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

ACCREDITED
Test Lab
Cert 2764.01

FCC LISTED, REGISTRATION NUMBER: 2764.01

ISED LISTED REGISTRATION NUMBER: 23595-1

Test report No:
2602ERM.005A2

Test report

USA FCC Part 15.249, 15.209
CANADA RSS-210, RSS-Gen
Radio Frequency Devices. Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz.

Identification of item tested	CP1150 Sound Processor
Trademark	Cochlear
Model and /or type reference	CP1150
Other identification of the product	FCC ID: WTO-CP1150 IC: 8039A-CP1150 HW Version: Build W SW Version: 0922B02T00 (02.02.00#766564)
Features	---
Manufacturer	Cochlear LTD 1 University Avenue, Macquarie University, NSW, Australia – 2109.
Test method requested, standard	USA FCC Part 15.249 10-1-18 Edition: Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, 5725 - 5875 MHz, and 24.0 – 24.25 GHz. USA FCC Part 15.209 10-1-18 Edition: Radiated emission limits; general requirements. CANADA RSS-210 Issue 9 (August 2016). CANADA RSS-Gen Issue 5 (April 2018). 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	02-26-2020
Report template No	FDT08_21

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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 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.

Frequency (MHz)	U(k=2)	Units
30-180	3.82	dB
180-1000	2.61	dB
1000-18000	2.92	dB
18000-40000	2.15	dB

Data provided by the client

Wi-Fi / BLE module.

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
2602B/04	Conducted Sample 2	CP1150	1010151025569	09/10/2019

1. Sample S/01 has undergone 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
2602B/02	Radiated Sample 2	CP1150	1010151026054	09/10/2019

1. Sample S/02 has undergone following test(s):

   All radiated tests indicated in appendix A.

Following accessory items were used to Charge the DUT

Control Nº	Description	Model	Serial Nº	Date of reception
2602B/06	Portable Charger	2819x	--	09/10/2019
2602B/07	Portable Charger Cable	--	--	09/10/2019

Test sample description

Ports..... :	Port name and description		Cable			
			Specified length [m]	Attached during test	Shielded	
				☐		
				☐		
				☐		
Supplementary information to the ports..... :	*No Data Provided*					
Rated power supply .....:	Voltage and Frequency		Reference poles			
			L1	L2		L1	L2
	☐	AC:	☐	☐	AC:	☐	☐
	☐	AC:	☐	☐	AC:	☐	☐
	☒	DC: 3-4.2 V					
	☐	DC:					
Rated Power .....:	*No Data Provided*						
Clock frequencies .....:	*No Data Provided*						
Other parameters.....:	*No Data Provided*						
Software version .....:	*0922B02T00 (02.02.00#766564)*						
Hardware version.....:	*Build W*						
Dimensions in cm (L x W x D) ....:	*34mm x 38mm x 11.6mm*						
Mounting position.....:	☐	Table top equipment					
	☐	Wall/Ceiling mounted equipment					
	☐	Floor standing equipment					
	☐	Hand-held equipment					
	☒	Other: Body Worn – off the ear					
Modules/parts .....:	Module/parts of test item		Type	Manufacturer			
	No provided data						
Accessories (not part of the test item) .....:	Description		Type	Manufacturer			

Documents as provided by the applicant.....:	Description	File name	Issue date
	Equipment declaration Data	*FDT30_15 Declaration Equipment Data CP1150 V1*	*09-12-2019*

Copy of marking plate:

Identification of the client

Cochlear LTD
1 University Avenue, Macquarie University,
NSW, Australia – 2109.

Testing period and place

Test Location	DEKRA Certification Inc.
Date (start)	09-11-2019
Date (finish)	09-12-2019

Document history

Report number	Date	Description
2602ERM.005	09-25-2019	First release
2602ERM.005A1	12-03-2019	Second release
2602ERM.005A2	02-26-2020	Third release

Modifications to the reference test report

It was introduced the following modifications in respect to the test report number 2602ERM.005A1 related with the same samples, in the next clauses and sub-clauses:

Clauses/ Sub-Clauses	Modification	Justification
Page 12/Product Information	Modified the antena gain	To comply with the FDT30 Doc

This modification test report cancels and replaces the test report 2602ERM.005A1

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. = 860 mbar Max. = 1060 mbar

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. = 860 mbar Max. = 1060 mbar

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. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

Remarks and comments

The tests have been performed by the technical personnel: Divya Adusumilli, Poojita Bhattu and Bhagyasree.

Testing verdicts

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

Summary

FCC PART 15.249 PARAGRAPH / RSS-249 (Proprietary Protocol)					
Report Section	**FCC Spec Clause**	**RSS Spec Clause**	**Test Description**	**Verdict**	**Remark**
A.1	§ 2.1049	RSS-Gen 6.7	99% Occupied Bandwidth	P	N/A
A.2	§ 15.249 (a)	RSS-210 B.10 (a)	Field Strength of fundamental	P	N/A
A.3	§ 15.249 (d)	RSS-210 B.10 (b)	Emission limitations radiated (Transmitter)	P	N/A
Supplementary information and remarks: None.					

