

ISED CABid: ES1909

Test Report No:
NIE: 68832RRF.002

Test Report

USA FCC Part 15.249, 15.209

CANADA RSS-210, RSS-Gen

(*) Identification of item tested	Airzone Main Control Board
(*) Trademark	AIRZONE
(*) Model and /or type reference	AZxxxCBxANT
Other identification of the product	HW version: 1.3 SW version: 3.3.0 FCC ID: SVS-CB-ANT IC: 24685-CB-ANT
(*) Features	SRD 915 MHz
Applicant	CORPORACIÓN EMPRESARIAL ALTRA S.L. C/ Marie Curie, 21, 29590, Málaga, Spain
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-210 Issue 10 (December 2019). CANADA RSS-Gen Issue 5, Amendment 2 (February 2021). 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  2022.02.11 11:37:59 +01'00'
Date of issue	2022-02-10
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 7

Remarks and comments 8

Testing verdicts.....9

Summary 9

Appendix A: Test results. SRD 915 MHz.....10

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 S.A.U. is an FCC-recognized accredited testing laboratory with the appropriate scope of accreditation that covers the performed test in this 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 an Airzone Main Control Board, model AZxxxCBxANT. Electronic board that controls the system through wired and wireless devices. Externally powered at 230 Vac. Wall mounted.

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 result.

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
68832B/023 (1)	Airzone Main Control Board	AZPV6IBPRO6A NT	000C1DLF	2021/06/17
68832B/057 (1)	Antenna	--	--	2021/06/17
68832B/024 (2)	Airzone Main Control Board	AZPV6IBPRO6A NT	000C1GXR	2021/06/17
68832B/056 (2)	Antenna	--	--	2021/06/17

Auxiliary elements used with the Sample S/01:

Control N°	Description	Model	Serial N°	Date of reception
68832B/002	AC Power Cord	--	--	2021/06/17

Sample S/01 has undergone the following test(s): The Radiated tests indicated in the Appendix B:

- (1) TX Low Channel tests.
- (2) TX High Channel tests.

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

Control N°	Description	Model	Serial N°	Date of reception
68832B/023 (1)	Airzone Main Control Board	AZPV6IBPRO6A NT	000C1DLF	2021/10/06
68832B/024 (2)	Airzone Main Control Board	AZPV6IBPRO6A NT	000C1GXR	2021/06/17

Auxiliary elements used with the Sample S/02:

Control N°	Description	Model	Serial N°	Date of reception
68832B/002	AC Power Cord	--	--	2021/06/17

Sample S/02 has undergone the following test(s): The Conducted tests indicated in the Appendix B:

- (3) TX Low Channel tests.
- (4) TX High Channel tests.

Test sample description

Ports.....:	Port name and description	Cable			
		Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾
	Airzone connection bus	100	☒	☒	☐
	Automation bus	100	☐	☒	☐
	Indoor unit bus	2	☐	☐	☐
	Motor output	15	☐	☐	☐
	Analog input: Alarm input	3	☐	☒	☐
	Analog input: Temperature probe	3	☐	☒	☐
	Relay output: VMC/Boiler	-	☐	☐	☐
	Relay Output: ON/OFF machine	-	☐	☐	☐
	Power	-	☒	☐	☐
Supplementary information to the ports.....:	-				
Rated power supply	Voltage and Frequency		Reference poles		
	☒	AC: 230/110 Vac	☒	☐	☐
	☐	DC:	☐	☐	☐
Rated Power	0.4 W				
Clock frequencies	6 MHz				
Other parameters.....:	-				
Software version	3.3.0				
Hardware version.....:	1.3				
Dimensions in cm (W x H x D).....:	195 x 180 x 55.5 mm				
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	
	Main control board		AZxxxCBxANT	AIRZONE	
	-				
	-				
Accessories (not part of the test item)	Description		Type	Manufacturer	
	Thermostat and user interface Think wireless		AZCE6THI NKRB	AIRZONE	
	Thermostat and user interface Think wire		AZCE6THI NKCB	AIRZONE	
	Circular damper with actuator		CPCCXXXX MTE	AIRZONE	
	Webserver		AZX6WEBS CLOUDC	AIRZONE	

	Gateway	AZX6GTCD A1	AIRZONE
	-		
Documents as provided by the applicant.....:	Description	File name	Issue date
	Technical datasheet Main Control Board	FTAZxxxCB xANT_A4	
	-		
	-		

⁽³⁾ Only for Medical Equipment

Identification of the client

CORPORACIÓN EMPRESARIAL ALTRA S.L.
C/ Marie Curie, 21, 29590, Málaga, Spain

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2021-09-28
Date (finish)	2021-10-29

Document history

Report number	Date	Description
68832RRF.002	2022-02-10	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: Nicolás Salguero, Rafael Fernández, Francisco Javier Fernández and José Manuel Jiménez.

