

**REPORT ON THE CERTIFICATION TESTING OF A  
ROBONICA  
ROBONI-I MOBILE ROBOT  
WITH RESPECT TO  
THE FCC RULES CFR 47, PARTS 15.209 & 15.247 JULY 2008  
INTENTIONAL RADIATOR SPECIFICATION**

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FCC ID: XL7-ROBONI-I

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ROBONICA Ltd  
ROBONI-I MOBILE ROBOT  
WITH RESPECT TO  
THE FCC RULES CFR 47, PARTS 15.209 & 15.247 JULY 2008  
INTENTIONAL RADIATOR SPECIFICATION**

**TRaC**  
testing regulatory and compliance

TEST DATE: 14<sup>th</sup> – 17<sup>th</sup> July 2009

TESTED BY: \_\_\_\_\_ D WINSTANLEY

APPROVED BY: \_\_\_\_\_ J CHARTERS  
RADIO PRODUCT  
MANAGER

DATE: 29<sup>th</sup> July 2009

**Distribution:**

- Copy Nos:
1. ROBONICA
  2. FCC EVALUATION LABORATORIES
  3. TRaC Telecoms & Radio

THIS DOCUMENT MAY BE REPRODUCED ONLY IN ITS ENTIRETY AND WITHOUT CHANGE

The results herein relate only to the sample tested. Full results are contained in the relevant works order file.

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 <b>Notes:</b>		
1. Component failure during test	YES NO	[ ] [X]
2. If Yes, details of failure:		
3. The facilities used for the testing of the product contain in this report are FCC Listed.		
4. The contents of the attached applicants declarations and other supplied information are not covered by the scope of this laboratory's UKAS or FCC accreditations' and is provided in good faith.		

## CERTIFICATE OF CONFORMITY & COMPLIANCE

FCC IDENTITY:	XL7-ROBONI-I
PURPOSE OF TEST:	Certification
TEST SPECIFICATION:	FCC RULES CFR 47, Parts 15.209 & 15.247 July 2008
TEST RESULT:	Compliant to Specification
EQUIPMENT UNDER TEST:	Roboni-i Mobile Robot
EQUIPMENT PART No:	750-0001
ITU: EMISSION CODE:	2k75A 1M57F1D
EQUIPMENT TYPE:	Digital Spread Spectrum Device & Inductive Reader
CARRIER EMISSION:	1.15 uV/m @ 300m 0.00003 Watts
ANTENNA TYPE:	Integral
GAIN ANTENNA:	Unity Gain
FREQUENCIES OF OPERATION:	125.6 kHz 2450.0 MHz
CHANNEL SPACING:	N/A
NUMBER OF CHANNELS:	1
FREQUENCY GENERATION:	SAW Resonator <input type="checkbox"/> Crystal <input type="checkbox"/> Synthesiser <input checked="" type="checkbox"/>
MODULATION METHOD:	FHSS <input type="checkbox"/> DSSS <input checked="" type="checkbox"/> Other <input type="checkbox"/>
POWER SOURCE(s):	+9Vdc
TEST DATE(s):	14 <sup>th</sup> – 17 <sup>th</sup> July 2009
ORDER No(s):	PO-F0001
APPLICANT:	Robonica
ADDRESS:	P O Box 68009 Highveld 0169 South Africa

TESTED BY: \_\_\_\_\_ D WINSTANLEY

APPROVED BY: \_\_\_\_\_ J CHARTERS  
RADIO  
PRODUCT  
MANAGER

## APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT):	Roboni-i Mobile Robot
EQUIPMENT TYPE:	Digital Spread Spectrum Device & Inductive Reader
PART NUMBER OF EUT:	750-0001
PURPOSE OF TEST:	Certification
TEST SPECIFICATION(s):	FCC RULES CFR 47, Parts 15.209 & 15.247 July 2008
TEST RESULT:	COMPLIANT      Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
APPLICANT'S CATEGORY:	MANUFACTURER <input checked="" type="checkbox"/> IMPORTER <input type="checkbox"/> DISTRIBUTOR <input type="checkbox"/> TEST HOUSE <input type="checkbox"/> AGENT <input type="checkbox"/>
APPLICANT'S ORDER No(s):	PO-F0001
APPLICANT'S CONTACT PERSON(s):	Mr Thys Nel
E-mail address:	thys.nel@robonica.com
APPLICANT:	Robonica
ADDRESS:	P O Box 68009 Highveld 0169 South Africa
TEL:	+27 (0)12 661-9707
FAX:	+27 (0)12 661-8984
EUT(s) COUNTRY OF ORIGIN:	South Africa
TEST LABORATORY:	TRaC Telecoms & Radio, Up Holland
UKAS ACCREDITATION No:	0971
TEST DATE(s):	14 <sup>th</sup> – 17 <sup>th</sup> July 2009
TEST REPORT No:	8F2021WUS2

# EQUIPMENT TEST / EXAMINATIONS REQUIRED

1.	<b>TEST/EXAMINATION</b>	<b>RULE PART</b>	<b>DETECTOR</b>	<b>APPLICABILITY</b>
	Intentional Emission Frequency:	15.247 & 15.209	Peak	Yes
	Intentional Emission Field Strength:	15.209	Average	Yes
	Intentional Emission Band Occupancy:	15.247(a)1 & 15.203	Peak	Yes
	Intentional Emission EIRP (mW):	15.247(b)1	Peak	Yes
	Spurious Emissions – Conducted:	15.207 15.107	Quasi Peak Average	Yes
	Spurious Emissions – Conducted:	15.247	Peak	Yes
	Spurious Emissions – Radiated <1000MHz:	15.209 ,15.247	Quasi Peak	Yes
	Spurious Emissions – Radiated >1000MHz:	15.247 15.209	Peak average	Yes
	Transmitter Carrier Frequency Separation:	15.247(a)(1)	Peak	Yes
	Transmitter Maximum Peak Power Output Power:	15.247(b)(1)	Peak	Yes
	Transmitter Band Edge Conducted Emissions:	15.247(c)	Peak	Yes
	Transmitter Band Edge Radiated Emission:	15.247(c)	Peak	Yes
	Extrapolation Factor:	15.31(f)	-	Yes
	Maximum Frequency of Search:	15.33	-	Yes
	Antenna Arrangements Integral:	15.203	-	Yes
	Antenna Arrangements External Connector:	15.204	-	Yes
	Restricted Bands:	15.205	-	Yes

2. Product Description: Remote Controlled Robot Incorporating Inductive Reader
  3. Temperatures: Ambient (Tnom) 18°C
  4. Supply Voltages: Vnom +9Vdc
- Note: Vnom voltages are as stated above unless otherwise shown on the test report page
5. Equipment Category: Single channel [X]  
Multi-channel [ ]
  6. Channel spacing: Narrowband [ ]  
Wideband [X]

## TRANSMITTER TESTS

### TRANSMITTER INTENTIONAL EMISSION – RADIATED – Part 15.209

Ambient temperature	=	18°C(<1GHz),	3m measurements @ fc	[X]
Relative humidity	=	77%(<1GHz),	10m measurements @ fc	[X]
Conditions	=	Open Area Test Site (OATS)	30m measurements @ fc	[ ]
Supply voltage	=	+9Vdc	300m extrapolated from 3m	[X]
Channel number	=	1	300m extrapolated from 10m	[X]

FREQ. (kHz)	MEASUREMENT Rx. READING (dBμV)	MEASUREMENT DISTANCE (meters)	EXTRAPOLATION (dB)	FIELD STRENGTH (uV/m)
125.6	86.3	3	85.08	1.51
125.6	80.3	10	59.08	1.51
Limit value @ fc		19.05 (uV/m)		
Band occupancy @ -20 dBc		f lower	f higher	
		125.144230769 kHz	127.900641026 kHz	

See spectrum analyser plot – Annex E

**Notes:**

- 1 Results quoted are extrapolated as indicated
- 2 Receiver detector @ fc = Average 10kHz bandwidth
- 3 When battery powered the EUT was powered with new/fully charged batteries

**Test Method:**

- 1 As per Radio – Noise Emissions, ANSI C63.4: 2003
- 2 Measuring distances 3m
- 3 EUT 0.8 metre above ground plane
- 4 Emissions maximised by rotation of EUT, on an automatic turntable.  
Raising and lowering the receiver antenna between 1m & 4m.  
Horizontal and vertical polarisations, of the receive antenna.  
EUT orientation in three orthogonal planes.  
Maximum results recorded

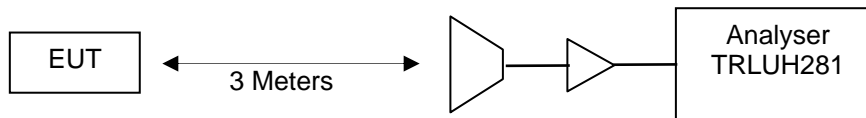
The test equipment used for the Transmitter Intentional Emission – Radiated – Part 15.209 no tests is shown overleaf:

## TRANSMITTER TESTS

### TRANSMITTER 6dB BANDWIDTH – RADIATED - PART 15.247(A)(2)

Ambient temperature = 18°C  
 Relative humidity = 54%  
 Conditions = Radio Lab  
 Supply voltage = +9Vdc

#### Diagram



Frequency	f <sub>lower</sub>	f <sub>Higher</sub>	Measured Bandwidth	Limit
2450 MHz	2449.322115 MHz	2450.892628 MHz	1570.513 kHz	>500 kHz

**Notes:** 1 For analyser plots see annex F.

**Test Method:** 1 The EUT was rotated to the direction of maximum radiation.  
 2 The 6dB bandwidth was recorded with the EUT activity transmitting data.  
 3 Radiated Measurement DTS Measurement 16<sup>th</sup> April 2007 Alternative Test Procedures

TYPE OF EQUIPMENT	MAKER/SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	<b>X</b>
HORN ANTENNA	EMCO	3115	9010-3580	138	<b>X</b>
PRE AMPLIFIER	HP	8449B	3008A016	572	<b>X</b>
CABLE	SUCCOFLEX	N/A	35226/4	UH291	<b>X</b>
CABLE	MEGAPHASE	TM26-3131 36	400559	UH293	<b>X</b>

