TEST REPORT

RADIO

Number	119778-639209
Composition of document	39 pages
FCC Registration Number	166175
MRA Designation Number	FR0010
Industry Canada Number	6230B
Standards	47 CFR Part 15.247 RSS-210, Issue 8 RSS-Gen, Issue 3
Issued to	IJINUS 25 Zone d'Activité de KERVIDANOU F-29300 MELLAC
Apparatus under test	Wireless Access Point
Trade mark	IJINUS
Manufacturer	IJINUS
Type	T2002
Serial number	00000607
IC	10983A-E001
FCC ID	SE6E001
Test date	2013/03/14, 2013/03/29 & 2013/04/24
Tests performed by	Stéphane PHOUDIAH & Arnaud FAYETTE
Test site	Fontenay aux Roses
Date of issue	2013/05/06

Written by :
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S.A.S au capital de 15.745.984 €
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SUMMARY

1. TEST PROGRAM

- **References**

Standards:
- 47 CFR Part 15C
- RSS-210
- RSS-Gen
- RSS-102
- CISPR 16-4-2
- ANSI C63.4

Standard Section	Test Description	TEST RESULT - Comments
RSS-Gen § 4.6.1	Occupied Bandwidth	PASS
CFR 47 § 15.247 (a) (2) RSS-210 § A8.2(a)	-6dB Bandwidth	PASS
CFR 47 § 15.247 (b) RSS-210 § A8.4(4)	Maximum Peak Output Power	PASS
CFR 47 § 15.247 (e) RSS-210 § A8.2 (b)	Power Spectral Density	PASS
CFR 47 § 15.247 (d) RSS-210 § A8.5	Band Edge	PASS
CFR 47 § 15.247 (d) RSS-210 § A8.5	Conducted Spurious Emissions	PASS
CFR 47 § 15.207 RSS-Gen § 7.2.4	AC Power Line Conducted Emissions	PASS
CFR 47 § 15.209 (a) CFR 47 § 15.247 (d) RSS-210 § A8.5	Transmitter Radiated emissions	PASS
RSS-Gen § 4.10	Receiver Radiated emissions	PASS

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. HARDWARE IDENTIFICATION

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

Photograph of EUT

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

-Personal Computer Lenovo T400

- **Input/output:**

- Usb

- **Equipment information:**

- External antenna connector: Yes
- Frequency band allocated: 900MHz to 930MHz
- Frequency band used: 915MHz
- Modulation: GFSK
- Number of channel: 1
- Antenna type: External
- Spreading: No
- Stand By mode: Yes (Receiver mode)
- Maximum Antenna Gain: 2dBi
- Type of power source: USB
- Power supply: 5Vdc
- Frequency plan:

Channel	Frequency (MHz)
Fnom	915

2.2. RUNNING MODE

The EUT is set in the following modes during tests:
-Permanent emission with modulation
-Communication
-Permanent reception

2.3. EQUIPEMENT LABELLING

IJINUS - Model/Modèle : T2002
FCC ID : SE6E001 / IC : 10983A-E001

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received,including interference that may cause undesired operation

2.4. EQUIPMENT MODIFICATIONS

No equipment modification has been necessary during testing.

3. OCCUPIED BANDWIDTH

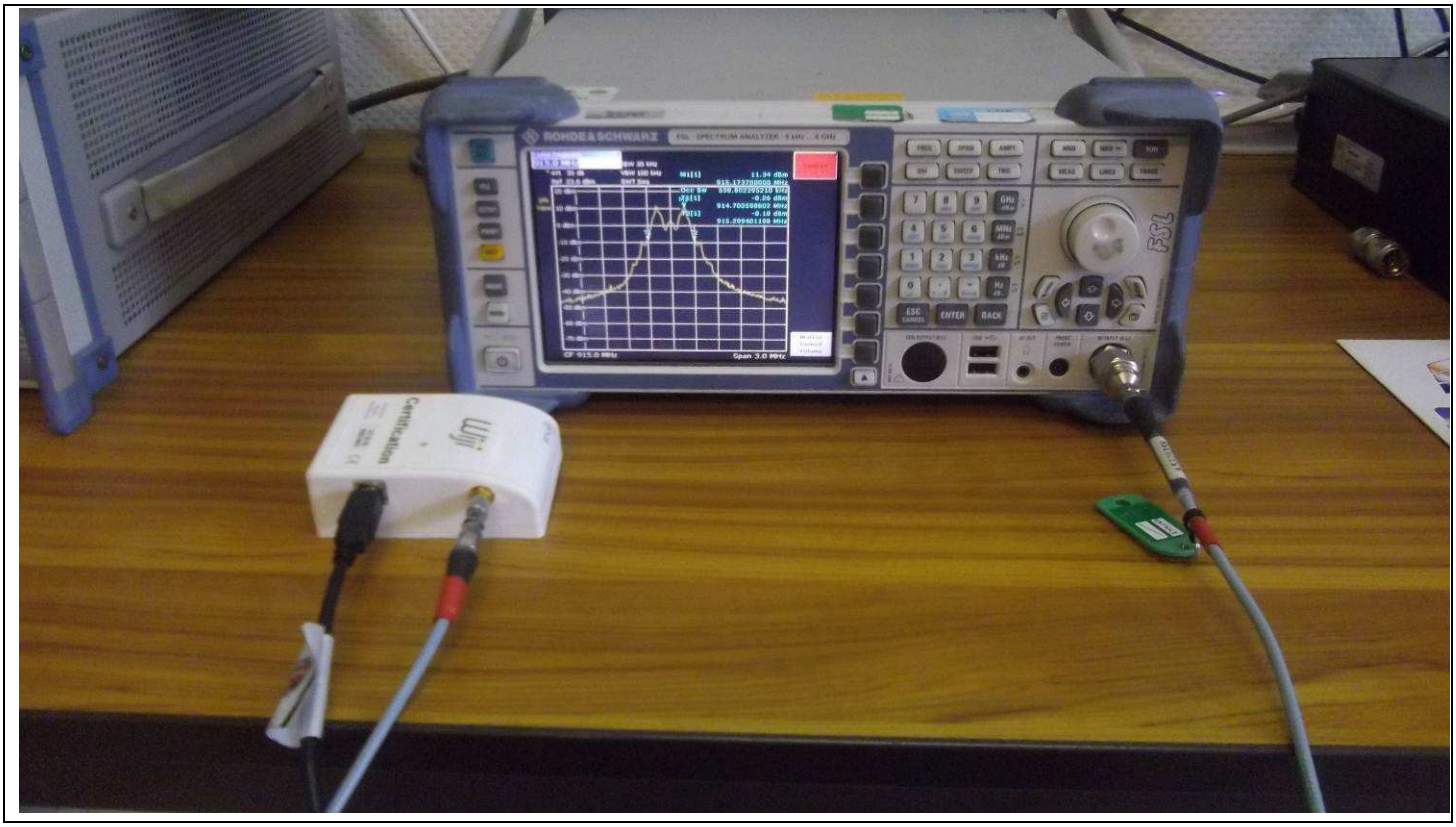
3.1. TEST CONDITIONS

Test performed by : Stéphane PHOUDIAH
Date of test : 2013/03/29
Ambient temperature : 23°C
Relative humidity : 43%

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 § 4.6.1 reference method.

Spectrum Analyzer Setting:
Center frequency= Fnom
Span= At least twice the emission spectrum
Amplitude= Sufficient to observe the signal amplitude
RBW= 1% of span
VBW= 3*RBW
Sweep= Auto
Trace= Max Hold
Detector= Peak
Occupied Bandwidth 99% activated



Photograph for Occupied Bandwidth

3.3. RESULTS

Temperature	Tnom
Voltage	**Vnom**
Frequency	Fnom
Occupied Bandwidth (kHz)	598,8

See graphics in annex

Result: PASS
Limit: → None

4. -6DB BANDWIDTH

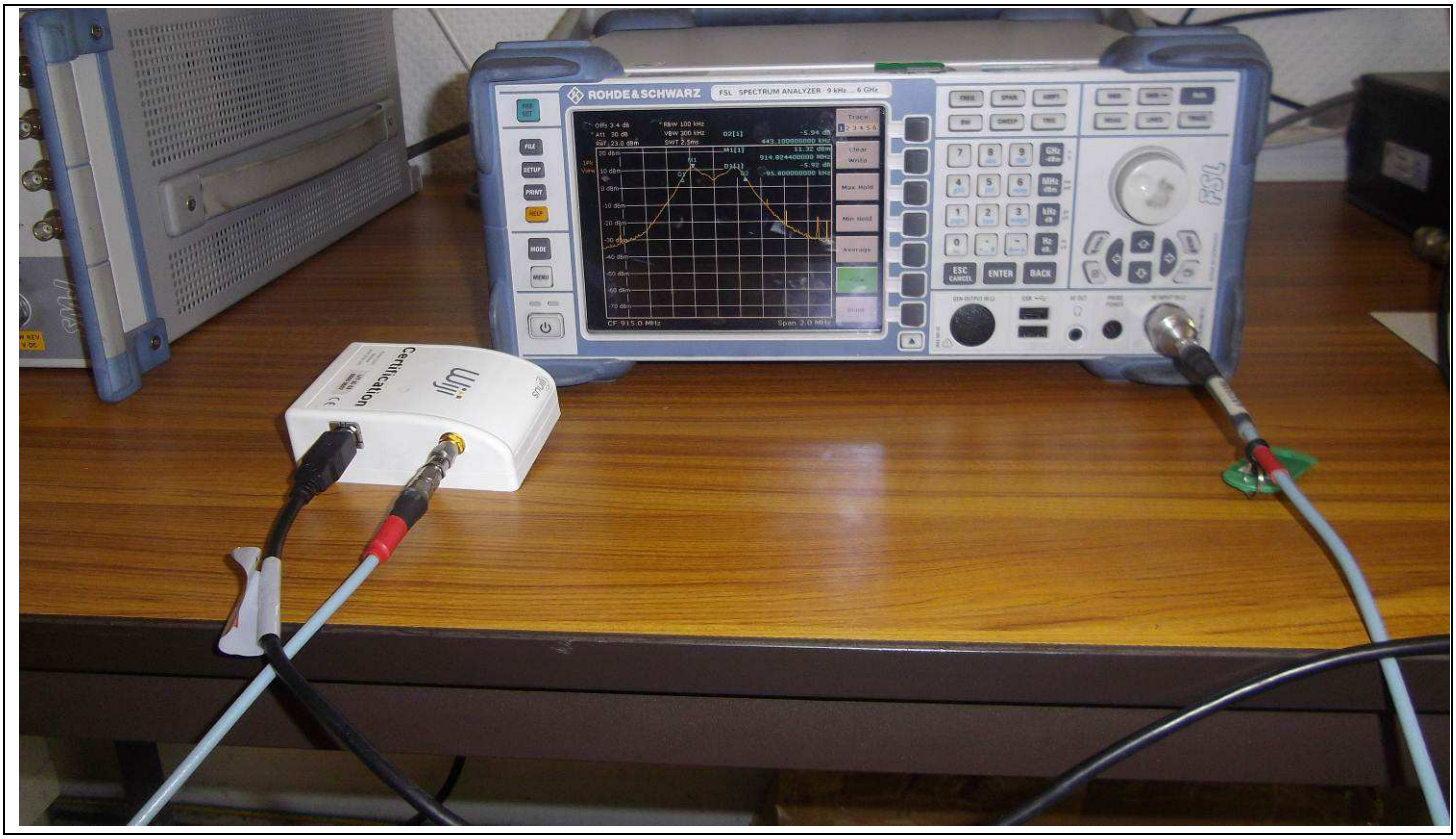
4.1. TEST CONDITIONS

Test performed by : Stéphane PHOUDIAH
Date of test : 2013/03/29
Ambient temperature : 23°C
Relative humidity : 43%

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 v02 § 7.1.

