



**Nemko Test Report:** 40099RUS1

**Applicant:** Andrew Corporation  
620 N. Greenfield Parkway  
Garner, NC 27529  
USA

**Equipment Under Test:** AF737  
(E.U.T.)

**FCC Identifier:** BCR-AF737

**In Accordance With:** **CFR 47, Part 27, Subpart C**  
Miscellaneous Wireless Communication Services

**Tested By:** Nemko USA, Inc.  
802 N. Kealy  
Lewisville, TX 75057-3136

**TESTED BY:**

David Light, Senior Wireless Engineer

**DATE:** 09 November 2009

**APPROVED BY:**

Tom Tidwell, Telecom Direct

**DATE:** 12 November 2009

**Number of Pages: 39**

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## Section 1. Summary of Test Results

Manufacturer Andrew Corporation

Model No.: AF737

Serial No.: 11

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with CFR 47, Part 27, Subpart C.



New Submission



Production Unit



Class II Permissive Change



Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.

See "Summary of Test Data".



NVLAP Lab Code 100426-0

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**Summary Of Test Data**

<b>NAME OF TEST</b>	<b>PARA. NO.</b>	<b>SPEC.</b>	<b>RESULT</b>
RF Power Output	27.50(d)	1000 Watts ERP	Complies
Occupied Bandwidth	2.1049	Input/Output	Complies
Spurious Emissions at Antenna Terminals	27.53(c)	-13 dBm	Complies
Field Strength of Spurious Emissions	27.53(c)	-13 dBm E.I.R.P.	Complies
Frequency Stability	27.54	Must stay in band	NA <sup>1</sup>

<sup>1</sup>Frequency stability testing was not performed since the device does not translate the frequency of the input signal.

## Section 2. General Equipment Specification

Supply Voltage Input:		120 Vac		
Frequency Bands:	Downlink:	Blocks A, B and C Lower 700 MHz Band 728 - 746 MHz Block C Upper 700 MHz Band 776 – 787 MHz		
Frequency Bands:	Uplink:	Blocks A, B and C Lower 700 MHz Band 698 - 716 MHz Block C Upper 700 MHz Band 746 - 757 MHz		
Type of Modulation and Designator:		LTE (F9W)		
System Gain:		94 dB		
Output Impedance:		50 ohms		
RF Output (Rated):	Downlink	<div><div>5.0</div><div>37</div><div>W</div><div>dBm</div></div>		
RF Output (Rated):	Uplink	<div><div>1.0</div><div>30</div><div>W</div><div>dBm</div></div>		
Frequency Translation:		F1-F1	F1-F2	N/A
		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Band Selection:		Software	Duplexer	Fullband
		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### Description of EUT

The Node A RF Cards convert the RF into digital signals and transfer them to the Node A rack for digital filtering. The digital architecture allows sub-band filtering and is shared between all RF Cards inserted into the Node A rack.

**Section 3. RF Power Output**

NAME OF TEST: RF Power Output	PARA. NO.: 27.50
TESTED BY: David Light	DATE: 06 November 2009

**Test Results:** Complies.**Measurement Data:**

Direction	Block	Composite Power (dBm)	RF Power (W)
Downlink	ABC Lower	37	5.0
	C Upper	37	5.0
Uplink	ABC Lower	30	1.0
	C Lower	30	1.0

**Equipment Used:** 1036-1082-1472-1469**Measurement Uncertainty:** +/- 1.7 DB**Temperature:** 22 °C**Relative Humidity:** 48 %

**Section 4. Occupied Bandwidth**

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.1049
TESTED BY: David Light	DATE: 06 November 2009

