Accreditation
N°1-0312
Scope available on
www.cofrac.fr

TEST REPORT

N°: 165479 **–** 747274 **Version : 01**

Subject **Electromagnetic compatibility (EMC) :**
Publication CFR 47 PART 15 of 2013 & ICES-003 of 2016

Issued to
BeOn IoT SAS.
23, rue de la cressonnière
31270 Cugnaux
France

Apparatus under test

Product	Tracking device
Trade mark	BeOn A1 / Safran aAero IoT
Manufacturer	BeOn IoT SAS
Model under test	CEM-ES-5
Serial number	035

Test date	March 3, 2020
Test location	LCIE, Ecuelles
Test performed by	**Laurent Deneux**
Composition of document	16 pages
Document issued on	March 23, 2020

Written by :
Laurent Deneux
Tests operator

Approved by :
LABORATOIRE CENTRAL DES INDUSTRIES ELECTRIQUES
33 avenue du General Leclerc
Julien Boutaud
Technical manager

PUBLICATION HISTORY

Each new edition of this test report replaces and cancels the previous edition. The control of the old editions of report is under responsibility of client.

Version	Date	Author	Modification
01	March 23th,2020	Laurent DENEUX	Creation of the document

Date of receipt of test item:
March 3th, 2020

SUMMARY

1. TEST PROGRAM....4
2. EQUIPMENT DESCRIPTION (DECLARED BY PROVIDER)....5
3. MEASUREMENT OF RADIATED EMISSIONS....8
4. UNCERTAINTIES CHART....15

AUTO CONTROL....16

1. Test Program

References

- ✓ **CFR 47 Part 15 Subpart B - Radio frequency devices - Unintentional radiators October 2013**
- ✓ **ICES -003 of 2016**
- ✓ **ANSI 63.4 of 2014**

Emission tests:

Test Description	Main characteristics	Test result - Comments
Measurement of radiated electric field in shielded room 15.109 (a), (b) & (c)	☐ **Class A** ☐ **Class B**	☐ **PASS** ☐ **FAIL** ☑ **NA** ☐ **NP (Limited Program)**
Measurement of radiated electric field in open space	☐ **Class A** ☑ **Class B**	☑ **PASS** ☐ **FAIL** ☐ **NA** ☐ **NP (Limited Program)**
Measurement of conducted disturbance on the AC main power port 15.107 (a) (c) (d)	☐ **Class A** ☐ **Class B**	☐ **PASS** ☐ **FAIL** ☑ **NA (1)** ☐ **NP (Limited Program)**

(1): EUT not directly or indirectly connected to the AC Power Public Network

The product is compliant according to CFR 47 Part 15 Subpart B - Radio frequency devices - Unintentional radiators October 2013 & ICES -003 of 2016 standards.

PASS: EUT complies with standard's requirement
FAIL: EUT does not comply with standard's requirement
NA: Not Applicable
NP: Test Not Performed

2. Equipment Description (declared by provider)

2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT): CEM-ES-5

Serial Number: 035

Equipment Under Test

Inputs/outputs - Cable:

Access	Inputs / Outputs	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
	-	-			☐	☐	

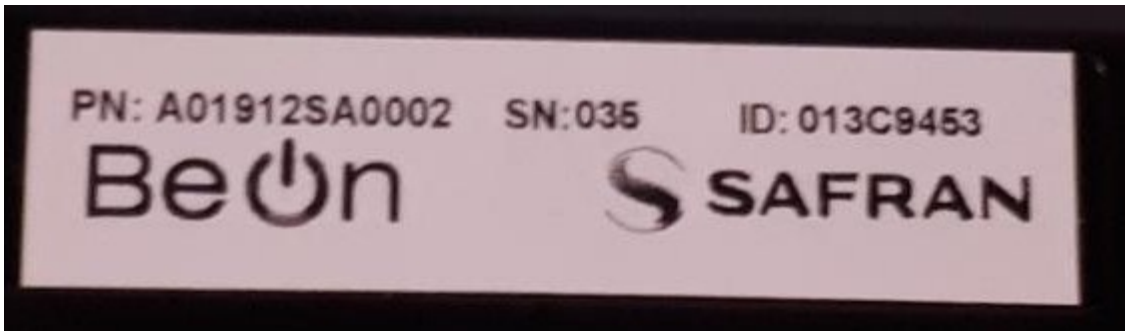
Auxiliary equipment used during test:

Type	Reference	Sn	Comments
-	-	-	-

Equipment information: (Declared by provider)

Apparatus Description	The product is a 'tracker' allowing: •To locate the merchandises outside or inside • Monitor temperatures • Monitor shocks • To detect the state of the module (movement or stationary) • Report this information via the networks.			
Type of power source:	☐ AC power supply	☐ DC power supply	☑ Battery (Alkaline)	
Test source voltage:	Vmin-Vmax:	☐ Vmin - Vmax V / Fmin - Fmax Hz	☑ 6 VDc	
Operating Modes	Mode 1	Monitor temperatures and Monitor shocks		
	Mode 2	-		
	Mode 3	-		
	Mode 4	-		

2.2. EQUIPMENT LABELLING



Equipment Labelling

2.3. EQUIPMENT MODIFICATIONS

☑ None ☐ Modification:

3. Measurement of radiated emissions

3.1. ENVIRONMENTAL CONDITIONS

Test performed by : **Laurent Deneux**
Date of test : March 3, 2020
Ambient temperature : 21°C
Relative humidity : 47%

3.2. TEST SETUP

Specifications:

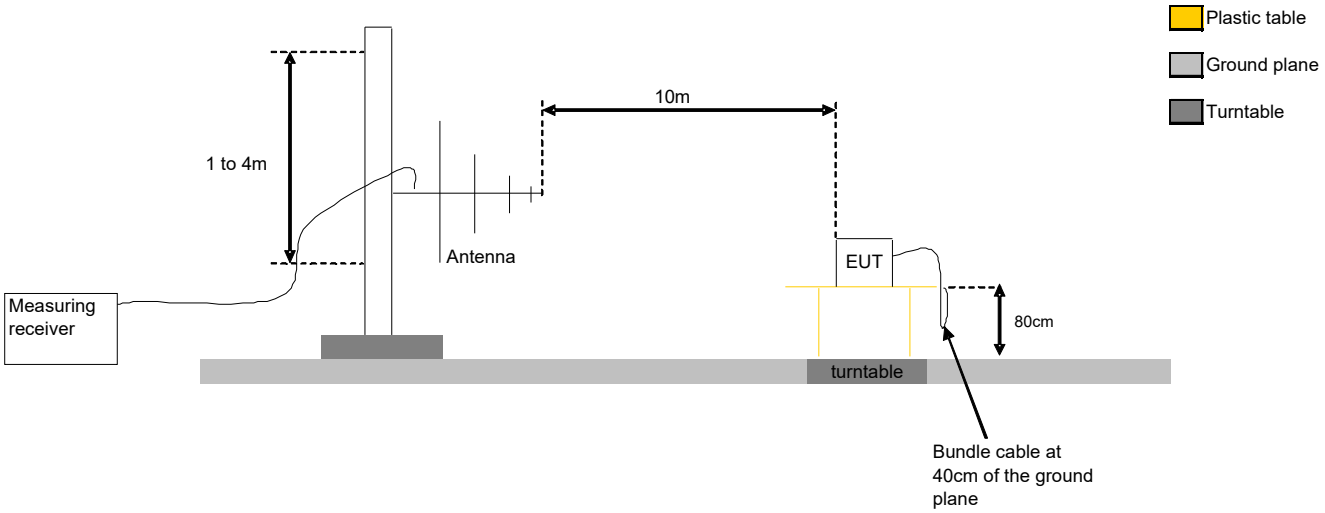
Frequency	30 – 1000 MHz	RBW 120 kHz
	1-18GHz	RBW 1MHz
Detector	Peak and Quasi-Peak	

Pre characterization in semi anechoic room is performed to define the critical frequencies

Operating conditions:

- The Equipment under Test is installed:
☐ Measure in semi anechoic room
☑ Measure in open area site
- Measuring distance:
☐ 3m
☑ 10m
- Deviation method:
☑ Yes
☐ No
-Product installation:
☑ The EUT was tested as a tabletop equipment and was placed on a non-conducting platform the top of which is 0.8m above the metal ground plane.
☐ The EUT is at 10cm height from reference plane

Operating mode:
☑ Mode 1 ☐ Mode 2 ☐ Mode 3 …



Test Set up for radiated measurement in open area test site

Measurement of radiated disturbances.

