RR-030-M42-08-100663-3-A

"This report cancels and replaces the test report N°RR-030-M42-08-100663-3-A Edition 0"

RADIO test report

According to the standard:
FCC PART 15 : 2007

Equipment under test:
Robot SPYKE with WiFi link

Company:
MECCANO

DISTRIBUTION: Mr. THEODORE

(COMPANY: MECCANO)

Number of pages: 44 with 4 annexes

Ed.	Date	Modified page(s)	Written by Name	Visa	Technical Verification and Quality Name	Visa
1	16/10/08	2, 3, 24, 26, 27, 44 et 43	F. LHEUREUX	FL	L. PERSIDE	Perside

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TEST CERTIFICATION FOR:	FCC Certification
EQUIPMENT UNDER TEST:	Robot SPYKE
Reference:	-
Serial number:	000065
MANUFACTURER:	WAVESTORM
APPLICANT:	
Company:	MECCANO
Address:	73 rue Henri Barbusse 92110 CLICHY FRANCE
Product manager:	Mr THEODORE
DATES OF TESTS:	2008, the 27th, 28th and 31st of March 2008, the 7th and 8th of October
TESTS SITES:	Open area test site at AUNAINVILLE (28) - FRANCE Registration Number by FCC: 910701 Laboratory EMITECH of MONTIGNY-LE-BRETONNEUX (78) - FRANCE
TESTS OPERATOR:	F. LHEUREUX

Ed.1

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ANNEX 1: ANTENNAS FACTORS, INSERTION LOSSES AND AMPLIFIER VALUES

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1. *INTRODUCTION*

This report presents the results of Electromagnetic Compatibility tests performed on the equipment: "Robot SPYKE with WiFi link", according to reference document listed below.

2. *REFERENCE DOCUMENT*

FCC Part 15 : 2007
Code of Federal Regulations
Title 47 – Telecommunication
Chapter 1 – Federal Commission
Part 15 – Radio frequency devices

3. *PRODUCT DESCRIPTION*

ITU Emission code:	-
Class:	B (residential environment)
Utilization:	Robot with a WiFi link
Operating frequency range:	From 2402 MHz to 2480 MHz
Number of channels:	Limited to 11 channels
Channel spacing:	1 MHz
Frequency generation:	-
Modulation:	-
Power source:	9.6 Vdc (Battery)

Power level, frequency range and channels characteristics are not user adjustable.

4. *EQUIPMENT UNDER TEST (EUT) CONFIGURATION*

- See antenna factors, insertion losses and amplifier values in annex 1.
- See internal photographies in annex 2.
- See setup photographies in annex 3.

Modification of the equipment during the tests: No.

5. *TESTS AND CONCLUSION*

The following table summarizes test results of the EUT.

Test procedure	Designation of test	Test results				Comments
		Pass	Fail	N.A.	N.P.	
15.207	Measurement of conducted emission on AC mains ports	X				
15.247 (b) (3)	Maximum peak power measurement	X				
15.247 (b) (1)	RF exposure compliance			X		Note 1
15.247 (e)	Power spectral density measurement	X				
15.247 (a) (2)	6 dB bandwidth measurement	X				
15.247 (d)	Band edge measurement	X				
15.205 and 15.209	Unintentional radiated emissions in the band 30 MHz – 25 GHz	X				
15.247 (a) (1)	Hopping mode measurement			X		
15.247 (a) (1) (iii)	Hopping timing measurement			X		

N.A.: Not Applicable
N.P.: Not Performed

Note 1: This type of equipment uses less than 0.5 W

Conclusion:

The tested sample "Robot SPYKE with WiFi link " submitted to the tests complies with the requirements of the standard:

- FCC PART 15: 2007

According to the limits specified in this report.

6. *MEASUREMENT OF CONDUCTED EMISSION ON AC MAINS PORTS*

Standard: FCC Part 15: 2007

Section: 15.107 and 15.207

Test configuration:

The equipment under test (EUT) is operating on a non conductive test table at 0.8 m above the horizontal metal ground plane and at 0.4 m above the vertical metal ground plane.

The EUT is supplied through LISN (Line Impedance Stabilization Network) bonded to the ground reference plane.

Tested cable	Measure with	E.U.T. height (cm)
110 Vac power supply charger	LISN	80

Frequency band	Tested cable	Resolution bandwidth	Video bandwidth	Detection mode
150 kHz - 30 MHz	110 Vac power supply charger	10 kHz	30 kHz	Peak
150 kHz – 30 MHz	110 Vac power supply charger	10 kHz	30 kHz	Average

Test method deviation: None

Test configuration photographies:

Limit: The EUT must satisfy requirements of the standard for class B as shown in table below.

Frequency range (MHz)	Limit for class B (dBµV)	
	Quasi-peak	Average
0.15 to 0.5	66 - 56	56 - 46
0.5 to 5	56	46
5 to 30	60	50

Operating mode during the test:

The equipment under test is in load mode.

Instrumentation test list:

Nr Emitech	Category	Brand	Type
2808	Cable	Cables & Connectiques	N-4m
2812	Cable	Cables & Connectiques	N-2m
326	LISN	Rohde et Schwarz	ESH2-Z5
5331	Power supply	CHROMA	6415
2205	Spectrum analyzer	Agilent	E7405A
1804	Test enclosure	Emitech	JD
237	Transient limiter	Hewlett Packard	11947 A

Results:

Curve reference	Comments
Curves 1 and 2	Measurement of peak detection on wire 1 and 2
Curves 3 and 4	Measurement of average detection on wire 1 and 2

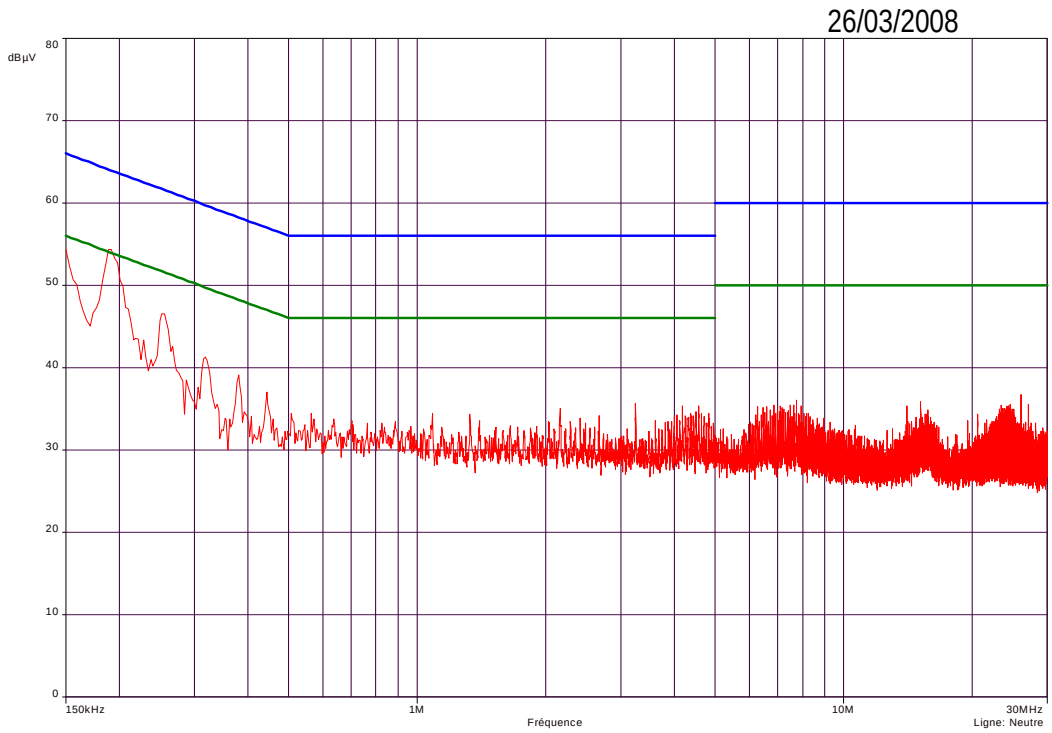
The equipment complies with the requirements of the FCC PART 15 : 2007.

