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TEST REPORT

N°: 157205 - 726502

Version : 02

Subject

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

Issued to

SAGEMCOM BROADBAND SAS
250 Route de l' Empereur
92500 – RUEIL MALMAISON
FRANCE

Apparatus under test

- ↻ Product
- ↻ Trade mark
- ↻ Manufacturer
- ↻ Model under test
- ↻ Serial number

Sound Box
Sagemcom®
SAGEMCOM
Sound Box SBDV01
253770742

Test date

September 24, 2018 to September 25, 2018

Test location

LCIE, Fontenay Aux Roses

Test performed by

Steve Bogler

Composition of document

20 pages

Document issued on

November 19, 2018

Written by :
Steve Bogler
Tests operator



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PUBLICATION HISTORY

Version	Date	Author	Modification
01	October 9, 2018	Steve Bogler	Creation of the document
02	November 19, 2018	Steve Bogler	Customer request withdraw all picture of the EUT from test report. Add measurement above 6GHz and test set up picture



SUMMARY

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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) & (c)	<input type="checkbox"/> Class A <input checked="" type="checkbox"/> Class B	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP (Limited Program)
Measurement of radiated electric field in open space	<input type="checkbox"/> Class A <input type="checkbox"/> Class B	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NA <input type="checkbox"/> NP (Limited Program)
Measurement of conducted disturbance on the AC main power port 15.107 (a) (c) (d)	<input type="checkbox"/> Class A <input checked="" type="checkbox"/> Class B	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP (Limited Program)

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): Sound Box SBDV01
Power supply : NBC80A200400M2

Serial Number: 253770742

Inputs/outputs - Cable:

Access	Inputs / Outputs	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Main power supply	Input	L1-N	-	-	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-
Network	Input	RJ45	-	-	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-

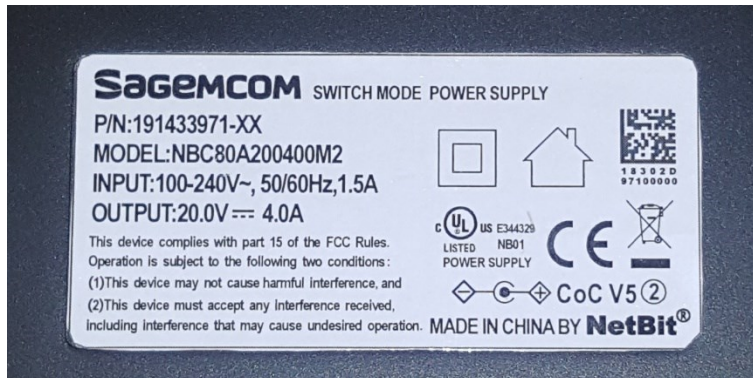
Auxiliary equipment used during test:

Type	Reference	Sn	Comments
LAPTOP	-	-	-

Equipment information: (Declared by provider)

Apparatus Description	EUT Description		
Type of power source:	<input checked="" type="checkbox"/> AC power supply	<input type="checkbox"/> DC power supply	<input type="checkbox"/> Battery (Select Type)
Test source voltage:	Vmin-Vmax:	<input type="checkbox"/> 100 - 240 V / 50 - 60 Hz	<input type="checkbox"/> Vnom VDC
Operating Modes	Mode 1	ON	

2.2. EQUIPMENT LABELLING



Factory S/N Code barre type 128	Code barre type 128	 FCC ID: VW3SBDV01	SAGEMCOM Sound Box SBDV01 253770742-ind 20V === 4A Date Code: WW/YY SSID : amplify-CCDDEE Made in CZECH Republic
	Code barre type 128		
	M/SO Part Number: 12345		
	Code barre type 128		
	SGC S/N: 123456789012		
	MAC Address : aa:bb:cc:dd:ee		
	TYM S/N : XXXXXXXXX	Manufactured under license from Dolby Laboratories. Dolby, Dolby Audio and the double-D symbol are trademarks of Dolby Laboratories.	

Equipment Labelling

2.3. EQUIPMENT MODIFICATIONS

None Modification:



3. Measurement of radiated emissions

3.1. ENVIRONMENTAL CONDITIONS

Test performed by : **Steve Bogler**
Date of test : September 25, 2018
Ambient temperature : 20°C
Relative humidity : 38%

3.2. TEST SETUP

Specifications:

Frequency	30 – 1000 MHz	RBW 120 kHz
	1-40GHz	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:

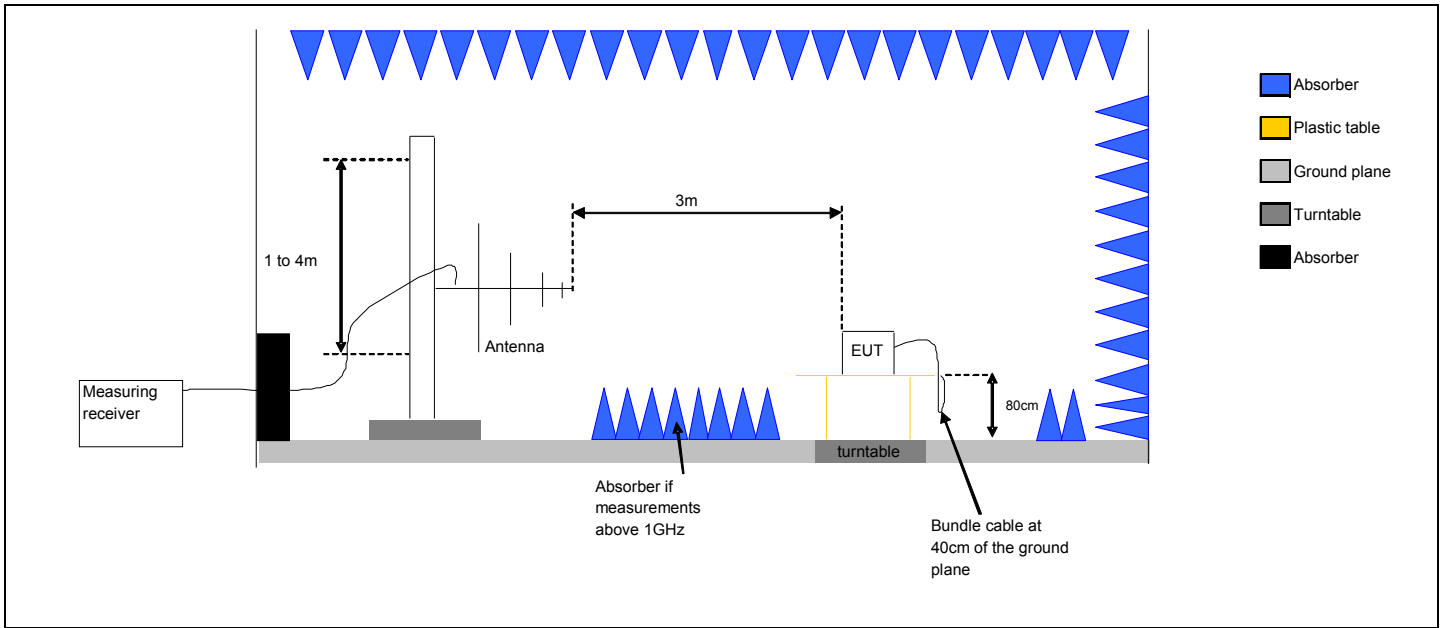
- Yes
 No

-Product installation:

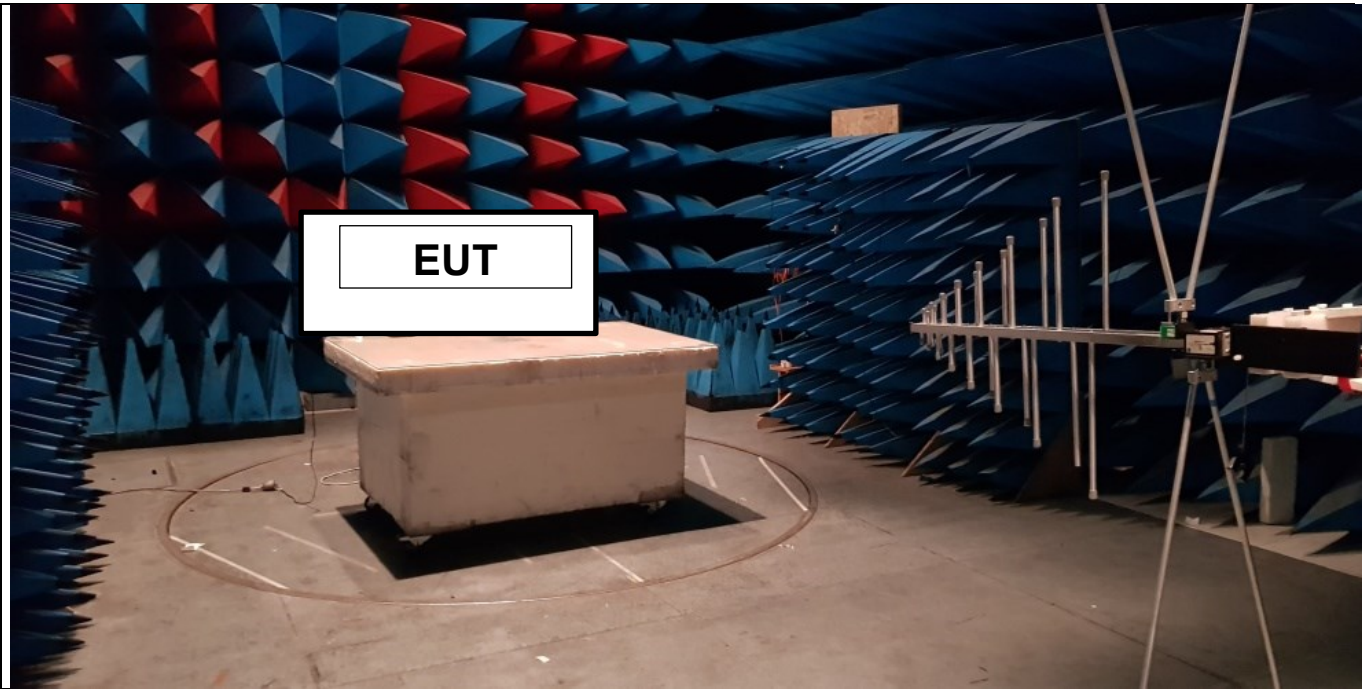
- The EUT was tested as a tabletop equipment and was placed on a non-conducting platform the top of which is 0.8m above the metal ground plane.
 The EUT is at 10cm height from reference plane

Operating mode:

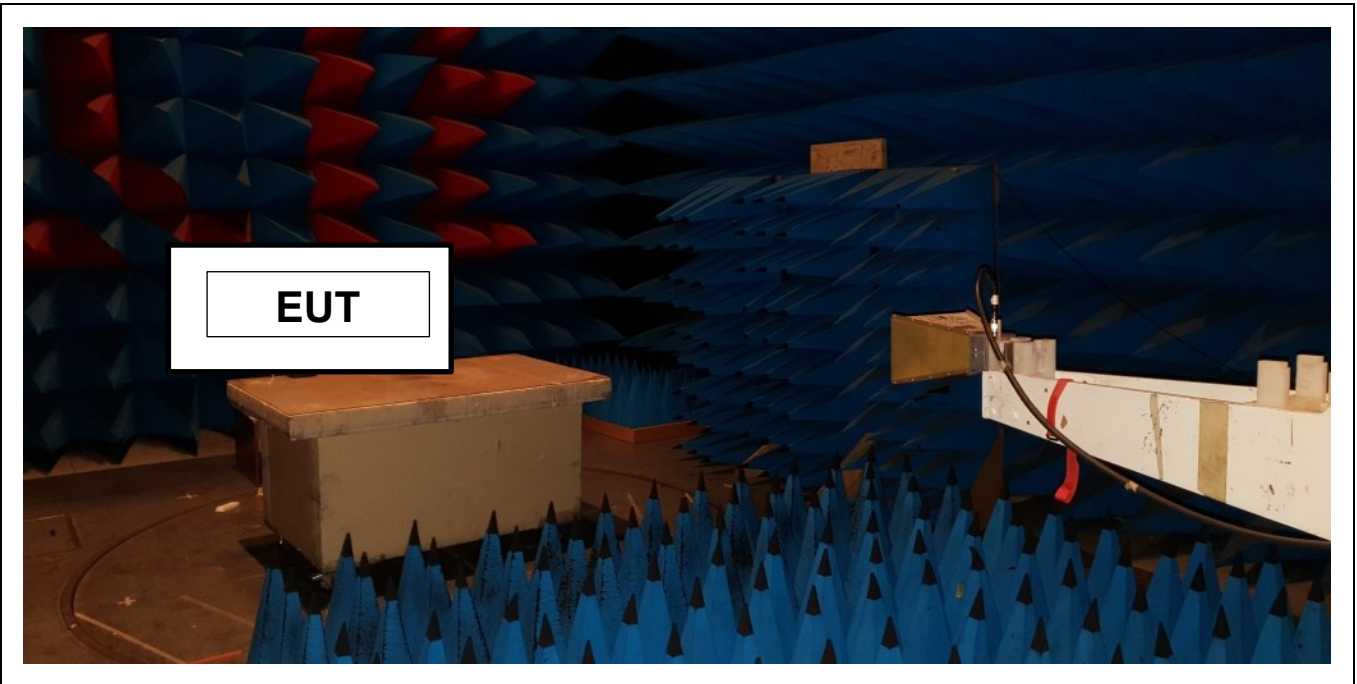
- Mode 1 Mode 2 Mode 3 ...



Test Set up for radiated measurement in semi anechoic chamber



Measurement of radiated disturbances.



Measurement of radiated disturbances.



3.3. LIMIT

at 3m Class A

Frequency Bands/frequencies	dB (µV/m) quasi-peak	dB (µV/m) peak	dB (µV/m) average
30-88MHz	49.5	-	-
88 – 216MHz	53.9	-	-
216 – 960 MHz	56.9	-	-
960 – 1000 MHz	60	-	-
1000-40000MHz	-	80	60

at 3m Class B

Frequency Bands/frequencies	dB (µV/m) quasi-peak	dB (µV/m) peak	dB (µV/m) average
30-88MHz	40	-	-
88 – 216MHz	43.5	-	-
216 – 960 MHz	46	-	-
960 – 1000 MHz	53.9	-	-
1000-40000MHz	-	73.9	53.9

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	-	-
1000-40000MHz	-	70	50

at 10m Class B

Frequency Bands/frequencies	dB (µV/m) quasi-peak	dB (µV/m) peak	dB (µV/m) average
30-88MHz	30	-	-
88 – 216MHz	33.5	-	-
216 – 960 MHz	36	-	-
960 – 1000 MHz	43.9	-	-
1000-40000MHz	-	63.9	43.9