List of equipment used during the test

Conducted Measurements

Test system Rohde & Schwarz TS 8997:

CONTROL NUMBER	DESCRIPTION	LAST CALIBRATION	NEXT CALIBRATION
1039	Signal analyzer Rohde & Schwarz FSV40	2017/03	2020/03
1040	Switch unit Rohde & Schwarz with power detector OSP120 / OSP-B157	2017/03	2020/03
1041	RF generator Rohde & Schwarz SMB100A	2017/04	2020/04
1042	RF generator Rohde & Schwarz SMBV100A	2018/01	2020/01

Radiated Measurements

CONTROL NUMBER	DESCRIPTION	LAST CALIBRATION	NEXT CALIBRATION
1179	Semi anechoic Absorber Lined Chamber Frankonia SAC 3 plus “L”	N/A	N/A
1064	BiconicalLog antenna ETS LINDGREN 3142E	2017/03	2020/03
1057	Double-ridge Waveguide Horn antenna 1-18 GHz	2017/03	2020/03
1056	Double-ridge Waveguide Horn antenna 18-40 GHz	2017/03	2020/03
1014	Spectrum analyzer Rohde & Schwarz FSV40	2017/03	2020/03
1015, 1017, 1019, 1020	Rohde & Schwarz EMC32 software	N/A	N/A

Appendix A: Test results (Proprietary Protocol 2.4 GHz)

Appendix A Content

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PRODUCT INFORMATION

The following information is provided by the client

Information	**Description**
Modulation	FHSS
Adaptive	Adaptive Equipment operating in Non-Adaptive mode
Operation mode	
- Operating Frequency Range	2404 – 2478 MHz
- Nominal Channel Bandwidth	2 MHz
- RF Output Power	0 dBm
Extreme operating conditions	
- Temperature range	5 ºC to +40 ºC
Antenna type	Integral Antenna
Antenna gain	2.1 dBi
Nominal Voltage	
- Supply Voltage	3-4.2 Vdc
- Type of power source	DC Voltage
Equipment type	Proprietary protocol 2.4GHz
Geo-location capability	No

DESCRIPTION OF TEST CONDITIONS

TEST CONDITIONS	DESCRIPTION
TC#01	Power supply (V): $V_{nominal}$ = 3.8 Vdc Data Rate: 2 Mbps Bandwidth: 2 MHz Test Frequencies for Conducted/ Radiated tests: Lowest channel: 2404 MHz Middle channel: 2442 MHz Highest channel: 2478 MHz

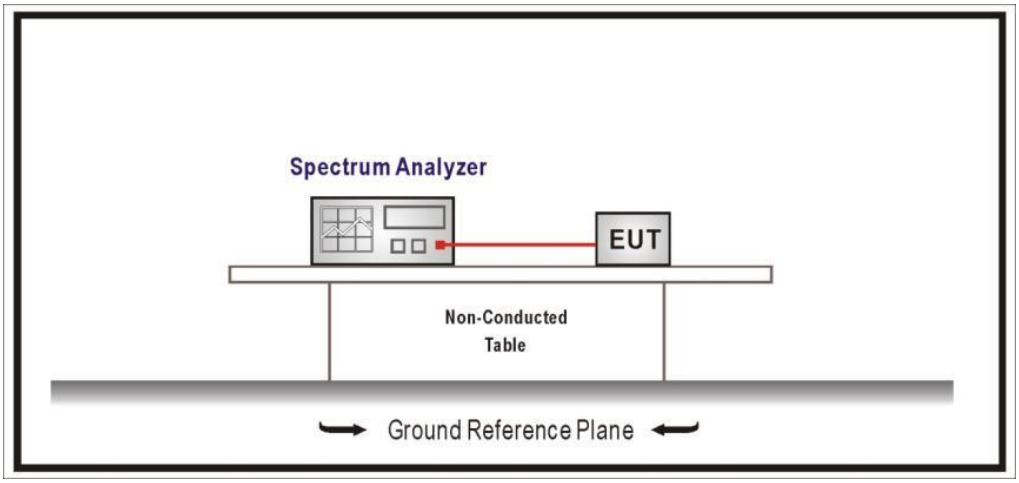
TEST A.1: 99% OCCUPIED BANDWIDTH

LIMITS:	Product standard:	§ 2.1049 and RSS-Gen
	Test standard:	§ 2.1049 and RSS-Gen 6.7