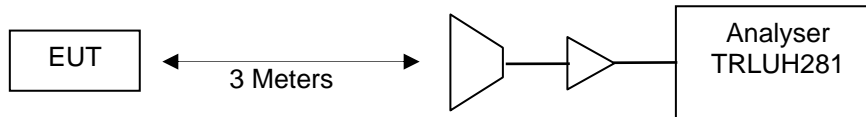


## TRANSMITTER TESTS

### TRANSMITTER – MAXIMUM PEAK POWER – RADIATED – PART 15.247(B)(3)

Ambient temperature = 18°C  
 Relative humidity = 54%  
 Conditions = Radio Lab  
 Supply voltage = +9Vdc

#### Diagram



Frequency MHz	Maximum Field Strength (V/m)	Antenna Gain (dBi)	Measurement Distance (meters)	Peak EIRP (Watts)	Limit (Watts)
2450.000	0.010	1	3	0.00003	1

**Notes:**

- 1 Gain of antenna 1, maximum gain antenna supplied by manufacturer.
- 2 Peak Power =  $(E \times d)^2 / (30 \times G)$   
 E = Maximum Field Strength (uV/m)  
 D = Measurement Distance  
 G = Numeric gain of transmitting antenna over an Isotropic radiator

**Test Method:**

- 1 The EUT was rotated to the direction of maximum radiation.
- 2 The EUT was operated in transmit mode with modulation.
- 3 The level on the analyser was recorded.
- 4 The resolution bandwidth of the analyser was set to > than the 6dB bandwidth
- 5 Radiated Measurement DTS Measurement 16<sup>th</sup> April 2007 Alternative Test Procedures

Test equipment used for Peak Power measurement:

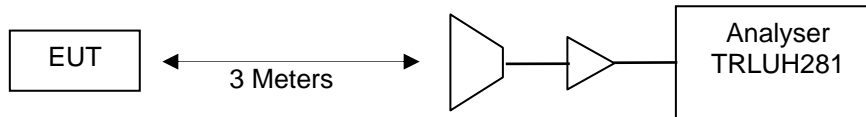
TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	<b>X</b>
HORN ANTENNA	EMCO	3115	9010-3580	138	<b>X</b>
PRE AMPLIFIER	HP	8449B	3008A016	572	<b>X</b>
CABLE	SUCCOFLEX	N/A	35226/4	UH291	<b>X</b>
CABLE	MEGAPHASE	TM26-3131 36	400559	UH293	<b>X</b>

## TRANSMITTER TESTS

### TRANSMITTER POWER SPECTRAL DENSITY – RADIATED - PART 15.247(E)

Ambient temperature = 18°C  
 Relative humidity = 54%  
 Conditions = Radio Lab  
 Supply voltage = +9Vdc

#### Diagram



Frequency MHz	Maximum Field Strength (V/m)	Antenna Gain (dBi)	Measurement Distance (meters)	Power Spectral Density (dBm)	Limit (dBm)
2450.000	0.0003	1	3	-25.94	+8

#### Notes:

- 1 For analyser plots see annex G.
- 2 Peak Power =  $(E_d)^2 / (30 \times G)$   
 E = Maximum Field Strength (V/m)  
 D = Measurement Distance  
 G = Numeric gain of transmitting antenna over an Isotropic radiator

#### Test Method:

- 1 The EUT was rotated to direction of maximum emission.
- 2 The resolution bandwidth on the analyser was set to 3kHz and trace set to max hold.
- 3 The span is set to 3MHz
- 4 The sweep time is 1000 seconds (Span/3kHz).
- 5 Radiated Measurement DTS Measurement 16<sup>th</sup> April 2007 Alternative Test Procedures

Test equipment used for Peak Power measurement:

TYPE OF EQUIPMENT	MAKER/SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	<b>X</b>
HORN ANTENNA	EMCO	3115	9010-3580	138	<b>X</b>
PRE AMPLIFIER	HP	8449B	3008A016	572	<b>X</b>
CABLE	SUCCOFLEX	N/A	35226/4	UH291	<b>X</b>
CABLE	MEGAPHASE	TM26-3131 36	400559	UH293	<b>X</b>

## TRANSMITTER TESTS

### TRANSMITTER SPURIOUS EMISSIONS – RADIATED – Part 15.247(c) and 15.209

Ambient temperature	=	18°C	3m measurements <1GHz	[X]
Relative humidity	=	54%	3m measurements <10GHz	[X]
Conditions	=	Open Area Test Site (OATS)	1m measurements <25GHz	[X]
Supply voltage	=	+9Vdc		

	Emission Freq (MHz)	Meas Rx. (dBuV)	Cable loss (dB)	Ant. Factor (dB/m)	Pre Amp Gain (dB)	Field Strength (dBµV/m)	Extrap. Factor (dB)	Result (µV/m)	Limit (µV/m)
30MHz – 88MHz								Note 5	100
88MHz – 216MHz								Note 5	150
216MHz – 960MHz								Note 5	200
960MHz – 1GHz								Note 5	500
1GHz – 25GHz	4899.391		1.8	34.2	34.8	35.96	-	62.80	500
	7348.894		2.2	35.9	35.2	44.27	-	163.49	500
	12253.141		4.1	39.2	35.3	45.08	9.54	59.84	500
	19596.891		6.3	41.3	36.0	42.72	9.54	45.60	500

- Notes:**
- 1 Initial pre scans were performed see Annex H for plots.
  - 2 See annex I for radiated bandedge compliance plot.
  - 3 Emissions above 1GHz were measured with both a peak and average detectors.
  - 4 All emissions with in 20dB of limit are recorded.
  - 5 Emissions not directly related to the transmitter are reported under receiver tests.

- Test Method:**
- 1 As per section 15.247.
  - 2 Measuring distances as Note 4 above.
  - 3 EUT 0.8 metre above ground plane.
  - 4 Emissions maximised by rotation of EUT, on an automatic turntable.  
Raising and lowering the receiver antenna between 1m & 4m >30MHz.  
Horizontal and vertical polarisations, of the receive antenna.  
EUT orientation in three orthogonal planes. Maximum results recorded.

The test equipment used for the tests is shown overleaf:

TYPE OF EQUIPMENT	MAKER/SUPPLIER	MODEL No	SERIAL No	TRL No	EQUIPMENT USED
HORN ANTENNA	EMCO	3115	9010-3580	138	<b>X</b>
RECEIVER	ROHDE & SCHWARZ	ESVS 10	825892/003	UH04	<b>X</b>
RANGE 1	TRaC	3 METRE	N/A	UH06	<b>X</b>
BILOG ANTENNA	CHASE	CBL6111	1519	UH70	<b>X</b>
SPECTRUM ANALYSER	ROHDE & SCHWARZ	FSU	200034	UH281	<b>X</b>
PRE AMPIFIER	WATKINS JOHNSON	6201-69	2740	UH372	<b>X</b>
PRE AMPLIFIER	AGILENT	8449B	3008A01610	572	<b>X</b>

## TRANSMITTER TESTS

### TRANSMITTER BAND EDGE EMISSIONS – RADIATED – Part 15.247(c)

Ambient temperature = 18°C  
 Relative humidity = 54%  
 Conditions = Radiated OATS  
 Supply voltage = +4.5Vdc

#### Test Result

Operating Frequency (MHz)	Bandedge	Result	Limit
2450.0 MHz	Lower	Compliant	-20 dBc
2450.0 MHz	Upper	Compliant	54 dBuV/m

See spectrum analyser scan plots – Annex I

Measure as compliant see analyser plots

**Notes:**

- 1 The EUT activity transmitting data.
- 2 See Annex I for analyser plot.

#### Test Method:

- 1 As per section 15.247
- 2 A plot covering the lowest channel and band edge was taken. A marker was set on the peak emission of the lowest channel. The delta marker function was then used to measure the highest out of band emissions. (If no peaks exist outside the band the level is taken at the band edge).
- 3 A plot covering the highest channel and band edge was taken. A marker was set on the peak emission of the highest channel. The delta marker function was then used to measure the highest out of band emissions. (If no peaks exist outside the band the level is taken at the band edge).

The test equipment used for the tests is shown below:

TYPE OF EQUIPMENT	MAKER/SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	<b>X</b>
HORN ANTENNA	EMCO	3115	9010-3580	138	<b>X</b>
PRE AMPLIFIER	HP	8449B	3008A016	572	<b>X</b>
CABLE	SUCCOFLEX	N/A	35226/4	UH291	<b>X</b>
CABLE	MEGAPHASE	TM26-3131 36	400559	UH293	<b>X</b>

## RECEIVER TESTS

### UNINTENTIONAL RADIATED EMISSIONS– Part 15.109

Ambient temperature = 18°C  
 Relative humidity = 54%  
 Conditions = Radiated OATS  
 Supply voltage = +9Vdc

	Emission Freq (MHz)	Meas Rx. (dBuV)	Cable loss (dB)	Ant. Factor (dB/m)	Pre Amp Gain (dB)	Field Strength (dBµV/m)	Extrap. Factor (dB)	Result (µV/m)	Limit (µV/m)
30MHz – 88MHz								Note 4	100
88MHz – 216MHz								Note 4	150
216MHz – 960MHz								Note 4	200
960MHz – 1GHz								Note 4	500
1GHz – 25GHz	2448.100 4896.185	47.65 44.67	1.2 1.8	28.9 34.2	35.0 34.8	42.73 45.87	9.54 9.54	45.65 65.54	500 500

**Notes:**

- 1 Emissions above 1GHz were measured with both a peak and average detectors.
- 2 Measurements <1GHz were performed at 3 meters.
- 3 Measurements >1GHz were initially performed at 1 metre.
- 4 Only emissions with in 20dB of limit are recorded.
- 5 Peak emissions recorded, peak emissions meet the average limit.
- 6 See Annex J For Plots

**Test Method:**

- 1 The EUT was operating in a permanent receive mode.
- 2 Measuring distances as Notes 3 to 5 above.
- 3 EUT 0.8 metre above ground plane.
- 4 Emissions maximised by rotation of EUT, on an automatic turntable.  
 Raising and lowering the receiver antenna between 1m & 4m >30MHz.  
 Horizontal and vertical polarisations, of the receive antenna.  
 EUT orientation in three orthogonal planes. Maximum results recorded.

