



LCIE

Bluetooth Low Energy Template: Release August 08th, 2017

TEST REPORT

N°: 155636-721608-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
- ↳ Trade mark
- ↳ Manufacturer
- ↳ Model under test
- ↳ Serial number
- ↳ FCC ID

Home router
SAGEMCOM
SAGEMCOM
DCIWA384 UHD Ait US V2
253764997
VW3DCIWA384-V2

Test date

: May 16, 2018 to June 7, 2018

Test location

Fontenay Aux Roses & Ecuelles

Composition of document

46 pages

Document issued on

September 13, 2018

Written by :
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Tests operator



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PUBLICATION HISTORY

Version	Date	Author	Modification
01	June 22, 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.....	32
11.	UNWANTED EMISSIONS IN RESTRICTED FREQUENCY BANDS	37
12.	UNCERTAINTIES CHART	46



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 P	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
6dB Bandwidth P	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA()	<input type="checkbox"/> NP(1)
Duty Cycle P	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
Maximum Conducted Output Power P	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
Power Spectral Density P	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
Conducted Spurious Emission at the Band Edge P	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA()	<input type="checkbox"/> NP(1)
Unwanted Emissions into Non-Restricted Frequency Bands P	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA()	<input type="checkbox"/> NP(1)
AC Power Line Conducted Emission P	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA(2)	<input type="checkbox"/> NP(1)
Unwanted Emissions into Restricted Frequency Bands P	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
Receiver Radiated emissions P	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
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

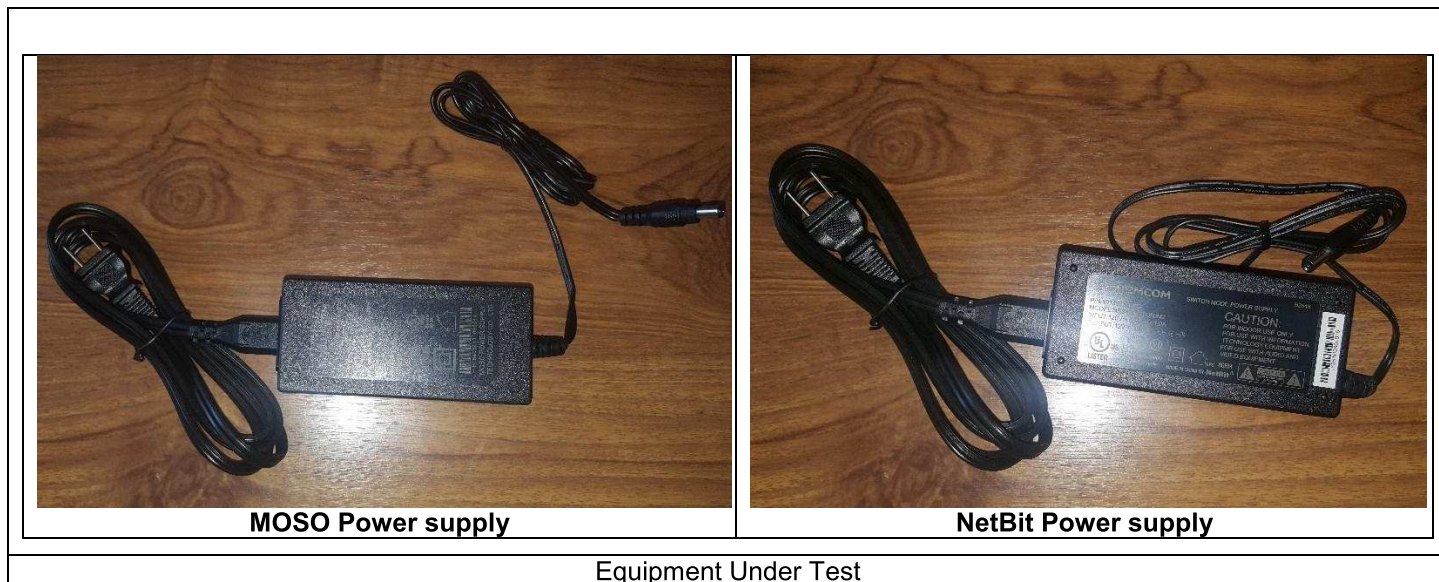
2. EQUIPMENT UNDER TEST: CONFIGURATION (DECLARED BY PROVIDER)

