



**REPORT ON THE CERTIFICATION TESTING OF A
PROMETHEAN Ltd
ACTIVEXPRESSION
WITH RESPECT TO
THE FCC RULES CFR 47, PART 15.247 July 2008
INTENTIONAL RADIATOR SPECIFICATION**



0728

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PROMETHEAN Ltd
ACTIVEXPRESSION
WITH RESPECT TO
THE FCC RULES CFR 47, PART 15.247 July 2008
INTENTIONAL RADIATOR SPECIFICATION**



TEST DATE: 22nd – 26th June 2009

TESTED BY: _____ D. WINSTANLEY
APPROVED BY: _____ J CHARTERS
RADIO PRODUCT
MANAGER
DATE: 9th July 2009 _____

Distribution:

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

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

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

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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.			



CERTIFICATE OF CONFORMITY & COMPLIANCE

FCC IDENTITY: QAM011

PURPOSE OF TEST: Class II Permissive Change

TEST SPECIFICATION: FCC RULES CFR 47, Part 15.247 July 2008

TEST RESULT: Compliant to Specification

EQUIPMENT UNDER TEST: Activexpression

ITU: EMISSION CODE: 1M43F7D

EQUIPMENT TYPE: Learner Response System

PRODUCT USE: Wireless LAN

CARRIER EMISSION: 0.00298W

ANTENNA TYPE: Integral

ALTERNATIVE ANTENNA: Not Applicable

BAND OF OPERATION: 2.4GHz – 2.4835GHz

CHANNEL SPACING: 1.7355MHz

NUMBER OF CHANNELS: 46

FREQUENCY GENERATION: SAW Resonator Crystal Synthesiser

MODULATION METHOD: FHSS DSSS Other

POWER SOURCE(s): +4.5Vdc

TEST DATE(s): 22nd – 26th June 2009

ORDER No(s): PG0005206

APPLICANT: Promethean Ltd

ADDRESS: Promethean House
Lower Phillips Road
Whitebirk Ind Est
Blackburn
BB1 5TH

TESTED BY: _____ D WINSTANLEY

APPROVED BY: _____ J CHARTERS
RADIO
PRODUCT
MANAGER

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 July 2008

TEST RESULT: COMPLIANT Yes
No

APPLICANT'S CATEGORY: MANUFACTURER
IMPORTER
DISTRIBUTOR
TEST HOUSE
AGENT

APPLICANT'S ORDER No(s): PG0005206

APPLICANT'S CONTACT PERSON(s): Mr B Lofthouse

E-mail address: Bryan.lofthouse@prometheanworld.com

APPLICANT: Promethean Ltd

ADDRESS: Promethean House
Lower Phillips Road
Whitebirk Ind Est
Blackburn
BB1 5TH

TEL: +44 (0) 1254 298 598

FAX: +44 (0) 1254 581 574

MANUFACTURER: Promethean Ltd

EUT(s) COUNTRY OF ORIGIN: United Kingdom

TEST LABORATORY: TRaC Telecoms & Radio, Up Holland

UKAS ACCREDITATION No: 0728

TEST DATE(s): 22nd – 26th June 2009

TEST REPORT No: RU1528/9097

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:	-	-	-
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 LAN
3. Temperatures: Ambient (Tnom) 22°C
4. Supply Voltages: Vnom +4.5Vdc
- 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 CARRIER FREQUENCY SEPARATION – CONDUCTED – Part 15.247(a)(1)

Ambient temperature = 22°C
 Relative humidity = 64%
 Conditions = Conducted –Radio Lab
 Supply voltage = +4.5Vdc

Transmitter Carrier Frequency Separation (MHz)
1.7355 MHz
LIMIT SPECIFIED IN 15.247 (A)(1): 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 1449.52kHz therefore carrier frequency separation must be greater than 966.346kHz.
 - 2 Conducted measurements were performed with a temporary antenna connector provided by the client.
 - 3 For analyser setting see scan data annex D.

- 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
CABLE	TRaC	N/A	N/A	UH358	X

TRANSMITTER TESTS

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

Ambient temperature = 20°C
 Relative humidity = 65%
 Conditions = Conducted –Radio Lab
 Supply voltage = +4.5Vdc

20dB Bandwidth (kHz)
1449.52 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
CABLE	TRaC	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 = 65%
 Conditions = Conducted –Radio Lab
 Supply voltage = +4.5Vdc

Packet Width (µs)	Number of Transmissions in 18.4 Seconds	Average time of Occupancy (s)
524.358	48	0.025
Limit		

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
CABLE	TRaC	N/A	N/A	UH358	X

TRANSMITTER TESTS

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

Ambient temperature = 20°C
 Relative humidity = 65%
 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	4.44	0.3	0	4.74	0.00298	0.125
Middle	4.43	0.3	0	4.73	0.00297	0.125
Top	4.26	0.3	0	4.56	0.00286	0.125

See spectrum analyser plot – Annex H

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
CABLE	TRaC	N/A	N/A	UH358	X

TRANSMITTER TESTS

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

Ambient temperature = 20°C
 Relative humidity = 65%
 Conditions = Conducted –Radio Lab
 Supply voltage = +4.5Vdc

Test Result

Operational Frequency	EUT Operation	Emissions Frequency (MHz)	Emissions Level (dBc)	Limit (dBc)
Bottom	Hopping	2400.000	-40.61	-20
Top	Hopping	2483.995	-41.54	-20

- 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 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
CABLE	TRaC	N/A	N/A	UH358	X

TRANSMITTER TESTS

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

Ambient temperature = 20°C
 Relative humidity = 65%
 Conditions = Conducted –Radio Lab
 Supply voltage = +4.5Vdc

Bottom Channel

Range Frequency (MHz)	Emission Frequency (MHz)	Emission Level	Cable loss	Level (dBm)	Limit (dBm)
0.1MHz - 25GHz	No Significant Emissions Within 20 dB of the Limit				-15.66

See spectrum analyser scan plots – Annex J

Middle Channel

Range Frequency (MHz)	Emission Frequency (MHz)	Emission Level	Cable loss	Level (dBm)	Limit (dBm)
0.1MHz - 25GHz	No Significant Emissions Within 20 dB of the Limit				-15.66

See spectrum analyser scan plots – Annex J

Top Channel

Range Frequency (MHz)	Emission Frequency (MHz)	Emission Level	Cable loss	Level (dBm)	Limit (dBm)
0.1MHz - 25GHz	No Significant Emissions Within 20 dB of the Limit				-15.66

See spectrum analyser scan plots – Annex J

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 a 100kHz 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.
- 4 See Annex J for scan plots.

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
CABLE	TRaC	N/A	N/A	UH358	X

TRANSMITTER TESTS

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

Ambient temperature = 22°C
Relative humidity = 59%
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
SPECTRUM ANALYSER	ROHDE & SCHWARZ	FSU46	200034	UH281	X
HORN ANTENNA	EMCO	3115	9010-3581	138	X
PRE AMPLIFIER	HP	8449B	3008A016	572	X

TRANSMITTER TESTS

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

Ambient temperature = 22°C
 Relative humidity = 59%
 Conditions = Radiated OATS
 Supply voltage = +4.5Vdc

Bottom Channel	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 7
88MHz – 216MHz Restricted bands									Note 7
216MHz – 960MHz Restricted bands									Note 7
960MHz – 1GHz Restricted bands									Note 7
1GHz – 25GHz Restricted bands	2701.762	42.00	1.2	29.1	35.2	37.10	-	71.61	500
	4805.586	48.85	1.8	32.8	34.9	48.55	-	267.61	500
	19222.431	42.23	4.0	37.3	33.3	50.23	9.54	109.39	500
30MHz -25GHz									Note 7

Middle Channel	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 7
88MHz – 216MHz Restricted bands									Note 7
216MHz – 960MHz Restricted bands									Note 7
960MHz – 1GHz Restricted bands									Note 7
1GHz – 25GHz Restricted bands	2744.935	44.28	1.2	29.1	35.2	39.38	-	93.11	500
	4881.634	49.47	1.8	32.8	34.9	49.17	-	287.41	500
	7322.423	43.75	2.1	36.0	35.2	46.65	-	215.03	500
	19526.576	44.49	4.1	37.2	33.3	52.49	9.54	140.44	500
30MHz -25GHz									Note 7

TRANSMITTER TESTS

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

Top Channel	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 7
88MHz – 216MHz Restricted bands									Note 7
216MHz – 960MHz Restricted bands									Note 7
960MHz – 1GHz Restricted bands									Note 7
1GHz – 25GHz Restricted bands	2366.987	45.18	1.1	27.9	35.2	38.98	-	88.92	500
	2789.939	41.81	1.2	29.2	35.3	36.91	-	70.06	500
	4961.137	47.38	1.8	34.1	34.8	48.48	-	265.46	500
	19844.352	44.27	4.1	37.2	34.3	51.27	9.54	122.04	500
30MHz -25GHz									Note 7

Notes:

- 1 During the scans the unit was operated in the following modes:
Hopping stopped unit operating on lowest, middle and highest channels
- 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 <18GHz were performed at 3 metres.
- 6 Measurements <25GHz were performed at 1 metre
- 7 Only emissions with in 20dB of limit are recorded.
- 8 Average emissions recorded
- 9 Peak emissions are within 20 dB of the average limit
- 10 Extrapolation as per 15.31(f)

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 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	EQUIPMENT USED
RECEIVER	ROHDE & SCHWARZ	ESHS 10	841431/014	UH186	X
SPECTRUM ANALYSER	ROHDE & SCHWARZ	FSU46	200034	UH281	X
BILOG ANTENNA	YORK	CBL611/A	1618	UH191	X
HORN ANTENNA	EMCO	3115	9010-3581	138	X
PRE AMPLIFIER	HP	8449B	3008A016	572	X
HORN ANTENNA	FLANN	20240-2	322	300	X
WAVEGUIDE – K CONVERTER	MAURY MICROWAVE	K233B	8810	UH330	X

RECEIVER TESTS

RECEIVER EMISSIONS RADIATED – Part 15.109

Ambient temperature = 22°C
 Relative humidity = 59%
 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									100
88MHz – 216MHz									150
216MHz – 960MHz									200
960MHz – 1GHz									500
1GHz – 25GHz	4807.333 9614.666	48.66 42.78	1.2 1.8	29.1 32.8	35.2 34.9	43.76 42.48	- -	154.17 133.05	500 500

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									100
88MHz – 216MHz									150
216MHz – 960MHz									200
960MHz – 1GHz									500
1GHz – 25GHz	4883.326 9766.652	49.91 42.11	1.2 1.8	29.1 32.8	35.2 34.9	45.01 41.81	- -	178.03 123.17	500 500

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									100
88MHz – 216MHz									150
216MHz – 960MHz									200
960MHz – 1GHz									500
1GHz – 25GHz	4962.844 9925.721	50.02 49.11	1.1 1.2	27.9 29.2	35.2 35.3	43.82 44.21	- -	138.51 162.36	500 500

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 <18GHz were performed at 3 metres.
- 5 Measurements <25GHz were performed at 1 metre.
- 6 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.

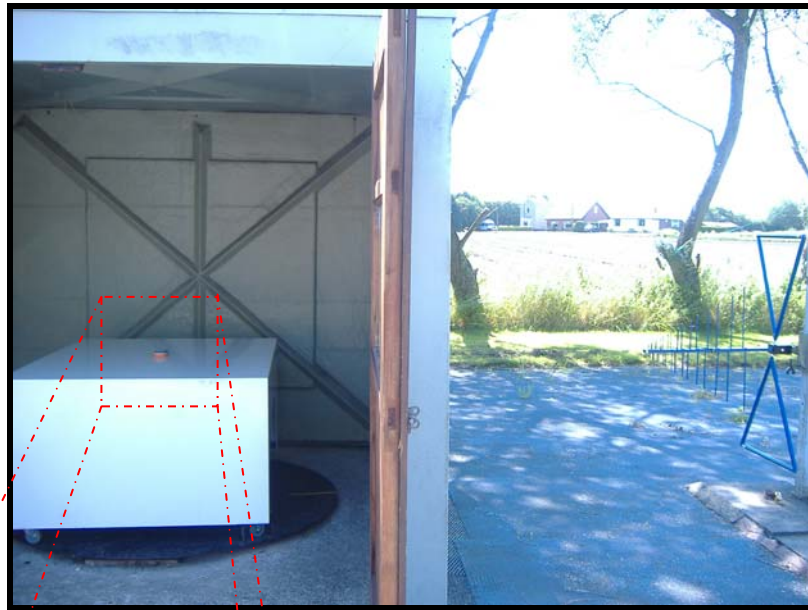
The test equipment used for the tests is shown below:

TYPE OF EQUIPMENT	MAKER/SUPPLIER	MODEL No	SERIAL No	TRL No	EQUIPMENT USED
RECEIVER	ROHDE & SCHWARZ	ESHS 10	841431/014	UH186	X
SPECTRUM ANALYSER	ROHDE & SCHWARZ	FSU46	200034	UH281	X
BILOG ANTENNA	YORK	CBL611/A	1618	UH191	X
HORN ANTENNA	EMCO	3115	9010-3581	138	X
PRE AMPLIFIER	HP	8449B	3008A016	572	X
HORN ANTENNA	FLANN	20240-2	322	300	X
WAVEGUIDE – K CONVERTER	MAURY MICROWAVE	K233B	8810	UH330	X

