DEKRA Certification, Inc.
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Sterling, VA 20164
United States of America

FCC LISTED,
REGISTRATION NUMBER:
2764.01

ISED LISTED
REGISTRATION NUMBER:
23595-1

Test Report No:
4892ERM.002A2

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	Wireless Alarm System with Integrated Home Automation
(*) Trademark	Qolsys
(*) Model and /or type reference	IQPanel5
(*) Derived model not tested	IQ5 Hub, IQ5 NS
Other identification of the product	FCC ID: 2AAJXQSIQP5 IC ID: 11205A-QSIQP5
(*) Features	LTE, BLE, Wi-Fi, Z-Wave, Power G
(*) Manufacturer	Qolsys Inc. 1919 S Bascom Ave., Suite 600, Campbell, CA 95008, USA
Test method requested, standard	USA FCC Part 15.247 (6-1-20): Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz / USA FCC Part 15.209 (6-28-21): Radiated emission limits; general requirements. USA FCC Part 15.207 (1-3-17): Conducted Limits. CANADA RSS-247 Issue 3 (August 2023). CANADA RSS-Gen Issue 5 Amendment 2 (February 2021). Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 558074 D01 15.247 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 Manager, email=domingo.galvez@dekra.com, c=US
Date of issue	03-28-2025
Report template No	FDT08_23 (*) “Data provided by the client”

Index

Acronyms

Acronym ID	Acronym Description
# of Tx Chains	Number of Transmission Chains
26Ebw	Emission Bandwidth
Avg COT	Average Channel Occupancy Time
BW	Bandwidth
Equipment	Equipment Type
Freq	Frequency
Freq Sep	Frequency Separation
Inband Peak Lvl	Inband Peak Level
Lvl	Level
MP	Measurement Point
Mod	Modulation
NHC	Number of Hopping Channels
NHp	Number of hops over the period
Occ Ch BW	Occupied Channel Bandwidth
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 Testing and 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 Testing and Certification internal document PODT000.

Test case	Frequency (MHz)	U(k=2)	Units
RF Power and PSD	2402-2483	0.88	dB
Occupied Bandwidth		1.87	%
Dwell Time		0.01	%
Band Edge	30-7000	0.64	dB
Conducted Spurious Emission	30 - 1000	0.48	dB
	1000 - 40000	0.94	dB
Radiated Spurious Emission	30-180	4.27	dB
	180-1000	3.14	dB
	1000-18000	3.3	dB
	18000-40000	3.49	dB

Data 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 IQPanel5 is a wireless alarm system that monitors protected premises and sends alarms via LTE cellular network or Wi-Fi to a compatible alarm receiver at the monitoring station. It receives alarms from PowerG fire/intrusion initiating devices, it has integral siren and touch screen display. It also contains Z-Wave interface for controlling home automation devices. It is powered via an external power adapter rated 12Vdc/1A and it has an internal back-up battery for 24h standby.

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.

Samples S/01, S/02, S/03 and S/04 are composed of the following elements and accessories and auxiliary equipment:

Id	Control Number	Description	Manufacturer/ Model	Serial Nº	Date of Reception	Application
S/01	4892/01	Power G (Sweep Mode)(TX)(Radiated)	Qolsys/IQPanel5	QP5017X062447G09167	12/18/2024	Element Under Test
S/01	4892/09	Laptop	DELL/ Latitude 5400	8H6J733	12/18/2024	Accessory
S/01	4892/12	USB to Micro USB	--	--	12/18/2024	Accessory

Sample S/01 is used for the test(s): All the hopping tests indicated in Appendix A.

Id	Control Number	Description	Manufacturer/ Model	Serial Nº	Date of Reception	Application
S/02	4892/06	Power G/Zwave/Wi-Fi (TX)(Conducted)	Qolsys/IQPanel5	QP4315B002411G06270	12/18/2024	Element Under Test
S/02	4892/09	Laptop	DELL/ Latitude 5400	8H6J733	12/18/2024	Accessory
S/02	4892/12	USB to Micro USB	--	--	12/18/2024	Accessory

Sample S/02 is used for the test(s): All other conducted tests except hopping tests indicated in Appendix A and C.

Id	Control Number	Description	Manufacturer/ Model	Serial Nº	Date of Reception	Application
S/03	4892/04	Power G (TX)(Radiated)	Qolsys/IQPanel5	QPH370B002411G06246	12/18/2024	Element Under Test
S/03	4892/09	Laptop	DELL/ Latitude 5400	8H6J733	12/18/2024	Accessory
S/03	4892/12	USB to Micro USB	--	--	12/18/2024	Accessory

Sample S/03 is used for the test(s): All the Radiated tests indicated in Appendix A.

Id	Control Number	Description	Manufacturer/ Model	Serial Nº	Date of Reception	Application
S/04	4892/07	LTE/Wi-Fi (TX)(Radiated)	Qolsys/IQPanel5	QP5017X062447G09150	12/18/2024	Element Under Test
S/04	4892/09	Laptop	DELL/ Latitude 5400	8H6J733	12/18/2024	Accessory
S/04	4892/12	USB to Micro USB	--	--	12/18/2024	Accessory

Sample S/04 is used for the test(s): All Radiated tests indicated in appendix B.

Id	Control Number	Description	Manufacturer/ Model	Serial Nº	Date of Reception	Application
S/05	4892/08	Zwave (TX)(Radiated)	Qolsys/IQPanel5	QP4315B002411G06268	12/18/2024	Element Under Test
S/05	4892/09	Laptop	DELL/ Latitude 5400	8H6J733	12/18/2024	Accessory
S/05	4892/12	USB to Micro USB	--	--	12/18/2024	Accessory

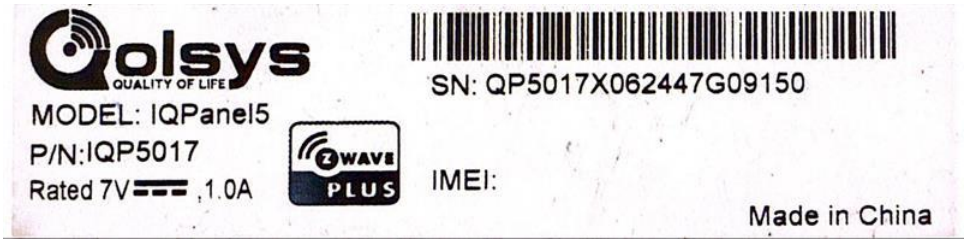
Sample S/05 is used for the test(s): All Radiated tests indicated in appendix C.

Test sample description

Ports…… :	Port name and description	Cable				
		Specified length [m]	Attached during test	Shielded	Coupled to patient	
	Ethernet (when Ethernet card is populated)		☒	☐	☐	
			☐	☐	☐	
			☐	☐	☐	
			☐	☐	☐	
			☐	☐	☐	
			☐	☐	☐	
			☐	☐	☐	
			☐	☐	☐	
Supplementary information to the ports…… :	No data provided					
Rated power supply .....:	Voltage and Frequency		Reference poles			
			L1	L2	L3	N	PE
	☒	AC: 120Vac/60Hz/0.68A	☐	☐	☐	☐	☐
	☐	AC:	☐	☐	☐	☐	☐
	☒	DC: 12V/1A external adapter (part of the EUT)					
	☒	DC: rechargeable 3.7V, 3000mAh lithium-ion battery					
Rated Power .....:	12W						
Clock frequencies.....:	24MHz, 39MHz, 38.4 MHz						
Other parameters .....:	No Data Provided						
Software version .....:	5.0.1						
Hardware version .....:	QB9501 Rev. OA						
Dimensions in cm (W x H x D) ....:	15.5 x 19.1 x 2.6						
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
	IQPanel5 Control Panel	Panel	Qolsys
	AC/DC Power adapter (use for conducted EMC)	Power Supply	Sure-Power
	Ethernet card (optional) (use for EMC testing)	Card	Qolsys
	SRF319 security receiver card (optional)(use for EMC	Card	Qolsys
Accessories (not part of the test item) .....:	Description	Type	Manufacturer
	No data provided		
Documents as provided by the applicant.....:	Description	File name	Issue date
	Block Diagram and Operational description	FDT30_18 Declaration Equipment Data signed	12/10/2024
	Schematic/Parts Lists/PCB		
	Internal/External photos		
	Manual/Labels		

Copy of marking plate:



Identification of the client

Qolsys Inc.,
1919 S Bascom Ave., Suite 600, Campbell, CA 95008,
USA

Testing period and place

Test Location	DEKRA Certification Inc.
Date (start)	12-21-2024
Date (finish)	01-08-2025

Document history

Report number	Date	Description
4892ERM.002	02-21-2025	First release.
4892ERM.002A1	03-21-2025	Second release. The time of occupancy and power test result for PowerG has been updated. The power test result and antenna gain for Z wave has been updated. The statement about 9KHz – 30MHz has been added for radiated test result also the conducted emissions test results for Z-Wave has been added. This modified report replaces and cancels the report 4892ERM.002.
4892ERM.002A2	03-28-2025	Third release. The time of occupancy test result for PowerG has been updated. This modified report replaces and cancels the report 4892ERM.002A1.

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. = 30 % Max. = 75 %
Air pressure	Min. = 860mbar Max. = 1060mbar

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

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

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

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

Remarks and comments

The tests have been performed by the technical personnel: Prudhvi Kothapalli, Yuqi Wang, Yuri Barone and Koji Nishimoto.

Testing verdicts

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

Summary

Appendix A: Power G

Requirement – Test case	FCC PART 15 PARAGRAPH / RSS-247	Verdict	Remark
RSS-247 5.1 (c) / FCC 15.247 (a) (1) (i) 20 dB Bandwidth		Pass	N/A
RSS-247 5.1 (b) / FCC 15.247 (a) (1) Carrier Frequency Separation		Pass	N/A
RSS-247 5.1 (c) / FCC 15.247 (a) (1) (i) Time of Occupancy (Dwell Time)		Pass	N/A
RSS-247 5.1 (c) / FCC 15.247 (a) (1) (i) Number of hopping channels		Pass	N/A
RSS-247 5.4 (a) / FCC 15.247 (b) (2) Maximum Peak Conducted output power & Antenna gain		Pass	N/A
RSS-247 5.5 / FCC 15.247 (d) Band-edge emissions compliance (Transmitter) - Conducted		Pass	N/A
FCC 2.1049 / 99dBw 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. DUT has an integral antenna, and no conducted testing is required

Appendix B: Wi-Fi 2.4 GHz

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 / 99dBw 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		N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d) Band-edge emissions compliance (Transmitter) - Radiated		N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Conducted		N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d) Emissions compliance (Transmitter) - Radiated		Pass	N/A

Supplementary information and remarks:

1. Only Partial Testing is requested.

Appendix C: Z-Wave Long Range

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) - Conducted		Pass	N/A
FCC 2.1049 / 99dBw 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
RSS-Gen 8.8 / FCC 15.207 (a) Continuous conducted emission on Power leads		Pass	Refer 2

Supplementary information and remarks:

1. DUT has an integral antenna, and no conducted testing is required.
2. Conducted emissions is performed only for the worst-case power.

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
1107	ETHERNET SNMP THERMOMETER	60038026952	2024-10-18	2026-10-18
1391	Signal Analyzer 50GHz	101281	2024-10-04	2026-10-04

Radiated Measurements

CONTROL NUMBER	DESCRIPTION	Serial No	LAST CALIBRATION	NEXT CALIBRATION
1012	ESR26 EMI TEST RECEIVER	101478	2023-02-18	2025-02-18
1014	FSV40 Signal Analyzer 40GHz	101626	2024-10-04	2026-10-04
1057	3115 Double-Ridged Waveguide Horn Antenna 1-18 GHz	211373	2023-07-18	2026-07-18
1064	3142E Biconilog Antenna	208600	2022-12-13	2025-12-13
1111	Ethernet SNMP Thermometer-SAC	60038026577	2024-10-18	2026-10-18
1179	SEMI-ANECHOIC CHAMBER	F169021	N/A	N/A
1314	WIRELESS MEASUREMENT SOFTWARE R&S EMC32	1040-OT102236	N/A	N/A
1461	Low Noise Preamplifier (1-18GHz)	BLMA0118-4A	2024-06-06	2026-06-06

Appendix A: Test results for Power G

Appendix A

PRODUCT INFORMATION

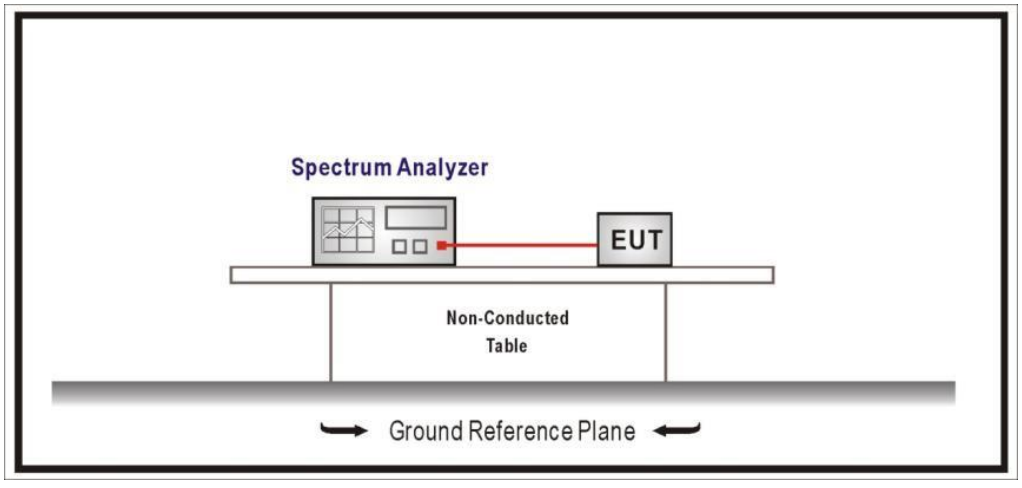
(*): Data provided by the client.

Information	Description
Modulation	FHSS
Frequency band/Range	912.75 - 919.107MHz
Maximum RF Output Power	14 dBm
Operation mode	
- Operating Frequency Range	902-928 MHz
- Channel Spacing	125 kHz
- Number of Channels	50 (125 kHz)
Extreme operating conditions	
- Temperature range	-40 ºC to 80 ºC
Antenna type	helical wire antenna soldered to main board (ANT1, Ocean Spring P/N 20-9154-10008)
Antenna gain	0.41 dBi
Nominal Voltage	
- Supply Voltage	12 V
- Type of power source	DC
Equipment type	Power G

DESCRIPTION OF TEST CONDITIONS

TEST CONDITIONS	DESCRIPTION
TC#01	Power supply (V): Power Supply: 12 V Type of power supply: DC voltage. Temperature (ºC): T_{nom} = +15 to + 35 Test Frequencies for Conducted tests: Lowest channel: 912.75 MHz Middle channel: 915.87 MHz Highest channel: 919.12 MHz Test Frequencies for Radiated tests: Lowest channel: 912.75 MHz Middle channel: 915.87 MHz Highest channel: 919.12 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.

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.

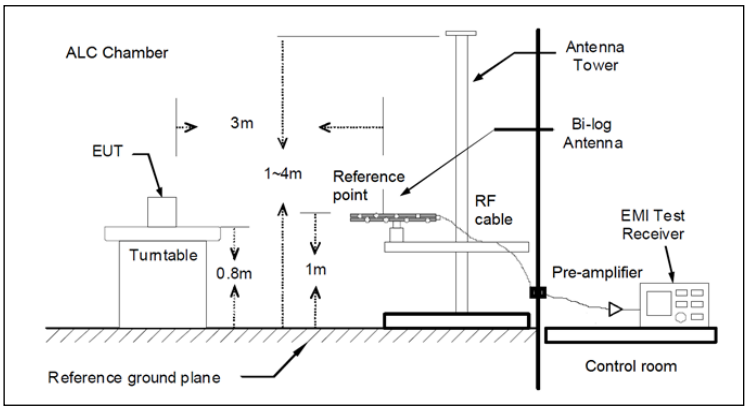


Fig A1: Radiated measurements Setup f < 1 GHz

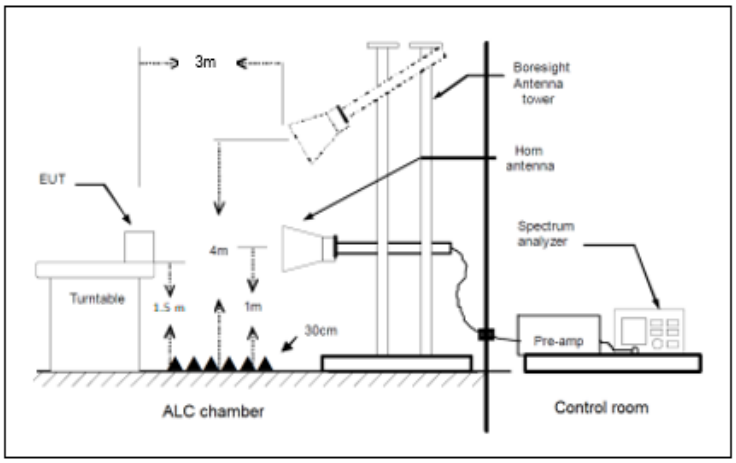


Fig A2: Radiated measurements setup f > 1 GHz

Test Cases Details

RSS-247 5.1 (c) / FCC 15.247 (a) (1)(i) 20 dB Bandwidth

Limits

The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

Test conditions modes: TC#01
Results

	Lowest frequency 912.75 MHz	Middle frequency 915.87 MHz	Highest frequency 919.12 MHz
20dB Spectrum bandwidth (KHz)	103.00	102.50	101.50

