

RRA-EMIESS22N617SER-03Av0

## Certification Radio test report

According to the standard:

CFR 47 FCC PART 15  
RSS GEN – Issue 5  
RSS 210 - Issue 10

Equipment under test:

*Key Panel Smart Key Manager v2*

FCC ID: **2A9X2STISKM2001**  
IC NUMBER: **29944-STISKM2001**

Company:

**SERV TRAYYOU INTERVERROUILLAGE**

Distribution : Mrs TRAN

(Company: SERV TRAYYOU INTERVERROUILLAGE)

Number of pages: 23 with 1 appendix

Ed.	Date	Modified Page(s)	Technical Verification and Quality Approval	
			Name and Function	Visa
0	26-Jan-23	Creation	M. DUMESNIL, Radio Laboratory Manager	

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Information in italics are declared by the manufacturer/customer and are under his responsibility

S51 RTY 000 INT 00018 [01]

**DESIGNATION OF PRODUCT:** *Key Panel Smart Key Manager v2*

**Serial number (S/N):** *Prototype*

**Reference / model (P/N):** *SKM2KP000*

**Software version:** *V1.0.0*

**Hardware version:** *V2.0.0*

**MANUFACTURER:** *SERV TRAYVOU INTERVERROUILLAGE*

**COMPANY SUBMITTING THE PRODUCT:**

**Company:** *SERV TRAYVOU INTERVERROUILLAGE*

**Address:** *1 TER RUE DU MARAIS  
BATIMENT B  
93100 - MONTREUIL  
FRANCE*

**Responsible:** *Mrs TRAN*

**Person(s) present during the tests:** *Mr KOUIN DE KER MARTIN (The first day)*

**DATES OF TEST:** *From 26-Sep-22 to 3-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:**



**WRITTEN BY:** *B. VOVARD*

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## REVISIONS HISTORY

Revision	Date	Modified pages	Modifications
0	11-Jan-23	/	Creation

## 1. INTRODUCTION

This report presents the results of radio test carried out on the following radio equipment: **Key Panel Smart Key Manager v2**, in accordance with normative reference.

The equipment under test integrates two parts:

- 125 kHz / 13.56MHz radio module already certified (Central Unit) - Elatec GmbH TWN4 MultiTech M (FCCID: WP5TWN4F17 / IC: 7948A-TWN4F17),
- 125 kHz function not already certified (Key Panel),

This report concerns only 125 kHz radio part of the Key Panel.

The EUT possesses 16 antennas 125 kHz, only fundamental and harmonics are checked on 16 antennas, others measurements are realized on the most powerful antenna.

## 2. PRODUCT DESCRIPTION

Class: B

Utilization: Residential use

Antenna type and gain: integral antenna (unknown gain)

Operating frequency: 125 kHz

Number of channels: 1

Channel spacing: Not concerned

Power source: 120 Vac 60 Hz

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 Compliance Testing 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

RSS-210 Issue 10, December 2019  
Licence-Exempt Radio Apparatus:  
Category I equipment.

#### **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

Radio performance tests procedures given in RSS-210:

- Paragraph 5 – RSS-Gen compliance
- Paragraph 7 - Technical specifications

**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
6796	R&S FSP7	Spectrum Analyzer	30/07/2021	2	30/07/2023
7279	SUCOFLEX SF104 N 1.5m	Cable	21/05/2022	2	20/05/2024
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
10759	COMTEST Cage 3	Anechoic chamber	/	/	/
10788	Emitech	Outside room Hors cage	/	/	/
10789	MATURO	Turntable and mat controller NCD	/	/	/
11535	R&S EZ-25	High pass filter	28/05/2022	3	27/05/2025
14475	Oregon Scientific BAR 206	Meteo Station	27/10/2021	2	27/10/2023
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				
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