ANNEX A
PHOTOGRAPHS

PHOTOGRAPH No. 1

TEST SETUP



PHOTOGRAPH No. 2

FRONT VIEW



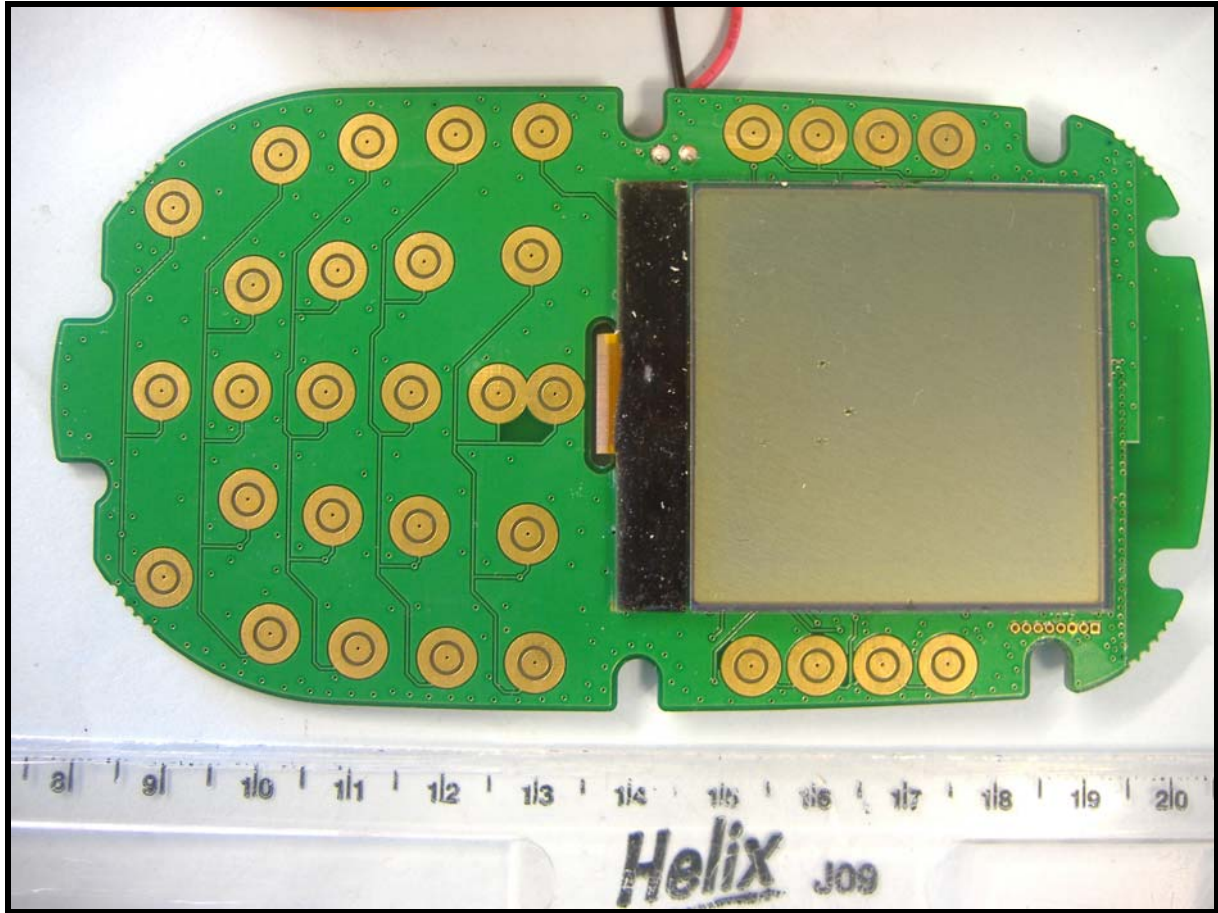
PHOTOGRAPH No. 3

BACK VIEW



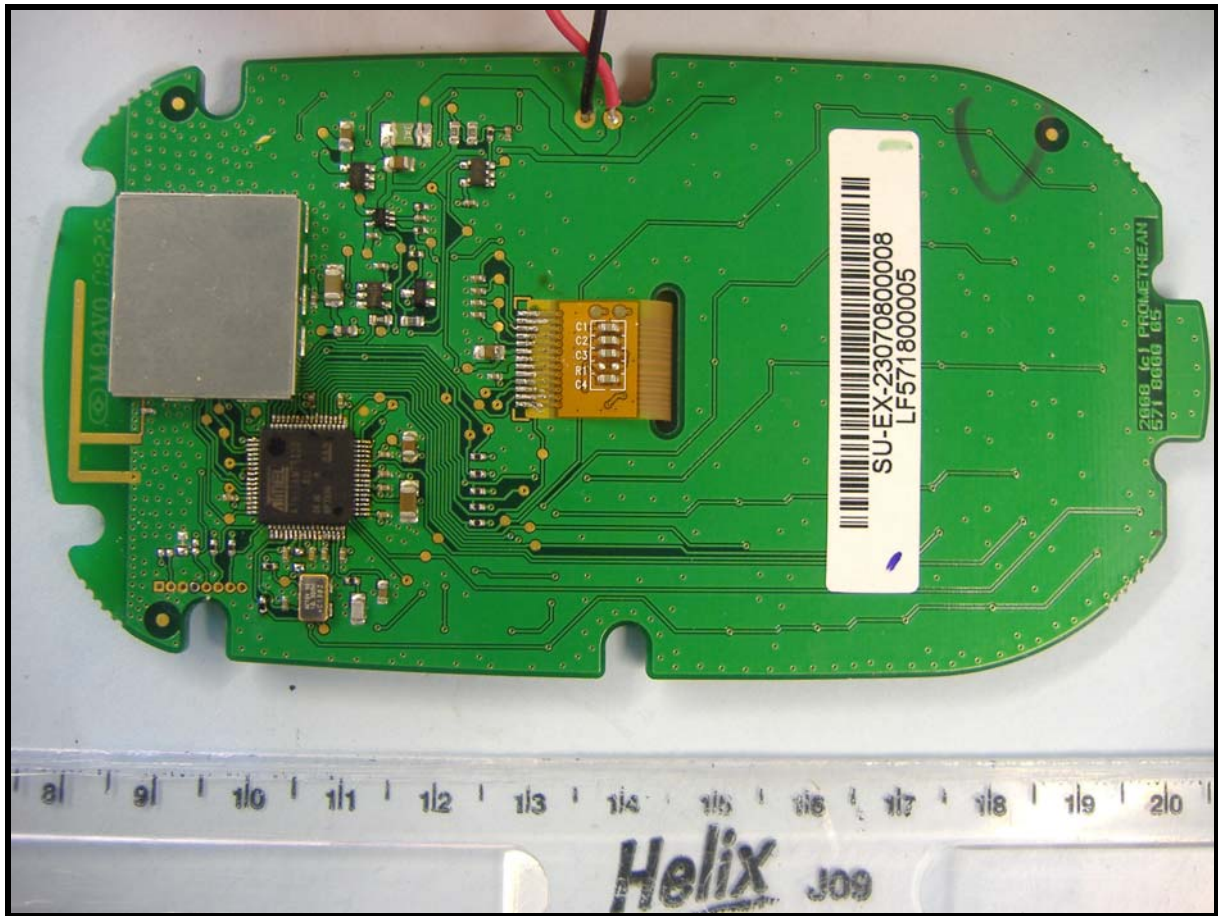
PHOTOGRAPH No. 4

TRANSMITTER PCB TOP



PHOTOGRAPH No. 5

TRANSMITTER PCB BOTTOM



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]

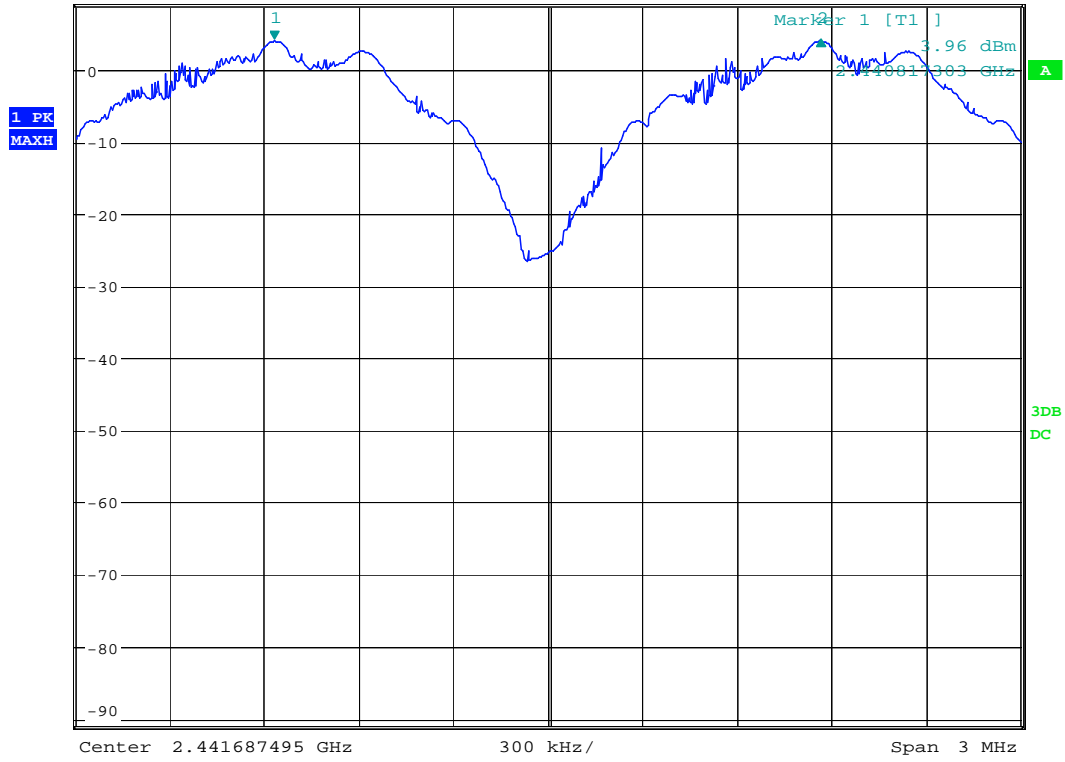
ANNEX C
EQUIPMENT CALIBRATION DETAILS

TRL Number	Equipment Type	Manufacturer	Last Cal Calibration	Calibration Period	Due For Calibration
UH186	Receiver	R&S	09/12/2008	12	09/12/2009
UH191	Bilog Antenna	York	01/10/2008	24	01/10/2010
UH281	Spectrum Analyser	R&S	28/10/2008	12	28/10/2009
UH330	Waveguide – K Transition	Maury M'wave	13/06/2008	24	13/06/2010
UH358	Cable	TRaC		Calibrate in use	
L138	1-18GHz Horn	EMCO	23/05/2007	24	23/05/2009
L300	18-26.5 GHz Horn	Flann	12/06/2008	24	12/06/2010
L572	Pre Amp	Agilent	04/07/2008	24	04/07/2010

ANNEX D
CARRIER FREQUENCY SEPARATION



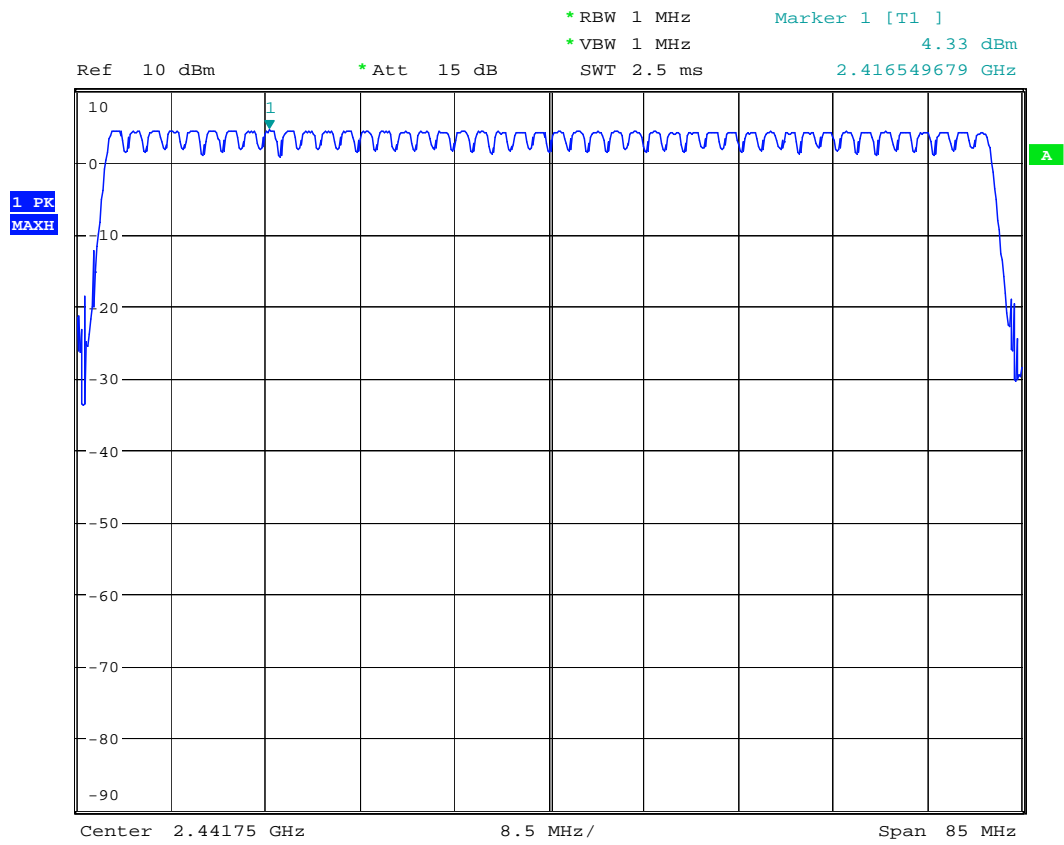
Ref 9 dBm * Att 20 dB * RBW 100 kHz Delta 2 [T1] -0.00 dB
* SWT 100 s 1.735576923 MHz