Verdict

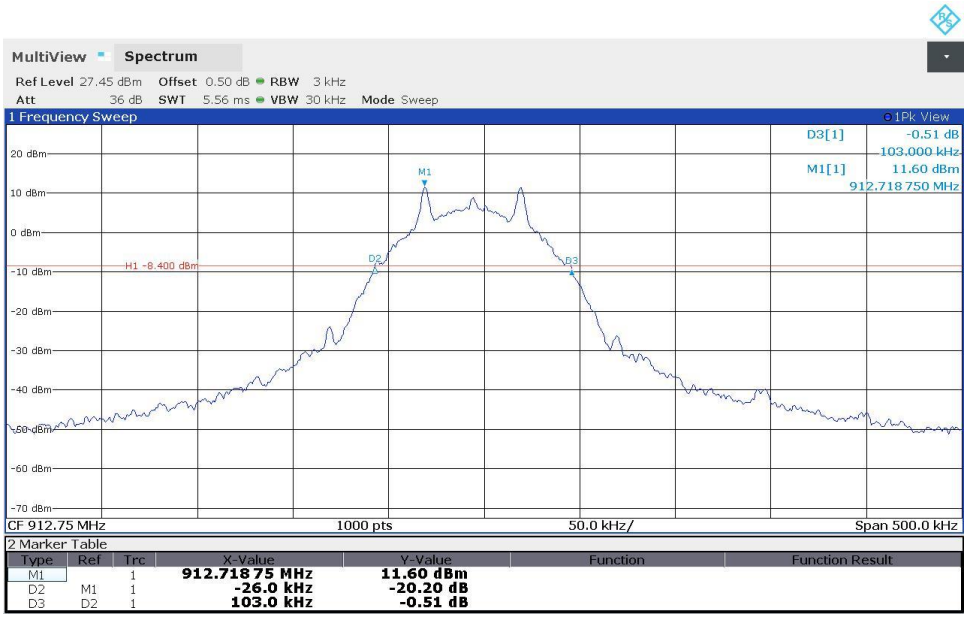
Pass

Results

Attachments

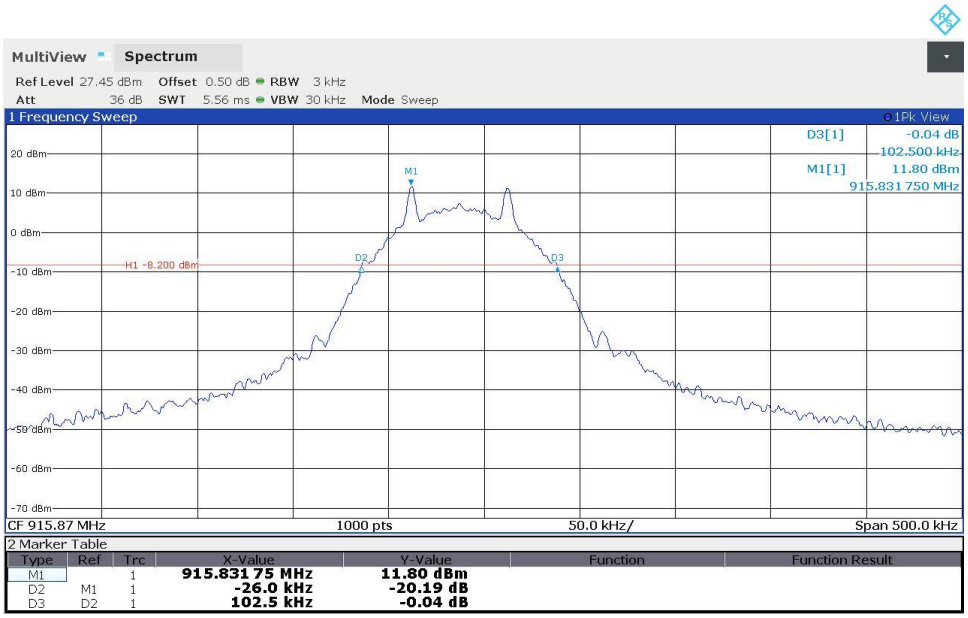
Frequency = 912.75 MHz, Bandwidth = 125 kHz

Images:



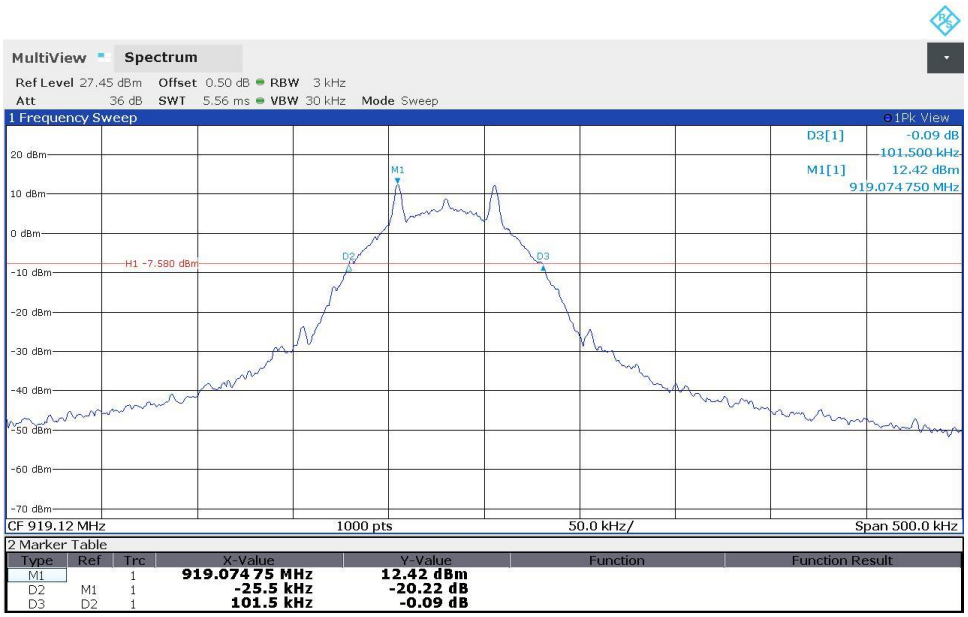
Frequency = 915.87 MHz, Bandwidth = 125 kHz

Images:



Frequency = 919.12 MHz, Bandwidth = 125 kHz

Images:



RSS-247 5.1 (b) / FCC 15.247 (a) (1) Carrier Frequency Separation

Limits

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Test conditions modes: TC#01

Results

Equipment	# of Tx Chains	Freq Sep (kHz)
Frequency Hopping Spread Spectrum systems	1	128.9

Verdict

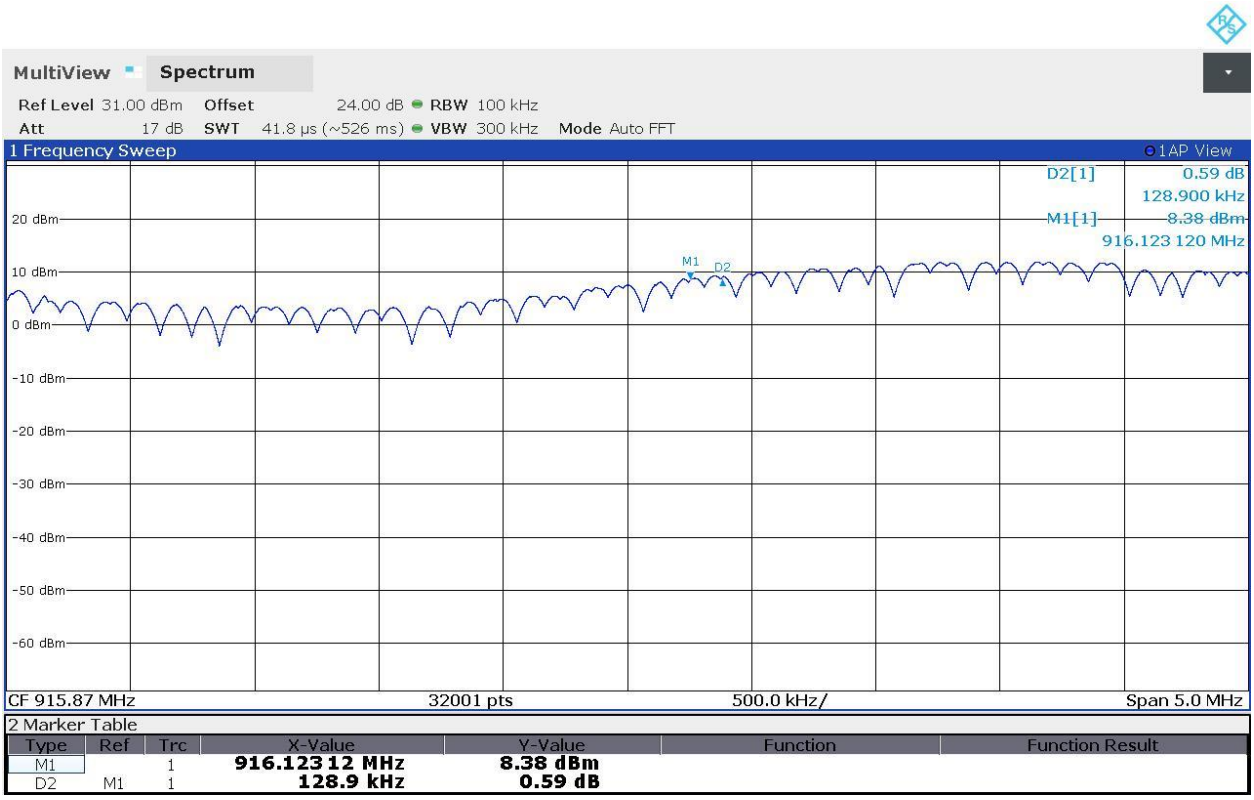
Pass

Results

Attachment

Frequency Range = 902-928 MHz, Bandwidth = 125 kHz

Images:



RSS-247 5.1 (c) / FCC 15.247 (a) (1) (i) Time of Occupancy (Dwell Time)

Limits

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

Test conditions modes: TC#01

Results

For 125 kHz BW, 20 dB bandwidth of the hopping channel is less than 250 kHz and there are 50 hopping channels.

Average time of occupancy = 90 ms × 4 hops=360 ms per 20 s.

Verdict

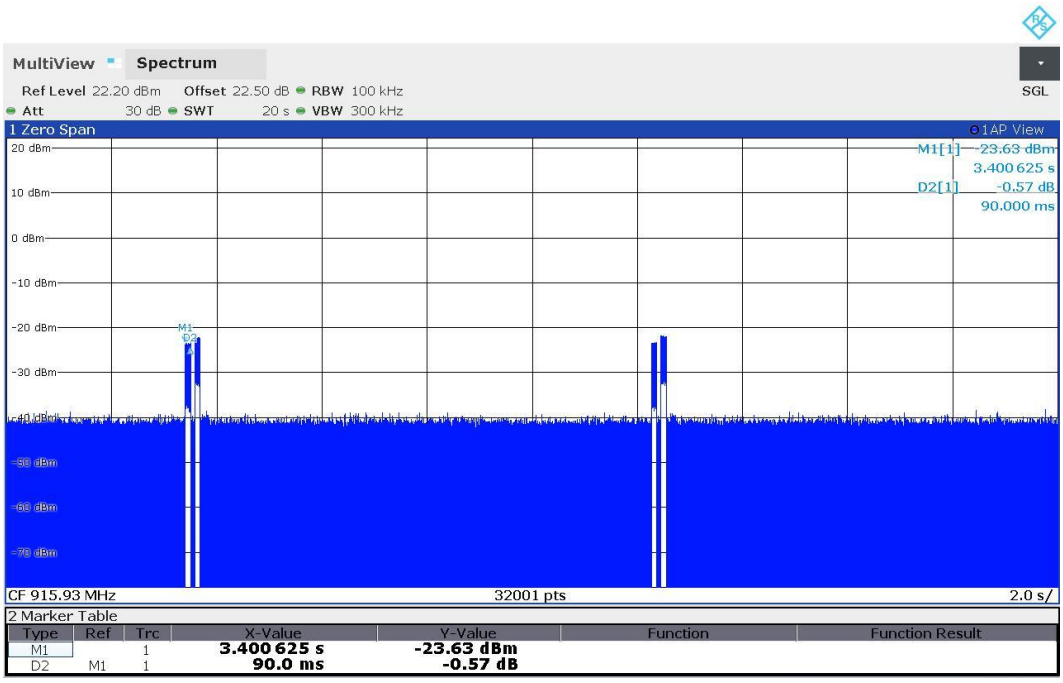
Pass

Results

Attachments

Frequency Range = 902-928 MHz, Bandwidth = 125 kHz

Images:



RSS-247 5.1 (c) / FCC 15.247 (a) (1) (i) Number of hopping channels

Limits

For frequency hopping systems operating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

Test conditions modes: TC#01

Results

Equipment	# of Tx Chains	NHC
Frequency Hopping Spread Spectrum systems	1	50

Verdict

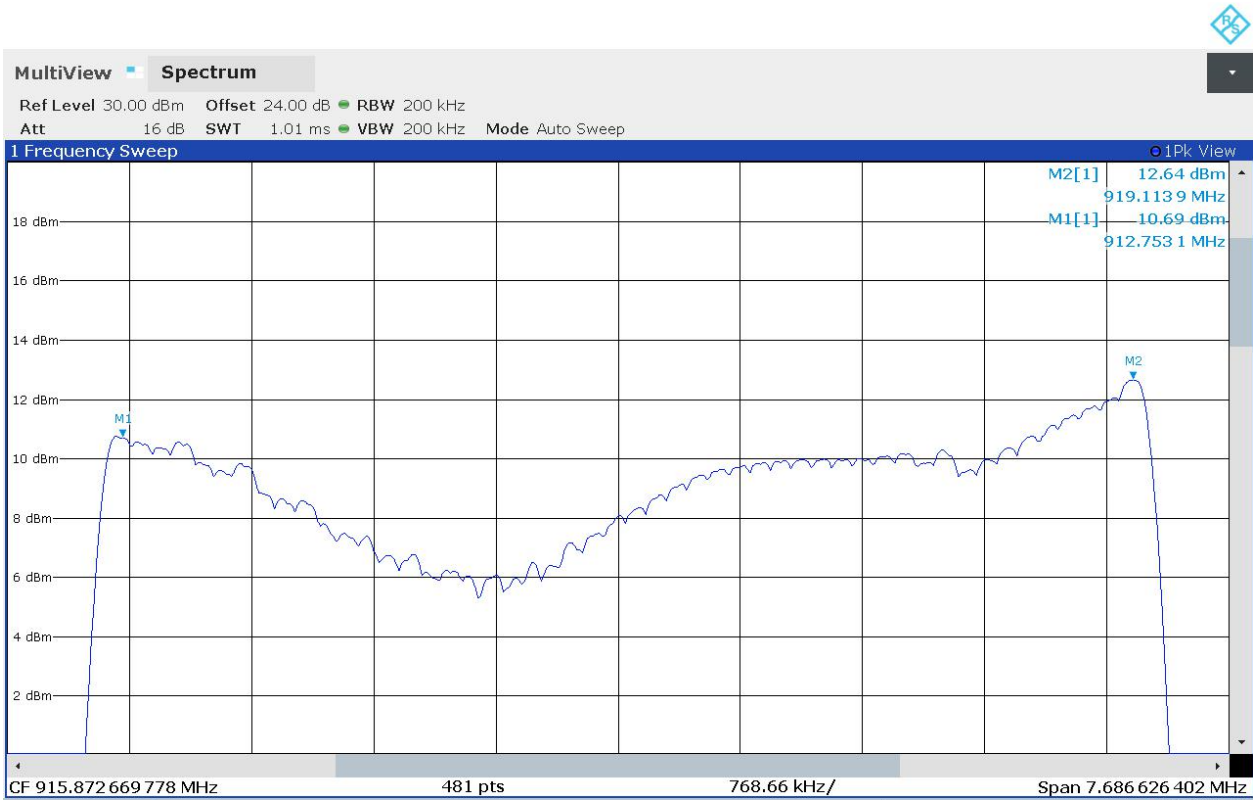
Pass

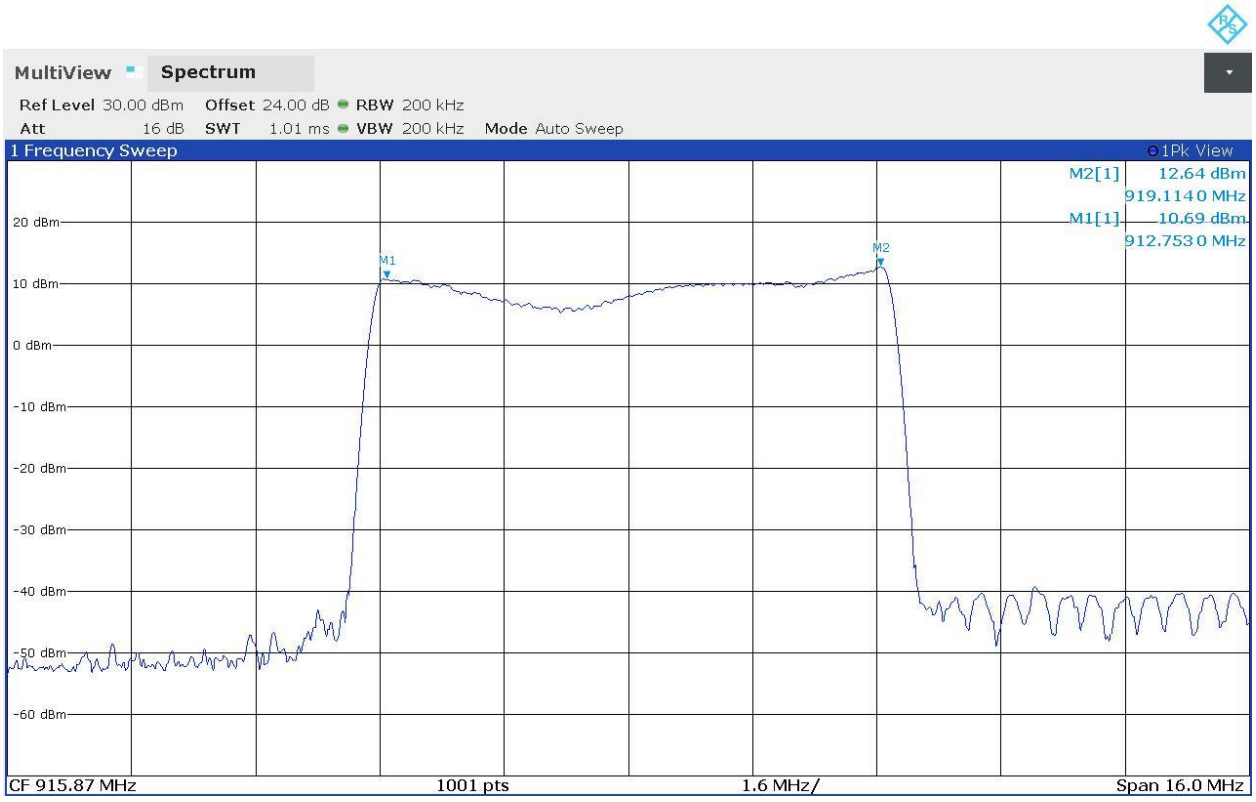
Results

Attachments

Frequency Range = 902-928 MHz, Bandwidth = 125 kHz

Images:





RSS-247 5.4 (a) / FCC 15.247 (b) (2) Maximum Peak Conducted output power & Antenna gain

Limits

§15.247(b)(2): For frequency hopping systems operating in the 902–928 MHz band: 1 watt for systems employing at least 50 hopping channels; and 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

RSS-247 5.4(a): For FHSs operating in the band 902-928 MHz, the maximum peak conducted output power shall not exceed 1.0 W, and the e.i.r.p. shall not exceed 4 W if the hopset uses 50 or more hopping channels; the maximum peak conducted output power shall not exceed 0.25 W and the e.i.r.p. shall not exceed 1 W if the hopset uses less than 50 hopping channels.

