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**REPORT ON THE CERTIFICATION TESTING OF A
PROMETHEAN LIMITED
ACTIVEXPRESSION
MODEL NUMBER PRM-AE1-01
WITH RESPECT TO
THE FCC RULES CFR 47, PART 15.247 September 2007
INTENTIONAL RADIATOR SPECIFICATION**



TEST REPORT NO: RU1481/8721

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INTENTIONAL RADIATOR SPECIFICATION**

TEST DATE: 30th July – 4th August 2008

TESTED BY: D WINSTANLEY

APPROVED BY: J CHARTERS
RADIO SECTION
LEADER

DATE: 15th August 2008

Distribution:

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 3. TRL Compliance Ltd

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Notes:			
1. Component failure during test	YES		<input type="checkbox"/>
	NO		<input checked="" type="checkbox"/>
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.			



TRL Compliance

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CERTIFICATE OF CONFORMITY & COMPLIANCE

FCC IDENTITY: QAM011

PURPOSE OF TEST: Certification

TEST SPECIFICATION: FCC RULES CFR 47, Part 15.247 September 2007

TEST RESULT: Compliant to Specification

EQUIPMENT UNDER TEST: Activexpression

ITU: EMISSION CODE: 1M43F7D

EQUIPMENT TYPE: Learner response system

PRODUCT USE: Wireless LAN

CARRIER EMISSION: 0.00369 W 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

MODULATION METHOD: FHSS DSSS Other

POWER SOURCE(s): +4.5Vdc

TEST DATE(s): 30th July – 4th August 2008

ORDER No(s): PG0004063

APPLICANT: Promethean Limited

ADDRESS: Promethean House
Lower Philips Road
Blackburn
BB1 5TH

TESTED BY: _____ D WINSTANLEY

APPROVED BY: _____ J CHARTERS
RADIO SECTION
LEADER

APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT): Activexpression

EQUIPMENT TYPE: Learner response system

PURPOSE OF TEST: Certification

TEST SPECIFICATION(s): FCC RULES CFR 47, Part 15.247 September 2007

TEST RESULT: COMPLIANT Yes
No

APPLICANT'S CATEGORY: MANUFACTURER
IMPORTER
DISTRIBUTOR
TEST HOUSE
AGENT

APPLICANT'S ORDER No(s): PG0004063

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): 30th July – 4th August 2008

TEST REPORT No: RU1481/8721

EQUIPMENT TEST / EXAMINATIONS REQUIRED

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:	-	-	No
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 : Learner response system
3. Temperatures: Ambient (Tnom) 22°C
4. Supply Voltages: Vnom +4.5Vdc
- Note: +4.5Vdc 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 CARRIER FREQUENCY SEPARATION – CONDUCTED – Part 15.247(a)(1)

Ambient temperature = 20°C
 Relative humidity = 69%
 Conditions = Conducted –Radio Lab
 Supply voltage = +4.5Vdc

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

See spectrum analyser plot – Annex D
See note 1

- Notes:**
- 1 20dB Bandwidth of one carrier is 1423.076 kHz therefore carrier frequency separation must be greater than 948.717 kHz.
 - 2 Conducted measurements were performed with a temporary antenna connector provided by the client.
 - 3 For analyser setting see scan data annex F.

- 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	TRL	N/A	N/A	UH358	X

TRANSMITTER TESTS

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

Ambient temperature = 20°C
 Relative humidity = 69%
 Conditions = Conducted –Radio Lab
 Supply voltage = +4.5Vdc

20dB Bandwidth (kHz)
1423.076 kHz
Limit >500kHz

See spectrum analyser plot – Annex F

Notes:

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

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	8304-100-N	N/A	222	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 = 20°C
 Relative humidity = 69%
 Conditions = Conducted –Radio Lab
 Supply voltage = +4.5Vdc

Packet Width (µs)	Number of Transmissions in 18.4 seconds	Average time of Occupancy (s)
541.98 µs	48	0.0260
Limit 0.4 seconds		

See spectrum analyser plot – Annex G

- Notes:**
- 1 Conducted measurements were performed with a temporary antenna connector provided by the client.
 - 2 For analyser setting see scan data annex G.
 - 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 seconds

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	TRL	N/A	N/A	UH358	X

TRANSMITTER TESTS

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

Ambient temperature = 23°C
 Relative humidity = 66%
 Conditions = Conducted –Radio Lab
 Supply voltage = +4.5Vdc

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	-4.82	10.5	0	5.68	0.00369	0.125
Middle	-5.00	10.5	0	5.50	0.00355	0.125
Top	-5.22	10.5	0	5.28	0.00337	0.125

See spectrum analyser plot – Annex I

Notes:

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

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	TRL	N/A	N/A	UH358	X

TRANSMITTER TESTS

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

Ambient temperature	=	23°C
Relative humidity	=	65%
Conditions	=	Conducted –Radio Lab
Supply voltage	=	+4.5Vdc

Test Result

Measured as compliant see analyser plots

Channel Frequency	EUT Operation	Emission Frequency (MHz)	Emission Level (dBC)	Limit (dBC)
Bottom	Modulated Carrier	2399.325 MHz	40.53	20
All	Hopping	2399.293 MHz	40.92	20
Top	Modulated Carrier	2483.931 MHz	40.92	20
All	Hopping	2483.955 MHz	41.22	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 I 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	TRL	N/A	N/A	UH358	X

TRANSMITTER TESTS

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

Ambient temperature = 24°C
 Relative humidity = 64%
 Conditions = Conducted –Radio Lab
 Supply voltage = +4.5Vdc

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				-14.59

See spectrum analyser scan plots – Annex J

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				-14.59

See spectrum analyser scan plots – Annex J

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				-14.59

See spectrum analyser scan plots – Annex J

Notes:

- 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
- 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	TRL	N/A	N/A	UH358	X

TRANSMITTER TESTS

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

Ambient temperature = 22°C
 Relative humidity = 61%
 Conditions = Radiated OATS
 Supply voltage = +4.5Vdc

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								Note 6	100
88MHz – 216MHz Restricted bands								Note 6	150
216MHz – 960MHz Restricted bands								Note 6	200
960MHz – 1GHz Restricted bands								Note 6	500
1GHz – 25GHz Restricted bands	2255.918	48.26	1.11	27.78	35.25	39.69	-	96.49	500
	2293.887	45.78	1.15	28.10	35.20	39.83	-	98.06	500
	2701.714	41.64	1.20	29.05	35.15	36.74	-	68.70	500
	4805.538	52.74	1.78	32.80	34.80	52.52	-	422.67	500
	12014.012	35.79	3.70	39.20	34.72	43.97	-	157.94	500
30MHz -25GHz								Note 6	9977

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								Note 6	100
88MHz – 216MHz Restricted bands								Note 6	150
216MHz – 960MHz Restricted bands								Note 6	200
960MHz – 1GHz Restricted bands								Note 6	500
1GHz – 25GHz Restricted bands	2212.710	42.95	1.10	27.78	35.50	36.33	-	65.54	500
	2288.718	45.67	1.12	28.10	35.20	39.69	-	96.49	500
	2331.896	45.63	1.16	28.50	35.10	40.19	-	102.21	500
	2744.868	41.06	1.20	29.09	35.18	36.17	-	64.34	500
	4881.538	45.46	1.78	33.00	34.90	45.34	-	184.93	500
	7322.307	37.44	2.18	36.20	35.20	40.62	-	107.40	500
30MHz -25GHz								Note 6	9977

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								Note 6	100
88MHz – 216MHz Restricted bands								Note 6	150
216MHz – 960MHz Restricted bands								Note 6	200
960MHz – 1GHz Restricted bands								Note 6	500
1GHz – 25GHz Restricted bands	2326.778	45.83	1.16	28.50	35.10	40.39	-	104.59	500
	2356.109	43.96	1.17	28.60	35.08	38.65	-	85.60	500
	2368.204	43.69	1.18	28.70	35.05	38.52	-	84.33	500
	2484.008	51.97	1.21	28.90	35.03	47.05	-	225.16	500
	4961.089	46.43	1.85	34.20	34.76	47.88	-	247.74	500
	7441.802	37.35	2.30	37.20	35.25	41.60	-	120.22	500
30MHz -25GHz								Note 6	9977

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 Average emissions recorded.

Test Method:

- 1 As per section 15.247 and Public Notice DA 00-705.
- 2 Measuring distances as Notes 4 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
RECEIVER	ROHDE & SCHWARZ	ESHS 10	825892/006	UH04	X
SPECTRUM ANALYSER	ROHDE & SCHWARZ	FSU46	200034	UH281	X
HORN ANTENNA	FLANN	20240-20	322	300	X
BILOG ANTENNA	CHASE	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	=	22°C
Relative humidity	=	61%
Conditions	=	Radiated OATS
Supply voltage	=	+4.5Vdc

Test Result

Measure as compliant, see analyser plots.

- Notes:**
- 1 The EUT was set in a hopping mode using all hopping channels.
 - 2 See Annex K 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	825892/006	UH04	
SPECTRUM ANALYSER	ROHDE & SCHWARZ	FSU46	200034	UH281	X
RANGE 1	TRL	3 METRE	N/A	UH06	
BILOG ANTENNA	CHASE	CBL6112B	2803	UH93	
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 = 24°C
 Relative humidity = 68%
 Conditions = Radiated OATS
 Supply voltage = +4.5Vdc

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								Note 5	100
88MHz – 216MHz								Note 5	150
216MHz – 960MHz								Note 5	200
960MHz – 1GHz								Note 5	500
1GHz – 25GHz	4807.328 9614.672		1.9 3.0	32.7 37.9	35.7 36.6	39.10 43.20	- -	90.15 144.54	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								Note 5	100
88MHz – 216MHz								Note 5	150
216MHz – 960MHz								Note 5	200
960MHz – 1GHz								Note 5	500
1GHz – 25GHz	4962.858 9925.713		2.20 3.00	33.23 38.23	35.6 36.8	41.94 43.26	- -	125.02 145.54	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 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 orthogonal planes. Maximum results recorded.

