REPORT ON THE CERTIFICATION TESTING OF A
PROMETHEAN LIMITED
ACTIVSLATE
WITH RESPECT TO
THE FCC RULES CFR 47, PART 15.247 September 2007
INTENTIONAL RADIATOR SPECIFICATION

TEST REPORT NO: RU1456/8559

COPY NO: 2

ISSUE NO: 1

FCC ID: QAM010

REPORT ON THE CERTIFICATION TESTING OF A
PROMETHEAN LIMITED
ACTIVSLATE
WITH RESPECT TO
THE FCC RULES CFR 47, PART 15.247 September 2007
INTENTIONAL RADIATOR SPECIFICATION

TEST DATE: 14th – 17th April 2008

TESTED BY: Daniel Winstanley Digitally signed by Daniel Winstanley DN: CN = Daniel Winstanley, C = <n Reason: I am the author of this document Date: 2008.04.29 15:53:06 +01'00' D WINSTANLEY

APPROVED BY: John Charters Digitally signed by John Charters DN: CN = John Charters, C = GB, O = TRL Compliance Ltd Reason: I am approving this document Date: 2008.04.29 16:08:23 +01'00' J CHARTERS RADIO SECTION LEADER

DATE: 25th April 2008

Distribution:

Copy Nos:
1. Promethean Limited
2. FCC EVALUATION LABORATORIES
3. TRL Compliance Ltd

Moss View, Nipe Lane, Up Holland, West Lancashire, WN8 9PY, UK.
T +44 (0)1695 556666
F +44 (0)1695 557077
E test@trlcompliance.com

CONTENTS

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:	QAM010
PURPOSE OF TEST:	Certification, Class II Permissive Change
TEST SPECIFICATION:	FCC RULES CFR 47, Part 15.247 September 2007
TEST RESULT:	Compliant to Specification
EQUIPMENT UNDER TEST:	ACTIVSLATE
ITU: EMISSION CODE:	1M55F7D
EQUIPMENT TYPE:	Wireless Mini Board
PRODUCT USE:	Wireless LAN
CARRIER EMISSION:	0.00287 Watts e.i.r.p.
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 [X]
MODULATION METHOD:	FHSS [X] DSSS [ ] Other [ ]
POWER SOURCE(s):	+3.7Vdc or +5Vdc External Power Supply (FW7605L/05)
TEST DATE(s):	14th – 17th April 2008
ORDER No(s):	PG0003383
APPLICANT:	Promethean Limited
ADDRESS:	Promethean House Lower Philips Road Blackburn BB1 5TH

TESTED BY: Daniel Winstanley — Digitally signed by Daniel Winstanley DN: CN = Daniel Winstanley, C = <n Reason: I am the author of this document Date: 2008.04.29 15:52:53 +01'00' — D WINSTANLEY

APPROVED BY: John Charters — Digitally signed by John Charters DN: CN = John Charters, C = GB, O = TRL Compliance Ltd Reason: I am approving this document Date: 2008.04.29 16:08:06 +01'00' — J CHARTERS RADIO SECTION LEADER

APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT):	ACTIVSLATE
EQUIPMENT TYPE:	Wireless Mini Board
PURPOSE OF TEST:	Certification, Class II Permissive Change
TEST SPECIFICATION(s):	FCC RULES CFR 47, Part 15.247 September 2007
TEST RESULT:	COMPLIANT Yes [X] No [ ]
APPLICANT'S CATEGORY:	MANUFACTURER [X] IMPORTER [ ] DISTRIBUTOR [ ] TEST HOUSE [ ] AGENT [ ]
APPLICANT'S ORDER No(s):	PG0003383
APPLICANT'S CONTACT PERSON(s):	Mr Bryan Lofthouse
E-mail address:	Bryan.Lofthouse@prometheanworld.com
APPLICANT:	Promethean Limited
ADDRESS:	Promethean House Lower Philips Road Blackburn BB1 5TH
TEL:	+44(0)1254 298598
FAX:	+44(0)1254 581574
EUT(s) COUNTRY OF ORIGIN:	United Kingdom
TEST LABORATORY:	TRL Compliance Ltd
UKAS ACCREDITATION No:	0728
TEST DATE(s):	14th – 17th April 2008
TEST REPORT No:	RU1456/8559

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	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 : Wireless Mini Board

3. Temperatures: Ambient (Tnom) 13^{o}C

4. Supply Voltages: Vnom +3.7Vdc or +5Vdc External Power Supply (FW7605L/05)

Note: +3.7Vdc 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	=	21^{o}C(<1GHz),
Relative humidity	=	56%(<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)**
No Significant Emissions Within 20 dB of the limit				

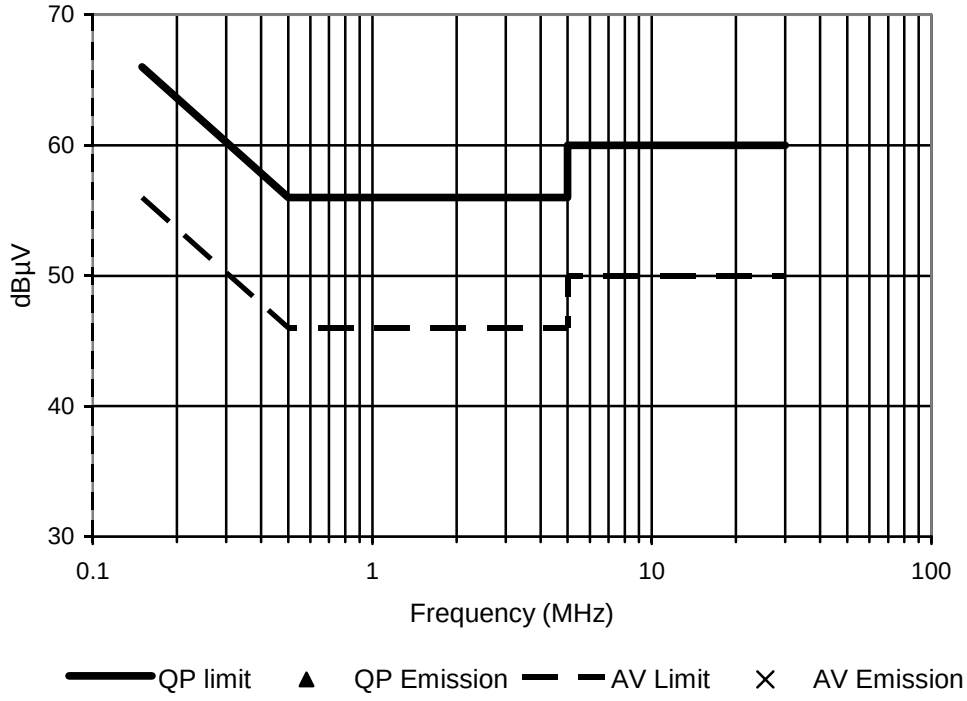
Notes:
1 See attached plot annex D
2 EUT tested without 2.4GHz communication and no pen present
3 EUT tested with 2.4GHz communication and pen present

Test Method:
1 As per Radio – Noise Emissions, ANSI C63.4: 2003

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	ESHS 10	830051/001	UH03	
LISN/AMN	ROHDE & SCHWARZ	ESH3-Z5	863906/018	UH05	
RECEIVER	ROHDE & SCHWARZ	ESHS 10	841429/012	UH187	**X**
LISN/AMN	ROHDE & SCHWARZ	ESH3-Z5	8407 31/015	UH195	**X**

POWER LINE CONDUCTION EMISSIONS



No Significant Emissions within 20 dB of the limit

TRANSMITTER TESTS

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

Ambient temperature	=	13^{o}C
Relative humidity	=	58%
Conditions	=	Conducted –Radio Lab
Supply voltage	=	+3.7Vdc

Transmitter Carrier Frequency Separation (MHz)
1.73 MHz
Limit The channels should be separated by at least 25kHz or $^{2}/_{3}$ the 20dB bandwidth which ever is greater.

See spectrum analyser plot – Annex E
See note 1

Notes:

1 20dB Bandwidth of one carrier is 1557.690 kHz therefore carrier frequency separation must be greater than 1038.512 kHz.
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	8304-0600N	N/A	246	**X**
CABLE	TRL	N/A	N/A	UH358	**X**

TRANSMITTER TESTS

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

Ambient temperature	=	20^{o}C
Relative humidity	=	59%
Conditions	=	Conducted –Radio Lab
Supply voltage	=	+3.7Vdc

20dB Bandwidth (kHz)
1557.690 kHz
Limit >500kHz

See spectrum analyser plot – Annex G

Notes:

1 The EUT has 48 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 band width 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	8304-0600N	N/A	246	**X**
CABLE	TRL	N/A	N/A	UH358	**X**

TRANSMITTER TESTS

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

Ambient temperature = 13^{o}C
Relative humidity = 58%
Conditions = Conducted –Radio Lab
Supply voltage = +3.7Vdc

Packet Width (µs)	**Number of Transmissions in 18.4 Seconds**	**Average time of Occupancy (s)**
557.69 µs	49	0.0273
Limit 0.4 seconds		

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 Average time of occupancy within a period of 0.4 * number of hopping channels
4 Number of hopping channels = 46
5 0.4 * 46 = 18.4

Test Method:

1 As per15.247 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	8304-0600N	N/A	246	**X**
CABLE	TRL	N/A	N/A	UH358	**X**

TRANSMITTER TESTS

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

Ambient temperature = 20°C
Relative humidity = 59%
Conditions = Conducted –Radio Lab
Supply voltage = +3.7Vdc

Channel Frequency	Measured Level (dBm)	Cable & Attenuator Loss (dB)	Antenna Gain (dBi)	Transmitter Peak Power Output (dBm)	Transmitter Peak Power Output (Watts)	Limit (Watts)
Bottom	-1.92	6.5	0	4.58	0.00287	0.125
Middle	-2.27	6.5	0	4.23	0.00264	0.125
Top	-2.43	6.5	0	4.07	0.00255	0.125

See spectrum analyser plot – Annex I

Notes:
1 Number of hopping channels employed is 46 see annex G.
2 Conducted measurements were performed with a temporary antenna connector provided by the client.
3 For analyser setting see scan data annex I.

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	8304-0600N	N/A	246	**X**
CABLE	TRL	N/A	N/A	UH358	**X**

TRANSMITTER TESTS

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

Ambient temperature = 17°C
Relative humidity = 52%
Conditions = Conducted –Radio Lab
Supply voltage = +3.7Vdc

Test Result

Measured as compliant see analyser plots

Channel Frequency	EUT Operation	Emission Frequency (MHz)	Emission Level (dBC)	Limit (dBC)
Bottom	Modulated Carrier	2399.200	40.05	20
All	Hopping	2399.257	40.80	20
Top	Modulated Carrier	2483.727	40.76	20
All	Hopping	2483.695	41.57	20

See spectrum analyser scan plots – Annex J

Notes:

1 The EUT was set to bottom operating frequency only with a modulated carrier.
2 The EUT was set to top operating frequency only with a modulated carrier.
3 The EUT was set in a hopping mode using all hopping channels.
4 A temporary antenna connector was used to take the measurement.
5 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	8304-0600N	N/A	246	**X**
CABLE	TRL	N/A	N/A	UH358	**X**

TRANSMITTER TESTS

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

Ambient temperature = 17°C
Relative humidity = 54%
Conditions = Conducted –Radio Lab
Supply voltage = +3.7Vdc

Bottom Channel

Frequency Range	Emission Frequency (MHz)	Emission Level	Cable loss	Level (dBm)	Limit (dBm)
30MHz – 25GHz	No Significant Emissions Within 20 dB of the Limit				-14.43

See spectrum analyser scan plots – Annex K

Middle Channel

Frequency Range	Emission Frequency (MHz)	Emission Level	Cable loss	Level (dBm)	Limit (dBm)
30MHz – 25GHz	No Significant Emissions Within 20 dB of the Limit				-14.43

See spectrum analyser scan plots – Annex K

Top Channel

Frequency Range	Emission Frequency (MHz)	Emission Level	Cable loss	Level (dBm)	Limit (dBm)
30MHz – 25GHz	No Significant Emissions Within 20 dB of the Limit				-14.43

See spectrum analyser scan plots – Annex K

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 middle channel
Hopping stopped unit operating on highest channel
2 Section 15.247(c) states that all spurious emissions measured within a100kHz bandwidth shall be attenuated by at least 20dB below the level of the highest fundamental level measured within a 100kHz bandwidth.
3 Only emissions within 20dB of limit are recorded.

