EMITECH GROUPE

RR051-17-103248-1-A Ed. 0

Certification Radio test report

According to the standard:
CFR 47 FCC PART 15

Equipment under test:
CARD PRINTER SPECTRUM

FCC ID: ZFX0020

Company:
EVOLIS

Distribution: Mrs BEAUDUSSEAU **(Company:** EVOLIS**)**

Number of pages: 45 with 7 appendixes

Ed.	Date	Modified Page(s)	Technical Verification and Quality Approval Name and Function / Visa
0	29-Sep-17	Creation	T. LEDRESSEUR, Radio Technician

Duplication of this document is only permitted for an integral photographic facsimile. It includes the number of pages referenced here above.
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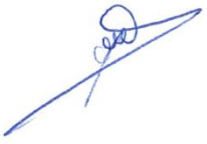
S51 RTY 000 INT 00002 [00]

DESIGNATION OF PRODUCT:	***CARD PRINTER SPECTRUM***
Serial number (S/N):	Z7301596
Reference / model (P/N):	SPECTRUM
Software version:	4.6
MANUFACTURER:	EVOLIS

COMPANY SUBMITTING THE PRODUCT:

Company:	EVOLIS
Address:	14 AVENUE DE LA FONTAINE ZI ANGERS BEAUCOUZE FRANCE
Responsible:	Mrs BEAUDUSSEAU
Persons present during the tests:	Mr GODARD (For the beginning)
DATES OF TEST:	From 2-Aug-17 to 4-Aug-17
TESTING LOCATION:	EMITECH ANGERS laboratory at JUIGNE SUR LOIRE (49) FRANCE FCC Accredited under US-EU MRA Designation Number: FR0009 Test Firm Registration Number: 873677
TESTED BY:	M. DUMESNIL ***VISA:***
WRITTEN BY:	M. DUMESNIL



CONTENTS

1. INTRODUCTION

This report presents the results of radio test carried out on the following radio equipment: **CARD PRINTER SPECTRUM**, in accordance with normative reference.

2. PRODUCT DESCRIPTION

ITU Emission code:	138HA1D
Class:	B
Utilization:	Card printer
Antenna type and gain:	Integral antenna (unknown gain)
Operating frequency range:	From 13.11 MHz to 14.01 MHz
Number of channels:	1
Channel spacing:	Not concerned
Modulation:	RFID
Power source:	2 x 120Vac – 60 Hz

Power level, frequency range and channels characteristics are not user adjustable.
The details pictures of the product and the circuit boards are joined with this file.

3. NORMATIVE REFERENCE

The standards and testing methods related throughout this report are those listed below.
They are applied on the whole test report even though the extensions (version, date and amendment) are not repeated.

CFR 47 FCC Part 15 (2017)	Radio Frequency Devices
ANSI C63.4	2014 Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
ANSI C63.10	2013 Procedures for ComplianceTesting of Unlicensed Wireless Devices.
447498 D01 General RF Exposure Guidance v06	RF Exposure procedures and equipment authorization policies for mobile and portable equipment

4. TEST METHODOLOGY

Radio performance tests procedures given in CFR 47 part 15:

Subpart A –General

Paragraph 19: labelling requirements
Paragraph 21: information to user

Subpart B –Unintentional Radiators

Paragraph 105: information to the user
Paragraph 107: Conducted limits
Paragraph 109: Radiated emission limits
Paragraph 111: Antenna power conduction limits for receivers

Subpart C – Intentional Radiators

Paragraph 203: Antenna requirement
Paragraph 205: Restricted bands of operation
Paragraph 207: Conducted limits
Paragraph 209: Radiated emission limits; general requirements
Paragraph 212: Modular transmitter
Paragraph 215: Additional provisions to the general radiated emission limitations
Paragraph 225: Operation within the band 13.110-14.010 MHz

5. TEST EQUIPMENT CALIBRATION DATES

Emitech Number	Model	Type	Last verification	Next verification	Validity
0000	BAT-EMC V3.6.0.32	Software	/	/	/
1406	EMCO 6502	Loop antenna	13/04/2017	13/04/2019	13/06/2019
4088	R&S FSP40	Spectrum Analyzer	29/10/2015	29/10/2017	29/12/2017
7566	Testo 608-Hi	Meteo station	15/02/2016	15/02/2018	15/04/2018
8508	California instruments 1251RP	Power source	12/12/2016	12/12/2017	12/02/2018
8511	HP 8447D	Low-noise amplifier	28/11/2016	28/11/2017	28/01/2018
8523	R&S FSEM30	Spectrum analyzer	25/08/2016	25/08/2018	25/10/2018
8526	Schwarzbeck VHBB 9124	Biconical antenna	12/06/2015	12/06/2018	12/08/2018

Emitech Number	Model	Type	Last verification	Next verification	Validity
8528	Schwarzbeck VHA 9103	Biconical antenna	15/03/2016	15/03/2019	15/05/2019
8535	EMCO 3115	Antenna	10/02/2016	10/02/2020	10/04/2020
8543	Schwarzbeck UHALP 9108A	Log periodic antenna	12/06/2015	12/06/2018	12/08/2018
8593	SIDT Cage 2	Anechoic chamber	/	/	/
8641	SECRE ETP232	High-pass filter	04/05/2017	04/05/2019	04/07/2019
8707	R&S ESI7	Test receiver	07/06/2016	07/06/2018	07/08/2018
8719	Thurbly Thandar Instruments 1600	LISN	06/04/2016	06/04/2018	06/06/2018
8720	R&S ESH3-Z5	LISN	28/11/2016	28/11/2018	28/01/2019
8732	Emitech	OATS	11/10/2016	11/10/2019	11/12/2019
8750	La Crosse Technology WS-9232	Meteo station	23/09/2016	23/09/2018	23/11/2018
8783	EMCO 3147	Log periodic antenna	15/03/2016	15/03/2019	15/05/2019
8864	Champ libre Juigné. V3.4	Software	/	/	/
8869	Load 50 Ω 1250-0256	HP	11/04/2016	11/04/2018	11/06/2018
8893	Emitech	Outside room Hors cage	/	/	/
8896	ACQUISYS GPS8	Satellite synchronized frequency standard	/	/	/
9489	Absorber sheath current	Emitech	21/04/2016	21/04/2018	21/06/2018
10739	LUCIX Corp S005180M3201	Low-noise amplifier	29/03/2017	29/03/2018	29/05/2018
10751	CLIMATS EXCAL 7714-HA	Climatic chamber	/	/	/
14476	Fluke 177	Multimeter	20/03/2017	20/03/2018	20/05/2018
/	GPIBShot V2.4	Software	/	/	/

6. TESTS RESULTS SUMMARY

6.1 general (subpart A)

Test procedure	Description of test	Respected criteria?				Comment
		Yes	No	NAp	NAs	
FCC Part 15.19	LABELLING REQUIREMENTS	X				*See certification documents*
FCC Part 15.21	INFORMATION TO USER	X				*See certification documents*

NAp: Not Applicable NAs: Not Asked

6.2 unintentional radiator (subpart B)

Test procedure	Description of test	Respected criteria?				Comment
		Yes	No	NAp	NAs	
FCC Part 15.105	INFORMATION TO THE USER	X				*See certification documents*
FCC Part 15.107	CONDUCTED LIMITS	X				*Class B Note 1*
FCC Part 15.109	RADIATED EMISSION LIMITS	X				*Class B Note 1*
FCC Part 15.111	ANTENNA POWER CONDUCTED LIMITS FOR RECEIVER			X		

NAp: Not Applicable NAs: Not Asked

Note 1: When the product is switched on the RFID is activated and in emission. For this reason the results of Subpart B and C are identical and that's why only the subpart C is mentioned on this test report.

6.3 intentional radiator (subpart C)

Test procedure	Description of test	Respected criteria?				Comment
		Yes	No	NAp	NAs	
FCC Part 15.203	ANTENNA REQUIREMENT	X				*Note 1*
FCC Part 15.205	RESTRICTED BANDS OF OPERATION	X				
FCC Part 15.207	CONDUCTED LIMITS	X				
FCC Part 15.209	RADIATED EMISSION LIMITS; general requirements	X				*Note 2*
FCC Part 15.212	MODULAR TRANSMITTERS			X		
FCC part 15.215	ADDITIONAL PROVISIONS TO THE GENERAL RADIATED EMISSION LIMITATIONS					
	(a) Alternative to general radiated emission limits	X				
	(b) Unwanted emissions outside of §15.225 frequency bands	X				*Note 3*
	(c) 20 dB bandwidth and band-edge compliance	X				
FCC Part 15.225	OPERATION WITHIN THE BAND 13.110-14.010 MHZ					
	(a) Field strength within the band 13.553-13.567 MHz	X				
	(b) Field strength within the bands 13.410-13.553 MHz and 13.567-13.710 MHz	X				
	(c) Field strength within the bands 13.110-13.410 MHz and 13.710-14.010 MHz	X				
	(d) Field strength outside the band 13.110-14.010 MHz	X				
	(e) Carrier frequency tolerance	X				
	(f) Powered tags		X			

NAp: Not Applicable NAs: Not Asked

Note 1: Integral and dedicated antenna without standard connector.

Note 2: See FCC part 15.225 (d).

Note 3: See FCC part 15.209. Unwanted emissions levels are all below the fundamental emission field strength level.

RF EXPOSURE:

Maximum measured power = 97.48 dBµV/m = 22.45 x 10^{-6} W at 13.56 MHz
with $P = (E \times d)^2 / (30 \times Gp)$ *with d = 3 m and Gp = 1*

In accordance with KDB 447498 D01 General RF Exposure Guidance v06:

PSD= $EIRP/(4*\pi*R^{2)}$

⇨ 22.45 x 10^{-6} $/(4*\pi*(20\ cm)^2)$= ***0.004 x 10-6 mW/cm² (limit = 0.97 mW/cm²)***

The equipment fulfils the requirements on power density for general population/uncontrolled exposure and therefore fulfils the requirements of 47 CFR §1.1310.

7. MEASUREMENT UNCERTAINTY

To declare, or not, the compliance with the specifications, it was not explicitly taken into account of uncertainty associated with the result(s)

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for normal distribution corresponds to a coverage probability of approximately 95%.

Parameter	Emitech Uncertainty
RF power, conducted	± 0.75dB
Radiated emission valid to 26 GHz F < 62.5 MHz: 62.5 MHz < F < 1 GHz: 1 GHz < F < 26 GHz:	 ± 5.14 dB ± 5.13 dB ± 5.16 dB
AC Power Lines conducted emissions	± 3.38 dB
Temperature	± 1 °C
Humidity	± 5 %

8. CONDUCTED LIMITS

Temperature (°C) : 27.4 **Humidity (%HR):** 39.6 **Date :** August 3, 2017

Technician : M. DUMESNIL

Standard: FCC Part 15

Test procedure: Paragraph 15.107

Limits: Class B

Software used: BAT-EMC V3.6.0.32

Test set up:

The EUT is isolated and placed on a wooden table, 0.8 m over an horizontal reference plane and 0.4 m from a vertical reference plane. It is powered by an artificial main network placed on the ground reference plane.
The equipment is powered with the AC power operating voltage of 120 V / 60 Hz.

See photos in appendix 2

Frequency range: 150 kHz - 30 MHz

Detection mode: Peak / Average

Bandwidth: 10 kHz / 9 kHz

Equipment under test operating condition:

The equipment is blocked in alternance of emission and reception mode with tag. The card printing is active.

