



RA-24-08103498-2/A Ed. 0

FCC CERTIFICATION RADIO Measurement Technical Report

**Standard to apply:
FCC Part 15**

**Equipment under test:
MULTIMEDIA BLUETOOTH MODULE
modular approval CK5050+ EA06**

**FCC ID:
RKXCK5050PEA06**

**Company:
PARROT**

DISTRIBUTION: Mr LEBLANC

Company: PARROT

Number of pages: 38 including 5 annexes

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PRODUCT: MULTIMEDIA BLUETOOTH MODULE

Reference / model: CK5050+ EA06

Serial number: PI040157AB

MANUFACTURER: PARROT

COMPANY SUBMITTING THE PRODUCT:

Company: PARROT

Address: 174, quai de Jemmapes
75010 PARIS
FRANCE

Responsible: Mr LEBLANC

DATE(S) OF TEST: 05 November 2008

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

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

TESTED BY: L. BERTHAUD

CONTENTS

TITLE	PAGE
1. INTRODUCTION.....	4
2. PRODUCT DESCRIPTION	4
3. NORMATIVE REFERENCE.....	4
4. TEST METHODOLOGY	5
5. ADD ATTACHMENTS FILES	5
6. TESTS AND CONCLUSIONS	6
6.1 Subpart C.....	6
6.2 Subpart B.....	7
7. PEAK OUTPUT POWER.....	8
8. RADIATED EMISSION LIMITS; GENERAL REQUIREMENTS.....	10
9. BAND EDGE COMPLIANCE	12
CURVE N°: 1.....	13
CURVE N°: 2.....	14
10. RADIATED EMISSION LIMITS.....	15
ANNEX 1: OCCUPIED POWER BANDWIDTH AND CHANNEL SEPARATION.....	17
ANNEX 2: NUMBER OF HOPPING FREQUENCIES	23
ANNEX 3: AVERAGE TIME OF OCCUPANCY ON ANY FREQUENCY	27
ANNEX 4: PHOTOS OF THE EQUIPMENT UNDER TEST	33
ANNEX 5: TEST SET UP AND OPEN AREA TEST SITE	36

1. INTRODUCTION

This document presents the result of RADIO test carried out on the following equipment: MULTIMEDIA BLUETOOTH MODULE CK5050+ EA06 in accordance with normative reference.

2. PRODUCT DESCRIPTION

ITU Emission code:	1M00F7D
Class:	B (residential environment)
Utilization:	Multimedia module with Bluetooth function
Antenna type:	dedicated antenna
Operating frequency range:	from 2402 MHz to 2480 MHz
Number of channels:	79
Channel spacing:	1 MHz
Frequency generation:	<input type="radio"/> SAW Resonator <input type="radio"/> Crystal <input checked="" type="radio"/> Synthesizer
Modulation: Frequency Hopping Spread Spectrum (FHSS)	<input checked="" type="radio"/> Amplitude <input type="radio"/> Digital <input checked="" type="radio"/> Frequency <input type="radio"/> Phase
Power source:	6 Vd.c.

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 (2008)	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 107: conducted limits
- Paragraph 109: radiated emission limits
- 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

6.1 Subpart C

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				
	(c) <i>operation with directional antenna gains > 6 dBi</i>			X		Note 5
	(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 6
DA 00-705	BAND EDGE COMPLIANCE	X				

NAP: Not Applicable

NAs: Not Asked

Note 1: professionally installed equipment.

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 (815.6 kHz; see annex 1).

Note 4: the frequency hopping system uses 79 channels (see annex 2).

The timing by channel is 182.8 μs. During 79 channels × 0.4 s (part 15) = 31.6 s, any channel is used 224 times, then 224 × 182.8 μs = 40.95 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 3).

Note 5: the antenna gain is less than 6 dBi.

Note 6: 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).

6.2 Subpart B

Test procedure	Description of test	Criteria respected ?				Comment
		Yes	No	NAp	NAs	
FCC Part 15.107	CONDUCTED LIMITS			X		
FCC Part 15.109	RADIATED EMISSION LIMITS	X				

NAp: Not Applicable

NAs: Not Asked

Conclusion:

The sample of MULTIMEDIA BLUETOOTH MODULE CK5050+ EA06 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. PEAK OUTPUT POWER

Standard: FCC Part 15

Test procedure: paragraph 15.247

Test equipment:

TYPE	BRAND	EMITECH NUMBER
Spectrum analyzer FSP 40	Rohde & Schwarz	4088
High pass filter HPM11630	Micro-tronics	1673
Low-noise amplifier 1 to 18 GHz	ALC	2648
Power meter 8541B	Gigatronics	3479
Power sensor 80401A	Gigatronics	3182
Power source E3610A	Hewlett Packard	4195
Bandpass filter 2.4 GHz	BL Microwave	5625

Test set up:

The measurement of the conducted output power level is realized with a calibrated RF power meter.

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): 20.5

Relative humidity (%): 58

Power source: 6 Vd.c.

Sample n° 1 Channel 1

	Level (W)	Limit (W)
Normal test conditions	0.316×10^{-3}	1

Sample n° 1 Channel 40

	Level (W)	Limit (W)
Normal test conditions	0.295×10^{-3}	1

Sample n° 1 Channel 79

	Level (W)	Limit (W)
Normal test conditions	0.269×10^{-3}	1

Test conclusion:

RESPECTED STANDARD

8. RADIATED EMISSION LIMITS; GENERAL REQUIREMENTS

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
Low-noise amplifier 18 to 26 GHz	ALC	3036
Power source E3610A	Hewlett Packard	4195

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 azimuth corresponds 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 to 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): 20.5

Relative humidity (%): 58

Power source: 6 Vd.c.

Channel 1

Not any spurious has been detected.

Channel 40

Not any spurious has been detected.

Channel 79

Not any spurious has been detected.

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 82.37 dB μ V/m on channel 1.

So the applicable limit is **62.37 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)).

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

TEST CONCLUSION:

RESPECTED STANDARD

9. 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
Power source E3610A	Hewlett Packard	4195

Measured condition:

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° 1

Upper Band Edge: from 2483.5 MHz to 2500 MHz, CURVE n° 2

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)*	Calculated Max Out of Band Emission Level (dBµV/m)**	Limit (dBµV/m)	Margin (dB)
2402	82.37	Peak	2386.76	-36.05	46.32 ⁽¹⁾	53.98	7.66
2480	80.17	Peak	2484.33	-36.91	43.26 ⁽¹⁾	53.98	10.72

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

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

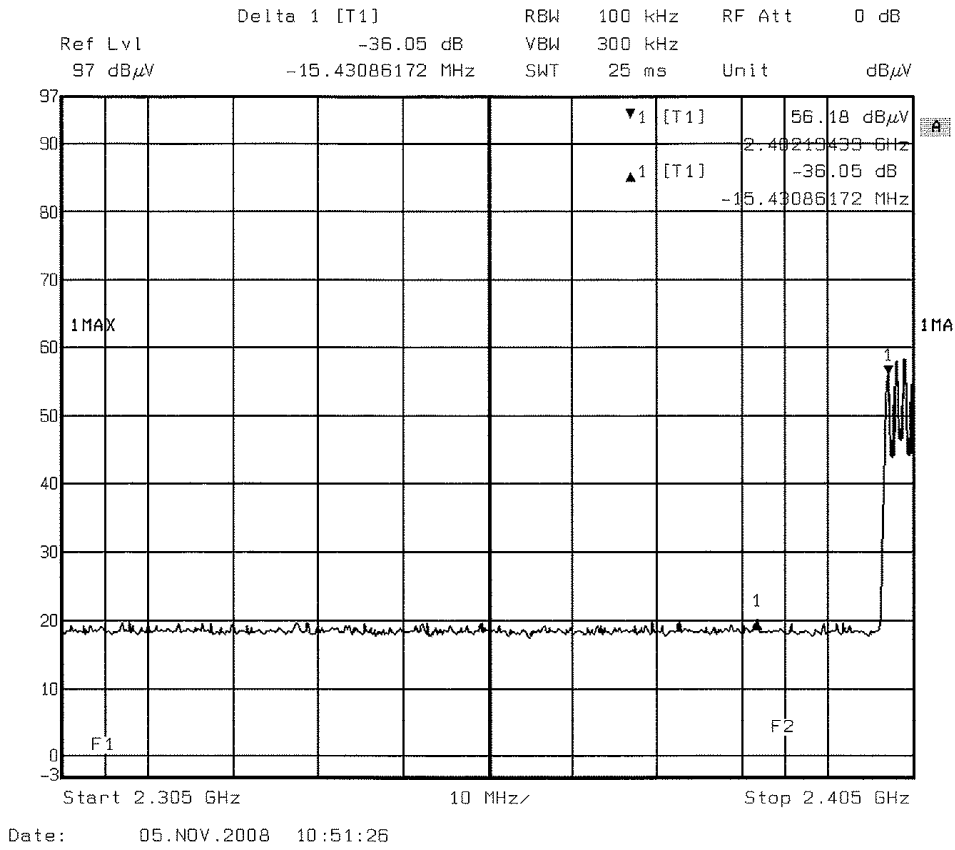
Calculated Emission Level = Field Strength Level – Delta Marker Level

⁽¹⁾ the peak level is lower than the average limit (53.98 dBµV/m).