**Test Results:** Complies.

**Test Data:** See attached plot(s).

**Equipment Used:** 1036-1082-1472-1469

**Measurement Uncertainty:** 1X10<sup>-7</sup> ppm

**Temperature:** 22 °C

**Relative Humidity:** 48 %

# Test Data – Occupied Bandwidth

Output

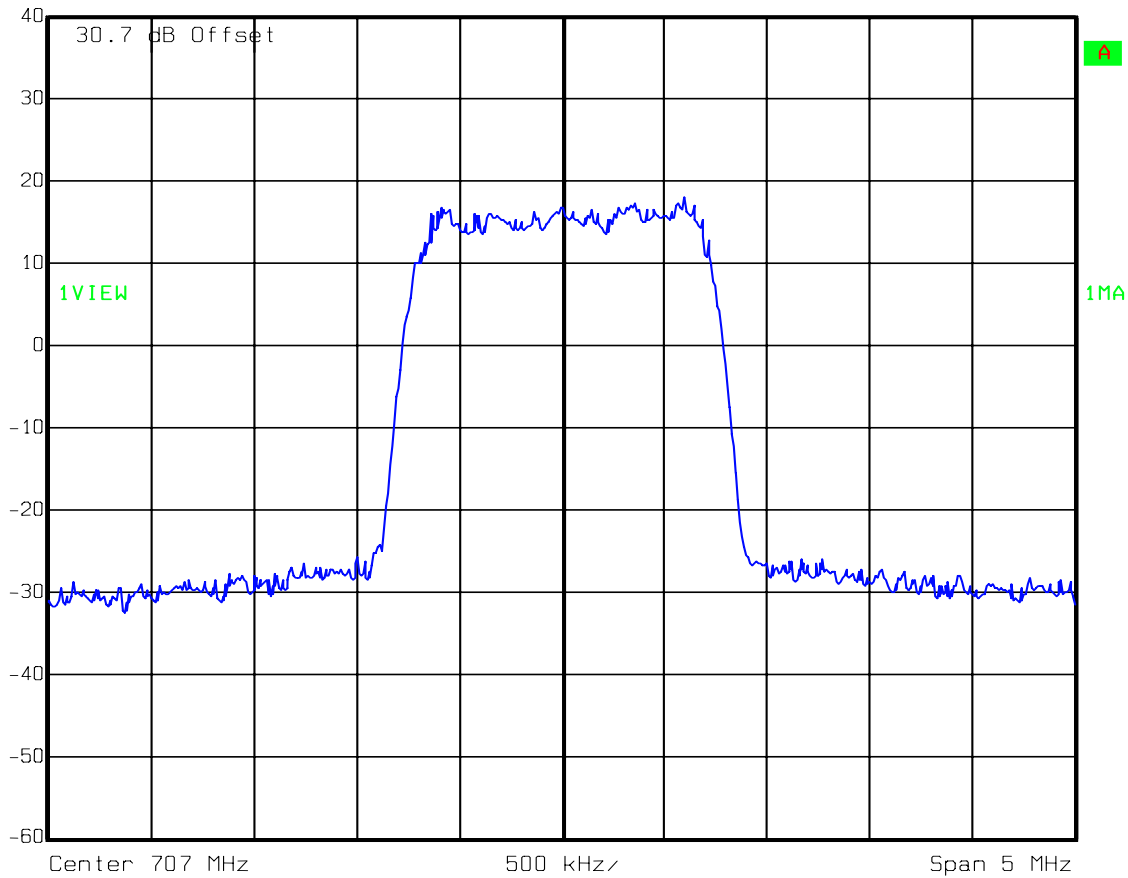
Uplink

Lower 700 Band



Ref Lvl  
40 dBm

RBW	30 kHz	RF Att	30 dB
VBW	30 kHz		
SWT	14 ms	Unit	dBm



Date: 06.NOV.2009 15:17:14



# Test Data – Occupied Bandwidth

Input

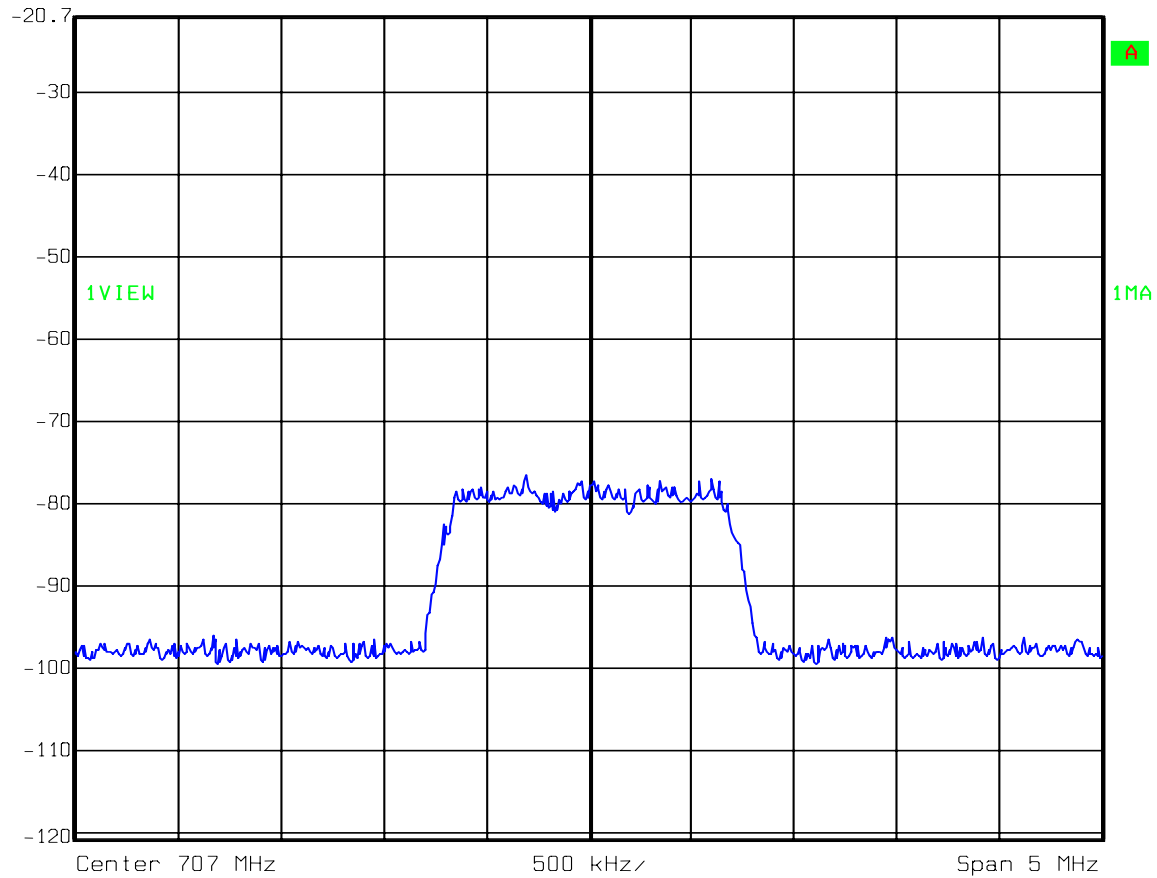
Uplink

Lower 700 Band



Ref Lvl  
-20.7 dBm

RBW	30 kHz	RF Att	10 dB
VBW	30 kHz		
SWT	14 ms	Unit	dBm



Date: 06.NOV.2009 15:18:18

# Test Data – Occupied Bandwidth

Output

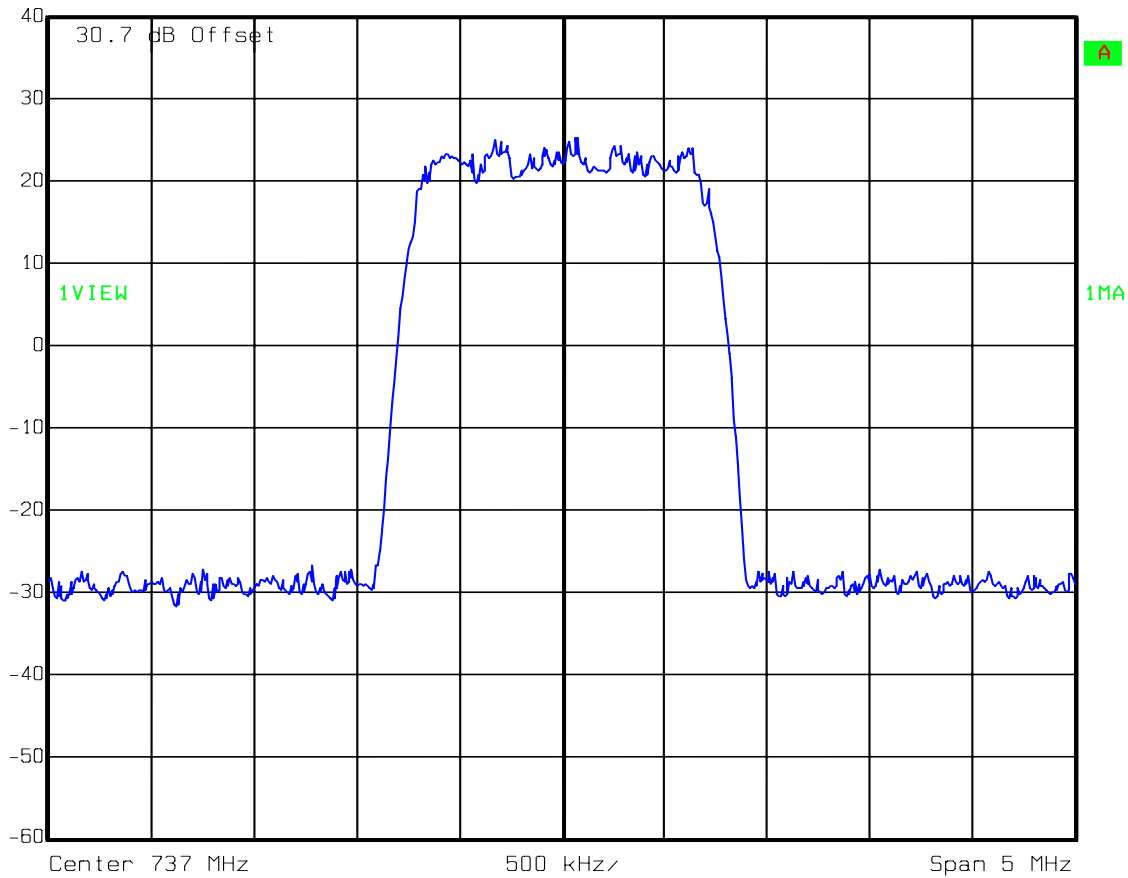
Downlink

Lower 700 Band



Ref Lvl  
40 dBm

RBW	30 kHz	RF Att	30 dB
VBW	30 kHz		
SWT	14 ms	Unit	dBm



Date: 06.NOV.2009 15:04:35

# Test Data – Occupied Bandwidth

Input

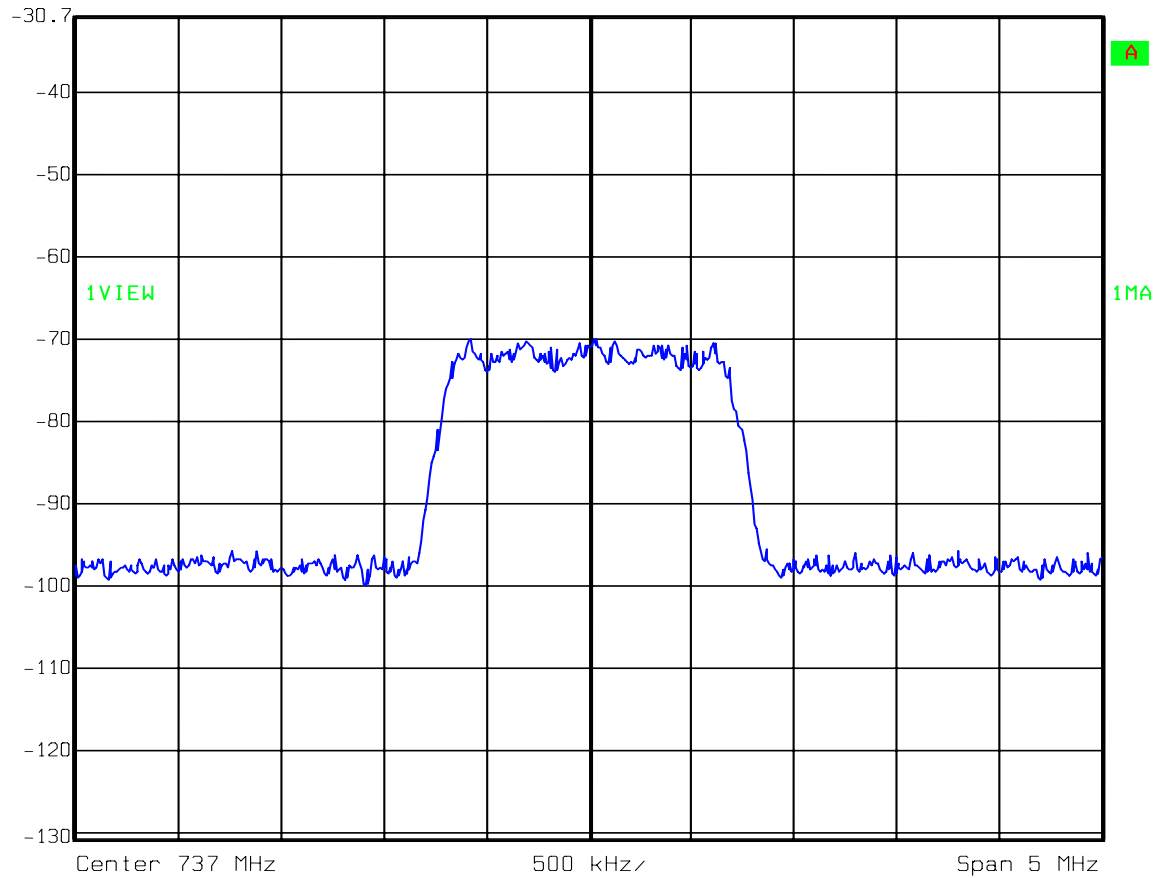
Downlink

Lower 700 Band



Ref Lvl  
-30.7 dBm

RBW	30 kHz	RF Att	10 dB
VBW	30 kHz		
SWT	14 ms	Unit	dBm



