



LCIE

Bluetooth Low Energy Template: Release August 08th, 2017

# TEST REPORT

N°: 152845-715034-A

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

↻ Product	DCIW387 ATN
↻ Trade mark	SAGEMCOM
↻ Manufacturer	SAGEMCOM
↻ Model under test	DCIW387 ATN
↻ Serial number	617510000063
↻ FCC ID	VW3DCIW387

## Test date

: January 22, 2018 to January 29, 2018

## Test location

Fontenay Aux Roses

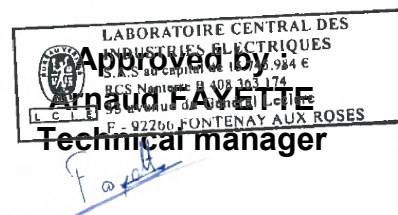
## Composition of document

44 pages

## Document issued on

April 11, 2018

Written by :  
**Armand MAHOUNGOU**  
Tests operator



This document shall not be reproduced, except in full, without the written approval of the LCIE. This document contains results related only to the items tested. It does not imply the conformity of the whole production to the items tested. Unless otherwise specified, the decision of conformity takes into account the uncertainty of measurement. This document doesn't anticipate any certification decision.

**LCIE**

Laboratoire Central des Industries Electriques  
Une société de Bureau Veritas

33, Av du Général Leclerc  
92266 Fontenay Aux Roses  
FRANCE

Tél : +33 1 40 95 60 60  
contact@lcie.fr  
www.lcie.fr



## PUBLICATION HISTORY

<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Modification</b>
01	February 26, 2018	Armand MAHOUNGOU	Creation of the document



## SUMMARY

1.	TEST PROGRAM .....	4
2.	EQUIPMENT UNDER TEST: CONFIGURATION (DECLARED BY PROVIDER) .....	5
3.	OCCUPIED BANDWIDTH .....	10
4.	6DB EMISSION BANDWIDTH .....	13
5.	DUTY CYCLE .....	16
6.	MAXIMUM CONDUCTED OUTPUT POWER .....	19
7.	POWER SPECTRAL DENSITY .....	22
8.	UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS AT THE BAND EDGE	25
9.	UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS .....	28
10.	AC POWER LINE CONDUCTED EMISSIONS .....	31
11.	UNWANTED EMISSIONS IN RESTRICTED FREQUENCY BANDS .....	36
12.	UNCERTAINTIES CHART .....	44

## 1. TEST PROGRAM

### References

- 47 CFR Part 15.247
- KDB 558074 D01 DTS Meas Guidance v04
- ANSI C63.10-2013

### Radio requirement:

Clause (47CFR Part 15.247) Test Description	Test result - Comments			
Occupied Bandwidth <a href="#">ℱ</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="#">ℱ</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="#">ℱ</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="#">ℱ</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="#">ℱ</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="#">ℱ</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="#">ℱ</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="#">ℱ</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="#">ℱ</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="#">ℱ</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 DCIW387 ATN

Serial Number: 617510000063



Front face



Back face

Equipment Under Test



**Power supply cable**



**USB – RS232 cable**

**Equipment Under Test**

**Inputs/outputs - Cable:**

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Power supply cable	-	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-
USB – RS232 cable	-	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-
Data cable	-	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-

**Auxiliary equipment used during test:**

Type	Reference	Sn	Comments
Laptop computer	-	-	Use to set the EUT





**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			
Sub-band REC7003:	Annex 3 (a)			
Spectrum Modulation:	<input checked="" type="checkbox"/> DSSS (Tested like it)			
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:	<input checked="" type="checkbox"/> 1	<input type="checkbox"/> 2		
Beam forming gain:	No			
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"/> 40°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"/> XVdc	

**Antenna Characteristic**

Antenna assembly	Gain (dBi)	Frequency Band (MHz)	Impedance(Ω)
1	3.6	2400-2483.5	50



L C I E

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 : "SD-20171218 - U44\_997950\_01 - BT-BLE FCC Notice for certification.pdf" for the command used during test





L C I E

### 2.3. EQUIPMENT LABELLING

DCIW387  
253744429- AJ1

**PROTOTYPE**

S/N: 61751000063

MAC: A039EE163228

Date Code: 51/17  
Made in TUNISIA

---

**SAGEMCOM** DCIW387 ATN  
253744429-ind.

SMARTCARD S/N:  
PIN CODE:  
CHIP ID : 0123456789ABCDEF FCC ID : VW3DCIW387

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.

Code Barre type 128

S/N: 123456789012

Code Barre type 128

MAC: YYYYYYYYYYYY  
Made in TUNISIA

Date Code: XX/YY

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

### 2.4. EQUIPMENT MODIFICATION

None       Modification:

### 3. OCCUPIED BANDWIDTH

#### 3.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU  
Date of test : January 26, 2018  
Ambient temperature : 26 °C  
Relative humidity : 47 %

#### 3.2. TEST SETUP

- The Equipment Under Test is installed:

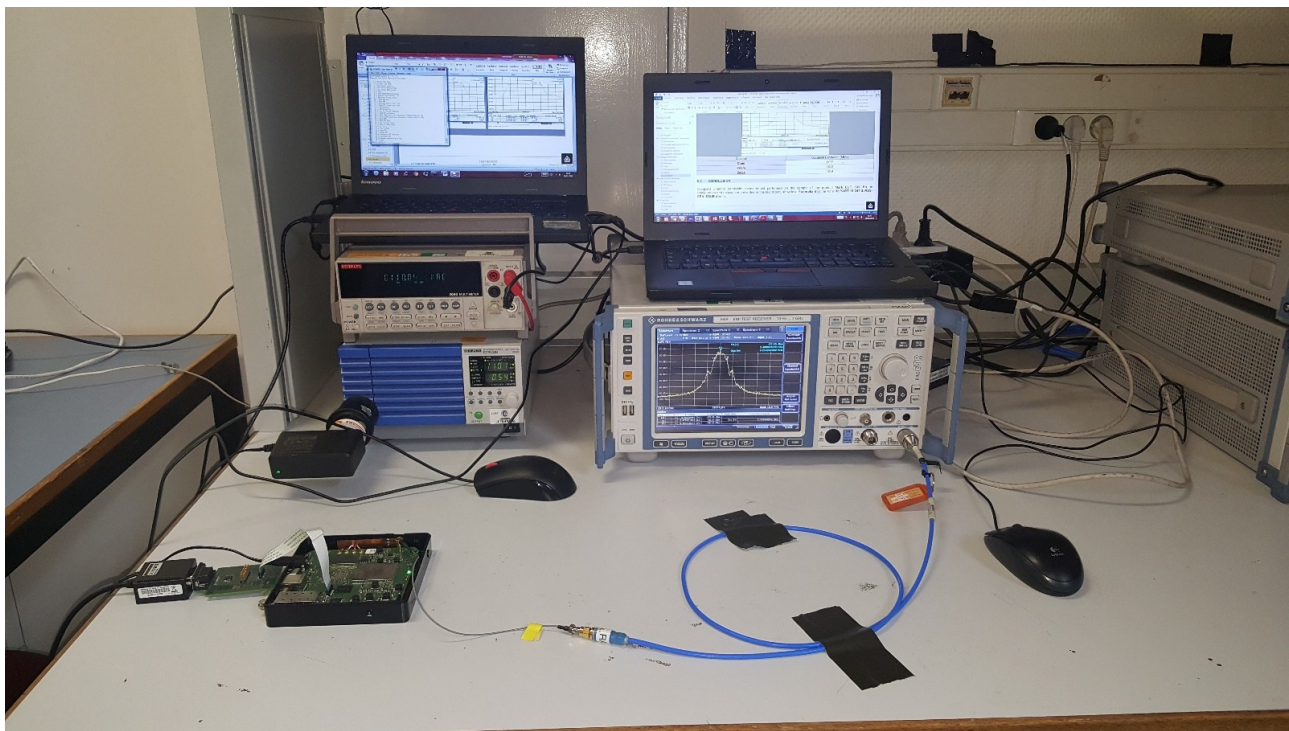
- On a table
- In an anechoic chamber

- 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

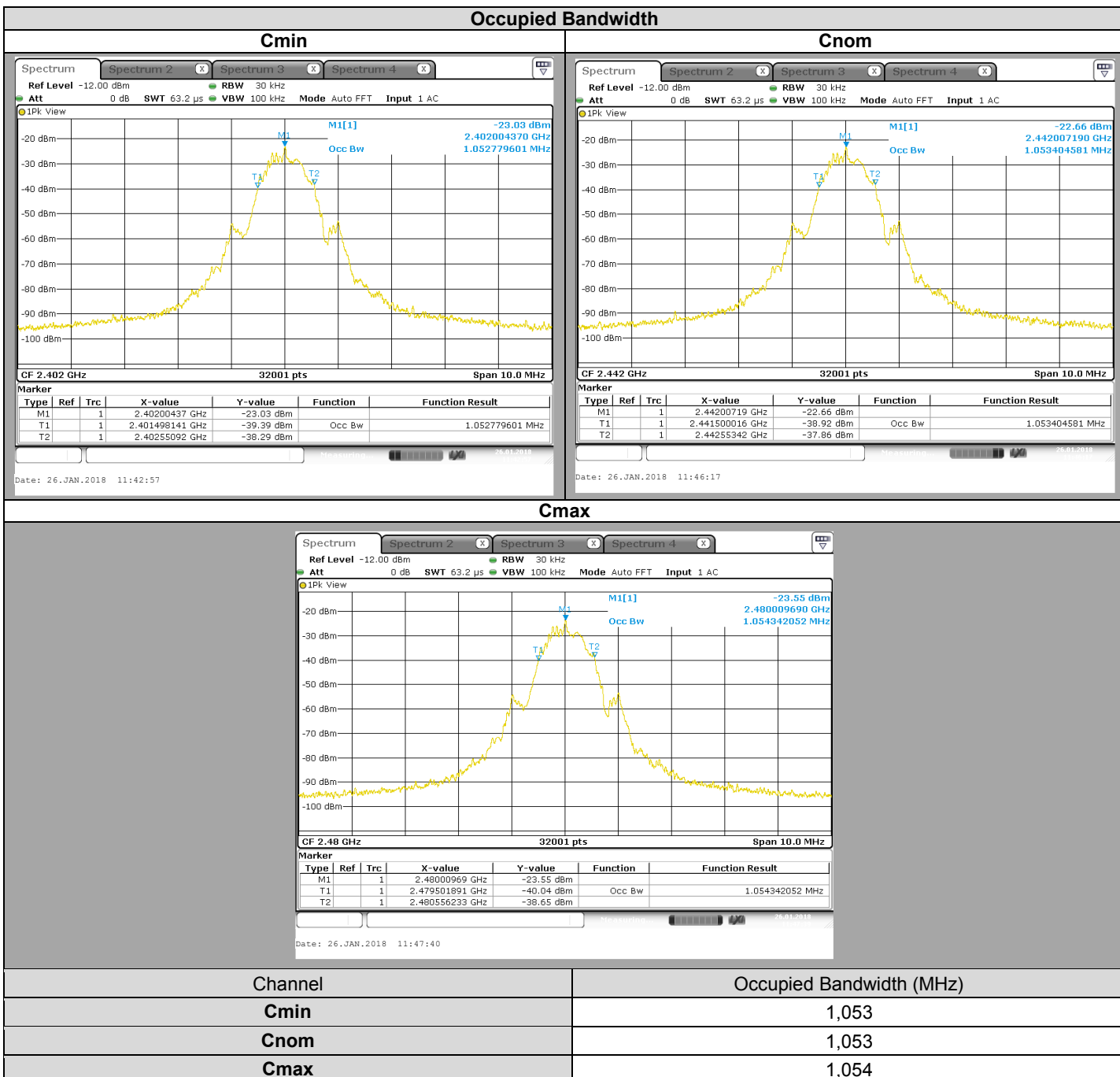
None

### 3.2. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2017/09	2018/09
Multi-meter	KEITHLEY	2000	A1242090	2016/06	2018/06
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2016/06	2018/06
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329661	2017/09	2018/09