TET TYU

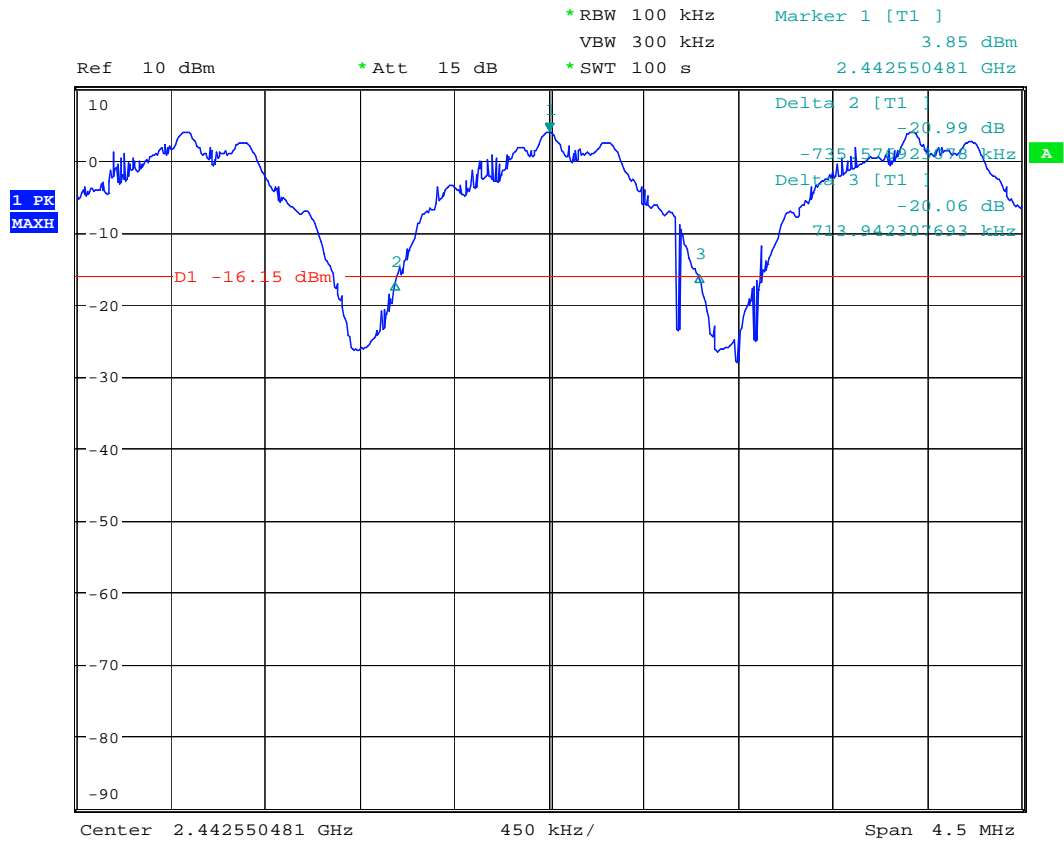
Date: 22.JUN.2009 13:14:09

ANNEX E
NUMBER OF HOPPING CHANNELS



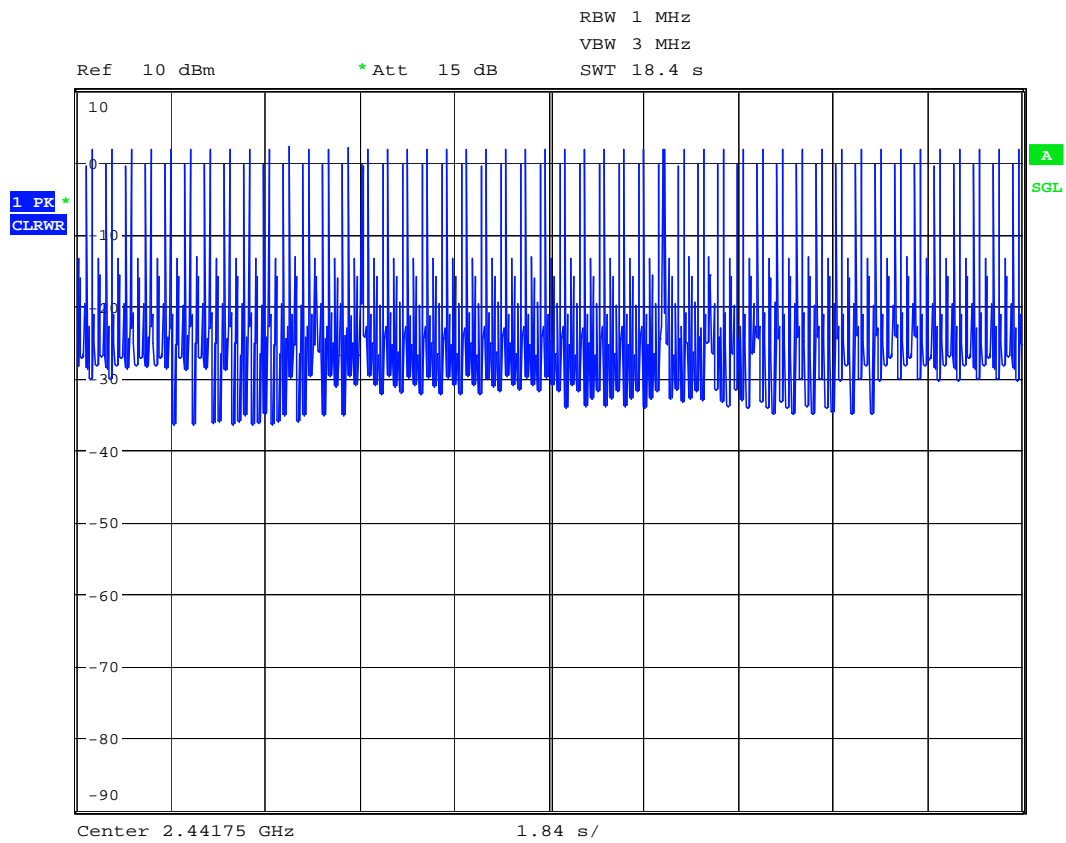
Date: 22.JUN.2009 13:14:42

ANNEX F
20dB BANDWIDTH



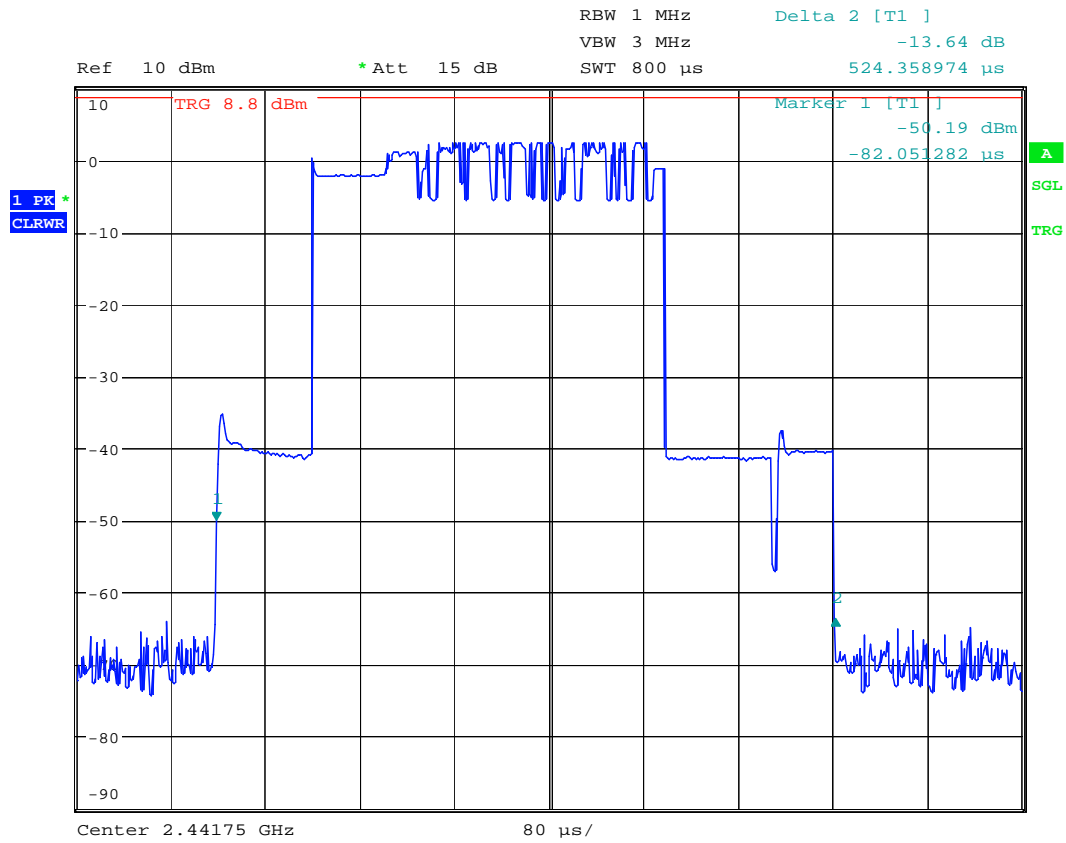
Date: 22.JUN.2009 13:34:35

ANNEX G
AVERAGE TIME OF OCCUPANCY



Date: 22.JUN.2009 13:19:37

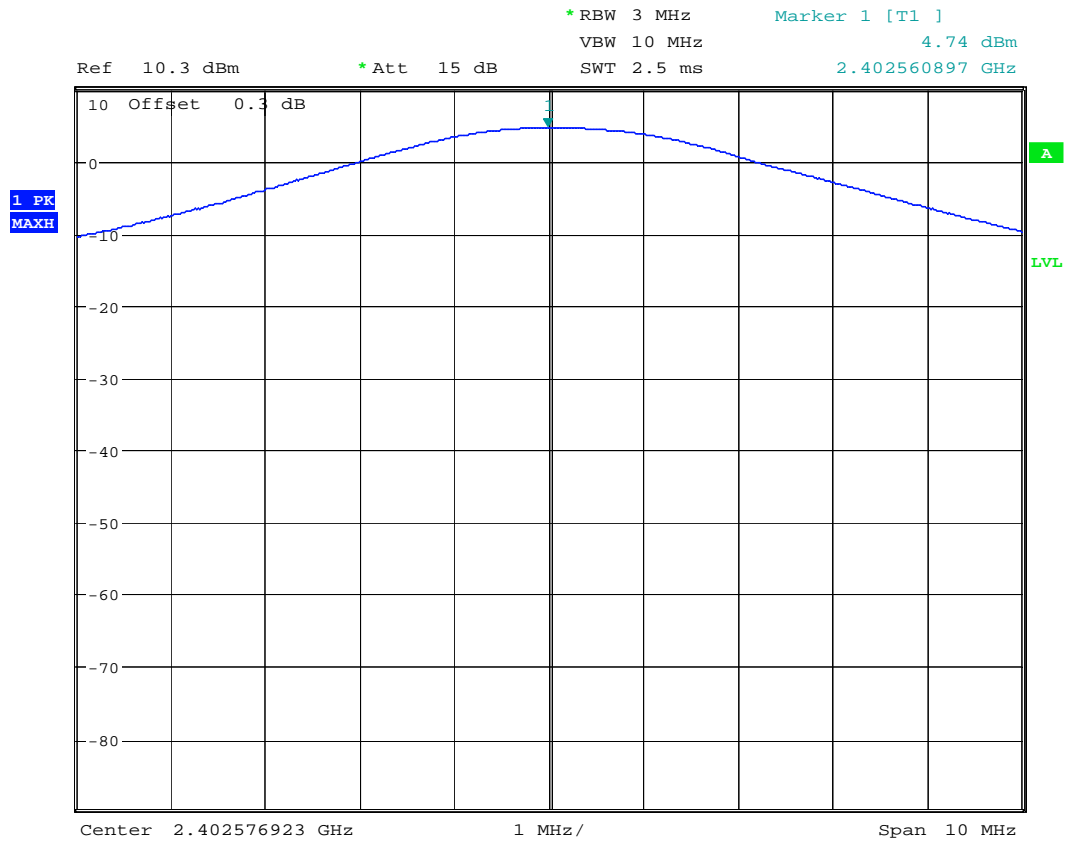
Number of transmissions made within 18.4 seconds