Test conclusion:

RESPECTED PUBLIC NOTICE

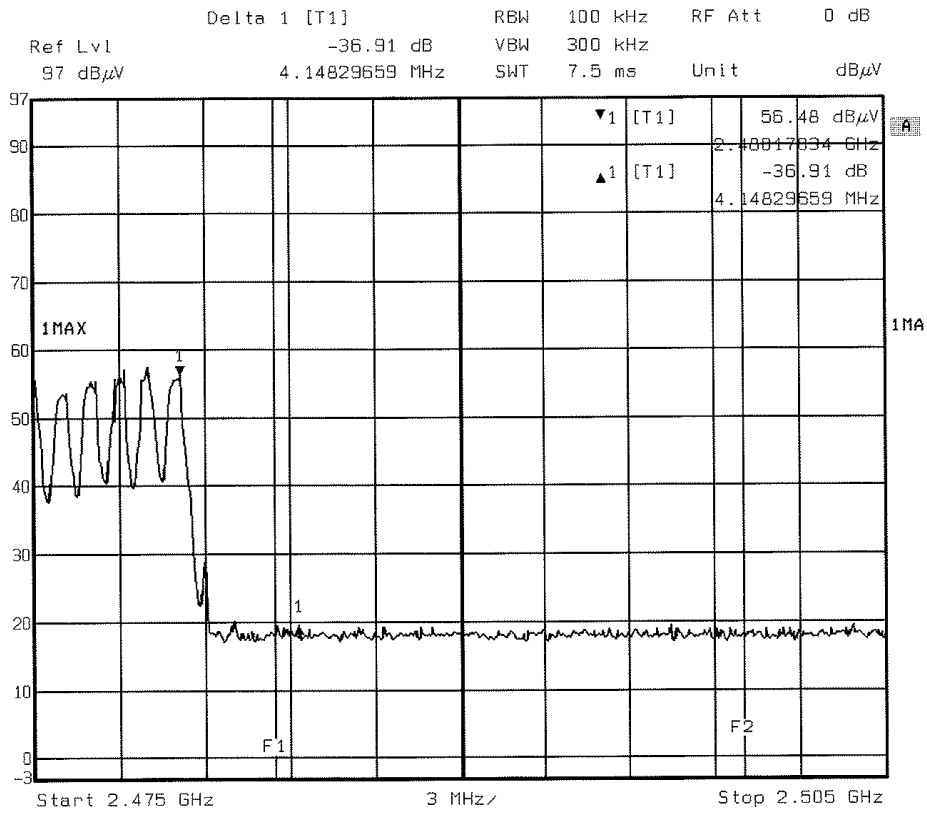
CURVE N°: 1.



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CURVE N°: 2.



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10. RADIATED EMISSION LIMITS

Standard: FCC Part 15

Test procedure: paragraph 109

Test equipment:

TYPE	BRAND	EMITECH NUMBER
Test receiver	Rohde & Schwarz ESVS 10	1219
Biconical antenna	Hewlett Packard 11966 C	728
Log periodic antenna	Rohde & Schwarz HL 223	1999
Double ridged guide antenna	Electrometrics EM 6961	1204
Spectrum analyzer	Rohde & Schwarz FSP40	4088
Open area test site	EMITECH	1274
Preamplifier 1 to 18 GHz	DBS Microwave DB97-1852	2648
High pass filter	Micro-tronics HPM11630	1673
Power source	Hewlett Packard E3610A	4195

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 30 MHz to harmonic 10 ($F_{\text{carrier}} \leq 1 \text{ GHz}$)

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

Bandwidth: 120 kHz ($F < 1 \text{ GHz}$)
1 MHz ($F > 1 \text{ GHz}$)

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 continuous reception mode (which corresponds to the standby mode of the transmitter).

Results:

Ambient temperature (°C): 20.5

Relative humidity (%): 58

Power source: 6 Vd.c.

Not any spurious has been detected.

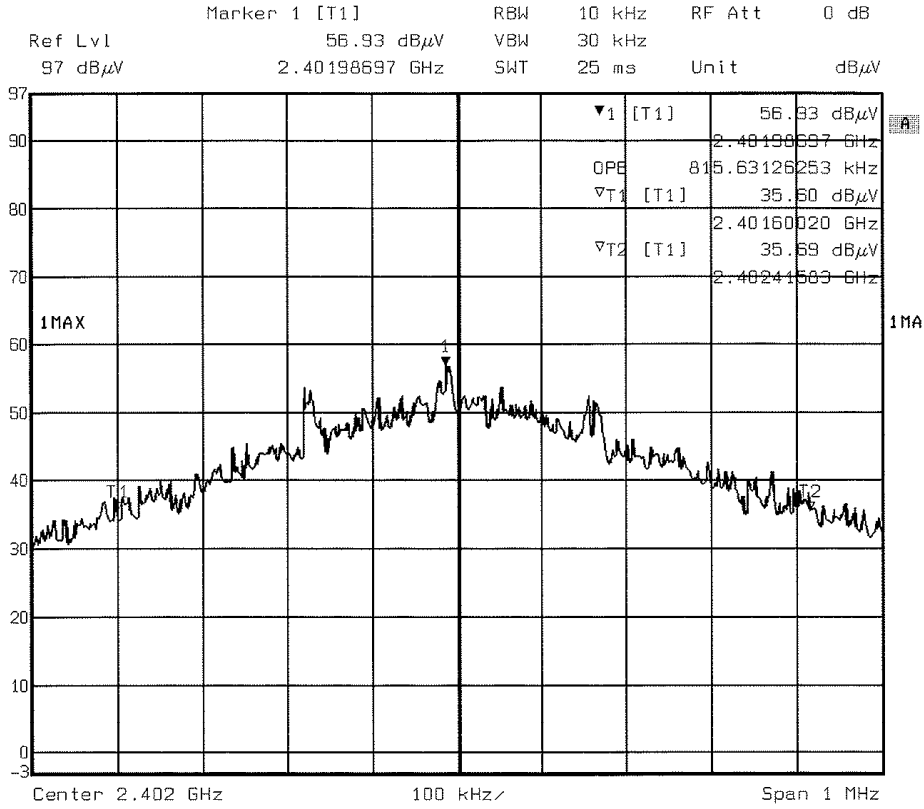
Any spurious which has more than 20 dB of margin compared to the applicable limit is not necessarily reported.

TEST CONCLUSION:

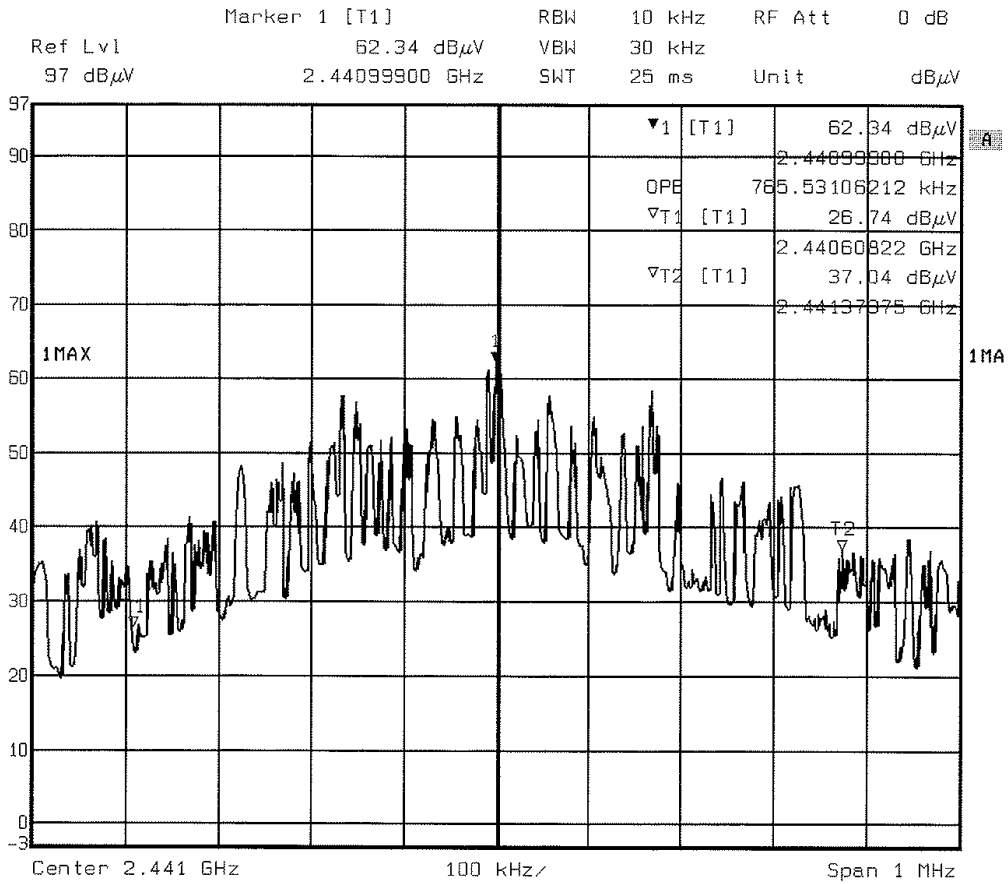
RESPECTED STANDARD

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

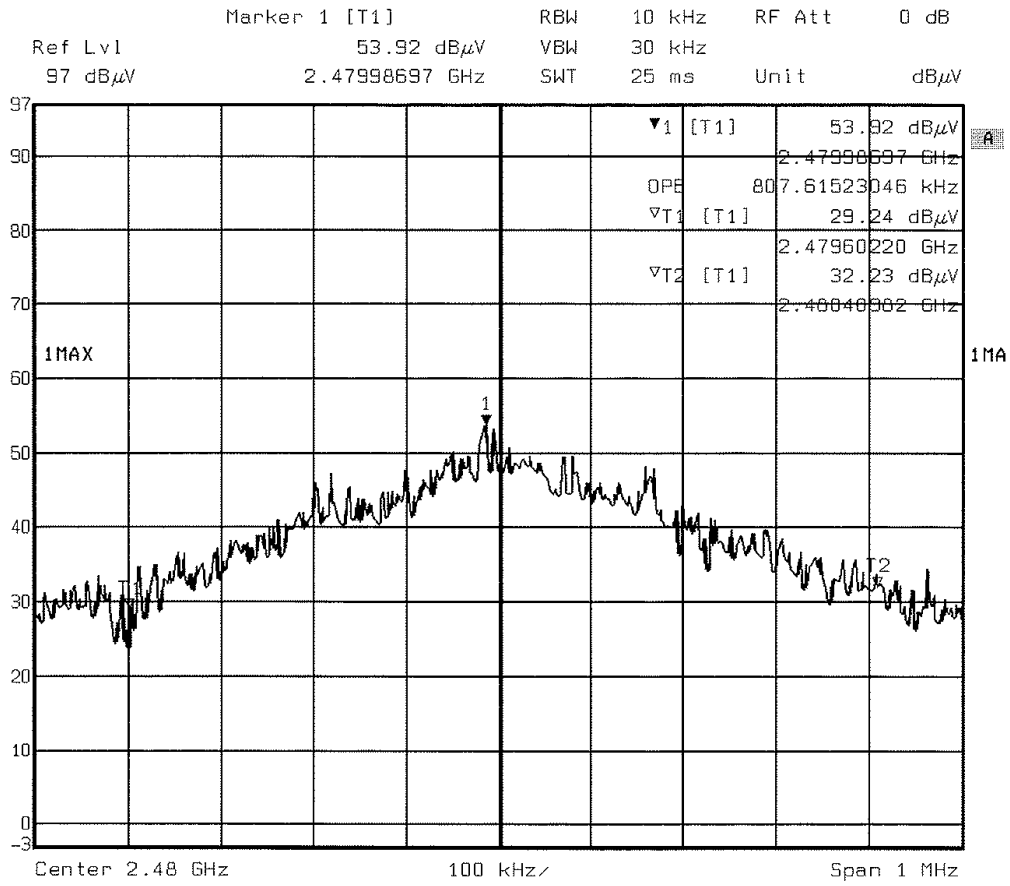
ANNEX 1: OCCUPIED POWER BANDWIDTH AND CHANNEL SEPARATION



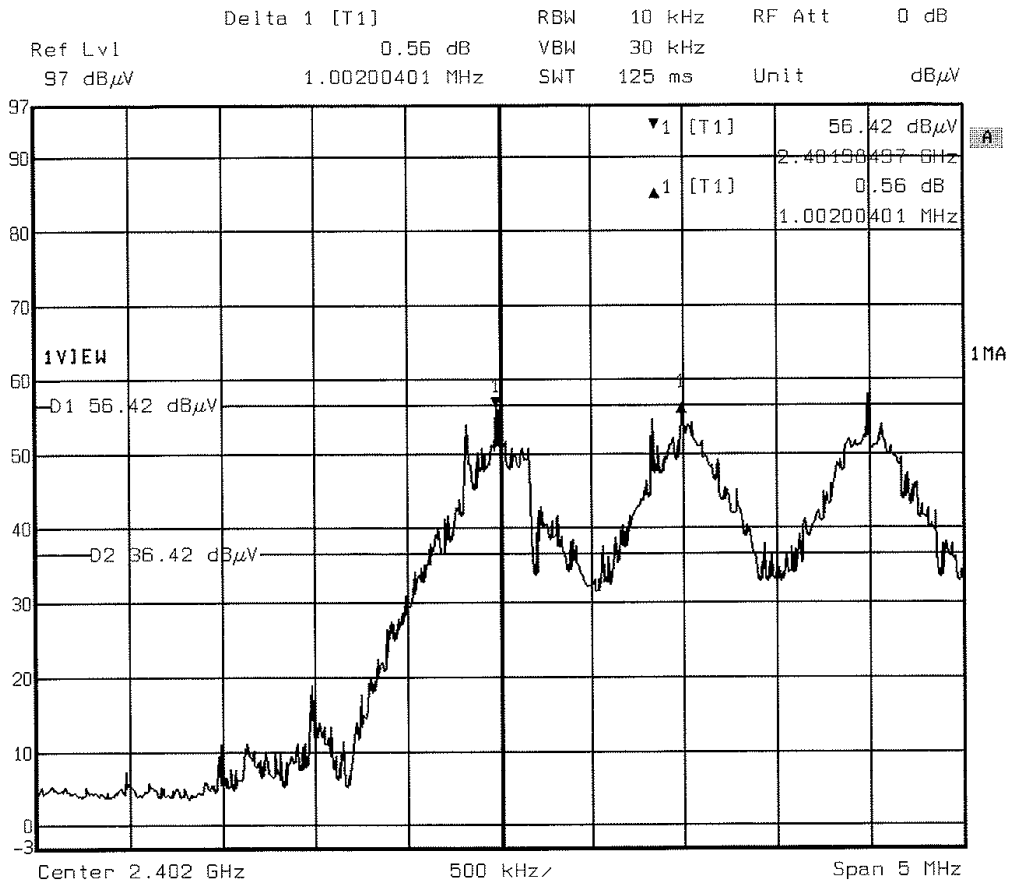
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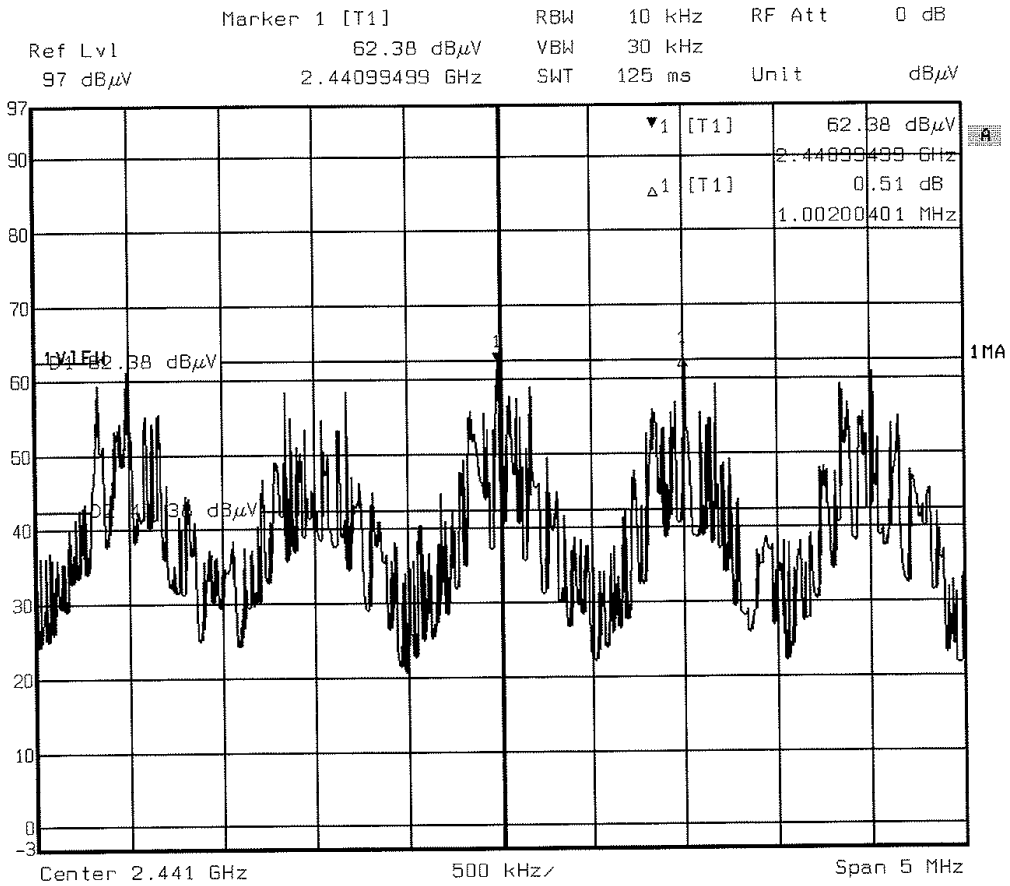