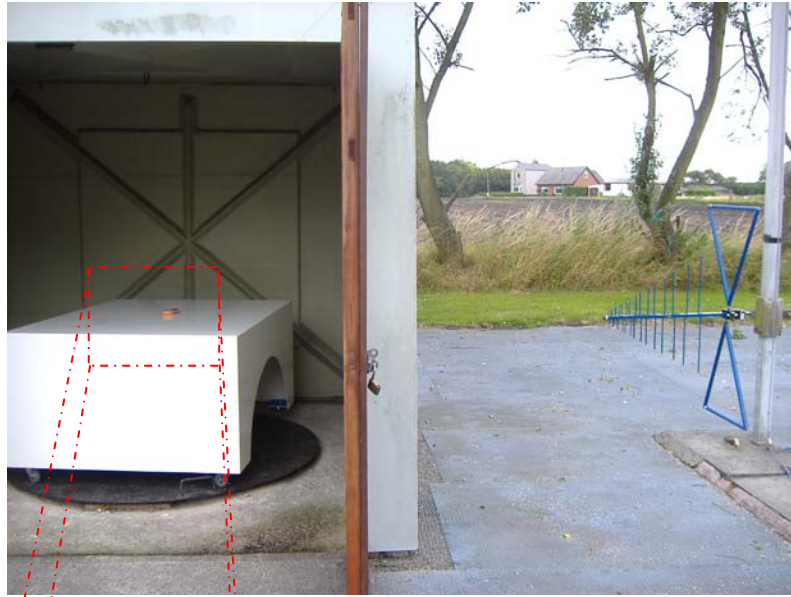
The test equipment used for the tests is shown below:

TYPE OF EQUIPMENT	MAKER/SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
RECEIVER	ROHDE & SCHWARZ	ESHS 10	825892/006	UH04	X
SPECTRUM ANALYSER	ROHDE & SCHWARZ	FSU46	200034	UH281	X
RANGE 1	TRL	3 METRE	N/A	UH06	X
HORN ANTENNA	FLANN	20240-20	322	300	X
BILOG ANTENNA	CHASE	CBL6112B	2803	UH93	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



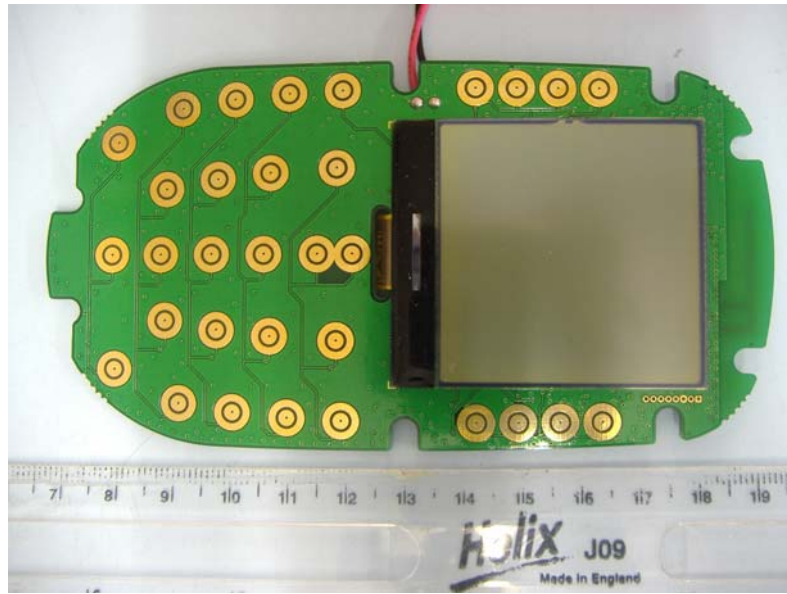
PHOTOGRAPH No. 3

BACK VIEW



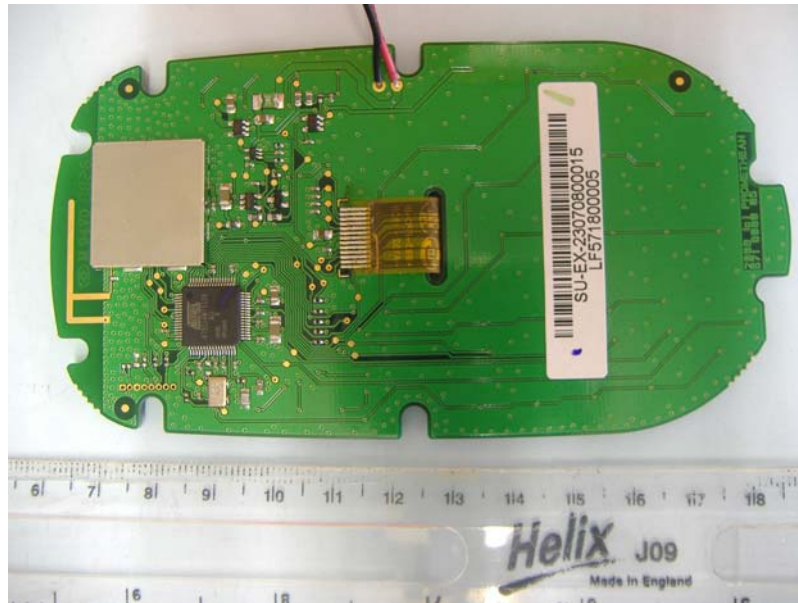
PHOTOGRAPH No. 4

TRANSMITTER PCB TRACK SIDE



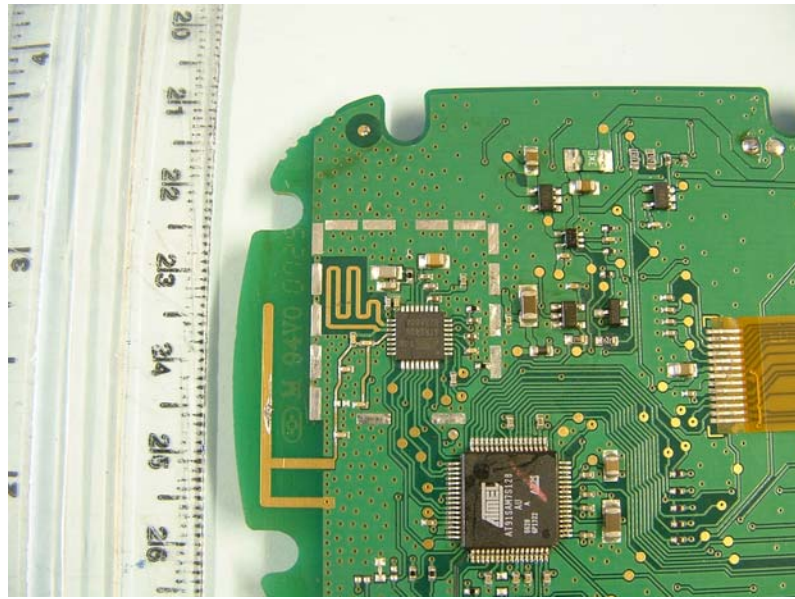
PHOTOGRAPH No. 5

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

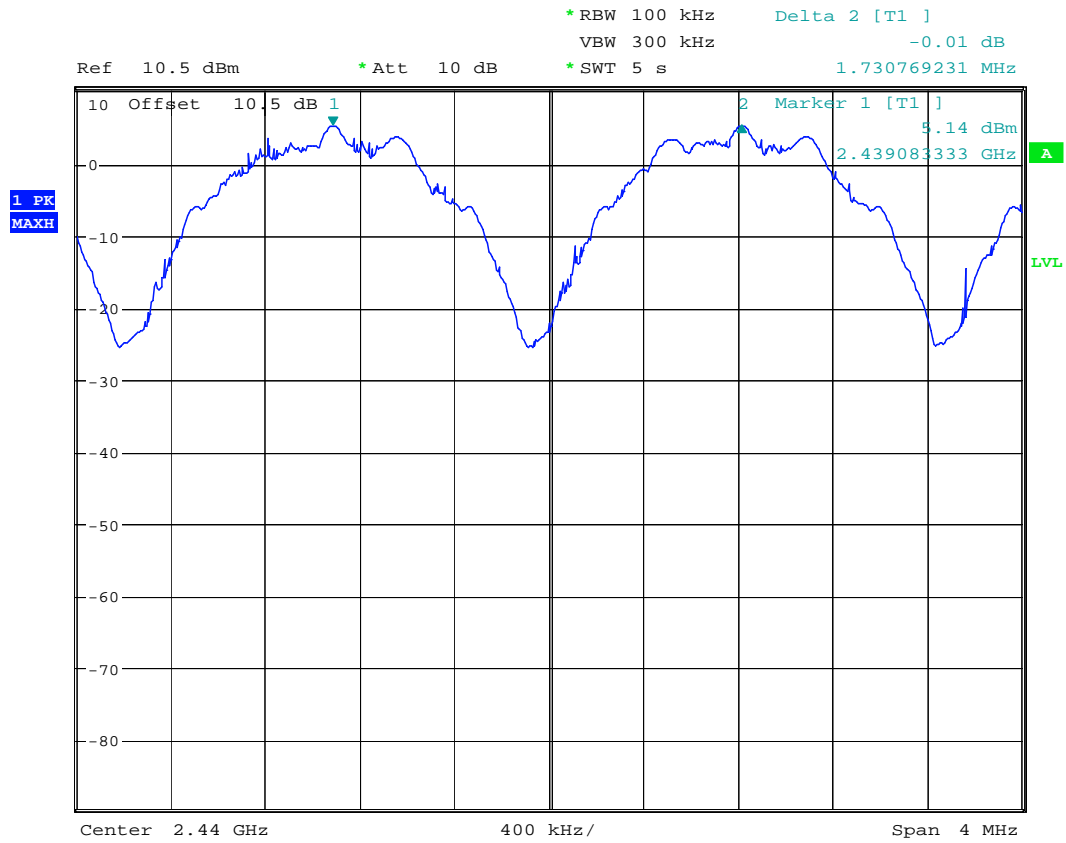
a.	TCB	-	APPLICATION	[X]
		-	FEE	[X]
b.	AGENT'S LETTER OF AUTHORISATION	-		[X]
c.	MODEL(s) vs IDENTITY	-		[]
d.	ALTERNATIVE TRADE NAME DECLARATION(s)	-		[X]
e.	LABELLING	-	PHOTOGRAPHS	[X]
		-	DECLARATION	[]
		-	DRAWINGS	[X]
f.	TECHNICAL DESCRIPTION	-		[X]
g.	BLOCK DIAGRAMS	-	Tx	[X]
		-	Rx	[]
		-	PSU	[]
		-	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
UH004	Receiver	R&S	06/11/2007	12	06/11/2008
UH06/07	IC OATS Submission	TRL	01/06/2007	24	01/06/2009
UH06/07	NSA Calibration	TRL	17/12/2007	12	17/12/2008
UH028	Log Periodic Ant	Schwarbeck	30/05/2007	24	30/05/2009
UH029	Bicone Antenna	Schwarbeck	06/05/2007	24	06/05/2009
UH041	Multimeter	AVOmeter	15/01/2008	12	15/01/2009
UH093	Bilog Antenna	Chase	21/05/2007	24	21/05/2009
UH122	Oscilloscope	Tektronix	10/12/2007	24	10/12/2009
UH132	Power meter	Marconi	15/01/2008	12	15/01/2009
UH162	ERP Cable Cal	TRL	21/12/2007	12	21/12/2008
UH228	Power Sensor	Marconi	16/01/2008	12	16/01/2009
UH253	1m Cable N type	TRL	30/01/2008	12	30/01/2009
UH254	1m Cable N type	TRL	30/01/2008	12	30/01/2009
UH269	1m Cable N type	TRL	30/01/2008	12	30/01/2009
UH270	1m Cable N type	TRL	30/01/2008	12	30/01/2009
UH271	1.5m Cable N type	TRL	30/01/2008	12	30/01/2009
UH272	1.5m Cable N type	TRL	30/01/2008	12	30/01/2009
UH273	2m Cable N type	TRL	30/01/2008	12	30/01/2009
UH274	2m Cable N type	TRL	30/01/2008	12	30/01/2009
UH281	Spectrum Analyser	R&S	24/10/2007	12	24/10/2008
UH340	Signal Generator	HP	06/05/2008	12	06/05/2009
UH358	Cable	TRL		Calibrate In Use	
UH365	Harmonic Mixer	Agilent	16/07/2008	24	16/07/2010
UH366	Harmonic Mixer	Agilent	21/07/2008	24	21/07/2010
UH367	Harmonic Mixer	Agilent	02/07/2008	24	02/07/2010
L005	CMTA	R&S	30/10/2007	12	30/10/2008
L007	Loop Antenna	R&S	22/05/2007	24	22/05/2009
L138	1-18GHz Horn	EMCO	23/05/2007	24	23/05/2009
L139	1-18GHz Horn	EMCO	23/05/2007	24	23/05/2009
L176	Signal Generator	Marconi	06/05/2008	12	06/05/2009
L193	Bicone Antenna	Chase	06/05/2008	24	06/05/2010
L203	Log Periodic Ant	Chase	06/05/2008	24	06/05/2010
L222	Attenuator	Bird		Calibrate In use	
L263/A	Horn 18-26GHz	Flann	13/06/2008	24	13/06/2010
L300	Horn 18-26GHz	Flann	12/06/2008	24	12/06/2010
L309	SMA Transition		13/06/2008	24	13/06/2010
L330	K type transition	Flann	13/06/2008	24	13/06/2010
L426	Temperature Indicator	Fluke	22/01/2008	12	22/01/2009
L479	Analyser	Anritsu	11/12/2007	12	11/12/2008
L572	Pre Amplifier	HP	01/07/2008	12	01/07/2009