The maximum peak conducted output power was measured using the method according to section 9 of Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 558074 D01 DTS Meas Guidance v05 dated 04/02/2019.

The EIRP power (dBm) is calculated by adding the declared maximum antenna gain to the measured conducted power.

Maximum declared antenna gain: 0.41 dBi

Test conditions modes: TC#01

Results

	Lowest frequency 912.75 MHz	Middle frequency 915.87 MHz	Highest frequency 919.12 MHz
Maximum conducted power (dBm)	12.90	12.89	12.87
Maximum EIRP power (dBm)	13.31	13.30	13.28

The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power limit is not required to be reduced from the stated values.

Verdict

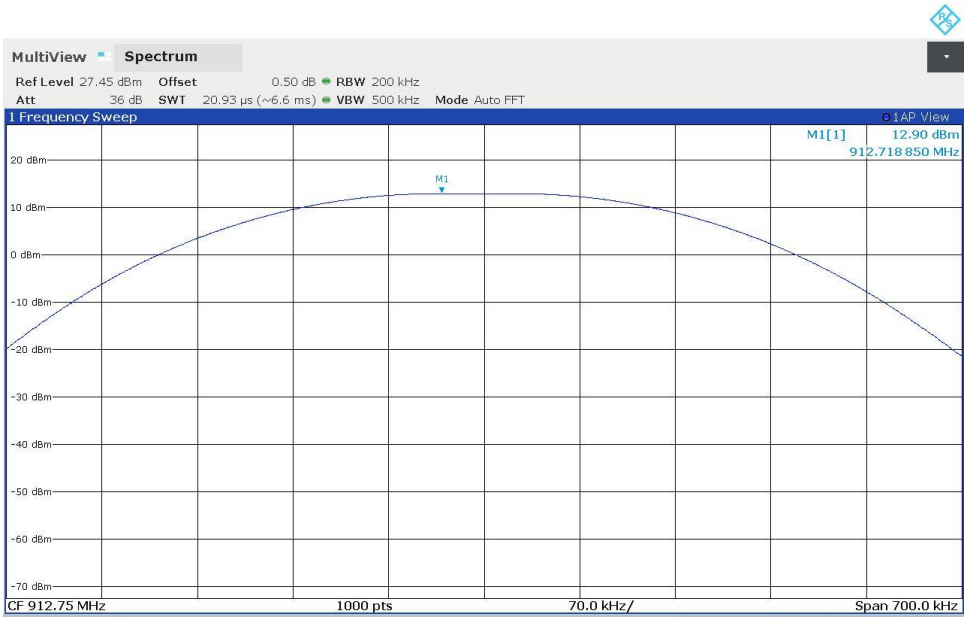
Pass

Results

Attachments

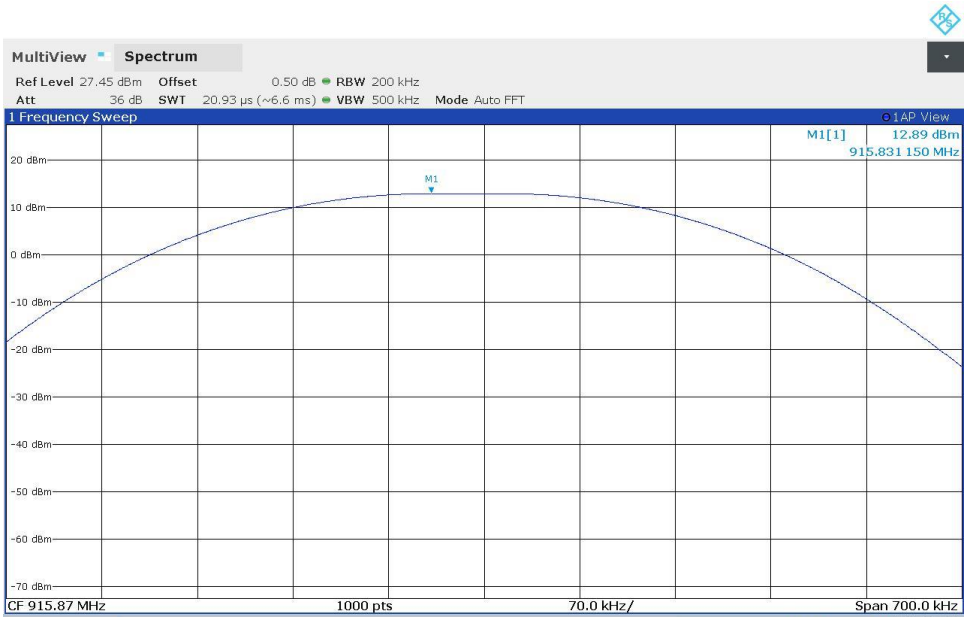
Frequency = 912.75 MHz, Bandwidth = 125 kHz

Images:



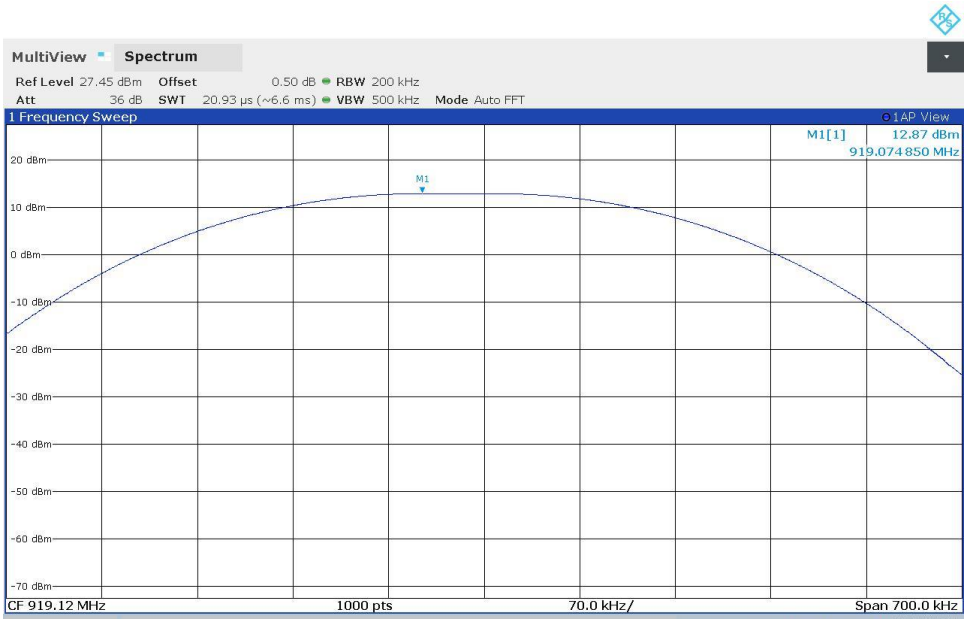
Frequency = 915.87 MHz, Bandwidth = 125 kHz

Images:



Frequency = 919.12 MHz, Bandwidth = 125 kHz

Images:



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

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.

Note: Radiated measurements are also used to show compliance with the limits in the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

Test conditions modes: TC#01

Results

Verdict

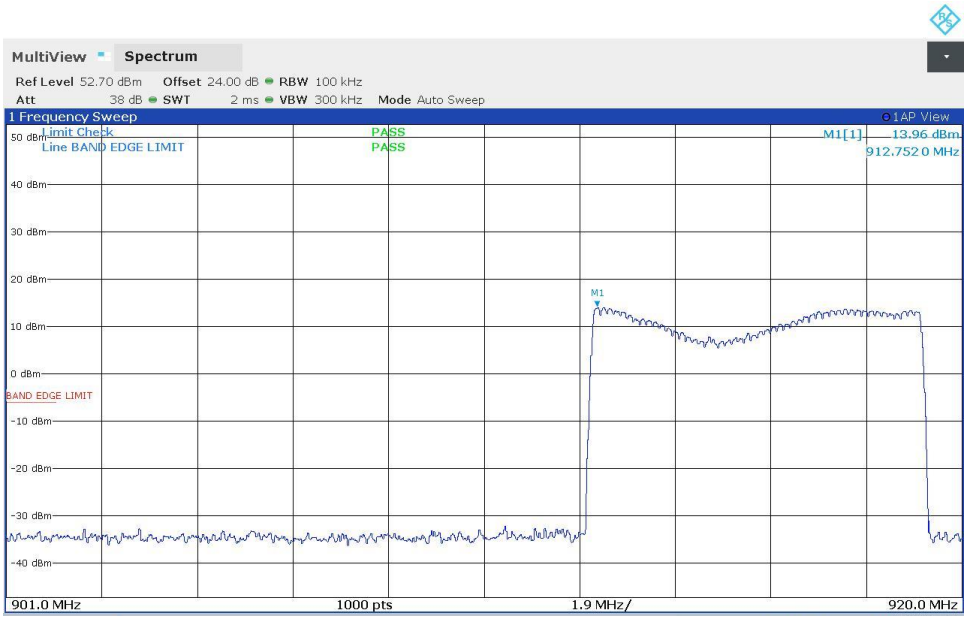
Pass

Results

Attachments

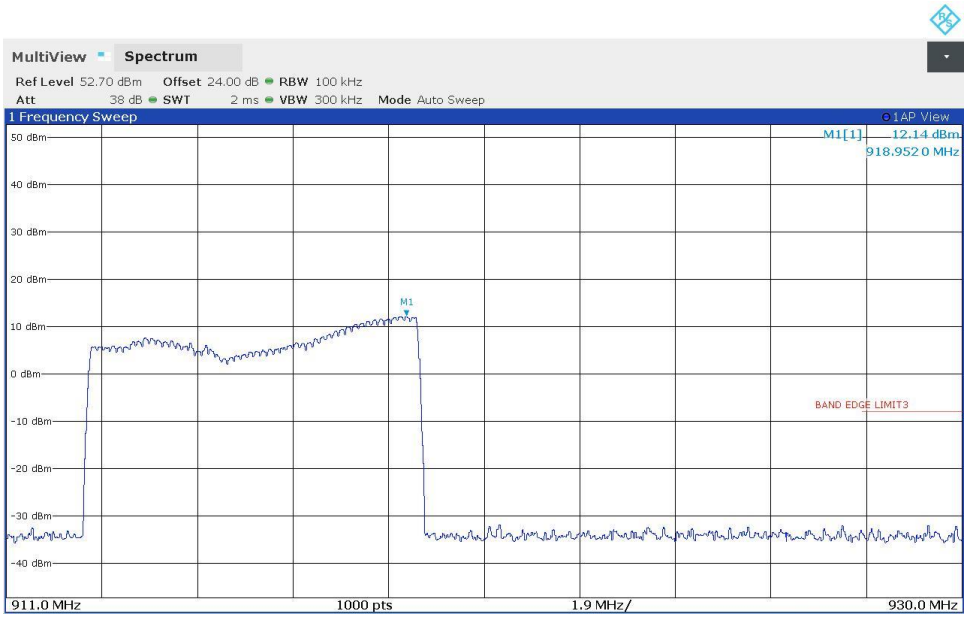
Frequency = 902-928 MHz, Bandwidth = 125 kHz

Images:



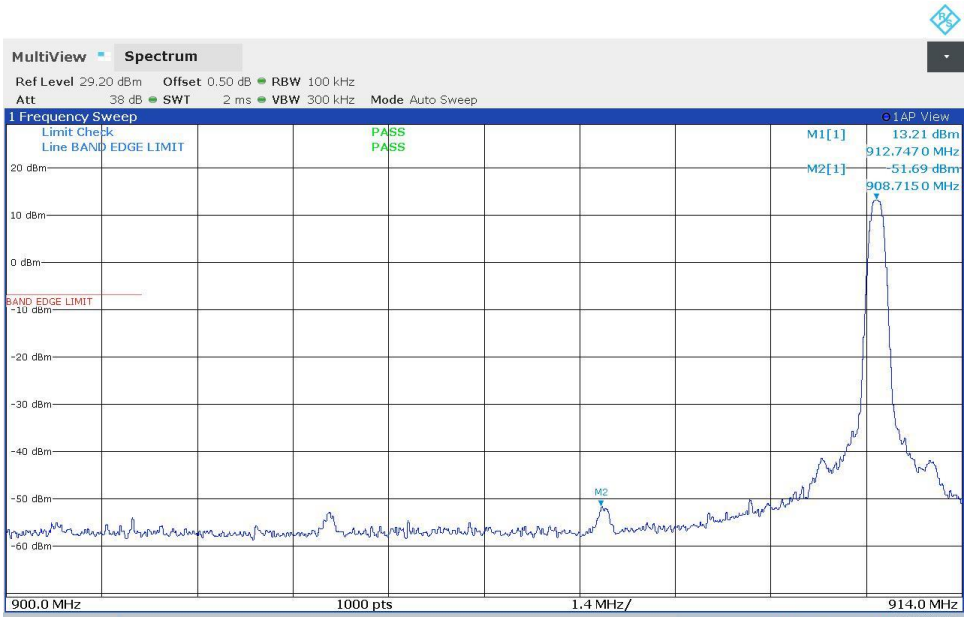
Frequency = 902-928 MHz, Bandwidth = 125 kHz

Images:



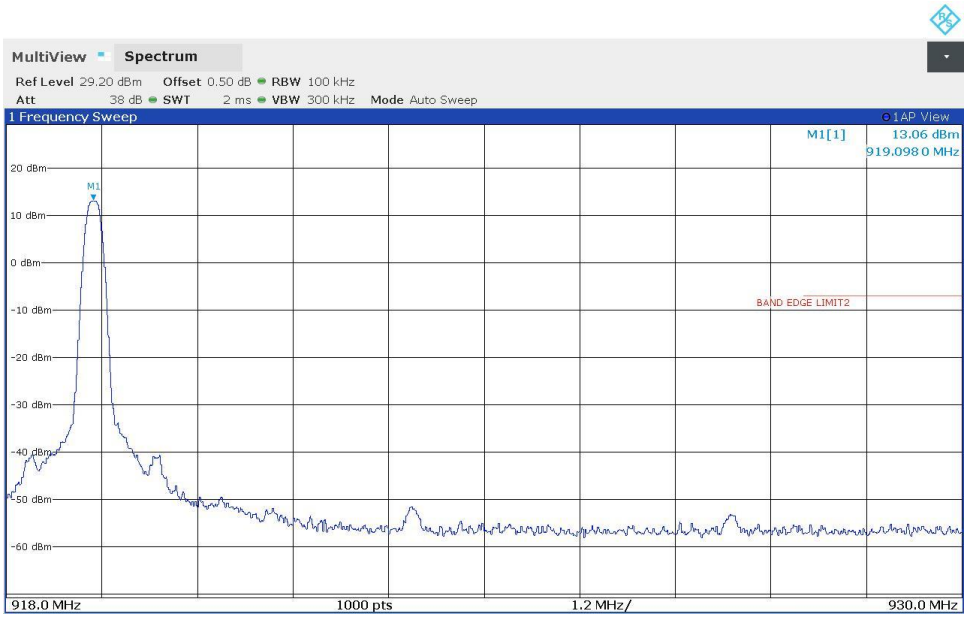
Frequency = 912.75 MHz, Bandwidth = 125 kHz

Images:



Frequency = 919.12 MHz, Bandwidth = 125 kHz

Images:



RSS-247 5.2 (a) / RSS-GEN 6.7 FCC 15.247 (a) (2) 99dBw Occupied Channel Bandwidth 99%

Limits

The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

Test conditions modes: TC#01

Results

	Lowest frequency 912.75 MHz	Middle frequency 915.87 MHz	Highest frequency 919.12 MHz
99% bandwidth (kHz)	93.72	91.61	94.11

Verdict

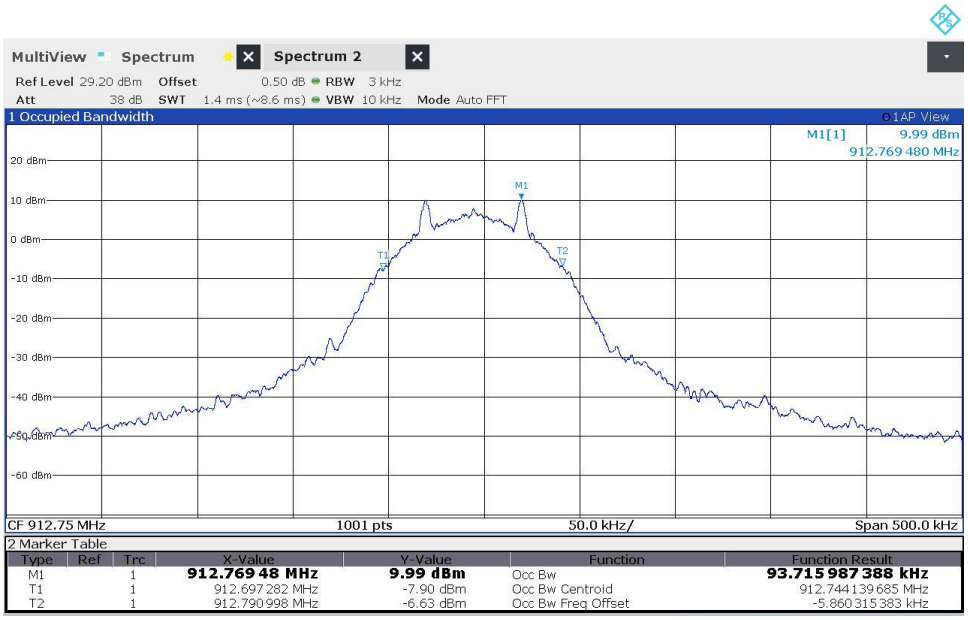
Pass

Results

Attachments

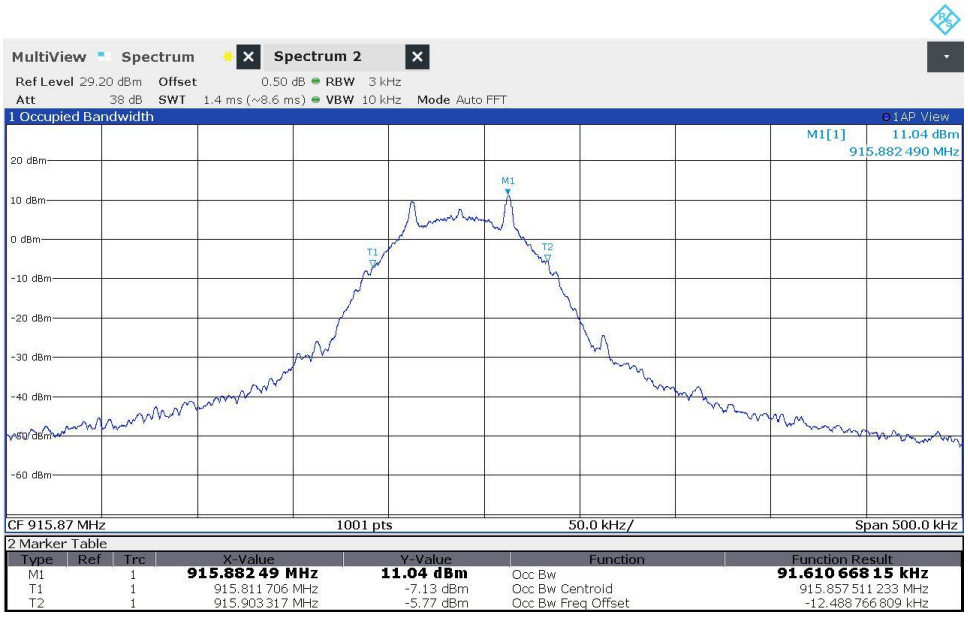
Frequency = 912.75 MHz, Bandwidth = 125 kHz

