

ISED CABid: ES1909

Test report No:
 NIE: 70573RRF.005

Test report

USA FCC Part 15.249, 15.209
 CANADA RSS-210, RSS-Gen

(*) Identification of item tested	CP1110 Sound Processor
(*) Trademark	Cochlear
(*) Model and /or type reference	CP1110
Other identification of the product	HW version: Build W SW version: 1122C00!00 (#992907) FCC ID: WTO-CP1110 IC: 8039A-CP1110
(*) Features	BTLE 5.0, Proprietary protocol 2.4 GHz, 5MHz Transcutaneous Link
Applicant	COCHLEAR LTD 1 University Avenue, Macquarie University, NSW 2109 Australia
Test method requested, standard	USA FCC Part 15.249 (10-1-20 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 (10-1-20 Edition): Radiated emission limits; general requirements. CANADA RSS-Gen Issue 5 amendment 1 (March 2019). General Requirements for Compliance of Radio Apparatus. CANADA RSS-210 Issue 10 (December 2019). Licence-Exempt Radio Apparatus: Category I Equipment ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Rafael López EMC Consumer & RF Lab. Manager
Date of issue	2022-04-21
Report template No	FDT08_23 (*) "Data provided by the client"

Index

Competences and guarantees	3
General Conditions	3
Uncertainty.....	3
Data provided by the client	3
Usage of samples	4
Test sample description	5
Identification of the client	6
Testing period and place	6
Document history	6
Environmental conditions	6
Remarks and comments.....	7
Testing verdicts.....	8
Summary	8
Appendix A: Test results. Proprietary protocol P2 (2.4 GHz)	9

Competences and guarantees

DEKRA Testing and Certification S.A.U. is a testing laboratory accredited by the National Accreditation Body (ENAC -Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

DEKRA Testing and Certification is a FCC-recognized accredited testing laboratory with appropriate scope of accreditation that include testing performed in this test report.

DEKRA Testing and Certification S.A.U. is an ISED-recognized accredited testing laboratory, CABid: ES1909, with the appropriate scope of accreditation that covers the performed tests in this report.

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

DEKRA Testing and Certification S.A.U. 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 S.A.U. at the time of performance of the test.

DEKRA Testing and Certification S.A.U. 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.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA Testing and Certification S.A.U.

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 Testing and Certification S.A.U.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification S.A.U. and the Accreditation Bodies.

Uncertainty

Uncertainty (factor $k=2$) was calculated according to the DEKRA Testing and Certification S.A.U. internal document PODT000.

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 CP1110 Sound Processor. CP1110 Sound Processor is part of a cochlear implant system. It is worn behind-the-ear and its purpose is to capture and digitally process sound, as well as to transfer the audio data and power to the cochlear implant over a transcutaneous link.

DEKRA Testing and Certification S.A.U. 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 N°	Description	Model	Serial N°	Date of reception
70573B/006	Sound Processor	CP1110	1010161021462W	2022/01/13
70573B/016	Power Extend Battery	M96X	G25007A	2022/01/13

Sample S/01 has undergone the following test(s): All Conducted tests indicated in Appendix A.

- Sample S/02 is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
70573B/008	Sound Processor	CP1110	1010161022858W	2022/01/13
70573B/011	Combined Link Coil, 11cm	CP1110	1182094W	2022/01/13
70573B/015	Implant device	CI512	1020121913217	2022/01/13
70573B/016	Power Extend Battery	M96X	G25007A	2022/01/13

Sample S/02 has undergone 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 ⁽³⁾	
	--		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Supplementary information to the ports..... :	--					
Rated power supply..... :	Voltage and Frequency		Reference poles			
			L1	L2	L3	N
	<input checked="" type="checkbox"/>	DC: 3.7 Vdc				
Rated Power..... :	--					
Clock frequencies..... :	--					
Other parameters..... :	--					
Software version..... :	1122C00!00 (#992907)					
Hardware version..... :	Build W					
Dimensions in cm (W x H x D)..... :	--					
	<input checked="" type="checkbox"/>	Other: Body-worn - behind the ear				
Modules/parts..... :	Module/parts of test item	Type			Manufacturer	
	--	--			--	
Accessories (not part of the test item)..... :	Description	Type			Manufacturer	
	--	--			--	
Documents as provided by the applicant..... :	Description	File name			Issue date	
	--	--			--	

⁽³⁾ Only for Medical Equipment

Identification of the client

COCHLEAR LTD
1 University Avenue, Macquarie University, NSW 2109 Australia

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2022-02-03
Date (finish)	2022-03-04

Document history

Report number	Date	Description
70573RRF.005	2022-04-21	First release

Environmental conditions

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

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

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

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

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

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

Remarks and comments

The tests have been performed by the technical personnel: Javier Miguel Nadales.

Used instrumentation:

Conducted Measurements:

	Last Calibration	Due Calibration
1. Shielded Room ETS LINDGREN S101	N.A.	N.A.
2. Signal and Spectrum Analyzer 10Hz-40GHz Rohde and Schwarz FSV40	2020/03	2022/03

Radiated Measurements:

	Last Calibration	Due Calibration
1. Semianechoic Absorber Lined Chamber ETS LINDGREN FACT 3 200 STP	N.A.	N.A.
2. Shielded Room ETS LINDGREN S101	N.A.	N.A.
3. Hybrid Bilog Antenna 30 MHz - 6 GHz ETS LINDGREN 3142E	2020/10	2023/10
4. Pre-amplifier G>40dB 10MHz-6GHz Bonn Elektronik BLNA 0160-01N	2022/03	2023/03
5. EMI Test Receiver 7 GHz ROHDE AND SCHWARZ ESR7	2021/11	2023/11
6. Broadband Horn antenna 1-18 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D	2019/11	2022/11
7. RF Pre-amplifier, 40 dB ,1-18 GHz BONN ELEKTRONIK BLMA 0118-1M	2021/06	2022/06
8. Spectrum Analyzer ROHDE AND SCHWARZ FSW50	2020/07	2022/07
9. Broadband Horn antenna 18 - 40 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9170	2020/05	2023/05
10. Pre-amplifier, G>30 dB, 18-40 GHz BONN ELEKTRONIK BLMA 1840-4A	2021/09	2023/09

Testing verdicts

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

Summary

Proprietary protocol P2 (2.4 GHz)

FCC PART 15 PARAGRAPH / RSS-210			
Requirement – Test case		Verdict	Remark
15.249 (a) / RSS-210 B.10 (a)	Field strength of fundamental and harmonic emissions	P	
15.249 (d) / RSS-210 B.10 (b)	Emissions radiated outside of the specific frequency bands	P	
<u>Supplementary information and remarks:</u> None.			

Appendix A: Test results. Proprietary protocol P2 (2.4 GHz)

INDEX

TEST CONDITIONS	11
Occupied Bandwidth	14
15.249 (a) / RSS-210 B.10 (a) Field strength of fundamental and harmonics emissions	16
15.249 (d) / RSS-210 B.10 (b) Emissions radiated outside of the specific frequency bands	18

TEST CONDITIONS

POWER SUPPLY (V) and ANTENNA:

V nominal:	3.7 Vdc
Type of Power Supply:	Rechargeable battery
Type of Antenna:	Integral
Declared Antenna Gain:	+2.4 dBi

TEST FREQUENCIES:

Low Channel:	2404 MHz
Middle Channel:	2442 MHz
High Channel:	2478 MHz

CONDUCTED MEASUREMENTS

The equipment under test was set up in a shielded room and it is connected to the spectrum analyser using a low loss RF cable. The reading of the spectrum analyser is corrected taking into account the cable loss.



RADIATED MEASUREMENTS

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna (bilog antenna for the range between 30 MHz to 1000 MHz and 1 GHz-17 GHz double ridge horn antenna) is situated at a distance of 3 m and at a distance of 1 m for the frequency range 17 GHz-26 GHz (17 GHz-40 GHz horn antenna).

