RRA-EMIESS22N643ALL-02Av0

Certification Radio test report

According to the standard:

CFR 47 FCC PART 15

RSS GEN – Issue 5

Equipment under test:

RS420NFC_SCR READER

FCC ID: *NQY-30022*
IC NUMBER: *4246A-30022*

Company:

ALLFLEX USA, Inc

Distribution: Mr LANGOUET **(Company:** ALLFLEX USA, Inc**)**

Number of pages: 20 with 1 appendix

Ed.	Date	Modified Page(s)	Technical Verification and Quality Approval Name and Function	Visa
0	15-Sep-23	Creation	M. DUMESNIL, Radio Laboratory Manager	

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S51 RTY 000 INT 00018 [01]

DESIGNATION OF PRODUCT:	***RS420NFC_SCR READER***
Serial number (S/N):	*C143 01542*
Reference / model (P/N):	*30022*
Software version:	*2.51.00 – Jun 24 2021*
MANUFACTURER:	*ALLFLEX USA, Inc*

COMPANY SUBMITTING THE PRODUCT:

Company:	ALLFLEX USA, Inc
Address:	2805 East 14th Street P.O Box 612266 75261-2266 Dallas Texas USA
Responsible:	Mr LANGOUET
Person(s) present during the tests:	/
DATES OF TEST:	From 6-Oct-22 to 12-Oct-22
TESTING LOCATION:	EMITECH ANGERS laboratory at JUIGNE SUR LOIRE (49) FRANCE FCC Accredited under US-EU MRA Designation Number: FR0009 Test Firm Registration Number: 873677 ISED Accredited under CANADA-EU MRA Designation Number: FR0001 Industry Canada Registration Number: 4452A
TESTED BY:	B. VOVARD **VISA:** B. Vovard
WRITTEN BY:	B. VOVARD

CONTENTS

REVISIONS HISTORY

Revision	Date	Modified pages	Modifications
0	**17-Oct-22**	/	Creation

1. INTRODUCTION

This report presents the results of radio test carried out on the following radio equipment: ***RS420NFC_SCR READER***, in accordance with normative reference.

The equipment under test integrates:

- Bluetooth radio part module already certified using 2.4 GHz (FCC ID: X3ZBTMOD3 / IC ID: 8828A-MOD3),
- RFID radio part already certified operational at 134.2 kHz,
- NFC radio part already certified operational at 13.56MHz,

This report concerns only the RFID part.

All tests are performed, firstly on battery only then on representative AC/DC Adapter referenced **FJ-SW20181201500**.

2. PRODUCT DESCRIPTION

Category of equipment (ISED):	I
Class:	B
Utilization:	Handheld animal control tag
Antenna type and gain:	Integral antenna (unknown gain)
Operating frequency range:	134.2 kHz
Number of channels:	1
Channel spacing:	Not concerned
Modulation:	ASK
Power source:	7.4Vdc Ni-MH batteries, Rechargeable by AC/DC Adapter 100-240Vac to 12Vdc

The applicant declares that the equipment can emit during the recharge of batteries.

Power level, frequency range and channels characteristics are not user adjustable.
The details pictures of the product and the circuit boards are joined with this file.

3. NORMATIVE REFERENCE

The standards and testing methods related throughout this report are those listed below.
They are applied on the whole test report even though the extensions (version, date and amendment) are not repeated.

CFR 47 FCC Part 15 (2022)	Radio Frequency Devices
ANSI C63.10	2013 Procedures for ComplianceTesting of Unlicensed Wireless Devices.
RSP-100	Issue 12, August 2019 Certification of Radio Apparatus and Broadcasting equipment
RSS-Gen	Issue 5, April 2018 General Requirements for Compliance of Radio Apparatus

4. TEST METHODOLOGY

Radio performance tests procedures given in CFR 47 part 15:

Subpart C – Intentional Radiators

- Paragraph 203: Antenna requirement
- Paragraph 205: Restricted bands of operation
- Paragraph 207: Conducted limits
- Paragraph 209: Radiated emission limits; general requirements

Radio performance tests procedures given in RSS-Gen:

- Paragraph 2 - General
- Paragraph 3 - Normative publications and related documents
- Paragraph 4 - Labelling requirements
- Paragraph 6 - General administrative and technical requirements
- Paragraph 8 - Licence-exempt Radio Apparatus

5. TEST EQUIPMENT CALIBRATION DATES

Emitech Number	Model	Type	Last calibration	Calibration interval (years)	Next calibration due
0	BAT-EMC V3.18.0.26	Software	/	/	/
1406	EMCO 6502	Loop antenna	08/04/2022	1	08/04/2023
7566	Testo 608-H1	Meteo station	22/11/2020	2	22/11/2022
8508	California instruments 1251RP	Power source	(1)	(1)	(1)
8590	RG214 N-5m	Cable	23/02/2022	2	23/02/2024
8720	R&S ESH3-Z5	LISN	02/02/2021	2	02/02/2023
8732	Emitech	OATS	28/03/2022	3	27/03/2025
8855	EMITECH	Turntable and mat controller	/	/	/
8896	ACQUISYS GPS8	Satellite synchronized frequency standard	/	/	/
10523	EMITECH	Absorber sheath current	24/02/2022	2	24/02/2024
10788	Emitech	Outside room Hors cage	/	/	/
11535	R&S EZ-25	High pass filter	28/05/2022	3	27/05/2025
14903	Fluke 177	Multimeter	01/02/2022	2	01/02/2024
18335	R&S ESW44	Test receiver	15/12/2021	1	15/12/2022
18412	MecHANC - N - 5m	Cable	15/02/2022	2	15/02/2024
-	RS Commander V1.6.4	Software	/	/	/

(1) The equipment is not verified; instead, the output voltage is checked before each measurement with the calibrated multimeter.

6. TESTS RESULTS SUMMARY

6.1 CFR 47 part 15 requirements (subpart C)

Test procedure	Description of test	Criteria respected?				Comment
		Yes	No	NAp	NAs	
FCC Part 15.203	ANTENNA REQUIREMENT	X				Note 1
FCC Part 15.205	RESTRICTED BANDS OF OPERATION	X				
FCC Part 15.207	CONDUCTED LIMITS	X				
FCC Part 15.209	RADIATED EMISSION LIMITS; GENERAL REQUIREMENTS	X				

NAp: Not Applicable NAs: Not Asked

Note 1: Integral antenna without standard connector.

6.2 RSS-Gen requirements

Test procedure	Description of test	Criteria respected ?				Comment
		Yes	No	NAp	NAs	
Paragraph 2	General	X				
Paragraph 3	Normative publications and related documents	X				
Paragraph 4	Labelling requirements	X				
Paragraph 6	General administrative and technical requirements	X				
§ 6.7	Occupied bandwidth (or 99% emission bandwidth) and x dB bandwidth	X				
Paragraph 8	Licence-exempt radio apparatus					
§ 8.1	Measurement Bandwidths and Detector Functions	X				
§ 8.2	Pulsed operation	X				
§ 8.3	Prohibition of amplifiers	X				
§ 8.4	User manual notice	X				see certification documents
§ 8.5	Measurement of licence-exempt devices on-site (in-situ)			X		
§ 8.6	Operating frequency range of devices in master/slave networks			X		
§ 8.7	Radio frequency identification (RFID) devices	X				
§ 8.8	AC power line conducted emissions limits	X				
§ 8.9	Transmitter emission limits	X				
§ 8.10	Restricted frequency bands	X				
§ 8.11	Frequency stability			X		

NAp: Not Applicable NAs: Not Asked

7. MEASUREMENT UNCERTAINTY

To declare, or not, the compliance with the specifications, it was not explicitly taken into account of uncertainty associated with the result(s)

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for normal distribution corresponds to a coverage probability of approximately 95%.

