



**REPORT ON THE CERTIFICATION TESTING OF A
AXELL WIRELESS
DUAL BAND REPEATER
MBF-T-7-8-19
WITH RESPECT TO
THE FCC RULES CFR 47, PART 27
PRIVATE LAND MOBILE REPEATER.**

TEST REPORT NO: TTR-004391WUS1

COPY NO: 1

ISSUE NO: 1

FCC ID: NEOA216SERIES

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AXELL WIRELESS
DUAL BAND REPEATER
MBF-T-7-8-19
WITH RESPECT TO
THE FCC RULES CFR 47, PART 27
PRIVATE LAND MOBILE REPEATER.**

TEST DATE: 23rd – 25th February 2011



APPROVED BY: _____

J CHARTERS
RADIO PRODUCT
MANAGER

DATE: 18th May 2010

Distribution:

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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: NEOA216SERIES

PURPOSE OF TEST: Class II Permissive Change

TEST SPECIFICATION: FCC RULES CFR 47, Part 27

TEST RESULT: Compliant to Specification

EQUIPMENT UNDER TEST: MBF-T-7-8-19

EQUIPMENT TYPE: Private Land Mobile Repeater

MAXIMUM GAIN:

600MHz Band Uplink	38.14 dB
700MHz Band Uplink	30.56 dB
700MHz Band Downlink	30.77 dB

MAXIMUM INPUT:

600MHz Band Uplink	-68.55 dBm
700MHz Band Uplink	-61.42 dBm
700MHz Band Downlink	+6.78 dBm

MAXIMUM OUTPUT CONDUCTED:

600MHz Band Uplink	-30.41 dBm
700MHz Band Uplink	-30.86 dBm
700MHz Band Downlink	+37.64 dBm

MAXIMUM NUMBER OF CHANNELS: Not Applicable

CHANNEL BANDWIDTH: Not Applicable, Wideband

POWER SOURCE(s): +110Vac

TEST DATE(s): 23rd – 25th February 2011

APPLICANT: Axell Wireless

ADDRESS: Aerial House
Asheridge Road
Chesham
Buckinghamshire
HP5 1TU

APPROVED BY:



J CHARTERS
RADIO
PRODUCT
MANAGER

APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT):	MBF-T-7-8-19		
EQUIPMENT TYPE:	Private Land Mobile Repeater		
PURPOSE OF TEST:	Class II Permissive Change		
TEST SPECIFICATION(s):	FCC RULES CFR 47, Part 27		
TEST RESULT:	COMPLIANT	Yes No	[X] []
APPLICANT'S CATEGORY:	MANUFACTURER IMPORTER DISTRIBUTOR TEST HOUSE AGENT	[X] [] [] [] []	
APPLICANT'S CONTACT PERSON(s):	Mr J Divall		
E-mail address:	Jon.divall@axellwireless.com		
APPLICANT:	Axell Wireless		
ADDRESS:	Aerial House Asheridge Road Chesham Buckinghamshire HP5 1TU United Kingdom		
TEL:	+44 (0)1494 777000		
FAX:	+44 (0)1494 778456		
MANUFACTURER:	Axell Wireless		
EUT(s) COUNTRY OF ORIGIN:	United Kingdom		
TEST LABORATORY:	TRaC Telecoms & Radio, Skelmersdale		
UKAS ACCREDITATION No:	0971		
TEST DATE(s):	23 rd – 25 th February 2011		
TEST REPORT No:	TTR-004391WUS1		

EQUIPMENT TEST / EXAMINATIONS REQUIRED

1.	TEST/EXAMINATION	RULE PART	APPLICABILITY	RESULT
	RF Power Output	27.50	Yes	Complies
	Audio Frequency Response	TIA EIA-603.3.2.6	N/A	N/A
	Audio Low-Pass Filter Response	TIA EIA-603.3.2.6	N/A	N/A
	Modulation Limiting	TIA EIA-603.3.2.6	N/A	N/A
	Occupied Bandwidth	27.53	Yes	Complies
	Spurious Emissions at Antenna Terminals	27.53	Yes	Complies
	Field Strength of Spurious Emissions	27.53	Yes	Complies
	Frequency Stability	27.54	N/A(note 1)	N/A
	Transient behaviour	N/A	N/A(note 2)	N/A

Notes:

1 The EUT does not contain modulation circuitry; therefore the test was not performed.

2 The EUT is not a keyed carrier system; therefore the test was not performed.

- | | | | | |
|----|-------------------------|------------------------------|-------------|-------------|
| 2. | Product class: | Uplink | Class A [] | Class B [X] |
| | | Downlink | Class A [] | Class B [X] |
| 3. | Product Use: | Private Land Mobile Repeater | | |
| 4. | Emission Designator(s): | F3E, F9W, GXW, G7W, DXW, F1D | | |
| 5. | Temperatures: | Ambient (Tnom) | 20°C | |
| 6. | Supply Voltages: | Vnom | +110Vac | |

Note: Vnom voltages are as stated above unless otherwise shown on the test report page

- | | | | | |
|----|---------------------|---|------------|--|
| 7. | Equipment Category: | Single channel | [X] | |
| | | Two channel | [] | |
| | | Multi-channel | [] | |
| 8. | Channel Bandwidth: | Narrowband | [] | |
| | | Wideband | [X] | |
| 9. | Test Location | TRaC Telecoms & Radio
Skelmersdale
Hull | [X]
[] | |

- | | | |
|-----|--|----------------------------------|
| 10. | Modifications made during test program | No modifications were performed. |
|-----|--|----------------------------------|

System description:

The MBF-T-7-8-19 is bi directional repeater covering four bands in the uplink direction and three bands in the downlink direction. This report covers the uplink bands covering the frequency ranges 698 MHz – 716 MHz, 776 MHz – 787MHz. The downlink bands are wideband and cover the frequency ranges 728 MHz – 757 MHz.

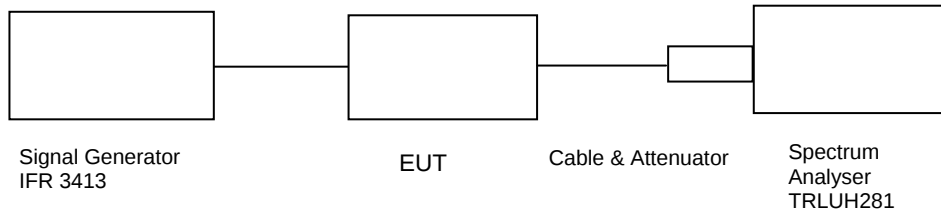
The MBF-T-7-8-19 also contains uplink bands covering the frequency ranges 824 MHz – 849MHz and 1850MHz – 1910MHz and downlink bands covering the frequency ranges 869 MHz – 894MHz and 1930MHz – 1990MHz. The results for these bands can be found in TRaC Telecoms & Radio test report TTR-001973WUS1.

COMPLIANCE TESTS

AMPLIFIER GAIN – CONDUCTED – PART 2.1046 – UPLINK

Ambient temperature = 20°C
 Relative humidity = 58%
 Supply voltage = +110Vac
 Channel number = See test results

Radio Laboratory



600 MHz Band

Frequency MHz	Signal Generator input level dBm	Input Cable Loss dB	Level at Spectrum Analyser dBm	Output Cable & Attenuator loss dB	Gain dB	Conducted Output Power dBm	Gain after 10dB input level increase dB
698.000	-66.70	0.23	-30.41	0.3	36.84	-30.09	26.97
707.000	-68.30	0.25	-30.72	0.3	38.14	-30.41	28.25
716.000	-67.80	0.26	-31.05	0.3	37.28	-30.78	27.44

Notes: 1. The signal generator input was increased by 10dBs and the level of the output signal remeasured.

700 MHz Band

Frequency MHz	Signal Generator input level dBm	Input Cable Loss dB	Level at Spectrum Analyser dBm	Output Cable & Attenuator loss dB	Gain dB	Conducted Output Power dBm	Gain after 10dB input level increase dB
776.000	-60.20	0.23	-30.94	0.3	29.74	-30.69	19.86
742.500	-61.20	0.22	-31.06	0.2	30.56	-30.86	20.68
787.000	-62.80	0.22	-31.21	0.2	31.99	-31.03	22.10

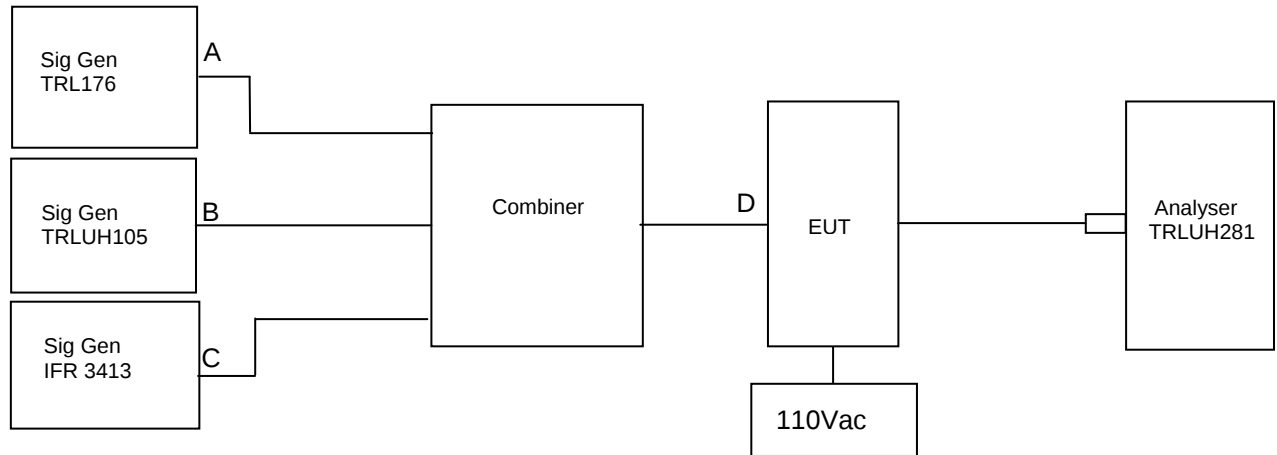
Notes: 1. The signal generator input was increased by 10dBs and the level of the output signal remeasured.

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	REF No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	X
SIGNAL GENERATOR	IFR	3413	341001/261	N/A	X
ATTENUATOR	AXELL	N/A	N/A	N/A	X
ATTENUATOR	SPINNER	745357	D37224	UH225	X
CABLE	TRaC	N/A	N/A	UH273	X
CABLE	TRaC	N/A	N/A	UH274	X

AMPLIFIER INTERMODULATION SPURIOUS EMISSIONS – CONDUCTED – PART 2.1053– UPLINK

Ambient temperature = 24°C
 Relative humidity = 56%
 Supply voltage = +110Vac

Radio Laboratory



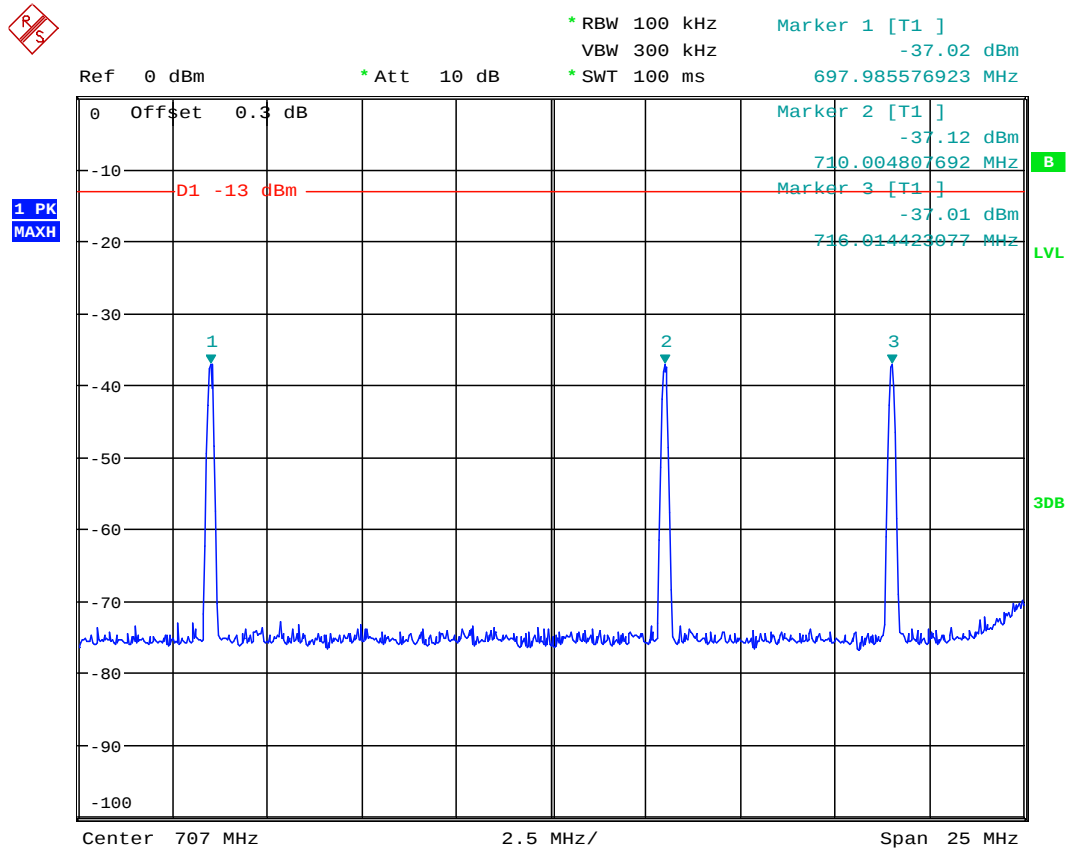
The intermodulation and spurious products were measured with the amplifier operating at maximum gain. A three tone test was conducted using the equipment as above. The input power level was adjusted so the level at point D was 10dB above the maximum input.

Uplink Band	RF Input Frequency (MHz)			Highest Intermodulation Product Level (dBm)	Limit (dBm)
600 MHz	698.0	710.0	716.0	No Significant Emissions Within 20 dB of Limit	-13
700 MHz	776.0	779.6	787.0	No Significant Emissions Within 20 dB of Limit	-13
Cross Band					
707	781.5	836.5	1880.5	No Significant Emissions Within 20 dB of Limit	-13

Test equipment used for intermodulation test

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	REF No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	R&S	FSU46	200034	UH281	X
SIGNAL GENERATOR	MARCONI	2042	119388/080	176	X
SIGNAL GENERATOR	IFR	3413	341001/261	N/A	X
SIGNAL GENERATOR	MARCONI	2023	112224/040	UH105	X
COMBINER	AXELL	N/A	N/A	N/A	X
ATTENUATOR	AXELL	N/A	N/A	N/A	X
ATTENUATOR	SPINNER	745357	D37224	UH225	X
CABLE	TRaC	N/A	N/A	UH253	X
CABLE	TRaC	N/A	N/A	UH254	X
CABLE	TRaC	N/A	N/A	UH269	X
CABLE	TRaC	N/A	N/A	UH273	X
CABLE	TRaC	N/A	N/A	UH274	X

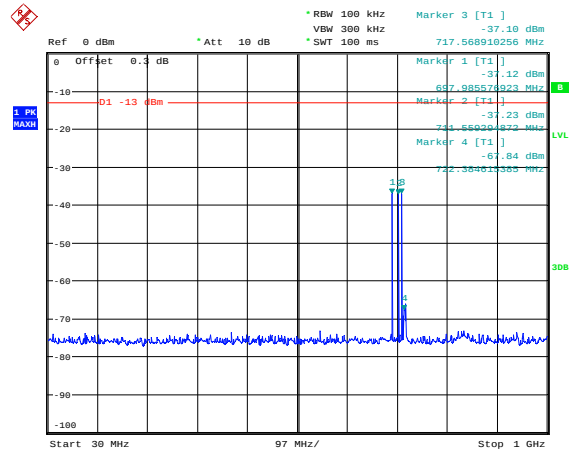
Intermodulation Inband – 600MHz Band



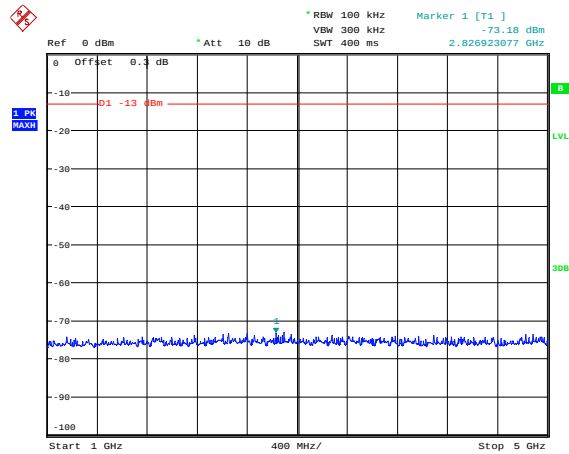
Date: 24.FEB.2011 14:12:02

The above plot shows that no products fall within 20 dB of the spurious limit.

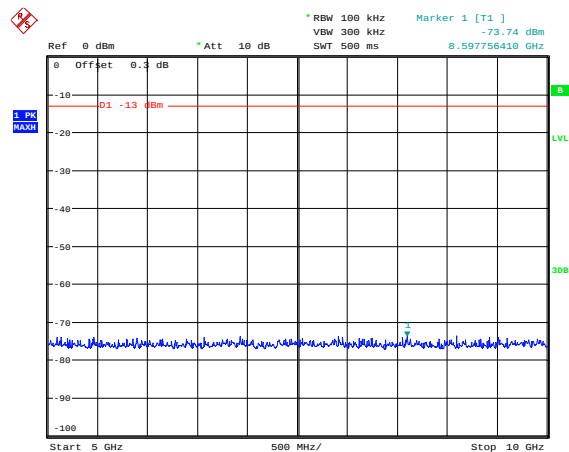
Intermodulation Wideband – 600MHz Band



Date: 24.FEB.2011 14:12:33



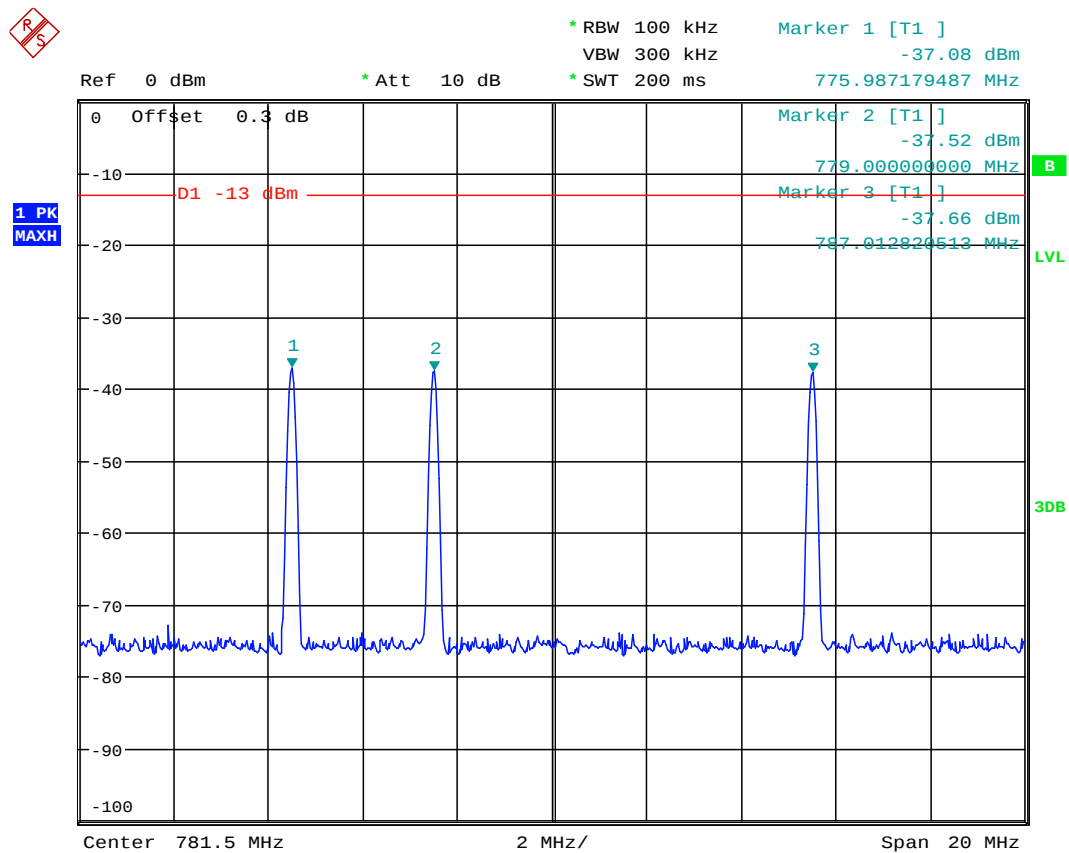
Date: 24.FEB.2011 14:12:51



Date: 24.FEB.2011 14:13:02

The above plot shows that there are no products outside the bands.

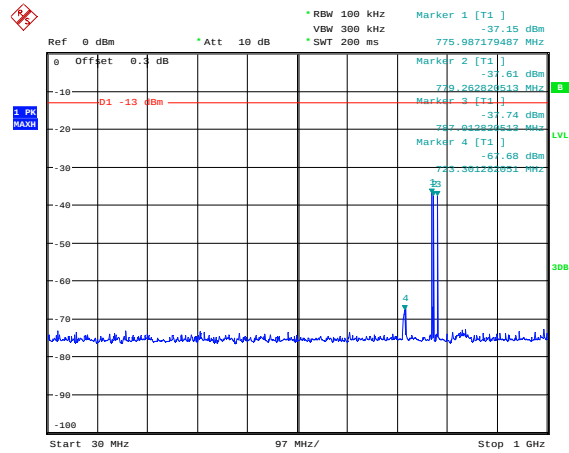
Intermodulation Inband – 700MHz Band



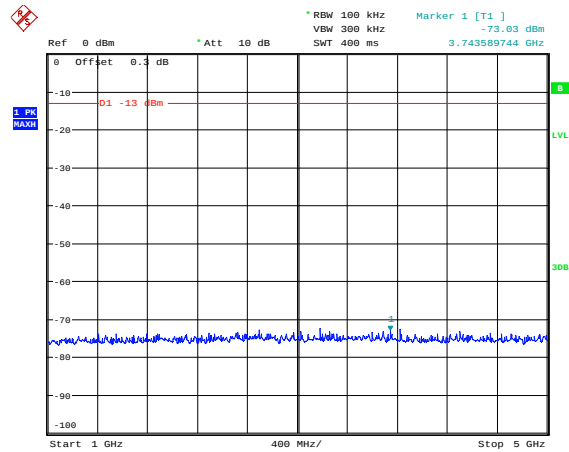
Date: 24.FEB.2011 14:17:23

The above plot shows that no products fall within 20 dB of the spurious limit.

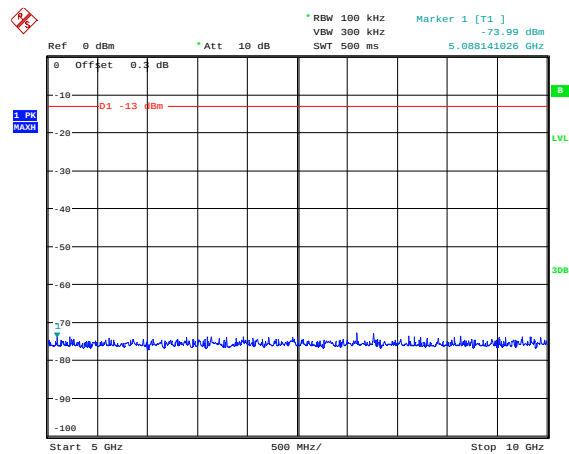
Intermodulation Wideband – 700MHz Band



Date: 24.FEB.2011 14:18:01



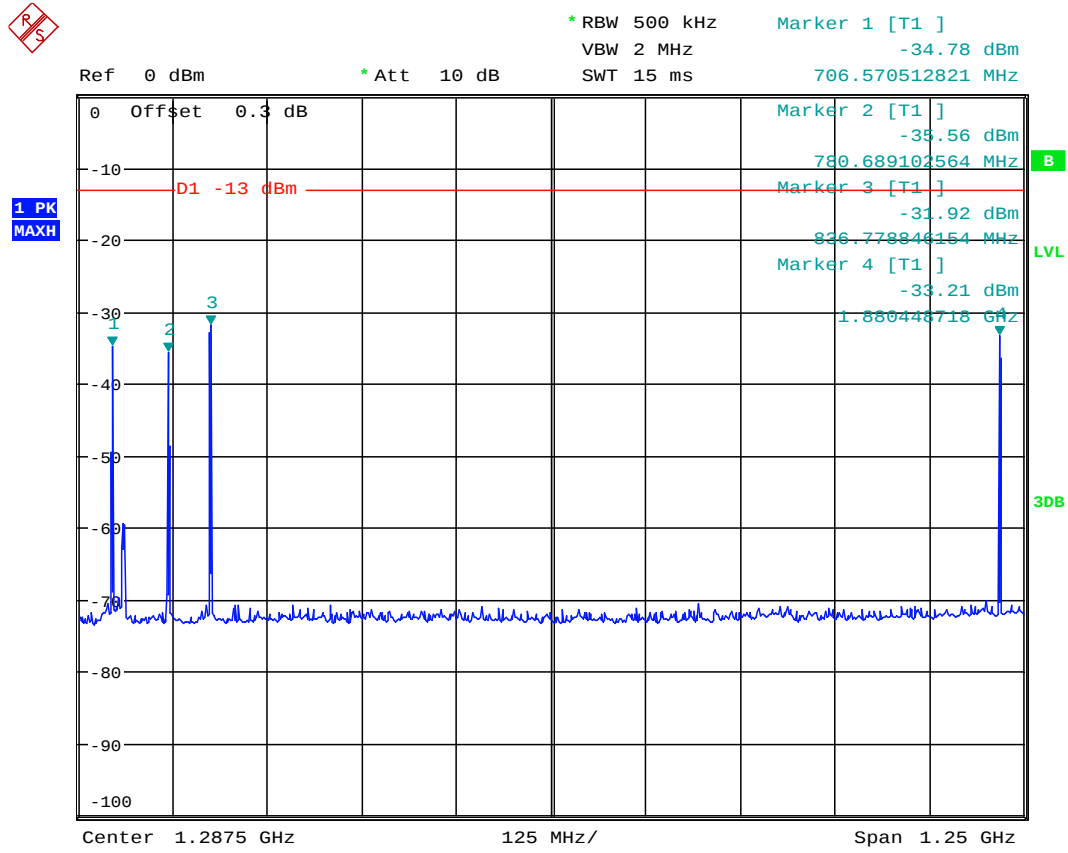
Date: 24.FEB.2011 14:18:33



Date: 24.FEB.2011 14:18:49

The above plot shows that there are no products outside the bands.