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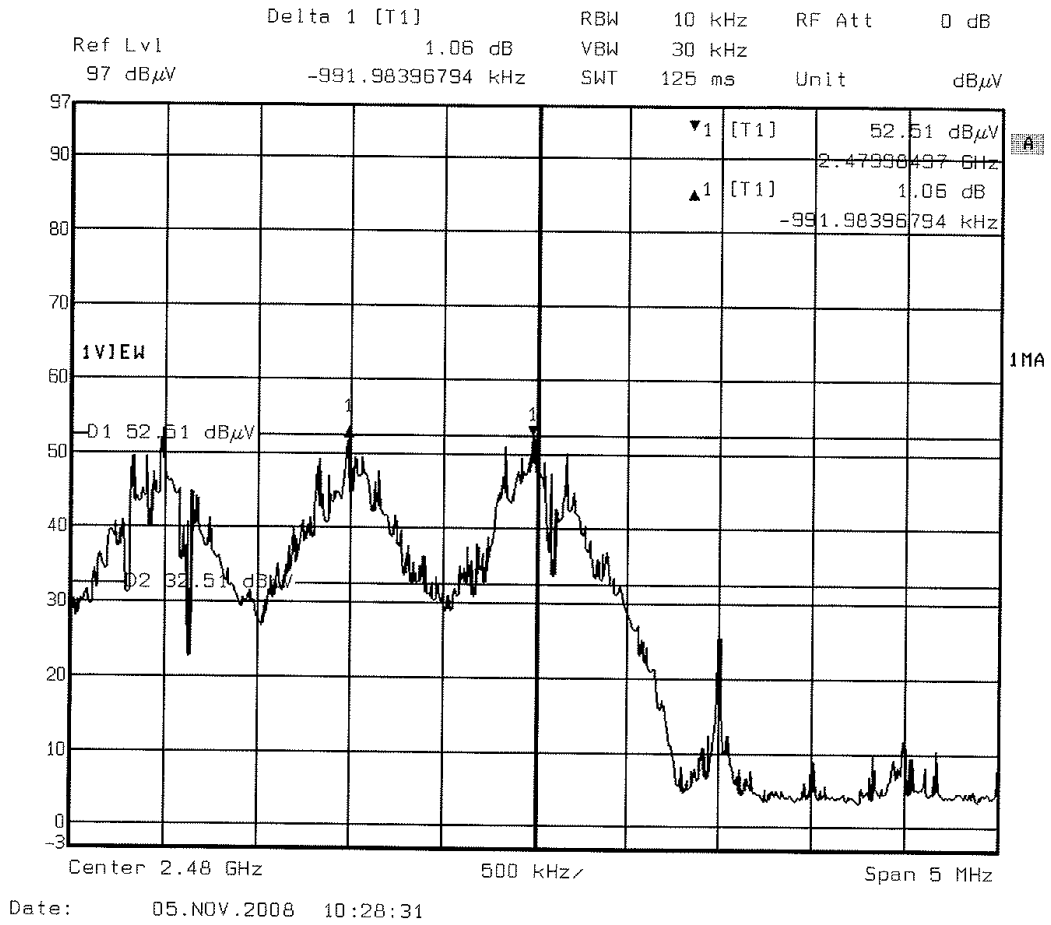
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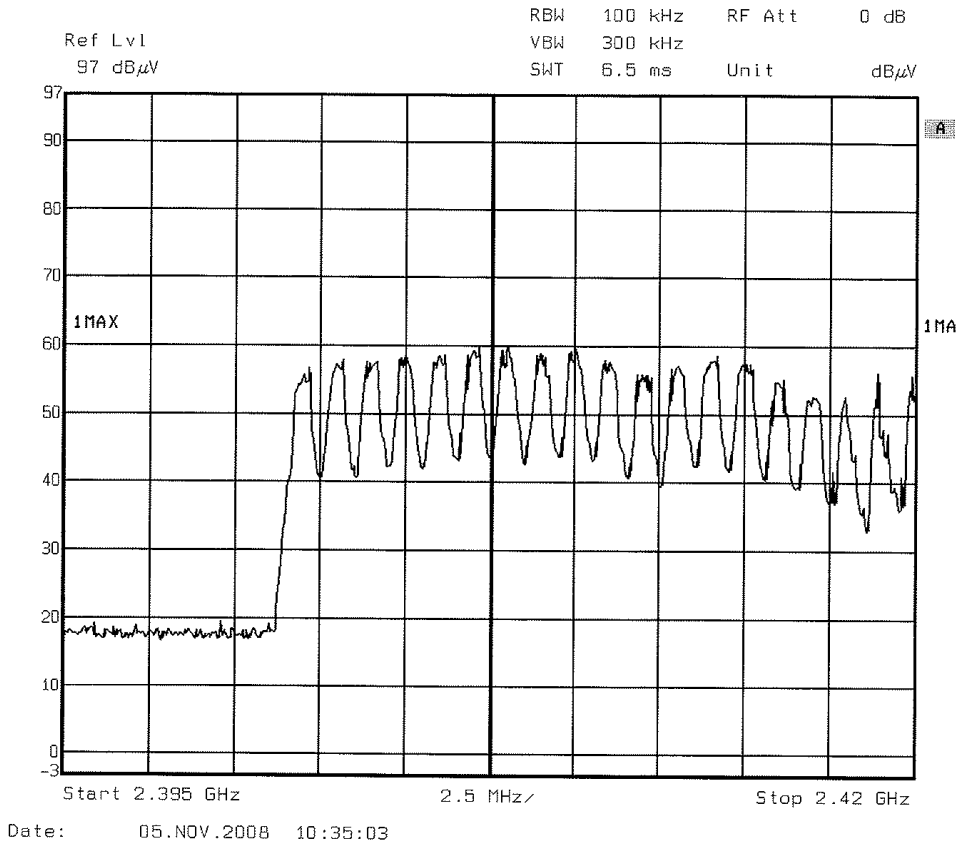
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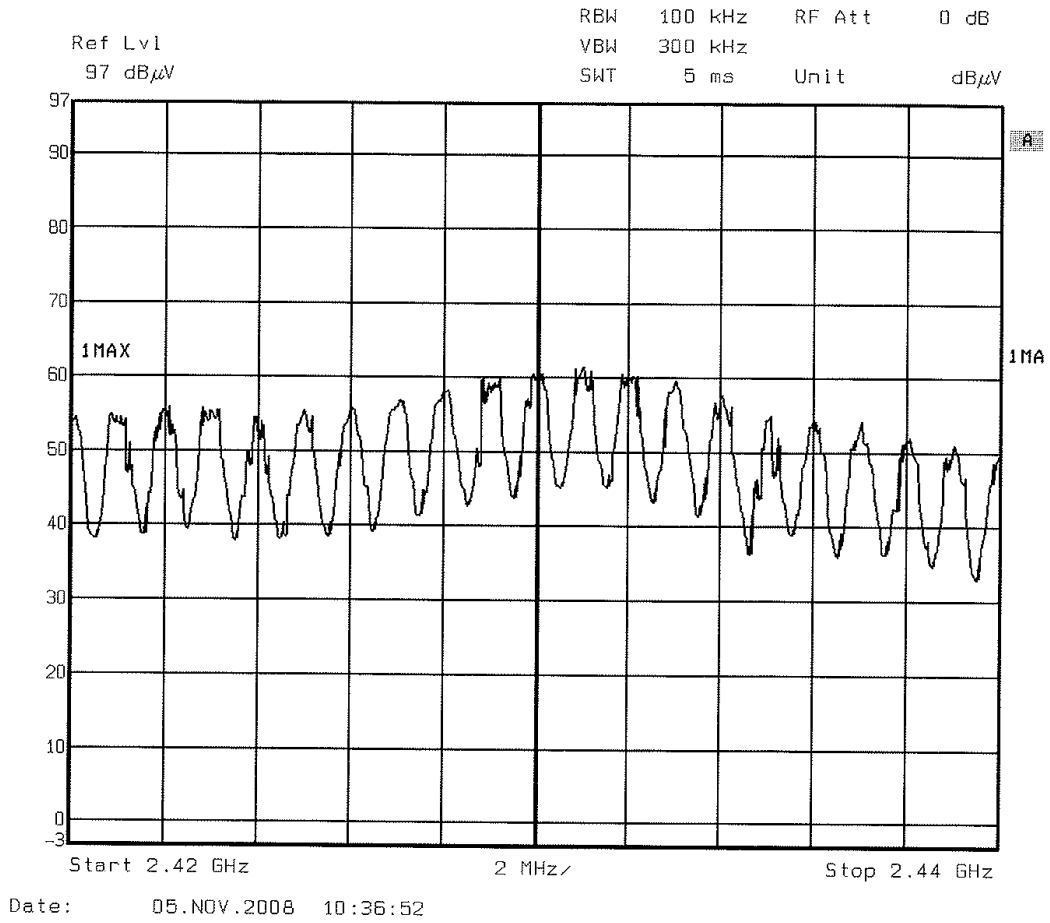


