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# Rapport d'essai / *Test report*

**N°** 56834-R4-E **JDE :** 104369

| | | |
|---|---|---|
| **DELIVRE A / *ISSUED TO*** | : | **INGENICO**<br>1 Rue Claude Chappe<br>B.P.348<br>07503 GUILHERAND GRANGES - FRANCE |
| **Objet / *Subject*** | : | Essais de compatibilité électromagnétique conformément aux normes **FCC CFR 47 Part 15, Subpart B.**<br>*Electromagnetic compatibility tests according to the standards* ***FCC CFR 47 Part 15, Subpart B*** |
| **Matériel testé / *Apparatus under test*** | : | |
| • Produit / *Product* | : | Terminal de paiement / *Payement terminal* |
| • Marque / *Trade mark* | : | **INGENICO** |
| • Constructeur / *Manufacturer* | : | **INGENICO** |
| • Nom commercial / *Marketing name* | | **ISMP** |
| • Type sous test / *Model under test* | : | **IMP350-01T1450A & IMP320-01T1446A & IMP300-BCSN1476A** |
| • N° de série / *serial number* | : | **PROTO1 & PROTO1 & PROTO1** |
| • FCC ID / IMP350 & IMP320 | : | **XKB-IMP3XX** |
| • FCC ID / IMP300 | | **XKB-IMP3XXCX** |
| **Date des essais / *Test date*** | : | Du 11 au 24 Janvier 2011 / *From January 11th to 24th, 2011* |
| **Lieu d'essai / *Test location*** | : | **LCIE SUD-EST**<br>ZI Centr'Alp – 170 rue de Chatagnon<br>38430 MOIRANS - FRANCE |
| **Test réalisé par / *Test performed by*** | : | Anthony MERLIN |

**Ce document comporte /*Composition of document :*** 29 pages.

MOIRANS, LE 18 MARS 2011 / MARCH 18TH, 2011

Ecrit par / *Written by,*
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Approuvé par / *Approved by,*
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## SUMMARY

## 1. TEST PROGRAM

**Standard:** **- FCC Part 15, Subpart B (Digital Devices)**
**- ANSI C63.4 (2009)**

| **EMISSION TEST** | **LIMITS** | | | **RESULTS (Comments)** |
|---|---|---|---|---|
| Limits for conducted disturbance at mains ports<br>150kHz-30MHz | **Frequency** | **Quasi-peak value (dBµV)** | **Average value (dBµV)** | **PASS** |
| | 150-500kHz | 66 to 56 | 56 to 46 | |
| | 0.5-5MHz | 56 | 46 | |
| | 5-30MHz | 60 | 50 | |
| Radiated emissions<br>30MHz-12.5GHz* | **Measure at 3m**<br>30MHz-88MHz : 40 dBµV/m<br>88MHz-216MHz : 43.5 dBµV/m<br>216MHz-960MHz : 46.0 dBµV/m<br>Above 960MHz : 54.0 dBµV/m | | | **PASS** |

***§15.33:** The highest internal source of a testing device is defined like more the highest frequency generated or used in the testing device or on which the testing device works or agrees.
- If the highest frequency of the internal sources of the testing device is lower than 108 MHz, measurement must be only performed until 1GHz.
- If the highest frequency of the internal sources of the testing device ranges between 108 MHz and 500 MHz, measurement must be only performed until 2GHz.
- If the highest frequency of the internal sources of the testing device ranges between 500 MHz and 1 GHz, measurement must be only performed until 5GHz.

If the highest frequency of the internal sources of the testing device is above 1 GHz, measurement must be only performed until 5 times the highest frequency or 40 GHz, while taking smallest of both.

## 2. SYSTEM TEST CONFIGURATION

### *2.1. JUSTIFICATION*

The system was configured for testing in a typical fashion (as a customer would normally use it).

### *2.2. HARDWARE IDENTIFICATION*

- **Model:**

Commercial Name : **ISMP**
Reference:

- **IMP320-01T1446A** *(No barcode)*
- **IMP350-01T1450A** *(With barcode) model tested, worst case.*
- **IMP300-BCSN1476A** (Base)

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

**IMP350-01T1450A** Serial number: **PROTO1 & PROTO1**
**Base with power supply adaptor:**
PHIHONG PSC12A-050, 100-240VAC / 5A / 50-60Hz, output 5VDC / 2A (US plug)
PHIHONG PSC12R-050, 100-240VAC / 5A / 50-60Hz, output 5VDC / 2A (Multi plug)
**Micro USB power supply adaptor:**
PHIHONG PSAC05R-050, 100-240VAC / 300mA / 50-60Hz, output 5VDC / 1A, No: 05 rev: 01.

Internal max frequencies:

- Clock: 400MHz

- **Input/output:**

- 2 x Power supply contacts (Base and Terminal)
- 1 x Mini USB, only used for recharge with power supply PHIHONG PSAC05R-050
- 1 x Dock connector

- **Cables:**

- None

- **Auxiliaries equipment used during test:**

- 1 x Iphone 4, Apple, Sn: 85034FMKA4S, configuration: plane mode.

- **Functions:**

- 1 x Barcode, not used on base, tested only in configuration n°2.
- 1 x CAM0, contact card reader, tested only in configuration n°2.

## *2.3. EUT CONFIGURATION*

***Configuration n°1:***
Terminal on its base for recharge with following parameters (with or without Iphone plugged, worst case results presented):
- Recharge of terminal
- Recharge of Iphone
- CAM0 (Contact card) OFF
- Barcode OFF

***Configuration n°2:***
Software TestCem used on terminal, followings functions are tested in loop during all tests (with or without Iphone plugged, worst case results presented):
- CAM0 (Contact card)
- Barcode
- Iphone plugged.

***Configuration n°3:***
Terminal plugged to power supply PHIHONG PSAC05R-050 for recharge with following parameters (with or without Iphone plugged, worst case results presented):
- Recharge of terminal
- Recharge of Iphone
- CAM0 (Contact card) OFF
- Barcode OFF

## *2.4. EQUIPMENT MODIFICATIONS*

None

## *2.5. SPECIAL ACCESSORIES*

None

# 3. RADIATED EMISSION DATA

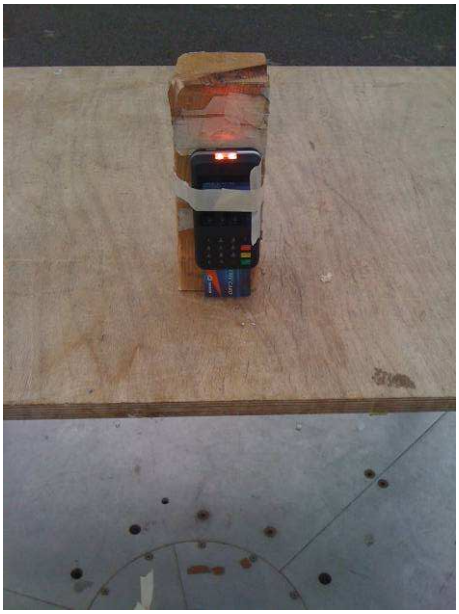
## *3.1. CLIMATIC CONDITIONS*

| | | | |
|---|---|---|---|
| Date of test | : January 11th, 2011 | and | January 24th, 2011 |
| Test performed by | : A.MERLIN | | |
| Atmospheric pressure | : 993mb | | 981mb |
| Relative humidity | : 30% | | 31% |
| Ambient temperature | : 22°C | | 20°C |

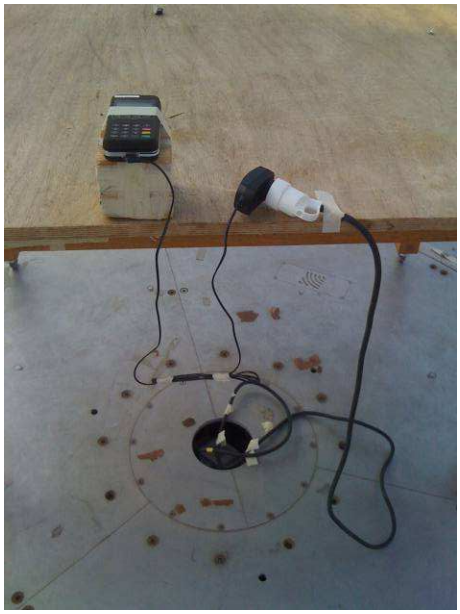
## *3.2. TEST SETUP*

The installation of EUT is identical for pre-characterization measurement in a 3 meters semi anechoic chamber and for measures on a 10 meters Open site.

***Configuration n°1***



***Configuration n°2***



***Configuration n°3***

## *3.3. TEST SEQUENCE AND RESULTS*

### 3.3.1. Pre-characterization [30MHz-2GHz]

For frequency band 30MHz to 1GHz, a pre-scan of all the setup has been performed in a 3 meters semi anechoic chamber.
The distance between EUT and antenna is 3 meters. Test is performed in horizontal (H) and vertical (V) polarization with a log-periodic antenna. The EUT is being rotated on 360° and on 3 axis during the measurement. The pre-characterization graphs are obtained in PEAK detection.
For frequency band 1GHz to 2GHz, a search is performed in the semi-anechoic chamber in order to determine frequencies radiated by the EUT (Measuring distance reduced to 1m).