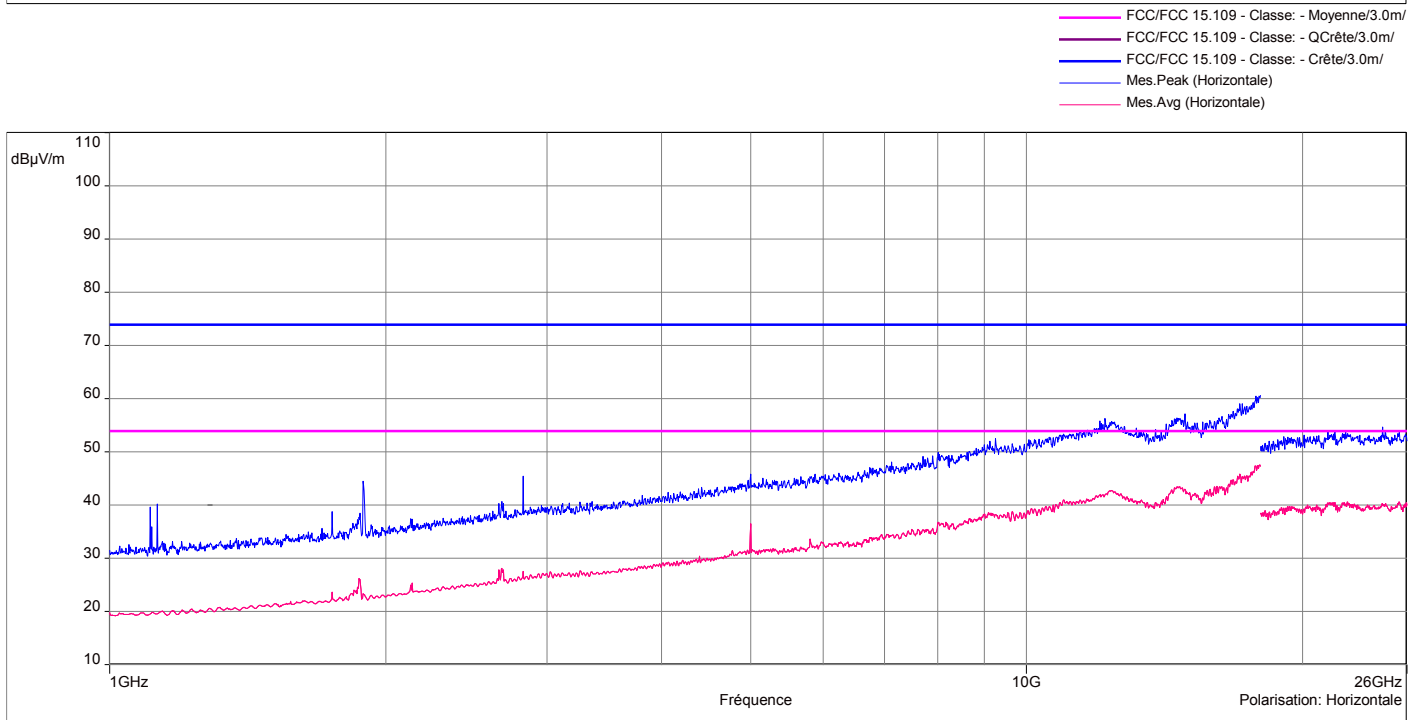
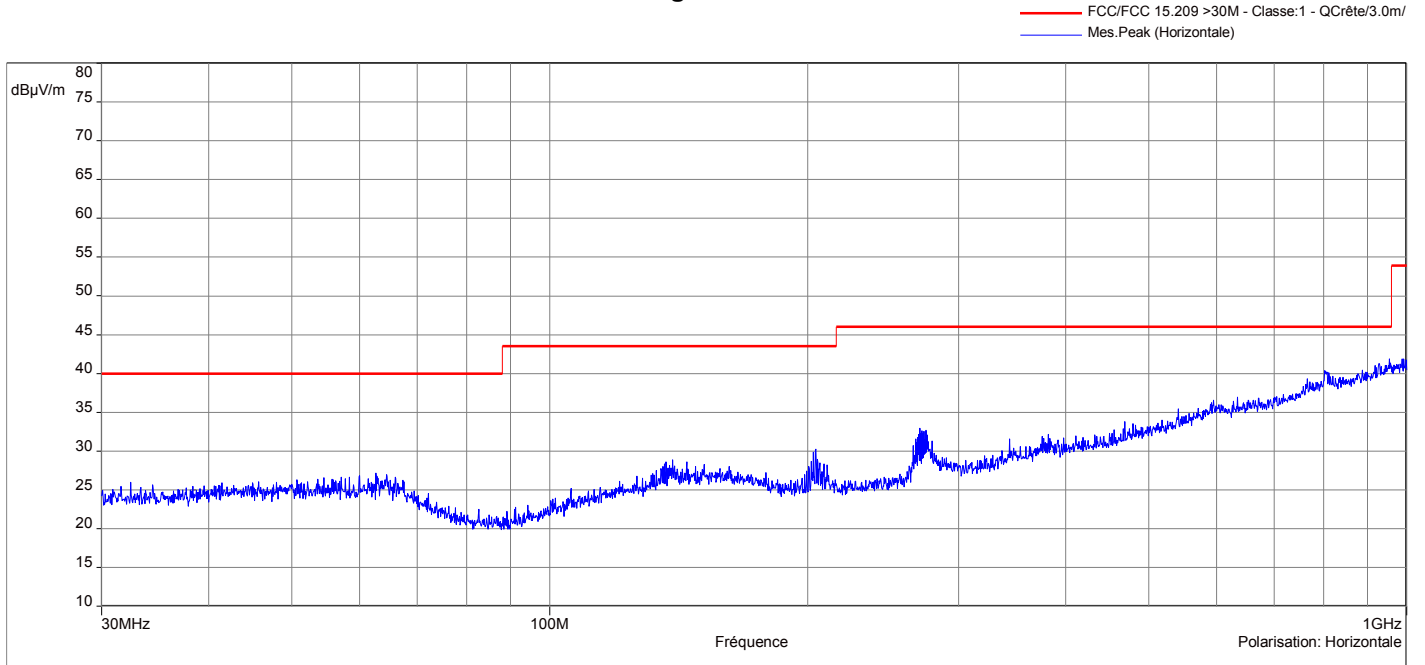
3.4. TEST EQUIPMENT LIST