Parameter	Emitech Uncertainty
RF power, conducted	± 0.8dB
Radiated emission valid to 26 GHz 9kHz – 30MHz 30MHz – 1GHz 1GHz – 18GHz	 ± 2.7. dB ± 5.0 dB ± 5.3 dB
AC Power Lines conducted emissions	± 3.4 dB
Temperature	± 1 °C
Humidity	± 5 %

8. AC CONDUCTED EMISSION

Temperature (°C) : 24 **Humidity (%HR):** 46 **Date :** October 12, 2022

Technician : B. VOVARD

Standard: FCC Part 15
RSS-GEN

Test procedure:
For FCC Part 15: Paragraph 15.207
For RSS-Gen: Paragraph 8.8
Method of paragraph 6.2 of ANSI C63.10

Limits: Class B

Software used: BAT-EMC V3.18.0.26

Test set up:

The EUT is isolated and placed on a wooden table, 0.8 m over an horizontal reference plane and 0.4 m from a vertical reference plane. It is powered by an artificial main network placed on the ground reference plane.
The equipment is powered with the AC power operating voltage of 120 V / 60 Hz.

Frequency range: 150 kHz - 30 MHz

Detection mode: Peak / Quasi-peak / Average

Bandwidth: 10 kHz / 9 kHz

Equipment under test operating condition:

The equipment under test is blocked in discontinuous modulated transmission mode, at the highest output power level at which the transmitter is intended to operate.

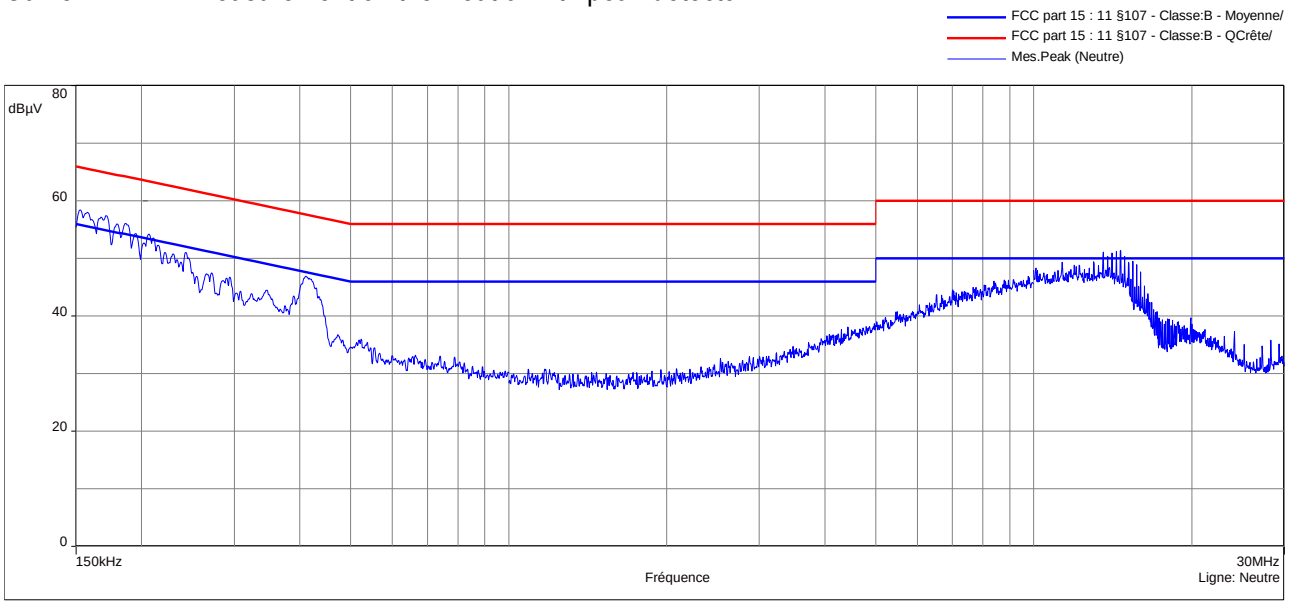
Results:

Sample N° 1

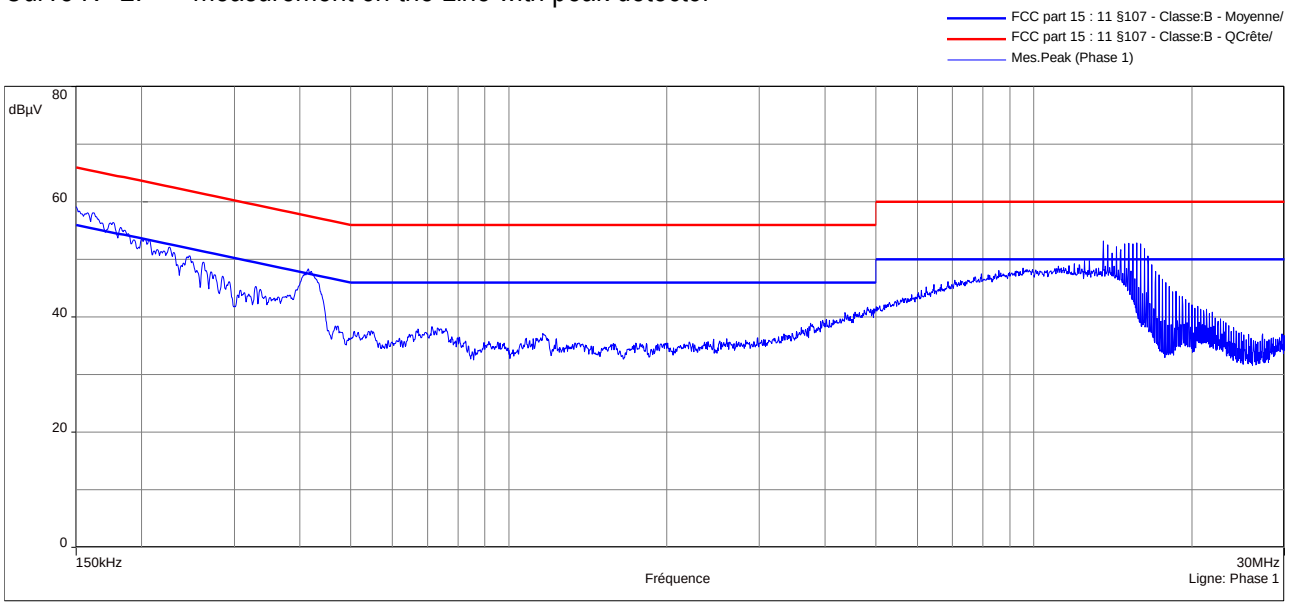
Measurement on the mains power supply:

The measurement is first realized with Peak detector.

Curve N° 1: measurement on the Neutral with peak detector



Curve N° 2: measurement on the Line with peak detector



The frequencies which are not 6 dB under the Quasi-peak limit are then analyzed with Quasi-peak detector.

The frequencies which are not 6 dB under the Average limit are then analyzed with Average detector.

Table N° 1: measurement on the Neutral, for the frequency range:

Frequency (MHz)	Quasi-peak (dBµV)	QP Limit (dBµV)	QP margin (dB)
0.153	52.15	65.9	13.75
0.411	41.57	57.6	16.03
0.419	42.43	57.5	15.07
0.435	39.37	57.2	17.83
0.444	36.76	57.0	20.24
6.810	37.23	60.0	22.77
7.116	37.5	60.0	22.50
8.630	39.66	60.0	20.34
10.302	41.06	60.0	18.94
11.318	40.9	60.0	19.10
11.744	41.48	60.0	18.52
13.552	49.8	60.0	10.20
13.874	41.68	60.0	18.32
14.626	50.83	60.0	9.17
19.899	34.59	60.0	25.41

Frequency (MHz)	Average (dBµV)	Average Limit (dBµV)	Average margin (dB)
0.153	34.75	55.9	21.15
0.411	31.23	47.6	16.37
0.419	32.42	47.5	15.08
0.435	29.53	47.2	17.67
0.444	25.9	47.0	21.10
6.810	29.36	50.0	20.64
7.116	29.76	50.0	20.24
8.630	31.98	50.0	18.02
10.302	33.41	50.0	16.59
11.318	33.46	50.0	16.54
11.744	34.02	50.0	15.98
13.552	46.26	50.0	3.74
13.874	33.95	50.0	16.05
14.626	47.85	50.0	2.15
19.899	29.45	50.0	20.55