Date: 06.NOV.2009 15:05:38

# Test Data – Occupied Bandwidth

Output

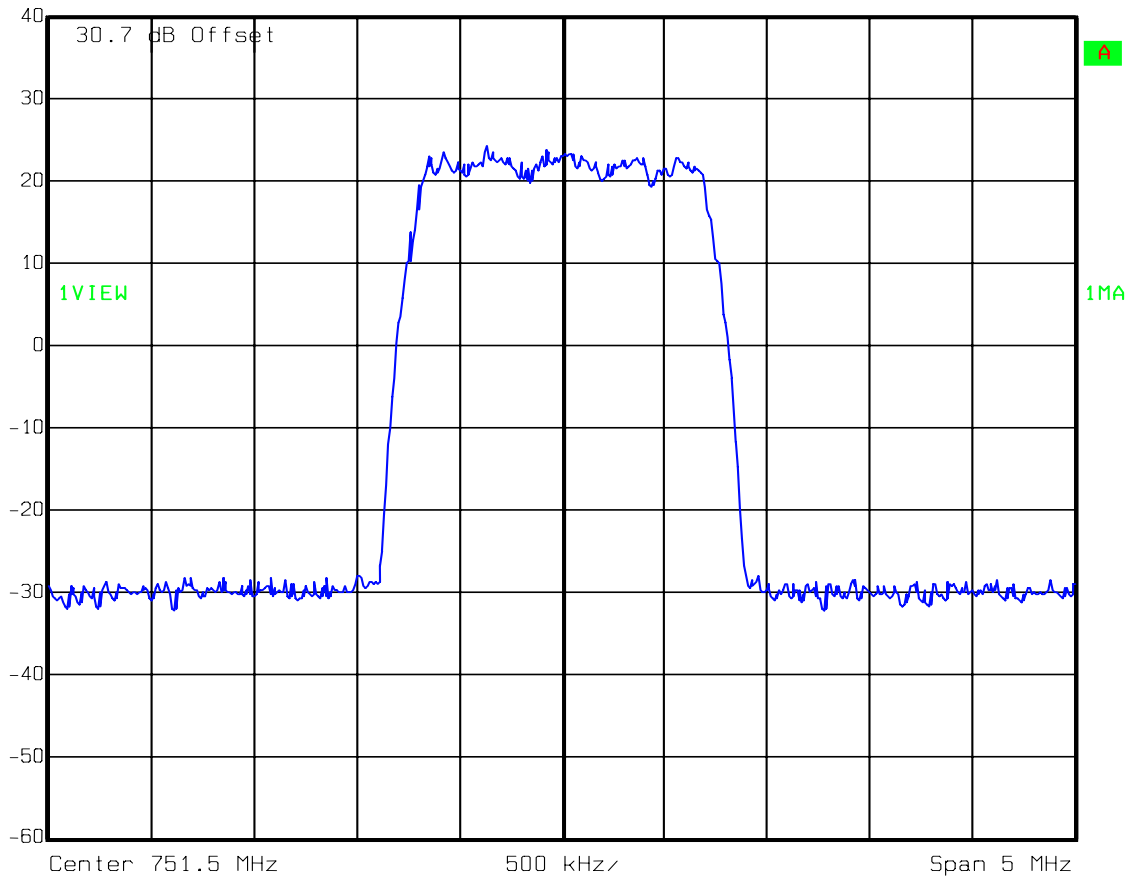
Uplink

Upper 700 Band



Ref Lvl  
40 dBm

RBW	30 kHz	RF Att	30 dB
VBW	30 kHz		
SWT	14 ms	Unit	dBm



Date: 09.NOV.2009 11:34:49

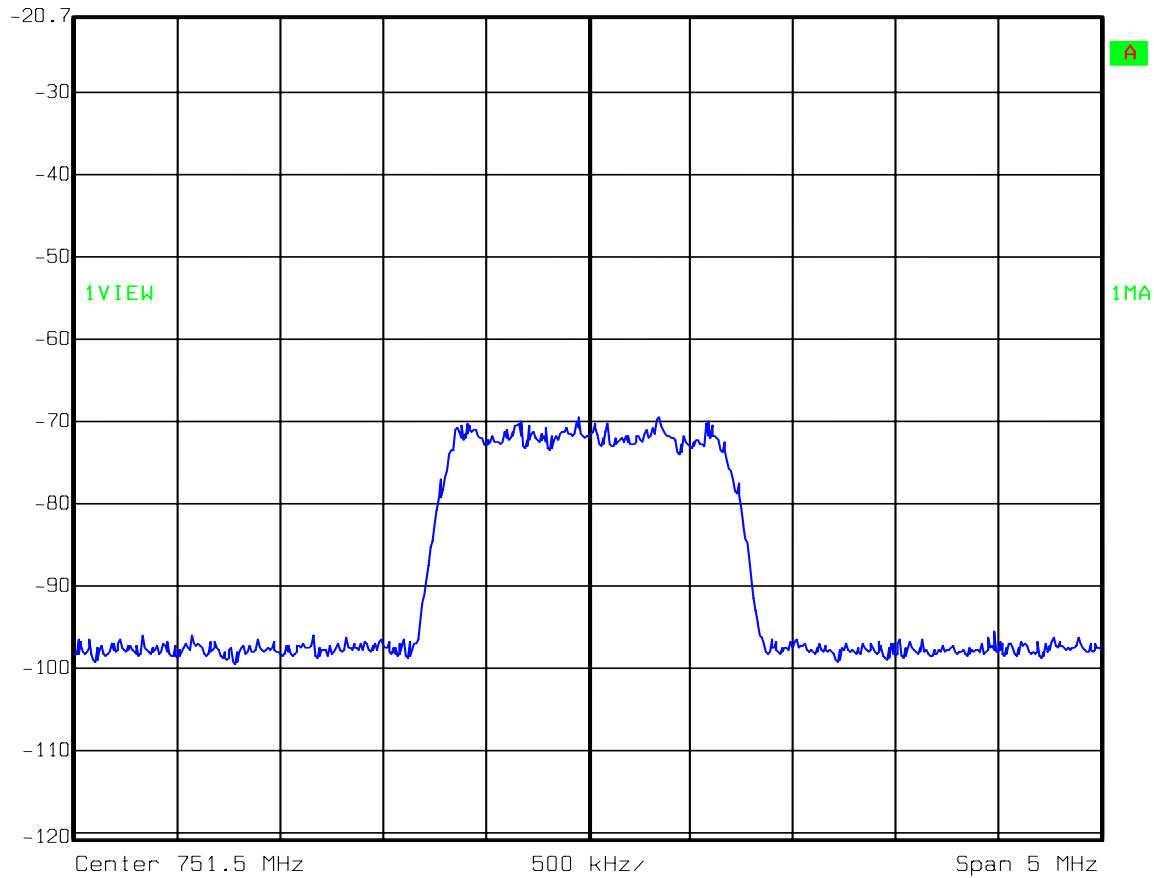
# Test Data – Occupied Bandwidth

Input  
Uplink  
Upper 700 Band



Ref Lvl  
-20.7 dBm

RBW	30 kHz	RF Att	10 dB
VBW	30 kHz		
SWT	14 ms	Unit	dBm



Date: 09.NOV.2009 11:35:48

# Test Data – Occupied Bandwidth

Output

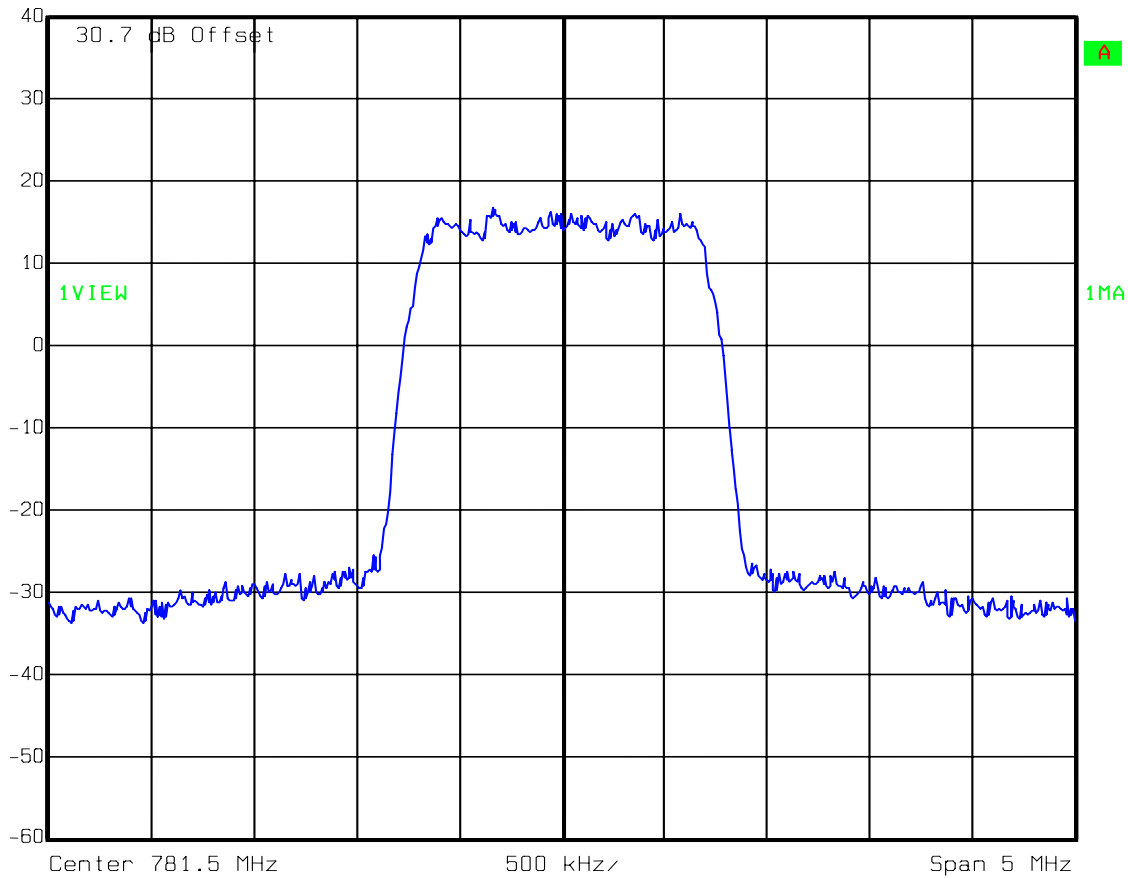
Downlink

Upper 700 Band



Ref Lvl  
40 dBm

RBW	30 kHz	RF Att	30 dB
VBW	30 kHz		
SWT	14 ms	Unit	dBm



Date: 09.NOV.2009 11:23:27

# Test Data – Occupied Bandwidth

Input

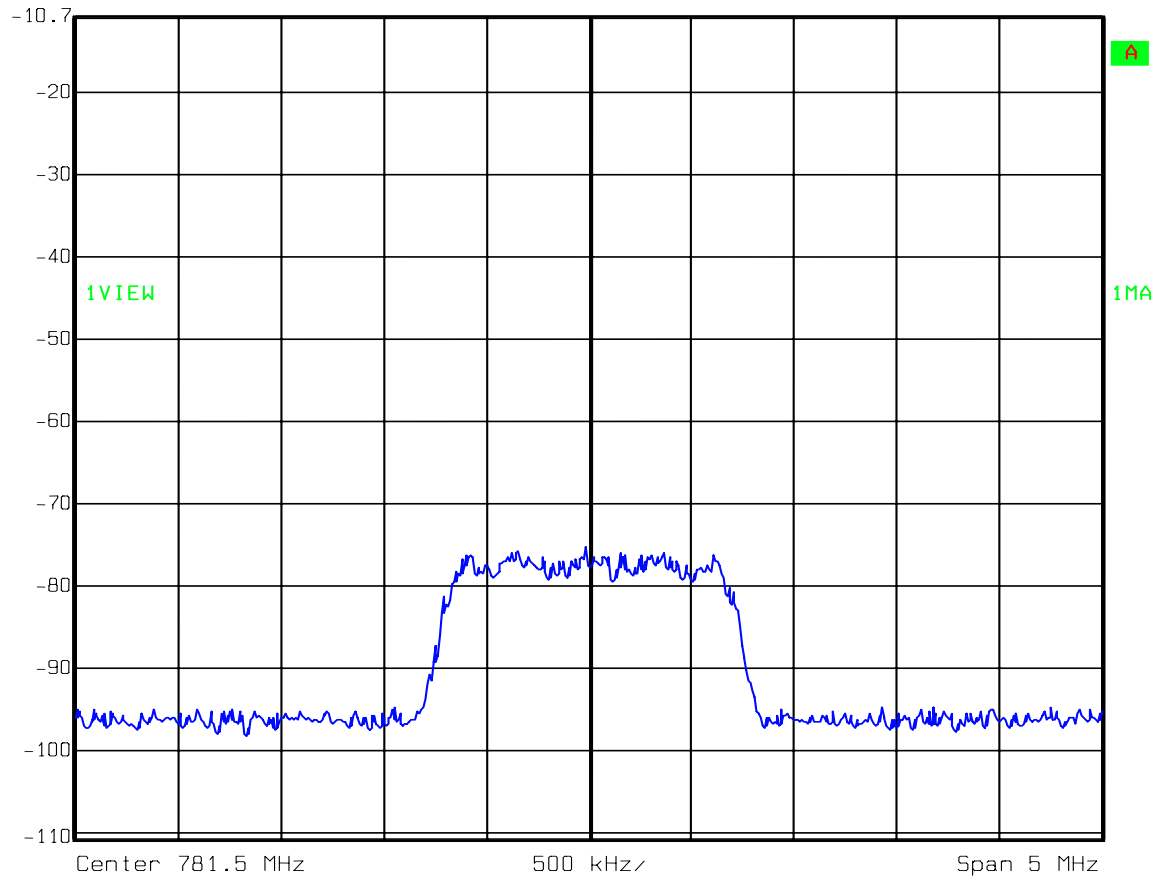
Downlink

Upper 700 Band



Ref Lvl  
-10.7 dBm

RBW	30 kHz	RF Att	10 dB
VBW	30 kHz		
SWT	14 ms	Unit	dBm



Date: 09.NOV.2009 11:24:45

**Section 5. Spurious Emissions at Antenna Terminals**

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 27.53
TESTED BY: David Light	DATE: 06 November 2009

