R051-24-10-105079-2/A Ed. 1

RADIO test report

according to standard:
FCC Part 15

Equipment under test:
Battletag: T-Blaster

FCC ID: ZEBTBLASTER1

Company:
UBISOFT

DISTRIBUTION: Mr SEYDOUX **Company: UBISOFT**

Number of pages: 22 including 3 annexes

Ed.	Date	Modified pages	Written by Name	Written by Visa	Technical Verification Quality Approval Name	Technical Verification Quality Approval Visa
0	3-Dec-10	Creation	L. BERTHAUD	LB	DUMESNIL M.	

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.

PRODUCT:	**Battletag**
Reference / model:	T-Blaster
Serial number:	not communicated
MANUFACTURER:	not communicated

COMPANY SUBMITTING THE PRODUCT:

Company:	UBISOFT
Address:	28 rue Armand Carrel 93108 MONTREUIL-SOUS-BOIS CEDEX FRANCE
Responsible:	Mr SEYDOUX
DATE(S) OF TEST:	27 and 28 October 2010 05 and 10 November 2010 09 December 2010
TESTING LOCATION:	EMITECH ATLANTIQUE laboratory at ANGERS (49) FRANCE EMITECH ATLANTIQUE open area test site in LA POUEZE (49) FRANCE FCC Registration Number: 101696/FRN: 0006 6490 08
TESTED BY:	L. BERTHAUD

CONTENTS

TITLE **PAGE**

1. INTRODUCTION

This document presents the result of RADIO test carried out on the following equipment: Battletag: T-Blaster in accordance with normative reference.

2. PRODUCT DESCRIPTION

ITU Emission code:	250KF7D
Class:	B (residential environment)
Utilization:	Infrared / RF gun
Antenna type and gain:	integrated PCB antenna, unknown gain
Operating frequency range:	From 915.3 MHz to 915.7 MHz
Number of channels:	3
Channel spacing:	200 kHz
Frequency generation:	Synthesizer
Modulation:	Frequency
Power source:	4 × 1.5V AA-LR6 batteries

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 (2009)	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.

4. TEST METHODOLOGY

Radio performance tests procedures given in 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 249: Operation within the bands 902-928 MHZ, 2400-2483.5 MHz, 5725-5850 MHz and 24.0-24.25 GHz.

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 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 §15.249 frequency bands	X				*Note 3*
	(c) 20 dB bandwidth and band-edge compliance	X				
FCC Part 15.249	OPERATION WITHIN THE BANDS 902-928 MHZ, 2400-2483.5 MHz, 5725-5850 MHz AND 24.0-24.25 GHz					
	(a) Fundamental and harmonics field strength	X				
	(b) Fixed point-to-point operation			X		
	(c) Measurement distance	X				
	(d) Out-of-band emissions	X				
	(e) Field strength limits above 1 GHz	X				
	(f) §15.37 (d) requirement			X		

NAp: Not Applicable NAs: Not Asked

Note 1: Integral PCB antenna.

Note 2: See FCC part 15.249 (d).

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

Conclusion:

The sample of Battletag: T-Blaster 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. RADIATED EMISSION LIMITS

Standard: FCC Part 15

Test procedure: paragraph 109

Limit class: Class B

Test equipments:

TYPE	BRAND	EMITECH NUMBER
Test receiver	Rohde & Schwarz ESH3	1058
Test receiver	Rohde & Schwarz ESVS10	1219
Spectrum analyzer	Rohde & Schwarz FSP40	4088
Loop antenna	EMCO 6502	1406
Biconical antenna	Hewlett Packard 11966 C	0728
Log periodic antenna	Rohde & Schwarz HL 223	1999
Double ridged guide antenna	Electrometrics EM 6961	1204
Preamplifier 1 to 18 GHz	DBS Microwave DB97-1852	2648
High pass filter	Micro-tronics HPM11630	6609
Open area test site	EMITECH	1274
Multimeter	Fluke 77-2	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 5000 MHz

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: 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 standby / reception mode.

