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Rapport d'essai / *Test report*

N° 201003-6156CR-R2-E **JDE :** 99698

DELIVRE A / *ISSUED TO* : **INGENICO**
Rue Claude Chappe
B.P. 344
07503 GUILHERAND GRANGES

Objet / *Subject* : Essais de compatibilité électromagnétique conformément aux normes **FCC CFR 47 Part 15, Subpart B et C.**
Electromagnetic compatibility tests according to the standards ***FCC CFR 47 Part 15, Subpart B and C***

Matériel testé / *Apparatus under test* :

- Produit / *Product* : **Lecteur de carte bancaire / *Bank payment terminal***
- Marque / *Trade mark* : **INGENICO**
- Constructeur / *Manufacturer* : **INGENICO**
- Type / *Model* **iPP3x0-01Txxxxx**
- Type sous test / *Model under test* : **iPP350-01T1108A** **iPP320-01T1185A**
- N° de série / *serial number* : **09350PP40063651** **09350PP40063626**
- FCC ID : **XKB-iPP3x0-01Txxx**

Date des essais / *Test date* : Du 26 au 28 Avril 2010 / *From April 26th to 28th, 2010*

Lieu d'essai / *Test location* : **BUREAU VERITAS LCIE SUD-EST**
ZI Centr'Alp – 170 rue de Chatagnon
38430 MOIRANS - France

Test réalisé par / *Test performed by* : Anthony MERLIN

Ce document comporte /*Composition of document :* 72 pages.

MOIRANS, LE 7 JUIN 2010 / *JUNE 7TH, 2010*

Ecrit par / *Written by,*
Anthony MERLIN

Approuvé par / *Approved by,*
Jacques LORQUIN

LABORATOIRE CENTRAL DES INDUSTRIES ELECTRIQUES
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SUMMARY

1. TEST PROGRAM

Standard: **- FCC Part 15, Subpart B (Digital Devices)**
- ANSI C63.4 (2003)

EMISSION TEST	LIMITS			RESULTS (Comments)
Limits for conducted disturbance at mains ports 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 30MHz-12.5GHz	**Measure at 3m** 30MHz-88MHz : 40 dBµV/m 88MHz-216MHz : 43.5 dBµV/m 216MHz-960MHz : 46.0 dBµV/m Above 960MHz : 54.0 dBµV/m			**PASS**

Standard: **- FCC Part 15, Subpart C**
- ANSI C63.4 (2003)

EMISSION TEST	LIMITS			RESULTS (Comments)
Limits for conducted disturbance at mains ports 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 9kHz-30MHz	**Measure at 300m** 9kHz-490kHz : 67.6dBµV/m /F(kHz) **Measure at 30m** 490kHz-1.705MHz : 87.6dBµV/m /F(kHz) 1.705MHz-30MHz : 29.5 dBµV/m			**PASS**
Radiated emissions 30MHz-12.5GHz*	**Measure at 3m** 30MHz-88MHz : 40 dBµV/m 88MHz-216MHz : 43.5 dBµV/m 216MHz-960MHz : 46.0 dBµV/m Above 960MHz : 54.0 dBµV/m			**PASS**
Fundamental frequency tolerance	**Operation within the band** **13.110-14.010 MHz §15.225**			**PASS**
Bandedge compliance	**Operation within the band** **13.110-14.010 MHz §15.225**			**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

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

E.U.T. : **iPP350-01T1108A**
Serial number: 09350PP40063651
Model with all options

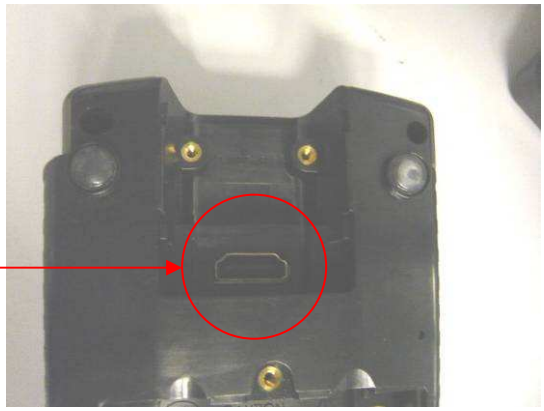
E.U.T. : iPP320-01T1185A
Serial number: 09350PP40063626
Model with all options

With Power supply FRIWO	153051	120V / 50-60Hz <-> 8Vdc	(Configuration n°1)
With Power supply PHIHONG	PSC16E-080	100-240V / 50Hz <-> 8Vdc	(Configuration n°4)

Highest internal frequency: 387 MHz

- **Input/output:**

1 x Power supply / Data port (Type HDMI, “1”)



- **Auxiliaries used for testing:**

- Laptop TOSHIBA SATELLITE PS141E-04YC sn: 13594938G
- POE Injector POE30U-560 (56Vdc 0.55A) PHIHONG sn: P71400110B1

- **I/O cables used for testing:**

- **Configuration 1**: 1 x Ethernet cable (2m) (AC/DC adapter input), shielded, Ref: IPP3xx-A-XXX-X

- **Configuration 2**: 1 x Ethernet cable (2m) (POE) shielded, Ref: IPP3xx-P-XXX-X
- **Configuration 2**: 1 x Ethernet cable (2m), FTP Cat 5e, Type CM shielded

- **Configuration 3**: 1 x USB cable (2m), shielded, Ref: IPP3xx-X-XXX-X

- **Configuration 4**: 1 x RS232 cable (2m), shielded, Ref: IPP3xx-XX-XXX-X

2.3. RUNNING MODE

Sequence n°1 :

A reading and writing process are performed on
- SAM1
- SAM2
- SAM3
- CAM0
- Cless

Sequence n°2 :

Sequence n°1 + a continuous ping process to EUT IP address from Laptop (TOSHIBA) (Ethernet link) is performed.

Sequence n°3:

sequence n°1 + serial communication on COM0

Serial communication (RS232, COM0) consists to performed a self communication (RX and TX are bypassed)

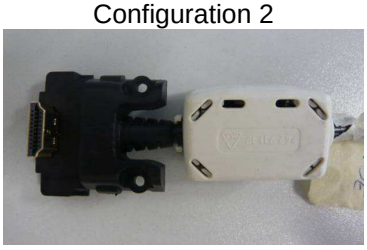
Configuration / Running mode	1	2	3	4
Sequence n°1			x	
Sequence n°2	x	x		
Sequence n°3				x

2.4. EQUIPMENT MODIFICATIONS

A ferrite (ref: wurth 742 711 31) on EUT cable has been necessary during testing for configuration 1 & 2.

Configuration 1

Configuration 2



2.5. EUT EXERCISE SOFTWARE

Pack OS 3777 0900 + driver Cless 8200490207

Appli test CEM: TESTCAM0107

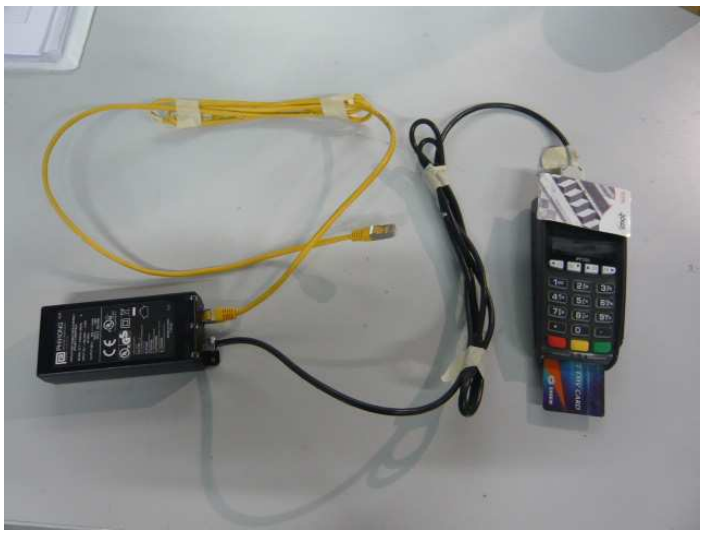
2.6. EUT CONFIGURATION

Configuration 1 :

Communication access : - Ethernet
Power supply : - Power supply adapter Type FRIWO 153051 (8Vdc <-> IPP3x)
Option Cable: - Ref: IPP3xx-A-XXX-X

Configuration 2 :

Communication access : - Ethernet
Power supply : - Power over Ethernet (POE) provided by a POE injector type PHIHONG POE30U-560
Option Cable: - Ref: IPP3xx-P-XXX-X



Configuration 3 :

Communication access : - USB
Power supply : - Power provided by a Laptop (USB, 5Vdc <-> IPP3x)
Option Cable: - Ref: IPP3xx-X-XXX-X

Configuration 4 :

Communication access : - RS232
Power supply : - Power supply adapter Type PSC16E-080 (8Vdc <-> IPP3x)
Option Cable: - Ref: IPP3xx-XX-XXX-X

3. RADIATED EMISSION DATA

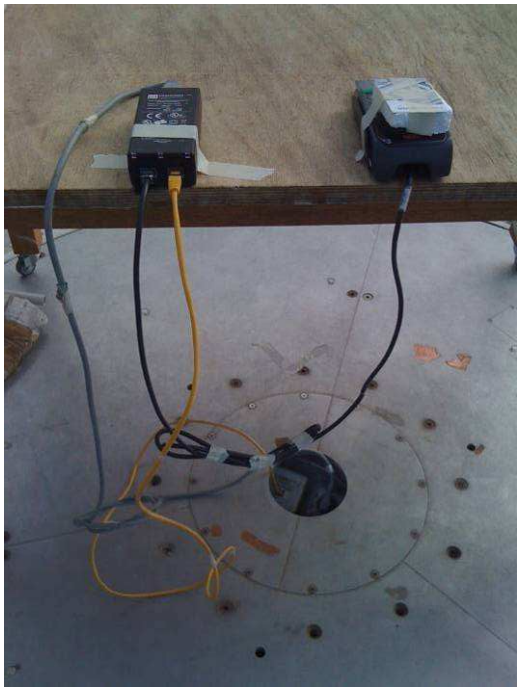
3.1. CLIMATIC CONDITIONS

Date of test : April 26th, 2010
Test performed by : A.MERLIN
Atmospheric pressure : 954mb
Relative humidity : 40%
Ambient temperature : 21°C

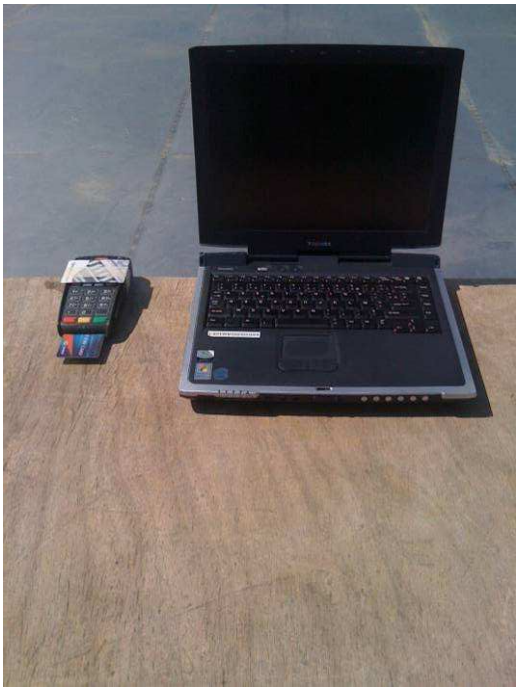
3.2. TEST SETUP

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


Configuration n°4

3.3. TEST SEQUENCE AND RESULTS

3.3.1. Pre-characterization at 3 meters [9kHz-30MHz]

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. For Pre-characterization, the loop antenna was rotated during the test for maximized the emission measurement. Measurement performed on 3 axis of EUT.
Frequency band investigated is 9kHz to 30MHz.

The pre-characterization graphs are obtained in PEAK detection.

See graph for 9kHz-30MHz band:

Configuration n°1	***Color***	**Emr#1**	(See annex 1)
Configuration n°1	***Black&White***	**Emr#2**	(See annex 1)
Configuration n°2	***Color***	**Emr#3**	(See annex 1)
Configuration n°2	***Black&White***	**Emr#4**	(See annex 1)
Configuration n°3	***Color***	**Emr#5**	(See annex 1)
Configuration n°3	***Black&White***	**Emr#6**	(See annex 1)
Configuration n°4	***Color***	**Emr#7**	(See annex 1)
Configuration n°4	***Black&White***	**Emr#8**	(See annex 1)

3.3.2. 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:

Configuration n°1 - Color		
H polarization	**Emr#9**	(See annex 1)
V polarization	**Emr#10**	(See annex 1)
Configuration n°1 – B&W		
H polarization	**Emr#11**	(See annex 1)
V polarization	**Emr#12**	(See annex 1)
Configuration n°2 - Color		
H polarization	**Emr#13**	(See annex 1)
V polarization	**Emr#14**	(See annex 1)
Configuration n°2 – B&W		
H polarization	**Emr#15**	(See annex 1)
V polarization	**Emr#16**	(See annex 1)
Configuration n°3 - Color		
H polarization	**Emr#17**	(See annex 1)
V polarization	**Emr#18**	(See annex 1)
Configuration n°3 – B&W		
H polarization	**Emr#19**	(See annex 1)
V polarization	**Emr#20**	(See annex 1)
Configuration n°4 - Color		
H polarization	**Emr#21**	(See annex 1)
V polarization	**Emr#22**	(See annex 1)
Configuration n°4 – B&W		
H polarization	**Emr#23**	(See annex 1)
V polarization	**Emr#24**	(See annex 1)

3.3.3. Characterization on 10 meters open site below 30 MHz

The product has been tested according to ANSI C63.4 (2003), FCC part 15 subpart C. Radiated Emissions were measured on an open area test site. A description of the facility is on file with the FCC.
The product has been tested at a distance of **10 meters** from the antenna and compared to the FCC part 15 subpart C §15.225 limits in the frequency range 13.553MHz 13.567MHz. Measurement bandwidth was 9kHz.
Antenna height was 1m for both horizontal and vertical polarization.
Antenna was rotated around its vertical axis.
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 clauses 3.2.

Worst configuration: Configuration n°2

Frequency (MHz)	QPeak Limit (dBµV/m) @ 30m	Qpeak (dBµV/m)	Qpeak-Limit (Margin dB)	Turntable Angle (deg)	Ant. Pol./ Angle (deg)	Tot Corr (dB)
13.56*[1]	84.0	43.7	**-40.3**	270	90	35.3
27.12*[1]	29.5	No Significant Frequency Observed				39.3

*[1]: Measure have been done at 10m distance and corrected according to requirements of 15.209.e) (M@30m = M@10m-19.1dB)

Limits Sub clause §15.225

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
13.553-13.567	15 848 84 dBµV/m	30
13.410-13.553 13.567-13.710	334 50.5 dBµV/m	30
13.110-13.410 13.710-14.010	106 40.5 dBµV/m	30

See chapter 5 of this test report for band edge measurements.

3.3.4. 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 and C §15.209 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 between Color and B&W by configuration:

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	34.12	40	31.8	**-8.2**	10	V	110	13.1	None
2	38.564	40	36.1	**-3.9**	45	V	100	12.0	None
3	40.678	40	37.9	**-2.1**	230	V	100	12.0	None
4	54.245	40	38.3	**-1.7**	50	V	110	12.3	With Modification §2.4
5	64.123	40	35.9	**-4.1**	45	V	100	11.0	None
6	67.893	40	35.2	**-4.8**	90	V	230	10.4	None
7	774.102	46	40.4	**-5.6**	200	H	150	26.1	None
8	999.968	54	43.8	**-10.2**	0	H	100	29.7	None

*: 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	37.356	40	36.4	**-3.6**	150	V	150	12.0	None
2	40.679	40	39.7	**-0.3**	100	V	100	12.0	With Modification §2.4
3	50.369	40	27.4	**-12.6**	300	V	100	12.7	None
4	54.237	40	38.9	**-1.1**	230	V	100	12.3	With Modification §2.4
5	176.16	43.5	31.8	**-11.7**	200	H	340	18.3	None
6	732.201	46	44.0	**-2.0**	290	H	110	25.8	None
7	999.991	54	41.2	**-12.8**	280	H	130	29.7	None

*: 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	33.771	40	23.9	**-16.1**	0	V	100	13.1	None
2	40.679	40	37.7	**-2.3**	320	V	100	12.0	None
3	54.249	40	36.4	**-3.6**	0	V	175	12.3	None
4	786.426	46	39.0	**-7.0**	160	V	170	26.2	None
5	870.856	46	39.3	**-6.7**	320	H	260	27.4	None
6	999.984	54	42.0	**-12.0**	0	H	220	29.7	None

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

Configuration n°4:

No	Frequency (MHz)	QPeak Limit (dBµV/m)	Qpeak * (dBµV/m)	Qpeak-Limit (Margin, dB)	Angle (deg)	Pol	Hgt (cm)	Tot Corr (dB)	Comments
1	34.12	40	35.0	**-5.0**	0	V	100	13.1	None
2	40.674	40	37.9	**-2.1**	0	V	100	12.0	None
3	54.24	40	38.2	**-1.8**	0	V	100	12.3	None
4	57.004	40	32.5	**-7.5**	0	V	100	11.9	None
5	122.005	43.5	34.5	**-9.0**	105	V	100	16.2	None
6	732.192	46	42.3	**-3.7**	250	H	110	25.8	None
7	786.44	46	38.7	**-7.3**	110	V	100	26.2	None
8	871.054	46	37.3	**-8.7**	230	V	120	27.5	None
9	999.991	54	41.4	**-12.6**	145	H	100	29.7	None

*: 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 – For all configuration

Measurements are performed using a PEAK and Average detection. (RBW = 1MHz)

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. FUNDAMENTAL FREQUENCY TOLERANCE (15.225E)

4.1. TEST CONDITIONS

Date of test : April 29th, 2010
Test performed by : A.MERLIN

The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency when the temperature is varied from -20℃ to +50℃ at the no minal power voltage and the primary power voltage is varied from 85% to 115% of the rated supply voltage at 20℃.

4.2. Temperature and voltage fluctuation

Temperature has been set at +20℃, –20℃ and +50℃.
Voltage is varied from 102V/60Hz to 138V/60Hz (4 configurations)
Frequency of carrier: 13.56 MHz
Upper limit: 13.561356 MHz
Lower limit: 13.558644 MHz
The equipment (RF box) is set in a climatic chamber. Measure is performed on one channel of RF module.

Configuration n°1:

Temperature / Voltage	-20℃	20℃	+50℃
Mains voltage: 110V/60Hz			
Frequency Drift (MHz)	0.000087	**REF**	-0.000062
Carrier level (dBc)	-2.520000	**REF**	-0.370000
Mains voltage: 93,5V/60Hz			
Frequency Drift (MHz)	0.000085	-0.000064	-0.000065
Carrier level (dBc)	-0.930000	-0.140000	-0.280000
Mains voltage: 126V/60Hz			
Frequency Drift (MHz)	0.000085	-0.000057	-0.000065
Carrier level (dBc)	-0.560000	-0.160000	-0.250000

Frequency drift measured is **87 Hz** when the temperature is varied from -20℃ to +50℃ and voltage is varied from 120V/60Hz ± 15%.

Configuration n°2:

Temperature / Voltage	-20℃	20℃	+50℃
Mains voltage: 110V/60Hz			
Frequency Drift (MHz)	0.000094	**REF**	-0.000032
Carrier level (dBc)	-1.840000	**REF**	-0.160000
Mains voltage: 93,5V/60Hz			
Frequency Drift (MHz)	0.000094	0.000000	-0.000040
Carrier level (dBc)	-1.980000	0.000000	-0.190000
Mains voltage: 126V/60Hz			
Frequency Drift (MHz)	0.000097	-0.000002	-0.000037
Carrier level (dBc)	-0.640000	0.000000	-0.190000

Frequency drift measured is **107 Hz** when the temperature is varied from -20℃ to +50℃ and voltage is varied from 120V/60Hz ± 15%.

Configuration n°3:

Temperature / Voltage	-20°C	20°C	+50°C
Mains voltage: 110V/60Hz			
Frequency Drift (MHz)	0.000054	**REF**	-0.000084
Carrier level (dBc)	-0.480000	**REF**	-0.670000
Mains voltage: 93,5V/60Hz			
Frequency Drift (MHz)	0.000062	-0.000026	-0.000082
Carrier level (dBc)	-0.230000	-0.370000	-0.650000
Mains voltage: 126V/60Hz			
Frequency Drift (MHz)	0.000062	-0.000019	-0.000079
Carrier level (dBc)	-0.160000	-0.300000	-0.600000

Frequency drift measured is **84 Hz** when the temperature is varied from -20°C to +50°C and voltage is varied from 120V/60Hz ± 15%.

Configuration n°4:

Temperature / Voltage	-20°C	20°C	+50°C
Mains voltage: 110V/60Hz			
Frequency Drift (MHz)	0.000075	**REF**	-0.000077
Carrier level (dBc)	-2.540000	**REF**	-0.260000
Mains voltage: 93,5V/60Hz			
Frequency Drift (MHz)	0.000070	-0.000059	-0.000074
Carrier level (dBc)	-1.660000	-0.170000	-0.260000
Mains voltage: 126V/60Hz			
Frequency Drift (MHz)	0.000075	-0.000057	-0.000074
Carrier level (dBc)	-3.160000	-0.140000	-0.260000

Frequency drift measured is **75 Hz** when the temperature is varied from -20°C to +50°C and voltage is varied from 120V/60Hz ± 15%.

5. BAND-EDGE COMPLIANCE §15.209

5.1. CLIMATIC CONDITIONS

Date of test : April 26th, 2010
Test performed by : A.MERLIN
Atmospheric pressure : 954mb
Relative humidity : 40%
Ambient temperature : 21°C

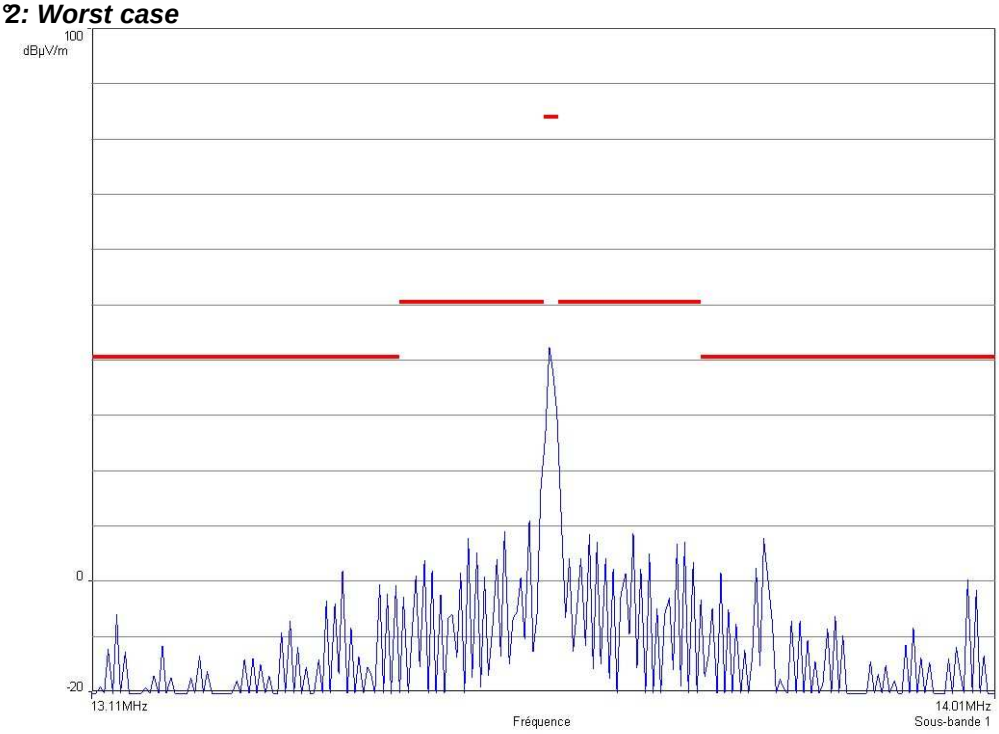
5.2. EQUIPMENT CONFIGURATION

See § 2.3.

5.3. Frequency band 13.110-14.010MHz

Following plots show radiated emission level in the frequency band 13.110-14.010MHz with a RBW of 9kHz and a quasi-peak detector. The graphs are obtained with a measuring receiver ESU8.

Configuration n°2: Worst case



6. CONDUCTED EMISSION DATA

6.1. CLIMATIC CONDITIONS

Date of test : April 28th, 2010
Test performed by : A.MERLIN
Atmospheric pressure : 801mb
Relative humidity : 41%
Ambient temperature : 24°C

6.2. SETUP FOR CONDUCTED EMISSIONS MEASUREMENT

The product has been tested according to ANSI C63.4-(2003) and FCC Part 15 subpart B and C.

The product has been tested with 120V/60Hz power line voltage and compared to the FCC Part 15 subpart B §15.107 and C §15.207 limits. Measurement bandwidth was 9kHz from 150 kHz to 30 MHz.

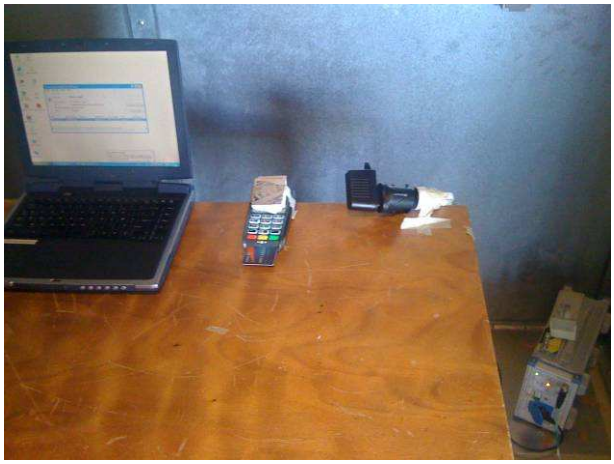
Measurement is made with a Rohde & Schwarz ESU8 receiver in peak mode. This was followed by a Quasi-Peak, i.e. CISPR measurement for any strong signal. If the average limit is met when using a Quasi-Peak detector, the EUT shall be deemed to meet both limits and measurement with the average detector is 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.

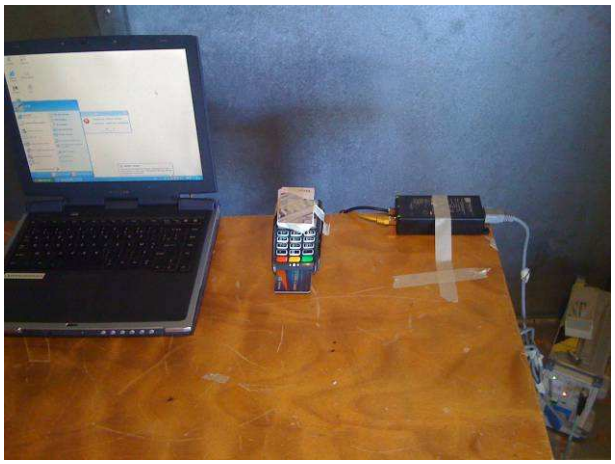
Interconnecting cables and equipment's were moved to position that maximized emission. A summary of the worst case emissions found in all test configurations and modes is shown on the following page.

