

TEST REPORT NO: RU1267/7257

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**REPORT ON THE CERTIFICATION TESTING OF A
PROMETHEAN TECHNOLOGIES Ltd
ACTIVHub
MODEL NUMBER PRM-AH2-01
WITH RESPECT TO
THE FCC RULES CFR 47, PART 15.247 August 2006
INTENTIONAL RADIATOR SPECIFICATION**

TEST DATE: 7th – 28th September 2006

TESTED BY: S HODGKINSON

APPROVED BY: p.p. J CHARTERS
RADIO SECTION
LEADER

DATE: 11th December 2006

Distribution:

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Notes:		
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: QAM009

PURPOSE OF TEST: Certification

TEST SPECIFICATION: FCC RULES CFR 47, Part 15.247 August 2006

TEST RESULT: Compliant to Specification

EQUIPMENT UNDER TEST: ACTIVHub

ITU: EMISSION CODE: 1M73F7D

EQUIPMENT TYPE: Local area network hub

PRODUCT USE: PC Hub

CARRIER EMISSION: 8.95 mW eirp

ANTENNA TYPE: Integral

ALTERNATIVE ANTENNA: Not Applicable

BAND OF OPERATION: 2400 MHz – 2483.5 MHz

CHANNEL SPACING: 1.73 MHz

NUMBER OF CHANNELS: 46

FREQUENCY GENERATION: SAW Resonator ☐ Crystal ☐ Synthesiser ☒

MODULATION METHOD: DSSS ☐ FHSS ☒

POWER SOURCE(s): +4.5Vdc Via USB

TEST DATE(s): 7th – 28th September 2006

ORDER No(s): P17597

APPLICANT: Promethean Technologies Ltd

ADDRESS: TDS House
Lower Philips Road
Whitebirk Ind Estate
Blackburn
BB1 5TH

TESTED BY: _____ S HODGKINSON

APPROVED BY: _____ p.p. J CHARTERS
RADIO SECTION
LEADER

APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT):	ACTIVHub
EQUIPMENT TYPE:	Response Monitor
PURPOSE OF TEST:	Certification
TEST SPECIFICATION(s):	FCC RULES CFR 47, Part 15.247 August 2006
TEST RESULT:	COMPLIANT Yes ☒ No ☐
APPLICANT'S CATEGORY:	MANUFACTURER ☒ IMPORTER ☐ DISTRIBUTOR ☐ TEST HOUSE ☐ AGENT ☐
APPLICANT'S ORDER No(s):	P17597
APPLICANT'S CONTACT PERSON(s):	Mr B Lofthouse
E-mail address:	Bryan.Lofthouse@prometheanworld.com
APPLICANT:	Promethean Technologies Ltd
ADDRESS:	TDS House Lower Philips Road Whitebirk Ind Estate Blackburn BB1 5TH
TEL:	+44 (0) 1254 298 598
FAX:	+44 (0) 1254 581 574
EUT(s) COUNTRY OF ORIGIN:	United Kingdom
TEST LABORATORY:	TRL Compliance Ltd
UKAS ACCREDITATION No:	0728
TEST DATE(s):	7 th – 28 th September 2006
TEST REPORT No:	RU1267/7257

EQUIPMENT TEST / EXAMINATIONS REQUIRED

1.

TEST/EXAMINATION	RULE PART	DETECTOR	APPLICABILITY
Intentional Emission Frequency:	15.247	Peak	Yes
Intentional Emission Field Strength:	-	-	No
Intentional Emission Band Occupancy:	15.247(a)1	Peak	Yes
Intentional Emission EIRP (mW):	15.247(b)1	Peak	Yes
Spurious Emissions – Conducted:	15.207	Quasi Peak Average	Yes
Spurious Emissions – Conducted:	15.247	Peak	Yes
Spurious Emissions – Radiated <1000MHz:	15.209 15.247 15.109	Quasi Peak	Yes
Spurious Emissions – Radiated >1000MHz:	15.247 15.209 15.109	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 : The AVTIVHub is a hub to receive data from a personal voting system. It connects via USB to a PC.
3. Temperatures: Ambient (Tnom) 21°C
4. Supply Voltages: Vnom +4.5Vdc Via USB
- Note: Vnom voltages are as stated above unless otherwise shown on the test report page
5. Equipment Category: Single channel []
Multi-channel [X]
6. Channel spacing: Narrowband []
Wideband [X]

TRANSMITTER TESTS

TRANSMITTER CONDUCTED EMISSIONS – AC POWER LINE Part 15.207

Ambient temperature = 22°C(<1GHz),
Relative humidity = 48%(<1GHz),
Conditions = Power Line Laboratory
Supply voltage = 110V AC
Supply Frequency = 60Hz

SIGNIFICANT EMISSIONS

FREQUENCY (MHz)	MEASUREMENT RECEIVER READING (dBµV)	DETECTOR	CONDUCTOR (L or N)	LIMIT (dBµV)
0.18	39.14	Average	Live	54.49
0.24	35.74	Average	Live	52.10

Notes:

- 1 See attached plot annex D.
- 2 EUT is to transmit in its normal hopping operating mode.
- 3 The EUT is connected to the Mains Via a PC.
- 4 Only emissions within 20 dB of the limit are recorded.

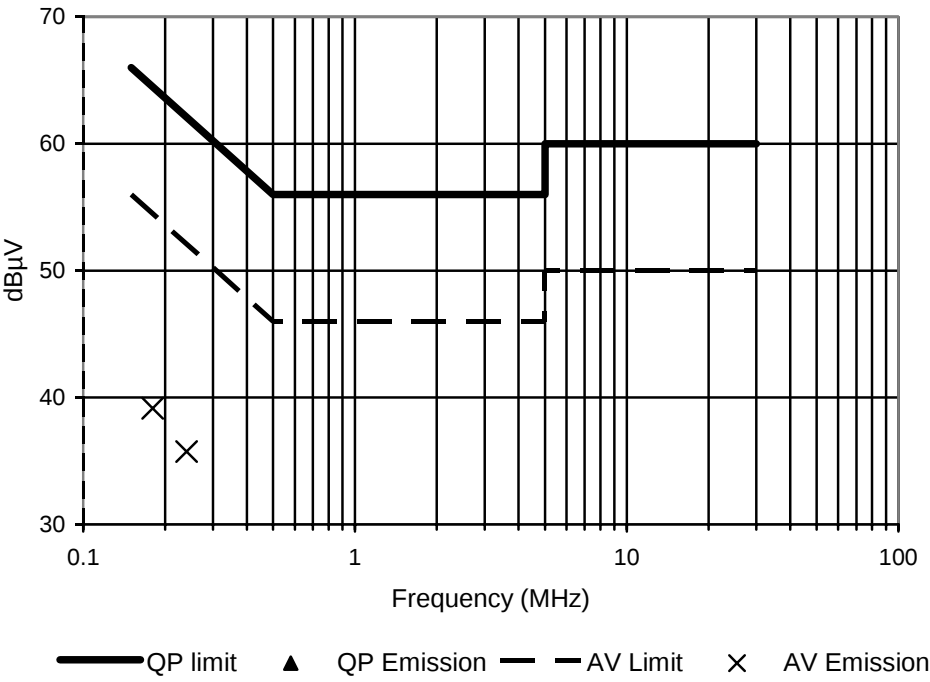
Test Method:

- 1 As per Radio – Noise Emissions, ANSI C63.4: 1992

The test equipment used for the Transmitter Conducted Emissions – AC Power Line Part 15.207 test was:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
RECEIVER	ROHDE & SCHWARZ	ESHS20	837960/003	237	
LISN / AMN	ROHDE & SCHWARZ	ESH3-Z5	83746/010	289	
RECEIVER	ROHDE & SCHWARZ	ESHS10	844077/019	353	
RECEIVER	ROHDE & SCHWARZ	ESHS 10	830051/01	UH03	X
LISN/AMN	ROHDE & SCHWARZ	ESH3-Z5	863906/018	UH05	X
SPECTRUM ANALYSER	MARCONI	2386/2380	152076/004	UH120	

POWER LINE CONDUCTION EMISSIONS



TRANSMITTER TESTS

TRANSMITTER CARRIER FREQUENCY SEPARATION – CONDUCTED – Part 15.247(a)(1)

Ambient temperature	=	21°C
Relative humidity	=	48%
Conditions	=	Conducted –Radio Lab
Supply voltage	=	4.5Vdc

Transmitter Carrier Frequency Separation (MHz)
1.73 MHz
LIMIT SPECIFIED IN 15.247 (A)(1): The channels should be separated by at least 25kHz or two-thirds the 20dB bandwidth of a hopping channel which ever is greater.

See spectrum analyser plot – Annex E
See note 1

- Notes:**
- 1 20dB Bandwidth of one carrier is 1.45MHz therefore carrier frequency separation must be greater than 1.45MHz.
 - 2 Conducted measurements were performed with a temporary antenna connector provided by the client.
 - 3 For analyser setting see scan data annex E.

- Test Method:**
- 1 Test method as per 15.247 and public notice DA 00-705.
 - 2 With the unit operating in hopping mode with maximum data rate a graphical plot of two adjacent channels was taken.
 - 3 Delta marker function was used to measure the difference between the peak emissions of each channel.

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	ROHDE & SCHWARZ	FSU 46	200034	UH281	X
ATTENUATOR	BIRD	8304-100-N	N/A	222	X
CABLE	MEGAPHASE	TM26 3131 36	400559	UH293	X

TRANSMITTER TESTS

TRANSMITTER 20dB BANDWIDTH – CONDUCTED – Part 15.247(a)(1)

Ambient temperature	=	21°C
Relative humidity	=	48%
Conditions	=	Conducted –Radio Lab
Supply voltage	=	4.5Vdc

20dB Bandwidth (kHz)
1.45 MHz

See spectrum analyser plot – Annex G

- Notes:**
- 1 The EUT has 46 hopping channels see annex F.
 - 2 Conducted measurements were performed with a temporary antenna connector provided by the client.
 - 3 For analyser setting see scan data annex G.

- Test Method:**
- 1 Test method as per 15.247 and public notice DA 00-705.
 - 2 With the unit operating in hopping mode with maximum data rate.
 - 3 The analyser was centre frequency was tuned to the centre of a hopping channel.
 - 4 The peak hold function was used to establish a 20dB bandwidth level.

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	ROHDE & SCHWARZ	FSU 46	200034	UH281	X
ATTENUATOR	BIRD	8304-100-N	N/A	222	X
CABLE	MEGAPHASE	TM26 3131 36	400559	UH293	X

TRANSMITTER TESTS

TRANSMITTER AVERAGE TIME OF OCCUPANCY – CONDUCTED – Part 15.247(a)(1)(iii)

Ambient temperature = 21°C
Relative humidity = 48%
Conditions = Conducted –Radio Lab
Supply voltage = 4.5Vdc

Packet Width (µs)	Number of Transmissions in 18.4 Seconds	Average time of Occupancy (ms)
592.3	48	0.0284
Limit 0.4seconds		

See spectrum analyser plot – Annex H

Notes:

- 1 Conducted measurements were performed with a temporary antenna connector provided by the client.
- 2 For analyser setting see scan data annex H.
- 3 18.4 second duration = $0.4 * 46$ (Number of hopping channels)

Test Method:

- 1 As per 15.247 and Public Notice DA 00-705.
- 2 The analyser was tuned to the centre frequency of the hopping channel
- 3 With the analyser set to zero span a sweep of 18.4 seconds was performed. The number of transmission was recorded.
- 4 The sweep time was reduced to show the length of one transmission.
The time occupancy of the system was tested on a single carrier. The maximum packet length was measured and multiplied by the number of transmissions within a 18.4 second period. The result was noted as being the average time of occupancy.