Spectrum Analyzer Setting:
Center frequency= Fnom
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 Bandwidth

4.3. RESULTS

Temperature	Tnom
Voltage	**Vnom**
Frequency	Fnom
-6dB Bandwidth (kHz)	538,9

See graphics in annex

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

5. MAXIMUM PEAK CONDUCTED POWER

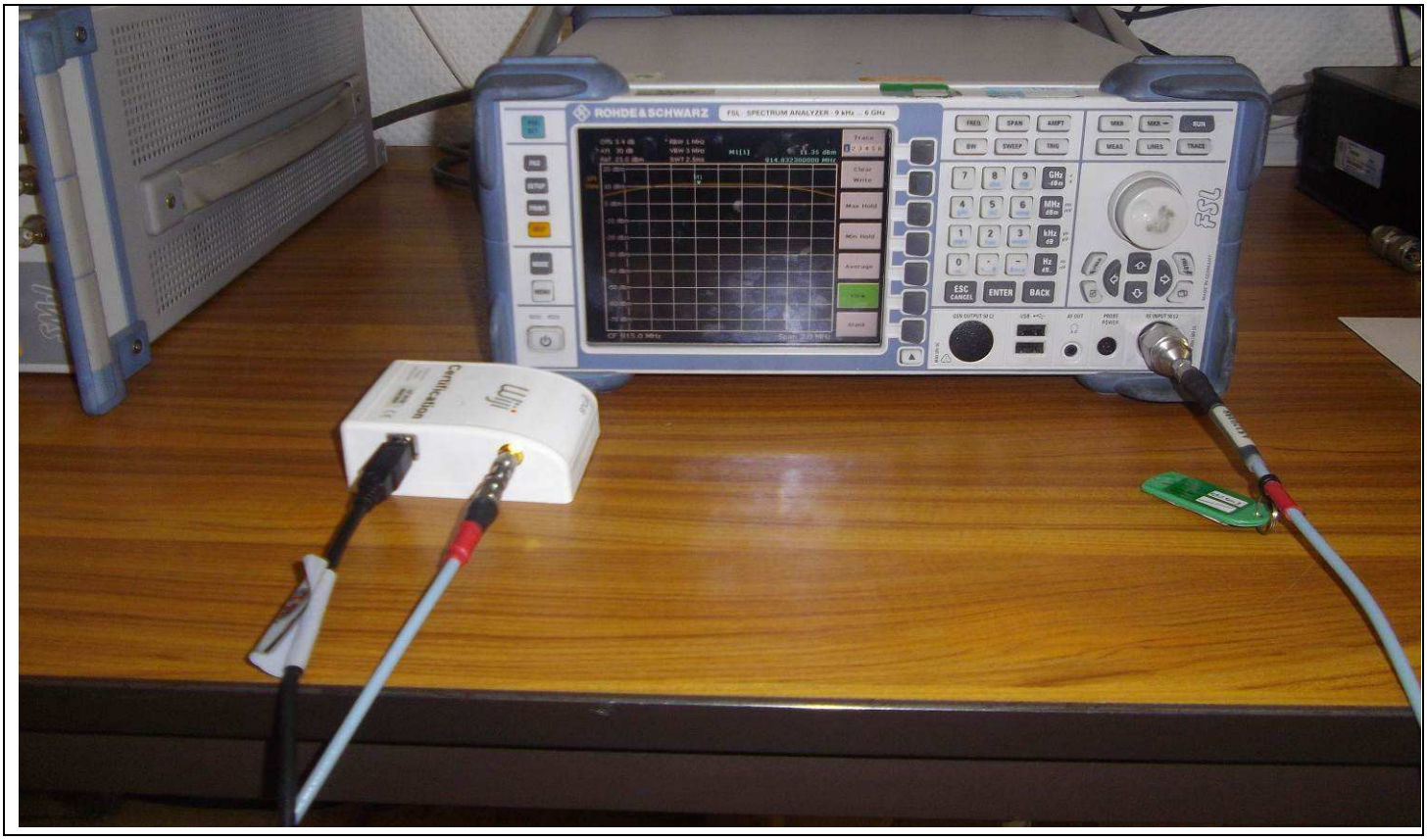
5.1. TEST CONDITIONS

Test performed by : Stéphane PHOUDIAH
Date of test : 2013/03/29
Ambient temperature : 23°C
Relative humidity : 43%

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 v02 § 8.1.1.

Spectrum Analyzer Setting:
Center frequency= Fnom
Span= At least twice the emission spectrum
Amplitude= Sufficient to observe the signal amplitude
RBW= At least the emission spectrum
VBW= 3*RBW
Sweep= Auto
Trace= Max Hold
Detector= Peak



Photograph for Maximum Peak Conducted Power

5.3. RESULTS

Temperature	Tnom
Voltage	**Vnom**
Frequency	Fnom
Maximum Peak Conducted Power (dBm)	11,35

See graphics in annex

Result: PASS
Limit: → The Maximum Peak Conducted Power must be lower than 30dBm

6. POWER SPECTRAL DENSITY

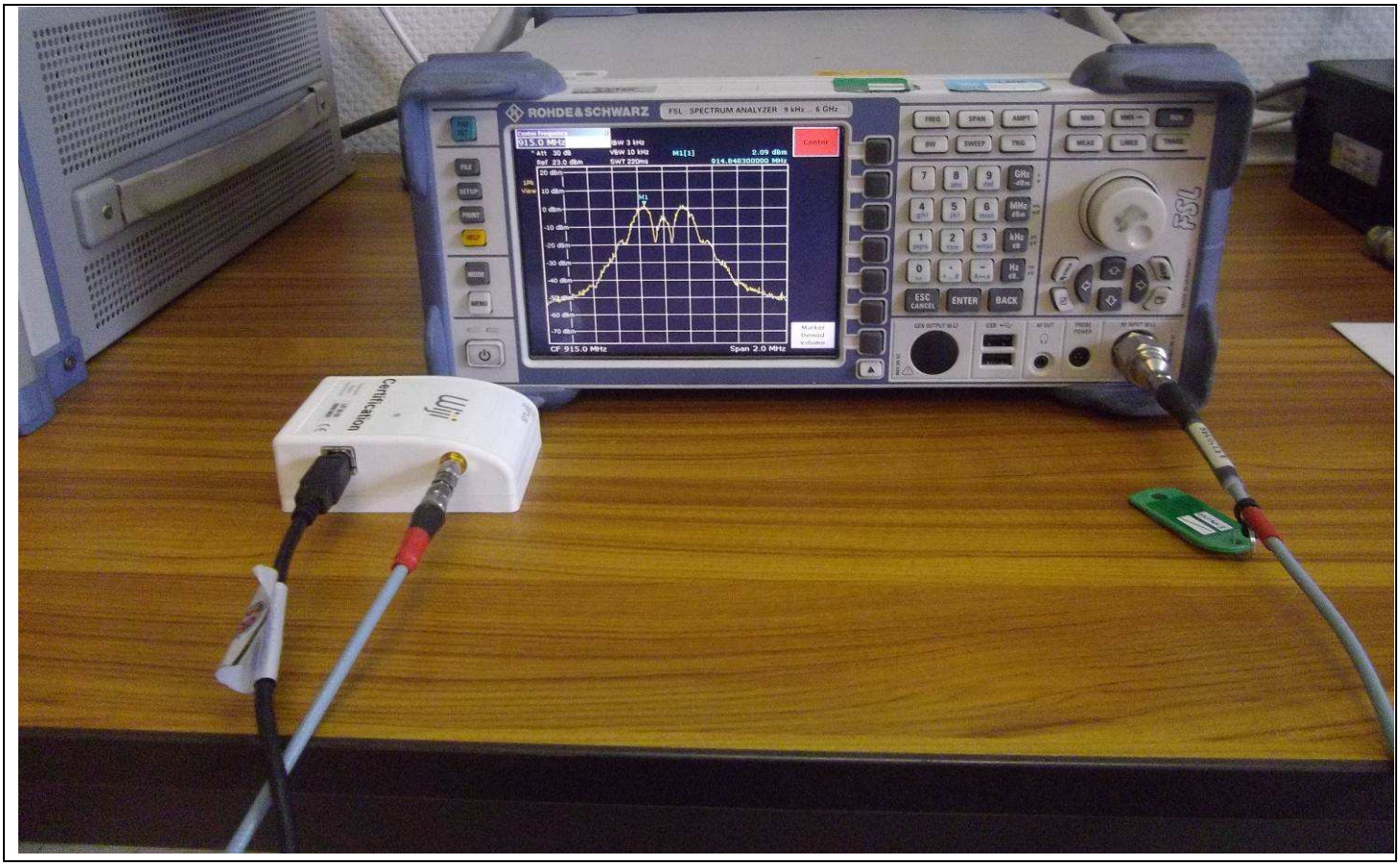
6.1. TEST CONDITIONS

Test performed by : Stéphane PHOUDIAH
Date of test : 2013/03/29
Ambient temperature : 23°C
Relative humidity : 43%

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 v02 § 9.1.

Spectrum Analyzer Setting:
Center frequency= Fnom
Span= At least twice the emission spectrum
Amplitude= Sufficient to observe the signal amplitude
RBW= 3kHz
VBW= 10kHz
Sweep= Auto
Trace= Max Hold
Detector= Peak



Photograph for Power Spectral Density

6.3. RESULTS

Temperature	Tnom
Voltage	**Vnom**
Frequency	Fnom
Power spectral density (dBm/3kHz)	2,09

See graphics in annex

Result: PASS
Limit: → The Power Spectral Density must be lower than 8dBm/3kHz

7. BAND EDGE

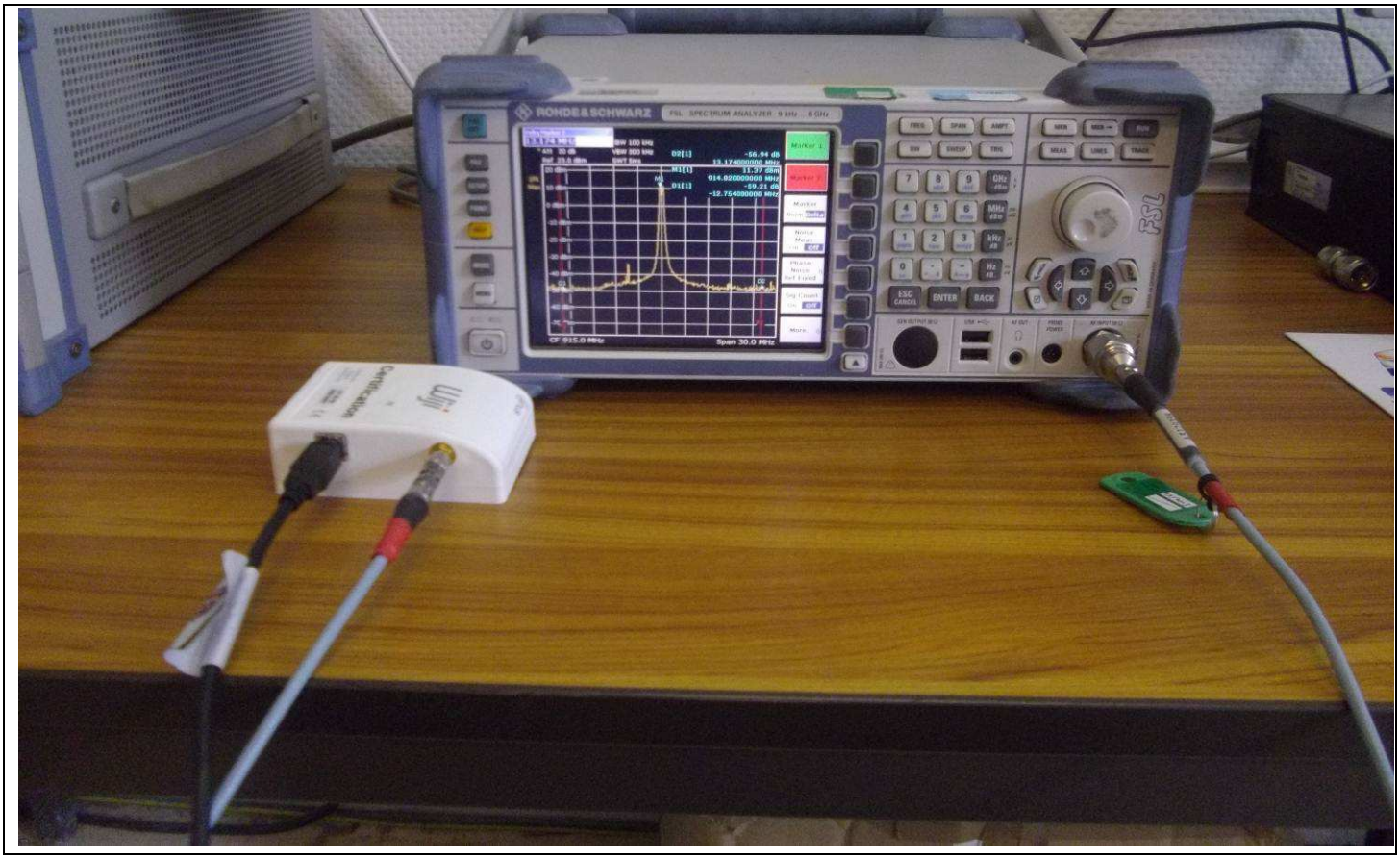
7.1. TEST CONDITIONS

Test performed by : Stéphane PHOUDIAH
Date of test : 2013/03/29
Ambient temperature : 23°C
Relative humidity : 43%

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 v02 § 10.2.5.

Spectrum Analyzer Setting:
Start frequency= 900MHz
Stop frequency= 930MHz
Amplitude= Sufficient to observe the signal amplitude
RBW= 100kHz
VBW= 300kHz
Sweep= Auto
Trace= Max Hold
Detector= Peak



Photograph for Band Edge

7.3. RESULTS

Temperature	Tnom	
Voltage	Vnom	
Band Edge (MHz)	902	928
Spurious Level (dBc)	-59,2	-56,9

See graphics in annex

Result: PASS
Limit: → All Spurious Emissions must be at least 20dB below the Fundamental Radiator Level at the Band Edge "902MHz & 928MHz"

8. CONDUCTED SPURIOUS EMISSIONS

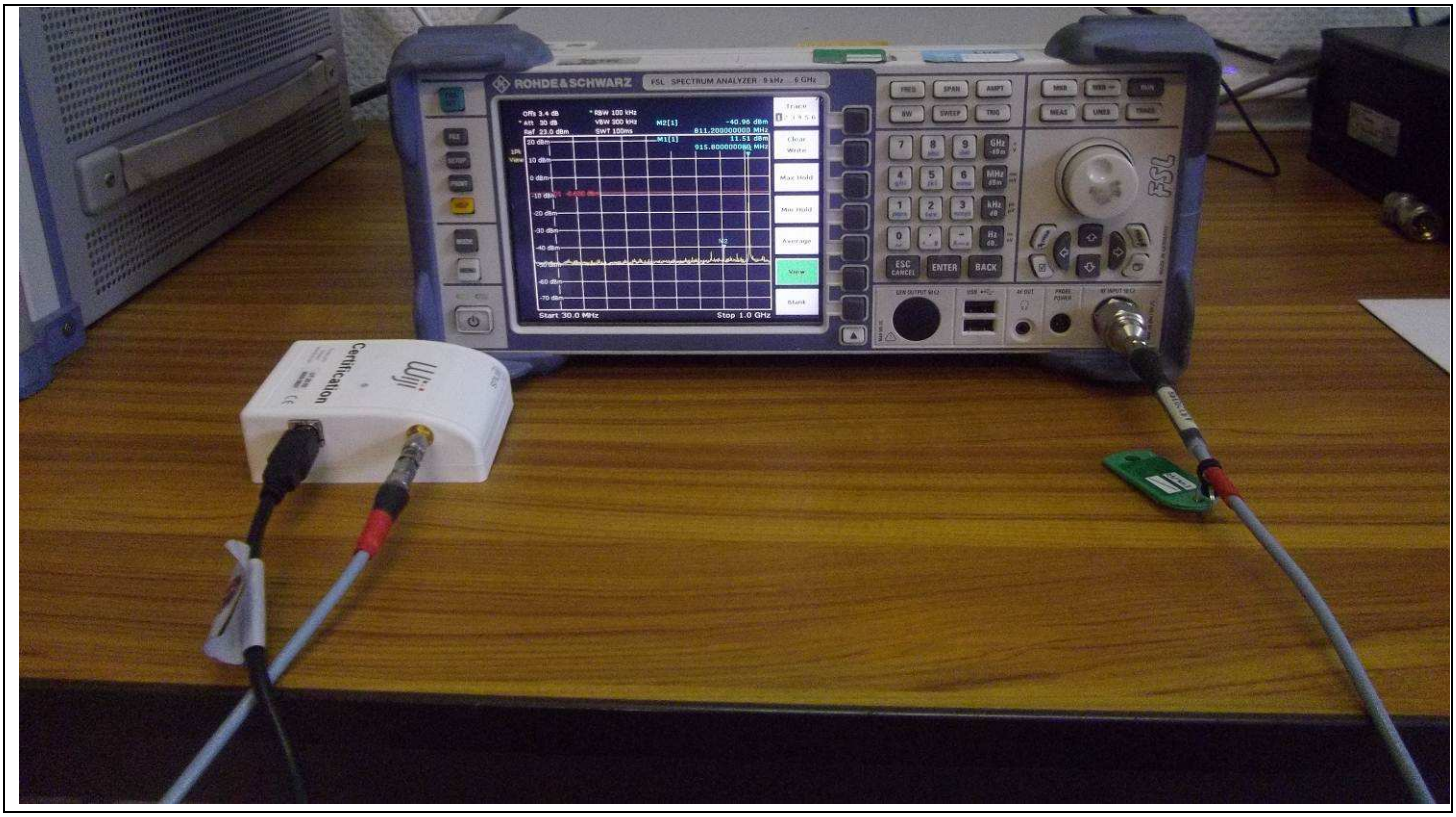
8.1. TEST CONDITIONS

Test performed by : Stéphane PHOUDIAH
Date of test : 2013/03/29
Ambient temperature : 23°C
Relative humidity : 43%

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 v02 § 10.1.

Spectrum Analyzer Setting:
Start frequency= 30MHz
Stop frequency= 10GHz
Amplitude= Sufficient to observe the signal amplitude
RBW= 100kHz
VBW= 300kHz
Sweep= Auto
Trace= Max Hold
Detector= Peak



Conducted Spurious Emissions

8.3. RESULTS

Frequency (MHz)	Spurious Level (dBm)	Spurious Level (dBc)
811,2	-40,9	-52,4
1830,4	-35,3	-46,8

See graphics in annex

Result: PASS
Limit: → All Spurious Emissions must be at least 20dB below the Fundamental Radiator Level outside of the 902MHz-928MHz band

9. AC POWER LINE CONDUCTED EMISSIONS

9.1. TEST CONDITIONS

Test performed by : Arnaud FAYETTE
Date of test : 2013/04/24
Ambient temperature : 22°C
Relative humidity : 40%

9.2. TEST SETUP

The product has been tested according to ANSI C63.4-(2003) 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 50Ω / 50µH. Interconnecting cables and equipment's were moved to position that maximized emission.

Photograph for AC Power Line Conducted Emissions (Rear view)

Photograph for AC Power Line Conducted Emissions (Global view)

9.3. RESULTS

Phase Line

Frequency (MHz)	Peak Level (dBµV/m)	Quasi-Peak Level (dBµV/m)	Quasi-Peak Limit (dBµV/m)	Average Level (dBµV/m)	Average Limit (dBµV/m)
0.15	55.1	-	66	38.3	56
0.52	39.3	-	56	30	46
0.6	38.9	-	56	30.8	46
1.2	42	-	56	31.9	46
2	42.6	-	56	31.7	46
4.39	41,4	-	56	30,3	46
15.5	43,9	-	60	32,8	50

Neutral Line

Frequency (MHz)	Peak Level (dBµV/m)	Quasi-Peak Level (dBµV/m)	Quasi-Peak Limit (dBµV/m)	Average Level (dBµV/m)	Average Limit (dBµV/m)
0.15	53.3	-	66	29.6	56
0.18	46.8	-	64.3	39.1	54.3
0.46	44.5	-	56.5	33.3	46.5
0.65	44.4	-	56	33.9	46
0.93	44.8	-	56	32.7	46
1.19	45.5	-	56	33.8	46
1.47	44.4	-	56	32.1	46
14.3	44.3	-	60	33.2	50

See annex for graphics

Result: PASS

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

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

*Decreases with the logarithm of the frequency

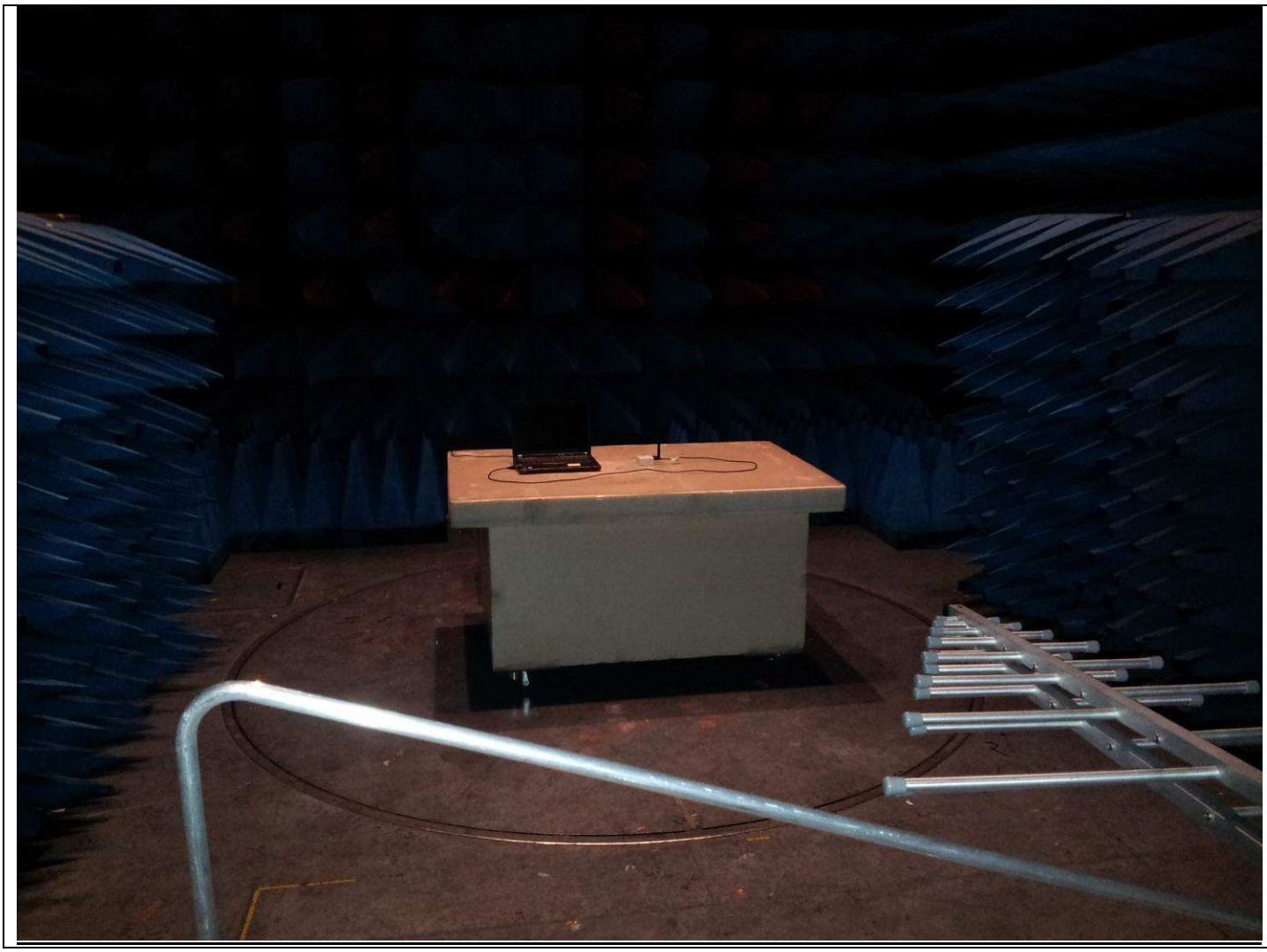
10. TRANSMITTER RADIATED EMISSIONS

10.1. TEST CONDITIONS

Test performed by : Arnaud Fayette
Date of test : 2013/03/14
Ambient temperature : 22°C
Relative humidity : 40%

10.2. TEST SETUP

The product has been tested according to ANSI C63.4 (2003). The EUT is placed in a semi-anechoic chamber. Distance between measuring antenna and the EUT is 3m. 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.



Photograph for Transmitter Radiated Emissions

10.3. RESULTS

- **Characterization in a semi anechoic chamber (30MHz to 10GHz):**

Vertical Polarization

Below 1GHz

Frequency (MHz)	Peak Level (dBµV/m)	QPeak Level (dBµV/m)	Limit (dBµV/m)
33.8	34.667	-	40
550.88	39.159	-	46
810.86	41.081	-	46

Above 1GHz

Frequency (MHz)	Average Level (dBµV/m)	Average Limit (dBµV/m)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)
1830.3	43.796	54	56.568	74
2744.4	36.991	54	50.576	74
7319.0	36.620	54	51.016	74

Horizontal Polarization

Below 1GHz

Frequency (MHz)	Peak Level (dBµV/m)	QPeak Level (dBµV/m)	Limit (dBµV/m)
108.25	28.615	-	43.5
862.88	36.950	-	46
966.92	36.827	-	54

Above 1GHz

Frequency (MHz)	Average Level (dBµV/m)	Average Limit (dBµV/m)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)
1071.1	27.419	54	38.754	74
1830.1	36.201	54	48.373	74
9151.6	37.895	54	51.961	74

See annex for graphics

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

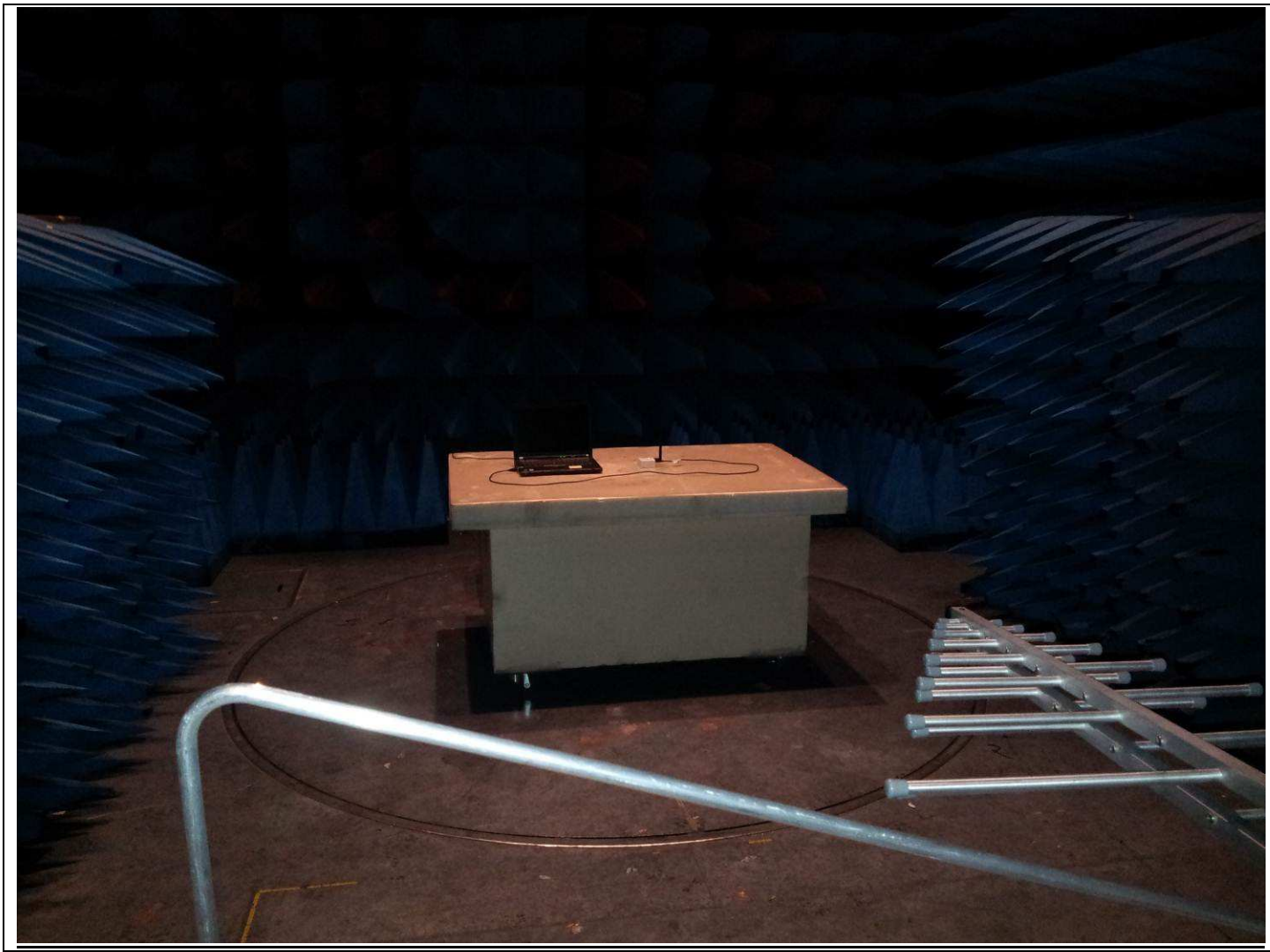
11. RECEIVER RADIATED EMISSIONS

11.1. TEST CONDITIONS

Test performed by : Arnaud Fayette
Date of test : 2013/03/14
Ambient temperature : 22°C
Relative humidity : 40%

11.2. TEST SETUP

The product has been tested according to ANSI C63.4 (2003). The EUT is placed in a semi-anechoic chamber. Distance between measuring antenna and the EUT is 3m. 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.



