DEKRA Certification, Inc.
405 Glenn Dr. Suite 12,
Sterling, VA 20164
United States of America

FCC LISTED, REGISTRATION NUMBER: 2764.01

ISED LISTED REGISTRATION NUMBER: 23595-1

Test Report No:
3680ERM.002

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	Bluetooth Low-Energy 5.2 Module
(*) Trademark	EM Microelectronic
(*) Model and /or type reference	EM9305v01
Other identification of the product	FCC ID: 2ACQR-EM9305V1 IC: 12155A-EM9305V1 HVIN: 12-1030-02
(*) Features	Bluetooth LE
Manufacturer	EM Microelectronic 5475 Mark Dabling Blvd, Suite 200 Colorado Springs, CO 80918
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 Digitally signed by Domingo Galvez DN: cn=Domingo Galvez, o=DEKRA Certification Inc., ou=Regulatory Lab, email=dgalvez@dekra.com, c=US
Date of issue	06-16-2023
Report template No	FDT08_23 (*) "Data provided by the client"

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United States of America

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Acronyms

Acronym ID	Acronym Description
# of Tx Chains	Number of Transmission Chains
BW	Bandwidth
Equipment	Equipment Type
Freq	Frequency
Inband Peak Lvl	Inband 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.

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	5150-5850	0.88	dB
Occupied Bandwidth		1.87	%
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 a The EM9305v1 is a high-performance, customizable Bluetooth low energy module for easy integration of the EM9305 BLE IC into custom applications.

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:

Control Nº	Description	Model	Serial Nº	Date of reception
3680/12	Conducted sample BC2	EM9305V1	-	06/17/2022

Sample S/01 is composed of the following accessories:

Control Nº	Description	Model	Serial Nº	Date of reception
3680/02	Carrier board	-	-	06/17/2022

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:

Control Nº	Description	Model	Serial Nº	Date of reception
3680/04	Conducted sample B1	EM9305V1	-	06/17/2022

Sample S/02 is composed of the following accessories:

Control Nº	Description	Model	Serial Nº	Date of reception
3680/01	Carrier board	-	-	06/17/2022

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

Test sample description

Ports…… :	Port name and description		Cable				
			Specified max length [m]	Attached during test	Shielded	Coupled to patient	
	None		.....	[ ]	[ ]	[ ]	
	.....		.....	[ ]	[ ]	[ ]	
	.....		.....	[ ]	[ ]	[ ]	
	.....		.....	[ ]	[ ]	[ ]	
	.....		.....	[ ]	[ ]	[ ]	
	.....		.....	[ ]	[ ]	[ ]	
Supplementary information to the ports…… :	No data provided						
Rated power supply .....:	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	[ ]	AC:	[ ]	[ ]	[ ]	[ ]	[ ]
	[ ]	AC:	[ ]	[ ]	[ ]	[ ]	[ ]
	[X]	DC: 3V CR2032 Battery					
	[ ]	DC:					
Rated Power .....:	3.6V Max						
Clock frequencies.....:	48MHz						
Other parameters .....:	No data provided						
Software version .....:	v1.0						
Hardware version .....:	12-1030-02						
Dimensions in cm (W x H x D) ....:	24.127x16.5mm						
Mounting position .....:	[ ]	Table top equipment					
	[ ]	Wall/Ceiling mounted equipment					
	[ ]	Floor standing equipment					
	[ ]	Hand-held equipment					
	[ ]	Other:					

Modules/parts.....:	Module/parts of test item	Type	Manufacturer
	B1, B2, B3	Radiating	EM Micro
	BC1, BC2, BC3	Conducted	EM Micro
	BCU1	Conducted	EM Micro
Accessories (not part of the test item) .....:	Description	Type	Manufacturer
	White DB9 USB-> UART Converter	Cable	EM Micro
	Carrier Board	PBA+Battery	EM Micro
Documents as provided by the applicant.....:	Description	File name	Issue date
	Declaration Equipment Data	FDT30_18 Completed	07/06/2022
Copy of marking plate:			
No marking plate			

Identification of the client

EM Microelectronic
5475 Mark Dabling Blvd, Suite 200 Colorado Springs, CO 80918

Testing period and place

Test Location	DEKRA Certification Inc.
Date (start)	06-17-2022
Date (finish)	7-27-2022

Document history

Report number	Date	Description
3680ERM.002	06-16-2023	First release

Environmental conditions

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

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 20 % Max. = 75 %

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

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 20 % Max. = 75 %

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

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 20 % Max. = 75 %

Remarks and comments

The tests have been performed by the technical personnel: Lakshmi Gollamudi, Juliana Cherry, and Nasir Khan.

List of equipment used during the test

Conducted Measurements

CONTROL NUMBER	DESCRIPTION	Serial No	LAST CALIBRATION	NEXT CALIBRATION
1039	FSV40 SIGNAL ANALYSER 40GHZ	101627	2020-09-24	2022-09-24
1107	ETHERNET SNMP THERMOMETER	60038026952	2020-08-16	2022-08-16
1313	WIRELESS MEASUREMENT SOFTWARE R&S WMS32	-	N/A	N/A

Radiated Measurements

CONTROL NUMBER	DESCRIPTION	Serial No	LAST CALIBRATION	NEXT CALIBRATION
981	LOW NOISE PREAMPLIFIER	1711156B	2020-11-10	2022-11-10
1012	ESR26 EMI TEST RECEIVER	101478	2022-04-12	2024-04-12
1014	FSV40 SIGNAL ANALYZER 40GHZ	101626	2021-05-19	2023-05-19
1056	3116C DOUBLE-RIDGED WAVEGUIDE HORN ANTENNAS	213179	2020-01-10	2023-01-10
1057	3115 DOUBLE-RIDGED WAVEGUIDE HORN ANTENNAS	211373	2020-06-03	2023-06-03
1065	3142E BICONILOG ANTENNA	208587	2020-08-13	2023-08-13
1111	ETHERNET SNMP THERMOMETER	60038026577	2020-08-16	2022-08-16
1179	SEMI-ANECHOIC CHAMBER	F169021	N/A	N/A
1314	WIRELESS MEASUREMENT SOFTWARE R&S EMC32	1040-OT102236	N/A	N/A

Testing verdicts

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

Summary

Bluetooth Low Energy 5.0 (2M, 1M)

Requirement – Test case	FCC PART 15 PARAGRAPH / RSS-247	Verdict	Remark
RSS-247 5.2 (a) / FCC 15.247 (a) (2) 6 dB Bandwidth		Pass	N/A
RSS-247 5.2 (b) / FCC 15.247 (e) Power spectral density		Pass	N/A
RSS-247 5.4 (d) / FCC 15.247 (b) (3) Maximum Peak Conducted output power		Pass	N/A
RSS-247 5.5 / FCC 15.247 (d) Band-edge emissions compliance (Transmitter)		Pass	N/A
FCC 2.1049 / Occupied Channel Bandwidth 99%		Pass	N/A
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Conducted		N/A	Refer 1
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Radiated		Pass	N/A
Supplementary information and remarks: 1. The equipment has an integral antenna.			

Appendix A: Test results. Bluetooth Low Energy 5.2

PRODUCT INFORMATION

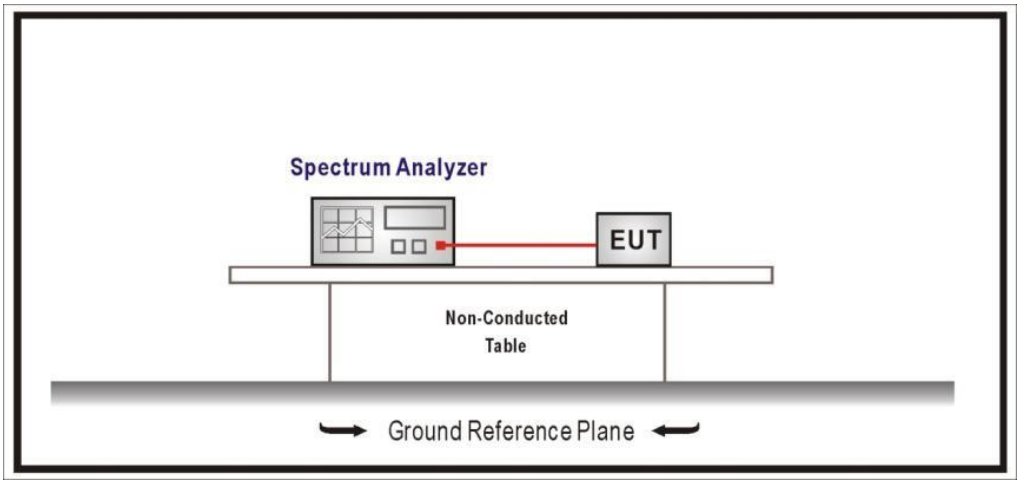
Information	Description
Modulation	GFSK
Operation mode 1: Single Antenna Equipment	
- Operating Frequency Range	2402 - 2480 MHz
- Nominal Channel Bandwidth	2 MHz
- RF Output Power	6 dBm
Antenna type	PCB IFA
Antenna gain	1.7 dBi
Nominal Voltage	
- Supply Voltage	3V CR2032 Battery V
- Type of power source	DC voltage
Equipment type	Bluetooth Low Energy
Geo-location capability	No

TEST CONDITIONS

(*): Data provided by the client.