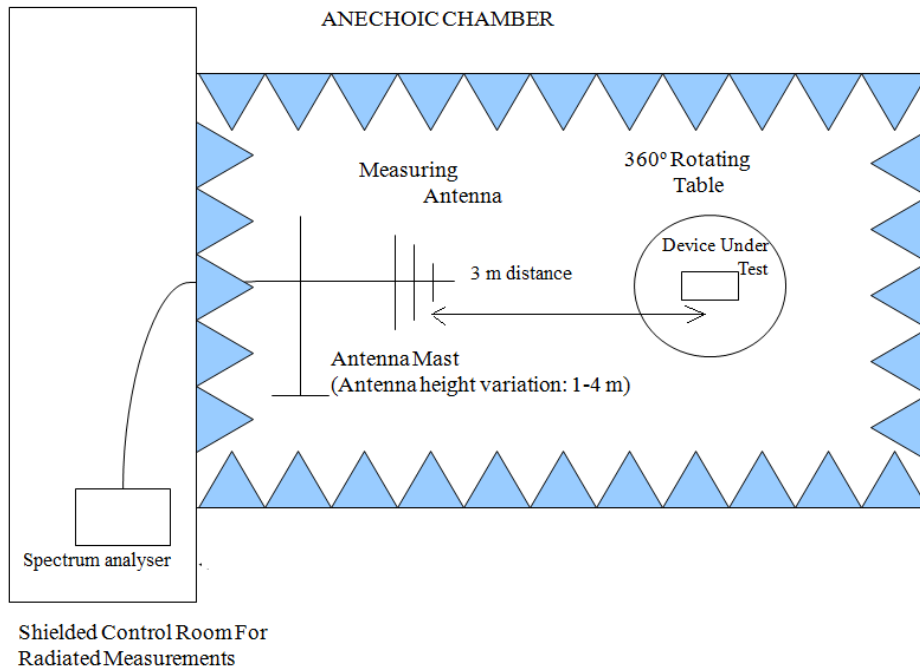
For radiated emissions in the range 17 GHz-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

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

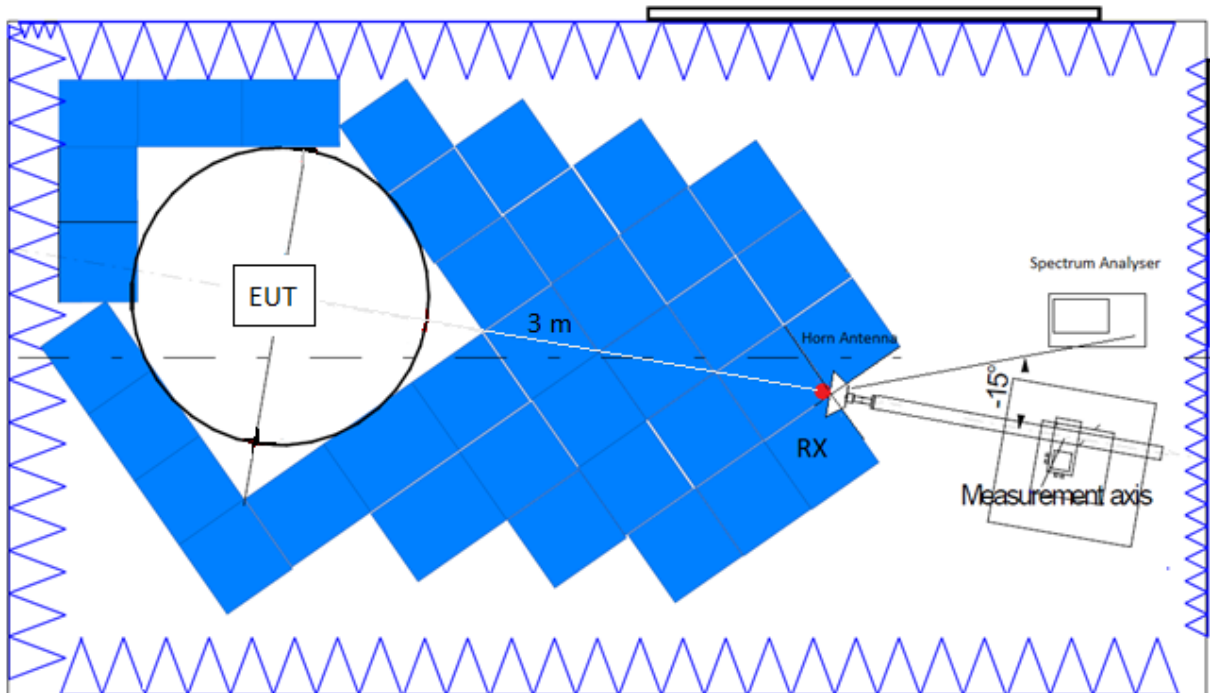
Measurements were made in both horizontal and vertical planes of polarization.

A resolution bandwidth/video bandwidth of 100 kHz/300 kHz was used for frequencies below 1 GHz and 1MHz/3MHz for frequencies above 1 GHz.

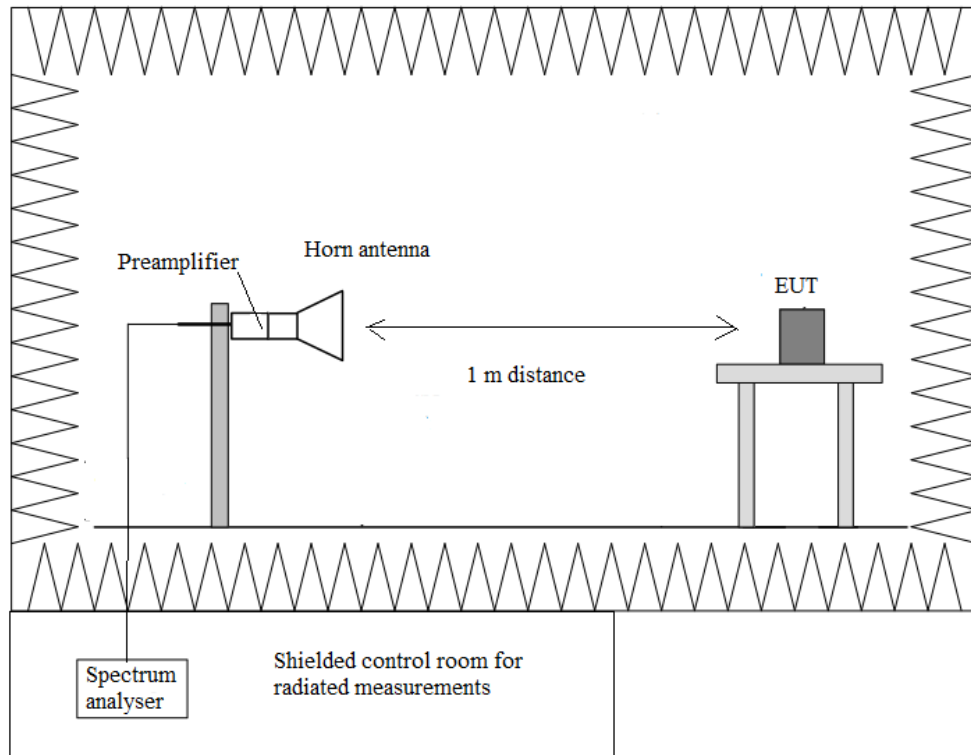
Radiated measurements setup $f < 1$ GHz:



Radiated measurements setup from 1 GHz to 17 GHz:



Radiated measurements setup $f > 17$ GHz:



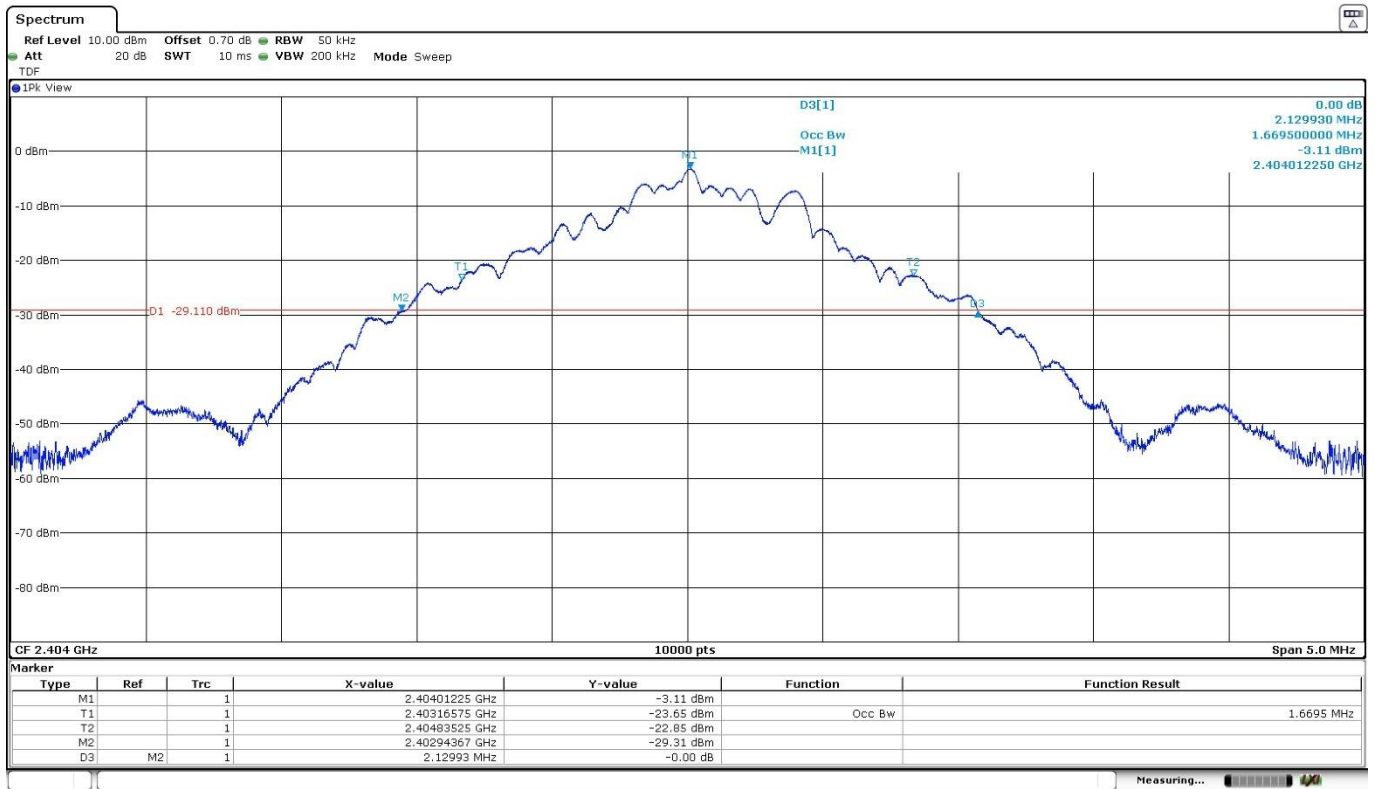
Occupied Bandwidth

RESULTS:

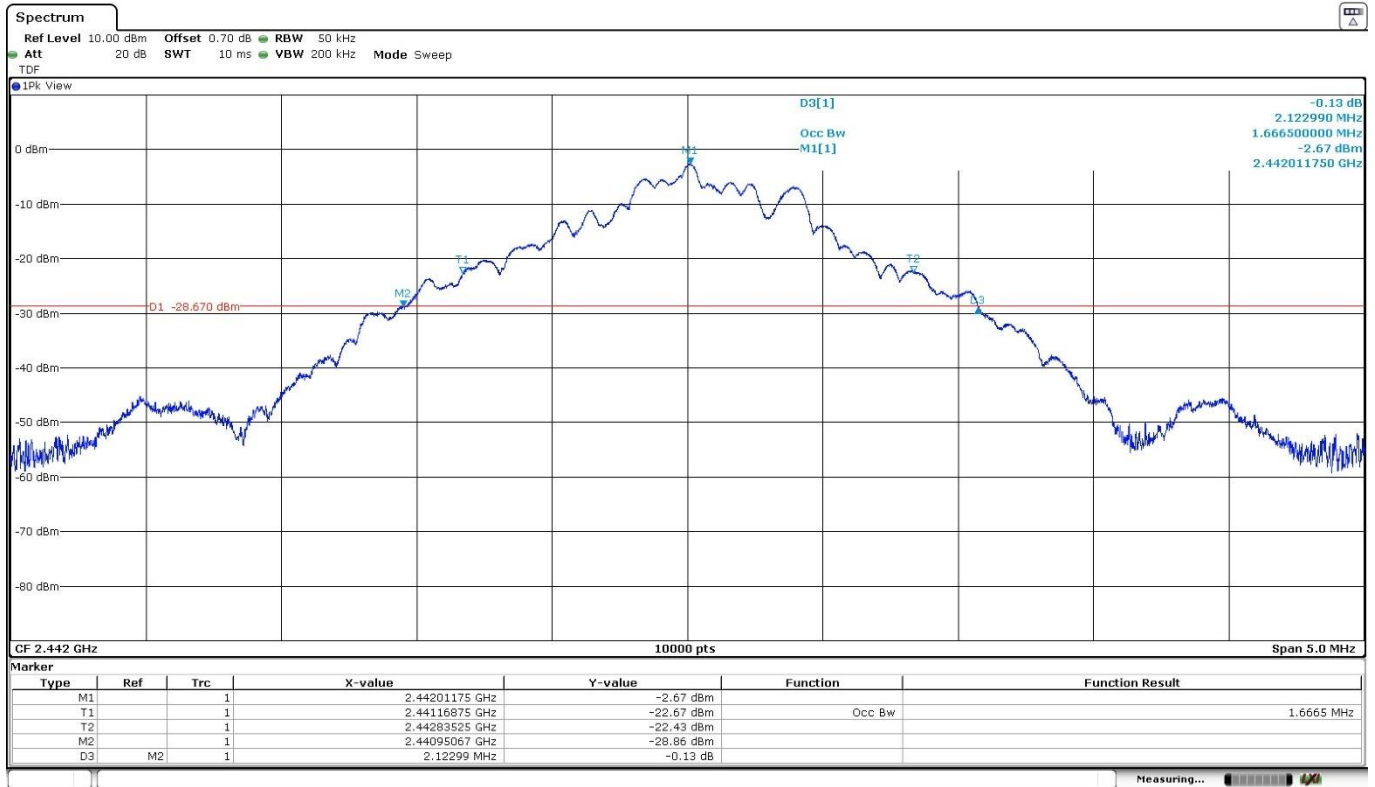
	Low Channel 2404 MHz	Middle Channel 2442 MHz	High Channel 2478 MHz
99% Bandwidth (MHz)	1.669	1.666	1.675
Measurement Uncertainty (kHz)	<±6.14		

Verdict: PASS

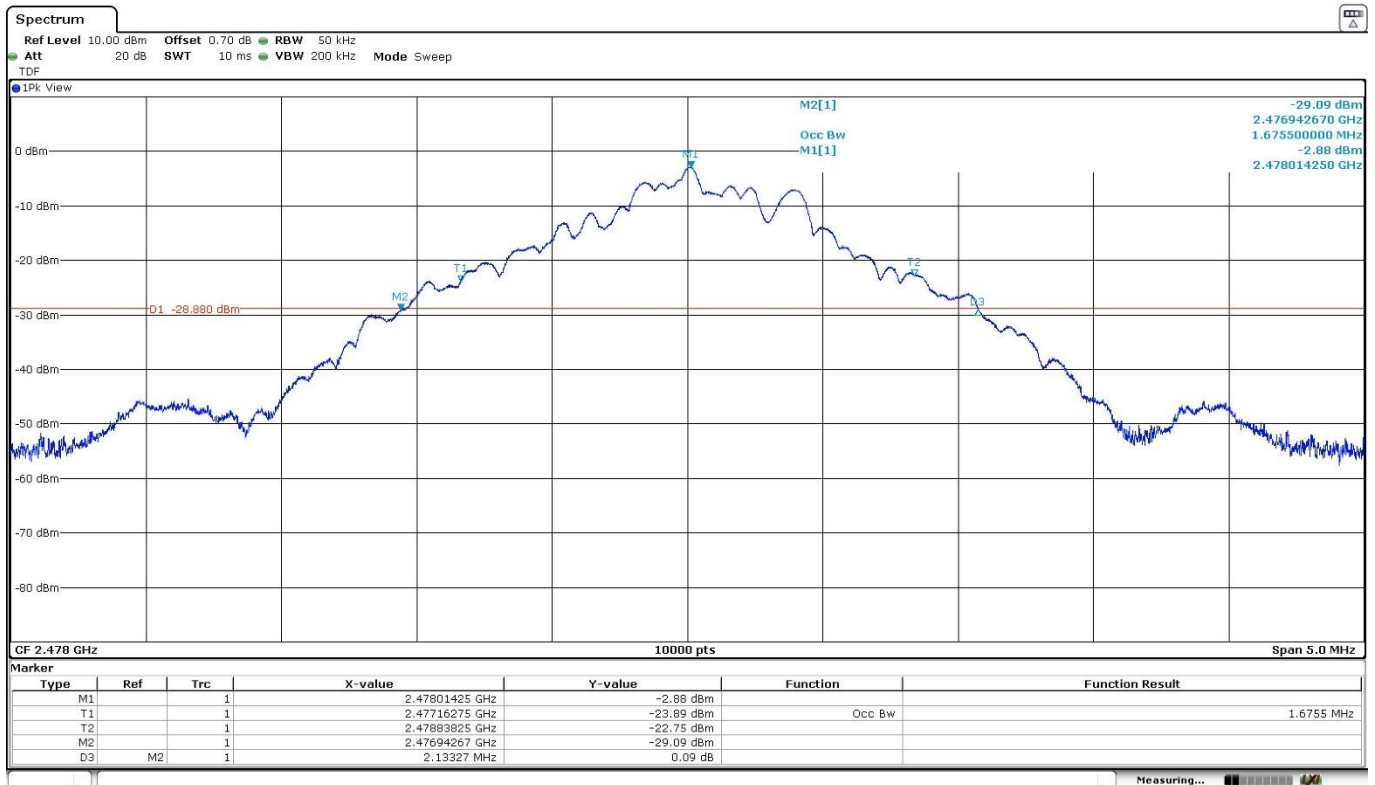
- Low Channel:



- Middle Channel:



- High Channel:



15.249 (a) / RSS-210 B.10 (a) Field strength of fundamental and harmonics emissions

SPECIFICATION:

The field strength of emissions from intentional radiators shall comply with the following

Fundamental frequency (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

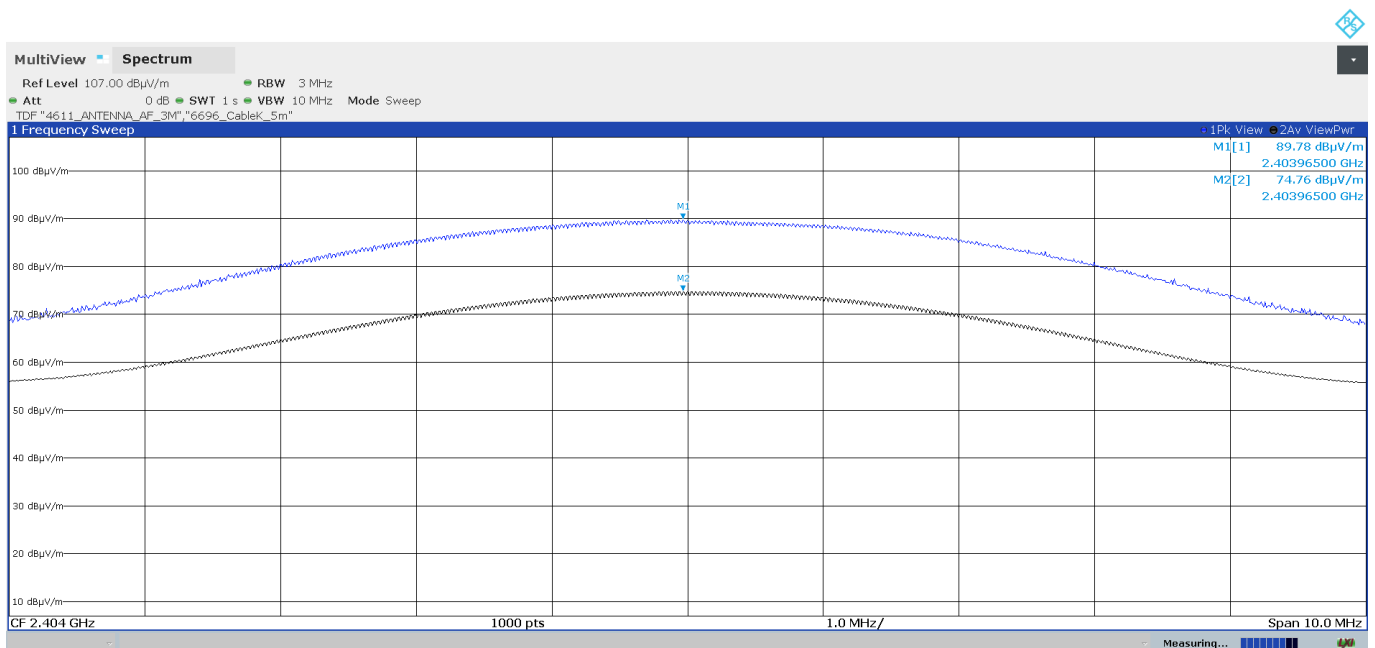
For frequencies above 1000 MHz, the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

RESULTS:

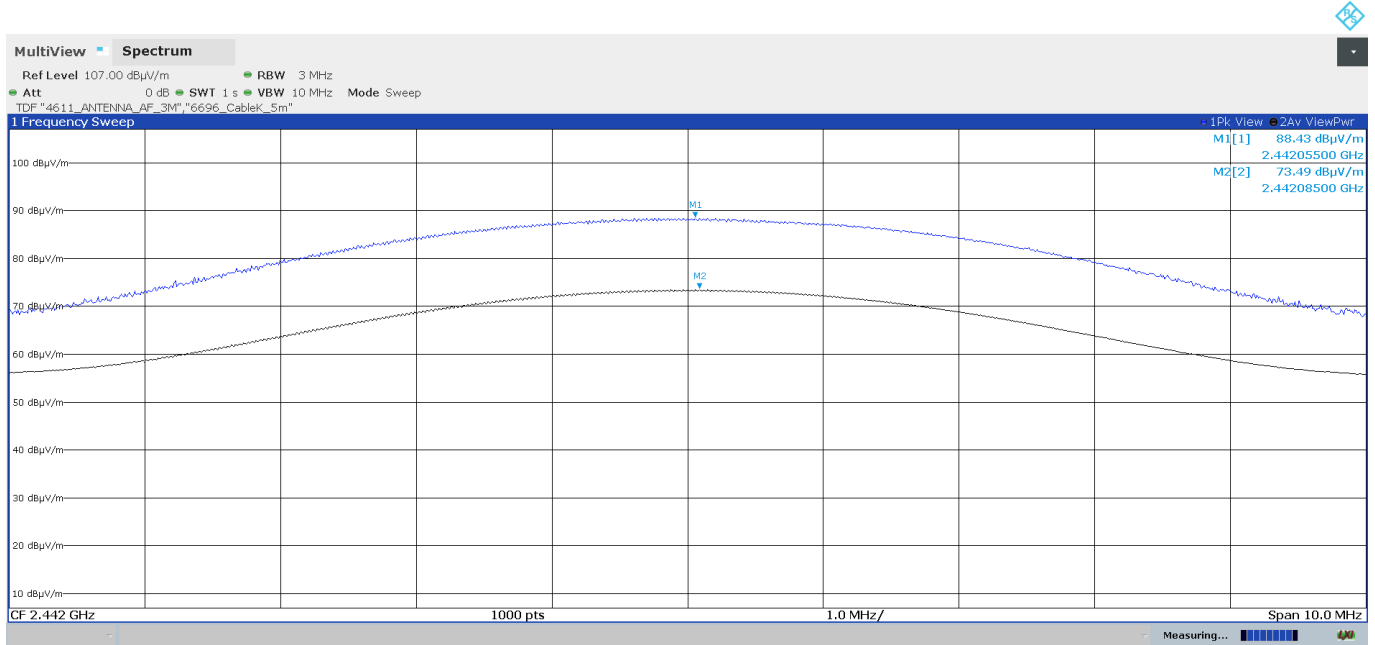
	Low Channel 2404 MHz	Middle Channel 2442 MHz	High Channel 2478 MHz
Average Field Strength (dBµV/m)	74.76	73.49	73.27
Peak Field Strength (dBµV/m)	89.78	88.43	88.35
Measurement Uncertainty (dB)	<±4.11		

