

TEST REPORT NO: RU1221/6870
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FCC ID: Q639522AC

**REPORT ON THE CERTIFICATION TESTING OF AN
IRIDIUM SATELLITE LLC
DAYTONA L-BAND TRANSCEIVER
WITH RESPECT TO
THE FCC RULES CFR 47, PART 25**

TEST DATE: 16th – 28th February 2006

TESTED BY: _____ D WINSTANLEY

APPROVED BY: _____ P GREEN
PRODUCT MANAGER
EMC

DATE: 14th March 2006 _____

Distribution:

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FS 503099

CONTENTS

	PAGE
CERTIFICATE OF CONFORMITY & COMPLIANCE	3
APPLICANT'S SUMMARY	4
EQUIPMENT TEST CONDITIONS	5
TESTS REQUIRED	5
TEST RESULTS – Transmitter	
RF Output Power - Conducted	7
Emissions Limitations - Conducted	8
Spurious Emissions - Conducted	9
Spurious Emissions - Radiated	10
Frequency Stability -Temperature	11
Frequency Stability -Voltage	12
	ANNEX
PHOTOGRAPHS	A
APPLICANT'S SUBMISSION OF DOCUMENTATION LIST	B
TEST EQUIPMENT	C
TEST SETUP SELECTION	D
DUTY CYCLE	E
EMISSIONS LIMITATIONS	F
TRANSMITTER SPURIOUS EMISSIONS – Conducted	G
TRANSMITTER SPURIOUS EMISSIONS – Radiated	H
FREQUENCY STABILITY – Temperature	I
FREQUENCY STABILITY – Voltage	J
EQUIPMENT CALIBRATION	K
MEASUREMENT UNCERTAINTY	L

Notes:

- | | | | |
|----|---|-----|-------------------------------------|
| 1. | Component failure during test | YES | ☐ |
| | | NO | ☒ |
| 2. | If Yes, details of failure: | | |
| 3. | The facilities used for the testing of the product contain in this report are FCC Listed. | | |

CERTIFICATE OF CONFORMITY & COMPLIANCE

FCC IDENTITY:	Q639522AC
PURPOSE OF TEST:	Certification
TEST SPECIFICATION:	FCC Rules CFR 47, Part 25
TEST RESULT:	Compliant to Specification
ITU EMISSIONS DESIGNATOR	41K7V7W
EQUIPMENT UNDER TEST:	Daytona L-Band Transceiver
EQUIPMENT TYPE:	Satellite Communications Module
MAXIMUM OUTPUT	40.01 dBm, 10.01dBW,
ANTENNA TYPE:	External TNC connector. For test purposes applicant declared a Fixed Mast Antenna with a gain of 3dBi
CHANNEL SPACING:	41.667 kHz
NUMBER OF CHANNELS:	252
MODULATION TYPE:	V7W
POWER SOURCE(s):	+4.5 Vdc
TEST DATE(s):	16 th – 28 th February 2006
ORDER No(s):	026388/MC3
APPLICANT:	Iridium Satellite LLC
ADDRESS:	6701 Democracy Blvd. Suite 500 Bethesda United States of America MD 20817
TESTED BY:	----- D WINSTANLEY
APPROVED BY:	----- P GREEN PRODUCT MANAGER EMC

APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT):	Daytona L-Band Transceiver
EQUIPMENT TYPE:	Satellite Communications Module
PURPOSE OF TEST:	Certification
TEST SPECIFICATION(s):	FCC Rules CFR 47, Part 25
TEST RESULT:	COMPLIANT Yes ☒ No ☐
APPLICANT'S CATEGORY:	MANUFACTURER ☒ IMPORTER ☐ DISTRIBUTOR ☐ TEST HOUSE ☐ AGENT ☐
APPLICANT'S CONTACT PERSON(s):	Mr C Geibel
E-mail address:	Conrad.geibel@iridium.com
APPLICANT:	Iridium Satellite LLC
ADDRESS:	6701 Democracy Blvd. Suite 500 Bethesda United States of America MD 20817
TEL:	+1 301 571 6277
FAX:	+1 301 571 6250
MANUFACTURER:	Iridium Satellite LLC
DEVELOPMENT AGENT	Cambridge Consultants Limited
DEVELOPMENT AGENT S CONTACT PERSON(s):	Ms M Campbell
E-mail address:	marion.campbell@cambridgeconsultants.com
ADDRESS:	Science Park Milton Road Cambridge CB4 4DW United Kingdom
TEL:	+44 (0)1223 420024
FAX:	+44 (0)1223 423373
EUT(s) COUNTRY OF ORIGIN:	United States
TEST LABORATORY:	TRL Compliance Ltd
UKAS ACCREDITATION No:	0728
TEST DATE(s)	16 th – 28 th February 2006
TEST REPORT No:	RU1221/6870

EQUIPMENT TEST / EXAMINATIONS REQUIRED

1.	TEST/EXAMINATION	FCC Part 2	FCC Part 25	APPLICABILITY	RESULT
	RF Power Output	-	25.204 (a)	YES	PASS
	Emissions Limitations	-	25.202 (f)	YES	PASS
	Spurious Emissions at Antenna Terminals	2.1051	25.202 (f) 25.213	YES	PASS
	Protection of the Radio Navigation Satellite Service	-	25.216(c) 25.216(f)	YES	PASS
	Spurious Emissions Radiated	2.1053	25.202 (f) 25.213	YES	PASS
	Frequency Stability Temperature	2.1055	25.202 (d)	YES	PASS
	Frequency Stability Voltage	2.1055	25.202 (d)	YES	PASS

Note: The Daytona L-Band Transceiver is subject to FCC Part 25 & Part 2 for FCC Certification for units marketed within the United States. The above tests, as specified in FCC Part 2, with limits as defined in FCC Part 25 were performed on the Daytona L-Band Transceiver.

2. Product Use: Satellite Data Communications
 3. Emission Designator: 41k7V7W
 4. Temperatures: Ambient 18°C
(Tnom)
 5. Supply Voltages: Vnom +4.5 Vdc
- Note: Vnom voltages are as stated above unless otherwise shown on the test report page
6. Equipment Category:

Single channel	☐
Two channel	☐
Multi-channel	☒
 7. Channel spacing:

Narrowband	☒	41.667 kHz
Wideband	☐	
 8. Test Location

TRL Compliance Limited	
Up Holland	☒
Long Green	☐
 9. Modifications made during test program No modifications were performed.

Product Description

The satellite communications module consists of an L-Band Transceiver (LBT) capable of simultaneous transmit and receive (duplex) operation covering the frequency range of 1616MHz to 1626.5MHz. The frequency accesses used for duplex channels are organised into sub-bands each of which contains eight frequency accesses. Each sub-band, therefore occupies 333.33 kHz (i.e. $8 \times 41.667\text{kHz}$). Up to 30 sub-bands containing 240 frequency accesses may be used for duplex channels.

Standard References

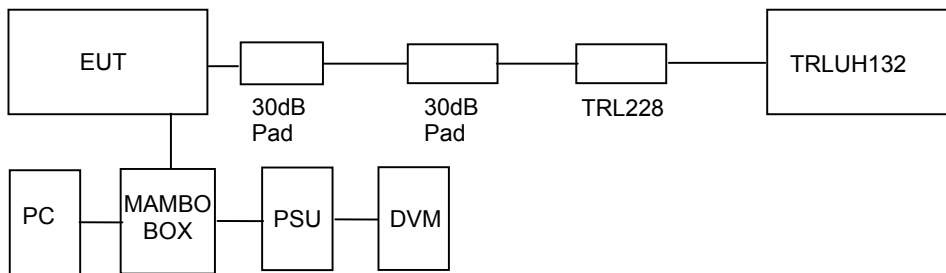
- | | |
|------------------------------|---|
| 47 CFR 2
10-1-03 Edition | Code of Federal Regulations, Title 47, Part 2, "Frequency allocations and Radio Telemetry Matters; General Rules and Regulations" |
| 47 CFR 25
10-1-03 Edition | Code of Federal Regulations, Title 47, Part 25, "Satellite Communications" Subpart C, "Technical Matters" |
| C63.4-2003 | American National Standards Institute (ANSI), "Methods of Measurement of Radio Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range 9 kHz to 40 GHz" |

COMPLIANCE TESTS

TRANSMITTER TESTS

RF OUTPUT POWER – CONDUCTED – PART 25.204 (a)

Ambient temperature	=	18°C	Radio Laboratory
Relative humidity	=	53%	
Supply voltage	=	+4.5 Vdc	
Channel number	=	See test results	



See Annex C for full list of test equipment

The test setup was as per the above diagram. The unit was tested on four channels. The unit was set to operate at maximum power and with a random modulating signal using the TX test application supplied (See Annex D for explanation of TX_test application commands). Power is supplied to the EUT via the MAMBO box. The antenna gain, included in the table below, represents the highest gain of any antennas that are used with this system.

Mode	Channel Number	Attenuator and cable loss dB	Level at Power Meter dBm	Antenna Gain dB	Duty Cycle Factor dB (See Annex D)	Carrier power dBm	Carrier power dBW	Limit dBW
9601	Channel 1	61.8	-35.35	3	10.4	39.85	9.85	40
9601	Channel 75	61.8	-35.31	3	10.4	39.89	9.89	40
9601	Channel 150	61.8	-35.27	3	10.4	39.93	9.93	40
9601	Channel 240	61.8	-35.19	3	10.4	40.01	10.01	40

Notes:

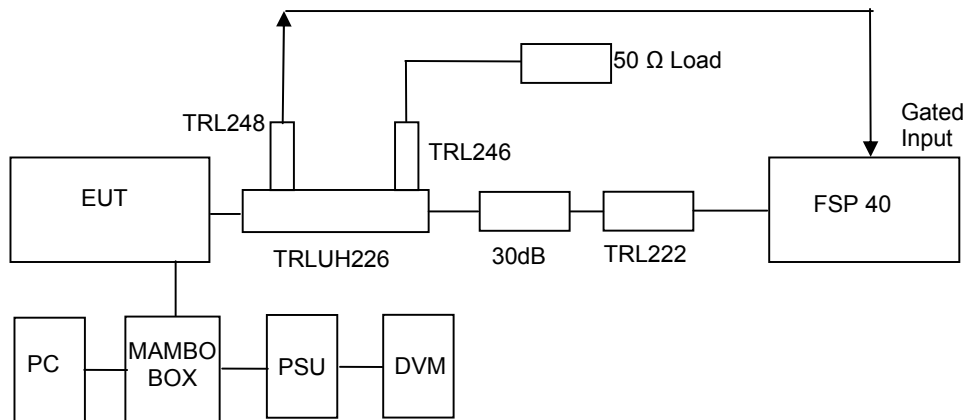
1. Duty Cycle Factor = $10 \times \log(1/X)$ Where $X = (T_{on} / T_{frame})$. See Annex E for duty cycle plots
2. Correction Factor for dBm to dBW = -30dB
3. Antenna gain of 3dBi is the worst case gain over an isotropic antenna

TRANSMITTER TESTS

EMISSIONS LIMITATIONS – CONDUCTED – PART 25.202 (f)

Ambient temperature = 20°C
Relative humidity = 54%
Supply voltage = +4.5 Vdc

Radio Laboratory



See Annex C for full list of test equipment

The test setup was as per the above diagram. The unit was tested on four channels. The unit was set to operate at maximum power and with a random modulating signal using the TX_test application supplied (See Annex D for explanation of TX_test application commands). Power is supplied to the EUT via the MAMBO box.

To enable an average measurement to be taken the gated input trigger of the spectrum analyser was used.

The Spurious limit is as follows:

On any frequency removed from the assigned frequency by the following percentage of the authorised bandwidth

±50%	-	100%	-25 dBc
±100%	-	250 %	-35 dBc
> ±250%			At least 43 + 10 log PdB

$$(10\log P_{\text{watts}}) - (43 + 10\log (P_{\text{watts}} * 1000)) = \text{LIMIT} = -13 \text{ dBm}$$

Where the Authorised Bandwidth = 41.667 kHz

The 3 kHz to 4 kHz bandwidth correction has been taken into account in the Ref level offset figure.

RESULT

The Daytona L-Band transceiver was found to comply with the limits.

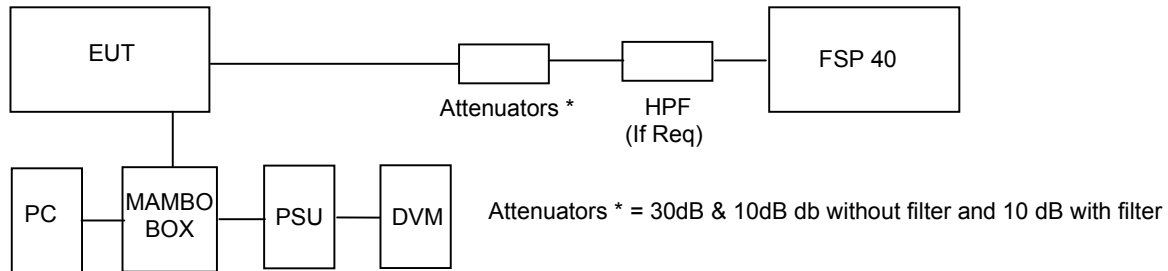
See plots in Annex F.

TRANSMITTER TESTS

SPURIOUS EMISSIONS – CONDUCTED – PART 25.202 (f) & 25.213

Ambient temperature = 20°C
 Relative humidity = 52%
 Supply voltage = +4.5 Vdc

Radio Laboratory



For measurements in the bands 1559MHz – 1605MHz and 1605MHz - 1610MHz use same test setup as per emissions limitations. For measurements below 1559MHz and above band edge of 1628.5MHz use the above test setup

See Annex C for full list of test equipment

The test setup was as per the above diagram. The unit was tested on top and bottom operating frequencies .The unit was set to operate at maximum power and with a random modulating signal using the using the TX_test application supplied (See Annex D for explanation of TX_test application commands). Power is supplied to the EUT via the MAMBO box.