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	ROHDE & SCHWARZ	FSU 46	200034	UH281	X
ATTENUATOR	BIRD	8304-100-N	N/A	222	X
CABLE	MEGAPHASE	TM26 3131 36	400559	UH293	X

TRANSMITTER TESTS

TRANSMITTER PEAK OUTPUT POWER – CONDUCTED – Part 15.247(b)(1)

Ambient temperature = 21°C
Relative humidity = 48%
Conditions = Conducted –Radio Lab
Supply voltage = 4.5Vdc

Channel Frequency (MHz)	Measured Level (dBm)	Cable & Attenuator Loss (dB)	Antenna Gain (dBi)	Transmitter Peak Power Output (dBm)	Transmitter Peak Power Output (Watts)	Limit (Watts)
2402.784	-6.10	11.34	4.1	9.34	0.00859	0.125
2440.800	-5.92	11.34	4.1	9.52	0.00895	0.125
2480.544	-5.96	11.34	4.1	9.48	0.00887	0.125

See spectrum analyser plot – Annex I

Notes:

- 1 Number of hopping channels employed is 46 see annex F.
- 2 Conducted measurements were performed with a temporary antenna connector provided by the client.
- 3 For analyser setting see scan data annex I.
- 4 The EUT was set to transmit a permanent carrier on the required channel.
- 5 Antenna gain as declared by manufacturer.

Test Method:

- 1 As per 15.247 and Public Notice DA 00-705.
- 2 The analyser was centered on a hopping channel with peak hold enabled.
- 3 Marker to peak function was used to find the peak emission.

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	ROHDE & SCHWARZ	FSU 46	200034	UH281	X
ATTENUATOR	BIRD	8304-100-N	N/A	222	X
CABLE	MEGAPHASE	TM26 3131 36	400559	UH293	X

TRANSMITTER TESTS

TRANSMITTER BAND EDGE EMISSIONS – CONDUCTED – Part 15.247(c)

Ambient temperature = 21°C
Relative humidity = 48%
Conditions = Conducted – Radio Lab
Supply voltage = +4.5Vdc

Test Result

Measured as compliant; see analyser plots.

Notes:

- 1 The EUT was set in a hopping mode using all hopping channels.
- 2 A temporary antenna connector was used to take the measurement.
- 3 See Annex J for analysers plots.

Test Method:

- 1 As per section 15.247 and Public Notice DA 00-705.
- 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	ROHDE & SCHWARZ	FSU 46	200034	UH281	X
ATTENUATOR	BIRD	8304-100-N	N/A	222	X
CABLE	MEGAPHASE	TM26 3131 36	400559	UH293	X

TRANSMITTER TESTS

TRANSMITTER CONDUCTED SPURIOUS EMISSIONS – CONDUCTED – Part 15.247(c)

Ambient temperature = 21°C
 Relative humidity = 48%
 Conditions = Conducted –Radio Lab
 Supply voltage = +4.5Vdc

Top Channel

Range Frequency (MHz)	Emission Frequency (MHz)	Emission Level	Cable loss	Level (dBm)	Limit (dBm)
30 - 25000	No Significant Emissions Within 20 dB of the Limit				-26.12

See spectrum analyser scan plots – Annex K

Bottom Channel

Range Frequency (MHz)	Emission Frequency (MHz)	Emission Level	Cable loss	Level (dBm)	Limit (dBm)
30 - 25000	No Significant Emissions Within 20 dB of the Limit				-26.71

See spectrum analyser scan plots – Annex K

Hopping at maximum data rate

Range Frequency (MHz)	Emission Frequency (MHz)	Emission Level	Cable loss	Level (dBm)	Limit (dBm)
30 - 25000	No Significant Emissions Within 20 dB of the Limit				-25.99

See spectrum analyser scan plots – Annex K

Notes:

- During the scans the unit was operated in the following modes:
 Hopping stopped unit operating on lowest channel
 Hopping stopped unit operating on highest channel
 Hopping over all frequencies.
- Section 15.247(c) states that all spurious emissions measured within a 100kHz bandwidth shall be attenuated by at least 20dB below the level of the highest fundamental level measured within a 100kHz bandwidth.
- Only emissions within 20dB of limit are recorded.

Test Method:

- As per section 15.247 and Public Notice DA 00-705.
- Frequency sweeps were performed to check for spurious emissions.
- Any emissions discovered were checked for compliance with the limit.

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	ROHDE & SCHWARZ	FSU 46	200034	UH281	X
ATTENUATOR	BIRD	8304-100-N	N/A	222	X
CABLE	MEGAPHASE	TM26 3131 36	400559	UH293	X

TRANSMITTER TESTS

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

Ambient temperature = 20°C
 Relative humidity = 58%
 Conditions = Radiated OATS
 Supply voltage = +4.5Vdc

Bottom Channel 30MHz -25000MHz

	Emission Frequency (MHz)	Meas. Rx. (dBuV)	Cable loss (dB)	Ant. Factor (dBi)	Field Strength (dBµV/m)	Extrap. Factor (dB)	Result (µV/m)	Limit (µV/m)
30MHz – 88MHz Restricted band	Note 5							100
88MHz – 216MHz Restricted band	Note 5							150
216MHz – 960MHz Restricted band	331.80	21.6	2.1	13.9	37.6	-	75.85	200
960MHz – 1GHz Restricted band	Note 5							500
1GHz – 25GHz Restricted band	2388.0 4805.9	35.55 24.59	1.65 1.16	28.9 33.5	66.10 59.25	-20 -20	201.84 91.73	500 500
30MHz – 25GHz	Note 5							-20dBc

Top Channel 30MHz -25000MHz

	Emission Frequency (MHz)	Meas. Rx. (dBuV)	Cable loss (dB)	Ant. Factor (dBi)	Field Strength (dBµV/m)	Extrap. Factor (dB)	Result (µV/m)	Limit (µV/m)
30MHz – 88MHz Restricted band	Note 5							100
88MHz – 216MHz Restricted band	Note 5							150
216MHz – 960MHz Restricted band	245.75 260.15 325.15 400.00	23.9 20.8 19.5 15.6	1.8 1.9 2.1 2.4	11.3 13.5 13.7 16.0	37.0 36.2 35.3 34.0	- - - -	70.79 64.56 58.21 50.12	200 200 200 200
960MHz – 1GHz Restricted band	Note 5							500
1GHz – 25GHz Restricted band	4961.6	22.37	1.16	33.5	57.03	-20	71.04	500
30MHz – 25GHz	Note 5							-20dBc

TRANSMITTER TESTS

TRANSMITTER EMISSIONS cont. – RADIATED – Part 15.247(c) and 15.209

Hopping at maximum data rate 30MHz -25000MHz

	Emission Frequency (MHz)	Meas. Rx. (dBuV)	Cable loss (dB)	Ant. Factor (dBi)	Field Strength (dBµV/m)	Extrap. Factor (dB)	Result (µV/m)	Limit (µV/m)
30MHz – 88MHz Restricted band	Note 5							100
88MHz – 216MHz Restricted band	Note 5							150
216MHz – 960MHz Restricted band	245.75 260.15 331.80	23.9 20.8 21.6	1.8 1.9 2.1	11.3 13.5 13.9	37.0 36.2 37.6	- - -	70.79 64.56 75.85	200 200 200
960MHz – 1GHz Restricted band	Note 5							500
1GHz – 25GHz Restricted band	2389.2 4958.5	36.22 26.68	1.65 1.16	28.9 33.5	66.77 61.34	-20 -20	218.02 116.72	500 500
30MHz – 25GHz	Note 5							-20dBc

Notes:

- 1 During the scans the unit was operated in the following modes:
Hopping stopped unit operating on lowest channel.
Hopping stopped unit operating on highest channel.
Hopping between top and bottom operating frequencies.
- 2 Emissions above 1GHz were measured with both a peak and average detectors.
- 3 Measurements <1GHz were performed at 3 meters.
- 4 Measurements >1GHz were initially performed at 0.3metres. This distance was increased if sensitivity of analyser allowed.
- 5 Only emissions with in 20dB of limit are recorded.

Test Method:

- 1 As per section 15.247 and Public Notice DA 00-705.
- 2 Measuring distances as Notes 3 to 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 below:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
RECEIVER	ROHDE & SCHWARZ	ESHS 10	841431/014	UH186	X
SPECTRUM ANALYSER	ROHDE & SCHWARZ	FSU 46	200034	UH281	X
RANGE 1	TRL	3 METRE	N/A	UH06	X
BILOG ANTENNA	CHASE	CBL6111	1945	290	X
HORN ANTENNA	EMCO	3115	9010-3581	139	X

TRANSMITTER TESTS

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

Ambient temperature = 20°C
Relative humidity = 58%
Conditions = Radiated OATS
Supply voltage = +4.5Vdc

Test Result

Measured as compliant; see analyser plots.

- Notes:**
- 1 The EUT was set in a hopping mode using all hopping channels.
 - 2 See Annex L for analysers plots.

Test Method:

- 1 As per section 15.247 and Public Notice DA 00-705.
- 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
RECEIVER	ROHDE & SCHWARZ	ESHS 10	841431/014	UH186	
SPECTRUM ANALYSER	ROHDE & SCHWARZ	FSU 46	200034	UH281	X
RANGE 1	TRL	3 METRE	N/A	UH06	
BILOG ANTENNA	CHASE	CBL6111	1945	290	
HORN ANTENNA	EMCO	3115	9010-3581	139	X

RECEIVER TESTS

RECEIVER EMISSIONS RADIATED – Part 15.109

Ambient temperature = 20°C
 Relative humidity = 58%
 Conditions = Radiated OATS
 Supply voltage = +4.5Vdc

	Emission Frequency (MHz)	Meas. Rx. (dBuV)	Cable loss (dB)	Ant. Factor (dBi)	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	399.15	16.1	2.4	16.0	34.5	-	53.08	200
960MHz – 1GHz	Note 5							500
1GHz – 25GHz	Note 5							500

Notes:

- 1 During the scans the unit was operated in the following modes:
Hopping between all operating frequencies in receive mode.
- 2 Emissions above 1GHz were measured with both a peak and average detectors.
- 3 Measurements <1GHz were performed at 3 meters.
- 4 Measurements >1GHz were initially performed at 0.3metres. This distance was increased if sensitivity of analyser allowed.
- 5 Only emissions with in 20dB of limit are recorded.