## 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

## 6.3 RSS-210 requirements

Test Procedure RSS-210	Description of test	Criteria respected ?				Comment
		Yes	No	NAp	NAs	
Paragraph 5	RSS-Gen compliance	X				
Paragraph 7	Technical Specifications					
7.1	Emission Falling Within Restricted Frequency Bands	X				
7.2	General Field Strength Limits	X				
7.3	Transmitters with wanted and unwanted emissions that are within the general field strength limits	X				
7.4	Cordless Telephones			X		

**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	$\pm 0.8$ dB
Radiated emission valid to 26 GHz 9kHz – 30MHz 30MHz – 1GHz 1GHz – 18GHz	$\pm 2.7$ . dB $\pm 5.0$ dB $\pm 5.3$ dB
AC Power Lines conducted emissions	$\pm 3.4$ dB
Temperature	$\pm 1$ °C
Humidity	$\pm 5$ %

## 8. AC CONDUCTED EMISSION

**Temperature (°C) : 21**

**Humidity (%HR): 50**

**Date : September 29, 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.

See photos in appendix 3

**Frequency range:** 150 kHz - 30 MHz

**Detection mode:** Peak / Quasi-peak / Average

**Bandwidth:** 10 kHz

**Equipment under test operating condition:**

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

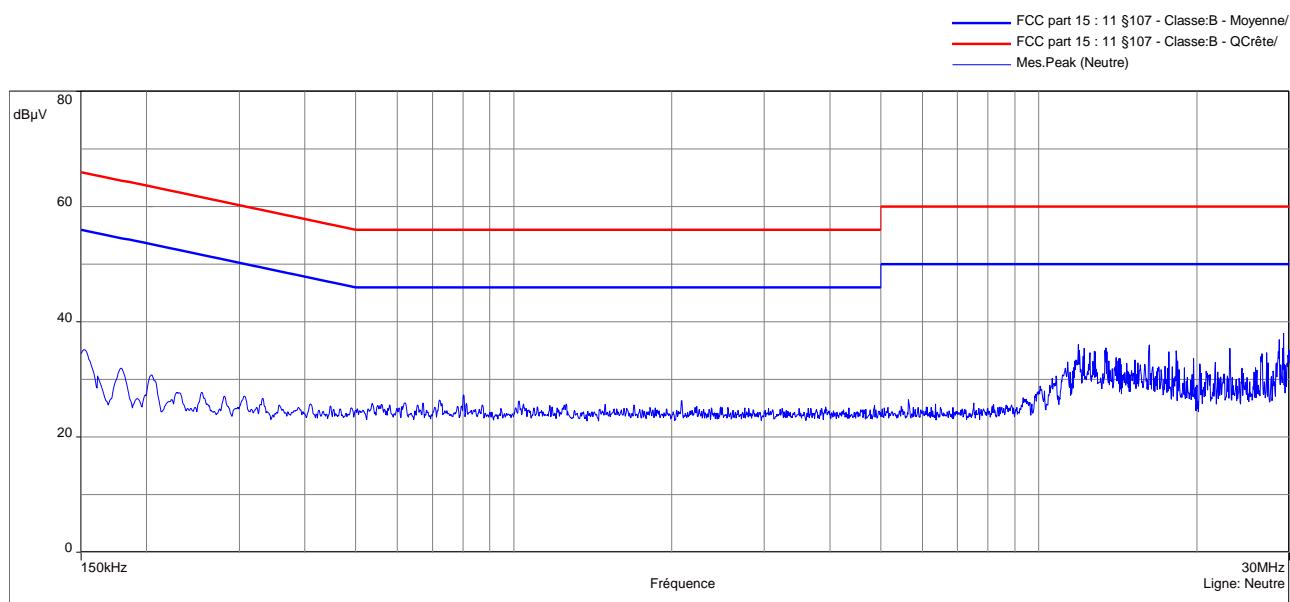
## Results:

### Sample N° 1

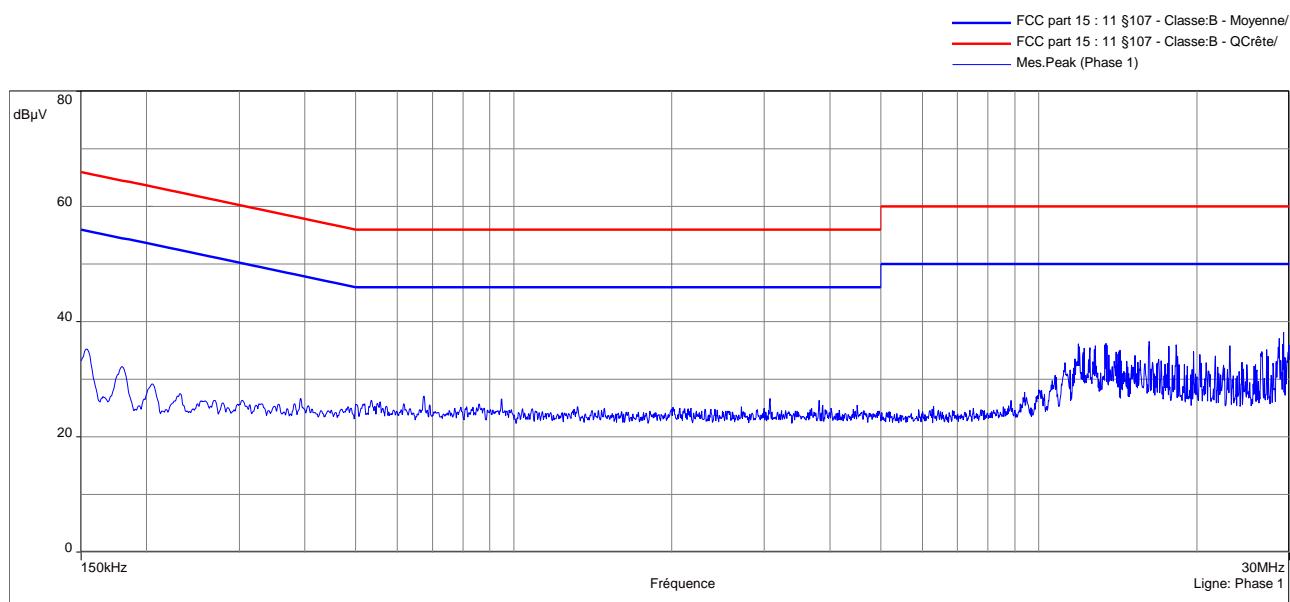
#### Measurement on the mains power supply:

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 (dB $\mu$ V)	QP Limit (dB $\mu$ V)	QP margin (dB)
0.152	30.22	65.9	35.68
10.792	25.20	60.0	34.80
11.338	23.92	60.0	36.08
11.892	32.85	60.0	27.15
13.418	33.19	60.0	26.81
16.229	34.18	60.0	25.82
18.243	33.69	60.0	26.31
19.709	31.83	60.0	28.17
23.129	32.72	60.0	27.28
24.349	29.02	60.0	30.98
27.160	32.30	60.0	27.70
29.236	36.27	60.0	23.73

Frequency (MHz)	Average (dB $\mu$ V)	Average Limit (dB $\mu$ V)	Average margin (dB)
0.152	27.91	55.9	27.99
10.792	21.55	50.0	28.45
11.338	18.15	50.0	31.85
11.892	29.54	50.0	20.46
13.418	31.18	50.0	18.82
16.229	32.82	50.0	17.18
18.243	32.98	50.0	17.02
19.709	30.94	50.0	19.06
23.129	31.19	50.0	18.81
24.349	27.32	50.0	22.68
27.160	29.98	50.0	20.02
29.236	33.56	50.0	16.44

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

Frequency (MHz)	Quasi-peak (dB $\mu$ V)	QP Limit (dB $\mu$ V)	QP margin (dB)
0.154	30.35	65.8	35.45
0.180	26.72	64.5	37.78
0.205	22.61	63.4	40.79
11.216	25.11	60.0	34.89
11.890	31.73	60.0	28.27
13.418	33.27	60.0	26.73
16.227	33.75	60.0	26.25
18.241	32.30	60.0	27.70
20.257	31.03	60.0	28.97
21.663	31.10	60.0	28.90
23.127	32.63	60.0	27.37
29.236	36.22	60.0	23.78