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

### 3.3. RESULTS



### 3.1. CONCLUSION

Occupied Channel Bandwidth measurement performed on the sample of the product **SAGEMCOM DCIW387 ATN**, SN: **617510000063**, 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 : Armand MAHOUNGOU  
Date of test : January 26, 2018  
Ambient temperature : 26 °C  
Relative humidity : 47 %

### 4.2. TEST SETUP

- The Equipment Under Test is installed:

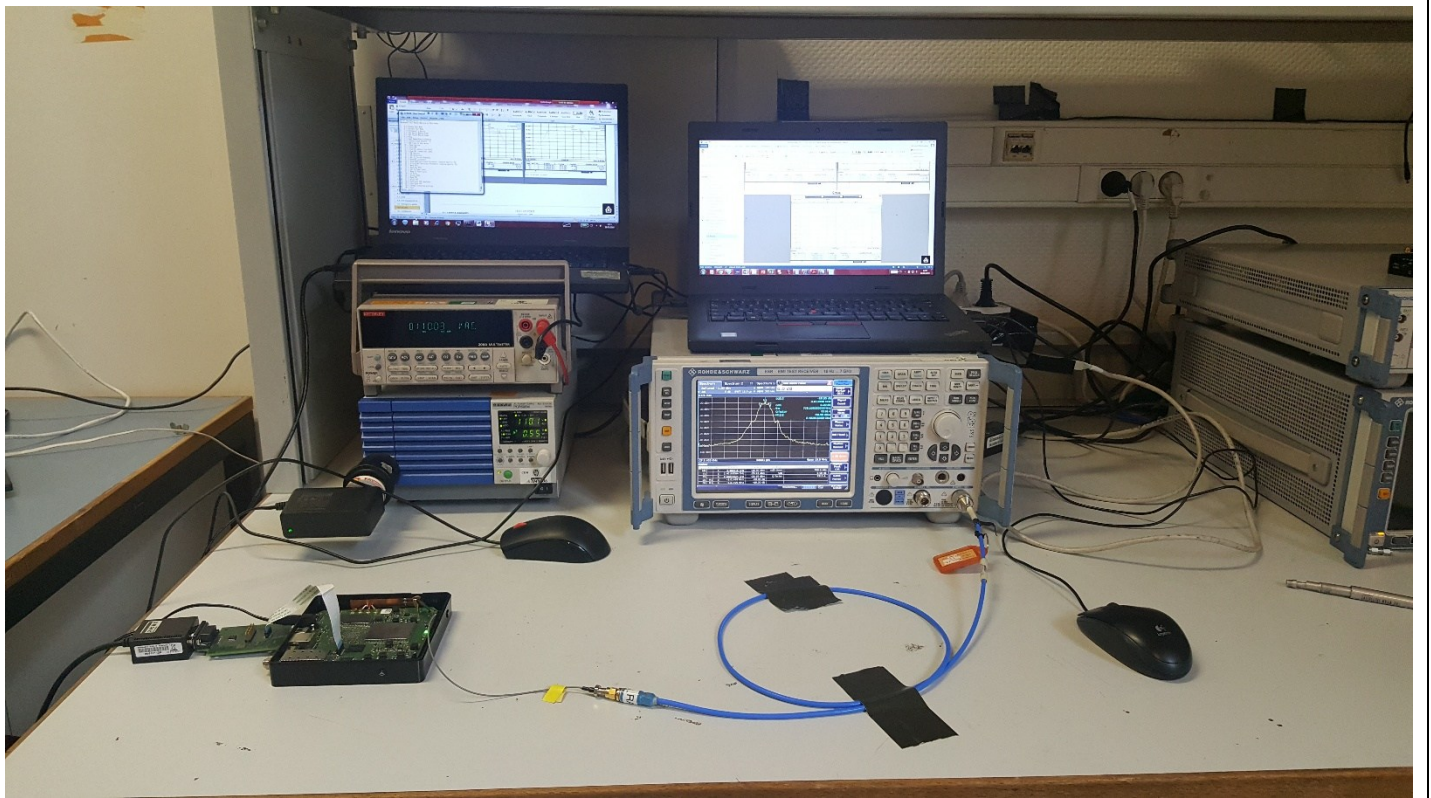
- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

- Test Procedure:

- KDB 558074 D01 DTS Meas Guidance v04 § 8.1
- KDB 558074 D01 DTS Meas Guidance v04 § 8.2



Photograph for 6dB emission bandwidth



#### 4.3. LIMIT

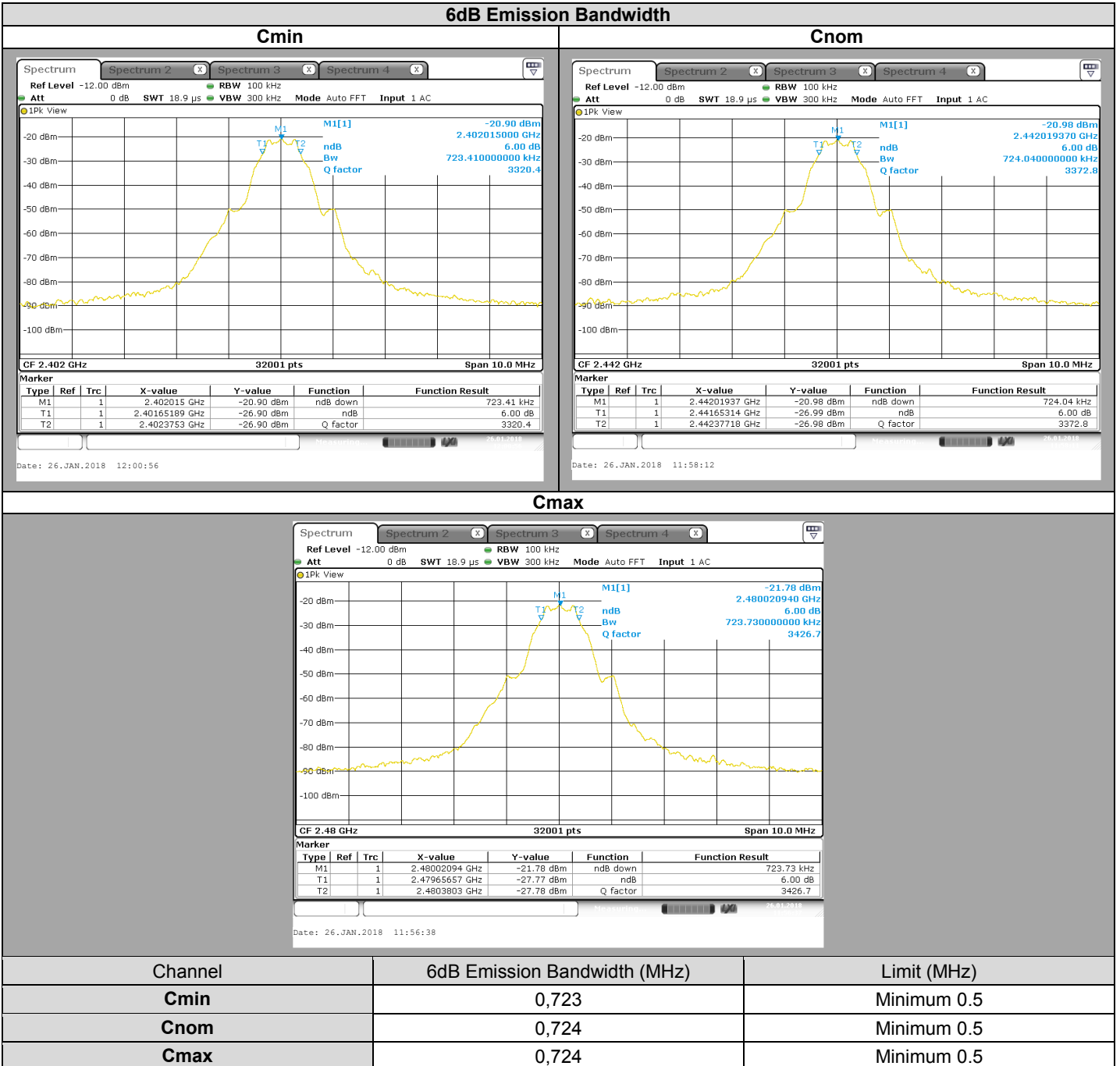
The 6dB bandwidth shall be at least 500kHz

#### 4.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2017/09	2018/09
Multi-meter	KEITHLEY	2000	A1242090	2016/06	2018/06
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2016/06	2018/06
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329661	2017/09	2018/09

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 DCIW387 ATN**, SN: **617510000063**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.



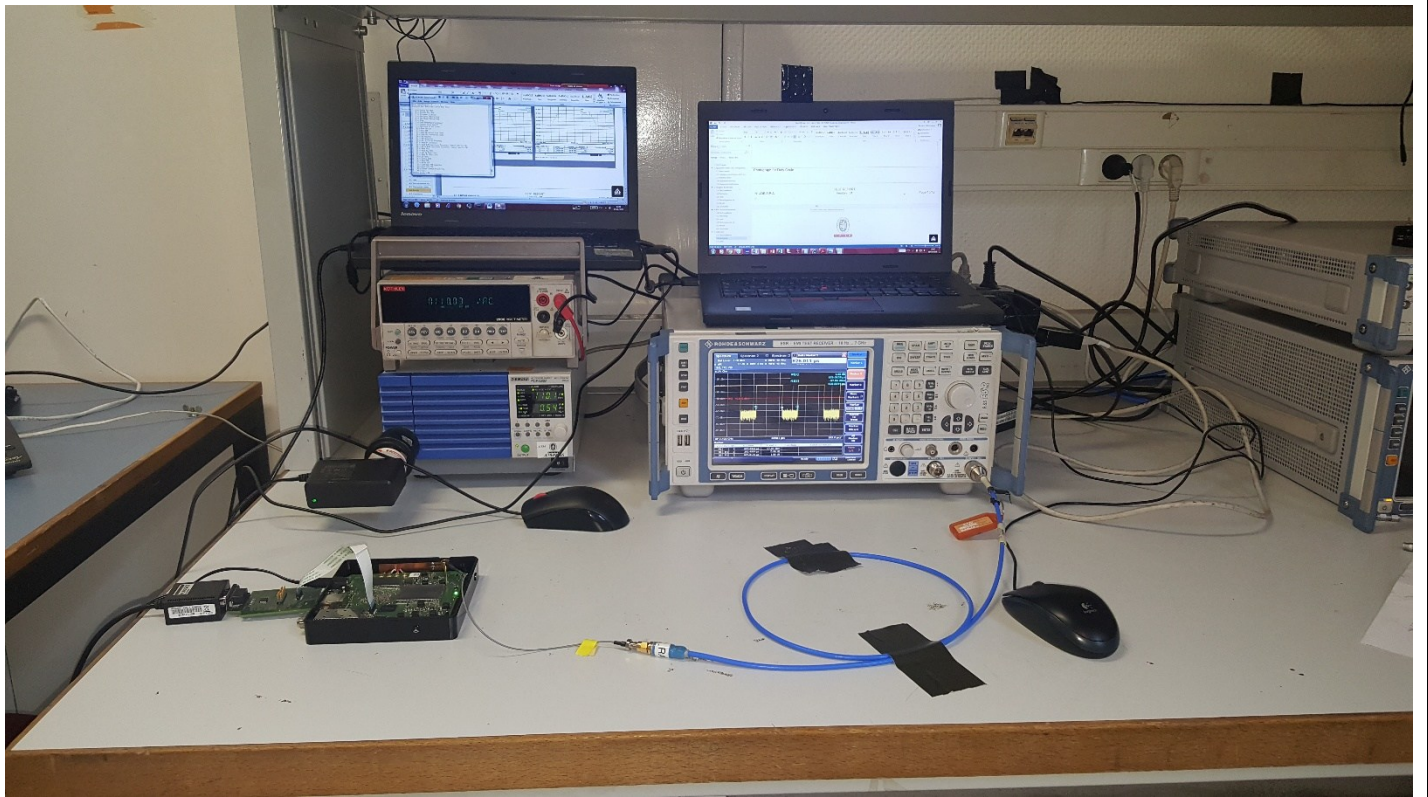
## 5. DUTY CYCLE

### 5.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU  
Date of test : January 26, 2018  
Ambient temperature : 26 °C  
Relative humidity : 47 %