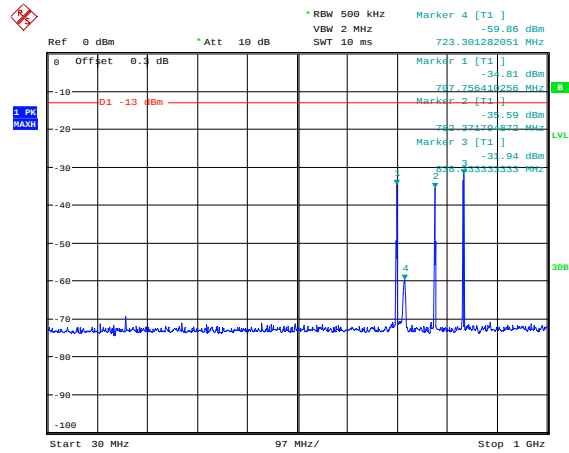
Intermodulation Inband – Cross Band



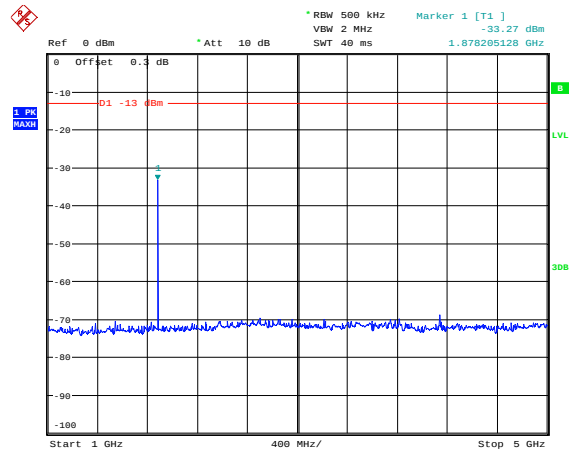
Date: 24.FEB.2011 14:26:25

The above plot shows that no products fall within 20 dB of the spurious limit.

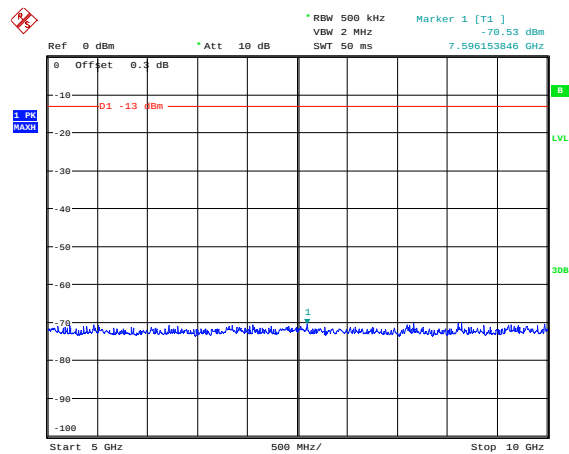
Intermodulation Wideband – Cross Band



Date: 24.FEB.2011 14:27:06



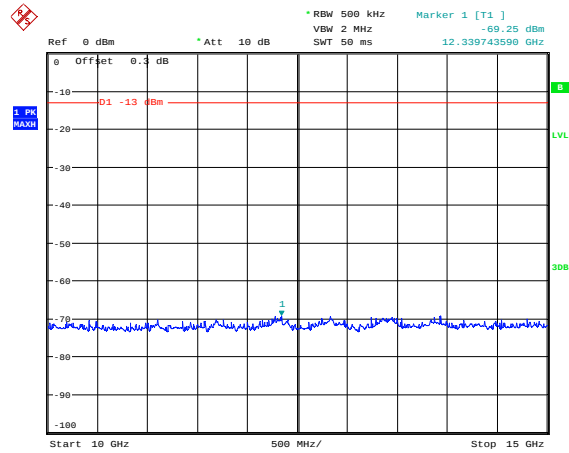
Date: 24.FEB.2011 14:27:39



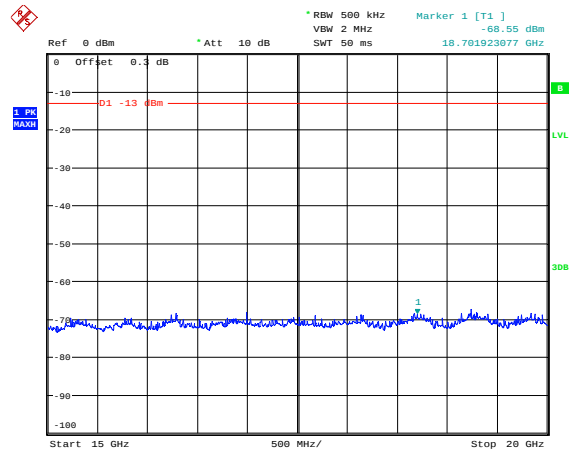
Date: 24.FEB.2011 14:27:50

The above plot shows that there are no products outside the bands.

Intermodulation Wideband – Cross Band



Date: 24.FEB.2011 14:28:03



Date: 24.FEB.2011 14:28:16

The above plot shows that there are no products outside the bands.

TRANSMITTER TESTS

AMPLIFIER MODULATED CHANNEL TEST – CONDUCTED – Part 2.1049– UPLINK

Ambient temperature = 24°C
 Relative humidity = 56%
 Supply voltage = +110Vac
 Channel number = See test results

Radio Laboratory



This test was performed to show that the amplifier does not alter the input signal in any way. The input signal was set to the maximum input. The following modulation schemes were produced, a 2500Hz FM tone with 2.5 and 5 kHz deviation, 10MHz wide LTE in the 600MHz and 700 MHz bands.

The plots show the signal measured at the signal generator and the signal measured at the output of the EUT.

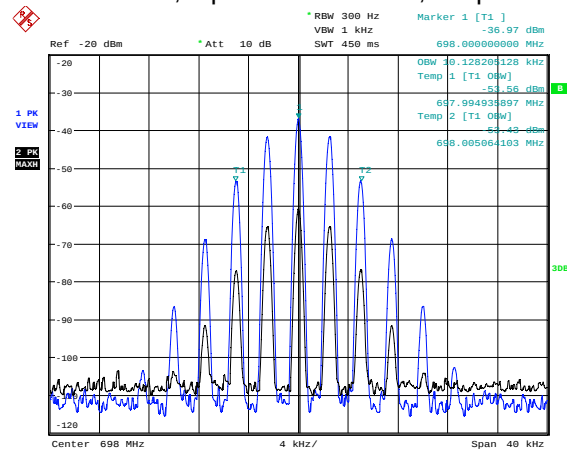
Note: The cables and attenuators had the following losses.

1. Cable and attenuator between EUT and spectrum analyser 0.3dB
2. Cable between signal generator and EUT 0.3dB

Modulation Type	Frequency Of Operational					
	698.000	707.000	716.000	776.000	742.500	787.000
2.5 kHz FM	10.128 kHz	10.128 kHz	10.128 kHz	10.128 kHz	10.128 kHz	10.128 kHz
5 kHz FM	15.256 kHz	15.256 kHz	15.256 kHz	15.256 kHz	15.256 kHz	15.256 kHz
LTE	8.942 MHz	8.958 MHz	8.942 MHz	8.958 MHz	8.942 MHz	8.942 MHz

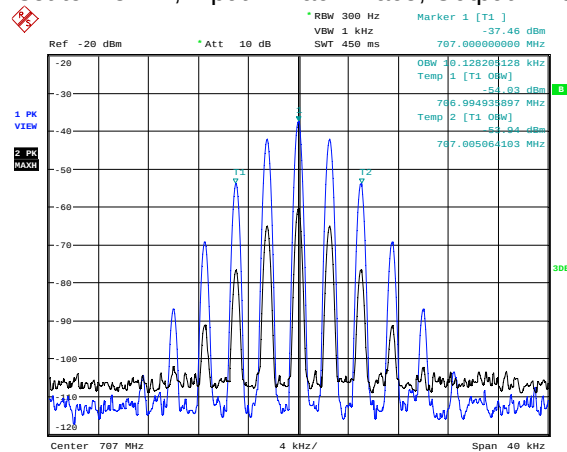
TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	REF No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	X
SIGNAL GENERATOR	IFR	3413	341001/261	N/A	X
ATTENUATOR	BIRD	8308-200	N/A	103	X
ATTENUATOR	BIRD	830-100-N	N/A	222	X
CABLE	TRaC	N/A	N/A	UH273	X
CABLE	TRaC	N/A	N/A	UH274	X

698.0MHz FM deviation set to 2.5kHz, Input – Black Trace, Output - Blue Trace



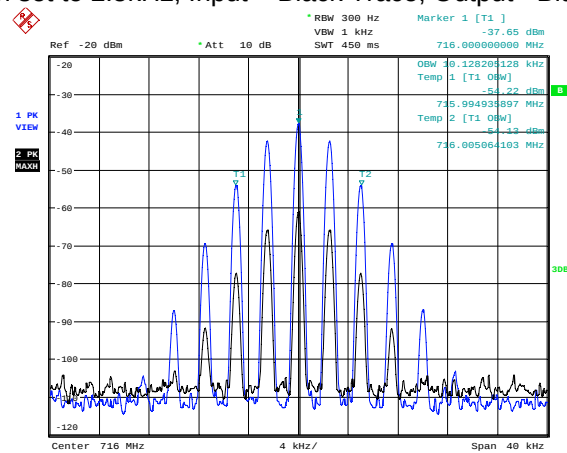
Date: 24.FEB.2011 09:19:21

707.0MHz FM deviation set to 2.5kHz, Input – Black Trace, Output - Blue Trace



Date: 24.FEB.2011 09:17:29

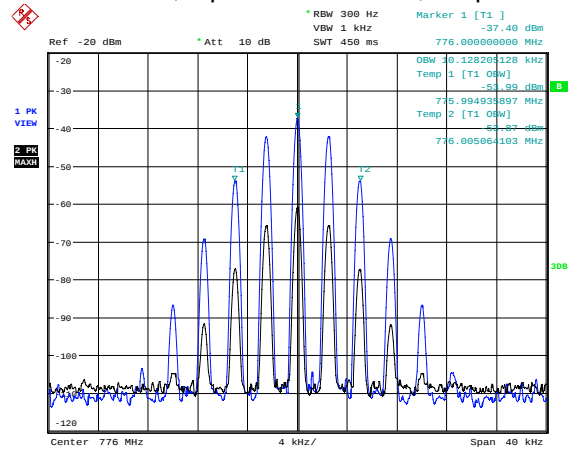
716.0MHz FM deviation set to 2.5kHz, Input – Black Trace, Output - Blue Trace



Date: 24.FEB.2011 09:16:53

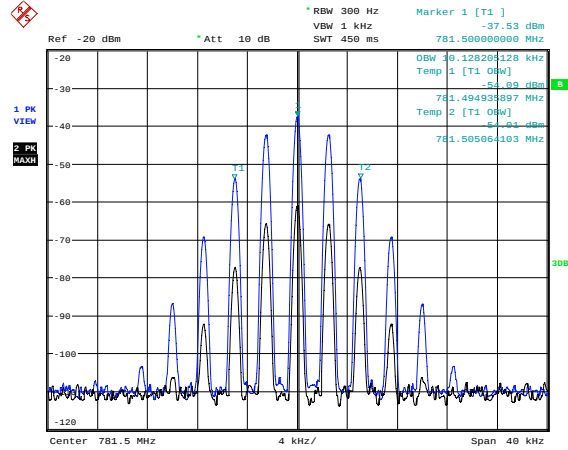
The above plots show no significant distortion visible when compared to the input signal.

776.0MHz FM deviation set to 2.5kHz, Input – Black Trace, Output - Blue Trace



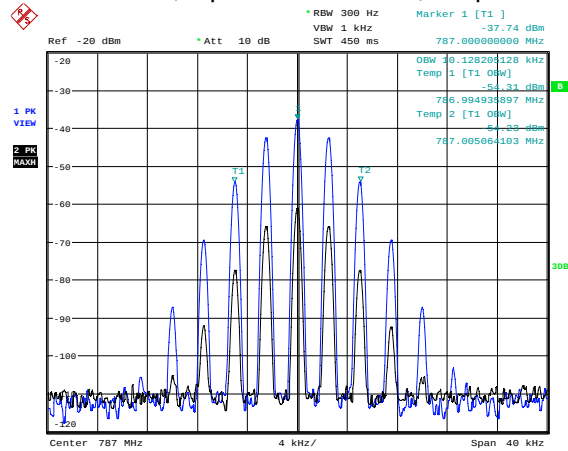
Date: 24.FEB.2011 09:21:28

742.5MHz FM deviation set to 2.5kHz, Input – Black Trace, Output - Blue Trace



Date: 24.FEB.2011 09:22:56

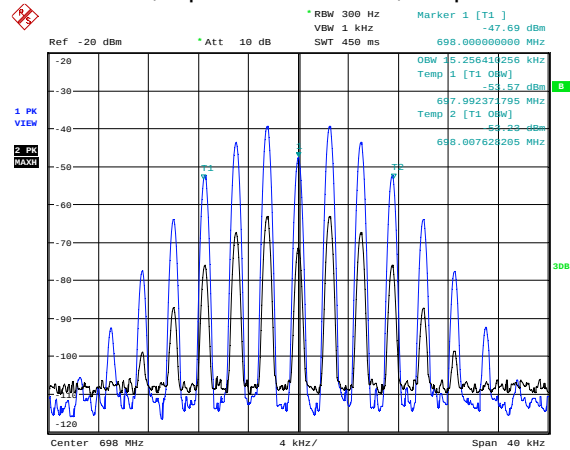
787.0MHz FM deviation set to 2.5kHz, Input – Black Trace, Output - Blue Trace



Date: 24.FEB.2011 09:23:27

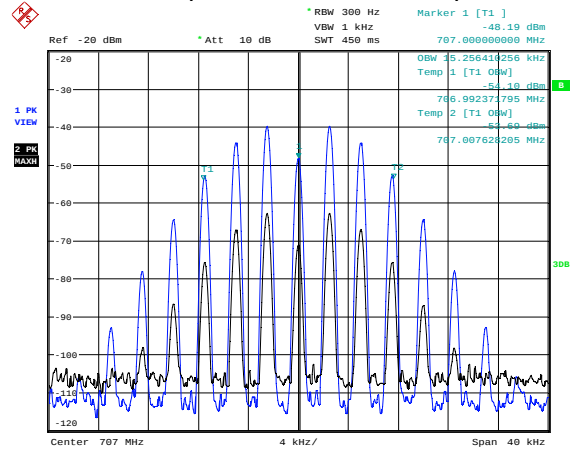
The above plots show no significant distortion visible when compared to the input signal.

698.0MHz FM deviation set to 5kHz, Input – Black Trace, Output - Blue Trace



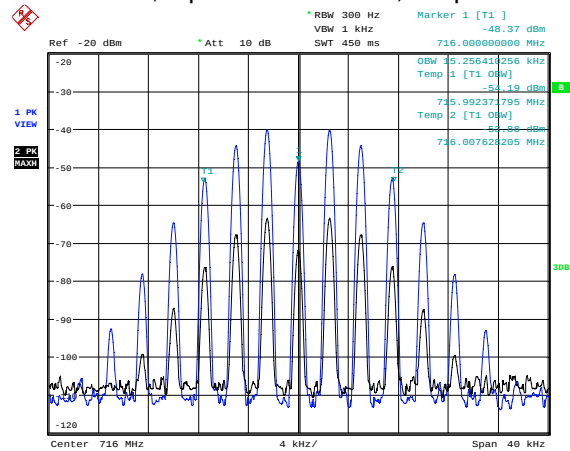
Date: 24.FEB.2011 09:14:21

707.0MHz FM deviation set to 5kHz, Input – Black Trace, Output - Blue Trace



Date: 24.FEB.2011 09:15:01

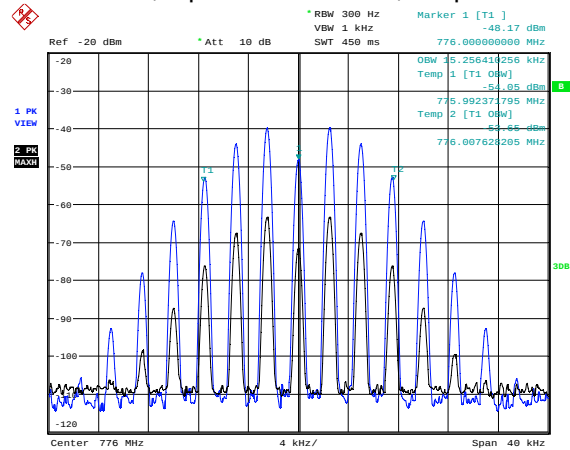
716.0MHz FM deviation set to 5kHz, Input – Black Trace, Output - Blue Trace



Date: 24.FEB.2011 09:15:54

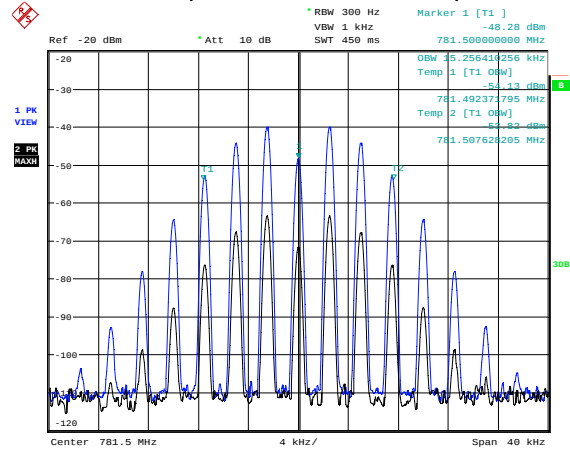
The above plots show no significant distortion visible when compared to the input signal.

776.0MHz FM deviation set to 5kHz, Input – Black Trace, Output - Blue Trace



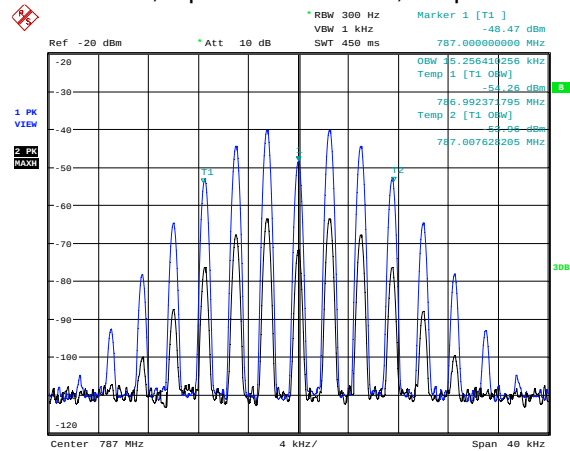
Date: 24.FEB.2011 09:27:22

742.5MHz FM deviation set to 5kHz, Input – Black Trace, Output - Blue Trace



Date: 24.FEB.2011 09:25:48

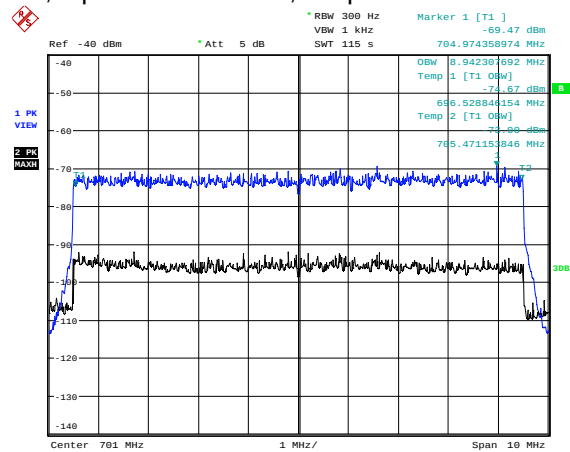
787.0MHz FM deviation set to 5kHz, Input – Black Trace, Output - Blue Trace



Date: 24.FEB.2011 09:24:48

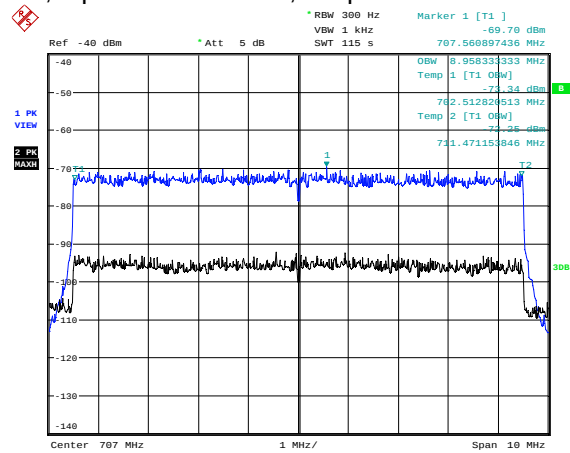
The above plots show no significant distortion visible when compared to the input signal.

698.0MHz LTE Modulation, Input – Black Trace, Output - Blue Trace



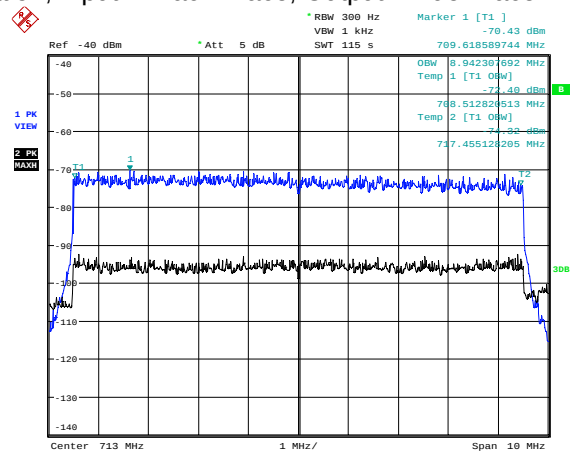
Date: 24.FEB.2011 10:32:57

707.0MHz LTE Modulation, Input – Black Trace, Output - Blue Trace



Date: 24.FEB.2011 10:38:36

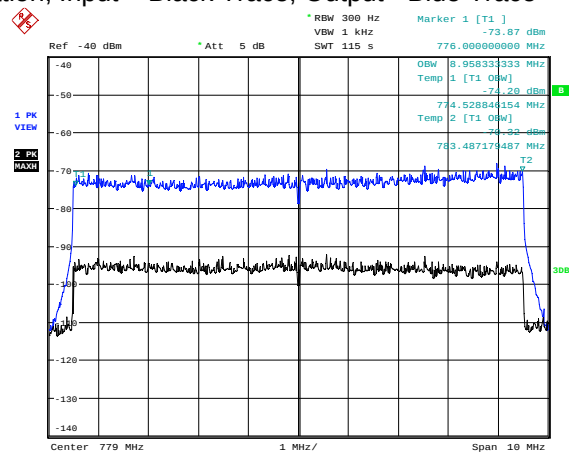
716.0MHz LTE Modulation, Input – Black Trace, Output - Blue Trace



Date: 24.FEB.2011 10:45:48

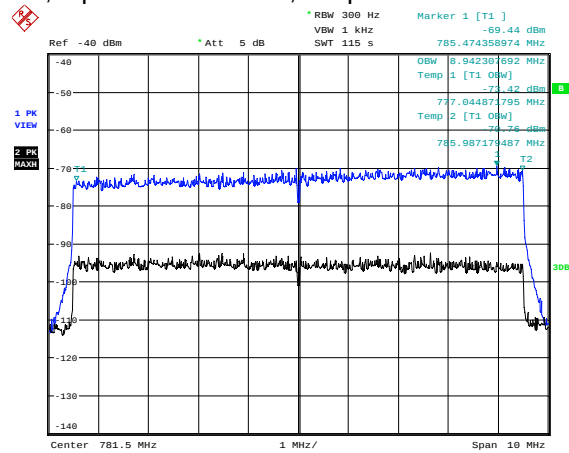
The above plots show no significant distortion visible when compared to the input signal.