3.3. LIMIT

☐ at 10m Class A

Frequency Bands/frequencies	dB (µV/m) quasi-peak	dB (µV/m) peak	dB (µV/m) average
30-88MHz	39.5	-	-
88 – 216MHz	43.9	-	-
216 – 960 MHz	46.9	-	-
960 – 1000 MHz	50	-	-
1000-6000MHz	-	70	50

☑ at 10m Class B

Frequency Bands/frequencies	dB (µV/m) quasi-peak	dB (µV/m) peak	dB (µV/m) average
30-88MHz	29.5	-	-
88 – 216MHz	33	-	-
216 – 960 MHz	35.5	-	-
960 – 1000 MHz	43.5	-	-
1000-6000MHz	-	63.5	43.5

3.4. TEST EQUIPMENT LIST

Test equipment used					
Description	**Manufacturer**	**Model**	**Identifier**	**Last Calibration date**	**Calibration due date**
Open test site	LCIE	-	F2000400	2019-06	2020-06
EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	A2642021	2018-10	2020-10
Bilog antenna	CHASE	CBL 6112A	C2040040	2019-04	2020-04
Cable	-	-	A5329442	2019-129	2020-12
Cable	-	-	A5329876	2019-12	2020-12
Cable	-	-	A5329542	2019-08	2020-08
Preamplifier	HEWLETT PACKARD	8449B	A4069002	2018-04	2020-04
Horn	EMCO	3115	C2042016	2019-06	2020-06

3.5. RESULTS

Diagram N°1
Vertical & Horizontal Polarization
Quasi Peak measurement
(30MHz-1000MHz)

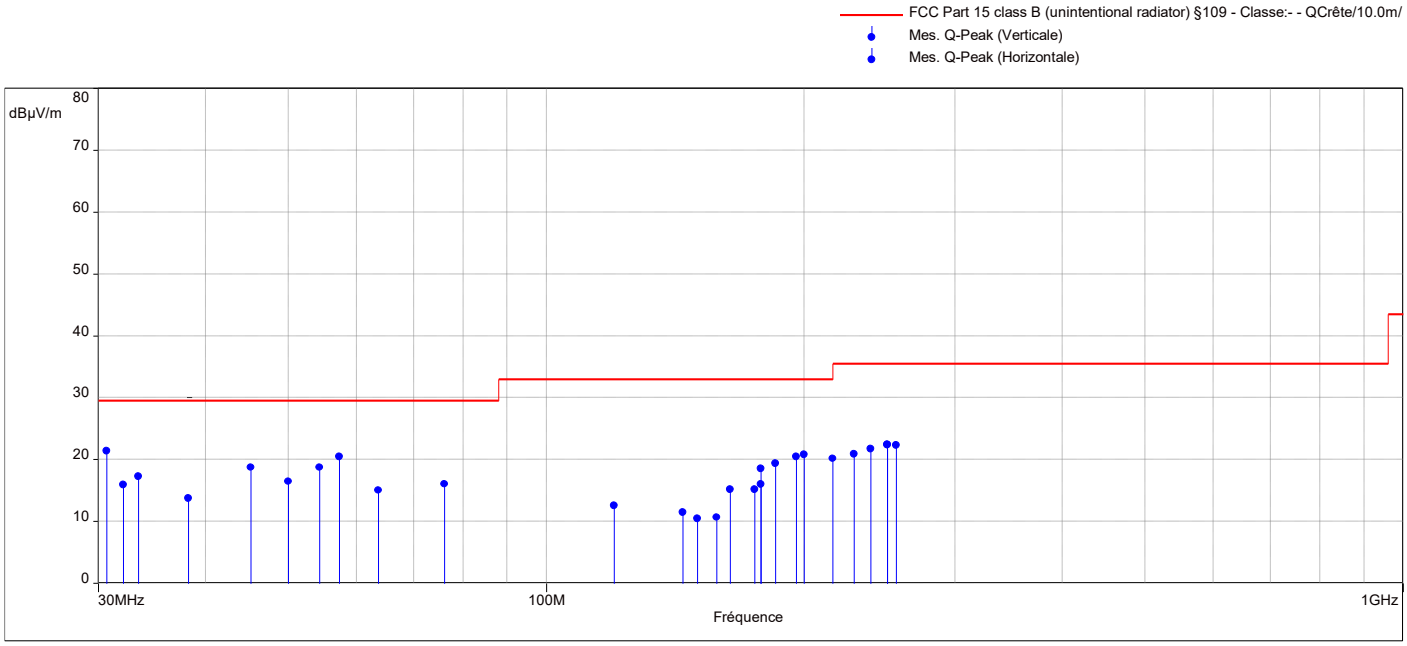


Diagram N°2
Vertical & Horizontal Polarization
Peak measurement
(1GHz-18GHz)