### 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 v04 § 6.0 b)



Photograph for Duty Cycle



### 5.3. LIMIT

None

### 5.4. TEST EQUIPMENT LIST

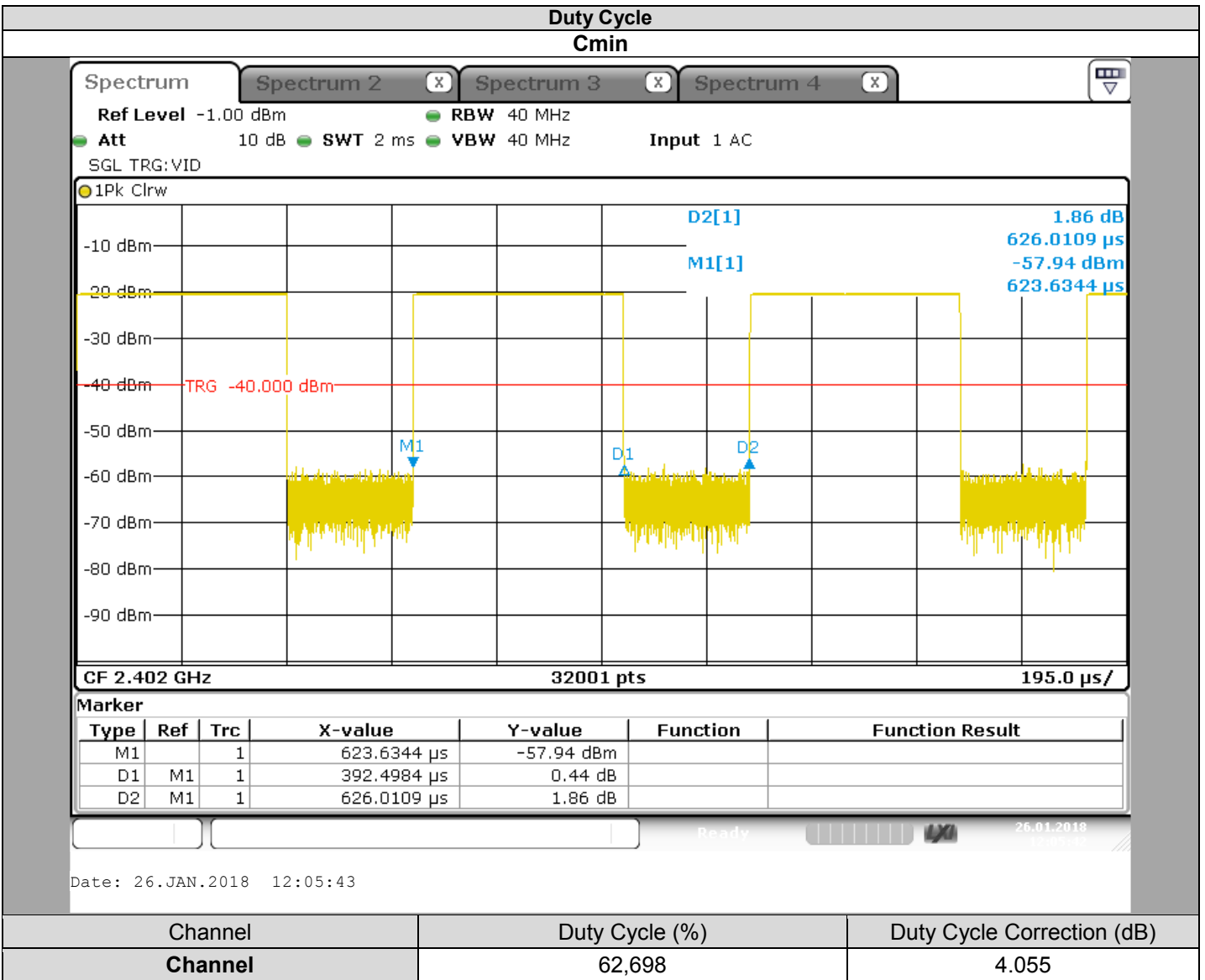
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2017/09	2018/09
Multi-meter	KEITHLEY	2000	A1242090	2016/06	2018/06
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2016/06	2018/06
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329661	2017/09	2018/09

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



L C I E

**5.5. RESULTS**



**5.6. CONCLUSION**

Duty Cycle measurement performed on the sample of the product **SAGEMCOM DCIW387 ATN**, SN: 61751000063, 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 : Armand MAHOUNGOU  
Date of test : January 26, 2018  
Ambient temperature : 26 °C  
Relative humidity : 47 %

### 6.2. TEST SETUP

- The Equipment Under Test is installed:

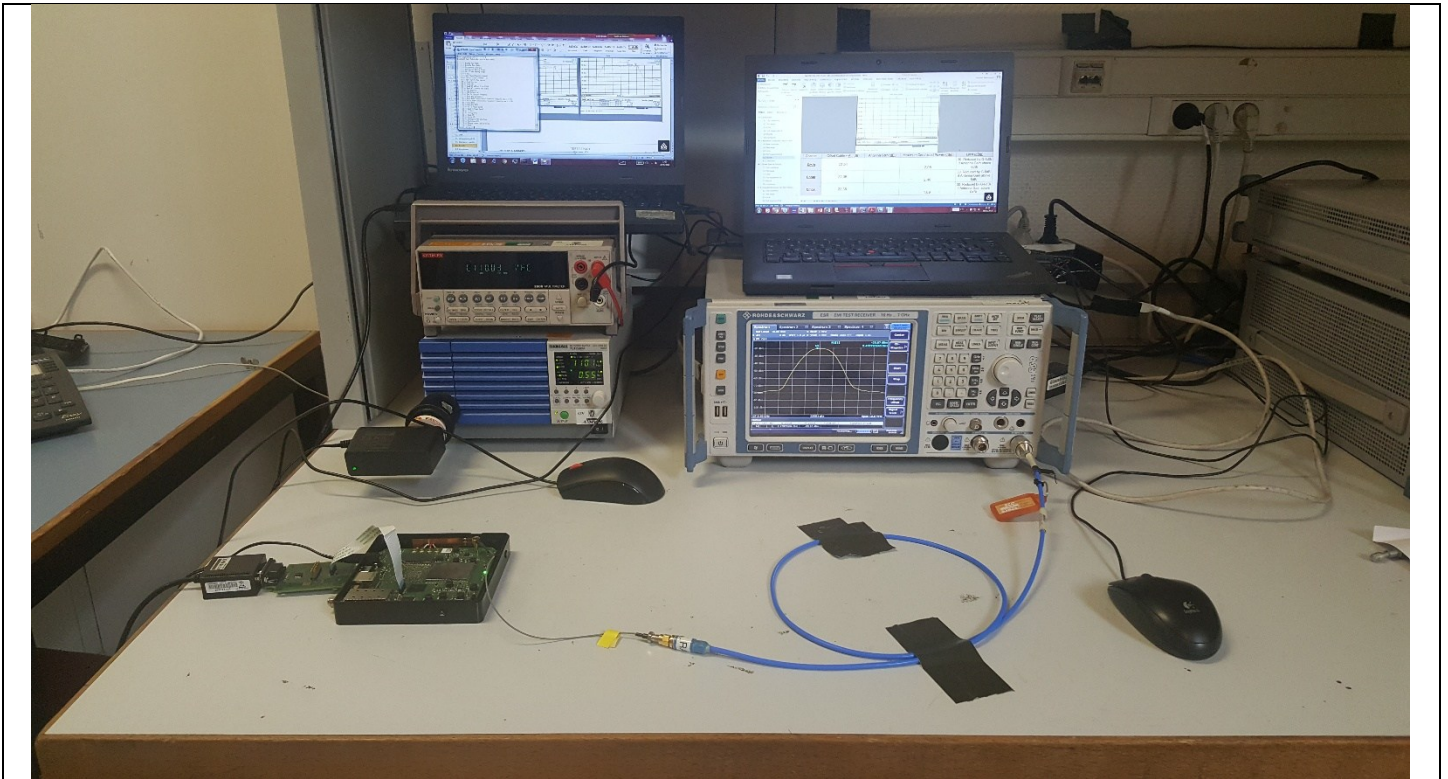
- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

- Test Procedure:

- KDB 558074 D01 DTS Meas Guidance v04 § 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

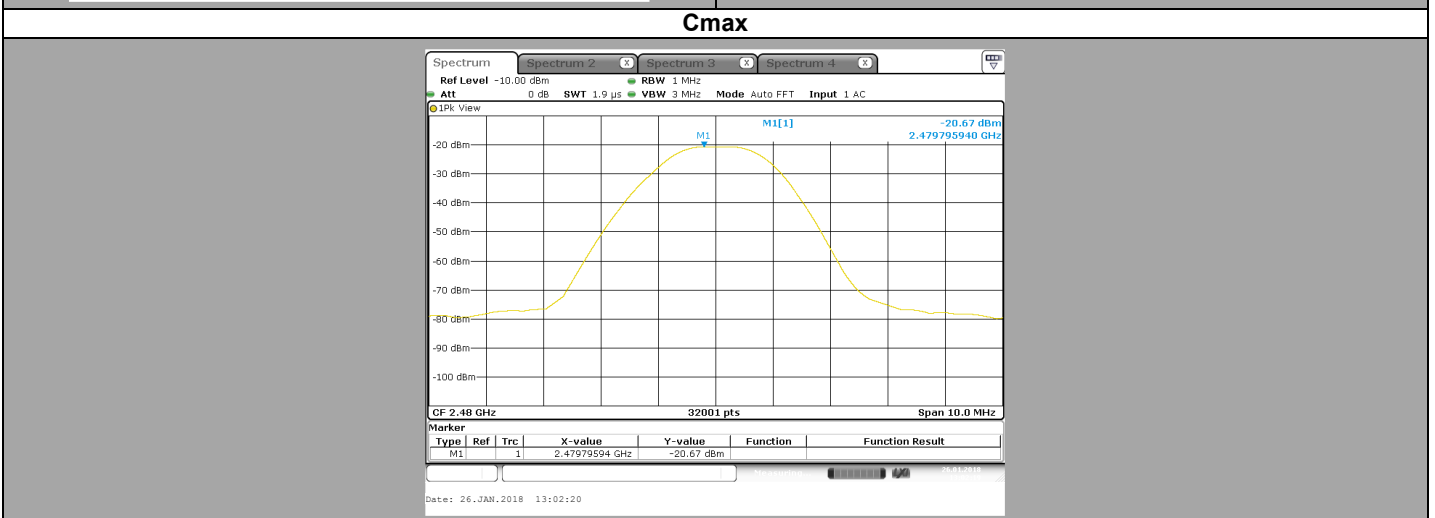
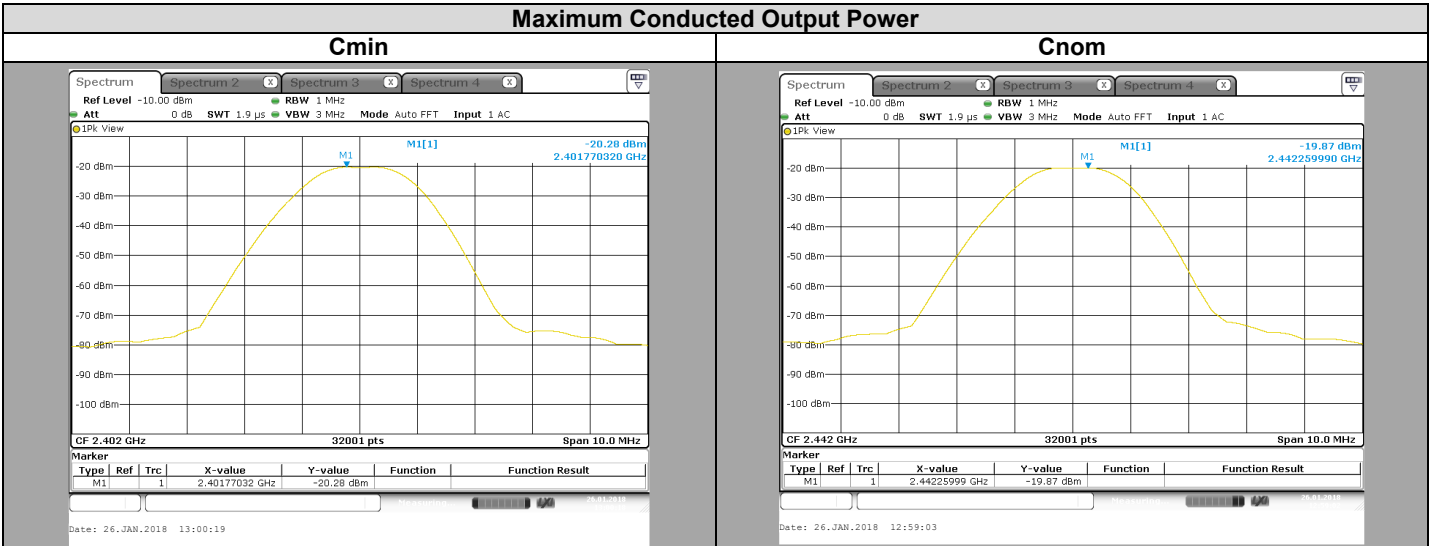
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2017/09	2018/09
Multi-meter	KEITHLEY	2000	A1242090	2016/06	2018/06
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2016/06	2018/06
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329661	2017/09	2018/09