The test equipment used for the tests is shown below:

TYPE OF EQUIPMENT	MAKER/SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	<b>X</b>
HORN ANTENNA	EMCO	3115	9010-3580	138	<b>X</b>
PRE AMPLIFIER	HP	8449B	3008A016	572	<b>X</b>
CABLE	SUCCOFLEX	N/A	35226/4	UH291	<b>X</b>
CABLE	MEGAPHASE	TM26-3131 36	400559	UH293	<b>X</b>

**ANNEX A**  
**PHOTOGRAPHS**



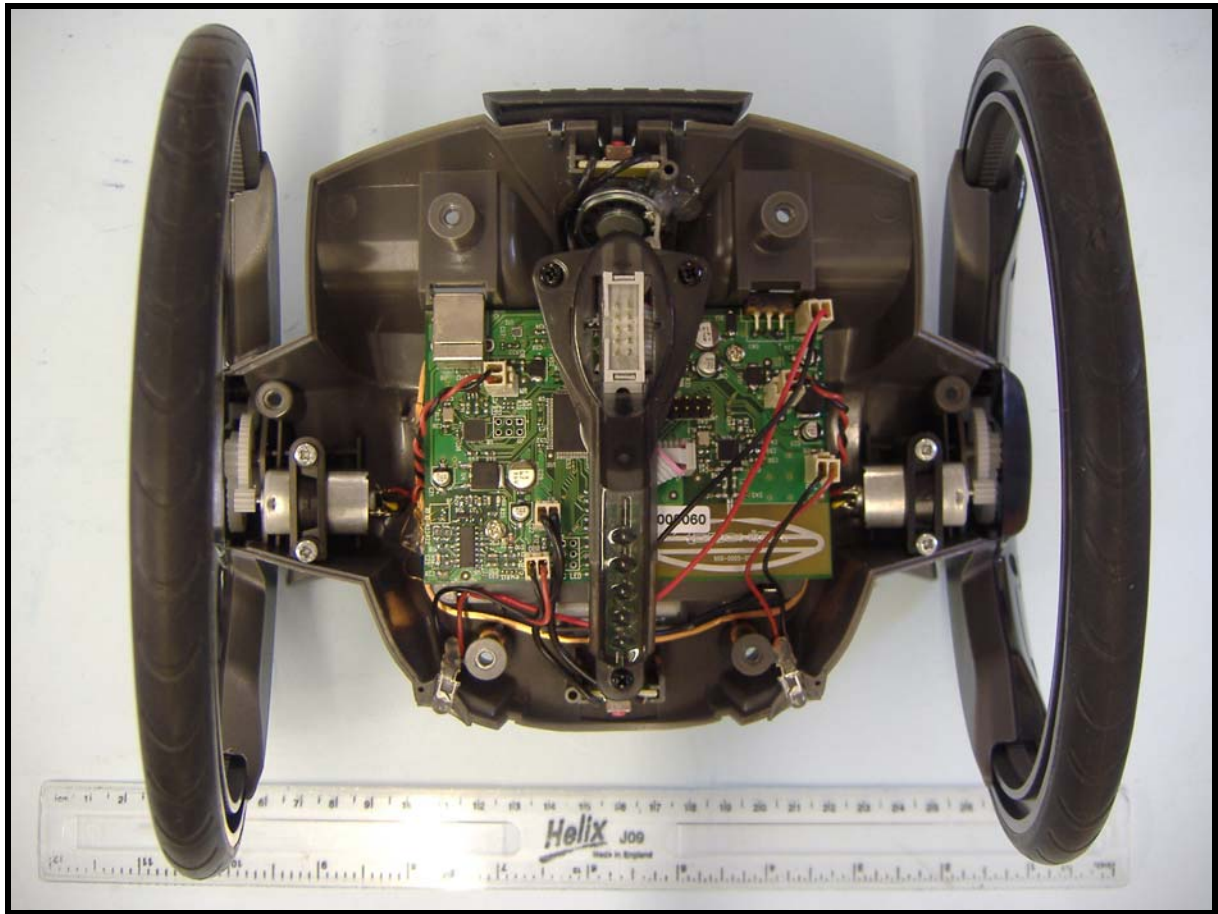






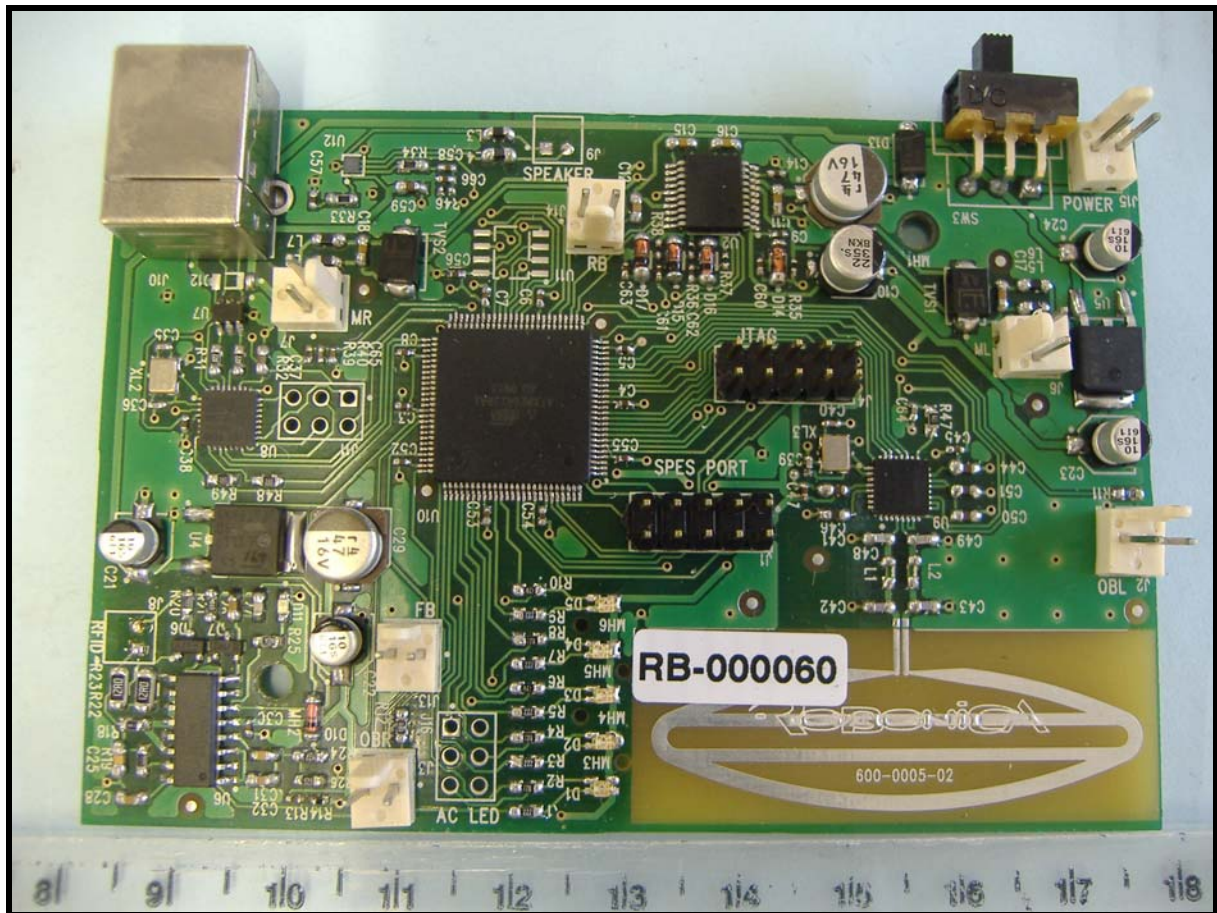
PHOTOGRAPH No. 4

OVERVIEW TOP REMOVED



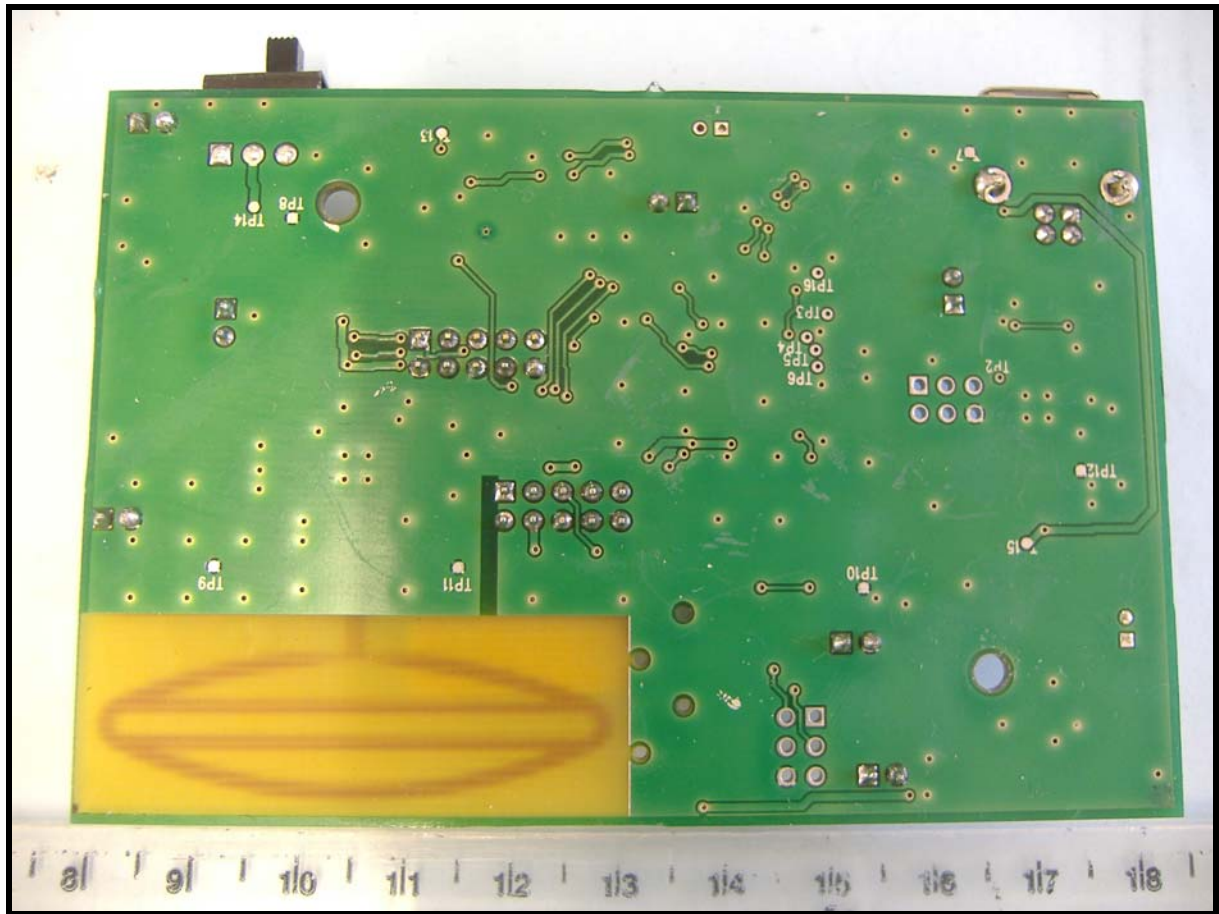
PHOTOGRAPH No. 5

PCB COMPONENT SIDE

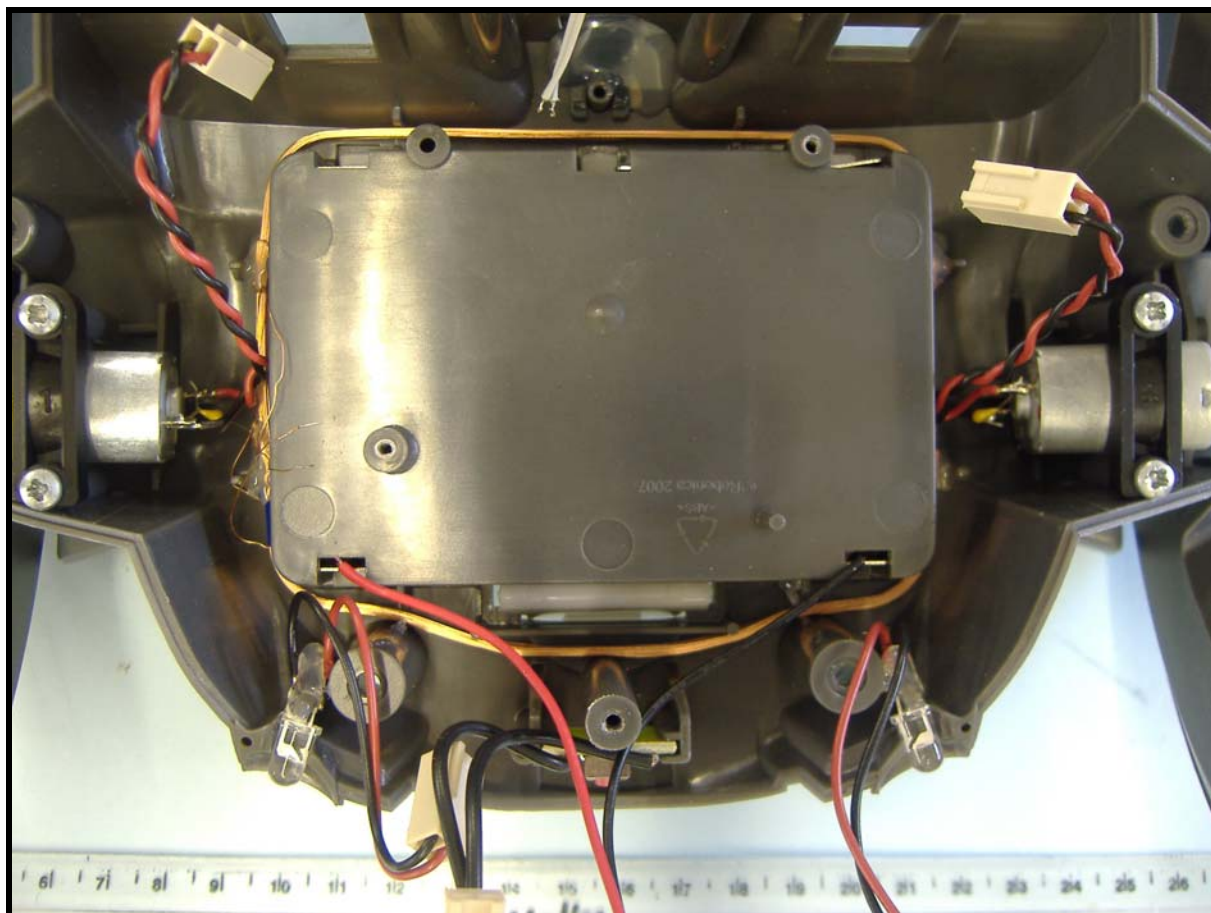


PHOTOGRAPH No. 6

PCB TRACK SIDE







**ANNEX B**  
**APPLICANT'S SUBMISSION OF DOCUMENTATION LIST**

## APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

a.	TCB	-	APPLICATION	[X]
		-	FEE	[X]
b.	AGENT'S LETTER OF AUTHORISATION	-		[X]
c.	MODEL(s) vs IDENTITY	-		[ ]
d.	ALTERNATIVE TRADE NAME DECLARATION(s)	-		[X]
e.	LABELLING	-	PHOTOGRAPHS	[X]
		-	DECLARATION	[ ]
		-	DRAWINGS	[X]
f.	TECHNICAL DESCRIPTION	-		[X]
g.	BLOCK DIAGRAMS	-	Tx	[X]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
h.	CIRCUIT DIAGRAMS	-	Tx	[X]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
i.	COMPONENT LOCATION	-	Tx	[X]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
j.	PCB TRACK LAYOUT	-	Tx	[X]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
k.	BILL OF MATERIALS	-	Tx	[X]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
l.	USER INSTALLATION / OPERATING INSTRUCTIONS	-		[X]

**ANNEX C**  
**EQUIPMENT CALIBRATION DETAILS**



TRL Number	Equipment Type	Manufacturer	Last Cal Calibration	Calibration Period	Due For Calibration
UH06/07	IC OATS Submission	TRL	02/07/2009	24	02/07/2011
UH06/07	NSA Calibration	TRL	19/06/2009	12	19/06/2010
UH281	Spectrum Analyser	R&S	28/10/2008	12	28/10/2009
UH291	K-Type Cable	Succoflex	15/07/2009	12	15/07/2010
UH293	K-Type Cable	Megaphase	15/07/2009	12	15/07/2010
UH330	K type transition	Maury M'wave	12/06/2008	24	12/06/2010
UH340	Signal Generator	HP	03/06/2009	12	03/06/2010
UH378	3M Cable	TRaC	15/07/2009	12	15/07/2010
UH379	High Pass Filter	Axell	15/07/2009	12	15/07/2010
L005	CMTA	R&S	29/10/2008	12	29/10/2009
L007	Loop Antenna	R&S	22/05/2007	27	22/08/2009
L138	1-18GHz Horn	EMCO	23/05/2007	27	23/08/2009