**Test Results:** Complies.

**Test Data:** See attached plot(s).

**Equipment Used:** 1036-1082-1472-1469

**Measurement Uncertainty:** +/- 1.7 dB

**Temperature:** 22 °C

**Relative Humidity:** 48 %



# Test Data – Spurious Emissions at Antenna Terminals

Low Band Edge

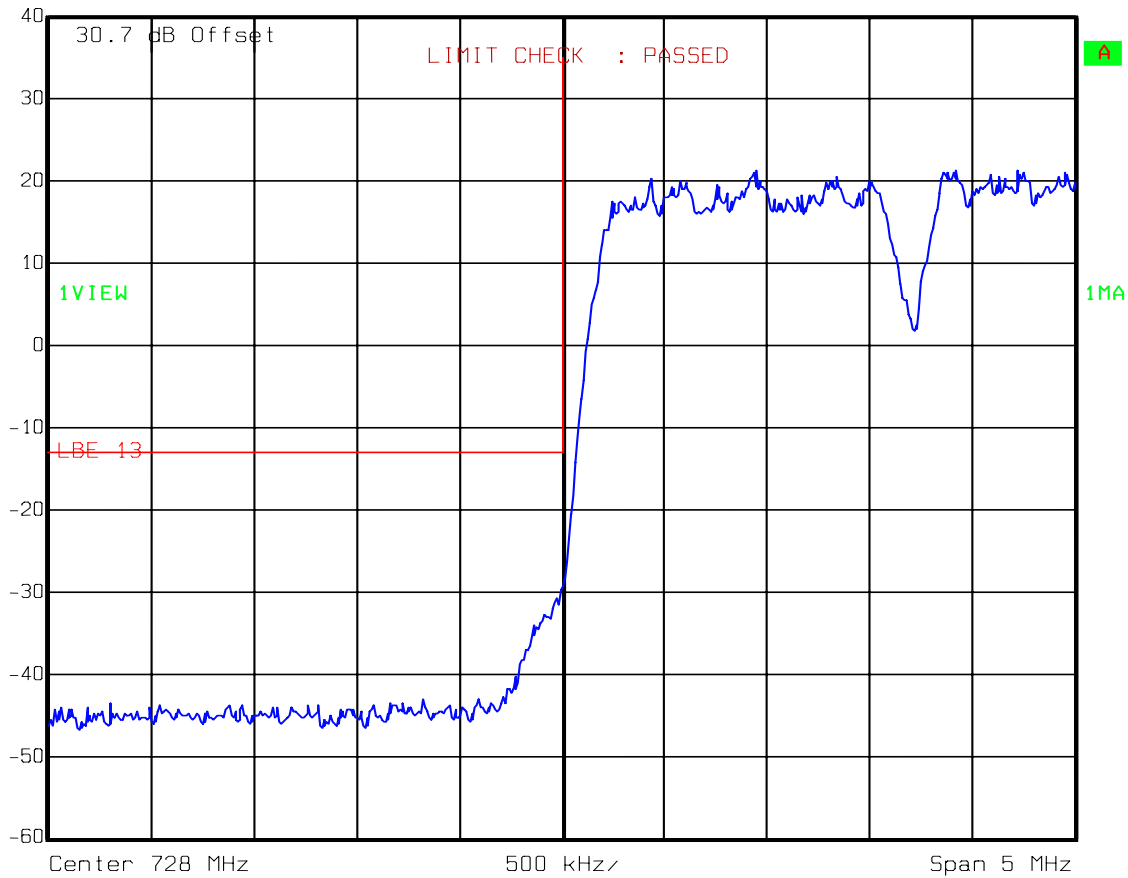
Downlink

Lower 700 Band



Ref Lvl  
40 dBm

RBW 30 kHz RF Att 30 dB  
VBW 30 kHz  
SWT 14 ms Unit dBm



Date: 06.NOV.2009 15:01:18

Test Data – Spurious Emissions at Antenna Terminals

High Band Edge

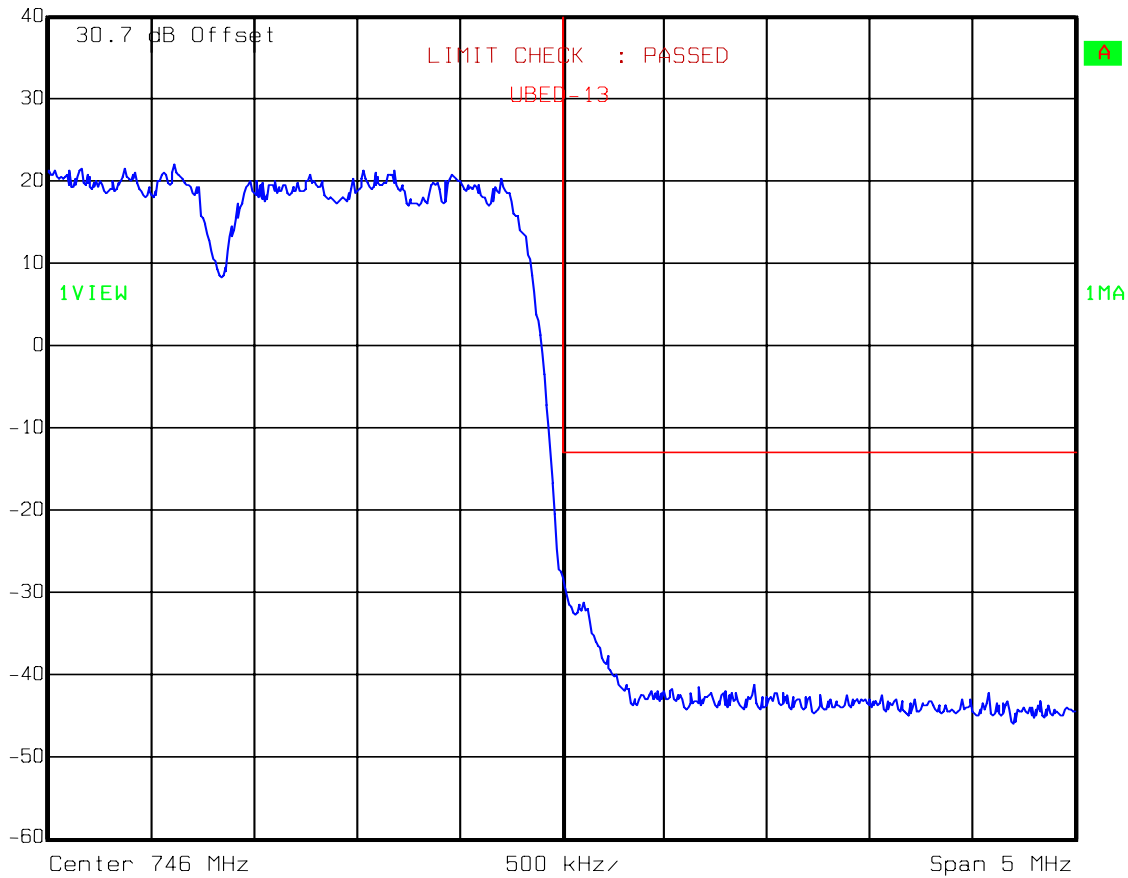
Downlink

Lower 700 Band



Ref Lvl  
40 dBm

RBW 30 kHz RF Att 30 dB  
VBW 30 kHz  
SWT 14 ms Unit dBm



Date: 06.NOV.2009 15:02:46

**Test Data – Spurious Emissions at Antenna Terminals**

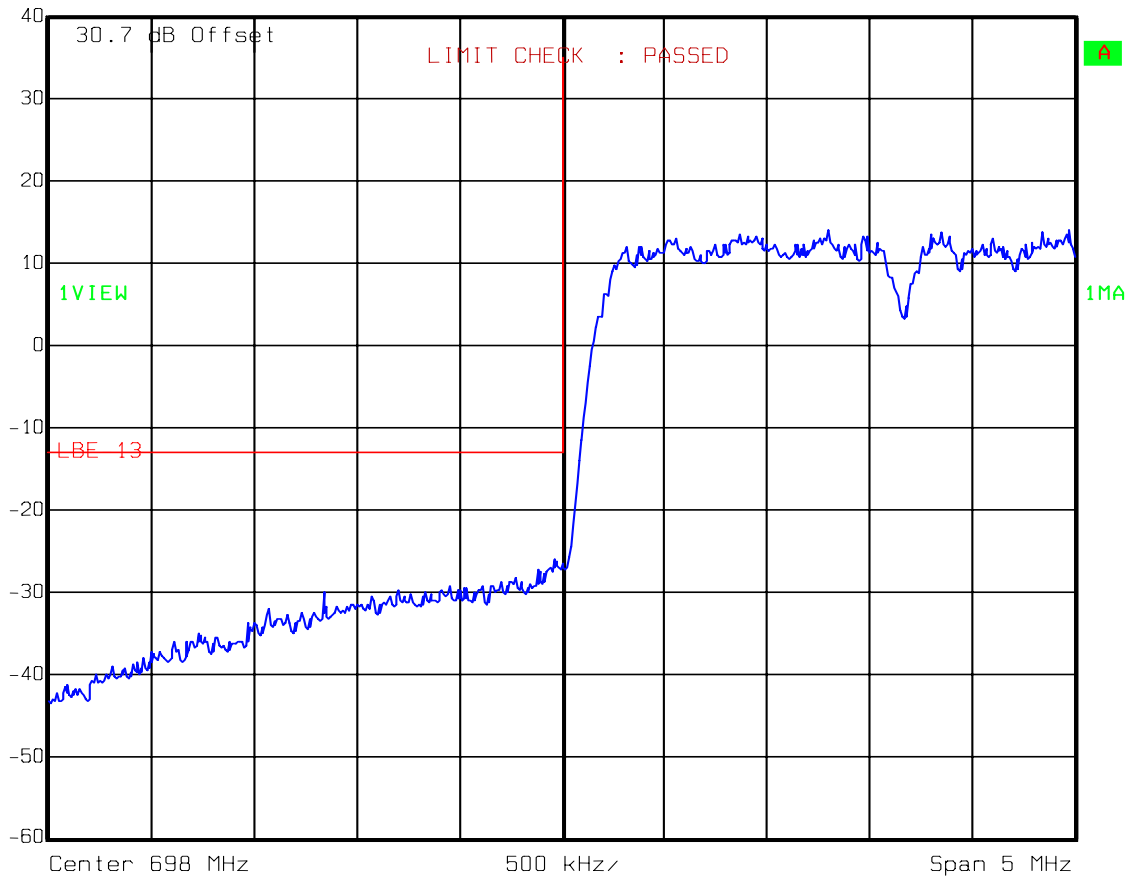