Test Method:

- 1 As per section 15.247 and Public Notice DA 00-705.
- 2 Measuring distances as Notes 3 to 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 below:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
RECEIVER	ROHDE & SCHWARZ	ESHS 10	841431/014	UH186	X
SPECTRUM ANALYSER	ROHDE & SCHWARZ	FSU 46	200034	UH281	X
RANGE 1	TRL	3 METRE	N/A	UH06	X
BILOG ANTENNA	CHASE	CBL6111	1945	290	X
HORN ANTENNA	EMCO	3115	9010-3581	139	X

ANNEX A
PHOTOGRAPHS

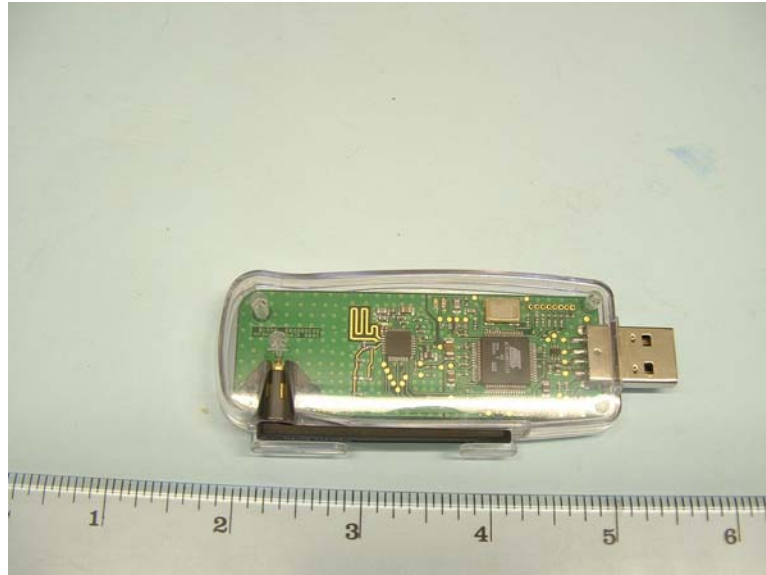
PHOTOGRAPH No. 1

TEST SETUP



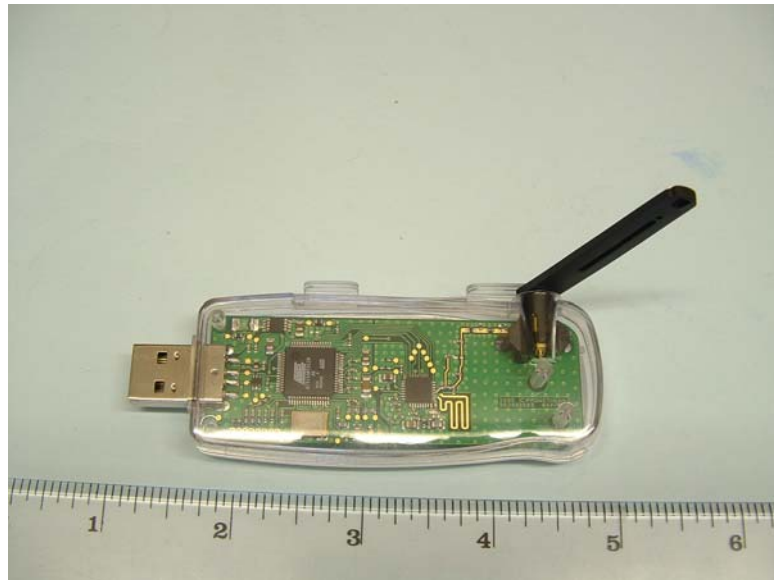
PHOTOGRAPH No. 2

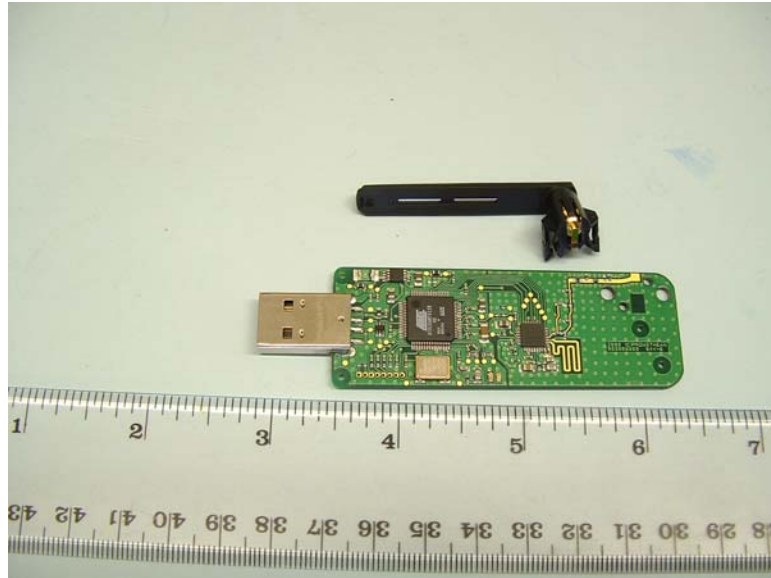
OVERVIEW ANTENNA LOWERED

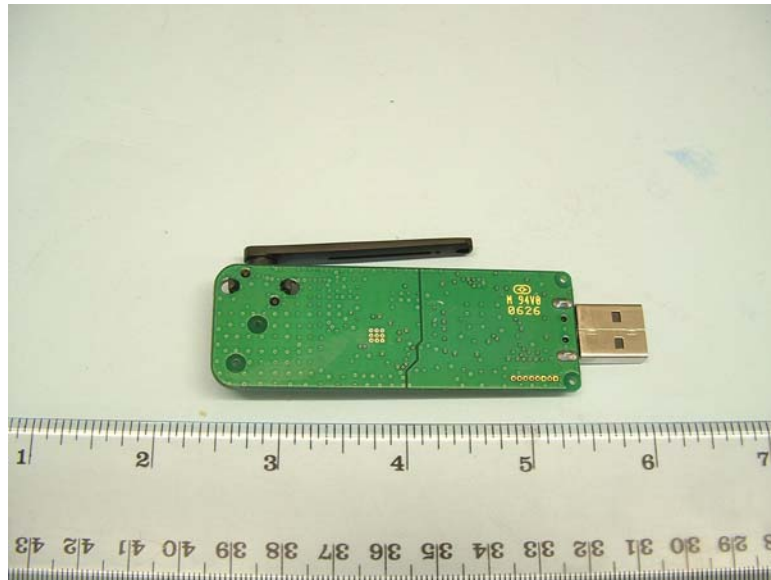


PHOTOGRAPH No. 3

OVERVIEW ANTENNA RAISED







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
UH003	Receiver	R&S	24/07/2006	12	24/07/2007
UH005	LISN	R&S	11/04/2006	12	11/04/2007
UH006	3m Range ERP CAL	TRL	06/01/2006	12	06/01/2007
UH028	Log Periodic Ant	Schwarbeck	28/04/2005	24	28/04/2007
UH029	Bicone Antenna	Schwarbeck	27/04/2005	24	27/04/2007
UH041	Multimeter	AVOmeter	20/12/2005	12	20/12/2006
UH122	Oscilloscope	Tektronix	07/06/2005	24	07/06/2007
UH132	Power meter	Marconi	03/01/2006	12	03/01/2007
UH162	ERP Cable Cal	TRL	06/01/2006	12	06/01/2007
UH187	Receiver	R&S	01/02/2006	12	01/02/2007
UH228	Power Sensor	Marconi	03/01/2006	12	03/01/2007
UH253	1m Cable N type	TRL	23/02/2006	12	23/02/2007
UH254	1m Cable N type	TRL	05/01/2006	12	05/01/2007
UH265	Notch filer	Telonic	24/06/2005	12	24/06/2006
UH271	1m Cable N type	TRL	23/02/2006	12	23/02/2007
UH273	1m Cable N type	TRL	23/02/2006	12	23/02/2007
UH281	Spectrum Analyser	R&S	24/07/2006	12	24/07/2007
UH293	Cable	Megaphase		Calibrate in use	
L005	CMTA	R&S	05/12/2005	12	05/12/2006
L007	Loop Antenna	R&S	29/03/2005	24	29/03/2007
L138	1-18GHz Horn	EMCO	15/04/2005	24	15/04/2007
L139	1-18GHz Horn	EMCO	03/05/2005	24	03/05/2007
L176	Signal Generator	Marconi	15/02/2006	12	15/02/2007
L193	Bicone Antenna	Chase	12/10/2003	24	12/10/2005
L203	Log Periodic Ant	Chase	21/10/2003	24	21/10/2005
L222	Attenuator	Bird		Calibrate in use	
L280	18GHz Cable	Rosenberger	05/01/2006	12	05/01/2007
L290	Bilog Antenna	Chase	20/10/2005	24	20/10/2007
L343	CCIR Noise Filter	TRL	20/09/2006	12	20/09/2007
L426	Temperature Indicator	Fluke	04/01/2006	12	04/01/2007
L479	Analyser	Anritsu	18/11/2005	12	18/11/2006
L552	Signal Generator	Agilent	24/07/2006	12	24/07/2007
L572	Pre Amp	Agilent	03/02/2006	12	03/02/2007
N/A	High Pass Filter	AFL	23/02/2006	12	23/02/2007

ANNEX D
POWER LINE CONDUCTION

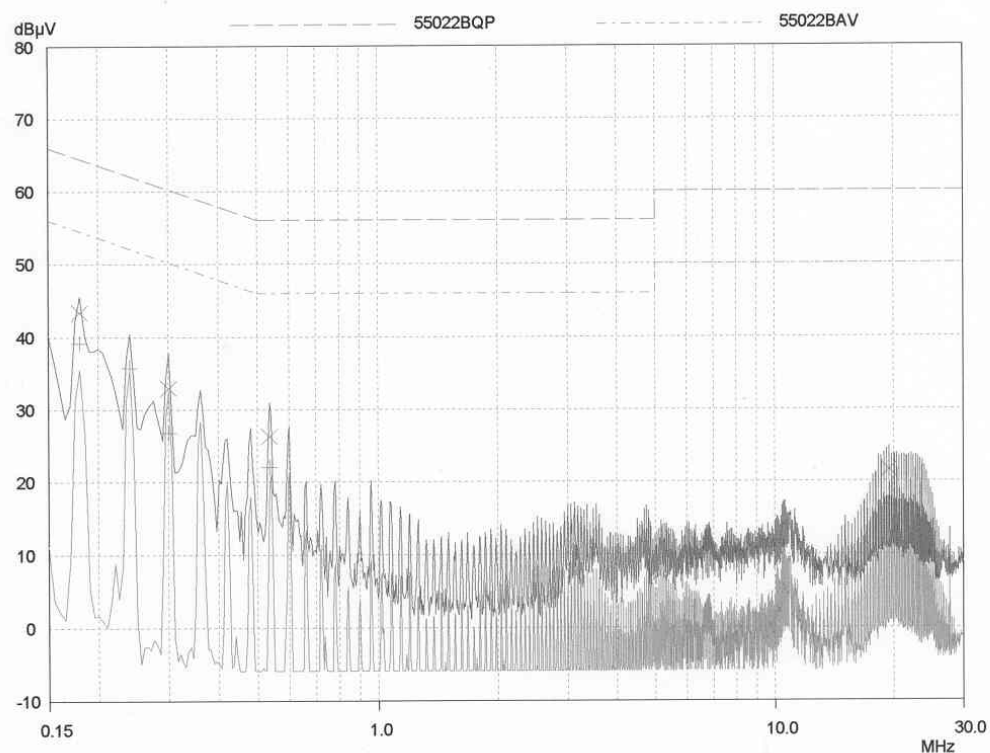
Powerline Conduction

28 Sep 2006 09:15

150kHz - 30MHz

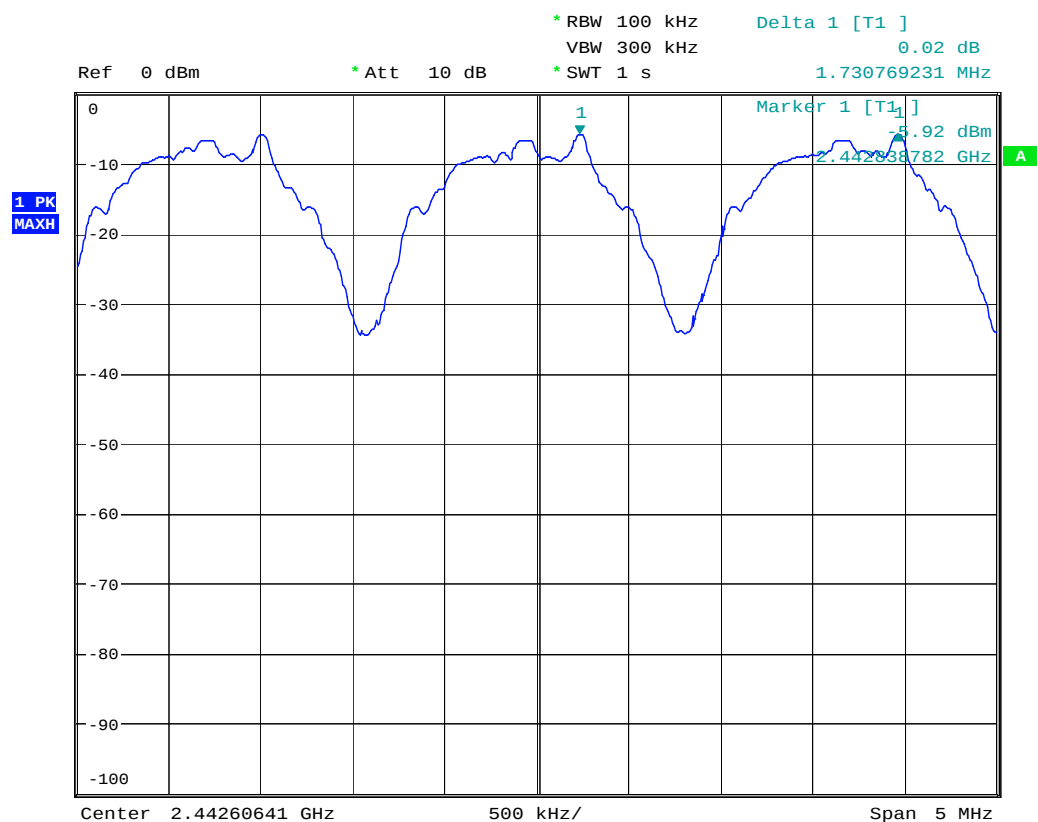
EUT: Activhub
 Manuf: Promethean
 Op Cond: LISN UH05, cable UH21 & Receiver UH187
 Operator: S Hodgkinson
 Test Spec: EN55022 Class B (or Variant)
 Comment: Live 110v 60Hz
 Unit in tx hopping mode