Frequency (MHz)	Average (dB $\mu$ V)	Average Limit (dB $\mu$ V)	Average margin (dB)
0.154	27.81	55.8	27.99
0.180	24.16	54.5	30.34
0.205	18.23	53.4	35.17
11.216	19.37	50.0	30.63
11.890	28.10	50.0	21.90
13.418	31.23	50.0	18.77
16.227	32.51	50.0	17.49
18.241	31.56	50.0	18.44
20.257	30.05	50.0	19.95
21.663	29.78	50.0	20.22
23.127	31.38	50.0	18.62
29.236	33.48	50.0	16.52

### Test conclusion:

RESPECTED STANDARD

**9. OCCUPIED BANDWIDTH****Temperature (°C) : 21****Humidity (%HR): 50****Date : September 29, 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:**Radiated test

Test realized in near field.

Setting:

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

**Test operating condition of the equipment:**

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

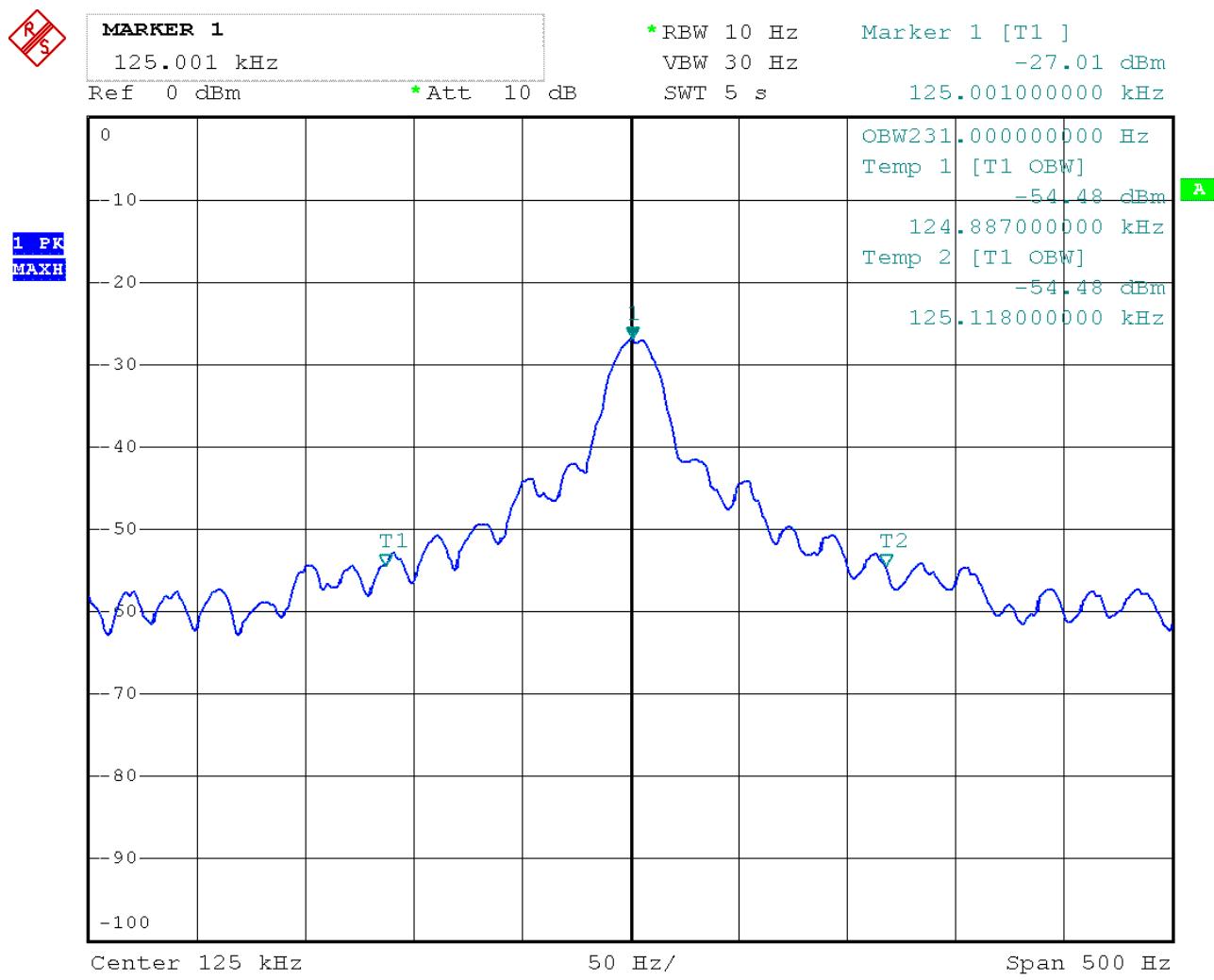
Power source: 120 Vac 60 Hz by an external power supply