2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT):
SAGEMCOM DCIWA384 UHD AIt US V2

Serial Number: 253764997

	
<p align="center">Front face</p>	<p align="center">Back face</p>
	
<p align="center">Rear face</p>	<p align="center">DOKOCOM Power supply</p>
<p align="center">Equipment Under Test</p>	



Inputs/outputs - Cable:

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

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Laptop computer	-	-	-
Power supply	MSA-Z3800IC12.0-48W-P		MOSO



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	2.5	2400-2483	50



CHANNEL PLAN			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
Cmin: 0	2402	Cmid: 20	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	Cmax: 39	2480

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


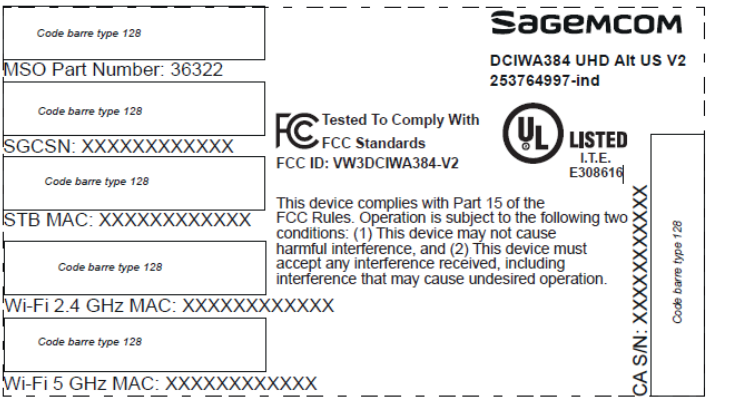



2.2. RUNNING MODE

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 document "CR-20180405 - Bluetooth compliance test commands of M384R-US-4L.docx" is used to set the product:

2.3. EQUIPMENT LABELLING

 <p>Sagemcom DCIWA384 UHD Ait US V2 253764997-Ind</p> <p>MSO Part Number: 36322</p> <p>SGCSN: 318162114043</p> <p>STB MAC: 289EFC3BD4B3</p> <p>Wi-Fi 2.4 GHz MAC: 289EFC3BD4BE</p> <p>Wi-Fi 5 GHz MAC: 289EFC3BD4BF</p> <p>CA SIN: 224370289820</p> <p>FCC Tested To Comply With FCC Standards FCC ID: VW3DCIWA384-V2</p> <p>UL LISTED I.T.E. E308616</p> <p>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.</p>	 <p>Sagemcom DCIWA384 UHD Ait US V2 253764997-ind</p> <p>MSO Part Number: 36322</p> <p>SGCSN: XXXXXXXXXXXXX</p> <p>STB MAC: XXXXXXXXXXXXX</p> <p>Wi-Fi 2.4 GHz MAC: XXXXXXXXXXXXX</p> <p>Wi-Fi 5 GHz MAC: XXXXXXXXXXXXX</p> <p>FCC Tested To Comply With FCC Standards FCC ID: VW3DCIWA384-V2</p> <p>UL LISTED I.T.E. E308616</p> <p>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.</p> <p>CA SIN: XXXXXXXXXXXXX</p>
 <p>Sagemcom Switching Power Adapter CS 60001 92848 RUEIL CEDEX-FRANCE P/N:191360131-XX MODEL:MSA-Z3800IC12.0-48W-P INPUT:100-120V~ 50/60Hz 1.2A max. OUTPUT:12.0V = 3.8A EFFICIENCY LEVEL: VI</p> <p>FC LISTED E314897 3002</p> <p>UL LISTED I.T.E. E308616</p> <p>H18403E131000014</p> <p>MOSO POWER SUPPLY TECHNOLOGY CO., LTD.</p>	 <p>Sagemcom SWITCH MODE POWER SUPPLY P/N:191358307-XX Model:LLPL-C048120386ZS Input:120V~50/60Hz 1.3A Max Output:12V = 3.8A</p> <p>CAUTION: FOR INDOOR USE ONLY FOR USE WITH AUDIO AND VIDEO EQUIPMENT FOR USE WITH INFORMATION TECHNOLOGY EQUIPMENT</p> <p>UL LISTED I.T.E. E308616</p> <p>FC LISTED I.T.E. E308616</p> <p>MADE IN CHINA BY DOKOCOM</p>
 <p>Sagemcom SWITCH MODE POWER SUPPLY P/N:191357366-XX MODEL:NBS42C120380M2 INPUT:120V~50/60Hz 1.0A OUTPUT:12V = 3.8A</p> <p>CAUTION: FOR INDOOR USE ONLY FOR USE WITH INFORMATION TECHNOLOGY EQUIPMENT FOR USE WITH AUDIO AND VIDEO EQUIPMENT</p> <p>UL LISTED I.T.E. E344329</p> <p>VI LISTED I.T.E. power supply AV power supply</p> <p>MADE IN CHINA BY NetBit</p>	 <p>Sagemcom SWITCH MODE POWER SUPPLY P/N:191357366-XX MODEL:NBS42C120380M2 INPUT:120V~50/60Hz 1.0A OUTPUT:12V = 3.8A</p> <p>CAUTION: FOR INDOOR USE ONLY FOR USE WITH INFORMATION TECHNOLOGY EQUIPMENT FOR USE WITH AUDIO AND VIDEO EQUIPMENT</p> <p>UL LISTED I.T.E. E344329</p> <p>VI LISTED I.T.E. power supply AV power supply</p> <p>MADE IN CHINA BY NetBit</p>