Results:

Ambient temperature (°C): 19.5
Relative humidity (%): 60

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

Voltage at the beginning of test (V): 6.13
Voltage at the end of test (V): 6.07
Percentage of voltage drop during the test (%): 0.98

Not any spurious has been detected.

Applicable limits: for 30 MHz ≤ F < 88 MHz: 40 dBµV/m
88 MHz ≤ F < 216 MHz: 43.52 dBµV/m
216 MHz ≤ F < 960 MHz: 46.02 dBµV/m
Above 960 MHz: 53.98 dBµV/m

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

Test conclusion:

RESPECTED STANDARD

8. ADDITIONAL PROVISIONS TO THE GENERAL RADIATED EMISSION LIMITATIONS

Standard: FCC Part 15

Test procedure: Paragraph 15.215

Test equipments:

TYPE	MANUFACTURER	EMITECH NUMBER
Spectrum analyzer FSP 40	Rohde & Schwarz	4088
Spectrum analyzer FSP7	Rohde & Schwarz	6796
Double ridged guide antenna	Electrometrics EM 6961	1204
Multimeter	Fluke 77-2	0812

Test set up:

Test realized in near field. All field strength measurements are correlated with the radiated maximum peak output power.
The 20 dB bandwidth curves are given in annex 1.

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 (the software output power of the equipment is set to: 0 dBm).

Results:

Ambient temperature (°C): 21
Relative humidity (%): 36

Lower Band Edge: 902 MHz
Upper Band Edge: 928 MHz

Sample n°1:

Fundamental frequency (MHz)	Field Strength Level of fundamental (dBµV/m)	Detector (Peak or Average)	Frequency of maximum Band-edges Emission (MHz)	Delta Marker (dB)*	Calculated Max Out-of-Band Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
915.3	94	Peak	900.96	-51.5	42.5**	74	31.5
915.7	94	Peak	929.73	-50.2	43.8**	74	30.2

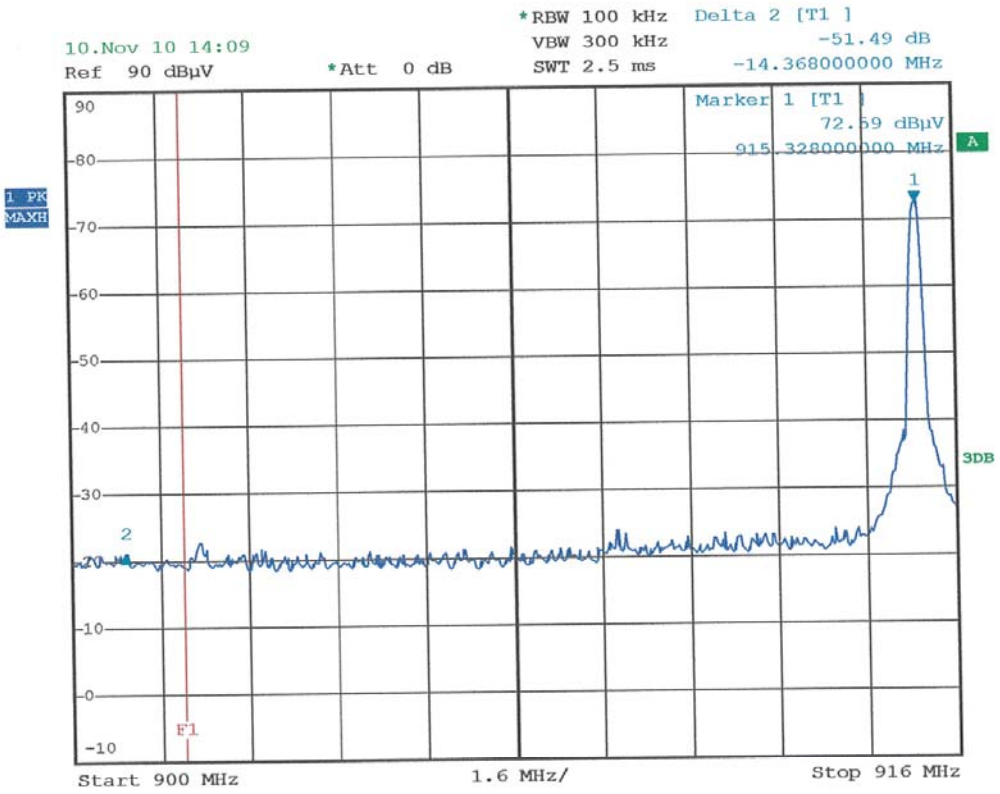
* *Marker-Delta method*
** *The peak level is lower than the average limit (54 dBµV/m).*