LIMITS

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

TEST SETUP	

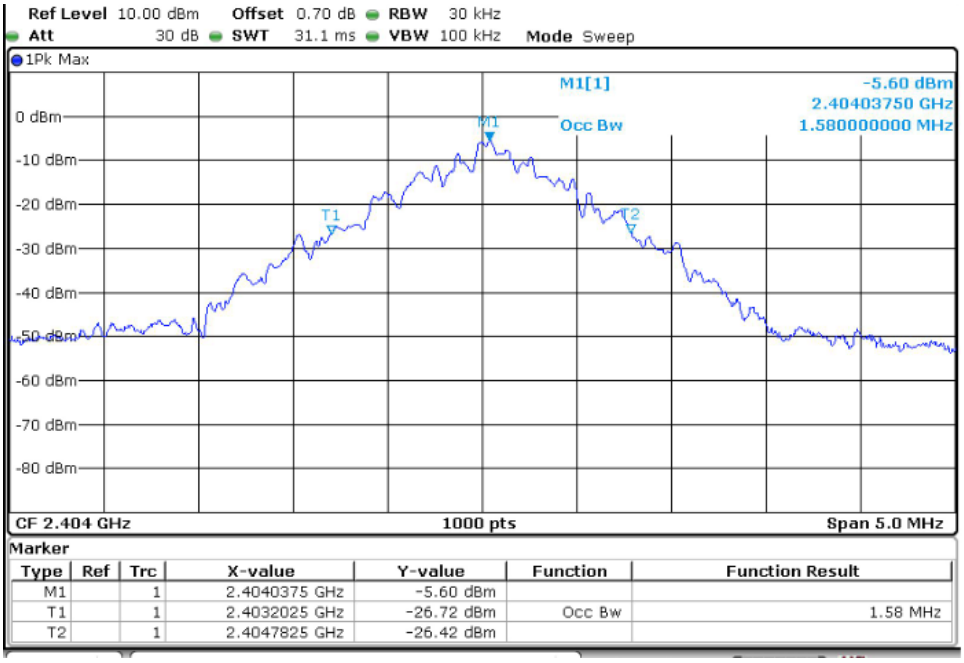


TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01
TEST RESULTS:	PASS

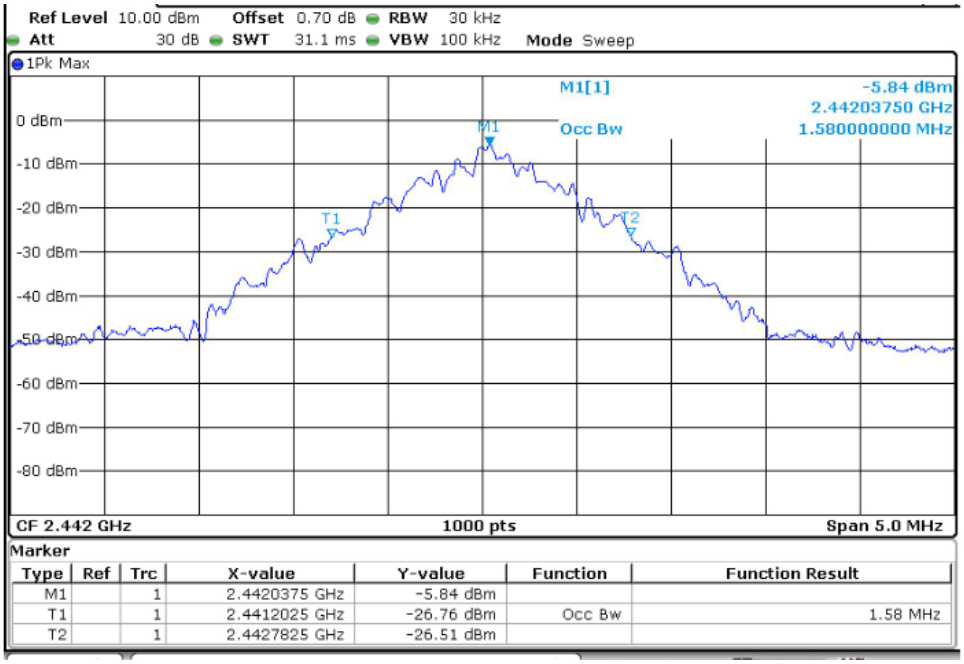
	Lowest frequency 2404 MHz	Middle frequency 2442 MHz	Highest frequency 2478 MHz
99% bandwidth (MHz)	1.580	1.580	1.580
Measurement uncertainty (kHz)	<± 8.33		

TEST RESULTS (Cont.):	

Lowest Channel

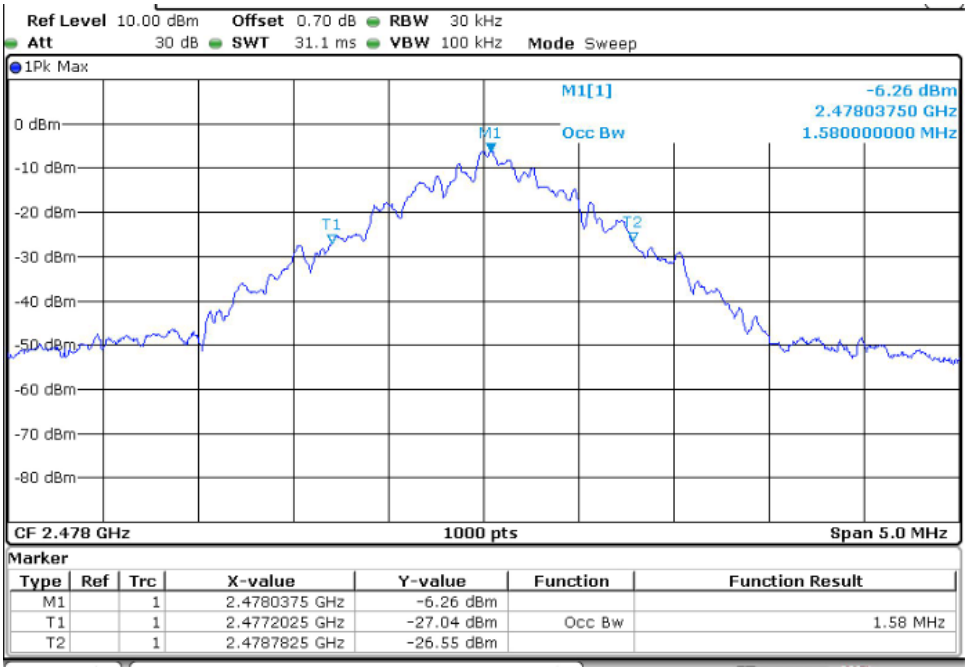


Middle Channel



TEST RESULTS (Cont.):	

Highest Channel



TEST A.2: FUNDAMENTAL FIELD STRENGTH

LIMITS:	Product standard:	Part 15 Subpart C §15.249 and RSS-210
	Test standard:	Part 15 Subpart C §15.249(a) and RSS-210 B.10(a)

LIMITS

The field strength of emissions in this band shall not exceed 2500 millivolts/meter. The field strength of emissions from intentional radiators shall comply with the following

Frequency Range (MHz)	Field strength of fundamental (mV/m)	Field strength (dBµV/m)	Measurement distance (m)
902 - 928	50	93.98	3
2400 – 2483.5	50	93.98	3
5725 - 5875	50	93.98	3
24000-24250	250	107.96	3

For frequencies above 1000 MHz, the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

RSS-210. The field strength of fundamental and harmonic emissions, measured at 3 m, shall not exceed 50 mV/m and 0.5 mV/m respectively. Attenuation below the general field strength limits specified in RSS-Gen is not required

TEST SETUP	

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 1m for the frequency range 1-18 GHz (1 GHz-18 GHz Double ridge horn antenna).