The Spurious limit was calculated as follows:

On any frequency removed from the assigned frequency by more that 250% of the authorised bandwidth

At least $43 + 10 \log (P) \text{dB}$

$(10 \log P_{\text{watts}}) - (43 + 10 \log (P_{\text{watts}} * 1000)) = \text{LIMIT} = -13 \text{ dBm}$

RESULTS

Frequency Range (MHz)	Ch N°	Freq. of Emission	Spectrum Analyser Level (dBm)	Attenuator & Cable Losses (dB)	Spurious Emission Level (dBm)	Limit dBm
30MHz – 1559MHz	No significant emissions within 10 dB's of the limit					-13
1559MHz – 1605MHz	1	1567.648	-83.11	40.7	-42.41	-40
	240	1582.920	-81.93	40.7	-41.23	-40
	1	1604.908	-83.42	40.7	-42.72	-40
1605MHz – 1610MHz	1	1605.000	-83.37	40.7	-42.67	-40 note 4
	240	1605.000	-83.55	40.7	-42.85	-40 note 4
1628.5MHz – 16.3 GHz	No significant emissions within 10 dB's of the limit					-13

Notes :

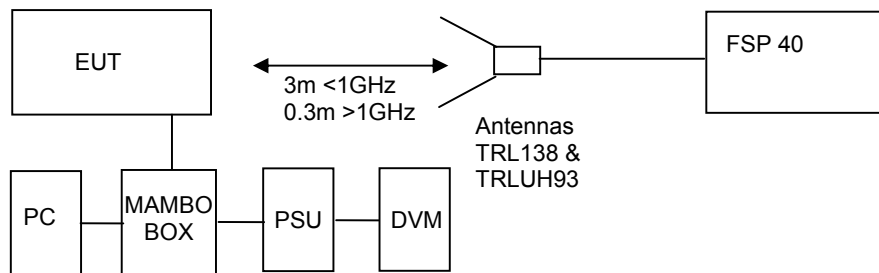
1. Emissions Checked up to 10 times Fc
2. Reference level offset of Scan plots in Annex G already have approximate attenuator losses taken into account
3. Average measurement in a carrier on state were taken in the bands 1599MHz to 1605MHz and 1605MHz -1610MHz. All other scans were peak hold for worst case.
4. -40 to -10 Linearly interpolated in dBm Vs frequency offset.
5. Correction Factor for dBm to dBW = -30dB

The Daytona L-Band transceiver was found to comply with the limits. See Annex G for plots

TRANSMITTER TESTS

SPURIOUS EMISSIONS – RADIATED – PART 25.202 (f) & 25.213

Ambient temperature = 19°C
 Relative humidity = 48%
 Conditions = OATS
 Supply voltage = +4.5 Vdc
 Supply Frequency = N/A



See Annex C for full list of test equipment

The test setup was as per the above diagram. The unit was tested on top and bottom operating frequencies. The unit was set to operate at maximum power and with a random modulating signal using the using the TX_test application supplied (See Annex D for explanation of TX_test application commands). Power is supplied to the EUT via the MAMBO box. The unit was mounted on a turntable and rotated through 360° to find the worst case emission.

The Spurious limit was calculated as follows:

On any frequency removed from the assigned frequency by more that 250% of the authorised bandwidth

At least $43 + 10 \log P_{dB}$

$(10 \log P_{watts}) - (43 + 10 \log (P_{watts} * 1000)) = \text{LIMIT} = -13 \text{ dBm}$

RESULTS

Frequency Range (MHz)	Ch N°	Freq. of Emission	Spectrum Analyser Level (dBm)	Attenuator & Cable Losses (dB)	Spurious Emission Level (dBm)	Limit dBm
30MHz – 1559MHz					No significant emissions within 10 dB's of the limit	-13
1559MHz – 1605MHz					No significant emissions within 10 dB's of the limit	-40
1605MHz – 1610MHz					No significant emissions within 10 dB's of the limit	-40 to 10 note 4
1628.5MHz – 16.3 GHz					No significant emissions within 10 dB's of the limit	-13

Notes :

1. Emissions Checked up to 10 times Fc
2. Scan plots of channels 1 & 240 with receive antenna in vertical polarization in annex H.
3. The unit was mounted on a turntable and rotated through 360° and in 3 orthogonal planes to find the worst case emission.
4. -40 to -10 Linearly interpolated in dBm Vs frequency offset.
5. Correction Factor for dBm to dBW = -30dB

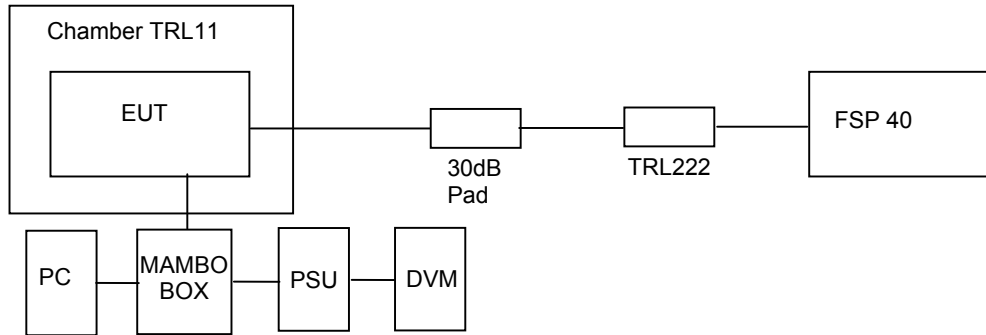
The Daytona L-Band transceiver was found to comply with the limits. See annex H for plots

TRANSMITTER TESTS

FREQUENCY STABILITY – CONDUCTED – TEMPERATURE – PART 25.202 (d)

Ambient temperature = 16°C
 Relative humidity = 47%
 Supply voltage = +4.5 Vdc

Radio Laboratory



See Annex C for full list of test equipment

The test setup was as per the above diagram. The unit was tested on four channels. The unit was set to operate at maximum power and with a random modulating signal using the TX_test application supplied (See Annex D for explanation of TX_test application commands). Power is supplied to the EUT via the MAMBO box. The Analyser was set to max hold.

RESULTS

TEMP	Frequency (MHz)			
°C	Channel 1	Channel 75	Channel 150	Channel 240
+60	1616.01916	1619.10440	1622.22800	1625.97760
+50	1616.02000	1619.10440	1622.22780	1625.97860
+40	1616.02020	1619.10360	1622.22840	1625.97920
+30	1616.02020	1619.10480	1622.22900	1625.97960
+20	1616.01860	1619.10480	1622.22920	1625.98000
+10	1616.02000	1619.10460	1622.22920	1625.97840
0	1616.01980	1619.10280	1622.22780	1625.97920
-10	1616.02020	1619.10320	1622.22620	1625.97780
-20	1616.02100	1619.10400	1622.22860	1625.97860
-30	1616.01960	1619.10320	1622.22840	1625.97860

Notes: 1.Limit ± 10 ppm (See Annex I for plots verses limit)

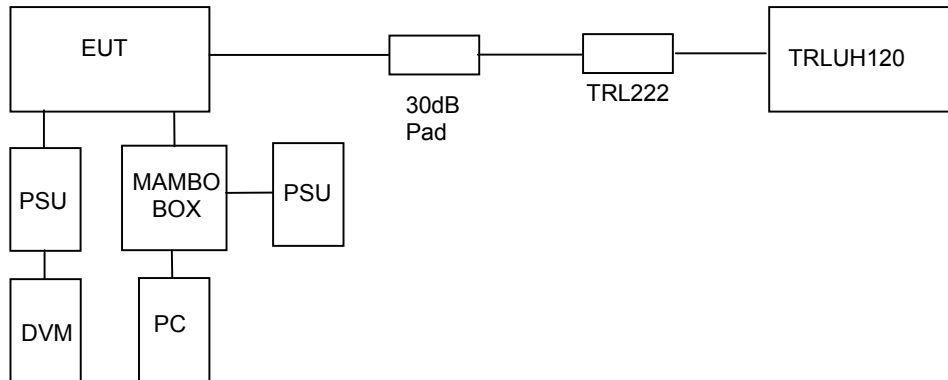
The DAYTONA L-BAND TRANSCEIVER was found to comply with the limits

TRANSMITTER TESTS

FREQUENCY STABILITY – CONDUCTED – VOLTAGE – PART 25.202 (d)

Ambient temperature = 20°C
 Relative humidity = 54%
 Supply voltage = +4.5 Vdc

Radio Laboratory



See Annex C for full list of test equipment

The test setup was as per the above diagram. The unit was tested on four channels. The unit was set to operate at maximum power and with a random modulating signal using the TX_test application supplied (See Annex D for explanation of TX_test application commands). Power is supplied to the EUT via the MAMBO box has been disabled and a separate power supply used to allow the voltage to be varied. The Analyser was set to max hold

RESULTS

VOLTAGE	Frequency (MHz)			
%	Channel 1	Channel 75	Channel 150	Channel 240
85	1616.02840	1619.10880	1622.23560	1625.97680
90	1616.02760	1619.11160	1622.23520	1625.98600
95	1616.02680	1619.11000	1622.23520	1625.98640
100	1616.02640	1619.11080	1622.23520	1625.98480
105	1616.02640	1619.10920	1622.23520	1625.98520
110	1616.02640	1619.10840	1622.23400	1625.98480
115	1616.02600	1619.11000	1622.23480	1625.98400

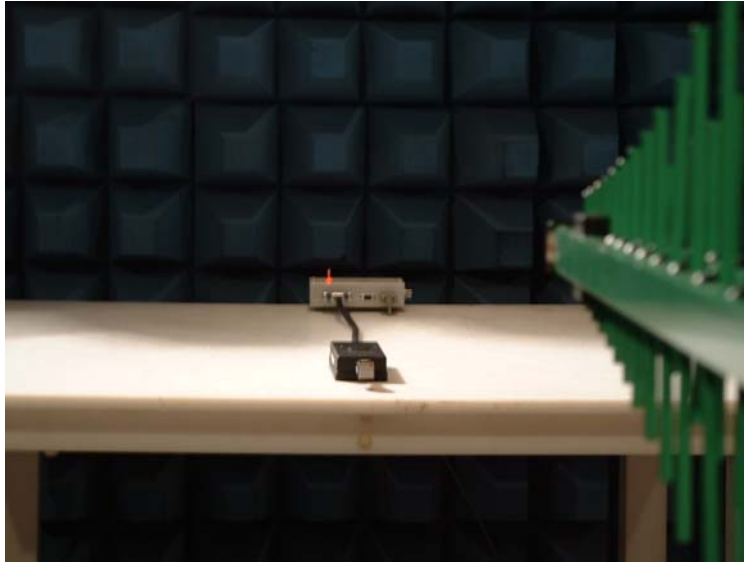
Notes: 1.Limit ± 10 ppm (See Annex J for plots verses limit)

The Daytona L-band transceiver was found to comply with the limits.

ANNEX A
PHOTOGRAPHS

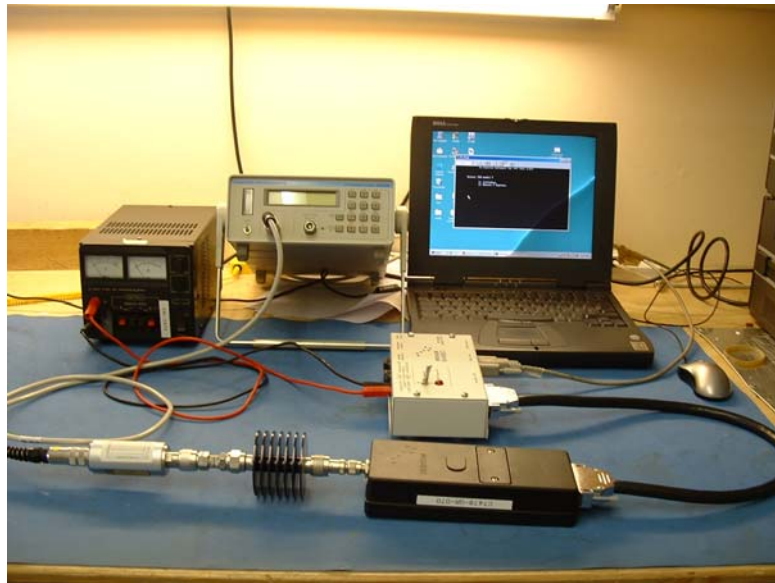
PHOTOGRAPH 1.

RADIATED TEST SETUP



PHOTOGRAPH 2.

CONDUCTED TEST SETUP



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)	-		[]
e.	LABELLING	-	PHOTOGRAPHS	[]
		-	DECLARATION	[]
		-	DRAWINGS	[]
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
TEST EQUIPMENT LIST

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No
SPECTRUM ANALYSER	R & S	FSP 40	N/A	N/A
PSU	MANSON	EP-603	60316619	UH177
PSU	THURLBY THANDAR	PL320QMD	N/A	N/A
RF DIODE	SUHNER	H7	1001.17.A	248
HORN	EMCO	3115	9010-3580	138
HORN	EMCO	3115	9010-3581	139
BIDIRECTIONAL COUPLER	NARDA	3022	72622	UH226
CABLE	ROSENBERGER	MICRO COAX	N/A	280
ENVIRONMENTAL CHAMBER(TEMP)	SHARTREE	TCC125-815P	CS 203	11
POWER METER	MARCONI	6960B	236997010	UH96
POWER SENSOR	MARCONI	6920	1227	179
MULTIMETER	AVOmeter	M3004	M3270006	UH41
LOAD	SUHNER	65 BNC-50-0-1	N/A	N/A
10dB ATTENUATOR	BIRD	8340-100-N	N/A	222
30 dB ATTENUATOR	NARDA	776C-30	619	N/A
30 dB ATTENUATOR	JFW	50PF-030	N/A	N/A
MAMBO-BOX	CCL	C7032-GA-002	N/A	N/A
HIGH PASS FILTER	AFL	N/A	N/A	N/A
RF ANALYSER, DC - 26.5GHz	MARCONI	2380	152089 / 009	UH 120
		2386	152076 / 044	

ANNEX D
TX TEST APPLICATION SETUP

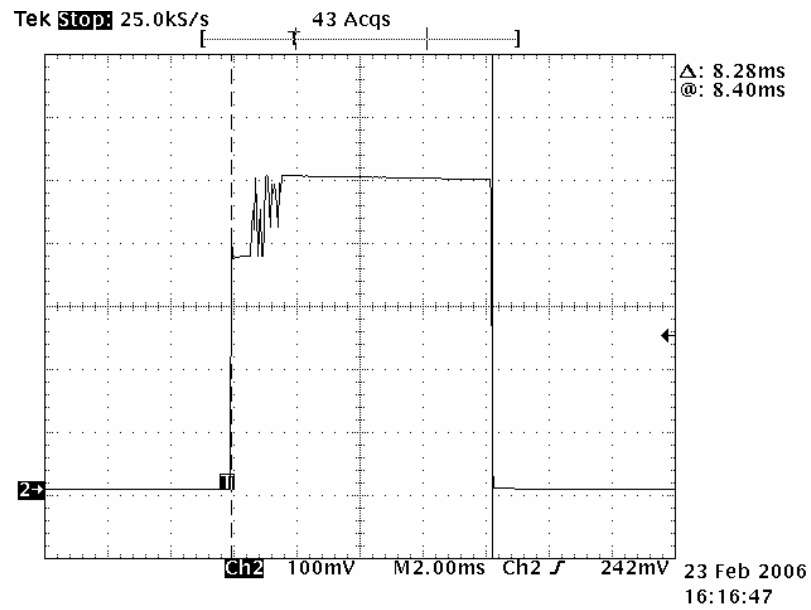
TX TEST APPLICATION SETUP SELECTION

Command Function	Selection Options	selection
Use STPM (traffic channel)	0 (static), 1(selectable)	0
Channel	1 – 240	1, 75, 150 or 240
Time Slot	1 – 4	3
Frame Tick	0 (internal), 1 (External)	0 (internal)
BER Loopback	0 (Random Data), 1 (Loopback Data)	0 (Random Data)
Register Seed	0 (Carrier), 1(Random data)	1 (Random Data)
Propagation Delay	1820µs - 11480µs	5000µs
SV Doppler Frequency	-40,000 – 40,000Hz	0