Low Band Edge

Uplink

Lower 700 Band

Ref Lvl  
40 dBm

RBW	30 kHz	RF Att	30 dB
VBW	30 kHz		
SWT	14 ms	Unit	dBm



Date: 06.NOV.2009 15:14:55

**Test Data – Spurious Emissions at Antenna Terminals**

High Band Edge

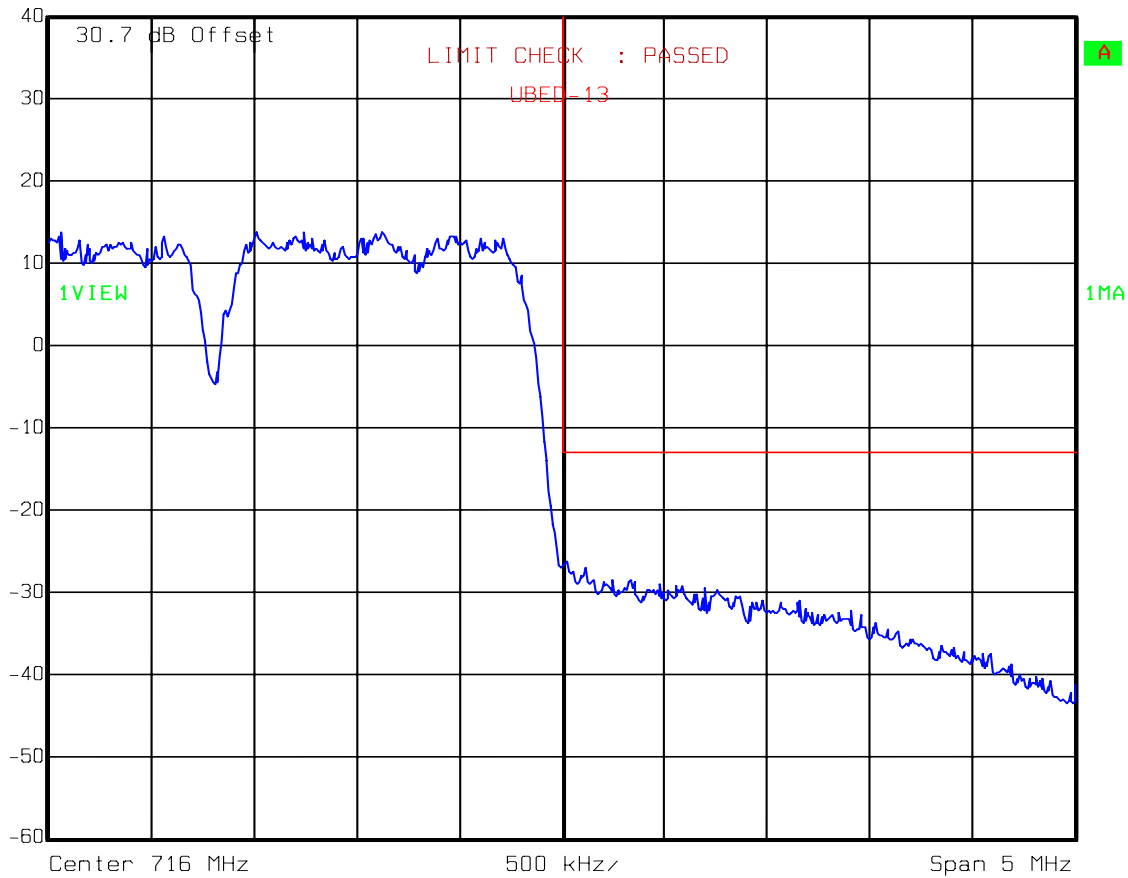
Uplink

Lower 700 Band



Ref Lvl  
40 dBm

RBW	30 kHz	RF Att	30 dB
VBW	30 kHz		
SWT	14 ms	Unit	dBm



Date: 06.NOV.2009 15:16:22

**Test Data – Spurious Emissions at Antenna Terminals**

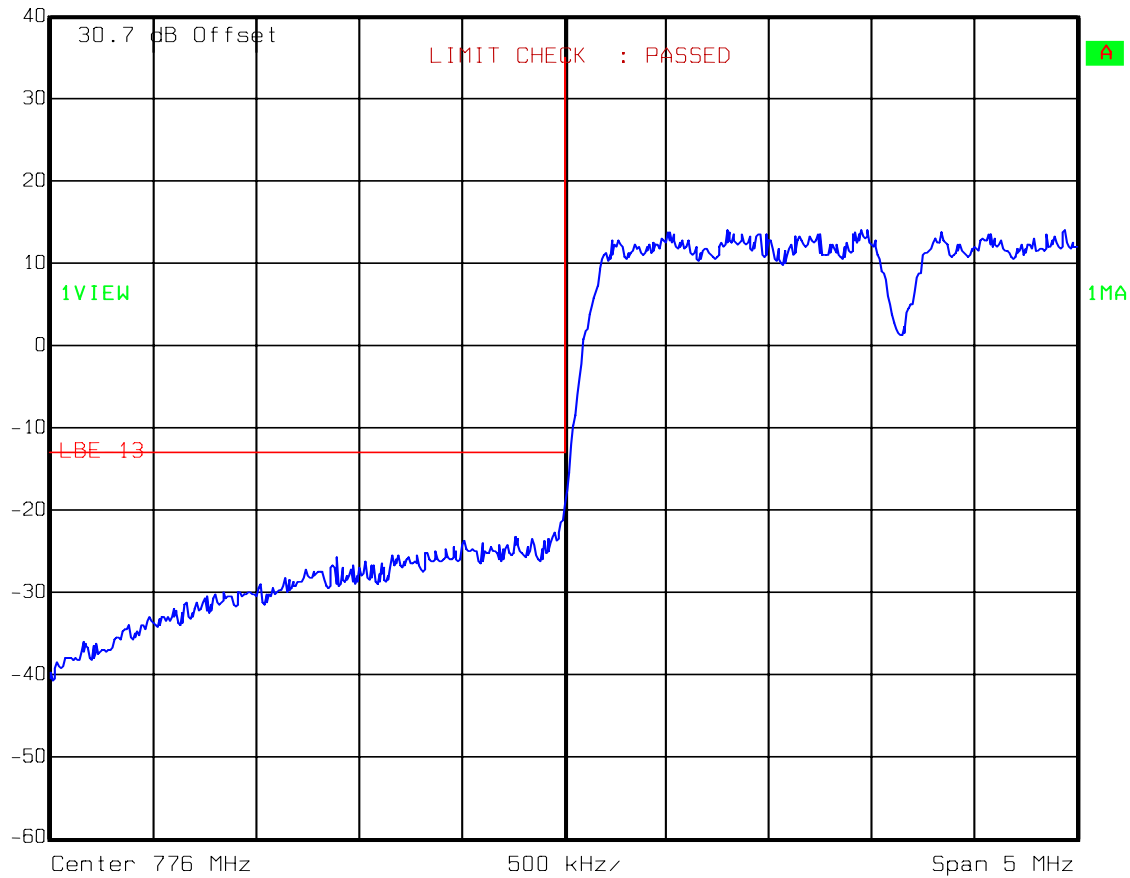
Low Band Edge

Downlink

Upper 700 Band

Ref Lvl  
40 dBm

RBW	30 kHz	RF Att	30 dB
VBW	30 kHz		
SWT	14 ms	Unit	dBm



Date: 09.NOV.2009 11:21:02

Test Data – Spurious Emissions at Antenna Terminals

High Band Edge

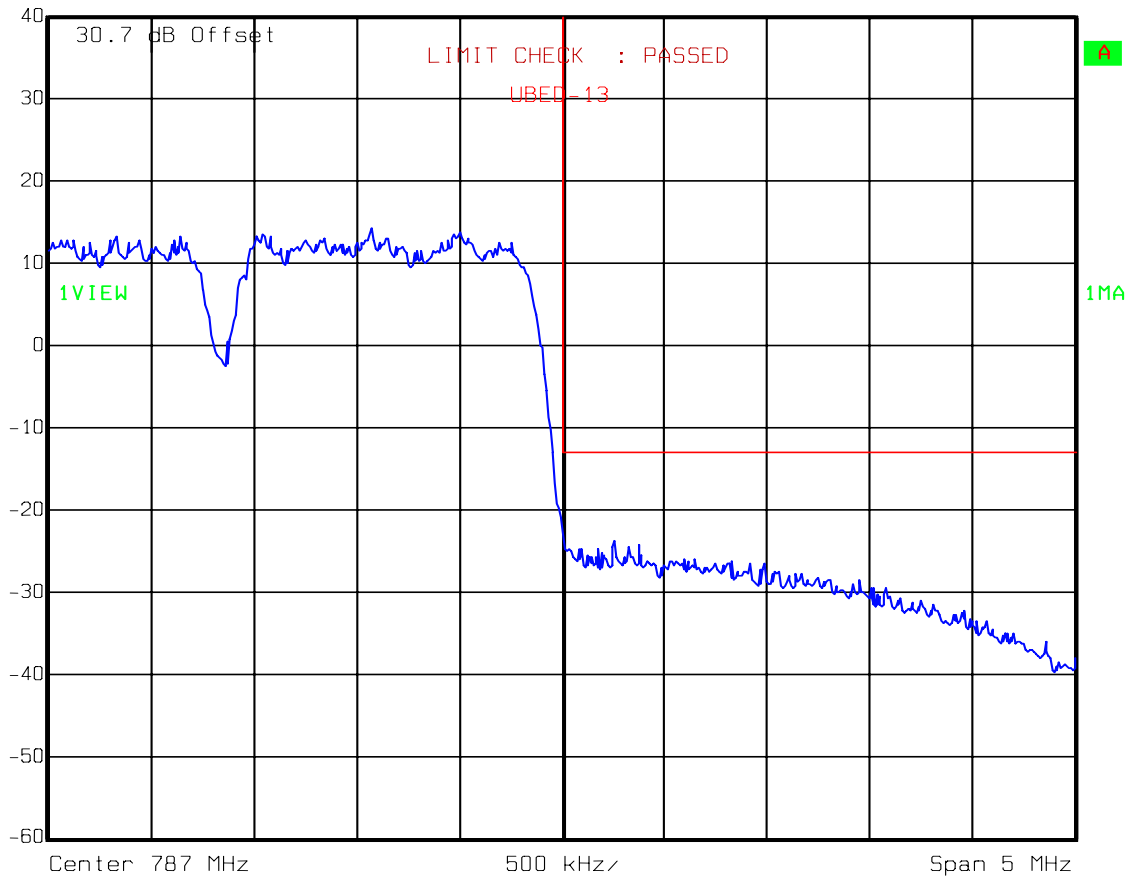
Downlink

Upper 700 Band



Ref Lvl  
40 dBm