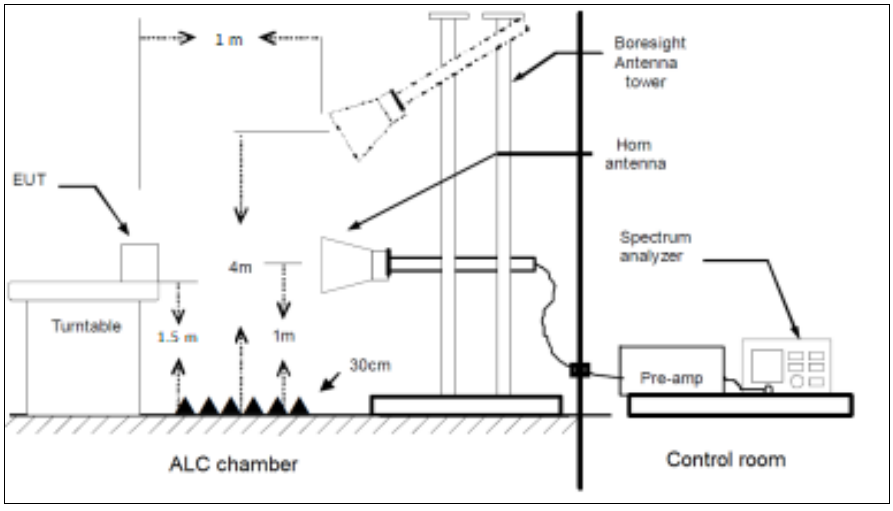
For radiated emissions in the range 1-18 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

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 and cable loss.

Radiated measurements setup f > 1 GHz

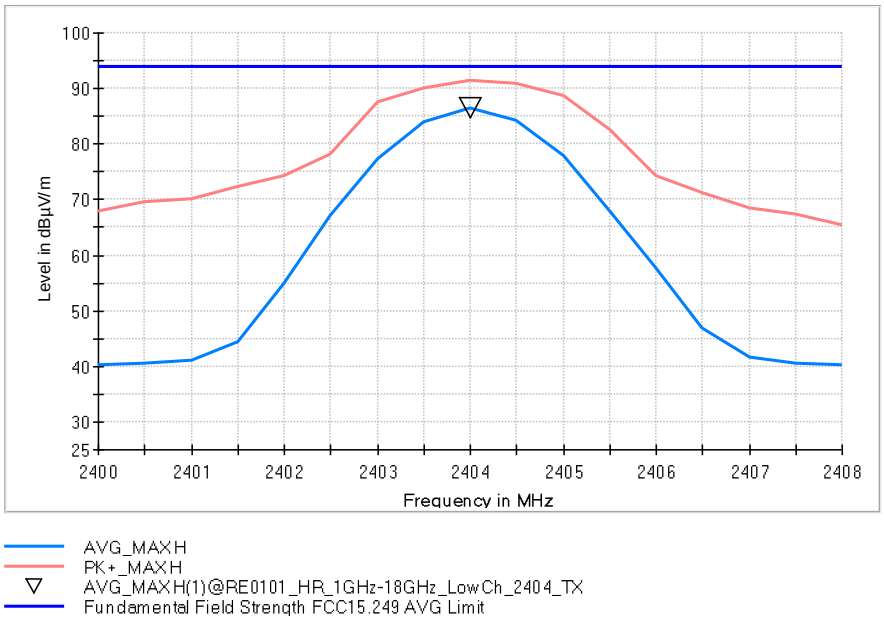


TESTED SAMPLES:	S/02
TESTED CONDITIONS MODES:	TC#01
TEST RESULTS:	PASS

	Lowest frequency 2404 MHz	Middle frequency 2442 MHz	Highest frequency 2478 MHz
Field strength average (dBµV/m)	86.6	87.0	87.0
Field strength peak (dBµV/m)	91.4	91.9	92.2
Measurement uncertainty (dB)	<±3.88		

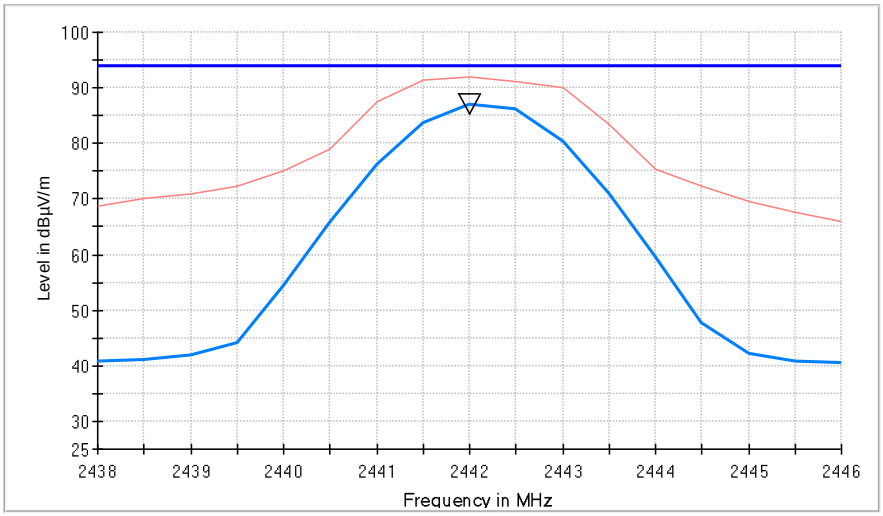
TEST RESULTS (Cont.):	

