



TEST REPORT

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Standards

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

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Apparatus under test

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Serial number
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JN5179-001-M13
NXP
NXP Semiconductors
JN5179-001-M13
00001-ZbHYWW
8764A-JN5179M1X
XXMJN5179M1X

Test date

2016/07/19 to 2016/09/15

Tests performed by

Mathieu CERISIER

Test site

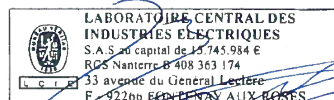
Fontenay aux Roses

Date of issue

2016/09/23

Written by :
Mathieu CERISIER
Tests operator

Approved by :
Julien BOUTAUD
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



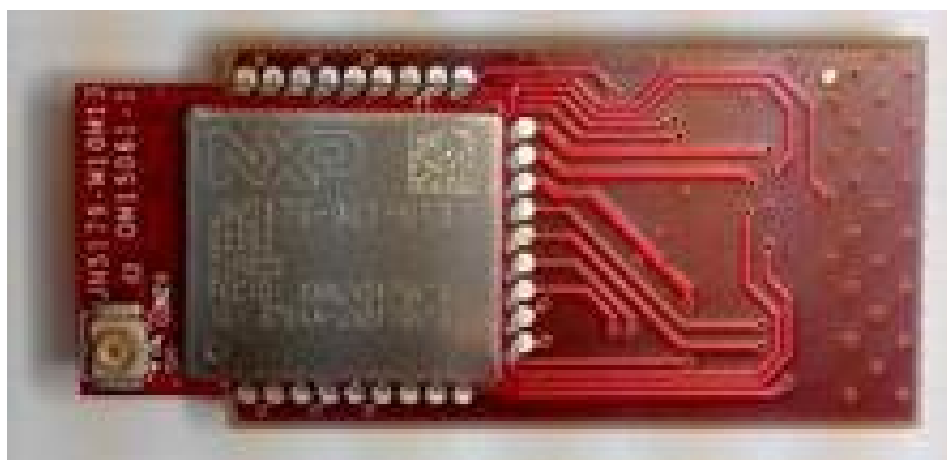
2. EQUIPMENT DESCRIPTION

2.1. GENERAL DESCRIPTION

“The JN5179-001-M13 module provides designers with a ready-made component that provides a fully integrated solution for applications, using the IEEE802.15.4 standard in the 2.4 GHz - 2.5 GHz ISM frequency band, including ZigBee Smart Energy, Light Link and Home Automation and can be quickly and easily included in product designs. The module integrates all of the RF components required, removing the need to perform expensive RF design and test. Products can be designed by simply connecting sensors and switches to the module IO pins. The module uses NXP’s single chip IEEE802.15.4 wireless microcontroller, allowing designers to make use of the extensive chip development support material.

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: Single 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) Internal power supply
 External 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:

M13 Gain (dBi)
2

- Operating frequency range:

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



-Channel plan:

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

-Data Rate:

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



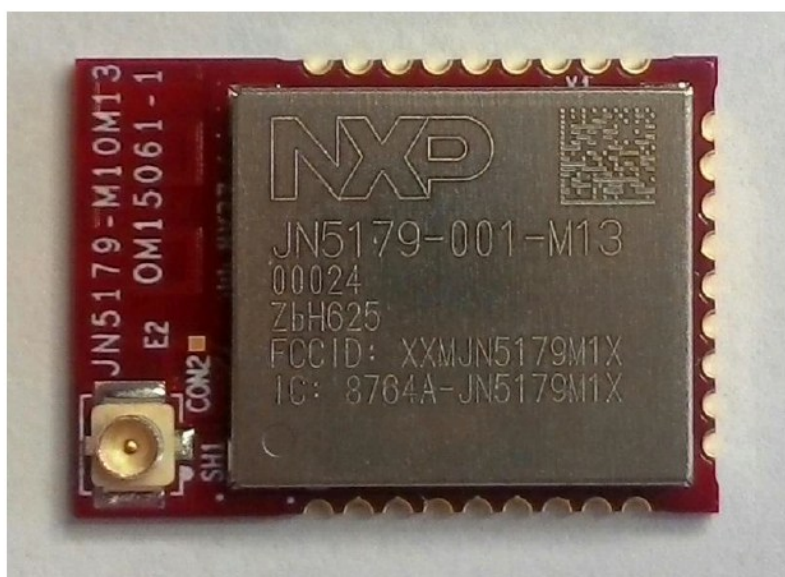
2.3. RUNNING MODE

- - 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	5	<input type="checkbox"/>
18	5	<input type="checkbox"/>
26	4	<input checked="" 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 : 2016/07/19
Ambient temperature : 27°C
Relative humidity : 44%

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:

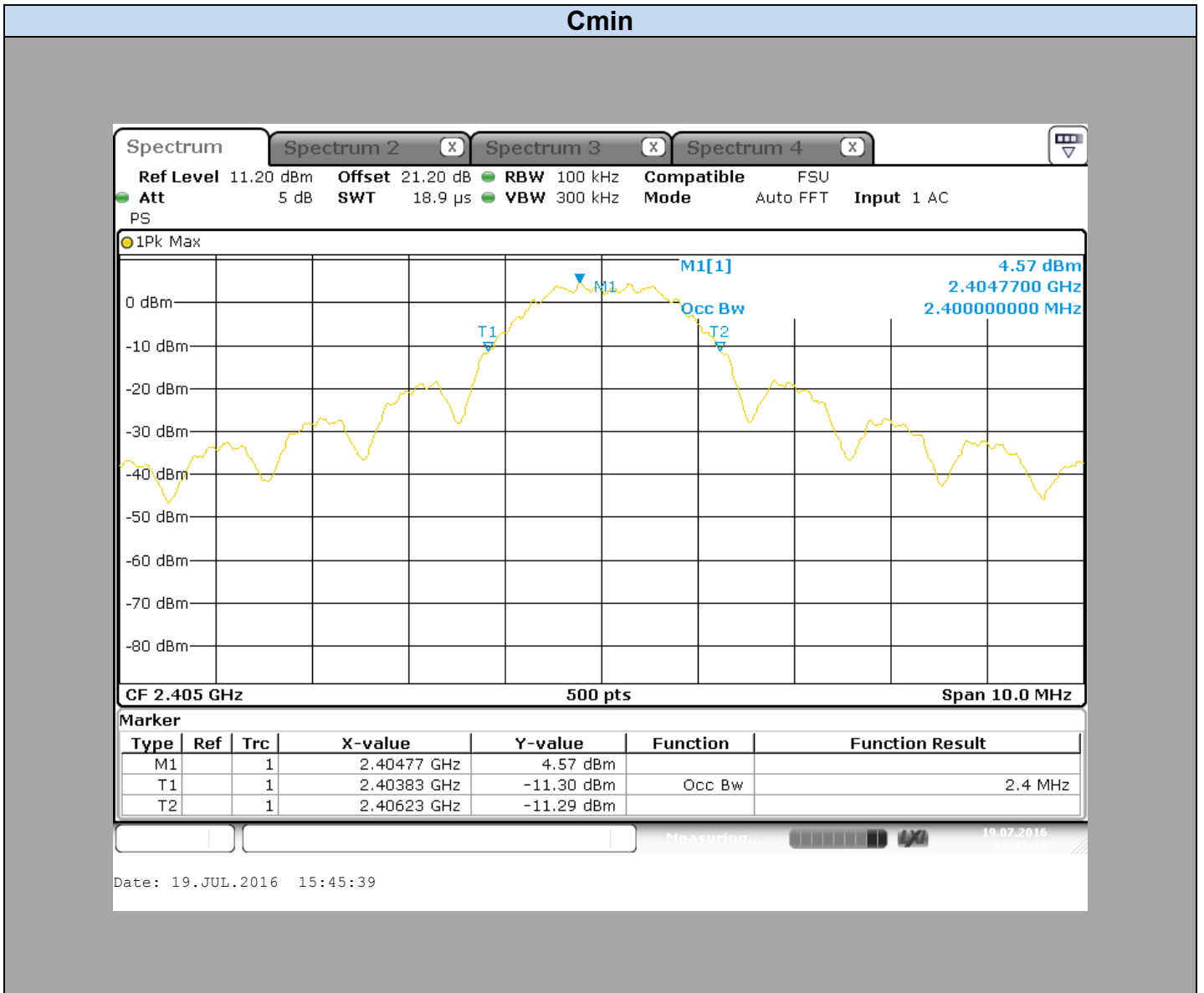
Center frequency= Cmin or Cnom or Cmax
Span= Above the emission spectrum
Amplitude= Sufficient to observe the signal amplitude
RBW= 1% to 5% of the occupied bandwidth (OBW)
VBW \geq 3*RBW
Sweep= Auto
Trace= Max Hold
Detector= Peak
Occupied Bandwidth 99% activated



Photograph for Occupied Bandwidth

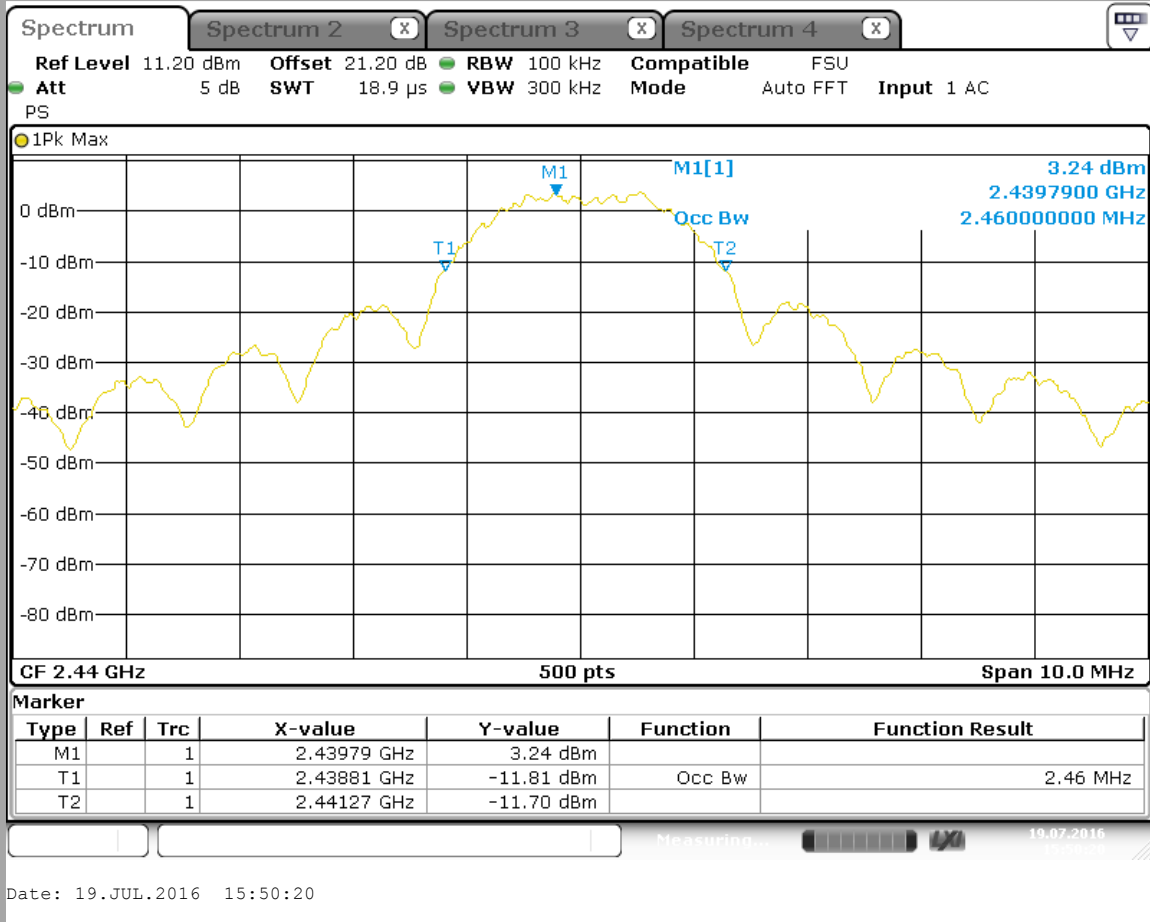


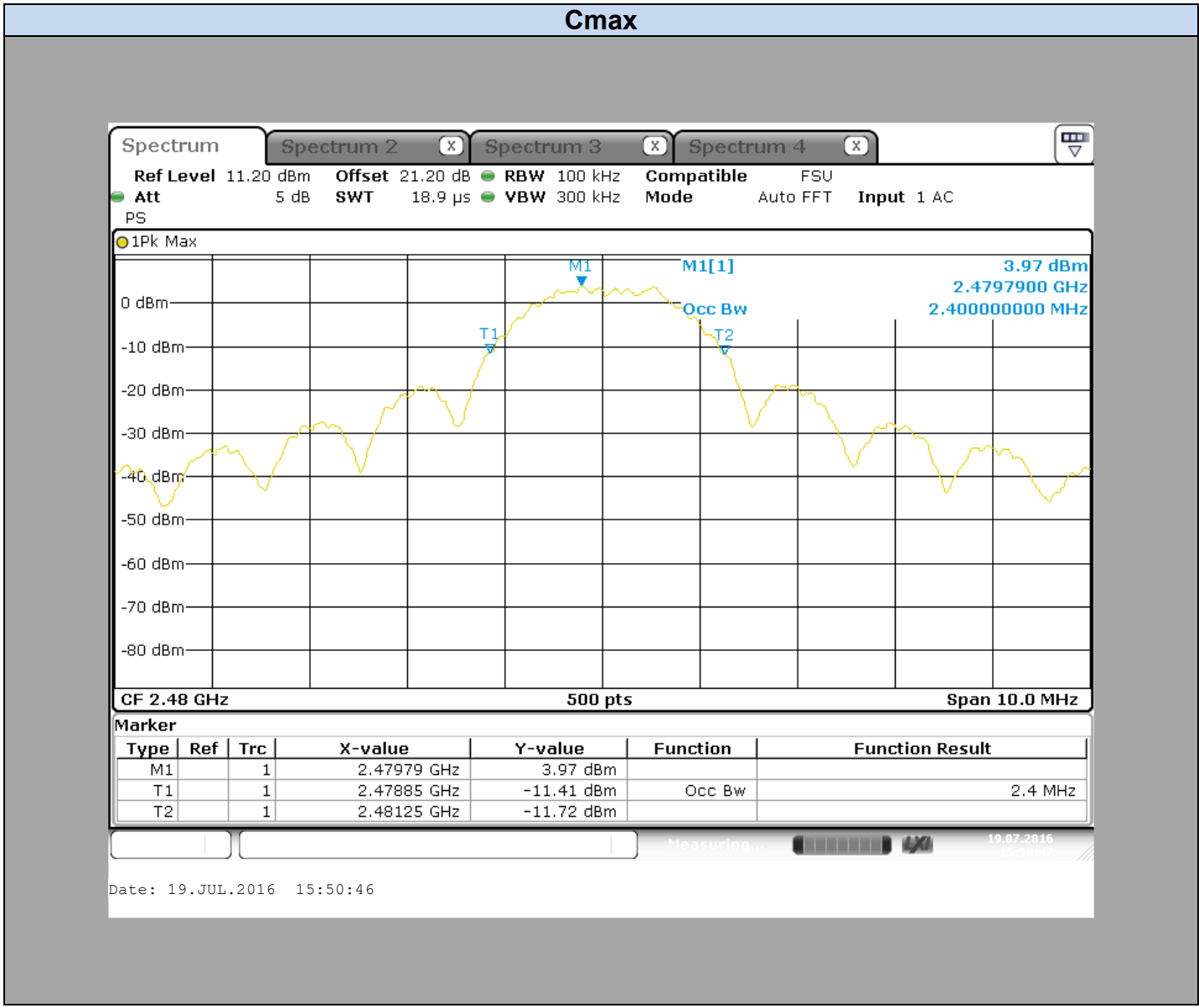
3.3. GRAPHICS & RESULTS





Cnom





M13			
Temperature	Tnom		
Voltage	Vnom		
Frequency	Cmin	Cnom	Cmax
Occupied Bandwidth (MHz)	2,4	2,46	2,4

Result: **PASS**

Limit: → None



4. -6dB BANDWIDTH

4.1. TEST CONDITIONS

Test performed by : Mathieu CERISIER
Date of test : 2016/07/19
Ambient temperature : 27°C
Relative humidity : 44%

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:

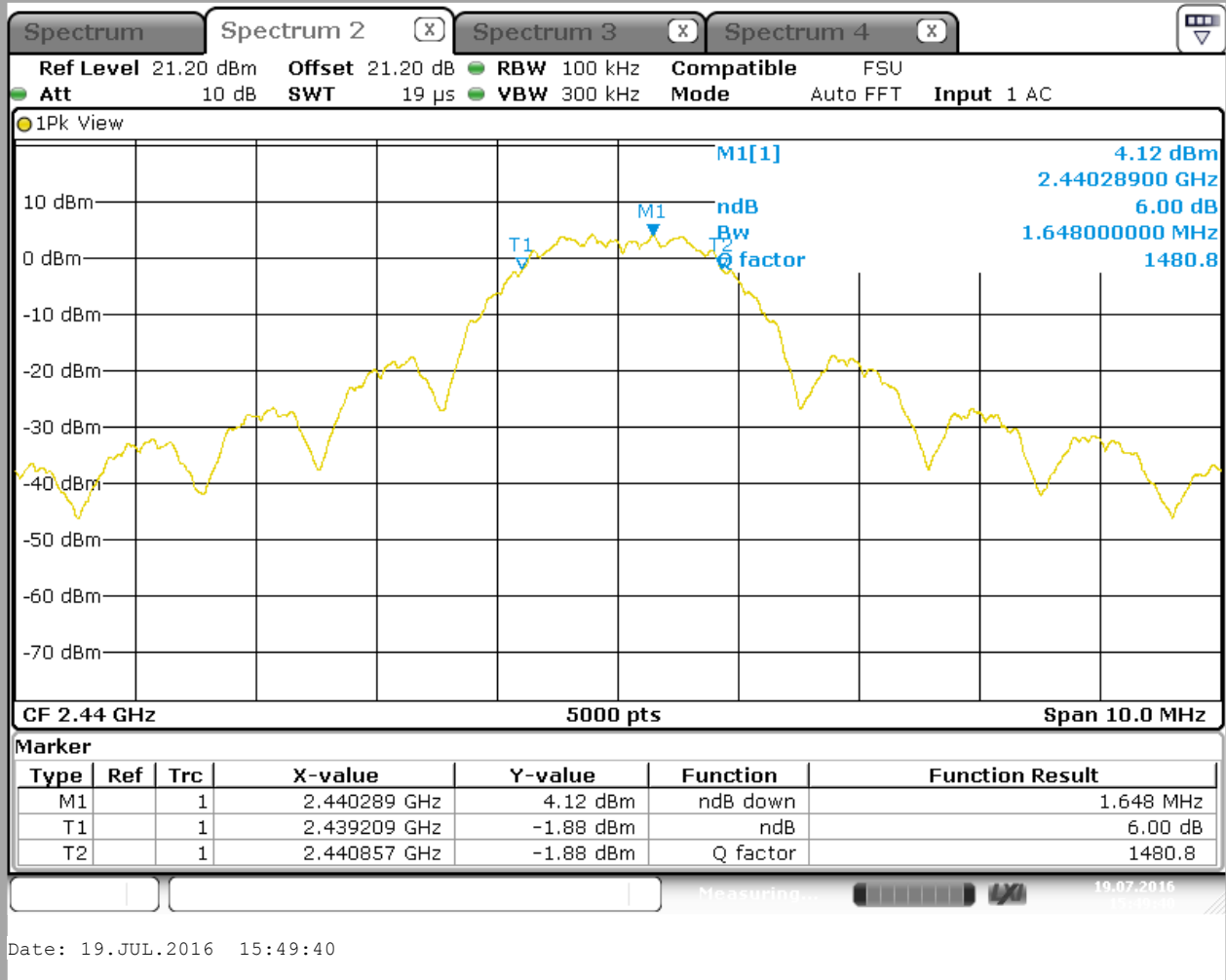
Center frequency= Cmin or Cnom or Cmax
Span= At least twice the emission spectrum
Amplitude= Sufficient to observe the signal amplitude
RBW= 100kHz
VBW≥ 300kHz
Sweep= Auto
Trace= Max Hold
Detector= Peak

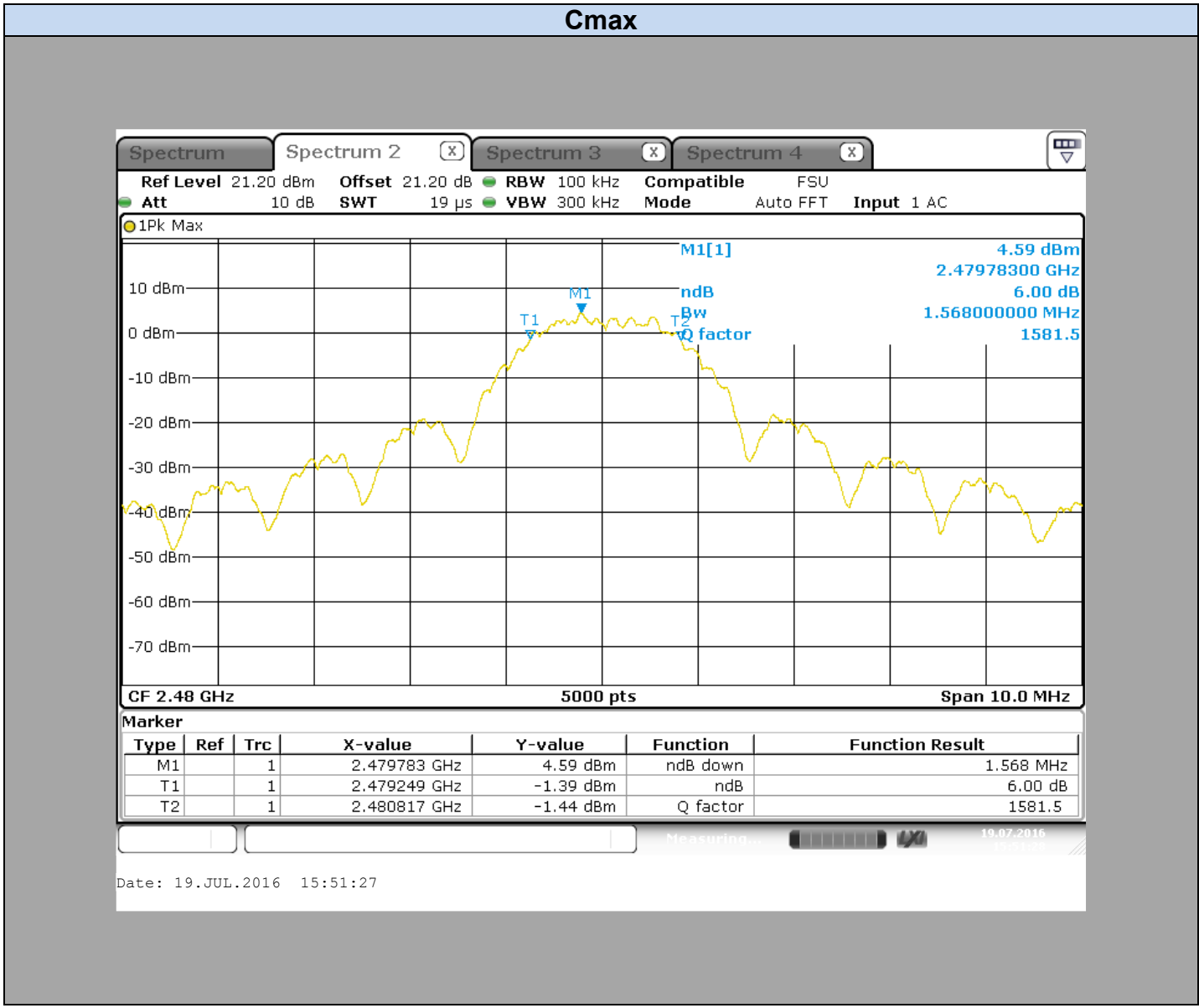


Photograph for -6dB Bandwidth



Cnom





M13			
Temperature	Tnom		
Voltage	Vnom		
Frequency	Cmin	Cnom	Cmax
-6dB Bandwidth (MHz)	1,592	1,648	1,569

Result: **PASS**

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



5. MAXIMUM CONDUCTED POWER

5.1. TEST CONDITIONS

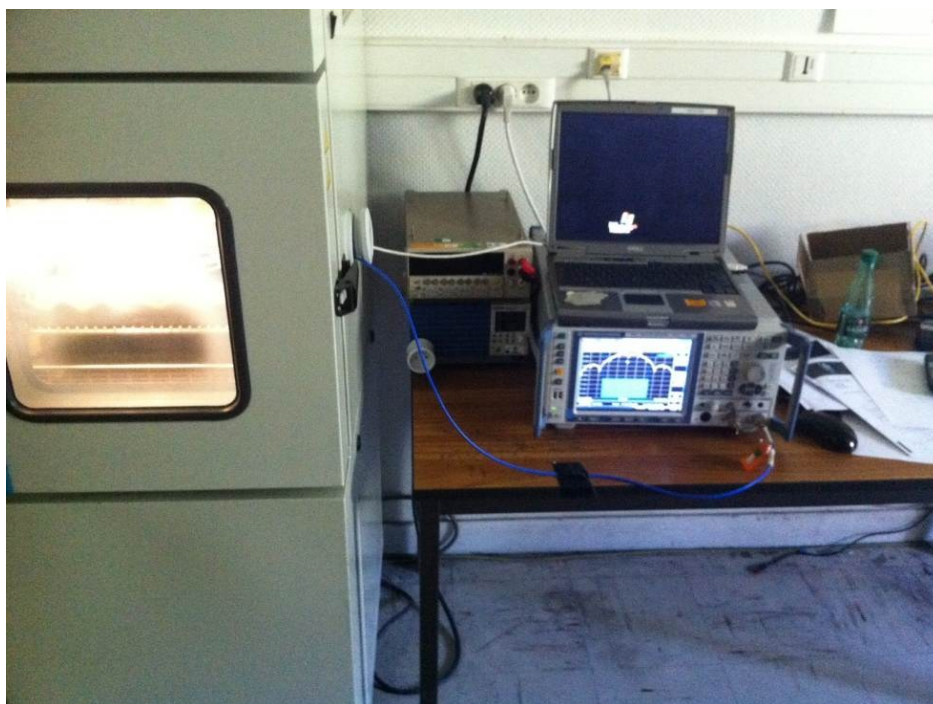
Test performed by : Mathieu CERISIER
Date of test : 2016/07/19
Ambient temperature : 27°C
Relative humidity : 44%

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):

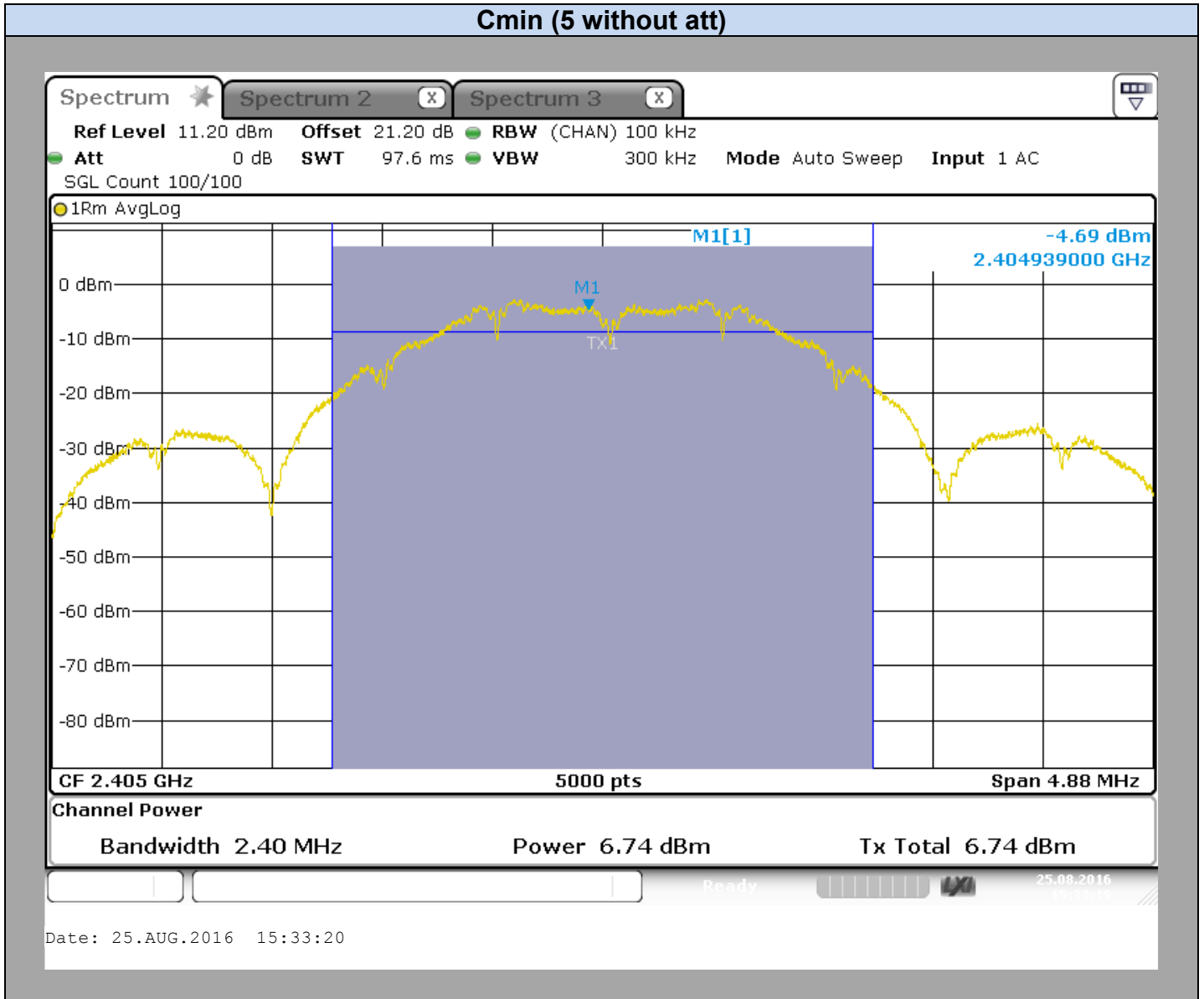
Center frequency= C_{min} or C_{nom} or C_{max}
Span \geq At least 1.5 times the OBW
Amplitude= Sufficient to observe the signal amplitude
RBW= 1% to 5% of the OBW
VBW \geq 3*RBW
Sweep= Auto
Sweep points= $2 * \text{Span} / \text{RBW}$
Trace= RMS
Trigger= Free Run
Detector= Average 100
Meas Fonction=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



Photograph for Maximum Conducted Power

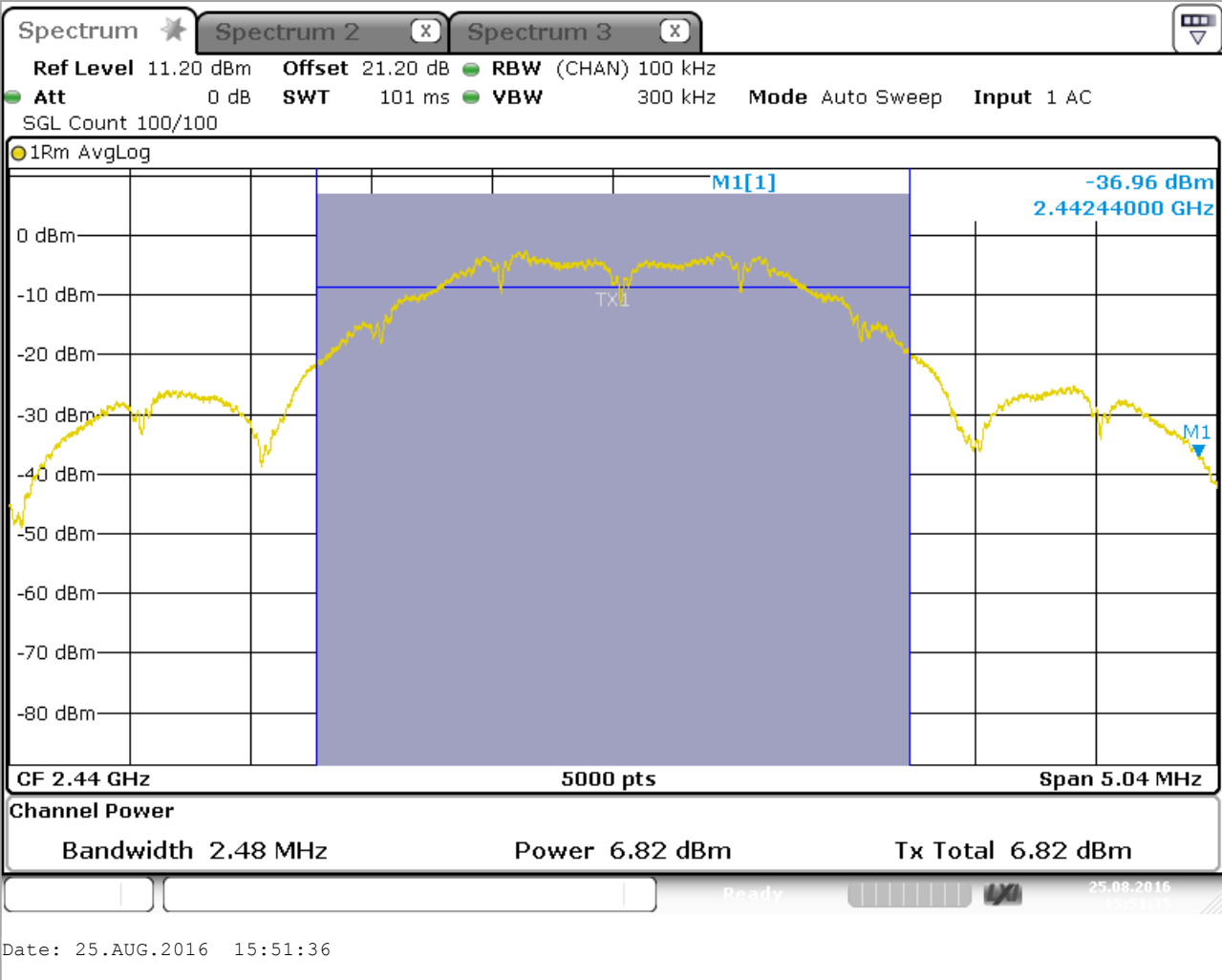


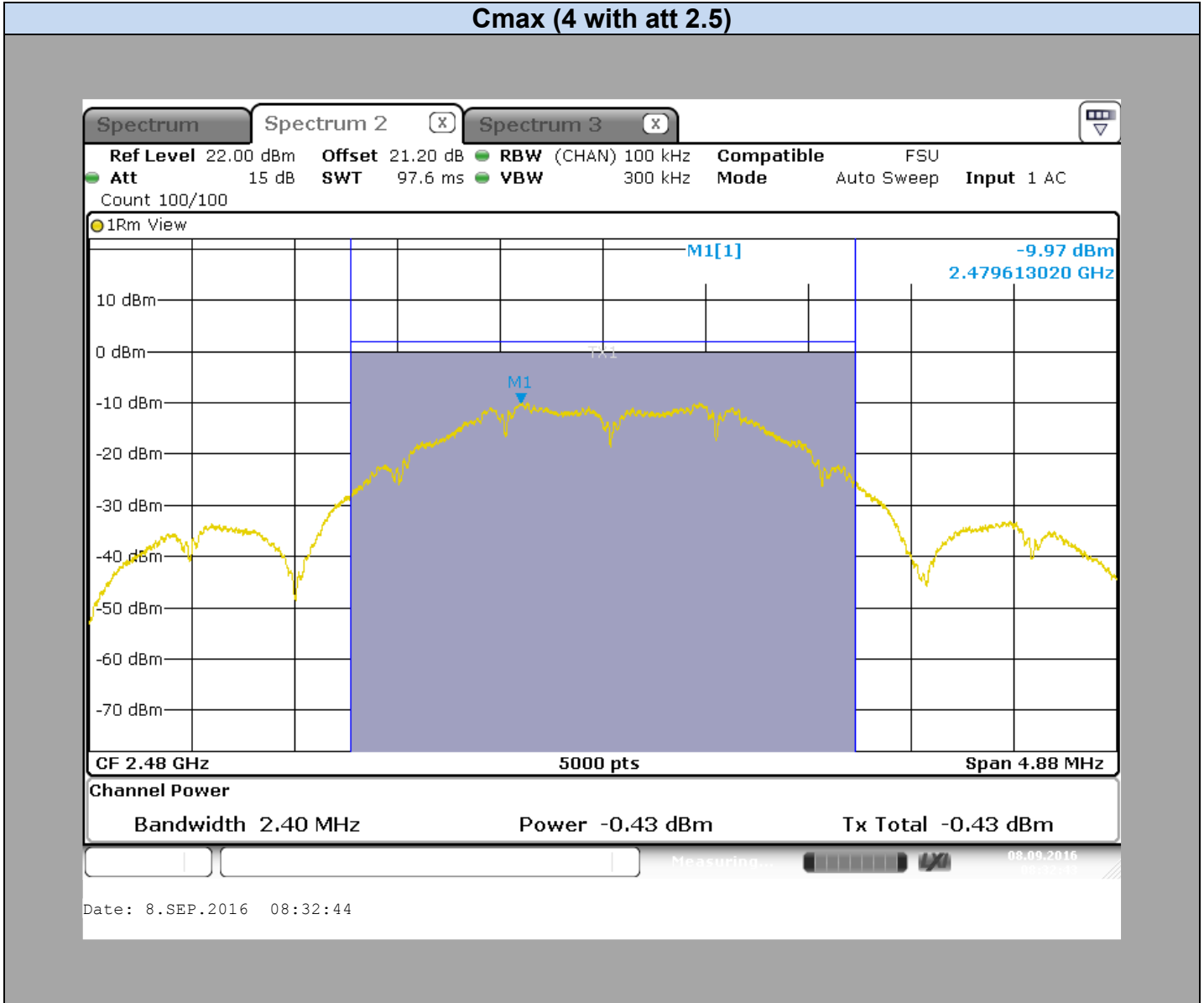
5.3. GRAPHICS & RESULTS





Cnom (5 without att)





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

M13			
Channel	Overall Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Limit (dBm)
Cmin	2	6,74	30
Cnom	2	6,82	30
Cmax	2	-0.43	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 : 2016/07/19
Ambient temperature : 27°C
Relative humidity : 44%

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:

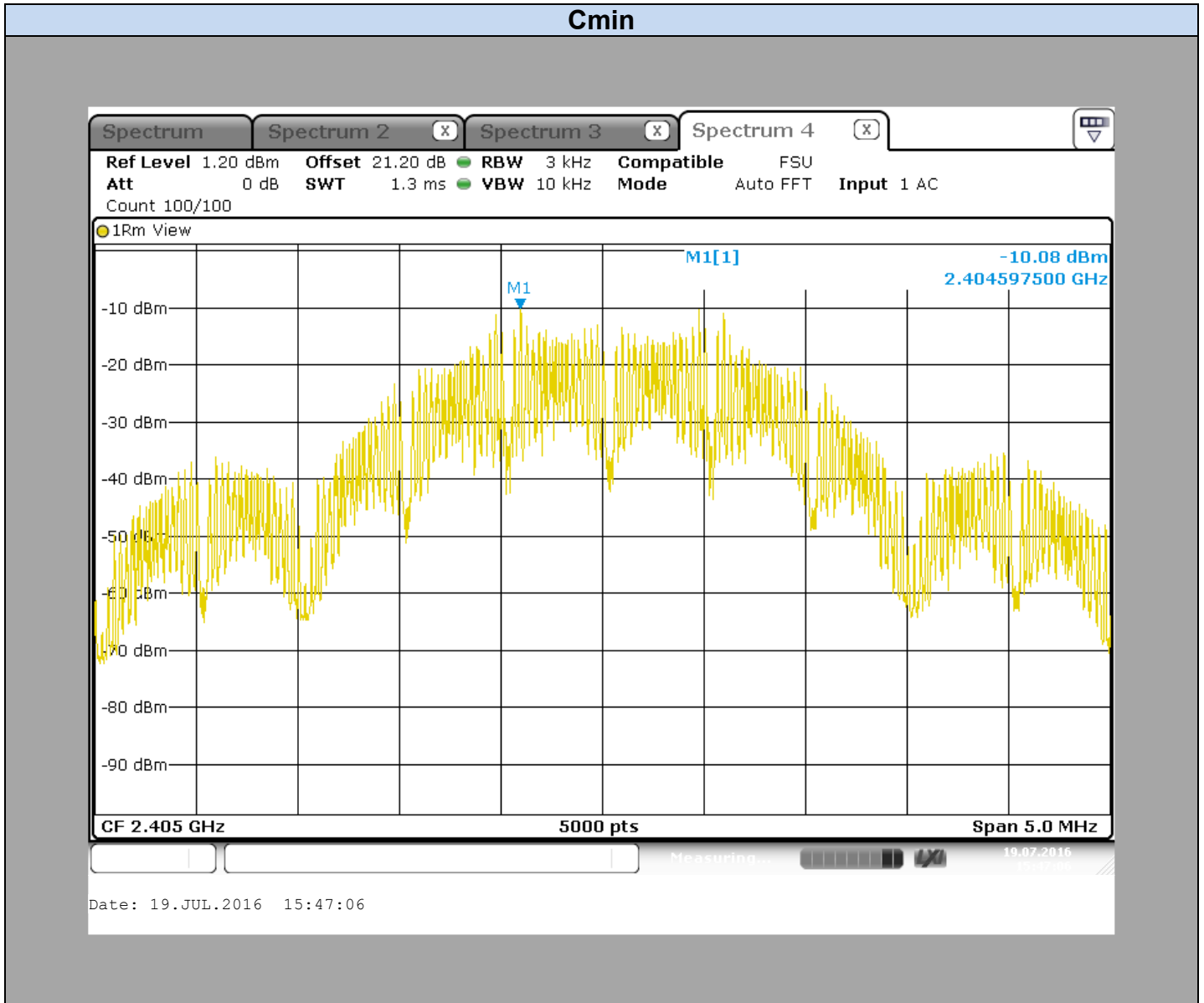
Center frequency= Cmin or Cnom or Cmax
Span \geq At least 1.5 times the OBW
Amplitude= Sufficient to observe the signal amplitude
 $3\text{kHz} \leq \text{RBW} \leq 100\text{kHz} := 3\text{kHz}$
 $\text{VBW} \geq 3 * \text{RBW} = 10\text{kHz}$
Sweep= Auto
Sweep points $\geq 2 * \text{Span} / \text{RBW}$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



Photograph for Power Spectral Density

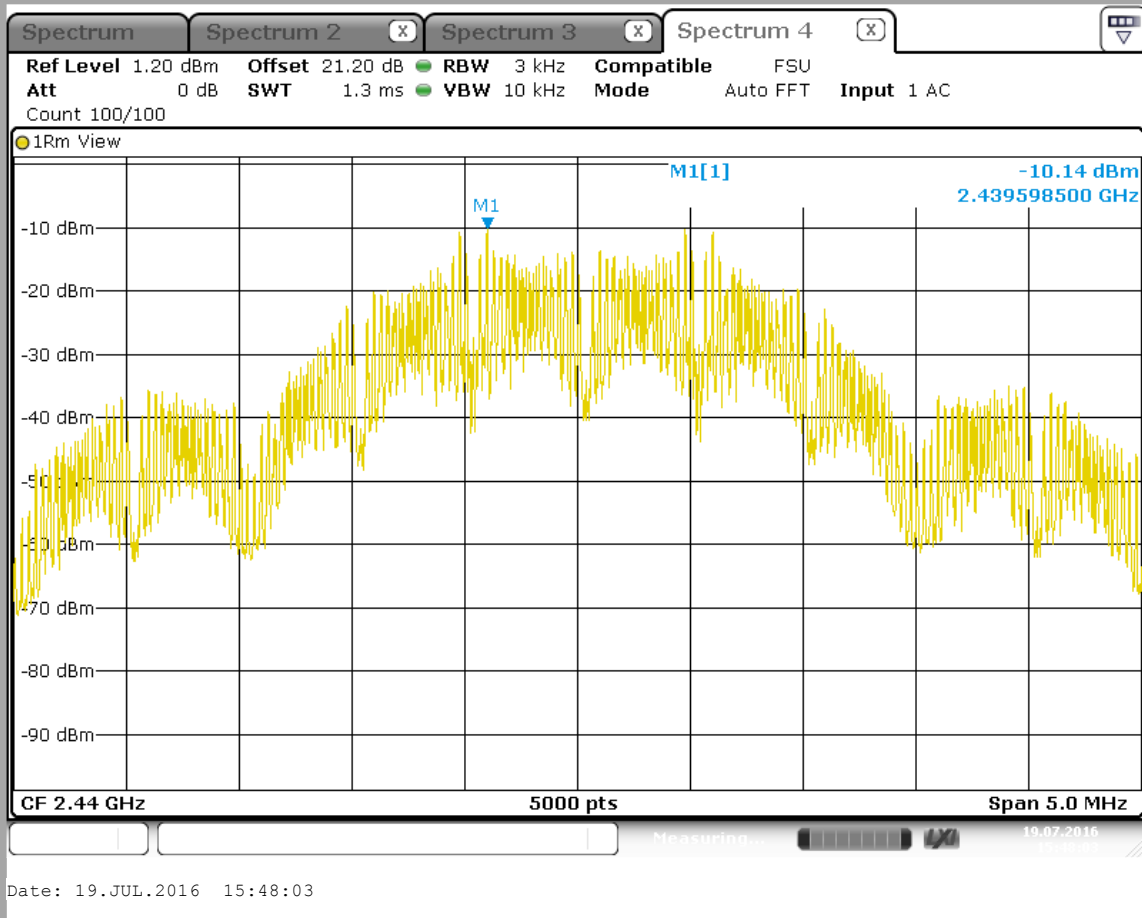


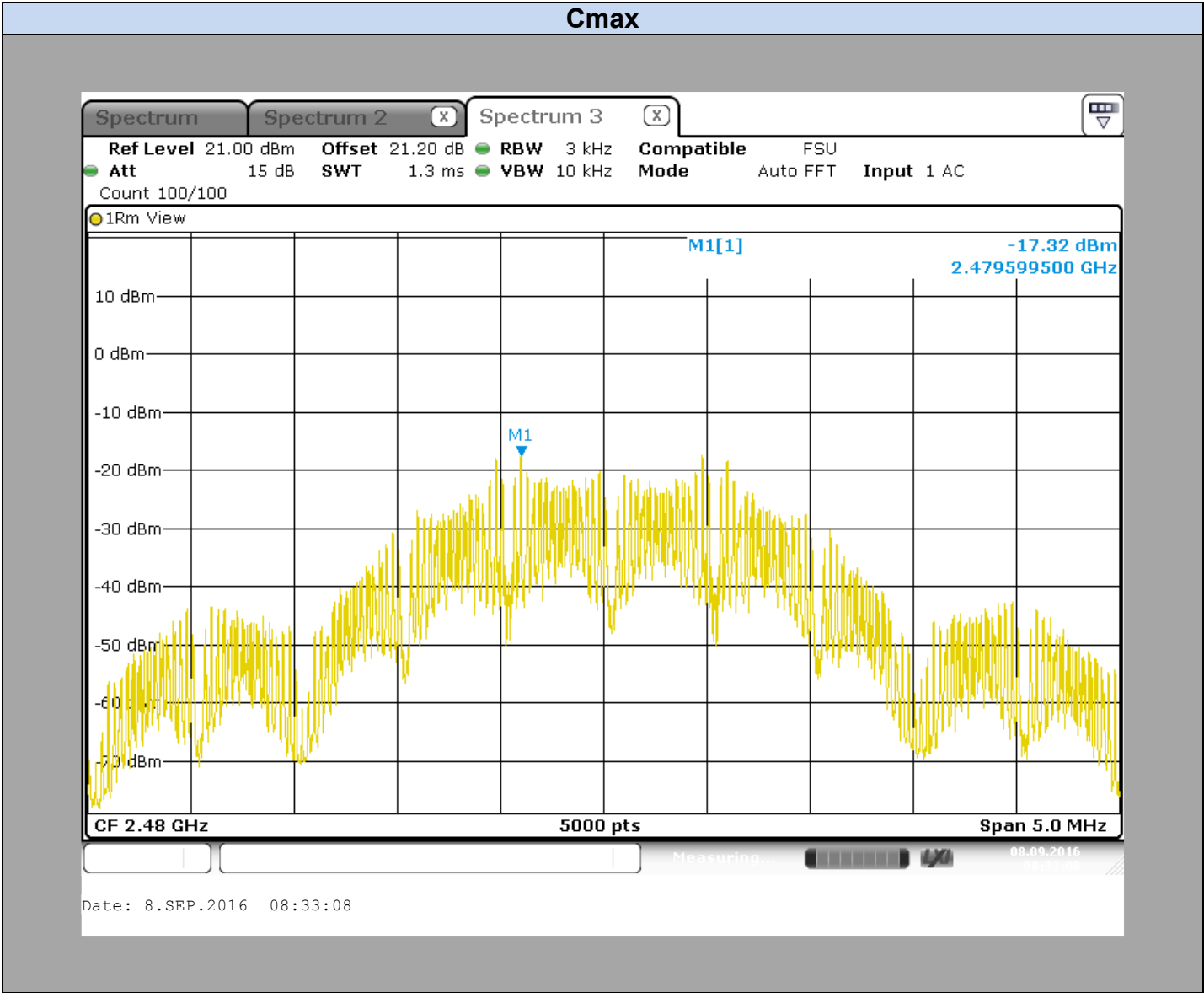
6.3. GRAPHICS & RESULTS





Cnom





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

M13			
Channel	Antenna Gain (dBi)	Power spectral density (dBm/3kHz)	Limit (dBm)
Cmin	2	-10,08	8
Cnom	2	-10,14	8
Cmax	2	-17,32	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:

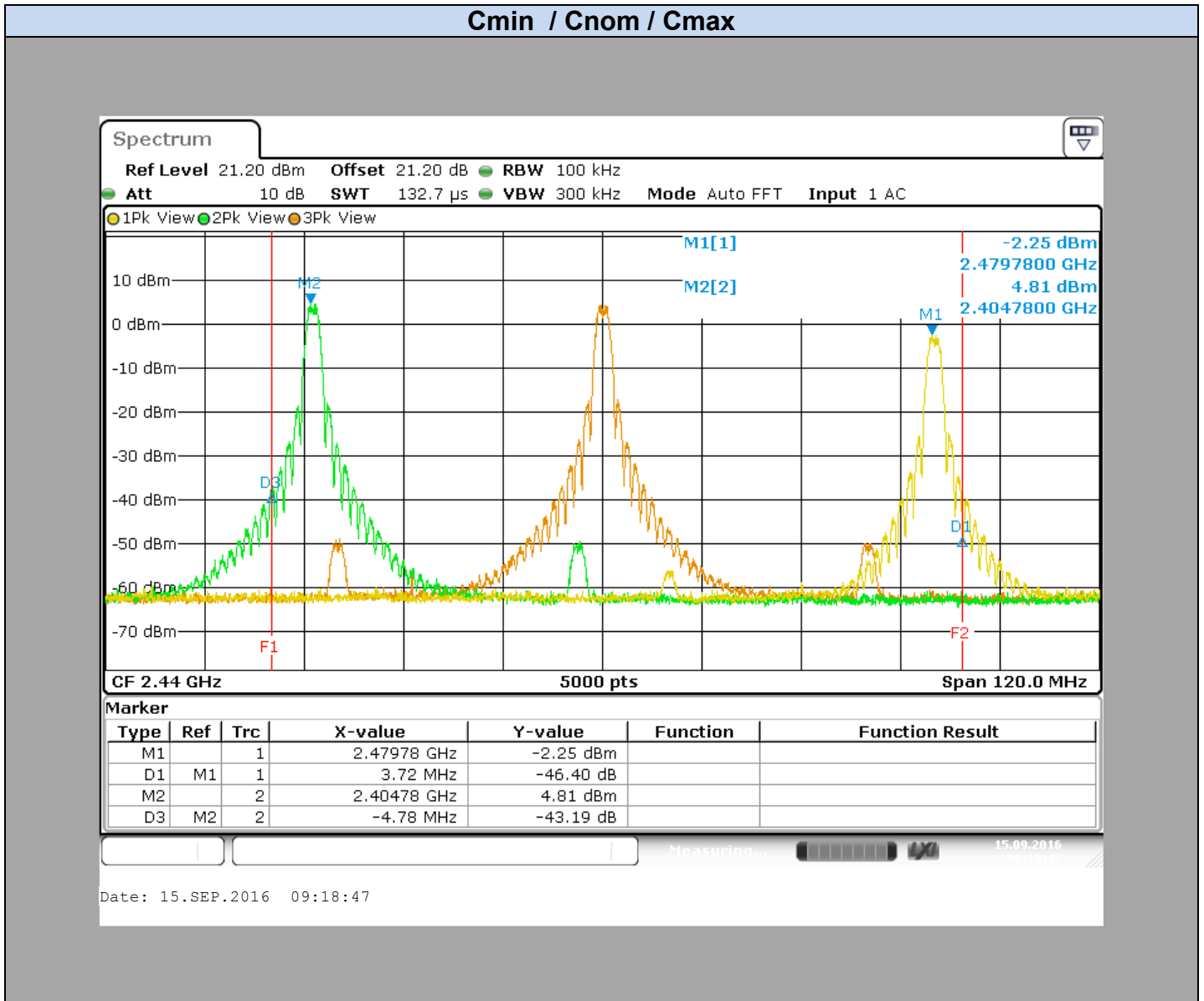
Start frequency= 2380MHz
Stop frequency= 2500MHz
span \geq 1.5 times the DTS Bandwidth
Amplitude= Sufficient to observe the signal amplitude
RBW= 100kHz
VBW \geq 300kHz
Sweep Time= Auto Couple
Detector= Peak
Trace= Max Hold



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



7.3. GRAPHICS & RESULTS



M13		
Temperature	Tnom	
Voltage	Vnom	
Conducted Spurious Emission at the Band Edge (MHz)	2400	2483,5
Spurious Level (dBc)	-43.19	-46.40

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 : 2016/07/22
Ambient temperature : 24°C
Relative humidity : 41%

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

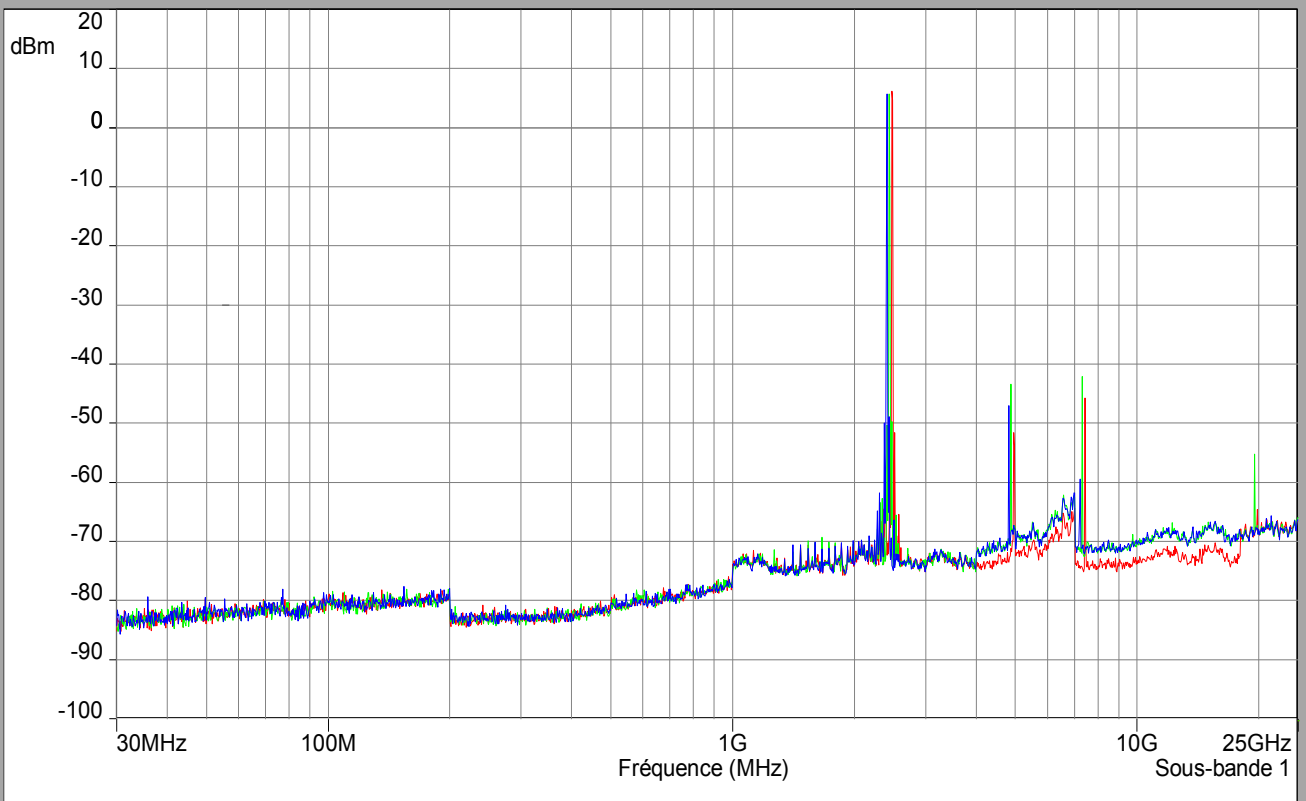
Cmin / Cnom / Cmax

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
— Cnom
— Cmax





Frequency (MHz)	Spurious Level (dBm)	Spurious Level (dBc)
4811,1	-47,002	52,662
4879,1	-43,412	49,072
4959,1	-51,618	57,823
7216,2	-59,51	65,17
7318,6	-42,101	47,761
7441,7	-45,763	51,968

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)

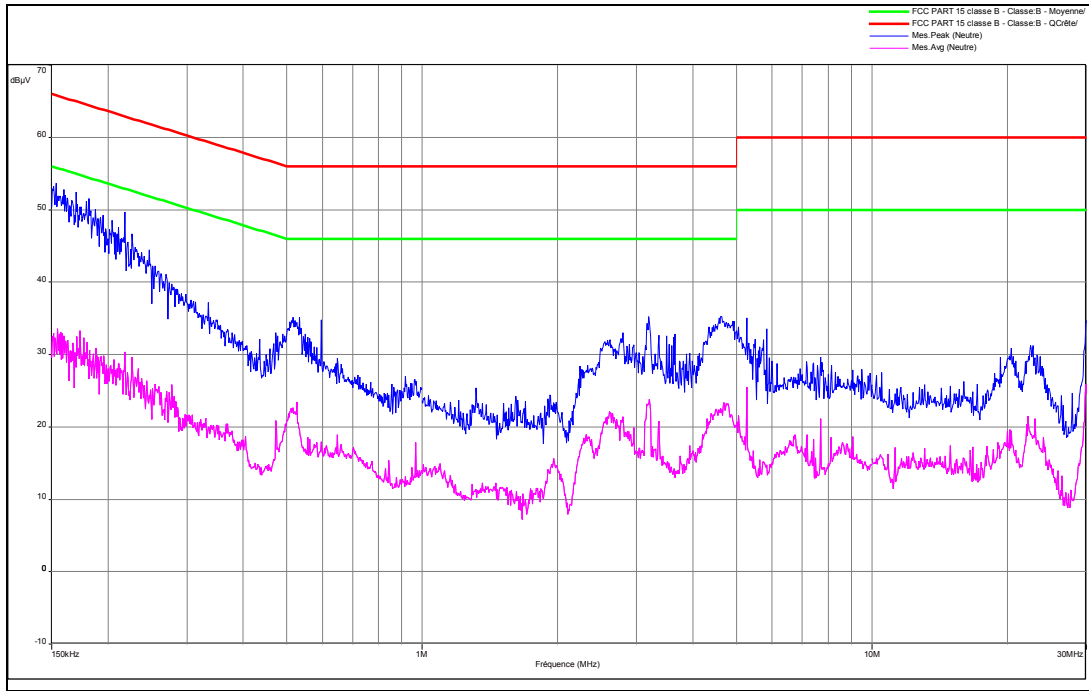


Photograph for AC Power Line Conducted Emissions (Rear view)

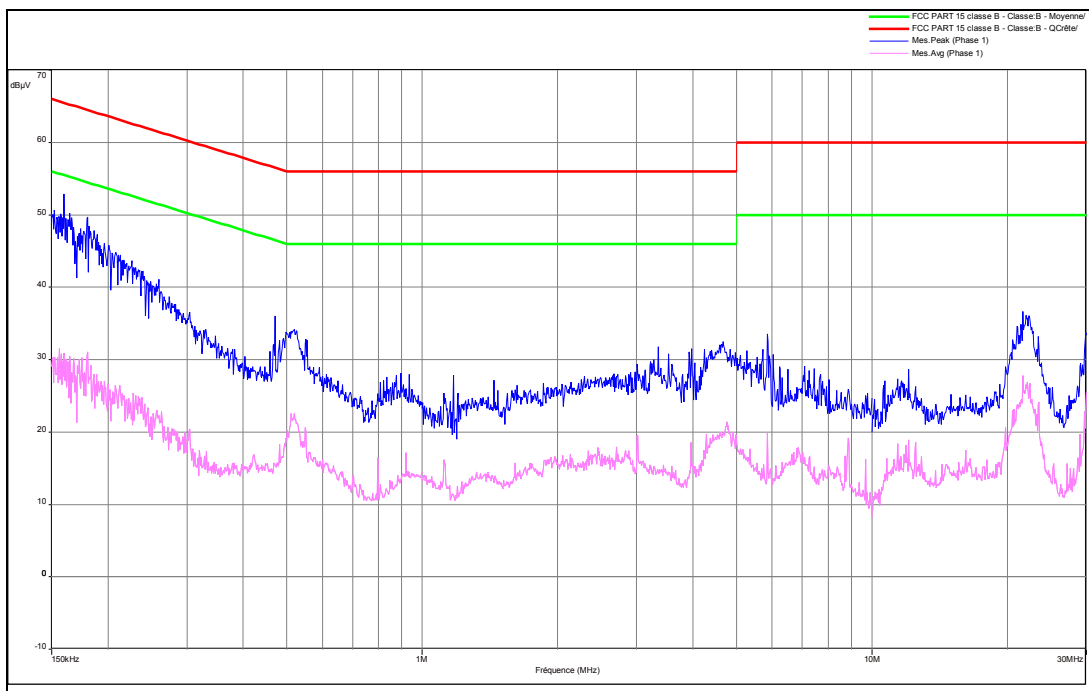


9.3. RESULTS

Phase Line – M13



Neutral Line – M13





Phase Line – M13

Frequency kHz	conducted level dB μ V			
	peak detection	Quasi peak limit	Average value	average value limit
153.3	53.6	65.8	33.2	55.8
515	35.2	56	23.4	46
3184	35.2	56	23.7	46
22262	29	60	21.4	50
29870	34	60	25.5	50

Neutral Line – M13

Frequency kHz	conducted level dB μ V			
	peak detection	Quasi peak limit	Average value	average value limit
159.5	52.8	65.5	31.6	65.5
519	34	56	21.7	46
4656	31.7	56	21.5	46
21675	36.6	60	27.7	50
29879	33.7	60	23.3	50

Result: PASS

Limit: → Quasi-Peak
 0,15kHz to 0,5MHz: 66dB μ V to 56dB μ V*
 0,5MHz to 5MHz: 56dB μ V
 5MHz to 30MHz: 60dB μ V

Average
 0,15kHz to 0,5MHz: 56dB μ V to 46dB μ V*
 0,5MHz to 5MHz: 46dB μ V
 5MHz to 30MHz: 50dB μ 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 5th, 2016
Ambient temperature : 22°C
Relative humidity : 39%

10.2. TEST SETUP

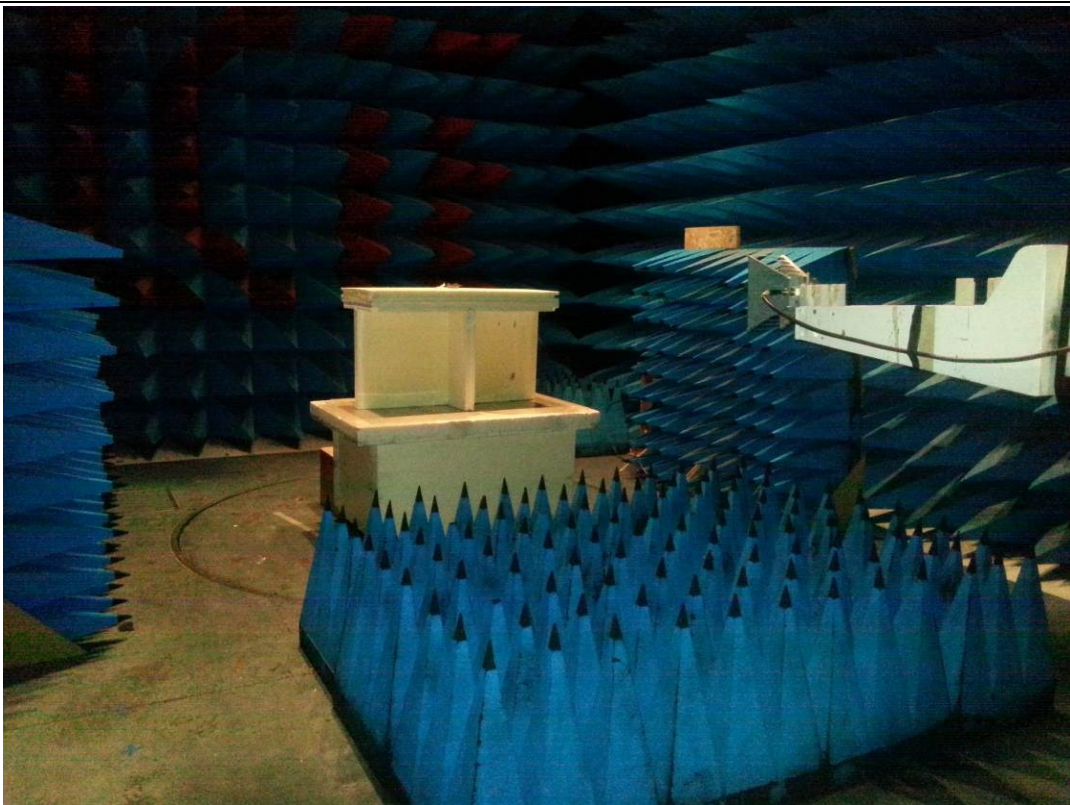
The product has been tested according to ANSI C63.10 (2013). The EUT is placed in an OATS between 30MHz to 1000MHz and in a semi-anechoic chamber between 1GHz to 26GHz. Distance between measuring antenna and the EUT is 10m. Test is performed in horizontal (H) and vertical (V) polarization with bilog 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

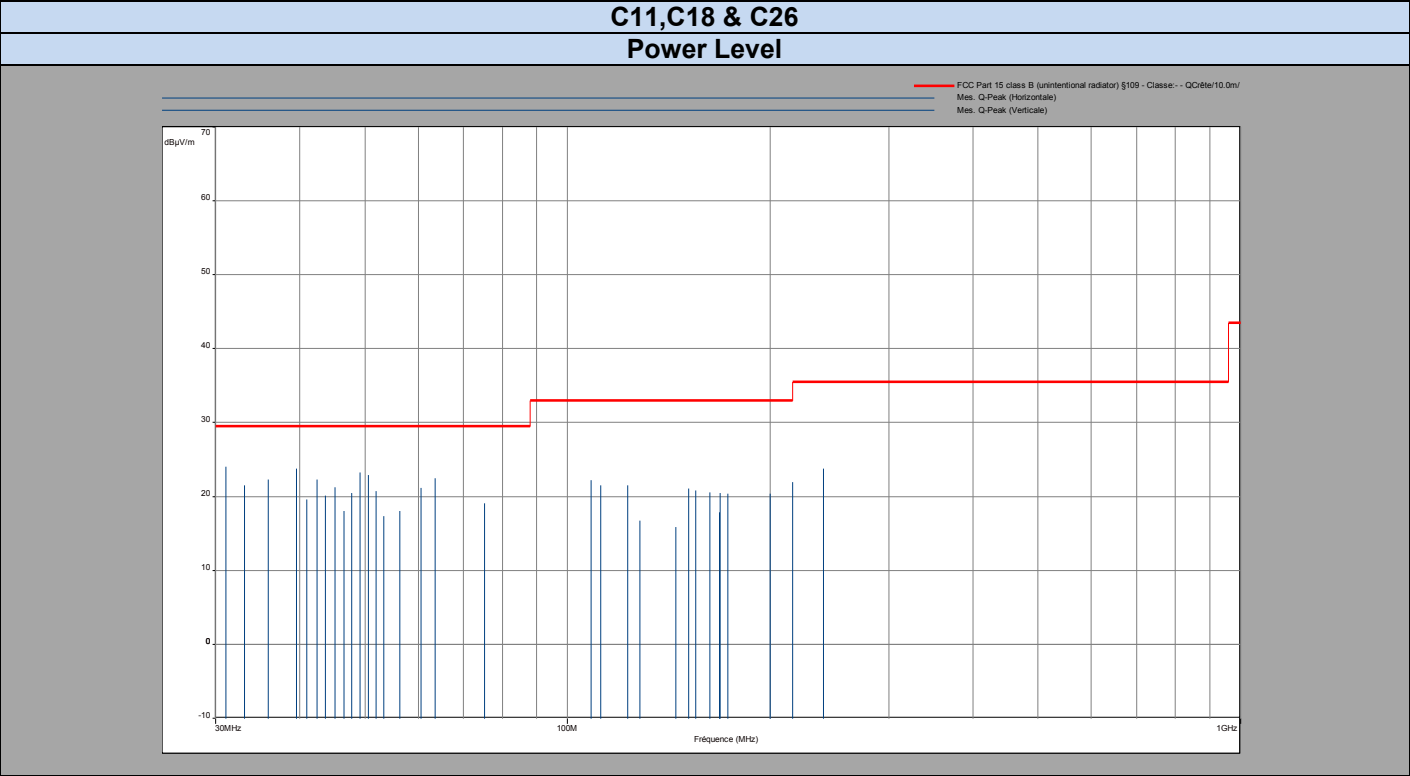


Photograph for Unwanted Emissions into Restricted Frequency Bands



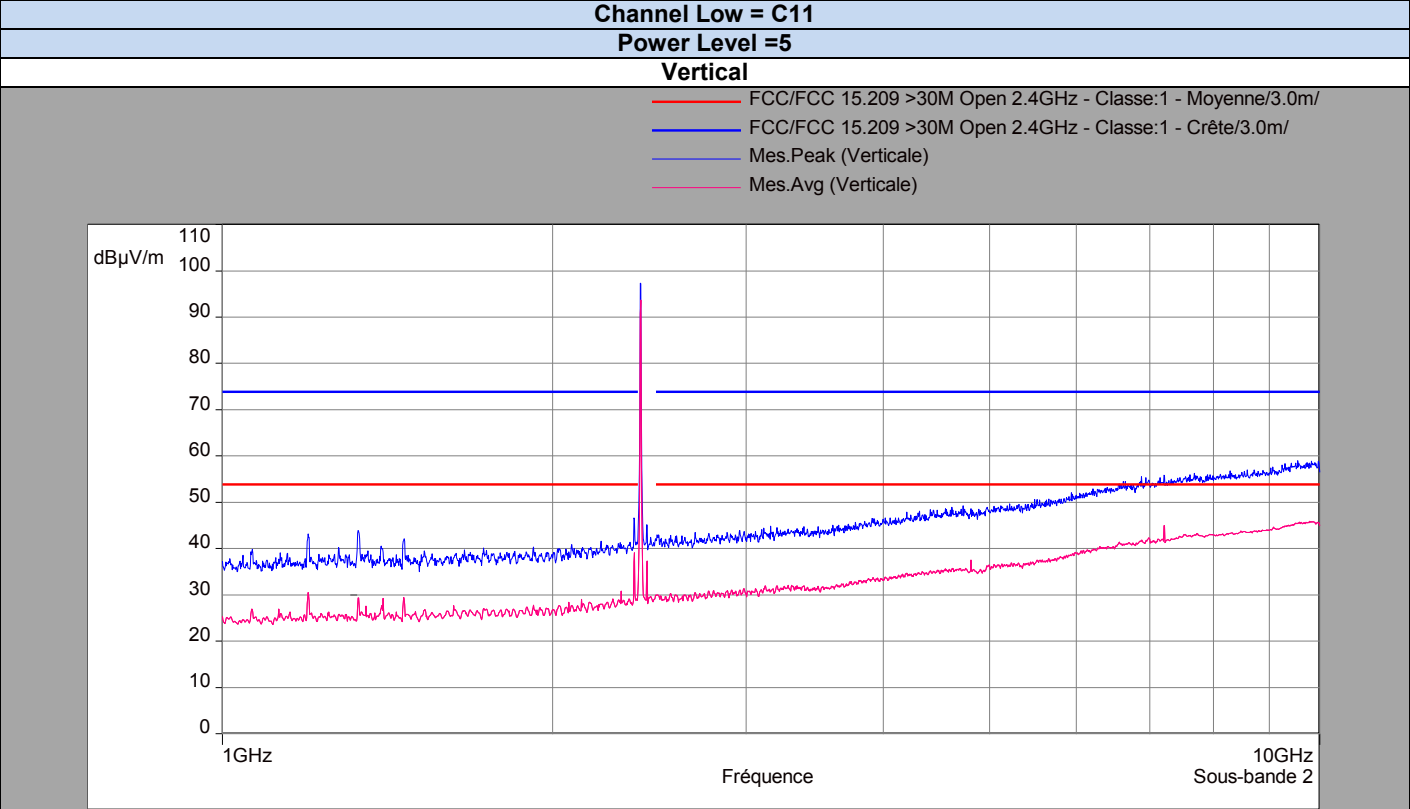
10.3. RESULTS

Below 1GHz – M13

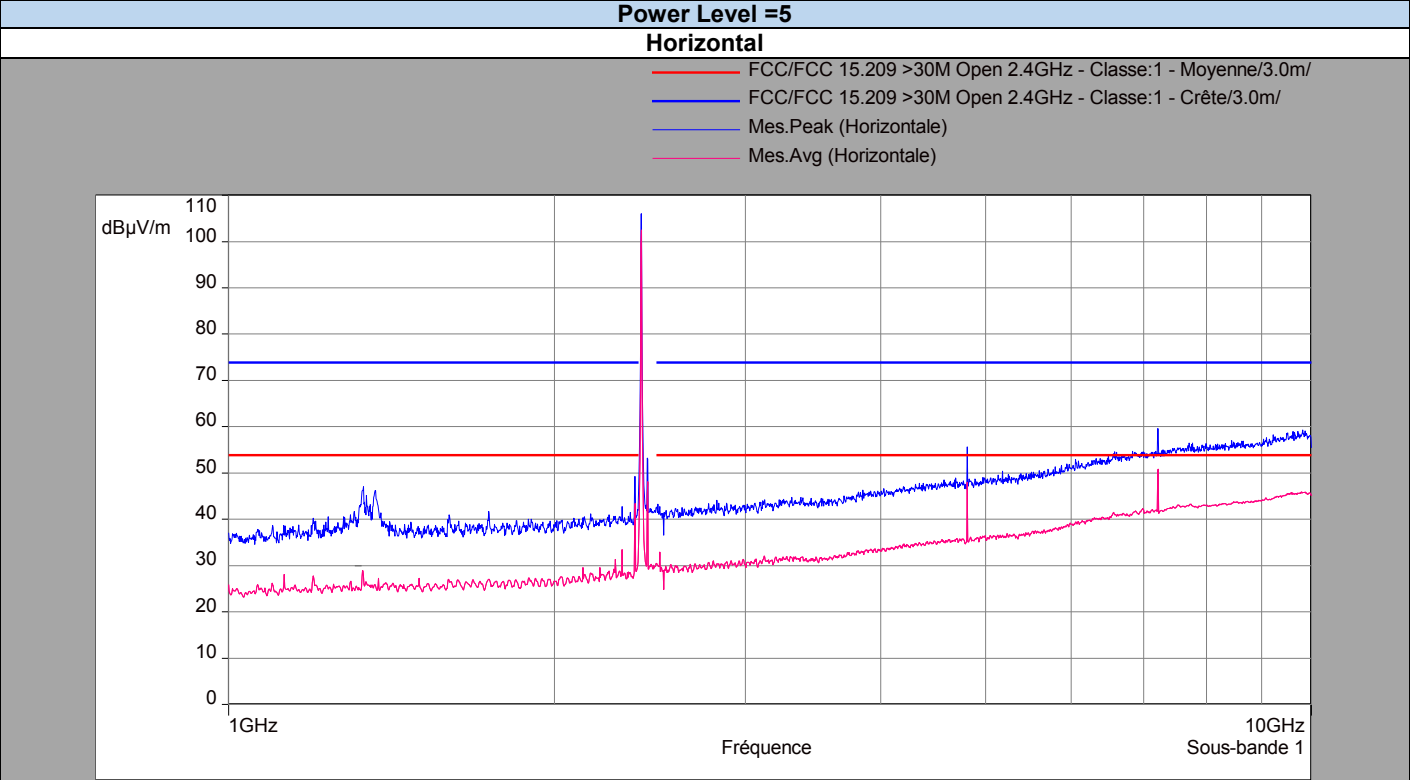




Above 1GHz – M13



No spurious has been observed between 10GHz to 26GHz



No spurious has been observed between 10GHz to 26GHz

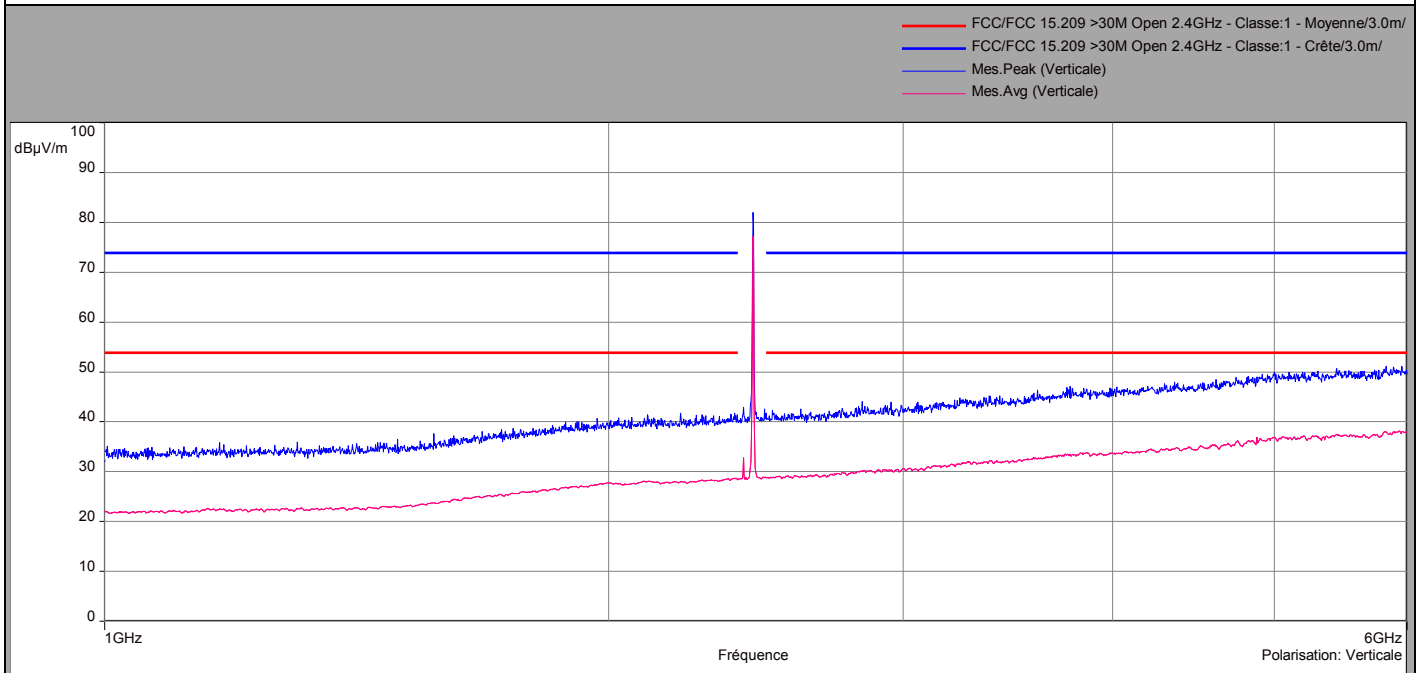


Above 1GHz – M13

Channel Low = C18

Power Level =5

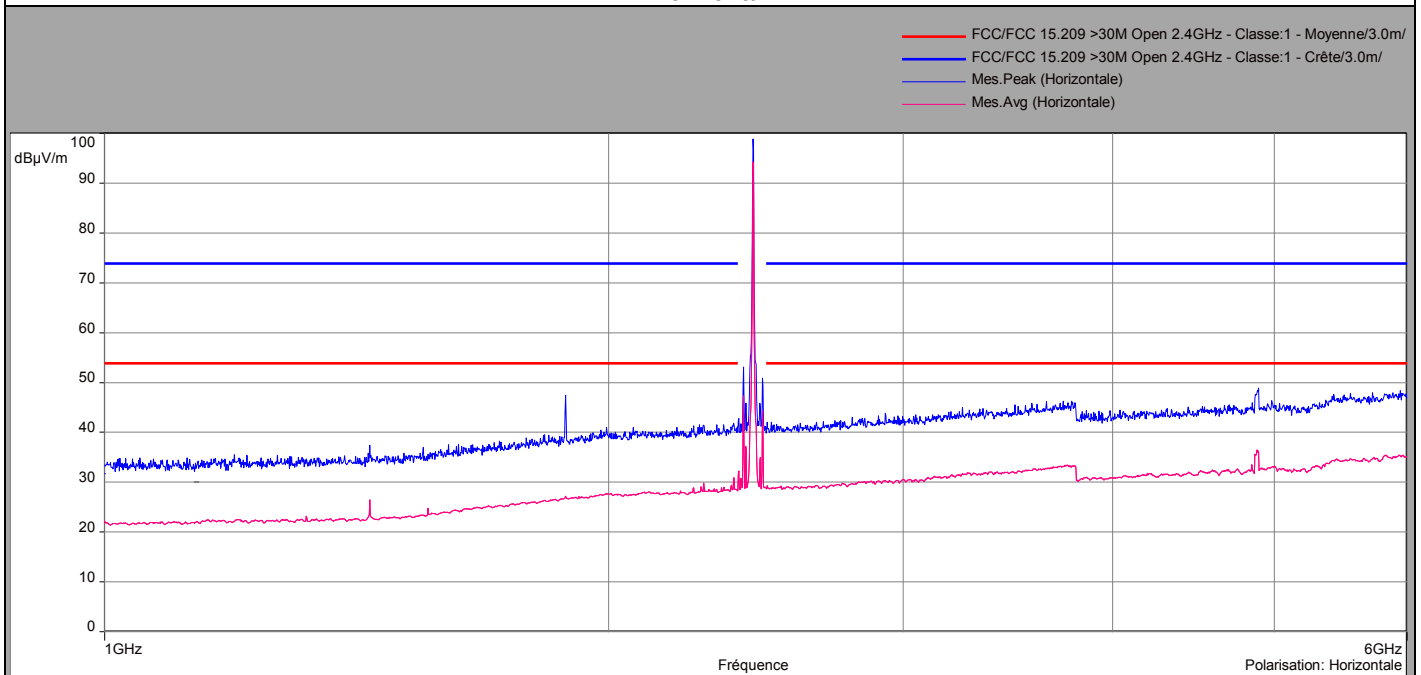
Vertical



No spurious has been observed between 6GHz to 26GHz

Power Level =5

Horizontal



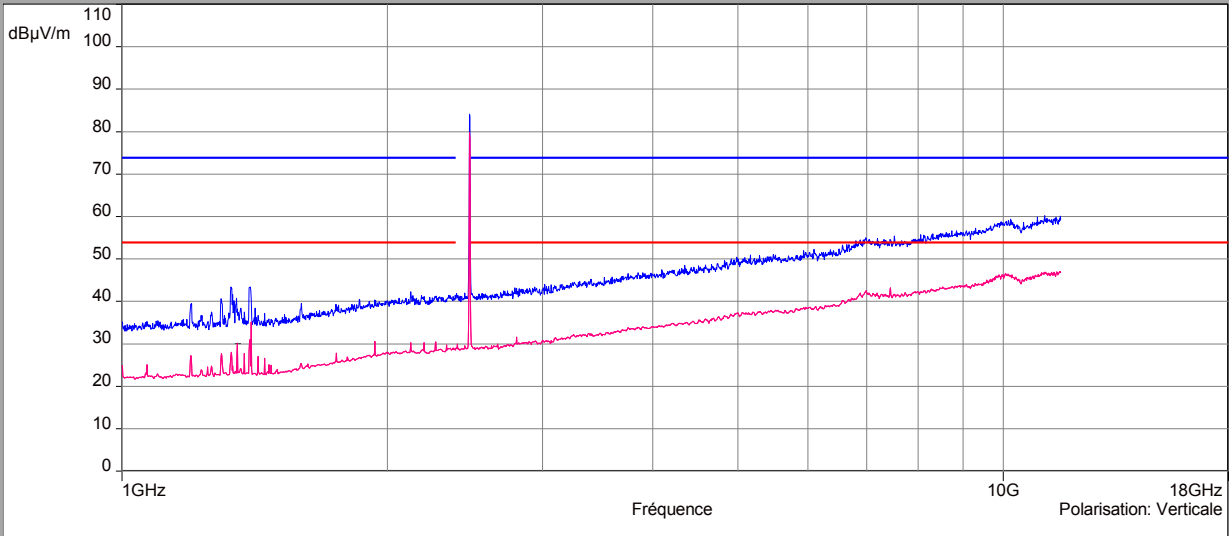
No spurious has been observed between 6GHz to 26GHz



Above 1GHz – M13

Channel High = C26
Power Level =4 with att 2.5
Vertical

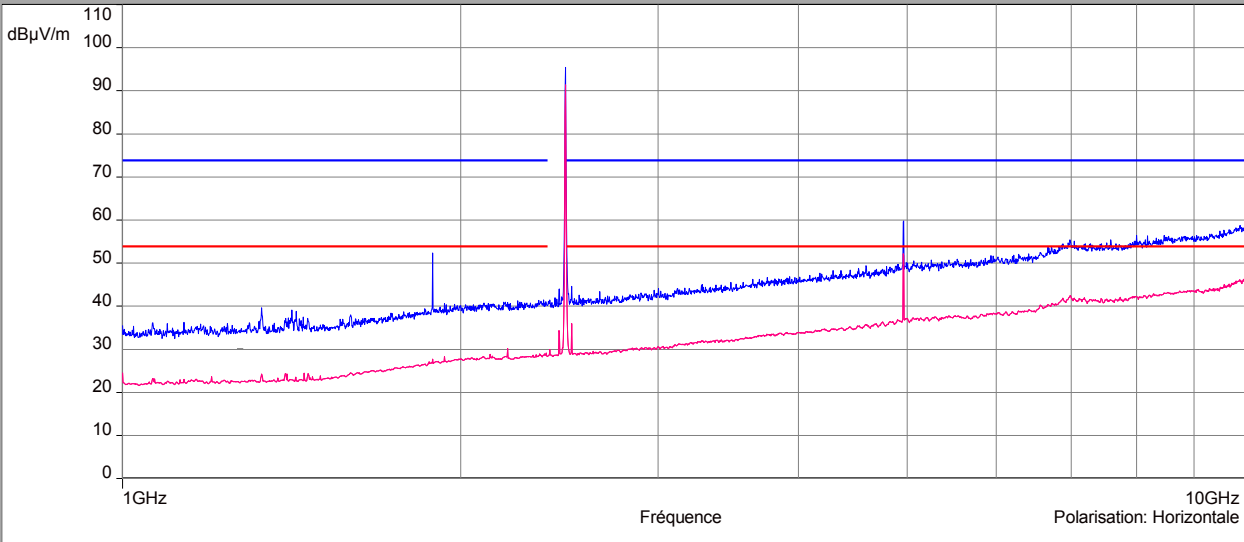
- FCC/FCC 15.209 >30M Open 2.4GHz - Classe:1 - Moyenne/3.0m/
- FCC/FCC 15.209 >30M Open 2.4GHz - Classe:1 - Crête/3.0m/
- Mes.Peak (Verticale)
- Mes.Avg (Verticale)



No spurious has been observed between 10GHz to 26GHz

Power Level =4 with att 2.5
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

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



Frequency MHz	Level measured QPeak Level dBµV/m	Limit level FCC Part.15 class B
31.1	24	29.5
39.6	23.8	29.5
49.52	23.2	29.5
108.3	22.2	33
240	23.8	35.5

Characterization in a semi 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	1197.5	30.53	53.9	43.17	73.9
Horizontal	1332	28.89	53.9	47.02	73.9
Horizontal	1367.5	27.02	53.9	46.19	73.9
Vertical	1395	29.19	53.9	40.59	73.9
Vertical	1463	29.47	53.9	42.12	73.9
Horizontal	2309	33.38	53.9	42.80	73.9
Horizontal	2390	31.84	53.9	42.81	73.9
