



## TEST REPORT

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Composition of document

## RADIO

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70 pages

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Industry Canada Number

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6230B

### Standards

47 CFR Part 15.247  
RSS-247, Issue 1  
RSS-Gen, Issue 4

### Issued to

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### Apparatus under test

Trade mark  
Manufacturer  
Type  
Serial number  
IC  
FCC ID

JN5179-001-M16  
NXP  
NXP Semiconductors  
JN5179-001-M16  
00001-ZbHYWW  
8764A-JN5179M16  
XXMJN5179M16

### Test date

2016/07/19 to 2015/09/15

### Tests performed by

**Mathieu CERISIER**

### Test site

Fontenay aux Roses

### Date of issue

2016/09/23

Written by :  
**Mathieu CERISIER**  
Tests operator

Approved by :  
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Technical manager



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## 1. TEST PROGRAM

- References**

- Standards:
- 47 CFR Part 15C
  - RSS-247
  - RSS-Gen
  - CISPR 16-4-2
  - ANSI C63.10 (2013)
  - DTS measurement guidance 558074 D01 v03r05

Standard Section	Test Description	TEST RESULT - Comments
RSS-Gen § 6.6	Occupied Bandwidth	PASS
CFR 47 § 15.247 (a) (2) RSS-247 § 5.2 (1)	-6dB Bandwidth	PASS
CFR 47 § 15.247 (b) RSS-247 § 5.4 (4)	Maximum Output Power	PASS
CFR 47 § 15.247 (e) RSS-247 § 5.2 (2)	Power Spectral Density	PASS
CFR 47 § 15.247 (d) RSS-247 § 5.5	Conducted Spurious Emission at the Band Edge	PASS
CFR 47 § 15.247 (d) RSS-247 § 5.5	Unwanted Emissions into Non-Restricted Frequency Bands	PASS
CFR 47 § 15.207 RSS-Gen § 8.8	AC Power Line Conducted Emissions	PASS
CFR 47 § 15.209 (a) CFR 47 § 15.205 (a) CFR 47 § 15.247 (d) RSS-Gen § 8.10	Unwanted Emissions into Restricted Frequency Bands	PASS
RSS-Gen § 7.1	Receiver Radiated emissions	PASS (Include in Unwanted Emissions into Restricted Frequency Bands)

PASS: EUT complies with standard's requirement

FAIL: EUT does not comply with standard's requirement

NA: Not Applicable

NP: Test Not Performed



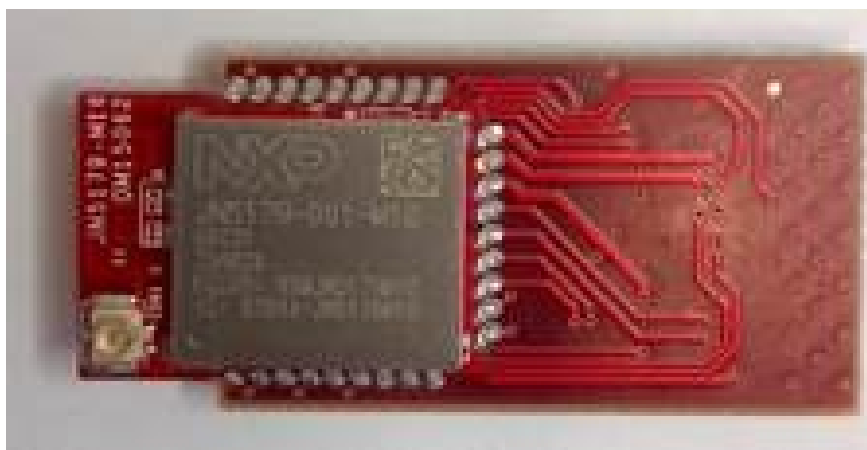
## 2. EQUIPMENT DESCRIPTION

### 2.1. GENERAL DESCRIPTION

- The JN5179-001-M16 is module suitable for ZIGBEE applications using the IEEE802.15.4 standard in the 2.4 GHz - 2.5 GHz ISM frequency band.
- The JN5179-001-M16 includes an integral antenna and a µFL connector for an external antenna
- The modules use the JN5179 chip, a NXP's single chip IEEE802.15.4 wireless microcontroller.

### 2.2. HARDWARE & SOFTWARE IDENTIFICATION

- **Equipment under test (EUT):**



Photograph of EUT

#### **Auxiliary equipment used during test:**

Type	Reference	Sn	Comments
Carrier board	DR1174	-	To connect the EUT
USB cable	-	-	Interface PC – CMET - Device
Laptop	DELL	-	-



• **Software identification:**

- CMET 5.02

• **Equipment information:**

- Modulation technology: DSSS modulation

- Transmit operating mode:  Multiple antenna:

- Number of transmit chains:  1

- Number of receiver chains:  1

- Antenna type:  Integral  External

- Beamforming gain:  Yes ( dB)  No

- Type of the equipment:  Stand-alone equipment  Plug-in radio device  Combined equipment

- Temperature range: Tmin:  -20°C  0°C  -40°C

Tnom:  20°C

Tmax:  +35°C  55°C  +85°C

- Test source voltage : Vnom:  120V/60Hz  3.3 Vdc

Note: the mother board is connected to the PC with USB. A LDO on the mother board generates the 3.3V voltage from the USB 5V supply.

- Type of power source:  Battery (Alkaline/Lithium-Ion/Lead acid/Other)

External power supply

Internal power supply

Car Charger

- Test sequence/test software used: See 2.2. Running Mode

- Ad-hoc mode:  Yes  No

- Duty Cycle:  Continuous duty  Intermittent duty  Continuous operation

- Equipment type:  Representative production model  Pre-production model

- Antenna Gain:

M16 Gain (dBi)
Integral 1.8 (Note1)
External 2 (Note 1)

The EUT cannot transmit simultaneously on the two antenna.

- Operating frequency range:

Frequency Band (MHz)	Available
2400MHz to 2483,5MHz	<input checked="" type="checkbox"/>



-Channel plan:

Channel	Frequency (MHz)	Available Channel
<b>Cmin: 11</b>	2405	<input checked="" type="checkbox"/>
<b>12</b>	2410	<input checked="" type="checkbox"/>
<b>13</b>	2415	<input checked="" type="checkbox"/>
<b>14</b>	2420	<input checked="" type="checkbox"/>
<b>15</b>	2425	<input checked="" type="checkbox"/>
<b>16</b>	2430	<input checked="" type="checkbox"/>
<b>17</b>	2435	<input checked="" type="checkbox"/>
<b>Cnom: 18</b>	2440	<input checked="" type="checkbox"/>
<b>19</b>	2445	<input checked="" type="checkbox"/>
<b>20</b>	2450	<input checked="" type="checkbox"/>
<b>21</b>	2455	<input checked="" type="checkbox"/>
<b>22</b>	2460	<input checked="" type="checkbox"/>
<b>23</b>	2465	<input checked="" type="checkbox"/>
<b>24</b>	2470	<input checked="" type="checkbox"/>
<b>25</b>	2475	<input checked="" type="checkbox"/>
<b>Cmax: 26</b>	2480	<input checked="" type="checkbox"/>

-Data Rate:

Data Rate (Mbps)	Modulation Type	Worst Case Modulation
0,25	O-QPSK	<input checked="" type="checkbox"/>



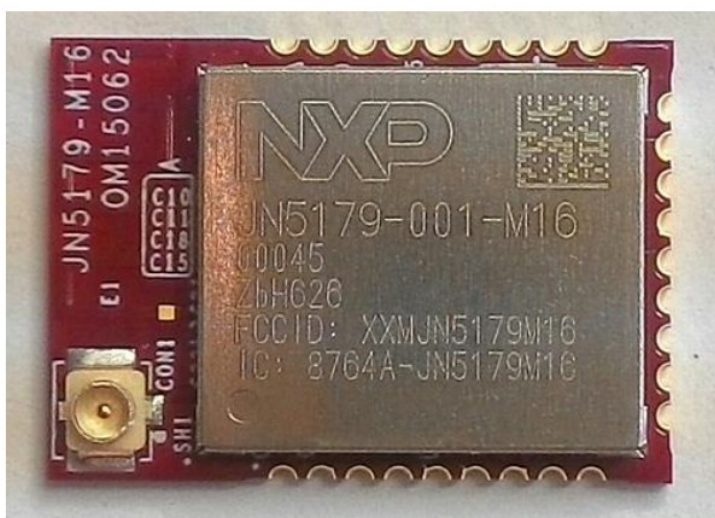
### 2.3. RUNNING MODE

- - Permanent emission with modulation on a fixed channel in the data rate that produced the highest power
- - Permanent reception
- The following procedure is used to set the equipment:
- TERATERM : User guide Rev. 01.00 – 2/5/2016

-Channel Power and attenuator configuration:

Channel	Power	2.5dB Att
11	4	<input checked="" type="checkbox"/>
18	4	<input checked="" type="checkbox"/>
26	2	<input type="checkbox"/>

### 2.4. EQUIPEMENT LABELLING



- Line 1** : Brand name
- Line 2** : Product name
- Line 3** : Serial Number (variable)
- Line 4** : Batch number (variable)
- Line 5** : FCC number
- Line 6** : IC number

### 2.5. EQUIPMENT MODIFICATIONS

No equipment modification has been necessary during testing.



### 3. OCCUPIED BANDWIDTH

#### 3.1. TEST CONDITIONS

Test performed by : Mathieu CERISIER  
Date of test : 2016/07/20  
Ambient temperature : 26°C  
Relative humidity : 42%

#### 3.2. TEST SETUP

The Equipment Under Test is installed on a table and set in permanent emission with modulation. Measurement is performed with a spectrum analyzer on the EUT conducted access. The product has been tested according to the RSS-GEN § 6.6 reference method.

##### **Spectrum Analyzer Setting:**

Center frequency= Cmin or Cnom or Cmax  
Span= Above the emission spectrum  
Amplitude= Sufficient to observe the signal amplitude  
RBW= 1% to 5% of the occupied bandwidth (OBW)  
VBW  $\geq$  3\*RBW  
Sweep= Auto  
Trace= Max Hold  
Detector= Peak  
Occupied Bandwidth 99% activated