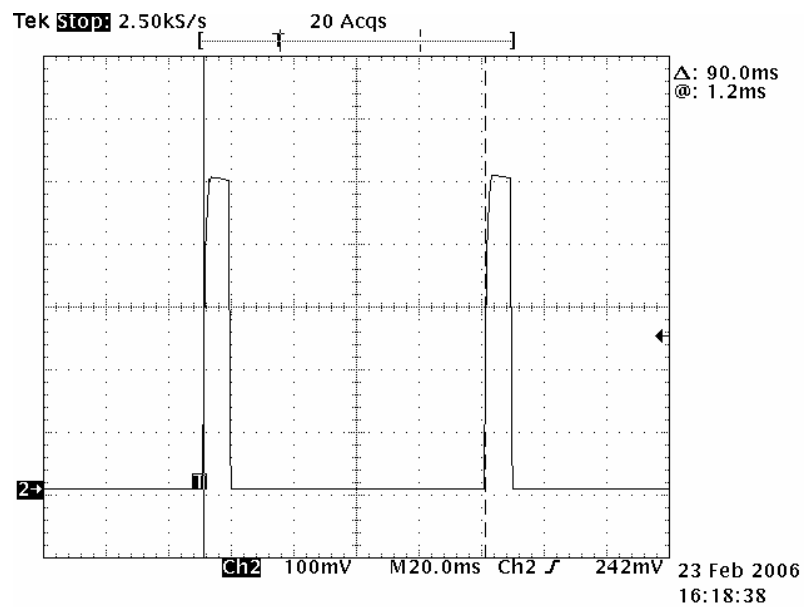
Notes: TX Test is an application supplied to allow easy alteration to the units operation

ANNEX E
DUTY CYCLE

Duty Cycle Plots

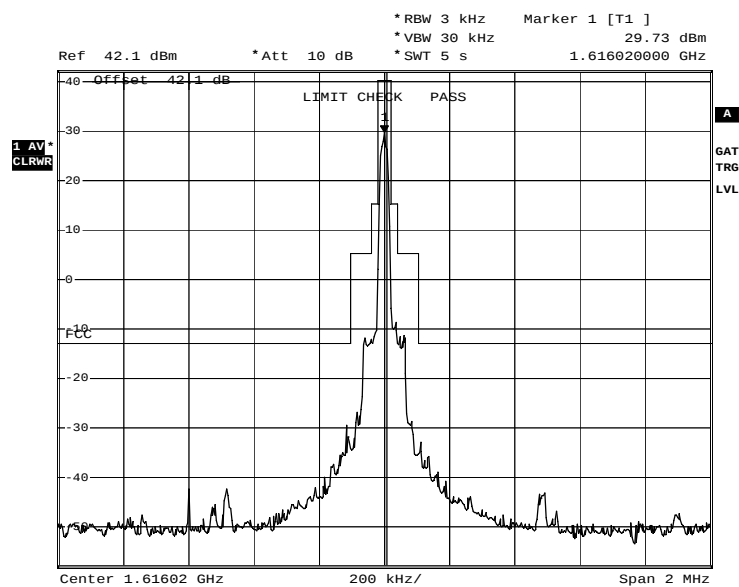


$$T_{\text{on}} = 8.28\text{mS}$$



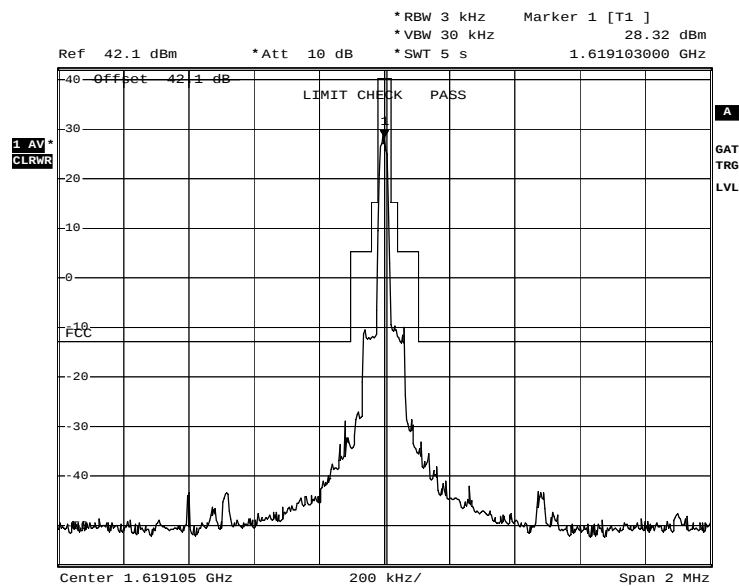
$$T_{\text{frame}} = 90\text{mS}$$

ANNEX F
EMISSIONS LIMITATIONS



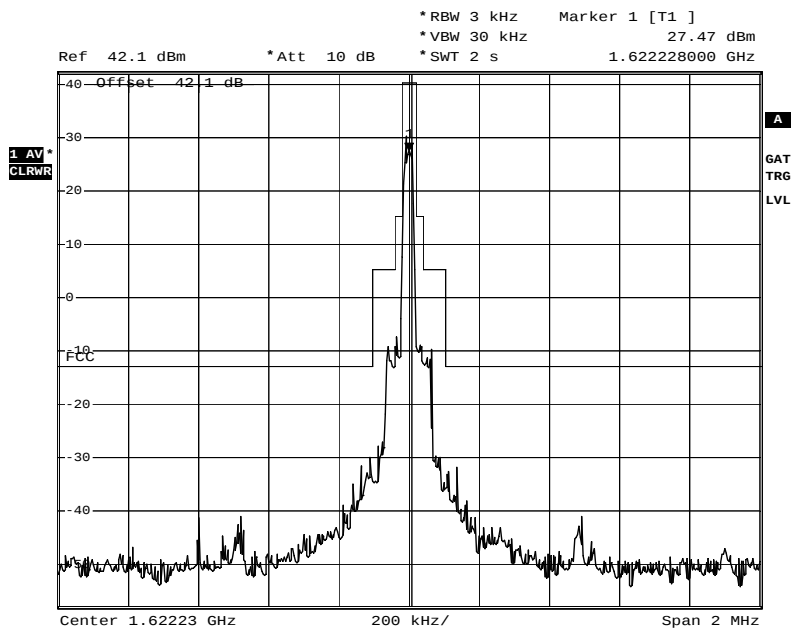
Date: 17.FEB.2006 12:07:40

Channel 1



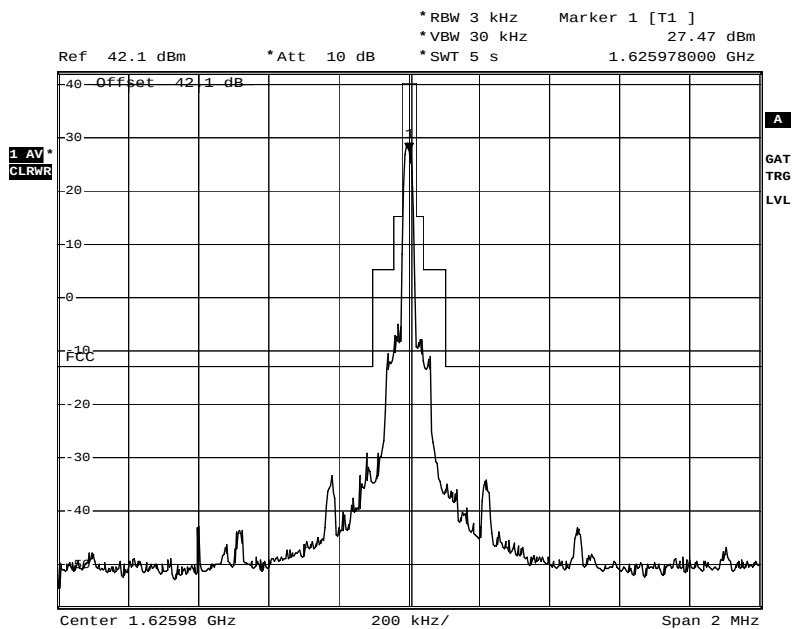
Date: 17.FEB.2006 12:22:14

Channel 75



Date: 17.FEB.2006 12:38:06

Channel 150



Date: 17.FEB.2006 13:11:22

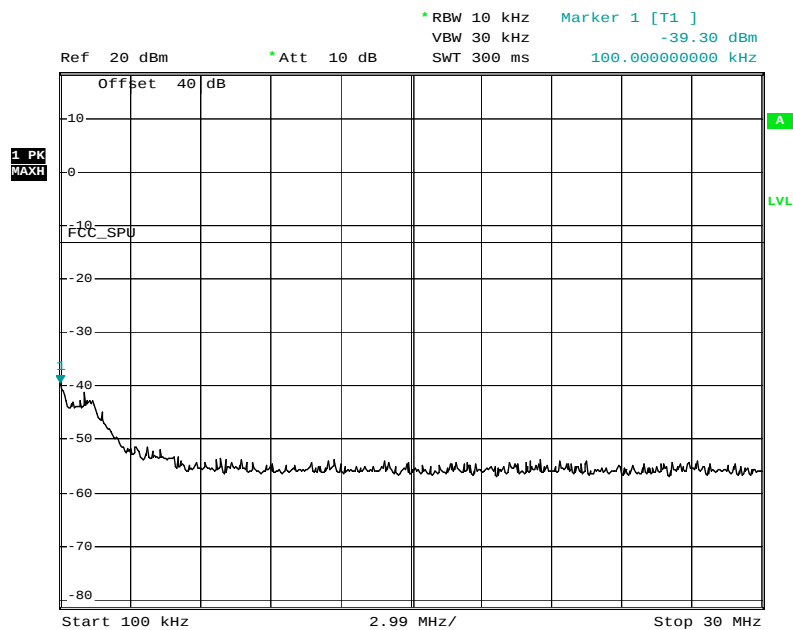
Channel 240

RU1221/6870

ANNEX G
TRANSMITTER SPURIOUS EMISSIONS - Conducted

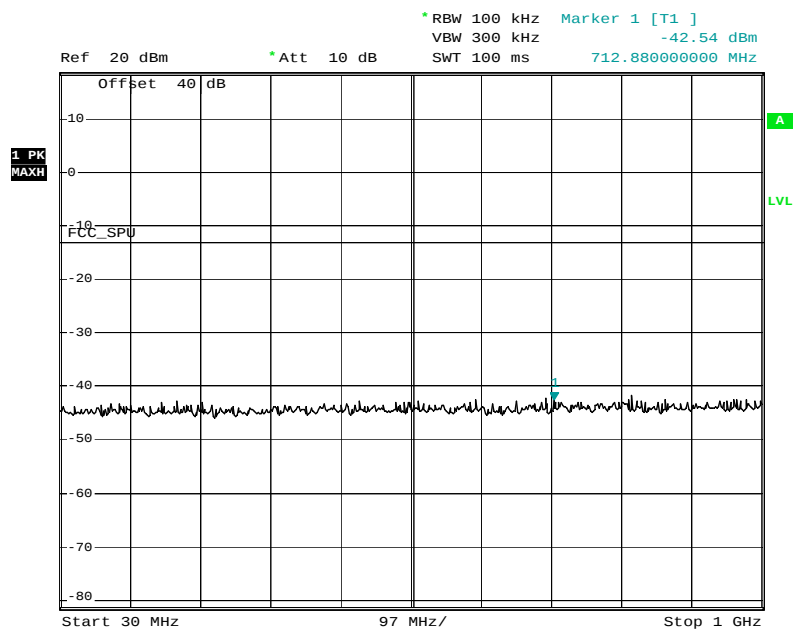
TRANSMITTER SPURIOUS EMISSIONS – Conducted

Channel 1



Date: 20.FEB.2006 16:22:36

100 kHz – 30MHz

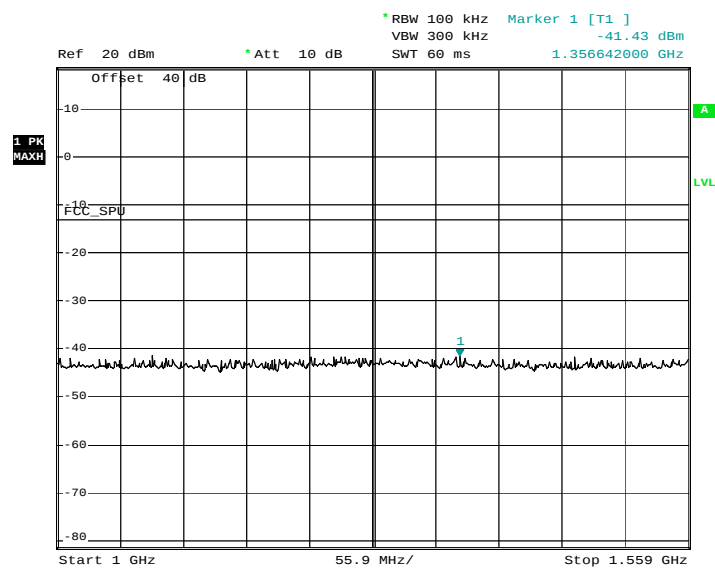


Date: 20.FEB.2006 16:23:11

30MHz – 1000MHz
RU1221/6870

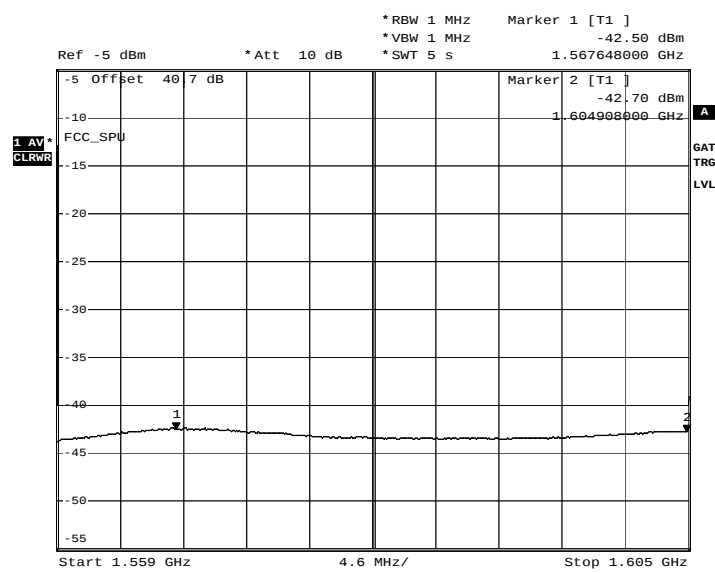
TRANSMITTER SPURIOUS EMISSIONS – Conducted