**See graphs for 30MHz-1GHz:**

| | | | |
|---|---|---|---|
| H polarization | **Emr#1** | *Configuration n°1* | (See annex 1) |
| V polarization | **Emr#2** | *Configuration n°1* | (See annex 1) |
| H polarization | **Emr#3** | *Configuration n°2 – Axis XY* | (See annex 1) |
| V polarization | **Emr#4** | *Configuration n°2 – Axis XY* | (See annex 1) |
| H polarization | **Emr#5** | *Configuration n°2 – Axis Z* | (See annex 1) |
| V polarization | **Emr#6** | *Configuration n°2 – Axis Z* | (See annex 1) |
| H polarization | **Emr#7** | *Configuration n°3 – Axis XY* | (See annex 1) |
| V polarization | **Emr#8** | *Configuration n°3 – Axis XY* | (See annex 1) |
| H polarization | **Emr#9** | *Configuration n°3 – Axis Z* | (See annex 1) |
| V polarization | **Emr#10** | *Configuration n°3 – Axis Z* | (See annex 1) |

### 3.3.2. Characterization on 10 meters open site from 30MHz to 2GHz

The product has been tested at a distance of **10 meters** from the antenna and compared to the FCC part 15 subpart B §15.109 limits. Measurement bandwidth was 120kHz from 30 MHz to 1GHz and 1MHz from 1GHz to 2GHz.
Antenna height search was performed from 1m to 4m for both horizontal and vertical polarization. Continuous linear turntable azimuth search was performed with 360 degrees range. Measurement performed on 3 axis of EUT.
A summary of the worst case emissions found in all test configurations and modes is shown on clause 3.2

**Worst case final data result:**

***Configuration n°1:***

| No | Frequency (MHz) | QPeak Limit (dBµV/m) | Qpeak * (dBµV/m) | Qpeak-Limit (Margin, dB) | Angle (deg) | Pol | Hgt (cm) | Tot Corr (dB) | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 52.793 | 40.0 | 27.6 | **-12.4** | 210 | V | 100 | 11.5 | |
| 2 | 144.286 | 43.5 | 28.9 | **-14.6** | 35 | V | 100 | 14.9 | |
| 3 | 577.551 | 46.0 | 33.9 | **-12.1** | 180 | V | 150 | 23.2 | |
| 4 | 630.345 | 46.0 | 31.8 | **-14.2** | 10 | V | 250 | 24.1 | |
| 5 | 774.399 | 46.0 | 34.1 | **-11.9** | 45 | V | 200 | 26.5 | |

*: Measure have been done at 10m distance and corrected according to requirements of 15.209.e)
(M@3m = M@10m+10.5dB)

***Configuration n°2:***

| No | Frequency (MHz) | QPeak Limit (dBµV/m) | Qpeak * (dBµV/m) | Qpeak-Limit (Margin, dB) | Angle (deg) | Pol | Hgt (cm) | Tot Corr (dB) | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 58.919 | 40.0 | 25.3 | **-14.7** | 140 | V | 100 | 11.6 | AXIS Z |
| 2 | 325.008 | 46.0 | 38.7 | **-7.3** | 300 | V | 100 | 18.7 | AXIS XY |
| 3 | 352.541 | 46.0 | 38.9 | **-7.1** | 70 | V | 100 | 19.0 | AXIS XY |
| 4 | 375.009 | 46.0 | 42.3 | **-3.7** | 90 | V | 100 | 19.2 | AXIS XY |
| 5 | 425.012 | 46.0 | 38.9 | **-7.1** | 120 | V | 100 | 20.2 | AXIS XY |
| 6 | 500.019 | 46.0 | 39.0 | **-7.0** | 310 | V | 100 | 22.2 | AXIS Z |
| 7 | 625.009 | 46.0 | 38.6 | **-7.4** | 190 | V | 250 | 24.0 | AXIS Z |
| 8 | 875.027 | 46.0 | 39.6 | **-6.4** | 300 | V | 300 | 27.9 | AXIS Z |

*: Measure have been done at 10m distance and corrected according to requirements of 15.209.e)
(M@3m = M@10m+10.5dB)

***Configuration n°3:***

| No | Frequency (MHz) | QPeak Limit (dBµV/m) | Qpeak * (dBµV/m) | Qpeak-Limit (Margin, dB) | Angle (deg) | Pol | Hgt (cm) | Tot Corr (dB) | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 40.341 | 40.0 | 31.6 | **-8.4** | 190 | V | 100 | 13.3 | AXIS Z |
| 2 | 41.789 | 40.0 | 36.0 | **-4.0** | 135 | V | 100 | 12.9 | AXIS Z |
| 3 | 44.611 | 40.0 | 31.9 | **-8.1** | 95 | V | 100 | 11.7 | AXIS Z |
| 4 | 129.578 | 43.5 | 33.6 | **-9.9** | 185 | H | 250 | 14.8 | AXIS Z |
| 5 | 133.317 | 43.5 | 34.7 | **-8.8** | 15 | H | 200 | 14.6 | AXIS XY |
| 6 | 135.377 | 43.5 | 34.2 | **-9.3** | 55 | H | 300 | 14.4 | AXIS XY |
| 7 | 138.927 | 43.5 | 32.4 | **-11.1** | 345 | H | 200 | 14.2 | AXIS XY |
| 8 | 145.623 | 43.5 | 31.4 | **-12.1** | 255 | V | 150 | 13.7 | AXIS Z |
| 9 | 243.602 | 46.0 | 29.4 | **-16.6** | 220 | V | 100 | 14.8 | AXIS XY |
| 10 | 290.311 | 46.0 | 33.9 | **-12.1** | 45 | V | 150 | 16.1 | AXIS XY |

*: Measure have been done at 10m distance and corrected according to requirements of 15.209.e)
(M@3m = M@10m+10.5dB)

***Frequency band 1GHz to 2GHz***
Measurements are performed using a PEAK and Average detection. (RBW = 1MHz)

***Configuration n°1:***

| No | Frequency (GHz) | Limit Average (dBµV/m) | Measure Average (dBµV/m) | Margin (Mes-Lim) (dB) | Angle Table (deg) | Pol Ant. | Ht Ant. (cm) | Correc. factor (dB) | Comments |
|---|---|---|---|---|---|---|---|---|---|
| No Significant Frequency observed | | | | | | | | | |

**Note: Measures have been done at 3m distance.**

***Configuration n°2:***

| No | Frequency (GHz) | Limit Average (dBµV/m) | Measure Average (dBµV/m) | Margin (Mes-Lim) (dB) | Angle Table (deg) | Pol Ant. | Ht Ant. (cm) | Correc. factor (dB) | Comments |
|---|---|---|---|---|---|---|---|---|---|
| No Significant Frequency observed | | | | | | | | | |

**Note: Measures have been done at 3m distance.**

***Configuration n°3:***

| No | Frequency (GHz) | Limit Average (dBµV/m) | Measure Average (dBµV/m) | Margin (Mes-Lim) (dB) | Angle Table (deg) | Pol Ant. | Ht Ant. (cm) | Correc. factor (dB) | Comments |
|---|---|---|---|---|---|---|---|---|---|
| No Significant Frequency observed | | | | | | | | | |

**Note: Measures have been done at 3m distance.**

**RESULTS: PASS**

### *3.4. FIELD STRENGTH CALCULATION*

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follow:

FS = RA + AF + CF – AG

Where FS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Factor
AG = Amplifier Gain

Assume a receiver reading of 52.5dBµV is obtained. The antenna factor of 7.4 and a cable factor of 1.1 are added. The amplifier gain of 29dB is subtracted, giving a field strength of 32 dBµV/m.
FS = 52.5 + 7.4 + 1.1 – 29 = 32 dBµV/m
The 32 dBµV/m value can be mathematically converted to its corresponding level in µV/m.
Level in µV/m = Common Antilogarithm [(32dBµV/m)/20] = 39.8 µV/m.

# 4. CONDUCTED EMISSION DATA

## *4.1. CLIMATIC CONDITIONS*

| | | | |
|---|---|---|---|
| Date of test | : January 11th, 2011 | and | January 21st, 2011 |
| Test performed by | : A.MERLIN | | |
| Atmospheric pressure | : 993mb | | 991mb |
| Relative humidity | : 30% | | 31% |
| Ambient temperature | : 22°C | | 21°C |

## *4.2. SETUP FOR CONDUCTED EMISSIONS MEASUREMENT*

The product has been tested according to ANSI C63.4-(2009) and FCC Part 15 subpart B.

The product has been tested with 120V/60Hz power line voltage and compared to the FCC Part 15 subpart B §15.107. Measurement bandwidth was 9kHz from 150 kHz to 30 MHz.
Measurement is made with a Rohde & Schwarz ESU8 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 50Ω / 50µH.
The Peak data are shown on plots in annex 1. Quasi-Peak and Average measurements are detailed in a table with frequencies and levels measured.
Interconnecting cables and equipment's were moved to position that maximized emission. A summary of the worst case emissions found in all test configurations and modes is shown on the following page.

## *4.3. TEST SETUP*

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 trough the LISN (measure).


***Configuration n°1***



***Configuration n°3***

### *4.4. TEST SEQUENCE AND RESULTS*

Measurements are performed on the phase (L1) and neutral (N) of power line voltage.
A measurement is also performed with a 50Ω dummy load replacing the transmitter antenna in order to demonstrate that some 13.56MHz may be cross-coupled to AC line connection.
Graphs are obtained in PEAK detection.
Measures are also performed in Quasi-Peak and Average for any strong signal.