Test Method:

1 As per section 15.247 and Public Notice DA 00-705.
2 Frequency sweeps were performed to check for spurious emissions.
3 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	8304-0600N	N/A	246	**X**
CABLE	TRL	N/A	N/A	UH358	**X**

TRANSMITTER TESTS

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

Ambient temperature = 18^{o}C
Relative humidity = 48%
Conditions = Radiated OATS
Supply voltage = +3.7Vdc

Bottom Channel 30MHz -25000MHz

	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 Restricted bands									100
88MHz – 216MHz Restricted bands									150
216MHz – 960MHz Restricted bands									200
960MHz – 1GHz Restricted bands									500
1GHz – 25GHz Restricted bands	4805.512		1.9	32.7	35.7	45.62	-		500
30MHz -25GHz									20dBc

Middle Channel 30MHz -25000MHz

	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 Restricted bands									100
88MHz – 216MHz Restricted bands									150
216MHz – 960MHz Restricted bands									200
960MHz – 1GHz Restricted bands									500
1GHz – 25GHz Restricted bands	4881.511 7322.331		1.9 1.9	32.7 35.9	35.7 36.2	46.51 42.99	- -		500 500
30MHz -25GHz									20dBc

TRANSMITTER TESTS

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

Top Channel 30MHz -25000MHz

	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 Restricted bands									100
88MHz – 216MHz Restricted bands									
216MHz – 960MHz Restricted bands									200
960MHz – 1GHz Restricted bands									500
1GHz – 25GHz Restricted bands	4961.083 7441.625		2.20 1.90	33.23 36.35	35.6 35.9	45.15 46.94	- -		500 500
30MHz -25GHz									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 middle channel
Hopping stopped unit operating on highest channel
2 Initial pre scans were performed see Annex L for plots.
3 Emissions above 1GHz were measured with both a peak and average detectors.
4 Measurements <1GHz were performed at 3 meters.
5 Measurements >1GHz were initial performed at 3 metres.
6 Only emissions with in 20dB of limit are recorded.
7 Peak emissions recorded, peak emissions meet the average limit.

Test Method:

1 As per section 15.247 and Public Notice DA 00-705.
2 Measuring distances as Notes 5 to 6 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 orthagonal 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	825892/006	UH04	**X**
SPECTRUM ANALYSER	ROHDE & SCHWARZ	FSU46	200034	UH281	**X**
RANGE 1	TRL	3 METRE	N/A	UH06	**X**
BILOG ANTENNA	YORK	CBL6112B	2803	UH93	**X**
HORN ANTENNA	EMCO	3115	9010-3580	138	**X**
PRE APMLIFIER	AGILENT	8449B	3008A016	572	**X**

TRANSMITTER TESTS

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

Ambient temperature = 18^{o}C
Relative humidity = 48%
Conditions = Radiated OATS
Supply voltage = +3.7Vdc

Test Result

Measure as compliant, see analyser plots.

Channel Frequency	EUT Operation	Emission Frequency (MHz)	Emission Level (dBC)	Limit
Bottom	Modulated Carrier	2399.216	39.89	20 dBc
All	Hopping	2399.191	40.76	20 dBc
Top	Modulated Carrier	2483.993	454.98 (note 3)	500 µV/m
All	Hopping	2484.000	14.82	500 µV/m

See spectrum analyser scan plots – Annex J

Notes:
1 The EUT was set in a hopping mode using all hopping channels.
2 See Annex L for analysers plots.
3 Duty Cycle correction performed to reach this result

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	FSU46	200034	UH281	**X**
HORN ANTENNA	EMCO	3115	9010-3580	138	**X**
PRE APMLIFIER	AGILENT	8449B	3008A016	572	**X**

RECEIVER TESTS

RECEIVER EMISSIONS RADIATED – Part 15.109

Ambient temperature	=	19^{o}C
Relative humidity	=	53%
Conditions	=	Radiated OATS
Supply voltage	=	+3.7Vdc

Bottom Channel 30MHz -25000MHz

	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	No Significant Emission within 20 dB of the limit								100
88MHz – 216MHz									150
216MHz – 960MHz									200
960MHz – 1GHz									500
1GHz – 25GHz									500

Middle Channel 30MHz -25000MHz

	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	No Significant Emission within 20 dB of the limit								100
88MHz – 216MHz									150
216MHz – 960MHz									200
960MHz – 1GHz									500
1GHz – 25GHz									500

Top Channel 30MHz -25000MHz

	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	No Significant Emission within 20 dB of the limit								100
88MHz – 216MHz									150
216MHz – 960MHz									200
960MHz – 1GHz									500
1GHz – 25GHz									500

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 middle channel
Hopping stopped unit operating on highest channel
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 3 metres.
5 Only emissions with in 20dB of limit are recorded.
6 Peak emissions recorded, peak emissions meet the average limit.

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 orthagonal 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	FSU46	200034	UH281	**X**
RANGE 1	TRL	3 METRE	N/A	UH06	**X**
BILOG ANTENNA	YORK	CBL611/A	1618	UH191	**X**
HORN ANTENNA	EMCO	3115	9010-3580	138	**X**
PRE APMLIFIER	AGILENT	8449B	3008A016	572	**X**

ANNEX A

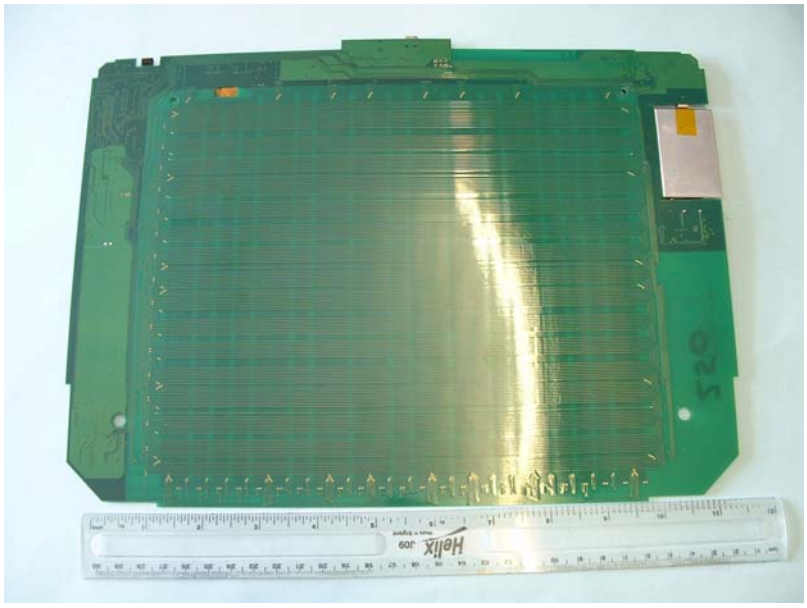
PHOTOGRAPHS

PHOTOGRAPH No. 1 **TEST SETUP**

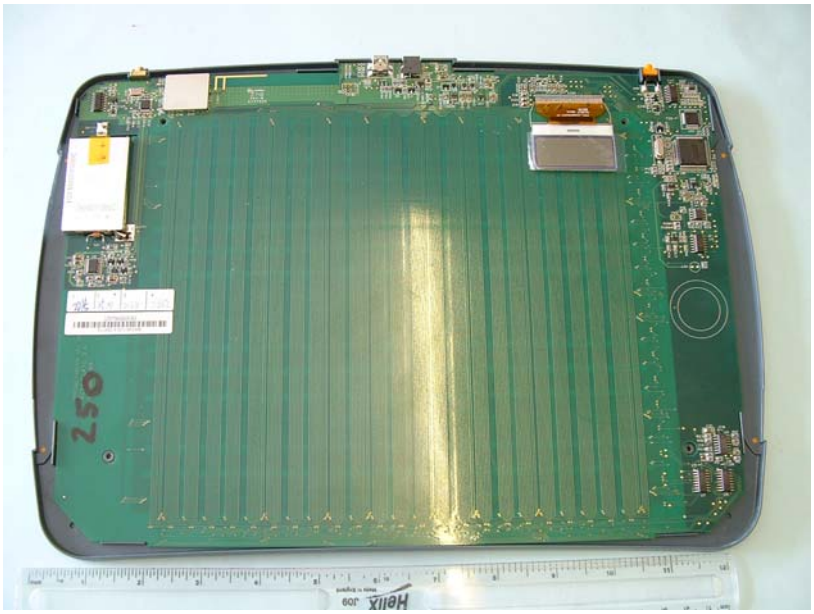
PHOTOGRAPH No. 2 **FRONT VIEW**

PHOTOGRAPH No. 3 **BACK VIEW**

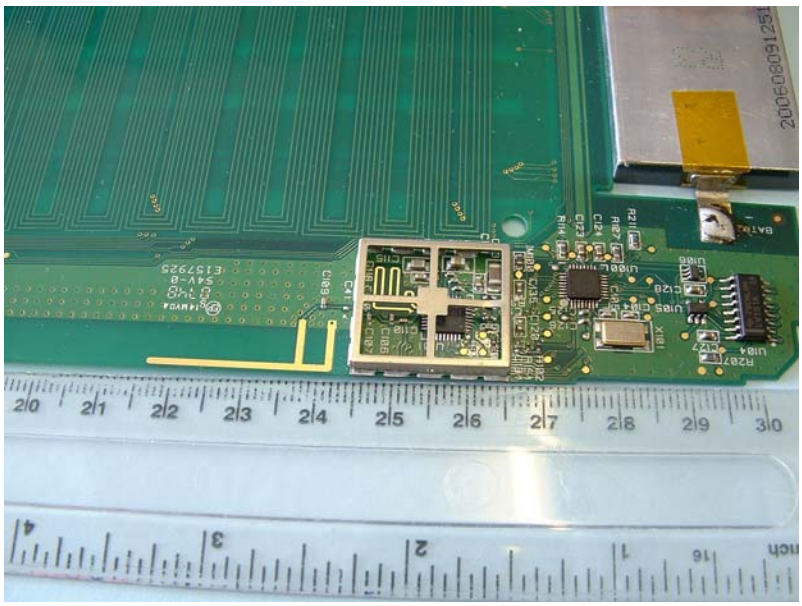
PHOTOGRAPH No. 4 **TRANSMITTER PCB TRACK SIDE**



PHOTOGRAPH No. 5 **TRANSMITTER PCB COMPONENT SIDE**



PHOTOGRAPH No. 5 **RF CLOSE UP CAN REMOVED**



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]

