



L C I E

Rapport d'essai / Test report

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DELIVRE A / ISSUED TO

: TAGSYS RFID
785 Voie Antiope
Athélia III
13600 LA CIOTAT - FRANCE

Objet / Subject

: Essais de compatibilité électromagnétique conformément aux normes
Electromagnetic compatibility tests according to the standards
FCC CFR 47 Part 15, Subpart B et C.
RSS-GEN / RSS-210

Matériel testé / Apparatus under test :

- Produit / Product : Lecteur RFID / RFID Reader
- Marque / Trade mark : TAGSYS RFID
- Constructeur / Manufacturer : TAGSYS RFID
- Type / Model : MEDIO L40
- N° de série / serial number : G1323002B0
- Type d'antenne / Antenna Model : AERO LC / TR-CAu / TR-SA
- N° de série / serial number : See configuration page 4
- FCC ID : QHKMEDIOL40
- IC : 7562A-MEDIOL40

Date des essais / Test date

: Du 19 Juin au 15 Juillet 2013 / From June 19th to July 15th, 2013

Lieu d'essai / Test location

: LCIE SUD-EST
ZI Centr'Alp – 170 rue de Chatagnon
38430 MOIRANS - FRANCE

Test réalisé par / Test performed by

: Anthony MERLIN /Jonathan PAUC

Ce document comporte / Composition of document : 63 pages.

MOIRANS, LE 2 OCTOBRE 2013 / OCTOBER 2ND, 2013

Ecrit par / Written by,
Jonathan PAUC

Approuvé par / Approved by,
Jacques LORQUIN

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LCIE

33, av du Général Leclerc
BP 8
92266 Fontenay-aux-Roses cedex
France

Tél : +33 1 40 95 60 60
Fax : +33 1 40 95 86 56
contact@lcie.fr
www.lcie.fr

Société par Actions Simplifiée
au capital de 15 745 984 €
RCS Nanterre B 408 363 174
www.lcie.com



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1. TEST PROGRAM

Standard:

- FCC Part 15, Subpart B (Digital Devices)
- FCC Part 15, Subpart C
- ANSI C63.4 (2003)
- RSS-Gen Issue 3 – Dec 2010
- RSS-210 Issue 8 – Dec 2010

EMISSION TEST	LIMITS			RESULTS (Comments)
Limits for conducted disturbance at mains ports 150kHz-30MHz CFR 47 §15.207	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 CFR 47 §15.209 (a) CFR 47 §15.225 RSS-Gen §4.9	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-25GHz* CFR 47 §15.209 (a) CFR 47 §15.225 RSS-Gen §4.9	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 field strength limit CFR 47 §15.225 RSS-210 §A2.6	Operation within the band 13.110-14.010 MHz			See precedent report Not performed due to modifications
Fundamental frequency tolerance CFR 47 §15.225 (e) RSS-210 §A2.6	Operation within the band 13.110-14.010 MHz			PASS
Occupied bandwidth RSS-Gen §4.6.1	No limit			See test results p13
Receiver Spurious Emission** RSS-Gen §4.10	See RSS-Gen §4.10			NA

*§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.

**Testing covered the receive mode, and receiver spurious emissions are considered to be the same as transmitter.



2. SYSTEM TEST CONFIGURATION

2.1. JUSTIFICATION

The system was configured for testing in a typical fashion (as a customer would normally use it). Different configuration of antennas with RFID reader MEDIO L40 are already certified, a little modification with new power supply and 2 news antennas are presented and tested in this test report:

- MEDIO L40 + 4 x AERO LC (Already certified – Worst Case, tested to show there is none modification and compliance)
- MEDIO L40 + 1 x TR-CAu New antenna
- MEDIO L40 + 1 x TR-SA New antenna

Reader may be used with 1 until 4 antennas (see different configurations), but not emitted together; so only worst configuration tested.

Maximum Power Output: 5W.

Precedent power supply certified, VP ELECTRONIQUE is used with the new XP POWER for all tests.

2.2. HARDWARE IDENTIFICATION

Equipment under test (EUT):

MEDIO L40

Serial number: **G1323002B0**

FCC ID: **QHKMEDIOL40**

IC: **7562A-MEDIOL40**

Internal max frequencies: 300MHz

Antenna:

TR-CAu

Sn: T0720001A0

TR-SA

Sn: T0817004-D0

AERO LC

Sn: T0531010B1

AERO LC

Sn: E0730062C1-R

AERO LC

Sn: E0912050C1-R

AERO LC

Sn: E0616045C0-R

Power supply:

- AC/DC adapter VPELECTRONIQUE, A2-50S18R-V 100-240VAC, 1.5A, 50-60Hz, 24VDC, 2.08A, Sn: none.

- AC/DC adapter XP Power, VEH40US24 100-240VAC / 47-63Hz, 24VDC, Sn: 06592709 1051

Measurement performed with both power supplies, worst case presented followings tests in this report.

Input/output:

- 1 x Power supply 24VDC

- 1 x Synchro

- 1 x LAN

- 1 x USB

- 1 x RS-232

- 1 x GPIO

- 1 x Extension

- 4 x RF outputs SMA

Cables:

- 1 x Power supply 2 wires unshielded, length: 1m until adapter.

- 1 x Synchro, 2 wires unshielded, length: 1m

- 1 x LAN, shielded cable, length: 5m connected to laptop by switch.

- 1 x USB, shielded cable, length: 2m

- 1 x RS-232, LAN cable shielded with adaptor, length: 3m

- 1 x GPIO, 8 wires unshielded, length: 1m

- 1 x Extension, 10 wires unshielded, length: 1m

- 4 x RF output SMA, BNC cable with 6 ferrites reader side shielded, length: 3m

- 1 x RF output TR-SA antenna, BNC cable with 6 ferrites reader side shielded, length: 3m

- 1 x RF output TR-CAu antenna, BNC cable with 6 ferrites reader side shielded, length: 3m

Auxiliaries equipment used during test:

- 1 x Laptop HEWLETT PACKARD PROTECTSMART with its power supply

sn: 5CD244603W

- 1 x TAGSYS - RFID tag (ISO 15693)



2.3. EUT CONFIGURATION

The EUT exercise program used during radiated and conducted testing was exercised the reader in a manner similar to a typical use.

The test program permits the continuous reading of a RFID tag.

Software: TAGSYS Explorer v1.6.0.27291

Tag Parameter :

AERO LC configuration :

Output power parameter : 5W
RF mode : Multiplexer (Each RF channel ON independently, never 4 together)

TR-CAu configuration:

Output power parameter : 3.5W
RF mode : Multiplexer (Each RF channel ON independently, never 2 together "Channel 1 & 2")

TR-SA configuration:

Output power parameter : 2W
RF mode : Mono channel (channel 1)

2.4. EQUIPMENT MODIFICATIONS

None

2.5. SPECIAL ACCESSORIES

None

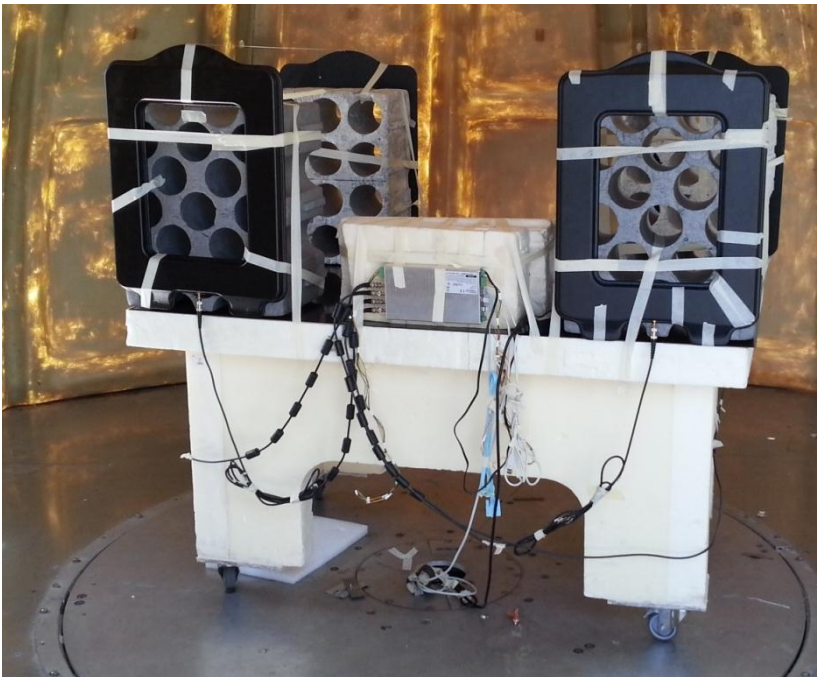
3. RADIATED EMISSION DATA

3.1. TEST CONDITIONS

Date of test	: June 20 th , 2013	June 21 st , 2013
Test performed by	: J.PAUC	J.PAUC
Atmospheric pressure	: 998mb	993mb
Relative humidity	: 50%	49%
Ambient temperature	: 26°C	27°C

3.2. TEST SETUP

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



AERO LC Configuration



TR-CAu Configuration



TR-SA Configuration



3.3. TEST EQUIPMENT LIST

N° LCIE	TYPE	COMPANY	REF
C2040051	Antenna Bi-log	CHASE	CBL6111A
C2040052	Antenna Loop	ELECTRO-METRICS	EM-6879
A5329061	Cable	SUCOFLEX	106G
A5329188	Cable OATS (Mast at 10m)	UTIFLEX	-
A5329199	Cable OATS (Mast at 10m)	UTIFLEX	-
F2000409	OATS	-	-
A2642019	Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8
F2000288	Antenna mast (OATS)	LCIE	-
F2000372	Turntable / Mast controller (OATS)	ETS Lindgren	Model 2066
F2000403	Turntable (OATS)	ETS Lindgren	Model 2187
A7102067	Amplifier 1-13GHz	LCIE SUD EST	-
A7486006	Amplifier 0.1MHz – 1300 MHz	HEWLETT PACKARD	8447F
C2040052	Antenna Loop	ELECTRO-METRICS	EM-6879
C2040172	Antenna Bi-log	CHASE	CBL6111A
C2042029	Antenna horn	EMCO	3115
A5329038	Cable N/N	-	-
A5329193	Cable N/N	-	-
A5329206	Cable N/N	-	-
D3044017	Semi-Anechoic chamber #3	SIEPEL	-
A2642020	Receiver 9kHz - 6GHz	ROHDE & SCHWARZ	FSL6
F2000371	Turntable chamber (Cage#3)	ETS Lingren	Model 2165
F2000444	Turntable controller (Cage#3)	ETS Lingren	Model 2090

3.4. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

**3.5. TEST SEQUENCE AND RESULTS****3.5.1. 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.

AERO LC	(With XP Power)	Emr#1	(See annex 1)
AERO LC	(With VP ELECTRONIQUE)	Emr#2	(See annex 1)
TR-CAu	(With XP Power)	Emr#3	(See annex 1)
TR-CAu	(With VP ELECTRONIQUE)	Emr#4	(See annex 1)
TR-SA	(With XP Power)	Emr#5	(See annex 1)
TR-SA	(With VP ELECTRONIQUE)	Emr#6	(See annex 1)

3.5.2. 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 2 GHz, 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#7	AERO LC+VP ELECTRONIQUE	(See annex 1)
V polarization	Emr#8	AERO LC+VP ELECTRONIQUE	(See annex 1)
H polarization	Emr#9	AERO LC+XP POWER	(See annex 1)
V polarization	Emr#10	AERO LC+XP POWER	(See annex 1)
H polarization	Emr#11	TR-CAu+VP ELECTRONIQUE	(See annex 1)
V polarization	Emr#12	TR-CAu+VP ELECTRONIQUE	(See annex 1)
H polarization	Emr#13	TR-CAu+XP POWER	(See annex 1)
V polarization	Emr#14	TR-CAu+XP POWER	(See annex 1)
H polarization	Emr#15	TR-SA+VP ELECTRONIQUE	(See annex 1)
V polarization	Emr#16	TR-SA+VP ELECTRONIQUE	(See annex 1)
H polarization	Emr#17	TR-SA+XP POWER	(See annex 1)
V polarization	Emr#18	TR-SA+XP POWER	(See annex 1)



3.5.3. 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.

Frequency (MHz)	QPeak Limit (dBμV/m) @ 30m	Qpeak (dBμV/m)	Qpeak-Limit (Margin dB)	Turntable Angle (deg)	Ant. Pol./ Angle (deg)	Tot Corr (dB)	Antenna
13.56 ^{*1}	84.0	81.0	-3.0	110	0	35.3	AERO LC
13.56 ^{*1}	84.0	72.7	-11.3	110	0	35.3	TR-CAu
13.56 ^{*1}	84.0	79.2	-4.8	110	0	35.3	TR-SA

^{*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.



3.5.4. 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:

AERO LC:

No	Frequency (MHz)	QPeak Limit (dBμV/m)	Qpeak * (dBμV/m)	Qpeak-Limit (Margin, dB)	Angle (deg)	Pol	Hgt (cm)	Tot Corr (dB)	Comments
1	38.092	40.0	34.5	-5.5	135	V	150	16.5	/
2	40.680	40.0	34.6	-5.4	150	V	150	15.1	/
3	65.836	40.0	26.8	-13.2	265	V	130	8.3	/
4	125.000	43.5	37.2	-6.3	80	V	200	14.7	/
5	800.000	46.0	34.6	-11.4	320	V	100	26.8	/
6	352.560	46.0	25.6	-20.4	10	V	250	17.6	/

*: 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)

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



Worst case final data result:

TR-CAu:

No	Frequency (MHz)	QPeak Limit (dBμV/m)	Qpeak * (dBμV/m)	Qpeak-Limit (Margin, dB)	Angle (deg)	Pol	Hgt (cm)	Tot Corr (dB)	Comments
1	37.514	40.0	28.8	-11.2	130	V	145	16.8	/
2	40.680	40.0	32.1	-7.9	150	V	120	15.1	/
3	61.382	40.0	28.1	-11.9	260	V	130	8.1	/
4	124.999	43.5	38.2	-5.3	347	V	100	14.7	/
5	352.560	46.0	26.1	-19.9	0	V	175	17.6	/
6	749.960	46.0	34.8	-11.2	390	V	165	26.7	/
7	800.000	46.0	36.0	-10	300	V	200	26.8	/

*: 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)

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
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No Significant Frequency observed

Note: Measures have been done at 3m distance.

RESULTS: PASS



Worst case final data result:

TR-SA:

No	Frequency (MHz)	QPeak Limit (dBμV/m)	Qpeak * (dBμV/m)	Qpeak-Limit (Margin, dB)	Angle (deg)	Pol	Hgt (cm)	Tot Corr (dB)	Comments
1	40.680	40.0	32.1	-7.9	170	V	100	15.1	/
2	37.338	40.0	32.2	-7.8	240	V	200	16.9	/
3	125.000	43.5	40.2	-3.3	350	V	150	14.7	/
4	352.560	46.0	22.6	-23.4	220	V	100	17.6	/
5	800.030	46.0	27.8	-18.2	320	V	220	26.8	/

*: 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)

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
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No Significant Frequency observed

Note: Measures have been done at 3m distance.

RESULTS: PASS

3.6. 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.

$$FS = 52.5 + 7.4 + 1.1 - 29 = 32 \text{ dB}\mu\text{V/m}$$

The 32 dBμV/m value can be mathematically converted to its corresponding level in μV/m.

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(32\text{dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}.$$

4. FUNDAMENTAL FREQUENCY TOLERANCE (15.225E)

4.1. TEST CONDITIONS

Date of test : July 16th, 2013
Test performed by : A.MERLIN

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency when the temperature is varied from -20°C to $+50^{\circ}\text{C}$ at the nominal power voltage and the DC power voltage is varied from 17VDC to 27VDC of the rated supply voltage at 20°C . (Worst case)

4.2. TEMPERATURE AND VOLTAGE FLUCTUATION

Temperature has been set at $+20^{\circ}\text{C}$, -20°C and $+50^{\circ}\text{C}$.

Voltage is varied from 17VDC to 27VDC, worst case,

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.





Voltage	Temperature	-30°C	-20°C	20°C	+50°C
Mains voltage: 24VDC Frequency Drift (MHz) Carrier level (dBc)		- 0.000099 + 0.40	- 0.000067 + 0.40	13.559886 7.600000	- 0.000039 - 0.10
Mains voltage: 18VDC Frequency Drift (MHz) Carrier level (dBc)		- 0.000099 + 0.40	- 0.000066 + 0.40	+ 0.000000 - 0.05	- 0.000039 - 0.10
Mains voltage: 27VDC Frequency Drift (MHz) Carrier level (dBc)		- 0.000099 + 0.40	- 0.000064 + 0.40	- 0.000001 + 0.00	- 0.000039 - 0.10

Frequency drift measured is **99 Hz** when the temperature is varied from -30°C to +50°C and voltage is varied.

4.3. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE
Attenuator 14dB	RADIALL	-	A7122163
Cable SMA	-	-	A5329580
Climatic chamber	BIA CLIMATIC	CL 6-25	D1022117
Data Logger	AGILENT	34970A	A6440083
Data Logger card	AGILENT	34970A	A6449036
Frequency Counter	HEWLETT PACKARD	HP 5350B	B2082009
Multimeter	FLUKE	189	A1240171
Power supply DC	AFX	0	A7044292
Receiver 9kHz - 6GHz	ROHDE & SCHWARZ	FSL6	A2642020

4.4. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

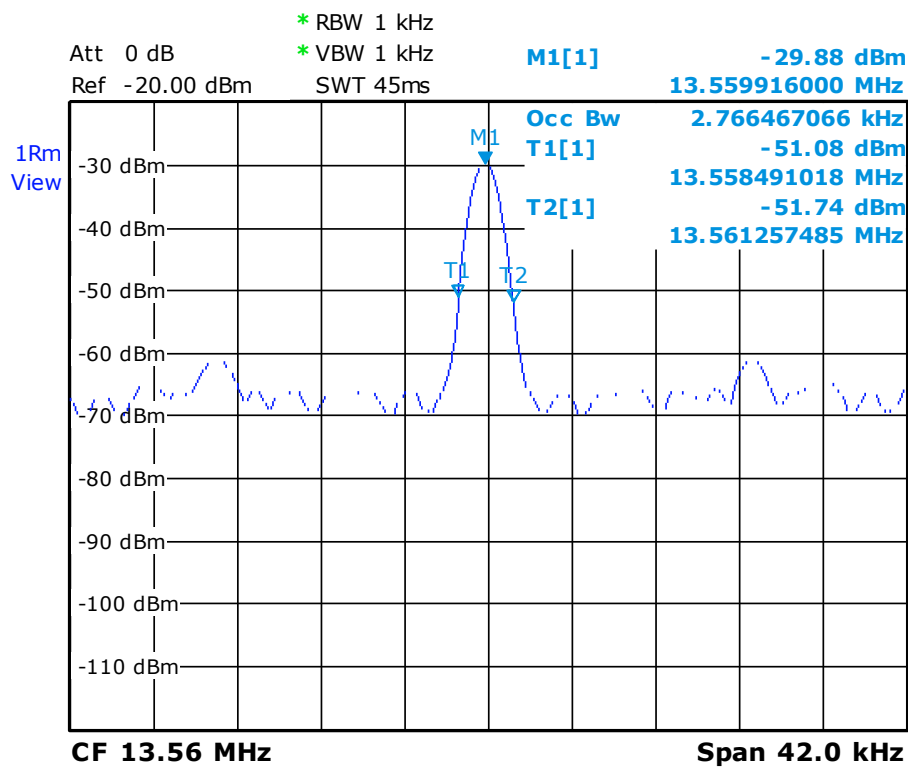
**5. OCCUPIED BANDWIDTH****5.1. CLIMATIC CONDITIONS**

Date of test : July 16th, 2013
Test performed by : A.MERLIN
Atmospheric pressure : 100hPa
Relative humidity : 40%
Ambient temperature : 25°C

5.2. TEST RESULTS

Same results with all power supplies, results with XP Power presented.

TR-CAu:



Measured occupied bandwidth is **2.77 kHz**

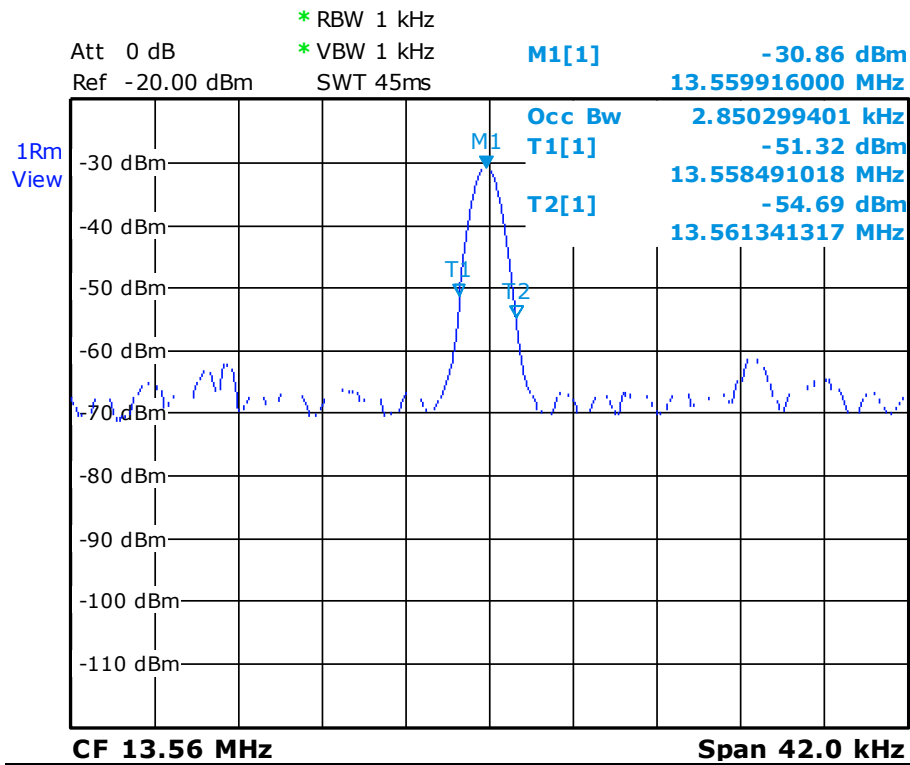
Measurement settings:

RBW = 1kHz / Video BW = 1kHz / SPAN 42kHz / PEAK

The occupied bandwidth is measured with 99% OBW function of spectrum analyzer.



TR-SA:



Measured occupied bandwidth is **2.85 kHz**

Measurement settings:

RBW = 1kHz / Video BW = 1kHz / SPAN 42kHz / PEAK

The occupied bandwidth is measured with 99% OBW function of spectrum analyzer.

**6. BAND-EDGE COMPLIANCE §15.209****6.1. TEST CONDITIONS**

Date of test : July 15th, 2013
Test performed by : A.MERLIN
Atmospheric pressure : 994hPa
Relative humidity : 33%
Ambient temperature : 25°C

6.2. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE
Antenna Loop	ELECTRO-METRICS	EM-6879	C2040052
Antenna Bi-Log	AH System	SAS-521-7	C2040180
Cable	-	-	A5329183
Cable	-	-	A5329590
Semi-Anechoic chamber #1	SIEPEL	-	D3044016
Spectrum Analyzer 9kHz - 6GHz	ROHDE & SCHWARZ	FSL6	A2642020
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011
Thermo-hygrometer (C1)	OREGON	WMR 80	B4206013
Turntable chamber (Cage#1)	MATURO Gmbh	TT 2.0 SI	F2000406
Antenna mast (Cage#1)	MATURO Gmbh	AM 4.0	F2000407
Turntable controller (Cage#1)	MATURO Gmbh	Control Unit	F2000408

6.3. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

7. CONDUCTED EMISSION DATA

7.1. TEST CONDITIONS

Date of test	: July 15 th , 2013	July 3 rd , 2013
Test performed by	: A.MERLIN	J.PAUC
Atmospheric pressure	: 994hPa	995hPa
Relative humidity	: 33%	35%
Ambient temperature	: 25°C	26°C

7.2. SETUP FOR CONDUCTED EMISSIONS MEASUREMENT

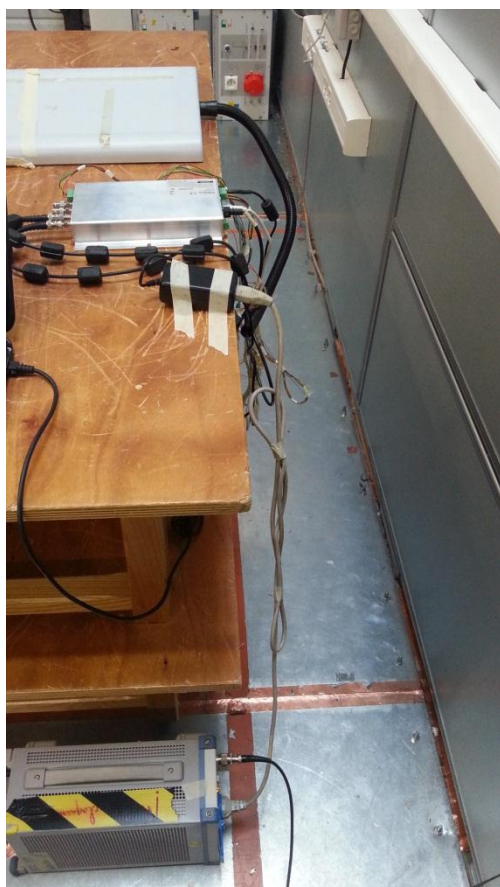
The product has been tested according to ANSI C63.4-(2003) and FCC Part 15 subpart B and C. The product has been tested with 120V/60Hz power line voltage and compared to the FCC Part 15 subpart B §15.107 and C §15.207 limits. Measurement bandwidth was 9kHz from 150 kHz to 30 MHz. Measurement is made 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.

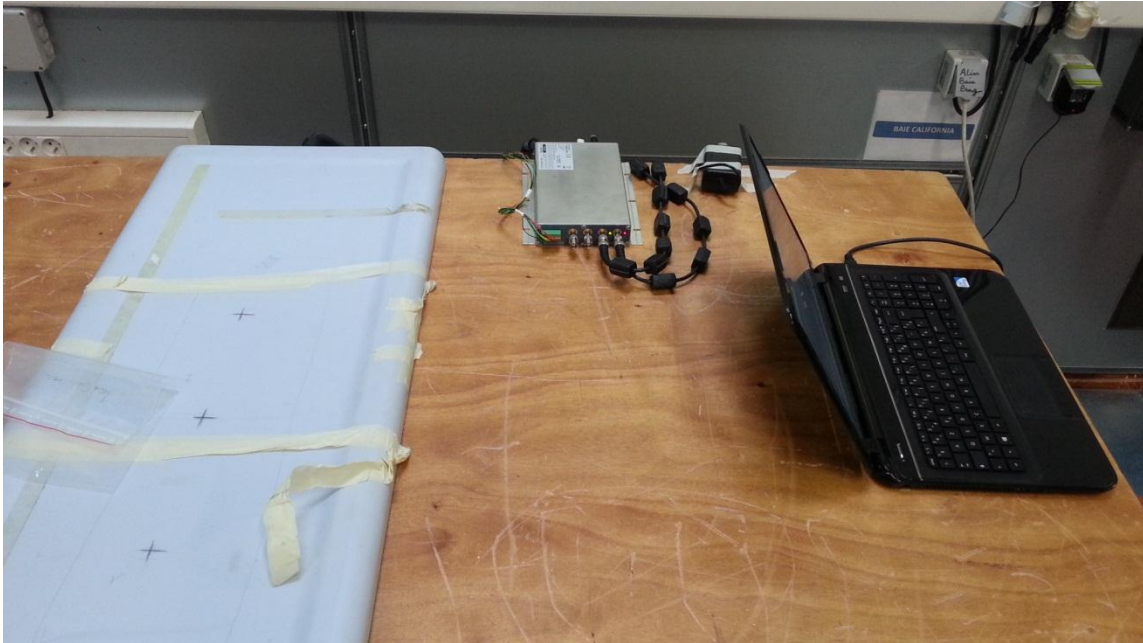
The EUT is placed on the ground reference plane, at 80cm from the LISN. The distance between the EUT and the vertical ground plane is 40cm. Auxiliaries are powered by another LISN. The cable has been shorted to 1meter length. The EUT is powered trough the LISN (measure).



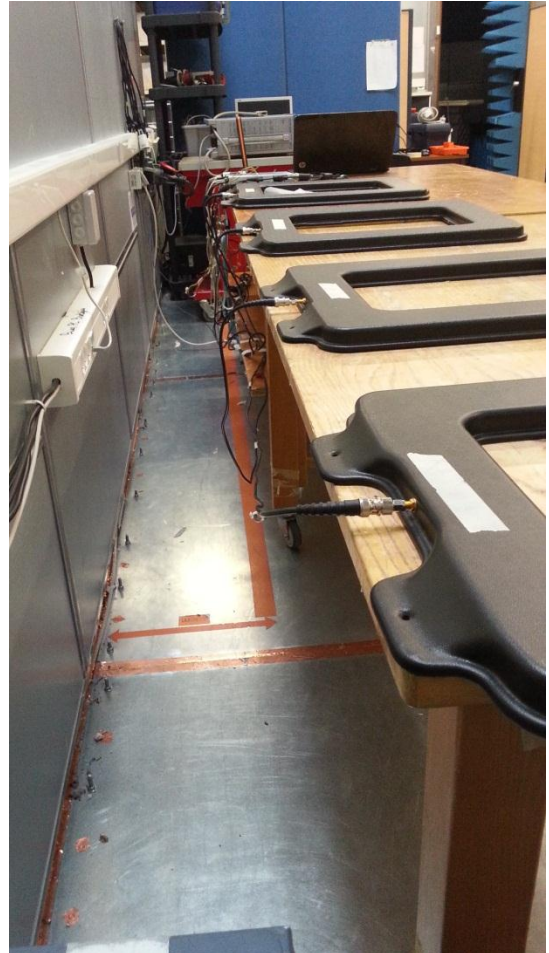


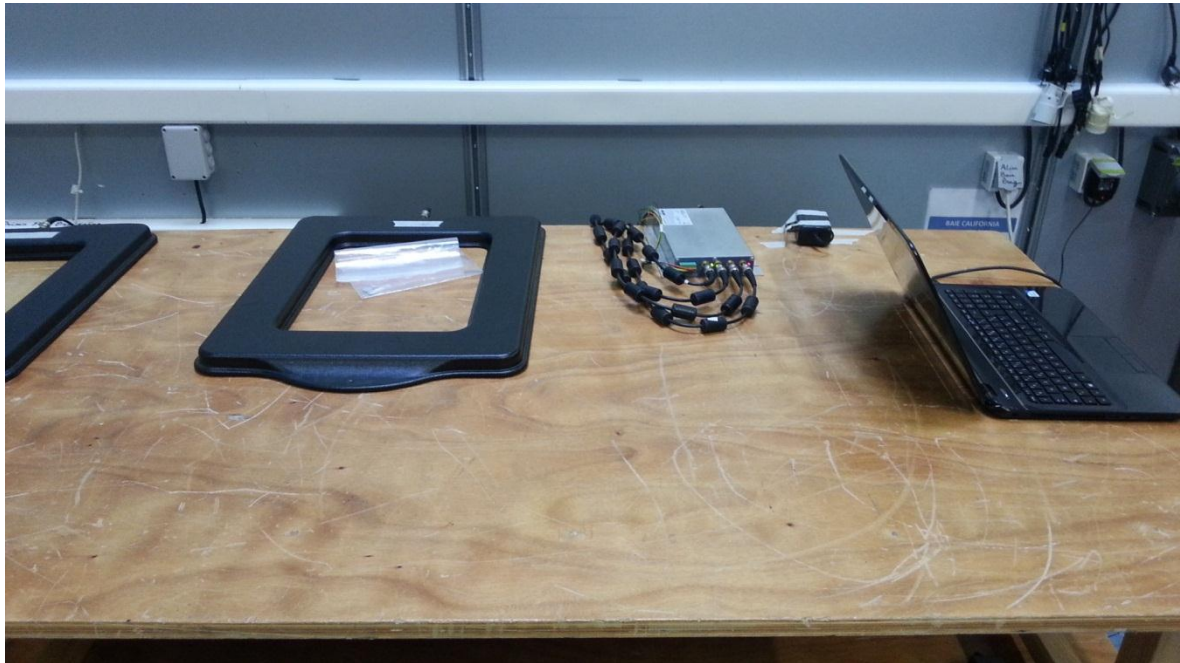
TR-SA Configuration



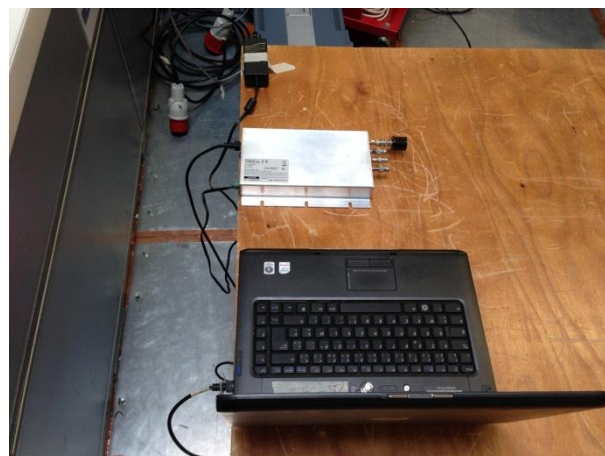
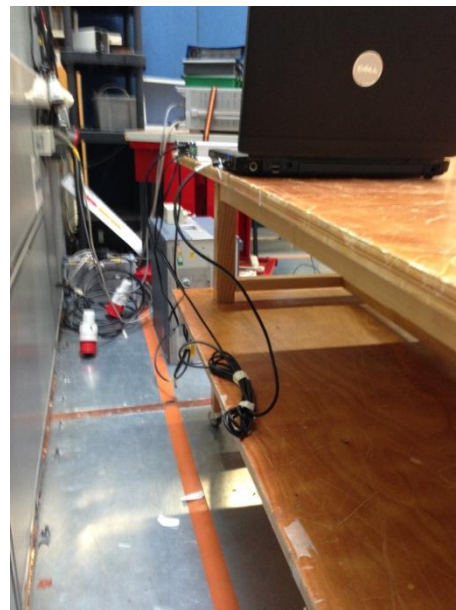


TR-CAu configuration

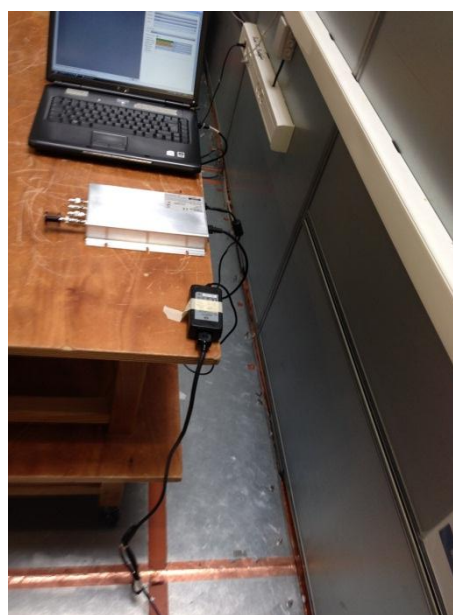




AERO LC configuration



VPE Power supply Setup (Dummy Load)



XP Power supply Setup (Dummy Load)

7.3. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE
Cable	-	-	A5329585
Conducted emission comb generator	BARDET	-	A3169049
LISN tri-phase ESH2-Z5	RHODE & SCHWARZ	33852.19.53	C2320062
Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	A2642019
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011
Transient limiter	RHODE & SCHWARZ	ESH3-Z2	A7122204

7.4. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

**7.5. 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.

Measure on L1:	graph Emc#1	AERO LC + VP ELECTRONIQUE	(see annex 1)
Measure on N:	graph Emc#2	AERO LC + VP ELECTRONIQUE	(see annex 1)
Measure on L1:	graph Emc#3	AERO LC + XP POWER	(see annex 1)
Measure on N:	graph Emc#4	AERO LC + XP POWER	(see annex 1)
Measure on L1:	graph Emc#5	TR-CAu + VP ELECTRONIQUE	(see annex 1)
Measure on N:	graph Emc#6	TR-CAu + VP ELECTRONIQUE	(see annex 1)
Measure on L1:	graph Emc#7	TR-CAu + XP POWER	(see annex 1)
Measure on N:	graph Emc#8	TR-CAu + XP POWER	(see annex 1)
Measure on L1:	graph Emc#9	TR-SA + VP ELECTRONIQUE	(see annex 1)
Measure on N:	graph Emc#10	TR-SA + VP ELECTRONIQUE	(see annex 1)
Measure on L1:	graph Emc#11	TR-SA + XP POWER	(see annex 1)
Measure on N:	graph Emc#12	TR-SA + XP POWER	(see annex 1)
Measure on L1:	graph Emc#13	With Dummy Load + VP ELECTRONIQUE	(see annex 1)
Measure on N:	graph Emc#14	With Dummy Load + VP ELECTRONIQUE	(see annex 1)
Measure on L1:	graph Emc#15	With Dummy Load + XP POWER	(see annex 1)
Measure on N:	graph Emc#16	With Dummy Load + XP POWER	(see annex 1)

RESULT: PASS



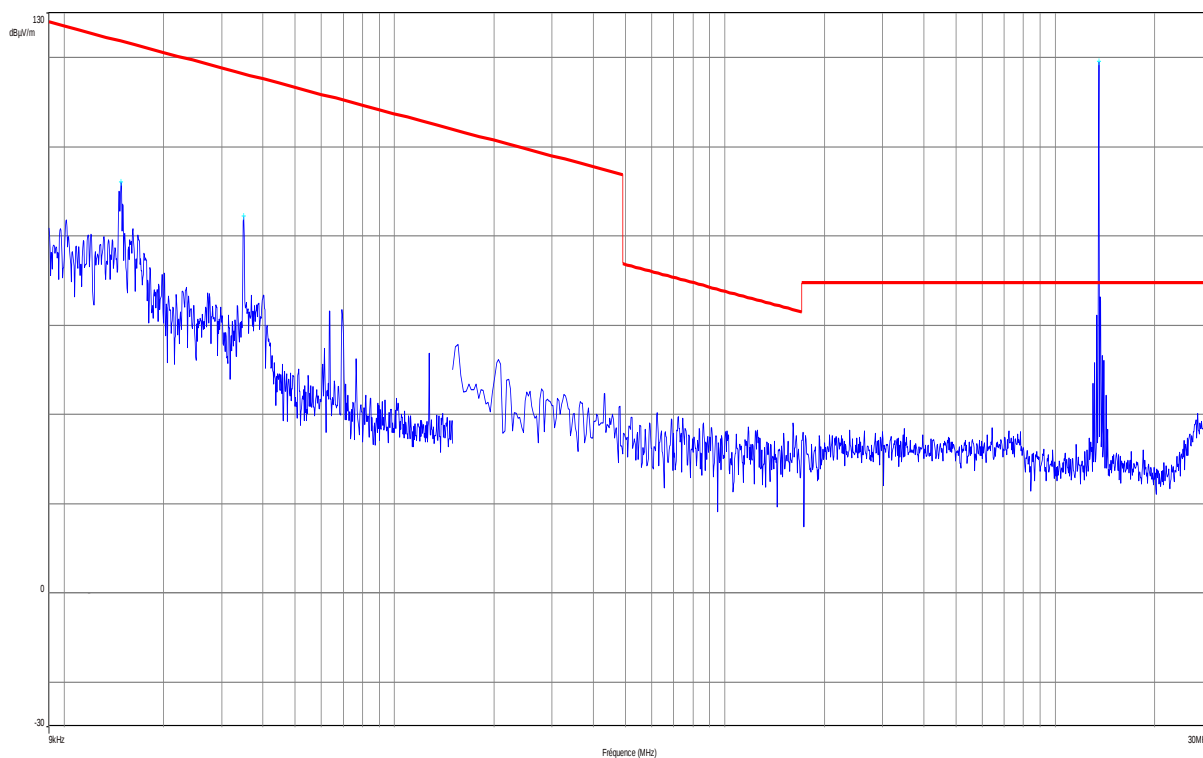
8. ANNEX 1 (GRAPHS)

RADIATED EMISSIONS

Graph name :	Emr#1	Test configuration:
Limit :	FCC Part15C	EMR1 - 150kHz-30MHz (AERO LC) + Alim XP power supply
Class :	B	

PARAMETERS

Antenna polarization:	Vertical	Legend:
Azimuth :	0° - 360°	Peak Measure
RBW :	100kHz	
VBW :	300kHz	QPeak Limit@3m
Frequency :	9kHz - 30MHz	

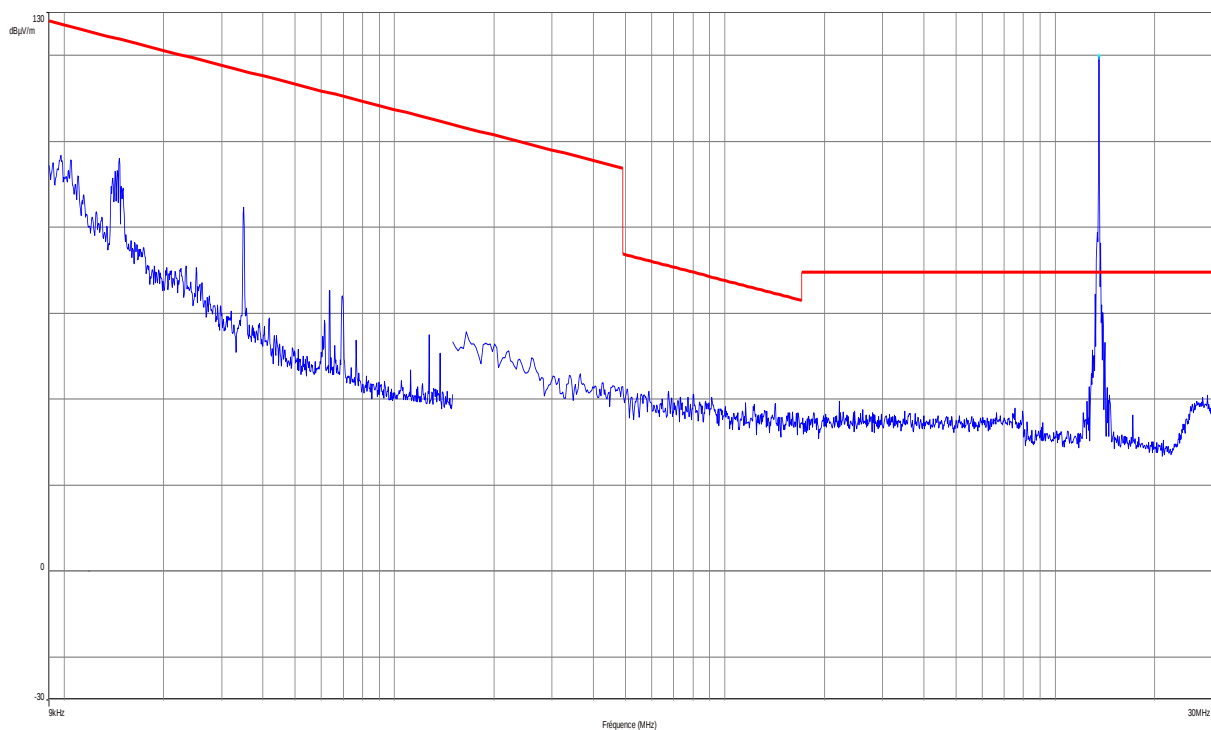


Frequency (MHz)	Peak Level (dBμV/m)
0.0148656	92.22
0.0349581	84.47
13.561605*	119.1

*Carrier Frequency



RADIATED EMISSIONS			
Graph name :	Emr#2	Test configuration:	
Limit :	FCC Part15C	EMR2 - 150kHz-30MHz (AERO LC) + VP ELECTRONIQUE	
Class :	B		
PARAMETERS			
Antenna polarization:	Vertical	Legend:	
Azimuth :	0° - 360°		Peak Measure
RBW :	100kHz		
VBW :	300kHz		QPeak Limit@3m
Frequency :	9kHz - 30MHz		

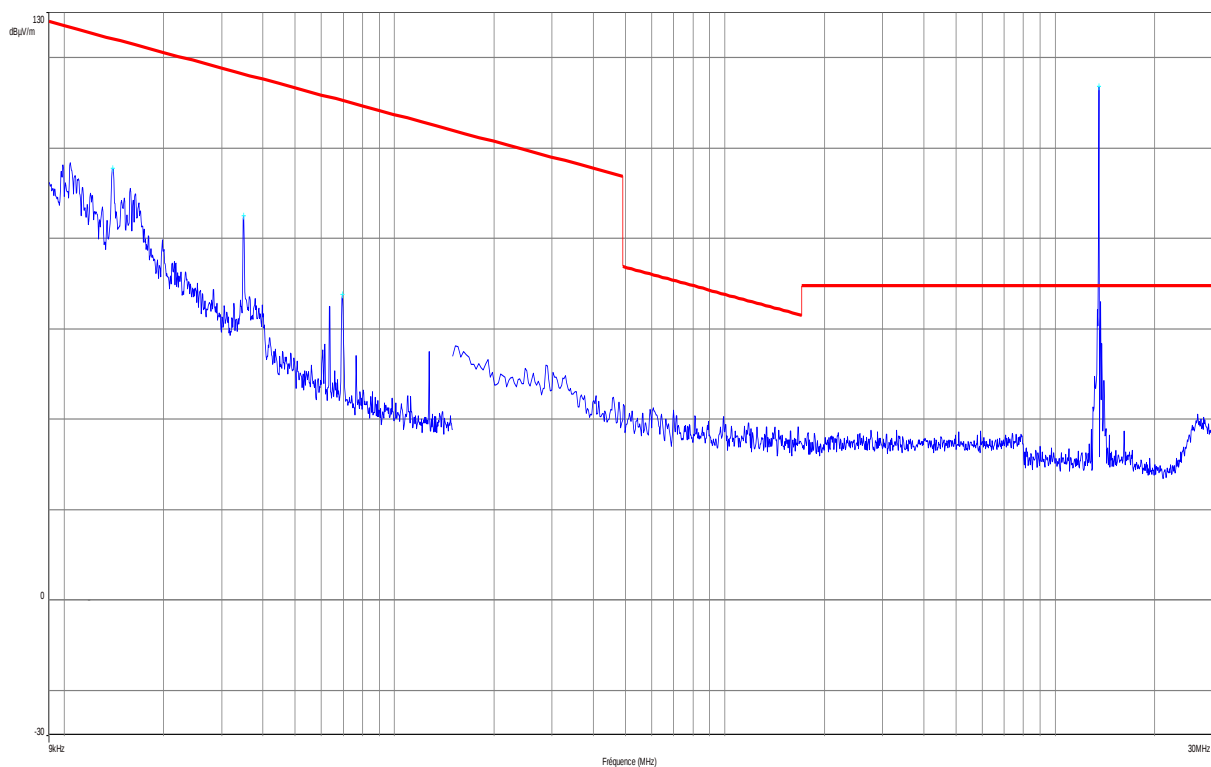


Frequency (MHz)	Peak Level (dBμV/m)
13.561605*	119.9

*Carrier Frequency



RADIATED EMISSIONS			
Graph name :	Emr#3	Test configuration:	
Limit :	FCC Part15C	EMR3 - 150kHz-30MHz (TR_CAU) + XP power	
Class :	B		
PARAMETERS			
Antenna polarization:	Vertical	Legend:	
Azimuth :	0° - 360°		Peak Measure
RBW :	100kHz		
VBW :	300kHz		
Frequency :	9kHz - 30MHz		



Frequency (MHz)	Peak Level (dBμV/m)
0.0140619	95.5
0.0349158	85.09
0.0694608	67.6
13.561605*	113.7

*Carrier Frequency

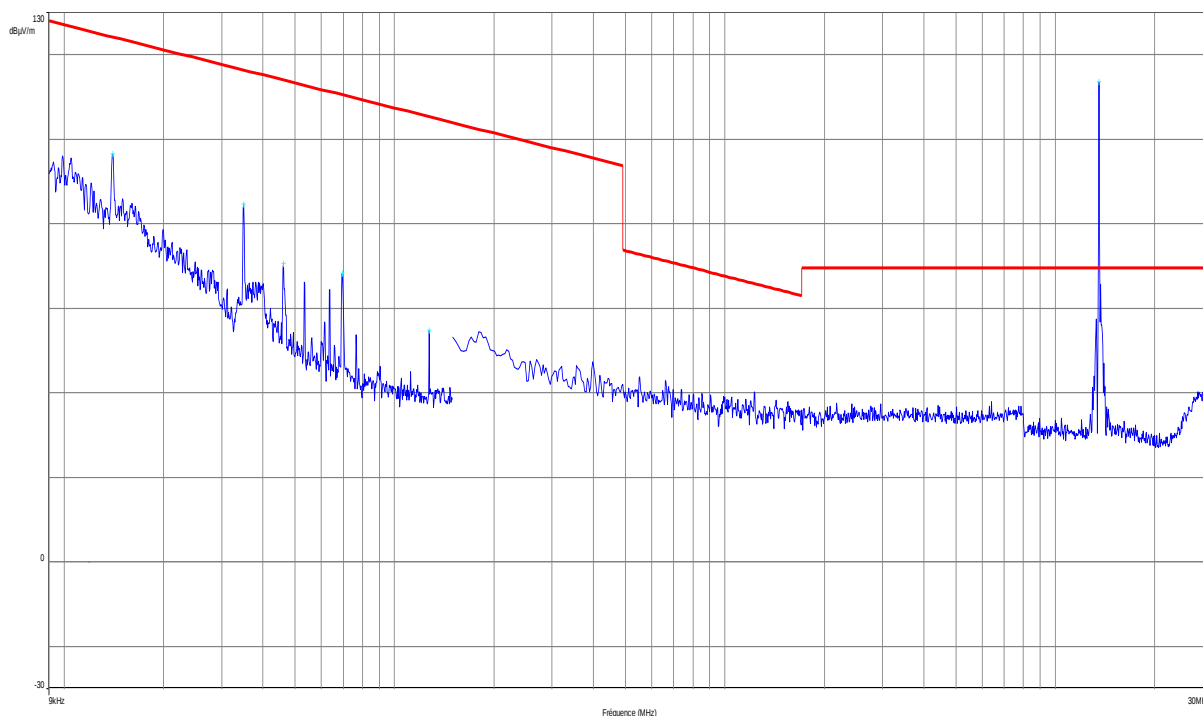


RADIATED EMISSIONS

Graph name :	Emr#4	Test configuration:
Limit :	FCC Part15C	EMR4 - 150kHz-30MHz (TR_CAU) + VP
Class :	B	ELECTRONIQUE

PARAMETERS

Antenna polarization:	Vertical	Legend:
Azimuth :	0° - 360°	Peak Measure
RBW :	100kHz	QPeak Limit@3m
VBW :	300kHz	
Frequency :	9kHz - 30MHz	



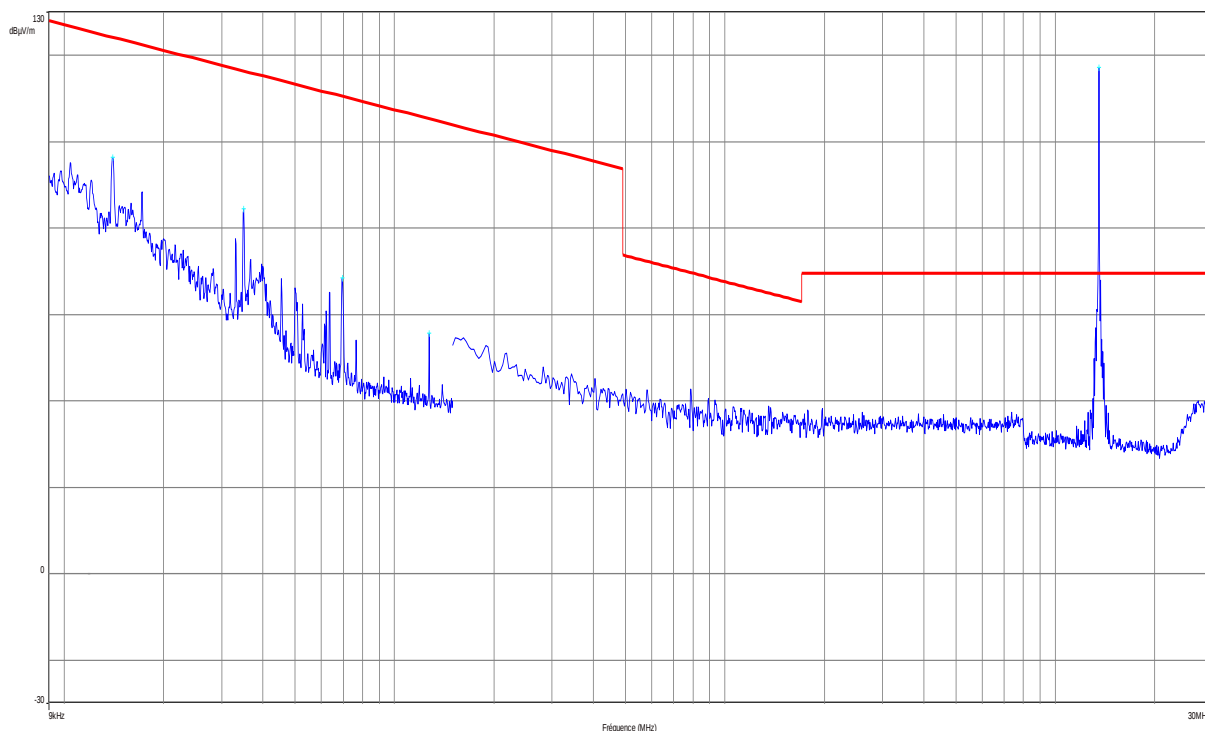
Frequency (MHz)	Peak Level (dBμV/m)
0.0140337	96.56
0.034944	84.67
0.046083	70.69
0.0694467	68.37
0.1272708	54.76
13.561605*	113.6

*Carrier Frequency



RADIATED EMISSIONS

Graph name :	Emr#5	Test configuration:	
Limit :	FCC Part15C	EMR5 - 150kHz-30MHz (TR_SA) + Alim XP power	
Class :	B		
PARAMETERS			
Antenna polarization:	Vertical	Legend:	
Azimuth :	0° - 360°		Peak Measure
RBW :	100kHz		
VBW :	300kHz		QPeak Limit@3m
Frequency :	9kHz - 30MHz		



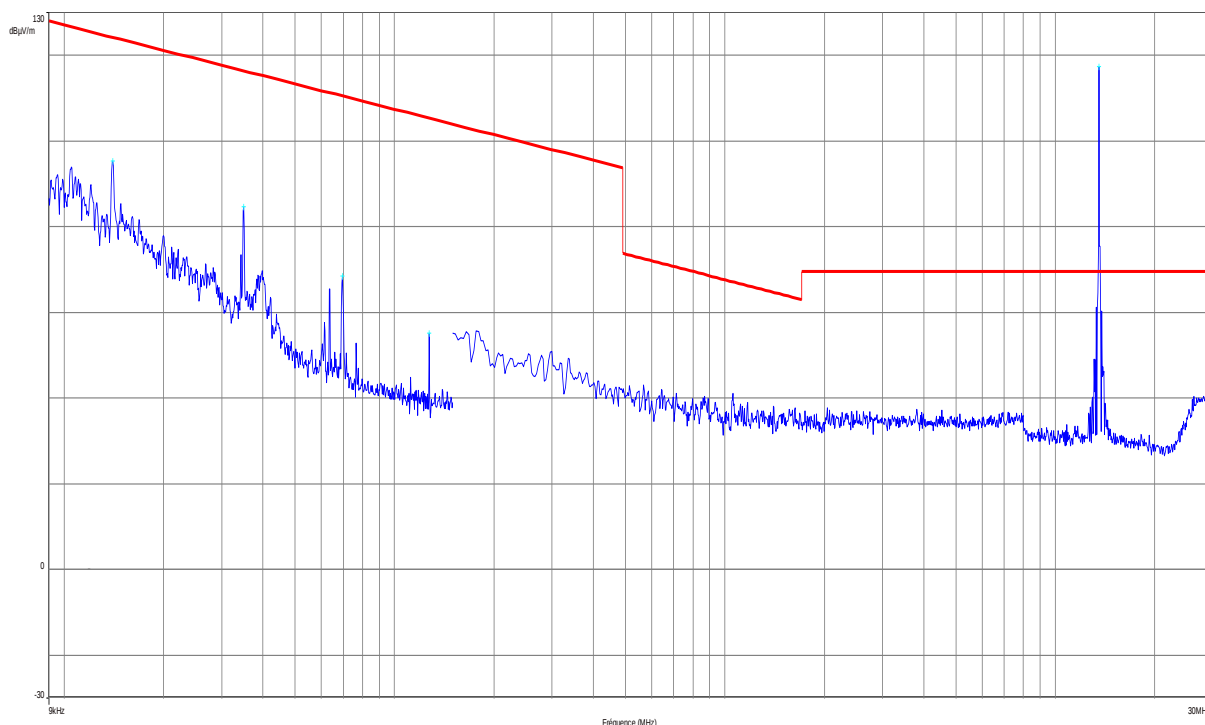
Frequency (MHz)	Peak Level (dBμV/m)
0.0140337	96.36
0.0349299	84.56
0.0695031	68.5
0.1272708	55.62
13.561605*	117.2

*Carrier Frequency



RADIATED EMISSIONS

Graph name :	Emr#6	Test configuration:	
Limit :	FCC Part15C	EMR6 - 150kHz-30MHz (TR_SA) + VP ELECTRONIQUE	
Class :	B		
PARAMETERS			
Antenna polarization:	Vertical	Legend:	
Azimuth :	0° - 360°		Peak Measure
RBW :	100kHz		
VBW :	300kHz	QPeak Limit@3m	
Frequency :	9kHz - 30MHz		



Frequency (MHz)	Peak Level (dBμV/m)
0.0140337	95.25
0.0349299	84.69
0.0694749	68.55
0.1272708	55.07
13.561605*	117.3

*Carrier Frequency

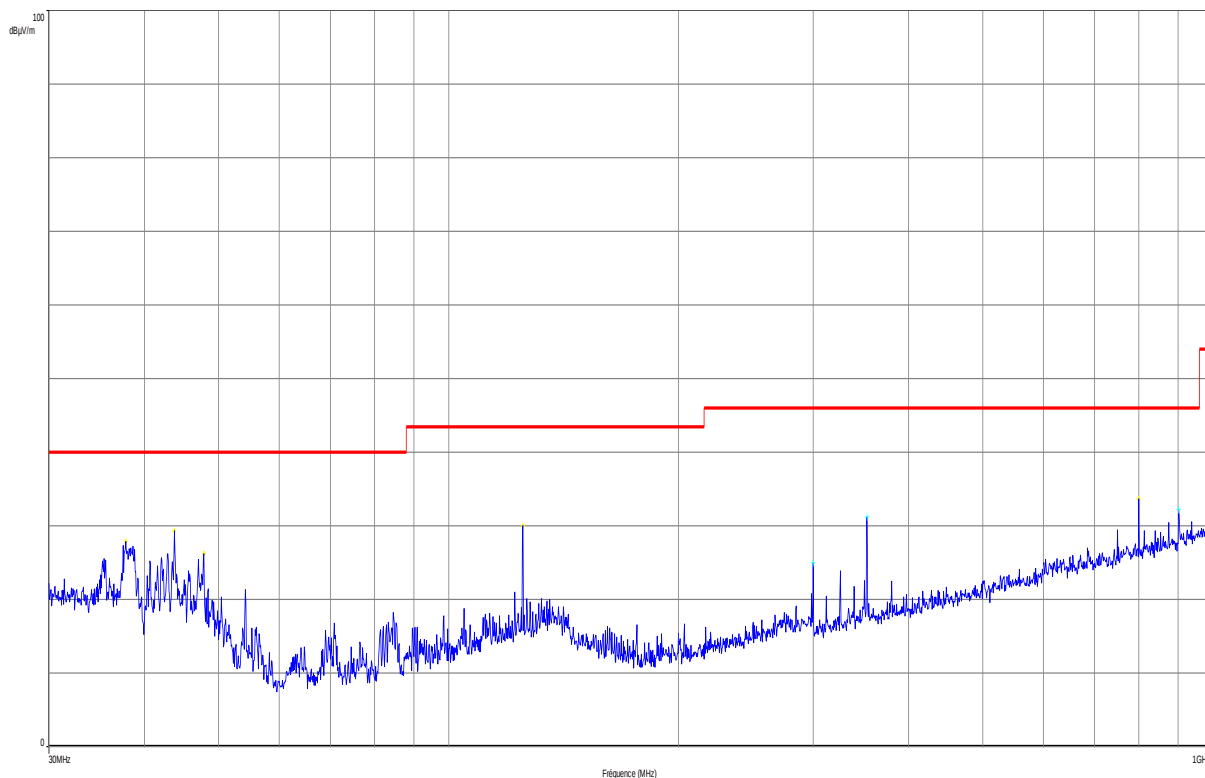


RADIATED EMISSIONS

Graph name :	Emr#7	Test configuration:
Limit :	FCC Part15C	EMR7 - Pol H 30MHz - 1GHz (AERO LC) + XP power
Class :	B	

PARAMETERS

Antenna polarization:	Horizontal	Legend:
Azimuth :	0° - 360°	Peak Measure
RBW :	100kHz	
VBW :	300kHz	QPeak Limit@3m
Frequency :	30MHz - 1GHz	



Frequency (MHz)	Peak (dBµV/m)
37.82	27.89
43.804	29.37
47.85	26.23
125.013	29.96
299.96	25.01
352.56	31.18
800	33.68
902.4	32.23

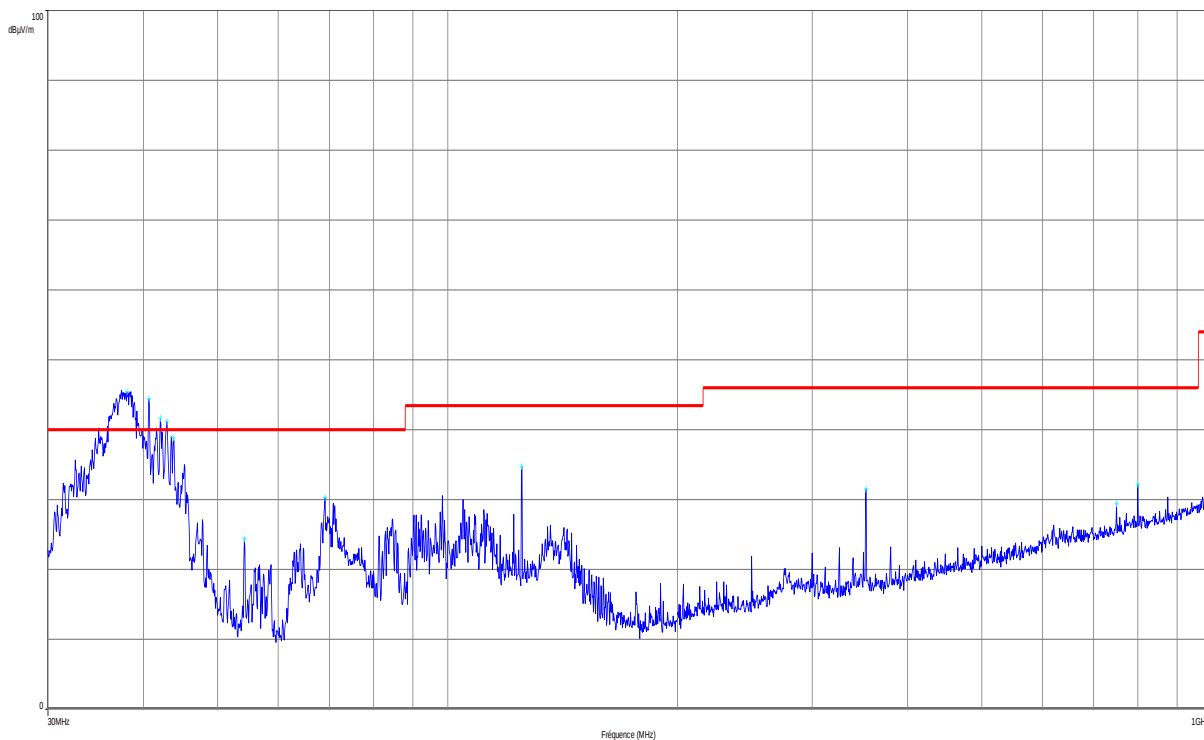


RADIATED EMISSIONS

Graph name :	Emr#8	Test configuration:
Limit :	FCC Part15C	EMR8 - Pol V 30MHz - 1GHz (AERO LC) + XP power
Class :	B	

PARAMETERS

Antenna polarization:	Vertical	Legend:
Azimuth :	0° - 360°	Peak Measure
RBW :	100kHz	
VBW :	300kHz	QPeak Limit@3m
Frequency :	30MHz - 1GHz	

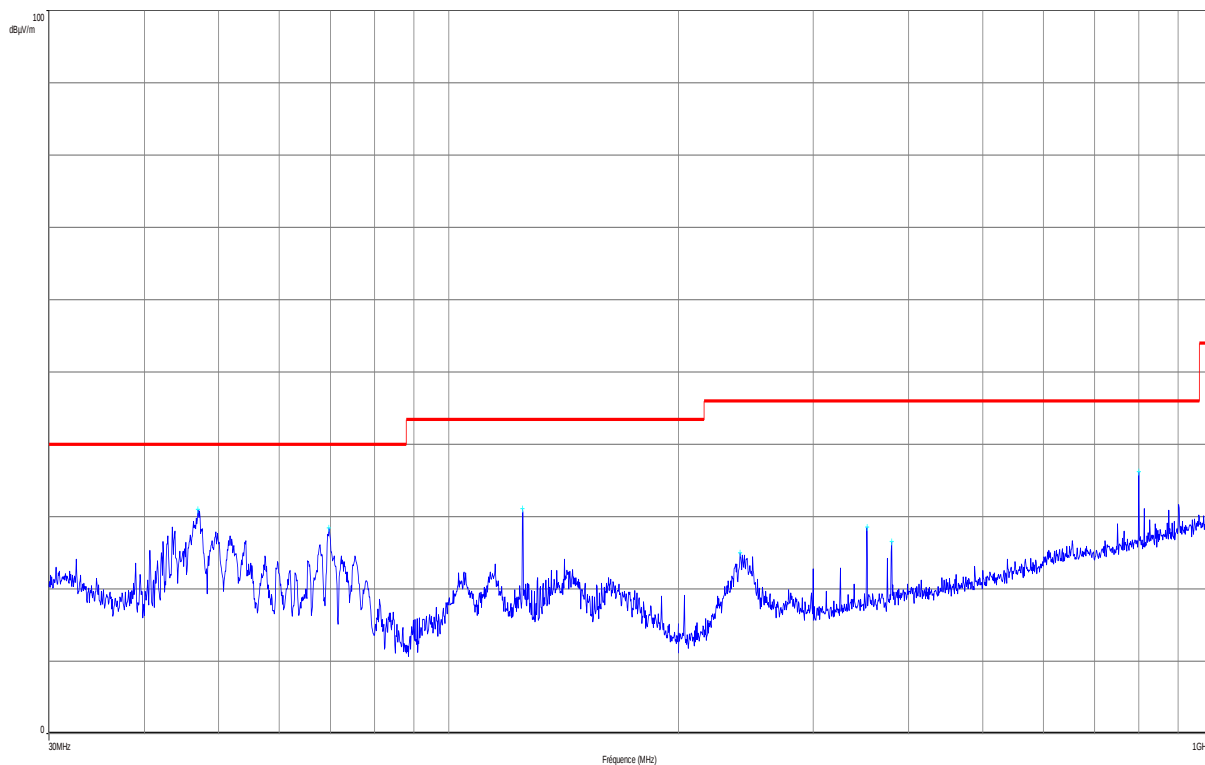


Frequency (MHz)	Peak Level (dBμV/m)
38.092	45.5
40.676	44.41
42.087	41.67
42.937	41.24
43.804	38.85
54.208	24.49
69.1	30.28
124.996	34.81
352.56	31.54
749.96	29.5
800.04	32.24



RADIATED EMISSIONS

Graph name :	Emr#9	Test configuration:
Limit :	FCC Part15C	EMR9 - Pol H 30MHz - 1GHz (AERO LC) + VP
Class :	B	ELECTRONIQUE
PARAMETERS		
Antenna polarization:	Horizontal	Legend:
Azimuth :	0° - 360°	Peak Measure
RBW :	100kHz	QPeak Limit@3m
VBW :	300kHz	
Frequency :	30MHz - 1GHz	



Frequency (MHz)	Peak Level (dBµV/m)
47	31.05
69.695	28.41
124.996	31.14
240.68	24.95
352.56	28.6
379.64	26.59
800.04	36.28

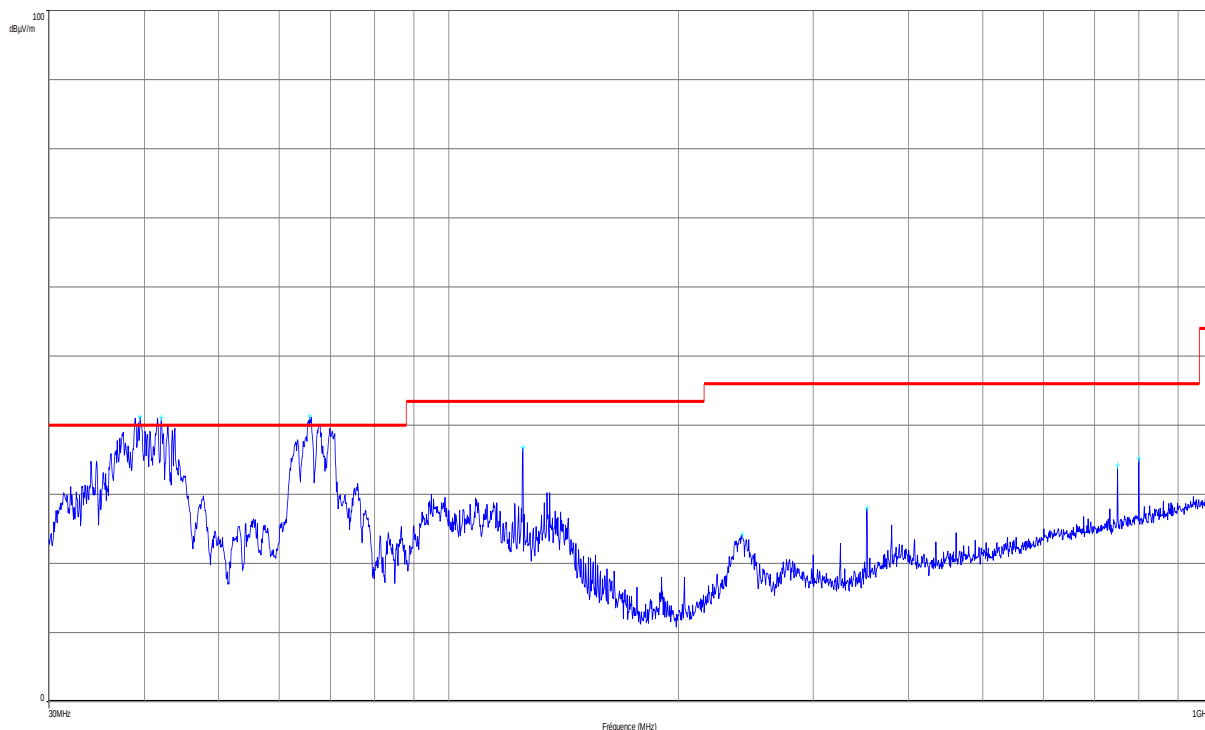


RADIATED EMISSIONS

Graph name :	Emr#10	Test configuration:
Limit :	FCC Part15C	EMR10 - Pol V 30MHz - 1GHz (AERO LC) + VP
Class :	B	ELECTRONIQUE

PARAMETERS

Antenna polarization:	Vertical	Legend:
Azimuth :	0° - 360°	Peak Measure
RBW :	100kHz	QPeak Limit@3m
VBW :	300kHz	
Frequency :	30MHz - 1GHz	



Frequency (MHz)	Peak Level (dBµV/m)
39.469	41.19
42.07	41.13
65.836	41.32
125.013	36.74
242.32	24.26
352.56	27.95
750	34.27
800.04	35.2

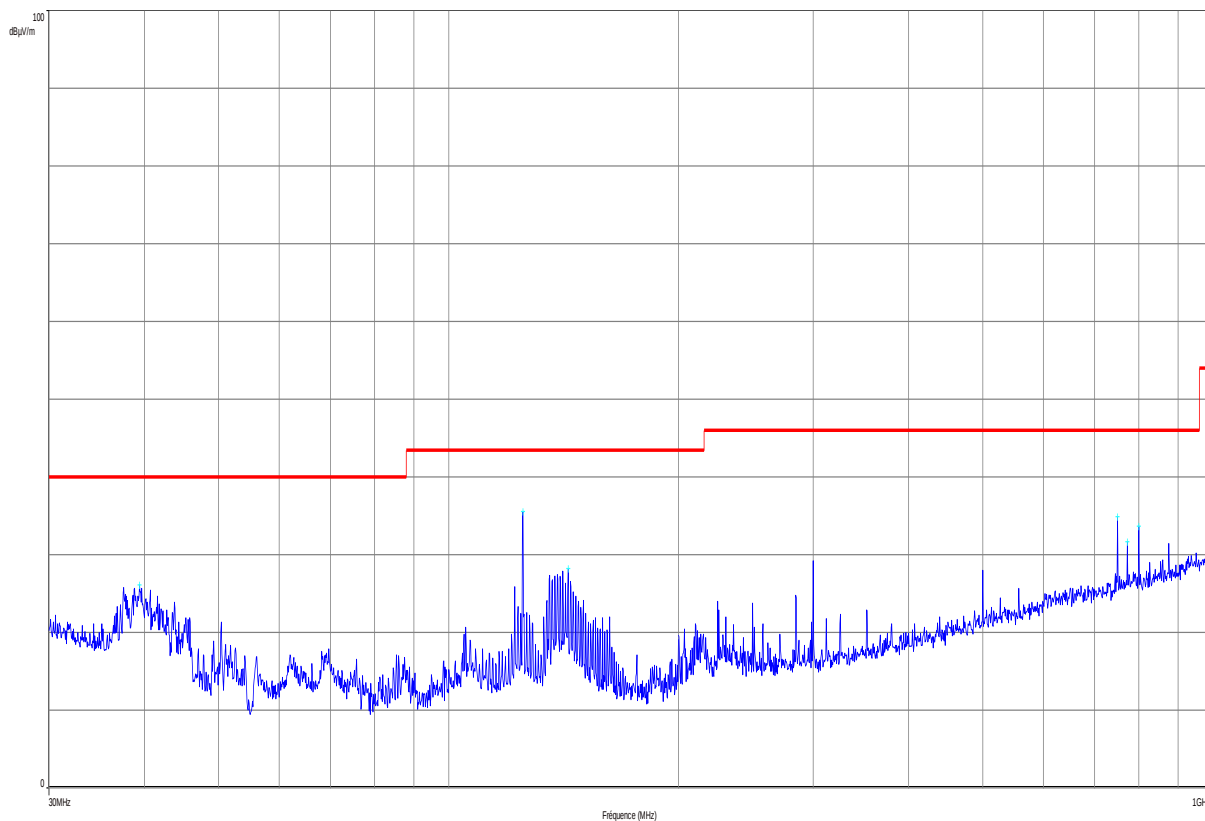


RADIATED EMISSIONS

Graph name :	Emr#11	Test configuration:
Limit :	FCC Part15C	EMR11 - Pol H 30MHz - 1GHz (TR_CAu) + XP Power
Class :	B	

PARAMETERS

Antenna polarization:	Horizontal	Legend:
Azimuth :	0° - 360°	Peak Measure
RBW :	100kHz	
VBW :	300kHz	QPeak Limit@3m
Frequency :	30MHz - 1GHz	



Frequency (MHz)	Peak Level (dBµV/m)
39.435	26.09
125.013	35.56
143.305	28.21
749.96	34.89
772.88	31.65
800	33.66

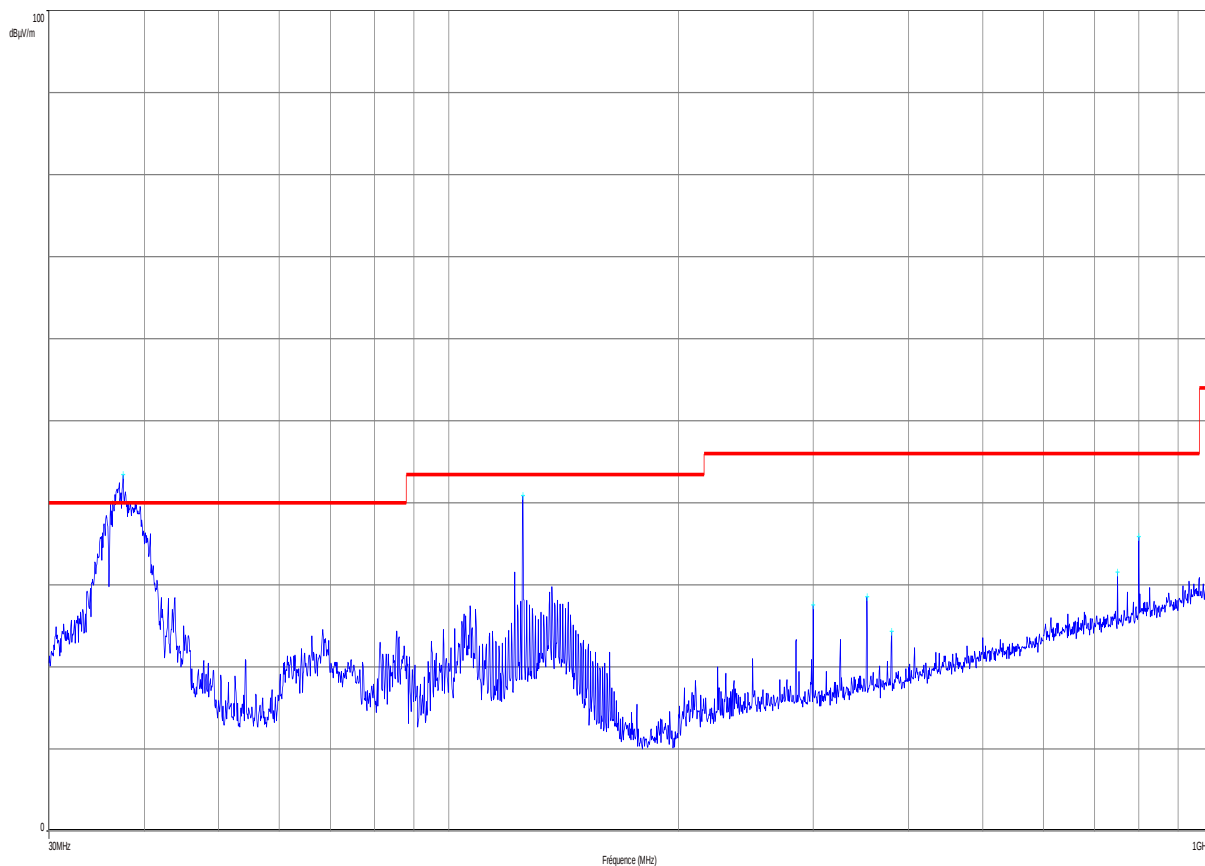


RADIATED EMISSIONS

Graph name :	Emr#12	Test configuration:
Limit :	FCC Part15C	EMR12 - Pol V 30MHz - 1GHz (TR_CAu) + Alim XP power
Class :	B	

PARAMETERS

Antenna polarization:	Vertical	Legend:
Azimuth :	0° - 360°	Peak Measure
RBW :	100kHz	
VBW :	300kHz	QPeak Limit@3m
Frequency :	30MHz - 1GHz	



Frequency (MHz)	Peak Level (dBμV/m)
37.514	43.44
125.013	40.84
299.96	27.55
352.56	28.52
379.68	24.3
749.96	31.54
800.04	35.85

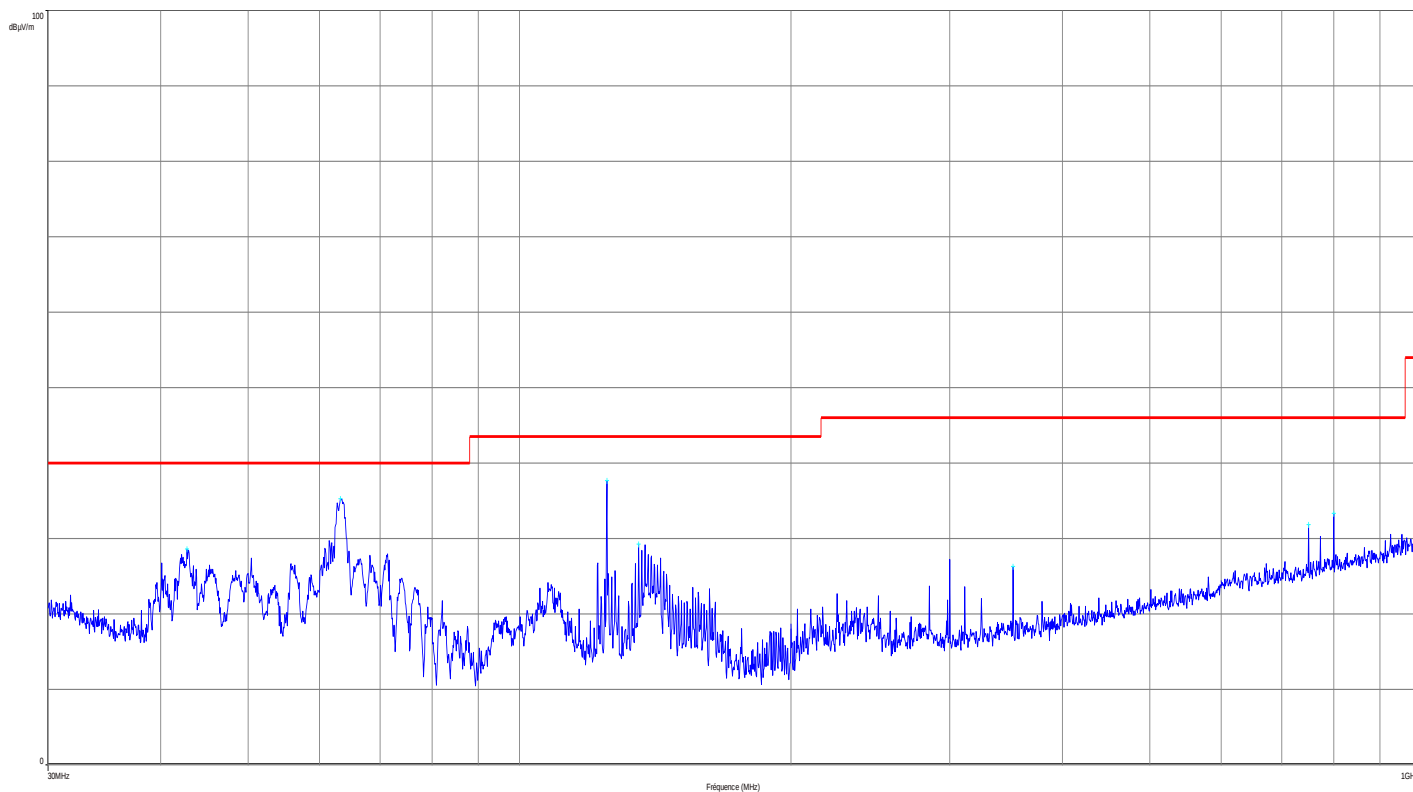


RADIATED EMISSIONS

Graph name :	Emr#13	Test configuration:
Limit :	FCC Part15C	EMR13 - Pol H 30MHz - 1GHz (TR_CAU) + VP
Class :	B	ELECTRONIQUE

PARAMETERS

Antenna polarization:	Horizontal	Legend:
Azimuth :	0° - 360°	 Peak Measure
RBW :	100kHz	 QPeak Limit@3m
VBW :	300kHz	
Frequency :	30MHz - 1GHz	



Frequency (MHz)	Peak Level (dBμV/m)
42.767	28.64
63.303	35.31
125.013	37.65
135.57	29.23
352.56	26.28
749.96	31.88
800	33.37

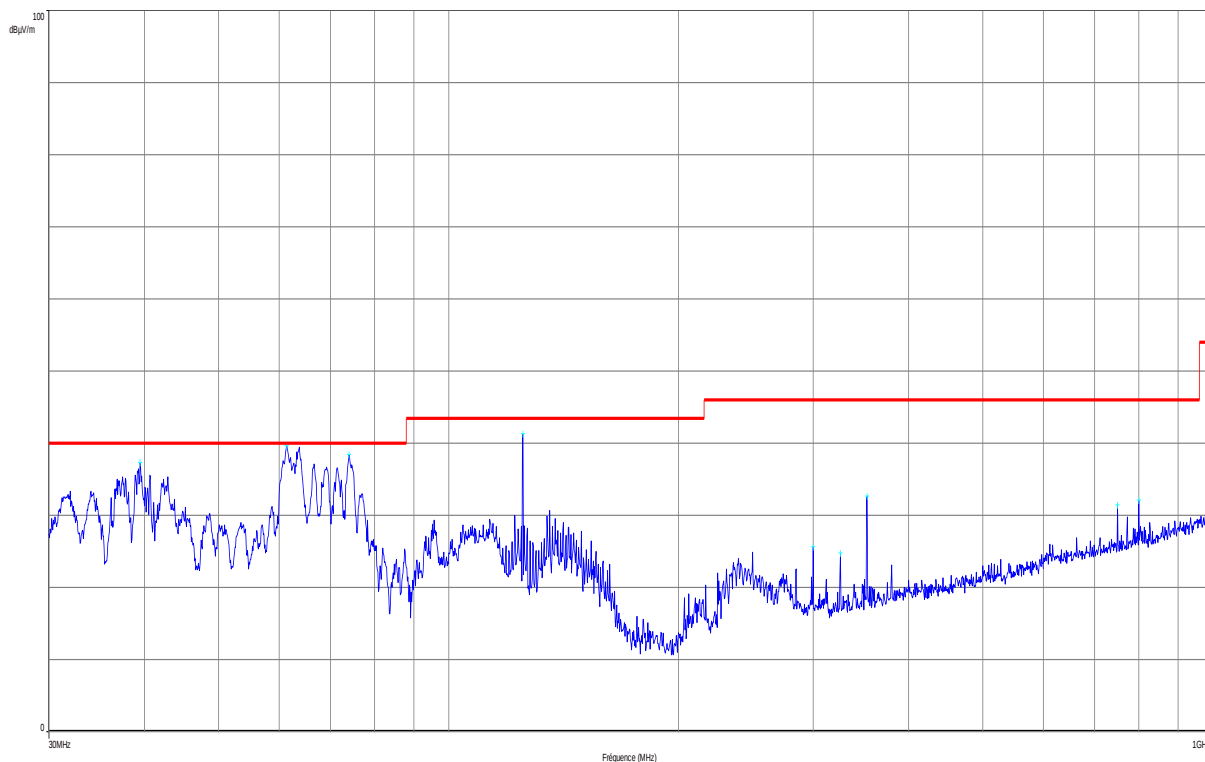


RADIATED EMISSIONS

Graph name :	Emr#14	Test configuration:
Limit :	FCC Part15C	EMR14 - Pol V 30MHz - 1GHz (TR_CAU) + VP
Class :	B	ELECTRONIQUE

PARAMETERS

Antenna polarization:	Vertical	Legend:
Azimuth :	0° - 360°	Peak Measure
RBW :	100kHz	QPeak Limit@3m
VBW :	300kHz	
Frequency :	30MHz - 1GHz	



Frequency (MHz)	Peak Level (dBµV/m)
39.486	37.35
61.382	39.72
74.115	38.47
125.013	41.33
299.96	25.69
325.4	24.73
352.56	32.68
749.96	31.41
800	32.07

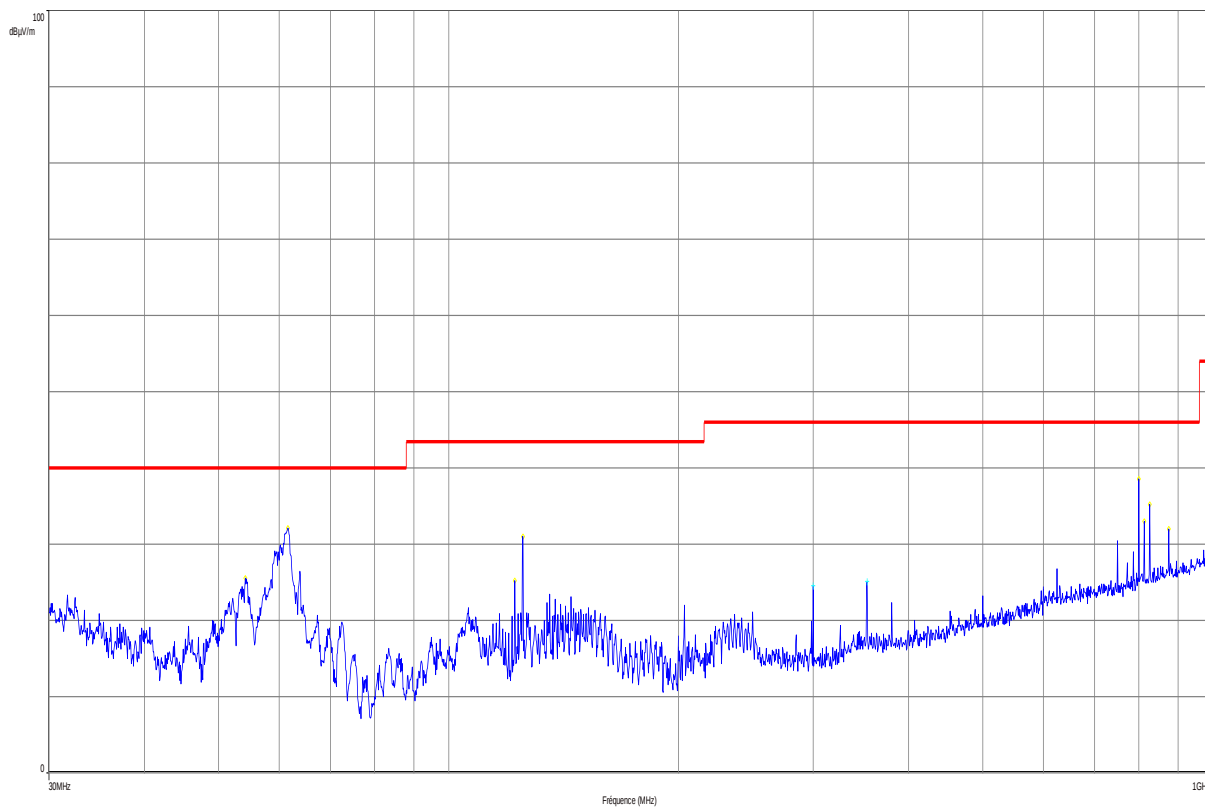


RADIATED EMISSIONS

Graph name :	Emr#15	Test configuration:
Limit :	FCC Part15C	EMR15 - Pol H 30MHz - 1GHz (TR_SA) + XP power
Class :	B	

PARAMETERS

Antenna polarization:	Horizontal	Legend:
Azimuth :	0° - 360°	Peak Measure
RBW :	100kHz	
VBW :	300kHz	QPeak Limit@3m
Frequency :	30MHz - 1GHz	

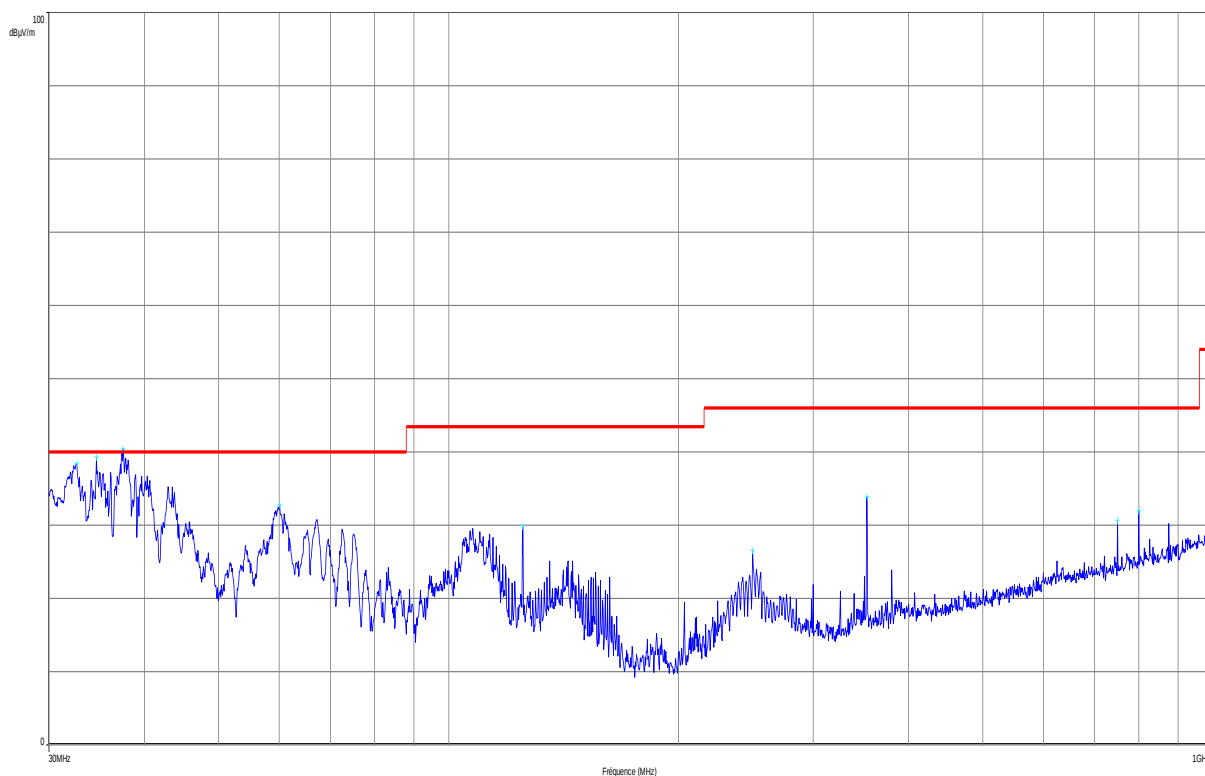


Frequency (MHz)	Peak (dBμV/m)
54.242	25.58
61.586	32.14
122.038	25.28
125.013	31.03
300	24.54
352.56	25.14
800.04	38.57
813.6	32.97
827.16	35.17
875.04	32.05



RADIATED EMISSIONS

Graph name :	Emr#16	Test configuration:	
Limit :	FCC Part15C	EMR16 - Pol V 30MHz - 1GHz (TR_SA) + Alim XP power	
Class :	B		
PARAMETERS			
Antenna polarization:	Vertical	Legend:	
Azimuth :	0° - 360°		Peak Measure
RBW :	100kHz		
VBW :	300kHz	QPeak Limit@3m	
Frequency :	30MHz - 1GHz		

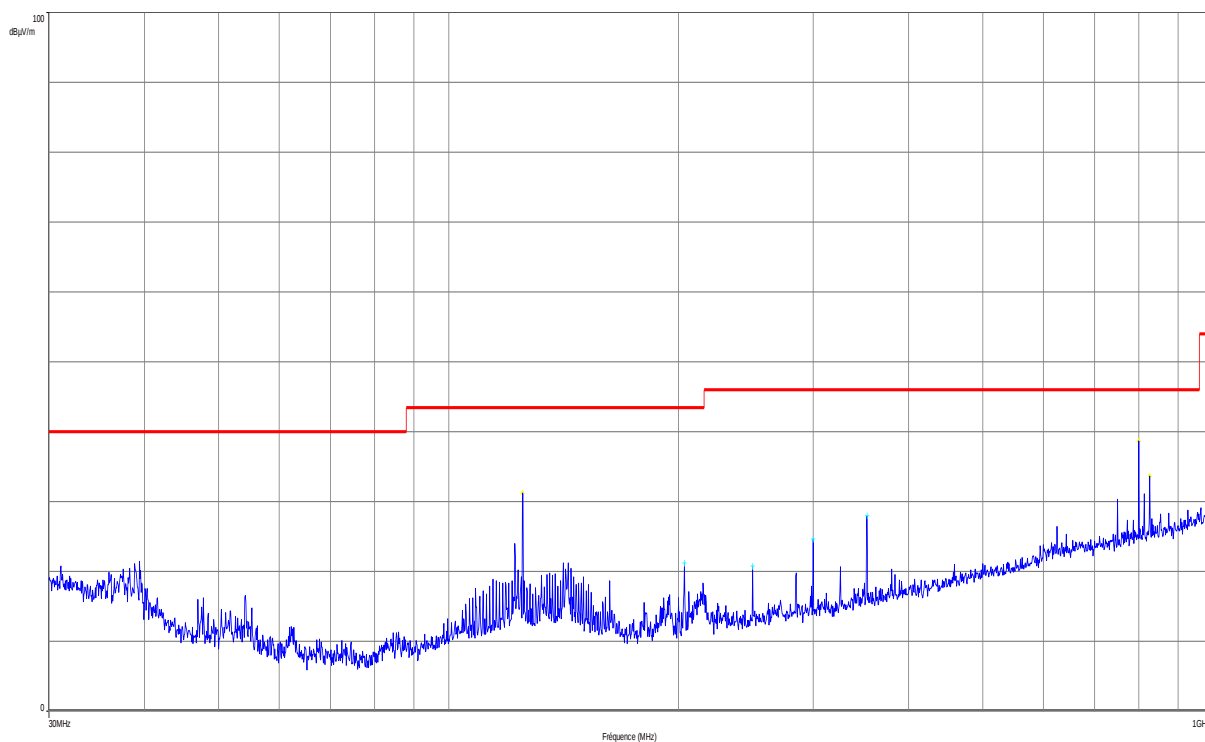


Frequency (MHz)	Peak Level (dBµV/m)
32.601	38.39
34.641	39.3
37.497	40.43
60.107	32.82
124.996	29.94
250	26.6
352.56	33.9
750	30.66
800.04	31.97



RADIATED EMISSIONS

Graph name :	Emr#17	Test configuration:
Limit :	FCC Part15C	EMR17 - Pol H 30MHz - 1GHz (TR_SA) + VP
Class :	B	ELECTRONIQUE
PARAMETERS		
Antenna polarization:	Horizontal	Legend:
Azimuth :	0° - 360°	Peak Measure
RBW :	100kHz	QPeak Limit@3m
VBW :	300kHz	
Frequency :	30MHz - 1GHz	

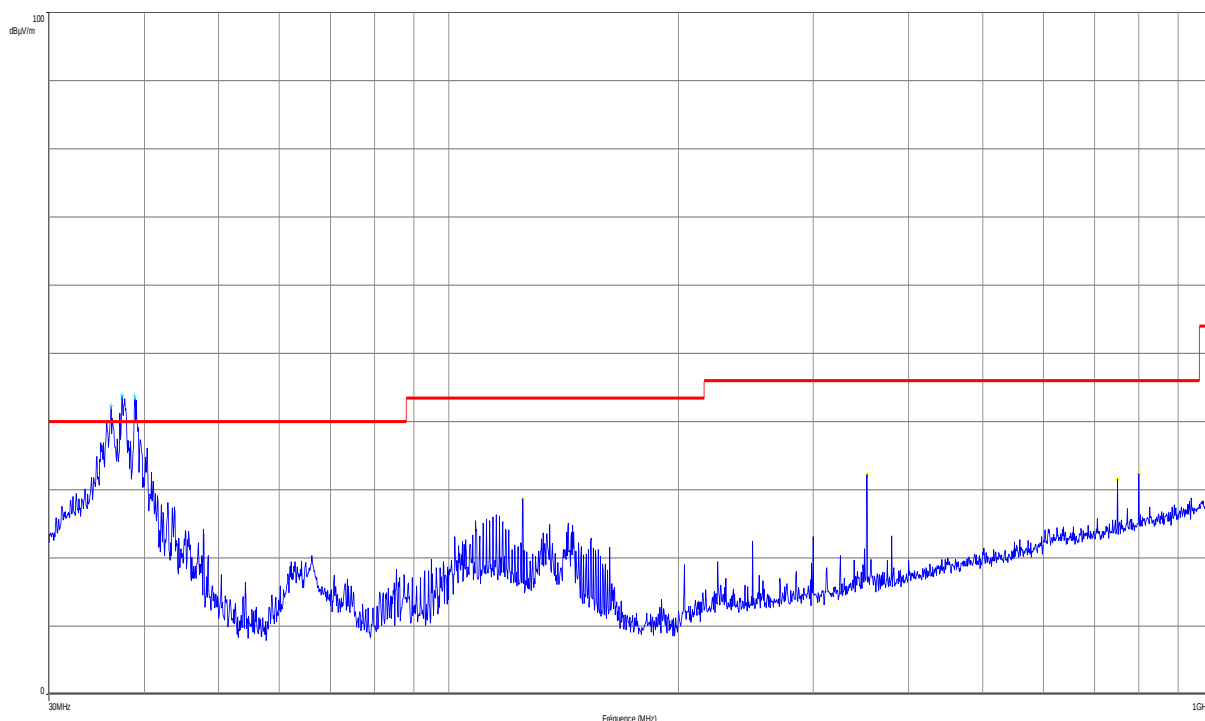


Frequency (MHz)	Peak (dBµV/m)
124.996	31.18
203.4	21.17
250	20.83
300	24.62
352.56	27.99
800.04	38.68
827.16	33.62



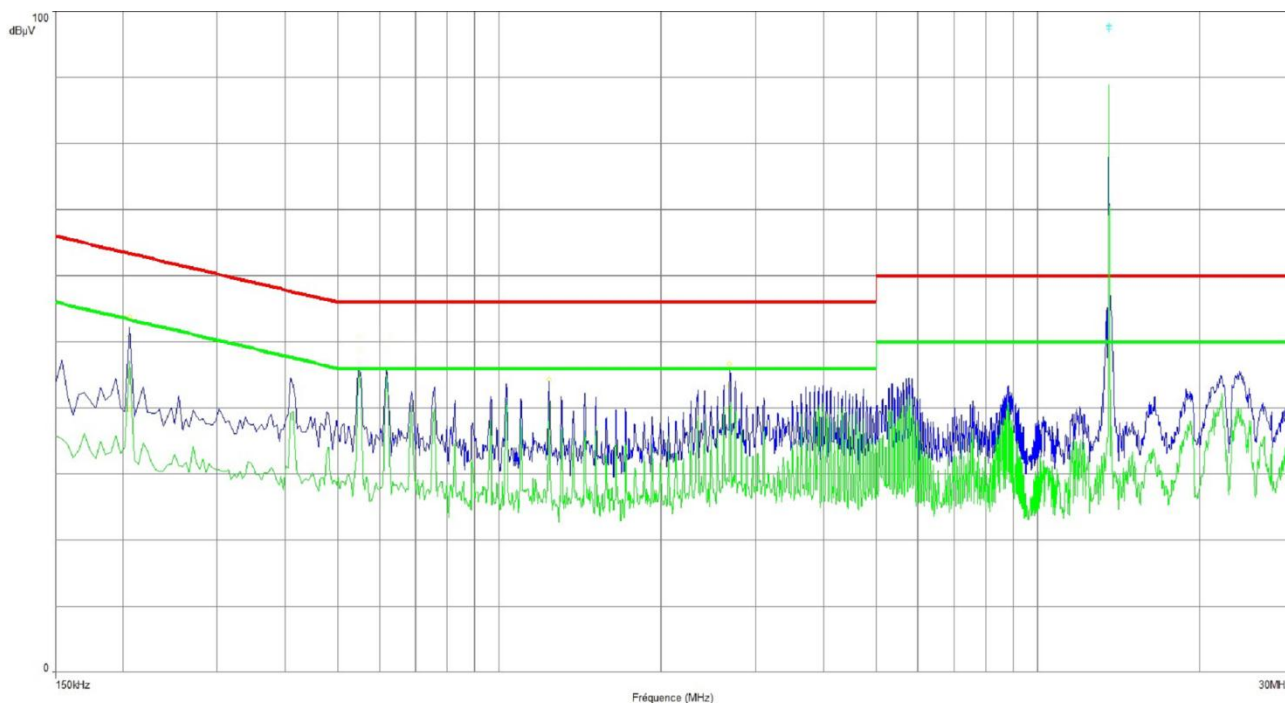
RADIATED EMISSIONS

Graph name :	Emr#18	Test configuration:
Limit :	FCC Part15C	EMR18 - Pol V 30MHz - 1GHz (TR_SA) + VP
Class :	B	ELECTRONIQUE
PARAMETERS		
Antenna polarization:	Horizontal	Legend:
Azimuth :	0° - 360°	Peak Measure
RBW :	100kHz	QPeak Limit@3m
VBW :	300kHz	
Frequency :	30MHz - 1GHz	



Frequency (MHz)	Peak (dBμV/m)
36.188	42.35
37.412	43.91
38.823	43.79
125.013	28.67
352.56	32.18
750	31.54
800.04	32.33

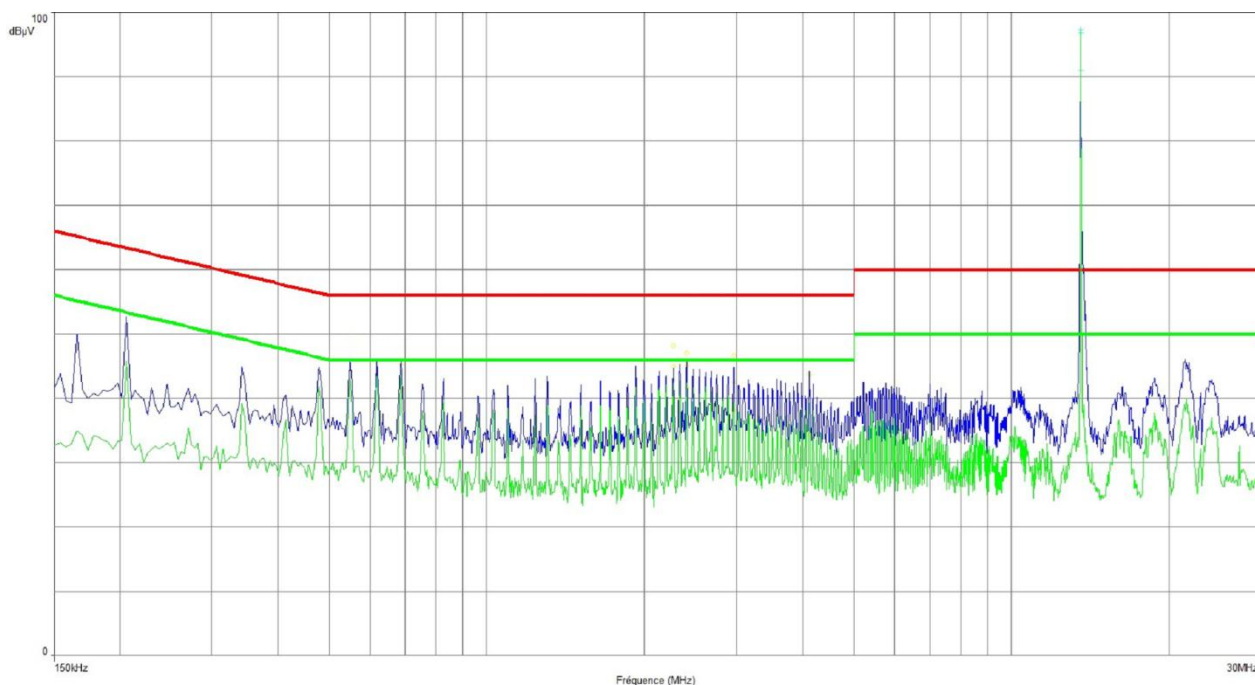
CONDUCTED EMISSIONS				
Graph name :	Emc#1	Test configuration:		
Limit :	EN 55022	AERO LC + VP ELECTRONIQUE		
Class :	B			
PARAMETERS				
Voltage / Frequency :	110VAC / 60Hz	Legend:		
Line :	Phase	Peak Measure		Average Measure
RBW :	9kHz			
VBW :	30kHz	QPeak Limit		Average Limit
Frequency :	150kHz- 30MHz			



Frequency (MHz)	Avg (dBμV)	Lim Avg (dBμV)	Avg-LimAvg (dB)	QPeak (dBμV)	LimQPeak (dBμV)	QPeak-LimQPeak (dB)
0.206	39.77	53.37	-13.6	50.86	63.37	-12.51
0.55	44.5	46	-1.50	48.71	56	-7.29
0.618	44.72	46	-1.28	48.53	56	-7.47
1.238	36.06	46	-9.94	40.29	56	-15.71
2.678	39.72	46	-6.28	43.33	56	-12.67
13.558*	97.28	50	47.28	97.63	60	37.63

*Carrier Frequency, See graphs with Dummy load

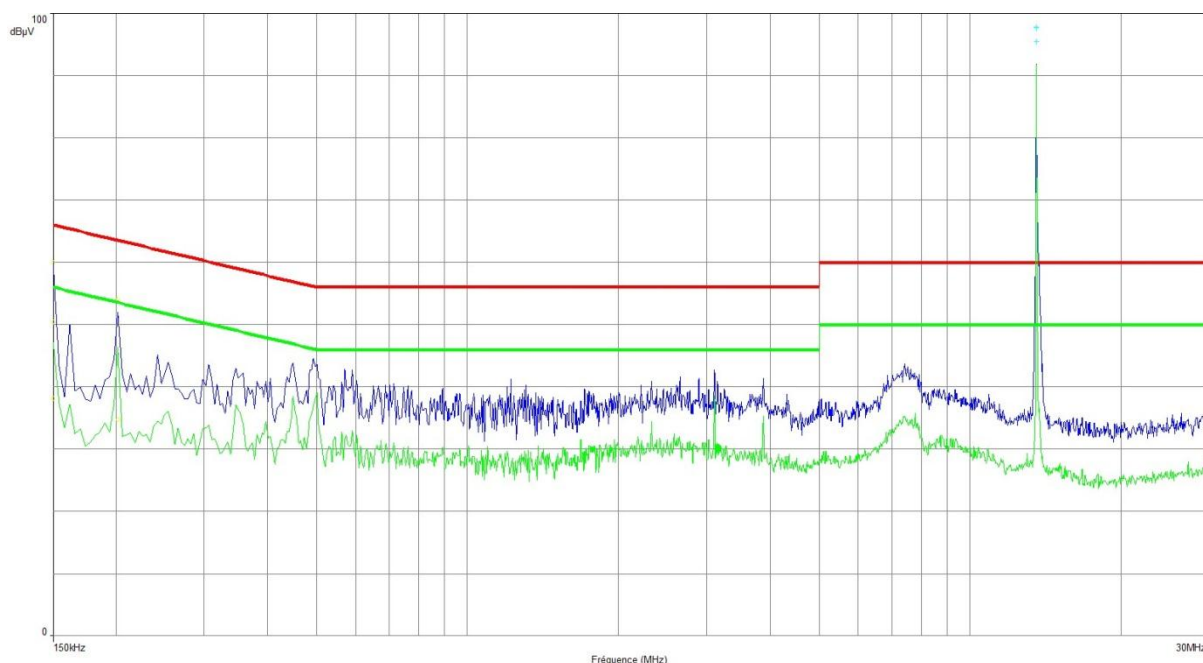
CONDUCTED EMISSIONS					
Graph name :	Emc#2	Test configuration:			
Limit :	EN 55022	AERO LC + VP ELECTRONIQUE			
Class :	B				
PARAMETERS					
Voltage / Frequency :	110VAC / 60Hz	Legend:			
Line :	Neutral		Peak Measure		Average Measure
RBW :	9kHz			QPeak Limit	
VBW :	30kHz				
Frequency :	150kHz- 30MHz				



Frequency (MHz)	Avg (dBμV)	Lim Avg (dBμV)	Avg-LimAvg (dB)	QPeak (dBμV)	LimQPeak (dBμV)	QPeak-LimQPeak (dB)
0.55	44.67	46	-1.33	49.59	56	-6.41
0.618	44.55	46	-1.45	49.3	56	-6.70
0.686	41.47	46	-4.53	45.24	56	-10.76
2.266	42.84	46	-3.16	44.92	56	-11.08
2.402	41.55	46	-4.45	45.04	56	-10.96
2.954	38.18	46	-7.82	42.56	56	-13.44
4.118	34.37	46	-11.63	39.47	56	-16.53
13.558*	90.97	50	40.97	96.84	60	36.84

*Carrier Frequency, See graphs with Dummy load

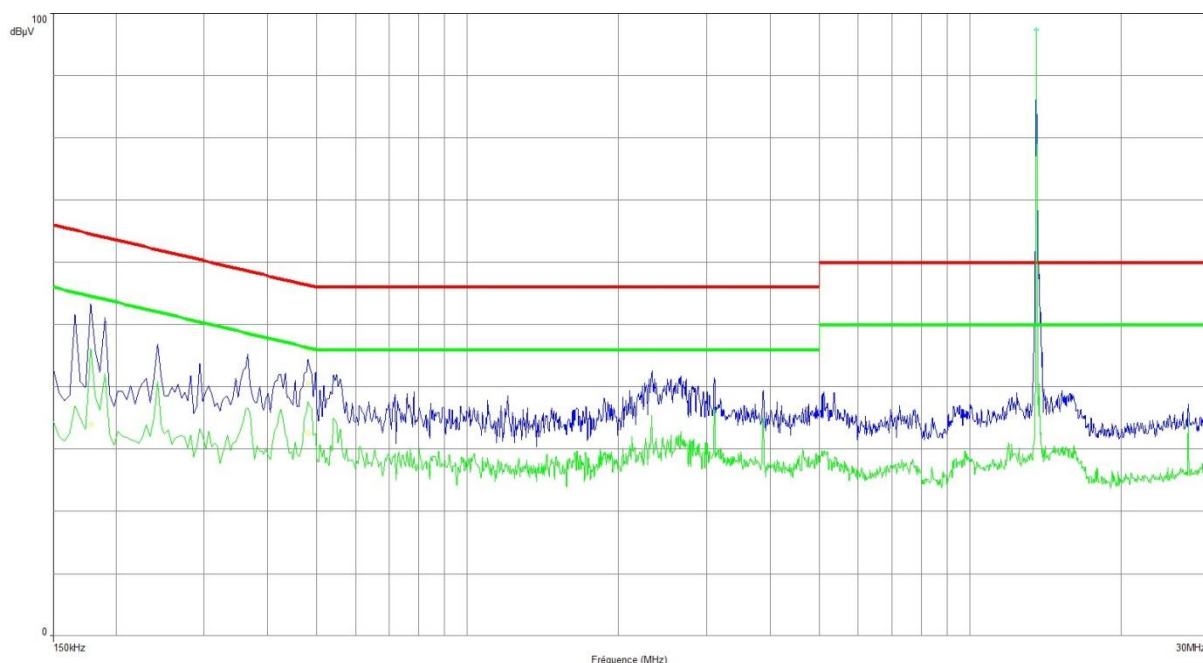
CONDUCTED EMISSIONS				
Graph name :	Emc#3	Test configuration:		
Limit :	EN 55022	AERO LC + XP Power		
Class :	B			
PARAMETERS				
Voltage / Frequency :	110VAC / 60Hz	Legend:		
Line :	Phase	Peak Measure		Average Measure
RBW :	9kHz			
VBW :	30kHz	QPeak Limit		Average Limit
Frequency :	150kHz- 30MHz			



Frequency (MHz)	Avg (dBμV)	Lim Avg (dBμV)	Avg-LimAvg (dB)	QPeak (dBμV)	LimQPeak (dBμV)	QPeak-LimQPeak (dB)
0.15	38.11	56	-17.89	50.46	66	-15.54
0.202	34.71	53.53	-18.81	49.84	63.53	-13.68
13.558*	95.48	50	45.48	97.61	60	37.61

*Carrier Frequency, See graphs with Dummy load

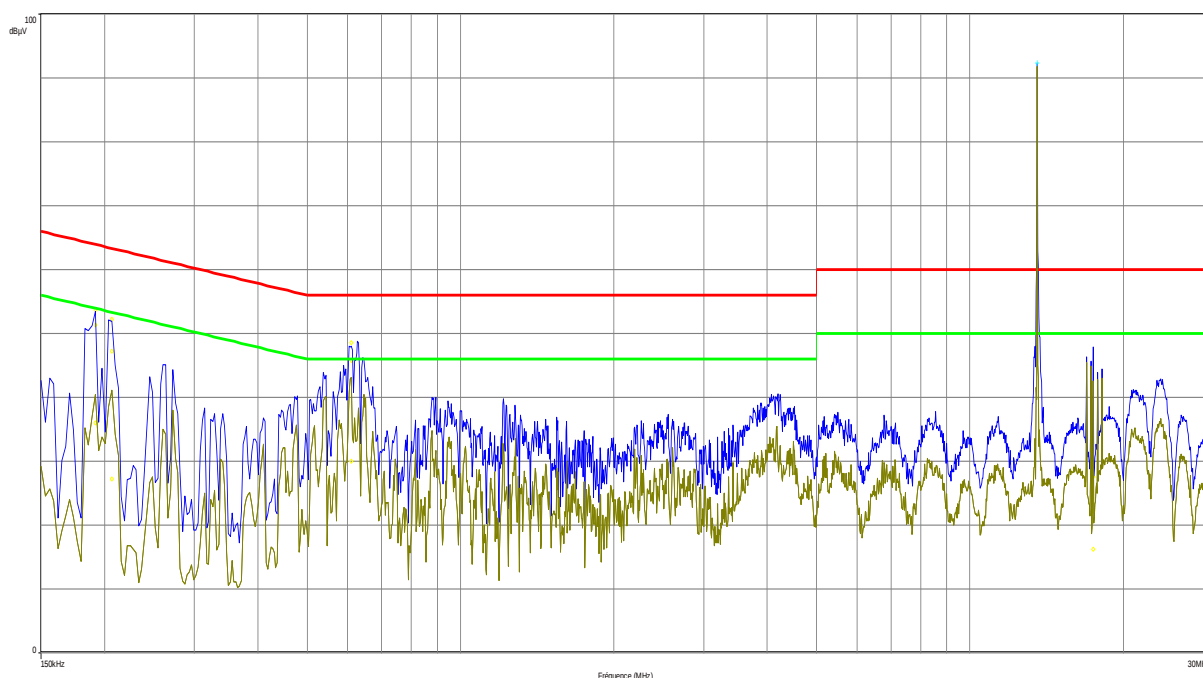
CONDUCTED EMISSIONS				
Graph name :	Emc#4	Test configuration:		
Limit :	EN 55022	AERO LC + XP Power		
Class :	B			
PARAMETERS				
Voltage / Frequency :	110VAC / 60Hz	Legend:		
Line :	Neutral	Peak Measure		Average Measure
RBW :	9kHz			
VBW :	30kHz	QPeak Limit		Average Limit
Frequency :	150kHz- 30MHz			



Frequency (MHz)	Avg (dBμV)	Lim Avg (dBμV)	Avg-LimAvg (dB)	QPeak (dBμV)	LimQPeak (dBμV)	QPeak-LimQPeak (dB)
0.178	34	54.58	-20.58	50.36	64.58	-14.22
0.482	32.64	46.3	-13.67	40.56	56.3	-15.74
13.558*	97.35	50	47.35	97.32	60	37.32

*Carrier Frequency, See graphs with Dummy load

CONDUCTED EMISSIONS				
Graph name :	Emc#5	Test configuration:		
Limit :	EN 55022	TR-CAu + VP ELECTRONIQUE		
Class :	B			
PARAMETERS				
Voltage / Frequency :	110VAC / 60Hz	Legend:		
Line :	Phase	Peak Measure		Average Measure
RBW :	9kHz			
VBW :	30kHz	QPeak Limit		Average Limit
Frequency :	150kHz- 30MHz			



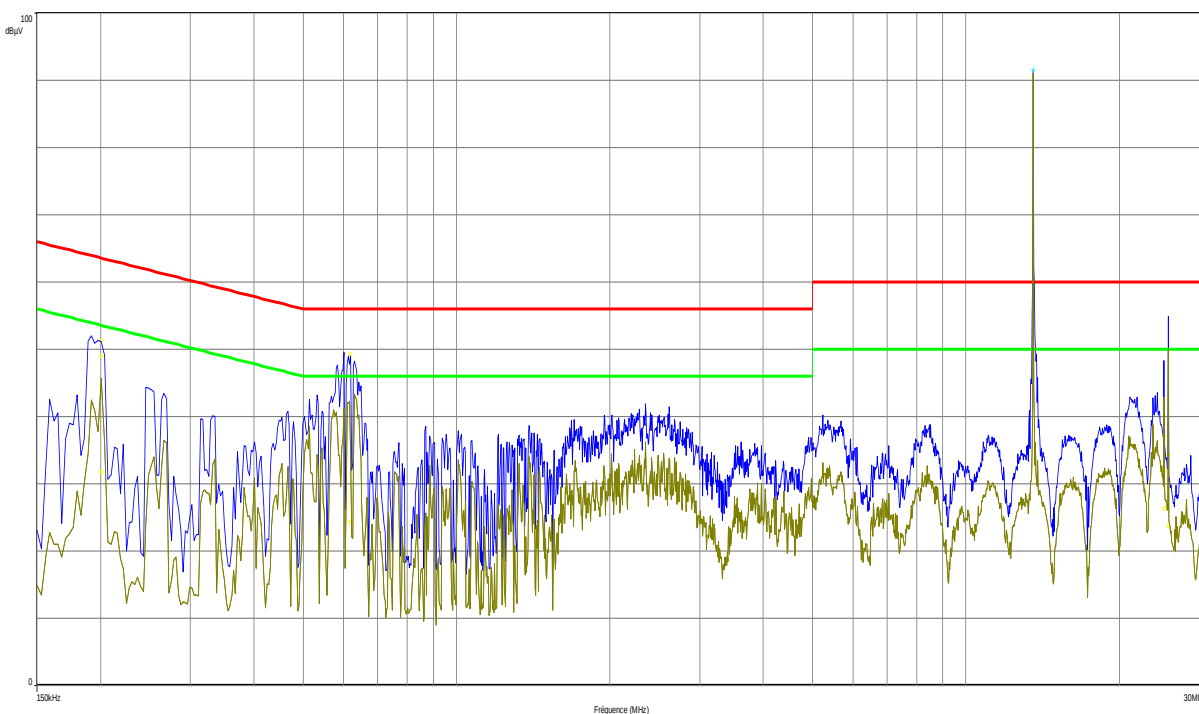
Frequency (MHz)	Avg (dBμV)	Lim Avg (dBμV)	Avg-LimAvg (dB)	QPeak (dBμV)	LimQPeak (dBμV)	QPeak-LimQPeak (dB)
0.19179	36.02	53.96	-17.94	51.35	63.96	-12.61
0.206715	27.27	53.34	-26.07	47.26	63.34	-16.08
0.60969	29.96	46	-16.04	45.83	56	-10.17
17.44509	16.18	50	-33.82	22.27	60	-37.73

Frequency (MHz)	Peak Level (dBμV)
13.55862*	92.37

*Carrier Frequency, See graphs with Dummy load



CONDUCTED EMISSIONS				
Graph name :	Emc#6	Test configuration:		
Limit :	EN 55022	TR-CAu + VP ELECTRONIQUE		
Class :	B			
PARAMETERS				
Voltage / Frequency :	110VAC / 60Hz	Legend:		
Line :	Neutral	Peak Measure		Average Measure
RBW :	9kHz			
VBW :	30kHz	QPeak Limit		Average Limit
Frequency :	150kHz- 30MHz			



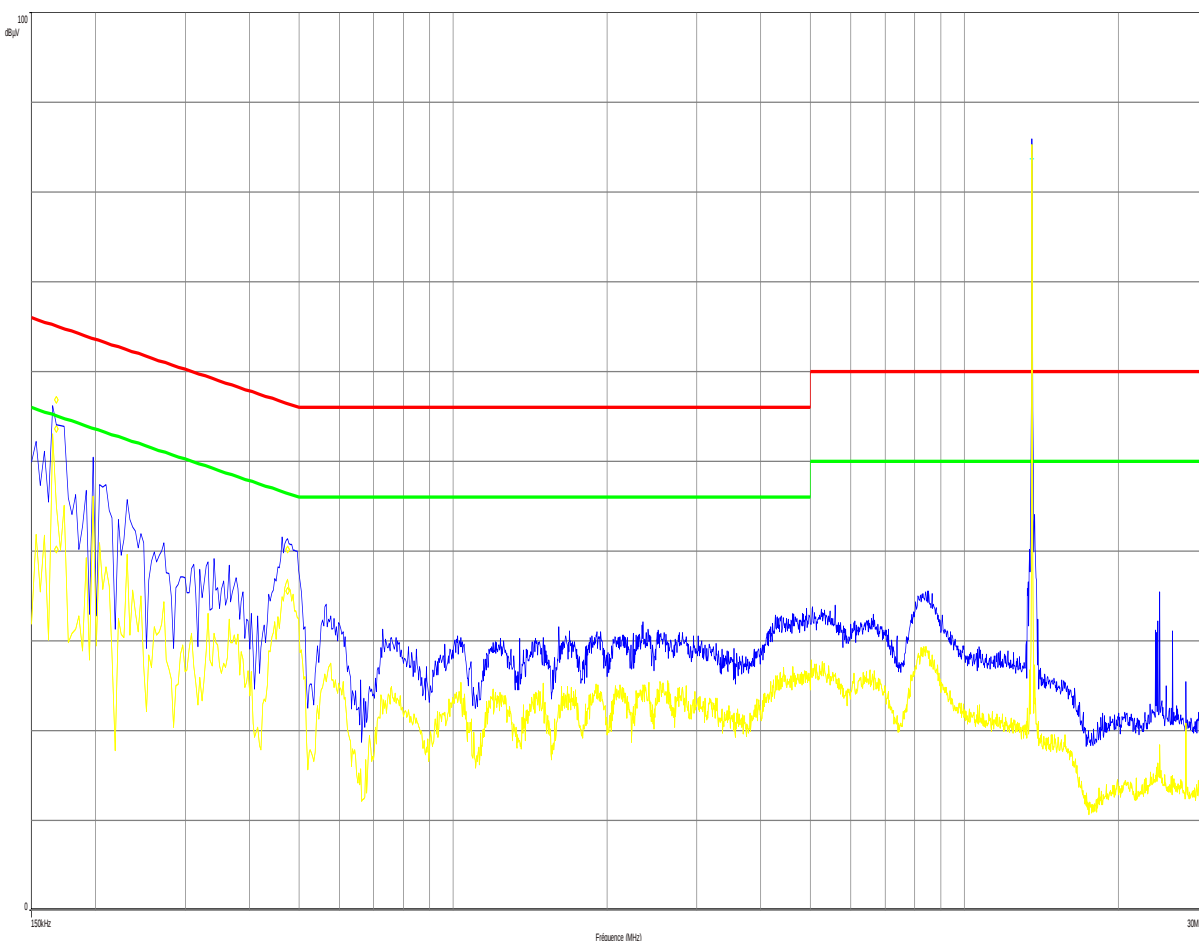
Frequency (MHz)	Avg (dBμV)	Lim Avg (dBμV)	Avg-LimAvg (dB)	QPeak (dBμV)	LimQPeak (dBμV)	QPeak-LimQPeak (dB)
0.200745	31.75	53.58	-21.83	48.98	63.58	-14.6
0.618645	24.31	46	-21.69	41.3	56	-14.7
24.47178	26.37	50	-23.63	31.93	60	-28.07
24.96132	23.79	50	-26.21	29.3	60	-30.7

Frequency (MHz)	Peak Level (dBμV)
13.55862*	91.58

*Carrier Frequency, See graphs with Dummy load



CONDUCTED EMISSIONS				
Graph name :	Emc#7	Test configuration:		
Limit :	EN 55022	TR-CAu - XP power		
Class :	B			
PARAMETERS				
Voltage / Frequency :	110VAC / 60Hz	Legend:		
Line :	Phase	Peak Measure		Average Measure
RBW :	9kHz			
VBW :	30kHz	QPeak Limit		Average Limit
Frequency :	150kHz- 30MHz			



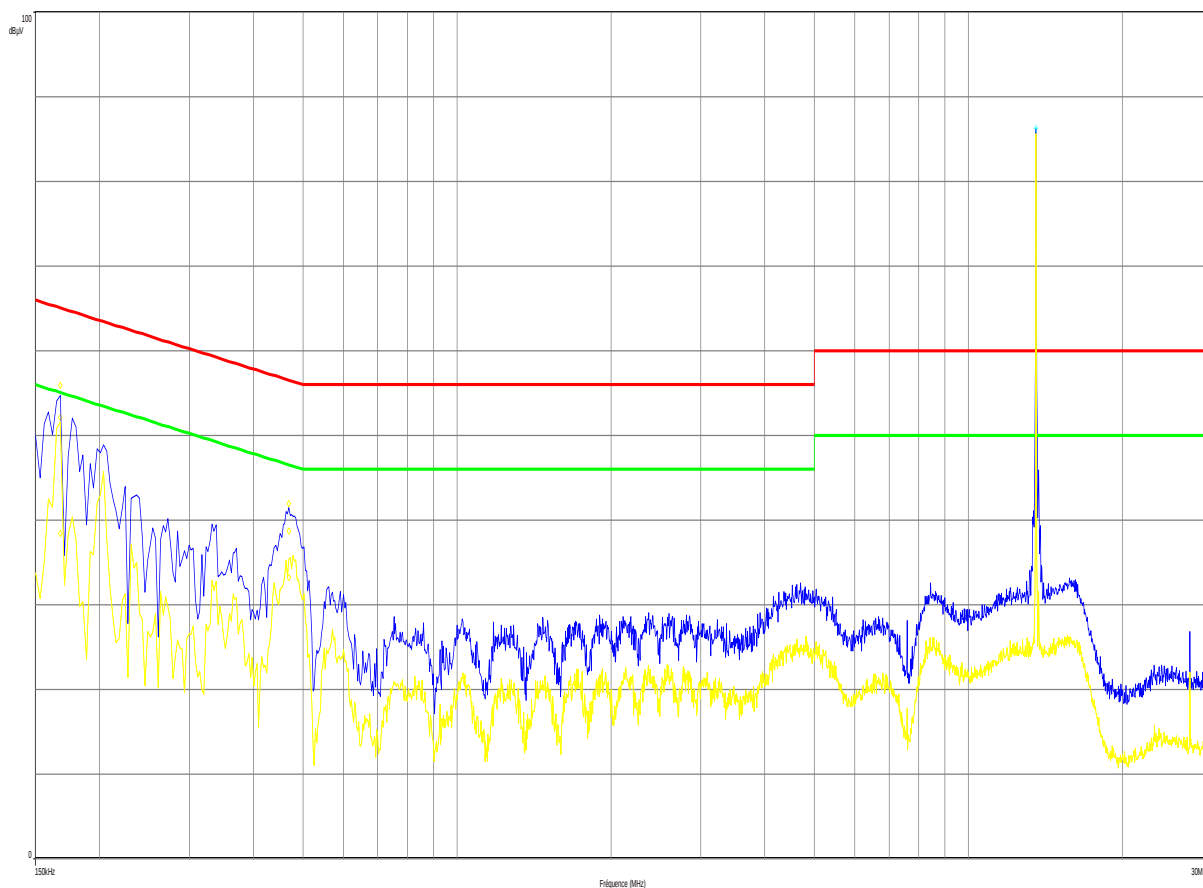
Frequency (MHz)	Avg (dBμV)	Lim Avg (dBμV)	Avg-LimAvg (dBμV)	QPeak (dBμV)	LimQPeak (dBμV)	QPeak-LimQPeak (dBμV)
0.16791	40.18	55.06	-14.88	53.62	65.06	-11.44
0.475365	35.6	46.42	-10.82	40.16	56.42	-16.26

Frequency (MHz)	Peak Level (dBμV)
13.555635*	96.1

*Carrier Frequency, See graphs with Dummy load



CONDUCTED EMISSIONS				
Graph name :	Emc#8	Test configuration:		
Limit :	EN 55022	TR-CAu - XP power		
Class :	B			
PARAMETERS				
Voltage / Frequency :	110VAC / 60Hz	Legend:		
Line :	Neutral	Peak Measure		Average Measure
RBW :	9kHz			
VBW :	30kHz	QPeak Limit		Average Limit
Frequency :	150kHz- 30MHz			



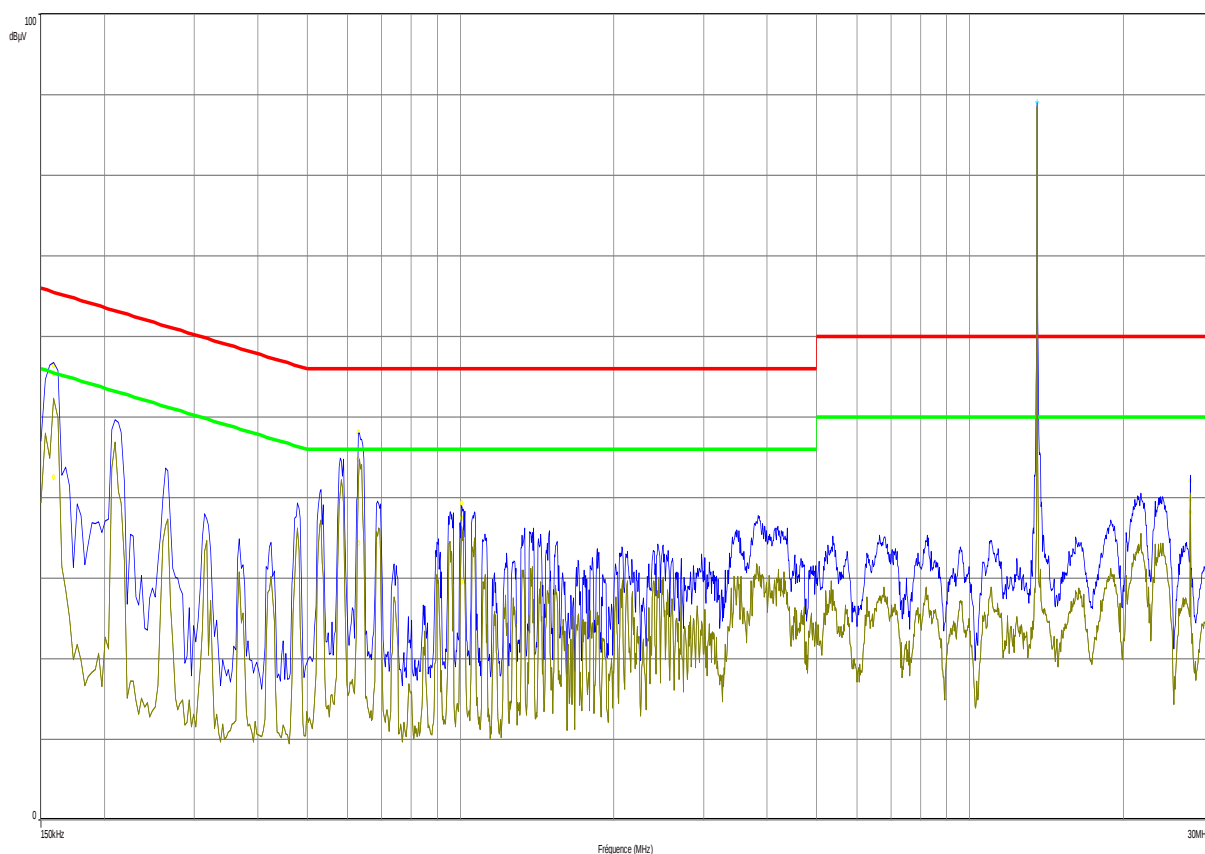
Frequency (MHz)	Avg (dBμV)	Lim Avg (dBμV)	Avg-LimAvg (dBμV)	QPeak (dBμV)	LimQPeak (dBμV)	QPeak-LimQPeak (dBμV)
0.16791	38.42	55.06	-16.64	52.1	65.06	-12.96
0.469395	33.29	46.52	-13.24	38.72	56.52	-17.81

Frequency (MHz)	Peak Level (dBμV)
13.55862*	95.3

*Carrier Frequency, See graphs with Dummy load



CONDUCTED EMISSIONS				
Graph name :	Emc#9	Test configuration:		
Limit :	EN 55022	TR-SA + VP ELECTRONIQUE		
Class :	B			
PARAMETERS				
Voltage / Frequency :	110VAC / 60Hz	Legend:		
Line :	Phase	Peak Measure		Average Measure
RBW :	9kHz			
VBW :	30kHz	QPeak Limit		Average Limit
Frequency :	150kHz- 30MHz			



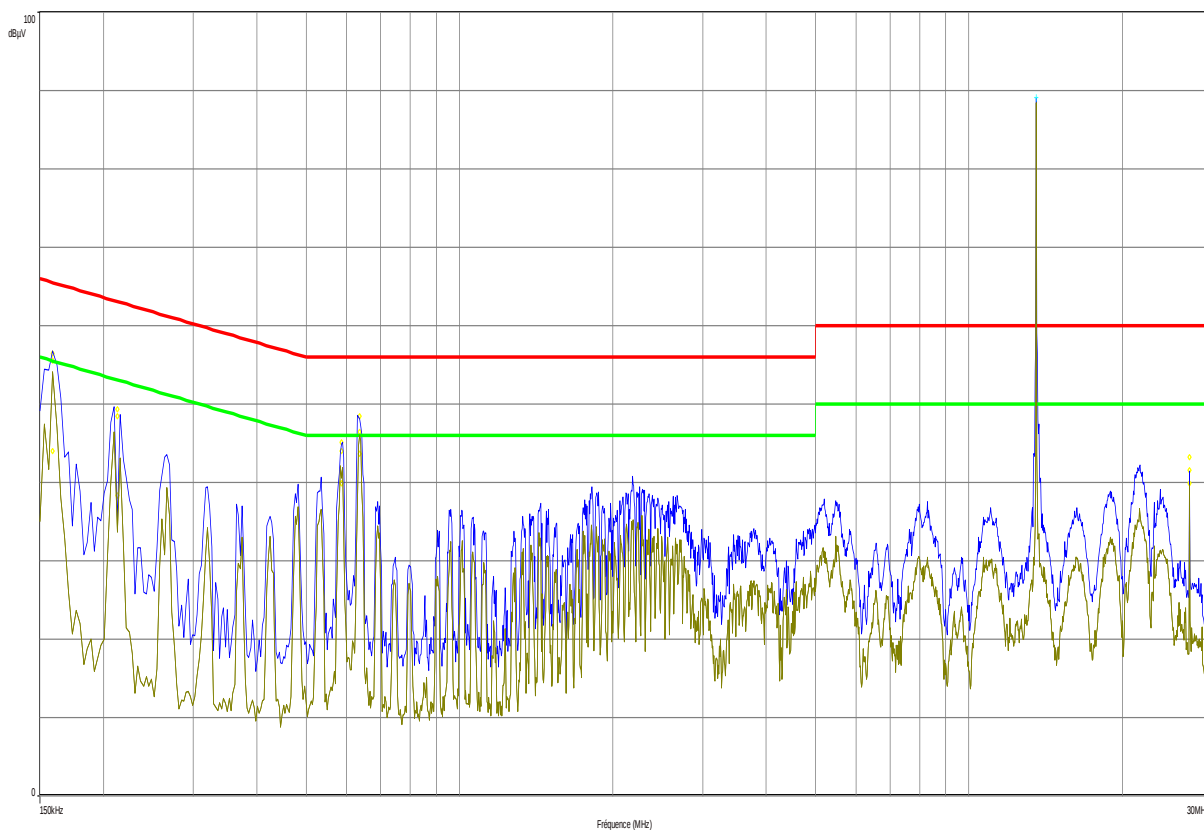
Frequency (MHz)	Avg (dBμV)	Lim Avg (dBμV)	Avg-LimAvg (dB)	QPeak (dBμV)	LimQPeak (dBμV)	QPeak-LimQPeak (dB)
0.158955	42.54	55.52	-12.97	55.46	65.52	-10.06
0.630585	34.29	46	-11.71	44.8	56	-11.2
1.00371	29.55	46	-16.45	37.42	56	-18.58
27.12246	38.24	50	-11.76	39.74	60	-20.26

Frequency (MHz)	Peak Level (dBμV)
13.55862*	89.52

*Carrier Frequency, See graphs with Dummy load



CONDUCTED EMISSIONS				
Graph name :	Emc#10	Test configuration:		
Limit :	EN 55022	TR-SA + VP ELECTRONIQUE		
Class :	B			
PARAMETERS				
Voltage / Frequency :	110VAC / 60Hz	Legend:		
Line :	Neutral	Peak Measure		Average Measure
RBW :	9kHz			
VBW :	30kHz	QPeak Limit		Average Limit
Frequency :	150kHz- 30MHz			



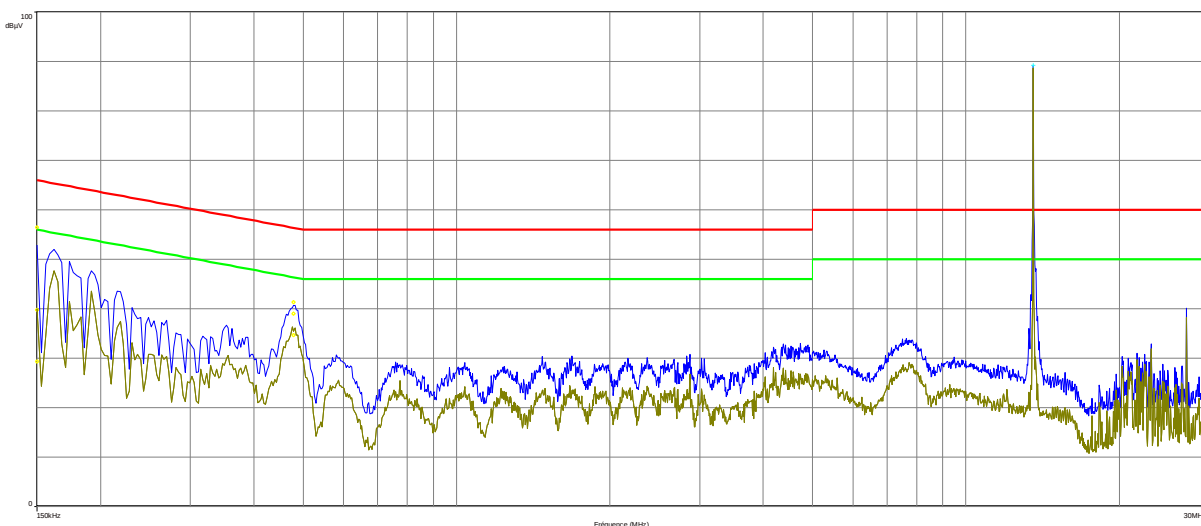
Frequency (MHz)	Mes.Avg (dBµV)	Lim.Avg (dBµV)	Mes.Avg-Lim.Avg (dB)	Mes.Q-Peak (dBµV)	Lim.Q-Peak (dBµV)	Mes.Q-Peak-Lim.Q-Peak (dB)
0.158955	44.01	55.52	-11.5	55.61	65.52	-9.91
0.212685	38.33	53.1	-14.77	48.43	63.1	-14.67
0.58581	39.88	46	-6.12	44.03	56	-11.97
0.636555	43.63	46	-2.37	46.39	56	-9.61
27.119475	39.92	50	-10.08	41.52	60	-18.48

Frequency (MHz)	Peak Level (dBµV)
13.55862*	89.68

*Carrier Frequency, See graphs with Dummy load



CONDUCTED EMISSIONS				
Graph name :	Emc#11	Test configuration:		
Limit :	EN 55022	TR-SA + XP Power		
Class :	B			
PARAMETERS				
Voltage / Frequency :	110VAC / 60Hz	Legend:		
Line :	Phase	Peak Measure		Average Measure
RBW :	9kHz			
VBW :	30kHz	QPeak Limit		Average Limit
Frequency :	150kHz- 30MHz			



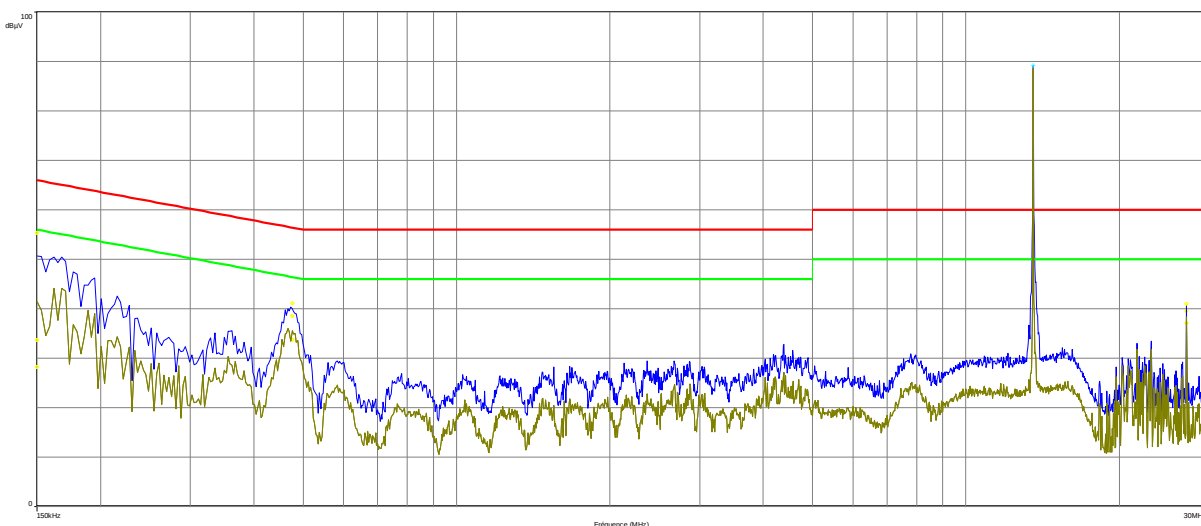
Frequency (MHz)	Mes.Avg (dBμV)	Lim.Avg (dBμV)	Mes.Avg-Lim.Avg (dB)	Mes.Q-Peak (dBμV)	Lim.Q-Peak (dBμV)	Mes.Q-Peak-Lim.Q-Peak (dB)
0.15	39.77	56	-16.23	29.37	66	-36.63
0.47835	34.69	46.37	-11.68	39.04	56.37	-17.33

Frequency (MHz)	Peak Level (dBμV)
13.55862*	89.26

*Carrier Frequency, See graphs with Dummy load



CONDUCTED EMISSIONS				
Graph name :	Emc#12	Test configuration:		
Limit :	EN 55022	TR-SA + XP Power		
Class :	B			
PARAMETERS				
Voltage / Frequency :	110VAC / 60Hz	Legend:		
Line :	Neutral	Peak Measure		Average Measure
RBW :	9kHz			
VBW :	30kHz	QPeak Limit		Average Limit
Frequency :	150kHz- 30MHz			



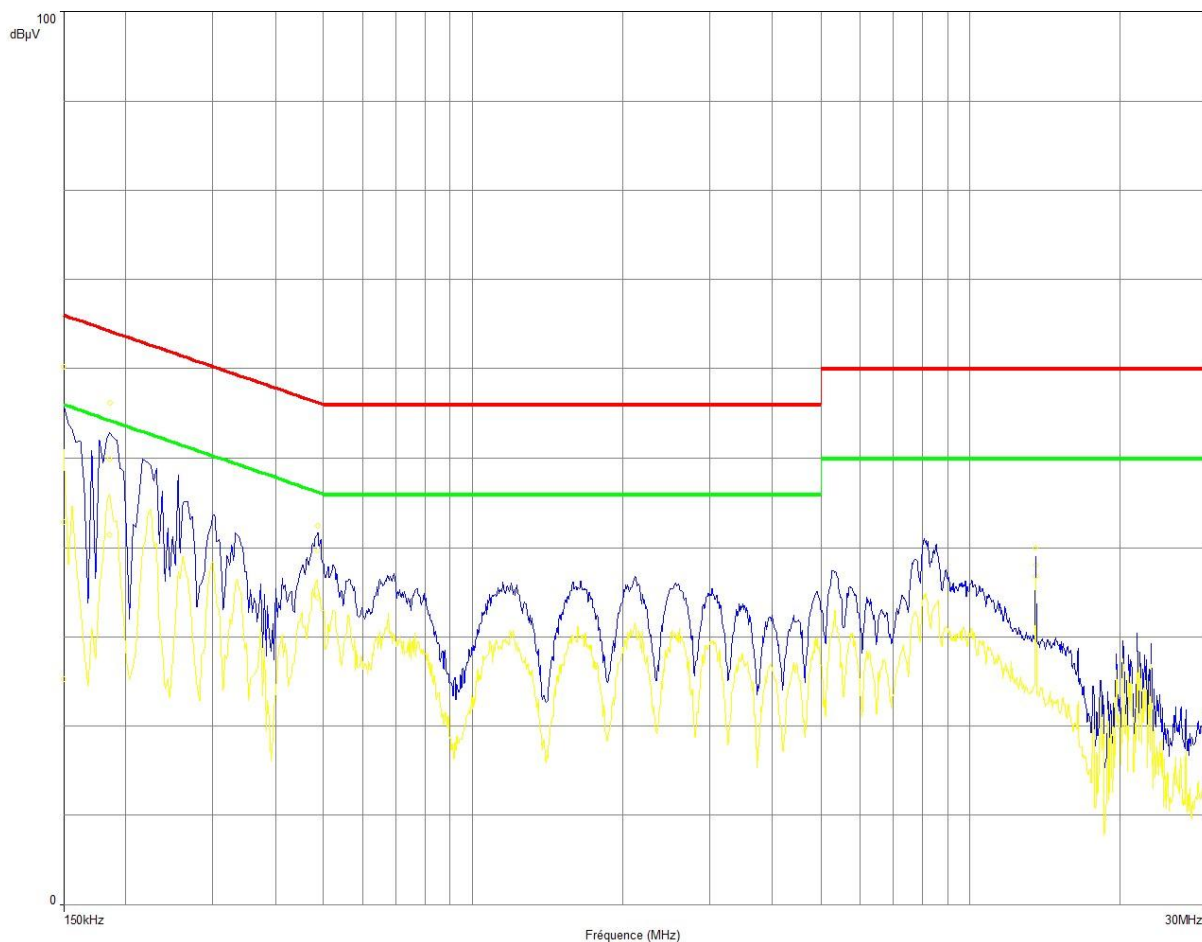
Frequency (MHz)	Mes.Avg (dBμV)	Lim.Avg (dBμV)	Mes.Avg-Lim.Avg (dB)	Mes.Q-Peak (dBμV)	Lim.Q-Peak (dBμV)	Mes.Q-Peak-Lim.Q-Peak (dB)
0.15	33.63	56	-22.37	28.23	66	-37.77
0.475365	33.81	46.42	-12.61	38.5	56.42	-17.92
27.119475	37.06	50	-12.94	39.59	60	-20.41

Frequency (MHz)	Peak Level (dBμV)
13.55862*	89.22

*Carrier Frequency, See graphs with Dummy load



CONDUCTED EMISSIONS				
Graph name :	Emc#13	Test configuration:		
Limit :	EN 55022	Dummy load - XP Power		
Class :	B			
PARAMETERS				
Voltage / Frequency :	110VAC / 60Hz	Legend:		
Line :	Phase	Peak Measure		Average Measure
RBW :	9kHz			
VBW :	30kHz	QPeak Limit		Average Limit
Frequency :	150kHz- 30MHz			



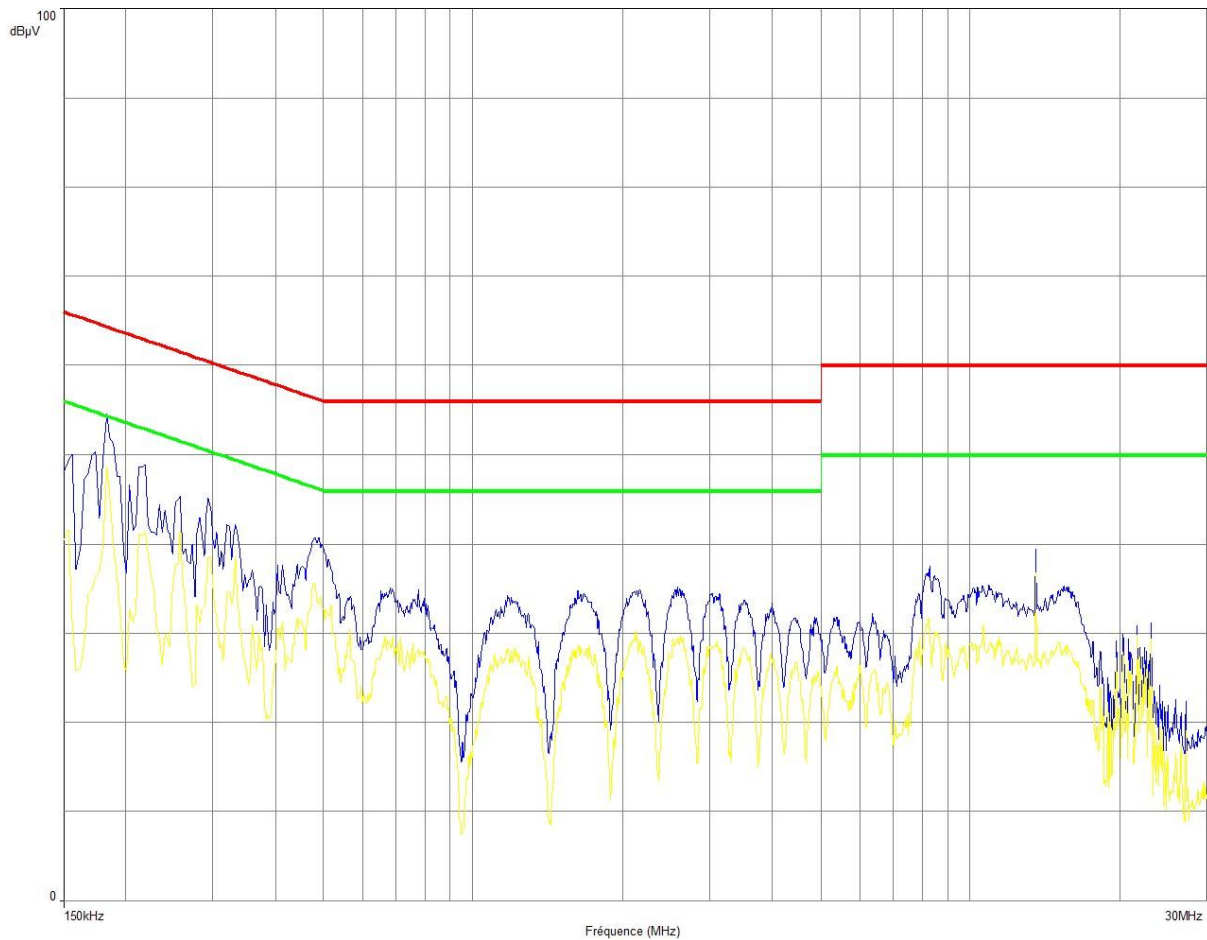
Frequency (MHz)	Avg (dBμV)	Lim Avg (dBμV)	MesAvg - LimAvg (dBμV)	QPeak (dBμV)	Lim QPeak (dBμV)	MesQP - LimQP (dBμV)
0.150	42.87	56.00	-13.13	45.31	66.00	-20.69
0.186	41.47	54.22	-12.75	49.89	64.22	-14.33
0.487	34.41	46.21	-11.80	39.66	56.21	-16.56
13.559*	36.74	50.00	-13.26	38.01	60.00	-21.99

*Carrier Frequency, See graphs with Dummy load



L C I E

CONDUCTED EMISSIONS					
Graph name :	Emc#14	Test configuration:			
Limit :	EN 55022	Dummy load - XP Power			
Class :	B				
PARAMETERS					
Voltage / Frequency :	110VAC / 60Hz	Legend:			
Line :	Neutral		Peak Measure		Average Measure
RBW :	9kHz				QPeak Limit
VBW :	30kHz				
Frequency :	150kHz- 30MHz				



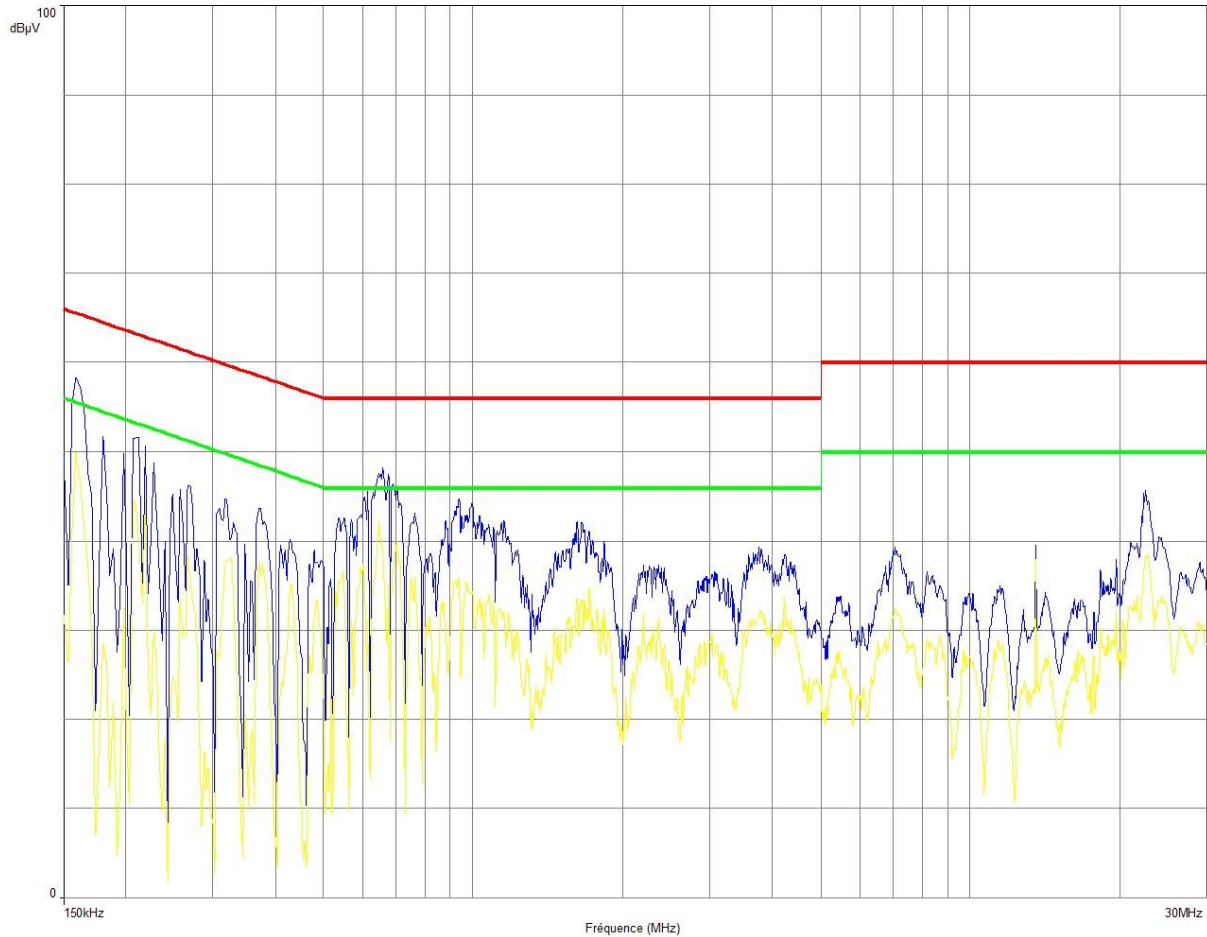
Frequency (MHz)	Avg (dBμV)	Lim Avg (dBμV)	MesAvg - LimAvg (dBμV)	QPeak (dBμV)	Lim QPeak (dBμV)	MesQP - LimQP (dBμV)
0.186	41.23	54.22	-12.99	49.45	64.22	-14.77
13.559*	36.71	50.00	-13.29	38.69	60.00	-21.31

*Carrier Frequency, See graphs with Dummy load



L C I E

CONDUCTED EMISSIONS					
Graph name :	Emc#15	Test configuration:			
Limit :	EN 55022	Dummy load – VP ELECTRONIQUE			
Class :	B				
PARAMETERS					
Voltage / Frequency :	110VAC / 60Hz	Legend:			
Line :	Phase		Peak Measure		Average Measure
RBW :	9kHz				
VBW :	30kHz		QPeak Limit		Average Limit
Frequency :	150kHz- 30MHz				



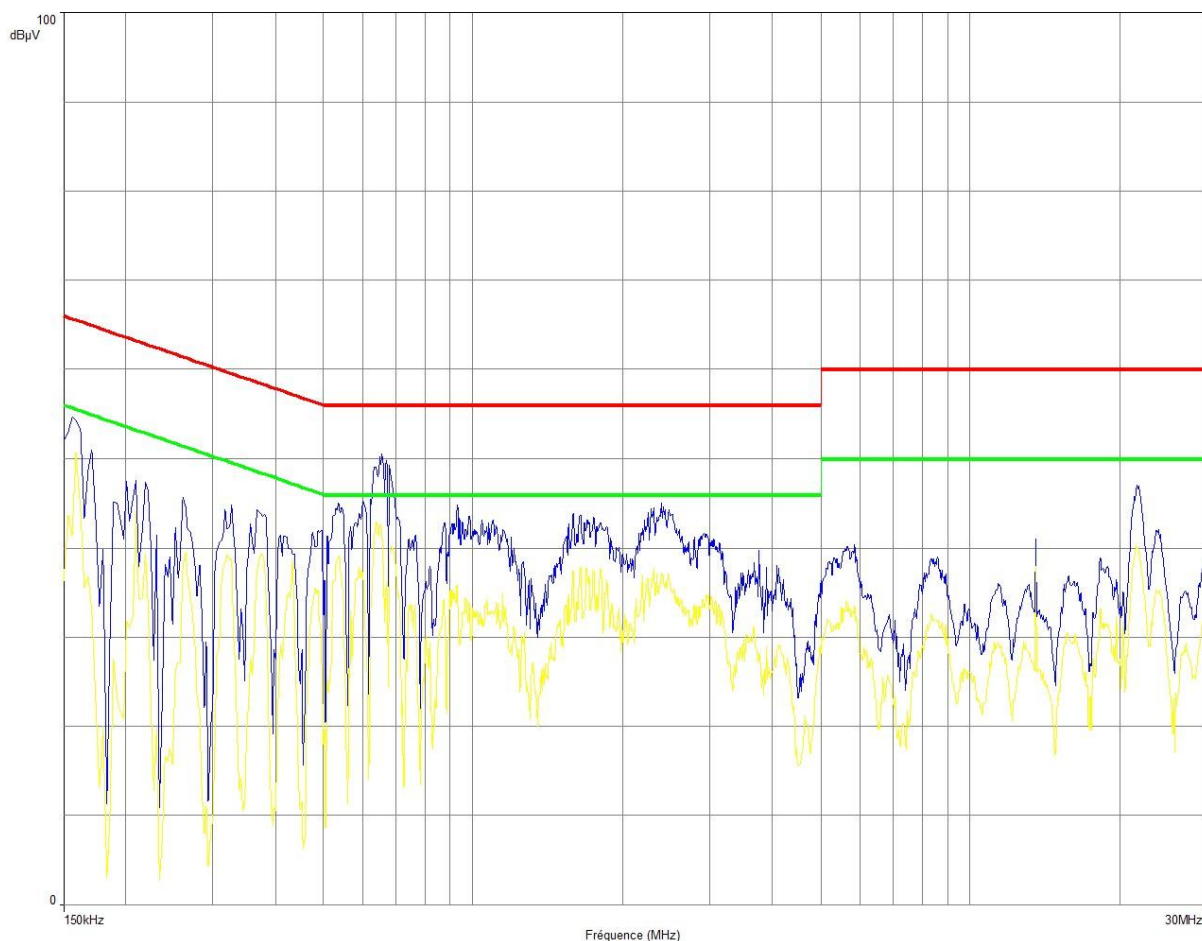
Frequency (MHz)	Avg (dBμV)	Lim Avg (dBμV)	MesAvg - LimAvg (dBμV)	QPeak (dBμV)	Lim QPeak (dBμV)	MesQP - LimQP (dBμV)
0.159	40.37	55.52	-15.15	54.04	65.52	-11.48
0.654	40.15	46.00	-5.85	47.83	56.00	-8.17
13.559*	37.89	50.00	-12.11	39.00	60.00	-21.00
22.517	28.53	50.00	-21.47	34.83	60.00	-25.17

*Carrier Frequency, See graphs with Dummy load



L C I E

CONDUCTED EMISSIONS				
Graph name :	Emc#16	Test configuration:		
Limit :	EN 55022	Dummy load - VP ELECTRONIQUE		
Class :	B			
PARAMETERS				
Voltage / Frequency :	110VAC / 60Hz	Legend:		
Line :	Neutral	Peak Measure		Average Measure
RBW :	9kHz			
VBW :	30kHz	QPeak Limit		Average Limit
Frequency :	150kHz- 30MHz			



Frequency (MHz)	Avg (dBμV)	Lim Avg (dBμV)	MesAvg - LimAvg (dBμV)	QPeak (dBμV)	Lim QPeak (dBμV)	MesQP - LimQP (dBμV)
0.159	42.50	55.52	-13.02	52.62	65.52	-12.89
0.654	40.75	46.00	-5.25	48.55	56.00	-7.45
2.383	34.82	46.00	-11.18	40.21	56.00	-15.79
13.559*	38.08	50.00	-11.92	39.67	60.00	-20.33
21.669	37.22	50.00	-12.78	42.33	60.00	-17.67

*Carrier Frequency, See graphs with Dummy load

**9. 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 <i>Measurement of conducted disturbances in voltage on the power port</i>	3.57 dB	3.6 dB
Mesure des perturbations conduites en tension sur le réseau de télécommunication <i>Measurement of conducted disturbances in voltage on the telecommunication port.</i>	3.28 dB	A l'étude / Under consid.
Mesure des perturbations discontinues conduites en tension <i>Measurement of discontinuous conducted disturbances in voltage</i>	3.47 dB	3.6 dB
Mesure des perturbations conduites en courant <i>Measurement of conducted disturbances in current</i>	2.90 dB	A l'étude / Under consid.
Mesure du champ électrique rayonné sur le site en espace libre de Moirans <i>Measurement of radiated electric field on the Moirans open area test site</i>	5.07 dB	5.2 dB

Les valeurs d'incertitudes calculées du laboratoire étant inférieures aux valeurs d'incertitudes limites établies par la norme, la conformité de l'échantillon est établie directement par les niveaux limites applicables. / The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the standard. The conformity of the sample is directly established by the applicable limits values.