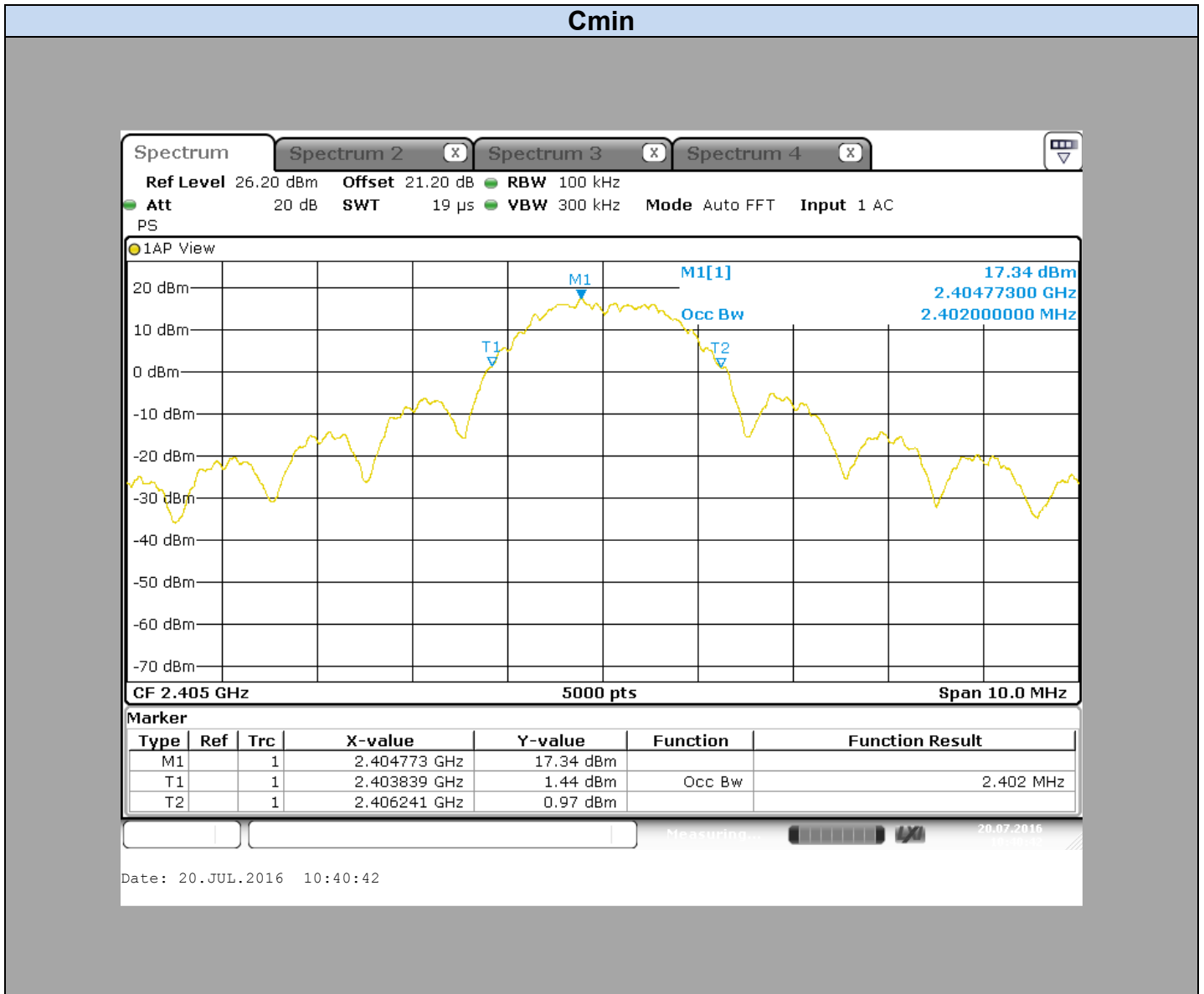


Photograph for Occupied Bandwidth



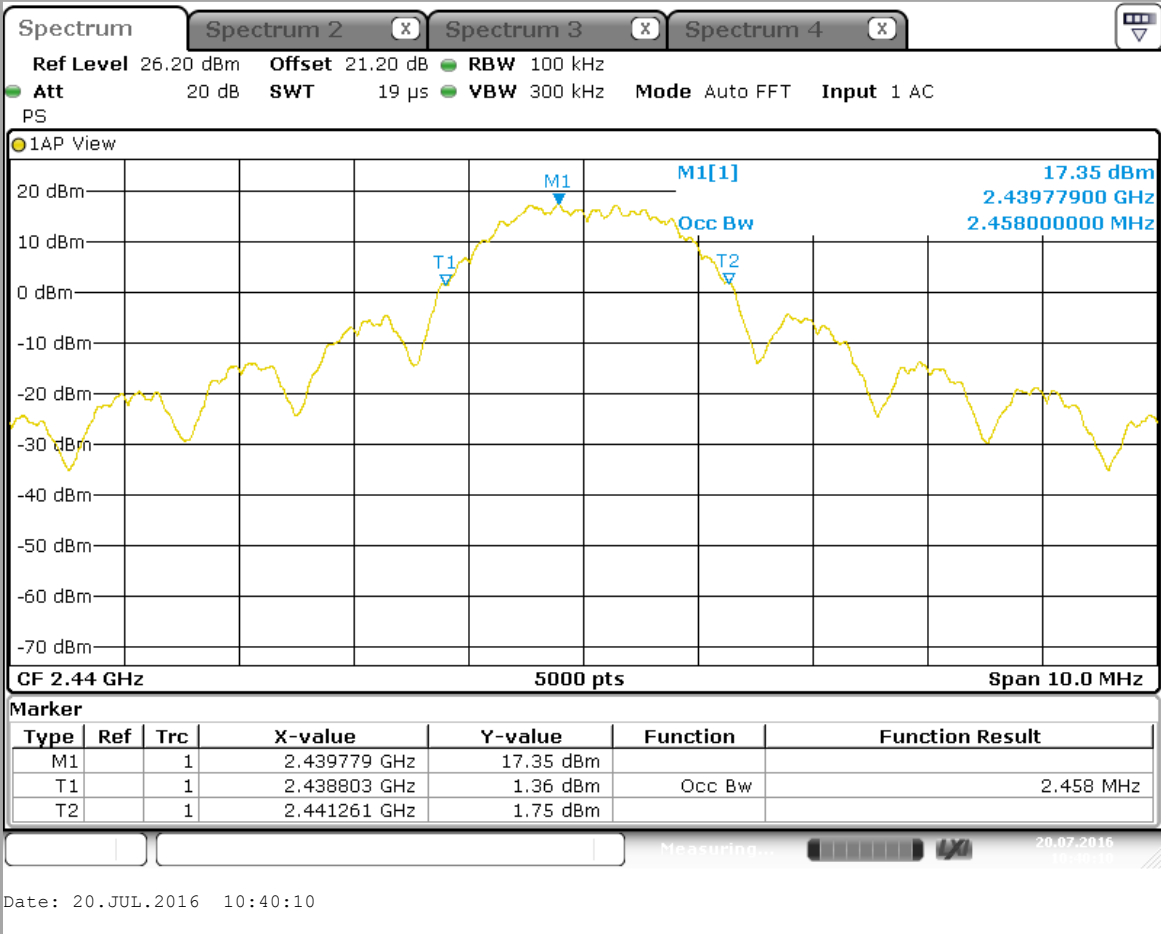


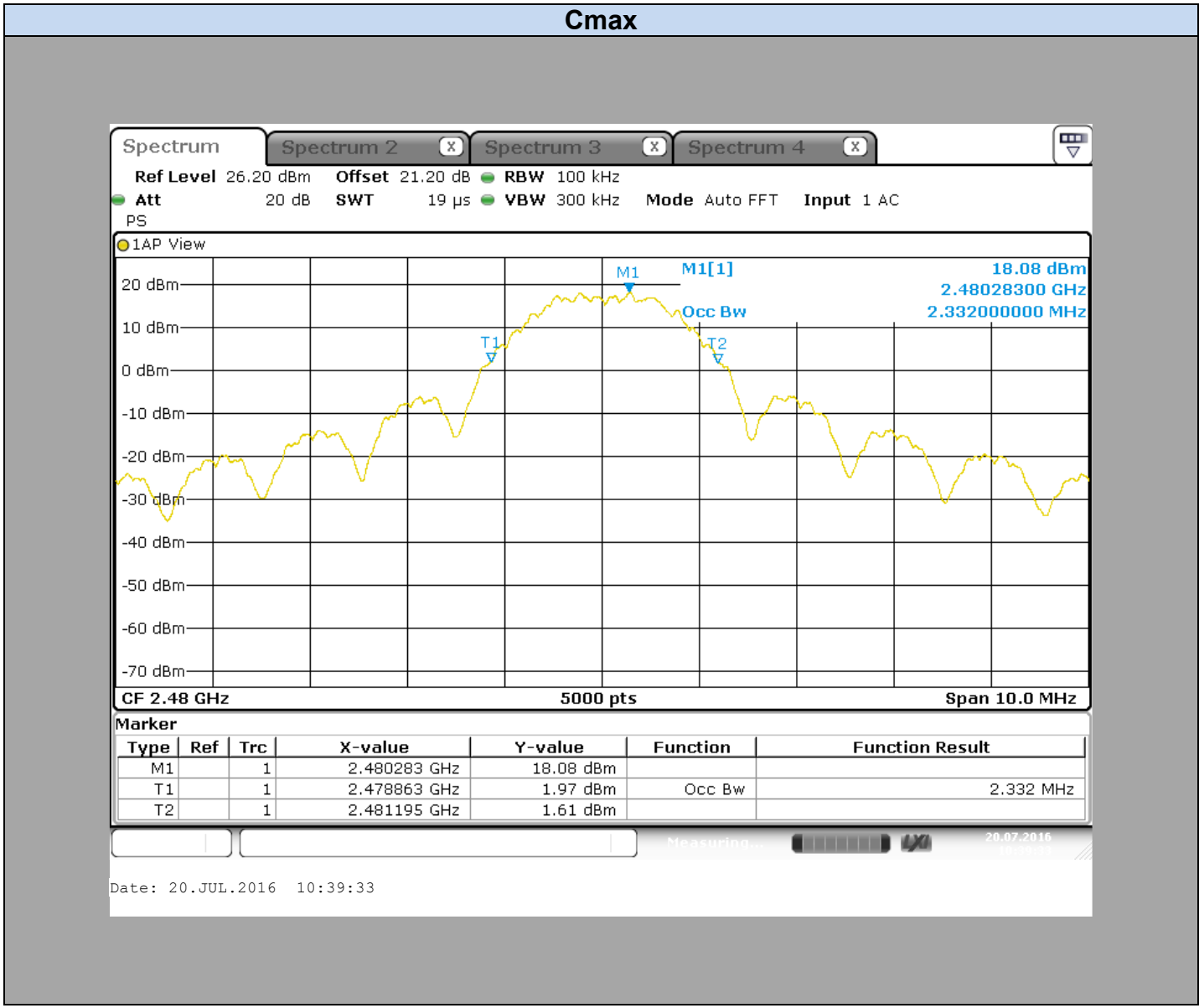
3.3. GRAPHICS & RESULTS





Cnom





M16			
Temperature	Tnom		
Voltage	Vnom		
Frequency	Cmin	Cnom	Cmax
Occupied Bandwidth (MHz)	2,402	2,458	2,332

Result: **PASS**

Limit: → None



## 4. -6dB BANDWIDTH

### 4.1. TEST CONDITIONS

Test performed by : Mathieu CERISIER  
Date of test : 2016/07/20  
Ambient temperature : 26°C  
Relative humidity : 42%

### 4.2. TEST SETUP

The Equipment Under Test is installed on a table and set in permanent emission with modulation. Measurement is performed with a spectrum analyzer on the EUT conducted access. The product has been tested according to the FCC KDB 558074 D01 DTS Meas Guidance v03r05 § 8.1.

#### **Spectrum Analyzer Setting:**

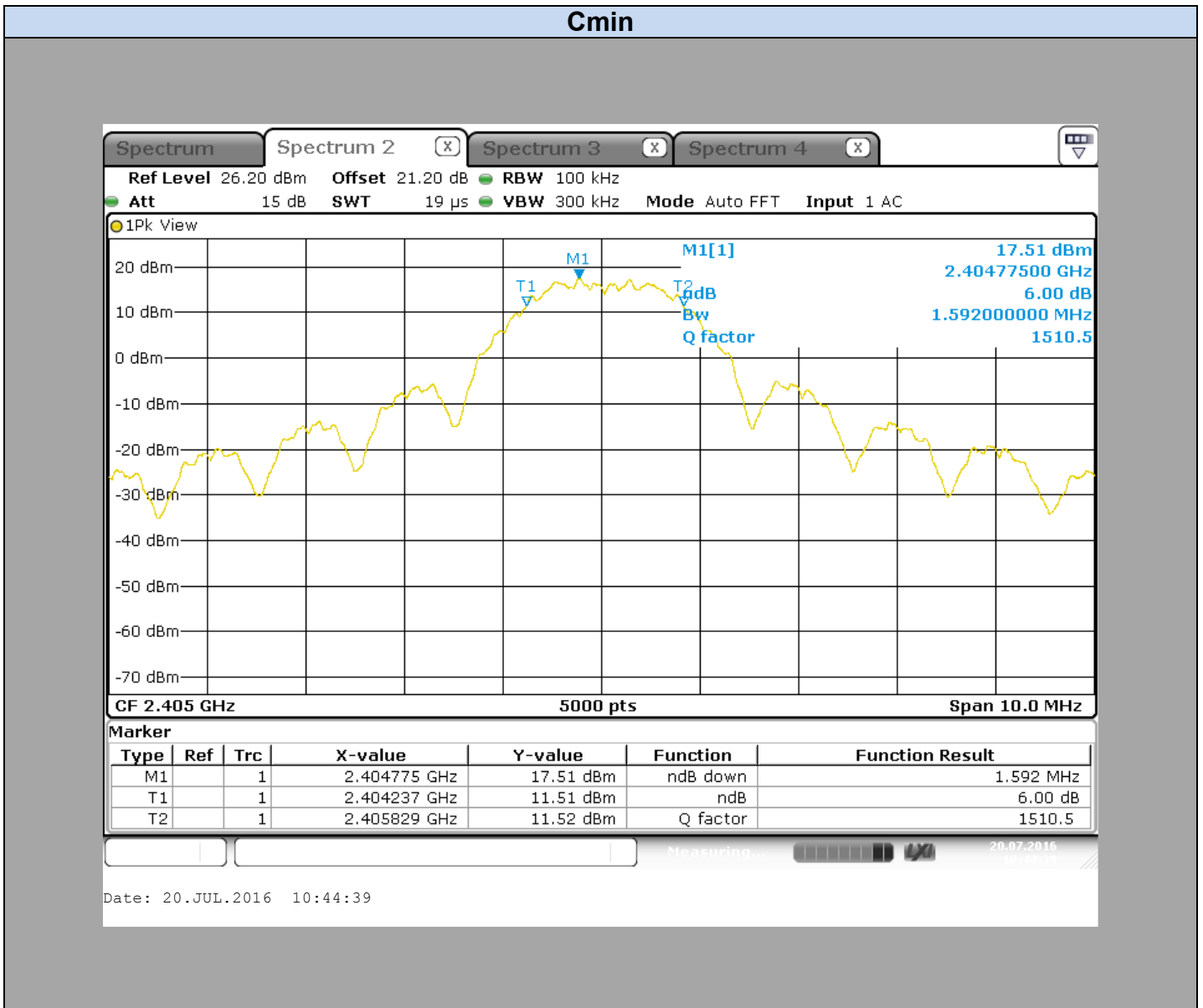
Center frequency= Cmin or Cnom or Cmax  
Span= At least twice the emission spectrum  
Amplitude= Sufficient to observe the signal amplitude  
RBW= 100kHz  
VBW≥ 300kHz  
Sweep= Auto  
Trace= Max Hold  
Detector= Peak



Photograph for -6dB Bandwidth

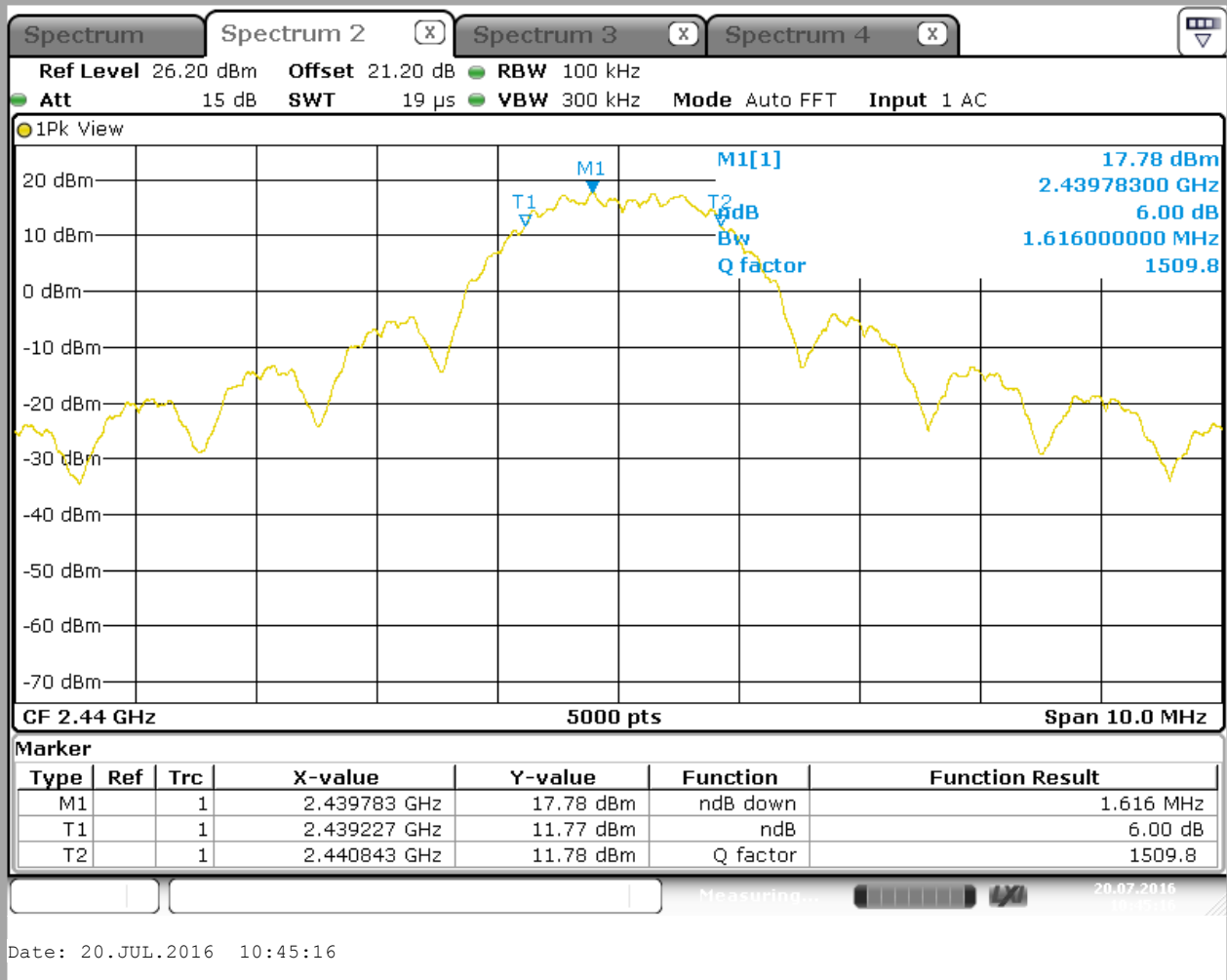


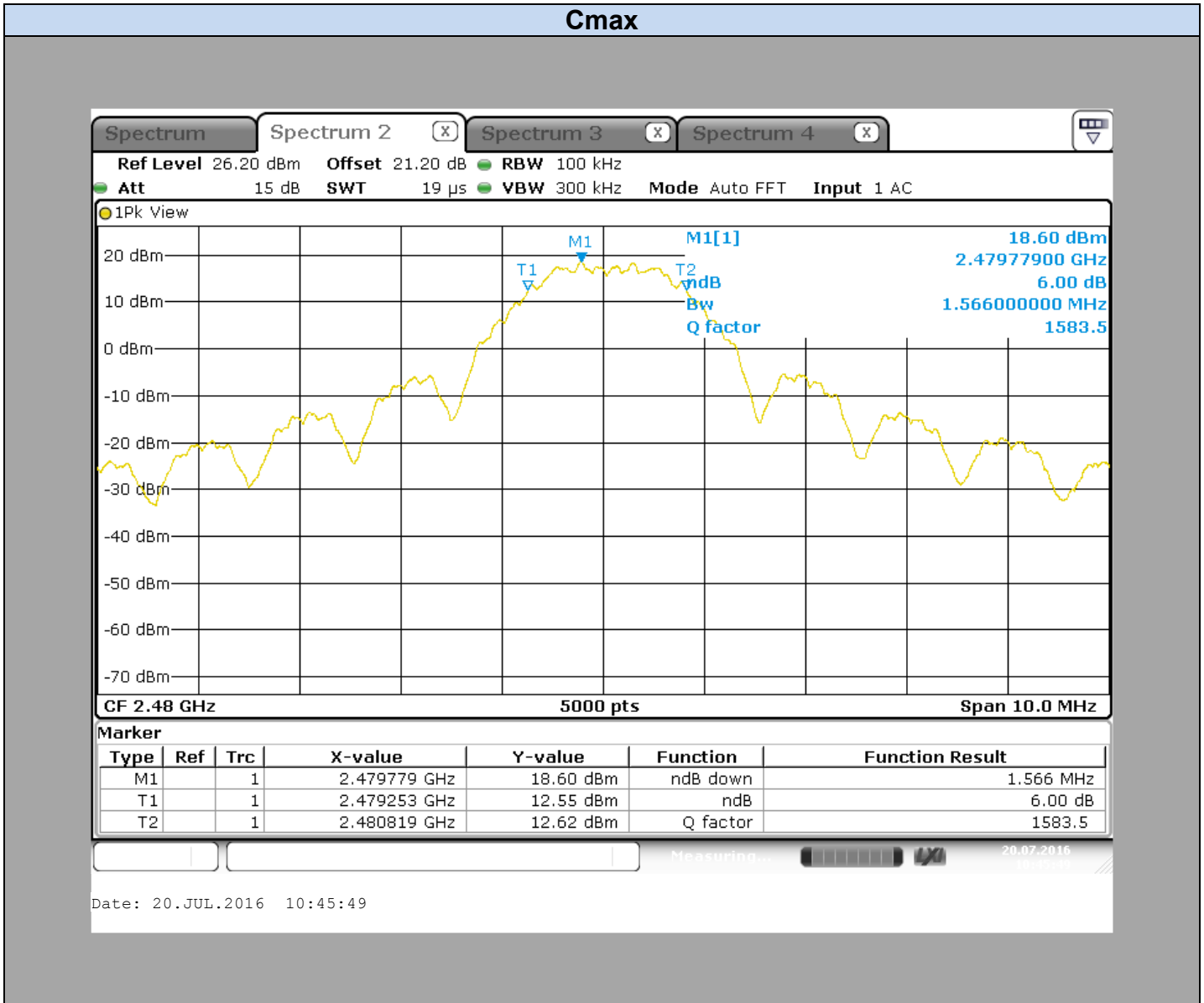
4.3. GRAPHICS & RESULTS





### Cnom





M16			
Temperature	Tnom		
Voltage	Vnom		
Frequency	Cmin	Cnom	Cmax
-6dB Bandwidth (MHz)	1,592	1,616	1,566

Result: **PASS**

Limit: → The -6dB bandwidth must be greater than 500kHz



## 5. MAXIMUM CONDUCTED POWER

### 5.1. TEST CONDITIONS

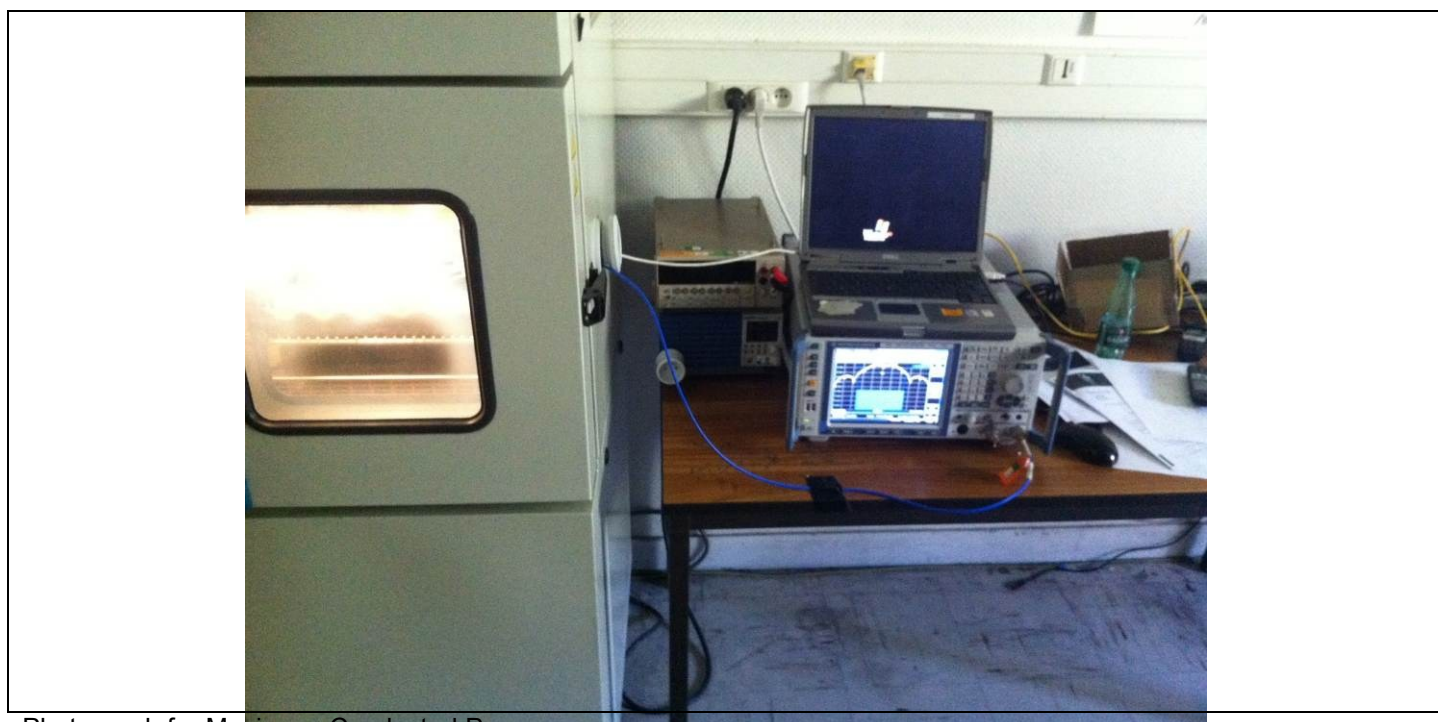
Test performed by : Mathieu CERISIER  
Date of test : 2016/07/20  
Ambient temperature : 26°C  
Relative humidity : 42%

### 5.2. TEST SETUP

The Equipment Under Test is installed on a table and set in permanent emission with modulation. Measurement is performed with a spectrum analyzer on the EUT conducted access. The product has been tested according to the FCC KDB 558074 D01 DTS Meas Guidance v03r05 § 9.2.2.2

#### **Spectrum Analyzer Setting (Maximum Peak Conducted Power):**

Center frequency=  $C_{min}$  or  $C_{nom}$  or  $C_{max}$   
Span  $\geq$  At least 1.5 times the OBW  
Amplitude= Sufficient to observe the signal amplitude  
RBW= 1% to 5% of the OBW  
VBW  $\geq$  3\*RBW  
Sweep= Auto  
Sweep points=  $2 * \text{Span} / \text{RBW}$   
Trace= RMS  
Trigger= Free Run  
Detector= Average 100  
Meas Fonction= Channel Power inside of the emission spectrum

