



LCIE

Bluetooth Low Energy Template: Release August 20th, 2016

# TEST REPORT

N°: 145064-694081A

Version : 01

## Subject

Radio spectrum matters  
tests according to standards:  
47 CFR Part 15.247 [P](#)

## Issued to

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

## Apparatus under test

[P](#) Product **DGCI384 UHD AIt US**  
[P](#) Trade mark **SAGEMCOM**  
[P](#) Manufacturer **SAGEMCOM**  
[P](#) Model under test **TheBox (253697282)**  
[P](#) Serial number **616400107098**  
[P](#) FCC ID **VW3DGCI384**

## Test date

: November 9, 2016 to November 22, 2016

## Test location

Fontenay Aux Roses & Ecuelles

## Composition of document

50 pages

## Document issued on

January 9, 2017

**Written by :**  
Arnaud FAYETTE  
**Tests operator**

**Approved by :**  
Stéphane PHOUDIAH  
**Technical manager**



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## PUBLICATION HISTORY

<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Modification</b>
01	January 6, 2017	Arnaud FAYETTE	Creation of the document



## SUMMARY

1.	TEST PROGRAM .....	4
2.	EQUIPMENT UNDER TEST: CONFIGURATION (DECLARED BY PROVIDER) .....	5
3.	OCCUPIED BANDWIDTH .....	12
4.	6DB EMISSION BANDWIDTH .....	15
5.	DUTY CYCLE .....	18
6.	MAXIMUM CONDUCTED OUTPUT POWER .....	20
7.	POWER SPECTRAL DENSITY .....	23
8.	UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS AT THE BAND EDGE	26
9.	UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS .....	29
10.	AC POWER LINE CONDUCTED EMISSIONS .....	32
11.	UNWANTED EMISSIONS IN RESTRICTED FREQUENCY BANDS .....	37
12.	UNCERTAINTIES CHART .....	50

## 1. TEST PROGRAM

### References

- 47 CFR Part 15.247
- KDB 558074 D01 DTS Meas Guidance v03r05
- ANSI C63.10-2013

### Radio requirement:

Clause (47CFR Part 15.247) Test Description	Test result - Comments			
Occupied Bandwidth <a href="#">ℹ</a>	<input checked="" type="checkbox"/> <b>PASS</b>	<input type="checkbox"/> <b>FAIL</b>	<input type="checkbox"/> <b>NA</b>	<input type="checkbox"/> <b>NP(1)</b>
6dB Bandwidth <a href="#">ℹ</a>	<input checked="" type="checkbox"/> <b>PASS</b>	<input type="checkbox"/> <b>FAIL</b>	<input type="checkbox"/> <b>NA()</b>	<input type="checkbox"/> <b>NP(1)</b>
Duty Cycle <a href="#">ℹ</a>	<input checked="" type="checkbox"/> <b>PASS</b>	<input type="checkbox"/> <b>FAIL</b>	<input type="checkbox"/> <b>NA</b>	<input type="checkbox"/> <b>NP(1)</b>
Maximum Conducted Output Power <a href="#">ℹ</a>	<input checked="" type="checkbox"/> <b>PASS</b>	<input type="checkbox"/> <b>FAIL</b>	<input type="checkbox"/> <b>NA</b>	<input type="checkbox"/> <b>NP(1)</b>
Power Spectral Density <a href="#">ℹ</a>	<input checked="" type="checkbox"/> <b>PASS</b>	<input type="checkbox"/> <b>FAIL</b>	<input type="checkbox"/> <b>NA</b>	<input type="checkbox"/> <b>NP(1)</b>
Conducted Spurious Emission at the Band Edge <a href="#">ℹ</a>	<input checked="" type="checkbox"/> <b>PASS</b>	<input type="checkbox"/> <b>FAIL</b>	<input type="checkbox"/> <b>NA()</b>	<input type="checkbox"/> <b>NP(1)</b>
Unwanted Emissions into Non-Restricted Frequency Bands <a href="#">ℹ</a>	<input checked="" type="checkbox"/> <b>PASS</b>	<input type="checkbox"/> <b>FAIL</b>	<input type="checkbox"/> <b>NA()</b>	<input type="checkbox"/> <b>NP(1)</b>
AC Power Line Conducted Emission <a href="#">ℹ</a>	<input checked="" type="checkbox"/> <b>PASS</b>	<input type="checkbox"/> <b>FAIL</b>	<input type="checkbox"/> <b>NA(2)</b>	<input type="checkbox"/> <b>NP(1)</b>
Unwanted Emissions into Restricted Frequency Bands <a href="#">ℹ</a>	<input checked="" type="checkbox"/> <b>PASS</b>	<input type="checkbox"/> <b>FAIL</b>	<input type="checkbox"/> <b>NA</b>	<input type="checkbox"/> <b>NP(1)</b>
Receiver Radiated emissions <a href="#">ℹ</a>	<input checked="" type="checkbox"/> <b>PASS</b>	<input type="checkbox"/> <b>FAIL</b>	<input type="checkbox"/> <b>NA</b>	<input type="checkbox"/> <b>NP(1)</b>
This table is a summary of test report, see conclusion of each clause of this test report for detail.				

(1): Limited program

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

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 UNDER TEST: CONFIGURATION (DECLARED BY PROVIDER)**

**2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):**

Equipment under test (EUT):  
**SAGEMCOM TheBox (253697282)**

**Serial Number: 616400107098**



Equipment Under Test



Equipment Under Test



**Inputs/outputs - Cable:**

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
1	Power Supply	-	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-

**Auxiliary equipment used during test:**

Type	Reference	Sn	Comments
Laptop	-	-	Use to set the EUT
Power supply°1	NBS60C120500M2	16366C25200017	P/N:191363252-xx
Power supply°2	LPL-C060120500ZS	1637215590020	P/N:191363559-XX
Power supply°3	MSA-Z5000IS12.0-60A-P	H16386E6950010	P/N:191363695-XX
Power supply°4	A15-060P1A	16413K72800092	P/N:191363728

**Equipment information:**

Bluetooth LE Type:	<input checked="" type="checkbox"/> BLE	<input type="checkbox"/> v4.0	<input type="checkbox"/> v4.1	<input type="checkbox"/> v4.2
Frequency band:	[2400 – 2483.5] MHz			
Number of Channel:	40			
Spacing channel:	2MHz			
Channel bandwidth:	1MHz			
Antenna Type:	<input checked="" type="checkbox"/> Integral	<input type="checkbox"/> External	<input type="checkbox"/> Dedicated	
Antenna connector:	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Temporary for test	
Transmit chains:	1 Single antenna			
Receiver chains	1			
Type of equipment:	<input checked="" type="checkbox"/> Stand-alone	<input type="checkbox"/> Plug-in	<input type="checkbox"/> Combined	
Ad-Hoc mode:	<input type="checkbox"/> Yes		<input checked="" type="checkbox"/> No	
Duty cycle:	<input checked="" type="checkbox"/> Continuous duty	<input type="checkbox"/> Intermittent duty	<input type="checkbox"/> 100% duty	
Equipment type:	<input checked="" type="checkbox"/> Production model		<input type="checkbox"/> Pre-production model	
Operating temperature range:	Tmin:	<input type="checkbox"/> -20°C	<input checked="" type="checkbox"/> 0°C	<input type="checkbox"/> X°C
	Tnom:	20°C		
	Tmax:	<input type="checkbox"/> 35°C	<input type="checkbox"/> 55°C	<input checked="" type="checkbox"/> 45°C
Type of power source:	<input checked="" type="checkbox"/> AC power supply	<input type="checkbox"/> DC power supply	<input type="checkbox"/> Battery	
Operating voltage range:	Vnom:	<input checked="" type="checkbox"/> 120V/60Hz	<input type="checkbox"/> X Vdc	

**Antenna Characteristic**

Antenna assembly	Gain (dBi)	Frequency Band (MHz)	Impedance(Ω)
1	2.6	2400-2483.5	50



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### CHANNEL PLAN

Channel	Frequency (MHz)	Channel	Frequency (MHz)
<b>Cmin: 0</b>	2402	<b>Cmid: 20</b>	2442
1	2404	21	2444
2	2406	22	2446
3	2408	23	2448
4	2410	24	2450
5	2412	25	2452
6	2414	26	2454
7	2416	27	2456
8	2418	28	2458
9	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	<b>Cmax: 39</b>	2480

### DATA RATE

Data Rate (Mbps)	Modulation Type	Worst Case Modulation
1	GFSK	<input checked="" type="checkbox"/>



## 2.2. RUNNING MODE

The EUT is set in the following modes during tests:

- Permanent emission with modulation on a fixed channel in the data rate that produced the highest power
- Permanent reception

Following commands with the specific test software "TERATERM" are used to set the product:

- See document "BT command The Box.docx" for the command used during test

## 2.3. EQUIPMENT LABELLING



Power supply n° 1



Power supply n° 2



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Power supply n° 3



Power supply n° 4



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**SAGEMCOM**  
DGC1384 UHD Ait US  
253697282 – A01

**FC** Tested To Comply With  
FCC Standards  
FCC ID: VW3DGC1384

**UL LISTED**  
I.T.E.  
E308616

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

**Wi-Fi Network Configuration**  
Network name (SSID)  
Security key

CA S/N: 224250417792

MSD Part Number  
SGCSM  
STB MAC  
eCM MAC  
eMTA MAC  
eRouter MAC

Example of the final labelling plate

**2.4. EQUIPMENT MODIFICATION**

None       Modification:



### 3. OCCUPIED BANDWIDTH

#### 3.1. TEST CONDITIONS

Test performed by : Arnaud FAYETTE  
Date of test : November 14, 2016  
Ambient temperature : 23 °C  
Relative humidity : 45 %

#### 3.2. TEST SETUP

- The Equipment Under Test is installed:

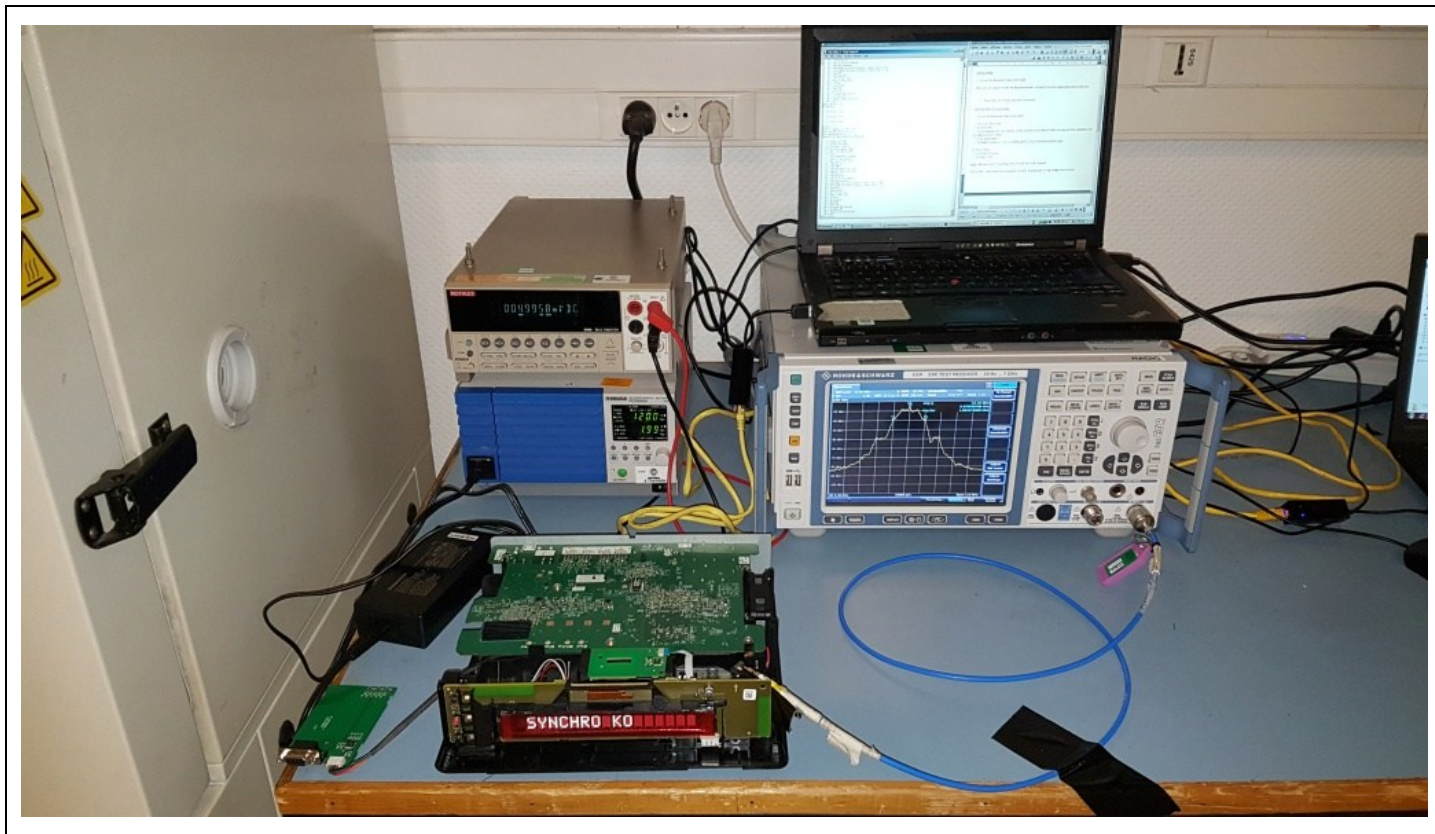
- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

- Test Procedure:

- RSS-Gen Issue 4 § 6.6
- ANSI C63.10 § 6.9.2



Photograph for Occupied bandwidth



### 3.1. LIMIT

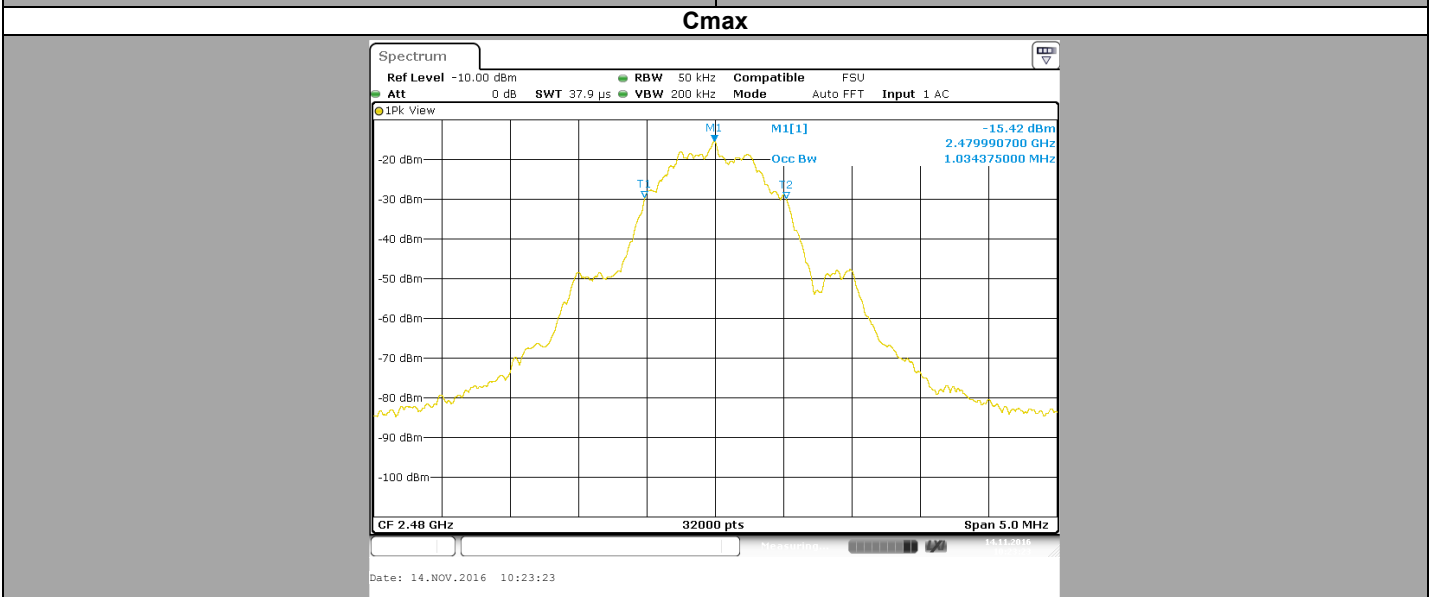
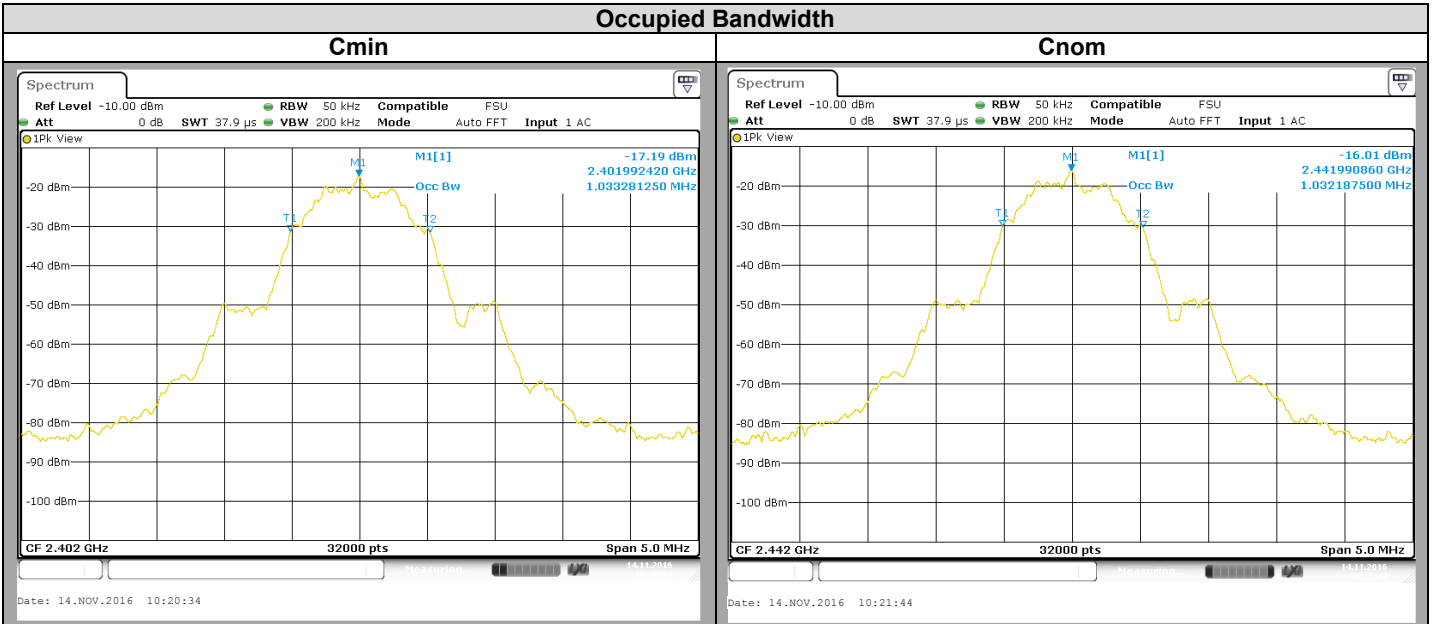
None

### 3.2. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Calibration date	Calibration due
Multi-meter	KEITHLEY	2000	A1241084	2016/05	2018/05
Programmable AC/DC power supply	-; KIKUSUI	PCR500M	A7049006	Verified with calibrated multimeter	Verified with calibrated multimeter
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2016/09	2017/09
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329674	2016/09	2017/09

Note: In our quality system, the test equipment calibration due is more & less 2 months

### 3.3. RESULTS



Channel	Occupied Bandwidth (MHz)
Cmin	1,033
Cnom	1,032
Cmax	1,034

### 3.1. CONCLUSION

Occupied Channel Bandwidth measurement performed on the sample of the product **SAGEMCOM TheBox (253697282)**, SN: **616400107098**, in configuration and description presented in this test report, show levels compliant to the **47 CFR PART 15.247** limits.

## 4. 6dB EMISSION BANDWIDTH

### 4.1. TEST CONDITIONS

Test performed by : Arnaud FAYETTE  
Date of test : November 14, 2016  
Ambient temperature : 24 °C  
Relative humidity : 45 %

### 4.2. TEST SETUP

- The Equipment Under Test is installed:

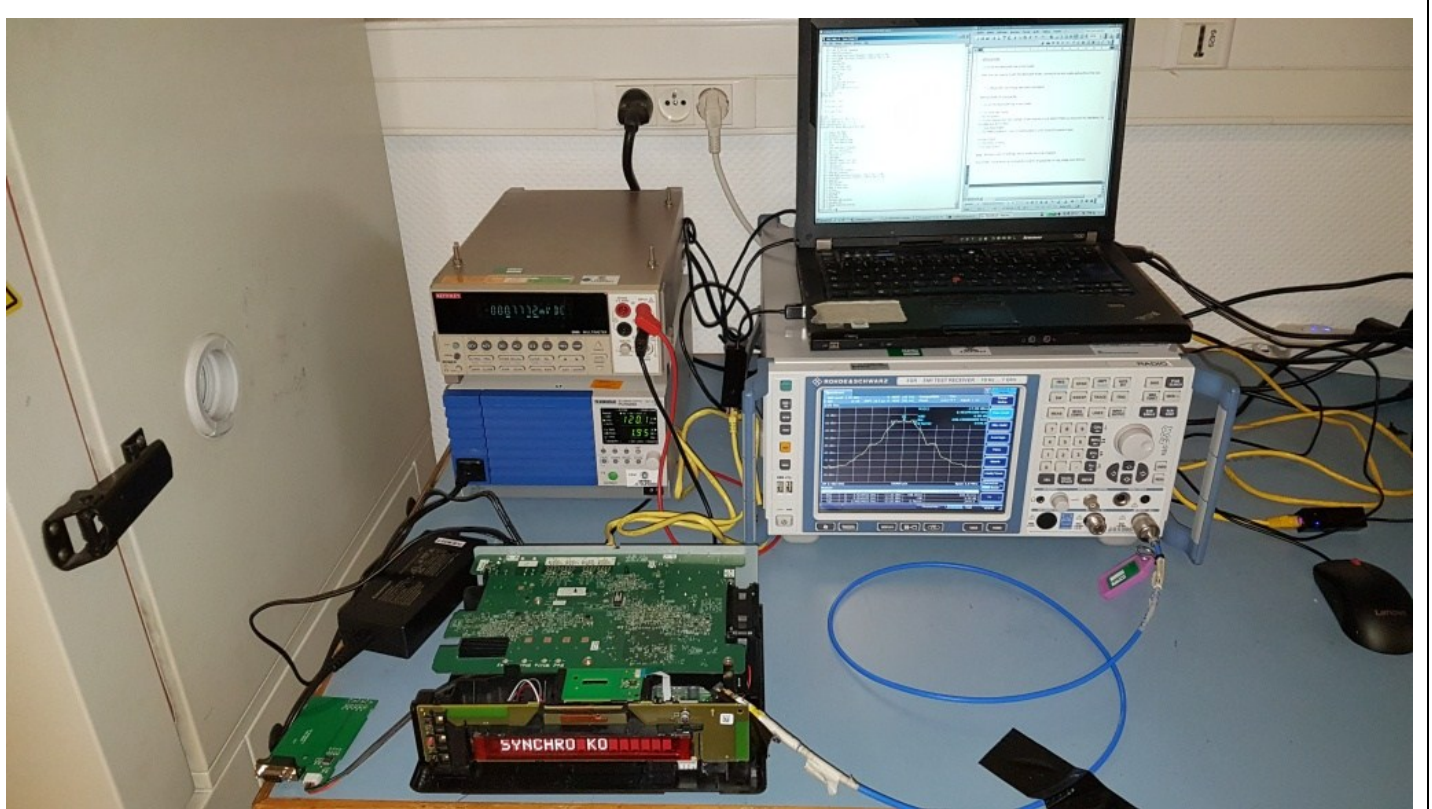
- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

- Test Procedure:

- KDB 558074 D01 DTS Meas Guidance v03r05 § 8.1
- KDB 558074 D01 DTS Meas Guidance v03r05 § 8.2



Photograph for 6dB emission bandwidth



#### 4.3. LIMIT

The 6dB bandwidth shall be at least 500kHz

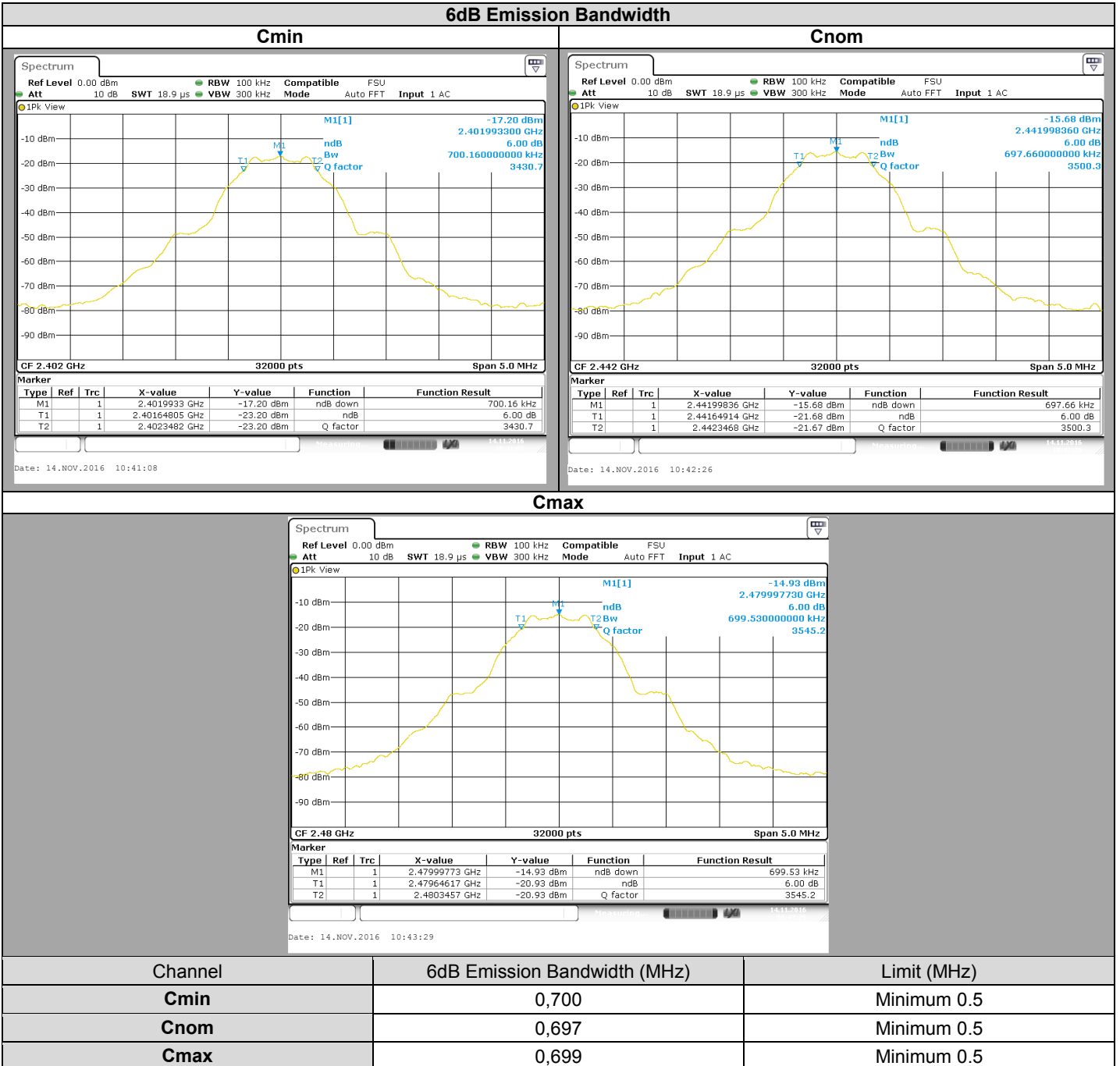
#### 4.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Calibration date	Calibration due
Multi-meter	KEITHLEY	2000	A1241084	2016/05	2018/05
Programmable AC/DC power supply	-; KIKUSUI	PCR500M	A7049006	Verified with calibrated multimeter	Verified with calibrated multimeter
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2016/09	2017/09
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329674	2016/09	2017/09

Note: In our quality system, the test equipment calibration due is more & less 2 months



#### 4.5. RESULTS



#### 4.6. CONCLUSION

6dB Emission Bandwidth measurement performed on the sample of the product **SAGEMCOM TheBox (253697282)**, SN: **616400107098**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.