2.4. EQUIPMENT MODIFICATION

None Modification:

3. OCCUPIED BANDWIDTH

3.1. TEST CONDITIONS

Test performed by : Mathieu CERISIER
Date of test : May 29, 2018
Ambient temperature : 26 °C
Relative humidity : 43 %

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

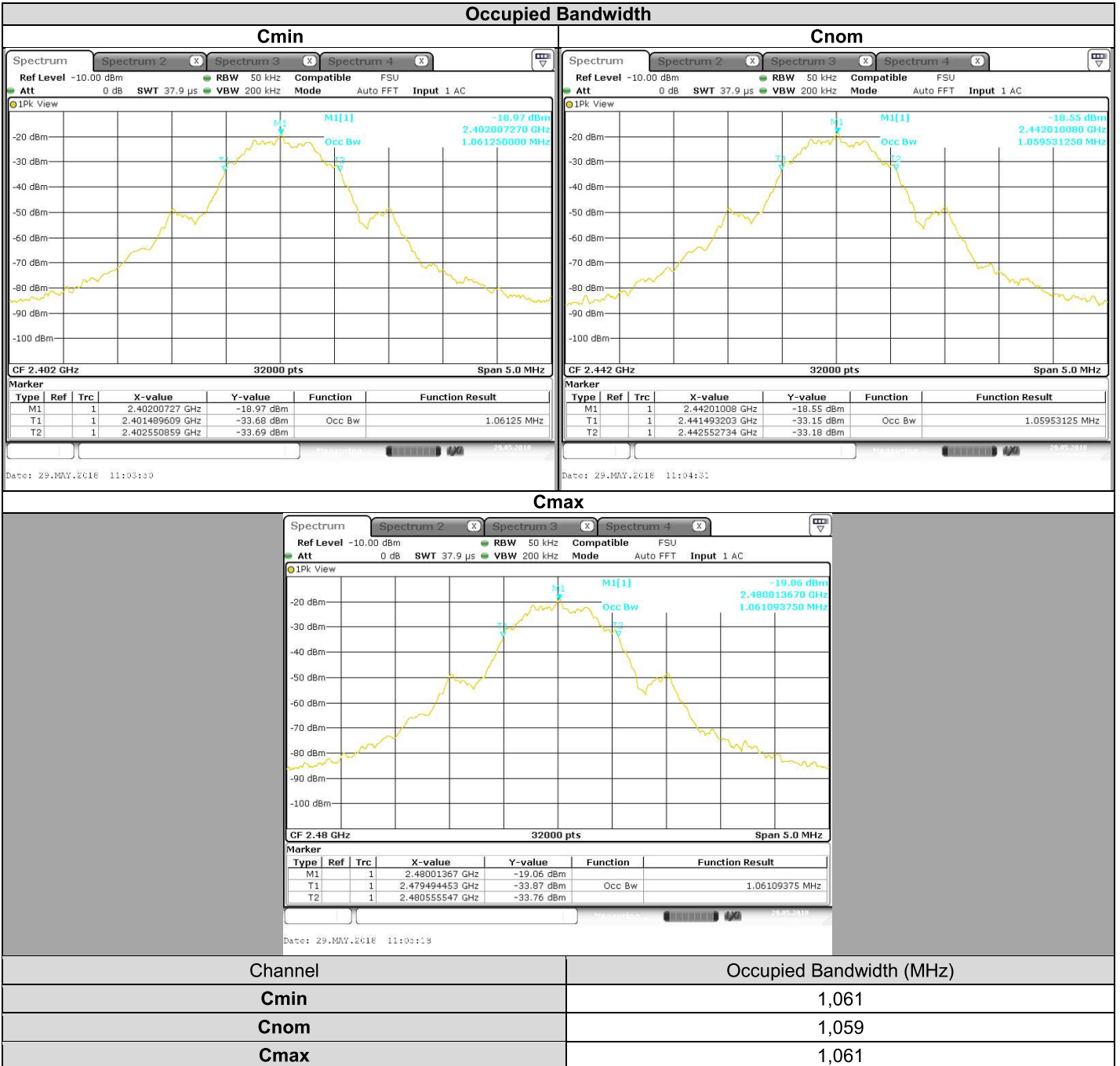
None

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	A5329676	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 DCIWA384 UHD Ait US V2**, SN: **253764997**, 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 : Mathieu CERISIER
Date of test : May 29, 2018
Ambient temperature : 26 °C
Relative humidity : 43 %