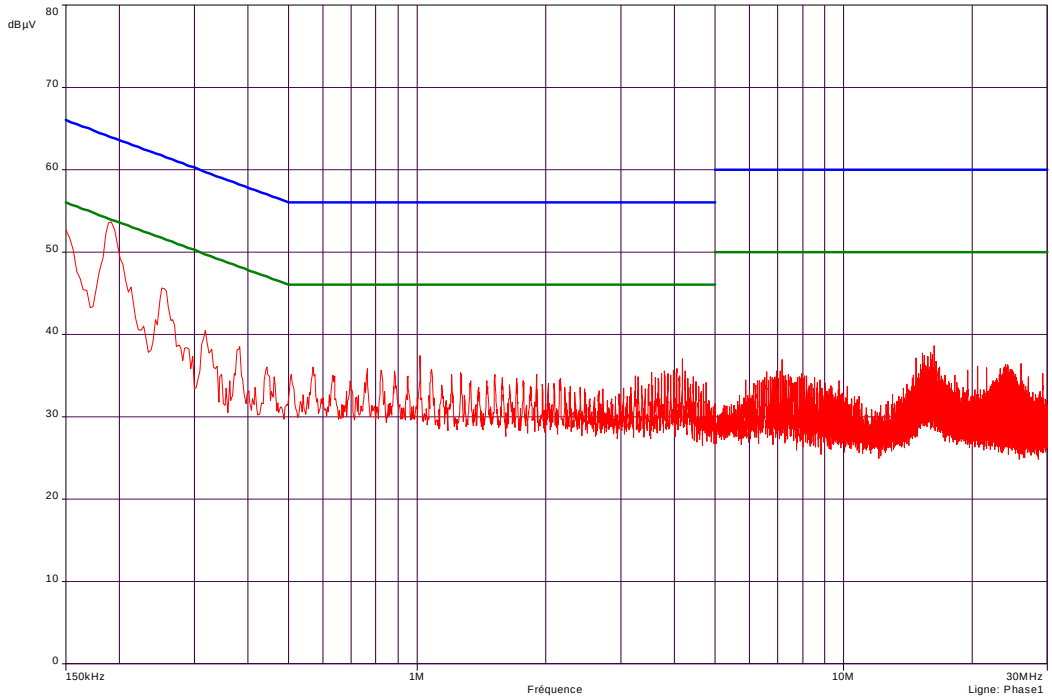
Curves 1 and 2

ROBOT SPYKE WITH WIFI LINK

CONDUCTED VOLTAGE EMISSION (MEASUREMENT)

Power supply 110 Vac / Peak detection / /in load mode.



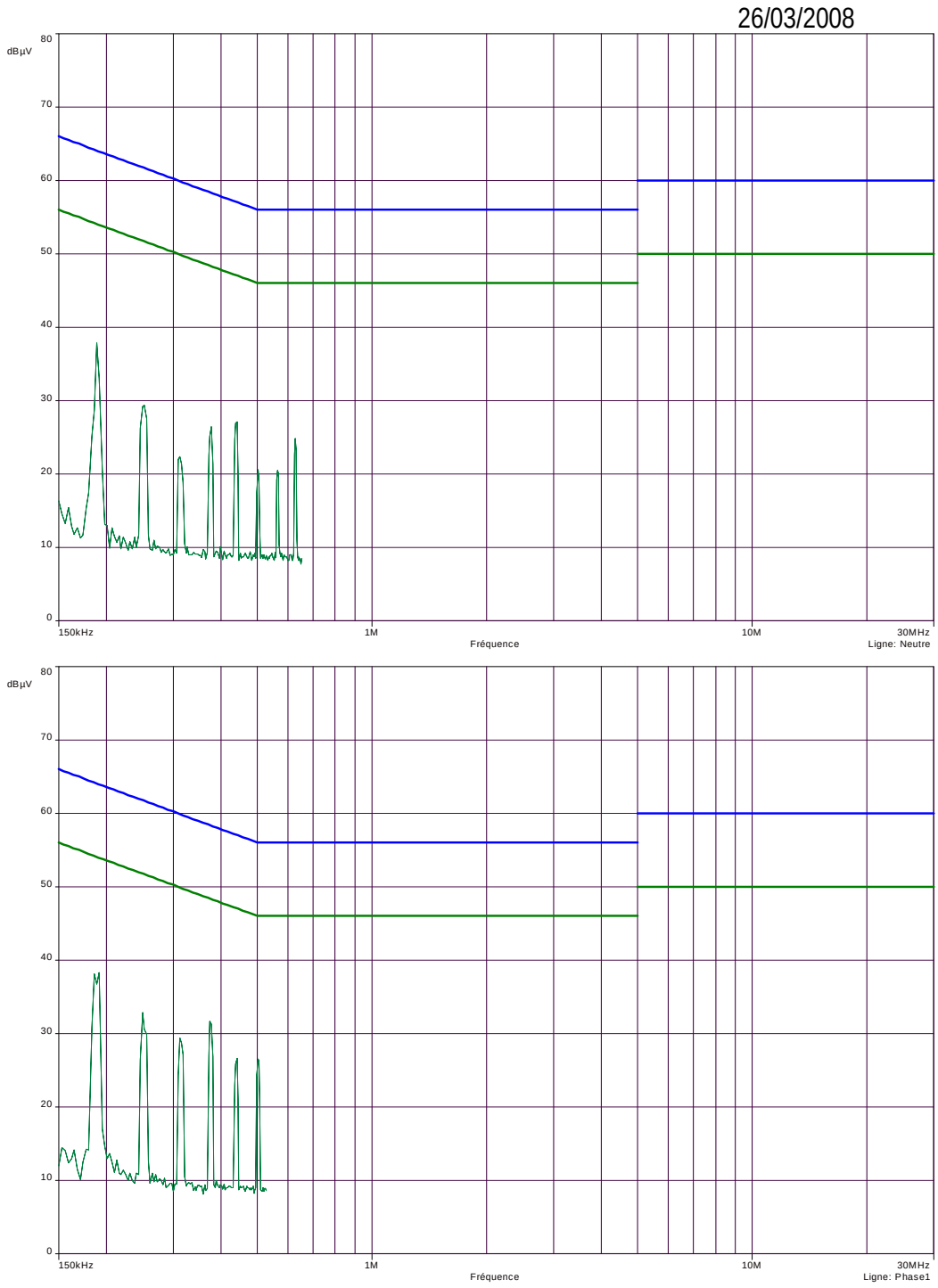


Class: B of the standard

ROBOT SPYKE WITH WIFI LINK

CONDUCTED VOLTAGE EMISSION (MEASUREMENT)

Power supply 110 Vac / Average detection / in load mode.



Class: B of the standard

7. *MAXIMUM PEAK POWER MEASUREMENT*

Standard: FCC PART 15: 2007

Section: 15.247 (b) (3)

Test procedure: Public Notice DA 00-705, alternative test procedure.

Test configuration:

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.

The level was maximised in antenna height, azimuth and polarization. The maximum level measured on the spectrum analyzer was recorded.

Distance of antenna: 3 meters.

Test equipment used:

Nr Emitech	Category	Brand	Type
3374	Antenna	Emco	Cornet 3115
2341	Antenna mast	HD GmbH	MA 240
2896	Cable	Cables & Connectiques	N-13m
1097	High pass filter	Trilithic	6HC1300-2.5-KK
2342	Mast controller	HD GmbH	HD 100
187	Open site	Emitech	Aunainville
5175	Spectrum analyzer	Rohde & Schwarz	R&S FSP40

Equipment under test operating condition:

EUT is in continuous transmission mode.

Measure conditions:

Ambient temperature (°C): 6
Relative humidity (%): 84

Power source: 9.6 Vd.c.

For RF peak level: Resolution bandwidth: 1 MHz
Video bandwidth: 1 MHz

Results:

Polarization of test antenna: horizontal (height: 125 cm, Az: 6°).