TEST CONDITIONS	DESCRIPTION
TC#01 (2 Mbps)	Power supply (V): $V_{nominal}$ = 3V CR2032 Battery V Data Rate: 2 Mbps Bandwidth: 2 MHz Test Frequencies for Conducted/ Radiated tests: Lowest channel: 2402 MHz Middle channel: 2440 MHz Highest channel: 2480 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 (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 360º 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.

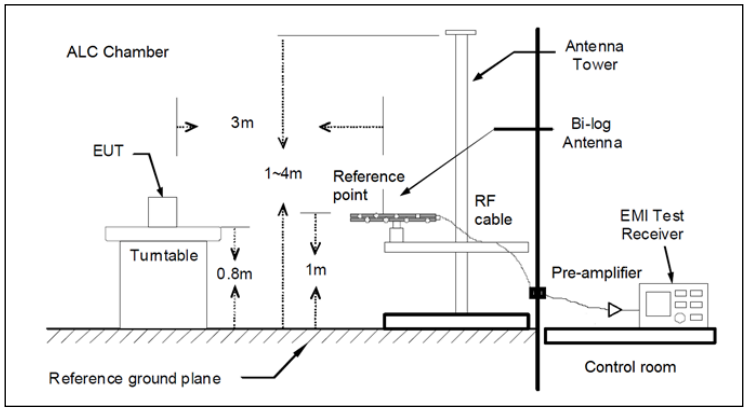


Fig A1: Radiated measurements Setup f < 1 GHz

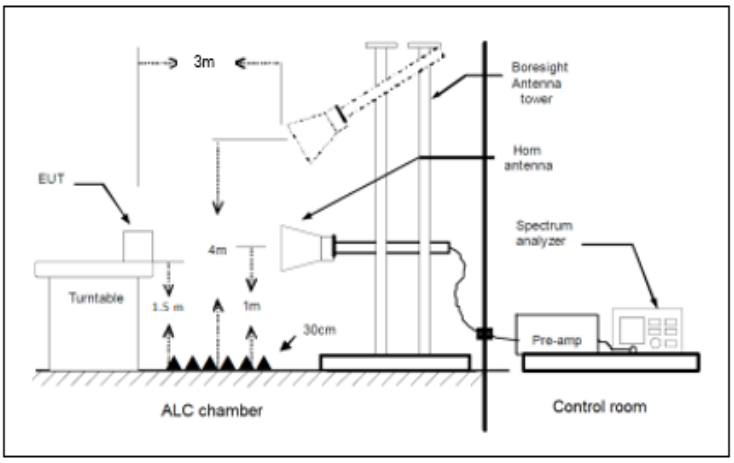


Fig A2: Radiated measurements setup f > 1-18 GHz

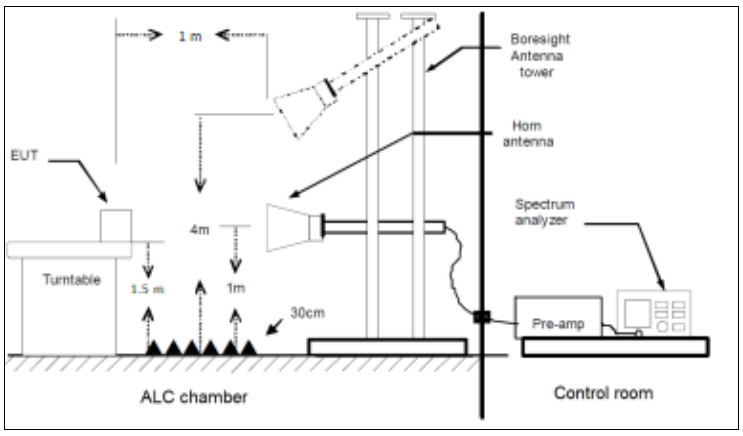


Fig A3: Radiated measurements setup f > 18 GHz

TEST CASES DETAILS

RSS-247 5.2 (a) / FCC 15.247 (a) (2) 6 dB Bandwidth

Limits

The minimum 6 dB bandwidth shall be at least 500 kHz.

Modulation: BTLE 5.2 (GFSK 2 Mbit/s)
Results

Freq (MHz)	BW (MHz)	# of Tx Chains	Port	Emission Bandwidth (MHz)
2402.00000				1.465
2440.00000	2	1	1	1.426
2480.00000				1.465

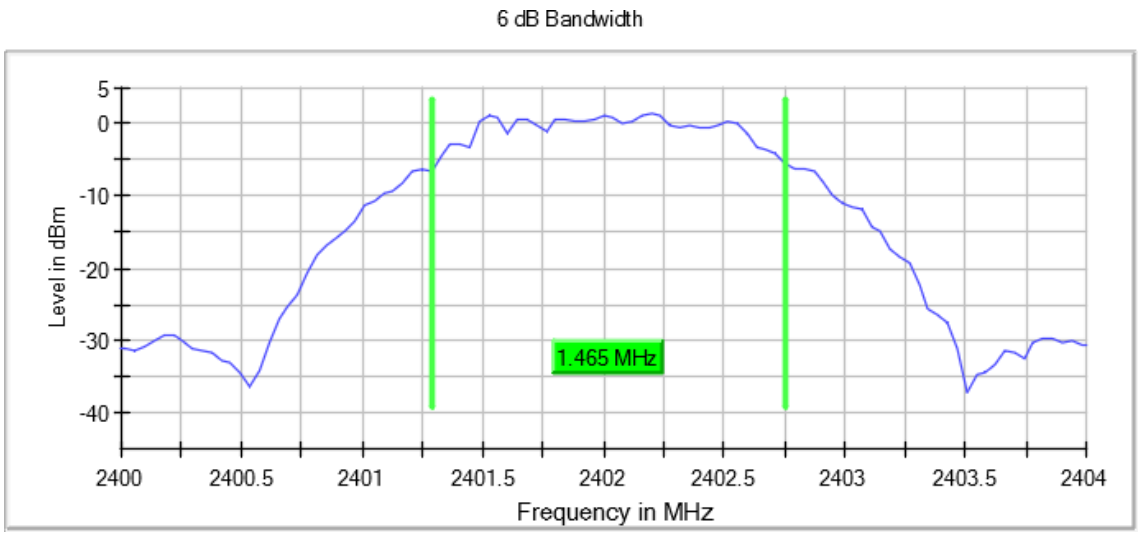
Verdict

Pass

Attachments

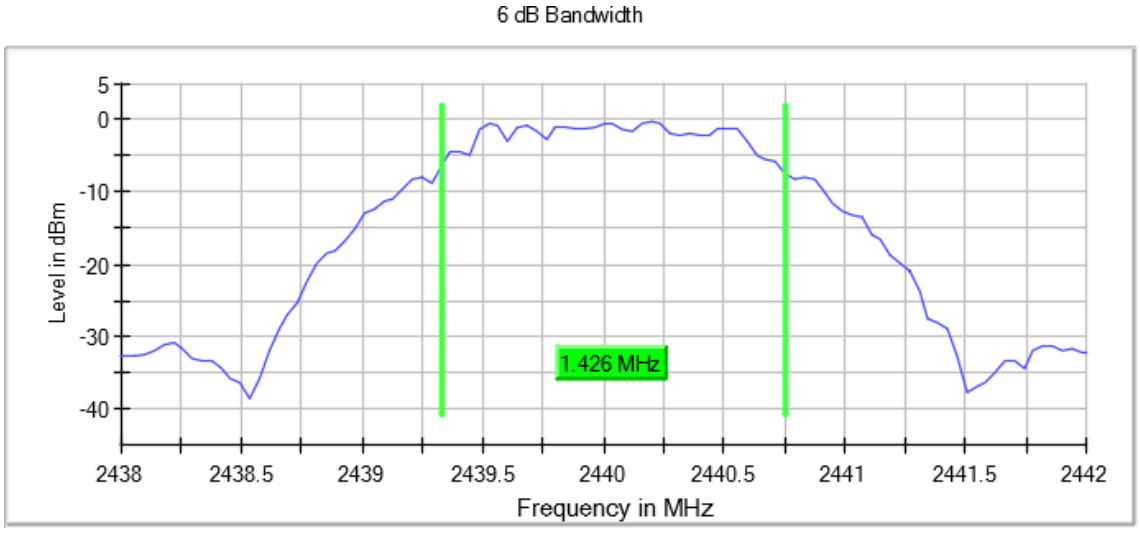
Frequency MHz = 2402.00000, Bandwidth MHz = 2, Modulation = BTLE 5.2 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