Scan Settings		(1 Range)			Receiver Settings					
		Frequencies			IF BW	Detector	M-Time	Atten	Preamp	OpRge
Start	Stop	Step			10kHz	PK+AV	50msec	Auto	OFF	60dB
150kHz	30MHz	5kHz								
Transducer	No.	Start	Stop	Name						
	1	150kHz	30MHz	UH21						
Final Measurement:		Detectors:	X QP / + AV							
		Meas Time:	2sec							
		Subranges:	25							
		Acc Margin:	20 dB							



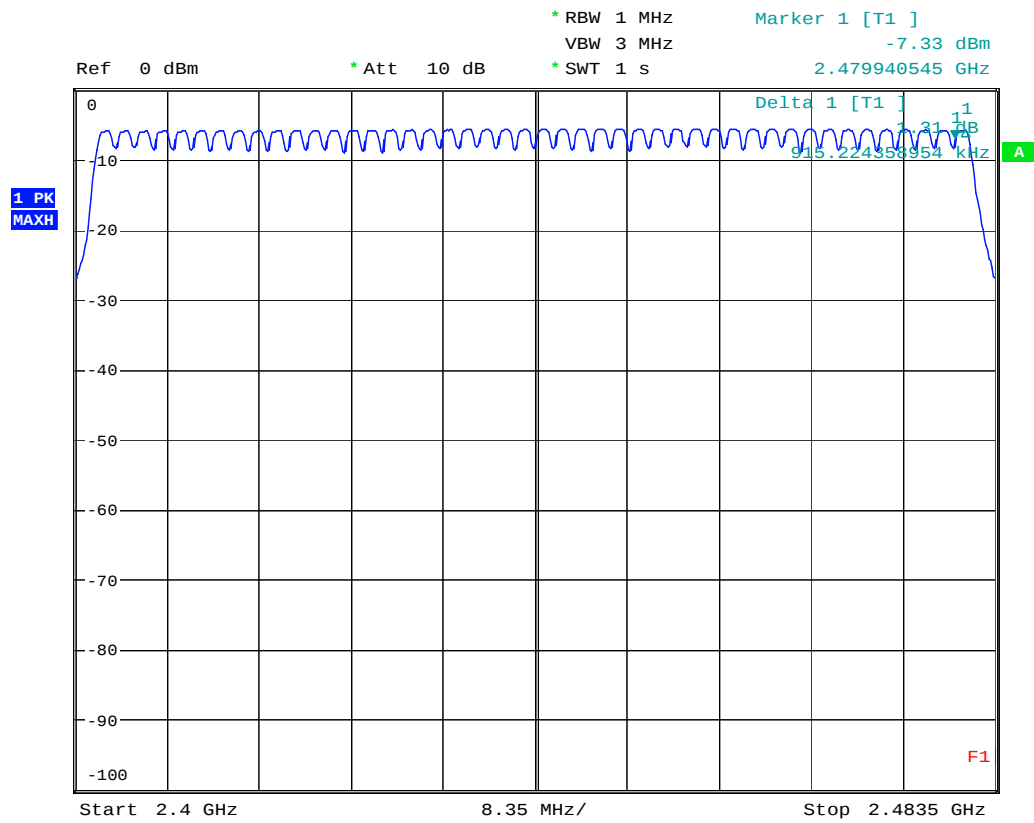
ANNEX E

CARRIER FREQUENCY SEPARATION



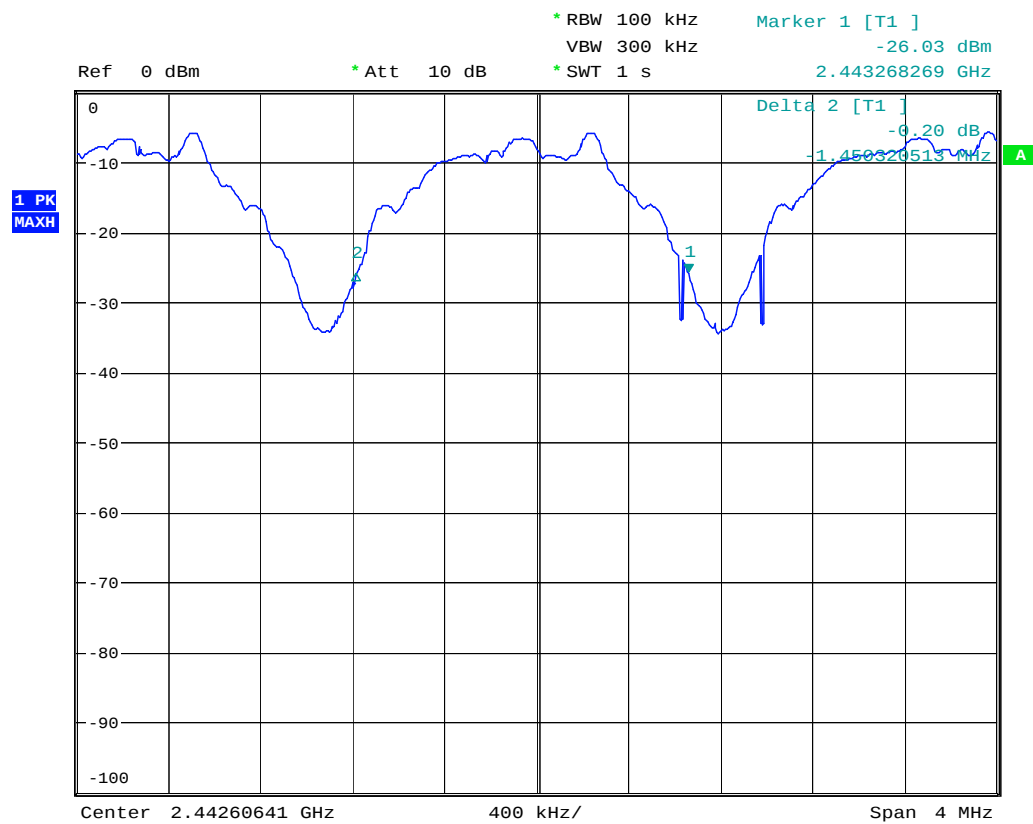
Date: 7.SEP.2006 12:24:49

ANNEX F
NUMBER OF HOPPING CHANNELS



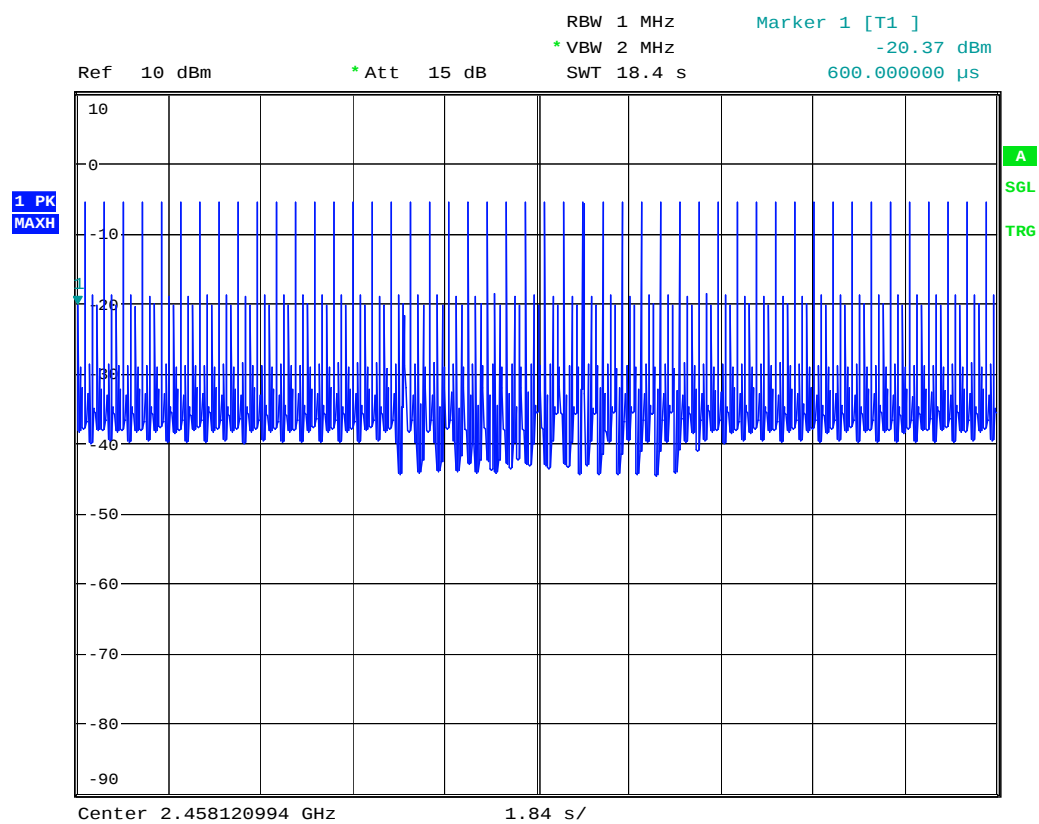
Date: 7.SEP.2006 12:03:41

ANNEX G
20dB BANDWIDTH



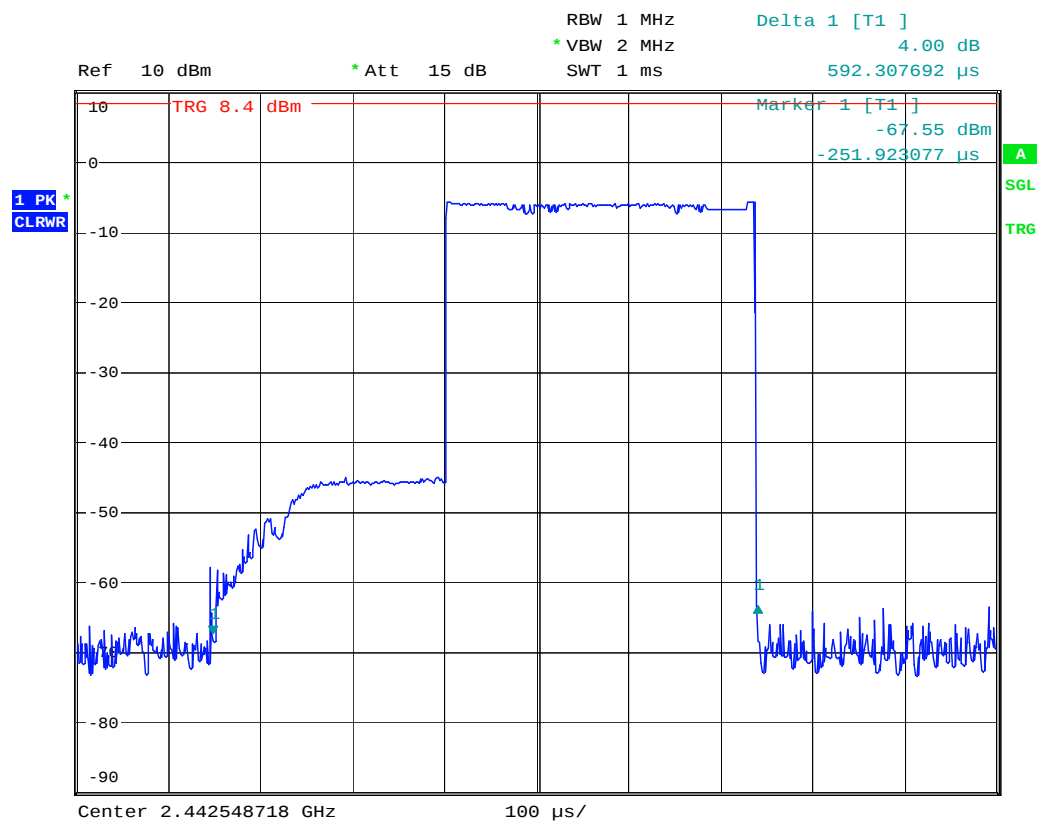
Date: 7.SEP.2006 12:55:41

ANNEX H
AVERAGE TIME OF OCCUPANCY



Date: 8.SEP.2006 11:14:32

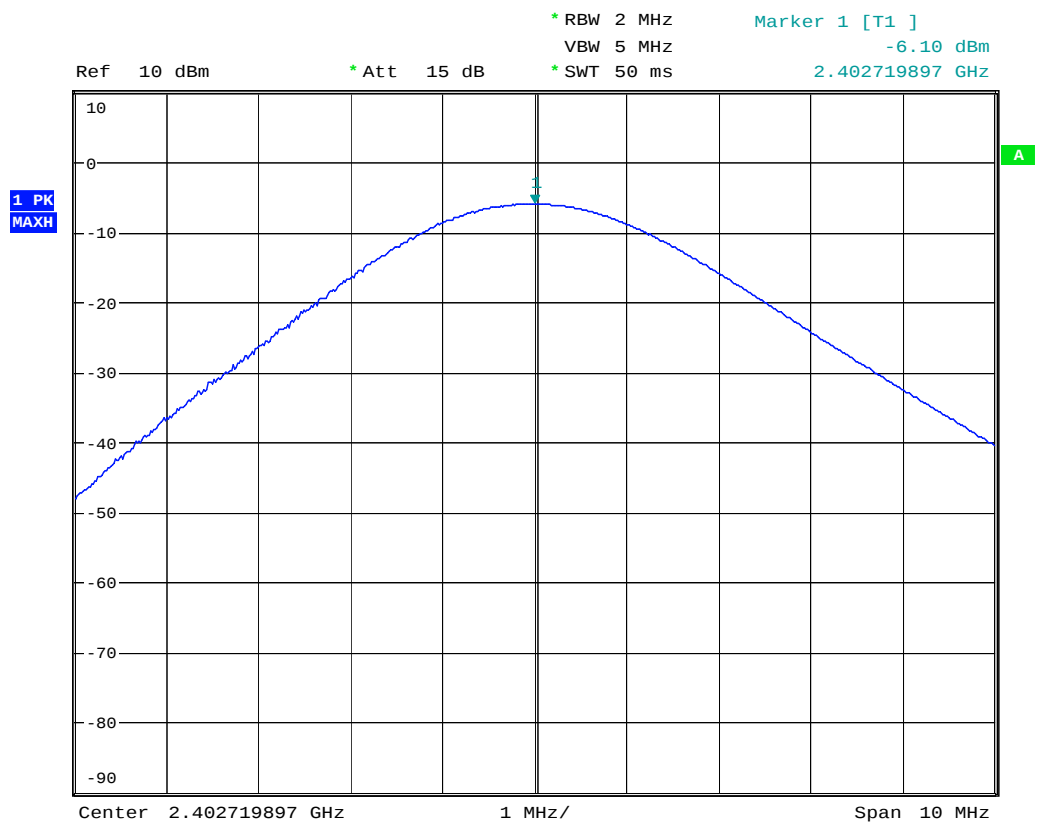
Number of transmissions made within 18.4 seconds



