



**REPORT ON THE CERTIFICATION TESTING OF A  
AXELL WIRELESS  
DUAL BAND REPEATER  
MBF-D-7-71  
WITH RESPECT TO  
THE FCC RULES CFR 47, PART 27  
PRIVATE LAND MOBILE REPEATER.**

TEST REPORT NO: TTR-001973WUS2  
COPY NO: 1  
ISSUE NO: 1  
FCC ID: NEOA216SERIES

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MBF-D-7-71  
WITH RESPECT TO  
THE FCC RULES CFR 47, PART 27  
PRIVATE LAND MOBILE REPEATER.**

TEST DATE: 15<sup>th</sup> – 29<sup>th</sup> November 2010



APPROVED BY: .....

J CHARTERS  
RADIO PRODUCT  
MANAGER

DATE: 14<sup>th</sup> February 2011 .....

Distribution:

- Copy Nos:
1. Axell Wireless
  2. TCB: TRaC EMC & Safety
  3. TRaC Telecoms & Radio

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**HULL**

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<b>Notes:</b>			
1.    Component failure during test	YES		[ ]
	NO		[X]
2.    If Yes, details of failure:			
3.    The facilities used for the testing of the product contain in this report are FCC Listed.			

**CERTIFICATE OF CONFORMITY & COMPLIANCE**

FCC IDENTITY:	NEOA216SERIES
PURPOSE OF TEST:	Certification
TEST SPECIFICATION:	FCC RULES CFR 47, Part 27
TEST RESULT:	Compliant to Specification
EQUIPMENT UNDER TEST:	MBF-D-7-71
EQUIPMENT TYPE:	Private Land Mobile Repeater
MAXIMUM GAIN:	600MHz Band Uplink 38.20 dB
	700MHz Band Uplink 31.70 dB
	1700MHz Band Uplink 30.20 dB
	700MHz Band Downlink 40.70 dB
	2110MHz Band Downlink 33.20 dB
MAXIMUM INPUT:	600MHz Band Uplink -65.40 dB
	700MHz Band Uplink -60.40 dB
	1700MHz Band Uplink -61.50 dB
	700MHz Band Downlink -0.50 dB
	2110MHz Band Downlink +5.30 dB
MAXIMUM OUTPUT CONDUCTED:	600MHz Band Uplink -27.20 dB
	700MHz Band Uplink -28.70 dB
	1700MHz Band Uplink -31.30 dB
	700MHz Band Downlink +40.20 dB
	2110MHz Band Downlink +38.50 dB
MAXIMUM NUMBER OF CHANNELS:	Not Applicable
CHANNEL BANDWIDTH:	Not Applicable, Wideband
POWER SOURCE(s):	+110Vac
TEST DATE(s):	15 <sup>th</sup> – 29 <sup>th</sup> November 2010
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-D-7-71

EQUIPMENT TYPE: Private Land Mobile Repeater

PURPOSE OF TEST: Certification

TEST SPECIFICATION(s): FCC RULES CFR 47, Part 27

TEST RESULT: COMPLIANT Yes   
No

APPLICANT'S CATEGORY: MANUFACTURER   
IMPORTER   
DISTRIBUTOR   
TEST HOUSE   
AGENT

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): 15<sup>th</sup> – 29<sup>th</sup> November 2010

TEST REPORT No: TTR-001973WUS2

### 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 [ ]
- 9. Test Location TRaC Telecoms & Radio  
Skelmersdale [X]  
Hull [ ]
- 10. Modifications made during test program No modifications were performed.

**System description:**

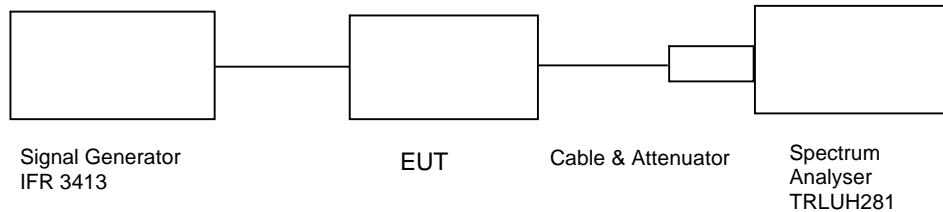
The MBF-D-7-71 is bi directional repeater covering three bands in the uplink direction and two bands in the downlink direction. The uplink bands are wideband and cover the frequency ranges 698 MHz – 716 MHz, 776 MHz – 787MHz and 1710 MHz – 1755 MHz. The downlink bands are wideband and cover the frequency ranges 728 MHz – 757 MHz and 2110 MHz – 2155 MHz

## 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	-63.60	0.3	-27.27	0.3	36.9	-27.0	27.0
707.000	-65.10	0.3	-27.46	0.3	38.2	-27.2	28.3
716.000	-63.70	0.3	-27.65	0.3	36.7	-27.4	26.7

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	-58.90	0.3	-28.85	0.3	30.7	-28.6	20.77
742.500	-59.90	0.3	-28.88	0.3	31.6	-28.6	21.70
787.000	-60.10	0.3	-28.97	0.3	31.7	-28.7	21.83

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

#### 1700 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
1710.000	-59.60	0.5	-31.73	0.5	28.9	-31.2	18.90
1732.500	-60.80	0.7	-31.78	0.5	30.2	-31.3	20.25
1755.000	-59.30	0.6	-31.69	0.5	28.7	-31.2	18.69

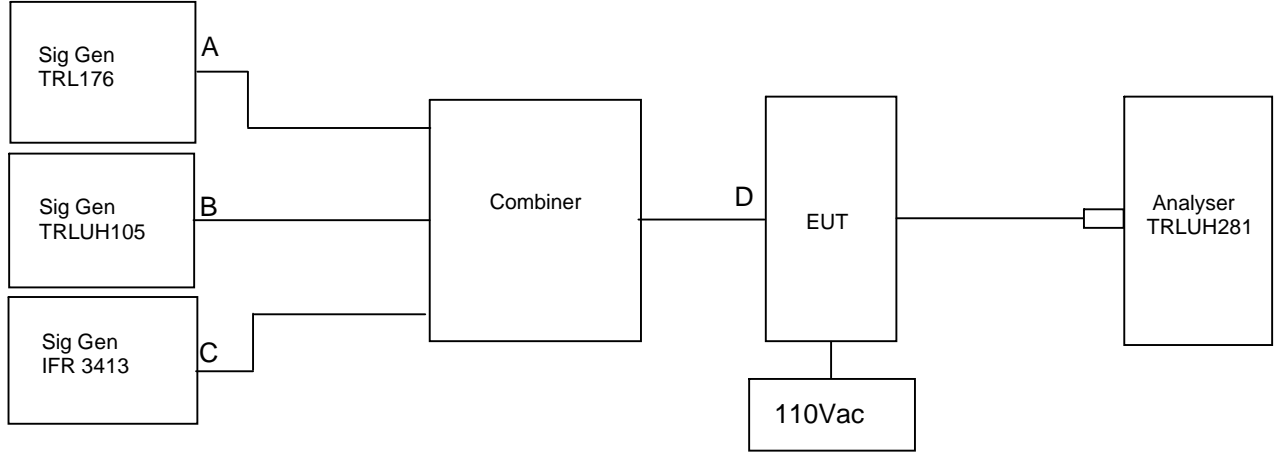
Notes: 1. The signal generator input was increased by 10dBs and the level of the output signal remeasured.

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.

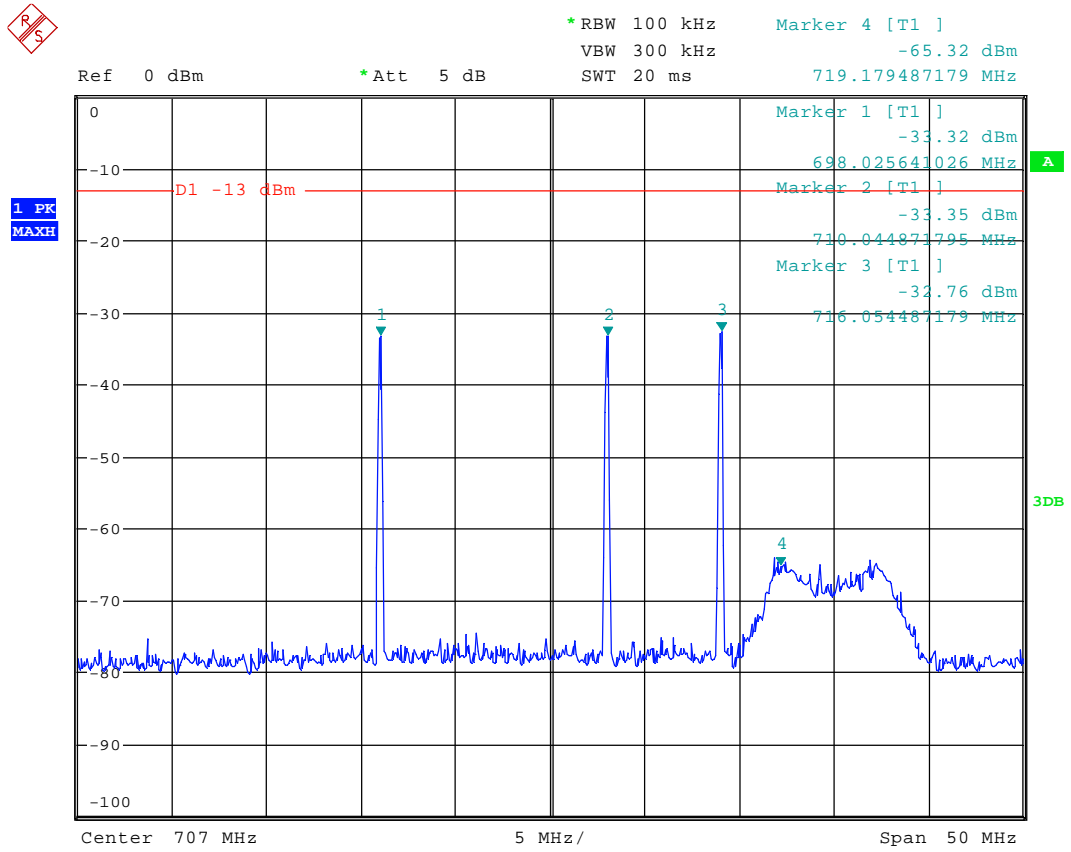
Uplink Band	RF Input Frequency (MHz)			Highest Intermodulation Product Level (dBm)	Limit (dBm)
600 MHz	698.0	710.0	716.0	No Significant Emissions Within 20 dB of Limit	-13
700 MHz	776.0	779.6	787.0	No Significant Emissions Within 20 dB of Limit	-13
1700 MHz	1710.0	1740.0	1755.0	No Significant Emissions Within 20 dB of Limit	-13
Cross Band	707.0	742.5	1732.5	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

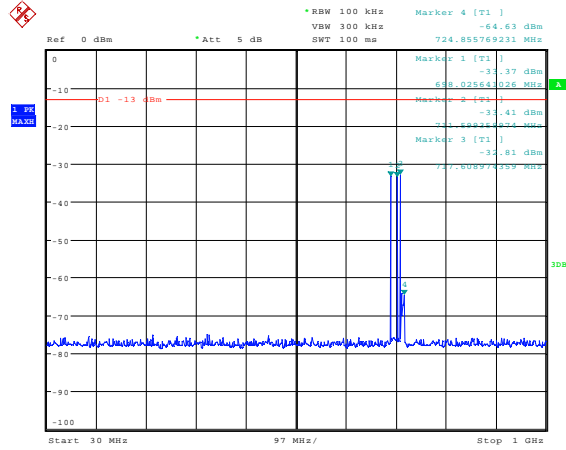
### Intermodulation Inband – 600MHz Band



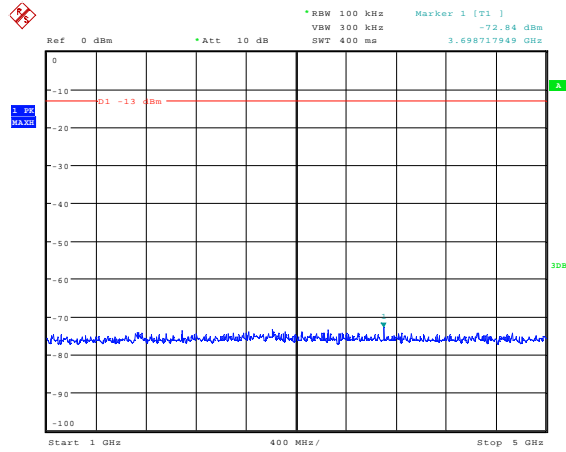
Date: 19.NOV.2010 09:18:37

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

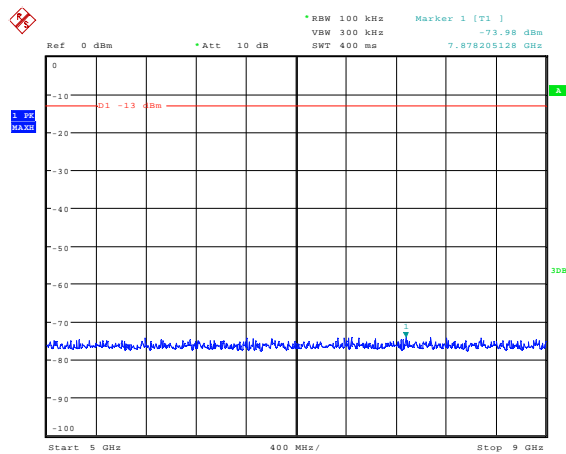
## Intermodulation Wideband – 600MHz Band



Date: 19.NOV.2010 09:18:57



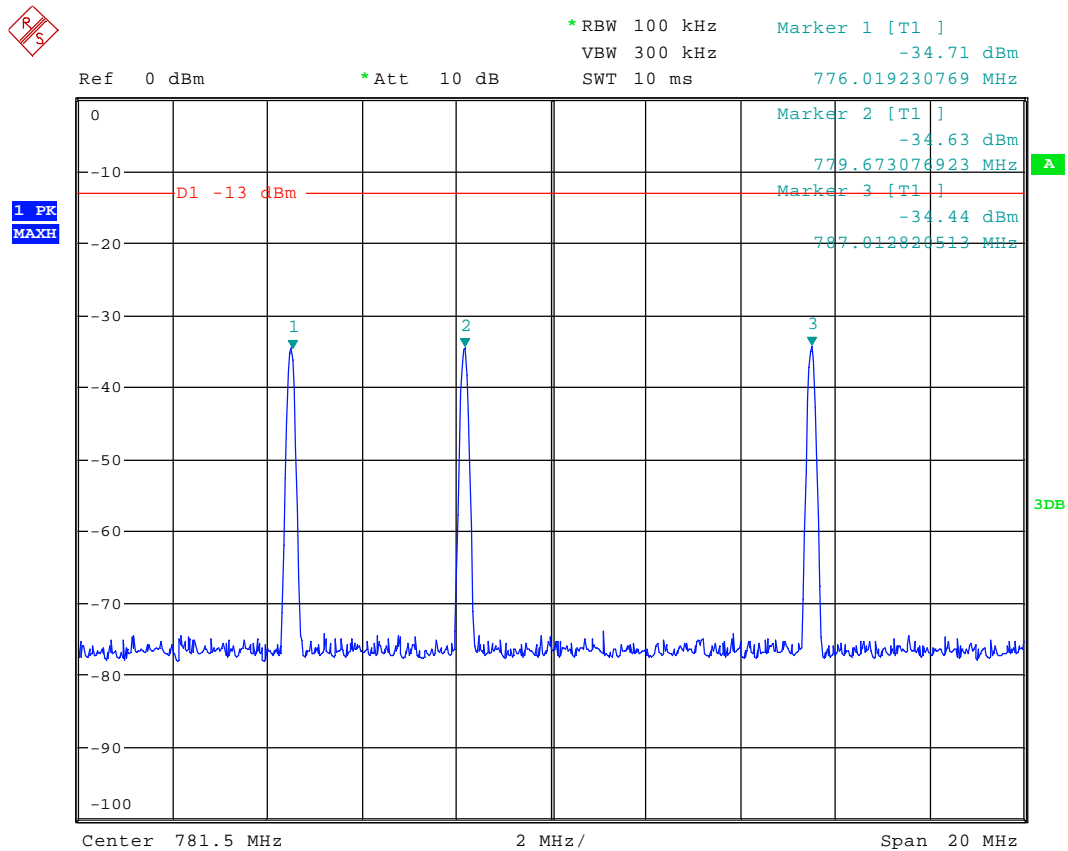
Date: 19.NOV.2010 09:19:39



Date: 19.NOV.2010 09:19:52

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

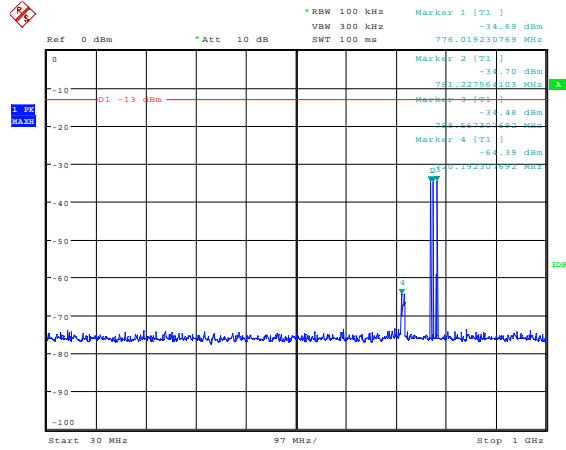
### Intermodulation Inband – 700MHz Band



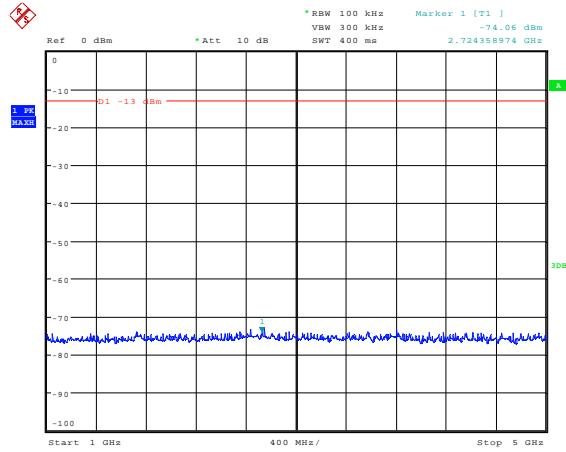
Date: 19.NOV.2010 09:26:13

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

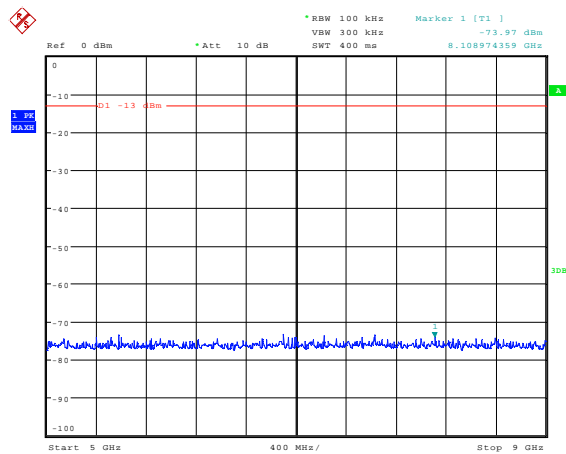
## Intermodulation Wideband – 700MHz Band



Date: 19.NOV.2010 09:26:42



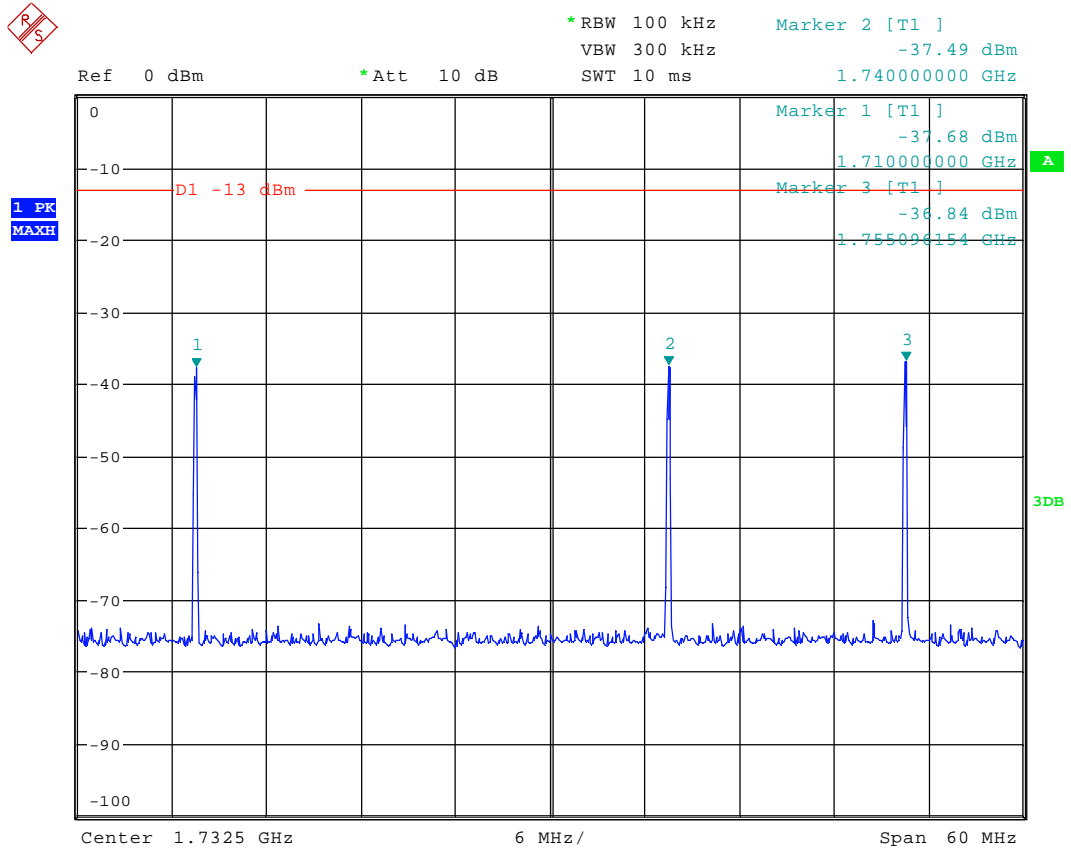
Date: 19.NOV.2010 09:27:15



Date: 19.NOV.2010 09:27:29

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

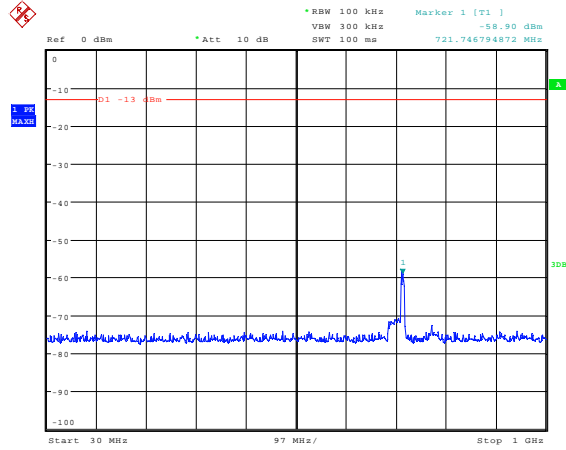
### Intermodulation Inband – 1700MHz Band



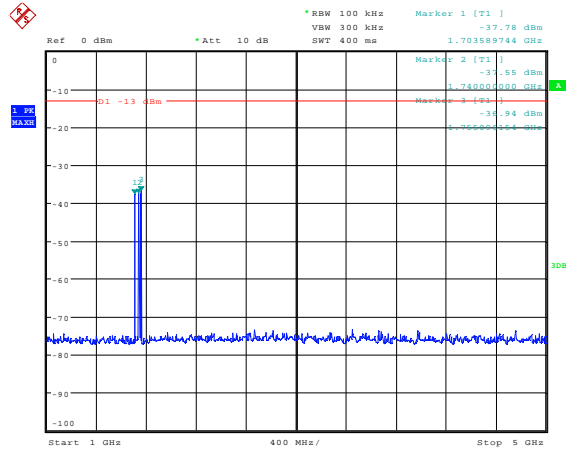
Date: 19.NOV.2010 09:42:30

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

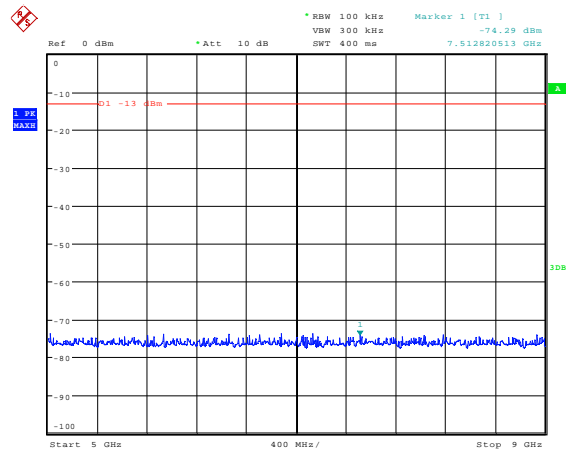
### Intermodulation Wideband – 1700MHz Band



Date: 19.NOV.2010 09:45:26



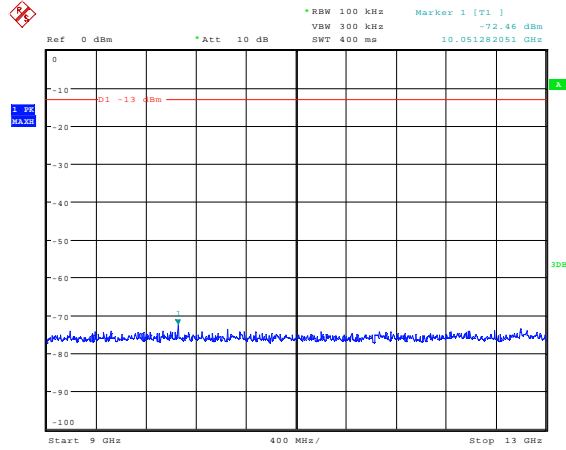
Date: 19.NOV.2010 09:45:13



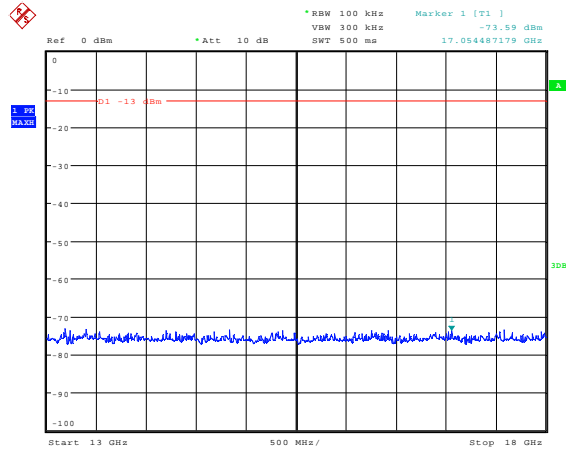
Date: 19.NOV.2010 09:45:40

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

# Intermodulation Wideband – 1700MHz Band



Date: 19.NOV.2010 09:45:58



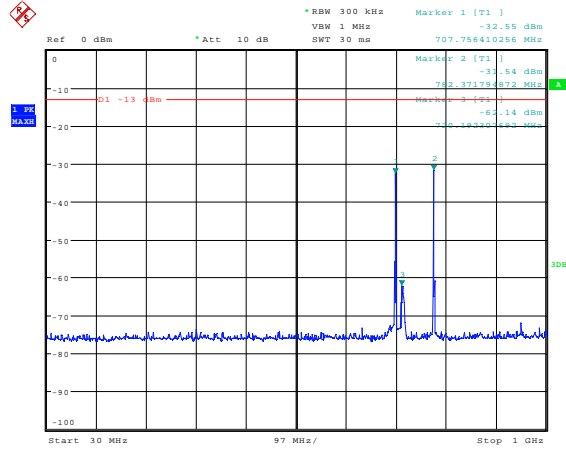
Date: 19.NOV.2010 09:46:10

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

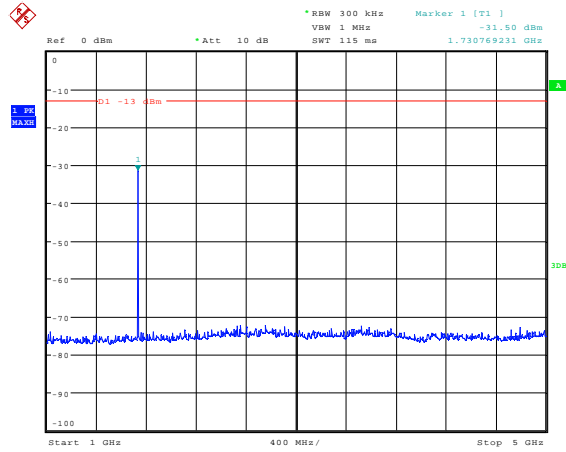




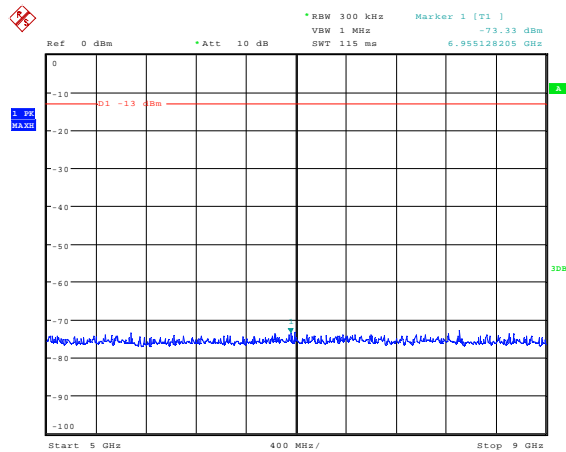
## Intermodulation Wideband – Cross Band



Date: 19.NOV.2010 09:56:53



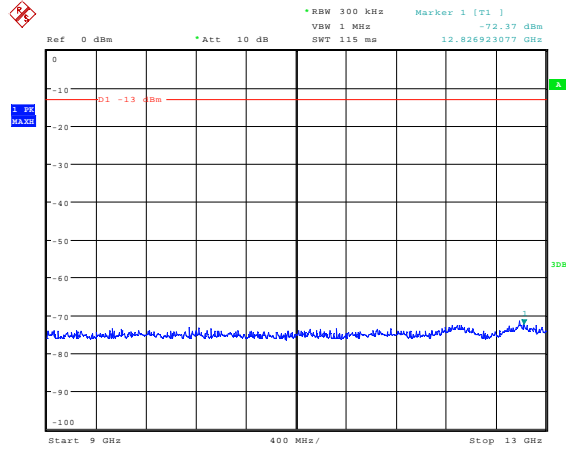
Date: 19.NOV.2010 09:57:04



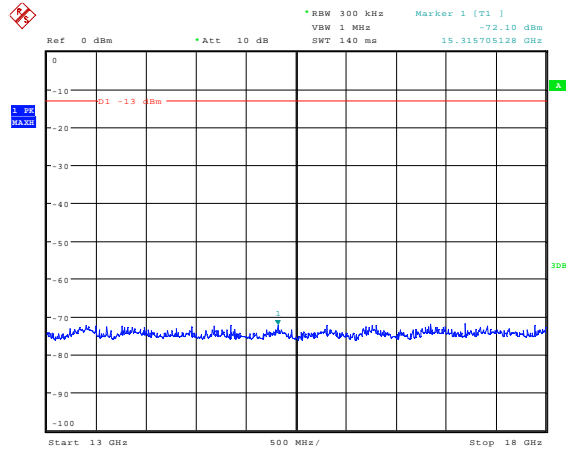
Date: 19.NOV.2010 09:57:16

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

# Intermodulation Wideband – Cross Band



Date: 19.NOV.2010 09:57:32



Date: 19.NOV.2010 09:57:53

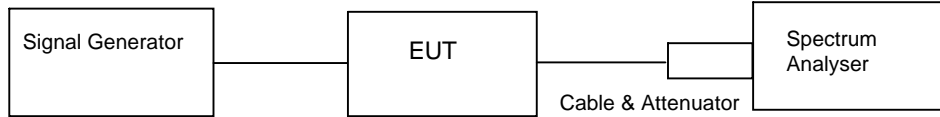
The above plot shows that there are no products outside the bands.

**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, GSM, EDGE, CDMA and W-CDMA, 20MHz wide LTE in the 1700 MHz band and 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.

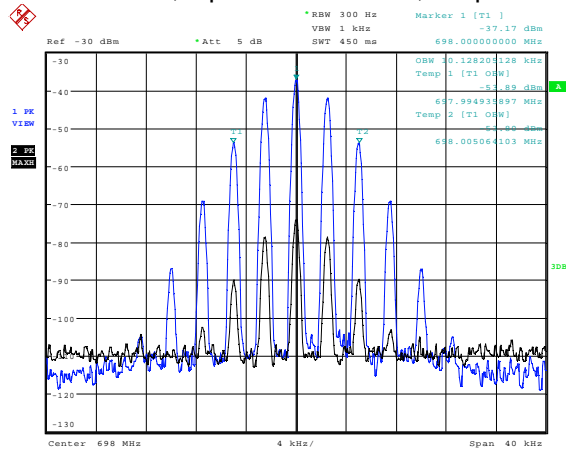
1. Cable and attenuator between EUT and spectrum analyser 0.3dB
2. Cable between signal generator and EUT 0.3dB

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	8.958 MHz	8.958 MHz	8.942 MHz	8.910 MHz	8.942 MHz	8.942 MHz

Frequency Of Operational	Modulation Type						
	2.5 kHz FM	5 kHz FM	LTE	GSM	EDGE	CDMA	W-CDMA
1710.000	10.128 kHz	15.256 kHz	17.875 MHz	241.987 kHz	238.782 kHz	1.272 MHz	4.134 MHz
1732.500	10.128 kHz	15.256 kHz	17.910 MHz	241.987 kHz	235.576 kHz	1.275 MHz	4.173 MHz
1755.000	10.128 kHz	15.256 kHz	17.875 MHz	243.589 kHz	233.974 kHz	1.272 MHz	4.163 MHz

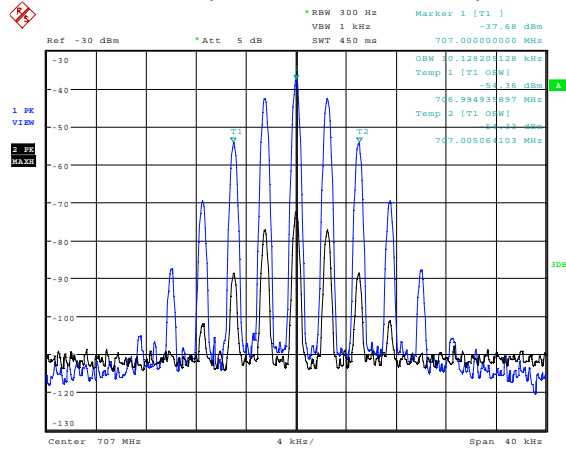
TYPE OF EQUIPMENT	MAKER/SUPPLIER	MODEL No	SERIAL No	REF No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	<b>X</b>
SIGNAL GENERATOR	IFR	3413	341001/261	N/A	<b>X</b>
ATTENUATOR	BIRD	8308-200	N/A	103	<b>X</b>
ATTENUATOR	BIRD	830-100-N	N/A	222	<b>X</b>
CABLE	TRaC	N/A	N/A	UH273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

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



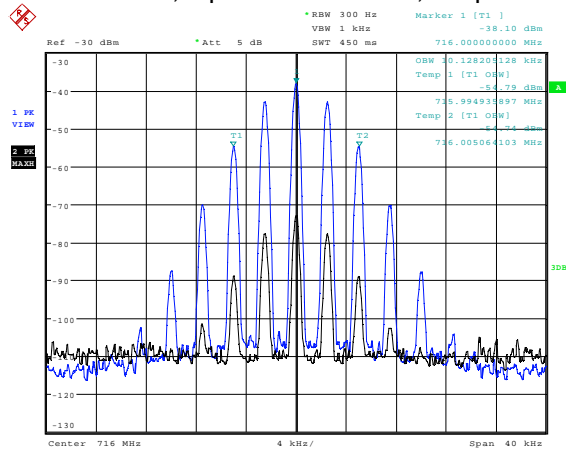
Date: 18.NOV.2010 11:58:07

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



Date: 18.NOV.2010 11:59:22

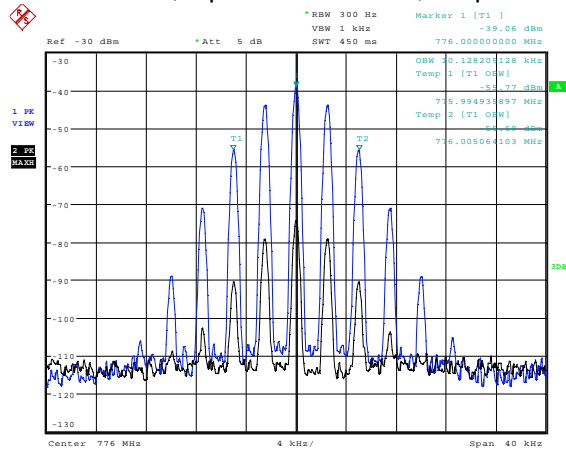
716.0MHz FM deviation set to 2.5kHz, Input – Black Trace, Output - Blue Trace



Date: 18.NOV.2010 12:00:35

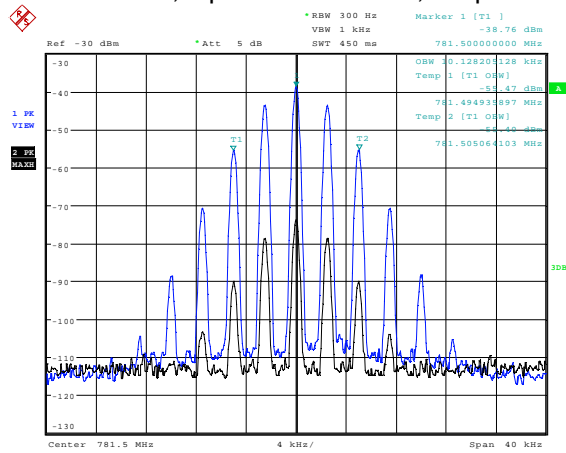
The above plots show no significant distortion visible when compared to the input signal.