Channel 1 (2412.03 MHz) Curve 5

		Level dBµV	Cable loss dB	Antenna factor dB	Electro-magnetic field (dBµV/m)	P* (W)
Normal test conditions	Nominal power source (V): 12	74.14	3.6	28.2	105.94	7.455×10^{-3}

Channel 6 (2433.63 MHz) Curve 6

		Level dBµV	Cable loss dB	Antenna factor dB	Electro-magnetic field (dBµV/m)	P* (W)
Normal test conditions	Nominal power source (V): 12	74.04	3.6	28.2	105.84	7.285×10^{-3}

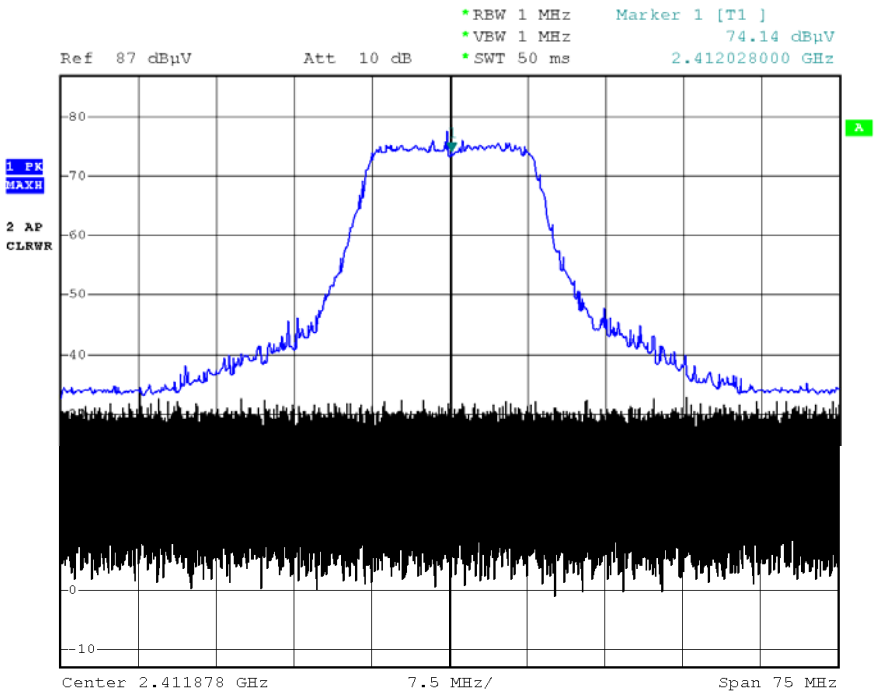
Channel 11 (2466.48 MHz) Curve 7

		Level dBµV	Cable loss dB	Antenna factor dB	Electro-magnetic field (dBµV/m)	P* (W)
Normal test conditions	Nominal power source (V): 12	72.73	3.6	28.2	104.53	5.388×10^{-3}

* $P = (E \times d)^2 / (30 \times Gp)$ with d = 3m and Gp = 1.58

Test conclusion: Complies with the requirements of the standard.

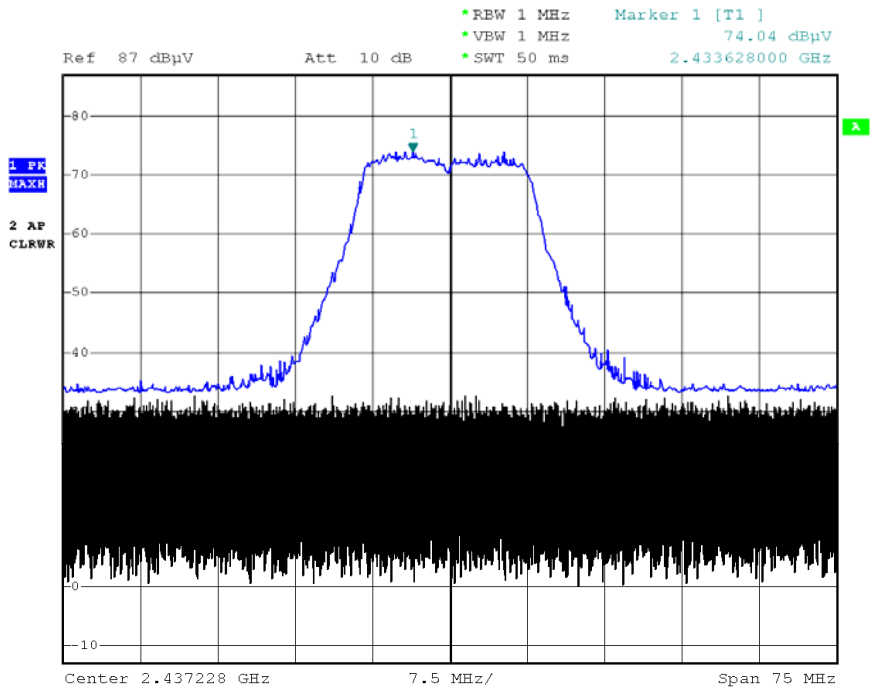
Curve 5



Maximum output power channel 1 PH

Date: 28.MAR.2008 09:57:24

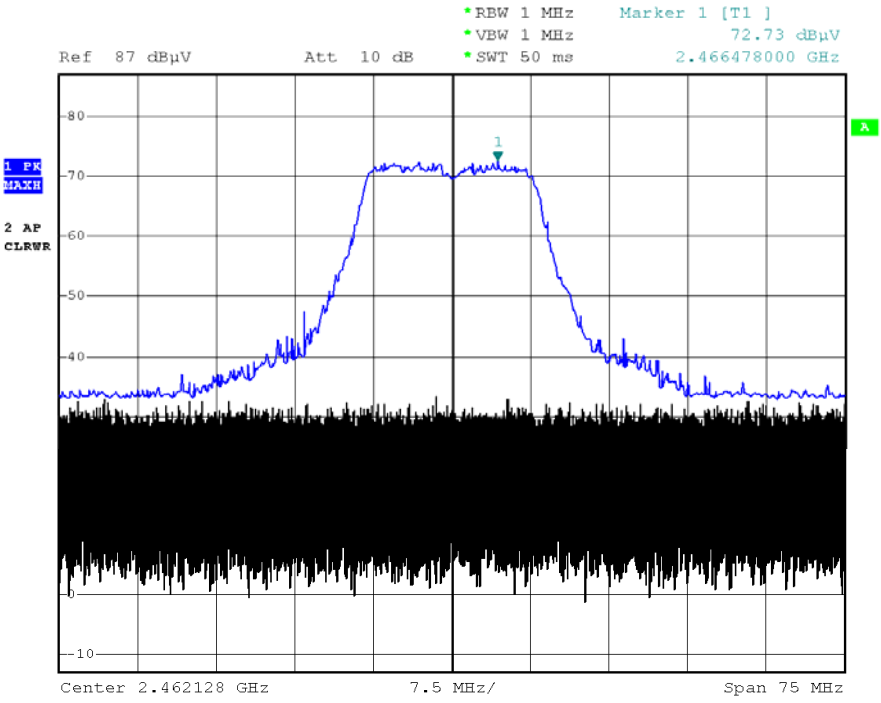
Curve 6



Maximum output power channel 6 PH

Date: 28.MAR.2008 10:01:59

Curve 7



Maximum output power channel 11 PH

Date: 28.MAR.2008 10:04:20

8. *POWER SPECTRAL DENSITY MEASUREMENT*

Standard: FCCC PART 15 : 2007

Section: 15.247 (e)

Test procedure: Public Notice DA 00-705, alternative test procedure.

Instrumentation test list:

Nr Emitech	Category	Brand	Type
3374	Antenna	Emco	3115
2341	Antenna mast	HD GmbH	MA 240
2896	Cable	Cables & Connectiques	N-13m
1097	High pass filter	Trilithic	6HC1300-2.5-KK
2342	Mast controller	HD GmbH	HD 100
187	Open site	Emitech	Aunainville
5175	Spectrum analyzer	Rohde & Schwarz	FSP40

Test configuration:

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.

The level was maximised in antenna height, azimuth and polarization. The maximum level measured on the spectrum analyzer was recorded.

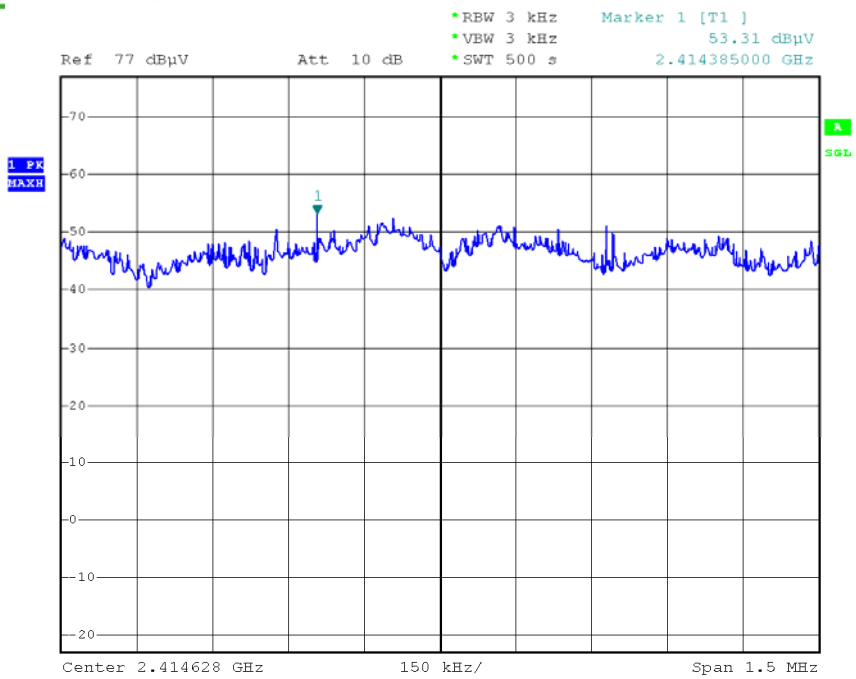
Measured condition: Resolution bandwidth: 3 kHz.
Video bandwidth: 3 kHz.
SPAN: 1.5 MHz.
Sweep: 500 seconds.
Ambient temperature C°: 6
Relative humidity (%): 84

Result:

Channel	Channel frequency (MHz)	RF power level (dBm)	Limit (dBm)	Curve reference
1	2414	- 12.10	8	Curve 8
6	2439	- 16.35	8	Curve 9
11	2458	- 14.87	8	Curve 10

Test conclusion: Respect the standard.