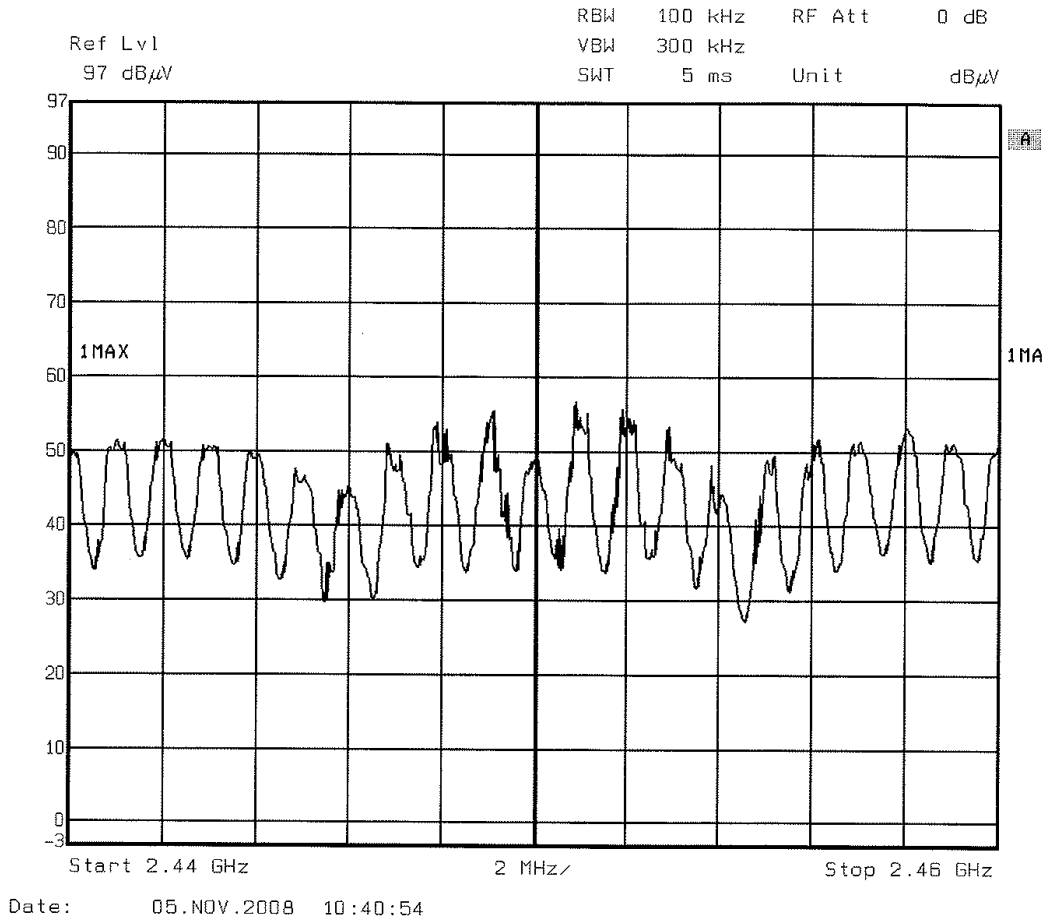
ANNEX 2: NUMBER OF HOPPING FREQUENCIES

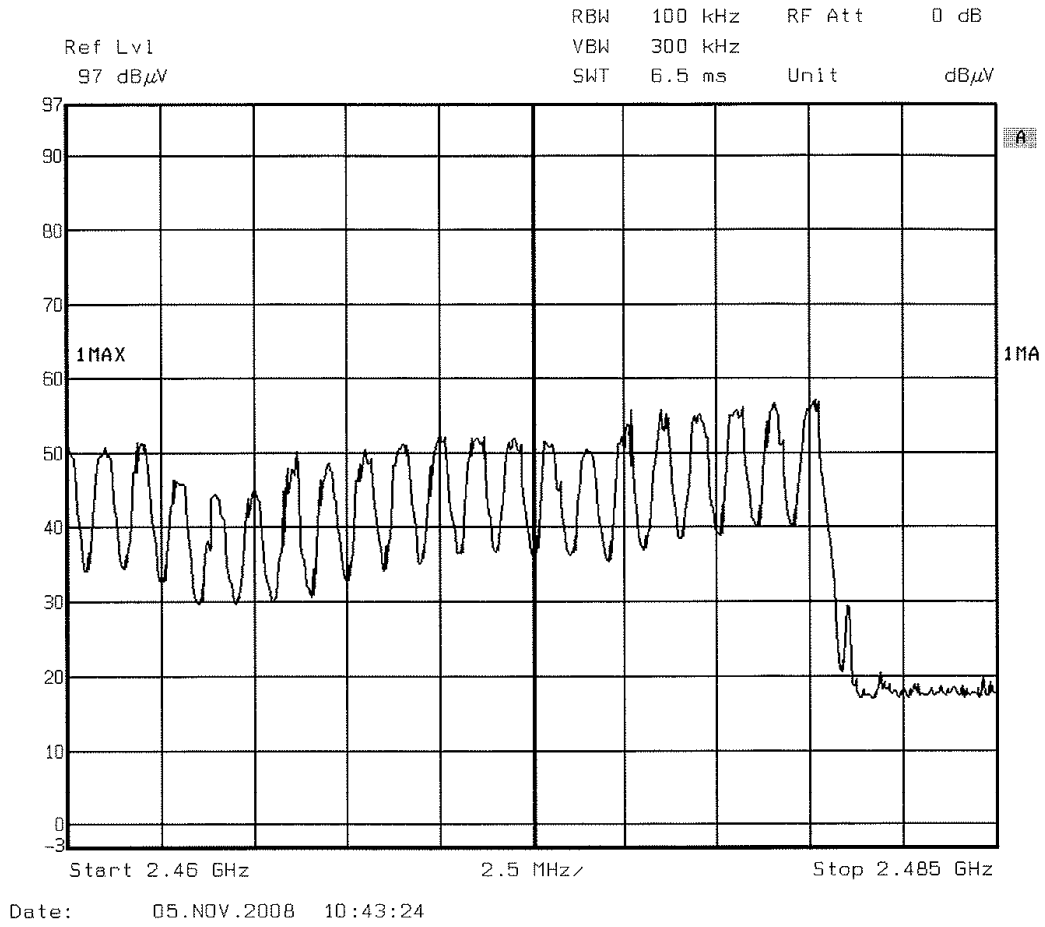


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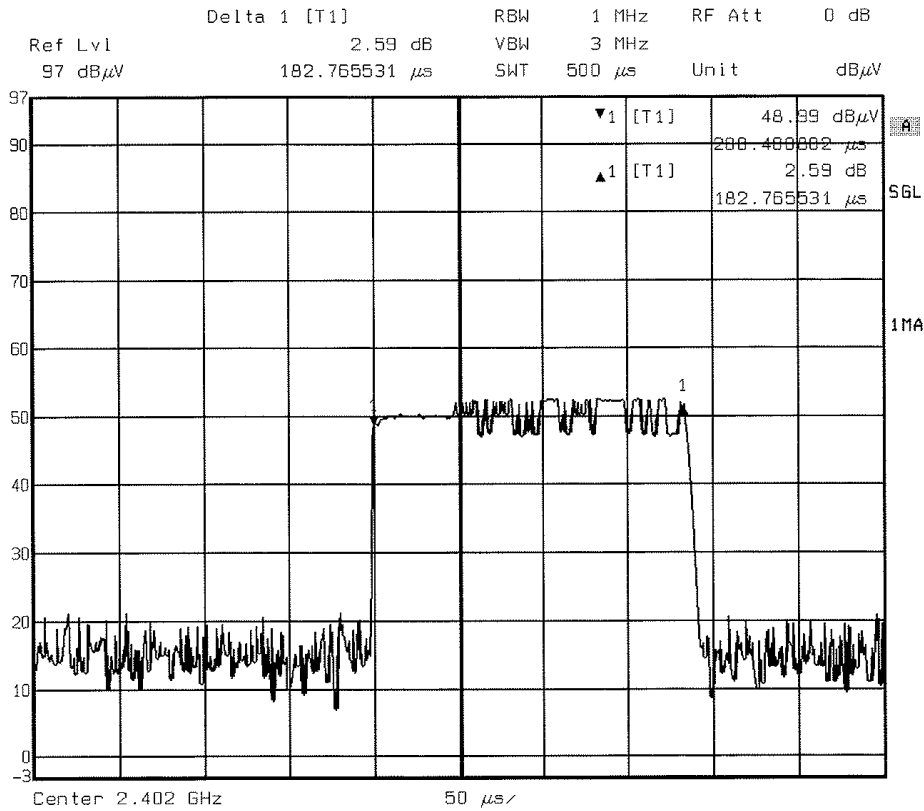
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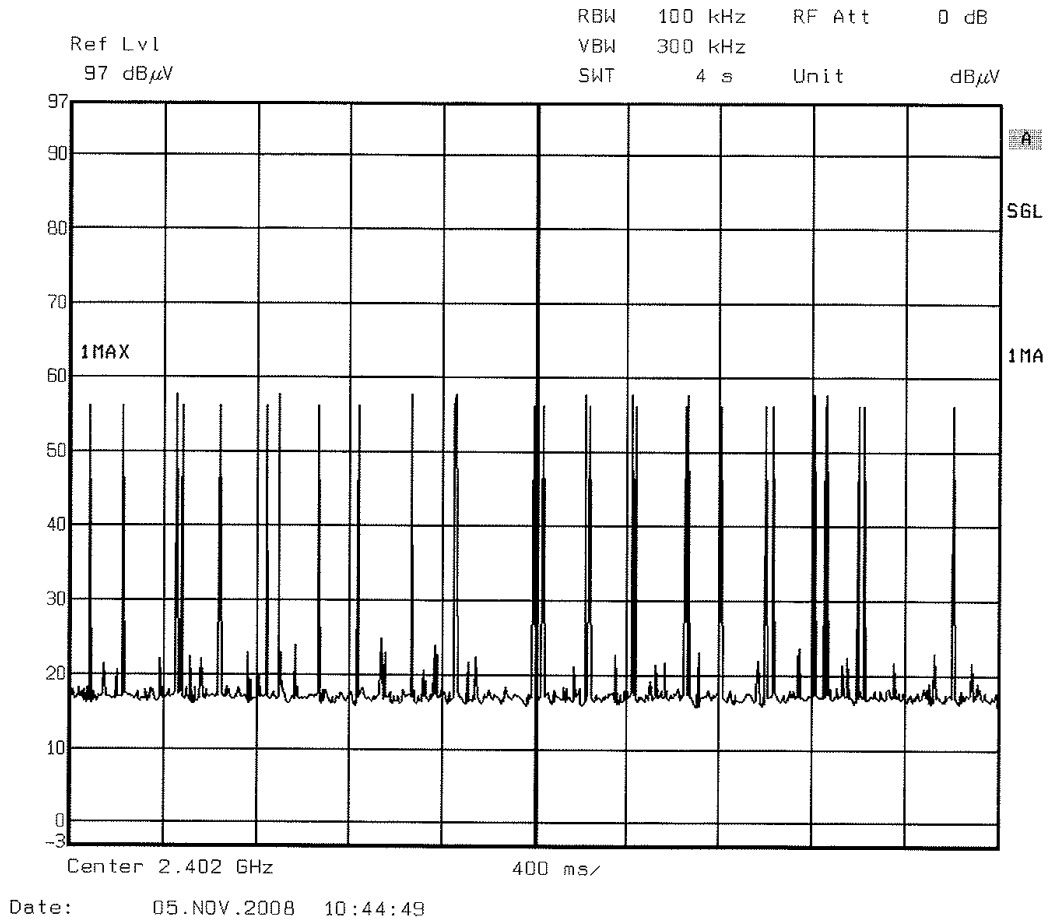