Table N° 2: measurement on the Line, for the frequency range:

Frequency (MHz)	Quasi-peak (dBµV)	QP Limit (dBµV)	QP margin (dB)
0.151	49.1	66.0	16.90
0.203	42.88	63.5	20.62
0.246	38.93	61.9	22.97
0.285	38.02	60.7	22.68
0.383	39.44	58.2	18.76
0.447	34.22	56.9	22.68
0.548	31.58	56.0	24.42
1.162	30.95	56.0	25.05
4.826	35.16	56.0	20.84
9.531	41.9	60.0	18.10
12.478	45	60.0	15.00
14.894	50.98	60.0	9.02
17.311	46.19	60.0	13.81
21.873	38.4	60.000	21.600
27.240	35.14	60.0	24.86

Frequency (MHz)	Average (dBµV)	Average Limit (dBµV)	Average margin (dB)
0.151	31.57	56.0	24.43
0.203	27.71	53.5	25.79
0.246	26.45	51.9	25.45
0.285	28.76	50.7	21.94
0.383	32.36	48.2	15.84
0.447	26.28	46.9	20.62
0.548	23.54	46.00	22.46
1.162	22.68	46.0	23.32
4.826	27.85	46.0	18.15
9.531	34.7	50.0	15.30
12.478	39.4	50.0	10.60
14.894	48.22	50.0	1.78
17.311	43.71	50.0	6.29
21.873	35.54	50.000	14.460
27.240	29.71	50.0	20.29

Test conclusion:

RESPECTED STANDARD

9. OCCUPIED BANDWIDTH

Temperature (°C) : 24 **Humidity (%HR):** 45 **Date :** October 11, 2022
Technician : B. VOVARD

Standard: FCC Part 15
RSS-GEN

Test procedure:
Method of paragraphs 6.9.3 of ANSI C63.10 (99% Measurement)

Test set up:

Test realized in near field.

Setting:

Measure	**99%**
Center frequency	The centre frequency of the channel under test
Detector	Peak
Span	1.5 to 5 times the OBW
RBW	1% to 5% of the OBW
VBW	3 x RBW
Trace	Max hold
Sweep	Auto

Test operating condition of the equipment:

The equipment under test is blocked in discontinuous modulated transmission mode, at the highest output power level at which the transmitter is intended to operate.

Configuration 1: E.U.T supplied by battery
Power source: Fully charged battery

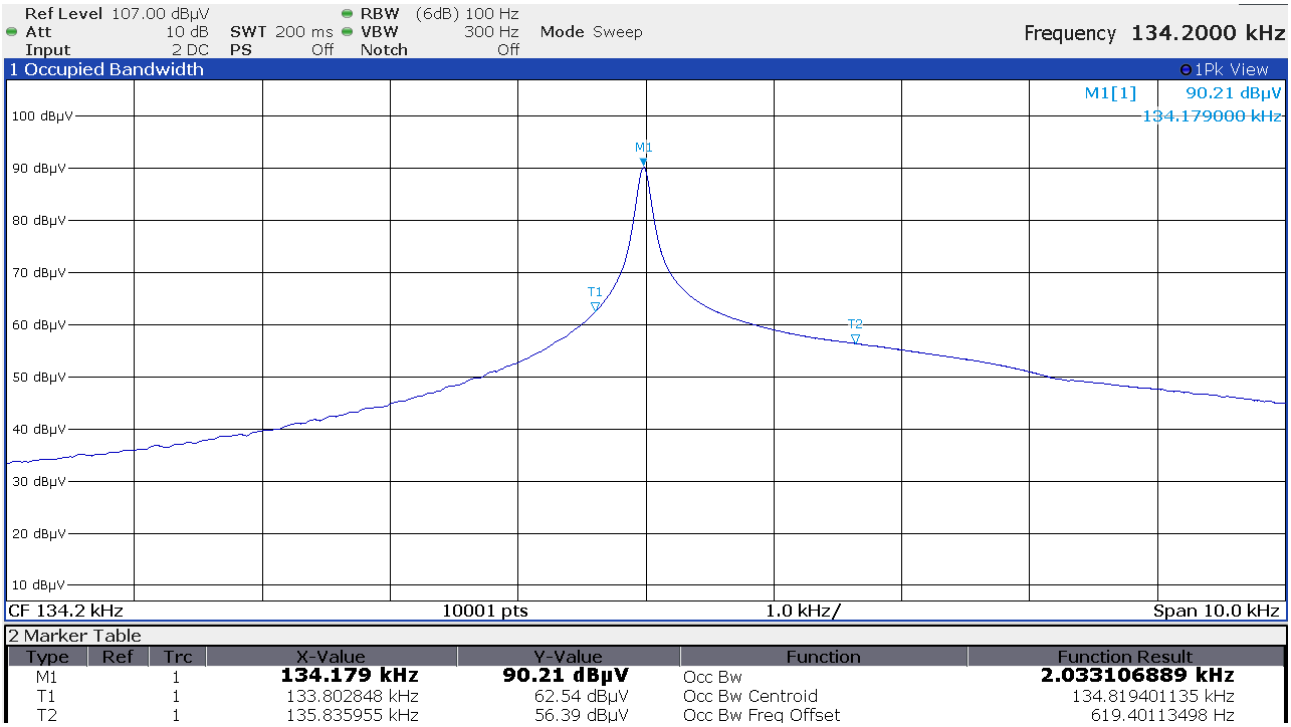
Configuration 2: E.U.T supplied with AC/DC power supply
Power source: 120 Vac 60 Hz trough a variac
Percentage of voltage variation during the test (%): ± 1