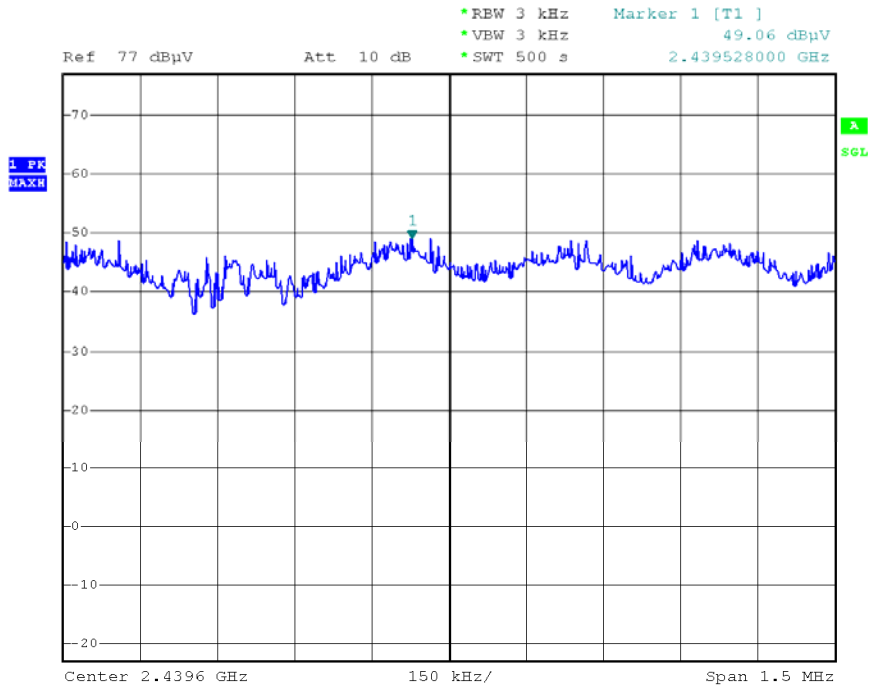
Curve 8



Power spectral density measurement channel 1 PH

Date: 28.MAR.2008 11:55:36

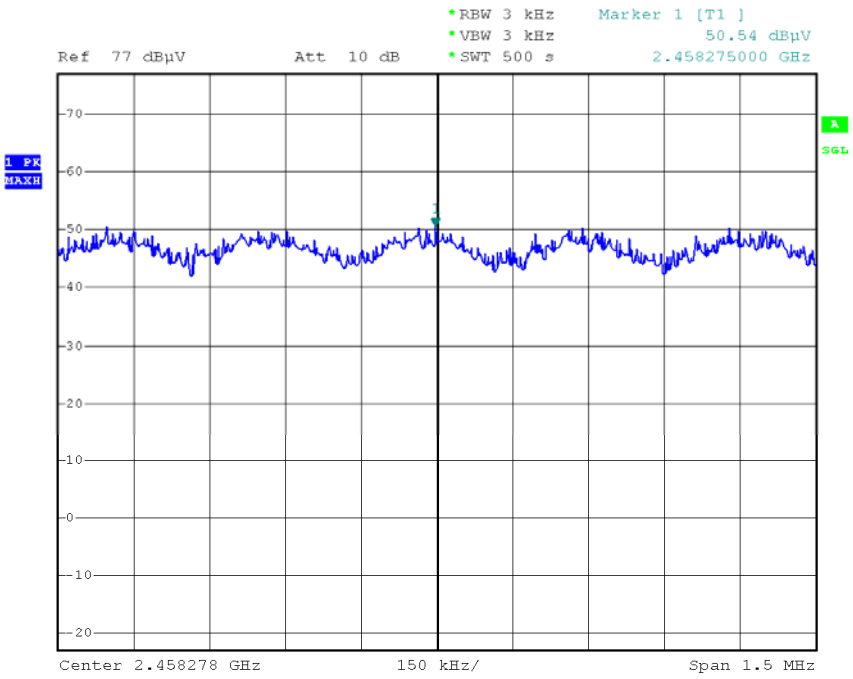
Curve 9



Power spectral density measurement channel 6 PH

Date: 28.MAR.2008 11:30:14

Curve 10



Power spectral density measurement channel 11 PH

Date: 28.MAR.2008 11:42:00

9. *6 dB BANDWIDTH MEASUREMENT*

Standard: FCC PART 15 : 2007

Section: 15.247 (a) (2)

Test configuration:

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.

The level was maximised in antenna height, azimuth and polarization.

The 6 dB bandwidth was recorded on spectrum analyzer.

Instrumentation test list:

Nr Emitech	Category	Brand	Type
3374	Antenna	Emco	3115
2341	Antenna mast	HD GmbH	MA 240
2896	Cable	Cables & Connectiques	N-13m
1097	High pass filter	Trilithic	6HC1300-2.5-KK
2342	Mast controller	HD GmbH	HD 100
187	Open site	Emitech	Aunainville
5175	Spectrum analyzer	Rohde & Schwarz	FSP40

Equipment under test operating condition:

EUT is in continuous transmission mode.

Measure condition:

Resolution bandwidth: 100 kHz
Video bandwidth: 100 kHz

Ambient temperature (°C): 9
Relative humidity (%): 75

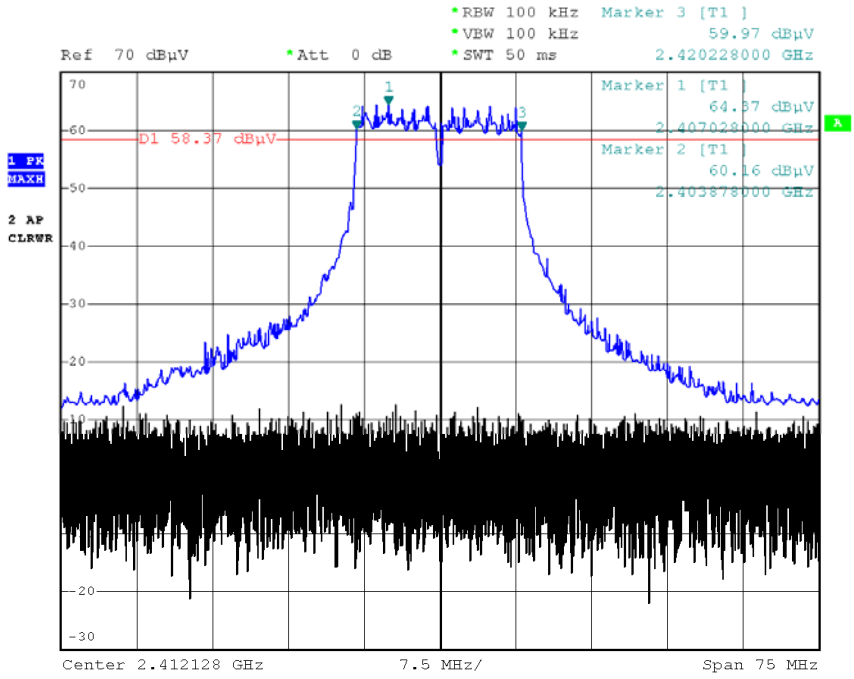
Results:

Polarization of test antenna: Horizontal (height: 100 cm, Az: 0°)

Channel frequency (MHz)	Limit (kHz)	6 dB bandwidth (MHz)	Curve reference
2412.03	> 500	16.35	Curve 11
2433.63	> 500	16.35	Curve 12
2466.48	> 500	16.65	Curve 13

Test conclusion: Complies with the requirements of the standard.

