

RR051-13-103687-1/A Ed. 1

This report cancels and replaces the test report N° RR051-13-103687-1/A Edition 0

Certification test report

According to the standard(s):
CFR 47 FCC Part 15

Equipment under test:
Zigbee lighting control modules AN 1323

FCC ID:
2AAOGGC520198

Company:
AEG POWER SOLUTIONS SAS

DISTRIBUTION: Mr LE PALLEC

(Company: AEG POWER SOLUTIONS SAS)

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DESIGNATION OF PRODUCT: Zigbee lighting control modules AN 1323

Serial number (S/N): 3AW01323DALAV1

Reference / model (P/N): ZCM

Software version: Not communicated

MANUFACTURER: AEG POWER SOLUTIONS SAS

COMPANY SUBMITTING THE PRODUCT:

Company: AEG POWER SOLUTIONS SAS

Address: 4 rue Louis de Broglie
BP 10119
22301 LANNION CEDEX

Responsible: Mr LE PALLEC

DATES OF TEST: 11-JUL-13, 12-JUL-13

TESTING LOCATION: EMITECH ANGERS laboratory at JUIGNE SUR LOIRE (49)
FRANCE
EMITECH ANGERS open area test site in JUIGNE SUR LOIRE (49)
FRANCE
FCC 2.948 Listed Site Registration Number: 90469

TESTED BY: T.LEDRESSEUR

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1. INTRODUCTION

This document presents the result of certification test carried out on the following equipment: Zigbee lighting control modules AN 1323 in accordance with normative reference.

2. PRODUCT DESCRIPTION

Class: B (residential environment)

Antenna type and gain: dedicated antenna
specifications for antenna used during test:

- »Reference: LX18437AB
- » Impedance: 50 ohms
- » Frequency: 2.4 GHz
- » Polarization: vertical
- » VSWR: 2: 1 Max
- » Connector: MMCX male 90°
- » Cable length: RG178 cable 250 mm
- » Housing: 70 ± 2 mm
- » Operating temperature: -30°C to +60°C
- » Protection rating: IP66
- » Gain: 2.2 dBi

Operating frequency range: 2405 to 2480 MHZ

Number of channels: 16

Channel spacing: 5MHz

Modulation: Zigbee 802.15.4

Power source: 120 Vac – 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 (2013) Radio Frequency Devices

ANSI C63.4 (2003) Methods of Measurement of Radio-Noise Emissions from Low-voltage Electrical and Electronics Equipment in the range of 9 kHz to 40 GHz.

558074 D01 DTS v03r01 Guidance for Performing Compliance on Digital Transmission Systems Operating under §15.247

4. TEST METHODOLOGY

Radio performance tests procedures given in CFR 47 part 15:

Subpart B –Unintentional Radiators

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 247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz

5. TEST EQUIPMENT CALIBRATION DATES

Equipment	Model	Type	Last verification	Next verification	Validity
1922	Microwave DB C020180F-4B1	Low-noise amplifier 1 to 18 GHz	01/08/2012	01/08/2013	01/10/2013
1939	IMC WR42	Horn antenna	20/04/2012	20/04/2016	20/06/2016
3036	ALC Microwave ALN02-0102	Low-noise amplifier	04/04/2013	04/04/2014	04/06/2014
8508	Alternative power supply 1000VA 1251RP	California instruments	18/05/2011	18/05/2013	18/07/2013
8511	Préamplificateur 8447D	Hewlett Packard	28/06/2012	28/06/2013	28/08/2013
8523	R&S FSEM30	Spectrum analyser	07/09/2012	07/09/2014	07/11/2014
8524	Test receiver HP8591EM	Hewlett Packard	18/05/2013	18/05/2013	18/07/2013
8526	Schwarzbeck VHBB 9124	Biconical antenna	12/06/2012	12/06/2016	12/08/2016
8533	HFH2-Z2	Loop antenna	01/05/2013	01/05/2014	01/07/2014
8534	Emco 3115	Horn antenna	30/10/2012	30/10/2016	30/12/2016
8535	Emco 3115	Horn antenna	30/10/2012	30/10/2016	30/12/2016
8543	Schwarzbeck UHALP 9108A	Log periodic antenna	12/06/2012	12/06/2016	12/08/2016
8593	SIDT Cage 2	Full anechoic room	06/09/2011	06/09/2013	06/11/2013
8671	Meteo station WS-9232	La Crosse Technology	20/07/2012	20/07/2014	20/09/2014
8675	AOIP MN5102B	Multimeter	15/01/2013	15/01/2015	15/03/2015
8707	R&S ESI7	Test receiver	03/10/2012	03/10/2014	03/12/2014
8719	RSIL 16A LISN 1600	THURLBY THANDAR	28/05/2012	28/05/2014	28/07/2014
8730	Radiofrequency generator SMR20	Rohde & Schwarz	17/05/2011	17/05/2013	17/07/2013
8732	Emitech	OATS	09/06/2011	09/06/2013	09/08/2013
8750	La Crosse Technology WS-9232	Meteo station	20/07/2012	20/07/2014	20/09/2014
8779*	Alternostat E520	FERRIX	/	/	/
8955	HP SMA-1m	Cable	10/01/2013	10/01/2015	10/03/2015
9237	N-5m	Cable	06/04/2012	06/04/2014	06/06/2014
9239	N-2m	Cable	04/04/2012	04/04/2014	04/06/2014
9243	N-7m	Cable	04/04/2012	04/04/2014	04/06/2014
9489	Absorber sheath current	EMITECH	14/09/2012	14/09/2014	14/11/2014

* The equipment is not verified; instead, the output voltage is checked before each measurement with the calibrated multimeter.

6. TESTS AND CONCLUSIONS

6.1 unintentional radiator (subpart B)

Test procedure	Description of test	Respected criteria?				Comment
		Yes	No	NAP	NAs	
FCC Part 15.107	CONDUCTED LIMITS	X				
FCC Part 15.109	RADIATED EMISSION LIMITS	X				
FCC Part 15.111	ANTENNA POWER CONDUCTED LIMITS FOR RECEIVER			X		

NAP: Not Applicable

NAs: Not Asked

6.2 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 §15.247 frequency bands	X				Note 3
	(c) 20 dB bandwidth and band-edge compliance	X				
FCC Part 15.247	OPERATION WITHIN THE BANDS 902-928 MHZ, 2400-2483.5 MHz and 5725-5850 MHz					
	(a) (1) Hopping systems			X		
	(a) (2) Digital modulation techniques	X				Note 4
	(b) Maximum peak output power	X				Note 5
	(c) Operation with directional antenna gains > 6 dBi			X		
	(d) Intentional radiator	X				
	(e) Peak power spectral density	X				
	(f) Hybrid system			X		
	(g) Frequency hopping requirements			X		
	(h) Frequency hopping intelligence			X		
	(i) RF exposure compliance	X				Note 6

NAP: Not Applicable

NAs: Not Asked

Note 1: *dedicated antenna with not-standard connector. Professionally installed equipment.*

Note 2: *See FCC part 15.247 (d).*

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

Note 4: *The minimum 6 dB bandwidth of the equipment is 1603 kHz (see appendix 4).*

Note 5: *Conducted measurement is not possible (dedicated antenna), so we used the radiated method in open field.*

Note 6: $PSD = EIRP / 4 * \pi * R^2 = 3.78 / 4 * \pi * (20 \text{ cm}^2) = 0.015 \text{ mW/cm}^2$ (limit= 1 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.

Conclusion:

The sample of Zigbee lighting control modules AN 1323 submitted to the tests complies with the regulations of standard CFR 47 FCC Part 15 in accordance with the limits or criteria defined in this report.

7. MEASUREMENT OF THE CONDUCTED DISTURBANCES

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 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 / 9kHz

Equipment under test operating condition:

The equipment is blocked in reception mode.

Results:

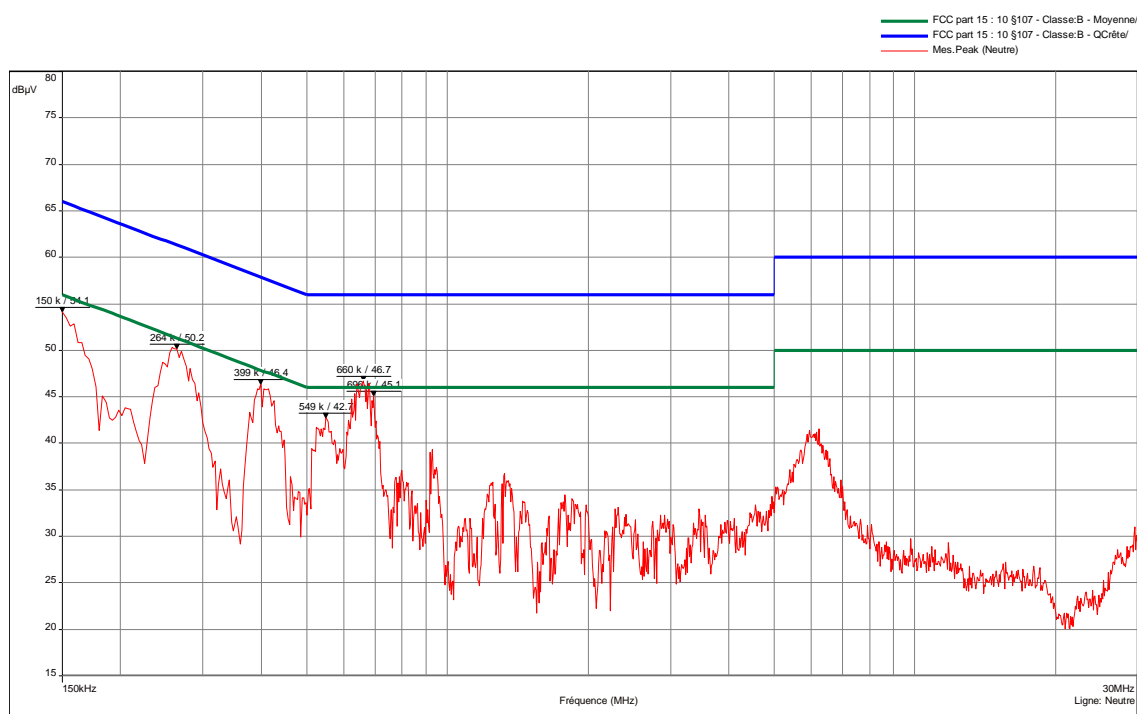
Ambient temperature (°C): 26
Relative humidity (%): 42

Sample N° 1:

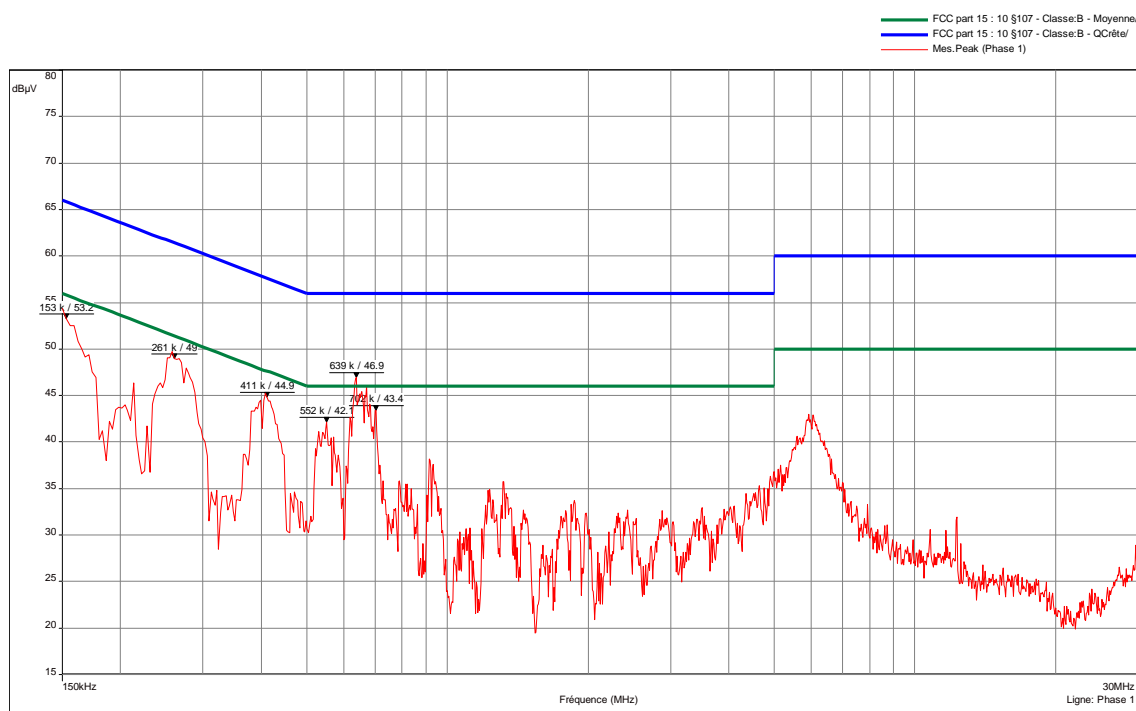
Measurement on the mains power supply:

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 Average limit are then analyzed with Average detector.