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



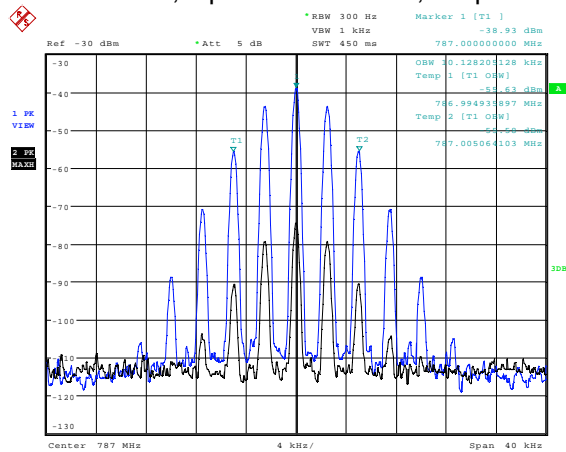
Date: 18.NOV.2010 11:53:40

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



Date: 18.NOV.2010 11:54:57

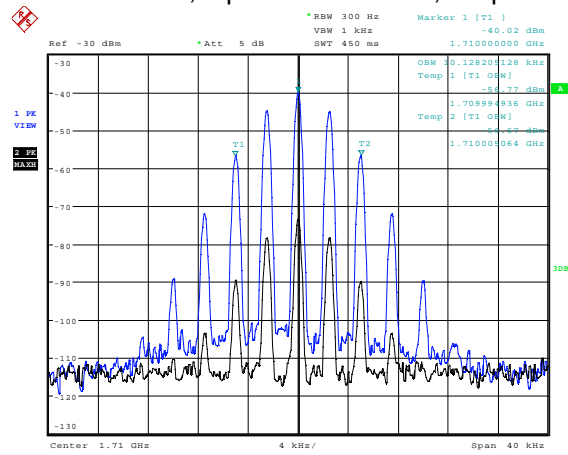
787.0MHz FM deviation set to 2.5kHz, Input – Black Trace, Output - Blue Trace



Date: 18.NOV.2010 11:56:50

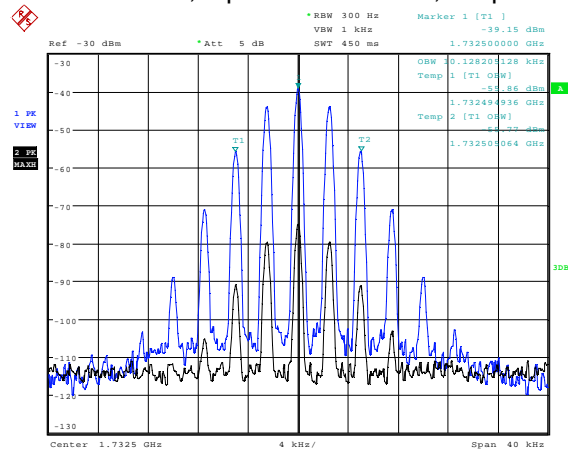
The above plots show no significant distortion visible when compared to the input signal.

1710.0MHz FM deviation set to 2.5kHz, Input – Black Trace, Output - Blue Trace



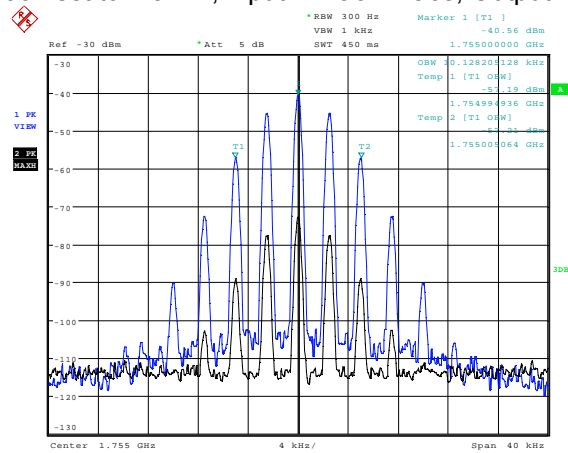
Date: 18.NOV.2010 11:51:39

1732.5MHz FM deviation set to 2.5kHz, Input – Black Trace, Output - Blue Trace



Date: 18.NOV.2010 11:50:58

1755.0MHz FM deviation set to 2.5kHz, Input – Black Trace, Output - Blue Trace

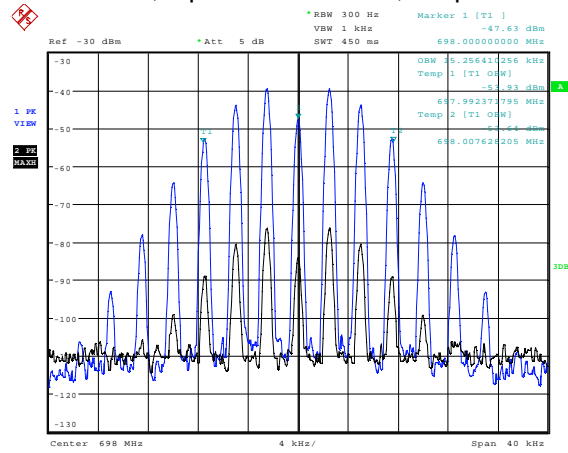


Date: 18.NOV.2010 11:49:34

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

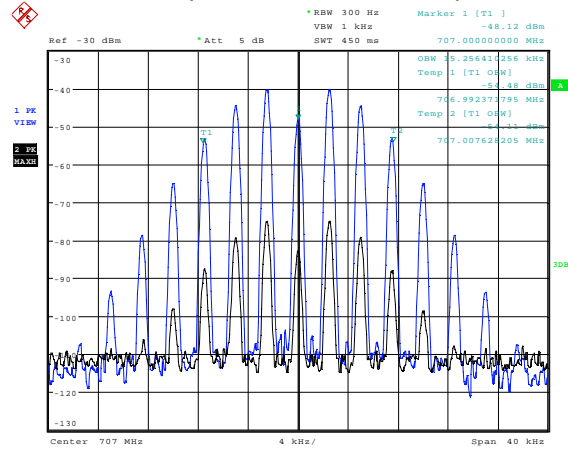


698.0MHz FM deviation set to 5kHz, Input – Black Trace, Output - Blue Trace



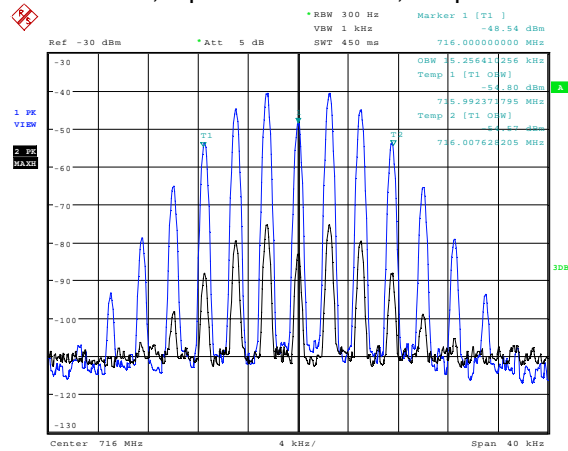
Date: 18.NOV.2010 11:58:29

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



Date: 18.NOV.2010 11:58:55

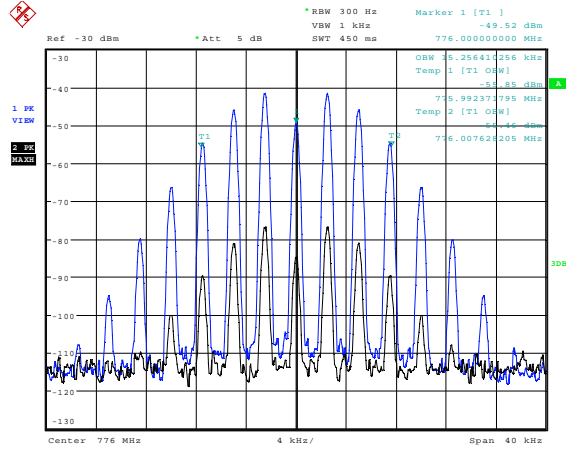
716.0MHz FM deviation set to 5kHz, Input – Black Trace, Output - Blue Trace



Date: 18.NOV.2010 12:00:00

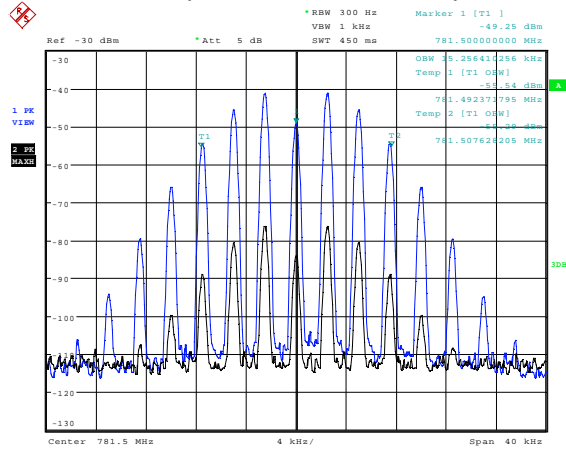
The above plots show no significant distortion visible when compared to the input signal.

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



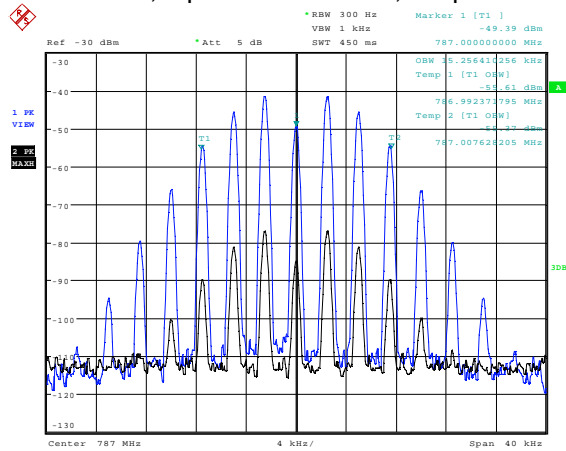
Date: 18.NOV.2010 11:53:10

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



Date: 18.NOV.2010 11:55:48

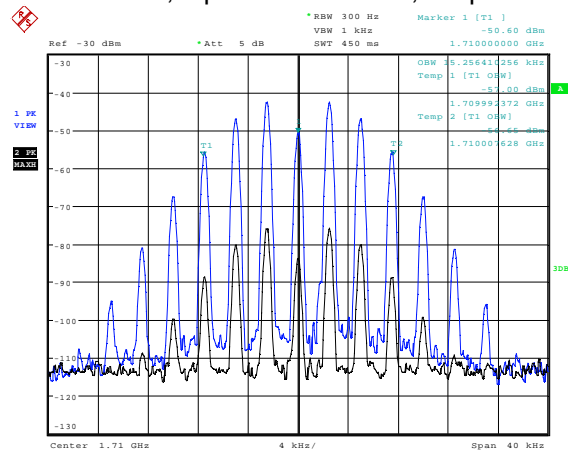
787.0MHz FM deviation set to 5kHz, Input – Black Trace, Output - Blue Trace



Date: 18.NOV.2010 11:56:22

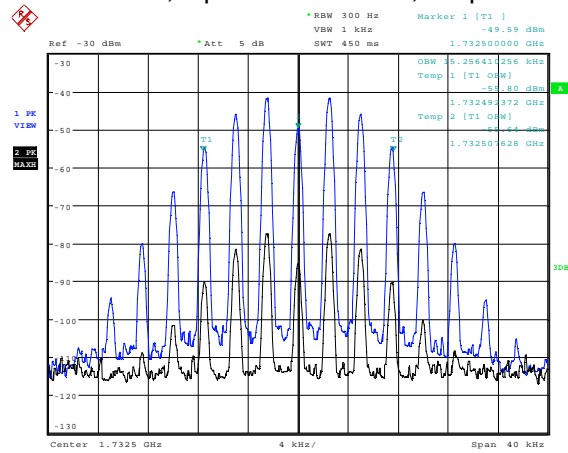
The above plots show no significant distortion visible when compared to the input signal.

1710.0MHz FM deviation set to 5kHz, Input – Black Trace, Output - Blue Trace



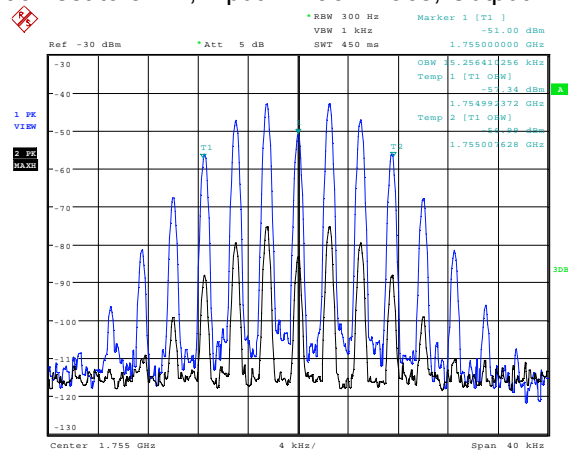
Date: 18.NOV.2010 11:52:15

1732.5MHz FM deviation set to 5kHz, Input – Black Trace, Output - Blue Trace



Date: 18.NOV.2010 11:50:34

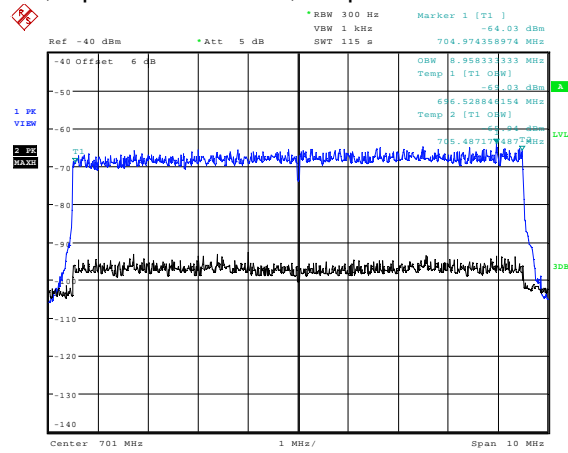
1755.0MHz FM deviation set to 5kHz, Input – Black Trace, Output - Blue Trace



Date: 18.NOV.2010 11:49:57

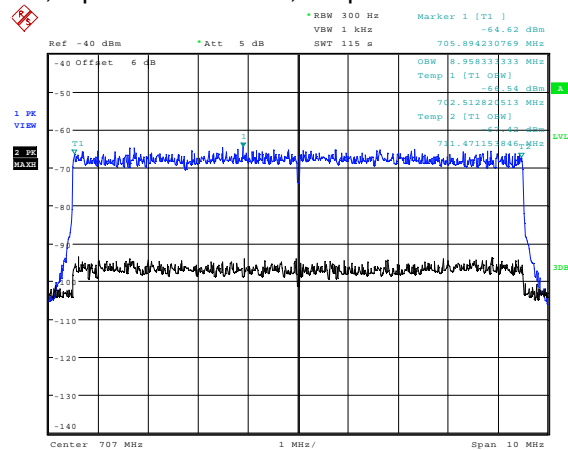
The above plots show no significant distortion visible when compared to the input signal.

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



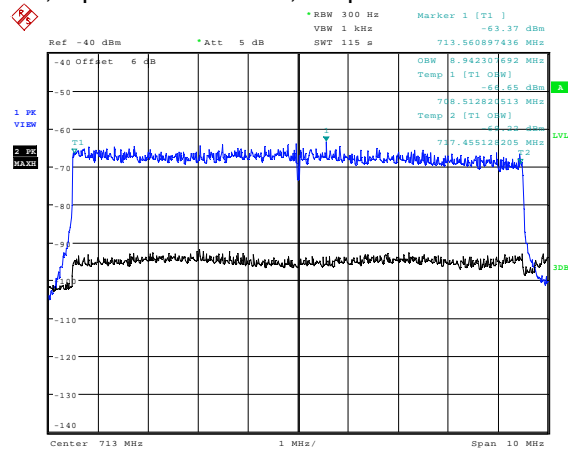
Date: 22.NOV.2010 13:05:09

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



Date: 22.NOV.2010 13:09:26

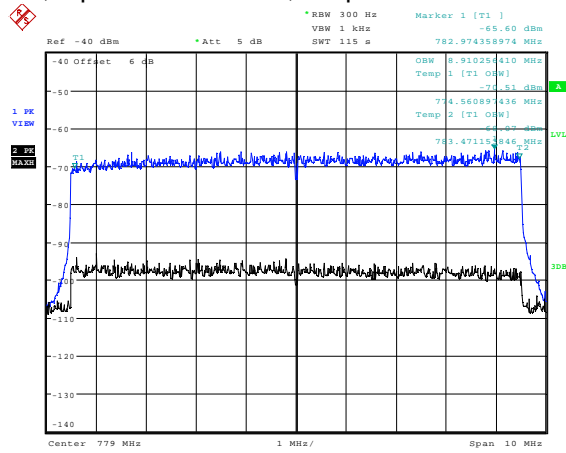
### 716.0MHz LTE Modulation, Input – Black Trace, Output - Blue Trace



Date: 22.NOV.2010 14:02:00

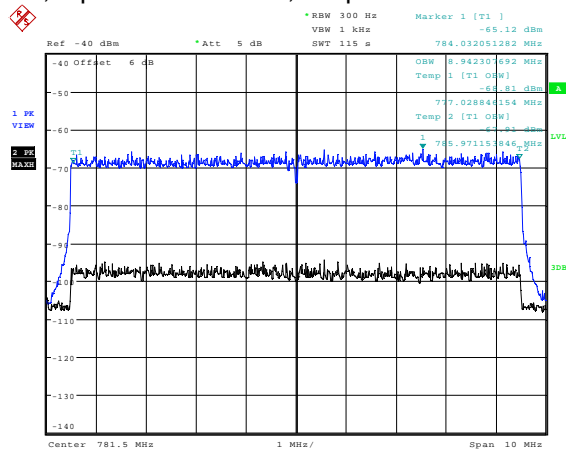
The above plots show no significant distortion visible when compared to the input signal.

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



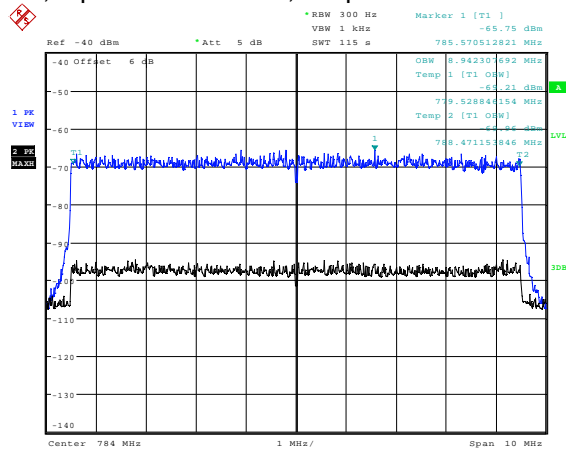
Date: 22.NOV.2010 12:38:01

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



Date: 22.NOV.2010 12:51:14

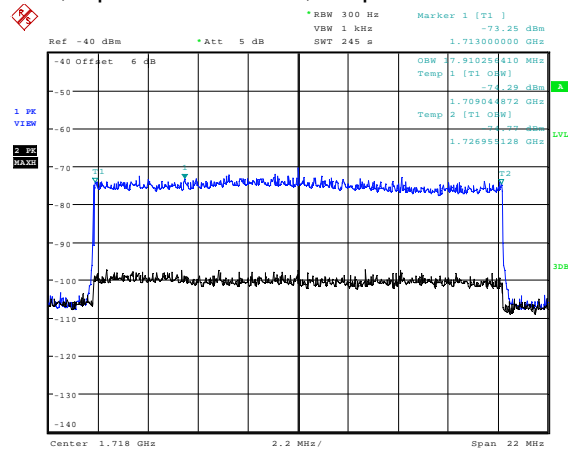
787.0MHz LTE Modulation, Input – Black Trace, Output - Blue Trace



Date: 22.NOV.2010 12:59:24

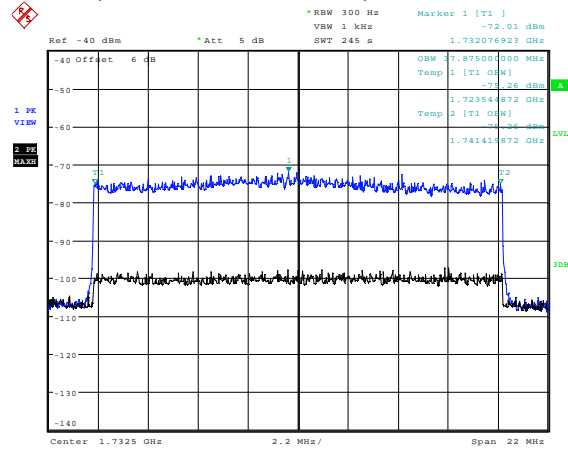
The above plots show no significant distortion visible when compared to the input signal.

1710.0MHz LTE Modulation, Input – Black Trace, Output - Blue Trace



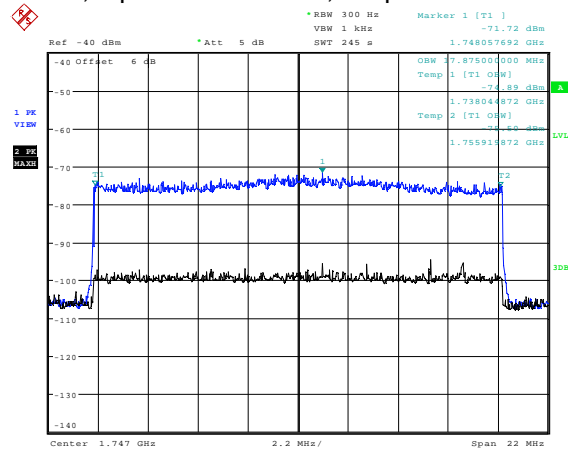
Date: 22.NOV.2010 14:36:17

1732.5MHz LTE Modulation, Input – Black Trace, Output - Blue Trace



Date: 22.NOV.2010 14:47:07

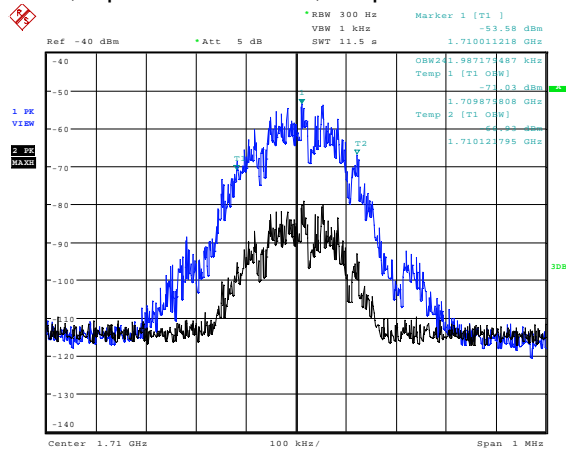
1755.0MHz LTE Modulation, Input – Black Trace, Output - Blue Trace



Date: 22.NOV.2010 15:41:42

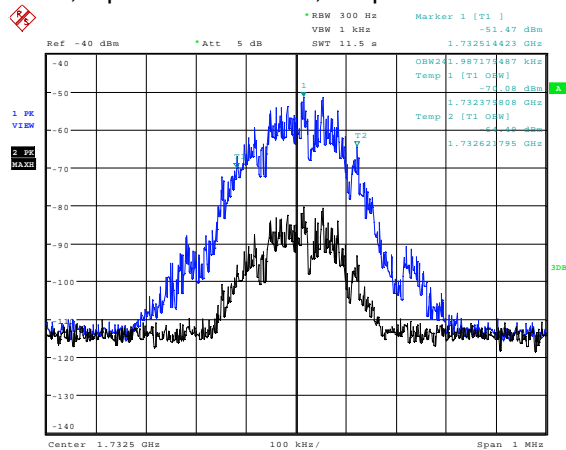
The above plots show no significant distortion visible when compared to the input signal.

1710.0MHz GSM Modulation, Input – Black Trace, Output - Blue Trace



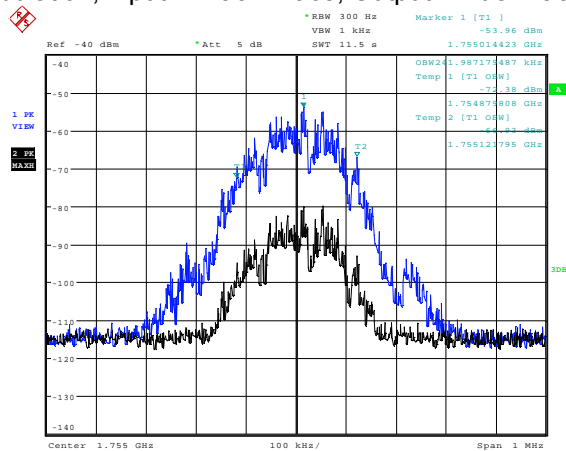
Date: 18.NOV.2010 16:52:29

1732.5MHz GSM Modulation, Input – Black Trace, Output - Blue Trace



Date: 18.NOV.2010 16:54:13

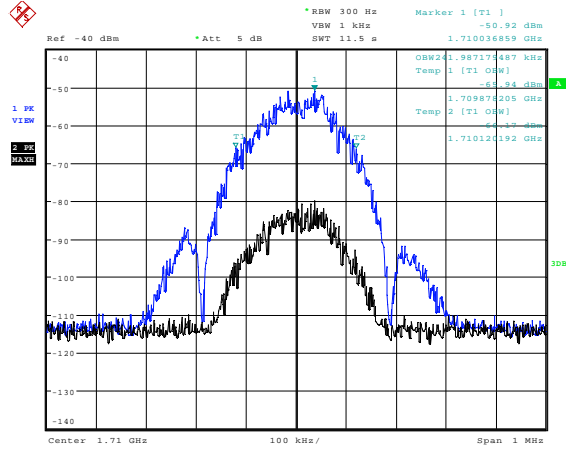
1755.0MHz GSM Modulation, Input – Black Trace, Output - Blue Trace



Date: 18.NOV.2010 16:55:28

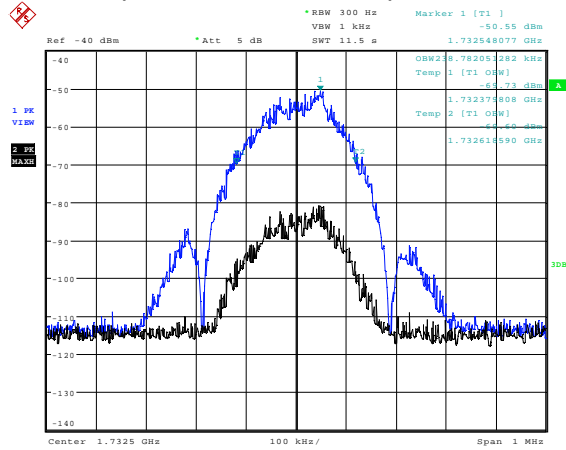
The above plots show no significant distortion visible when compared to the input signal.

1710.0MHz EDGE Modulation, Input – Black Trace, Output - Blue Trace



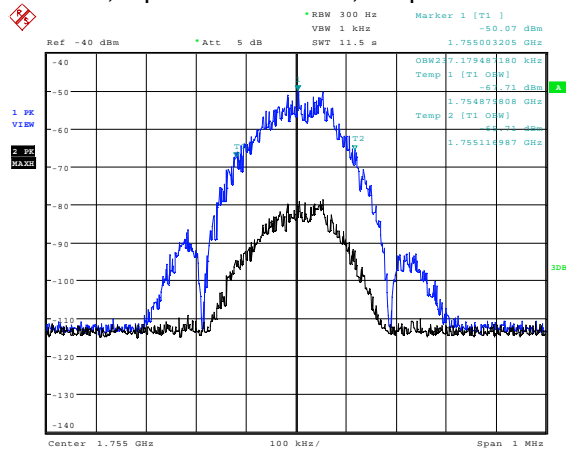
Date: 19.NOV.2010 08:43:10

1732.5MHz EDGE Modulation, Input – Black Trace, Output - Blue Trace



Date: 19.NOV.2010 08:39:56

1755.0MHz EDGE Modulation, Input – Black Trace, Output - Blue Trace

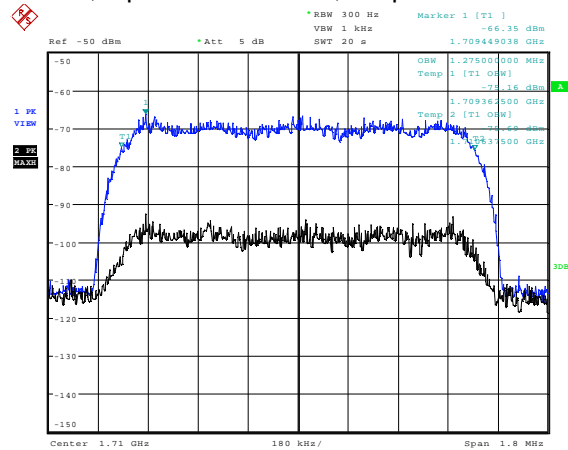


Date: 19.NOV.2010 08:36:54

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

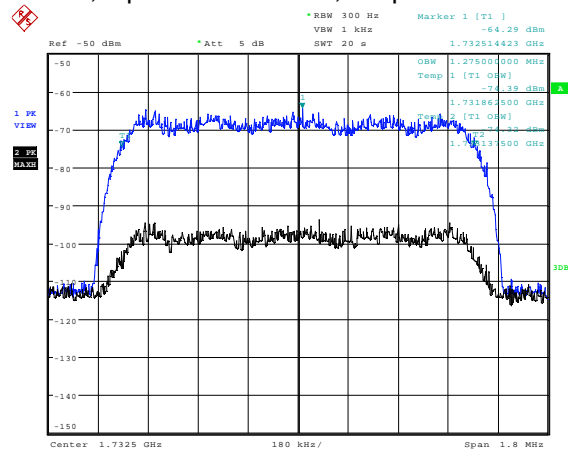


1710.0MHz CDMA Modulation, Input – Black Trace, Output - Blue Trace



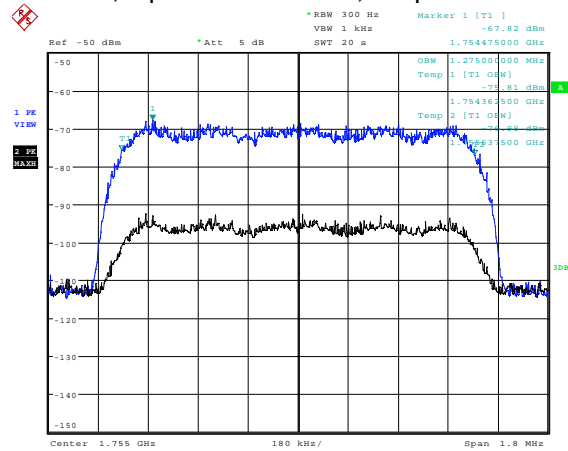
Date: 18.NOV.2010 16:17:07

1732.5MHz CDMA Modulation, Input – Black Trace, Output - Blue Trace



Date: 18.NOV.2010 16:14:22

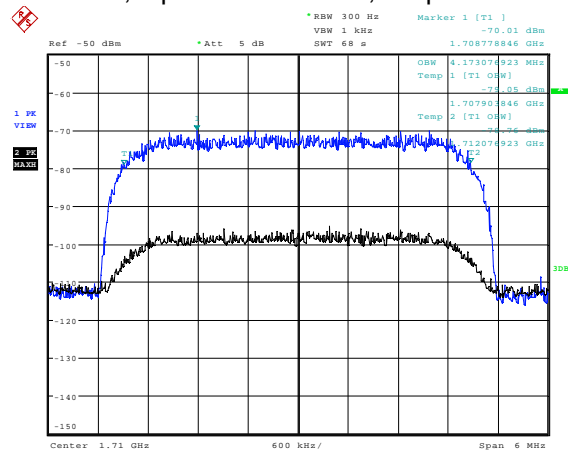
1755.0MHz CDMA Modulation, Input – Black Trace, Output - Blue Trace



Date: 18.NOV.2010 16:11:33

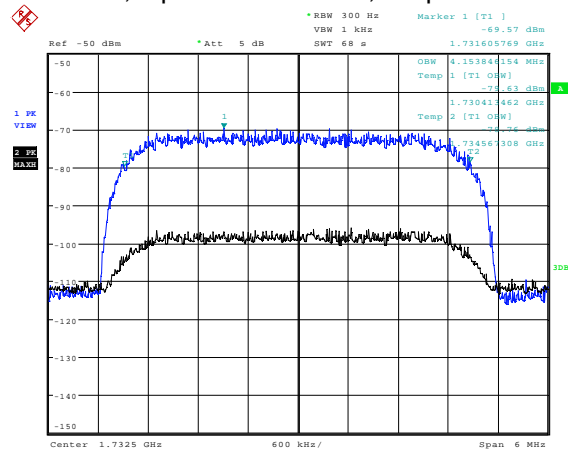
The above plots show no significant distortion visible when compared to the input signal.