776.0MHz LTE Modulation, Input – Black Trace, Output - Blue Trace



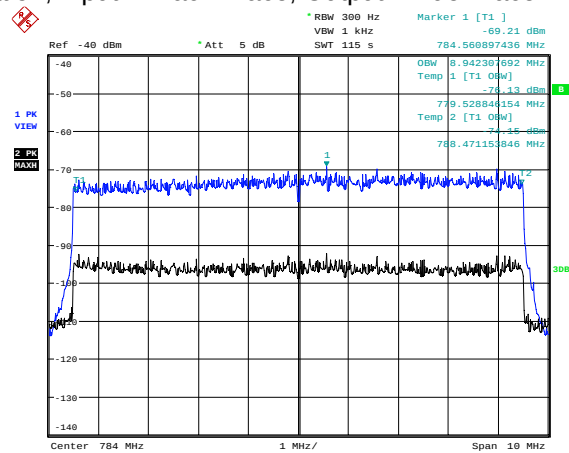
Date: 24.FEB.2011 10:11:29

742.5MHz LTE Modulation, Input – Black Trace, Output - Blue Trace



Date: 24.FEB.2011 10:23:01

787.0MHz LTE Modulation, Input – Black Trace, Output - Blue Trace



Date: 24.FEB.2011 10:27:36

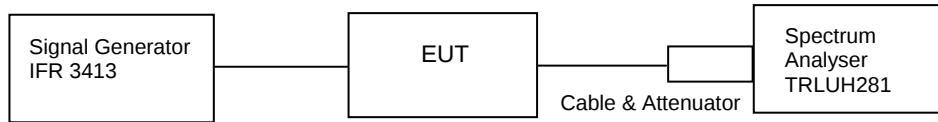
The above plots show no significant distortion visible when compared to the input signal.

TRANSMITTER TESTS

AMPLIFIER SPURIOUS EMISSIONS – CONDUCTED – Part 2.1053 – UPLINK

Ambient temperature = 20°C
 Relative humidity = 45%
 Supply voltage = +110Vac

Radio Laboratory



The test was set up as per the diagram. The level at the input was adjusted to compensate for the loss of the interconnecting cable. The unit was tested operating at maximum power and on three test frequencies.

The Spurious limit was calculated as follows:

On any frequency removed from the assigned frequency by more than 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

600 MHz Band

FREQUENCY RANGE	EUT FREQ (MHz)	EMISSION FREQ. (MHz)	MEASURED LEVEL (dBm)	ATTEN & CABLE LOSSES (dB)	EMISSION LEVEL (dBm)	LIMIT (dBm)
100kHz - 20GHz	No Significant Emissions Within 20 dB of the limit					-13

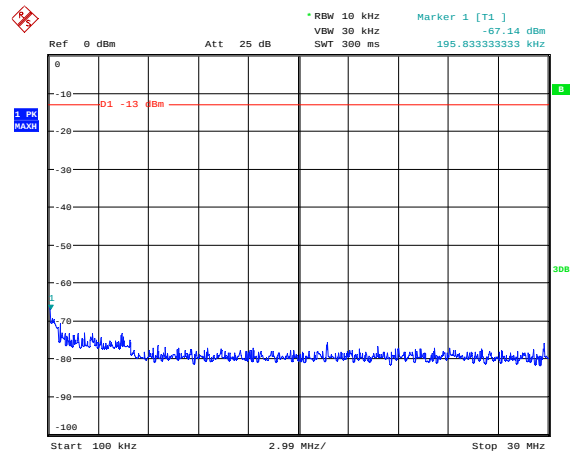
700 MHz Band

FREQUENCY RANGE	EUT FREQ (MHz)	EMISSION FREQ. (MHz)	MEASURED LEVEL (dBm)	ATTEN & CABLE LOSSES (dB)	EMISSION LEVEL (dBm)	LIMIT (dBm)
100kHz - 20GHz	No Significant Emissions Within 20 dB of the limit					-13

The test equipment used for the Transmitter Conducted Emissions:

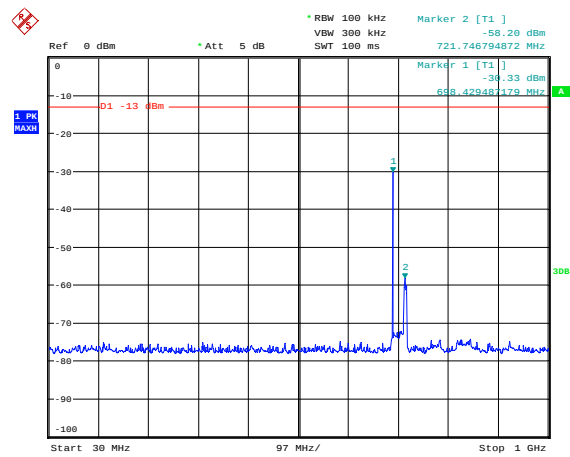
TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	REF No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	X
SIGNAL GENERATOR	AEROFLEX	3413	341001/261	N/A	X
ATTENUATOR	BIRD	8308-200	N/A	103	X
ATTENUATOR	BIRD	830-100-N	N/A	222	X
CABLE	TRaC	N/A	N/A	UH273	X
CABLE	TRaC	N/A	N/A	UH274	X