Used instrumentation:

Conducted Measurements:

	Last Calibration	Due Calibration
1. Shielded Room ETS LINDGREN S101	N/A	N/A
2. Signal and Spectrum Analyzer 10 Hz - 40 GHz ROHDE AND SCHWARZ FSV40	2021/02	2023/02
3. AC Power Supply 135/270 V, 5/10/20/40 A ELGAR CS-AC35(351SL)	2019/09	2022/09

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. Biconical/Log Antenna 30 MHz - 6 GHz ETS LINDGREN 3142E	2020/04	2023/04
4. Preamplifier G>40dB 10MHz-6GHz, BONN ELEKTRONIK, BLNA 0160-01N	2021/03	2022/03
5. EMI Test Receiver 7 GHz ROHDE AND SCHWARZ ESR7	2020/12	2022/12
6. AC Power Supply 135/270 V, 5/10/20/40 A ELGAR CS-AC35(351SL)	2019/09	2022/09
7. Digital Multimeter FLUKE 175	2021/11	2022/11
8. Horn Antenna 1-18 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D	2020/08	2023/08
9. RF Preamplifier, 40 dB ,1-18 GHz BONN ELEKTRONIK BLMA 0118-1M	2021/06	2022/06
10. Spectrum Analyzer ROHDE AND SCHWARZ FSW50	2020/07	2022/07

Testing verdicts

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

Summary

1. SRD 915 MHz:

FCC PART 15 PARAGRAPH / RSS-210			
Requirement – Test case		Verdict	Remark
FCC 15.249 (a) / RSS-210 B.10 (a)	Field strength of fundamental and harmonic emissions	P	
FCC 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. SRD 915 MHz

TEST CONDITIONS	12
Occupied Bandwidth	14
FCC 15.249 (a) / RSS-210 B.10 (a) Field strength of fundamental and harmonics emissions	16
FCC 15.249 (d) / RSS-210 B.10 (b) Emissions radiated outside of the specific frequency bands	18

TEST CONDITIONS

(*): Declared by the Applicant.

POWER SUPPLY (*):

Vnominal: 115 Vac
Type of Power Supply: Mains Supply.

ANTENNA (*):

Type of Antenna: Internal (Monopole SMA)
Maximum Declared Antenna Gain: -1.3 dBi

TEST FREQUENCIES:

Conducted Tests:

Low Channel: 915.20 MHz
High Channel: 917.20 MHz

Radiated Tests:

Low Channel: 915.20 MHz
High Channel: 917.20 MHz

Declared Operating Channel Width (OCW): 200 kHz

The EUT is continuously transmitting.

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.



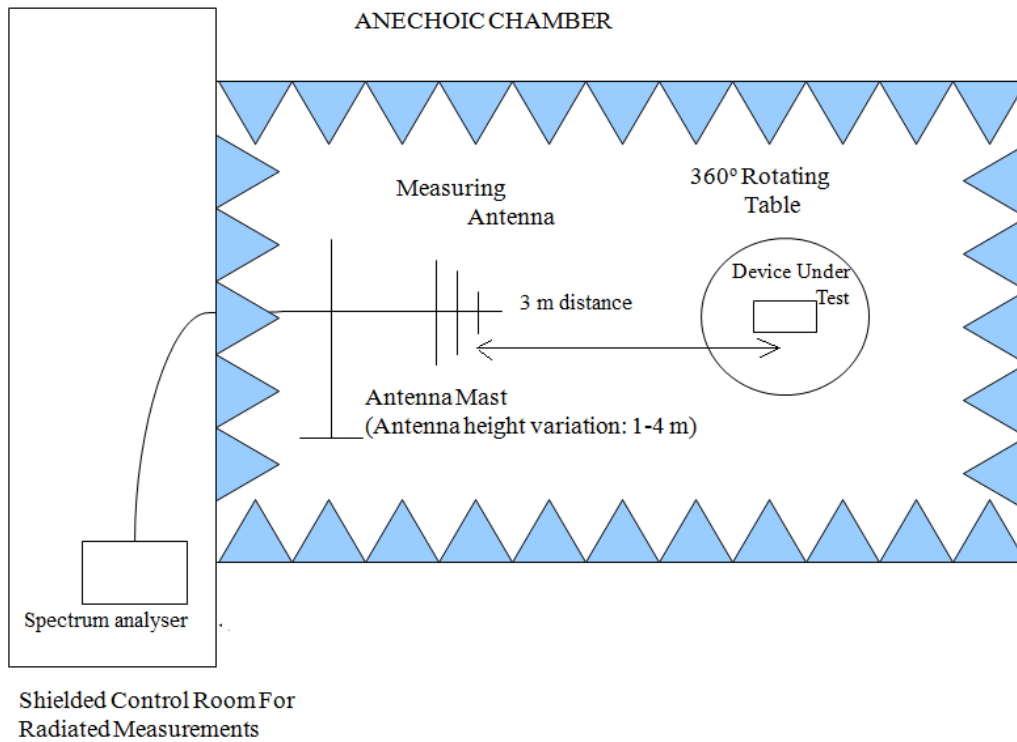
RADIATED MEASUREMENTS:

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-10 GHz Double ridge horn antenna) is situated at a distance of 3 m.