## 5. DUTY CYCLE

### 5.1. TEST CONDITIONS

Test performed by : Arnaud FAYETTE  
Date of test : November 14, 2016  
Ambient temperature : 23 °C  
Relative humidity : 45 %

### 5.2. TEST SETUP

- The Equipment Under Test is installed:

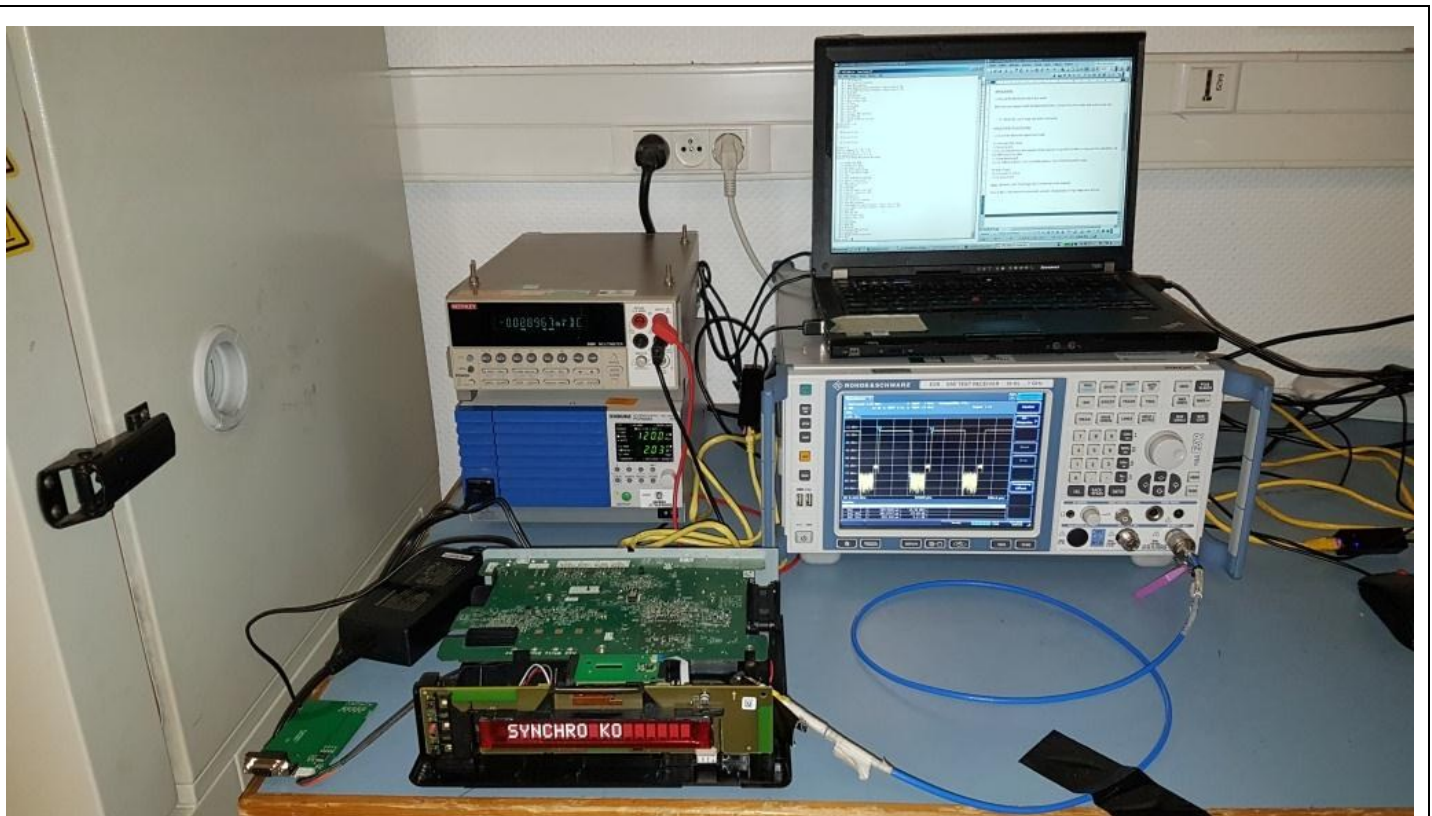
- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

- Test Procedure:

- KDB 558074 D01 DTS Meas Guidance v03r05 § 6.0 b)



Photograph for Duty Cycle

### 5.3. LIMIT

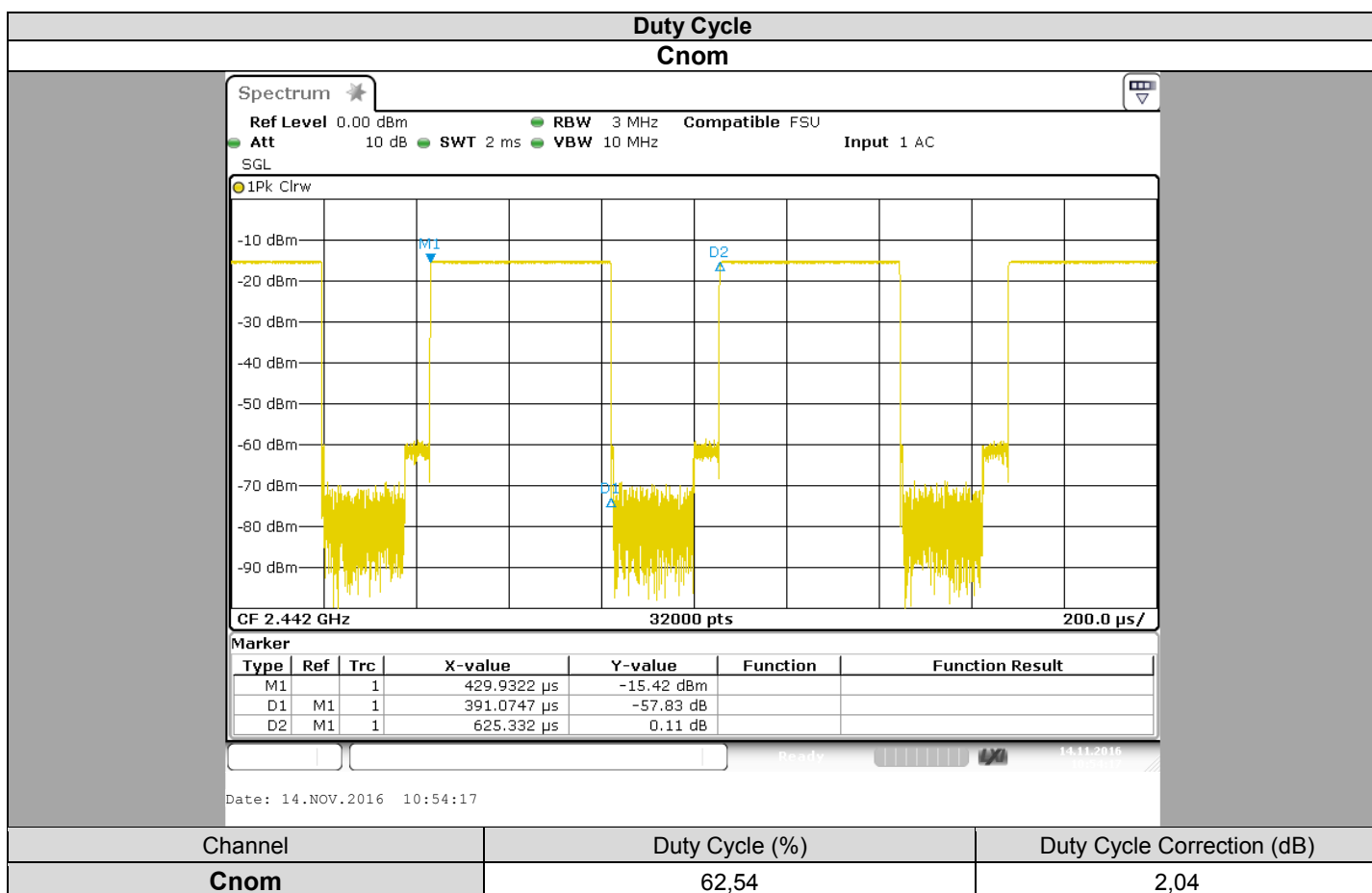
None

### 5.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Calibration date	Calibration due
Multi-meter	KEITHLEY	2000	A1241084	2016/05	2018/05
Programmable AC/DC power supply	-; KIKUSUI	PCR500M	A7049006	Verified with calibrated multimeter	Verified with calibrated multimeter
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2016/09	2017/09
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329674	2016/09	2017/09

Note: In our quality system, the test equipment calibration due is more & less 2 months

### 5.5. RESULTS



### 5.6. CONCLUSION

Duty Cycle measurement performed on the sample of the product **SAGEMCOM TheBox (253697282)**, SN: **616400107098**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.

## 6. MAXIMUM CONDUCTED OUTPUT POWER

### 6.1. TEST CONDITIONS

Test performed by : Arnaud FAYETTE  
Date of test : November 14, 2016  
Ambient temperature : 23 °C  
Relative humidity : 45 %

### 6.2. TEST SETUP

- The Equipment Under Test is installed:

- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

- Test Procedure:

- KDB 558074 D01 DTS Meas Guidance v03r05 § 9.1.1 (RBW≥DTS bandwidth)



Photograph for Maximum Conducted Output Power



### 6.3. LIMIT

Maximum Conducted Output power:  
2400MHz-2483.5MHz: Shall not exceed 30dBm  
Limits are reduced by G-6dBi if Overall Antenna Gain above 6dBi

### 6.4. TEST EQUIPMENT LIST

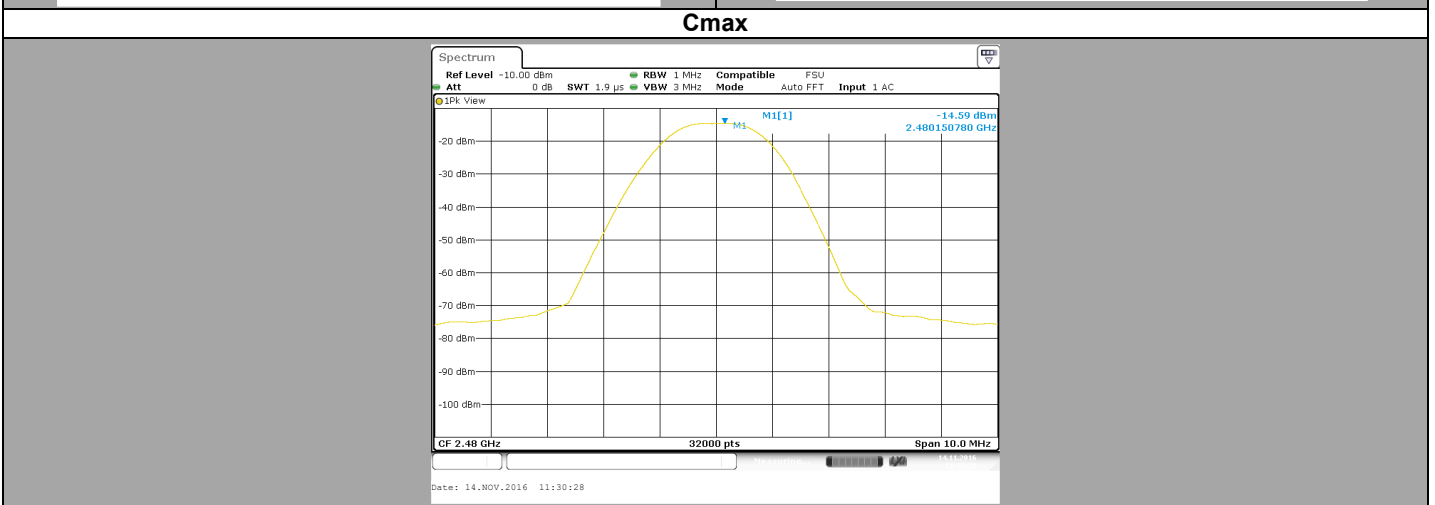
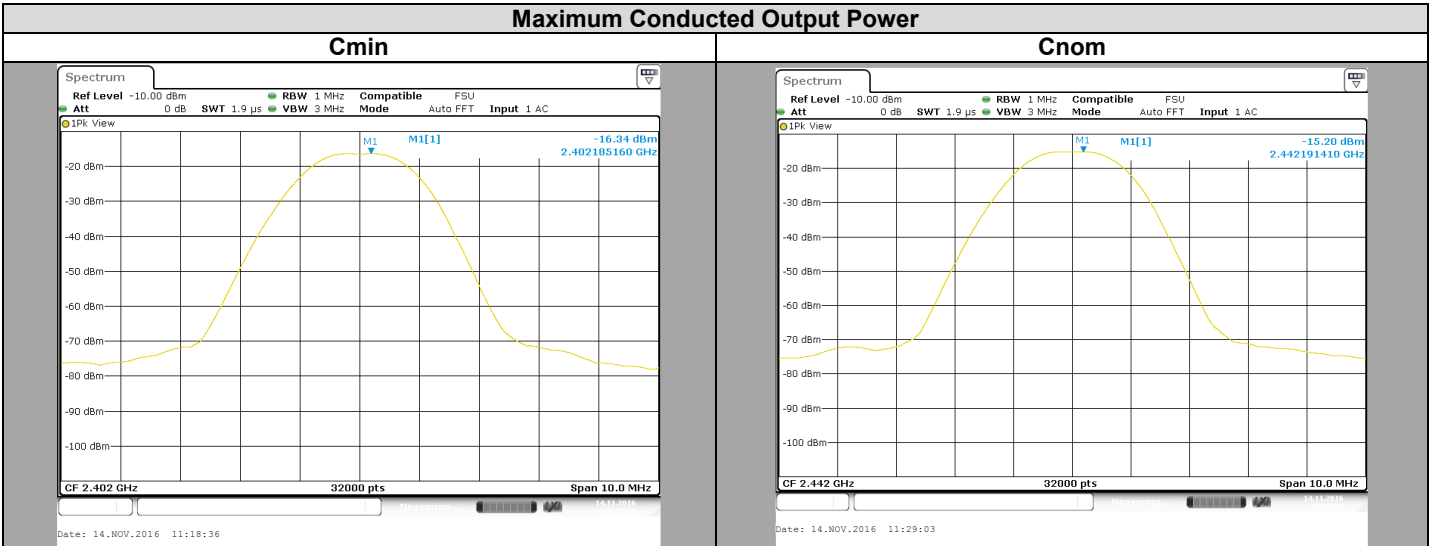
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Calibration date	Calibration due
Multi-meter	KEITHLEY	2000	A1241084	2016/05	2018/05
Programmable AC/DC power supply	-; KIKUSUI	PCR500M	A7049006	Verified with calibrated multimeter	Verified with calibrated multimeter
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2016/09	2017/09
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329674	2016/09	2017/09

