

Test report No:
NIE: 67760REM.001A1

Test report

FCC Rules and Regulations CFR 47, Part 15, Subpart B
(10-1-19 Edition) & ICES-003 Issue 7 (October 2020)

(*) Identification of item tested	POWER 365
(*) Trademark	Fonroche POWER 365
(*) Model and /or type reference	POWER 365 V4
Other identification of the product	HW version: V4 SW version: 6.1.11 FCC ID: 2AZ65FLV4 Contains FCC ID: Q9B409810 (Integrated LoRa module) IC: N/A
(*) Features	LoRa WAN
Manufacturer	FONROCHE LIGHTING ZAC des champs de Lescaze CS 90021 47310, Roquefort, FRANCE
Test method requested, standard	FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-19 Edition) & ICES-003 Issue 7 (October 2020)
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Rafael López Martín EMC Consumer & RF Lab. Manager 
Date of issue	2021-07-30 13:05:07 +02'00'
Report template No	FDT08_23 (*) "Data provided by the client"

Index

ACRONYMS3

COMPETENCES AND GUARANTEES3

GENERAL CONDITIONS4

UNCERTAINTY4

DATA PROVIDED BY THE CLIENT4

USAGE OF SAMPLES5

TEST SAMPLE DESCRIPTION6

IDENTIFICATION OF THE CLIENT7

TESTING PERIOD AND PLACE7

DOCUMENT HISTORY7

ENVIRONMENTAL CONDITIONS8

REMARKS AND COMMENTS9

TESTING VERDICTS9

LIST OF EQUIPMENT USED DURING THE TEST9

SUMMARY.....10

APPENDIX A: TEST RESULTS11

Acronyms

Acronym ID	Acronym Description
Code	EMC Test Code
Freq Rng	Frequency Range
OM	Operation Mode
S/	Sample
V	Verdict
RE	Radiated Emission
LR	Low Range
HR	High Range

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.

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.

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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.
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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 radio disturbance characteristics of EUT from 30 MHz to 1000 MHz is $I = \pm 4,9$ dB for quasi-peak measurements, $I = \pm 4,6$ 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 $I = \pm 2,6$ 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 POWER 365. It is the power supply for a lighting system that is independent from the grid. The purpose is to integrate the already certified LoRa module in our end product POWER 365.

The battery is charged by solar panels and it has a BMS that regulates the battery charge/discharge, the battery has a feature for LoRa communication to monitor the state of the battery from a distance.

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 N°	Date of Reception	Application
S/01	67760_1.1	LED Light	--	--	2021-04-12	Element Under Test
S/01	67760_2.1	Red power supply cable	--	--	2021-04-12	Element Under Test
S/01	67760_3.1	Black power supply cable	--	--	2021-04-12	Element Under Test
S/01	67760_4.1	Support	--	--	2021-04-12	Element Under Test
S/01	67760_5.1	Power 365	POWER 365 V4	--	2021-04-12	Element Under Test
S/01	67760_6.1	Light support	--	--	2021-04-12	Element Under Test
S/01	67760_7.1	Light base	--	--	2021-04-12	Element Under Test
S/01	67760_8.1	Light pipe	--	--	2021-04-12	Element Under Test
S/01	67760_9.1	Accessory box	--	--	2021-04-12	Element Under Test

Notes referenced to samples during the project:

None.

Test sample description

Ports..... :	Port name and description	Cable				
		Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾	
	Solar panel	1m	[X]	[]	[]	
	Lantern	4.65m	[X]	[]	[]	
	--	--	[]	[]	[]	
Supplementary information to the ports..... :	N/A					
Rated power supply	Voltage and Frequency		Reference poles			
			L1	L2	L3	N
	[X]	DC: 28V				
	[X]	DC: 20V/48V				
Rated Power	310 W					
Clock frequencies	N/A					
Other parameters.....	11 A					
Software version	6.1.11					
Hardware version.....	V4					
Dimensions in cm (W x H x D).....	489x406x100					
Mounting position.....	[]	Table top equipment				
	[]	Wall/Ceiling mounted equipment				
	[X]	Floor standing equipment				
	[]	Hand-held equipment				
	[]	Other:				
Modules/parts	Module/parts of test item		Type		Manufacturer	
	POWER 365				Fonroche lighting	
						