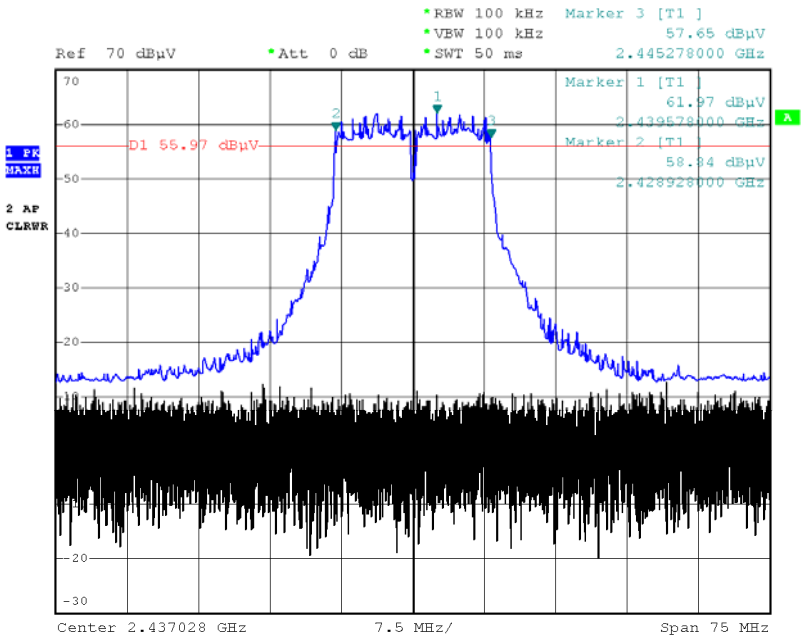
Curve 11



6 dB bandwidth channel 1

Date: 27.MAR.2008 16:25:20

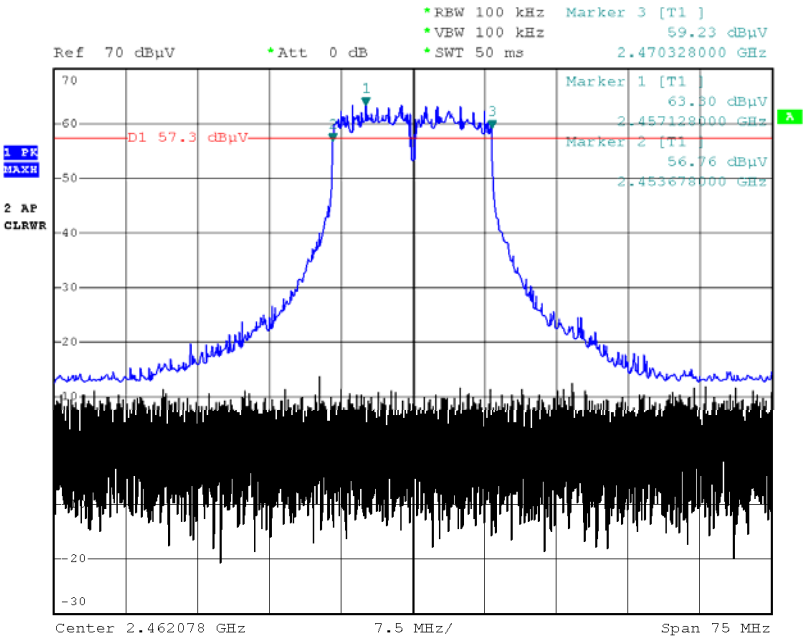
Curve 12



6 dB bandwidth channel 6

Date: 27.MAR.2008 16:21:43

Curve 13



6 dB bandwidth channel 11

Date: 27.MAR.2008 16:29:32

10. *BAND EDGE MEASUREMENT*

Standard: FCC PART 15 : 2007

Section: 15.247 (d)

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

Test configuration:

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.

The level was maximised in antenna height, azimuth and polarization. Then the level at 20 dB under the maximum level on the analyzer was recorded.

Distance of antenna: 3 meters.

Test equipment used:

Nr Emitech	Category	Brand	Type
3374	Antenna	Emco	3115
2341	Antenna mast	HD GmbH	MA 240
2896	Cable	Cables & Connectiques	N-13m
1097	High pass filter	Trilithic	6HC1300-2.5-KK
2342	Mast controller	HD GmbH	HD 100
187	Open site	Emitech	Aunainville
5175	Spectrum analyzer	Rohde & Schwarz	FSP40

Equipment under test operating condition:

EUT is in continuous transmission mode.

Measured condition:

Resolution bandwidth: 100 kHz Ambient temperature (°C): 6

Video bandwidth: 100 kHz Relative humidity (%): 84

Results:

Polarization of test antenna: horizontal (height: 125 cm, Az: 6°).

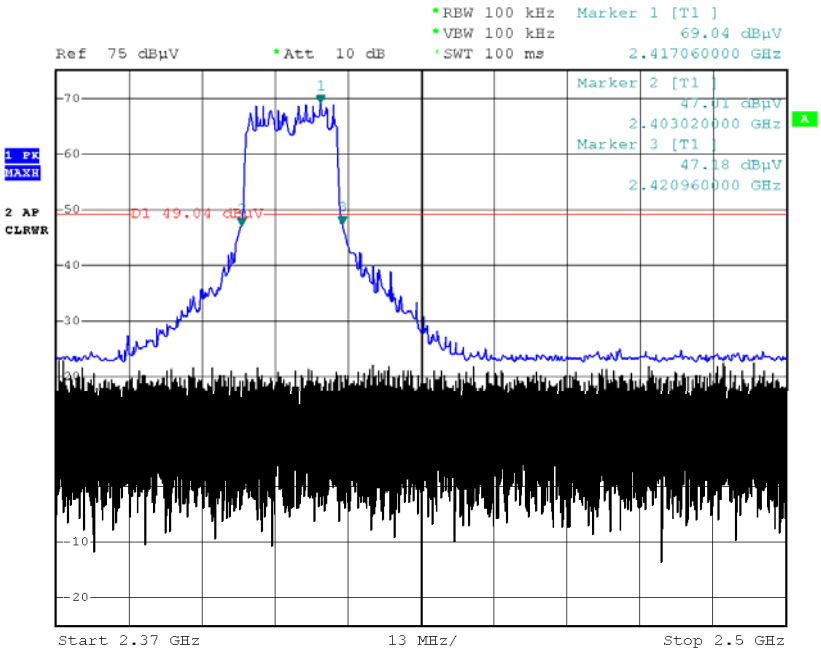
Lowest frequency limit: from 2310 MHz to 2390 MHz, curve n° 14
Upper Band Edge: from 2483.5 MHz to 2500 MHz, curve n° 15

Fundamental frequency (MHz)	Field Strength Level of fundamental (dBµV/m)	Detector	Frequency of maximum Band-edges Emission (MHz)	Delta Marker (dB)*	Calculated Max Out of Band Emission Level (dBµV/m)**	Limit (dBµV/m)	Margin (dB)
2412	97.79	Peak	2388.8	- 41.64	55.45	77.79	22.34
2466	94.95	Peak	2483.6	- 39.41	56.31	74.95	18.64

* 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

Test conclusion: Complies with the requirements of the standard.

Channel 1 *Curve 14*



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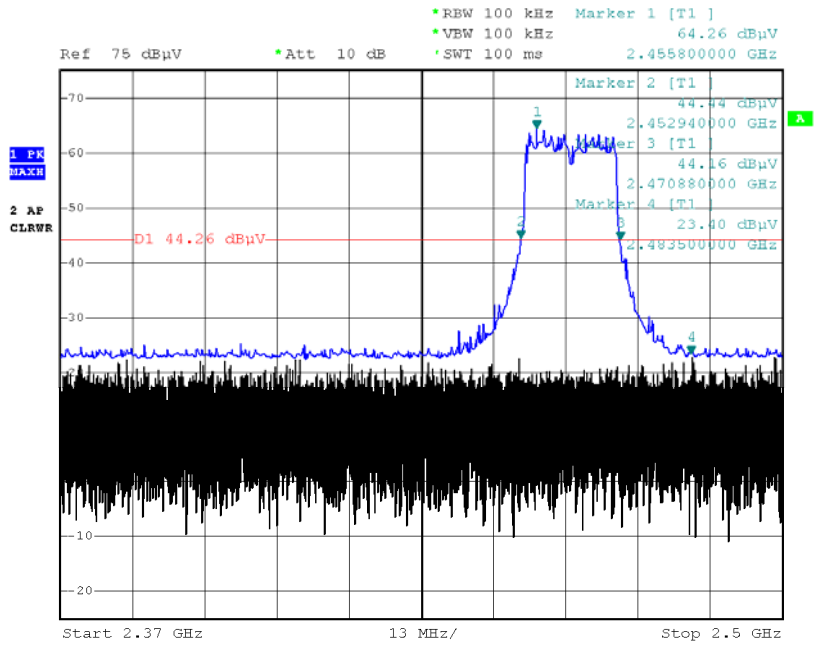
Channel 11 *Curve 15*



Date: 28.MAR.2008 14:37:44

11. *UNINTENTIONAL RADIATED EMISSIONS IN THE BAND 30 MHZ – 25 GHZ*

Standard: FCC PART 15: 2007

Sections: 15.205 and 15.209

Equipment under test arrangement:

The equipment under test (EUT) is placed on a non-conductive test table at 0.8 m above the horizontal metal ground plane.