***Configuration n°1:***

| | | |
|---|---|---|
| Measure on L1: | graph Emc#1 | (see annex 1) |
| Measure on N: | graph Emc#2 | (see annex 1) |

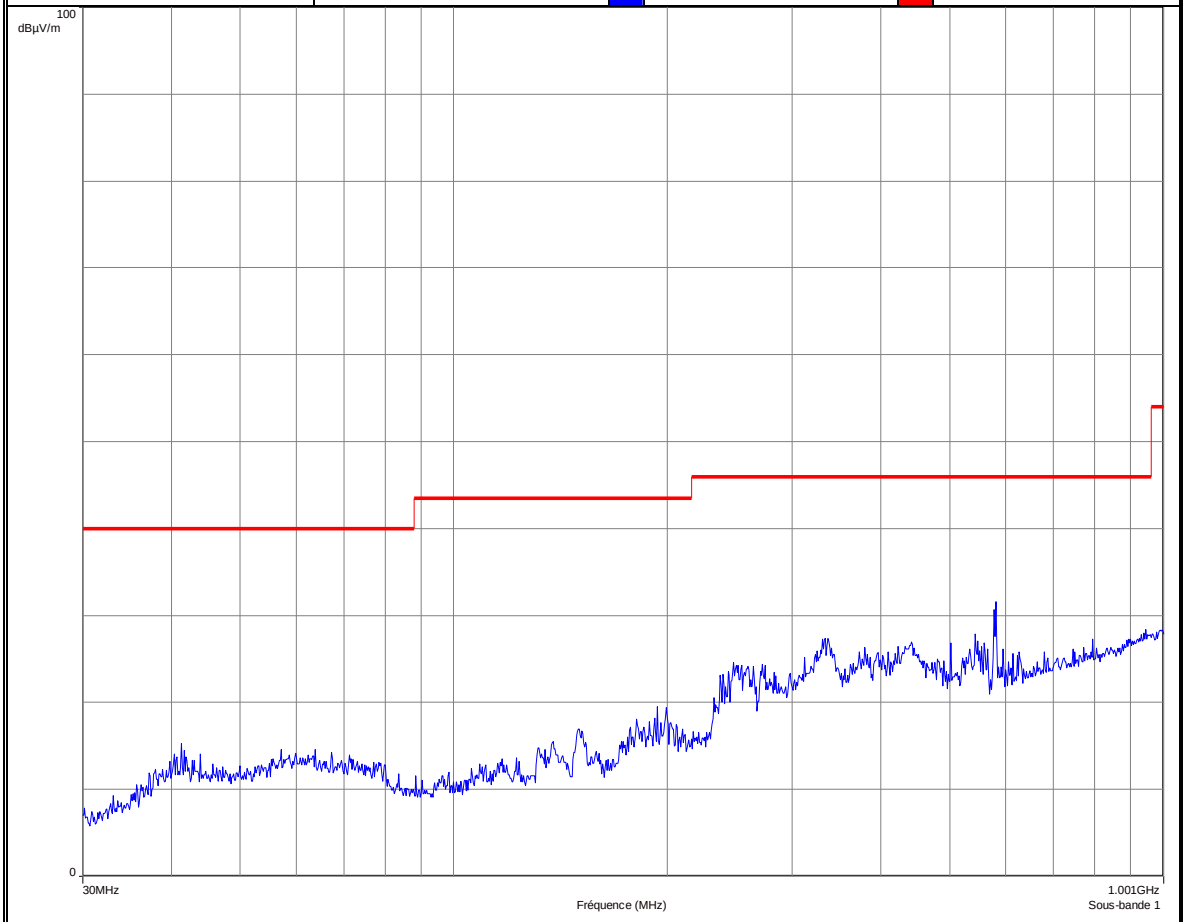
***Configuration n°3:***

| | | |
|---|---|---|
| Measure on L1: | graph Emc#3 | (see annex 1) |
| Measure on N: | graph Emc#4 | (see annex 1) |

**RESULT: PASS**

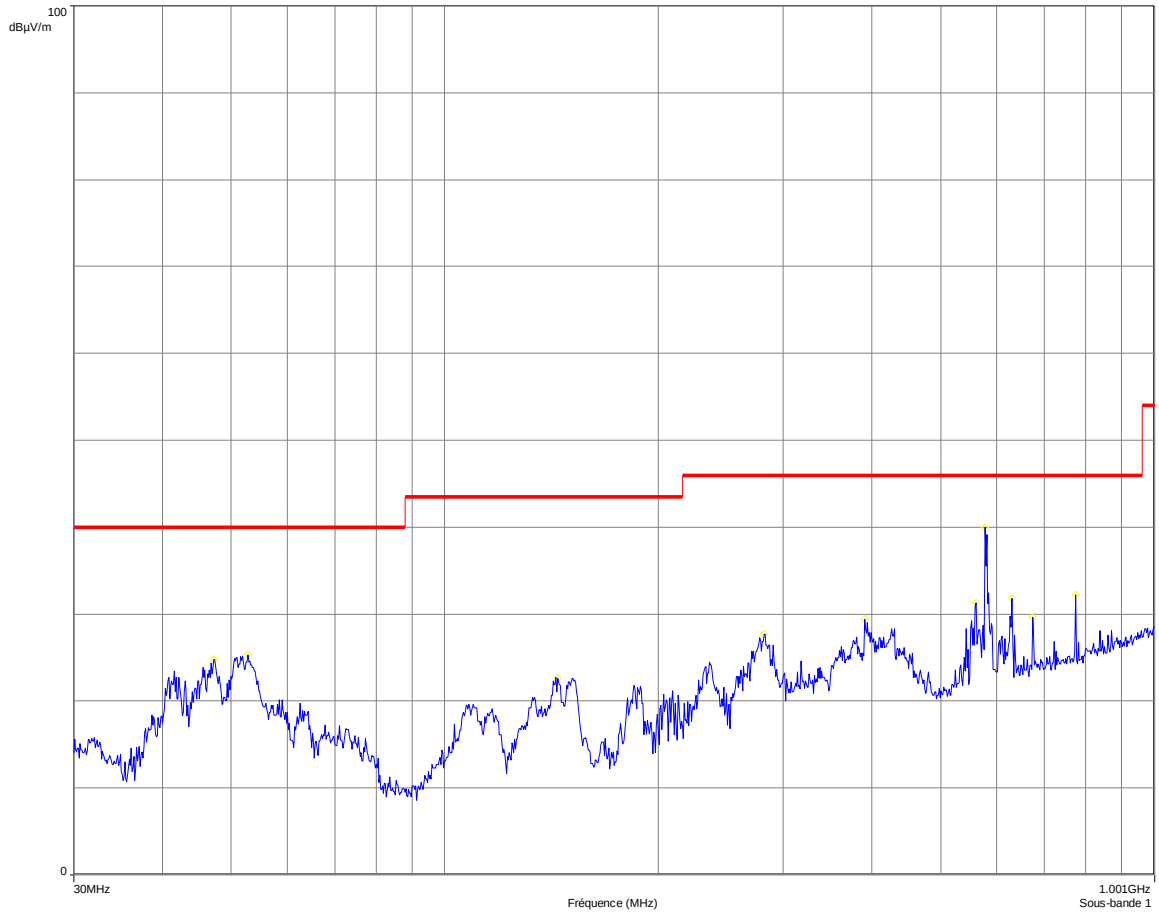
## 5. ANNEX 1 (GRAPHS)

| RADIATED EMISSION | | Test configuration: 1 | |
|---|---|---|---|
| Graph name: | **Emr#1** | | |
| Antenna position: | **Horizontal** | | |
| Azimuth: | **0°- 360°** | | |
| RBW/VBW: | **120kHz / 300kHz** | **Peak Measure** | **QPeak Limit@3m** |



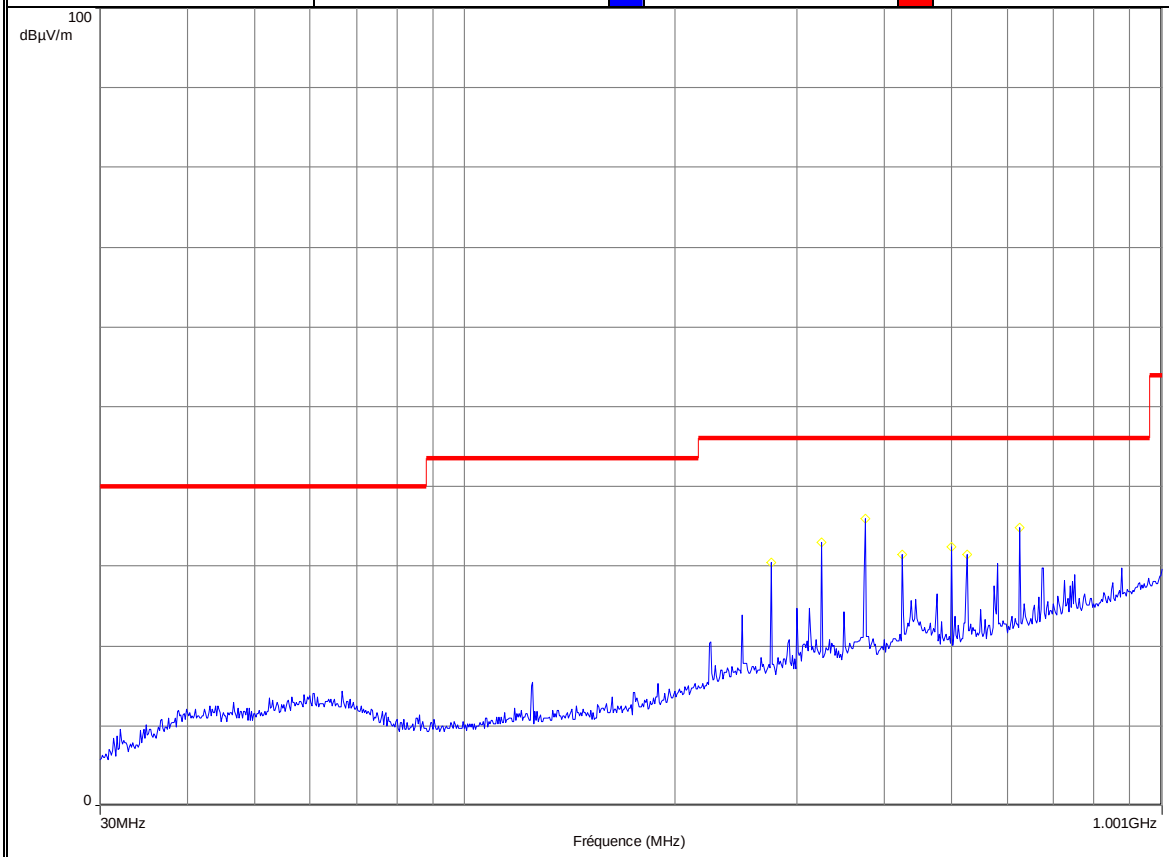

| Frequency (MHz) | Peak (dBµV/m) |
|---|---|
| 337.160 | 27.4 |
| 581.000 | 31.6 |

| RADIATED EMISSION | | Test configuration: 1 | | |
|---|---|---|---|---|
| Graph name: | **Emr#2** | | | |
| Antenna position: | **Vertical** | | | |
| Azimuth: | **0° - 360°** | | | |
| RBW/VBW: | **120kHz / 300kHz** | **Peak Measure** | | **QPeak Limit@3m** |



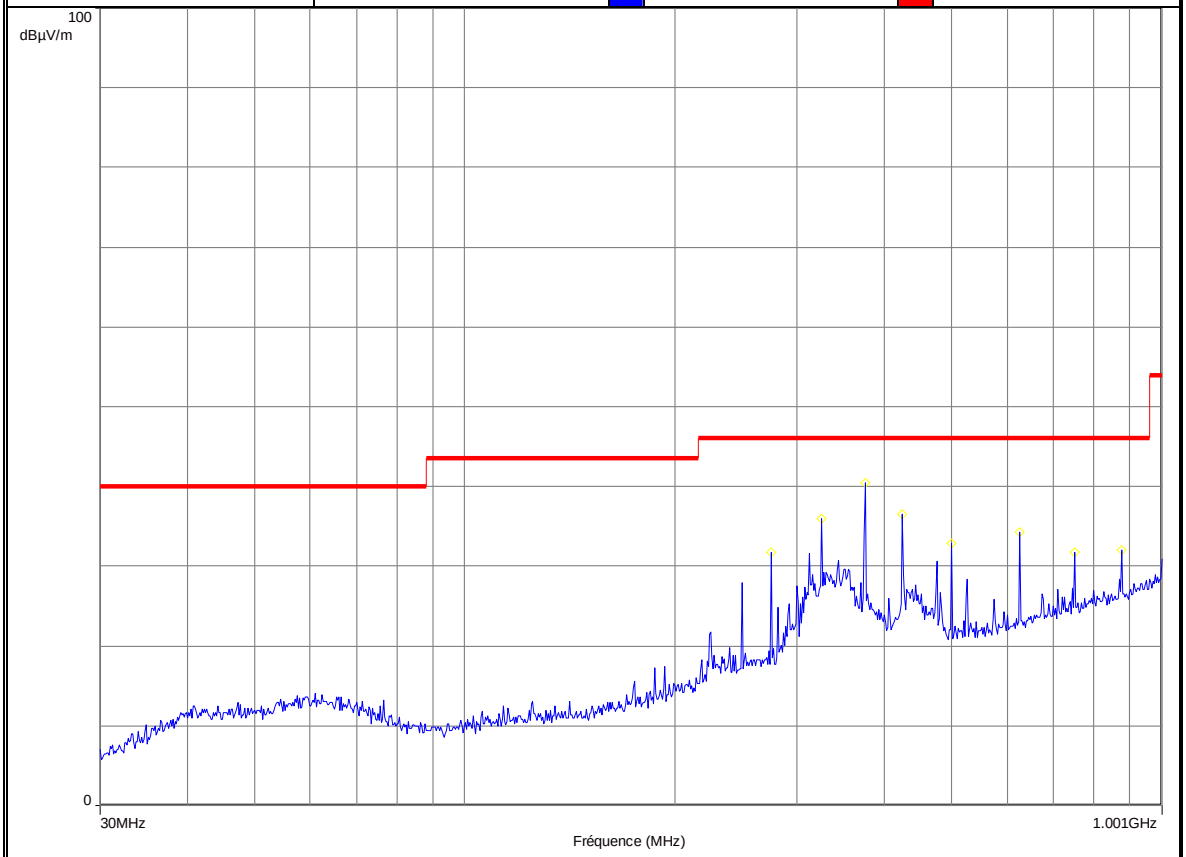

| Frequency (MHz) | Peak (dBµV/m) |
|---|---|
| 47.200 | 24.8 |
| 52.840 | 25.3 |
| 144.280 | 22.7 |
| 281.960 | 27.7 |
| 390.480 | 29.4 |
| 561.200 | 31.3 |
| 577.560 | 39.9 |
| 630.320 | 31.8 |
| 674.200 | 29.7 |
| 774.440 | 32.2 |

| RADIATED EMISSION | | Test configuration: 2 |
|---|---|---|
| Graph name: | **Emr#4** | **Axis XY** |
| Antenna position: | **Horizontal** | **Barcode ON** |
| Azimuth: | **0° - 360°** | |
| RBW/VBW: | **120kHz / 300kHz** | **Peak Measure** / **QPeak Limit@3m** |



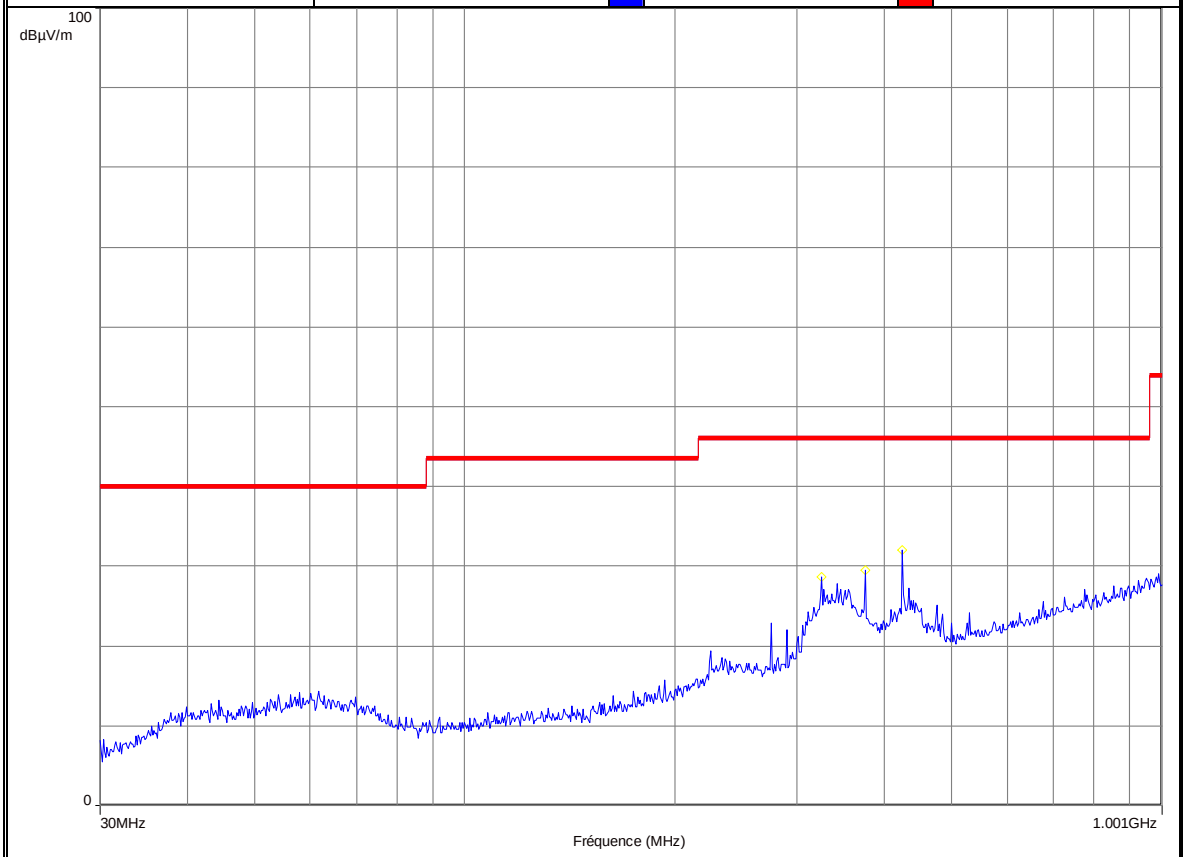

| Frequency (MHz) | Peak (dBµV/m) |
|---|---|
| 275.040 | 30.5 |
| 324.920 | 33.0 |
| 374.920 | 35.9 |
| 424.960 | 31.5 |
| 499.920 | 32.5 |
| 524.880 | 31.4 |
| 624.960 | 34.8 |

| RADIATED EMISSION | | Test configuration: 2 |
|---|---|---|
| Graph name: | **Emr#5** | **Axis XY** |
| Antenna position: | **Vertical** | **Barcode ON** |
| Azimuth: | **0° - 360°** | |
| RBW/VBW: | **120kHz / 300kHz** | **Peak Measure** / **QPeak Limit@3m** |