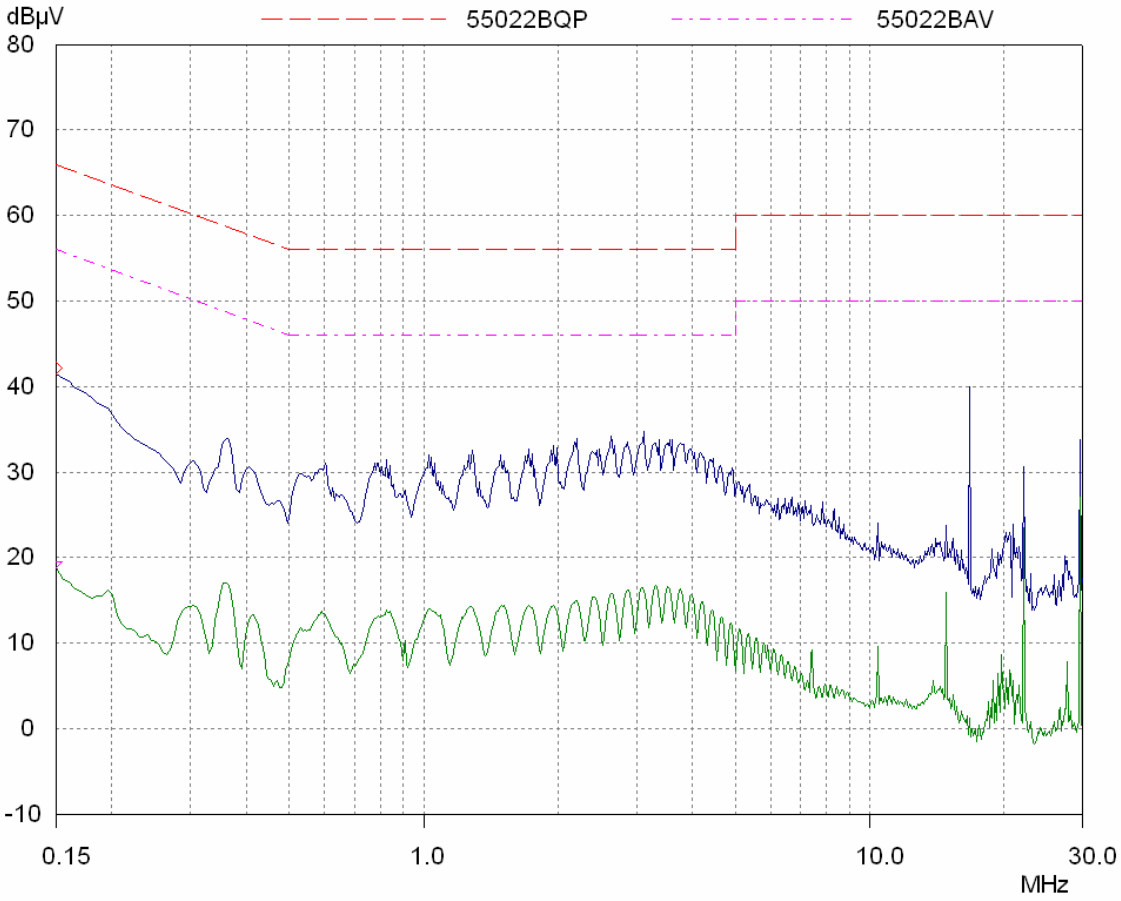
ANNEX C

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
UH358	Cable	TRL		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