RBW 30 kHz RF Att 30 dB  
VBW 30 kHz  
SWT 14 ms Unit dBm



Date: 09.NOV.2009 11:22:31

# Test Data – Spurious Emissions at Antenna Terminals

Low Band Edge

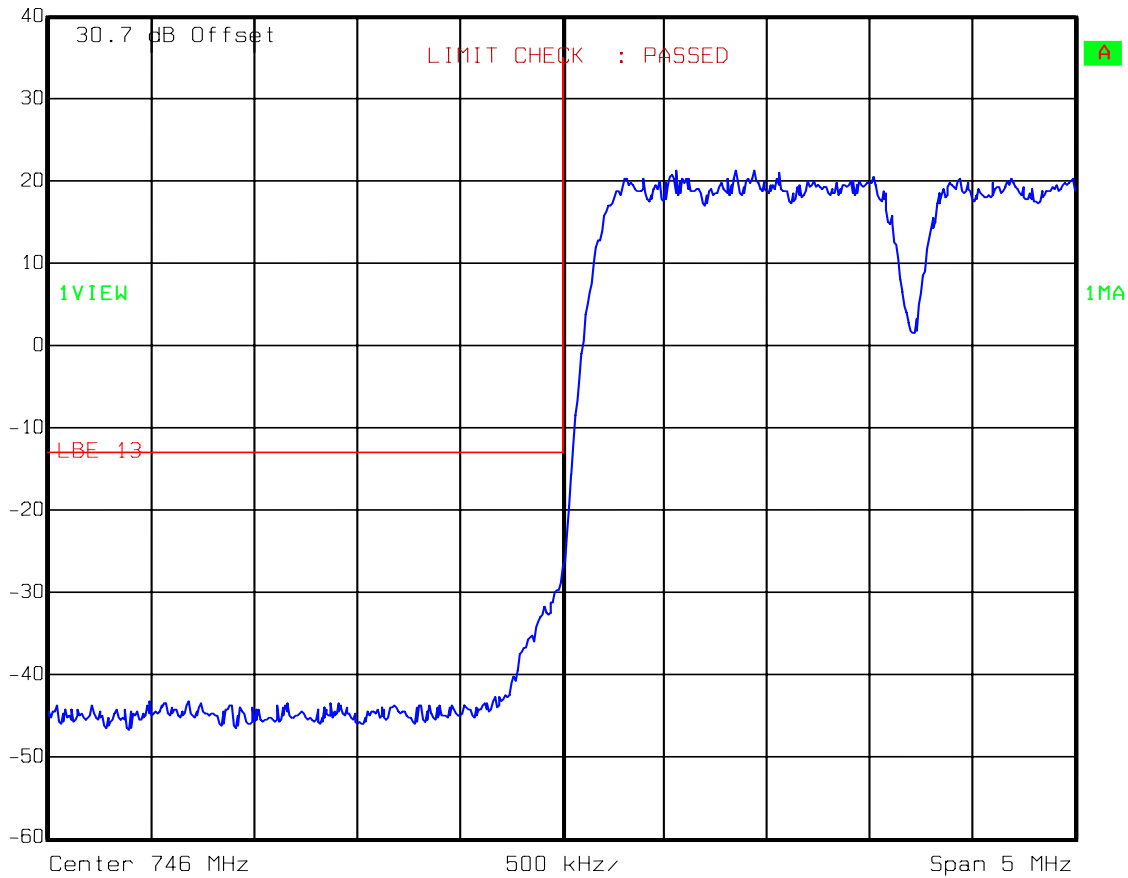
Uplink

Upper 700 Band



Ref Lvl  
40 dBm

RBW 30 kHz RF Att 30 dB  
VBW 30 kHz  
SWT 14 ms Unit dBm



Date: 09.NOV.2009 11:32:26

Test Data – Spurious Emissions at Antenna Terminals

High Band Edge

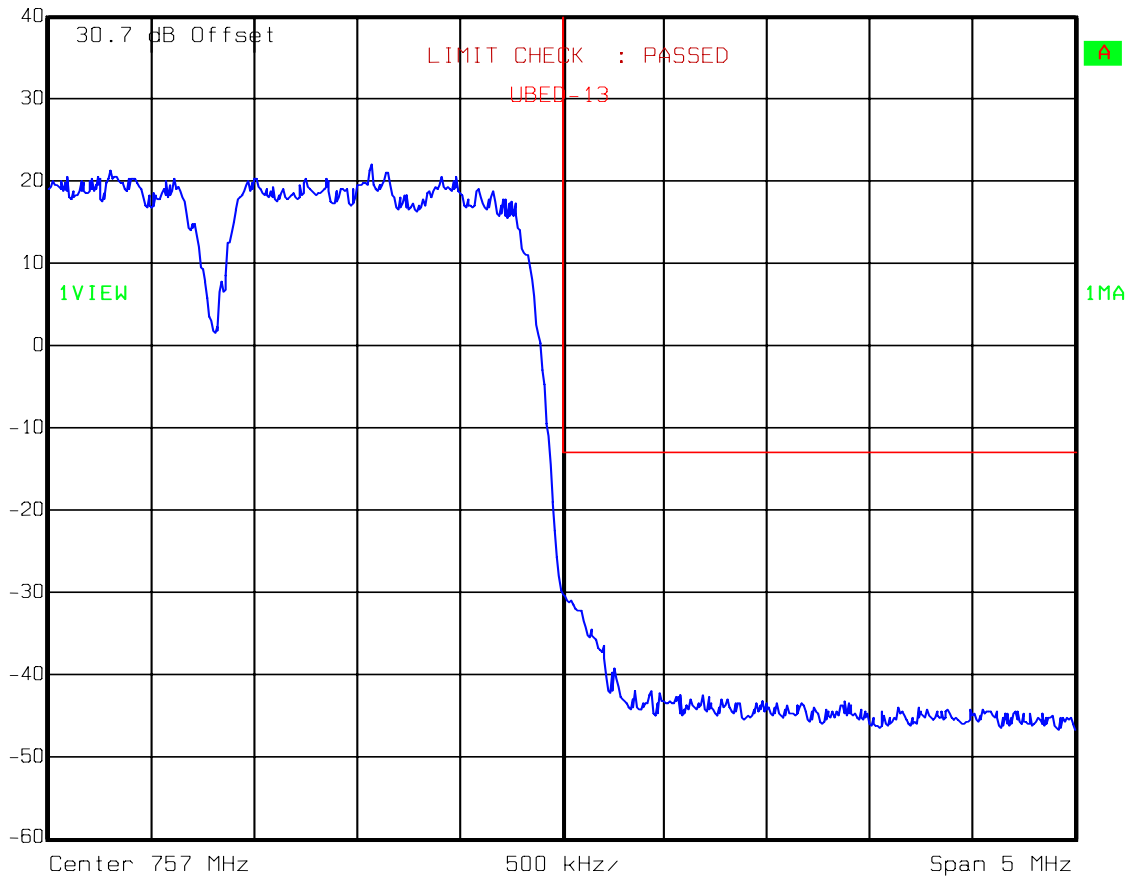
Uplink

Upper 700 Band



Ref Lvl  
40 dBm

RBW 30 kHz RF Att 30 dB  
VBW 30 kHz  
SWT 14 ms Unit dBm



Date: 09.NOV.2009 11:33:48

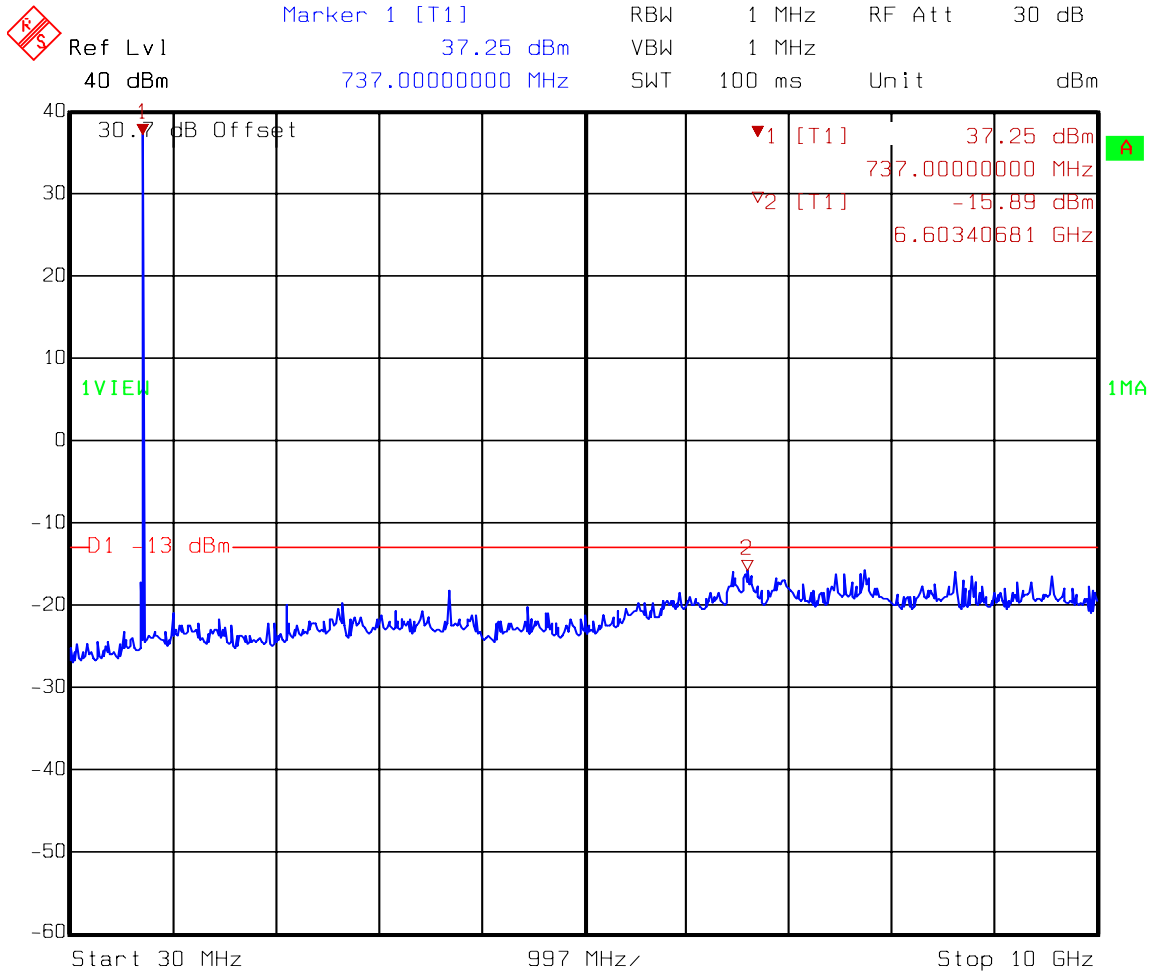


## Test Data – Spurious Emissions at Antenna Terminals

SPURS

Downlink

Lower 700 Band



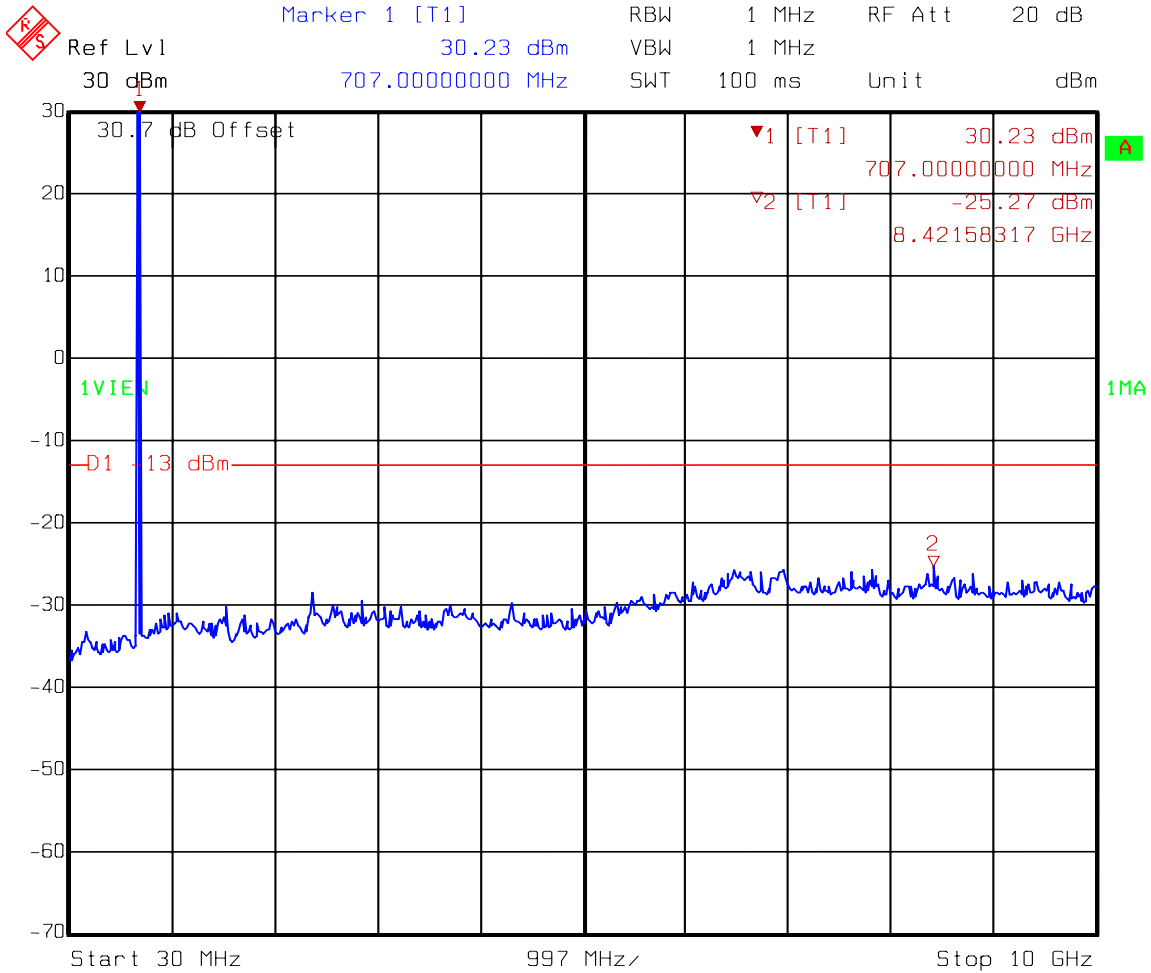
Date: 06.NOV.2009 15:07:36