Verdict: PASS

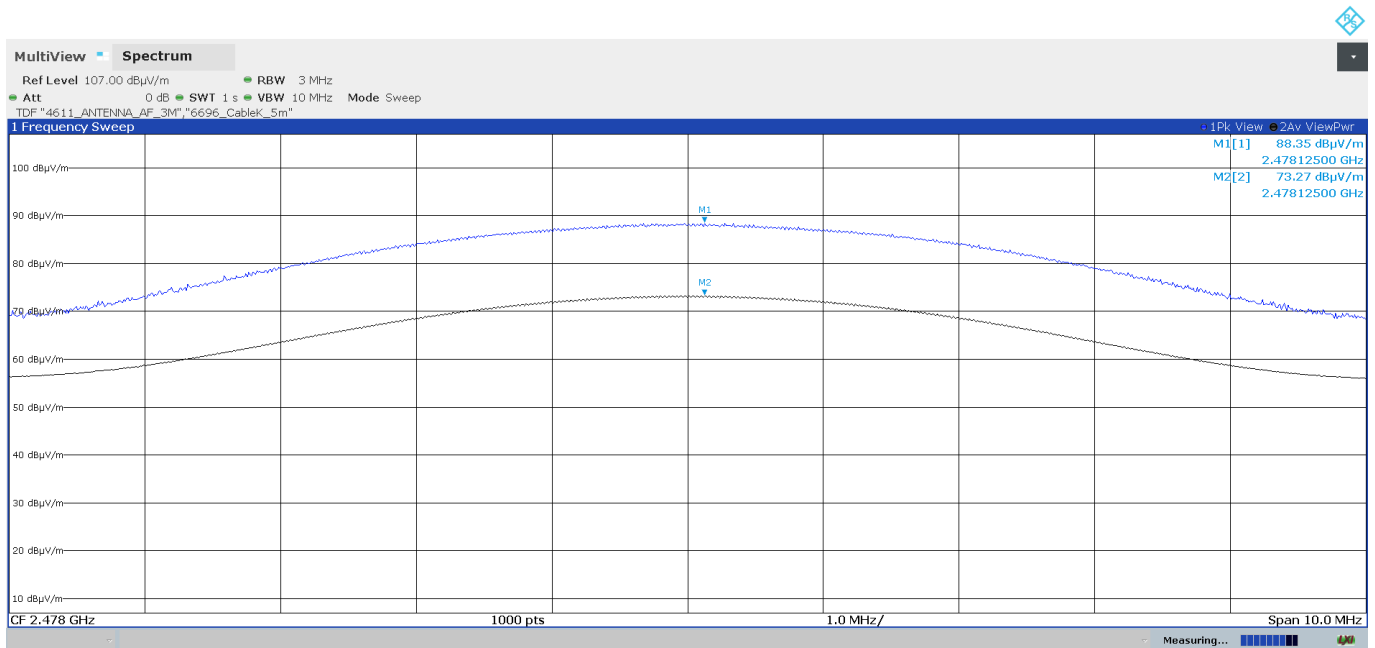
- Low Channel:



- Middle Channel:



- High Channel:



15.249 (d) / RSS-210 B.10 (b) Emissions radiated outside of the specific frequency bands

SPECIFICATION:

The field strength of harmonics from intentional radiators shall comply with the following

Fundamental frequency (MHz)	Field strength of harmonics ($\mu\text{V/m}$)	Field strength of harmonics (dB $\mu\text{V/m}$)	Measurement distance (m)
902 - 928	500	54	3
2400 – 2483.5	500	54	3
5725 - 5875	500	54	3
24000-24250	2500	67.96	3

Emissions radiated 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 ($\mu\text{V/m}$)	Field strength (dB $\mu\text{V/m}$)	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

Whichever is the lesser attenuation.

RESULTS:

The situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

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

All tests were performed in a semi-anechoic chamber at a distance of 3 m for the frequency range 30 MHz-17 GHz and at distance of 1 m for the frequency range 17 GHz-26 GHz.

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.

Frequency range 30 MHz - 1 GHz:

The spurious signals detected do not depend on the operating channel.

No spurious frequencies detected at less than 20 dB below the limit.

Measurement Uncertainty (dB) $<\pm 5.01$

Frequency range 1 - 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).

Spurious signals with peak levels above the average limit (54 dB μ V/m at 3 m) are measured with average detector for checking compliance with the average limit.

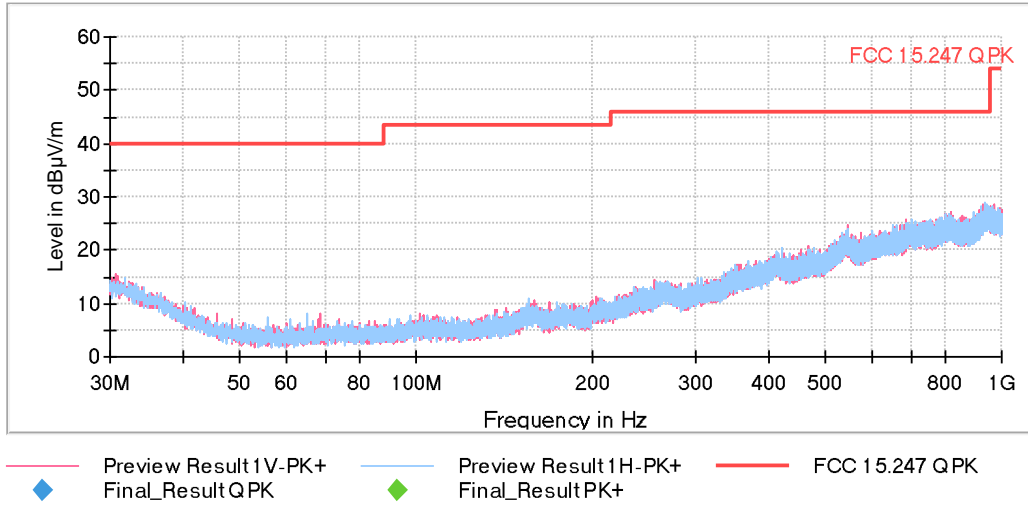
No spurious frequencies detected at less than 20 dB below the limit.

Measurement Uncertainty:	1-3 GHz	$<\pm 4.11$ dB
	3-17 GHz	$<\pm 4.32$ dB
	17-26 GHz	$<\pm 4.58$ dB

Verdict: PASS

FREQUENCY RANGE 30 MHz - 1 GHz

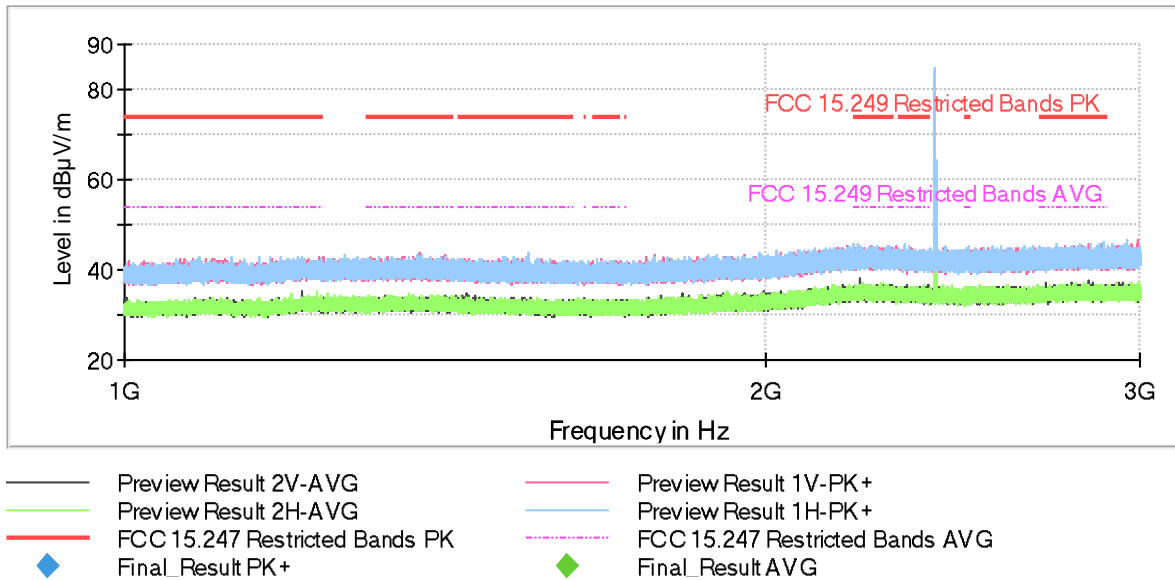
The spurious frequencies detected do not depend on the operating channel.



This plot is valid for the Low, Middle and High Channels.

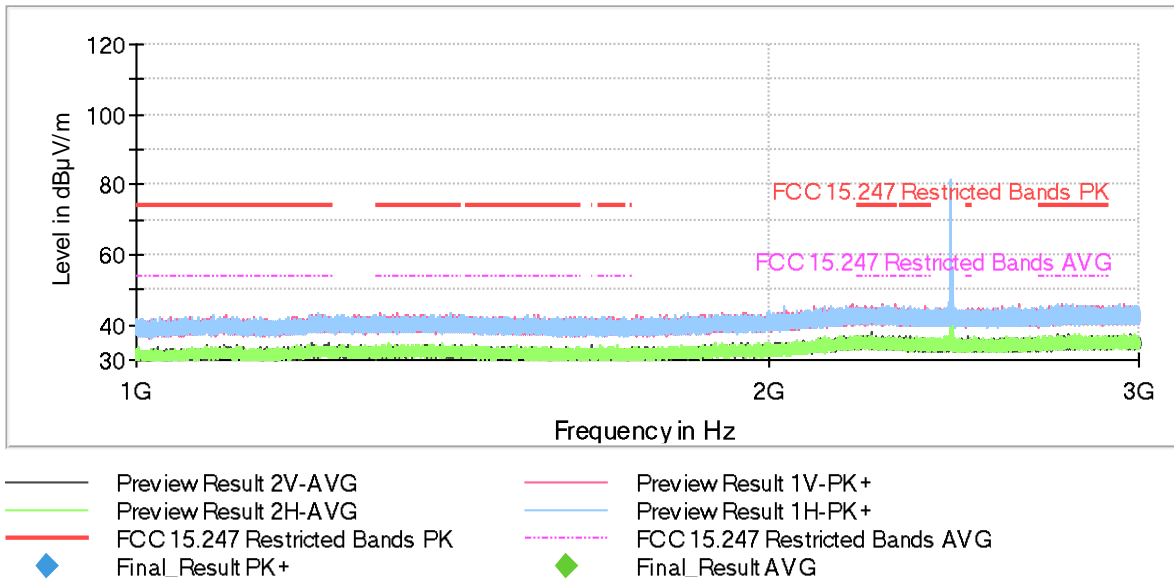
FREQUENCY RANGE 1 - 3 GHz

- Low Channel:



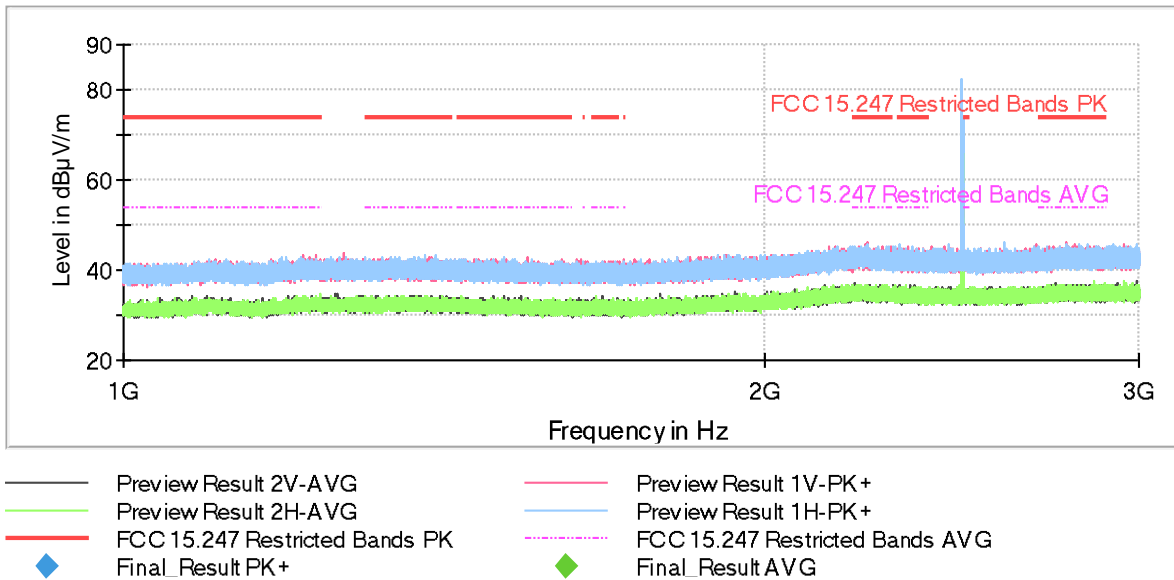
The peak above the limit is the carrier frequency.

- Middle Channel:



The peak above the limit is the carrier frequency.

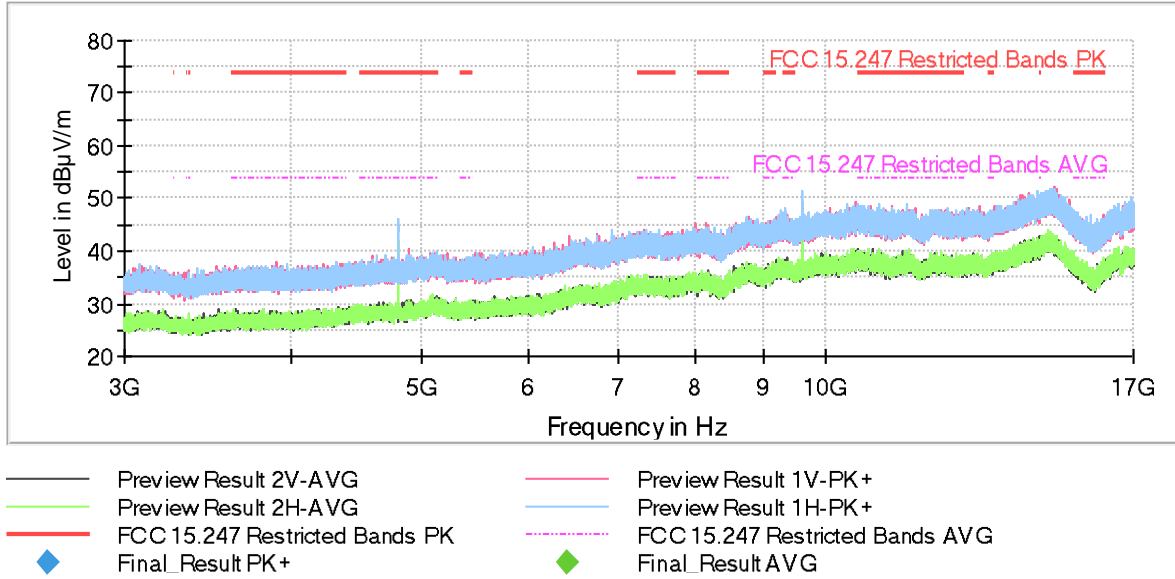
- High Channel:



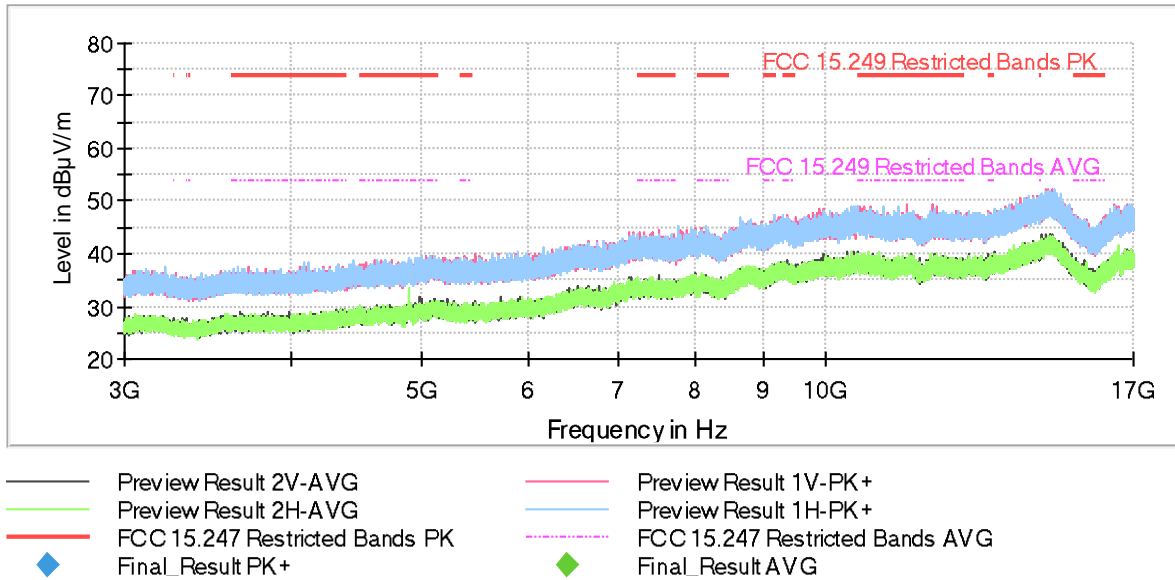
The peak above the limit is the carrier frequency.