Results:

Sample N° 1

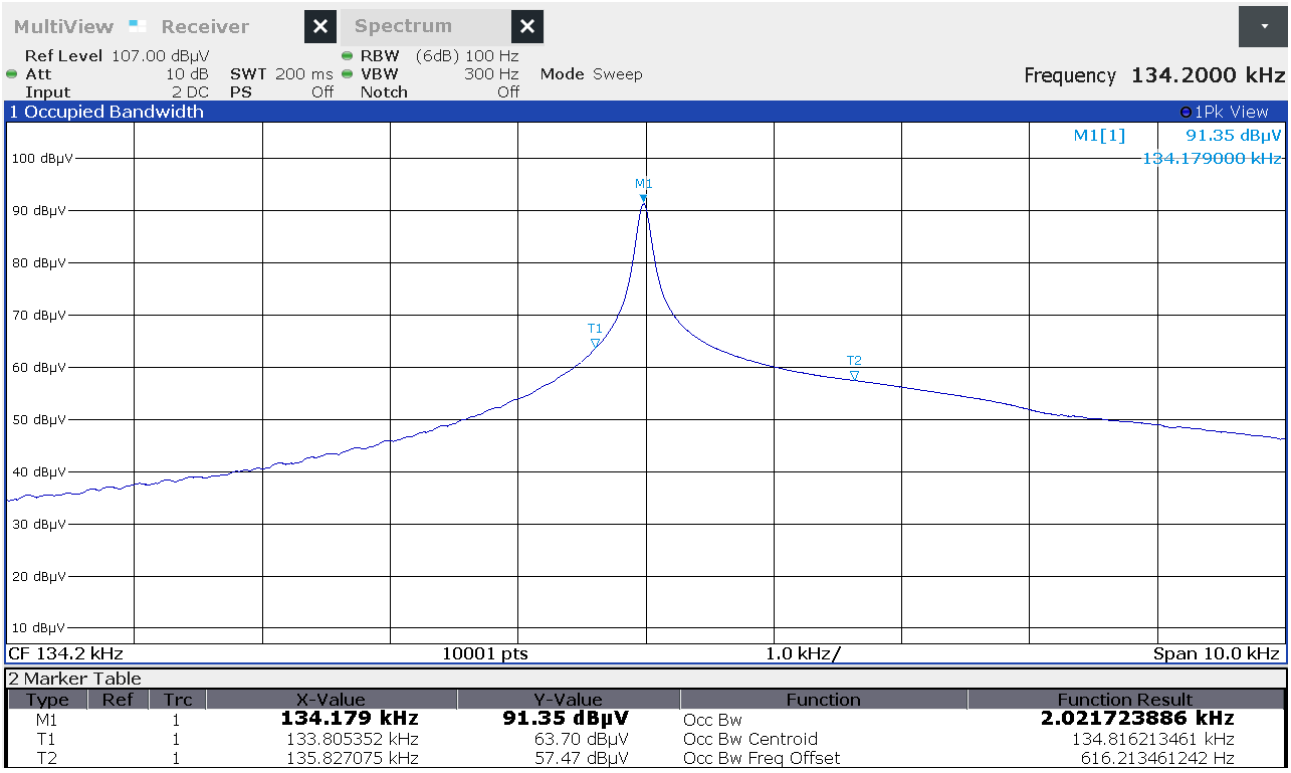
Configuration 1

99% bandwidth



Configuration 2

99% bandwidth



Limit:

Measure realized for reporting only

Test conclusion:

RESPECTED STANDARD

10. RADIATED EMISSION LIMITS; GENERAL REQUIREMENTS

Temperature (°C) : 21 **Humidity (%HR):** 47 **Date :** October 6, 2022

Technician : B. VOVARD

Standard: FCC Part 15
RSS-GEN
RSS-210

Test procedure: For FCC Part 15: paragraph 209
For RSS-GEN: paragraph 8.9
For RSS-210: paragraph 7.2
Method of § 6.4 of ANSI C63.10

Test set up:

First an exploratory radiated measurement was performed. During this phase the product is oriented in three orthogonal planes.

Then the final measurement is realized with the product on the most critical orientation.

The measure is realized on open area test site under 1 GHz

When the system is tested in an open area test site (OATS), the EUT is placed on a rotating table, 0.8m from a ground plane.

When the system is tested in anechoic chamber, the EUT is placed on a rotating table, 1.5 m from a ground plane.

Zero degree azimuths correspond to the front of the device under test.

Frequency range: From 9 kHz to 10th harmonic

Detection mode: Quasi-peak (F < 1 GHz)
Except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000MHz. Radiated emission limits in these bands are based on measurements employing an average detector

Bandwidth: 200Hz (9 kHz < F < 150kHz)
9 kHz (150 kHz < F < 30MHz)
120 kHz (30 MHz < F < 1 GHz)
1 MHz (F > 1 GHz)

Distance of antenna: 10 meters (in open area test site)

Antenna height: 1 meter

Antenna polarization: vertical and horizontal (only the highest level is recorded)

