

ISED CABid: ES1909
Lab. Company Number: 4621A

Test Report No:
NIE: 68962RRF.002A1

Test Report

USA FCC Part 15.249, 15.209

CANADA RSS-210, RSS-Gen

(*) Identification of item tested	AIDOO Z-WAVE PLUS
(*) Trademark	AIRZONE
(*) Model and /or type reference	AZAI6ZWUxxx
Other identification of the product	HW version: V1.0 SW version: Not provided FCC ID: SVS-ZWU IC: 24685-ZWU
(*) 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  2022.12.13 16:51:50 +01'00'
Date of issue	2022-12-13
Report template No	FDT08_24 (*) "Data provided by the client"

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Competences and guarantees

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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.

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The results presented in this Test Report apply only to the particular item under test established in this document.

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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 model AZAI6ZWUxxx is a device to manage and integrate units remotely. Wireless Z-Wave Plus connection. It operates in any Z-Wave network with other Z-Wave/Z-Wave Plus certified devices and controllers from any other manufacturer. As a constantly powered node, will act as repeater regardless of the vendor in order to increase the reliability of the network.

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
68962C/001	AIDOO Z-WAVE PLUS	AZAI6ZWUFUJ	0A6WFX	2022/04/18

Auxiliary elements used with the Sample S/01:

Control N°	Description	Model	Serial N°	Date of reception
68962C/006	Power Supply	APV-12-12	-	2022/04/18

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

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

Control N°	Description	Model	Serial N°	Date of reception
68962C/002	AIDOO Z-WAVE PLUS	AZAI6ZWUFUJ	0A6WG3	2022/04/18

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

Test sample description

Ports.....:	Port name and description	Cable					
		Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾		
	Modbus port	100	☒	☒	☐		
	Indoor unit port	2.5 m	☒	☐	☐		
	-	-	☐	☐	☐		
Supplementary information to the ports.....:	-						
Rated power supply	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	☐ AC:		☐	☐	☐	☐	☐
	☐ AC:		☐	☐	☐	☐	☐
	☒ DC: 12 Vdc						
☐ DC:							
Rated Power..... :	310 mW						
Clock frequencies..... :	-						
Other parameters	-						
Software version..... :	Not provided						
Hardware version	V1.0						
Dimensions in cm (W x H x D) ... :	92 x 80 x 29 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		
	Aidoo Z-WAVE PLUS		AZAI6ZWxF UJ		AIRZONE		
	-		-		-		
Accessories (not part of the test item)	Description		Type		Manufacturer		
	Smart Home Controller		VeraEdge-EU		VERA		
	-		-		-		
Documents as provided by the applicant	Description		File name		Issue date		
	Data Sheet		FT_AZAI6Z WxF		-		
	-		-		-		

⁽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)	2022-05-09
Date (finish)	2022-05-11

Document history

Report number	Date	Description
68962RRF.002	2022-11-16 2022-12-13	First release.
68962RRF.002A1	2022-12-13	Second release. This report is modified due to minor typos. This modification test report cancels and replaces the test report 68962RRF002

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.	DC Power Supply 40V/40A Rohde & Schwarz NGPE40	N/A	N/A
3.	Signal and Spectrum Analyzer 10 Hz - 40 GHz ROHDE AND SCHWARZ FSV40	2021/02	2023/02

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	2020/10	2023/10
4.	RF Preamplifier 40 dB, 10 MHz - 6 GHz BONN ELEKTRONIK BLNA 0160-01N	2022/03	2023/03
5.	EMI Test Receiver 7 GHz ROHDE AND SCHWARZ ESR7	2020/12	2022/12
6.	Horn Antenna 1-18 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D	2020/08	2023/08
7.	RF Preamplifier G>30dB, 1-18GHz BONN ELEKTRONIK BLMA 0118-3A	2021/12	2022/12
8.	Signal and Spectrum Analyzer 10 Hz - 40 GHz ROHDE AND SCHWARZ FSV40	2021/10	2023/10
9.	EMC/RF Testing SW ROHDE AND SCHWARZ EMC32	N/A	N/A

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	
Occupied Bandwidth		P	
Supplementary information and remarks:			
None.			