For maximum meter reading at each frequency, the antenna height is adjusted between 1 m and 4 m above the ground plane. A 360 degrees rotation of the EUT is performed in vertical and horizontal polarization. The frequency azimuth and antenna height are presented in the table on the next pages.

The equipment is in continuous transmission on channel 6 in load mode.

Frequency range: 30 MHz – 1 GHz
1 GHZ – 25 GHz

Detection mode: Quasi-peak for 30 MHz – 1 GHz
Average for 1 GHz – 25 GHz

Resolution bandwidth: 120 kHz for 30 MHz – 1 GHz
1 MHz for 1 GHz – 25 GHz

Measurement distance: 3 meters

Limit: For restrictive bands (see paragraph 15.205), the EUT must satisfy requirements of the section 15.209 as shown in table below (for 3 m).

Frequency range (MHz)	Limit (dBµV/m)
30 to 88	40.0
88 to 216	43.5
216 to 960	46.0
960 to 25000	54.0

Ed.1 | Limit for peak detection: 74 dBµV/m.

Instrumentation tests list:

Nr Emitech	Category	Marque	type
3106	Antenna	Schwarzbeck	UHALP 9108
3374	Antenna	Emco	3115
2341	Antenna mast	HD GmbH	MA 240
1144	Biconical antenna	Schwarzbeck	VHBA 9123
2450	Cable	Cables & Connectiques	HF 12m
2451	Cable	Cables & Connectiques	HF 2m
2452	Cable	Cables & Connectiques	HF 13m
2896	Cable	Cables & Connectiques	N-13m
1097	High pass filter	Trilithic	6HC1300-2.5-KK
1529	High pass filter	Trilitic	5EHLX500-3-KK
4691	High pass filter	Micro-tronics	5175
2342	Mast controller	HD GmbH	HD 100
187	Open site	Emitech	Aunainville
2102	Power supply	Secas	CF1000 50/60
3229	Preamplifier	Miteq	AMF-6D-010250-70-7P
1057	Receiver	Rohde & Schwarz	ESVP
1216	Receiver	Rohde & Schwarz	ESVS10
5175	Spectrum analyzer	Rohde & Schwarz	FSP40

Results:

Mode	Frequency (MHz)	Polarization	Antenna height (cm)	Azimuth (degrees)	Measurement (dBµV/m)	Limit (dBµV/m)	Margin (dB)
In load + WiFi standby	38.451	Vertical	100	30	29.5	74.0	54.5
	148.461	Vertical	100	250	37.2	74.0	32.9
	182.018	Vertical	100	320	38.5	74.0	35.5
	324.014	Vertical	100	0	31.2	46.0	14.8
	500.020	Vertical	220	0	41.3	74.0	32.7
	38.451	Horizontal	278	50	27.5	74.0	46.5
	148.461	Horizontal	344	60	36.8	74.0	37.2
	182.018	Horizontal	170	240	43.8	74.0	30.2
	500.004	Horizontal	200	240	50.1	74.0	29.9
	600.025	Horizontal	171	0	43.0	74.0	31.0
In transmission mode on channel 6	84.008	Vertical	100	60	25.3	74.0	48.7
	144.018	Vertical	100	120	17.3	74.0	56.7
	168.018	Vertical	100	30	29.3	43.5	14.2
	182.014	Vertical	260	90	31.6	74.0	42.4
	324.015	Vertical	150	10	32.0	46.0	14.0
	500.020	Vertical	220	0	45.2	74.0	28.7
	522.018	Vertical	100	0	38.0	74.0	36.0
	84.008	Horizontal	400	180	19.5	74.0	54.5
	144.018	Horizontal	100	290	10.3	74.0	63.7
	168.018	Horizontal	306	80	21.9	43.5	21.6
	182.014	Horizontal	390	290	22.2	74.0	51.8
	324.026	Horizontal	100	300	31.1	46.0	14.9
	500.004	Horizontal	200	240	52.4	74.0	21.6
	600.025	Horizontal	175	0	50.0	74.0	24.0

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Mode	Frequency (MHz)	Polarization	Antenna height (cm)	Azimuth (degrees)	Measurement (dBµV/m)	Limit (dBµV/m)	Margin (dB)
In transmission mode on channel 1	71.951	Vertical	100	160	33.1	74.0	40.9
	143.999	Vertical	100	110	29.3	74.0	44.7
	147.850	Vertical	100	160	32.7	74.0	41.3
	168.002	Vertical	100	100	30.0	43.5	13.5
	180.001	Vertical	100	120	30.0	74.0	44.0
	300.005	Vertical	142	180	35.0	74.0	39.0
	324.004	Vertical	164	320	28.0	46.0	18.0
	456.008	Vertical	105	0	24.5	74.0	49.5
	500.000	Vertical	210	50	49.3	74.0	24.7
	528.010	Vertical	100	20	35.0	74.0	39.0
	600.000	Vertical	100	290	37.2	74.0	36.8
	71.951	Horizontal	253	290	23.0	74.0	51.0
	143.999	Horizontal	110	300	21.0	74.0	53.0
	147.850	Horizontal	110	290	26.0	74.0	48.0
	168.002	Horizontal	175	110	26.4	43.5	17.1
	180.001	Horizontal	176	260	31.2	74.0	42.8
	300.005	Horizontal	110	110	41.7	74.0	32.3
	324.004	Horizontal	100	80	26.7	46.0	19.3
	456.008	Horizontal	100	90	26.5	74.0	47.5
	500.000	Horizontal	200	280	54.5	74.0	19.5
	528.010	Horizontal	186	0	31.9	74.0	42.1
	600.000	Horizontal	175	160	47.7	74.0	26.3
	1694.00	Horizontal	158	0	49.7	54.0	4.3

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Mode	Frequency (MHz)	Polarization	Antenna height (cm)	Azimuth (degrees)	Measurement (dBµV/m)	Limit (dBµV/m)	Margin (dB)
In transmission mode on channel 11	72.062	Vertical	127	180	27.4	74.0	46.6
	131.998	Vertical	105	100	27.1	43.5	16.4
	144.000	Vertical	105	90	29.0	74.0	45.0
	147.871	Vertical	100	290	32.3	43.5	41.7
	168.002	Vertical	100	90	28.6	74.0	14.9
	180.005	Vertical	100	300	29.0	74.0	45.0
	324.007	Vertical	160	310	29.1	46.0	16.9
	500.000	Vertical	210	70	48.4	74.0	25.6
	528.010	Vertical	100	20	36.0	74.0	38.0
	600.008	Vertical	100	300	38.0	74.0	36.0
	72.062	Horizontal	235	300	19.2	74.0	54.8
	144.000	Horizontal	100	260	20.2	74.0	53.8
	147.871	Horizontal	100	290	26.9	74.0	47.1
	180.005	Horizontal	185	260	30.4	74.0	43.6
	324.007	Horizontal	100	90	26.6	46.0	19.4
	500.000	Horizontal	197	270	53.8	74.0	20.2
	528.010	Horizontal	194	0	32.3	74.0	41.7
	600.008	Horizontal	173	160	48.0	74.0	26.0
	1690.00	Horizontal	158	0	49.7	54.0	4.3

No frequencies are observed between 1 GHz and 25 GHz for both polarizations in load mode.

Test conclusion:

The equipment complies with the requirements of the standard FCC PART 15.205 and 15.209 : 2007.

□□□ *End of report, 4 annexes to be forwarded* □□□

ANNEX 1:

ANTENNA FACTORS, INSERTION LOSSES AND AMPLIFIER VALUES

BILL OF MATERIAL

The test antenna used for the radiated emission between 30 MHz and 300 MHz is the biconical antenna n°1144. Antenna factors are given in table 1.

The test antenna used for the radiated emission between 300 MHz and 1 GHz is the log-periodic antenna n°3106. Antenna factors are given in table 2.

The measuring receiver n°1057 used in the frequency range 30 MHz to 1 GHz has an integrated preamplifier.

The test cable used between 30 MHz and 1 GHz to connect the antennas to the receiver for measurements at a distance of 3 meters has losses given in table 3.