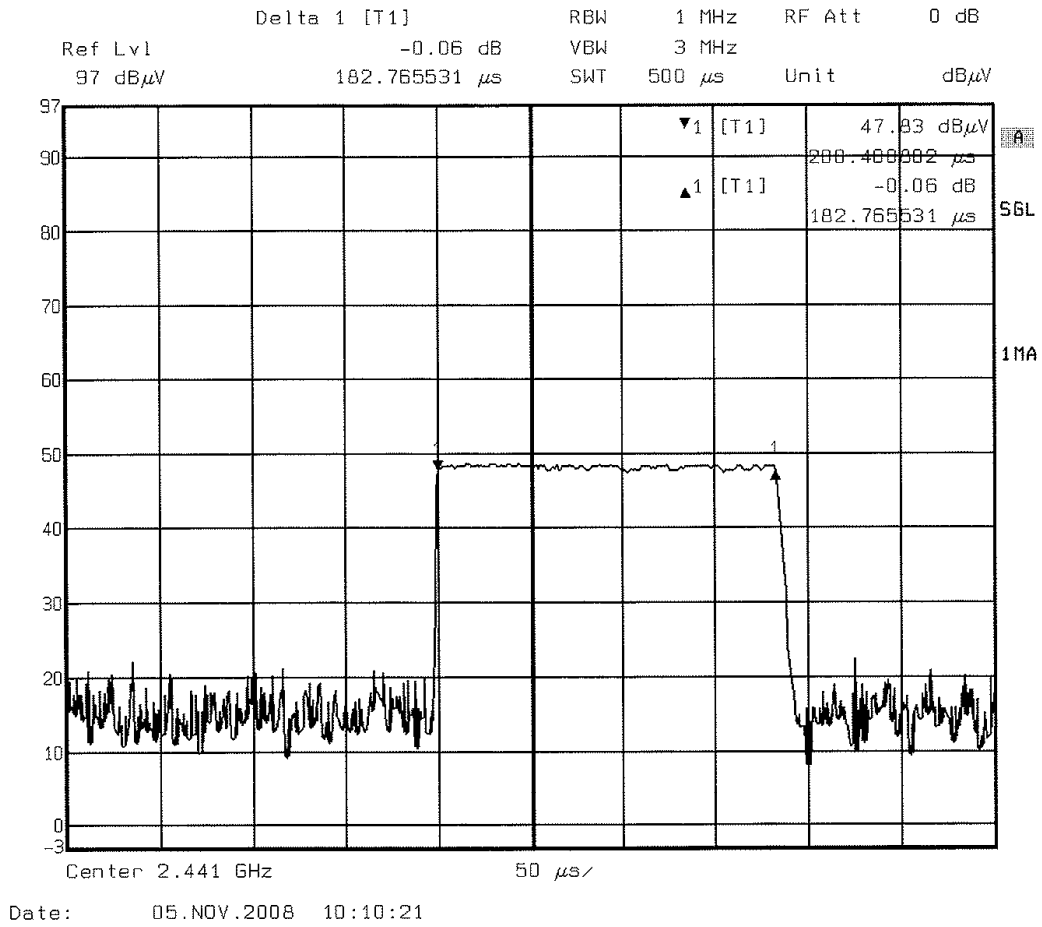


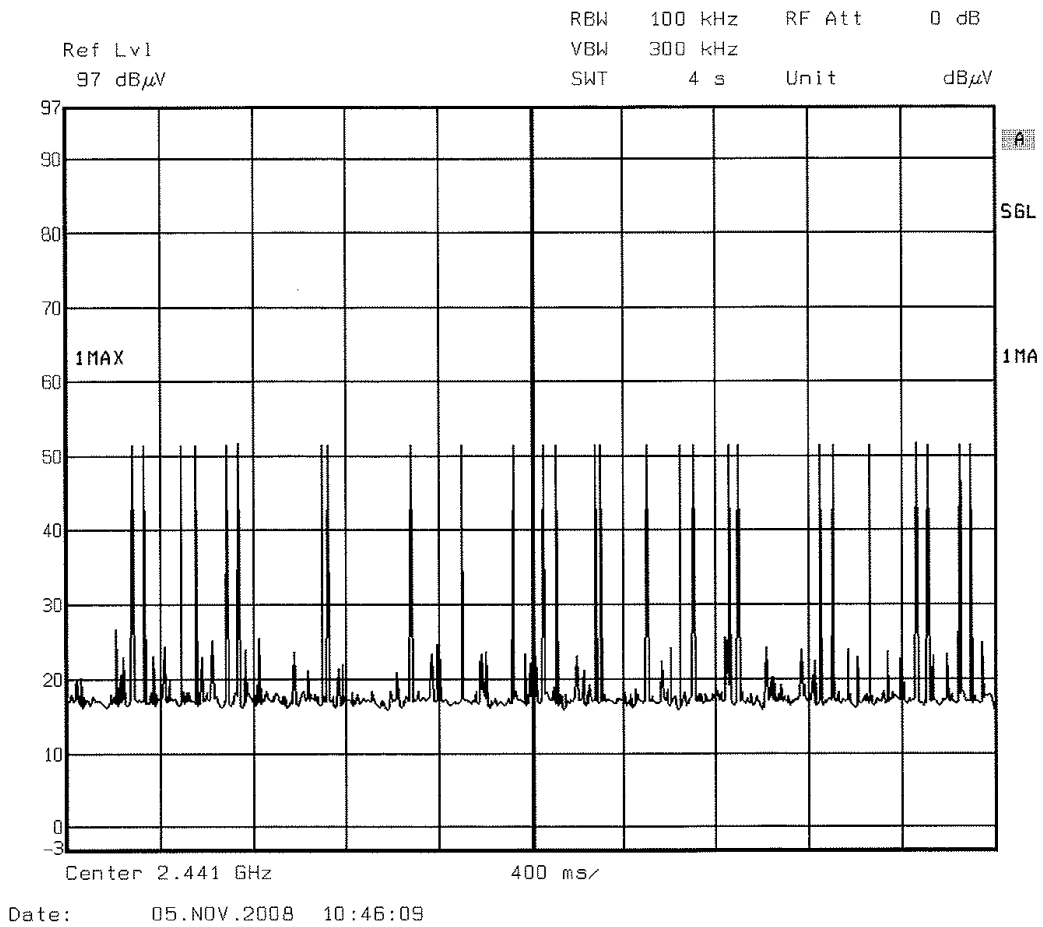
ANNEX 3: AVERAGE TIME OF OCCUPANCY ON ANY FREQUENCY

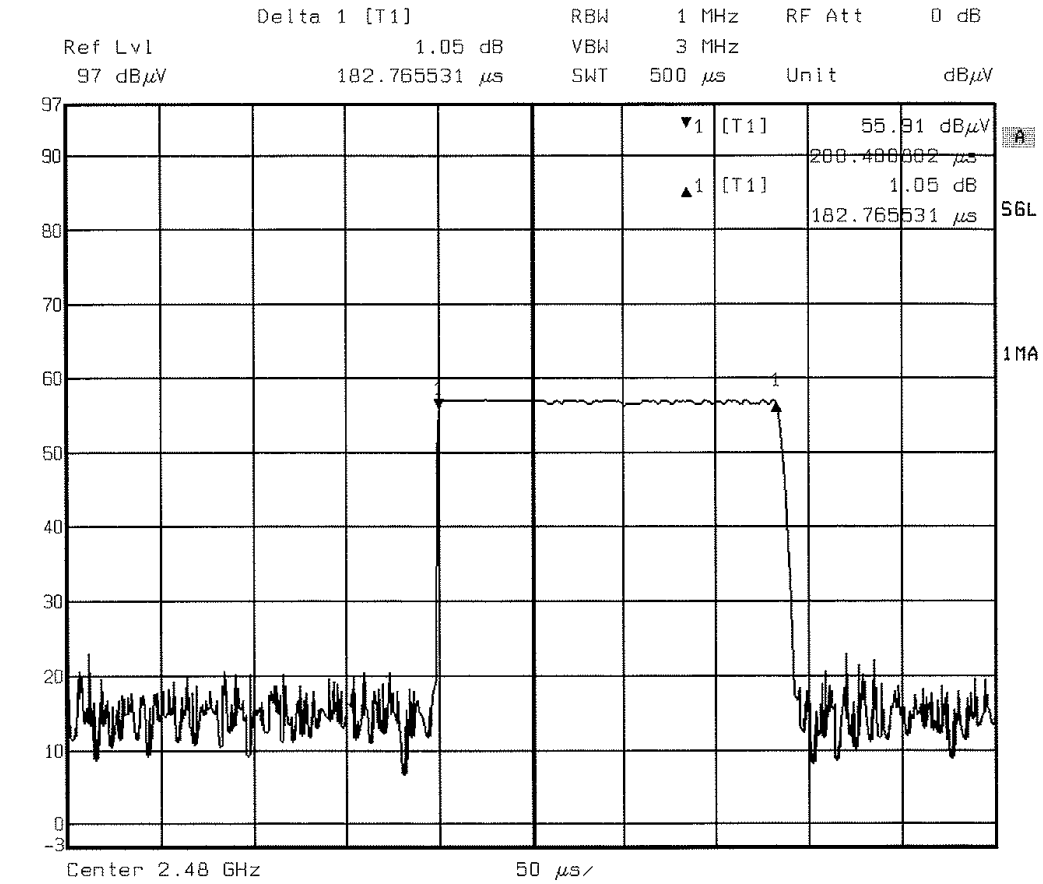


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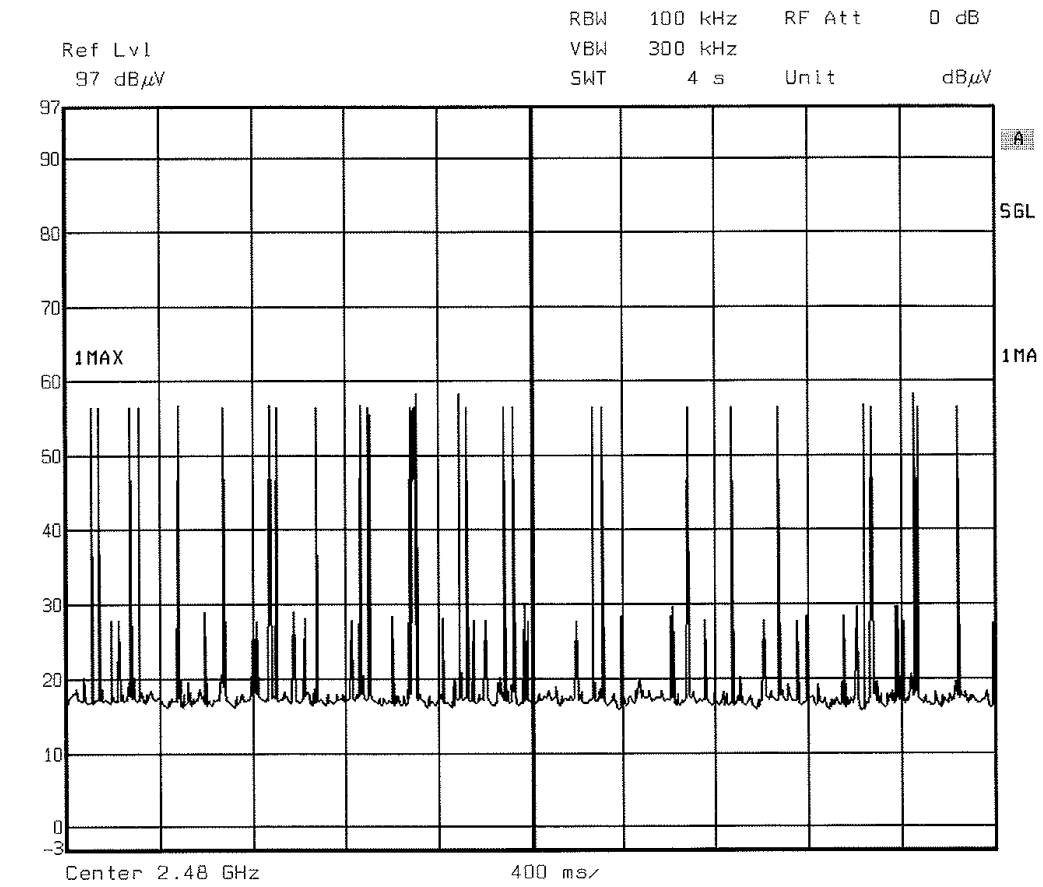