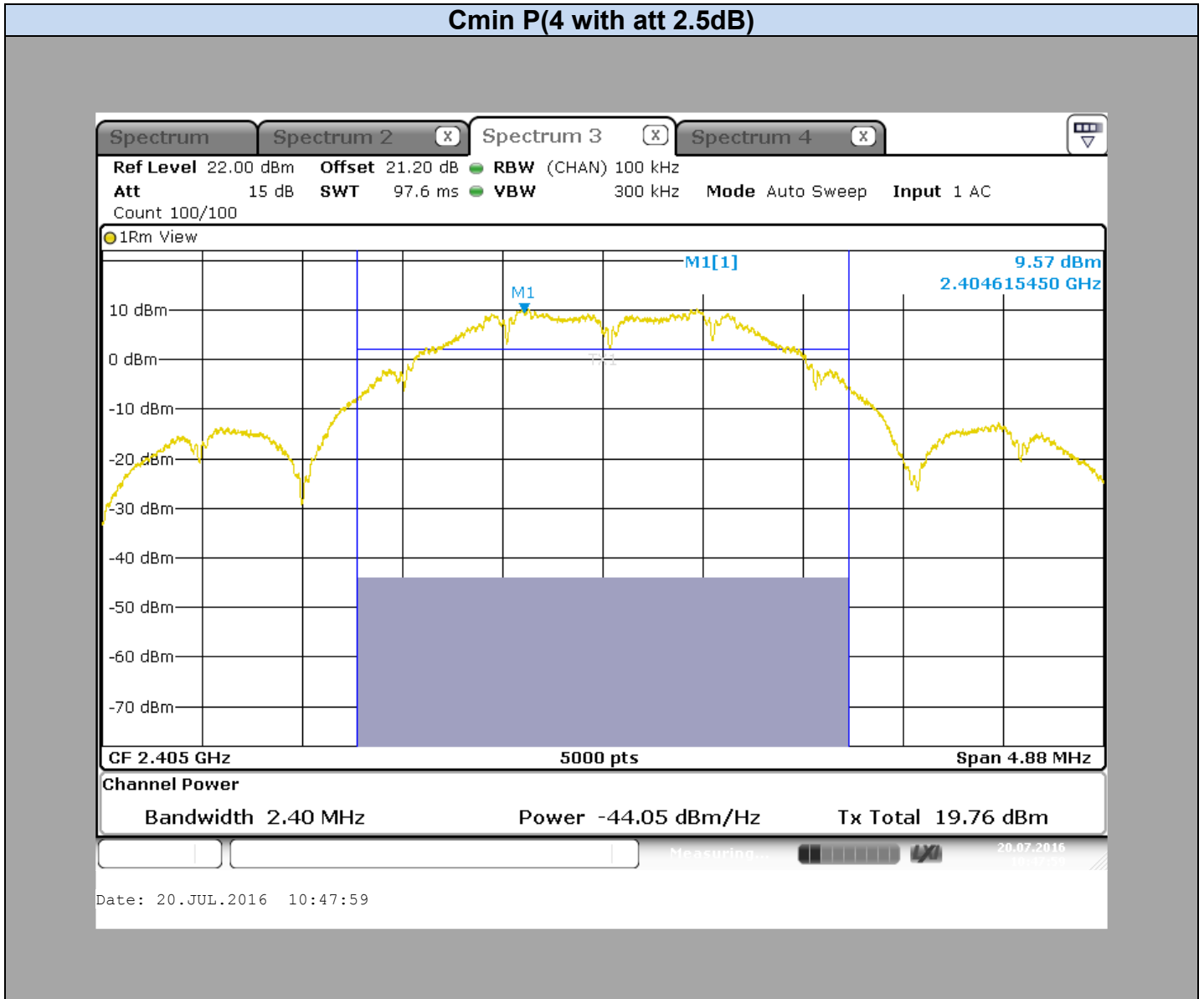


Photograph for Maximum Conducted Power



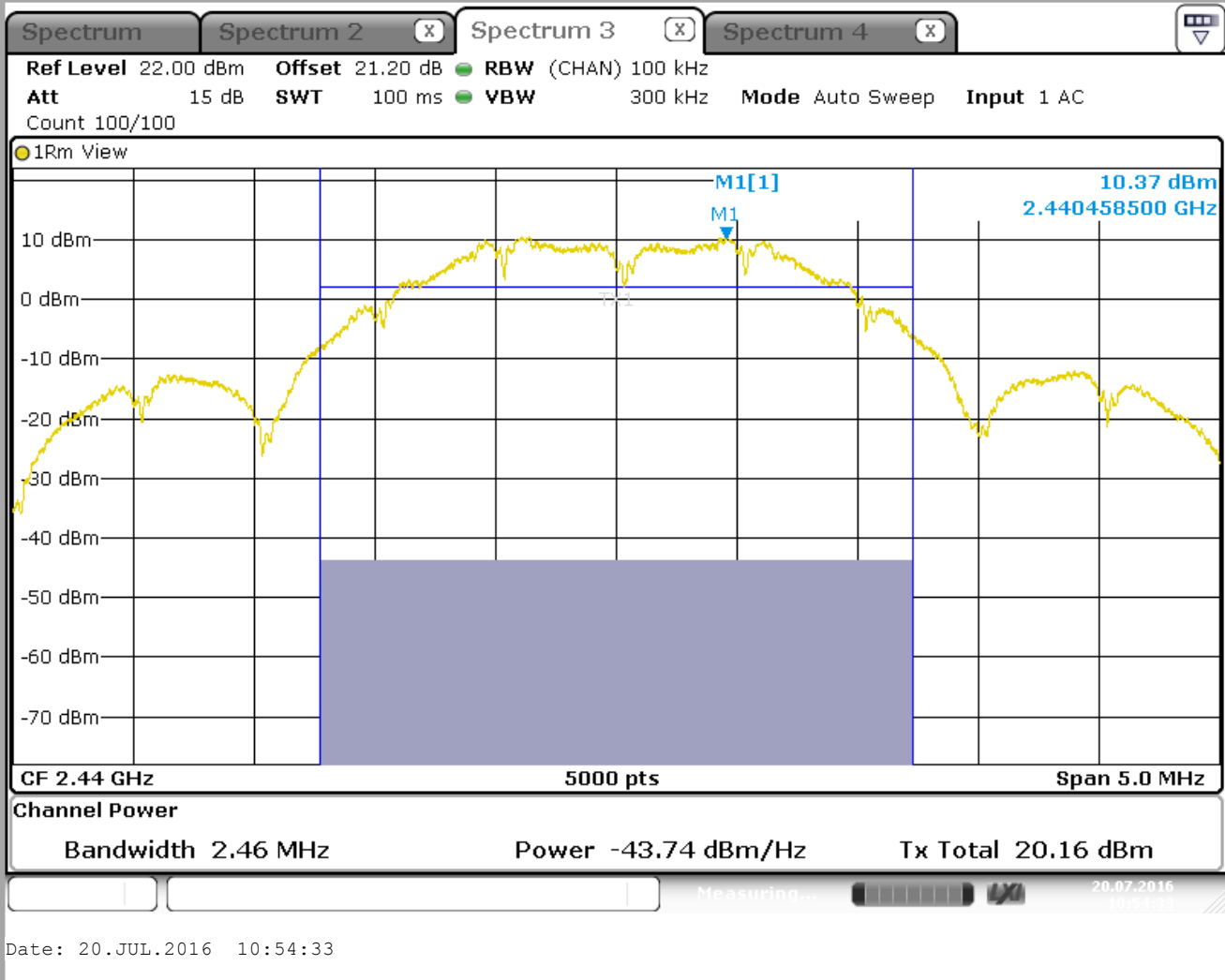


### 5.3. GRAPHICS & RESULTS



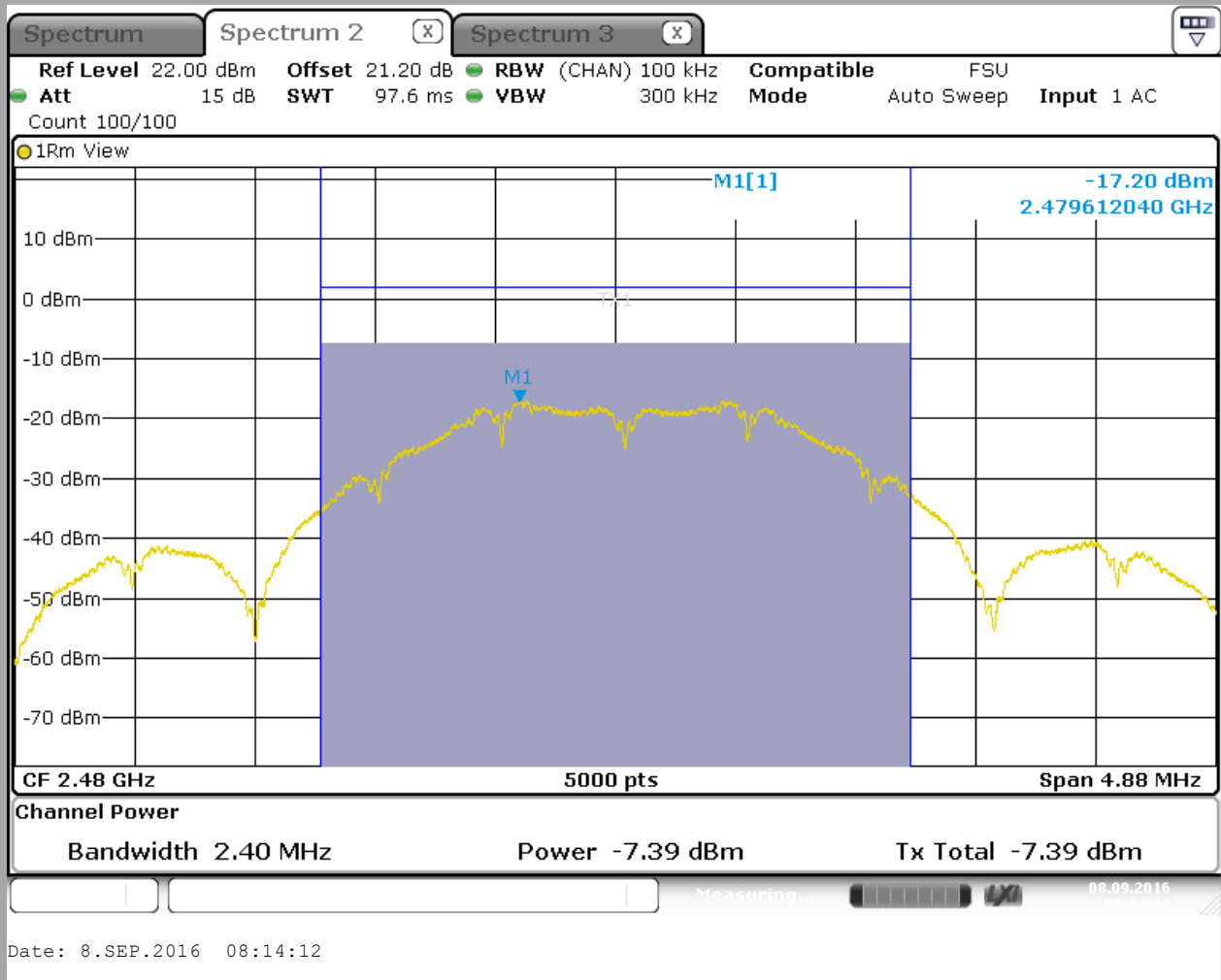


### Cnom P(4 with att 2.5dB)





### Cmax Pmax (2 without att 2.5dB)





Spectrum Analyzer Offset:  
Cable Loss + Attenuator= **21,2dB**

M16 Integral antenna 1dBi			
Channel	Overall Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Limit (dBm)
Cmin	1.8	19,76	30
Cnom	1.8	20,16	30
Cmax	1.8	-7.39	30

M16 External antenna 2 dBi			
Channel	Overall Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Limit (dBm)
Cmin	2	19,76	30
Cnom	2	20,16	30
Cmax	2	-7.39	30

**Result: PASS**

**Limit:** → The Maximum Conducted Power must be lower than 30dBm  
Limits are reduced by G-6dBi if Overall Antenna Gain above 6dBi



## 6. POWER SPECTRAL DENSITY

### 6.1. TEST CONDITIONS

Test performed by : Mathieu CERISIER  
Date of test : 2016/07/20  
Ambient temperature : 26°C  
Relative humidity : 42%

### 6.2. TEST SETUP

The Equipment Under Test is installed on a table and set in permanent emission with modulation. Measurement is performed with a spectrum analyzer on the EUT conducted access. The product has been tested according to the FCC KDB 558074 D01 DTS Meas Guidance v03r05 § 10.3.

#### Spectrum Analyzer Setting:

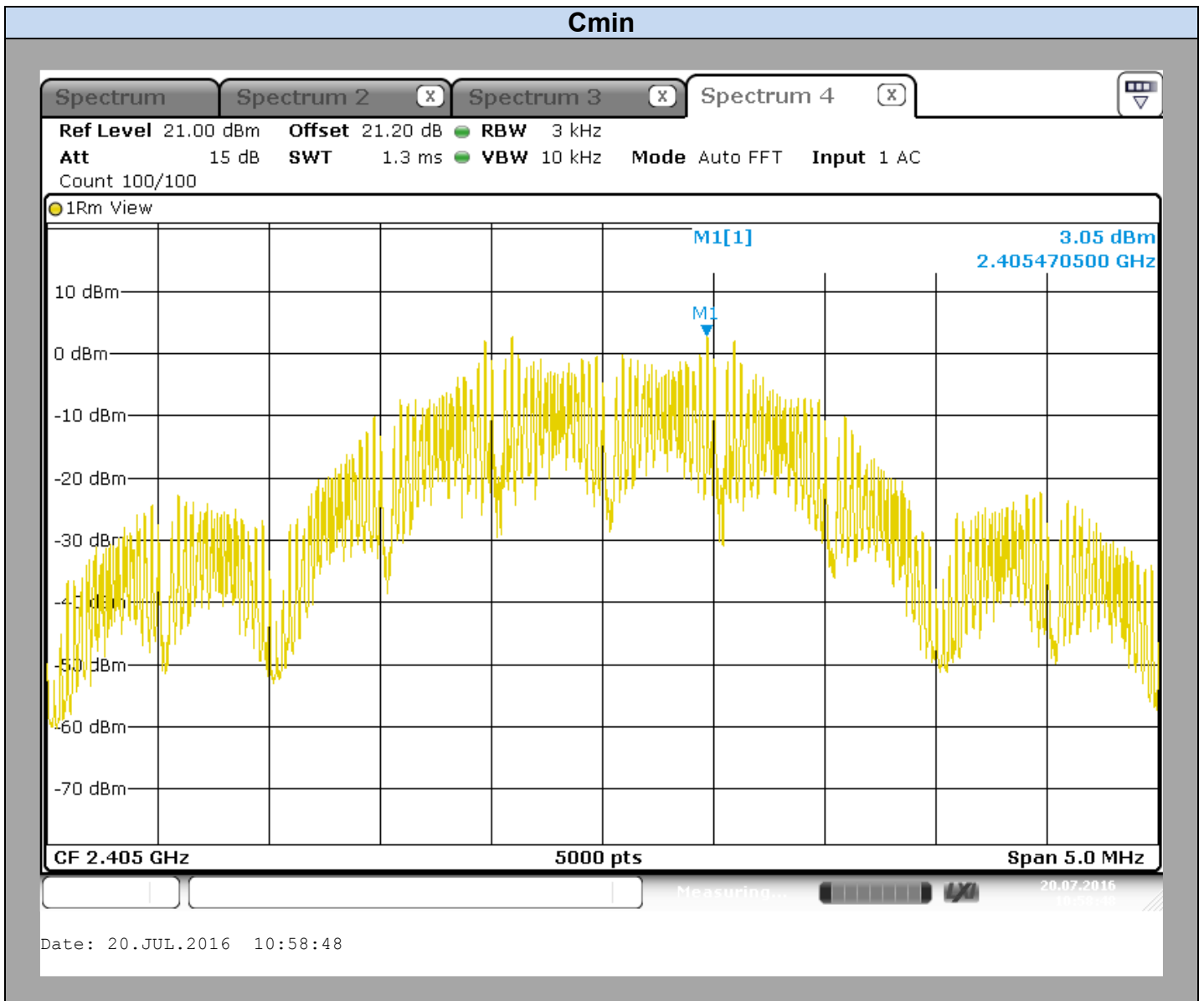
Center frequency= Cmin or Cnom or Cmax  
Span  $\geq$  At least 1.5 times the OBW  
Amplitude= Sufficient to observe the signal amplitude  
 $3\text{kHz} \leq \text{RBW} \leq 100\text{kHz} := 3\text{kHz}$   
 $\text{VBW} \geq 3 * \text{RBW} = 10\text{kHz}$   
Sweep= Auto  
Sweep points  $\geq 2 * \text{Span} / \text{RBW}$   
Trace= Average 100  
Detector= RMS