Equipment under test operating condition:

The equipment under test is blocked in discontinuous modulated transmission mode, at the highest output power level at which the transmitter is intended to operate.

Configuration 1: E.U.T supplied by battery
Power source: Fully charged battery

Configuration 2: E.U.T supplied with AC/DC power supply
Power source: 120 Vac 60 Hz trough a variac
Percentage of voltage variation during the test (%): ± 1

Results:

Configuration 1

Sample N° 1: Carrier = 134.2 kHz

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 10 meters dBµV/m (1)	Field strength at 300 meters dBµV/m (2)	Limits 300m dBµV/m	Margin (dB)
134.2	P	87.49	28.40	45	16.60
134.2	Av	70.49	11.41	25	13.59

With antenna height: 100 cm; Azimuth: 290°; Polarization antenna: Parallel - Position 2

(1) Field strength measured at 10 meters

(2) Field strength extrapolated at 300 meters using 40dB/decade fall off

Sample 1: Harmonics and spurious:

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 10 meters dBµV/m (3)	Field strength at 300 meters dBµV/m (4)	Limits 300m dBµV/m	Margin (dB)
268.4	P	40.96	-18.12	39	57.12
268.4	Av	29.96	-29.12	19	48.12
402.6	P	53.92	-5.16	35.5	40.66
402.6	Av	42.92	-16.16	15.5	31.66

(3) Noise Floor measured at 10 meters

(4) Noise Floor extrapolated at 300 meters using 40dB/decade fall off

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 10 meters dBµV/m (5)	Field strength at 30 meters dBµV/m (6)	Limits 30m dBµV/m	Margin (dB)
536.8	QP	46.81	27.73	33	5.27
671.0	QP	43.83	24.75	31.07	6.32
805.2	QP	42.01	22.93	29.49	6.56
939.4	QP	40.50	21.42	28.15	6.73