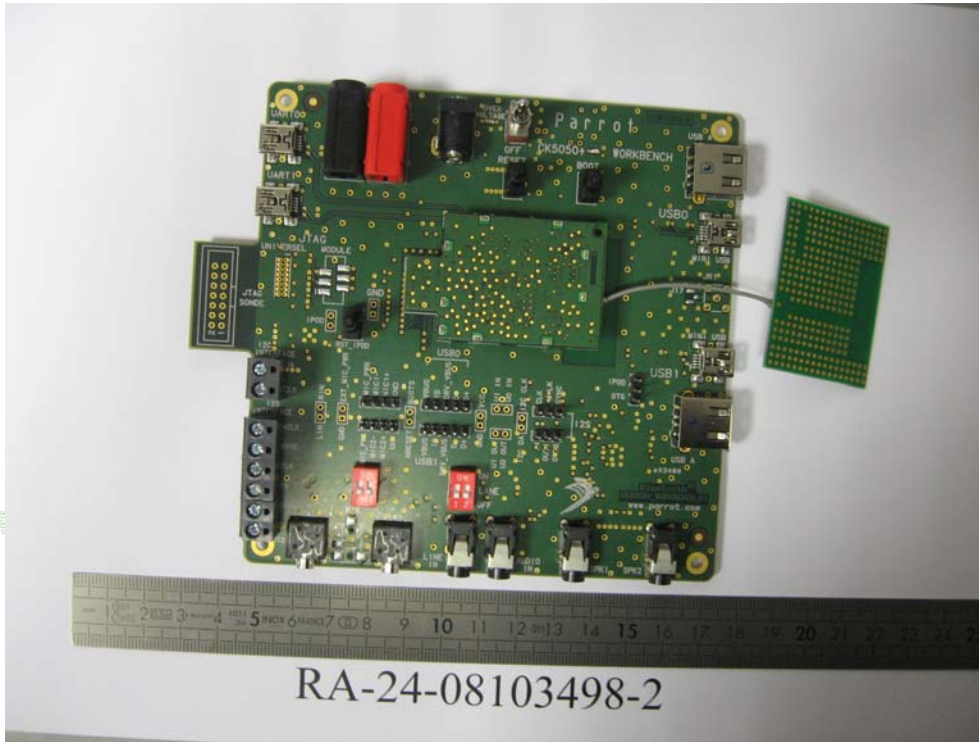
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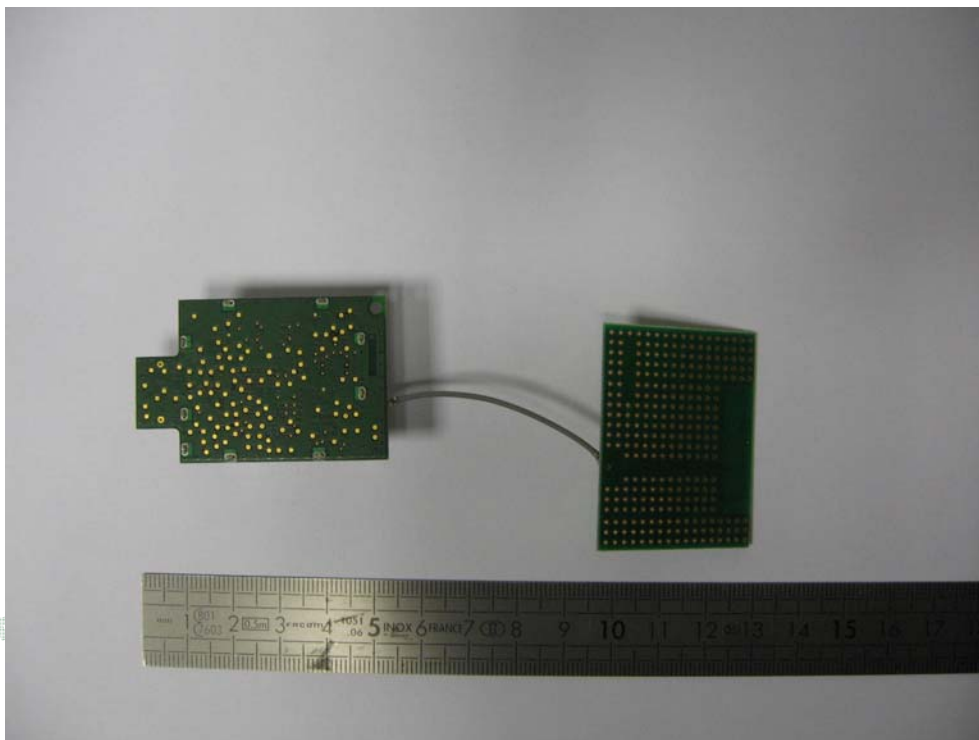
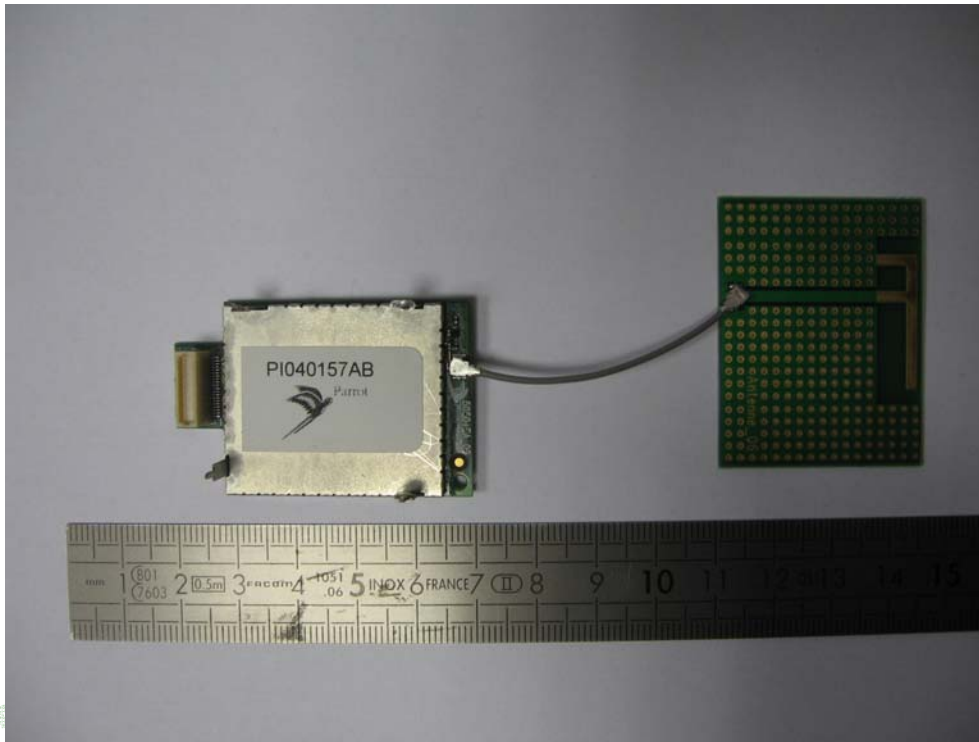
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ANNEX 4: PHOTOS OF THE EQUIPMENT UNDER TEST