Channel 1



Date: 20.FEB.2006 16:24:32

1000MHz – 1559MHz

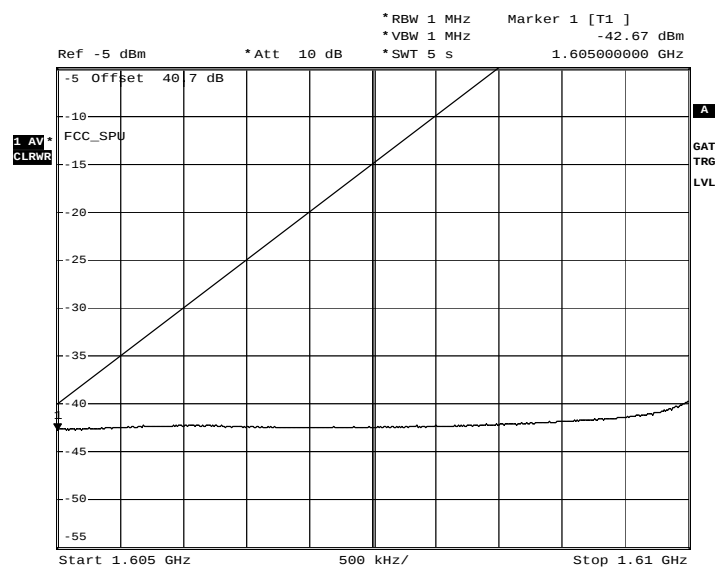


Date: 17.FEB.2006 14:56:57

1559MHz – 1605MHz

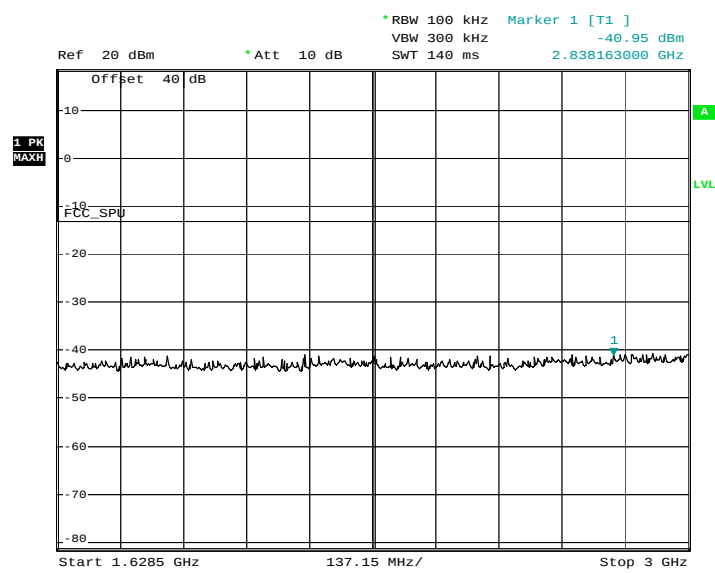
TRANSMITTER SPURIOUS EMISSIONS – Conducted

Channel 1



Date: 17.FEB.2006 14:47:13

1605MHz – 1610MHz

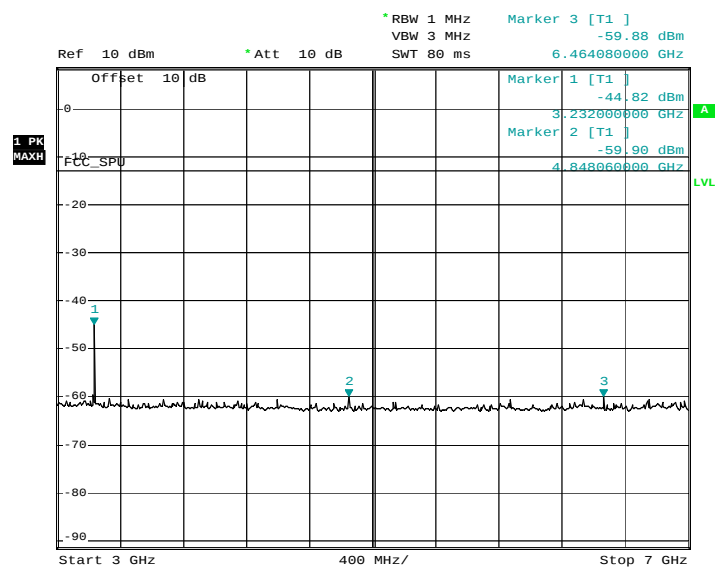


Date: 20.FEB.2006 16:25:24

1628.5MHz – 3000MHz

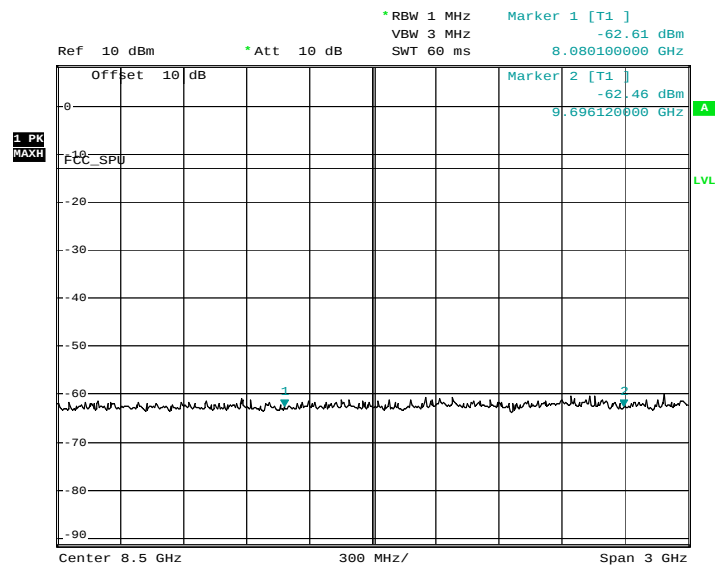
TRANSMITTER SPURIOUS EMISSIONS – Conducted

Channel 1



Date: 20.FEB.2006 16:46:52

3GHz – 7GHz

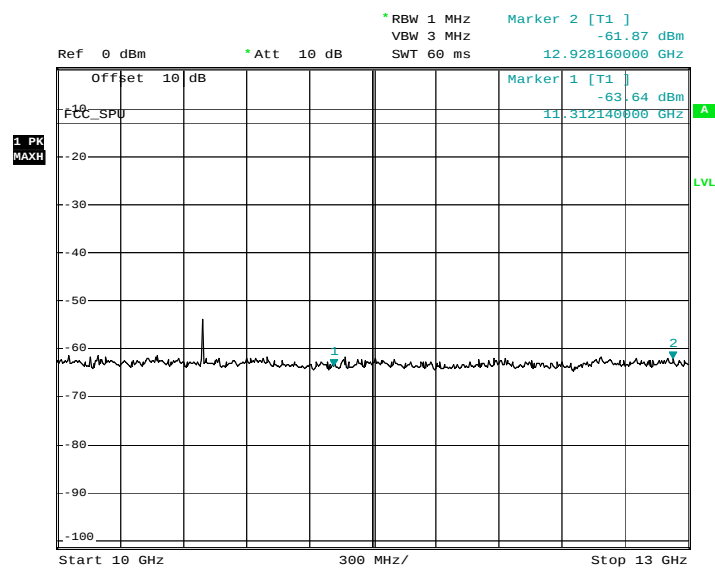


Date: 20.FEB.2006 16:45:17

7GHz – 10GHz

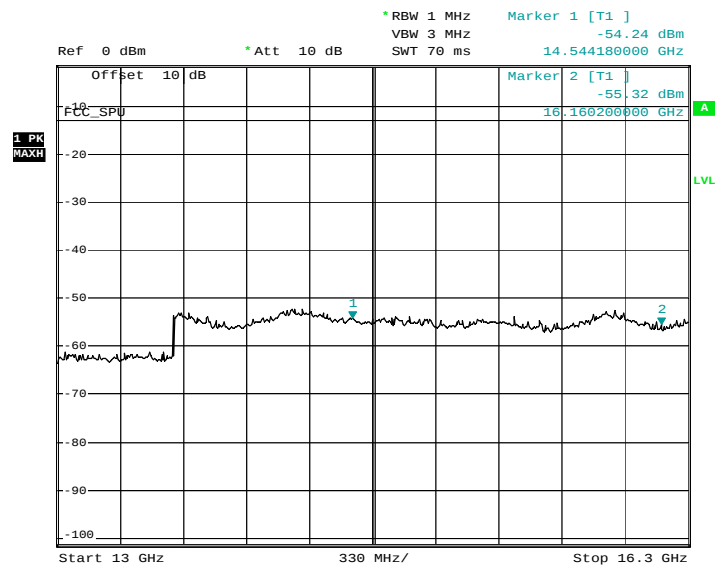
TRANSMITTER SPURIOUS EMISSIONS – Conducted

Channel 1



Date: 20.FEB.2006 16:50:10

10GHz – 13GHz

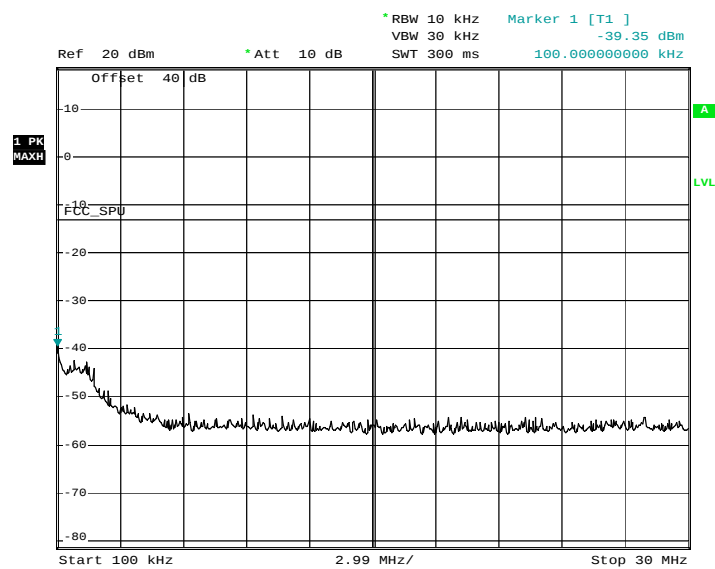


Date: 20.FEB.2006 16:52:23

13GHz – 16.3GHz

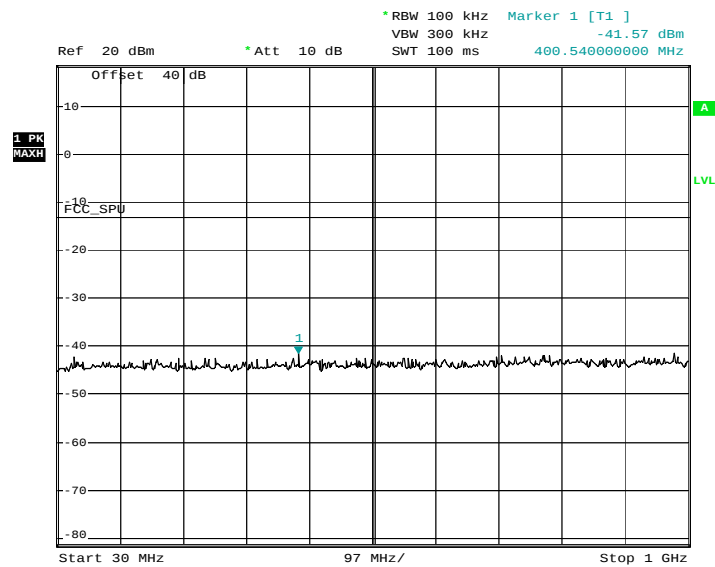
TRANSMITTER SPURIOUS EMISSIONS – Conducted

Channel 240



Date: 20.FEB.2006 16:28:25

100 kHz – 30MHz

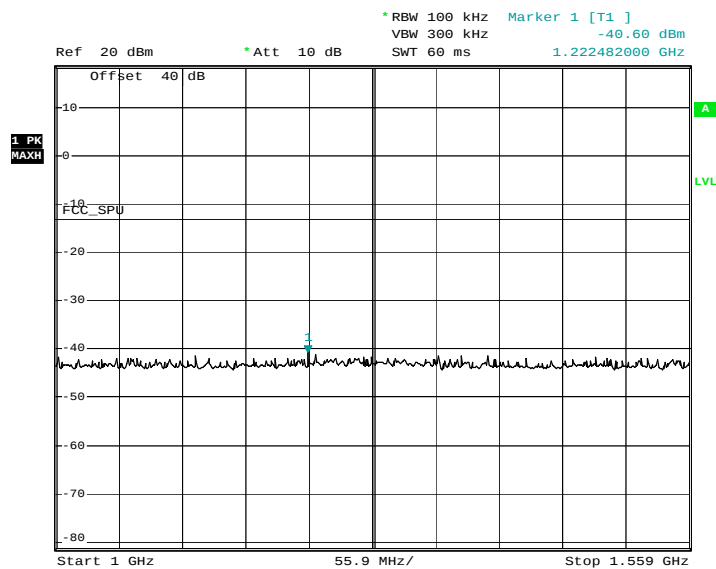


Date: 20.FEB.2006 16:29:36

30MHz – 1000MHz

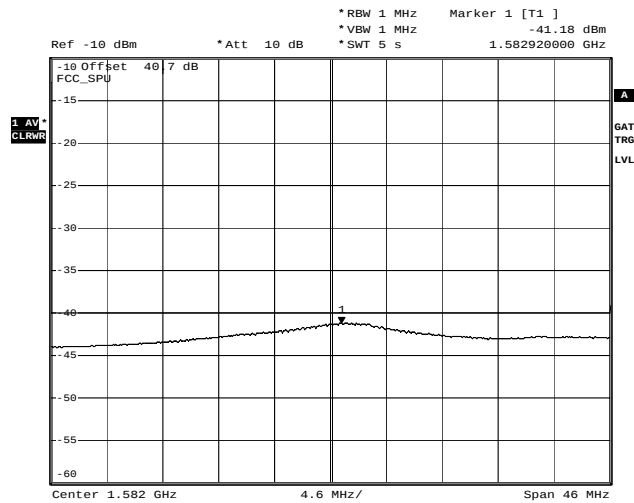
TRANSMITTER SPURIOUS EMISSIONS – Conducted