Results N° 1: average measurement on the Neutral, for the frequency range:

Frequencies (kHz)	Average measurement (dBμV)	Limit (dBμV)	Margin (dB)
150	36.9	56	19.1
264	32.1	51.3	19.2
399	28	47.8	19.8
549	23.9	46	22.1
660	26.6	46	19.4
696	23.3	46	22.7

Results N° 2: average measurement on the Line, for the frequency range:

Frequencies (kHz)	Average measurement (dBμV)	Limit (dBμV)	Margin (dB)
150	36.5	56	19.5
264	31.6	51.3	19.7
399	26.9	47.8	20.9
549	23.6	46	22.4
660	30.2	46	15.8
696	22.4	46	23.6

Test conclusion:

RESPECTED STANDARD

8. RADIATED EMISSION LIMITS

Standard: FCC Part 15

Test procedure: paragraph 109

Limit class: Class B

Test set up:

The measure is realized on open area test site from 30 MHz to 1 GHz and in anechoic chamber above 1 GHz.

The EUT is placed on a rotating table, 0.8 m from a ground plane in open test site and 1.5m from a ground plane in anechoic chamber. Zero degree azimuths correspond to the front of the device under test.

See photos in appendix 2.

Frequency range: From 30 MHz to 12.5 GHz (5th harmonic of the highest frequency used : 2480 MHz).

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

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

Video bandwidth: 3 MHz (F > 1 GHz)

Distance of antenna: 3 meters

Antenna height: 1 to 4 meters

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

Equipment under test operating condition:

The equipment is blocked in reception mode.

Results:

Ambient temperature (°C): 21.5
Relative humidity (%): 55

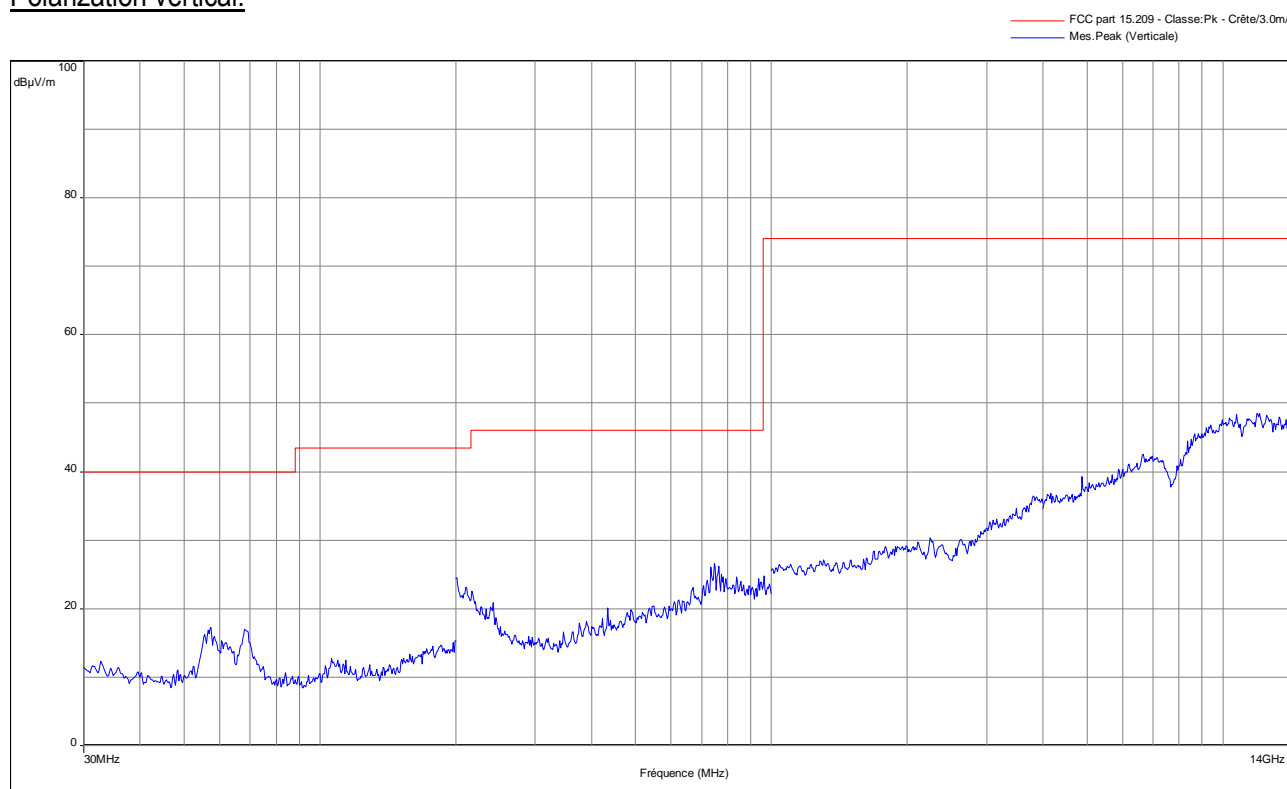
Power source: 120 Vac – 60 Hz

Sample N° 1:

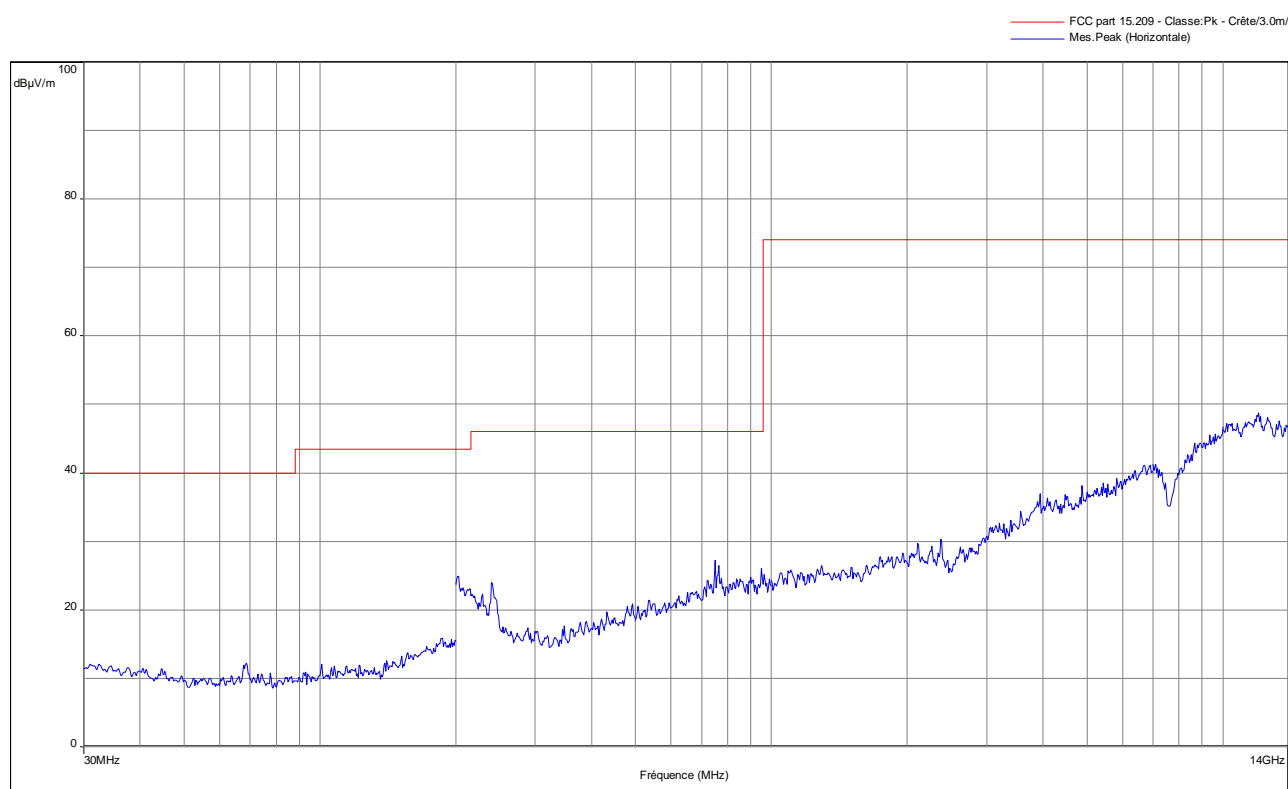
No significant spurious has been detected.

Applicable limits:	for $30 \text{ MHz} \leq F \leq 88 \text{ MHz}$:	40 dB μ V/m at 3 meters
	for $88 \text{ MHz} < F \leq 216 \text{ MHz}$:	43.5 dB μ V/m at 3 meters
	for $216 \text{ MHz} < F \leq 960 \text{ MHz}$:	46 dB μ V/m at 3 meters
	above 960 MHz :	54 dB μ V/m at 3 meters

Polarization vertical:



Polarization Horizontal:



Note: any spurious which has more than 20 dB of margin compared to the applicable limit is not necessarily reported.

Test conclusion:

RESPECTED STANDARD

9. MEASUREMENT OF THE CONDUCTED DISTURBANCES

Standard: FCC Part 15

Test procedure: Paragraph 15.207

Software used: BAT-EMC V3.6.0.32

Test set up:

The EUT is 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 under test is blocked in continuous modulated transmission mode, at the highest output power level at which the transmitter is intended to operate.

Results:

Ambient temperature (°C): 26
Relative humidity (%): 42

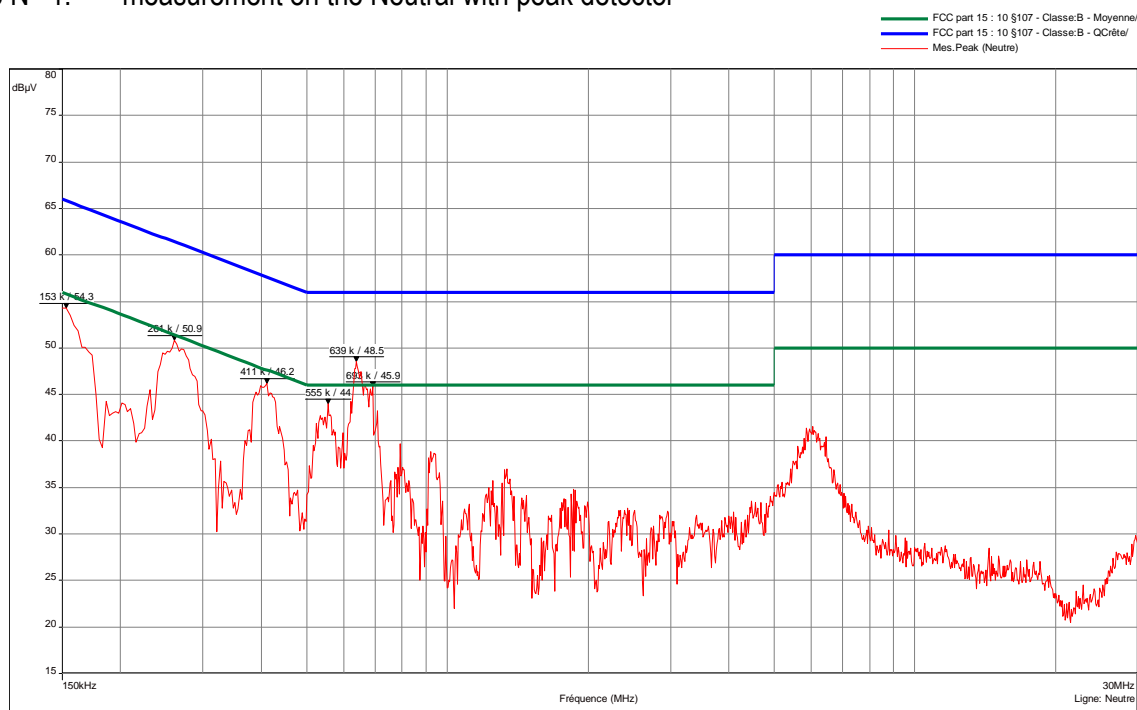
Sample N° 1:

Measurement on the mains power supply:

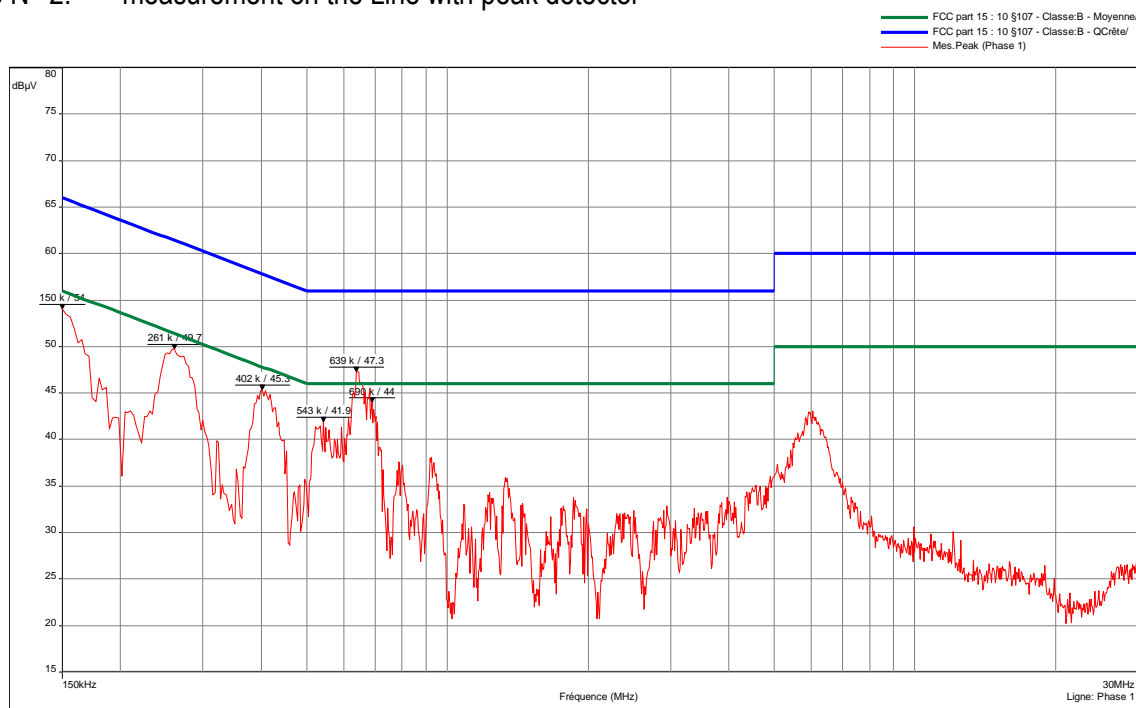
Low channel (2405MHz)

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 Average limit are then analyzed with Average detector.

Results N° 1: average measurement on the Neutral, for the frequency range:

Frequencies (kHz)	Average measurement (dBμV)	Limit (dBμV)	Margin (dB)
153	37.7	56	18.3
261	33.4	51.4	18
411	29	47.6	18.6
555	25.4	46	20.6
639	31.1	46	14.9
693	25.3	46	20.7

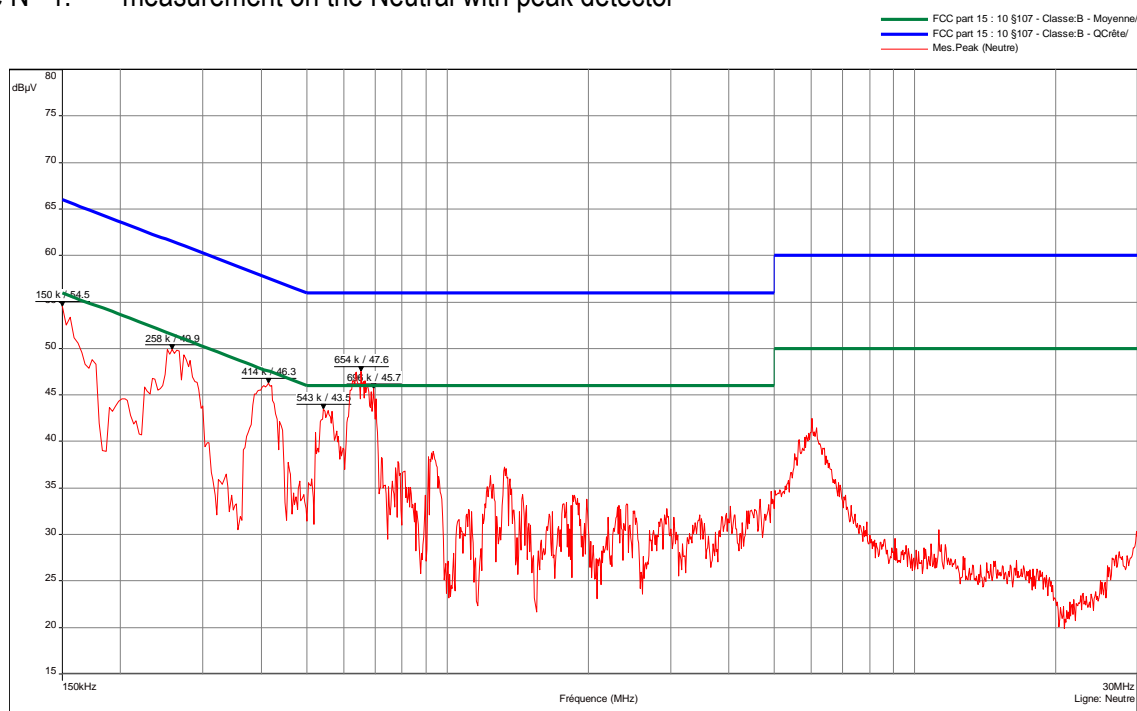
Results N° 2: average measurement on the Line, for the frequency range:

Frequencies (kHz)	Average measurement (dBμV)	Limit (dBμV)	Margin (dB)
153	37.1	56	18.9
261	32.5	51.4	18.9
411	28.1	47.6	19.5
555	24.6	46	21.4
639	30.4	46	15.6
693	24.5	46	21.5

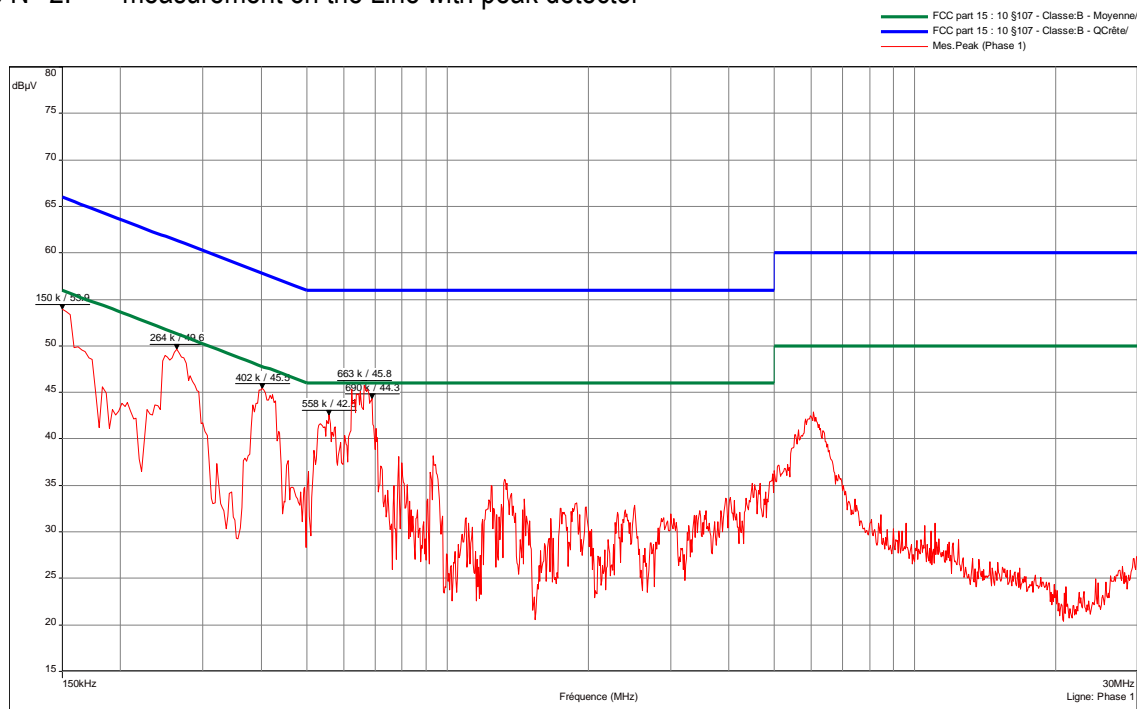
Central channel (2440MHz)

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 Average limit are then analyzed with Average detector.

Results N° 1: average measurement on the Neutral, for the frequency range:

Frequencies (kHz)	Average measurement (dBμV)	Limit (dBμV)	Margin (dB)
153	38	56	18
261	33.3	51.4	18.1
402	29.1	47.6	18.5
555	24.8	46	21.2
654	27.3	46	18.7
693	24.5	46	21.5

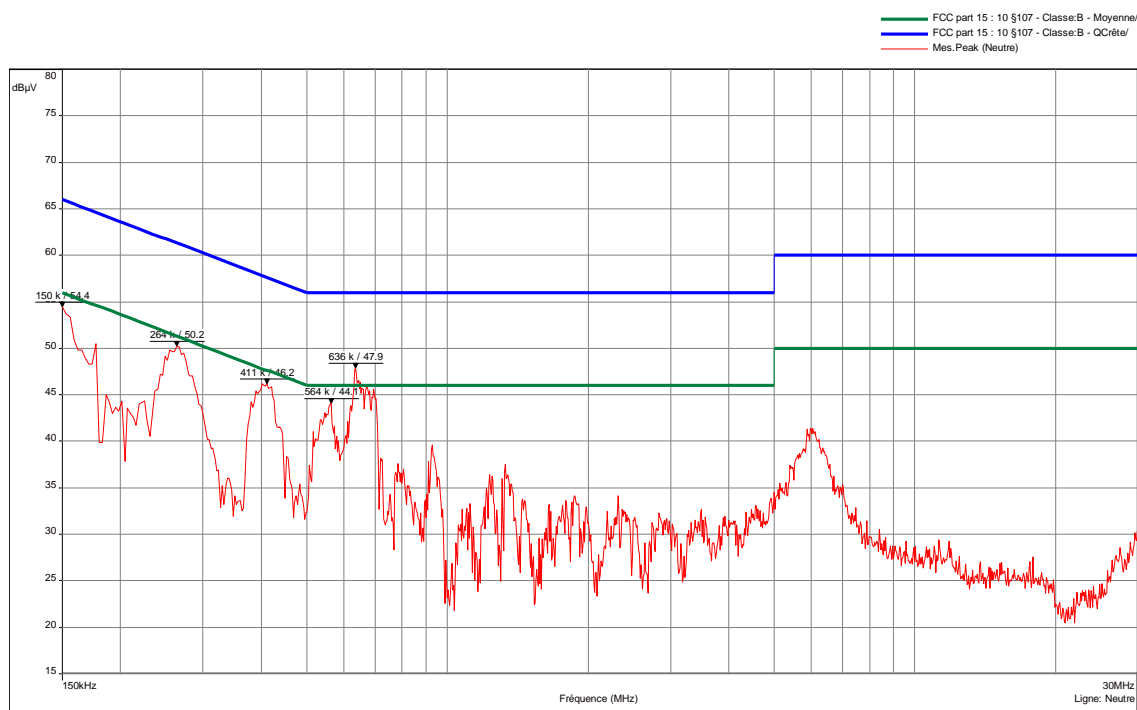
Results N° 2: average measurement on the Line, for the frequency range:

Frequencies (kHz)	Average measurement (dBμV)	Limit (dBμV)	Margin (dB)
153	37.9	56	18.1
261	32.8	51.4	18.6
402	28.1	47.6	19.5
555	24.2	46	21.8
654	26.4	46	19.6
693	23.4	46	22.6

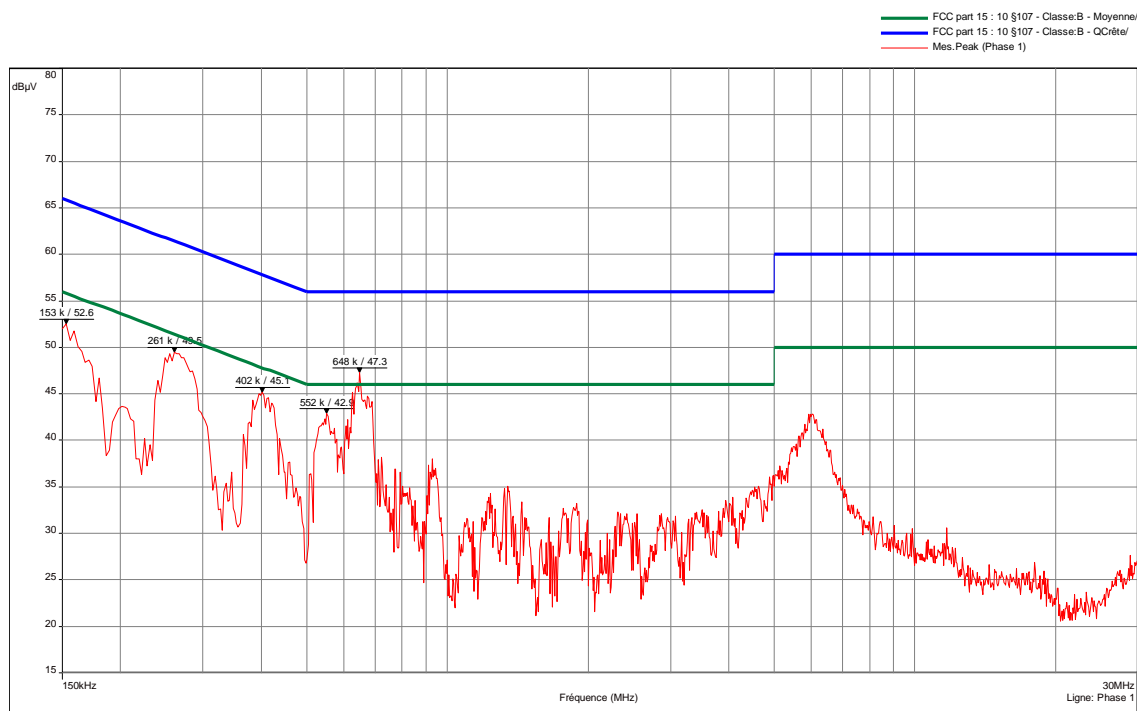
High channel (2480MHz)

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 Average limit are then analyzed with Average detector.

Results N° 1: average measurement on the Neutral, for the frequency range:

Frequencies (kHz)	Average measurement (dBμV)	Limit (dBμV)	Margin (dB)
153	37.9	56	18.1
261	33.5	51.4	17.9
411	28.9	47.6	18.7
555	25.2	46	20.8
639	28.1	46	17.9

Results N° 2: average measurement on the Line, for the frequency range:

Frequencies (kHz)	Average measurement (dBμV)	Limit (dBμV)	Margin (dB)
153	37.5	56	18.5
261	32.8	51.4	18.6
411	27.9	47.6	19.7
555	24.5	46	21.5
639	27	46	19

Test conclusion:

RESPECTED STANDARD

10. ADDITIONAL PROVISIONS TO THE GENERAL RADIATED EMISSION LIMITATIONS

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 under test is blocked in continuous transmission mode, modulated by internal data signal, at the highest output power level which the transmitter is intended to operate.

Results:

Ambient temperature (°C): 26
Relative humidity (%): 42

Lower Band Edge: from 2398 MHz to 2400 MHz
Upper Band Edge: from 2483.5 MHz to 2485.5 MHz

Sample N° 1:

fundamental frequency (MHz)	field strength level of fundamental (dB μ V/m)	detector (peak or average)	frequency of maximum band-edges emission (MHz)	delta marker (dB)*	calculated max out-of-band emission level (dB μ V/m)	limit (dB μ V/m)	margin (dB)
2405	101	Peak	2399.964	48.6	52.4	78	25.6
2480	100	Peak	2483.51	50.2	49.8**	74	24.2

* Marker-Delta method

** The peak level detected is lower than the applicable average limit (54 dB μ V/m).

20 dB bandwidth curves are given in appendix 5; band-edge curves are given in appendix 6.

Test conclusion:

RESPECTED STANDARD

11. MAXIMUM PEAK OUTPUT POWER

Standard: FCC Part 15

Test procedure: paragraph 15.247 (b)

Test set up:

The measure is realized in anechoic chamber.

The EUT is placed on a rotating table, 0.8m from a ground plane. Zero degree azimuths correspond to the front of the device under test.

The measurement of the electro-magnetic field is realized, with a resolution bandwidth adjusted at 3 MHz and video bandwidth at 10 MHz ($RBW \geq DTS$ bandwidth see §9.1.1 of KDB 558074).

Distance of antenna: 3 meters

Antenna polarization: vertical and horizontal

Equipment under test operating condition:

The equipment under test is blocked in continuous modulated transmission mode, at the highest output power level at which the transmitter is intended to operate.

Results:

Ambient temperature (°C): 21.5
Relative humidity (%): 55
Power source: 120 Vac – 60 Hz

Sample n° 1 Low channel

	Level (dBμV)	Cable loss (dB)	Antenna factor (dB)	Electro- magnetic field (dBμV/m):	Conducted power * (mW)	Limit (mW)
Nominal supply voltage:	69.32	3.48	28.2	101	2.276	1000

Polarization of test antenna: vertical (height: 150 cm)

Position of equipment: see photos in appendix 2 (azimuth: 239 degrees)

Central channel

	Level (dBμV)	Cable loss (dB)	Antenna factor (dB)	Electro- magnetic field (dBμV/m):	Conducted power * (mW)	Limit (mW)
Nominal supply voltage:	68.09	3.11	28.3	99.5	1.611	1000

Polarization of test antenna: vertical (height: 150 cm)

Position of equipment: see photos in appendix 2 (azimuth: 238 degrees)

High channel

	Level (dBμV)	Cable loss (dB)	Antenna factor (dB)	Electro- magnetic field (dBμV/m):	Conducted power * (mW)	Limit (mW)
Nominal supply voltage:	68.66	3.14	28.2	100	1.81	1000

Polarization of test antenna: vertical (height: 150 cm)

Position of equipment: see photos in appendix 2 (azimuth: 238 degrees)

* Conducted power $P = (Ed)^2 / 30G$
With $d=3m$ and $G=1.64$

Test conclusion:

RESPECTED STANDARD

12. MEASUREMENT BELOW 30MHZ

Standard: FCC Part 15

Test procedure: paragraph 15.33 (a)

Limit class: Class B

Test set up:

The measure is realized on open area test site..

The EUT is placed on a rotating table, 0.8 m from a ground plane in open test site. Zero degree azimuths correspond to the front of the device under test.

See photos in appendix 2.

Frequency range: From 9 kHz to 30 MHz.

Detection mode: Quasi-peak ($F < 1 \text{ GHz}$)

Bandwidth: 300 Hz ($F < 150 \text{ kHz}$) 9 kHz ($150 \text{ kHz} < F < 30 \text{ MHz}$)

Distance of antenna: 10 meters

Antenna polarization: parallel, perpendicular and 45°

Equipment under test operating condition:

The equipment is blocked in transmission mode.

Results:

Ambient temperature (°C):	21.5
Relative humidity (%):	55
Power source:	120 Vac – 60 Hz

Sample N° 1:

No significant spurious has been detected.

Applicable limits:	for $9 \text{ kHz} \leq F \leq 490 \text{ kHz}$:	$2400/F(\text{kHz})$ microvolts/meter at 300 meters
	for $490 \text{ kHz} \leq F \leq 1.705 \text{ MHz}$:	$24000/F(\text{kHz})$ microvolts/meter at 30 meters
	for $1.705 \text{ MHz} \leq F \leq 30 \text{ Mhz}$:	30 microvolts/meter at 30 meters

According with the FCC Part 15.31(o) any spurious which has more than 20 dB of margin compared to the applicable limit is not necessarily reported.

Test conclusion:

RESPECTED STANDARD

13. INTENTIONAL RADIATOR

Standard: FCC Part 15

Test procedure: paragraph 15.205, paragraph 15.209, paragraph 15.247 (d)

Test set up:

The measure is realized on open area test site from 30 MHz to 1 GHz and in anechoic chamber above 1 GHz.

The EUT is placed on a rotating table, 0.8 m from a ground plane in open test site and 1.5m from a ground plane in anechoic chamber. Zero degree azimuths correspond to the front of the device under test.

See photos in appendix 2.

Frequency range: From 30 MHz to 24.8 GHz (10th harmonic of the highest fundamental frequency: 2480 MHz).

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

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

Video bandwidth: 3 MHz (F > 1 GHz)

Distance of antenna: 3 / 10 meters

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

Equipment under test operating condition:

The equipment under test is blocked in continuous modulated transmission mode, at the highest output power level at which the transmitter is intended to operate.

Results:

Ambient temperature (°C): 21.5
Relative humidity (%): 55

Power source: 120 Vac – 60 Hz

Sample N° 1: Low channel

FREQUENCIES (MHz)	Detector P: Peak QP: Quasi-Peak Av: Average	Antenna height (cm)	resolution bandwidth (kHz)	Polarization H: Horizontal V: Vertical	Field strength (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)
4810.9*	P	150	1000	V	52.3**	74	21.7

Sample N° 1: Central channel

FREQUENCIES (MHz)	Detector P: Peak QP: Quasi-Peak Av: Average	Antenna height (cm)	resolution bandwidth (kHz)	Polarization H: Horizontal V: Vertical	Field strength (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)
4880.8*	P	150	1000	V	48.2**	74	25.8

Sample N° 1: High channel

FREQUENCIES (MHz)	Detector P: Peak QP: Quasi-Peak Av: Average	Antenna height (cm)	resolution bandwidth (kHz)	Polarization H: Horizontal V: Vertical	Field strength (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)
4960.9*	P	150	1000	V	46**	74	28

* Restricted bands of operation in 15.205

** The peak level detected is lower than the applicable average limit (54 dB μ V/m).

Note: any spurious which has more than 20 dB of margin compared to the applicable limit is not necessarily reported.

Applicable limits: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

The highest level recorded in a 100 kHz bandwidth is 101 dB μ V/m on channel 11.

So the applicable limit is 81 dB μ V/m.

In addition, radiated emissions which fall in the restricted band, as defined in section 15.205 (a), must also comply with the radiated emission limits specified in section 15.209 (a) (see section 15.205 (c)).

Test conclusion:

RESPECTED STANDARD

14. PEAK POWER DENSITY

Standard: FCC Part 15

Test procedure: paragraph 15.247 (e)

Test set up:

We used the same method of the peak output power measurement.

Resolution bandwidth: 3 kHz
Video bandwidth: 10 kHz

Equipment under test operating condition:

The equipment under test is blocked in continuous modulated transmission mode, at the highest output power level at which the transmitter is intended to operate.