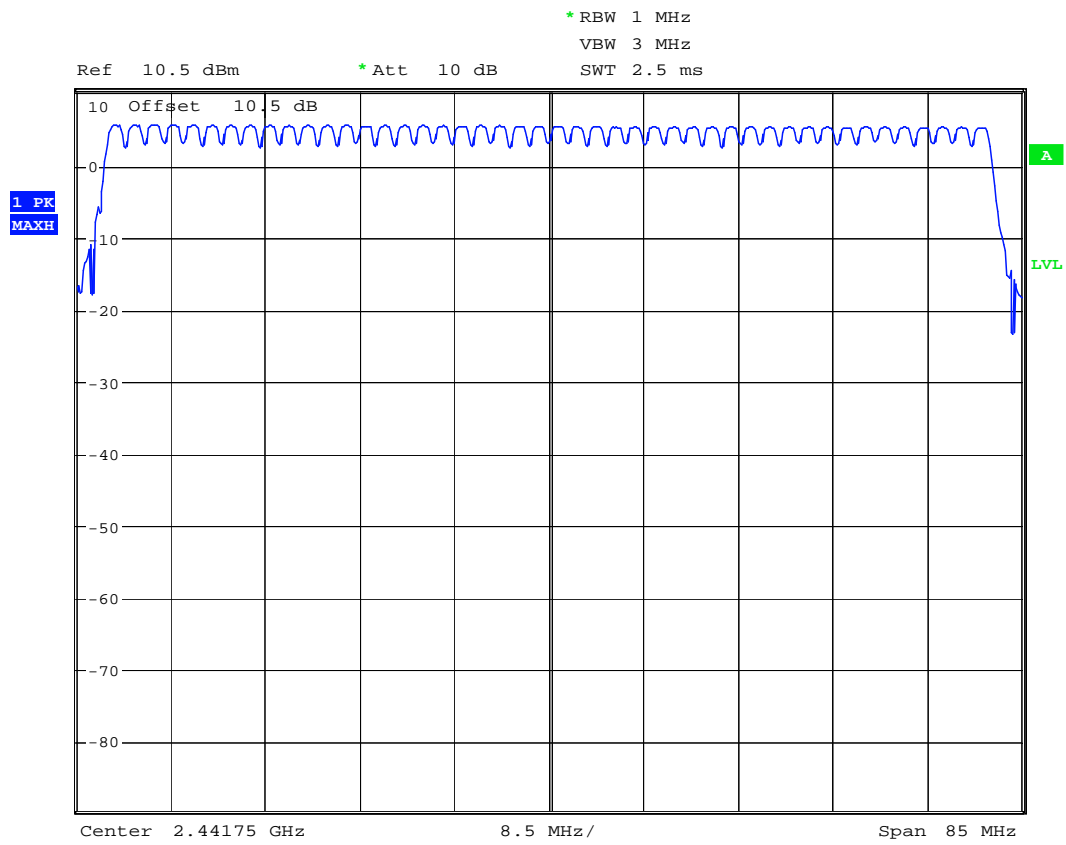
ANNEX D

CARRIER FREQUENCY SEPARATION



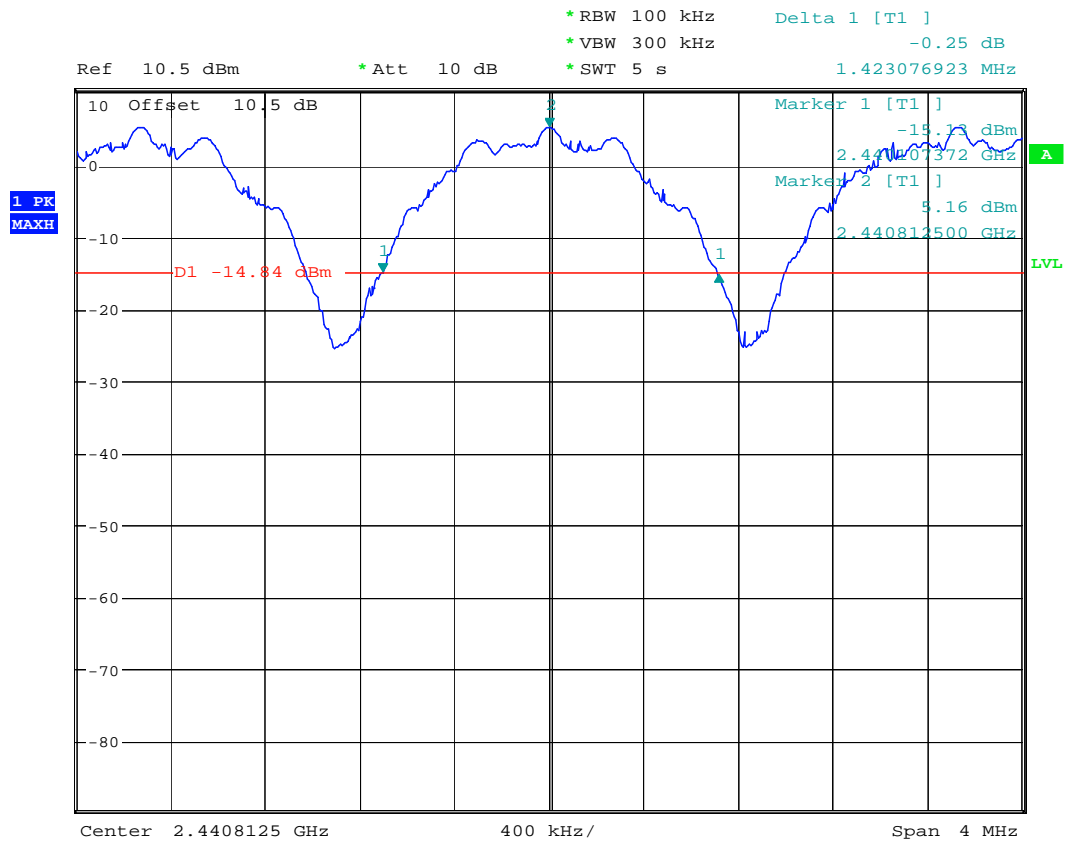
Date: 4.AUG.2008 12:29:40

ANNEX E
NUMBER OF HOPPING CHANNELS



Date: 4.AUG.2008 13:01:30

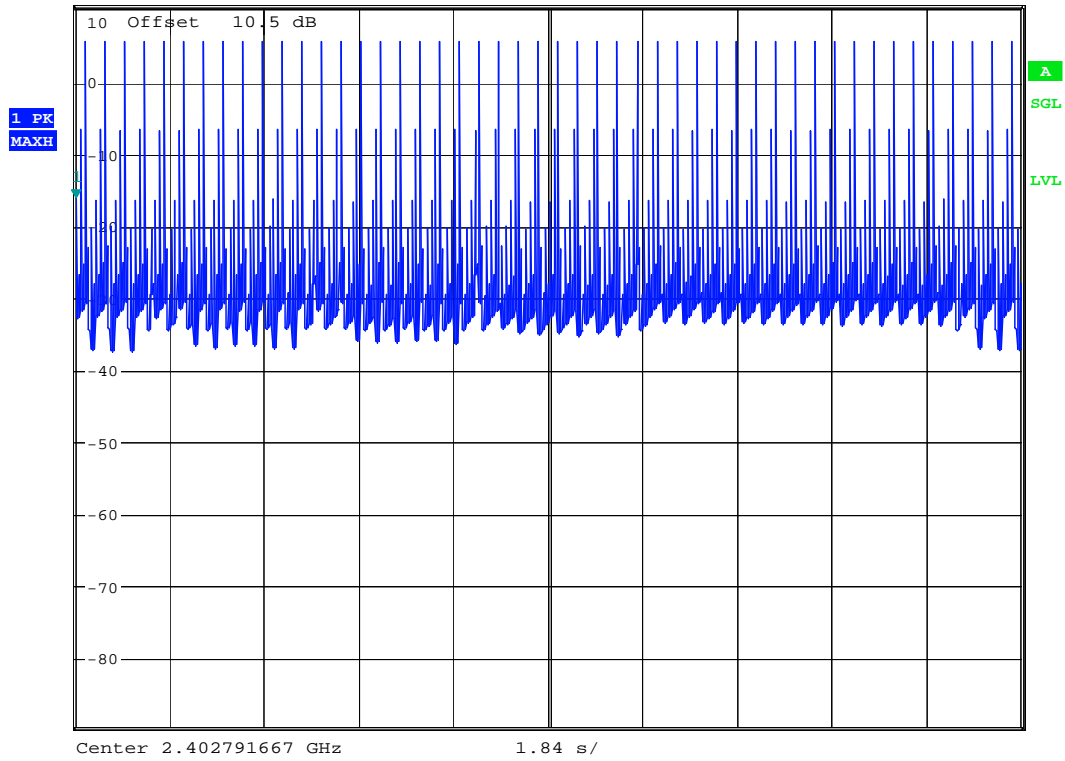
ANNEX F
20dB BANDWIDTH



Date: 4.AUG.2008 13:43:58

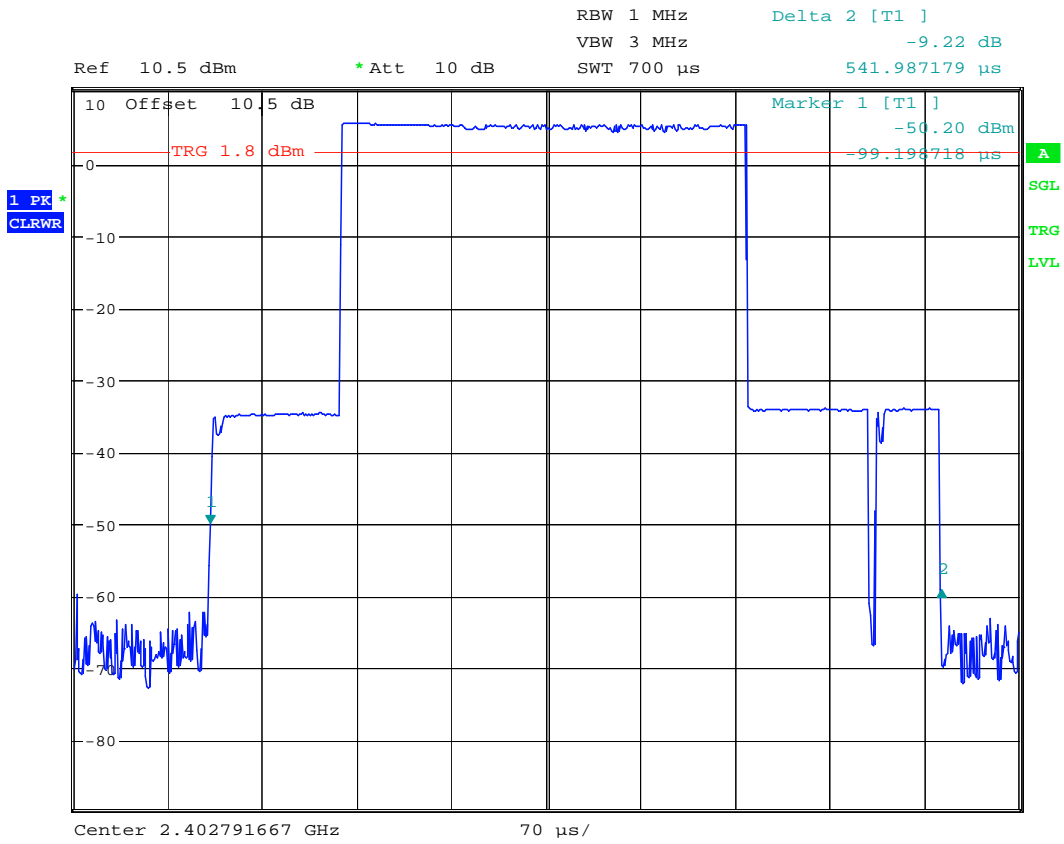
ANNEX G
AVERAGE TIME OF OCCUPANCY

RBW 1 MHz Marker 1 [T1]
VBW 3 MHz -16.32 dBm
Ref 10.5 dBm *Att 10 dB SWT 18.4 s 2.500000 ms



Date: 4.AUG.2008 13:03:33

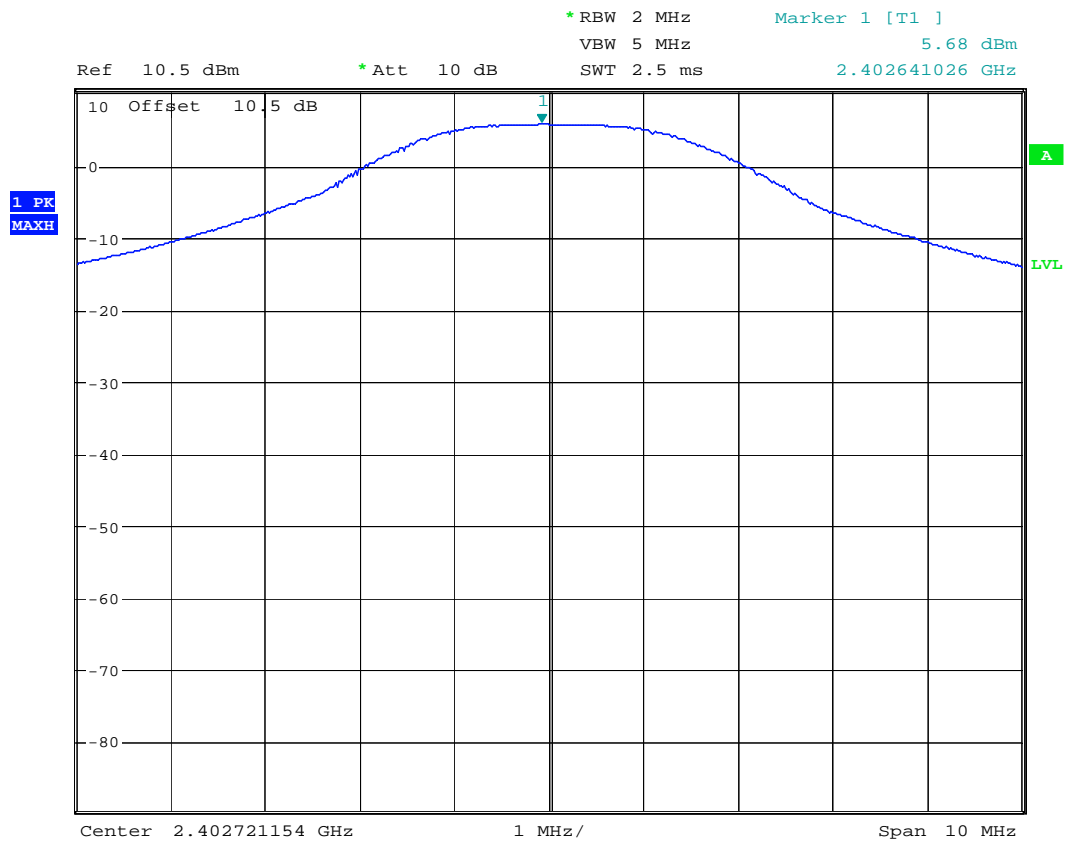
Number of transmissions made within 18.4 seconds