Appendix A: Test results. SRD 915 MHz

TEST CONDITIONS	11
Occupied Bandwidth	13
FCC 15.249 (a) / RSS-210 B.10 (a) Field strength of fundamental and harmonics emissions	15
FCC 15.249 (d) / RSS-210 B.10 (b) Emissions radiated outside of the specific frequency bands	17

TEST CONDITIONS

(*): Declared by the Applicant.

POWER SUPPLY (*):

Vnominal: 12 Vdc
Type of Power Supply: Mains Supply.

ANTENNA (*):

Type of Antenna: Internal (Omnidirectional)
Maximum Declared Antenna Gain: -2.5 dBi

TEST FREQUENCIES:

Conducted Tests:

Low Channel: 908.4 MHz
High Channel: 916 MHz

Radiated Tests:

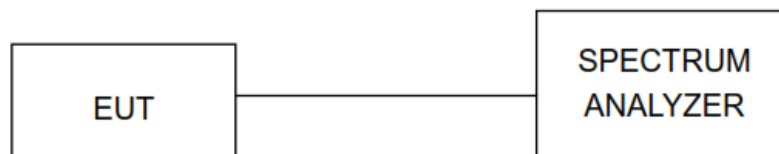
Low Channel: 908.4 MHz
High Channel: 916 MHz

MODULATION:

The sample is configured in GFSK modulation continuous transmission using the software provided by the manufacturer.

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.



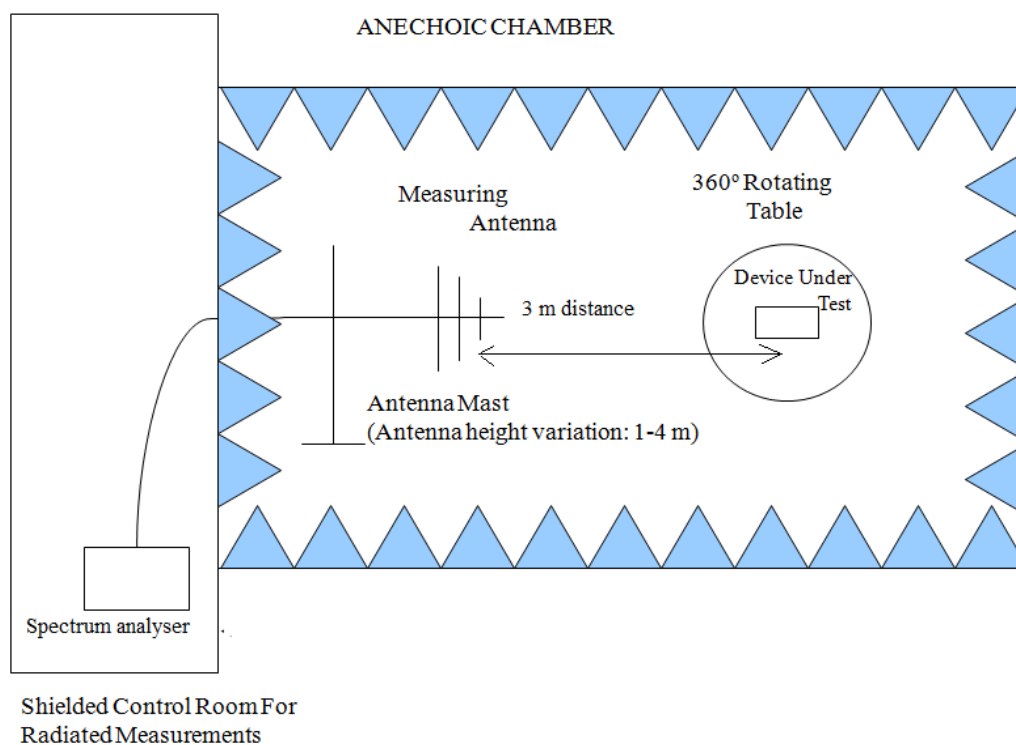
RADIATED MEASUREMENTS:

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.