Date: 7.SEP.2006 13:07:34

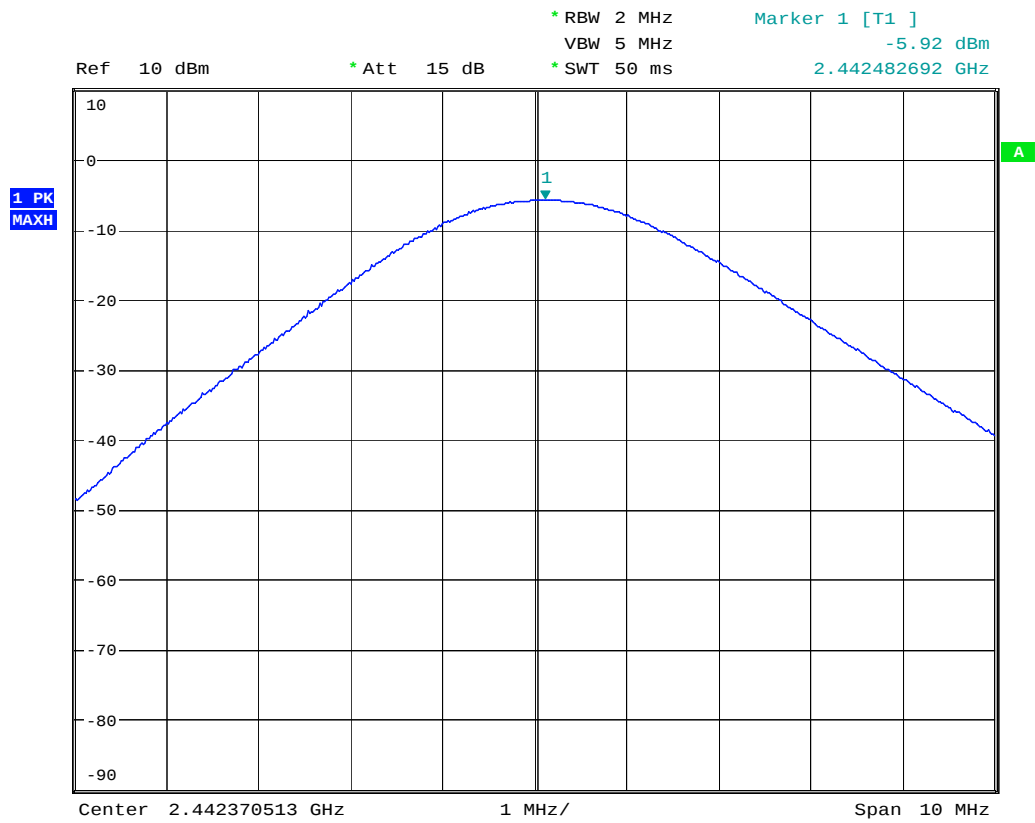
Length of one packet

ANNEX I
PEAK POWER CONDUCTED



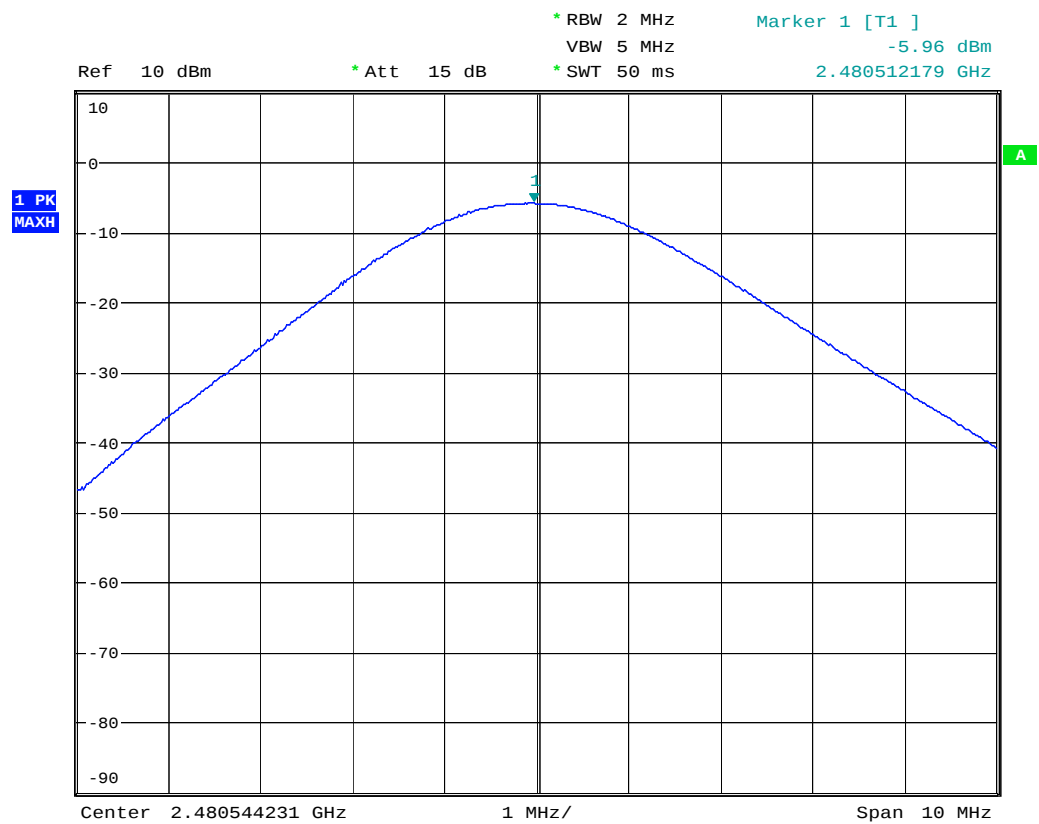
Date: 8.SEP.2006 12:21:43

PEAK POWER LOW CHANNEL



Date: 8.SEP.2006 12:19:24

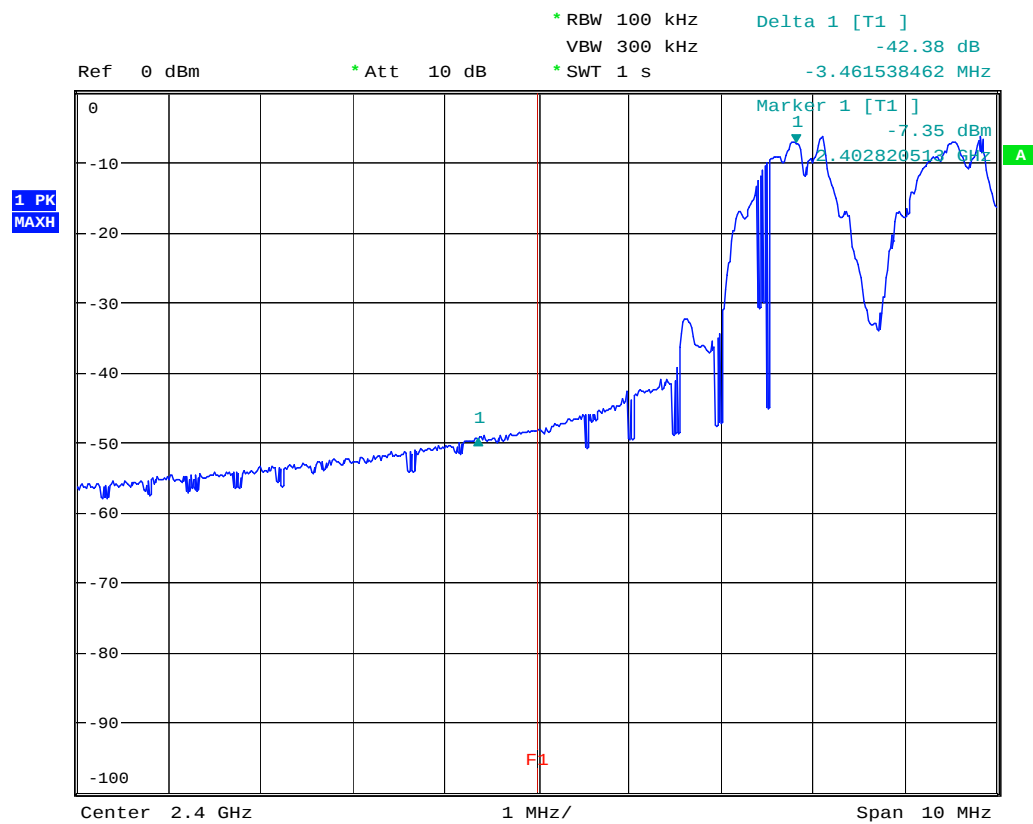
PEAK POWER MID CHANNEL



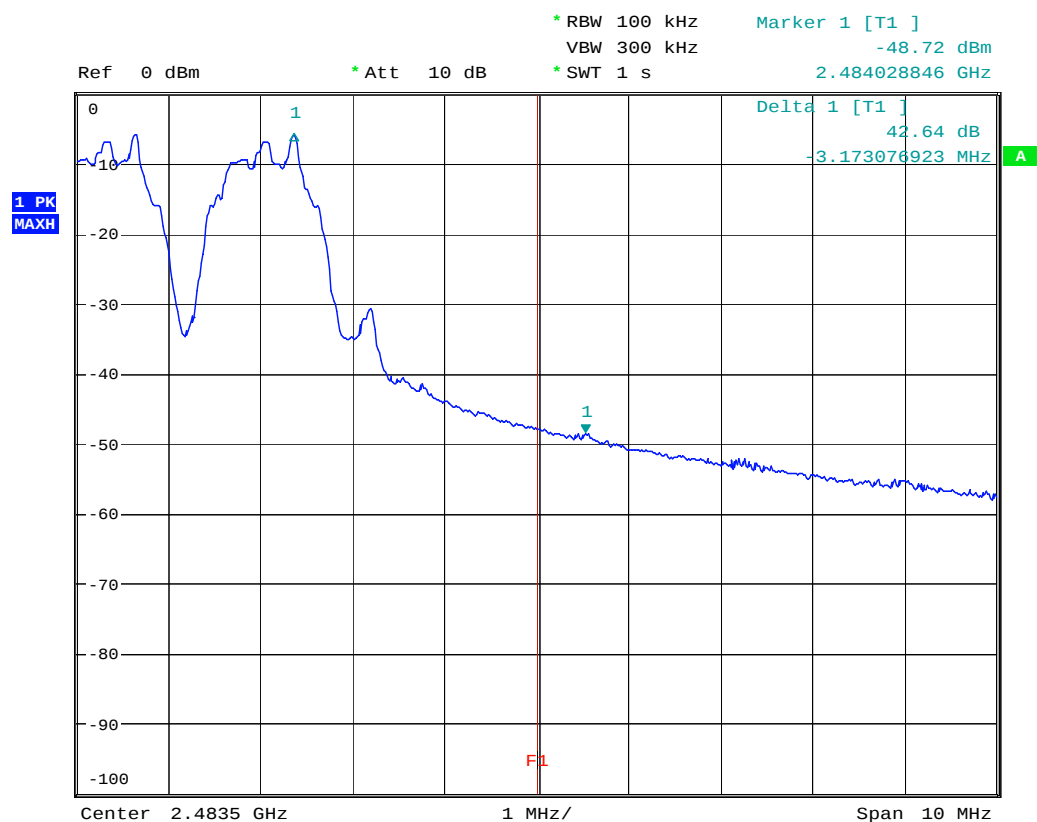
Date: 8.SEP.2006 12:17:12

PEAK POWER HIGH CHANNEL

ANNEX J
BAND EDGE CONDUCTED EMISSION



Date: 7.SEP.2006 11:15:29

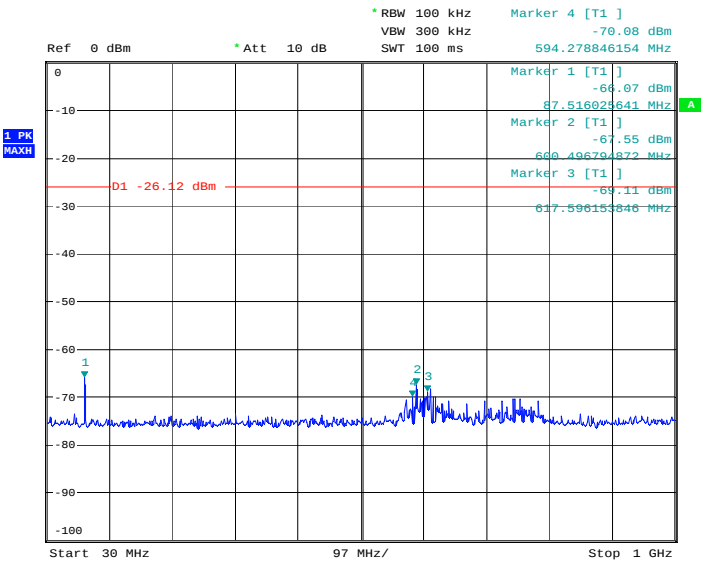


Date: 7.SEP.2006 11:31:51

ANNEX K
CONDUCTED SPURIOUS EMISSION

Bottom Channel

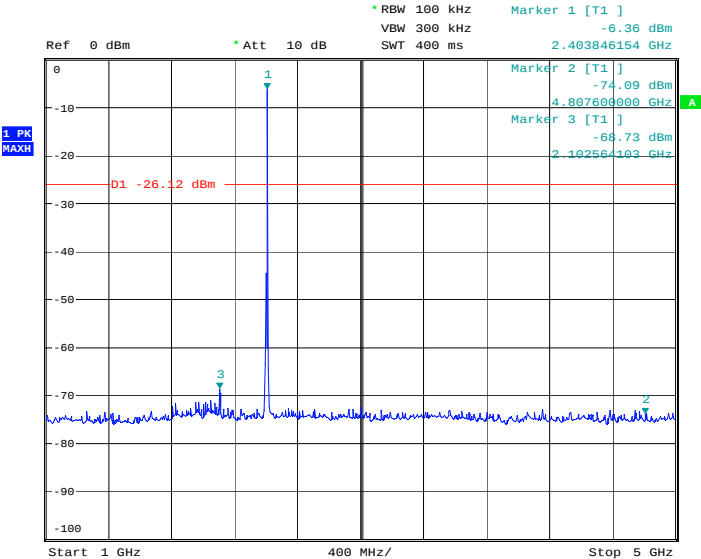