Date: 4.AUG.2008 13:05:06

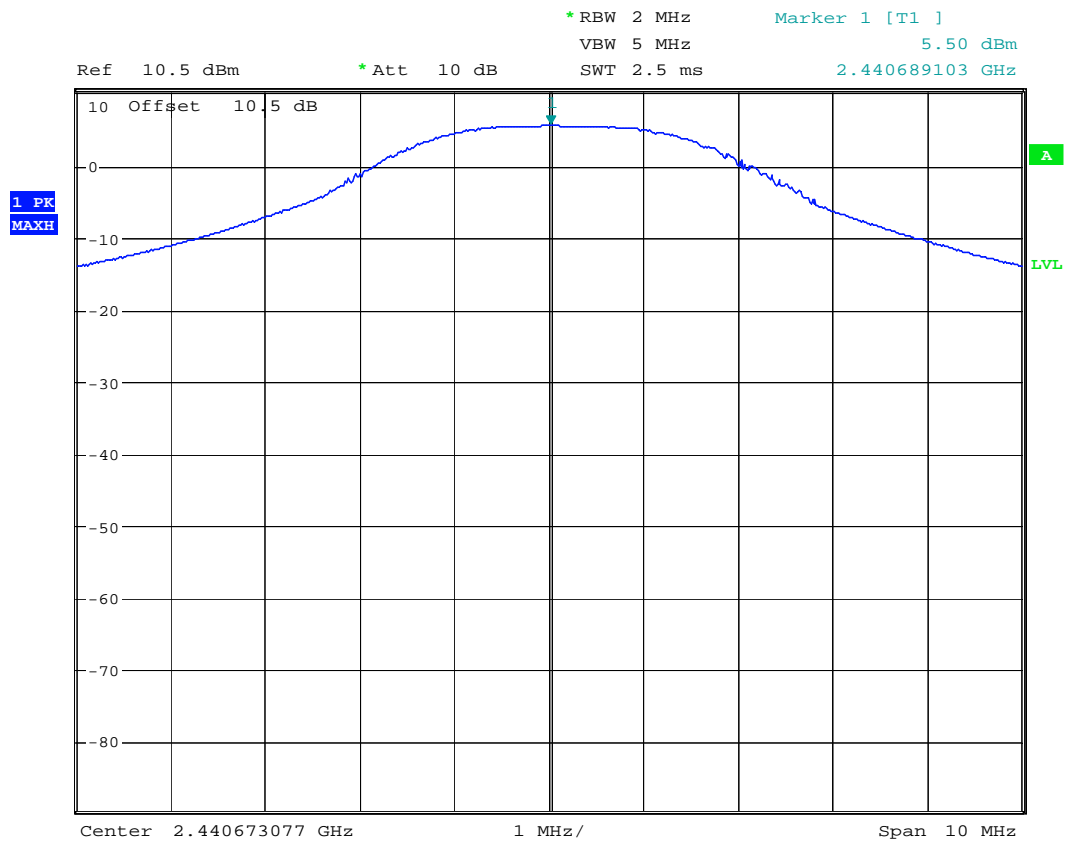
Length of one packet

ANNEX H
PEAK POWER CONDUCTED



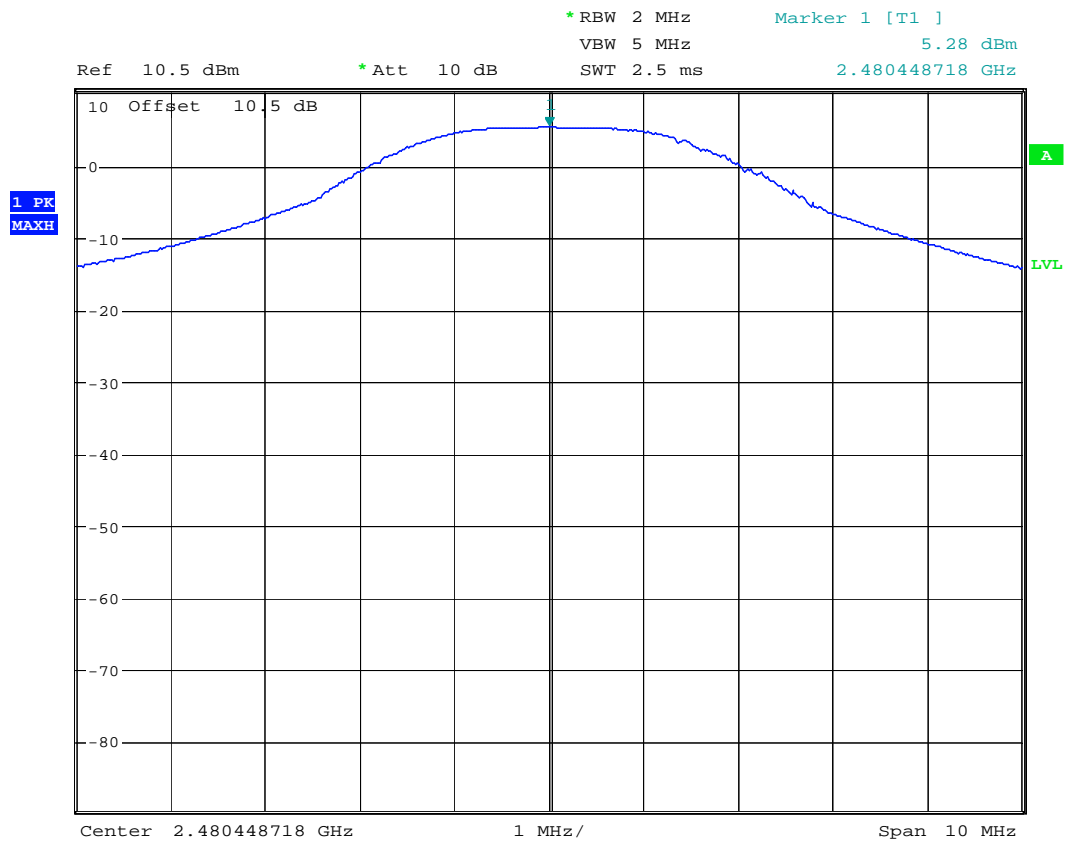
Date: 4.AUG.2008 15:45:33

PEAK POWER LOW CHANNEL



Date: 4.AUG.2008 15:49:44

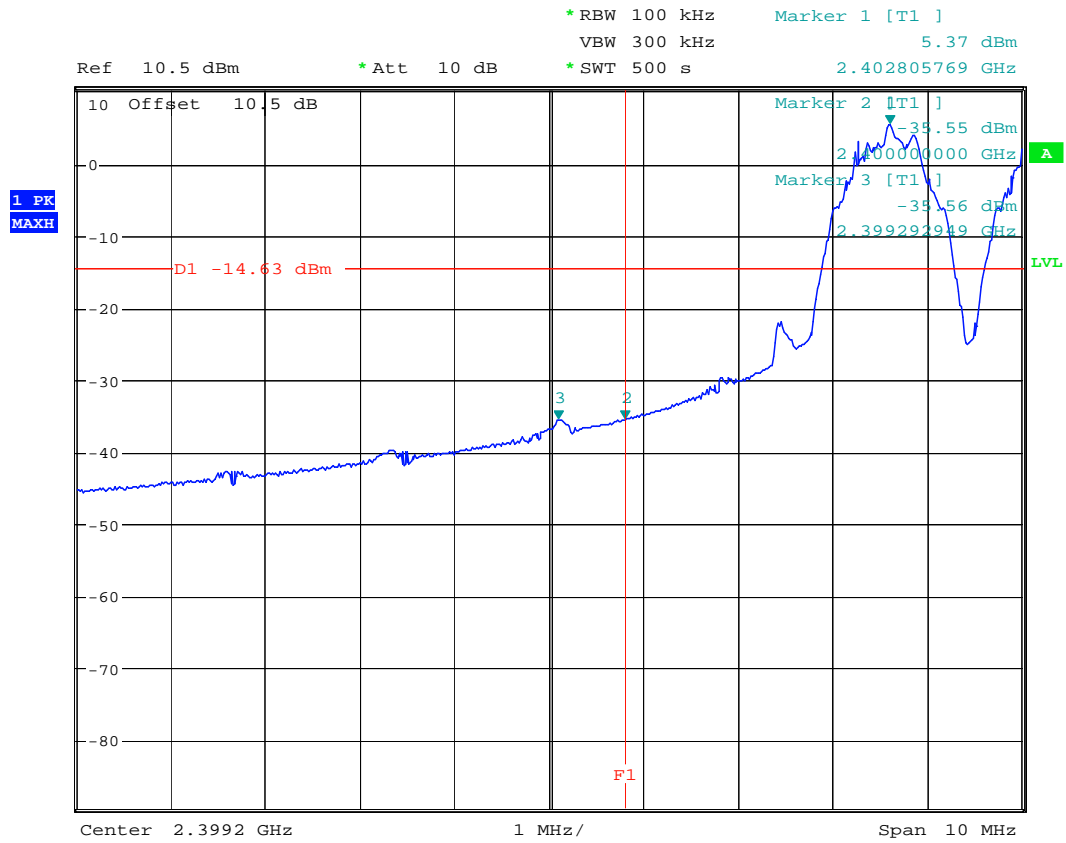
PEAK POWER MID CHANNEL



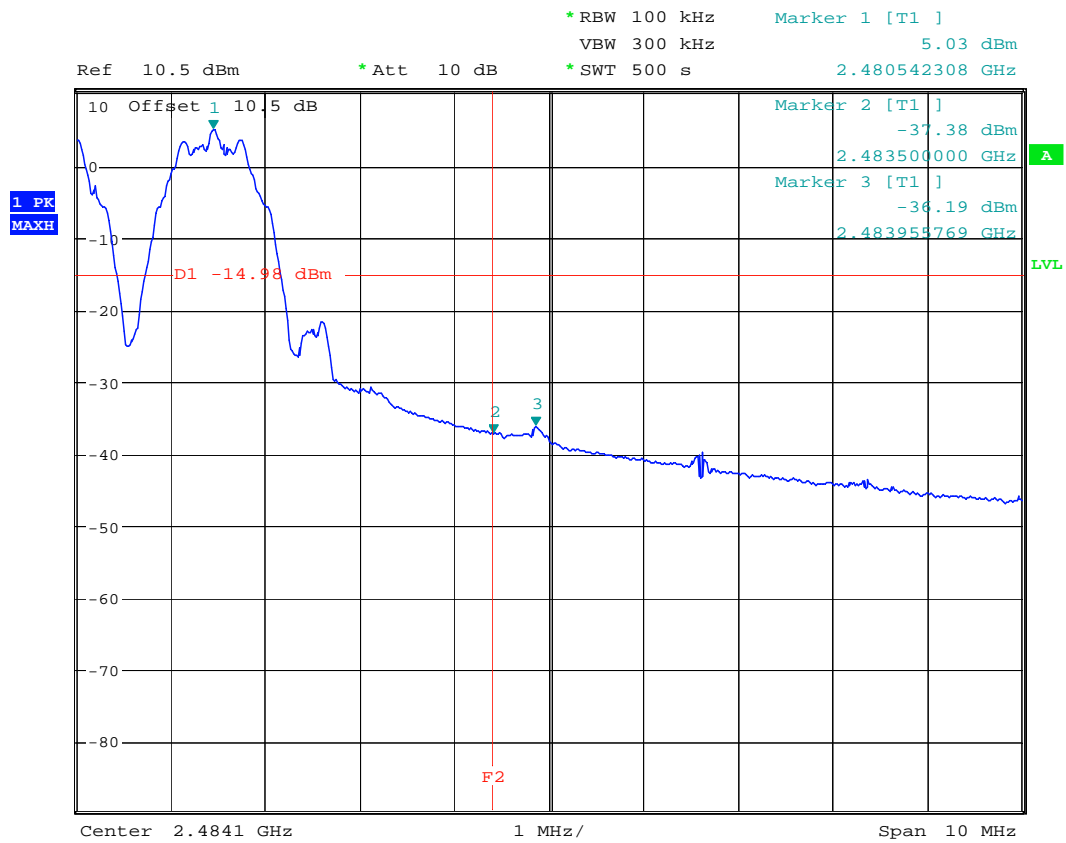
Date: 4.AUG.2008 15:54:26

PEAK POWER HIGH CHANNEL

ANNEX I
BAND EDGE CONDUCTED EMISSION



Date: 4.AUG.2008 16:21:02

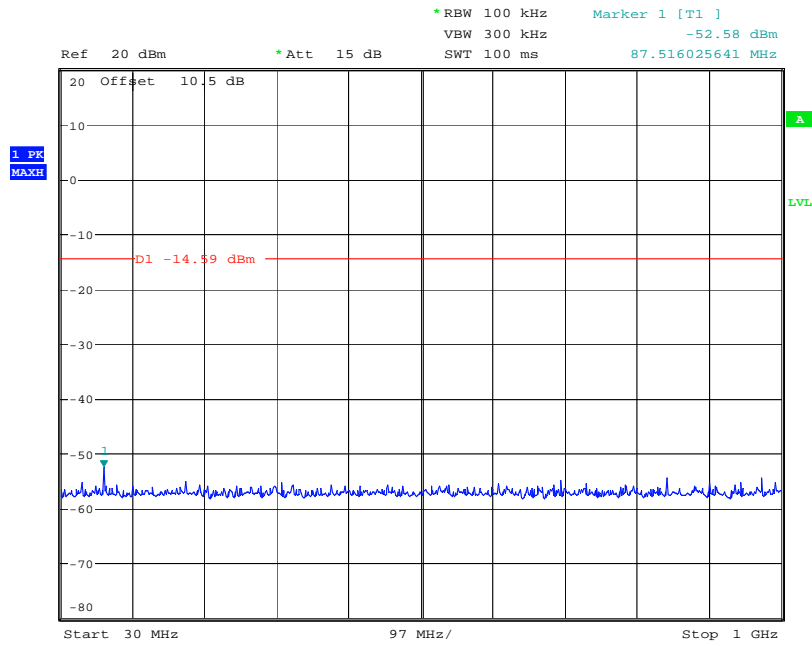