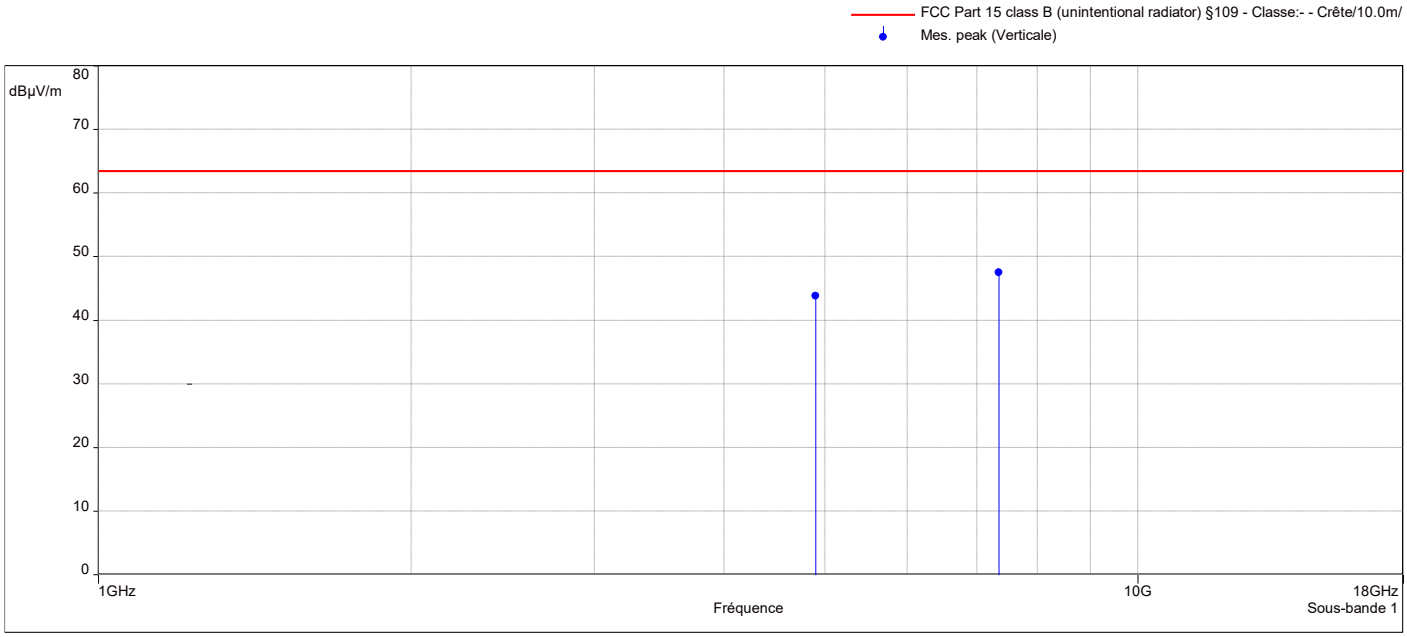
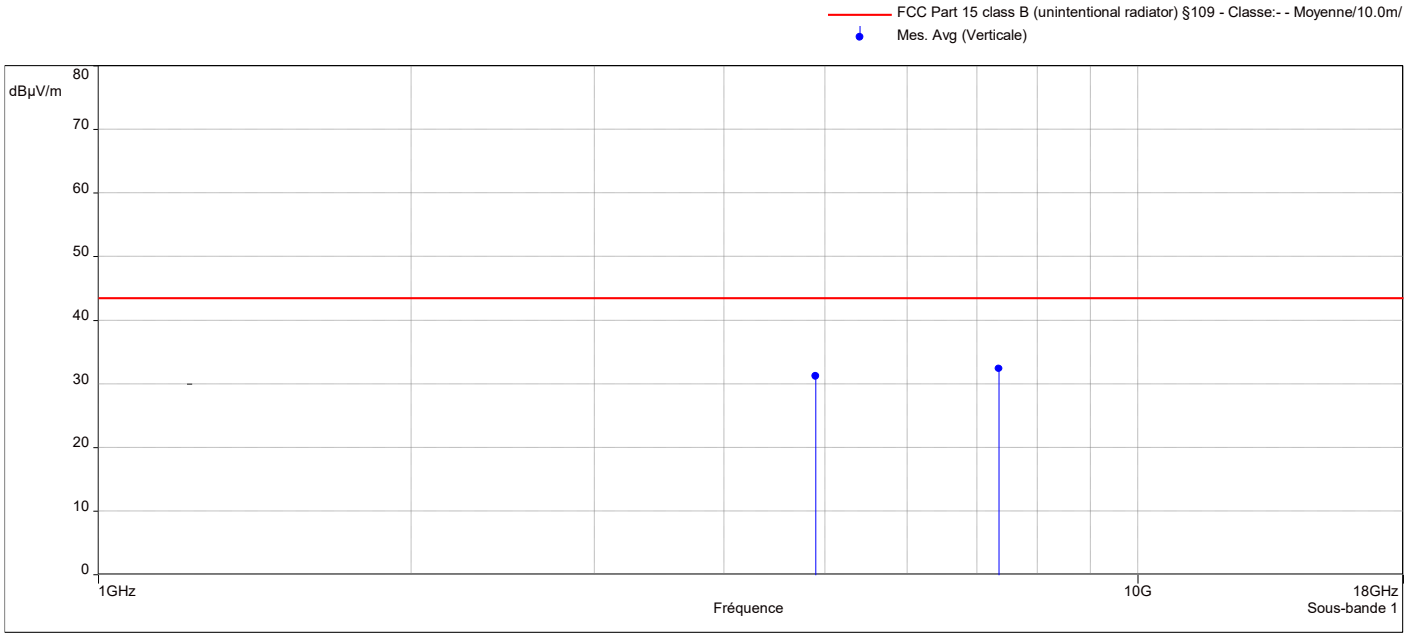