The test antennas used for the radiated emission between 1 GHz and 25 GHz are the horn antenna n°3374 and 1045. Antenna factors are given in table 4 and 5.

The amplifier n°3229 and its cable used to connect the spectrum analyzer to the test cable has gain values given in the table 6.

The test cable used between 1 GHz and 25 GHz to connect the horn antenna to the amplifier for measurements at a distance of 3 meters has losses given in table 7.

Frequency (MHz)	Antenna factor (dB/m)	Frequency (MHz)	Antenna factor (dB/m)
30	12.6	120	11.4
35	11.2	-	-
40	9.6	140	11.2
45	8.7	-	-
50	8.7	160	12.5
60	8.7	-	-
70	8.7	180	13.3
80	8.6	200	14.7
90	9.5	-	-
100	10.5	-	-

TABLE 1 : BICONICAL ANTENNA

Frequency (MHz)	Antenna factor (dB/m)	Frequency (MHz)	Antenna factor (dB/m)
200	23.6	-	-
300	14.3	700	20.4
400	16.1	800	20.6
500	17.4	900	21.7
600	18.6	1000	22.0

TABLE 2 : LOG-PERIODIC ANTENNA

Frequency (MHz)	loss (dB)	Frequency (MHz)	loss (dB)
30	0.9	150	2.3
35	1.1	160	2.4
40	1.1	180	2.5
45	0.9	200	2.6
50	1.3	250	3.1
60	1.4	300	3.4
70	1.5	400	4.2
80	1.5	500	4.9
90	1.7	600	5.5
100	1.7	700	6.0
120	2.0	800	6.6
125	1.9	900	7.2
140	2.2	1000	7.9

TABLE 3 : TEST CABLE FOR 3M MEASUREMENT INTO 30MHz and 1GHz

Frequency (GHz)	Antenna factor (dB/m)	Frequency (GHz)	Antenna factor (dB/m)	Frequency (GHz)	Antenna factor (dB/m)
1.0	23.4	7.0	35.3	14	41.6
1.5	25.5	7.5	36.5	15	40.9
2.0	26.8	8.0	36.7	16	37.3
2.5	29.0	8.5	37.5	17	39.9
3.0	29.9	9.0	37.8	18	47.4
3.5	31.1	9.5	37.7	18	31.4
4.0	32.6	10.0	37.8	19	31.7
4.5	32.3	10.5	37.9	20	32.8
5.0	33.3	11.0	38.2	21	32.0
5.5	34.1	11.5	38.6	22	32.7
6.0	34.1	12.0	39.1	23	32.4
6.5	33.9	13	39.6	24	32.6

TABLE 4 : HORN ANTENNA 3374 (1 to 18 GHz) and 1045 (18 to 25 GHz)

Frequency (GHz)	Gain value (dB)	Frequency (GHz)	Gain value (dB)	Frequency (GHz)	Gain value (dB)
1.0	24.3	7.0	19.6	14	16.8
1.5	23.6	-	-	15	13.3
2.0	22.3	8.0	18.3	16	9.8
2.5	20.9	-	-	17	11.0
3.0	19.1	9.0	16.2	18	11.1
-	-	-	-	20	5.4
4.0	17.1	10.0	15.0	22	1.4
-	-	-	-	-	-
5.0	17.7	11.0	15.1	-	-
-	-	-	-		
6.0	18.2	12.0	15.9		
-	-	13.0	17.5		

TABLE 5 : AMPLIFIER (1 – 26 GHz)

Frequency (GHz)	loss (dB)	Frequency (GHz)	loss (dB)	Frequency (GHz)	Loss (dB)
1.0	2.4	4.5	5.2	18	11.2
1.5	2.9	5	5.6	21	13.3
2.0	3.5	6	6.2	24	14.9
2.5	3.9	8	7.2		
3.0	4.2	10	8.2		
3.5	4.6	12	9.0		
4.0	5.0	15	10.2		

