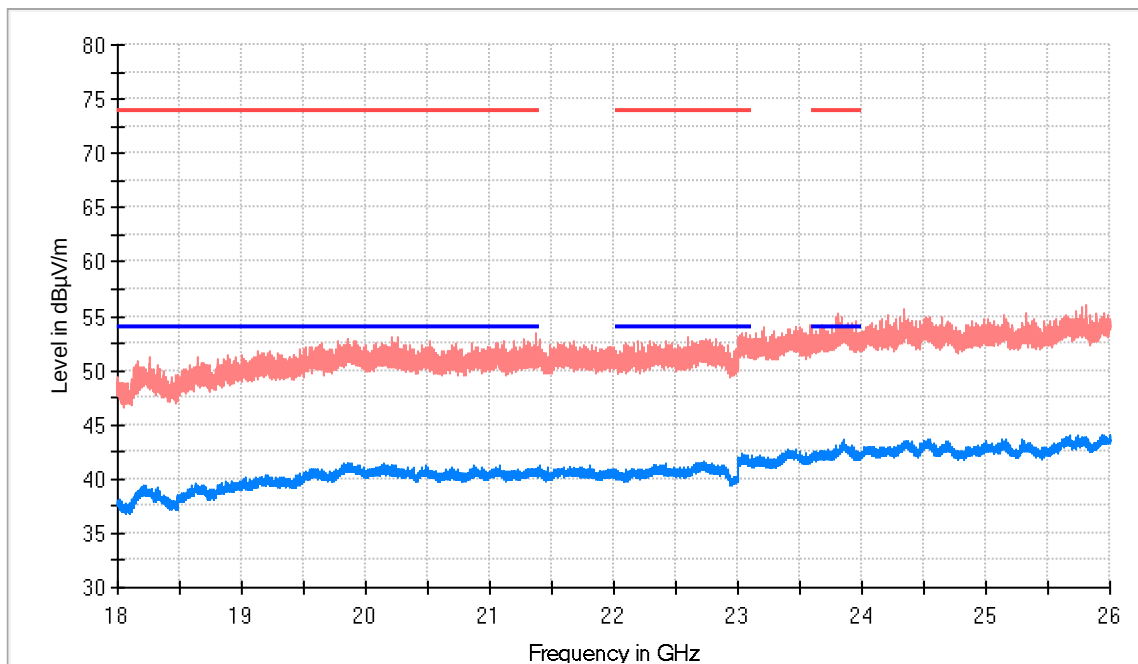
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
20063.000000	53.2	40.7	H	13.3	54.0
23015.500000	53.9	41.1	H	12.9	54.0
23964.500000	55.0	42.0	V	12.0	54.0

Frequency range 18 - 26 GHz

Highest Channel

Frequency MHz = 2452.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40,
Modulation = 802.11n HT40 (OFDM MCS0), Frequency Range GHz = [18, 26]

Images:



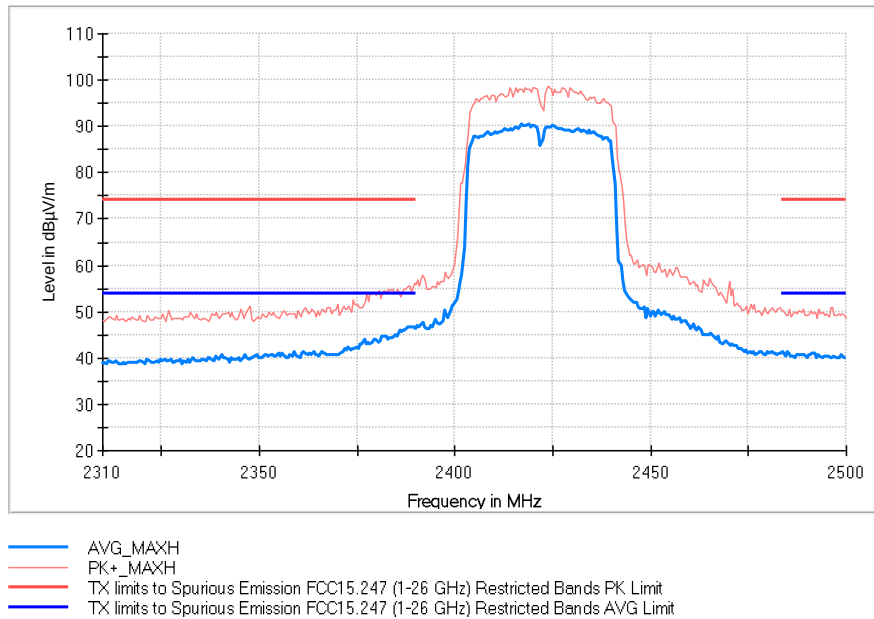
— AVG_MAXH
— PK+_MAXH
— TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
— TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBμV/m)	AVG_MAXH (dBμV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBμV/m)
21369.500000	53.4	40.4	V	13.6	54.0
22600.500000	53.1	40.5	H	13.5	54.0
23814.500000	55.2	42.6	V	11.4	54.0