Results:

Ambient temperature (°C): 21.5
Relative humidity (%): 55
Power source: 120 Vac – 60 Hz

Sample N° 1:

	Peak power density at frequency: 2405 MHz
Normal test conditions (dBm)	-10.9
Limits (dBm)	+8

Sample N° 1:

	Peak power density at frequency: 2440 MHz
Normal test conditions (dBm)	-11.9
Limits (dBm)	+8

Sample N° 1:

	Peak power density at frequency: 2480 MHz
Normal test conditions (dBm)	-11.9
Limits (dBm)	+8

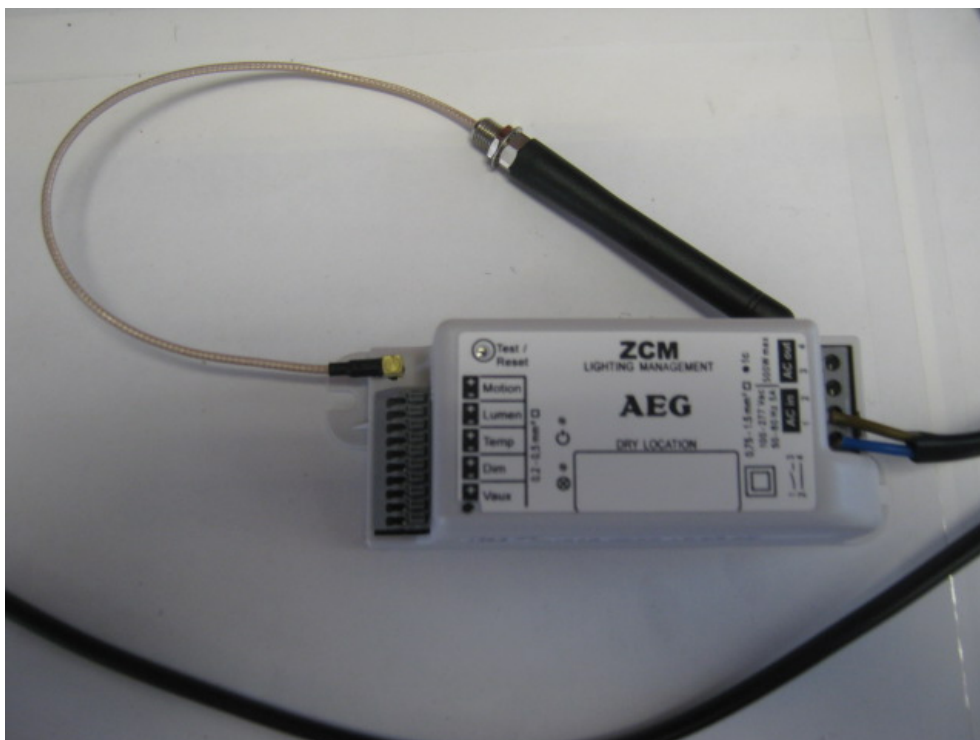
Test conclusion:

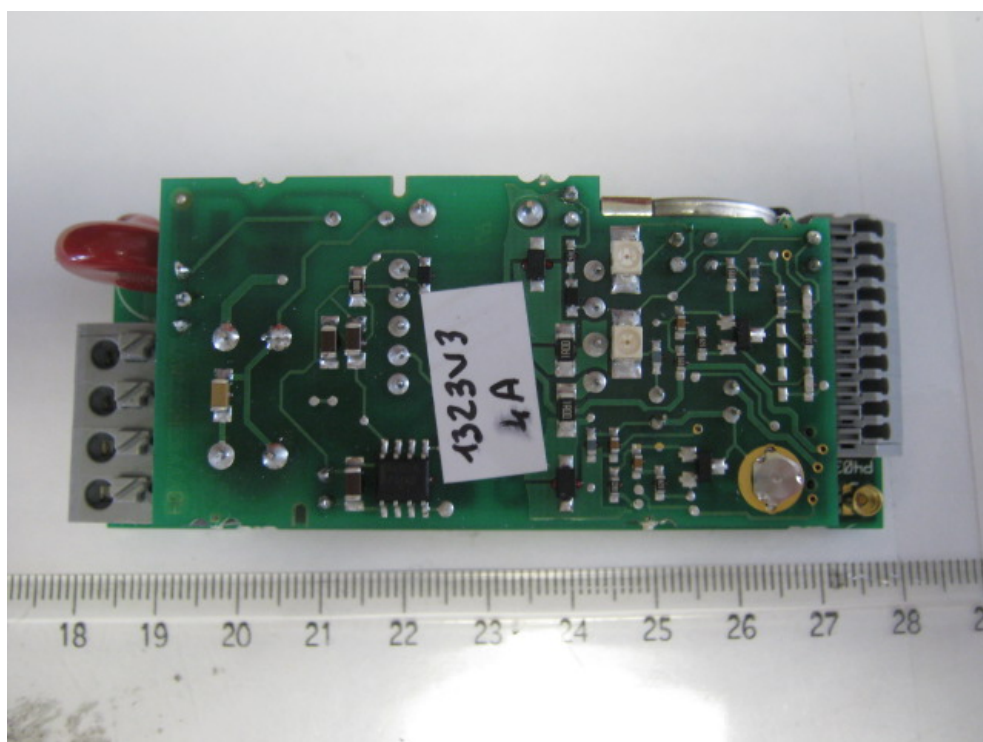
RESPECTED STANDARD

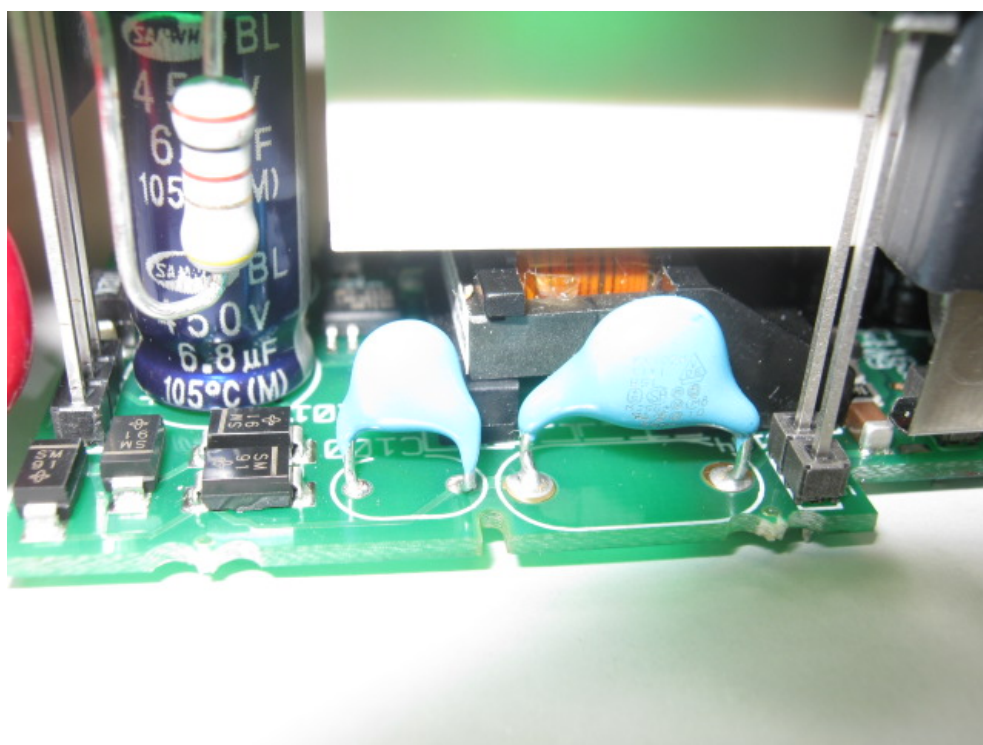
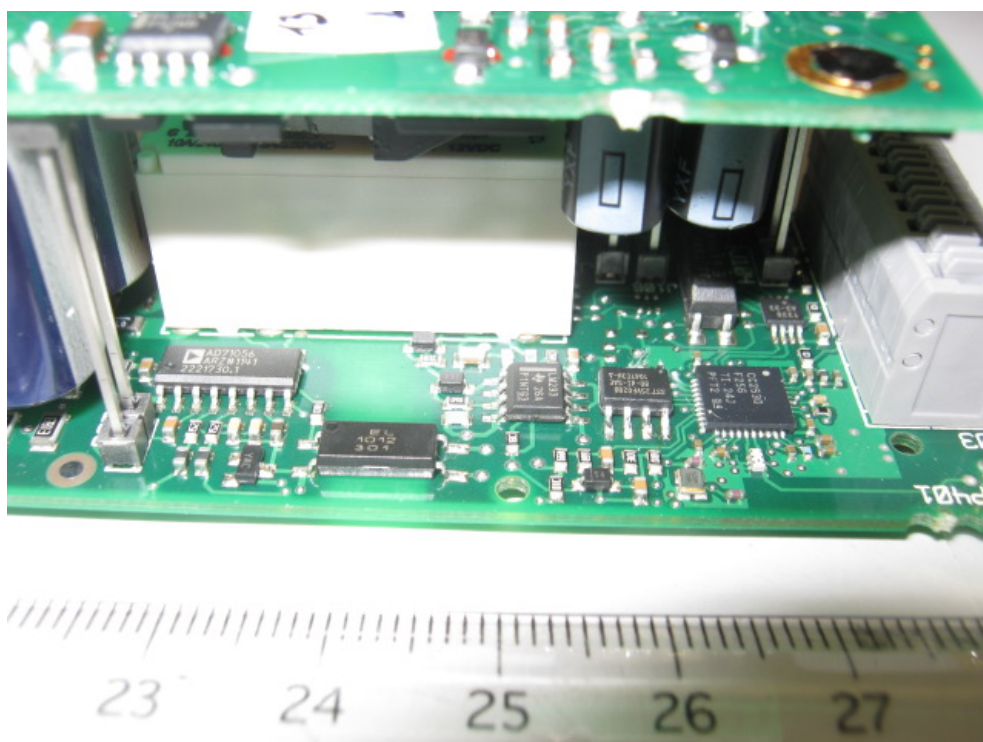
□□□ End of report, 6 appendixes to be forwarded □□□

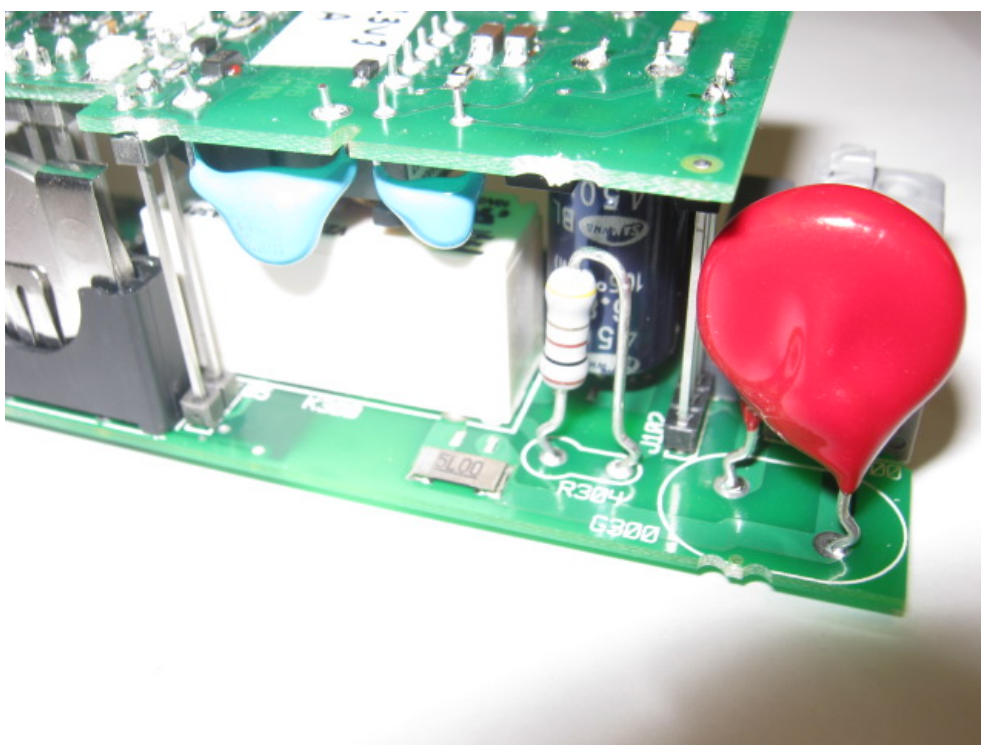
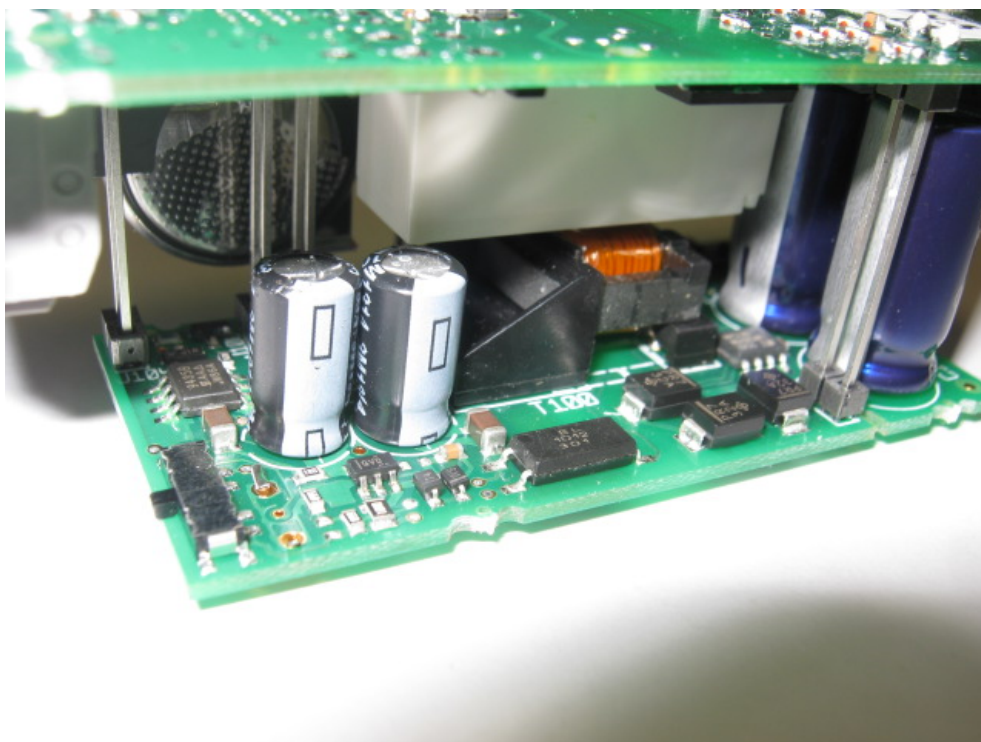
APPENDIX 1: Photos of the equipment under test

General view

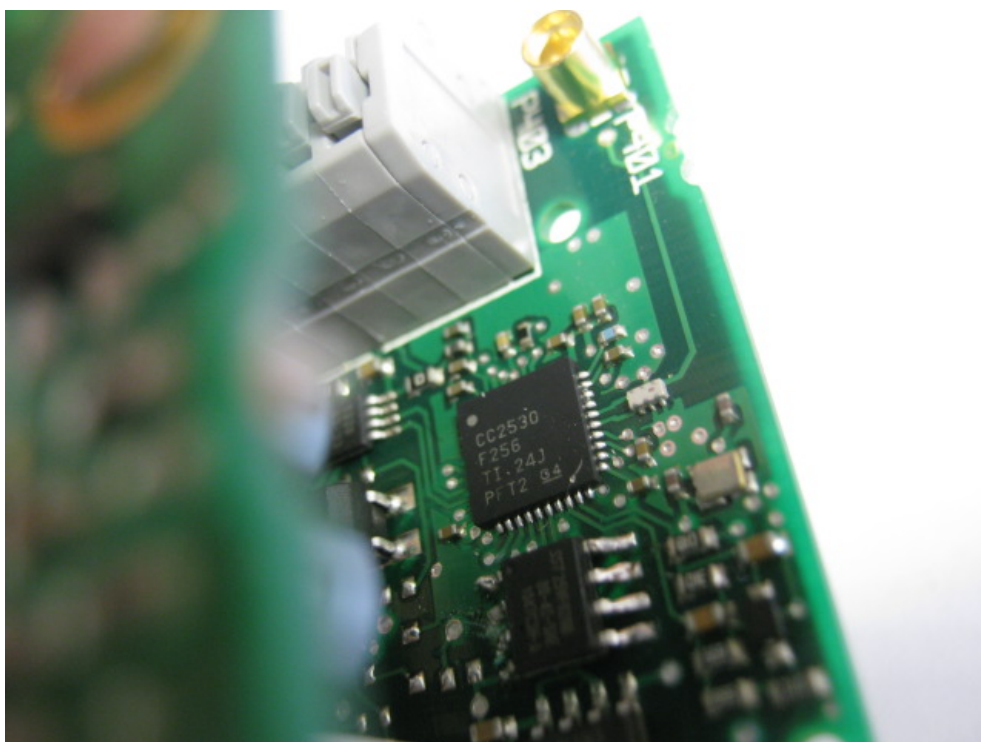


Internal viewPrinted circuit

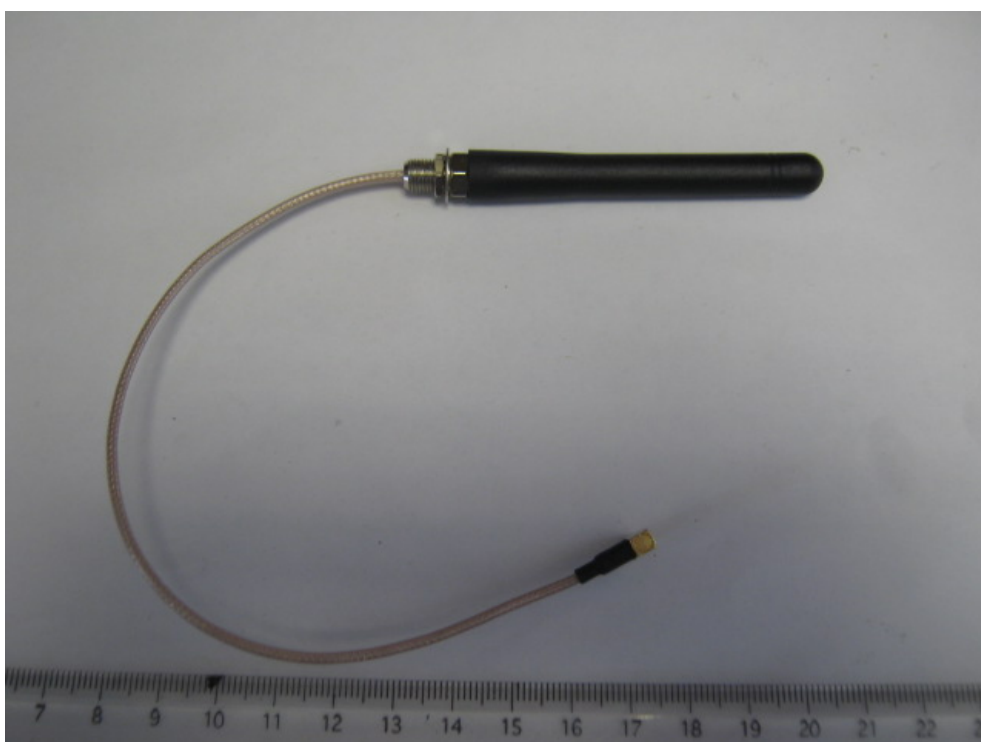




Radio module



Antenna

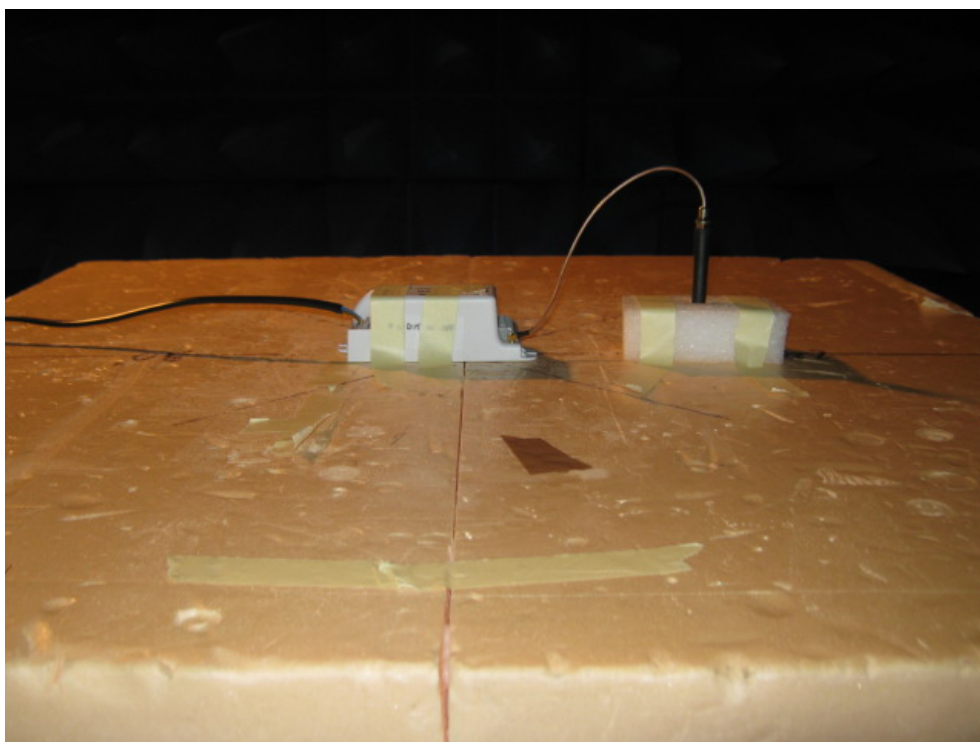


APPENDIX 2: Test set up

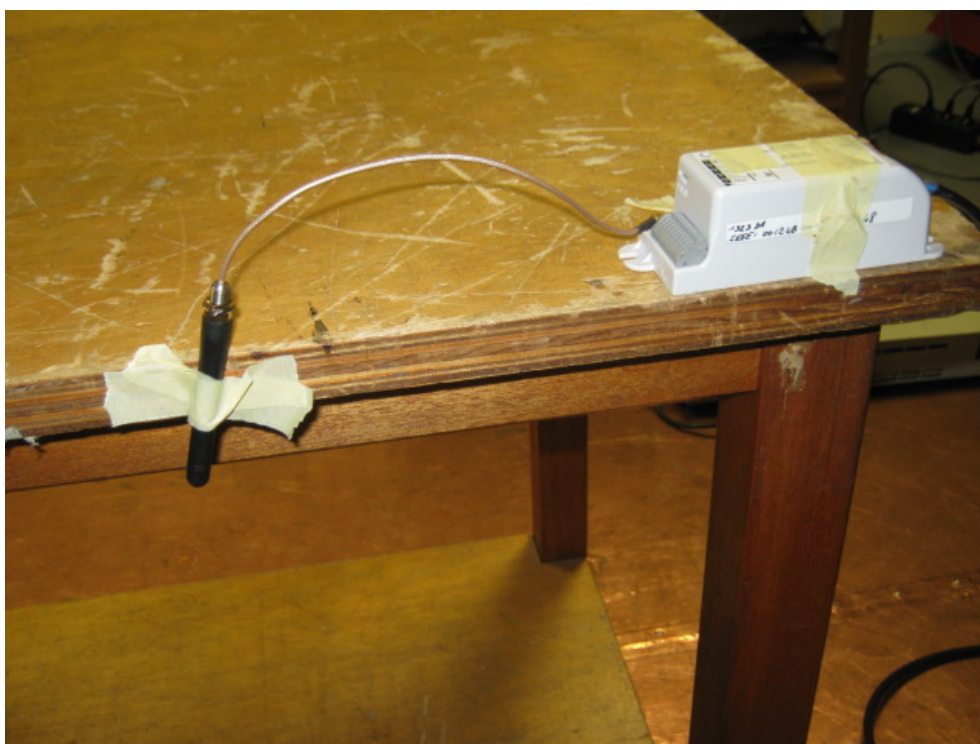
Open area test site



Anechoic chamber test site



Set up for conducted emission



APPENDIX 3: Test equipment list

MEASUREMENT OF THE CONDUCTED DISTURBANCES

TYPE	MANUFACTURER	EMITECH NUMBER	SERIAL NUMBERS
RSIL 16A LISN 1600	THURLBY THANDAR	8719	54876
Alternative power supply 1000VA 1251RP	California instruments	8508	L07129
High pass filter ETP232	SECRE	8641	WITHOUT
Absorber sheath current	EMITECH	9489	WITHOUT
Test receiver HP8591EM	Hewlett Packard	8524	3536a00401
Meteo station WS-9232	La Crosse Technology	8671	WITHOUT
Multimeter MN5102B	AOIP	8675	04 1112

RADIATED EMISSION LIMITS

TYPE	MANUFACTURER	EMITECH NUMBER	SERIAL NUMBERS
Spectrum analyzer FSEM30	Rohde & Schwarz	8523	845112/021
Biconical antenna VHBB 9124	Schwarzbeck	8526	91240213
Log periodic antenna UHALP 9108A	Schwarzbeck	8543	494
Antenna 3115	Electrometrics	8535	00050910
Antenna WR42	IMC	1939	WITHOUT
Préamplificateur 8447D	Hewlett Packard	8511	2443AO3886
Low-noise amplifier 1 to 18 GHz	Microwave DB	1922	116
Low-noise amplifier Low-noise amplifier	ALC Microwave	3036	0010
Alternative power supply 1000VA 1251RP	California instruments	8508	L07129
Multimeter MN5102B	AOIP	8675	04 1112
Meteo station WS-9232	La Crosse Technology	8750	WITHOUT
Anechoic Chamber	EMITECH	8593	WITHOUT
Open test site	EMITECH	8732	WITHOUT

ADDITIONAL PROVISIONS TO THE GENERAL RADIATED EMISSION LIMITATIONS

TYPE	MANUFACTURER	EMITECH NUMBER	SERIAL NUMBERS
Spectrum analyzer FSEM30	Rohde & Schwarz	8523	845112/021
Antenna 3115	Electrometrics	8535	00050910
Alternative power supply 1000VA 1251RP	California instruments	8508	L07129
Multimeter MN5102B	AOIP	8675	04 1112
Meteo station WS-9232	La Crosse Technology	8750	WITHOUT
Anechoic Chamber	EMITECH	8593	WITHOUT

MAXIMUM PEAK output power

TYPE	MANUFACTURER	EMITECH NUMBER	SERIAL NUMBERS
Spectrum analyzer FSEM30	Rohde & Schwarz	8523	845112/021
Antenna 3115	Electrometrics	8535	00050910
Alternative power supply 1000VA 1251RP	California instruments	8508	L07129
Multimeter MN5102B	AOIP	8675	04 1112
Meteo station WS-9232	La Crosse Technology	8750	WITHOUT
Anechoic Chamber	EMITECH	8593	WITHOUT

MEASUREMENT BELOW 30MHz

TYPE	MANUFACTURER	EMITECH NUMBER	SERIAL NUMBERS
Spectrum analyzer FSEM30	Rohde & Schwarz	8523	845112/021
Active loop antenna HFH2-Z2	Rohde & Schwarz	8533	871920/0036
Alternative power supply 1000VA 1251RP	California instruments	8508	L07129
Multimeter MN5102B	AOIP	8675	04 1112
Meteo station WS-9232	La Crosse Technology	8750	WITHOUT
Open test site	EMITECH	8732	WITHOUT

INTENTIONAL RADIATOR

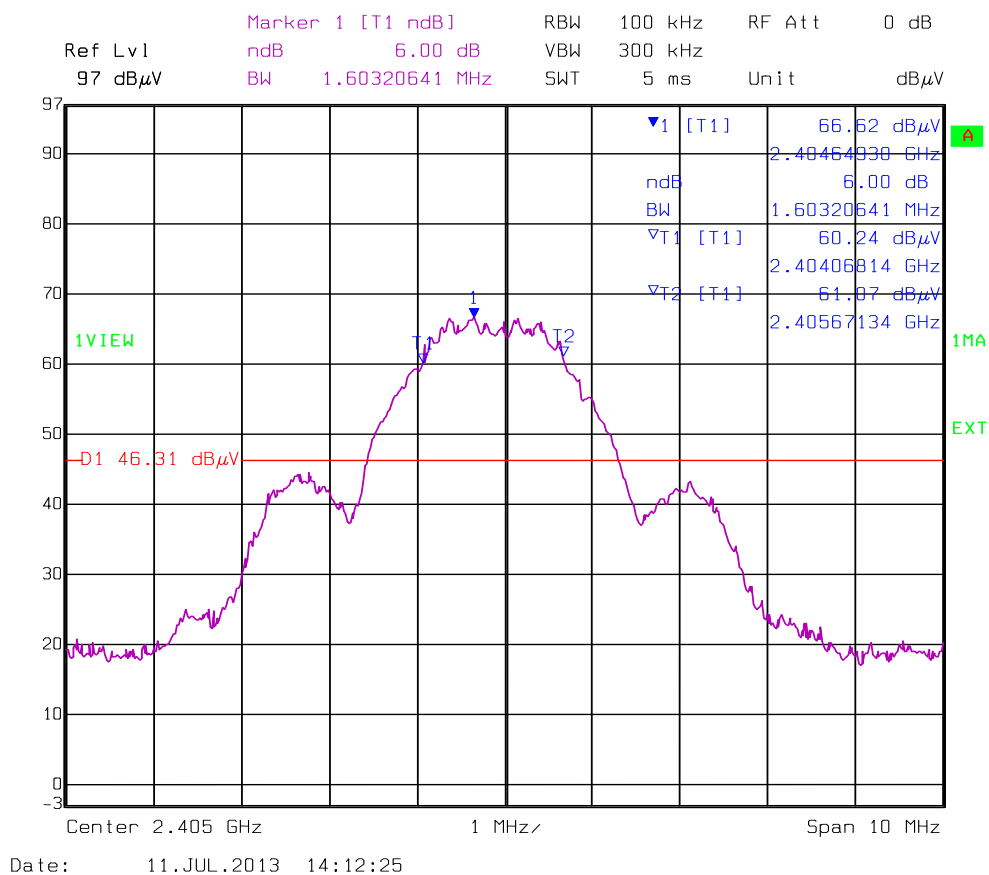
TYPE	MANUFACTURER	EMITECH NUMBER	SERIAL NUMBERS
Spectrum analyzer FSEM30	Rohde & Schwarz	8523	845112/021
Active loop antenna HFH2-Z2	Rohde & Schwarz	8533	871920/0036
Biconical antenna VHBB 9124	Schwarzbeck	8526	91240213
Log periodic antenna UHALP 9108A	Schwarzbeck	8543	494
Antenna 3115	Electrometrics	8535	00050910
Antenna WR42	IMC	1939	WITHOUT
Préamplificateur 8447D	Hewlett Packard	8511	2443AO3886
Low-noise amplifier 1 to 18 GHz	Microwave DB	1922	116
Low-noise amplifier Low-noise amplifier	ALC Microwave	3036	0010
Low pass filter 1 GHz	Filtek	4087	18069-01
rejector filter 2400 MHz BRM50702	Microtronics	7299	021
3.225GHz High pass filter	Filtek	8262	14A54-01
Alternative power supply 1000VA 1251RP	California instruments	8508	L07129
Multimeter MN5102B	AOIP	8675	04 1112
Meteo station WS-9232	La Crosse Technology	8750	WITHOUT
Anechoic Chamber	EMITECH	8593	WITHOUT
Open test site	EMITECH	8732	WITHOUT

PEAK POWER DENSITY

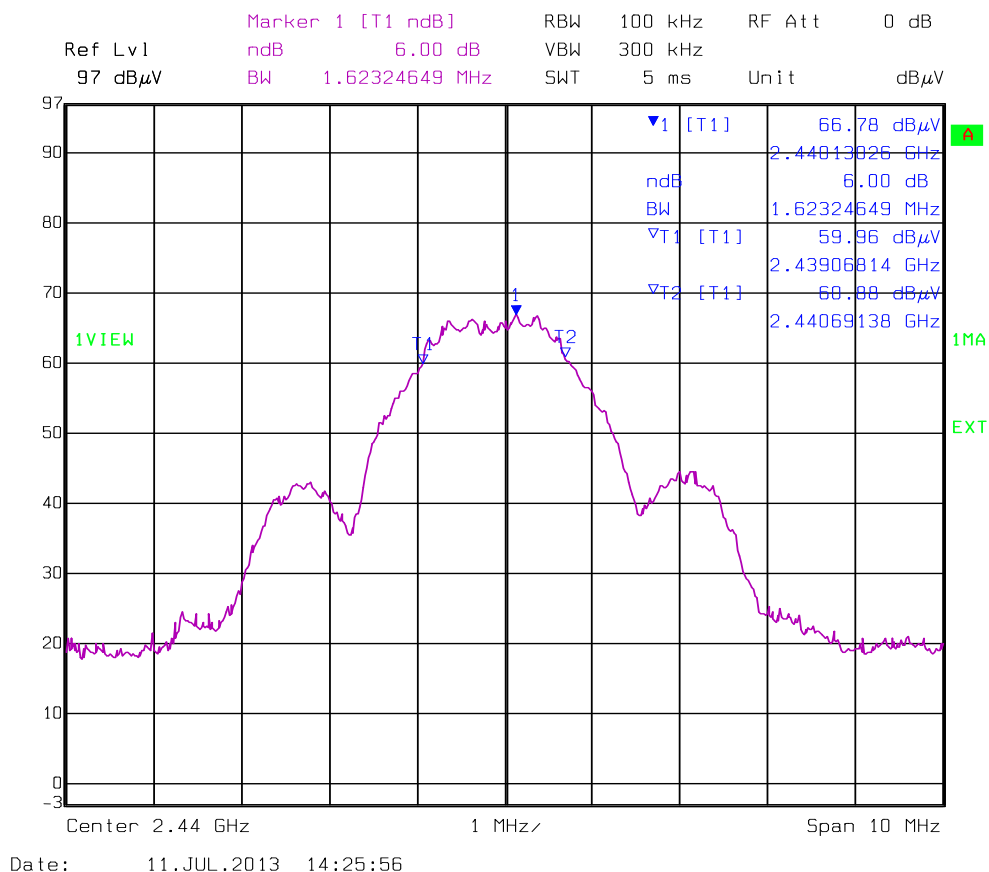
TYPE	MANUFACTURER	EMITECH NUMBER	SERIAL NUMBERS
Spectrum analyzer FSEM30	Rohde & Schwarz	8523	845112/021
Antenna 3115	Electrometrics	8535	00050910
Alternative power supply 1000VA 1251RP	California instruments	8508	L07129
Multimeter MN5102B	AOIP	8675	04 1112
Meteo station WS-9232	La Crosse Technology	8750	WITHOUT
Anechoic Chamber	EMITECH	8593	WITHOUT

APPENDIX 4: 6 dB bandwidth

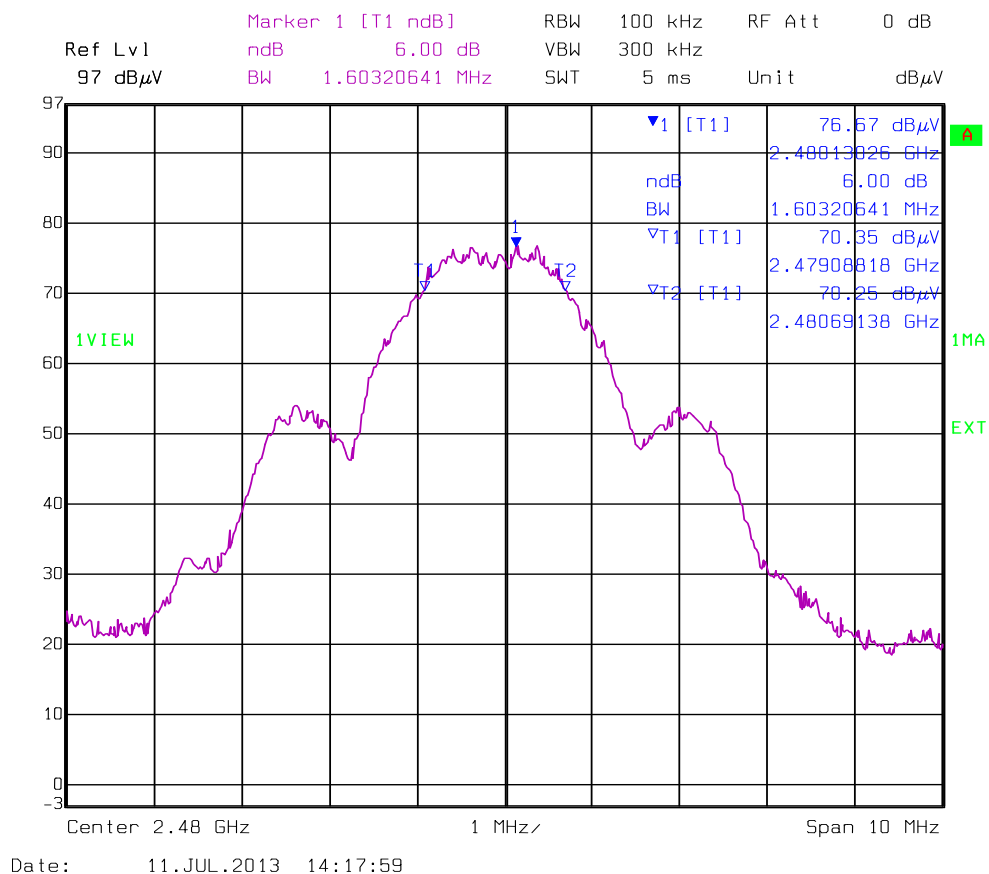
Low channel



Central channel

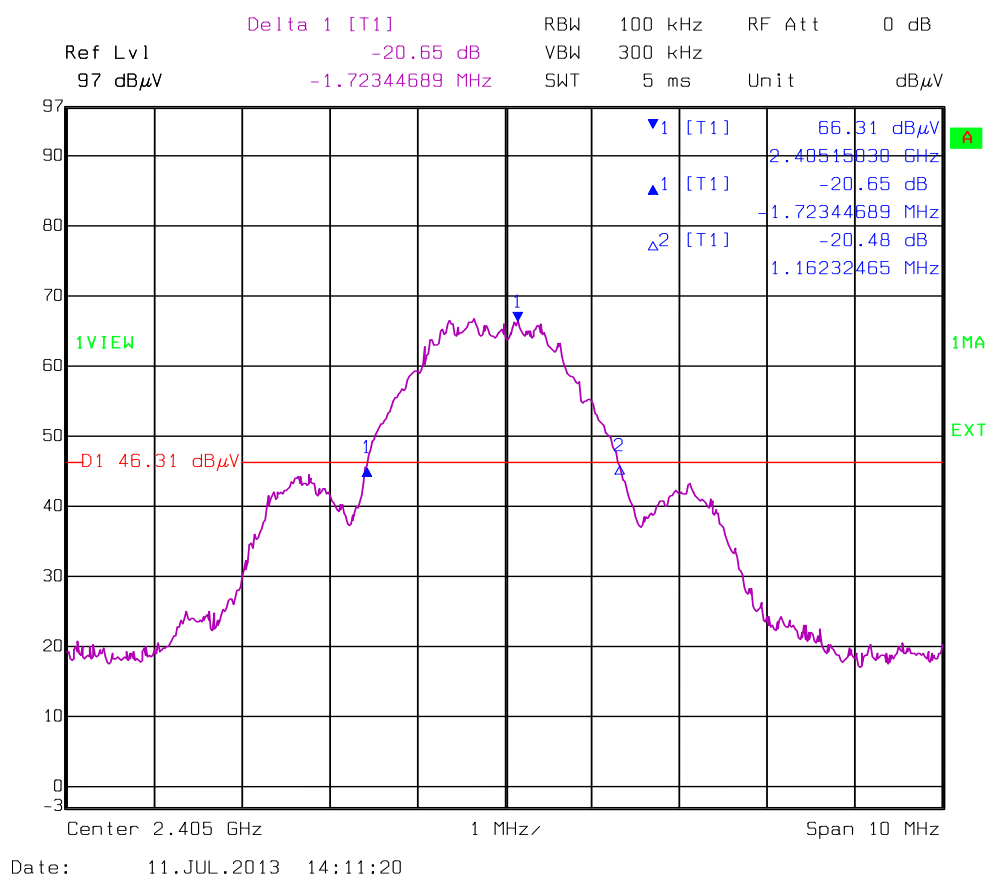


High channel

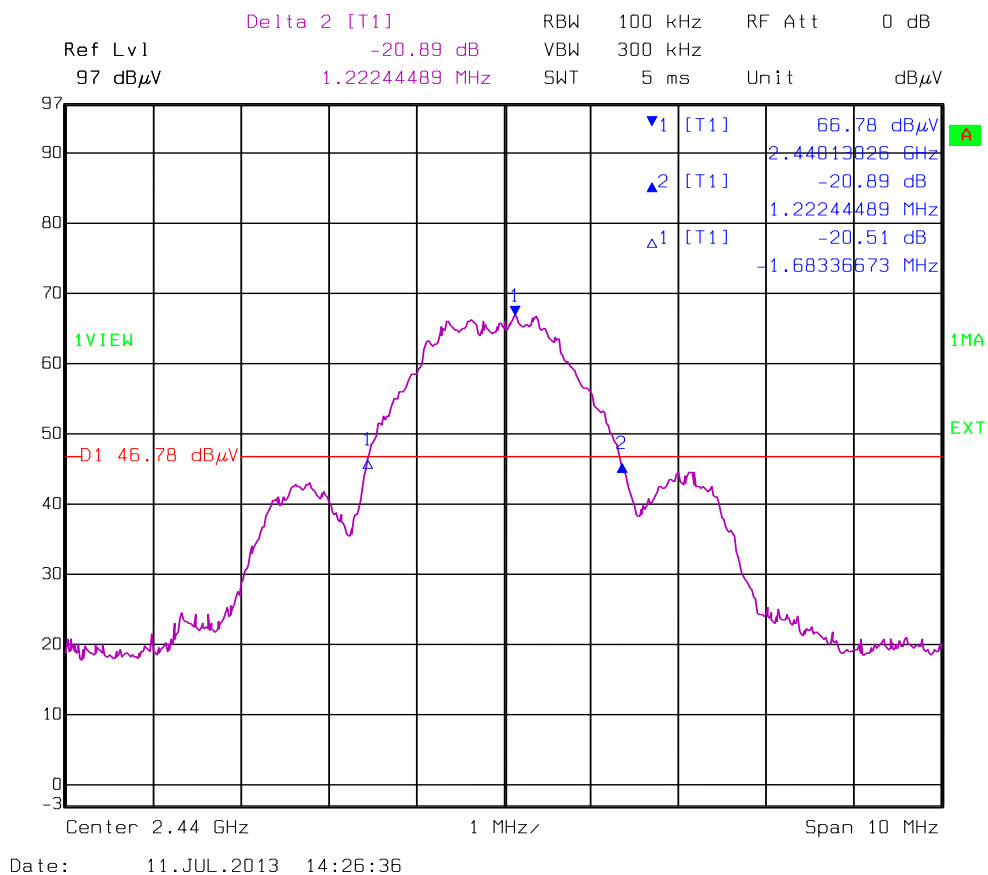


APPENDIX 5: 20 dB bandwidth

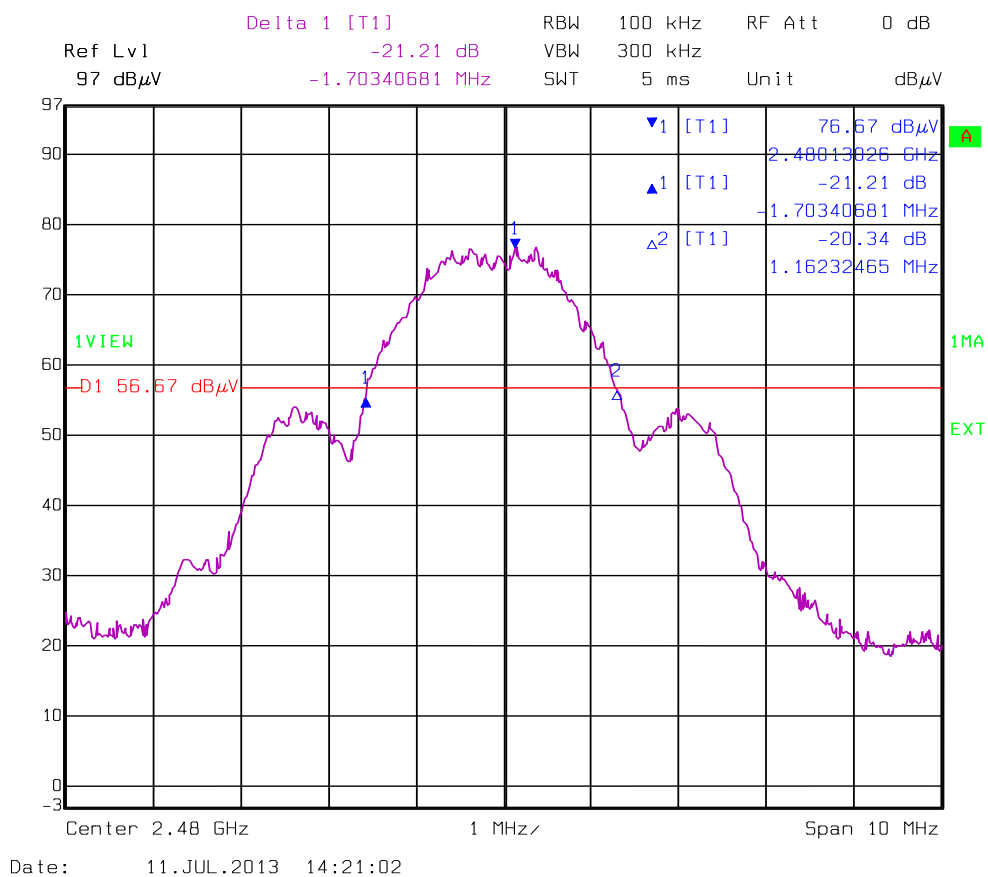
Low channel



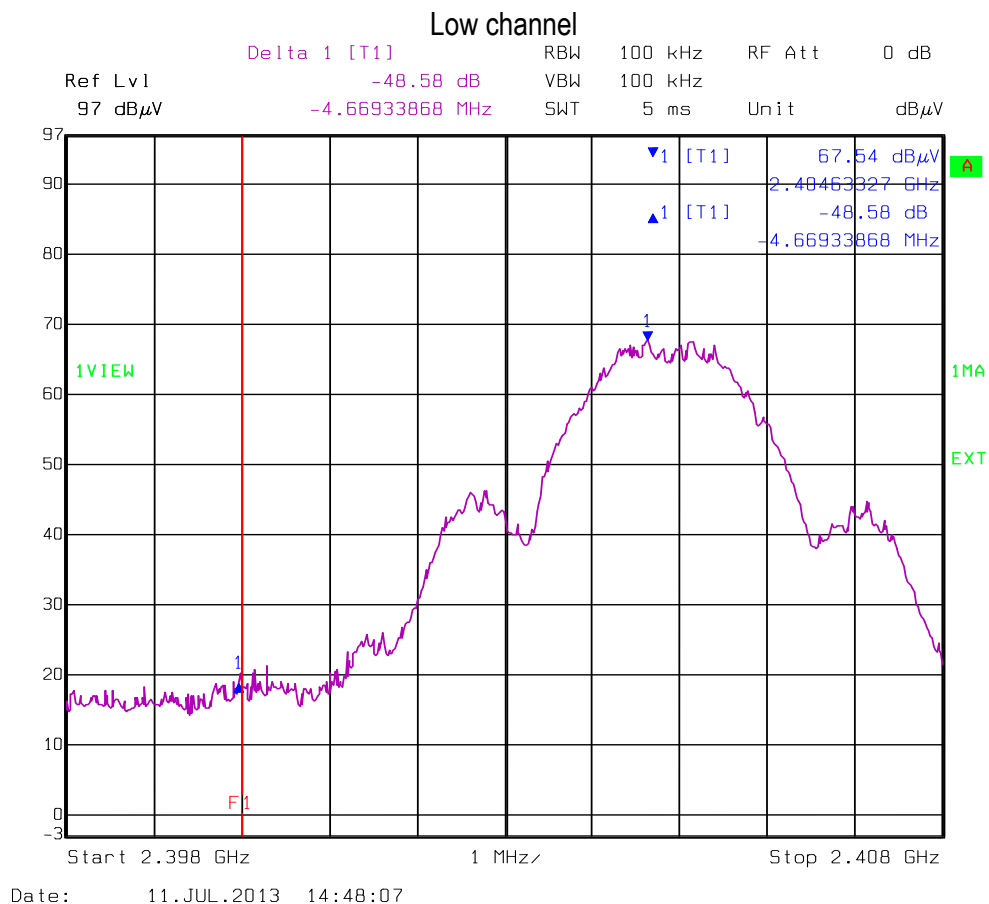
Central channel



High channel



APPENDIX 6: Band edge



High channel