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



L C I E

## 6.5. RESULTS



Channel	Offset Cable + Att (dB)	Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Limit (dBm)
<b>Cmin</b>	<b>22,36</b>	<b>3,6</b>	<b>2,08</b>	30
<b>Cnom</b>	<b>22,36</b>	<b>3,6</b>	<b>2,49</b>	30
<b>Cmax</b>	<b>22,36</b>	<b>3,6</b>	<b>1,69</b>	30

## 6.6. CONCLUSION

Maximum Conducted Output Power measurement performed on the sample of the product **SAGEMCOM DCIW387 ATN**, SN: **61751000063**, 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 : Armand MAHOUNGOU  
Date of test : January 26, 2018  
Ambient temperature : 26 °C  
Relative humidity : 47 %

### 7.2. TEST SETUP

- The Equipment Under Test is installed:

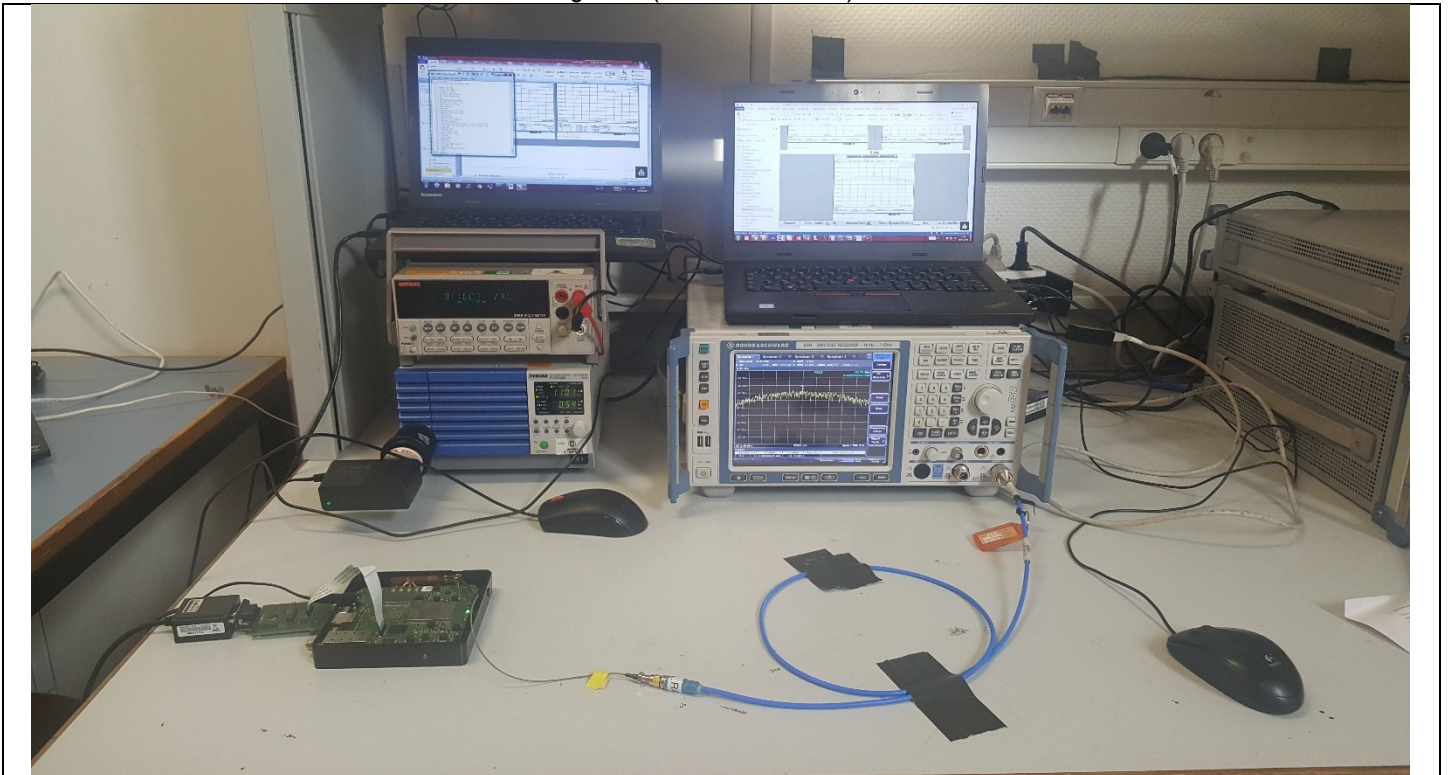
- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

- Test Procedure:

- KDB 558074 D01 DTS Meas Guidance v04 § 10.2 (Method PKPSD)



Photograph for Power Spectral Density





### 7.3. LIMIT

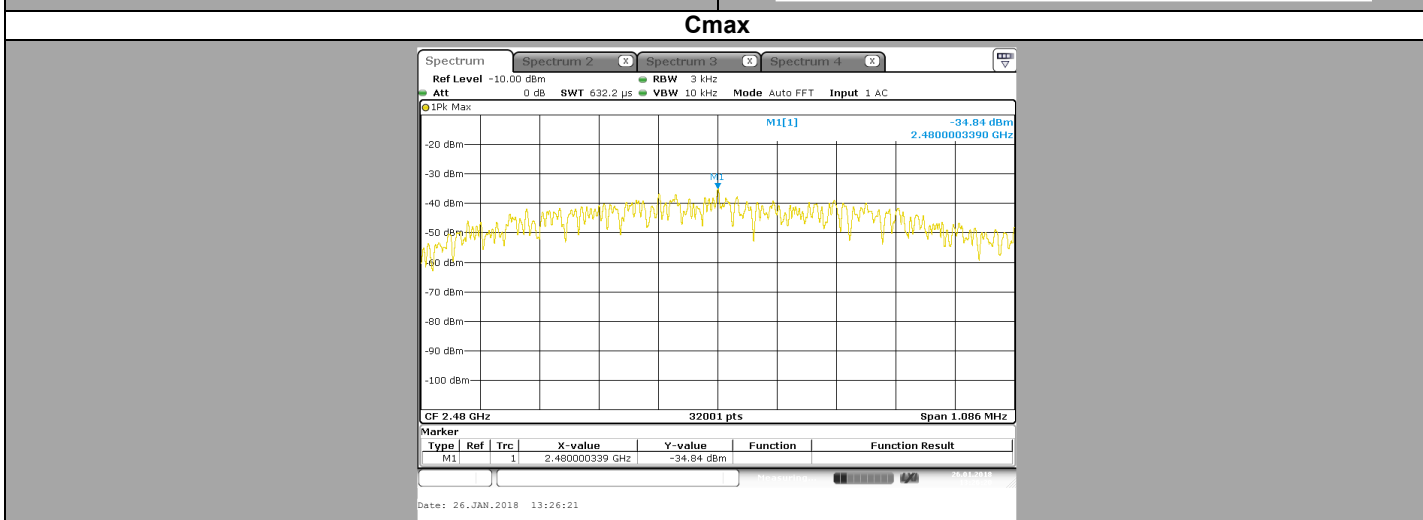
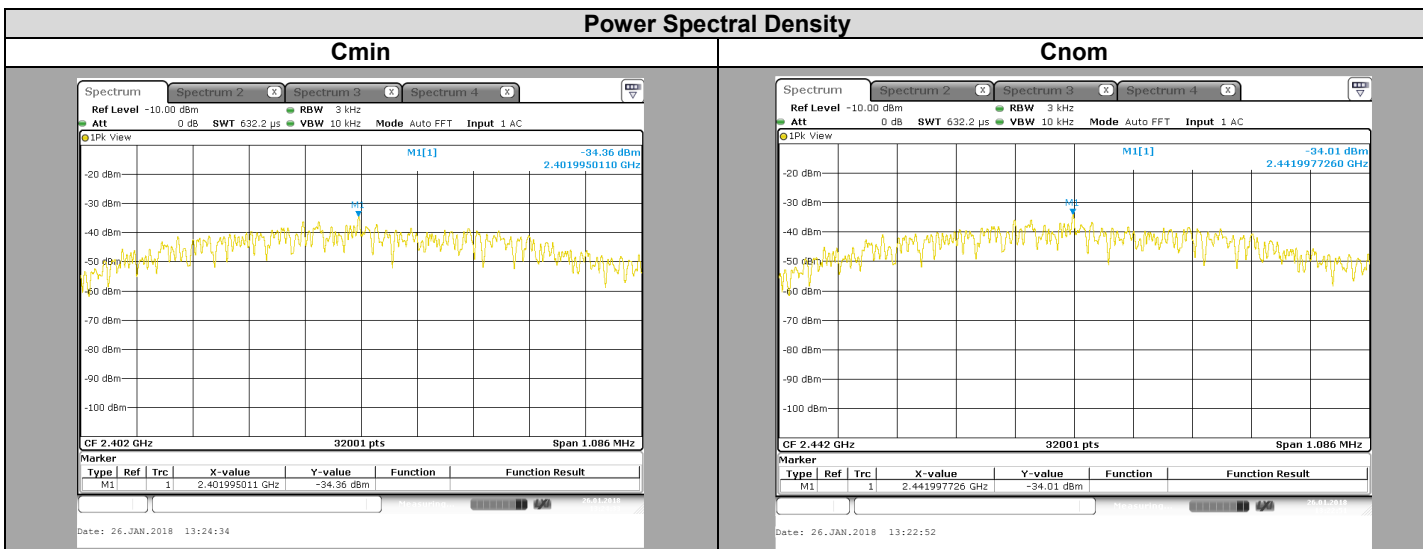
Power Spectral Density:  
2400MHz-2483.5MHz: Shall not exceed 8dBm/3kHz  
Limits are reduced by G-6dBi if Overall Antenna Gain above 6dBi

### 7.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2017/09	2018/09
Multi-meter	KEITHLEY	2000	A1242090	2016/06	2018/06
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2016/06	2018/06
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329661	2017/09	2018/09

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

## 7.5. RESULTS



Channel	Offset Cable + Att (dB)	Antenna Gain (dBi)	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
<b>Cmin</b>	22,36	3,6	-11,99	8
<b>Cnom</b>	22,36	3,6	-11,65	8
<b>Cmax</b>	22,36	3,6	-12,34	8

## 7.6. CONCLUSION

Power Spectral Density measurement performed on the sample of the product **SAGEMCOM DCIW387 ATN**, SN: **617510000063**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.