Restricted Bands (2.31 GHz - 2.5 GHz)

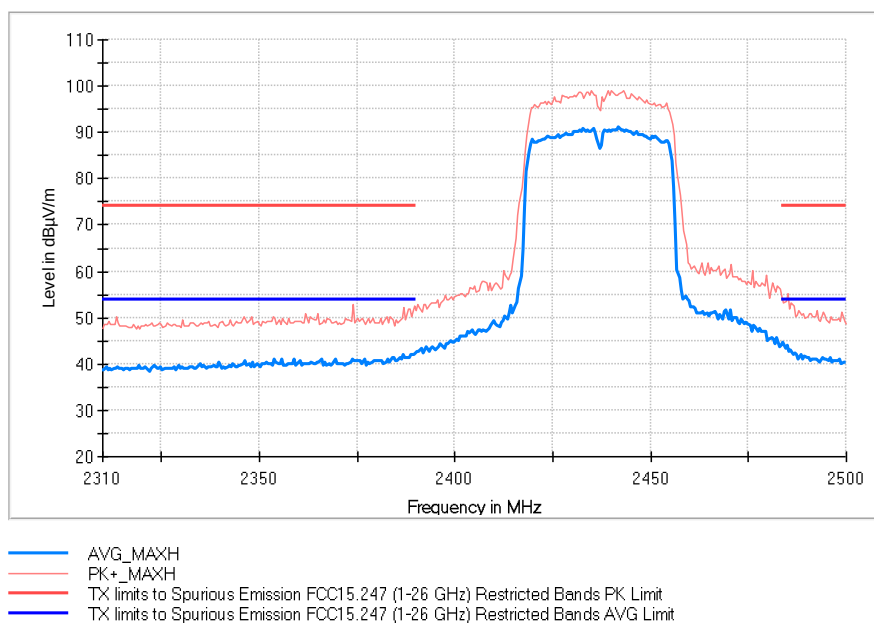
Lowest Channel

Frequency MHz = 2422.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40,
Modulation = 802.11n HT40 (OFDM MCS0), Frequency Range GHz = [1, 18]



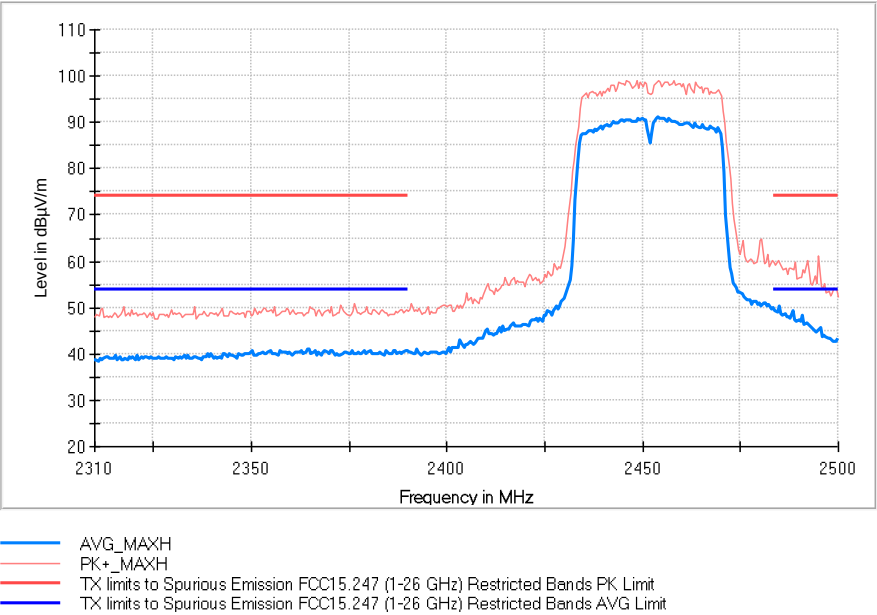
Middle Channel

Frequency MHz = 2437.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40,
Modulation = 802.11n HT40 (OFDM MCS0), Frequency Range GHz = [1, 18]



Highest Channel

Frequency MHz = 2452.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 40, Modulation = 802.11n HT40 (OFDM MCS0), Frequency Range GHz = [1, 18]



Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time
30 MHz - 1 GHz	48.5 kHz	RMS; PK+	100 kHz	1 s

Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time
1 GHz - 3 GHz	500 kHz	PK+; AVG	1 MHz	1 s
3 GHz - 18 GHz	500 kHz	PK+; AVG	1 MHz	1 s

Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time
18 GHz - 26 GHz	500 kHz	PK+; AVG	1 MHz	1 s