Images:



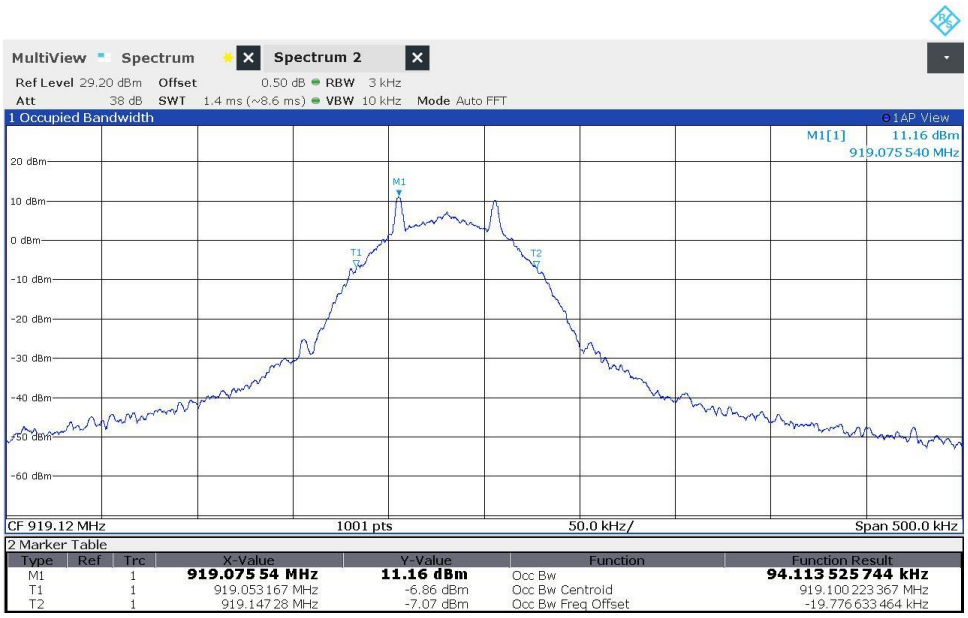
Frequency = 915.87 MHz, Bandwidth = 125 kHz

Images:



Frequency = 919.12 MHz, Bandwidth = 125 kHz

Images:



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

Limits

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 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
Above 960	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

Test conditions modes: TC#01

Frequency range 9KHz – 30 MHz

No radiofrequency signal generated in the device found below 10º sub-harmonic, no further investigation required.

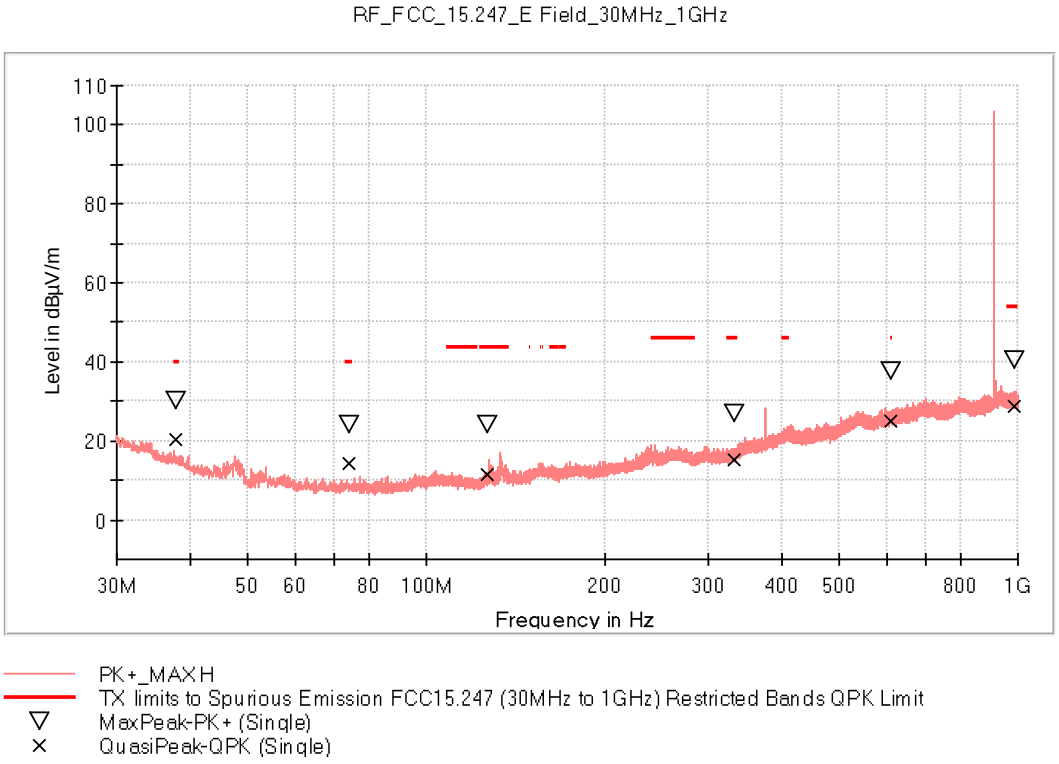
Results: Frequency range 0.03 - 1 GHz

Lowest Channel

Attachments

Frequency = 912.75 MHz, Bandwidth = 125 kHz, Frequency Range GHz = [0.03, 1]

Images:



Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Margin - QPK (dB)	Limit - QPK (dBµV/m)
37.711500	30.0	20.1	V	19.9	40.0
73.989500	24.2	14.1	H	25.9	40.0
126.660500	24.0	11.4	V	32.1	43.5
331.961000	27.1	15.4	V	30.6	46.0
610.496500	37.6	25.0	V	21.1	46.0
983.558500	40.2	28.6	V	25.4	54.0

Test conditions modes: TC#01

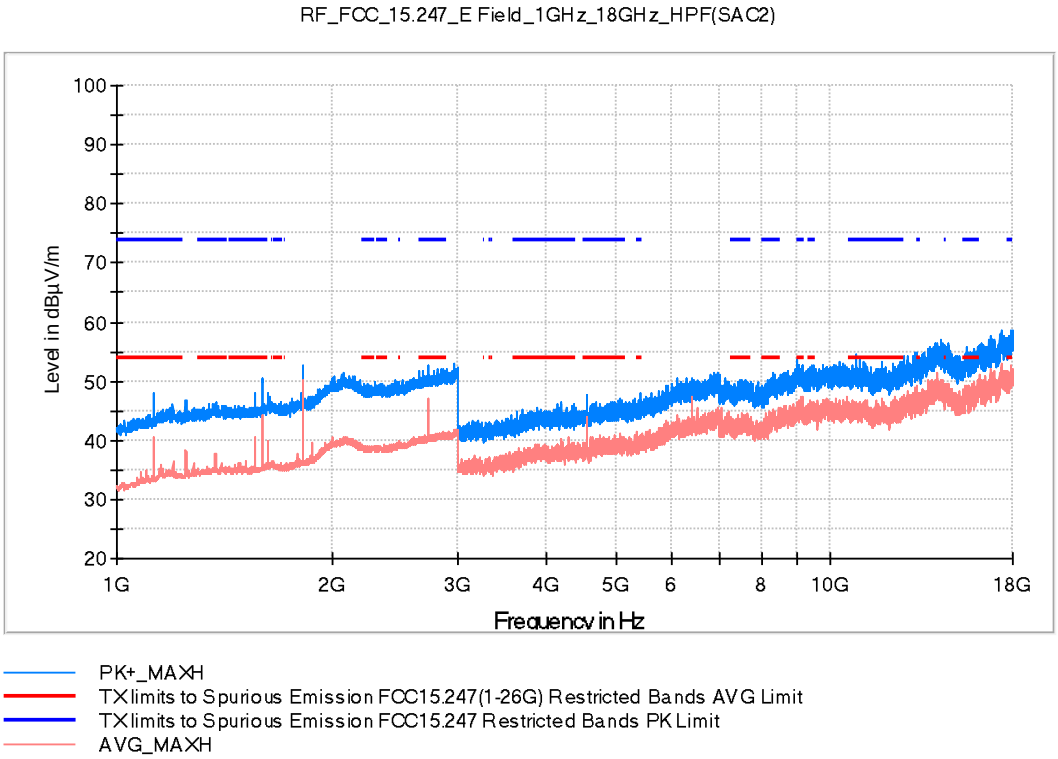
Results: Frequency range 1 - 18 GHz

Lowest Channel

Attachments

Frequency = 912.75 MHz, Bandwidth = 125 kHz, Frequency Range GHz = [1, 18]

Images:



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
1600.000000	50.0	44.2	H	9.8	54.0
2738.500000	52.7	47.0	H	7.0	54.0
16133.500000	54.8	51.0	V	3.0	54.0

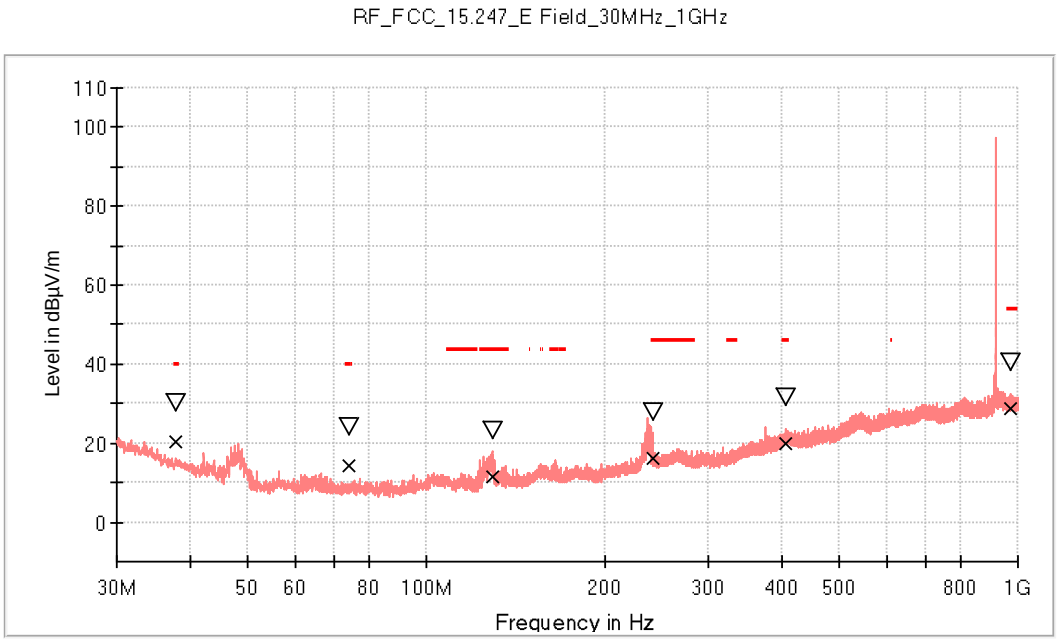
Results: Frequency range 0.03 - 1 GHz

Middle Channel

Attachments

Frequency = 915.87 MHz, Bandwidth = 125 kHz, Frequency Range GHz = [0.03, 1]

Images:



Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Margin - QPK (dB)	Limit - QPK (dBµV/m)
37.711500	30.0	20.2	H	19.9	40.0
74.038000	23.9	14.2	V	25.9	40.0
129.085500	23.2	11.7	V	31.9	43.5
241.023500	27.9	16.3	V	29.7	46.0
406.457000	31.3	19.8	H	26.2	46.0
972.500500	40.6	28.8	H	25.3	54.0

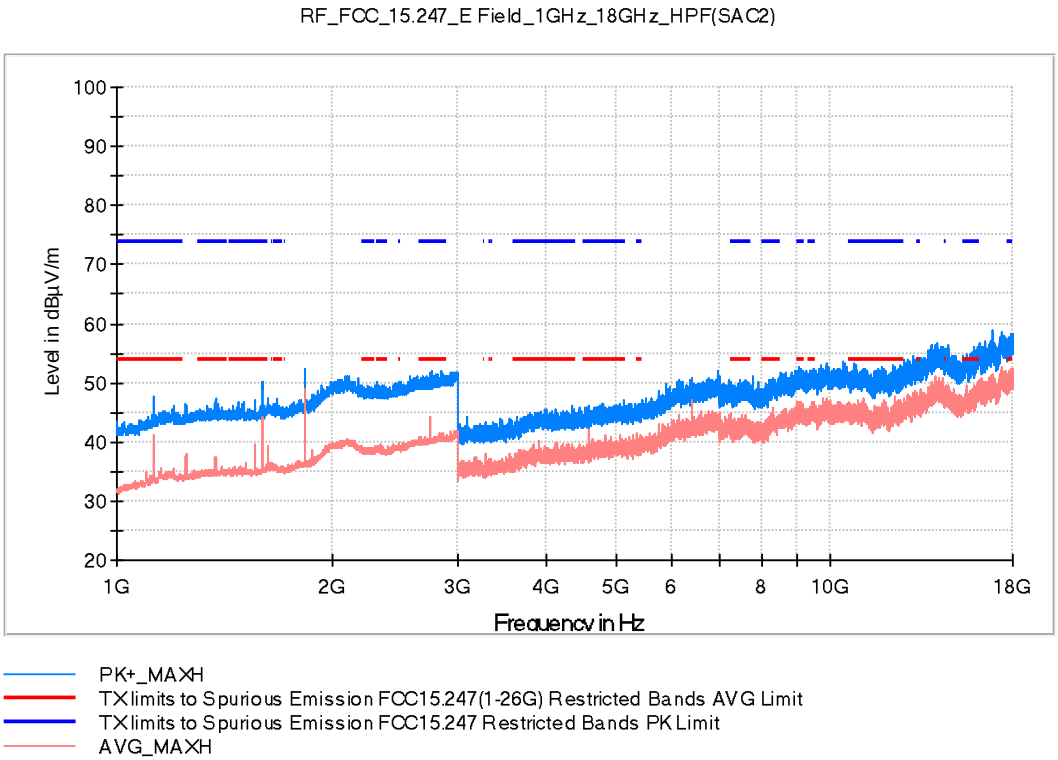
Results: Frequency range 1 - 18 GHz

Middle Channel

Attachments

Frequency = 915.87 MHz, Bandwidth = 125 kHz, Frequency Range GHz = [1, 18]

Images:



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
1600.000000	49.6	44.2	V	9.8	54.0
2747.500000	51.8	44.2	V	9.8	54.0
12284.500000	52.7	47.8	H	6.2	54.0

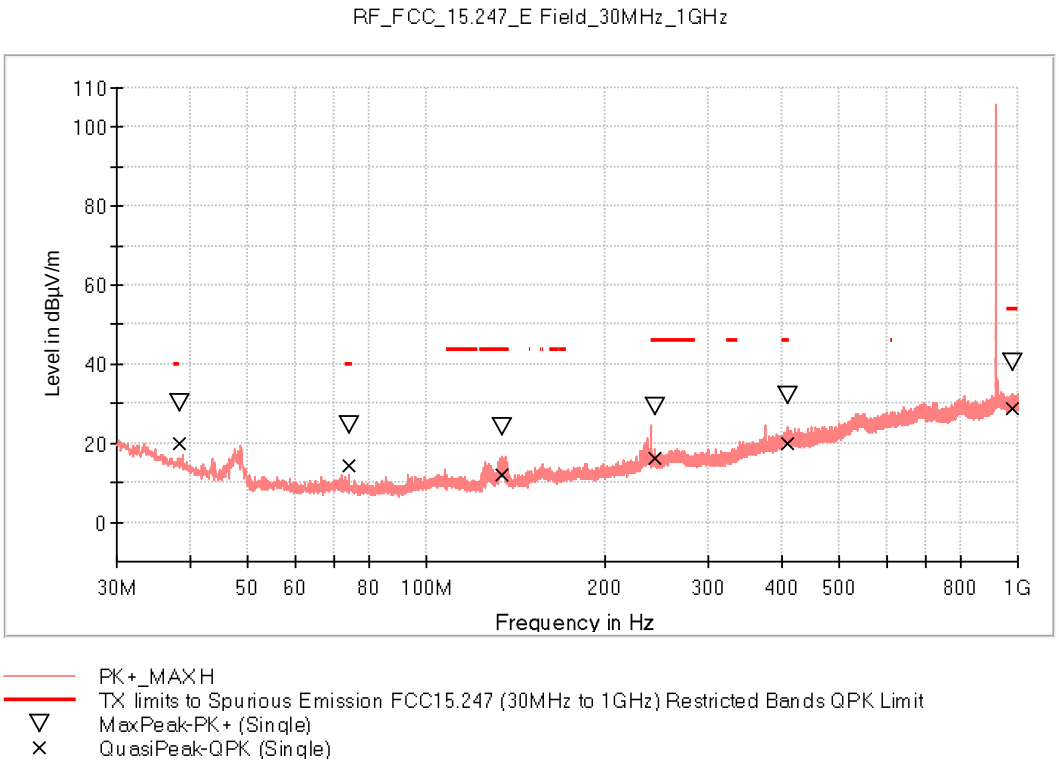
Results: Frequency range 0.03 - 1 GHz

Highest Channel

Attachments

Frequency = 919.12 MHz, Bandwidth = 125 kHz, Frequency Range GHz = [0.03, 1]

Images:



Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
38.148000	29.9	19.9	V	20.1	40.0
74.038000	24.4	14.1	V	25.9	40.0
134.032500	23.9	12.1	V	31.4	43.5
244.079000	29.3	16.3	V	29.7	46.0
408.882000	32.1	19.9	H	26.1	46.0
979.921000	40.5	28.7	H	25.4	54.0

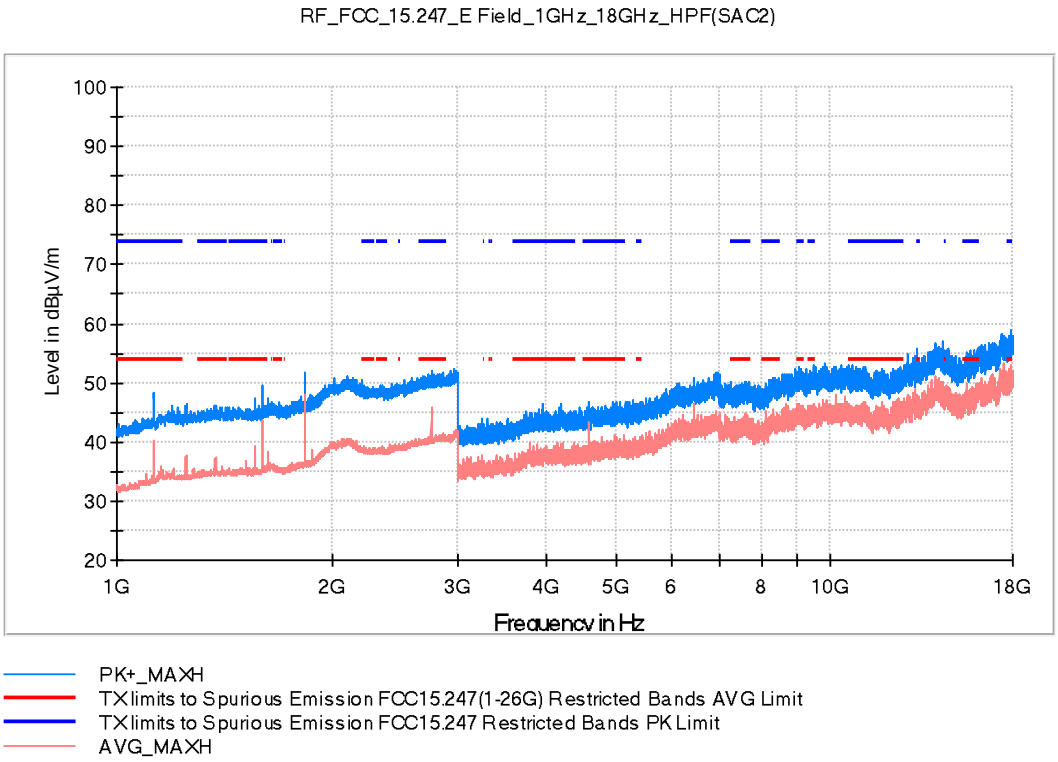
Results: Frequency range 1 - 18 GHz

Highest Channel

Attachments

Frequency = 919.12 MHz, Bandwidth = 125 kHz, Frequency Range GHz = [1, 18]

Images:



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
1600.000000	49.2	43.5	H	10.5	54.0
2757.500000	52.1	46.0	H	8.0	54.0
12480.500000	51.5	47.3	V	6.7	54.0

Appendix B: Test results for Wi-Fi 2.4 GHz

Appendix B

PRODUCT INFORMATION

(*): Data provided by the client.