Accessories (not part of the test item)	Description		Type		Manufacturer	
	Cross				Fonroche lighting	
	Pole				Fonroche lighting	
	Battery support				Fonroche lighting	
	Lantern				Fonroche lighting	
						
Documents as provided by the applicant.....	Description		File name		Issue date	
						

⁽³⁾ Only for Medical Equipment

Identification of the client

FONROCHE LIGHTING
ZAC des champs de Lescaze CS 90021
47310, Roquefort, FRANCE

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2021-04-13
Date (finish)	2021-04-13

Document history

Report number	Date	Description
67760REM.001	2021-07-30	First release
67760REM.001A1	2021-07-30	Second release. It is modified FCC ID and IC, and it is changed the operation mode due to typo.

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. = 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 °C Max. = 35 °C
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 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 60 %
Air pressure	Min. = 860mbar Max. = 1060mbar

Remarks and comments

The tests have been performed by the technical personnel: Rosa Maria Gallardo and Antonio 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 Number	Description	Model	Manufacturer	Next Calibration
2942	EMI TEST RECEIVER 20Hz-40GHz	ESU40	ROHDE AND SCHWARZ	2021-09-17
4523	EMI TEST RECEIVER 20Hz-26.5GHz	ESU26	ROHDE AND SCHWARZ	2023-03-15
4612	HORN ANTENNA 1-18GHz	BBHA 9120 D	SCHWARZBECK MESS-ELEKTRONIK	2021-06-14
5641	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2021-07-31
6064	SEMIANECHOIC ABSORBER LINED CHAMBER III	SAC-3	Frankonia	---
6126	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2022-04-05
6132	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2022-04-05
6195	PRE-AMPLIFIER G>55dB 1-18GHz	AMF-7D-01001800-22-10P	NARDA	2021-05-19
6329	SHIELDED ROOM	---	FRANKONIA	---

Summary

Test Specification	Requirement – Test case	Verdict	Remark
FCC CFR 47, Part 15, Subpart B (10-1-19 Edition) & ICES-003 Issue 7 (October 2020)	RE Radiated emission. Electromagnetic field measure	Pass	---
	CE Conducted emission.	N/A	(1)
<u>Supplementary information and remarks:</u> 1. This test is not applicable, not required by the standard. EUT is powered in DC			

Appendix A: Test results

Appendix A content

DESCRIPTION OF THE OPERATION MODES13

TEST STANDARDS VERSION APPLIED14

TEST CASES DETAILS15

RE Radiated emission. Electromagnetic field measure15

Description of the operation modes

The operation modes described in this paragraph constitute a functionality of the sample under test for itself.

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. Night mode. Light ON. LoRa OFF. Power supply: 28Vdc (Internal batteries)
OM/02	EUT ON. Day mode. Light OFF. LoRa reception mode. Power supply: 30Vdc (simulated by photovoltaic panel)

Note: When EUT is configured in “Night mode”, LoRa communication is not available.

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 (10-1-19 Edition) & ICES-003 Issue 7 (October 2020)	ANSI C63.4 (2014)	RE Radiated emission. Electromagnetic field measure

Test Cases Details

RE Radiated emission. Electromagnetic field measure

Limits of interference Class B

The applied limit for radiated emissions, 3 m distance, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-1-19 Edition), Secs. 15.109 & ICES-003 Issue 7 (October 2020):