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

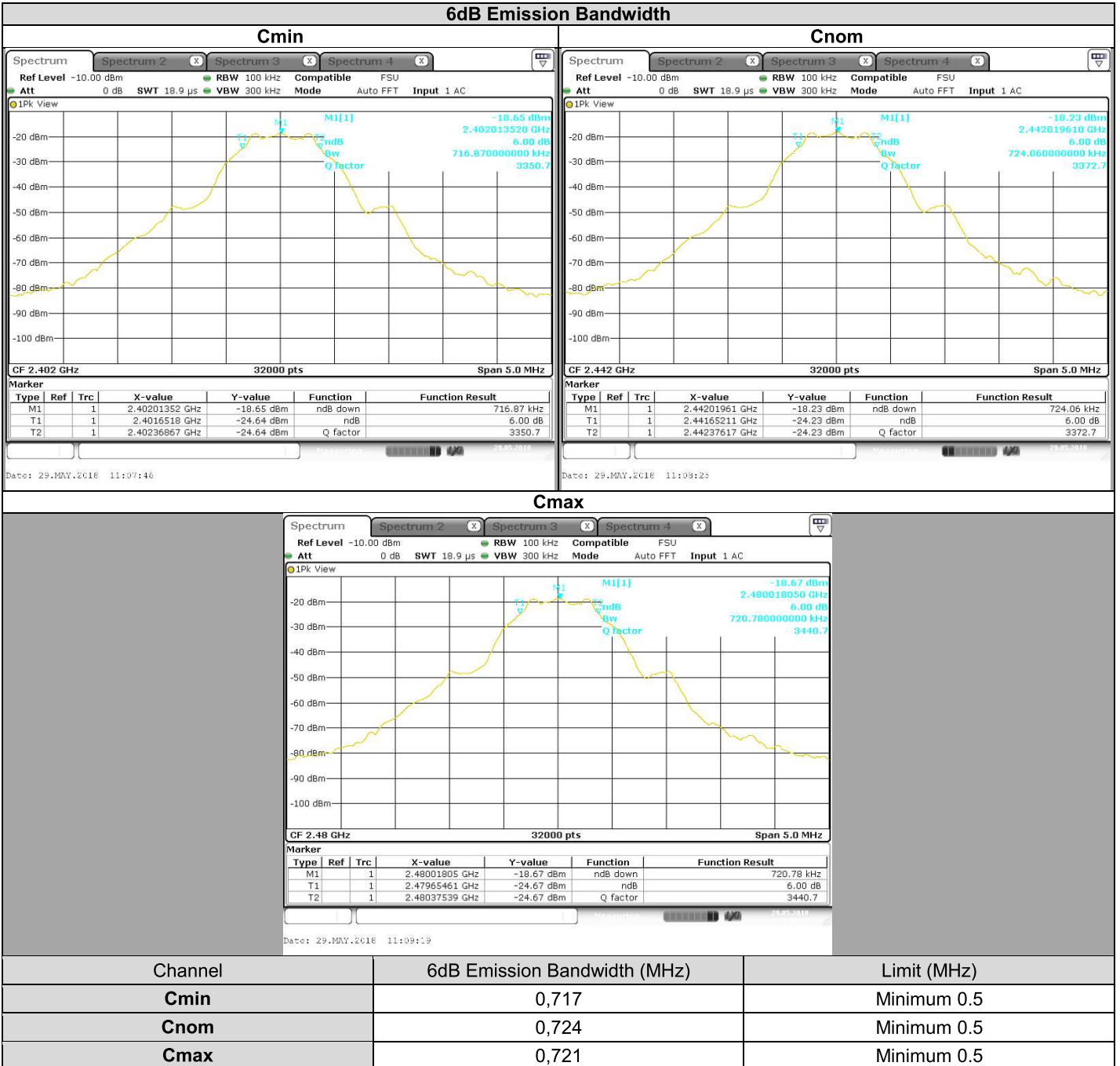
The 6dB bandwidth shall be at least 500kHz

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	A5329676	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 DCIWA384 UHD Ait US V2**, SN: **253764997**, 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 : Mathieu CERISIER
Date of test : May 29, 2018
Ambient temperature : 26 °C
Relative humidity : 43 %