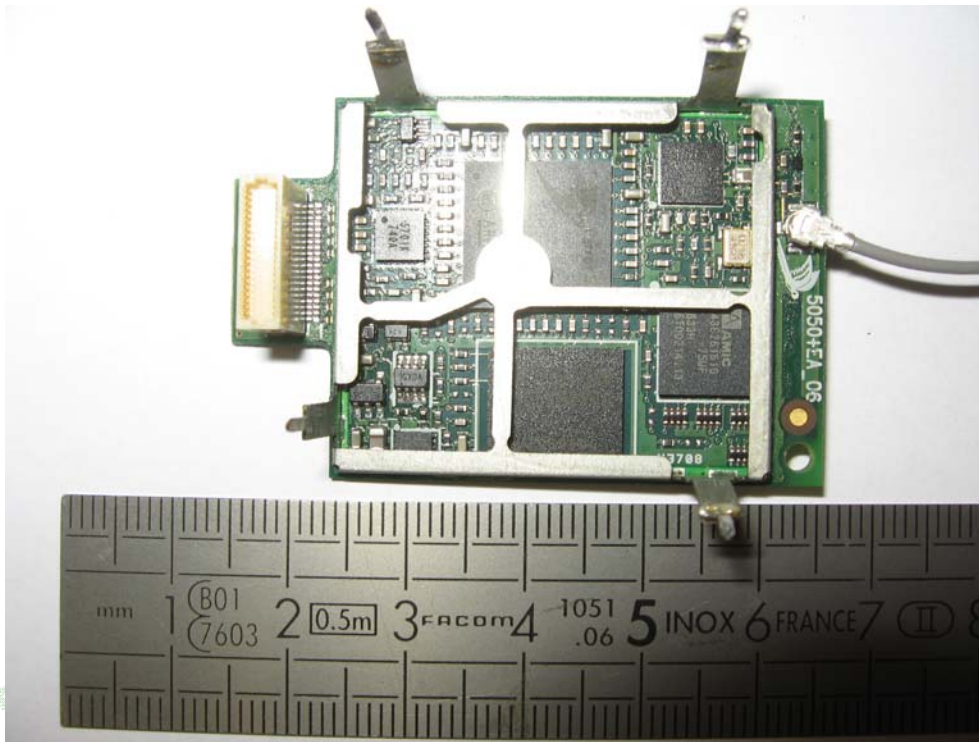
GENERAL VIEW: equipment on its workbench



GENERAL VIEW



GENERAL VIEW: equipment without its shield



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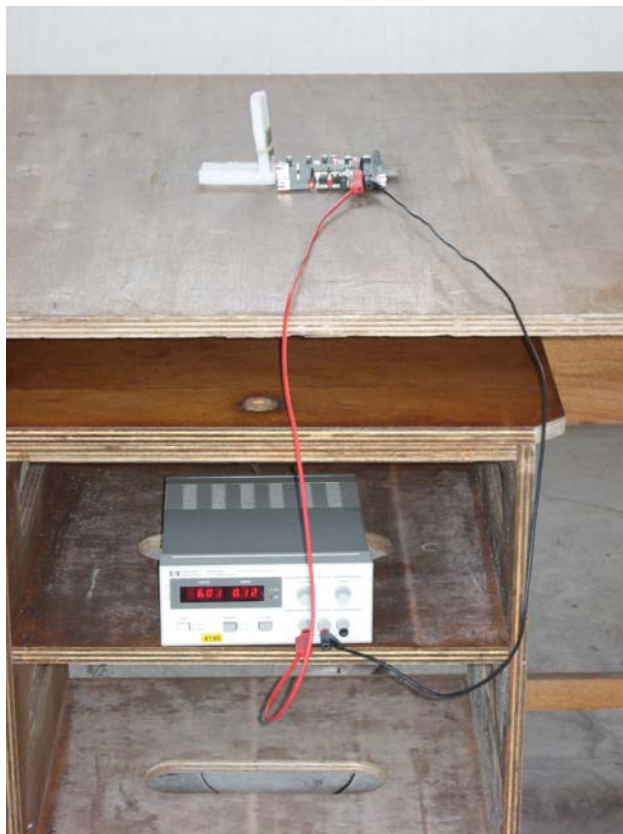
ANNEX 5: TEST SET UP AND OPEN AREA TEST SITE

TEST SET UP RADIATED MEASUREMENTS



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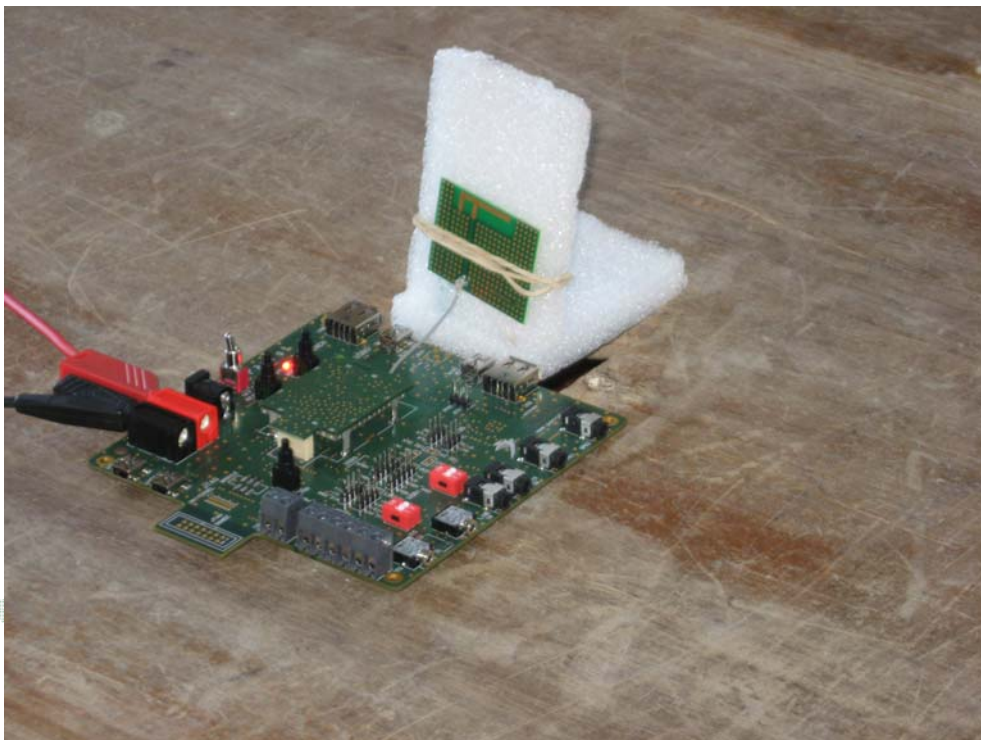
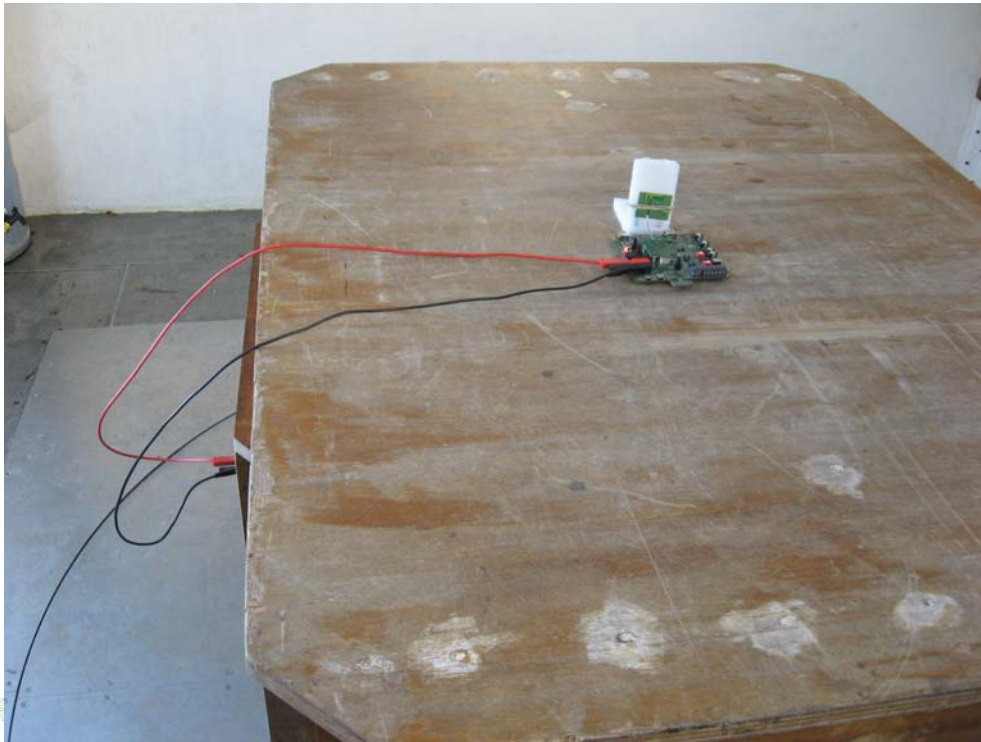
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TEST SET UP RADIATED MEASUREMENTS



Open area test site