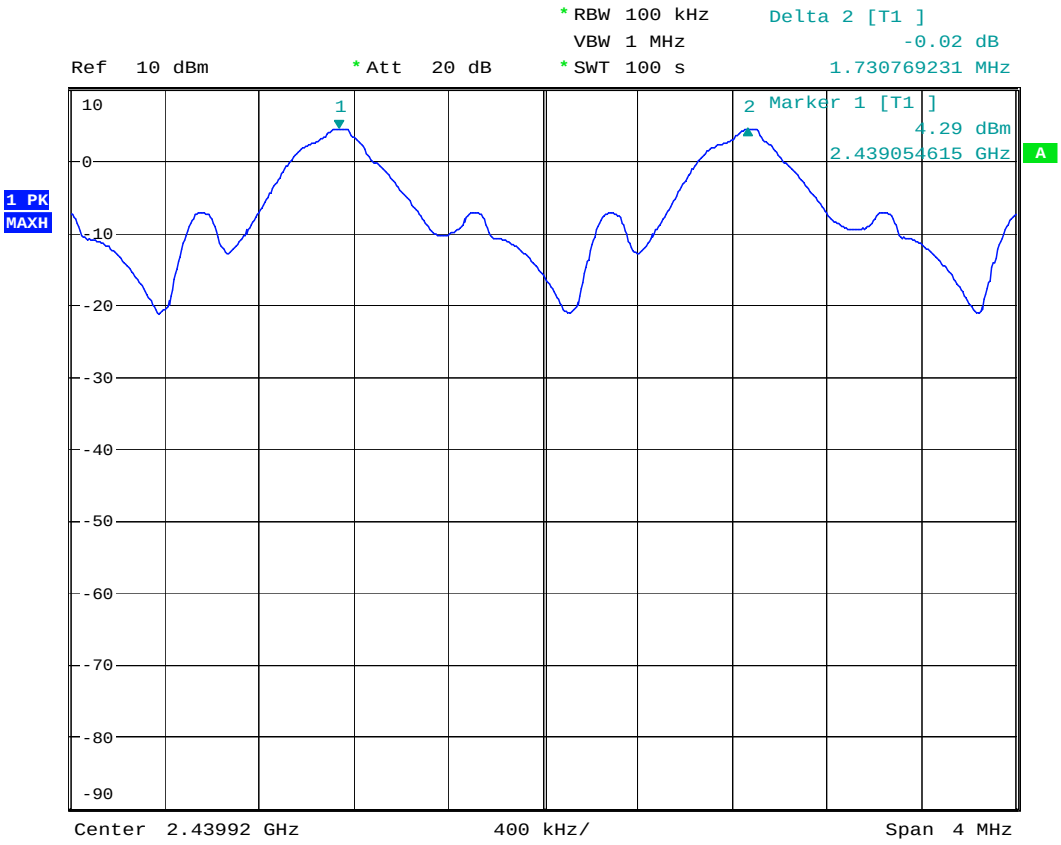
ANNEX D

POWER LINE CONDUCTION


dBµV
55022BQP
55022BAV
80
70
60
50
40
30
20
10
0
-10
0.15
1.0
10.0
30.0
MHz

ANNEX E

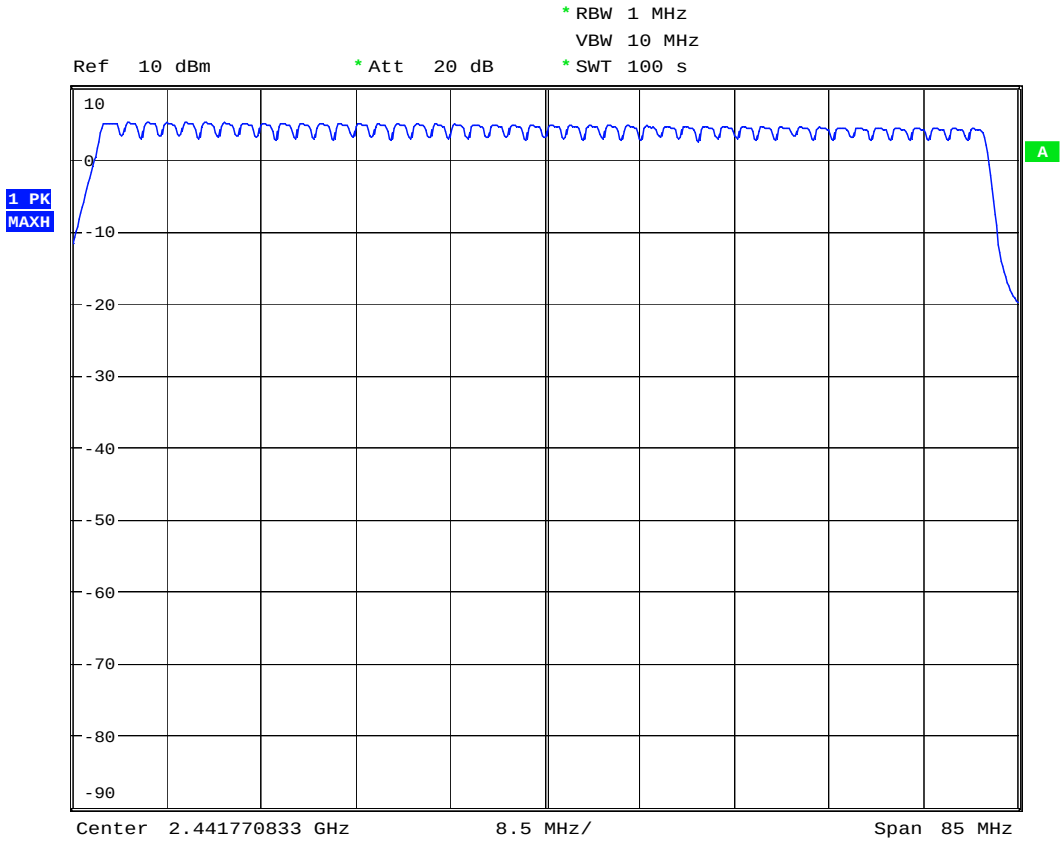
CARRIER FREQUENCY SEPARATION



Date: 15.APR.2008 12:15:19

ANNEX F

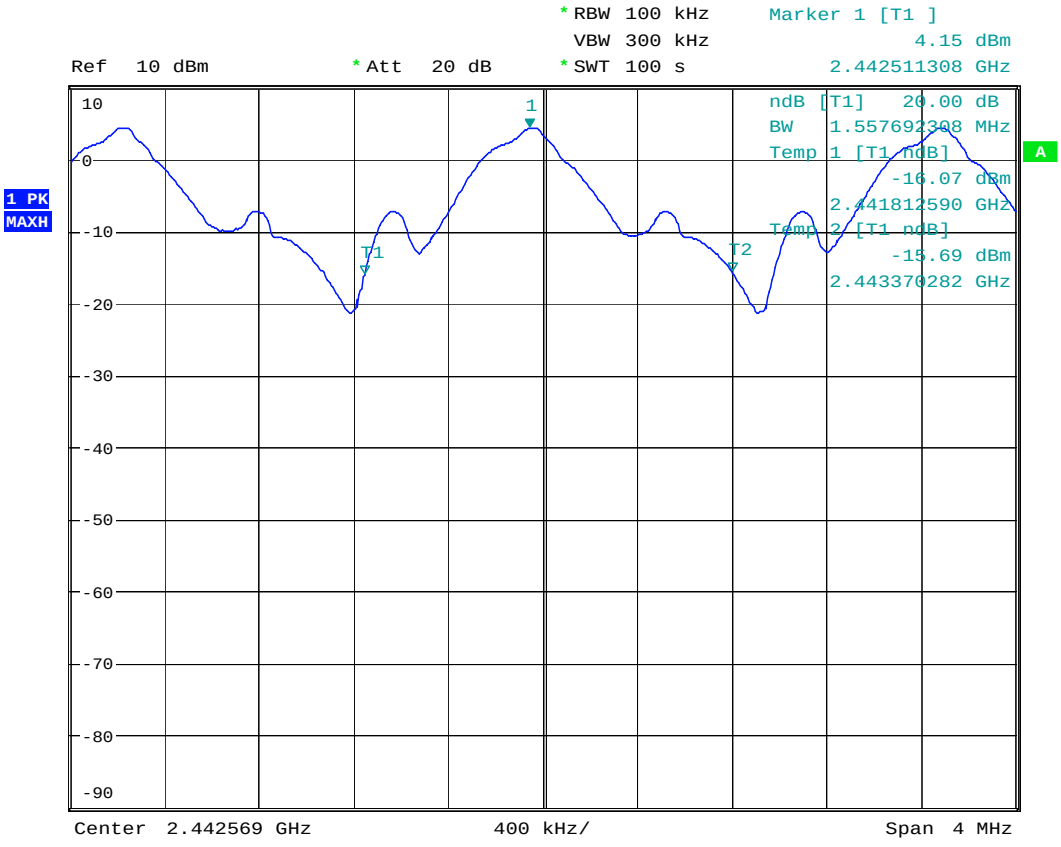
NUMBER OF HOPPING CHANNELS



Date: 15.APR.2008 12:21:20

ANNEX G

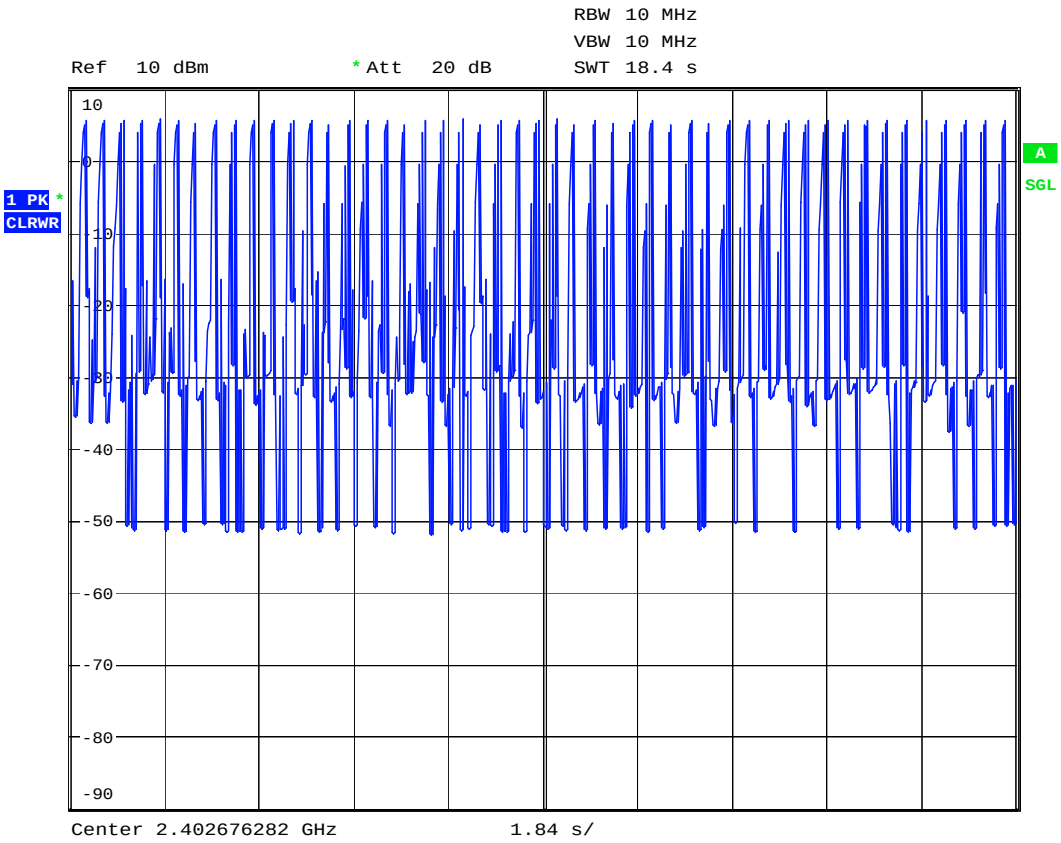
20dB BANDWIDTH



Date: 15.APR.2008 13:00:49

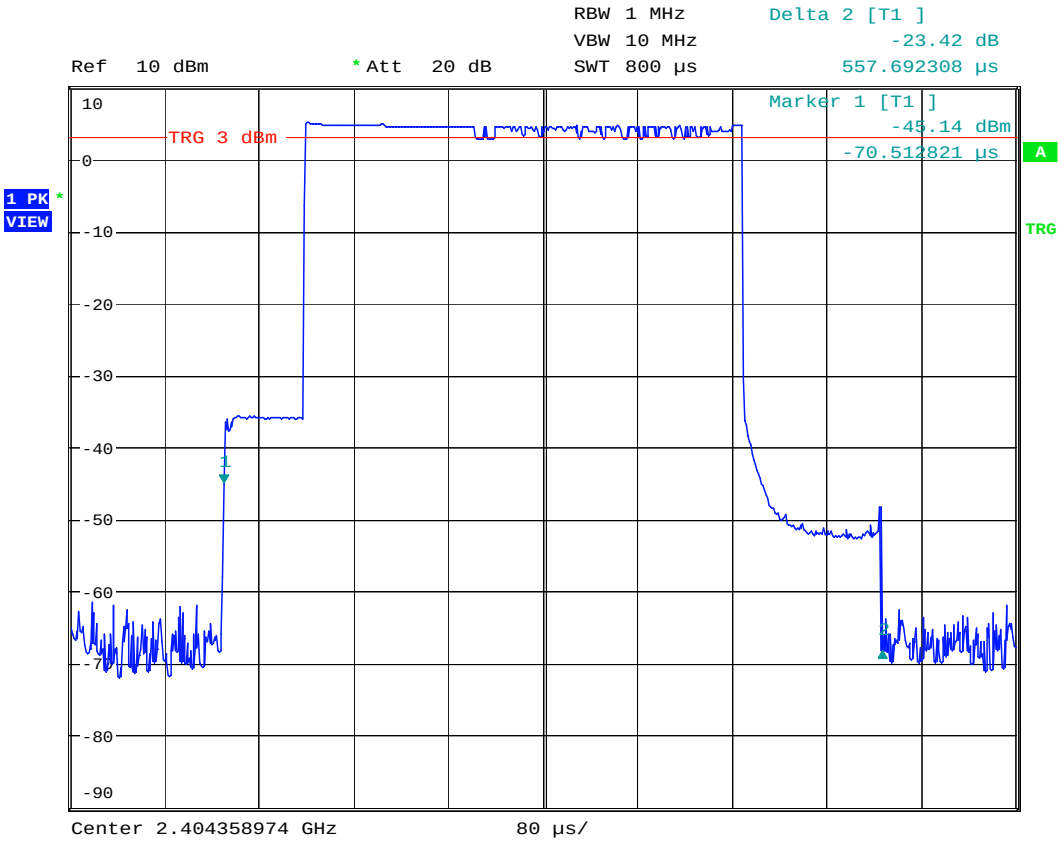
ANNEX H

AVERAGE TIME OF OCCUPANCY



Date: 15.APR.2008 12:51:09

Number of transmissions made within 18.4 seconds

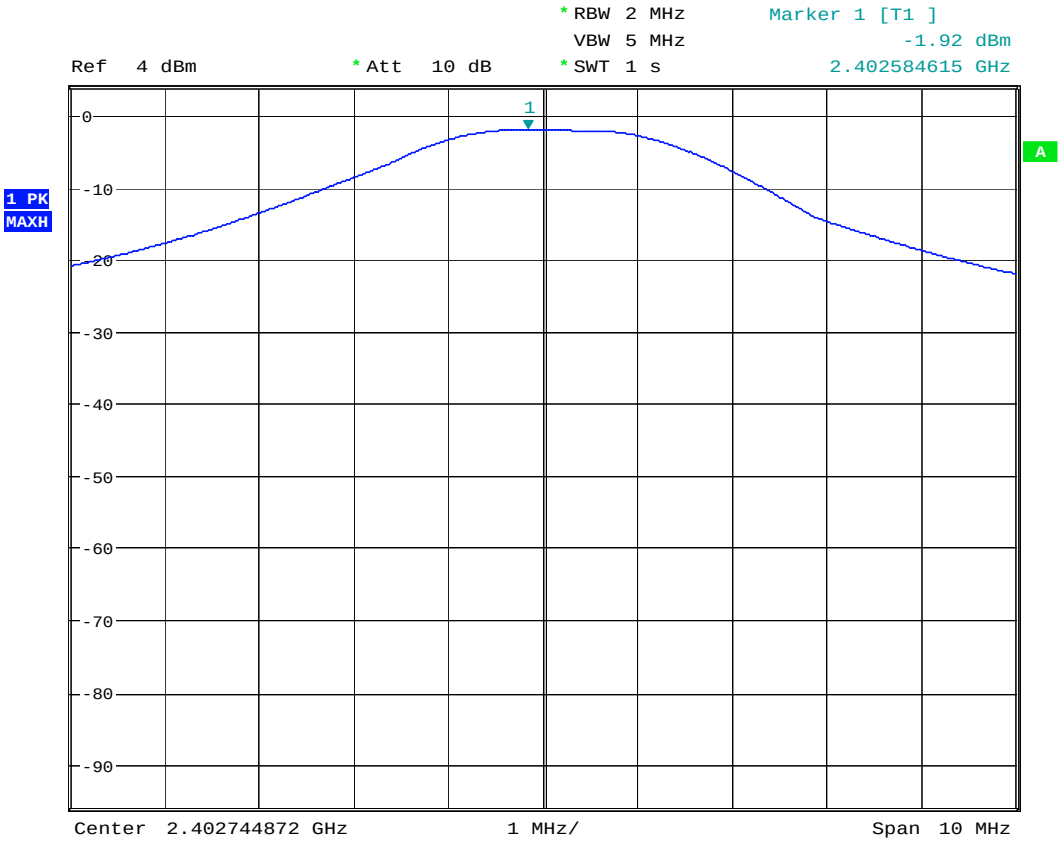


Date: 15.APR.2008 12:29:15