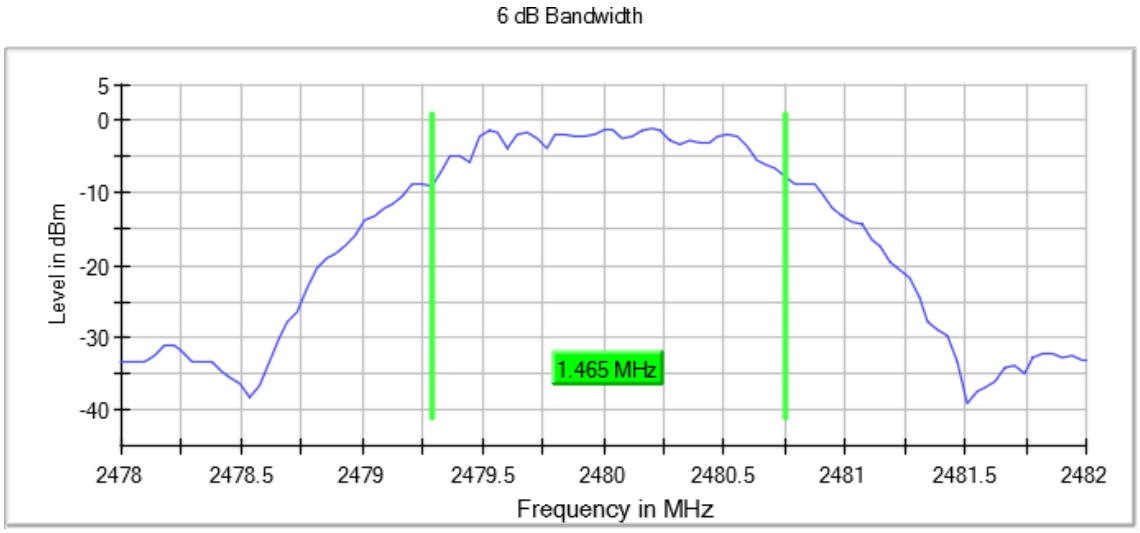
Frequency MHz = 2440.00000, Bandwidth MHz = 2, Modulation = BTLE 5.2 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Bandwidth MHz = 2, Modulation = BTLE 5.2 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Measurement

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40000 GHz	2.43800 GHz	2.47800 GHz
Stop Frequency	2.40400 GHz	2.44200 GHz	2.48200 GHz
Span	4.000 MHz	4.000 MHz	4.000 MHz
RBW	100.000 kHz	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz	300.000 kHz
Sweep Points	101	101	101
Sweep time	18.938 µs	18.938 µs	18.938 µs
Reference Level	0.000 dBm	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	100	100	100
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamp	Off	Off	Off
Stable mode	Trace	Trace	Trace
Stable value	0.50 dB	0.50 dB	0.50 dB
Run	8 / max. 150	9 / max. 150	10 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.08 dB	0.34 dB	0.01 dB

RSS-247 5.2 (b) / FCC 15.247 (e) Power spectral density

Limits

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Modulation: BTLE 5.2 (GFSK 2 Mbit/s)
Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	PSD (dBm)
2402.00000	Digital Transmission System (DTS)	2	1	1	-9.27
2440.00000					-10.93
2480.00000					-11.80

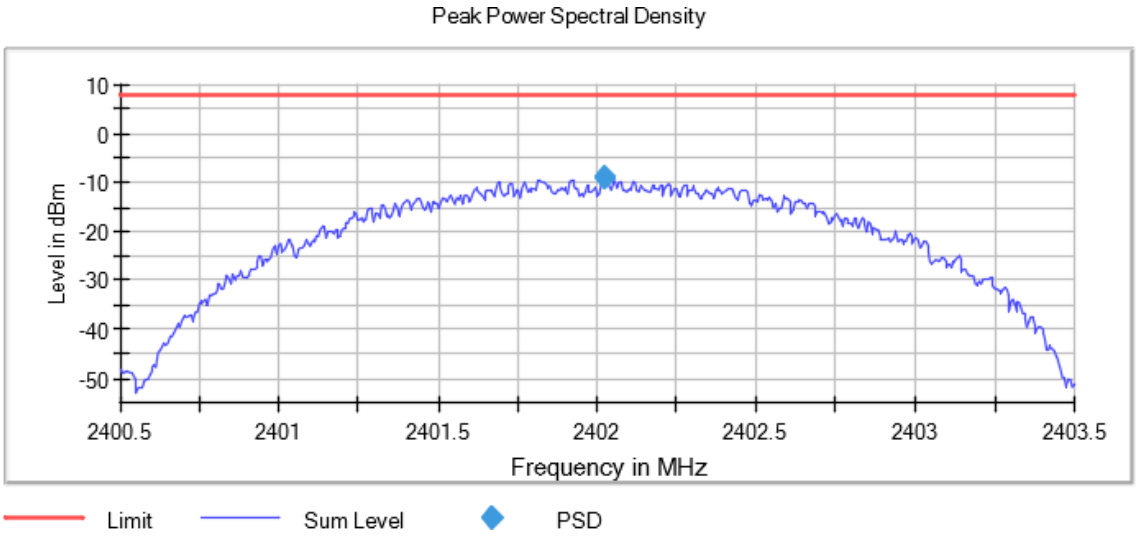
Verdict

Pass

Attachments

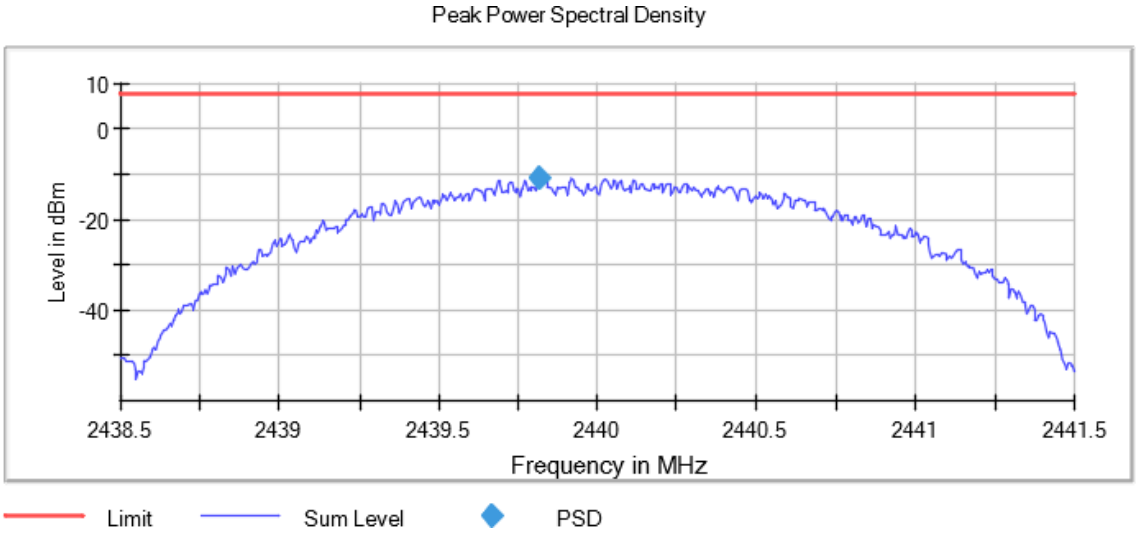
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.2 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



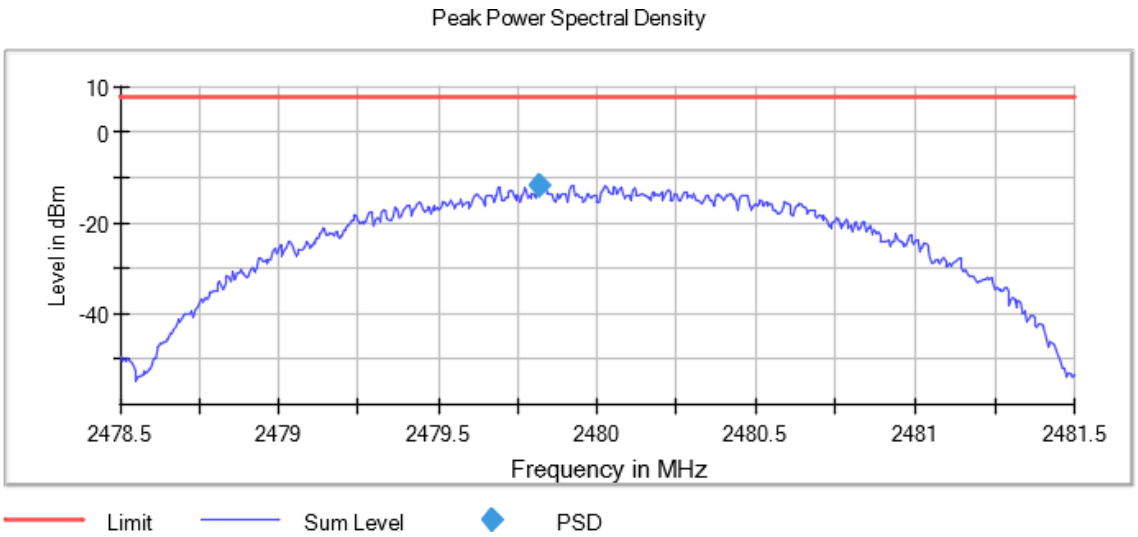
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.2 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Measurement

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40050 GHz	2.43850 GHz	2.47850 GHz
Stop Frequency	2.40350 GHz	2.44150 GHz	2.48150 GHz
Span	3.000 MHz	3.000 MHz	3.000 MHz
RBW	10.000 kHz	10.000 kHz	10.000 kHz
VBW	30.000 kHz	30.000 kHz	30.000 kHz
Sweep Points	600	600	600
Sweep time	3.000 ms	3.000 ms	3.000 ms
Reference Level	0.000 dBm	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	100	100	100
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	Sweep	Sweep	Sweep
Preamp	off	Off	off
Stable mode	Trace	Trace	Trace
Stable value	0.50 dB	0.50 dB	0.50 dB
Run	5 / max. 150	5 / max. 150	7 / max. 150
Stable	2 / 2	2 / 2	2 / 2
Max Stable Difference	0.22 dB	0.13 dB	0.16 dB

RSS-247 5.4 (d) / FCC 15.247 (b) (3) Maximum Peak 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) (Canada).