L139	1-18GHz Horn	EMCO	23/05/2007	27	23/08/2009
L176	Signal Generator	Marconi	23/06/2009	12	23/06/2010
L426	Temperature Indicator	Fluke	21/01/2009	12	21/01/2010
L479	Analyser	Anritsu	22/09/2008	12	22/09/2009
L527	3M Cable	TRaC	15/07/2009	12	15/07/2010
L572	Pre Amp	Agilent	15/07/2009	12	15/07/2010
L664	3M Cable	TRaC	15/07/2009	12	15/07/2010

**ANNEX D**  
**MEASUREMENT UNCERTAINTY**

## **Radio Testing – General Uncertainty Schedule**

*All statements of uncertainty are expanded standard uncertainty using a coverage factor of 1.96 to give a 95% confidence where no required test level exists.*

### **[1] Adjacent Channel Power**

Uncertainty in test result = **1.86dB**

### **[2] Carrier Power**

Uncertainty in test result (Equipment - TRLUH120) = **2.18dB**

Uncertainty in test result (Equipment – TRL05) = **1.08dB**

Uncertainty in test result (Equipment – TRL479) = **2.48dB**

### **[3] Effective Radiated Power**

Uncertainty in test result = **4.71dB**

### **[4] Spurious Emissions**

Uncertainty in test result = **4.75dB**

### **[5] Maximum frequency error**

Uncertainty in test result (Equipment - TRLUH120) = **119ppm**

Uncertainty in test result (Equipment – TRL05) = **0.113ppm**

Uncertainty in test result (Equipment – TRL479) = **0.265ppm**

### **[6] Radiated Emissions, field strength OATS 14kHz-18GHz Electric Field**

Uncertainty in test result (14kHz – 30MHz) = **4.8dB**, Uncertainty in test result (30MHz – 1GHz) = **4.6dB**,  
Uncertainty in test result (1GHz-18GHz) = **4.7dB**

### **[7] Frequency deviation**

Uncertainty in test result = **3.2%**

### **[8] Magnetic Field Emissions**

Uncertainty in test result = **2.3dB**

### **[9] Conducted Spurious**

Uncertainty in test result (Equipment TRL479) Up to 8.1GHz = **3.31dB**

Uncertainty in test result (Equipment TRL479) 8.1GHz – 15.3GHz = **4.43dB**

Uncertainty in test result (Equipment TRL479) 15.3GHz – 21GHz = **5.34dB**

Uncertainty in test result (Equipment TRLUH120) Up to 26GHz = **3.14dB**

### **[10] Channel Bandwidth**

Uncertainty in test result = **15.5%**

### **[11] Amplitude and Time Measurement – Oscilloscope**

Uncertainty in overall test level = **2.1dB**, Uncertainty in time measurement = **0.59%**, Uncertainty in Amplitude measurement = **0.82%**