Note: In our quality system, the test equipment calibration due is more & less 2 months



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## 6.5. RESULTS



Channel	Maximum Conducted Power without Offset (dBm)	Offset Cable + Att (dB)	Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Limit (dBm)
<b>Cmin</b>	<b>-16,34</b>	<b>21,4</b>	2.6	5,06	30. Reduced by G-6dBi if Antenna Gain above 6dBi
<b>Cnom</b>	<b>-15,20</b>	<b>21,4</b>	2.6	6,20	30. Reduced by G-6dBi if Antenna Gain above 6dBi
<b>Cmax</b>	<b>-14,59</b>	<b>21,4</b>	2.6	6,81	30. Reduced by G-6dBi if Antenna Gain above 6dBi

## 6.6. CONCLUSION

Maximum Conducted Output Power measurement performed on the sample of the product **SAGEMCOM TheBox (253697282)**, SN: **616400107098**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.



## 7. POWER SPECTRAL DENSITY

### 7.1. TEST CONDITIONS

Test performed by : Arnaud FAYETTE  
Date of test : November 14, 2016  
Ambient temperature : 23 °C  
Relative humidity : 45 %

### 7.2. TEST SETUP

- The Equipment Under Test is installed:

- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

- Test Procedure:

- KDB 558074 D01 DTS Meas Guidance v03r05 § 10.2 (Method PKPSD)



Photograph for Power Spectral Density



### 7.3. LIMIT

Power Spectral Density:

2400MHz-2483.5MHz: Shall not exceed 8dBm/3kHz

Limits are reduced by G-6dBi if Overall Antenna Gain above 6dBi

### 7.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Calibration date	Calibration due
Multi-meter	KEITHLEY	2000	A1241084	2016/05	2018/05
Programmable AC/DC power supply	-; KIKUSUI	PCR500M	A7049006	Verified with calibrated multimeter	Verified with calibrated multimeter
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2016/09	2017/09
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329674	2016/09	2017/09

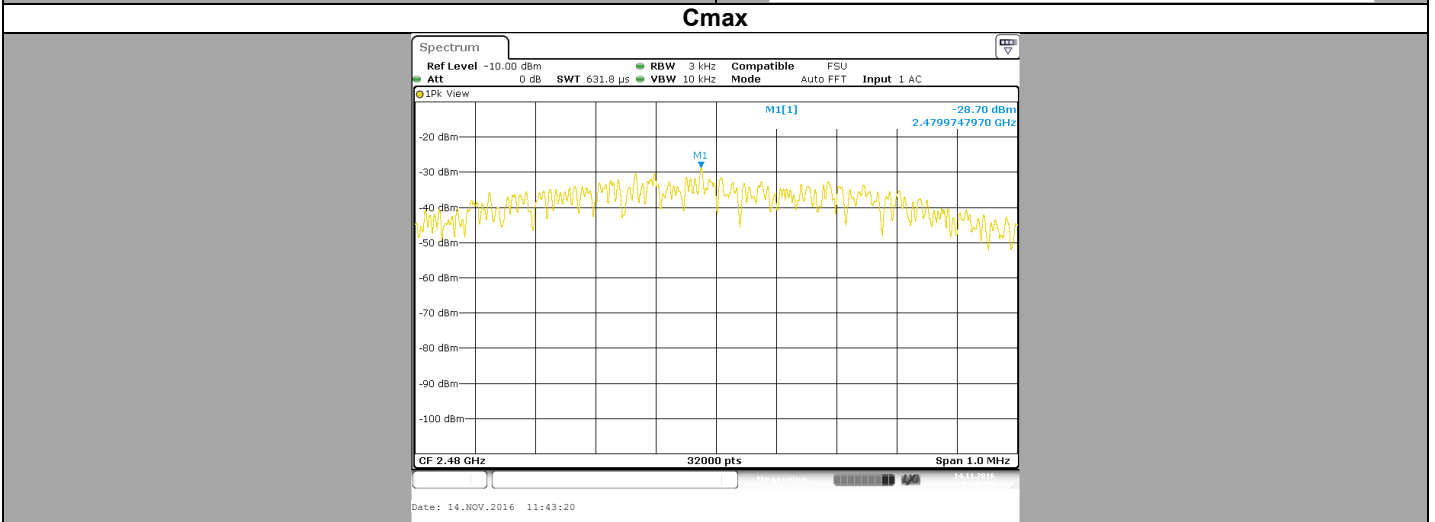
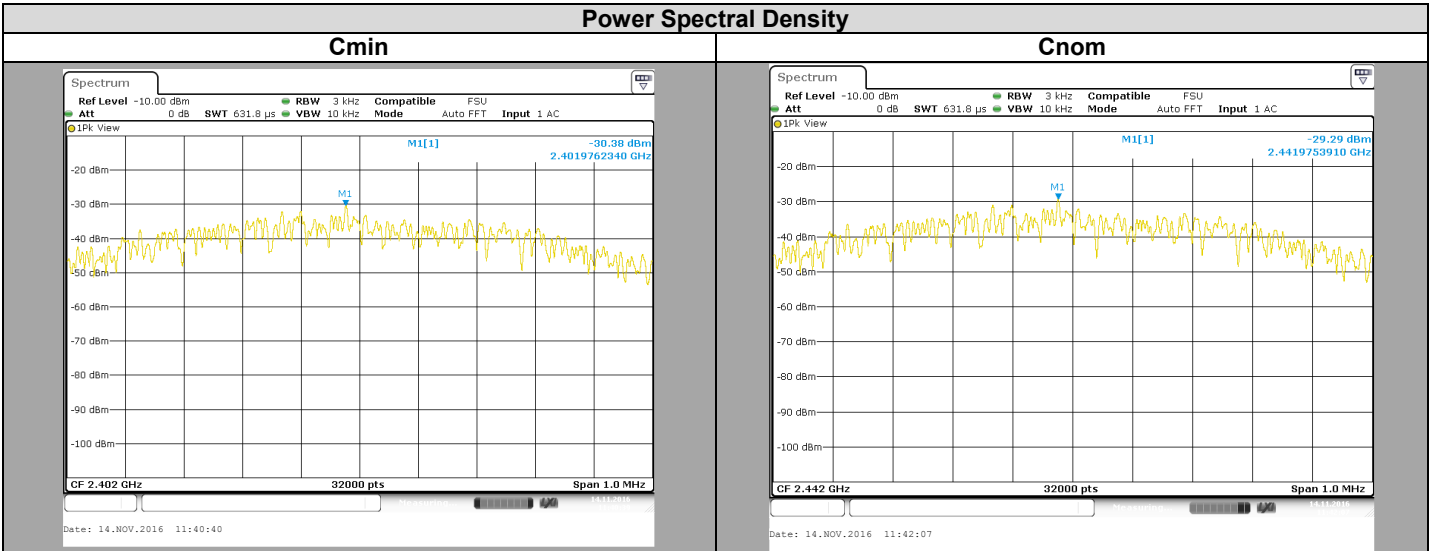
Note: In our quality system, the test equipment calibration due is more & less 2 months





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## 7.5. RESULTS



Channel	Power Spectral Density (dBm/3kHz)	Offset Cable + Att (dB)	Antenna Gain (dBi)	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
Cmin	-30,38	21,4	2.6	-8,98	8. Reduced by G-6dBi if Antenna Gain above 6dBi
Cnom	-29,29	21,4	2.6	-7,89	8. Reduced by G-6dBi if Antenna Gain above 6dBi
Cmax	-28,70	21,4	2.6	-7,3	8. Reduced by G-6dBi if Antenna Gain above 6dBi

## 7.6. CONCLUSION

Power Spectral Density measurement performed on the sample of the product **SAGEMCOM TheBox (253697282)**, SN: **616400107098**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.

## 8. UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS AT THE BAND EDGE

### 8.1. TEST CONDITIONS

Test performed by : Arnaud FAYETTE  
Date of test : November 14, 2016  
Ambient temperature : 23 °C  
Relative humidity : 45 %

### 8.2. TEST SETUP

- The Equipment Under Test is installed:

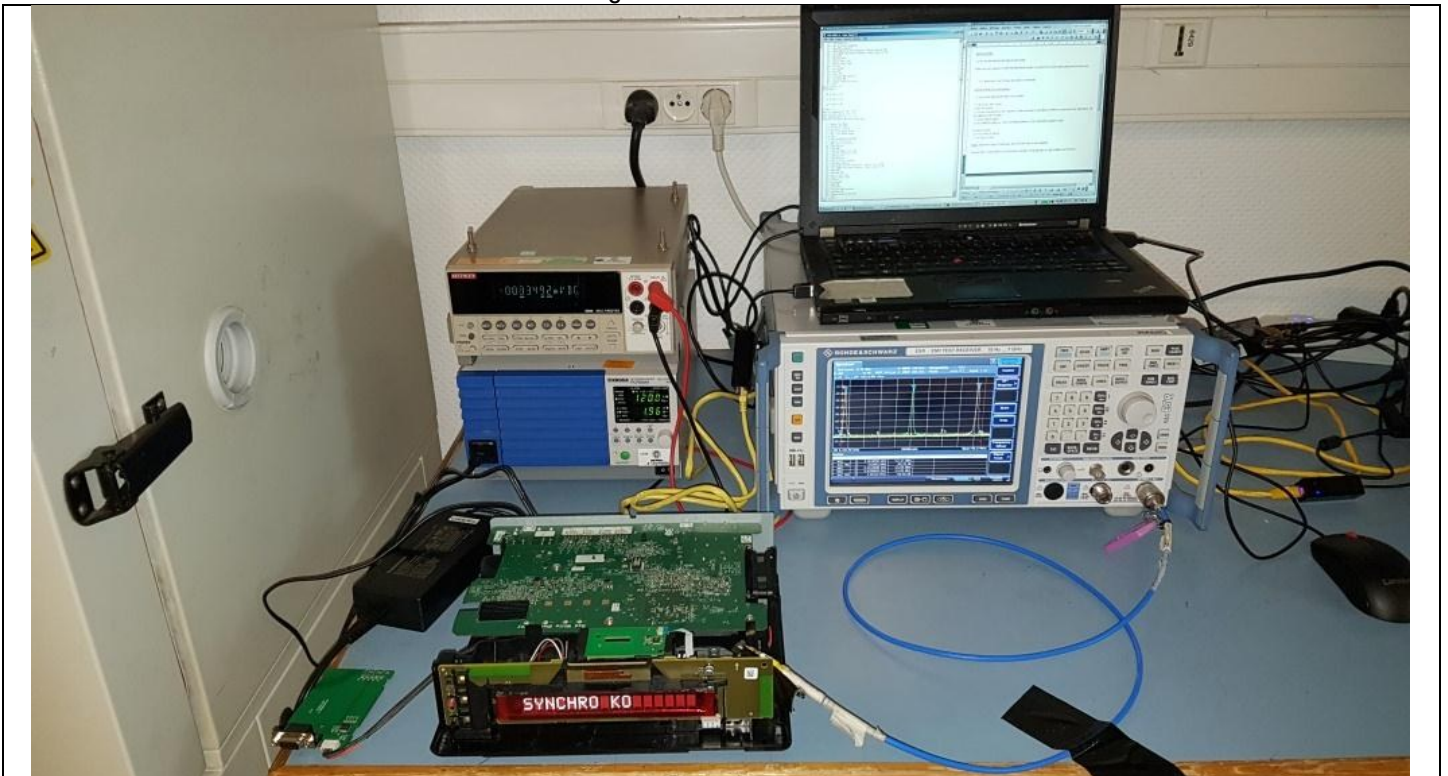
- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

- Test Procedure:

- KDB 558074 D01 DTS Meas Guidance v03r05 § 11



Photograph for Unwanted Emission into non-restricted frequency bands at the band edge



### 8.3. LIMIT

All Spurious Emissions must be at least 20dB below the Fundamental Radiator Level at the Band Edge Edge “2400MHz & 2483,5MHz”

### 8.4. TEST EQUIPMENT LIST

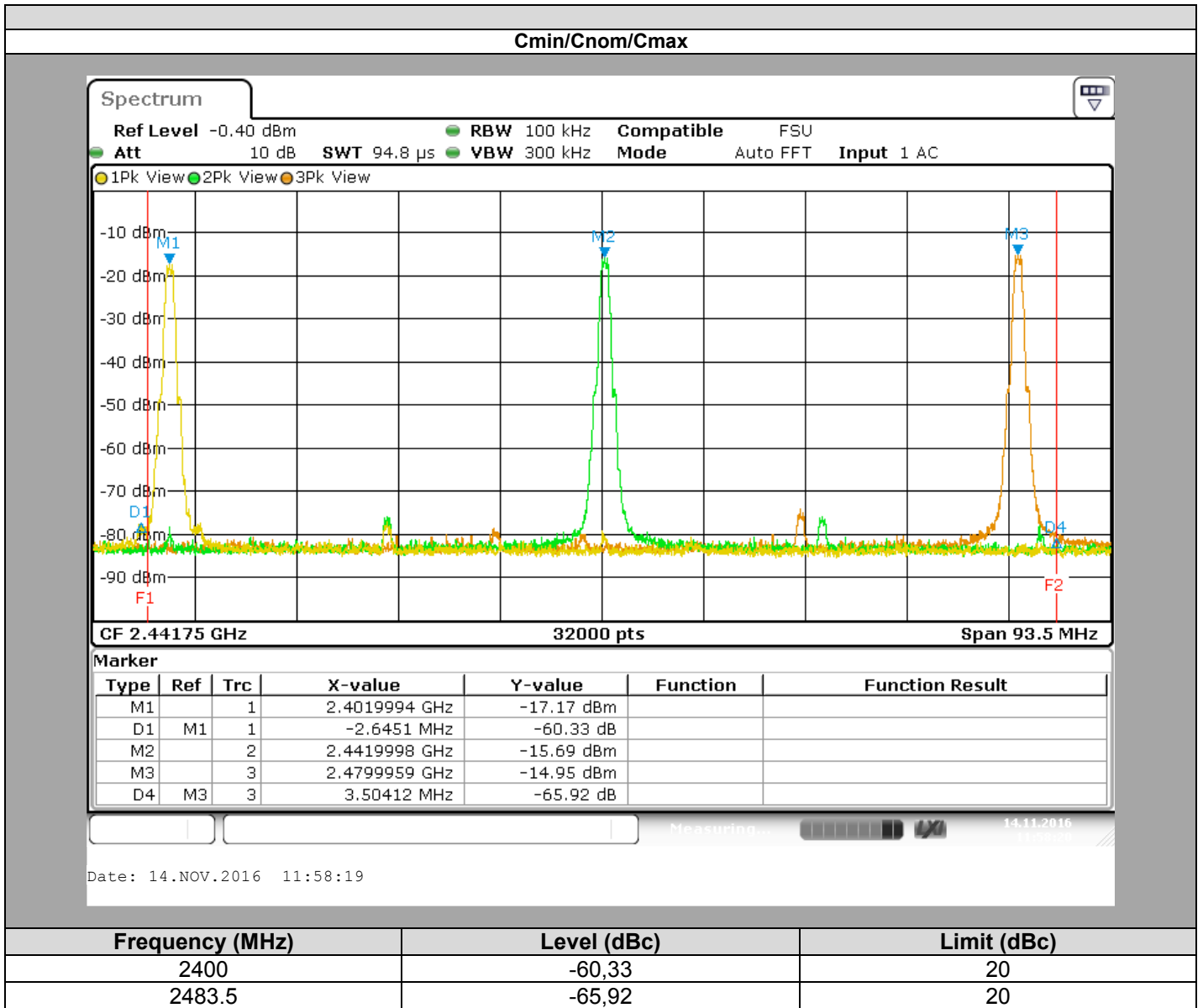
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Calibration date	Calibration due
Multi-meter	KEITHLEY	2000	A1241084	2016/05	2018/05
Programmable AC/DC power supply	-; KIKUSUI	PCR500M	A7049006	Verified with calibrated multimeter	Verified with calibrated multimeter
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2016/09	2017/09
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329674	2016/09	2017/09

Note: In our quality system, the test equipment calibration due is more & less 2 months



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### 8.5. RESULTS



### 8.6. CONCLUSION

Unwanted Emission into non-restricted frequency bands at the band edge measurement performed on the sample of the product **SAGEMCOM TheBox (253697282)**, SN: **616400107098**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.

## 9. UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS

### 9.1. TEST CONDITIONS

Test performed by : Mathieu CERISIER  
Date of test : November 10, 2016  
Ambient temperature : 24 °C  
Relative humidity : 41 %

### 9.2. TEST SETUP

- The Equipment Under Test is installed:

- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

- Test Procedure:

- KDB 558074 D01 DTS Meas Guidance v03r05 § 11



Photograph for Unwanted Emission into non-restricted frequency bands



### 9.3. LIMIT

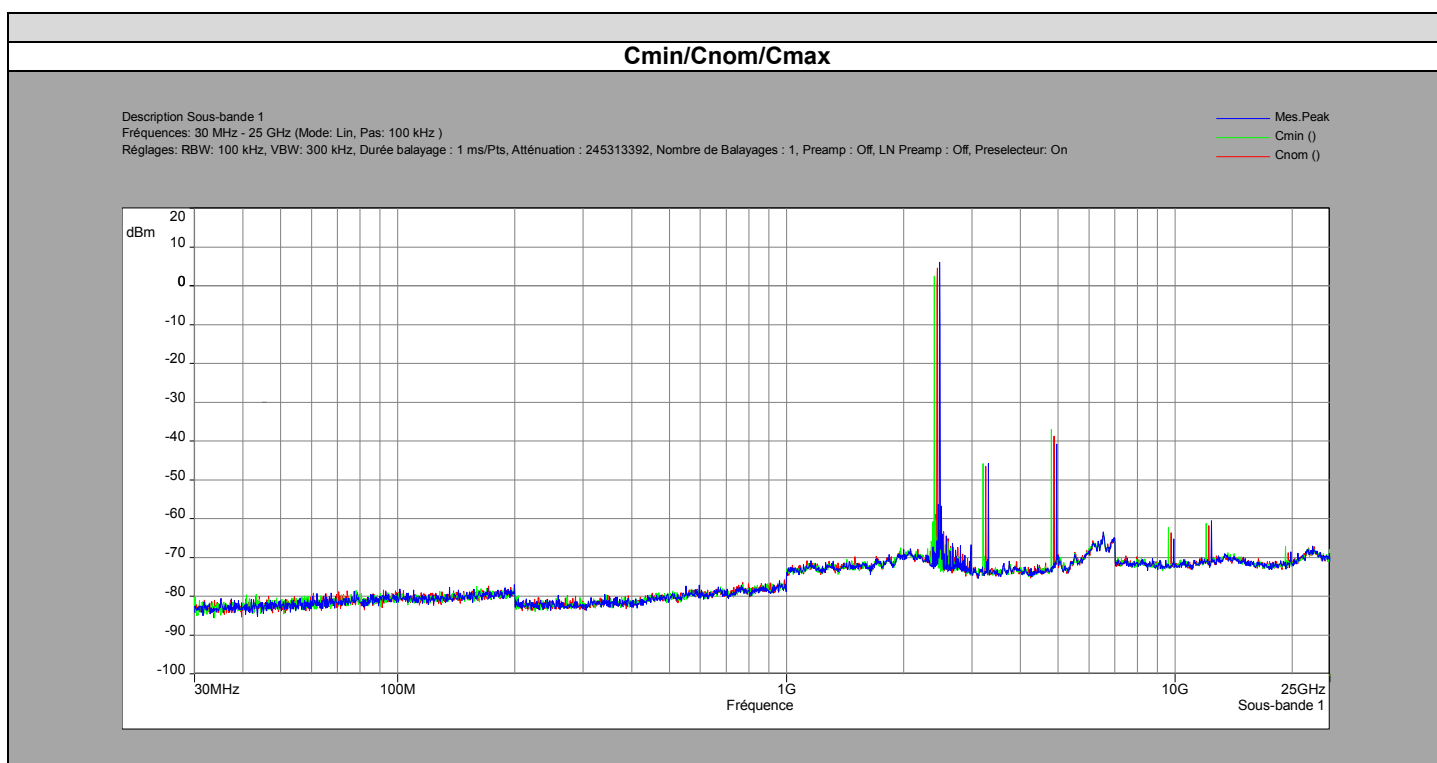
All Spurious Emissions must be at least 20 below the Fundamental Radiator Level

### 9.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESI40 1088 740K40	A2642010	2016/07	2017/07
Measurement RF cable	Télédyne	Cordon 082-5454-1.5mtr	A5329624	2016/08	2018/08
Rejector filter 2,4GHz	-	2.45GHz	A7484048	2016/08	2018/08
Programmable AC/DC power supply	-; KIKUSUI	PCR500M	A7040079	2016/06	2018/06

Note: In our quality system, the test equipment calibration due is more & less 2 months

## 9.5. RESULTS



Frequency (MHz)	Level (dBm)	Level (dBc)	Limit (dBc)
2402	2,466		
3202,7	-45,342	47,808	20
4804	-36,792	39,258	20
851,5	-77,173	79,639	20
2442	4,612		
3256	-46,459	51,071	20
4884	-38,74	43,352	20
772,3	-76,433	81,045	20
2480	6,015		
3306,7	-45,826	51,841	20
4959,5	-40,775	46,79	20
882,6	-76,783	82,798	20

## 9.6. CONCLUSION

Unwanted Emission into non-restricted frequency bands measurement performed on the sample of the product **SAGEMCOM TheBox (253697282)**, SN: **616400107098**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.



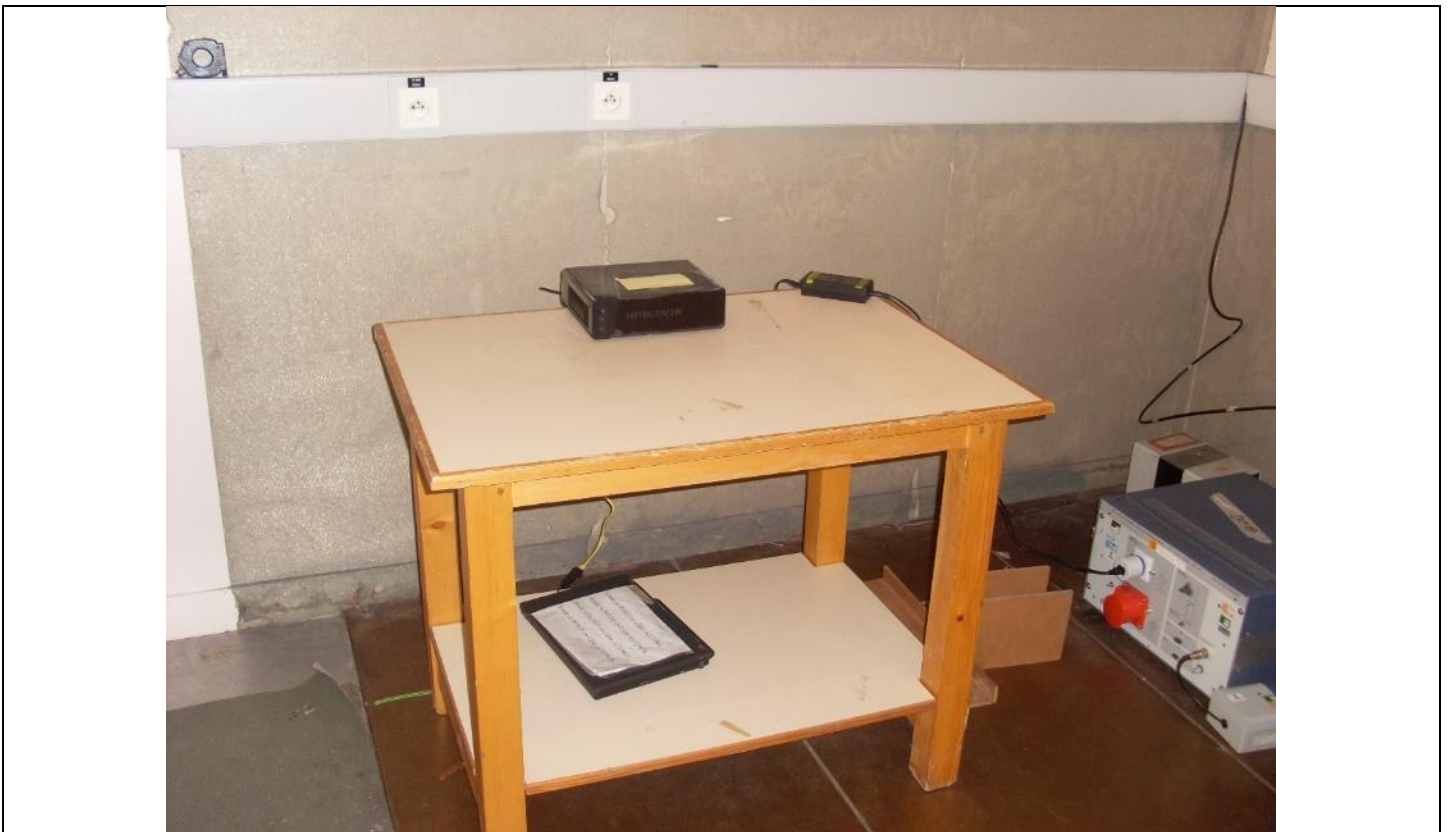
## 10. AC POWER LINE CONDUCTED EMISSIONS

### 10.1. TEST CONDITIONS

Test performed by : Laurent DENEUX  
Date of test : November 21, 2016  
Ambient temperature : Temperature 21°C  
Relative humidity : Humidity 53%

### 10.2. TEST SETUP

The product has been tested according to ANSI C63.10 (2013) method. The EUT is placed on the ground reference plane, at 80cm from the LISN. The distance between the EUT and the vertical ground plane is 40cm. Auxiliaries are powered by another LISN. The cable has been shorted to 1meter length. The EUT is powered through the LISN. Measurement is made with a receiver in peak mode. This was followed by a Quasi-Peak, i.e. CISPR measurement for any strong signal. If the average limit is met when using a Quasi-Peak detector, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary. The LISN (measure) is  $50\Omega / 50\mu\text{H}$ . Interconnecting cables and equipment's were moved to position that maximized emission.