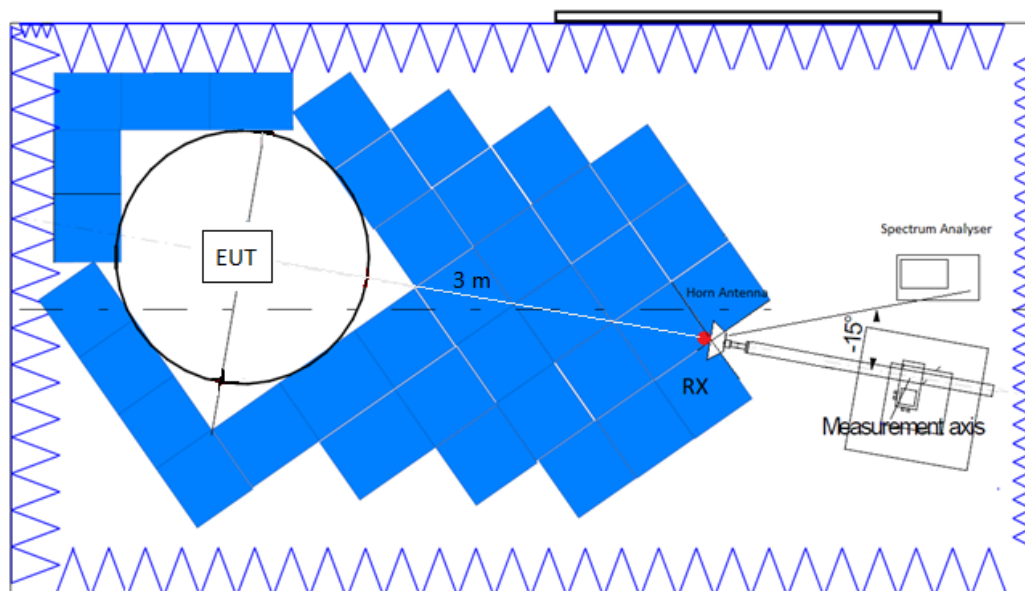
The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height (Bilog antenna and Double ridge horn antenna) was varied from 1 to 4 meters to find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

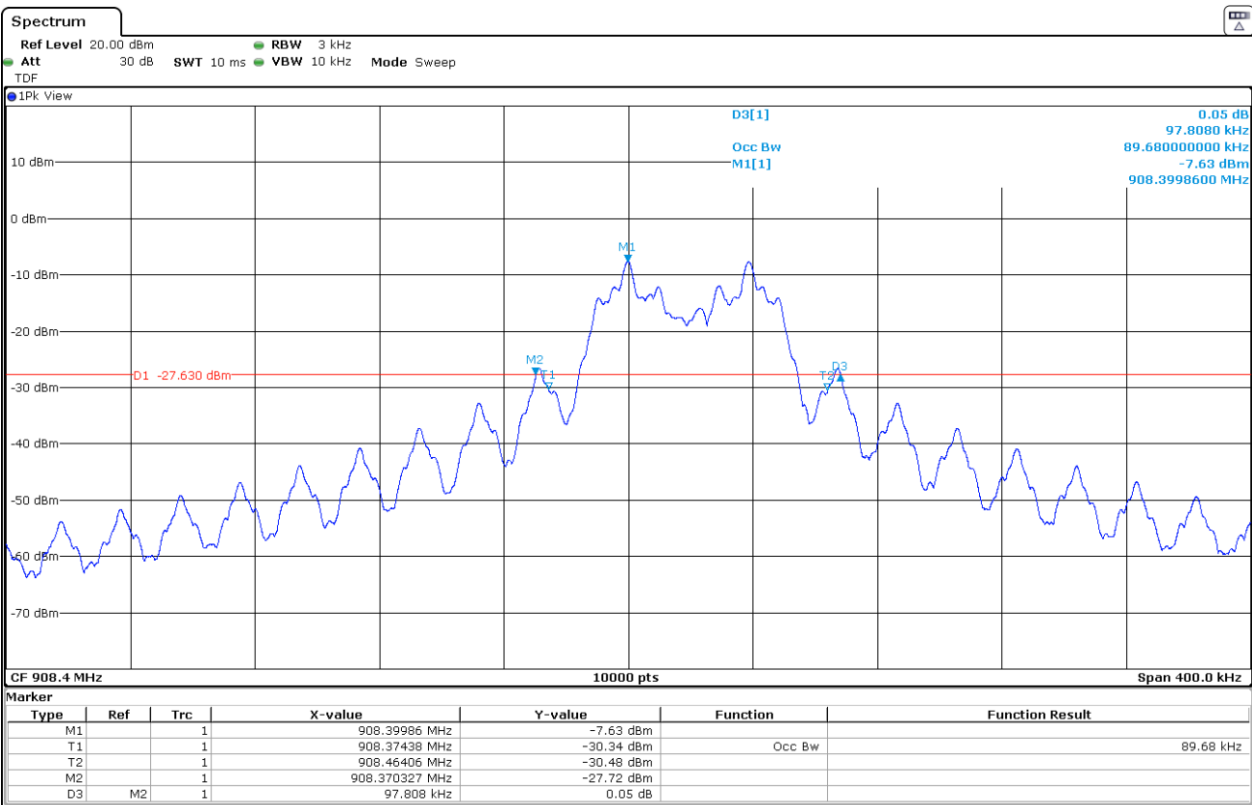
In some cases, the “x dB bandwidth” is required, which is defined as the frequency range between two points, one at the lowest frequency below and one at the highest frequency above the carrier frequency, at which the maximum power level of the transmitted emission is attenuated x dB below the maximum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