Channel 240



Date: 20.FEB.2006 16:30:19

1000MHz – 1559MHz

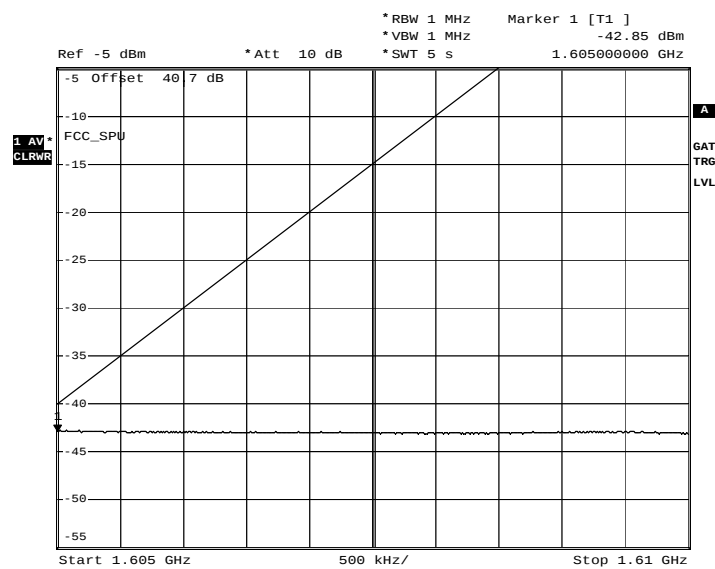


Date: 17.FEB.2006 14:37:45

1559MHz – 1605MHz

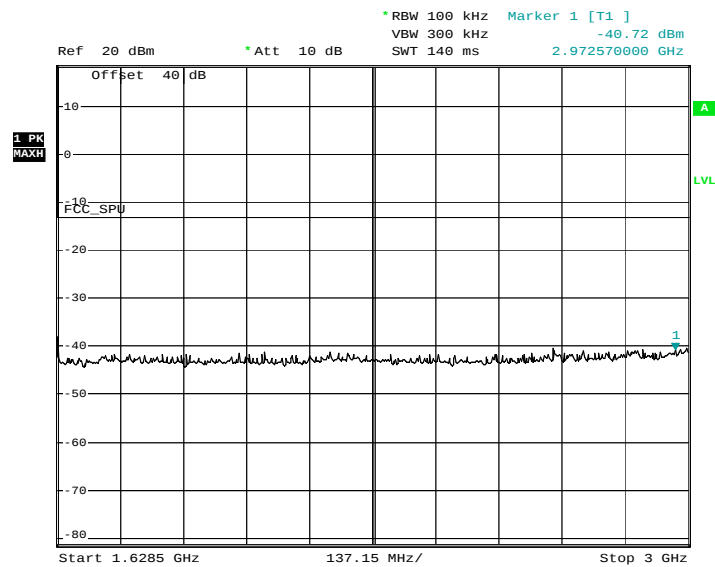
TRANSMITTER SPURIOUS EMISSIONS – Conducted

Channel 240



Date: 17.FEB.2006 14:41:30

1605MHz – 1610MHz

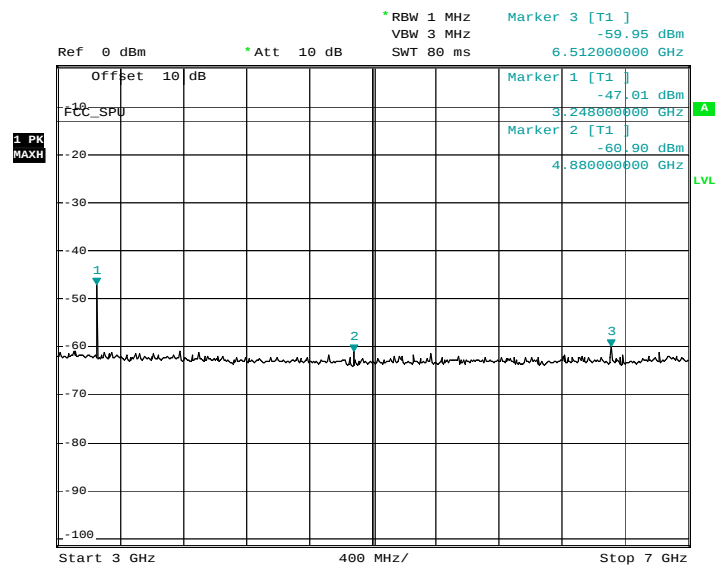


Date: 20.FEB.2006 16:27:10

1628.5MHz – 3000MHz

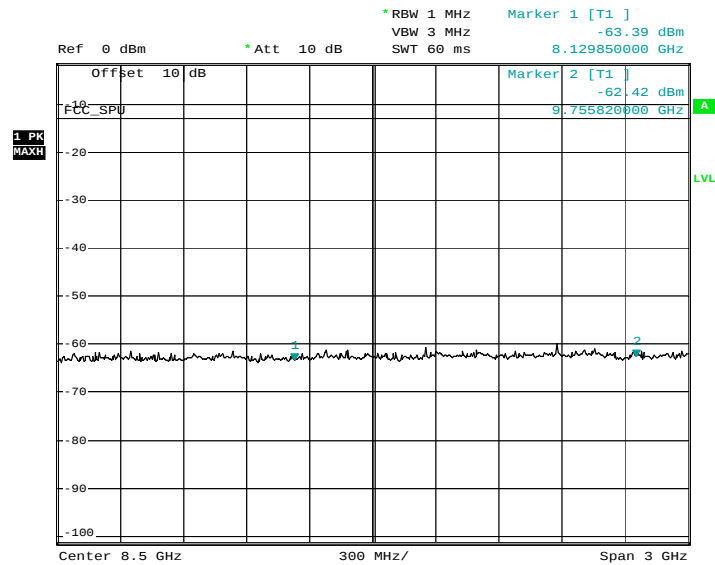
TRANSMITTER SPURIOUS EMISSIONS – Conducted

Channel 240



Date: 20.FEB.2006 17:25:24

3GHz – 7GHz

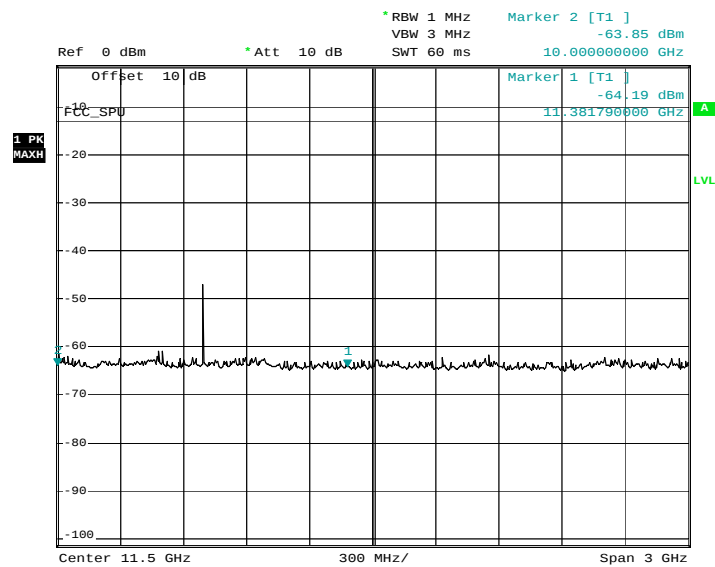


Date: 20.FEB.2006 17:28:15

7GHz – 10GHz

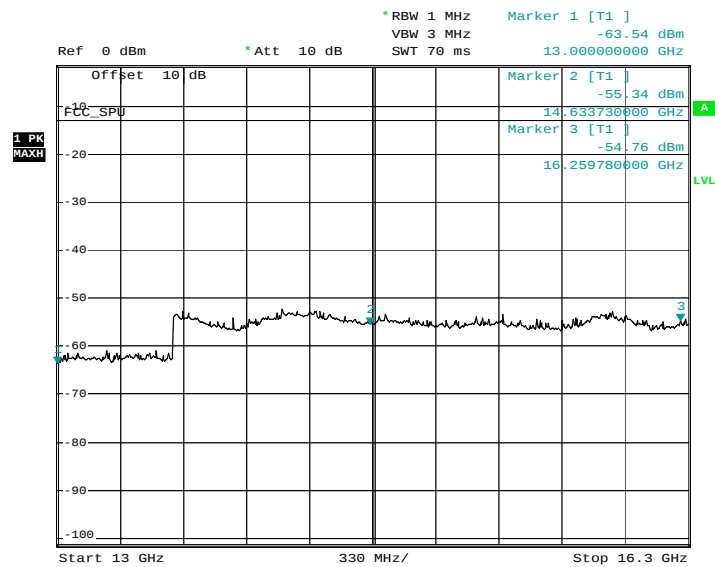
TRANSMITTER SPURIOUS EMISSIONS – Conducted

Channel 240



Date: 20.FEB.2006 17:30:21

10GHz – 13GHz



Date: 20.FEB.2006 17:31:22

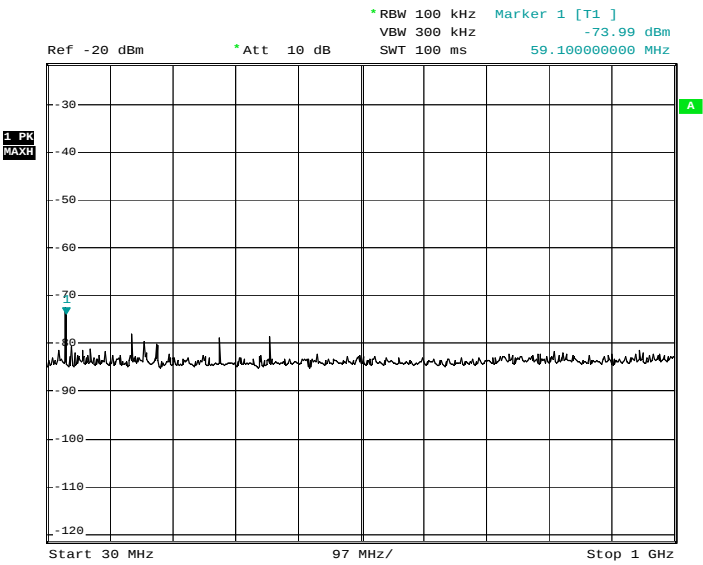
13GHz – 16.3GHz

ANNEX H

TRANSMITTER SPURIOUS EMISSIONS - Radiated

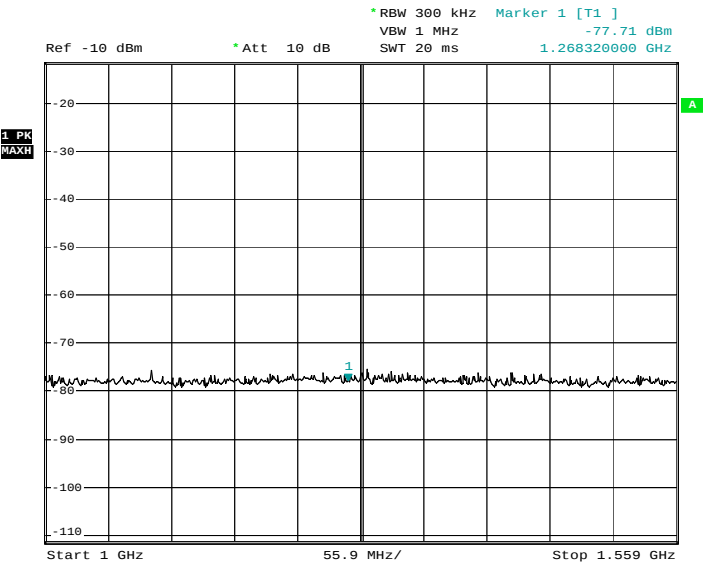
TRANSMITTER SPURIOUS EMISSIONS – Radiated

Channel 1



Date: 24.FEB.2006 14:04:06

30MHz – 1000MHz

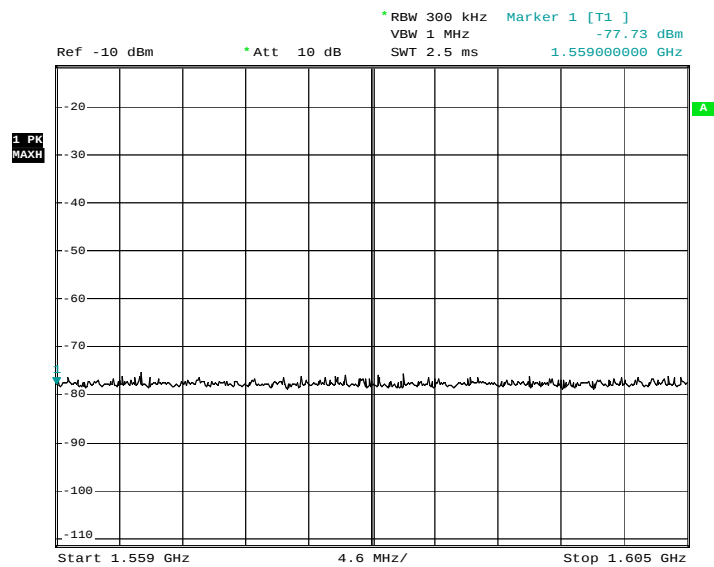


Date: 22.FEB.2006 12:01:55

1000MHz – 1559MHz

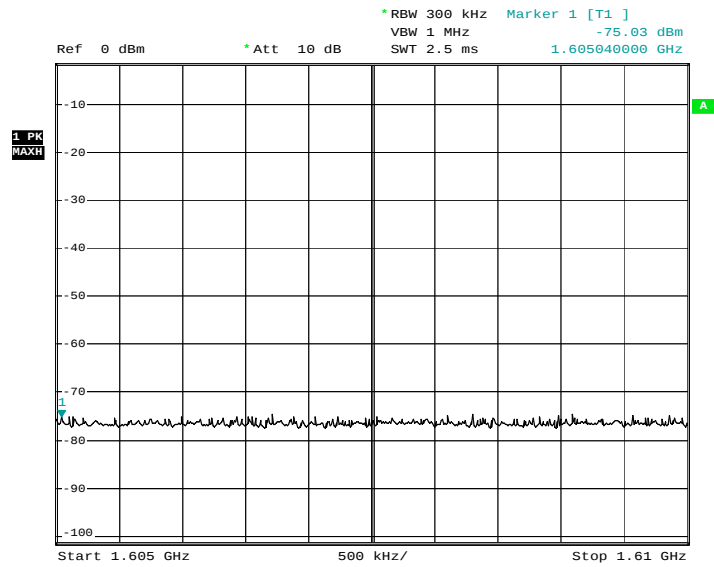
TRANSMITTER SPURIOUS EMISSIONS – Radiated