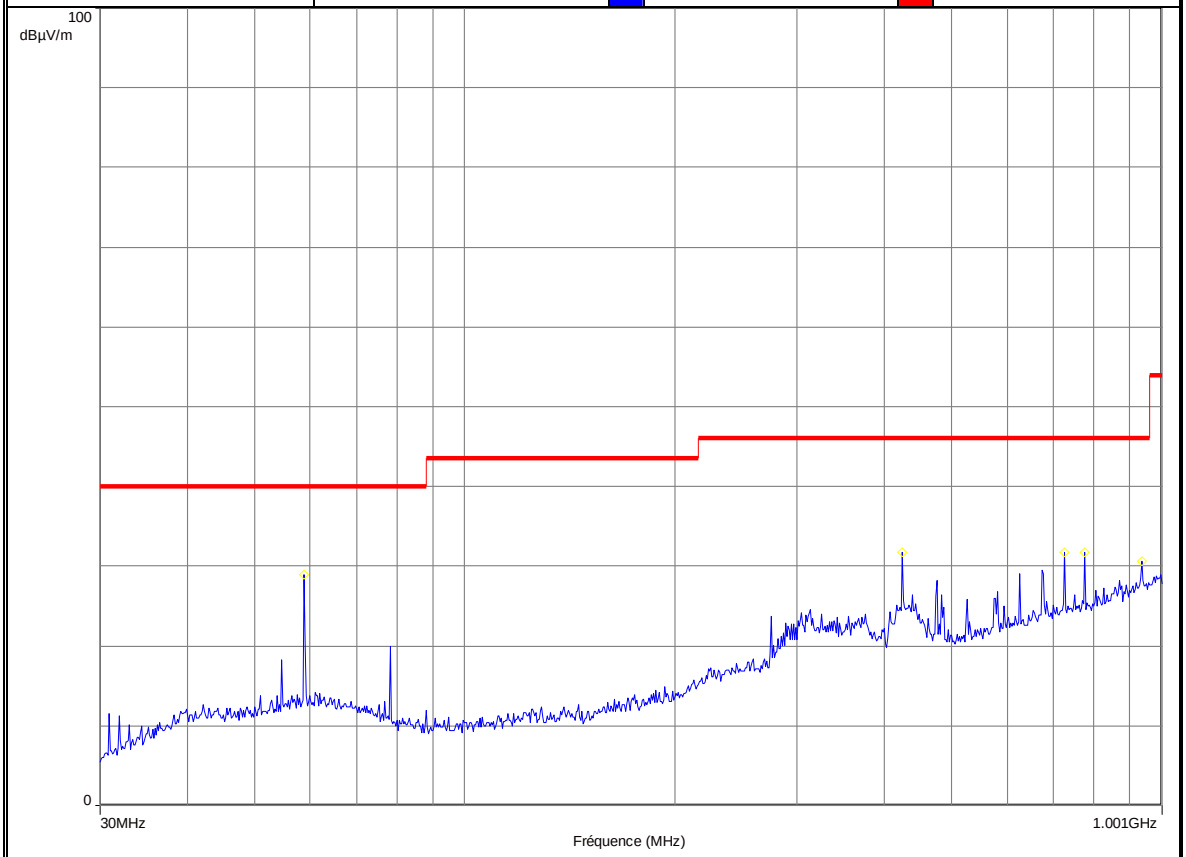

| Frequency (MHz) | Peak (dBµV/m) |
|---|---|
| 275.000 | 31.7 |
| 324.920 | 36.0 |
| 374.920 | 40.4 |
| 424.960 | 36.6 |
| 499.920 | 32.9 |
| 625.000 | 34.3 |
| 750.000 | 31.8 |
| 875.040 | 32.0 |

| RADIATED EMISSION | | Test configuration: 2 |
|---|---|---|
| Graph name: | **Emr#6** | **Axis Z** |
| Antenna position: | **Horizontal** | **Barcode ON** |
| Azimuth: | **0° - 360°** | |
| RBW/VBW: | **120kHz / 300kHz** | **Peak Measure** / **QPeak Limit@3m** |



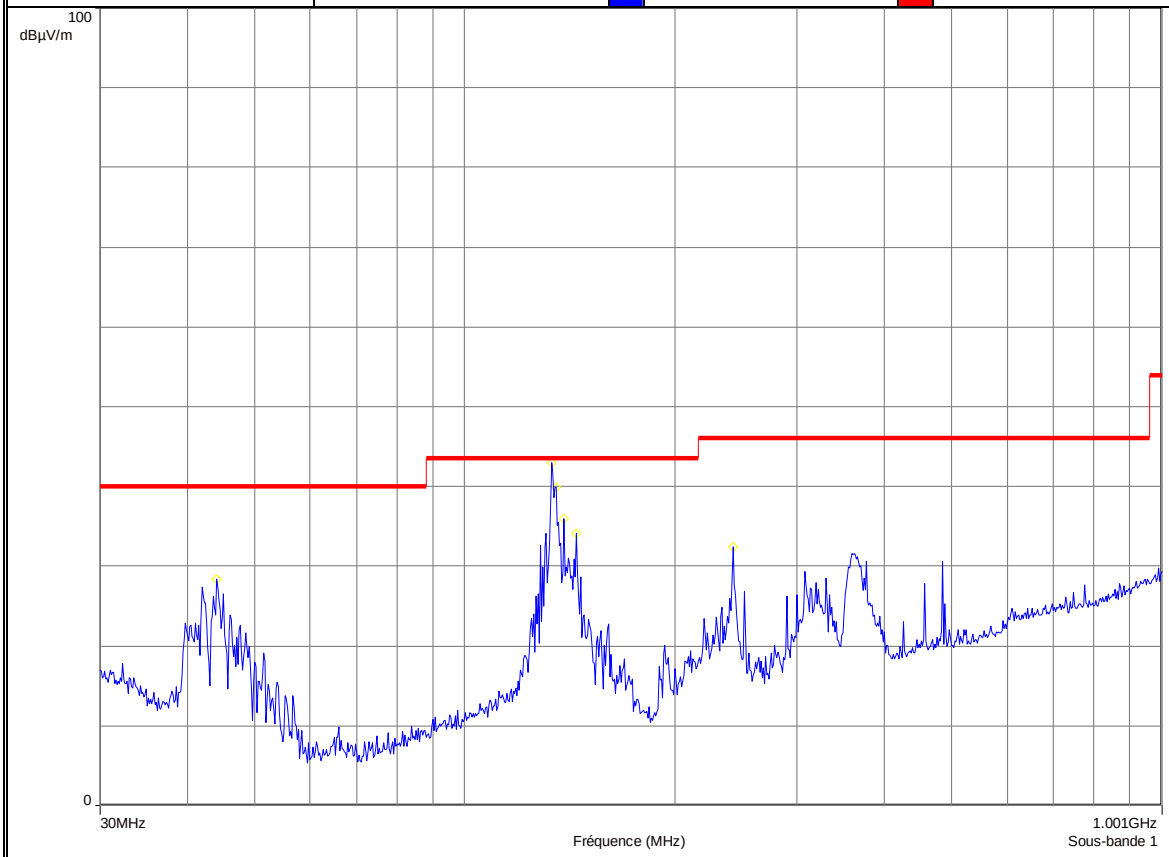

| Frequency (MHz) | Peak (dBµV/m) |
|---|---|
| 324.920 | 28.7 |
| 374.840 | 29.4 |
| 424.960 | 32.0 |

| RADIATED EMISSION | | Test configuration: 2 |
|---|---|---|
| Graph name: | **Emr#7** | **Axis Z** |
| Antenna position: | **Vertical** | **Barcode ON** |
| Azimuth: | **0° - 360°** | |
| RBW/VBW: | **120kHz / 300kHz** | **Peak Measure** / **QPeak Limit@3m** |



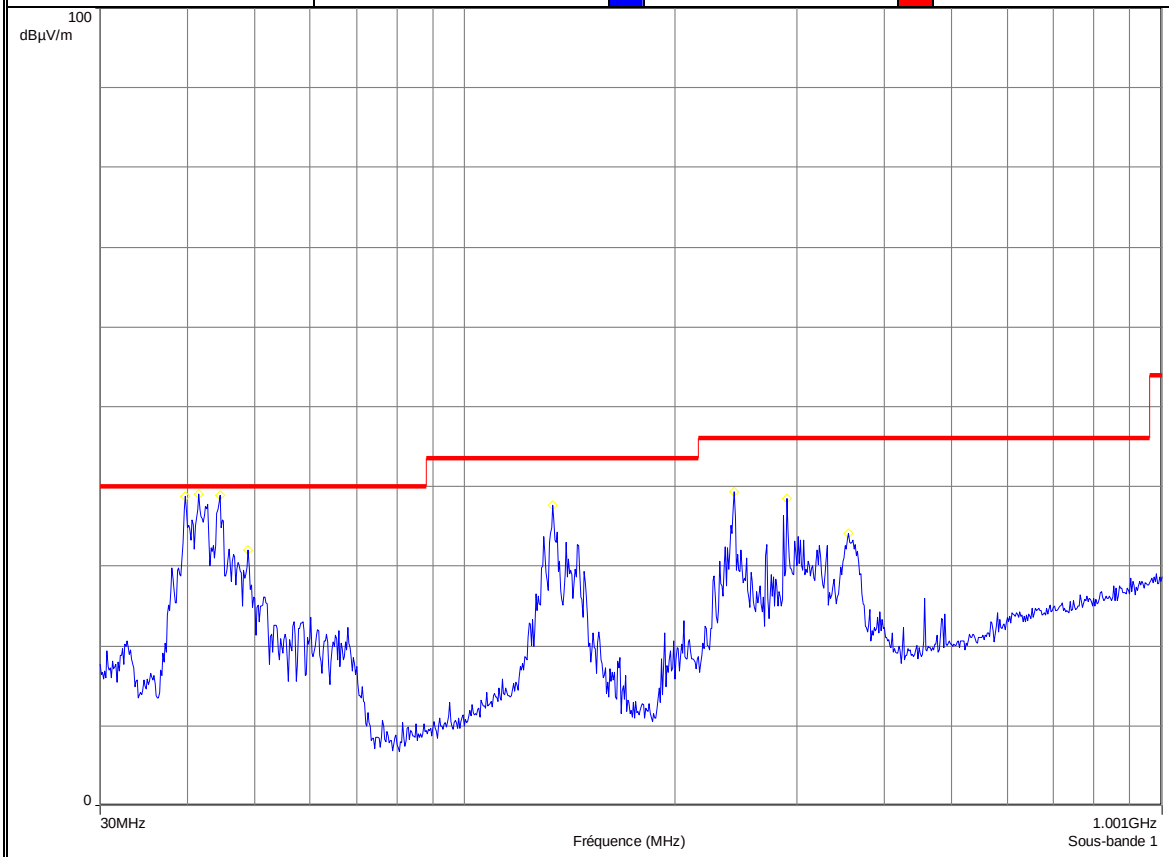

| Frequency (MHz) | Peak (dBµV/m) |
|---|---|
| 58.920 | 28.9 |
| 424.960 | 31.7 |
| 724.920 | 31.7 |
| 774.920 | 31.7 |
| 937.440 | 30.7 |

| RADIATED EMISSION | | Test configuration: 3 | |
|---|---|---|---|
| Graph name: | **Emr#8** | **USB power supply** | **Axis XY** |
| Antenna position: | **Horizontal** | | |
| Azimuth: | **0° - 360°** | | |
| RBW/VBW: | **120kHz / 300kHz** | **Peak Measure** | **QPeak Limit@3m** |