RESULTS:

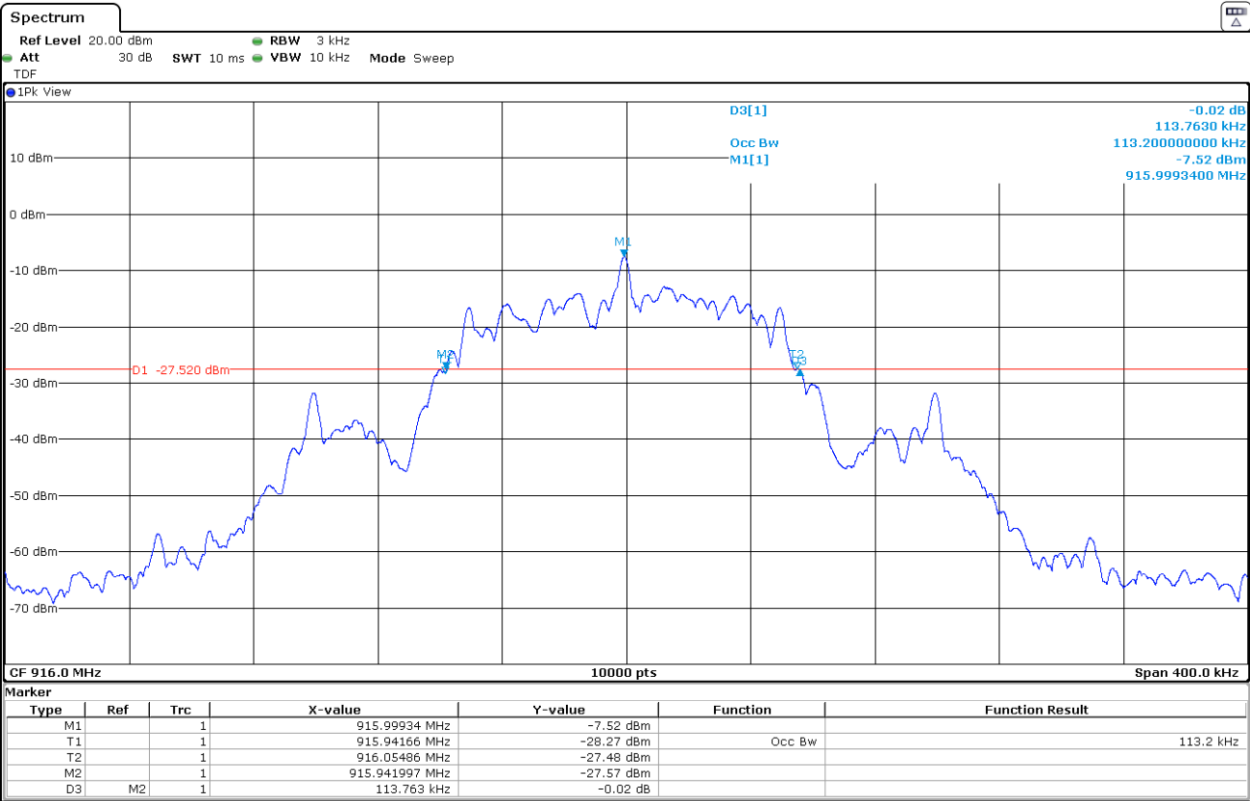
- **SRD 915 MHz:**

	Low Channel	High Channel
99% Bandwidth (MHz)	0.08968	0.1132
-20 dBc Bandwidth (MHz)	0.097808	0.113763