The maximum peak conducted output power level in the fundamental emission was measured using the method according to point 11.9.1.1 ”RBW ≥ DTS bandwidth” of ANSI C.63.10-2013.

Modulation: BTLE (GFSK 2 Mbit/s)

Maximum declared antenna gain: +1.7dBi

Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	EIRP (dBm)	Peak Power (dBm)
2402.00000	Digital Transmission System (DTS)	2	1	6.2	4.5
2440.00000				4.6	2.9
2480.00000				3.8	2.1

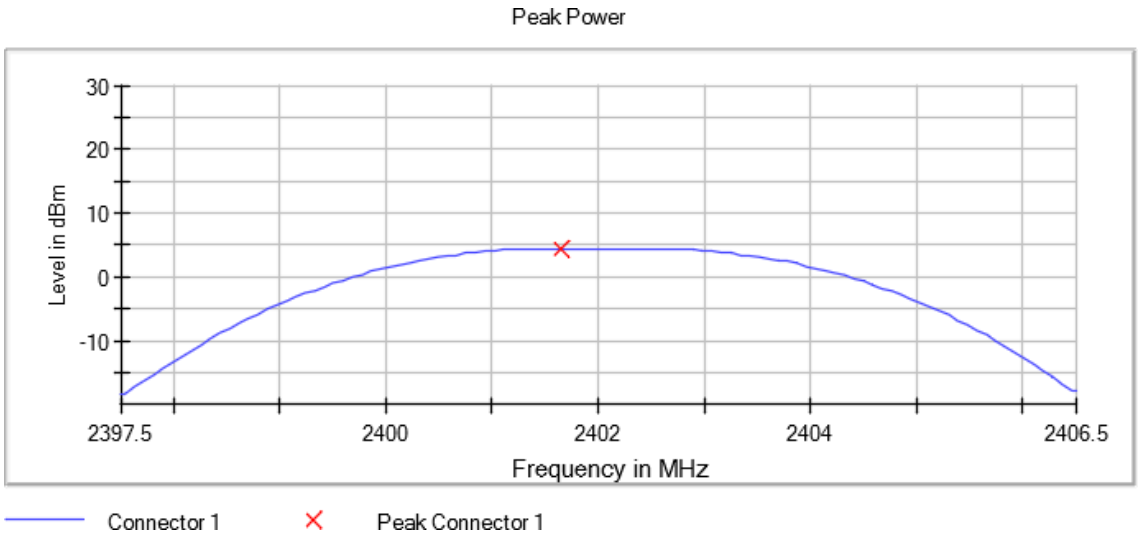
Verdict

Pass

Attachments

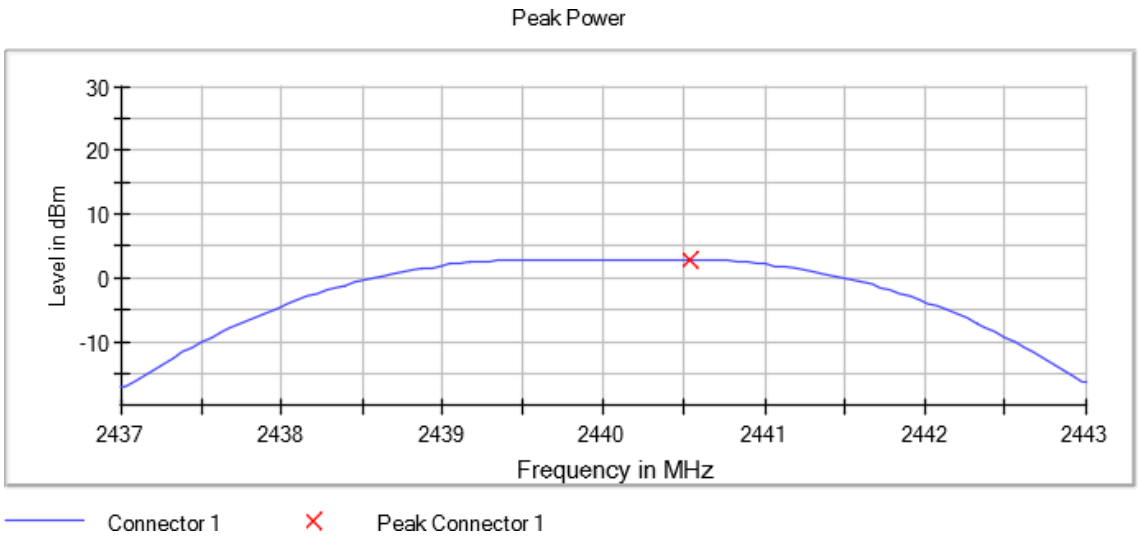
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.2 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



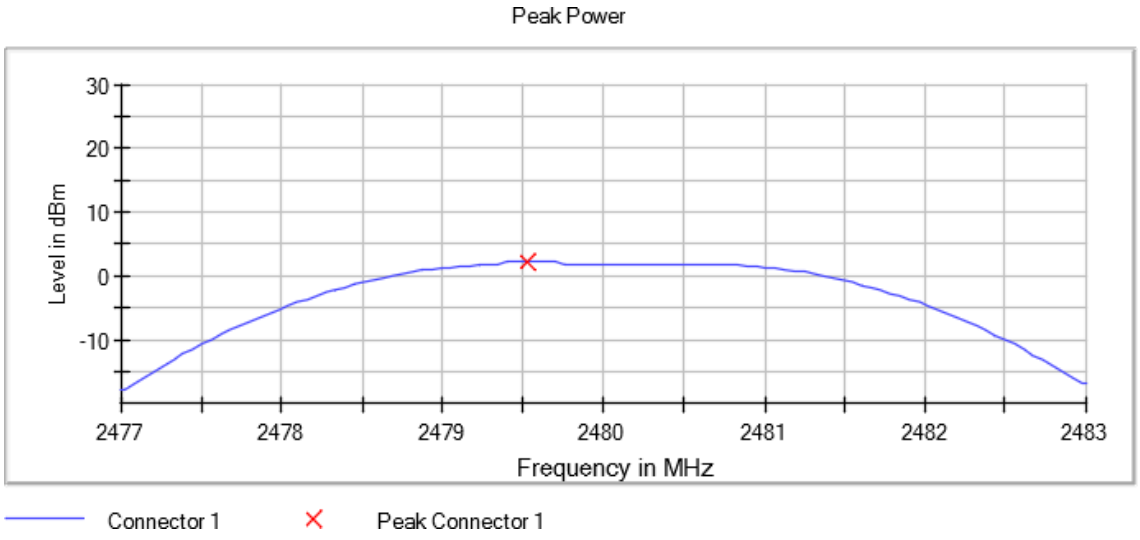
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.2 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Measurement

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.39750	2.43700	2.47700
Stop Frequency	2.40650	2.44300	2.48300
Span	9.000 MHz	6.000 MHz	6.000 MHz
RBW	3.000 MHz	2.000 MHz	2.000 MHz
VBW	10.000	10.000	10.000
SweepPoints	101	101	101
Sweeptime	1.271 µs	953.450 ns	953.450 ns
Reference Level	10.000	10.000	10.000
Attenuation	30.000 dB	30.000 dB	30.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
SweepCount	100	100	100
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweeptype	FFT	FFT	FFT
Preamp	off	off	off
Stablemode	Trace	Trace	Trace
Stablevalue	0.50 dB	0.50 dB	0.50 dB
Run	4 / max.	4 / max.	4 / max.
Stable	3 / 3	3 / 3	3 / 3
Max Stable	0.05 dB	0.05 dB	0.01 dB

RSS-247 5.5 / FCC 15.247 (d) Band-edge emissions compliance (Transmitter)

Limits

In any 100 kHz bandwidths outside the frequency band in which the intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Modulation: BTLE 5.2 (GFSK 2 Mbit/s)