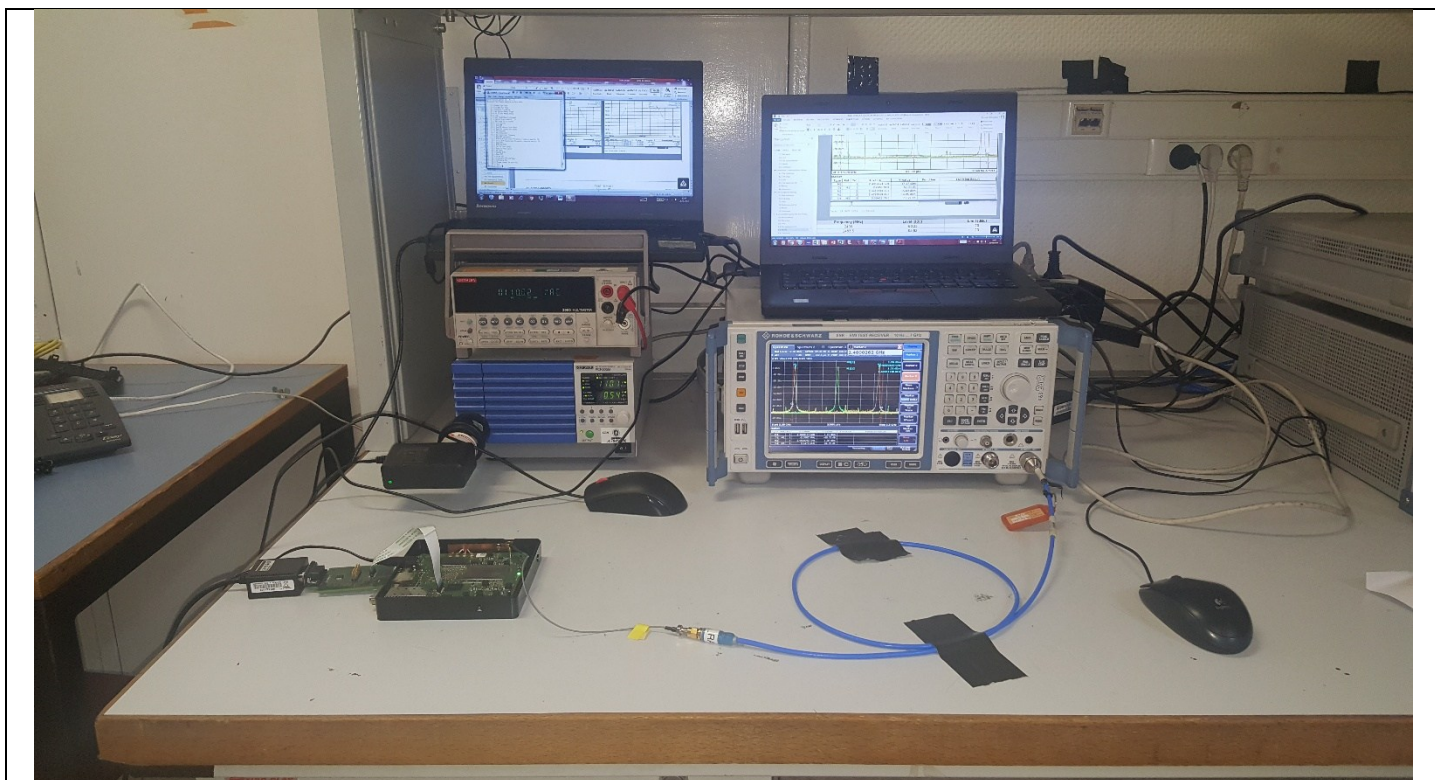
## 8. UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS AT THE BAND EDGE

### 8.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU  
Date of test : January 26, 2018  
Ambient temperature : 26 °C  
Relative humidity : 47 %

### 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 v04 § 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

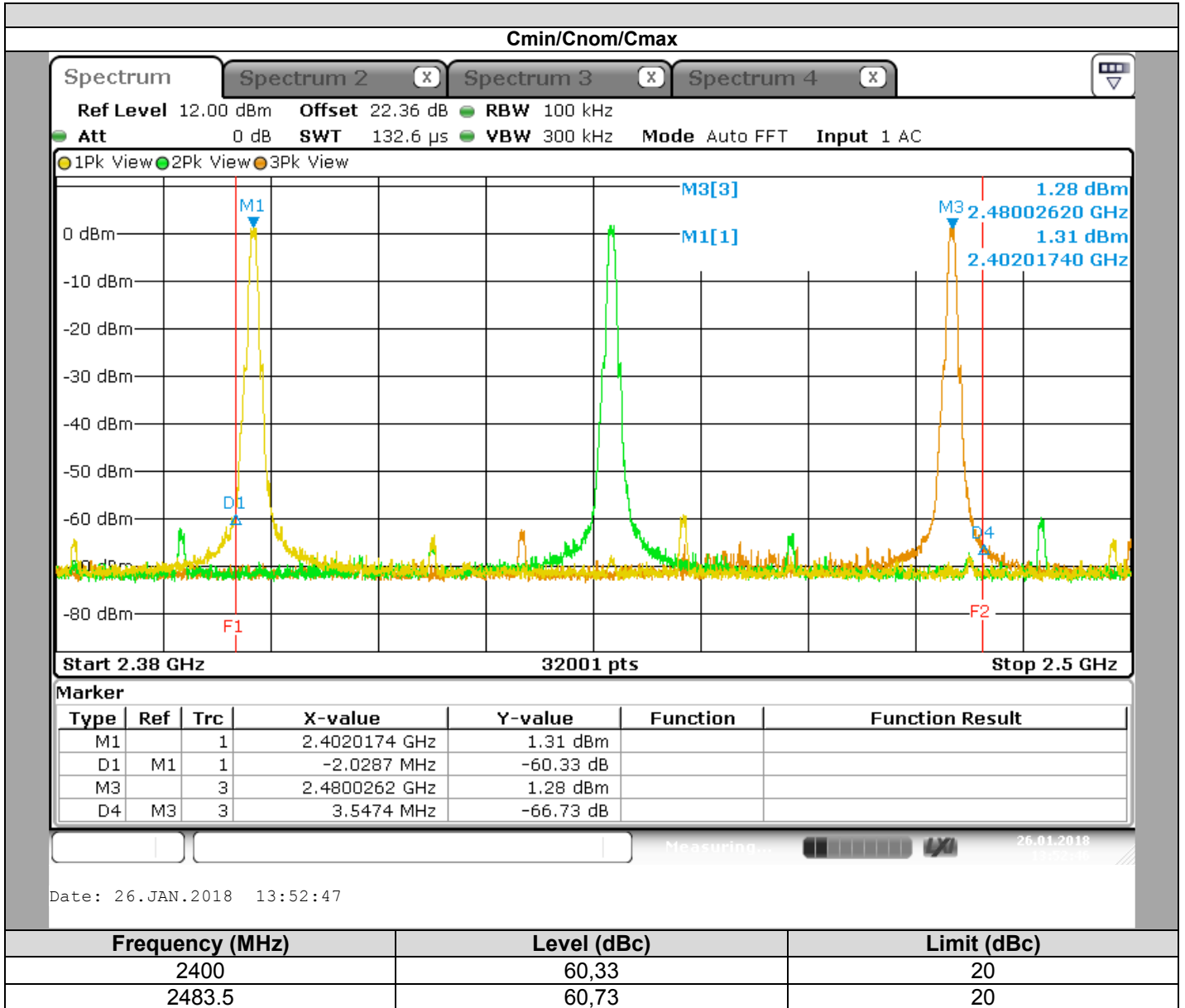
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2017/09	2018/09
Multi-meter	KEITHLEY	2000	A1242090	2016/06	2018/06
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2016/06	2018/06
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329661	2017/09	2018/09

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



L C I E

### 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 DCIW387 ATN**, SN: **61751000063**, in configuration and description presented in this test report, show levels **Select Result** to the **47 CFR PART 15.247** limits.



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

### 9.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU  
Date of test : January 26, 2018  
Ambient temperature : 26 °C  
Relative humidity : 47 %

### 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 v04 § 11



Photograph for Unwanted Emission into non-restricted frequency bands



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	2017/07	2018/07
cable	Télédyne	084-0555-2MTR	A5329758	2017/10	2018/10
Attenuator 3dB	WEINSCHEL	WA54-3-12	A7122223	2017/10	2018/10
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2016/06	2018/06
Multi-meter	KEITHLEY	2000	A1242090	2016/06	2018/06
Rejector filter 2,4GHz	-	2.45GHz	A7484048	2017/09	2018/09

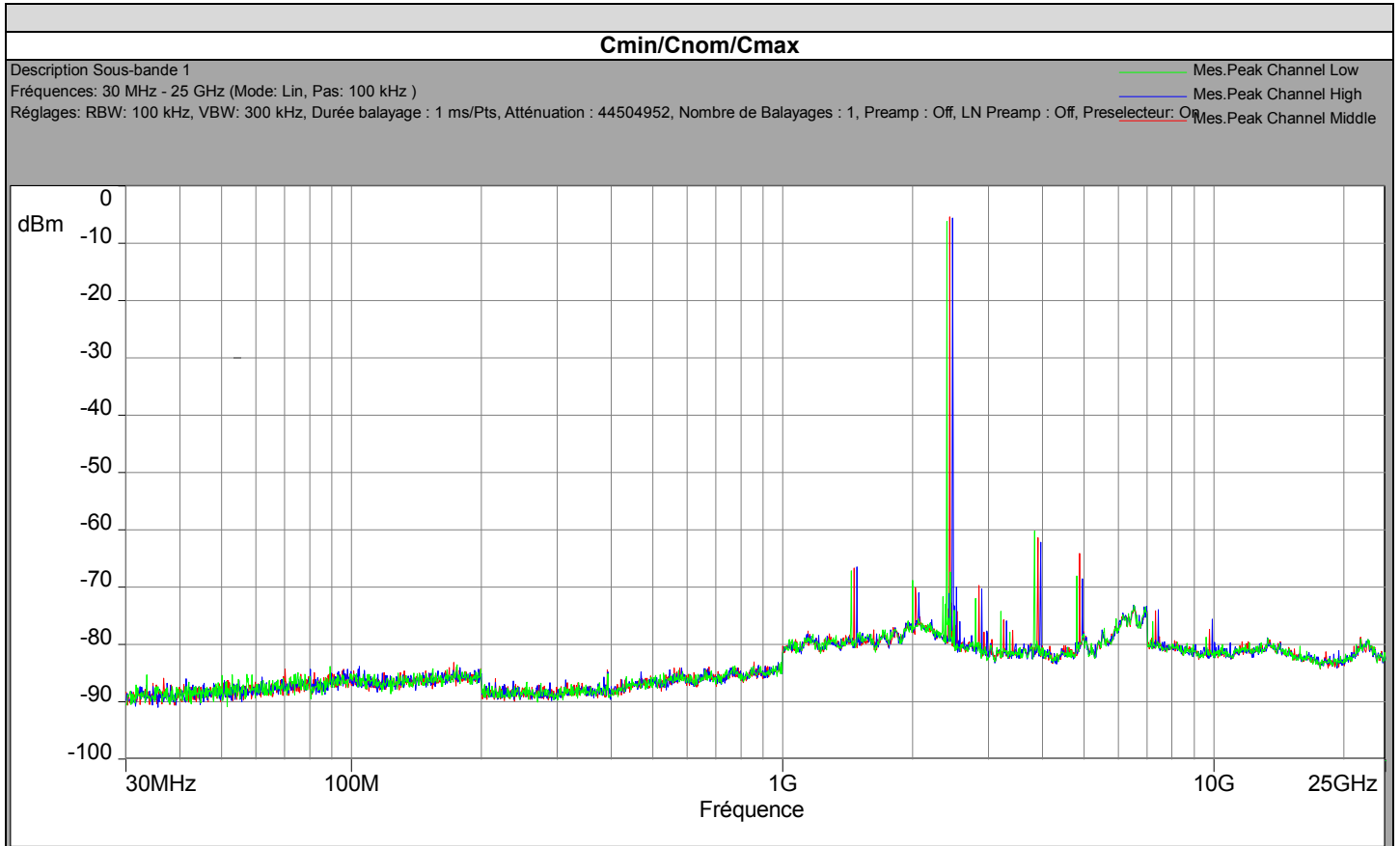
Note: In our quality system, the test equipment calibration due is more & less 2 months





L C I E

## 9.5. RESULTS



Frequency (MHz)	Level (dBm)	Level (dBc)	Limit (dBc)
2402	-6,13		
4804,5	-68,05	61,92	20
7205	-75,94	69,81	20
9607	-78,69	72,56	20
2442	-5,41		
4884,5	-64,07	58,66	20
7325	-74,10	68,69	20
9767	-77,32	71,91	20
2480	-5,56		
4960,5	-68,57	63,01	20
7439	-73,88	68,32	20
9919	-75,56	70,00	20