Measurement Uncertainty (kHz)	<± 0.36	

- Low Channel:



- High Channel:



Verdict: Pass

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.

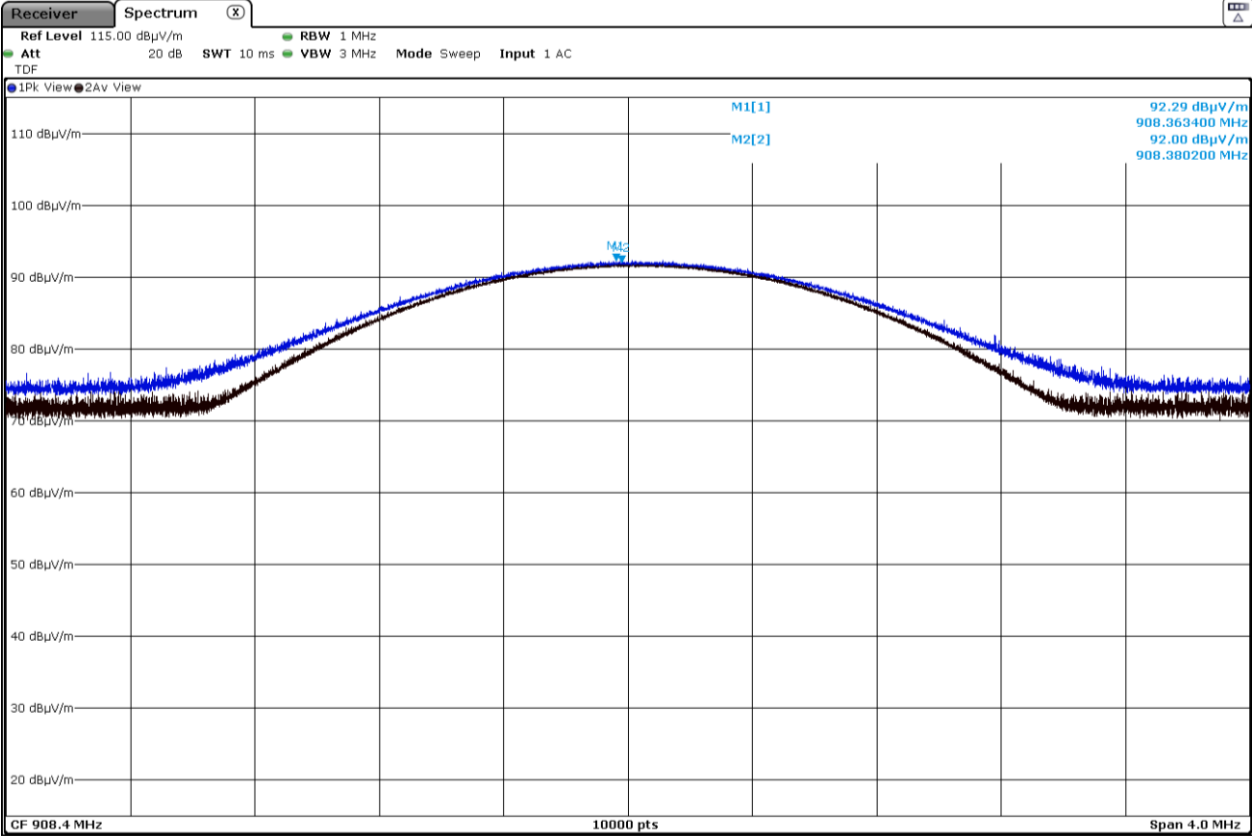
RESULTS:

- SRD 915 MHz:**

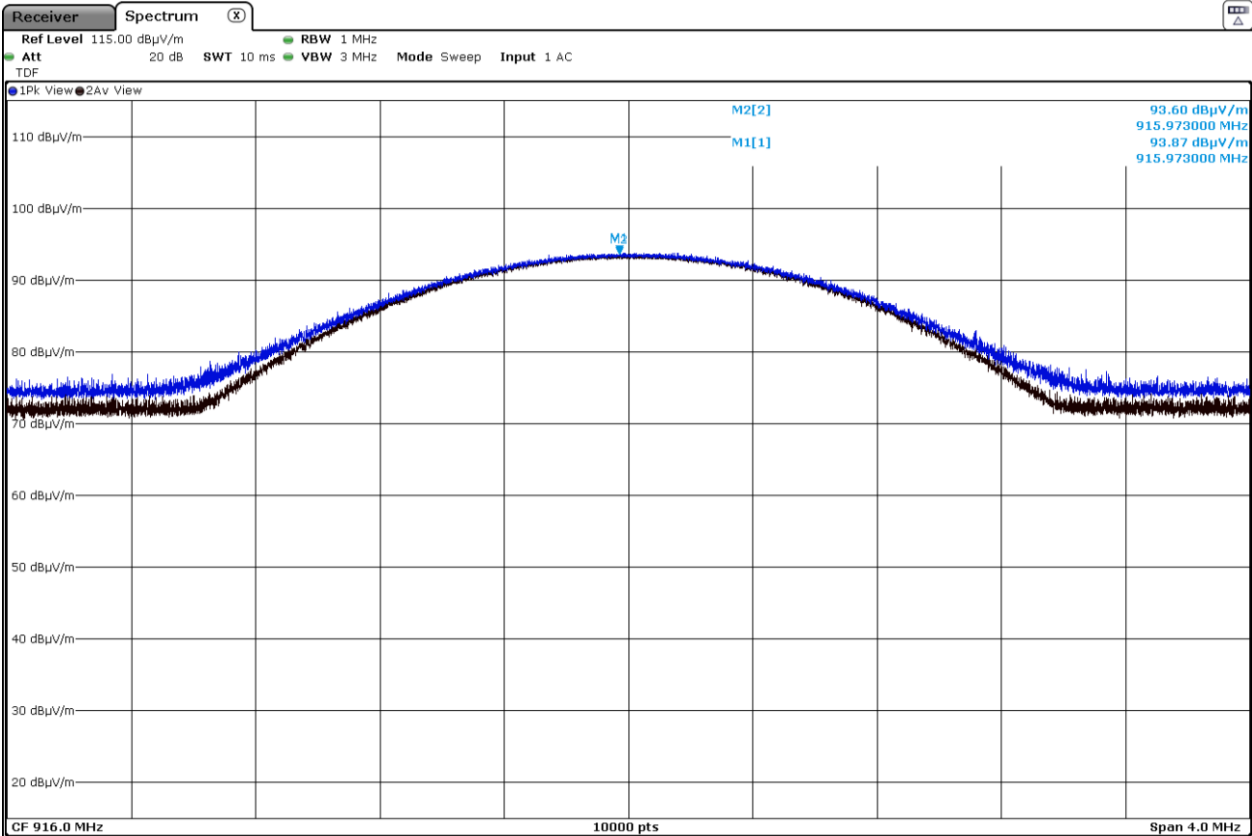
	Low Channel	High Channel
Field Strength (dBμV/m) Peak	92.29	93.87
Field Strength (dBμV/m) Average	92	93.6
Measurement Uncertainty (dB)	<± 4.68	

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
319.393438	28.45	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 Frequency (GHz)	Emission Level (dBμV/m)	Polarization	Detector
1.8168125	49.73	V	Peak
2.72525	42.52	V	Peak
3.6335	46.47	V	Peak
7.267156	49.25	V	Peak

- HIGH CHANNEL.