Percentage of voltage variation during the test (%): **± 1**

## Results:

## Sample N° 1

99% bandwidth



## Limit:

Measure realized for reporting only

## 10. RADIATED EMISSION LIMITS; GENERAL REQUIREMENTS

Temperature (°C) : 19 to 22

**Humidity (%HR):** 45 to 57

**Date :** September 27, 2022 and  
October 3, 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
  - Method of § 6.5 of ANSI C63.10

## Test set up:

First an exploratory radiated measurement was performed. During this phase the product is oriented in this normal position.

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.

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

See photos in Test setup document

**Frequency range:** From 9 kHz to 1GHz (10<sup>th</sup> harmonic of the highest fundamental frequency)

**Detection mode:** Quasi-peak ( $F < 1$  GHz)

### Peak / Average (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:** 3 meters (in open area test site)

**Antenna height:** 1 to 4 meters (in open area test site)

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

**Equipment under test operating condition:**

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

Power source: 120 Vac 60 Hz by an external power supply

Percentage of voltage variation during the test (%):  $\pm 1$

## Results:

### Sample N° 1: Carrier with antenna 1 = 125 kHz

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 3 meters dB $\mu$ V/m (1)	Field strength at 300 meters dB $\mu$ V/m (2)	Limits 300m dB $\mu$ V/m	Margin (dB)
125	P	55.22	-24.78	45.67	70.45
125	Av	42.22	-37.78	25.67	63.45

With antenna height: 100 cm; Azimuth: 0°; Polarization antenna: Parallel - Position 1

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

### Sample N° 1: Carrier with antenna 2 = 125 kHz

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 3 meters dB $\mu$ V/m (1)	Field strength at 300 meters dB $\mu$ V/m (2)	Limits 300m dB $\mu$ V/m	Margin (dB)
125	P	54.60	-25.40	45.67	71.07
125	Av	41.60	-38.40	25.67	64.07

With antenna height: 100 cm; Azimuth: 0°; Polarization antenna: Parallel - Position 1

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

### Sample N° 1: Carrier with antenna 3 = 125 kHz

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 3 meters dB $\mu$ V/m (1)	Field strength at 300 meters dB $\mu$ V/m (2)	Limits 300m dB $\mu$ V/m	Margin (dB)
125	P	54.44	-25.56	45.67	71.23
125	Av	41.44	-38.56	25.67	64.23

With antenna height: 100 cm; Azimuth: 0°; Polarization antenna: Parallel - Position 1

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

### Sample N° 1: Carrier with antenna 4 = 125 kHz

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 3 meters dB $\mu$ V/m (1)	Field strength at 300 meters dB $\mu$ V/m (2)	Limits 300m dB $\mu$ V/m	Margin (dB)
125	P	54.10	-25.90	45.67	71.57
125	Av	41.10	-38.90	25.67	64.57

With antenna height: 100 cm; Azimuth: 0°; Polarization antenna: Parallel - Position 1

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

Sample N° 1: Carrier with antenna 5 = 125 kHz

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 3 meters dB $\mu$ V/m (1)	Field strength at 300 meters dB $\mu$ V/m (2)	Limits 300m dB $\mu$ V/m	Margin (dB)
125	P	54.70	-25.30	45.67	70.97
125	Av	41.70	-38.30	25.67	63.97