Conducted emissions 698.0MHz 100kHz – 30MHz



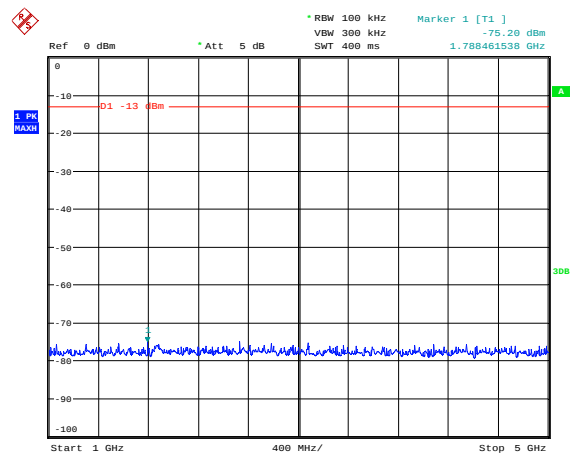
Date: 23.FEB.2011 11:39:57

Conducted emissions 698.0MHz 30MHz – 1GHz



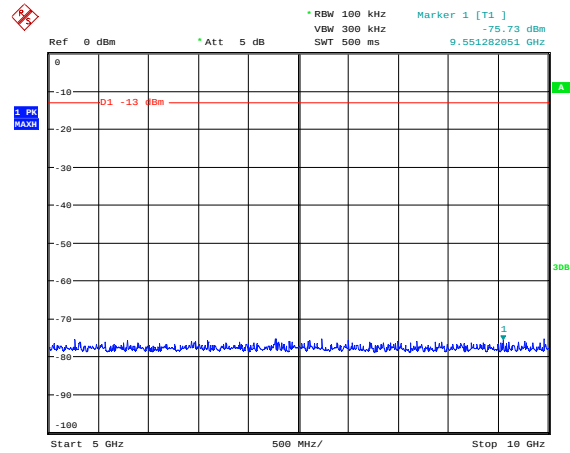
Date: 23.FEB.2011 11:39:42

Conducted emissions 698.0MHz 1 – 5GHz



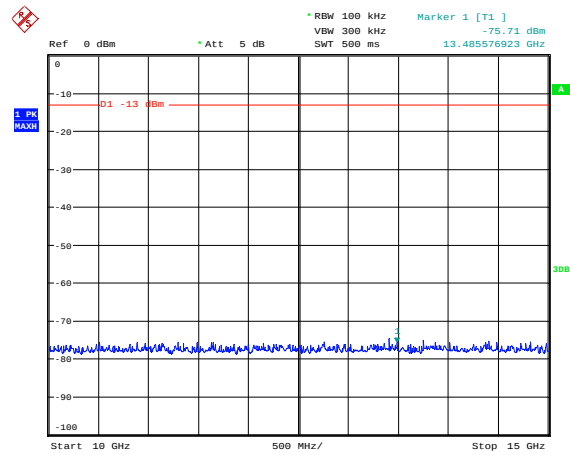
Date: 23.FEB.2011 11:40:13

Conducted emissions 698.0MHz 5 – 10GHz



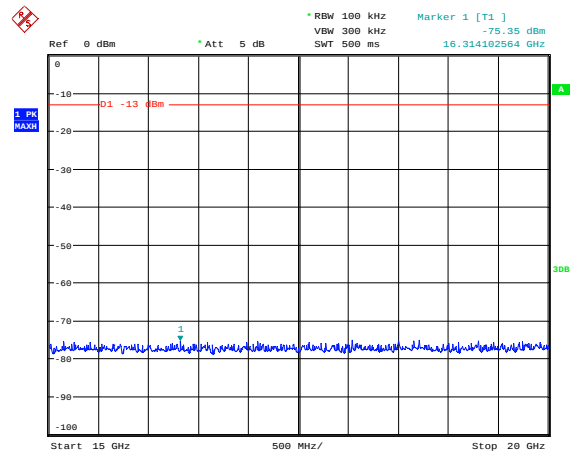
Date: 23.FEB.2011 11:40:28

Conducted emissions 698.0MHz 10 – 15GHz



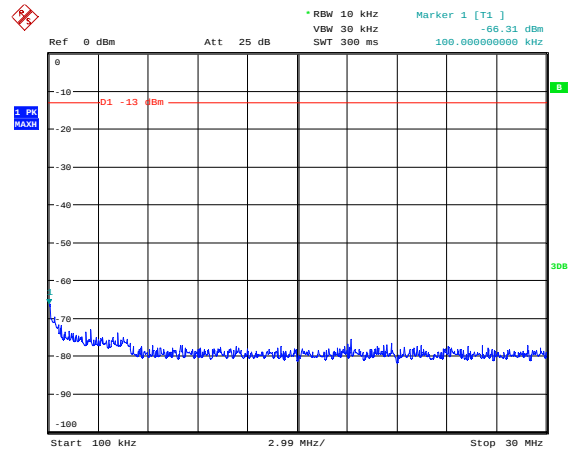
Date: 23.FEB.2011 11:40:44

Conducted emissions 698.0MHz 15 – 20GHz



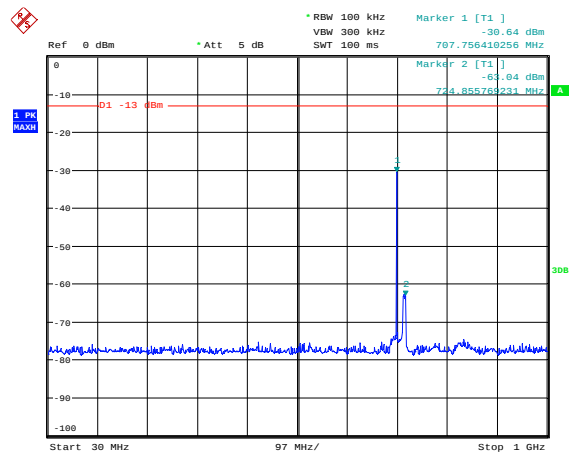
Date: 23.FEB.2011 11:40:59

Conducted emissions 707.0MHz 100kHz – 30MHz



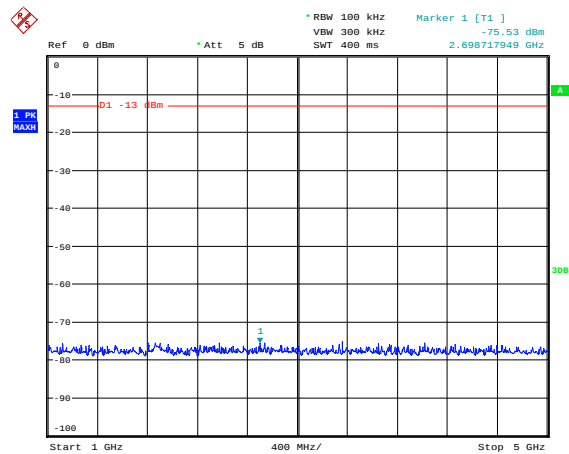
Date: 23.FEB.2011 11:37:25

Conducted emissions 707.0MHz 30MHz – 1GHz



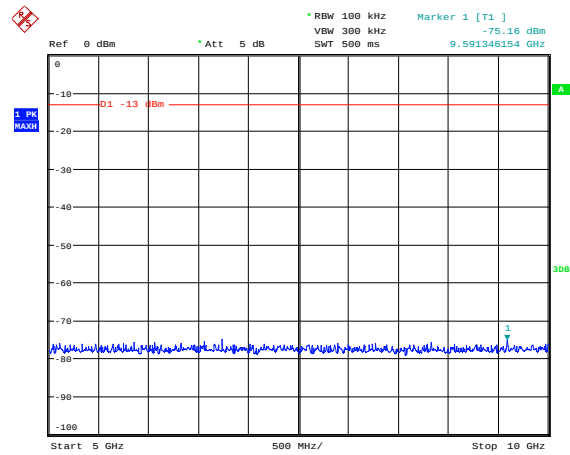
Date: 23.FEB.2011 11:37:38

Conducted emissions 707.0MHz 1 – 5GHz



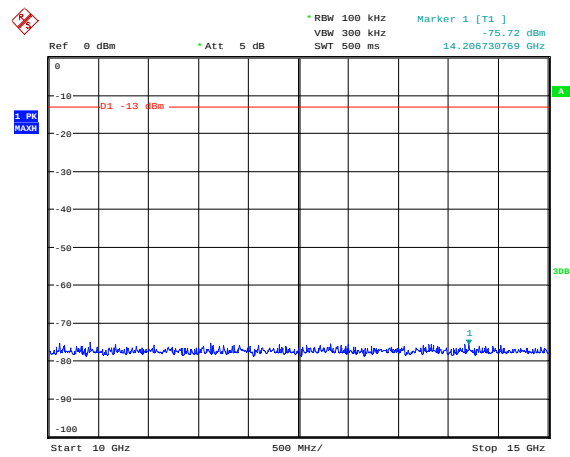
Date: 23.FEB.2011 11:37:52

Conducted emissions 707.0MHz 5 – 10GHz



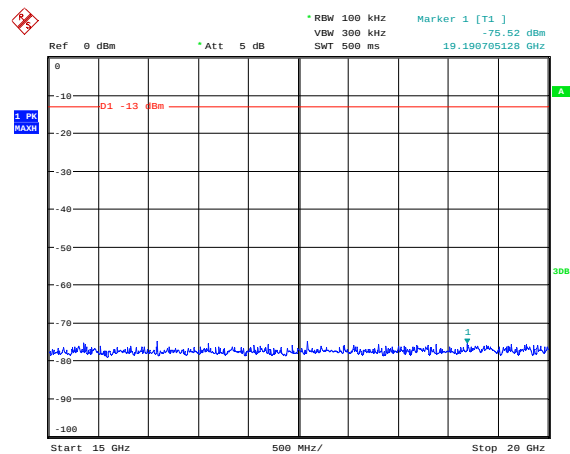
Date: 23.FEB.2011 11:38:14

Conducted emissions 707.0MHz 10 – 15GHz



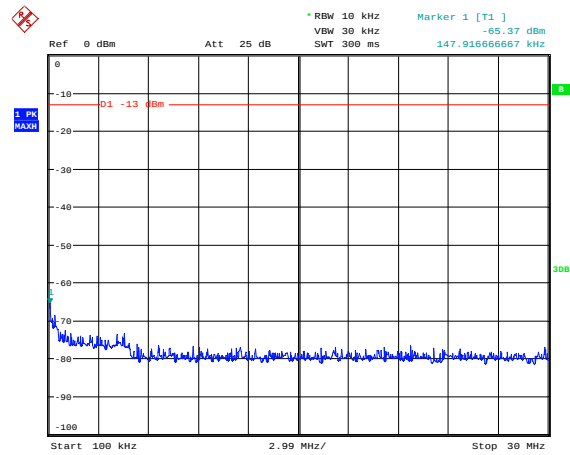
Date: 23.FEB.2011 11:38:34

Conducted emissions 707.0MHz 15 – 20GHz



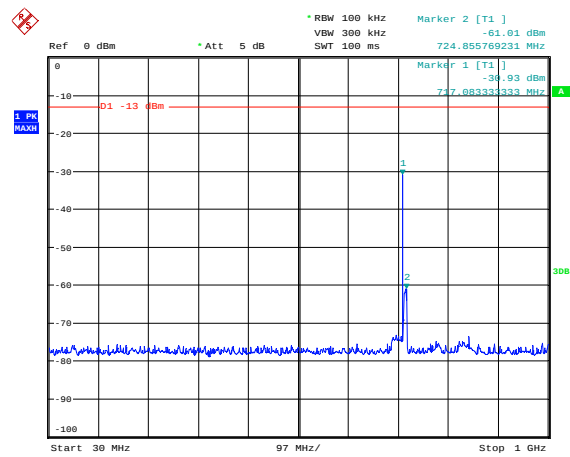
Date: 23.FEB.2011 11:38:46

Conducted emissions 716.0MHz 100kHz – 30MHz



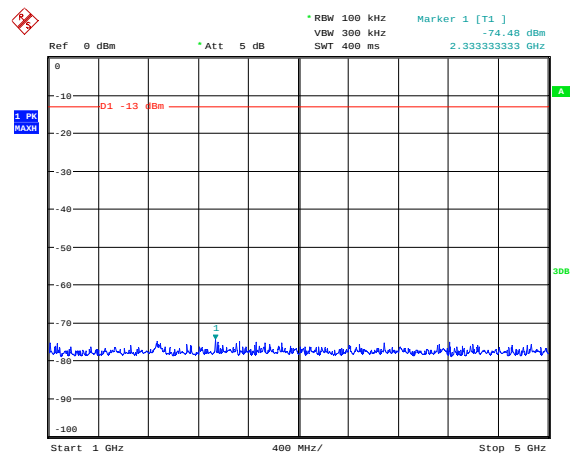
Date: 23.FEB.2011 11:36:59

Conducted emissions 716.0MHz 30MHz – 1GHz



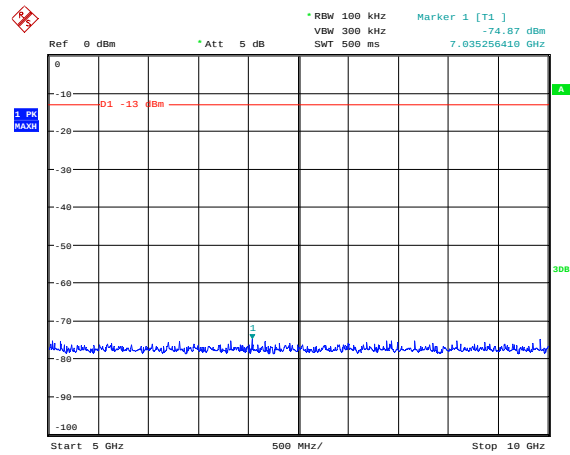
Date: 23.FEB.2011 11:36:47

Conducted emissions 716.0MHz 1 – 5GHz



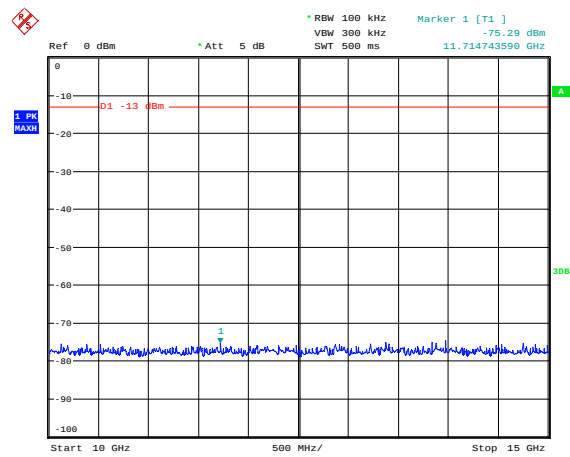
Date: 23.FEB.2011 11:36:25

Conducted emissions 716.0MHz 5 – 10GHz



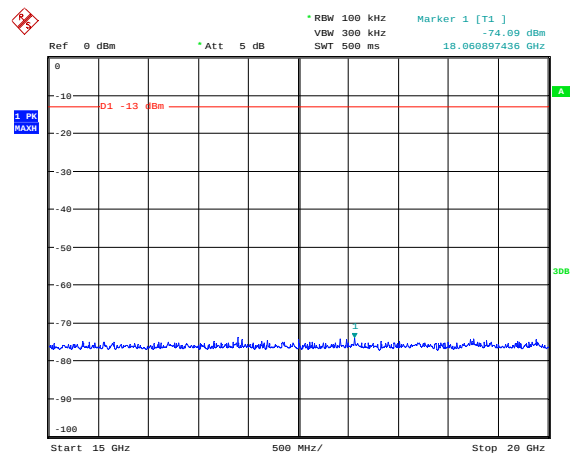
Date: 23.FEB.2011 11:36:10

Conducted emissions 716.0MHz 10 – 15GHz



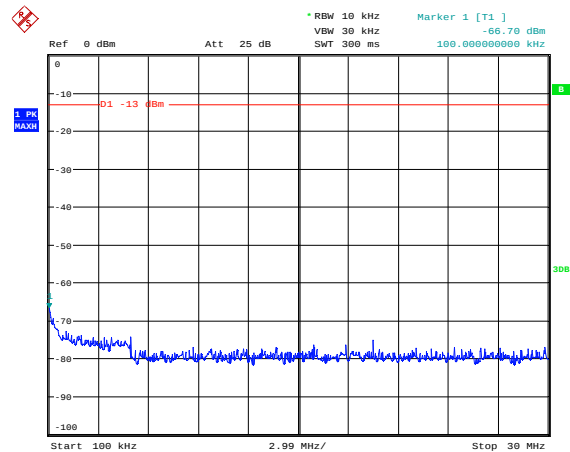
Date: 23.FEB.2011 11:35:52

Conducted emissions 716.0MHz 15 – 20GHz



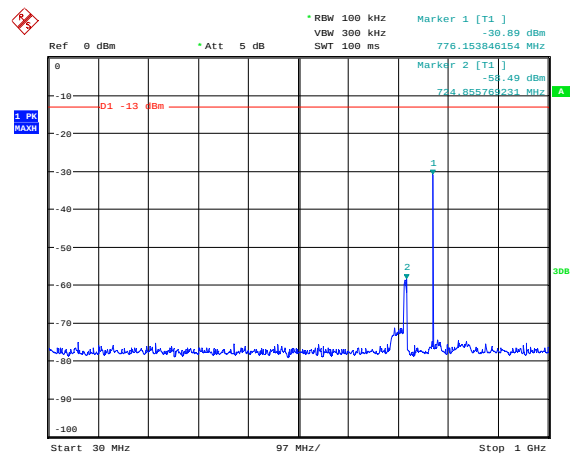
Date: 23.FEB.2011 11:35:37

Conducted emissions 776.0MHz 100kHz – 30MHz



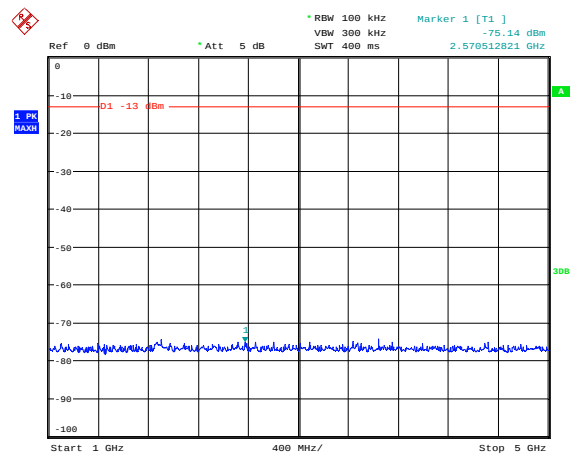
Date: 23.FEB.2011 11:31:36

Conducted emissions 776.0MHz 30MHz – 1GHz



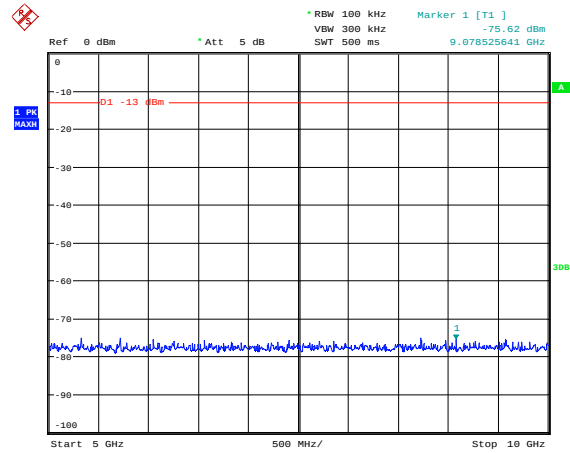
Date: 23.FEB.2011 11:31:51

Conducted emissions 776.0MHz 1 – 5GHz



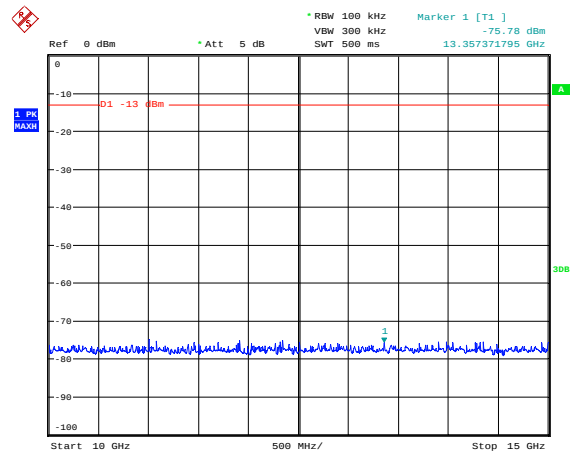
Date: 23.FEB.2011 11:32:40

Conducted emissions 776.0MHz 5 – 10GHz



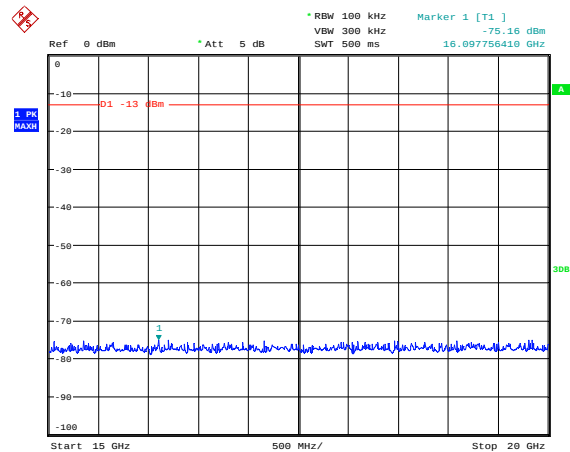
Date: 23.FEB.2011 11:33:26

Conducted emissions 776.0MHz 10 – 15GHz



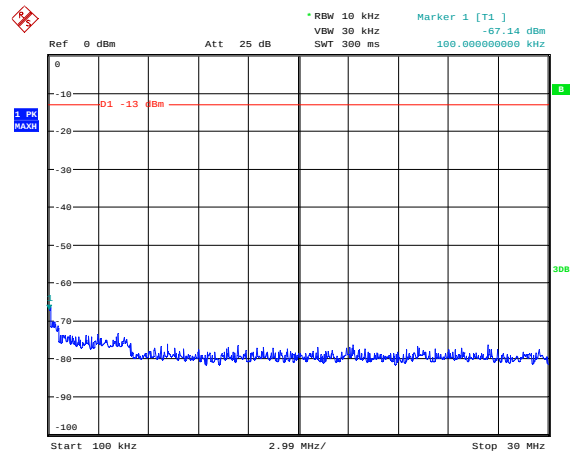
Date: 23.FEB.2011 11:33:40

Conducted emissions 776.0MHz 15 – 20GHz



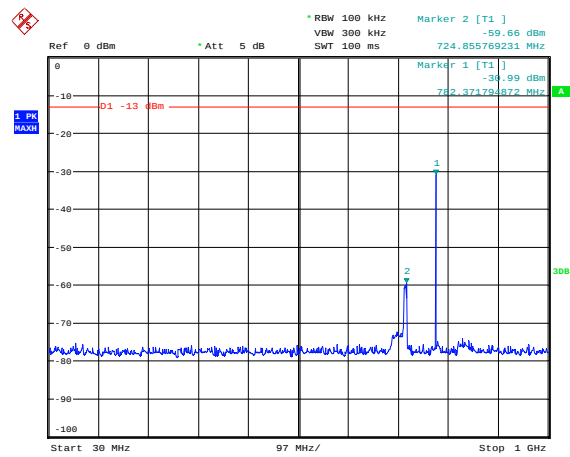
Date: 23.FEB.2011 11:33:54

Conducted emissions 781.5MHz 100kHz – 30MHz



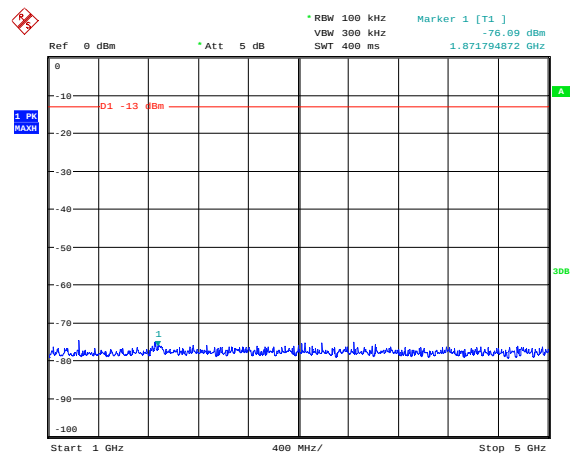
Date: 23.FEB.2011 11:31:21

Conducted emissions 781.5MHz 30MHz – 1GHz



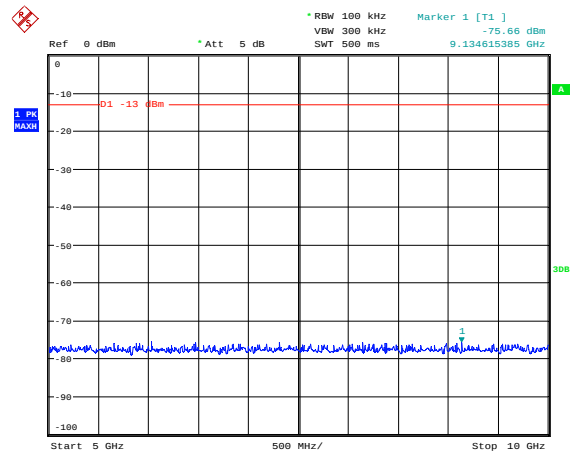
Date: 23.FEB.2011 11:31:09

Conducted emissions 781.5MHz 1 – 5GHz



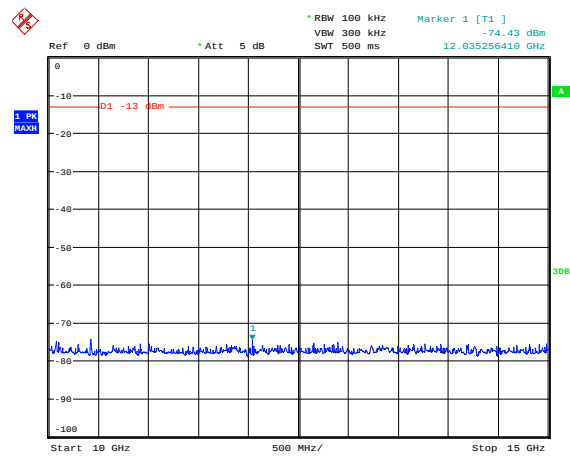
Date: 23.FEB.2011 11:30:54

Conducted emissions 781.5MHz 5 – 10GHz



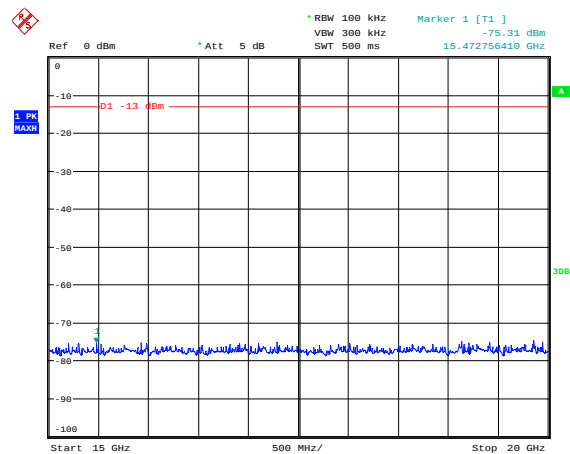
Date: 23.FEB.2011 11:30:41

Conducted emissions 781.5MHz 10 – 15GHz



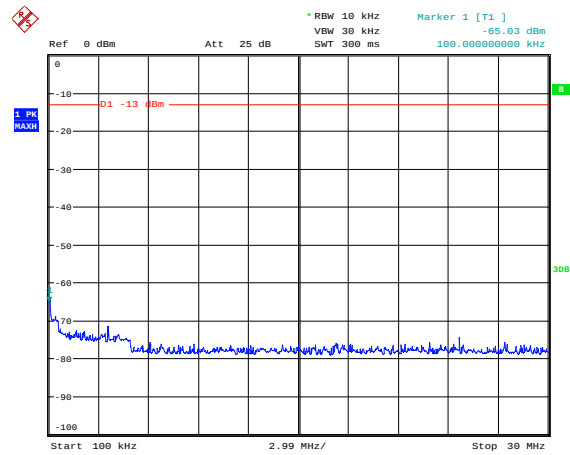
Date: 23.FEB.2011 11:30:26

Conducted emissions 781.5MHz 15 – 20GHz



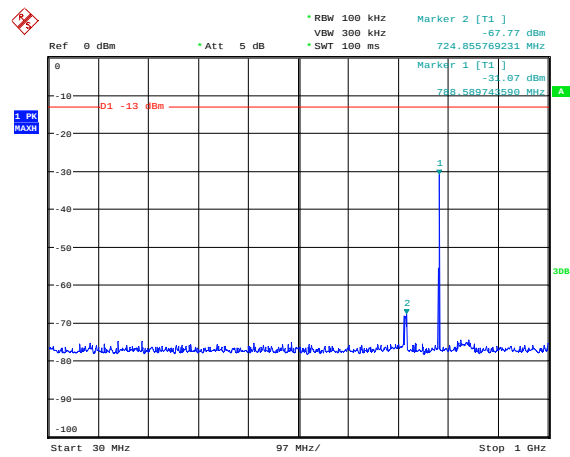
Date: 23.FEB.2011 11:30:09

Conducted emissions 787.0MHz 100kHz – 30MHz



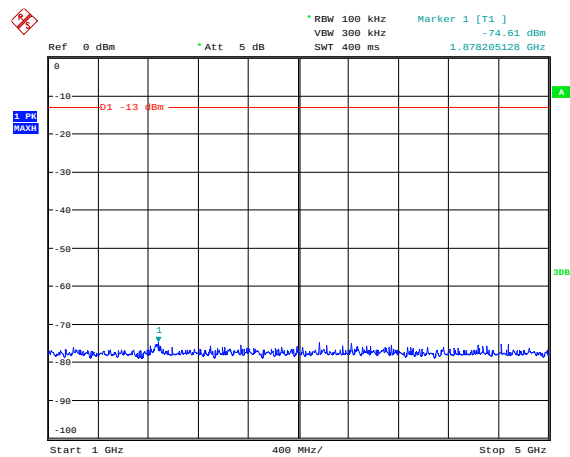
Date: 23.FEB.2011 11:26:20

Conducted emissions 787.0MHz 30MHz – 1GHz



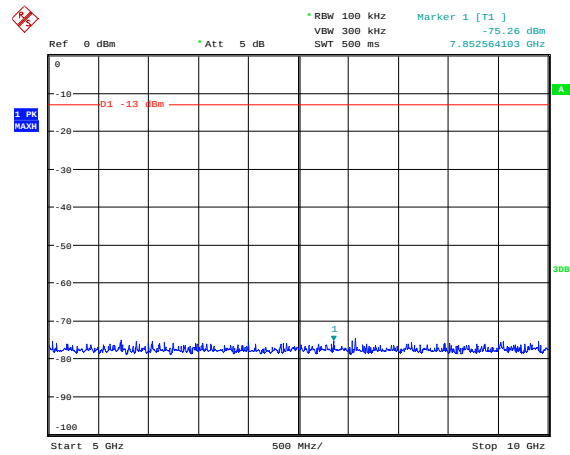
Date: 23.FEB.2011 11:27:46

Conducted emissions 787.0MHz 1 – 5GHz



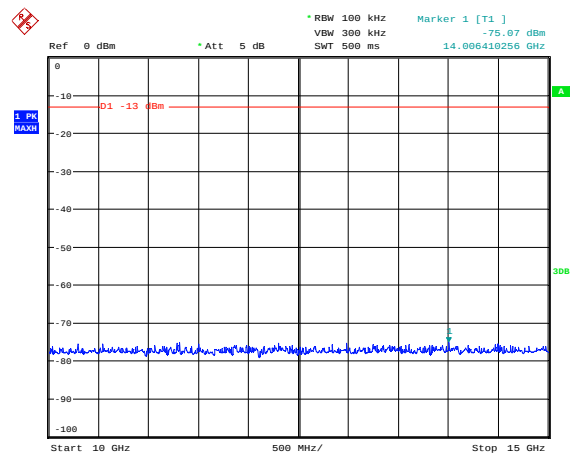
Date: 23.FEB.2011 11:28:16

Conducted emissions 787.0MHz 5 – 10GHz



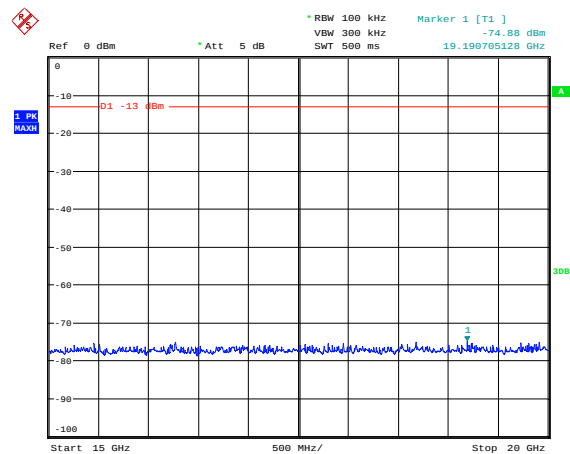
Date: 23.FEB.2011 11:28:44

Conducted emissions 787.0MHz 10 – 15GHz



Date: 23.FEB.2011 11:29:04

Conducted emissions 787.0MHz 15 – 20GHz

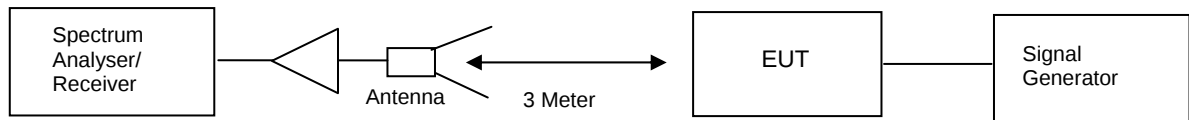


Date: 23.FEB.2011 11:29:29

TRANSMITTER TESTS

AMPLIFIER SPURIOUS EMISSIONS – RADIATED – Part 2.1053– UPLINK

Ambient temperature = 15°C
 Relative humidity = 45%
 Conditions = OATS
 Supply voltage = +110Vac
 Supply Frequency = N/A



The test was set up as per the diagram. The level at the input was adjusted to compensate for the loss of the interconnecting cable. The unit was tested operating maximum power on three test frequencies with a 50 ohm load on the output. The unit was also tested with the signal generator replaced by another 50ohm load.

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

600 MHz Band

FREQUENCY RANGE	FREQ. (MHz)	MEAS. Rx. (dBμV)	CABLE LOSS (dB)	ANT FACTOR	FIELD STRENGTH (dBμV/m)	CALCULATED EIRP (dBm)	LIMIT (dBm)
30MHz – 20 GHz	No Significant Emissions Within 20 dB of Limit						-13

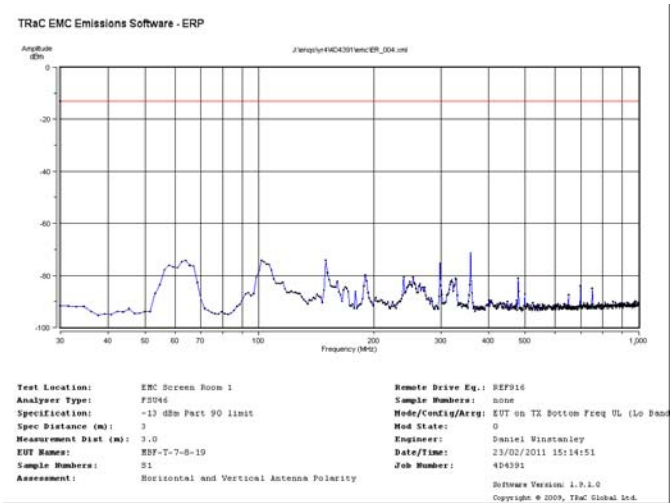
700 MHz Band

FREQUENCY RANGE	FREQ. (MHz)	MEAS. Rx. (dBμV)	CABLE LOSS (dB)	ANT FACTOR	FIELD STRENGTH (dBμV/m)	CALCULATED EIRP (dBm)	LIMIT (dBm)
30MHz – 20 GHz	No Significant Emissions Within 20 dB of Limit						-13

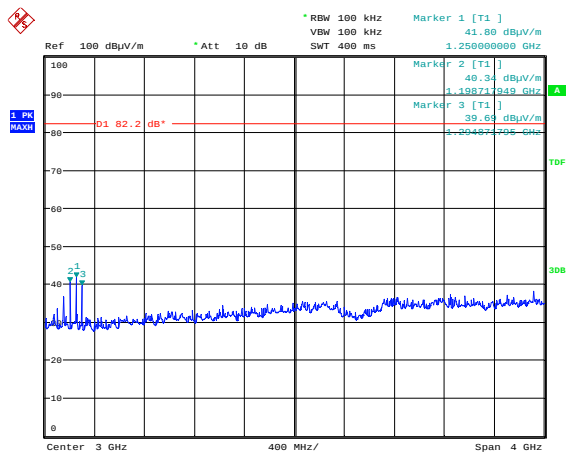
The test equipment used for the Transmitter Spurious Emissions:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	REF No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	X
HORN	EMCO	3115	9010-3580	138	X
HORN	FLANN	20240-20	322	300	X
PRE AMPLIFIER	HP	8449B	3008A016	572	X
SIGNAL GENERATOR	IFR	3413	341001/261	N/A	X
ANTENNA	YORK	CBL611/A	1618	UH191	X

Radiated emissions 698.0 MHz 30MHz – 1GHz

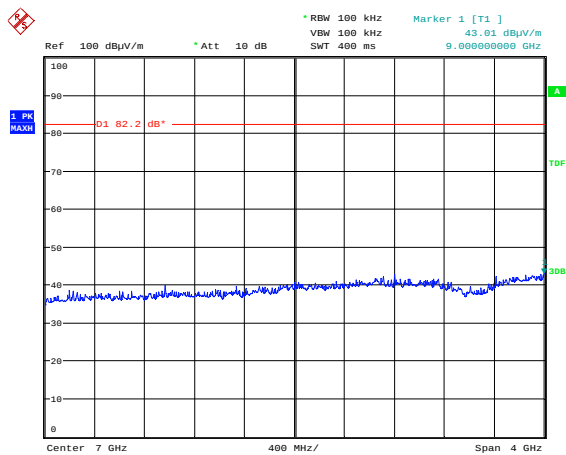


Radiated emissions 698.0 MHz 1 – 5GHz



Date: 23.FEB.2011 15:59:56

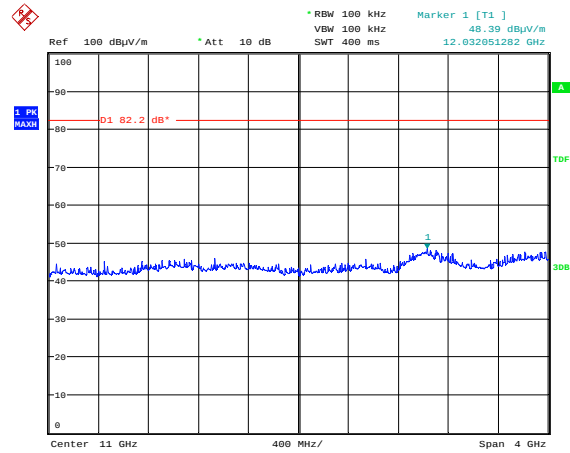
Radiated emissions 698.0 MHz 5 – 9GHz



Date: 23.FEB.2011 16:00:20

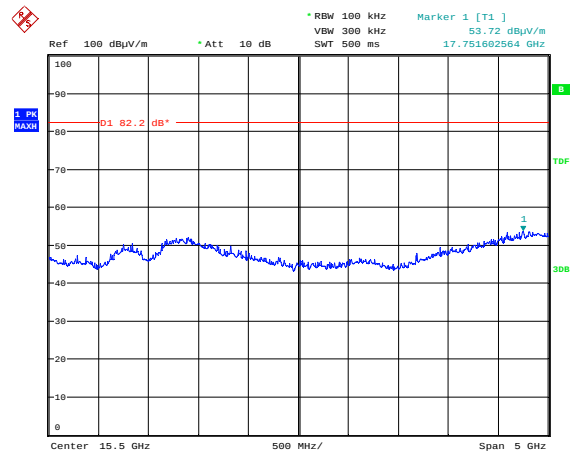
The above test results show that there were no emissions within 20dBs of the –13dBm limit.

Radiated emissions 698.0 MHz 9 – 13GHz



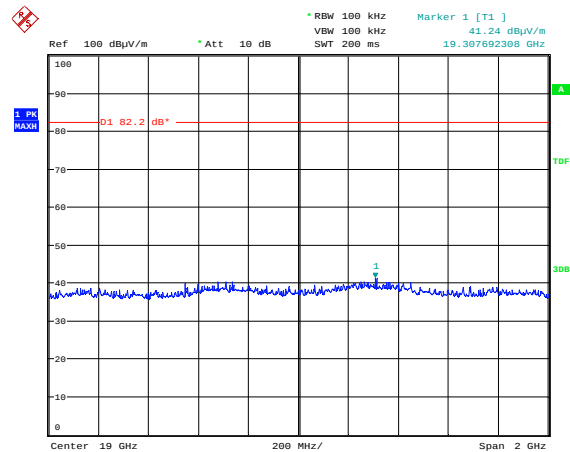
Date: 23.FEB.2011 16:00:38

Radiated emissions 698.0 MHz 13 – 18GHz



Date: 23.FEB.2011 16:05:31

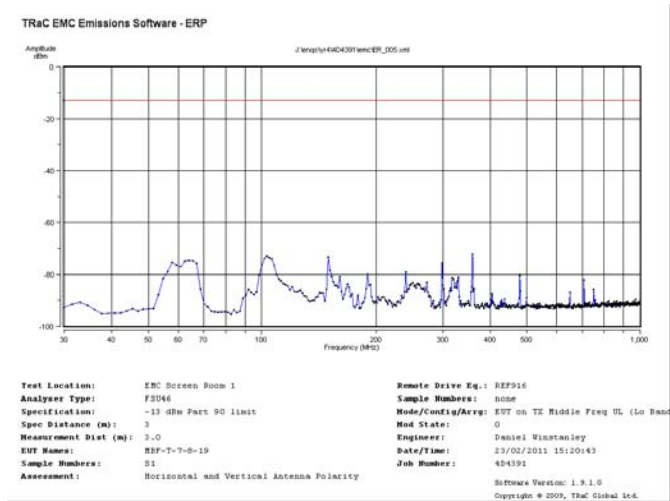
Radiated emissions 698.0 MHz 18 – 20GHz



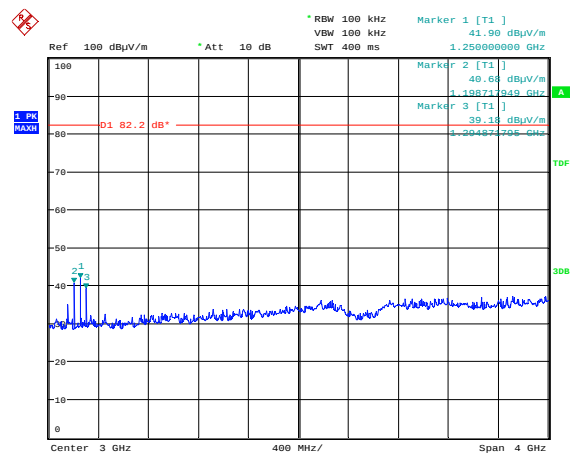
Date: 23.FEB.2011 16:46:53

The above test results show that there were no emissions within 20dBs of the -13dBm limit.