Measure is first realized on power supply of printer with 50Ω load on RSIL of power supply of the PC card and next realized on power supply of PC card with 50Ω load on RSIL of power supply of the printer

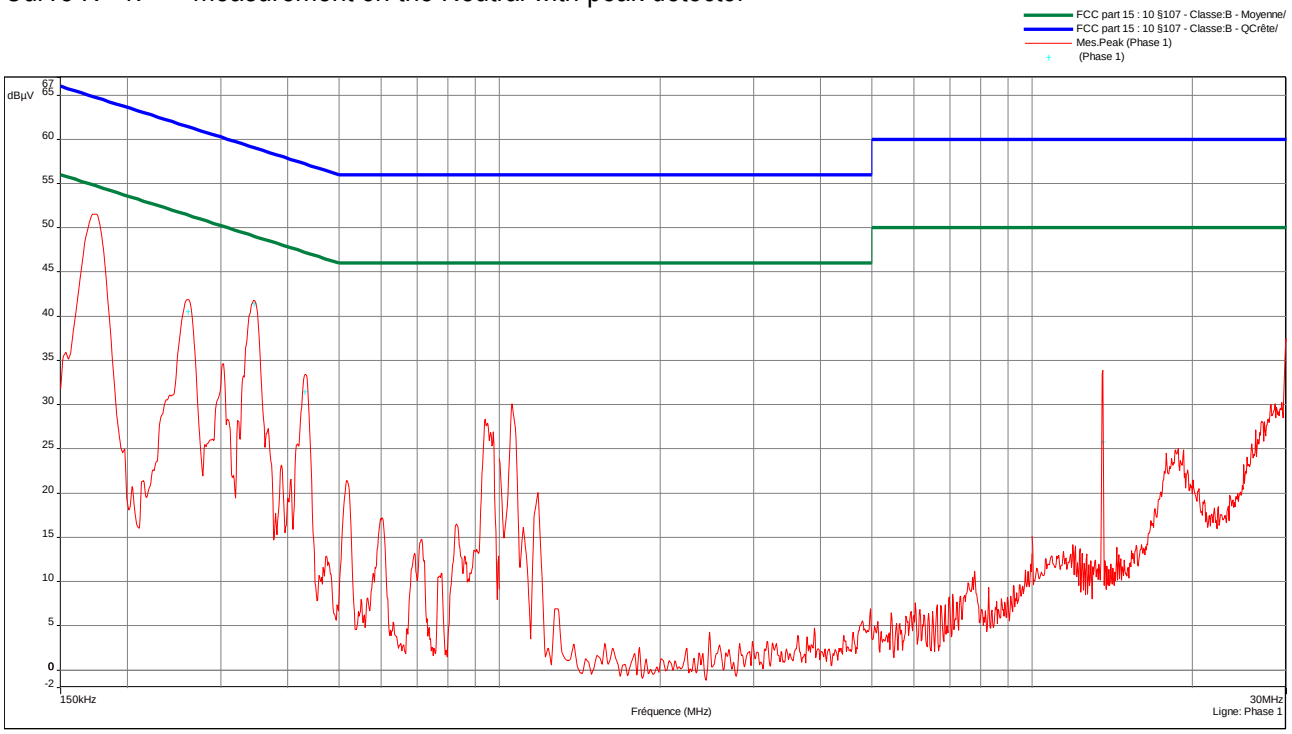
Results:

Sample N° 1:

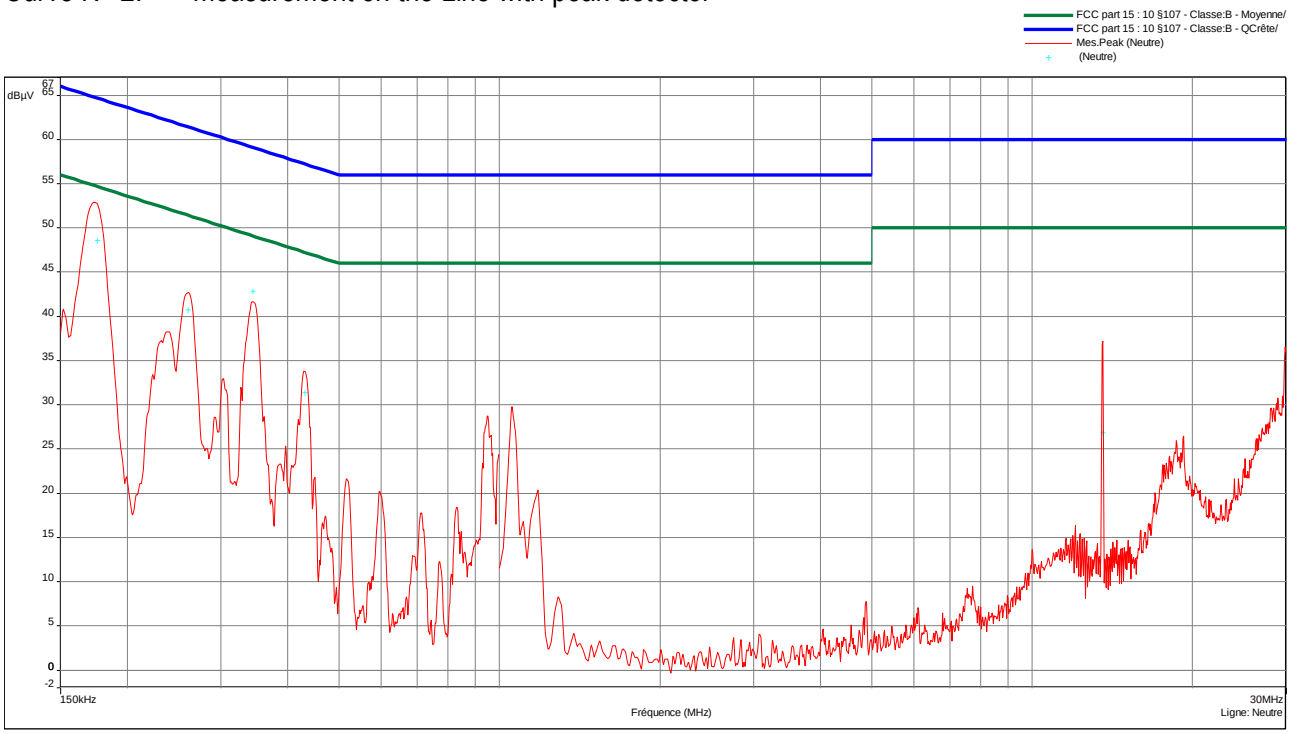
Measurement on the mains power supply of the Printer

The measurement is first realized with Peak detector.

Curve N° 1: measurement on the Neutral with peak detector



Curve N° 2: measurement on the Line with peak detector



The frequencies which are not 6 dB under the Quasi-peak limit are then analyzed with Quasi-peak detector:

Neutral

Frequency (MHz)	Quasi-peak (dBµV)	QP Limit (dBµV)	QP margin (dB)
0.175755	46.61	64.684	18.074
0.26067	38.94	61.410	22.470
0.34414	41.15	59.103	17.953
0.43101	29.81	57.233	27.423
13.566	25.77	60.000	34.230

Line

Frequency (MHz)	Quasi-peak (dBµV)	QP Limit (dBµV)	QP margin (dB)
0.26067	37.9	61.410	23.510
0.345925	37.66	59.060	21.400
0.43118	27.83	57.230	29.400
13.566	23.74	60.000	36.260

The frequencies which are not 6 dB under the Average limit are then analyzed with Average detector:

Neutral

Frequency (MHz)	Quasi-peak (dBµV)	QP Limit (dBµV)	QP margin (dB)
0.175755	39.750	54.684	14.934
0.26067	32.070	51.410	19.340
0.34414	35.21	49.103	13.893
0.43101	20.16	47.233	27.073
13.566	26.15	50.000	23.850

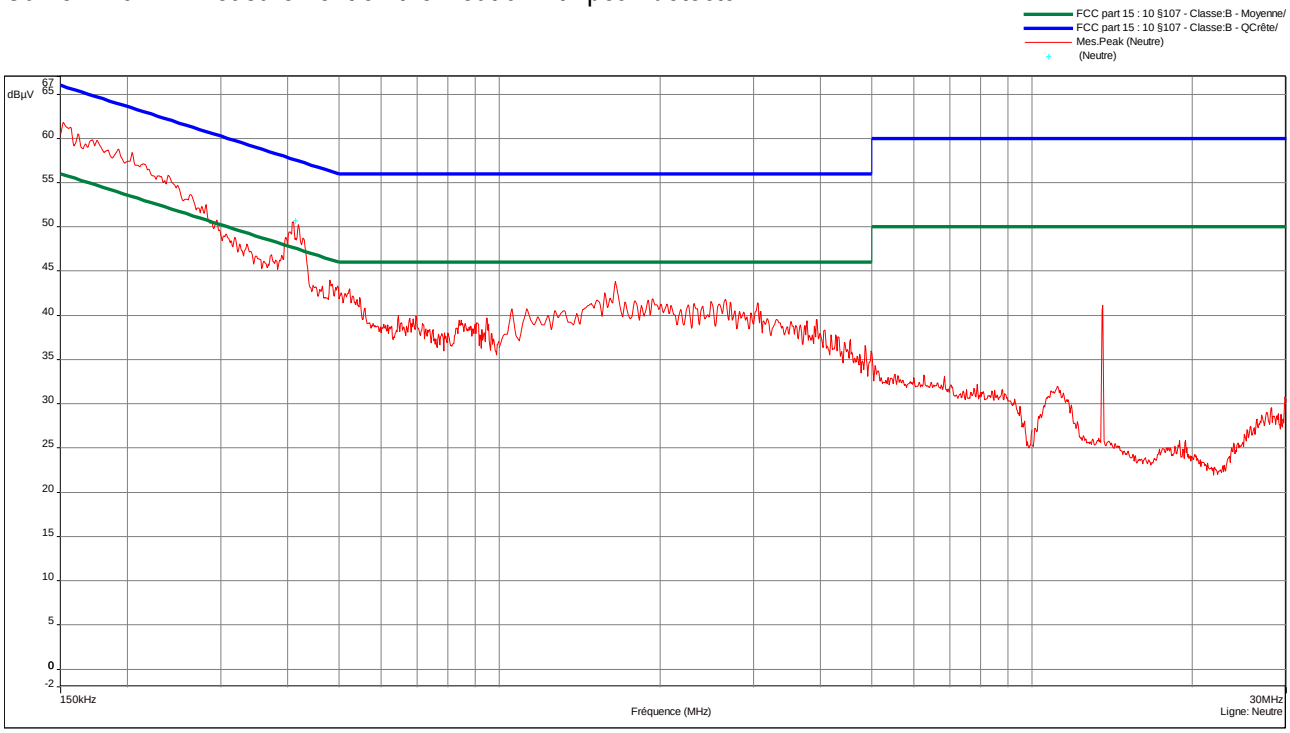
Line

Frequency (MHz)	Quasi-peak (dBµV)	QP Limit (dBµV)	QP margin (dB)
0.26067	31.87	51.410	19.540
0.345925	33.31	49.060	15.750
0.43118	23.43	47.230	23.800
13.566	23.470	50.000	26.530

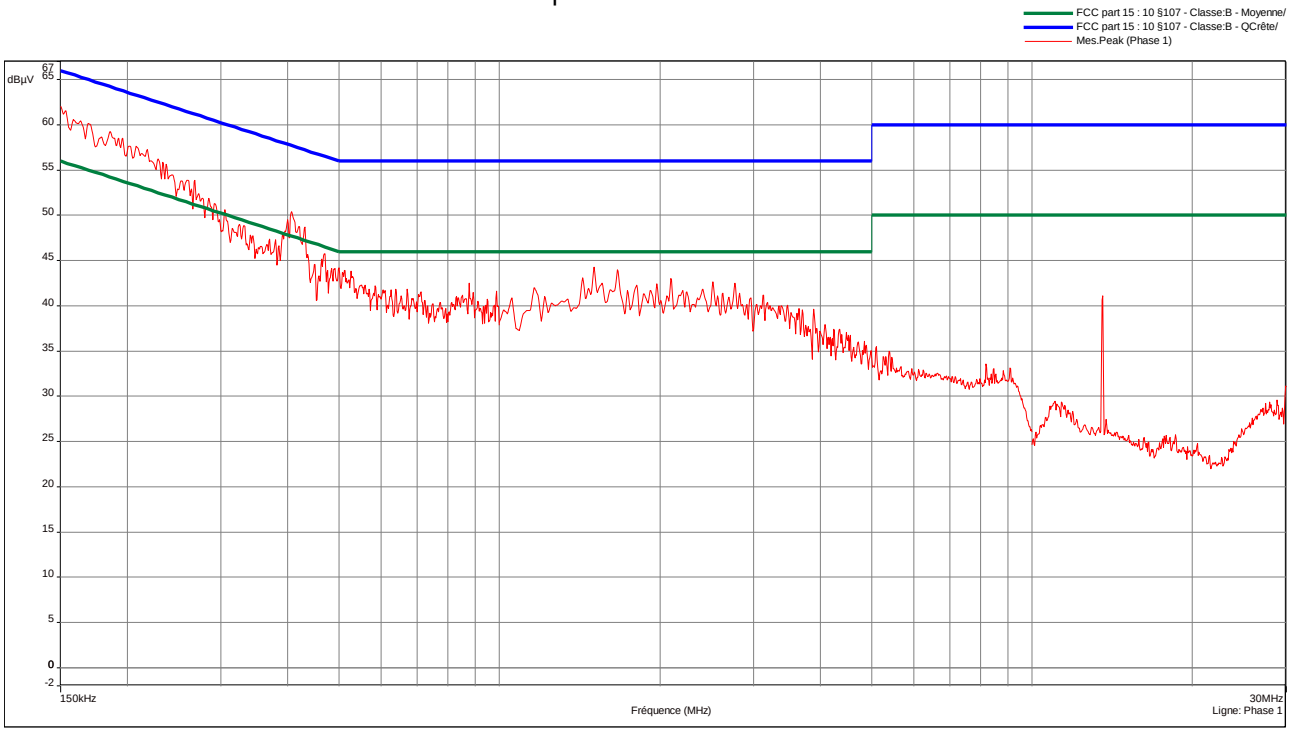
Measurement on the mains power supply of the PC card

The measurement is first realized with Peak detector.