FREQUENCY RANGE 3 - 17 GHz

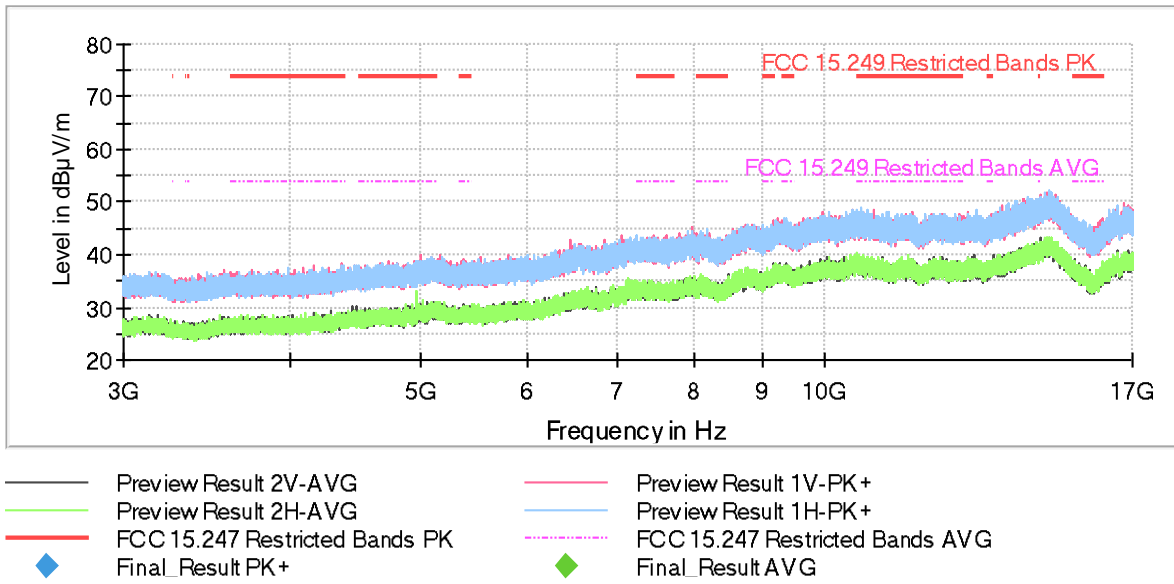
- Low Channel:



- Middle Channel:

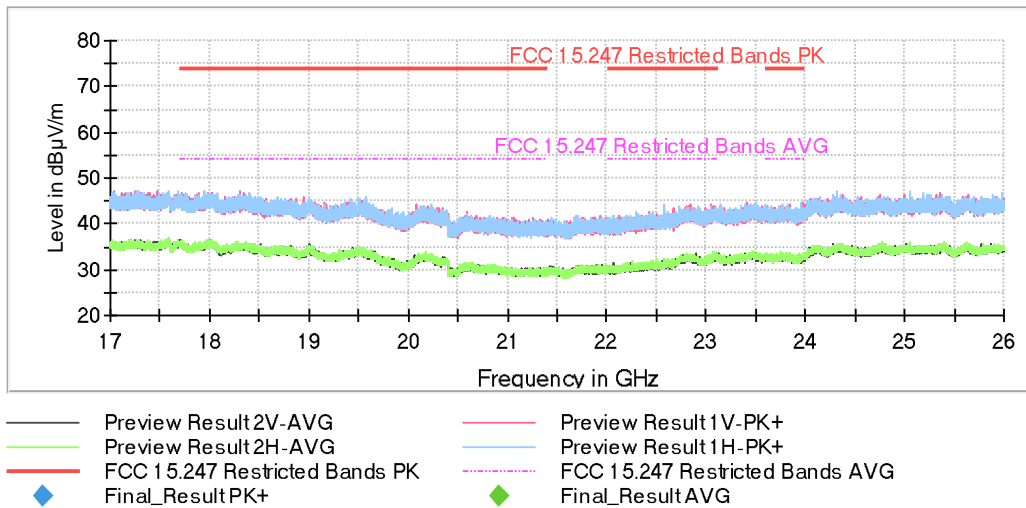


- High Channel:



FREQUENCY RANGE 17 - 26 GHz

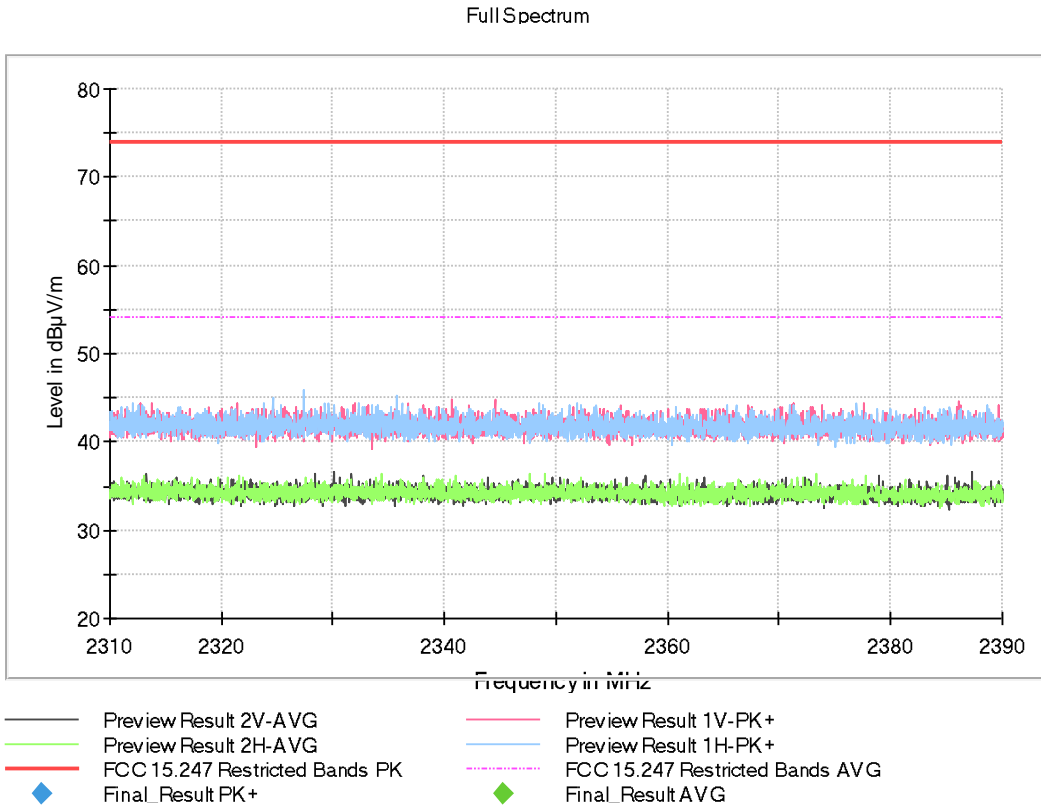
The spurious frequencies detected do not depend on the operating channel.



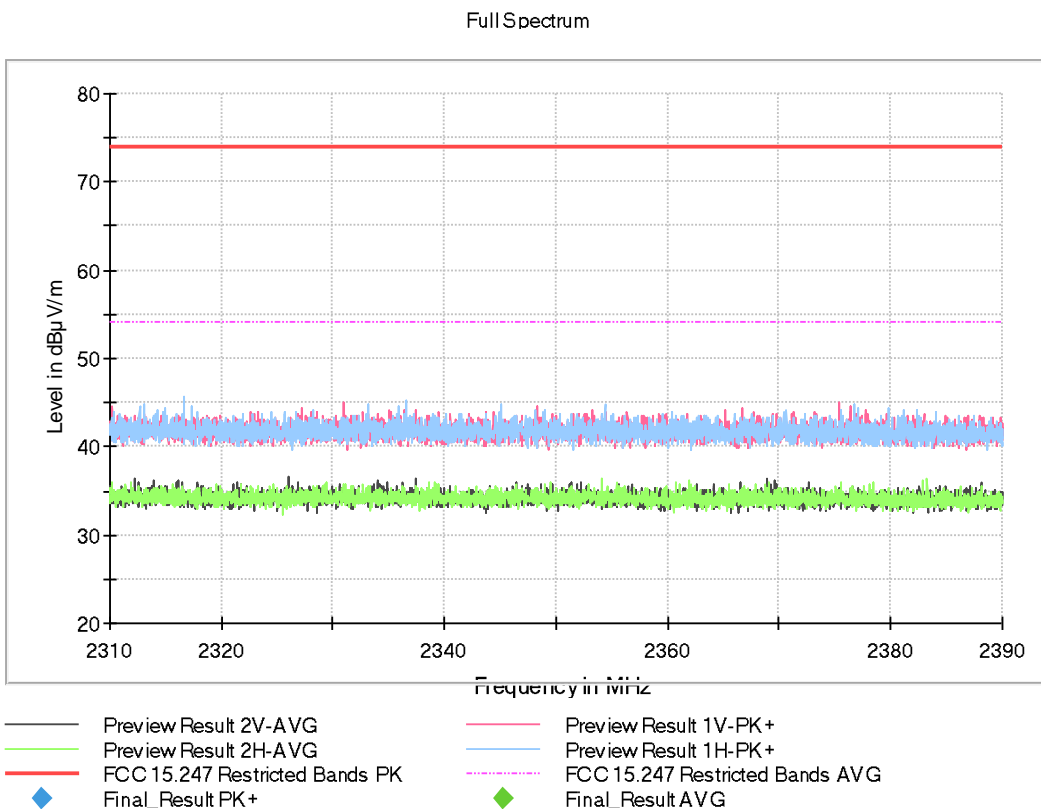
This plot is valid for the Low, Middle and High Channels.