With antenna height: 100 cm; Azimuth: 0°; Polarization antenna: Parallel - Position 1

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

Sample N° 1: Carrier with antenna 6 = 125 kHz

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 3 meters dB $\mu$ V/m (1)	Field strength at 300 meters dB $\mu$ V/m (2)	Limits 300m dB $\mu$ V/m	Margin (dB)
125	P	54.67	-25.33	45.67	71.00
125	Av	41.67	-38.33	25.67	64.00

With antenna height: 100 cm; Azimuth: 0°; Polarization antenna: Parallel - Position 1

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

Sample N° 1: Carrier with antenna 7 = 125 kHz

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 3 meters dB $\mu$ V/m (1)	Field strength at 300 meters dB $\mu$ V/m (2)	Limits 300m dB $\mu$ V/m	Margin (dB)
125	P	55.56	-24.44	45.67	70.11
125	Av	42.56	-37.44	25.67	63.11

With antenna height: 100 cm; Azimuth: 0°; Polarization antenna: Parallel - Position 1

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

Sample N° 1: Carrier with antenna 8 = 125 kHz

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 3 meters dB $\mu$ V/m (1)	Field strength at 300 meters dB $\mu$ V/m (2)	Limits 300m dB $\mu$ V/m	Margin (dB)
125	P	54.96	-25.04	45.67	70.71
125	Av	41.96	-38.04	25.67	63.71

With antenna height: 100 cm; Azimuth: 0°; Polarization antenna: Parallel - Position 1

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

Sample N° 1: Carrier with antenna 9 = 125 kHz

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 3 meters dB $\mu$ V/m (1)	Field strength at 300 meters dB $\mu$ V/m (2)	Limits 300m dB $\mu$ V/m	Margin (dB)
125	P	55.17	-24.83	45.67	70.50
125	Av	42.17	-37.83	25.67	63.50

With antenna height: 100 cm; Azimuth: 0°; Polarization antenna: Parallel - Position 1

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

Sample N° 1: Carrier with antenna 10 = 125 kHz

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 3 meters dB $\mu$ V/m (1)	Field strength at 300 meters dB $\mu$ V/m (2)	Limits 300m dB $\mu$ V/m	Margin (dB)
125	P	55.37	-24.63	45.67	70.30
125	Av	42.37	-37.63	25.67	63.30

With antenna height: 100 cm; Azimuth: 0°; Polarization antenna: Parallel - Position 1

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

Sample N° 1: Carrier with antenna 11 = 125 kHz

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 3 meters dB $\mu$ V/m (1)	Field strength at 300 meters dB $\mu$ V/m (2)	Limits 300m dB $\mu$ V/m	Margin (dB)
125	P	55.35	-24.65	45.67	70.32
125	Av	42.35	-37.65	25.67	63.32

With antenna height: 100 cm; Azimuth: 0°; Polarization antenna: Parallel - Position 1

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

Sample N° 1: Carrier with antenna 12 = 125 kHz

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 3 meters dB $\mu$ V/m (1)	Field strength at 300 meters dB $\mu$ V/m (2)	Limits 300m dB $\mu$ V/m	Margin (dB)
125	P	55.88	-24.12	45.67	69.79
125	Av	42.88	-37.12	25.67	62.79

With antenna height: 100 cm; Azimuth: 0°; Polarization antenna: Parallel - Position 1

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

Sample N° 1: Carrier with antenna 13 = 125 kHz

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 3 meters dB $\mu$ V/m (1)	Field strength at 300 meters dB $\mu$ V/m (2)	Limits 300m dB $\mu$ V/m	Margin (dB)
125	P	55.41	-24.59	45.67	70.26
125	Av	42.41	-37.59	25.67	63.26

With antenna height: 100 cm; Azimuth: 0°; Polarization antenna: Parallel - Position 1