TABLE 6: TEST CABLE FOR 3 M MEASUREMENT

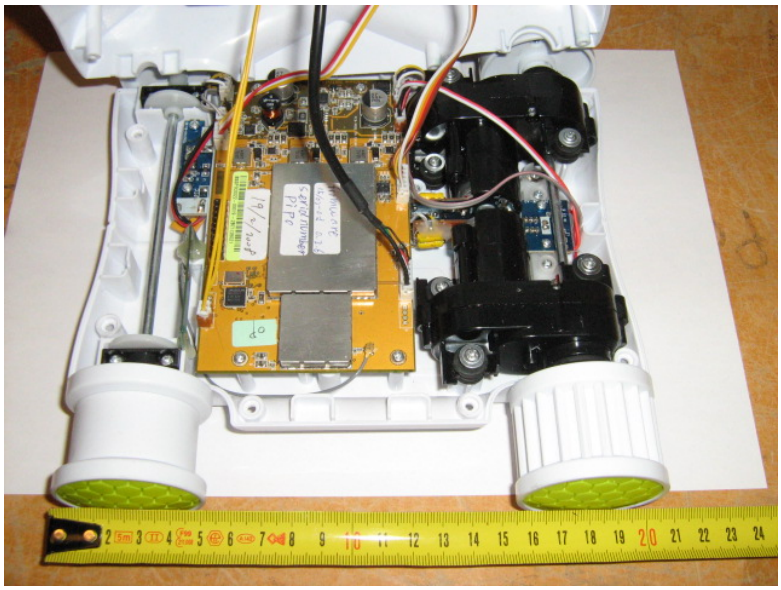
ANNEX 2

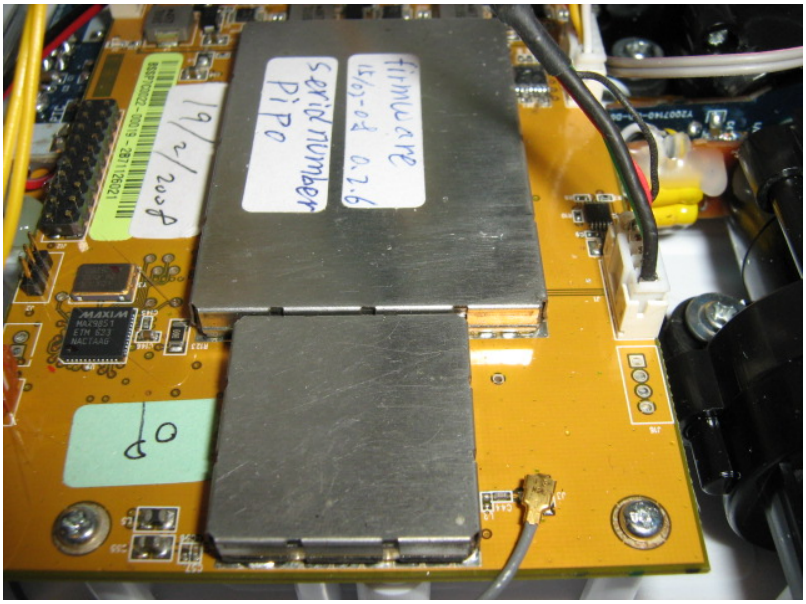
EXTERNAL AND INTERNAL PHOTOGRAPHIES

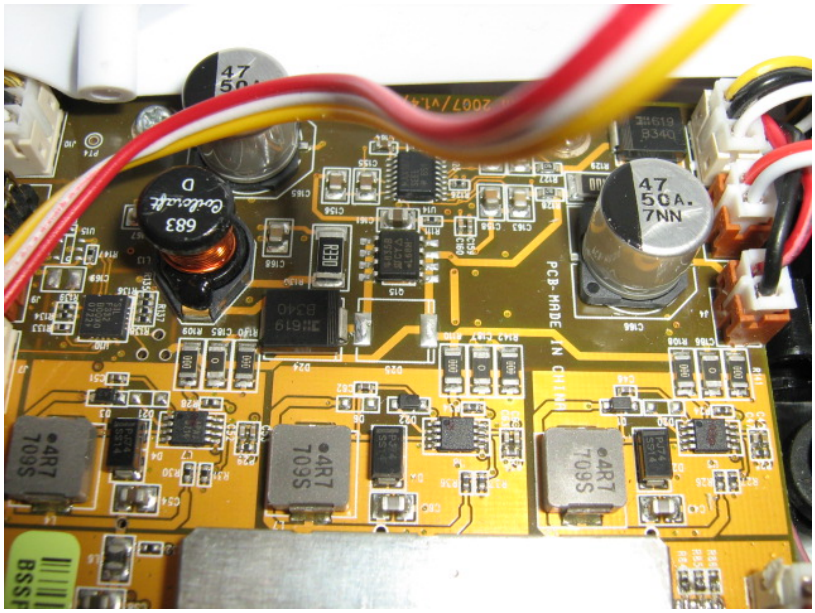
EQUIPMENT UNDER TEST (EUT) PHOTOGRAPHIES

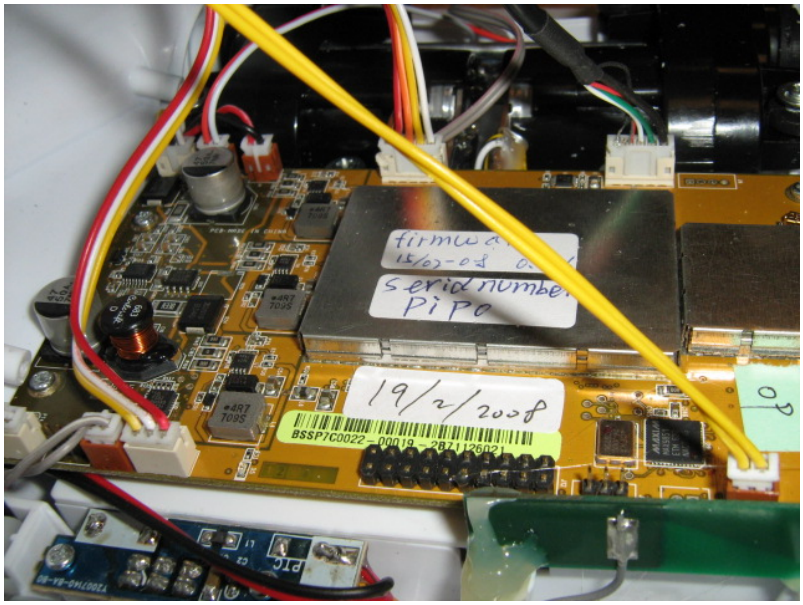
Robot SPYKE with WiFi link

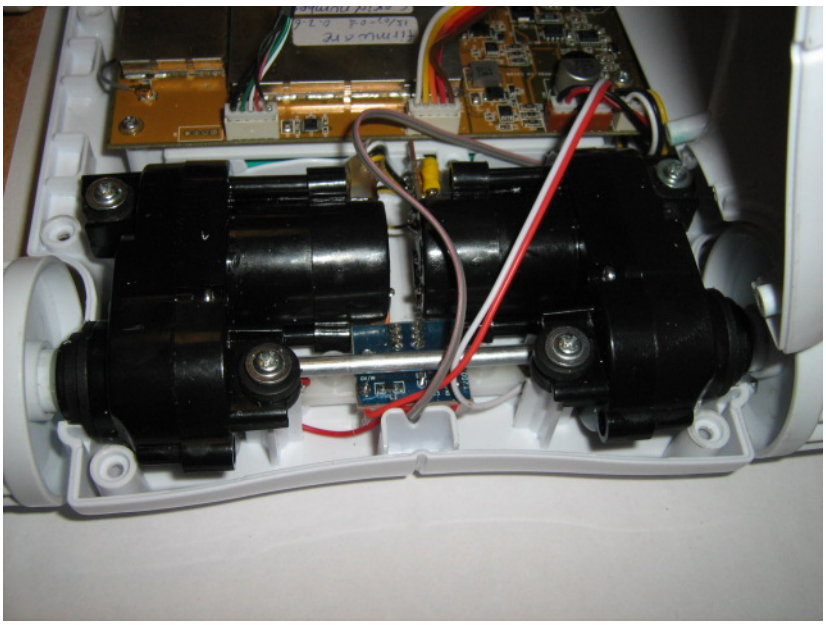

KINGS
MODEL: KSS15-135-1000
EINGANG/INPUT:100-240V~50-60Hz 500mA
AUSGANG/OUTPUT:13.5VDC 1000mA
N136
Q 060581
CONFORMS TO
ANSI/UL
STD.60950-1-2002
CERTIFIED TO
CAN/CSA STD.
C22.2 No. 60950-1-03
3028505
Made in China
Nur für Geräte der Informationstechnik
For Office Equipment Use Only

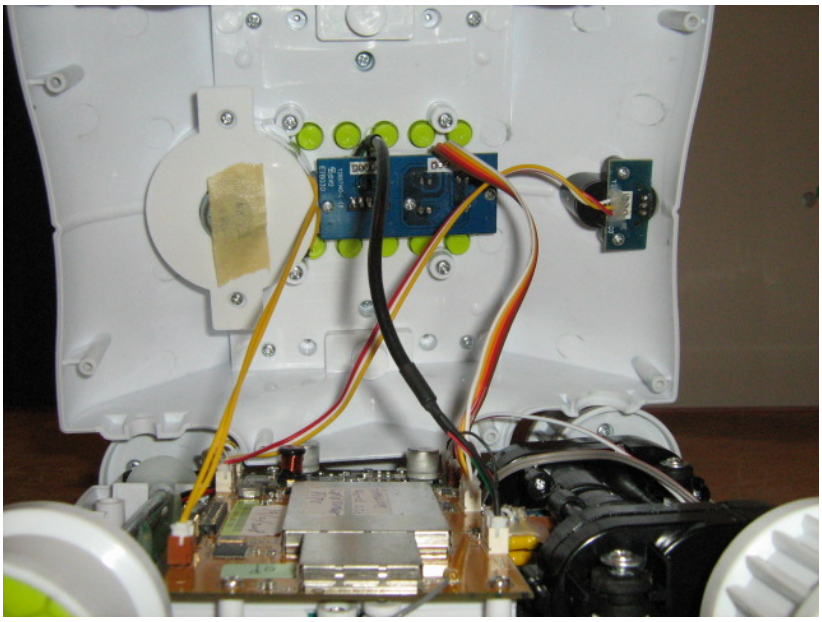



19/2/2008
Serial number
PiPo


PCB- MADE IN CHINA

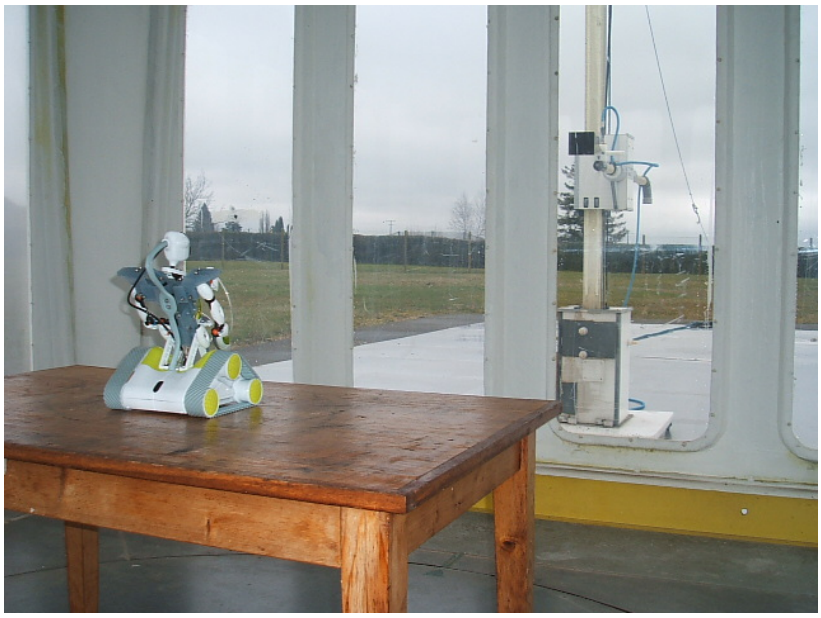

Serial numbe
PiPo
19/2/2008





ANNEX 3:

TEST SETUP PHOTOGRAPHIES



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ANNEX 4:

CALIBRATION DATE

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N° EMITECH	LAST CALIBRATION	CALIBRATION DUE DATE
2808	06/06/06	06/06/08
2812	06/06/06	06/06/08
326	09/08/07	09/08/08
5331	24/09/07	24/09/08
2205	22/05/06	22/05/08
237	05/10/06	05/10/08
3374	04/03/08	04/03/10
2896	22/02/07	22/02/09
1097	22/02/07	22/02/09
187	22/02/07	22/02/09
5175	17/09/07	17/09/09
3106	18/06/07	18/06/09
1144	20/08/07	20/0809
2450	28/05/06	28/05/08
2451	30/05/06	30/05/08
2452	05/06/06	05/06/08
1529	22/02/07	22/02/09
4691	11/01/07	11/01/09
3229	06/04/07	08/07/08
1216	25/04/07	25/04/09
1057	04/07/07	04/07/09
5175	17/09/07	17/09/09