See Curve N° 1 and Curve N° 2 on the following pages.

Test conclusion:

RESPECTED STANDARD

CURVE N° 1.



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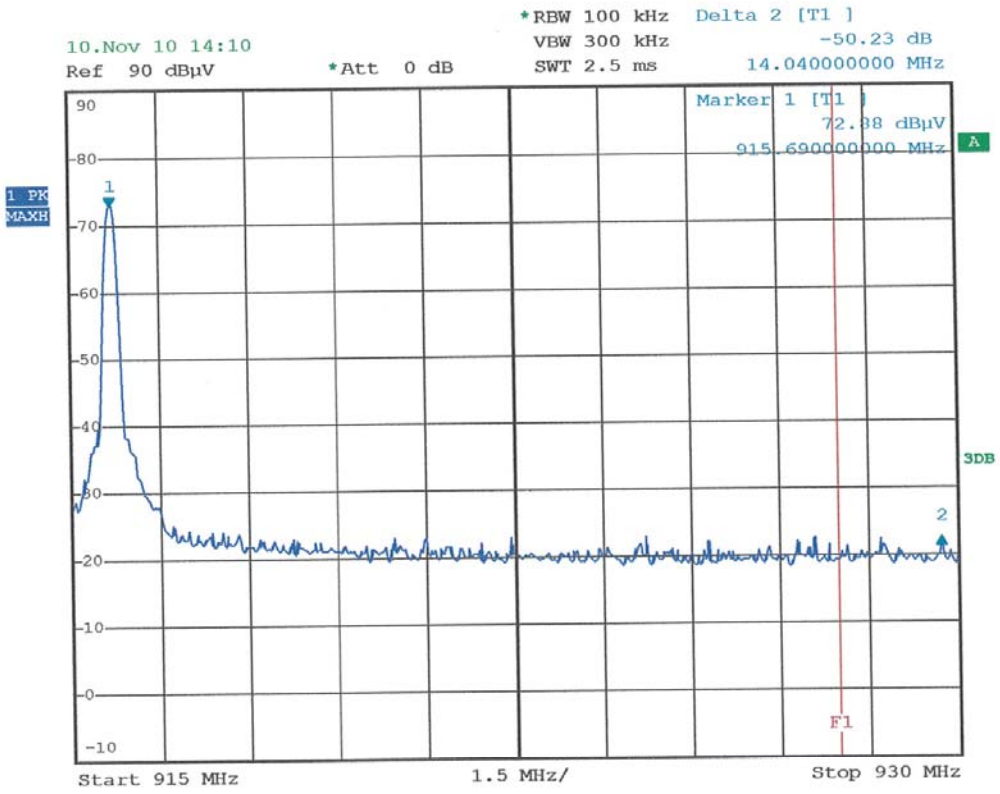
CURVE N° 2.