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

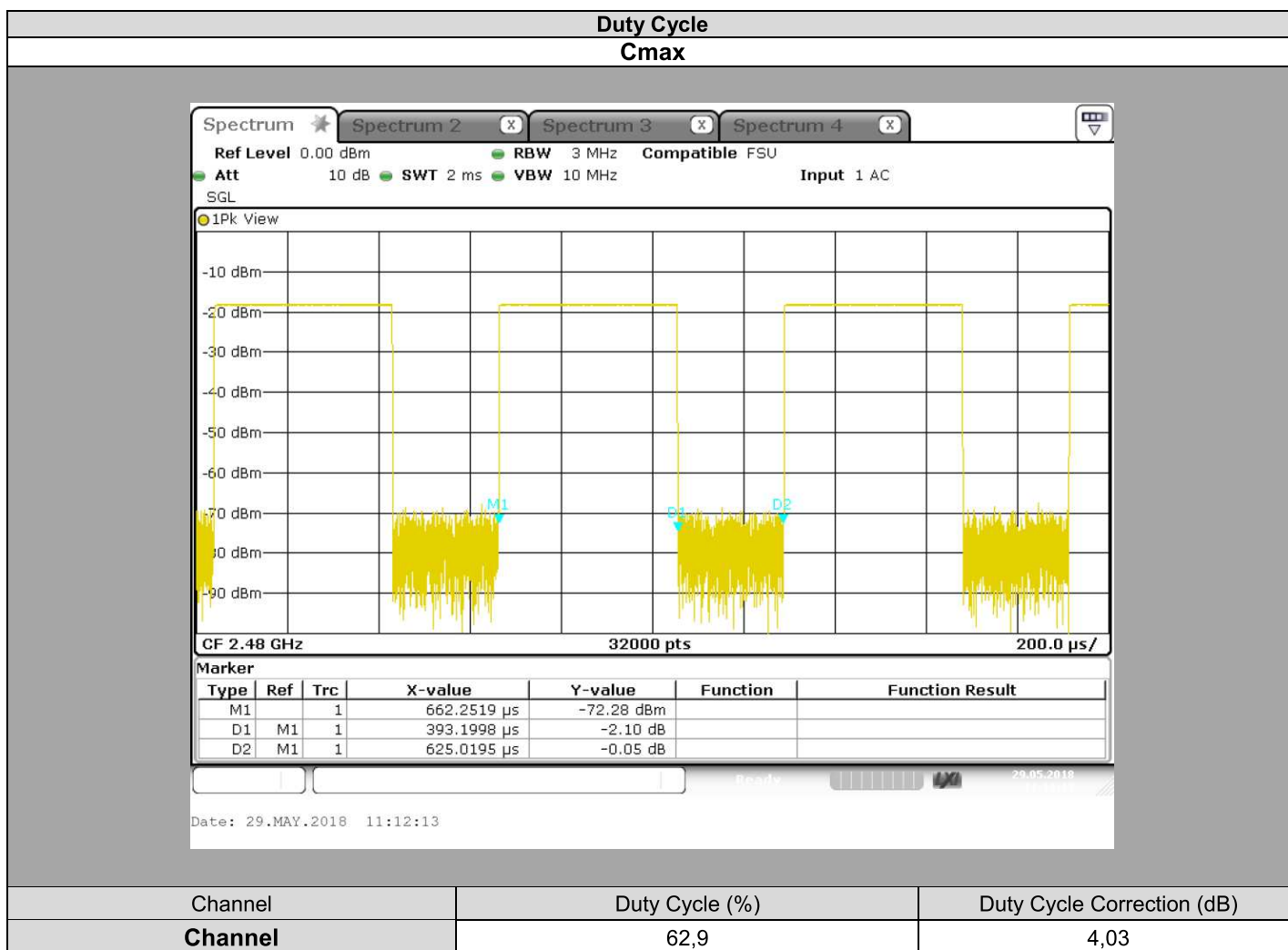
None

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	A5329676	2017/09	2018/09

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 DCIWA384 UHD AIt US V2**, SN: **253764997**, 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 : Mathieu CERISIER
Date of test : May 29, 2018
Ambient temperature : 26 °C
Relative humidity : 43 %