(5) Noise Floor measured at 10 meters

(6) Noise Floor extrapolated at 30 meters using 40dB/decade fall off

Configuration 2

Sample N° 1: Carrier = 134.2 kHz

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 10 meters dBµV/m (1)	Field strength at 300 meters dBµV/m (2)	Limits 300m dBµV/m	Margin (dB)
134.2	P	87.35	28.26	45	16.74
134.2	Av	70.35	11.26	25	13.74

With antenna height: 100 cm; Azimuth: 290°; Polarization antenna: Parallel - Position 2

(1) Field strength measured at 10 meters
(2) Field strength extrapolated at 300 meters using 40dB/decade fall off

Sample 1: Harmonics and spurious:

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 10 meters dBµV/m (3)	Field strength at 300 meters dBµV/m (4)	Limits 300m dBµV/m	Margin (dB)
268.4	P	40.97	-18.11	39	57.11
268.4	Av	29.97	-29.11	19	48.11
402.6	P	53.67	-5.41	35.5	40.91
402.6	Av	42.67	-16.41	15.5	31.91

(3) Noise Floor measured at 10 meters
(4) Noise Floor extrapolated at 300 meters using 40dB/decade fall off

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 10 meters dBµV/m (5)	Field strength at 30 meters dBµV/m (6)	Limits 30m dBµV/m	Margin (dB)
536.8	QP	46.69	27.61	33	5.39
671.0	QP	43.60	24.52	31.07	6.55
805.2	QP	41.86	22.78	29.49	6.71
939.4	QP	40.47	21.39	28.15	6.76

(5) Noise Floor measured at 10 meters
(6) Noise Floor extrapolated at 30 meters using 40dB/decade fall off

Applicable limits:
for 9 kHz ≤ F ≤ 490 kHz : 2400/F(kHz) at 300 meters
for 490 kHz < F ≤ 1.705 MHz : 24000/F(kHz) at 30 meters
for 1.705 MHz < F ≤ 30 MHz : 29.5 dBµV/m at 30 meters
for 30 MHz < F ≤ 88 MHz : 40 dBµV/m at 3 meters
for 88 MHz < F ≤ 216 MHz : 43.5 dBµV/m at 3 meters
for 216 MHz < F ≤ 960 MHz : 46 dBµV/m at 3 meters
Above 960 MHz : 54 dBµV/m at 3 meters

Test conclusion:

RESPECTED STANDARD

□□□ End of report, 1 appendix to be forwarded □□□

APPENDIX 1: Test equipment list

AC conducted emissions

TYPE	MANUFACTURER	EMITECH NUMBER
Outside room Hors cage	Emitech	10788
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Test receiver ESW44	Rohde & Schwarz	18335
LISN ESH3-Z5	Rohde & Schwarz	8720
High-pass filter EZ-25	Rohde & Schwarz	11535
Absorber sheath current	Emitech	10523
Cable N-5m RG214	GYL Technologies	8590
Power source 1251RP	California instruments	8508
Multimeter 177	Fluke	14903
Meteo station 608-H1	Testo	7566
Software	BAT-EMC V3.18.0.26	0000

Occupied bandwidth

TYPE	MANUFACTURER	EMITECH NUMBER
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Test receiver ESW44	Rohde & Schwarz	18335
Cable N-5m	MecHANC	18412
Power source 1251RP	California instruments	8508
Multimeter 177	Fluke	14903
Meteo station 608-H1	Testo	7566
Software	RS Commander	-

Radiated emission limits; general requirements

TYPE	MANUFACTURER	EMITECH NUMBER
Open test site	EMITECH	8732
Turntable and mat controller	EMITECH	8855
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Test receiver ESW44	Rohde & Schwarz	18335
Loop antenna 6502	EMCO	1406
Cable N-5m	MecHANC	18412
Power source 1251RP	California instruments	8508
Multimeter 177	Fluke	14903
Meteo station 608-H1	Testo	7566