Radiated emissions 707.0MHz 30MHz – 1GHz

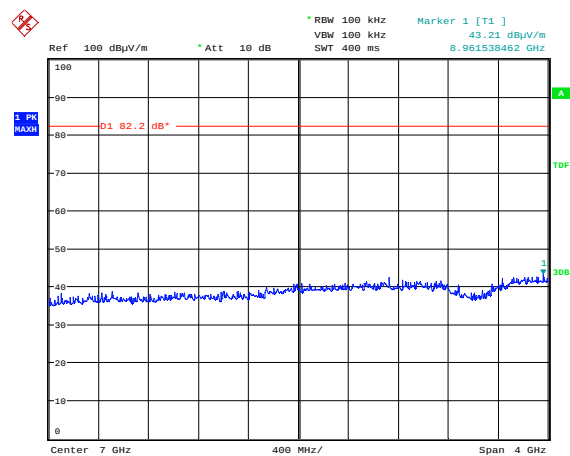


Radiated emissions 707.0MHz 1 – 5GHz



Date: 23.FEB.2011 15:59:18

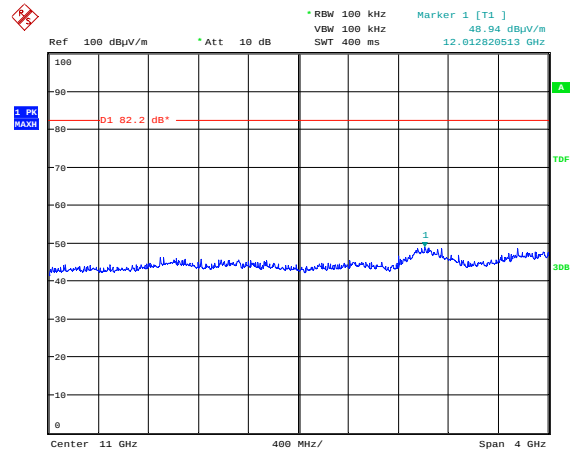
Radiated emissions 707.0MHz 5 – 9GHz



Date: 23.FEB.2011 16:02:53

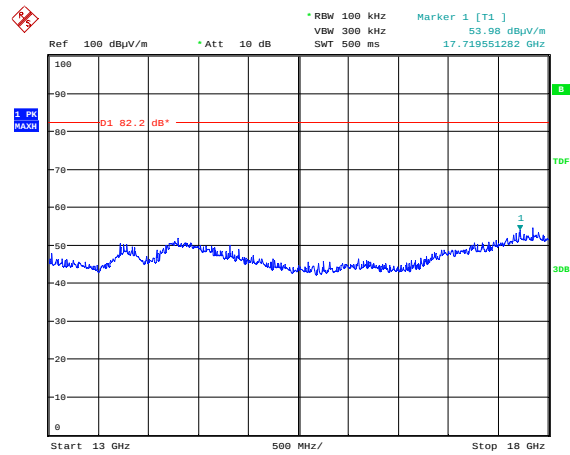
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

Radiated emissions 707.0MHz 9 – 13GHz



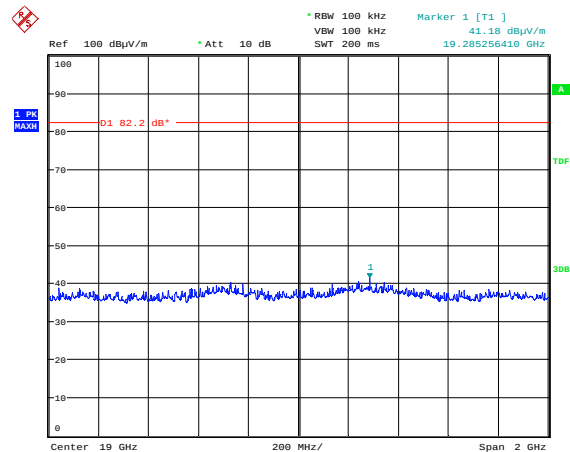
Date: 23.FEB.2011 16:02:19

Radiated emissions 707.0MHz 13 – 18GHz



Date: 23.FEB.2011 15:59:33

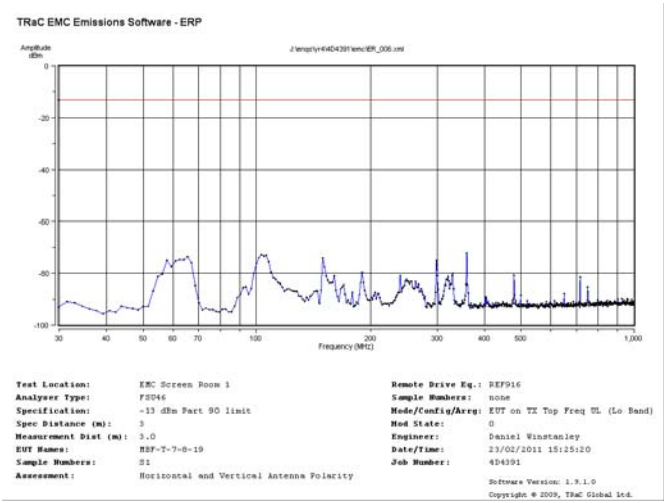
Radiated emissions 707.0MHz 18 – 20GHz



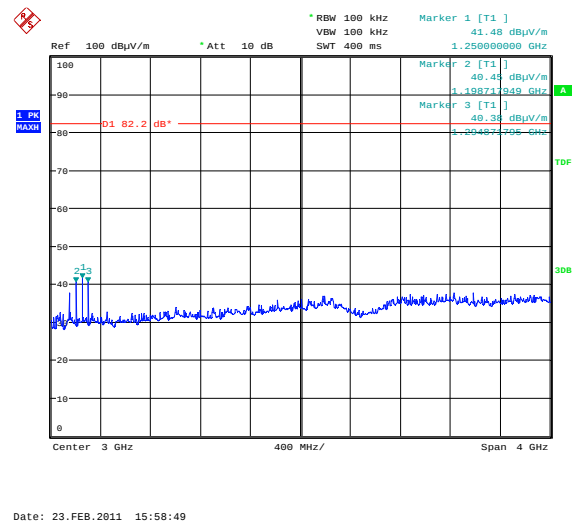
Date: 23.FEB.2011 16:42:40

The above test results show that there were no emissions within 20dBs of the -13dBm limit.

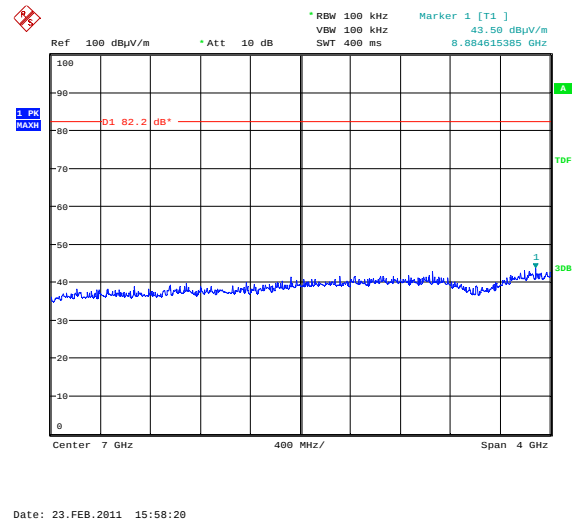
Radiated emissions 716.0 MHz 30MHz – 1GHz



Radiated emissions 716.0 MHz 1 – 5GHz

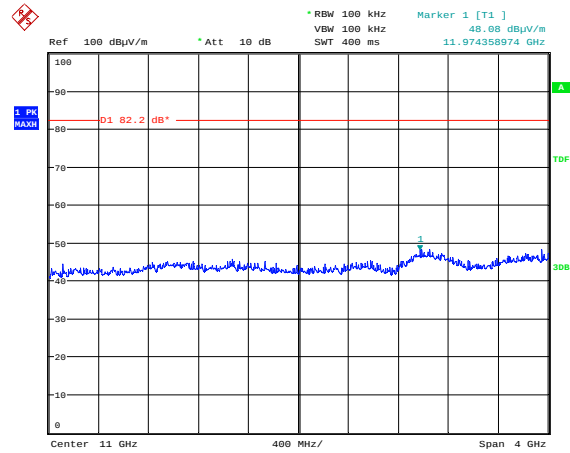


Radiated emissions 716.0 MHz 5 – 9GHz



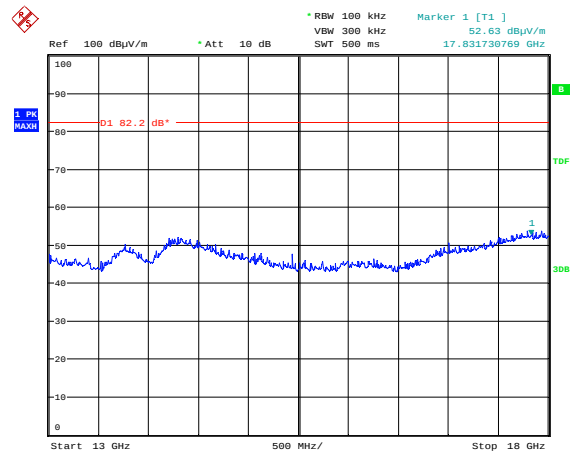
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

Radiated emissions 716.0 MHz 9 – 13GHz



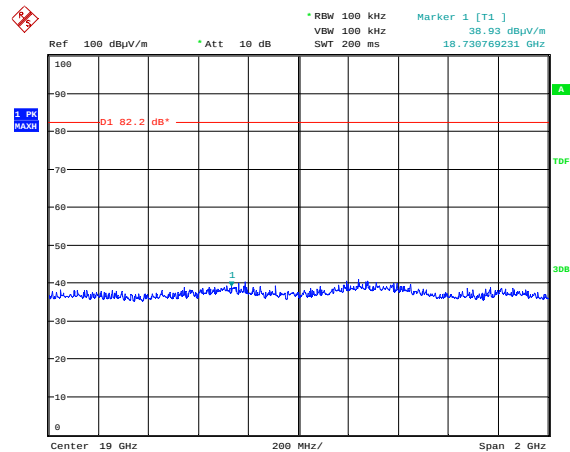
Date: 23.FEB.2011 16:04:35

Radiated emissions 716.0 MHz 13 – 18GHz



Date: 23.FEB.2011 15:57:28

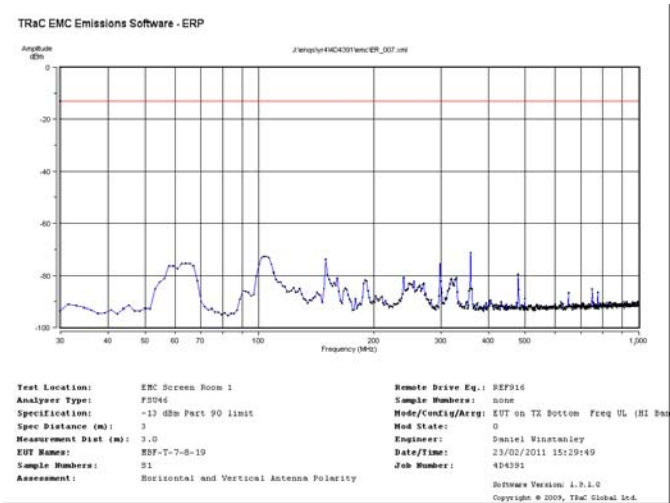
Radiated emissions 716.0 MHz 18 – 20GHz



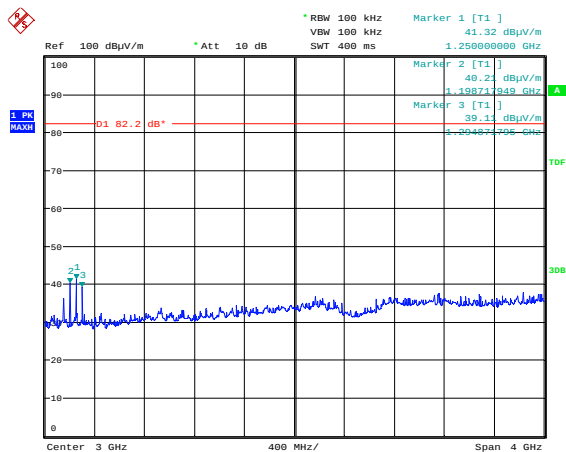
Date: 23.FEB.2011 16:46:06

The above test results show that there were no emissions within 20dBs of the -13dBm limit.

Radiated emissions 776.0 MHz 30MHz – 1GHz

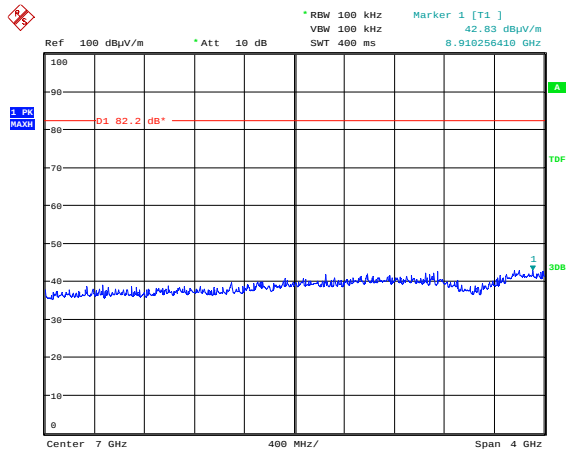


Radiated emissions 776.0 MHz 1 – 5GHz



Date: 23.FEB.2011 15:55:55

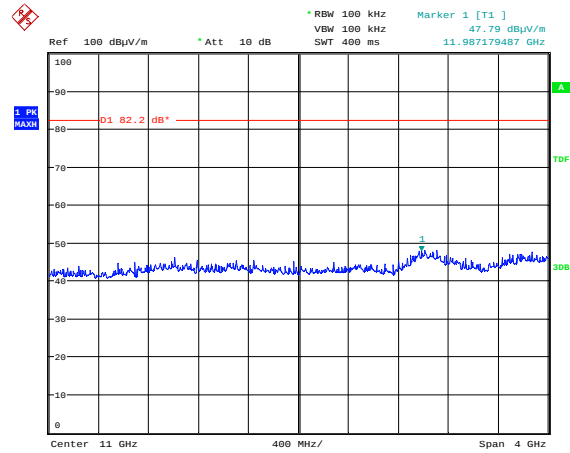
Radiated emissions 776.0 MHz 5 – 9GHz



Date: 23.FEB.2011 15:56:28

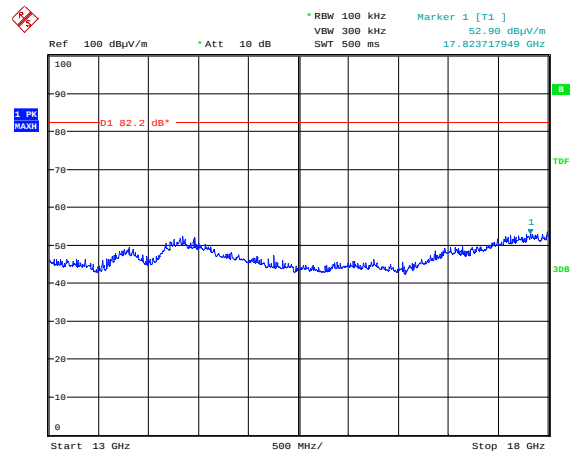
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

Radiated emissions 776.0 MHz 9 – 13GHz



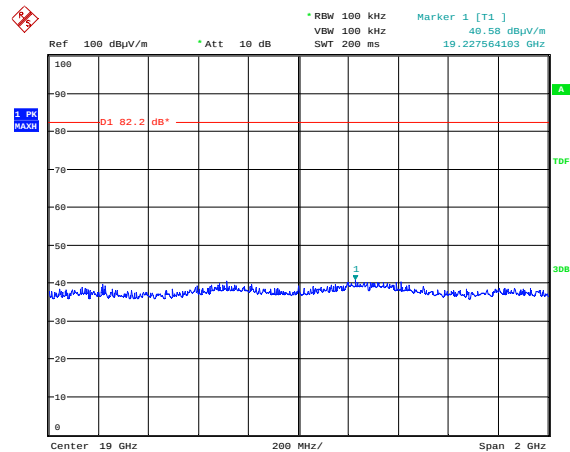
Date: 23.FEB.2011 16:09:54

Radiated emissions 776.0 MHz 13 – 18GHz



Date: 23.FEB.2011 15:56:51

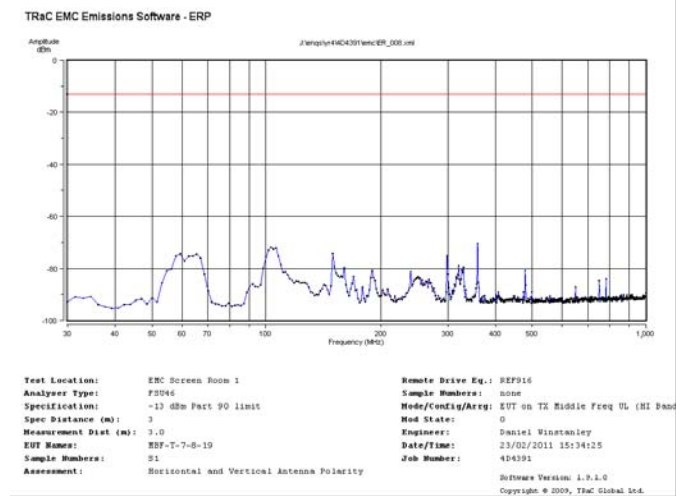
Radiated emissions 776.0 MHz 18 – 20GHz



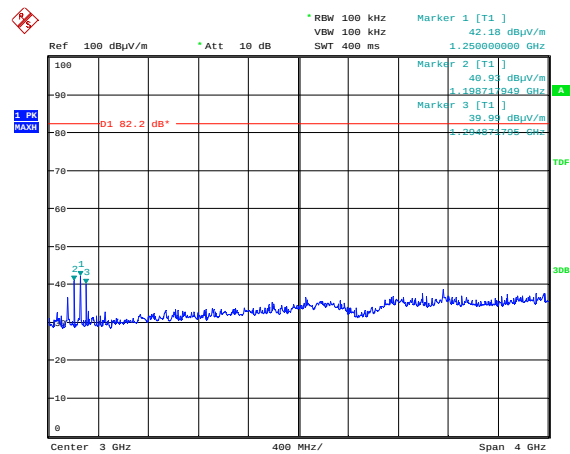
Date: 23.FEB.2011 16:43:26

The above test results show that there were no emissions within 20dBs of the -13dBm limit.

Radiated emissions 781.5 MHz 30MHz – 1GHz

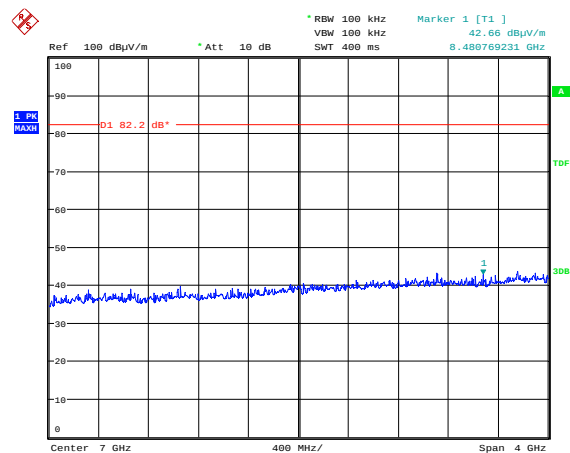


Radiated emissions 781.5 MHz 1 – 5GHz



Date: 23.FEB.2011 15:55:31

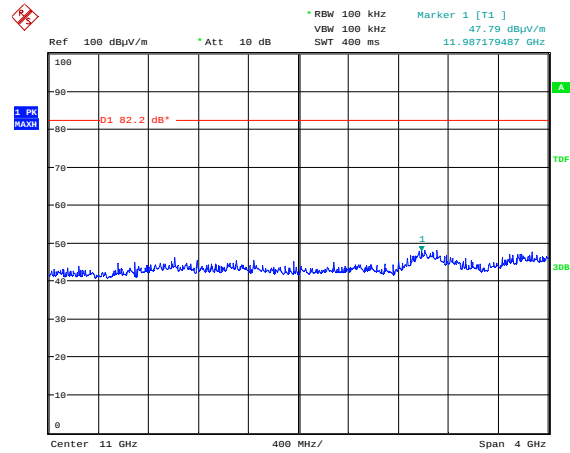
Radiated emissions 781.5 MHz 5 – 9GHz



Date: 23.FEB.2011 16:10:11

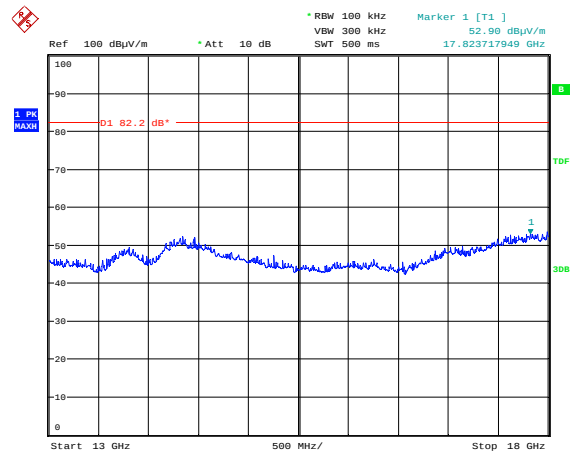
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

Radiated emissions 742.5 MHz 9 – 13GHz



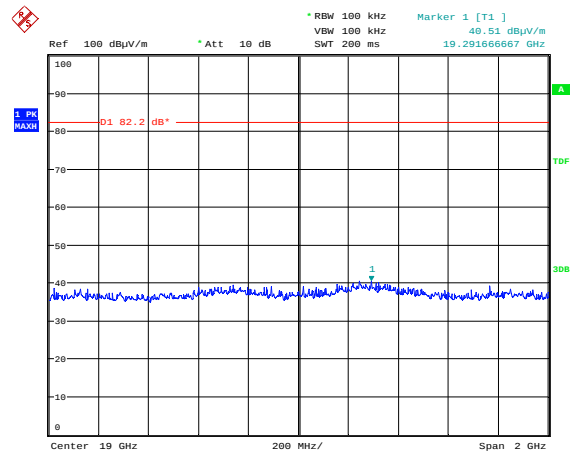
Date: 23.FEB.2011 16:09:54

Radiated emissions 742.5 MHz 13 – 18GHz



Date: 23.FEB.2011 15:56:51

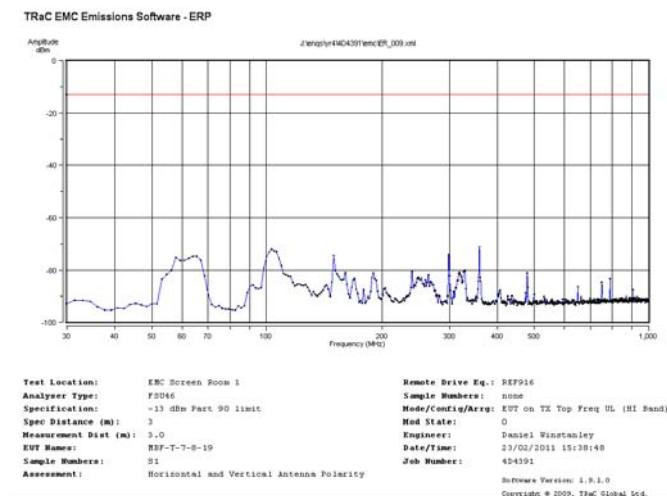
Radiated emissions 742.5 MHz 18 – 20GHz



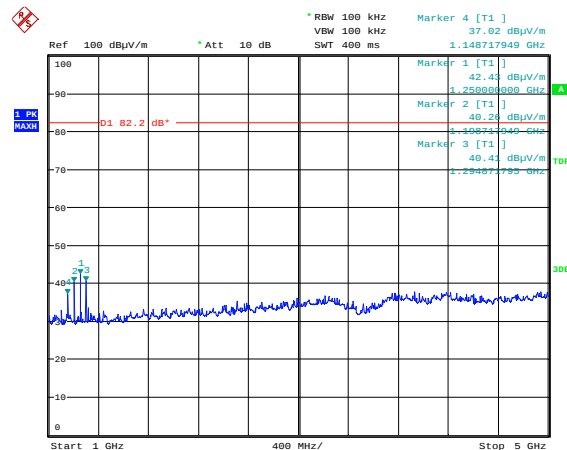
Date: 23.FEB.2011 16:45:31

The above test results show that there were no emissions within 20dBs of the -13dBm limit.

Radiated emissions 787.0 MHz 30MHz – 1GHz

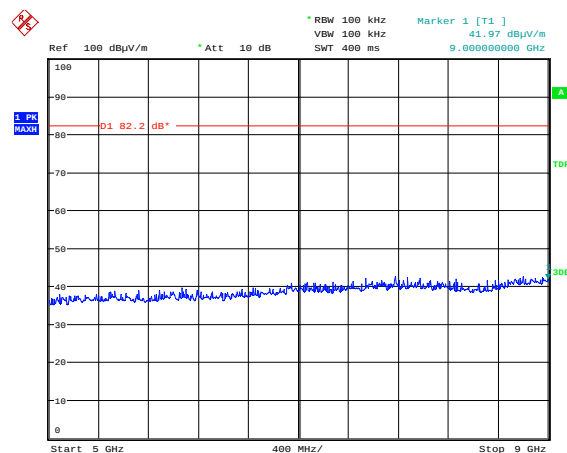


Radiated emissions 787.0 MHz 1 – 5GHz



Date: 23.FEB.2011 15:51:53

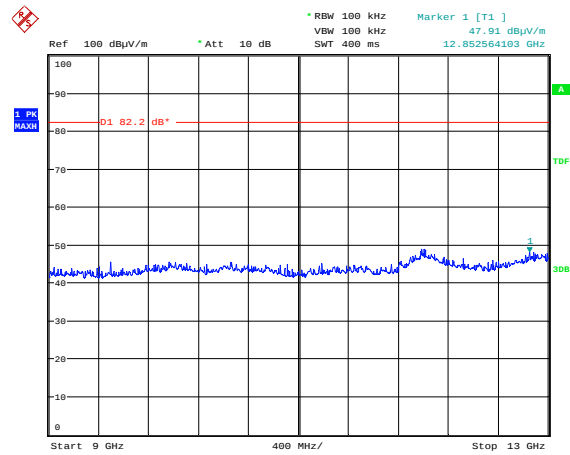
Radiated emissions 787.0 MHz 5 – 9GHz



Date: 23.FEB.2011 15:52:16

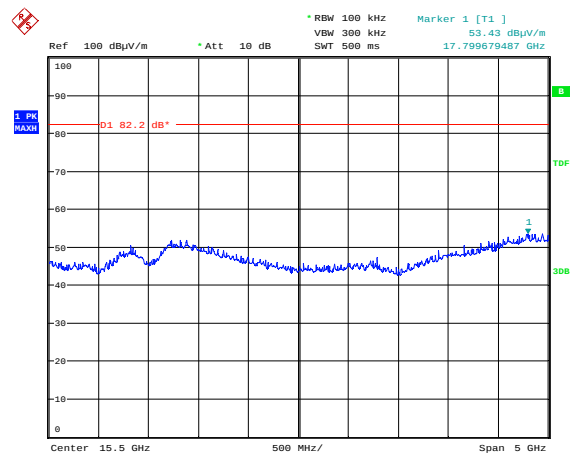
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

Radiated emissions 787.0 MHz 9 – 13GHz



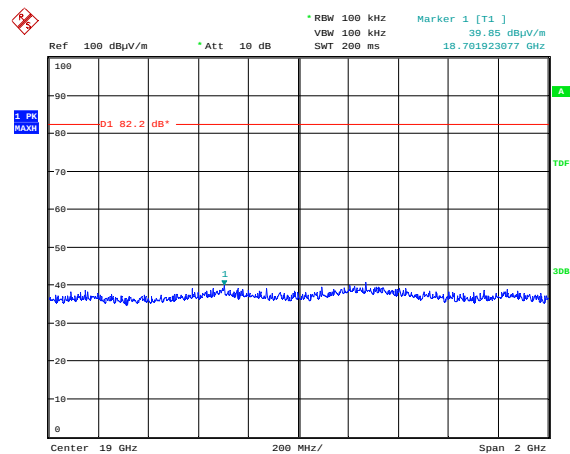
Date: 23.FEB.2011 15:52:44

Radiated emissions 787.0 MHz 13 – 18GHz



Date: 23.FEB.2011 16:08:54

Radiated emissions 787.0 MHz 18 – 20GHz



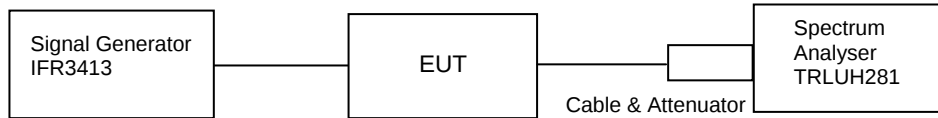
Date: 23.FEB.2011 16:44:54

The above test results show that there were no emissions within 20dBs of the –13dBm limit.