Photograph for AC Power Line Conducted Emissions (Front view)





Photograph for AC Power Line Conducted Emissions (Rear view)

### 10.3. LIMIT

#### Quasi-Peak

0,15kHz to 0,5MHz: 66dB $\mu$ V to 56dB $\mu$ V\*

0,5MHz to 5MHz: 56dB $\mu$ V

5MHz to 30MHz: 60dB $\mu$ V

#### Average

0,15kHz to 0,5MHz: 56dB $\mu$ V to 46dB $\mu$ V\*

0,5MHz to 5MHz: 46dB $\mu$ V

5MHz to 30MHz: 50dB $\mu$ V

\*Decreases with the logarithm of the frequency

### 10.4. TEST EQUIPMENT LIST

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	A2642021	2015-12	2016-12
V ISLN	ROHDE & SCHWARZ	ESH2-Z5	C2322001	2016-05	2017-05
Pulse limiter	ROHDE & SCHWARZ	ESH3-Z2	A2649008	2016-03	2017-03
Cable	-	-	A5329417	2016-10	2017-10
Cable	-	-	A5329589	2016-10	2017-10
Ground plane	LCIE	-	-	-	-

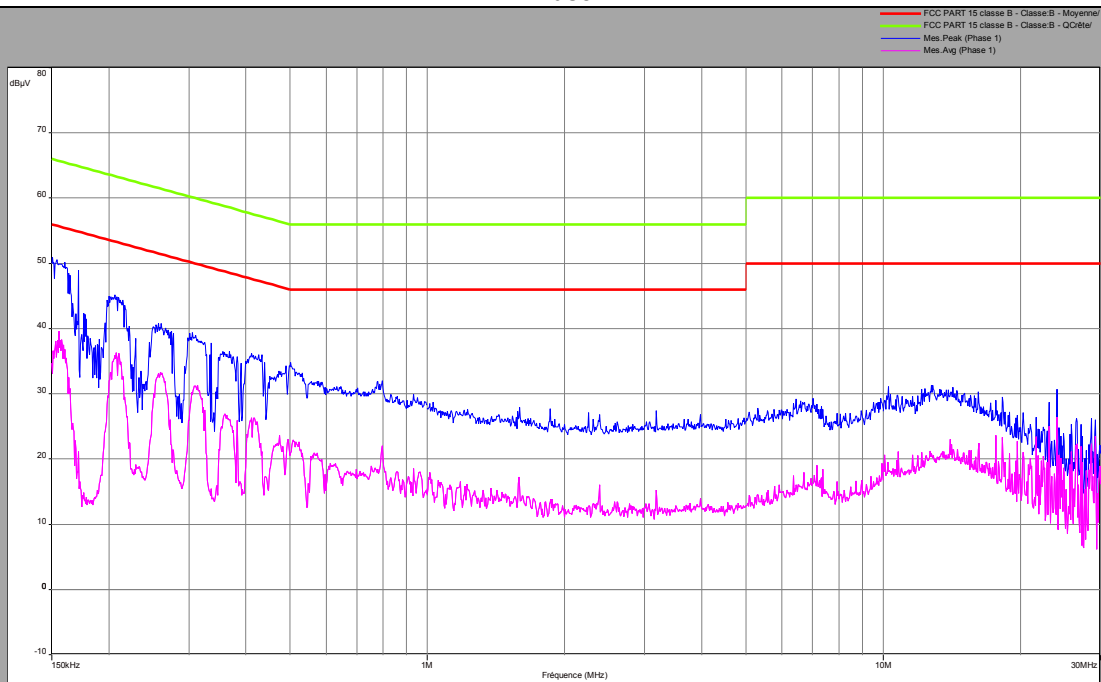
Note: In our quality system, the test equipment calibration due is more & less 2 months

### 10.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

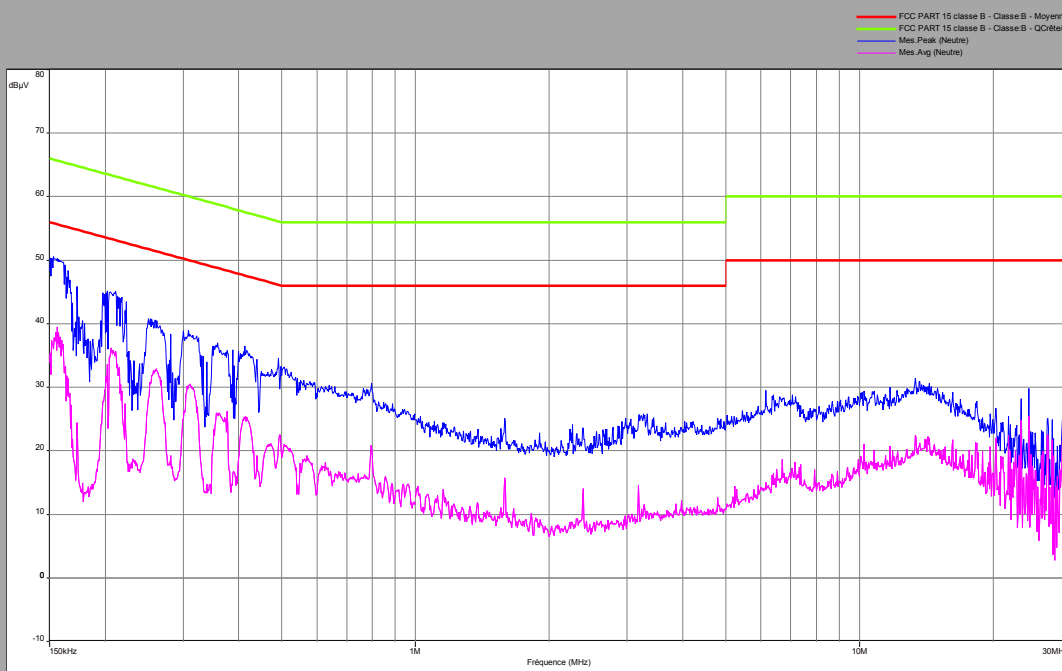
None       Divergence:

## 10.6. RESULTS

### Channel Phase



### Line





L C I E

Phase Line							
Frequency (MHz)	Peak Level (dB $\mu$ V)	Quasi-Peak Level (dB $\mu$ V)	Quasi-Peak Limit (dB $\mu$ V)	Margin Quasi-peak limit	Average Level (dB $\mu$ V)	Average Limit (dB $\mu$ V)	Margin Average Limit
0,153	50,4	-	65,8	15,4	39,5	55,8	16,3
0,26	40,7	-	61,4	20,7	33,3	51,4	18,1
1,596	28	-	56	28	17,3	46	28,7
10,262	31	-	60	29	17,8	50	32,2
24	31	-	60	29	26,4	50	23,6

Neutral Line							
Frequency (MHz)	Peak Level (dB $\mu$ V)	Quasi-Peak Level (dB $\mu$ V)	Quasi-Peak Limit (dB $\mu$ V)	Margin Quasi-peak limit	Average Level (dB $\mu$ V)	Average Limit (dB $\mu$ V)	Margin Average Limit
0,158	50	-	65,6	15,6	39,5	55,6	16,1
0,26	40,3	-	61,4	21,1	32,9	51,4	18,5
1,588	25	-	56	31	16	46	30
14,364	30,6	-	60	29,4	22	50	28
24	30	-	60	30	25,4	50	24,6

## 10.7. CONCLUSION

Ac Power Line Conducted Emission measurement performed on the sample of the product **SAGEMCOM TheBox (253697282)**, SN: **616400107098**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.247 limits.

## 11. UNWANTED EMISSIONS IN RESTRICTED FREQUENCY BANDS

### 11.1. TEST CONDITIONS

Test performed by : Laurent DENEUX  
Date of test : November 21, 2016 to November 22, 2016  
Ambient temperature : Temperature 19°C  
Relative humidity : Humidity 46%

### 11.2. TEST SETUP

The product has been tested according to ANSI C63.10 (2013). The EUT is placed **on an open area test site**. Distance between measuring antenna and the EUT is **10m**. Test is performed in horizontal (H) and vertical (V) polarization with **bilog** antenna below 1GHz and with a horn antenna above 1GHz. Measurement bandwidth was 120kHz below 1GHz and 1MHz above 1GHz. The level has been maximised by the turntable rotation of 360 degrees range on the 3 axis of EUT. Antenna height search was performed from 1 to 4m. The EUT is place at 1.5m high above 1GHz and at 0.8m high under 1GHz.



Photograph for Unwanted Emission in restricted frequency bands



Photograph for Unwanted Emission in restricted frequency bands



Photograph for Unwanted Emission in restricted frequency bands



### 11.3. LIMIT

**Limit at 10m:**

30MHz to 88MHz: 29.5dB $\mu$ V/m QPeak  
 88MHz to 216MHz: 33dB $\mu$ V/m QPeak  
 216MHz to 960MHz: 35.5dB $\mu$ V/m QPeak  
 960MHz to 1000MHz: 43.5dB $\mu$ V/m QPeak  
 Above 1000MHz: 63.5B $\mu$ V/m Peak  
 43.5B $\mu$ V/m Average

### 11.4. TEST EQUIPMENT LIST

Apparatus	Trade Mark	Type	Registration number	Cal. Date	Cal. Due
Open test site	LCIE	-	F2000400	2016-05	2017-05
EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	A2642021	2015-12	2016-12
Preamplifier	HELWETT PACKARD	8449B	A7080071	2016-01	2017-01
Bilog antenna	CHASE	CBL 6112A	C2040040	2016-01	2017-01
Measurement horn antenna 18-26,5GHz	PASTERNAK	PE9852/2F-20	C2042048	2015/05	2017/05
Horn	ETS	3115	C2042023	2016-01	2017-01
Cable	-	-	A5329542	2016-03	2017-03
Cable	-	-	A5329449	2016-10	2017-10
Cable	-	-	A5329368	2016-05	2017-05
Cable	-	-	A5329444	2016-10	2017-10

Note: In our quality system, the test equipment calibration due is more & less 2 months

### 11.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None       Divergence:

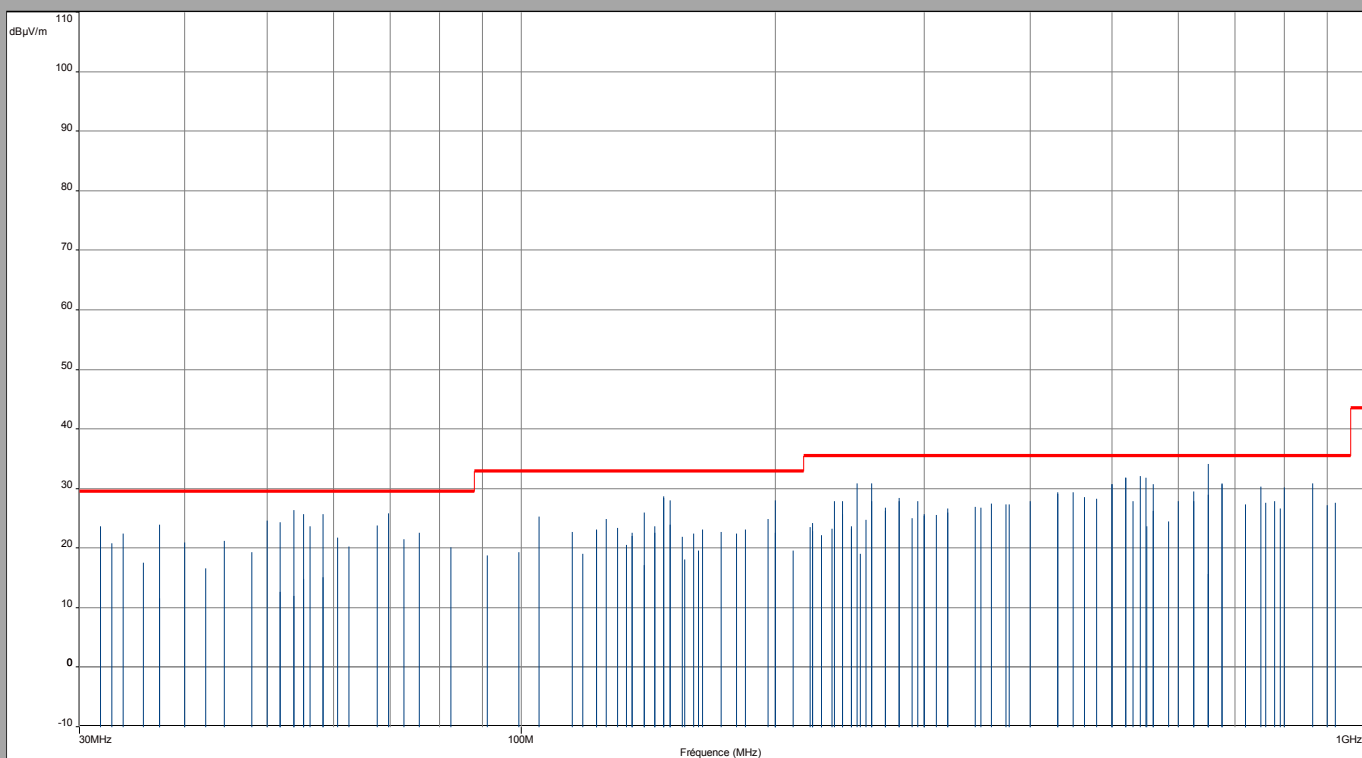
## 11.6. RESULTS

**Below 1GHz**

**Channel**

**Vertical & horizontal Polarization**

— FCC Part 15 class B (unintentional radiator) §109 - Classe: -- QCrête/10.0m/  
 Mes. Q-Peak (Horizontale)  
 Mes. Q-Peak (Verticale)  
 Finaux Manuel (Horizontale)  
 Finaux Manuel (Verticale)