Date: 4.AUG.2008 16:43:39

ANNEX J
CONDUCTED SPURIOUS EMISSION

Bottom Channel

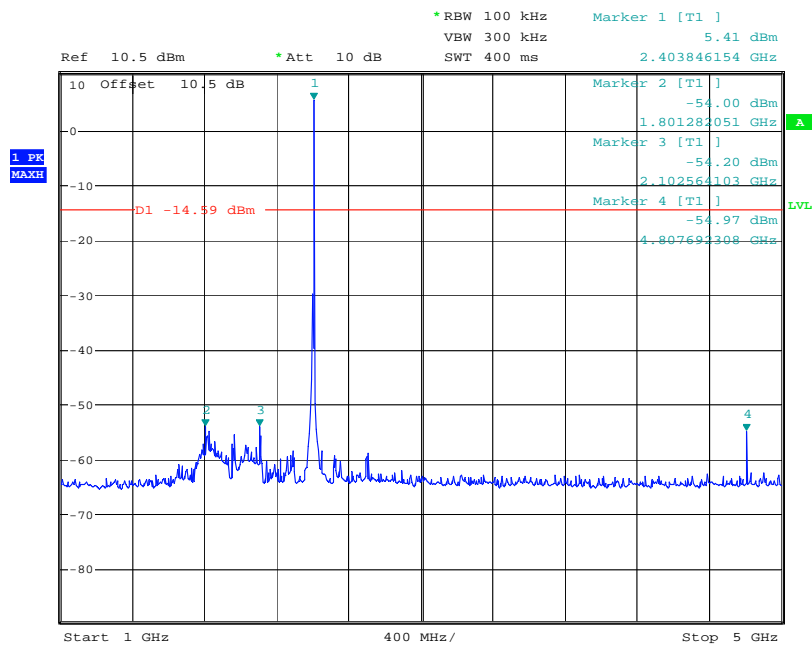
30 MHz – 1 GHz



Date: 4.AUG.2008 16:46:08

Bottom Channel

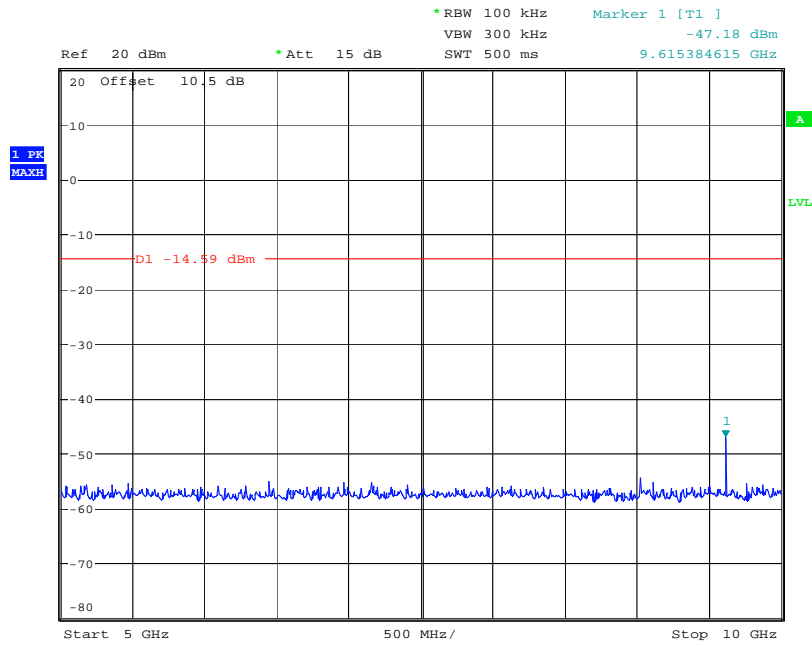
1 GHz – 5 GHz



Date: 4.AUG.2008 16:45:36

Bottom Channel

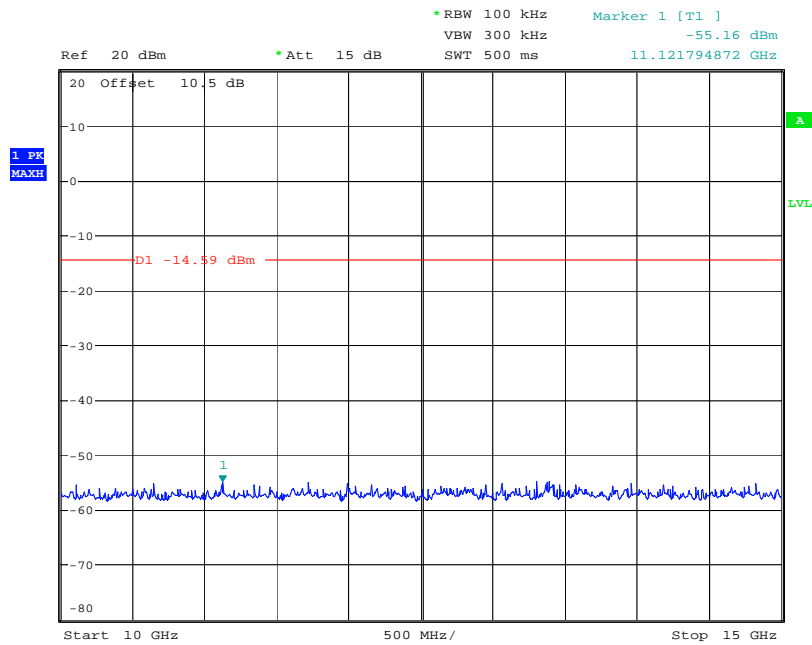
5 GHz – 10 GHz



Date: 4.AUG.2008 16:46:22

Bottom Channel

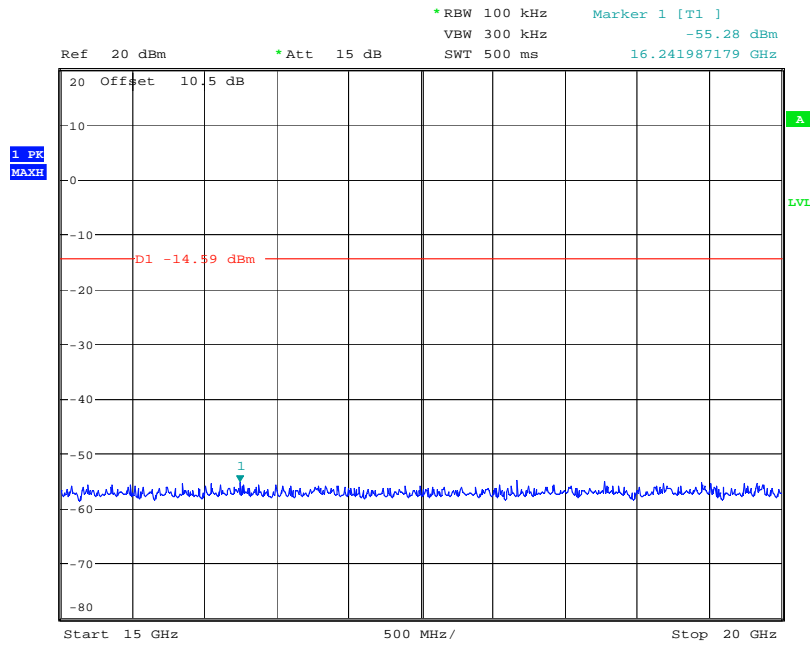
10 GHz – 15 GHz



Date: 4.AUG.2008 16:46:40

Bottom Channel

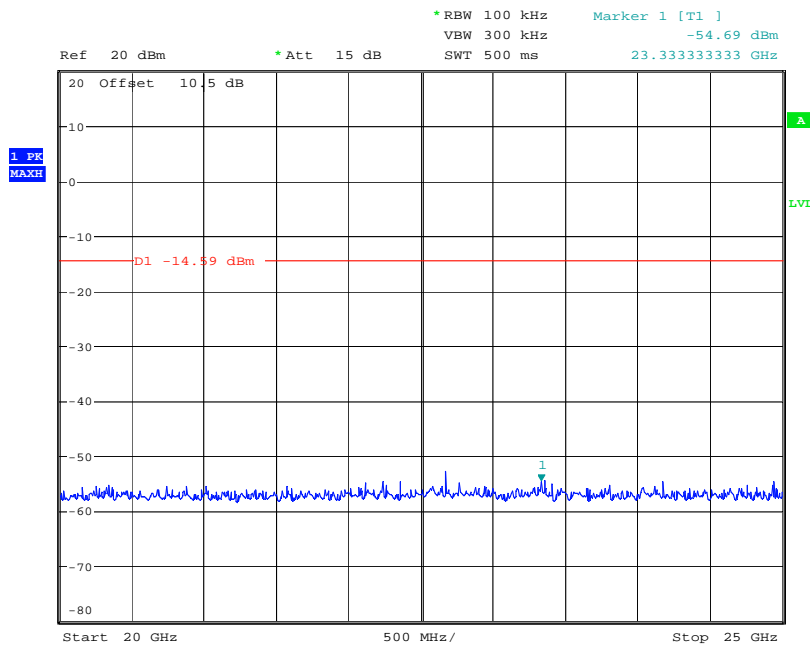