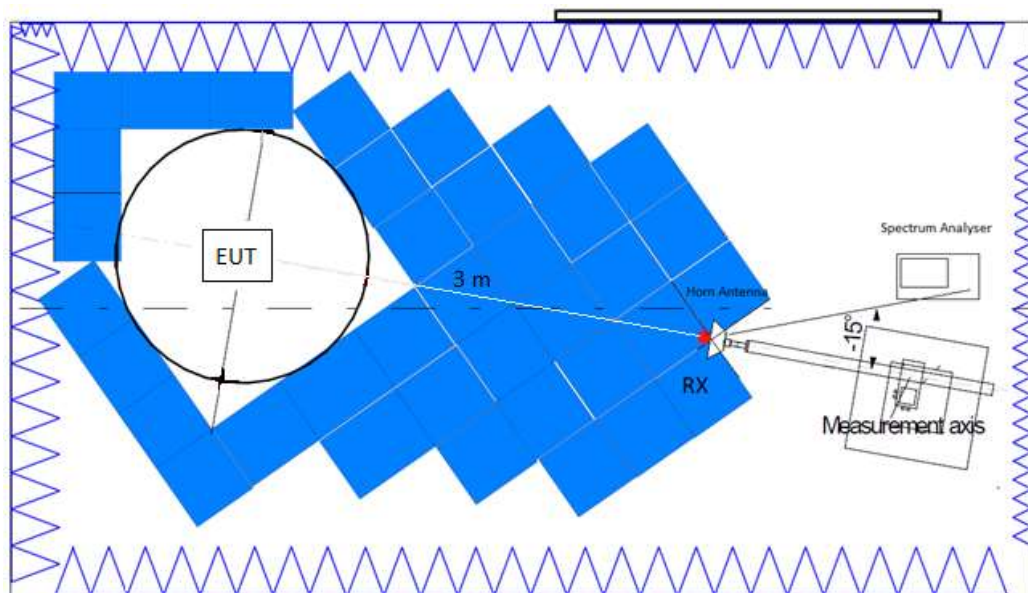
The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height (Bilog antenna and Double ridge horn antenna) was varied from 1 to 4 meters to find 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 1 MHz / 3 MHz for frequencies above 1 GHz.

Radiated measurements setup $f < 1$ GHz:



Radiated measurements setup from 1 to 10 GHz:



Occupied Bandwidth

LIMITS:

* RSS-Gen Issue 5, Clause 6.7 Occupied bandwidth (or 99% emission bandwidth) and x dB bandwidth:

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

In some cases, the “x dB bandwidth” is required, which is defined as the frequency range between two points, one at the lowest frequency below and one at the highest frequency above the carrier frequency, at which the maximum power level of the transmitted emission is attenuated x dB below the maximum in-band power level of the modulated signal, where the two points are on the outskirts of the in-band emission. [...]