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9. FUNDAMENTAL AND HARMONICS FIELD STRENGTH

Standard: FCC Part 15

Test procedure: paragraph 15.249 (a)

Test equipments:

TYPE	BRAND	EMITECH NUMBER
Spectrum analyzer	Rohde & Schwarz FSP40	4088
Log periodic antenna	Rohde & Schwarz HL 223	1999
Double ridged guide antenna	Electrometrics EM 6961	1204
Open area test site	EMITECH	1274
Multimeter	Fluke 77-2	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 azimuth corresponds to the front of the equipment under test.
We use for this measure outdoor test site. 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.

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 (the software output power of the equipment is set to: 0 dBm).

Results:

Ambient temperature (°C): 19.5
Relative humidity (%): 60

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

Voltage at the beginning of the test (V): 6.13
Voltage at the end of the test (V): 6.07
Percentage of voltage drop (%): 0.98
Channel 1

FREQUENCIES (MHz)	Detector P: Peak QP: Quasi-Peak Av: Average	Antenna height (cm)	Azimuth (degree)	resolution bandwidth (kHz)	Polarization H: Horizontal V: Vertical	Field strength (dBµV/m)	Limits (dBµV/m)	Margin (dB)
915.31*	QP	130	115	120	H	94	94	0
1830.6	Av	150	0	1000	V	53.9	54	0.1
1830	P	150	0	1000	V	65.4	74	8.6
2746	Av	120	35	1000	V	27.8	54	26.2
2746	P	120	35	1000	V	41.8	74	32.2

Channel 2

FREQUENCIES (MHz)	Detector P: Peak QP: Quasi-Peak Av: Average	Antenna height (cm)	Azimuth (degree)	resolution bandwidth (kHz)	Polarization H: Horizontal V: Vertical	Field strength (dBµV/m)	Limits (dBµV/m)	Margin (dB)
915.51*	QP	130	115	120	H	94	94	0
1831	Av	155	0	1000	V	53.4	54	0.6
1831	P	155	0	1000	V	67.4	74	6.6
2746.6	Av	120	30	1000	V	26.3	54	27.7
2746.6	P	120	30	1000	V	40.9	74	33.1

Channel 3

FREQUENCIES (MHz)	Detector P: Peak QP: Quasi-Peak Av: Average	Antenna height (cm)	Azimuth (degree)	resolution bandwidth (kHz)	Polarization H: Horizontal V: Vertical	Field strength (dBµV/m)	Limits (dBµV/m)	Margin (dB)
915.71*	QP	130	115	120	H	94	94	0
1831.4	Av	150	0	1000	V	53.7	54	0.3
1831.4	P	150	0	1000	V	65.1	74	8.9
2747.1	Av	120	35	1000	V	27.2	54	26.8
2747.1	P	120	35	1000	V	41.4	74	32.6

* *Fundamental emission*

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

Test conclusion:

RESPECTED STANDARD

10. OUT-OF-BAND EMISSIONS

Standard: FCC Part 15

Test procedure: paragraph 15.205
paragraph 15.209
paragraph 15.249 (d)

Test equipments:

TYPE	BRAND	EMITECH NUMBER
Test receiver	Rohde & Schwarz ESH3	1058
Test receiver	Rohde & Schwarz ESVS10	1219
Spectrum analyzer	Rohde & Schwarz FSP40	4088
Loop antenna	EMCO 6502	1406
Biconical antenna	Hewlett Packard 11966 C	0728
Log periodic antenna	Rohde & Schwarz HL 223	1999
Double ridged guide antenna	Electrometrics EM 6961	1204
Preamplifier 1 to 18 GHz	DBS Microwave DB97-1852	2648
High pass filter	Micro-tronics HPM11630	6609
Open area test site	EMITECH	1274
Multimeter	Fluke 77-2	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 azimuth corresponds to the front of the equipment under test.

Frequency range: From 9 kHz to 10^{th} harmonic of the highest fundamental frequency.

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: 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 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 (the software output power of the equipment is set to: 0 dBm).