Spurious Frequency (GHz)	Emission Level (dBμV/m)	Polarization	Detector
1.8319375	48.90	V	Peak
2.748125	42.70	V	Peak
3.663906	44.86	V	Peak
7.327968	49.93	V	Peak

Measurement Uncertainty (dB) $< \pm 4.22$

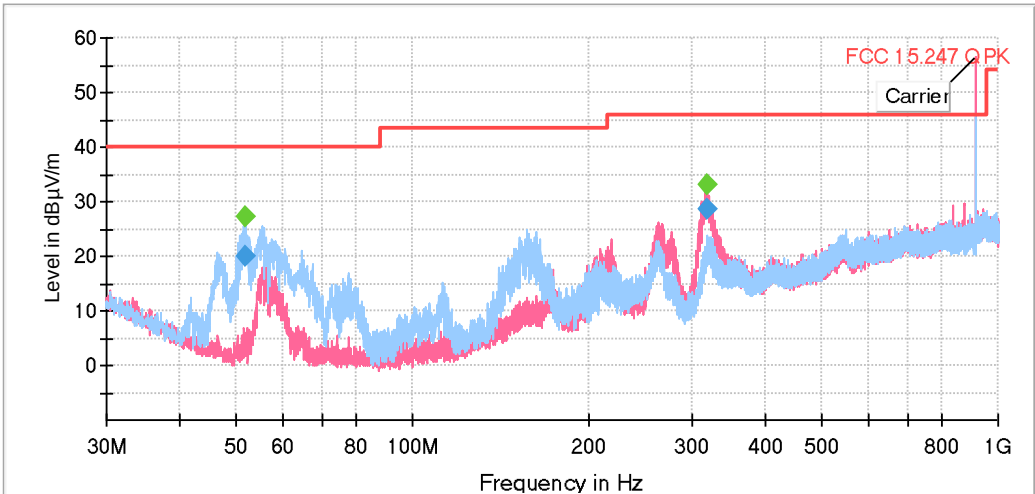
Verdict: PASS

The setting for each range of frequency is indicated in the following tables:

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [ESR 7] 30 MHz - 1 GHz	30,312 kHz	PK+	100 kHz	1 s	0 dB
Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [FSW 50] 1 GHz - 3 GHz	62.5 kHz	PK+ ; AVG	1 MHz	1 s	0 dB
Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [FSW 50] 3 GHz - 10 GHz	218.75 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

FREQUENCY RANGE 30 MHz - 1 GHz:

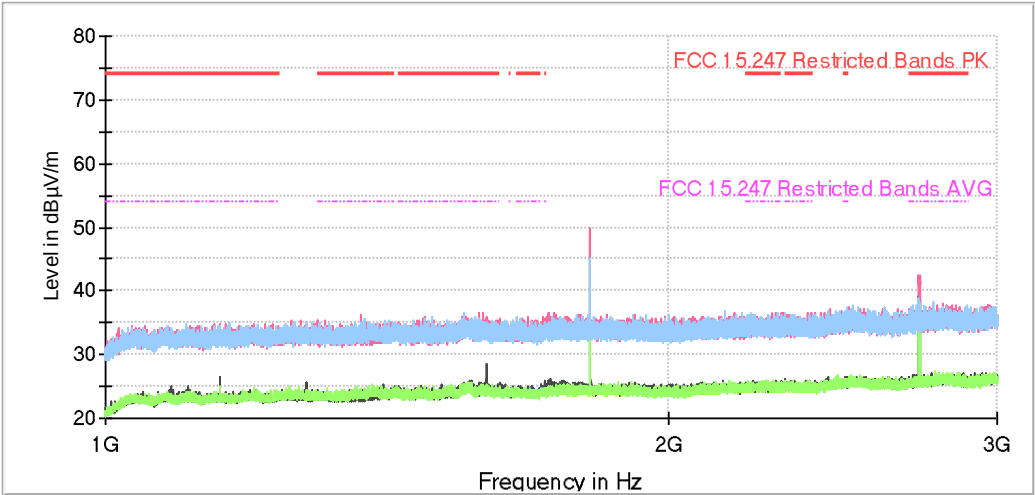
This plot is valid for all channels.



