DEKRA Testing and Certification, S.A.U.
Parque Tecnológico de Andalucía,
c/ Severo Ochoa nº 2 · 29590 Campanillas · Málaga · España
C.I.F. A29 507 456

ISED CABid: ES1909

Test report No:
NIE: 68962REM.002A2

Test report

FCC Rules and Regulations CFR 47, Part 15, Subpart B & Subpart C (10-1-20 Edition)
ICES-003 Issue 7 (October 2020)
RSS-Gen Issue 5 (April 2018)

(*) Identification of item tested	AIDOO Z-WAVE PLUS
(*) Trademark	AIRZONE
(*) Model and /or type reference	AZAI6ZWUxxx (USA/Canada)
(*) Derived model not tested	AZAI6ZWExxx (Europe) AZAI6ZWHxxx (Australia/NZ)
Other identification of the product	FCC ID: SVS-ZWU IC: 24685-ZWU HW version: V1.0 SW version: Not provided data
(*) Features	See data sheet
Manufacturer	CORPORACIÓN EMPRESARIAL ALTRA S.L. C/ MARIE CURIE 21, MÁLAGA (29590), SPAIN
Test method requested, standard	FCC Rules and Regulations CFR 47, Part 15, Subpart B & Subpart C (10-1-20 Edition) ICES-003 Issue 7 (October 2020) & RSS-Gen Issue 5 (April 2018)
Summary	IN COMPLIANCE
Approved by (name / position & signature)	José Manuel Gómez Industrial & Automotive EMC Lab. Manager Firmado digitalmente por 53680346W JOSE MANUEL GOMEZ (C:A29507456) Fecha: 2022.12.22 14:40:07 +01'00'
Date of issue	2022-12-12
Report template No	FDT08_24 (*) “Data provided by the client”

Index

Acronyms

Acronym ID	Acronym Description
Code	EMC Test Code
Freq Rng	Frequency Range
MP	Measurement Point
OM	Operation Mode
S/	Sample
V	Verdict

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 tests in this report, FCC designation number ES0004.

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.

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.

The total uncertainty of the measurement system for the measured conducted disturbance characteristics of EUT from 150 kHz to 30 MHz is I = ± 3,9 dB for quasi-peak measurements, I = ± 3,2 dB for peak measurements (k = 2).

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 30 MHz to 1000 MHz is I = ± 4,9 dB for quasi-peak measurements, I = ± 4,6 dB for peak measurements (k= 2).

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 1000 MHz to 12.75 GHz is I = ± 2,6 dB for peaks and average measurements (k = 2).

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 AIDOO Z-WAVE PLUS, model AZAI6ZWUxxx (USA/Canada)

Derived model not tested AZAI6ZWExxx for Europe, AZAI6ZWHxxx (Australia/NZ)

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.

Id	Control Number	Description	Model	Serial Nº	Date of Reception	Application
S/01	68962C_5.1	AIDOO box	AZAI6ZWUFUJ	0A6WFV	2022-04-18	Element Under Test
S/01	68962C_6.1	Power supply	APV-12-12	--	2022-04-18	Auxiliary Element
S/01	69449_12.1	Display	--	--	2022-04-18	Auxiliary Element
S/01	69449_7.1	TTL cable	--	--	2022-04-18	Auxiliary Element
S/02	68962C_5.1	AIDOO box	AZAI6ZWUFUJ	0A6WFV	2022-04-18	Element Under Test
S/02	68962C_6.1	Power supply	APV-12-12	--	2022-04-18	Auxiliary Element
S/02	69449_12.1	Display	--	--	2022-04-18	Auxiliary Element
S/02	69449_7.1	TTL cable	--	--	2022-04-18	Auxiliary Element

Notes referenced to samples during the project.

Id	Description
S/01	Original Sample
S/02	Sample S/02 is Sample S/01 adding in PCB 10 uF capacitor, 10 mH coil, and the voltage regulator inputs of the second operational amplifier are set to 12 V and 0 V.