30 MHz – 1 GHz



Date: 8.SEP.2006 14:10:41

Bottom Channel

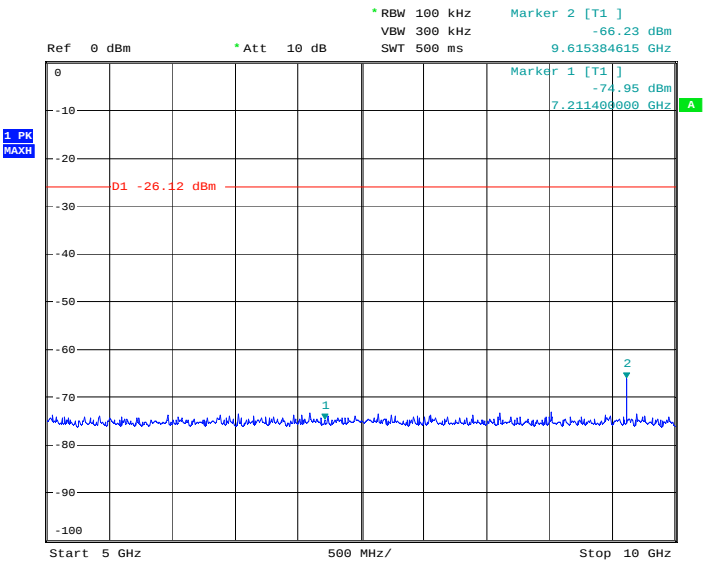
1 GHz – 5 GHz



Date: 8.SEP.2006 14:12:02

Bottom Channel

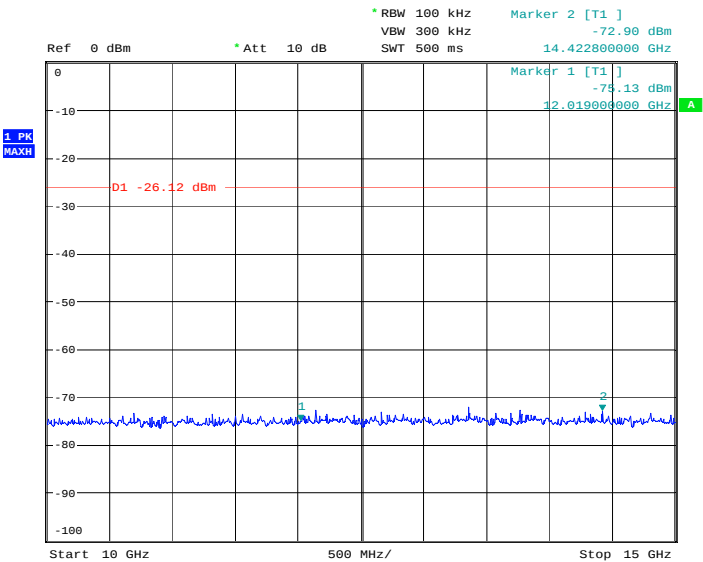
5 GHz – 10 GHz



Date: 8.SEP.2006 14:12:51

Bottom Channel

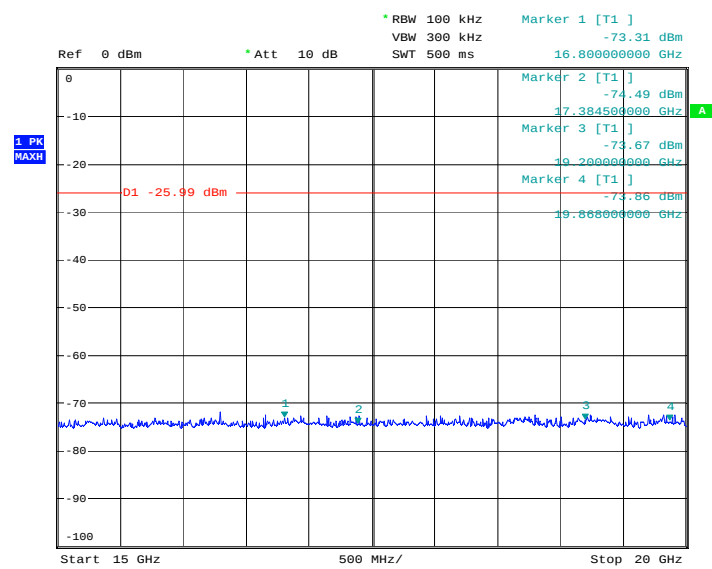
10 GHz – 15 GHz



Date: 8.SEP.2006 14:13:38

Bottom Channel

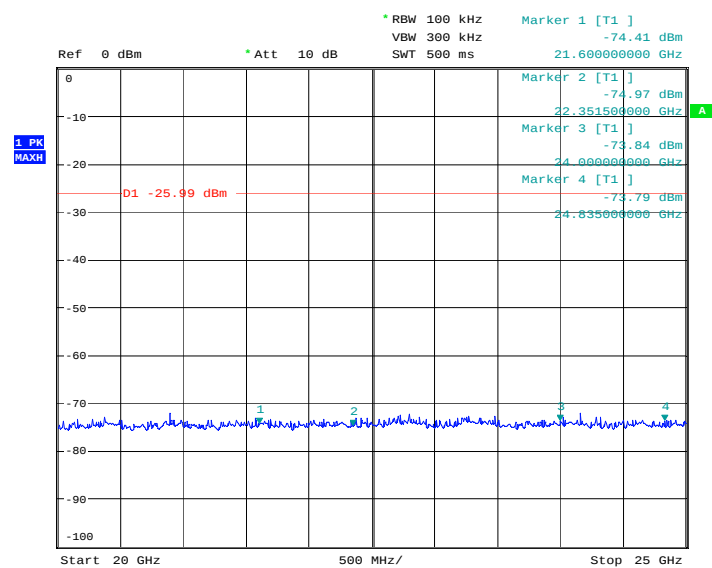
15 GHz – 20 GHz



Date: 8.SEP.2006 13:21:20

Bottom Channel

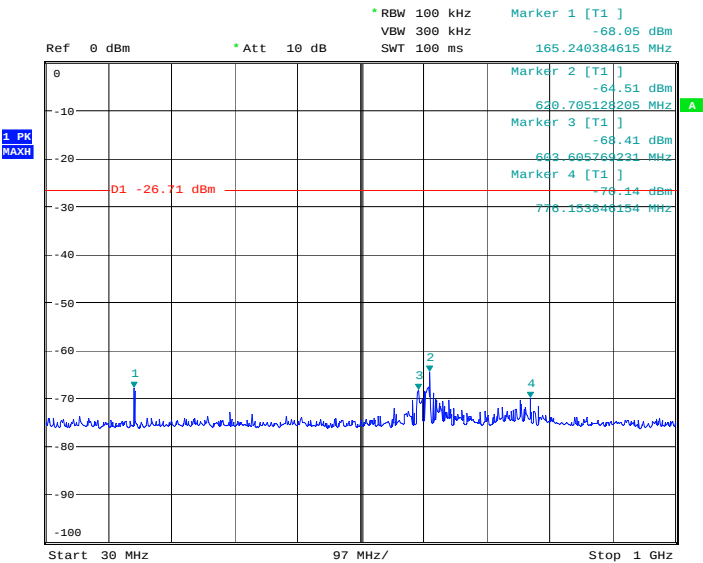
20 GHz – 25 GHz



Date: 8.SEP.2006 13:22:28

Top Channel

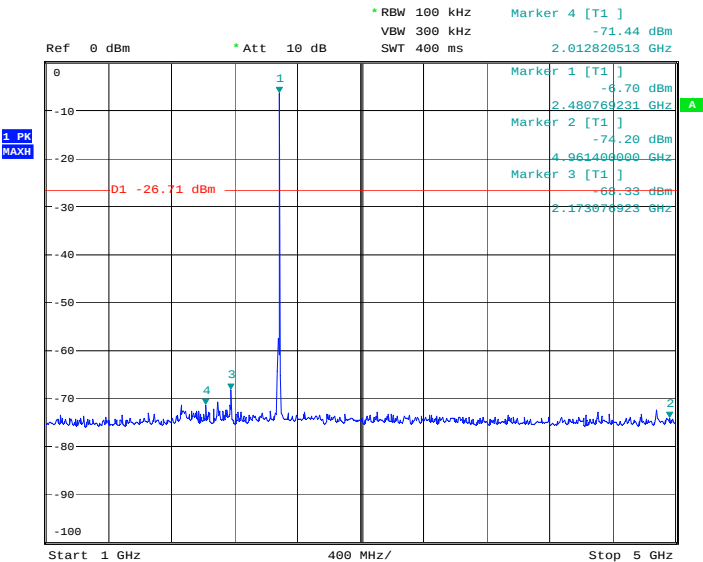
30 MHz – 1 GHz



Date: 8.SEP.2006 14:36:45