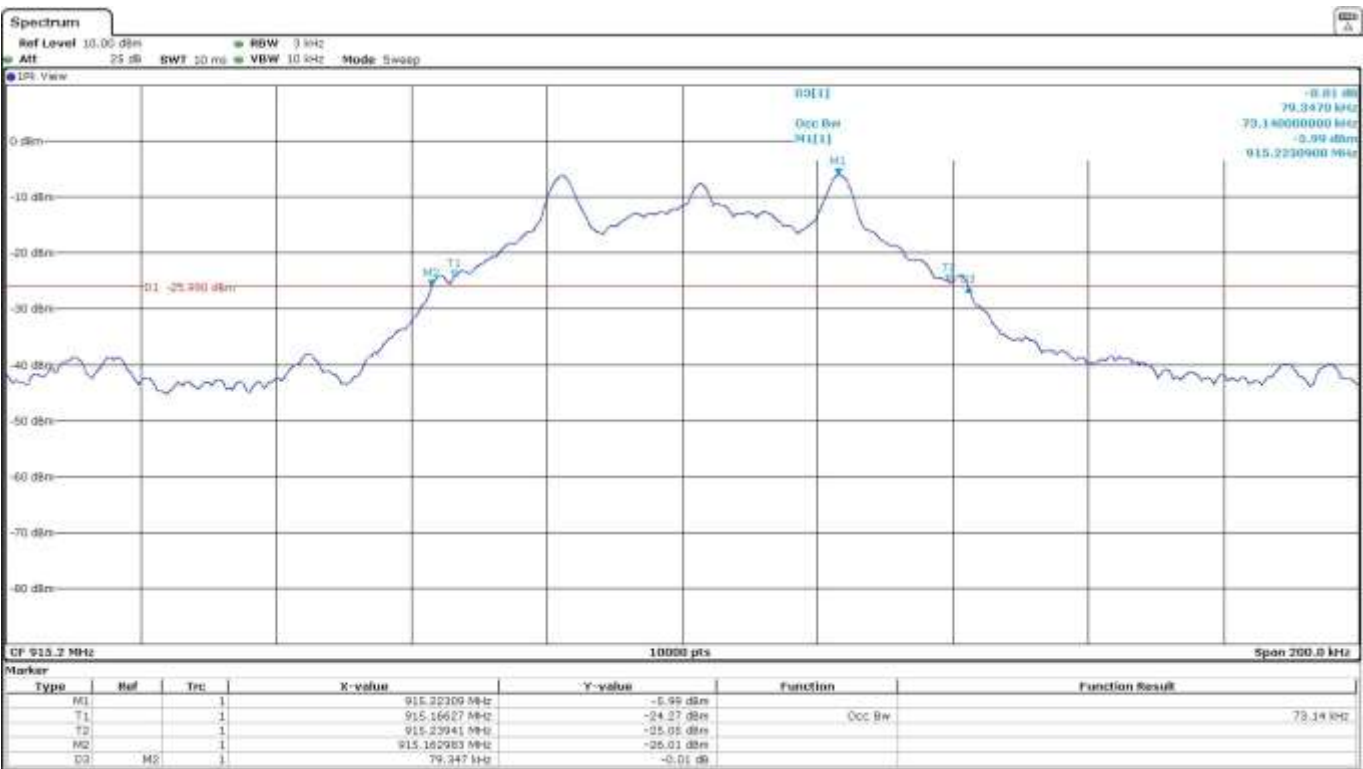
RESULTS:

- SRD 915 MHz:

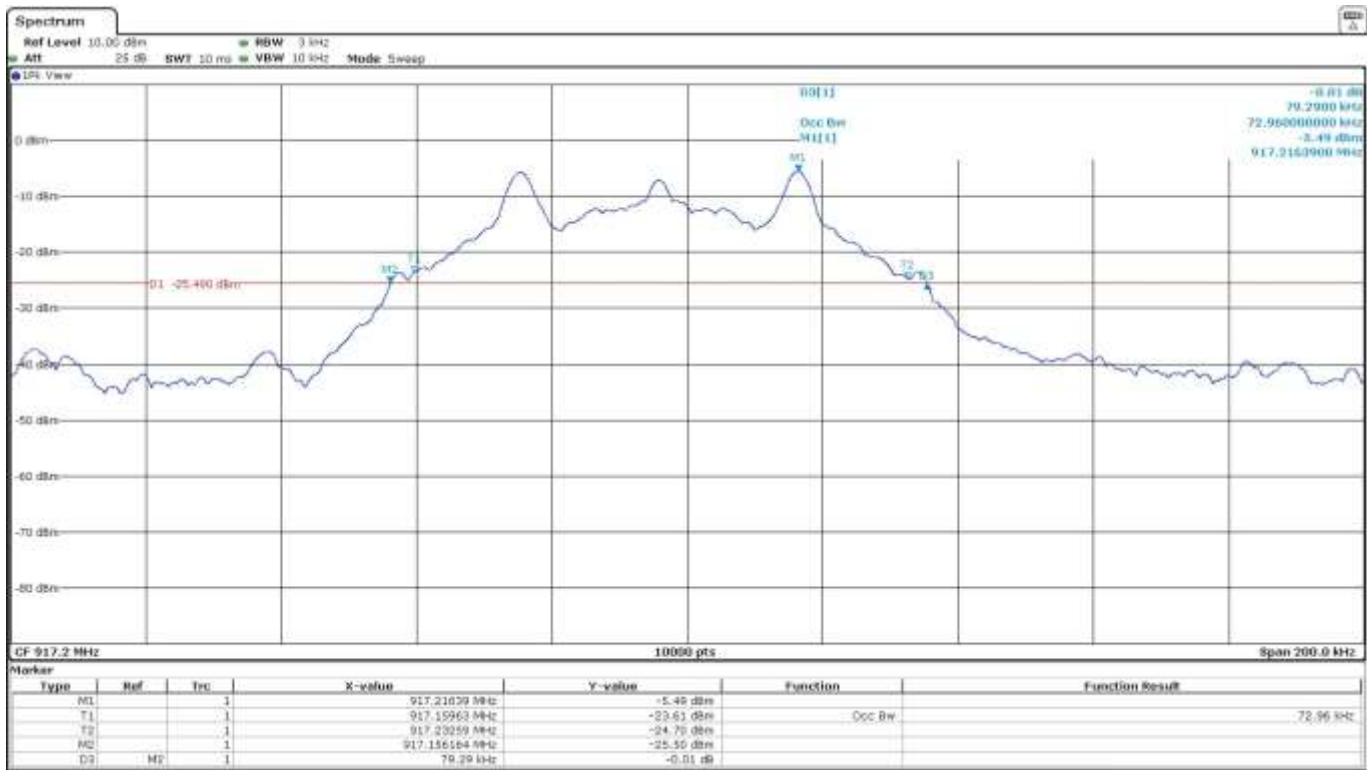
	Low Channel	High Channel
99% Bandwidth (kHz)	73.14	72.96
-20 dBc Bandwidth (kHz)	79.347	79.29
Measurement Uncertainty (kHz)	<± 0.36	