### 1710.0MHz W-CDMA Modulation, Input – Black Trace, Output - Blue Trace



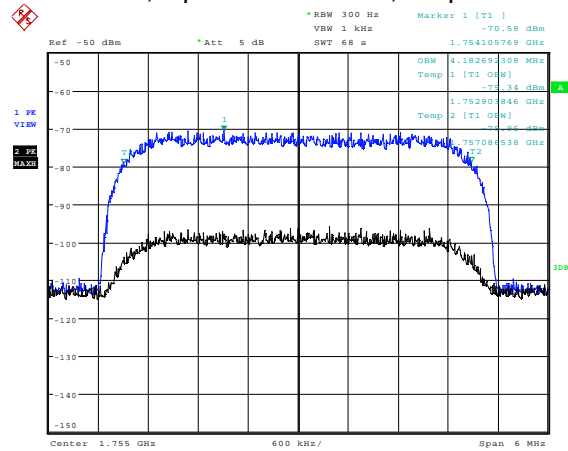
Date: 18.NOV.2010 15:28:20

### 1732.5MHz W-CDMA Modulation, Input – Black Trace, Output - Blue Trace



Date: 18.NOV.2010 15:47:52

### 1755.0MHz W-CDMA Modulation, Input – Black Trace, Output - Blue Trace



Date: 18.NOV.2010 15:59:32

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 PdB

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

**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

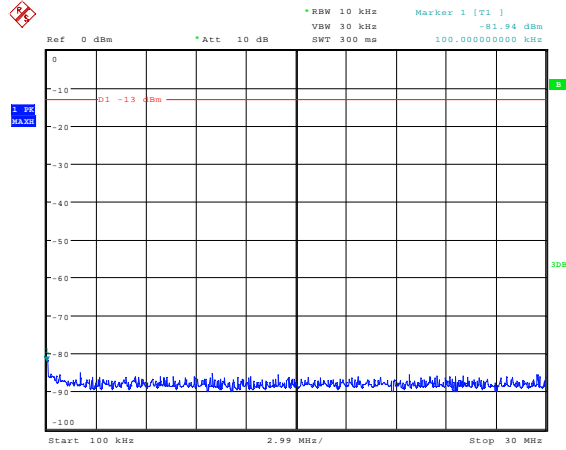
**1700 MHz Band**

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:

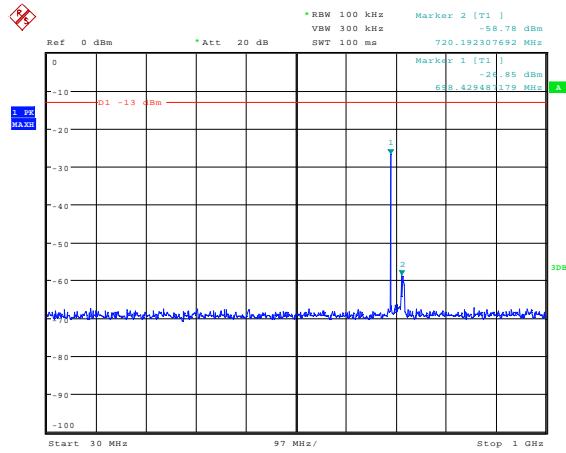
TYPE OF EQUIPMENT	MAKER/SUPPLIER	MODEL No	SERIAL No	REF No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	<b>X</b>
SIGNAL GENERATOR	AEROFLEX	3413	341001/261	N/A	<b>X</b>
ATTENUATOR	BIRD	8308-200	N/A	103	<b>X</b>
ATTENUATOR	BIRD	830-100-N	N/A	222	<b>X</b>
CABLE	TRaC	N/A	N/A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

Conducted emissions 698.0MHz 100kHz – 30MHz



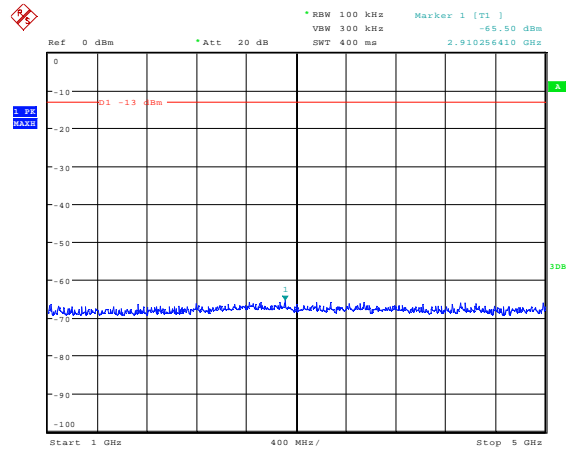
Date: 18.NOV.2010 11:18:09

Conducted emissions 698.0MHz 30MHz – 1GHz



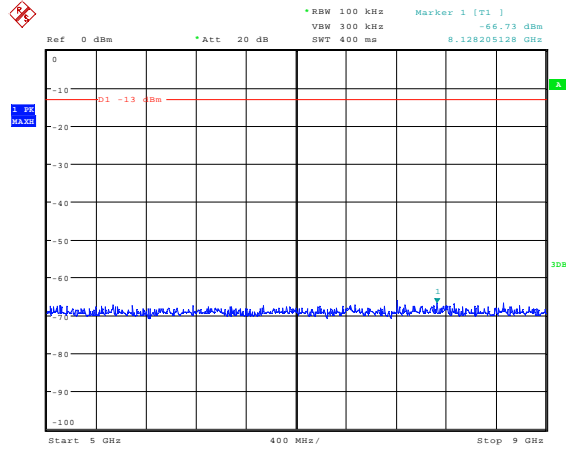
Date: 18.NOV.2010 11:18:36

Conducted emissions 698.0MHz 1 – 5GHz



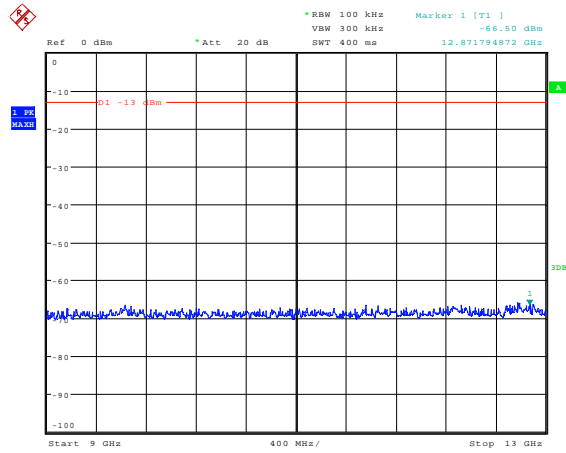
Date: 18.NOV.2010 11:19:18

Conducted emissions 698.0MHz 5 – 9GHz



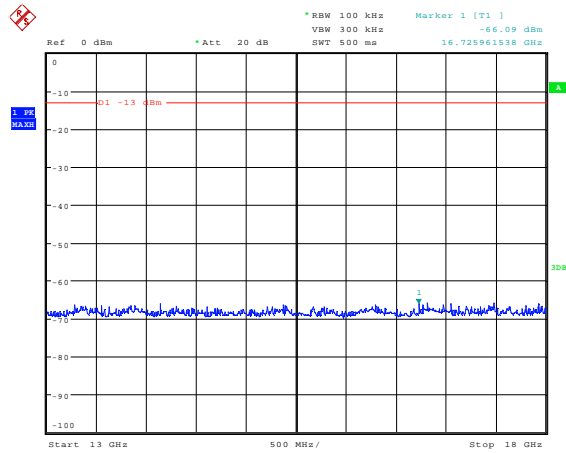
Date: 18.NOV.2010 11:19:30

Conducted emissions 698.0MHz 9 – 13GHz



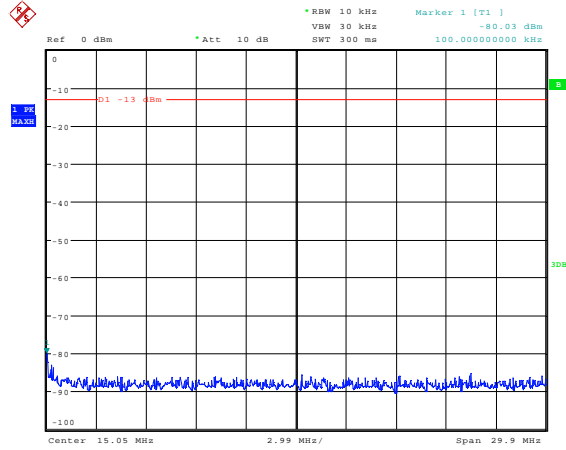
Date: 18.NOV.2010 11:19:44

Conducted emissions 698.0MHz 13 – 18GHz



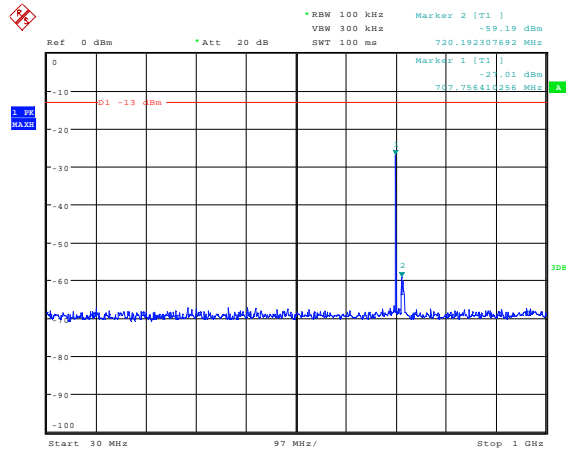
Date: 18.NOV.2010 11:19:59

Conducted emissions 707.0MHz 100kHz – 30MHz



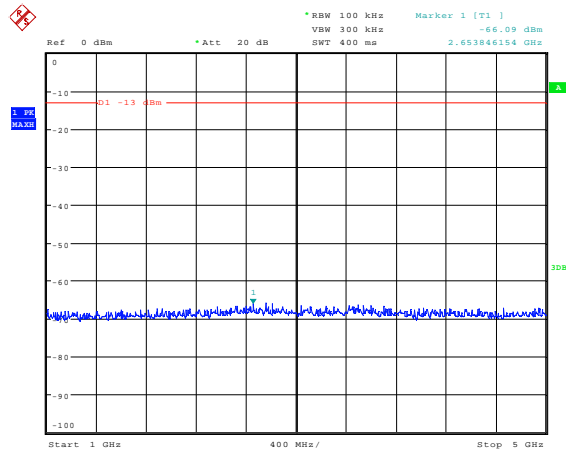
Date: 18.NOV.2010 11:22:07

Conducted emissions 707.0MHz 30MHz – 1GHz



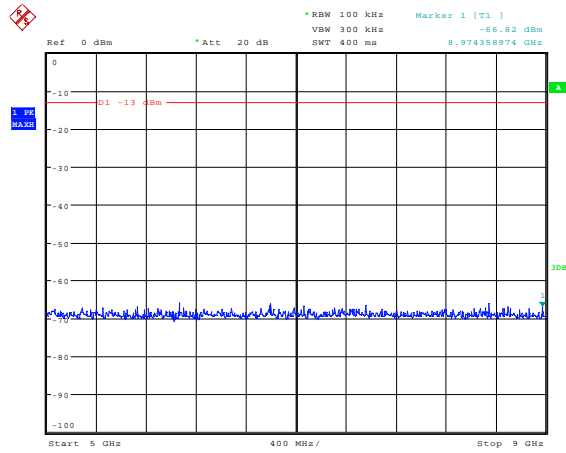
Date: 18.NOV.2010 11:21:54

Conducted emissions 707.0MHz 1 – 5GHz



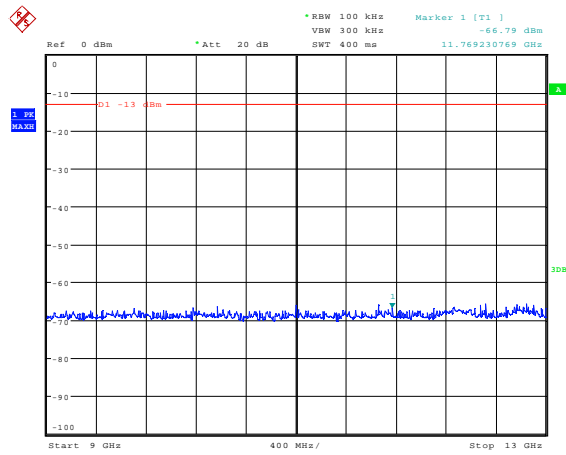
Date: 18.NOV.2010 11:21:39

### Conducted emissions 707.0MHz 5 – 9GHz



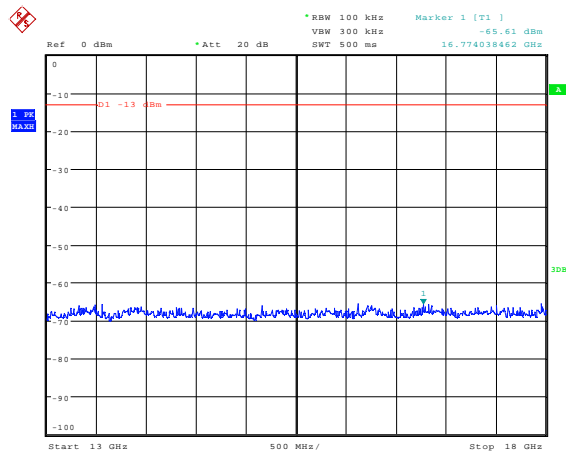
Date: 18.NOV.2010 11:21:24

### Conducted emissions 707.0MHz 9 – 13GHz



Date: 18.NOV.2010 11:21:11

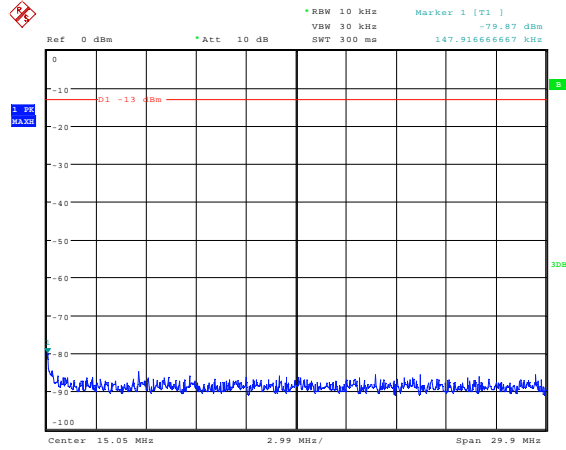
### Conducted emissions 707.0MHz 13 – 18GHz



Date: 18.NOV.2010 11:20:56

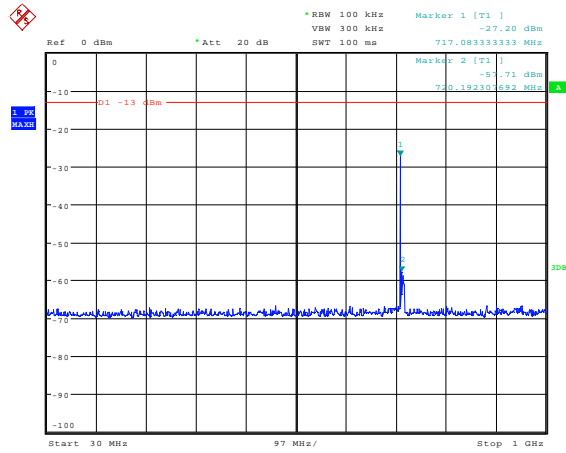


Conducted emissions 716.0MHz 100kHz – 30MHz



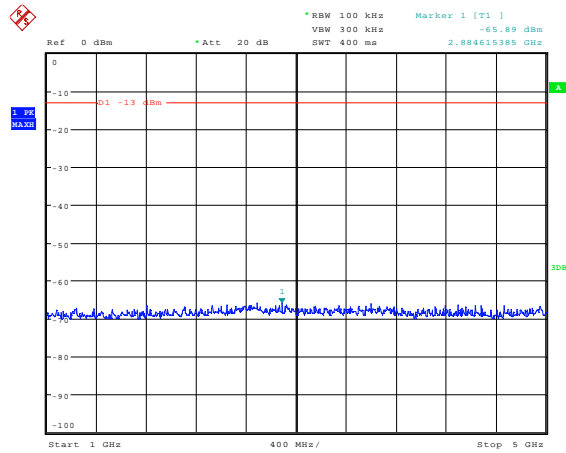
Date: 18.NOV.2010 11:22:35

Conducted emissions 716.0MHz 30MHz – 1GHz



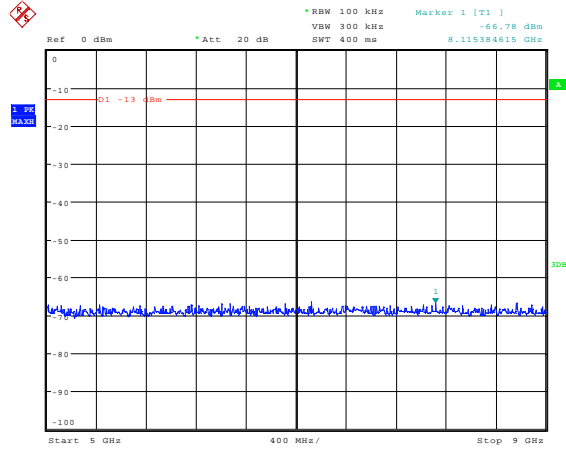
Date: 18.NOV.2010 11:23:14

Conducted emissions 716.0MHz 1 – 5GHz



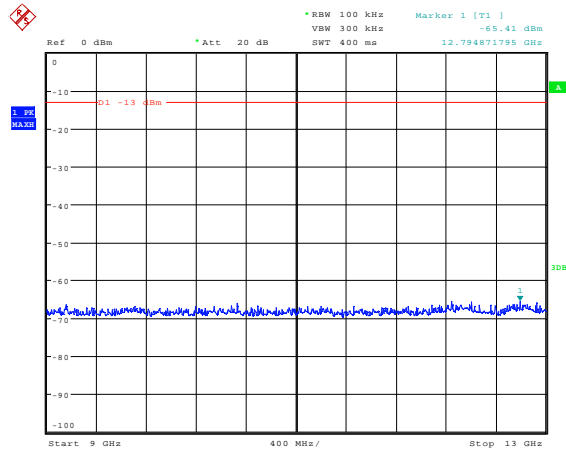
Date: 18.NOV.2010 11:24:07

Conducted emissions 716.0MHz 5 – 9GHz



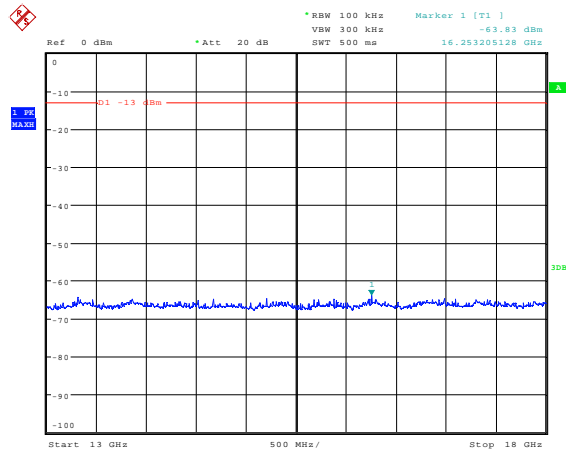
Date: 18.NOV.2010 11:24:21

Conducted emissions 716.0MHz 9 – 13GHz



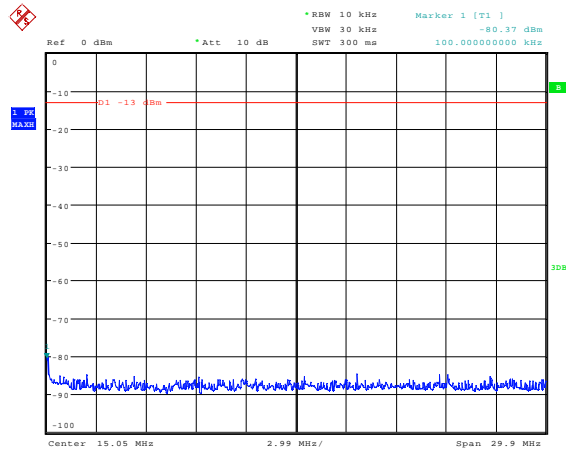
Date: 18.NOV.2010 11:24:49

Conducted emissions 716.0MHz 13 – 18GHz



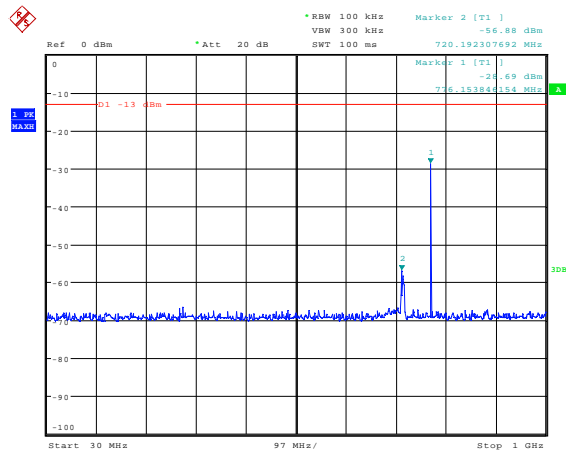
Date: 18.NOV.2010 11:32:38

### Conducted emissions 776.0MHz 100kHz – 30MHz



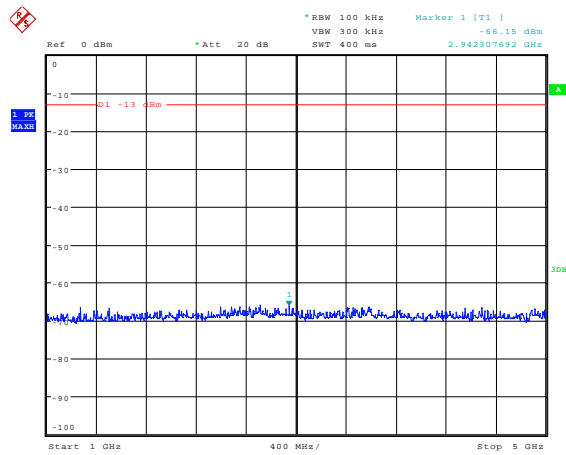
Date: 18.NOV.2010 11:36:00

### Conducted emissions 776.0MHz 30MHz – 1GHz



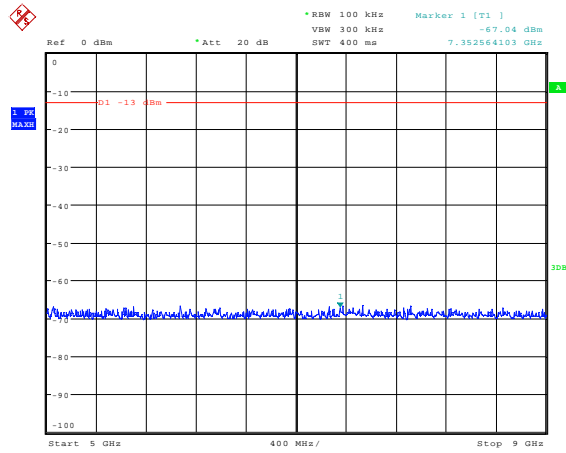
Date: 18.NOV.2010 11:35:40

### Conducted emissions 776.0MHz 1 – 5GHz



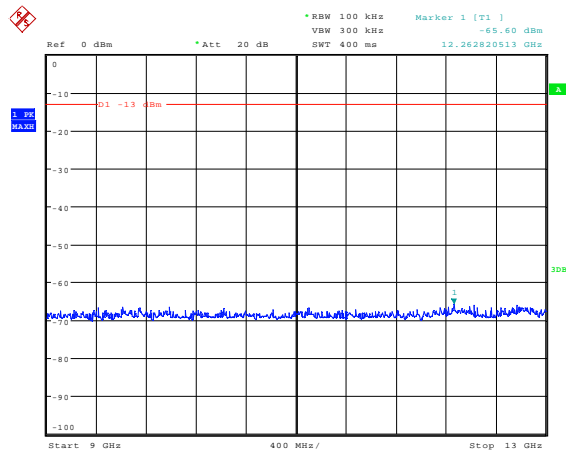
Date: 18.NOV.2010 11:35:22

### Conducted emissions 776.0MHz 5 – 9GHz



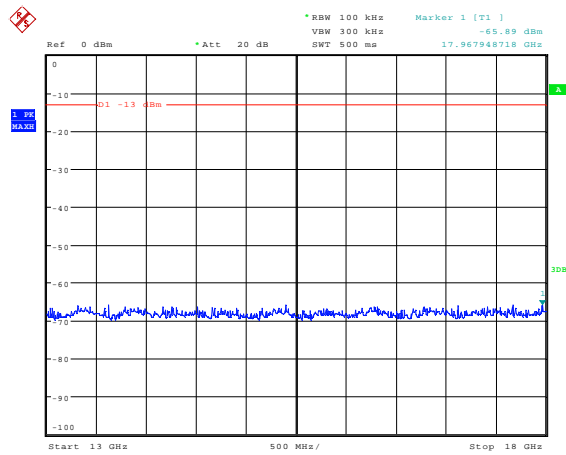
Date: 18.NOV.2010 11:35:06

### Conducted emissions 776.0MHz 9 – 13GHz



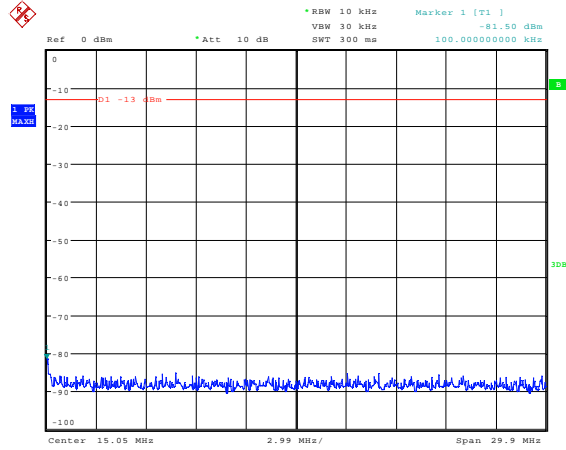
Date: 18.NOV.2010 11:34:46

### Conducted emissions 776.0MHz 13 – 18GHz



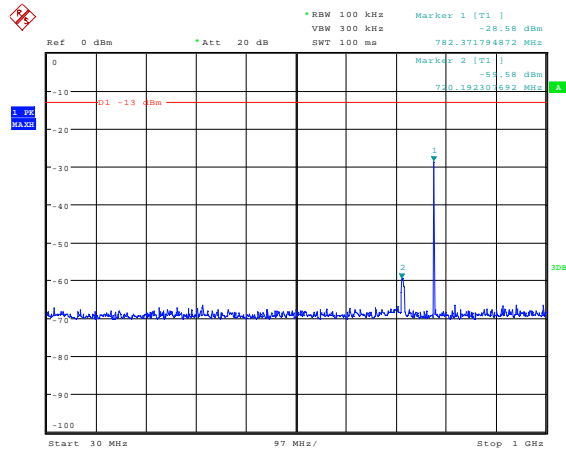
Date: 18.NOV.2010 11:34:29

### Conducted emissions 742.5MHz 100kHz – 30MHz



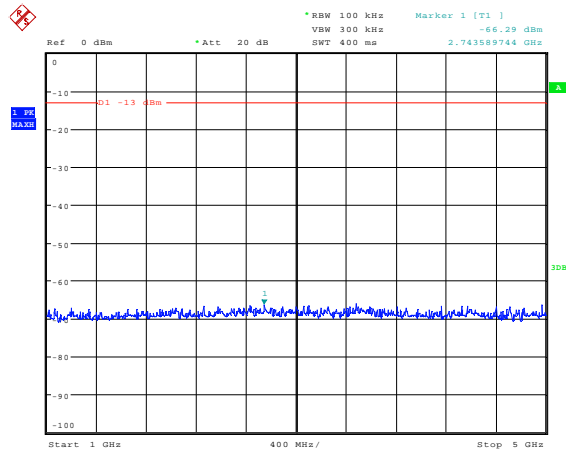
Date: 18.NOV.2010 11:36:29

### Conducted emissions 742.5MHz 30MHz – 1GHz



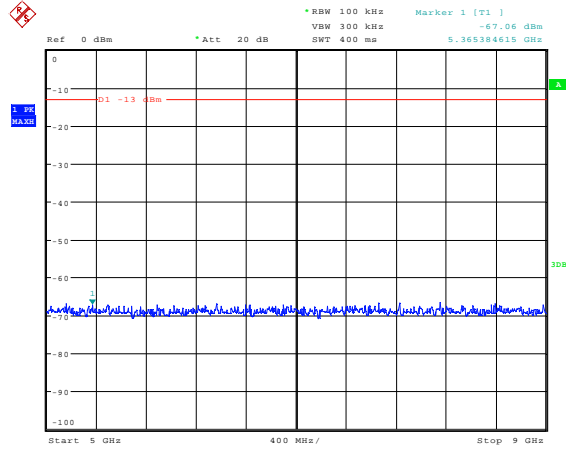
Date: 18.NOV.2010 11:36:45

### Conducted emissions 742.5MHz 1 – 5GHz



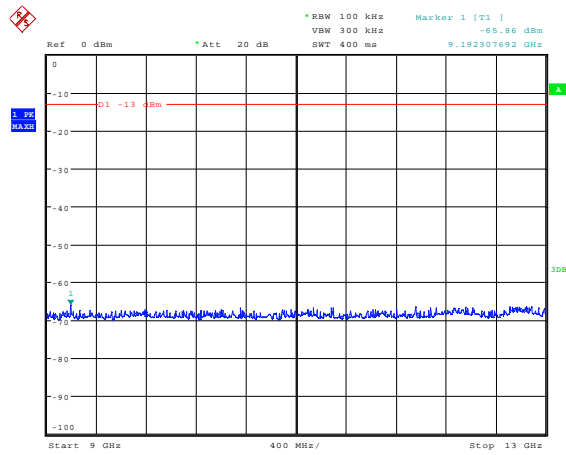
Date: 18.NOV.2010 11:36:59

### Conducted emissions 742.5MHz 5 – 9GHz



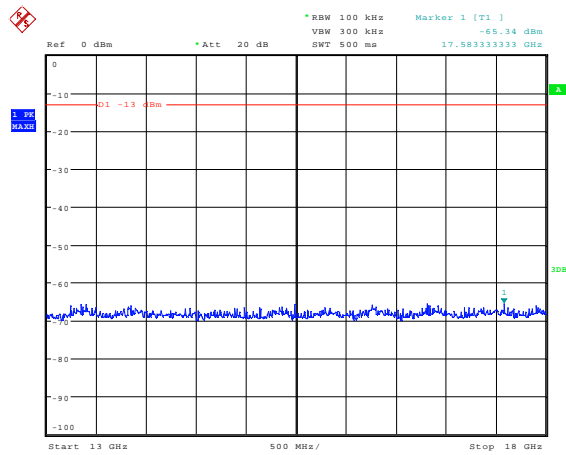
Date: 18.NOV.2010 11:37:12

### Conducted emissions 742.5MHz 9 – 13GHz



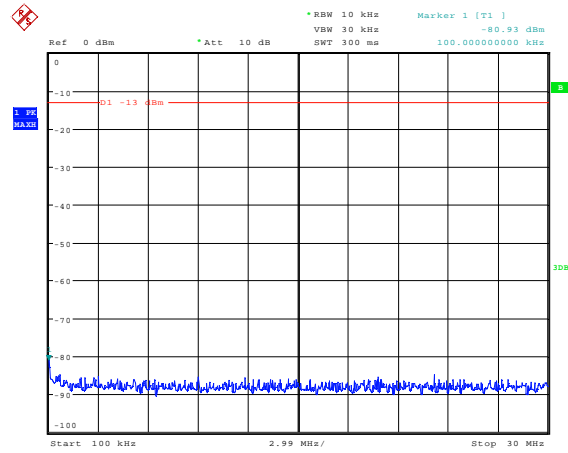
Date: 18.NOV.2010 11:37:27

### Conducted emissions 742.5MHz 13 – 18GHz



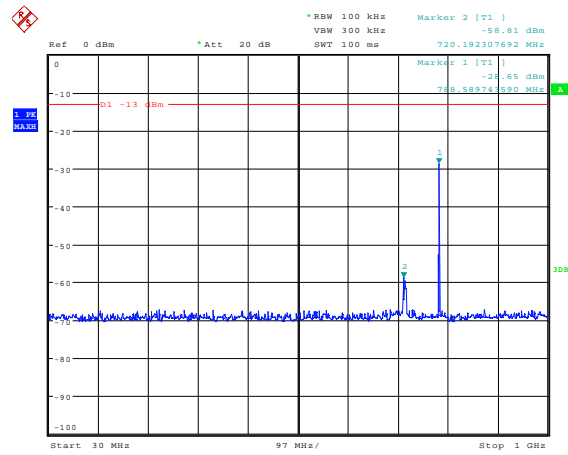
Date: 18.NOV.2010 11:37:40

### Conducted emissions 787.0MHz 100kHz – 30MHz



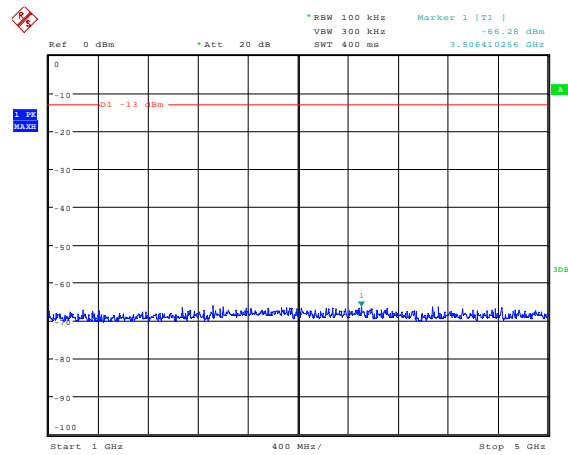
Date: 18.NOV.2010 11:40:18

### Conducted emissions 787.0MHz 30MHz – 1GHz



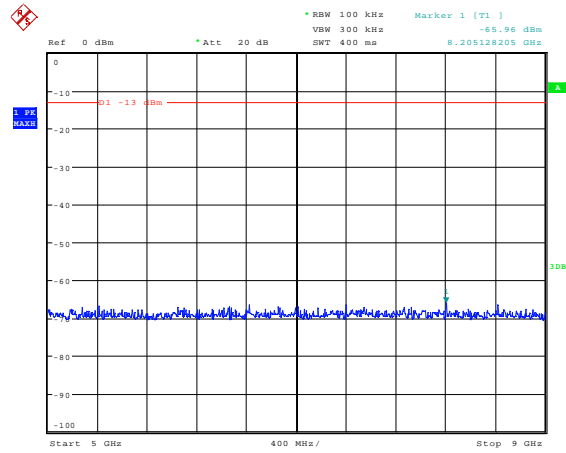
Date: 18.NOV.2010 11:40:03

### Conducted emissions 787.0MHz 1 – 5GHz



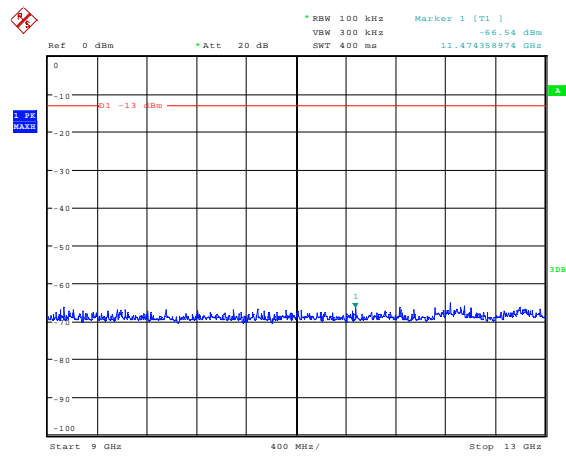
Date: 18.NOV.2010 11:39:46

### Conducted emissions 787.0MHz 5 – 9GHz



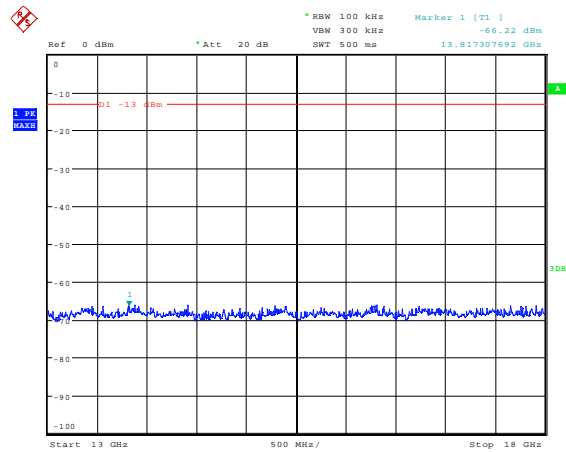
Date: 18.NOV.2010 11:39:32

### Conducted emissions 787.0MHz 9 – 13GHz



Date: 18.NOV.2010 11:39:21

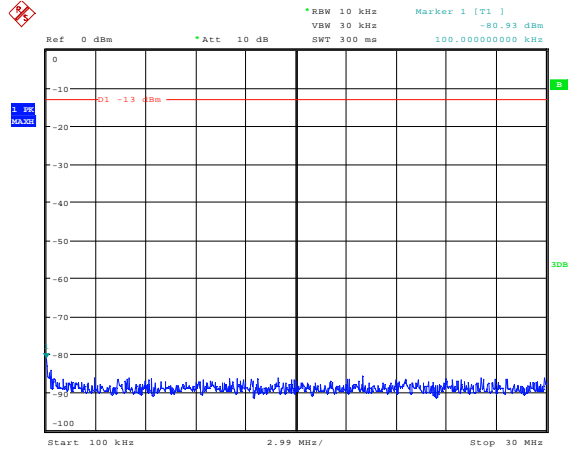
### Conducted emissions 787.0MHz 13 – 18GHz