Top Channel

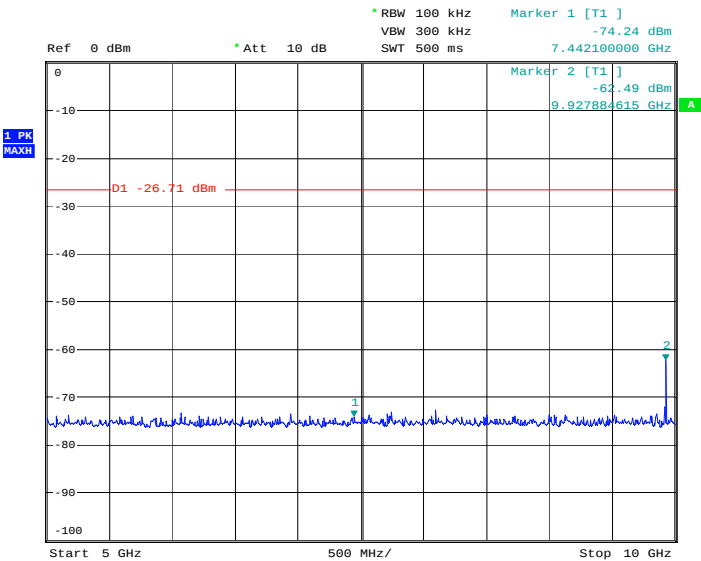
1 GHz – 5 GHz



Date: 8.SEP.2006 14:36:00

Top Channel

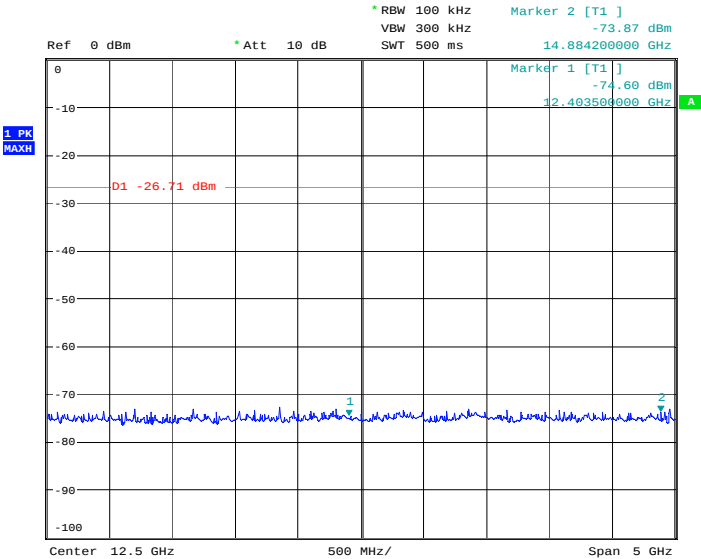
5 GHz – 10 GHz



Date: 8.SEP.2006 14:37:20

Top Channel

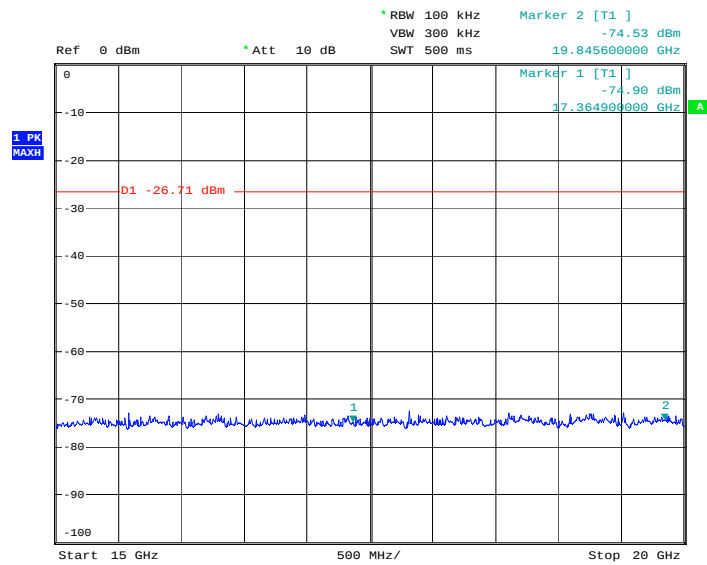
10 GHz – 15 GHz



Date: 8.SEP.2006 14:38:43

Top Channel

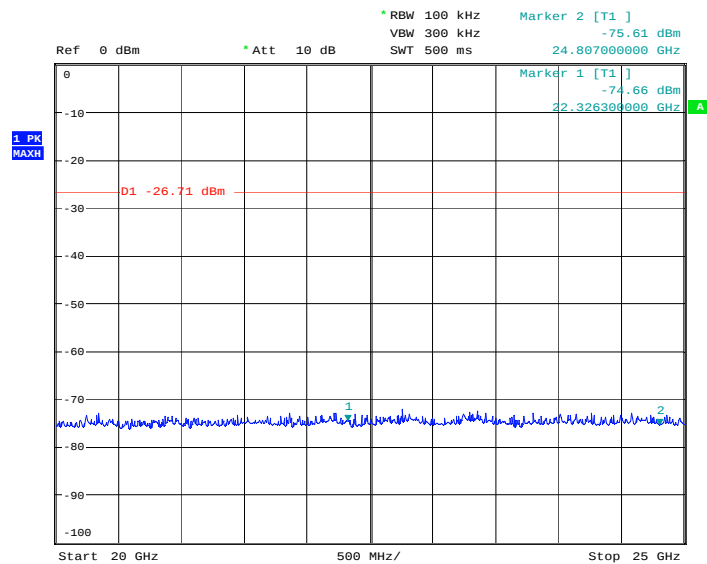
15 GHz – 20 GHz



Date: 8.SEP.2006 14:39:24

Top Channel

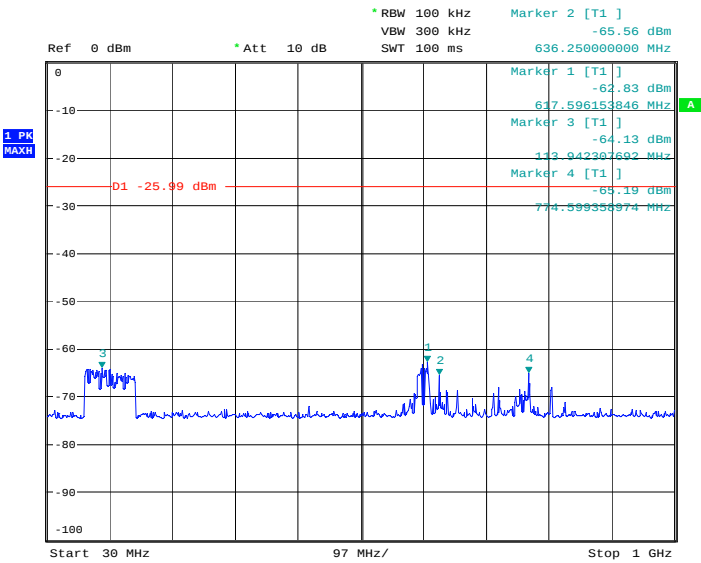
20 GHz – 25 GHz



Date: 8.SEP.2006 14:40:15

Hopping

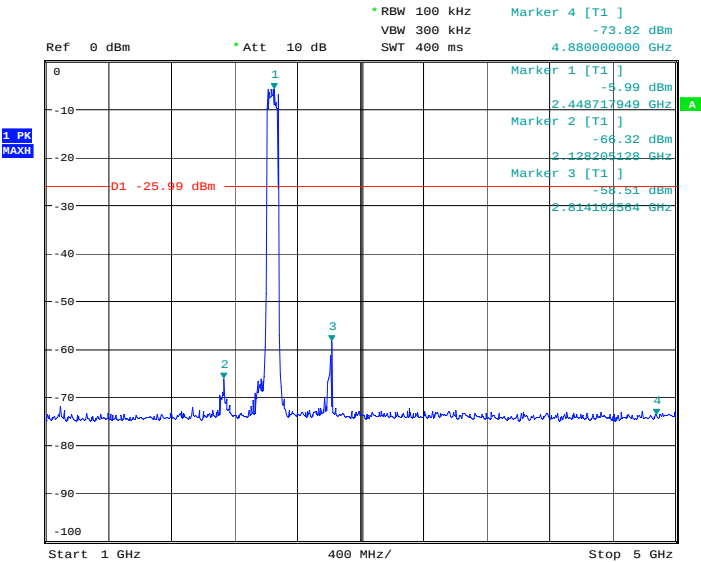
30 MHz – 1 GHz



Date: 8.SEP.2006 13:05:33

Hopping

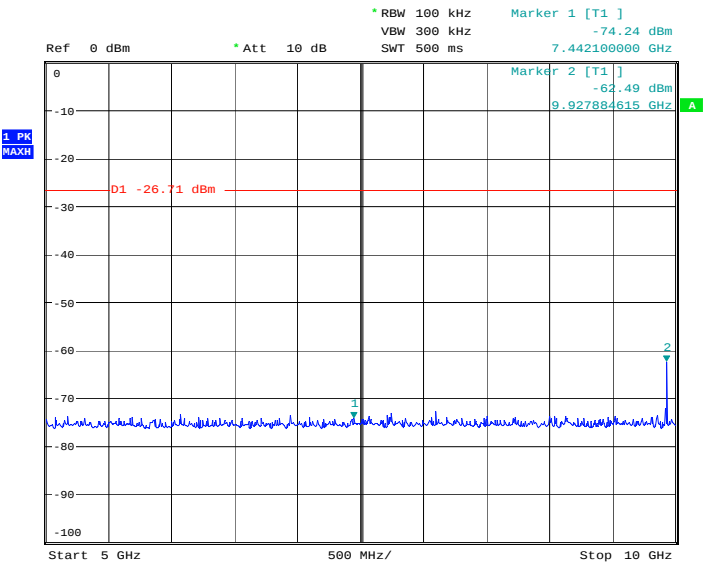
1 GHz – 5 GHz



Date: 8.SEP.2006 12:40:49

Hopping

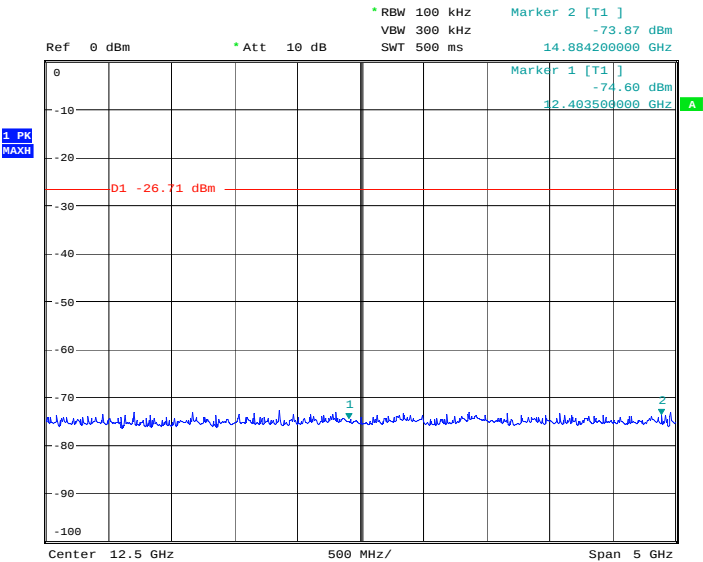
5 GHz – 10 GHz



Date: 8.SEP.2006 14:37:20

Hopping

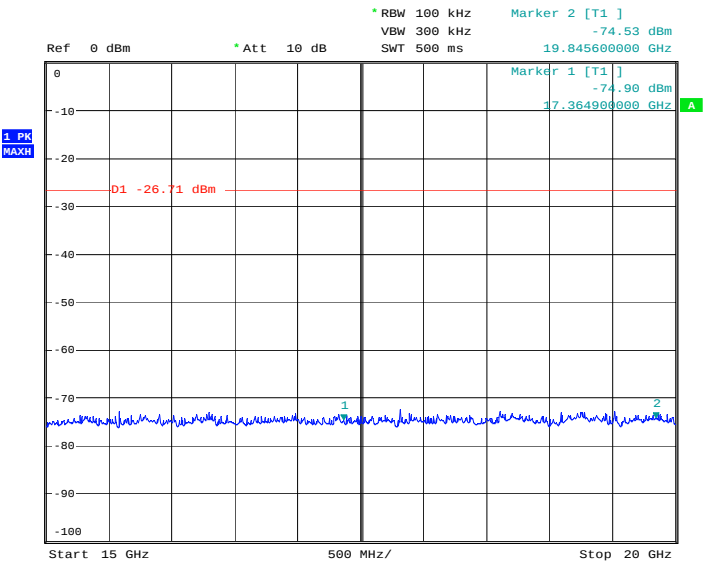
10 GHz – 15 GHz



Date: 8.SEP.2006 14:38:43

Hopping

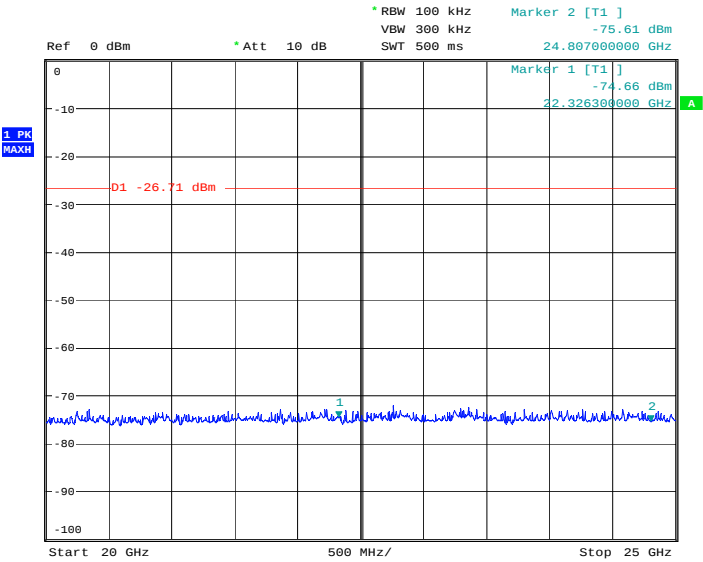
15 GHz – 20 GHz



Date: 8.SEP.2006 14:39:24

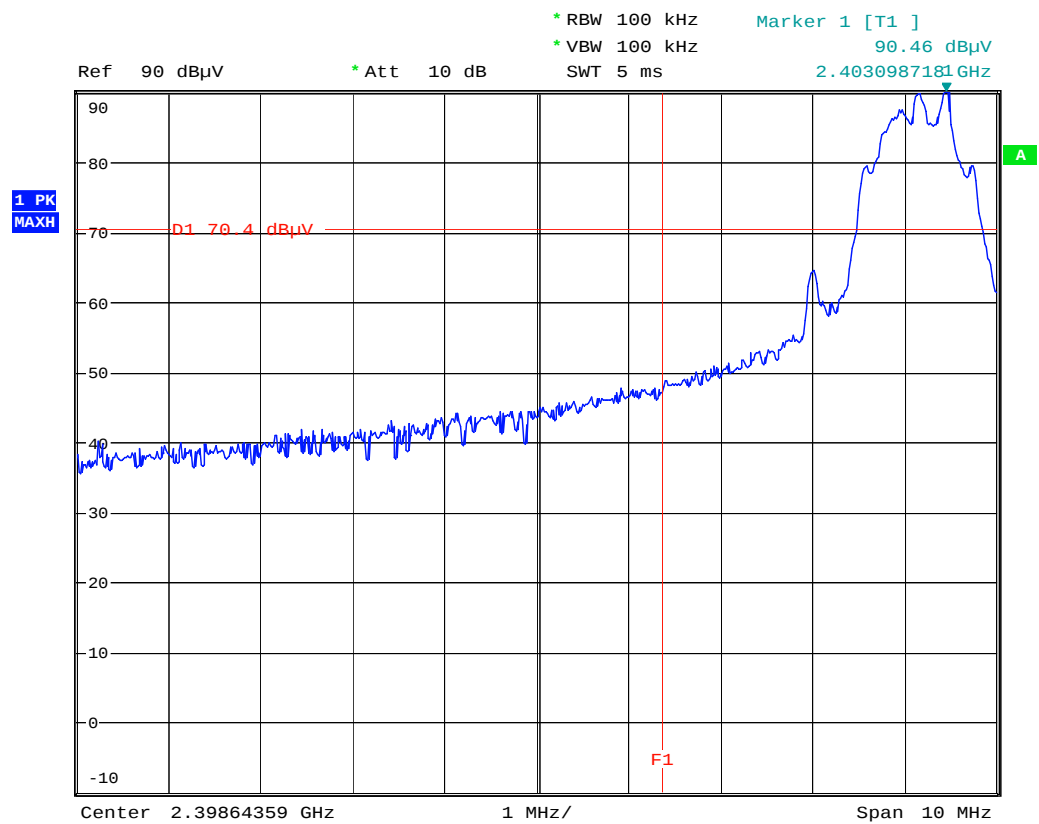
Hopping

20 GHz – 25 GHz

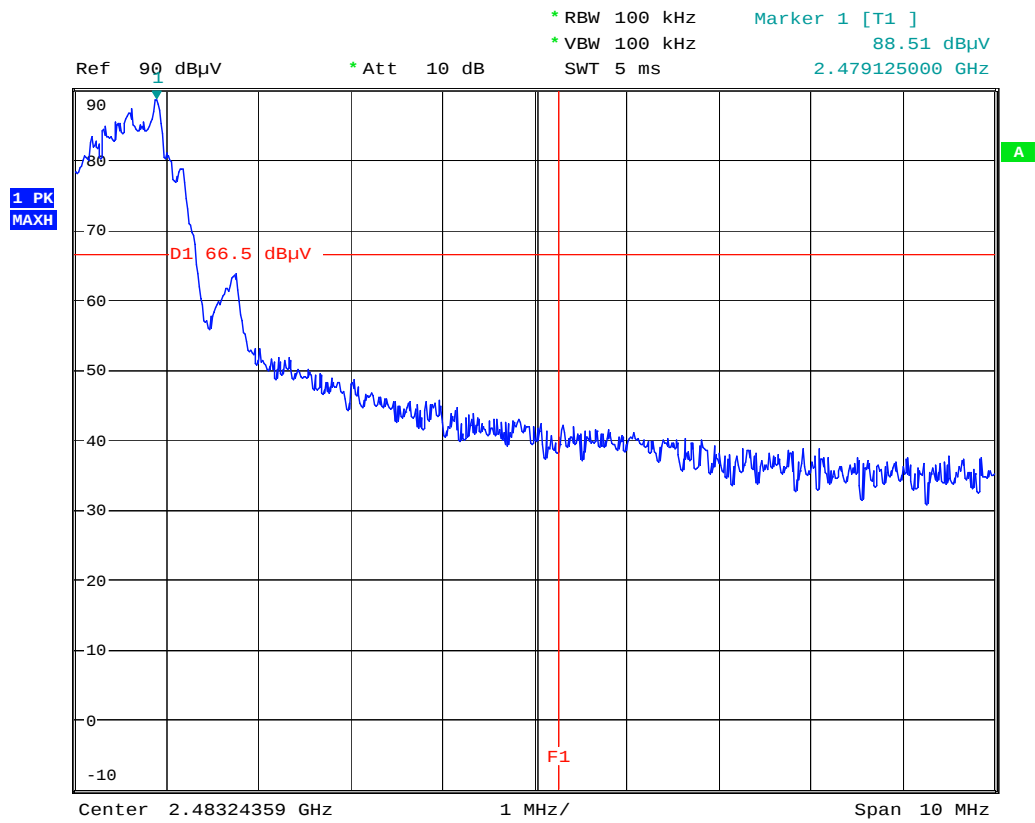


Date: 8.SEP.2006 14:40:15

ANNEX L
BAND EDGE EMISSIONS RADIATED



Date: 27.SEP.2006 11:38:10



Date: 27.SEP.2006 11:53:23

ANNEX M
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%**