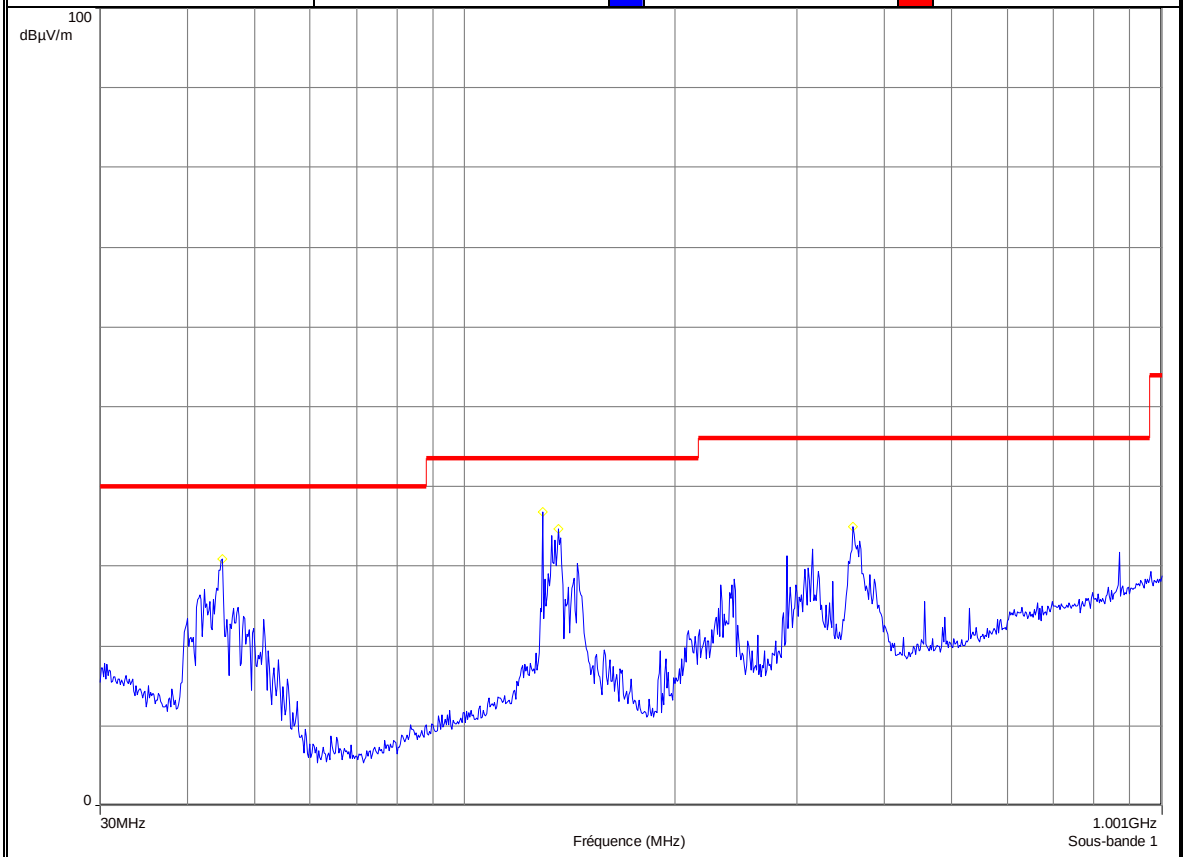

| Frequency (MHz) | Peak (dBµV/m) |
|---|---|
| 44.150 | 28.4 |
| 133.300 | 43.0 |
| 135.400 | 39.8 |
| 138.950 | 35.9 |
| 144.650 | 34.1 |
| 242.850 | 32.5 |

| RADIATED EMISSION | | Test configuration: 3 | |
|---|---|---|---|
| Graph name: | **Emr#9** | **USB power supply** | **Axis XY** |
| Antenna position: | **Vertical** | | |
| Azimuth: | **0° - 360°** | | |
| RBW/VBW: | **120kHz / 300kHz** | **Peak Measure** | **QPeak Limit@3m** |



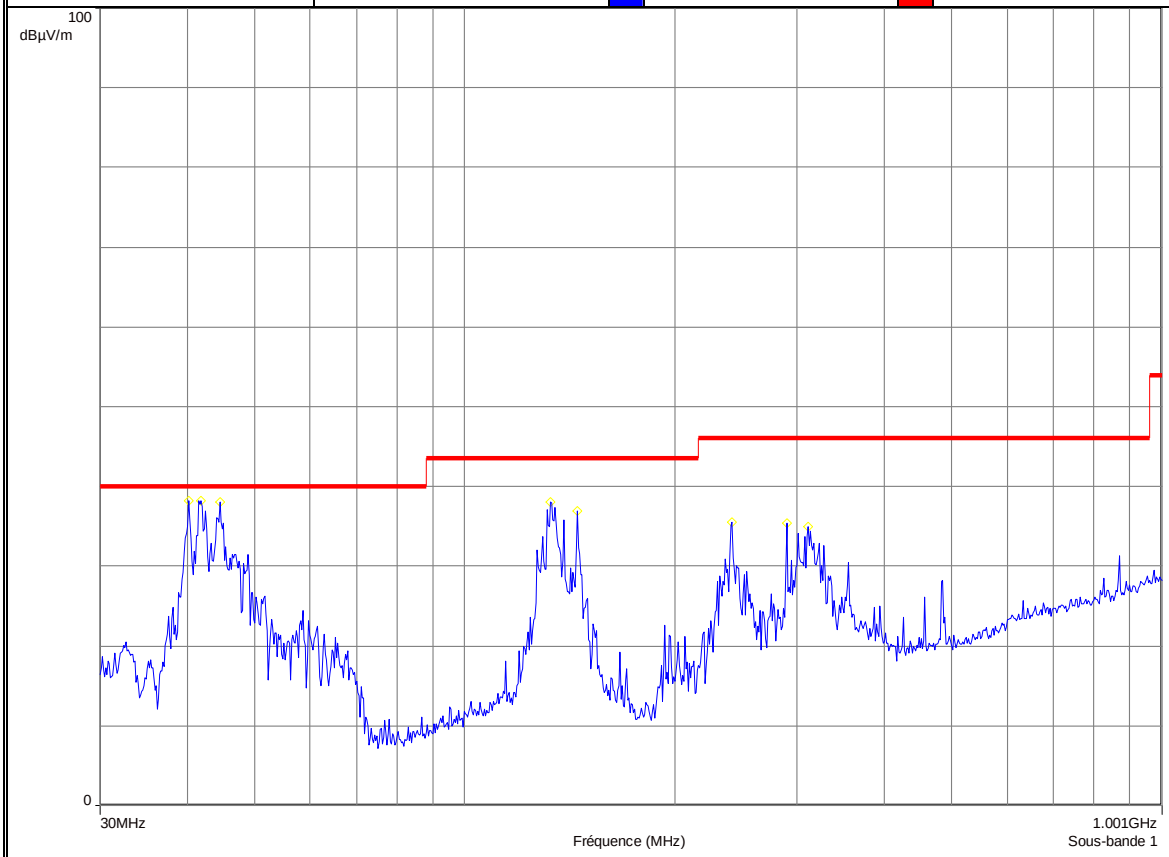

| Frequency (MHz) | Peak (dBµV/m) |
|---|---|
| 39.800 | 38.8 |
| 41.600 | 39.0 |
| 44.550 | 38.9 |
| 48.900 | 32.0 |
| 133.700 | 37.6 |
| 243.350 | 39.3 |
| 290.300 | 38.5 |
| 355.250 | 34.1 |

| RADIATED EMISSION | | Test configuration: 3 | |
|---|---|---|---|
| Graph name: | **Emr#10** | **USB power supply** | **Axis Z** |
| Antenna position: | **Horizontal** | | |
| Azimuth: | **0° - 360°** | | |
| RBW/VBW: | **120kHz / 300kHz** | **Peak Measure** | **QPeak Limit@3m** |



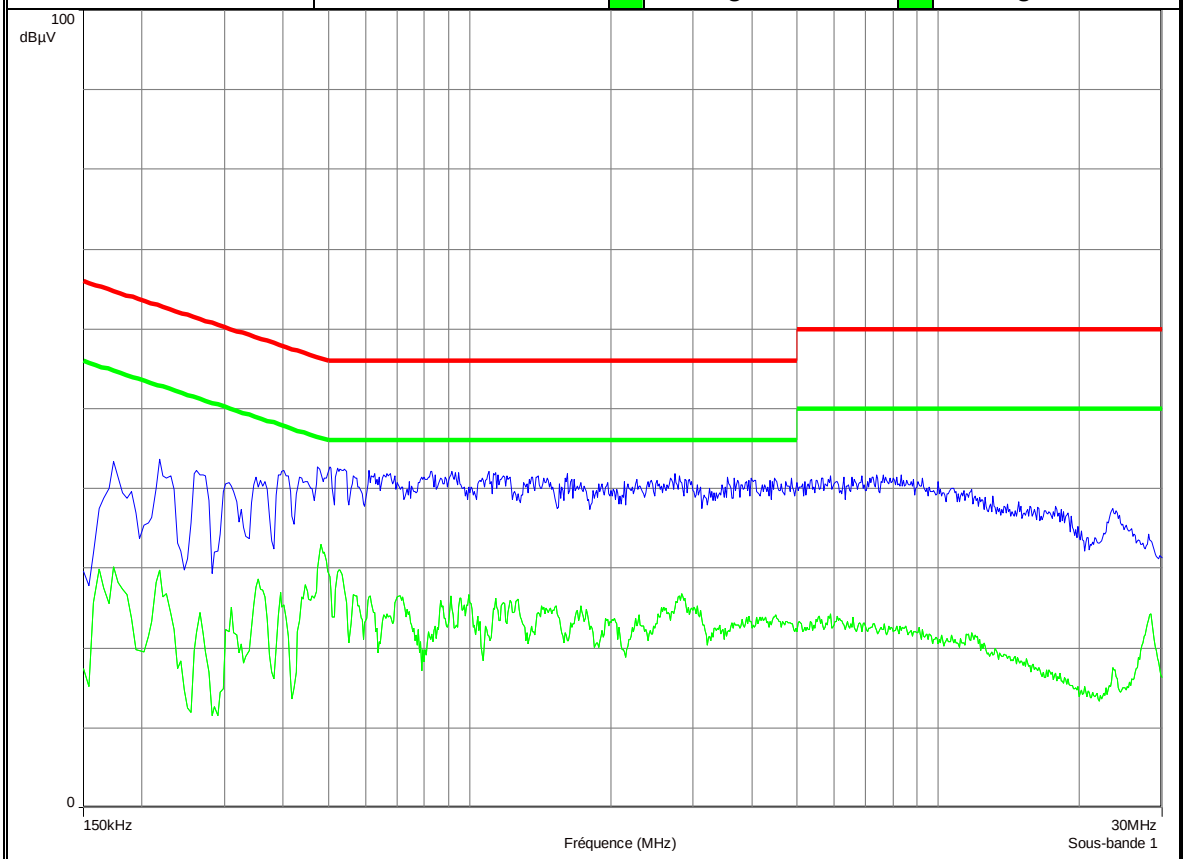

| Frequency (MHz) | Peak (dBµV/m) |
|---|---|
| 44.900 | 30.9 |
| 129.600 | 36.8 |
| 136.250 | 34.7 |
| 360.300 | 35.0 |