Verdict: PASS

- Low Channel:



- High Channel:



FCC 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.

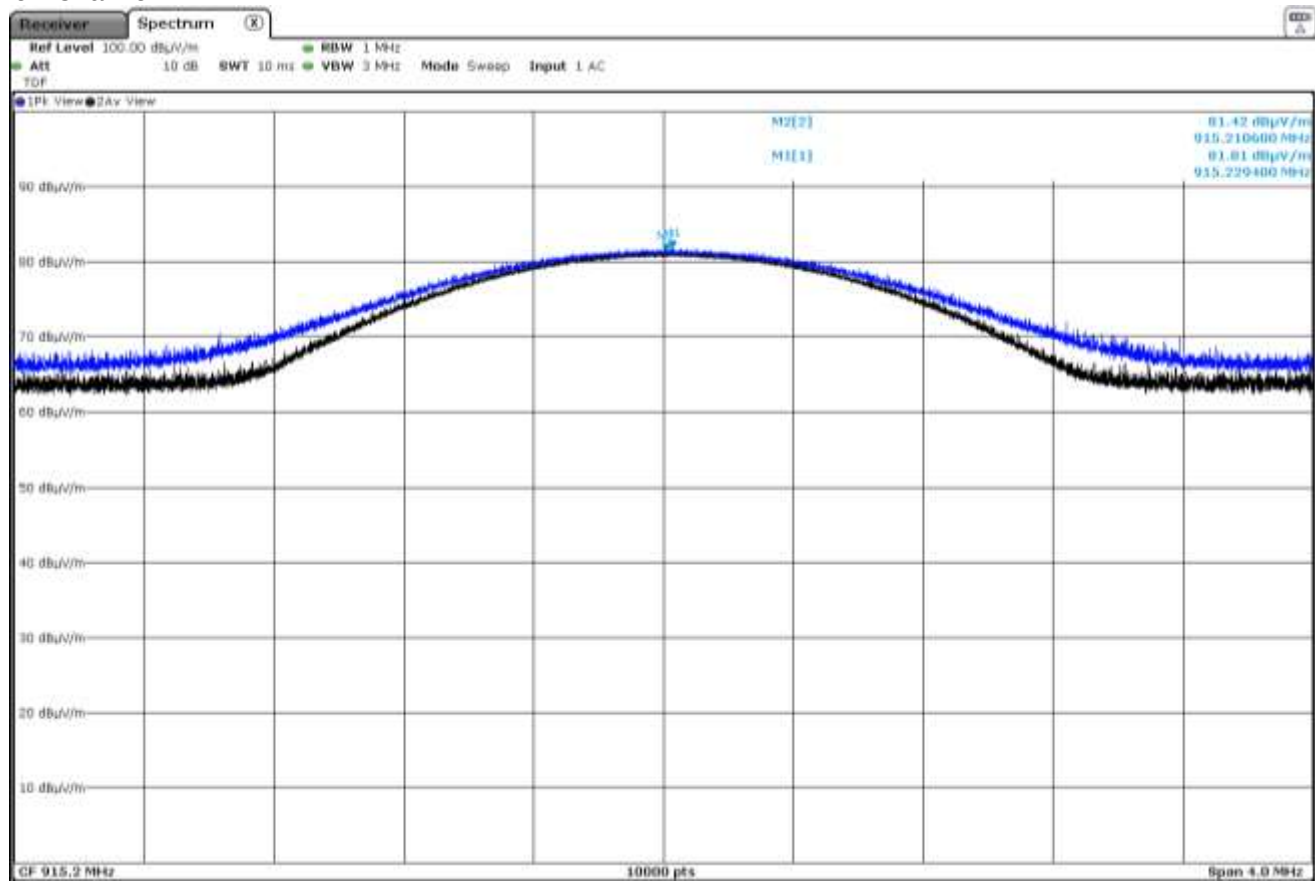
RESULTS:

- SRD 915 MHz:**

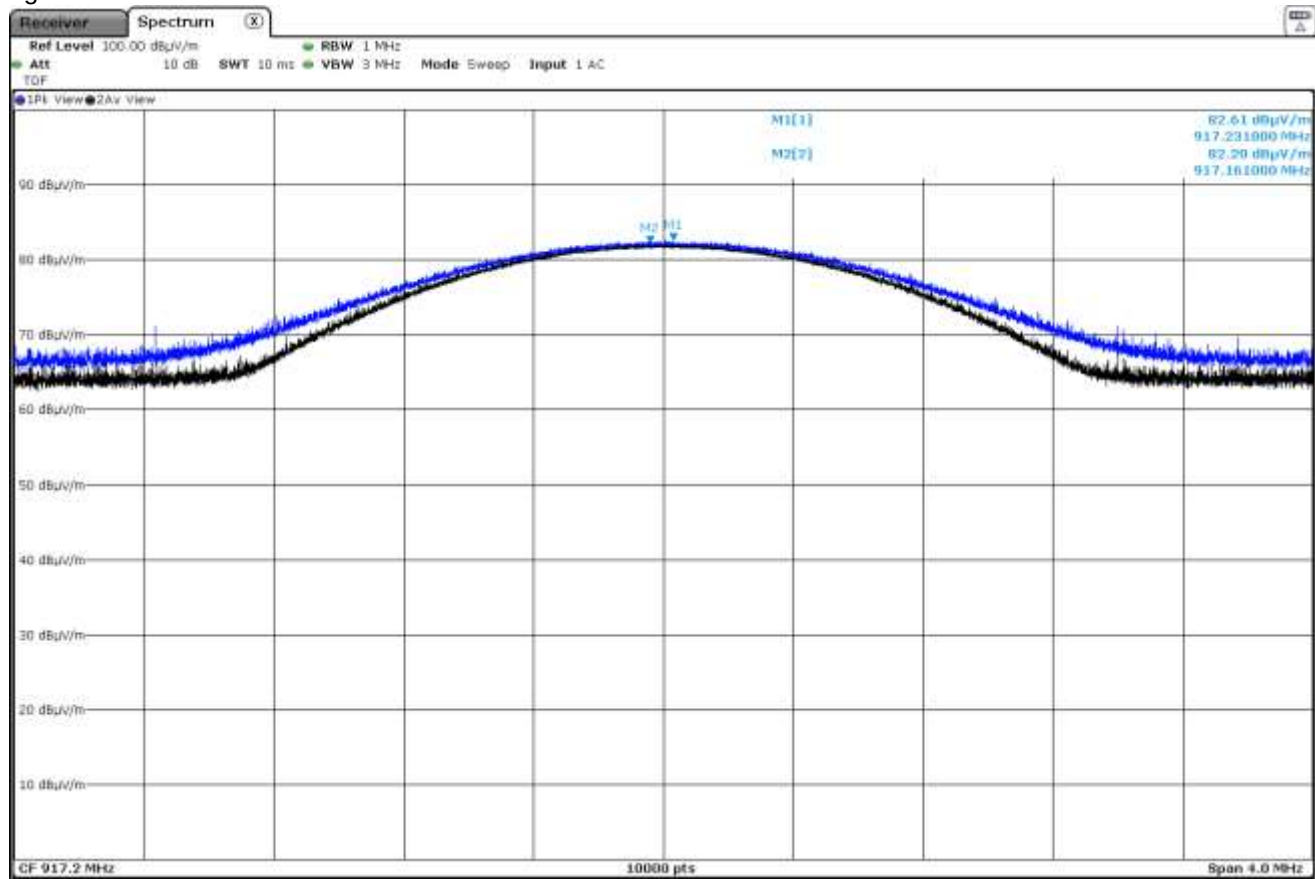
	Low Channel	High Channel
Field Strength (dBμV/m) Peak	81.81	82.61
Field Strength (dBμV/m) Average	81.42	82.20
Measurement Uncertainty (dB)	<± 4.68	

Verdict: PASS

- Low Channel:



- High Channel:



FCC 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 ($\text{dB}\mu\text{V/m}$)	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 ($\text{dB}\mu\text{V/m}$)	Measurement distance (m)
0.009-0.490	$2400/F(\text{kHz})$	-	300
0.490-1.705	$24000/F(\text{kHz})$	-	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-10 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 frequencies do not depend on the operating channel.