Curve N° 3: measurement on the Neutral with peak detector

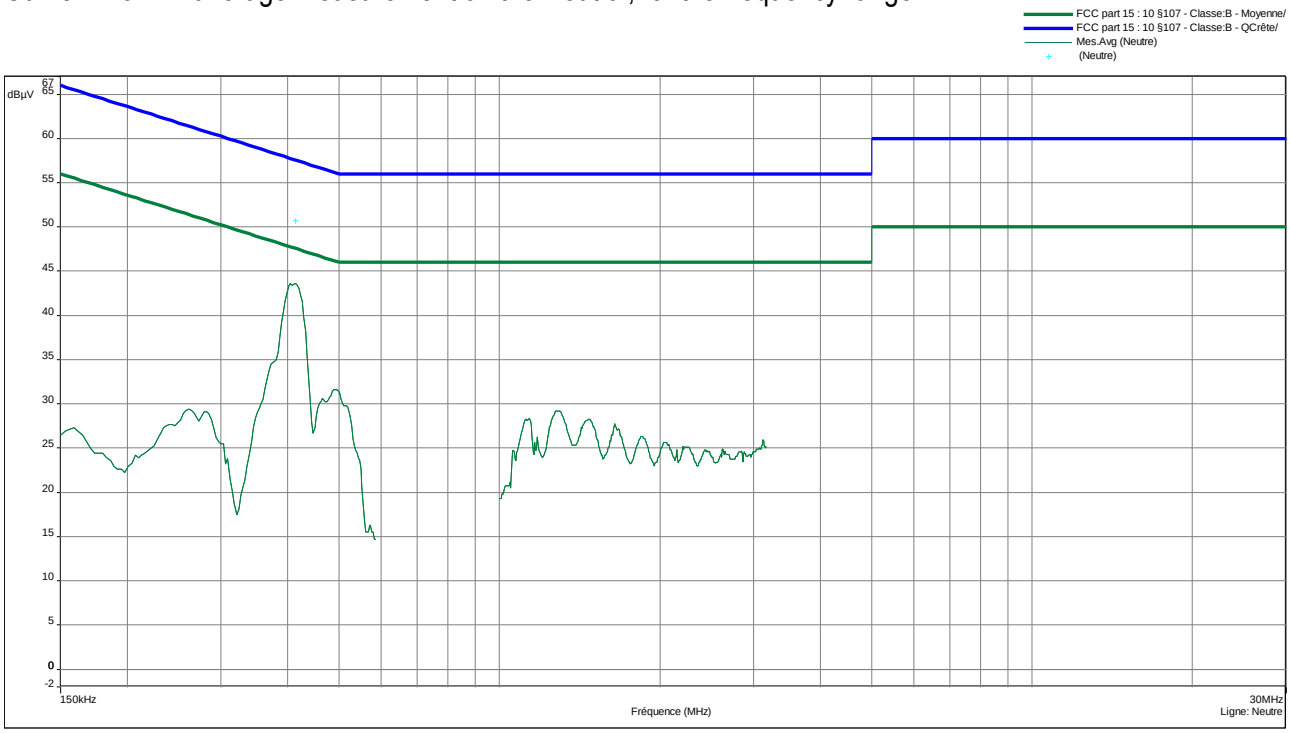


Curve N° 4: measurement on the Line with peak detector

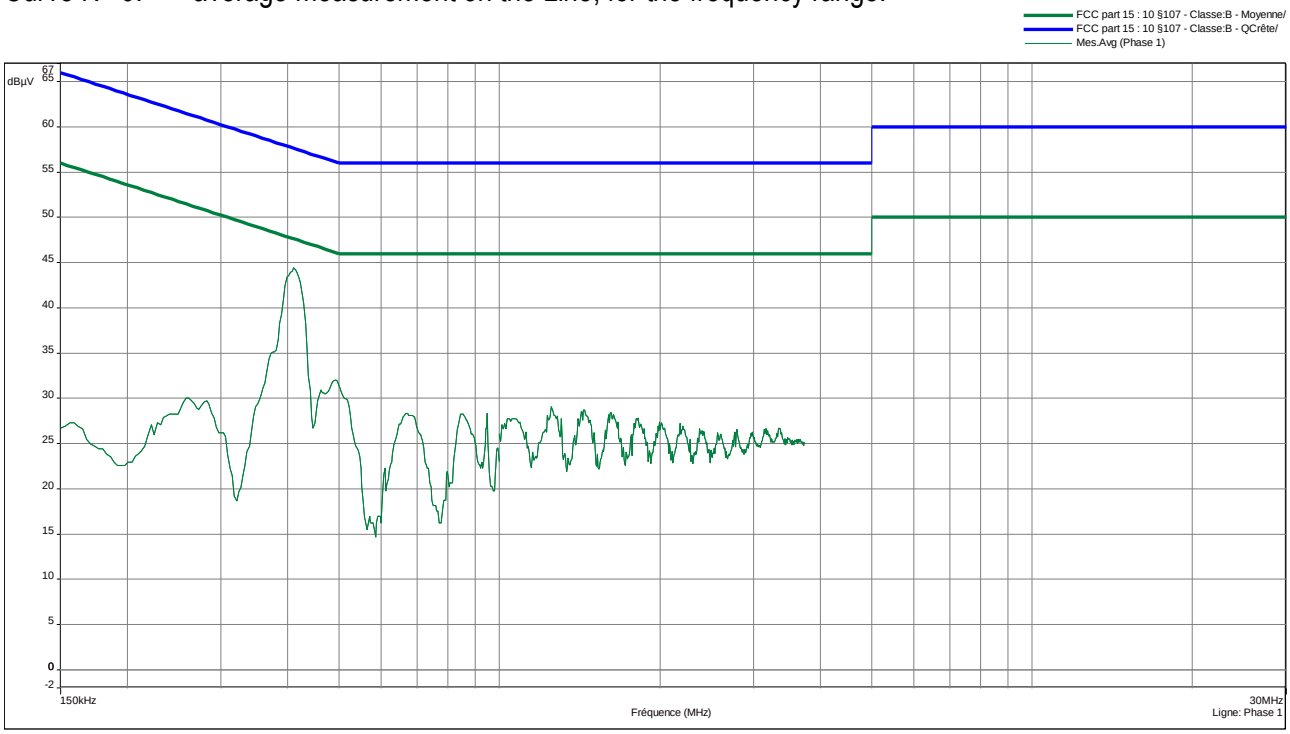


The frequencies which are not 6 dB under the Quasi-peak limit are then analyzed with Quasi-peak detector.
The frequencies which are not 6 dB under the Average limit are then analyzed with Average detector.

Curve N° 5: average measurement on the Neutral, for the frequency range:



Curve N° 6: average measurement on the Line, for the frequency range:



Test conclusion:

RESPECTED STANDARD

9. *RADIATED EMISSION LIMITS*

Temperature (°C) : 25.1 **Humidity (%HR):** 46.1 **Date :** August 2, 2017 and August 3, 2017

Technician : M. DUMESNIL

Standard: FCC Part 15

Test procedure: paragraph 109

Limit class: Class B

Test set up:

First an exploratory radiated measurement was performed. During this phase the product is oriented in this normal position.

The measure is realized on open area test site under 1 GHz and in anechoic chamber above 1 GHz.

When the system is tested in an open area test site (OATS), the EUT is placed on a rotating table, 0.8m from a ground plane.

When the system is tested in anechoic chamber, the EUT is placed on a rotating table, 1.5 m from a ground plane.

Zero degree azimuths correspond to the front of the device under test.

See photos in appendix 2.

Frequency range: From 30 MHz to 5th harmonic of the highest frequency used (1.6GHz).

Detection mode: Quasi-peak (F < 1 GHz) Average (F > 1 GHz)

Bandwidth: 120 kHz (F < 1 GHz) 1 MHz (F > 1 GHz)

Distance of antenna: 10 meters (in open area test site) / 3 meters (in anechoic room)

Antenna height: 1 to 4 meters (in open area test site) / 1.5 meter (in anechoic room)

Antenna polarization: vertical and horizontal (only the highest level is recorded)

Equipment under test operating condition:

The equipment is blocked in alternance of emission and reception mode with tag. The card printing is active.

Power source: 120 Vac – 60 Hz by an external power supply
Percentage of voltage variation during the test (%): ± 1

Results:

Sample N° 1

Frequencies (MHz)	Detector P QP Av	Antenna height (cm)	Azimuth (degree)	RBW (kHz)	Polarization H: Horizontal V: Vertical	Field strength Measured at 10 m (dBµV/m)	Field strength Computed at 3 m (dBµV/m)	Limits (dBµV/m)	Margin (dB)
58.22	QP	100	322	120	V	29.51	39.97	40	0.03
399.92	P	200	100	120	H	25.9	36.36	46	9.64
1600	P	150	/	1000	H	/	45.1 (1)	74	28.9
2178.1	P	150	/	1000	H	/	54 (1)	74	20
2293.3	P	150	/	1000	H	/	53.7 (1)	74	20.3
2433.1	P	150	/	1000	H	/	53.4 (1)	74	20.6
6385.6	P	150	/	1000	V	/	52.2 (1)	74	21.8

P= Peak, QP=Quasi-peak, Av=Average
(1) The peak level is lower or equal than the average limit (54 dBµV/m)

Applicable limits: for 30 MHz ≤ F ≤ 88 MHz : 40 dBµV/m at 3 meters
for 88 MHz < F ≤ 216 MHz : 43.5 dBµV/m at 3 meters
for 216 MHz < F ≤ 960 MHz : 46 dBµV/m at 3 meters
Above 960 MHz : 54 dBµV/m at 3 meters

Test conclusion:

RESPECTED STANDARD

10. CONDUCTED LIMITS

Temperature (°C) : 27.4 **Humidity (%HR):** 39.6 **Date :** August 3, 2017
Technician : M. DUMESNIL

Standard: FCC Part 15

Test procedure: Paragraph 15.207

Software used: BAT-EMC V3.6.0.32

Test set up:

The EUT is isolated and placed on a wooden table, 0.8 m over an horizontal reference plane and 0.4 m from a vertical reference plane. It is powered by an artificial main network placed on the ground reference plane.
The equipment is powered with the AC power operating voltage of 120 V / 60 Hz.

See photos in appendix 2

Frequency range: 150 kHz - 30 MHz

Detection mode: Peak / Average

Bandwidth: 10 kHz / 9 kHz

Equipment under test operating condition:

The equipment is blocked in alternance of emission and reception mode with tag. The card printing is active.

Measure is first realized on power supply of printer with 50Ω load on RSIL of power supply of the PC card and next realized on power supply of PC card with 50Ω load on RSIL of power supply of the printer

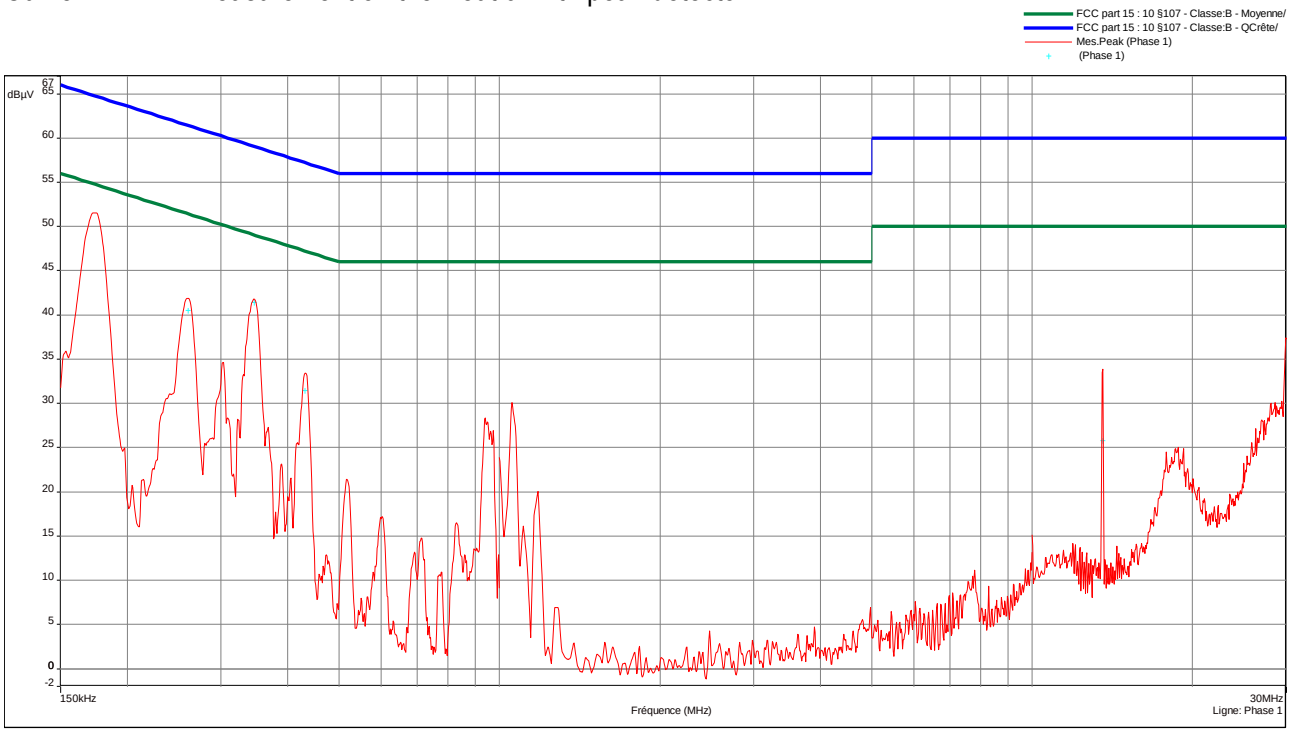
Results:

Sample N° 1:

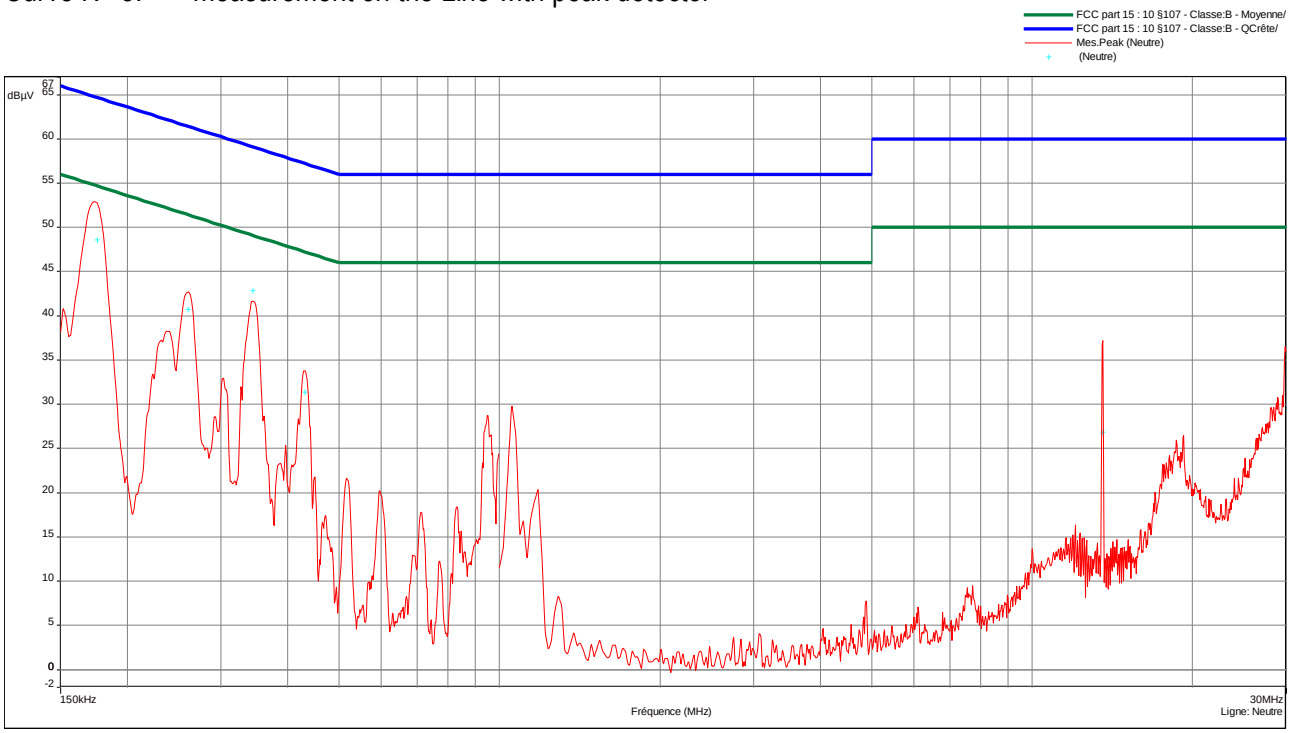
Measurement on the mains power supply of the Printer

The measurement is first realized with Peak detector.

Curve N° 7: measurement on the Neutral with peak detector



Curve N° 8: measurement on the Line with peak detector



The frequencies which are not 6 dB under the Quasi-peak limit are then analyzed with Quasi-peak detector:

Neutral

Frequency (MHz)	Quasi-peak (dBµV)	QP Limit (dBµV)	QP margin (dB)
0.175755	46.61	64.684	18.074
0.26067	38.94	61.410	22.470
0.34414	41.15	59.103	17.953
0.43101	29.81	57.233	27.423
13.566	25.77	60.000	34.230

Line

Frequency (MHz)	Quasi-peak (dBµV)	QP Limit (dBµV)	QP margin (dB)
0.26067	37.9	61.410	23.510
0.345925	37.66	59.060	21.400
0.43118	27.83	57.230	29.400
13.566	23.74	60.000	36.260

The frequencies which are not 6 dB under the Average limit are then analyzed with Average detector:

Neutral

Frequency (MHz)	Average (dBµV)	Average Limit (dBµV)	Average margin (dB)
0.175755	39.750	54.684	14.934
0.26067	32.070	51.410	19.340
0.34414	35.21	49.103	13.893
0.43101	20.16	47.233	27.073
13.566	26.15	50.000	23.850

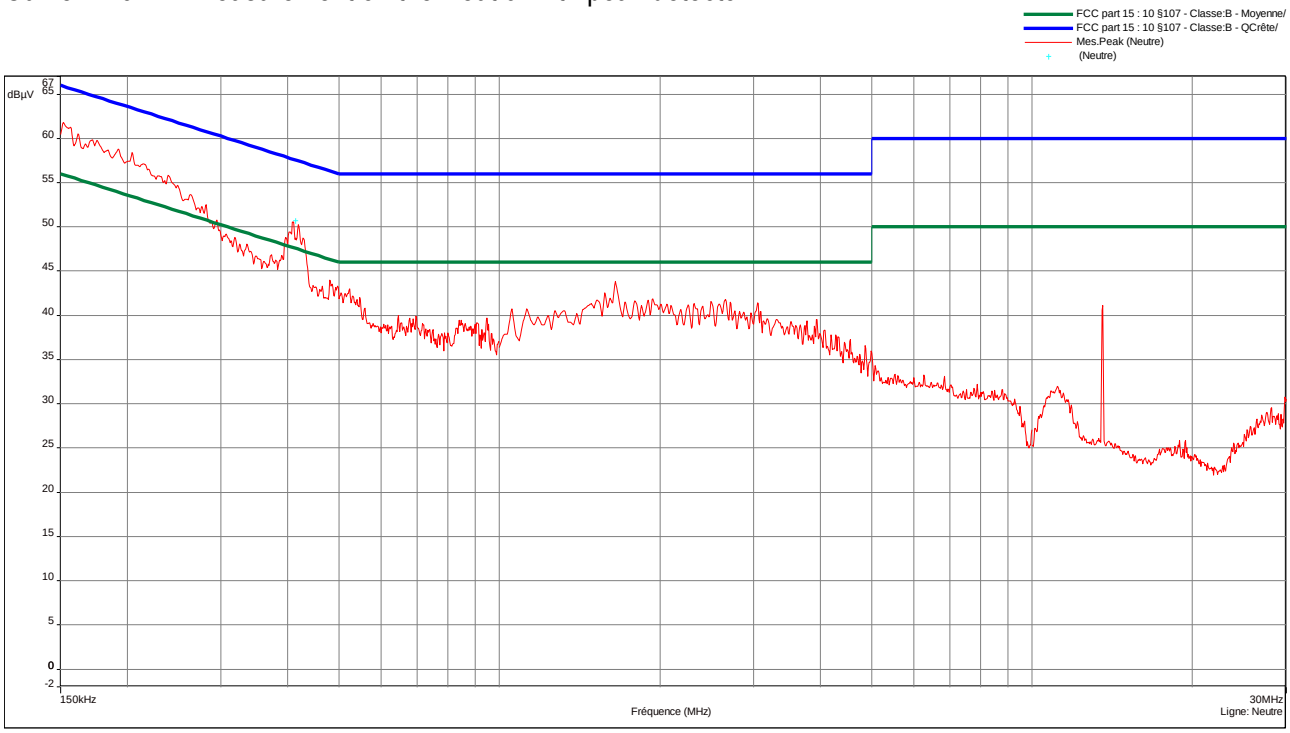
Line

Frequency (MHz)	Average (dBµV)	Average Limit (dBµV)	Average margin (dB)
0.26067	31.87	51.410	19.540
0.345925	33.31	49.060	15.750
0.43118	23.43	47.230	23.800
13.566	23.470	50.000	26.530

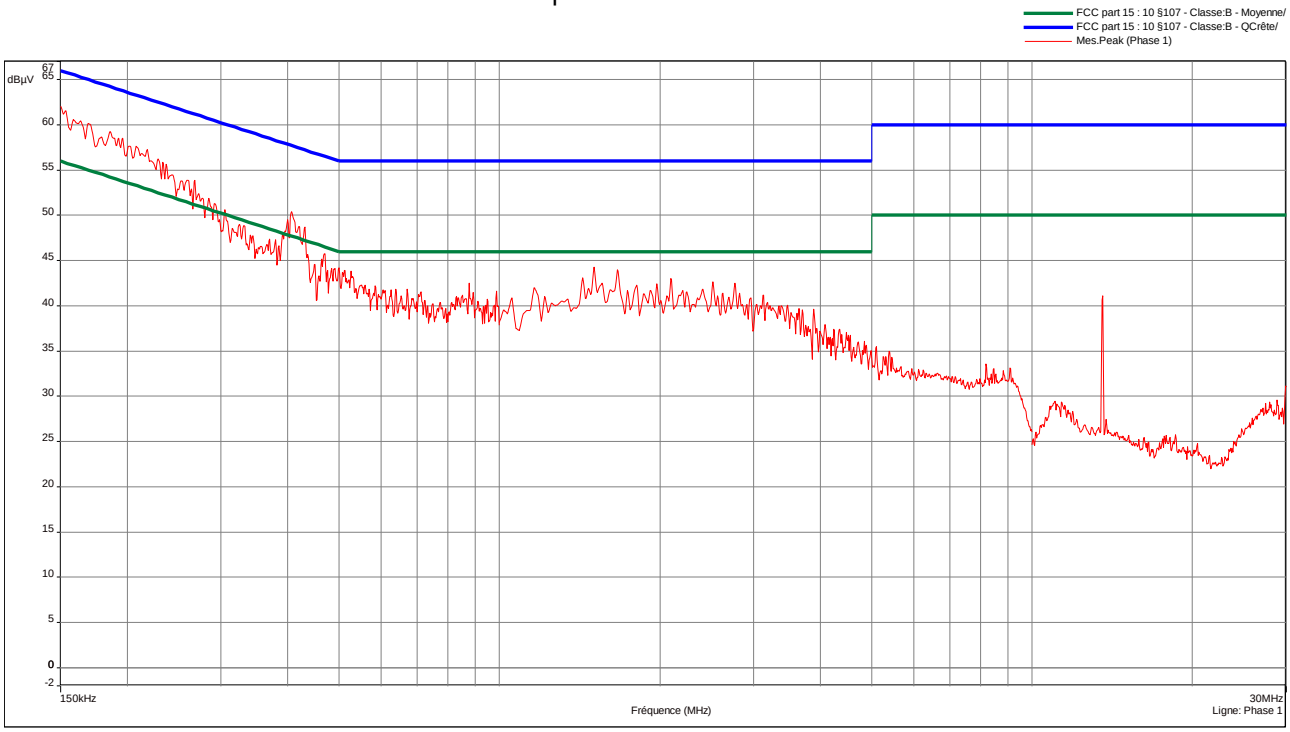
Measurement on the mains power supply of the PC card

The measurement is first realized with Peak detector.

Curve N° 9: measurement on the Neutral with peak detector

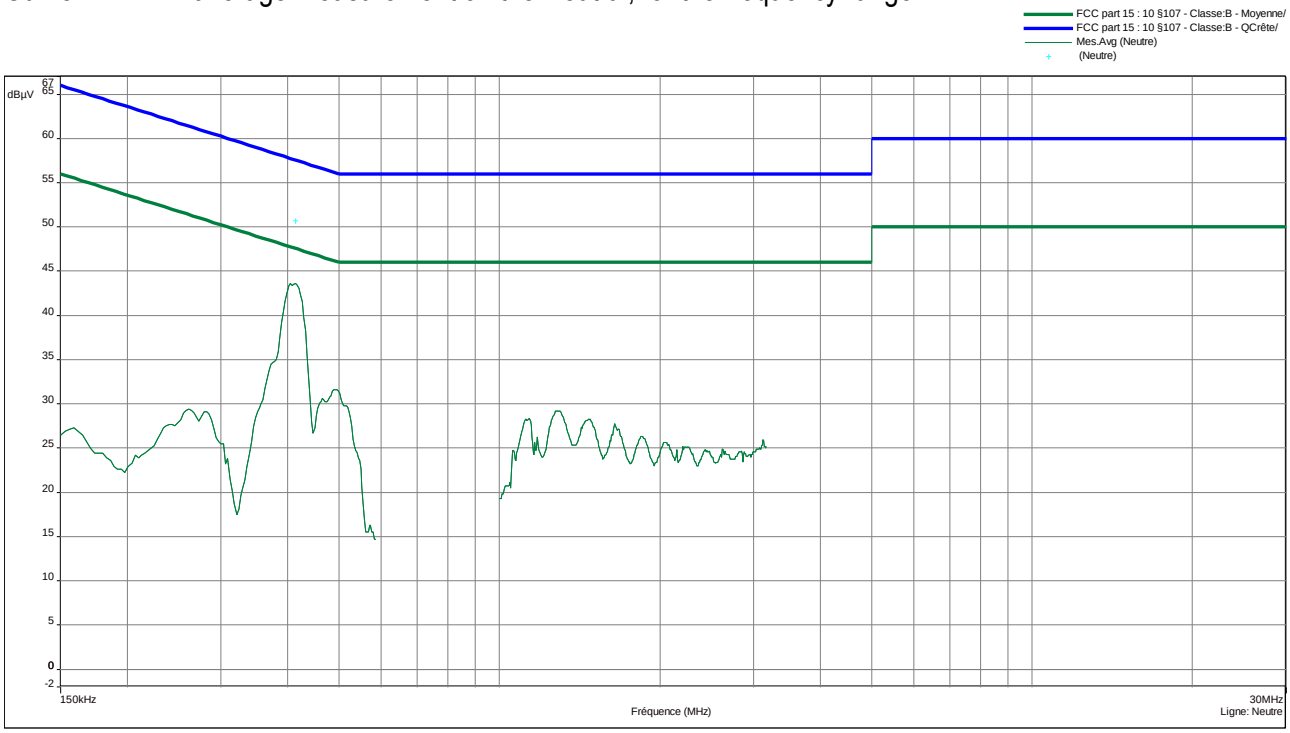


Curve N° 10: measurement on the Line with peak detector

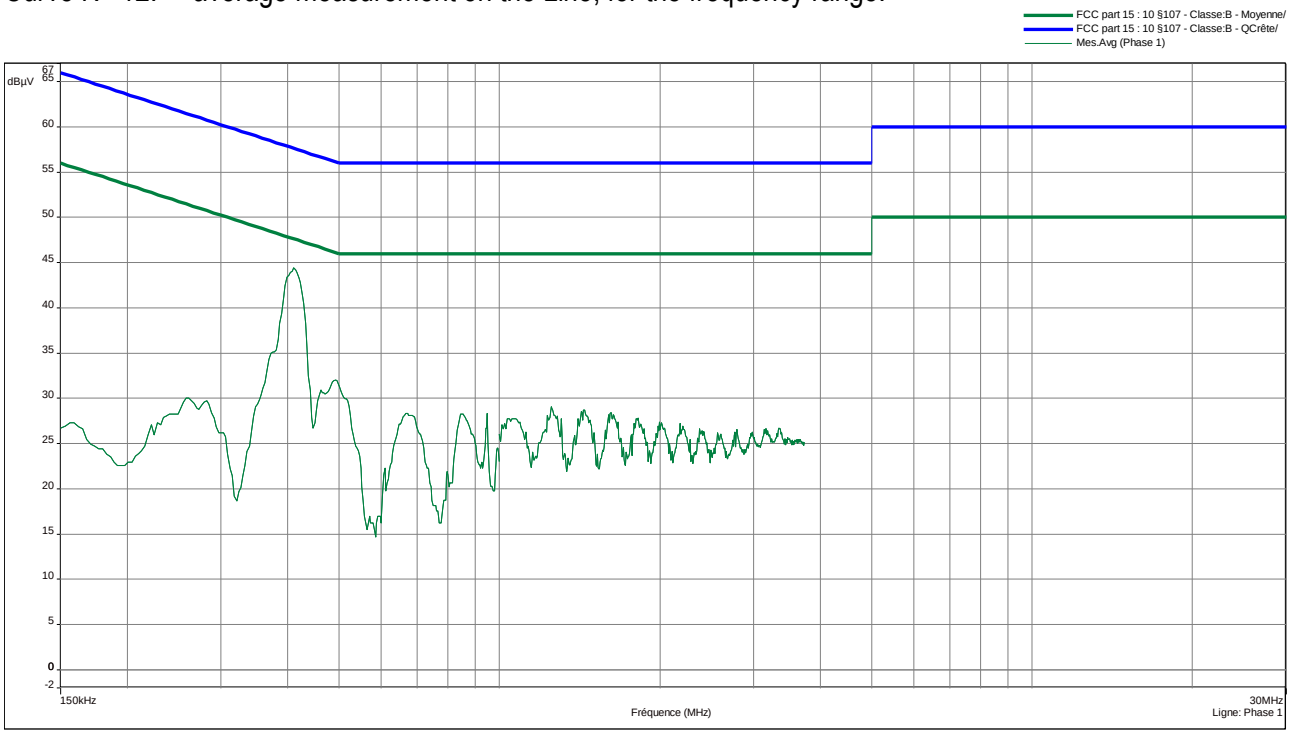


The frequencies which are not 6 dB under the Quasi-peak limit are then analyzed with Quasi-peak detector.
The frequencies which are not 6 dB under the Average limit are then analyzed with Average detector.

Curve N° 11: average measurement on the Neutral, for the frequency range:



Curve N° 12: average measurement on the Line, for the frequency range:



Test conclusion:

RESPECTED STANDARD

11. ADDITIONAL PROVISIONS TO THE GENERAL RADIATED EMISSION LIMITATIONS

Temperature (°C) : 26.5 **Humidity (%HR):** 49 **Date :** August 4, 2017
Technician : F. NOURRY

Standard: FCC Part 15

Test procedure: Paragraph 15.215

Test set up:

Test realized in near field. All field strength measurements are correlated with the radiated maximum peak output power

Test operating condition of the equipment:

The equipment is blocked in alternance of emission and reception mode with tag. The card printing is active.

Power source: 120 Vac – 60 Hz by an external power supply
Percentage of voltage variation during the test (%): ± 1

Results:

Lower Band Edge: From 13.090 MHz to 13.110 MHz
Upper Band Edge: From 14.010 MHz to 14.030 MHz

Sample N° 1:

Fundamental frequency (MHz)	Field Strength Level of fundamental (dBµV/m)	Detector (Peak or Average)	Frequency of maximum Band-edges Emission (MHz)	Delta Marker (dB) (2)	Calculated Max Out-of-Band Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
13.56	38.4	Peak	12.716312	-28.96	9.44	48.63	39.19
13.56	38.4	Peak	14.411703	-37.08	1.32	48.63	47.31

(2) Marker-Delta method

20 dB bandwidth curves are given in appendix 4; band-edge curves are given in appendix 6.

Test conclusion:

RESPECTED STANDARD

12. OPERATION WITHIN THE BAND 13.110 – 14.010 MHZ

Temperature (°C) : 25.1 **Humidity (%HR):** 46.1 **Date :** August 3, 2017 and September 4, 2017

Technician : M. DUMESNIL and F. NOURRY

Standard: FCC Part 15

Test procedure: paragraph 15.225 (a), (b), (c), (e)

Test set up:

The product is oriented in in this normal position.

The system is tested in an open area test site (OATS). The EUT is placed on a rotating table, 0.8 m from a ground plane. Zero degree azimuth corresponds to the front of the equipment under test.

See photos in appendix 2

The frequency tolerance measure is realized in near-field.

Detection mode: Quasi-peak (F < 1 GHz)

Bandwidth: 9 kHz (150 kHz < F < 30MHz)

Distance of antenna: 10 meters

Antenna height: 1 meter

Antenna polarization: oriented in the vertical plane. The lowest point of the loop is 1m above ground level.

Equipment under test operating condition:

The equipment is blocked in alternance of emission and reception mode with tag. The card printing is active.

Power source: 120 Vac – 60 Hz by an external power supply
Percentage of voltage variation during the test (%): ± 1

Results:

Sample N° 1:

Carrier field strength

	Field strength (dBµV/m) at frequency: 13.56 MHz
Normal test conditions measure at 10 m	38.4
Normal test conditions correlated at 30 m	57.48
Limits at 30m (dBµV/m)	84
Margin (dB)	26.52

Polarization of test antenna: perpendicular at the equipment at 0 degree.
Position of equipment: see photos in appendix 2 (azimuth: 253°)

Frequency stability

			Measured frequency difference (ppm)	Limits (ppm)
Normal test conditions	Temperature (°C): 20 Humidity (%):	Minimal power source (V): 102	+0.89	±100
		Maximal power source (V): 138	+0.59	
Extreme test conditions	Minimal temperature (°C): -20	Nominal power source (V): 120	0	
	Maximal temperature (°C): +50	Nominal power source (V): 120	+0.59	

Field strength within the band 13.110-14.010 MHz

See spectrum mask in appendix 7.

Test conclusion:

RESPECTED STANDARD

13. FIELD STRENGTH OUTSIDE THE BAND 13.110-14.01 MHZ

Temperature (°C) : 25.1 **Humidity (%HR):** 46.1 **Date :** August 2, 2017 and August 3, 2017

Technician : M. DUMESNIL

Standard: FCC Part 15

Test procedure: paragraph 209
paragraph 15.225 (d)

Test set up:

First an exploratory radiated measurement was performed. During this phase the product is oriented in this normal position.

The measure is realized on open area test site under 1 GHz and in anechoic chamber above 1 GHz.

When the system is tested in an open area test site (OATS), the EUT is placed on a rotating table, 0.8m from a ground plane.

When the system is tested in anechoic chamber, the EUT is placed on a rotating table, 1.5 m from a ground plane.

Zero degree azimuths correspond to the front of the device under test.

See photos in appendix 2.

Frequency range: From 9 kHz to 10th harmonic of the highest fundamental frequency (13.56 MHz) or 5th harmonic of the highest frequency used by the digital device (1.6 GHz), whichever is greater

Frequency range: From 9 kHz to 5th harmonic of the highest fundamental frequency (1.6 GHz).

Detection mode: Quasi-peak (F < 1 GHz) Peak / Average (F > 1 GHz)

Bandwidth: 200Hz (9 kHz < F < 150kHz)
9 kHz (150 kHz < F < 30MHz)
120 kHz (30 MHz < F < 1 GHz)
1 MHz (F > 1 GHz)

Distance of antenna: 10 meters (in open area test site) / 3 meters (in anechoic room)

Antenna height: 1 to 4 meters (in open area test site) / 1.5 meter (in anechoic room)

Antenna polarization: vertical and horizontal (only the highest level is recorded)

Equipment under test operating condition:

The equipment is blocked in alternance of emission and reception mode with tag. The card printing is active.

Power source: 120 Vac – 60 Hz by an external power supply
Percentage of voltage variation during the test (%): ± 1

Results:

Sample N° 1

Below 30 MHz

Frequencies (MHz)	Detector P QP Av	Antenna height (cm)	Azimuth (degree)	RBW (kHz)	Polarization (Parallel Perpendicular Horizontal)	Field strength Measured at 10 m (dBµV/m)	Field strength Computed at 30 m (dBµV/m)	Limits (dBµV/m)	Margin (dB)
27.12	P	100	0	9	Parallel	27,9	8.82	29.5	20.68

Above 30 MHz

Frequencies (MHz)	Detector P QP Av	Antenna height (cm)	Azimuth (degree)	RBW (kHz)	Polarization H: Horizontal V: Vertical	Field strength Measured at 10 m (dBµV/m)	Field strength Computed at 3 m (dBµV/m)	Limits (dBµV/m)	Margin (dB)
40.67 (3)	P	189	201	120	V	25.7	36.16	40	3.84
58.22	QP	100	322	120	V	29.51	39.97	40	0.03
108.48 (3)	P	107	259	120	V	24.4	34.86	43.5	8.64
399.92 (3)	P	200	100	120	H	25.9	36.36	46	9.64
1600	P	150	/	1000	H	/	45.1 (1)	74	28.9
2178.1	P	150	/	1000	H	/	54 (1)	74	20
2293.3	P	150	/	1000	H	/	53.7 (1)	74	20.3
2433.1	P	150	/	1000	H	/	53.4 (1)	74	20.6
6385.6	P	150	/	1000	V	/	52.2 (1)	74	21.8

P= Peak, QP=Quasi-peak, Av=Average
(1) The peak level is lower or equal than the average limit (54 dBµV/m)
(3) Restricted bands of operation in 15.205

Applicable limits: for 9 kHz ≤ F ≤ 490 kHz : 2400/F(kHz) at 300 meters
for 490 kHz < F ≤ 1.705 MHz : 24000/F(kHz) at 30 meters
for 1.705 MHz < F ≤ 30 MHz : 29.5 dBµV/m at 30 meters
for 30 MHz < F ≤ 88 MHz : 40 dBµV/m at 3 meters
for 88 MHz < F ≤ 216 MHz : 43.5 dBµV/m at 3 meters
for 216 MHz < F ≤ 960 MHz : 46 dBµV/m at 3 meters
Above 960 MHz : 54 dBµV/m at 3 meters

Test conclusion:

RESPECTED STANDARD

□□□ End of report, 7 appendixes to be forwarded □□□

APPENDIX 1: Photos of the equipment under test

External photos:

Ac adapter:

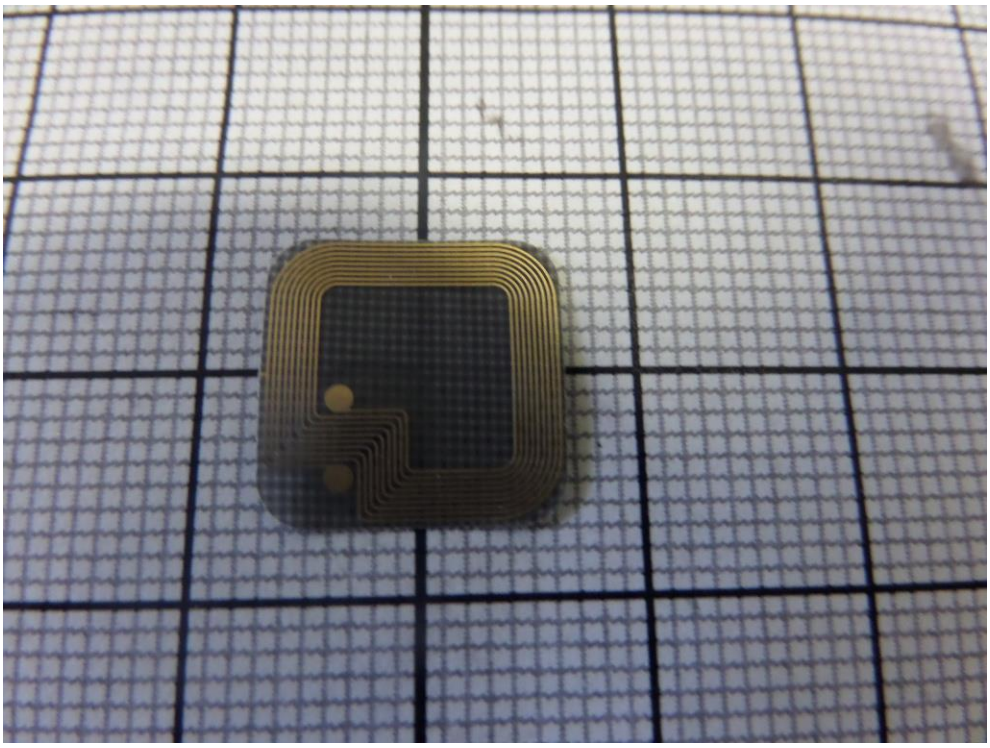

AC ADAPTER
MODEL /型号/型號/모델명: KPL-065M-VI
INPUT /输入/輸入/정격입력:
100-240V ~ 50/60Hz 1.7A
OUTPUT /输出/輸出/정격출력:
+24V ⎓ 2.71A 65W
EFFICIENCY LEVEL: VI
IS 13252 (Part 1)/
IEC 60950-1
R-41018279
LPS
RoHS


EV7-11-17110104-14833

Tag:


evolis


YMCKI RT
400 prints / roll
RT5F012NAA
© 2013 Evolis Card Printer.

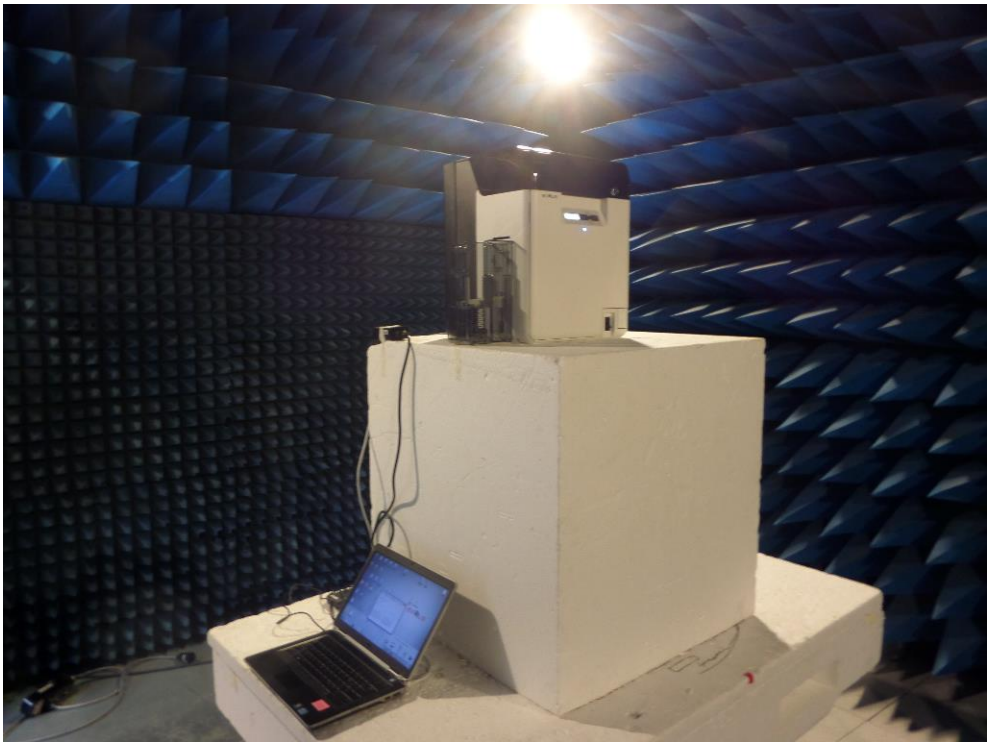


Internal photos:

CONFIDENTIAL

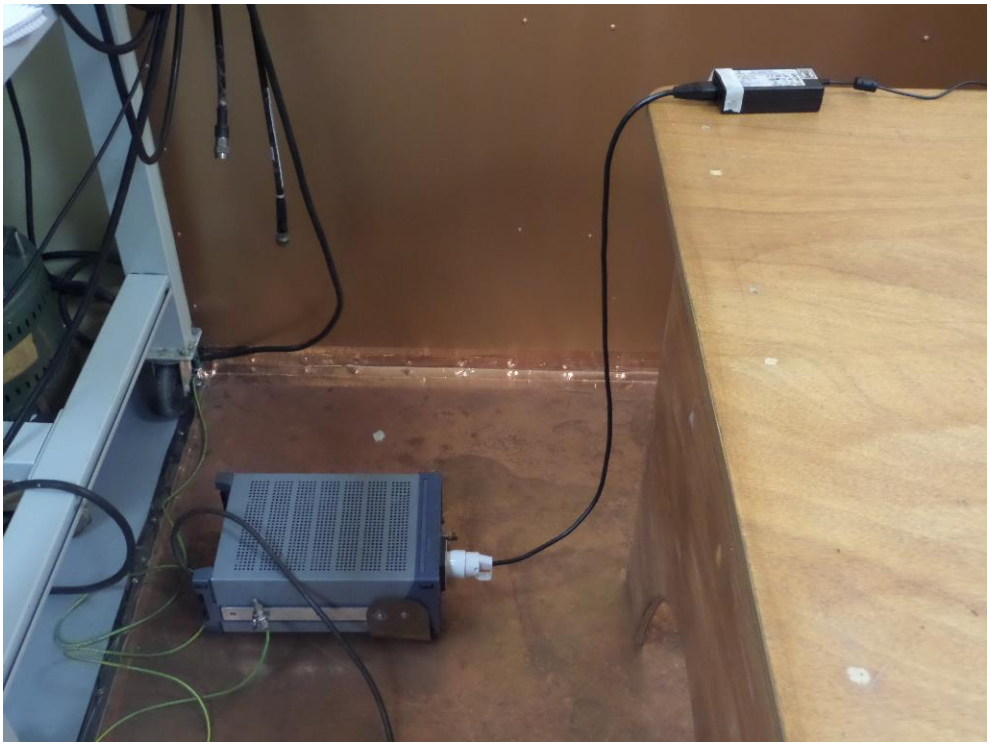
APPENDIX 2: Test set up

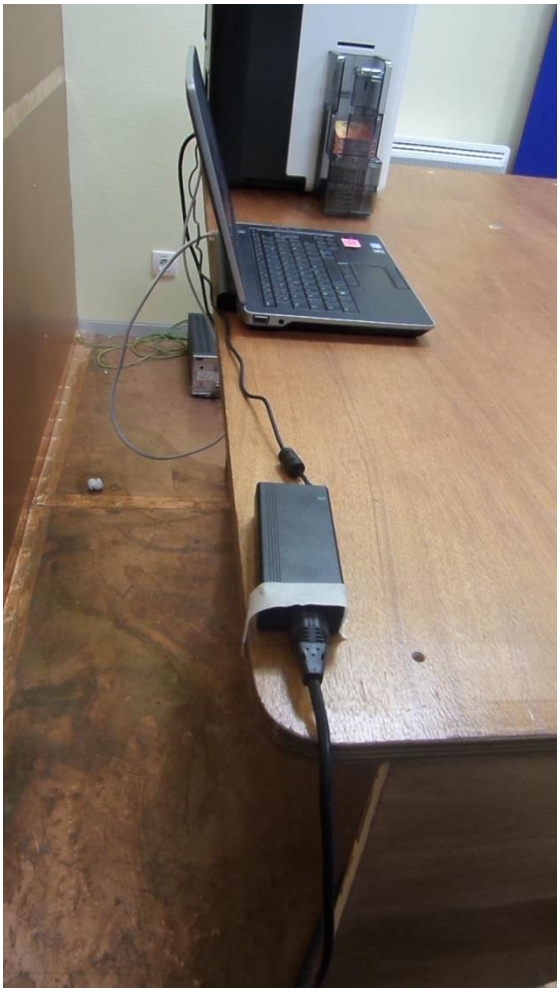
Anechoïc room



Open area test site

Conducted emissions





APPENDIX 3: Test equipment list

Conducted limits

TYPE	MANUFACTURER	EMITECH NUMBER
Outside room Hors cage	Emitech	8893
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Test receiver ESI7	Rohde & Schwarz	8707
LISN 1600	Thurbly Thandar Instruments	8719
LISN ESH3-Z5	Rohde & Schwarz	8720
High-pass filter ETP232	SECRE	8641
Absorber sheath current	Emitech	9489
50 Ohms load	Hewlett Packard	8869
Power source 1251RP	California instruments	8508
Multimeter 177	Fluke	14476
Meteo station 608-Hi	Testo	7566
Software	BAT-EMC V3.6.0.32	0000

Radiated emission limits

TYPE	MANUFACTURER	EMITECH NUMBER
Open test site	EMITECH	8732
Anechoic Chamber	EMITECH	8593
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Test receiver ESI7	Rohde & Schwarz	8707
Spectrum Analyzer FSP40	Rohde & Schwarz	4088
Loop antenna 6502	EMCO	1406
Biconical antenna VHBB 9124	Schwarzbeck	8526
Biconical antenna VHA 9103	Schwarzbeck	8528
Log periodic antenna UHALP 9108A	Schwarzbeck	8543
Log periodic antenna 3147	EMCO	8783
Antenna 3115	EMCO	8535
Low-noise amplifier 8447D	Hewlett Packard	8511
Low-noise amplifier S005180M3201	LUCIX Corp.	10739
Power source 1251RP	California instruments	8508
Multimeter 177	Fluke	14476
Meteo station 608-Hi	Testo	7566
Meteo station WS-9232	La Crosse Technology	8750
Software	BAT-EMC V3.6.0.32	0000

Additional provisions to the general radiated emission limitations

TYPE	MANUFACTURER	EMITECH NUMBER
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Spectrum Analyzer FSEM30	Rohde & Schwarz	8523
Power source 1251RP	California instruments	8508
Multimeter 177	Fluke	14476
Meteo station WS-9232	La Crosse Technology	8750
Software	GPIBShot V2.4	-

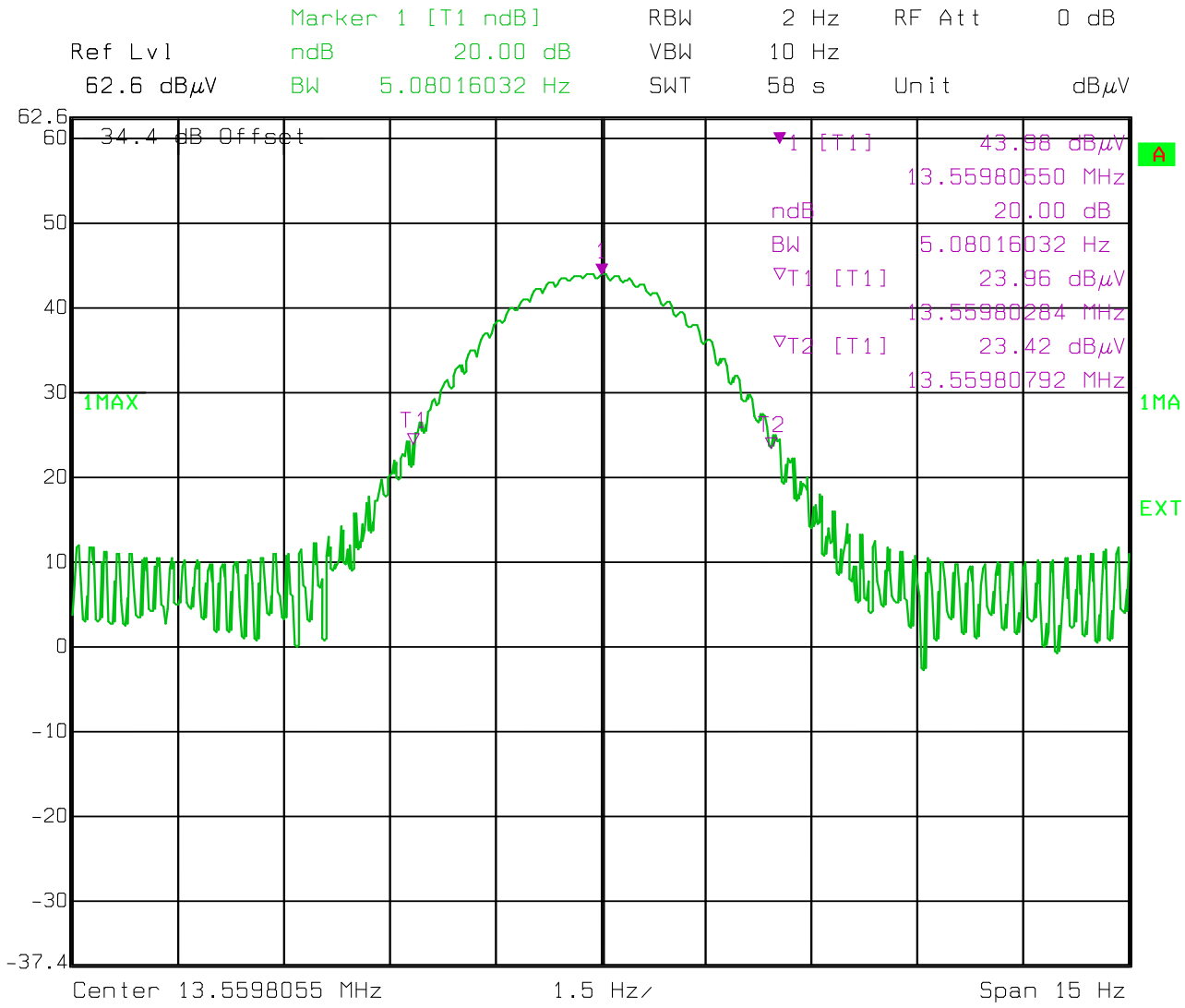
Operation within the band 13.110 – 14.010 MHz

TYPE	MANUFACTURER	EMITECH NUMBER
Open test site	EMITECH	8732
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Test receiver ESI7	Rohde & Schwarz	8707
Spectrum Analyzer FSEM30	Rohde & Schwarz	8523
Loop antenna 6502	EMCO	1406
Climatic chamber EXCAL 7714-HA	CLIMATS	10751
Power source 1251RP	California instruments	8508
Multimeter 177	Fluke	14476
Meteo station WS-9232	La Crosse Technology	8750
Software	BAT-EMC V3.6.0.32	0000

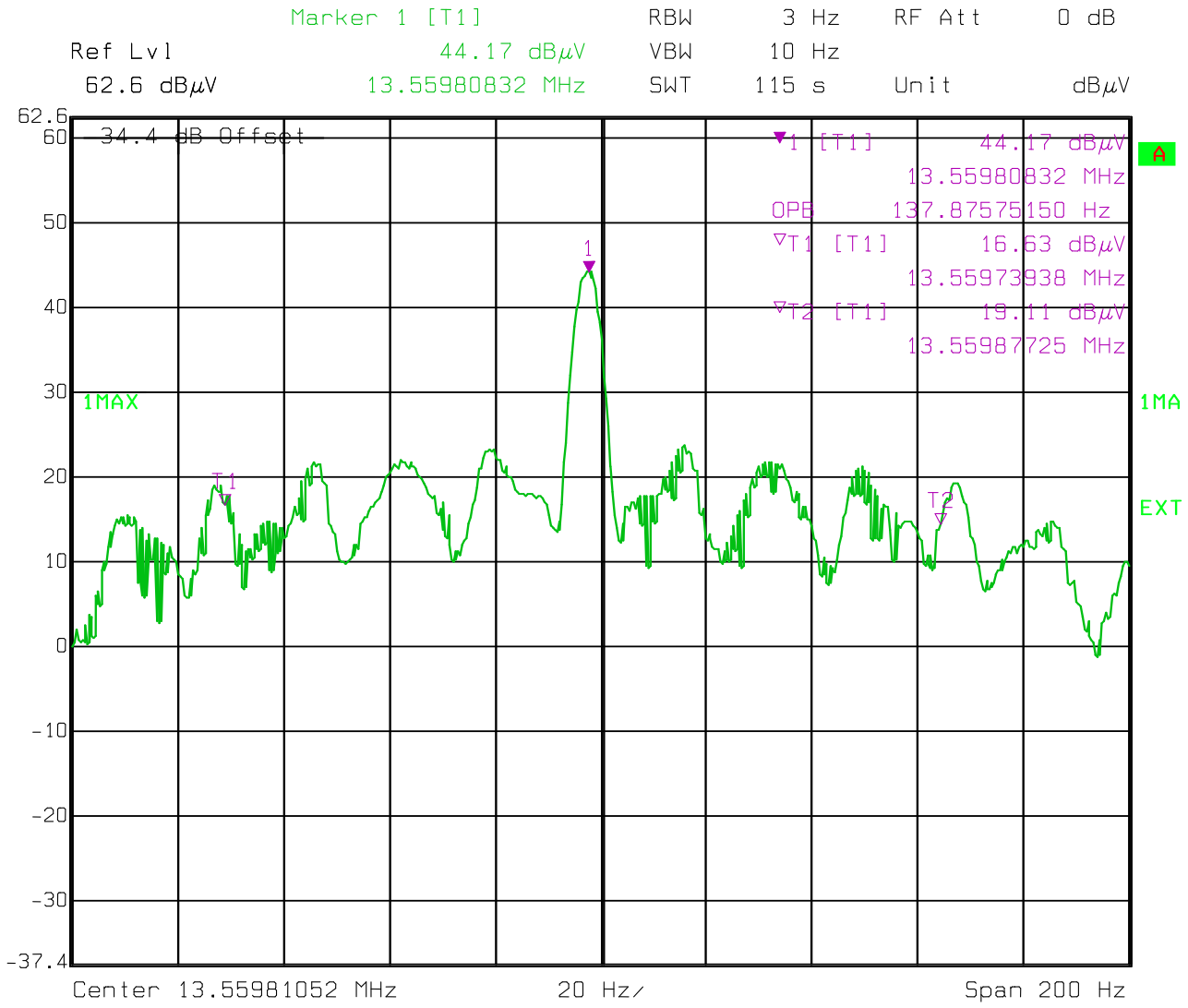
Field strength outside the band 13.110-14.010 MHz

TYPE	MANUFACTURER	EMITECH NUMBER
Open test site	EMITECH	8732
Anechoic Chamber	EMITECH	8593
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Test receiver ESI7	Rohde & Schwarz	8707
Spectrum Analyzer FSP40	Rohde & Schwarz	4088
Loop antenna 6502	EMCO	1406
Biconical antenna VHBB 9124	Schwarzbeck	8526
Biconical antenna VHA 9103	Schwarzbeck	8528
Log periodic antenna UHALP 9108A	Schwarzbeck	8543
Log periodic antenna 3147	EMCO	8783
Antenna 3115	EMCO	8535
Low-noise amplifier 8447D	Hewlett Packard	8511
Low-noise amplifier S005180M3201	LUCIX Corp.	10739
Power source 1251RP	California instruments	8508
Multimeter 177	Fluke	14476
Meteo station 608-Hi	Testo	7566
Meteo station WS-9232	La Crosse Technology	8750
Software	BAT-EMC V3.6.0.32	0000
Software	Champ libre Juigné. V3.5	8864

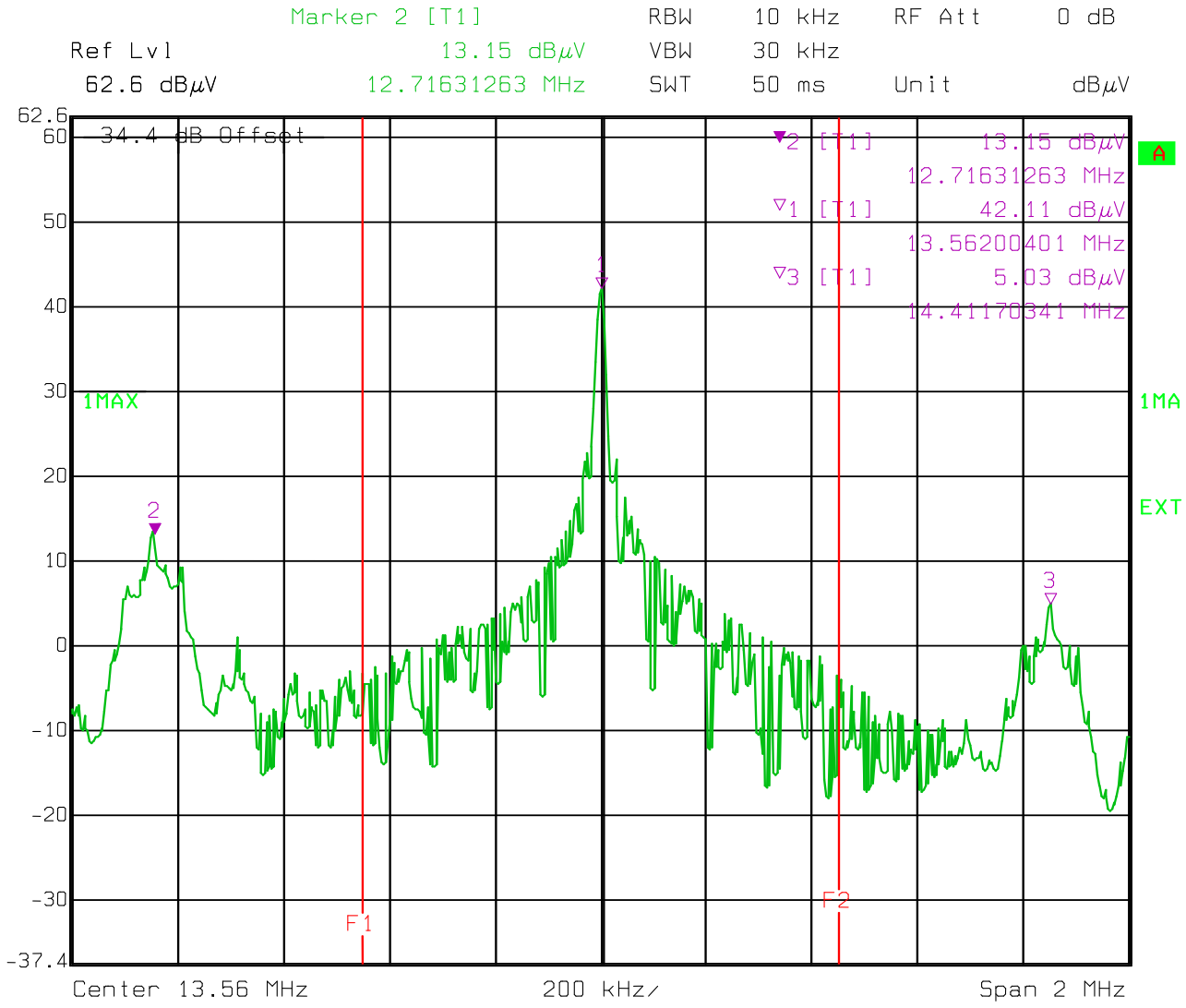
APPENDIX 4: 20 dB bandwidth



APPENDIX 5: 99% bandwidth

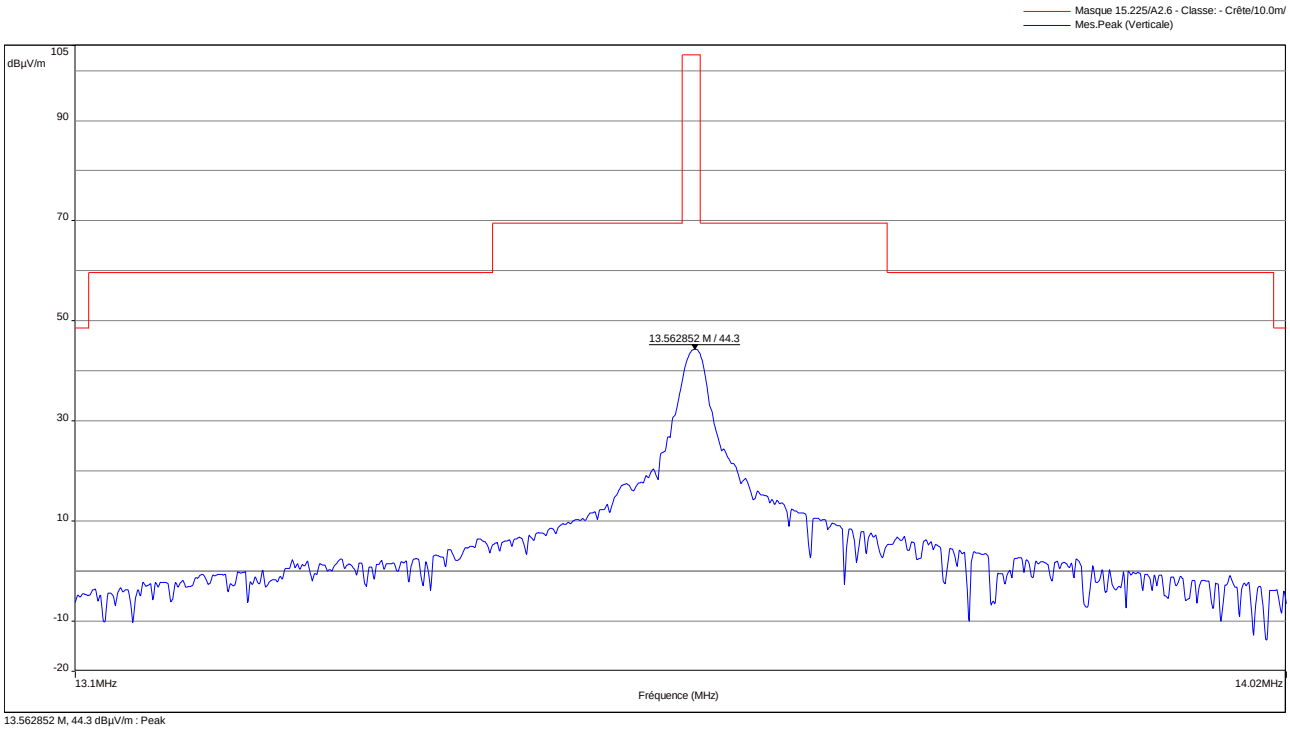


APPENDIX 6: Band edge



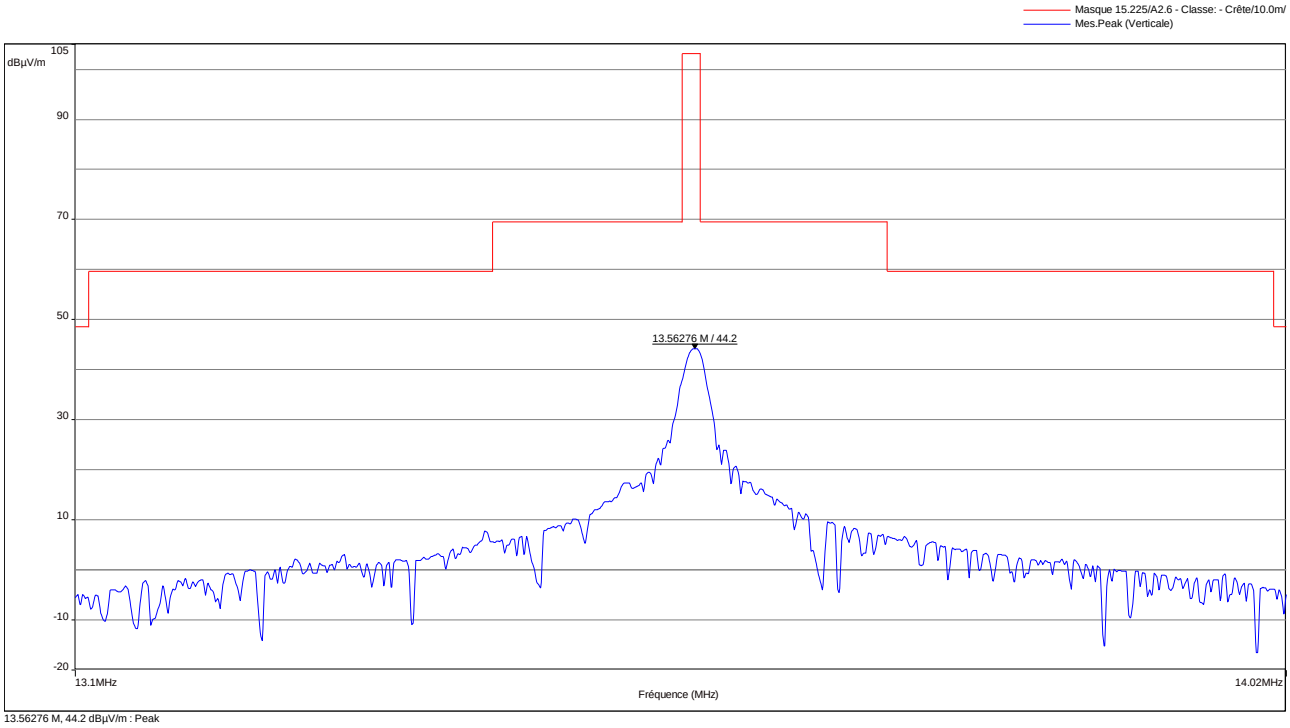
APPENDIX 7: Spectrum mask

20°C, 120Vac -60Hz



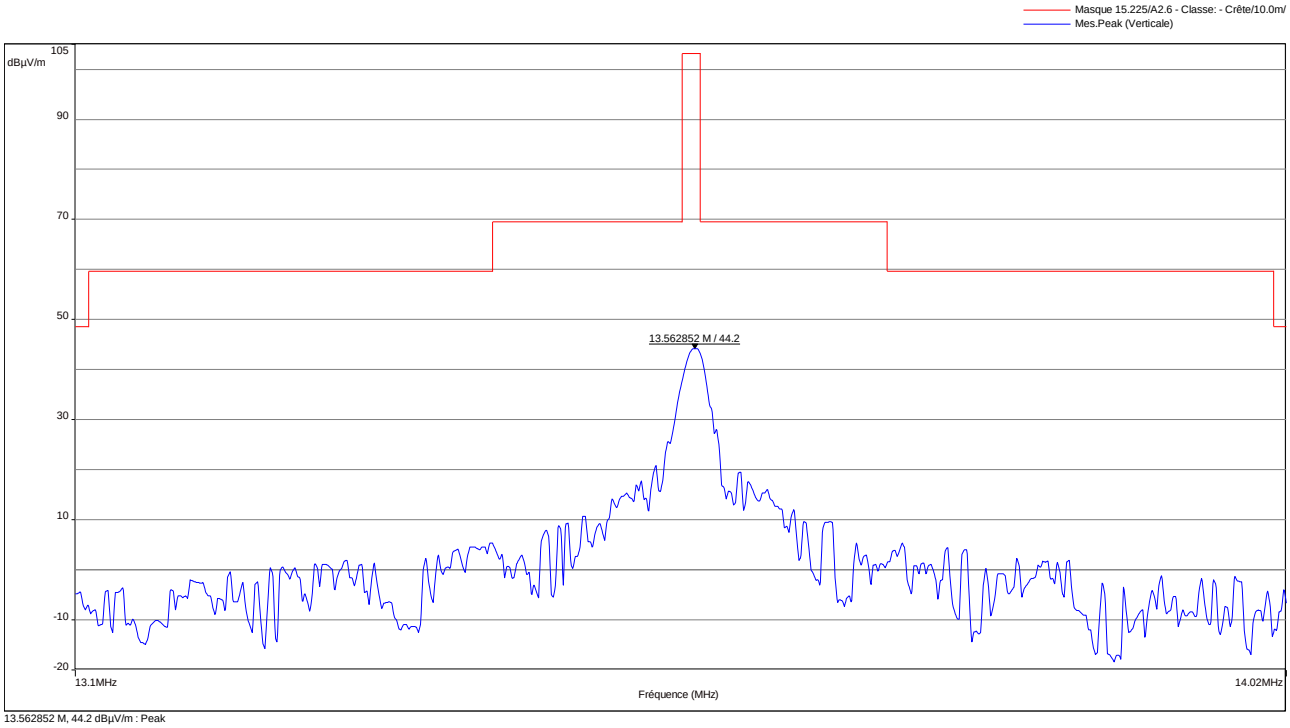
13.562852 M, 44.3 dBµV/m : Peak

20°C, 102Vac -60Hz



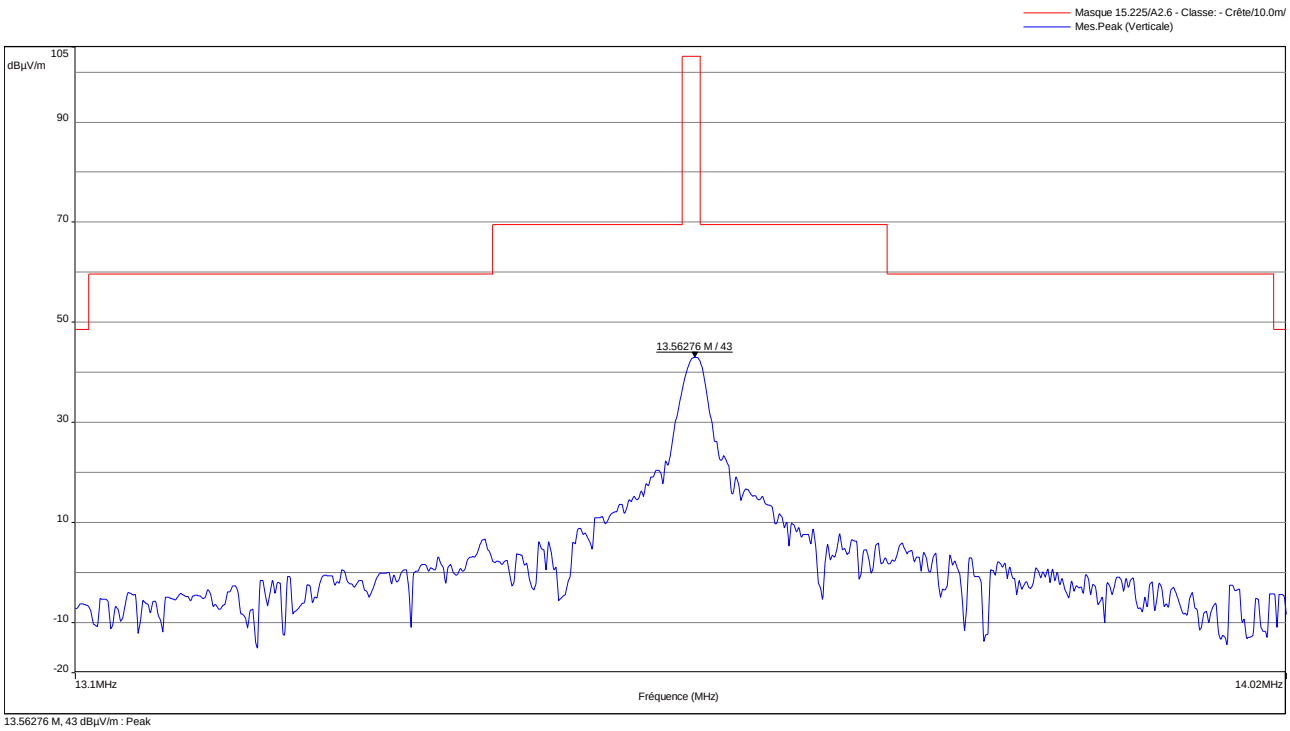
13.56276 M, 44.2 dBµV/m : Peak

20°C, 138Vac -60Hz



13.562852 M, 44.2 dBµV/m : Peak

-20°C, 120Vac -60Hz



13.56276 M, 43 dBµV/m : Peak

+50°C, 120Vac -60Hz