Diagram N°3
Vertical & Horizontal Polarization
Average value
(1GHz-18GHz)



3.6. CONCLUSION

Measures of Radiated Emission, performed on the sample of the product CEM-ES-5, SN: 035, in configuration and description presented in this test report, show levels conform to the FCC part 15 & ICES -003 limits.

4. Uncertainties Chart

Kind of measurement	Wide uncertainty laboratory (k=2) ±x(dB)	CISPR uncertainty limit ±y(dB)
Measurement of conducted disturbances in voltage on the AC power port (9 kHz – 150 kHz)	2,67	3.8
Measurement of conducted disturbances in voltage on the AC power port (150 kHz – 30 MHz)	2,67	3.4
Measurement of conducted disturbances in voltage on the telecommunication port. (AAN)	3,67	5.0
Measurement of conducted disturbances in current (current clamp)	2,73	2.9
Measurement of disturbance power	2,67	4.5
Measurement of radiated magnetic field from 10kHz to 30MHz in SAC V01	4,48	/
Measurement of radiated magnetic field from 10kHz to 30MHz in SAC C01	4,48	/
Measurement of radiated electric field from 30 to 1000MHz in horizontal position on the OATS (Ecuelles)	4,88	6.3
Measurement of radiated electric field from 1 to 18GHz on the Ecuelles site	5.16	/
Measurement of radiated electric field from 30 to 1000MHz in vertical position on the OATS (Ecuelles)	4,99	6.3
Measurement of radiated electric field from 30 to 1000MHz in horizontal position in SAC C01	5,08	6.3
Measurement of radiated electric field from 30 to 1000MHz in vertical position in SAC C01	5,16	6.3
Measurement of radiated electric field from 30 to 1000MHz in horizontal position in SAC V01	5,08	6.3
Measurement of radiated electric field from 30 to 1000MHz in vertical position in SAC V01	5,15	6.3
Measurement of radiated electric field from 1 to 6 GHz C01	5,1	5.2
Measurement of radiated electric field from 1 to 6 GHz V01	4,85	5.2
Measurement of radiated magnetic field from 10kHz to 30MHz on the OATS (Ecuelles)	4,48	/

End of test report

AUTO CONTROL

1. Measurement of radiated emissions

Polarity antenna	Frequency MHz	Level measured dBµV/m
Vertical	65	38.9
Vertical	115	48.4
Vertical	515	47.2
Vertical	900	39.8

2. Measurement of conducted disturbance