Spurious frequencies detected at less than 20 dB below the limit:

Spurious Frequency (MHz)	Emission Level (dBμV/m)	Polarization	Detector
189.32250	27.04	V	Quasi Peak
382.44950	28.17	V	Quasi Peak

Measurement Uncertainty (dB) $< \pm 5.01$

Frequency range 1 - 10 GHz:

The results in the next tables show the maximum measured levels in the 1-10 GHz range.

Spurious frequencies with peak levels above the average limit (54 dBμV/m at 3 m) are measured with average detector for checking compliance with the average limit.

In this case, there is no frequency with peak level above the average limit (54 dBμV/m at 3 m).

- LOW CHANNEL. Spurious frequencies closest to the limit:

Spurious Frequency (MHz)	Emission Level (dBμV/m)	Polarization	Detector
1830.400000	43.68	H	Peak
5491.250000	48.46	H	Peak

- HIGH CHANNEL. Spurious frequencies closest to the limit:

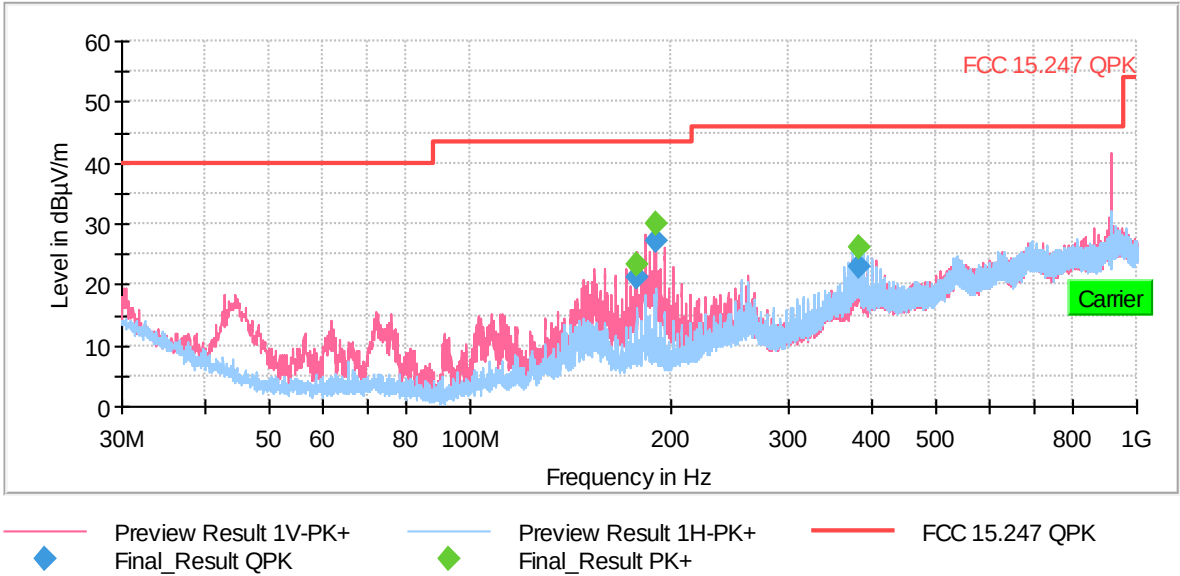
Spurious Frequency (MHz)	Emission Level (dBμV/m)	Polarization	Detector
1834.400000	41.33	H	Peak
5503.250000	50.44	H	Peak

Measurement Uncertainty (dB) $< \pm 4.22$

Verdict: PASS

FREQUENCY RANGE 30 MHz - 1 GHz:

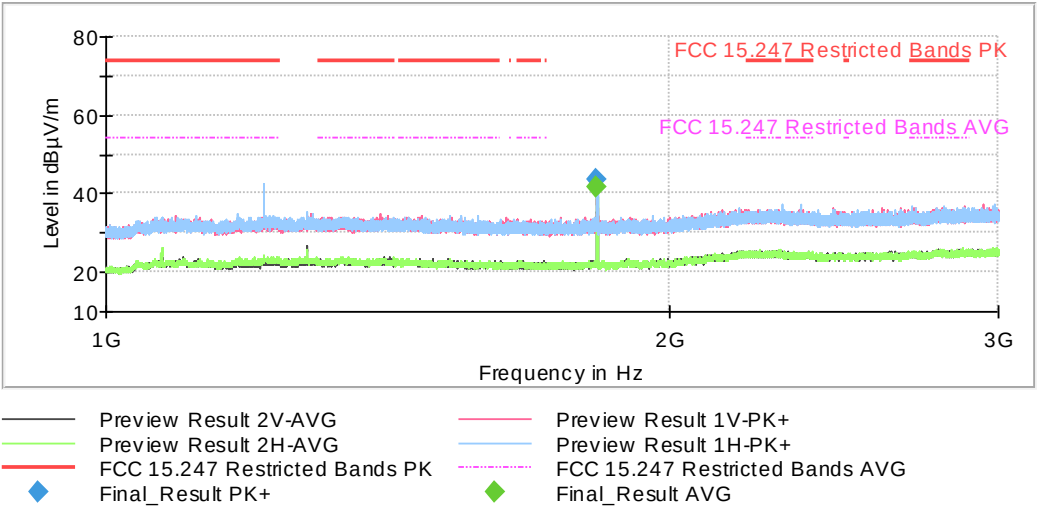
This plot is valid for all channels.