Lowest Channel

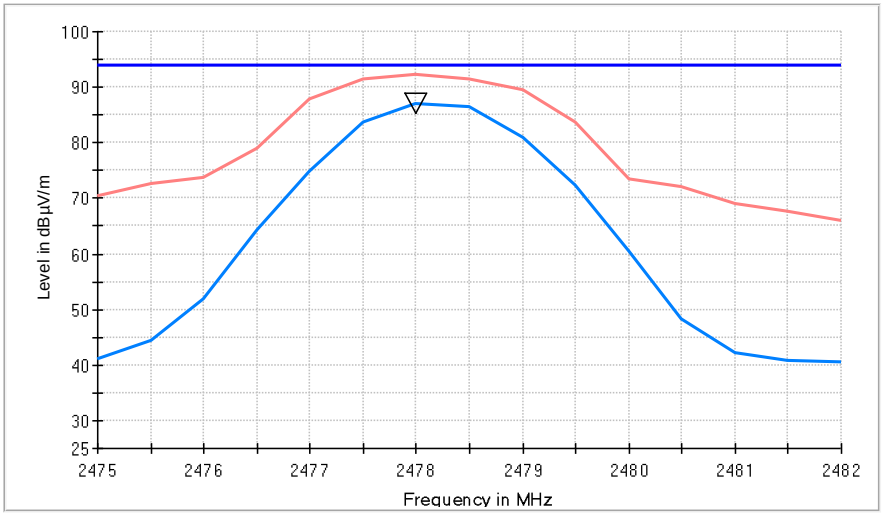


TEST RESULTS (Cont.):	

Middle Channel



Highest Channel



TEST A.3: EMISSION LIMITATIONS RADIATED (TRANSMITTER)

LIMITS:	Product standard:	Part 15 Subpart C §15.249 and RSS-210
	Test standard:	Part 15 Subpart C §15.249(b), RSS-210 and RSS-Gen 8.9 and 8.10

LIMITS

The field strength of harmonics from intentional radiators shall comply with section 15.249 mentioned as the following:

Frequency Range (MHz)	Field strength of fundamental (mV/m)	Field strength (dBµV/m)	Measurement distance (m)
902 - 928	50	93.98	3
2400 – 2483.5	50	93.98	3
5725 - 5875	50	93.98	3
24000-24250	250	107.96	3

Radiated emissions outside of the specific frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of fundamental or to the general radiated emission limits specified in section 15.209:

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.

TEST SETUP	

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

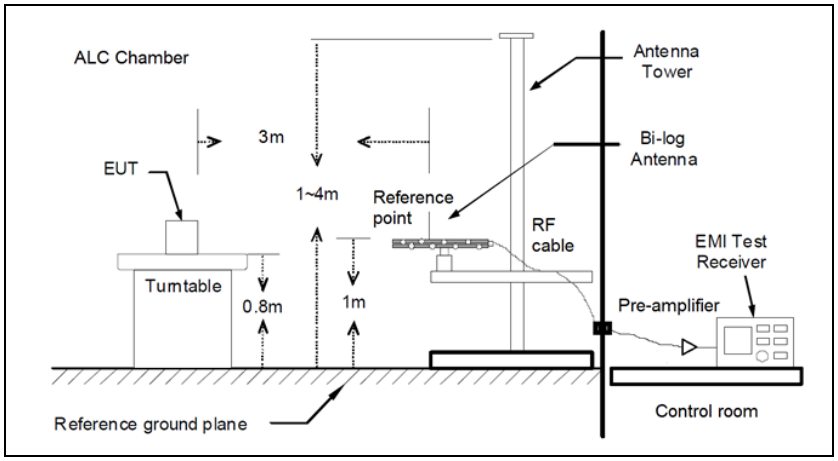
For radiated emissions in the range 1-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

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.

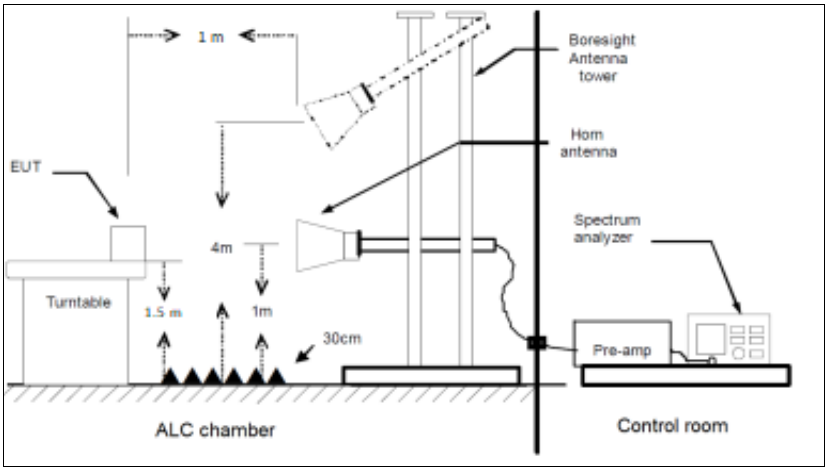
Measurements were made in both horizontal and vertical planes of polarization.

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.