Date: 22.JUN.2009 13:17:23

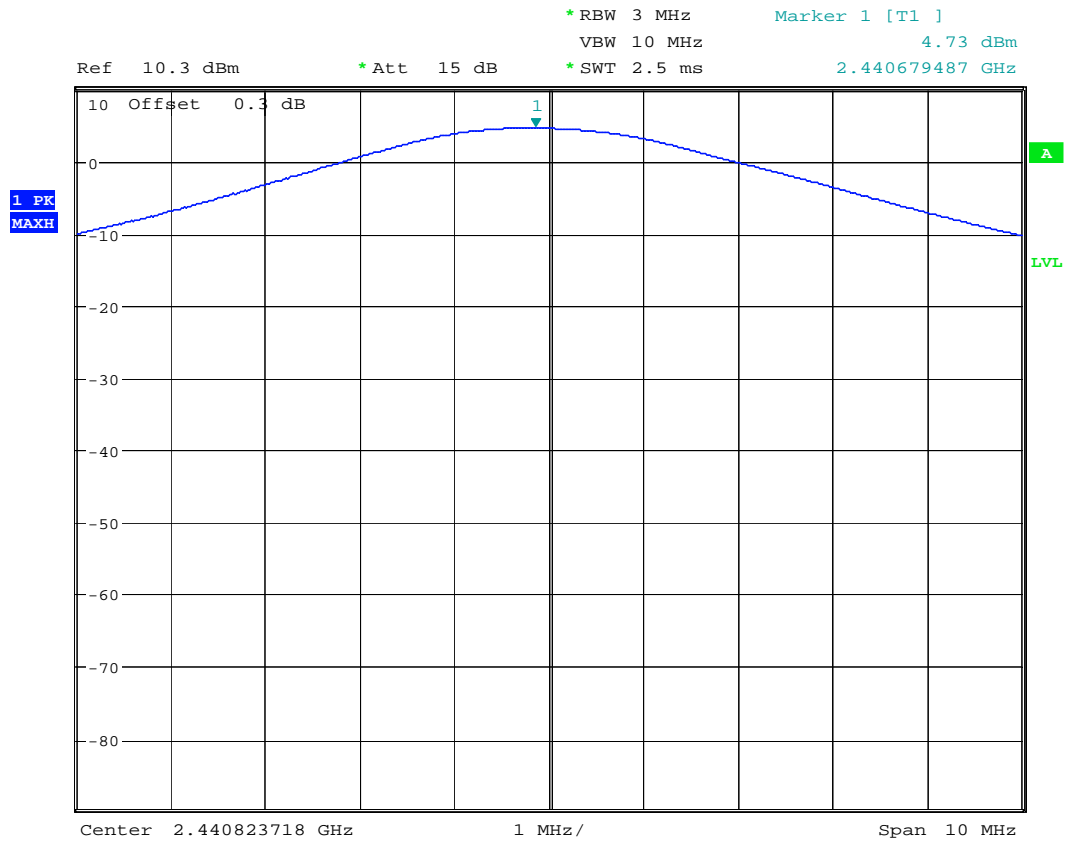
Length of one packet

ANNEX H
PEAK POWER CONDUCTED



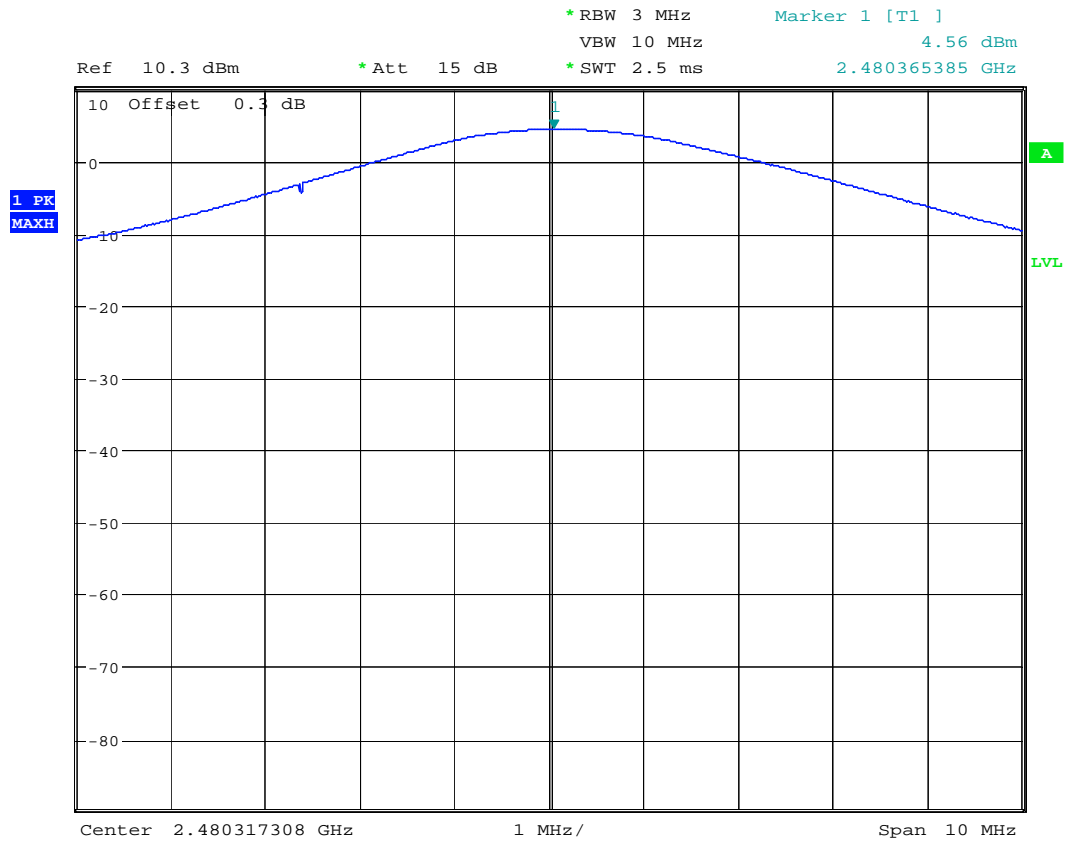
Date: 22.JUN.2009 13:42:20

PEAK POWER LOW CHANNEL



Date: 22.JUN.2009 13:48:00

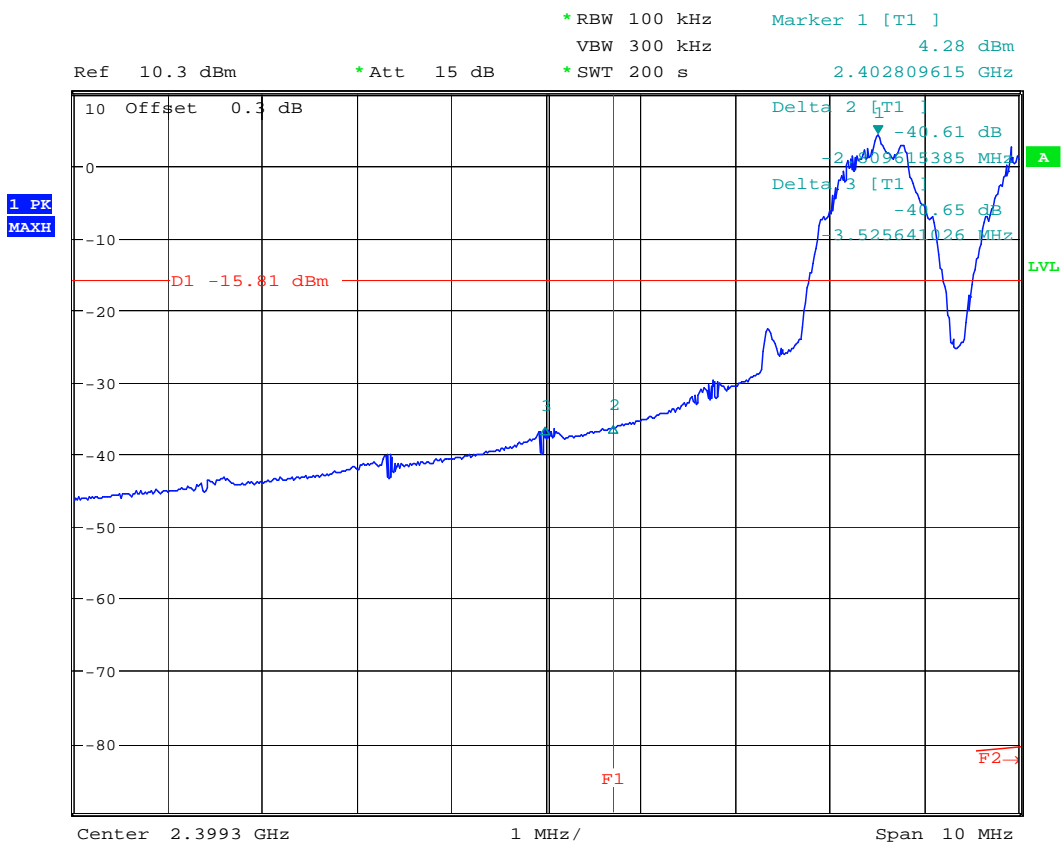
PEAK POWER MID CHANNEL



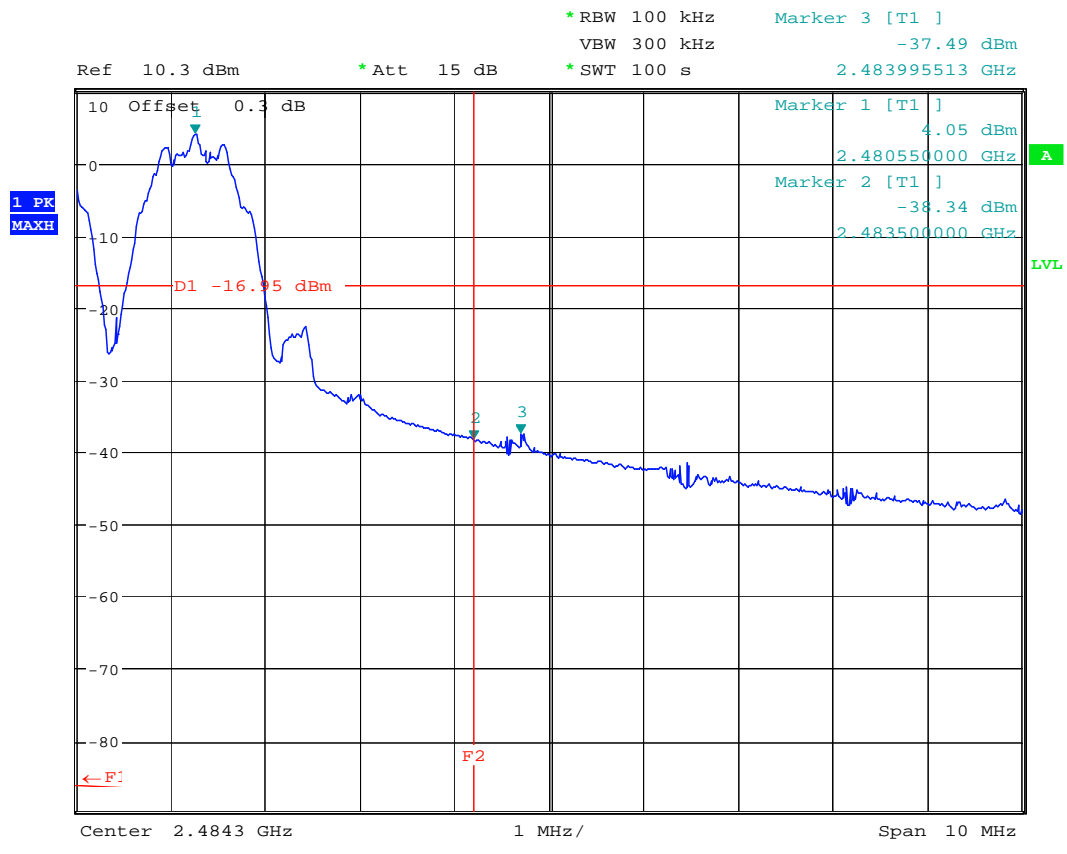
Date: 22.JUN.2009 13:52:25

PEAK POWER HIGH CHANNEL

ANNEX I
BAND EDGE CONDUCTED EMISSION



Date: 22.JUN.2009 14:53:05

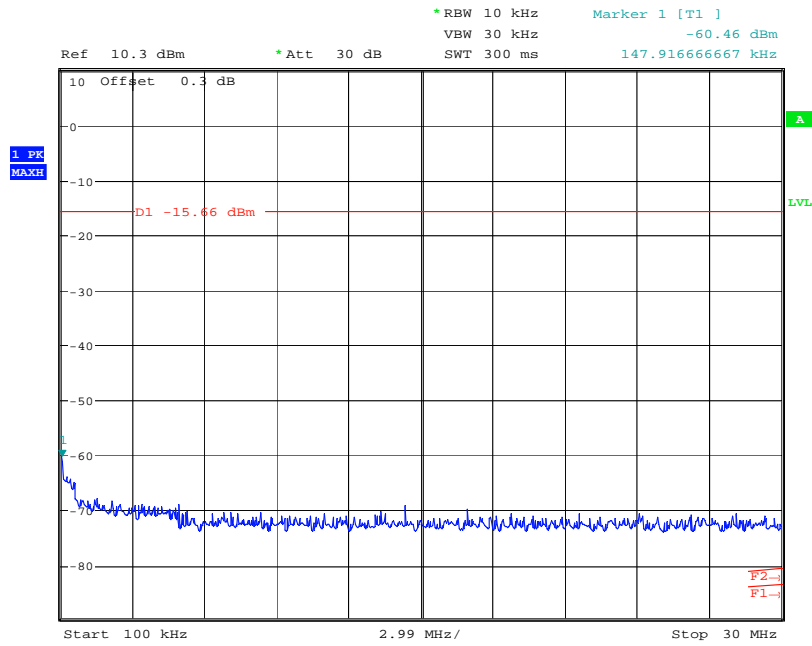


Date: 22.JUN.2009 14:07:40

ANNEX J
CONDUCTED SPURIOUS EMISSION

Bottom Channel

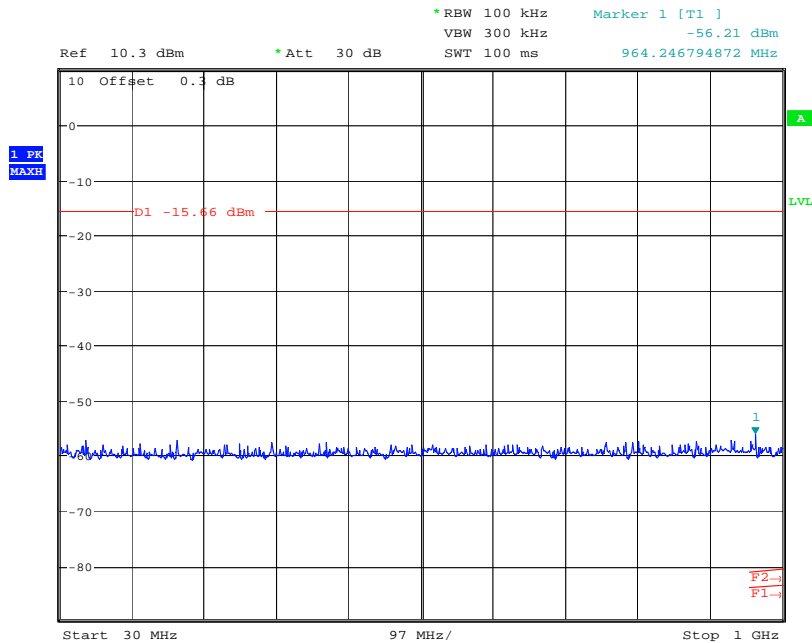
0.1 MHz – 30 GHz



Date: 22.JUN.2009 15:02:17

Bottom Channel

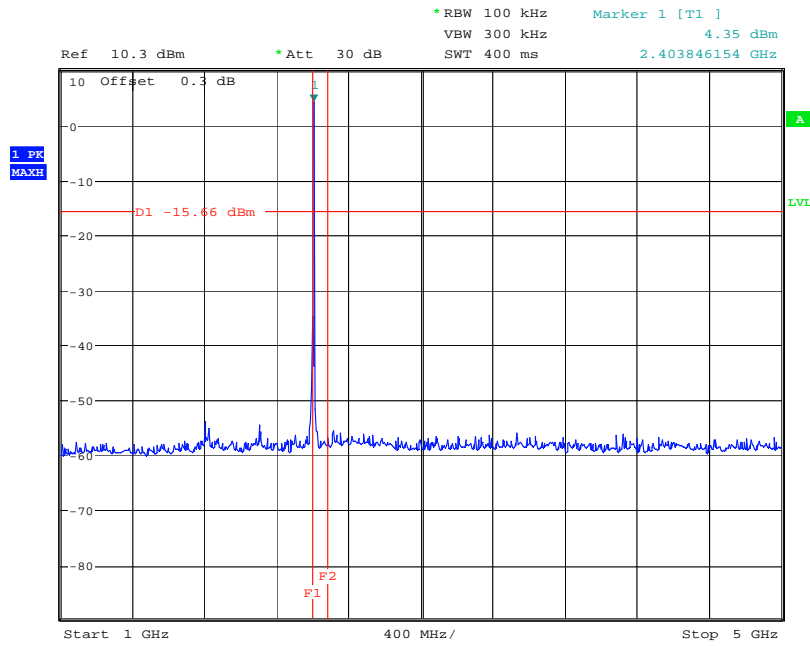
30 MHz – 1 GHz



Date: 22.JUN.2009 15:02:44

Bottom Channel

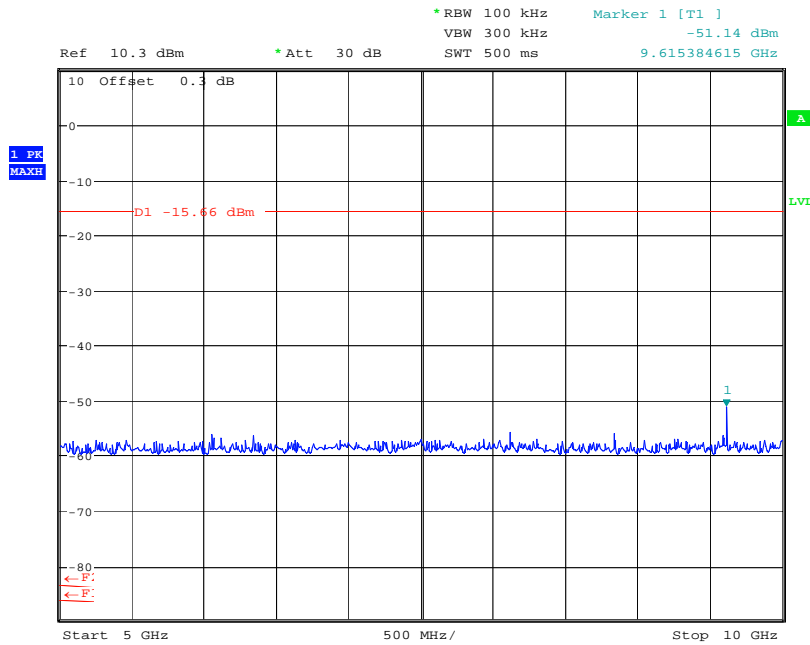
1 GHz – 5 GHz



Date: 22.JUN.2009 15:01:40

Bottom Channel

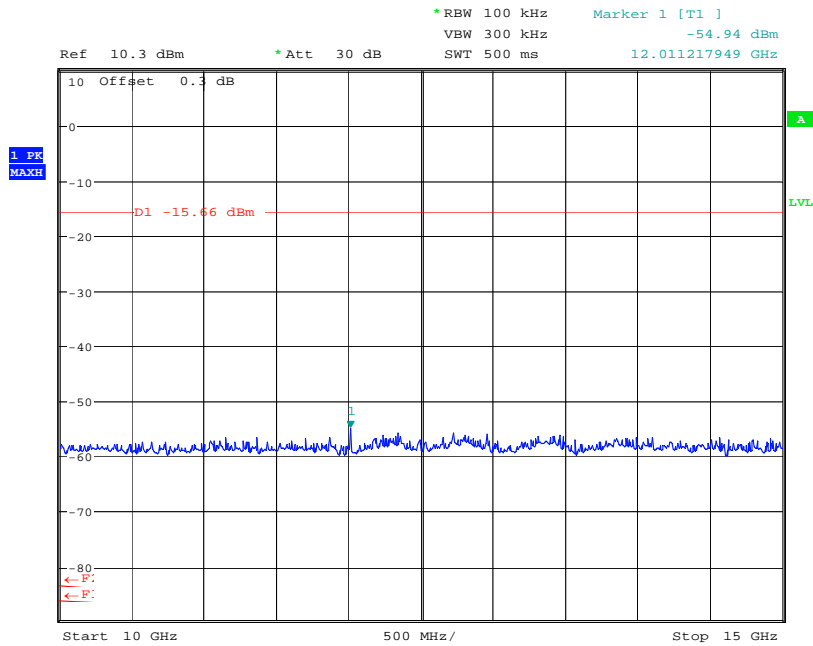