Results:

Ambient temperature (°C): 18.5
Relative humidity (%): 73

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

Voltage at the beginning of test (V): 6.09
Voltage at the end of test (V): 6.02
Percentage of voltage drop during the test (%): 1.15

Channel 1

FREQUENCIES (MHz)	Detector P: Peak QP: Quasi-Peak Av: Average	Antenna height (cm)	Azimuth (degree)	Polarization H: Horizontal V: Vertical	Field strength (dBµV/m)	Limits (dBµV/m)	Margin (dB)
707.3	QP	115	120	H	36.9	46	9.1
759.3	QP	100	120	H	37.9	46	8.1
902.3	QP	130	130	H	43.5	46	2.5

Channel 2

FREQUENCIES (MHz)	Detector P: Peak QP: Quasi-Peak Av: Average	Antenna height (cm)	Azimuth (degree)	Polarization H: Horizontal V: Vertical	Field strength (dBµV/m)	Limits (dBµV/m)	Margin (dB)
707.5	QP	115	115	H	36.9	46	9.1
759.5	QP	110	130	H	36.9	46	9.1
902.5	QP	125	135	H	43.4	46	2.6

Channel 3

FREQUENCIES (MHz)	Detector P: Peak QP: Quasi-Peak Av: Average	Antenna height (cm)	Azimuth (degree)	Polarization H: Horizontal V: Vertical	Field strength (dBµV/m)	Limits (dBµV/m)	Margin (dB)
707.7	QP	120	120	H	37	46	9
759.7	QP	110	150	H	36.5	46	9.5
902.7	QP	125	140	H	43.9	46	2.1

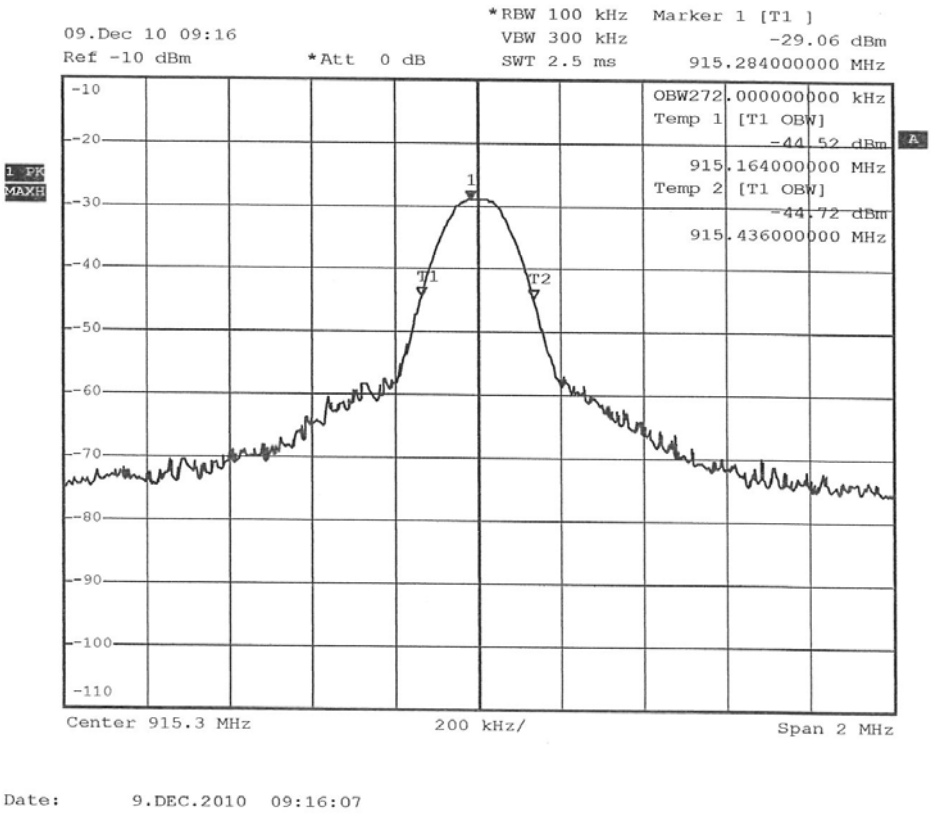
Note: any spurious which has more than 20 dB of margin compared to the applicable limit is not necessarily reported.