FREQUENCY RANGE 2.31-2.39 GHz

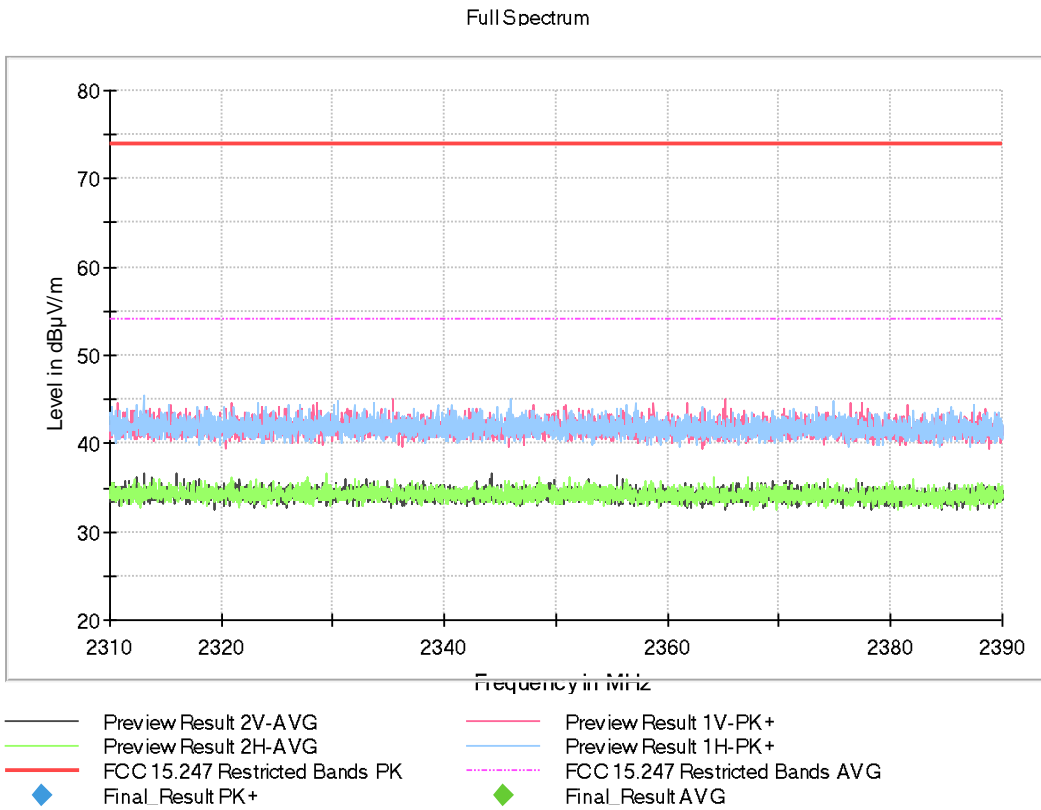
- Low Channel:



- Middle Channel:

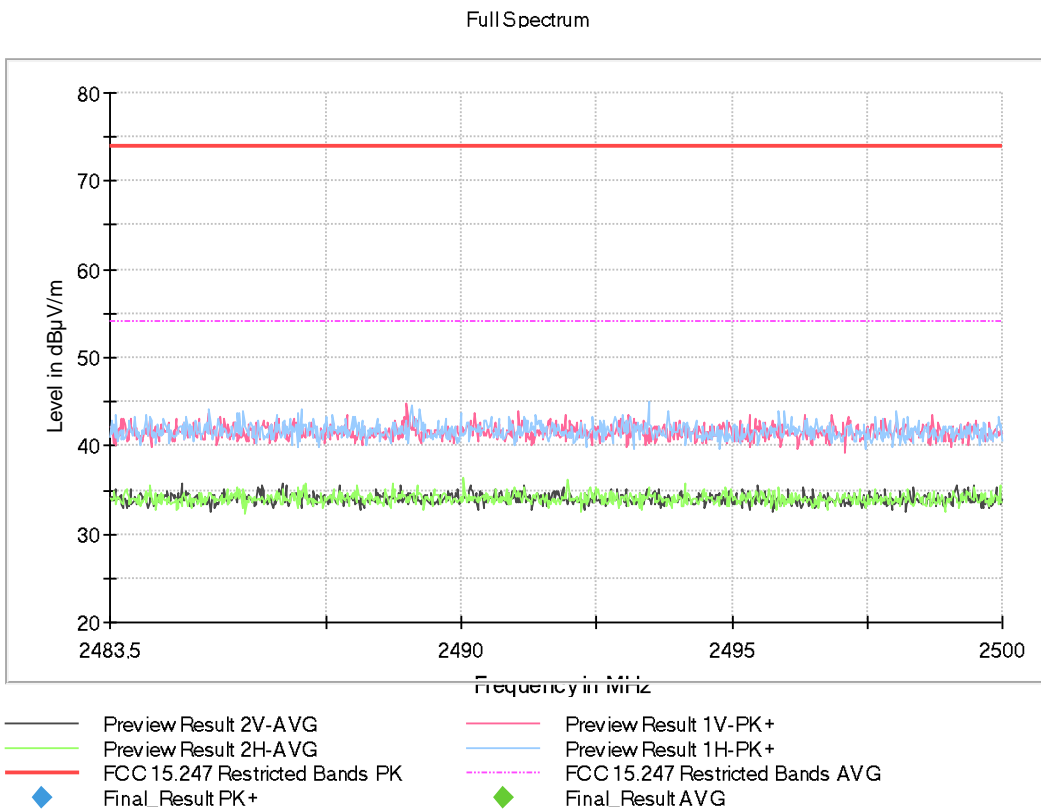


- High Channel:

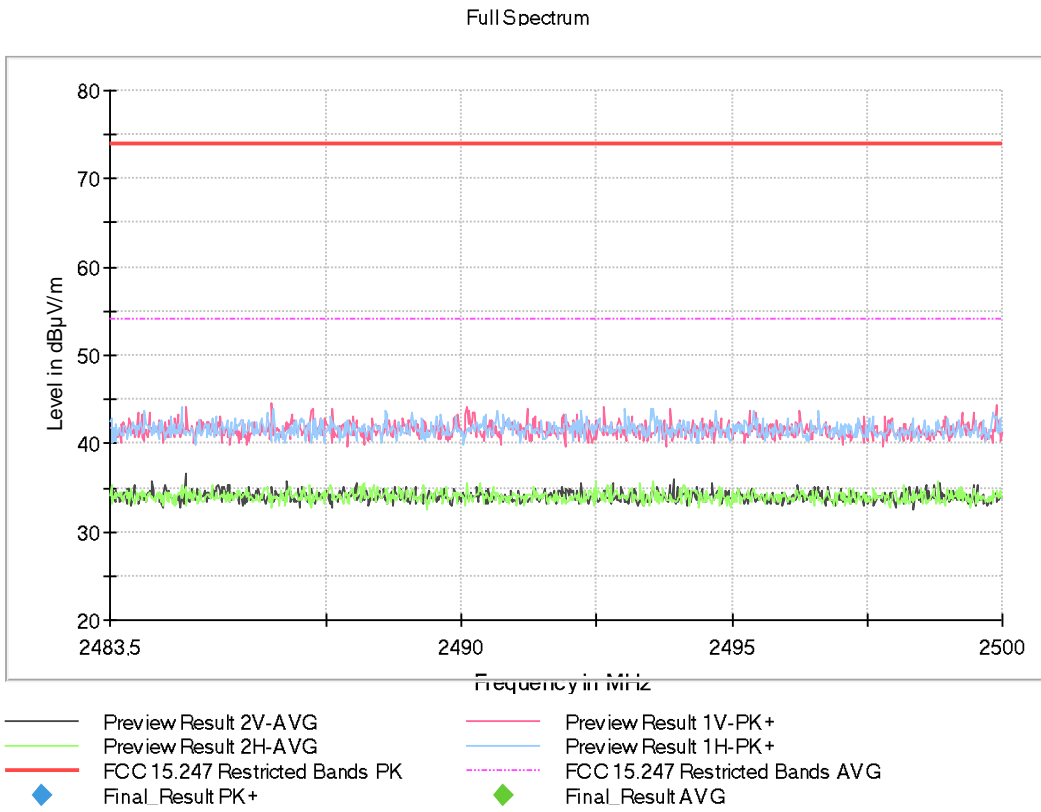


FREQUENCY RANGE 2.4835-2.5 GHz

- Low Channel:



- Middle Channel:



- High Channel:

