



## TEST REPORT

Number  
Composition of document

FCC Registration Number  
Industry Canada Number

### Standards

### Issued to

### Apparatus under test

Trade mark  
Manufacturer  
Type  
Serial number  
IC  
FCC ID

## RADIO

139112-680504A  
72 pages

166175 (FAR) or 888863 (Ecuelles)  
6230B

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

NXP Semiconductors  
2 Esplanade Anton Philips  
14906 Caen Cedex 9  
FRANCE  
NXP Semiconductors

JN5179-001-M00 & JN5179-001-RPSMA  
NXP  
NXP Semiconductors  
JN5179-001-M00 & JN5179-001-RPSMA  
No serial number  
8764A-JN5179M0  
XXMJN5179M0

### Test date

2015/12/23 & 2015/12/24, 2015/12/18 & 2016/03/14

### Tests performed by

Armand MAHOUNGOU

### Test site

Fontenay aux Roses/ Ecuelles

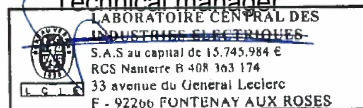
### Date of issue

2016/04/01

Written by :  
**Armand MAHOUNGOU**  
Tests operator

Approved by :  
**Stéphane PHOUDIAH**

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 v03r04

| Standard Section                                                                    | Test Description                                       | TEST RESULT - Comments                                               |
|-------------------------------------------------------------------------------------|--------------------------------------------------------|----------------------------------------------------------------------|
| RSS-Gen § 6.6                                                                       | Occupied Bandwidth                                     | PASS                                                                 |
| CFR 47 § 15.247 (a) (2)<br>RSS-247 § 5.2 (1)                                        | -6dB Bandwidth                                         | PASS                                                                 |
| CFR 47 § 15.247 (b)<br>RSS-247 § 5.4 (4)                                            | Maximum Output Power                                   | PASS                                                                 |
| CFR 47 § 15.247 (e)<br>RSS-247 § 5.2 (2)                                            | Power Spectral Density                                 | PASS                                                                 |
| CFR 47 § 15.247 (d)<br>RSS-247 § 5.5                                                | Conducted Spurious Emission at the Band Edge           | PASS                                                                 |
| CFR 47 § 15.247 (d)<br>RSS-247 § 5.5                                                | Unwanted Emissions into Non-Restricted Frequency Bands | PASS                                                                 |
| CFR 47 § 15.207<br>RSS-Gen § 8.8                                                    | AC Power Line Conducted Emissions                      | PASS                                                                 |
| CFR 47 § 15.209 (a)<br>CFR 47 § 15.205 (a)<br>CFR 47 § 15.247 (d)<br>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. EQUIPMENT OF THE SAME FAMILY

| Model            | RF mode          | Power supply    | Test performed                                                                                                                                                                                                               |
|------------------|------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| JN5179-001-M00   | Integral antenna | 3.3Vdc (Note 1) | Unwanted emission into the restricted frequency bands<br>AC power line conducted emissions                                                                                                                                   |
|                  |                  | 6Vdc (Note 1)   | Unwanted emission into the restricted frequency bands<br>AC power line conducted emissions                                                                                                                                   |
| JN5179-001-RPSMA | SMA-RP connector | 3.3Vdc (Note 1) | Occupied bandwidth<br>-6dB bandwidth<br>Maximum conducted power<br>Power spectral density<br>Unwanted emission into non-restricted frequency bands at the band edge<br>Unwanted emission into non-restricted frequency bands |
|                  |                  | 6Vdc (Note 1)   | Occupied bandwidth<br>-6dB bandwidth<br>Maximum conducted power<br>Power spectral density<br>Unwanted emission into non-restricted frequency bands at the band edge<br>Unwanted emission into non-restricted frequency bands |

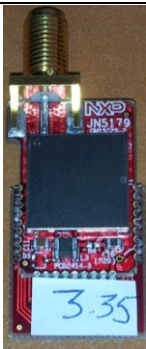
Note 1: The hardware difference between 3.3V and 6V power supplied versions only differ with the following component(s) : R4 ( 0 ohm) is not connected on the 3.3V power supplied versions. Other parts are identical.

2.2. HARDWARE & SOFTWARE IDENTIFICATION

• Equipment under test (EUT):



JN5179-001-M00 (3.3Vdc)



JN5179-001-RPSMA (3.3Vdc)



JN5179-001-M00 (6Vdc)

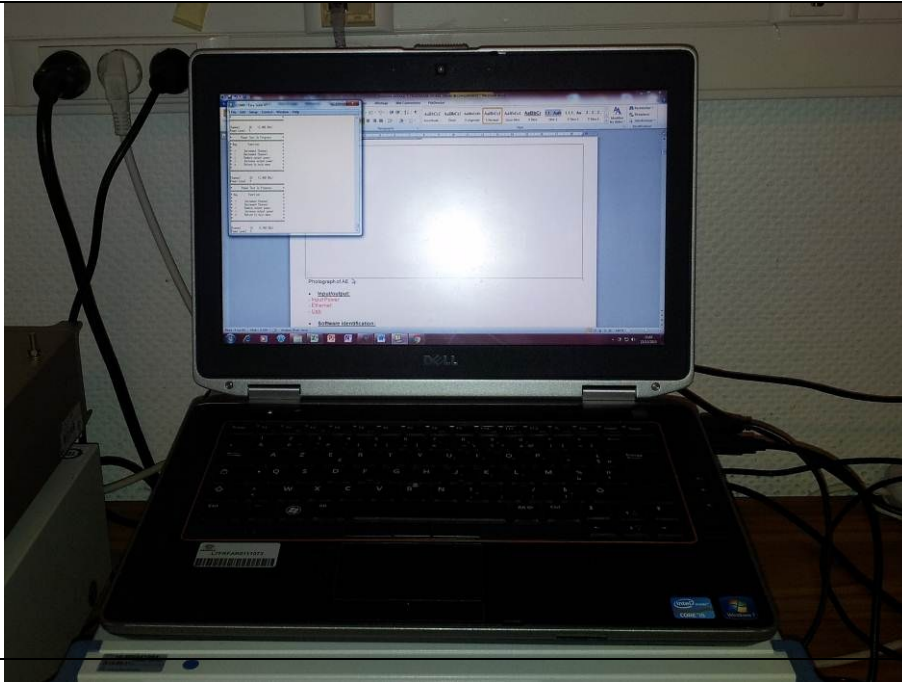


JN5179-001-RPSMA (6Vdc)

Photograph of EUT Electronic Board



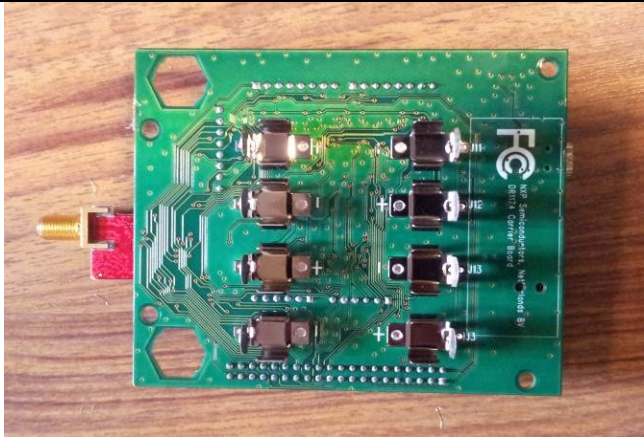
- **Auxiliary equipment (AE) used for testing:**



Photograph of AE



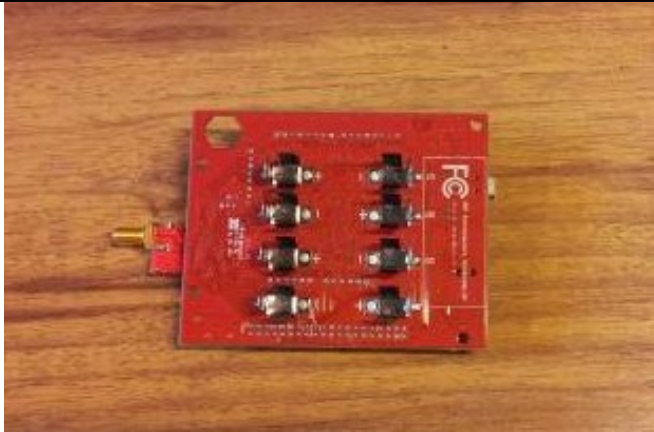
Front face (USB cable 3.3V)



Back face (USB cable 3.3V)



Front face (Power supply 6V)



Front face (Power supply 6V)



USB cable



Power supply

Photograph of AE



- **Input/output:**

- Input Power
- Usb

- **Software identification:**

--Software version: CMET 4.2

- **Equipment information:**

- Modulation technology: DSSS modulation

- Transmit operating mode: ☒ Single antenna

- Number of transmit chains: ☒ 1

- Number of receiver chains: ☒ 1

- Antenna type: ☒ Integral (JN5179-001-M00) ☒ External (JN5179-001-RPSMA)

- Beamforming gain: ☐ Yes ☒ No

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

- Test source voltage1: 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.

- Test source voltage2: Vnom: ☐ 120V/60Hz ☒ 6 Vdc

Note: the mother board is connected to the PC with USB only for control. An extra board connected to the 110V main supply generates the 6V voltage that supplies the mother board and the JN5179 module.

- Type of power source: ☐ Battery (Alkaline/Lithium-Ion/Lead acid/Other) ☐ Internal power supply  
☒ External power supply ☐ Car Charger

- Duty Cycle: ☐ Continuous duty ☐ Intermittent duty ☒ Continuous operation

- Equipment type: ☐ Representative production model ☒ Pre-production model



- Antenna Characteristics:

| Declared Antenna Gain (dBi) |
|-----------------------------|
| 0.86                        |

- 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

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

The following procedure is used to set the equipment:

- CMET for Certification JN5179-.doc



2.4. EQUIPEMENT LABELLING

|                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br><b>JN5179-001-M00</b><br>FCC ID:XXMJN5179M0<br>IC ID:8764A-JN5179M0<br> 0081 | <br><b>JN5179-001-RPSMA</b><br>FCC ID:XXMJN5179M0<br>IC ID:8764A-JN5179M0<br> 0081 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

2.5. EQUIPMENT MODIFICATIONS

The power on channel 26 was reduced: Setting -> 4

### 3. OCCUPIED BANDWIDTH

#### 3.1. TEST CONDITIONS

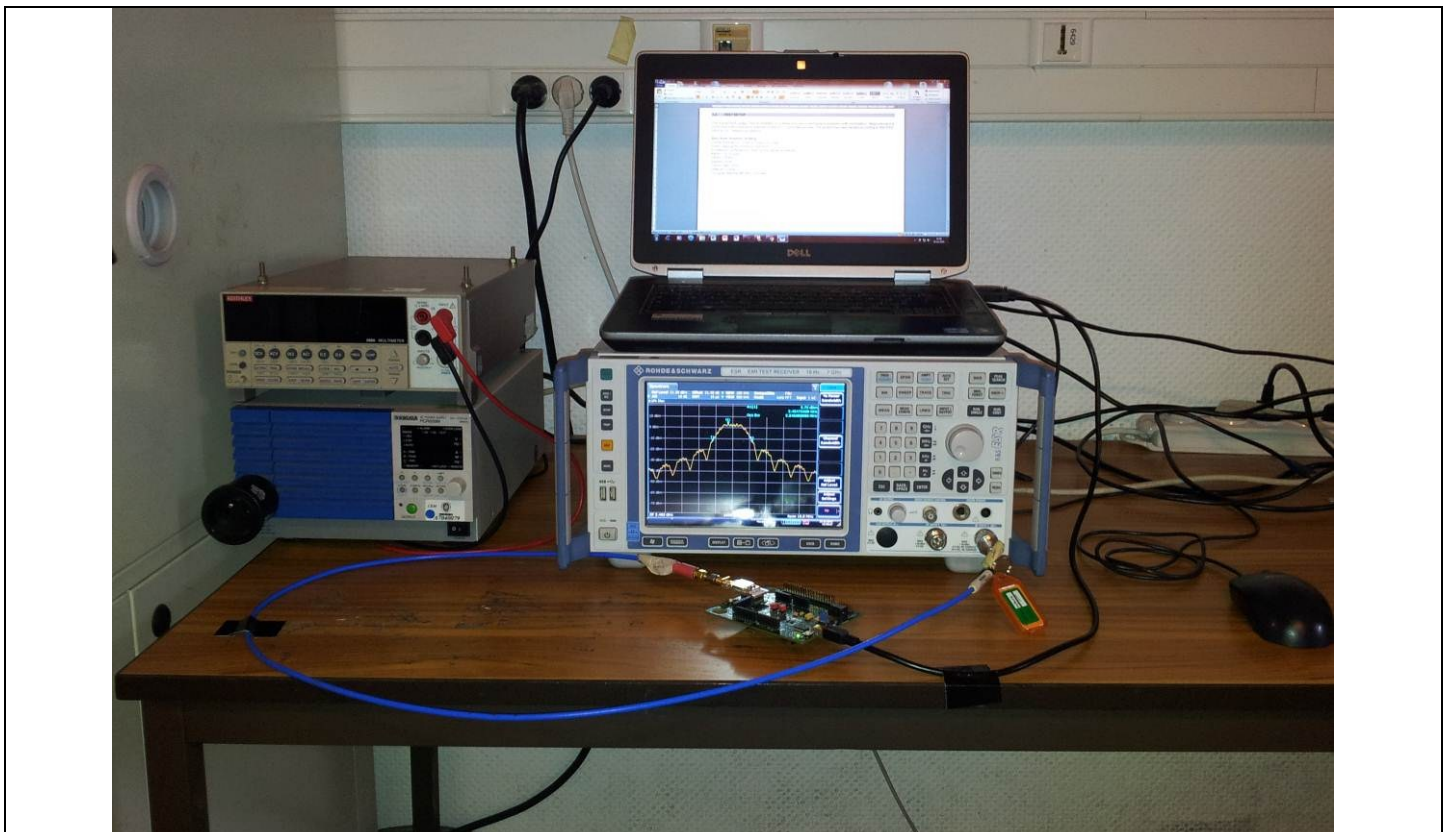
Test performed by : Armand MAHOUNGOU  
Date of test : 2015/12/23  
Ambient temperature : 24°C  
Relative humidity : 47%

#### 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.

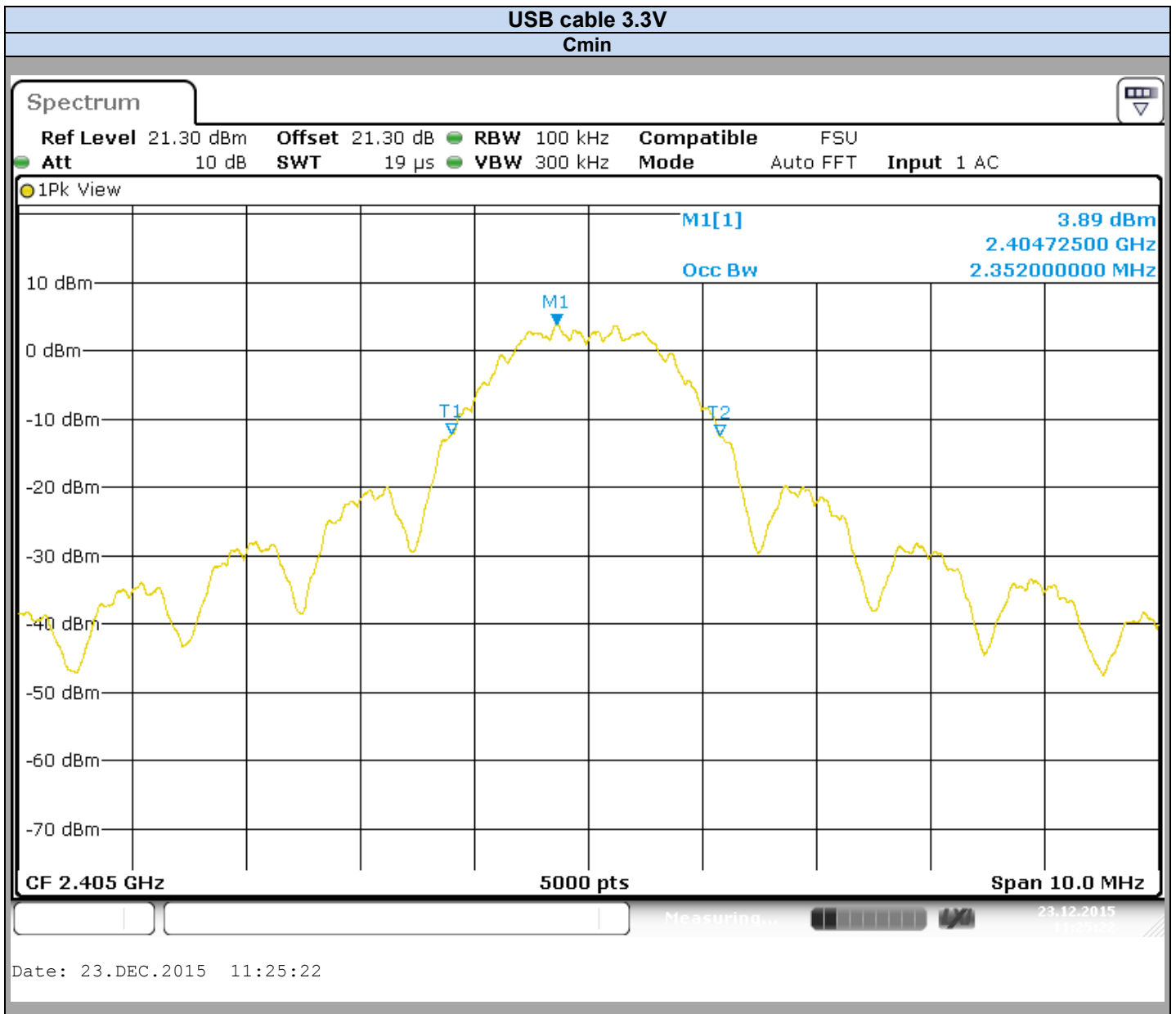
##### **Spectrum Analyzer Setting:**

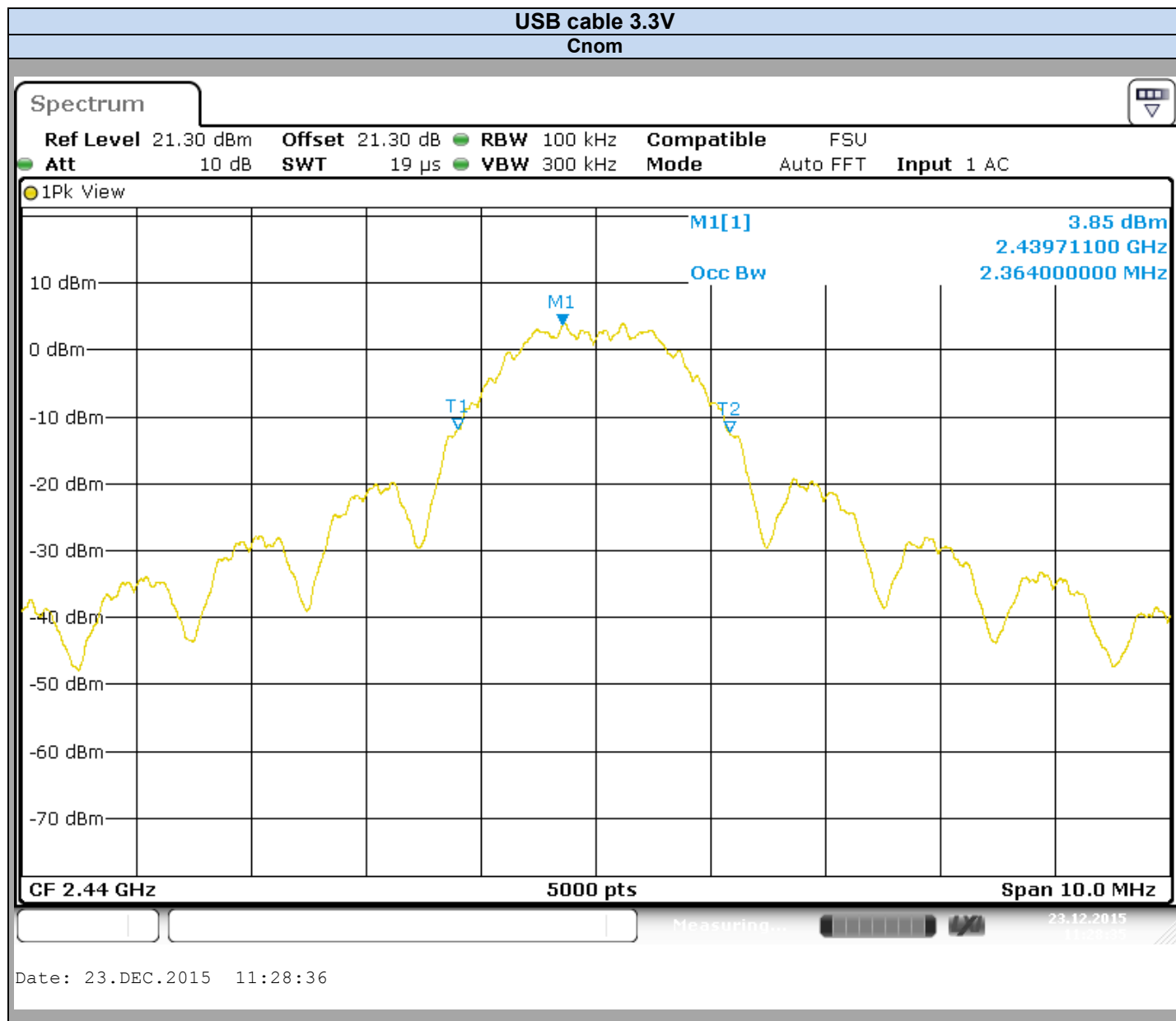
Center frequency= Cmin or Cnom or Cmax  
Span= Above the emission spectrum  
Amplitude= Sufficient to observe the signal amplitude  
RBW= 1% of span  
VBW  $\geq 3 \times$  RBW  
Sweep= Auto  
Trace= Max Hold  
Detector= Peak  
Occupied Bandwidth 99% activated

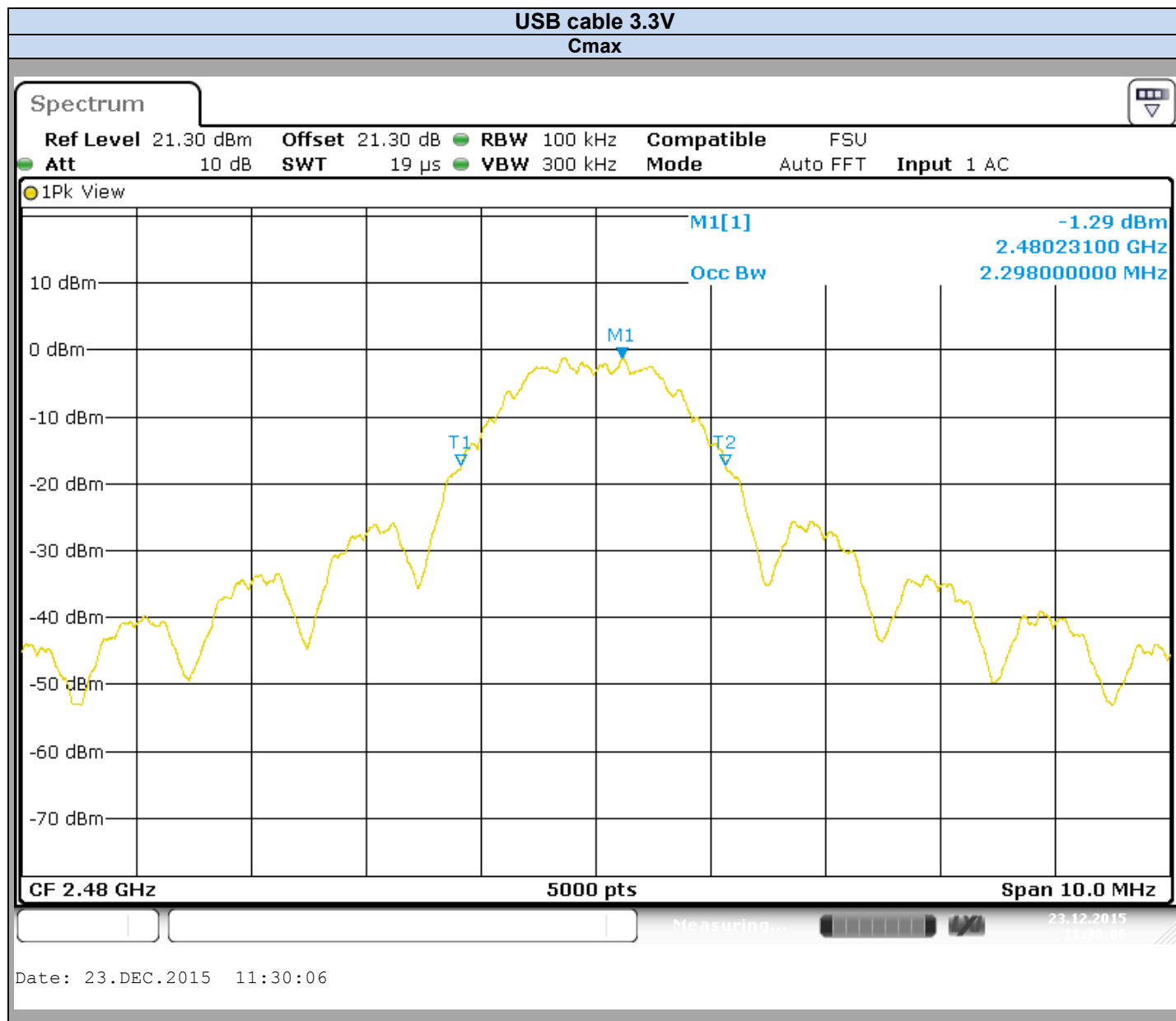


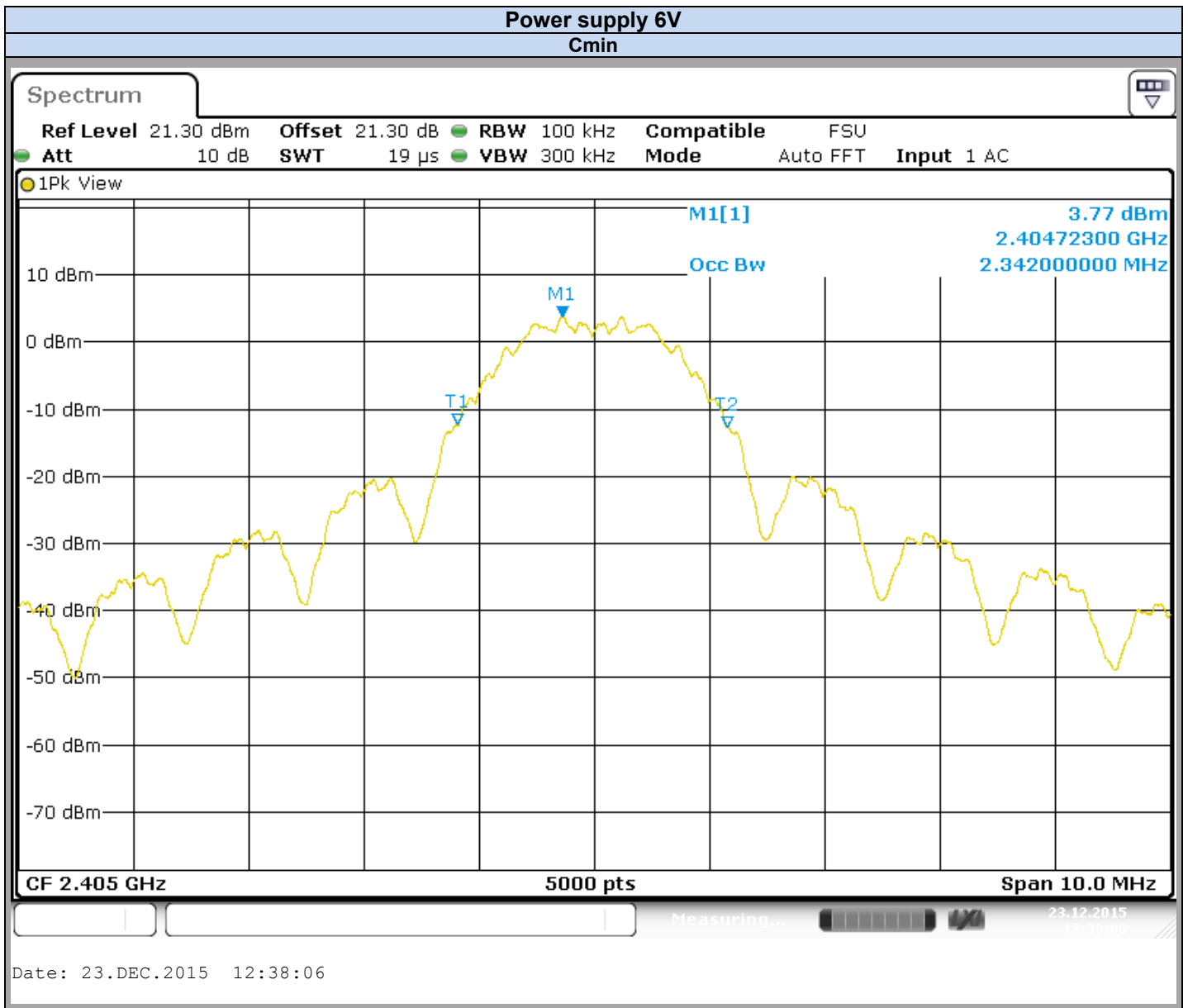
Photograph for Occupied Bandwidth

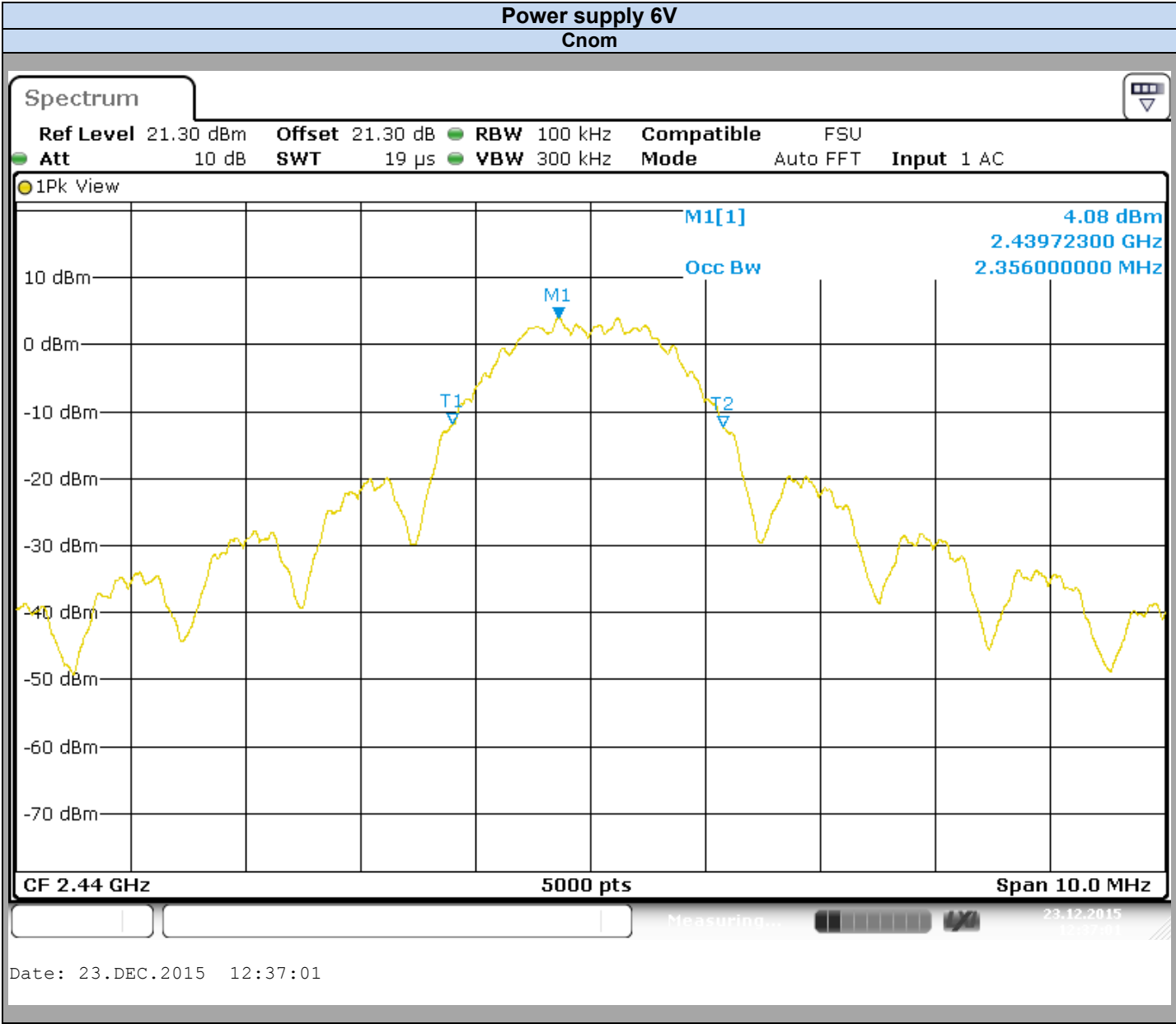
### 3.3. GRAPHICS & RESULTS

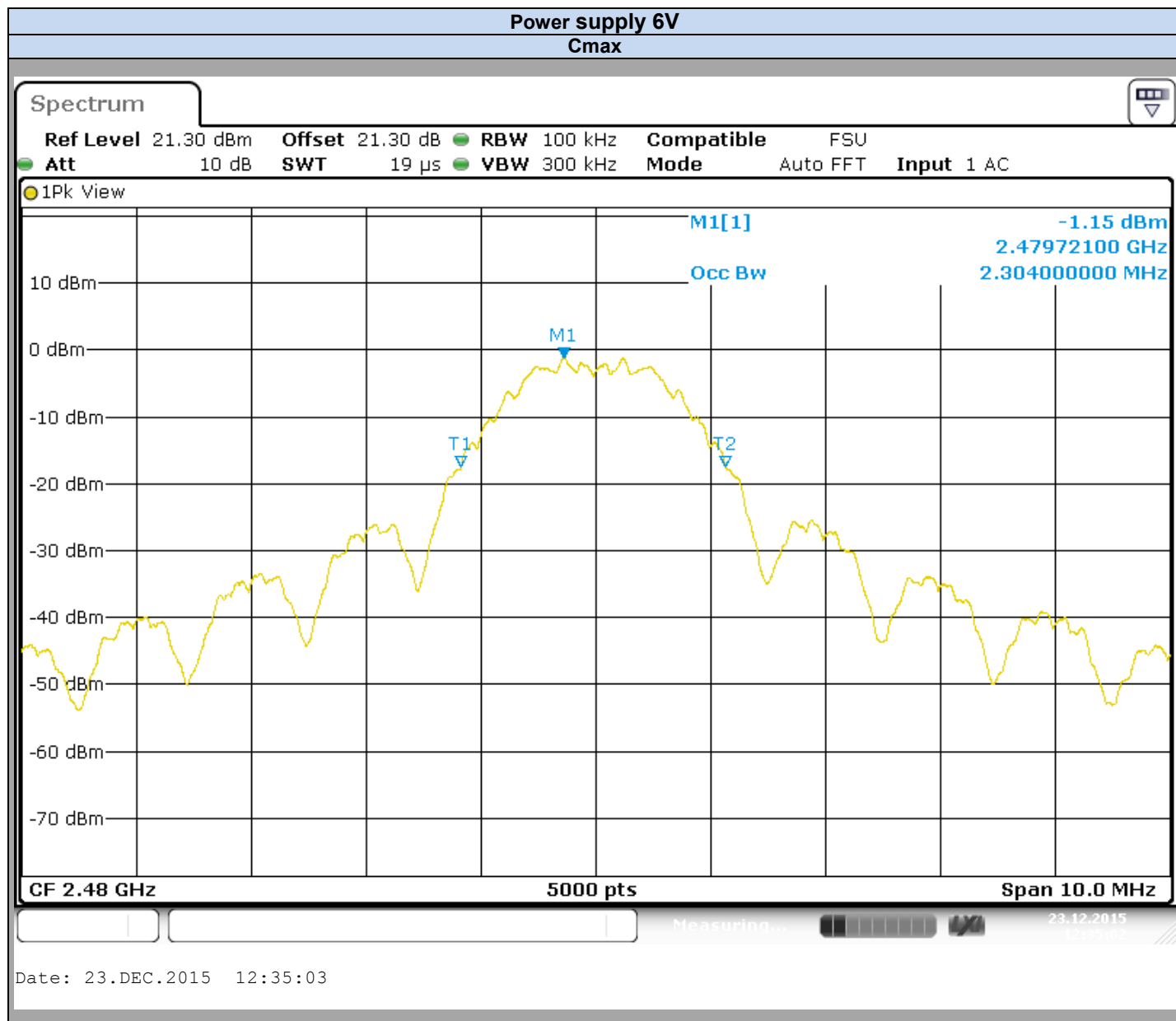














| USB cable 3.3V           |       |       |       |
|--------------------------|-------|-------|-------|
| Temperature              | Tnom  |       |       |
| Voltage                  | Vnom  |       |       |
| Frequency                | Cmin  | Cnom  | Cmax  |
| Occupied Bandwidth (MHz) | 2.352 | 2.364 | 2.298 |

| Power supply 6V          |       |       |       |
|--------------------------|-------|-------|-------|
| Temperature              | Tnom  |       |       |
| Voltage                  | Vnom  |       |       |
| Frequency                | Cmin  | Cnom  | Cmax  |
| Occupied Bandwidth (MHz) | 2.342 | 2.356 | 2.304 |

Result: **PASS**  
Limit: → None



## 4. -6dB BANDWIDTH

### 4.1. TEST CONDITIONS

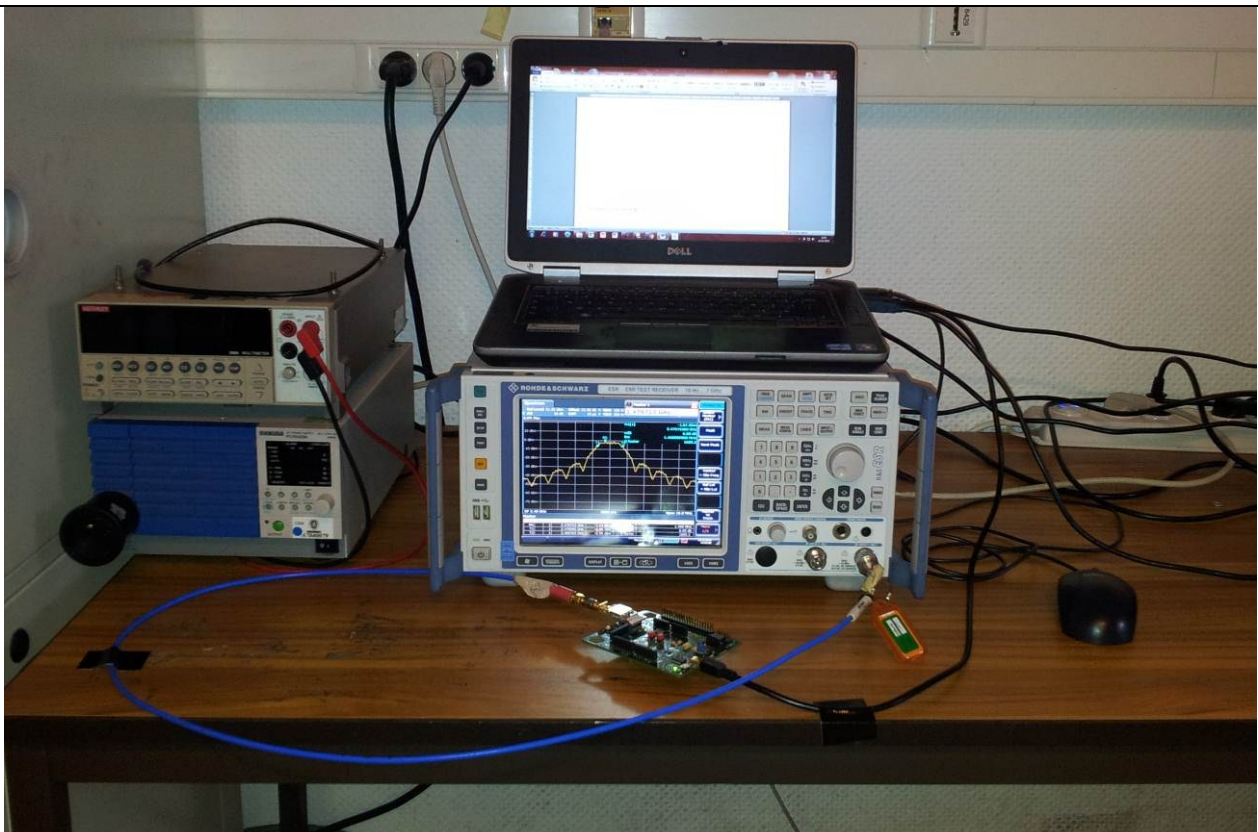
Test performed by : Armand MAHOUNGOU  
Date of test : 2015/12/23  
Ambient temperature : 24°C  
Relative humidity : 47%

### 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 v03r04 § 8.1 Option 1.

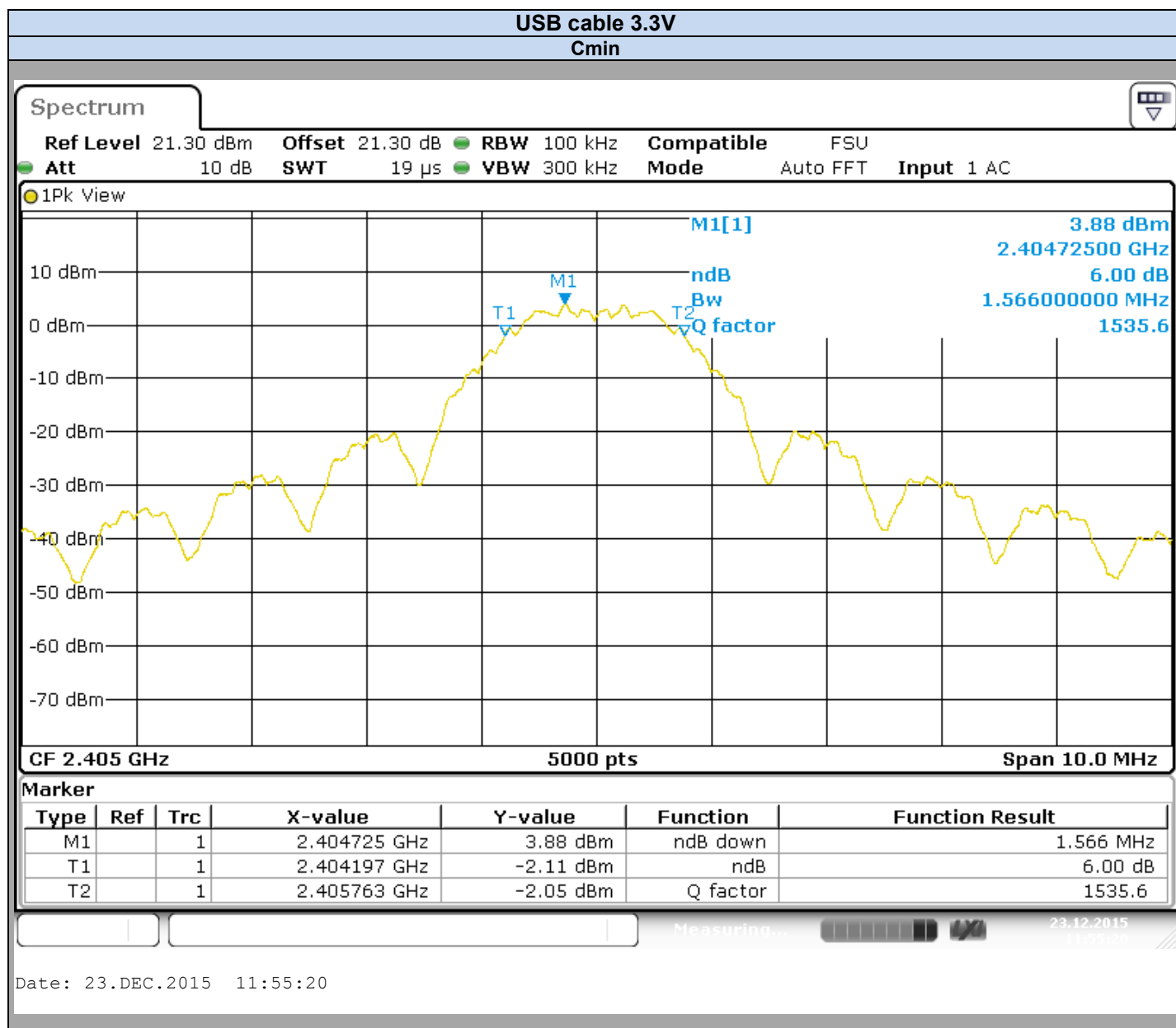
#### Spectrum Analyzer Setting:

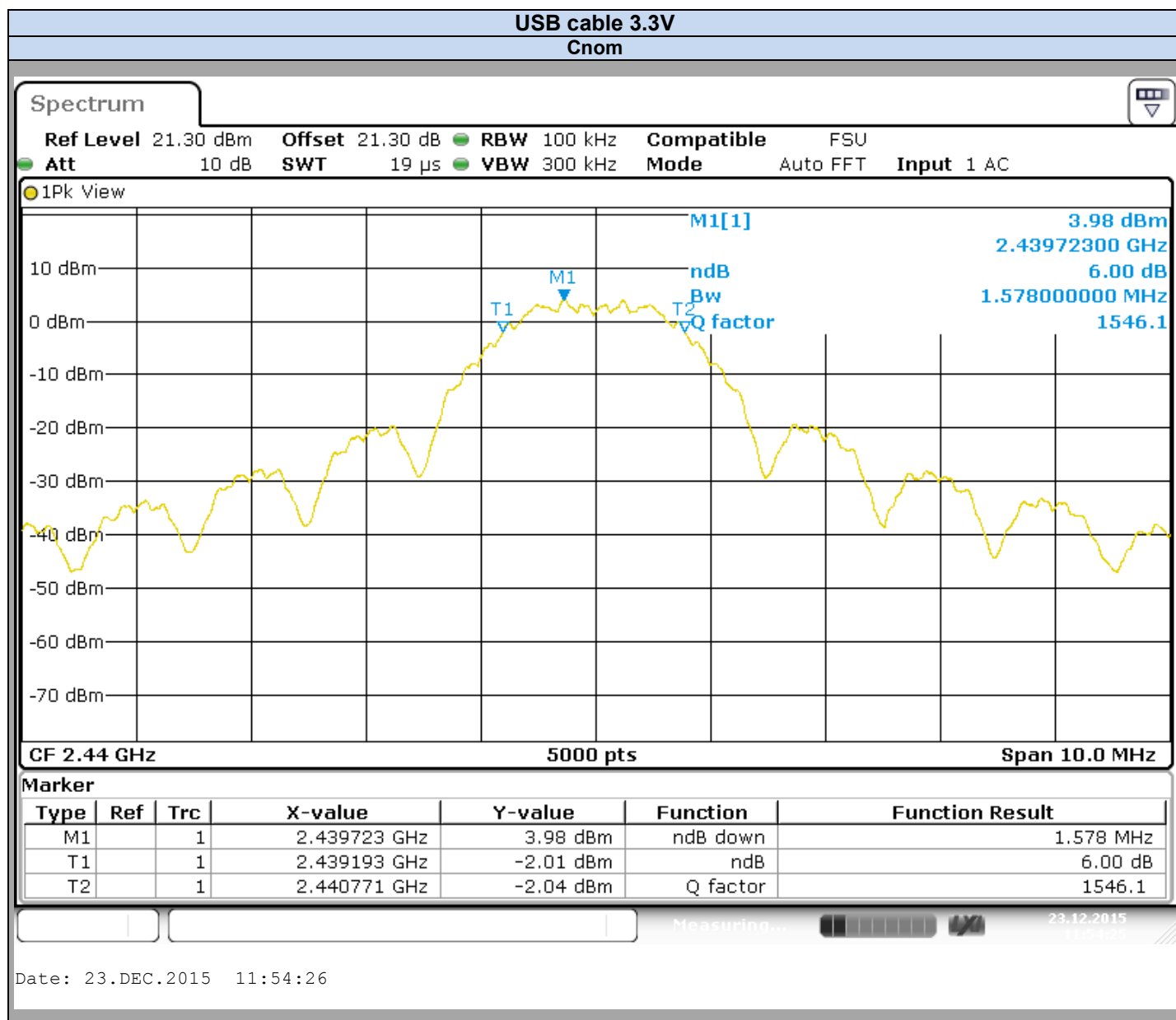
Center frequency= Cmin or Cnom or Cmax  
Span= At least twice the emission spectrum  
Amplitude= Sufficient to observe the signal amplitude  
RBW= 100kHz  
VBW≥ 300kHz  
Sweep= Auto  
Trace= Max Hold  
Detector= Peak

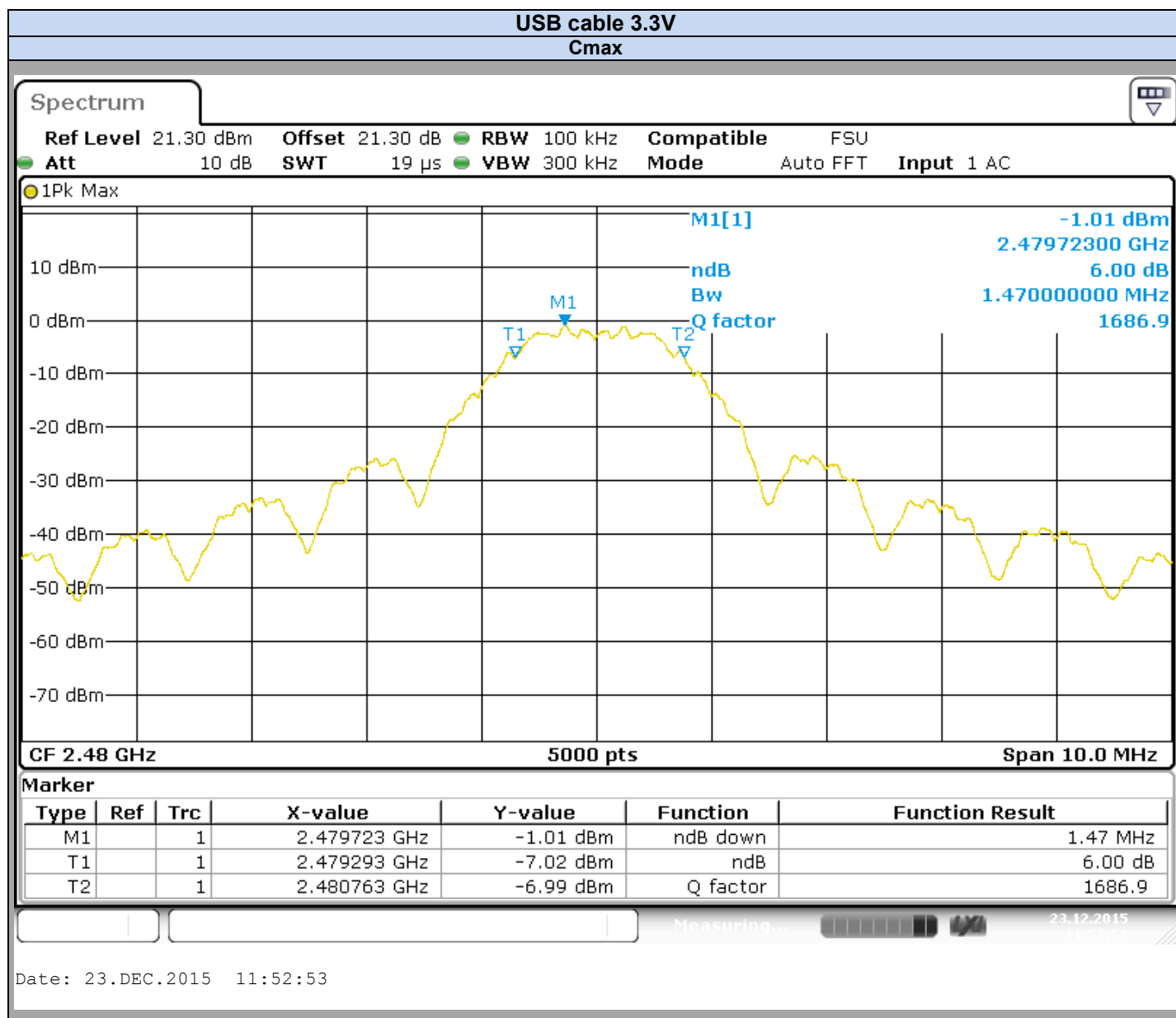


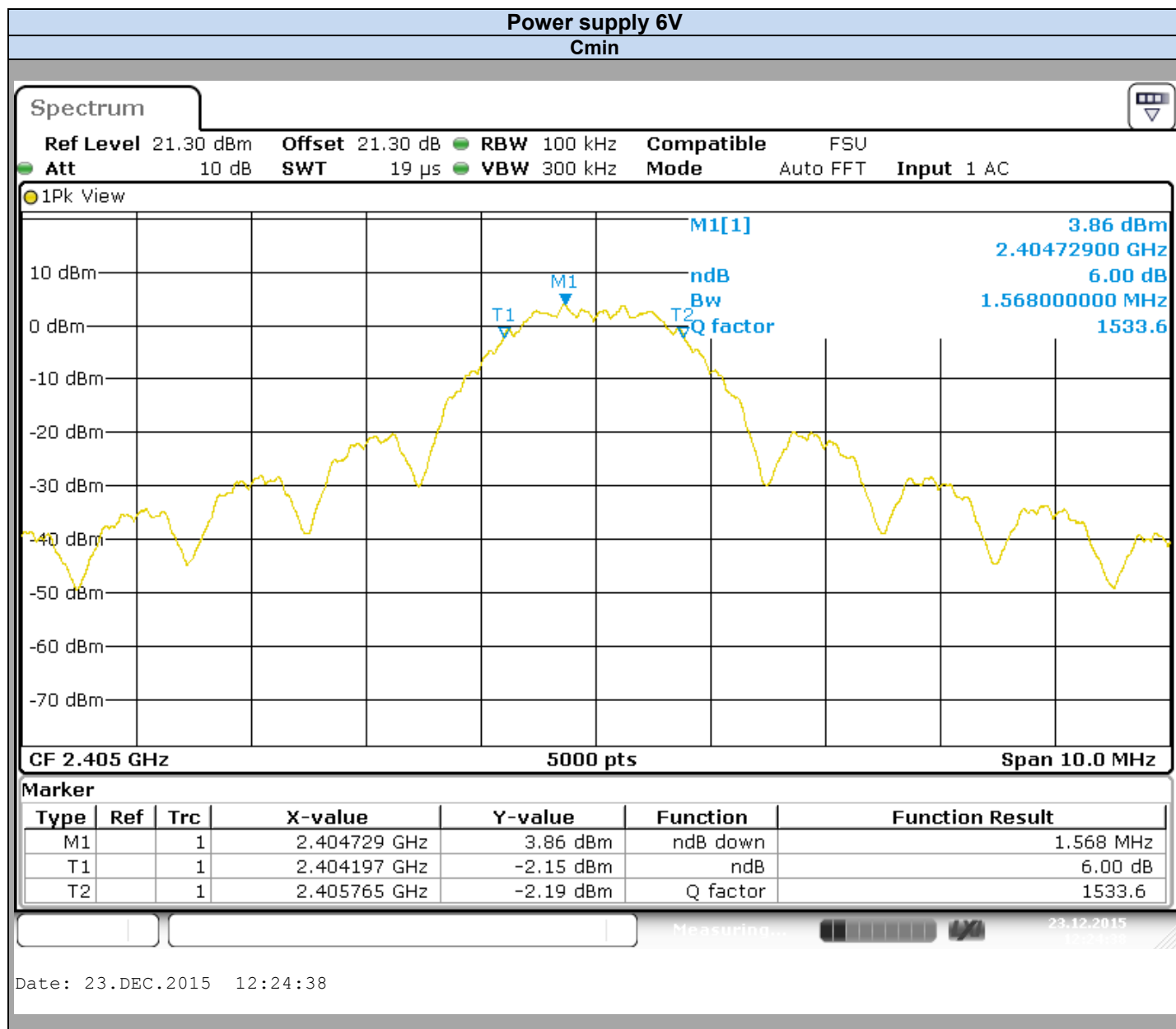
Photograph for -6dB Bandwidth

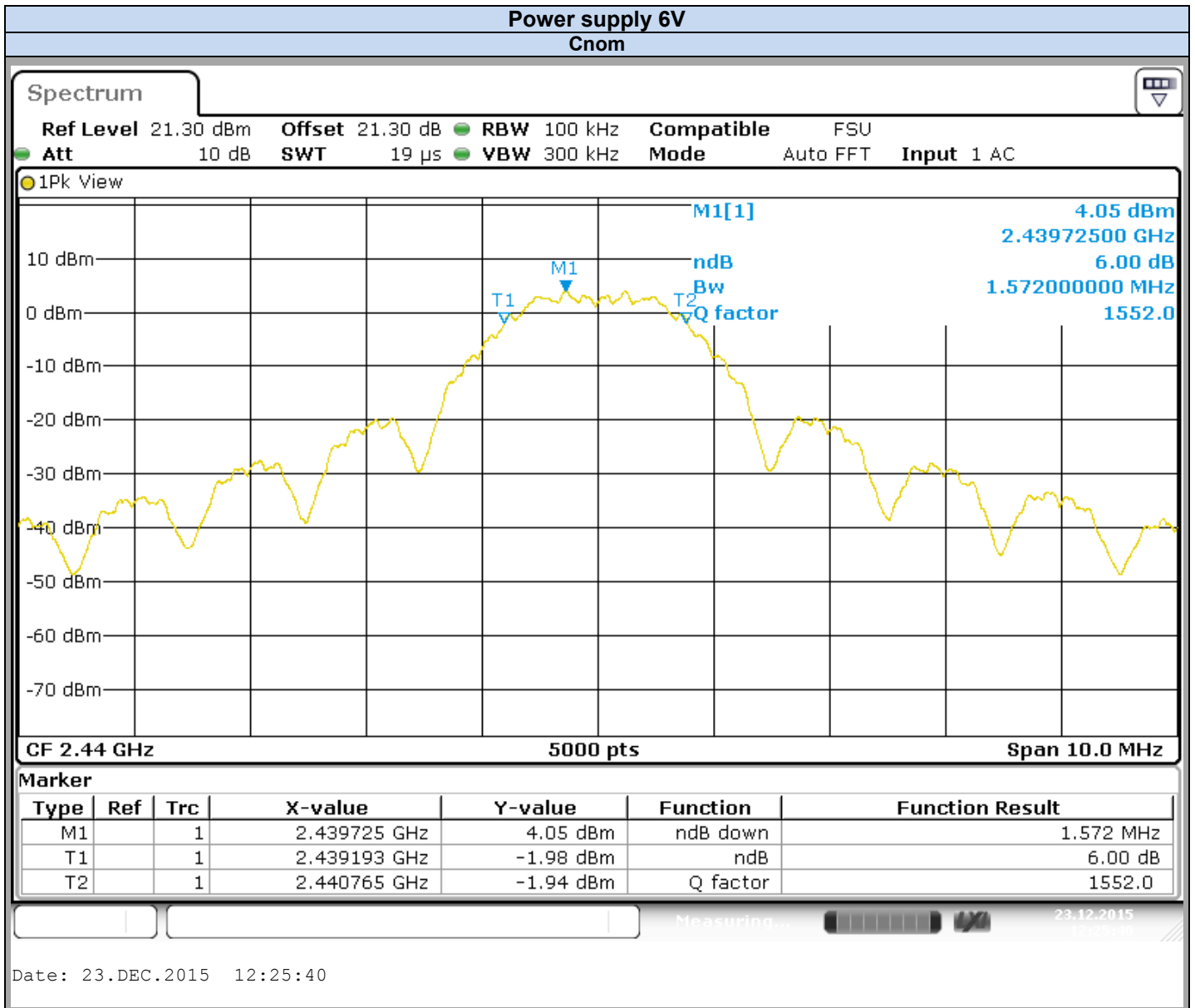
#### 4.1. GRAPHICS & RESULTS

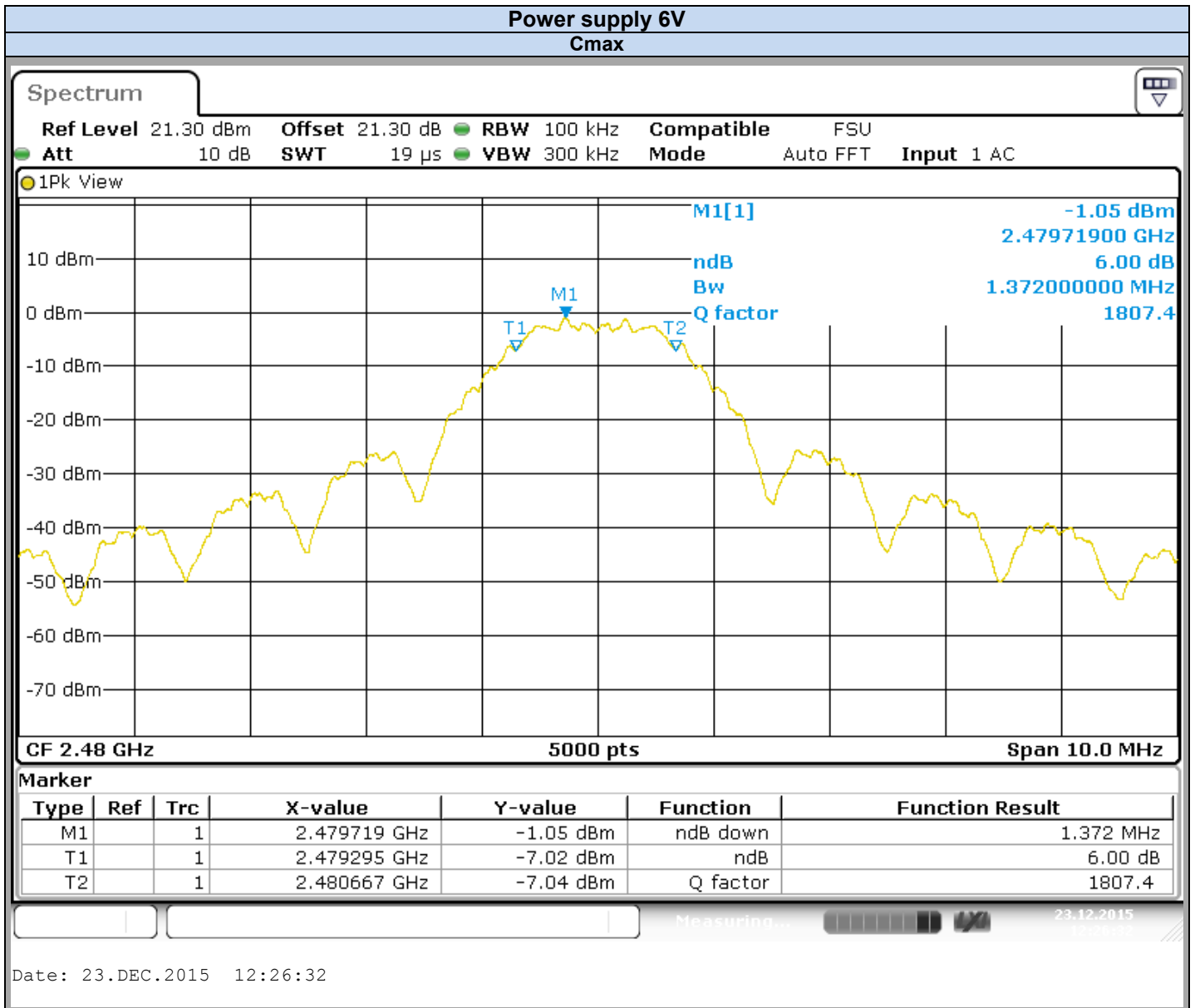














| USB cable 3.3V       |       |       |       |
|----------------------|-------|-------|-------|
| Voltage              | Vnom  |       |       |
| Frequency            | Cmin  | Cnom  | Cmax  |
| -6dB Bandwidth (MHz) | 1.566 | 1.578 | 1.470 |

| Power supply 6V      |       |       |       |
|----------------------|-------|-------|-------|
| Voltage              | Vnom  |       |       |
| Frequency            | Cmin  | Cnom  | Cmax  |
| -6dB Bandwidth (MHz) | 1.568 | 1.572 | 1.372 |

**Result:** **PASS**

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



## 5. MAXIMUM CONDUCTED POWER

### 5.1. TEST CONDITIONS

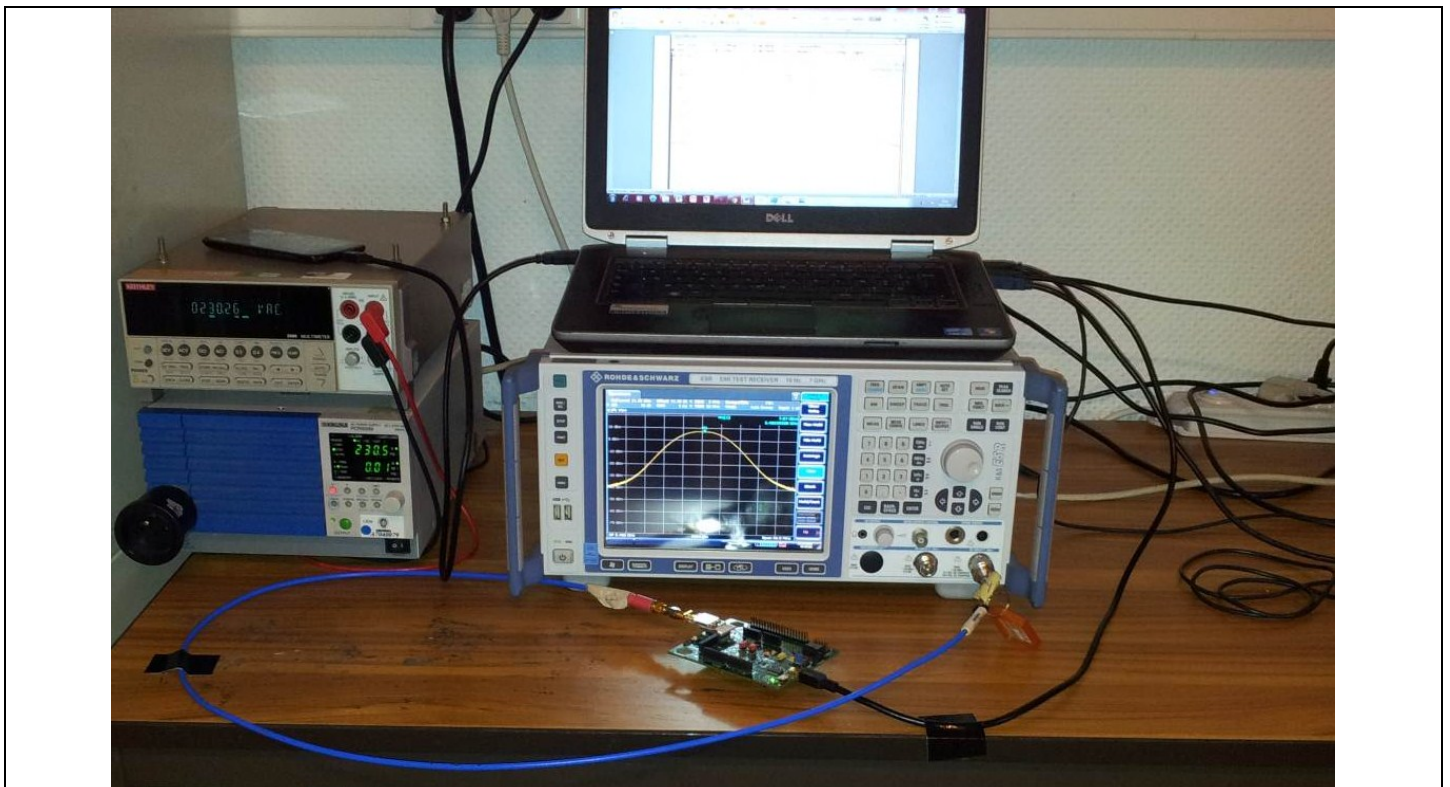
Test performed by : Armand MAHOUNGOU  
Date of test : 2015/12/23  
Ambient temperature : 24°C  
Relative humidity : 47%

### 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 v03r4 § 9.1.1

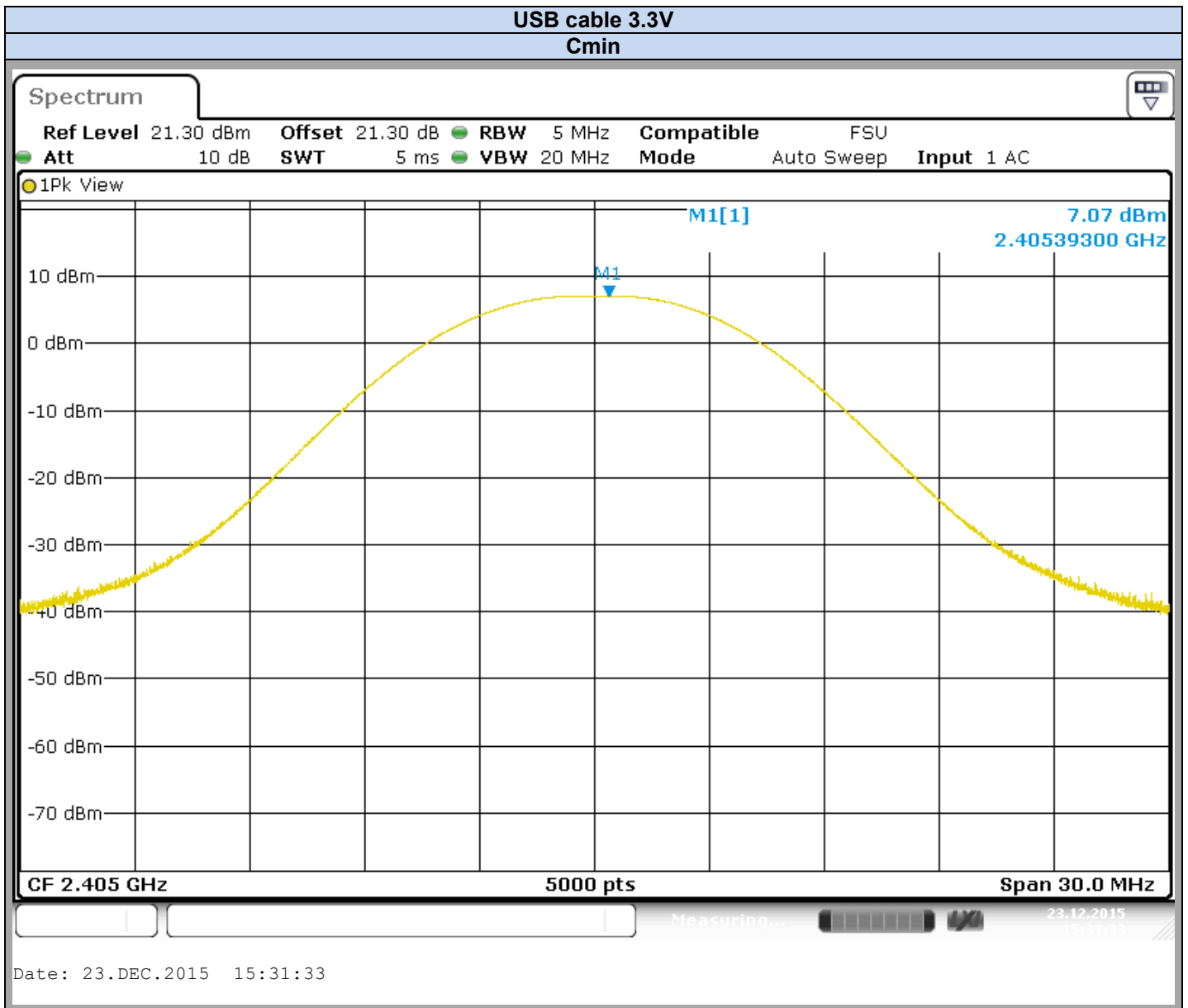
#### **Spectrum Analyzer Setting (Maximum Peak Conducted Power):**

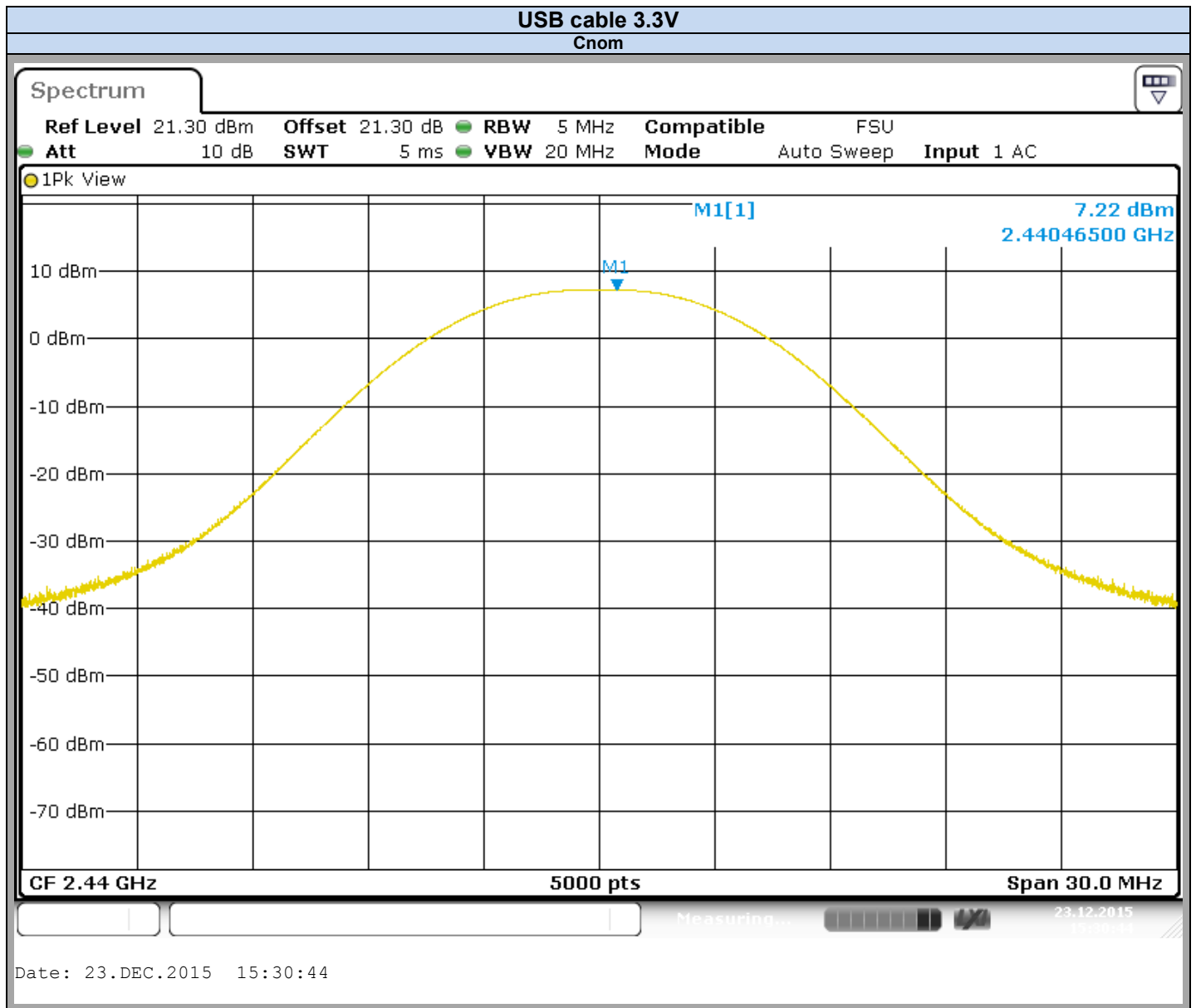
Center frequency= Cmin or Cnom or Cmax  
Span  $\geq$  3RBW  
Amplitude= Sufficient to observe the signal amplitude  
RBW  $\geq$  DTS Bandwidth  
VBW  $\geq$  3RBW  
Sweep= Auto  
Trace= Max Hold  
Detector= Peak

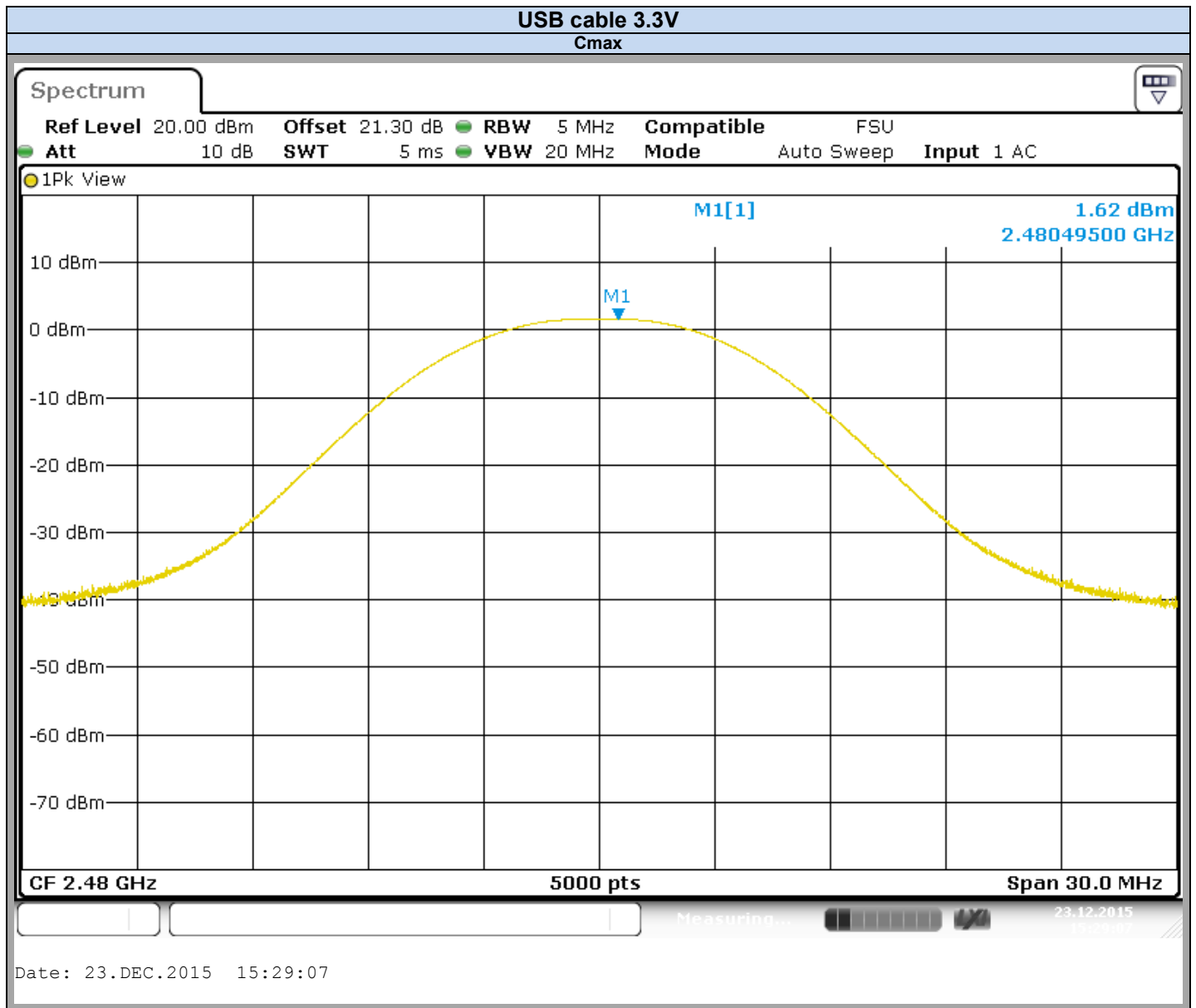


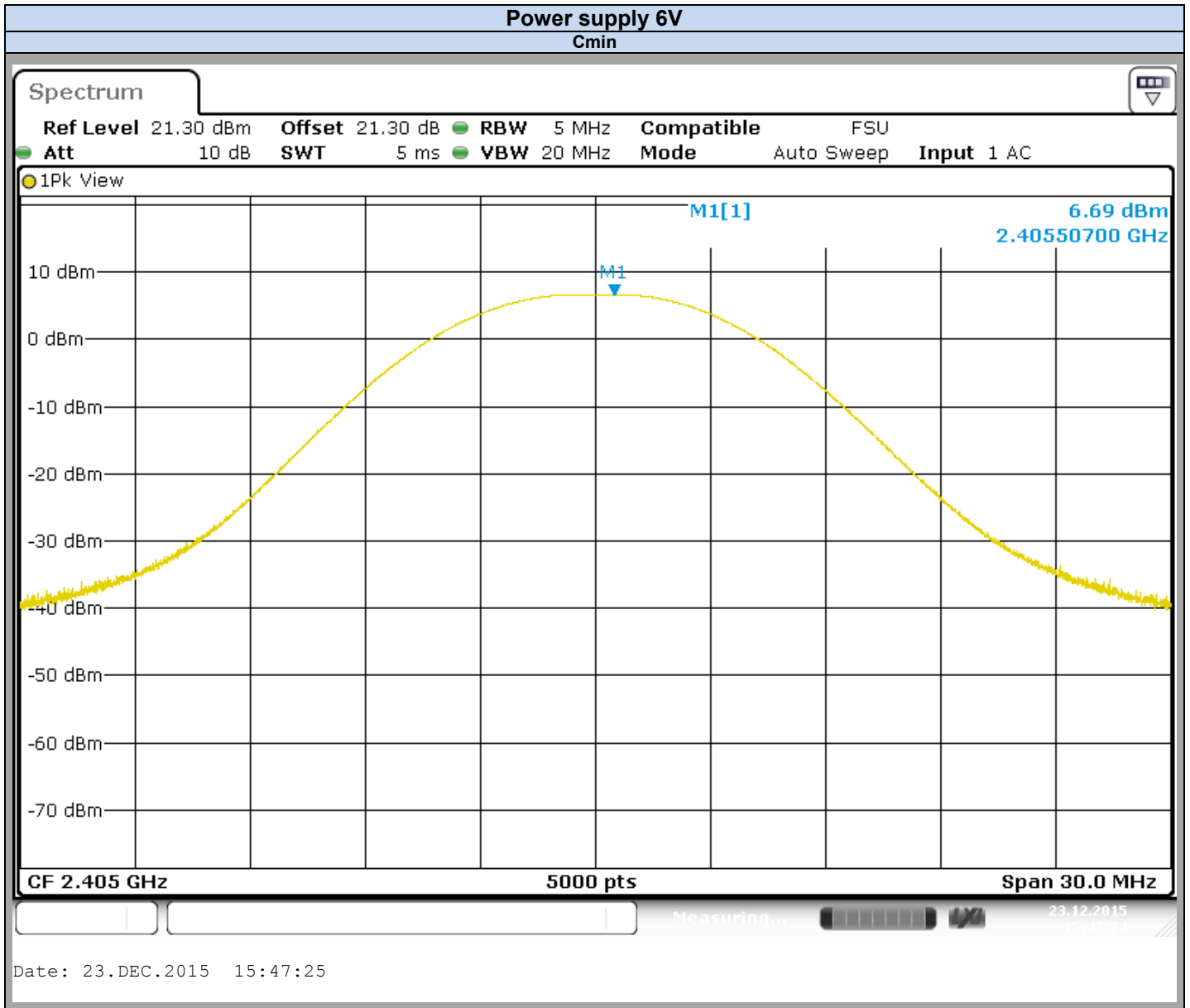
Photograph for Maximum Conducted Power

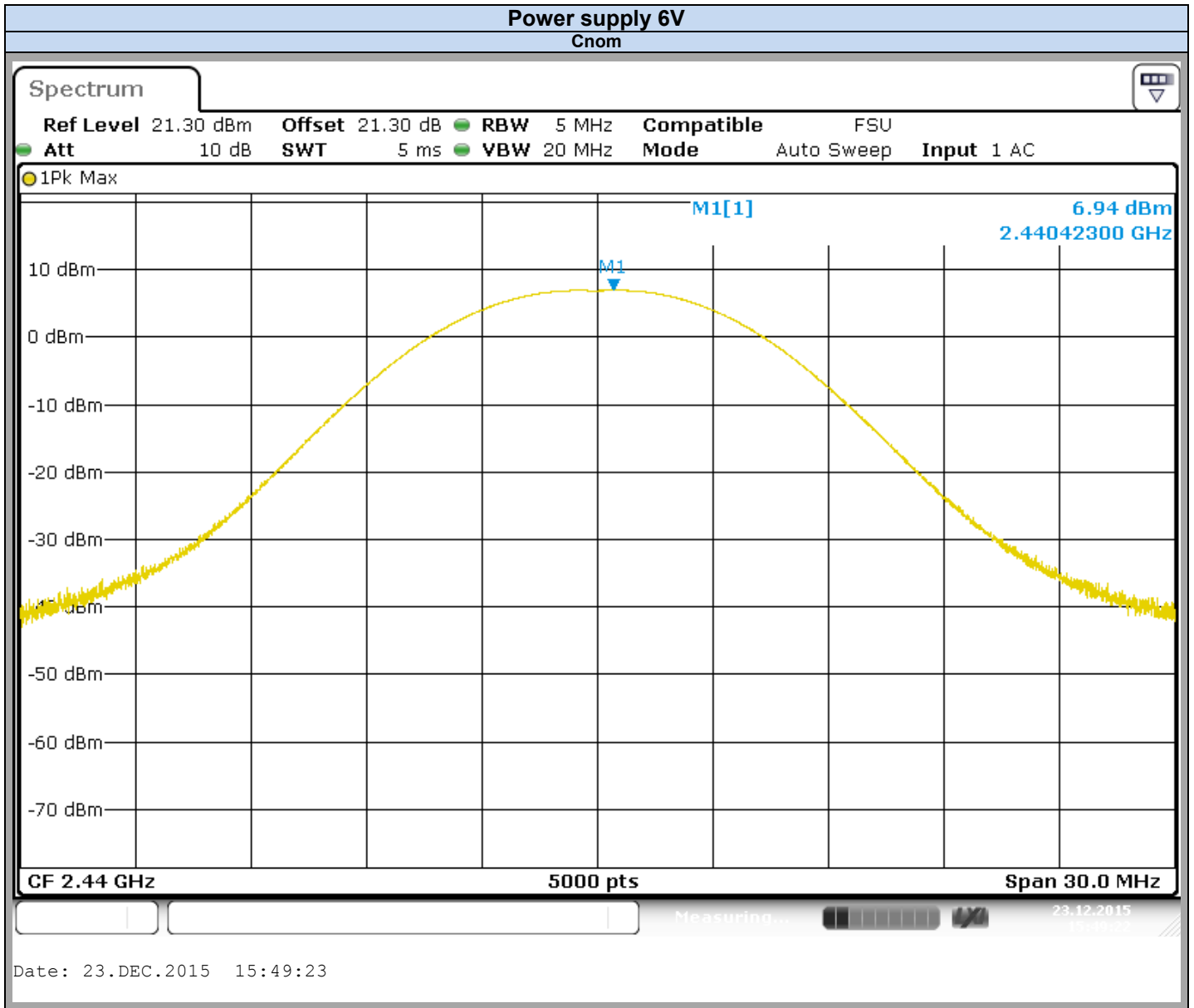
## 5.1. GRAPHICS & RESULTS

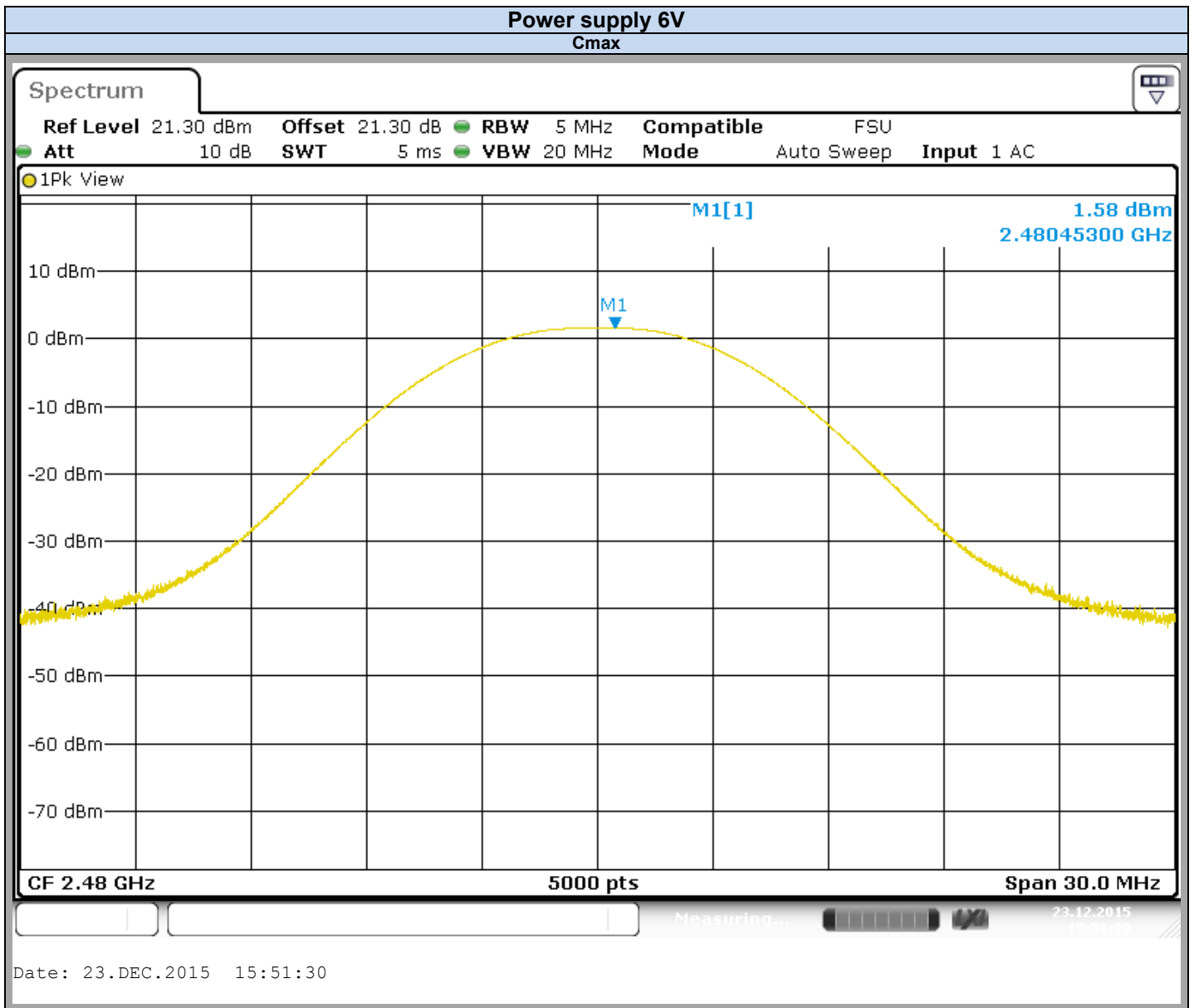














Spectrum Analyzer Offset:

Cable Loss=1.3dB + Attenuator= 20dB

| USB cable 3.3Vdc |           |                            |             |
|------------------|-----------|----------------------------|-------------|
| Channel          | Tx1 (dBm) | Overall Antenna Gain (dBi) | Limit (dBm) |
| Cmin             | 7.07      | 0.86                       | 30          |
| Cnom             | 7.22      | 0.86                       | 30          |
| Cmax             | 1.62      | 0.86                       | 30          |

| Power supply 6V |           |                            |             |
|-----------------|-----------|----------------------------|-------------|
| Channel         | Tx1 (dBm) | Overall Antenna Gain (dBi) | Limit (dBm) |
| Cmin            | 6.69      | 0.86                       | 30          |
| Cnom            | 6.94      | 0.86                       | 30          |
| Cmax            | 1.58      | 0.86                       | 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

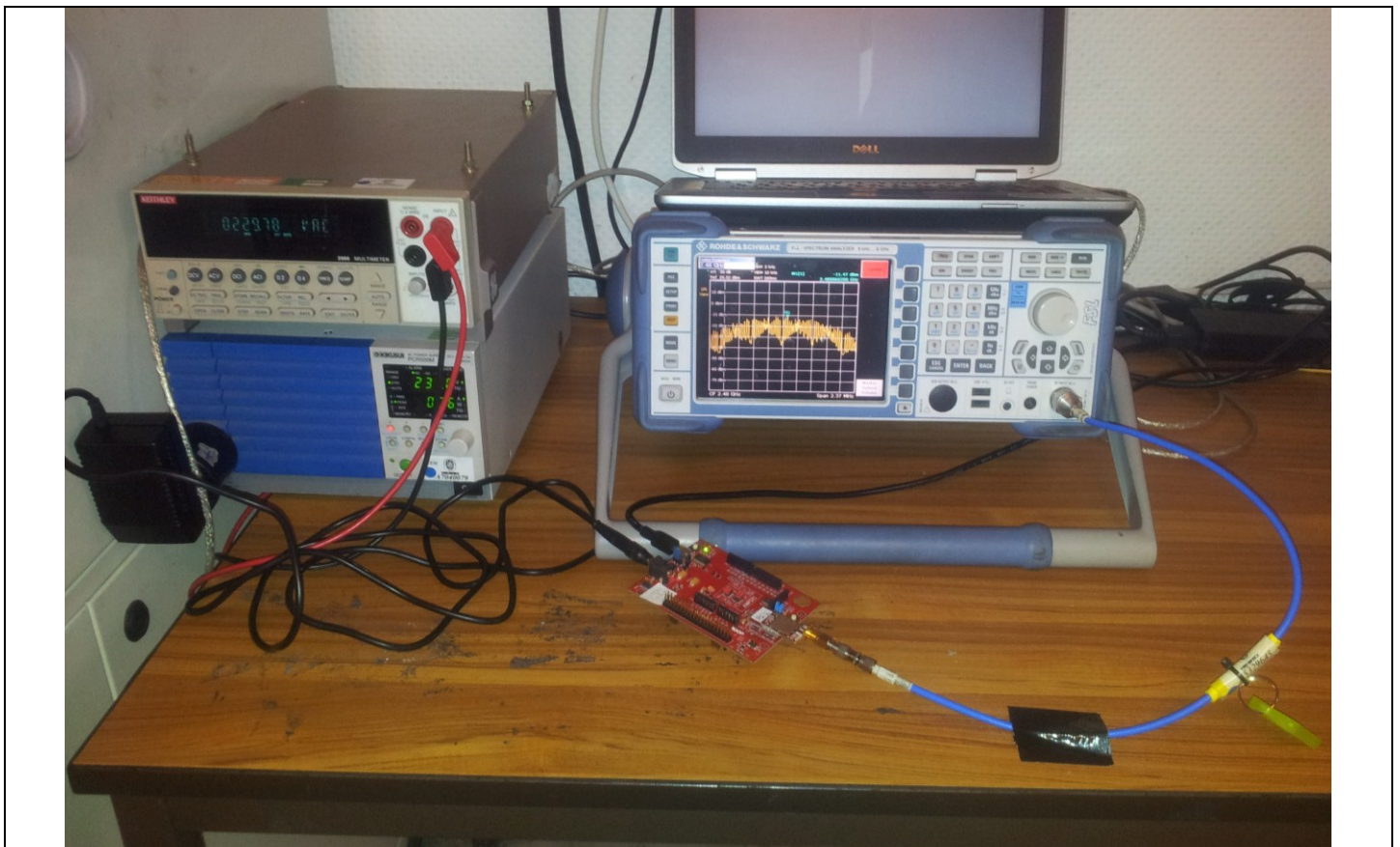
Test performed by : Armand MAHOUNGOU  
Date of test : 2015/03/14  
Ambient temperature : 22°C  
Relative humidity : 44%

### 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 v03r4 § 10.2.

#### Spectrum Analyzer Setting:

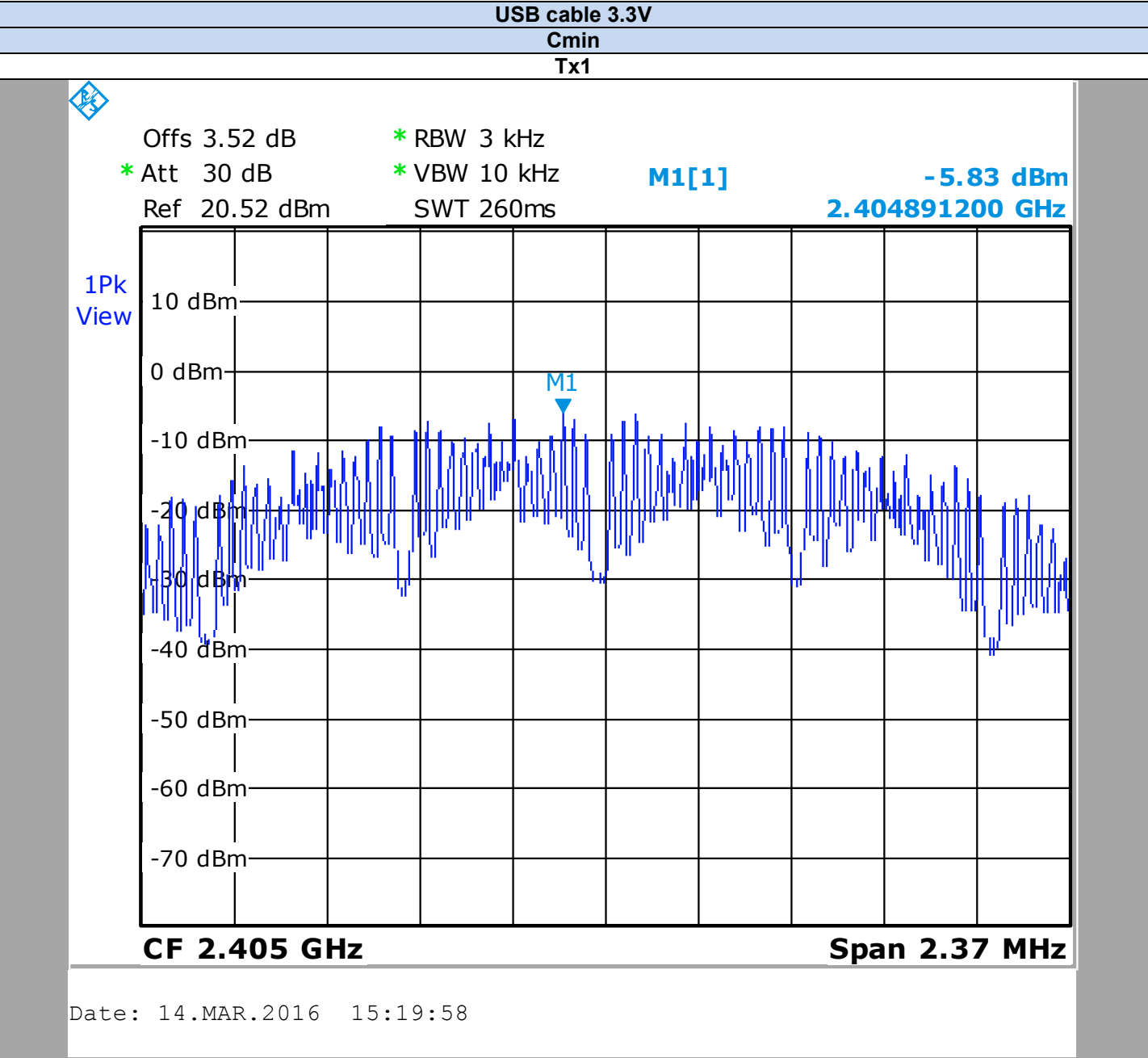
Center frequency= Cmin or Cnom or Cmax  
Span= 1.5 times the DTS Bandwidth  
Amplitude= Sufficient to observe the signal amplitude  
 $RBW = 3\text{kHz} \leq RBW \leq 100\text{kHz}$   
 $VBW \geq 3 \times RBW$   
Sweep= Auto  
Trace= Max Hold  
Detector= Peak

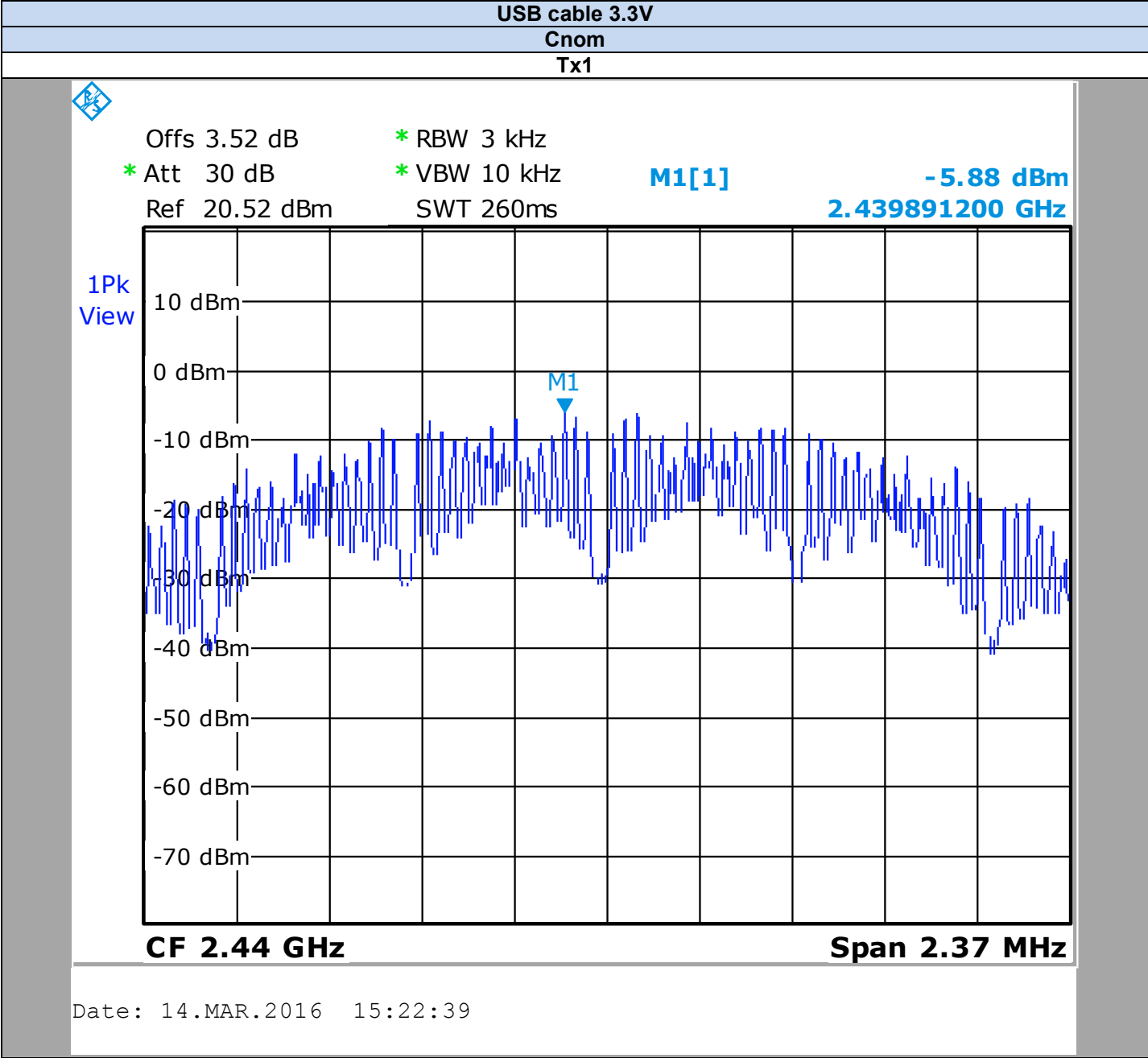


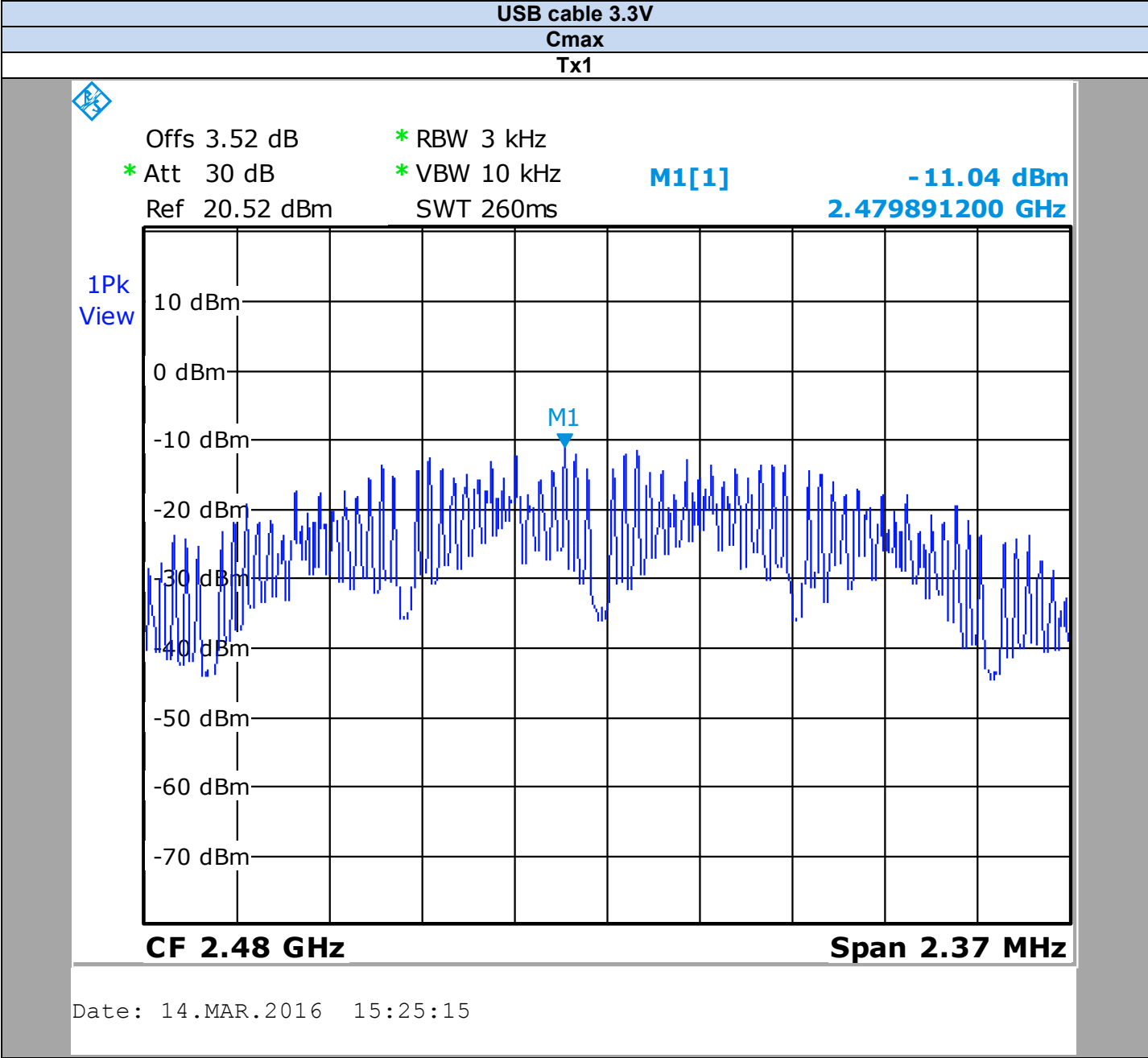
Photograph for Power Spectral Density

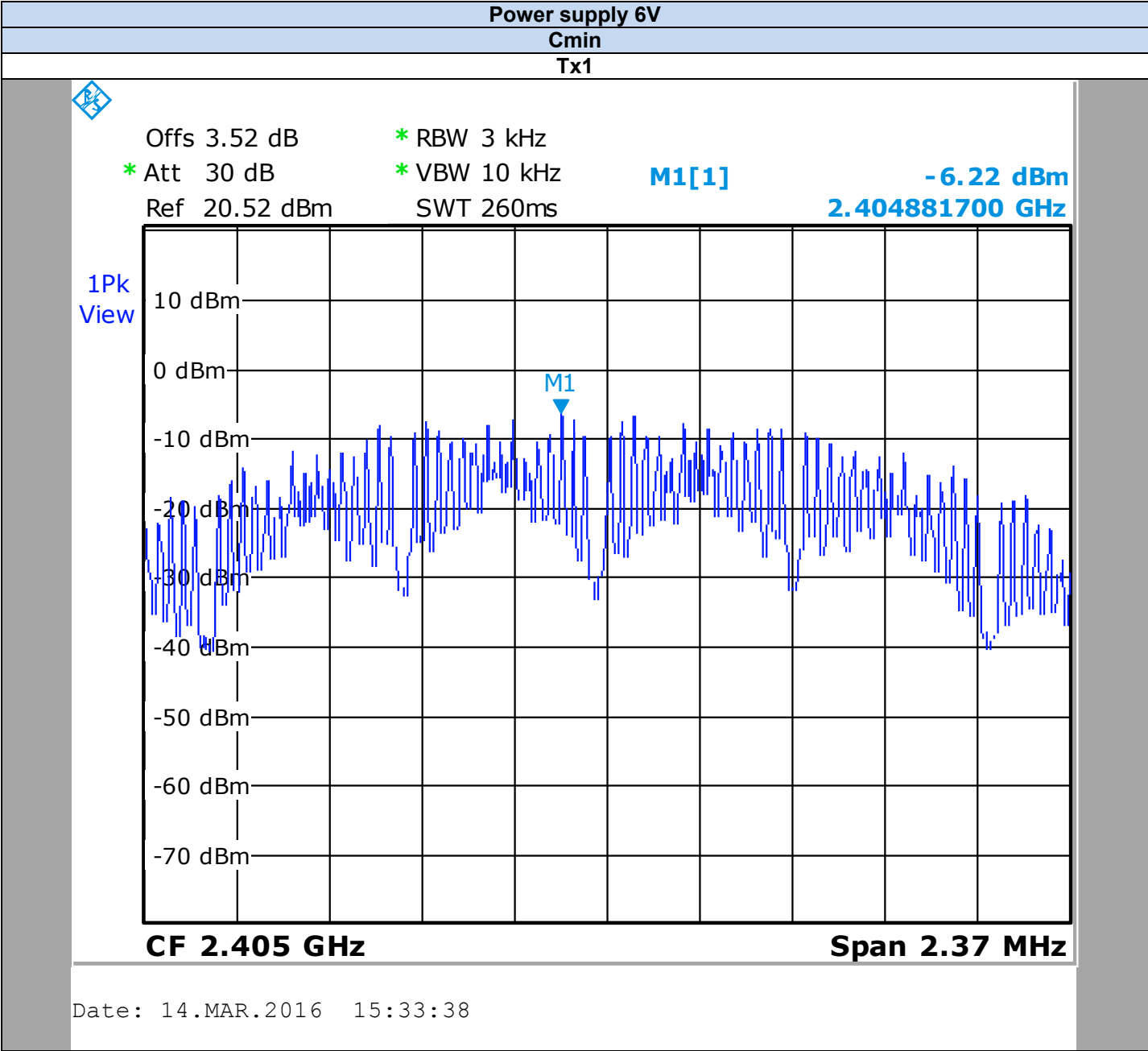


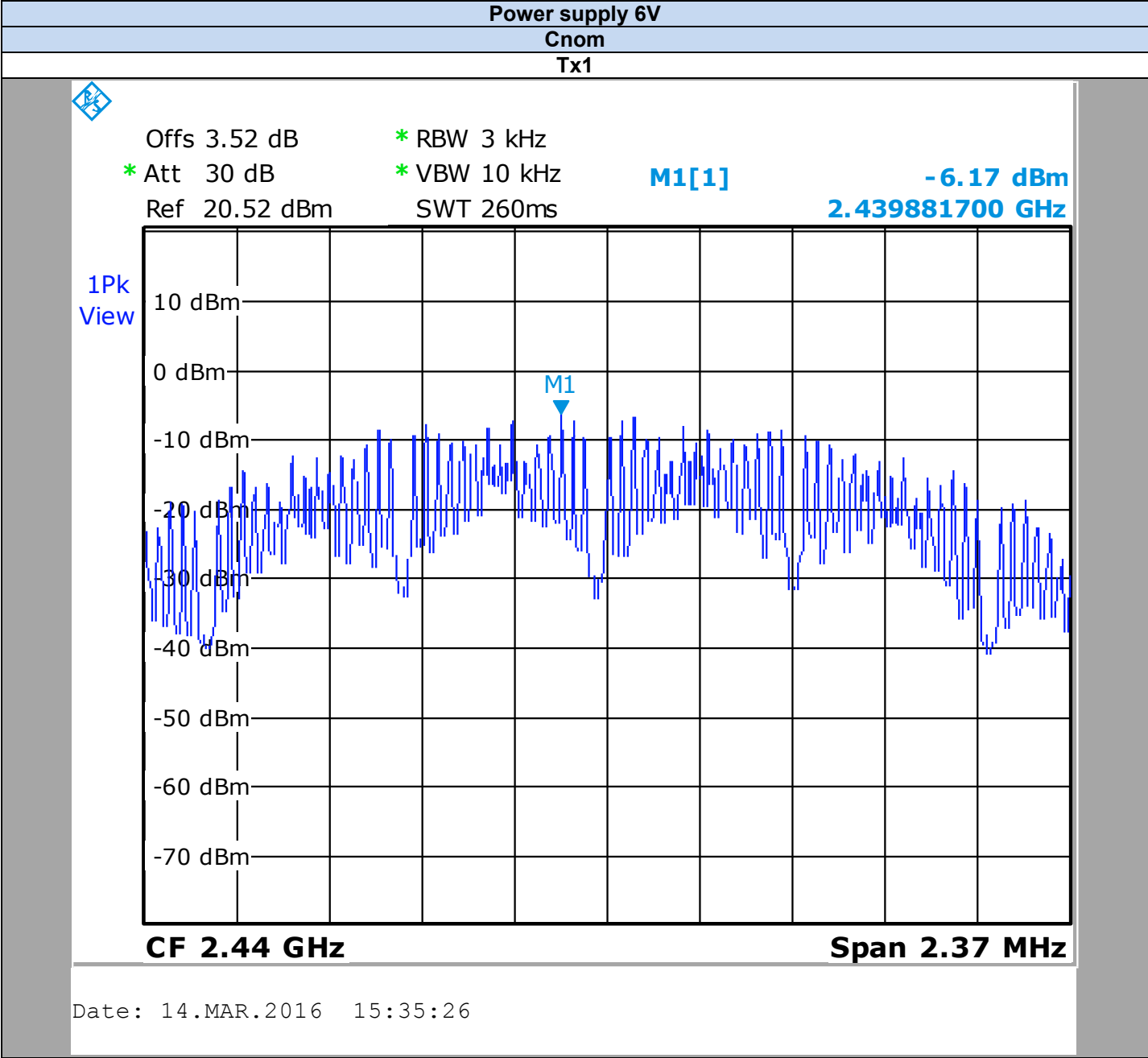
6.1. GRAPHICS & RESULTS

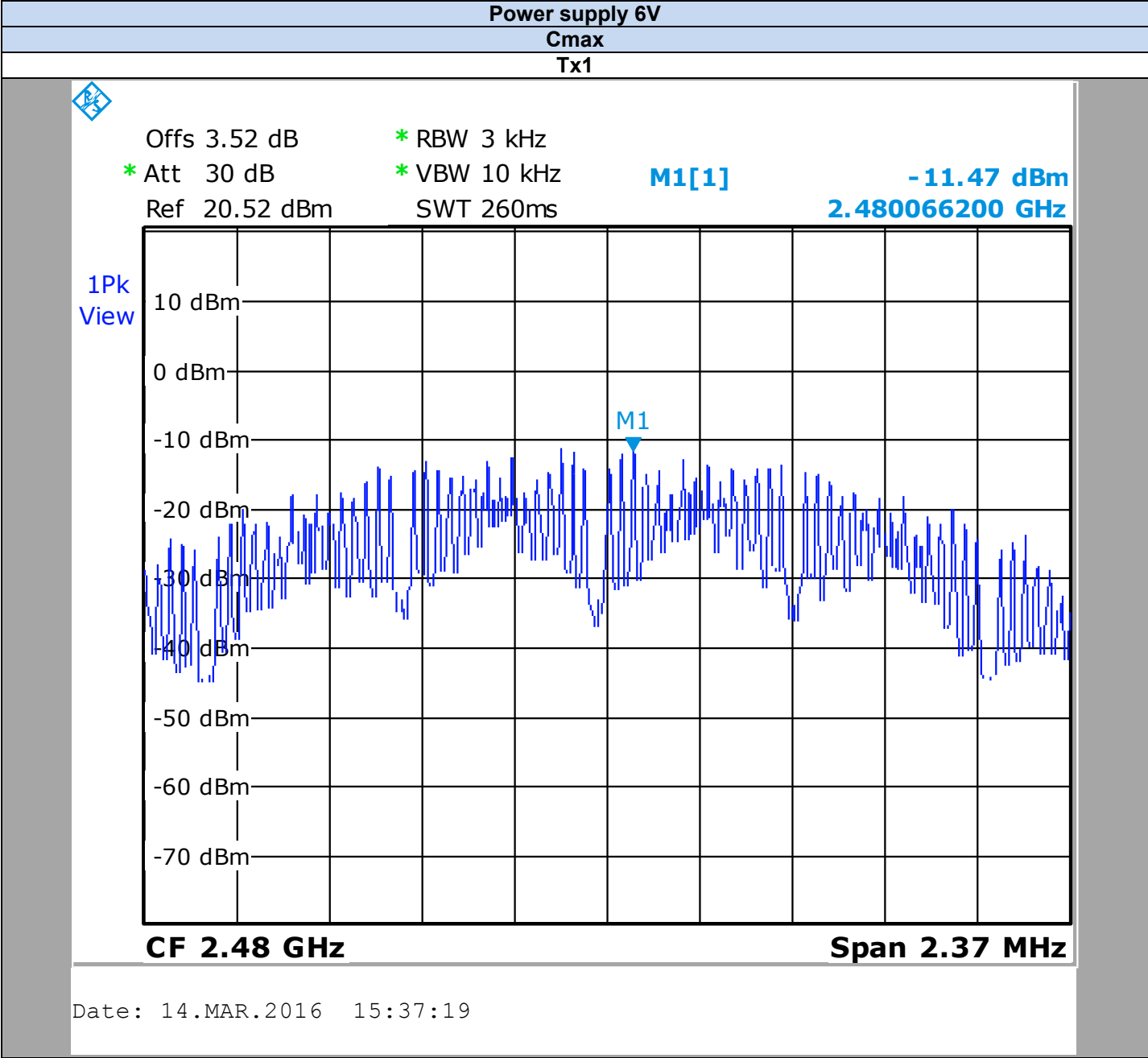














Spectrum Analyzer Offset:  
Cable Loss=1,3dB + Attenuator= 20dB

| USB cable 3V |           |                            |             |
|--------------|-----------|----------------------------|-------------|
| Channel      | Tx1 (dBm) | Overall Antenna Gain (dBi) | Limit (dBm) |
| Cmin         | -5.83     | 0.86                       | 8           |
| Cnom         | -5.88     | 0.86                       | 8           |
| Cmax         | -11.04    | 0.86                       | 8           |

| Power supply 6V |           |                            |             |
|-----------------|-----------|----------------------------|-------------|
| Channel         | Tx1 (dBm) | Overall Antenna Gain (dBi) | Limit (dBm) |
| Cmin            | -6.22     | 0.86                       | 8           |
| Cnom            | -6.17     | 0.86                       | 8           |
| Cmax            | -11.47    | 0.86                       | 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

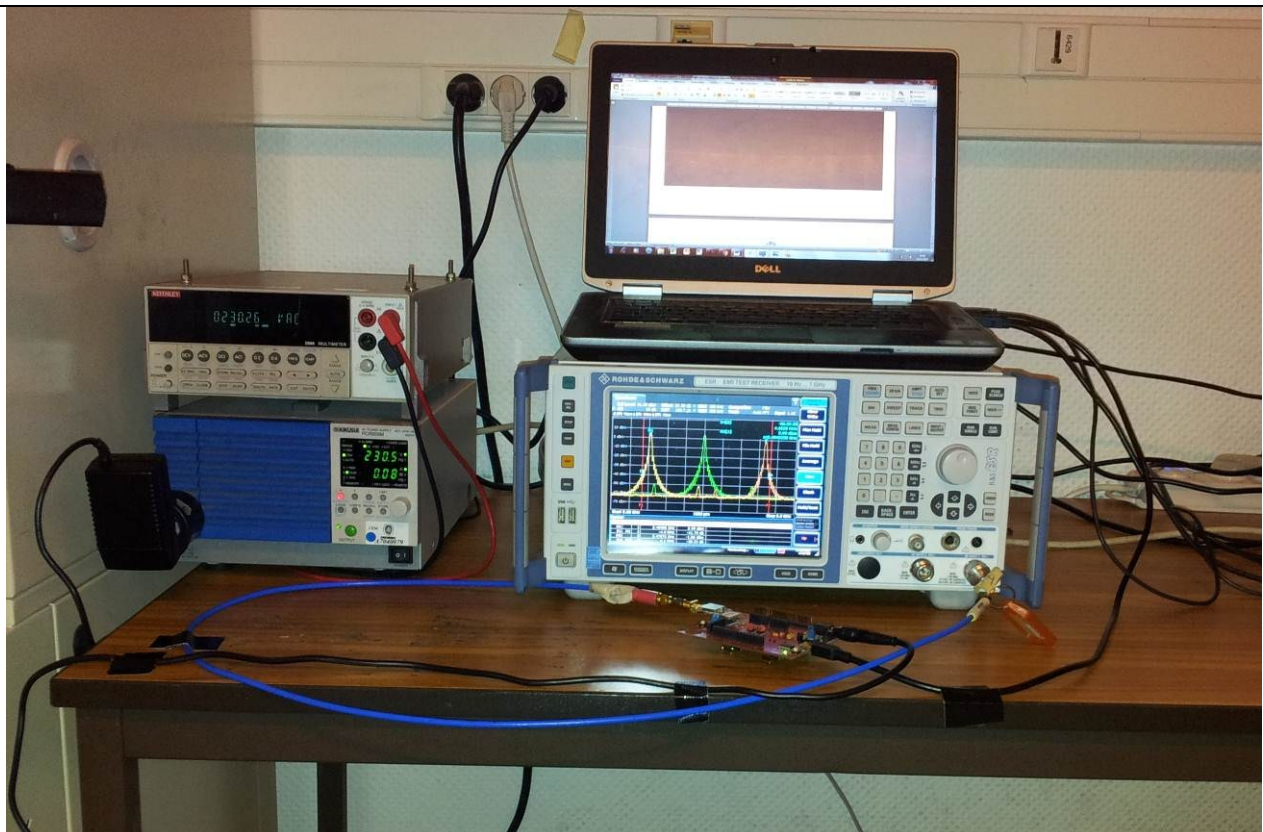
Test performed by : Armand MAHOUNGOU  
Date of test : 2015/12/23  
Ambient temperature : 24°C  
Relative humidity : 47%

### 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 v03r4 § 11.0.

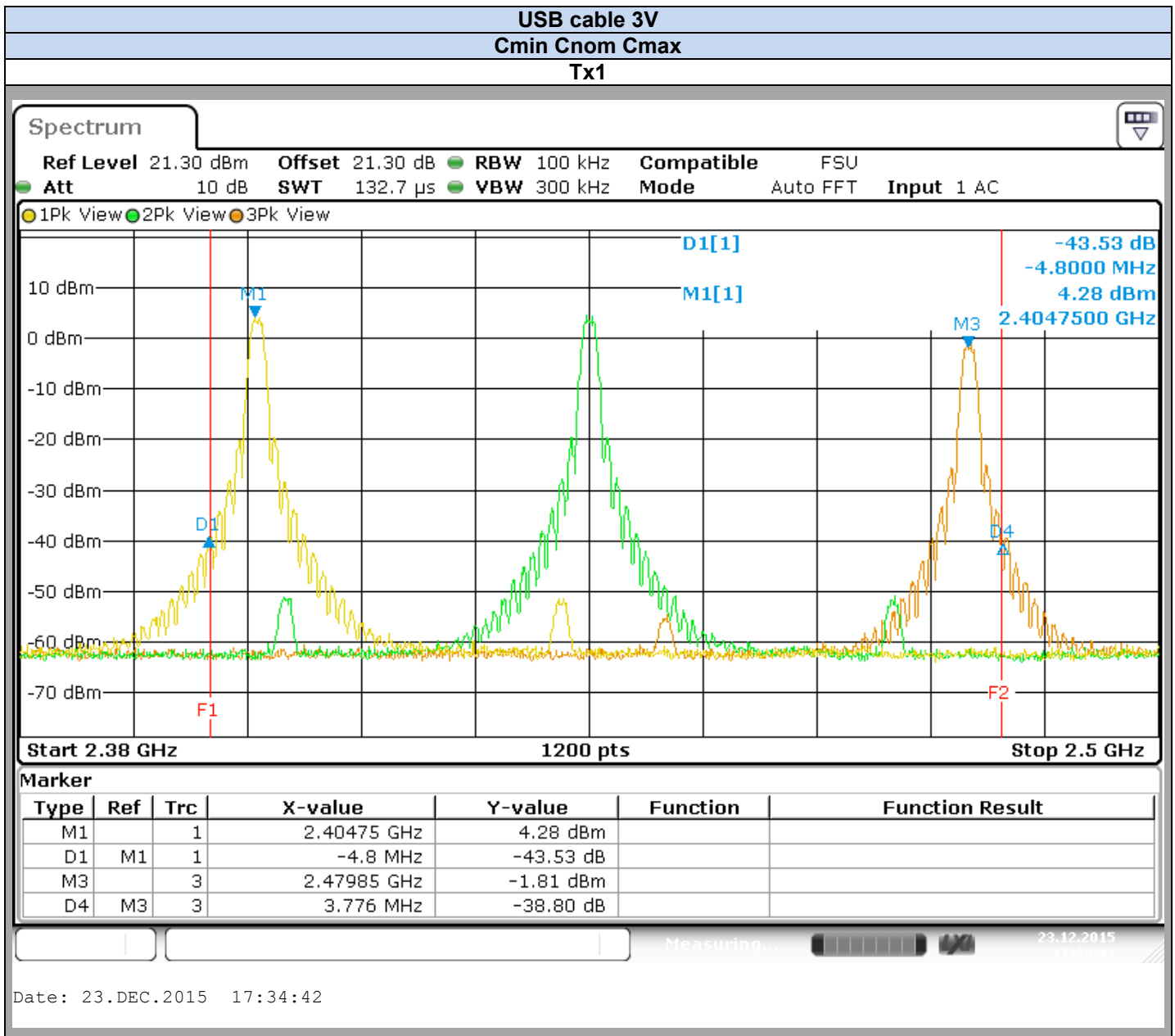
#### Spectrum Analyzer Setting:

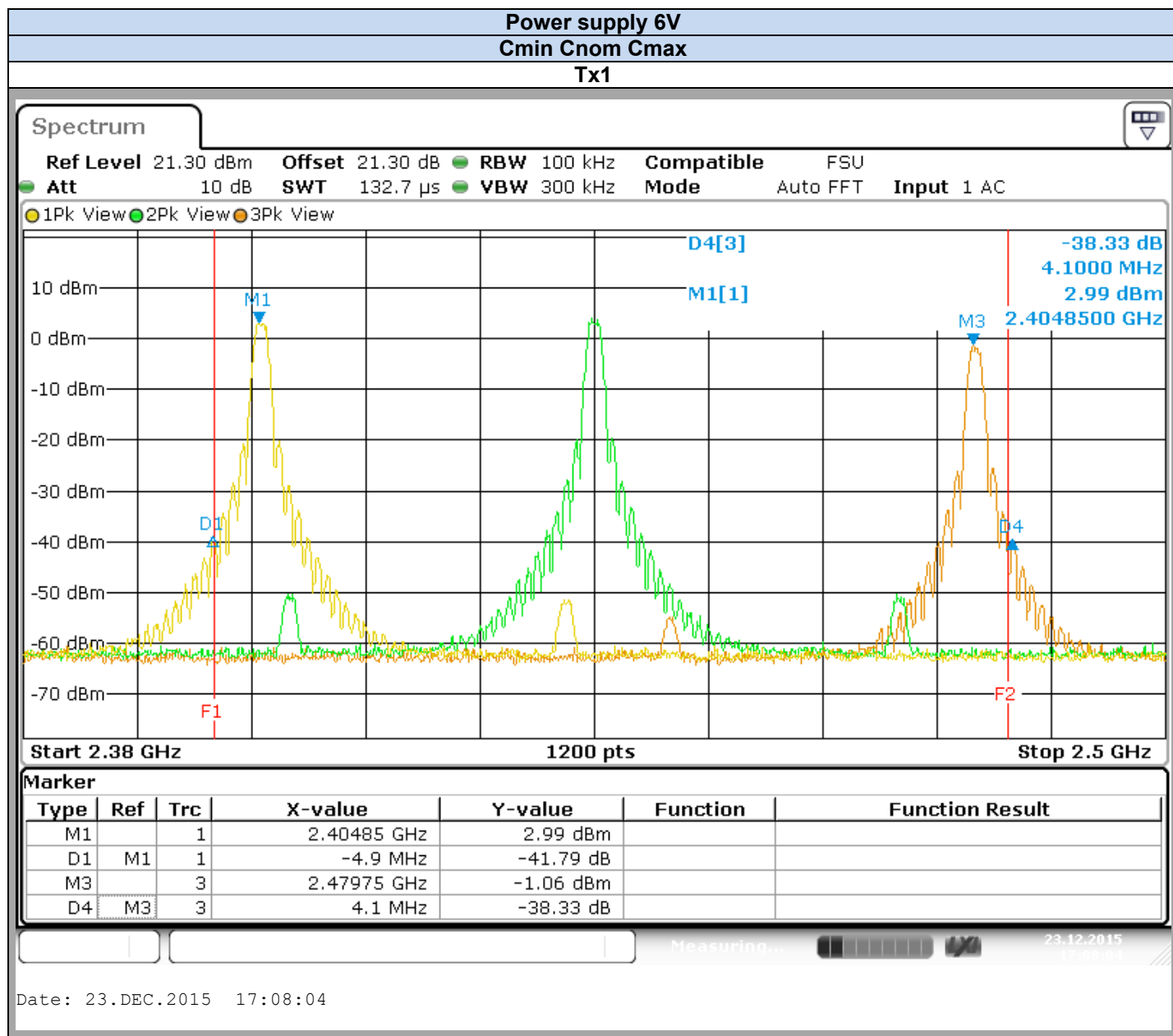
Start frequency= 2380MHz  
Stop frequency= 2500MHz  
Amplitude= Sufficient to observe the signal amplitude  
RBW= 100kHz  
VBW= 300kHz  
Sweep Time= Auto  
Sweep Point= 1200  
Trace= Max Hold  
Detector= Peak



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

## 7.1. GRAPHICS & RESULTS







| USB cable 3.3V                                     |       |        |
|----------------------------------------------------|-------|--------|
| Temperature                                        | Tnom  |        |
| Voltage                                            | Vnom  |        |
| Conducted Spurious Emission at the Band Edge (MHz) | 2400  | 2483,5 |
| Spurious Level (dBc)                               | 43.53 | 38.80  |

| Power supply 6V                                    |       |        |
|----------------------------------------------------|-------|--------|
| Temperature                                        | Tnom  |        |
| Voltage                                            | Vnom  |        |
| Conducted Spurious Emission at the Band Edge (MHz) | 2400  | 2483,5 |
| Spurious Level (dBc)                               | 41.79 | 38.33  |

**Result:** **PASS**

**Limit:** → All Spurious Emissions must be at least 20dB (Maximum 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

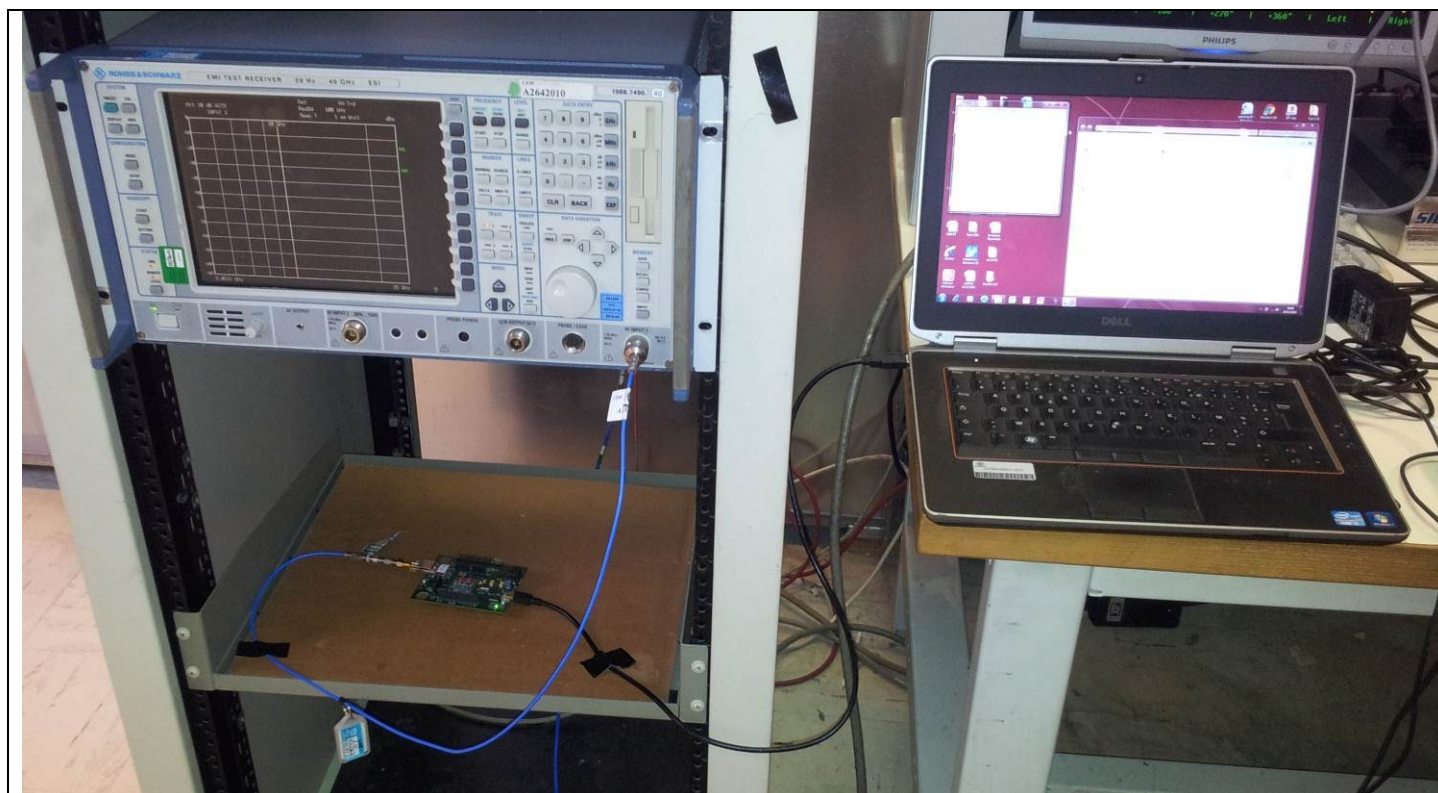
Test performed by : Armand MAHOUNGOU  
Date of test : 2015/12/24  
Ambient temperature : 24°C  
Relative humidity : 47%

### 8.2. TEST SETUP

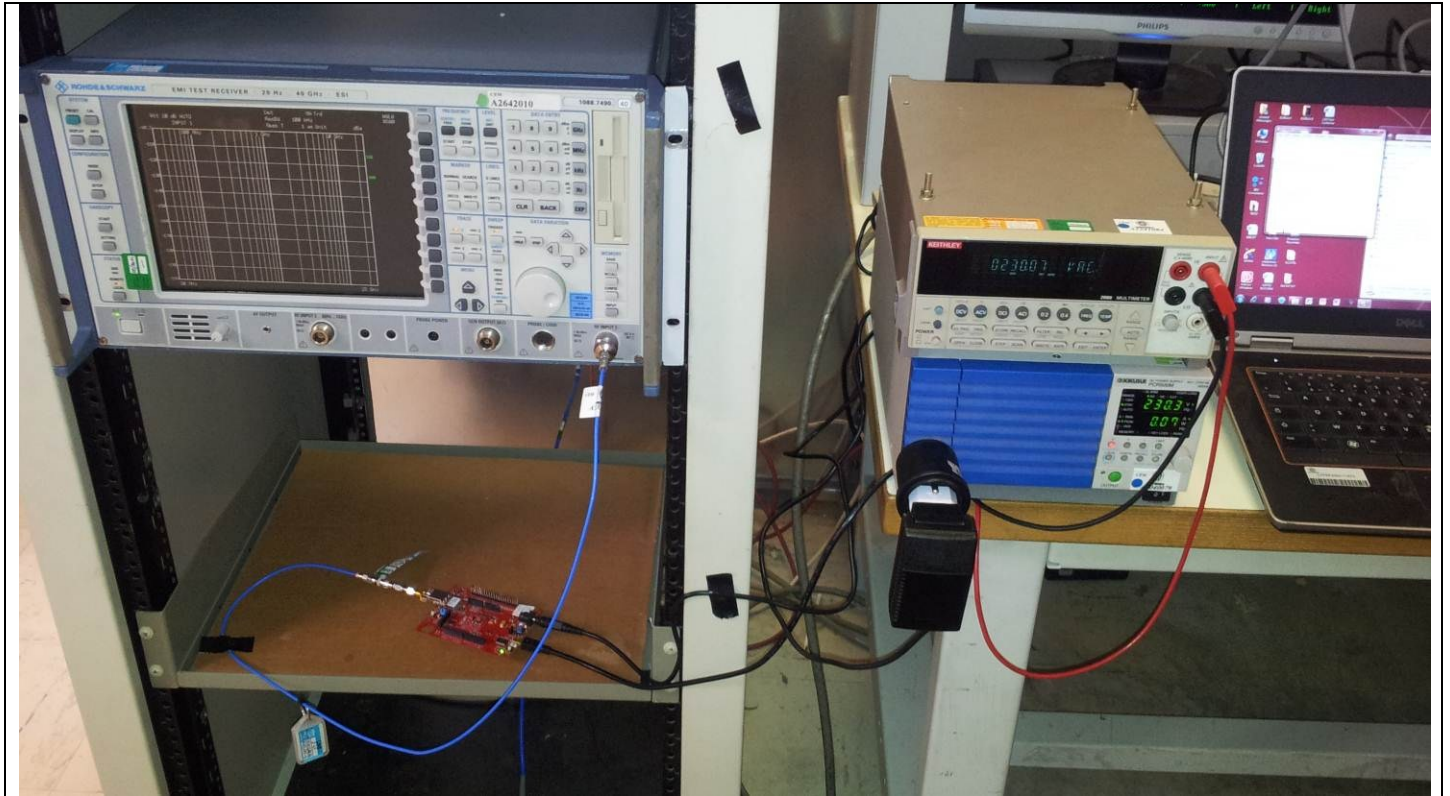
The Equipment Under Test is installed on a table and set in permanent emission with modulation. Measurement is performed with a spectrum analyzer on the EUT conducted access. The product has been tested according to the FCC KDB 558074 D01 DTS Meas Guidance v03r4 § 11.0.

#### Spectrum Analyzer Setting:

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

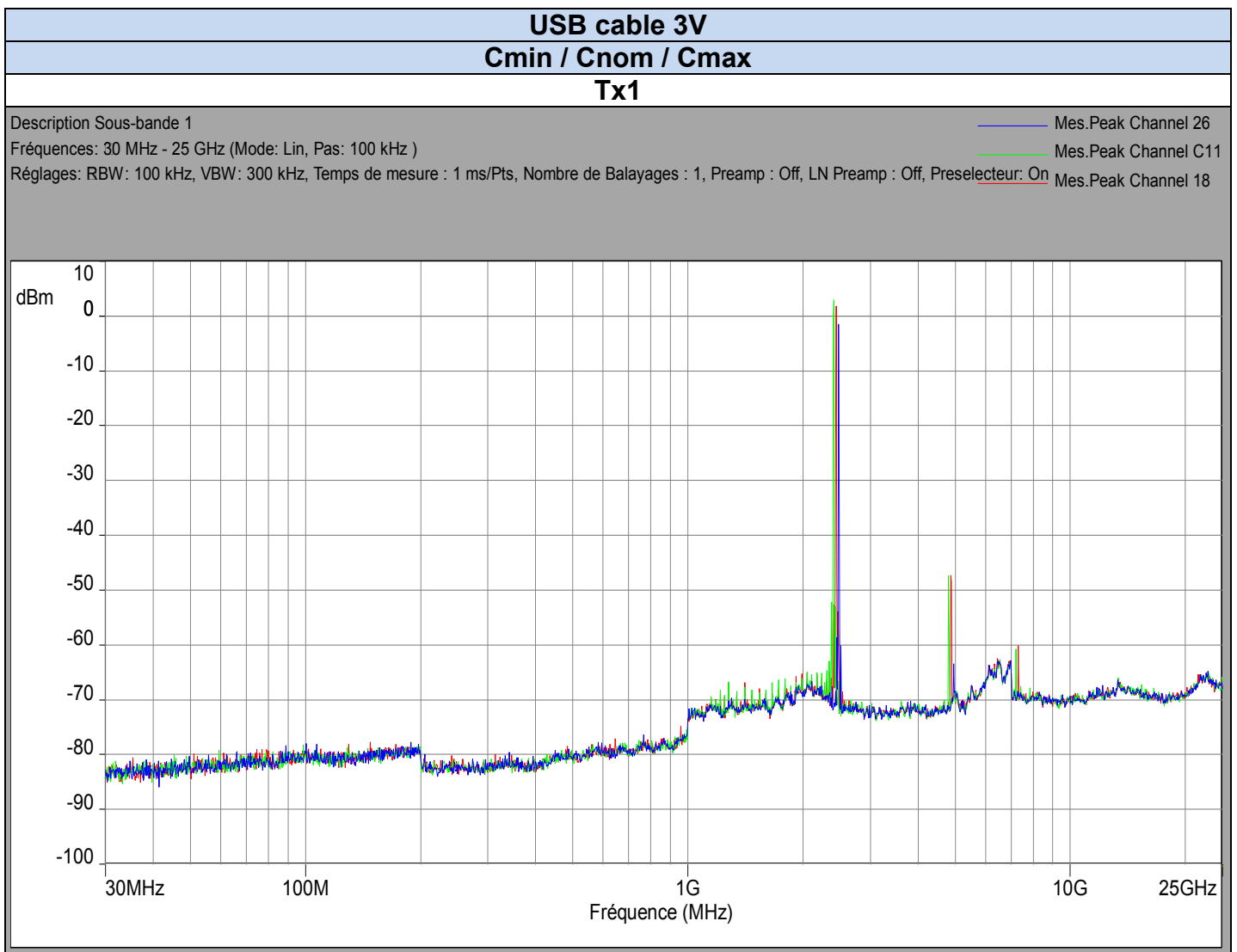


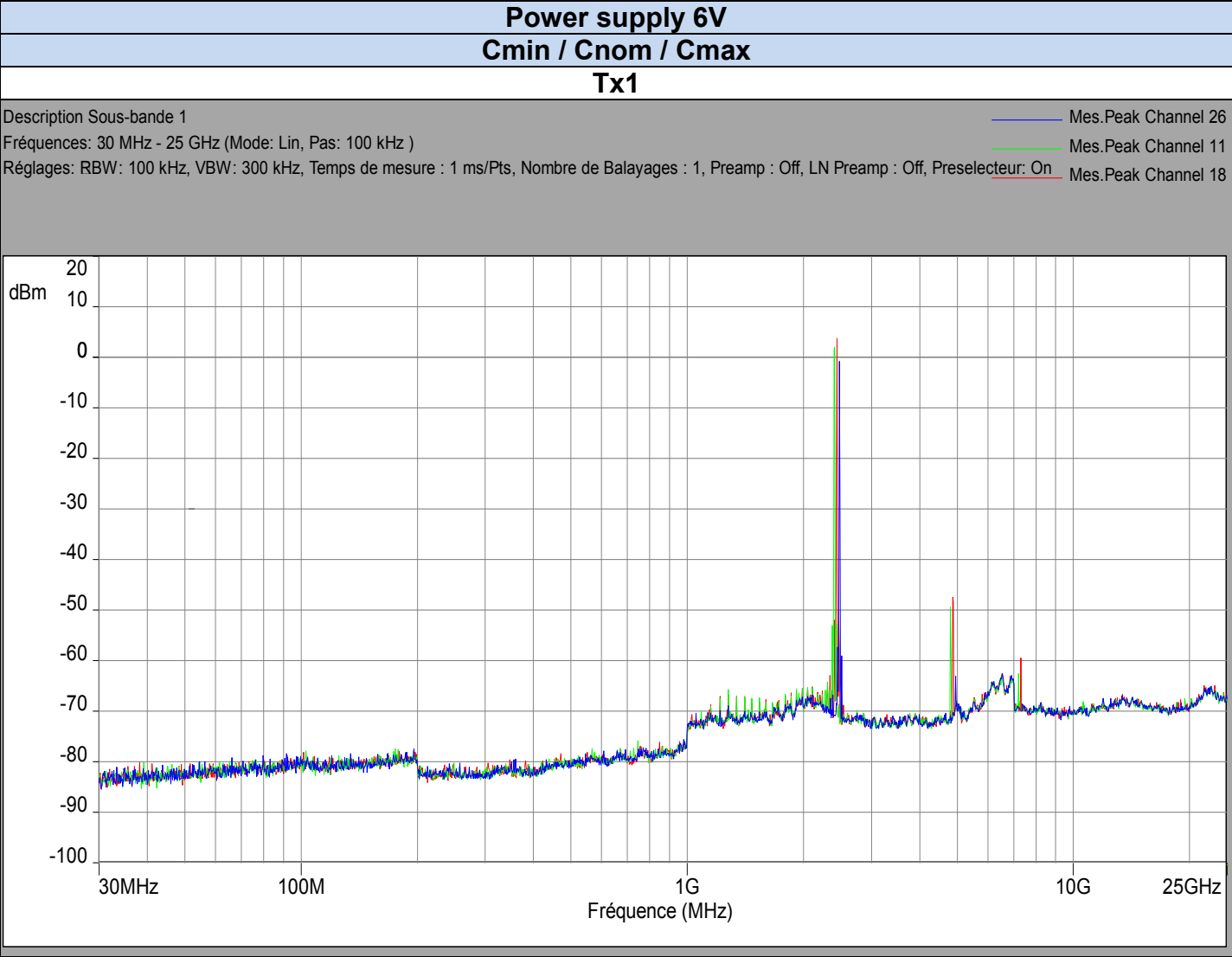
Photograph for Unwanted Emissions into Non-Restricted Frequency Bands



Photograph for Unwanted Emissions into Non-Restricted Frequency Bands

### 8.3. GRAPHICS & RESULTS







| USB cable 3.3V  |                      |                      |
|-----------------|----------------------|----------------------|
| Frequency (MHz) | Spurious Level (dBm) | Spurious Level (dBc) |
| 4809            | -47.74               | -44.84               |
| 4879            | -47.37               | -45.52               |
| 4959            | -63.51               | -65.05               |
| 7213.7          | -60.73               | -57.83               |
| 7321.5          | -60.09               | -58.24               |

| Power supply 6V |                      |                      |
|-----------------|----------------------|----------------------|
| Frequency (MHz) | Spurious Level (dBm) | Spurious Level (dBc) |
| 4811            | -49.37               | -41.41               |
| 4879            | -47.49               | -43.70               |
| 4959            | -63.11               | -63.92               |
| 7213.7          | -62.49               | -60.53               |
| 7318.5          | -59.46               | -55.67               |

**Result:** **PASS**

**Limit:** → All Spurious Emissions must be at least 20dB (Maximum Conducted Power), below the Fundamental Radiator Level outside of the 2400MHz-2483,5MHz band



## 9. AC POWER LINE CONDUCTED EMISSIONS

### 9.1. TEST CONDITIONS

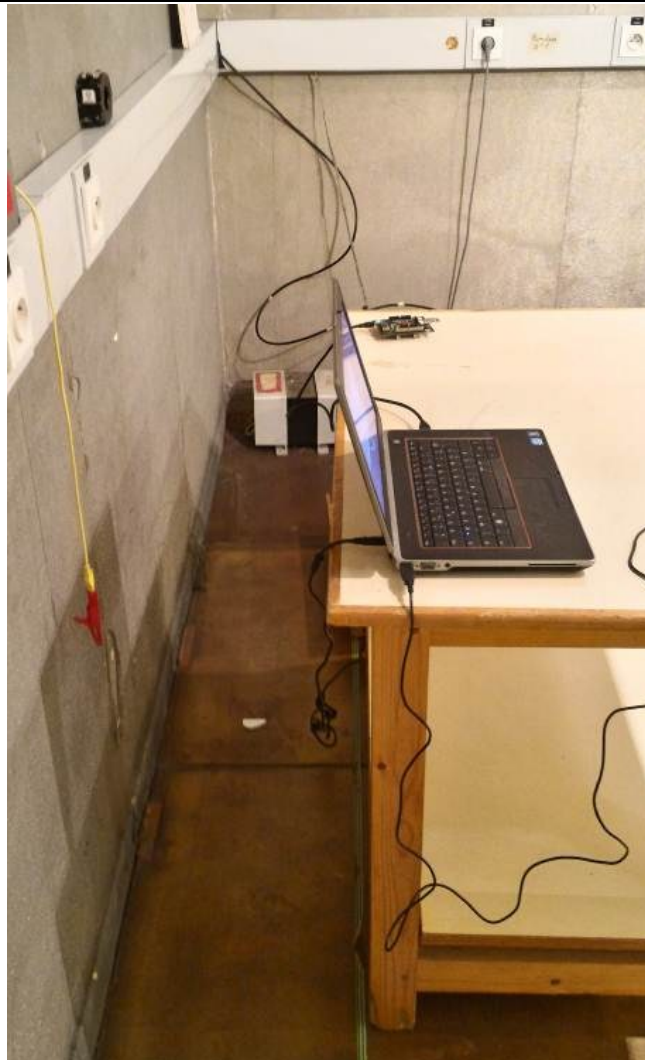
Test performed by :Laurent DENEUX  
Date of test :December 18<sup>th</sup>,2015  
Ambient temperature :21°C  
Relative humidity :53%

### 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 (Front view) - JN5179-001-M00 3V



Photograph for AC Power Line Conducted Emissions (Rear view) -JN5179-001-M00 3V



Photograph for AC Power Line Conducted Emissions (Front view) -JN5179-001-M00 6V

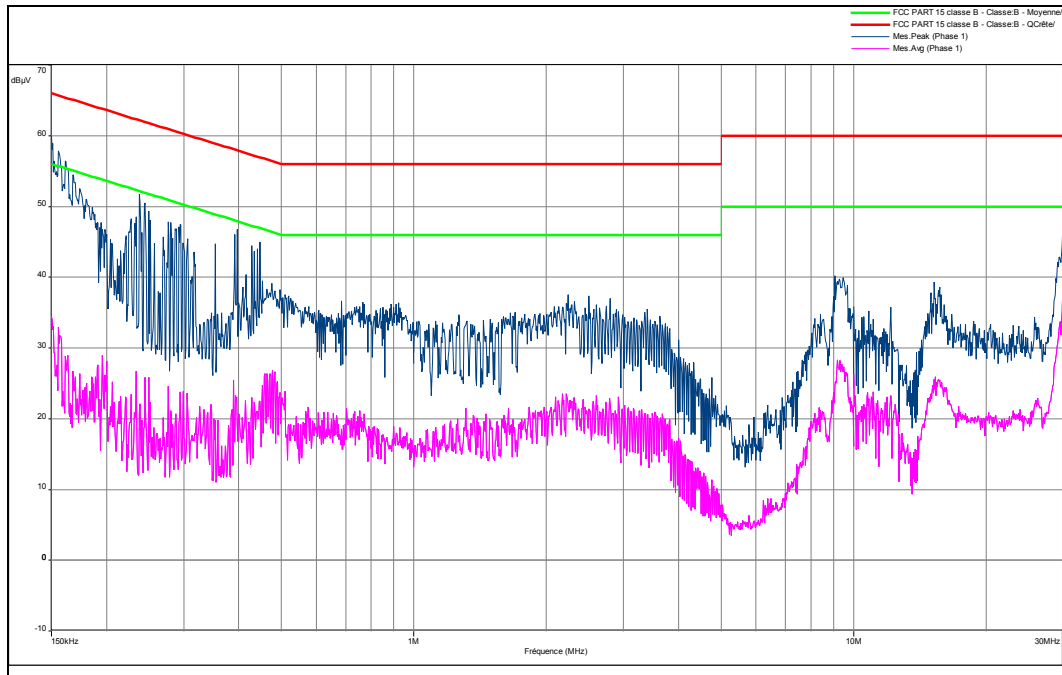


Photograph for AC Power Line Conducted Emissions (Rear view) - JN5179-001-M00 6V

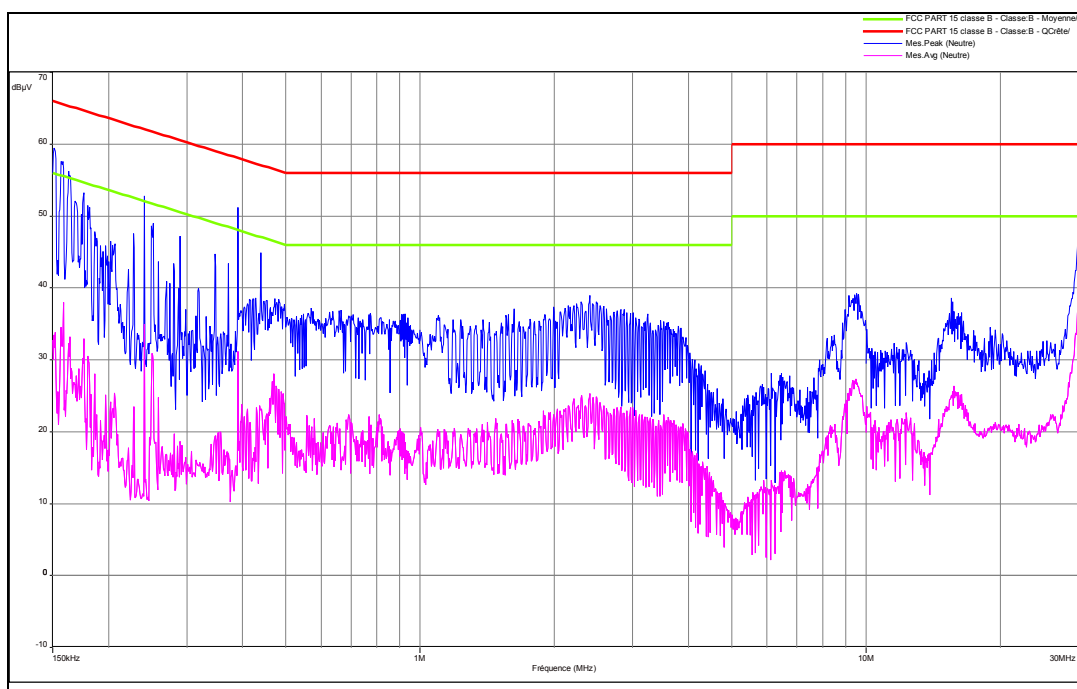
### 9.3. RESULTS

#### Channel 11 - JN5179-001-M00 3V

**Phase Line**



**Neutral Line**





## Phase Line

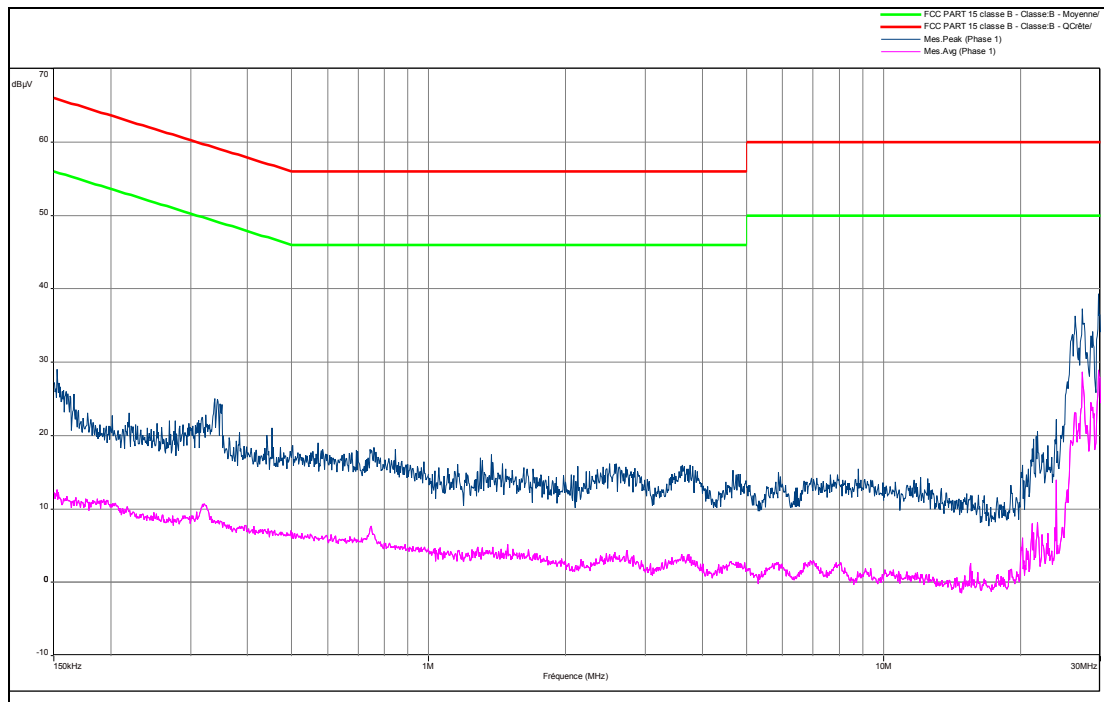
| Frequency (MHz) | Peak Level (dBμV) | Quasi-Peak Level (dBμV) | Quasi-Peak Limit (dBμV) | Average Level (dBμV) | Average Limit (dBμV) |
|-----------------|-------------------|-------------------------|-------------------------|----------------------|----------------------|
| 0.150           | 60                | -                       | 66                      | 34.3                 | 56                   |
| 0.237           | 51.7              | -                       | 62                      | 26.7                 | 52                   |
| 0.396           | 46.7              | -                       | 58                      | 25.5                 | 48                   |
| 9.058           | 40.2              | -                       | 60                      | 28.4                 | 50                   |
| 15.248          | 39.3              | -                       | 60                      | 25.9                 | 50                   |
| 30              | 42.7              | -                       | 60                      | 38.6                 | 50                   |

## Neutral Line

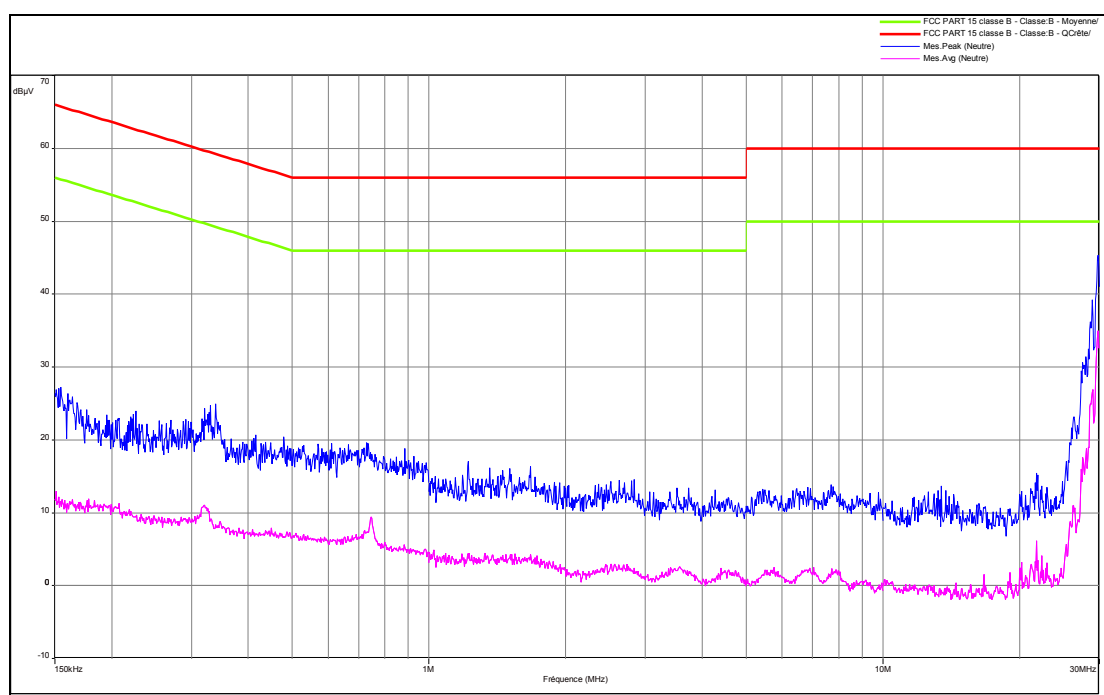
| Frequency (MHz) | Peak Level (dBμV) | Quasi-Peak Level (dBμV) | Quasi-Peak Limit (dBμV) | Average Level (dBμV) | Average Limit (dBμV) |
|-----------------|-------------------|-------------------------|-------------------------|----------------------|----------------------|
| 0.151           | 59.2              | -                       | 65.9                    | 38                   | 55.9                 |
| 0.240           | 52.7              | -                       | 62                      | 35                   | 52                   |
| 0.390           | 51.2              | -                       | 58                      | 31.2                 | 48                   |
| 9.426           | 39                | -                       | 60                      | 27.3                 | 50                   |
| 15.66           | 42                | -                       | 60                      | 26.3                 | 50                   |
| 30              | 47                | -                       | 60                      | 39                   | 50                   |

**Channel 11 - JN5179-001-M00 6V**

**Phase Line**



**Neutral Line**





## Phase Line

| Frequency (MHz) | Peak Level (dBμV) | Quasi-Peak Level (dBμV) | Quasi-Peak Limit (dBμV) | Average Level (dBμV) | Average Limit (dBμV) |
|-----------------|-------------------|-------------------------|-------------------------|----------------------|----------------------|
| 0.152           | 29                | -                       | 65.8                    | 13                   | 55.8                 |
| 0.343           | 25                | -                       | 59.1                    | 11                   | 49.1                 |
| 21.37           | 20                | -                       | 60                      | 6                    | 50                   |
| 24              | 38                | -                       | 60                      | 14                   | 50                   |
| 27.37           | 37                | -                       | 60                      | 28.6                 | 50                   |
| 29.7            | 39.3              | -                       | 60                      | 29                   | 50                   |

## Neutral Line

| Frequency (MHz) | Peak Level (dBμV) | Quasi-Peak Level (dBμV) | Quasi-Peak Limit (dBμV) | Average Level (dBμV) | Average Limit (dBμV) |
|-----------------|-------------------|-------------------------|-------------------------|----------------------|----------------------|
| 0.154           | 27.2              | -                       | 65.7                    | 13                   | 55.7                 |
| 0.338           | 25                | -                       | 59.2                    | 9.5                  | 49.2                 |
| 21.8            | 44.5              | -                       | 60                      | 3                    | 50                   |
| 26.3            | 37.5              | -                       | 60                      | 28                   | 50                   |
| 29              | 39.2              | -                       | 60                      | 27                   | 50                   |
| 29.7            | 45.4              | -                       | 60                      | 34.8                 | 50                   |

Result: **PASS**

**Limit: → Quasi-Peak**  
 0,15kHz to 0,5MHz: 66dBμV to 56dBμV\*  
 0,5MHz to 5MHz: 56dBμV  
 5MHz to 30MHz: 60dBμV

**Average**  
 0,15kHz to 0,5MHz: 56dBμV to 46dBμV\*  
 0,5MHz to 5MHz: 46dBμV  
 5MHz to 30MHz: 50dBμV

\*Decreases with the logarithm of the frequency



## 10. UNWANTED EMISSIONS INTO RESTRICTED FREQUENCY BANDS

### 10.1. TEST CONDITIONS

Test performed by :Laurent DENEUX  
Date of test :December 18<sup>th</sup>,2015  
Ambient temperature :18°C  
Relative humidity :47%

### 10.2. TEST SETUP

The product has been tested according to ANSI C63.10 (2013). The EUT is placed in a semi-anechoic chamber. 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 (JN5179-001-M00 -power supply 3V)



Photograph for Unwanted Emissions into Restricted Frequency Bands (JN5179-001-M00 -power supply 3V)



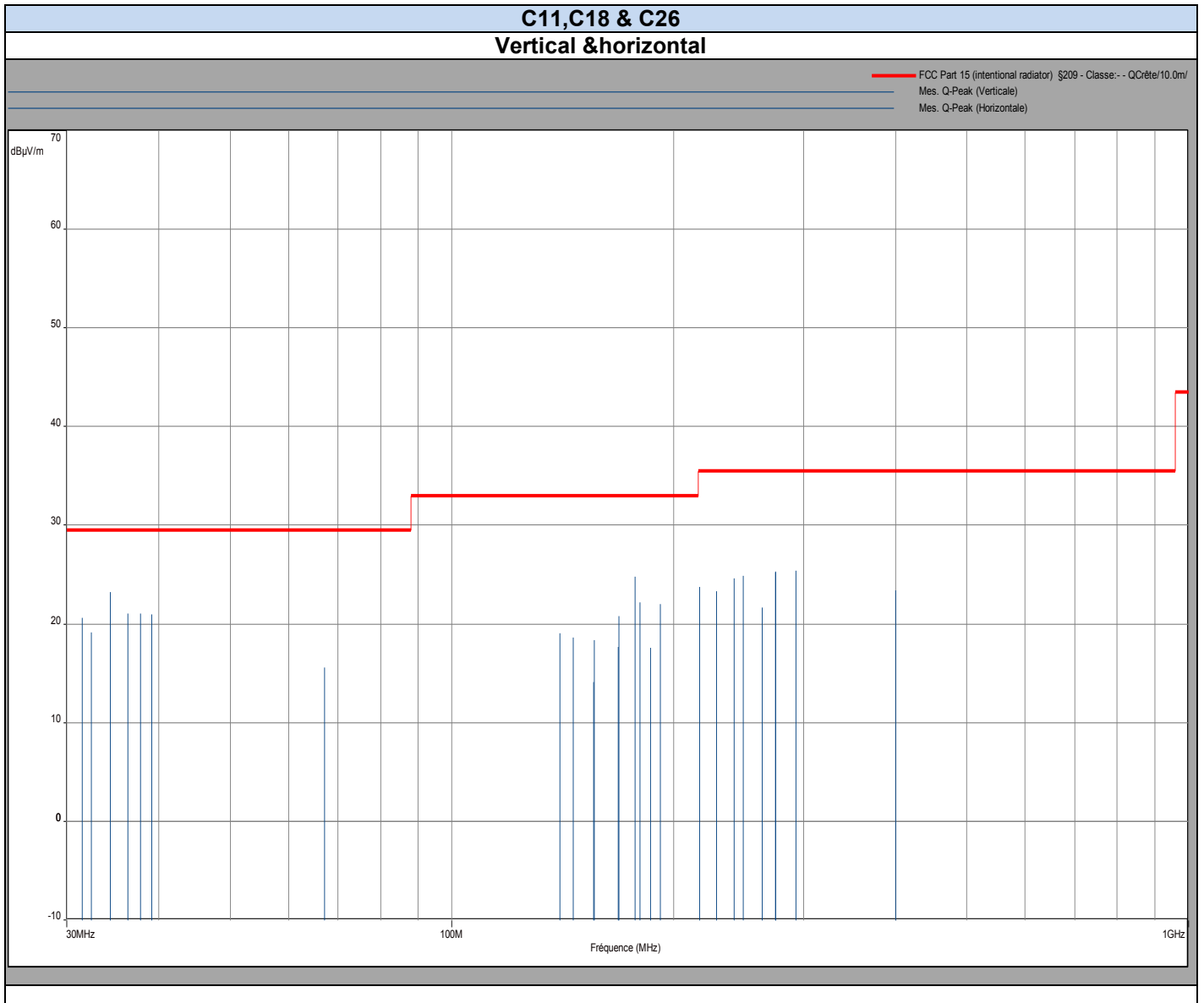
Photograph for Unwanted Emissions into Restricted Frequency Bands (JN5179-001-M00 -power supply 6V)



Photograph for Unwanted Emissions into Restricted Frequency Bands (JN5179-001-M00 -power supply 6V)

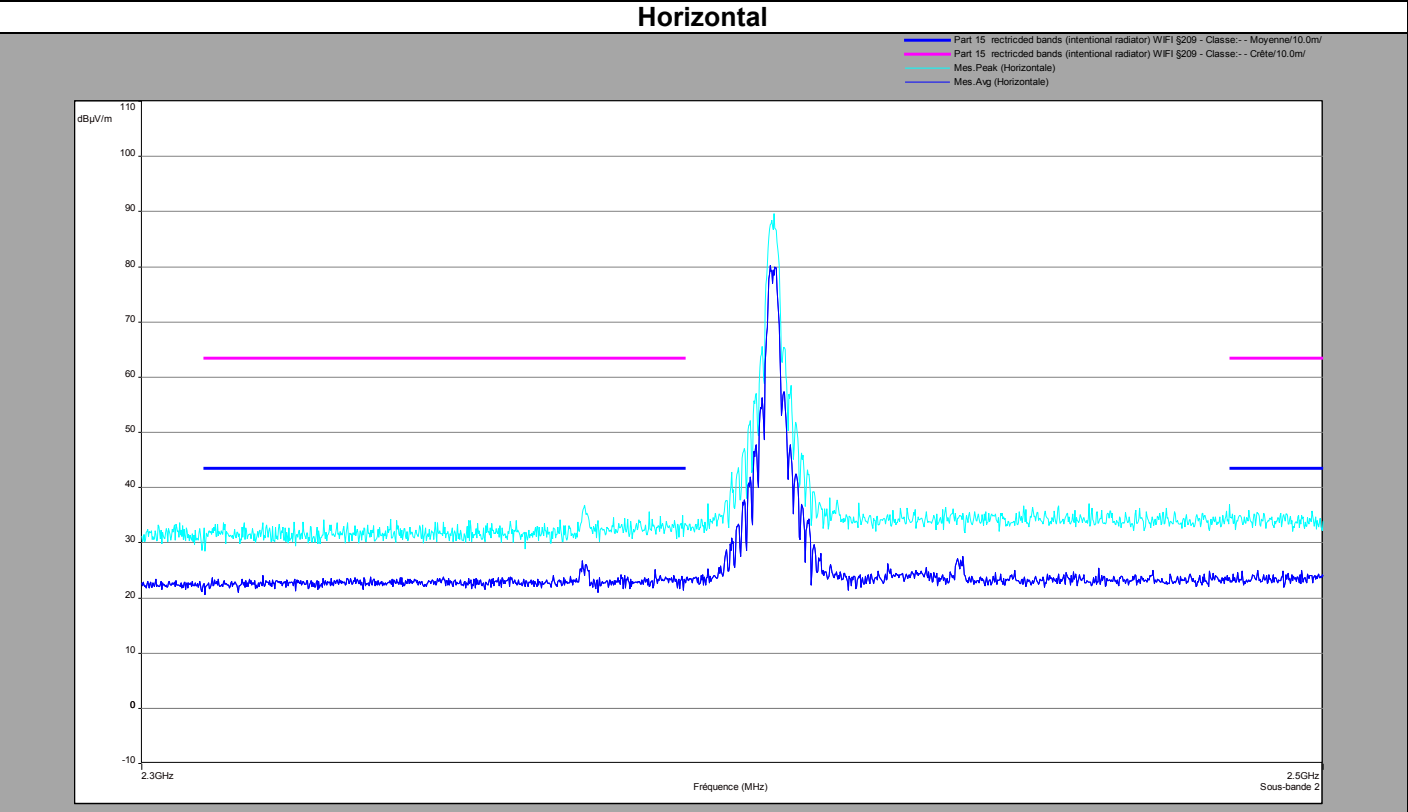
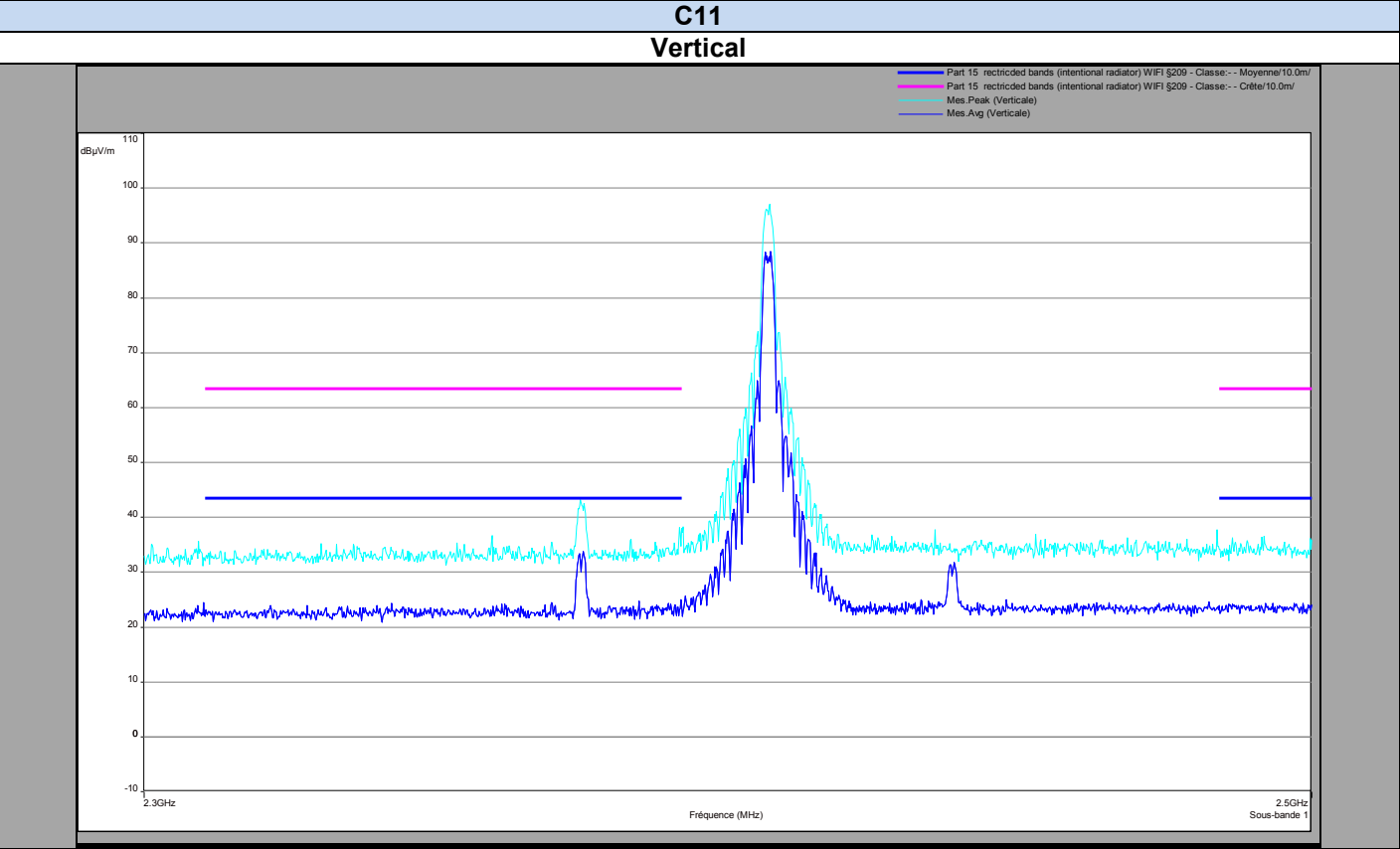
### 10.3. RESULTS

JN5179-001-M00 (power supply 3V)  
Below 1GHz



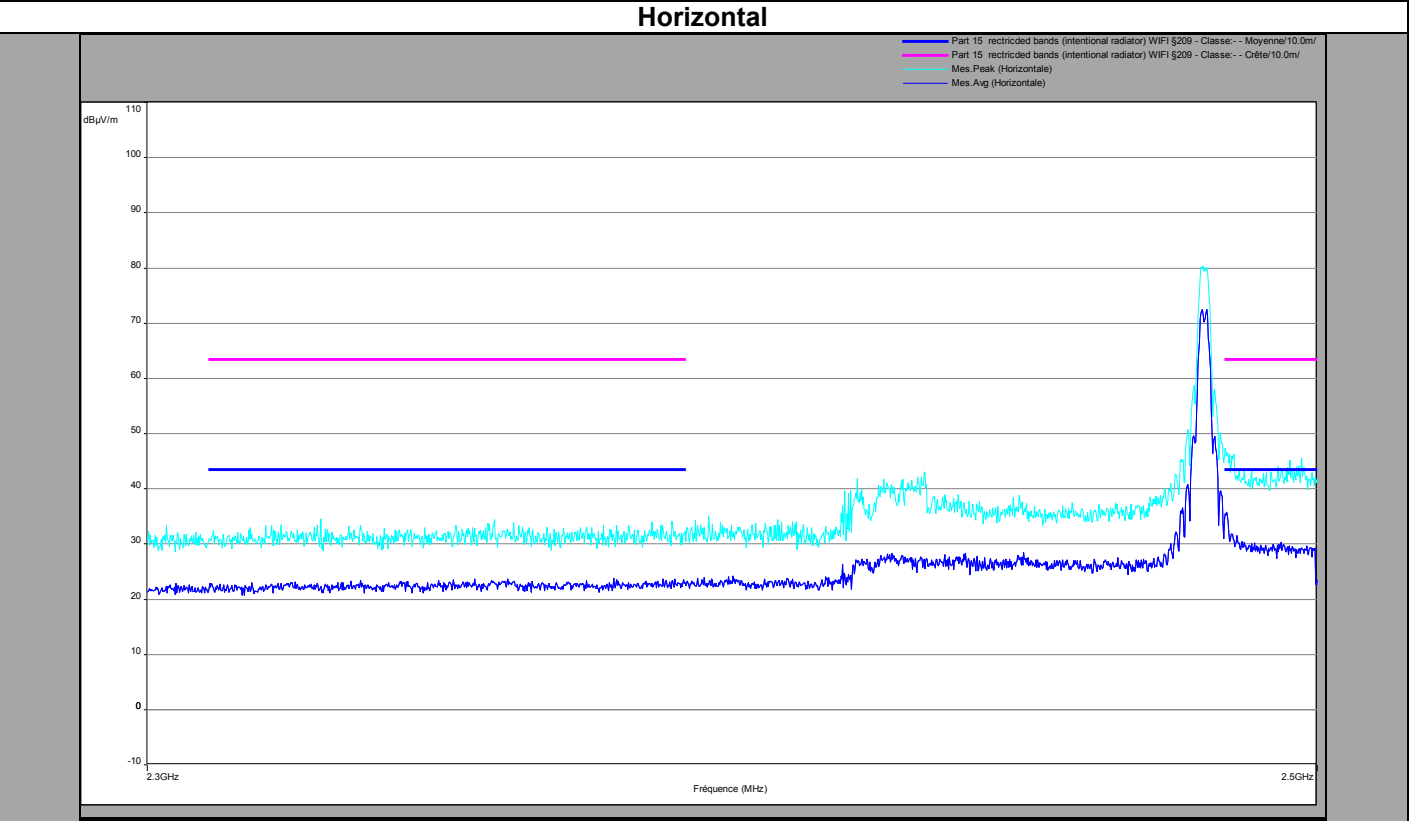
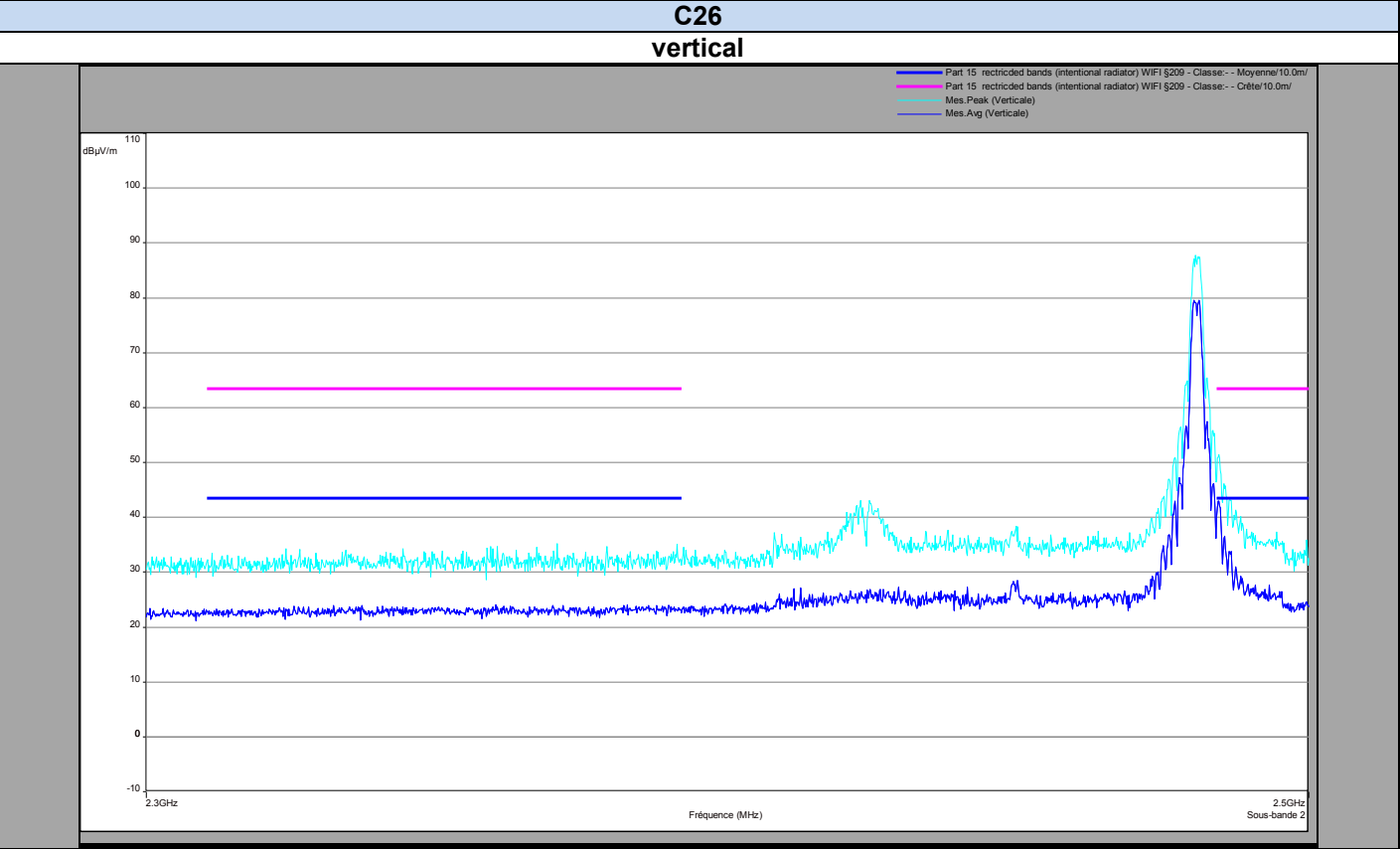


JN5179-001-M00 (power supply 3V)  
Above 1GHz



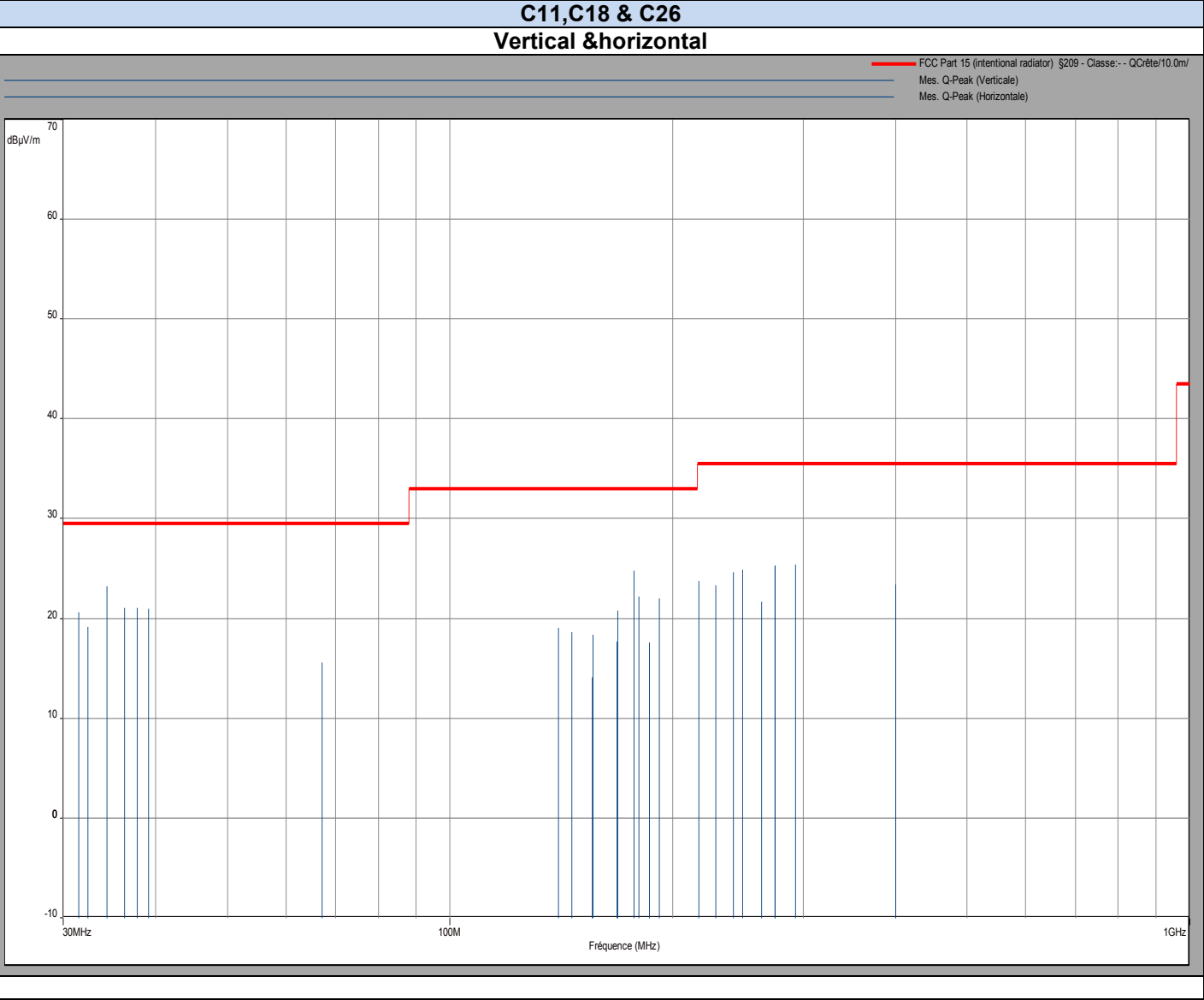


JN5179-001-M00 (power supply 3V)  
Above 1GHz





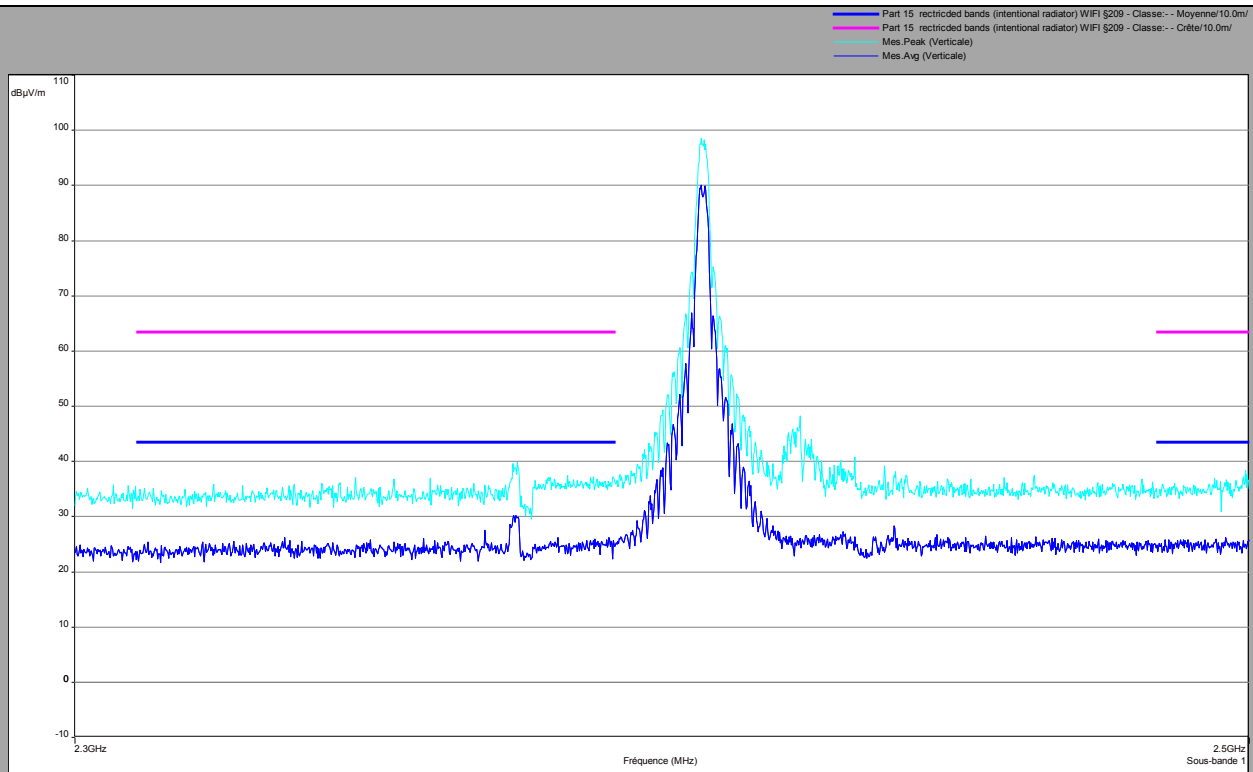
JN5179-001-M00 (power supply 6V)  
Below 1GHz



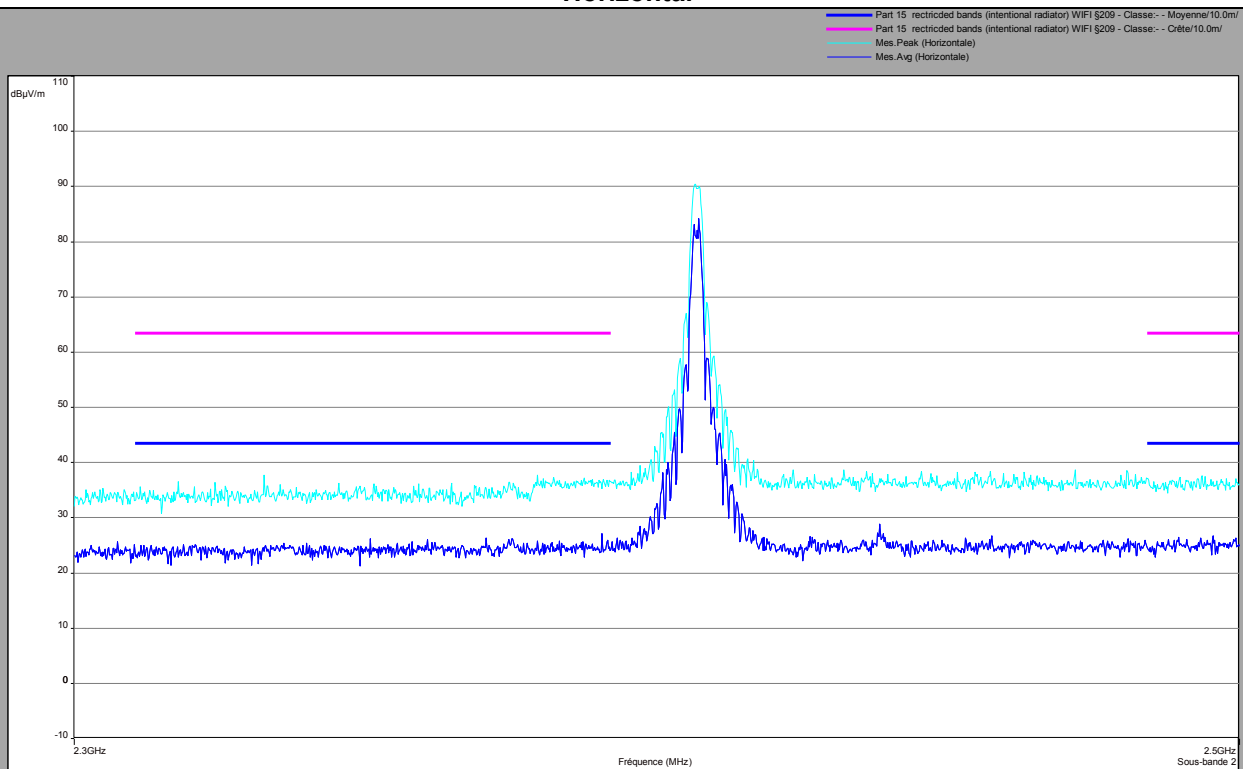


JN5179-001-M00 (power supply 6V)  
Above 1GHz

C11  
Vertical

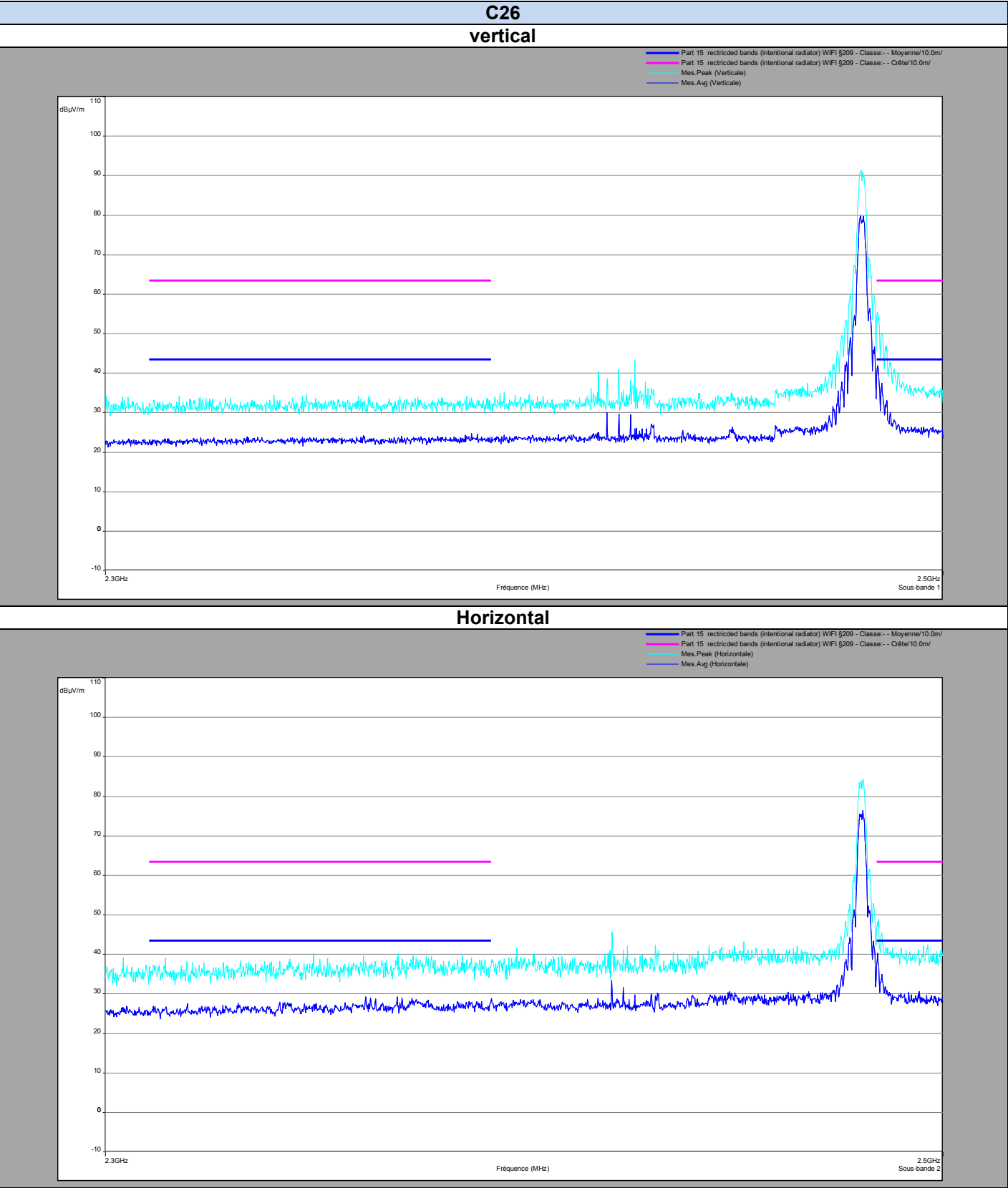


Horizontal





JN5179-001-M00 (power supply 6V)  
Above 1GHz





• **Characterization on an open test site (30MHz to 40GHz):**

**JN5179-001-M00 (power supply 3V)**

**Below 1GHz**

C11 18 and 26

| Polarisation | Frequency (MHz) | QPeak Level (dBμV/m) | Limit (dBμV/m) |
|--------------|-----------------|----------------------|----------------|
| Vertical     | 32.3            | 22.03                | 29.5           |
| Vertical     | 34.6            | 22.59                | 29.5           |
| Vertical     | 40.9            | 22.31                | 29.5           |
| Vertical     | 72              | 23.85                | 29.5           |
| Vertical     | 166             | 14.78                | 33             |
| Vertical     | 177.4           | 19.82                | 33             |
| Vertical     | 192.1           | 20.18                | 33             |
| Vertical     | 202.1           | 22.7                 | 33             |
| Vertical     | 209.8           | 18.79                | 33             |
| Vertical     | 221.6           | 24.17                | 35.5           |
| Vertical     | 240             | 19.96                | 35.5           |
| Vertical     | 253.9           | 22.91                | 35.5           |
| Vertical     | 268.7           | 25.9                 | 35.5           |
| Vertical     | 285.6           | 25.32                | 35.5           |
| Vertical     | 300             | 25.5                 | 35.5           |
| Vertical     | 400             | 23.45                | 35.5           |
| Vertical     | 480             | 25.05                | 35.5           |
| Horizontal   | 180.1           | 18.52                | 33             |
| Horizontal   | 233.8           | 19.27                | 35.5           |
| Horizontal   | 266.4           | 20.23                | 35.5           |
| Horizontal   | 281.1           | 21.86                | 35.5           |
| Horizontal   | 300             | 25.43                | 35.5           |
| Horizontal   | 396.3           | 26.09                | 35.5           |
| Horizontal   | 500             | 26.29                | 35.5           |

Above 1GHz

C11

| Polarisation | Frequency (MHz) | Average Level (dBμV/m) | Average Limit (dBμV/m) | Peak Level (dBμV/m) | Peak Limit (dBμV/m) |
|--------------|-----------------|------------------------|------------------------|---------------------|---------------------|
| Vertical     | 4810            | 25.3                   | 43.5                   | 34.3                | 63.5                |
| Vertical     | 7215            | 41.8                   | 43.5                   | 50.5                | 63.5                |
| Horizontal   | 7215            | 42.7                   | 43.5                   | 52.3                | 63.5                |

C18

| Polarisation | Frequency (MHz) | Average Level (dBμV/m) | Average Limit (dBμV/m) | Peak Level (dBμV/m) | Peak Limit (dBμV/m) |
|--------------|-----------------|------------------------|------------------------|---------------------|---------------------|
| Vertical     | 4880            | 28.1                   | 43.5                   | 34.7                | 63.5                |
| Vertical     | 7320            | 41.1                   | 43.5                   | 50.1                | 63.5                |
| Horizontal   | 7320            | 40.4                   | 43.5                   | 50.4                | 63.5                |

C26

| Polarisation | Frequency (MHz) | Average Level (dBμV/m) | Average Limit (dBμV/m) | Peak Level (dBμV/m) | Peak Limit (dBμV/m) |
|--------------|-----------------|------------------------|------------------------|---------------------|---------------------|
| Vertical     | 7441            | 38.6                   | 43.5                   | 51.3                | 63.5                |
| Horizontal   | 7441            | 38.7                   | 43.5                   | 51.3                | 63.5                |



**JN5179-001-M00 (power supply 6V)**  
**Below 1GHz**

C11 , 18 and 26

| Polarisation | Frequency (MHz) | QPeak Level (dBµV/m) | Limit (dBµV/m) |
|--------------|-----------------|----------------------|----------------|
| Vertical     | 31.5            | 20.67                | 29.5           |
| Vertical     | 32.4            | 19.21                | 29.5           |
| Vertical     | 34.4            | 23.27                | 29.5           |
| Vertical     | 36.3            | 21.08                | 29.5           |
| Vertical     | 37.8            | 21.11                | 29.5           |
| Vertical     | 39.1            | 21.03                | 29.5           |
| Vertical     | 67.2            | 15.63                | 29.5           |
| Vertical     | 140.2           | 19.12                | 33             |
| Vertical     | 146.2           | 18.69                | 33             |
| Vertical     | 155.6           | 14.17                | 33             |
| Vertical     | 168.3           | 17.69                | 33             |
| Vertical     | 177.4           | 24.82                | 33             |
| Vertical     | 185.9           | 17.66                | 33             |
| Vertical     | 216.9           | 23.76                | 35.5           |
| Vertical     | 228.6           | 23.33                | 35.5           |
| Vertical     | 248.5           | 24.95                | 35.5           |
| Vertical     | 263.7           | 21.67                | 35.5           |
| Vertical     | 275.2           | 25.23                | 35.5           |
| Vertical     | 292.8           | 25.41                | 35.5           |
| Vertical     | 400             | 23.42                | 35.5           |
| Horizontal   | 156.2           | 18.43                | 33             |
| Horizontal   | 168.5           | 20.82                | 33             |
| Horizontal   | 180             | 22.25                | 33             |
| Horizontal   | 191.9           | 22.07                | 33             |
| Horizontal   | 241.6           | 24.66                | 35.5           |
| Horizontal   | 275.2           | 25.34                | 35.5           |

Above 1GHz

C11

| Polarisation | Frequency (MHz) | Average Level (dBµV/m) | Average Limit (dBµV/m) | Peak Level (dBµV/m) | Peak Limit (dBµV/m) |
|--------------|-----------------|------------------------|------------------------|---------------------|---------------------|
| Vertical     | 7215            | 37.5                   | 43.5                   | 52.4                | 63.5                |
| Horizontal   | 7215            | 41.2                   | 43.5                   | 53.3                | 63.5                |

C18

| Polarisation | Frequency (MHz) | Average Level (dBµV/m) | Average Limit (dBµV/m) | Peak Level (dBµV/m) | Peak Limit (dBµV/m) |
|--------------|-----------------|------------------------|------------------------|---------------------|---------------------|
| Vertical     | 7320            | 38.7                   | 43.5                   | 52.2                | 63.5                |
| Horizontal   | 7320            | 40.4                   | 43.5                   | 52.6                | 63.5                |

C26

| Polarisation | Frequency (MHz) | Average Level (dBµV/m) | Average Limit (dBµV/m) | Peak Level (dBµV/m) | Peak Limit (dBµV/m) |
|--------------|-----------------|------------------------|------------------------|---------------------|---------------------|
| Vertical     | 7441            | 36.3                   | 43.5                   | 50.9                | 63.5                |
| Horizontal   | 7441            | 37.1                   | 43.5                   | 50                  | 63.5                |

|                 |                    |                                     |
|-----------------|--------------------|-------------------------------------|
| <b>Limit:</b> → | 30MHz to 88MHz:    | 29.5dBµV/m QPeak                    |
|                 | 88MHz to 216MHz:   | 33dBµV/m QPeak                      |
|                 | 216MHz to 960MHz:  | 35.5dBµV/m QPeak                    |
|                 | 960MHz to 1000MHz: | 43.5dBµV/m QPeak                    |
|                 | Above 1000MHz:     | 63.5BµV/m Peak<br>43.5BµV/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 |
| EMI receiver                                                                                                                                     | ROHDE & SCHWARZ | ESR 7             | A2642023            | 2015/03          | 2016/03         |
| RF cable & 20 dB attenuator                                                                                                                      | Télédyn         | 920-0202-048      | A5329661            | 2015/10          | 2016/10         |
| Multi-meter                                                                                                                                      | KEITHLEY        | 2000              | A1241084            | 2014/02          | 2016/02         |
| Programmable AC/DC power supply                                                                                                                  | KIKUSUI         | PCR500M           | A7040079            | 2014/05          | 2016/05         |
| Spectrum analyzer                                                                                                                                | ROHDE & SCHWARZ | FSL6              | A4060032            | 2015/04          | 2017/04         |
| Unwanted Emissions into Restricted Frequency Bands & Receiver Spurious Emissions                                                                 |                 |                   |                     |                  |                 |
| Apparatus                                                                                                                                        | Trade Mark      | Type              | Registration number | Calibration date | Calibration due |
| EMI receiver                                                                                                                                     | ROHDE & SCHWARZ | ESI40 1088 740K40 | A2642010            | 2015/05          | 2016/05         |
| Rejector filter 2,4GHz                                                                                                                           | -               | 2.45GHz           | A7484048            | 2015/12          | 2016/12         |
| Measurement RF cable                                                                                                                             | -               | -                 | A5329592            | 2014/05          | 2016/05         |
| Attenuator 3dB                                                                                                                                   | WEINSCHEL       | WA54-3-12         | A7122223            | 2015/06          | 2016/06         |
| Multi-meter                                                                                                                                      | KEITHLEY        | 2000              | A1241084            | 2014/02          | 2016/02         |
| Programmable AC/DC power supply                                                                                                                  | KIKUSUI         | PCR500M           | A7040079            | 2014/05          | 2016/05         |
| AC Power Line Conducted Emissions                                                                                                                |                 |                   |                     |                  |                 |
| Apparatus                                                                                                                                        | Trade Mark      | Type              | Registration number | Calibration date | Calibration due |
| Receiver                                                                                                                                         | ROHDE & SCHWARZ | ESU 26            | A2642018            | 2015-01          | 2016-01         |
| V ISLN                                                                                                                                           | ROHDE & SCHWARZ | ESH2-Z5           | C2322001            | 2015-06          | 2016-06         |
| Pulse limiter                                                                                                                                    | ROHDE & SCHWARZ | ESH3-Z2           | A2649008            | 2015-02          | 2016-02         |
| Cable                                                                                                                                            | -               | -                 | A5329417            | 2015-10          | 2016-10         |
| Ground plane                                                                                                                                     | LCIE            | -                 | -                   | -                | -               |



## 12. UNCERTAINTIES CHART

| Kind of test                                                                                                                  | Measurement uncertainties<br>(k=2) $\pm x(\text{dB})$ / (Hz) | Limit for uncertainties<br>$\pm y(\text{dB})$ |
|-------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------|
| <b>TRANSMITTER REQUIREMENTS</b>                                                                                               |                                                              |                                               |
| Radio frequency                                                                                                               | $\pm 2.10^{-8}$ Hz                                           | $\pm 1.10^{-7}$ Hz                            |
| RF Conducted power                                                                                                            | $\pm 0.6$ dB                                                 | $\pm 1.5$ dB                                  |
| Spurious emissions <ul style="list-style-type: none"> <li>Frequency &lt; 1000 MHz</li> <li>Frequency &gt; 1000 MHz</li> </ul> | $\pm 3.9$ dB<br>$\pm 3.1$ dB                                 | $\pm 6$ dB                                    |
| Spurious in conduction                                                                                                        | $\pm 1.6$ dB                                                 | $\pm 3$ 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> | $\pm 3.9$ dB<br>$\pm 3.1$ dB                                 | $\pm 6$ dB                                    |