Photograph for Receiver Radiated Emissions

11.3. RESULTS

- **Characterization in a semi anechoic chamber (30MHz to 10GHz):**

Vertical Polarization

Below 1GHz

Frequency (MHz)	Peak Level (dBµV/m)	QPeak Level (dBµV/m)	Limit (dBµV/m)
31.8	36.663	-	40
96	31.354	-	43.5
258.44	27.270	-	46

Above 1GHz

Frequency (MHz)	Average Level (dBµV/m)	Average Limit (dBµV/m)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)
5056.2	36.561	54	50.350	74
5889.5	39.977	54	53.093	74
9072.8	37.768	54	51.354	74

Horizontal Polarization

Below 1GHz

Frequency (MHz)	Peak Level (dBµV/m)	QPeak Level (dBµV/m)	Limit (dBµV/m)
72.35	25.176	-	40
120	24.332	-	43.5
209.3	23.255	-	43.5

Above 1GHz

Frequency (MHz)	Average Level (dBµV/m)	Average Limit (dBµV/m)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)
1887	26.863	54	41.078	74
5488	41.596	54	49.882	74
5977	39.919	54	53.408	74

See annex for graphics

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

12. TEST EQUIPMENT LIST

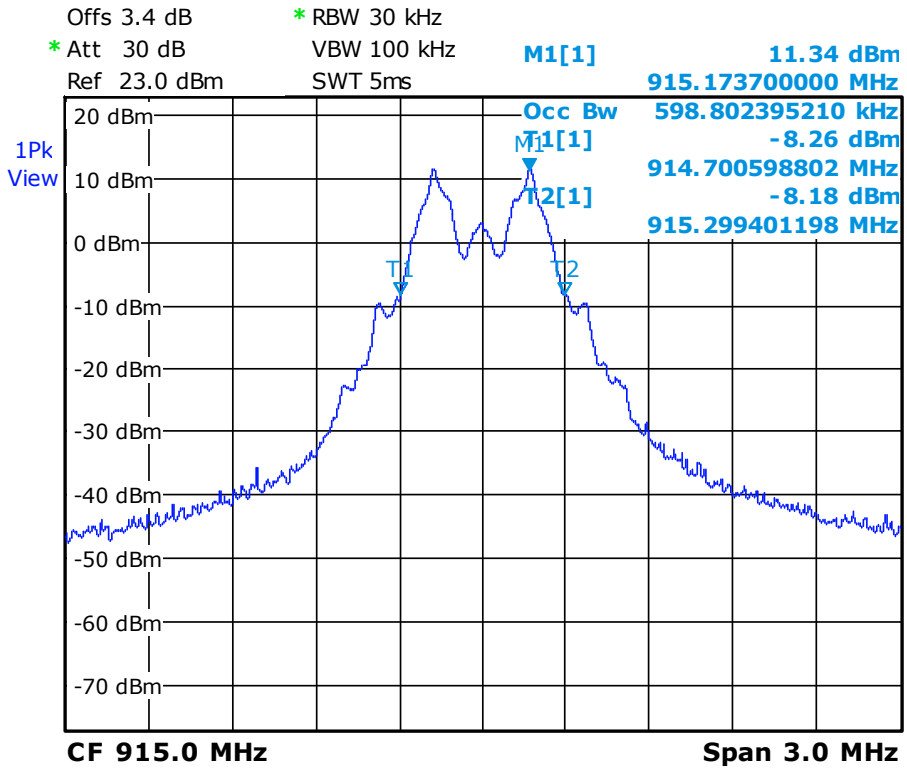
Occupied Bandwidth, -6dB Bandwidth, Maximum Peak Output Power, Power Spectral Density, Conducted Spurious Emissions					
Apparatus	**Trade Mark**	**Type**	**Registration number**	**Calibration date**	**Calibration due**
RF Cable	-	CS3D 01	A5329358	2012/09	2013/09
Attenuator	MINICIRCUIT	BW-S3W22	A7122210	2012/05	2013/05
EMI test receiver	ROHDE & SCHWARZ	ESI40	A2642010	2012/09	2013/09
RF Cable	-	CS3B 01	A5329428	2013/03	2013/03
Signal Generator	ROHDE & SCHWARZ	SMJ100a	A5444007	2013/01	2014/01
Spectrum Analyser	ROHDE & SCHWARZ	FSL	A4060032	2012/11	2013/11
Transmitter & Receiver Radiated Emissions					
Apparatus	**Trade Mark**	**Type**	**Registration number**	**Calibration date**	**Calibration due**
Semi anechoic chamber	SIEPEL	C01	D3044008	2011/04	2014/04
RF Cable	-	5C23	A5329261	2013/03	2014/03
RF Cable	-	CS21 11	A5329459	2013/03	2014/03
RF Cable	-	CS2F 03	A5329374	2013/03	2014/03
Bilog Antenna	SCHWARZBECK	VULB9160	C2040150	2013/03	2014/03
Horn Antenna	EMCO	3115	C2042018	2012/04	2013/04
EMI Test receiver	RHODE & SCHWARZ	ESI40	A2642010	2012/09	2013/09
AC Power Line Conducted Emissions					
Apparatus	**Trade Mark**	**Type**	**Registration number**	**Calibration date**	**Calibration due**
Semi anechoic chamber 11,8x8,1x9,5m	SIEPEL	C01	D3044008	2011/04	2014/04
EMI receiver	RHODE & SCHWARZ	ESI40	A2642010	2012/09	2013/09
V LISN	RHODE & SCHWARZ	ESH3-Z5	C2322003	2012/12	2012/13
Pulse limiter	RHODE & SCHWARZ	ESH3-Z2	A2649005	2012/11	2013/11

13. UNCERTAINTIES CHART

Kind of test	Measurement uncertainties (k=2) ±x(dB) / (Hz)	Limit for uncertainties ±y(dB)
TRANSMITTER REQUIREMENTS		
Radio frequency	$\pm 2.10^{-8}$ Hz	$\pm 1.10^{-7}$ Hz
RF Conducted power	±0.6 dB	±1.5 dB
Spurious emissions • Frequency < 1000 MHz • Frequency > 1000 MHz	 ±3.9 dB ±3.1 dB	±6 dB
Spurious in conduction	±1.6 dB	±3 dB
Temperature	±0.5°C	±1°C
Humidity	±2.5 %	±10 %
RECEIVER REQUIREMENTS		
Spurious emissions • Frequency < 1000 MHz • Frequency > 1000 MHz	 ±3.9 dB ±3.1 dB	±6 dB

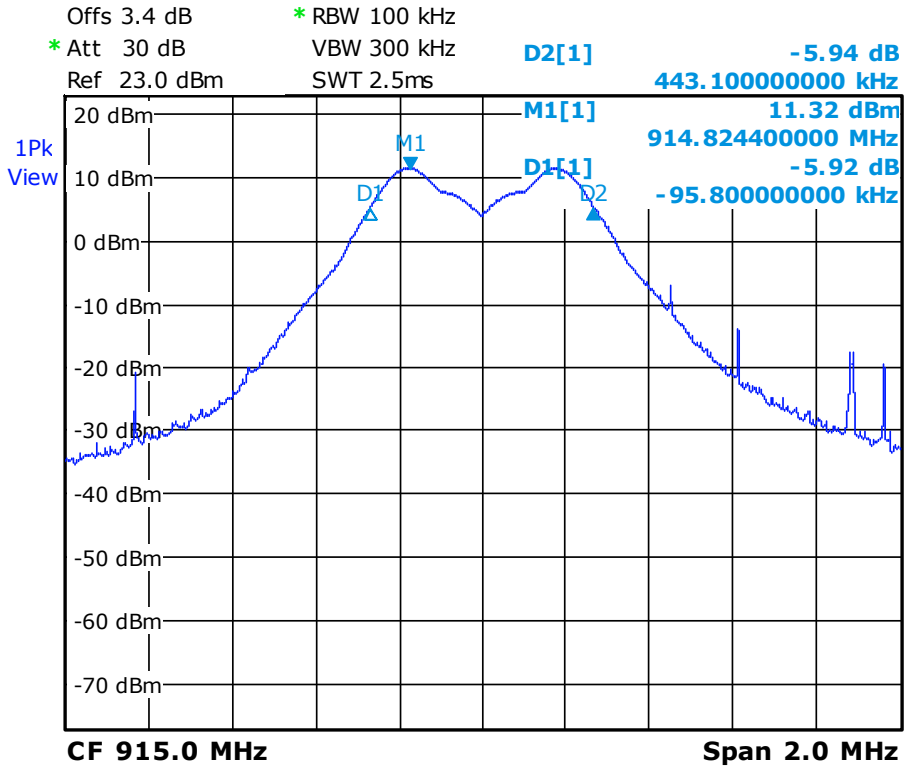
14. ANNEX (GRAPHS)

Occupied Bandwidth
Frequency: Fnom
Temperature: Tnom
Voltage: Vnom



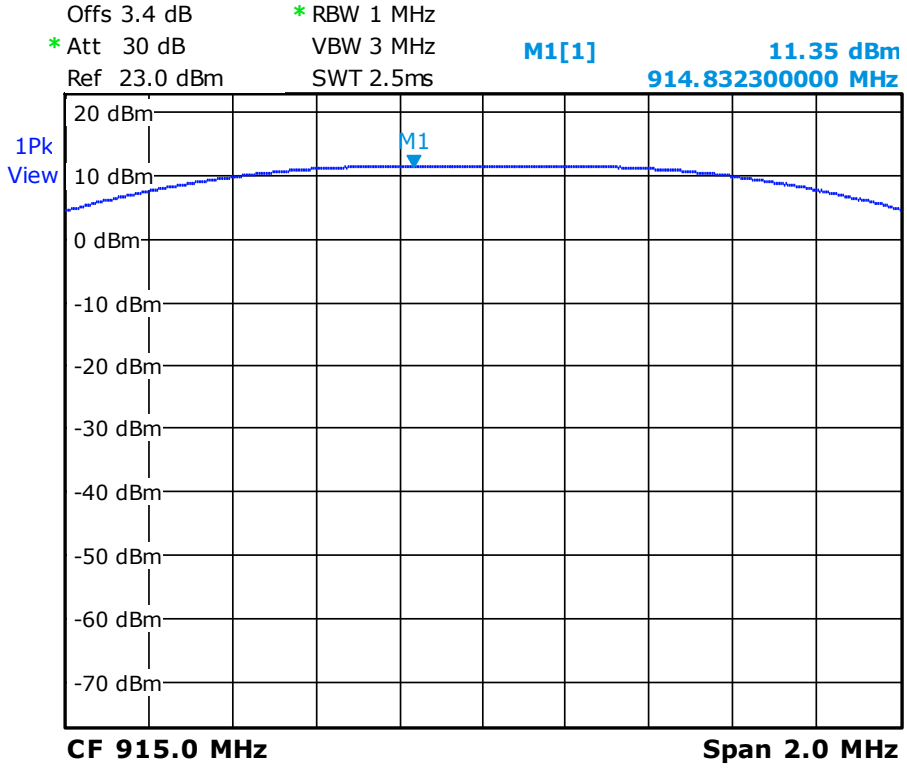
Date: 29.MAR.2013 12:20:52

-6dB bandwidth
Frequency: Fnom
Temperature: Tnom
Voltage: Vnom



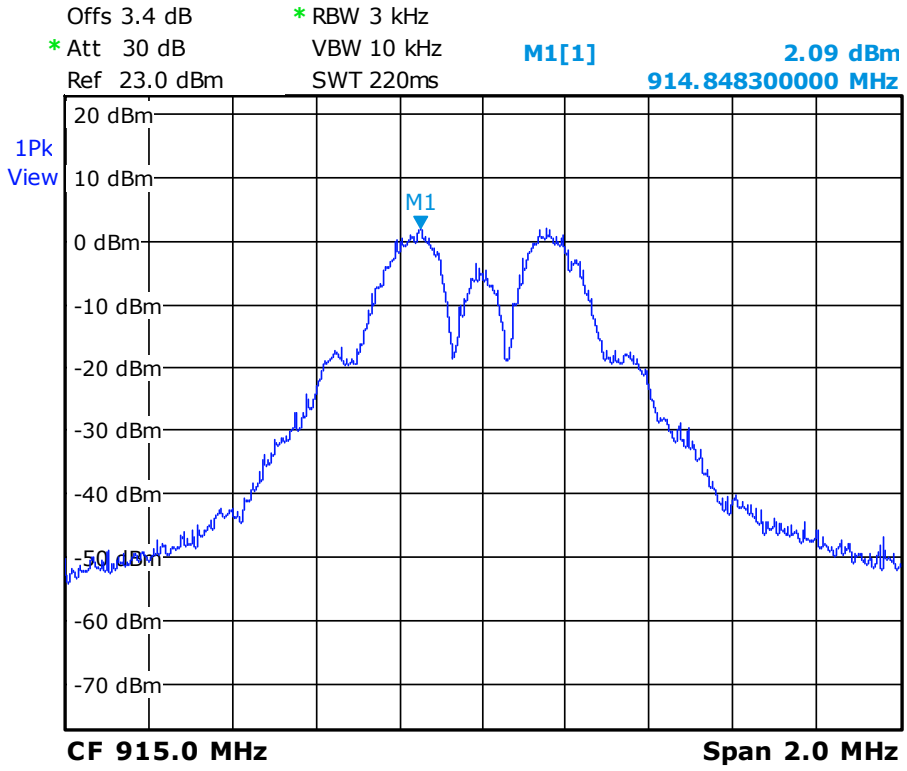
Date: 29.MAR.2013 11:27:14

Maximum Peak Output Power
Frequency: Fnom
Temperature: Tnom
Voltage: Vnom



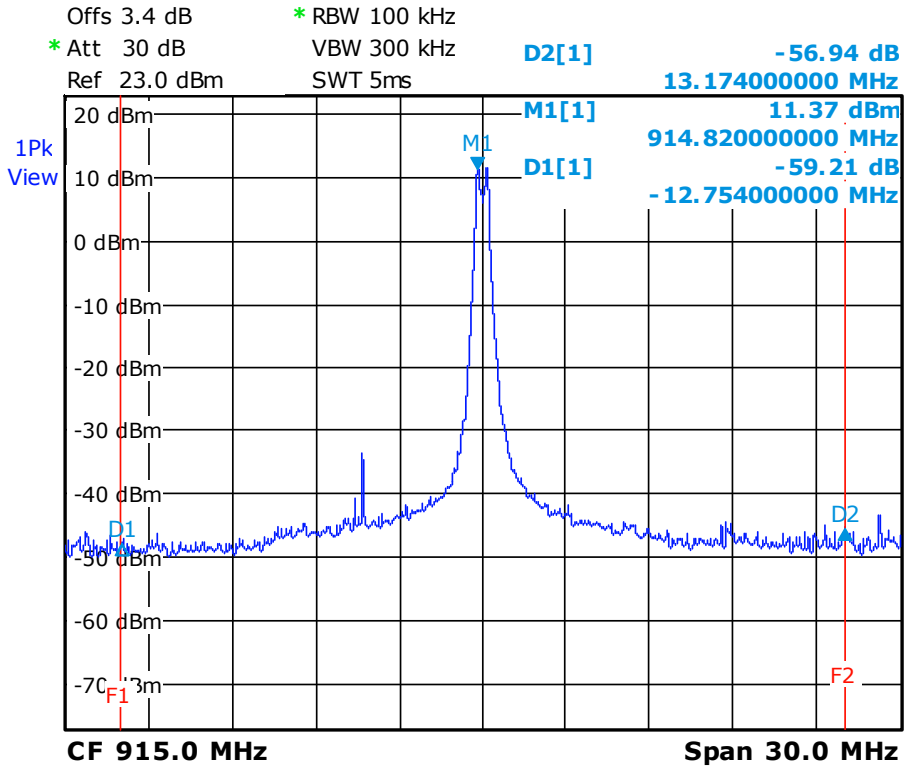
Date: 29.MAR.2013 11:36:50

Power Spectral Density
Frequency: Fnom
Temperature: Tnom
Voltage: Vnom



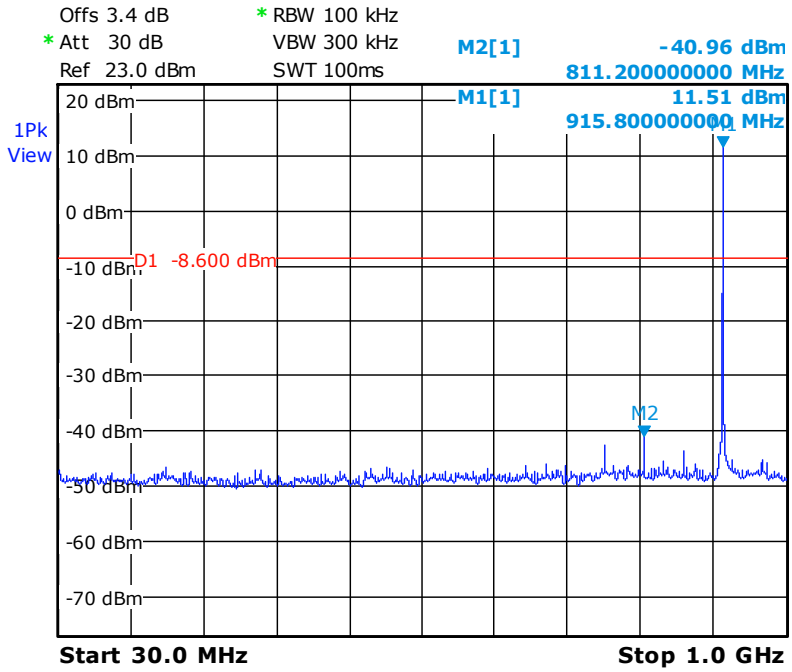
Date: 29.MAR.2013 11:57:19

Band Edge
Frequency: Fnom
Temperature: Tnom
Voltage: Vnom



Date: 29.MAR.2013 11:46:26

Conducted Spurious Emissions
Frequency: Fnom
Temperature: Tnom
Voltage: Vnom



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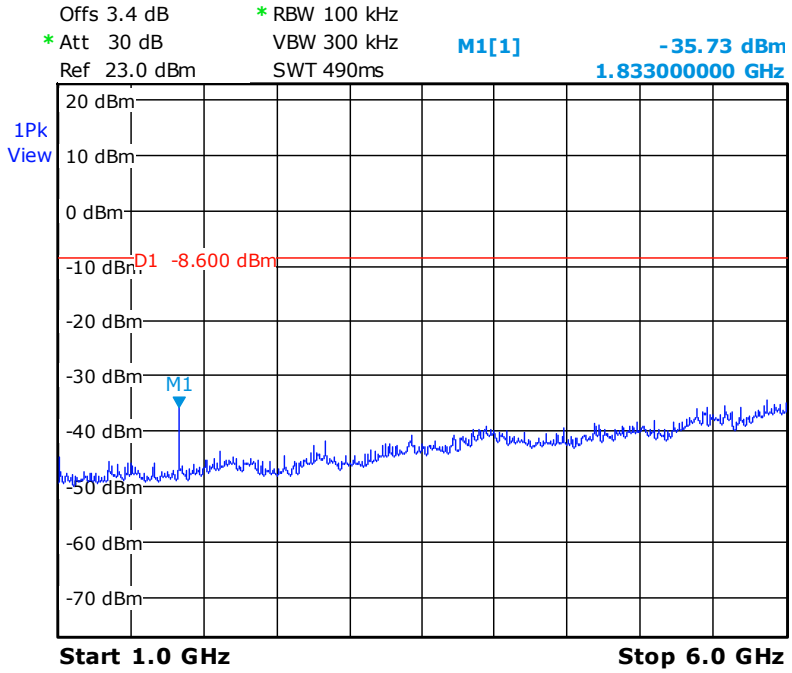

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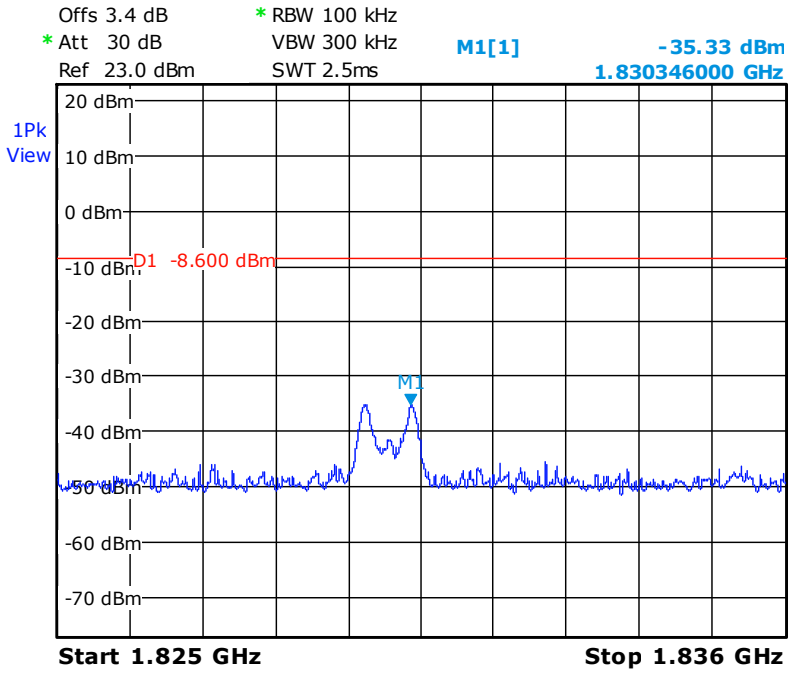

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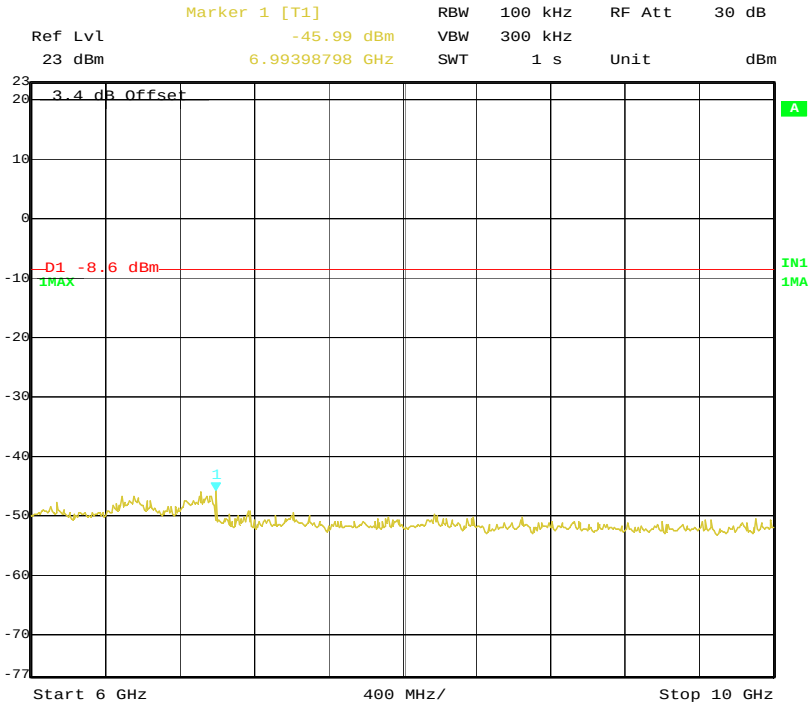
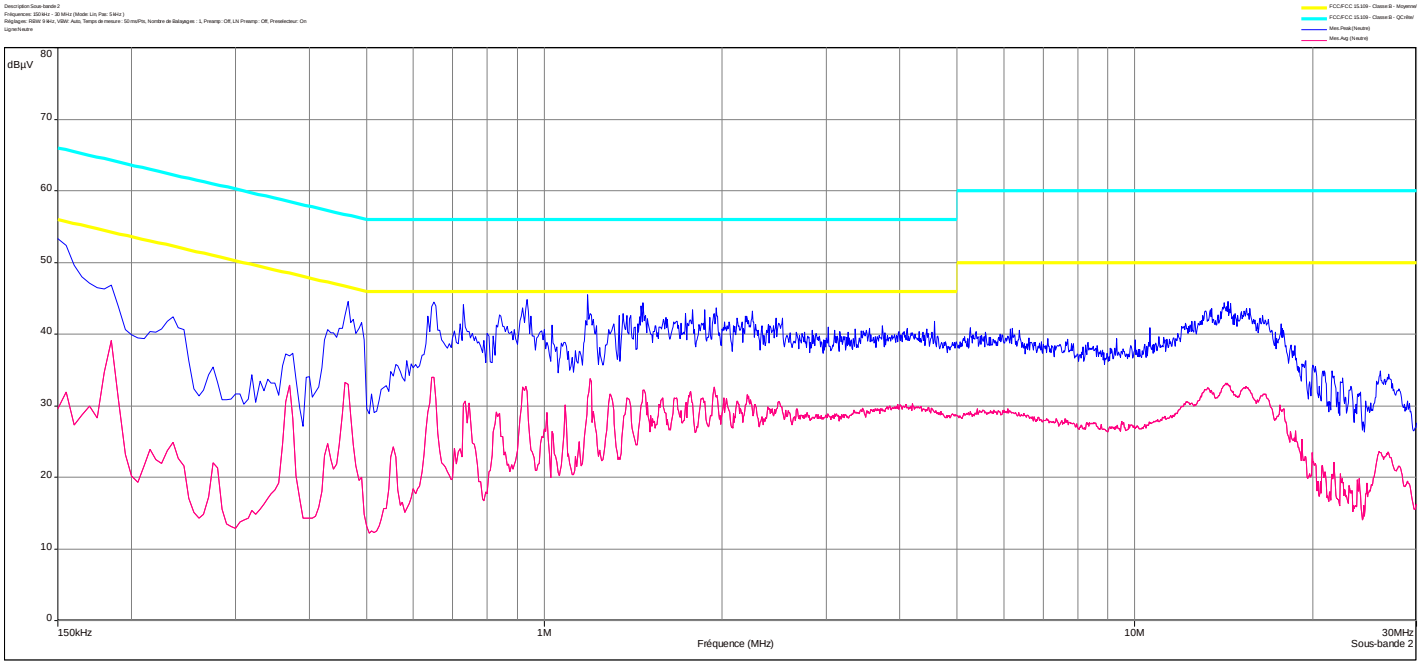
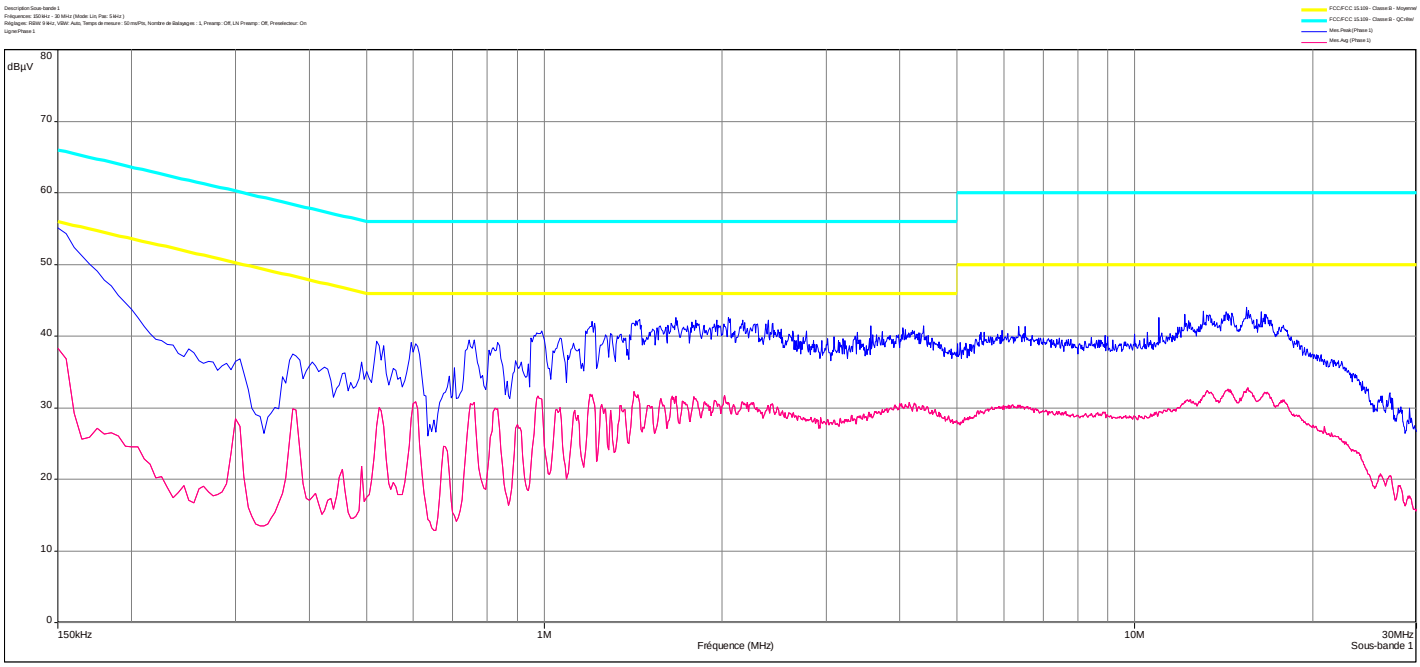