Test sample description

Test Sample description (compulsory information for EMC and RF testing services

<table>
<tr><td rowspan="7">Ports…… :</td><td rowspan="2">Port name and description</td><td colspan="4">Cable</td></tr>
<tr><td>Specified max length [m]</td><td>Attached during test</td><td>Shielded</td><td>Coupled to patient(3)</td></tr>
<tr><td>Modbus port</td><td>100</td><td>[X]</td><td>[X]</td><td>[ ]</td></tr>
<tr><td>Indoor unit port</td><td>3 m</td><td>[X]</td><td>[ ]</td><td>[ ]</td></tr>
<tr><td>.....</td><td>.....</td><td>[ ]</td><td>[ ]</td><td>[ ]</td></tr>
<tr><td>.....</td><td>.....</td><td>[ ]</td><td>[ ]</td><td>[ ]</td></tr>
<tr><td>.....</td><td>.....</td><td>[ ]</td><td>[ ]</td><td>[ ]</td></tr>
<tr><td>.....</td><td>.....</td><td>[ ]</td><td>[ ]</td><td>[ ]</td></tr>
<tr><td>Supplementary information to the ports…… :</td><td colspan="5">.....</td></tr>
<tr><td rowspan="5">Rated power supply .....:</td><td colspan="2" rowspan="2">Voltage and Frequency</td><td colspan="5">Reference poles</td></tr>
<tr><td>L1</td><td>L2</td><td>L3</td><td>N</td><td>PE</td></tr>
<tr><td>[ ]</td><td>AC: .....</td><td>[ ]</td><td>[ ]</td><td>[ ]</td><td>[ ]</td><td>[ ]</td></tr>
<tr><td>[ ]</td><td>AC: .....</td><td>[ ]</td><td>[ ]</td><td>[ ]</td><td>[ ]</td><td>[ ]</td></tr>
<tr><td>[X]</td><td colspan="5">DC: 12 Vdc</td></tr>
<tr><td>[ ]</td><td colspan="5">DC: .....</td></tr>
<tr><td>Rated Power .....:</td><td colspan="5">310 mW</td></tr>
<tr><td>Clock frequencies.....:</td><td colspan="5">Not provided data</td></tr>
<tr><td>Other parameters .....:</td><td colspan="5">Not provided data</td></tr>
<tr><td>Software version .....:</td><td colspan="5">Not provided data</td></tr>
<tr><td>Hardware version .....:</td><td colspan="5">V1.0</td></tr>
<tr><td>Dimensions in cm (W x H x D) ....:</td><td colspan="5">92 x 80 x 29 mm</td></tr>
</table>

Mounting position .....:	[ ]	Table top equipment		
	[X]	Wall/Ceiling mounted equipment		
	[ ]	Floor standing equipment		
	[ ]	Hand-held equipment		
	[ ]	Other:		
Modules/parts.....:	Module/parts of test item		Type	Manufacturer
	Aidoo Z-WAVE PLUS		AZAI6ZWxFUJ	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_AZAI6ZWxF	.....
	.....		.....	.....
	.....		.....	.....
	.....		.....	.....

(3) Only for Medical Equipment

Identification of the client

CORPORACIÓN EMPRESARIAL ALTRA S.L.
C/ MARIE CURIE 21, MÁLAGA (29590), SPAIN

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2022-04-27
Date (finish)	2022-06-17

Document history

Report number	Date	Description
68962REM.002	2022-06-17	First release
68962REM.002A1	2022-11-10	Second release: It was corrected minor typos This test report cancels and replaces the report: 68962REM.002
68962REM.002A2	2022-12-12	Third release: A typo was corrected in the operation mode description This test report cancels and replaces the report: 68962REM.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. = 60 %
Air pressure	Min. = 860mbar Max. = 1060mbar

Remarks and comments

The tests have been performed by the technical personnel: Julio Bautista Martin and Raul Alfaya Ruiz.

Testing verdicts

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

List of equipment used during the test

Control No.	Equipment	Model	Manufacturer	Next Calibration
7553	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2023-04-19
7816	EMI TEST RECEIVER 1Hz-26.5GHz	ESW26	ROHDE AND SCHWARZ	2023-11-04
7614	SEMIANECHOIC ABSORBER LINED CHAMBER V	FACT 3 200 STP	ETS LINDGREN	--
6815	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2025-03-04
7743	HORN ANTENNA 0,75-18GHz	3115	ETS LINDGREN	2023-08-24
0246	HORN ANTENNA 1-18GHz	11966E	HEWLETT PACKARD	2024-11-12
6227	POWER AMPLIFIER 125W 9KHz-250MHz	BBA150	ROHDE AND SCHWARZ	--
8052	POWER AMPLIFIER 250W/110W/100W 80MHz-1GHz/0,69GHz-3,2GHz/2,5GHz-6GHz	BBA150	ROHDE AND SCHWARZ	--
4848	SOFTWARE DE MEDIDA EMC/RF	EMC32	ROHDE AND SCHWARZ	--
4729	PRE-AMPLIFIER G>30dB 18-40GHz	BLMA 1840-1M	BONN ELEKTRONIK	2023-02-16
6204	THREE-PHASE ARTIFICIAL NETWORK 32A	PMM L3-32	NARDA	2022-09-27

Summary

Test Specification.	Requirement – Test case	Verdict	Remark
FCC 47 CFR Part 15B	RE Radiated emission. Electromagnetic field measure	Pass	--
FCC 47 CFR Part 15B FCC 47 CFR Part 15C ICES-003 RSS-Gen	CE Continuous conducted emission	Pass	--

Supplementary information and remarks:
None

Appendix A: Test results

Appendix A content

Description of the operation modes

The operation modes described in this paragraph constitute a functionality of the sample under test for itself. Every operation mode takes a failure criteria for the immunity test that they were applying to it and a monitoring to guarantee performance of the same ones.

The operation modes used by the samples to which the present report refers, are shown in the following table:

Id	Description
OM/01	EUT ON. RX mode (SRD 915 MHz). Modbus port and Indoor Unit port working and transmitting data with auxiliary equipment. Power supply: 12 Vdc through a power supply device 115Vac input.
OM/02	EUT ON. TX mode (SRD 915 MHz). Modbus port and Indoor Unit port working and transmitting data with auxiliary equipment. Power supply: 12 Vdc through a power supply device 115Vac input.

Test standards version applied

The product standards and test standards applied for each test cases are shown in the following table:

Product Test Standard	Test standard	Requirement – Test case
FCC CFR 47, Part 15, Subpart B (10-1-20 Edition) & ICES-003 Issue 7 (October 2020)	ANSI C63.4 (2014)	RE Radiated emission.
FCC CFR 47, Part 15, Subpart B and Subpart C (10-1-20 Edition) & ICES-003 Issue 7 (October 2020) RSS-Gen Issue 5 (April 2018)	ANSI C63.4 (2014)	CE Continuous conducted emission

Test Cases Details

FCC 47 CFR Part 15B

RE Radiated emission. Electromagnetic field measure

Limits

Limits of interference Class B

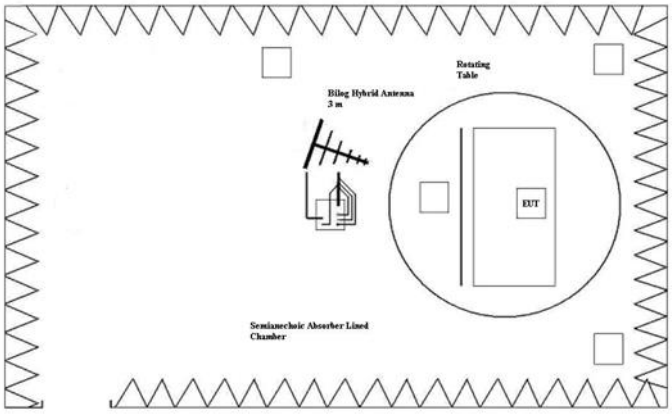
The applied limit for radiated emissions, 3 m distance, according to the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-1-20 Edition), Secs. 15.109 & ICES-003 Issue 7 (October 2020)

Frequency range (MHz)	FCC Part 15B		ICES-003 Issue 7		FCC Part 15B & ICES-003 Issue 7	
	QP Limit for 3 m		QP Limit for 3 m		PK Limit for 3 m	AVG Limit for 3 m
	(μV/m)	(dBμV/m)	(μV/m)	(dBμV/m)	(dBμV/m)	(dBμV/m)
30 to 88	100	40	100	40	---	---
88 to 216	150	43.5	150	43.5	---	---
216 to 230	200	46	200	46	---	---
230 to 960	200	46	224	47		
960 to 1000	500	54	500	54	---	---
Above 1000	---	---	---	---	74	54

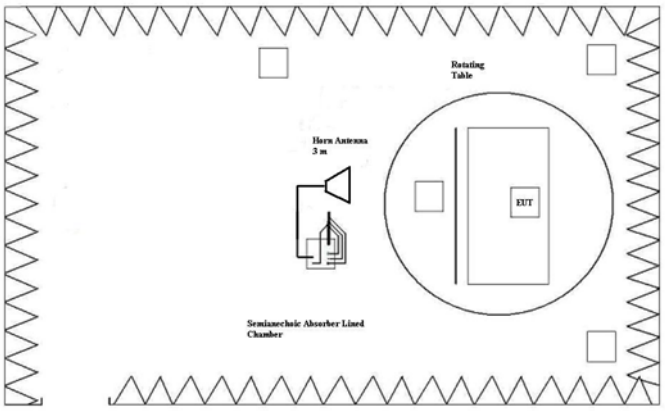
NOTE: FCC QP and AVG limits are in concordance with RSS-Gen Issue 5 (March 2019), Secs. 7.1 and 7.3.

Limits according to FCC Part 15B, equal to o more stringent than those of ICES-003 Issue 7.

Setup for measurements



Setup for measurements < 1GHz.



Setup for measurements > 1GHz.

Results

S/	OM	Code	Freq Rng (MHz)	Comments	V
01	OM/01	RE0101LR	[30, 1000]		P
01	OM/01	RE0101HR	[1000, 12750]		P

Verdict

Pass

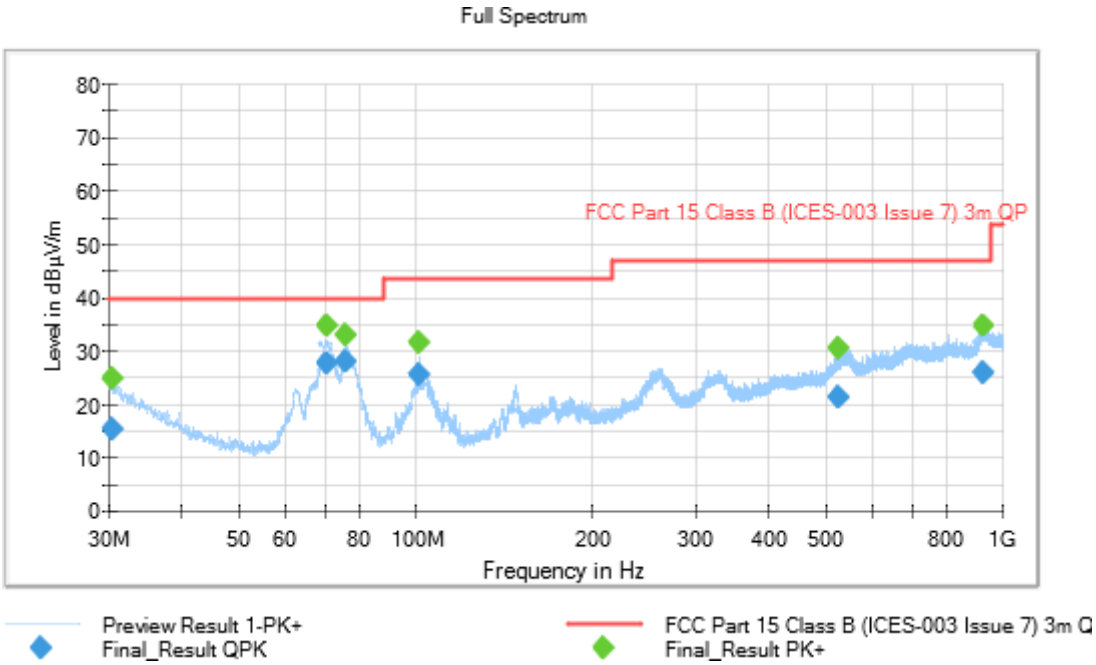
Attachments

EMC Test Code = RE0201LR, Frequency Range MHz = [30, 1000]

Sample ID: S/02

Operation Mode: OM/01. EUT ON. RX mode (SRD 915 MHz). Modbus port and Indoor Unit port working and transmitting data with auxiliary equipment. Power supply: 12 Vdc through a power supply device 115Vac input.