### **[11] Power Line Conduction**

Uncertainty in test result = **3.4dB**

***[12] Spectrum Mask Measurements***

Uncertainty in test result = **2.59% (frequency)**  
Uncertainty in test result = **1.32dB (amplitude)**

***[13] Adjacent Sub Band Selectivity***

Uncertainty in test result = **1.24dB**

***[14] Receiver Blocking – Listen Mode, Radiated***

Uncertainty in test result = **3.42dB**

***[15] Receiver Blocking – Talk Mode, Radiated***

Uncertainty in test result = **3.36dB**

***[16] Receiver Blocking – Talk Mode, Conducted***

Uncertainty in test result = **1.24dB**

***[17] Receiver Threshold***

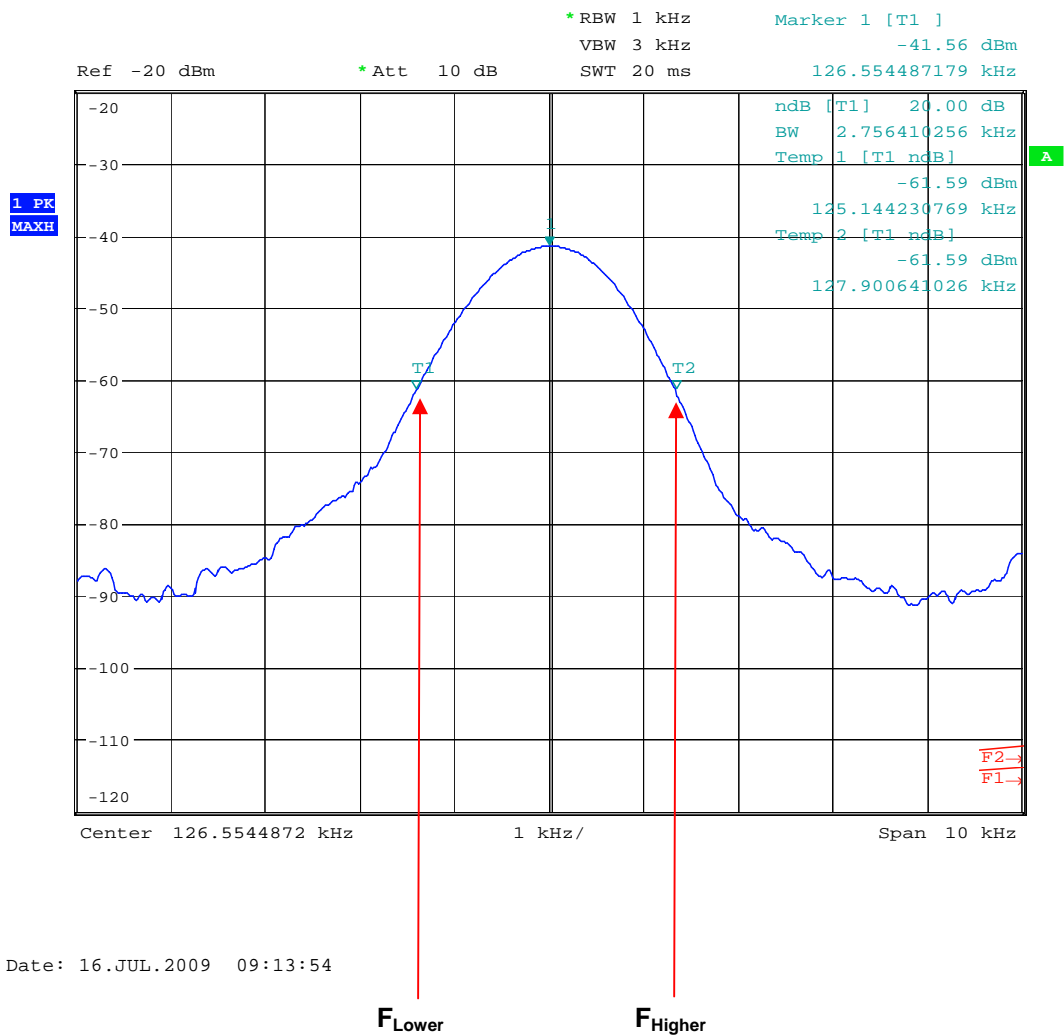
Uncertainty in test result = **3.23dB**

***[18] Transmission Time Measurement***

Uncertainty in test result = **7.98%**

**ANNEX E**  
**20dB BANDWIDTH**

20dB BANDWIDTH

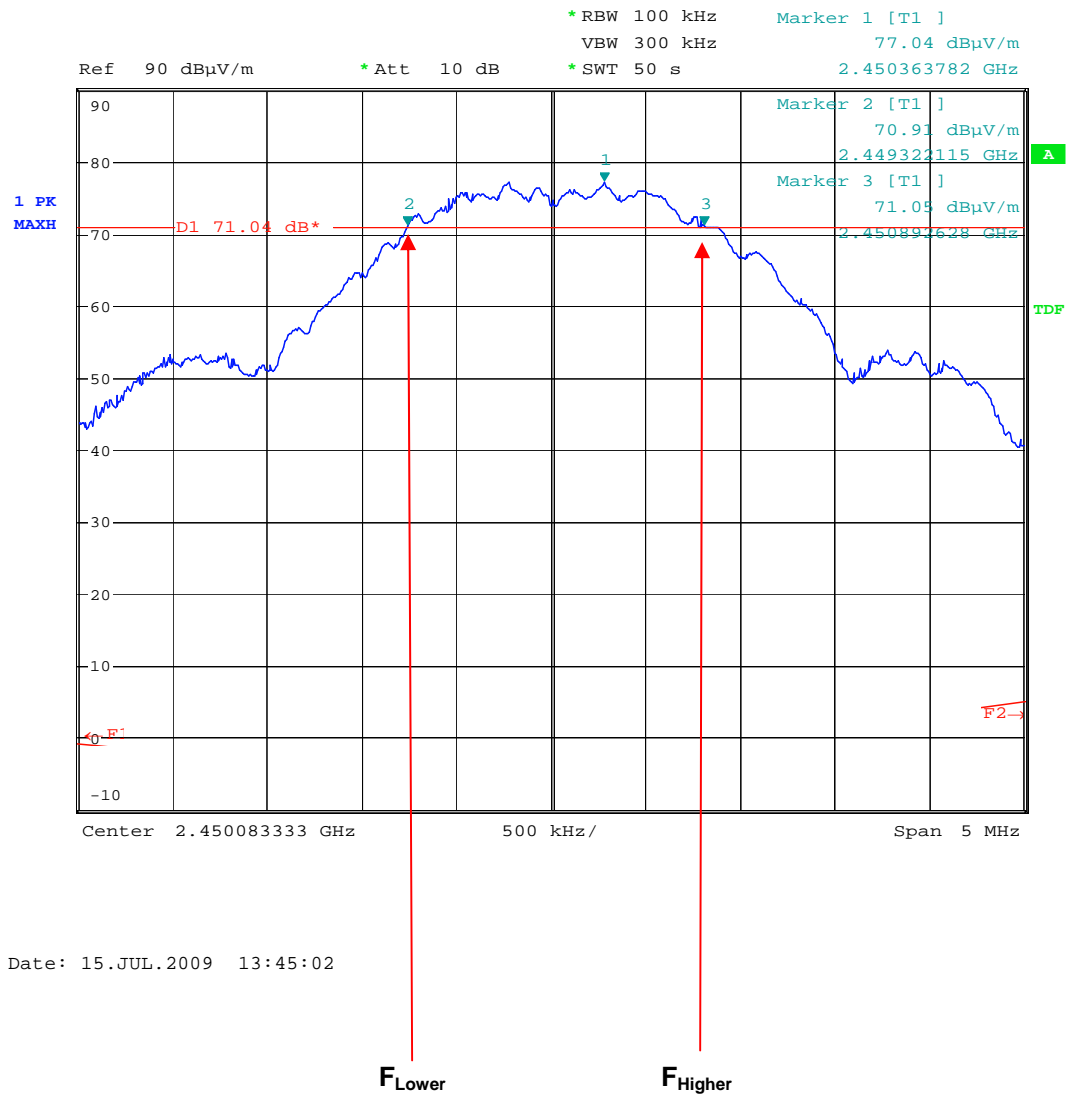


Date: 16.JUL.2009 09:13:54

F<sub>Lower</sub>      = 125.144230769 kHz  
F<sub>Higher</sub>      = 127.900641026 kHz  
Occupied Bandwidth      = 2.756410256 kHz