## 9.6. CONCLUSION

Unwanted Emission into non-restricted frequency bands measurement performed on the sample of the product **SAGEMCOM DCIW387 ATN**, SN: **61751000063**, 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 : February 1, 2018  
Ambient temperature : 21 °C  
Relative humidity : 49 %

### 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)



L C I E



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
Receiver	RHODE & SCHWARZ	ESIB26	A2642021	2015/12	2017/12
V ISLN	ROHDE & SCHWARZ	ESH2-Z5	C2322001	2017/08	2018/08
Pulse limiter	ROHDE & SCHWARZ	ESH3-Z2	A2649008	2017/09	2018/09
Cable	-	-	A5329417	2017/10	2018/10
Cable	-	-	A5329589	2017/08	2018/08
Reference ground plan 2 x 3m	L.C.I.E.	-	-	-	-
Supplementary information:					

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

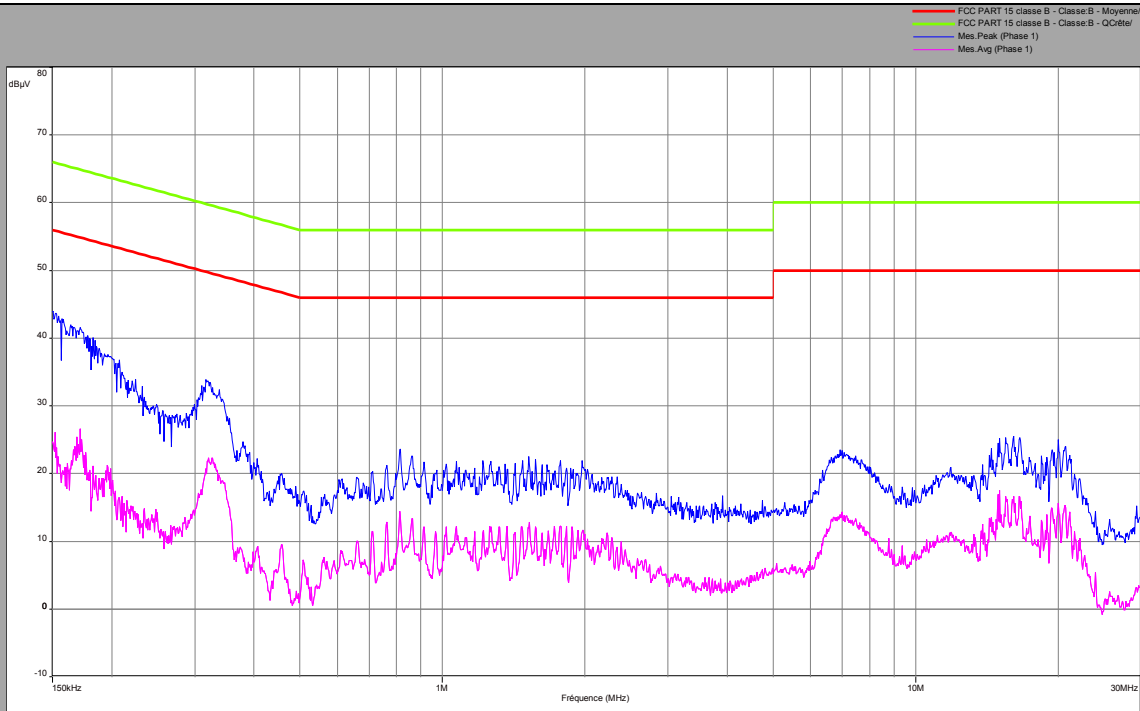
None       Divergence:



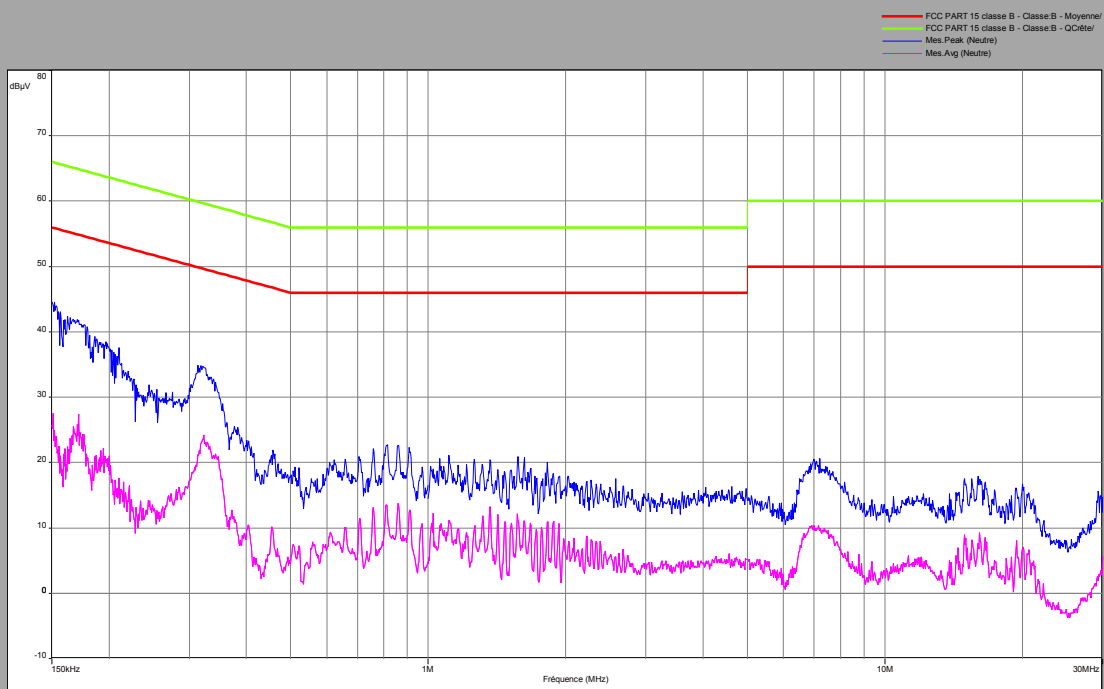
L C I E

## 10.6. RESULTS

### Cmin Phase



### Neutral



**Phase**

Frequency (MHz)	Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Margin Peak (dBµV)	Average Level (dBµV)	Average Limit (dBµV)	Margin Average (dBµV)
0.171	41.6	64.9	23.3	26.6	54.9	28.3
0.324	33.8	59.8	26.0	22.2	49.8	27.6
0.813	23.5	56	32.5	14.5	46	31.5
6.968	22.8	60	37.2	14.4	50	35.6
16.58	24.8	60	35.2	15.8	50	34.2

**Neutral**

Frequency (MHz)	Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Margin Peak (dBµV)	Average Level (dBµV)	Average Limit (dBµV)	Margin Average (dBµV)
0.151	44	65.9	21.9	27.5	55.9	28.4
0.322	34.6	59.6	25.0	24.2	49.6	25.4
1.366	20.4	56	35.6	13.3	46	32.7
6.968	20	60	40.0	10.3	50	39.7
15.51	17.5	60	42.5	7.6	50	42.4

**10.7. CONCLUSION**

Ac Power Line Conducted Emission measurement performed on the sample of the product **SAGEMCOM DCIW387 ATN**, SN: **617510000063**, 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 : Armand MAHOUNGOU & Laurent DENEUX  
Date of test : January 8, 2018 to January 12, 2018  
Ambient temperature : 24 °C & 27 °C  
Relative humidity : 44 % & 46 %

### 11.2. TEST SETUP

#### Below 1GHz

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. Measurement bandwidth was 120kHz below 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 0.8m high under 1GHz.

#### Above 1GHz

The product has been tested according to ANSI C63.10 (2013). The EUT is placed **in a full anechoic chamber**. Distance between measuring antenna and the EUT is **3m**. Test is performed in horizontal (H) and vertical (V) polarization with a horn antenna . Measurement bandwidth was 1MHz. The level has been maximised by the turntable rotation of 360 degrees range on the 3 axis of EUT.. The EUT is place at 1.5m high .