Photograph for Power Spectral Density

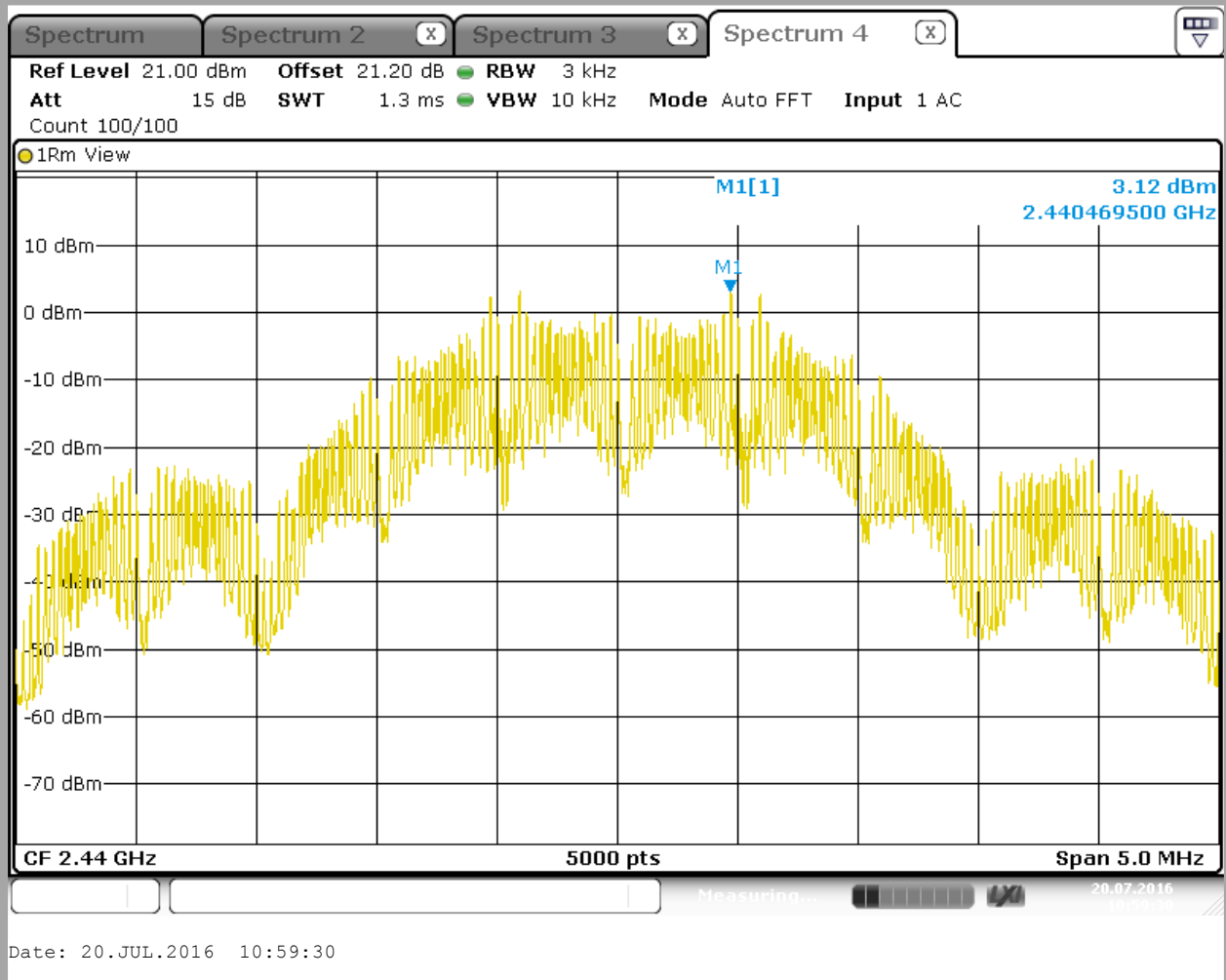


### 6.3. GRAPHICS & RESULTS



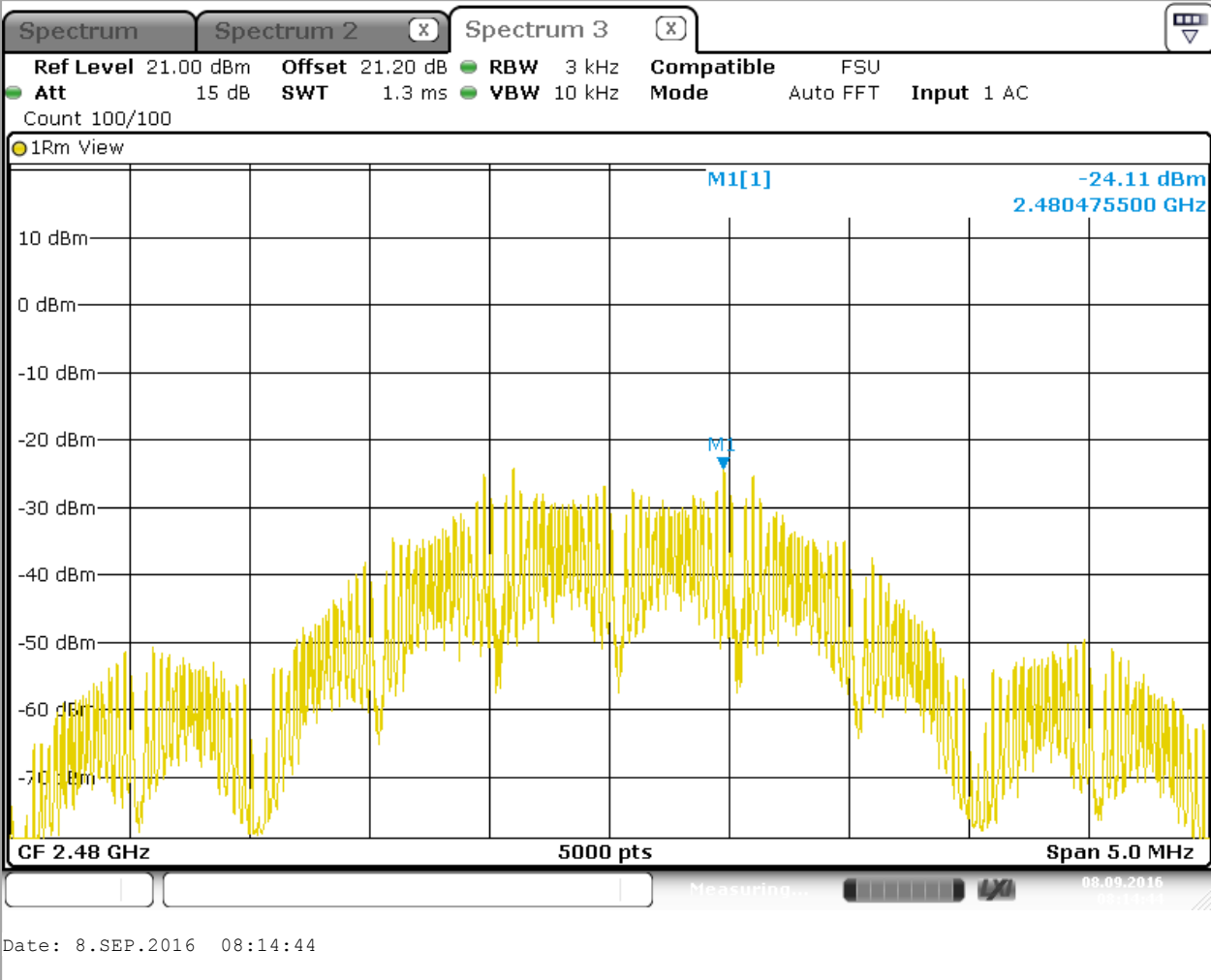


### Cnom





Cmax







Spectrum Analyzer Offset:  
Cable Loss + Attenuator= **21,2dB**

**M16 antenna 1dBi**

Channel	Antenna Gain (dBi)	Power spectral density (dBm/3kHz)	Limit (dBm)
Cmin	1.8	3,05	8
Cnom	1.8	3,12	8
Cmax	1.8	-24.11	8

**M16 antenna 2dBi**

Channel	Antenna Gain (dBi)	Power spectral density (dBm/3kHz)	Limit (dBm)
Cmin	2	3,05	8
Cnom	2	3,12	8
Cmax	2	-24.11	8

**Result: PASS**

**Limit:** → The Power Spectral Density must be lower than 8dBm/3kHz  
Limits are reduced by G-6dBi if Overall Antenna Gain above 6dBi



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

### 7.1. TEST CONDITIONS

Test performed by : Mathieu CERISIER  
Date of test : 2016/09/15  
Ambient temperature : 26°C  
Relative humidity : 42%

### 7.2. TEST SETUP

The Equipment Under Test is installed on a table and set in permanent emission with modulation. Measurement is performed with a spectrum analyzer on the EUT conducted access. The product has been tested according to the FCC KDB 558074 D01 DTS Meas Guidance v03r05 § 11.0.

#### Spectrum Analyzer Setting:

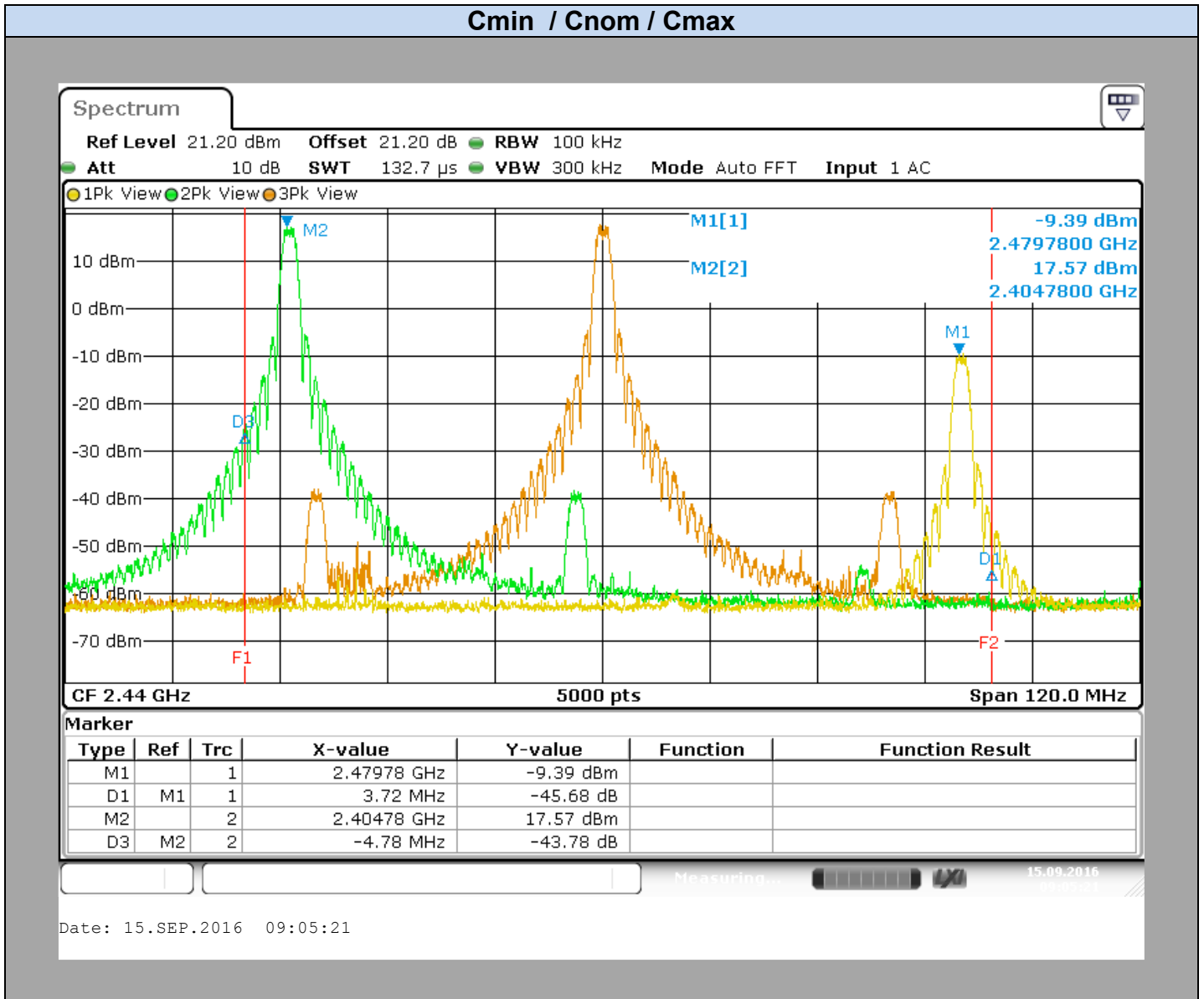
Start frequency= 2380MHz  
Stop frequency= 2500MHz  
span  $\geq$  1.5 times the DTS Bandwidth  
Amplitude= Sufficient to observe the signal amplitude  
RBW= 100kHz  
VBW  $\geq$  300kHz  
Sweep Time= Auto Couple  
Detector= Peak  
Trace= Max Hold



Photograph for Unwanted Emissions into Non-Restricted Frequency Bands At the Band Edge



7.3. GRAPHICS & RESULTS



M16		
Temperature	Tnom	
Voltage	Vnom	
Conducted Spurious Emission at the Band Edge (MHz)	2400	2483,5
Spurious Level (dBc)	-43.78	-45.68

Result: **PASS**

Limit: → All Spurious Emissions must be at least 30dB (Average Conducted Power) below the Fundamental Radiator Level at the Band Edge Edge "2400MHz & 2483,5MHz"



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

### 8.1. TEST CONDITIONS

Test performed by : Mathieu CERISIER  
Date of test : 2016/07/28  
Ambient temperature : 23°C  
Relative humidity : 42%

### 8.2. TEST SETUP

The Equipment Under Test is installed on a table and set in permanent emission with modulation. Measurement is performed with a spectrum analyzer on the EUT conducted access. The product has been tested according to the FCC KDB 558074 D01 DTS Meas Guidance v03r05 § 11.0.

#### Spectrum Analyzer Setting:

Start frequency= 30MHz  
Stop frequency= 25GHz  
Amplitude= Sufficient to observe the signal amplitude  
RBW= 100kHz  
VBW= 300kHz  
Sweep Time= Auto  
Sweep Point= 249700  
Trace= Max Hold  
Detector= Peak



Photograph for Unwanted Emissions into Non-Restricted Frequency Bands



### 8.3. GRAPHICS & RESULTS

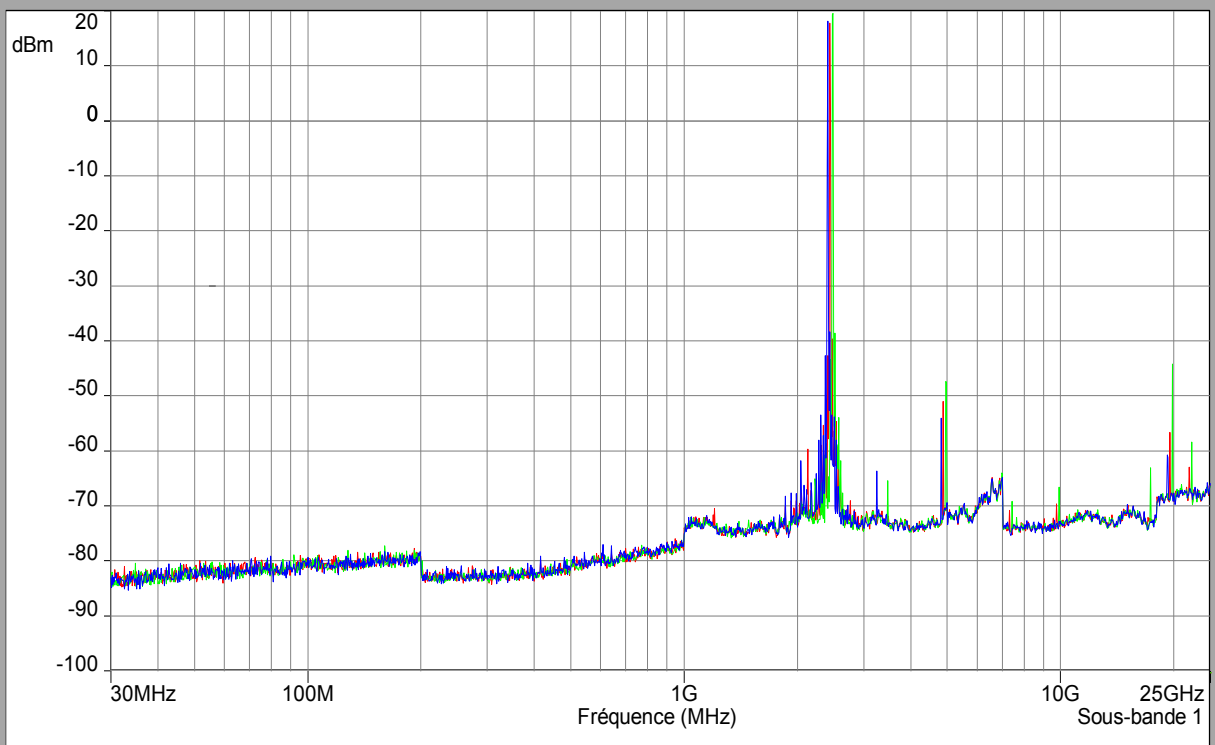
#### Cmin / Cnom / Cmax

Description Sous-bande 1

Fréquences: 30 MHz - 25 GHz (Mode: Lin, Pas: 100 kHz)

Réglages: RBW: 100 kHz, VBW: 300 kHz, Auto, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur: On

— Cmin  
— Cmax  
— Cnom





Frequency (MHz)	Spurious Level (dBm)	Spurious Level (dBc)
4809,1	-54,052	72,193
4879,1	-51,006	68,769
4961	-47,381	66,884
19 236	-60,769	78,91
7318,4	-70,842	88,605
7441,6	-69,217	88,72

**Result: PASS**

**Limit:** → All Spurious Emissions must be at least 30dB (Average Conducted Power) below the Fundamental Radiator Level outside of the 2400MHz-2483,5MHz band



## 9. AC POWER LINE CONDUCTED EMISSIONS

### 9.1. TEST CONDITIONS

Test performed by : Laurent DENEUX  
Date of test : July 25th, 2016  
Ambient temperature : 21°C  
Relative humidity : 40%

### 9.2. 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 (product)





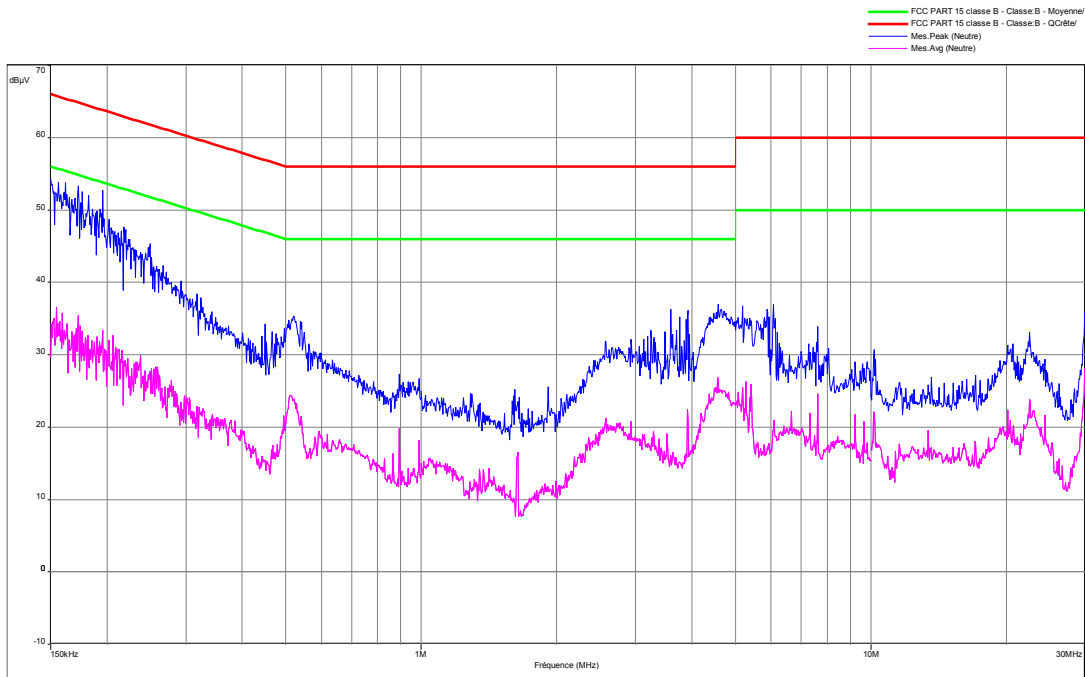
Photograph for AC Power Line Conducted Emissions (Rear view)



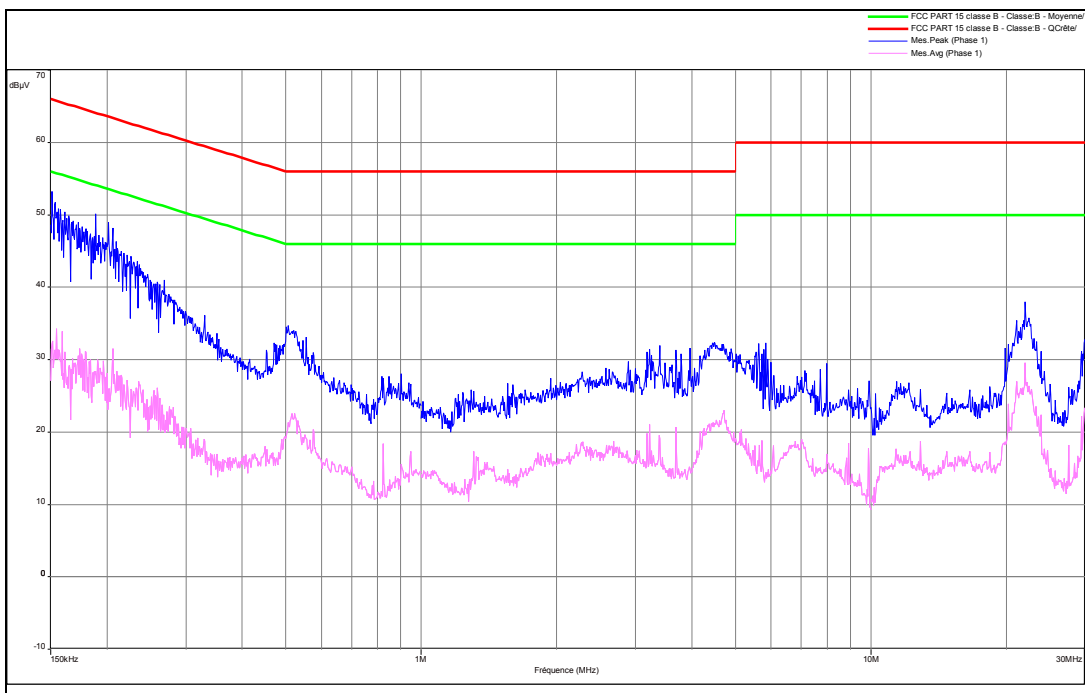


9.3. RESULTS

Phase Line – M16



Neutral Line – M16





**Phase Line – M16**

Frequency kHz	conducted level dB $\mu$ V			
	peak detection	Quasi peak limit	Average value	average value limit
173	53.3	64.8	35.4	54.8
519	35.3	56	24.3	46
4575	37	56	27	46
5184	36.7	60	25.5	50
29915	35.8	60	28.2	50

**Neutral Line – M16**

Frequency kHz	conducted level dB $\mu$ V			
	peak detection	Quasi peak limit	Average value	average value limit
161.5	50.4	65.4	34.2	55.4
521	33.7	56	22	46
3394	32	56	20	46
22054	38	60	29.2	50
29402	30.5	60	22.2	50

**Result: PASS**

**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



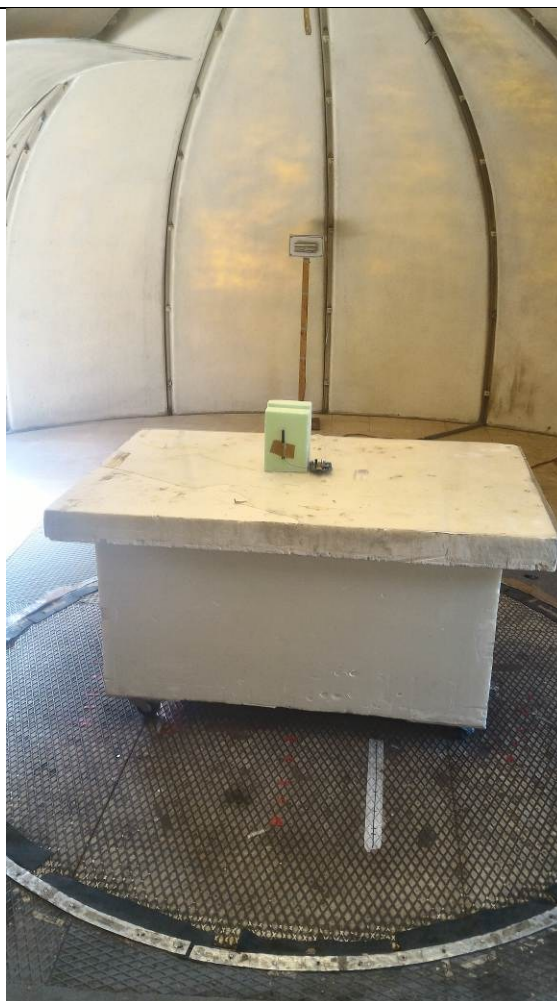
## 10. UNWANTED EMISSIONS INTO RESTRICTED FREQUENCY BANDS

### 10.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU  
Date of test : August 5<sup>th</sup>, 2016  
Ambient temperature : 21°C  
Relative humidity : 38%

### 10.2. TEST SETUP

The product has been tested according to ANSI C63.10 (2013). The EUT is placed in an OATS between 30MHz to 1000MHz and in a semi-anechoic chamber between 1GHz to 26GHz. 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 Emissions into Restricted Frequency Bands