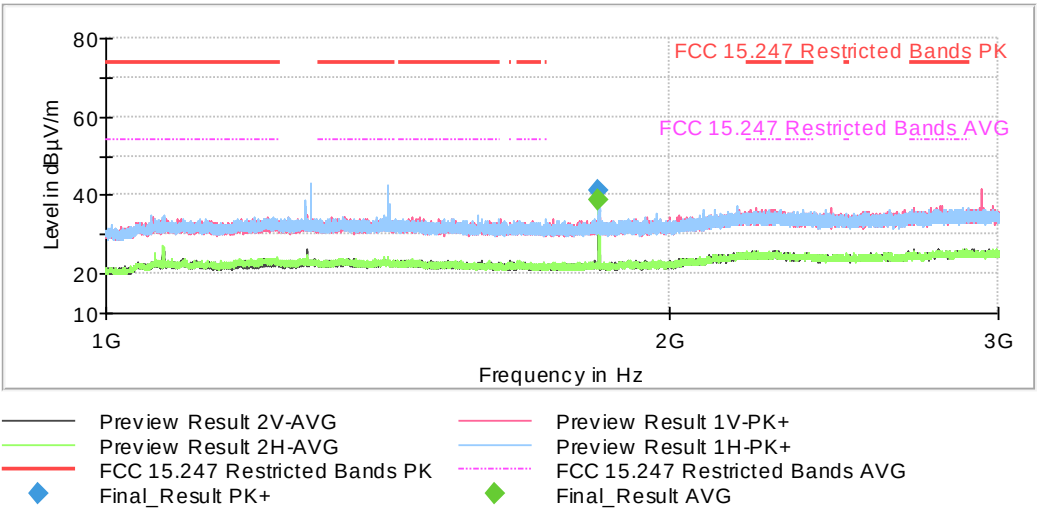
The peak above the limit is the carrier frequency.

FREQUENCY RANGE 1 - 3 GHz:

- Low Channel:

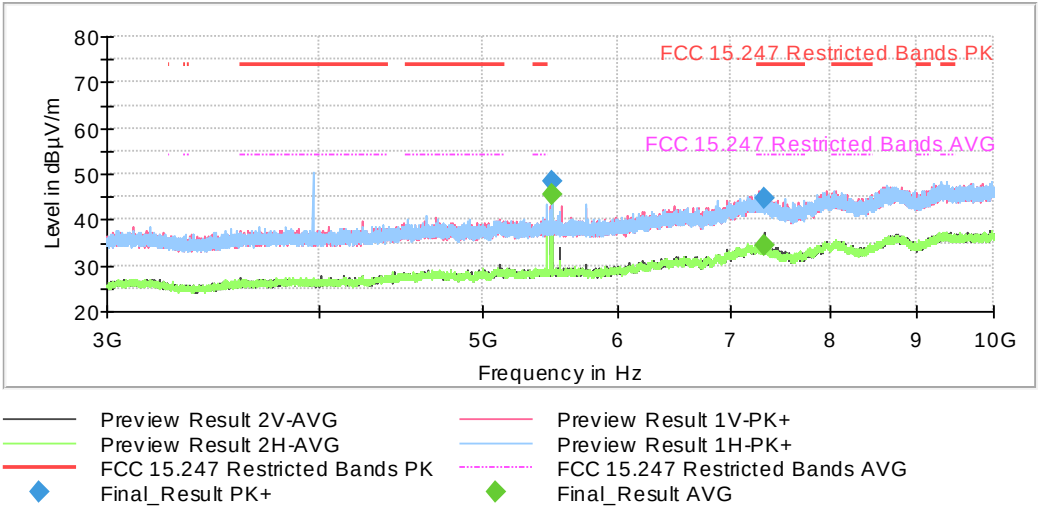


- High Channel:



FREQUENCY RANGE 3 - 10 GHz:

- Low Channel:



- High Channel:

