Rapport d'essais / *Test Report*

N° : **21714-FCC-2**

Test Firm Registration Number: 171131
IC Company Number: 9545A (Test site)

Matériel testé : *Equipment under test*:	**STRESSIT**

Constructeur:
Manufacturer:
CORDIA
ZAC Villette aux Aulnes
2 rue Galilée
77290 Mitry Mory – France

Rapport délivré à :
Issued to:
CORDIA
ZAC Villette aux Aulnes
2 rue Galilée
77290 Mitry Mory – France

Référence de la proposition :
Proposal number:
112015-21714

Date de l'essai :
Date of test:
Le 22 décembre 2015
December 22nd, 2015

Objectif des essais :
Test purpose:
EMC qualification accordingly to following standards:
- CFR 47, FCC Part 15, Subpart B
(Receiver subject to part 15B)

FCC ID:
2AGZJSTRESSIT

Lieu du test:
Test location:
SMEE CE-Mesures
38 VOIRON - France

Test réalisé par :
Test realized by:
Jérémy BLANCHER

Conclusion :
Conclusion:
L'équipement satisfait aux prescriptions des normes citées en référence.
The appliance complies with requirements of above mentioned standards.

Ed.	Date	Modifications / Pages	Written by:	Approved by: Visa
1	January 22sd, 2016	Initial Edition	Jeremy Blancher	Laurent Chapus

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1. Normative references

Standard: FCC CFR 47, PART 15, Subpart B

ANSI C63.4 (2014): American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

2. Test synthesis

Class B digital device:

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<tr><td colspan="2">Above 1GHz</td><td>54.0 (AV)
74.0 (Pk)</td></tr>
</table>

- **General conclusion:**

Measures and tests performed on the sample of the product STRESSIT, in configuration and description presented in this test report, show compliance with standards FCC CFR 47, PART 15, Subpart B.

3. Equipement Sous Test (EST) / *Equipment Under Test* (EUT)

Nom /
Identification

STRESSIT — Sn: FSAS0001

Alimentation /
Power supply

- AC mains
- 12V DC Internal battery

Auxiliaires /
Auxiliaries

- InterfaceIT (CORDIA equipment, Radio communication, FCC ID: 2AGZJSTREMOTE)

Entrées-Sorties /
Input / Output

	Câbles pour essai / *Cables for test*	Blindé / *Shielded*	Prévu pour >3m / *Intended for >3m*
AC Mains	2 Lines + PE	No	Mains

Version programme /
Firmware version

N.C

Mode de fonctionnement /
Running mode

The tested samples can be set in following modes:
- Equipment is lighting with sound
- Multiple sound / light configurations are enable

Configuration is set with Interface IT remote control.

Programme de test /
Test program /

N.C

Information sur l'équipement /
Equipment information

- Carrier frequency: 433.92 MHz (Receiver only)
- Antenna type: Internal wire antenna
- RF module: AUREL, model RX-4MM3
- Modulations: OOK
- Power supply: - AC mains (normal running mode with battery charging)
  - 12V DC battery (normal running mode)
- Battery type: ACD, model ST 65 (12V DC, 7.2Ah)
- Equipment intended for use as a fixed station for indoor environment
- Equipment designed for continuous operation

4. Conditions pendant les essais / *Test conditions*

Humidité relative / *Relative Humidity* : 40 - 55%
Température / *Temperature* : 5 - 20°C

Tension d'alimentation / *Power supply voltage*:
Equipment sous test / *Equipment under test* : 110/60Hz or 230V/50Hz

5. Modifications de l'EST / *Modifications of the EUT*

None

6. Conducted Emission Measurement (150kHz-30MHz)

TEST: Limits for conducted disturbance 150kHz – 30MHz	**Verdict**
Method: The LISN is placed 0,8 m from the boundary of the unit under test and bonded to a ground reference plane. This distance was between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment were at least 0,8 m from the AMN. All power was connected to the system through Artificial Mains Network (AMN). Conducted voltage measurements on lines were made at the output of the LISN. The EUT is 80cm above the ground reference plane and 40cm from the vertical ground plane. The AC power cable is 1m length.	**Pass**

Laboratory Parameters:	Required prior to the test	During the test
Ambient Temperature	10 to 40 °C	20°C
Relative Humidity	10 to 90 %	50%
Fully configured sample scanned over the following frequency range	Frequency range on each side of line	Measurement Point
	150kHz to 30MHz	AC input port (110V)

Limits

Frequency (MHz)	Limit dB (µV)			
	Quasi-Peak	Result	Average	Result
0.15 – 0.50	66 \ 56	**Pass**	56 \ 46	**Pass**
0.50 – 5	56	**Pass**	46	**Pass**
5 – 30	60	**Pass**	50	**Pass**

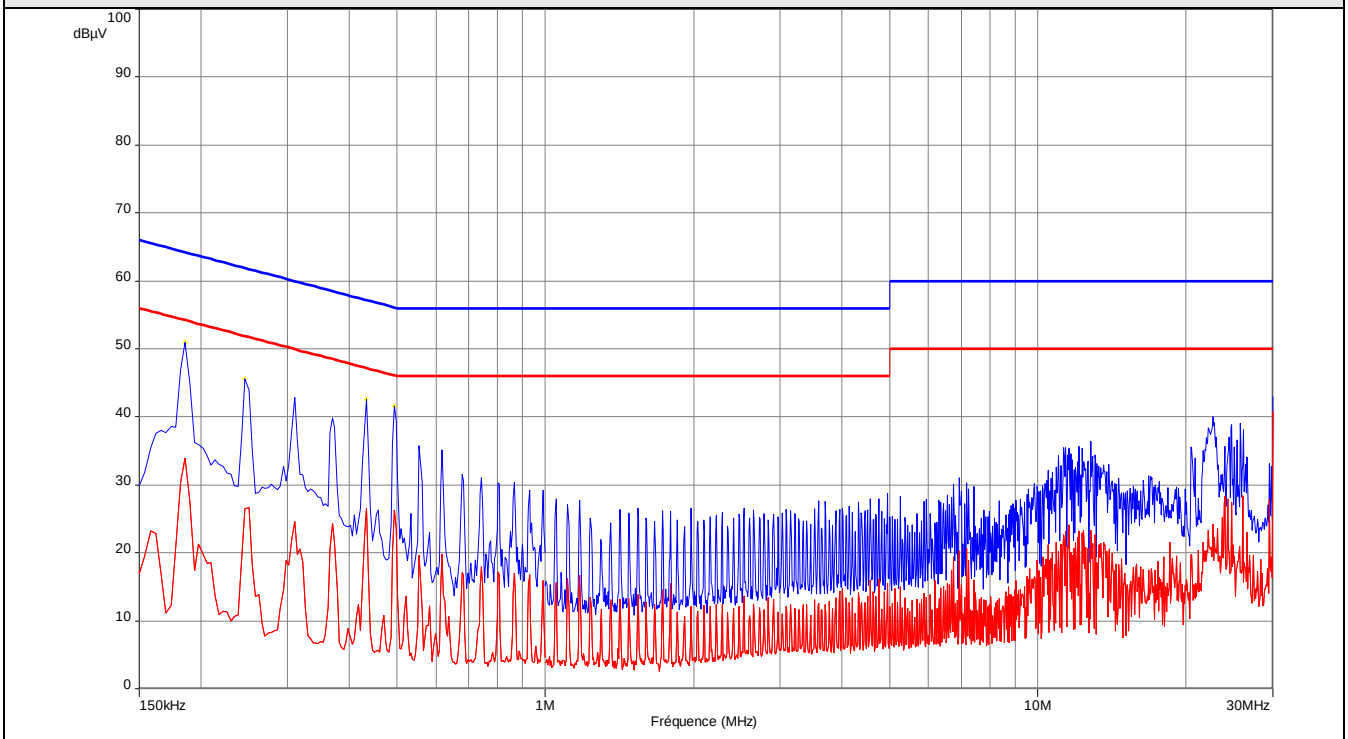
Supplementary information:
Test location: SMEE – CE Mesures
Test date: December 22nd, 2015 by J. Blancher
Power supply voltage: AC mains, 110V / 60Hz

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Attenuator / limiter	SMEE	ATT#1	ATT-101-004	2015/3	2016/3
Cable RF	Div	2m	CAB-101-007	2015/3	2016/3
LISN (50Ω / 50µH)	AFJ	LS16C	RSI-101-001	2015/3	2016/3
LISN (50Ω / 50µH)	AFJ	LS16C	RSI-101-002	2015/3	2016/3
Measuring receiver	Rohde & Schwarz	ESRP	REC-151-002	2015/7	2017/7
Ref. Comb generator	SMEE	EMC-250K	REF-111-001	-	-

Tabulated Results for Mains Terminal Disturbance Voltage on AC port								
FREQ	**Meas. PK**	**Mes. QP**	**LIMIT QP**	**Margin QP**	**Mes. AV**	**LIMIT AV**	**Margin AV**	Line
(MHz)	(dBµV)	(dBµV)	(dBµV)	(dB)	(dBµV)	(dBµV)	(dB)	
0.186	51.6	49.7	64.2	**-14.6**	34.0	54.2	**-20.2**	L1
0.246	45.9	43.6	61.9	**-18.3**	28.1	51.9	**-23.8**	L1
0.434	43.0	40.2	57.2	**-17.0**	26.2	47.2	**-21.0**	L1
0.494	41.5	38.5	56.1	**-17.7**	25.7	46.1	**-20.4**	L1
0.186	52.2	50.0	64.2	**-14.3**	34.1	54.2	**-20.1**	N
0.430	41.7	38.7	57.3	**-18.5**	24.5	47.3	**-22.7**	N
0.498	40.6	37.1	56.0	**-19.0**	22.9	46.0	**-23.1**	N
0.558	37.3	34.6	56.0	**-21.4**	20.4	46.0	**-25.6**	N

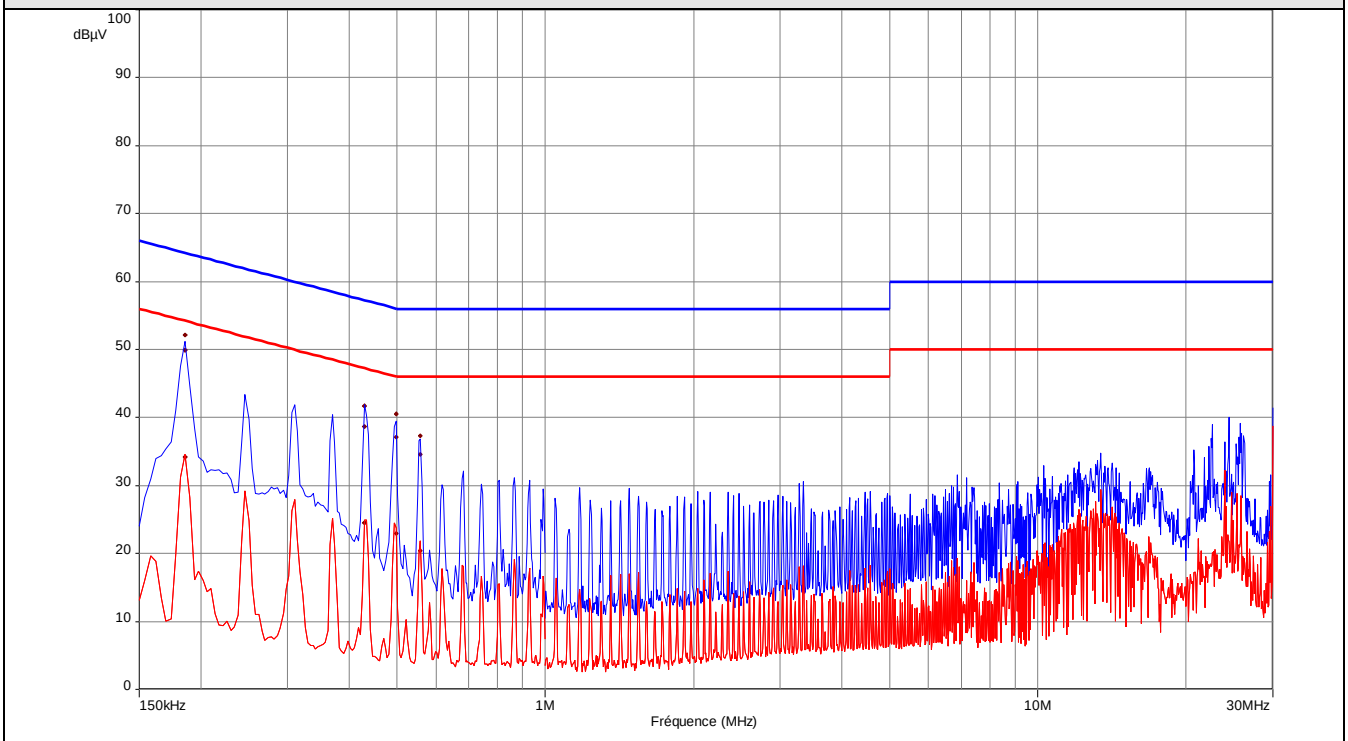
Frequency band investigated:	150kHz-30MHz
RBW:	9kHz
Voltage:	110V / 60Hz
Limit:	15.107 (a) Class B
Final measurement detector:	Quasi-Peak and Average
Wide Measurement Uncertainty:	± 3.6dB (k=2)
RESULT:	PASS
Measured value calculation:	The measured value (level) is calculated by adding the Cable Factor, the Transient suppressor attenuation and LISN attenuation from the receiver amplitude reading. The basic equation is as follow: Meas. = RA + CF + ATT_{TRAN} + ATT_{LISN} Where Meas. = Level (dBµV) RA = Receiver Amplitude CF = Cable Factor ATT_{TRAN} = Transient suppressor attenuation ATT_{LISN} = LISN attenuation Margin value = Emission level – Limit value

Graphical representation of Conducted Disturbance Measurement (Peak and Average detection)
AC port, Line L1



----: Peak | ----: Average

Graphical representation of Conducted Disturbance Measurement (Peak and Average detection)
AC port, Line Neutral



----: Peak | ----: Average

7. Radiated Emission Measurement (30MHz-3GHz)

TEST: Limits for radiated disturbance 30 MHz – 3 GHz			**Verdict**
Method: Measurements were made in a 3-meter Open Area Test Site (OATS) that complies to ANSCI C63.4. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 10 meter (Freq < 30MHz) or 3 meter (Freq > 30MHz). The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in horizontal and vertical polarities. Final measurements (Peak, Quasi-peak) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4 m. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable. A pre-scan frequency identification of the EUT has been performed in full anechoic chamber. The measured radiated field of the EUT is realised at 3-meters of distance. Antenna is 1.25-meters high. The pre-characterization graphs are obtained in PEAK detection.			**PASS**
Laboratory Parameters:	Required prior to the test		During the test
Ambient Temperature	10 to 40 °C		7°C
Relative Humidity	10 to 90 %		45%
Fully configured sample scanned over the following frequency range	Frequency range on each side of line		Measurement Point
	30MHz – 3GHz		3 m measurement distance
Limits			
Frequency (MHz)	Limit at 3m (dBµV/m)		
	Level / Detector	Results	
30 to 88	40.0 (QP)	**Pass**	
88 to 216	43.5 (QP)	**Pass**	
216 to 960	46.0 (QP)	**Pass**	
Above 960	54.0 (QP)	**Pass**	
Above 1GHz	54.0 / AV / 3m 74.0 / PK / 3m	**Pass**	
Supplementary information: Test location: SMEE – CE Mesures Test date: December 22nd, 2015 by J. Blancher Power supply voltage: AC mains, 230V / 50Hz			

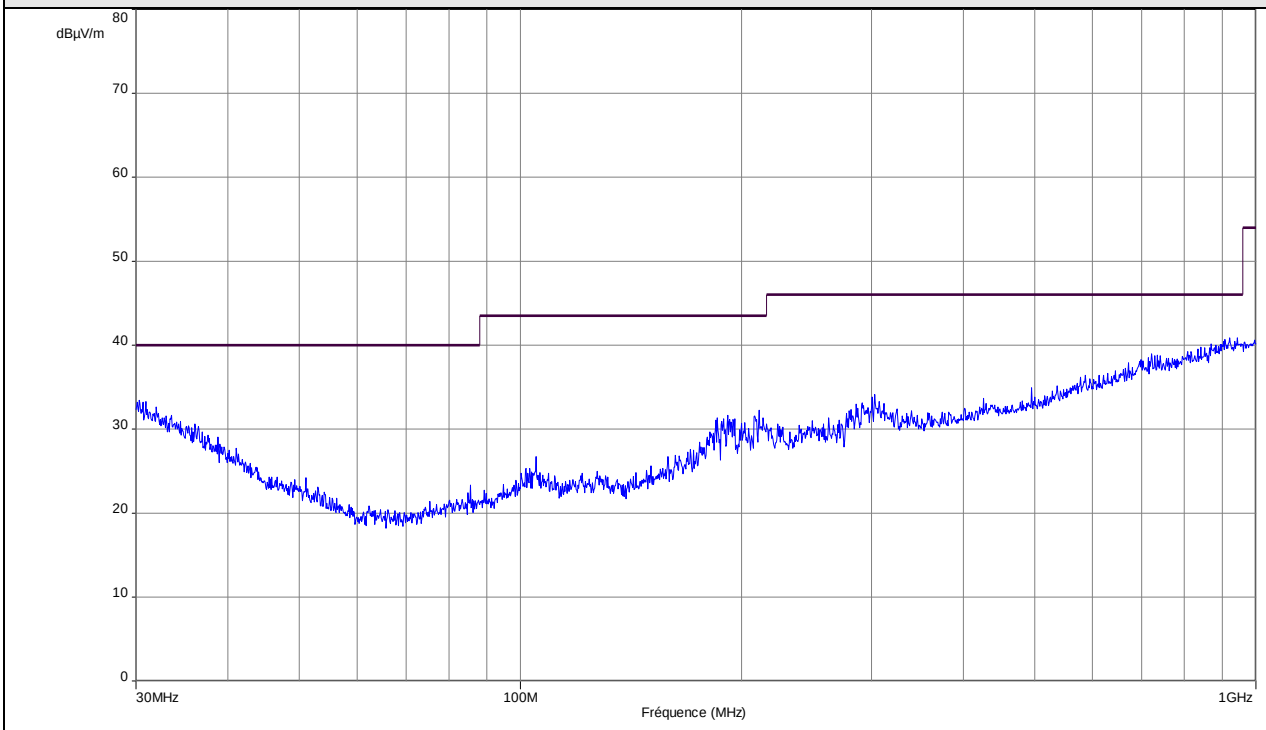
Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Log-periodic antenna	TDK	PLP3003	ANT-101-001	2015/8	2016/8
Biconnic antenna	COM-POWER	AB- 900	ANT-101-003	2015/8	2016/8
BiConiLog antenna	EMCO	3142B	ANT-101-010	2015/8	2016/8
Horn antenna	ETS-LINDGREN	3115	ANT-141-013	2015/7	2018/7
RF cable	Div	2m	CAB-101-011	2015/3	2016/3
RF cable	Div	OATS/25m	CAB-101-019	2015/3	2016/3
RF cable	Div	OATS/10m	CAB-101-020	2015/3	2016/3
Anechoic chamber	COMTEST	214263	CAG-141-001	-	-
OATS	Div	10m	SIT-101-001	2015/8	2016/8
Antenna mast	Innco- Systems	MA4000EP	MAT-101-001	-	-
Turntable	Innco- Systems	DS1200S	PLA-101-001	-	-
Measuring Rec	Rohde&Schwarz	ESRP	REC-151-002	2015/7	2017/7
Ref. Comb generator	SMEE	EMR-10M	REF-111-002	-	-

Tabulated Results for Radiated Disturbance (3m measurement on Open Area Test Site, 30MHz-1GHz)										
FREQ	**Meter reading**	**Meter reading**	**Total factor**	**Field level**	**Field level**	**Pol**	**Antenna height**	**Table angle**	**Limit**	**Margin**
MHz	(QP) dBµV	(Pk) dBµV	dB	(QP) dBµV/m	(Pk) dBµV/m		cm	Degré	(QP) dBµV/m	dB
341,610	12,5	17,4	18,7	**31,2**	36,1	V	150	215	46	**-14,8**

Supplementary information:
Frequency list measured on the Open Area Test Site has been created with pre-scan results.
Test performed with AC mains cable (Worst case)

Frequency band investigated:	30MHz-1GHz
RBW:	120kHz
Measurement distance:	3m
Limit:	FCC Part 15.109
Final measurement detector:	Quasi-Peak
Wide Measurement Uncertainty:	± 5.2dB (k=2)
RESULT:	PASS
Field Strength Calculation:	The field strength (level) is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation is as follow: FS = RA + AF + CF – AG Where FS = Field Strength RA = Receiver Amplitude AF = Antenna Factor CF = Cable Factor AG = Amplifier Gain Total factor (dB) is AF + CF – AG Margin value = Emission level – Limit value

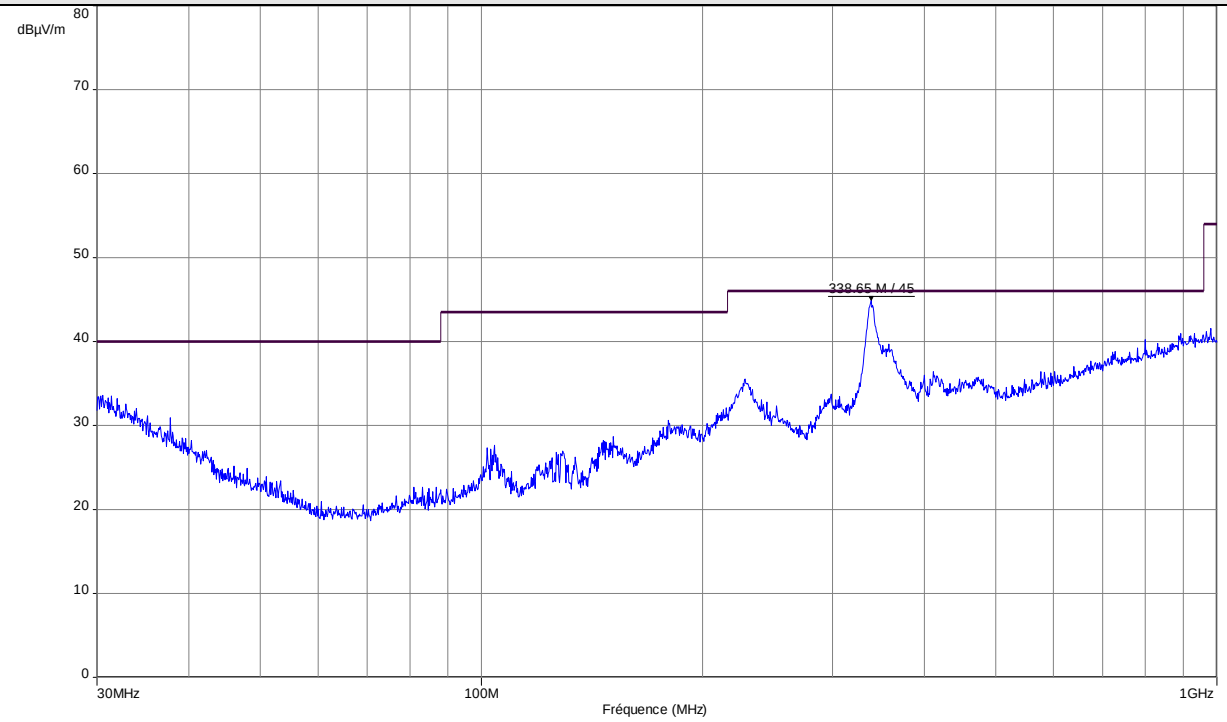
Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 30MHz-1GHz / 3m / Horizontal) – Powered by AC mains