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

Sample N° 1: Carrier with antenna 14 = 125 kHz

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 3 meters dB $\mu$ V/m (1)	Field strength at 300 meters dB $\mu$ V/m (2)	Limits 300m dB $\mu$ V/m	Margin (dB)
125	P	55.22	-24.78	45.67	70.45
125	Av	42.22	-37.78	25.67	63.45

With antenna height: 100 cm; Azimuth: 0°; Polarization antenna: Parallel - Position 1

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

Sample N° 1: Carrier with antenna 15 = 125 kHz

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 3 meters dB $\mu$ V/m (1)	Field strength at 300 meters dB $\mu$ V/m (2)	Limits 300m dB $\mu$ V/m	Margin (dB)
125	P	55.50	-24.50	45.67	70.17
125	Av	42.50	-37.50	25.67	63.17

With antenna height: 100 cm; Azimuth: 0°; Polarization antenna: Parallel - Position 1

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

Sample N° 1: Carrier with antenna 16 = 125 kHz

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 3 meters dB $\mu$ V/m (1)	Field strength at 300 meters dB $\mu$ V/m (2)	Limits 300m dB $\mu$ V/m	Margin (dB)
125	P	54.56	-25.44	45.67	71.11
125	Av	41.56	-38.44	25.67	64.11

With antenna height: 100 cm; Azimuth: 0°; Polarization antenna: Parallel - Position 1

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

Sample 1: Harmonics and spurious (Worst case):

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 3 meters dB $\mu$ V/m <sup>(3)</sup>	Field strength at 300 meters dB $\mu$ V/m <sup>(4)</sup>	Limits 300m dB $\mu$ V/m	Margin (dB)
250	P	59.58	-20.42	39.65	60.07
250	Av	48.58	-31.42	19.65	51.07

(3) Noise Floor measured at 3 meters

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

Frequencies (kHz)	Detector P: Peak Av: Average	Field strength at 3 meters dB $\mu$ V/m <sup>(5)</sup>	Field strength at 300 meters dB $\mu$ V/m <sup>(6)</sup>	Limits 300m dB $\mu$ V/m	Margin (dB)
375	P	54.35	-25.65	36.12	61.77
375	Av	44.35	-35.65	16.12	51.77

(5) Noise Floor measured at 3 meters

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

Frequencies (kHz)	Detector QP: Quasi-Peak	Field strength at 3 meters dB $\mu$ V/m <sup>(7)</sup>	Field strength at 30 meters dB $\mu$ V/m <sup>(8)</sup>	Limits 30m dB $\mu$ V/m	Margin (dB)
500	QP	41.79	1.79	33.62	31.83

(7) Noise Floor measured at 3 meters

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

Applicable limits:	for $9 \text{ kHz} \leq F \leq 490 \text{ kHz}$ :	$2400/F(\text{kHz})$ at 300 meters
	for $490 \text{ kHz} < F \leq 1.705 \text{ MHz}$ :	$24000/F(\text{kHz})$ at 30 meters
	for $1.705 \text{ MHz} < F \leq 30 \text{ MHz}$ :	$29.5 \text{ dB}\mu\text{V/m}$ at 30 meters
	for $30 \text{ MHz} < F \leq 88 \text{ MHz}$ :	$40 \text{ dB}\mu\text{V/m}$ at 3 meters
	for $88 \text{ MHz} < F \leq 216 \text{ MHz}$ :	$43.5 \text{ dB}\mu\text{V/m}$ at 3 meters
	for $216 \text{ MHz} < F \leq 960 \text{ MHz}$ :	$46 \text{ dB}\mu\text{V/m}$ at 3 meters
	Above $960 \text{ MHz}$ :	$54 \text{ dB}\mu\text{V/m}$ 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
Full anechoic chamber	EMITECH	10759
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Spectrum Analyzer FSP7	Rohde & Schwarz	6796
N-1.5M Cable	SUCOFLEX	7279
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
Full anechoic chamber	EMITECH	10759
Turntable and mat controller NCD	MATURO	10789
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 BAR 206	Oregon Scientific	14475