Description	Constructor	Model	N°	Cal. Date	Cal. Due
Bilog antenna	SCHWARZBECK	VULB9160	C2040150	2018/04	2019/04
Cable	-	-	A5329711	2017/06	2018/07*
Horn antenna	A-infoMW	Broadband 1-18	C2042056	2016/07	2018/07
Horn antenna (18-26,5GHz)	PASTERNAK	PE9852/2F-20	C2042049	2017/12	2019/12
Horn antenna (26,5-40GHz)	PASTERNAK	PE9852/2F-20	C2042052	2018/03	2020/03
SEMI ANECHOIC CHAMBER	SIEPEL	ANE	D3044008	2014/09	2018/09
EMI Receiver	ROHDE & SCHWARZ	ESU26	A2642018	2016/10	2018/10
EMI receiver	ROHDE & SCHWARZ	ESI40 1088 740K40	A2642010	2016/07	2018/07*
Preamplifier	LCIE	-	A7086012	2018/03	2019/03
Preamplifier	LCIE	LCIE-ALB-001	A7080073	2018/08	2020/08
Cable	-	-	A5329360	-	-
AC power supply	ADAPTIVE POWER SYSTEM	FC210	A7360017	-	-
*Note : In our quality system, the test equipment calibration due is more or less 2 month					



3.5. RESULTS

Diagram N°1



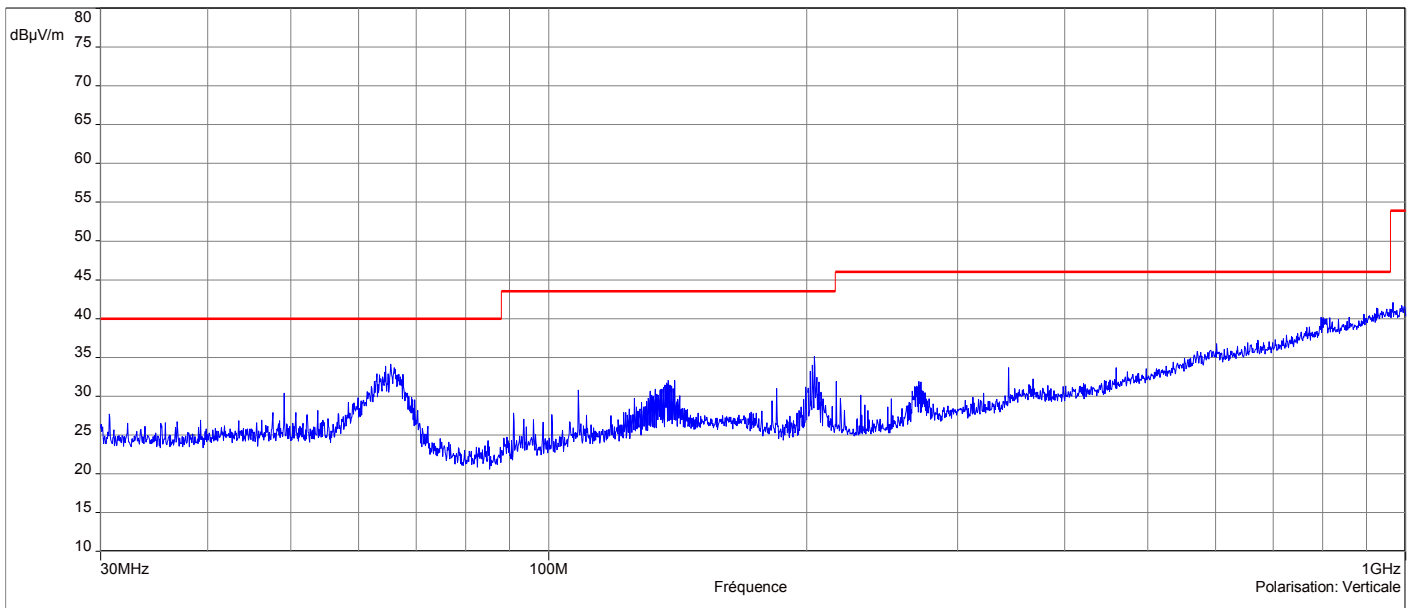
**No significant spurious has been observed between 26GHz to 40GHz
Horizontal Polarization (30MHz-40GHz)**