15 GHz – 20 GHz



Date: 4.AUG.2008 16:46:58

Bottom Channel

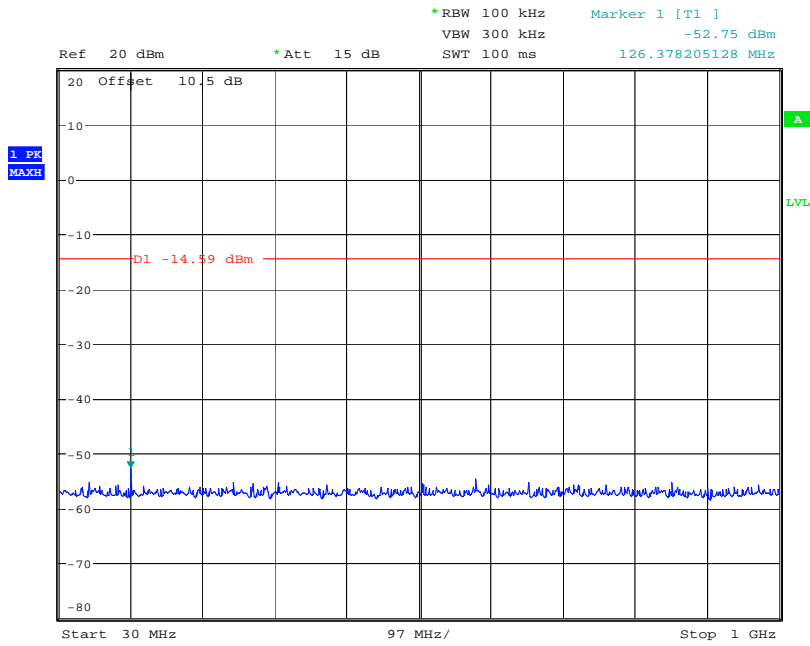
20 GHz – 25 GHz



Date: 4.AUG.2008 16:47:12

Middle Channel

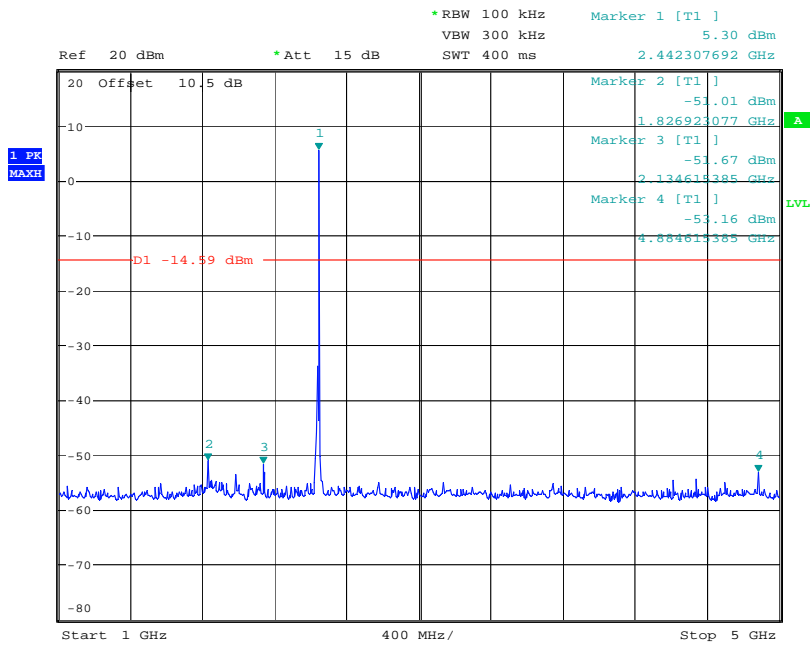
30 MHz – 1 GHz



Date: 4.AUG.2008 16:51:50

Middle Channel

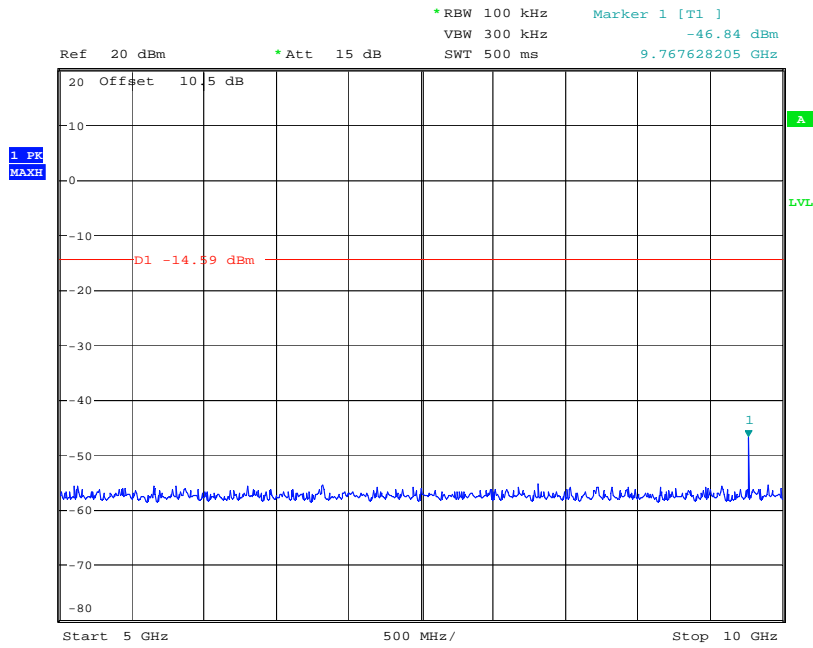
1 GHz – 5 GHz



Date: 4.AUG.2008 16:51:26

Middle Channel

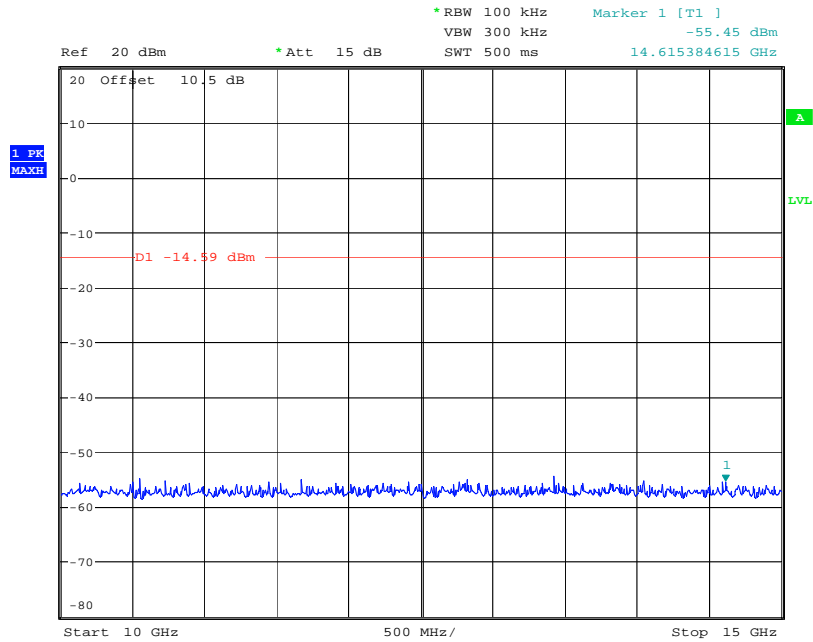
5 GHz – 10 GHz



Date: 4.AUG.2008 16:51:07

Middle Channel

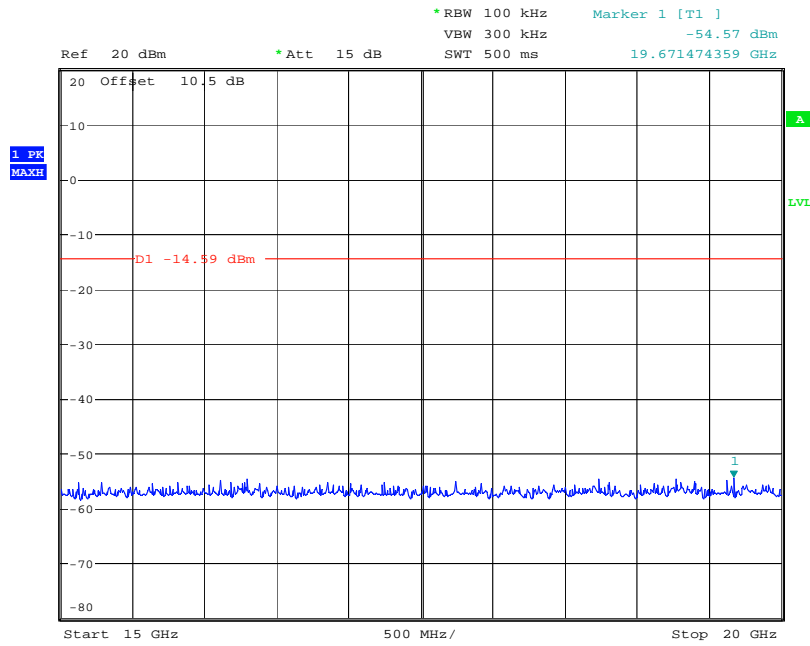
10 GHz – 15 GHz



Date: 4.AUG.2008 16:50:53

Middle Channel

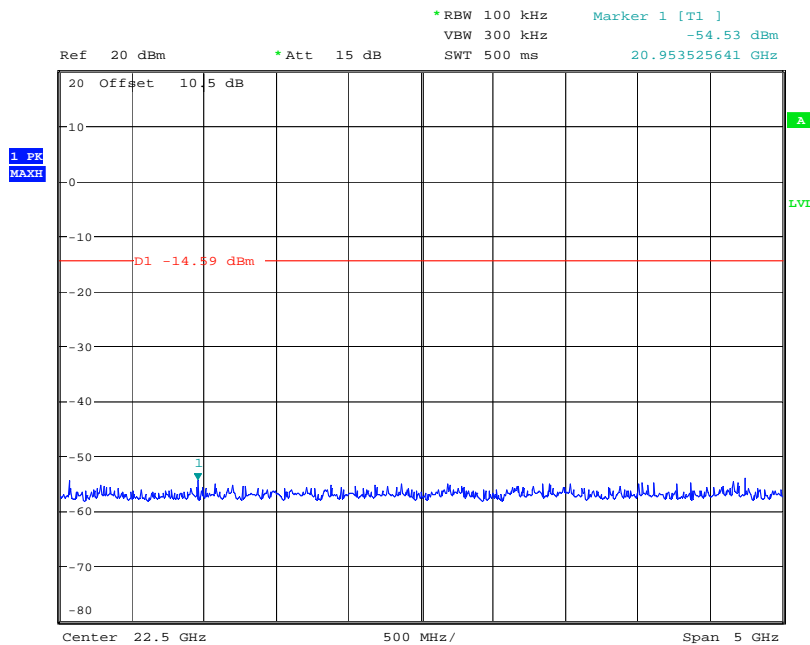
15 GHz – 20 GHz



Date: 4.AUG.2008 16:50:38

Middle Channel

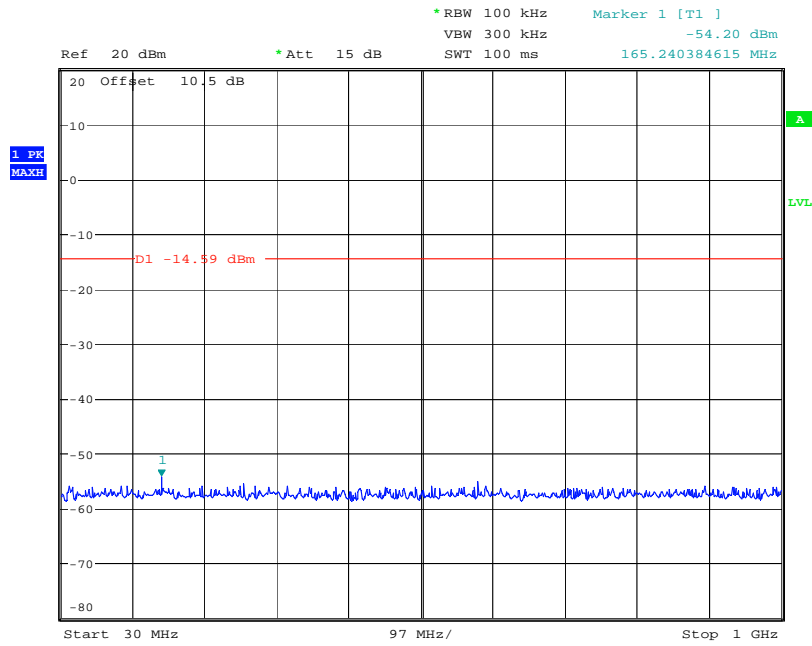
20 GHz – 25 GHz



Date: 4.AUG.2008 16:50:23

Top Channel

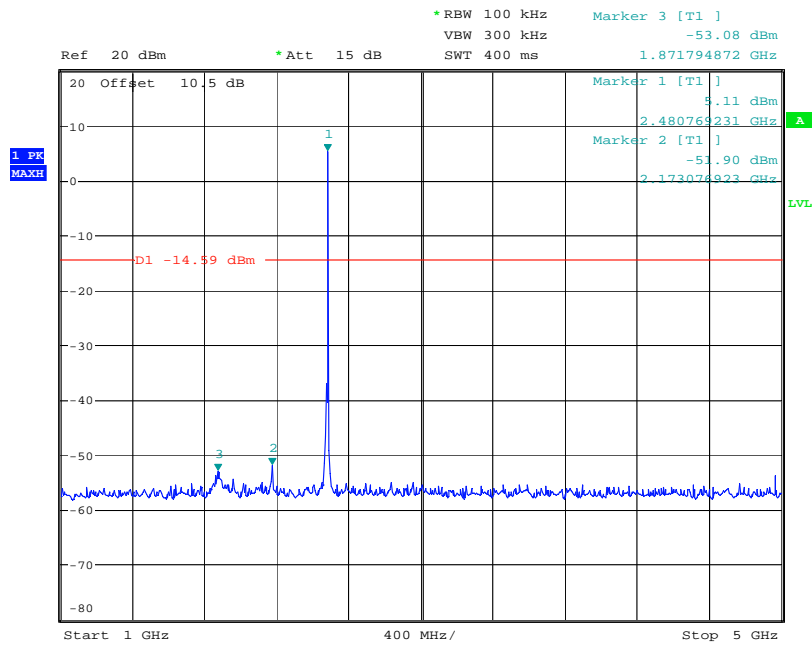
30 MHz – 1 GHz



Date: 4.AUG.2008 16:48:46

Top Channel

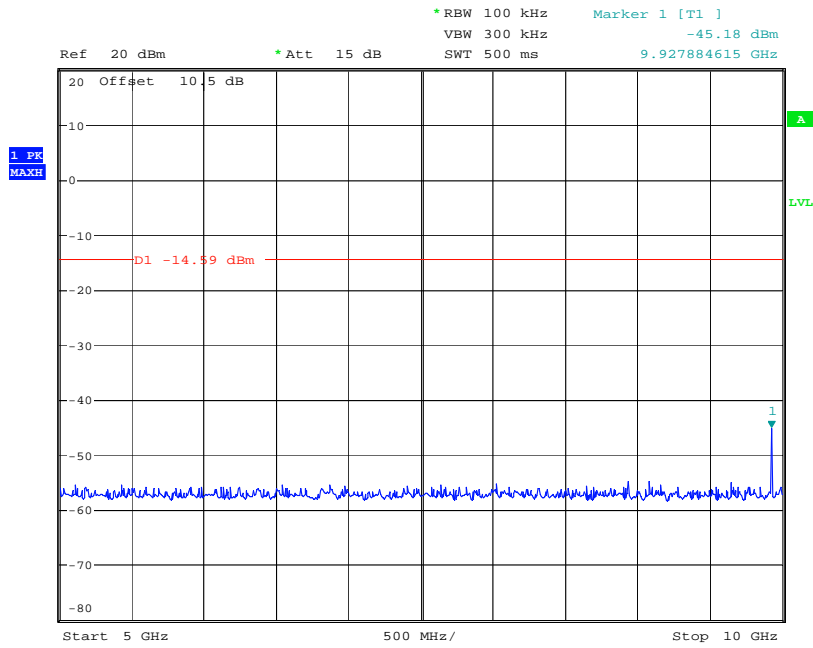
1 GHz – 5 GHz



Date: 4.AUG.2008 16:48:30

Top Channel

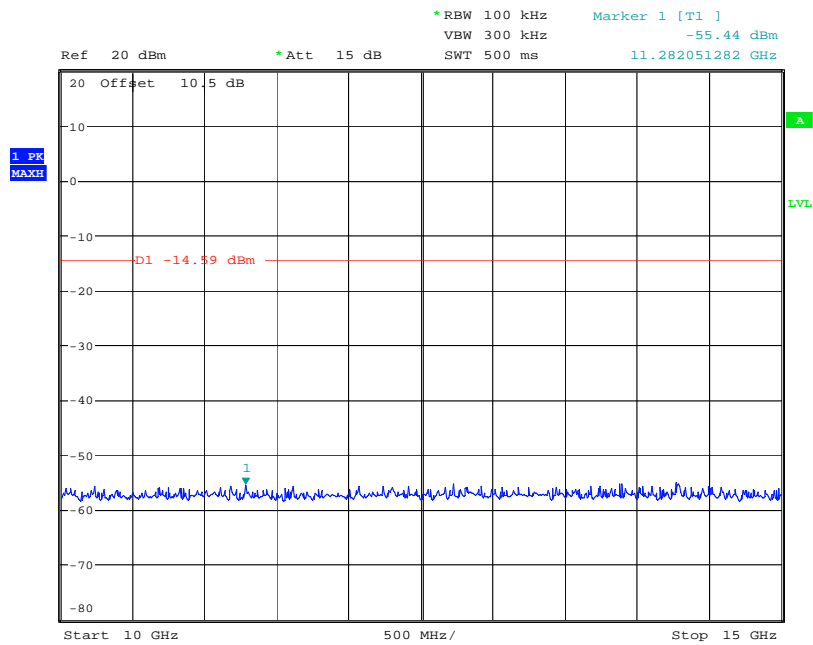
5 GHz – 10 GHz



Date: 4.AUG.2008 16:49:04

Top Channel

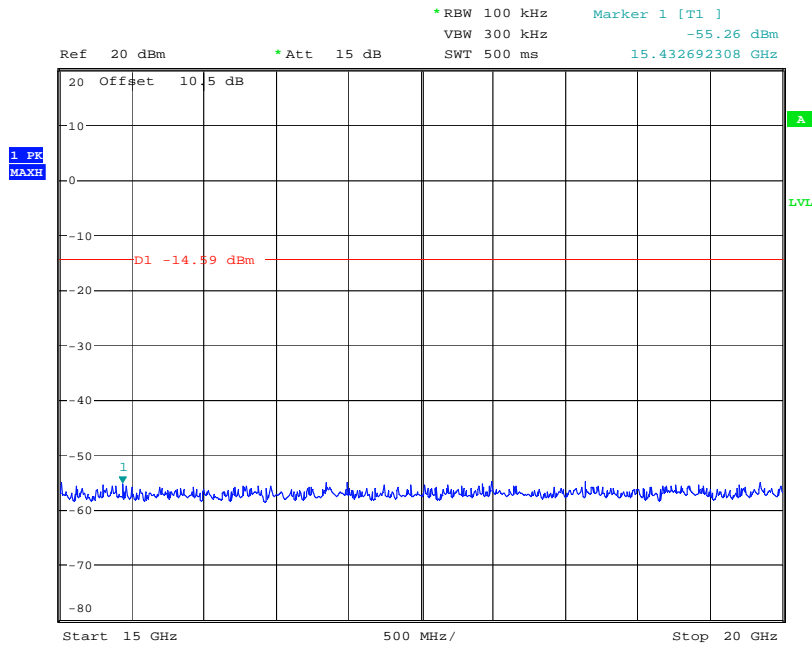
10 GHz – 15 GHz



Date: 4.AUG.2008 16:49:20

Top Channel

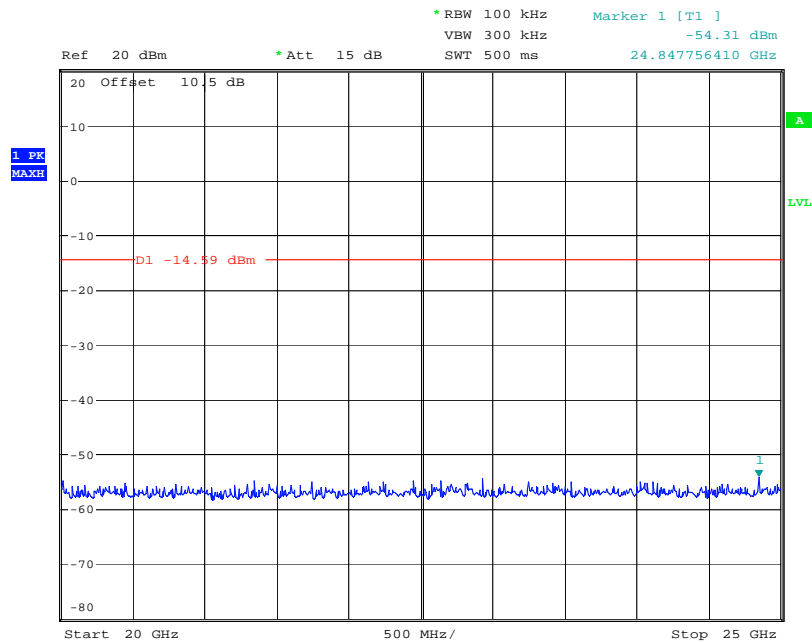
15 GHz – 20 GHz



Date: 4.AUG.2008 16:49:36

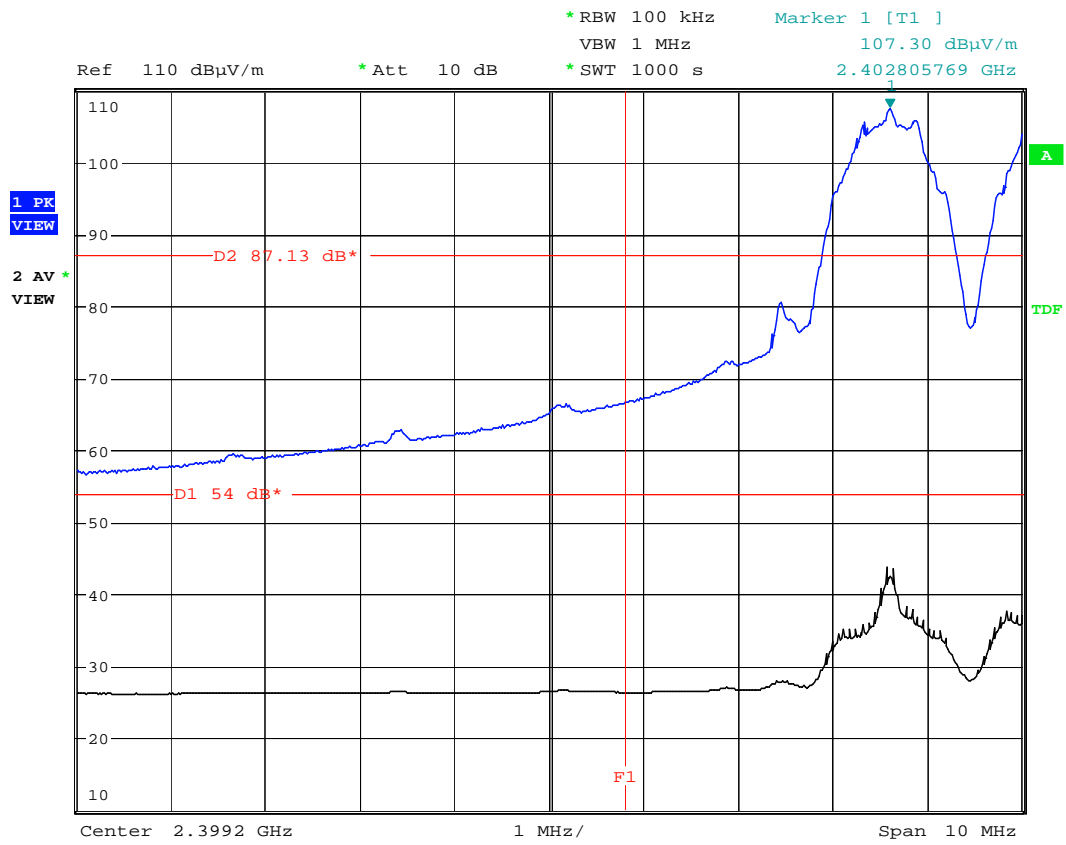
Top Channel

20 GHz – 25 GHz

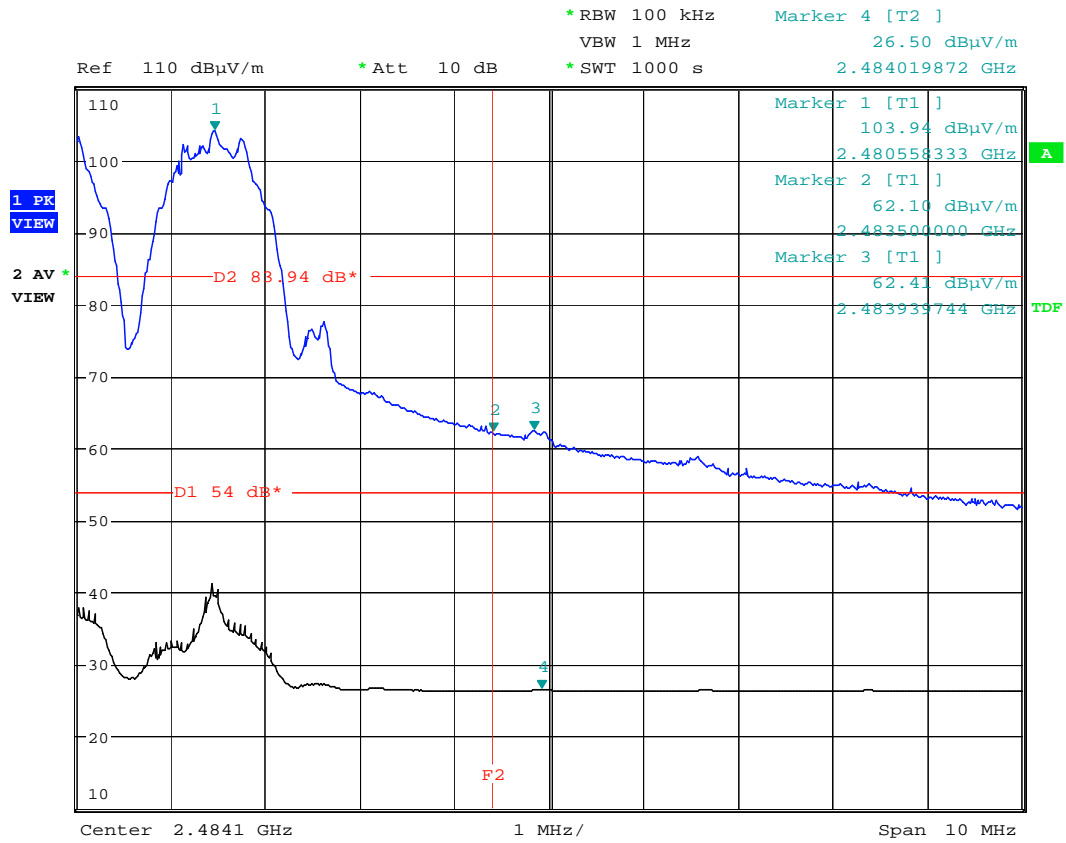


Date: 4.AUG.2008 16:49:52

ANNEX K
BAND EDGE EMISSIONS RADIATED



Date: 1.AUG.2008 13:35:59



Date: 1.AUG.2008 12:10:53

ANNEX L
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%**