**Test Data – Spurious Emissions at Antenna Terminals**

SPURS

Uplink

Lower 700 Band



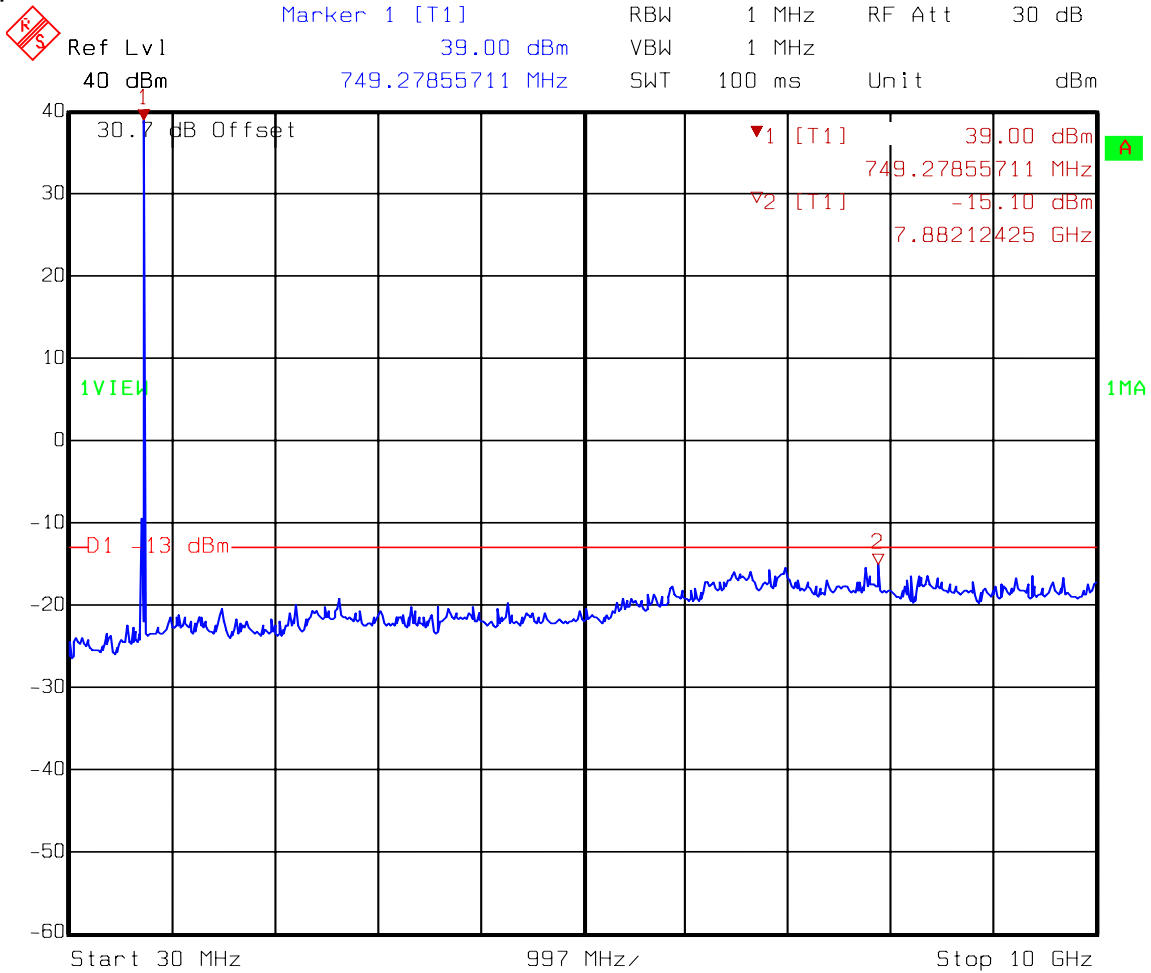
Date: 06.NOV.2009 15:19:55

## Test Data – Spurious Emissions at Antenna Terminals

SPURS

Downlink

Upper 700 Band



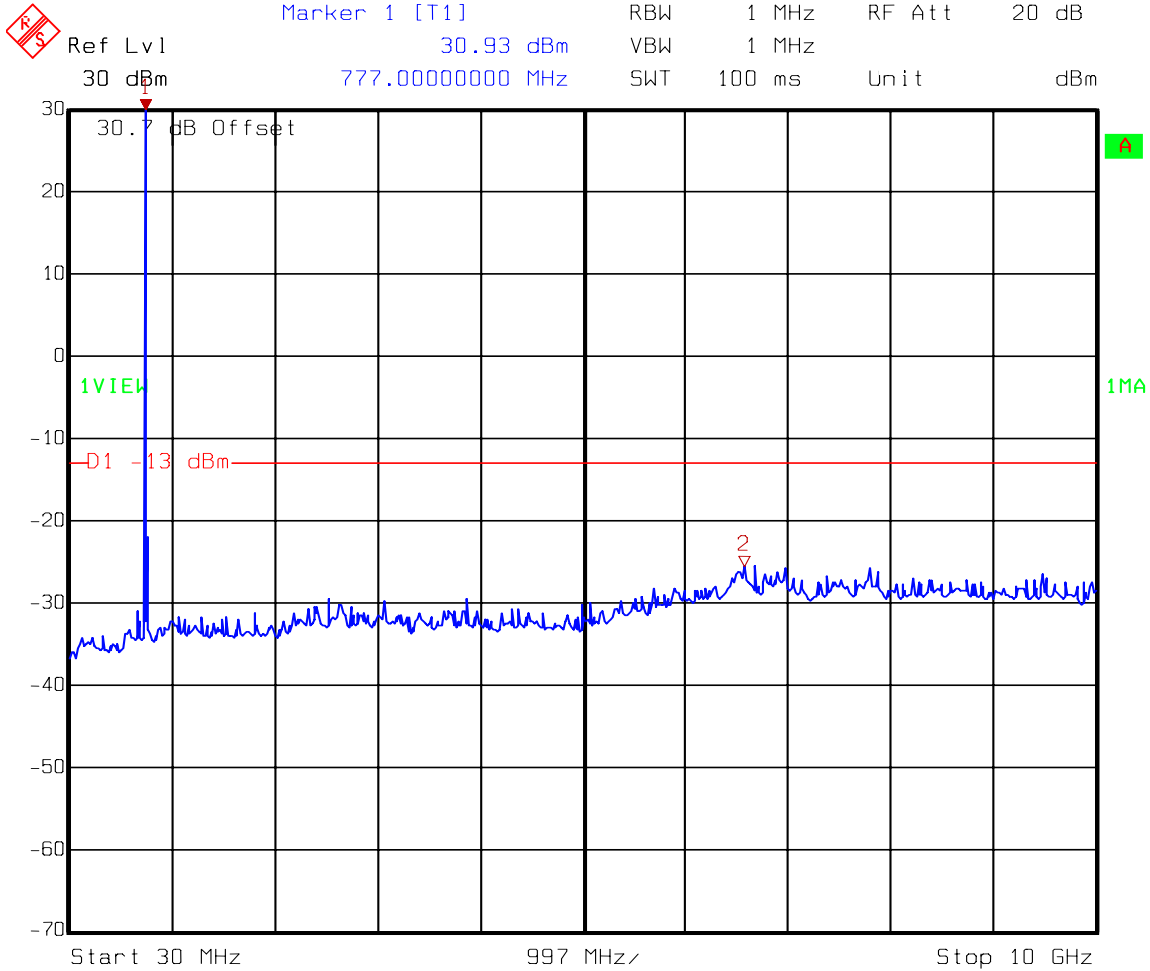
Date: 09.NOV.2009 11:37:42

Test Data – Spurious Emissions at Antenna Terminals

SPURS

Uplink

Upper 700 Band



Date: 09.NOV.2009 11:28:13

**Section 6. Field Strength of Spurious**

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 27.53
TESTED BY: David Light	DATE: 09 November 2009

**Test Results:** Complies.

**Test Data:** The spectrum was searched from 30 MHz to the tenth harmonic of the carrier. There were no emissions detected above the noise floor, which was at least 20 dB below the specification limit of -13 dBm.