Radiated measurements Setup f < 1 GHz



Radiated measurements setup f > 1 GHz



TESTED SAMPLES:	S/02
TESTED CONDITIONS MODES:	TC#01
TEST RESULTS:	PASS

Frequency range 30 MHz – 1000 MHz

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

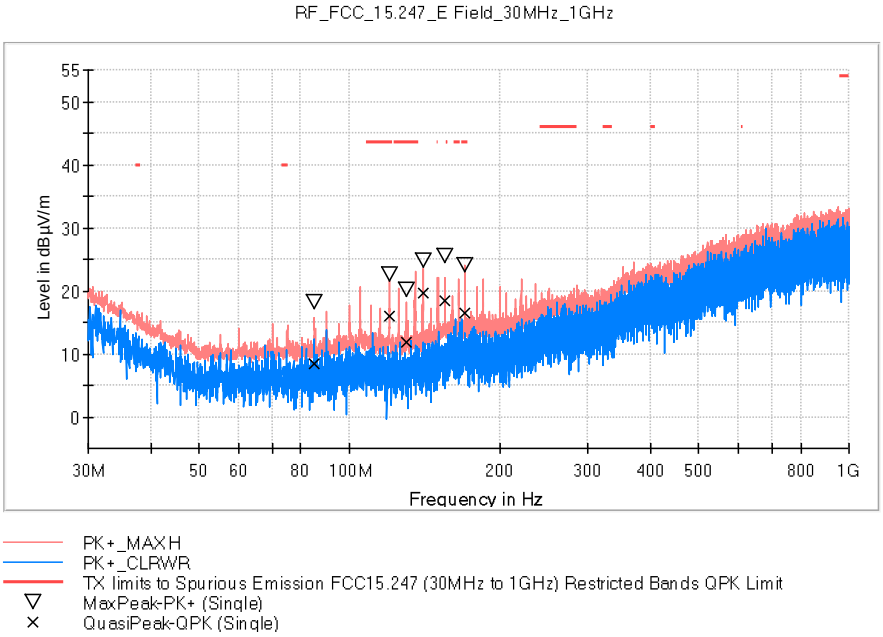
Frequency range 1 GHz – 26 GHz

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

For 18 GHz – 26 GHz frequency range the radiated spurious signals detected at less than 10 dB with respect to the limit for low, middle and high channels.

TEST RESULTS (Cont.):	**30-1000 MHz**

Middle Channel

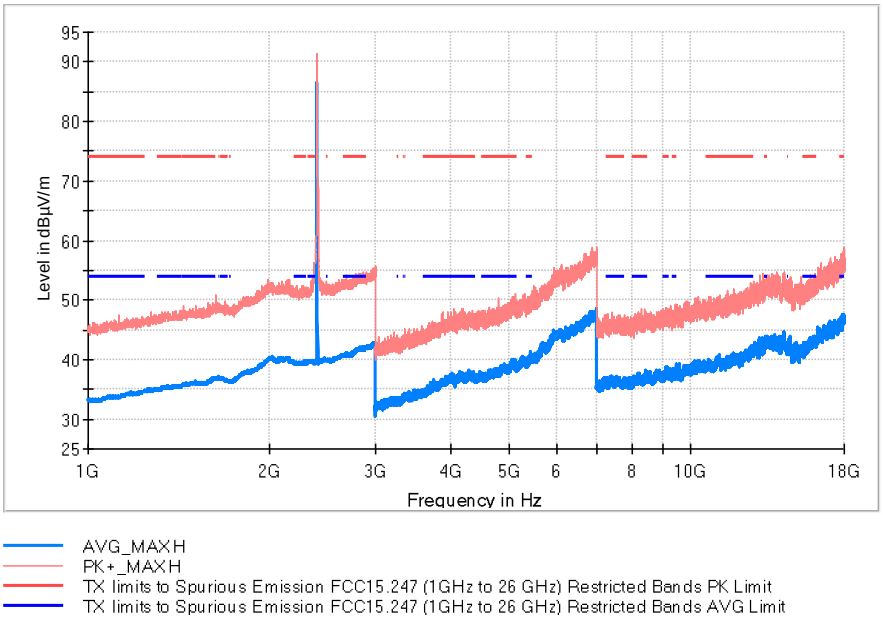


Result Table_Single

Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol
85.144500	18.2	8.3	V
120.258500	22.6	15.9	H
130.298000	20.1	11.8	H
140.289000	24.8	19.7	H
155.324000	25.5	18.3	H
170.310500	24.0	16.5	H

TEST RESULTS (Cont.):	1-18 GHz (Lowest Channel)

1GHz_18GHz_ HP & VP_CH Low

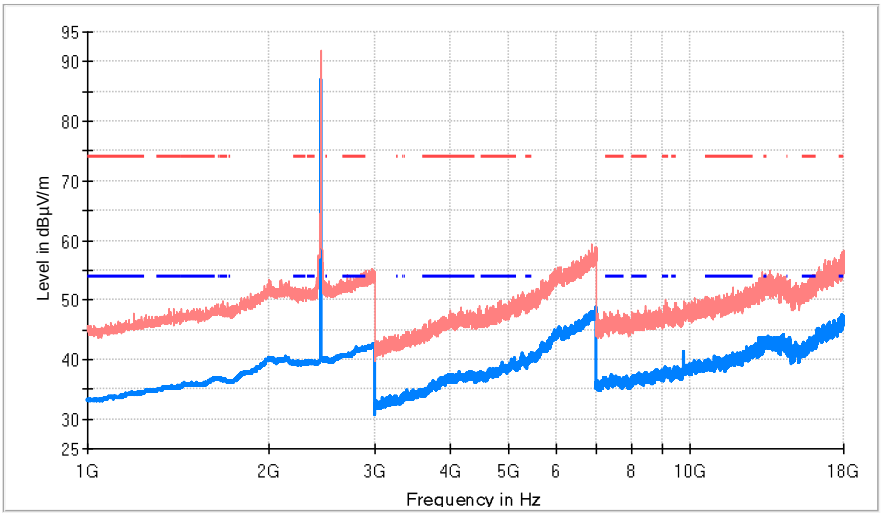


Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comment
2404.000000	91.4	86.6	H	**Fundamental**
9614.500000	47.1	39.3	V	