**ANNEX F**  
**6dB BANDWIDTH**

## 6dB BANDWIDTH

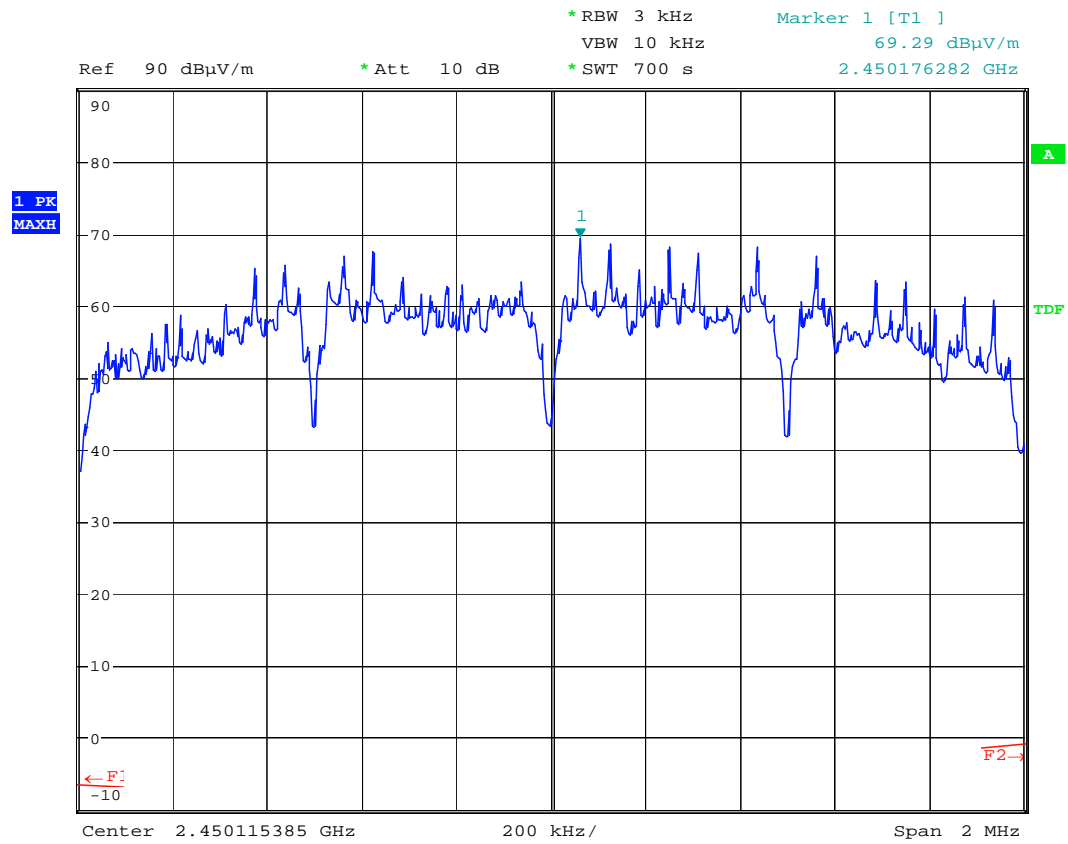


$F_{\text{Lower}}$  = 2449.322115 MHz  
 $F_{\text{Higher}}$  = 2405.852625 MHz  
 Occupied Bandwidth = 1570.513 kHz