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

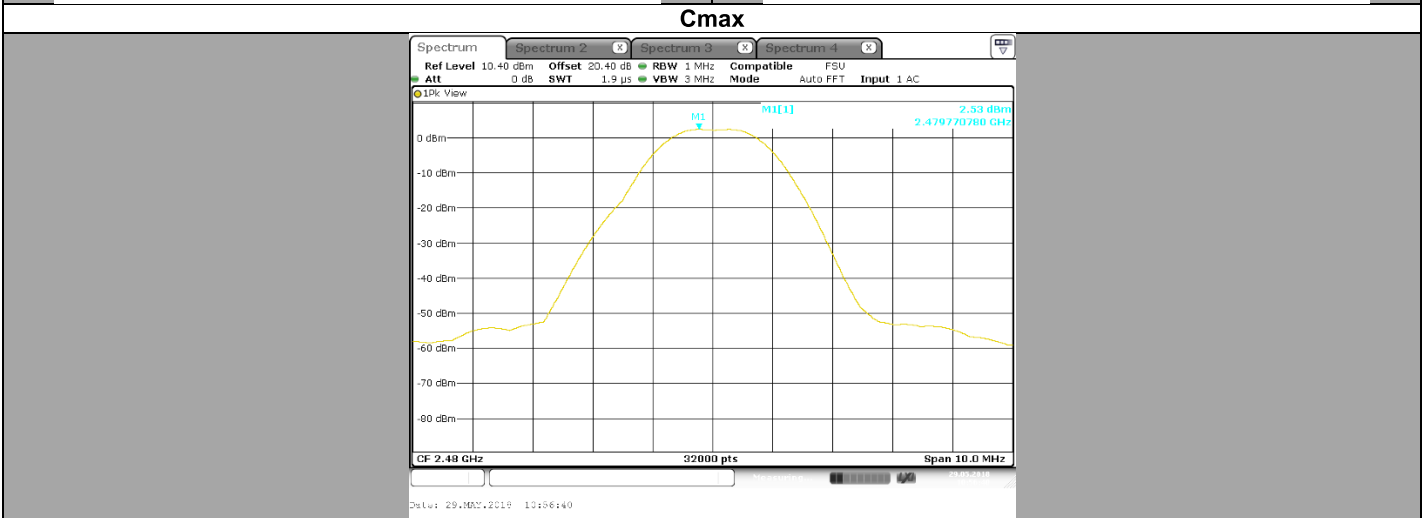
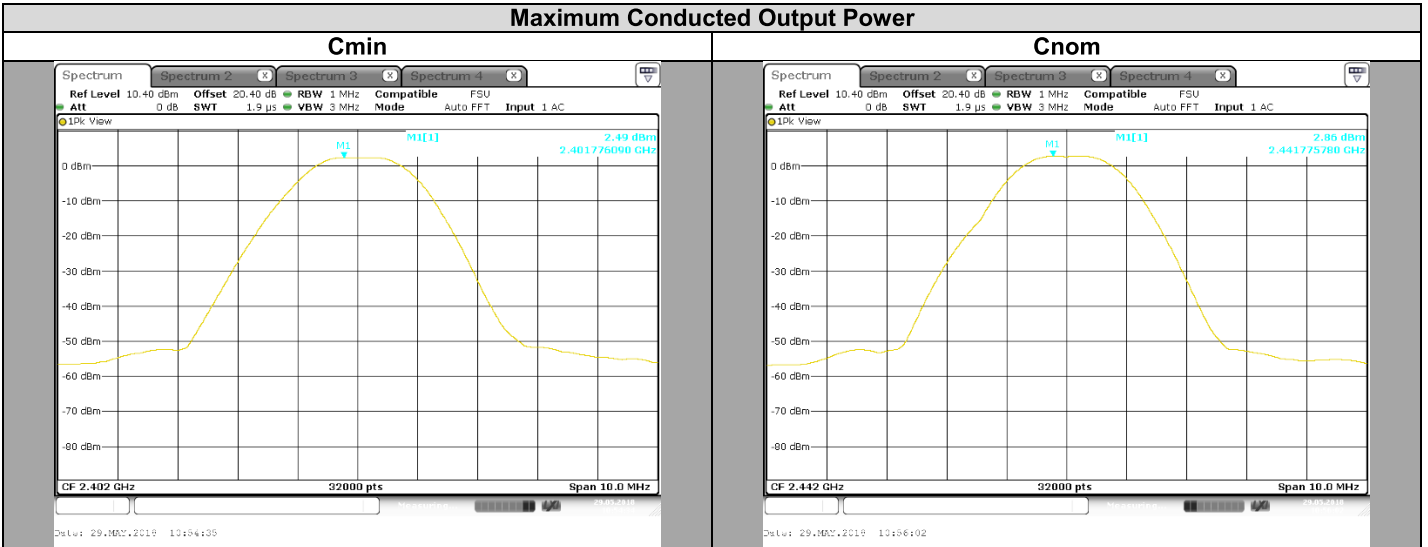
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2017/09	2018/09
Multi-meter	KEITHLEY	2000	A1242090	2016/06	2018/06
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2016/06	2018/06
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329676	2017/09	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)
Cmin	20,4	2.5	2,49	30
Cnom	20,4	2.5	2,86	30
Cmax	20,4	2.5	2,53	30

6.6. CONCLUSION

Maximum Conducted Output Power measurement performed on the sample of the product **SAGEMCOM DCIWA384 UHD Ait US V2**, SN: **253764997**, 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 : Mathieu CERISIER
Date of test : May 29, 2018
Ambient temperature : 26 °C
Relative humidity : 43 %

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	A5329676	2017/09	2018/09

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