Results

Freq (MHz)	Lvl (dBm)
2399.975000	-29.9
2399.925000	-31.3
2399.875000	-33.5
2399.825000	-34.7
2399.775000	-36.8
2399.725000	-40.4
2399.675000	-41.2
2399.625000	-42.8
2399.525000	-43.9
2483.825000	-53.5
2483.775000	-53.5
2484.325000	-54.2
2483.875000	-54.4
2484.375000	-54.5
2483.725000	-54.6
2497.175000	-54.9
2498.325000	-55.0
2498.275000	-55.0
2399.575000	-43.9
2399.475000	-45.7
2399.425000	-49.9
2399.375000	-49.9
2399.325000	-50.0
2399.225000	-50.5
2483.675000	-55.0

Freq (MHz)	Lvl (dBm)
2497.125000	-55.2
2484.275000	-55.2
2486.675000	-55.2
2483.575000	-55.2
2484.175000	-55.2

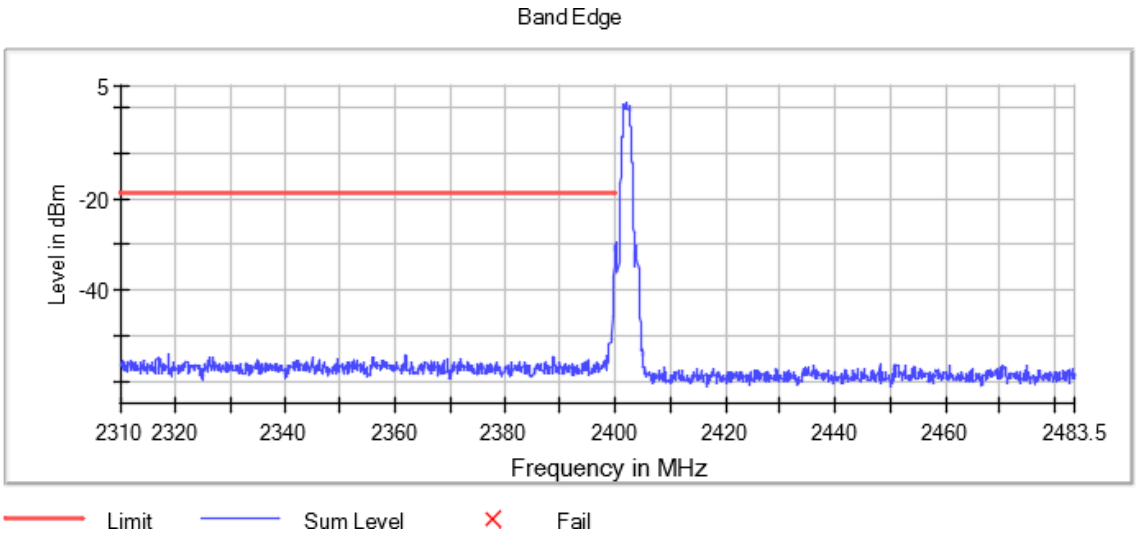
Verdict

Pass

Attachments

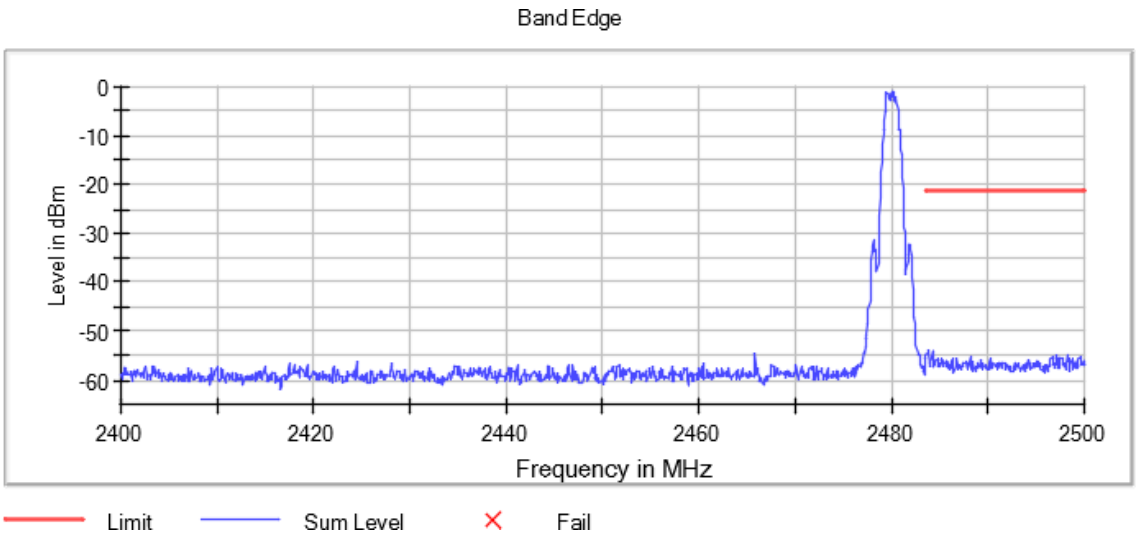
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.2 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.2 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Measurement Point = 1, Active Port = 1

Images:



Measurement 1

Setting	Instrument Value	Instrument Value
Start Frequency	2.31000	2.40000 GHz
Stop Frequency	2.40000	2.48350 GHz
Span	90.000 MHz	83.500 MHz
RBW	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz
SweepPoints	1800	1670
Sweeptime	113.672 µs	94.727 µs
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	FFT
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	5 / max. 150	5 / max. 150
Stable	3 / 3	3 / 3
Max Stable Difference	0.22 dB	0.12 dB

FCC 2.1049 / Occupied Channel Bandwidth 99%

Limits

No Limit has been set to this test case

Modulation: BTLE 5.2 (GFSK 2 Mbit/s)
Results

Freq (MHz)	Equipment	BW (MHz)	# of Tx Chains	Port	Occ Ch BW (MHz)
2402.00000	Digital Transmission System (DTS)	2	1	1	2.040
2440.00000					2.040
2480.00000					2.050

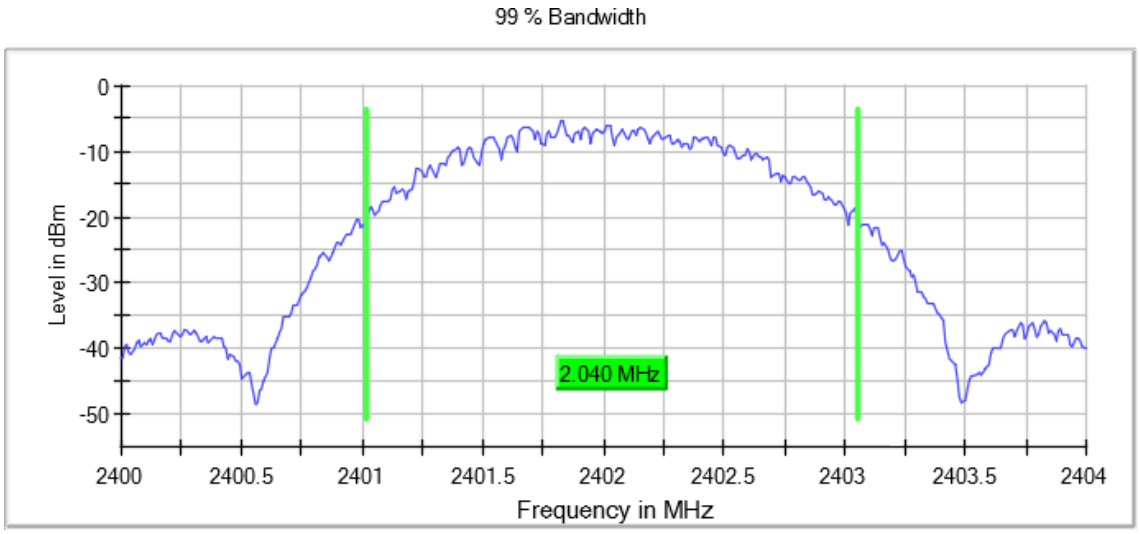
Verdict

Pass

Attachments

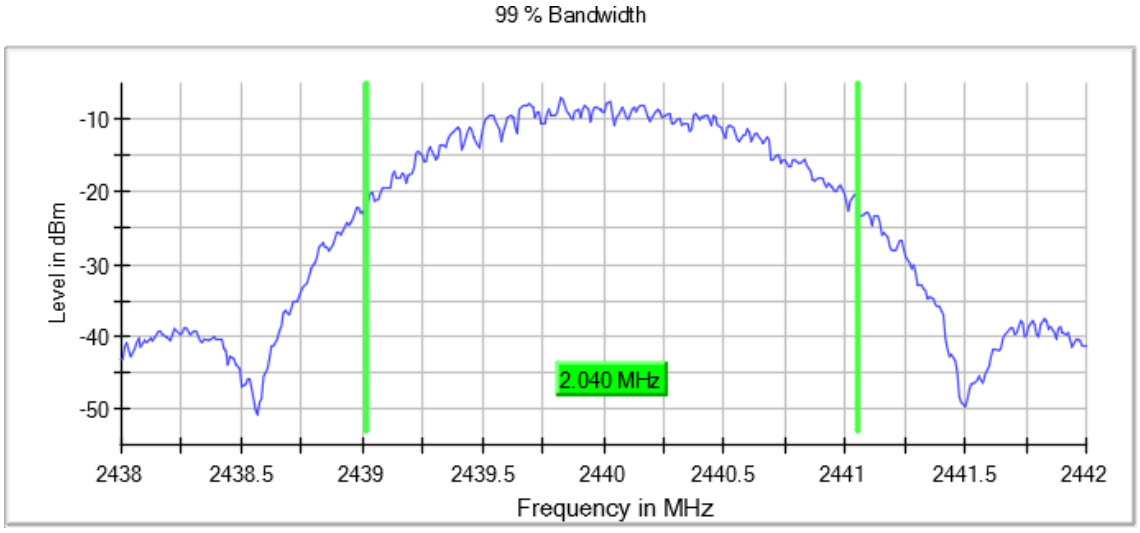
Frequency MHz = 2402.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.2 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