Information	Description
Modulation	DTS
Frequency band/Range	2400-2483.5 MHz
Maximum RF Output Power	+16.5dBm +/-3dB
Operation mode	
- Operating Frequency Range	2401-2473 MHz
- Channel Bandwidth	20 MHz
Extreme operating conditions	
- Temperature range	-40 ºC to 80 ºC
Antenna type	chip antenna (ANT3, Vigorconn P/N 3.N101.0770) on the main board
Antenna gain	+3 dBi
Nominal Voltage	
- Supply Voltage	12 V
- Type of power source	DC
Equipment type	Wi-Fi 2.4GHz

DESCRIPTION OF TEST CONDITIONS

TEST CONDITIONS	DESCRIPTION
TC#01	Power supply (V): Power Supply: 12 V Type of power supply: DC voltage. Temperature (ºC): T_{nom} = +15 to + 35 Test Frequencies for Radiated tests: Lowest channel: 2412 MHz Middle channel: 2442 MHz Highest channel: 2462 MHz

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

Limits

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 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
Above 960	500	54	3

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

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

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

Verdict

Pass

Results:

Frequency range 9KHz – 30 MHz

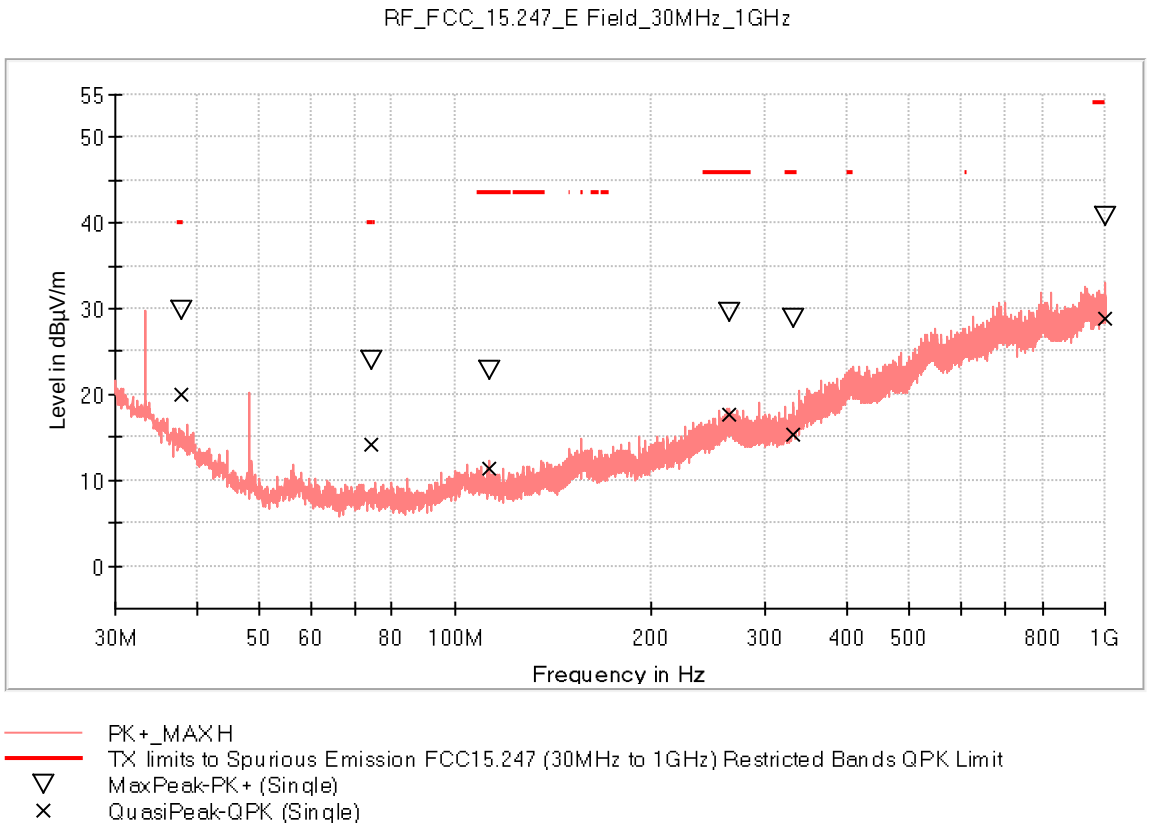
No radiofrequency signal generated in the device found below 10º sub-harmonic, no further investigation required.

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

Lowest Channel

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

Images:



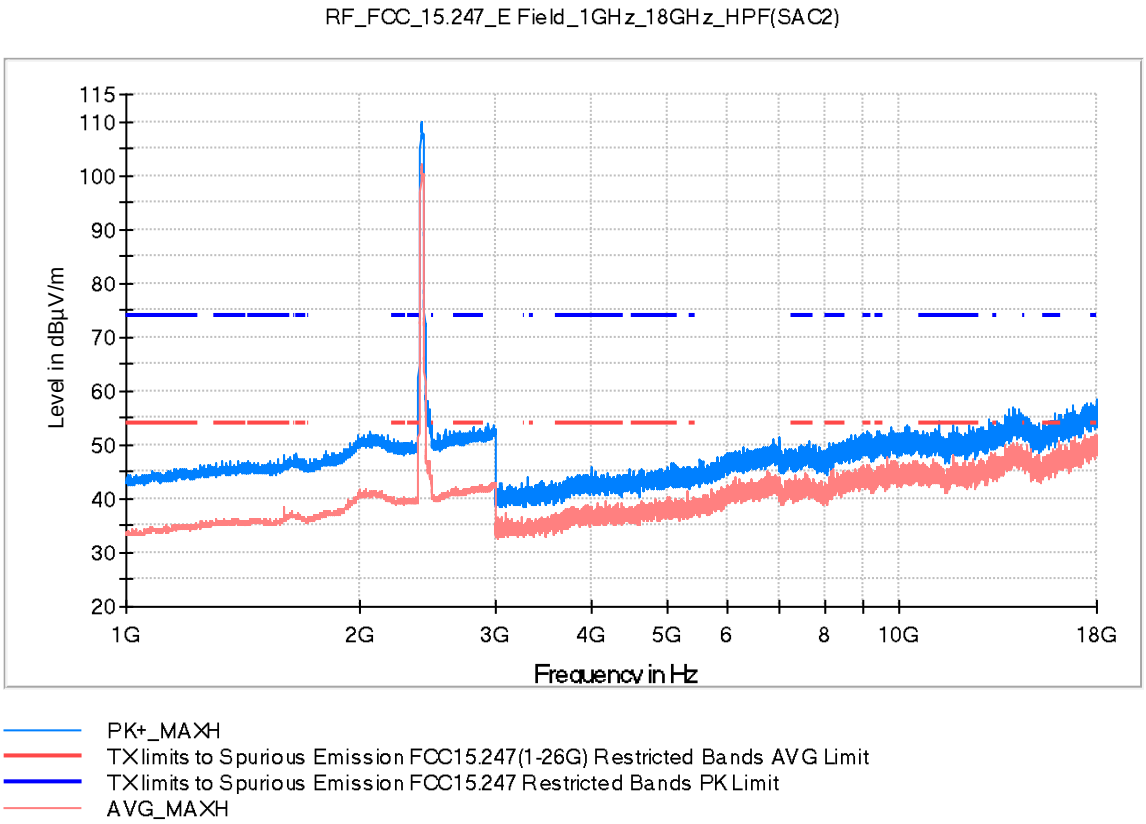
Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Margin - QPK (dB)	Limit - QPK (dBµV/m)
38.002500	29.7	19.9	V	20.1	40.0
74.232000	23.9	14.1	H	26.0	40.0
113.177500	22.7	11.4	H	32.2	43.5
263.430500	29.6	17.6	H	28.4	46.0
331.379000	28.9	15.3	V	30.7	46.0
997.623500	40.8	28.8	V	25.3	54.0

Frequency range 1 - 18 GHz

Lowest Channel

Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbps), Frequency Range GHz = [1, 18]

Images:



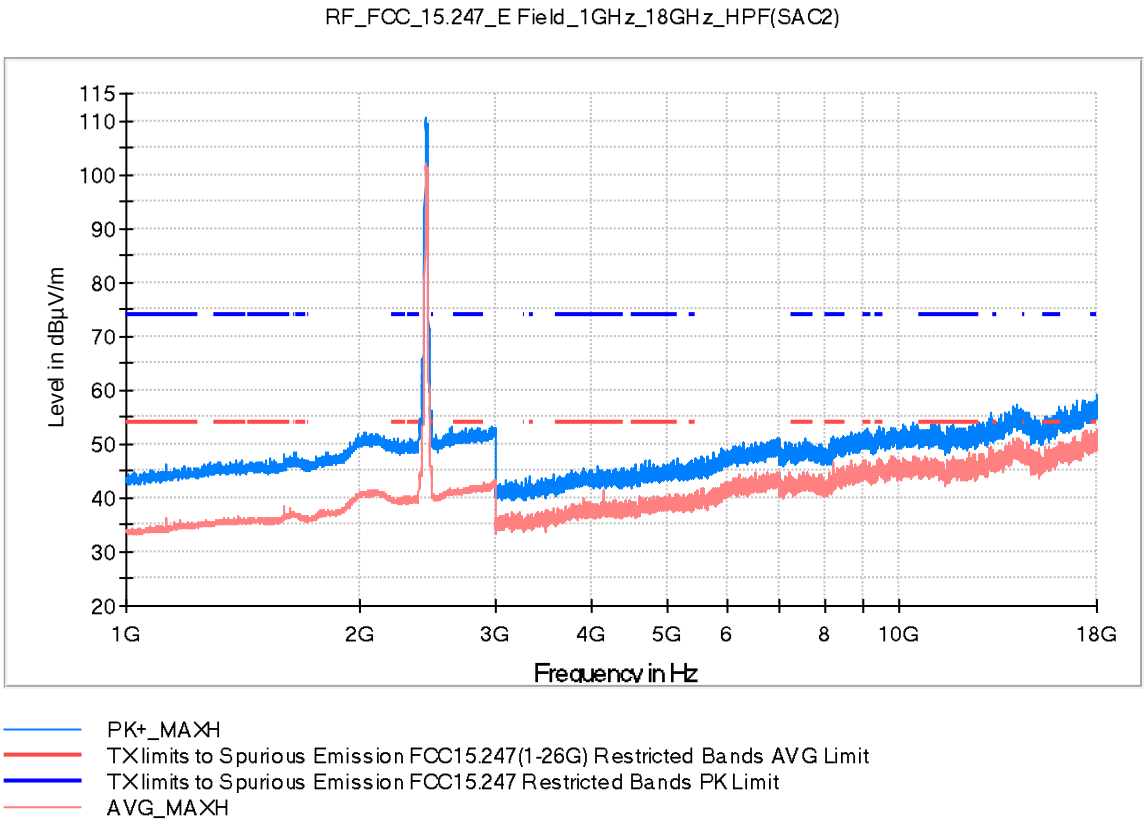
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
1600.000000	47.2	38.6	H	15.4	54.0	
2389.500000	62.6	51.3	H	2.7	54.0	
2411.500000	109.7	100.9	H	---	---	Fundamental
11821.500000	47.9	43.6	V	10.4	54.0	
17902.500000	56.5	51.9	V	2.1	54.0	

Frequency range 1 - 18 GHz

Middle Channel

Frequency MHz = 2442.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbps), Frequency Range GHz = [1, 18]

Images:



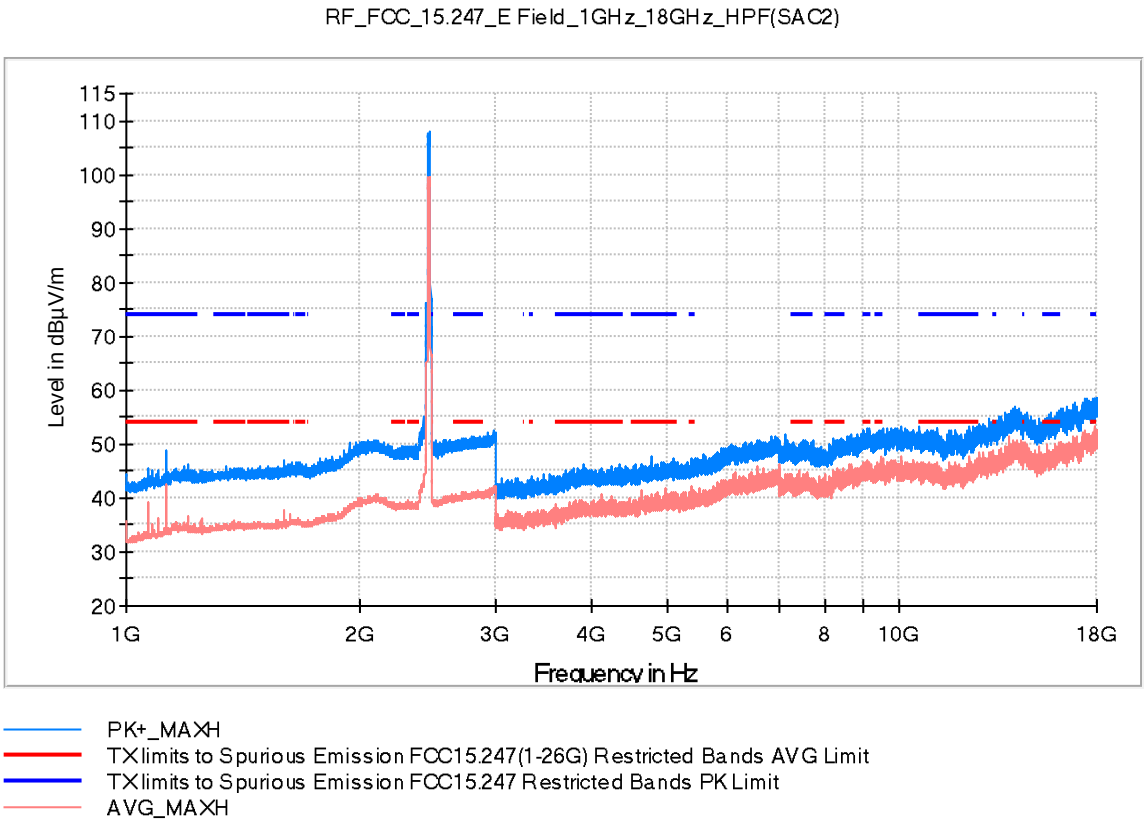
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
1125.000000	46.3	36.4	V	17.6	54.0	
1600.000000	47.7	38.7	V	15.3	54.0	
2444.000000	110.6	102.2	H	---	---	Fundamental
8231.000000	49.5	46.5	H	7.5	54.0	
17882.000000	56.3	52.2	V	1.8	54.0	

Frequency range 1 - 18 GHz

Highest Channel

Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbps), Frequency Range GHz = [1, 18]

Images:

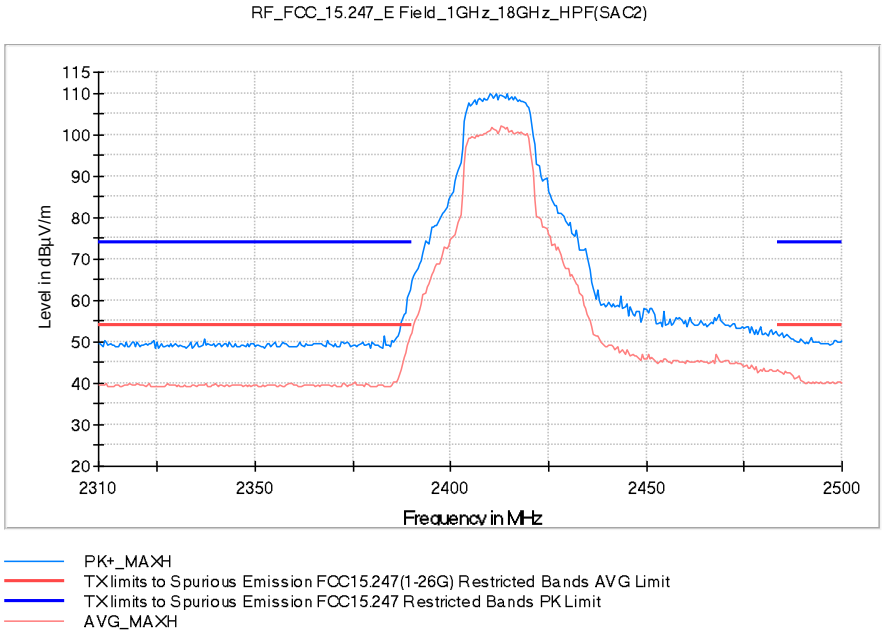


Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2463.000000	106.7	99.6	H	---	---	Fundamental
2483.500000	65.5	53.0	H	1.0	54.0	
11801.500000	50.5	46.7	V	7.3	54.0	