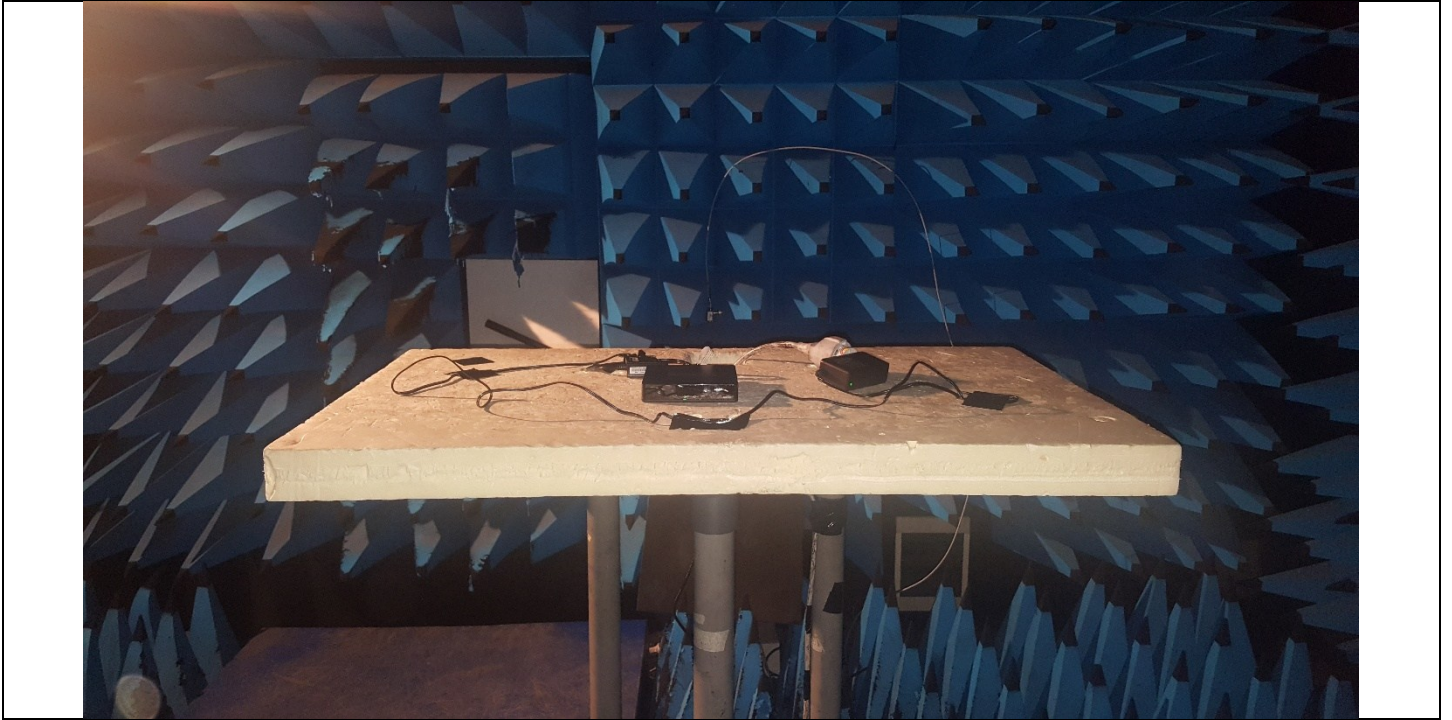


Photograph for Unwanted Emission in restricted frequency bands





L C I E

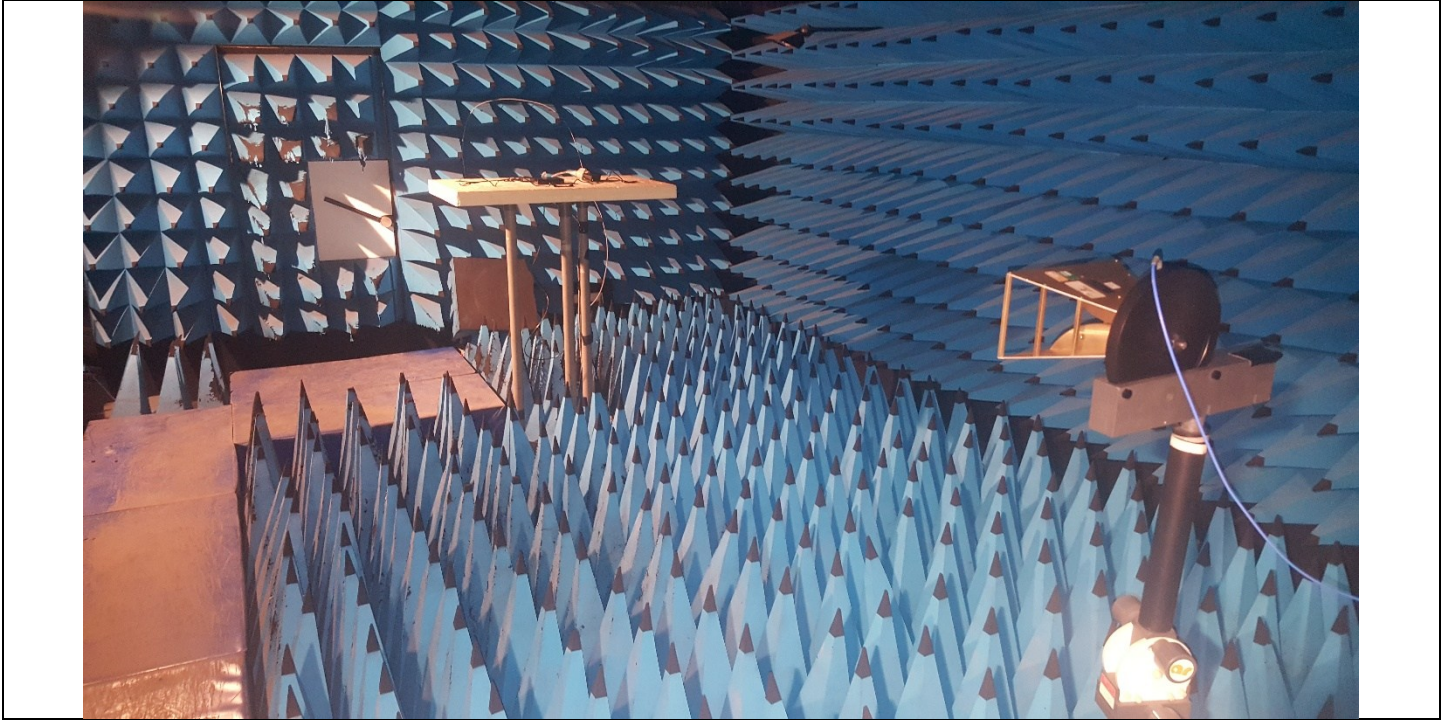


Photograph for Unwanted Emission in restricted frequency bands

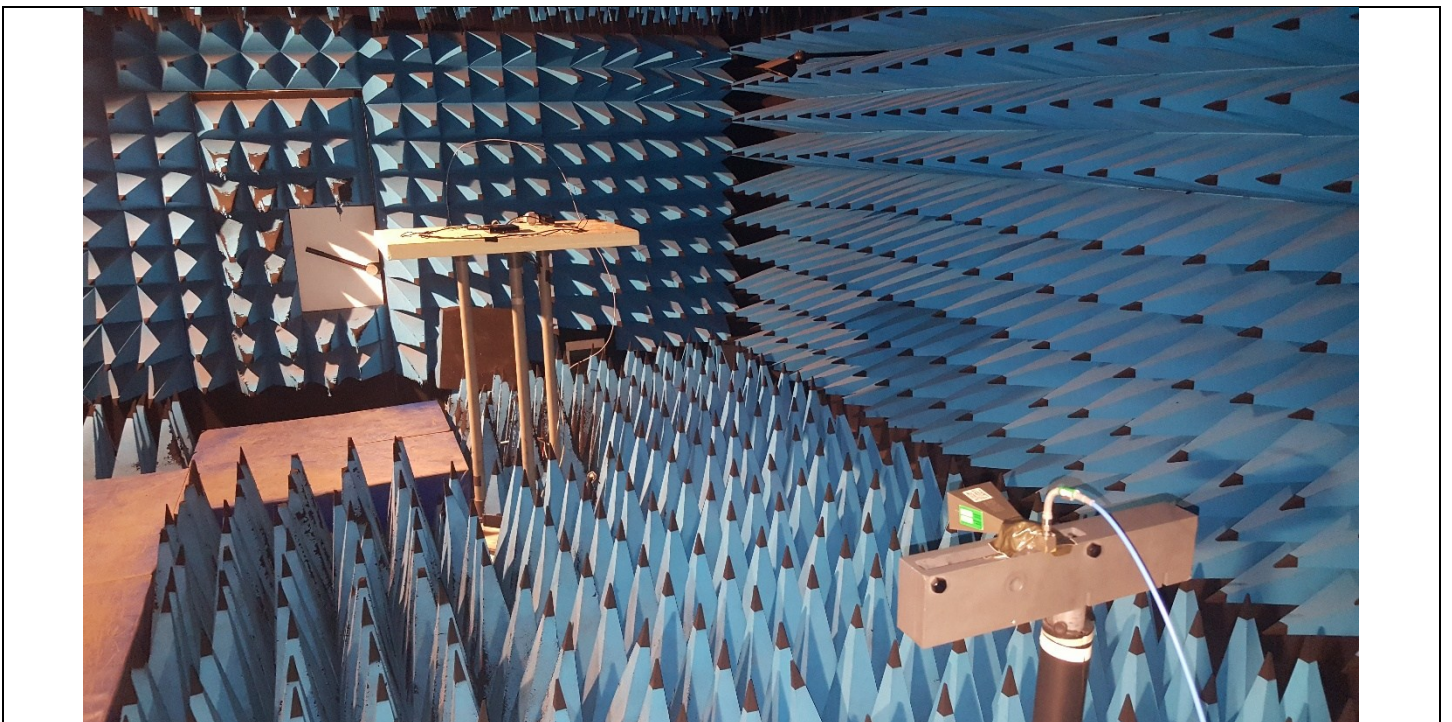




L C I E



Photograph for Unwanted Emission in restricted frequency bands



Photograph for Unwanted Emission in restricted frequency bands

### 11.3. LIMIT

#### Limit at 3m:

30MHz to 88MHz: 40dB $\mu$ V/m QPeak  
 88MHz to 216MHz: 43,5dB $\mu$ V/m QPeak  
 216MHz to 960MHz: 46dB $\mu$ V/m QPeak  
 960MHz to 1000MHz: 54dB $\mu$ V/m QPeak  
 Above 1000MHz: 74dB $\mu$ V/m Peak  
 54dB $\mu$ V/m Average

#### 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

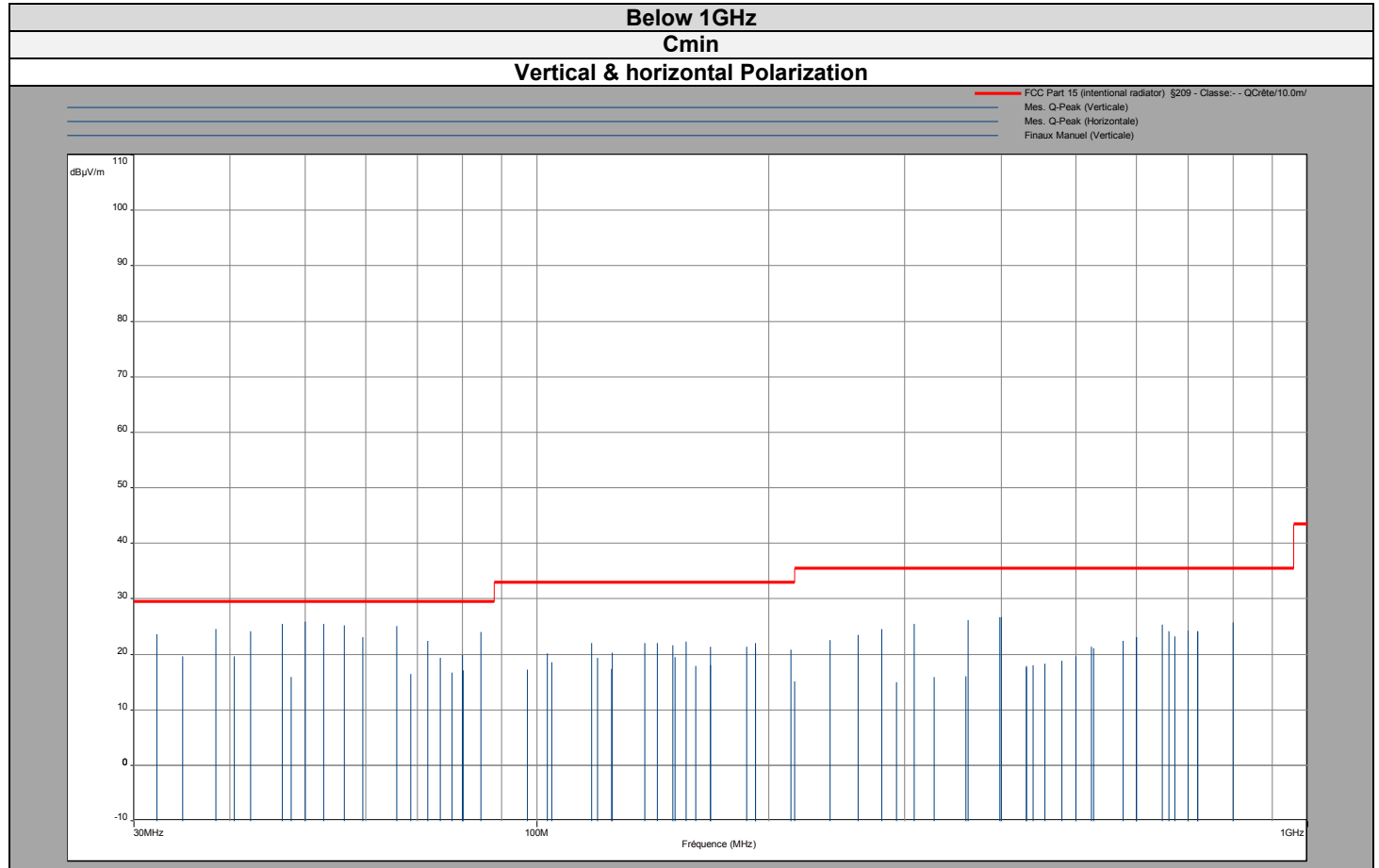
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Open test site	LCIE	-	F2000400	2017/06	2018/06
EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	A2642021	2015/12	2017/12
Bilog antenna	CHASE	CBL 6112A	C2040040	2017/03	2018/03
Cable	-	-	A5329449	2017/10	2018/10
Cable	-	-	A5329380	2017/06	2018/06
cable	-	-	A5329444	2017/10	2018/10
Full anechoic chamber	SIEPEL	-	D3044019	2017/05	2021/05
Preamplifier	LCIE; LCIE	LCIE-ALB-001	A7080073	2017/08	2018/08
Measurement horn antenna 18-26,5GHz	PASTERNAK	PE9852/2F-20	C2042048	2017/05	2019/05
Horn antenna	AH SYSTEMS	SAS 571	C2042041	2017/04	2018/04
EMI receiver	ROHDE & SCHWARZ	ESI40 1088 740K40	A2642010	2017/07	2018/07
Rejector filter 2,4GHz	-	2.45GHz	A7484048	2017/09	2018/09
cable	Télédyne	084-0505-1MTR	A5329757	2017/03	2018/03
cable	Télédyne	084-0555-3MTR	A5329760	2017/03	2018/03
cable	Télédyne	084-555-1.5MTR	A5329759	2017/03	2018/03