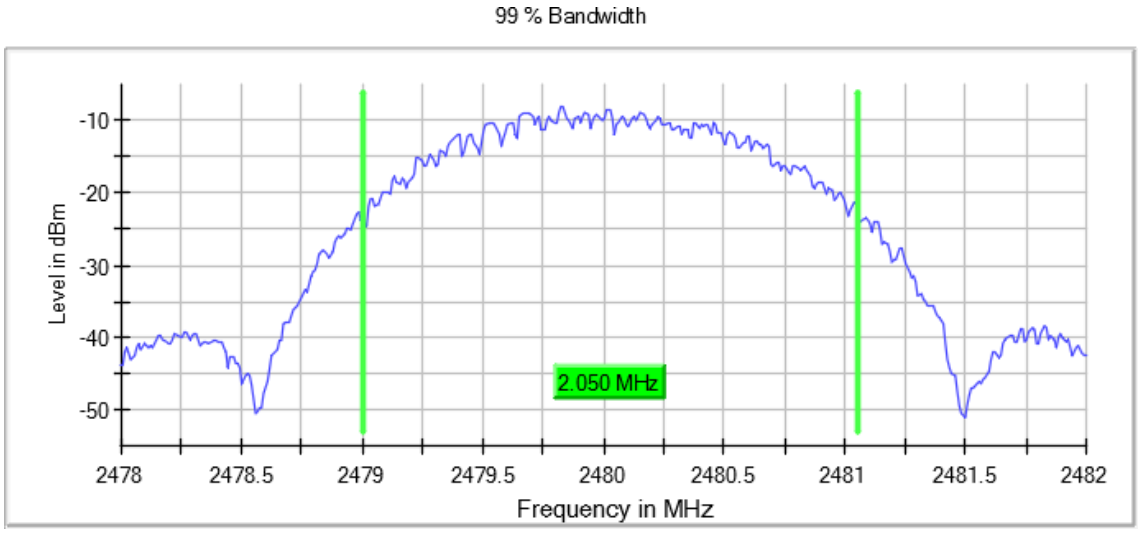
Frequency MHz = 2440.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.2 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Frequency MHz = 2480.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 2, Modulation = BTLE 5.2 (GFSK 2 Mbit/s), Number of Transmission Chains = 1, Active Port = 1

Images:



Measurement

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40000 GHz	2.43800 GHz	2.47800 GHz
Stop Frequency	2.40400 GHz	2.44200 GHz	2.48200 GHz
Span	4.000 MHz	4.000 MHz	4.000 MHz
RBW	20.000 kHz	20.000 kHz	20.000 kHz
VBW	100.000 kHz	100.000 kHz	100.000 kHz
Sweep Points	400	400	400
Sweep time	94.824 µs	94.824 µs	94.824 µs
Reference Level	0.000 dBm	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	100	100	100
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamp	Off	Off	Off
Stable mode	Trace	Trace	Trace
Stable value	0.30 dB	0.30 dB	0.30 dB
Run	6 / max. 150	6 / max. 150	7 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.06 dB	0.07 dB	0.08 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

Verdict

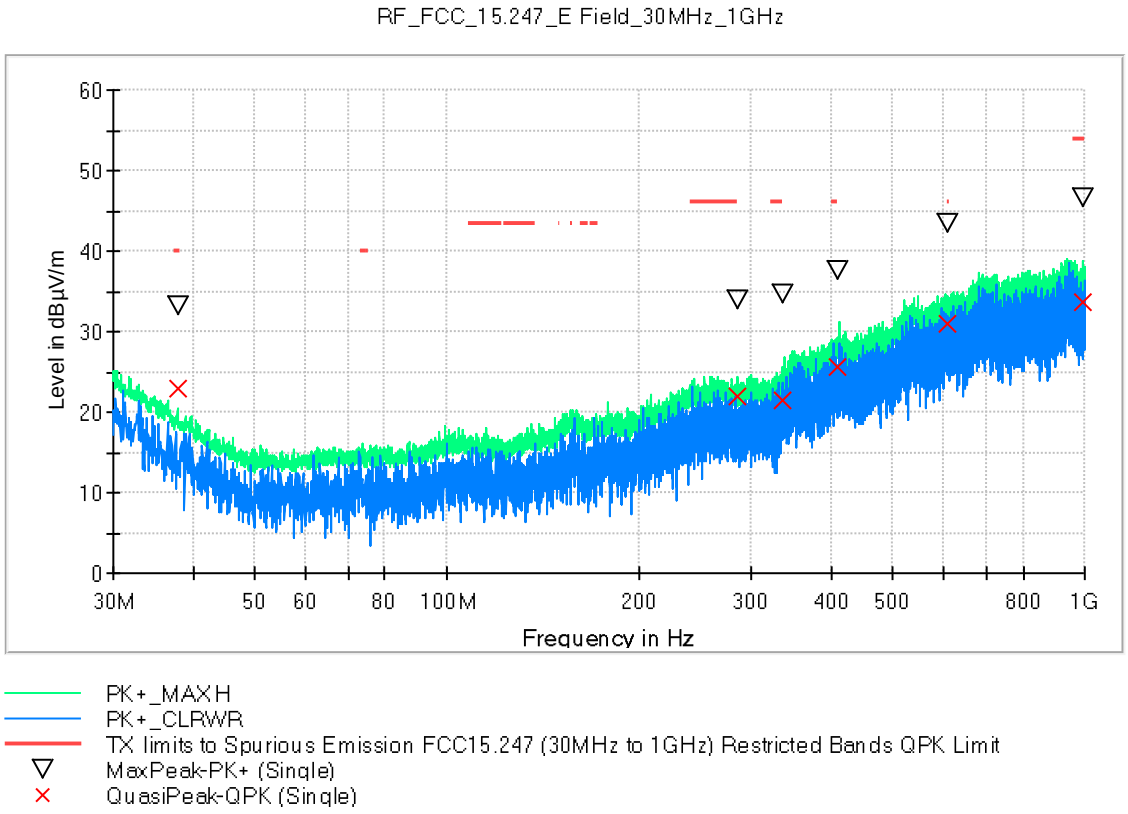
Pass

Modulation: BTLE 5.0 (GFSK 2 Mbit/s)
Results

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

Frequency range 30 - 1000 MHz

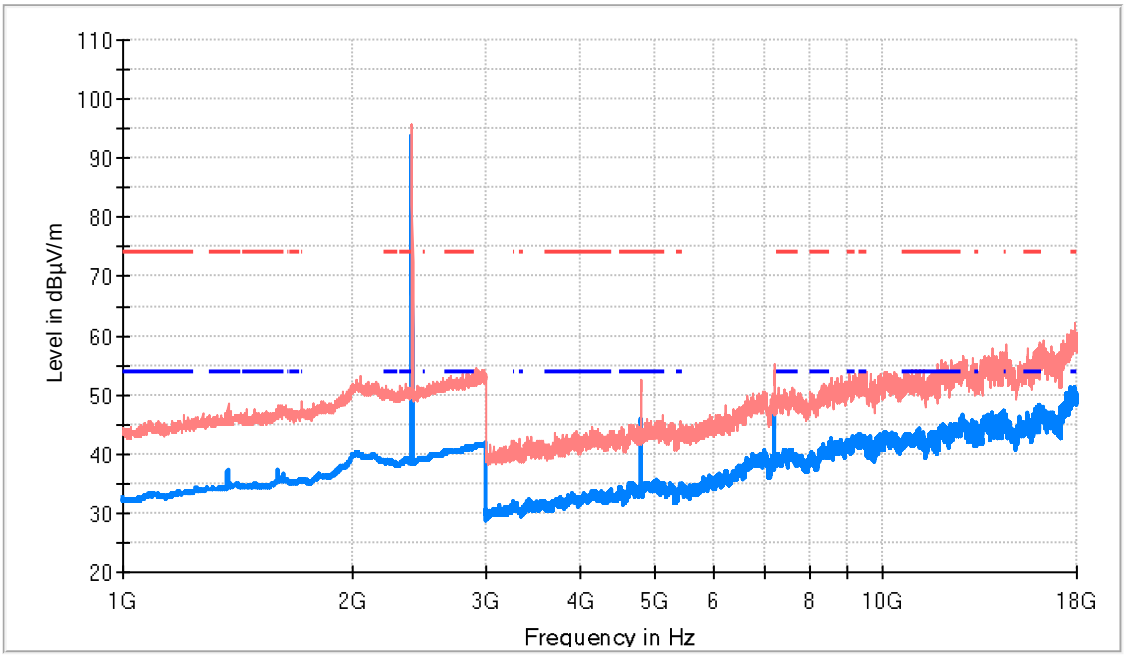
Middle Channel



Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Margin - QPK (dB)	Limit - QPK (dBµV/m)
37.808500	33.2	23.0	H	17.0	40.0
284.722000	34.0	21.8	V	24.2	46.0
334.774000	34.7	21.5	H	24.5	46.0
408.882000	37.6	25.5	H	20.5	46.0
608.944500	43.4	31.0	V	15.0	46.0
995.295500	46.5	33.6	H	20.4	54.0