TEST RESULTS (Cont.):	1-18 GHz (Middle Channel)

1GHz_18GHz_HP & VP_CH Mid



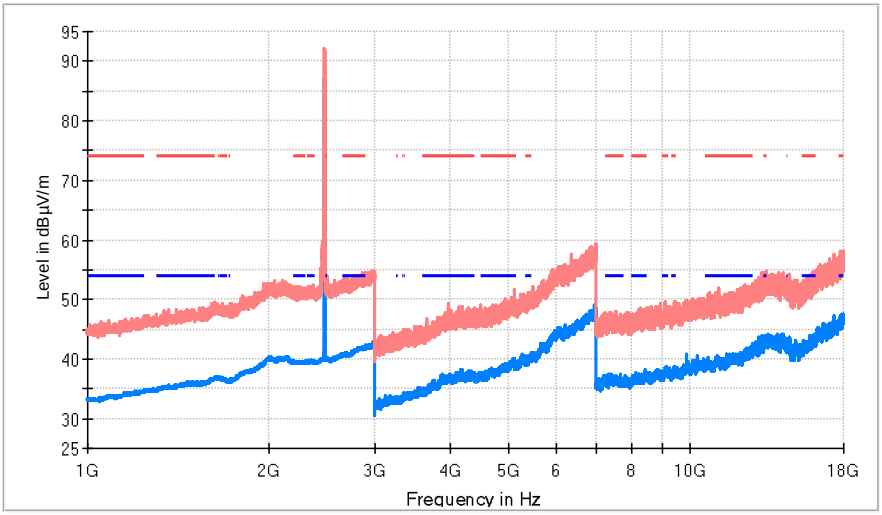
AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1GHz to 26 GHz) Restricted Bands AVG Limit

Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comment
2442.000000	91.9	87.0	H	Fundamental
9768.500000	48.6	41.2	H	

TEST RESULTS (Cont.):	1-18 GHz (Highest Channel)

1GHz_18GHz_HP & VP_CH High

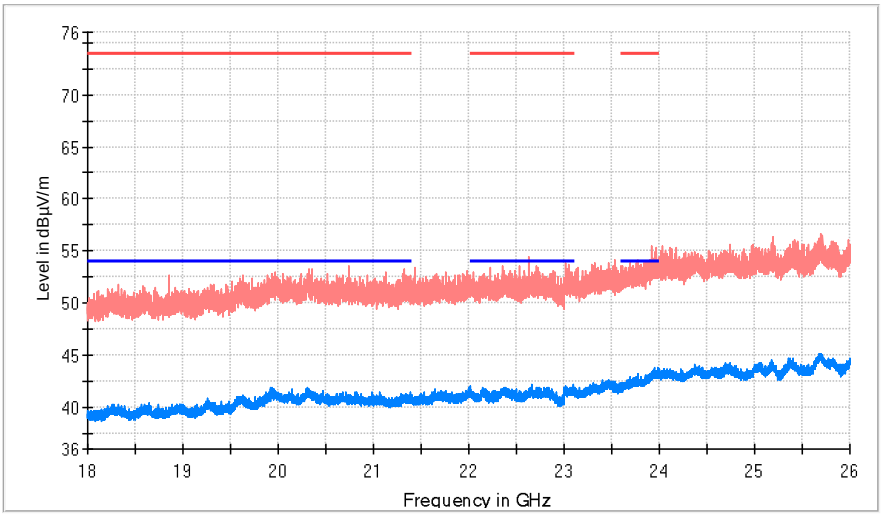


Maximizations

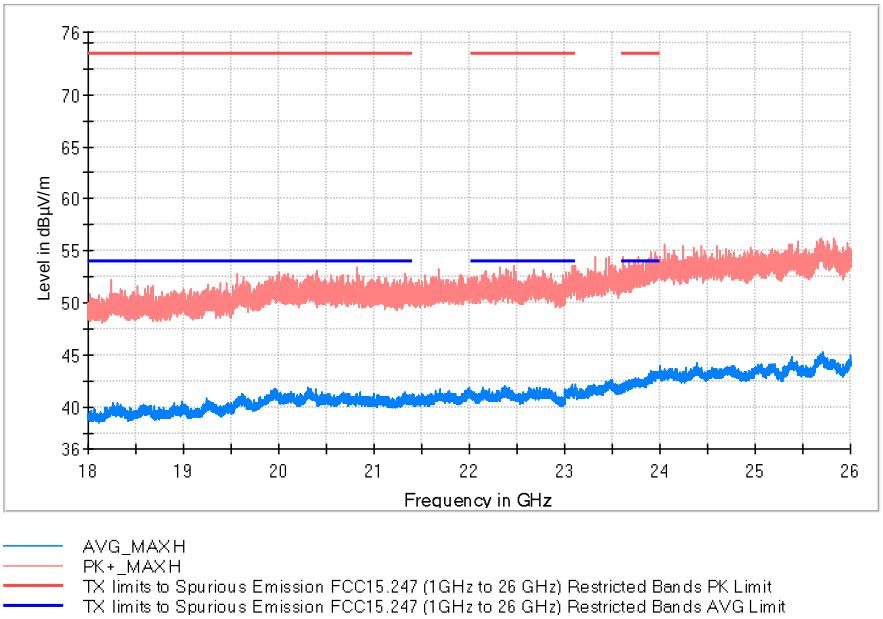
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comment
2478.000000	92.2	87.0	H	Fundamental
9913.500000	49.2	40.9	V	

TEST RESULTS (Cont.):	18 – 26 GHz

Low Channel

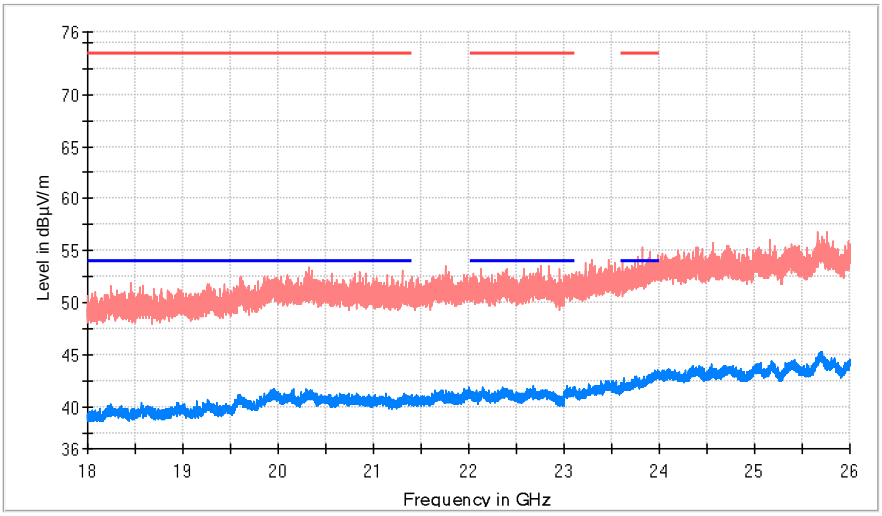


Middle Channel



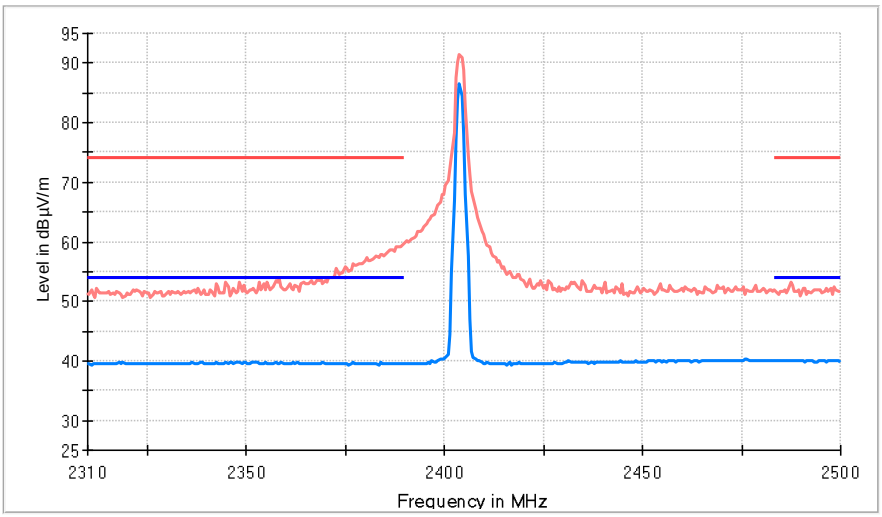
TEST RESULTS (Cont.):	18 – 26 GHz

Highest Channel

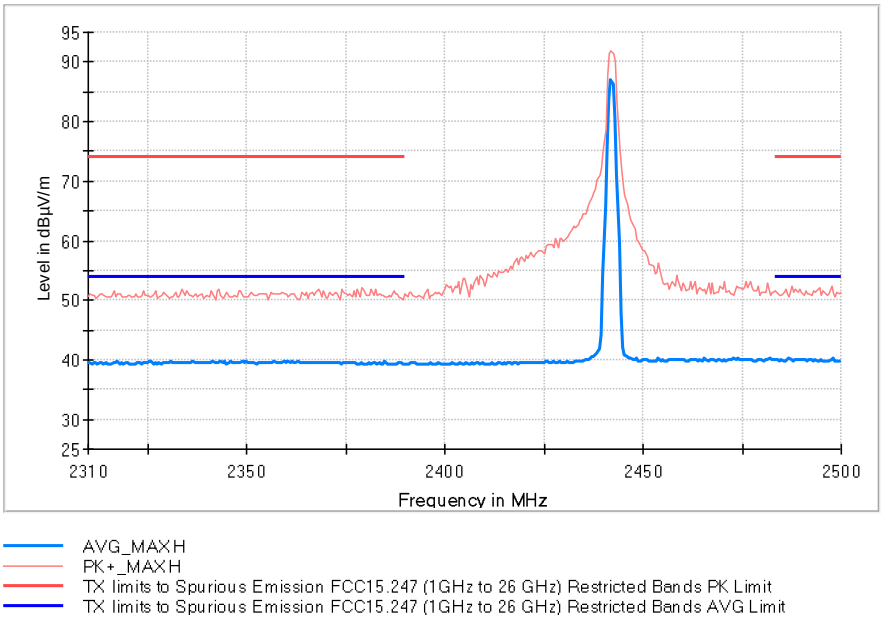


TEST RESULTS (Cont.):	Restricted Bands (2.31 GHz – 2.5 GHz)

Low Channel



Middle Channel



TEST RESULTS (Cont.):	

Highest Channel