AMPLIFIER GAIN – CONDUCTED – PART 2.1046 – DOWNLINK

Ambient temperature = 23°C
 Relative humidity = 37%
 Supply voltage = +110Vac
 Channel number = See test results

Radio Laboratory

**700 MHz Band**

Frequency MHz	Signal Generator input level dBm	Input Cable Loss dB	Level at Spectrum Analyser dBm	Output Cable & Attenuator loss dB	Gain dB	Conducted Output Power dBm	Gain after 10dB input level increase dB
728.000	7.40	0.11	-3.27	40.60	30.04	37.33	20.04
742.500	7.10	0.23	-2.88	40.52	30.77	37.64	20.85
757.000	9.30	0.35	-3.44	40.52	28.13	37.08	18.13

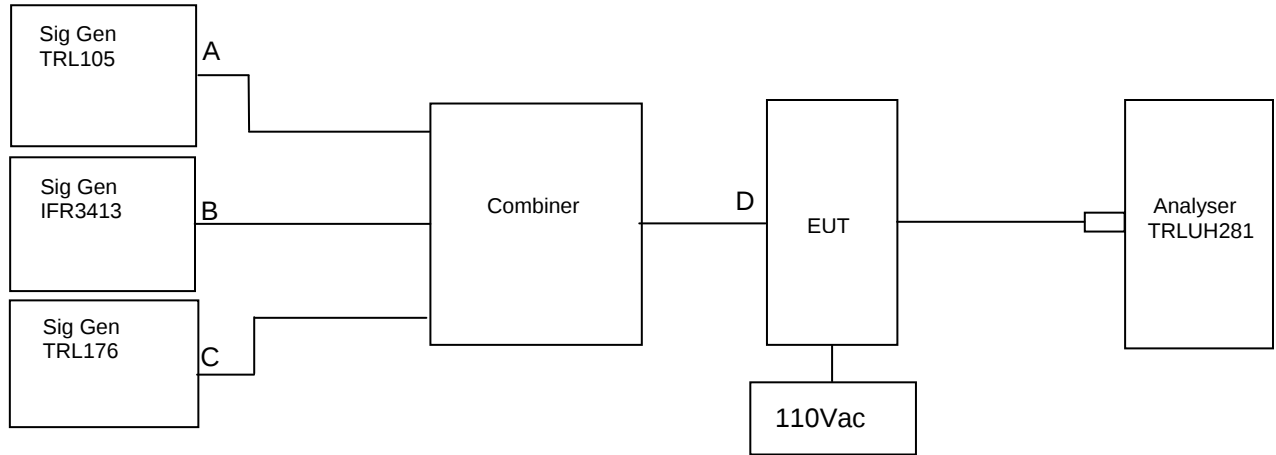
Notes: 1. The signal generator input was increased by 10dBs and the level of the output signal remeasured.

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	REF No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	X
SIGNAL GENERATOR	IFR	3413	341001/261	N/A	X
ATTENUATOR	SPINNER	745357	D37224	UH225	X
ATTENUATOR	AXELL	20dB	N/A	N/A	X
CABLE	TRaC	N/A	N/A	UH253	X
CABLE	TRaC	N/A	N/A	UH254	X
CABLE	TRaC	N/A	N/A	UH271	X

AMPLIFIER INTERMODULATION SPURIOUS EMISSIONS – CONDUCTED – PART 2.1053– DOWNLINK

Ambient temperature = 23°C
 Relative humidity = 37%
 Supply voltage = +110Vac

Radio Laboratory



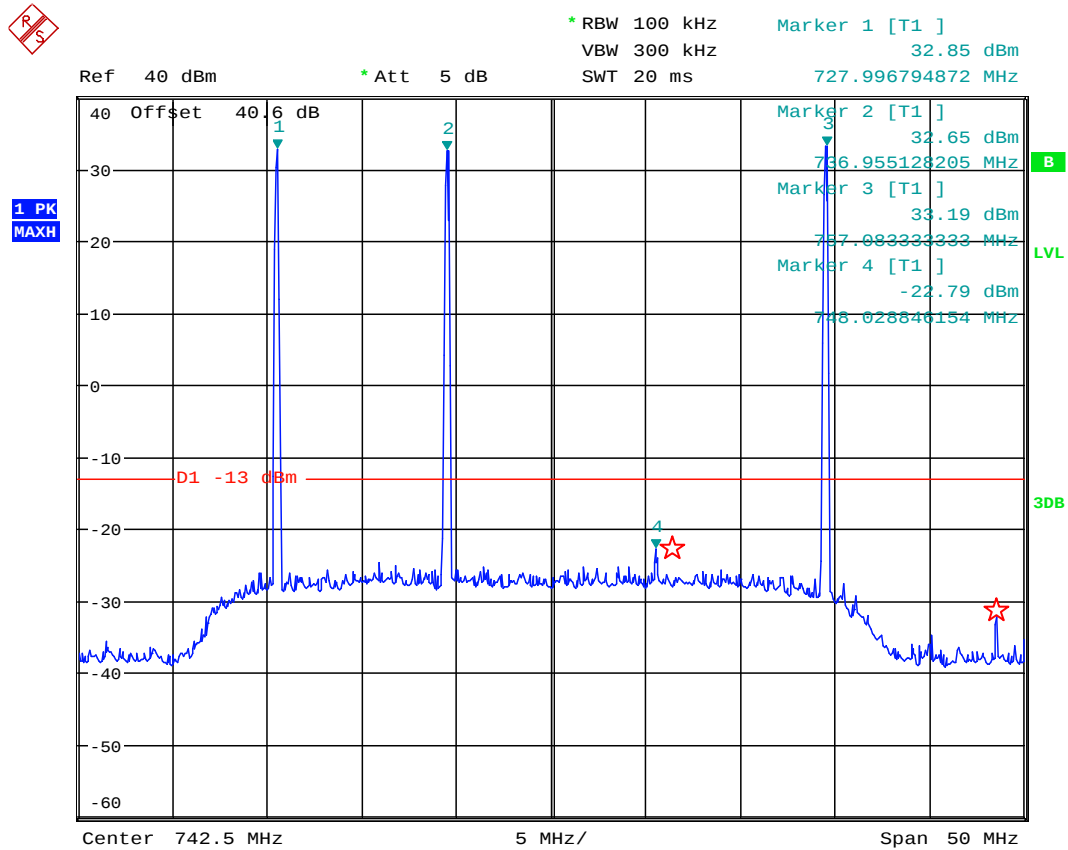
The intermodulation and spurious products were measured with the amplifier operating at maximum gain. A three tone test was conducted using the equipment as above. The input power level was adjusted so the level at point D was 10dB above the maximum input.

Downlink Band	RF Input Frequency (MHz)			Highest Intermodulation Product Level (dBm)	Limit (dBm)
700	728.000	737.692	757.000	-21.64 dBm @ 747.407 MHz	-13
Cross Band	742.5	881.5	1960	-18.10 dBm @ 2481.506 MHz	-13

Test equipment used for intermodulation test

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	REF No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	R&S	FSU46	200034	UH281	X
SIGNAL GENERATOR	MARCONI	2042	119388/080	176	X
SIGNAL GENERATOR	IFR	3413	341001/261	N/A	X
SIGNAL GENERATOR	MARCONI	2023	112224/040	UH105	X
COMBINER	AXELL	N/A	N/A	N/A	X
ATTENUATOR	AXELL	N/A	N/A	N/A	X
ATTENUATOR	SPINNER	745357	D37224	UH225	X
CABLE	TRaC	N/A	N/A	UH253	X
CABLE	TRaC	N/A	N/A	UH254	X
CABLE	TRaC	N/A	N/A	UH269	X
CABLE	TRaC	N/A	N/A	UH273	X
CABLE	TRaC	N/A	N/A	UH274	X

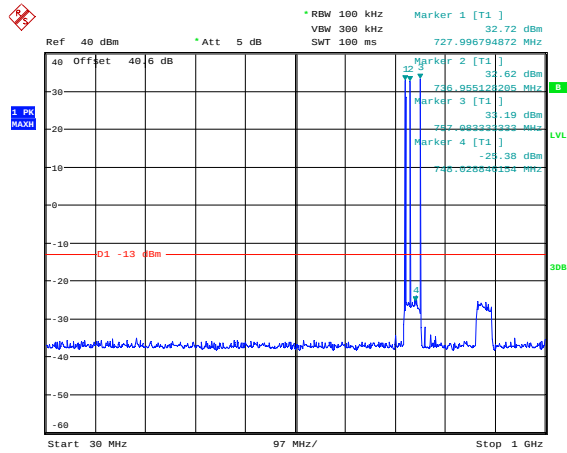
Intermodulation Inband – 700 MHz Downlink Band



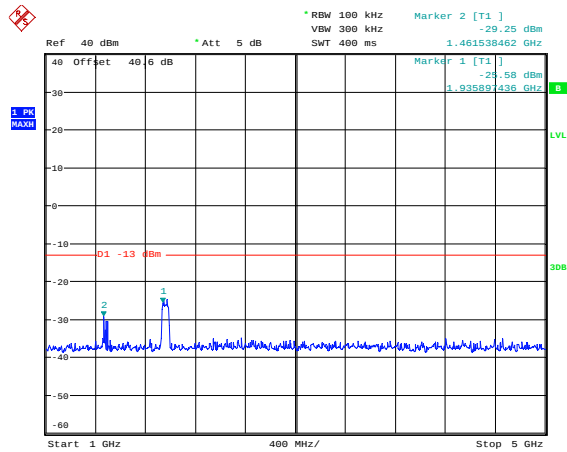
Date: 24.FEB.2011 13:43:47

The above plot shows that all products (designated by ☆) are below the spurious limit.

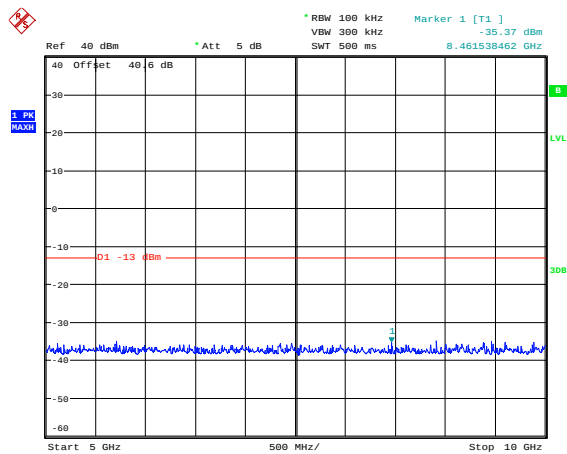
Intermodulation Wideband – 700 MHz Downlink Band



Date: 24.FEB.2011 13:44:27



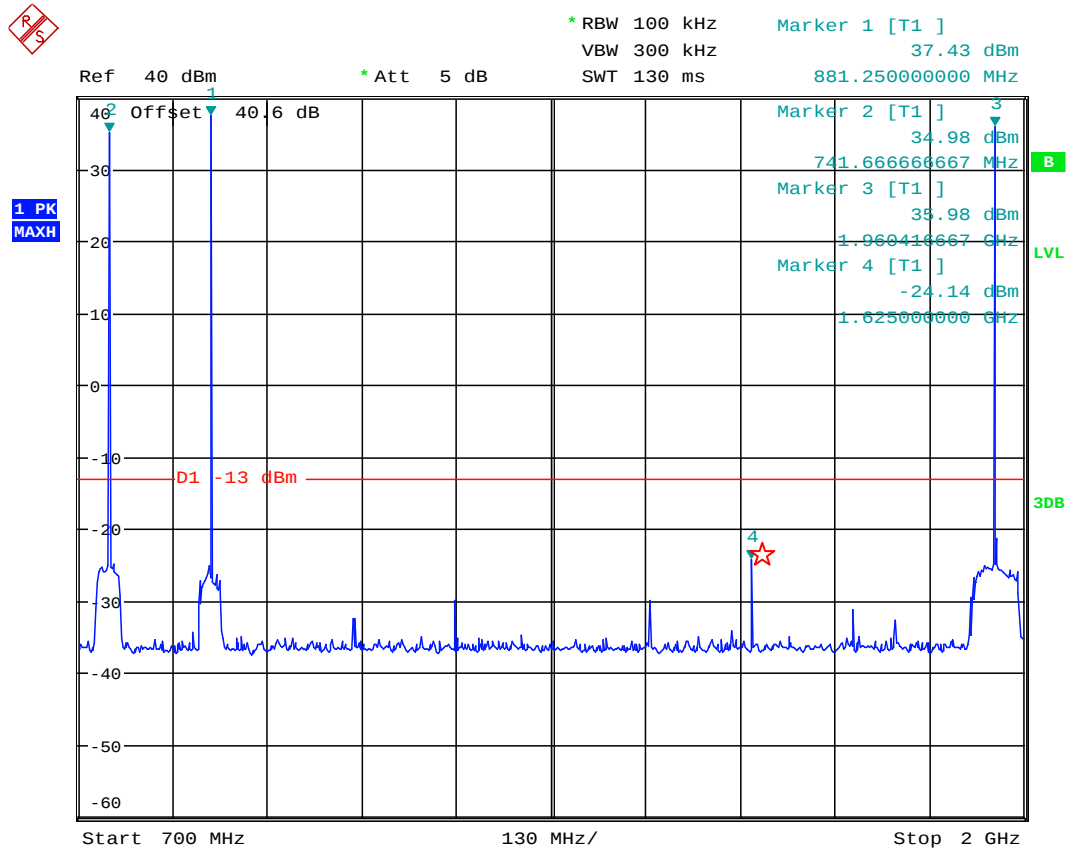
Date: 24.FEB.2011 13:44:45



Date: 24.FEB.2011 13:45:00

The above plot shows that products outside the bands are below the limit

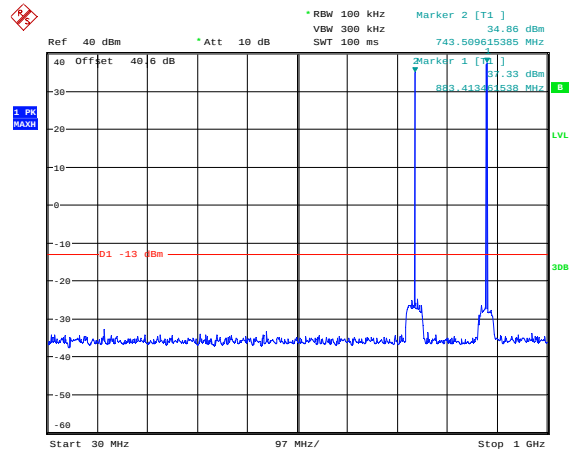
Intermodulation Inband – Cross Band



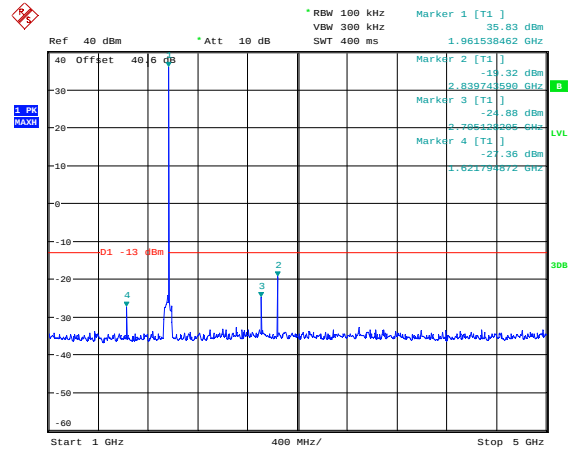
Date: 24.FEB.2011 13:55:36

The above plot shows that all products (designated by ☆) are below the spurious limit.

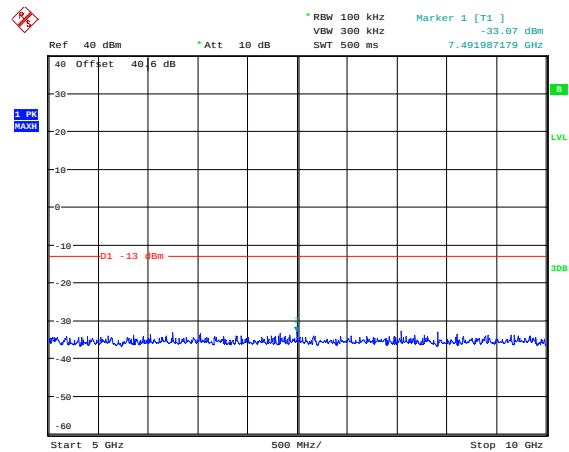
Intermodulation Wideband – Cross Band



Date: 24.FEB.2011 13:58:05



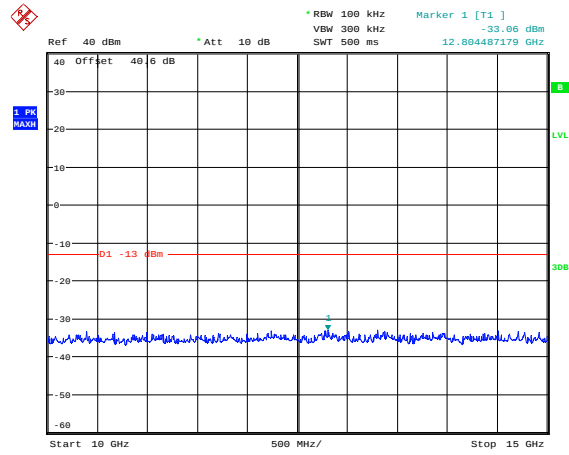
Date: 24.FEB.2011 13:58:27



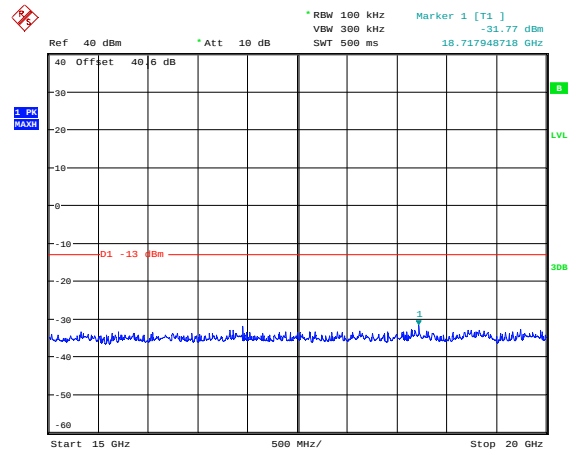
Date: 24.FEB.2011 14:01:49

The above plot shows that products outside the bands are below the limit

Intermodulation Wideband – Cross Band



Date: 24.FEB.2011 14:02:04



Date: 24.FEB.2011 14:02:20

The above plot shows that products outside the bands are below the limit

TRANSMITTER TESTS

AMPLIFIER MODULATED CHANNEL TEST – CONDUCTED – Part 2.1049– DOWNLINK

Ambient temperature = 24°C
 Relative humidity = 56%
 Supply voltage = +110Vac
 Channel number = See test results

Radio Laboratory



This test was performed to show that the amplifier does not alter the input signal in any way. The input signal was set to the maximum input. The following modulation schemes were produced, a 2500Hz FM tone with 2.5 and 5 kHz deviation, 10MHz wide LTE.

The plots show the signal measured at the signal generator and the signal measured at the output of the EUT.

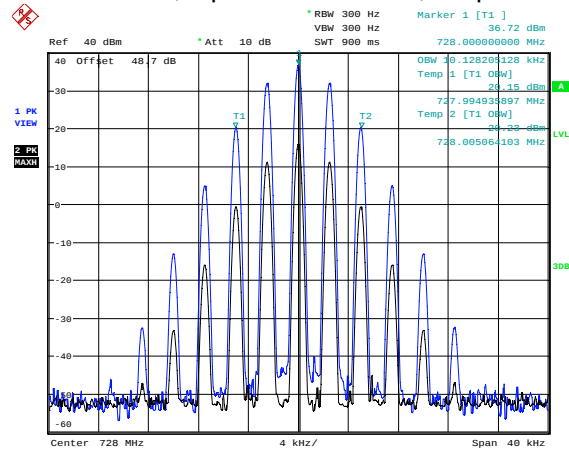
Note: The cables and attenuators had the following losses.

1. Cable and attenuator between EUT and spectrum analyser 40.6dB
2. Cable between signal generator and EUT 0.4dB

Frequency Of Operational	Modulation Type		
	2.5 kHz FM	5 kHz FM	LTE
728.000	10.128 kHz	15.256 kHz	8.942 MHz
742.500	10.128 kHz	15.256 kHz	8.958 MHz
757.000	10.128 kHz	15.256 kHz	8.942 MHz

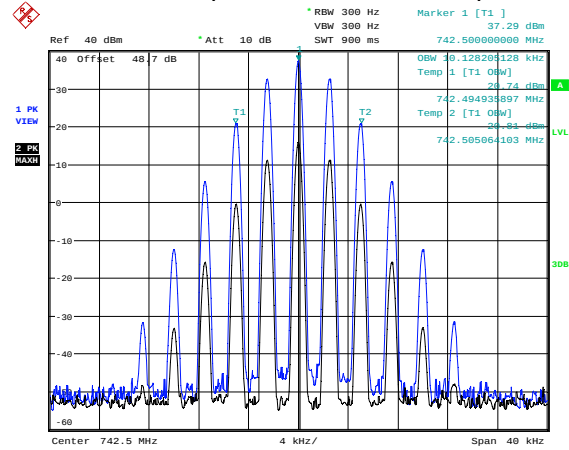
TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	REF No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	X
SIGNAL GENERATOR	IFR	3413	341001/261	N/A	X
ATTENUATOR	BIRD	8308-200	N/A	103	X
ATTENUATOR	BIRD	830-100-N	N/A	222	X
CABLE	TRaC	N/A	N/A	UH273	X
CABLE	TRaC	N/A	N/A	UH274	X

728.0MHz FM deviation set to 2.5kHz, Input – Black Trace, Output - Blue Trace



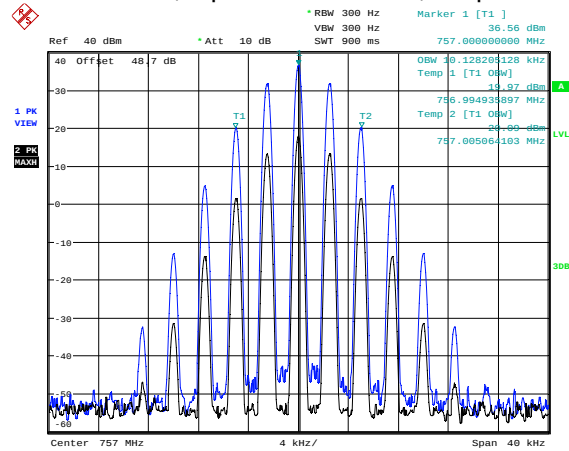
Date: 24.FEB.2011 09:01:20

742.5MHz FM deviation set to 2.5kHz, Input – Black Trace, Output - Blue Trace



Date: 24.FEB.2011 09:02:29

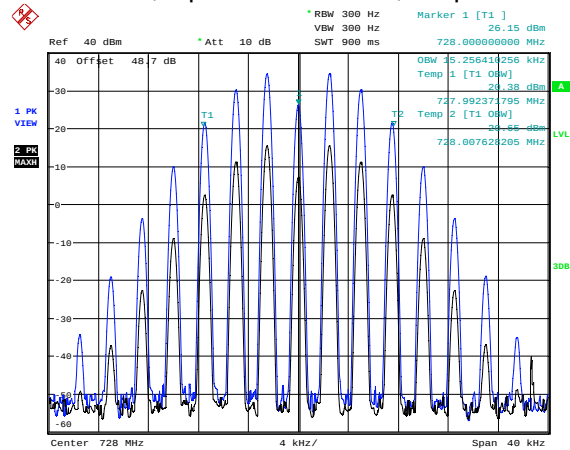
757.0MHz FM deviation set to 2.5kHz, Input – Black Trace, Output - Blue Trace



Date: 24.FEB.2011 09:03:52

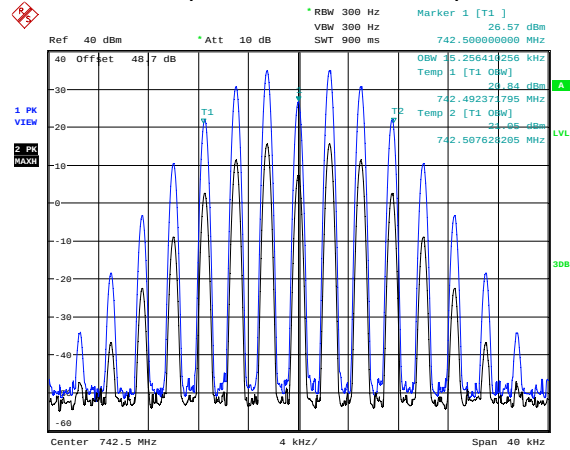
The above plots show no significant distortion visible when compared to the input signal.