| RADIATED EMISSION | | Test configuration: 3 | |
|---|---|---|---|
| Graph name: | **Emr#11** | **USB power supply** | **Axis Z** |
| Antenna position: | **Vertical** | | |
| Azimuth: | **0° - 360°** | | |
| RBW/VBW: | **120kHz / 300kHz** | **Peak Measure** | **QPeak Limit@3m** |




| Frequency (MHz) | Peak (dBµV/m) |
|---|---|
| 40.250 | 38.2 |
| 41.850 | 38.2 |
| 44.600 | 38.0 |
| 132.850 | 38.1 |
| 145.250 | 37.0 |
| 241.650 | 35.6 |
| 290.200 | 35.4 |
| 310.650 | 35.0 |

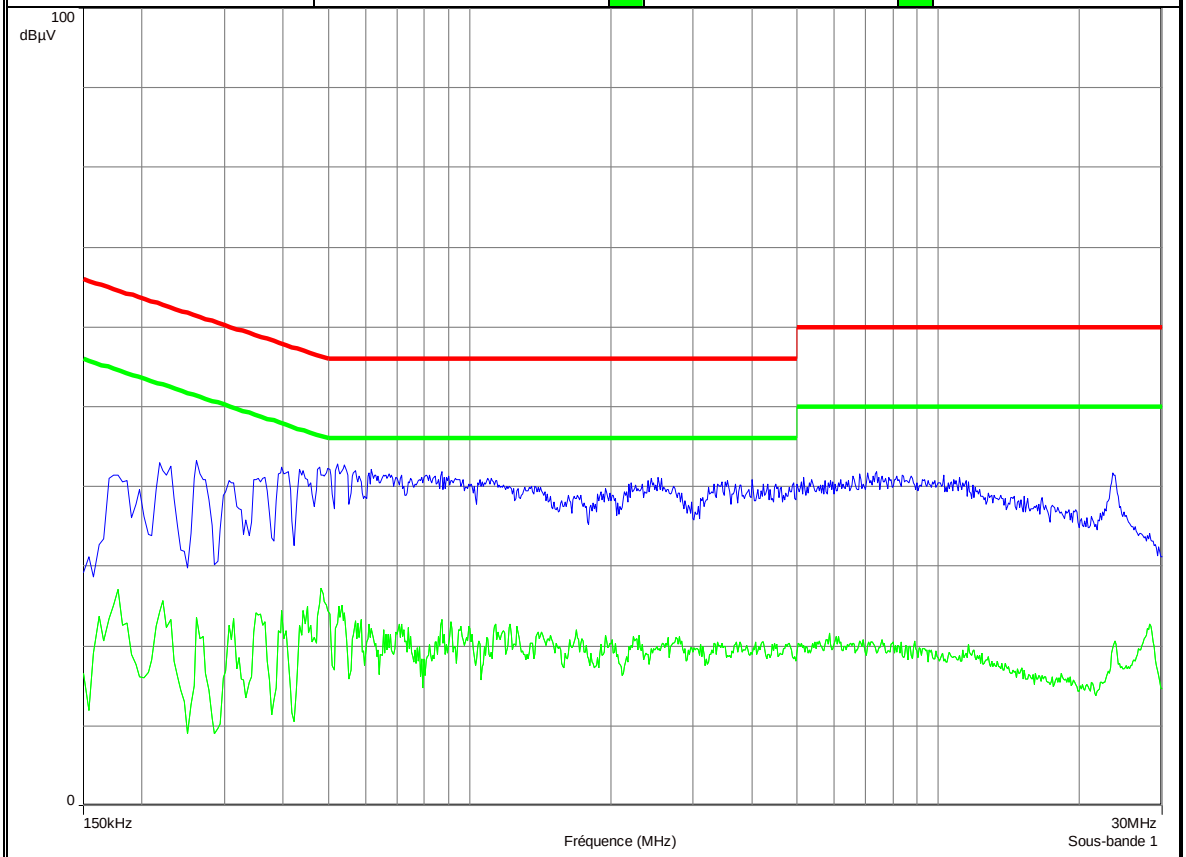
| CONDUCTED EMISSIONS | | Test configuration: | | | |
|---|---|---|---|---|---|
| Graph name: | **Emc#1** | **Base** | | | |
| Voltage / Frequency | **120V / 60Hz** | | | | |
| Line/Port | **Phase 1** | **Peak Measure** | | **QPeak Limit** | |
| RBW / VBW : | **9kHz / 30kHz** | **Average Measure** | | **Average Limit** | |




| Frequency (MHz) | Avg (dBµV) | Lim Avg (dBµV) | Avg-LimAvg (dBµV) | QPeak (dBµV) | LimQPeak (dBµV) | QPeak-LimQPeak (dBµV) |
|---|---|---|---|---|---|---|

**No frequency observed**

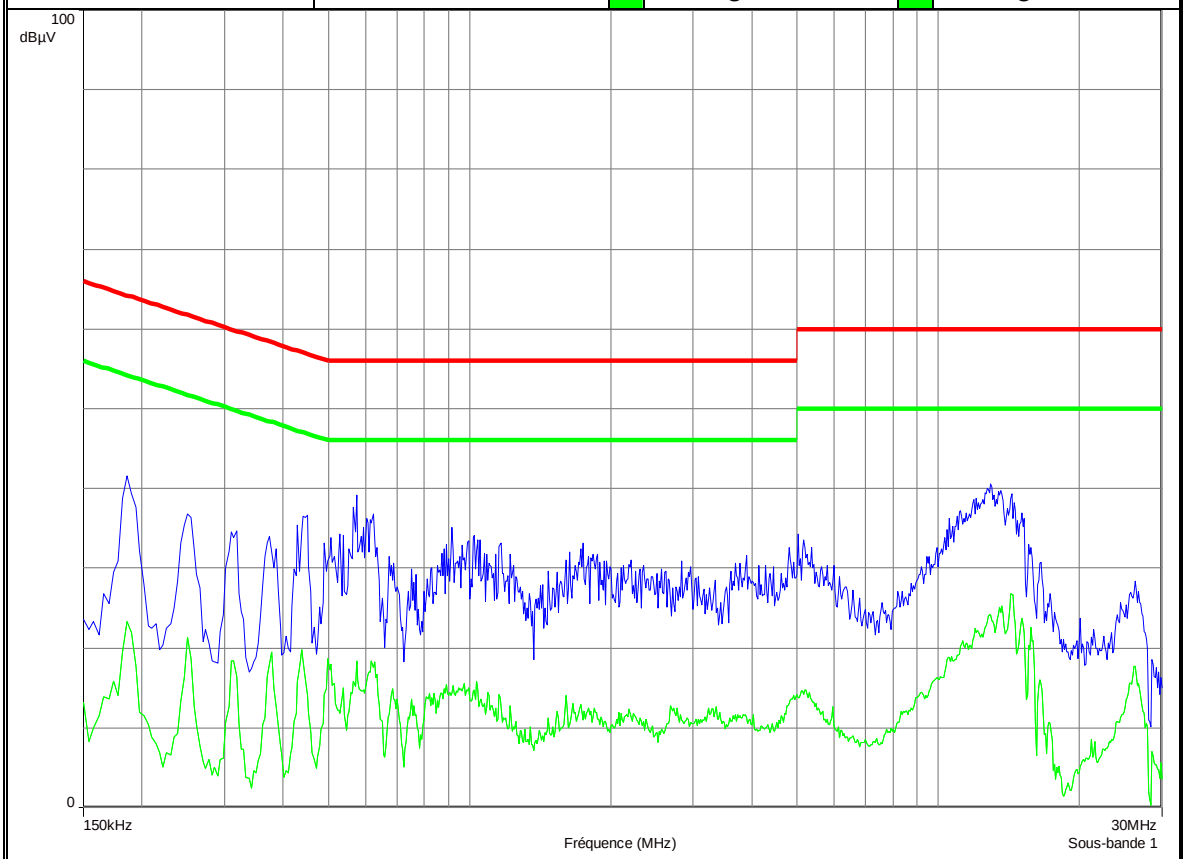
| CONDUCTED EMISSIONS | | Test configuration: | | | |
|---|---|---|---|---|---|
| Graph name: | **Emc#2** | **Base** | | | |
| Voltage / Frequency | **120V / 60Hz** | | | | |
| Line/Port | **Neutral** | **Peak Measure** | | **QPeak Limit** | |
| RBW / VBW : | **9kHz / 30kHz** | **Average Measure** | | **Average Limit** | |




| Frequency (MHz) | Avg (dBµV) | Lim Avg (dBµV) | Avg-LimAvg (dBµV) | QPeak (dBµV) | LimQPeak (dBµV) | QPeak-LimQPeak (dBµV) |
|---|---|---|---|---|---|---|