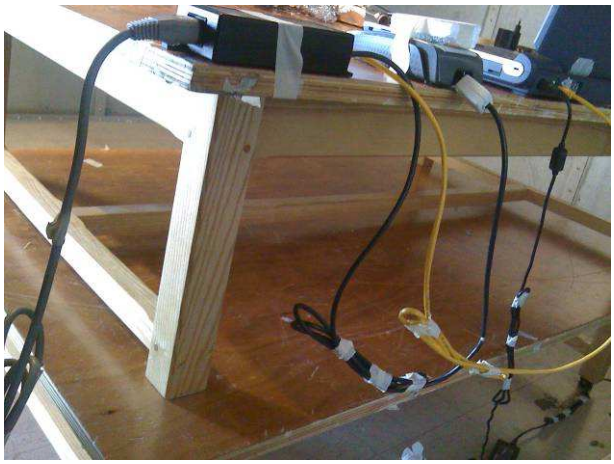
6.3. TEST SETUP

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).

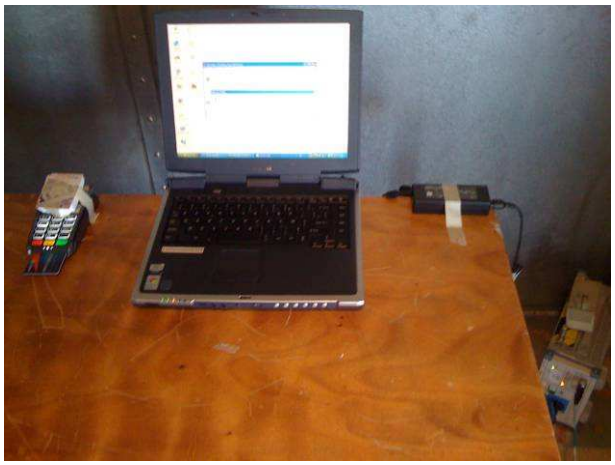


Configuration n°1

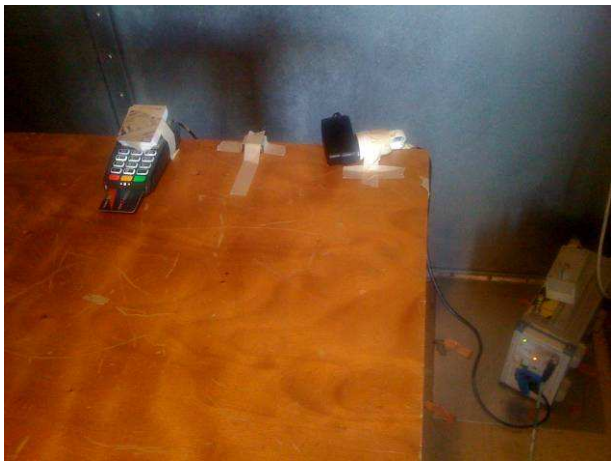




Configuration n°2



Configuration n°3



Configuration n°4

6.4. 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 – Color:			
Measure on L1:	graph Emc#1		(see annex 1)
Measure on N:	graph Emc#2		(see annex 1)
Configuration n°1 – B&W:			
Measure on L1:	graph Emc#3		(see annex 1)
Measure on N:	graph Emc#4		(see annex 1)
Configuration n°2 – Color:			
Measure on L1:	graph Emc#5	*Laptop power supply*	(see annex 1)
Measure on N:	graph Emc#6	*Laptop power supply*	(see annex 1)
Measure on L1:	graph Emc#7	*POE power supply*	(see annex 1)
Measure on N:	graph Emc#8	*POE power supply*	(see annex 1)
Configuration n°2 – B&W:			
Measure on L1:	graph Emc#9	*Laptop power supply*	(see annex 1)
Measure on N:	graph Emc#10	*Laptop power supply*	(see annex 1)
Measure on L1:	graph Emc#11	*POE power supply*	(see annex 1)
Measure on N:	graph Emc#12	*POE power supply*	(see annex 1)
Configuration n°3 – Color:			
Measure on L1:	graph Emc#13		(see annex 1)
Measure on N:	graph Emc#14		(see annex 1)
Configuration n°3 – B&W:			
Measure on L1:	graph Emc#15		(see annex 1)
Measure on N:	graph Emc#16		(see annex 1)
Configuration n°4 – Color:			
Measure on L1:	graph Emc#17		(see annex 1)
Measure on N:	graph Emc#18		(see annex 1)
Configuration n°4 – B&W:			
Measure on L1:	graph Emc#19		(see annex 1)
Measure on N:	graph Emc#20		(see annex 1)

RESULT: PASS

TEST EQUIPMENT LIST (MOIRANS SITE)

	N°LCIE	TYPE	COMPANY	REF	commentaire
RADIATED EMISSION MEASUREMENT (PRE-SCAN SEMI-ANECHOIC CHAMBER #2)					
	A5329032VO	Absorption clamp	LUTHI	MDS21	
	A5329044VO	Absorption clamp	RHODE ET SCHWARZ	85024A	
X	A4049060VO	Adapter quasi-peak	HEWLETT PACKARD	HP85650A	
X	A7102024VO	Amplifier 8 GHz	HEROTEK	A1080304A	
X	A7486006VO	Amplifier 0.1MHz – 1300 MHz	HEWLETT PACKARD	8447F	
	A7085008VO	Amplifier 0.1MHz – 1300 MHz	HEWLETT PACKARD	8447D	
	A7085009VO	Amplifier 0.1MHz – 1300 MHz	HEWLETT PACKARD	8447D	
	A7085010VO	Amplifier 10MHz – 1300 MHz	A-INFO INC	JXWBLA-T	
X	C2040146VO	Antenna Bi-Log XWing	TESEQ	CBL6144	
	C2042027VO	Antenna horn	EMCO	3115	
	C2042028VO	Antenna horn 26GHz	SCHWARZBECK	BBHA 9170	
X	C2040052VO	Antenna Loop	ELECTRO-METRICS	EM-6879	
X	A5329045VO	Cable EMR (s-Anechoic chamber)			
X	A5329056VO	Cable Radiat EMI (Pre-amp/Analyzer)			
X	A5329057VO	Cable Radiat. EMI (Pre-amp/cage)			
X	A2642019	Measurement Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	
X	A4060030VO	Pre-selector RF	HEWLETT PACKARD	HP85685A	
X	A3169050VO	Radiated emission comb generator	BARDET		
X	D3044015VO	Semi-Anechoic chamber #2	SIEPEL		
X	A4060029VO	Spectrum analyzer	HEWLETT PACKARD	HP8568B	
X	A4060028VO	Spectrum analyzer display	HEWLETT PACKARD	HP85662A	
X	F2000404VO	Turntable chamber	ETS Lingren	Model 2165	
X	F2000393VO	Turntable controller chamber	ETS Lingren	Model 2066	
RADIATED EMISSION MEASUREMENT (OPEN AREA TEST SITE)					
	A5329032VO	Absorption clamp	LUTHI	MDS21	
	A5329044VO	Absorption clamp	RHODE ET SCHWARZ	85024A	
X	A4049059VO	Adapter quasi-peak	HEWLETT PACKARD	HP85650A	
	A7102024VO	Amplifier 8 GHz	HEROTEK	A1080304A	
	A7102026VO	Amplifier 8-26GHz	ALDETEC	ALS01452	
	A7085008VO	Amplifier 0.1MHz – 1300 MHz	HEWLETT PACKARD	8447D	
	A7085009VO	Amplifier 0.1MHz – 1300 MHz	HEWLETT PACKARD	8447D	
	A7085010VO	Amplifier 10MHz – 1300 MHz	A-INFO INC	JXWBLA-T	
X	C2040050VO	Antenna biconic	EMCO	3104C	
	C2040051VO	Antenna Bi-log	CHASE	CBL6111A	
	C2042027VO	Antenna horn	EMCO	3115	
	C2042028VO	Antenna horn 26GHz	SCHWARZBECK	BBHA 9170	
X	C2040056VO	Antenna log-periodic	EMCO	3146	
X	C2040052VO	Antenna Loop	ELECTRO-METRICS	EM-6879	
X	F2000288VO	Antenna mast	EMCO	1050	
X	A5329048VO	Cable EMR OATS	SUCOFLEX	106G	
X	A5329199VO	Cable OATS (Mast at 10m)	UTIFLEX		
X	A5329188VO	Cable OATS (Mast at 10m)	UTIFLEX		
	A5329076VO	Cable OATS (Mast at 3m)	UTIFLEX		
	A5329196VO	Cable OATS (Turntable)	UTIFLEX		
	A5329187VO	Cable OATS (Turntable)	UTIFLEX		
	A2640011VO	Measurement receiver 9kHz–30MHz	ROHDE ET SCHWARZ	ESH3	
X	A2642019	Measurement Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	
X	A4060027VO	Pre-selector RF	HEWLETT PACKARD	HP85685A	
X	A3169050VO	Radiated emission comb generator	BARDET		
X	A4060017VO	Spectrum analyzer	HEWLETT PACKARD	HP8568B	
	A4060018VO	Spectrum Analyzer 9KHz – 26.5GHz	HEWLETT PACKARD	8593E	
	A4060016VO	Spectrum analyzer 9kHz –1.8GHz	HEWLETT PACKARD	8591E	
X	A4060019VO	Spectrum analyzer display	HEWLETT PACKARD	HP85662A	
X	F2000403VO	Turntable	ETS LINDGREN	Model 2187	
X	F2000286VO	Turntable / Antenna mast controller	ETS LINDGREN	Model 2066	
CONDUCTED MEASUREMENT EMISSION					
	A5329061VO	Cable Conduct. EMI			
X	A5329060VO	Cable Conduct. EMI			

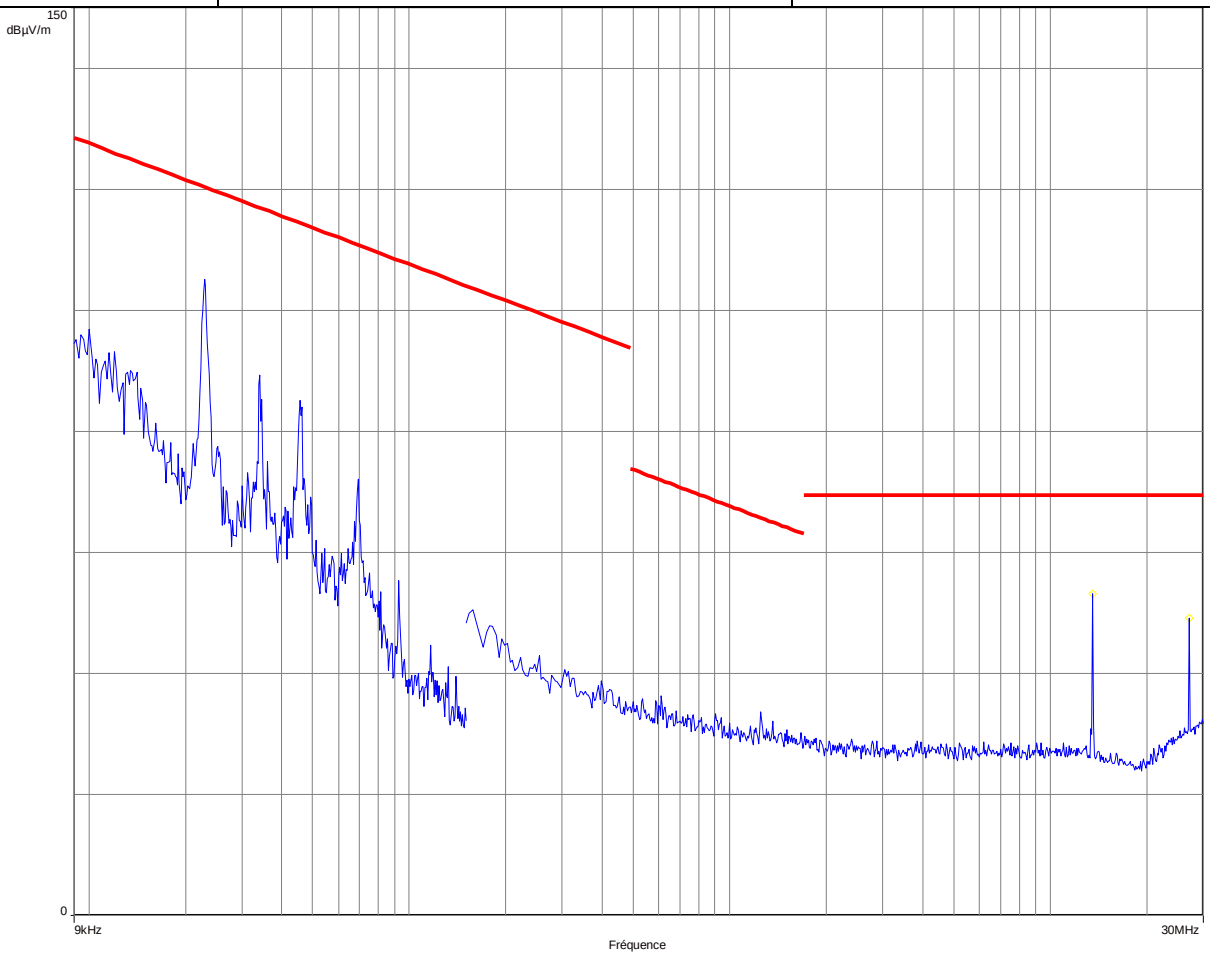
	N°LCIE	TYPE	COMPANY	REF	commentaire
X	A5329189VO	Shielded cable	UTIFLEX		
	A5329076VO	Shielded cable	UTIFLEX		
	A5329206VO	Shielded cable	UTIFLEX		
	A5329207VO	Shielded cable	UTIFLEX		
	A5329060VO	Shielded cable	UTIFLEX		
	A5329071VO	Shielded cable	UTIFLEX		
X	A3169049VO	Conducted emission comb generator	BARDET		
	A4040015	Clickmeter	SCHAFFNER	DIA1512D	
	A5329037VO	Current injection probe	SCHAFFNER	CIP8213	
	A1290017VO	Current probe	SCHAFFNER	CSP9160	
	A5329036VO	Direct Injection Module 100+50 Ohms	LCIE	MID01-100 ohms	
	A7156004VO	Direct Injection Module 100+50 Ohms	LUTHI	CR100A	
	A5329042VO	Ferrite Tube	LUTHI	FTC 101	
	A1092042VO	Ferrite Tube	LUTHI	FTC101	
	C2320059VO	LISN	EMCO	3810/2SH	
	C2320068VO	LISN	EMCO	3825/2	
	C2320061VO	LISN	TELEMETER ELECTRONIC	NNB-2/16Z	
	C2320062VO	LISN tri-phase ESH2-Z5	RHODE ET SCHWARZ	33852.19.53	
	C2320063VO	LISN tri-phase ESH2-Z5	RHODE ET SCHWARZ	33852.19.53	
X	C2320123VO	LISN	RHODE ET SCHWARZ	ENV216	
	A2640011VO	Measurement receiver 9kHz–30MHz	ROHDE ET SCHWARZ	ESH3	
X	A2642019VO	Measurement Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	
	C2320067VO	ISN 2 x 2 wires	RHODE ET SCHWARZ	ENY22	
	C2320066VO	ISN 4 wires	RHODE ET SCHWARZ	ENY41	
	C2320124VO	ISN 4 wires	TESEQ	T400A	
	D3044016VO	Semi-Anechoic chamber #1	SIEPEL		
	D3044017VO	Semi-Anechoic chamber #3	SIEPEL		
	D3044015VO	Semi-Anechoic chamber #2	SIEPEL		
X	D3044010VO	Faraday Cage	RAY PROOF		
X	A4049061VO	Transient limiter	HEWLETT PACKARD	11947A	
	A4089117VO	Voltage probe	LCIE		
FUNDAMENTAL FREQUENCY TOLERANCE					
X	D1022117VO	Climatic chamber	BIA CLIMATIC	CL 6-25	200 105 6
X	B2082009VO	Frequency Counter	Hewlett Packard	HP 5350B	
X	A2240015VO	Passive loop antenna	EMCO	7405-901	/
X		BNC cable 50Ω			
	A5329206VO	Shielded cable	UTIFLEX		
	C2040052VO	Antenna Loop	ELECTRO-METRICS	EM-6879	690234
	A4060018VO	Spectrum Analyzer 9KHz – 26.5GHz	HEWLETT PACKARD	8593E	3409u00537
X	A2642019	Measurement Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	100131
BAND-EDGE COMPLIANCE					
	A2240015VO	Passive loop antenna	EMCO	7405-901	/
		BNC cable 50Ω			
X	A5329198VO	Shielded cable	UTIFLEX		
X	C2040052VO	Antenna Loop	ELECTRO-METRICS	EM-6879	690234
	A4060018VO	Spectrum Analyzer 9KHz – 26.5GHz	HEWLETT PACKARD	8593E	3409u00537
X	A2642019	Measurement Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	100131

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 *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 *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 *Measurement of discontinuous conducted disturbances in voltage*	3.47 dB	3.6 dB
Mesure des perturbations conduites en courant *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 *Measurement of radiated electric field on the Moirans open area test site*	5.07 dB	5.2 dB

8. ANNEX 1 (GRAPHS)

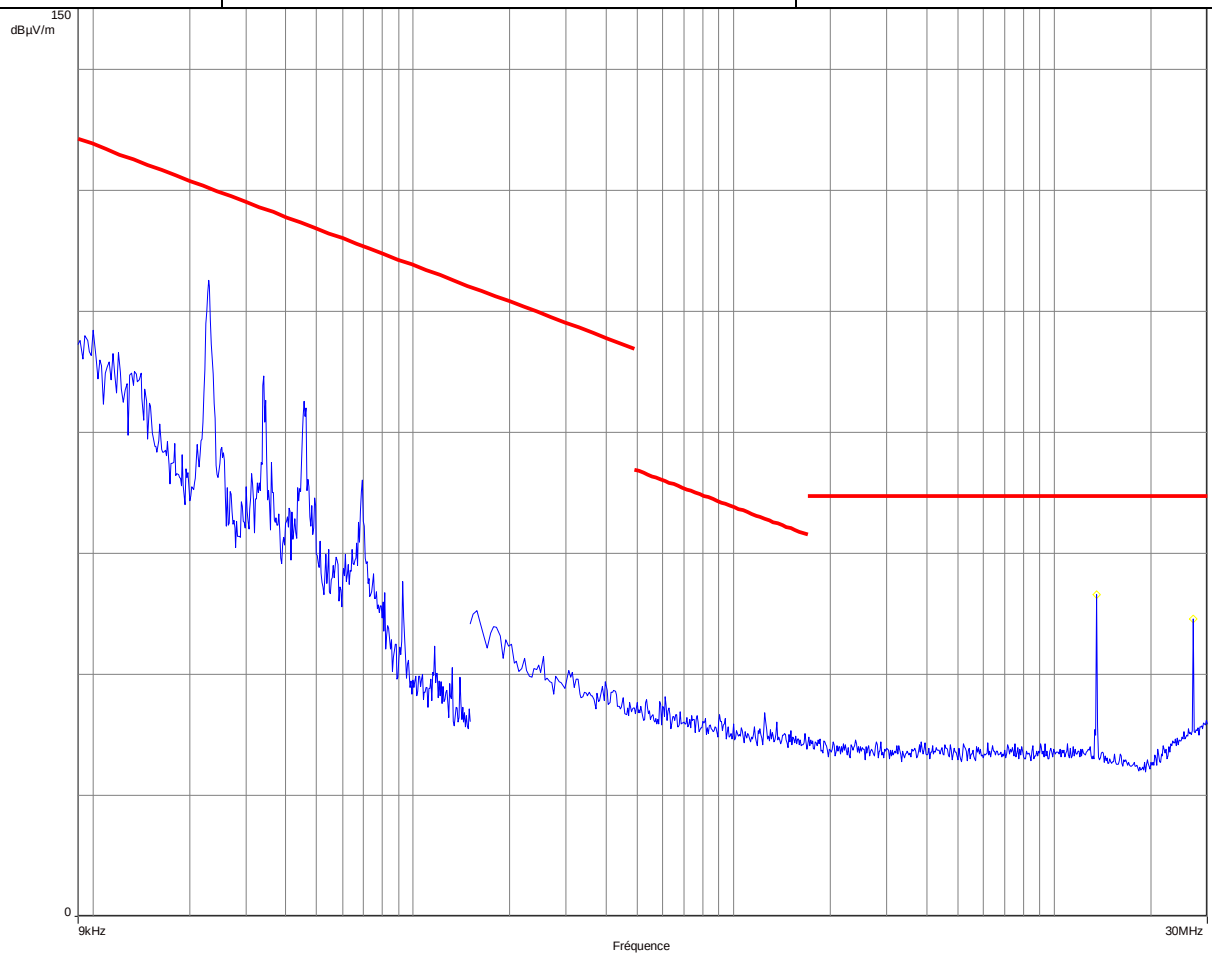
RADIATED EMISSIONS (Pre-characterization at 3meters)		**Test configuration:**
Graph name:	**Emr#1**	**Configuration n°1**
Antenna polarization	**Parallel**	**Color**
Frequency band	**9kHz-30MHz**	
Azimuth:	**0-359°**	
RBW / VBW :	**9kHz / 30kHz**	



Frequency (MHz)	Peak (dBµV/m)
13.562*	53.21
27.118	49.18

***Carrier Frequency**

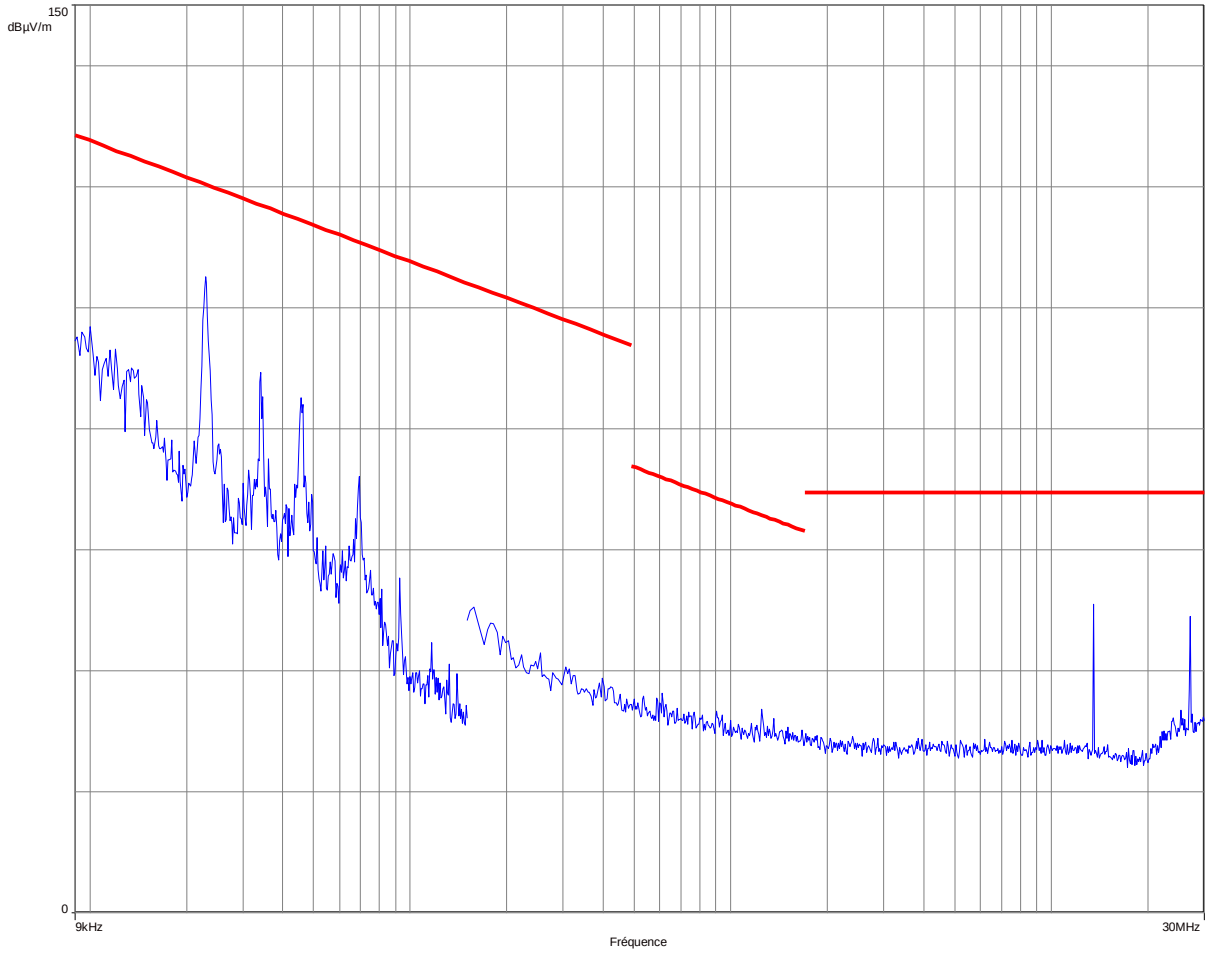
RADIATED EMISSIONS (Pre-characterization at 3meters)		**Test configuration:**
Graph name:	**Emr#2**	**Configuration n°1**
Antenna polarization	**Parallel**	**B&W**
Frequency band	**9kHz-30MHz**	
Azimuth:	**0-359°**	
RBW / VBW :	**9kHz / 30kHz**	



Frequency (MHz)	Peak (dBµV/m)
13.562*	53.13
27.118	49.2

***Carrier Frequency**

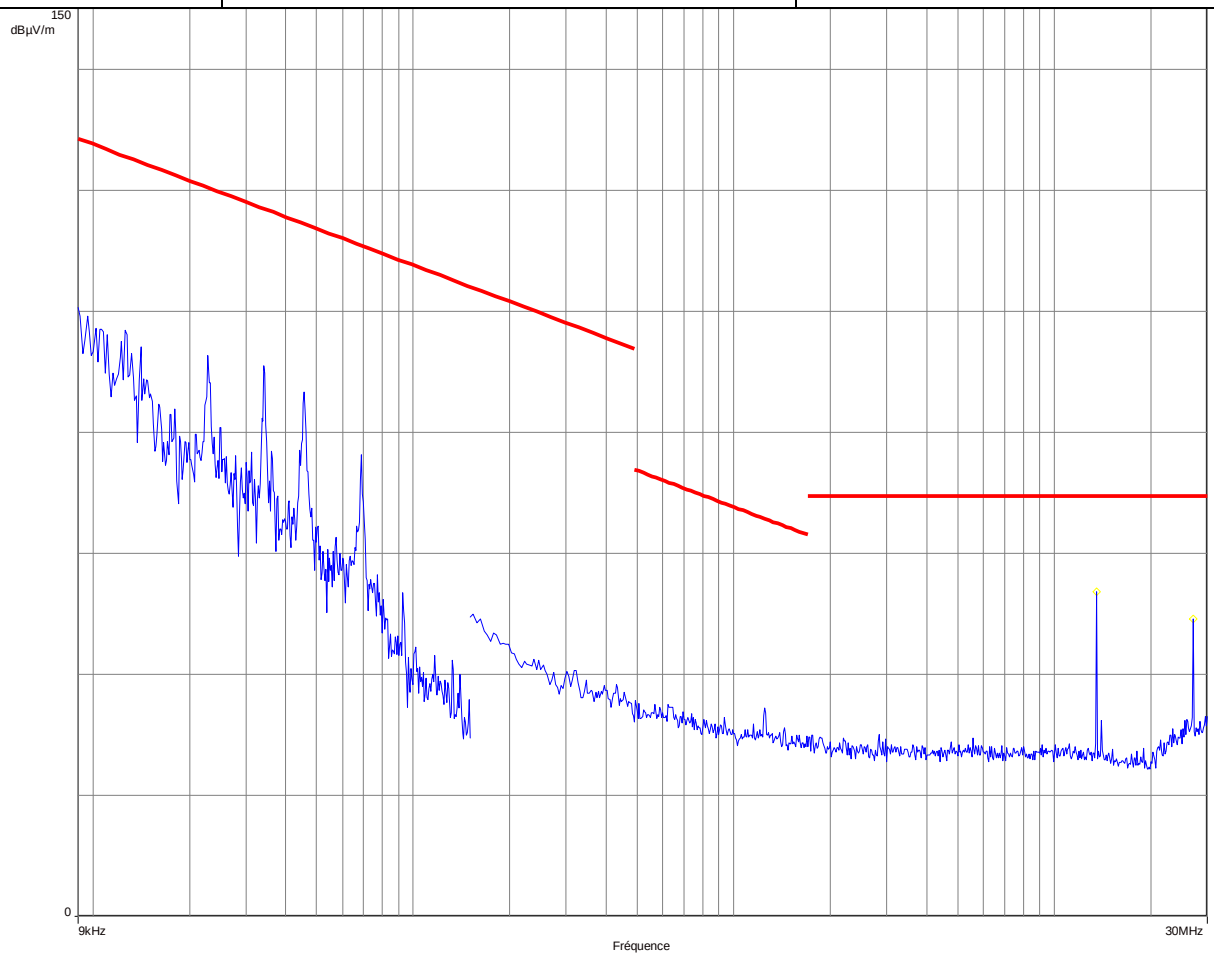
RADIATED EMISSIONS (Pre-characterization at 3meters)		**Test configuration:**
Graph name:	**Emr#3**	**Configuration n°2**
Antenna polarization	**Parallel**	**Color**
Frequency band	**9kHz-30MHz**	
Azimuth:	**0-359°**	
RBW / VBW :	**9kHz / 30kHz**	



Frequency (MHz)	Peak (dBµV/m)
13.55*	51.03
27.114	48.9

***Carrier Frequency**

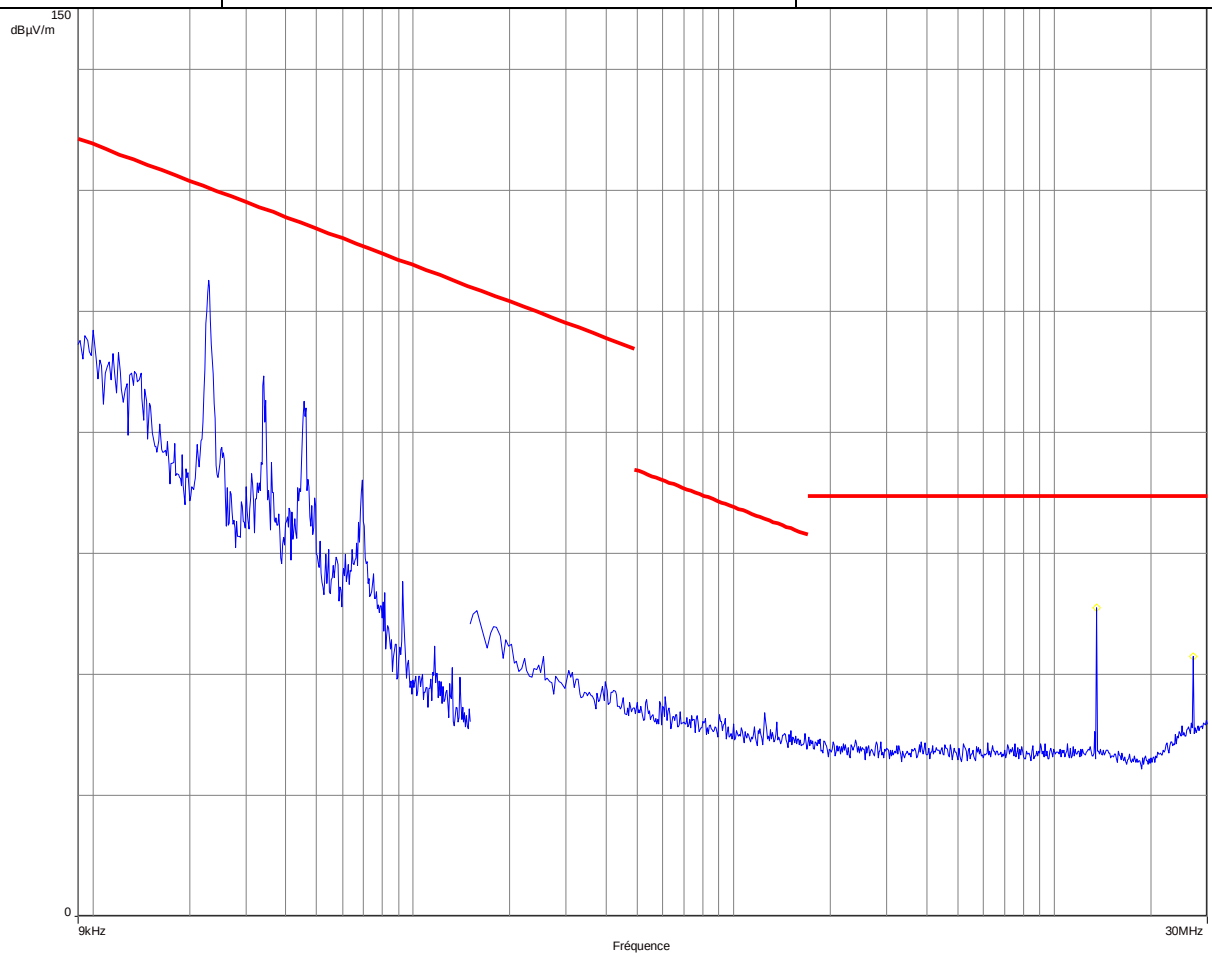
RADIATED EMISSIONS (Pre-characterization at 3meters)		**Test configuration:**
Graph name:	**Emr#4**	**Configuration n°2**
Antenna polarization	**Parallel**	**B&W**
Frequency band	**9kHz-30MHz**	
Azimuth:	**0-359°**	
RBW / VBW :	**9kHz / 30kHz**	



Frequency (MHz)	Peak (dBµV/m)
13.55*	53.63
27.114	49.2

***Carrier Frequency**

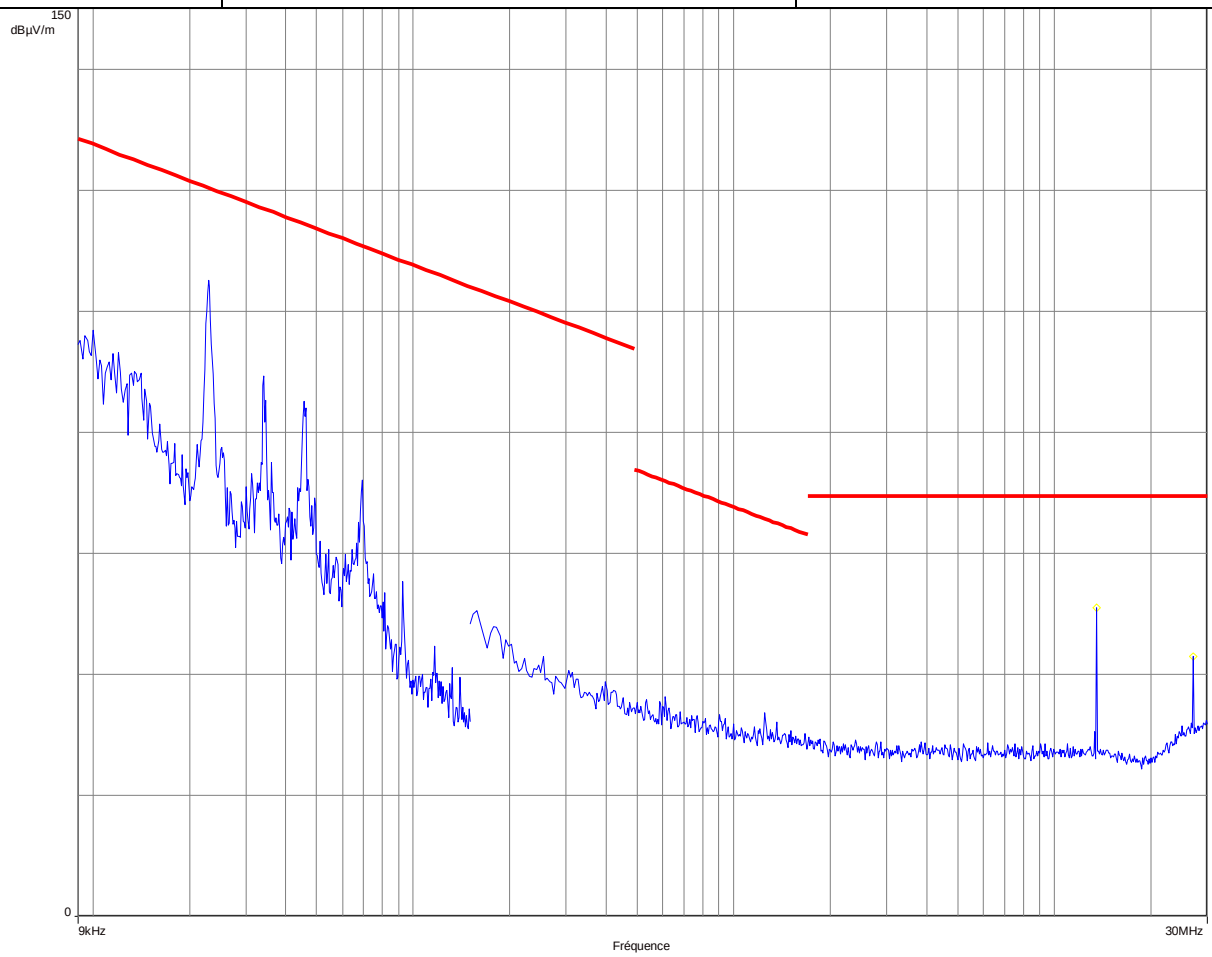
RADIATED EMISSIONS (Pre-characterization at 3meters)		**Test configuration:**
Graph name:	**Emr#5**	**Configuration n°3**
Antenna polarization	**Parallel**	**Color**
Frequency band	**9kHz-30MHz**	
Azimuth:	**0-359°**	
RBW / VBW :	**9kHz / 30kHz**	



Frequency (MHz)	Peak (dBµV/m)
13.558*	50.93
27.118	43

***Carrier Frequency**

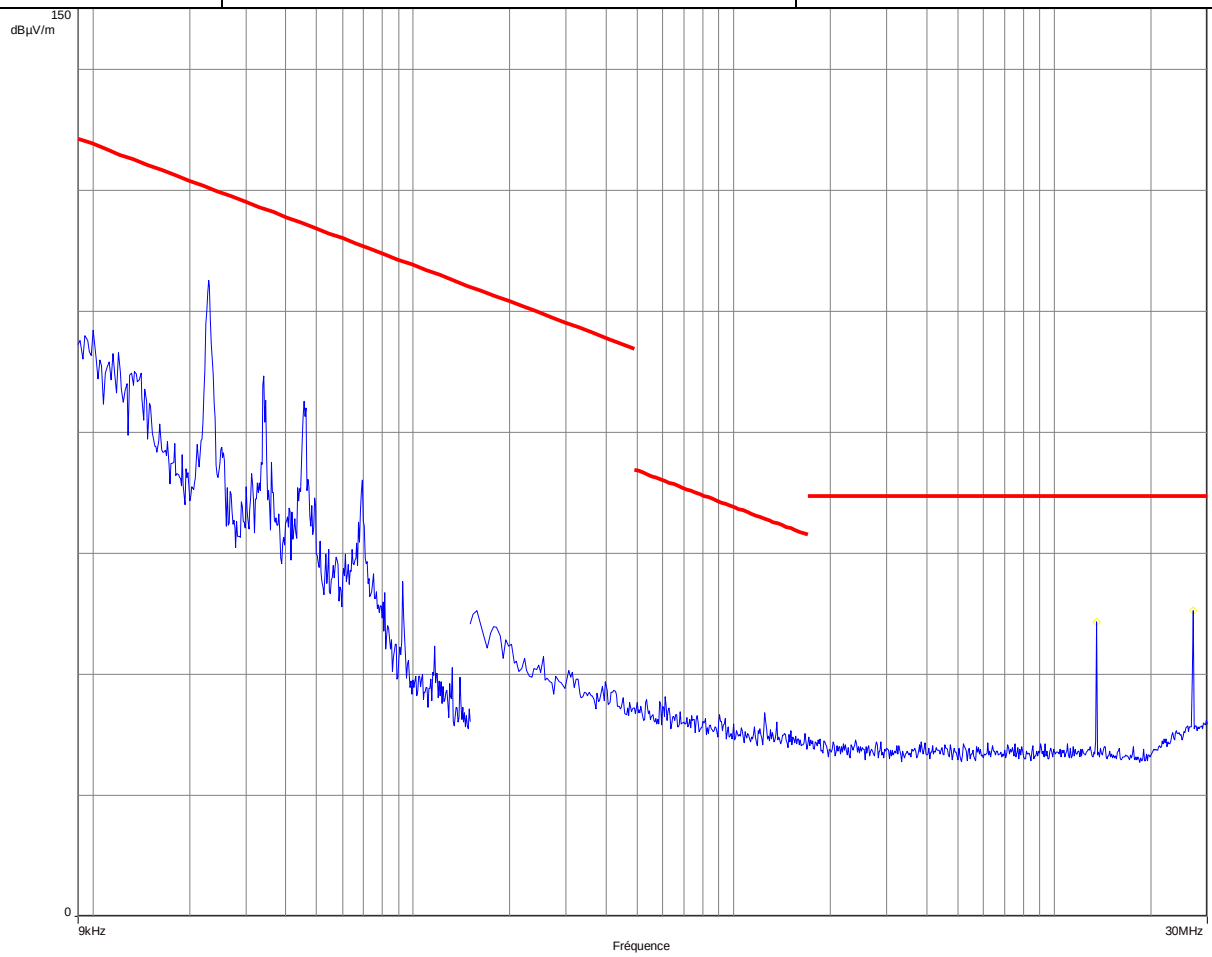
RADIATED EMISSIONS (Pre-characterization at 3meters)		**Test configuration:**
Graph name:	**Emr#6**	**Configuration n°3**
Antenna polarization	**Parallel**	**B&W**
Frequency band	**9kHz-30MHz**	
Azimuth:	**0-359°**	
RBW / VBW :	**9kHz / 30kHz**	



Frequency (MHz)	Peak (dBµV/m)
13.558*	50.9
27.118	43.1

***Carrier Frequency**

RADIATED EMISSIONS (Pre-characterization at 3meters)		**Test configuration:**
Graph name:	**Emr#7**	**Configuration n°4**
Antenna polarization	**Parallel**	**Color**
Frequency band	**9kHz-30MHz**	
Azimuth:	**0-359°**	
RBW / VBW :	**9kHz / 30kHz**	

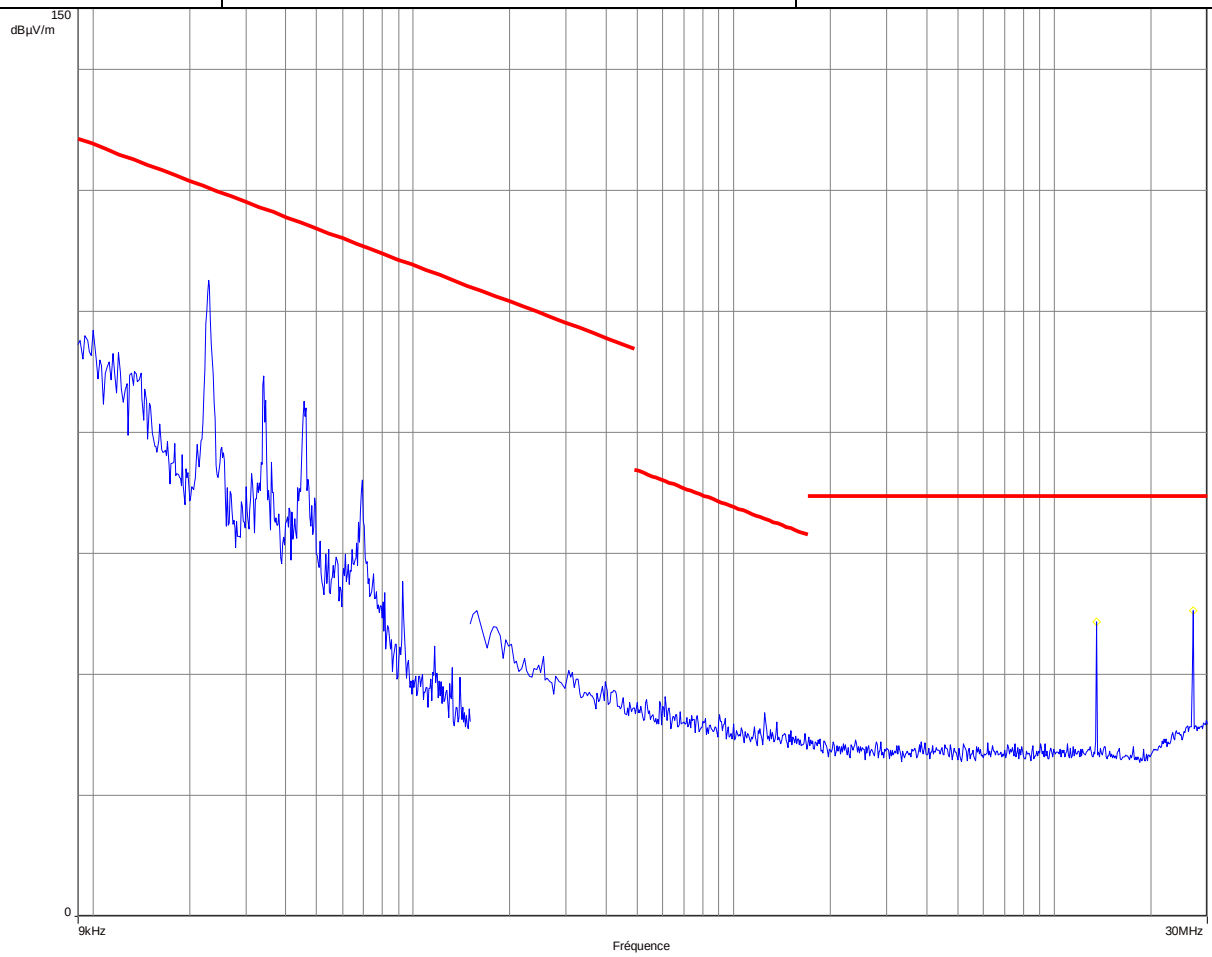


Frequency (MHz)	Peak (dBµV/m)
13.558	48.63
27.106	50.49

Frequency (MHz)	Peak (dBµV/m)

***Carrier Frequency**

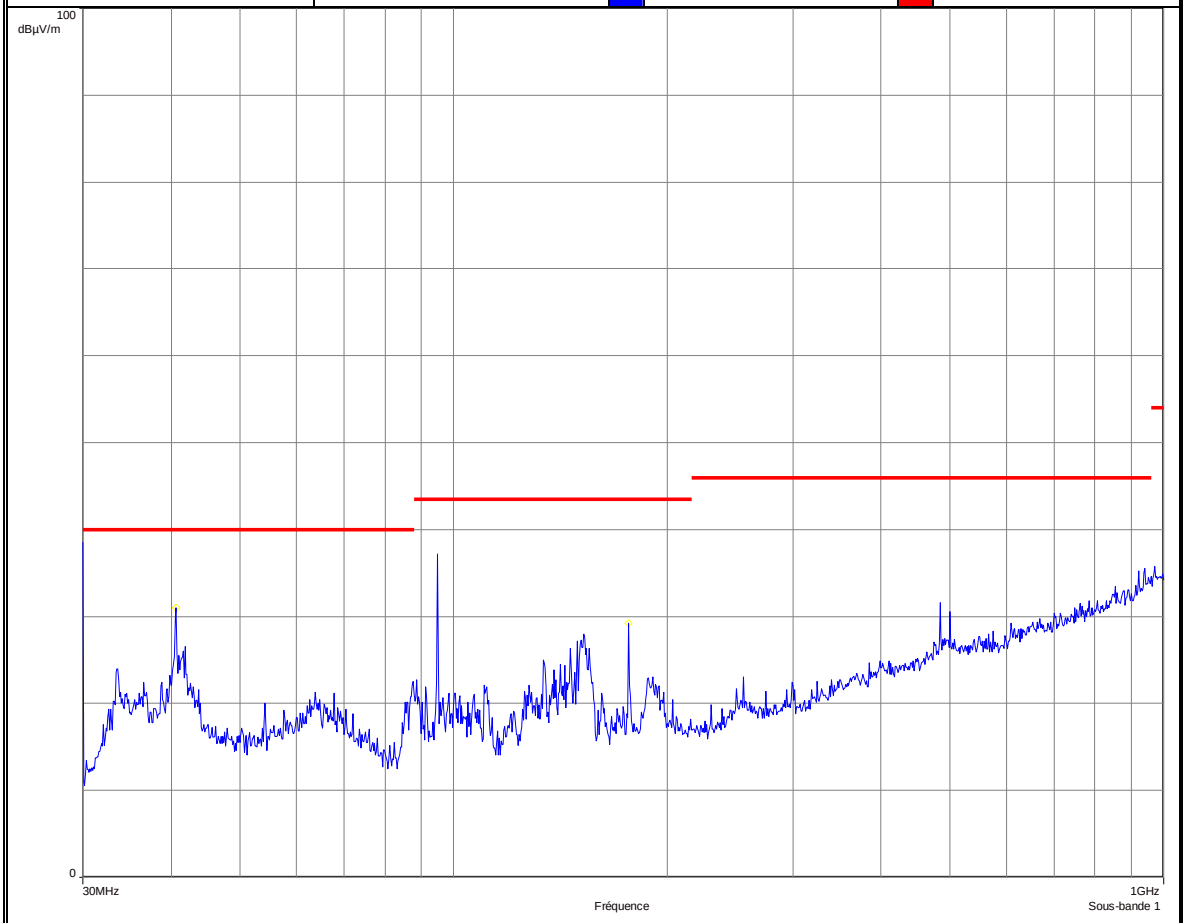
RADIATED EMISSIONS (Pre-characterization at 3meters)		**Test configuration:**
Graph name:	**Emr#8**	**Configuration n°4**
Antenna polarization	**Parallel**	**B&W**
Frequency band	**9kHz-30MHz**	
Azimuth:	**0-359°**	
RBW / VBW :	**9kHz / 30kHz**	



Frequency (MHz)	Peak (dBµV/m)
13.55*	53.62
27.114	48.79

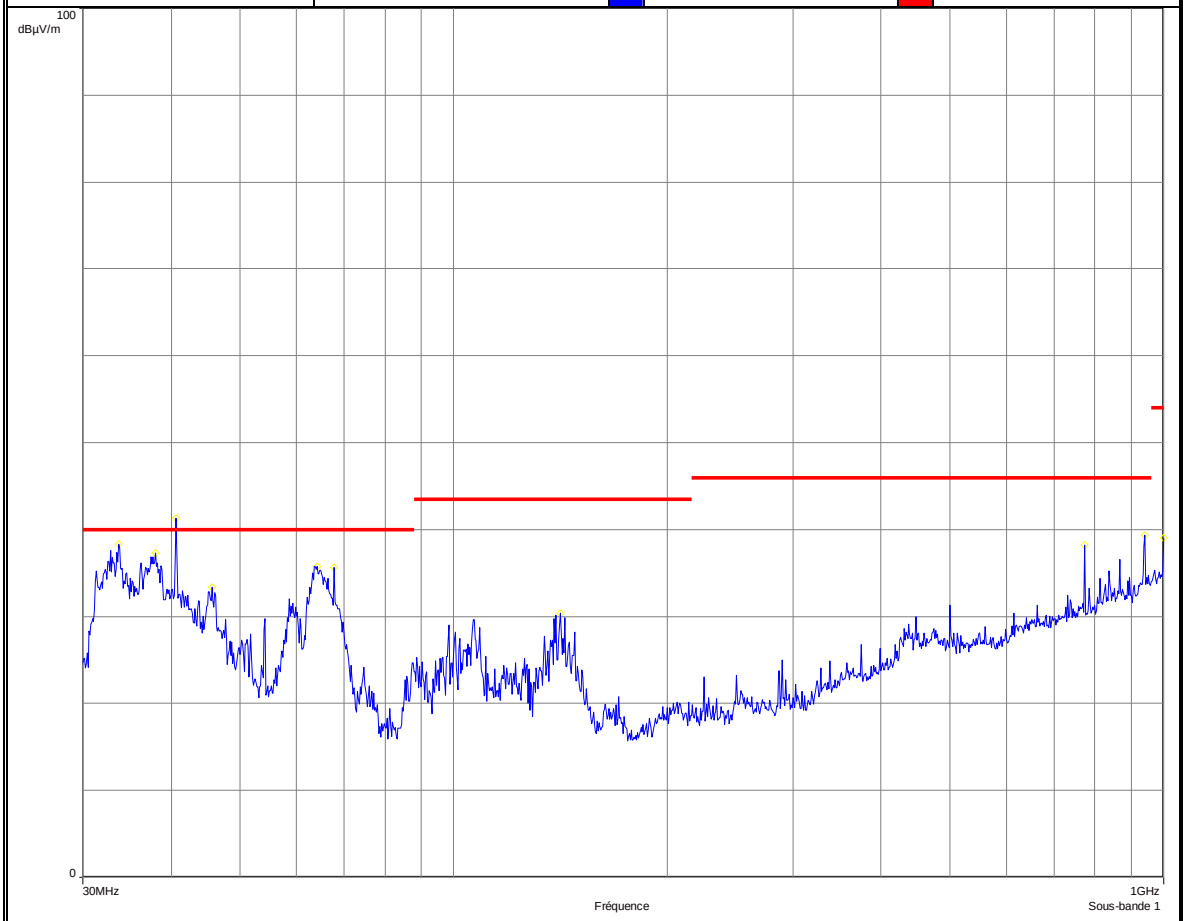
***Carrier Frequency**

RADIATED EMISSION		Test configuration: N°1
Graph name:	**Emr#9**	**Color**
Antenna position:	**Horizontal**	**LAN**
Azimuth:	**0° - 360°**	**110V – 60Hz**
RBW/VBW:	**120kHz / 300kHz**	**Peak Measure** / **QPeak Limit@3m**