728.0MHz FM deviation set to 5kHz, Input – Black Trace, Output - Blue Trace



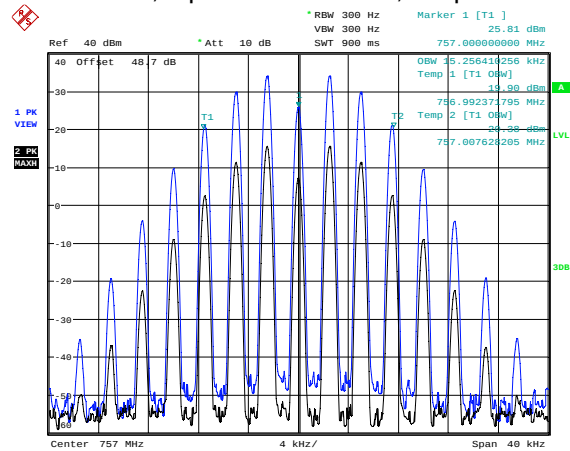
Date: 24.FEB.2011 09:06:27

742.5MHz FM deviation set to 5kHz, Input – Black Trace, Output - Blue Trace



Date: 24.FEB.2011 09:08:43

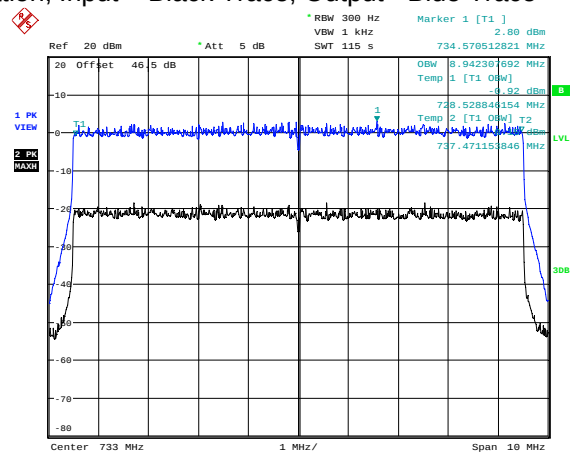
757.0MHz FM deviation set to 5kHz, Input – Black Trace, Output - Blue Trace



Date: 24.FEB.2011 09:04:42

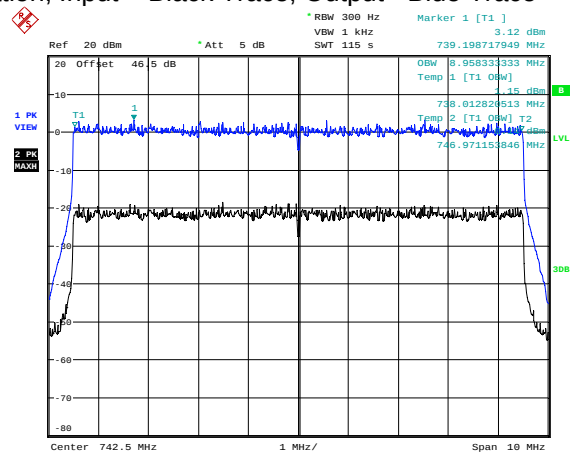
The above plots show no significant distortion visible when compared to the input signal.

728.0MHz LTE Modulation, Input – Black Trace, Output - Blue Trace



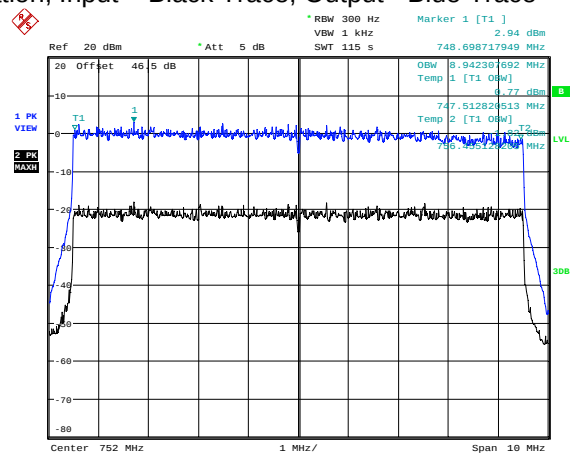
Date: 24.FEB.2011 11:07:32

742.5MHz LTE Modulation, Input – Black Trace, Output - Blue Trace



Date: 24.FEB.2011 11:28:44

757.0MHz LTE Modulation, Input – Black Trace, Output - Blue Trace



Date: 24.FEB.2011 11:45:28

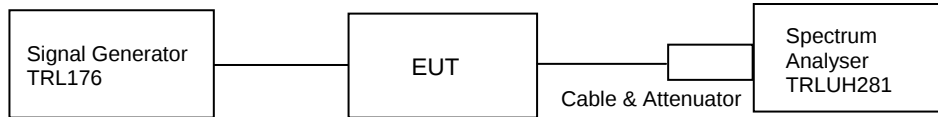
The above plots show no significant distortion visible when compared to the input signal.

TRANSMITTER TESTS

AMPLIFIER SPURIOUS EMISSIONS – CONDUCTED – Part 2.1053 – DOWNLINK

Ambient temperature = 24°C
 Relative humidity = 56%
 Supply voltage = +110Vac

Radio Laboratory
 Test Signal = F3E



The test was set up as per the diagram. The level at the input was adjusted to compensate for the loss of the interconnecting cable. The unit was tested operating at maximum power and on three test frequencies.

The Spurious limit was calculated as follows:

On any frequency removed from the assigned frequency by more than 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

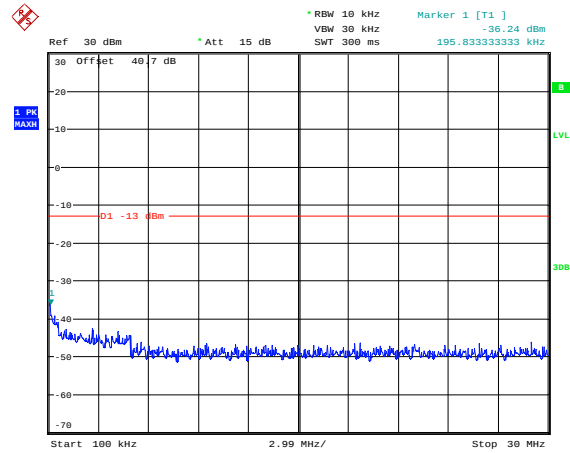
700MHz Downlink

FREQUENCY RANGE	FREQ. (MHz)	MEASURED LEVEL (dBm)	ATTENUATOR & CABLE LOSSES (dB)	EMISSION LEVEL (dBm)	LIMIT (dBm)
100kHz – 22 GHz	No Significant Emissions Within 20 dB of the Limit				-13

The test equipment used for the Transmitter Conducted Emissions:

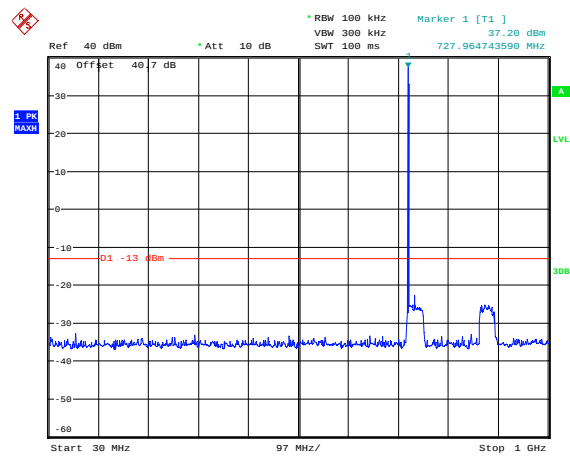
TYPE OF EQUIPMENT	MAKER/SUPPLIER	MODEL No	SERIAL No	REF No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	X
SIGNAL GENERATOR	IFR	3413	341001/261	N/A	X
ATTENUATOR	BIRD	8308-200	N/A	103	X
ATTENUATOR	BIRD	830-100-N	N/A	222	X
CABLE	TRaC	N/A	N/A	UH273	X
CABLE	TRaC	N/A	N/A	UH274	X

Conducted emissions 728.0MHz 100kHz – 30MHz



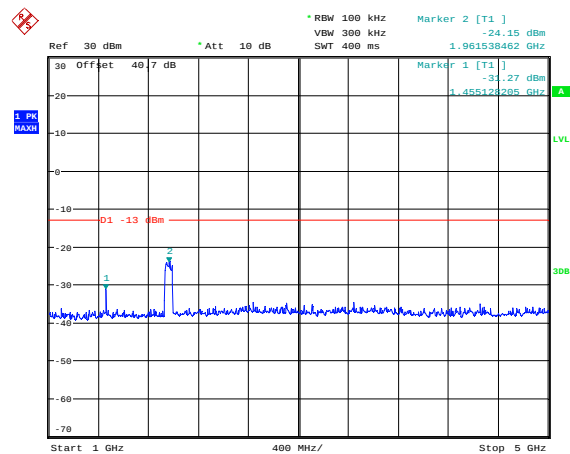
Date: 23.FEB.2011 12:55:46

Conducted emissions 728.0MHz 30MHz – 1GHz



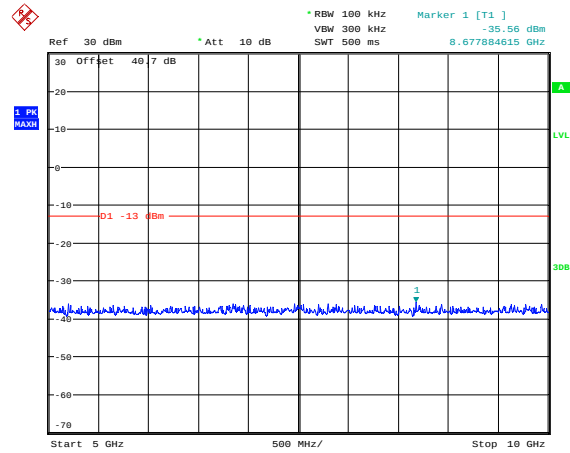
Date: 23.FEB.2011 12:54:00

Conducted emissions 728.0MHz 1 – 5GHz



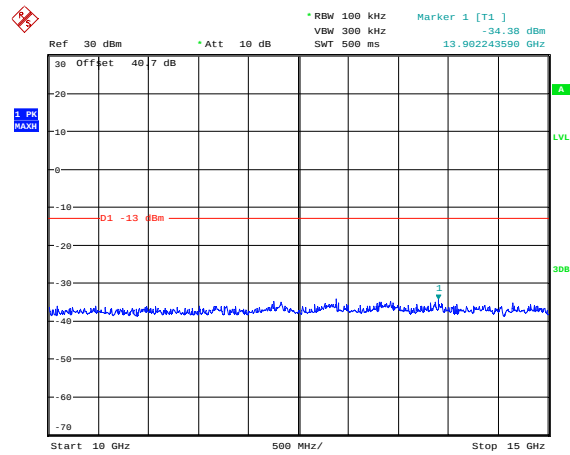
Date: 23.FEB.2011 12:57:58

Conducted emissions 728.0MHz 5 – 10GHz



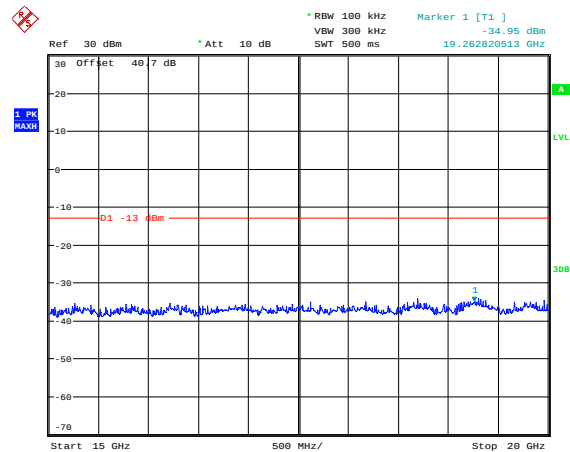
Date: 23.FEB.2011 12:59:21

Conducted emissions 728.0MHz 10 – 15GHz



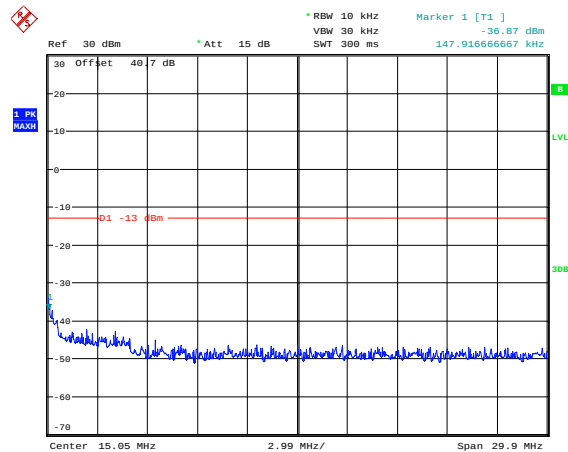
Date: 23.FEB.2011 12:59:06

Conducted emissions 728.0MHz 15 – 20GHz



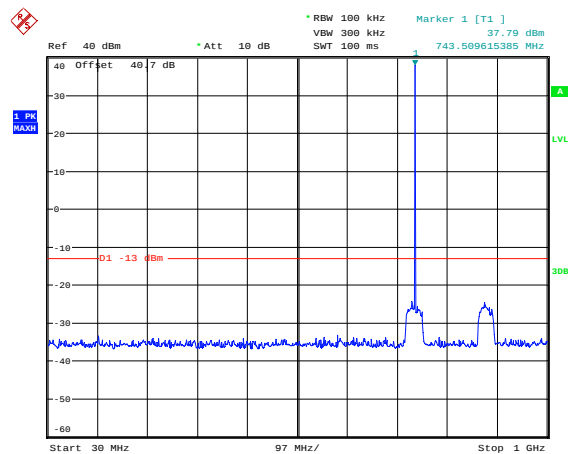
Date: 23.FEB.2011 12:59:34

Conducted emissions 742.5MHz 100kHz – 30MHz



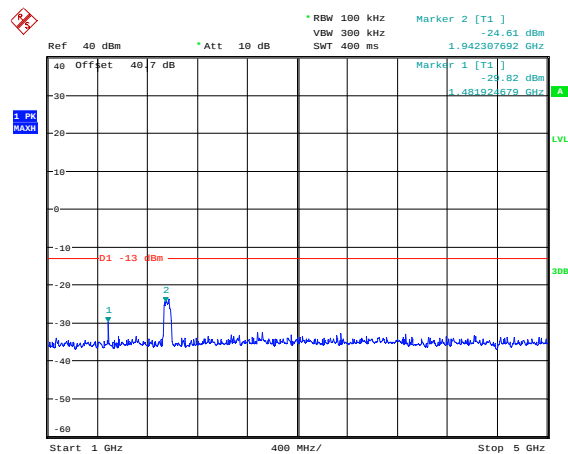
Date: 23.FEB.2011 12:50:57

Conducted emissions 742.5MHz 30MHz – 1GHz



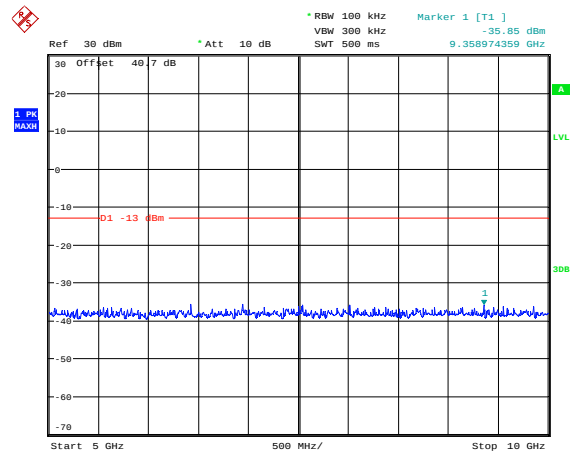
Date: 23.FEB.2011 12:51:15

Conducted emissions 742.5MHz 1 – 5GHz



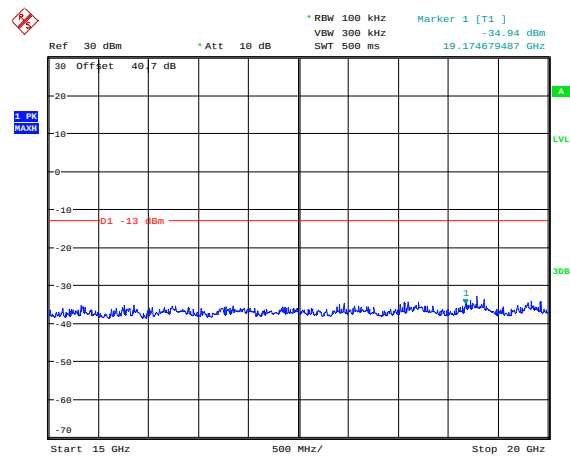
Date: 23.FEB.2011 12:50:45

Conducted emissions 742.5MHz 5 – 10GHz



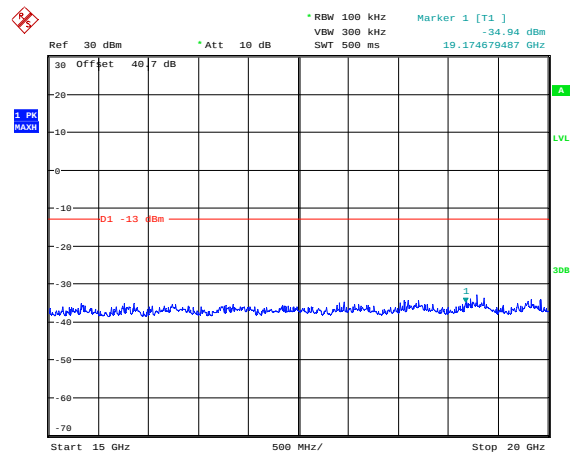
Date: 23.FEB.2011 12:51:46

Conducted emissions 742.5MHz 10 – 15GHz



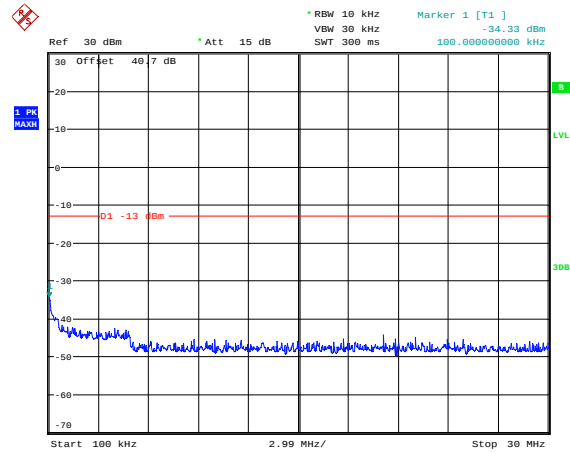
Date: 23.FEB.2011 12:52:24

Conducted emissions 742.5MHz 15 – 20GHz



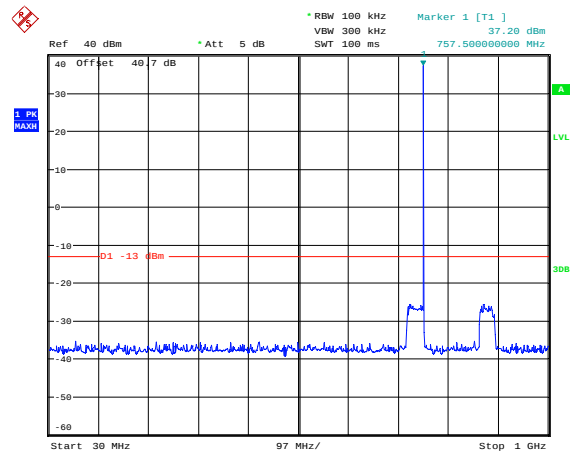
Date: 23.FEB.2011 12:52:24

Conducted emissions 757.0MHz 100kHz – 30MHz



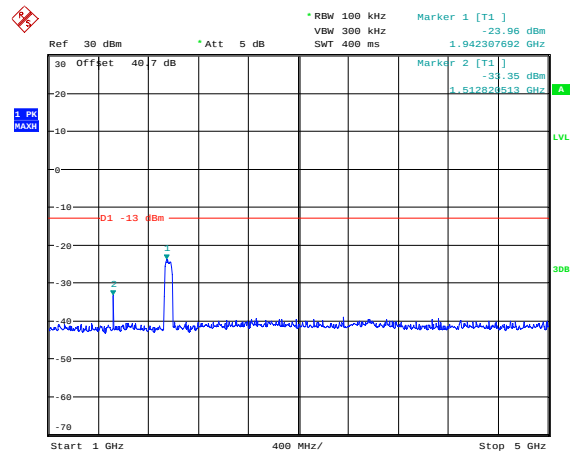
Date: 23.FEB.2011 12:43:02

Conducted emissions 757.0MHz 30MHz – 1GHz



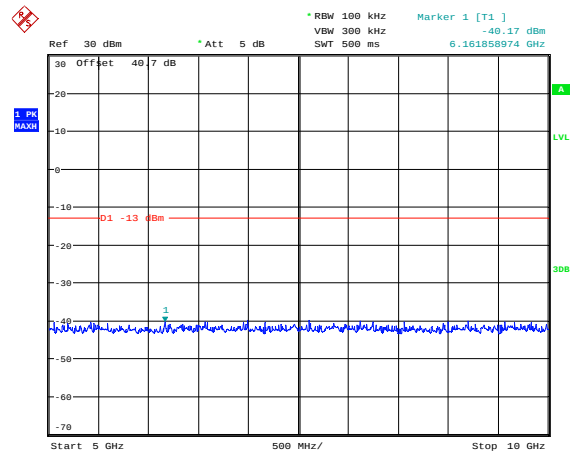
Date: 23.FEB.2011 12:43:14

Conducted emissions 757.0MHz 1 – 5GHz



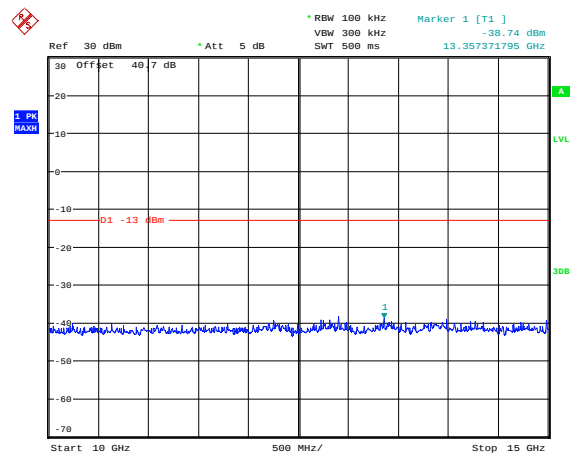
Date: 23.FEB.2011 12:43:51

Conducted emissions 757.0MHz 5 – 10GHz



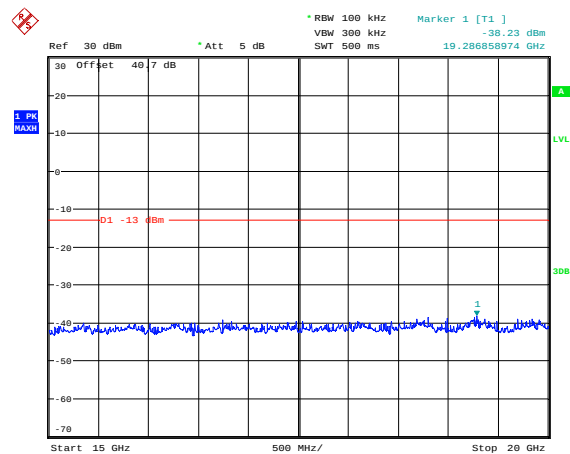
Date: 23.FEB.2011 12:44:06

Conducted emissions 757.0MHz 10 – 15GHz



Date: 23.FEB.2011 12:44:22

Conducted emissions 757.0MHz 15 – 20GHz

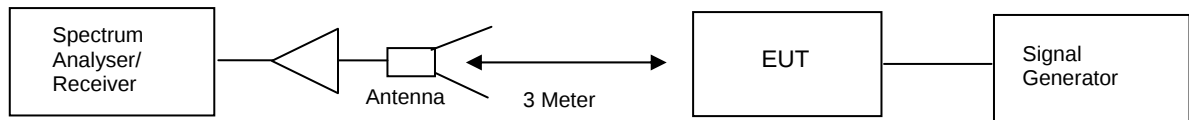


Date: 23.FEB.2011 12:44:35

TRANSMITTER TESTS

AMPLIFIER SPURIOUS EMISSIONS – RADIATED – Part 2.1053– DOWNLINK

Ambient temperature = 17°C
 Relative humidity = 48%
 Conditions = OATS
 Supply voltage = +110Vac
 Supply Frequency = N/A



The test was set up as per the diagram. The level at the input was adjusted to compensate for the loss of the interconnecting cable. The unit was tested operating maximum power on three test frequencies with a 50 ohm load on the output. The unit was also tested with the signal generator replaced by another 50ohm load.

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

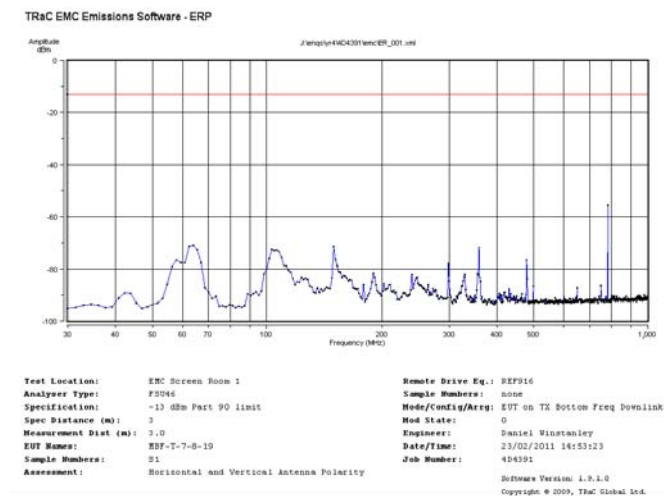
700 MHz Band

FREQUENCY RANGE	FREQ. (MHz)	MEAS. Rx. (dBμV)	CABLE LOSS (dB)	ANT FACTOR	FIELD STRENGTH (dBμV/m)	CALCULATED EIRP (dBm)	LIMIT (dBm)
30MHz – 20 GHz	No Significant Emissions Within 20 dB of Limit						-13

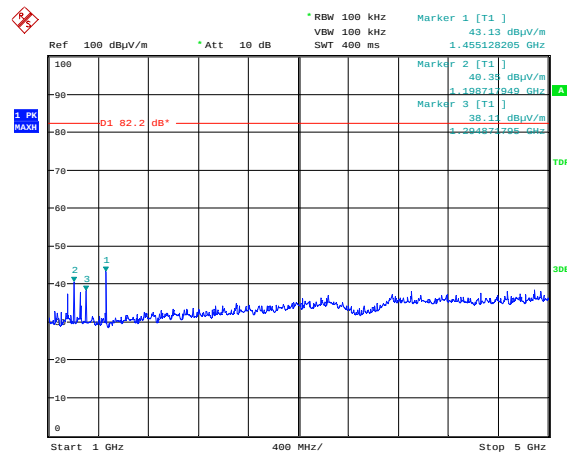
The test equipment used for the Transmitter Spurious Emissions:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	REF No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	X
HORN	EMCO	3115	9010-3580	138	X
HORN	FLANN	20240-20	322	300	X
PRE AMPLIFIER	HP	8449B	3008A016	572	X
SIGNAL GENERATOR	IFR	3413	341001/261	N/A	X
ANTENNA	YORK	CBL611/A	1618	UH191	X

Radiated emissions 728.0 30MHz – 1GHz

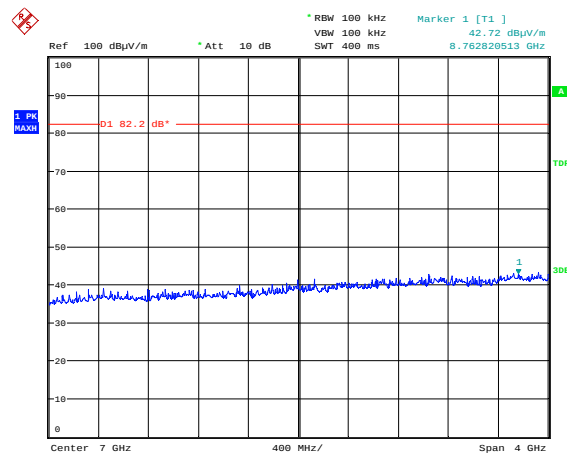


Radiated emissions 728.0 1 – 5GHz



Date: 23.FEB.2011 16:18:26

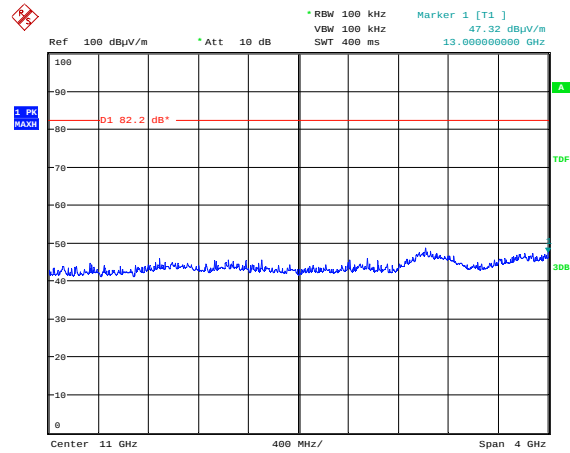
Radiated emissions 728.0 5 – 9GHz



Date: 23.FEB.2011 16:21:01

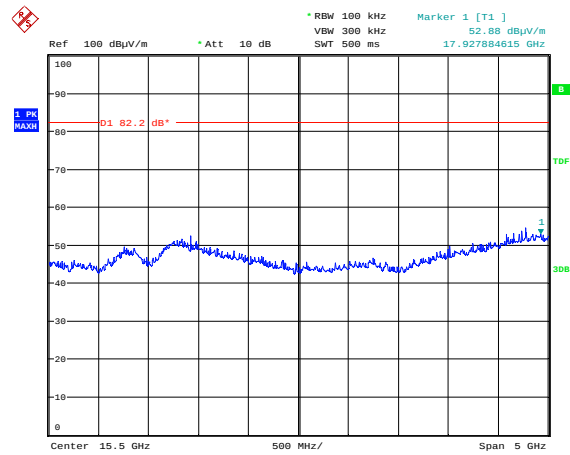
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

Radiated emissions 728.0 9 – 13GHz



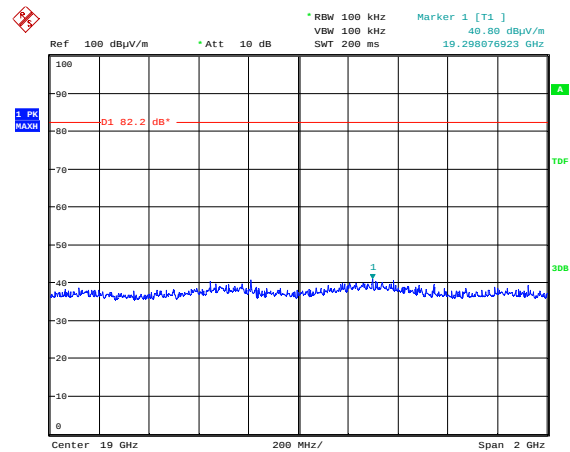
Date: 23.FEB.2011 16:21:20

Radiated emissions 728.0 13 – 18GHz



Date: 23.FEB.2011 16:20:41

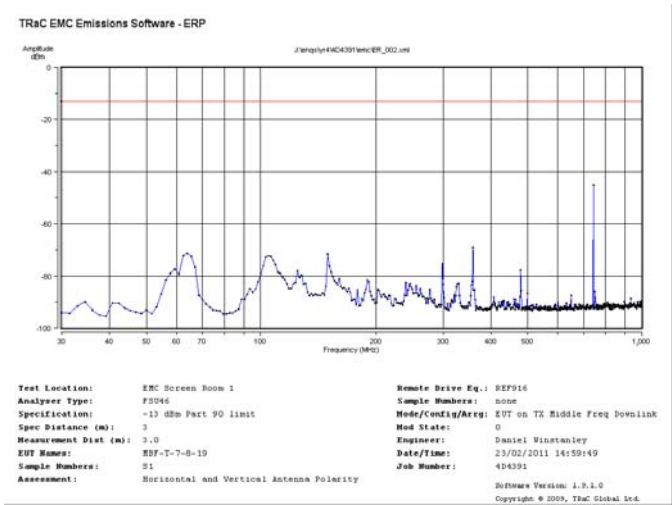
Radiated emissions 728.0 18 – 20GHz



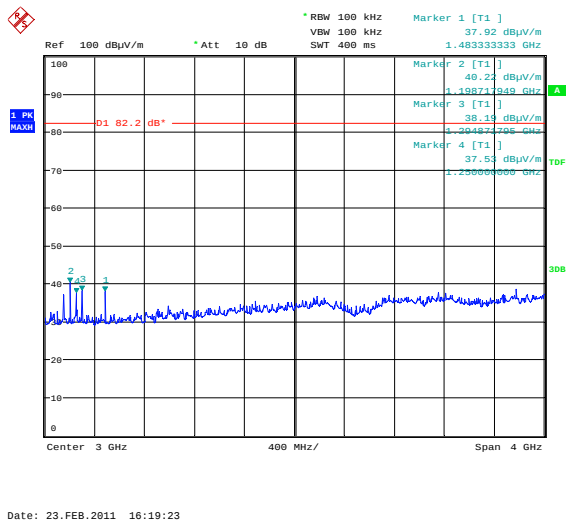
Date: 23.FEB.2011 16:38:06

The above test results show that there were no emissions within 20dBs of the -13dBm limit.

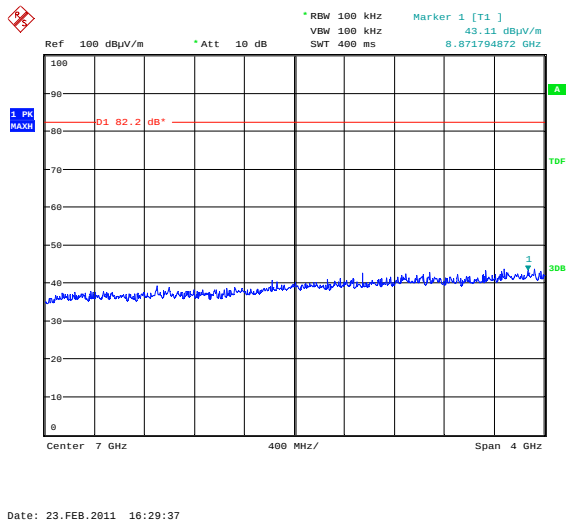
Radiated emissions 742.5 30MHz – 1GHz



Radiated emissions 742.5 1 – 5GHz

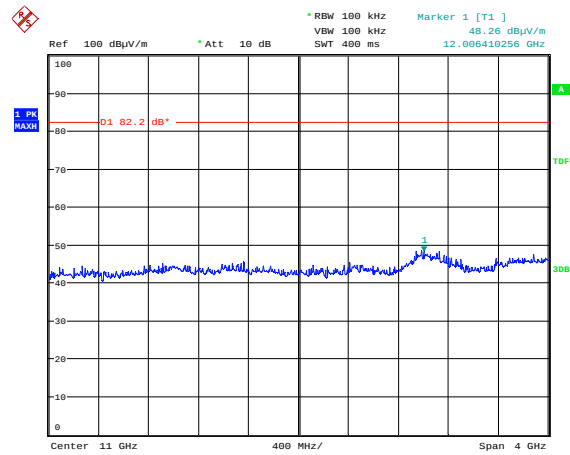


Radiated emissions 742.5 5 – 9GHz



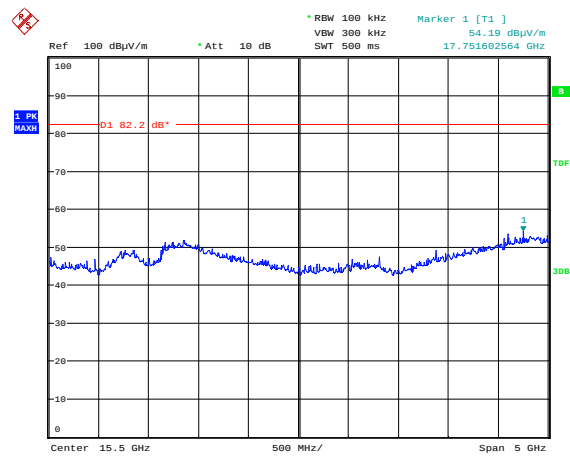
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

Radiated emissions 742.5 9 – 13GHz



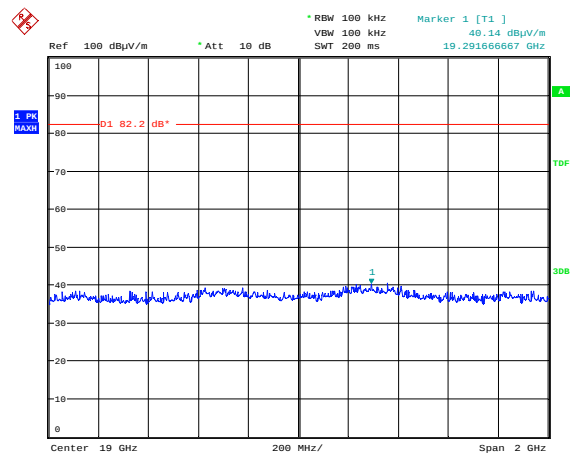
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Radiated emissions 742.5 13 – 18GHz



Date: 23.FEB.2011 16:24:50

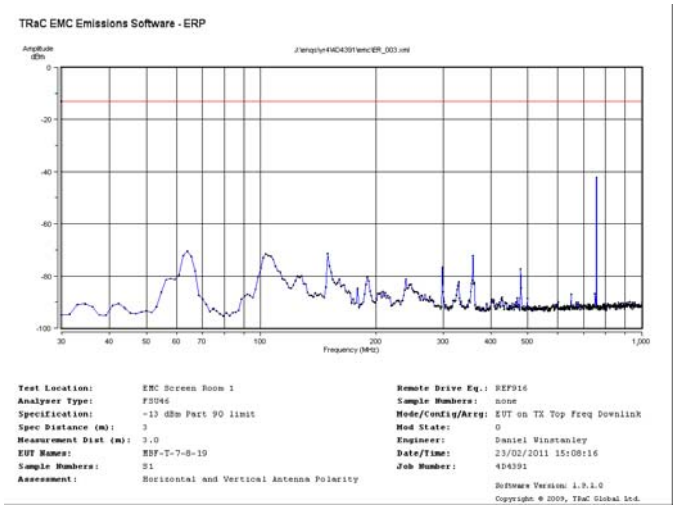
Radiated emissions 742.5 18 – 20GHz



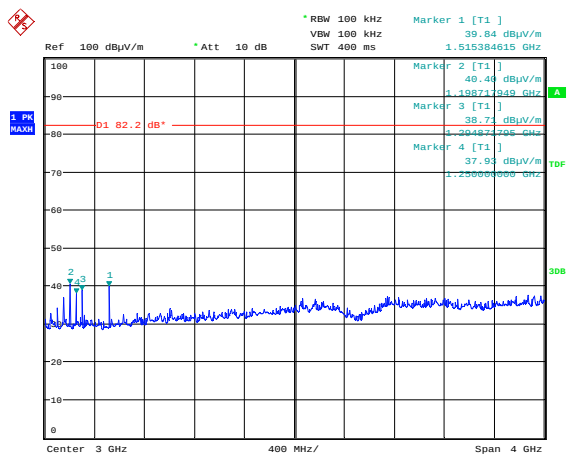
Date: 23.FEB.2011 16:39:47

The above test results show that there were no emissions within 20dBs of the -13dBm limit.

Radiated emissions 757.0 30MHz – 1GHz

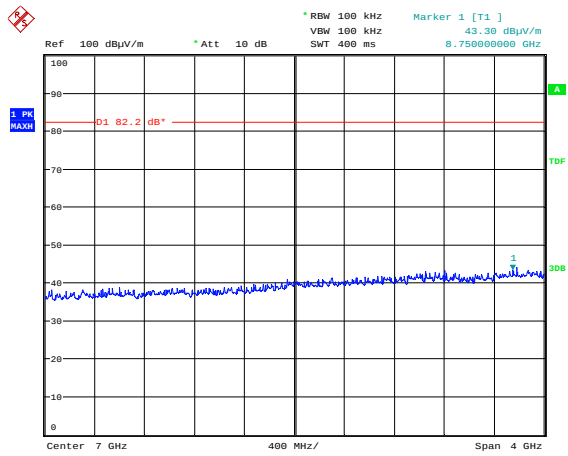


Radiated emissions 757.0 1 – 5GHz



Date: 23.FEB.2011 16:19:47

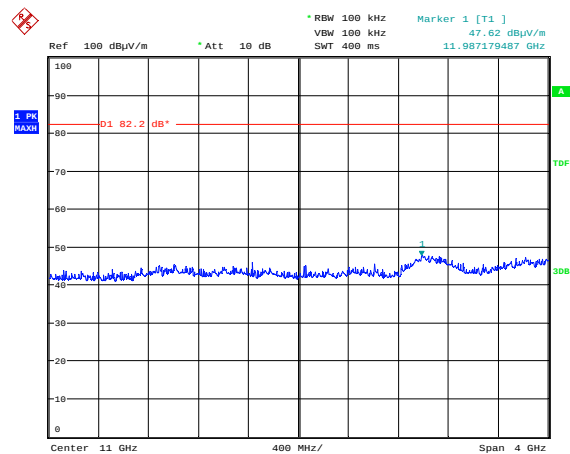
Radiated emissions 757.0 5 – 9GHz



Date: 23.FEB.2011 16:22:15

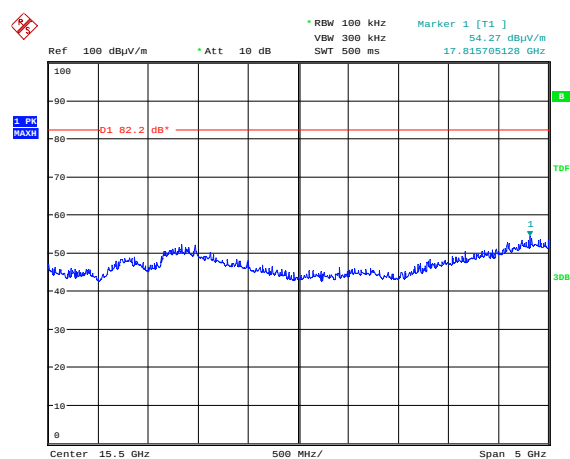
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

Radiated emissions 757.0 9 – 13GHz



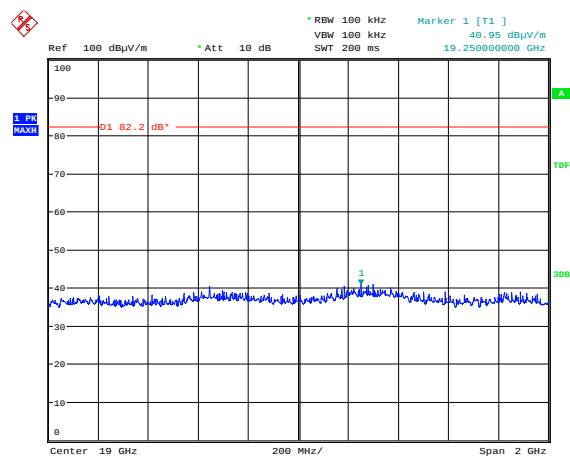
Date: 23.FEB.2011 16:22:29

Radiated emissions 757.0 13 – 18GHz



Date: 23.FEB.2011 16:24:32

Radiated emissions 757.0 18 – 20GHz

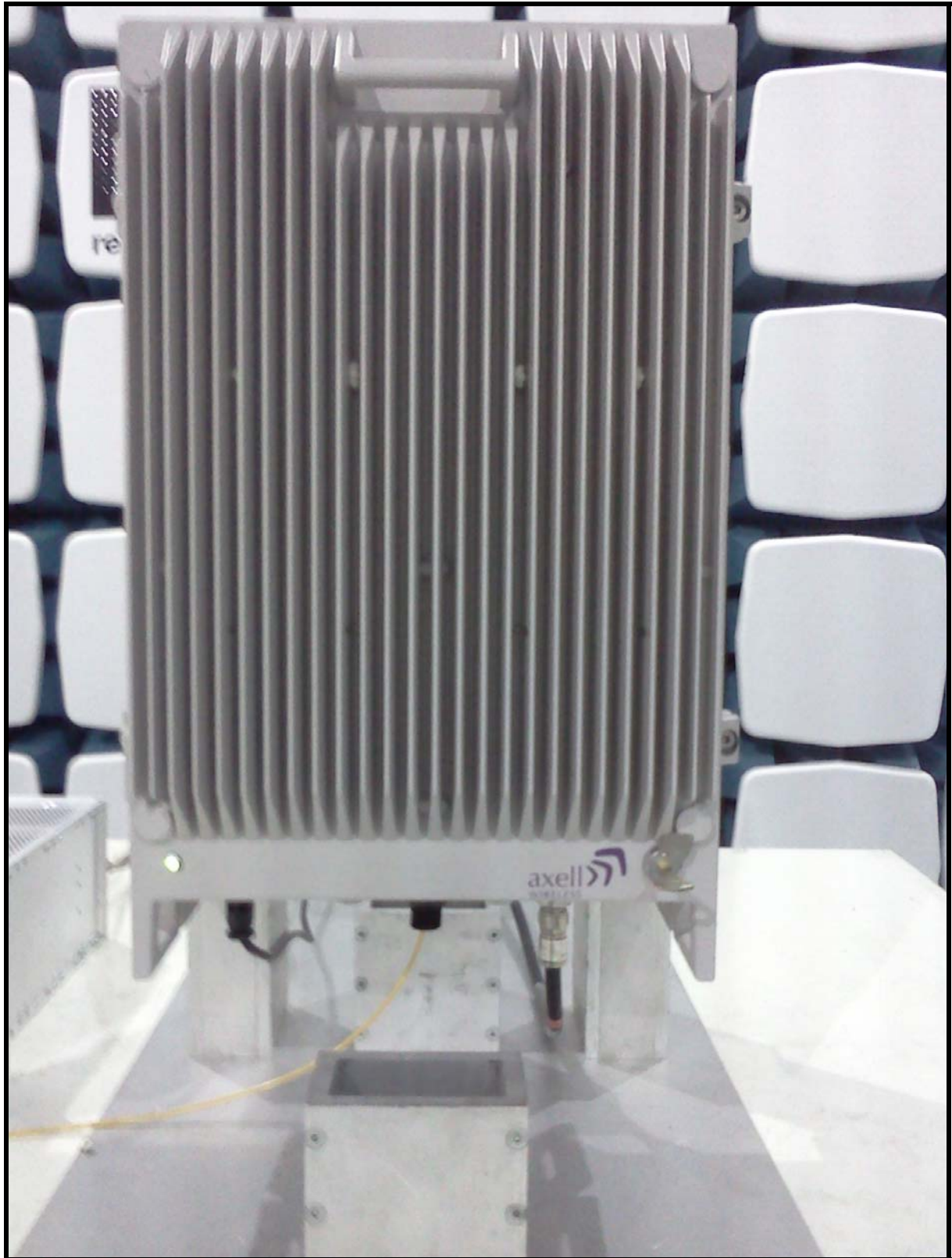


Date: 23.FEB.2011 16:38:47

The above test results show that there were no emissions within 20dBs of the -13dBm limit.

ANNEX A
PHOTOGRAPHS





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	[X]
		-	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
EQUIPMENT CALIBRATION

Number	Equipment Type	Manufacturer	Last Cal Calibration	Calibration Period	Due For Calibration
UH105	Signal Generator	Marconi	23/06/2009	12	23/06/2010
UH191	Bilog	York	01/10/2008	24	01/10/2010
UH225	Attenuator	Spinner		Calibrate In Use	
UH253	1m Cable N type	TRaC		Calibrate In Use	
UH254	1m Cable N type	TRaC		Calibrate In Use	
UH269	1m Cable N type	TRaC		Calibrate In Use	
UH270	1m Cable N type	TRaC		Calibrate In Use	
UH271	1.5m Cable N type	TRaC		Calibrate In Use	
UH272	1.5m Cable N type	TRaC		Calibrate In Use	
UH273	2m Cable N type	TRaC		Calibrate In Use	
UH274	2m Cable N type	TRaC		Calibrate In Use	
UH281	Spectrum Analyser	R&S	29/01/2010	12	29/01/2011
UH291	K-Type Cable	Succoflex		Calibrate In Use	
UH293	K-Type Cable	Megaphase		Calibrate In Use	
UH372	Pre Amplifier	Watkins Johnson	14/04/2010	12	14/04/2011
L138	1-18GHz Horn	EMCO	10/09/2009	24	10/09/2011
L176	Signal Generator	Marconi	08/07/2010	12	08/07/2011
L572	Pre Amp	Agilent	15/07/2009	12	15/07/2010
N/A	Signal Generator	IFR			
N/A	Attenuator	Axell		Calibrate In Use	

ANNEX D
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 - TRACUH120) = **2.18dB**

Uncertainty in test result (Equipment – TRAC05) = **1.08dB**

Uncertainty in test result (Equipment – TRAC479) = **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 - TRACUH120) = **119ppm**

Uncertainty in test result (Equipment – TRAC05) = **0.113ppm**

Uncertainty in test result (Equipment – TRAC479) = **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 TRAC479) Up to 8.1GHz = **3.31dB**

Uncertainty in test result (Equipment TRAC479) 8.1GHz – 15.3GHz = **4.43dB**

Uncertainty in test result (Equipment TRAC479) 15.3GHz – 21GHz = **5.34dB**

Uncertainty in test result (Equipment TRACUH120) 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%**