Restricted Bands (2.31 GHz - 2.5 GHz)

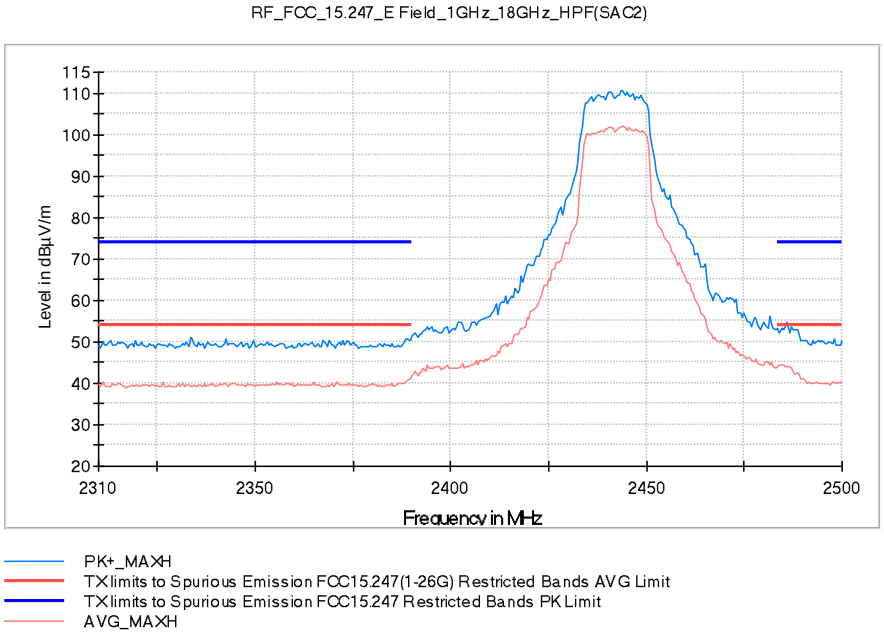
Lowest Channel

Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbps), Frequency Range GHz = [1, 18]

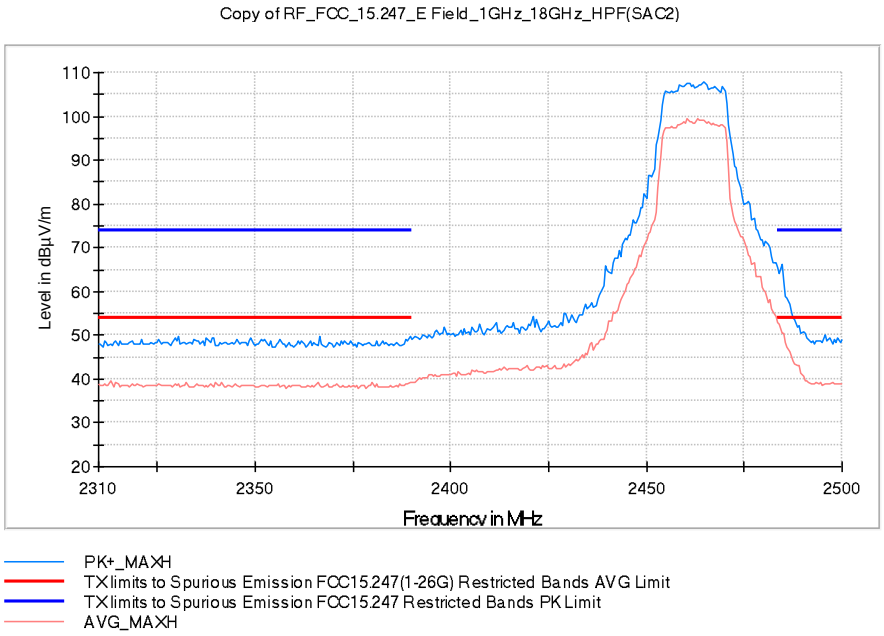


Middle Channel

Frequency MHz = 2442.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbps), Frequency Range GHz = [1, 18]



Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbps), Frequency Range GHz = [1, 18]

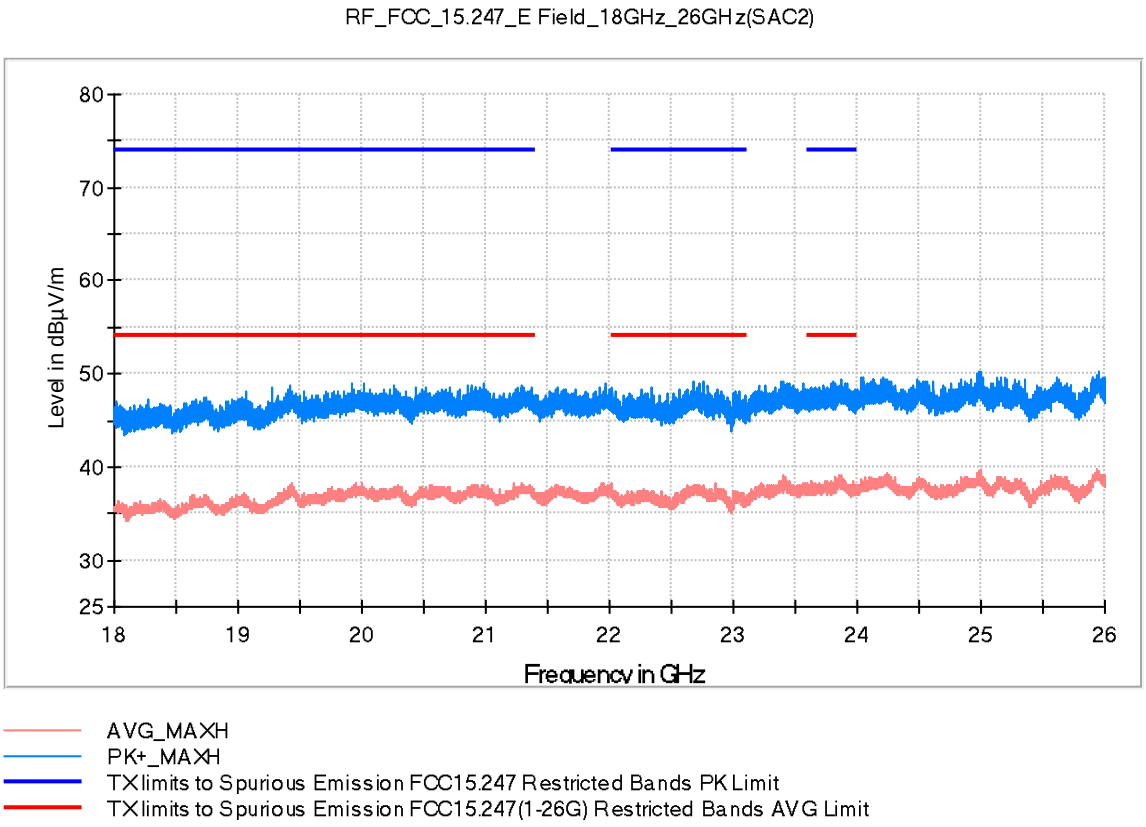


Frequency range 18 - 26 GHz

Lowest Channel

Frequency MHz = 2412.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbps), Frequency Range GHz = [18, 26]

Images:



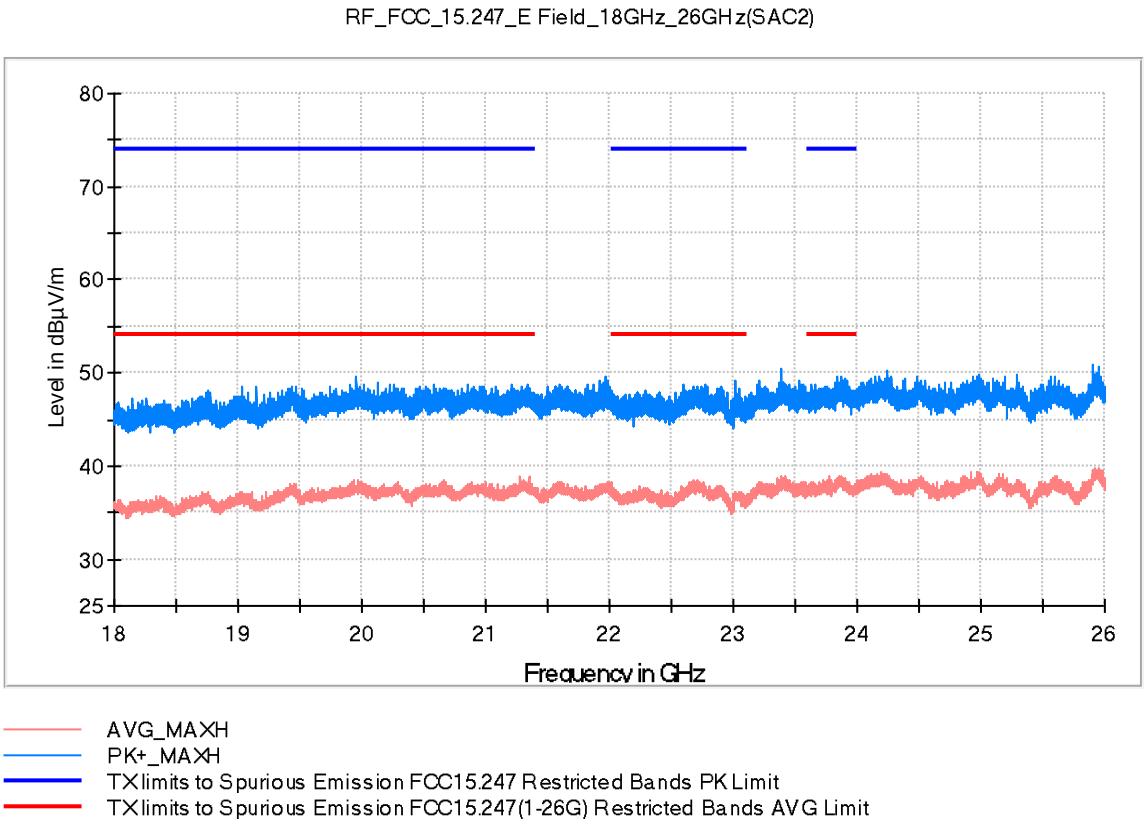
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19421.000000	48.8	36.9	H	17.1	54.0
22672.000000	49.2	37.0	V	17.0	54.0
23875.000000	49.4	37.9	V	16.1	54.0

Frequency range 18 - 26 GHz

Middle Channel

Frequency MHz = 2442.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbps), Frequency Range GHz = [18, 26]

Images:



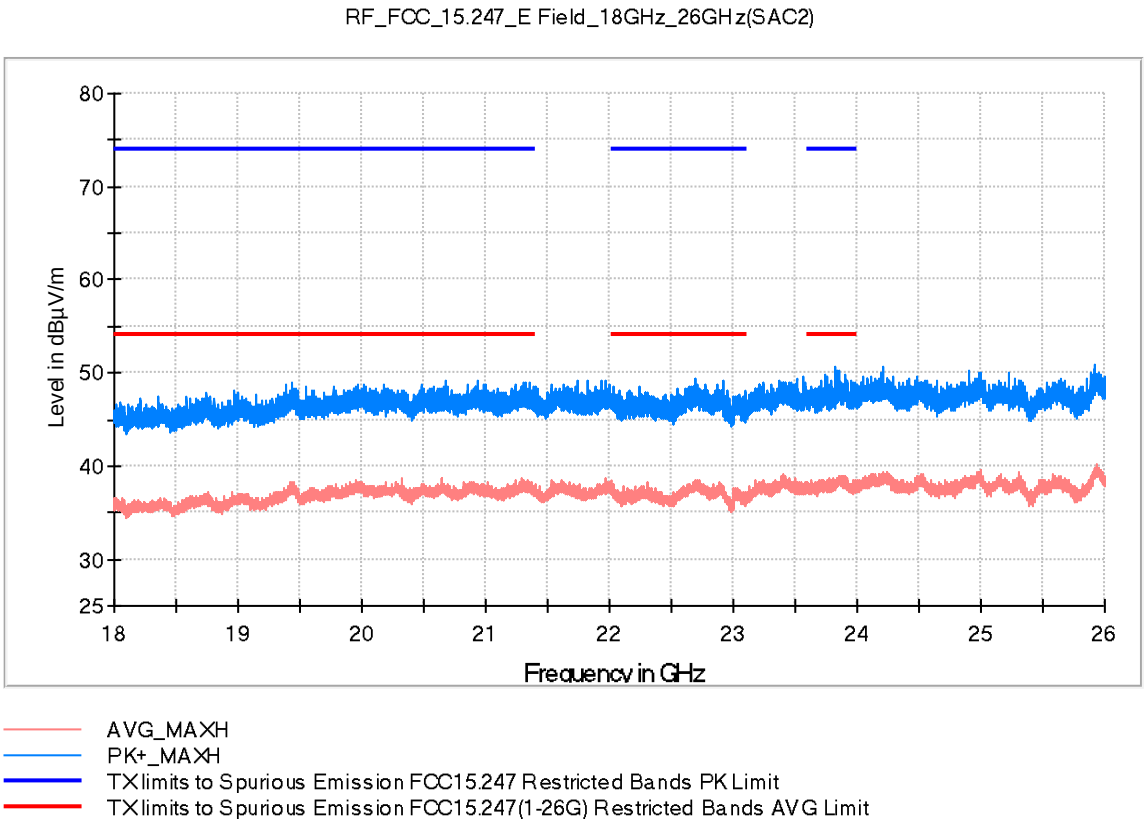
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
21282.000000	47.0	38.9	V	15.1	54.0
22679.000000	47.8	38.5	V	15.5	54.0
23851.500000	47.9	38.9	H	15.1	54.0

Frequency range 18 - 26 GHz

Highest Channel

Frequency MHz = 2462.00000, Equipment Type = Digital Transmission System (DTS), Bandwidth MHz = 20, Modulation = 802.11g (OFDM 6 Mbps), Frequency Range GHz = [18, 26]

Images:



Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
19426.500000	46.4	38.3	H	15.7	54.0
22722.000000	47.3	38.5	V	15.5	54.0

Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
30 MHz - 1 GHz	48.5 kHz	PK+	100 kHz	1 s	20 dB
1 GHz - 3 GHz	500 kHz	PK+ ; AVG	1 MHz	1 s	20 dB
3 GHz - 18 GHz	500 kHz	PK+ ; AVG	1 MHz	1 s	20 dB
18 GHz - 26 GHz	500 kHz	PK+ ; AVG	1 MHz	1 s	20 dB

Appendix C: Test results for Z-Wave Long Range

Appendix C

PRODUCT INFORMATION

(*): Data provided by the client.

Information	Description
Modulation	DTS
Frequency band/Range	902-928 MHz
Maximum RF Output Power	+20 dBm
Operation mode	
- Operating Frequency Range	912-920 MHz
- Number of Channels	2
Extreme operating conditions	
- Temperature range	-40 ºC to 80 ºC
Antenna type	chip antenna (ANT701, Quectel P/N YCIS003AA) soldered to main board
Antenna gain	1.5 dBi
Nominal Voltage	
- Supply Voltage	12 V
- Type of power source	DC
Equipment type	Z-Wave (long range)

DESCRIPTION OF TEST CONDITIONS

TEST CONDITIONS	DESCRIPTION
TC#01	Power supply (V): Power Supply: 12 V Type of power supply: DC voltage. Temperature (ºC): T_{nom} = +15 to + 35 Test Frequencies for Conducted and Radiated tests: Lowest channel: 912 MHz Highest channel: 920 MHz

Test Cases Details

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

Limits

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

Results

	Lowest frequency 912 MHz	Highest frequency 920 MHz
6 dB Spectrum bandwidth (KHz)	685	685

Verdict

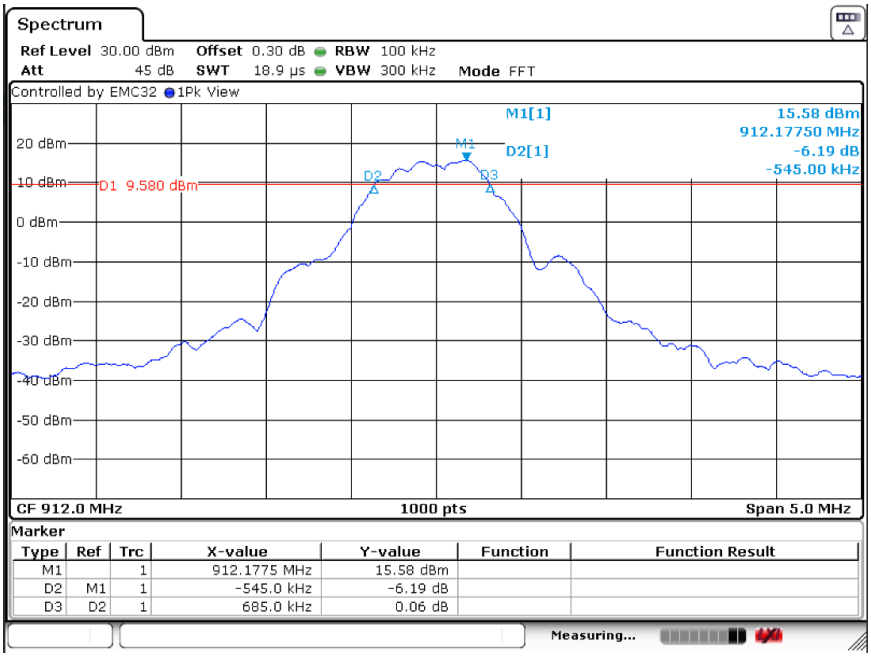
Pass

Results

Attachments

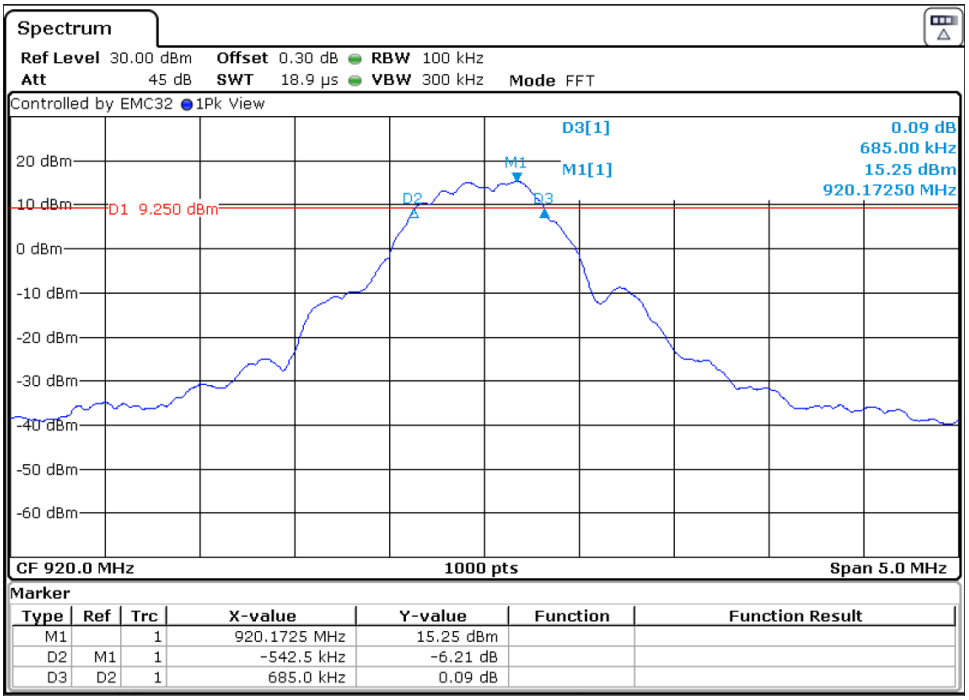
Lowest Frequency = 912 MHz

Images:



Highest Frequency = 920 MHz

Images:



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. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

The maximum power spectral density level in the fundamental emission was measured using the method AVGPSD (Average PSD) according to Section 8.4 of KDB 558074 D01 15.247 Meas Guidance v05r02.