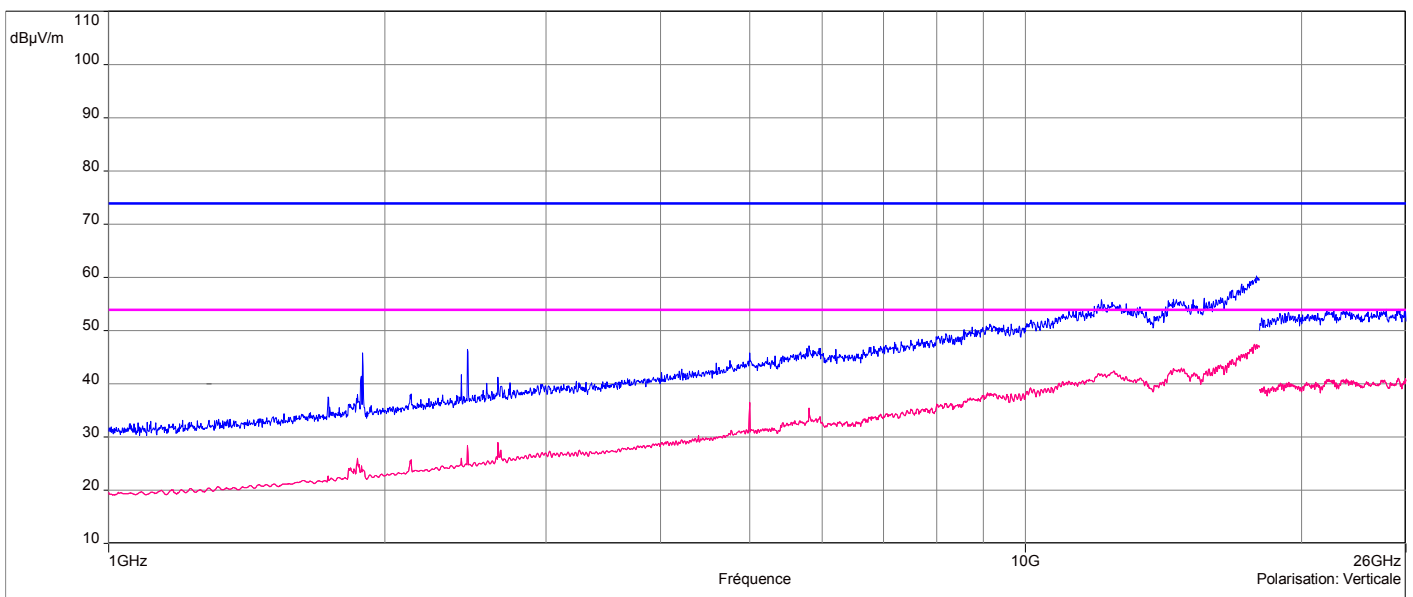
L C I E

Diagram N°2

— FCC/FCC 15.209 >30M - Classe:1 - QCrête/3.0m/
— Mes.Peak (Verticale)



— FCC/FCC 15.109 - Classe: - Moyenne/3.0m/
— FCC/FCC 15.109 - Classe: - QCrête/3.0m/
— FCC/FCC 15.109 - Classe: - Crête/3.0m/
— Mes.Peak (Verticale)
— Mes.Avg (Verticale)



**No significant spurious has been observed between 26GHz to 40GHz
Vertical Polarization (30MHz-40GHz)**

3.6. CONCLUSION

Measures of Radiated Emission, performed on the sample of the product **Sound Box SBDV01**, SN: 253770742, in configuration and description presented in this test report, show levels conform to the FCC part 15 & ICES -003 limits.



4. Measurement of conducted disturbance

4.1. ENVIRONMENTAL CONDITIONS

Test performed by : **Steve Bogler**
Date of test : September 25, 2018
Ambient temperature : 20°C
Relative humidity : 38%

4.2. TEST SETUP

Specifications:

Frequency 0.15 – 30 MHz RBW 9 kHz
Detector Peak , Quasi Peak and average

The measurement is performed on power supply with a LISN and telecommunication lines with RSI or current clamp for shielded cables.

Operating conditions:

- Deviation method:

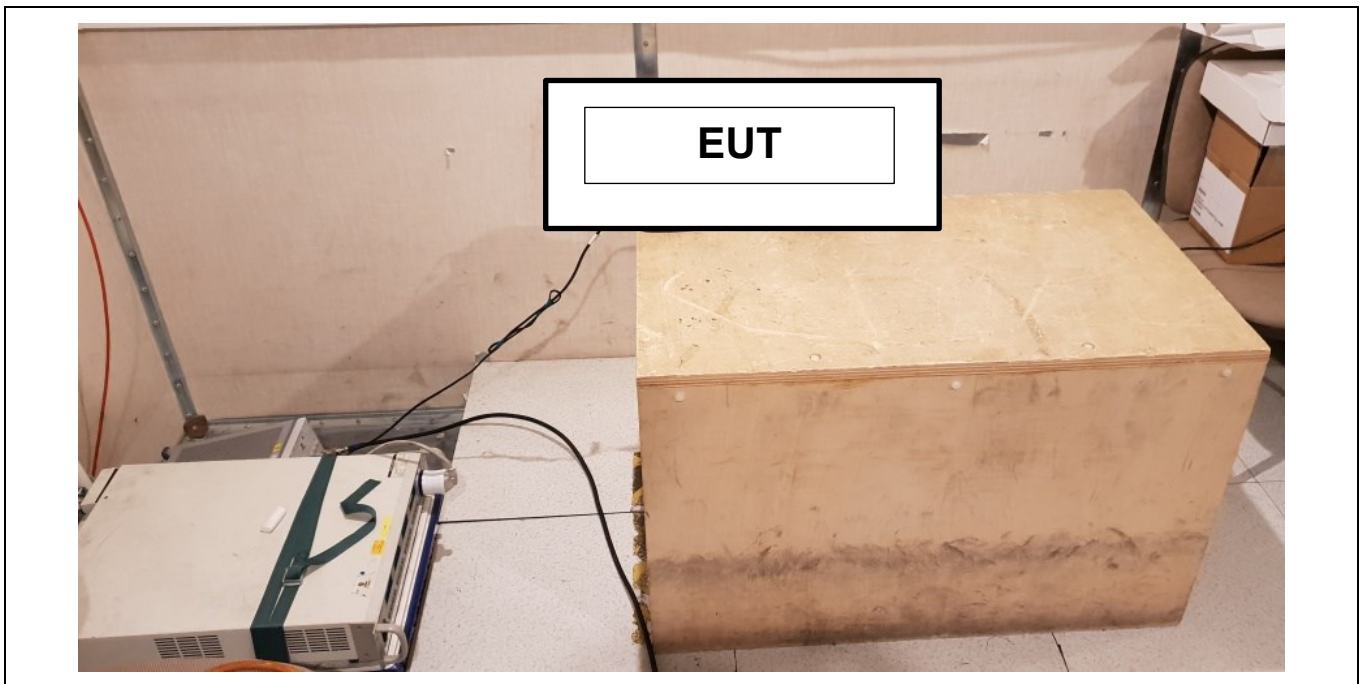
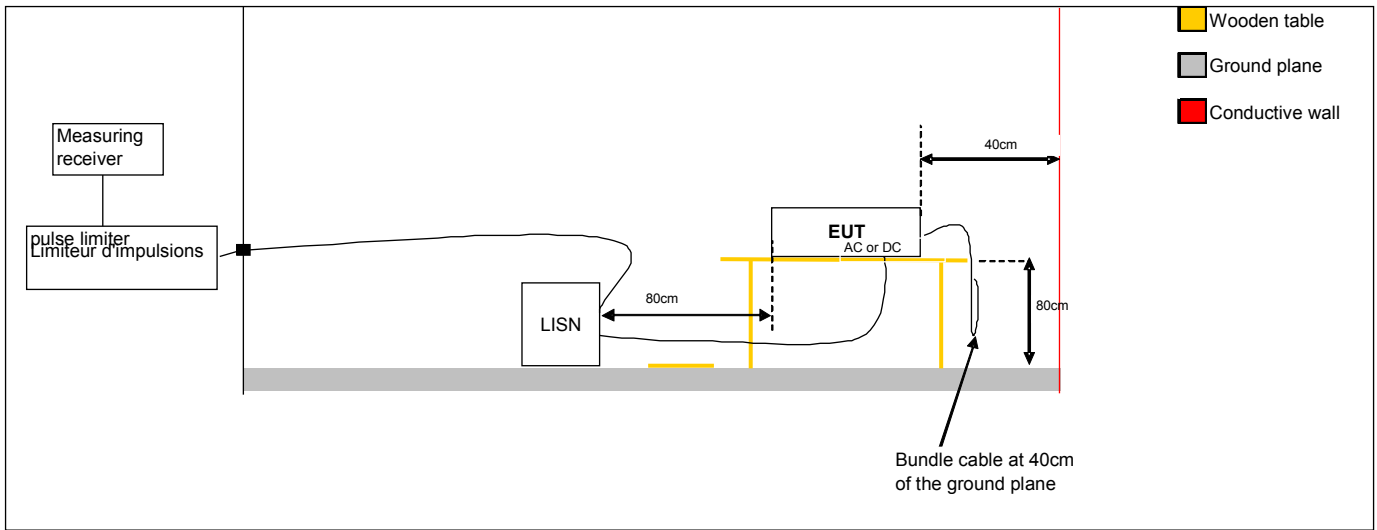
- Yes
 No

-Product installation:

- The EUT is installed on a wooden table 80 cm above the reference plane, at 80cm of the LISN and at 40cm of the vertical conductive wall
 The EUT is installed on a wooden table 40 cm above the reference plane, at 80cm of the LISN.
 The EUT is installed 10 cm above the reference plane, at 80cm of the LISN..

Operating mode:

- Mode 1 Mode 2 Mode 3 ...





Test set up of conducted emission on power supply



4.3. LIMIT

Power supply Class A

Frequency Bands/frequencies	dB ($\mu\text{V}/\text{m}$) quasi-peak	dB ($\mu\text{V}/\text{m}$) average
0.15-0.5MHz	79	66
0.5-30 MHz	73	60

Power supply Class B

Frequency Bands/frequencies	dB ($\mu\text{V}/\text{m}$) quasi-peak	dB ($\mu\text{V}/\text{m}$) average
0.15-0.5MHz	66-56	56-46
0.5-5 MHz	56	46
5-30 MHz	60	50

4.4. TEST EQUIPMENT LIST

Description	Constructor	Model	N°	Cal. Date	Cal. Due
EMI Receiver	ROHDE & SCHWARZ	ESU26	A2642018	2016/10	2018/10
RSIL	ROHDE & SCHWARZ	ENV215	C2320162	2018/01	2019/01
AC power supply	ADAPTIVE POWER SYSTEM	FC210	A7360017	-	-
Cable	-	-	A5329712	2018/03	2019/03