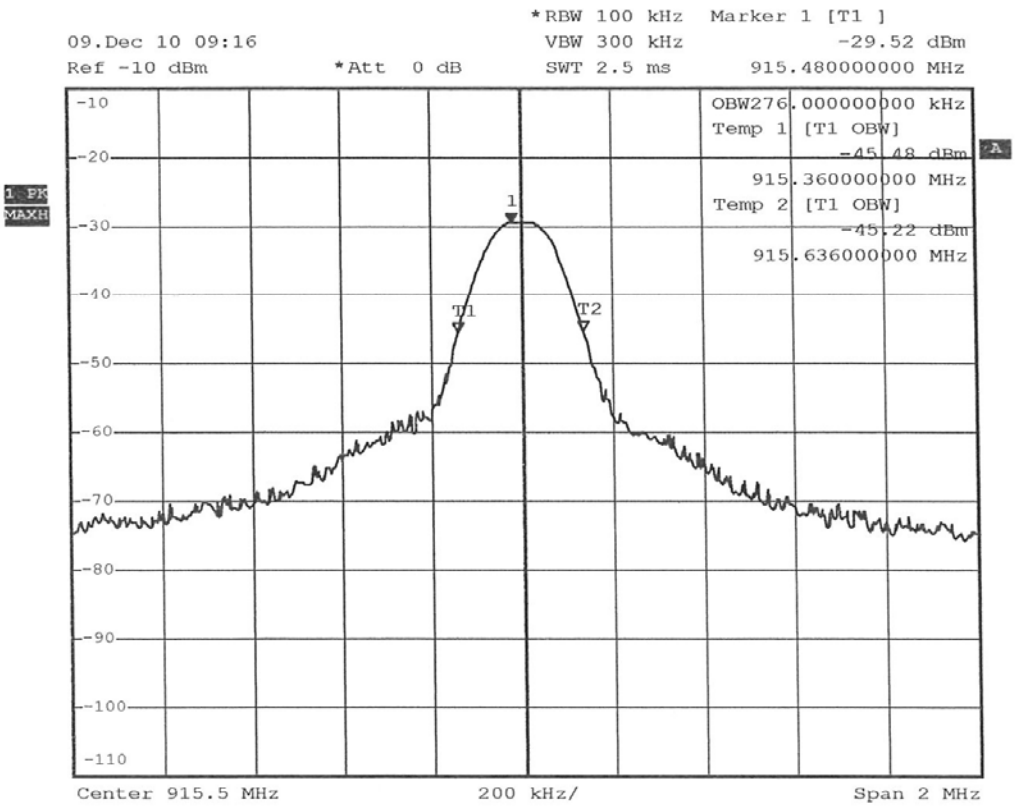
Test conclusion:

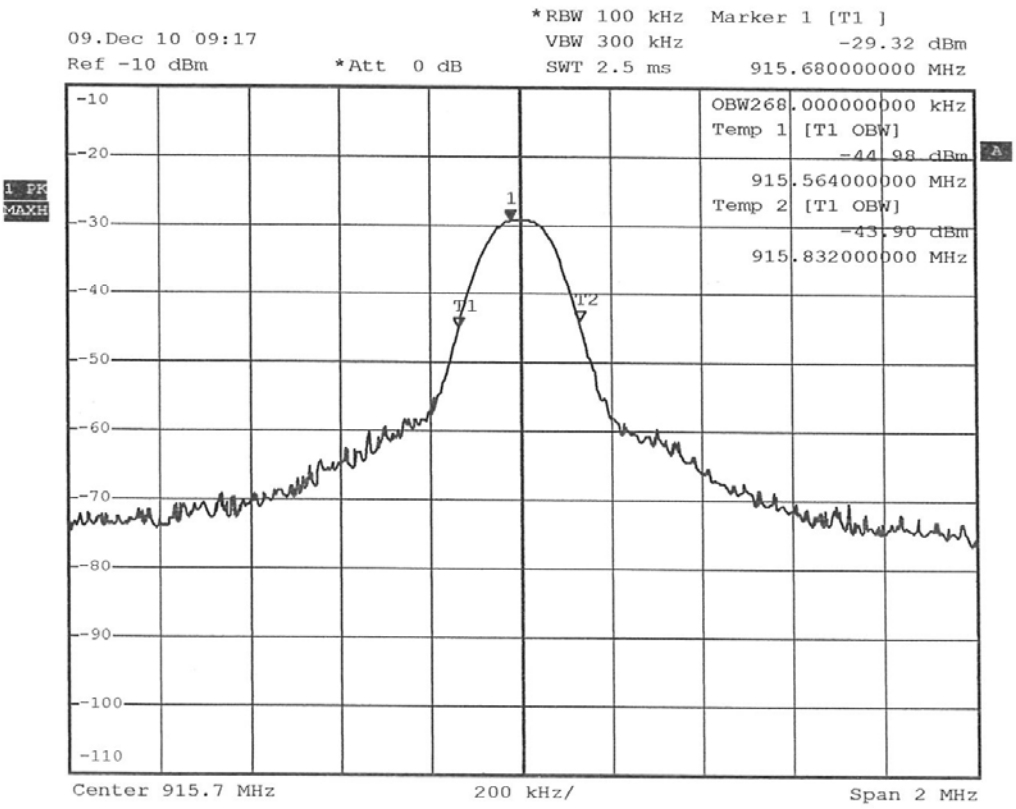
RESPECTED STANDARD

□□□ End of report, 3 annexes to be forwarded □□□

ANNEX 1: 20 dB BANDWIDTH




*RBW 100 kHz
Marker 1 [T1]
09.Dec 10 09:16
VBW 300 kHz
-29.52 dBm
Ref -10 dBm
*Att 0 dB
SWT 2.5 ms
915.480000000 MHz
OBW276.000000000 kHz
Temp 1 [T1 OBW]
-45.48 dBm
915.360000000 MHz
Temp 2 [T1 OBW]
-45.22 dBm
915.636000000 MHz
1 PK
MAXH
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
T1
T2
Center 915.5 MHz
200 kHz/
Span 2 MHz
Date: 9.DEC.2010 09:16:49



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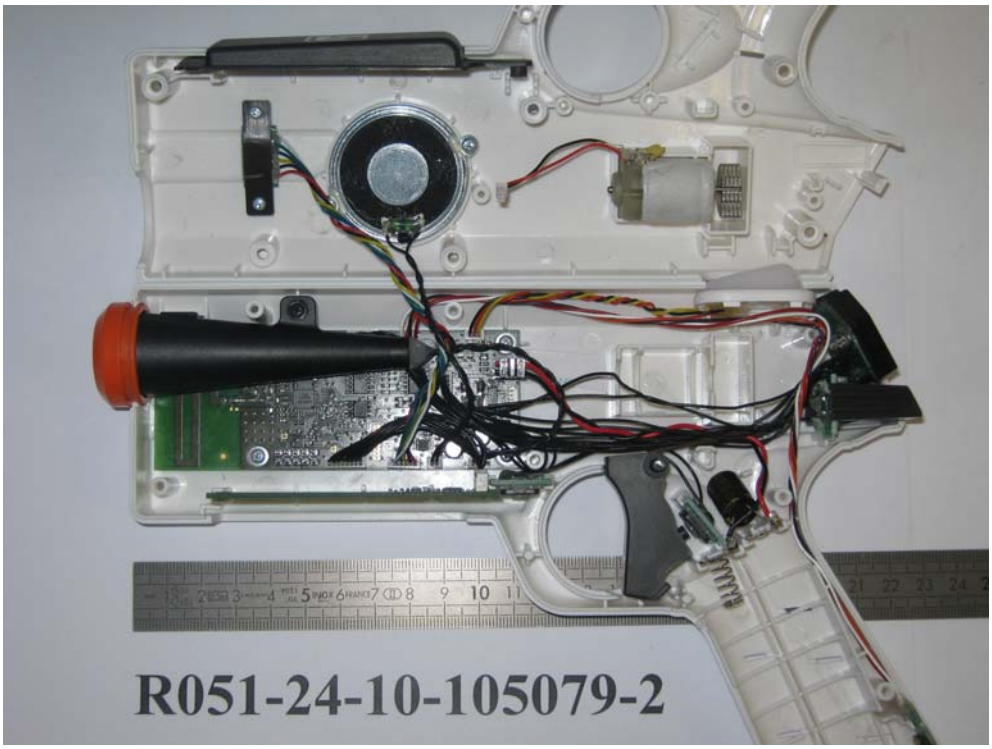
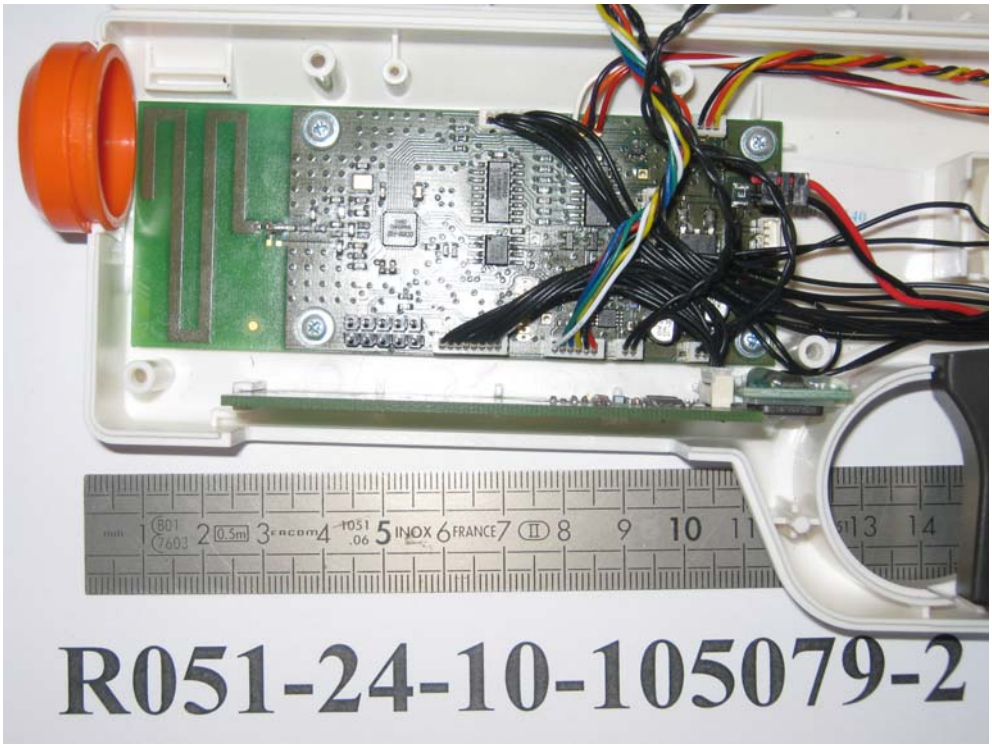
ANNEX 2: PHOTOS OF THE EQUIPMENT UNDER TEST

GENERAL VIEW

Internal view



Printed circuit board



ANNEX 3: TEST SET UP

RADIATED MEASUREMENTS

OPEN AREA TEST SITE