Frequency range 1 - 18 GHz

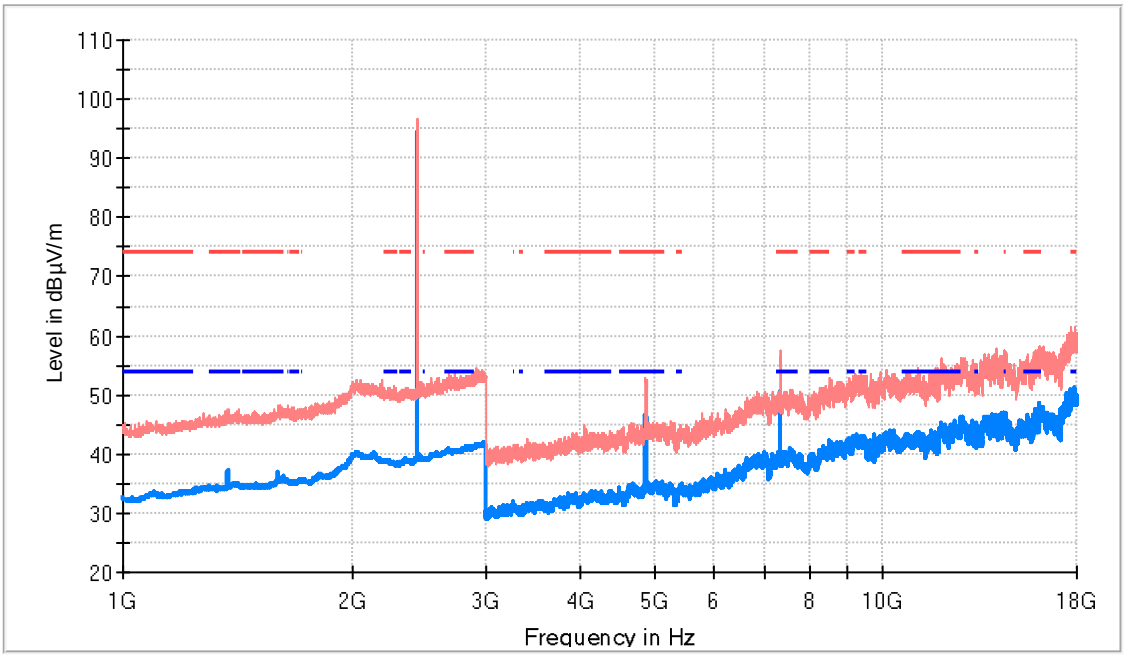
Lowest Channel



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2402.500000	95.6	93.0	H	---	---	Fundamental
4804.000000	50.4	45.9	H	8.1	54.0	

Frequency range 1 - 18 GHz

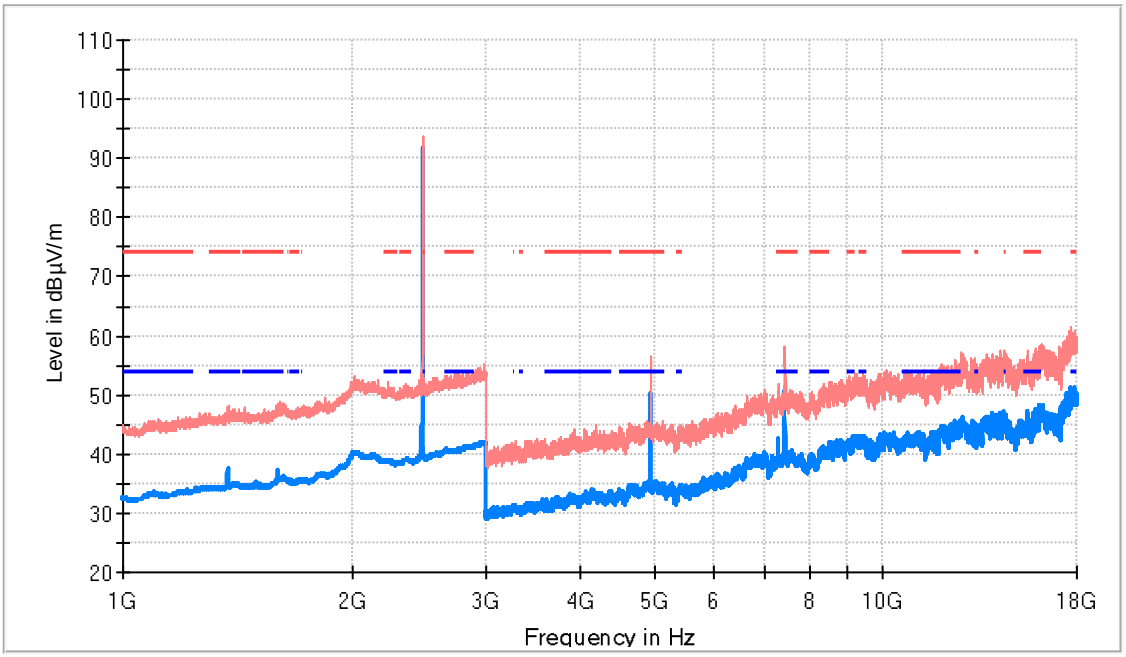
Middle Channel



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2439.500000	96.6	91.4	H	---	---	Fundamental
4878.500000	52.8	44.3	V	9.7	54.0	
7318.500000	57.6	48.4	V	5.6	54.0	

Frequency range 1 - 18 GHz

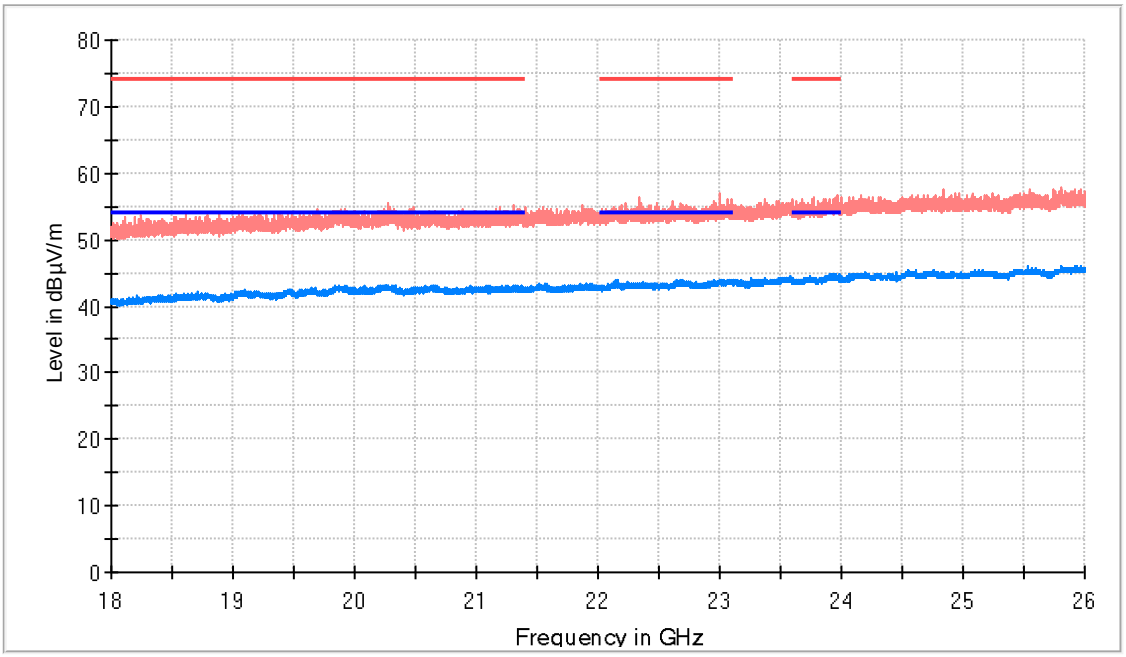
Highest Channel



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2479.500000	93.8	88.5	H	---	---	Fundamental
4958.000000	50.4	41.7	V	12.3	54.0	
7439.000000	56.3	50.5	V	3.5	54.0	

