

Certification Radio test report

According to the standard:
CFR 47 FCC PART 15

Equipment under test:
PHOENIX

FCC ID: XTLPHOENIX

Company:
OCEASOFT

Distribution: Mr ROUSSEAU

(Company: OCEASOFT)

Number of pages: 38 with 7 annexes

Ed.	Date	Modified Page(s)	Technical Verification and Quality Approval	
			Name and Function	Visa
0	14-Sep-17	Creation	M. DUMESNIL, Radio Technical Manager	

*Duplication of this document is only permitted for an integral photographic facsimile. It includes the number of pages referenced here above.
This document is the result of testing a specimen or a sample of the product submitted. It does not imply an assessment of the conformity of the whole manufactured products of the tested sample.*



DESIGNATION OF PRODUCT: PHOENIX

Serial number (S/N): Sample 1: Hopping Mode: E3032100011C
Sample 2: Blocked Mode: E303210000C9

Reference / model (P/N): CLI.005.3427

Software version: V2.0

MANUFACTURER: OCEASOFT

COMPANY SUBMITTING THE PRODUCT:

Company: OCEASOFT

Address: 720, RUE LOUIS LEPINE
34000 MONTPELLIER
FRANCE

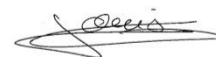
Responsible: Mr ROUSSEAU

DATES OF TEST: From 5-Sep-17 to 9-Sep-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: S. LOUIS

VISA:



WRITTEN BY: S. LOUIS

CONTENTS

<i>TITLE</i>	<i>PAGE</i>
1. INTRODUCTION	4
2. PRODUCT DESCRIPTION	4
3. NORMATIVE REFERENCE	5
4. TEST METHODOLOGY	5
5. TEST EQUIPMENT CALIBRATION DATES	6
6. TESTS AND CONCLUSIONS	7
7. MEASUREMENT UNCERTAINTY	9
8. RADIATED EMISSION LIMITS	10
9. ADDITIONAL PROVISIONS TO THE GENERAL RADIATED EMISSION LIMITATIONS	12
10. MAXIMUM PEAK CONDUCTED OUTPUT POWER	13
11. INTENTIONAL RADIATOR	15
12. PEAK POWER DENSITY	18
APPENDIX 1: PHOTOS OF THE EQUIPMENT UNDER TEST	20
APPENDIX 2: TEST SET UP	22
APPENDIX 3: TEST EQUIPMENT LIST	28
APPENDIX 4: 6 DB BANDWIDTH	31
APPENDIX 6: 99% BANDWIDTH	34
APPENDIX 7: BAND EDGE	37

1. INTRODUCTION

This document presents the result of RADIO test carried out on the following equipment: **Phoenix**, in accordance with normative reference.

2. PRODUCT DESCRIPTION

Class:	B
Utilization:	Device designed to monitor time and temperature sensitive products during transportation and storage.
Antenna type and gain:	Integral antenna – Unknown gain
Power level:	Adjusted by software: -12dBm
Operating frequency range:	From 2400MHz to 2483.5MHz
Frequency tested:	2402MHz, 2426MHz and 2480MHz
Number of channels:	40
Channel spacing:	2 MHz
Modulation:	Bluetooth Low Energy
Power source:	5 x 3 Vdc placed in parallel

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 Compliance Testing of Unlicensed Wireless Devices.
558074 D01 DTS v04	Guidance for Performing Compliance on Digital Transmission Systems Operating under §15.247
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 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
0000	BAT-EMC V3.6.0.32	Software	/	/	/
1922	Microwave DB C020180F-4B1	Low-noise amplifier	21/12/2016	21/12/2017	21/02/2018
4087	Filtek LP03/1000-7GH	Low Pass Filter	05/04/2016	05/04/2018	05/06/2018
4088	R&S FSP40	Spectrum Analyzer	29/10/2015	29/10/2017	29/12/2017
5625	BL Microwave BP2442-84-7CS	Band pass filter	04/03/2016	04/03/2018	04/05/2018
6796	R&S FSP7	Spectrum Analyzer	12/09/2016	12/09/2018	12/11/2018
7045	MPC F0-100	Climatic chamber	/	/	/
7190	R&S HL223	Antenna	15/03/2016	15/03/2019	15/05/2019
7240	Emco 3110	Biconical antenna	15/03/2016	15/03/2019	15/11/2019
7299	Microtronics BRM50702	Reject band filter	04/11/2015	04/11/2017	04/01/2018
7566	Testo 608-Hi	Meteo station	15/02/2016	15/02/2018	15/04/2018
8511	HP 8447D	Low-noise amplifier	28/11/2016	28/11/2017	28/01/2018
8526	Schwarzbeck VHBB 9124	Biconical antenna	12/06/2015	12/06/2018	12/08/2018
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	/	/	/
8750	La Crosse Technology WS-9232	Meteo station	23/09/2016	23/09/2018	23/11/2018
8896	ACQUISYS GPS8	Satellite synchronized frequency standard	/	/	/
10317	Fluke 177	Multimeter	24/08/2015	24/08/2017	24/10/2017
10730	ZFL-1000LN	Mini-circuit	21/11/2016	21/11/2017	21/01/2018
10739	LUCIX Corp S005180M3201	Low-noise amplifier	29/03/2017	29/03/2018	29/05/2018
10759	SIDT Cage 3	Anechoic chamber	/	/	/
10771	EMCO 3117	Antenna	23/11/2016	23/11/2019	23/01/2020
/	GPIBShot V2.4	Software	/	/	/

6. TESTS AND CONCLUSIONS

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		Supplied by batteries
FCC Part 15.109	RADIATED EMISSION LIMITS	X				Class B
FCC Part 15.111	ANTENNA POWER CONDUCTED LIMITS FOR RECEIVER			X		

NAp: Not Applicable

NAs: Not Asked

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		Supplied by batteries
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				

NAp: Not Applicable

NAs: Not Asked

Note 1: Integra antenna.

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 685 kHz (see appendix 4).

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

RF EXPOSURE:

In accordance with KDB 447498 D01 General RF Exposure Guidance v06, Paragraph 4.3.1.

Maximum measured power = 76.5 dBμV/m = 13.5×10^{-6} W at 2402 MHz
with $P = (E \times d)^2 / (30 \times G_p)$ with $d = 3$ m and $G_p = 1$

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

$$PSD = EIRP / (4 \times \pi \times R^2)$$

$$\Rightarrow 3097.3 / (4 \times \pi \times (20 \text{ cm})^2) = 2.67 \times 10^{-6} \text{ mW/cm}^2 \text{ (limit = 1 mW/cm}^2\text{)}$$

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

8. RADIATED EMISSION LIMITS

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 three orthogonal planes.

Then the final measurement is realized with the product on the most critical orientation.

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, 1.5m 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 5th harmonic of the highest frequency used (2.48 GHz).

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 reception mode.

Results:

Ambient temperature (°C): 26.4
Relative humidity (%): 39

Power source:

We used for power source the internal batteries of the equipment and we noted:

Voltage at the beginning of test (V): 3.03
Voltage at the end of test (V): 2.99
Percentage of voltage drop during the test (%): 1.32

Sample N° 2 Low, Central and High Channel

Not any 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

Test conclusion:

RESPECTED STANDARD

9. 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): 26.5
Relative humidity (%): 54

Power source:

We used for power source the internal batteries of the equipment and we noted:

Voltage at the beginning of test (V): 3.03
Voltage at the end of test (V): 2.99
Percentage of voltage drop during the test (%): 1.32

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

Sample N° 2:

Fundamental frequency (MHz)	Field Strength Level of fundamental (dBμV/m)	Detector (Peak or Average)	Frequency of maximum Band-edges Emission (MHz)	Delta Marker (dB) (1)	Calculated Max Out-of-Band Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2402	76.3	PEAK	2399.94	-41.96	34.34	56.3	21.96
2480	72.9	PEAK	2483.62	-31.36	41.54 (2)	74	32.46

(1) Marker-Delta method

(2) The peak level is lower than the average limit (54dBμV/m).

Band-edge curves are given in appendix 7.

Test conclusion:

RESPECTED STANDARD

10. MAXIMUM PEAK CONDUCTED OUTPUT POWER

Standard: FCC Part 15

Test procedure: paragraph 15.247 (b)
RBW $\geq$ DTS bandwidth method of paragraph 9.1.1 of KDB 558074

Test set up:

First an exploratory radiated measurement was performed. During this phase the product is oriented in three orthogonal planes.

Then the final measurement is realized with the product on the most critical orientation.

The measure is realized in anechoic chamber above 1 GHz.

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.

Distance of antenna: 3 meters (in anechoic room)

Antenna height: 1.5 meter (in anechoic room)

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

The measurement of the radiated electro-magnetic field is realized with an analyser, with a resolution bandwidth adjusted at 10 MHz and video bandwidth at 10 MHz.

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.

Power level is adjusted by software with the parameter -12dBm.

Results:

Ambient temperature (°C): 24.9
Relative humidity (%): 56

Power source:

We used for power source the internal batteries of the equipment and we noted:

Voltage at the beginning of test (V): 3.03
Voltage at the end of test (V): 2.99
Percentage of voltage drop during the test (%): 1.32

Sample N° 2 Low Channel (F=2402MHz)

	Electro-magnetic field (dBμV/m):	Maximum Peak conducted output power (W)	Limit (W)
Nominal supply voltage:	76.5	13.4×10^{-6}	1

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

Position of equipment: See photos in appendix 2 - Position 3 (azimuth: 40 degrees)

Sample N° 2 Central Channel (F=2440MHz)

	Electro-magnetic field (dBμV/m):	Maximum Peak conducted output power (W)	Limit (W)
Nominal supply voltage:	74.9	9.3×10^{-6}	1

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

Position of equipment: See photos in appendix 2 - Position 3 (azimuth: 40 degrees)

Sample N° 2 High Channel (F=2480MHz)

	Electro-magnetic field (dBμV/m):	Maximum Peak conducted output power (W)	Limit (W)
Nominal supply voltage:	72.9	5.8×10^{-6}	1

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

Position of equipment: See photos in appendix 2 - Position 3 (azimuth: 40 degrees)

$$* P = (E \times d)^2 / (30 \times G_p) \text{ with } d = 3 \text{ m and } G_p = 1$$

Test conclusion:

RESPECTED STANDARD

11. INTENTIONAL RADIATOR

Standard: FCC Part 15

Test procedure: paragraph 15.205, paragraph 15.209, paragraph 15.247 (d)
Emissions in non-restricted frequency bands method of paragraph 11 of KDB 558074
Emissions in restricted frequency bands method of paragraph 12 of KDB 558074

Test set up:

First an exploratory radiated measurement was performed. During this phase the product is oriented in three orthogonal planes.

Then the final measurement is realized with the product on the most critical orientation.

The measure is then 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 (2.48 GHz) or 5th harmonic of the highest frequency used by the digital device, whichever is greater

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

Bandwidth: 200Hz ($9 \text{ kHz} < F < 150\text{kHz}$)
9 kHz ($150 \text{ kHz} < F < 30\text{MHz}$)
120 kHz ($30 \text{ MHz} < F < 1 \text{ GHz}$)
100 kHz / 1 MHz ($F > 1 \text{ GHz}$)

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

Power level is adjusted by software with the parameter -12dBm.

Results:

Ambient temperature (°C): 24.9
Relative humidity (%): 56

Power source:

We used for power source the internal batteries of the equipment and we noted:

Voltage at the beginning of test (V): 3.03
Voltage at the end of test (V): 2.99
Percentage of voltage drop during the test (%): 1.32

Sample N° 2 Low Channel

Frequencies (MHz)	Detector P QP Av	Antenna height (cm)	RBW (kHz)	Polarization H: Horizontal V: Vertical	Field strength Measured at 3 m (dBμV/m)	Limits (dBμV/m) or (dBm)	Margin (dB)
4804 (1)*	P	150	1000	H	45 (2)	74	29
7206	P	150	100	H	42.4	56.3	13.9

P= Peak, QP=Quasi-peak, Av=Average

(1) restricted bands of operation in 15.205

(2) the peak level is lower than the average limit (54dBμV/m).

Sample N° 2 Central Channel

Frequencies (MHz)	Detector P QP Av	Antenna height (cm)	RBW (kHz)	Polarization H: Horizontal V: Vertical	Field strength Measured at 3 m (dBμV/m)	Limits (dBμV/m) or (dBm)	Margin (dB)
4880 (1)	P	150	1000	H	44.4 (2)	74	29.6
7320 (1)	P	150	1000	H	47.6 (2)	74	26.4

P= Peak, QP=Quasi-peak, Av=Average

(1) restricted bands of operation in 15.205

(2) the peak level is lower than the average limit (54dBμV/m).

Sample N° 2 High Channel

Frequencies (MHz)	Detector P QP Av	Antenna height (cm)	RBW (kHz)	Polarization H: Horizontal V: Vertical	Field strength Measured at 3 m (dBμV/m)	Limits (dBμV/m) or (dBm)	Margin (dB)
4960 (1)	P	150	1000	H	44.5 (2)	74	29.5
7440 (1)	P	150	1000	H	48.7 (2)	74	25.3

P= Peak, QP=Quasi-peak, Av=Average

(1) restricted bands of operation in 15.205

(2) the peak level is lower than the average limit (54dBμV/m).

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 76.3 dB μ V/m on low channel.

So the applicable limit is 56.3 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

12. PEAK POWER DENSITY

Standard: FCC Part 15

Test procedure: paragraph 15.247 (e)
PKPSD (Peak PSD) method of paragraph 10.2 of KDB 558074

Test set up:

First an exploratory radiated measurement was performed. During this phase the product is oriented in three orthogonal planes.

Then the final measurement is realized with the product on the most critical orientation.

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.

Distance of antenna: 3 meters (in anechoic room)

Antenna height: 1.5 meter (in anechoic room)

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

The measurement of the radiated electro-magnetic field is realized with an analyser.

Resolution bandwidth: 3kHz

Video bandwidth: 10 kHz

Detector: Peak

Then the peak marker function is used.

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.

Power level is adjusted by software with the parameter -12dBm.

Results:

Ambient temperature (°C): 24.9
Relative humidity (%): 56

Power source:

We used for power source the internal batteries of the equipment and we noted:

Voltage at the beginning of test (V): 3.03
Voltage at the end of test (V): 2.99
Percentage of voltage drop during the test (%): 1.32

Sample N° 2 Low Channel

	Maximum Peak conducted power density: (dBm / 3 kHz)
Normal test conditions	-32.23
Limits (dBm / 3 kHz)	+8 dBm

Sample N° 2 Central Channel

	Maximum Peak conducted power density: (dBm / 3 kHz)
Normal test conditions	-34.53
Limits (dBm / 3 kHz)	+8 dBm

Sample N° 2 High Channel

	Maximum Peak conducted power density: (dBm / 3 kHz)
Normal test conditions	-34.93
Limits (dBm / 3 kHz)	+8 dBm

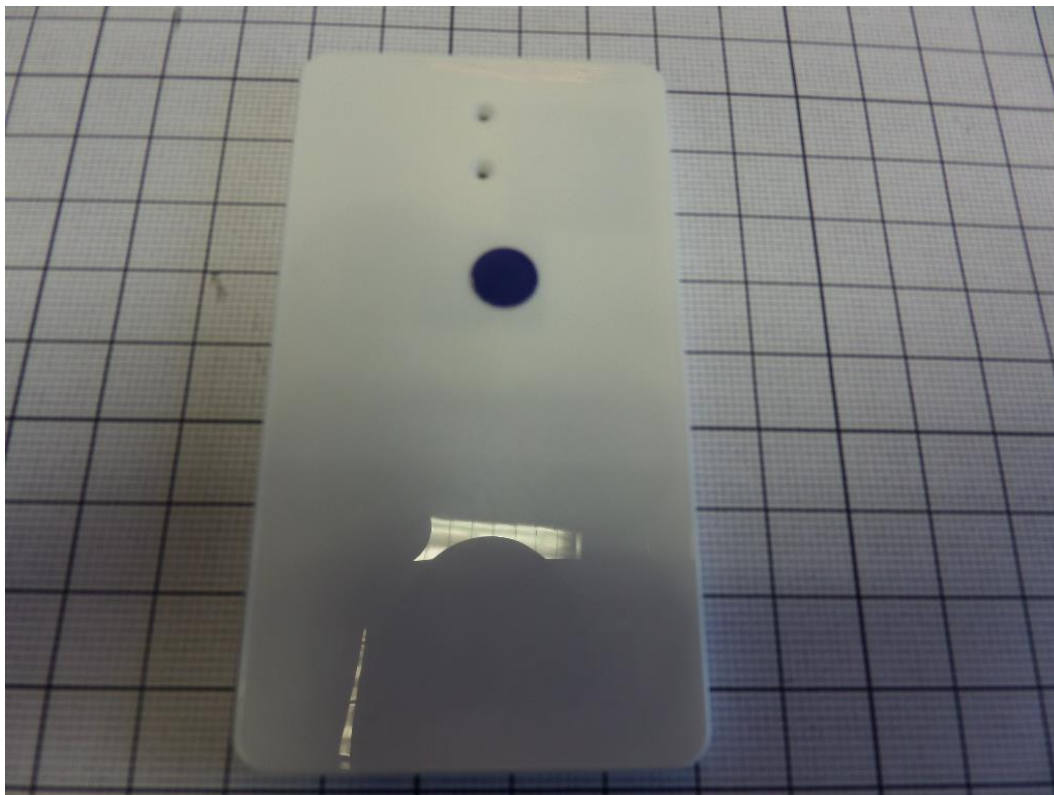
Test conclusion:

RESPECTED STANDARD

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

APPENDIX 1: Photos of the equipment under test

External view

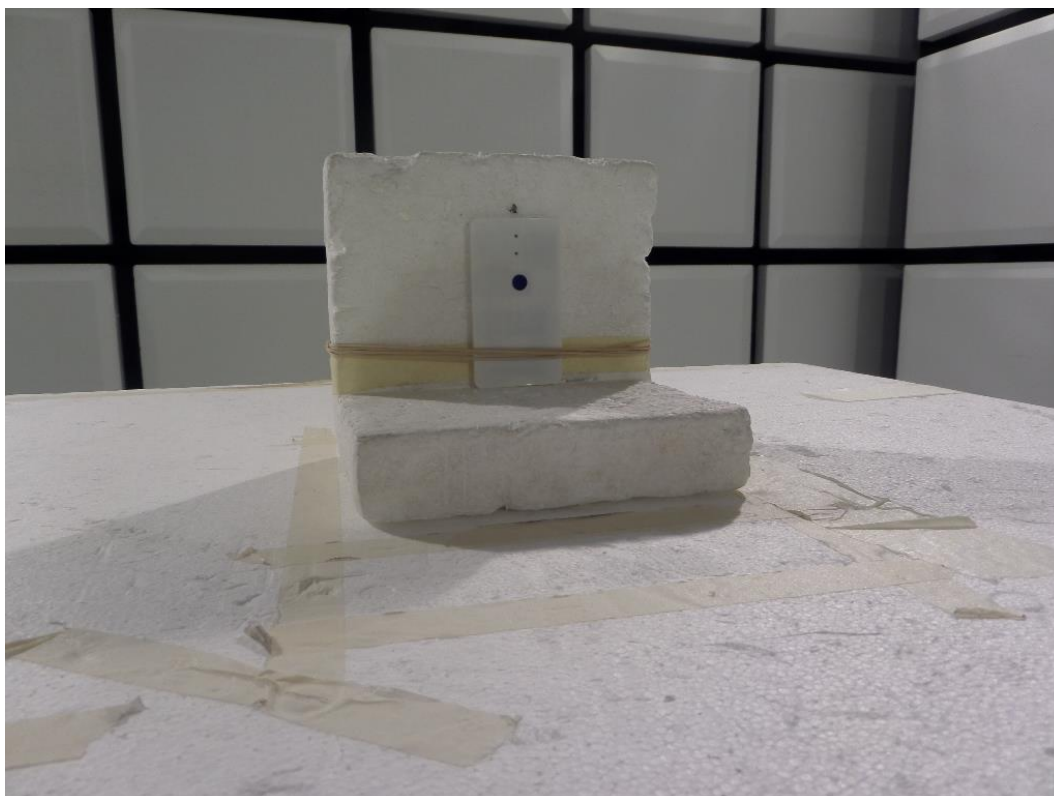


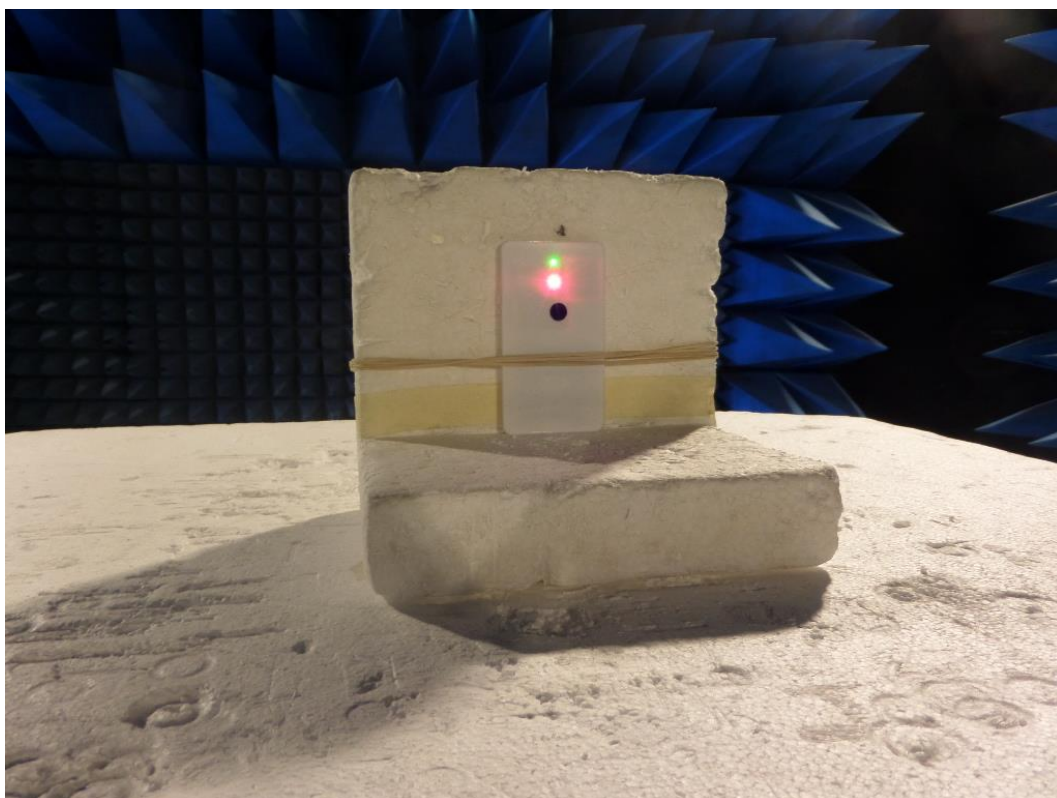
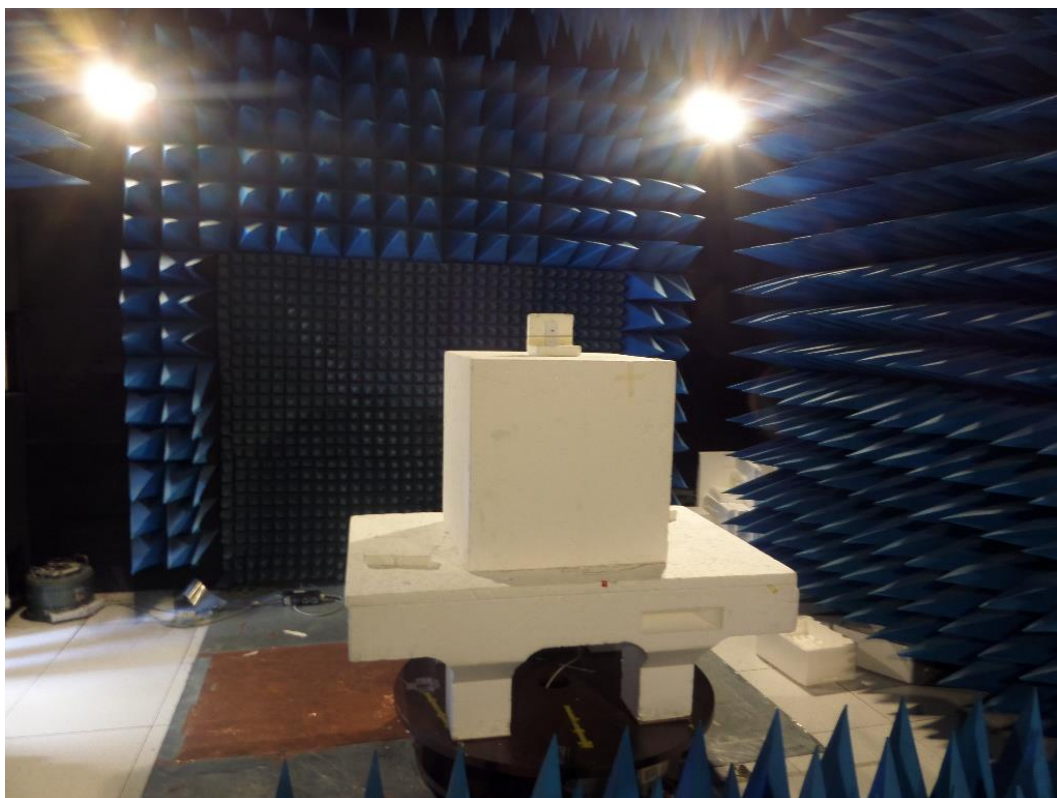
Inside view

CONFIDENTIAL

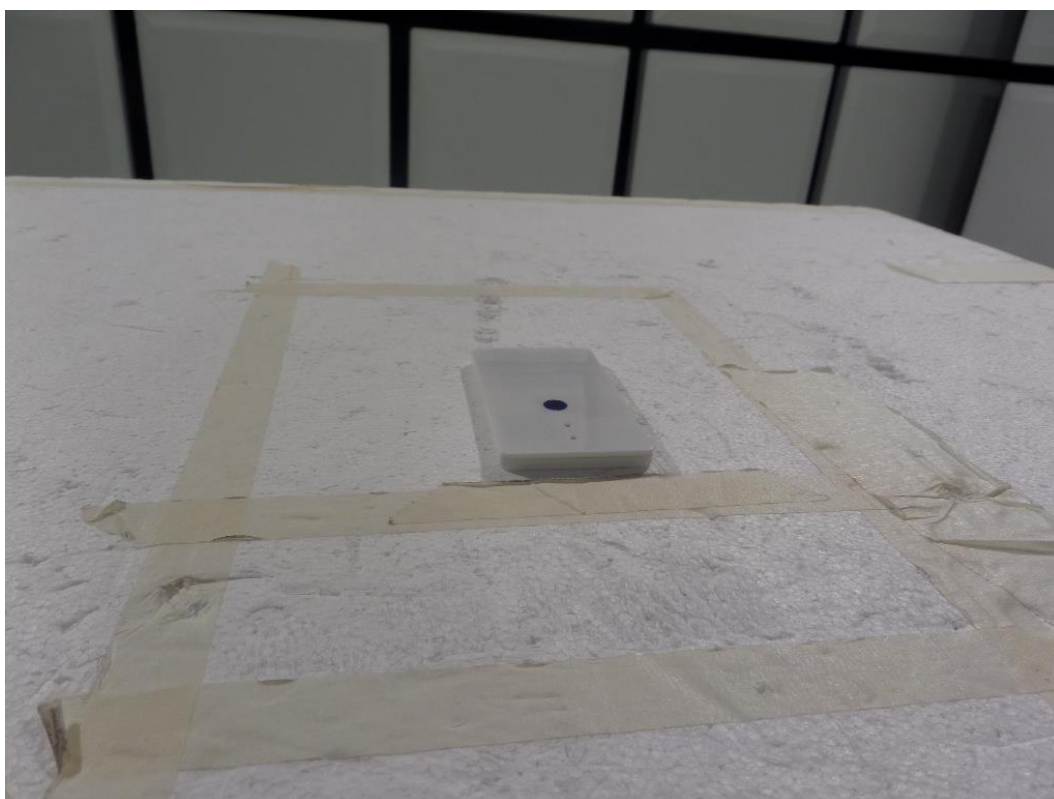
APPENDIX 2: Test set up

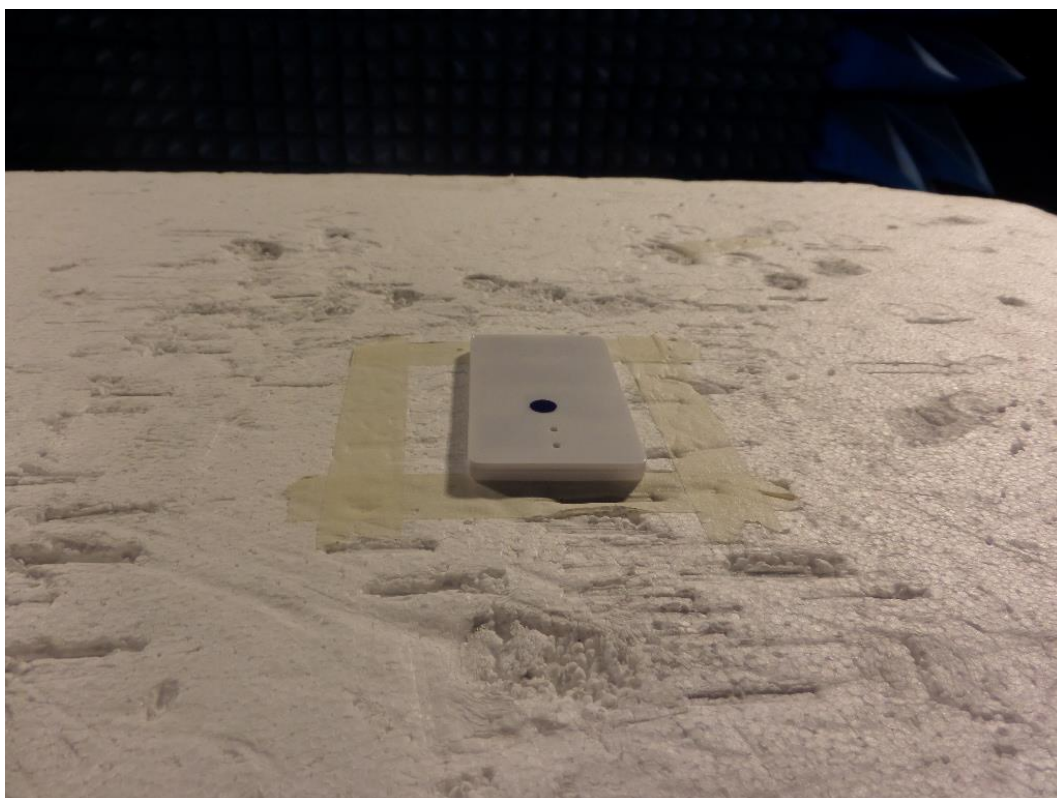
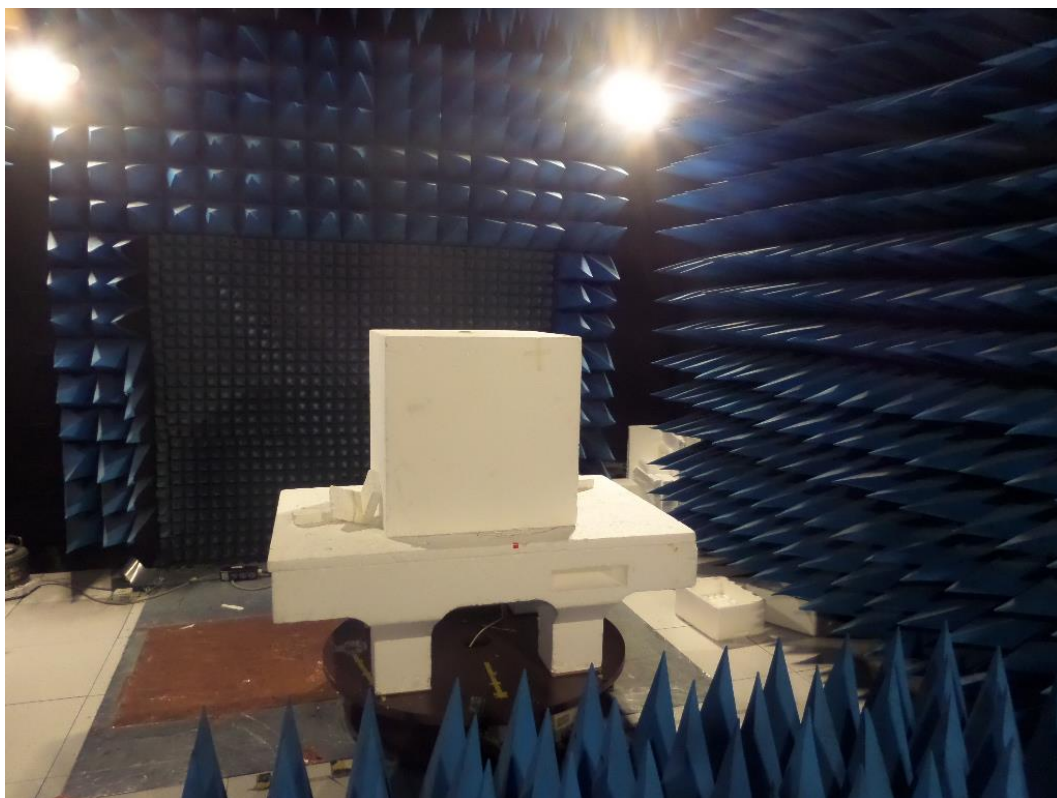
Position 1



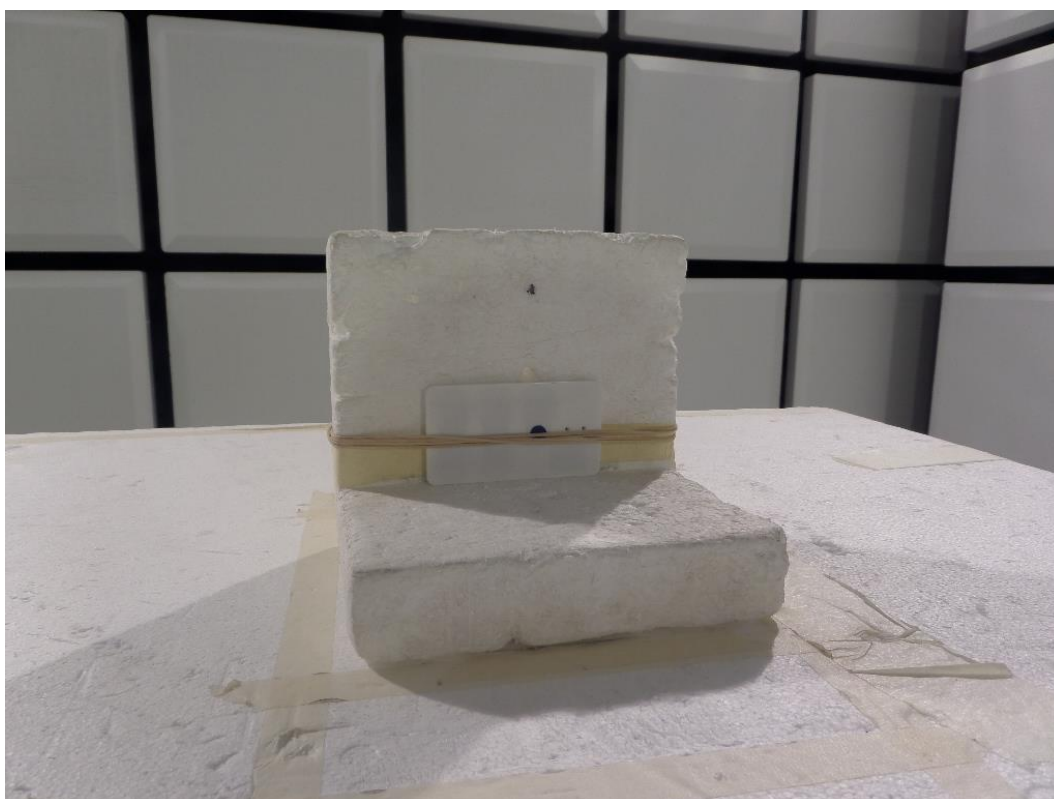
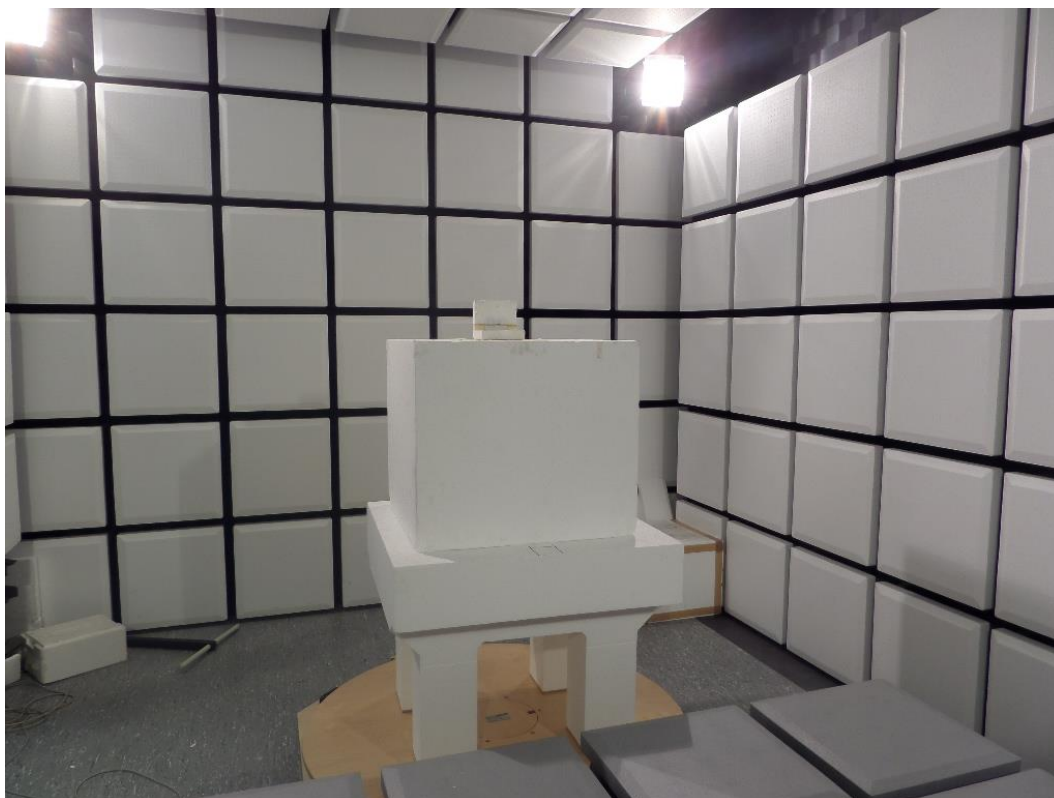


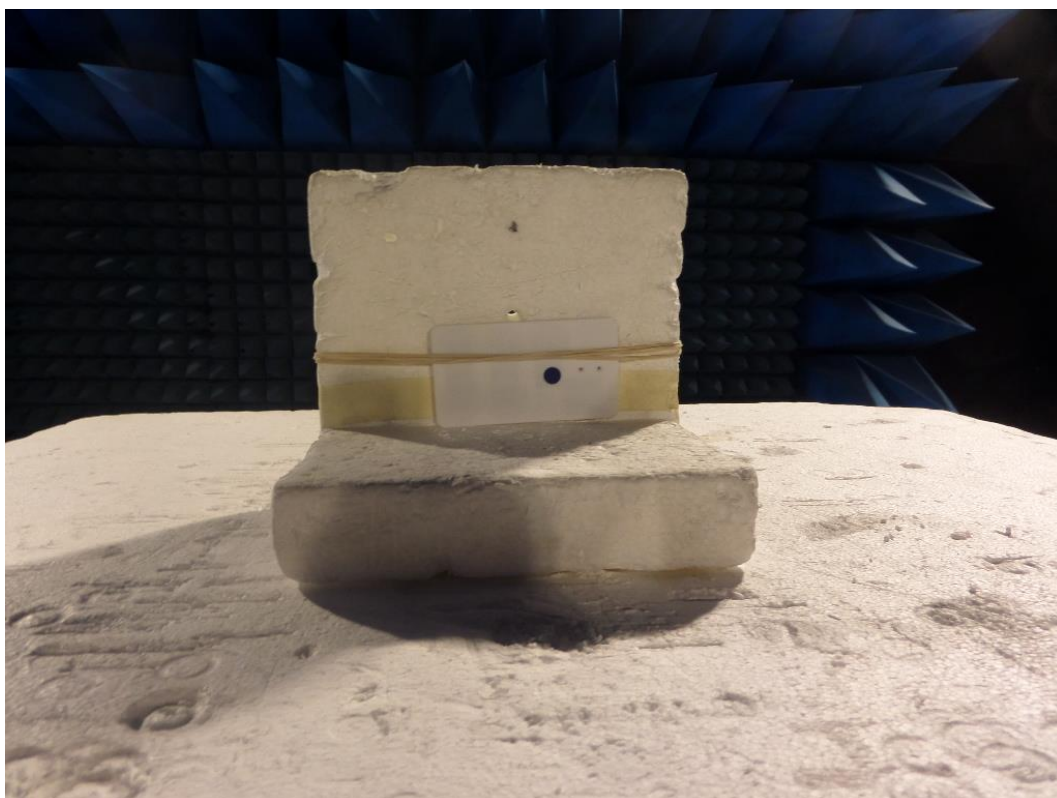
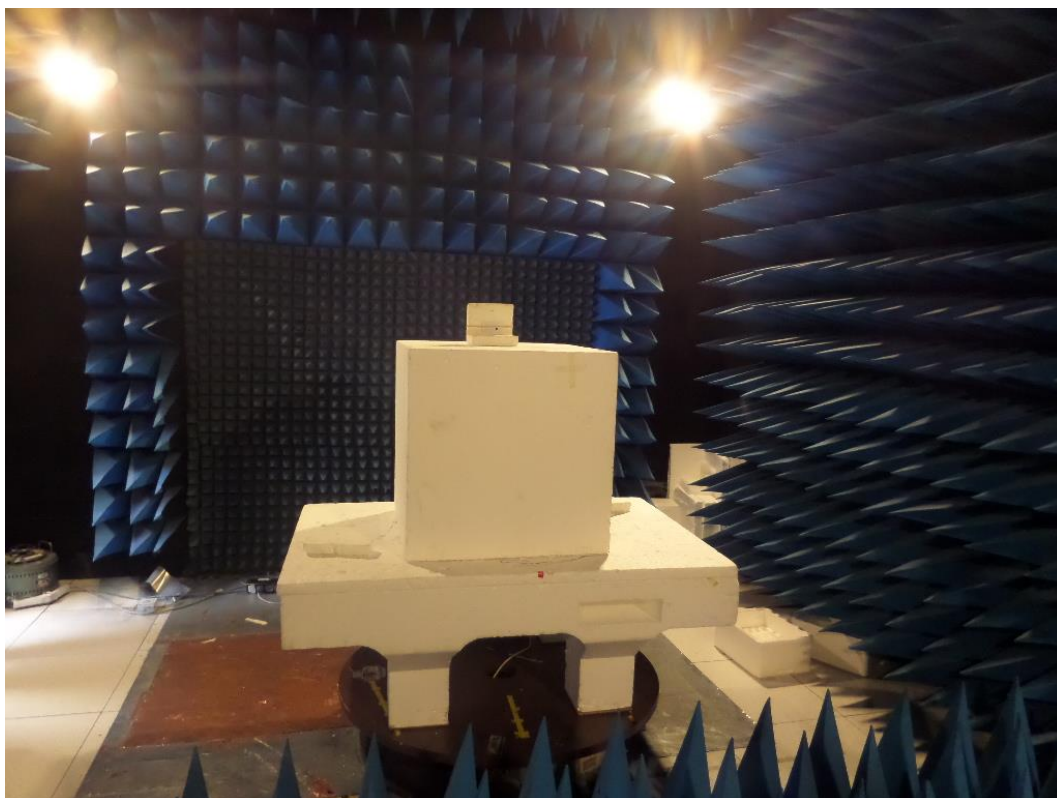
Position 2





Position 3





APPENDIX 3: Test equipment list**Peak power density**

TYPE	MANUFACTURER	EMITECH NUMBER
Anechoic Chamber	EMITECH	8593
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Spectrum Analyzer FSP40	Rohde & Schwarz	4088
Antenna 3115	EMCO	8535
Low-noise amplifier S005180M3201	LUCIX Corp.	10739
Multimeter 177	Fluke	10317
Meteo station WS-9232	La Crosse Technology	8750
Software	BAT-EMC V3.6.0.32	0000

Maximum peak output power

TYPE	MANUFACTURER	EMITECH NUMBER
Anechoic Chamber	EMITECH	8593
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Spectrum Analyzer FSP40	Rohde & Schwarz	4088
Antenna 3115	EMCO	8535
Low-noise amplifier S005180M3201	LUCIX Corp.	10739
Multimeter 177	Fluke	10317
Meteo station WS-9232	La Crosse Technology	8750
Software	BAT-EMC V3.6.0.32	0000

Intentional radiator

TYPE	MANUFACTURER	EMITECH NUMBER
Anechoic Chamber	EMITECH	8593
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Spectrum Analyzer FSP40	Rohde & Schwarz	4088
Radiocommunication analyser CMU200	Rohde & Schwarz	6816
Loop antenna 6502	EMCO	1406
Biconical antenna VHBB 9124	Schwarzbeck	8526
Log periodic antenna UHALP 9108A	Schwarzbeck	8543
Antenna 3115	EMCO	8535
Antenna 3160-09	ETS Lindgren	8786
Low-noise amplifier 8447D	Hewlett Packard	8511
Low-noise amplifier S005180M3201	LUCIX Corp.	10739
Low-noise amplifier S180265L3201	LUCIX Corp.	8704
Low pass filter LP03/1000-7GH	Filtek	4087
Reject band filter BRM50702	Microtronics	7299
Multimeter 177	Fluke	10317
Meteo station WS-9232	La Crosse Technology	8750
Software	BAT-EMC V3.6.0.32	0000

Additional provisions to the general radiated emission limitations

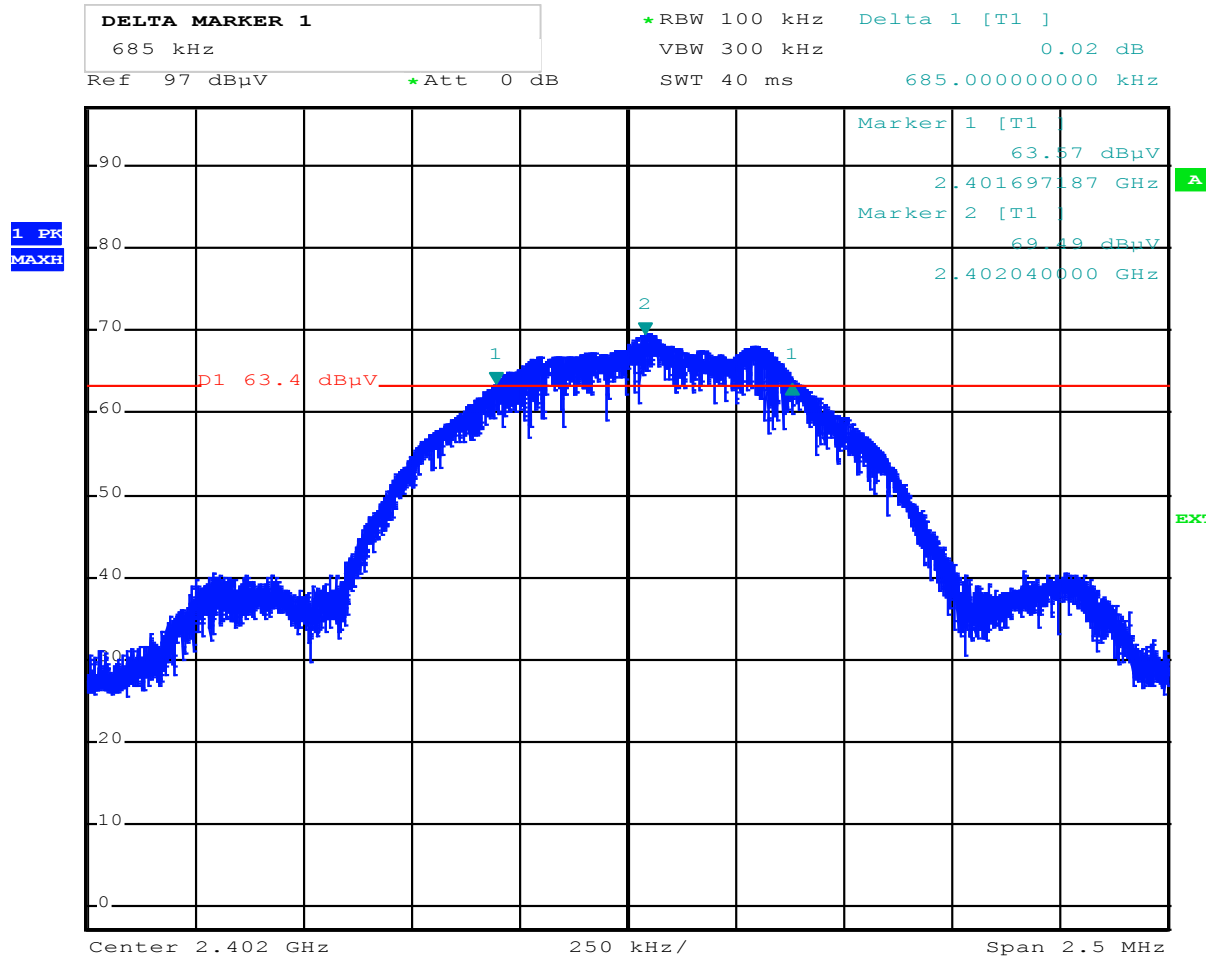
TYPE	MANUFACTURER	EMITECH NUMBER
Anechoic Chamber	EMITECH	8593
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Spectrum Analyzer FSP40	Rohde & Schwarz	4088
Antenna 3115	EMCO	8535
Low-noise amplifier S005180M3201	LUCIX Corp.	10739
Multimeter 177	Fluke	10317
Multimeter IDM106N	ISOTECH	8677
Meteo station WS-9232	La Crosse Technology	8750
Software	GPIBSHOT V2.4	-

Radiated emission limits

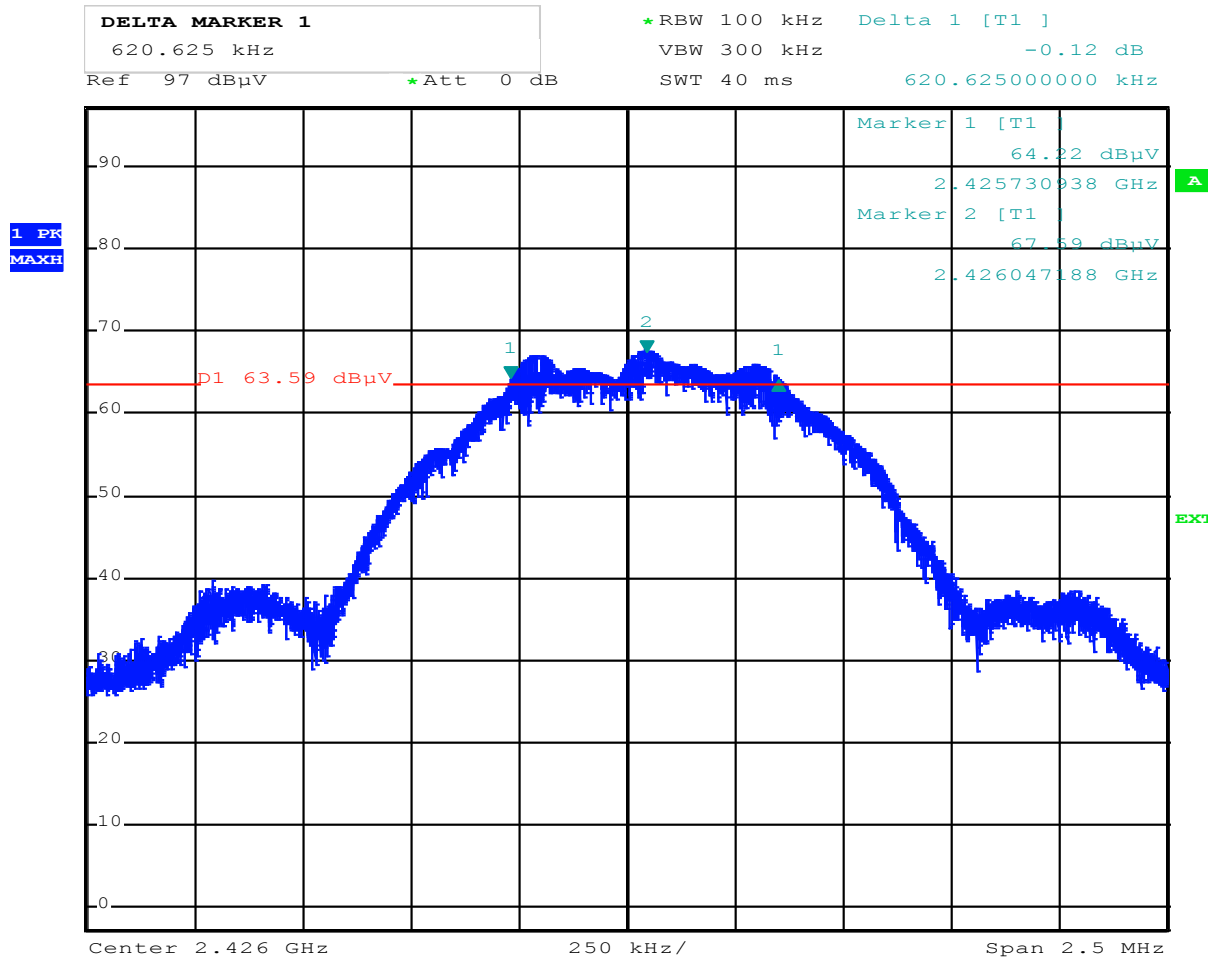
TYPE	MANUFACTURER	EMITECH NUMBER
Anechoic Chamber	EMITECH	8593
Full anechoic chamber	EMITECH	10759
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Spectrum Analyzer FSP40	Rohde & Schwarz	4088
Spectrum Analyzer FSP7	Rohde & Schwarz	6796
Biconical antenna VHBB 9124	Schwarzbeck	8526
Biconical antenna 3110	Emco	7240
Log periodic antenna UHALP 9108A	Schwarzbeck	8543
Log periodic antenna HL223	Rohde & Schwarz	7190
Antenna 3115	EMCO	8535
Antenna 3117	ETS-Lindgren	10771
Antenna 3160-09	ETS Lindgren	8786
Low-noise amplifier 8447D	Hewlett Packard	8511
Low-noise amplifier ZFL-1000LN	Mini-circuit	10730
Low-noise amplifier C020180F-4B1	Microwave DB	1922
Low-noise amplifier S005180M3201	LUCIX Corp.	10739
Low-noise amplifier S180265L3201	LUCIX Corp.	8704
Multimeter 177	Fluke	10317
Meteo station 608-H1	Testo	7566
Meteo station WS-9232	La Crosse Technology	8750
Software	BAT-EMC V3.6.0.32	0000

APPENDIX 4: 6 dB bandwidth

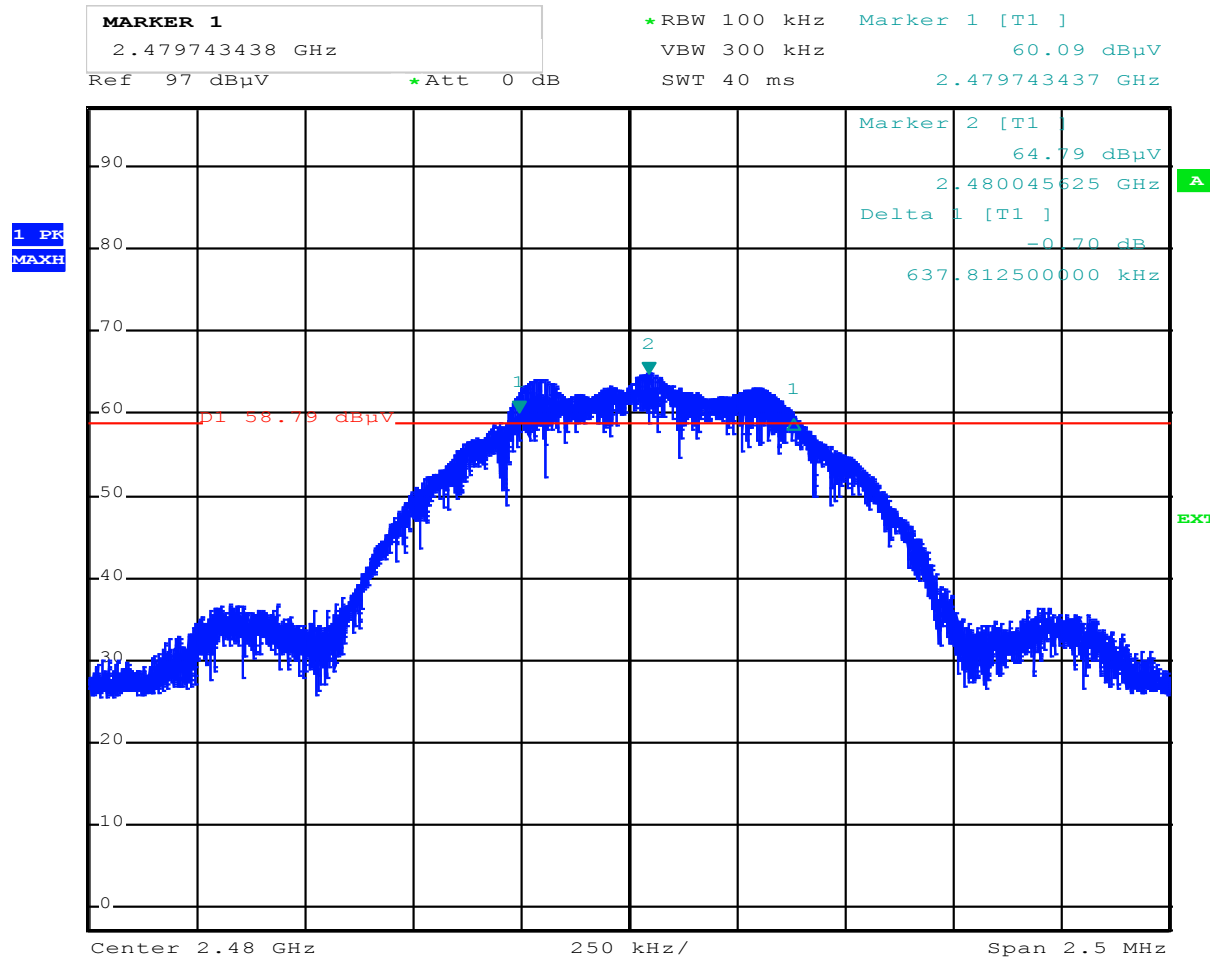
Low Channel



Central Channel

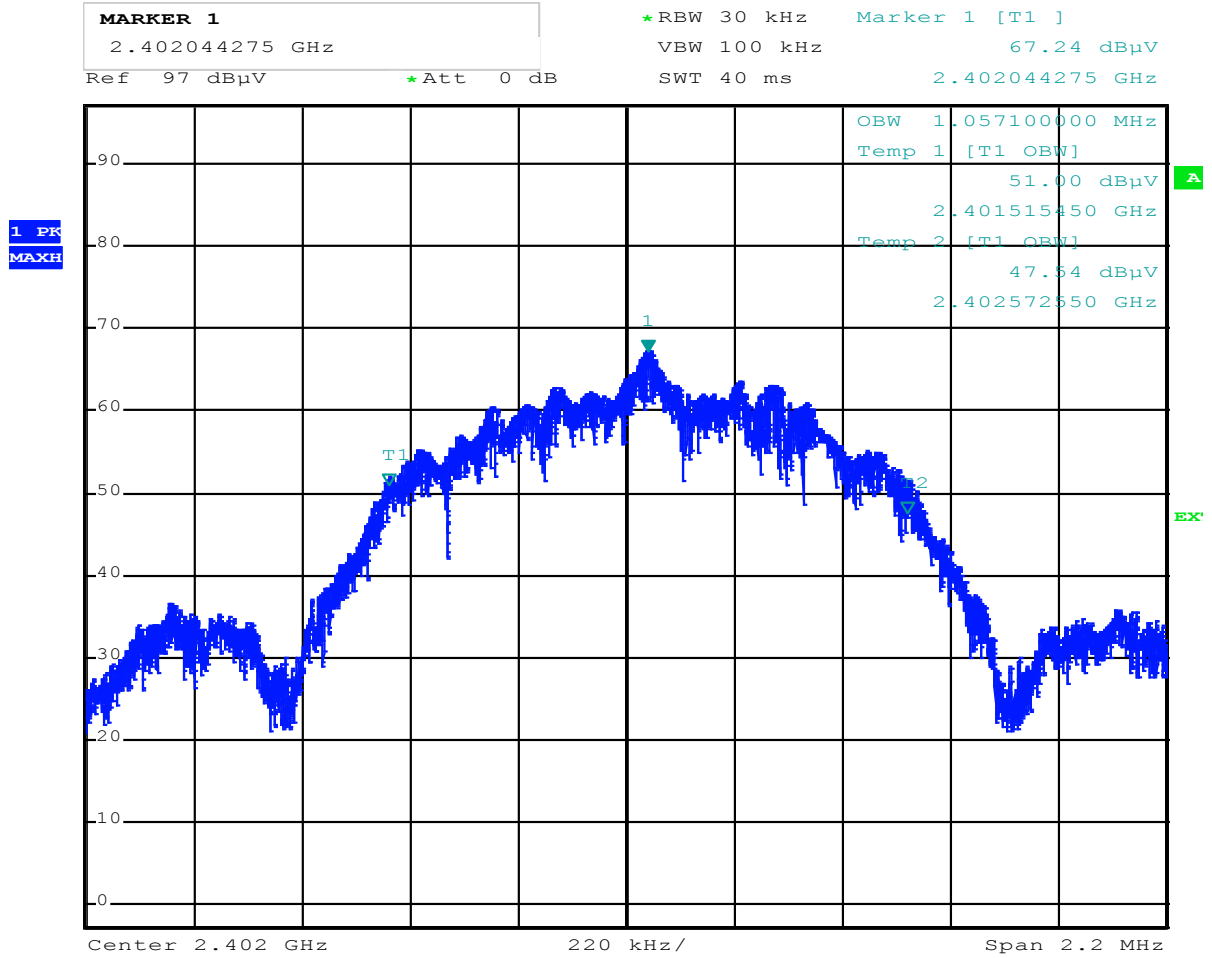


High Channel

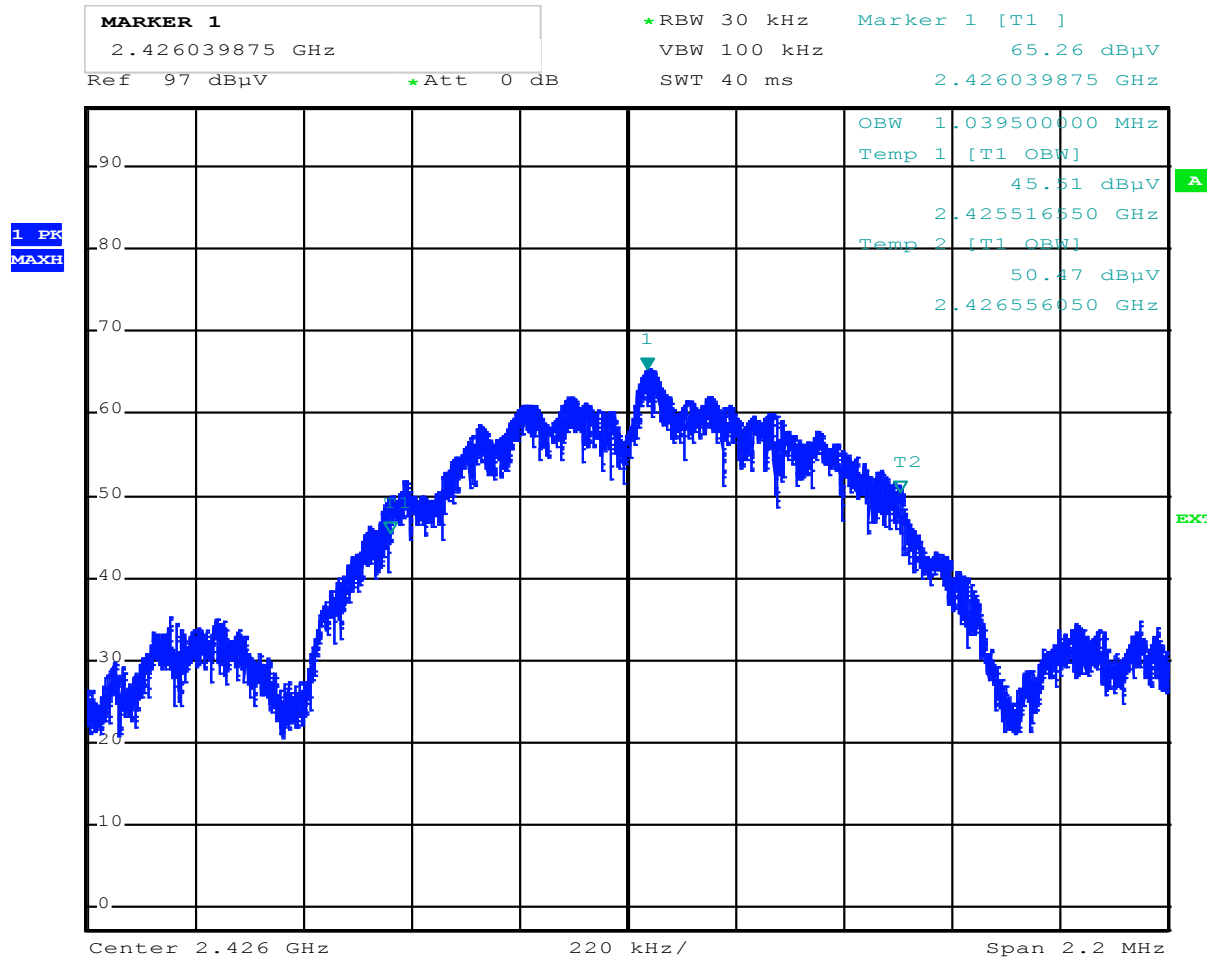


APPENDIX 6: 99% bandwidth

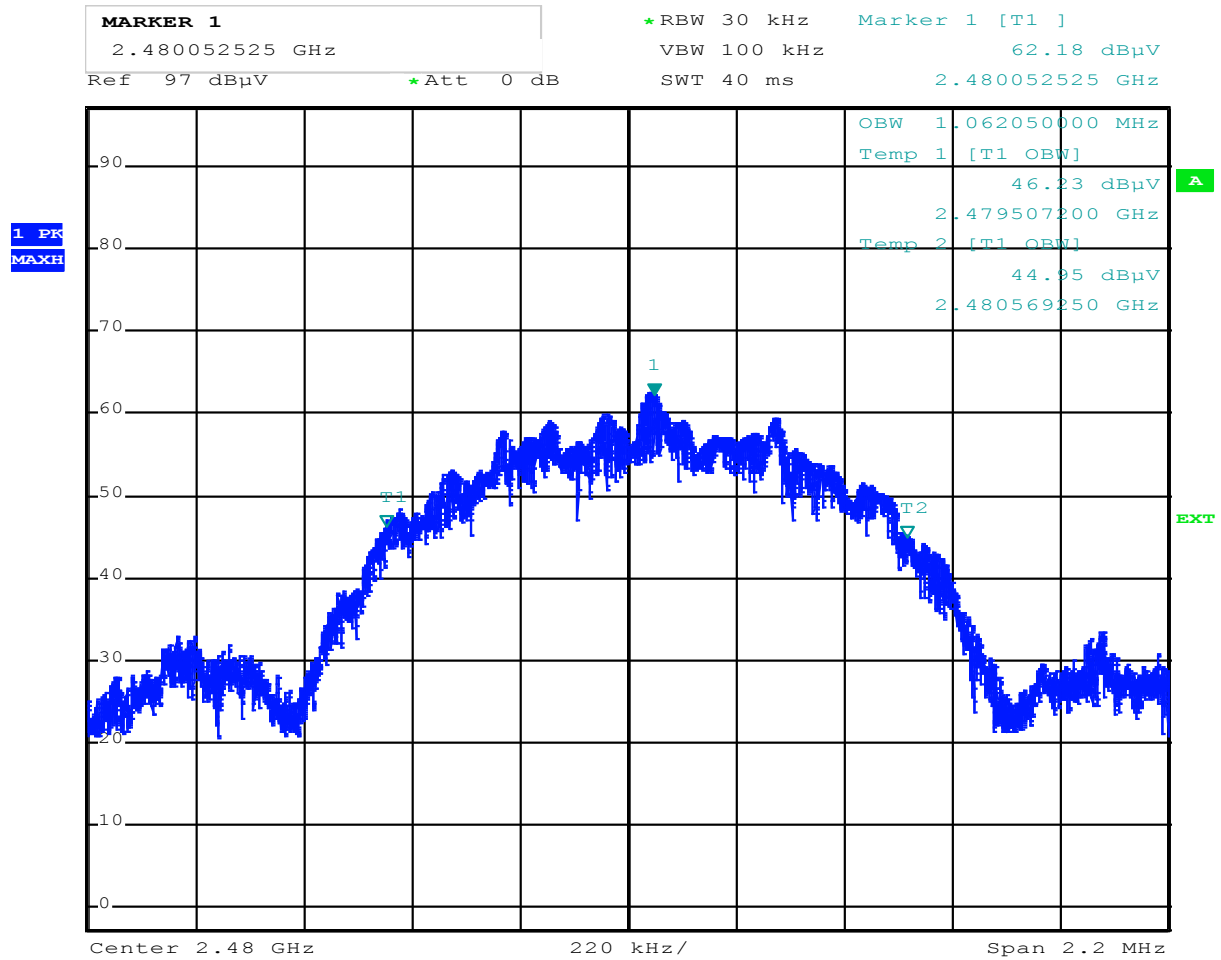
Low Channel



Central Channel

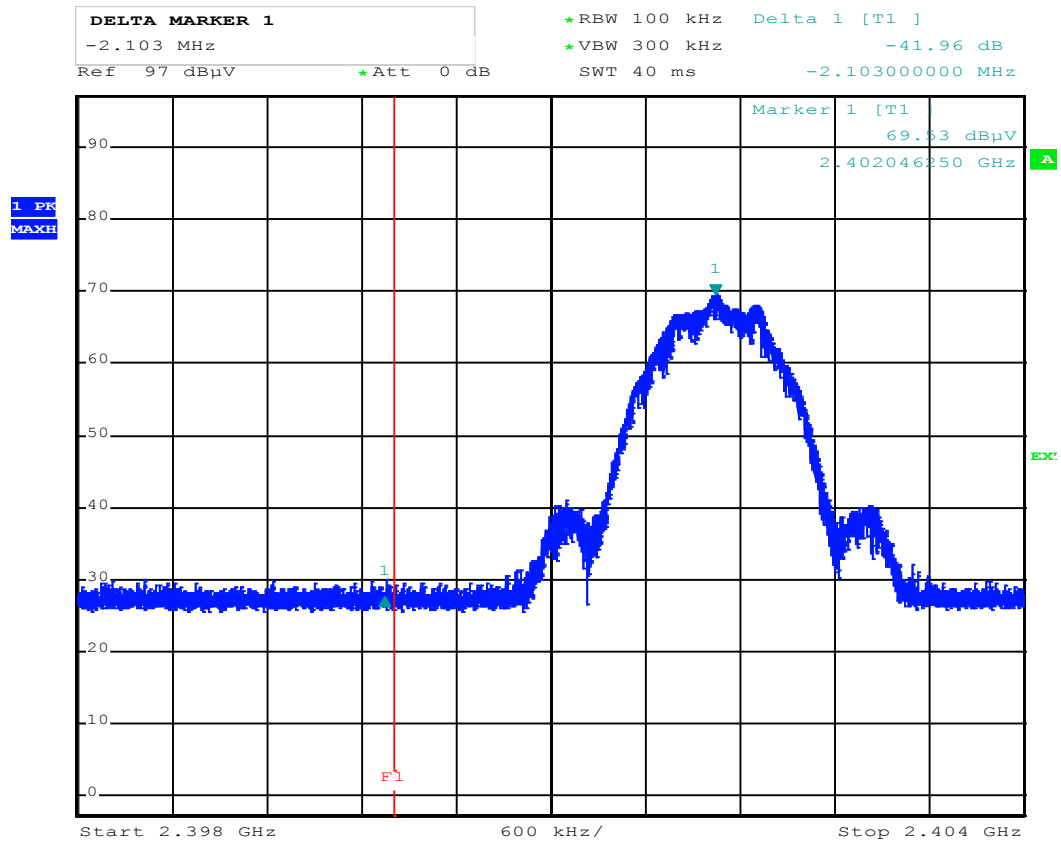


High Channel



APPENDIX 7: Band edge

Low Channel



High Channel