Channel 1



Date: 22.FEB.2006 12:04:03

1559MHz – 1605MHz

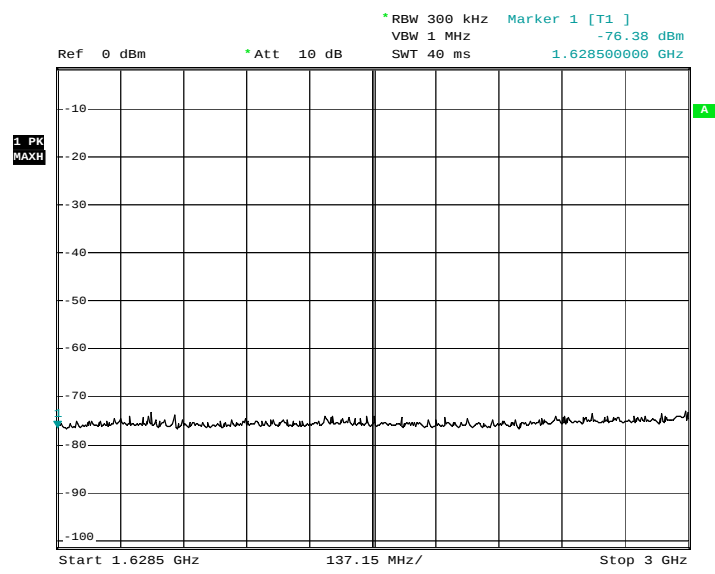


Date: 22.FEB.2006 12:05:52

1605MHz – 1610MHz

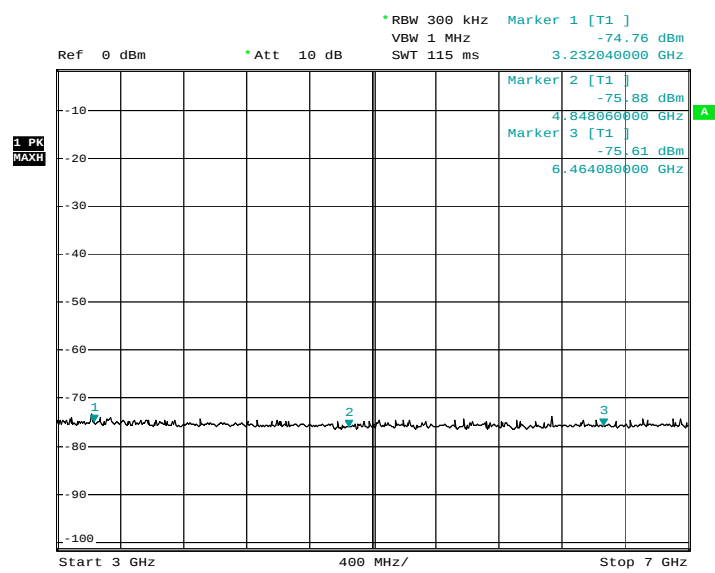
TRANSMITTER SPURIOUS EMISSIONS – Radiated

Channel 1



Date: 22.FEB.2006 12:07:25

1628.5MHz – 3000MHz

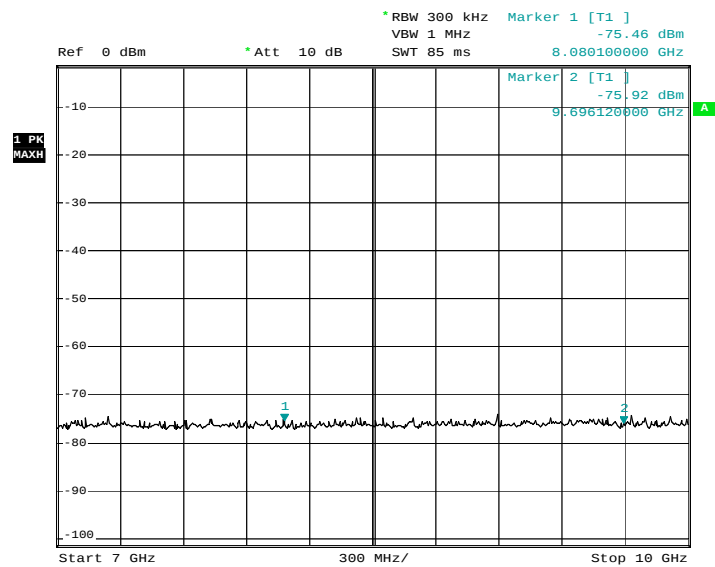


Date: 22.FEB.2006 12:16:41

3GHz – 7GHz

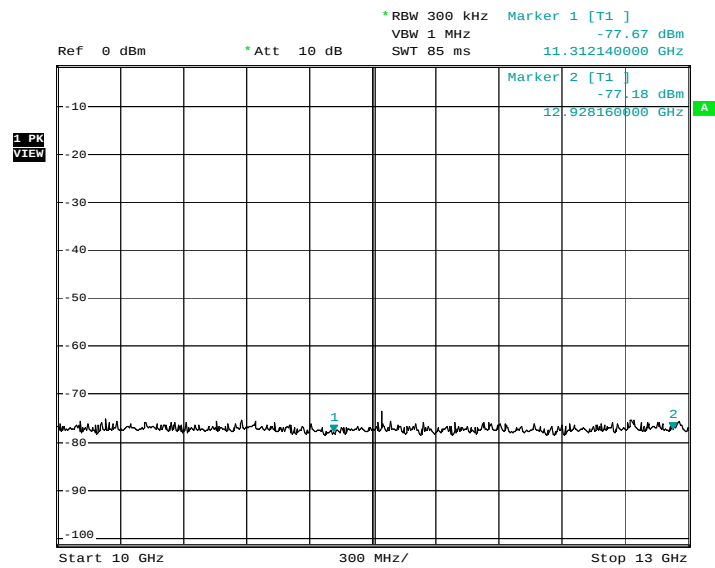
TRANSMITTER SPURIOUS EMISSIONS – Radiated

Channel 1



Date: 22.FEB.2006 12:20:08

7GHz – 10GHz

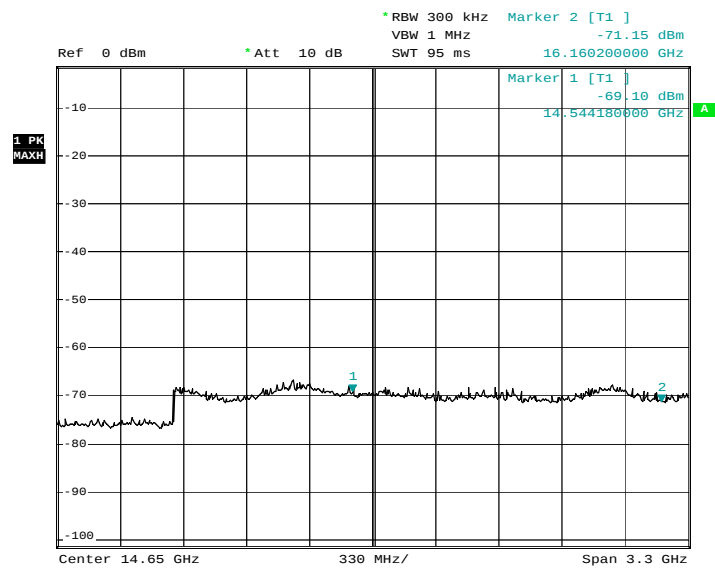


Date: 22.FEB.2006 12:22:09

10GHz – 13GHz

TRANSMITTER SPURIOUS EMISSIONS – Radiated

Channel 1

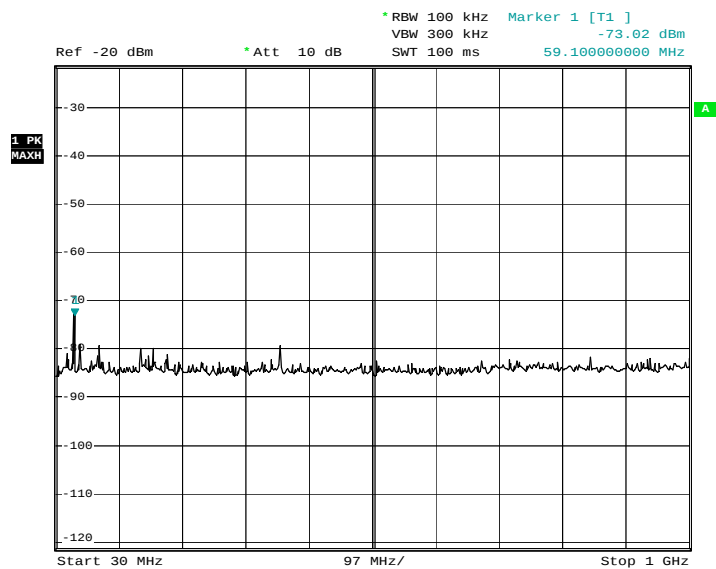


Date: 22.FEB.2006 12:24:24

13GHz – 16.3GHz

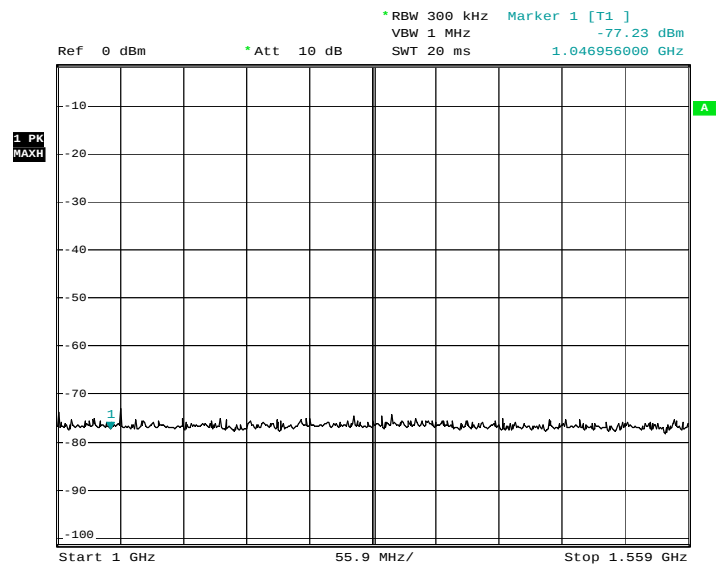
TRANSMITTER SPURIOUS EMISSIONS – Radiated

Channel 240



Date: 24.FEB.2006 14:07:10

30MHz – 1000MHz

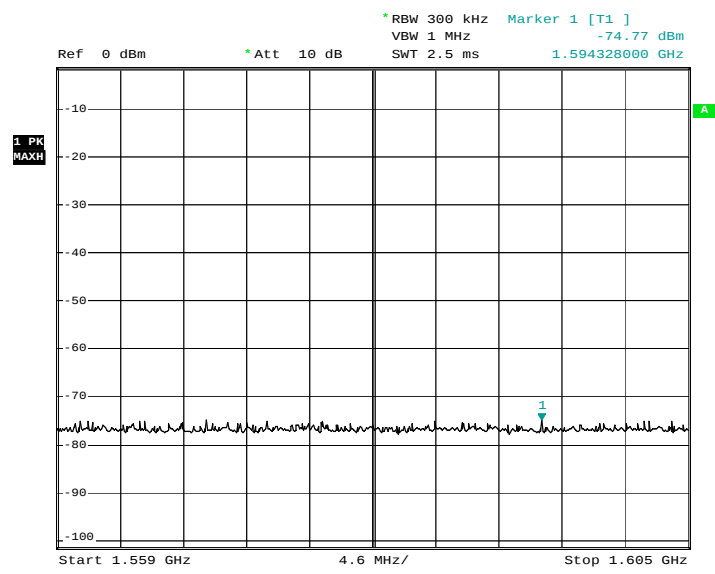


Date: 22.FEB.2006 13:15:29

1000MHz – 1559MHz

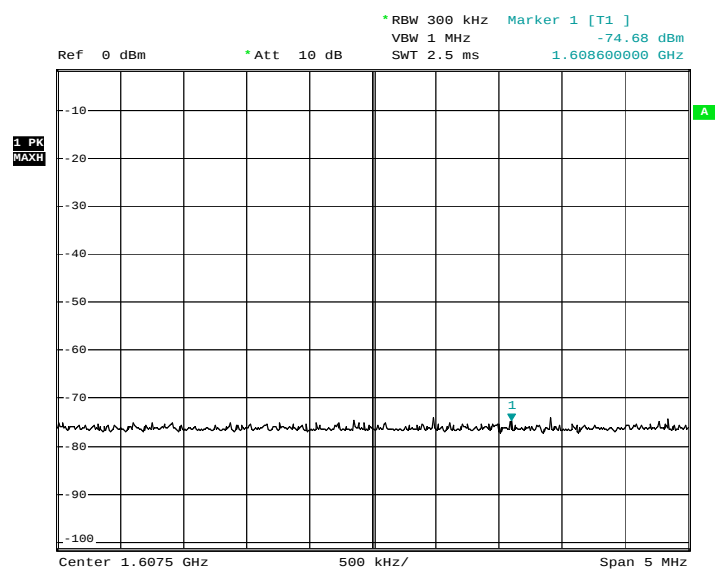
TRANSMITTER SPURIOUS EMISSIONS – Radiated

Channel 240



Date: 22.FEB.2006 13:16:21

1559MHz – 1605MHz

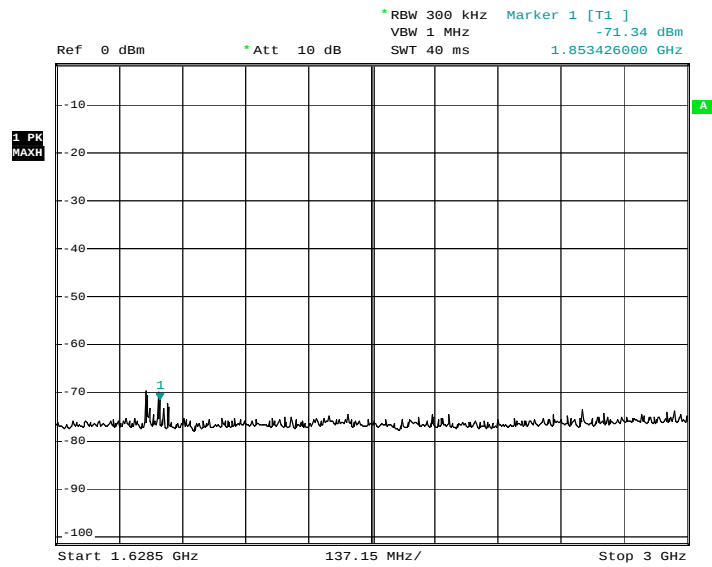


Date: 22.FEB.2006 13:17:48

1605MHz – 1610MHz

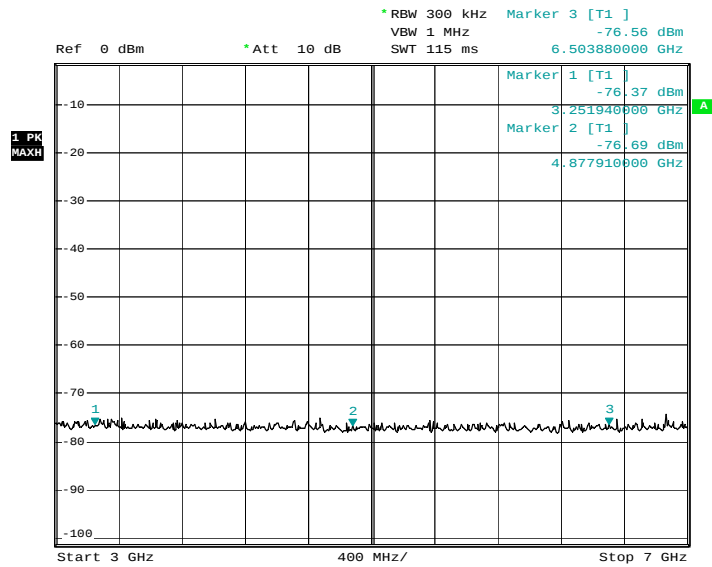
TRANSMITTER SPURIOUS EMISSIONS – Radiated