Results

	Lowest frequency 912 MHz	Highest frequency 920 MHz
Power spectral density (dBm)	7.50	7.34

Verdict

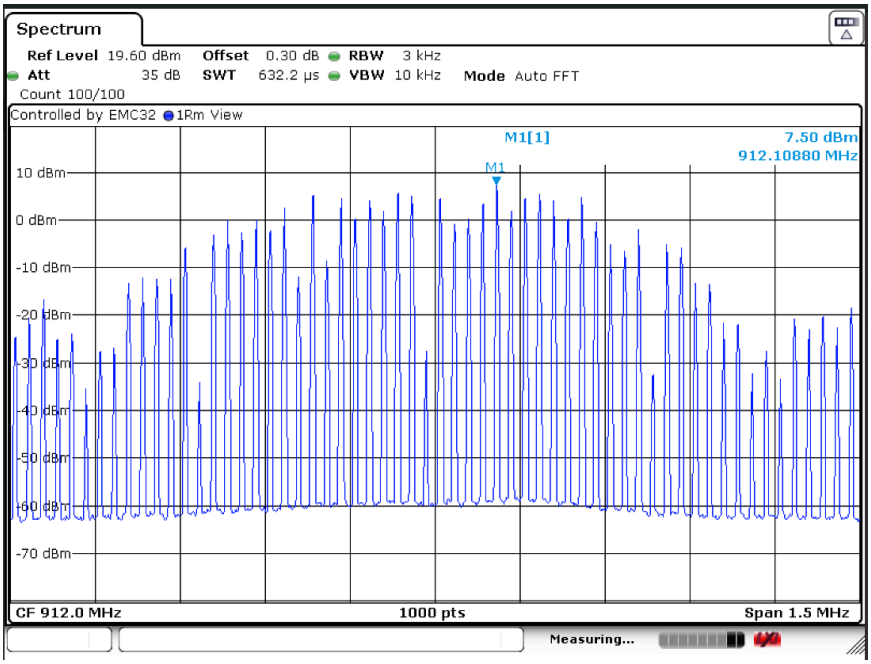
Pass

Results

Attachments

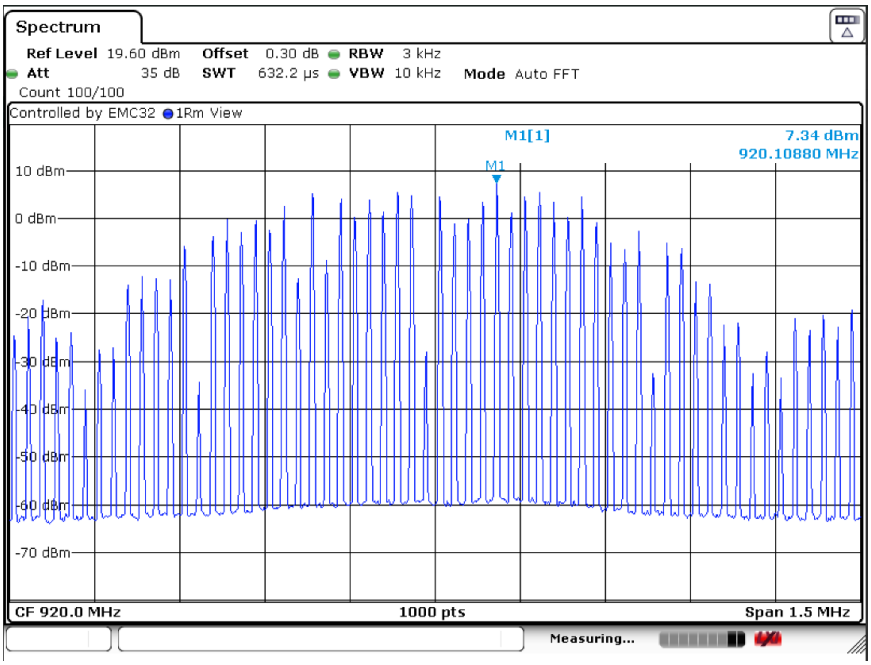
Lowest Frequency = 912 MHz

Images:



Highest Frequency = 920 MHz

Images:



RSS-247 5.4 (d) / FCC 15.247 (b) (3) Maximum Peak Conducted output power & Antenna gain

Limits

§15.247(b)(3) and RSS-247 5.4(d):

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt (30 dBm). As an alternative to a peak power measurement, compliance with the one-Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

The maximum peak conducted output power was measured using the method according to section 9 of Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 558074 D01 DTS Meas Guidance v05 dated 04/02/2019.

The EIRP power (dBm) is calculated by adding the declared maximum antenna gain to the measured conducted power.

RSS-247 5.4(d): The e.i.r.p. shall not exceed 4 W (36 dBm)

Maximum declared antenna gain: 1.5 dBi

Results

	Lowest frequency 912 MHz	Highest frequency 920 MHz
Maximum conducted power (dBm)	17.62	17.58
Maximum EIRP power (dBm)	19.12	19.08

Verdict

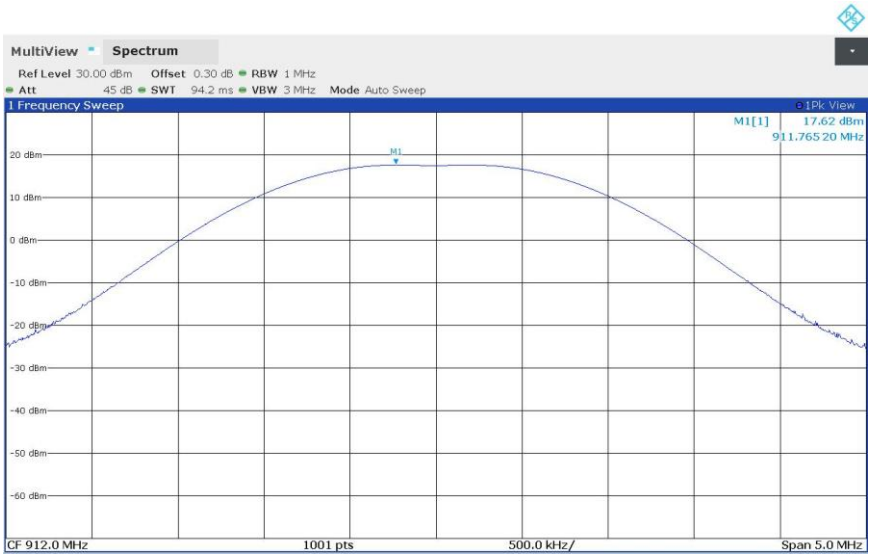
Pass

Results

Attachments

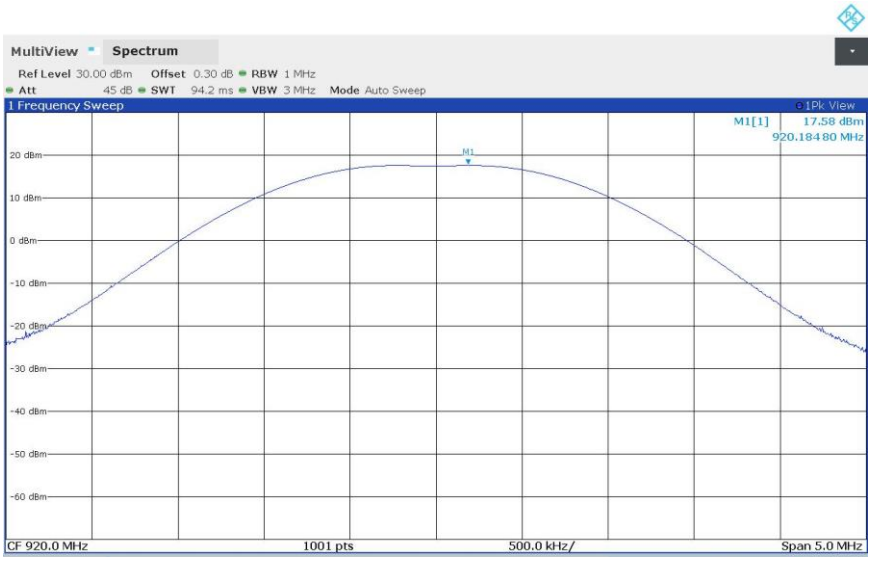
Lowest Frequency = 912 MHz

Images:



Highest Frequency = 920 MHz

Images:



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

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.

Note: Radiated measurements are also used to show compliance with the limits in the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

Verdict

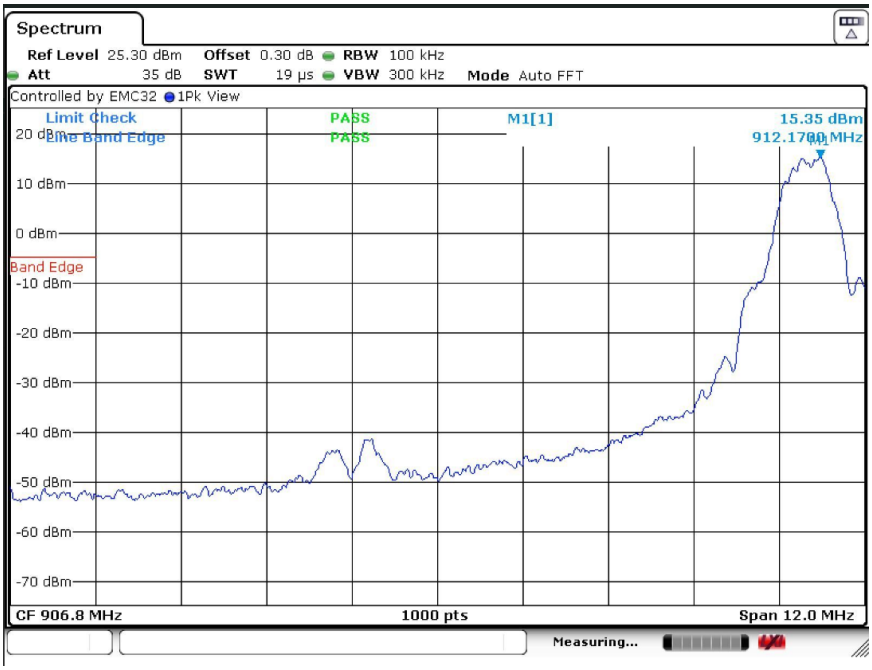
Pass

Results

Attachments

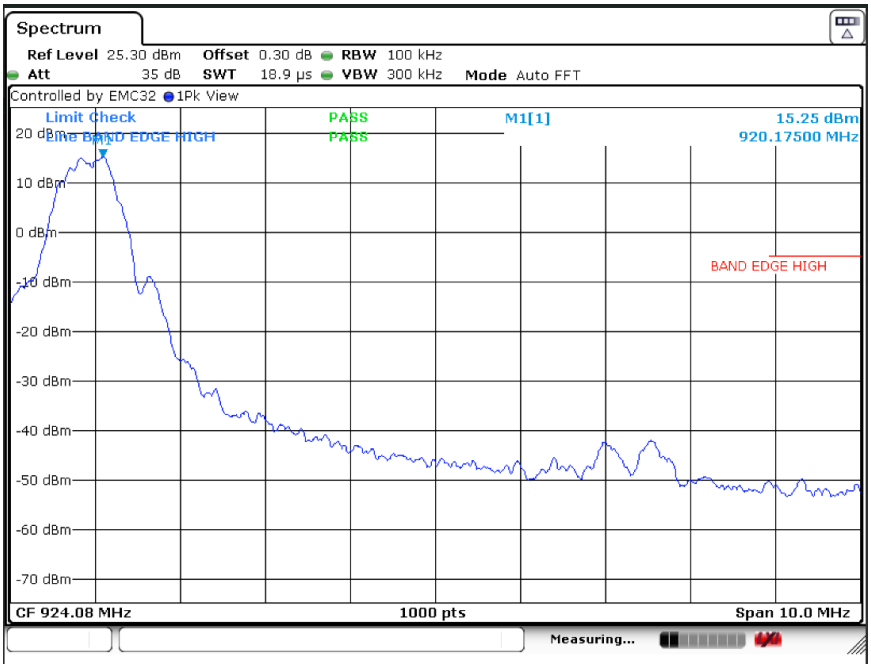
Lowest Frequency = 912 MHz

Images:



Highest Frequency = 920 MHz

Images:



RSS-247 5.2 (a) / RSS-GEN 6.7 FCC 15.247 (a) (2) 99dBw Occupied Channel Bandwidth 99%

Limits

The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs

Results

	Lowest frequency 912 MHz	Highest frequency 920 MHz
99% bandwidth (KHz)	915	920

Verdict

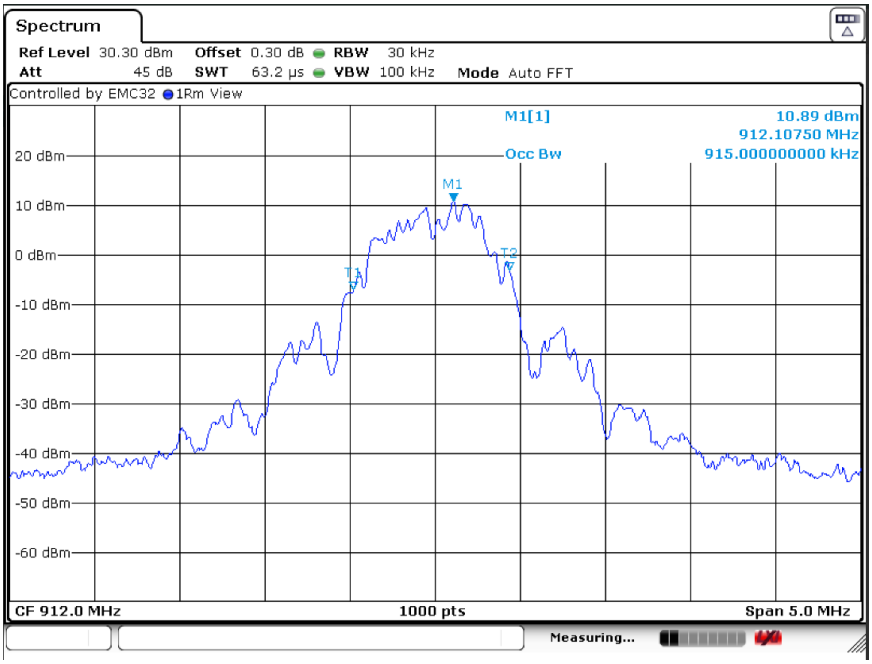
Pass

Results

Attachments

Lowest Frequency = 912 MHz

Images:



Highest Frequency = 920 MHz

Images:

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

Limits

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 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
Above 960	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

Frequency range 9KHz – 30 MHz

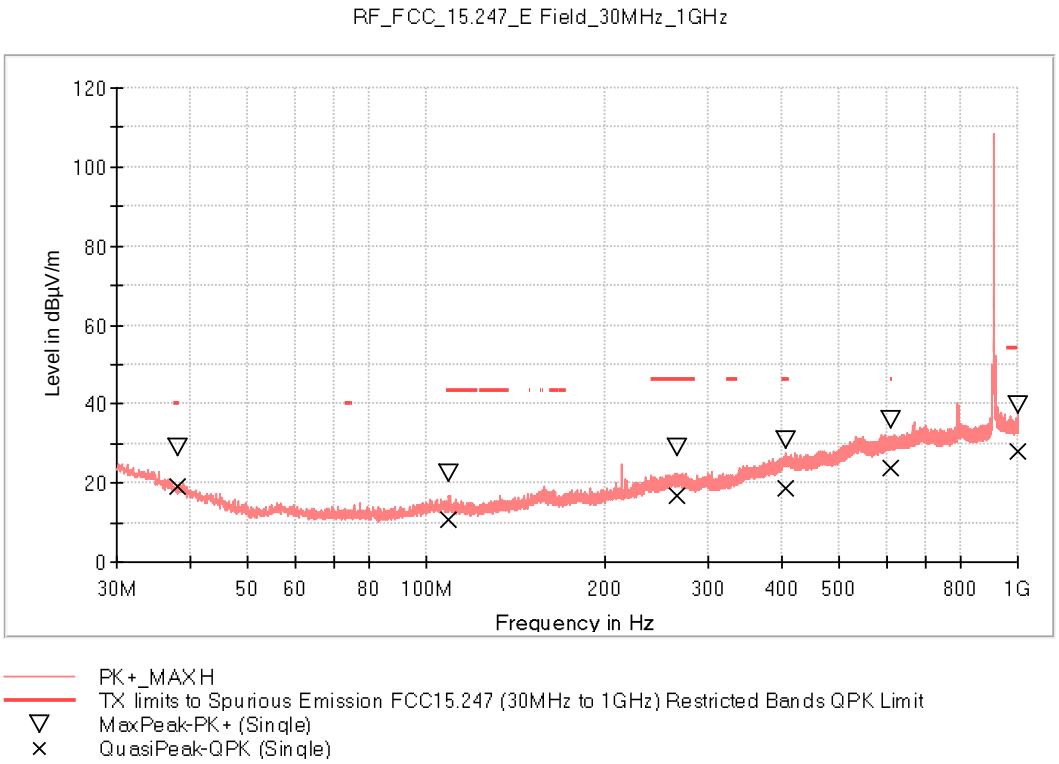
No radiofrequency signal generated in the device found below 10º sub-harmonic, no further investigation required.