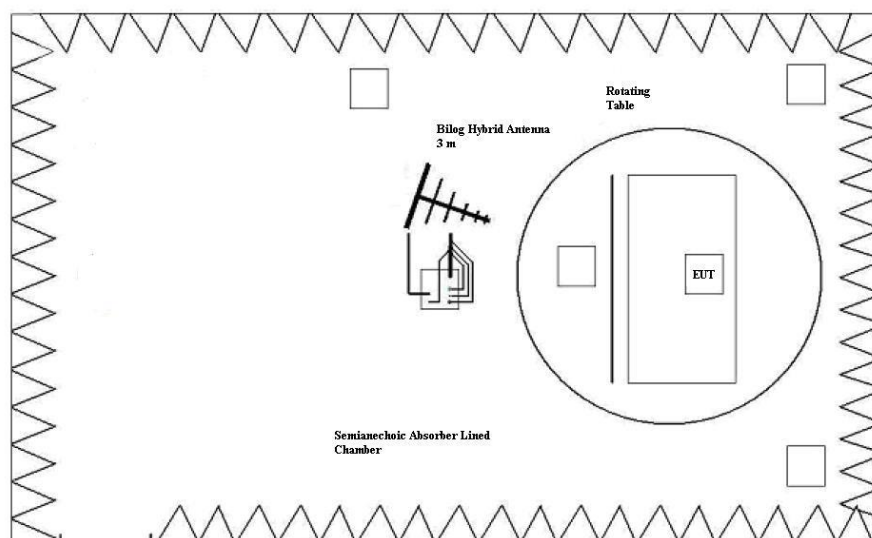
Table 2: Radiated emission limits

Frequency range (MHz)	FCC Part 15B Class B (3 m) Quasi-Peak (dBµV/m)	ICES-003 Issue 7 Limit for 3 m Quasi-Peak (dBµV/m)	FCC Part 15B & ICES-003 Issue 7	
			PK Limit for 3m (dBµV/m)	AVG Limit for 3m (dBµV/m)
30-88	40.0	40.0	---	---
88-216	43.5	43.5	---	---
216-230	46.0	46.0	---	---
230-960	46.0	47.0	---	---
960-1000	54.0	54.0	---	---
1 GHz – F _M	---	---	74	54

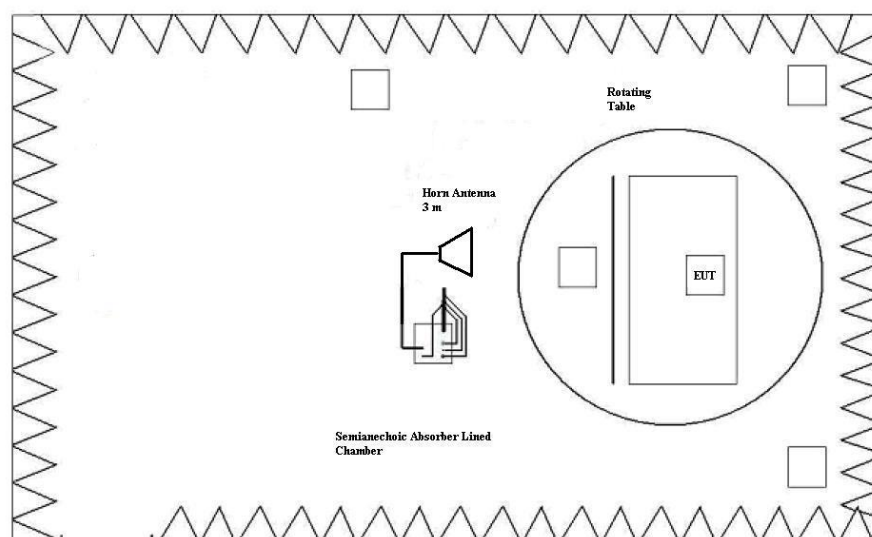
Above 1 GHz, except for outdoor units of home satellite receiving systems, the ITE or digital apparatus shall comply with the limits specified in table 2 up to the frequency F_M, which shall be determined as per table 3.