Vertical	2390	29.06	53.9	40.52	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	29.48	53.9	40.01	73.9
Vertical	2390	27.59	53.9	39.95	73.9
Horizontal	2483.5	27.99	53.9	40.12	73.9
Vertical	2483.5	28.75	53.9	41.23	73.9



Channel High = C26

Polarisation	Frequency (MHz)	Average Level (dBµV/m)	Average Limit (dBµV/m)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)
Vertical	1062.5	27.05	53.9	42.60	73.9
Vertical	1197	33.51	53.9	45.43	73.9
Vertical	1332	30.33	53.9	46.48	73.9
Vertical	1399	32.07	53.9	43.29	73.9
Vertical	1595.5	28.03	53.9	42.93	73.9
Vertical	2125	31.44	53.9	40.77	73.9
Horizontal	2483.5	53.47	53.9	63.07	73.9
Vertical	2483.5	40.03	53.9	50.74	73.9
Vertical	2625	34.24	53.9	43.11	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
Open test site	LCIE	-	F2000400	2016-05	2017-05
EMI Test Receiver	ROHDE & SCHWARZ	ESU	A2642018	2016-03	2017-03
Preamplifier	HELVETT PACKARD	8449B	A7080071	2016-01	2017-01
Bilog antenna	CHASE	CBL 6112A	C2040040	2016-01	2017-01
Horn	EMCO	3115	C2042016	2016-01	2017-01
Cable	-	-	A5329542	2016-03	2017-03
Cable	-	-	A5329449	2015-10	2016-10
Cable	-	-	A5329368	2016-05	2017-05
Cable	-	-	A5329444	2015-10	2016-10
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 $\pm y(\text{dB})$
TRANSMITTER REQUIREMENTS		
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"> • Frequency < 1000 MHz • Frequency > 1000 MHz 	$\pm 3.9 \text{ dB}$ $\pm 3.1 \text{ dB}$	$\pm 6 \text{ dB}$
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	$\pm 2.5 \%$	$\pm 10 \%$
RECEIVER REQUIREMENTS		
Spurious emissions <ul style="list-style-type: none"> • Frequency < 1000 MHz • Frequency > 1000 MHz 	$\pm 3.9 \text{ dB}$ $\pm 3.1 \text{ dB}$	$\pm 6 \text{ dB}$