Images:



Tables:

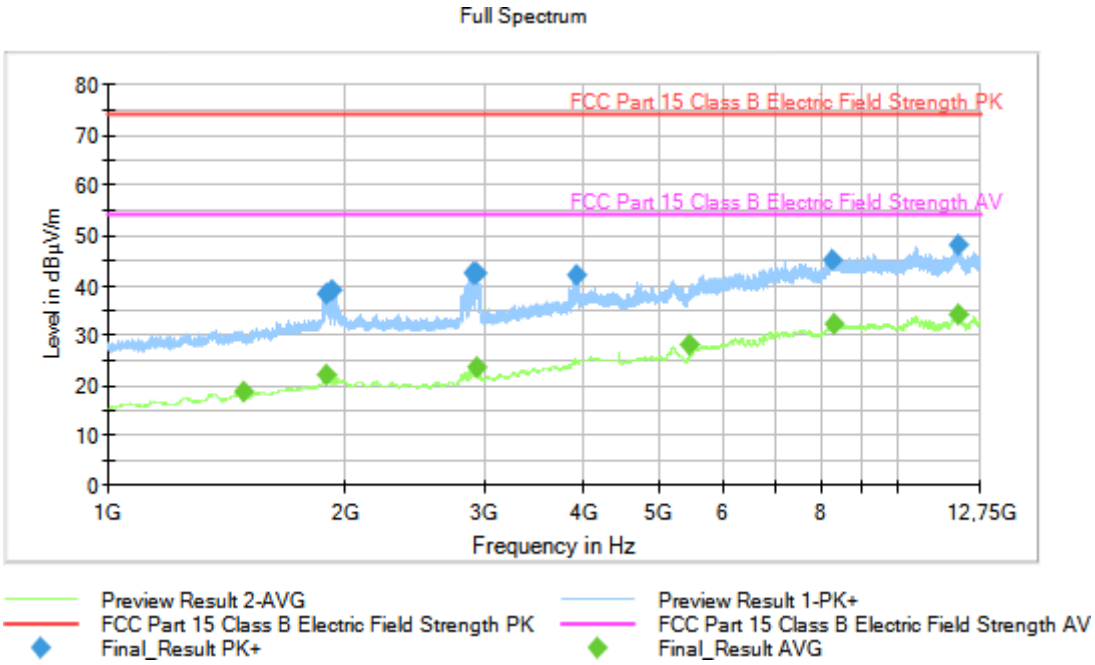
Frequency(MHz)	QuasiPeak(dBµV/m)	MaxPeak(dBµV/m)	Limit(dBµV/m)	Margin(dB)	Height(cm)	Pol	Azimuth(deg)
30.545220	15.12	---	40.00	24.88	121.0	V	129.0
30.545220	---	24.71	---	---	121.0	V	129.0
70.591000	27.47	---	40.00	12.53	106.0	V	329.0
70.591000	---	34.86	---	---	106.0	V	329.0
76.232000	27.94	---	40.00	12.06	121.0	V	305.0
76.232000	---	32.82	---	---	121.0	V	305.0
101.583000	25.49	---	43.52	18.03	104.0	V	4.0
101.583000	---	31.53	---	---	104.0	V	4.0
527.785000	21.15	---	47.00	25.85	138.0	V	261.0
527.785000	---	30.60	---	---	138.0	V	261.0
929.386000	25.74	---	47.00	21.26	181.0	V	52.0
929.386000	---	34.83	---	---	181.0	V	52.0

EMC Test Code = RE0201HR, Frequency Range MHz = [1000, 12750]

Sample ID: S/02

Operation Mode: OM/01. EUT ON. RX mode (SRD 915 MHz). Modbus port and Indoor Unit port working and transmitting data with auxiliary equipment. Power supply: 12 Vdc through a power supply device 115Vac input.

Images:



Tables:

Frequency(MHz)	MaxPeak(dBµV/m)	Average(dBµV/m)	Limit(dBµV/m)	Margin(dB)
1484.800000	---	18.72	53.97	35.25
1892.400000	38.41	---	73.97	35.56
1892.800000	---	22.30	53.97	31.67
1921.600000	38.96	---	73.97	35.01
2902.000000	42.57	---	73.97	31.40
2913.200000	42.27	---	73.97	31.70
2926.400000	42.32	---	73.97	31.65
2926.800000	---	23.72	53.97	30.25
3930.000000	41.94	---	73.97	32.03
5452.800000	---	28.13	53.97	25.84
8282.800000	45.21	---	73.97	28.76
8333.600000	---	32.43	53.97	21.54
11943.200000	48.15	---	73.97	25.82
11944.400000	---	34.18	53.97	19.79

CE Continuous conducted emission

Limits

Limits of interference Class B

The applied limit for continuous conducted emissions in power leads, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-1-20 Edition) Secs. 15.107 and Subpart C (10-1-20 Edition) Secs. 15.207 & ICES-003 Issue 7 (April 2020) & RSS-Gen Issue 5 (April 2018) in the frequency range 0,15 to 30 MHz, for Class B equipment was:

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

Results

S/	OM	Code	Freq Rng (MHz)	Line	V
02	OM/01	CE0101L1	[0.15, 30]	L1	P
02	OM/01	CE01010N	[0.15, 30]	N	P
02	OM/02	CE0102L1	[0.15, 30]	L1	P
02	OM/02	CE01020N	[0.15, 30]	N	P

Verdict

Pass

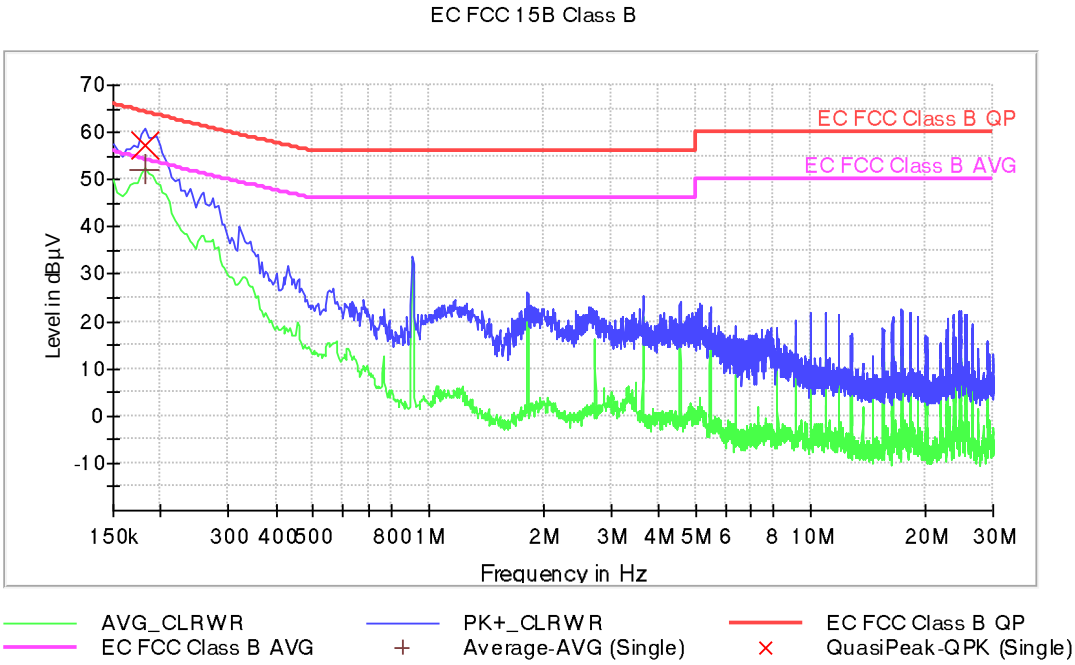
Attachments

EMC Test Code = CE0201L1, Frequency Range MHz = [0.15, 30], Conducted Emissions - Tested Line = L1

Sample ID: S/02

Operation Mode: OM/01. EUT ON. RX mode (SRD 915 MHz). Modbus port and Indoor Unit port working and transmitting data with auxiliary equipment. Power supply: 12 Vdc through a power supply device 115Vac input.

Images:



Documents:

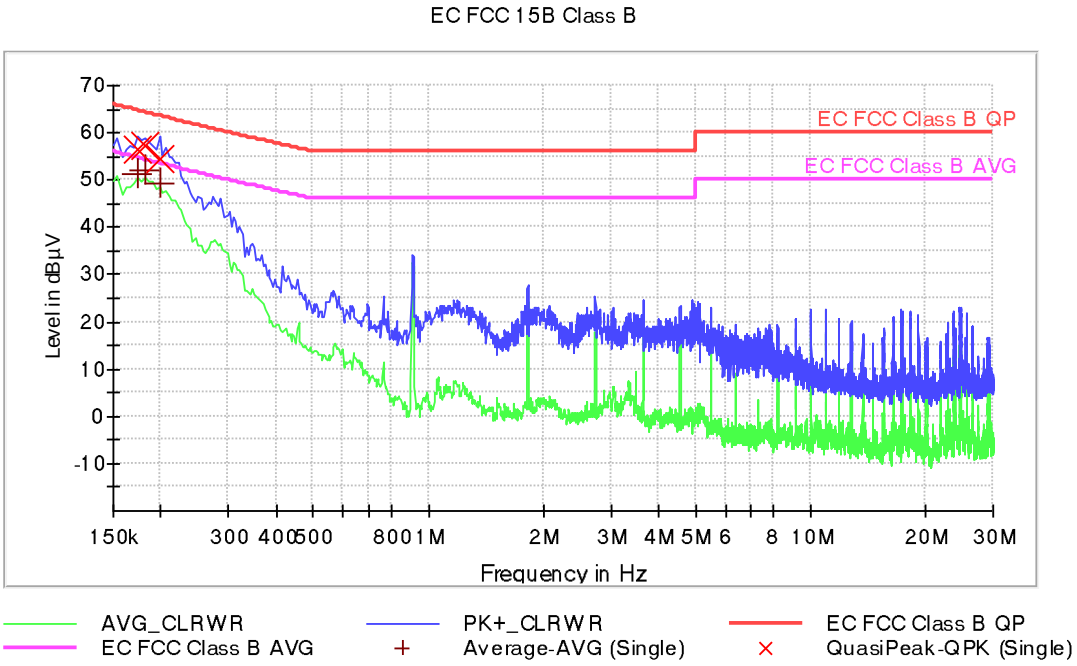
Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Line
0.182000	57.1	51.9	DC+

EMC Test Code = CE02010N, Frequency Range MHz = [0.15, 30], Conducted Emissions - Tested Line = N

Sample ID: S/02

Operation Mode: OM/01. EUT ON. RX mode (SRD 915 MHz). Modbus port and Indoor Unit port working and transmitting data with auxiliary equipment. Power supply: 12 Vdc through a power supply device 115Vac input.

Images:



Documents:

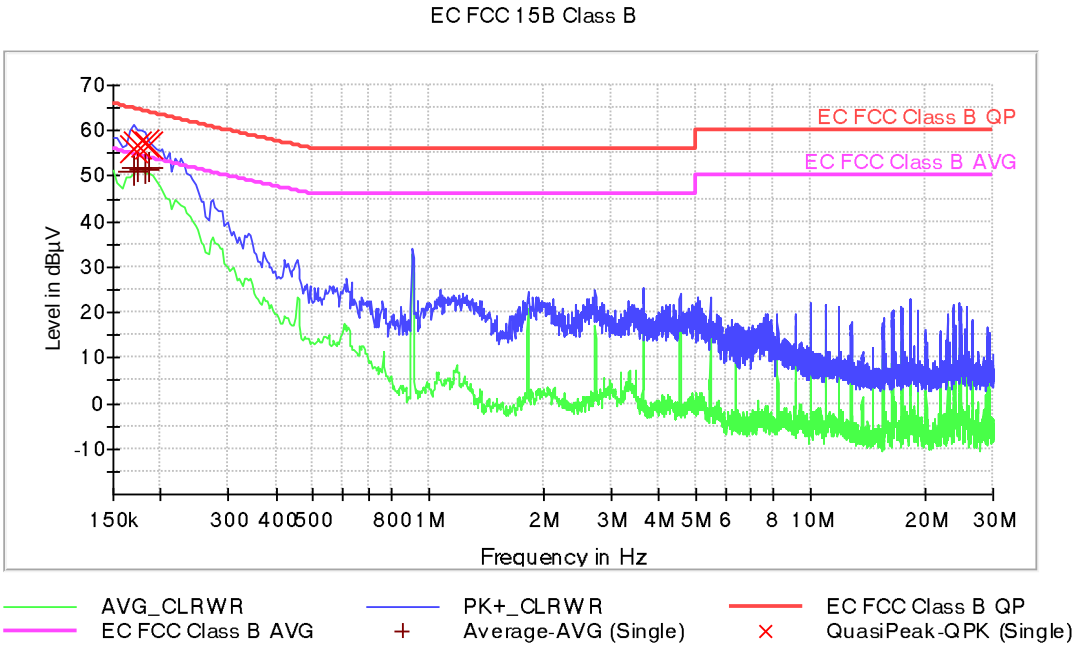
Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Line
0.174000	56.4	51.2	DC-
0.182000	57.1	52.0	DC-
0.198000	54.3	49.5	DC-