Frequency (MHz)	Peak (dBµV/m)
40.6	31
176.16	29.2

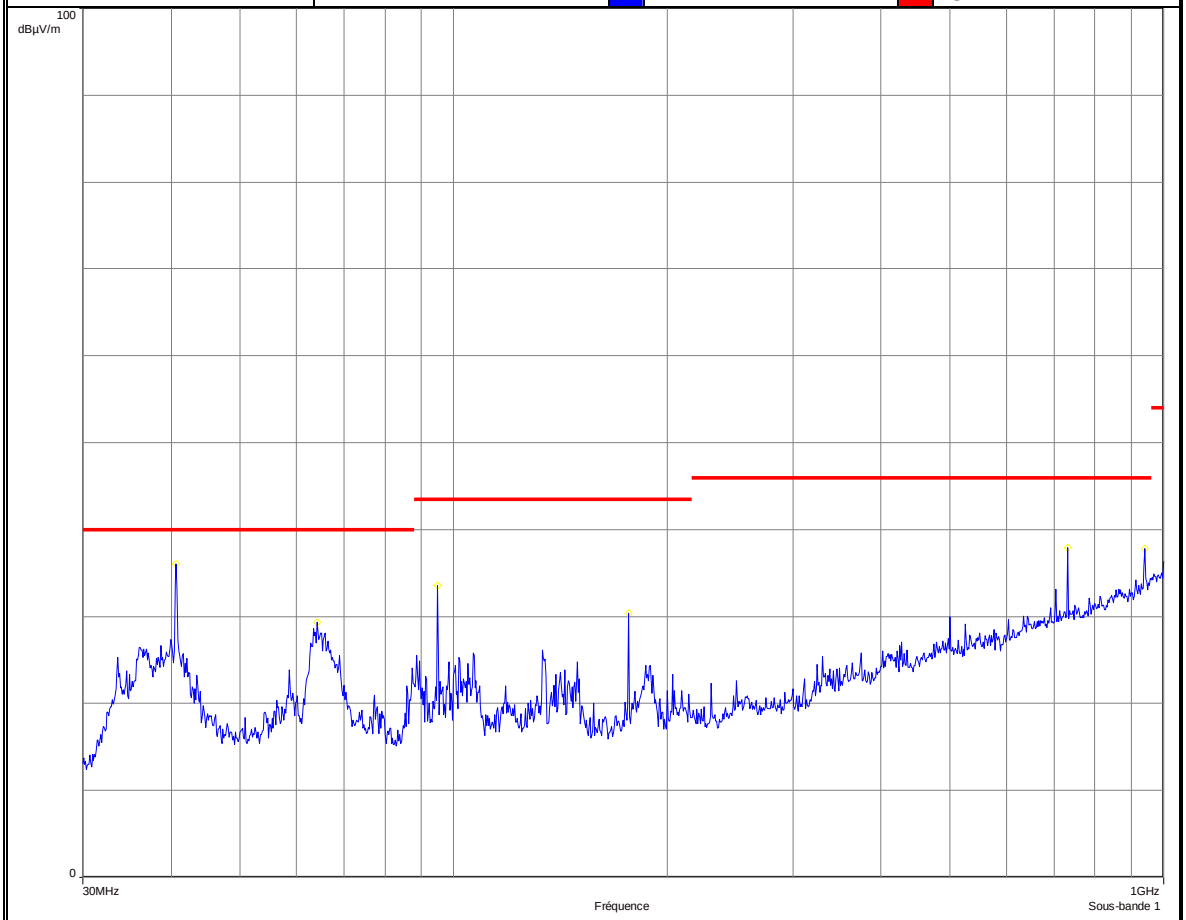
RADIATED EMISSION		Test configuration: N°1
Graph name:	**Emr#10**	**Color**
Antenna position:	**Vertical**	**LAN**
Azimuth:	**0°- 360°**	**110V – 60Hz**
RBW/VBW:	**120kHz / 300kHz**	**Peak Measure** / **QPeak Limit@3m**



Frequency (MHz)	Peak (dBµV/m)
33.72	38.29
38	37.32
40.6	41.3
45.6	33.4
64.12	35.77
67.76	35.69
141.12	30.39
774	38.23
939.56	39.41
999.96	39.1

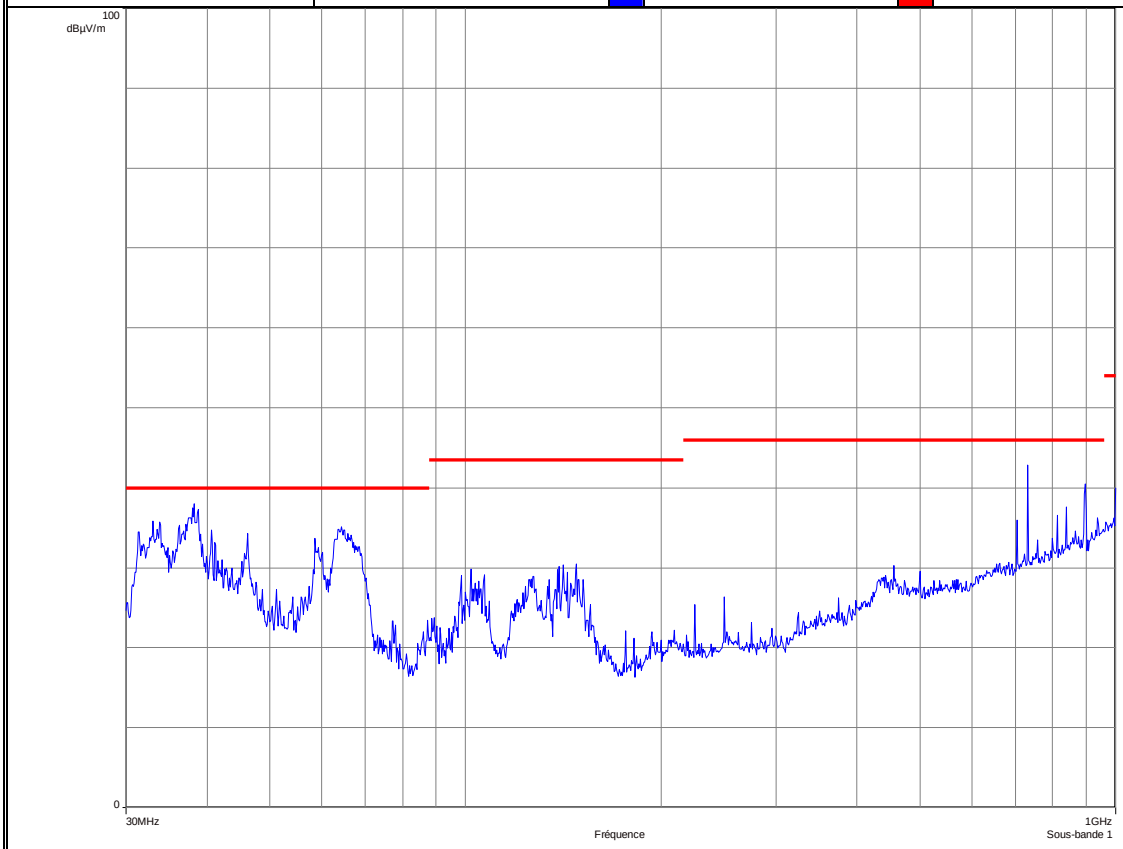
RADIATED EMISSION		Test configuration: N°1
Graph name:	**Emr#11**	**B&W**
Antenna position:	**Horizontal**	**LAN**
Azimuth:	**0°- 360°**	**110V – 60Hz**

RBW/VBW:	**120kHz / 300kHz**	**Peak Measure**	**QPeak Limit@3m**



Frequency (MHz)	Peak (dBµV/m)
40.64	36.01
64.08	29.38
94.84	33.6
176.16	30.4
732.08	37.94
939.56	37.81

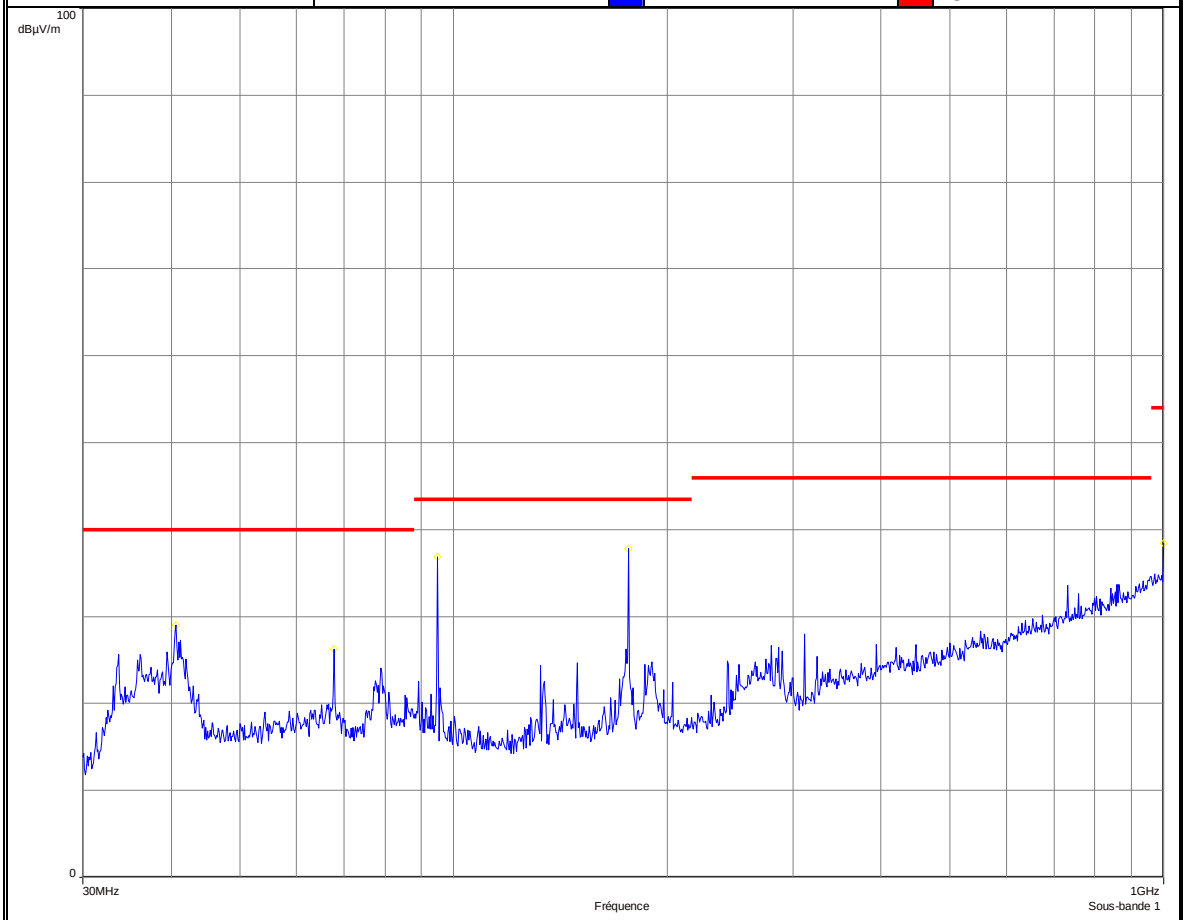
RADIATED EMISSION		Test configuration: N°1
Graph name:	**Emr#12**	**B&W**
Antenna position:	**Vertical**	**LAN**
Azimuth:	**0°- 360°**	**110V – 60Hz**
RBW/VBW:	**120kHz / 300kHz**	**Peak Measure** / **QPeak Limit@3m**



Frequency (MHz)	Peak (dBµV/m)
33.84	35.72
38.24	37.98
40.64	34.71
46.12	34.31
58.68	33.72
64.28	35.16
141.12	30.39
705.08	35.97
732.08	42.84
813.44	36.55
840.6	37.63
999.92	40

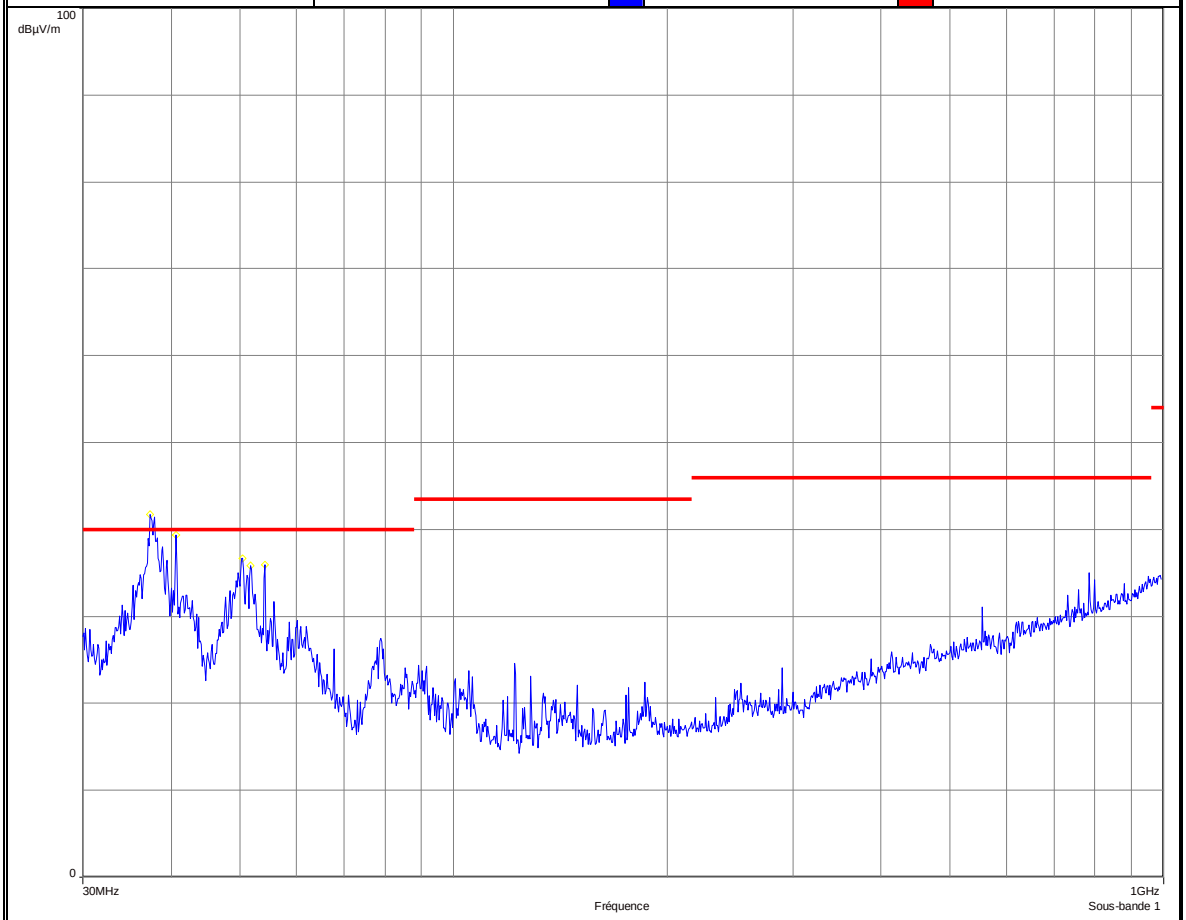
RADIATED EMISSION		Test configuration: N°2
Graph name:	**Emr#13**	**Color**
Antenna position:	**Horizontal**	**POE**
Azimuth:	**0°- 360°**	

RBW/VBW:	**120kHz / 300kHz**	**Peak Measure**	**QPeak Limit@3m**



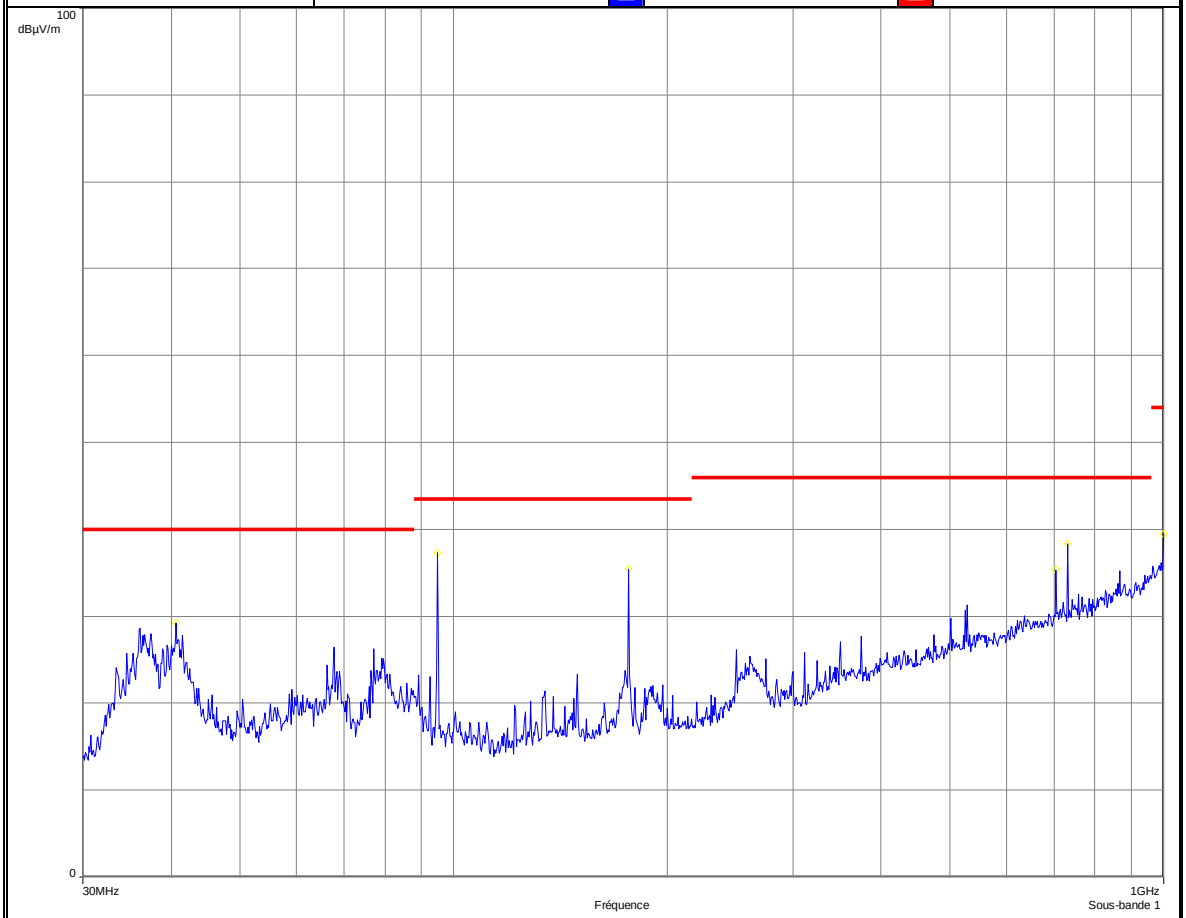
Frequency (MHz)	Peak (dBµV/m)
40.64	29.01
67.76	26.29
94.8	36.9
176.16	37.8
999.92	38.4

RADIATED EMISSION		Test configuration: N°2
Graph name:	**Emr#14**	**Color**
Antenna position:	**Vertical**	**POE**
Azimuth:	**0° - 360°**	
RBW/VBW:	**120kHz / 300kHz**	**Peak Measure** / **QPeak Limit@3m**



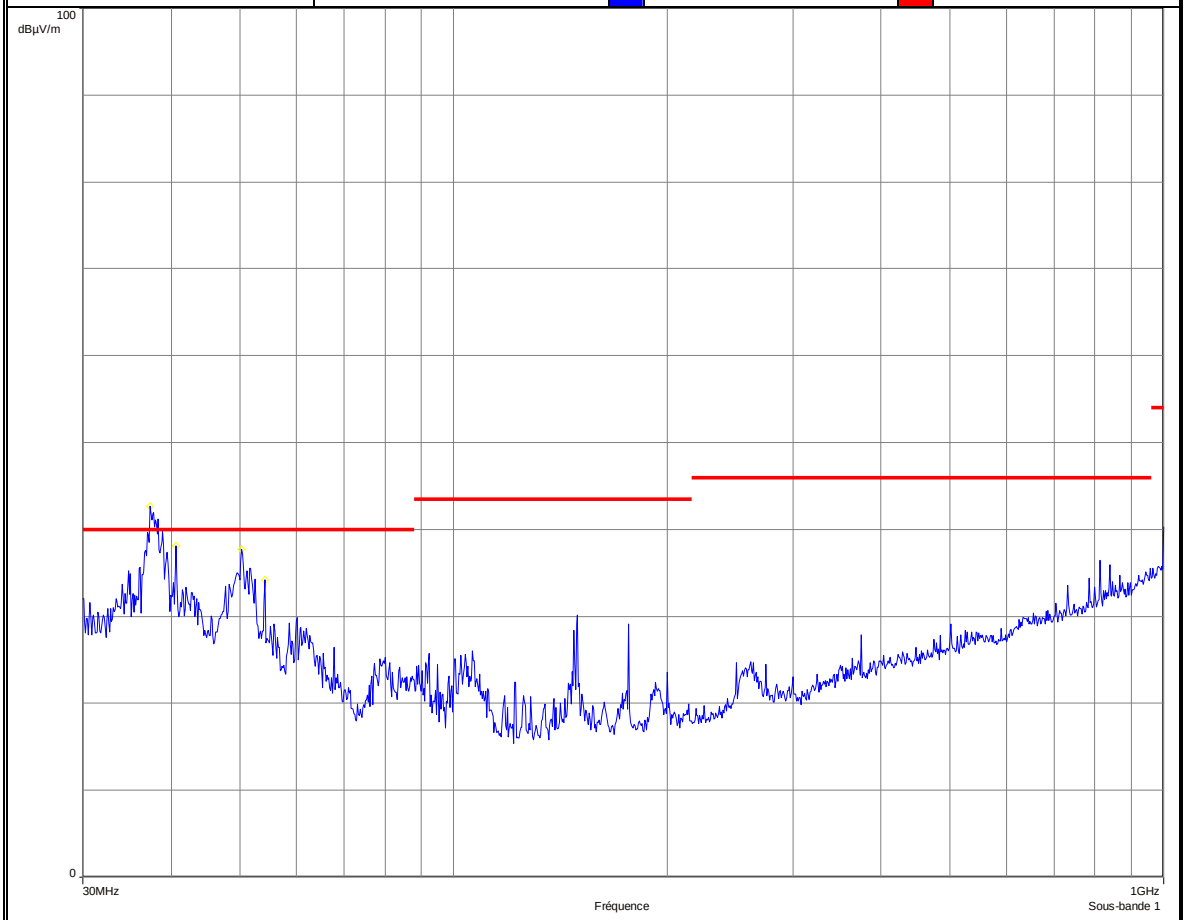
Frequency (MHz)	Peak (dBµV/m)
37.36	41.76
40.64	39.41
50.36	36.66
51.72	35.81
54.16	35.97

RADIATED EMISSION		Test configuration: N°2
Graph name:	**Emr#15**	**B&W**
Antenna position:	**Horizontal**	**POE**
Azimuth:	**0° - 360°**	
RBW/VBW:	**120kHz / 300kHz**	**Peak Measure** / **QPeak Limit@3m**



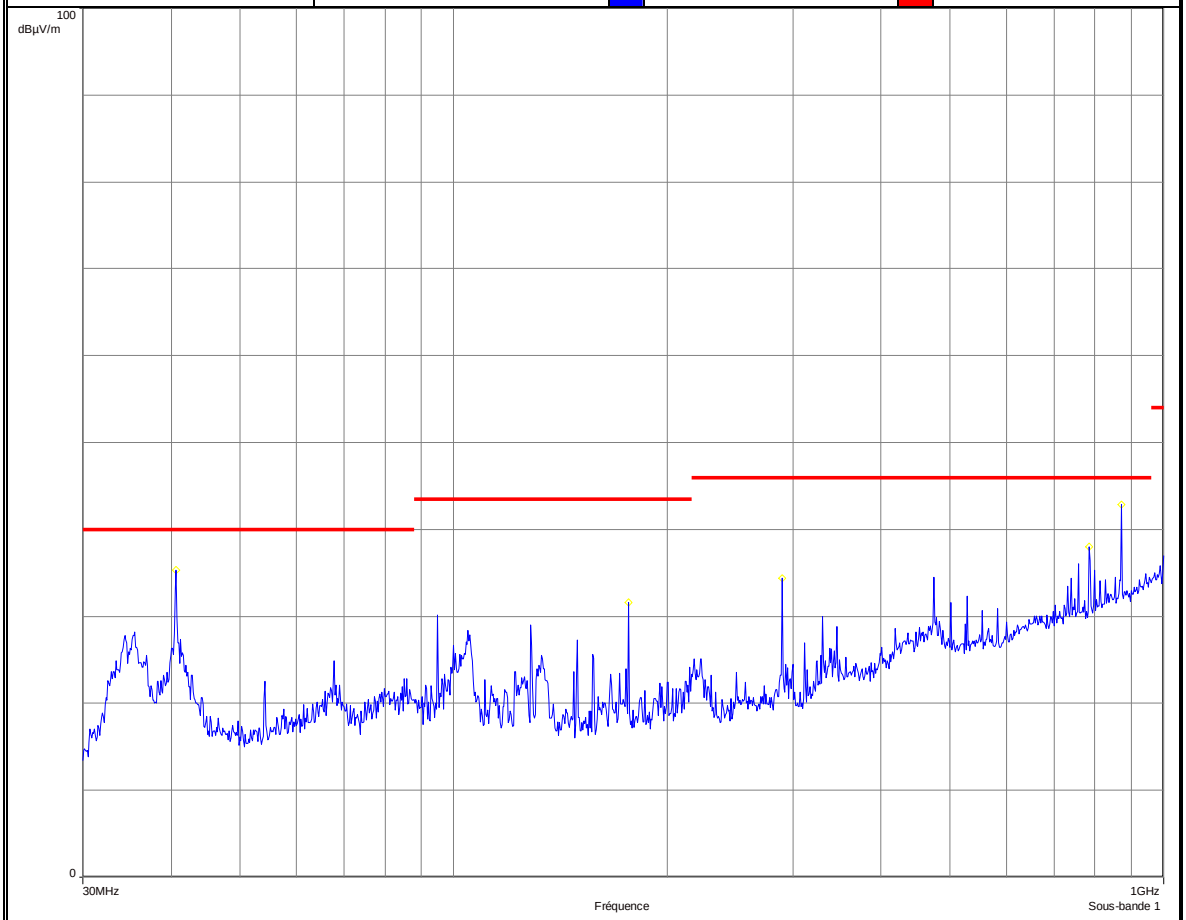
Frequency (MHz)	Peak (dBµV/m)
40.64	29.21
94.8	37.3
176.16	35.4
705	35.36
732.08	38.34
999.92	39.5

RADIATED EMISSION		Test configuration: N°2
Graph name:	**Emr#16**	**B&W**
Antenna position:	**Vertical**	**POE**
Azimuth:	**0° - 360°**	
RBW/VBW:	**120kHz / 300kHz**	**Peak Measure** / **QPeak Limit@3m**



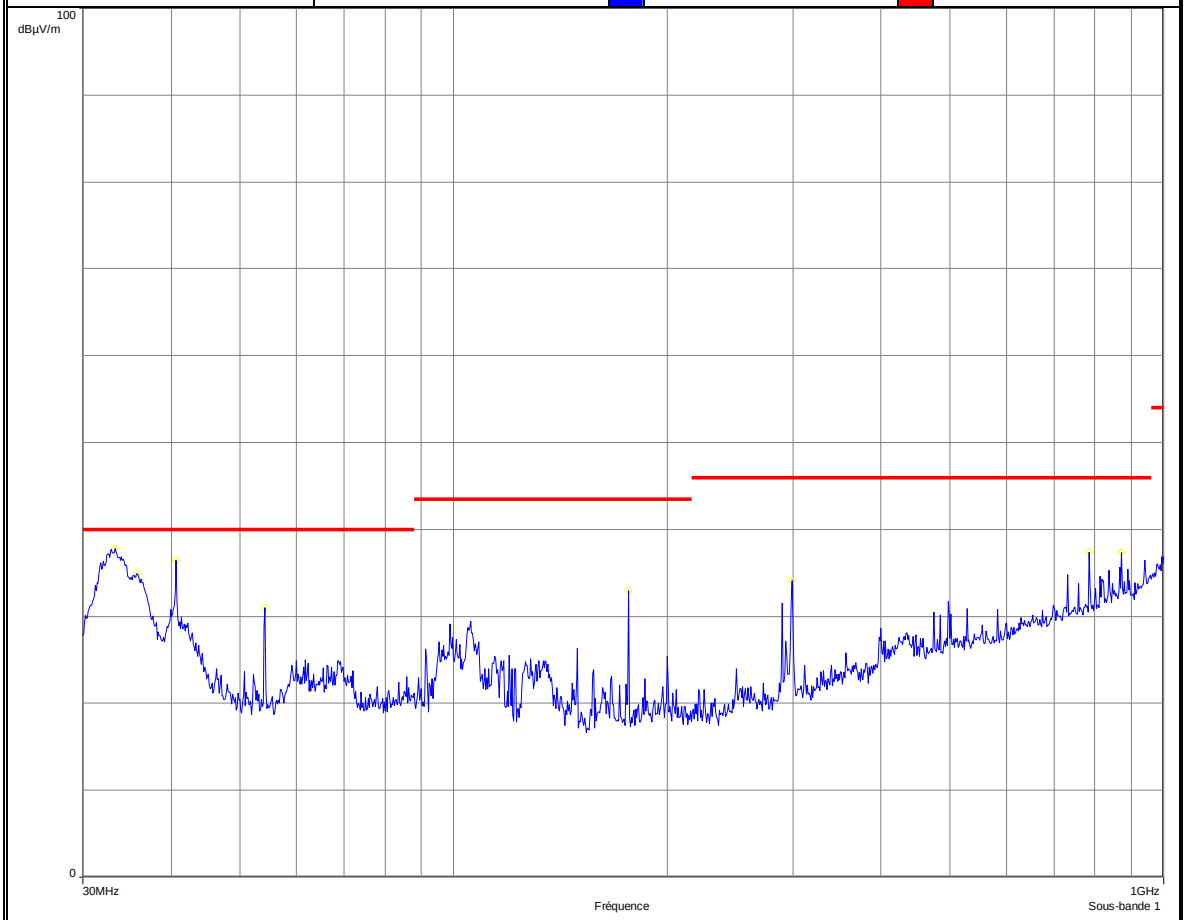
Frequency (MHz)	Peak (dBµV/m)
37.36	42.66
40.6	38.1
50.2	37.76
54.16	34.17

RADIATED EMISSION		Test configuration: N°3
Graph name:	**Emr#17**	**Color**
Antenna position:	**Horizontal**	**USB**
Azimuth:	**0° - 360°**	
RBW/VBW:	**120kHz / 300kHz**	**Peak Measure** / **QPeak Limit@3m**



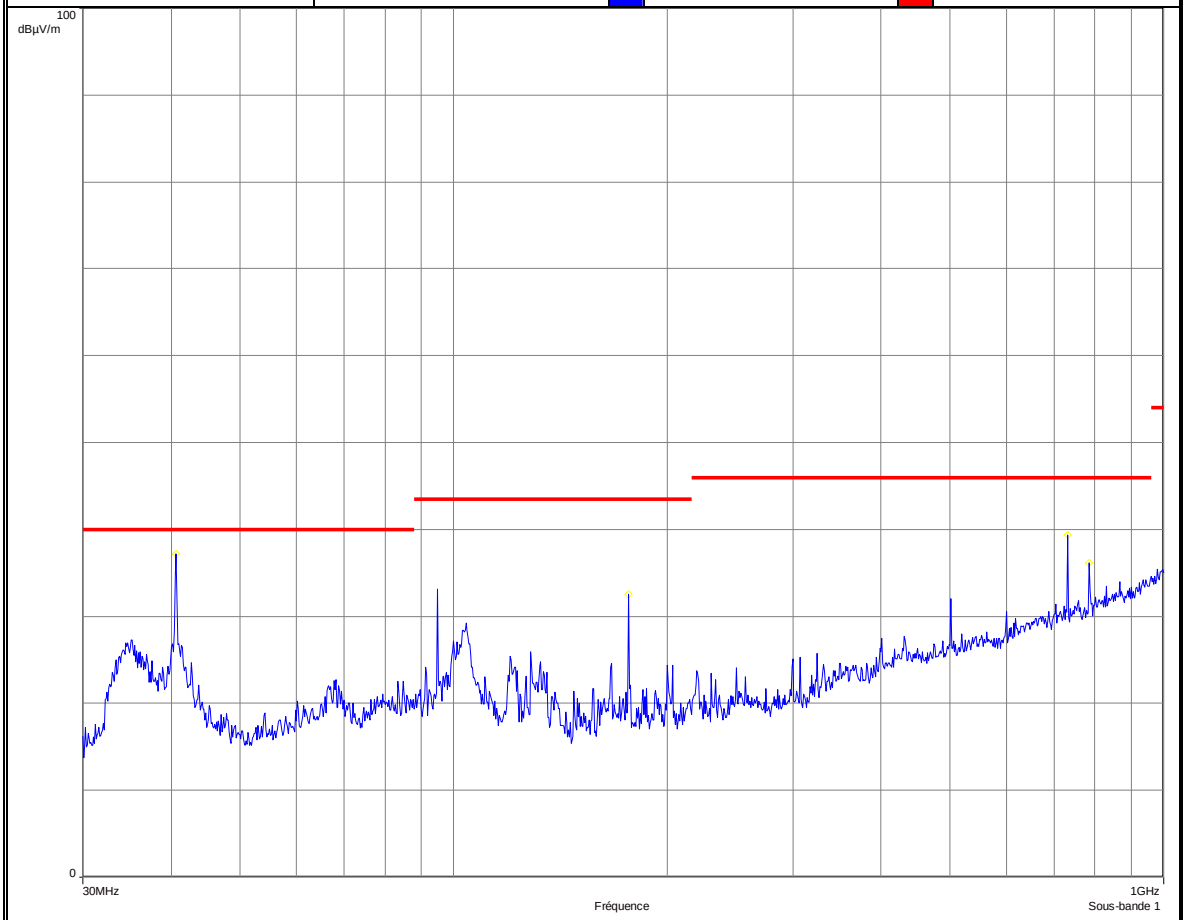
Frequency (MHz)	Peak (dBµV/m)
40.6	35.3
176.16	31.6
290.16	34.43
786.44	38.06
870.96	42.92

RADIATED EMISSION		Test configuration: N°3
Graph name:	**Emr#18**	**Color**
Antenna position:	**Vertical**	**USB**
Azimuth:	**0° - 360°**	
RBW/VBW:	**120kHz / 300kHz**	**Peak Measure** / **QPeak Limit@3m**



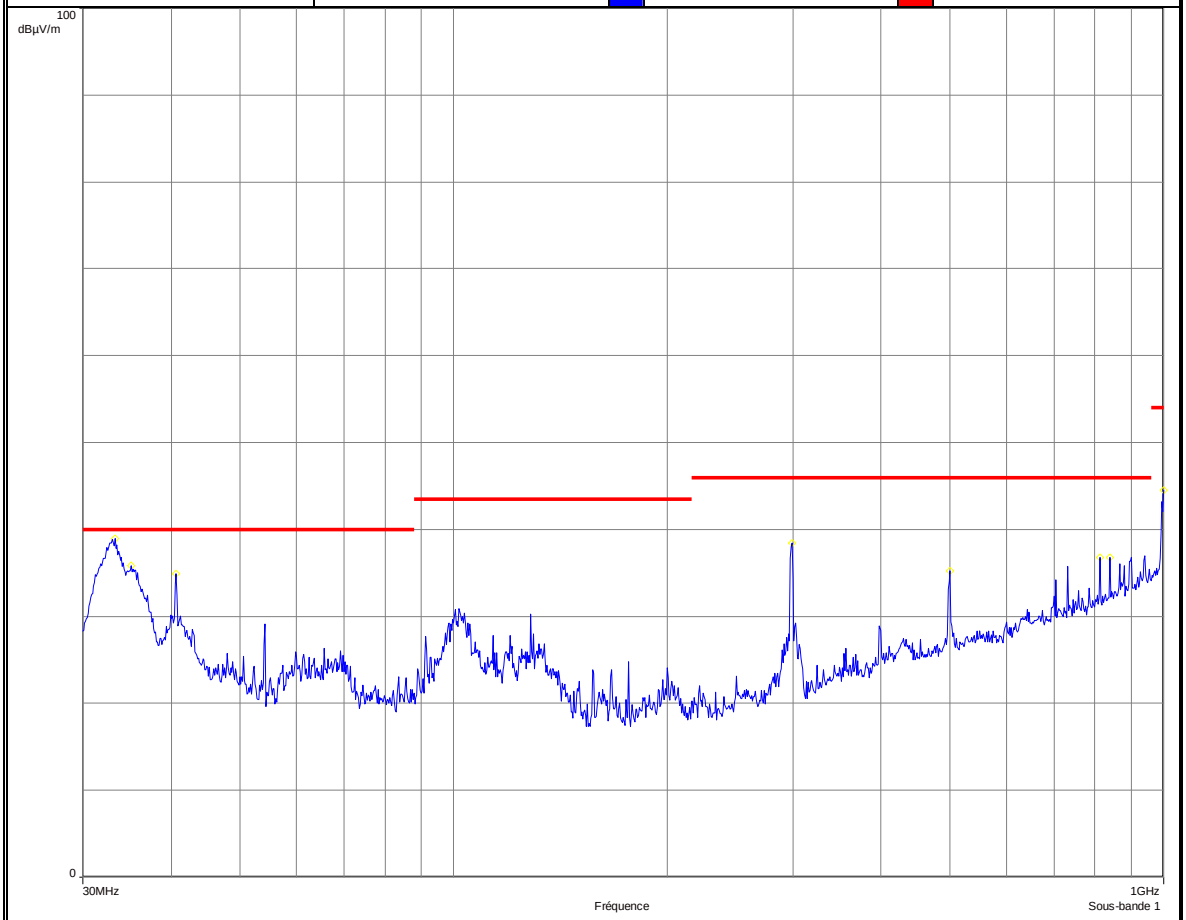
Frequency (MHz)	Peak (dBµV/m)
33.36	37.79
35.88	34.87
40.6	36.5
54.12	30.96
176.16	33
299.6	34.09
786.44	37.36
871.16	37.42

RADIATED EMISSION		Test configuration: N°3
Graph name:	**Emr#19**	**B&W**
Antenna position:	**Horizontal**	**USB**
Azimuth:	**0° - 360°**	
RBW/VBW:	**120kHz / 300kHz**	**Peak Measure** / **QPeak Limit@3m**



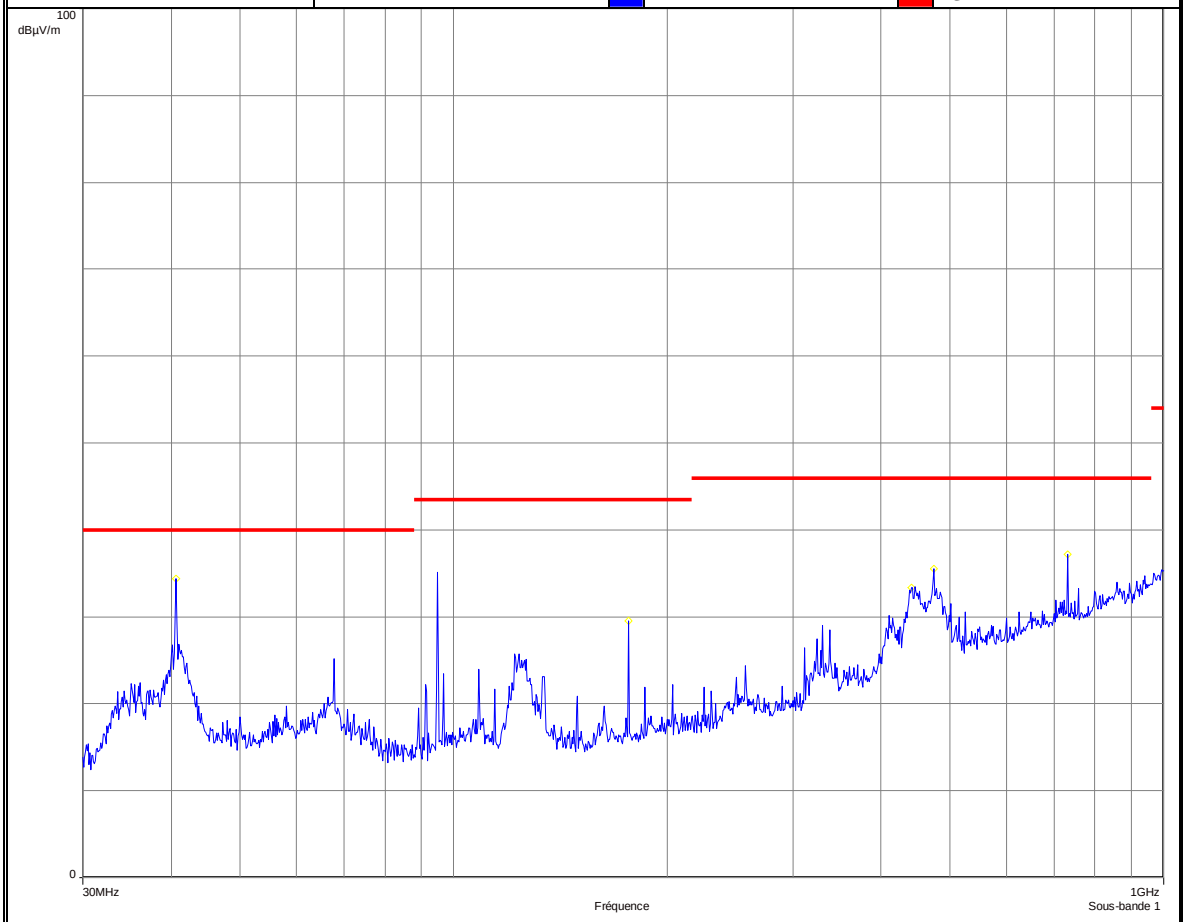
Frequency (MHz)	Peak (dBµV/m)
40.6	37.2
176.16	32.5
732.08	39.34
786.4	36.16

RADIATED EMISSION		Test configuration: N°3
Graph name:	**Emr#20**	**B&W**
Antenna position:	**Vertical**	**USB**
Azimuth:	**0° - 360°**	
RBW/VBW:	**120kHz / 300kHz**	**Peak Measure** / **QPeak Limit@3m**



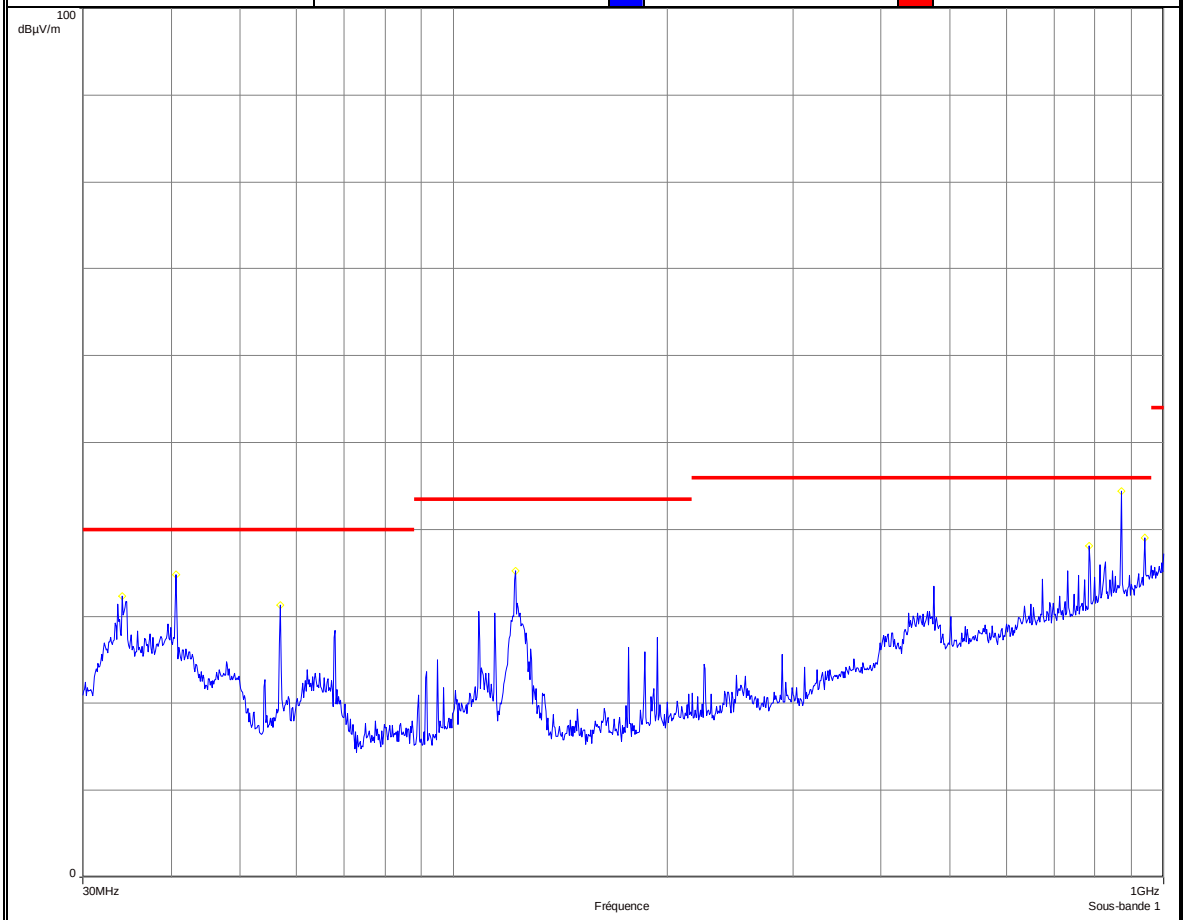
Frequency (MHz)	Peak (dBµV/m)
33.32	38.97
35.12	35.83
40.6	34.9
299.6	38.39
499.72	35.27
813.44	36.75
840.6	36.73
999.04	44.49

RADIATED EMISSION		Test configuration: N°4
Graph name:	**Emr#21**	**Color**
Antenna position:	**Horizontal**	**RS232**
Azimuth:	**0° - 360°**	
RBW/VBW:	**120kHz / 300kHz**	**Peak Measure** / **QPeak Limit@3m**



Frequency (MHz)	Peak (dBµV/m)
40.6	34.4
176.16	29.6
441	33.42
475	35.59
732.12	37.24

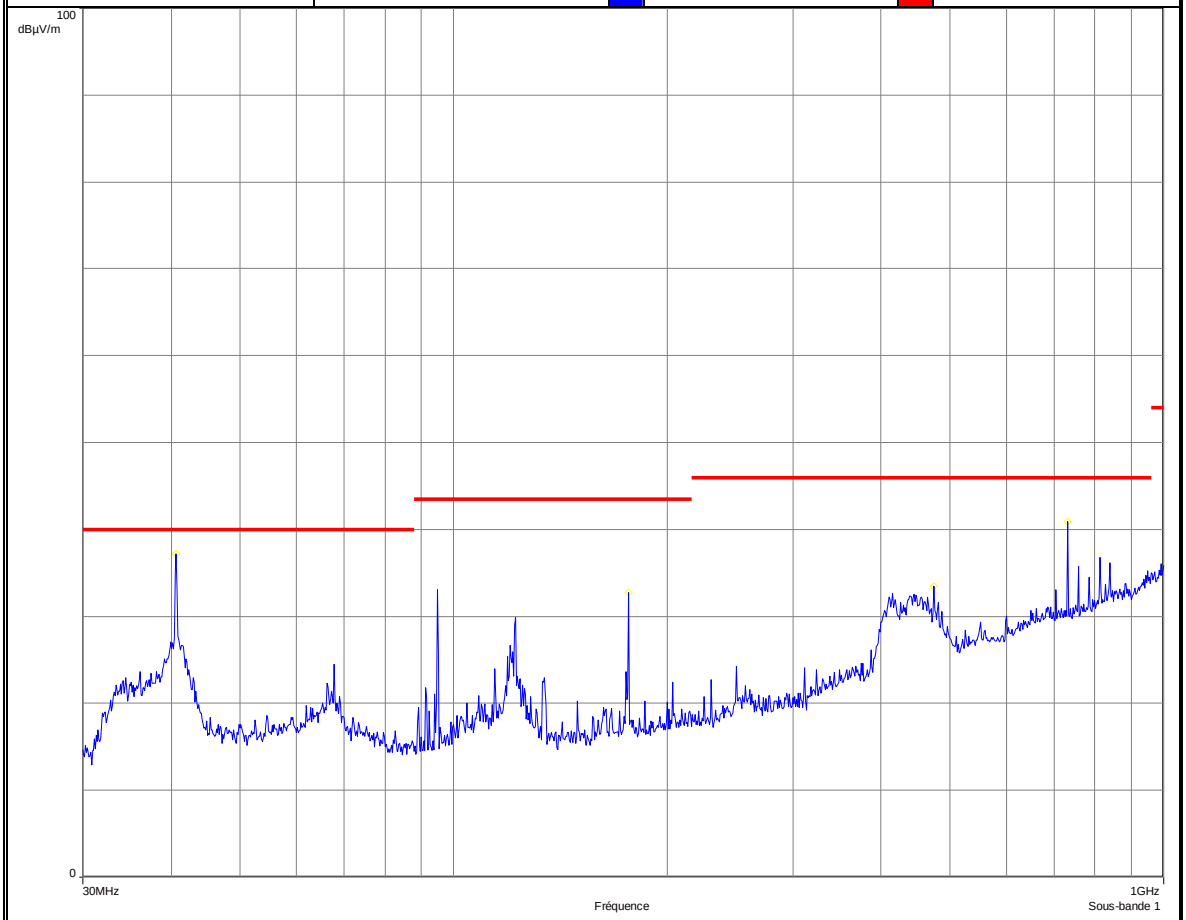
RADIATED EMISSION		Test configuration: N°4
Graph name:	**Emr#22**	**Color**
Antenna position:	**Vertical**	**RS232**
Azimuth:	**0° - 360°**	
RBW/VBW:	**120kHz / 300kHz**	**Peak Measure** / **QPeak Limit@3m**



Frequency (MHz)	Peak (dBµV/m)
34.12	32.33
40.6	34.8
56.96	31.32
121.96	35.18
786.4	38.16
871.08	44.42
939.44*	39

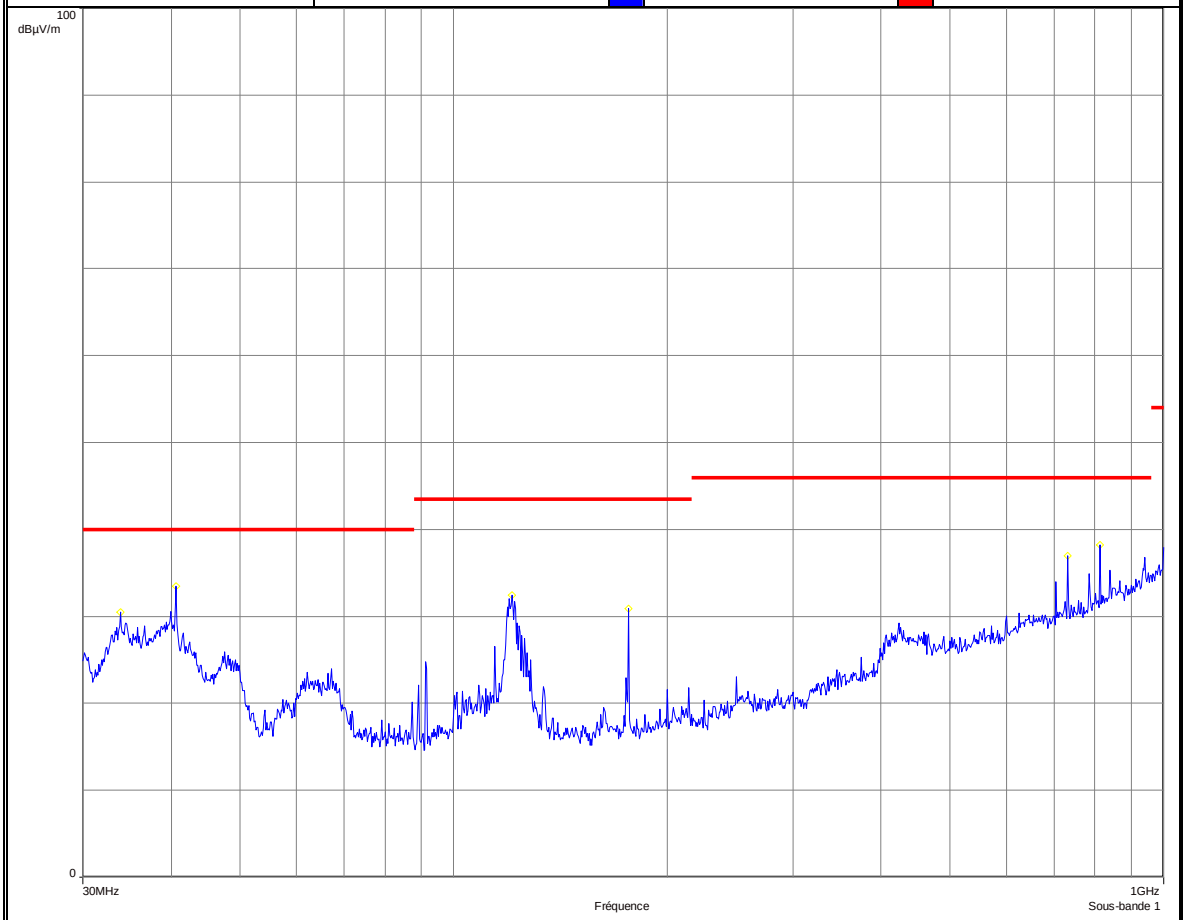
***Not emitted by EUT, GSM**

RADIATED EMISSION		Test configuration: N°4
Graph name:	**Emr#23**	**B&W**
Antenna position:	**Horizontal**	**RS232**
Azimuth:	**0° - 360°**	
RBW/VBW:	**120kHz / 300kHz**	**Peak Measure** / **QPeak Limit@3m**



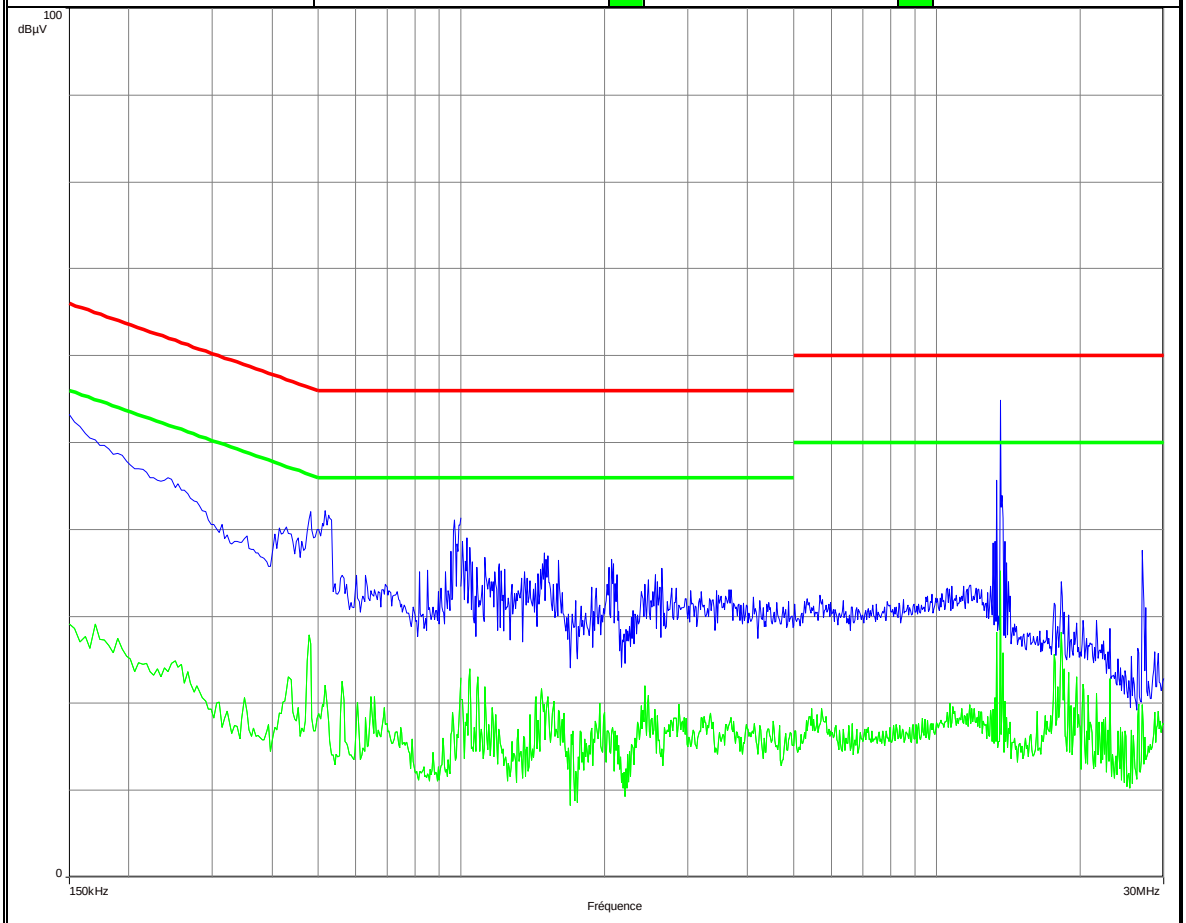
Frequency (MHz)	Peak (dBµV/m)
40.6	37.2
176.16	32.8
475	33.49
732.08	40.94

RADIATED EMISSION		Test configuration: N°4
Graph name:	**Emr#24**	**B&W**
Antenna position:	**Vertical**	**RS232**
Azimuth:	**0° - 360°**	
RBW/VBW:	**120kHz / 300kHz**	**Peak Measure** / **QPeak Limit@3m**



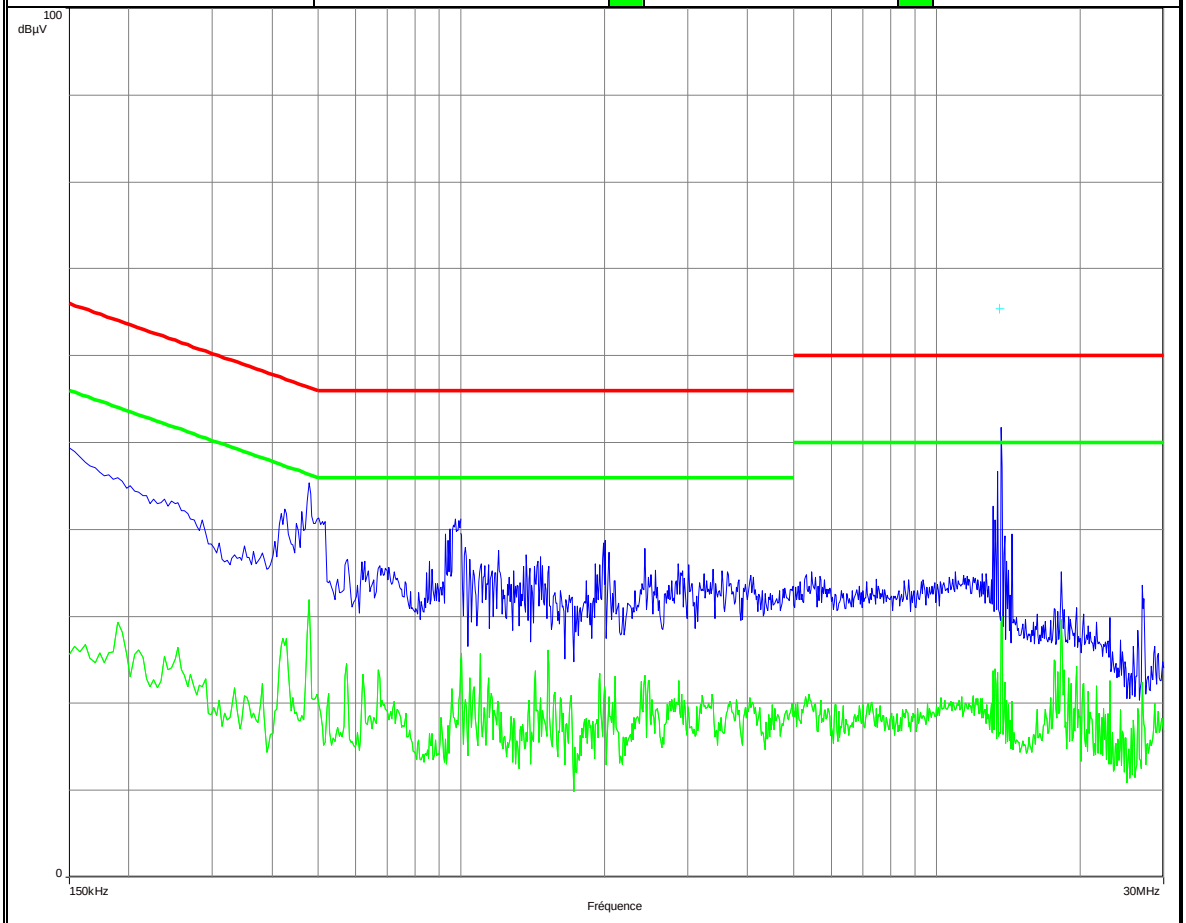
Frequency (MHz)	Peak (dBµV/m)
33.88	30.43
40.6	33.5
120.76	32.42
176.16	30.9
732.12	36.94
813.44	38.25

CONDUCTED EMISSIONS		Test configuration: N°1			
Graph name:	**Emc#1**	**Colour**			
Voltage / Frequency	**110Vac/60Hz**				
Line/Port	**Phase L1**	**Peak Measure**		**QPeak Limit**	
RBW / VBW :	**9kHz / 30kHz**	**Average Measure**		**Average Limit**	



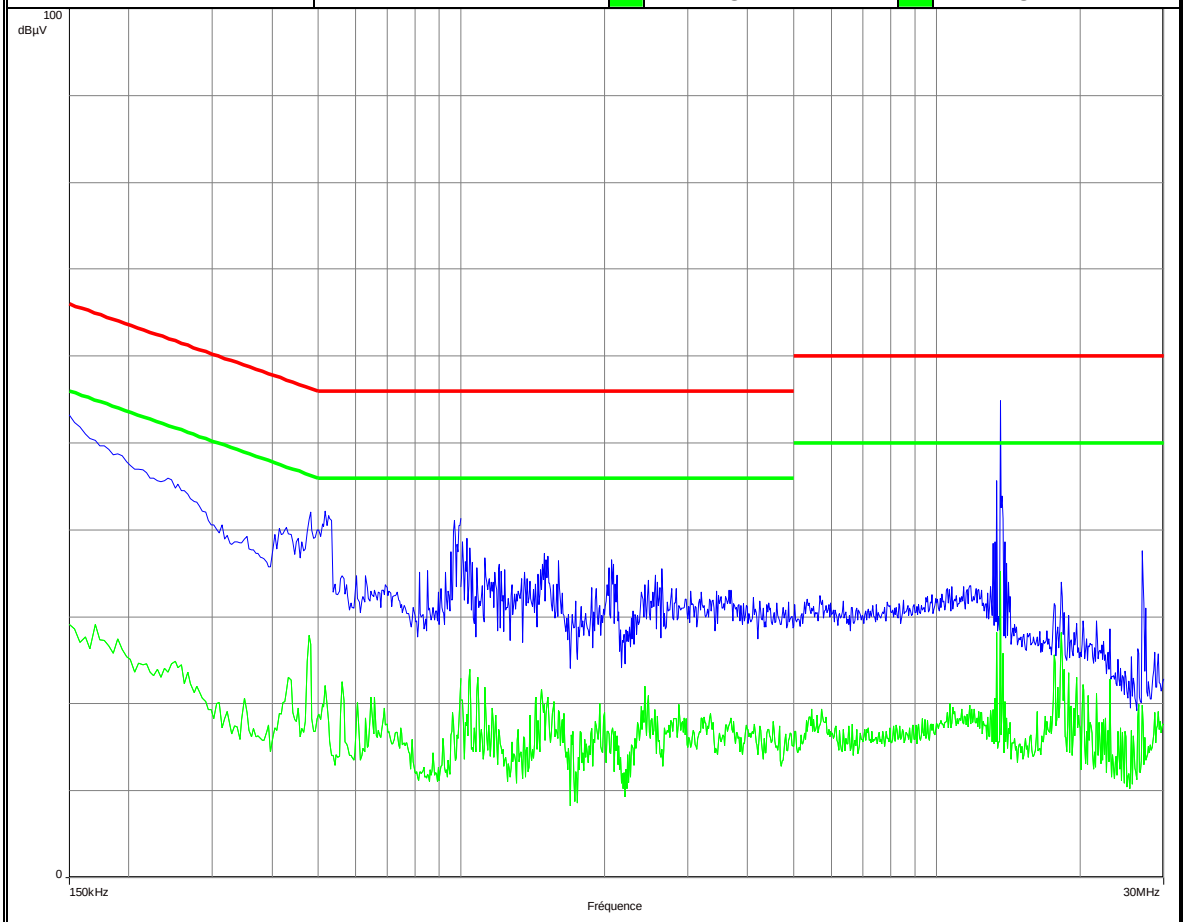
Frequency (MHz)	Avg (dBµV)	Lim Avg (dBµV)	Avg-LimAvg (dBµV)	QPeak (dBµV)	LimQPeak (dBµV)	QPeak-LimQPeak (dBµV)
13.56	32.8	50	**-17.2**	57.32	60	**-2.68**

CONDUCTED EMISSIONS		Test configuration: N°1			
Graph name:	**Emc#2**	**Colour**			
Voltage / Frequency	**110Vac/60Hz**				
Line/Port	**Neutral N**	**Peak Measure**		**QPeak Limit**	
RBW / VBW :	**9kHz / 30kHz**	**Average Measure**		**Average Limit**	



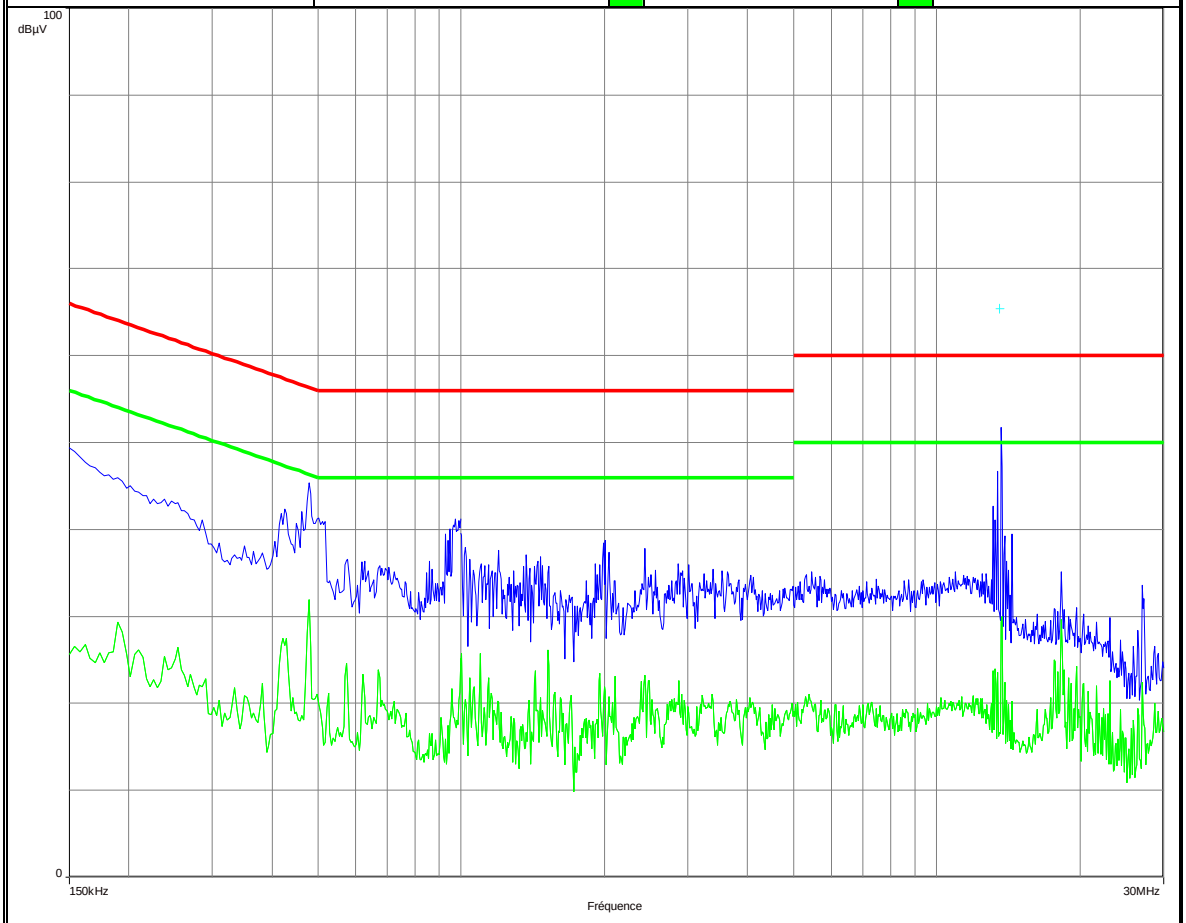
Frequency (MHz)	Avg (dBµV)	Lim Avg (dBµV)	Avg-LimAvg (dBµV)	QPeak (dBµV)	LimQPeak (dBµV)	QPeak-LimQPeak (dBµV)
13.56	47.99	50	**-2.01**	54.44	60	**-5.56**

CONDUCTED EMISSIONS		Test configuration: N°1	
Graph name:	**Emc#3**	**B&W**	
Voltage / Frequency	**110Vac/60Hz**		
Line/Port	**Phase L1**	**Peak Measure**	**QPeak Limit**
RBW / VBW :	**9kHz / 30kHz**	**Average Measure**	**Average Limit**



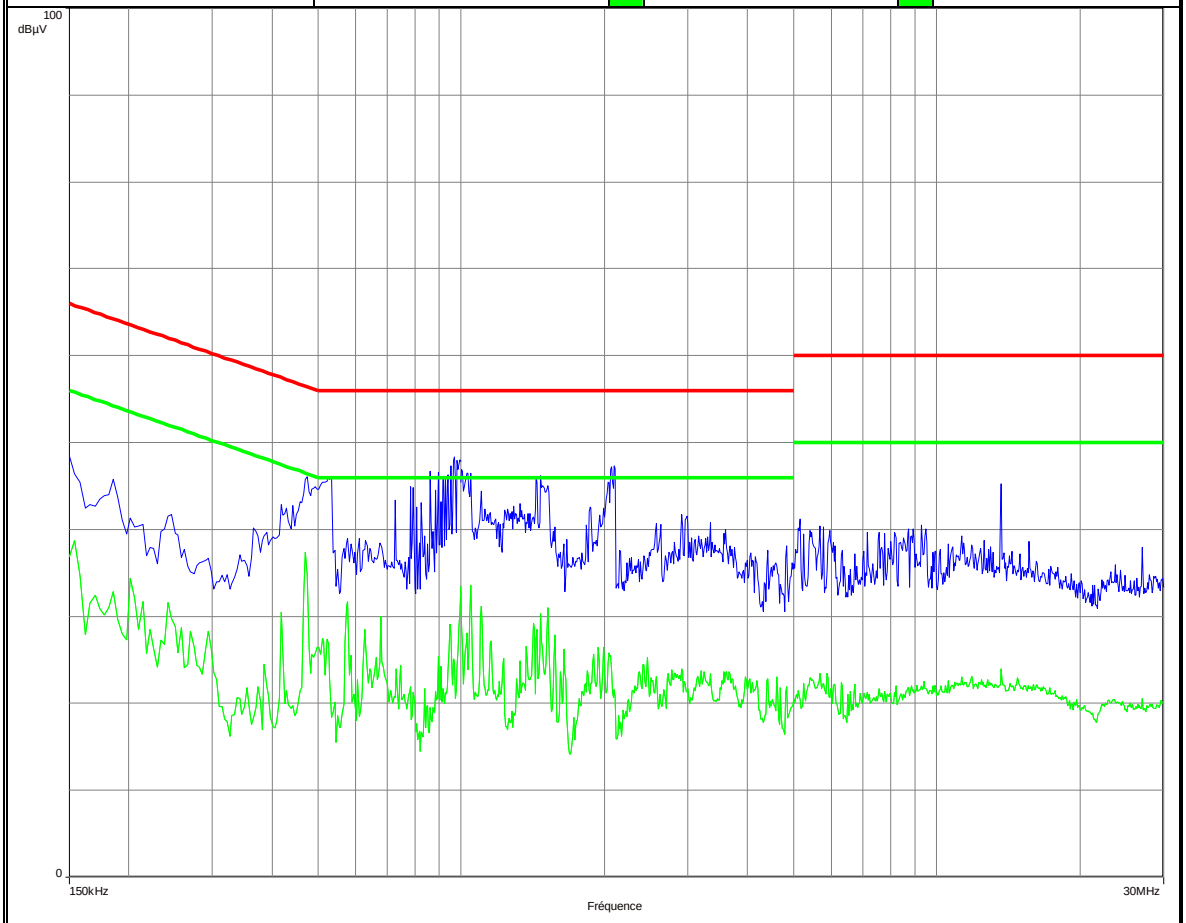
Frequency (MHz)	Avg (dBµV)	Lim Avg (dBµV)	Avg-LimAvg (dBµV)	QPeak (dBµV)	LimQPeak (dBµV)	QPeak-LimQPeak (dBµV)
13.56	41.13	50	**-8.87**	59.6	60	**-0.4**

CONDUCTED EMISSIONS		Test configuration: N°1			
Graph name:	**Emc#4**	**B&W**			
Voltage / Frequency	**110Vac/60Hz**				
Line/Port	**Neutral N**	**Peak Measure**		**QPeak Limit**	
RBW / VBW :	**9kHz / 30kHz**	**Average Measure**		**Average Limit**	



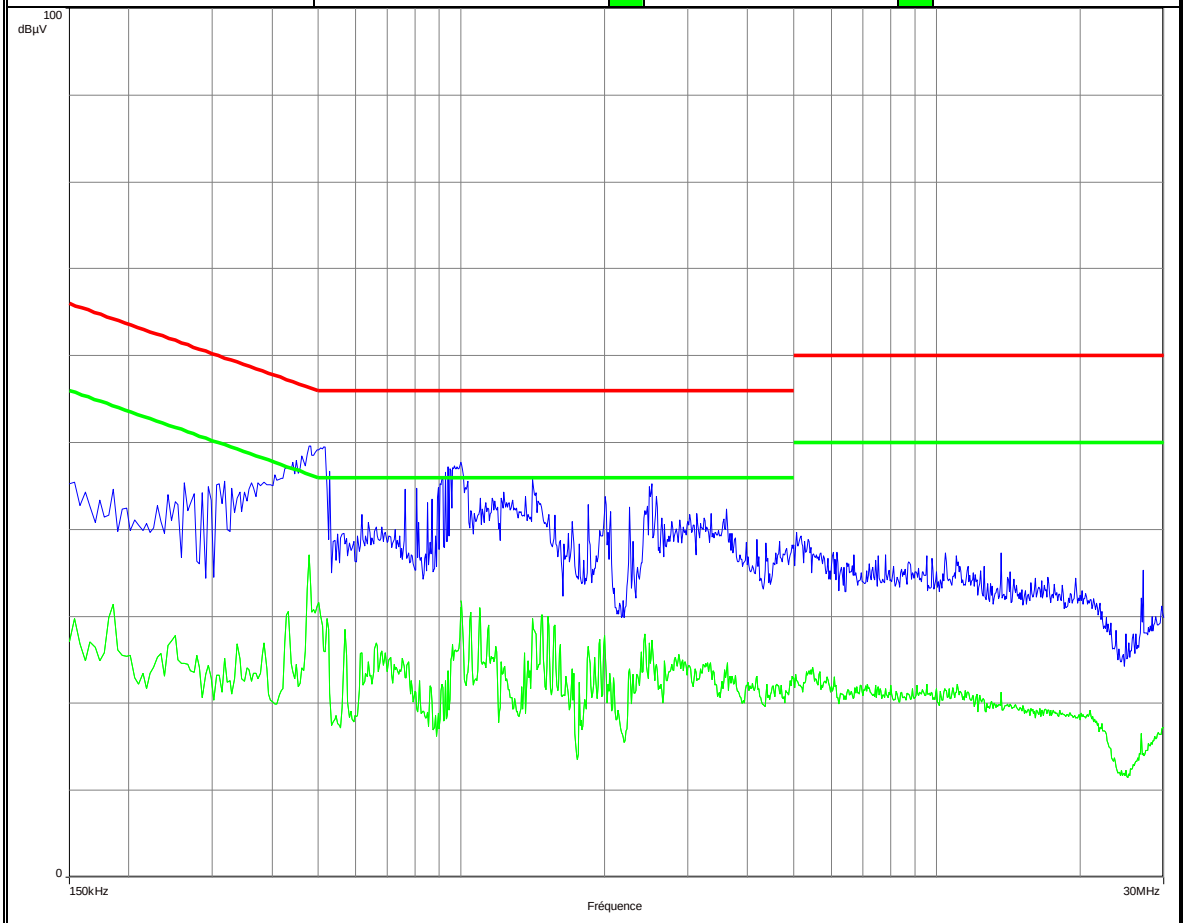
Frequency (MHz)	Avg (dBµV)	Lim Avg (dBµV)	Avg-LimAvg (dBµV)	QPeak (dBµV)	LimQPeak (dBµV)	QPeak-LimQPeak (dBµV)
13.56	47.99	50	**-2.01**	54.44	60	**-5.56**

CONDUCTED EMISSIONS		Test configuration: N°2			
Graph name:	**Emc#5**	**POE – PC power supply**			
Voltage / Frequency	**110Vac/60Hz**	**Colour**			
Line/Port	**Phase L1**	**Peak Measure**		**QPeak Limit**	
RBW / VBW :	**9kHz / 30kHz**	**Average Measure**		**Average Limit**	



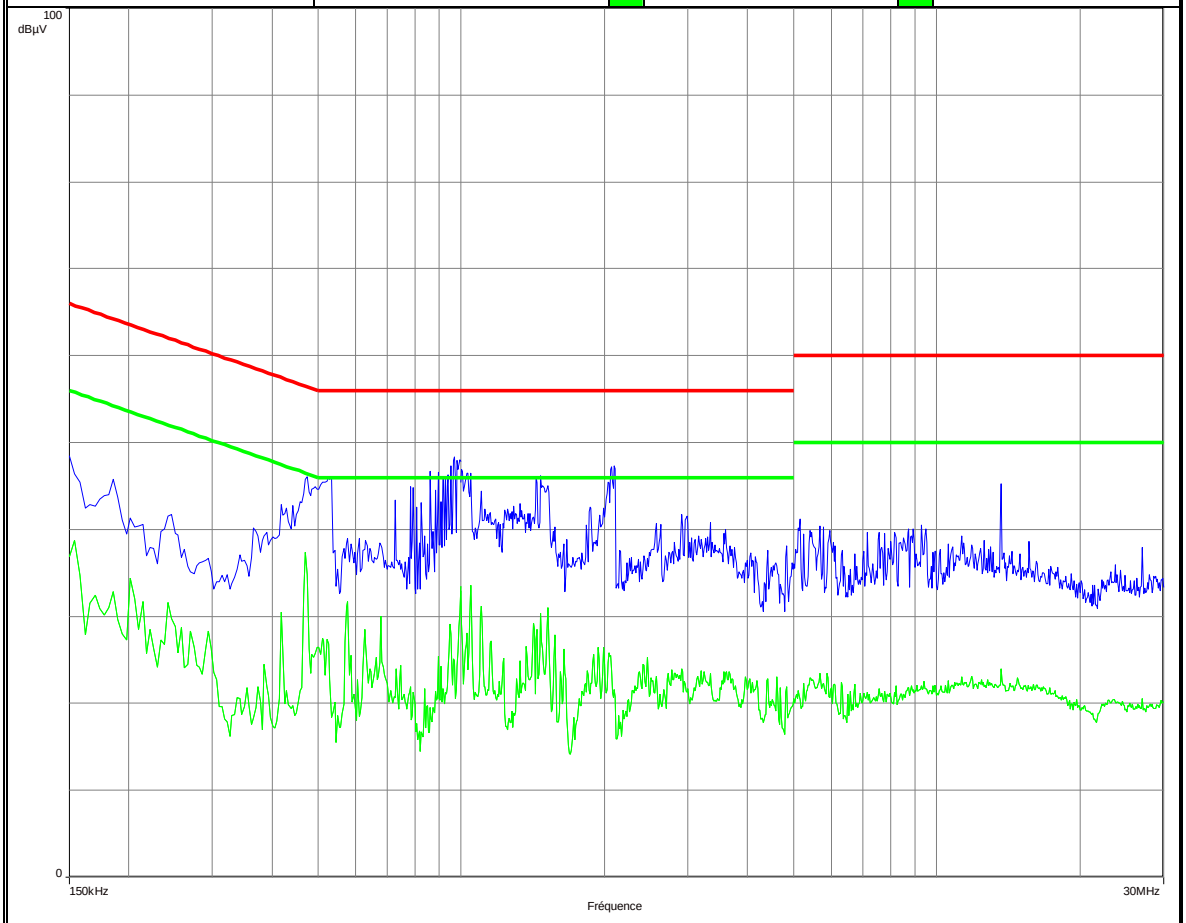
Frequency (MHz)	Avg (dBµV)	Lim Avg (dBµV)	Avg-LimAvg (dBµV)	QPeak (dBµV)	LimQPeak (dBµV)	QPeak-LimQPeak (dBµV)
13.56	38.9	50	**-11.1**	50	60	**-10**
27.12	24.6	50	**-25.4**	35.1	60	**-24.9**