Length of one packet

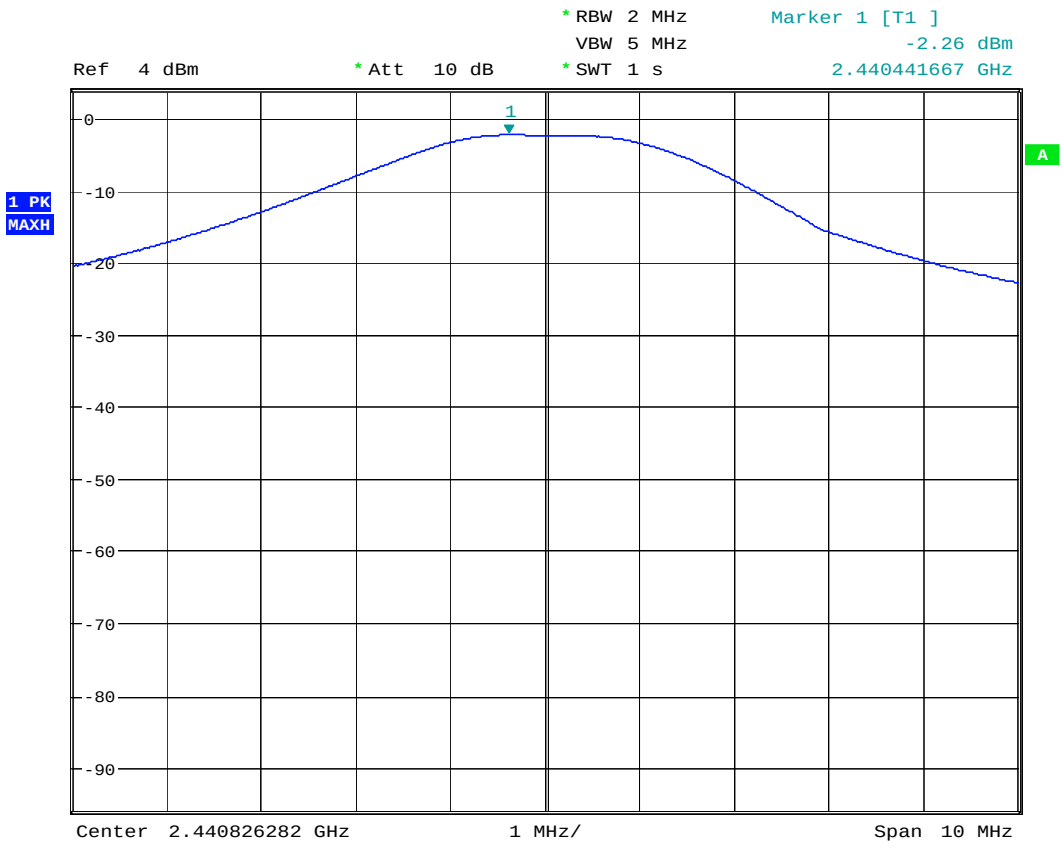
ANNEX I

PEAK POWER CONDUCTED



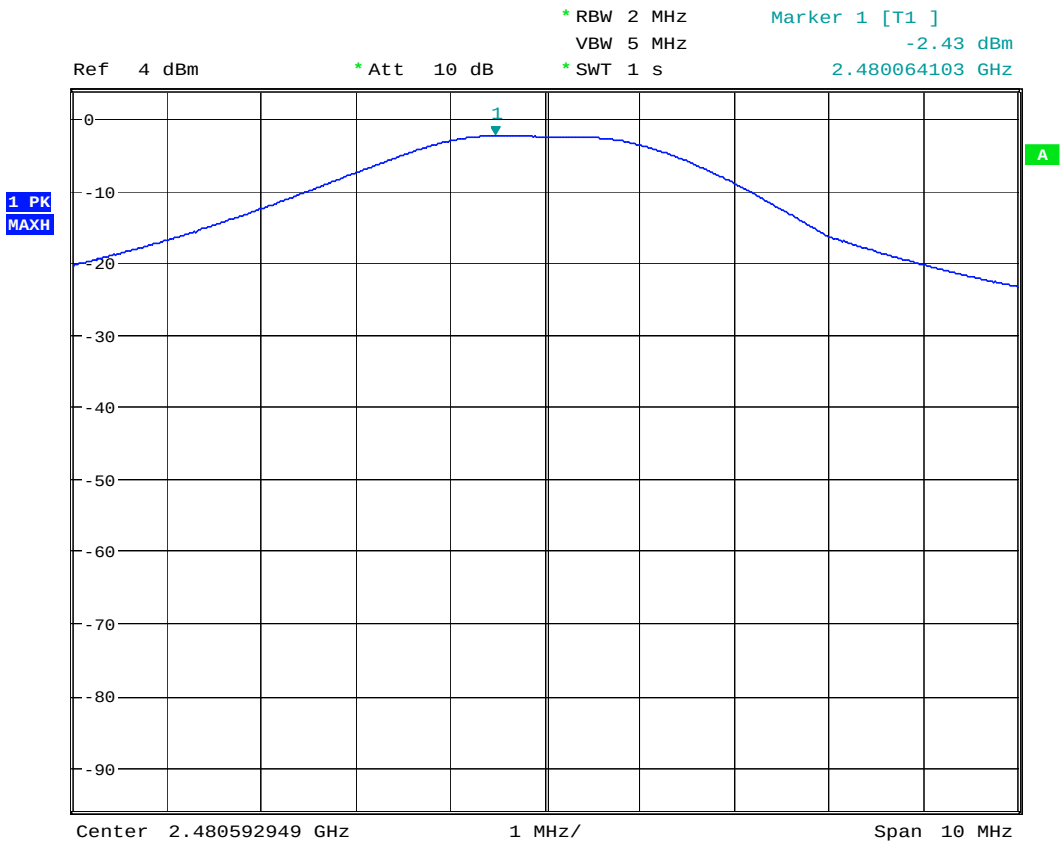
Date: 15.APR.2008 14:43:21

PEAK POWER LOW CHANNEL



Date: 15.APR.2008 14:41:11

PEAK POWER MID CHANNEL

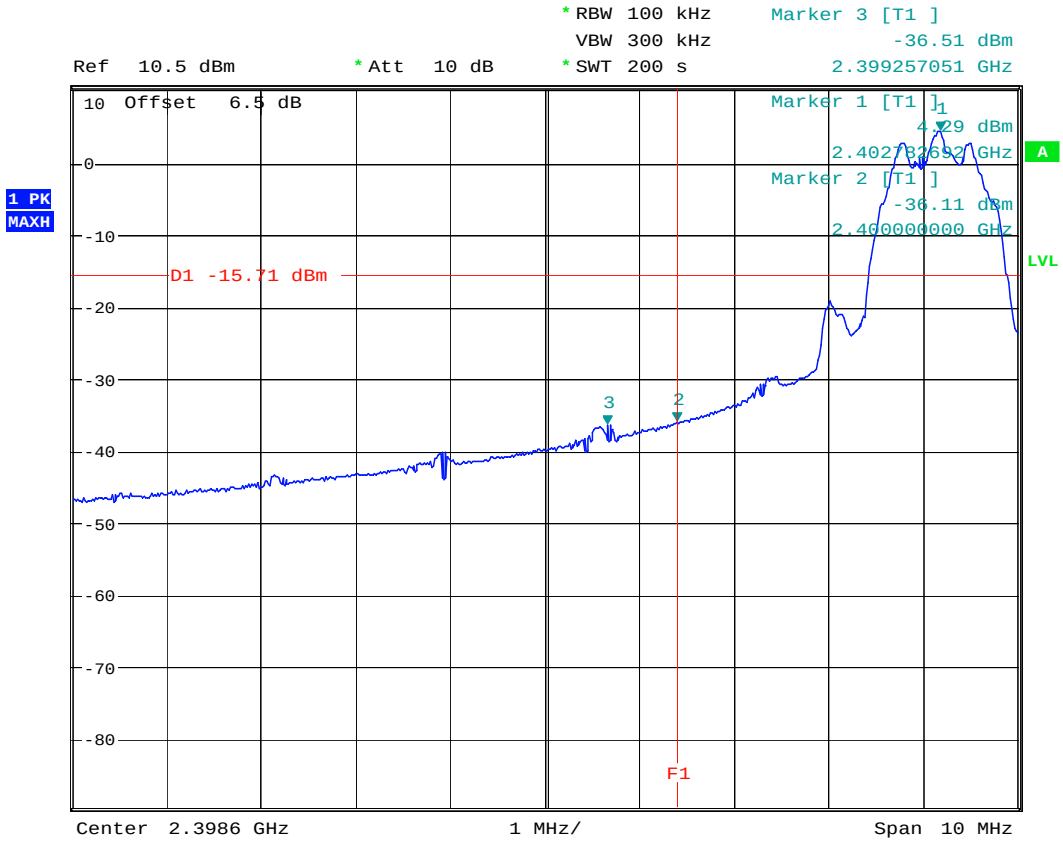


Date: 15.APR.2008 14:42:10

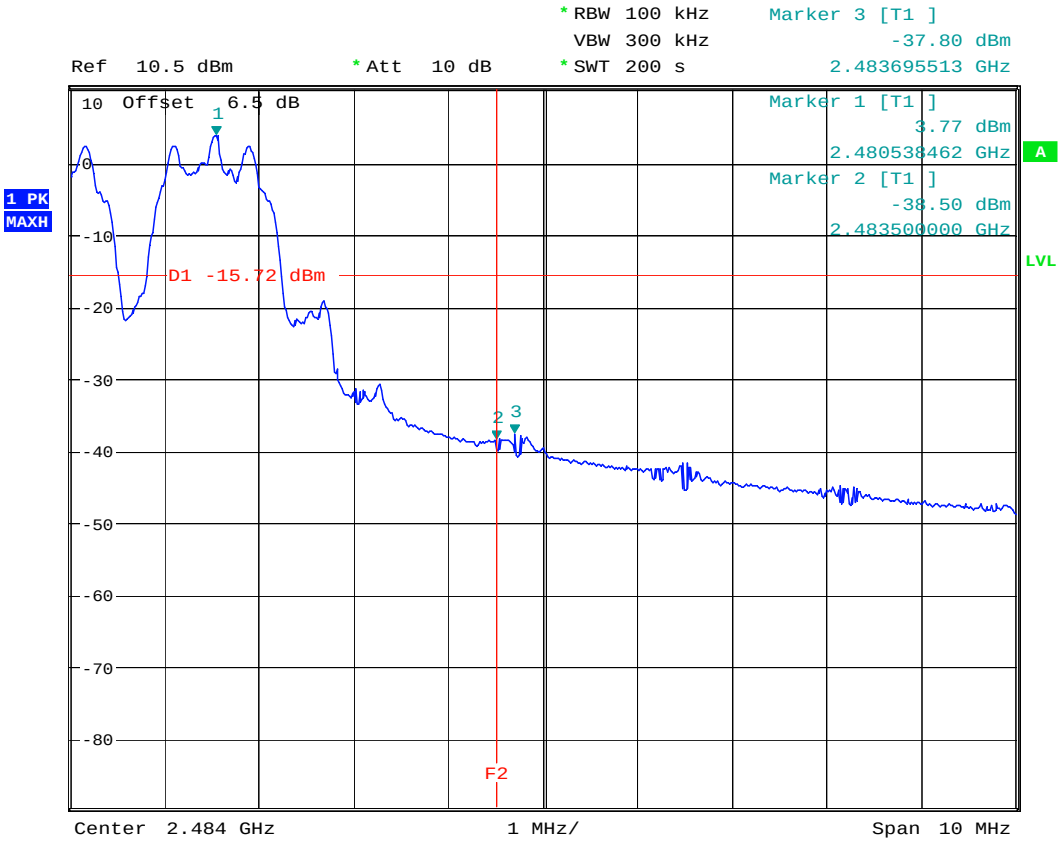
PEAK POWER HIGH CHANNEL

ANNEX J

BAND EDGE CONDUCTED EMISSION



Date: 15.APR.2008 15:47:07

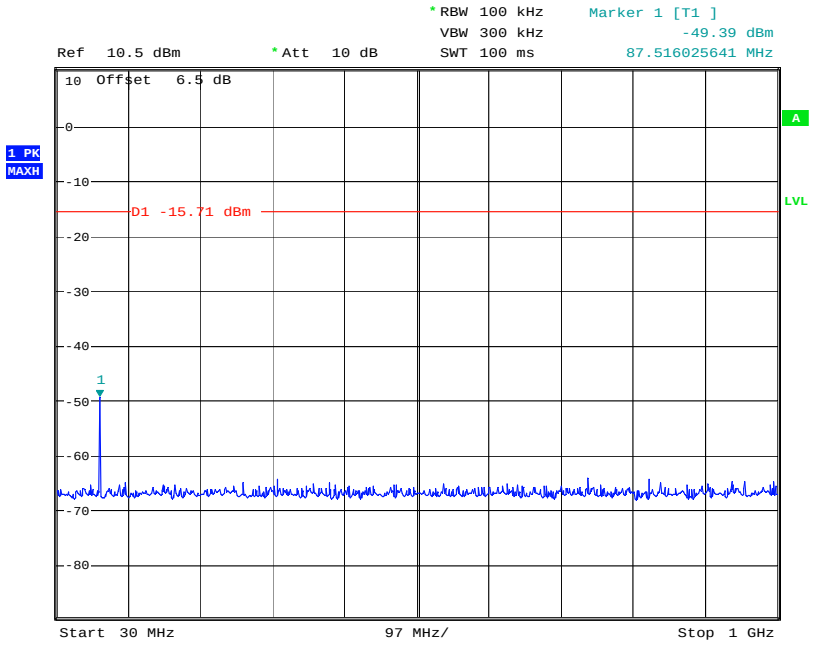


Date: 15.APR.2008 15:32:36

ANNEX K

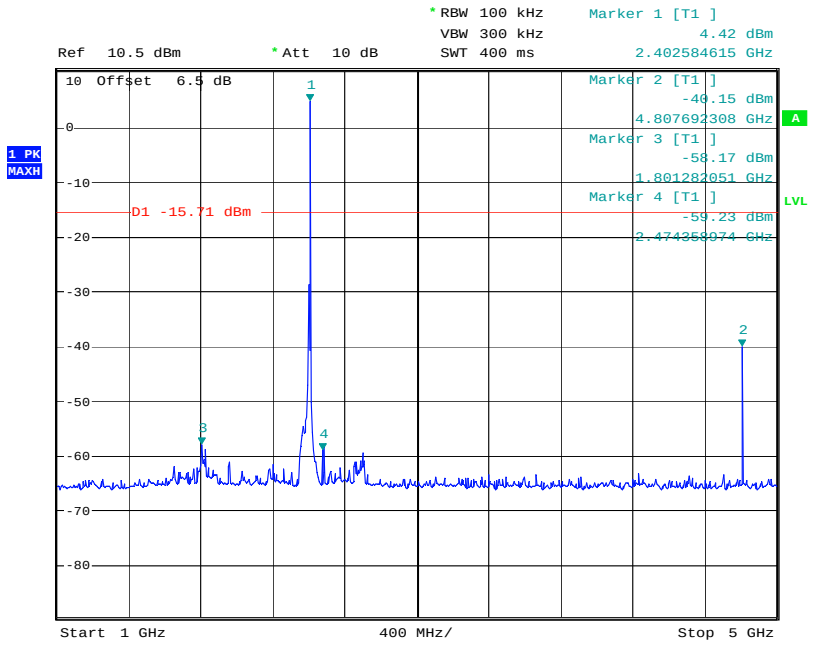
CONDUCTED SPURIOUS EMISSION

Bottom Channel 30 MHz – 1 GHz



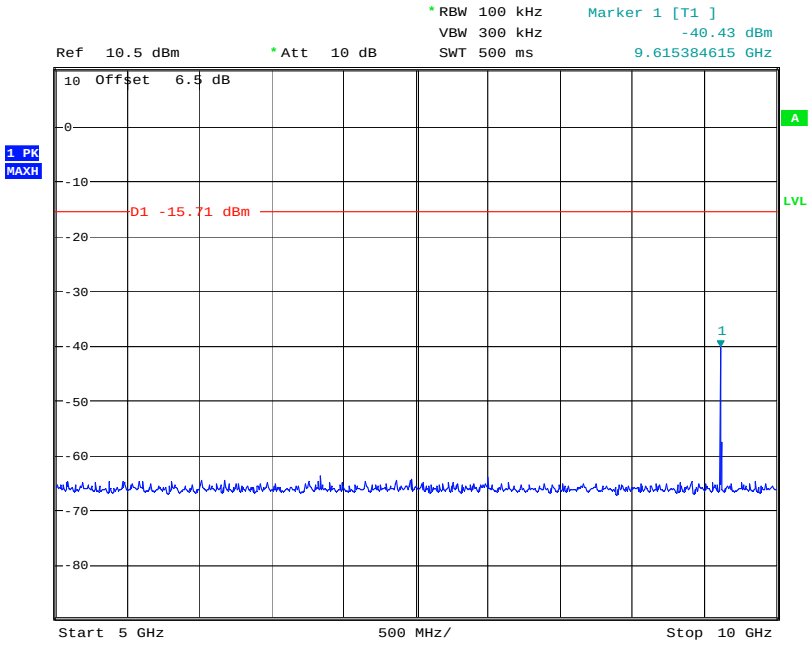