Table 3: Required highest measurement frequency for radiated emission

Highest internal Frequency (F _x)	Highest measurement Frequency (F _M)
F _x ≤ 108 MHz	1 GHz
108 MHz < F _x ≤ 500 MHz	2 GHz
500 MHz < F _x ≤ 1 GHz	5 GHz
F _x > 1 GHz	5 x F _x up to a maximum of 40 GHz
*F _x is the highest fundamental frequency generated and/or used in the ITE or digital apparatus under test.	



Setup for measurements < 1GHz.



Setup for measurements > 1GHz.

Results

SI	OM	Code	Freq Rng (MHz)	V
01	OM/01	RE0101LR	[30, 1000]	P
01	OM/01	RE0101HR	[1000, 12750]	P
01	OM/02	RE0102LR	[30, 1000]	P
01	OM/02	RE0102HR	[1000, 12750]	P

Note: Range: $f > 12.75$ GHz. Test required only if the 5th harmonics of the maximum internal work frequency EUT is higher than 12.75GHz

Verdict

Pass

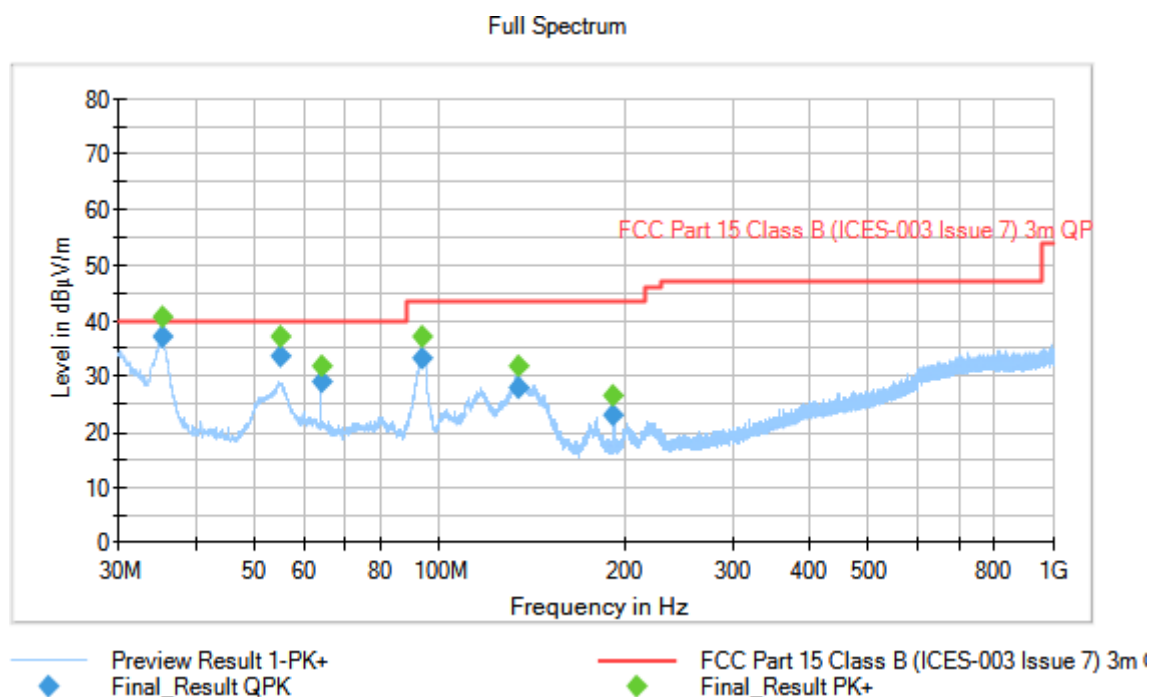
Attachments

EMC Test Code = RE0101LR, Frequency Range MHz = [30, 1000]

Sample ID: S/01

Operation Mode: OM/01. EUT ON. Night mode. Light ON. LoRa OFF. Power supply: 28Vdc (Internal batteries)

Images:



Documents:

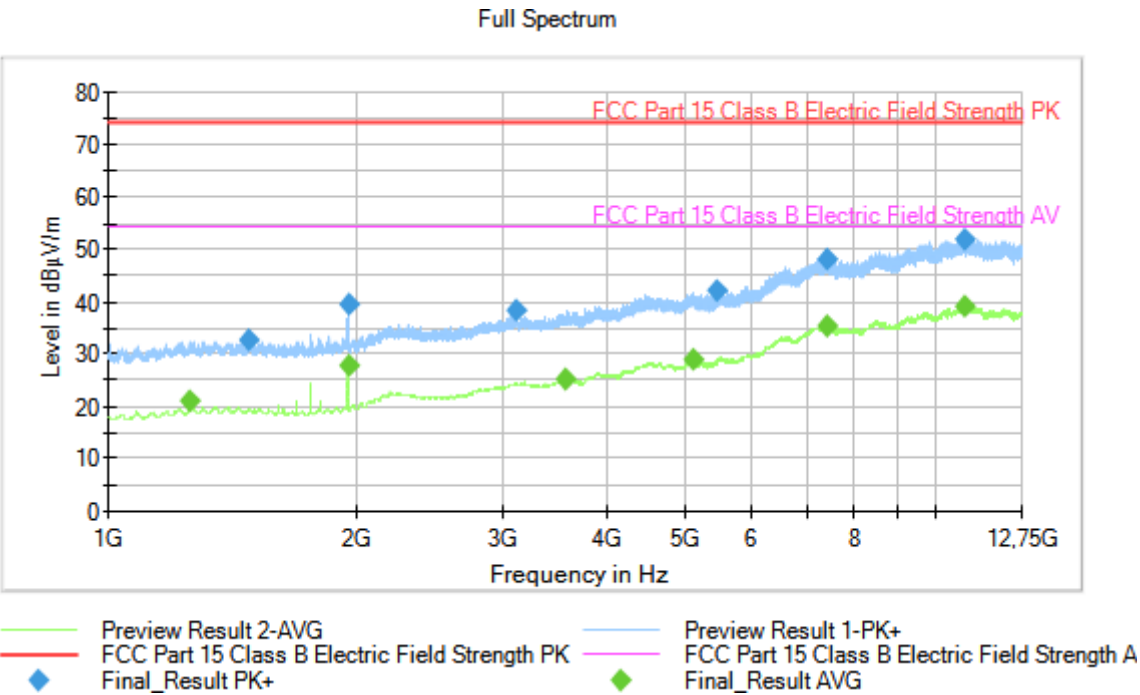
Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
35.272000	---	40.87	---	---	100.0	V	-135.0
35.272000	37.33	---	40.00	2.67	100.0	V	-135.0
55.138000	---	37.06	---	---	395.0	H	-112.0
55.138000	33.48	---	40.00	6.52	395.0	H	-112.0
64.004000	---	31.95	---	---	118.0	V	-16.0
64.004000	29.17	---	40.00	10.83	118.0	V	-16.0
93.490000	---	37.15	---	---	187.0	H	82.0
93.490000	33.13	---	43.52	10.39	187.0	H	82.0
134.092000	---	31.98	---	---	134.0	H	-154.0
134.092000	28.07	---	43.52	15.45	134.0	H	-154.0
192.003000	---	26.68	---	---	165.0	H	-62.0
192.003000	23.02	---	43.52	20.50	165.0	H	-62.0

EMC Test Code = RE0101HR, Frequency Range MHz = [1000, 12750]

Sample ID: S/01

Operation Mode: OM/01. EUT ON. Night mode. Light ON. LoRa OFF. Power supply: 28Vdc (Internal batteries)

Images:



Documents:

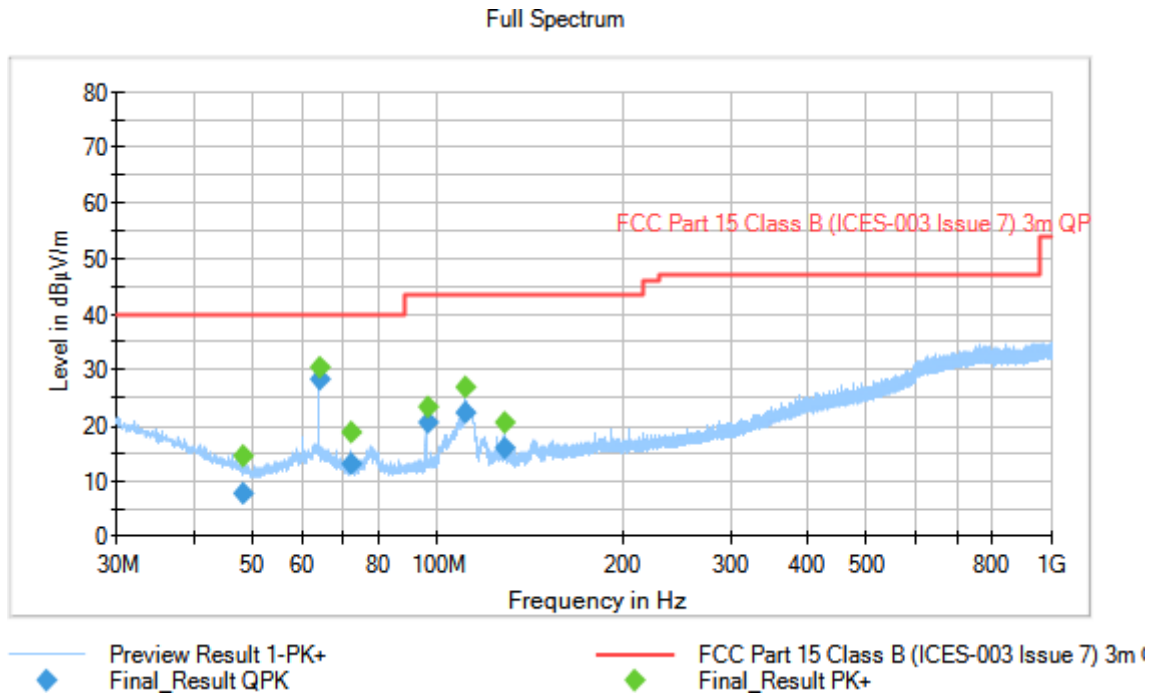
Frequency(MHz)	MaxPeak(dBµV/m)	Average(dBµV/m)	Limit(dBµV/m)	Margin(dB)
1250.000000	---	20.94	53.97	33.03
1480.000000	32.66	---	73.97	41.31
1949.600000	---	27.70	53.97	26.27
1950.400000	39.30	---	73.97	34.67
3104.800000	38.27	---	73.97	35.70
3564.800000	---	25.02	53.97	28.95
5098.400000	---	28.82	53.97	25.15
5449.200000	42.15	---	73.97	31.82
7415.600000	48.26	---	73.97	25.71
7415.600000	---	35.24	53.97	18.73
10850.800000	---	38.99	53.97	14.98
10854.000000	51.79	---	73.97	22.18

EMC Test Code = RE0102LR, Frequency Range MHz = [30, 1000]

Sample ID: S/01

Operation Mode: OM/02. EUT ON. Day mode. Light OFF. LoRa OFF. Power supply: 30Vdc (simulated by photovoltaic panel)

Images:



Documents:

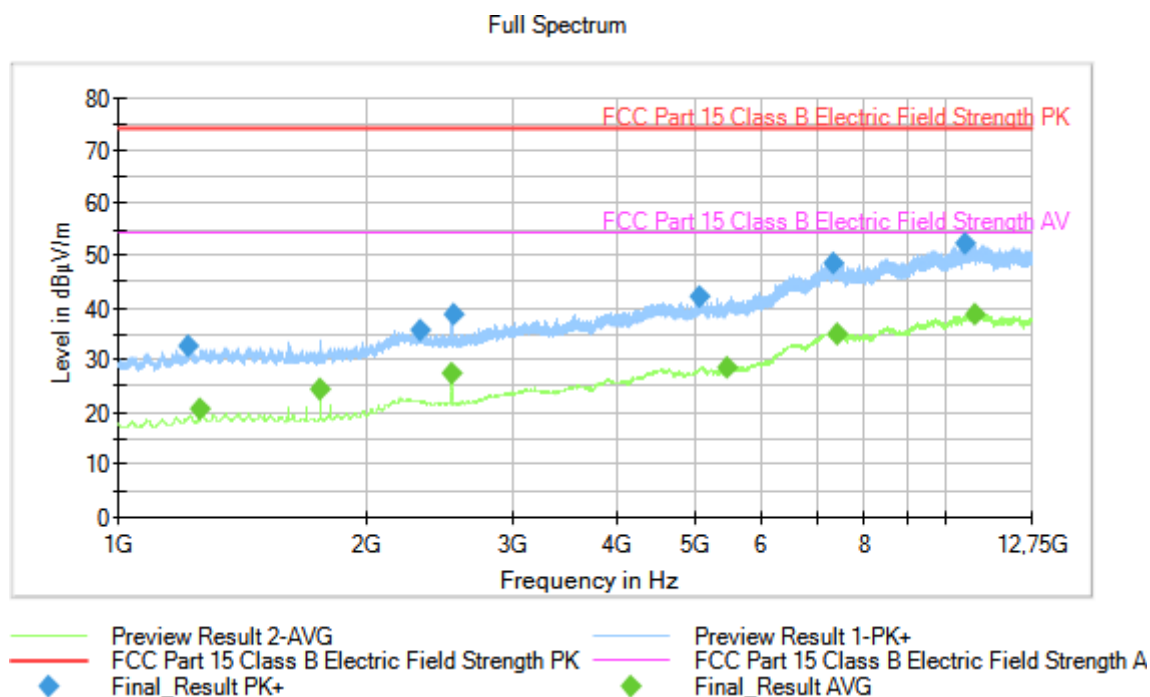
Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
48.086000	7.82	---	40.00	32.18	228.0	V	99.0
48.086000	---	14.35	---	---	228.0	V	99.0
64.025000	---	30.53	---	---	129.0	V	-112.0
64.025000	28.45	---	40.00	11.55	129.0	V	-112.0
72.422000	13.06	---	40.00	26.94	122.0	V	-103.0
72.422000	---	18.65	---	---	122.0	V	-103.0
96.532000	20.55	---	43.52	22.97	118.0	V	46.0
96.532000	---	23.28	---	---	118.0	V	46.0
111.019000	---	26.96	---	---	133.0	V	-4.0
111.019000	22.41	---	43.52	21.11	133.0	V	-4.0
128.036000	16.04	---	43.52	27.48	126.0	V	28.0
128.036000	---	20.55	---	---	126.0	V	28.0

EMC Test Code = RE0102HR, Frequency Range MHz = [1000, 12750]

Sample ID: S/01

Operation Mode: OM/02. EUT ON. Day mode. Light OFF. LoRa OFF. Power supply: 30Vdc (simulated by photovoltaic panel)

Images:



Documents:

Frequency(MHz)	MaxPeak(dBµV/m)	Average(dBµV/m)	Limit(dBµV/m)	Margin(dB)
1214.800000	32.66	---	73.97	41.31
1250.000000	---	20.57	53.97	33.40
1750.000000	---	24.51	53.97	29.46
2315.200000	35.78	---	73.97	38.19
2532.000000	---	27.50	53.97	26.47
2538.800000	38.74	---	73.97	35.23
5031.600000	42.18	---	73.97	31.79
5456.800000	---	28.47	53.97	25.50
7335.600000	48.33	---	73.97	25.64
7419.200000	---	35.11	53.97	18.86
10583.600000	52.03	---	73.97	21.94
10850.800000	---	38.77	53.97	15.20