CONDUCTED EMISSIONS		Test configuration: N°2			
Graph name:	**Emc#6**	**POE – PC power supply**			
Voltage / Frequency	**110Vac/60Hz**	**Colour**			
Line/Port	**Neutral N**	**Peak Measure**		**QPeak Limit**	
RBW / VBW :	**9kHz / 30kHz**	**Average Measure**		**Average Limit**	



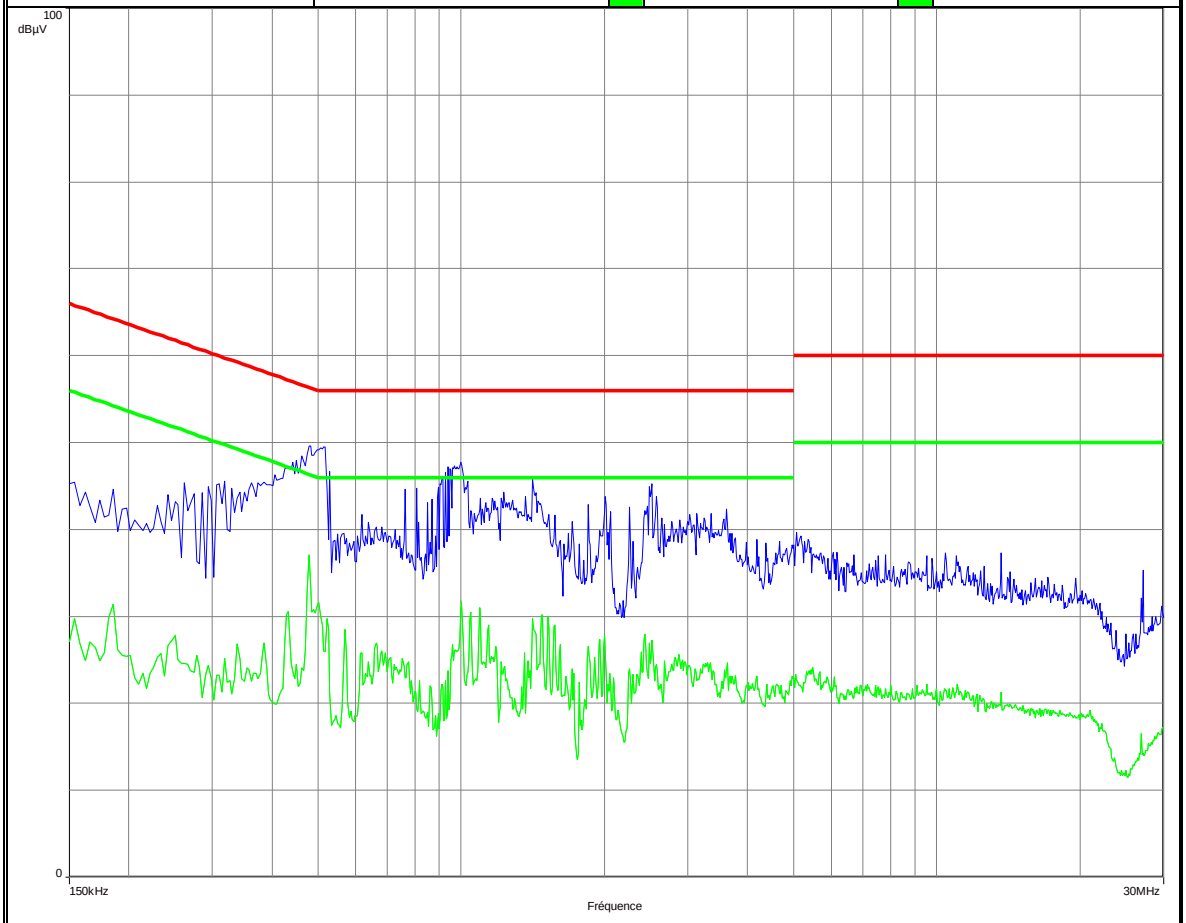
Frequency (MHz)	Avg (dBµV)	Lim Avg (dBµV)	Avg-LimAvg (dBµV)	QPeak (dBµV)	LimQPeak (dBµV)	QPeak-LimQPeak (dBµV)
13.56	33	50	**-17**	49.23	60	**-10.77**
27.116	20.9	50	**-29.1**	33.68	60	**-26.32**

CONDUCTED EMISSIONS		Test configuration: N°2			
Graph name:	**Emc#7**	**POE – PC power supply**			
Voltage / Frequency	**110Vac/60Hz**	**B&W**			
Line/Port	**Phase L1**	**Peak Measure**		**QPeak Limit**	
RBW / VBW :	**9kHz / 30kHz**	**Average Measure**		**Average Limit**	



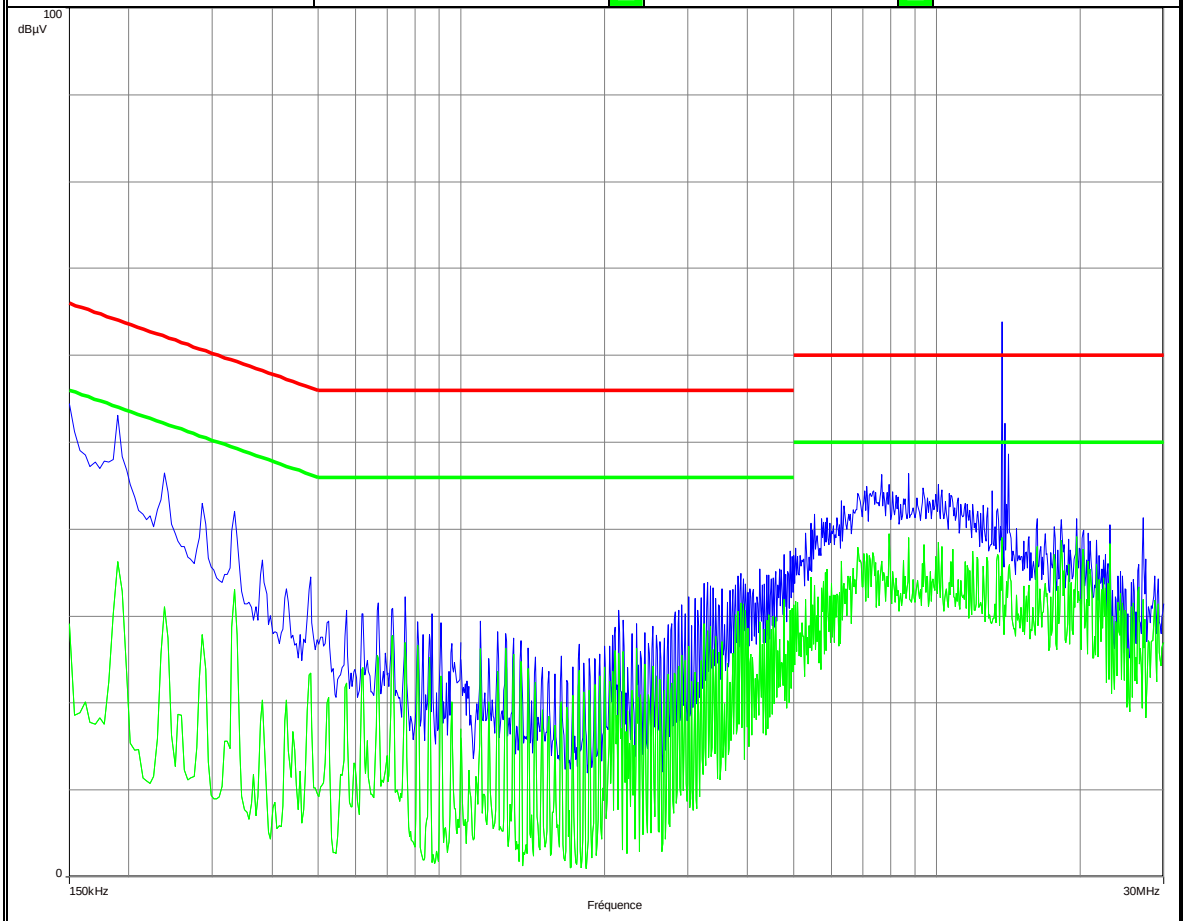
Frequency (MHz)	Avg (dBµV)	Lim Avg (dBµV)	Avg-LimAvg (dBµV)	QPeak (dBµV)	LimQPeak (dBµV)	QPeak-LimQPeak (dBµV)
13.56	38.5	50	**-11.5**	50.1	60	**-9.9**
27.12	24.5	50	**-25.5**	34.8	60	**-25.2**

CONDUCTED EMISSIONS		Test configuration: N°2			
Graph name:	**Emc#8**	**POE – PC power supply**			
Voltage / Frequency	**110Vac/60Hz**	**B&W**			
Line/Port	**Neutral N**	**Peak Measure**		**QPeak Limit**	
RBW / VBW :	**9kHz / 30kHz**	**Average Measure**		**Average Limit**	



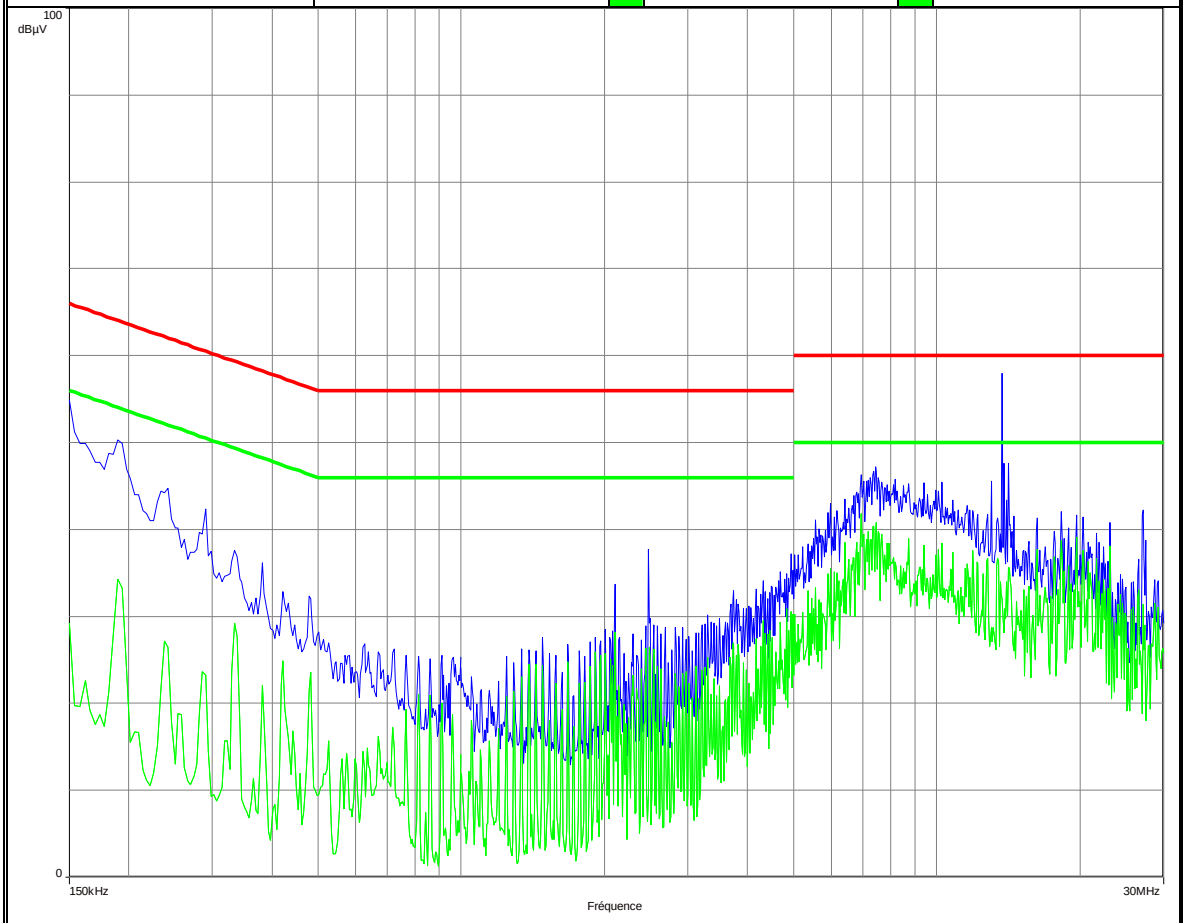
Frequency (MHz)	Avg (dBµV)	Lim Avg (dBµV)	Avg-LimAvg (dBµV)	QPeak (dBµV)	LimQPeak (dBµV)	QPeak-LimQPeak (dBµV)
13.56	34.3	50	**-15.7**	49.5	60	**-10.5**
27.116	21.1	50	**-28.9**	33.52	60	**-26.48**

CONDUCTED EMISSIONS		Test configuration: N°2			
Graph name:	**Emc#9**	**POE**			
Voltage / Frequency	**110Vac/60Hz**	**Colour**			
Line/Port	**Phase L1**	**Peak Measure**		**QPeak Limit**	
RBW / VBW :	**9kHz / 30kHz**	**Average Measure**		**Average Limit**	



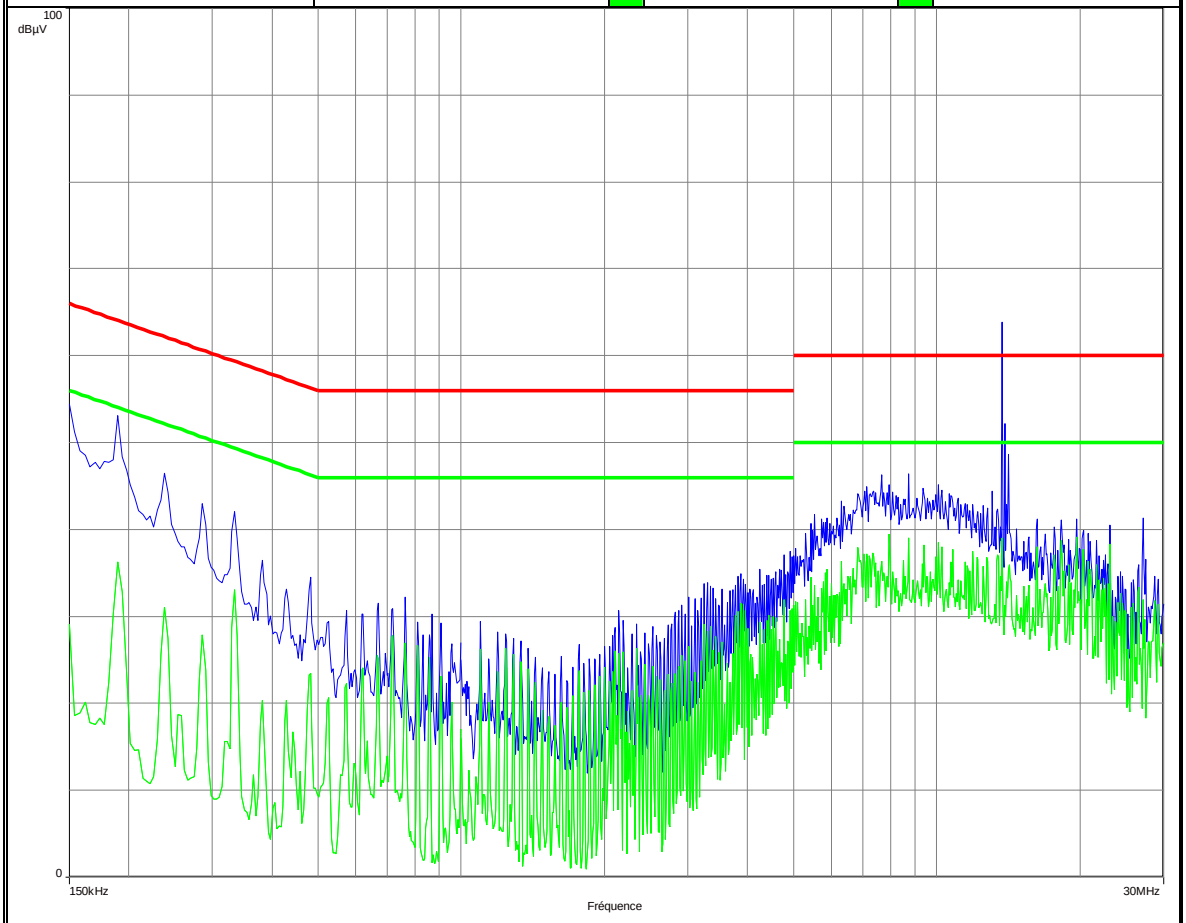
Frequency (MHz)	Avg (dBµV)	Lim Avg (dBµV)	Avg-LimAvg (dBµV)	QPeak (dBµV)	LimQPeak (dBµV)	QPeak-LimQPeak (dBµV)
13.568	38.1	50	**-11.9**	44.9	60	**-15.1**

CONDUCTED EMISSIONS		Test configuration: N°2			
Graph name:	**Emc#10**	**POE**			
Voltage / Frequency	**110Vac/60Hz**	**Colour**			
Line/Port	**Neutral N**	**Peak Measure**		**QPeak Limit**	
RBW / VBW :	**9kHz / 30kHz**	**Average Measure**		**Average Limit**	



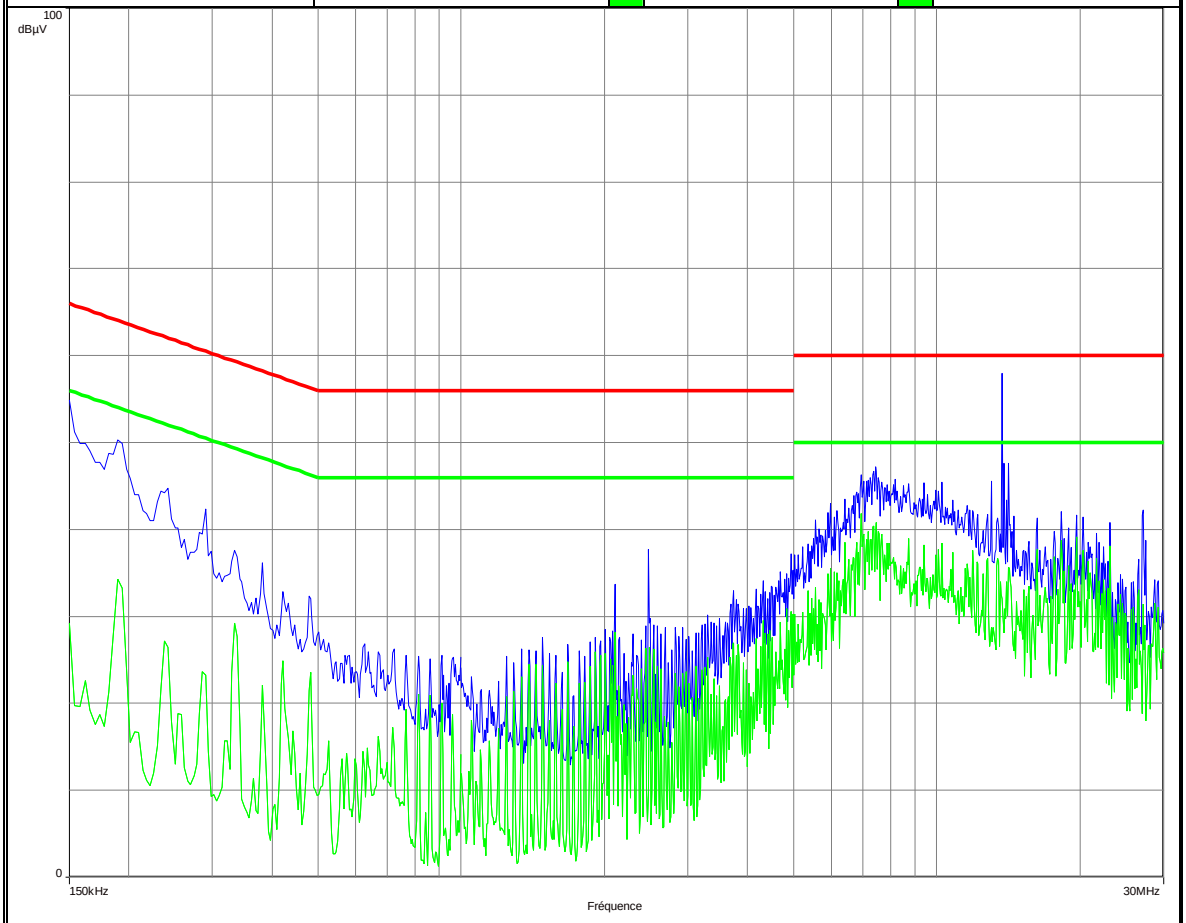
Frequency (MHz)	Avg (dBµV)	Lim Avg (dBµV)	Avg-LimAvg (dBµV)	QPeak (dBµV)	LimQPeak (dBµV)	QPeak-LimQPeak (dBµV)
13.568	35.12	50	**-14.88**	50.15	60	**-9.85**

CONDUCTED EMISSIONS		**Test configuration:** N°2			
Graph name:	**Emc#11**	**POE**			
Voltage / Frequency	**110Vac/60Hz**	**B&W**			
Line/Port	**Phase L1**	**Peak Measure**		**QPeak Limit**	
RBW / VBW :	**9kHz / 30kHz**	**Average Measure**		**Average Limit**	



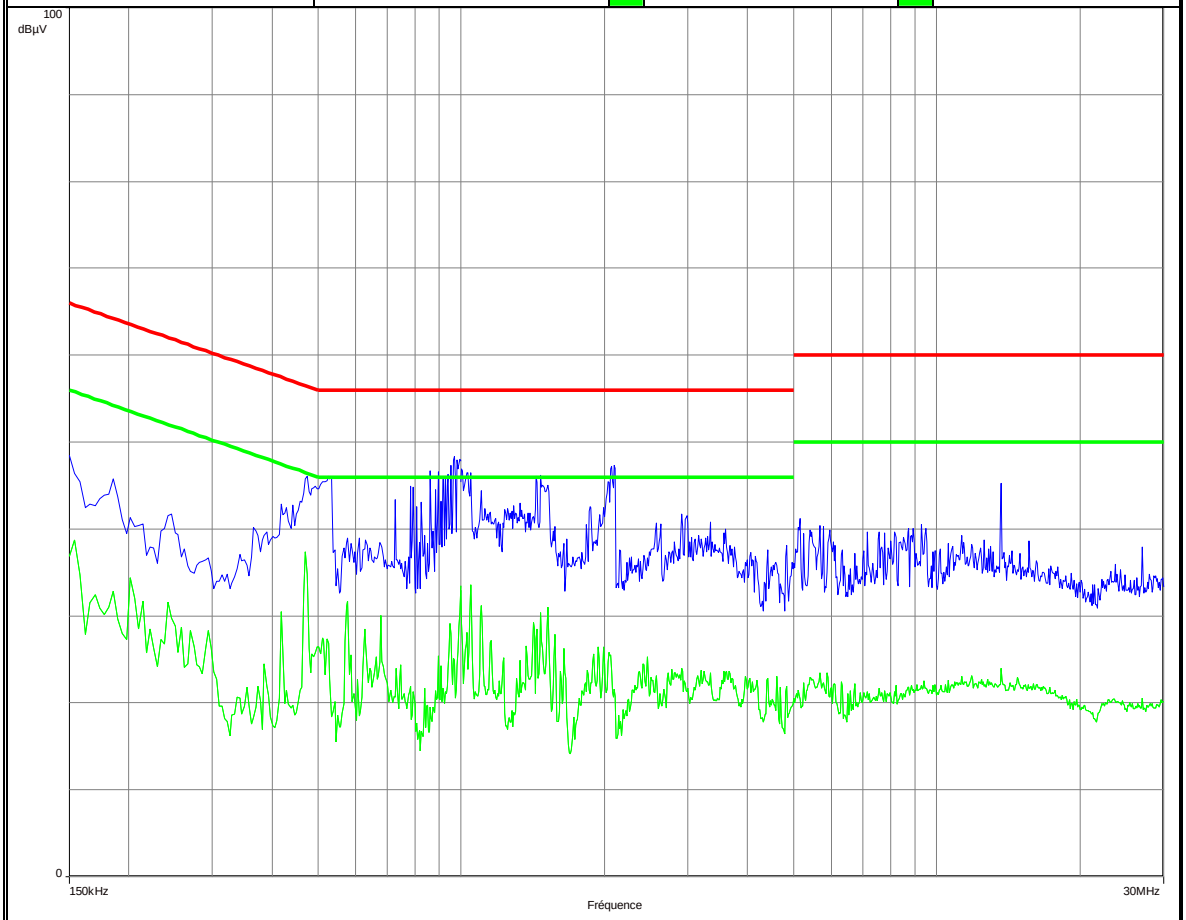
Frequency (MHz)	Avg (dBµV)	Lim Avg (dBµV)	Avg-LimAvg (dBµV)	QPeak (dBµV)	LimQPeak (dBµV)	QPeak-LimQPeak (dBµV)
13.568	37.9	50	**-12.1**	45.5	60	**-14.5**

CONDUCTED EMISSIONS		Test configuration: N°2			
Graph name:	**Emc#12**	**POE**			
Voltage / Frequency	**110Vac/60Hz**	**B&W**			
Line/Port	**Neutral N**	**Peak Measure**		**QPeak Limit**	
RBW / VBW :	**9kHz / 30kHz**	**Average Measure**		**Average Limit**	



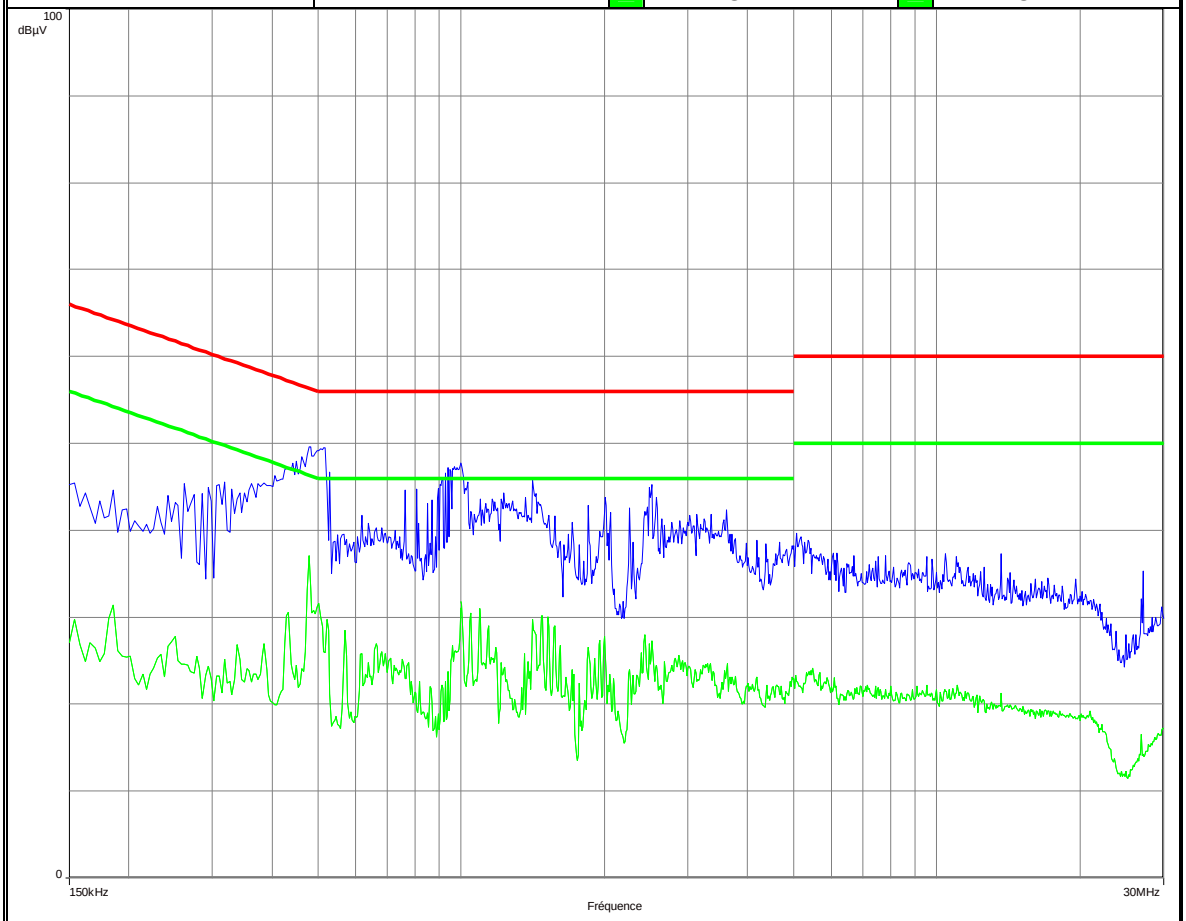
Frequency (MHz)	Avg (dBµV)	Lim Avg (dBµV)	Avg-LimAvg (dBµV)	QPeak (dBµV)	LimQPeak (dBµV)	QPeak-LimQPeak (dBµV)
13.568	34.27	50	**-15.73**	50.26	60	**-9.74**

CONDUCTED EMISSIONS		Test configuration: N°3			
Graph name:	**Emc#13**	**USB**			
Voltage / Frequency	**110Vac/60Hz**	**Color**			
Line/Port	**Phase L1**	**Peak Measure**		**QPeak Limit**	
RBW / VBW :	**9kHz / 30kHz**	**Average Measure**		**Average Limit**	



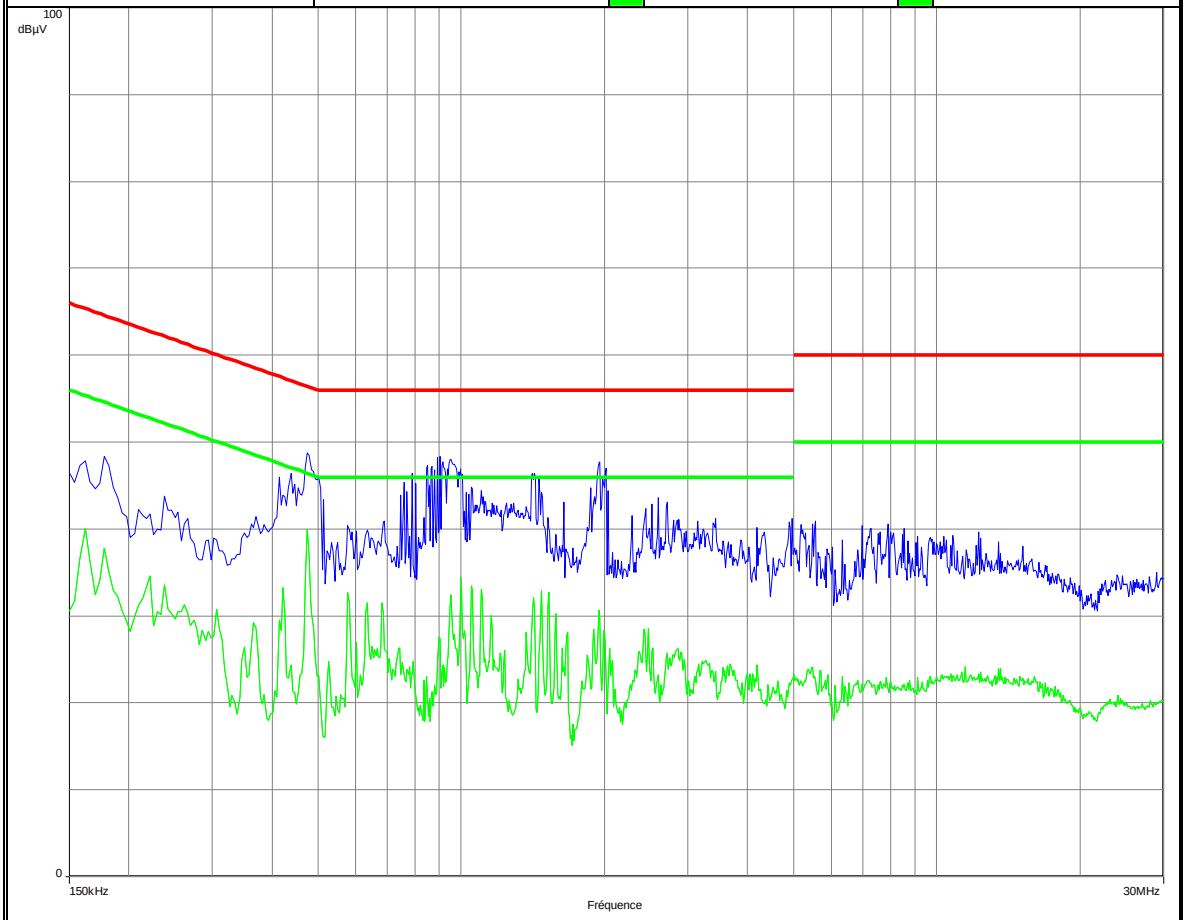
Frequency (MHz)	Avg (dBµV)	Lim Avg (dBµV)	Avg-LimAvg (dBµV)	QPeak (dBµV)	LimQPeak (dBµV)	QPeak-LimQPeak (dBµV)
13.56	40.72	50	**-9.28**	49.52	60	**-10.48**
27.12	23.88	50	**-26.12**	35.73	60	**-24.27**

CONDUCTED EMISSIONS		Test configuration: N°3			
Graph name:	**Emc#14**	**USB**			
Voltage / Frequency	**110Vac/60Hz**	**Color**			
Line/Port	**Neutral N**	**Peak Measure**		**QPeak Limit**	
RBW / VBW :	**9kHz / 30kHz**	**Average Measure**		**Average Limit**	



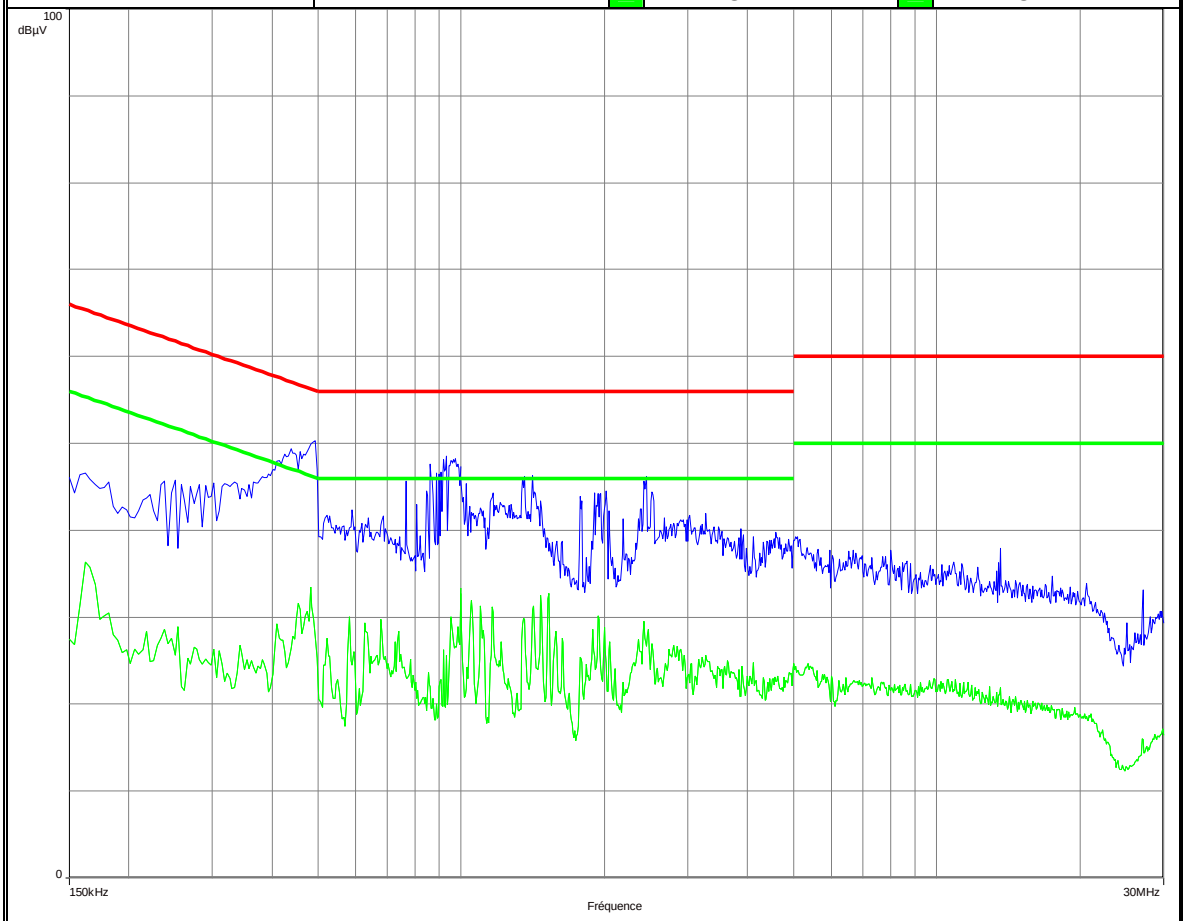
Frequency (MHz)	Avg (dBµV)	Lim Avg (dBµV)	Avg-LimAvg (dBµV)	QPeak (dBµV)	LimQPeak (dBµV)	QPeak-LimQPeak (dBµV)
13.56	34.24	50	**-15.76**	48.54	60	**-11.46**
27.116	20.67	50	**-29.33**	33.51	60	**-26.49**

CONDUCTED EMISSIONS		Test configuration: N°3			
Graph name:	**Emc#15**	**USB**			
Voltage / Frequency	**110Vac/60Hz**	**B&W**			
Line/Port	**Phase L1**	**Peak Measure**		**QPeak Limit**	
RBW / VBW :	**9kHz / 30kHz**	**Average Measure**		**Average Limit**	



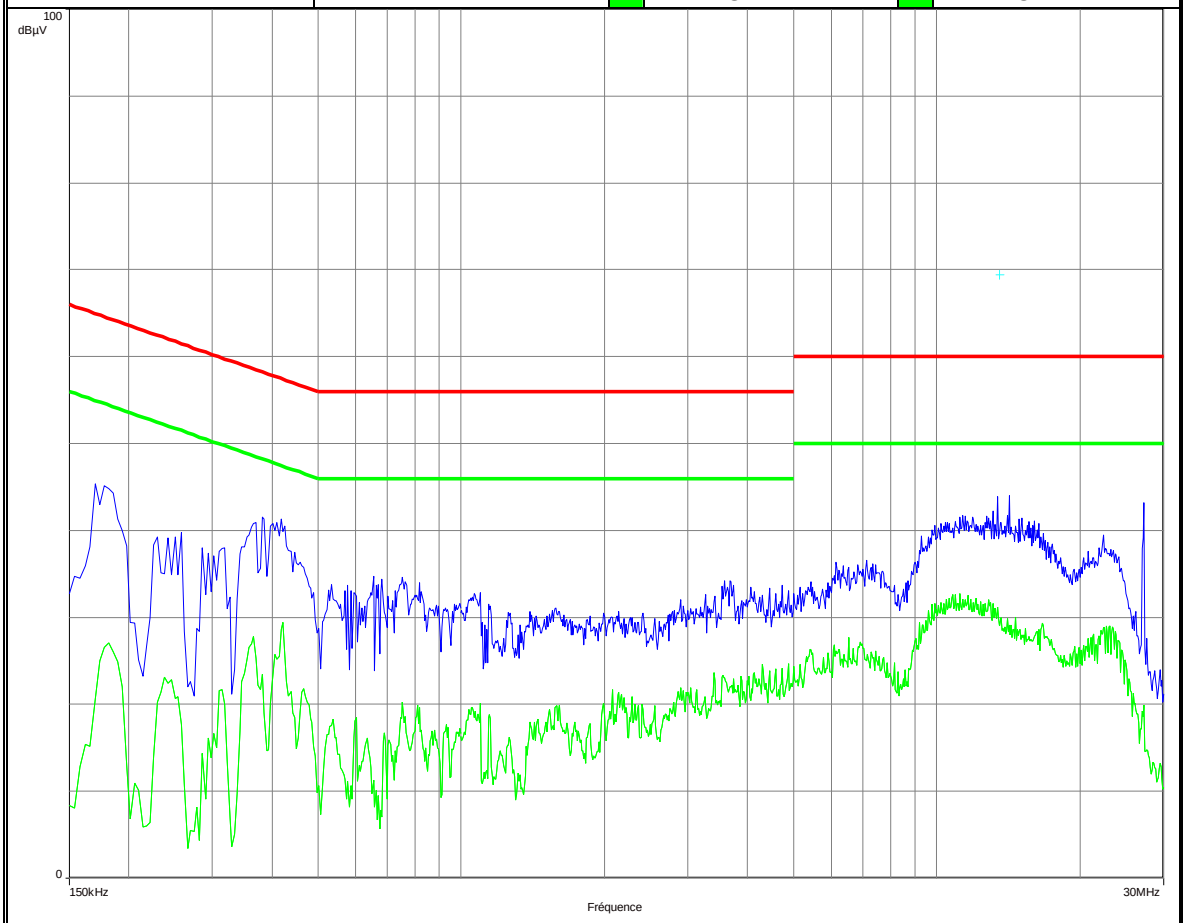
Frequency (MHz)	Avg (dBµV)	Lim Avg (dBµV)	Avg-LimAvg (dBµV)	QPeak (dBµV)	LimQPeak (dBµV)	QPeak-LimQPeak (dBµV)
13.56	36.6	50	**-13.4**	48.39	60	**-11.61**
27.116	44.95	50	**-5.05**	47.97	60	**-12.03**

CONDUCTED EMISSIONS		Test configuration: N°3	
Graph name:	**Emc#16**	**USB**	
Voltage / Frequency	**110Vac/60Hz**	**B&W**	
Line/Port	**Neutral N**	**Peak Measure**	**QPeak Limit**
RBW / VBW :	**9kHz / 30kHz**	**Average Measure**	**Average Limit**



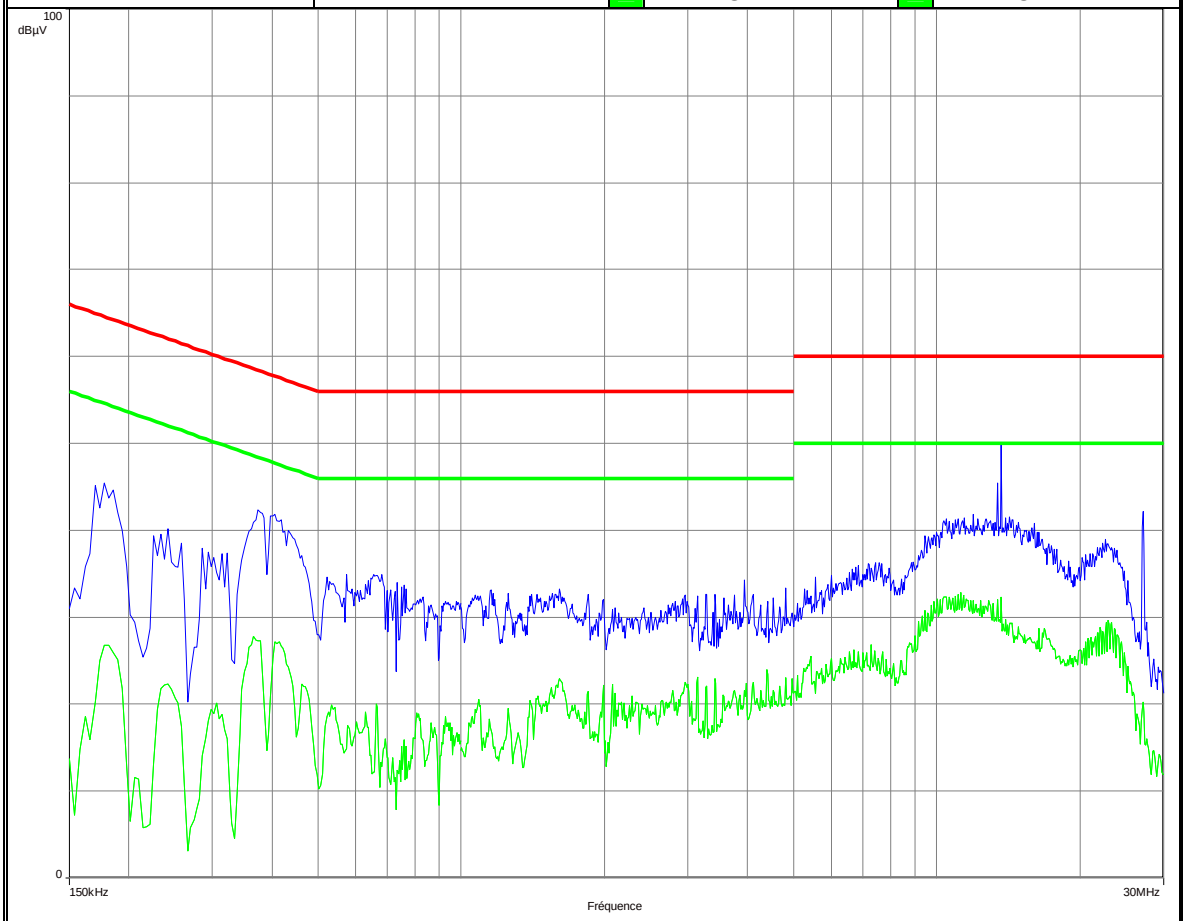
Frequency (MHz)	Avg (dBµV)	Lim Avg (dBµV)	Avg-LimAvg (dBµV)	QPeak (dBµV)	LimQPeak (dBµV)	QPeak-LimQPeak (dBµV)
13.56	34.67	50	**-15.33**	48.21	60	**-11.79**
27.12	46.03	50	**-3.97**	47.37	60	**-12.63**

CONDUCTED EMISSIONS		Test configuration: N°4			
Graph name:	**Emc#17**	**RS232**			
Voltage / Frequency	**110Vac/60Hz**	**Colour**			
Line/Port	**Phase L1**	**Peak Measure**		**QPeak Limit**	
RBW / VBW :	**9kHz / 30kHz**	**Average Measure**		**Average Limit**	



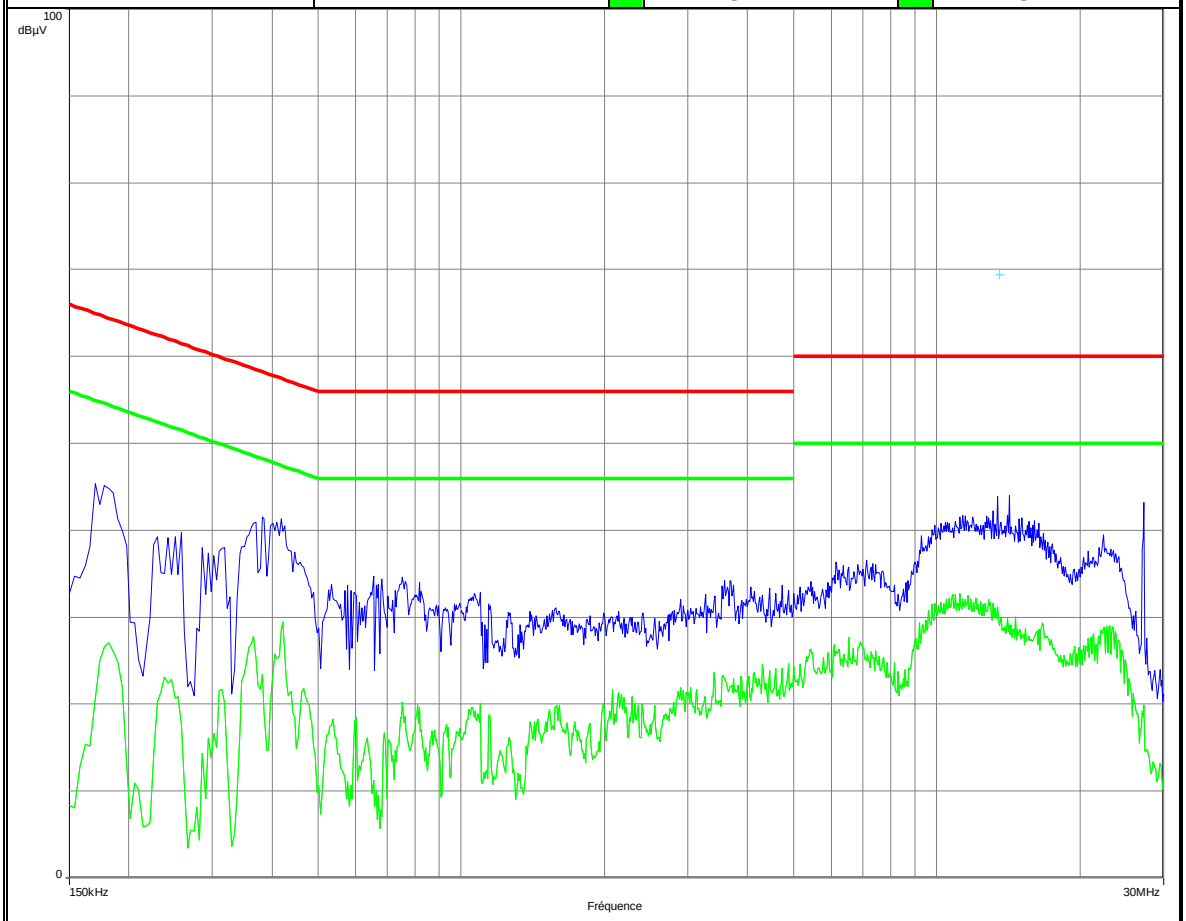
Frequency (MHz)	Avg (dBµV)	Lim Avg (dBµV)	Avg-LimAvg (dBµV)	QPeak (dBµV)	LimQPeak (dBµV)	QPeak-LimQPeak (dBµV)
13.56	47.89	50	**-2.11**	57.72	60	**-2.28**
27.12	34.41	50	**-15.59**	49.62	60	**-10.38**

CONDUCTED EMISSIONS		Test configuration: N°4	
Graph name:	**Emc#18**	**RS232**	
Voltage / Frequency	**110Vac/60Hz**	**Colour**	
Line/Port	**Neutral N**	**Peak Measure**	**QPeak Limit**
RBW / VBW :	**9kHz / 30kHz**	**Average Measure**	**Average Limit**



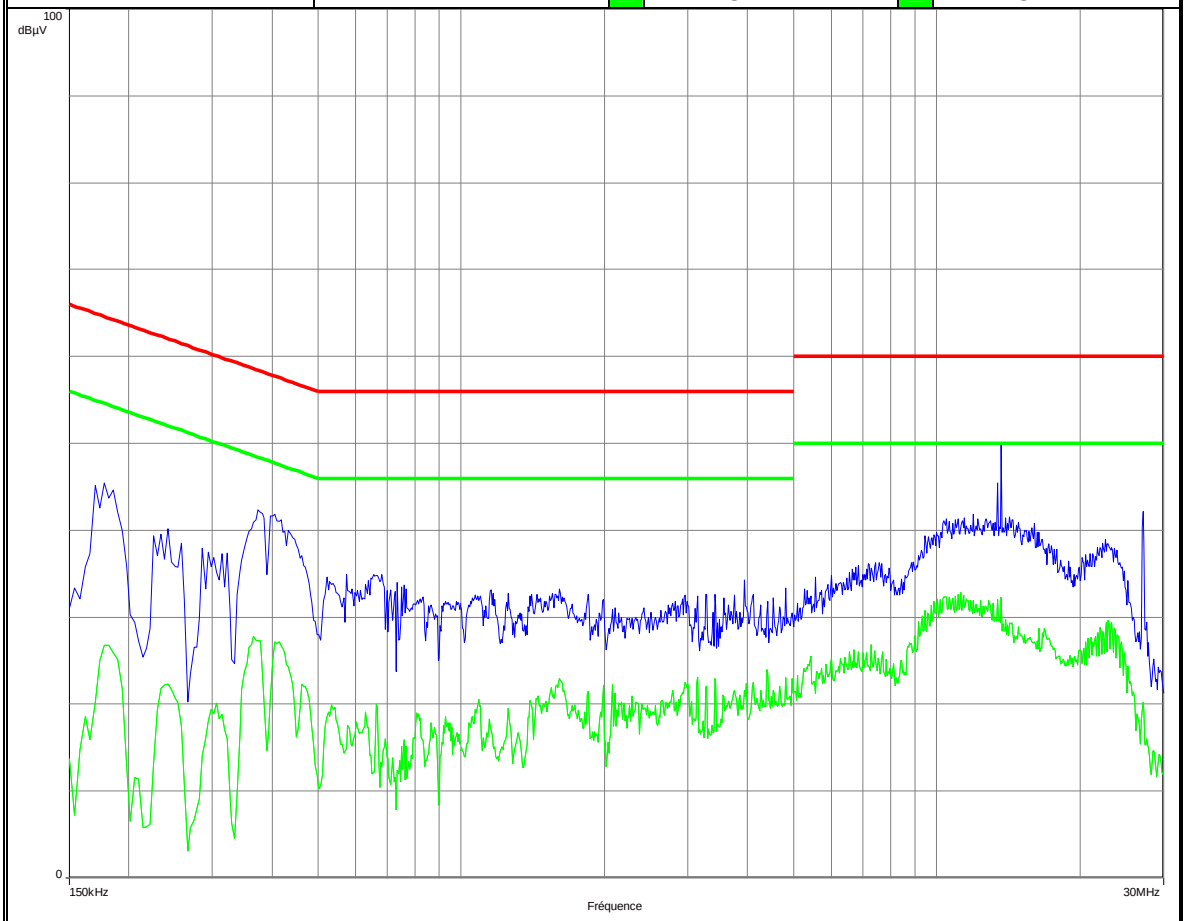
Frequency (MHz)	Avg (dBµV)	Lim Avg (dBµV)	Avg-LimAvg (dBµV)	QPeak (dBµV)	LimQPeak (dBµV)	QPeak-LimQPeak (dBµV)
13.56	43.76	50	**-6.24**	58.66	60	**-1.34**
27.12	37.21	50	**-12.79**	49.22	60	**-10.78**

CONDUCTED EMISSIONS		Test configuration: N°4	
Graph name:	**Emc#19**	**RS232**	
Voltage / Frequency	**110Vac/60Hz**	**B&W**	
Line/Port	**Phase L1**	**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)
13.56	42.98	50	**-7.02**	57.76	60	**-2.24**
27.12	40.61	50	**-9.39**	50.07	60	**-9.93**

CONDUCTED EMISSIONS		Test configuration: N°4	
Graph name:	**Emc#20**	**RS232**	
Voltage / Frequency	**110Vac/60Hz**	**B&W**	
Line/Port	**Neutral N**	**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)
13.556	43	50	**-7**	57.65	60	**-2.35**
27.116	37.85	50	**-12.15**	49.08	60	**-10.92**