EMC Test Code = CE0202L1, Frequency Range MHz = [0.15, 30], Conducted Emissions - Tested Line = L1

Sample ID: S/02

Operation Mode: OM/02. EUT ON. TX mode (SRD 915 MHz). Modbus port and Indoor Unit port working and transmitting data with auxiliary equipment. Power supply: 12 Vdc through a power supply device 115Vac input.

Images:



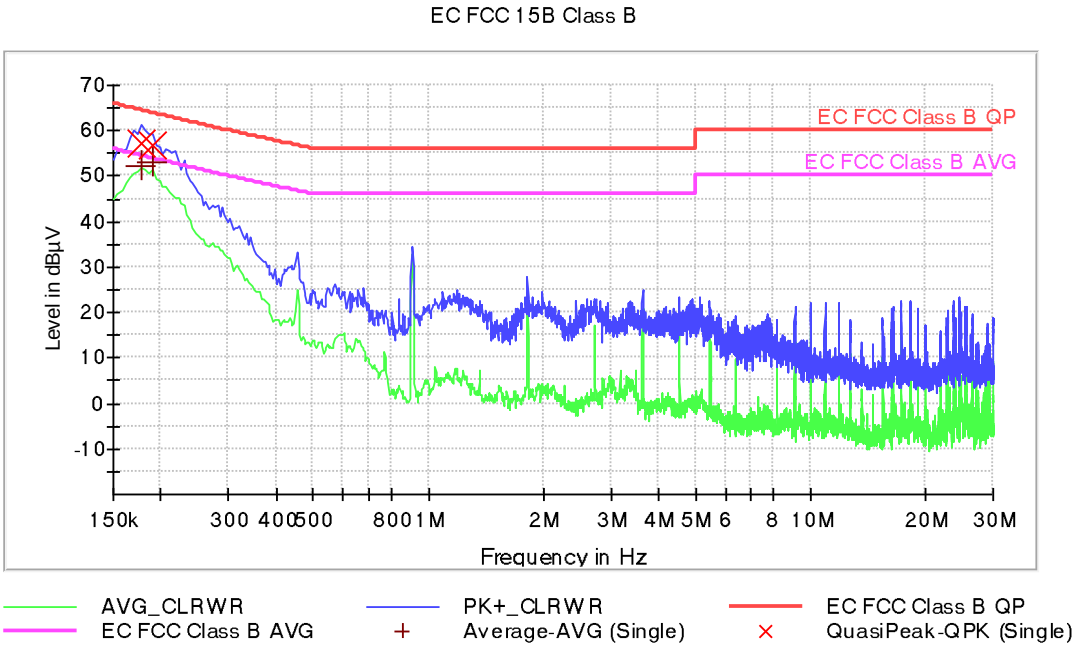
Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Line
0.170000	56.1	51.0	DC+
0.174000	56.7	51.7	DC+
0.182000	57.3	51.6	DC+
0.186000	56.9	51.7	DC+

EMC Test Code = CE02020N, Frequency Range MHz = [0.15, 30], Conducted Emissions - Tested Line = N

Sample ID: S/02

Operation Mode: OM/02. EUT ON. TX mode (SRD 915 MHz). Modbus port and Indoor Unit port working and transmitting data with auxiliary equipment. Power supply: 12 Vdc through a power supply device 115Vac input**.**

Images:



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Line
0.178000	57.2	52.2	DC-
0.190000	56.9	53.1	DC-