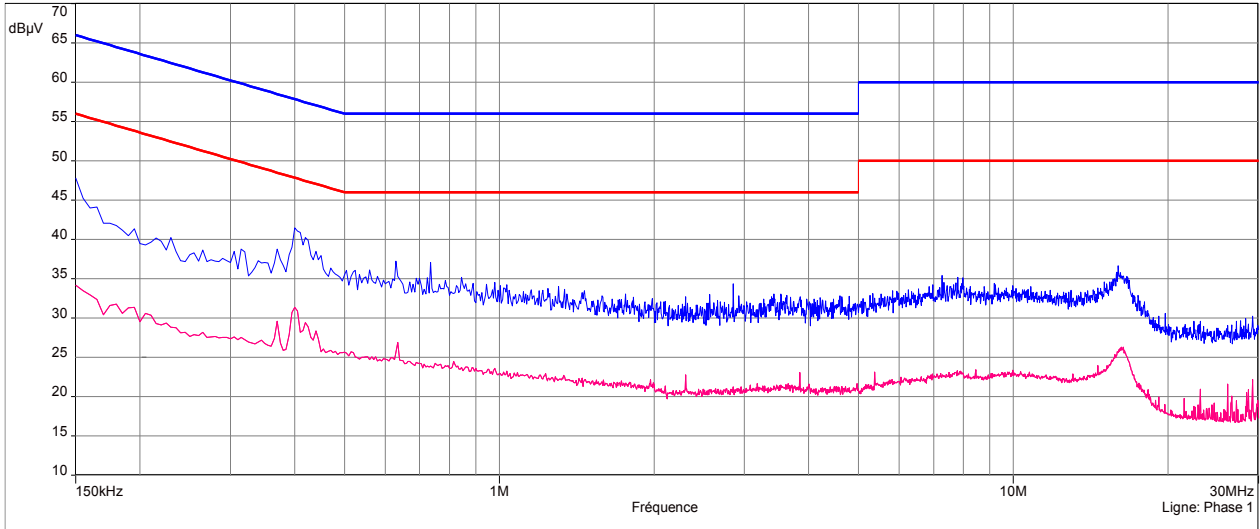


4.5. RESULTS

Diagram N°1

- FCC/FCC 15.107 - Classe:B - Moyenne/
- FCC/FCC 15.107 - Classe:B - QCrête/
- FCC/FCC 15.207 - Classe:B - Moyenne/
- FCC/FCC 15.207 - Classe:B - QCrête/
- Mes.Peak (Phase 1)
- Mes.Avg (Phase 1)

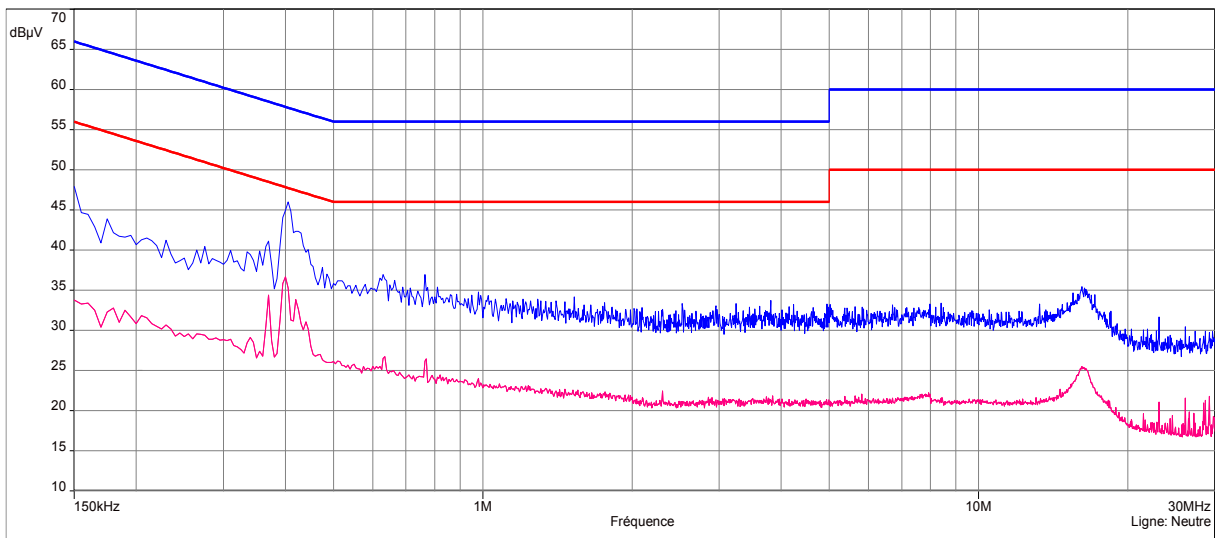
Description Sous-bande 1
Fréquences: 150 kHz - 30 MHz (Mode: Lin, Pas: 5 kHz)
Réglages: RBW: 9kHz, VBW: Auto, Durée balayage: 50 ms/Pts, Atténuation: 10 dB, Nombre de Balayages: 1, Preamp: Off, LN Preamp: Off, Preselecteur: On
Ligne:Phase 1



Phase Diagram N°2

- FCC/FCC 15.107 - Classe:B - Moyenne/
- FCC/FCC 15.107 - Classe:B - QCrête/
- FCC/FCC 15.207 - Classe:B - Moyenne/
- FCC/FCC 15.207 - Classe:B - QCrête/
- Mes.Peak (Neutre)
- Mes.Avg (Neutre)

Description Sous-bande 2
Fréquences: 150 kHz - 30 MHz (Mode: Lin, Pas: 5 kHz)
Réglages: RBW: 9kHz, VBW: Auto, Durée balayage: 50 ms/Pts, Atténuation: 10 dB, Nombre de Balayages: 1, Preamp: Off, LN Preamp: Off, Preselecteur: On
Ligne:Neutre



Neutral



4.6. CONCLUSION

Measures of Conducted Emission, performed on the sample of the product **Sound Box SBDV01**, SN: 253770742, in configuration and description presented in this test report, show levels conform to the FCC part 15 & ICES -003 limits.



5. Uncertainties Chart

Kind of measurement	Wide uncertainty laboratory (k=2) $\pm x$ (dB)	CISPR uncertainty limit $\pm y$ (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 (Ecuellas)	4,88	6.3
Measurement of radiated electric field from 1 to 18GHz on the Ecuellas site	5.16	/
Measurement of radiated electric field from 30 to 1000MHz in vertical position on the OATS (Ecuellas)	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 (Ecuellas)	4,48	/

End of test report