Date: 18.NOV.2010 11:39:10

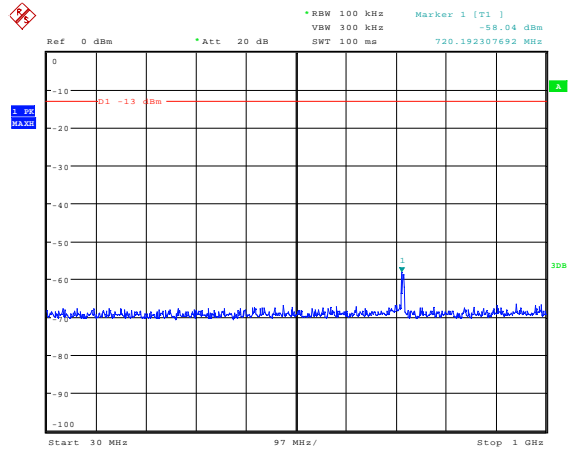


Conducted emissions 1710.0MHz 100kHz – 30MHz



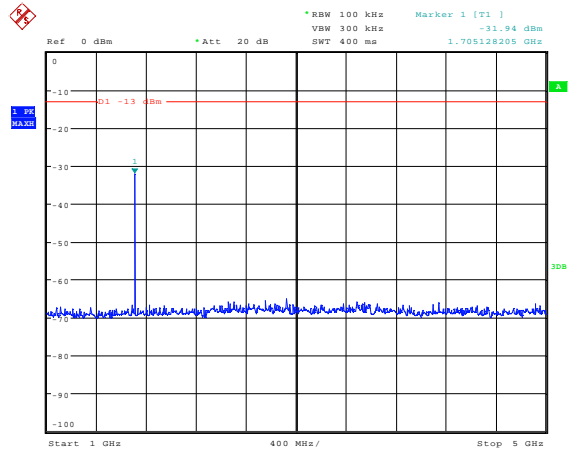
Date: 18.NOV.2010 11:41:11

Conducted emissions 1710.0MHz 30MHz – 1GHz



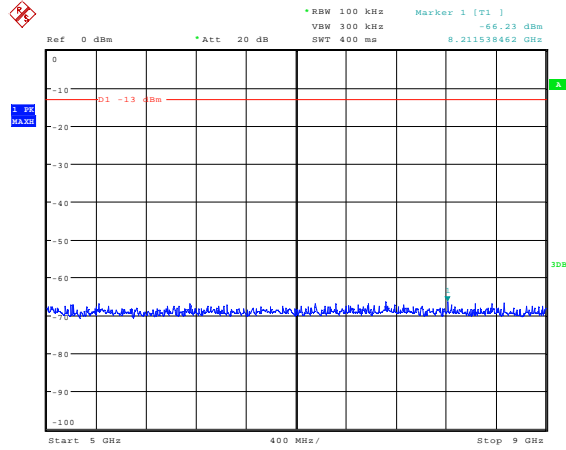
Date: 18.NOV.2010 11:41:24

Conducted emissions 1710.0MHz 1 – 5GHz



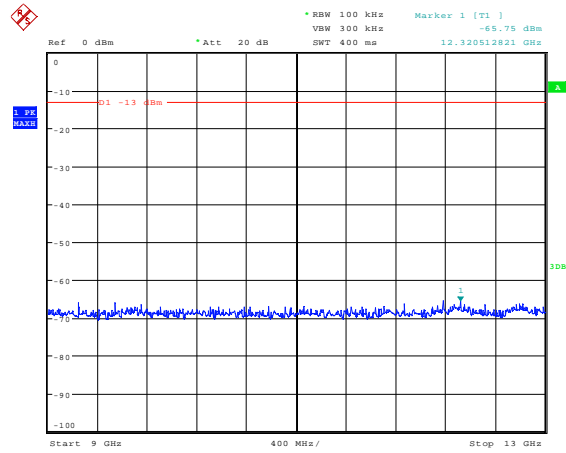
Date: 18.NOV.2010 11:41:42

### Conducted emissions 1710.0MHz 5 – 9GHz



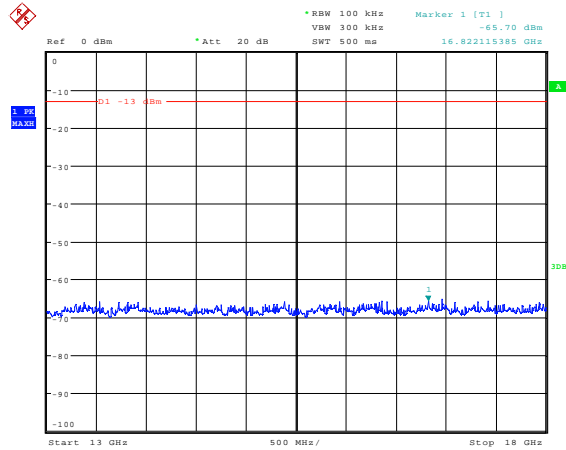
Date: 18.NOV.2010 11:41:55

### Conducted emissions 1710.0MHz 9 – 13GHz



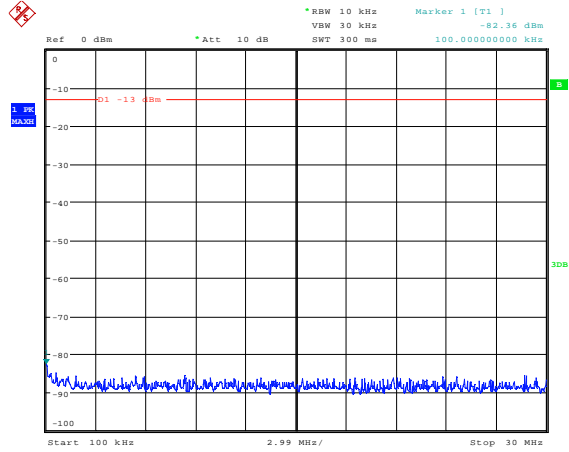
Date: 18.NOV.2010 11:42:07

### Conducted emissions 1710.0MHz 13 – 18GHz



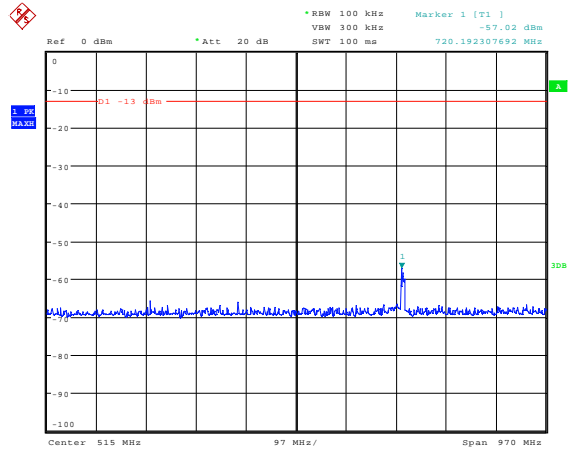
Date: 18.NOV.2010 11:42:21

Conducted emissions 1732.5MHz 100kHz – 30MHz



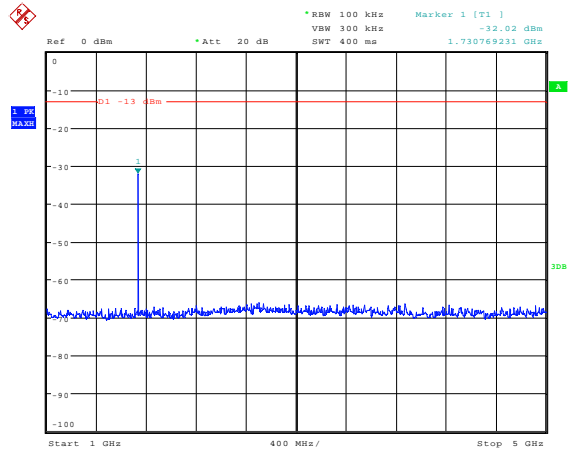
Date: 18.NOV.2010 11:45:10

Conducted emissions 1732.5MHz 30MHz – 1GHz



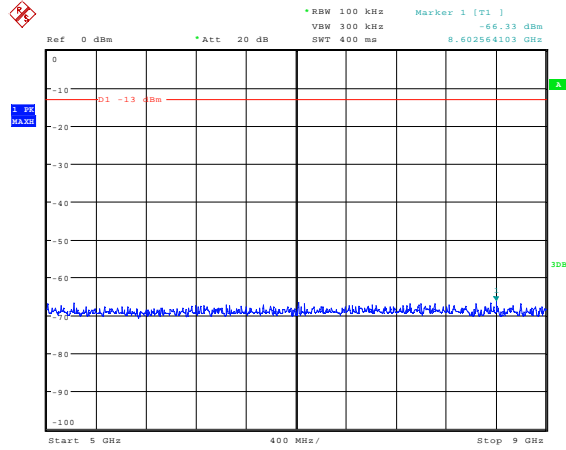
Date: 18.NOV.2010 11:44:59

Conducted emissions 1732.5MHz 1 – 5GHz



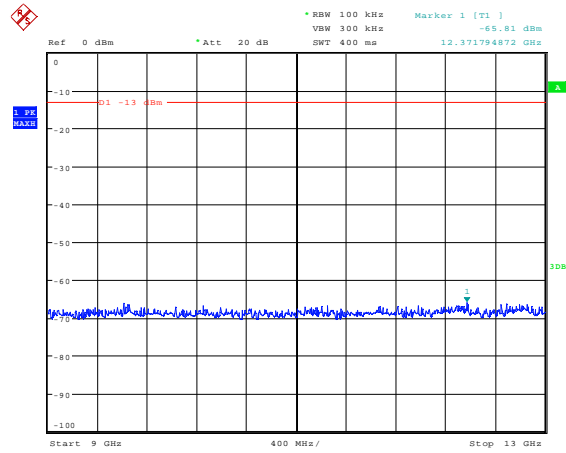
Date: 18.NOV.2010 11:44:28

Conducted emissions 1732.5MHz 5 – 9GHz



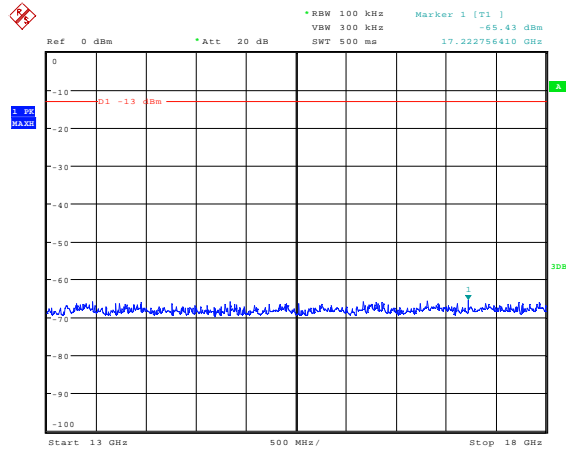
Date: 18.NOV.2010 11:44:17

Conducted emissions 1732.5MHz 9 – 13GHz



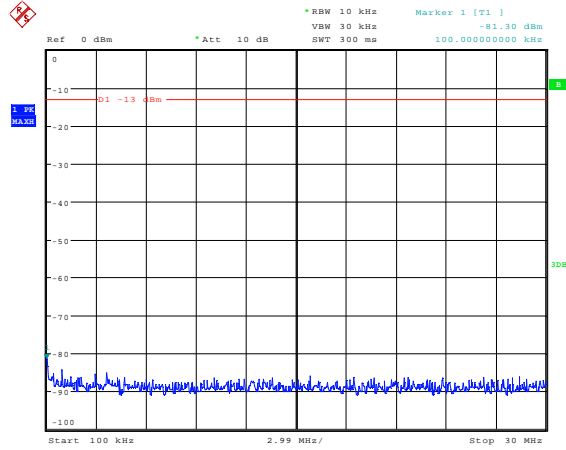
Date: 18.NOV.2010 11:44:04

Conducted emissions 1732.5MHz 13 – 18 GHz



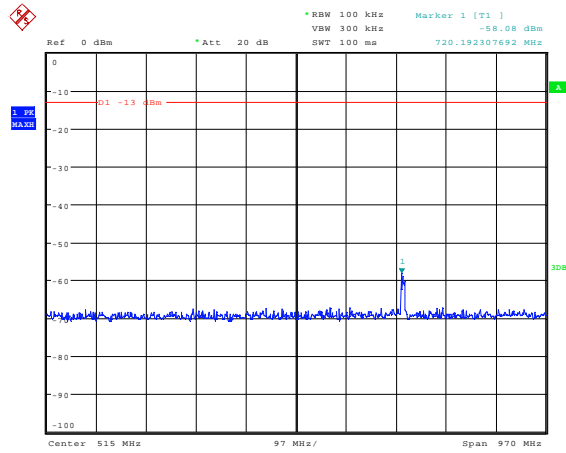
Date: 18.NOV.2010 11:43:51

Conducted emissions 1755.00MHz 100kHz – 30MHz



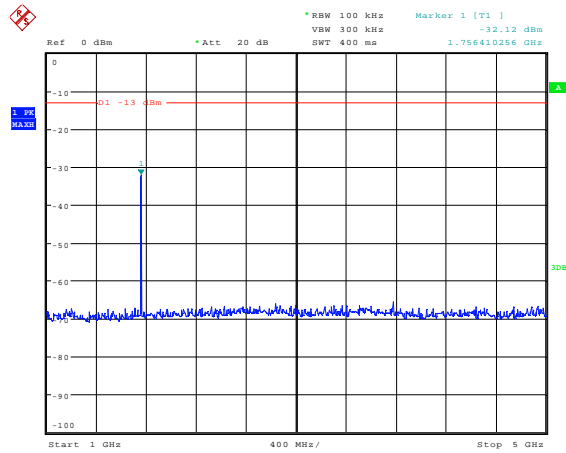
Date: 18.NOV.2010 11:45:44

Conducted emissions 1755.00MHz 30MHz – 1GHz



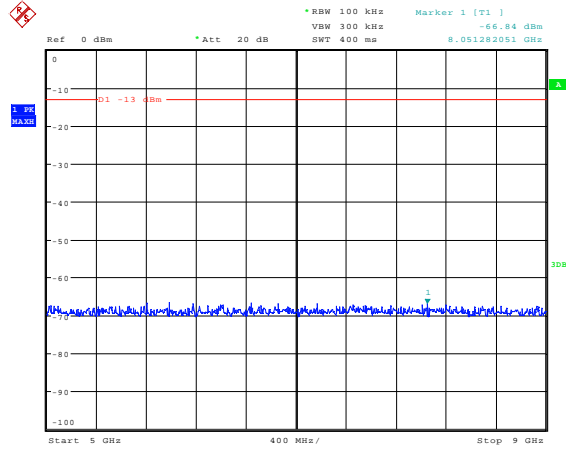
Date: 18.NOV.2010 11:45:54

Conducted emissions 1755.00MHz 1 – 5GHz



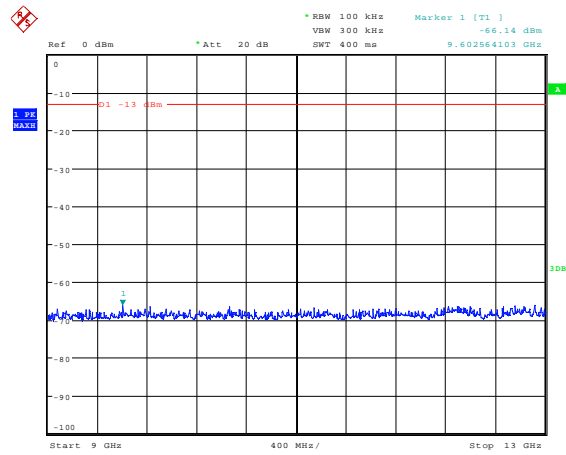
Date: 18.NOV.2010 11:46:06

Conducted emissions 1755.0.0MHz 5 – 9GHz



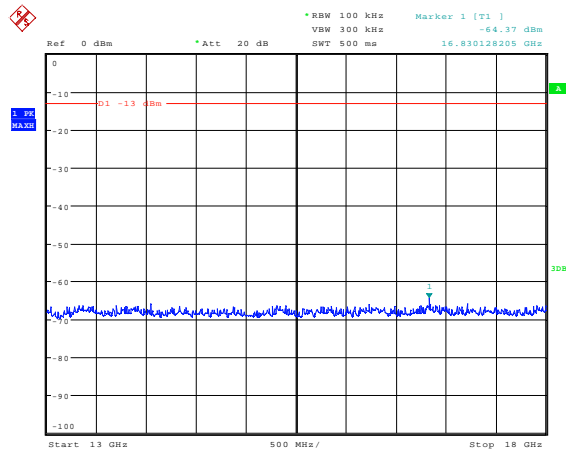
Date: 18.NOV.2010 11:46:20

Conducted emissions 1755.0.0MHz 9 – 13GHz



Date: 18.NOV.2010 11:46:33

Conducted emissions 1755.0.0MHz 13 – 18GHz

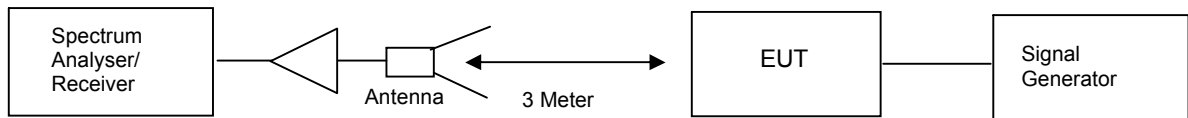


Date: 18.NOV.2010 11:46:48

## 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  $43 + 10 \log P_{dB}$

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

## 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 – 18 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 – 18 GHz	No Significant Emissions Within 20 dB of Limit						-13

### 1700 MHz Band

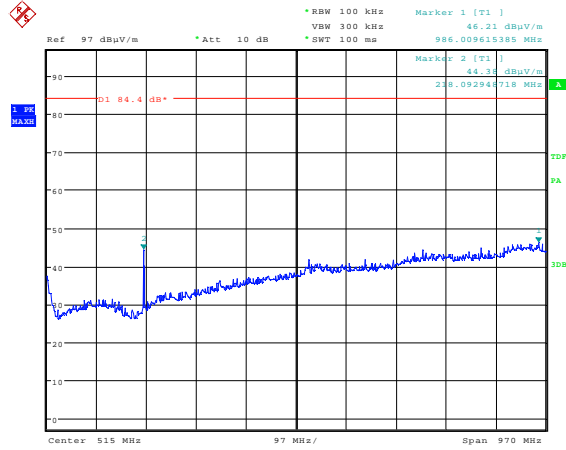
FREQUENCY RANGE	FREQ. (MHz)	MEAS. Rx. (dBµV)	CABLE LOSS (dB)	ANT FACTOR	FIELD STRENGTH (dBµV/m)	CALCULATED EIRP (dBm)	LIMIT (dBm)
30MHz – 18 GHz	No Significant Emissions Within 20 dB of Limit						-13

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	<b>X</b>
HORN	EMCO	3115	9010-3580	138	<b>X</b>
HORN	FLANN	20240-20	322	300	<b>X</b>
PRE AMPLIFIER	HP	8449B	3008A016	572	<b>X</b>
SIGNAL GENERATOR	IFR	3413	341001/261	N/A	<b>X</b>
ANTENNA	YORK	CBL611/A	1618	UH191	<b>X</b>

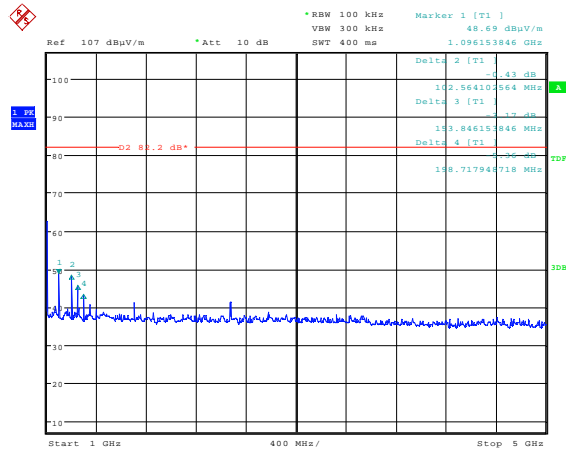


### Radiated emissions 698.0 MHz 30MHz – 1GHz



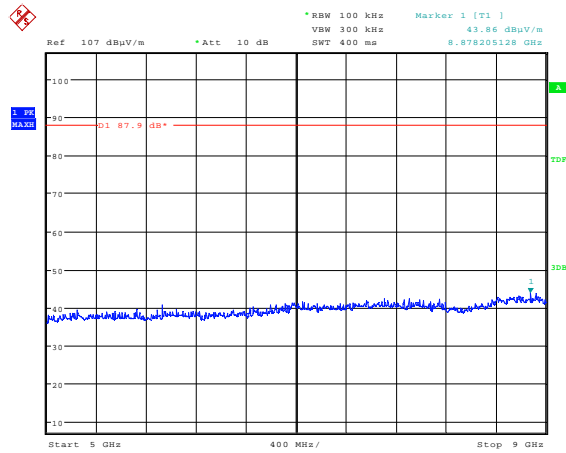
Date: 29.NOV.2010 10:35:23

### Radiated emissions 698.0 MHz 1 – 5GHz



Date: 25.NOV.2010 14:26:26

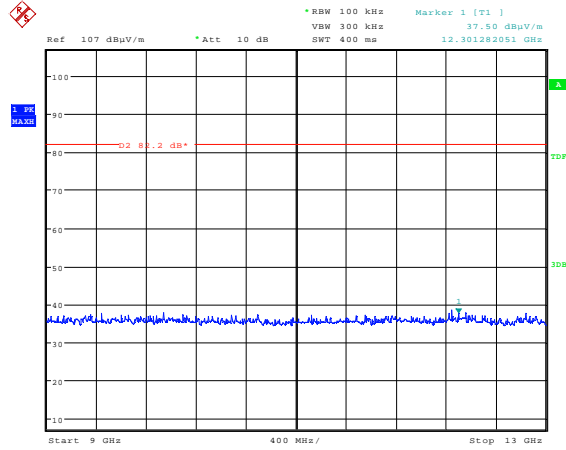
### Radiated emissions 698.0 MHz 5 – 9GHz



Date: 24.NOV.2010 11:29:35

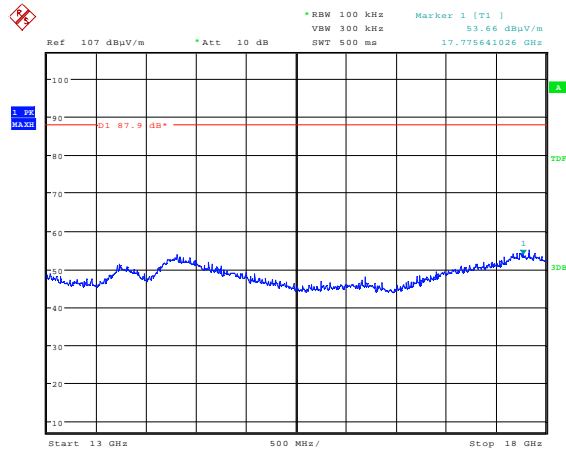
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

Radiated emissions 698.0 MHz 9 – 13GHz



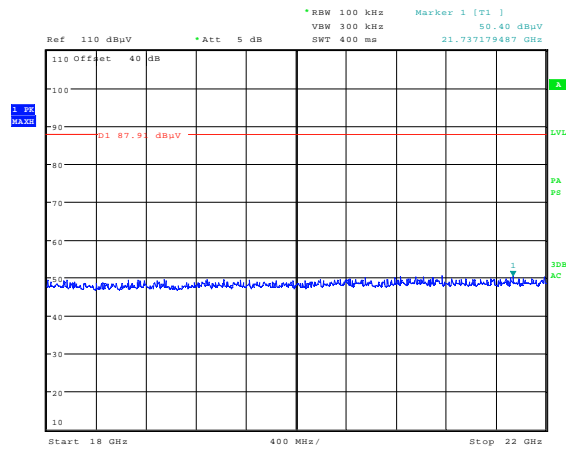
Date: 25.NOV.2010 15:31:12

Radiated emissions 698.0 MHz 13 – 18GHz



Date: 24.NOV.2010 10:45:55

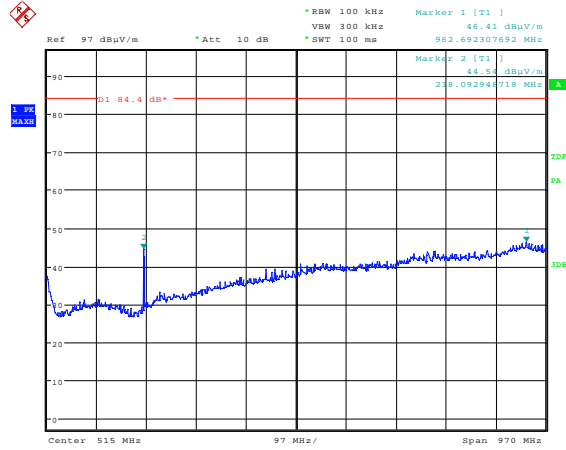
Radiated emissions 698.0 MHz 18 – 22GHz



Date: 23.NOV.2010 17:59:42

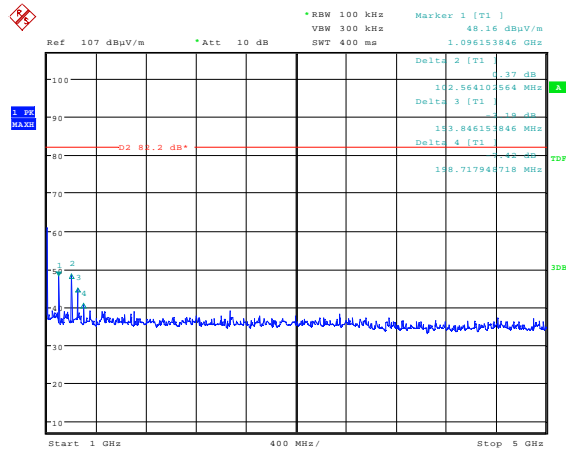
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

### Radiated emissions 707.0MHz 30MHz – 1GHz



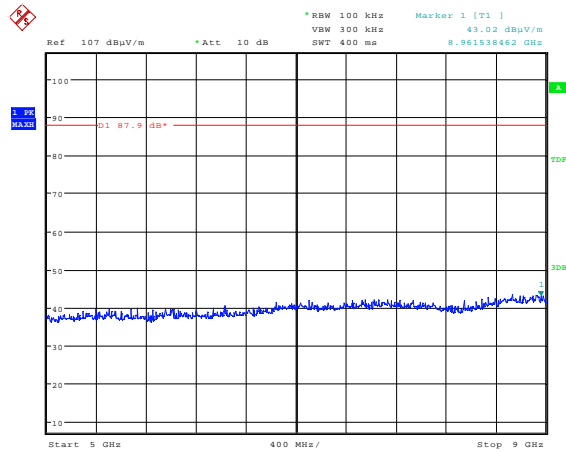
Date: 29.NOV.2010 10:35:56

### Radiated emissions 707.0MHz 1 – 5GHz



Date: 25.NOV.2010 14:27:09

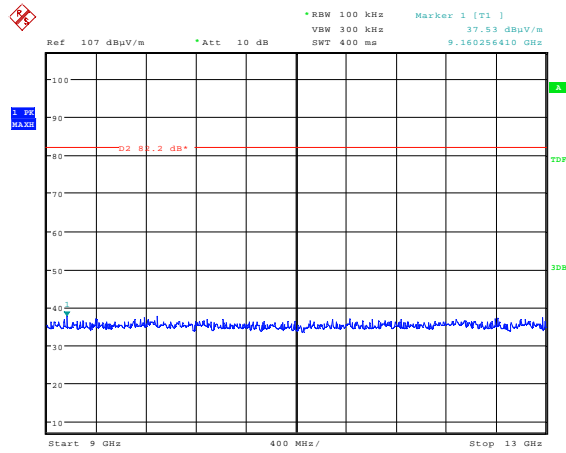
### Radiated emissions 707.0MHz 5 – 9GHz



Date: 24.NOV.2010 11:28:54

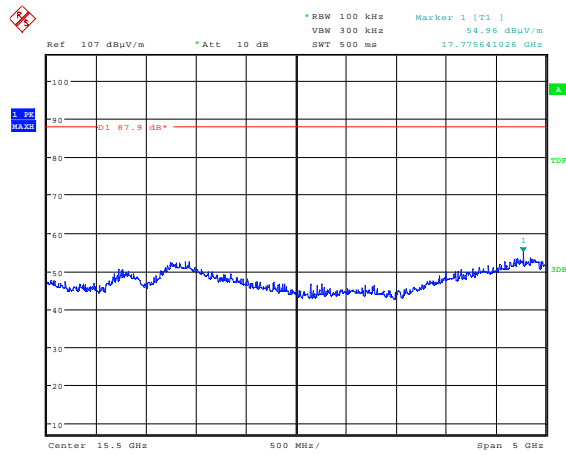
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

### Radiated emissions 707.0MHz 9 – 13GHz



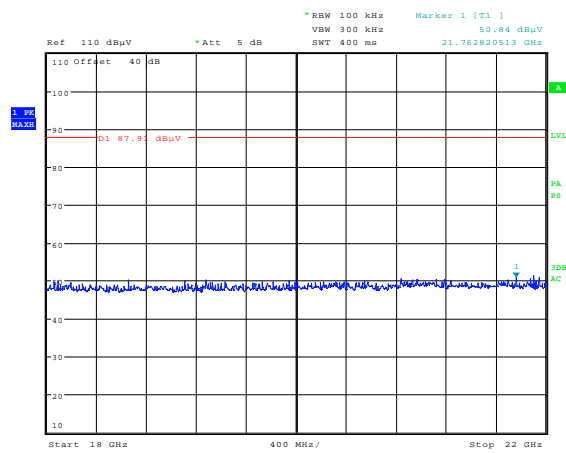
Date: 25.NOV.2010 15:31:54

### Radiated emissions 707.0MHz 13 – 18GHz



Date: 24.NOV.2010 10:47:08

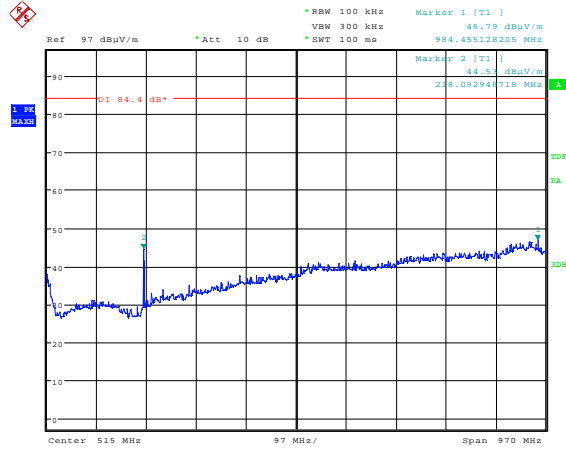
### Radiated emissions 707.0MHz 18 – 22GHz



Date: 23.NOV.2010 17:56:54

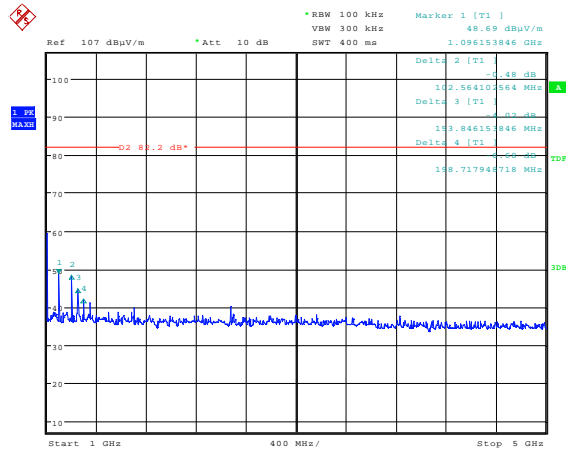
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

### Radiated emissions 716.0 MHz 30MHz – 1GHz



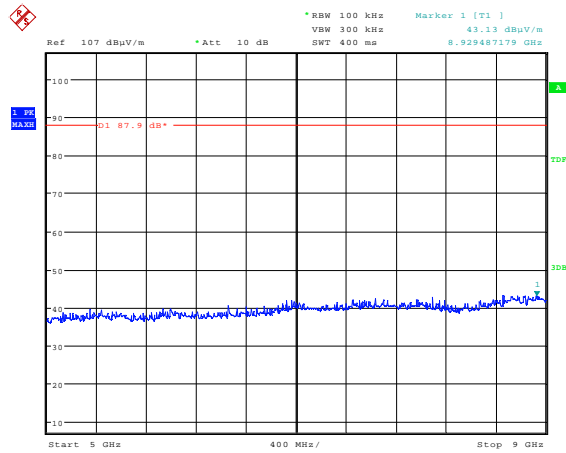
Date: 29.NOV.2010 10:36:21

### Radiated emissions 716.0 MHz 1 – 5GHz



Date: 25.NOV.2010 14:27:58

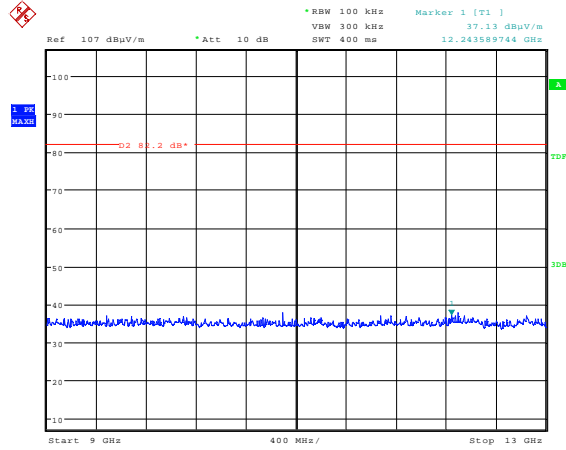
### Radiated emissions 716.0 MHz 5 – 9GHz



Date: 24.NOV.2010 11:28:27

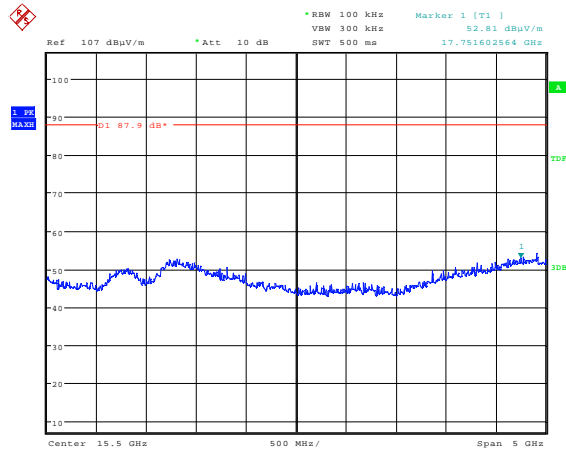
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

### Radiated emissions 716.0 MHz 9 – 13GHz



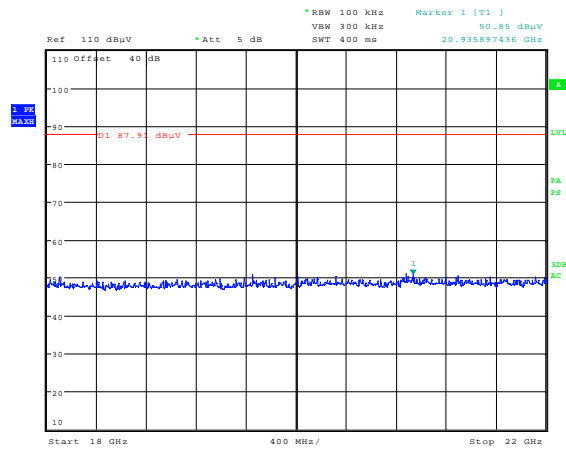
Date: 25.NOV.2010 15:32:23

### Radiated emissions 716.0 MHz 13 – 18GHz



Date: 24.NOV.2010 10:51:19

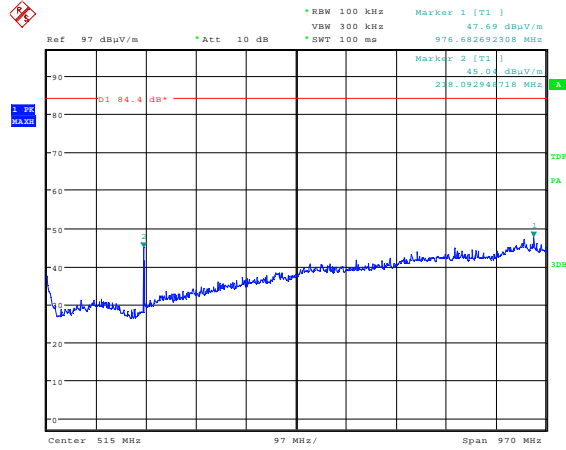
### Radiated emissions 716.0 MHz 18 – 22GHz



Date: 23.NOV.2010 17:58:02

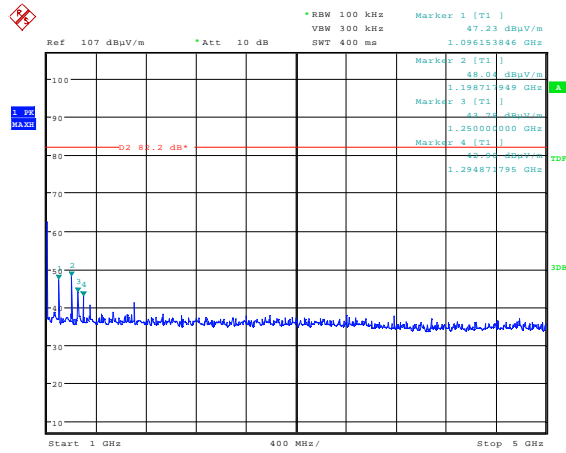
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

### Radiated emissions 776.0 MHz 30MHz – 1GHz



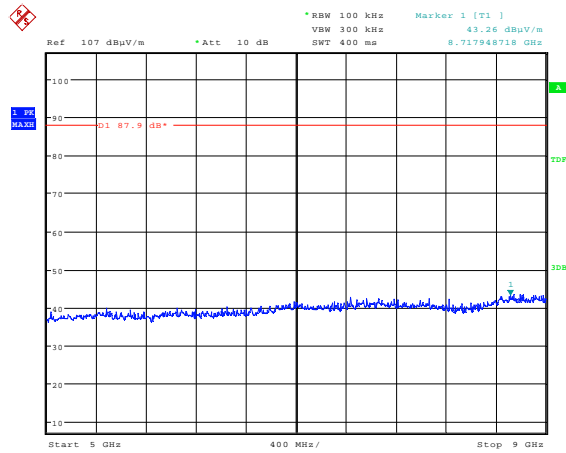
Date: 29.NOV.2010 10:33:28

### Radiated emissions 776.0 MHz 1 – 5GHz



Date: 25.NOV.2010 14:40:18

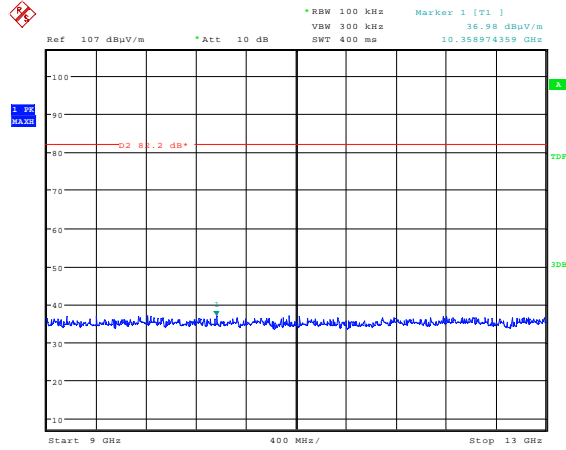
### Radiated emissions 776.0 MHz 5 – 9GHz



Date: 24.NOV.2010 11:31:44

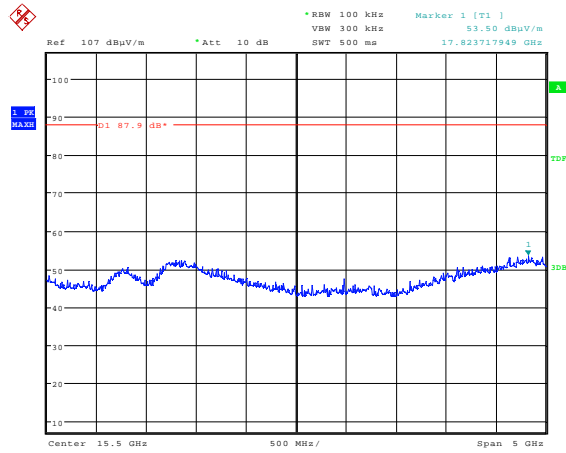
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

Radiated emissions 776.0 MHz 9 – 13GHz



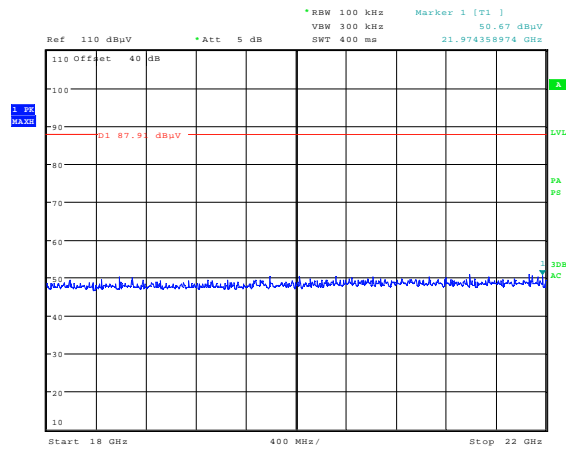
Date: 25.NOV.2010 15:18:29

Radiated emissions 776.0 MHz 13 – 18GHz



Date: 24.NOV.2010 10:58:59

Radiated emissions 776.0 MHz 18 – 22GHz

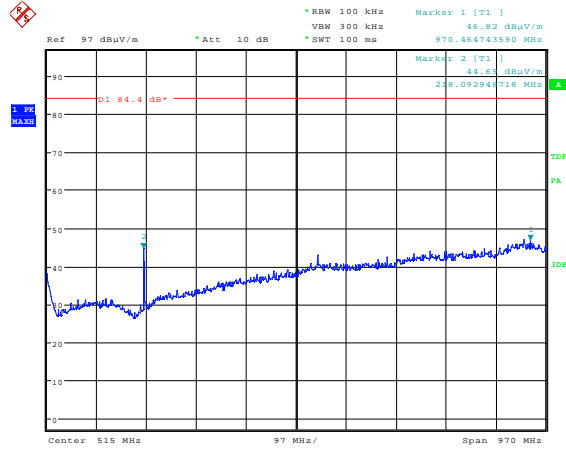


Date: 23.NOV.2010 18:03:47

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

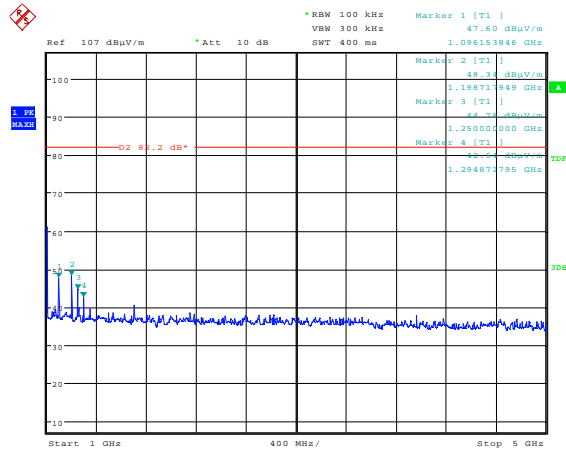


### Radiated emissions 742.5 MHz 30MHz – 1GHz



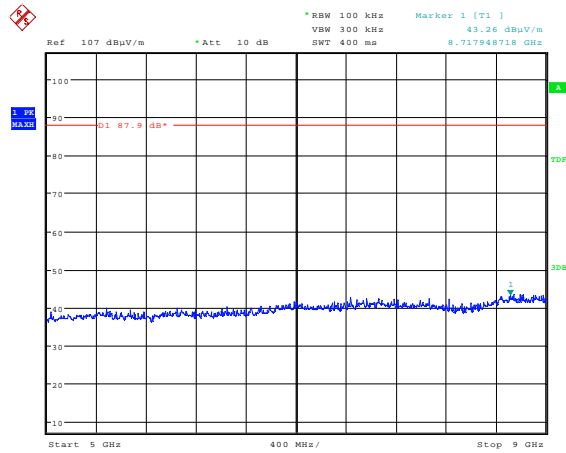
Date: 29.NOV.2010 10:34:02

### Radiated emissions 742.5 MHz 1 – 5GHz



Date: 25.NOV.2010 14:39:45

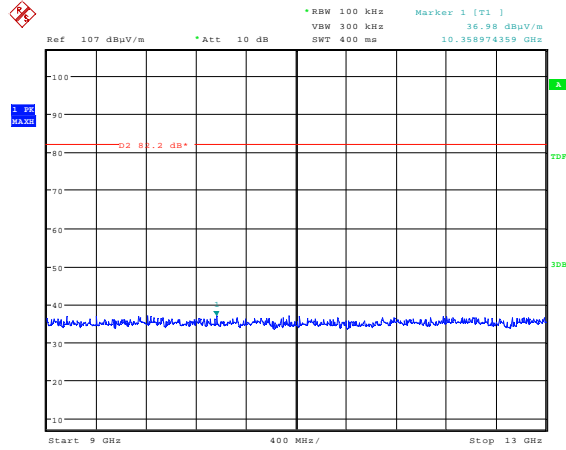
### Radiated emissions 742.5 MHz 5 – 9GHz