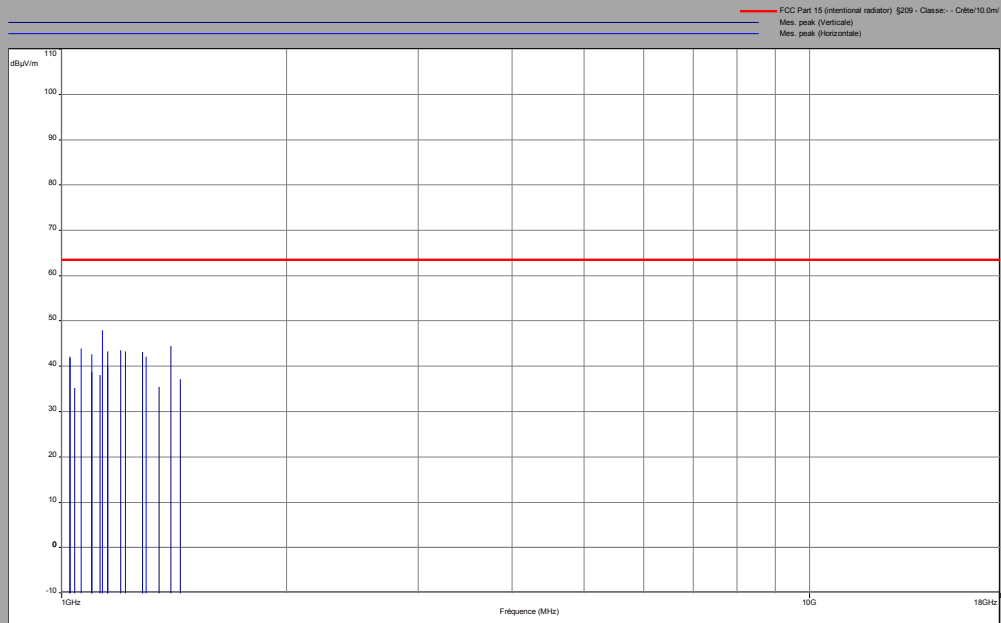


L C I E

**Above 1GHz**

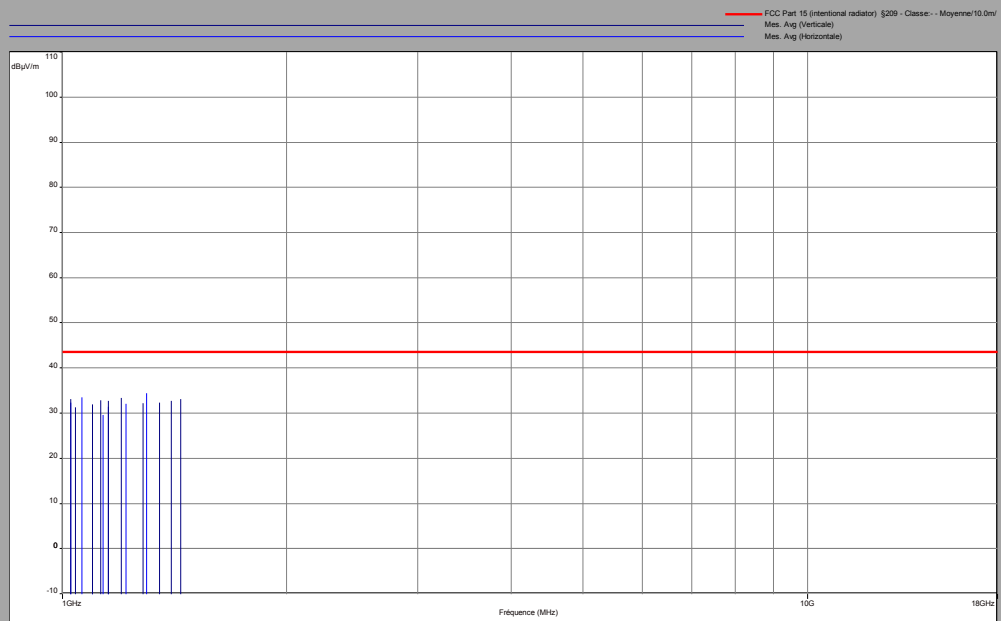
**Cmin/Cnom/Cmax**

**Vertical & horizontal Polarization (peak measurement)**



**No interference has been observed between 18GHz and 26GHz**

**Vertical & horizontal Polarization (average value)**

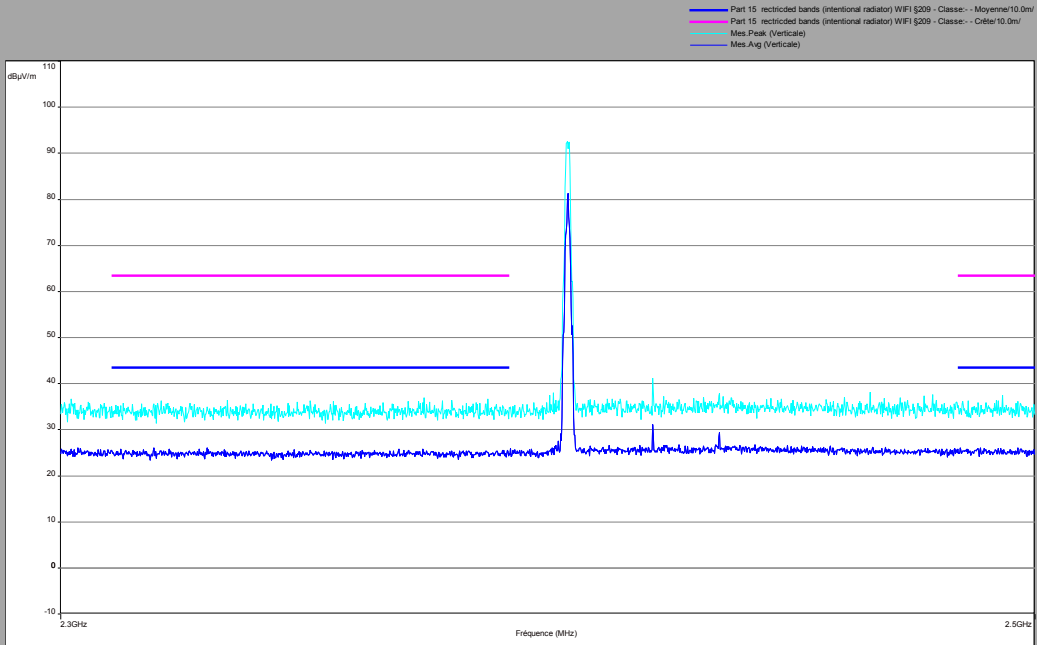


**No interference has been observed between 18GHz and 26GHz**

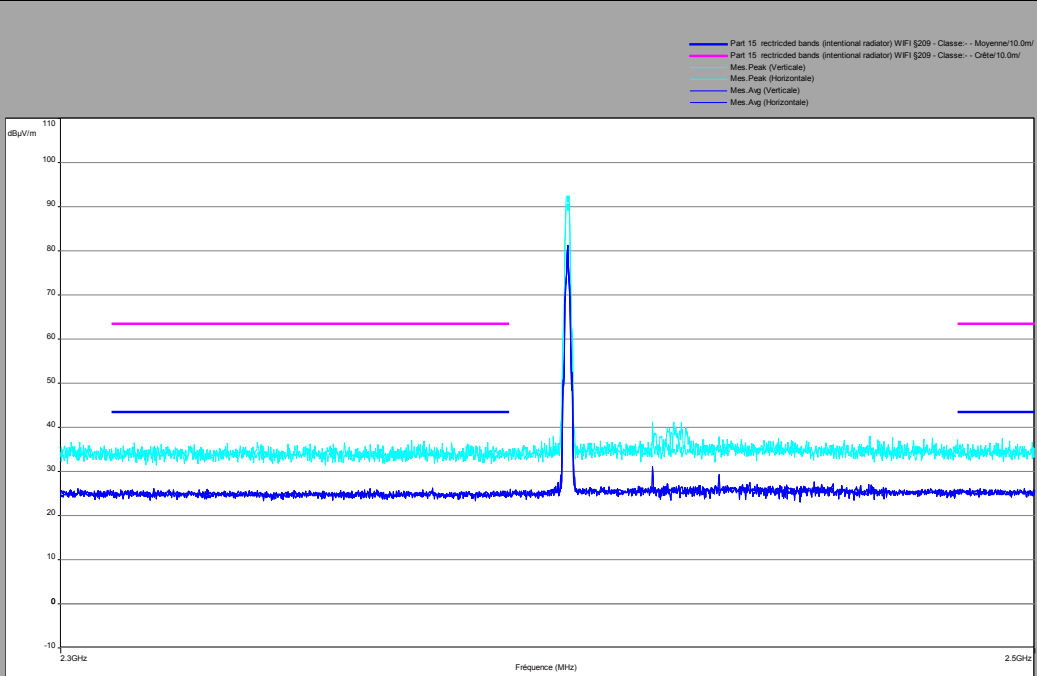
Above 1GHz Zoom 2310MHz-2500MHz

Cmin

Vertical Polarization



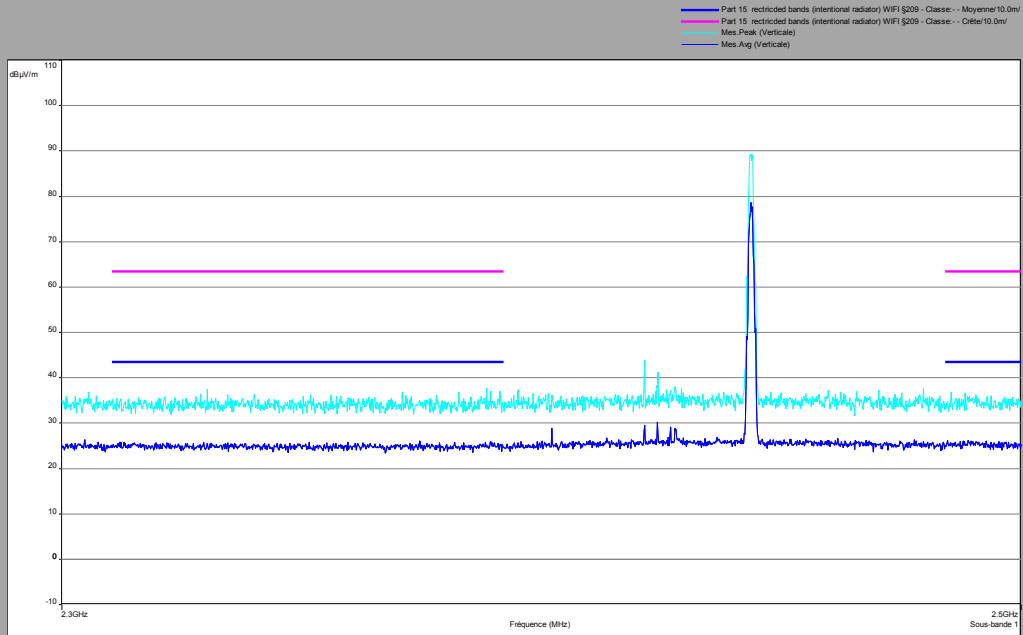
Horizontal polarization



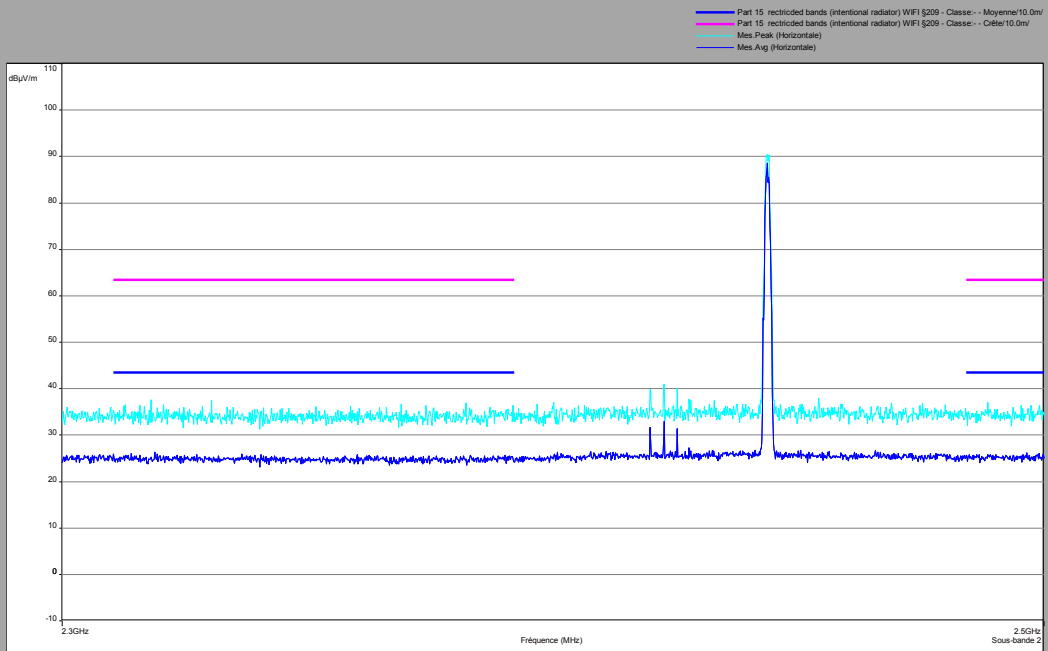
**Above 1GHz Zoom 2310MHz-2500MHz**

**Cnom**

**Vertical Polarization**



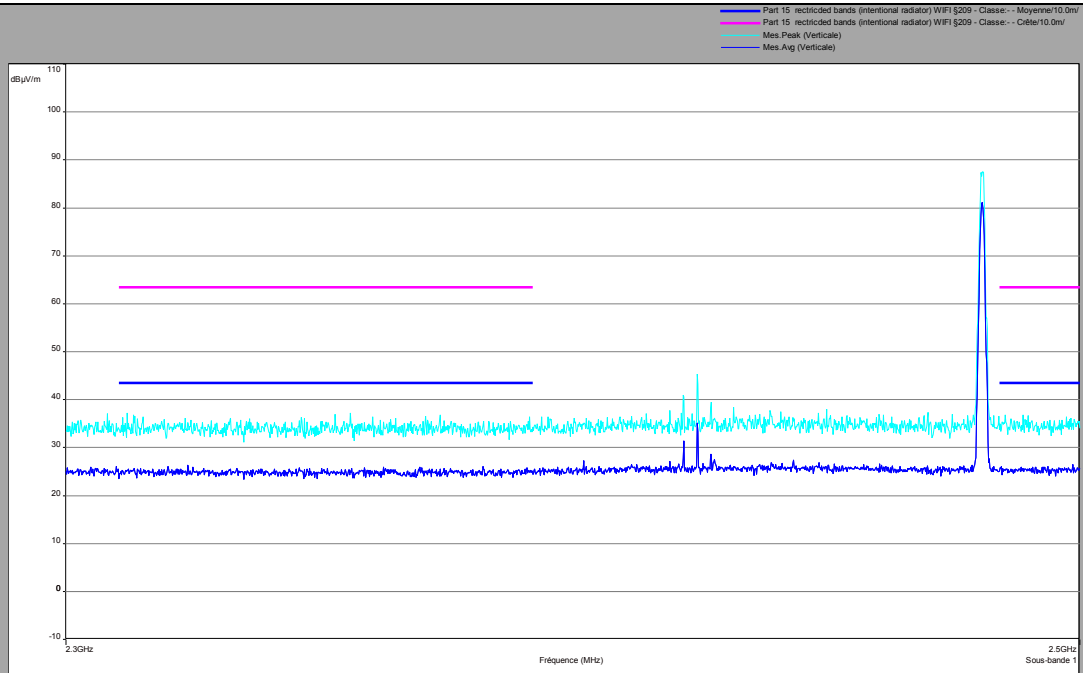
**Horizontal polarization**



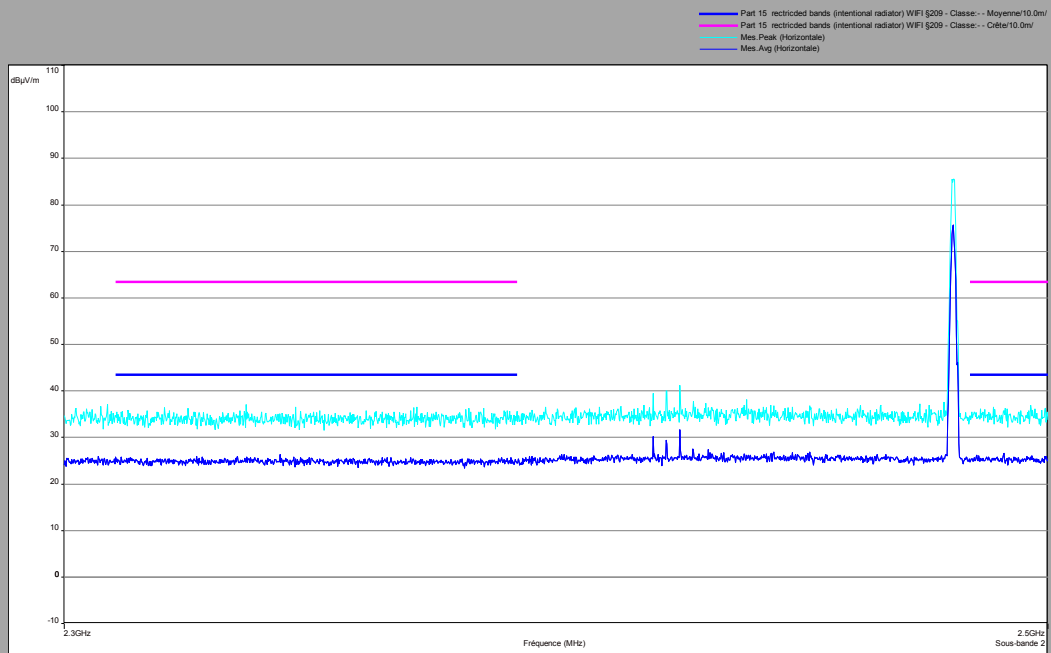
Above 1GHz Zoom 2310MHz-2500MHz

Cmax

Vertical Polarization



Horizontal polarization





L C I E

Below 1GHz

Polarisation	Frequency (MHz)	level Quasi peak (dBµV/m)	limit FCC	Margin
vertical	31.8	23.72	29.5	5.78
vertical	32.8	20.89	29.5	8.61
vertical	33.8	22.55	29.5	6.95
vertical	35.7	17.62	29.5	11.88
vertical	37.3	23.92	29.5	5.58
vertical	40	20.97	29.5	8.53
vertical	42.3	16.63	29.5	12.87
vertical	44.5	21.25	29.5	8.25
vertical	48	19.31	29.5	10.19
vertical	50.1	24.72	29.5	4.78
vertical	51.8	24.36	29.5	5.14
vertical	53.8	26.4	29.5	3.1
vertical	55.3	25.8	29.5	3.7
vertical	56.3	23.73	29.5	5.77
vertical	58.3	25.76	29.5	3.74
vertical	60.6	21.76	29.5	7.74
vertical	62.5	20.3	29.5	9.2
vertical	67.6	23.82	29.5	5.68
vertical	69.7	25.82	29.5	3.68
vertical	72.6	21.53	29.5	7.97
vertical	75.8	22.56	29.5	6.94
vertical	82.6	20.22	29.5	9.28
vertical	91.2	18.87	33	14.13
vertical	99.4	19.39	33	13.61
vertical	105	25.35	33	7.65
vertical	115	22.74	33	10.26
vertical	118.2	19.15	33	13.85
vertical	122.9	23.19	33	9.81
vertical	126	24.91	33	8.09
vertical	130	23.45	33	9.55
vertical	133.3	20.55	33	12.45
vertical	135.2	22.01	33	10.99
vertical	140	25.96	33	7.04
vertical	144	23.76	33	9.24
vertical	147.5	28.73	33	4.27
vertical	150	28.11	33	4.89
vertical	156	18.18	33	14.82



L C I E

Polarisation	Frequency (MHz)	level Quasi peak (dB $\mu$ V/m)	limit FCC	Margin
vertical	160	22.47	33	10.53
vertical	162	19.6	33	13.4
vertical	164	23.19	33	9.81
vertical	172.4	22.81	33	10.19
vertical	180	22.48	33	10.52
vertical	184.3	23.18	33	9.82
vertical	196	24.91	33	8.09
vertical	200	28.05	33	4.95
vertical	210	19.58	33	13.42
vertical	221.2	24.18	35.5	11.32
vertical	226.8	21.56	35.5	13.94
vertical	233.5	23.31	35.5	12.19
vertical	240	25.73	35.5	9.77
vertical	245.8	23.67	35.5	11.83
vertical	252	19.03	35.5	16.47
vertical	260	27.97	35.5	7.53
vertical	270	26.33	35.5	9.17
vertical	280	28.4	35.5	7.1
vertical	290	25.07	35.5	10.43
vertical	295	27.85	35.5	7.65
vertical	300	25.75	35.5	9.75
vertical	310	25.63	35.5	9.87
vertical	320	26.02	35.5	9.48
vertical	350	26.81	35.5	8.69
vertical	360	27.46	35.5	8.04
vertical	378	27.4	35.5	8.1
vertical	400	27.85	35.5	7.65
vertical	432	29.12	35.5	6.38
vertical	450	29.41	35.5	6.09
vertical	464.7	28.62	35.5	6.88
vertical	480	28.3	35.5	7.2
vertical	500	30.81	35.5	4.69
vertical	520	31.87	35.5	3.63
vertical	530	27.97	35.5	7.53
vertical	540	32.17	35.5	3.33
vertical	549.1	31.93	35.5	3.57
vertical	560	30.81	35.5	4.69





L C I E

Polarisation	Frequency (MHz)	level Quasi peak (dB $\mu$ V/m)	limit FCC	Margin
vertical	583.6	24.58	35.5	10.92
vertical	600	27.85	35.5	7.65
vertical	625	27.85	35.5	7.65
vertical	650	29.1	35.5	6.4