Date: 15.APR.2008 14:55:03

Bottom Channel 1 GHz – 5 GHz



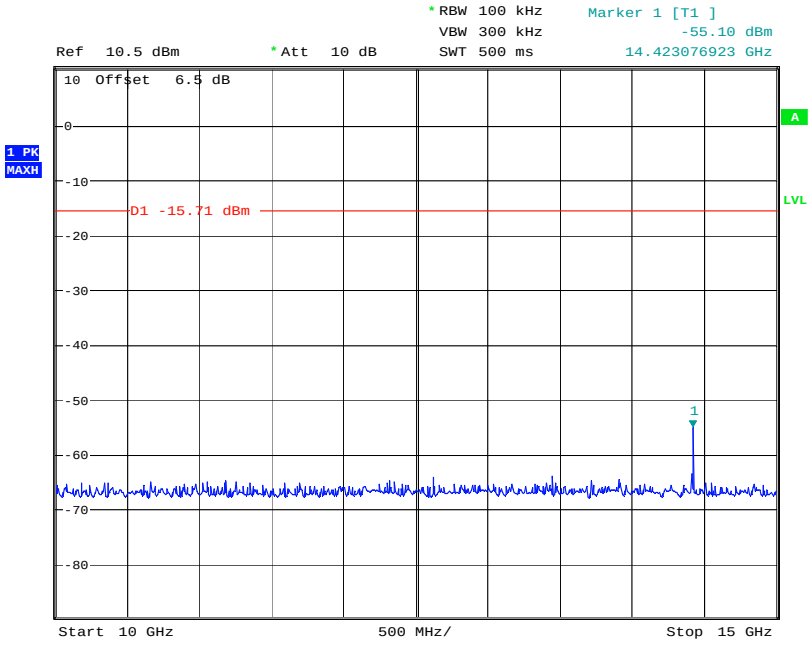
Date: 15.APR.2008 14:53:01

Bottom Channel 5 GHz – 10 GHz



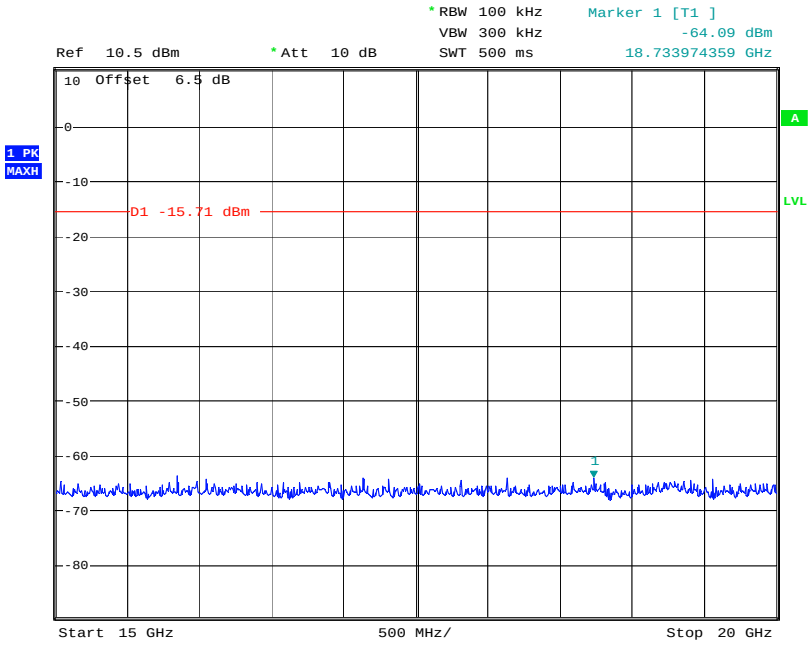
Date: 15.APR.2008 14:53:59

Bottom Channel 10 GHz – 15 GHz



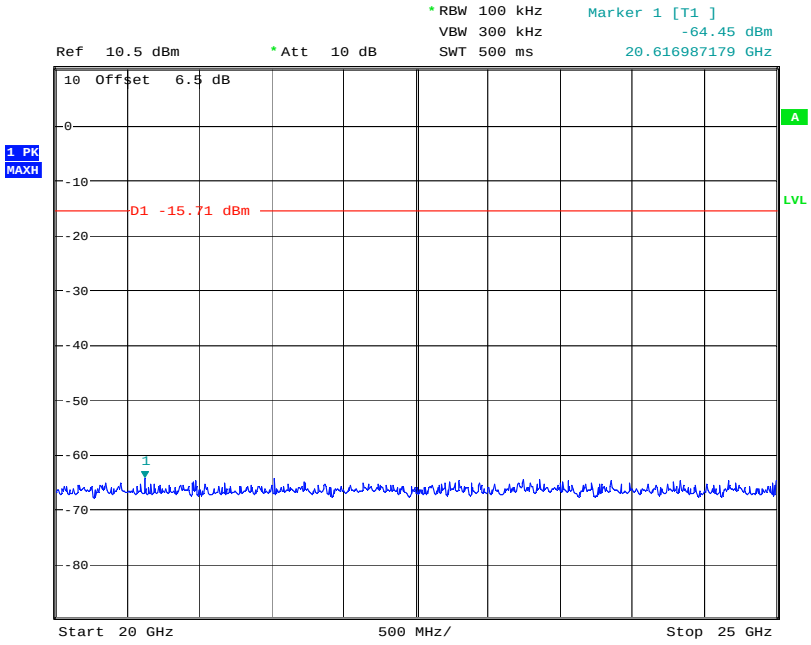
Date: 15.APR.2008 14:54:14

Bottom Channel 15 GHz – 20 GHz



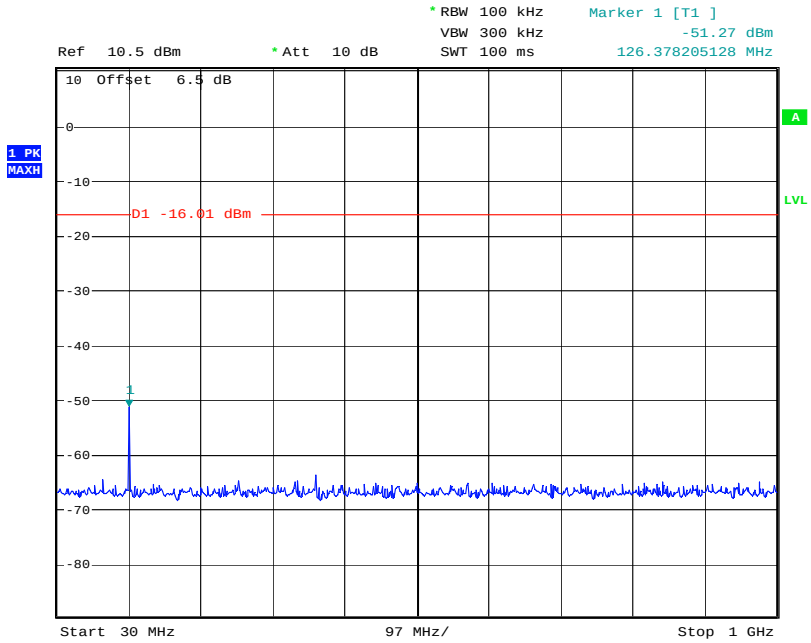
Date: 15.APR.2008 14:54:29

Bottom Channel 20 GHz – 25 GHz



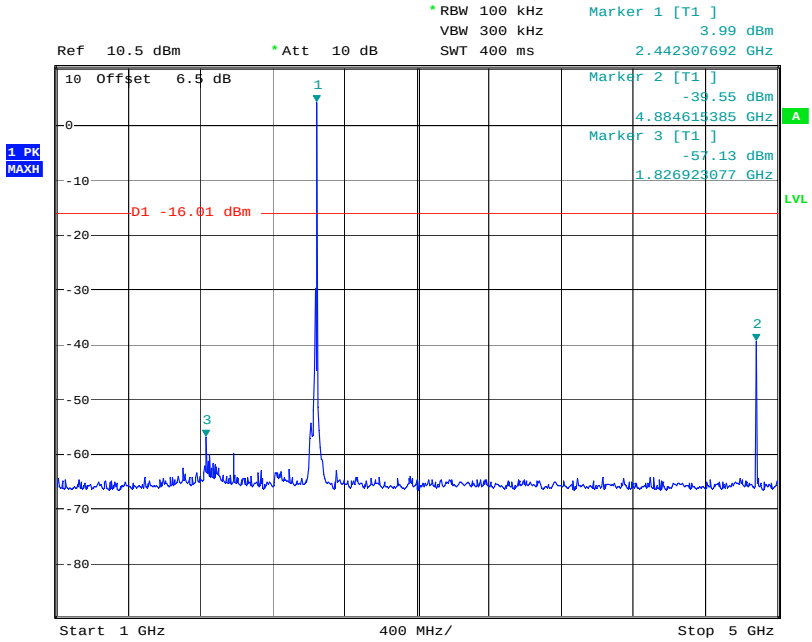
Date: 15.APR.2008 14:54:43

Middle Channel 30 MHz – 1 GHz



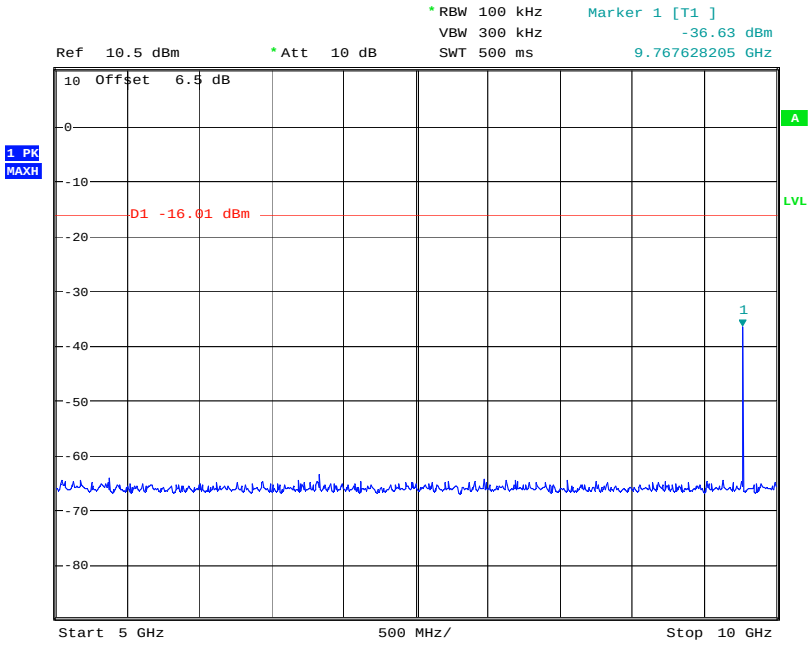
Date: 15.APR.2008 15:00:49

Middle Channel 1 GHz – 5 GHz



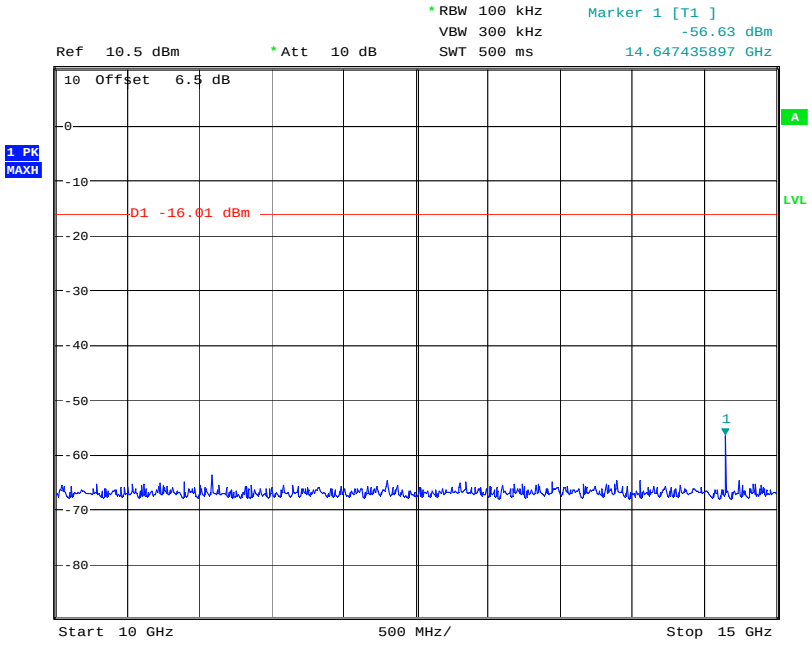
Date: 15.APR.2008 14:57:58

Middle Channel 5 GHz – 10 GHz



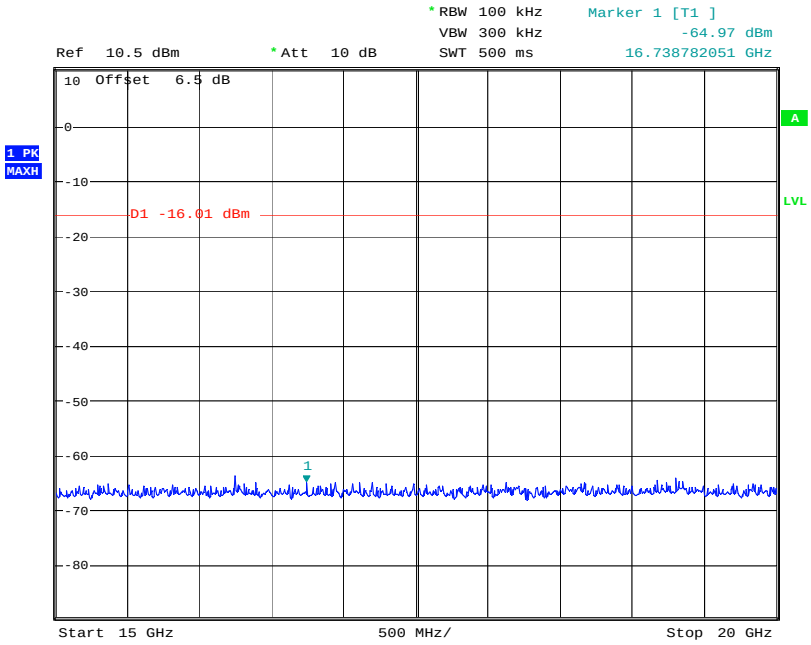
Date: 15.APR.2008 15:02:42

Middle Channel 10 GHz – 15 GHz



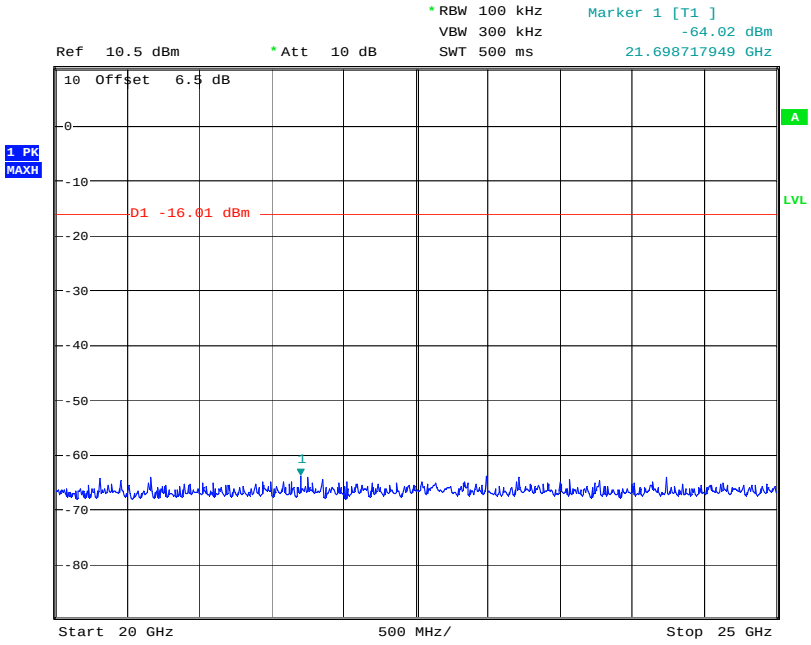
Date: 15.APR.2008 15:02:54

Middle Channel 15 GHz – 20 GHz



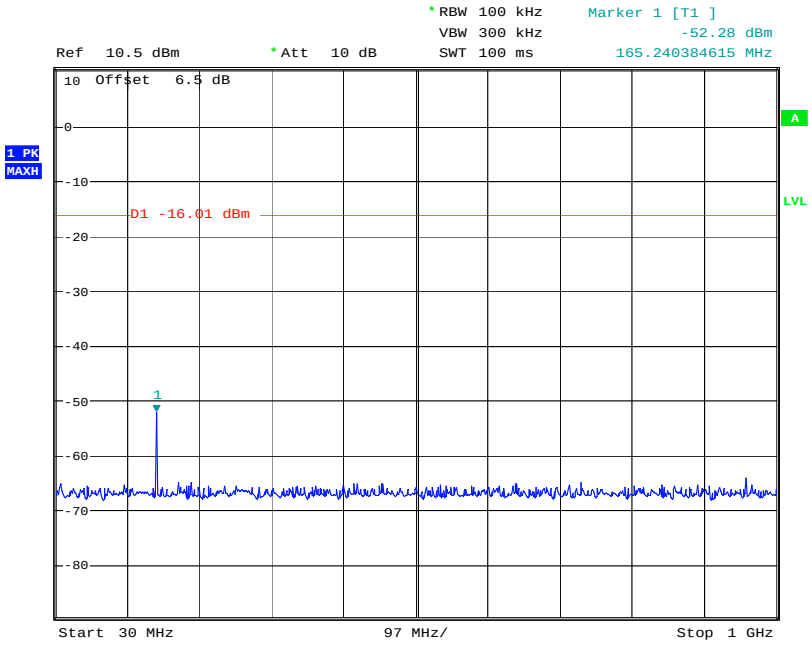
Date: 15.APR.2008 15:03:12

Middle Channel 20 GHz – 25 GHz



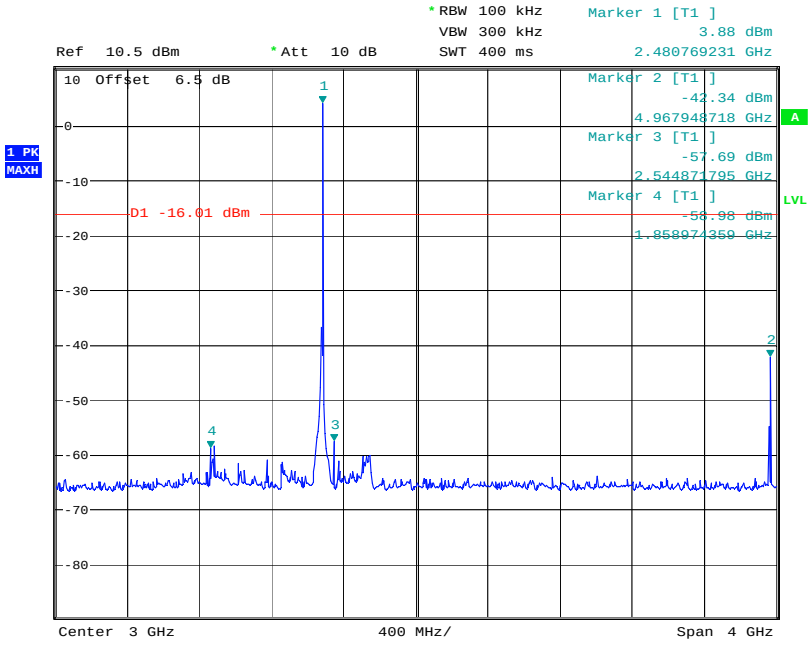
Date: 15.APR.2008 15:03:24

Top Channel 30 MHz – 1 GHz



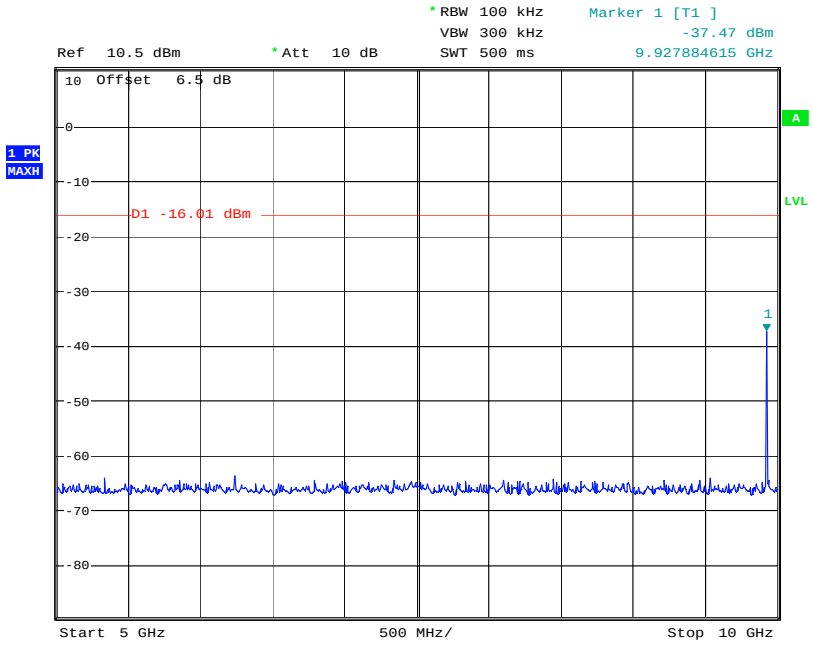
Date: 15.APR.2008 15:05:31

Top Channel 1 GHz – 5 GHz



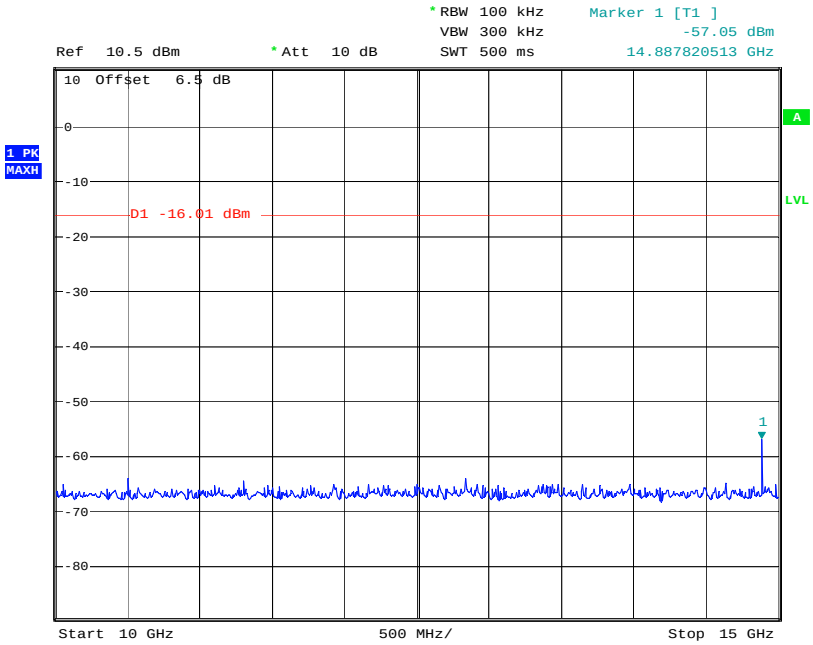
Date: 15.APR.2008 15:05:15

Top Channel 5 GHz – 10 GHz



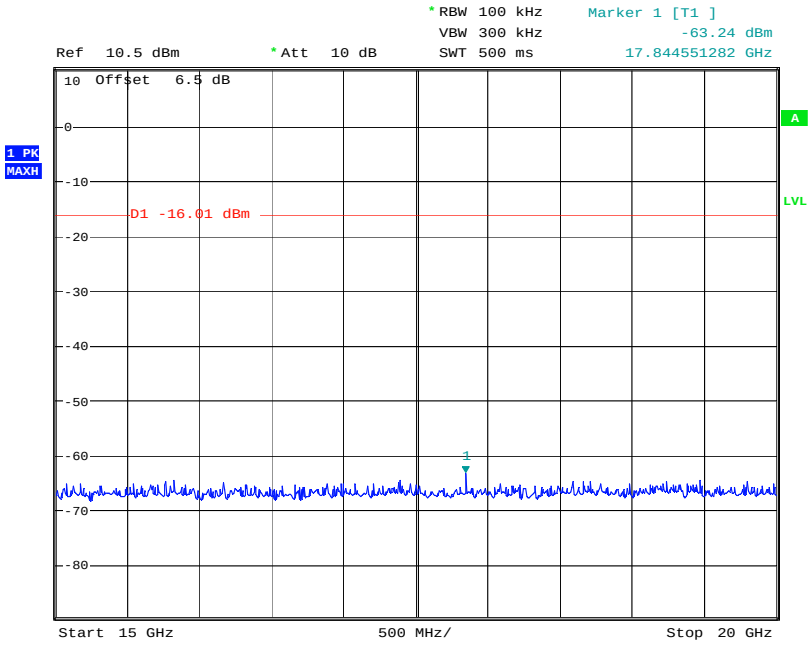
Date: 15.APR.2008 15:06:13

Top Channel 10 GHz – 15 GHz



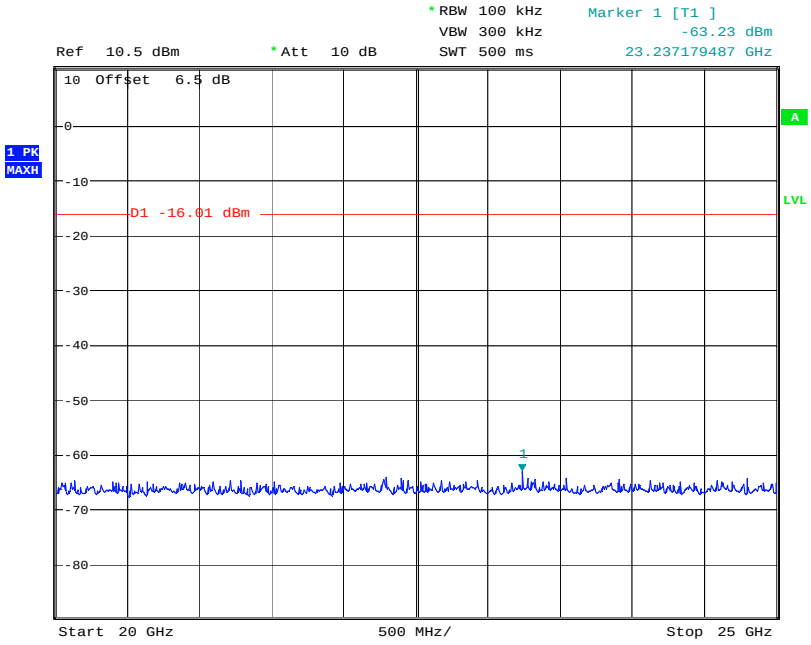
Date: 15.APR.2008 15:06:25

Top Channel 15 GHz – 20 GHz



Date: 15.APR.2008 15:06:37

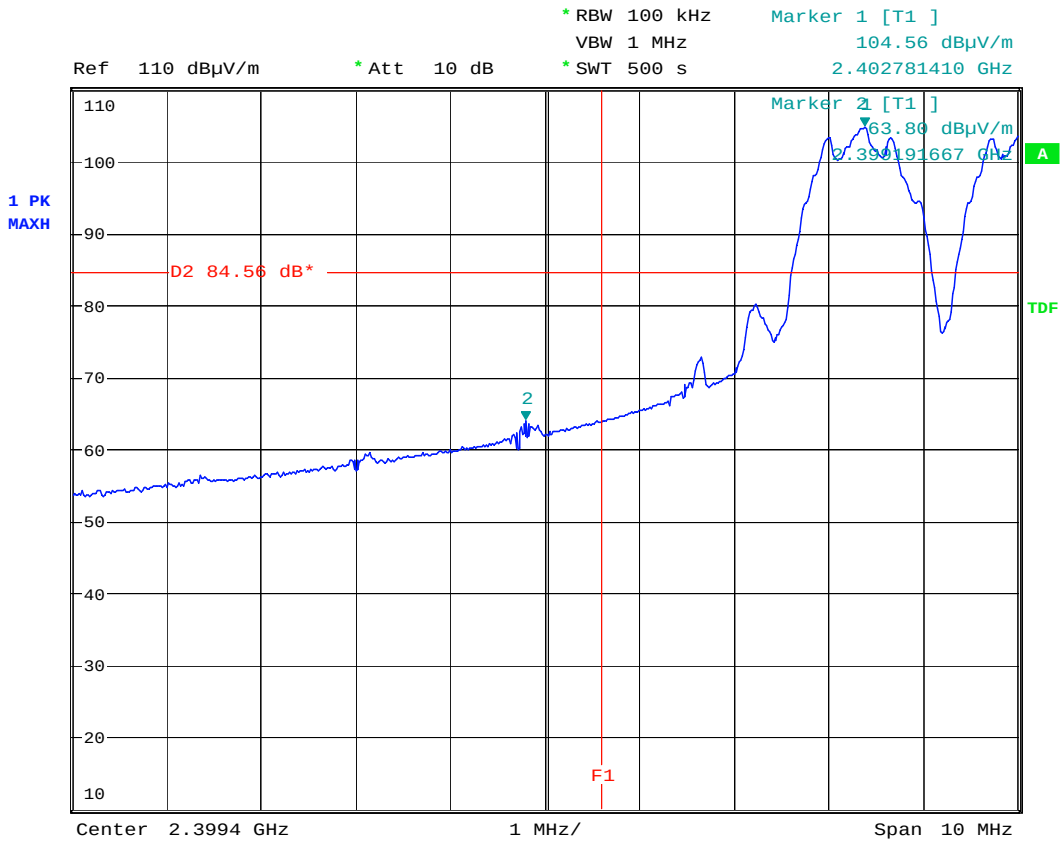
Top Channel 20 GHz – 25 GHz



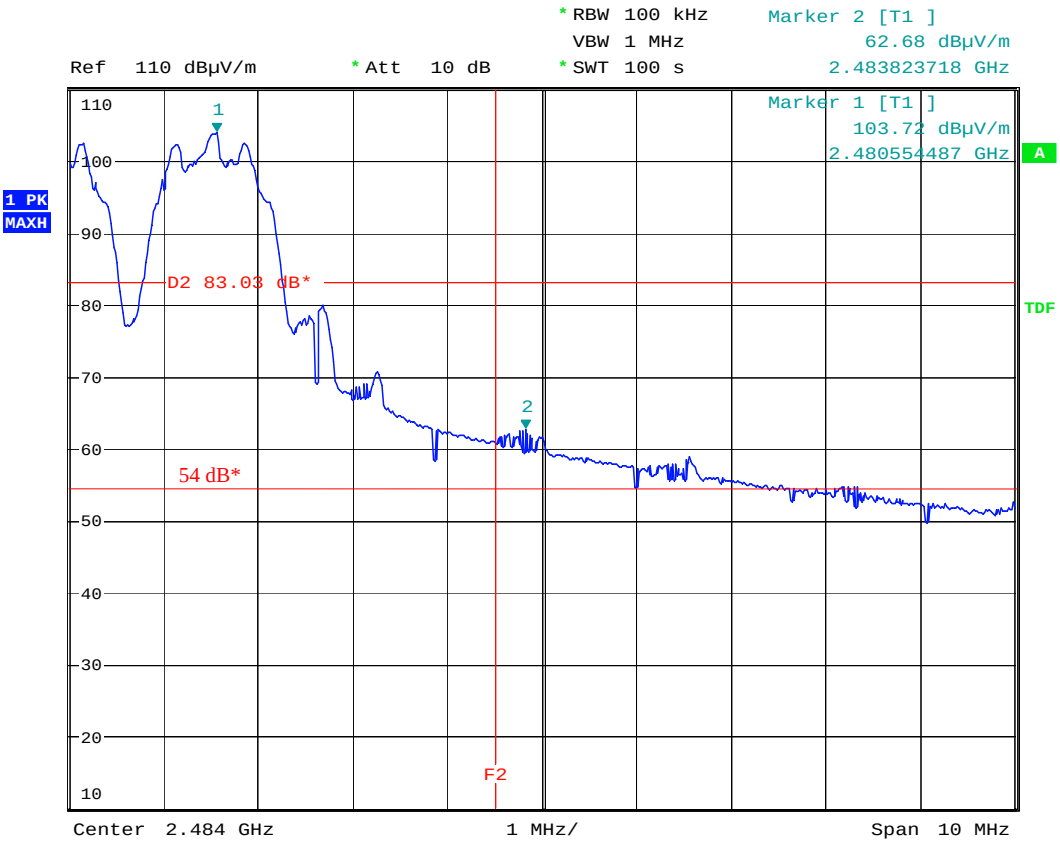
Date: 15.APR.2008 15:06:53

ANNEX L

BAND EDGE EMISSIONS RADIATED



Date: 14.APR.2008 15:23:20



Date: 14.APR.2008 15:03:41

Average Measurement taken at Peak Emission frequency outside of the band edge.
See table on page 17 for average measurement result.

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%**