Frequency range 18 - 26 GHz

Lowest Channel

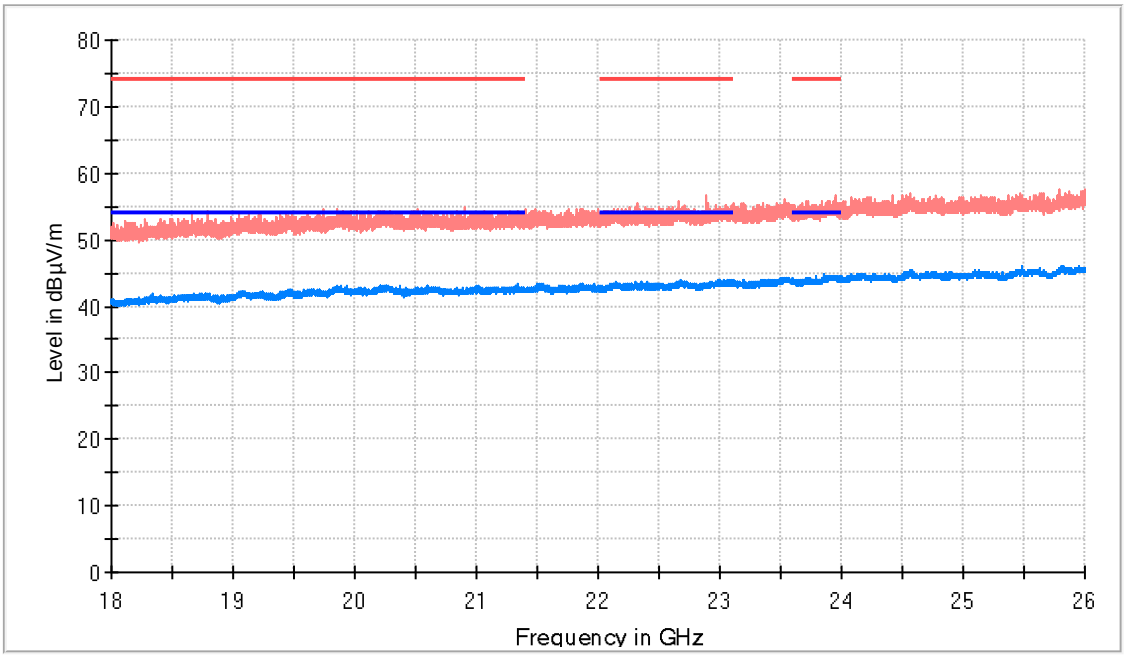


AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
22158.500000	53.9	43.9	H	10.1	54.0

Frequency range 18 - 26 GHz

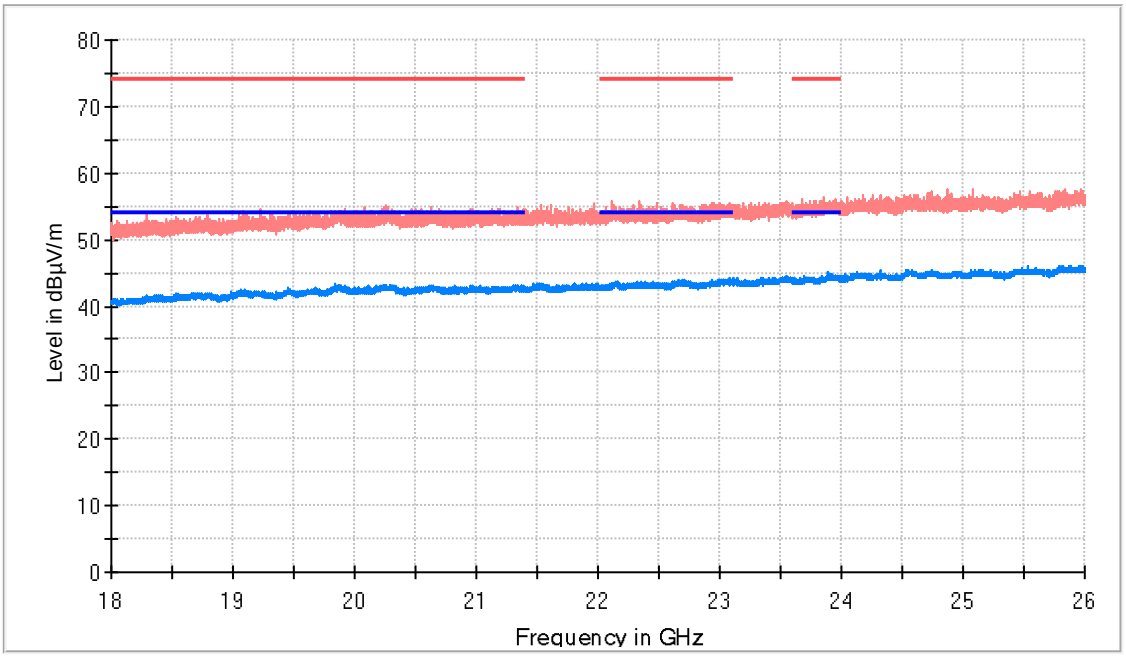
Middle Channel



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23847.500000	54.9	44.8	H	9.2	54.0

Frequency range 18 - 26 GHz

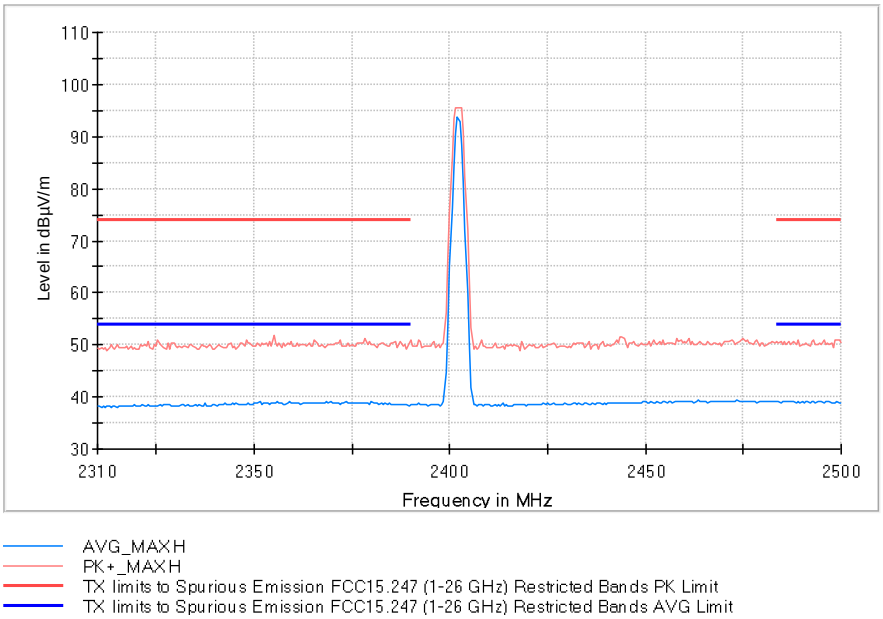
Highest Channel



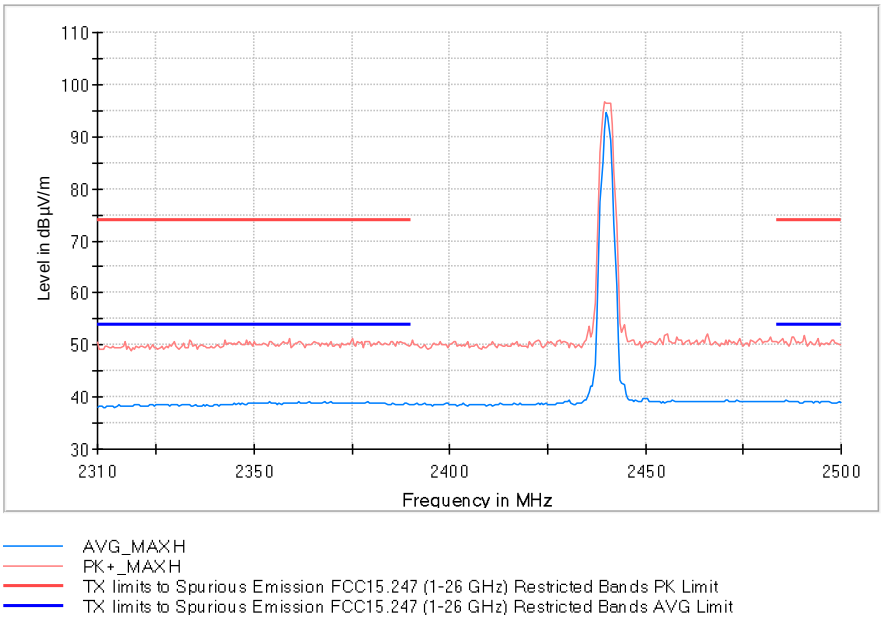
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23891.000000	53.9	45.1	V	8.9	54.0

Restricted Bands (2.31 GHz - 2.5 GHz)

Lowest Channel



Middle Channel



Highest Channel