5 GHz – 10 GHz



Date: 22.JUN.2009 15:03:00

Bottom Channel

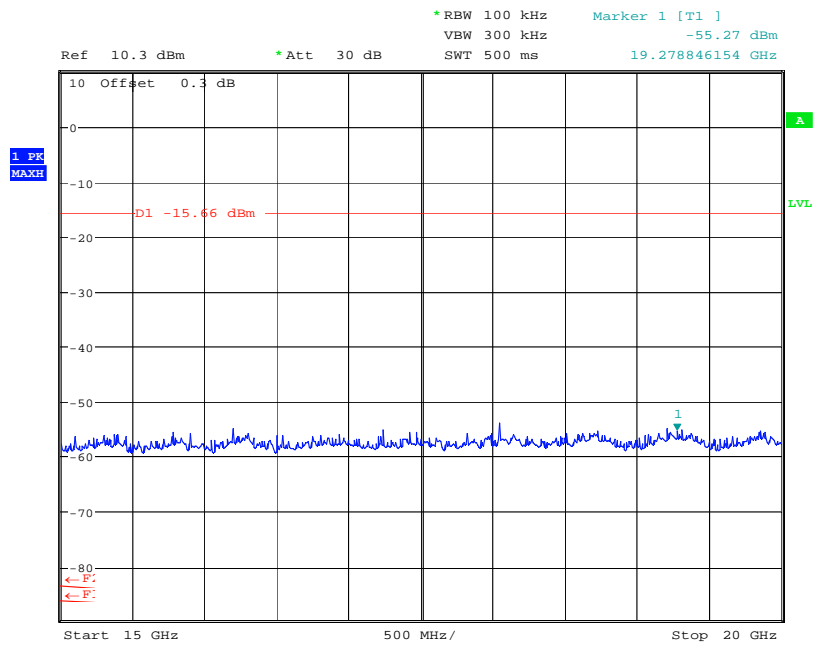
10 GHz – 15 GHz



Date: 22.JUN.2009 15:03:14

Bottom Channel

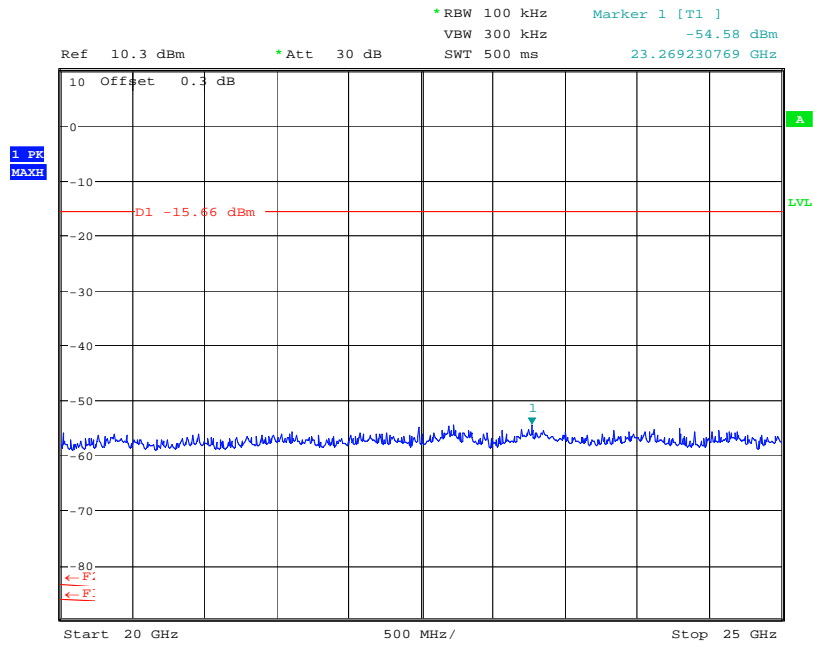
15 GHz – 20 GHz



Date: 22.JUN.2009 15:03:43

Bottom Channel

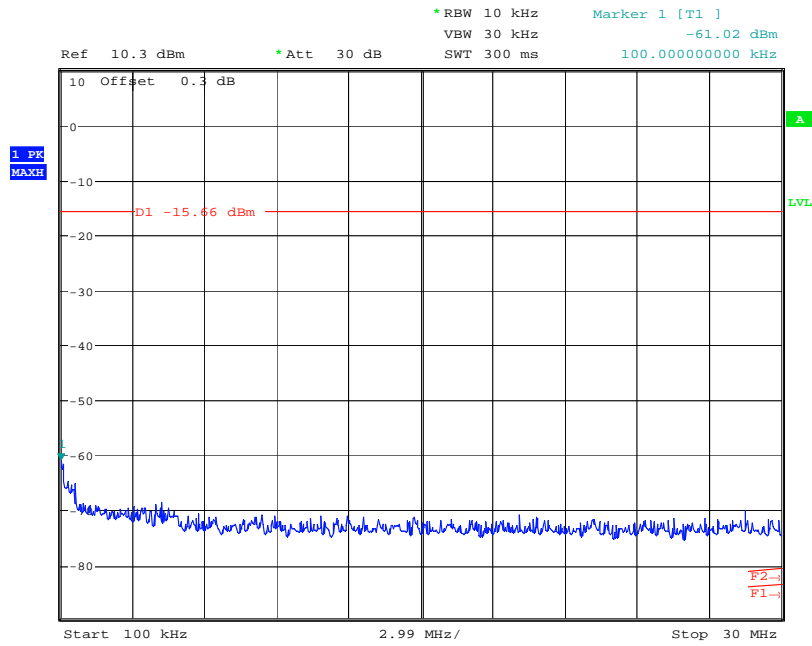
20 GHz – 25 GHz



Date: 22.JUN.2009 15:04:09

Middle Channel

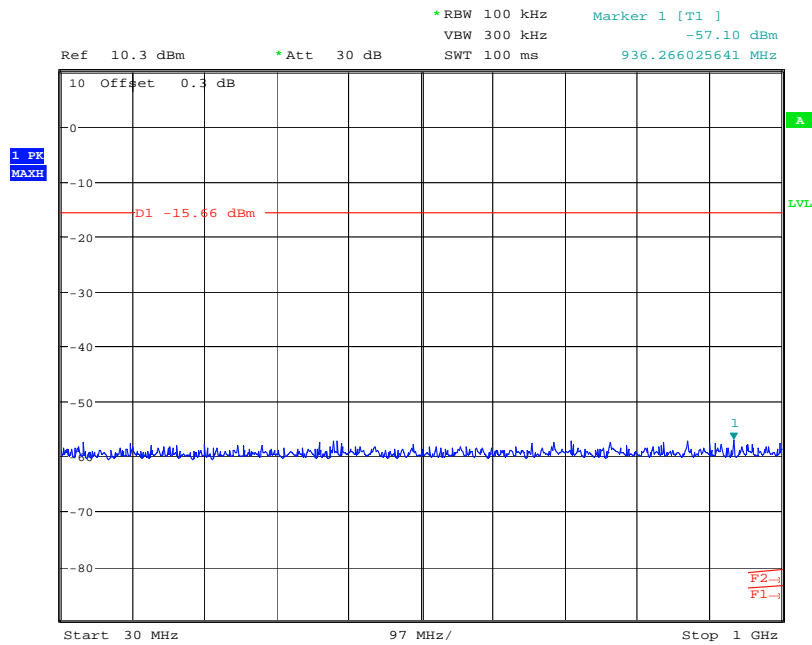
0.1 MHz – 30 GHz



Date: 22.JUN.2009 15:05:58

Middle Channel

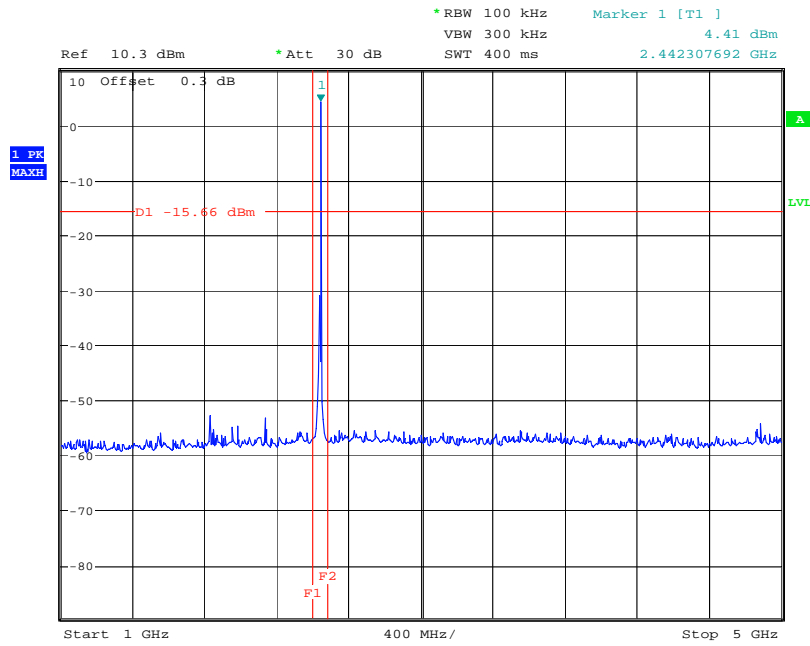
30 MHz – 1 GHz



Date: 22.JUN.2009 15:06:15

Middle Channel

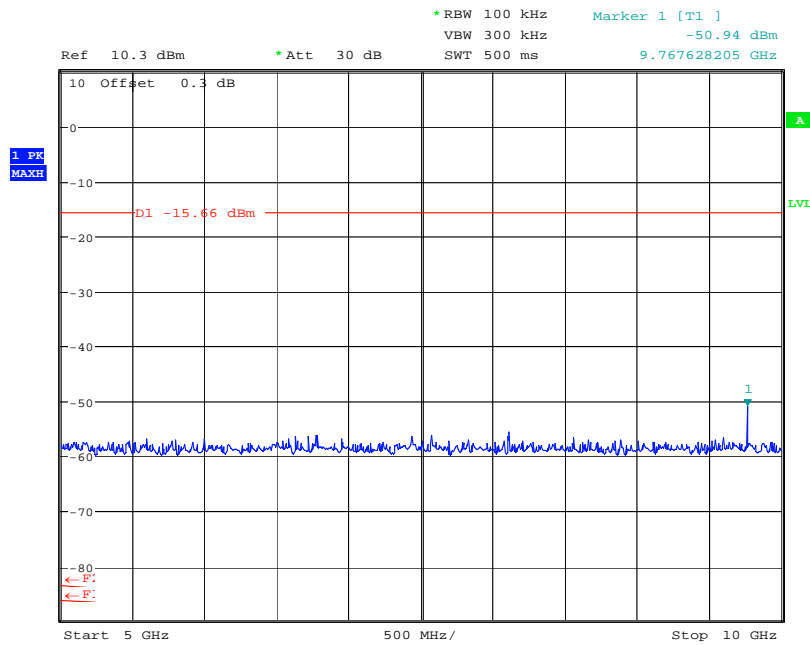
1 GHz – 5 GHz



Date: 22.JUN.2009 15:05:41

Middle Channel

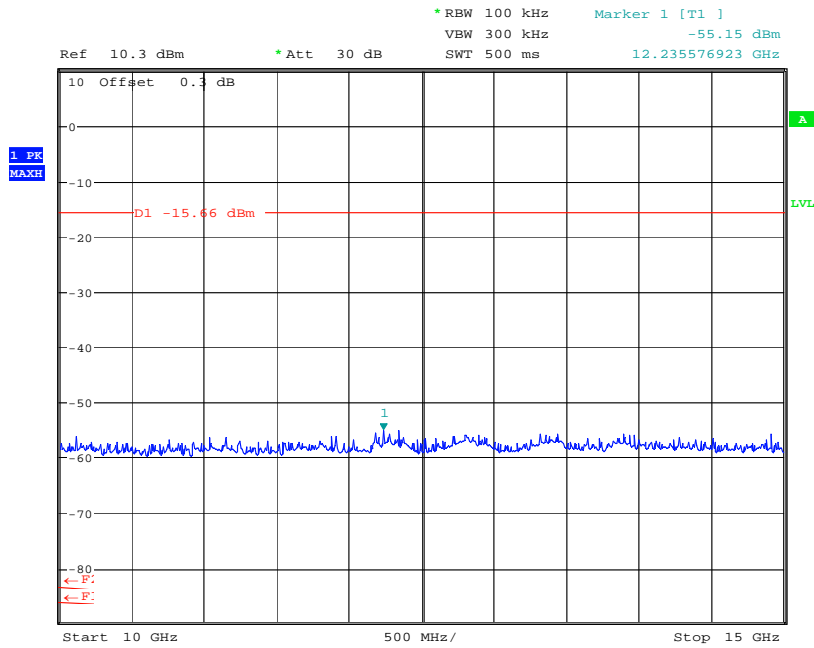
5 GHz – 10 GHz



Date: 22.JUN.2009 15:06:31

Middle Channel

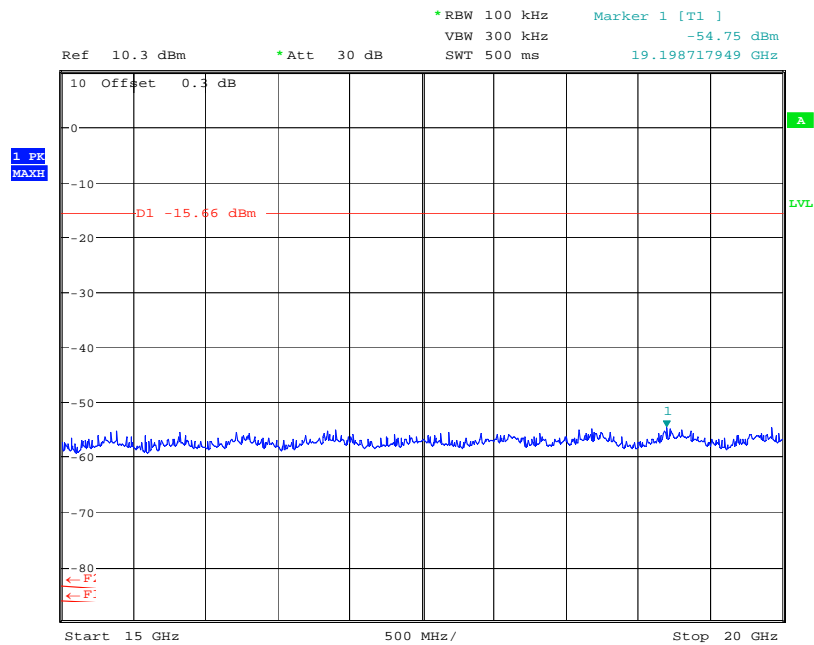
10 GHz – 15 GHz



Date: 22.JUN.2009 15:06:48

Middle Channel

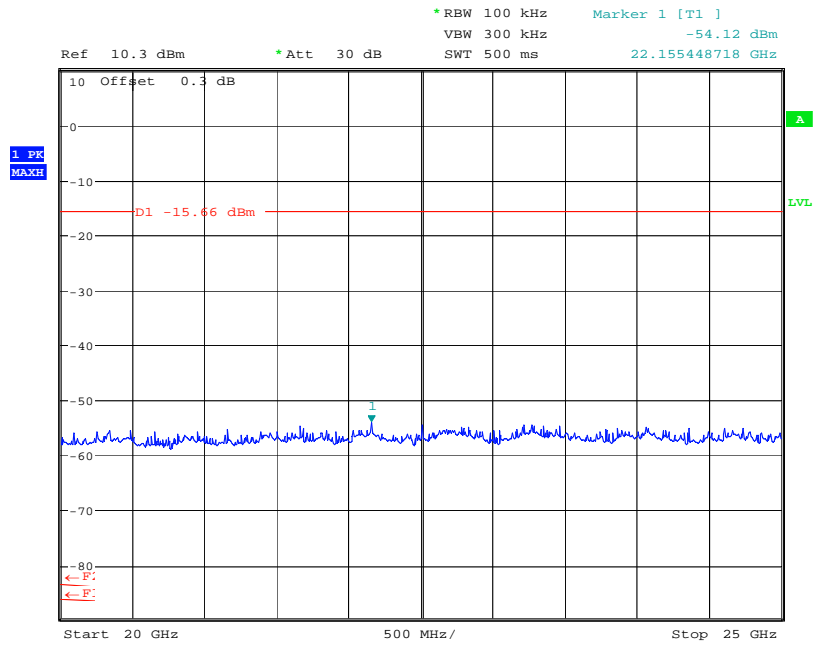