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





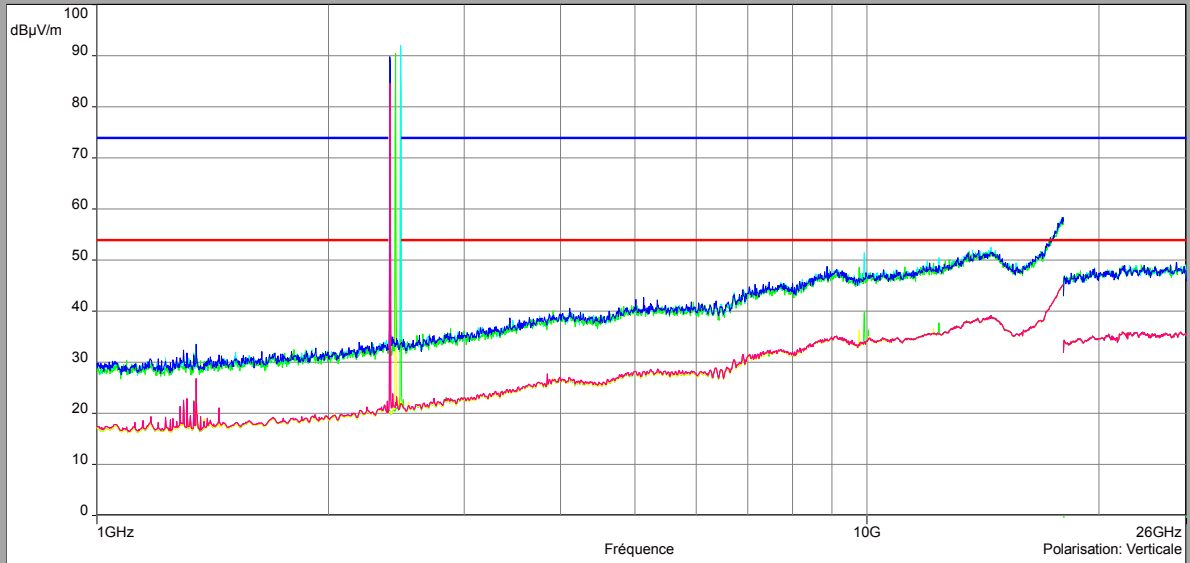
L C I E

### Above 1GHz

### Cmin/Cnom/Cmax

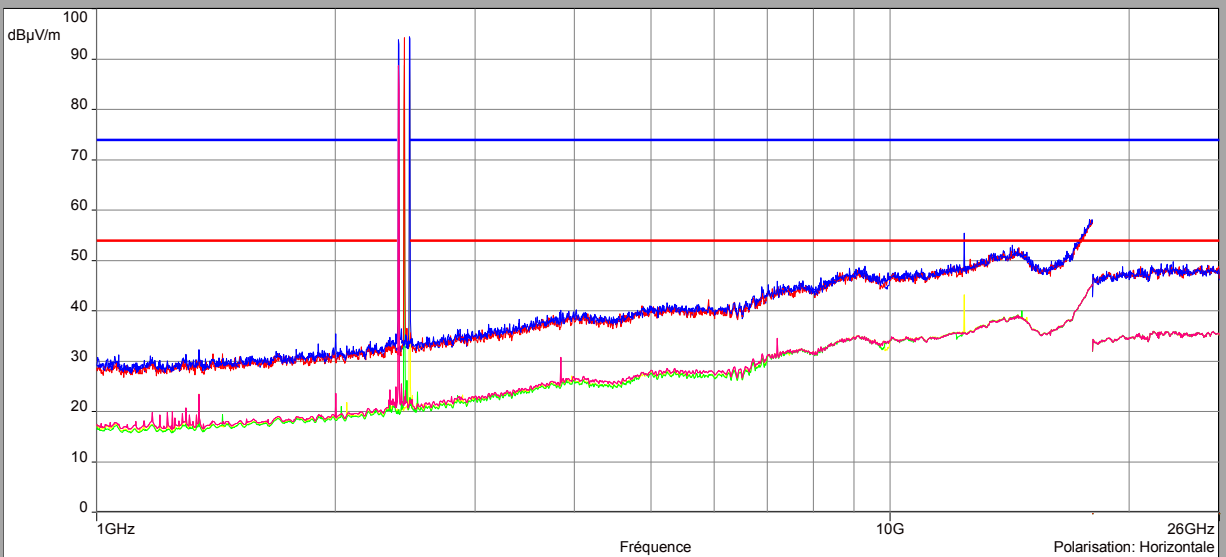
### Vertical Polarization

- FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/
- FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/
- Mes.Peak (Verticale)
- Mes.Avg (Verticale)
- Mes.Peak Channel Middle (Verticale)
- Mes.Avg Channel Middle (Verticale)
- Mes.Peak Channel High (Verticale)
- Mes.Avg Channel High (Verticale)



### Horizontal polarization

- FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/
- FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/
- Mes.Peak (Horizontale)
- Mes.Avg (Horizontale)
- Mes.Peak Channel Middle (Horizontale)
- Mes.Avg Channel Middle (Horizontale)
- Mes.Peak Channel High (Horizontale)
- Mes.Avg Channel High (Horizontale)







L C I E

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

#### Cmin/Cnom/Cmax

#### Vertical Polarization

Description Sous-bande 2

Fréquences: 2.31 GHz - 2.5 GHz (Mode: Lin, Pas: 500 kHz)

Réglages: RBW: 1 MHz, VBW: Auto, Durée balayage : 50 ms/Pts, Atténuation : 154548248, Nombre de Balayages : 1, Preamplificateur: Off, Préselecteur: Off

Polarisation: Verticale

Distance: 3 m

FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/

FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/

Mes. Peak Channel High (Verticale)

Mes. Peak Channel Middle (Verticale)

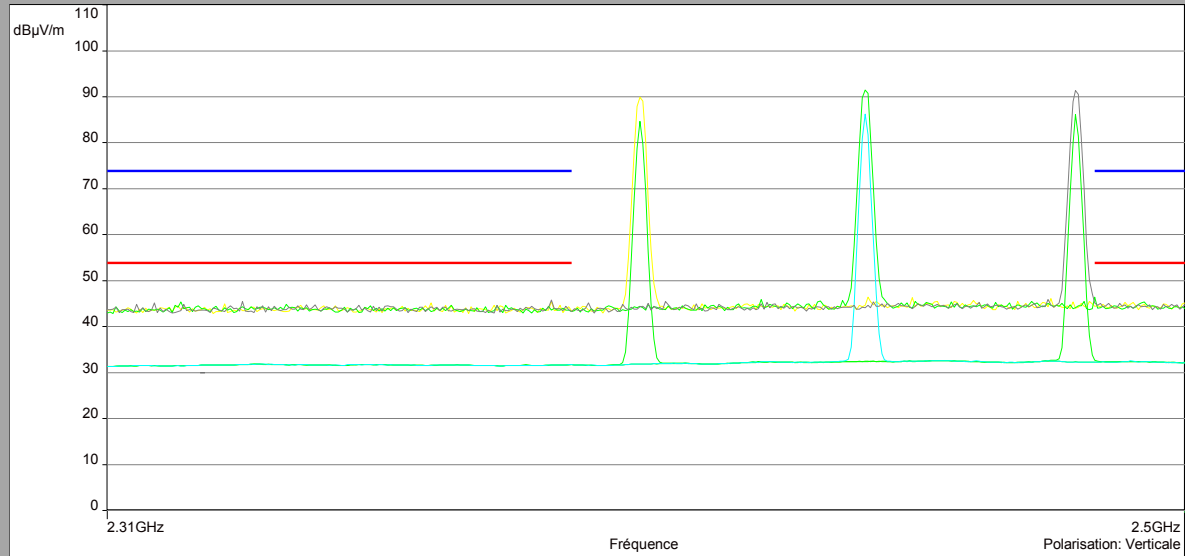
Mes. Peak Channel Low (Verticale)

Mes. Avg Channel Middle (Verticale)

Mes. Avg Channel Low (Verticale)

Mes. Avg Channel High (Verticale)

Mes. Peak Channel Low (Verticale)



#### Horizontal polarization

Description Sous-bande 1

Fréquences: 2.31 GHz - 2.5 GHz (Mode: Lin, Pas: 500 kHz)

Réglages: RBW: 1 MHz, VBW: Auto, Durée balayage : 50 ms/Pts, Atténuation : 12814304, Nombre de Balayages : 1, Preamplificateur: On, Préselecteur: Off

Polarisation: Horizontale

Distance: 3 m

FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/

FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/

Mes. Peak Channel Low (Horizontale)

Mes. Peak Channel High (Horizontale)

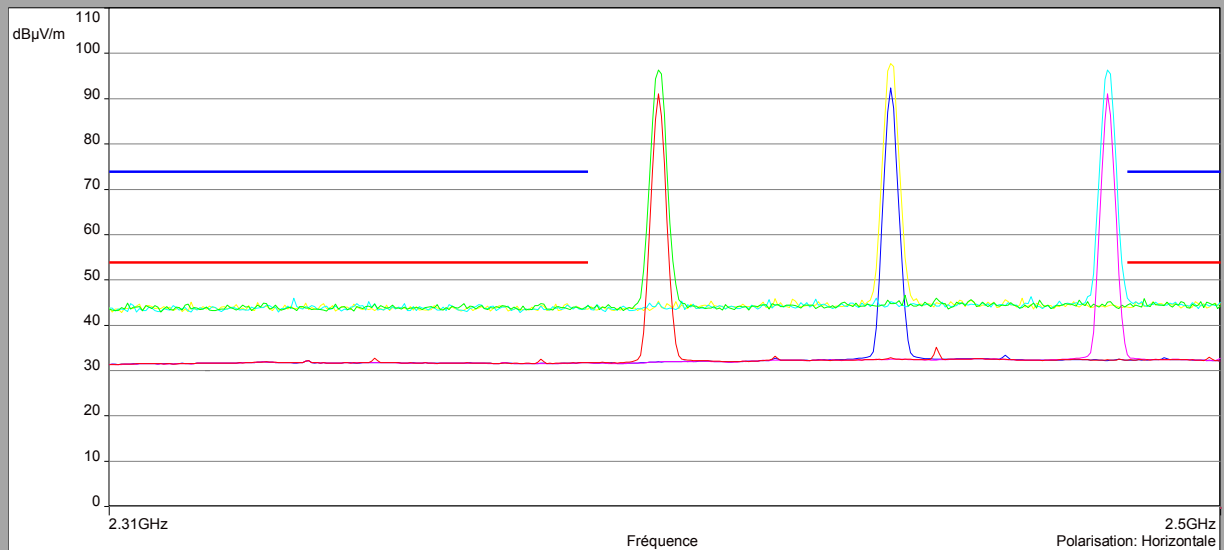
Mes. Peak Channel Middle (Horizontale)

Mes. Avg Channel High (Horizontale)

Mes. Avg Channel Low (Horizontale)

Mes. Avg Channel Middle (Horizontale)

Mes. Peak Channel Middle (Horizontale)





L C I E

Below 1GHz					
Polarization	Frequency (MHz)	Peak Level (dBµV/m)	QPeak Level (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)
Vertical	46.7	-	25.47	29.5	4.03
Vertical	280	-	24.6	35.5	10.9
Vertical	400	-	26.73	35.5	8.77
Horizontal	648	-	25.41	35.5	10.09
Horizontal	700	-	24.3	35.5	11.2
Horizontal	800	-	25.81	35.5	9.69

Above 1GHz								
Cmin/Cnom/Cmax								
Polarization	Frequency (MHz)	Average Level (dBµV/m)	Average Level + Duty Cycle Factor (dBµV/m)	Average Limit (dBµV/m)	Average Margin Level (dBµV/m)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin Level (dBµV/m)
Vertical	1346	26,79	30,85	54	23,16	33,86	74	40,14
Horizontal	2001,5	23,57	27,63	54	26,38	35,45	74	38,55
Horizontal	2390	22,03	26,09	54	27,92	35,42	74	38,58
Vertical	2390	20,51	24,57	54	29,44	31,58	74	42,42
Horizontal	2483,5	24,98	29,04	54	24,97	38,23	74	35,77
Vertical	2483,5	23,78	27,84	54	26,17	36,74	74	37,26
Horizontal	3843,5	30,73	34,79	54	19,22	40,20	74	30,80
Horizontal	7205,5	34,51	38,57	54	15,44	45,24	74	28,76
Vertical	9921	39,83	43,89	54	10,12	51,20	74	22,80
Horizontal	12399	43,19	47,25	54	6,76	55,46	74	18,54

## 11.7. CONCLUSION

Unwanted Emission in restricted frequency bands measurement performed on the sample of the product **SAGEMCOM DCIW387 ATN**, SN: **617510000063**, 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