Channel 240



Date: 22.FEB.2006 13:27:05

1628.5MHz – 3000MHz

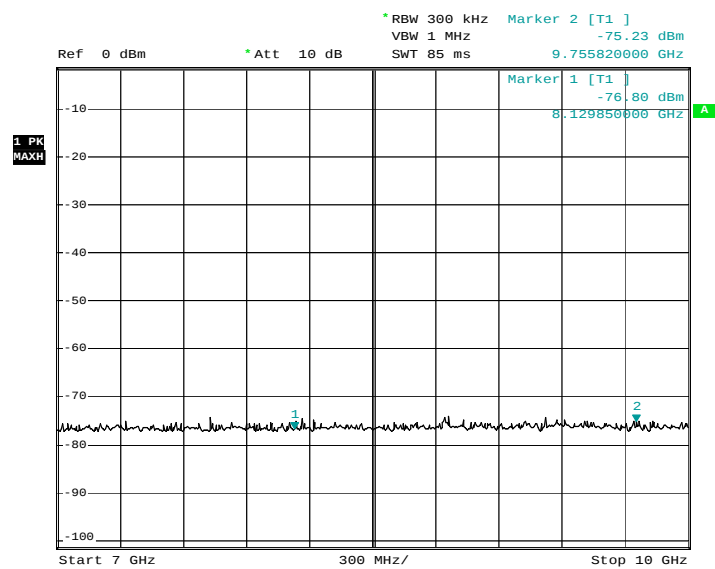


Date: 22.FEB.2006 13:21:11

3GHz – 7GHz

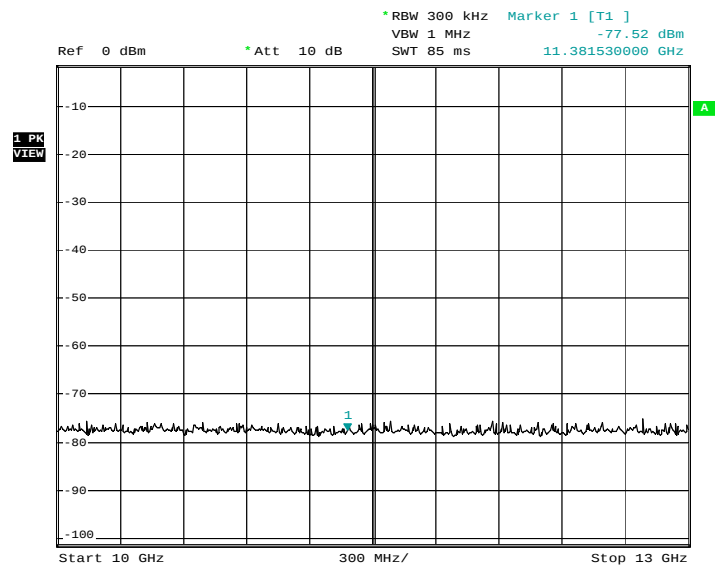
TRANSMITTER SPURIOUS EMISSIONS – Radiated

Channel 240



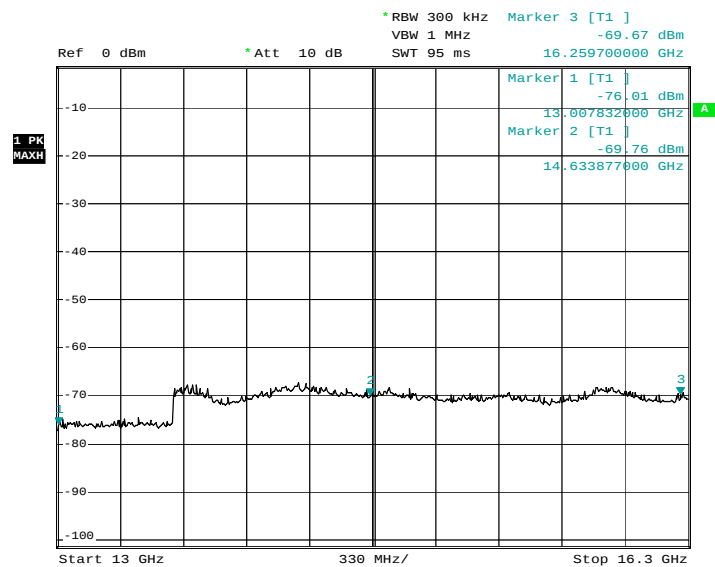
Date: 22.FEB.2006 13:21:52

7GHz – 10GHz



Date: 22.FEB.2006 13:22:36

10GHz – 13GHz

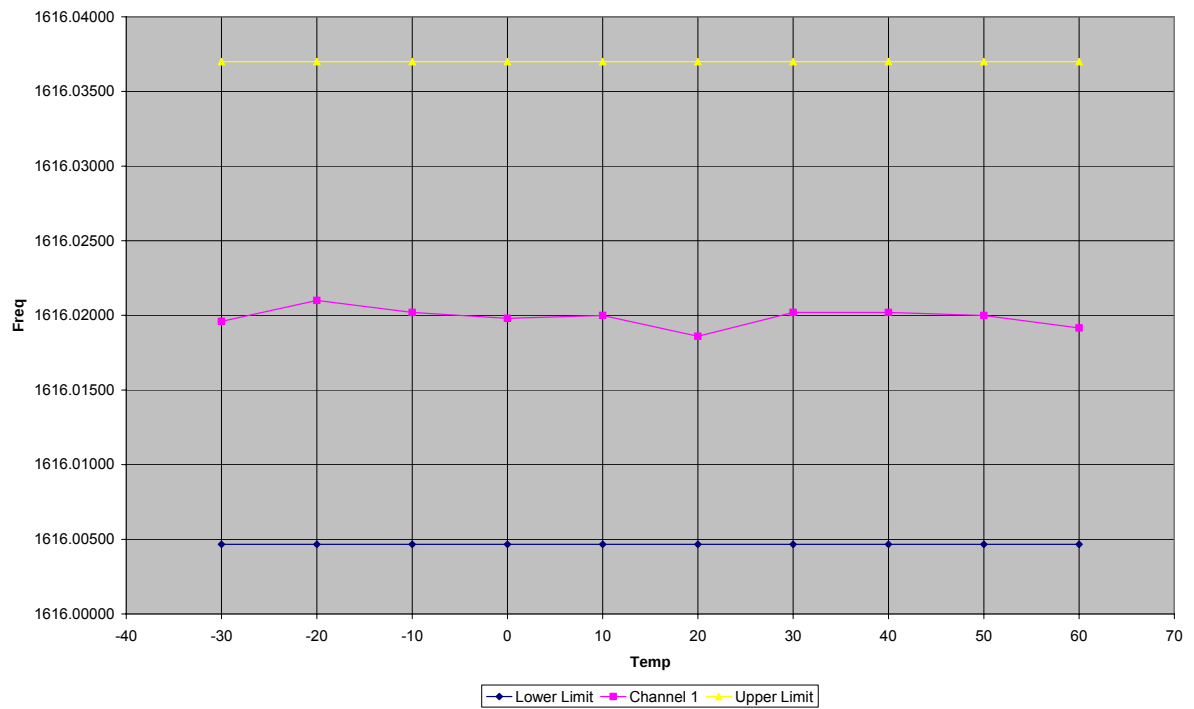


Date: 22.FEB.2006 13:23:37

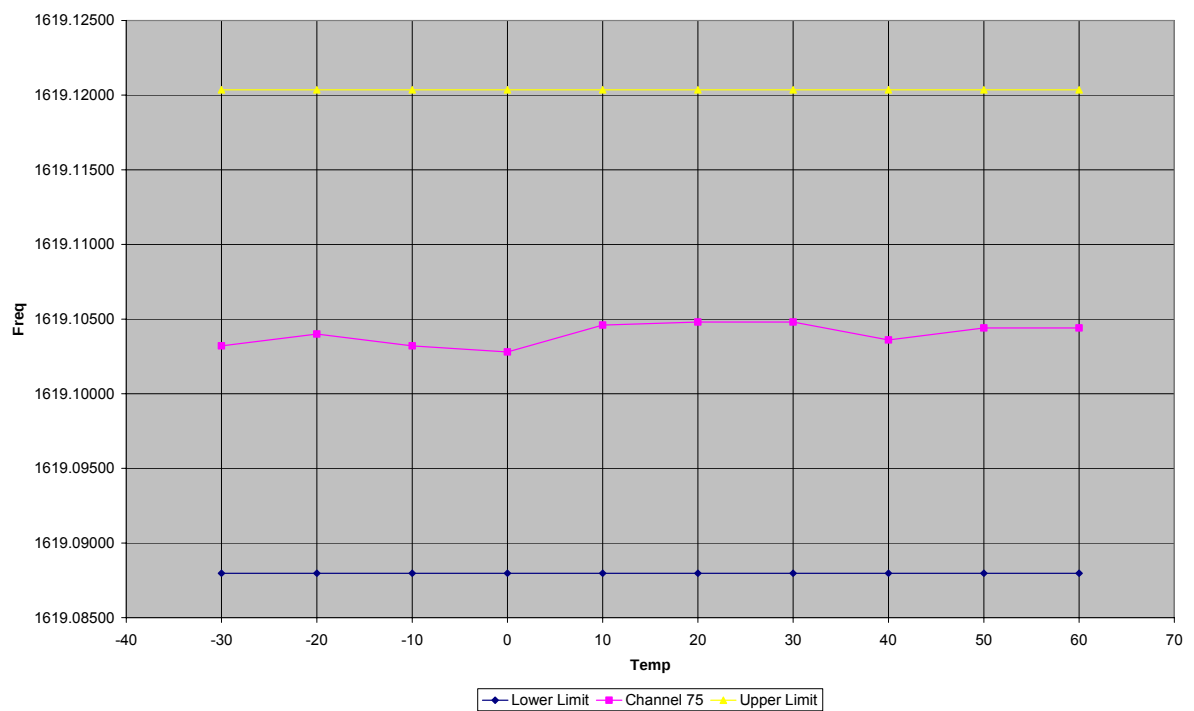
13GHz – 16.3GHz

ANNEX I
FREQUENCY STABILITY - Temperature

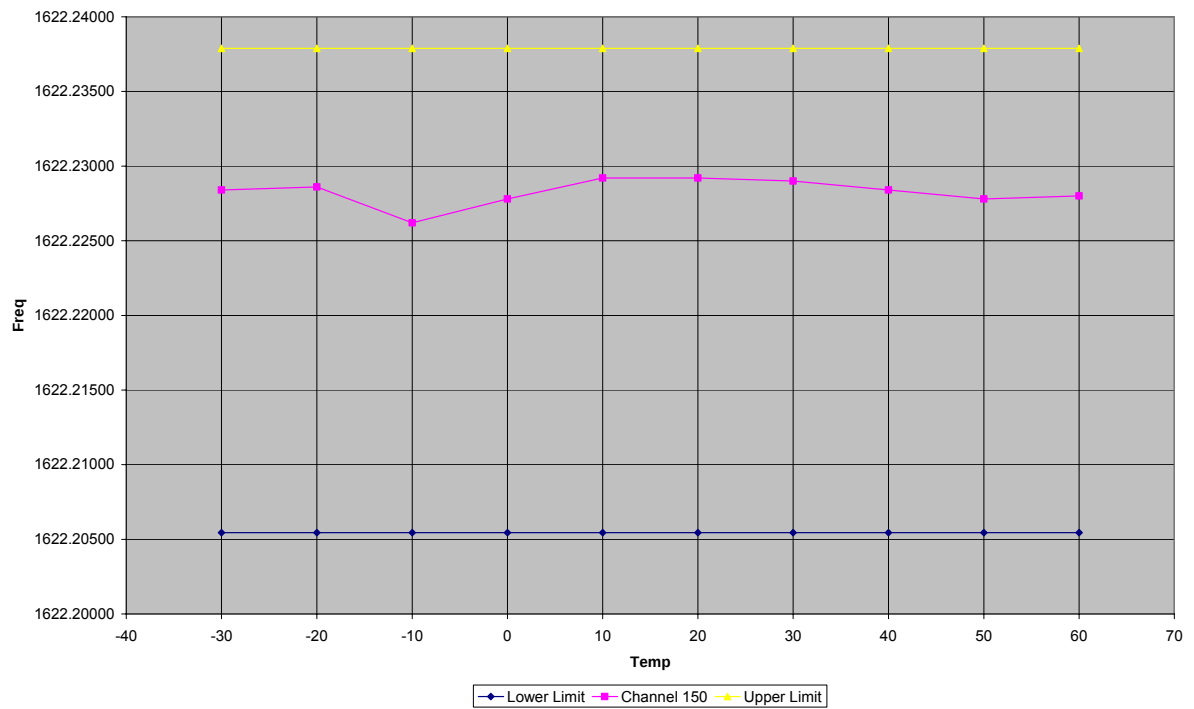
Channel 1 Frequency Stability - Temperature



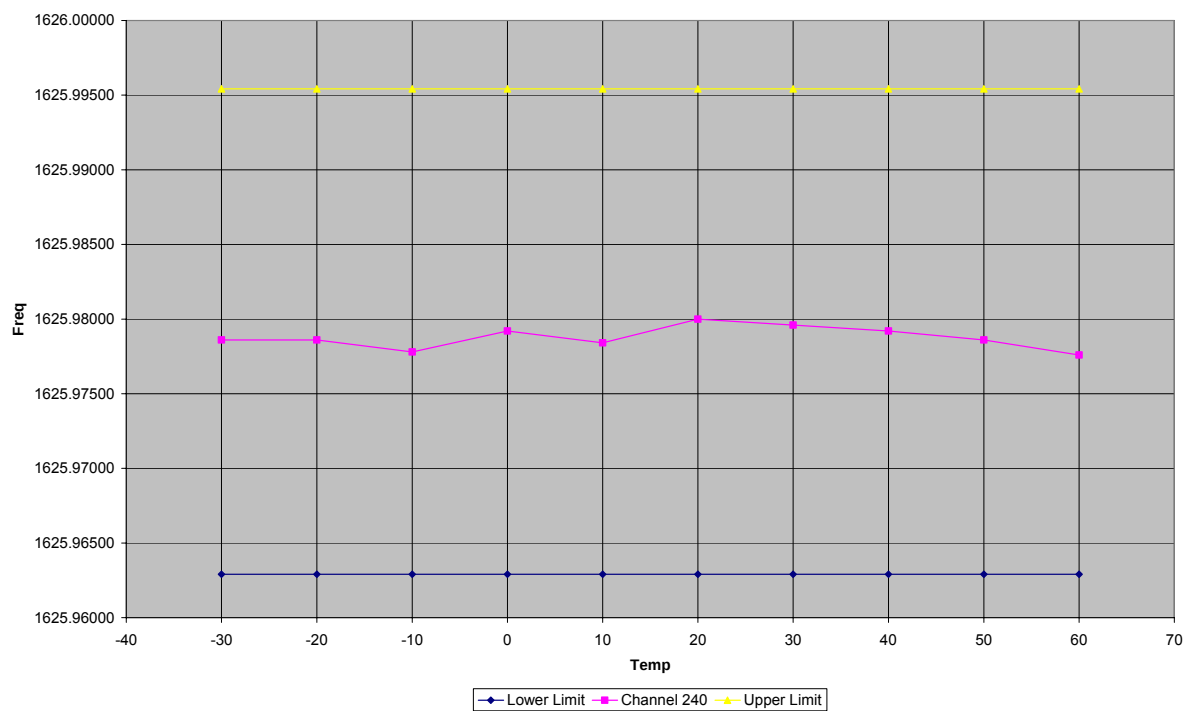
Channel 75 Frequency Stability - Temperature



Channel 150 Frequency Stability - Temperature

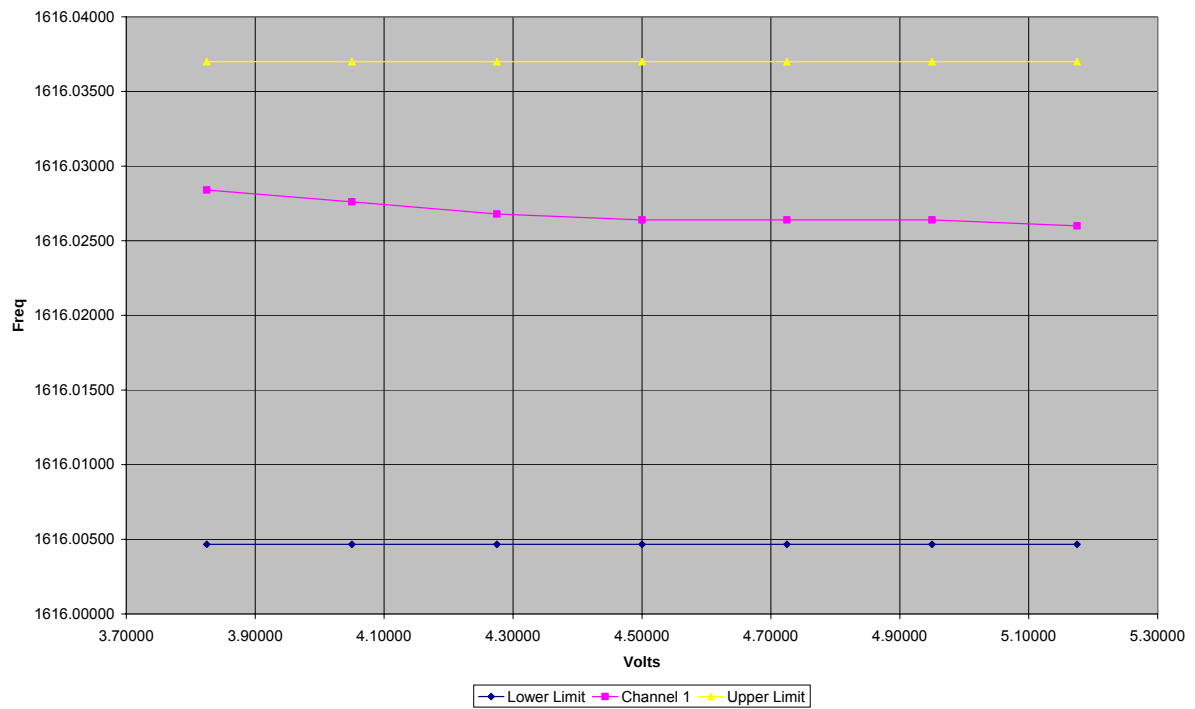


Channel 240 Frequency Stability - Temperature

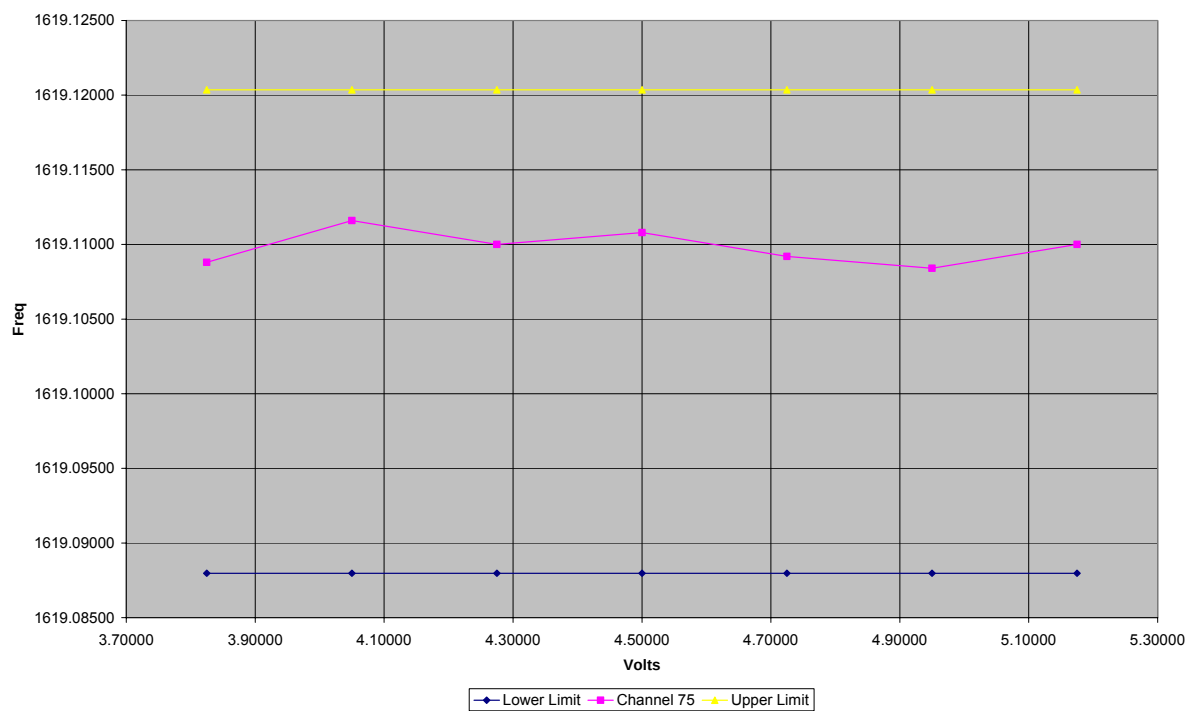


ANNEX J
FREQUENCY STABILITY – Voltage

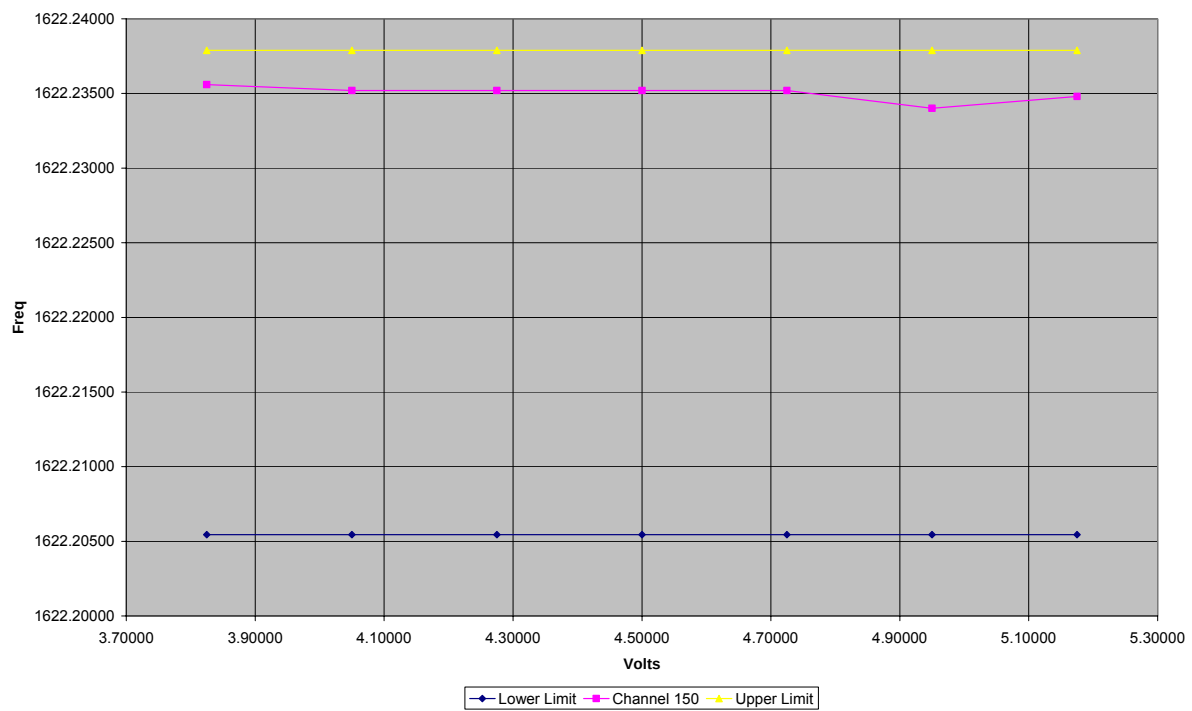
Channel 1 Frequency Stability - Voltage



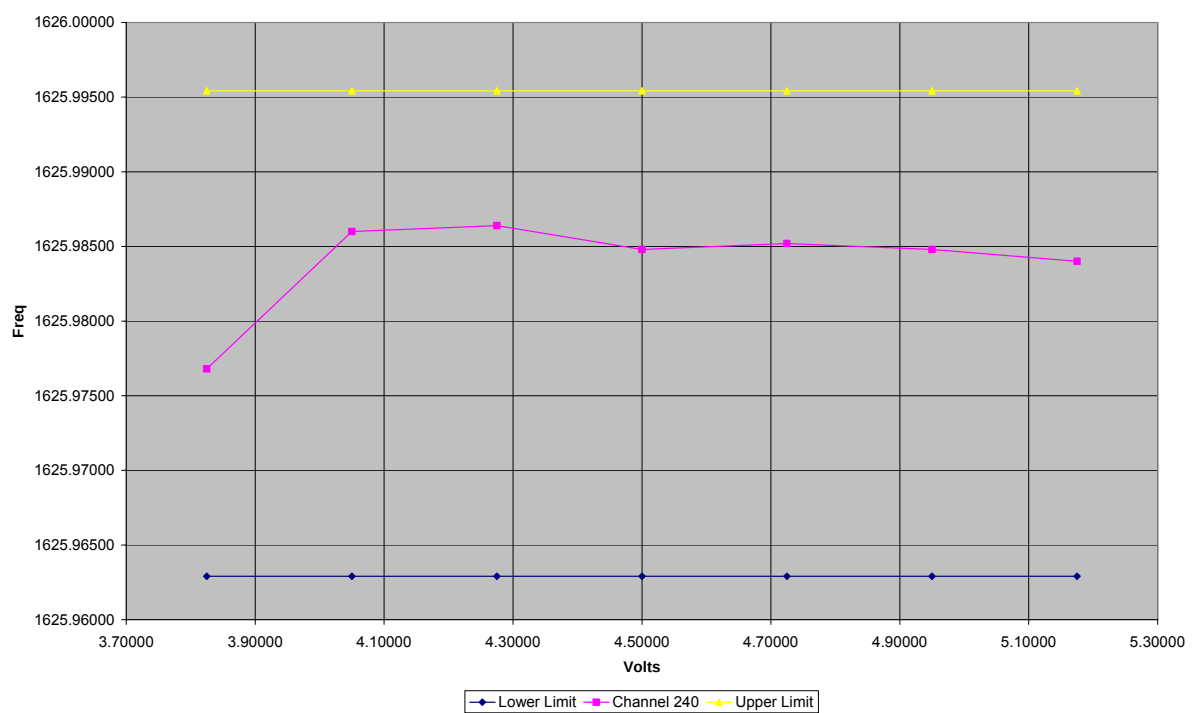
Channel 75 Frequency Stability - Voltage



Channel 150 Frequency Stability - Voltage



Channel 240 Frequency Stability - Voltage



ANNEX K
EQUIPMENT CALIBRATION

TRL Number	Equipment Type	Manufacturer	Last Cal Calibration	Calibration Period	Due For Calibration
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
UH093	Bilog	Schaffner	19/08/2005	24	19/08/2007
UH120	Spectrum Analyser	Marconi	15/03/2005	12	15/03/2006
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
UH177	Power Supply	Manson	Use Calibrated Multimeter		
UH179	Power Sensor	Marconi	14/12/2004	12	14/12/2005
UH191	Bilog	York	16/04/2004	24	16/04/2006
UH226	Bidirectional Coupler	Narda	Calibrate in use		
UH228	Power Sensor	Marconi	03/01/2006	12	03/01/2007
UH253	1m Cable N type	TRL	05/01/2006	12	05/01/2007
UH254	1m Cable N type	TRL	05/01/2006	12	05/01/2007
UH265	Notch filer	Telonic	24/06/2005	12	24/06/2006
L005	CMTA	R&S	05/12/2005	12	05/12/2006
L007	Loop Antenna	R&S	29/03/2005	24	29/03/2007
L011	Temperature Chamber	Shartree	Use Calibrated Temperature Indicator		
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	31/01/2005	12	31/01/2006
L193	Bicone Antenna	Chase	12/10/2003	24	12/10/2005
L203	Log Periodic Ant	Chase	21/10/2003	24	21/10/2005
L221	Attenuator	Bird	Calibrate in use		
L222	Attenuator	Bird	Calibrate in use		
L248	RF Diode	Suhner	Calibrate in use		
L280	18GHz Cable	Rosenberger	05/01/2006	12	05/01/2007
L343	CCIR Noise Filter	TRL	07/06/2005	12	07/06/2006
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	25/04/2005	12	25/04/2006
N/A	Analyser	R&S			
N/A	30dB Pad	Narda	Calibrate in use		
N/A	30dB Pad	JFW	Calibrate in use		
N/A	Mambo Box	CCL	Not applicable		
N/A	High Pass Filter	AFL	Calibrate in use		
N/A	Power Supply	Thurlby Thandar	Use Calibrated Multimeter		

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**