15 GHz – 20 GHz



Date: 22.JUN.2009 15:07:11

Middle Channel

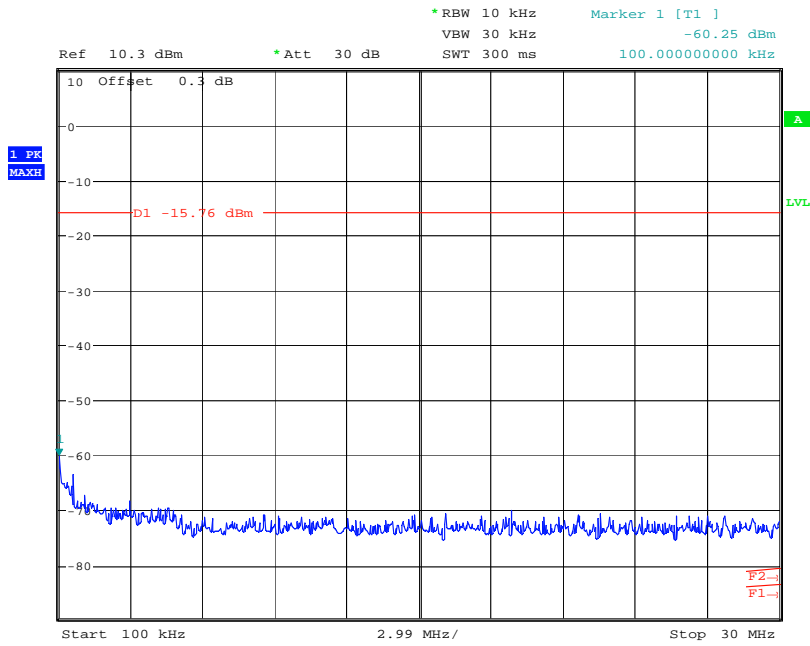
20 GHz – 25 GHz



Date: 22.JUN.2009 15:07:37

Top Channel

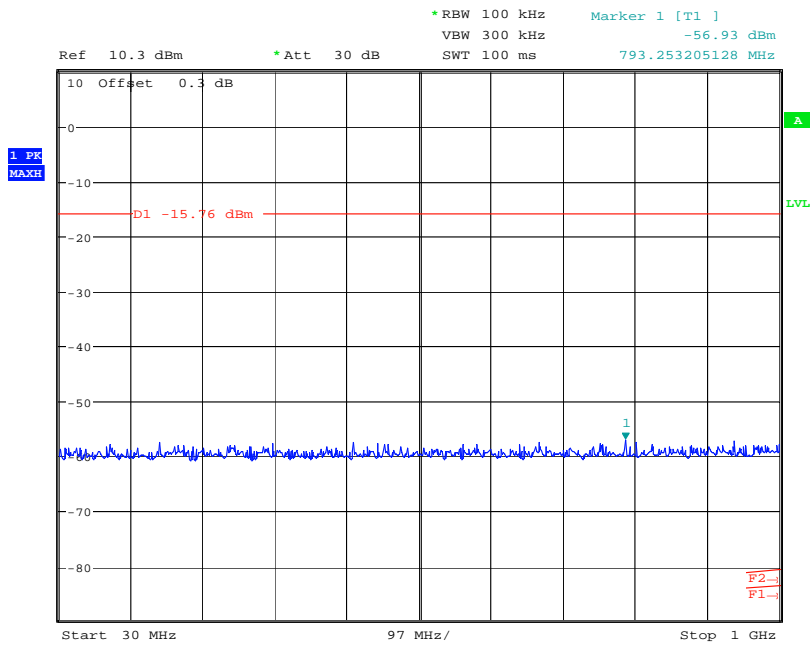
0.1 MHz – 30 GHz



Date: 22.JUN.2009 15:10:41

Top Channel

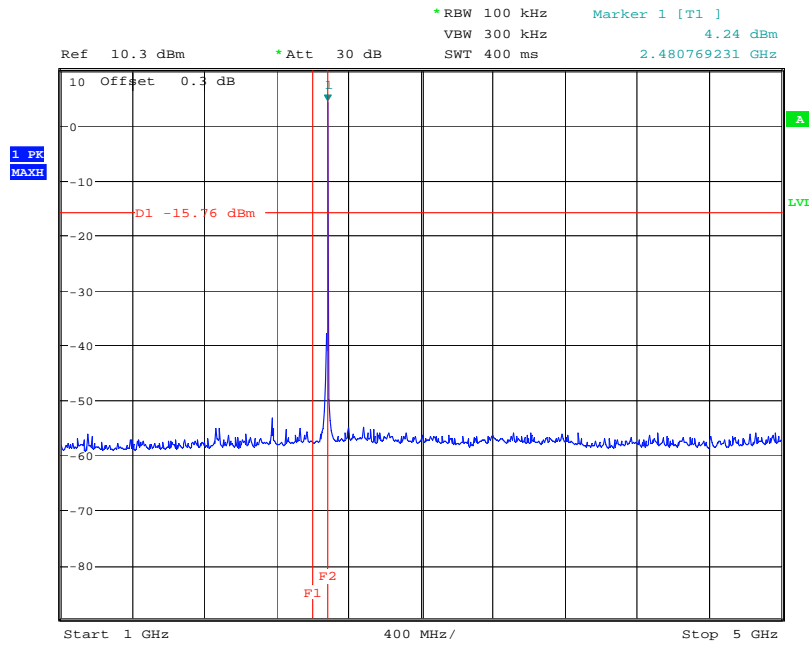
30 MHz – 1 GHz



Date: 22.JUN.2009 15:10:58

Top Channel

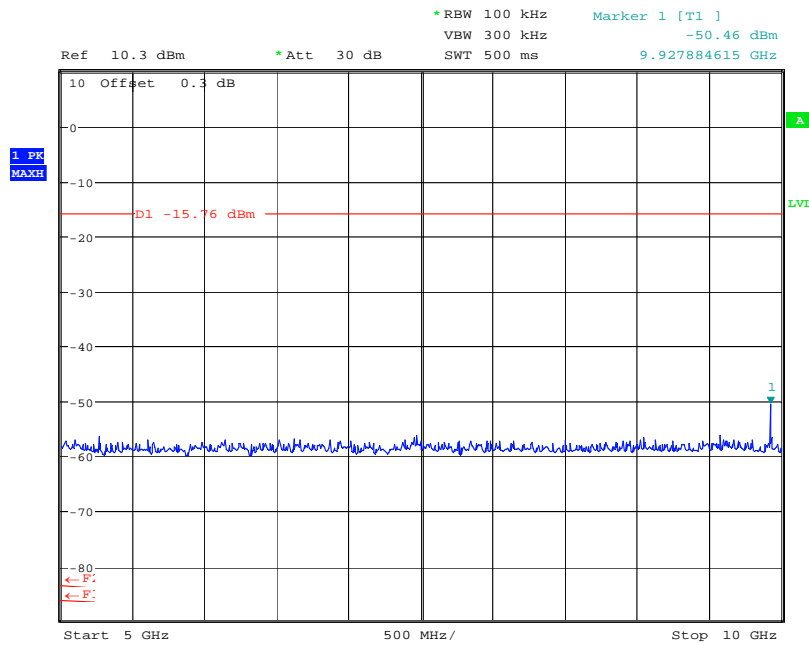
1 GHz – 5 GHz



Date: 22.JUN.2009 15:10:25

Top Channel

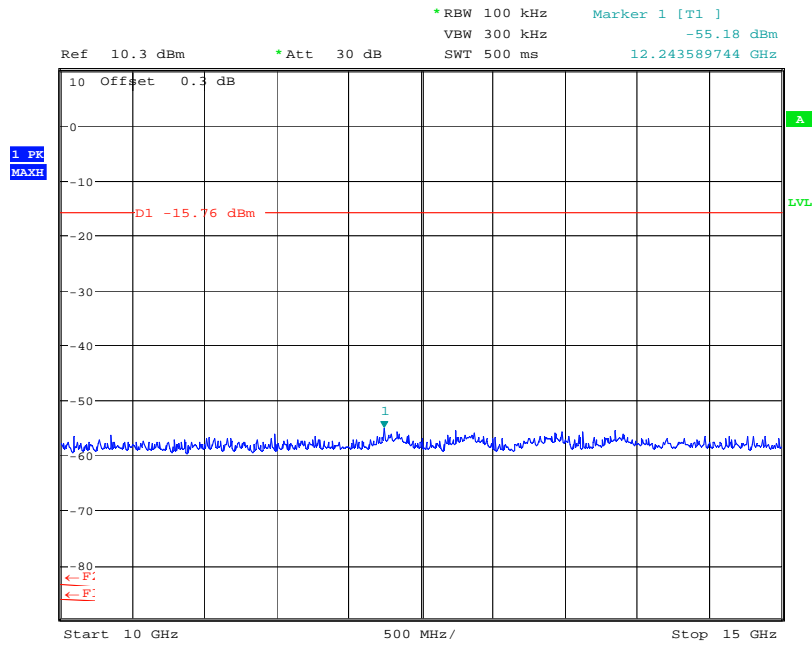
5 GHz – 10 GHz



Date: 22.JUN.2009 15:11:16

Top Channel

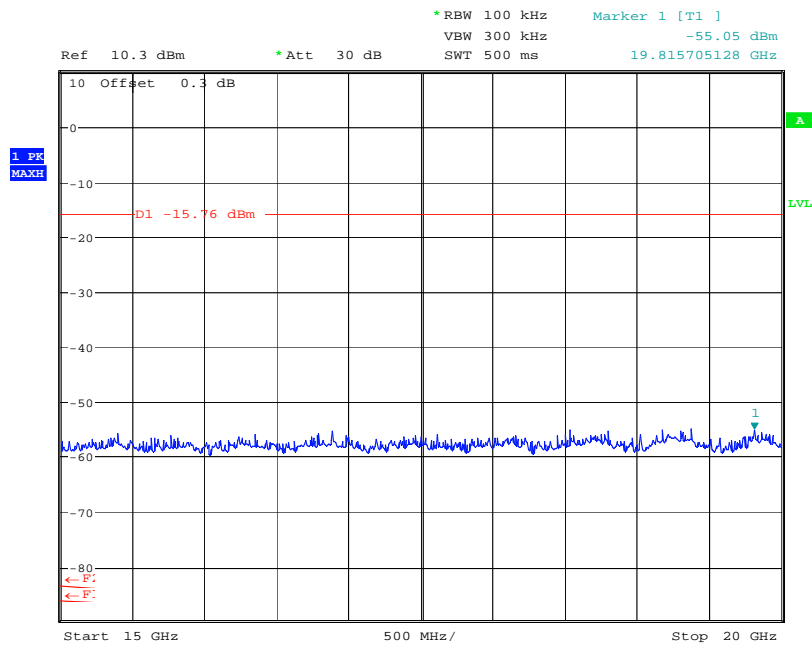
10 GHz – 15 GHz



Date: 22.JUN.2009 15:11:34

Top Channel

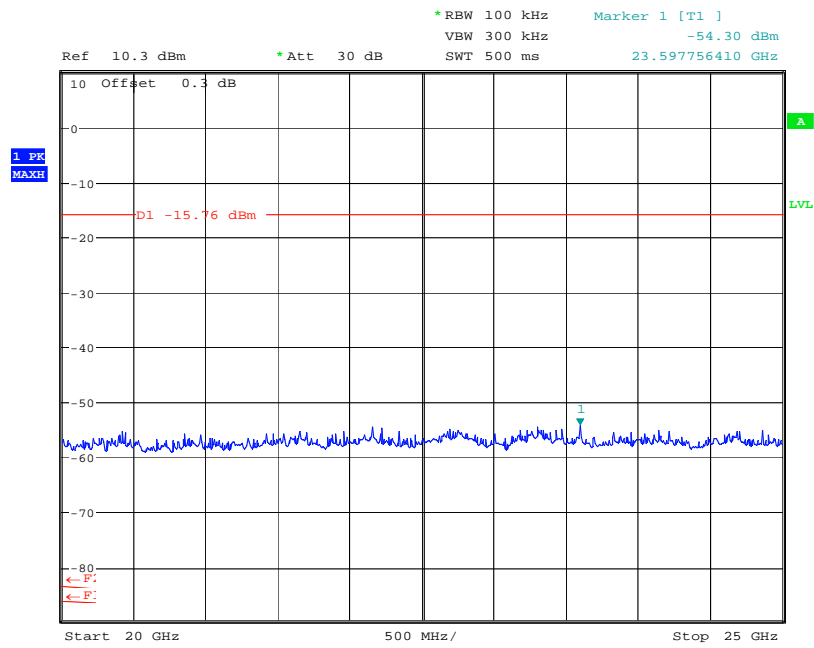
15 GHz – 20 GHz



Date: 22.JUN.2009 15:11:46

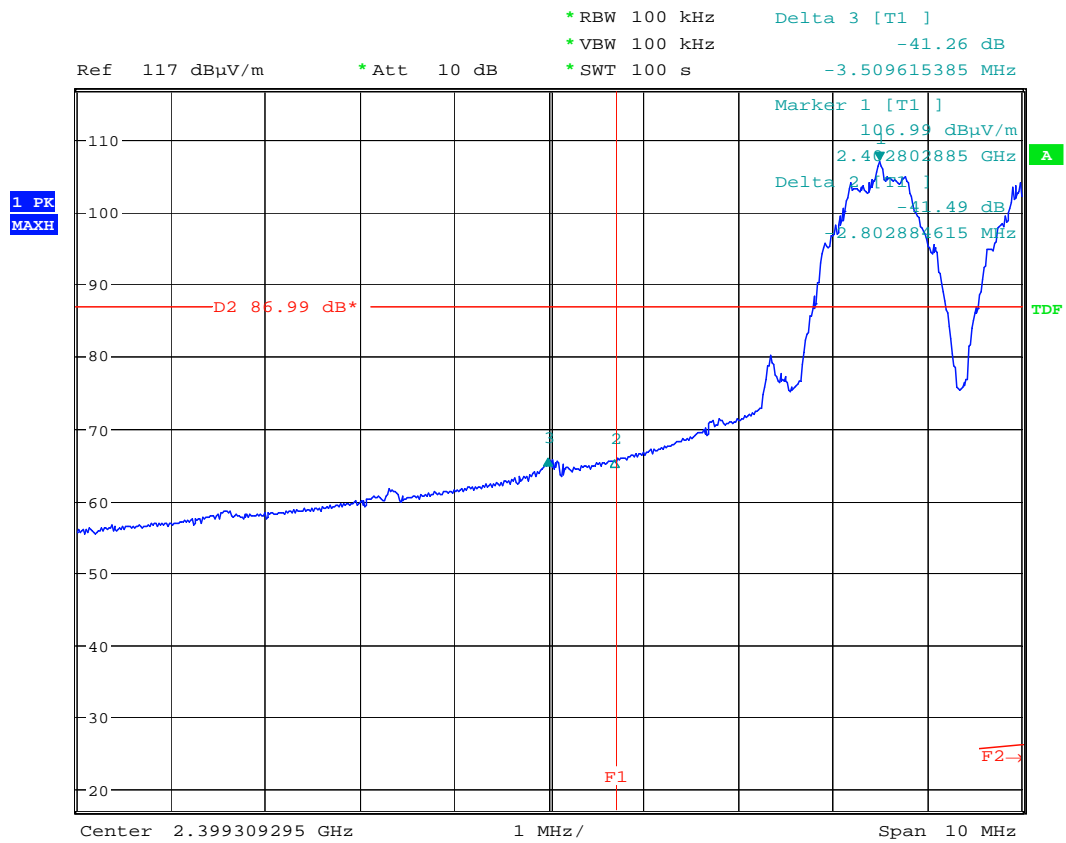
Top Channel

20 GHz – 25 GHz

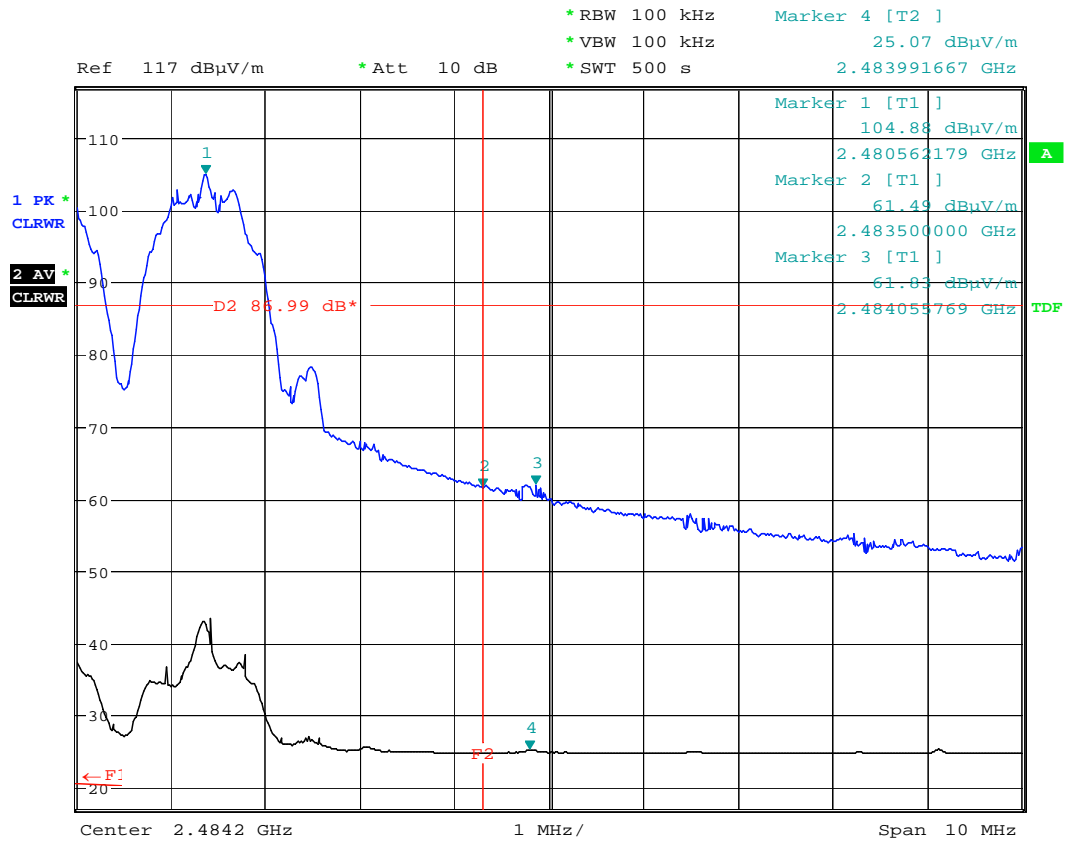


Date: 22.JUN.2009 15:12:02

ANNEX K
BAND EDGE EMISSIONS RADIATED



Date: 25.JUN.2009 09:06:22

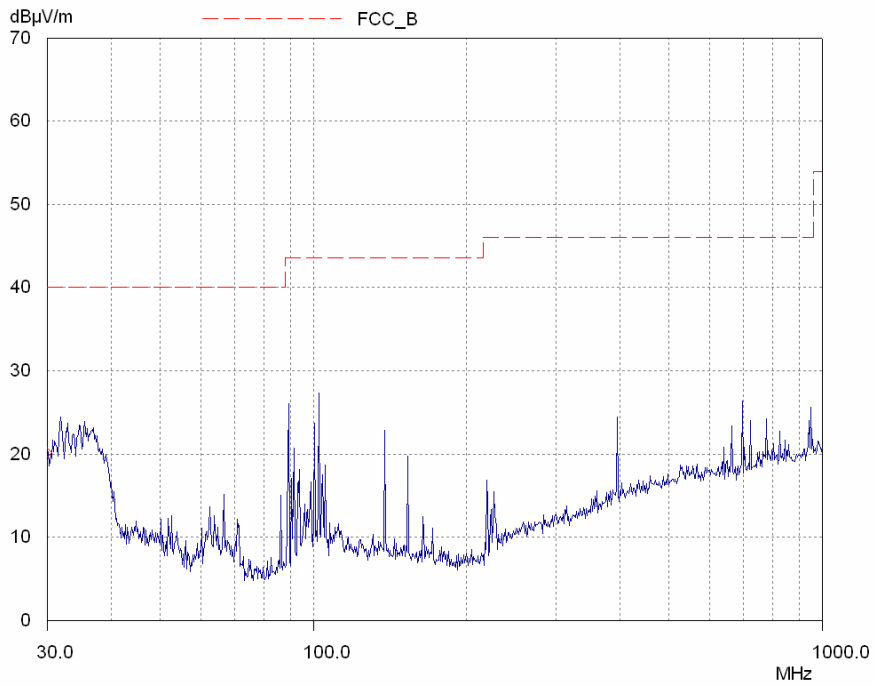


Date: 25.JUN.2009 09:55:02

ANNEX L
RADIATED SPURIOUS EMISSION

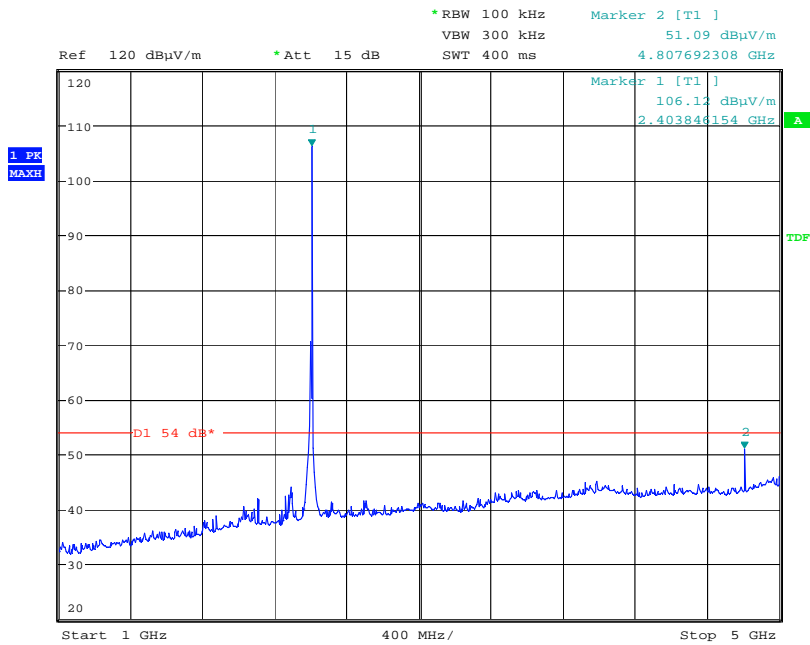
Bottom Channel

30 MHz – 1 GHz



Bottom Channel

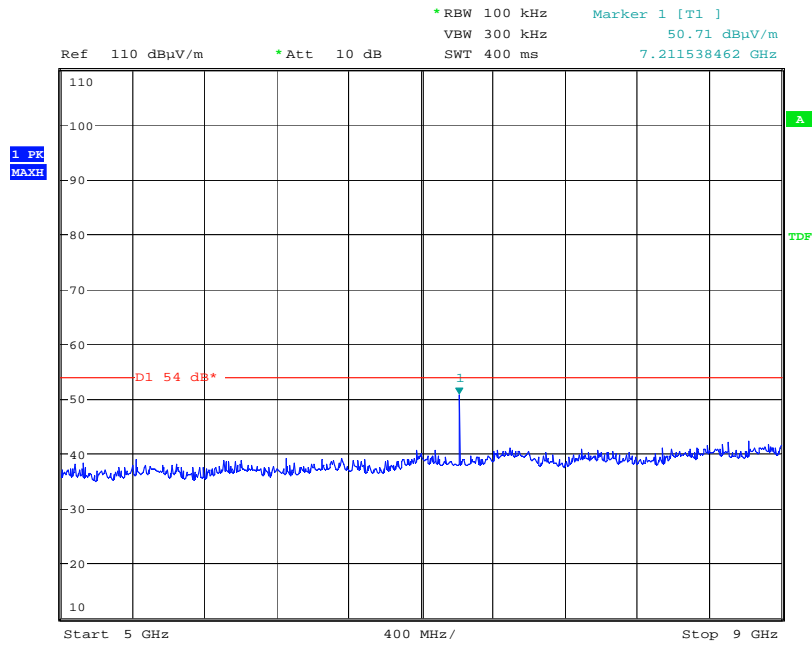
1 GHz – 5 GHz



Date: 23.JUN.2009 09:30:49

Bottom Channel

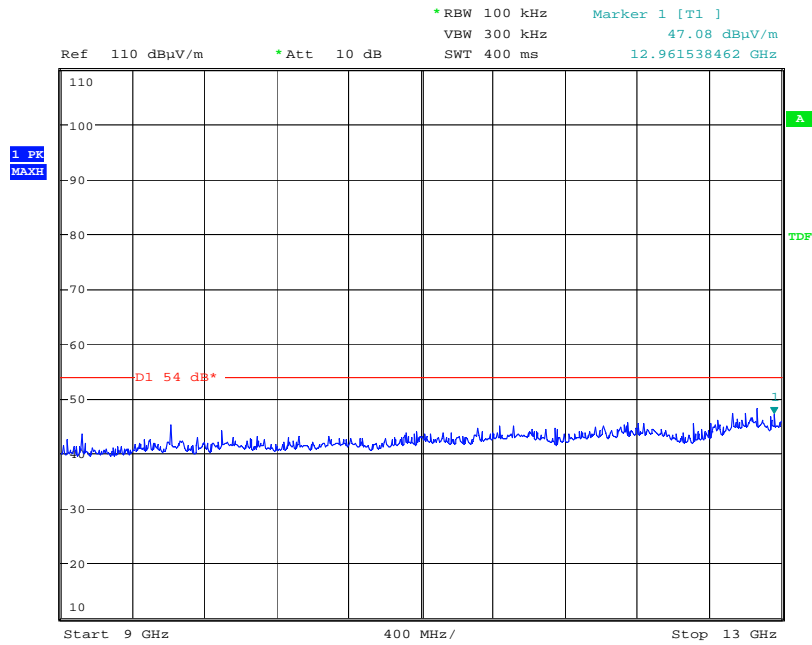
5 GHz – 9 GHz



Date: 23.JUN.2009 09:31:08

Bottom Channel

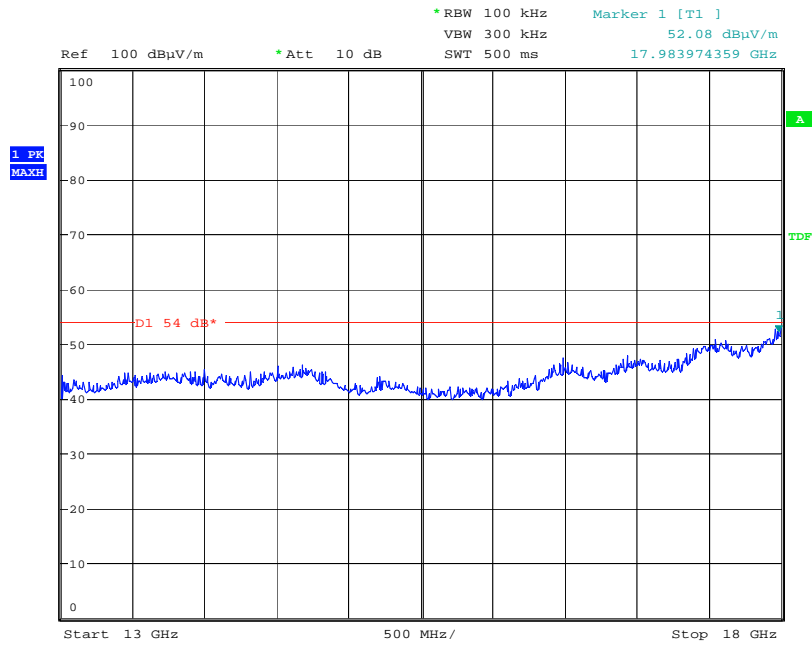
9 GHz – 13 GHz



Date: 23.JUN.2009 09:31:24

Bottom Channel

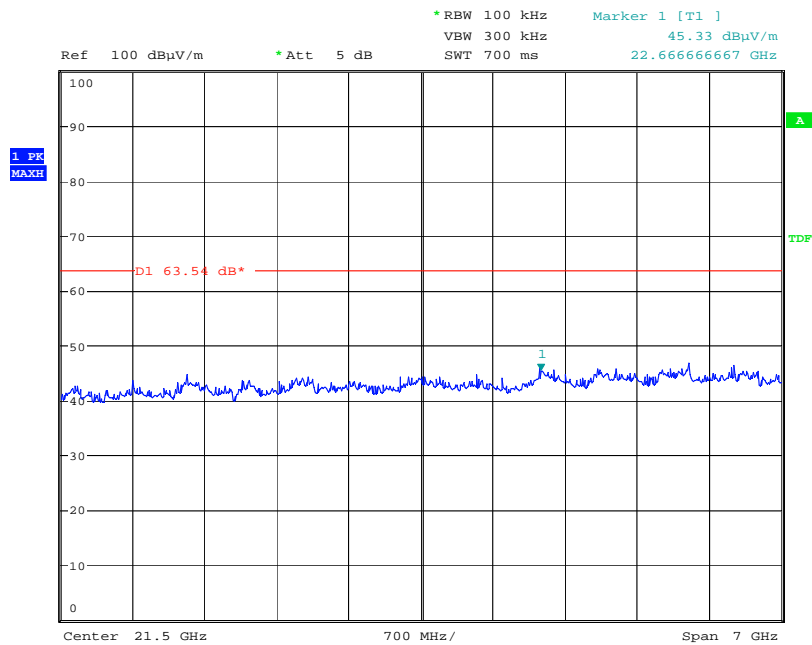
13 GHz – 18 GHz



Date: 23.JUN.2009 09:32:57

Bottom Channel

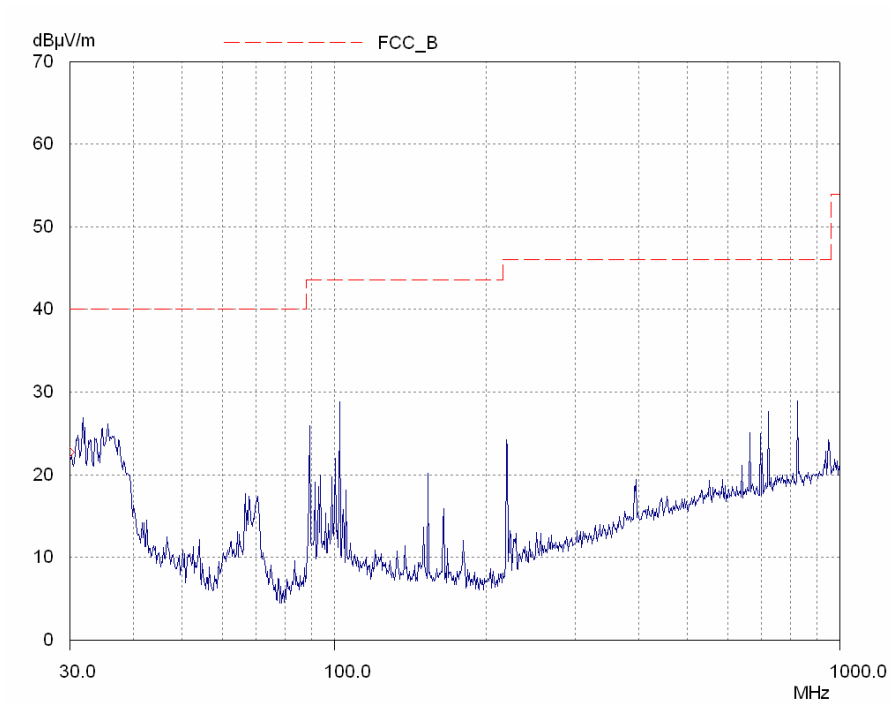
18 GHz – 25 GHz



Date: 23.JUN.2009 10:26:49

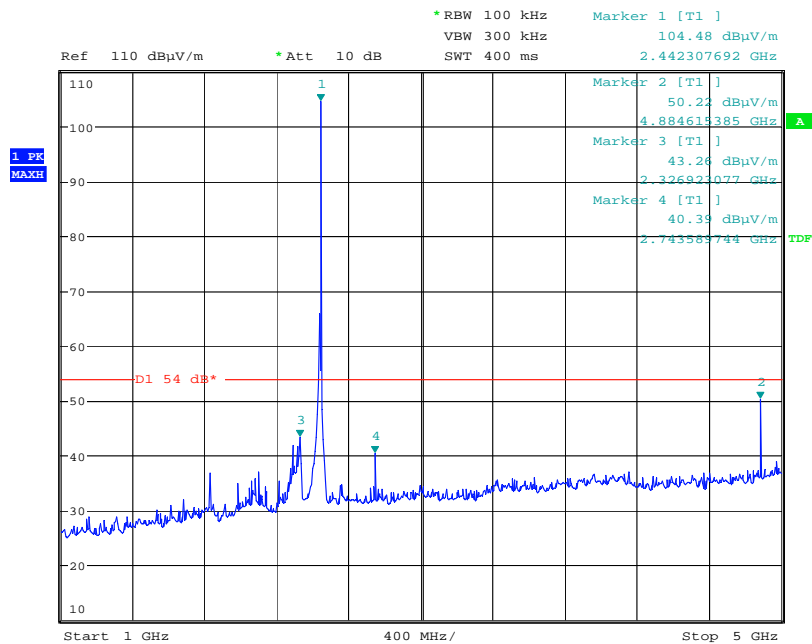
Middle Channel

30 MHz – 1 GHz



Middle Channel

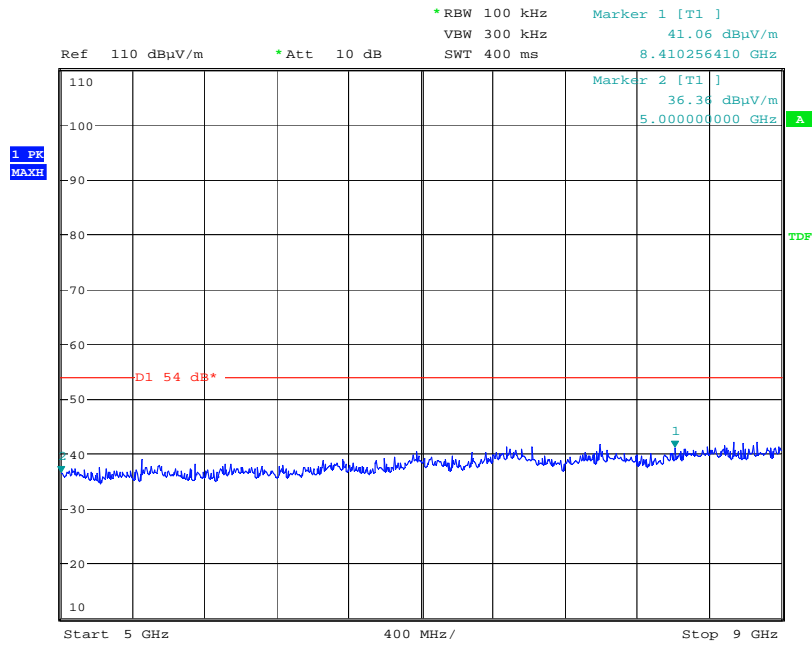
1 GHz – 5 GHz



Date: 23.JUN.2009 10:01:47

Middle Channel

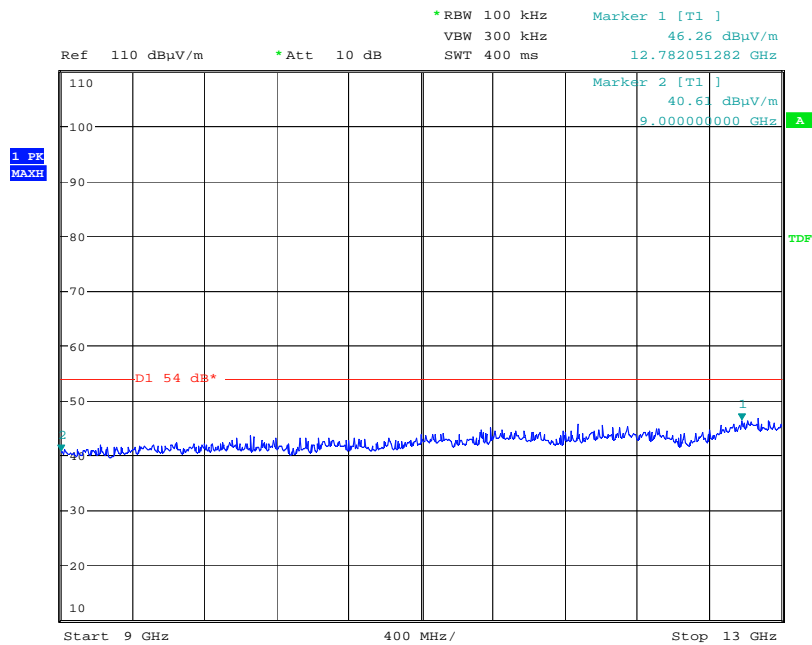