Date: 24.NOV.2010 11:31:44

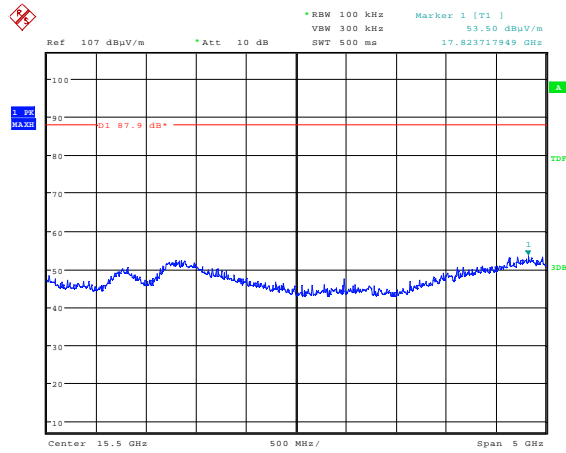
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

### Radiated emissions 742.5 MHz 9 – 13GHz



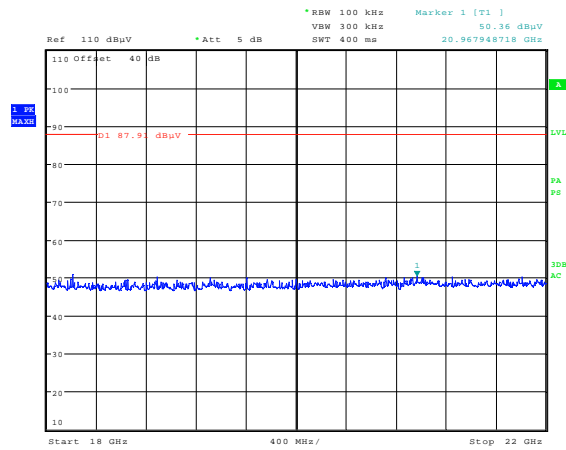
Date: 25.NOV.2010 15:18:29

### Radiated emissions 742.5 MHz 13 – 18GHz



Date: 24.NOV.2010 10:58:59

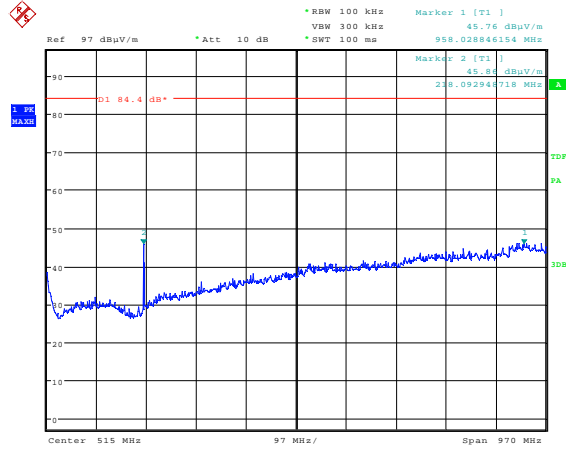
### Radiated emissions 742.5 MHz 18 – 22GHz



Date: 23.NOV.2010 18:03:20

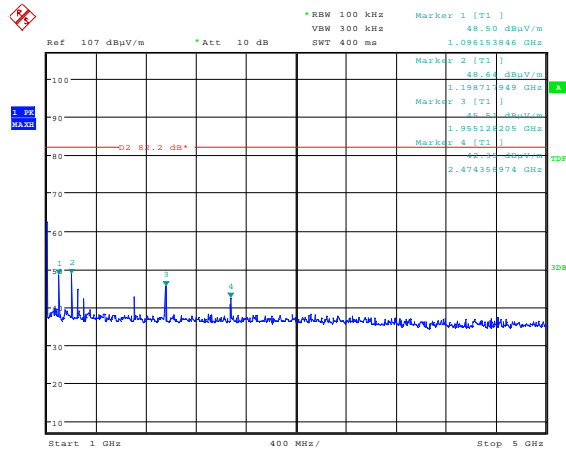
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

### Radiated emissions 787.0 MHz 30MHz – 1GHz



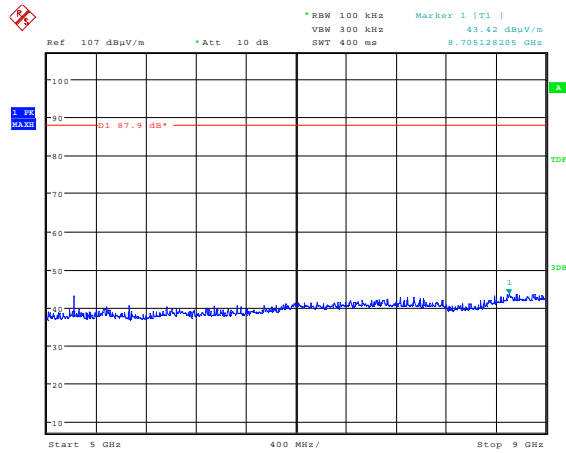
Date: 29.NOV.2010 10:34:28

### Radiated emissions 787.0 MHz 1 – 5GHz



Date: 25.NOV.2010 14:38:47

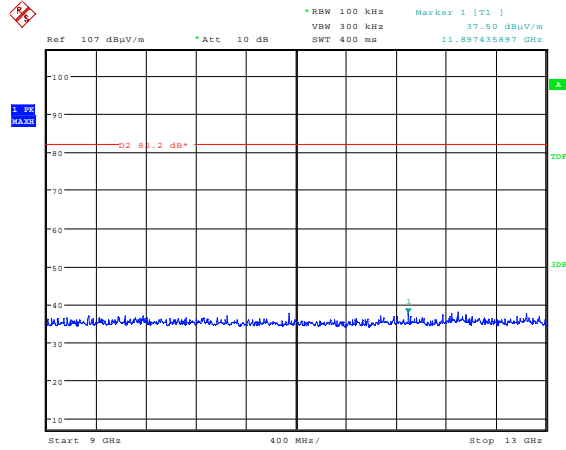
### Radiated emissions 787.0 MHz 5 – 9GHz



Date: 24.NOV.2010 11:33:11

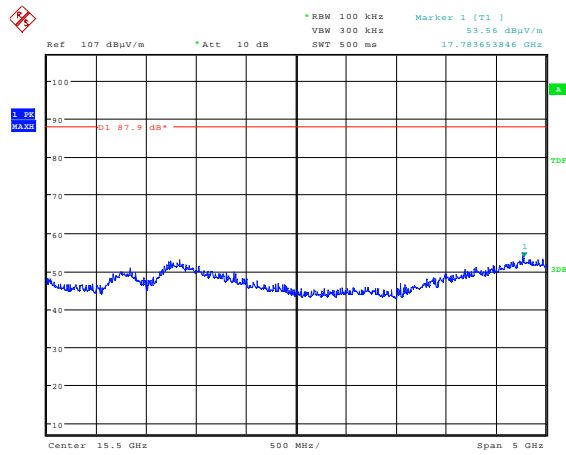
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

### Radiated emissions 787.0 MHz 9 – 13GHz



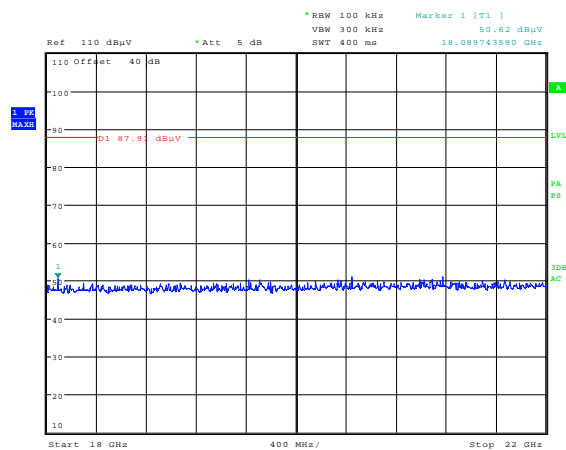
Date: 25.NOV.2010 15:19:39

### Radiated emissions 787.0 MHz 13 – 18GHz



Date: 24.NOV.2010 10:57:53

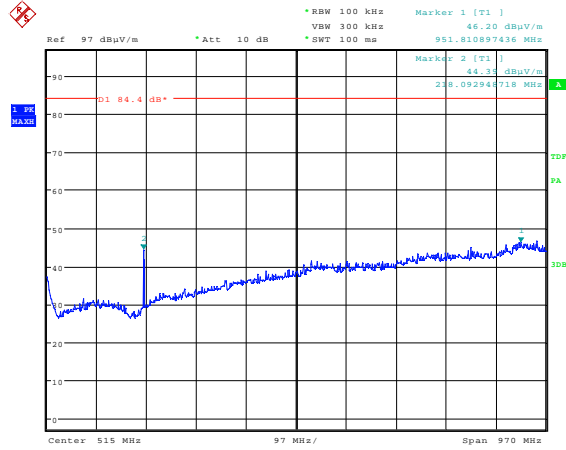
### Radiated emissions 787.0 MHz 18 – 22GHz



Date: 23.NOV.2010 18:02:58

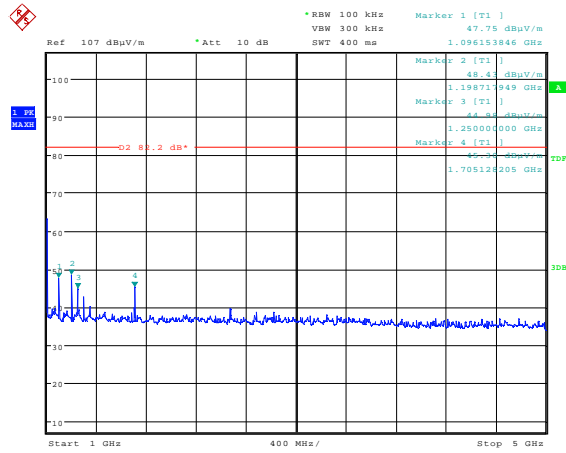
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

### Radiated emissions 1710.0 MHz 30MHz – 1GHz



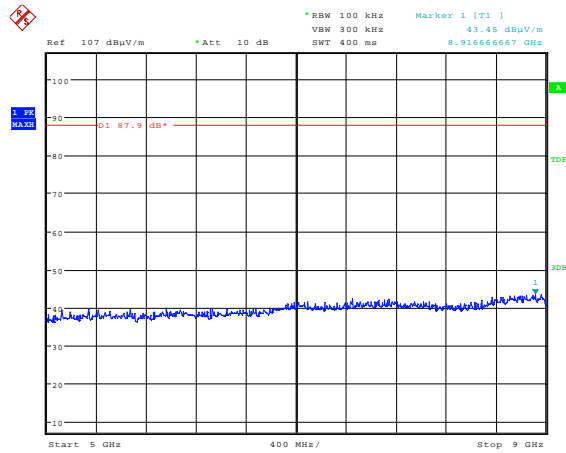
Date: 29.NOV.2010 10:30:50

### Radiated emissions 1710.0 MHz 1 – 5GHz



Date: 25.NOV.2010 14:43:16

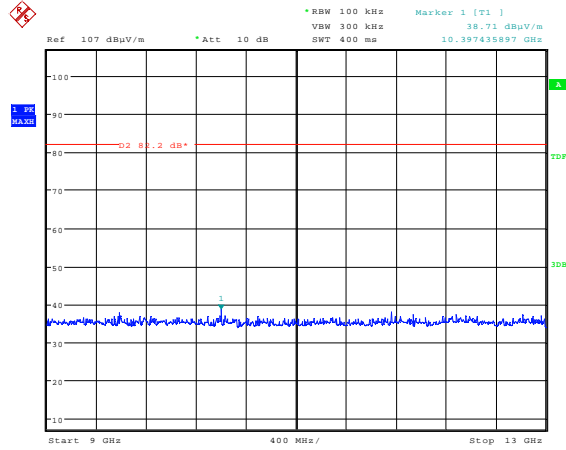
### Radiated emissions 1710.0 MHz 5 – 9GHz



Date: 24.NOV.2010 11:43:41

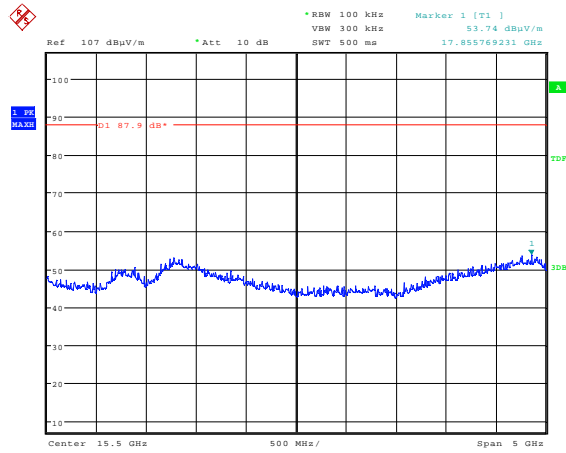
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

### Radiated emissions 1710.0 MHz 9 – 13GHz



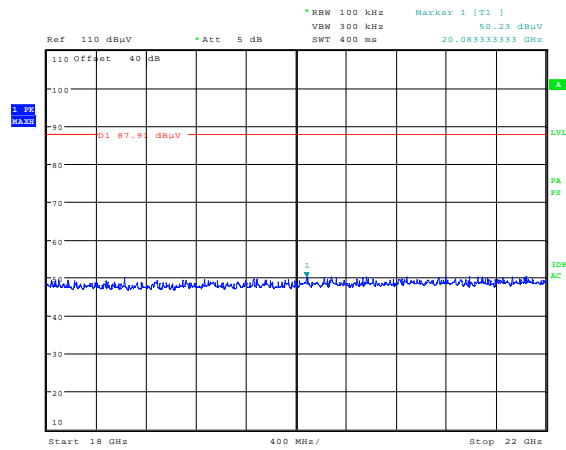
Date: 25.NOV.2010 15:16:38

### Radiated emissions 1710.0 MHz 13 – 18GHz



Date: 24.NOV.2010 11:01:06

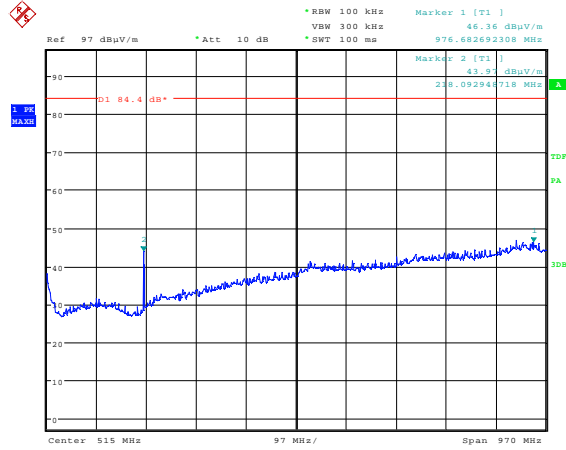
### Radiated emissions 1710.0 MHz 18 – 22GHz



Date: 23.NOV.2010 18:05:20

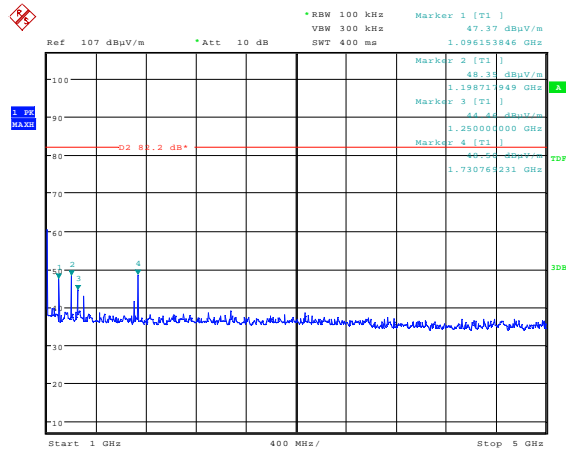
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

### Radiated emissions 1732.5 MHz 30MHz – 1GHz



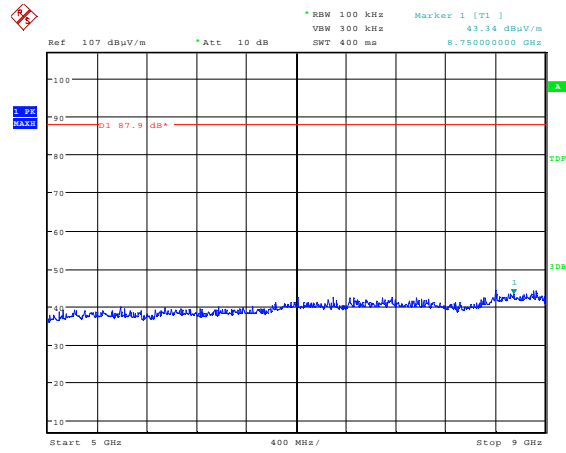
Date: 29.NOV.2010 10:30:21

### Radiated emissions 1732.5 MHz 1 – 5GHz



Date: 25.NOV.2010 14:44:23

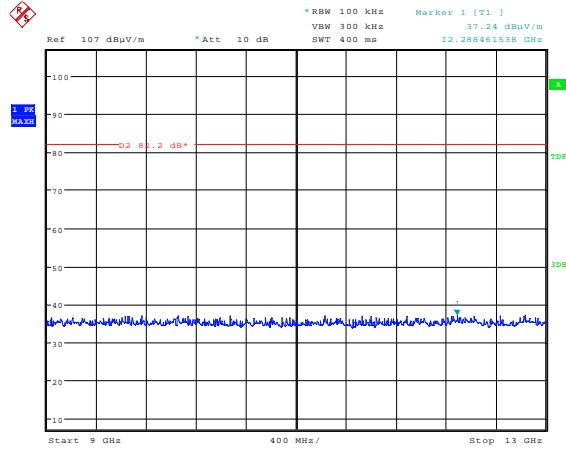
### Radiated emissions 1732.5 MHz 5 – 9GHz



Date: 24.NOV.2010 11:43:07

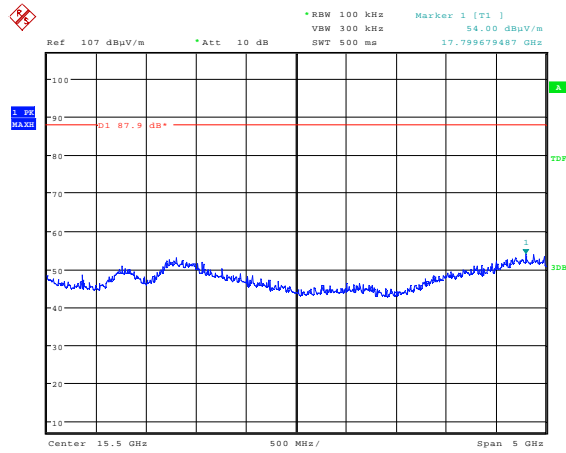
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

### Radiated emissions 1732.5 MHz 9 – 13GHz



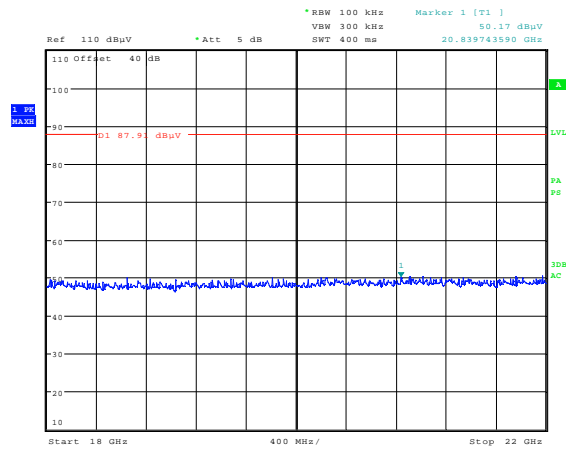
Date: 25.NOV.2010 15:15:52

### Radiated emissions 1732.5 MHz 13 – 18GHz



Date: 24.NOV.2010 11:01:44

### Radiated emissions 1732.5 MHz 18 – 22GHz

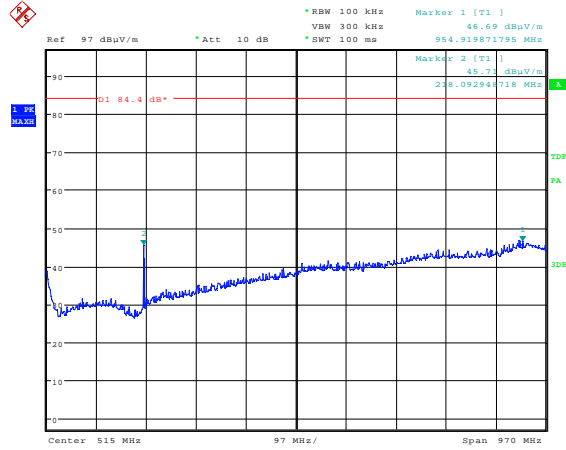


Date: 23.NOV.2010 18:05:50

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

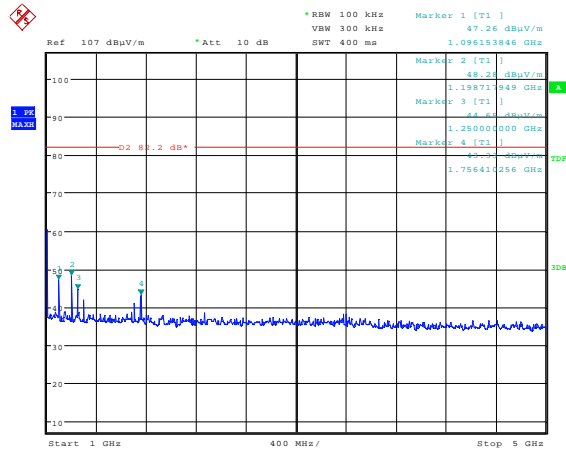


### Radiated emissions 1755.0 MHz 30MHz – 1GHz



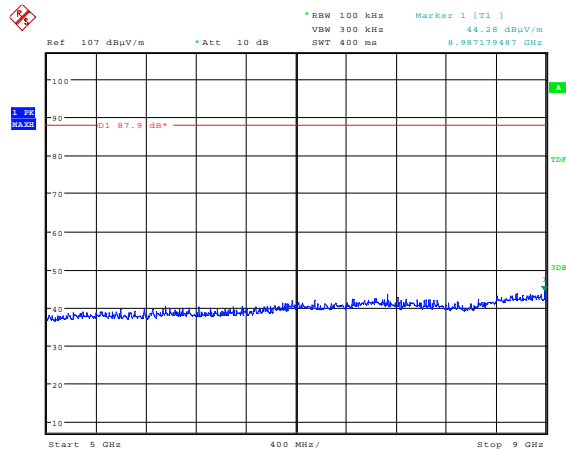
Date: 29.NOV.2010 10:29:55

### Radiated emissions 1755.0 MHz 1 – 5GHz



Date: 25.NOV.2010 14:45:47

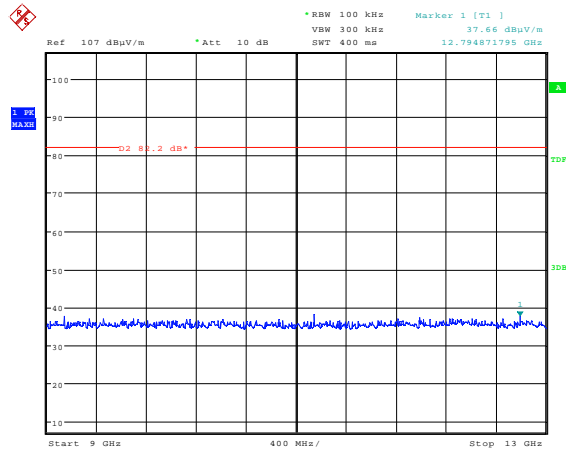
### Radiated emissions 1755.0 MHz 5 – 9GHz



Date: 24.NOV.2010 11:42:25

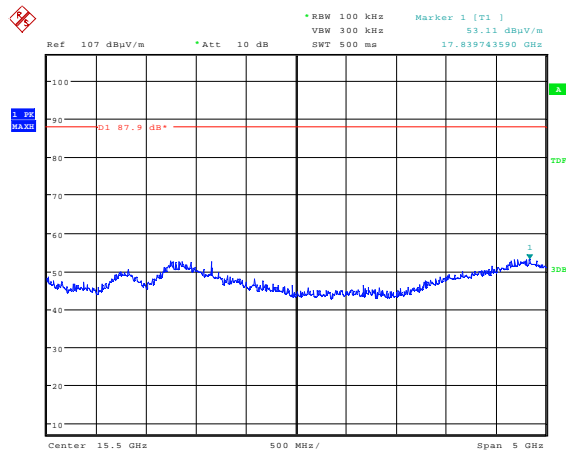
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

### Radiated emissions 1755.0 MHz 9 – 13GHz



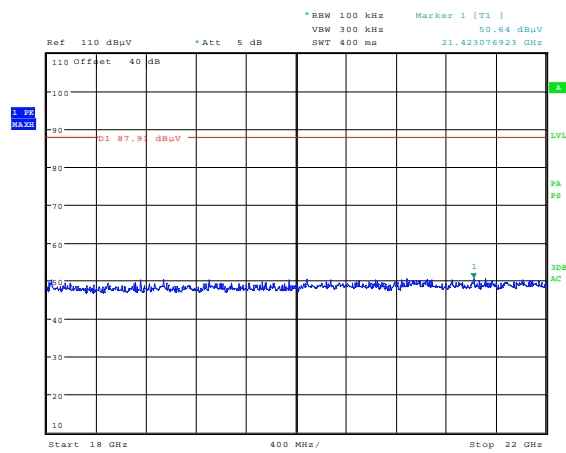
Date: 25.NOV.2010 15:15:12

### Radiated emissions 1755.0 MHz 13 – 18GHz



Date: 24.NOV.2010 11:02:15

### Radiated emissions 1755.0 MHz 18 – 22GHz



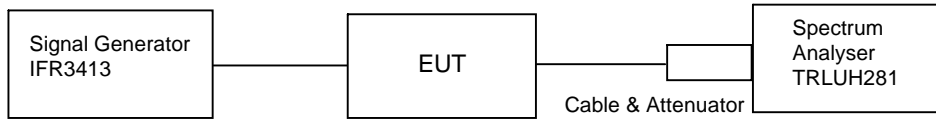
Date: 23.NOV.2010 18:06:54

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	-1.10	0.4	-4.12	40.5	37.9	36.4	27.98
742.500	-0.10	0.4	-0.34	40.5	40.7	40.2	27.61
757.000	1.10	0.3	-3.97	40.5	35.7	36.5	25.78

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

**2110 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
2110.0	7.00	0.7	-2.65	40.5	31.6	37.9	21.60
2132.5	6.00	0.7	-2.01	40.5	33.2	38.5	23.21
2155.0	7.70	0.7	-2.22	40.5	31.3	38.3	21.29

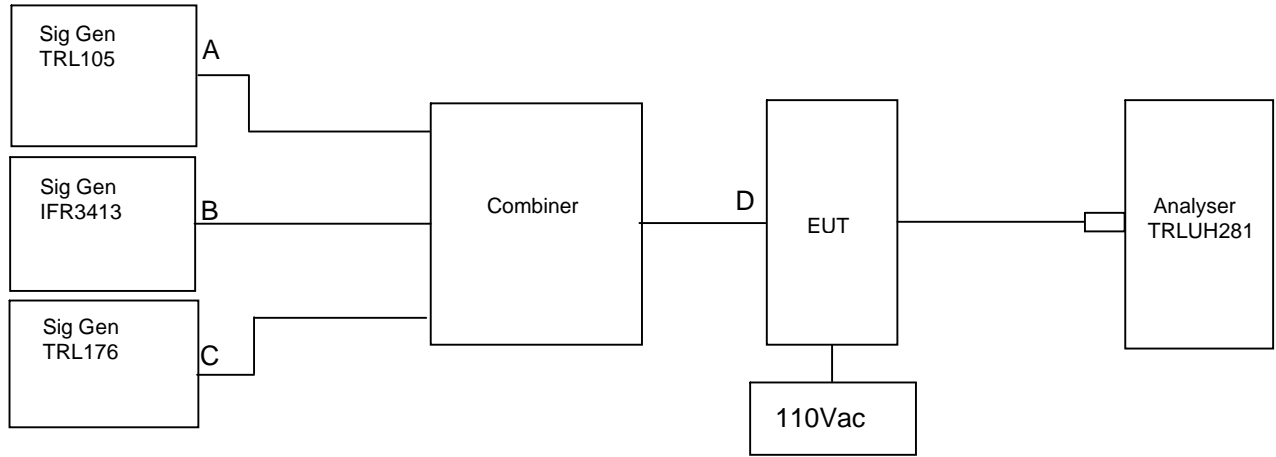
Notes: 1. The signal generator input was increased by 10dBs and the level of the output signal remeasured.

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



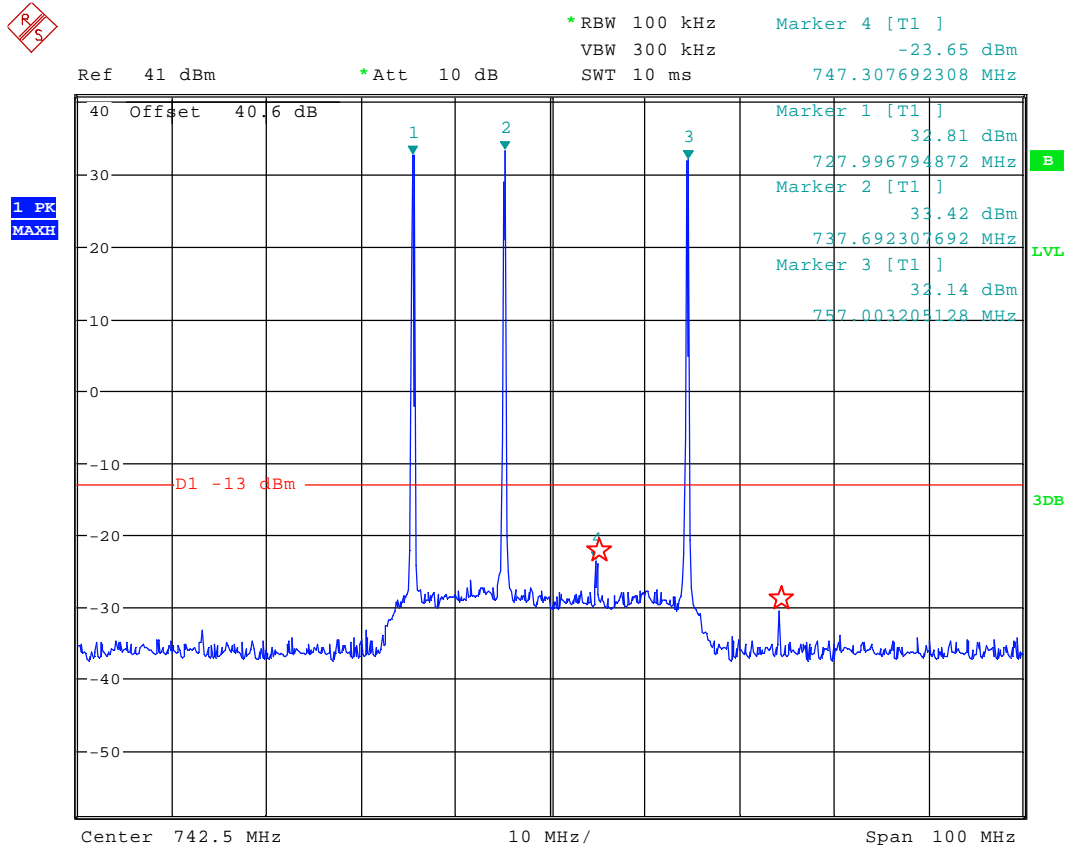
The intermodulation and spurious products were measured with the amplifier operating at maximum gain. A three tone test was conducted using the equipment as above. The input power level was adjusted so the level at point D was 10dB above the maximum input.