Results: Frequency range 0.03 - 1 GHz

Attachments

Lowest Frequency = 912 MHz, Frequency Range GHz = [0.03, 1]

Images:



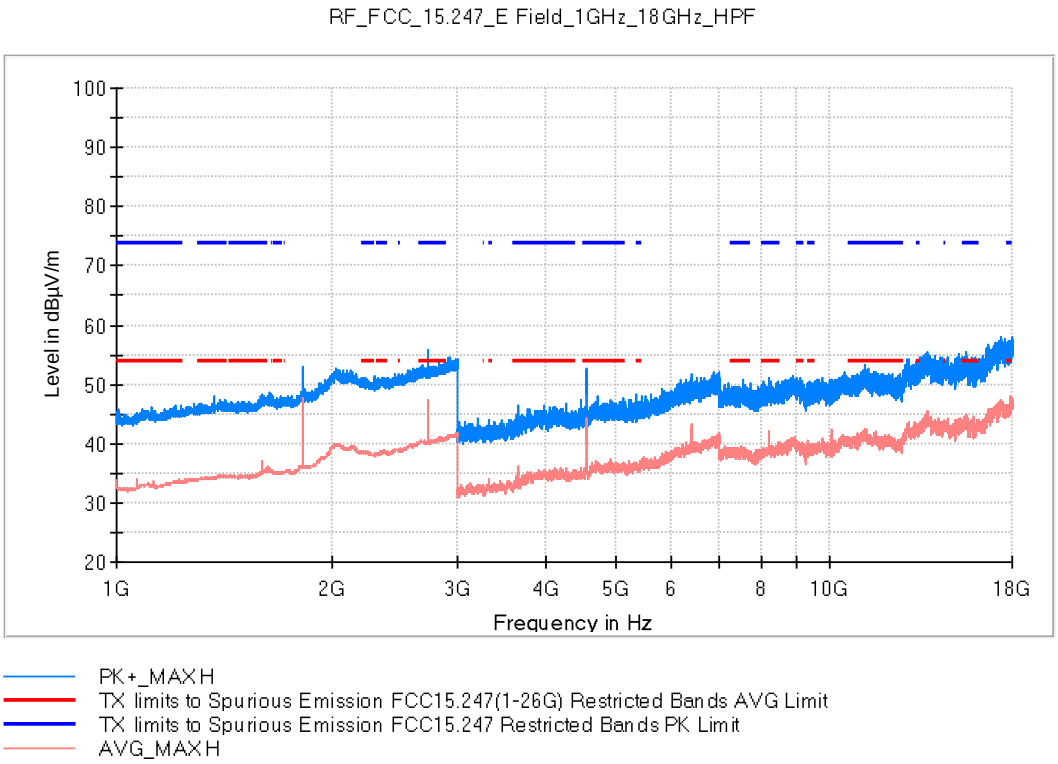
Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Margin - QPK (dB)	Limit - QPK (dBµV/m)	Comment
37.954000	29.0	19.1	H	20.9	40.0	
109.443000	22.4	10.9	H	32.6	43.5	
265.710000	29.0	16.8	V	29.2	46.0	
404.129000	30.9	18.8	H	27.2	46.0	
609.672000	36.1	24.0	H	22.1	46.0	
912.215000	108.5	---	V	---	---	Fundamental
998.011500	39.6	27.8	H	26.2	54.0	

Results: Frequency range 1 - 18 GHz

Attachments

Lowest Frequency = 912 MHz, Frequency Range GHz = [1, 18]

Images:



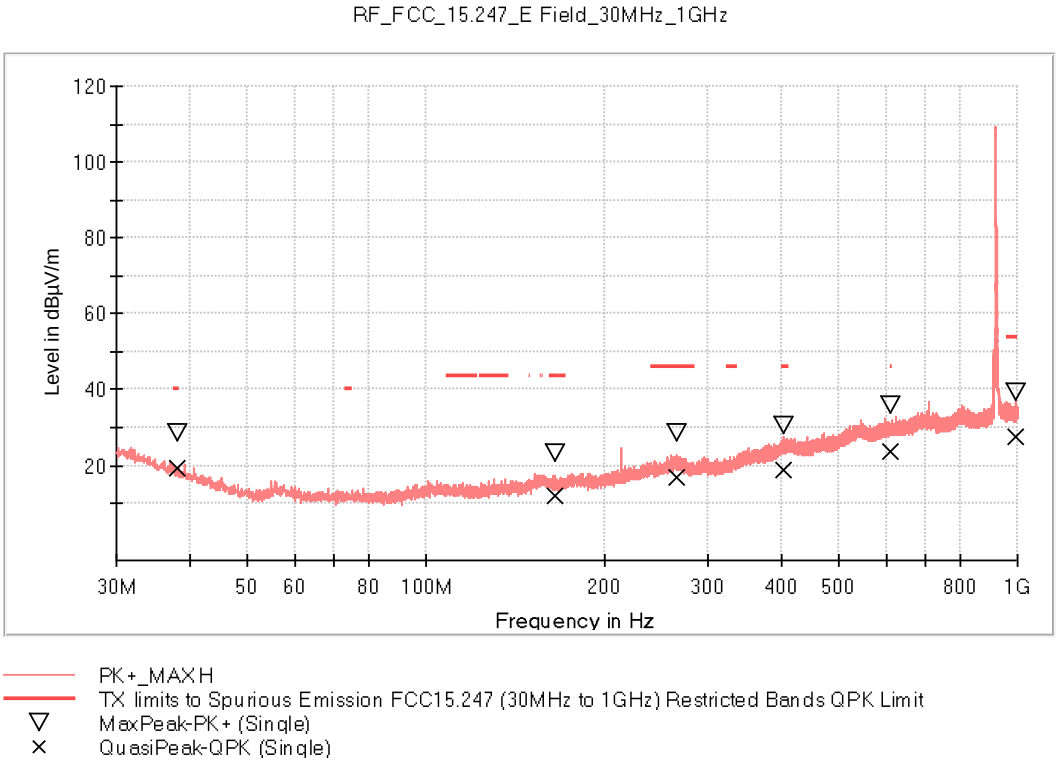
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2736.500000	54.4	47.5	V	6.5	54.0	3rd Harmonic
3648.500000	43.8	36.2	V	17.8	54.0	4th Harmonic
4561.000000	52.7	44.4	V	9.6	54.0	5th Harmonic
8210.000000	51.1	42.1	H	11.9	54.0	9th Harmonic
15479.000000	53.7	44.8	H	9.2	54.0	

Results: Frequency range 0.03 - 1 GHz

Attachments

Highest Frequency = 920 MHz, Frequency Range GHz = [0.03, 1]

Images:



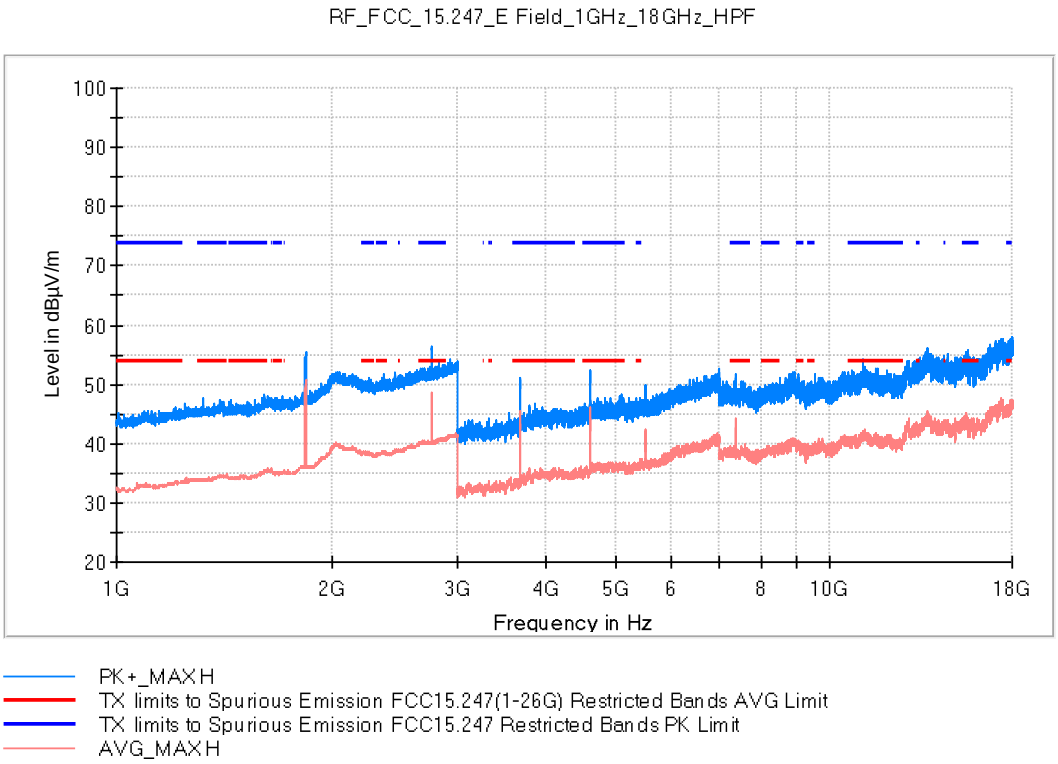
Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Margin - QPK (dB)	Limit - QPK (dBµV/m)	Comment
37.905500	28.7	19.1	H	20.9	40.0	
165.266500	23.4	11.8	V	31.7	43.5	
264.934000	28.8	16.9	H	29.1	46.0	
403.353000	30.3	18.8	V	27.2	46.0	
608.168500	35.6	23.9	H	22.1	46.0	
920.169000	109.3	---	H	---	---	Fundamental
989.912000	39.2	27.6	H	26.4	54.0	

Results: Frequency range 1 - 18 GHz

Attachments

Highest Frequency = 920 MHz, 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
2760.500000	56.5	48.7	V	5.3	54.0	3rd Harmonic
3680.500000	50.9	45.5	V	8.5	54.0	4th Harmonic
4600.500000	52.3	46.0	H	8.0	54.0	5th Harmonic
7361.500000	51.8	44.1	H	9.9	54.0	8th Harmonic
11171.500000	52.5	42.5	V	11.5	54.0	

RSS-Gen 8.8 / FCC 15.207 - Continuous conducted emission on Power leads

Limits:

- **FCC Rules and Regulations 47 CFR Part 15, Subpart C, Secs. 15.207:**

(a) for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

Frequency range	Limit (dBµV)	
(MHz)	Quasi-Peak	Average
0,15 to 0,5	66 – 56 (1)	56 – 46 (1)
0,5 to 5	56	46
5 to 30	60	50

(1) The limit decreases with the logarithm of the frequency

- **RSS-Gen Issue 5, Secs 8.8:**

Unless stated otherwise in the applicable RSS, for radio apparatus that are designed to be connected to the public utility AC power network, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the range 150 kHz to 30 MHz shall not exceed the limits in table 4, as measured using a 50 µH / 50 Ω line impedance stabilization network. This requirement applies for the radio frequency voltage measured between each power line and the ground terminal of each AC power-line mains cable of the EUT.

For an EUT that connects to the AC power lines indirectly, through another device, the requirement for compliance with the limits in table shall apply at the terminals of the AC power-line mains cable of a representative support device, while it provides power to the EUT.

Frequency range	Limit (dBµV) (1)	
(MHz)	Quasi-Peak	Average
0,15 to 0,5	66 – 56 (1)	56 – 46 (1)
0,5 to 5	56	46
5 to 30	60	50

(1) At the transition frequency, the lower limit applies
(2) The limit decreases with the logarithm of the frequency

Code: CEmmnnHH

a) CE: Conducted Emission,
b) mm: Sample number,
c) nn: Operation mode,
d) HH: Wire
(L1: Phase1, 0N: Neutral)

Id	Description
OM/01	DUT ON. Power supply 120Vdc. Z-Wave Long Range in TX. LTE, BLE, Wi-Fi, Power G in Idle mode.

Results

S/	OM	Code	Line	Freq Rng (MHz)	V
05	OM/01	CE05010N	N	[0.15, 30]	P
05	OM/01	CE0501L1	L1	[0.15, 30]	P

Verdict
Pass

Attachments

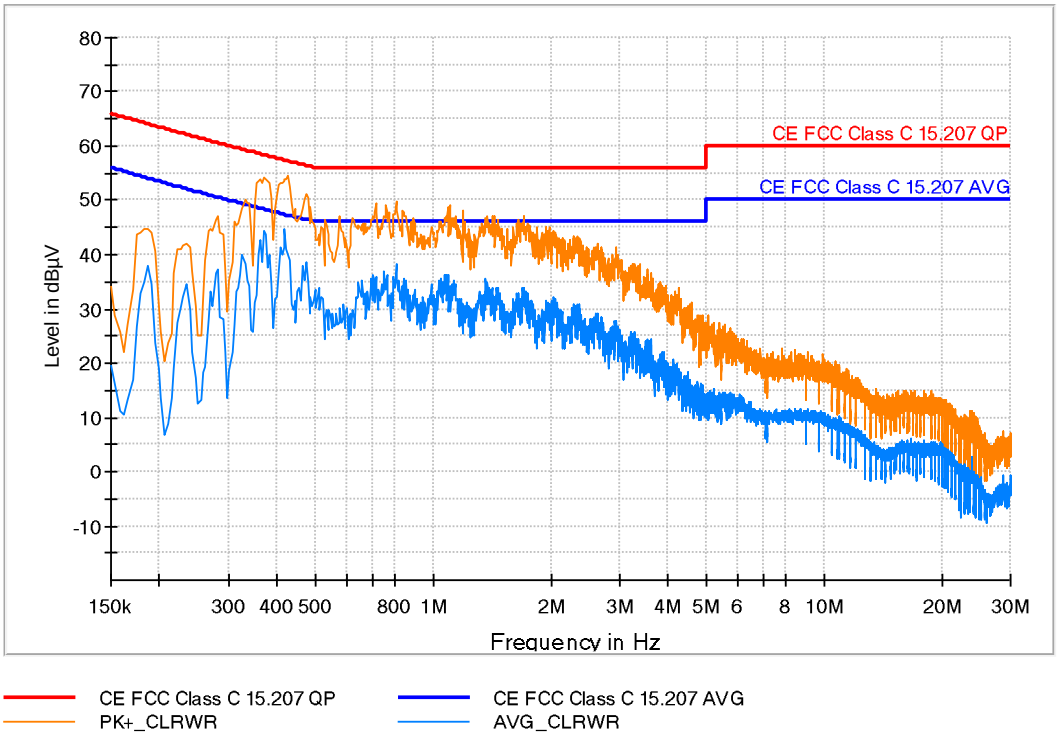
EMC Test Code = CE05010N Conducted Emissions - Tested Line = N

Frequency Range MHz = [0.15, 30]

Sample ID: S/05

Operation Mode: OM/01.

Images:



Tables:

Frequency (MHz)	PK+_CLRWR (dBµV)	AVG_CLRWR (dBµV)	Line	Margin - AVG (dB)	Limit - AVG (dBµV)
0.186000	44.9	37.9	N	16.2	54.1
0.418000	53.8	44.7	N	2.7	47.4
0.474000	51.2	38.6	N	7.8	46.4
0.806000	49.7	38.4	N	7.6	46.0
1.366000	46.7	35.4	N	10.6	46.0
2.294000	42.9	30.9	N	15.1	46.0
3.610000	33.8	23.5	N	22.5	46.0
6.158000	23.9	13.7	N	36.3	50.0
10.930000	19.2	10.1	N	39.9	50.0
17.974000	15.0	5.7	N	44.3	50.0

Attachments

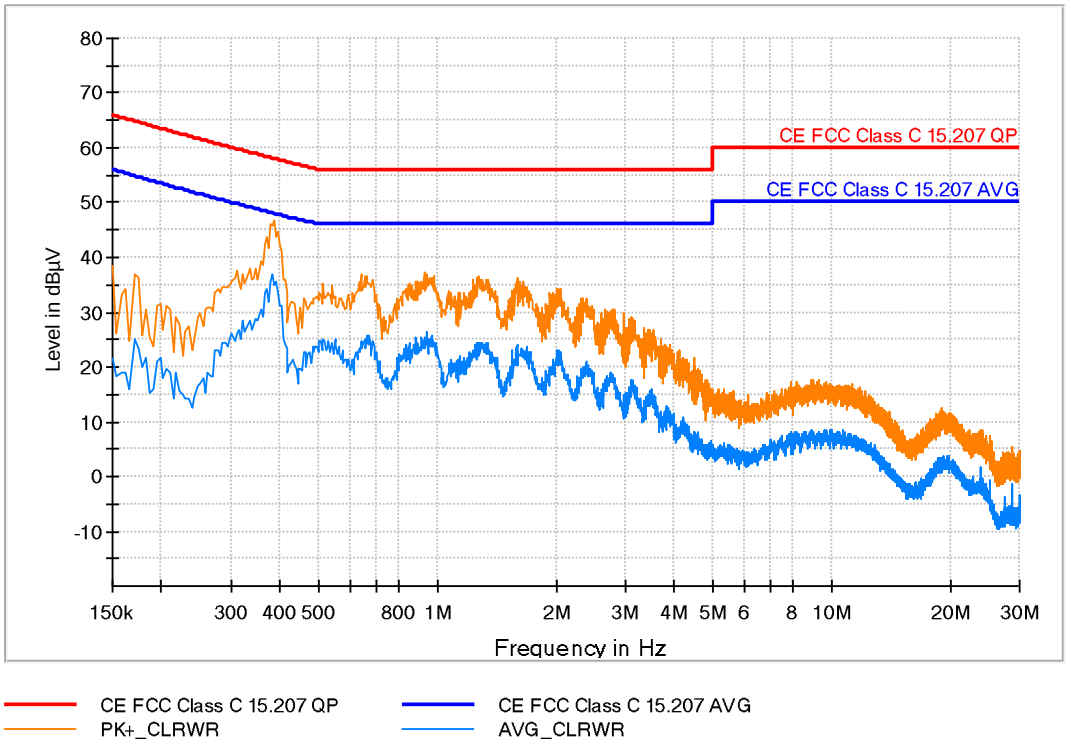
EMC Test Code = CE05010L1 Conducted Emissions - Tested Line = L1

Frequency Range MHz = [0.15, 30]

Sample ID: S/05

Operation Mode: OM/01.

Images:



Tables:

Frequency (MHz)	PK+_CLRWR (dBµV)	AVG_CLRWR (dBµV)	Line	Margin - AVG (dB)	Limit - AVG (dBµV)
0.170000	36.8	24.9	L1	29.9	54.9
0.382000	45.9	36.8	L1	11.2	48.1
0.662000	36.5	25.8	L1	20.2	46.0
0.942000	36.9	26.3	L1	19.7	46.0
1.298000	35.8	24.5	L1	21.5	46.0
2.378000	32.5	21.0	L1	25.0	46.0
3.606000	23.0	12.8	L1	33.2	46.0
9.658000	16.3	8.6	L1	41.4	50.0
10.722000	16.1	8.3	L1	41.7	50.0
19.570000	10.6	3.7	L1	46.3	50.0