5 GHz – 9 GHz



Date: 23.JUN.2009 09:59:24

Middle Channel

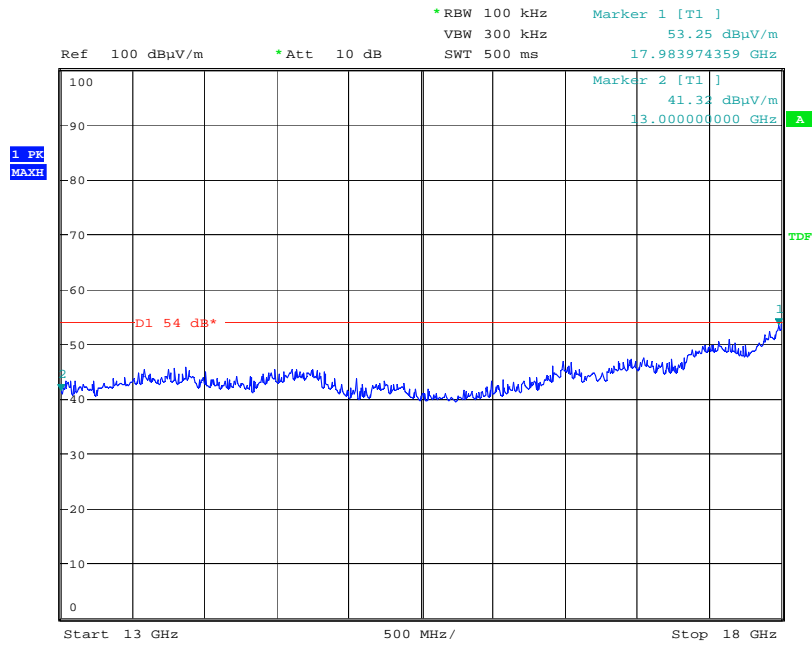
9 GHz – 13 GHz



Date: 23.JUN.2009 09:59:39

Middle Channel

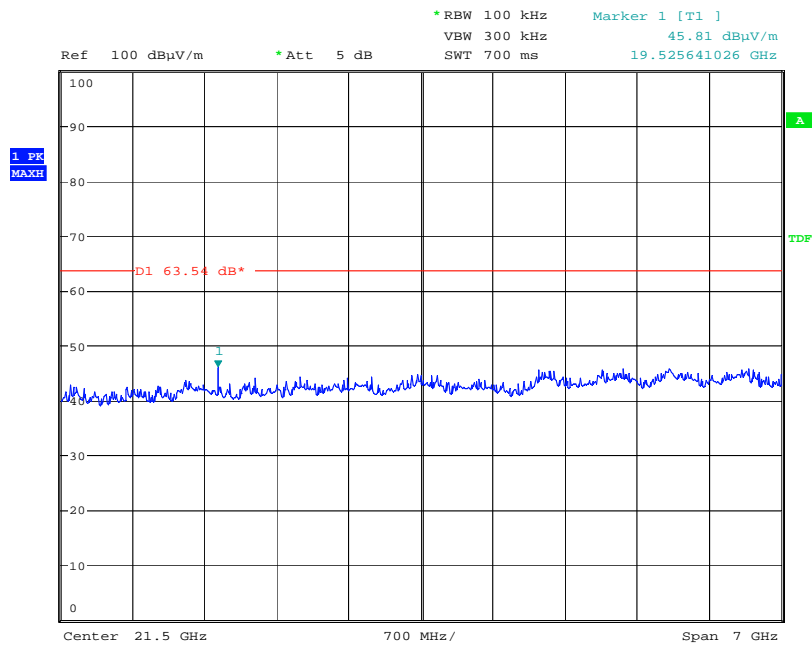
13 GHz – 18 GHz



Date: 23.JUN.2009 09:59:57

Middle Channel

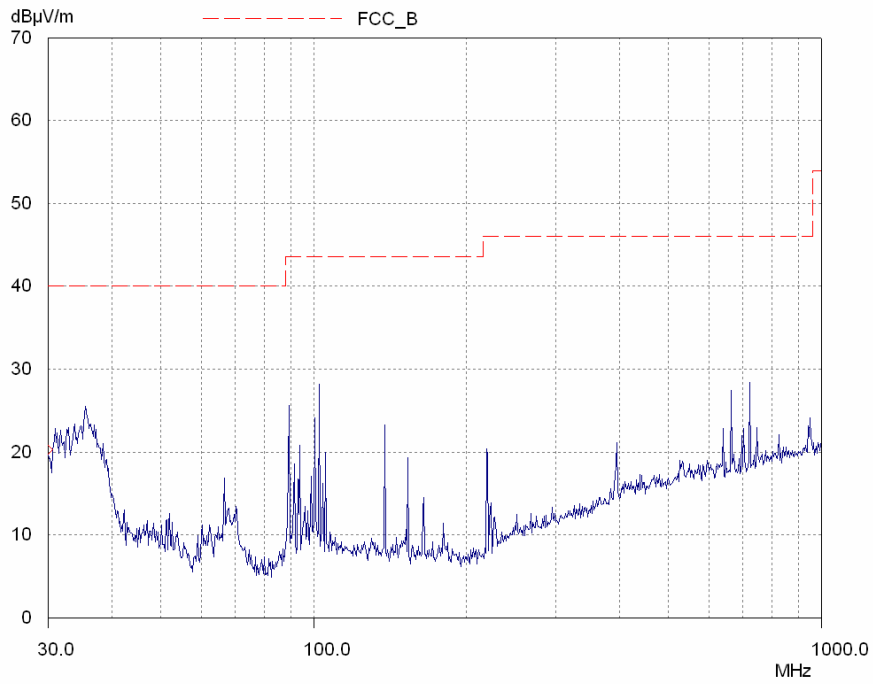
18 GHz – 25 GHz



Date: 23.JUN.2009 10:23:13

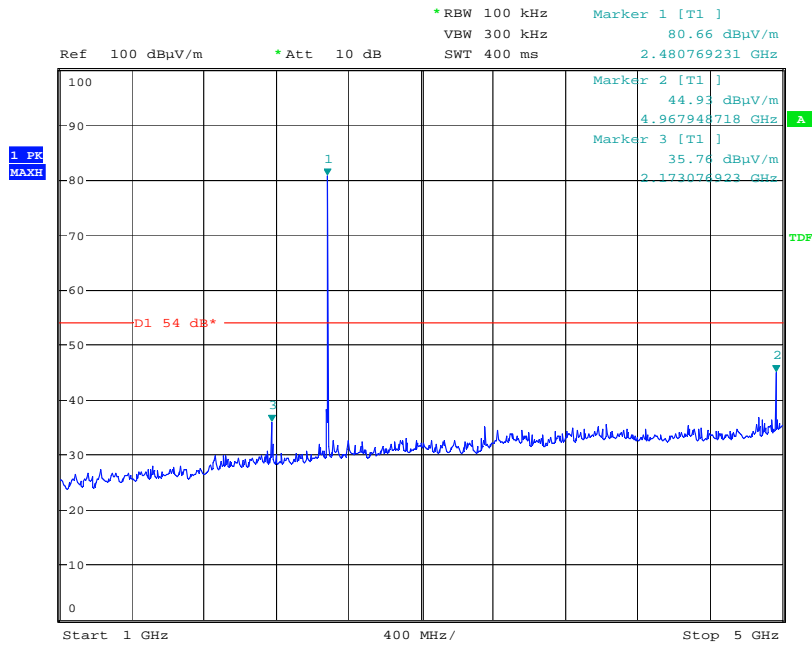
Top Channel

30 MHz – 1 GHz



Top Channel

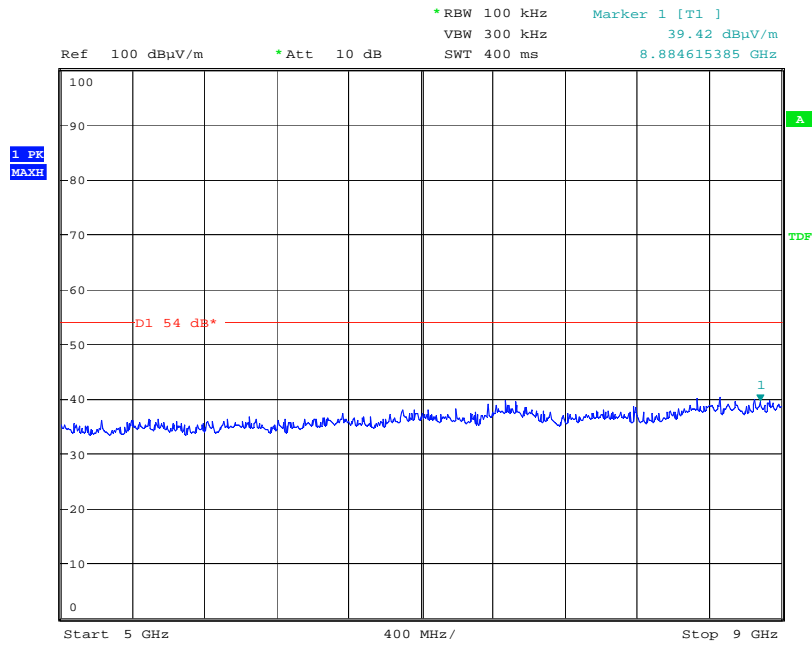
1 GHz – 5 GHz



Date: 23.JUN.2009 10:05:24

Top Channel

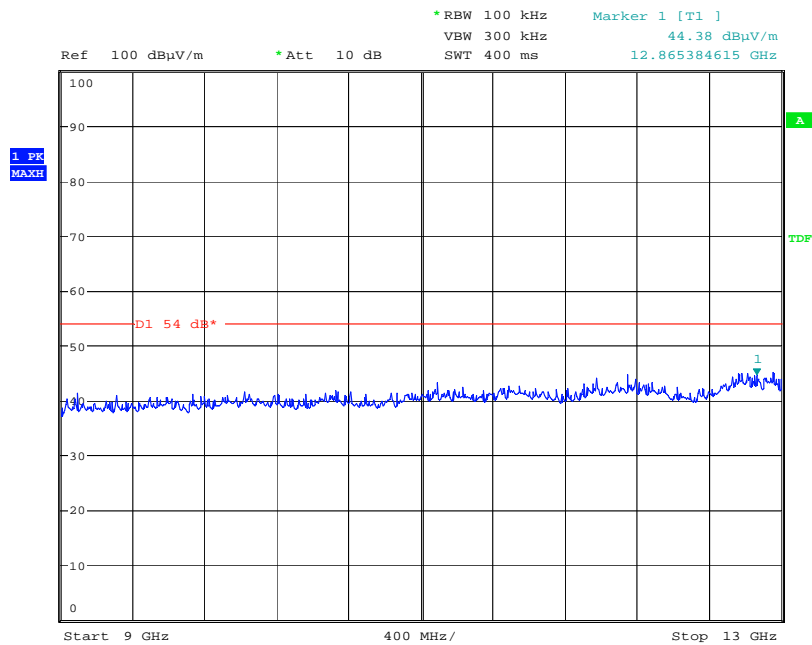
5 GHz – 9 GHz



Date: 23.JUN.2009 10:05:05

Top Channel

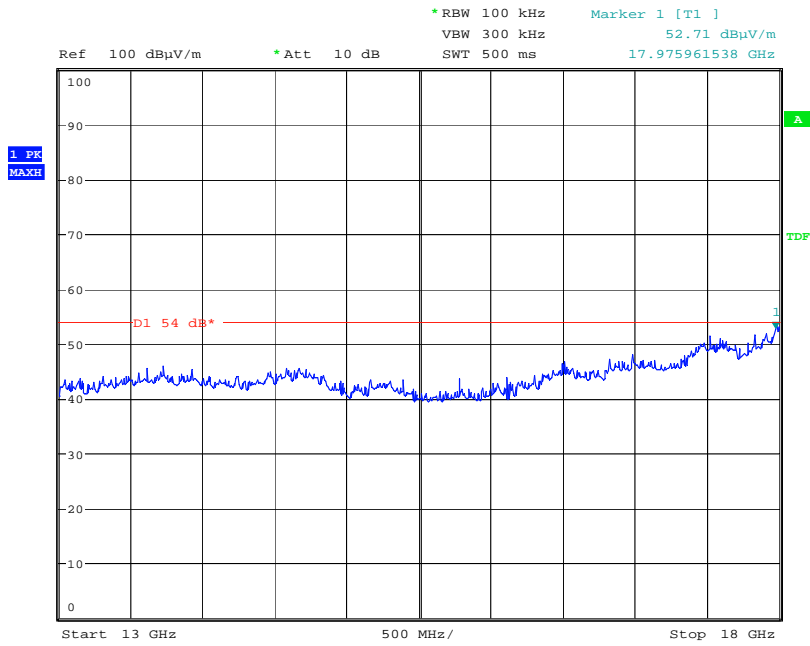
9 GHz – 13 GHz



Date: 23.JUN.2009 10:04:47

Top Channel

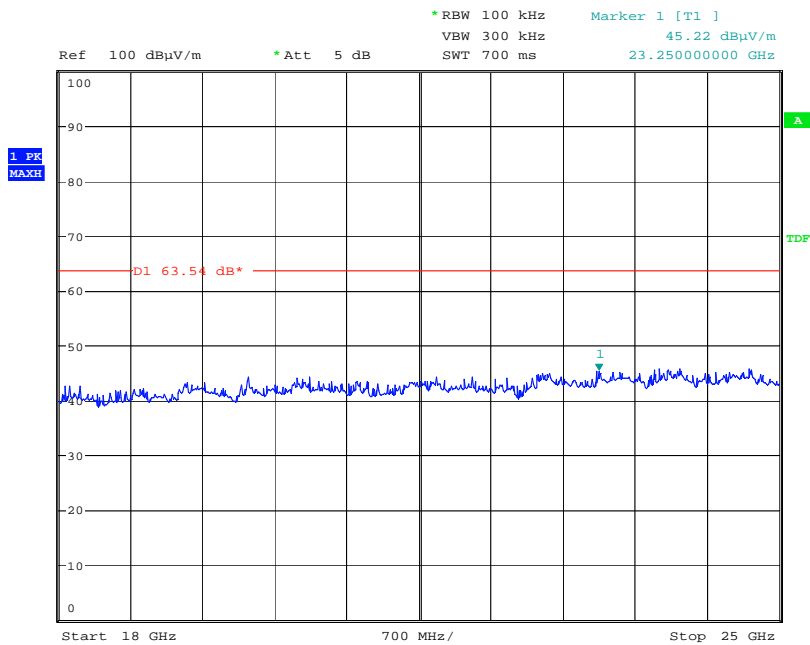
13 GHz – 18 GHz



Date: 23.JUN.2009 10:04:35

Top Channel

18 GHz – 25 GHz



Date: 23.JUN.2009 10:18:28

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%**