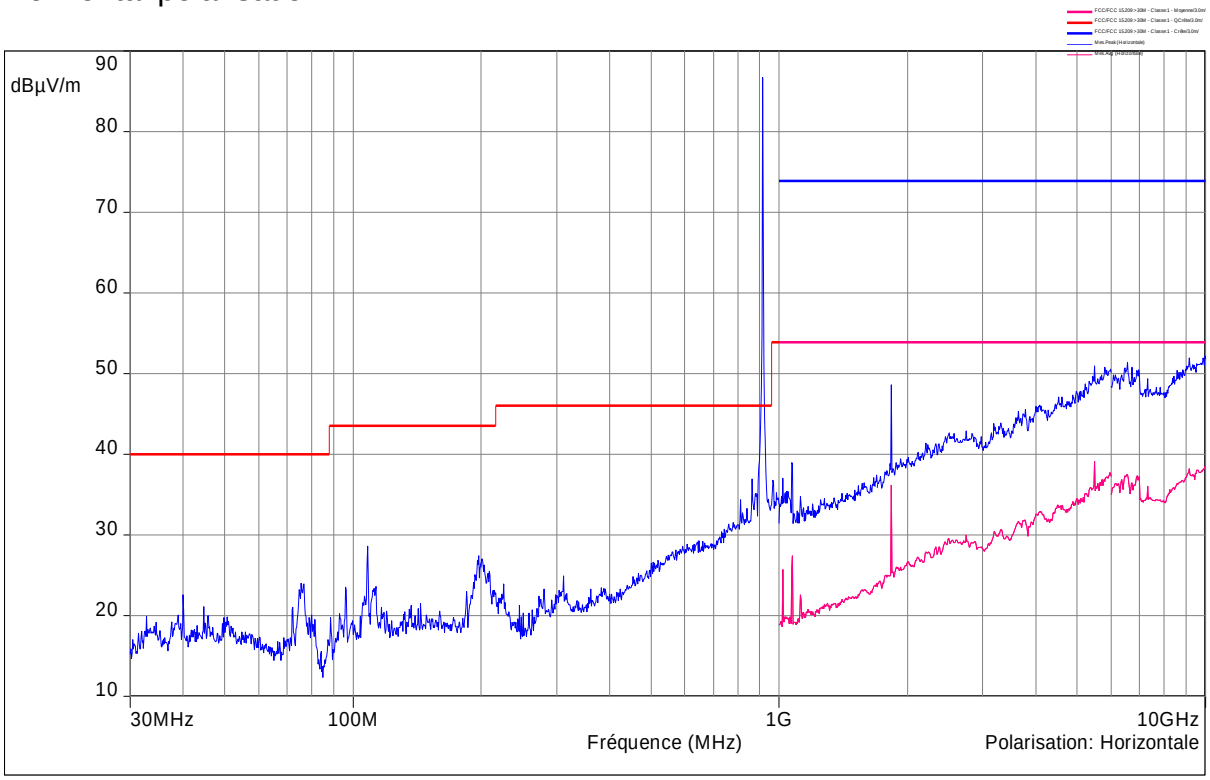
AC power line conduted emissions
Frequency: Fnom
Temperature: Tnom
Voltage: Vnom
Neutral Line



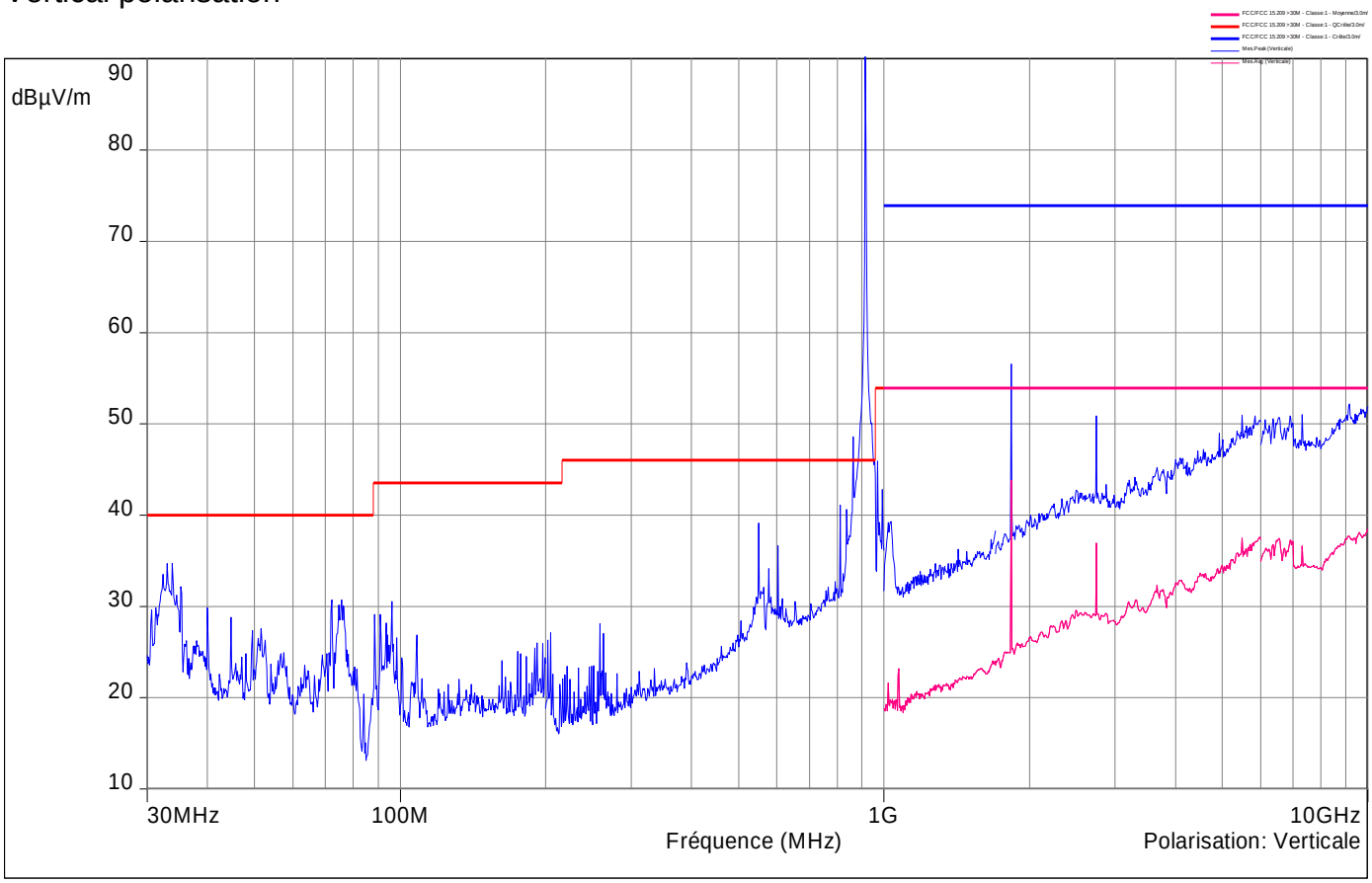
AC power line conduted emissions
Frequency: Fnom
Temperature: Tnom
Voltage: Vnom
Phase Line



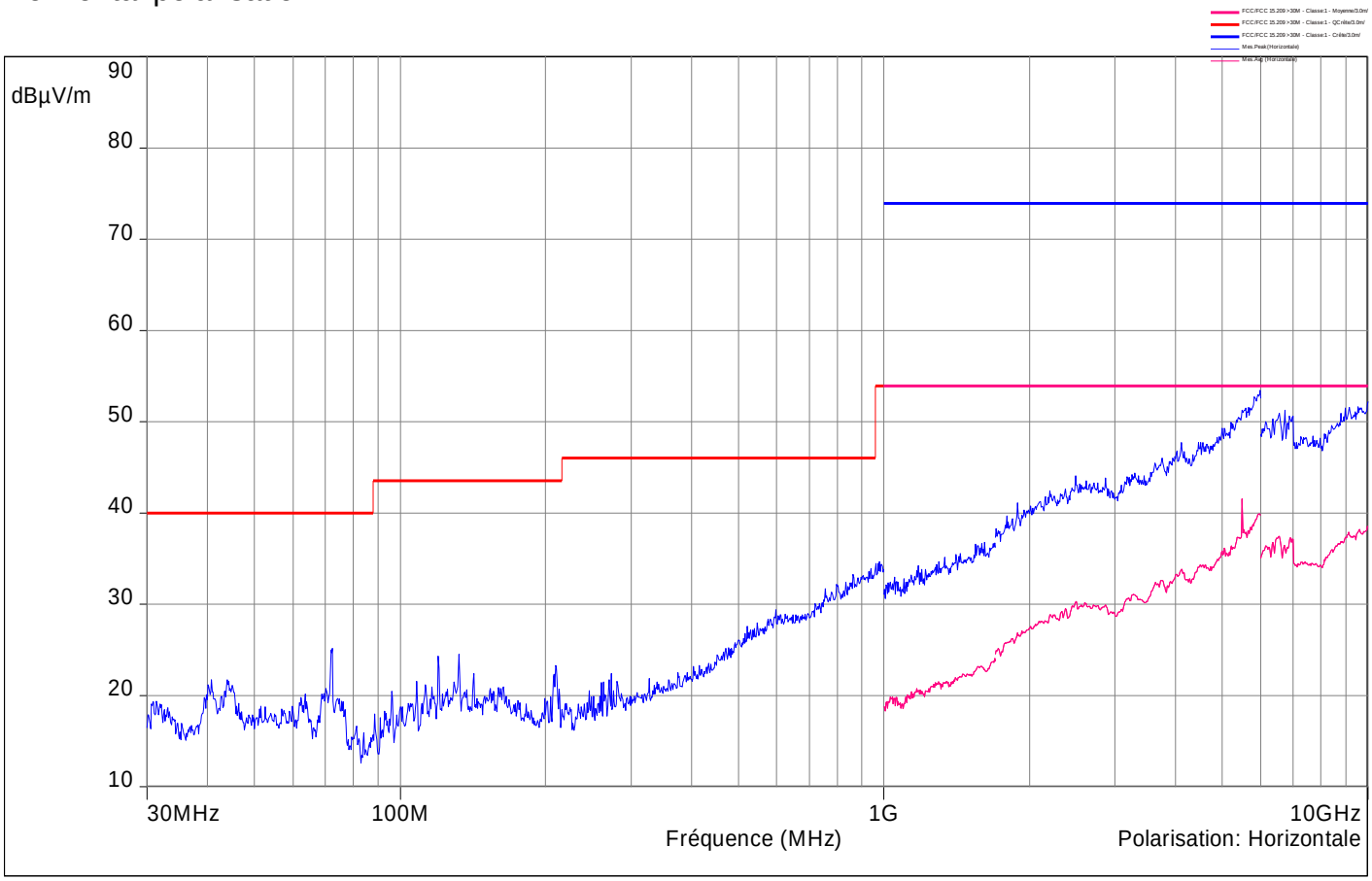
Transmitter Radiated Emissions
Frequency: Fnom
Temperature: Tnom
Voltage: Vnom
Horizontal polarisation



Transmitter Radiated Emissions
Frequency: Fnom
Temperature: Tnom
Voltage: Vnom
Vertical polarisation



Receiver Radiated Emissions
Frequency: Fnom
Temperature: Tnom
Voltage: Vnom
Horizontal polarisation



Receiver Radiated Emissions
Frequency: Fnom
Temperature: Tnom
Voltage: Vnom
Vertical polarisation