vertical	675	30.81	35.5	4.69
vertical	720	27.42	35.5	8.08
vertical	750	30.36	35.5	5.14
vertical	760	27.6	35.5	7.9
vertical	792	26.65	35.5	8.85
vertical	800	30.18	35.5	5.32
vertical	864	30.87	35.5	4.63



L C I E

Polarisation	Frequency (MHz)	level Quasi peak (dB $\mu$ V/m)	limit FCC	Margin
Horizontal	122.9	23.01	33	9.99
Horizontal	135.2	22.63	33	10.37
Horizontal	140	17.13	33	15.87
Horizontal	144	22.67	33	10.33
Horizontal	147.5	28.47	33	4.53
Horizontal	150	24	33	9
Horizontal	155	21.89	33	11.11
Horizontal	200	22.57	33	10.43
Horizontal	220	23.58	35.5	11.92
Horizontal	221.2	22.92	35.5	12.58
Horizontal	226.8	22.22	35.5	13.28
Horizontal	235	27.97	35.5	7.53
Horizontal	240	27.91	35.5	7.59
Horizontal	245.8	23.3	35.5	12.2
Horizontal	250	30.87	35.5	4.63
Horizontal	260	30.92	35.5	4.58
Horizontal	270	26.81	35.5	8.69
Horizontal	280	27.91	35.5	7.59
Horizontal	300	25.47	35.5	10.03
Horizontal	320	26.64	35.5	8.86
Horizontal	345	26.91	35.5	8.59
Horizontal	375.2	27.39	35.5	8.11
Horizontal	432	29.45	35.5	6.05
Horizontal	500	30.75	35.5	4.75
Horizontal	520	31.92	35.5	3.58
Horizontal	550	23.64	35.5	11.86
Horizontal	560	26.32	35.5	9.18
Horizontal	625	29.61	35.5	5.89
Horizontal	650	34.1	35.5	1.4
Horizontal	675	30.87	35.5	4.63
Horizontal	720	25.34	35.5	10.16
Horizontal	780	27.85	35.5	7.65
Horizontal	900	27.27	35.5	8.23
Horizontal	920	27.6	35.5	7.9



L C I E

Above 1GHz								
Cmin/Cnom/Cmax								
Polarization	Frequency (MHz)	Duty cycle correction (dB)	Average Level (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Margin Average Limit	Peak Level (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Margin Peak Limit
Vertical	1026	2,04	33,14	43,5	10,36	42,12	63,5	21,38
Vertical	1040	2,04	31,25	43,5	12,25	35,16	63,5	28,34
Vertical	1098	2,04	31,91	43,5	11,59	38,76	63,5	24,74
Vertical	1125	2,04	32,82	43,5	10,68	38,14	63,5	25,36
Vertical	1152	2,04	32,76	43,5	10,74	43,31	63,5	20,19
Vertical	1200	2,04	33,36	43,5	10,14	43,52	63,5	19,98
Vertical	1282	2,04	32,21	43,5	11,29	43,16	63,5	20,34
Vertical	1350	2,04	32,37	43,5	11,13	35,49	63,5	28,01
Vertical	1400	2,04	32,69	43,5	10,81	44,47	63,5	19,03
Vertical	1440	2,04	33,16	43,5	10,34	37,18	63,5	26,32
Vertical	2390	2,04	28	43,5	15,5	39,5	63,5	24
Vertical	2483,5	2,04	28,4	43,5	15,1	39	63,5	24,5
Horizontal	1026	2,04	32,4	43,5	11,1	41,82	63,5	21,68
Horizontal	1062	2,04	33,48	43,5	10,02	43,93	63,5	19,57
Horizontal	1098	2,04	31,6	43,5	11,9	42,58	63,5	20,92
Horizontal	1134	2,04	29,67	43,5	13,83	47,97	63,5	15,53
Horizontal	1152	2,04	31,4	43,5	12,1	40,07	63,5	23,43
Horizontal	1216	2,04	32,08	43,5	11,42	43,23	63,5	20,27
Horizontal	1296	2,04	34,46	43,5	9,04	42,11	63,5	21,39
Horizontal	2390	2,04	27,8	43,5	15,7	38,4	63,5	25,1
Horizontal	2483,5	2,04	28,04	43,5	15,46	39,2	63,5	24,3

## 11.7. CONCLUSION

Unwanted Emission in restricted frequency bands measurement performed on the sample of the product **SAGEMCOM TheBox (253697282)**, SN: **616400107098**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.247 limits.

## 12. UNCERTAINTIES CHART

47 CFR Part 15.209 & 15.207 Kind of test	Wide uncertainty laboratory (k=2) ±x(dB) / (Hz)/ ms	Uncertainty limit
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	/

The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the CISPR. The conformity of the sample is directly established by the applicable limits values. This table includes all uncertainties maximum feasible for testing in the laboratory, whether or not made in this report