**ANNEX G**  
**POWER SPECTRAL DENSITY**

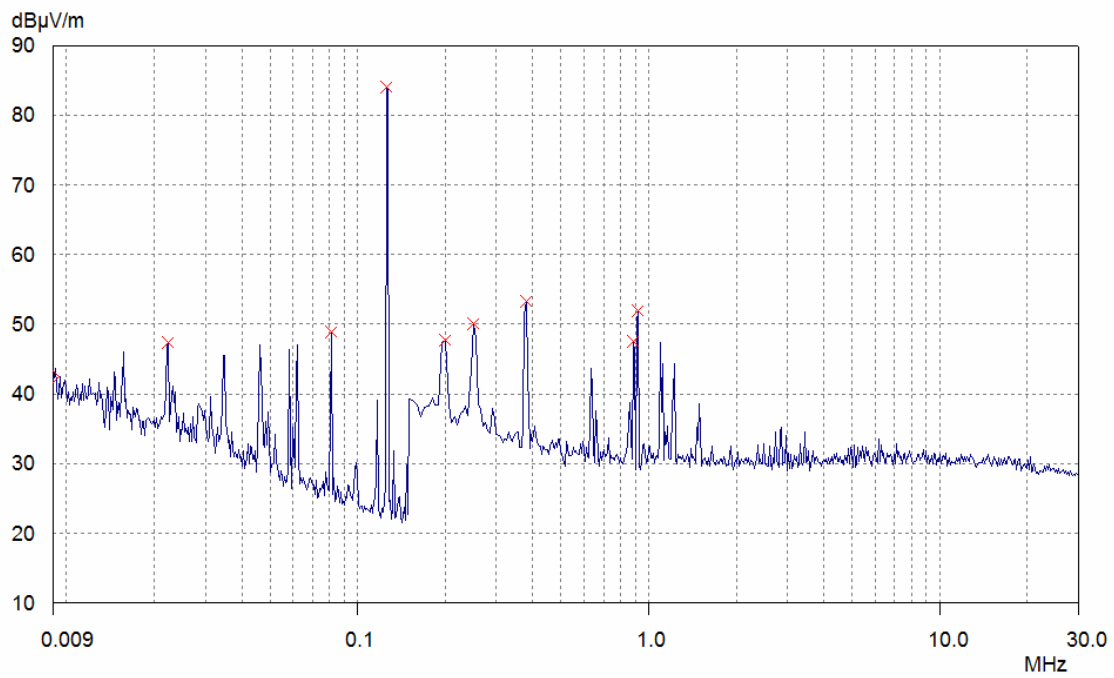
# POWER SPECTRAL DENSITY



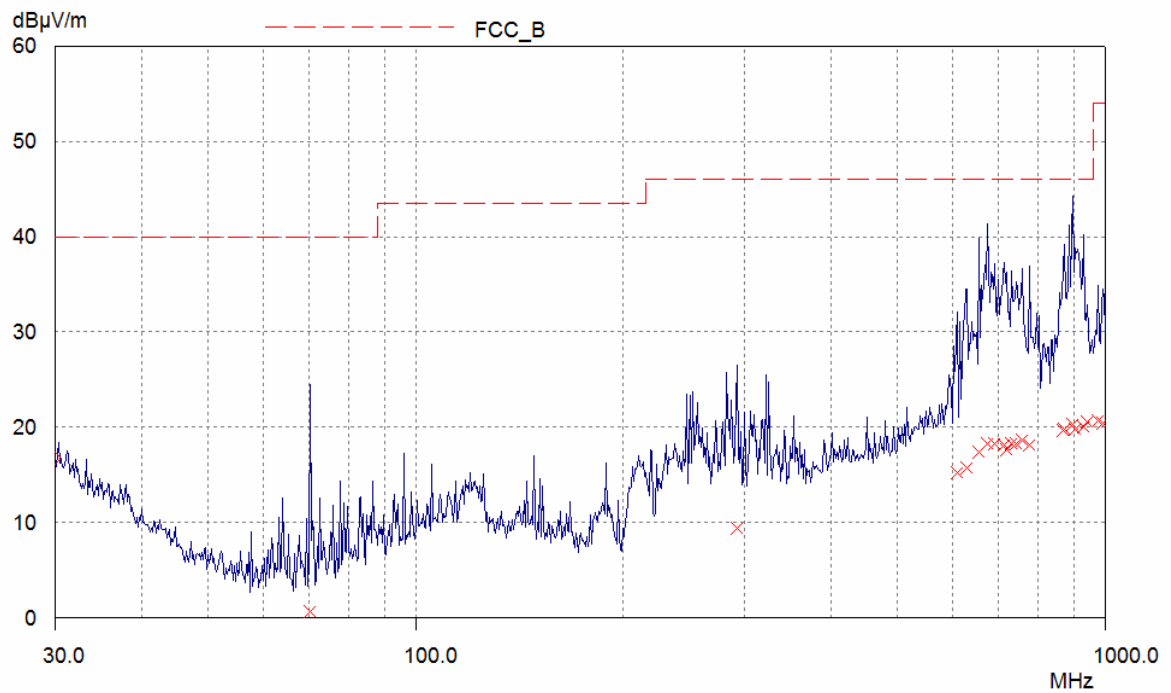
Date: 15.JUL.2009 16:48:14

## **ANNEX H**

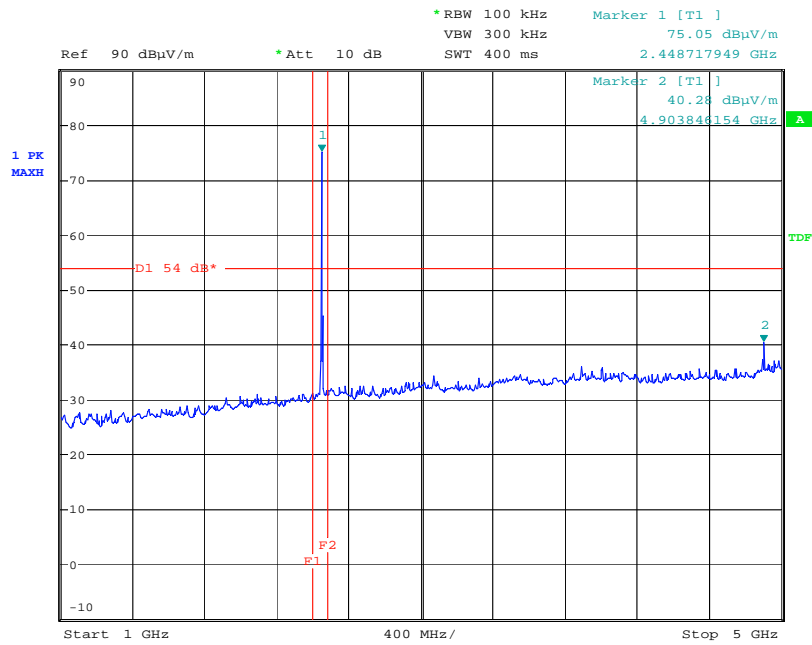
### **INTENTIONAL RADIATED EMISSIONS**



9kHz – 30MHz

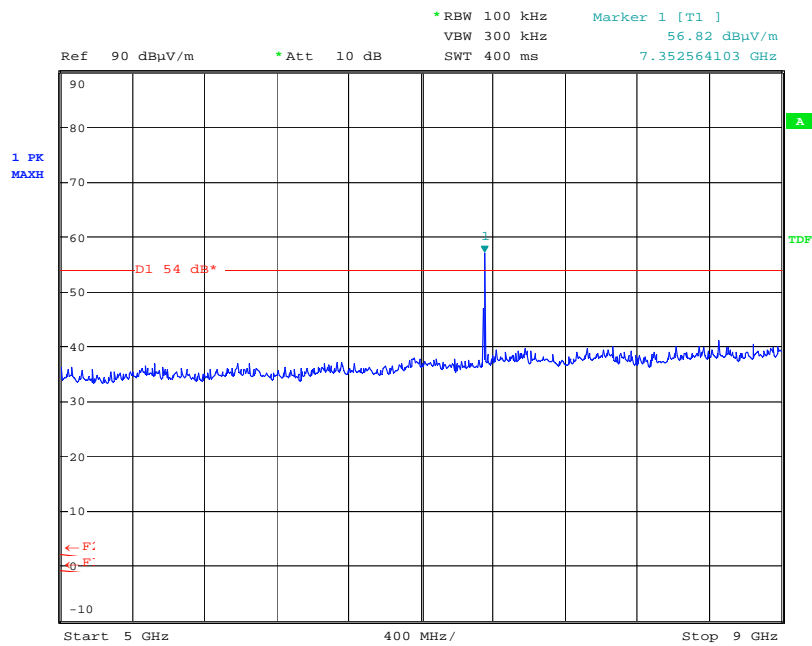


30 MHz – 1 GHz



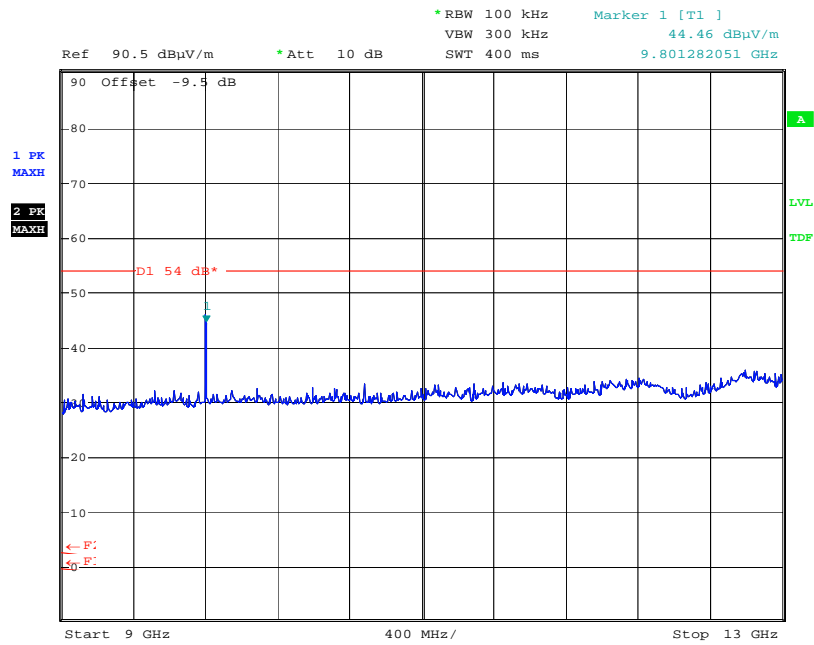
Date: 15.JUL.2009 13:57:26

## 1 GHz – 5 GHz



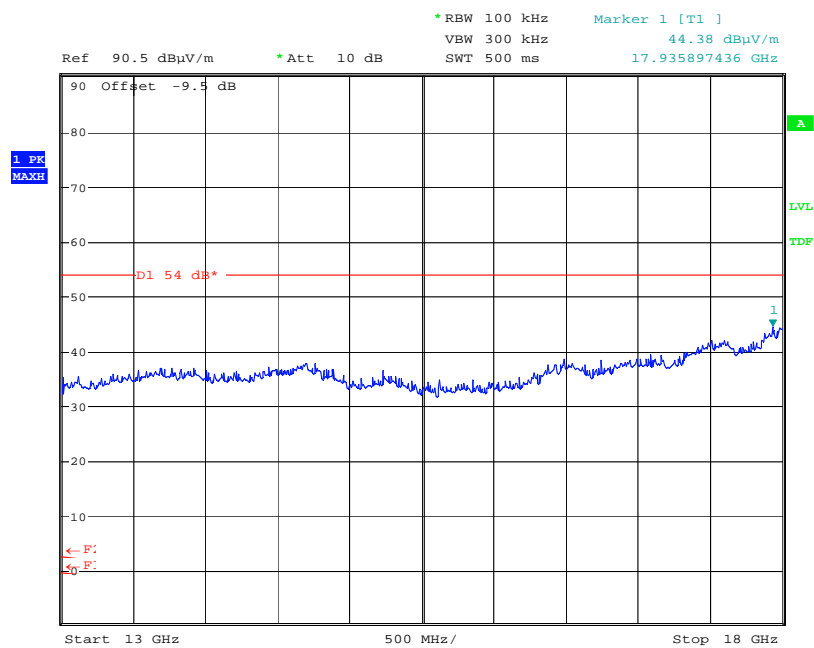
Date: 15.JUL.2009 13:57:50

## 5 GHz –9 GHz



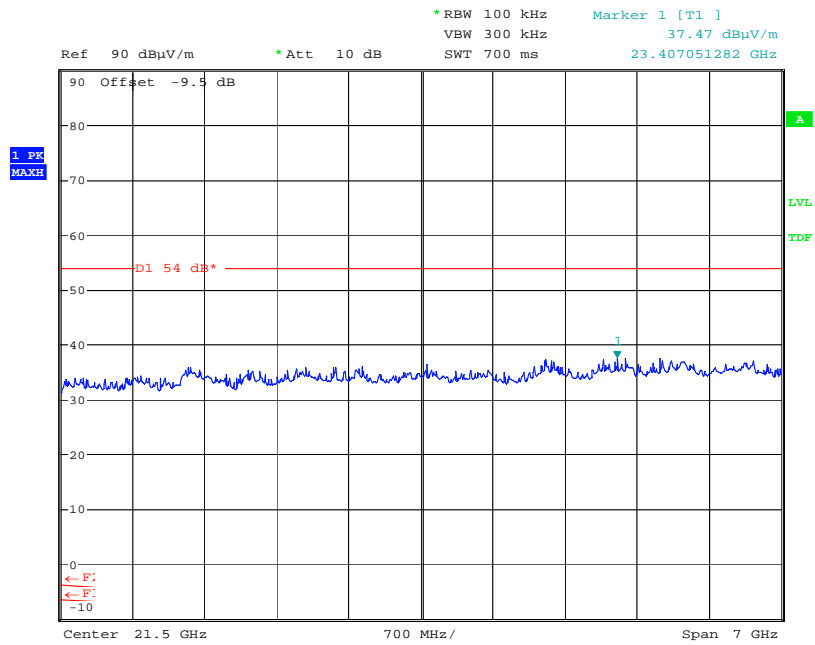
Date: 15.JUL.2009 14:01:53

## 9 GHz – 13 GHz



Date: 15.JUL.2009 14:03:23

## 13 GHz – 18 GHz

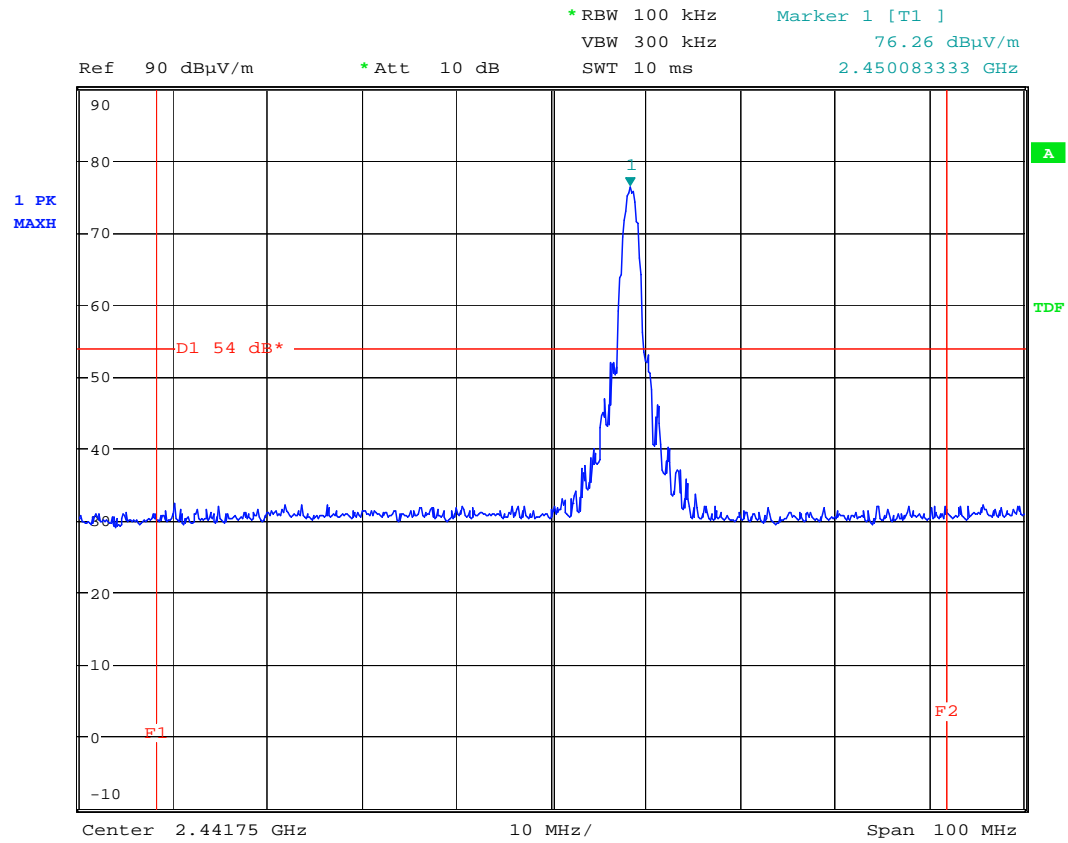


Date: 15.JUL.2009 14:47:54

18 GHz – 25 GHz

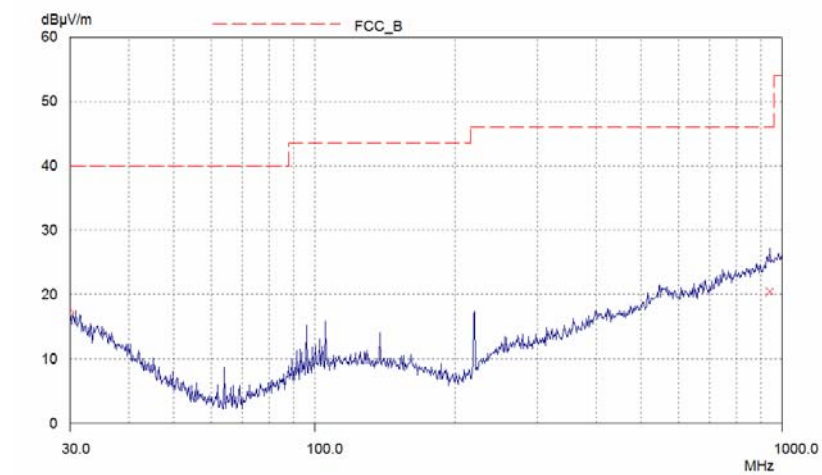
**ANNEX I**  
**RADIATED BANDEDGE COMPLIANCE**



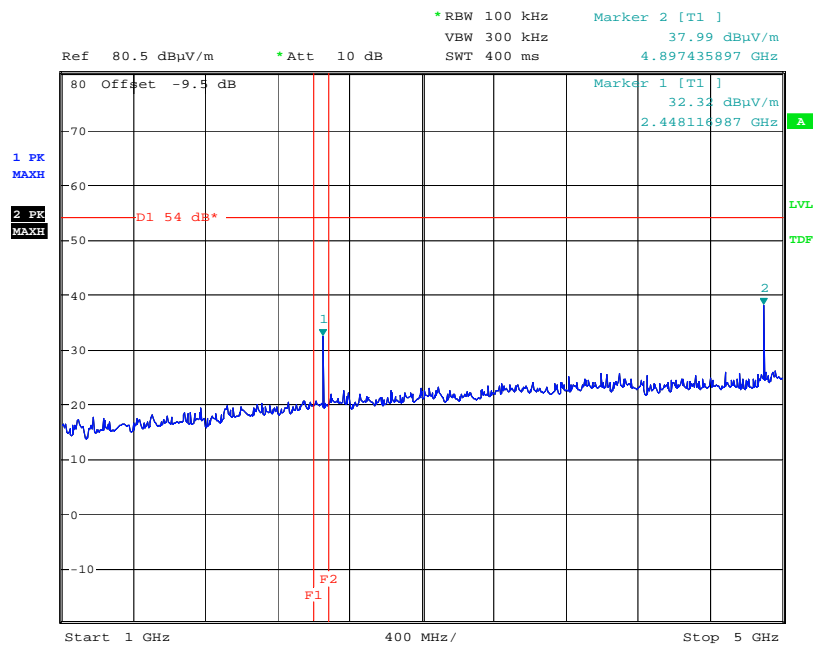


Date: 15.JUL.2009 13:35:18

**ANNEX J**  
**UNINTENTIONAL RADIATED EMISSIONS**

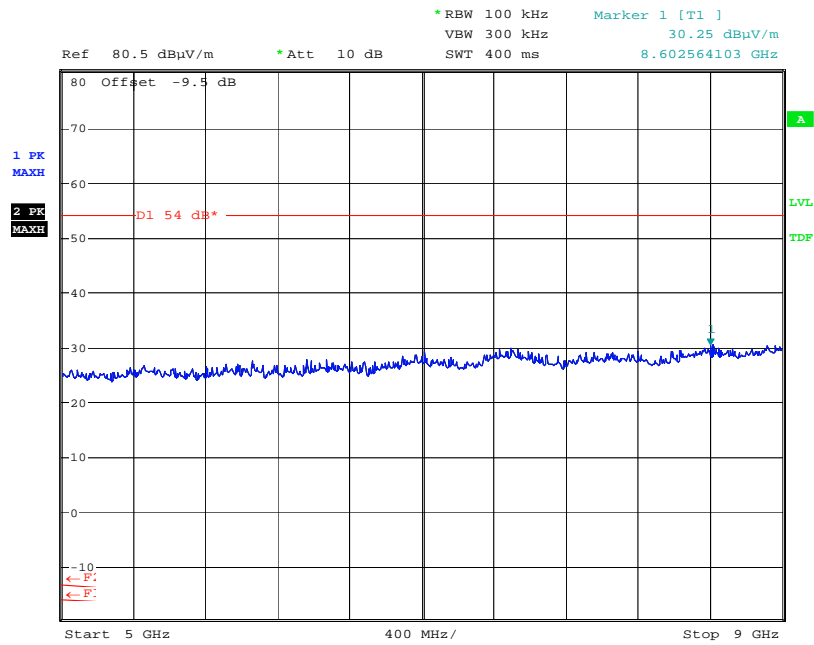


### 30 MHz – 1 GHz



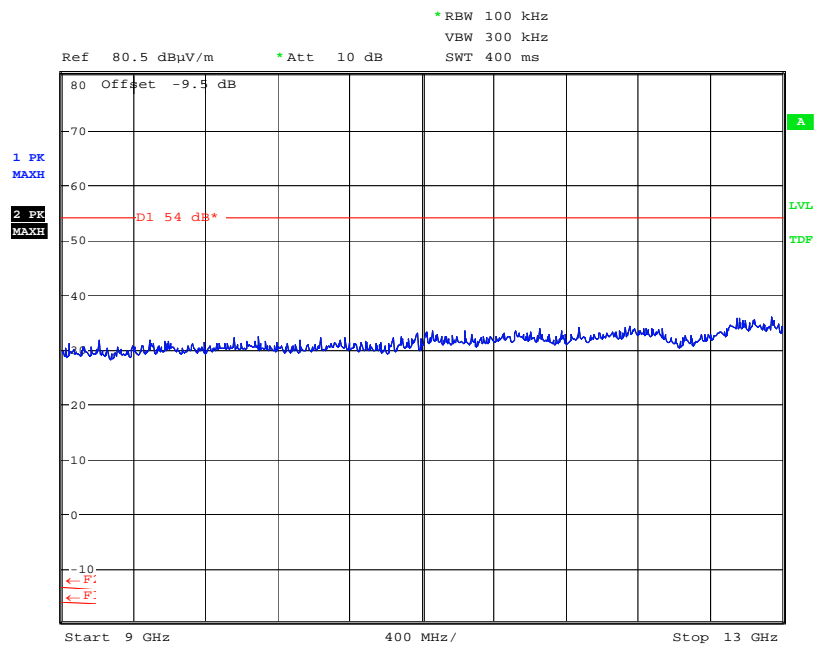
Date: 15.JUL.2009 14:35:01

### 1 GHz – 5 GHz



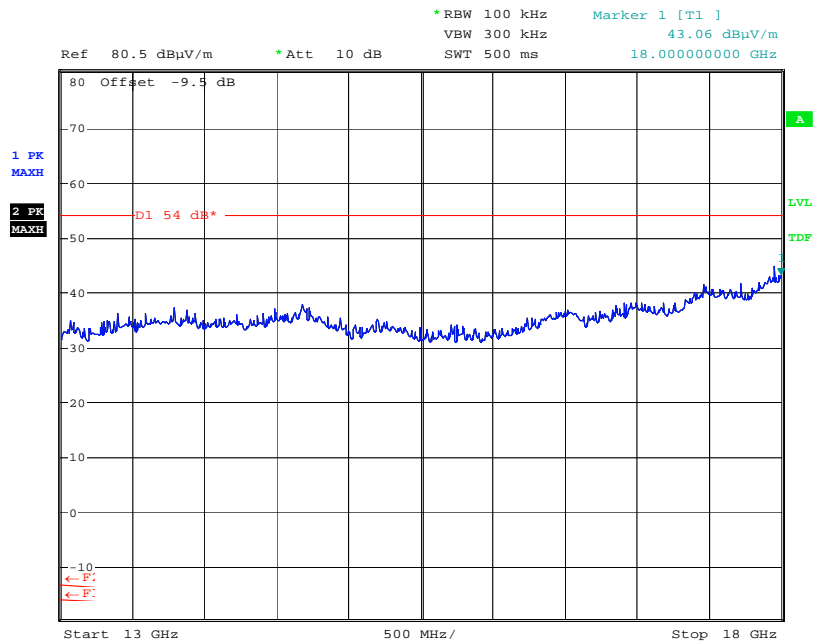
Date: 15.JUL.2009 14:35:31

## 5 GHz – 9 GHz



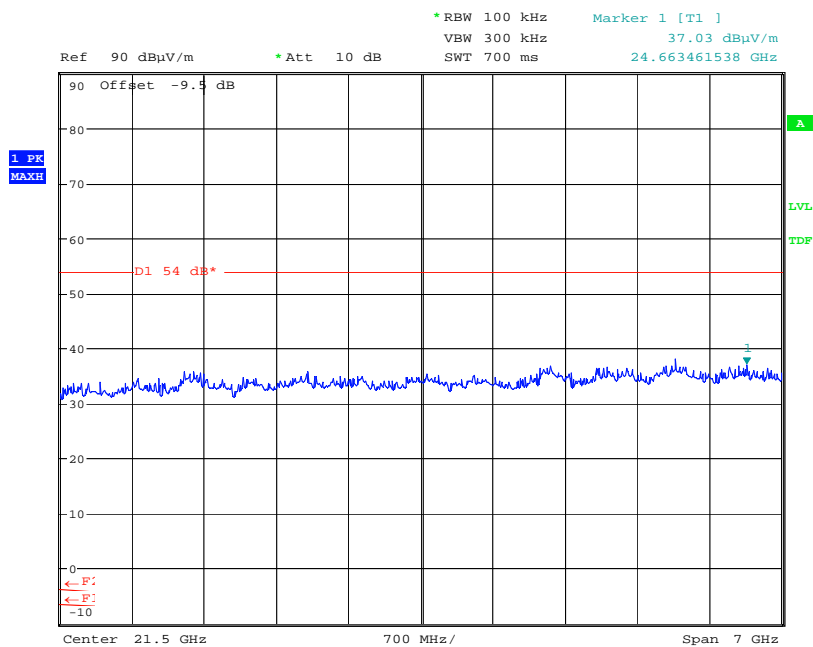
Date: 15.JUL.2009 14:35:53

## 9 GHz – 13 GHz



Date: 15.JUL.2009 14:36:08

## 13 GHz – 18 GHz



Date: 15.JUL.2009 14:46:43

## 18 GHz – 25 GHz