Photograph for Unwanted Emissions into Restricted Frequency Bands

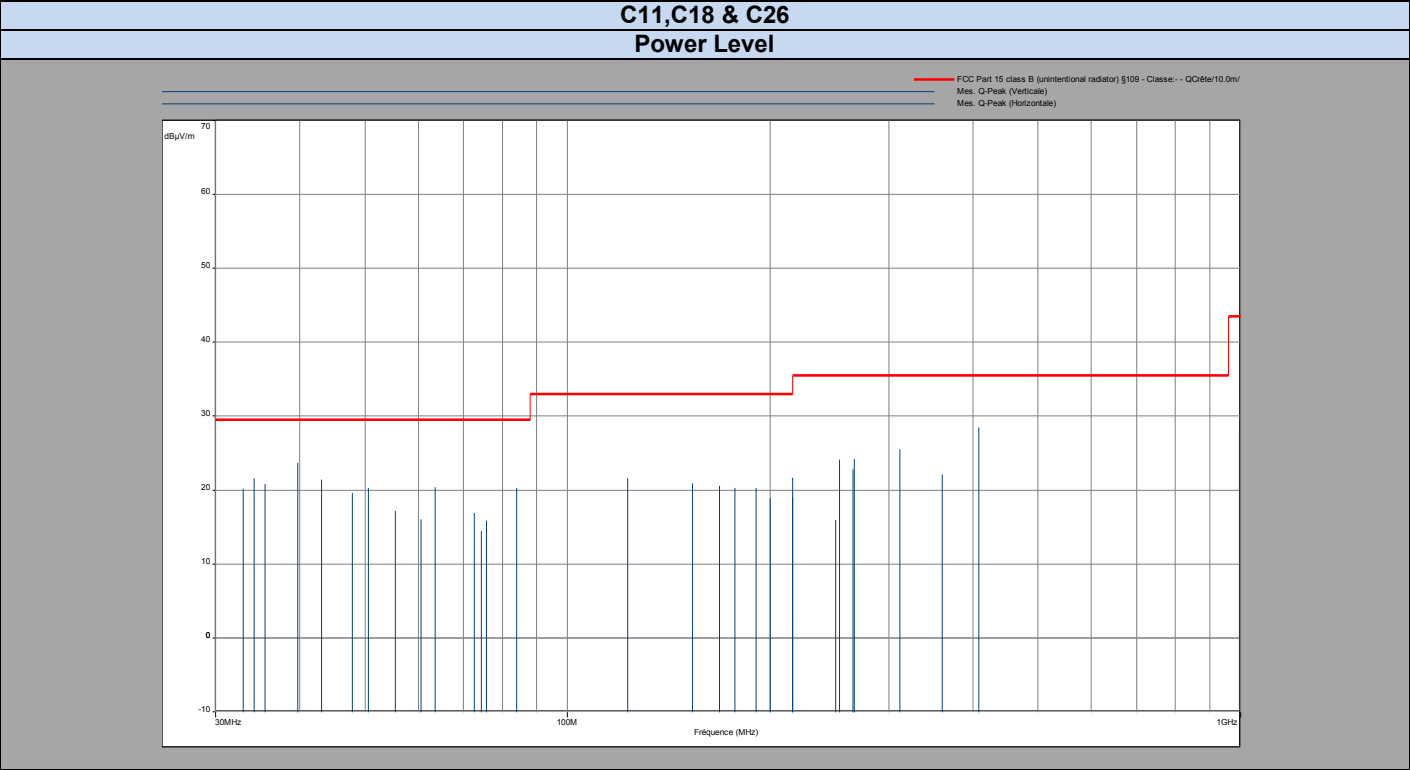


Photograph for Unwanted Emissions into Restricted Frequency Bands



10.3. RESULTS

Below 1GHz – M16





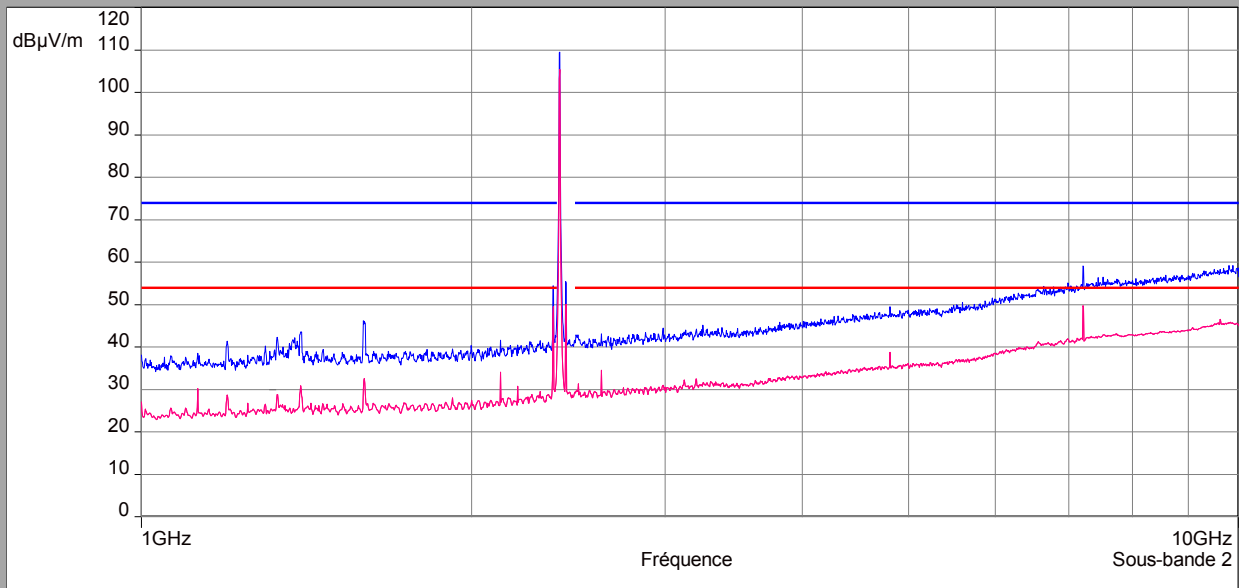
**Above 1GHz – M16**

**Channel Low = C11**

**Power Level =5**

**Vertical**

- FCC/FCC 15.209 >30M Open 2.4GHz - Classe:1 - Moyenne/3.0m/
- FCC/FCC 15.209 >30M Open 2.4GHz - Classe:1 - Crête/3.0m/
- Mes.Peak (Verticale)
- Mes.Avg (Verticale)

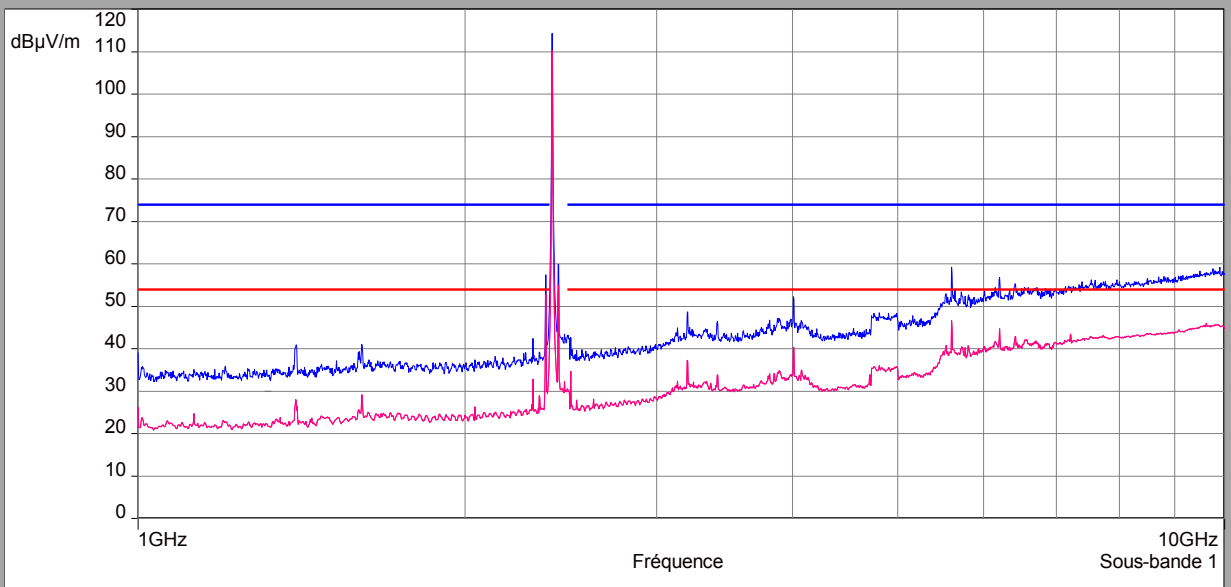


No spurious has been observed between 10GHz to 26GHz

**Power Level =5**

**Horizontal**

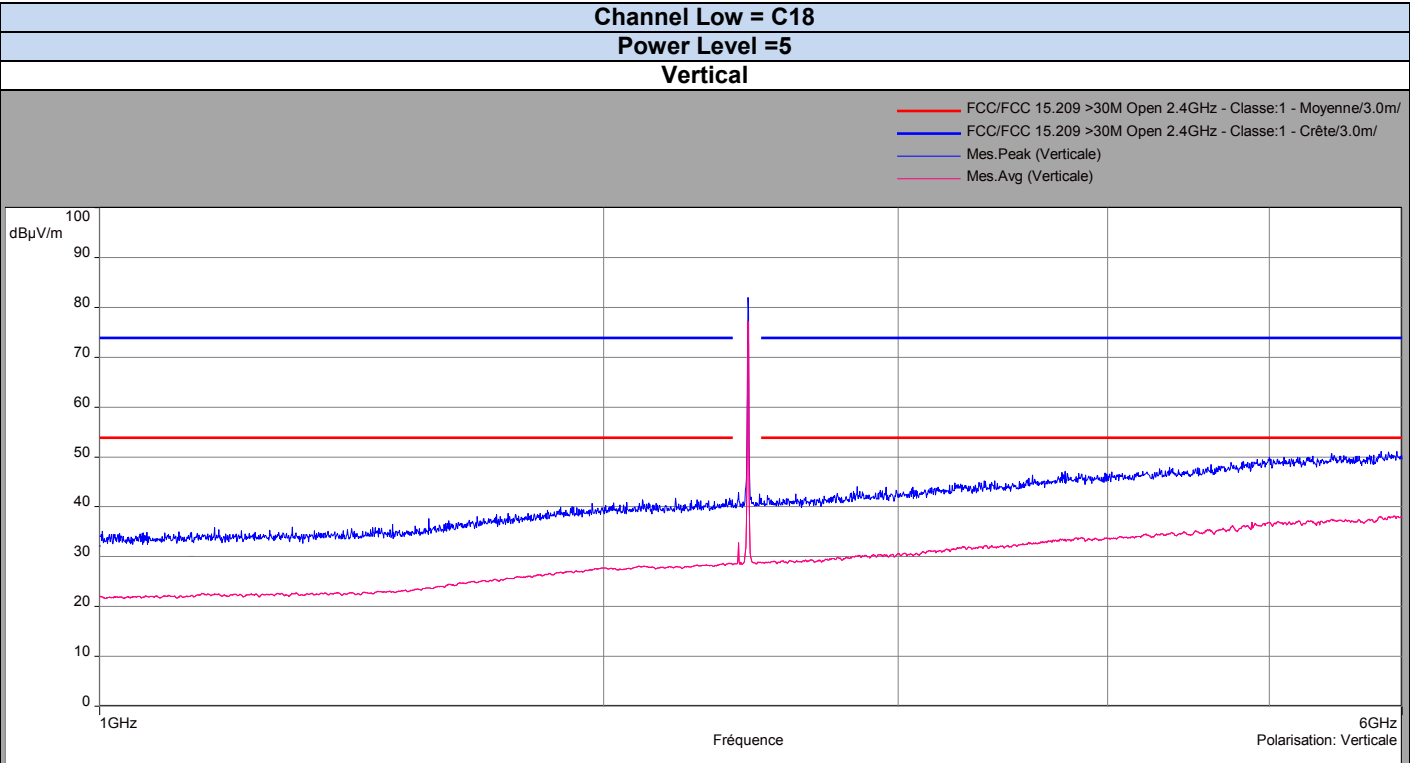
- FCC/FCC 15.209 >30M Open 2.4GHz - Classe:1 - Moyenne/3.0m/
- FCC/FCC 15.209 >30M Open 2.4GHz - Classe:1 - Crête/3.0m/
- Mes.Peak (Horizontale)
- Mes.Avg (Horizontale)



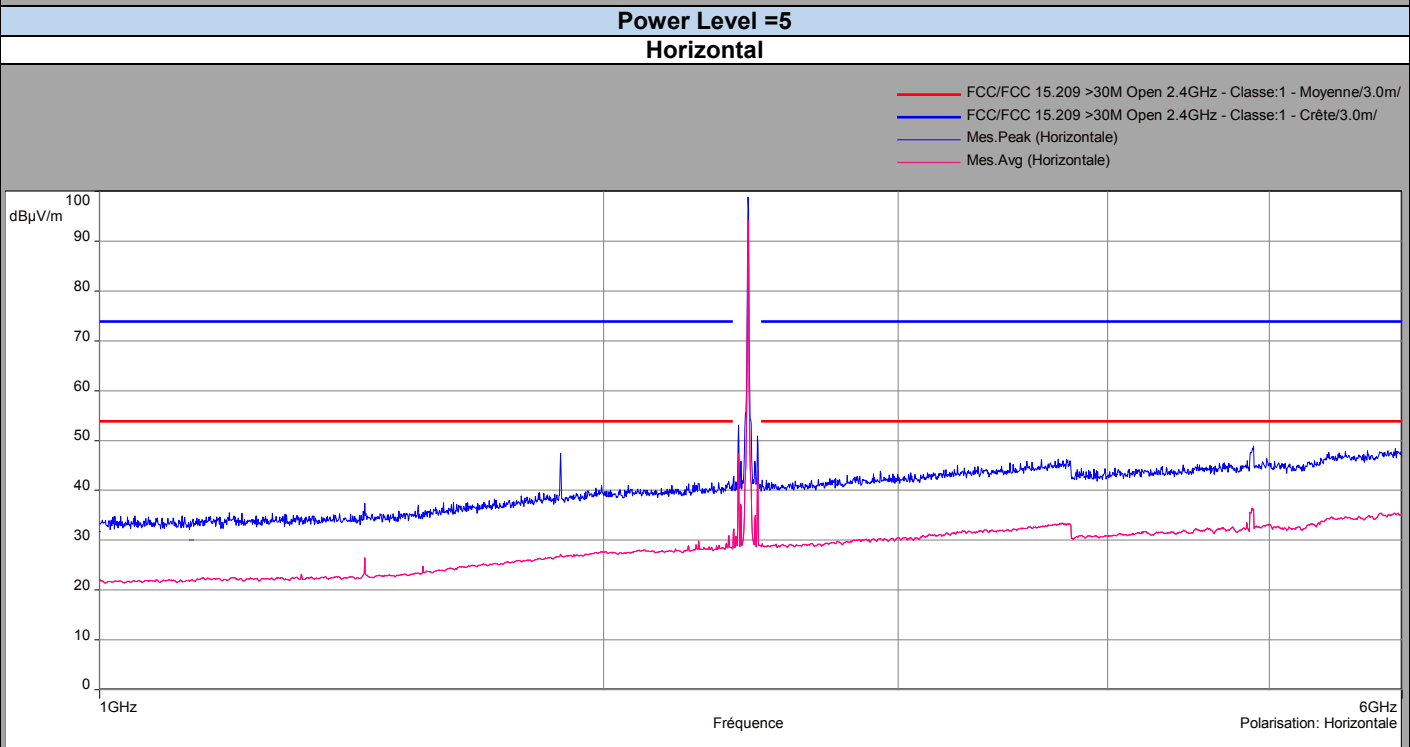
No spurious has been observed between 10GHz to 26GHz



**Above 1GHz – M16**



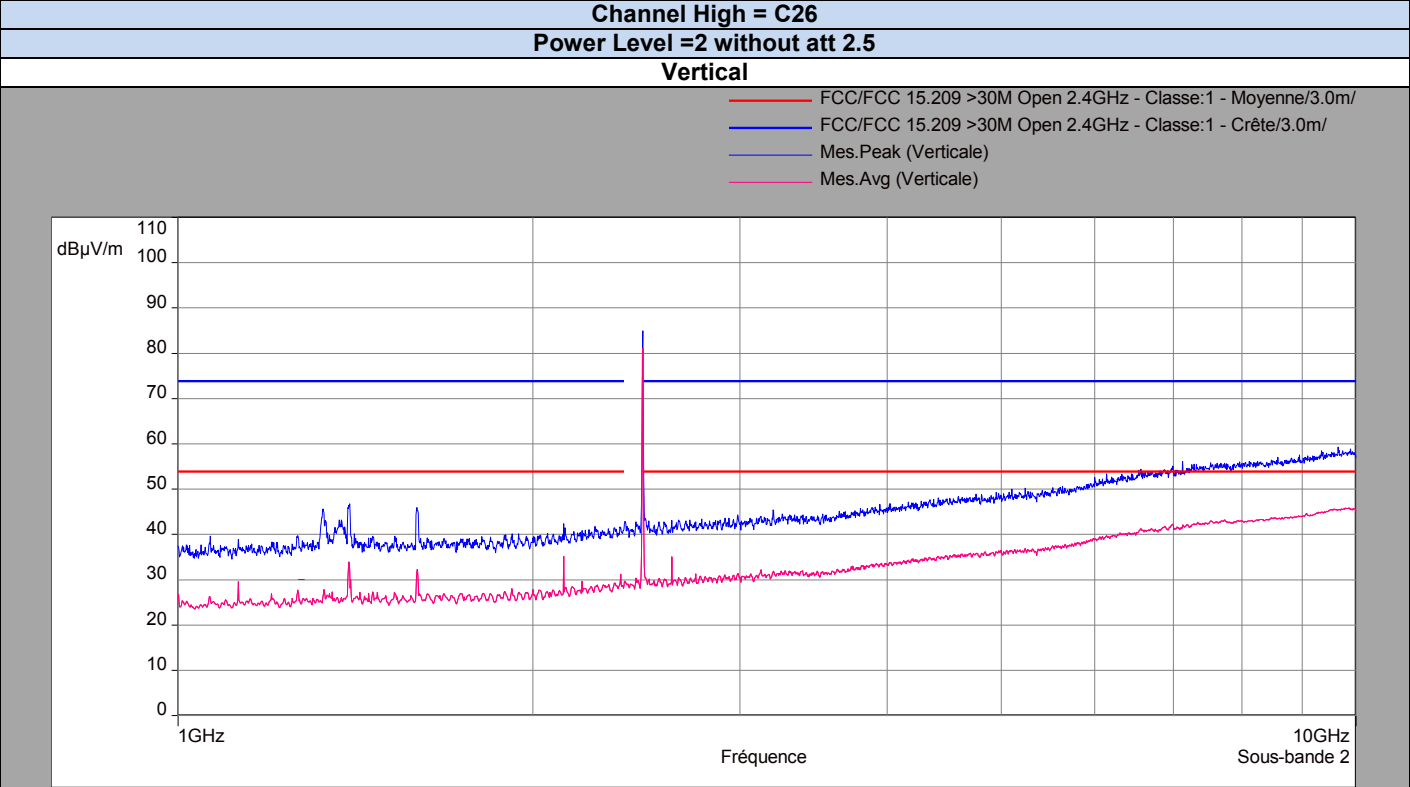
No spurious has been observed between 6GHz to 26GHz



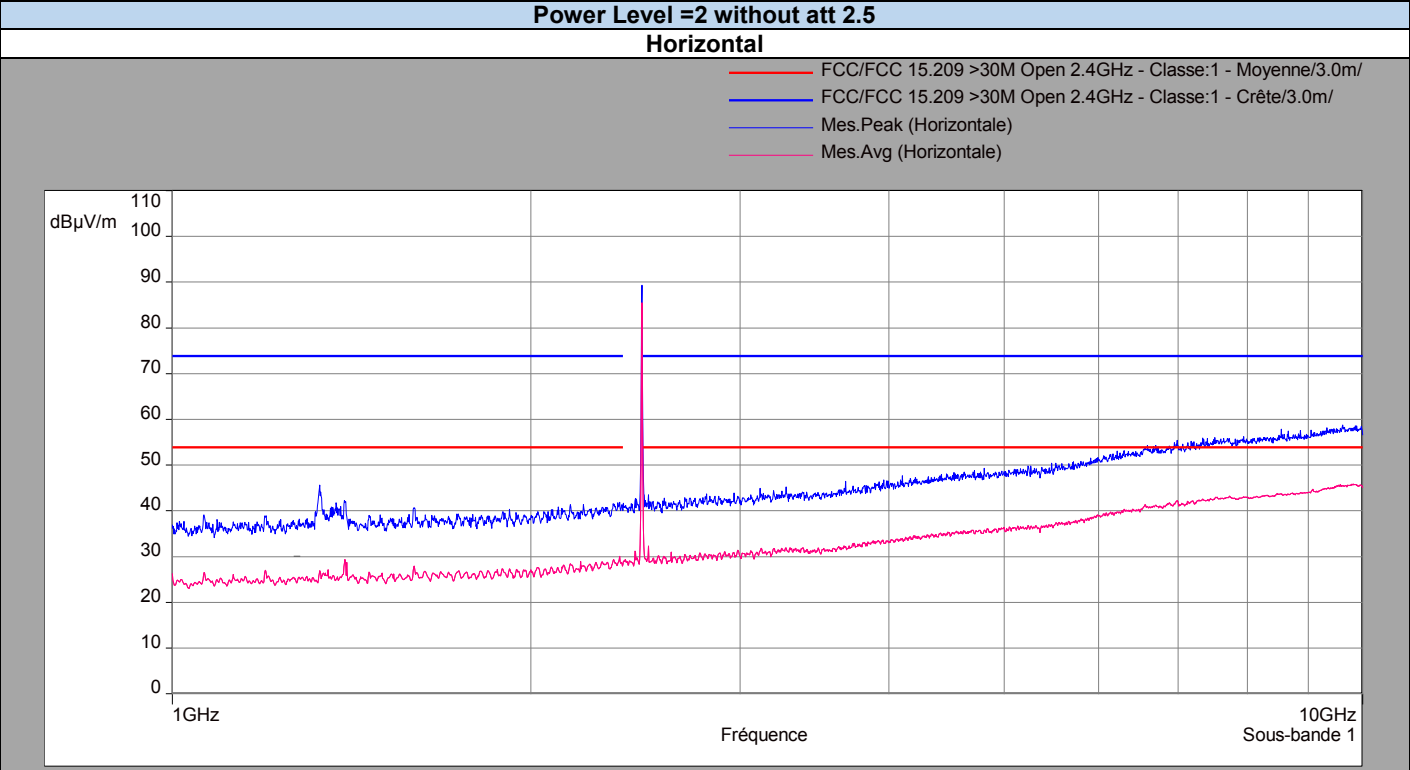
No spurious has been observed between 6GHz to 26GHz



**Above 1GHz – M16**



No spurious has been observed between 10GHz to 26GHz



No spurious has been observed between 10GHz to 26GHz





Characterization in an OATS (30MHz to 1GHz):

Frequency MHz	Level measured QPeak Level dBµV/m	Limit level FCC Part.15 class B
39.7	23.7	29.5
63.6	20.4	29.5
253.8	24.2	35.5
312	25.5	35.5
408	28.5	35.5

Characterization in a full anechoic chamber (1GHz to 26GHz):

Channel Low = C11

Polarisation	Frequency (MHz)	Average Level (dBµV/m)	Average Limit (dBµV/m)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)
Vertical	2373	49.44	53.9	53.84	73.9
Horizontal	2373	52.85	53.9	56.54	73.9
Horizontal	2390	36.95	53.9	47.12	73.9
Vertical	2390	34.40	53.9	46.22	73.9
Horizontal	4012	40.39	53.9	52.24	73.9
Vertical	7213.5	49.73	53.9	59.11	73.9

Channel High = C18

Polarisation	Frequency (MHz)	Average Level (dBµV/m)	Average Limit (dBµV/m)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)
Horizontal	2390	28.26	53.9	38.90	73.9
Vertical	2390	28.23	53.9	39.17	73.9
Horizontal	2483.5	28.73	53.9	39.88	73.9
Vertical	2483.5	28.81	53.9	41.51	73.9



Channel High = C26

Polarisation	Frequency (MHz)	Average Level (dBµV/m)	Average Limit (dBµV/m)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)
Horizontal	2483.5	45.97	53.9	56.14	73.9
Vertical	2483.5	37.61	53.9	49.20	73.9

**Result: PASS**

**Limit: →**

30MHz to 88MHz:	40dBµV/m QPeak
88MHz to 216MHz:	43,5dBµV/m QPeak
216MHz to 960MHz:	46dBµV/m QPeak
960MHz to 1000MHz:	54dBµV/m QPeak
Above 1000MHz:	74dBµV/m Peak
	54dBµV/m Average



## 11. TEST EQUIPMENT LIST

Occupied Bandwidth, -6dB Bandwidth, Maximum Peak Output Power, Power Spectral Density and Unwanted Emissions into Non-Restricted Frequency Bands					
Apparatus	Trade Mark	Type	Registration number	Calibration date	Calibration due
RF cable	CABLES & CONNECTIQUES	3.5MD/CSU528AA/3.5MD/1500	A5329356	2015/07	2016/07
EMI receiver	ROHDE & SCHWARZ	ESR7	A2642024	2016/03	2017/03
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329675	2015/10	2016/10
Attenuator 20 dB	-	SA 4016	A7122211	2015/11	2016/11
Unwanted Emissions into Restricted Frequency Bands & Receiver Spurious Emissions					
Apparatus	Trade Mark	Type	Registration number	Calibration date	Calibration due
Semi anechoic chamber	SIEPEL	-	D3044008	2014/05	2017/05
EMI receiver	ROHDE & SCHWARZ	ESIB26	A2642021	2015/12	2016/12
Horn antenna	A-INFOMW	LB-10180-NF	C2042051	2016/03	2017/03
Preamplifier	HEWLETT PACKARD	8449B OPT H02	A7080071	2016/07	2017/07
Cable	CABLES & CONNECTIQUES	2.9MD/CSU440AA/2.9MD/1000	A5329428	2016/05	2017/05
Cable	CABLES & CONNECTIQUES	3.5MD/CSU528AA/3.5MC/4000	A5329431	2016/03	2017/03
RF cable	RADIALL; CDI	30990-7M	A5329711	2016/03	2017/03
Rejector filter 2,4GHz	-	2.45GHz	A7484048	2015/12	2016/12
AC Power Line Conducted Emissions					
Apparatus	Trade Mark	Type	Registration number	Calibration date	Calibration due
EMI Test Receiver	ROHDE & SCHWARZ	ESU	A2642018	2016-03	2017-03
V ISLN	ROHDE & SCHWARZ	ESH2-Z5	C2322001	2016-05	2017-05
Pulse limiter	ROHDE & SCHWARZ	ESH3-Z2	A2649008	2016-03	2017-03
Cable	-	-	A5329417	2015-10	2016-10
Absorber	LCIE	-	A5329589	2015-07	2016-07
Ground plan	LCIE	-	-	-	-
Unwanted Emissions into Restricted Frequency Bands					
Apparatus	Trade Mark	Type	Registration number	Calibration date	Calibration due
EMI receiver	ROHDE & SCHWARZ	ESIB26	A2642021	2015/12	2016/12
Cable	sans; ATEM	SMA 0.5m	A5329645	2015/08	2016/08
Rejector filter 2,4GHz	-	2.45GHz	A7484048	2015/12	2016/12

In our qualification system the calibration due is more or less 2 months.



## 12. UNCERTAINTIES CHART

Kind of test	Measurement uncertainties (k=2) $\pm x(\text{dB}) / (\text{Hz})$	Limit for uncertainties $\pm y(\text{dB})$
<b>TRANSMITTER REQUIREMENTS</b>		
Radio frequency	$\pm 2 \cdot 10^{-8} \text{ Hz}$	$\pm 1 \cdot 10^{-7} \text{ Hz}$
RF Conducted power	$\pm 0.6 \text{ dB}$	$\pm 1.5 \text{ dB}$
Spurious emissions <ul style="list-style-type: none"> <li>• Frequency &lt; 1000 MHz</li> <li>• Frequency &gt; 1000 MHz</li> </ul>	$\pm 3.9 \text{ dB}$ $\pm 3.1 \text{ dB}$	$\pm 6 \text{ dB}$
Spurious in conduction	$\pm 1.6 \text{ dB}$	$\pm 3 \text{ dB}$
Temperature	$\pm 0.5^\circ\text{C}$	$\pm 1^\circ\text{C}$
Humidity	$\pm 2.5 \%$	$\pm 10 \%$
<b>RECEIVER REQUIREMENTS</b>		
Spurious emissions <ul style="list-style-type: none"> <li>• Frequency &lt; 1000 MHz</li> <li>• Frequency &gt; 1000 MHz</li> </ul>	$\pm 3.9 \text{ dB}$ $\pm 3.1 \text{ dB}$	$\pm 6 \text{ dB}$