**No frequency observed**

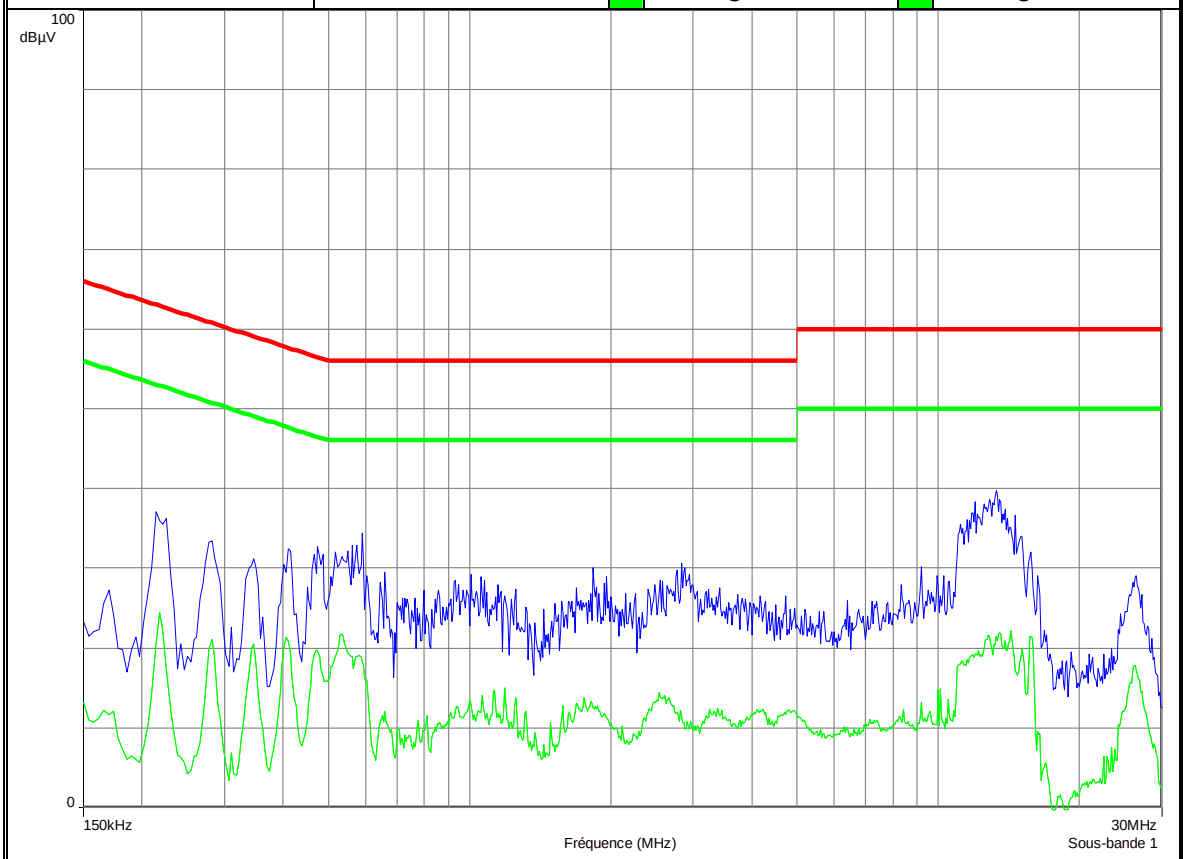
| CONDUCTED EMISSIONS | | Test configuration: | | | |
|---|---|---|---|---|---|
| Graph name: | **Emc#3** | **USB power supply** | | | |
| Voltage / Frequency | **120V / 60Hz** | | | | |
| Line/Port | **Phase 1** | **Peak Measure** | | **QPeak Limit** | |
| RBW / VBW : | **9kHz / 30kHz** | **Average Measure** | | **Average Limit** | |




| Frequency (MHz) | Avg (dBµV) | Lim Avg (dBµV) | Avg-LimAvg (dBµV) | QPeak (dBµV) | LimQPeak (dBµV) | QPeak-LimQPeak (dBµV) |
|---|---|---|---|---|---|---|

**No frequency observed**

| CONDUCTED EMISSIONS | | Test configuration: USB power supply | | | |
|---|---|---|---|---|---|
| Graph name: | **Emc#4** | | | | |
| Voltage / Frequency | **120V / 60Hz** | | | | |
| Line/Port | **Neutral** | **Peak Measure** | | **QPeak Limit** | |
| RBW / VBW : | **9kHz / 30kHz** | **Average Measure** | | **Average Limit** | |




| Frequency (MHz) | Avg (dBµV) | Lim Avg (dBµV) | Avg-LimAvg (dBµV) | QPeak (dBµV) | LimQPeak (dBµV) | QPeak-LimQPeak (dBµV) |
|---|---|---|---|---|---|---|

**No frequency observed**

## 6. TEST EQUIPMENT LIST

| USED | N°LCIE | TYPE | COMPANY | REF | CAL DATE | CAL DUE |
|---|---|---|---|---|---|---|
| ***RADIATED EMISSION DATA*** | | | | | | |
| x | A7102024 | Amplifier 1 - 8 GHz | HEROTEK | A1080304A | 10/09 | 10/10 |
| x | A7486006 | Amplifier 9kHz – 1300 MHz | HEWLETT PACKARD | 8447F | 04/10 | 04/11 |
| x | C2040050 | Antenna biconic | EMCO | 3104C | 01/10 | 01/11 |
| x | C2040056 | Antenna log-periodic | EMCO | 3146 | 01/10 | 01/11 |
| x | C2040146 | Antenna Bi-Log XWing | TESEQ | CBL6144 | 03/10 | 03/12 |
| x | C2042027 | Antenna horn | EMCO | 3115 | 09/09 | 09/10 |
| x | A5329038 | Cable N/N | - | - | 02/10 | 02/11 |
| x | A5329045 | Cable N/N | - | - | 12/09 | 12/10 |
| x | A5329056 | Cable N/N | - | - | 02/10 | 02/11 |
| x | A5329057 | Cable N/N | - | - | 02/10 | 02/11 |
| x | A5329061 | Cable N/N | SUCOFLEX | 106G | 12/09 | 12/10 |
| x | A5329188 | Cable N/N OATS (Mast at 10m) | UTIFLEX | - | 05/10 | 05/11 |
| x | A5329193 | Cable N/N | - | - | 02/10 | 02/11 |
| x | A5329199 | Cable N/N OATS (Mast at 10m) | UTIFLEX | - | 05/10 | 05/11 |
| x | A5329206 | Cable N/N | - | - | 02/10 | 02/11 |
| x | D3044015 | Semi-Anechoic chamber #2 | SIEPEL | - | 08/09 | 08/10 |
| x | D3044017 | Semi-Anechoic chamber #3 | SIEPEL | - | - | - |
| x | A3169050 | Radiated emission comb generator | BARDET | - | - | - |
| x | F2000409 | OATS | - | - | 08/10 | 08/11 |
| x | A4060030 | Pre-selector RF | HEWLETT PACKARD | HP85685A | - | - |
| x | A2642019 | Receiver 20Hz – 8GHz | ROHDE & SCHWARZ | ESU8 | 10/10 | 10/11 |
| x | A4060017 | Spectrum analyzer | HEWLETT PACKARD | HP8568B | 06/10 | 06/12 |
| x | A4060018 | Spectrum Analyzer 9KHz – 26.5GHz | HEWLETT PACKARD | 8593E | 02/10 | 02/11 |
| x | A4060019 | Spectrum analyzer display | HEWLETT PACKARD | HP85662A | 06/10 | 06/12 |
| x | A4060028 | Spectrum analyzer display | HEWLETT PACKARD | HP85662A | 06/10 | 06/12 |
| x | A4060029 | Spectrum analyzer | HEWLETT PACKARD | HP8568B | 06/10 | 06/12 |
| x | B4204052 | Thermo-hygrometer | HUGER | - | 04/10 | 04/12 |
| x | F2000371 | Turntable chamber (Cage#3) | ETS Lingren | Model 2165 | - | - |
| x | F2000372 | Turntable / Mast controller (OATS) | ETS Lindgren | Model 2066 | - | - |
| x | F2000392 | Antenna mast (OATS) | ETS Lindgren | 2071-2 | - | - |
| x | F2000393 | Turntable controller (Cage#2-3) | ETS Lingren | Model 2066 | - | - |
| x | F2000403 | Turntable (OATS) | ETS Lindgren | Model 2187 | - | - |
| x | F2000404 | Turntable chamber (Cage#2) | ETS Lingren | Model 2165 | - | - |
| ***CONDUCTED EMISSION DATA*** | | | | | | |
| x | A7122167 | Attenuator 10dB 18GHz 2W | JFW | - | 02/10 | 02/11 |
| x | A5329352 | Cable N/N | - | - | 12/09 | 12/10 |
| x | D3044010 | Faraday Cage | RAY PROOF | - | 01/10 | 01/11 |
| x | A3169049 | Conducted emission comb generator | BARDET | - | - | - |
| x | A2642019 | Receiver 20Hz – 8GHz | ROHDE & SCHWARZ | ESU8 | 10/10 | 10/11 |

## 7. UNCERTAINTIES CHART

| **Type de mesure / *Kind of measurement*** | **Incertitude élargie laboratoire / *Wide uncertainty laboratory* (k=2) ± x** | **Incertitude limite du CISPR / *CISPR uncertainty limit* ± y** |
|---|---|---|
| Mesure des perturbations conduites en tension sur le réseau d'énergie<br>*Measurement of conducted disturbances in voltage on the power port* | 3.57 dB | 3.6 dB |
| Mesure des perturbations conduites en tension sur le réseau de télécommunication<br>*Measurement of conducted disturbances in voltage on the telecommunication port.* | 3.28 dB | A l'étude / Under consid. |
| Mesure des perturbations discontinues conduites en tension<br>*Measurement of discontinuous conducted disturbances in voltage* | 3.47 dB | 3.6 dB |
| Mesure des perturbations conduites en courant<br>*Measurement of conducted disturbances in current* | 2.90 dB | A l'étude / Under consid. |
| Mesure du champ électrique rayonné sur le site en espace libre de Moirans<br>*Measurement of radiated electric field on the Moirans open area test site* | 5.07 dB | 5.2 dB |