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
2110	2110.0	2125.0	2155.0	-22.28 dBm @ 2140.064 MHz	-13
Cross Band	728.000	757.000	2125.0	-20.55 dBm @ 2891.025 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

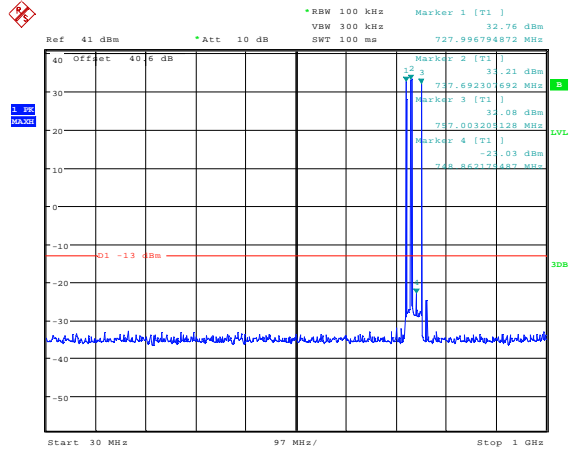
### Intermodulation Inband – 700 MHz Downlink Band



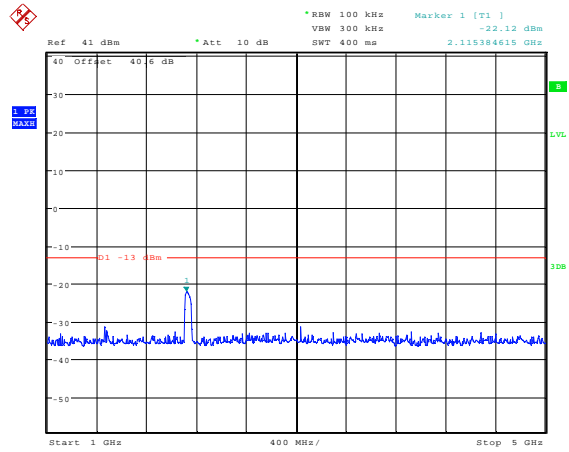
Date: 19.NOV.2010 13:23:30

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

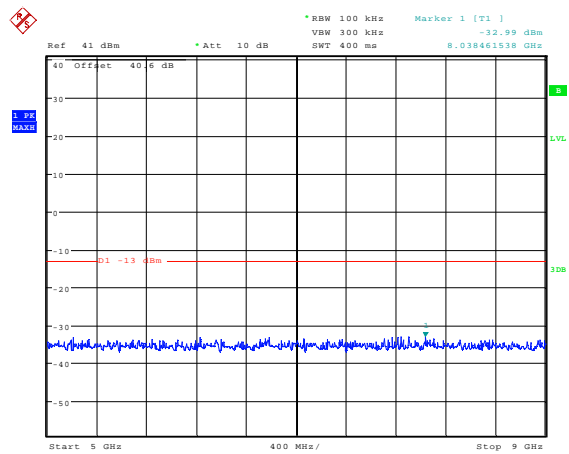
## Intermodulation Wideband – 700 MHz Downlink Band



Date: 19.NOV.2010 13:23:47



Date: 19.NOV.2010 13:24:02



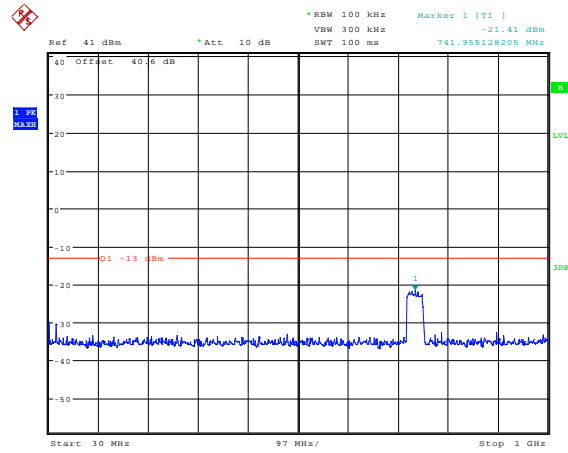
Date: 19.NOV.2010 13:24:17

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

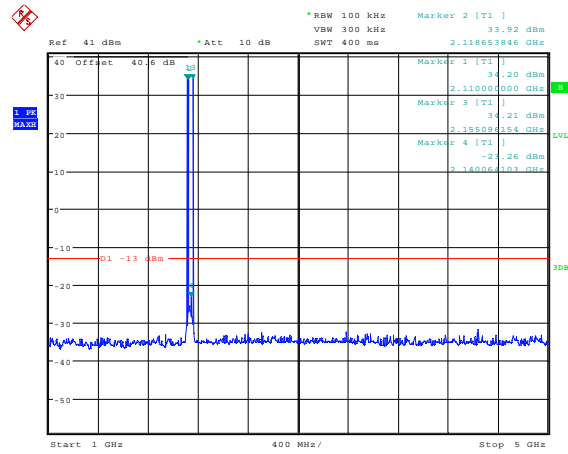




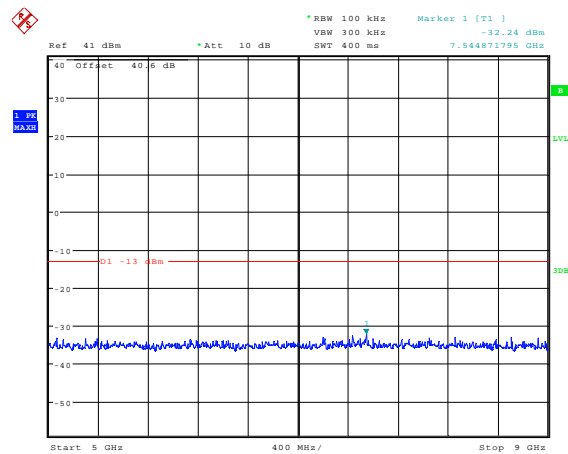
## Intermodulation Wideband – 2110 MHz Downlink Band



Date: 19.NOV.2010 13:54:38



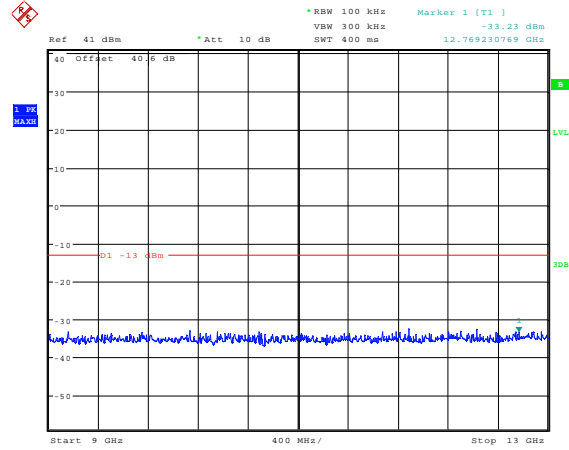
Date: 19.NOV.2010 13:53:30



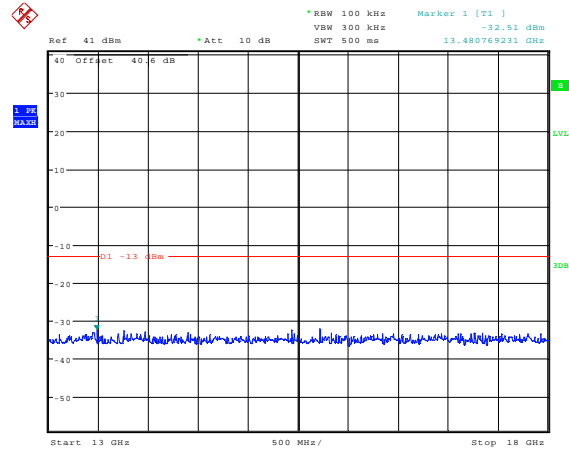
Date: 19.NOV.2010 13:53:43

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

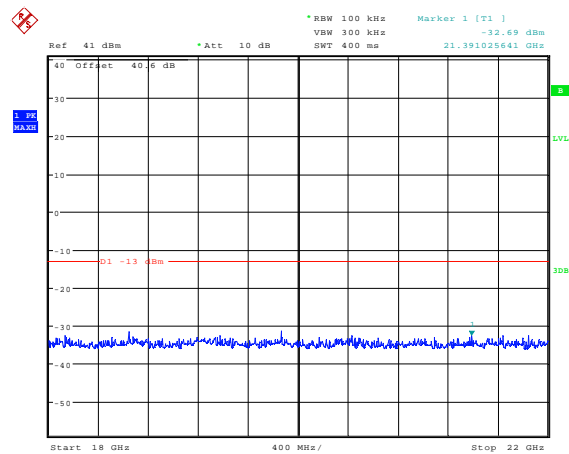
## Intermodulation Wideband – 2110 MHz Downlink Band



Date: 19.NOV.2010 13:53:55



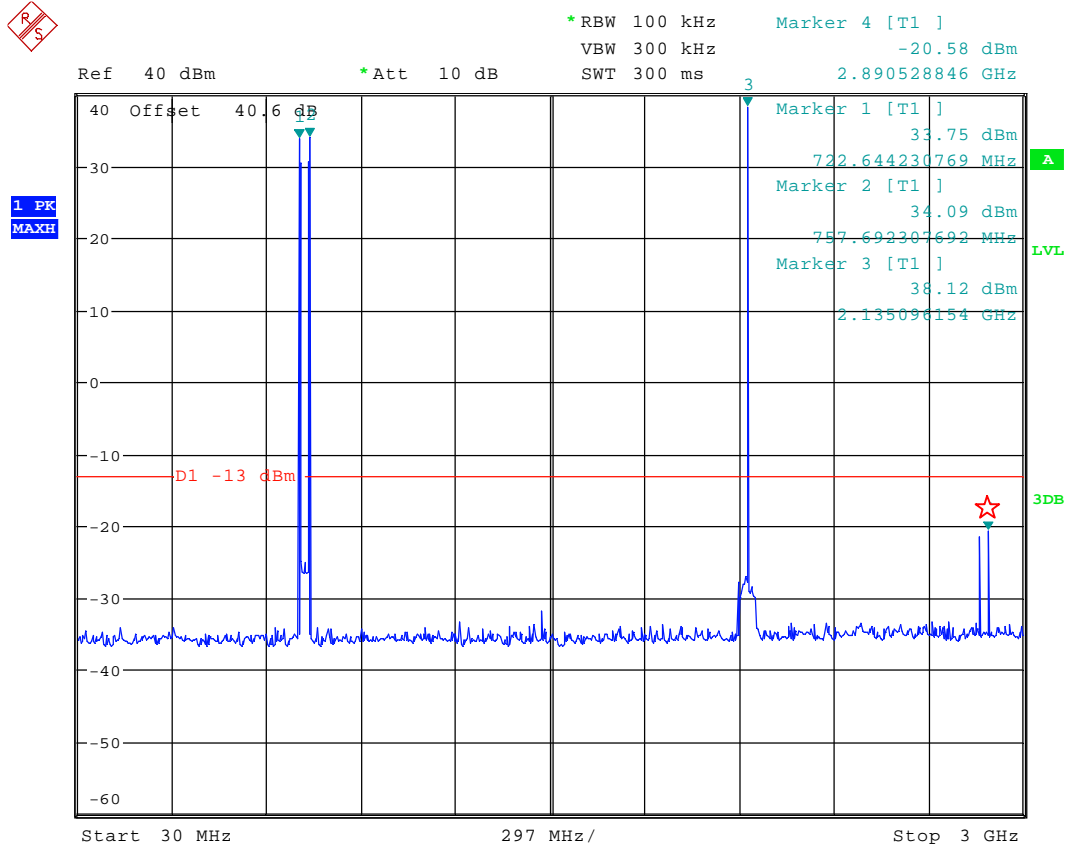
Date: 19.NOV.2010 13:54:07



Date: 19.NOV.2010 13:54:19

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

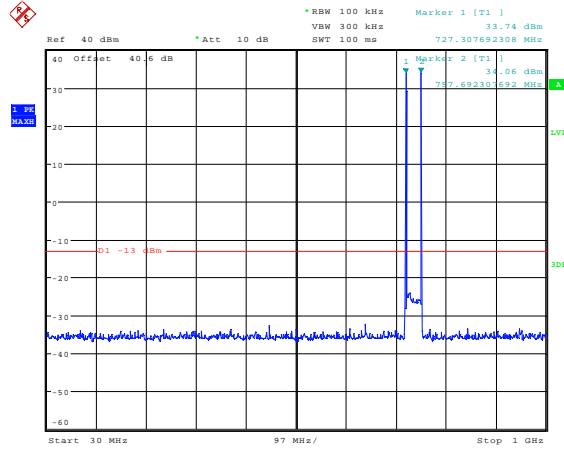
### Intermodulation Inband – Cross Band



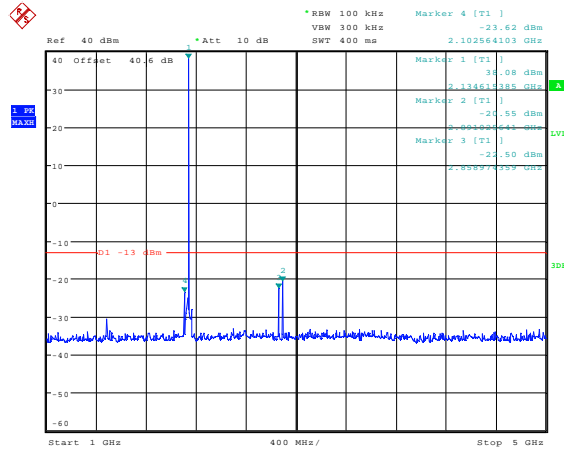
Date: 19.NOV.2010 14:27:19

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

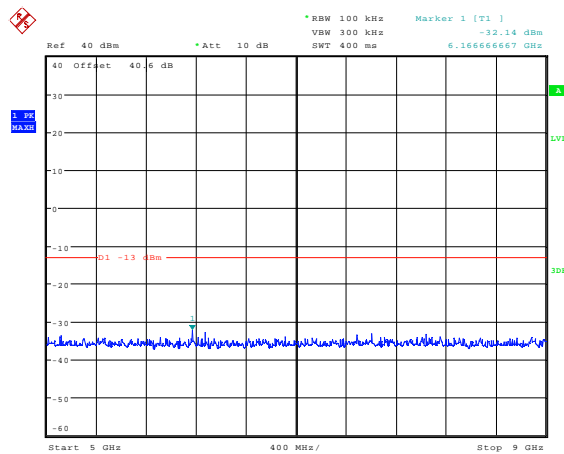
## Intermodulation Wideband – Cross Band



Date: 19.NOV.2010 14:27:39



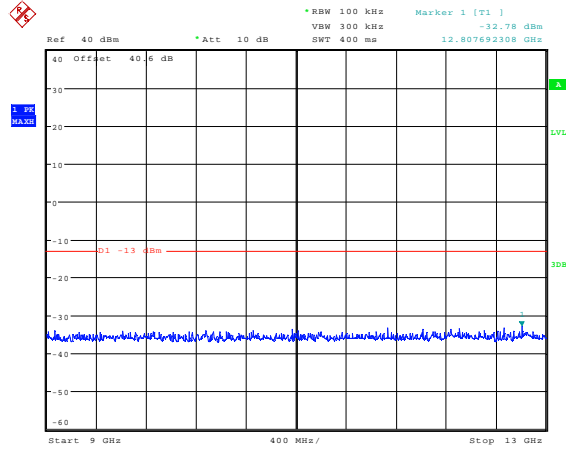
Date: 19.NOV.2010 14:27:56



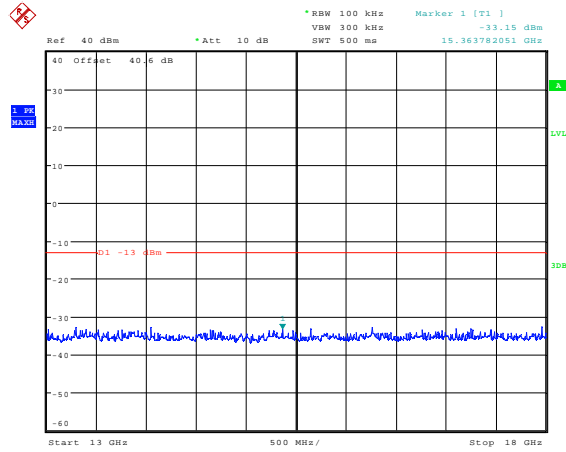
Date: 19.NOV.2010 14:28:13

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

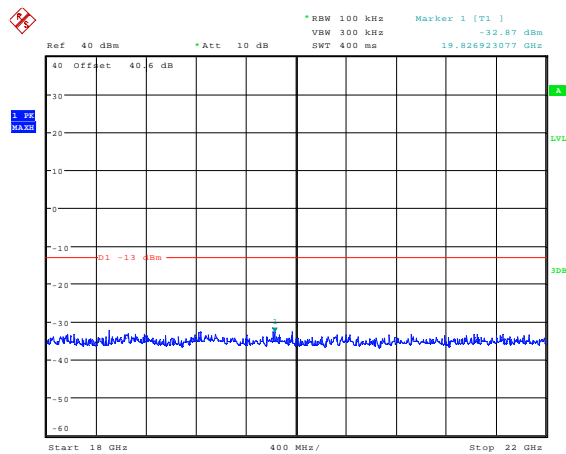
## Intermodulation Wideband – Cross Band



Date: 19.NOV.2010 14:28:27



Date: 19.NOV.2010 14:28:43



Date: 19.NOV.2010 14:28:57

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, 20MHz wide LTE, GSM, EDGE, CDMA and W-CDMA in the 2110 MHz band and a 2500Hz FM tone with 2.5 and 5 kHz deviation, 20MHz wide LTE in the 700MHz Band. 20MHz wide LTE modulation was only applied at the upper and lower frequencies as the band is only 29MHz wide.

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.

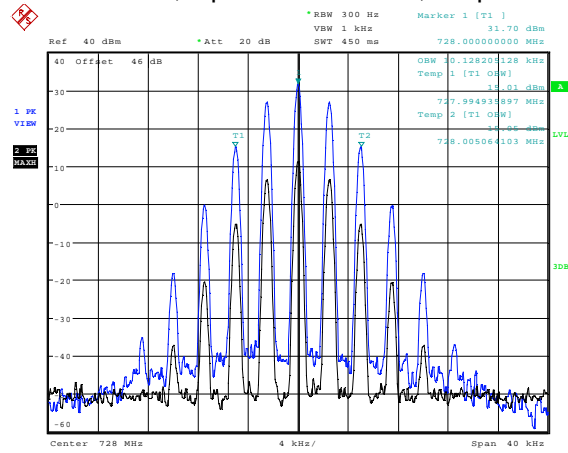
1. Cable and attenuator between EUT and spectrum analyser 40.6dB
2. Cable between signal generator and EUT 0.4dB

Frequency Of Operational	Modulation Type		
	2.5 kHz FM	5 kHz FM	LTE
728.000	10.128 kHz	15.256 kHz	17.839 MHz
742.500	10.128 kHz	15.256 kHz	N/A
757.000	10.128 kHz	15.256 kHz	17.839 MHz

Frequency Of Operational	Modulation Type						
	2.5 kHz FM	5 kHz FM	LTE	GSM	EDGE	CDMA	W-CDMA
2110.000	10.128 kHz	15.256 kHz	17.875 MHz	241.987 kHz	238.782 kHz	1.272 MHz	4.134 MHz
2132.500	10.128 kHz	15.256 kHz	17.910 MHz	241.987 kHz	235.576 kHz	1.275 MHz	4.173 MHz
2155.000	10.128 kHz	15.256 kHz	17.875 MHz	243.589 kHz	233.974 kHz	1.272 MHz	4.163 MHz

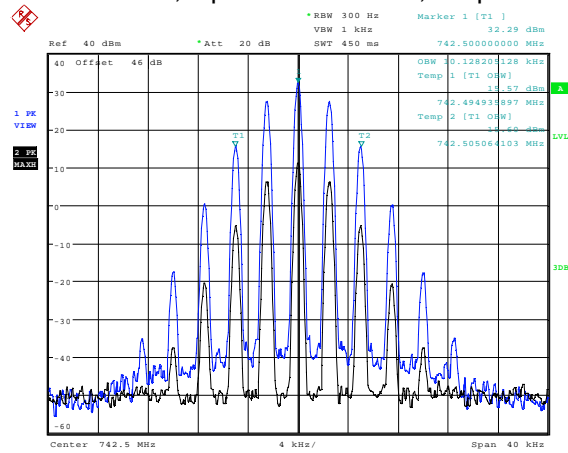
TYPE OF EQUIPMENT	MAKER/SUPPLIER	MODEL No	SERIAL No	REF No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	X
SIGNAL GENERATOR	IFR	3413	341001/261	N/A	X
ATTENUATOR	BIRD	8308-200	N/A	103	X
ATTENUATOR	BIRD	830-100-N	N/A	222	X
CABLE	TRaC	N/A	N/A	UH273	X
CABLE	TRaC	N/A	N/A	UH274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

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



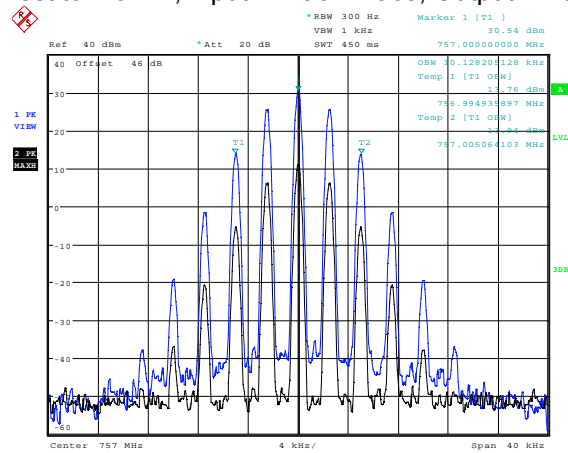
Date: 17.NOV.2010 12:02:36

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



Date: 17.NOV.2010 12:03:11

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

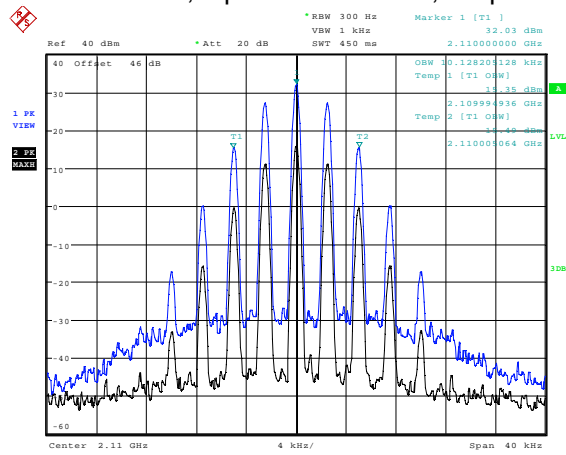


Date: 17.NOV.2010 12:04:39

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

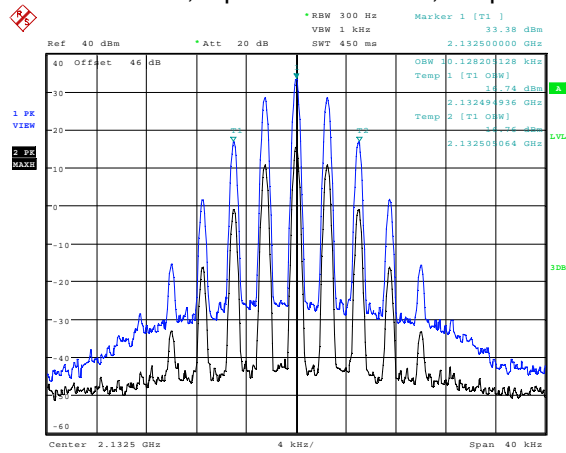


2110.0MHz FM deviation set to 2.5kHz, Input – Black Trace, Output - Blue Trace



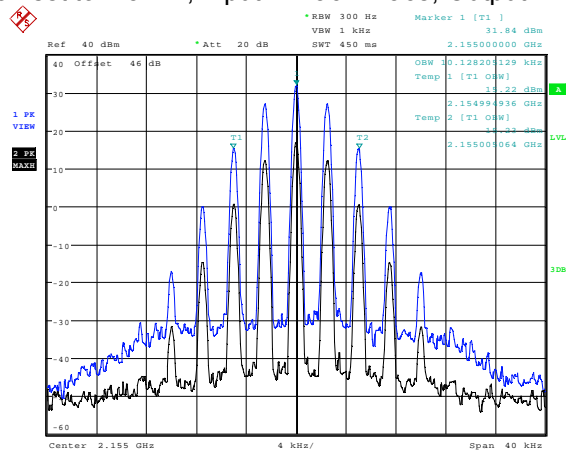
Date: 17.NOV.2010 12:00:55

2132.5MHz FM deviation set to 2.5kHz, Input – Black Trace, Output - Blue Trace



Date: 17.NOV.2010 12:00:18

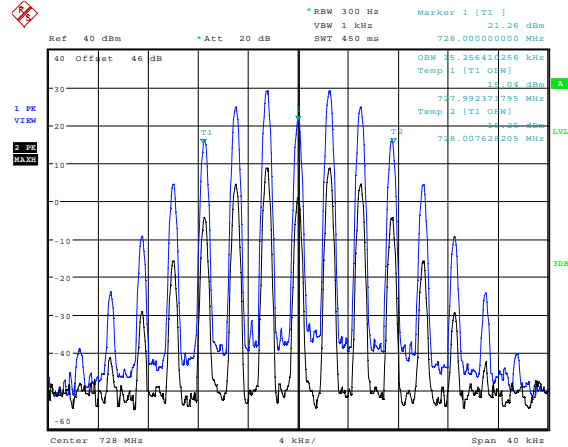
2155.0MHz FM deviation set to 2.5kHz, Input – Black Trace, Output - Blue Trace



Date: 17.NOV.2010 11:56:26

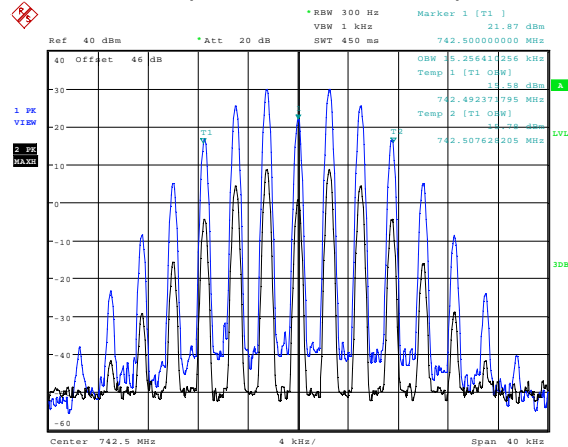
The above plots show no significant distortion visible when compared to the input signal.

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



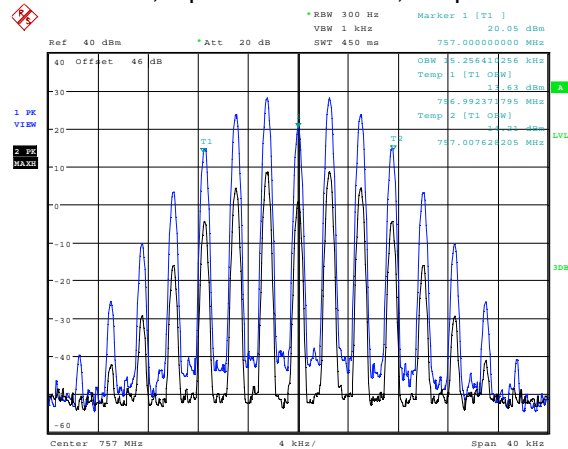
Date: 17.NOV.2010 12:02:14

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



Date: 17.NOV.2010 12:03:42

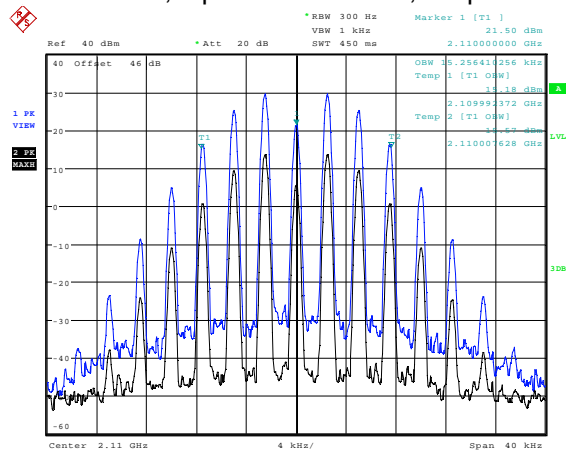
757.0MHz FM deviation set to 5kHz, Input – Black Trace, Output - Blue Trace



Date: 17.NOV.2010 12:04:13

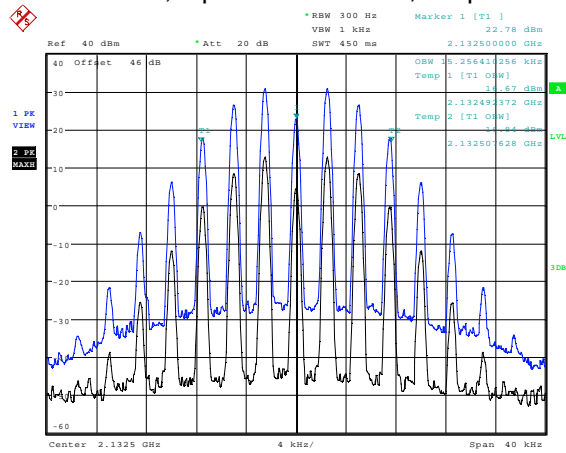
The above plots show no significant distortion visible when compared to the input signal.

2110.0MHz FM deviation set to 5kHz, Input – Black Trace, Output - Blue Trace



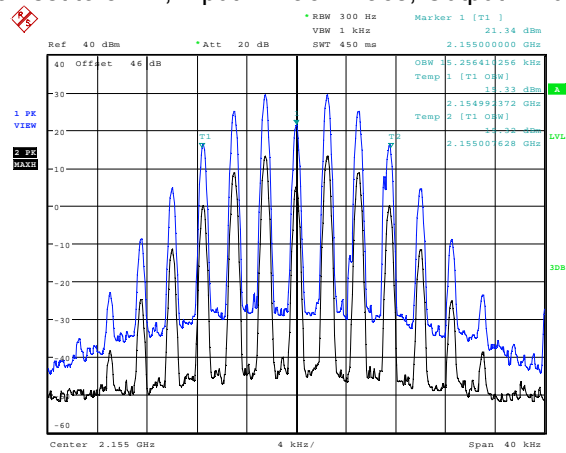
Date: 17.NOV.2010 12:01:26

2132.5MHz FM deviation set to 5kHz, Input – Black Trace, Output - Blue Trace



Date: 17.NOV.2010 11:59:05

2155.0MHz FM deviation set to 5kHz, Input – Black Trace, Output - Blue Trace

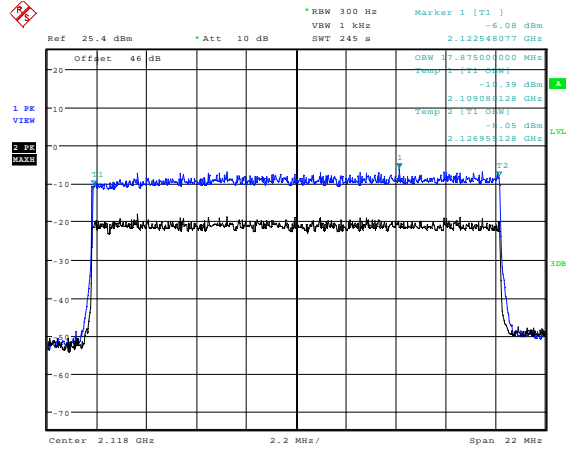


Date: 17.NOV.2010 11:57:47

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

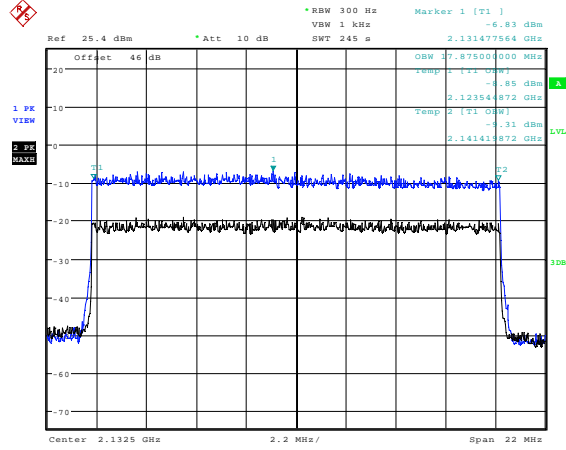


2110.0MHz LTE Modulation, Input – Black Trace, Output - Blue Trace



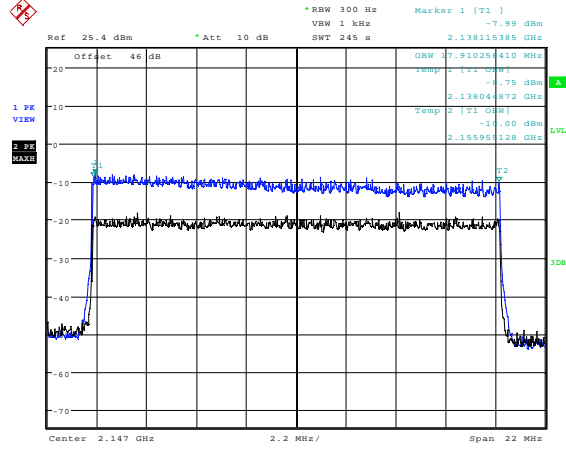
Date: 22.NOV.2010 11:45:58

2132.5MHz LTE Modulation, Input – Black Trace, Output - Blue Trace



Date: 22.NOV.2010 12:02:18

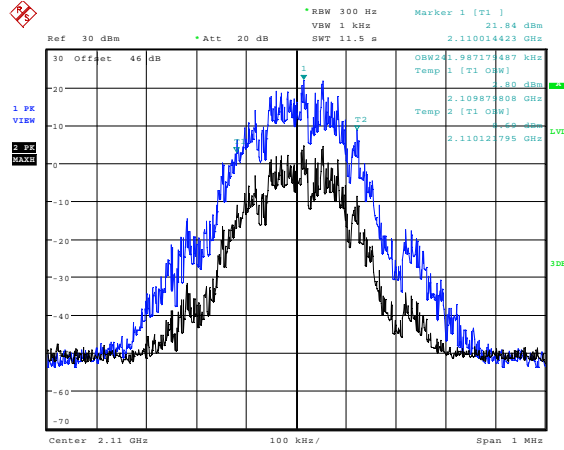
2155.0MHz LTE Modulation, Input – Black Trace, Output - Blue Trace



Date: 22.NOV.2010 12:18:24

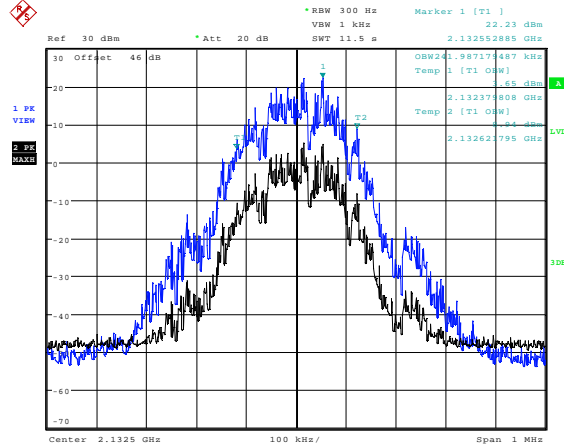
The above plots show no significant distortion visible when compared to the input signal.

2110.0MHz GSM Modulation, Input – Black Trace, Output - Blue Trace



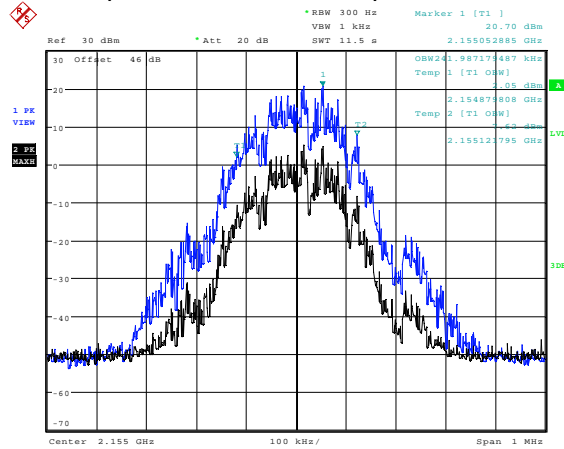
Date: 17.NOV.2010 11:34:21

2132.5MHz GSM Modulation, Input – Black Trace, Output - Blue Trace



Date: 17.NOV.2010 11:49:36

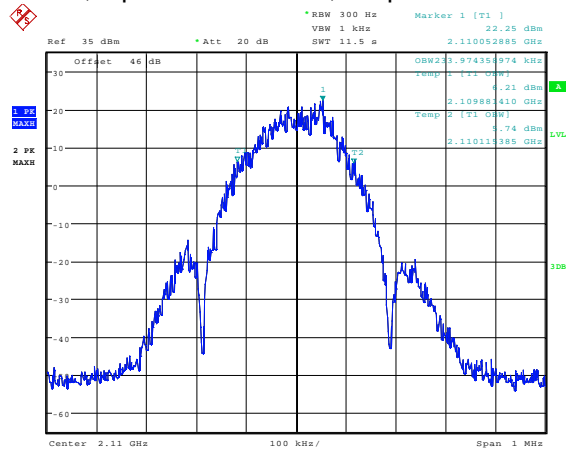
2155.0MHz GSM Modulation, Input – Black Trace, Output - Blue Trace



Date: 17.NOV.2010 11:54:02

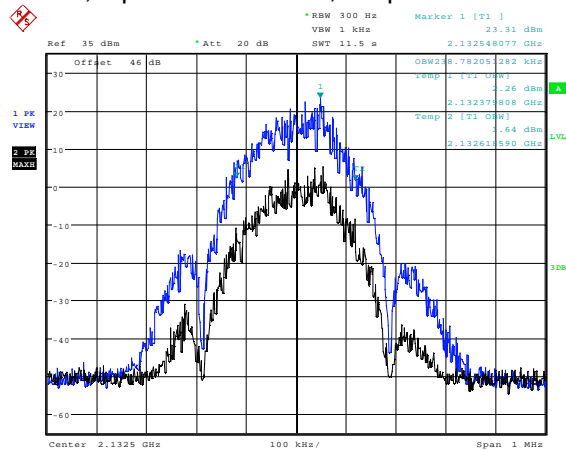
The above plots show no significant distortion visible when compared to the input signal.

2110.0MHz EDGE Modulation, Input – Black Trace, Output - Blue Trace



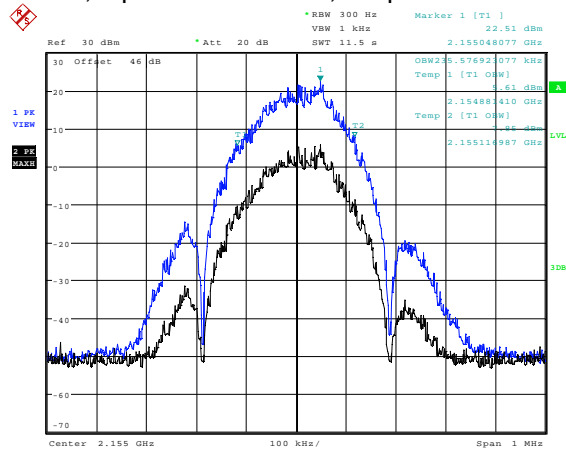
Date: 17.NOV.2010 11:04:54

2132.5MHz EDGE Modulation, Input – Black Trace, Output - Blue Trace



Date: 17.NOV.2010 11:03:47

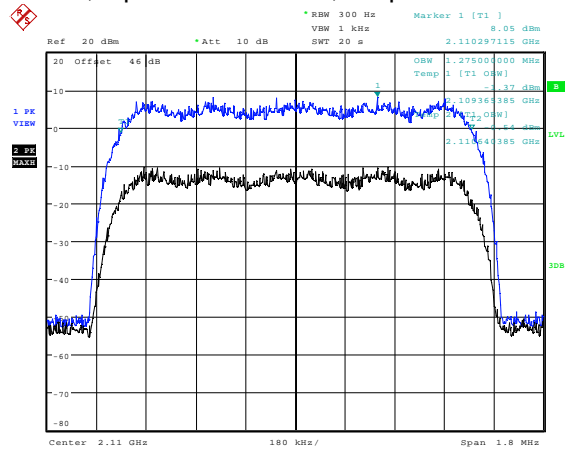
2155.0MHz EDGE Modulation, Input – Black Trace, Output - Blue Trace



Date: 17.NOV.2010 10:56:55

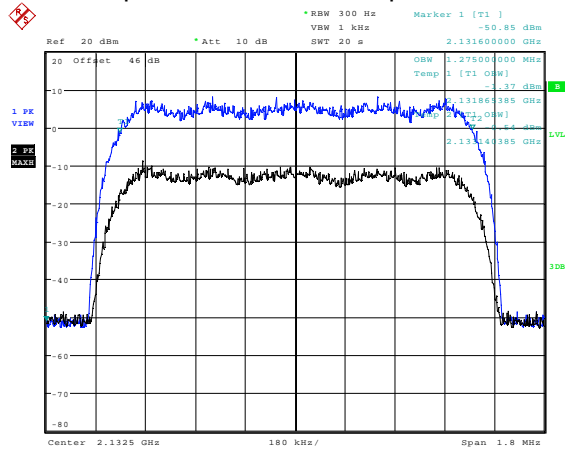
The above plots show no significant distortion visible when compared to the input signal.

2110.0MHz CDMA Modulation, Input – Black Trace, Output - Blue Trace



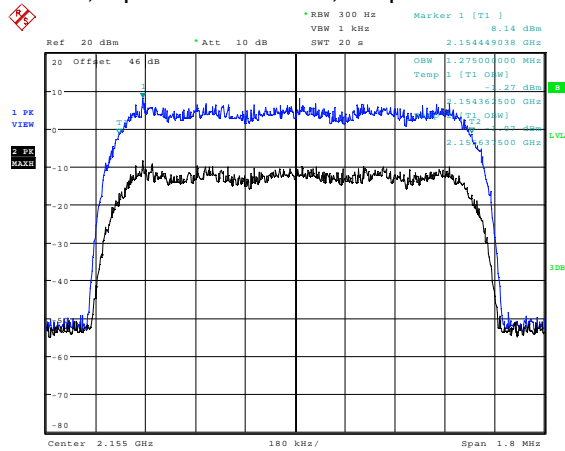
Date: 16.NOV.2010 15:23:03

2132.5MHz CDMA Modulation, Input – Black Trace, Output - Blue Trace



Date: 16.NOV.2010 15:26:10

2155.0MHz CDMA Modulation, Input – Black Trace, Output - Blue Trace

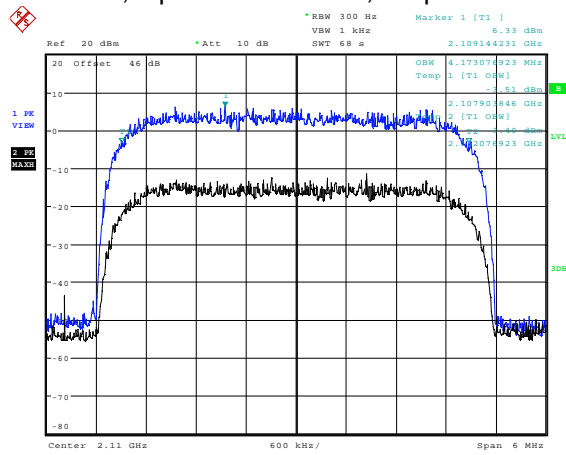


Date: 16.NOV.2010 15:32:45

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

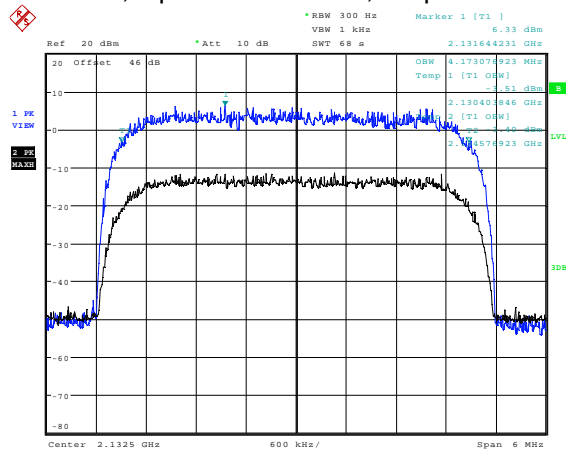


2110.0MHz W-CDMA Modulation, Input – Black Trace, Output - Blue Trace



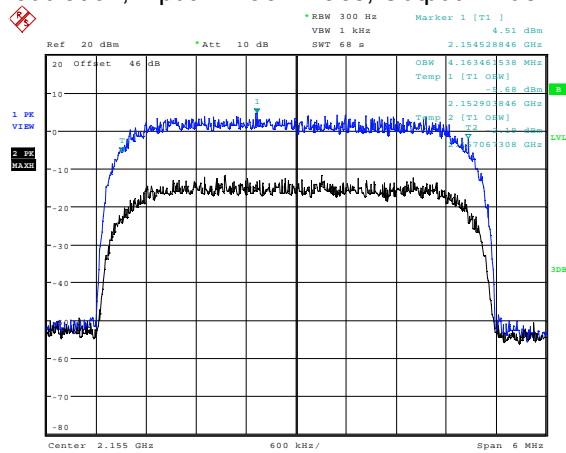
Date: 16.NOV.2010 15:51:41

2132.5MHz W-CDMA Modulation, Input – Black Trace, Output - Blue Trace



Date: 16.NOV.2010 15:50:09

2155.0MHz W-CDMA Modulation, Input – Black Trace, Output - Blue Trace



Date: 16.NOV.2010 15:38:01

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 that 250% of the authorised bandwidth

At least 43 + 10 log PdB

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

**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

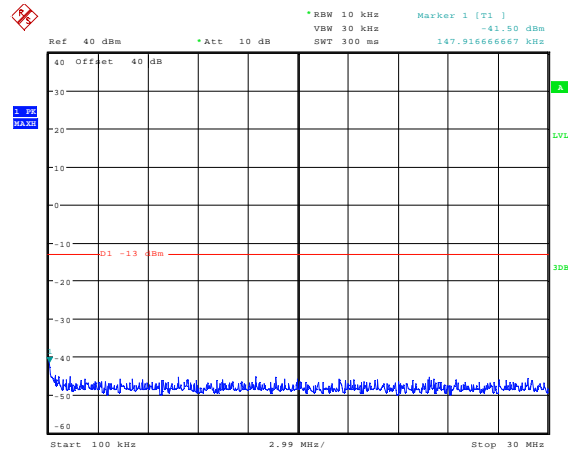
**2110MHz Downlink**

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:

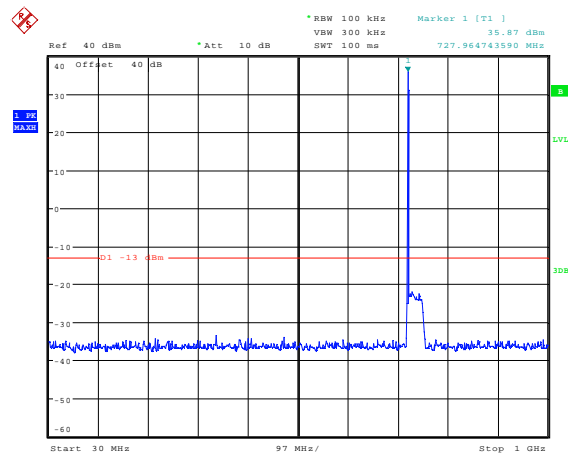
TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	REF No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	X
SIGNAL GENERATOR	IFR	3413	341001/261	N/A	X
ATTENUATOR	BIRD	8308-200	N/A	103	X
ATTENUATOR	BIRD	830-100-N	N/A	222	X
CABLE	TRaC	N/A	N/A	UH273	X
CABLE	TRaC	N/A	N/A	UH274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

### Conducted emissions 728.0MHz 100kHz – 30MHz



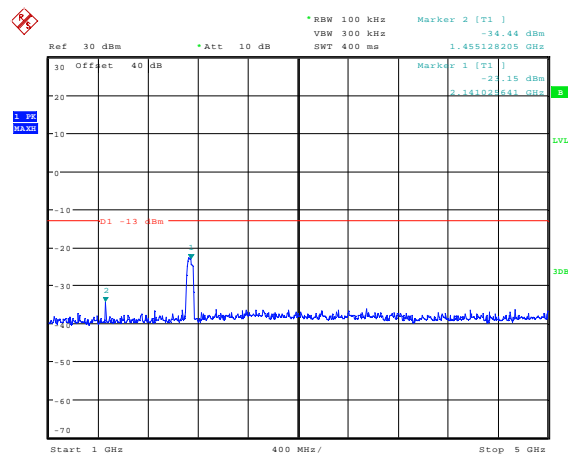
Date: 16.NOV.2010 14:24:22

### Conducted emissions 728.0MHz 30MHz – 1GHz



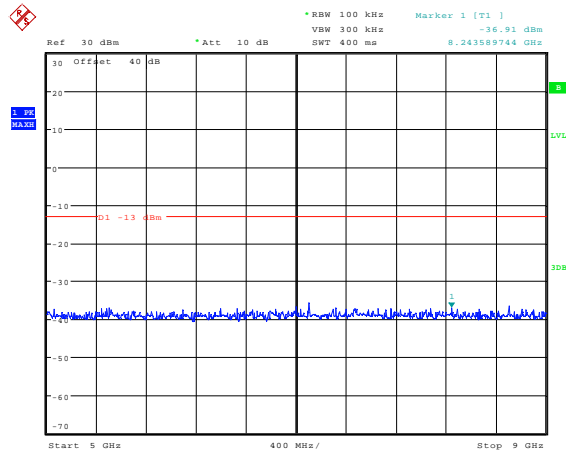
Date: 16.NOV.2010 14:24:08

### Conducted emissions 728.0MHz 1 – 5GHz



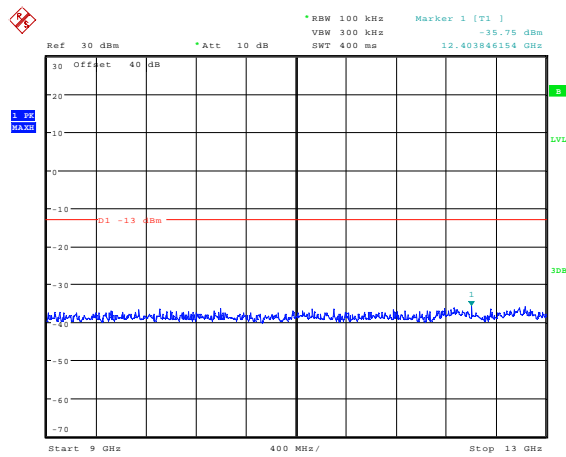
Date: 16.NOV.2010 14:24:58

### Conducted emissions 728.0MHz 5 – 9GHz



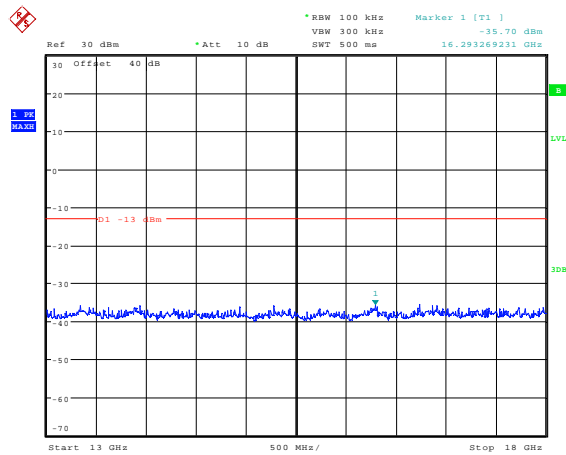
Date: 16.NOV.2010 14:25:15

### Conducted emissions 728.0MHz 9 – 13GHz



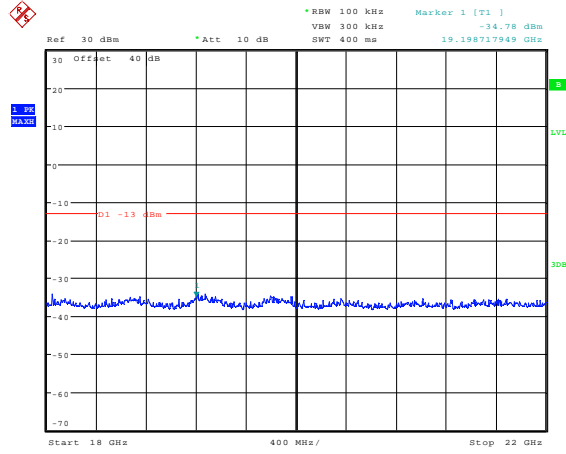
Date: 16.NOV.2010 14:25:46

### Conducted emissions 728.0MHz 13 – 18GHz



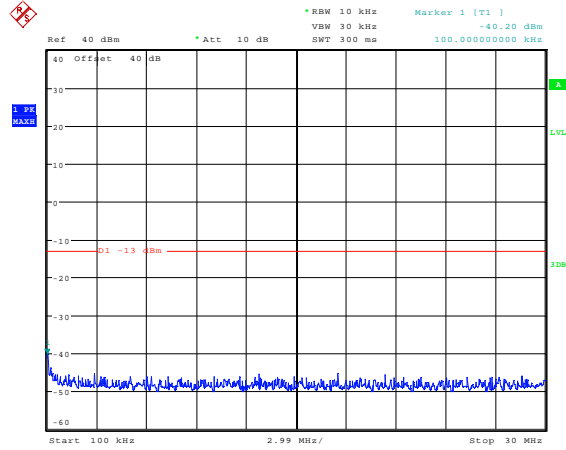
Date: 16.NOV.2010 14:26:09

# Conducted emissions 728.0MHz 18 – 22GHz



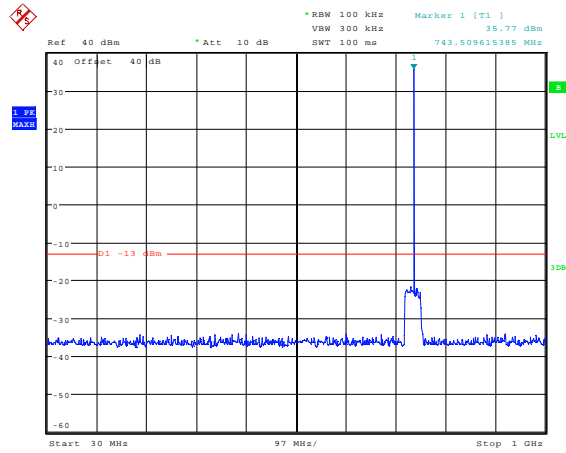
Date: 16.NOV.2010 14:28:17

Conducted emissions 742.5MHz 100kHz – 30MHz



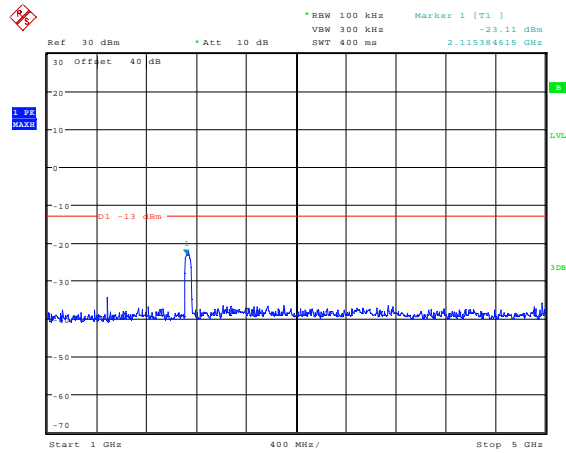
Date: 16.NOV.2010 14:35:25

Conducted emissions 742.5MHz 30MHz – 1GHz



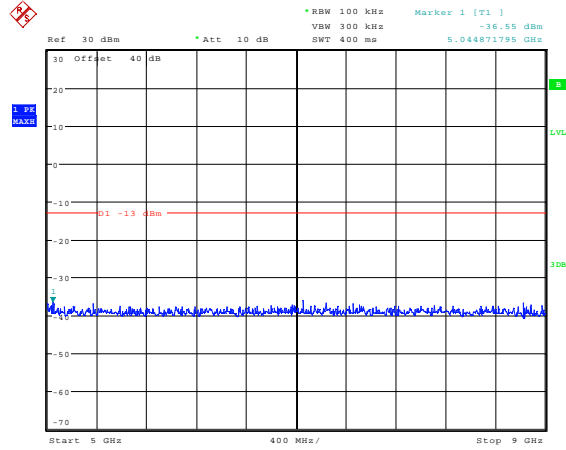
Date: 16.NOV.2010 14:35:14

Conducted emissions 742.5MHz 1 – 5GHz



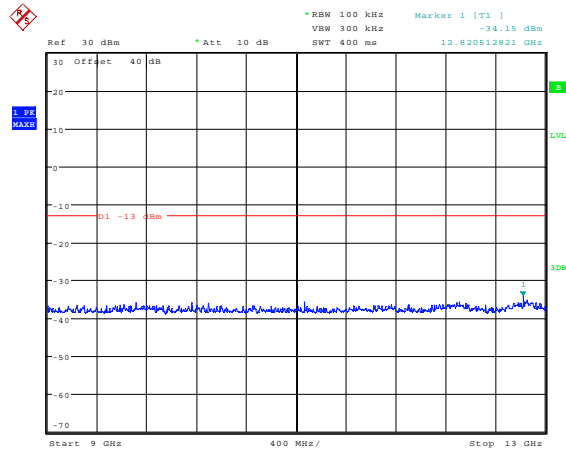
Date: 16.NOV.2010 14:34:54

Conducted emissions 742.5MHz 5 – 9GHz



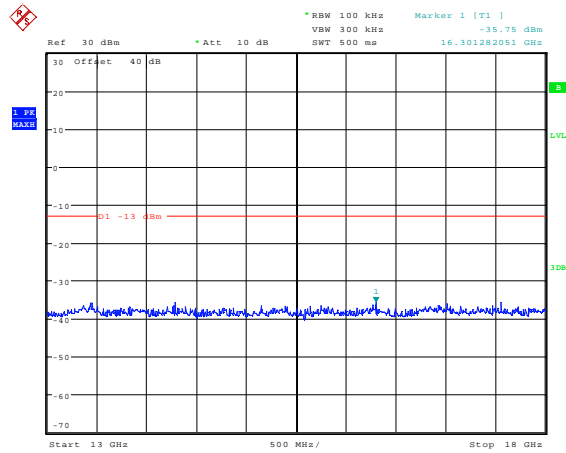
Date: 16.NOV.2010 14:34:38

Conducted emissions 742.5MHz 9 – 13GHz



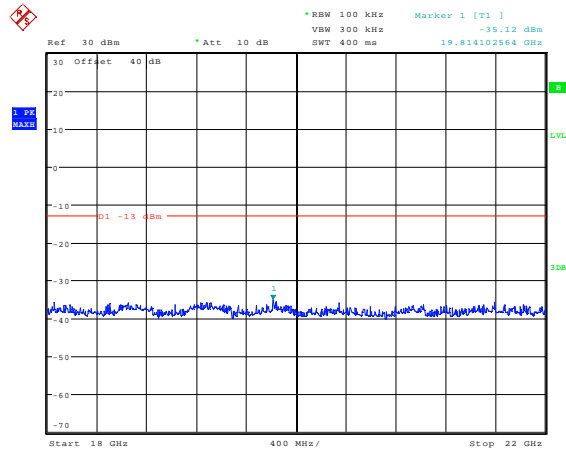
Date: 16.NOV.2010 14:34:21

Conducted emissions 742.5MHz 13 – 18GHz



Date: 16.NOV.2010 14:32:24

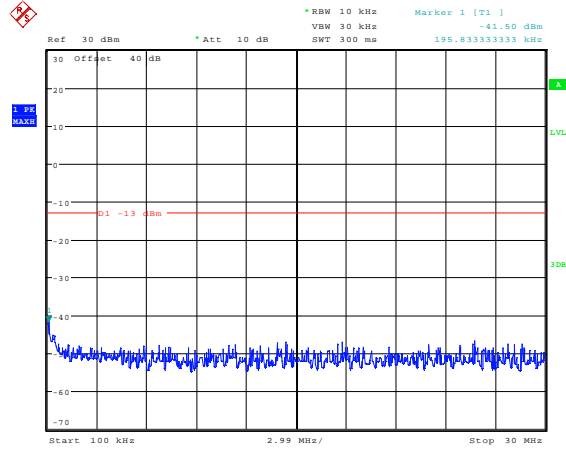
# Conducted emissions 742.5MHz 18 – 22GHz



Date: 16.NOV.2010 14:30:56

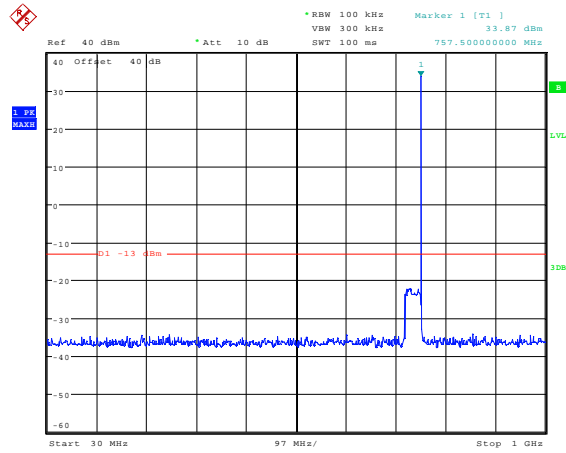


Conducted emissions 757.0MHz 100kHz – 30MHz



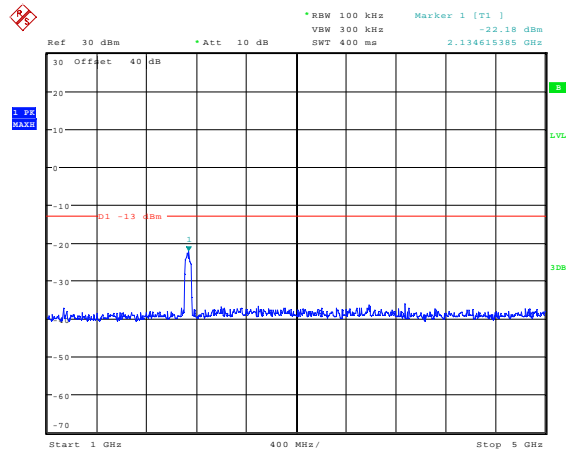
Date: 16.NOV.2010 14:41:29

Conducted emissions 757.0MHz 30MHz – 1GHz



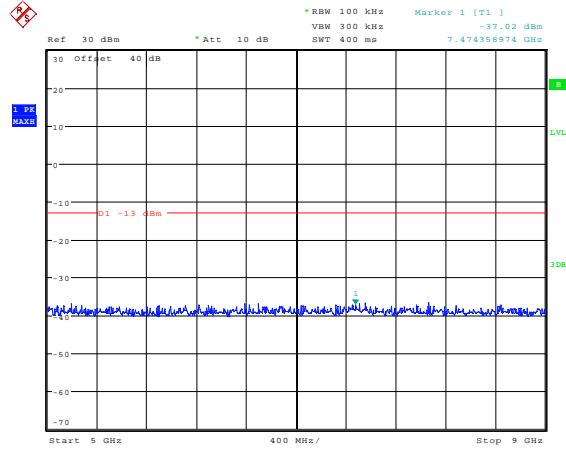
Date: 16.NOV.2010 14:41:42

Conducted emissions 757.0MHz 1 – 5GHz



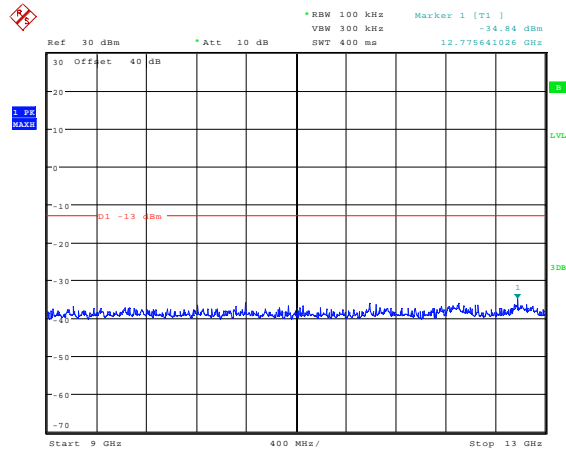
Date: 16.NOV.2010 14:42:03

Conducted emissions 757.0MHz 5 – 9GHz



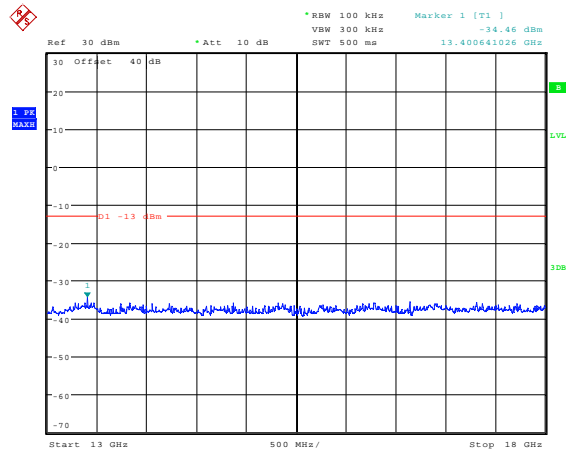
Date: 16.NOV.2010 14:42:20

Conducted emissions 757.0MHz 9 – 13GHz



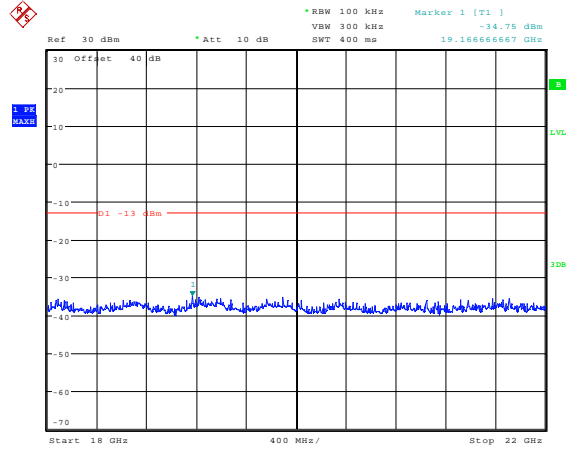
Date: 16.NOV.2010 14:42:36

Conducted emissions 757.0MHz 13 – 18GHz



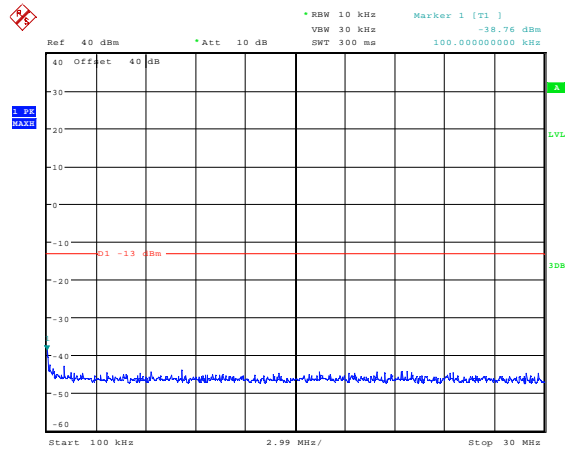
Date: 16.NOV.2010 14:43:30

# Conducted emissions 757.0MHz 18 – 22GHz



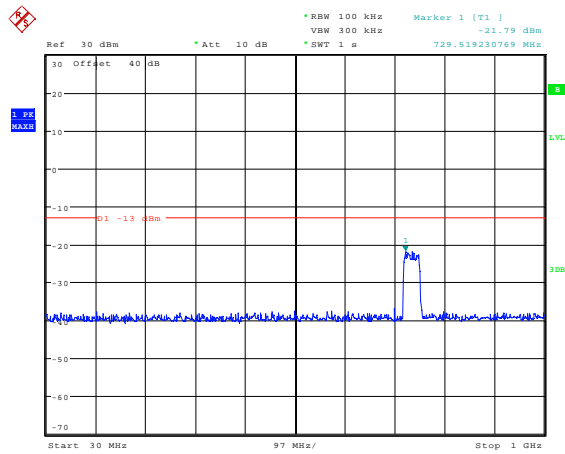
Date: 16.NOV.2010 14:43:43

### Conducted emissions 2110.0MHz 100kHz – 30MHz



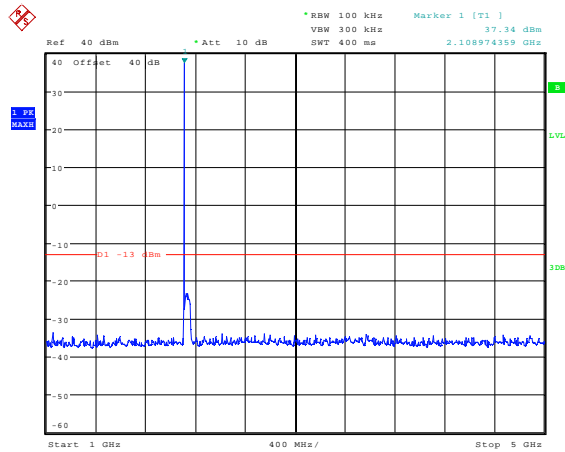
Date: 16.NOV.2010 14:20:18

### Conducted emissions 2110.0MHz 30MHz – 1GHz



Date: 16.NOV.2010 14:20:34

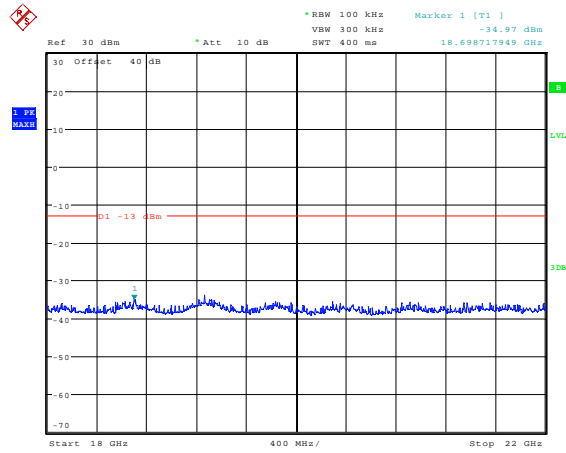
### Conducted emissions 2110.0MHz 1 – 5GHz



Date: 16.NOV.2010 14:20:57

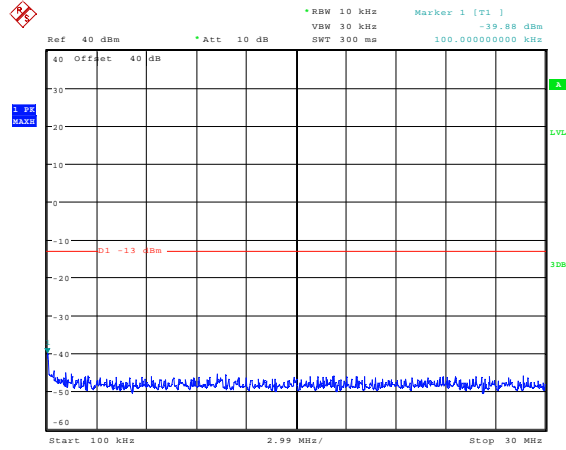


# Conducted emissions 2110.0MHz 18 – 22GHz



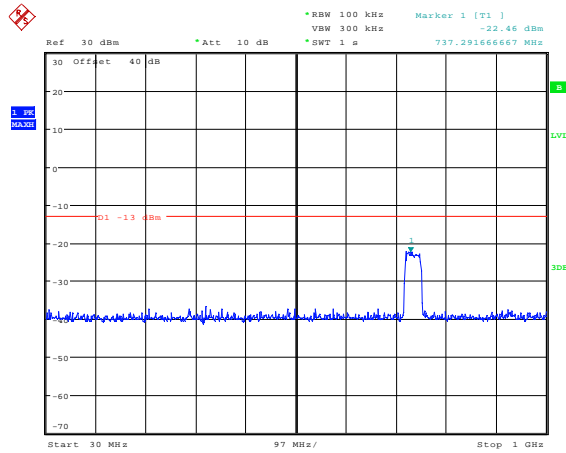
Date: 16.NOV.2010 14:22:48

Conducted emissions 2132.5MHz 100kHz – 30MHz



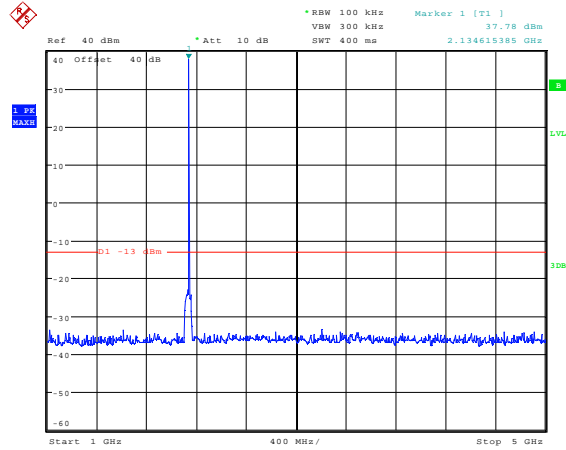
Date: 16.NOV.2010 14:17:08

Conducted emissions 2132.5MHz 30MHz – 1GHz



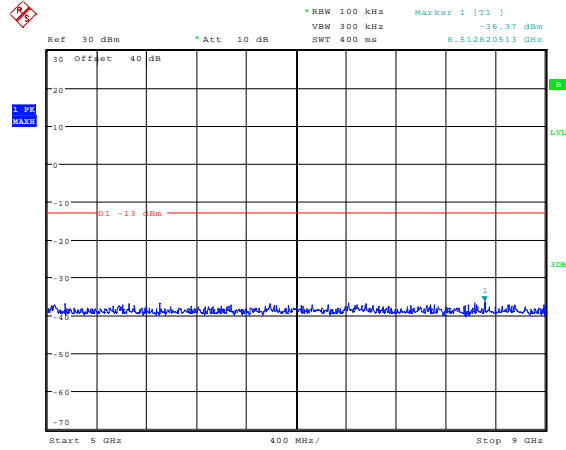
Date: 16.NOV.2010 14:16:55

Conducted emissions 2132.5MHz 1 – 5GHz



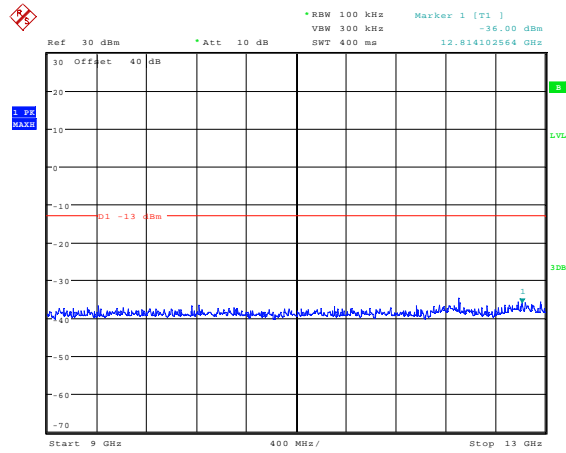
Date: 16.NOV.2010 14:16:33

### Conducted emissions 2132.5MHz 5 – 9GHz



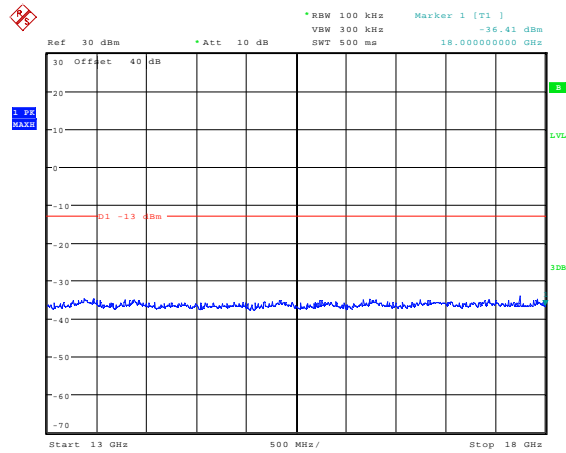
Date: 16.NOV.2010 14:16:19

### Conducted emissions 2132.5MHz 9 – 13GHz



Date: 16.NOV.2010 14:15:58

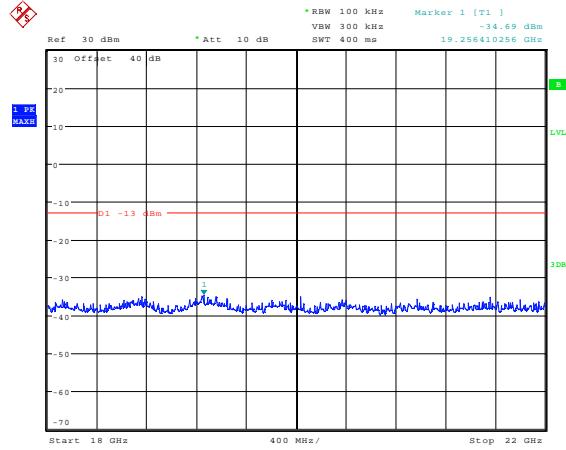
### Conducted emissions 2132.5MHz 13 – 18GHz



Date: 16.NOV.2010 14:15:39

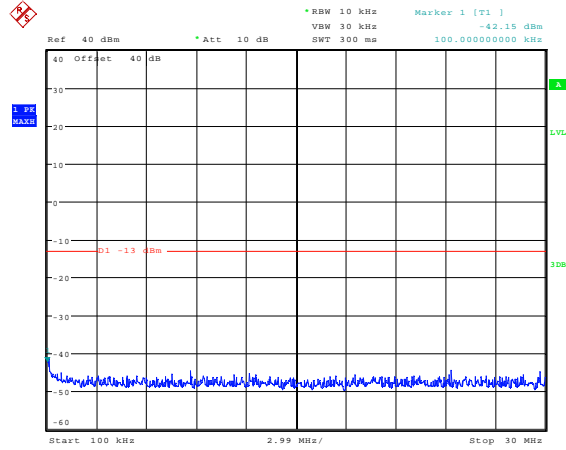


# Conducted emissions 2132.5MHz 18 – 22GHz



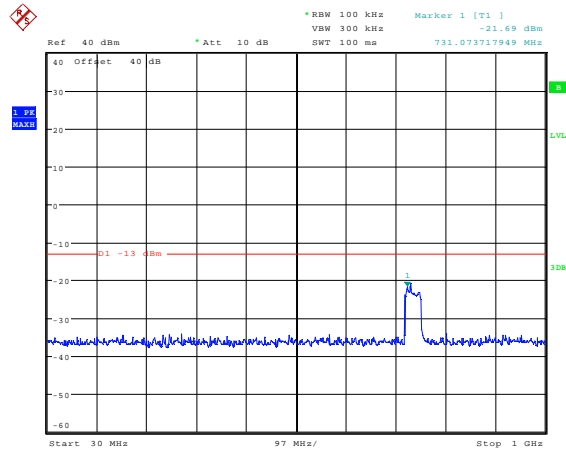
Date: 16.NOV.2010 14:00:24

Conducted emissions 2155.0MHz 100kHz – 30MHz



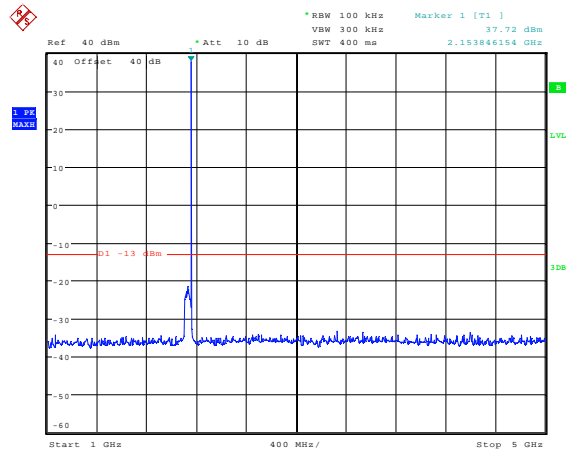
Date: 16.NOV.2010 13:57:45

Conducted emissions 2155.0MHz 30MHz – 1GHz



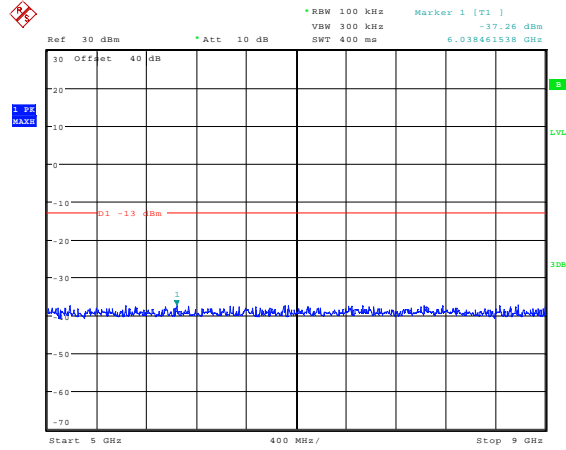
Date: 16.NOV.2010 13:58:12

Conducted emissions 2155.0MHz 1 – 5GHz



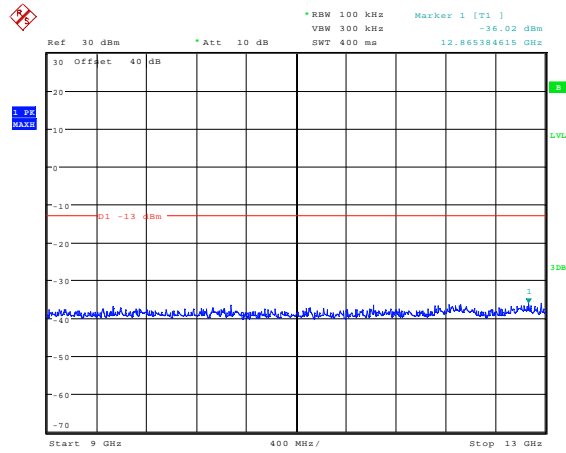
Date: 16.NOV.2010 13:58:29

### Conducted emissions 2155.0MHz 5 – 9GHz



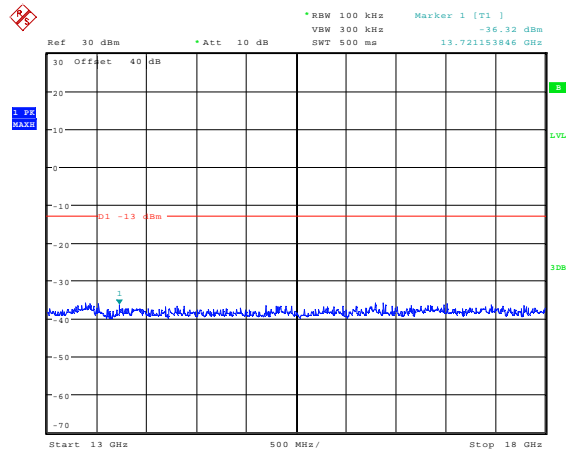
Date: 16.NOV.2010 13:58:52

### Conducted emissions 2155.0MHz 9 – 13GHz



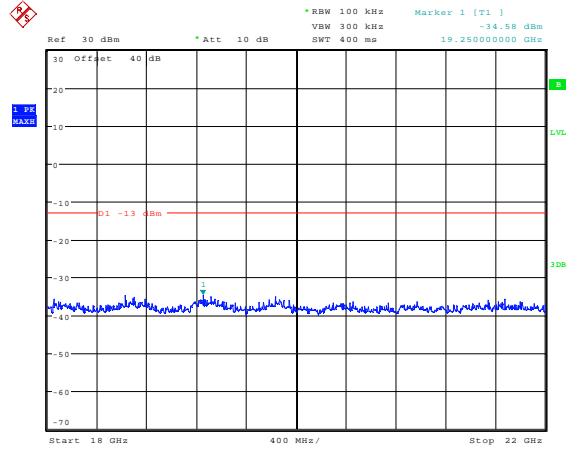
Date: 16.NOV.2010 13:59:14

### Conducted emissions 2155.0MHz 13 – 18GHz



Date: 16.NOV.2010 13:59:30

# Conducted emissions 2155.0MHz 18 – 22GHz

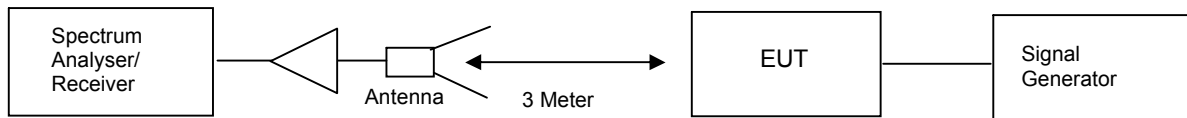


Date: 16.NOV.2010 13:59:46

## 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

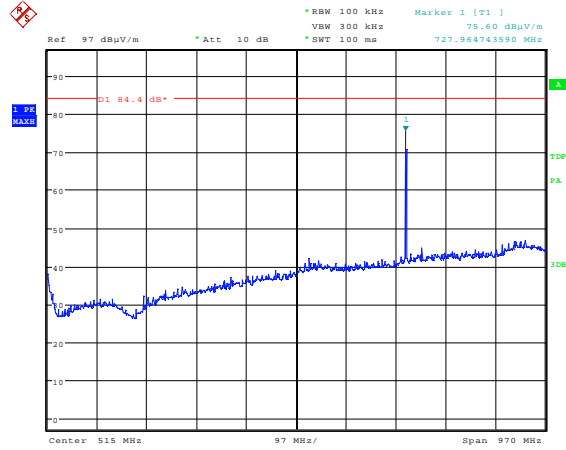
### 2110 MHz Band

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:

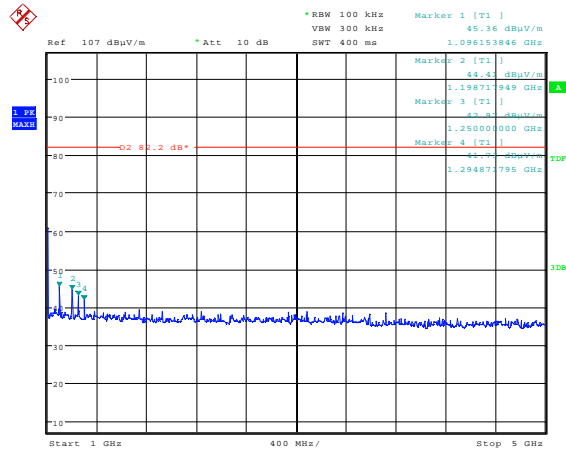
TYPE OF EQUIPMENT	MAKER/SUPPLIER	MODEL No	SERIAL No	REF No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	X
HORN	EMCO	3115	9010-3580	138	X
HORN	FLANN	20240-20	322	300	X
PRE AMPLIFIER	HP	8449B	3008A016	572	X
SIGNAL GENERATOR	IFR	3413	341001/261	N/A	X
ANTENNA	YORK	CBL611/A	1618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

### Radiated emissions 728.0 30MHz – 1GHz



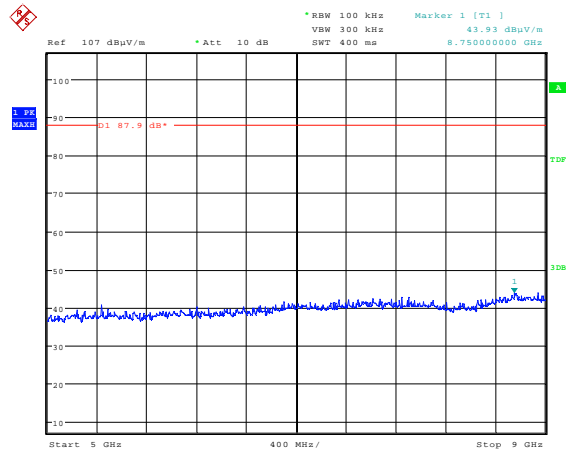
Date: 29.NOV.2010 10:06:14

### Radiated emissions 728.0 1 – 5GHz



Date: 25.NOV.2010 15:56:09

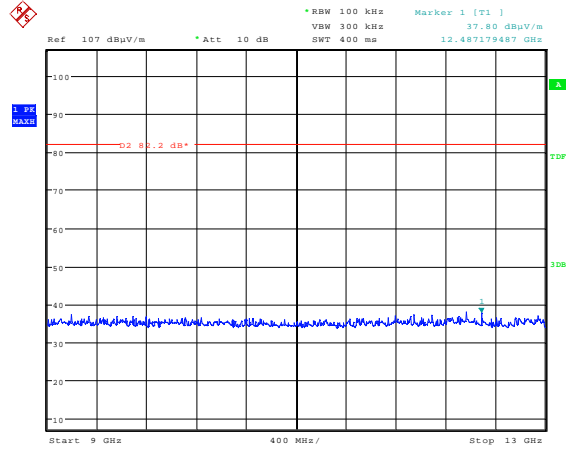
### Radiated emissions 728.0 5 – 9GHz



Date: 24.NOV.2010 12:02:46

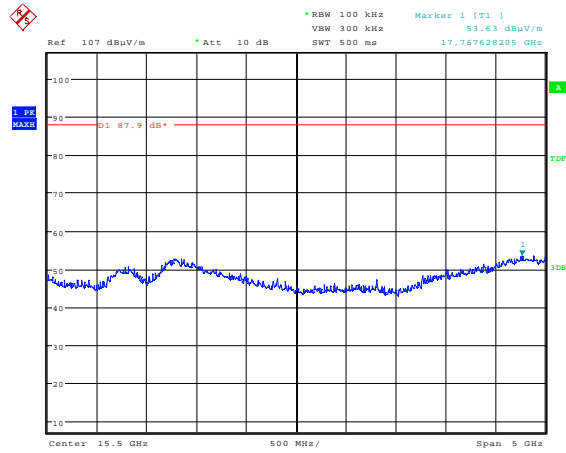
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

Radiated emissions 728.0 9 – 13GHz



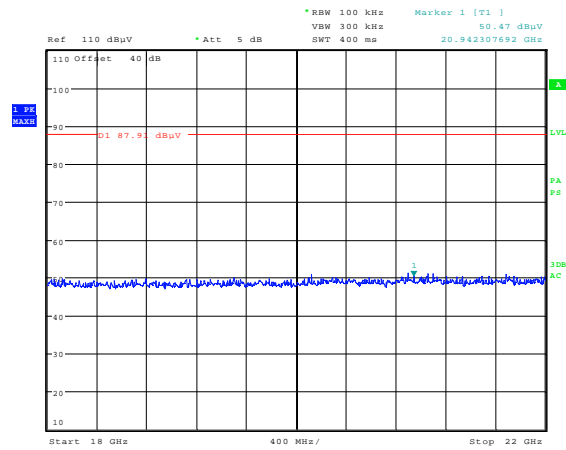
Date: 25.NOV.2010 15:42:26

Radiated emissions 728.0 13 – 18GHz



Date: 24.NOV.2010 12:07:23

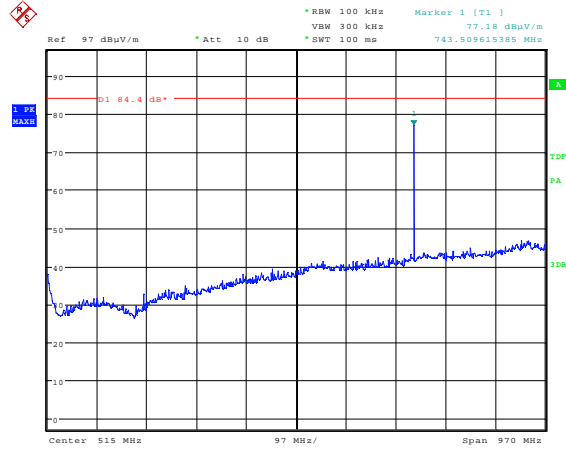
Radiated emissions 728.0 18 – 22GHz



Date: 23.NOV.2010 17:43:32

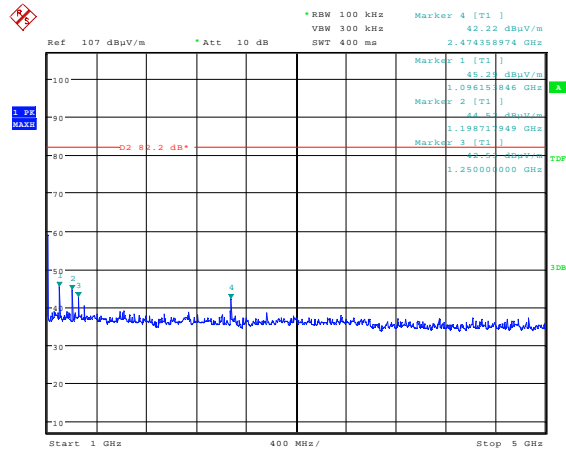
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

### Radiated emissions 742.5 30MHz – 1GHz



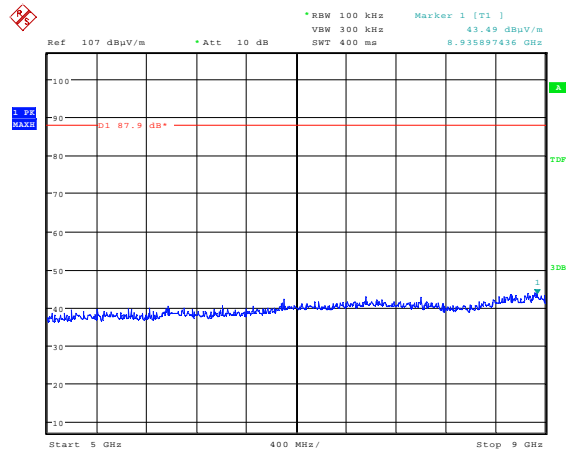
Date: 29.NOV.2010 10:04:56

### Radiated emissions 742.5 1 – 5GHz



Date: 25.NOV.2010 15:57:04

### Radiated emissions 742.5 5 – 9GHz

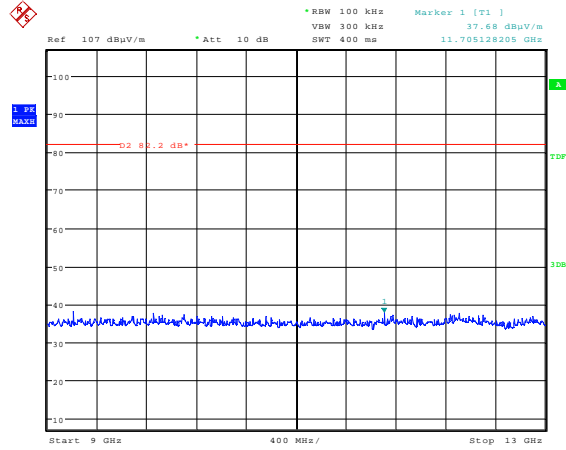


Date: 24.NOV.2010 12:02:07

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

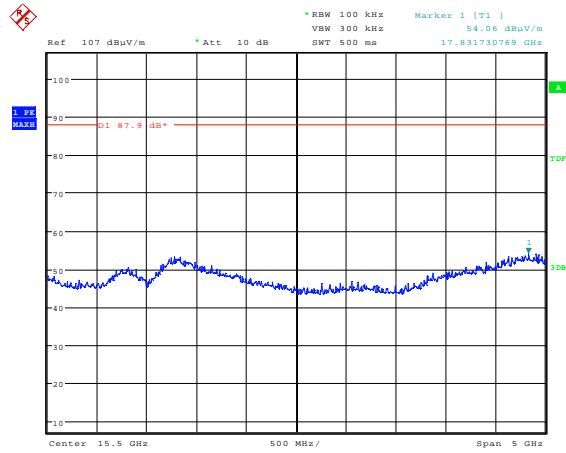


Radiated emissions 742.5 9 – 13GHz



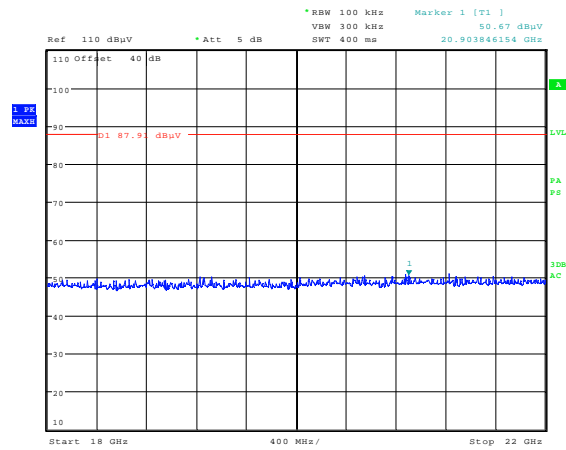
Date: 25.NOV.2010 15:41:45

Radiated emissions 742.5 13 – 18GHz



Date: 24.NOV.2010 12:08:23

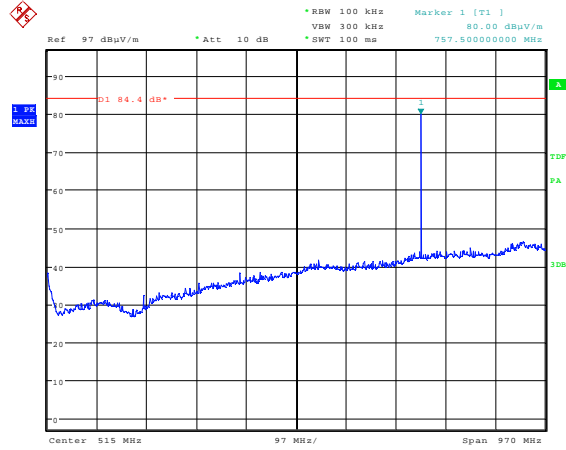
Radiated emissions 742.5 18 – 22GHz



Date: 23.NOV.2010 17:44:08

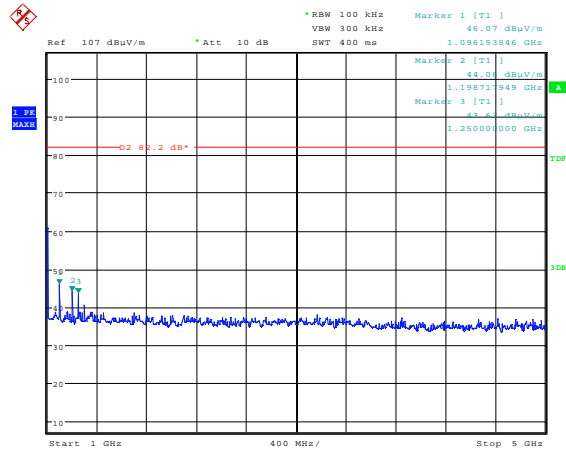
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

### Radiated emissions 757.0 30MHz – 1GHz



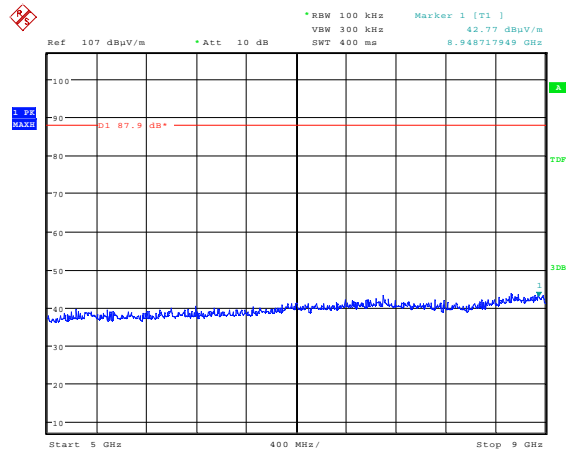
Date: 29.NOV.2010 10:05:36

### Radiated emissions 757.0 1 – 5GHz



Date: 25.NOV.2010 15:57:41

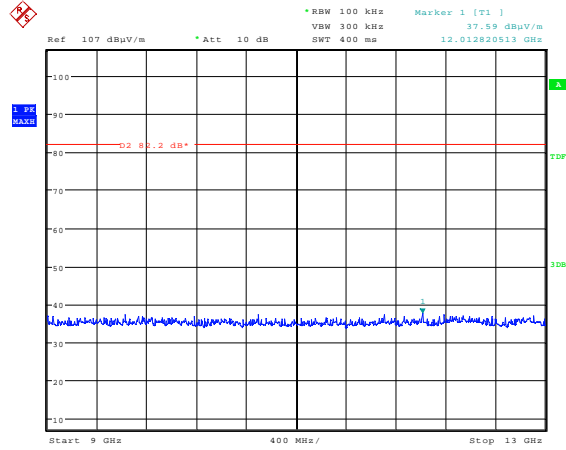
### Radiated emissions 757.0 5 – 9GHz



Date: 24.NOV.2010 12:01:36

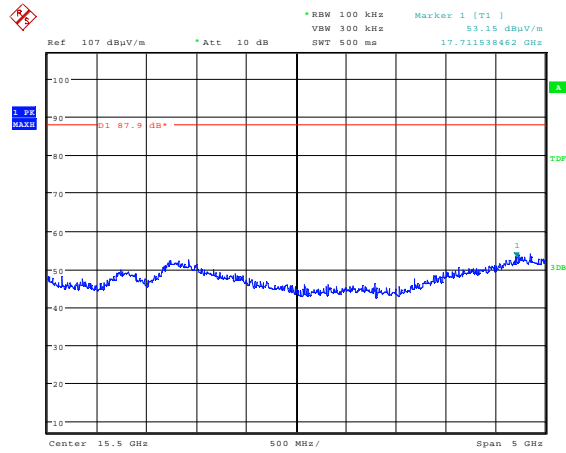
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

### Radiated emissions 757.0 9 – 13GHz



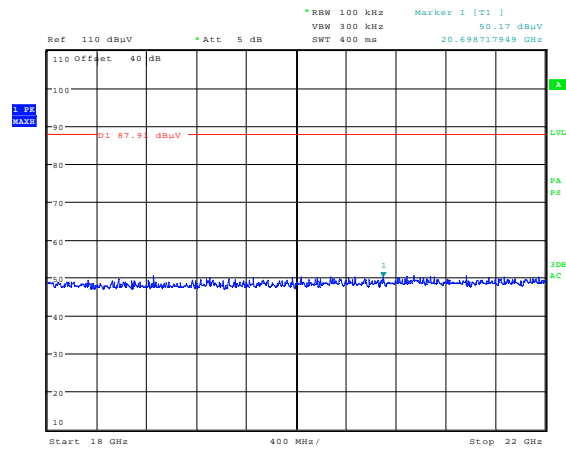
Date: 25.NOV.2010 15:41:12

### Radiated emissions 757.0 13 – 18GHz



Date: 24.NOV.2010 12:08:58

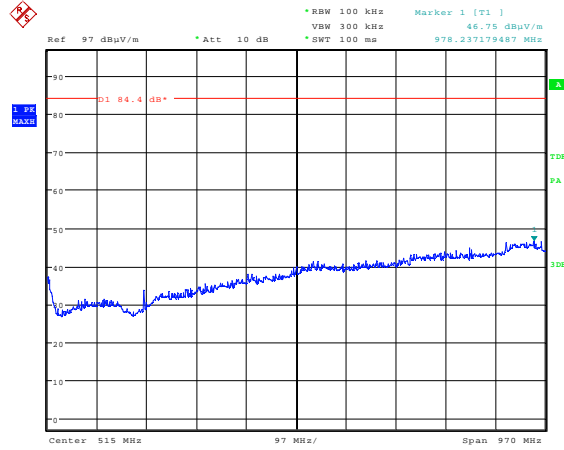
### Radiated emissions 757.0 18 – 22GHz



Date: 23.NOV.2010 17:44:43

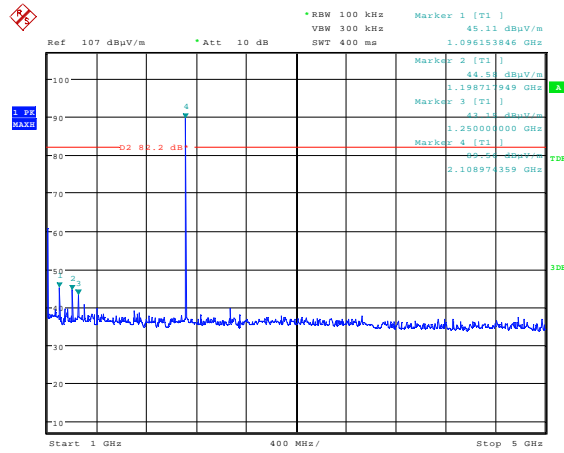
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

### Radiated emissions 2110.0 30MHz – 1GHz



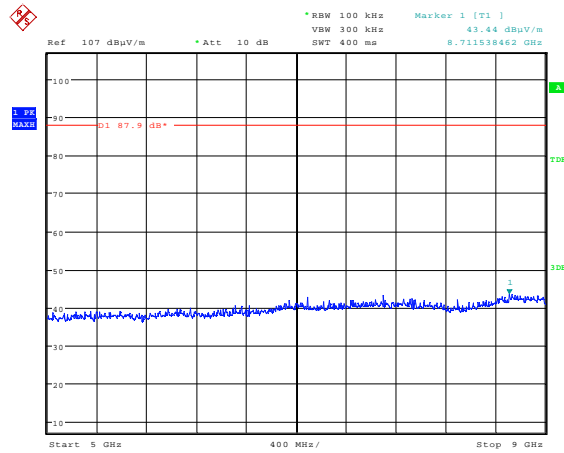
Date: 29.NOV.2010 10:08:35

### Radiated emissions 2110.0 1 – 5GHz



Date: 25.NOV.2010 16:15:24

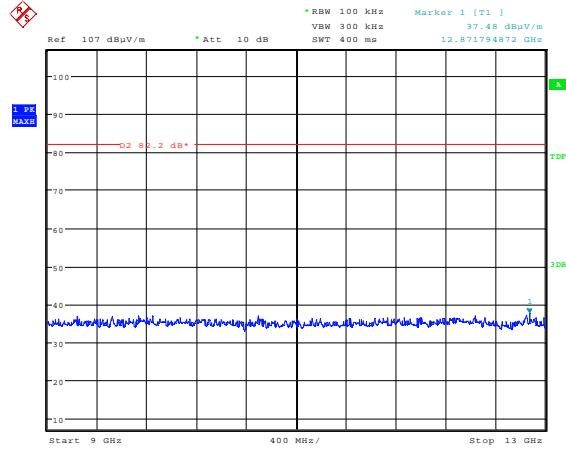
### Radiated emissions 2110.0 5 – 9GHz



Date: 24.NOV.2010 11:53:04

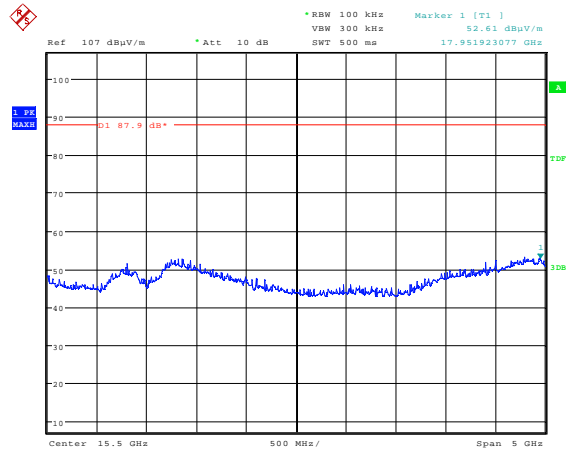
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

Radiated emissions 2110.0 9 – 13GHz



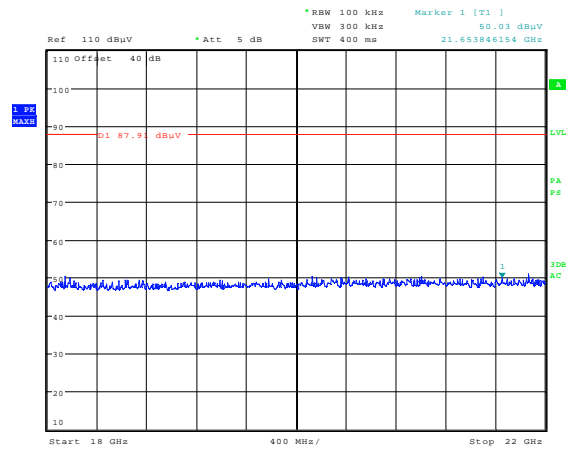
Date: 25.NOV.2010 15:43:57

Radiated emissions 2110.0 13 – 18GHz



Date: 24.NOV.2010 12:19:52

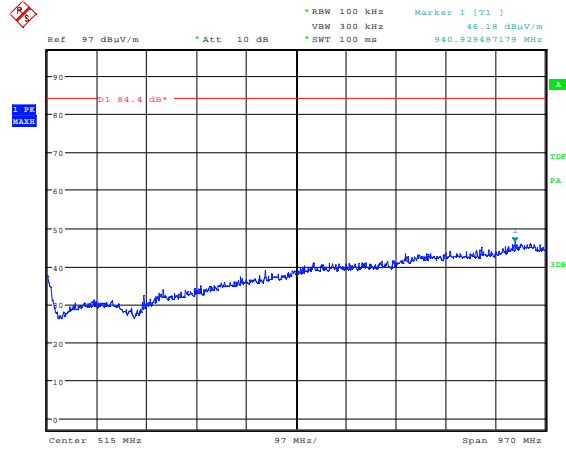
Radiated emissions 2110.0 18 – 22GHz



Date: 23.NOV.2010 17:48:58

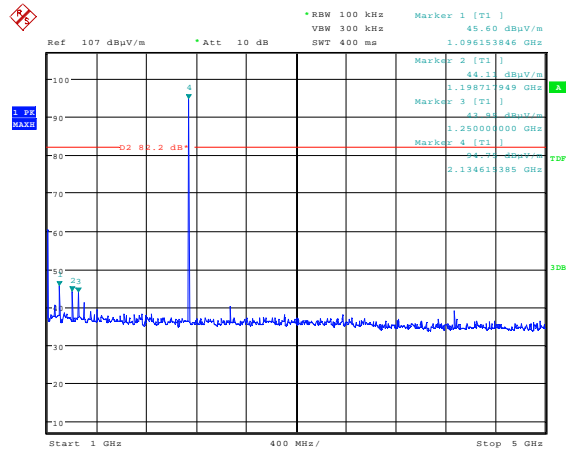
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

### Radiated emissions 2132.5 30MHz – 1GHz



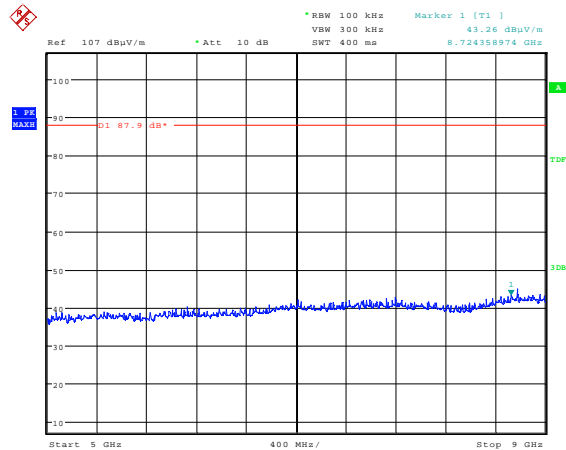
Date: 29.NOV.2010 10:09:05

### Radiated emissions 2132.5 1 – 5GHz



Date: 25.NOV.2010 16:14:44

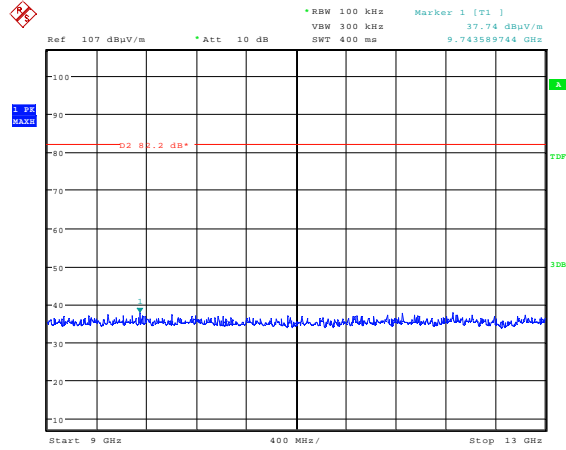
### Radiated emissions 2132.5 5 – 9GHz



Date: 24.NOV.2010 11:53:33

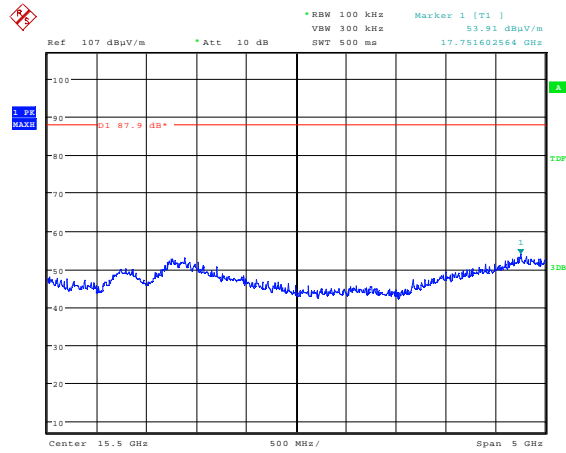
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

Radiated emissions 2132.5 9 – 13GHz



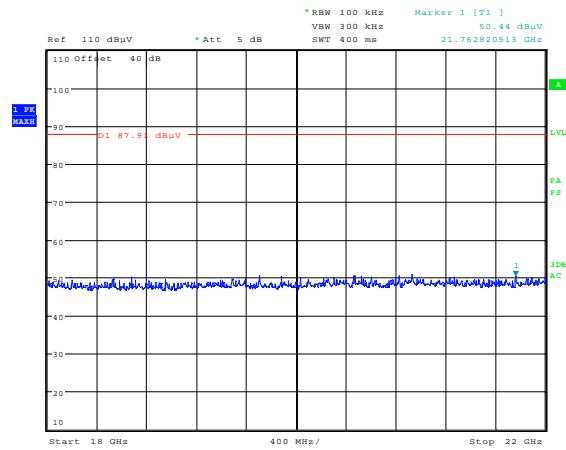
Date: 25.NOV.2010 15:44:37

Radiated emissions 2132.5 13 – 18GHz



Date: 24.NOV.2010 12:15:27

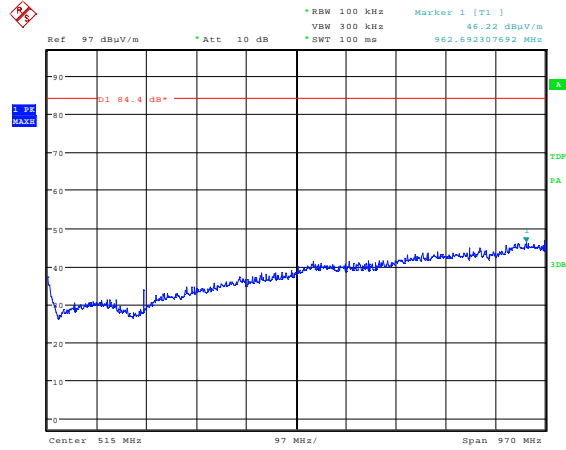
Radiated emissions 2132.5 18 – 22GHz



Date: 23.NOV.2010 17:52:44

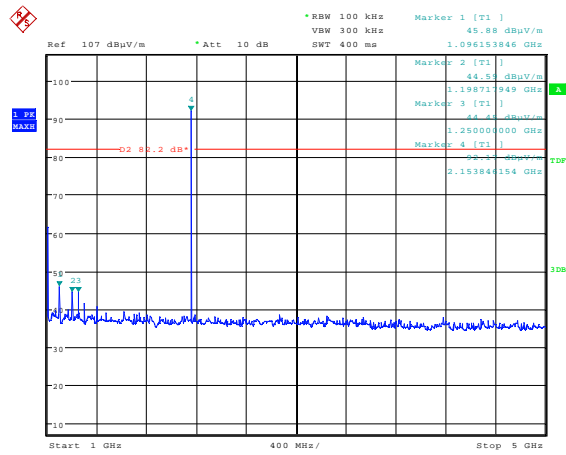
The above test results show that there were no emissions within 20dBs of the -13dBm limit.

### Radiated emissions 2155.0 30MHz – 1GHz



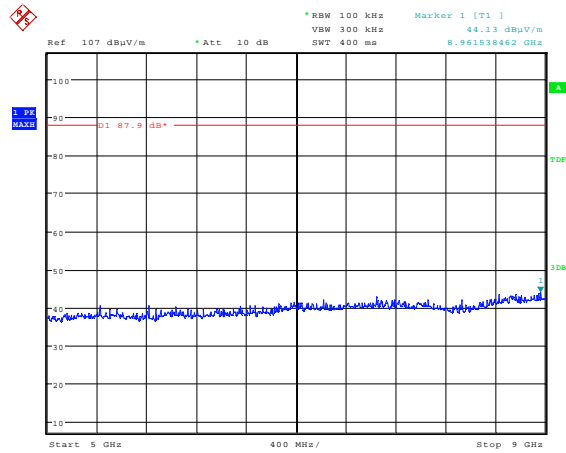
Date: 29.NOV.2010 10:09:33

### Radiated emissions 2155.0 1 – 5GHz



Date: 25.NOV.2010 16:14:02

### Radiated emissions 2155.0 5 – 9GHz

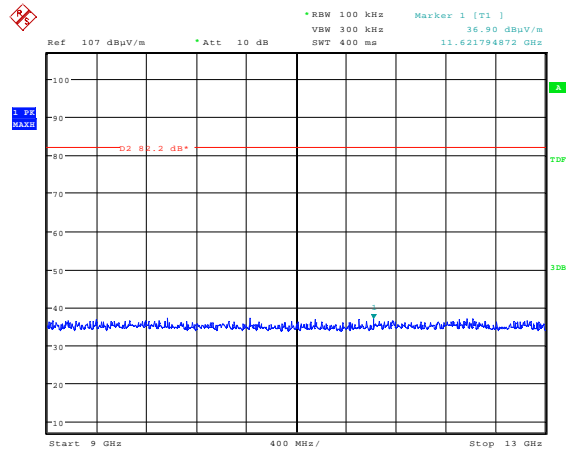


Date: 24.NOV.2010 11:54:04

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

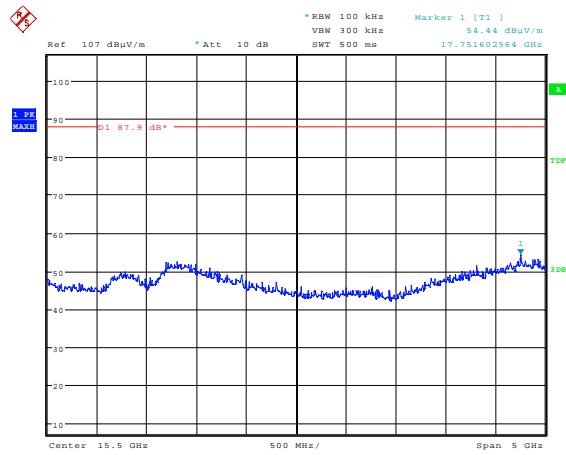


### Radiated emissions 2155.0 9 – 13GHz



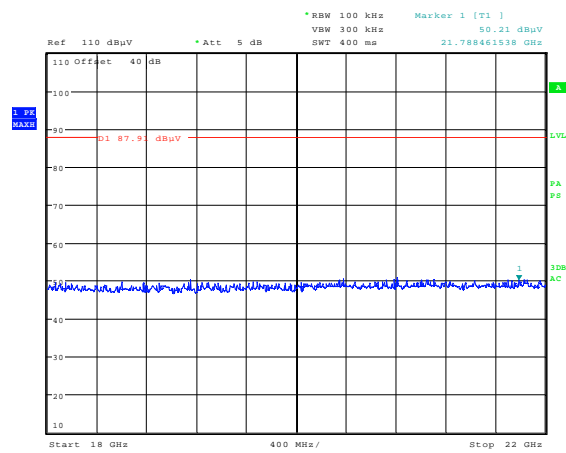
Date: 25.NOV.2010 15:45:08

### Radiated emissions 2155.0 13 – 18GHz



Date: 24.NOV.2010 12:18:37

### Radiated emissions 2155.0 18 – 22GHz



Date: 23.NOV.2010 17:52:18

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%**