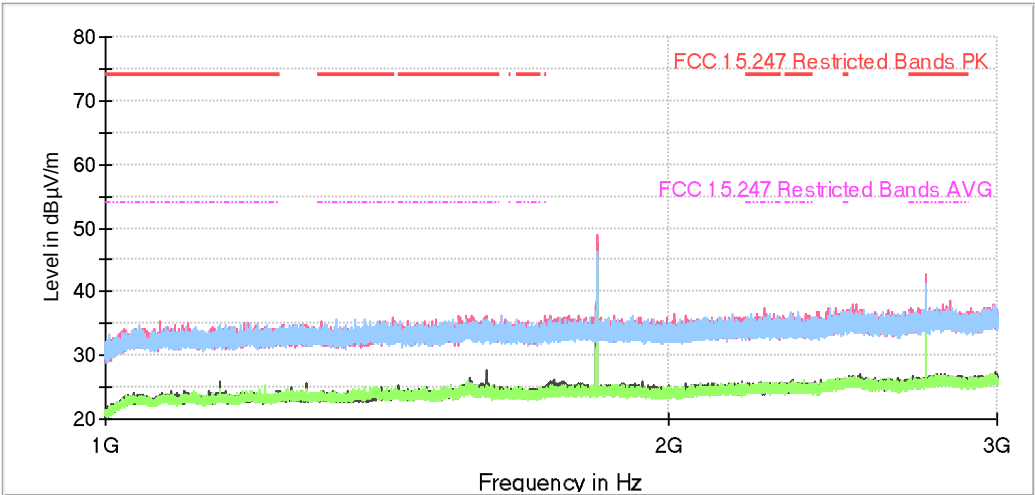
The peak above the limit is the carrier frequency.

FREQUENCY RANGE 1 - 3 GHz:

- Low Channel:

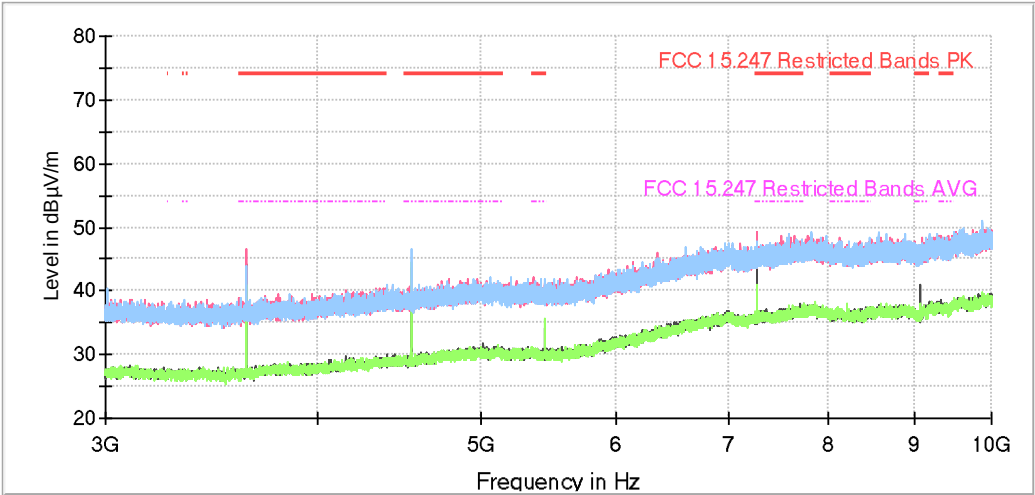


- High Channel:



FREQUENCY RANGE 3 - 10 GHz:

- Low Channel:



- High Channel:

