



**RA-24-08101968-2 /A Ed. 0**

**FCC CERTIFICATION  
RADIO Measurement  
Technical Report**

**standard to apply:  
FCC Part 15.247**

**Equipment under test:  
BLUETOOTH SPEAKER MULTI FONCTIONS  
PARROT DS 3120**

**FCC ID :  
RKXSARGAS**

**Company:  
PARROT S.A**

**DISTRIBUTION: Mr GUERRAB**

**Company: PARROT S.A**

**Number of pages: 39 including 5 annexes**

Ed.	Date	Modified pages	Written by		Technical Verification Quality Approval	
			Name	Visa	Name	Visa
0	30/05/2008	Creation	M. DUMESNIL	M. D.		

Duplication of this test report 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.



**PRODUCT:** BLUETOOTH SPEAKER MULTI FONCTIONS

**Reference / model:** not communicated

**Trade mark:** PARROT DS 3120

**Serial number:** not communicated

**MANUFACTURER:** AZTECH COMMUNICATION DEVISE (DG) LTD

**COMPANY SUBMITTING THE PRODUCT:**

**Company:** PARROT S.A

**Address:** 174 quai de Jemappes  
75010 PARIS  
FRANCE

**Responsible:** Mr GUERRAB

**DATE(S) OF TEST:** 14, 15 and 16 May 2008

**TESTING LOCATION:** EMITECH ATLANTIQUE laboratory at ANGERS (49)  
FRANCE  
EMITECH ATLANTIQUE open area test site in LA POUZEZE  
(49) FRANCE

Registration Number by FCC: 101696/FRN: 0006 6490 08

**TESTED BY:** M. DUMESNIL

**TUTOR:** P. BONNENFANT

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## 1. INTRODUCTION

This document presents the result of RADIO test carried out on the following equipment: BLUETOOTH SPEAKER MULTI FONCTIONS-PARROT DS 3120 in accordance with normative reference.

## 2. PRODUCT DESCRIPTION

Class: B (residential)

Utilization: Bluetooth speaker

Antenna type: integral antenna

Operating frequency range: from 2400 MHz to 2483.5 MHz

Number of channels: 79

Channel spacing: 1 MHz

Frequency generation:  SAW Resonator  Crystal  Synthetiser

Modulation: Frequency Hopping Spread Spectrum (FHSS)  
 Amplitude  Digital  Frequency  Phase

Power source: 115 Vac

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.

FCC Part 15 (2007) Code of Federal Regulations  
Title 47 - Telecommunication  
Chapter 1 - Federal Communications Commission  
Part 15 - Radio frequency devices  
Subpart C - Intentional Radiators

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.

Public Notice DA 00-705 Filing and Measurement Guideline for Frequency Hopping Spread Spectrum Systems.

#### **4. TEST METHODOLOGY**

Radio performance tests procedures given in part 15:

- Paragraph 33: frequency range of radiated measurements
- Paragraph 35: measurement detector functions and bandwidths
- Paragraph 203: antenna requirement
- Paragraph 205: restricted bands of operation
- Paragraph 207: conducted limits
- Paragraph 209: radiated emission limits; general requirements
- Paragraph 247: operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz

#### **5. ADD ATTACHMENTS FILES**

- “Synoptic“***
- “Block diagram“***
- “External photos and Product labeling“***
- “Assembly of components“***
- “Internal photos“***
- “Layout pcb“***
- “Bil of materials“***
- “Schematics“***
- “Product description“***
- “User guide“***

**6. TESTS AND CONCLUSIONS**

Test procedure	Description of test	Criteria respected ?				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 15.247	OPERATION WITHIN THE BAND 902-928 MHZ, 2400-2483.5 MHz and 5725-5850 MHz					
	(a) (1) <i>hopping systems</i>	X				Note 3
	(a) (1) (i) 902 – 928 MHz			X		
	(a) (1) (ii) 5725 – 5850 MHz			X		
	(a) (1) (iii) 2400 – 2483.5 MHz	X				Note 4
	(a) (2) <i>digital modulation techniques</i>			X		
	(b) <i>max output power</i>	X				Note 5
	(c) <i>operation with directional antenna gains &gt; 6 dBi</i>			X		Note 6
	(d) <i>intentional radiator</i>	X				
	(e) <i>peak power spectral density</i>			X		
	(f) <i>hybrid system</i>			X		
	(g)			X		
	(h)			X		
	(i) <i>RF exposure compliance</i>				X	Note 7
DA 00-705	BAND EDGE COMPLIANCE	X				

NAp: Not Applicable

NAs: Not Asked

Note 1: internal antenna (pcb antenna), see photos in annex 4.

Note 2: see FCC part 15.247 (d).

Note 3: the system hops to channel frequencies from a pseudo randomly ordered list of hopping frequencies. Each frequency is used equally on the average by the transmitter, and separated by a minimum of 20 dB bandwidth of the hopping channel (821.64 kHz; see annex 1).

Note 4: the frequency hopping system uses 79 channels.

The timing by channel is 142.08 μs. During 79 channels × 0.4 s (part 15) = 31.6 s, any channel is used 228 times, then 228 x 142.08 μs = 32.39 ms, thus the average time of occupancy on any channel is less than 400 ms within a period of 0.4 s multiplied by the number of hopping channels employed, in normal operating mode (see annex 2).

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

Note 6: the antenna gain is less than 6 dBi.

Note 7: this type of equipment uses less than 0.5 W of output power with a high signal transmitting duty factor (section 3 from Oet 65c).

**Conclusion:**

The sample of BLUETOOTH SPEAKER MULTI FONCTIONS-PARROT DS 3120 submitted to the tests complies with the regulations of the standard 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 15.207

**Limits:** Class B

**Test equipment:**

TYPE	BRAND	EMITECH NUMBER
Test receiver ESH3	Rohde & Schwarz	1058
Pulse limiter ESH3-Z2	Rohde & Schwarz	976
Artificial main network L3-25	PMM	834
Spectrum analyzer FSBS	Rohde & Schwarz	3133
Power source ALT 2000	K. SERRAS	2441
Transient limiter 11947A	Hewlett Packard	2565

**Software used:** BAT-EMC V3.1.7.1

**Test set up:**

The test unit 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 (see photos in annex 5).

**Equipment under test operating condition:**

The equipment is powered with the AC power operating voltage of 115 V / 60 Hz.

A Bluetooth connection was established between equipment under test and a cellular phone during the test.

**Frequency range:** 150 kHz - 30 MHz

**Detection mode:** Peak / Average

**Bandwidth:** 9 kHz

**Results:**

**Measurement on the mains power supply:**

The measurement is made with peak detector.

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

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

The spectrum lines which are less than 6 dB of the limit are analyzed with Quasi-Peak detector and average detector. The results are noted if necessary in the following table.

**Measurement with average detector:**

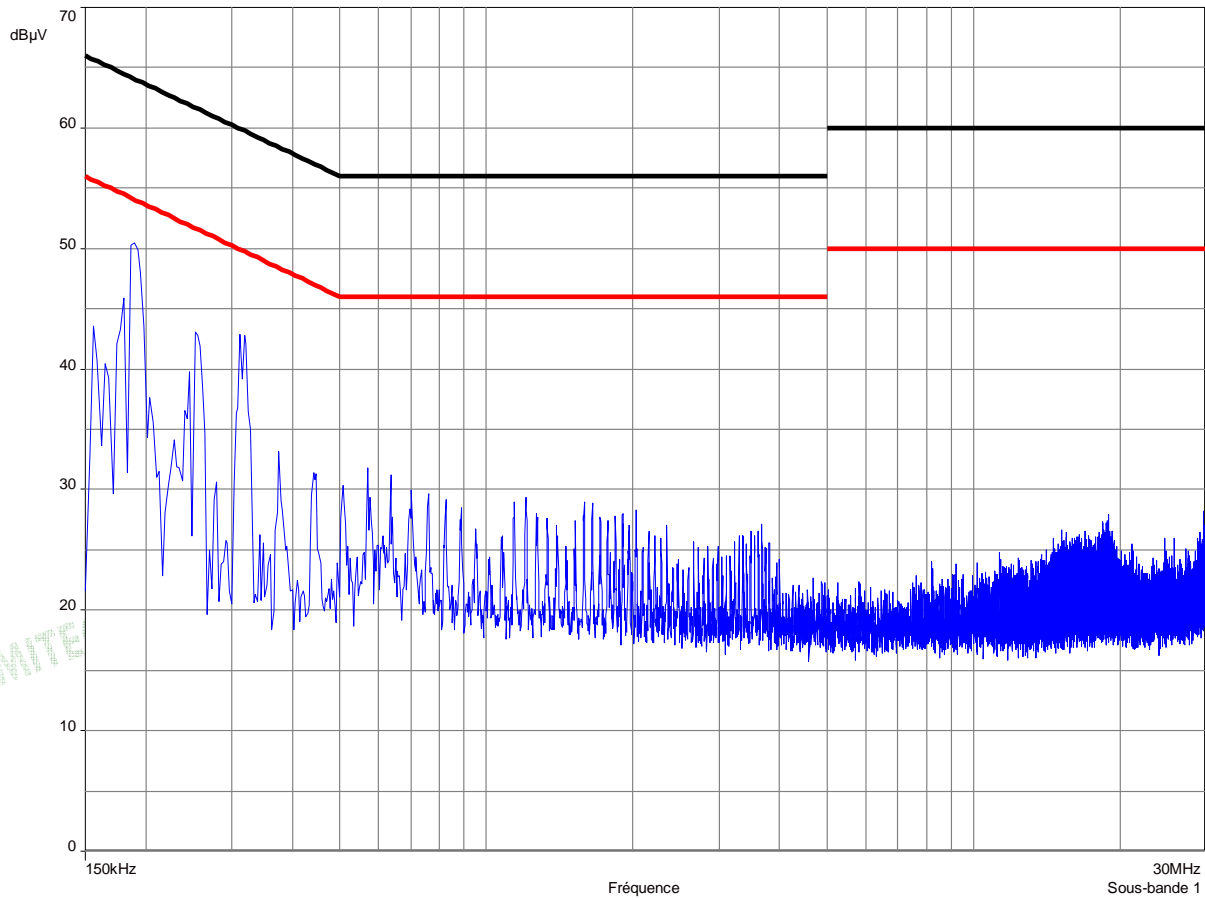
Frequency (MHz)	average	
	Limit (dBµV)	Neutral (dBµV)
0.1903	53.9	35.4

Frequency (MHz)	average	
	Limit (dBµV)	Line (dBµV)
0.1903	53.9	36.6



**CURVE N° 1:**

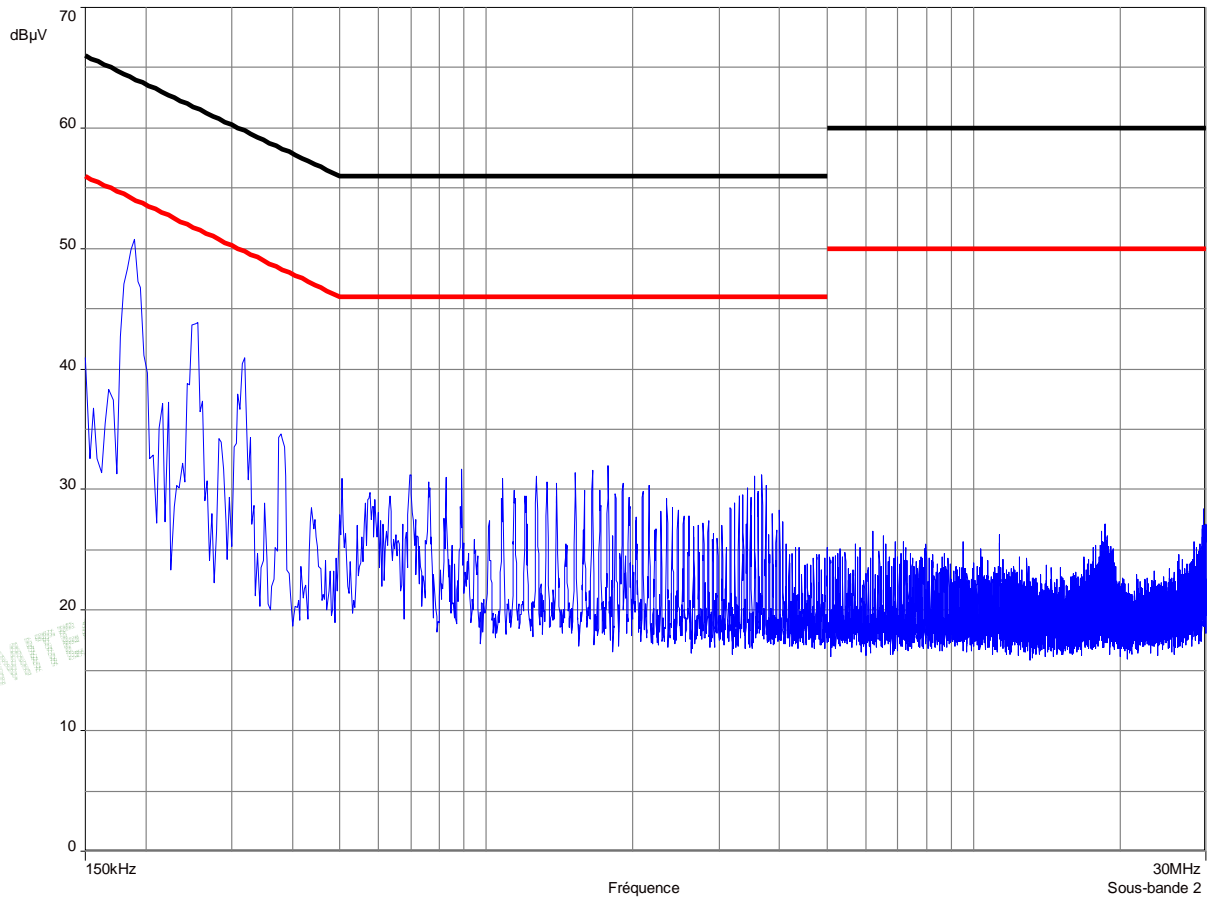
Measurement on the neutral with peak detector



RBW filter = 10 kHz  
VBW filter = 10 kHz  
Sweep time = 500 ms/MHz

**CURVE N° 2:**

Measurement on the line with peak detector



RBW filter = 10 kHz  
VBW filter = 10 kHz  
Sweep time = 500 ms/MHz

**8. PEAK OUTPUT POWER**

**Standard:** FCC Part 15

**Test procedure:** paragraph 15.247

**Test equipment:**

<b>TYPE</b>	<b>BRAND</b>	<b>EMITECH NUMBER</b>
Spectrum analyzer FSP 40	Rohde & Schwarz	4088
Antenna RGA60	Electrometrics	1204
Open site	EMITECH	1274
Variac R213	Dereix	1419
Meteo station AB 558	Oregon scientific	1539
Multimeter 77-2	Fluke	0812

**Test set up:**

The system is tested in an open area test site (OATS).

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

The measuring distance between the equipment and the test antenna is 3 m. The test antenna has been oriented in the two polarizations, we have recorded only the highest level.

Then a measurement of the electro-magnetic field is realized, with a resolution bandwidth adjusted at 1 MHz.

**Distance of antenna:** 3 meters

**Antenna height:** 1 to 4 meters

**Antenna polarization:** vertical and horizontal

**Equipment under test operating condition:**

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): 18.5

Relative humidity (%): 75

Power source: 115 Vac by a varic

Sample n° 1 Channel 1

		Level dB $\mu$ V	Cable loss dB	Antenna factor dB	Electro-magnetic field (dB $\mu$ V/m):	P* (W)
<b>Normal test conditions</b>	Nominal power source (V): 115 Vac	62.40	4.63	28.91	95.94	713.9 x 10 <sup>-6</sup>

Sample n° 1 Channel 40

		Level dB $\mu$ V	Cable loss dB	Antenna factor dB	Electro-magnetic field (dB $\mu$ V/m):	P* (W)
<b>Normal test conditions</b>	Nominal power source (V): 115 Vac	62.01	4.66	29.02	95.69	673.97 x 10 <sup>-6</sup>

Sample n° 1 Channel 79

		Level dB $\mu$ V	Cable loss dB	Antenna factor dB	Electro-magnetic field (dB $\mu$ V/m):	P* (W)
<b>Normal test conditions</b>	Nominal power source (V): 115 Vac	63.23	4.69	29.14	97.06	923.93 x 10 <sup>-6</sup>

 \*  $P = (E \times d)^2 / (30 \times G_p)$  with  $d = 3$  m and  $G_p = 1.65$ 
**Test conclusion:**

RESPECTED STANDARD

## 9. RADIATED EMISSION OF TRANSMITTER

**Standard:** FCC Part 15

**Test procedure:** paragraph 15.205  
 paragraph 15.209  
 paragraph 15.247

**Test equipment:**

TYPE	BRAND	EMITECH NUMBER
Test receiver ESH3	Rohde & Schwarz	1058
Test receiver ESVS 10	Rohde & Schwarz	1219
Spectrum analyzer FSP 40	Rohde & Schwarz	4088
Loop antenna	EMCO	1406
Biconical antenna HP 11966C	Hewlett Packard	728
Log periodic antenna HL 223	Rohde & Schwarz	1999
Open site	Emitech	1274
Antenna RGA-60	Electrometrics	1204
Low-noise amplifier 2 to 18 GHz	Microwave DB	1922
High pass filter HP12/3200-5AA	Filtek	
Antenna WR42	IMC	1939
Variac R213	Dereix	1419
Low-noise amplifier 18 to 26 GHz	ALC	3036
Meteo station AB 888	Oregon scientific	1539
Multimeter	Fluke	0812

**Test set up:**

The system is tested in an open area test site (OATS).

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

**Frequency range:** from 9 kHz to harmonic 10 ( $F_{\text{carrier}} \leq 10 \text{ GHz}$ )

**Bandwidth:** 120 kHz ( $F < 1 \text{ GHz}$ ) or 100 kHz, following 15.205 or 15.247  
 1 MHz ( $F > 1 \text{ GHz}$ ) or 100 kHz, following 15.205 or 15.247

**Distance of antenna:** between 30 m and 3 m according the frequencies and the limits.

**Antenna height:** 1 to 4 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 transmission mode, modulated by internal data signal, at the highest output power level which the transmitter is intended to operate.

**Results:**

Ambient temperature (°C): 23  
 Relative humidity (%): 55

Power source: 115 V.a.c. through a variac

The polarity column refers to the antenna polarity at which the maximum emissions level is measured.

**Channel 1**

FREQUENCIES (MHz)	Detector	Antenna height (cm)	Azimuth (degree)	resolution bandwidth (kHz)	Polarization H: Horizontal V: Vertical	Field strength (dBµV/m)	Limits (dBµV/m)	Margin (dB)
416.000	QP	100	168	120	H	51.8	76.82	25.02
727.990	QP	100	140	120	H	38.7	76.82	38.12

**Channel 40**

FREQUENCIES (MHz)	Detector	Antenna height (cm)	Azimuth (degree)	resolution bandwidth (kHz)	Polarization H: Horizontal V: Vertical	Field strength (dBµV/m)	Limits (dBµV/m)	Margin (dB)
416.000	QP	100	168	120	H	51.8	76.82	25.02
727.990	QP	100	140	120	H	38.7	76.82	38.12

**Channel 79**

FREQUENCIES (MHz)	detector	Antenna height (cm)	Azimuth (degree)	resolution bandwidth (kHz)	Polarization H: Horizontal V: Vertical	Field strength (dBµV/m)	Limits (dBµV/m)	Margin (dB)
416.000	QP	100	168	120	H	51.8	76.82	25.02
727.990	QP	100	140	120	H	38.7	76.82	38.12

\* restricted bands of operation in 15.205, this limit corresponding at the 15.209 section.

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 96.82 dBµV/m on channel 79.

So the applicable limit is 76.82 dBµV/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)).

Any spurious that has more than 20 dB of margin compared to the applicable limit is not necessary reported.

**TEST CONCLUSION:**

RESPECTED STANDARD

## 10. BAND EDGE COMPLIANCE

**Standard:** FCC Part 15.247

**Test procedure:** Public Notice DA 00-705, Delta Marker method

**Test equipment used:**

TYPE	MANUFACTURER	EMITECH NUMBER
Spectrum analyzer FSP 40	Rohde & Schwarz	4088
Antenna RGA-60	Electrometrics	1204
Variac R213	Dereix	1419
Mltimeter 77-2	Fluke	0812

**Measured condition:**

Requirements: Emissions that fall in the restricted bands (part 15.205). These emissions must be less than or equal to 500  $\mu\text{V/m}$  (54  $\text{dB}\mu\text{V/m}$ ) Part 15.35b applies in the restricted bands.

Test procedure: An in band field strength measurement of the fundamental Emission using the RBw and detector function required by C63.4-2003 and FCC Rules.

**Test operating condition of the equipment:**

The equipment is blocked in frequency hopping mode.

**Results:**

Lower Band Edge: from 2310 MHz to 2390 MHz, CURVE n° 3

Upper Band Edge: from 2483.5 MHz to 2500 MHz, CURVE n° 4

Sample n°1:

Fundamental frequency (MHz)	Field Strength Level of fundamental ( $\text{dB}\mu\text{V/m}$ )	Detector (Peak or Average)	Frequency of maximum Band-edges Emission (MHz)	Delta Marker (dB)*	Calculated Max Out of Band Emission Level ( $\text{dB}\mu\text{V/m}$ **)	Limit ( $\text{dB}\mu\text{V/m}$ )	Margin (dB)
2402	95.94	Peak	2311.4	-46.51	49.43 (1)	73.98	24.55
2479.884	97.06	peak	2496.46	-45.17	51.89 (1)	73.98	22.09

\* according to step 2 of Marker-Delta Method DA 00-705.

\*\* according to step 3 of Marker-Delta Method:

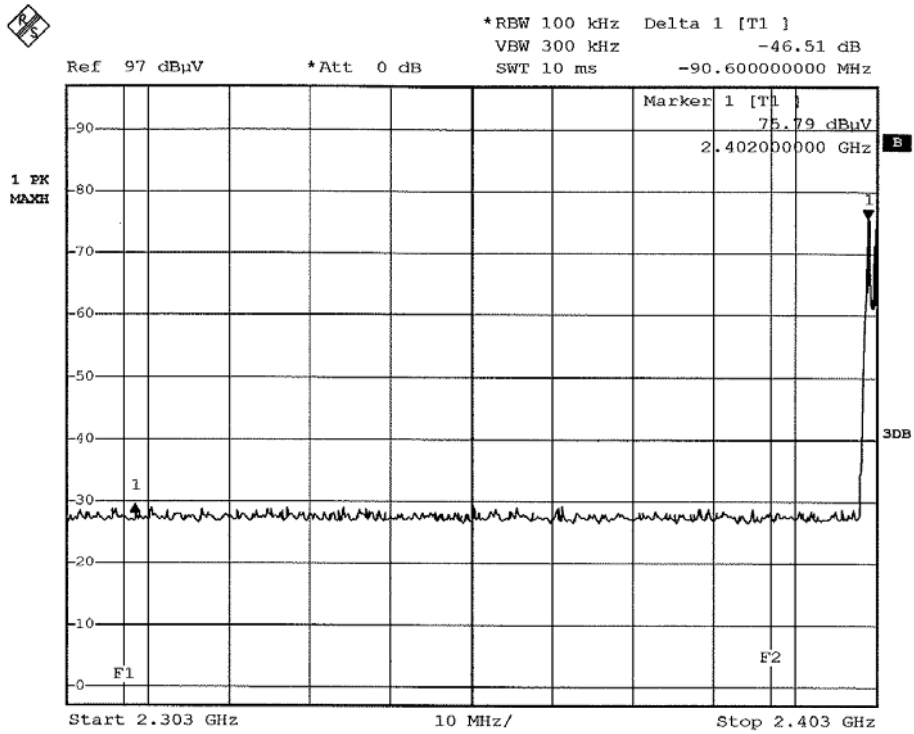
Calculated Emission Level = Field Strength Level – Delta Marker Level

(1) the peak level is lower than the average limit (53.98  $\text{dB}\mu\text{V/m}$ ).

**Test conclusion:**

RESPECTED PUBLIC NOTICE

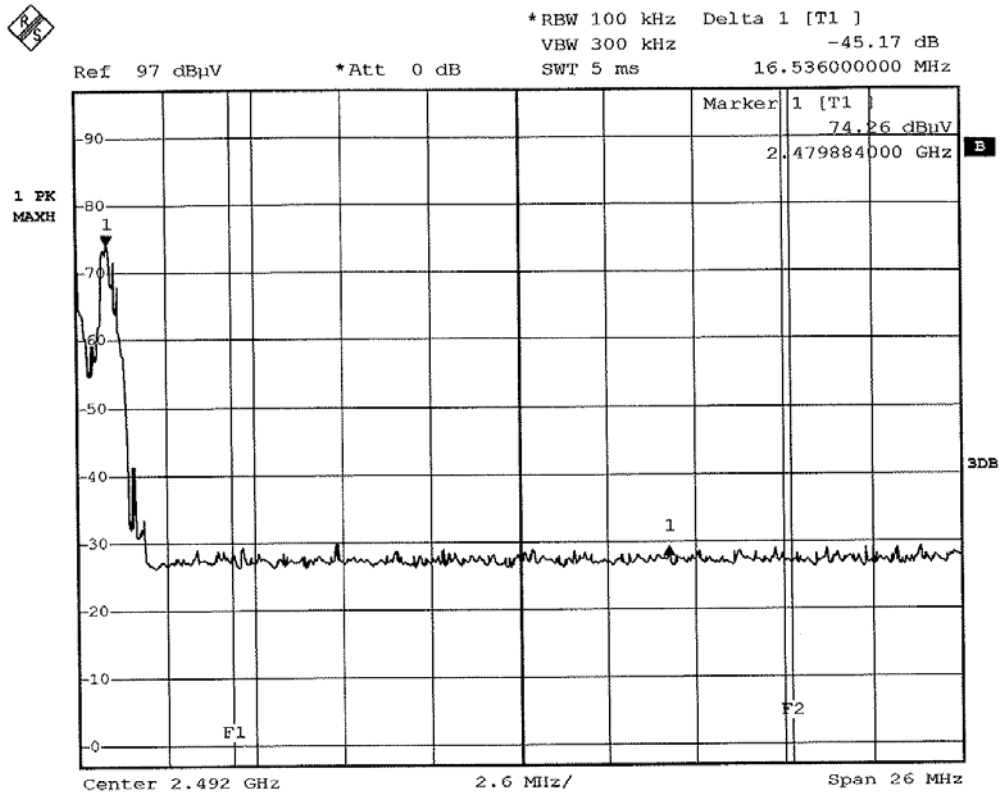
CURVE N° 3:



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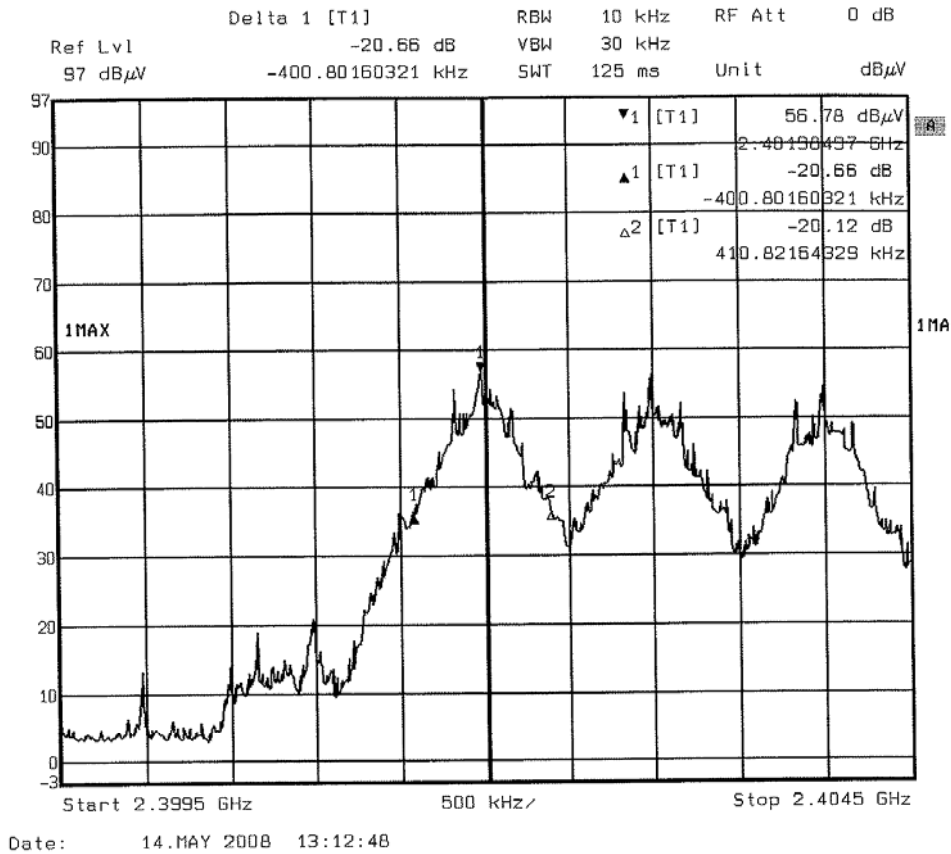
**CURVE N° 4:**

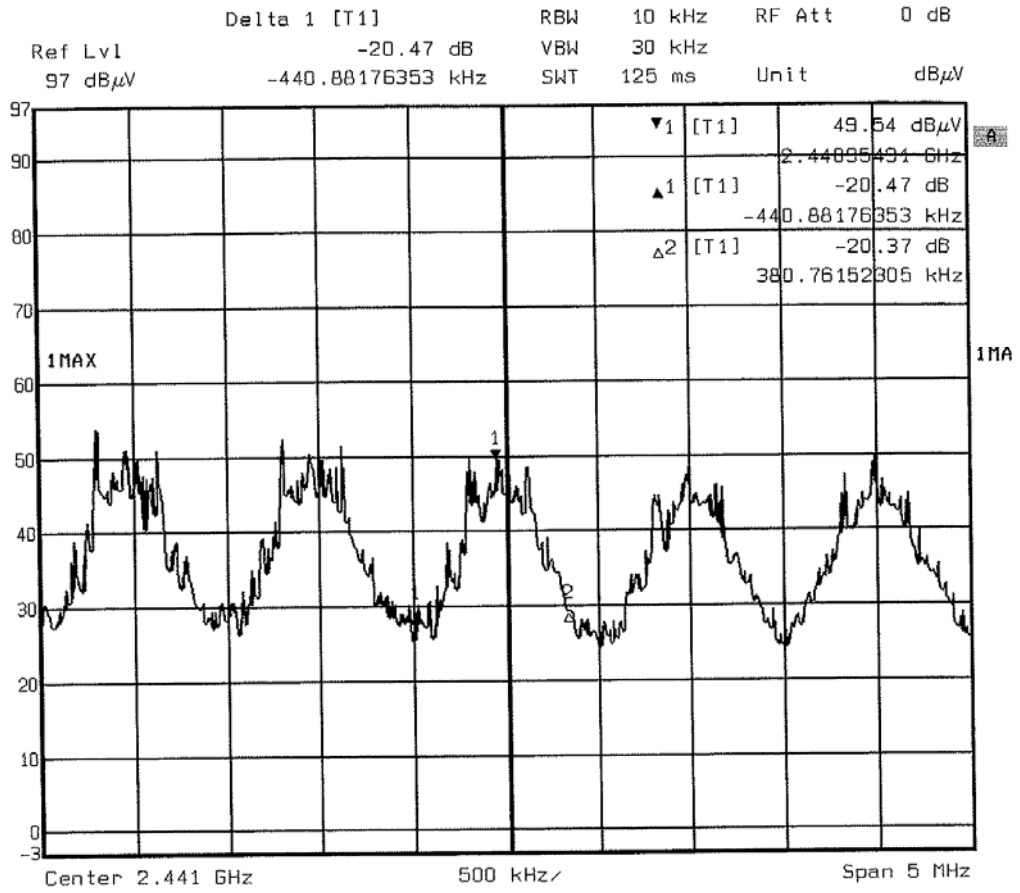


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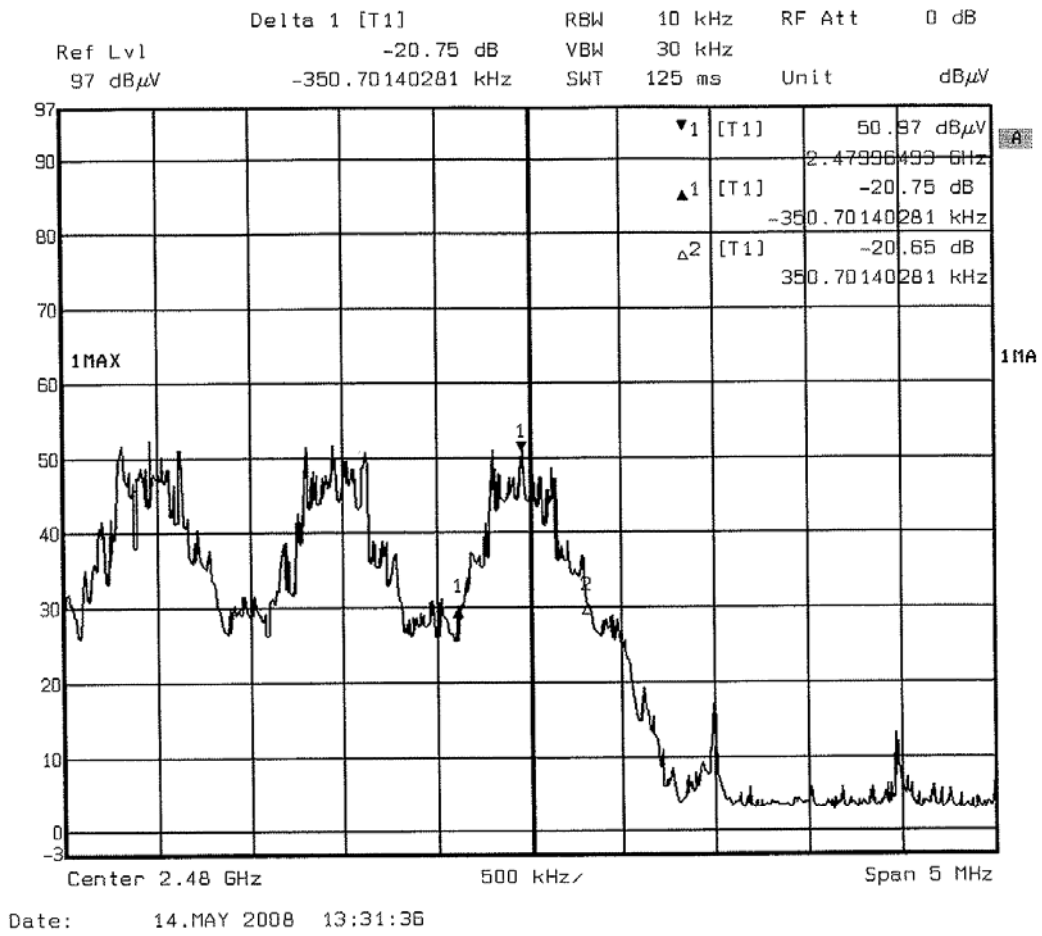
□□□ End of report, 5 annexes to be forwarded □□□

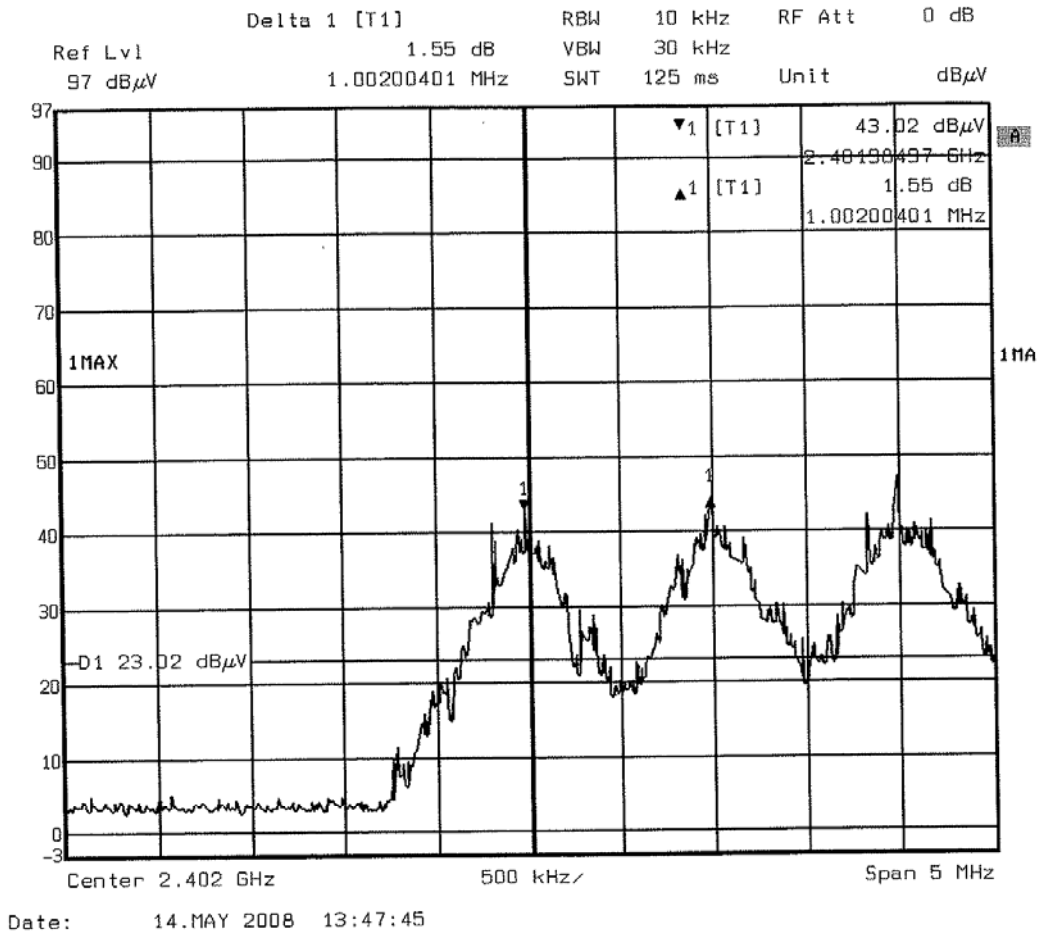
# ANNEX 1: OCCUPIED POWER BANDWIDTH AND CHANNEL SEPARATION

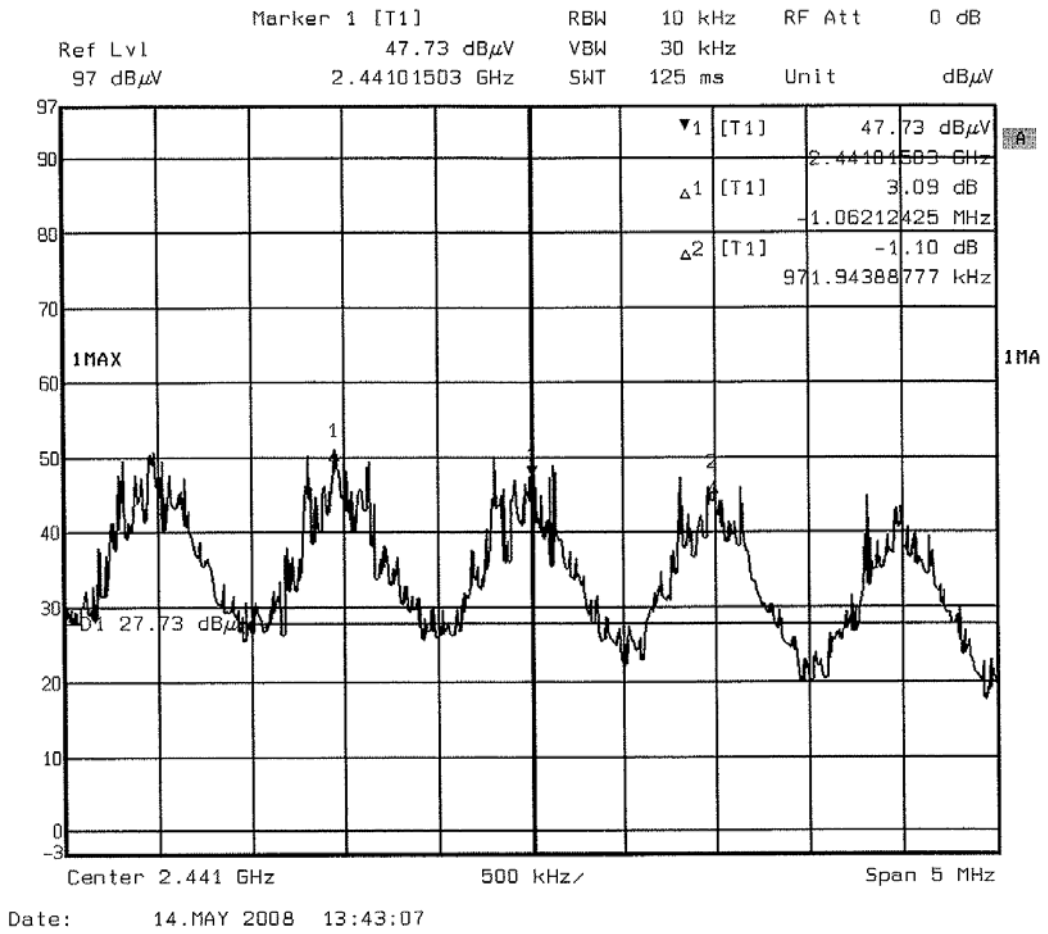


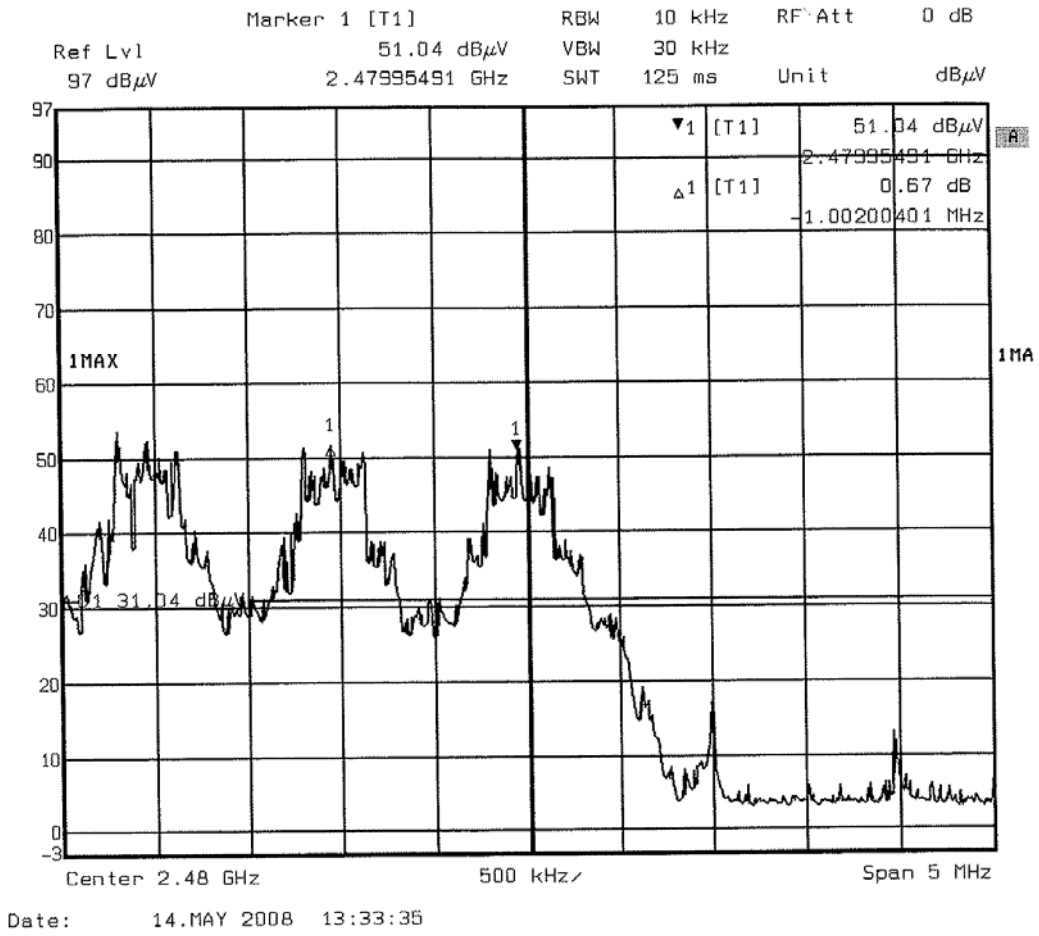


Date: 14.MAY 2008 13:23:56

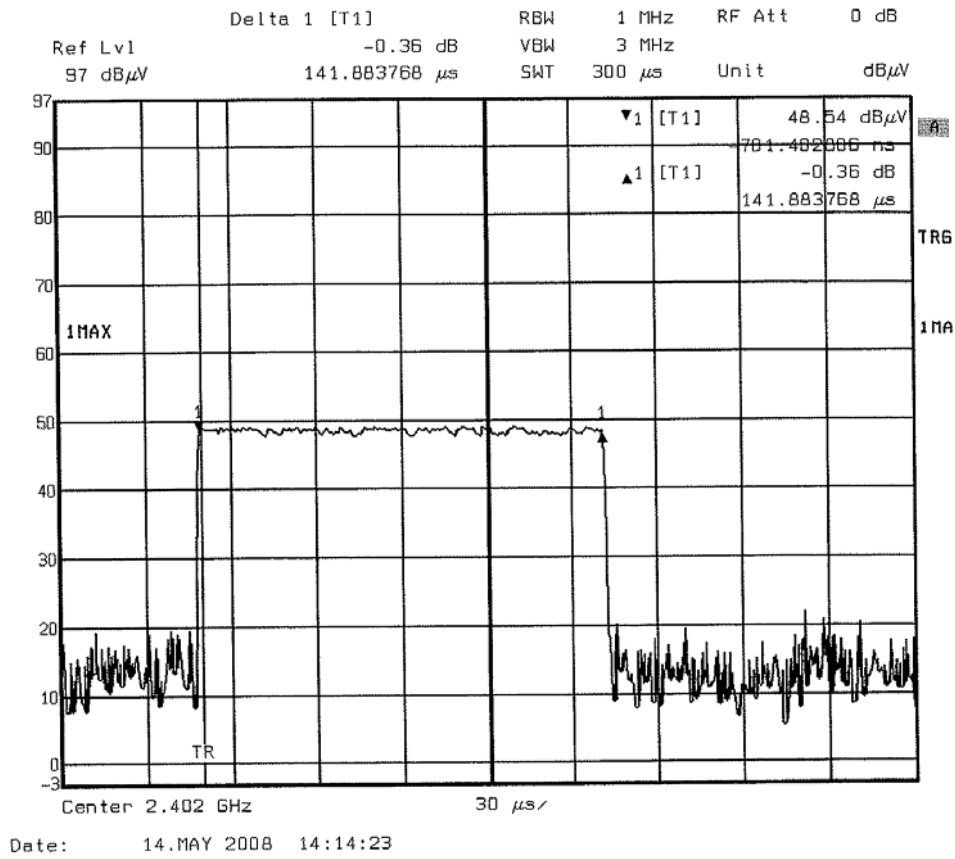




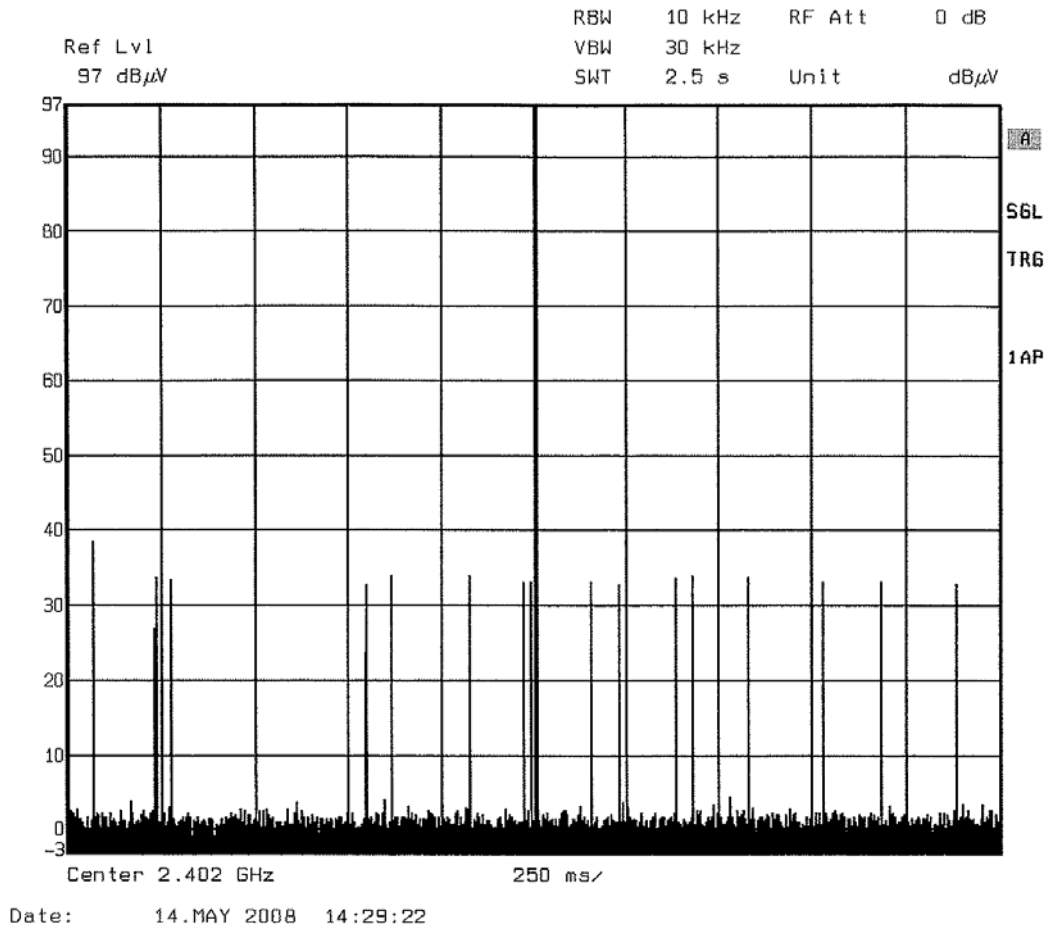


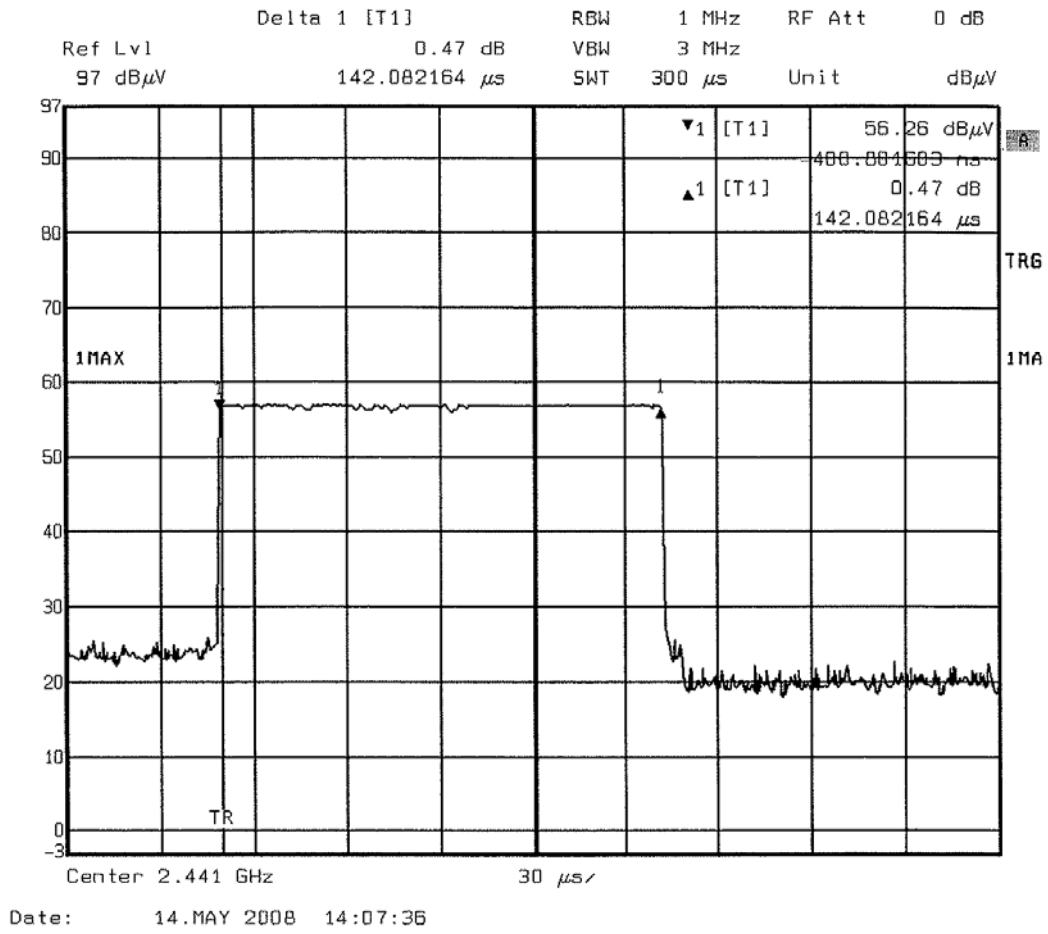


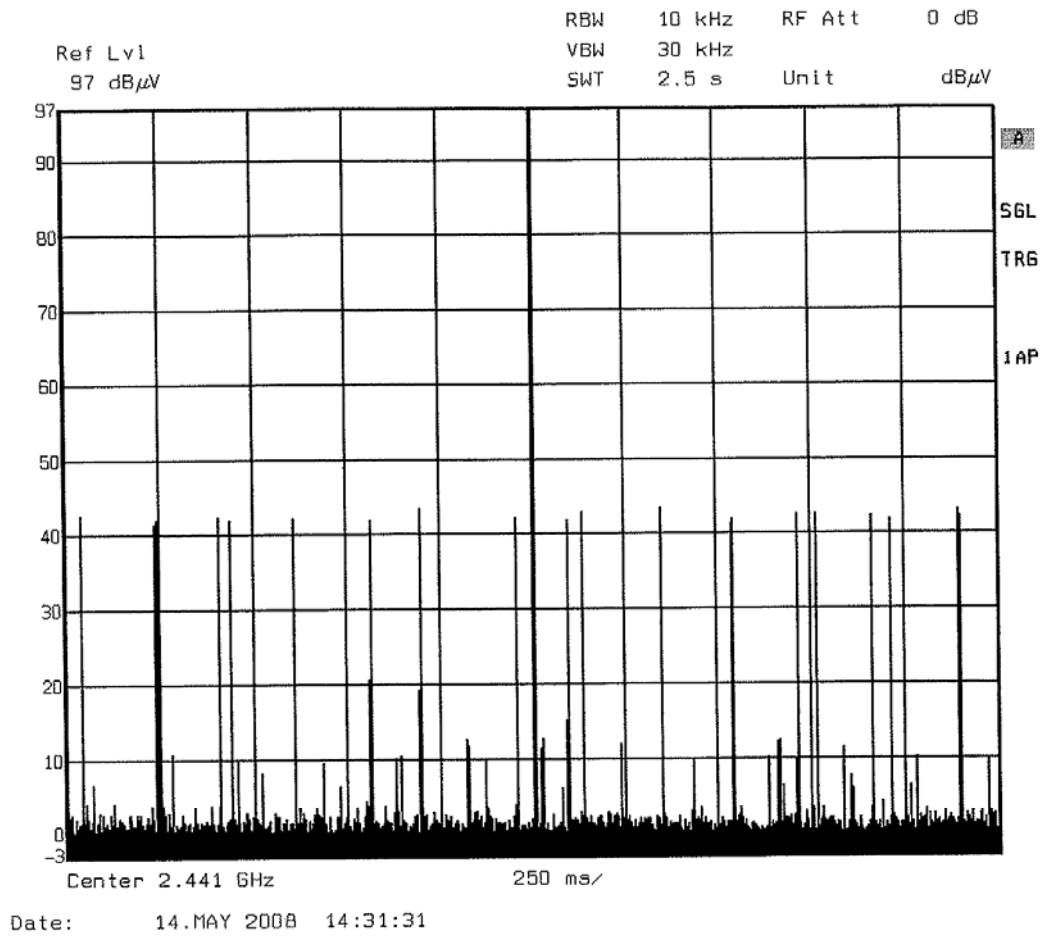
## ANNEX 2: AVERAGE TIME OF OCCUPENCY ON ANY FREQUENCIES

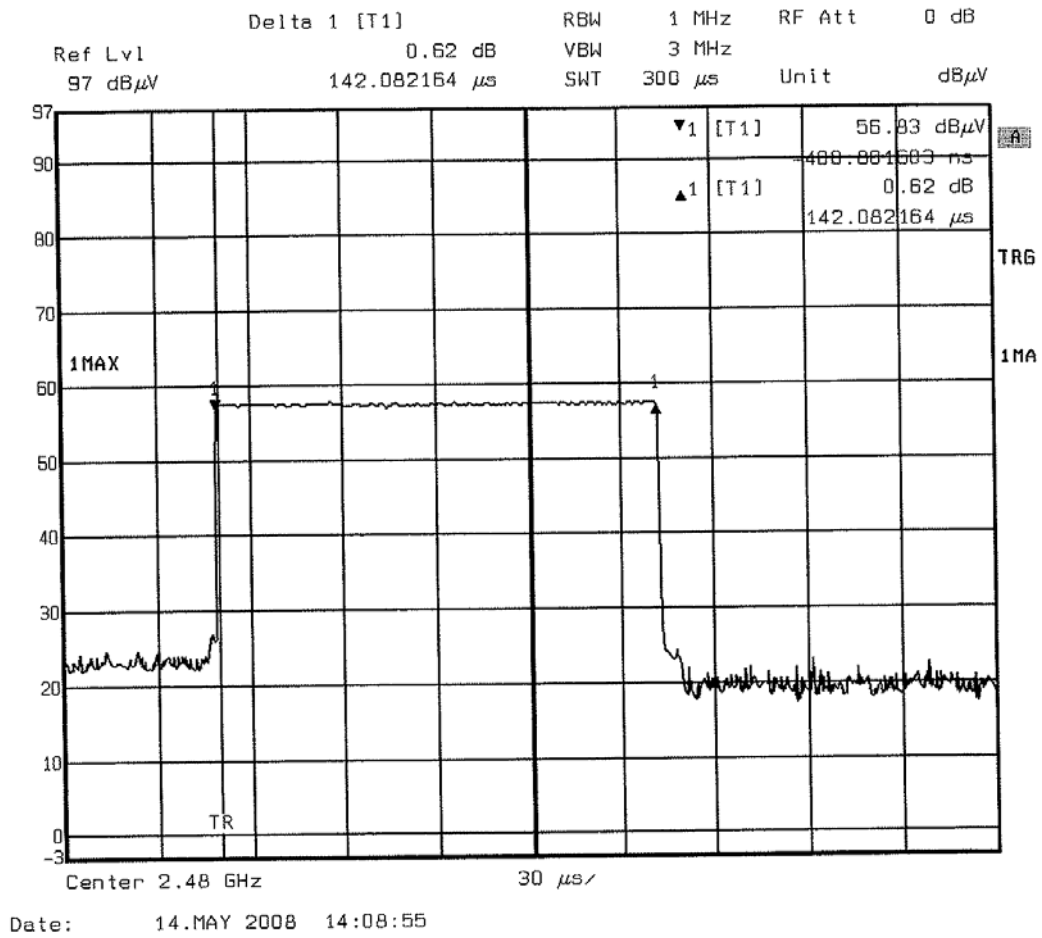


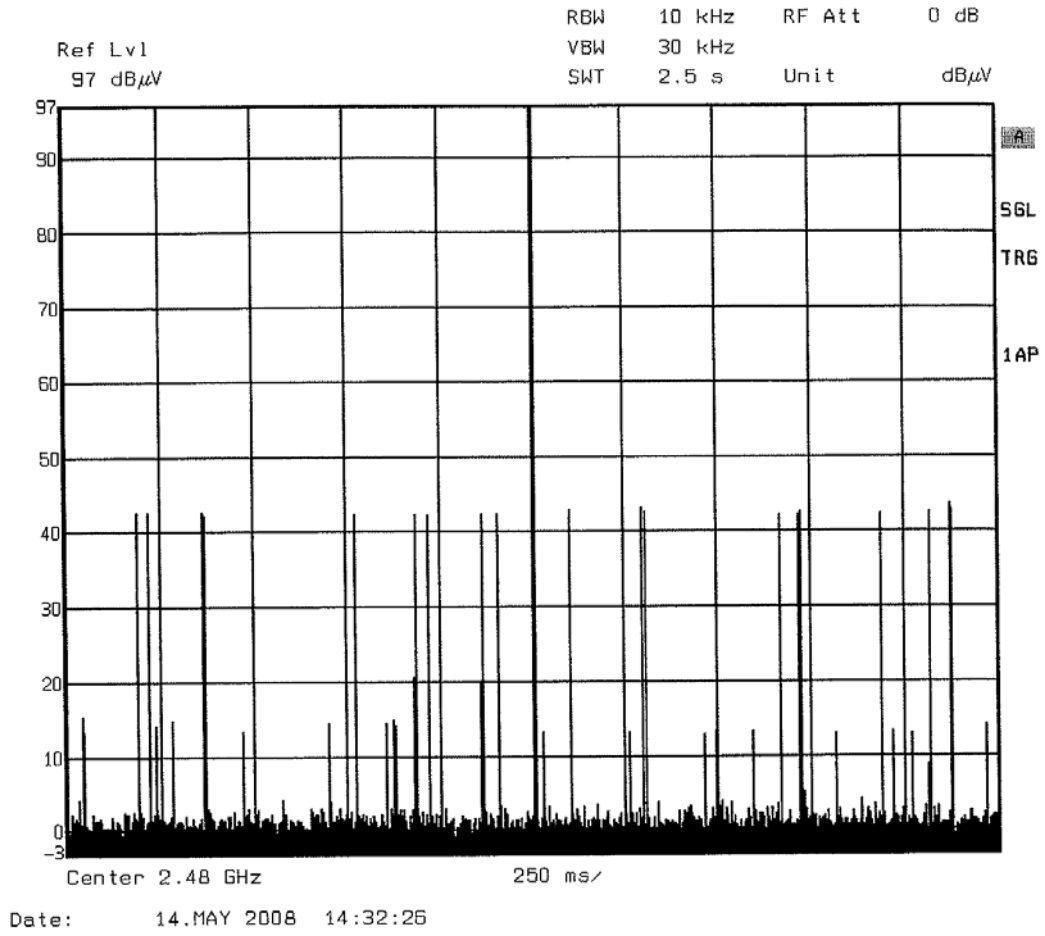




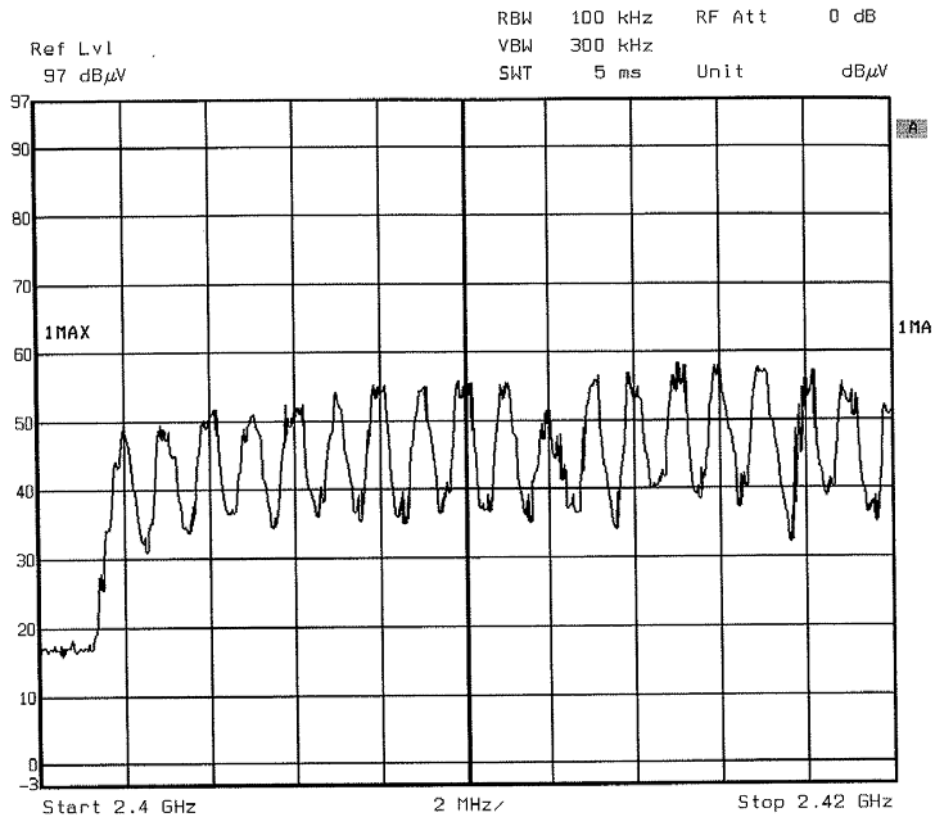




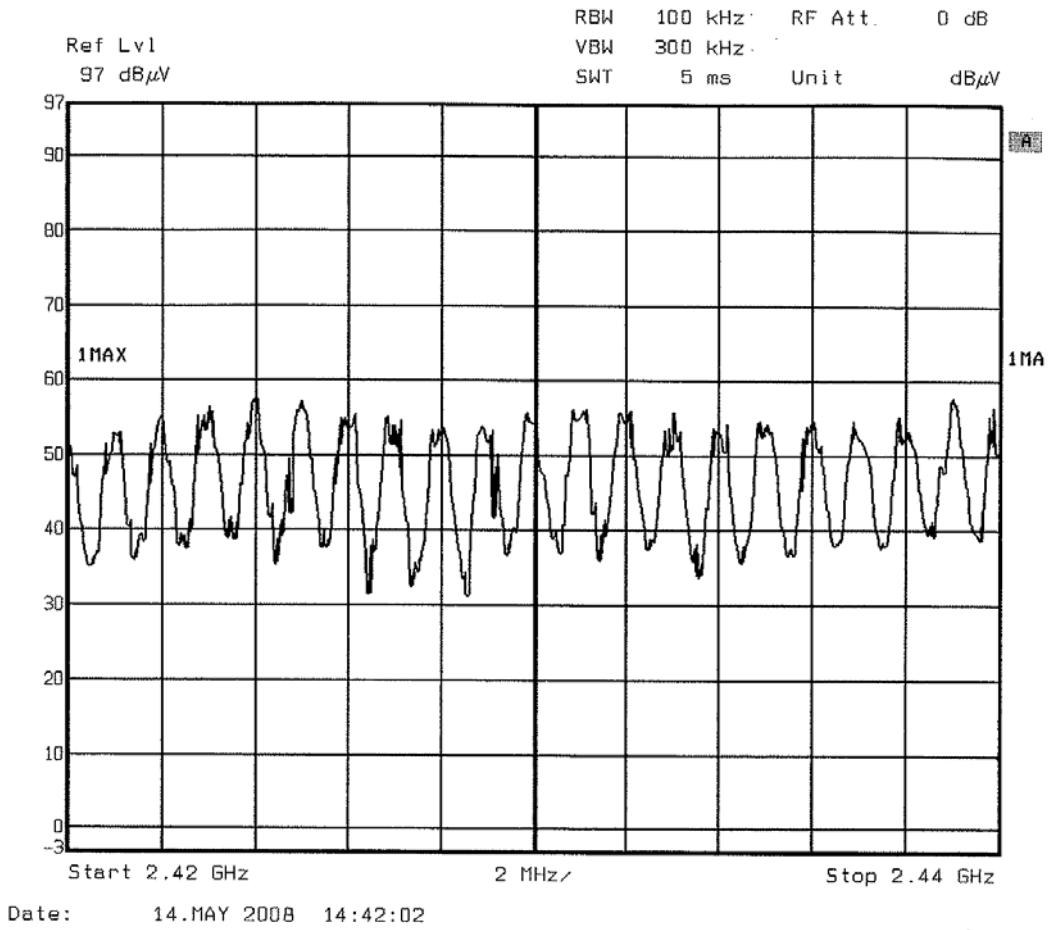


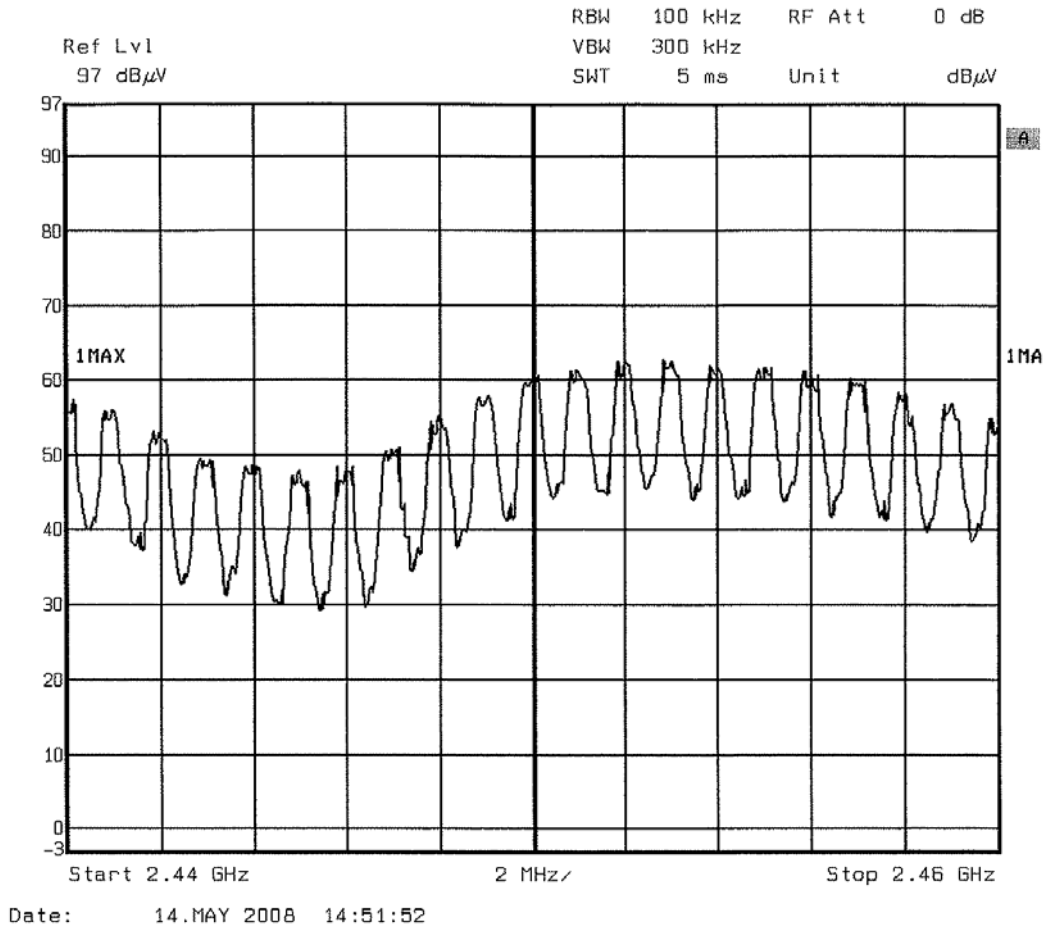


# ANNEX 3: NUMBER OF HOPPING FREQUENCIES

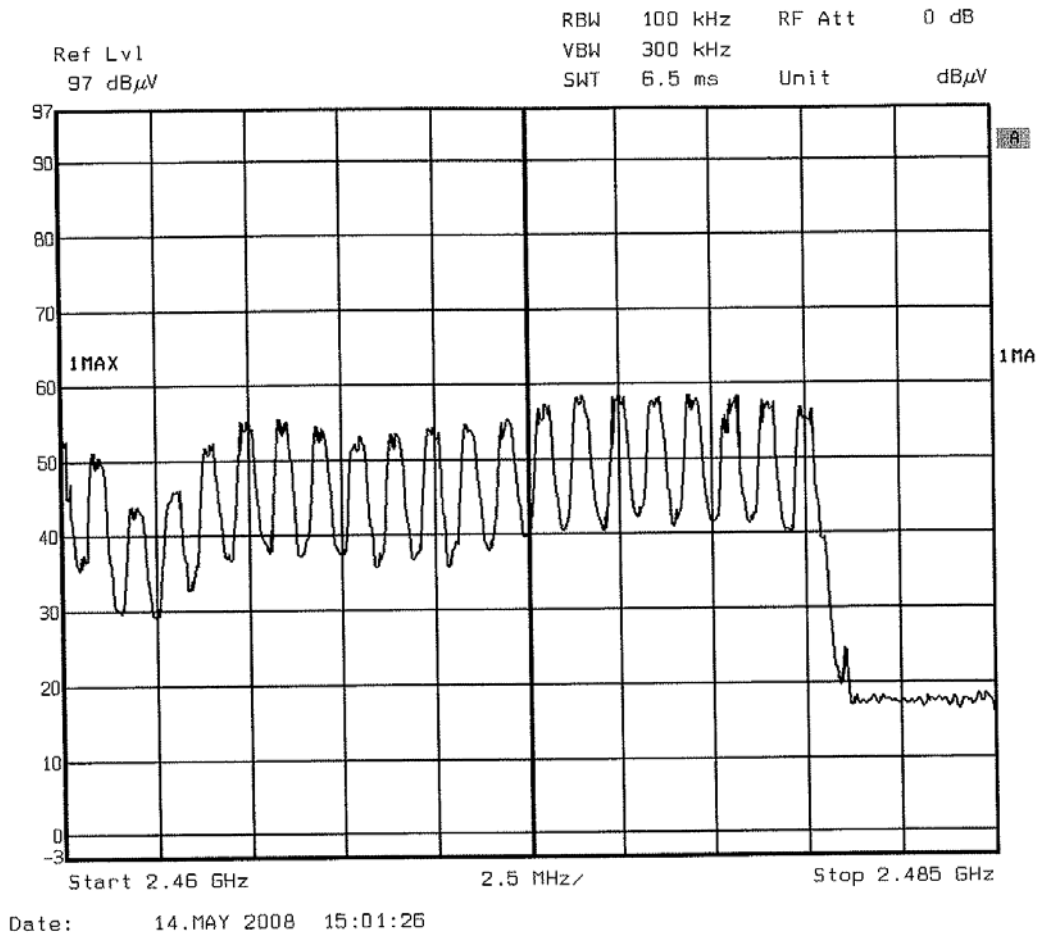


Date: 14.MAY 2008 14:37:27







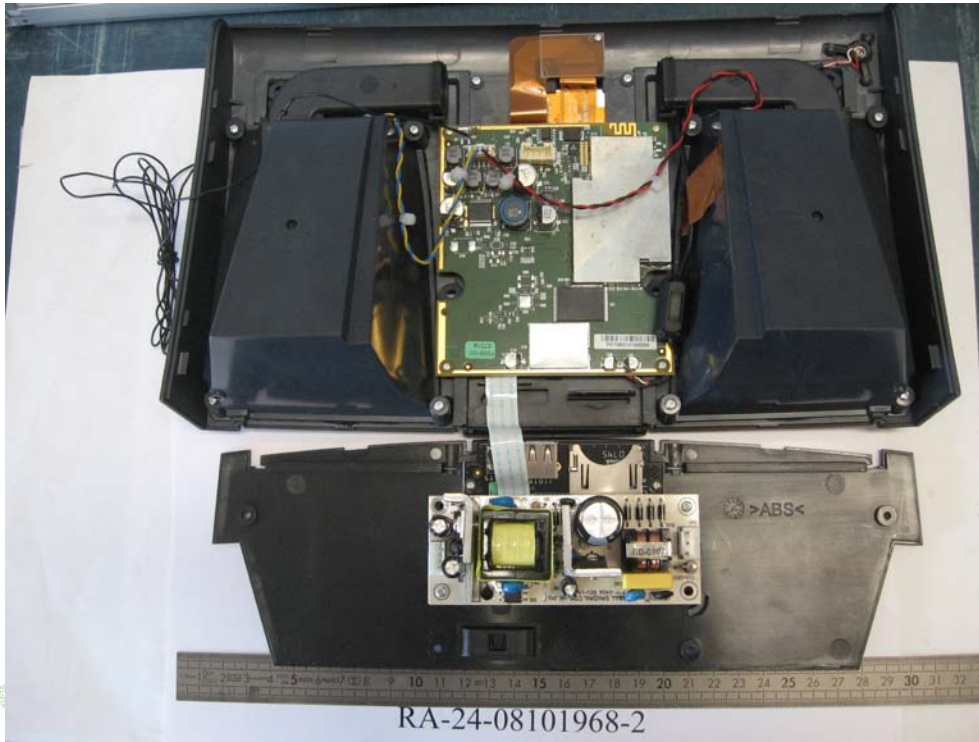


### ANNEX 4: PHOTOS OF THE EQUIPMENT UNDER TEST

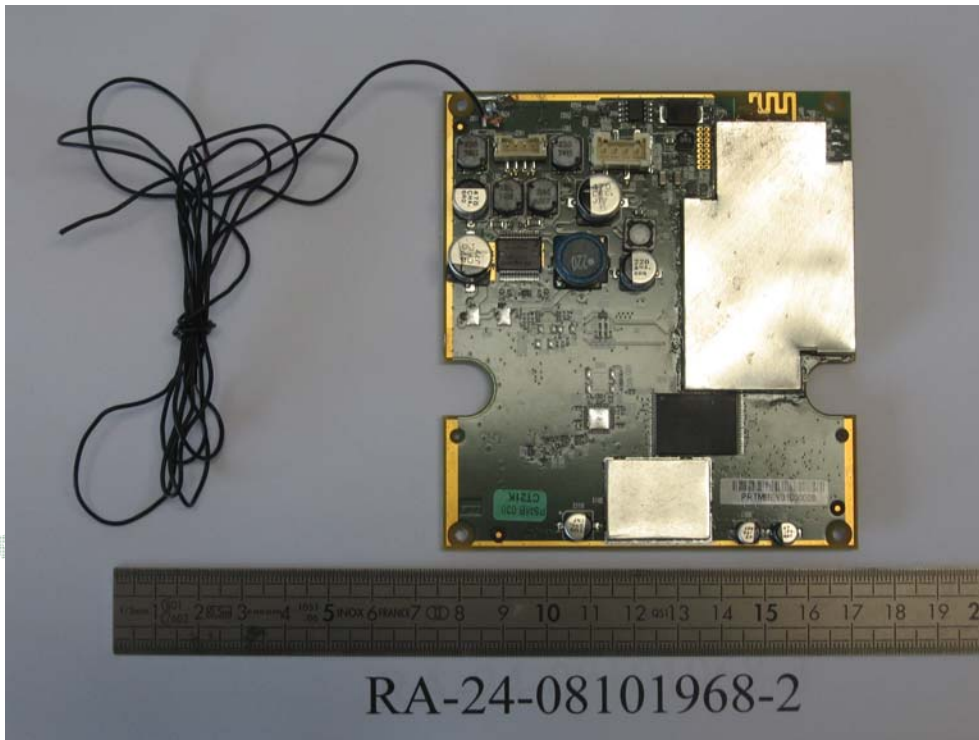
GENERAL VIEW



INTERNAL VIEW



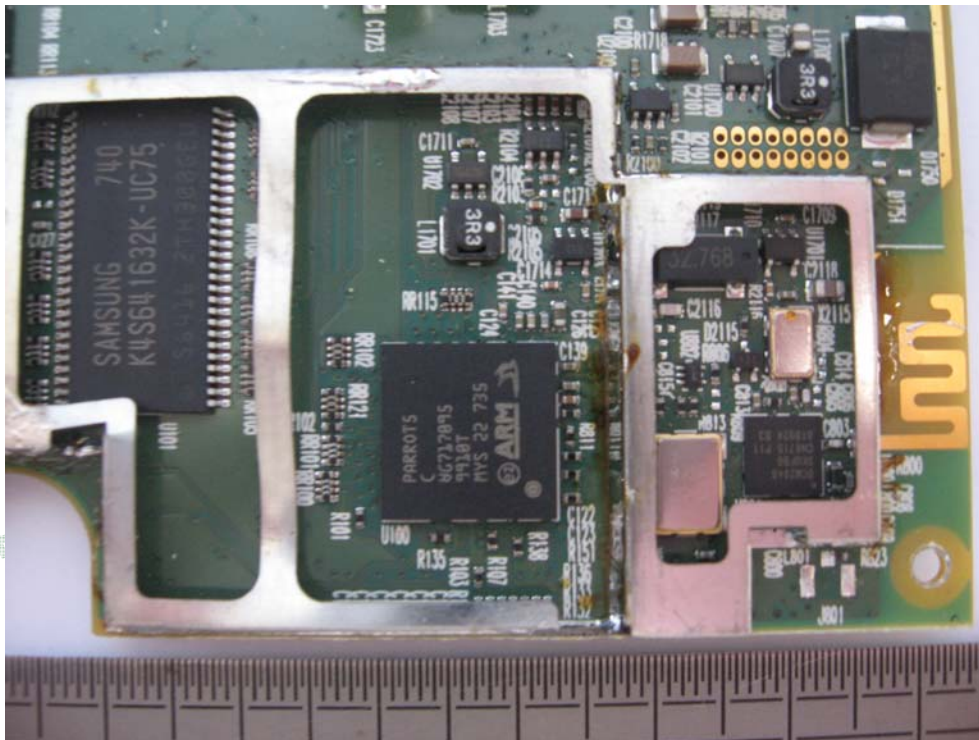
Printed circuit board: face 1



Printed circuit board: face 2



RADIO MODULE WITH ANTENNA



LABEL



EMITECH

EMITECH

EMITECH

EMITECH

EMITECH

# ANNEX 5: TEST SET UP AND OPEN AREA TEST SITE

## TEST SET UP FOR RADIATED MEASUREMENTS



**TEST SET UP FOR CONDUCTED EMISSIONS**



**OPEN AREA TEST SITE**