Note: Pre-scan graph only for identification purpose.

------ : Peak measure	------ : Class B limit (3m)	

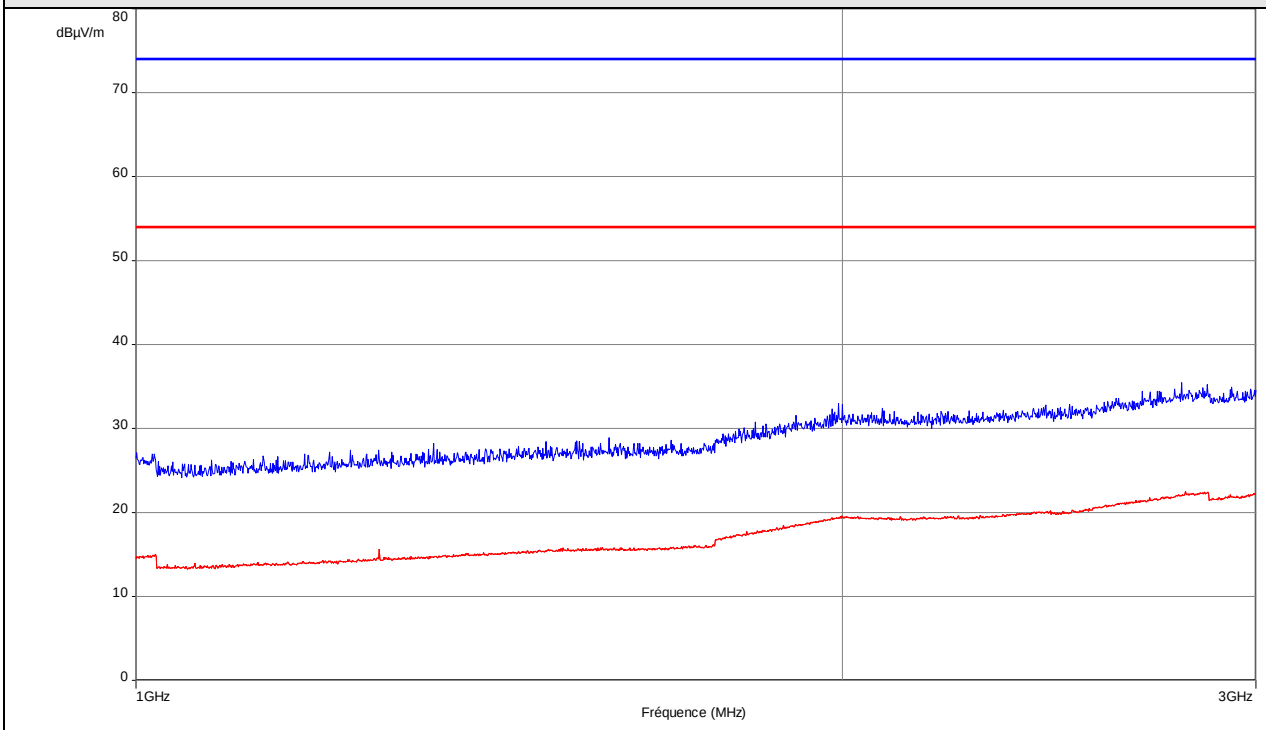
Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 30MHz-1GHz / 3m / Vertical) – Powered by AC mains



Note: Pre-scan graph only for identification purpose.

------ : Peak measure	------ : Class B limit (3m)	

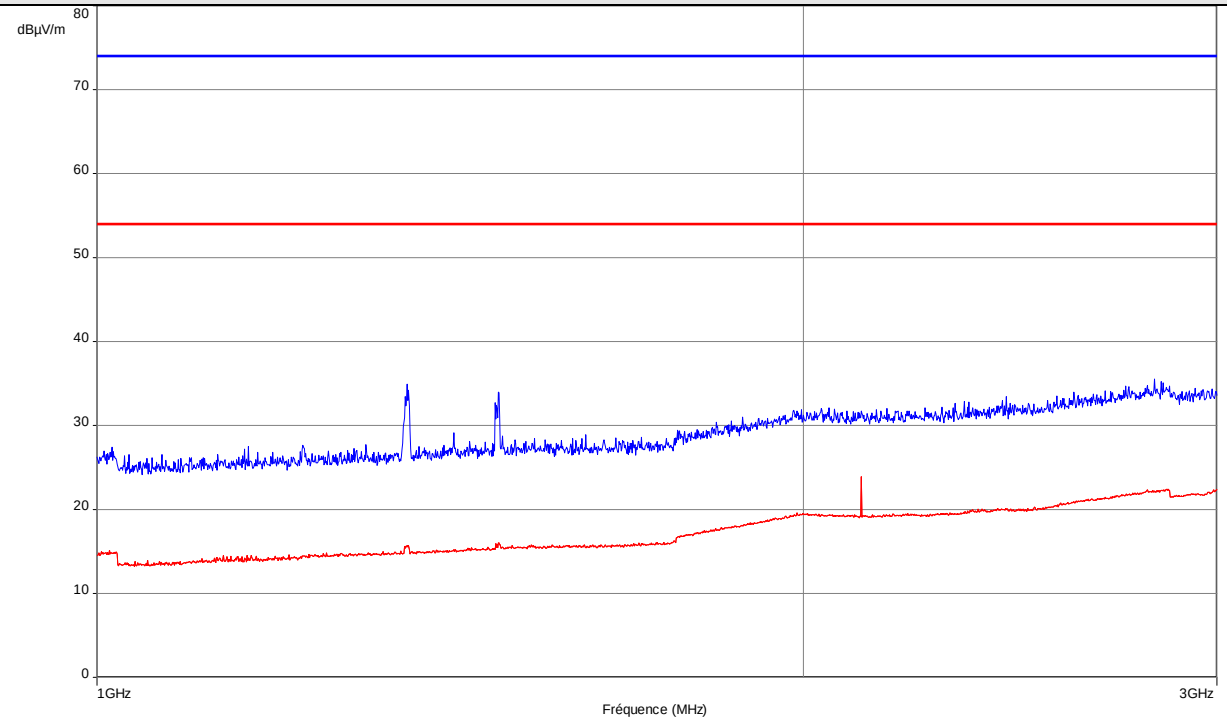
Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 1GHz-2GHz / 3m / Horizontal) – Powered by AC mains



Note: Pre-scan graph only for identification purpose.

------ : Peak measure / limit	------ : Average measure / limit	

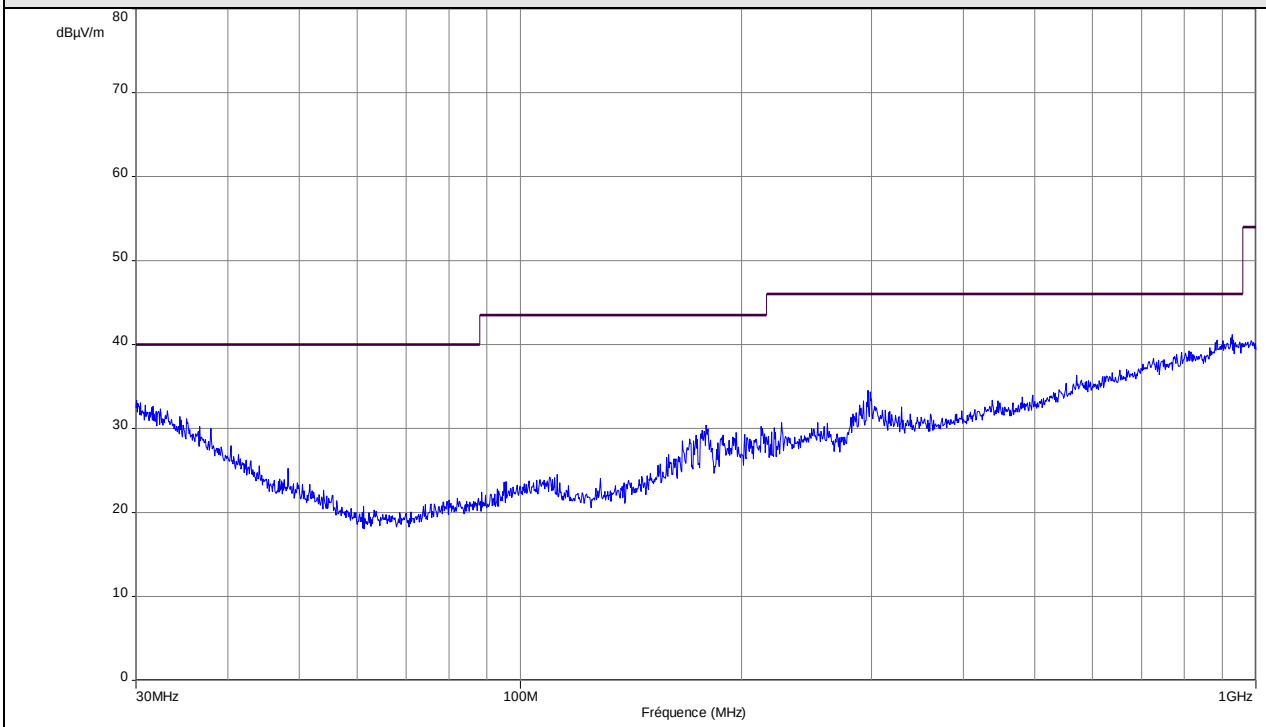
Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 1GHz-2GHz / 3m / Vertical) – Powered by AC mains



Note: Pre-scan graph only for identification purpose.

------ : Peak measure / limit	------ : Average measure / limit	

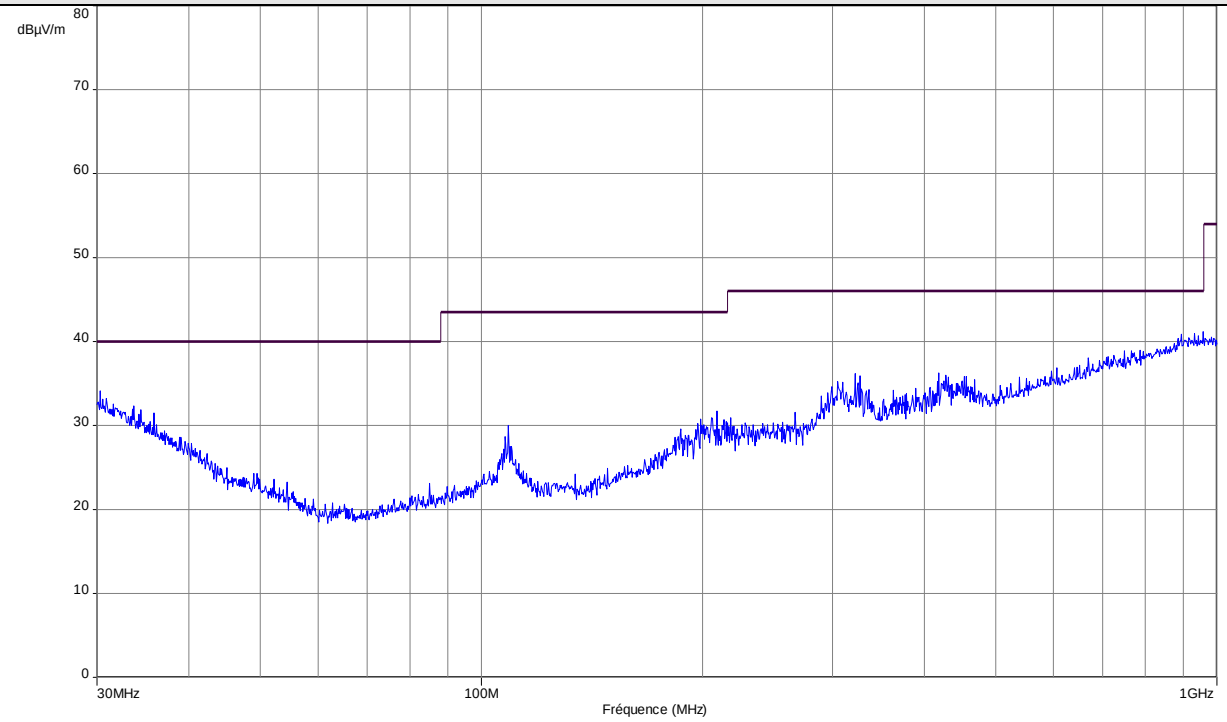
Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 30MHz-1GHz / 3m / Horizontal) – Powered by battery



Note: Pre-scan graph only for identification purpose.

------ : Peak measure	------ : Class B limit (3m)	

Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 30MHz-1GHz / 3m / Vertical) – Powered by battery



Note: Pre-scan graph only for identification purpose.

------ : Peak measure	------ : Class B limit (3m)	