**Equipment Used:** 1464-1484-1485-1016-993-791-1763

**Measurement Uncertainty:** +/-1.7 dB

**Temperature:** 22 °C

**Relative Humidity:** 48 %

RBW=VBW=100 kHz below 1000 MHz  
RBW=VBW=1 MHz above 1000 MHz  
Peak detector

## Section 7. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	01/19/09	01/20/11
1082	CABLE 2m	Astrolab 32027-2-29094-72TC	N/A	CBU	N/A
1472	20db Attenuator DC 18 Ghz	Omni Spectra 20600-20db	NONE	CBU	N/A
1469	10 db Attenuator DC 18 Ghz	MCL Inc. BW-S10W2 10db-2WDC	NONE	CBU	N/A
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	02/27/09	02/28/11
1484	Cable	Storm PR90-010-072	N/A	06/23/09	06/23/10
1485	Cable	Storm PR90-010-216	N/A	06/23/09	06/23/10
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	06/23/09	06/23/10
791	PREAMP, 25dB	Nemko USA, Inc. LNA25	398	05/28/09	05/28/10
993	Horn antenna	A.H. Systems SAS-200/571	XXX	08/31/09	08/31/11
1763	Bilog Antenna	Schaffner CBL 6111D	22926	11/20/08	11/20/09

## **ANNEX A - TEST DETAILS**

**NAME OF TEST: RF Power Output****PARA. NO.: 2.1046**

**Minimum Standard:** Para. No.27.53(d)(1). The power of each fixed or base station transmitting in the 2110-2155 MHz band and located in any county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, is limited to a peak equivalent isotropically radiated power (EIRP) of 3280 watts. The power of each fixed or base station transmitting in the 2110-2155 MHz band from any other location is limited to a peak EIRP of 1640 watts. A licensee operating a base or fixed station utilizing a power of more than 1640 watts EIRP must coordinate such operations in advance with all Government and non-Government satellite entities in the 2025-2110 MHz band. Operations above 1640 watts EIRP must also be coordinated in advance with the following licensees within 120 kilometers (75 miles) of the base or fixed station: all Broadband Radio Service (BRS) licensees authorized under Part 27 in the 2155-2160 MHz band and all AWS licensees in the 2110-2155 MHz band.

**Method Of Measurement:**Detachable Antenna:

The channel power integrated across the carrier's bandwidth at antenna terminals is measured using a spectrum analyzer. Power output is measured with the maximum rated input level.

Integral Antenna:

The antenna substitution method is used to determine the equivalent radiated power at spurious frequencies. The spurious emissions are measured at a distance of 3 meters. The EUT is then replaced with a reference substitution antenna with a known gain referenced to an isotropic radiator. This antenna is fed with a signal at the spurious frequency. The level of the signal is adjusted to repeat the previously measured level. The resulting eirp is the signal level fed to the reference antenna corrected for gain referenced to an isotropic radiator.



**NAME OF TEST: Occupied Bandwidth**

**PARA. NO.: 2.1049**

**Minimum Standard:** Input/Output

**Method Of Measurement:**

CDMA

Spectrum analyzer settings:

RBW=VBW=30 kHz

Span: 5 MHz

Sweep: Auto

GSM / EDGE

RBW=VBW= 3 kHz

Span: 1 MHz

Sweep: Auto

TDMA

RBW=VBW= 1 kHz

Span: 1 MHz

Sweep: Auto

W-CDMA

RBW=VBW= 50 kHz

Span: 10 MHz

Sweep: Auto

**NAME OF TEST: Spurious Emission at Antenna Terminals PARA. NO.: 27.53**

**Minimum Standard:** Para. No.27.53(g) For operations in the 1710-1755 MHz and 2110-2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log_{10}(P)$  dB.

**Method Of Measurement:**

Spectrum analyzer settings:

CDMA

RBW: 1 MHz (> 1 MHz from Band Edge)  
RBW: 30 kHz (< 1MHz from Band Edge)  
VBW:  $\geq$  RBW  
Sweep: Auto  
Video Avg: 6 Sweeps

GSM / EDGE

RBW: 1 MHz (> 1 MHz from Band Edge)  
RBW: 3 kHz (< 1 MHz from Band Edge)  
VBW:  $\geq$  RBW  
Sweep: Auto  
Video Avg: Disabled

TDMA

RBW: 1 MHz (> 1 MHz from Band Edge)  
RBW: 3 kHz (< 1 MHz from Band Edge)  
VBW:  $\geq$  RBW  
Sweep: Auto  
Video Avg: Disabled

W-CDMA

RBW: 1 MHz (> 1 MHz from Band Edge)  
RBW: 50 kHz (< 1MHz from Band Edge)  
VBW:  $\geq$  RBW  
Sweep: Auto  
Video Avg: 6 Sweeps

To demonstrate compliance at band edges the frequency of the input signal is set to the lowest and highest assigned channel and the center frequency of the spectrum analyzer is set to the upper and lower edges of the appropriate frequency block.

<b>NAME OF TEST: Field Strength of Spurious Radiation</b>	<b>PARA. NO.: 27.53</b>
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**Minimum Standard:**

Para. No.27.53(g) For operations in the 1710-1755 MHz and 2110-2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log_{10} (P)$  dB.

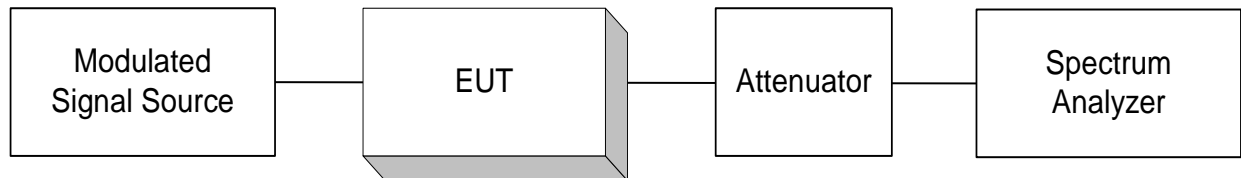
**Method of Measurement**

TIA/EIA-603-1992

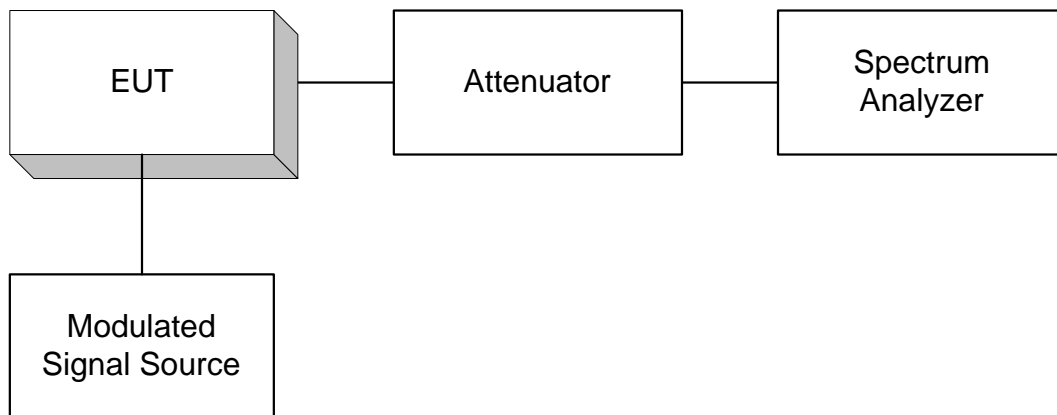
The antenna substitution method is used to determine the equivalent radiated power at spurious frequencies. The spurious emissions are measured at a distance of 3 meters. The EUT is then replaced with a reference substitution antenna with a known gain referenced to an isotropic radiator. This antenna is fed with a signal at the spurious frequency. The level of the signal is adjusted to repeat the previously measured level. The resulting eirp is the signal level fed to the reference antenna corrected for gain referenced to an isotropic radiator.

## **ANNEX B - TEST DIAGRAMS**

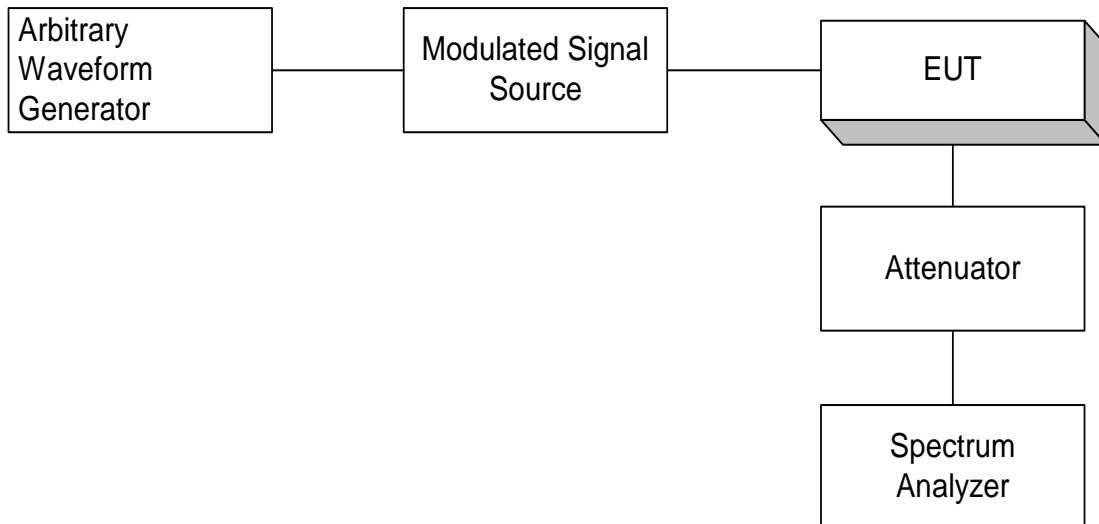
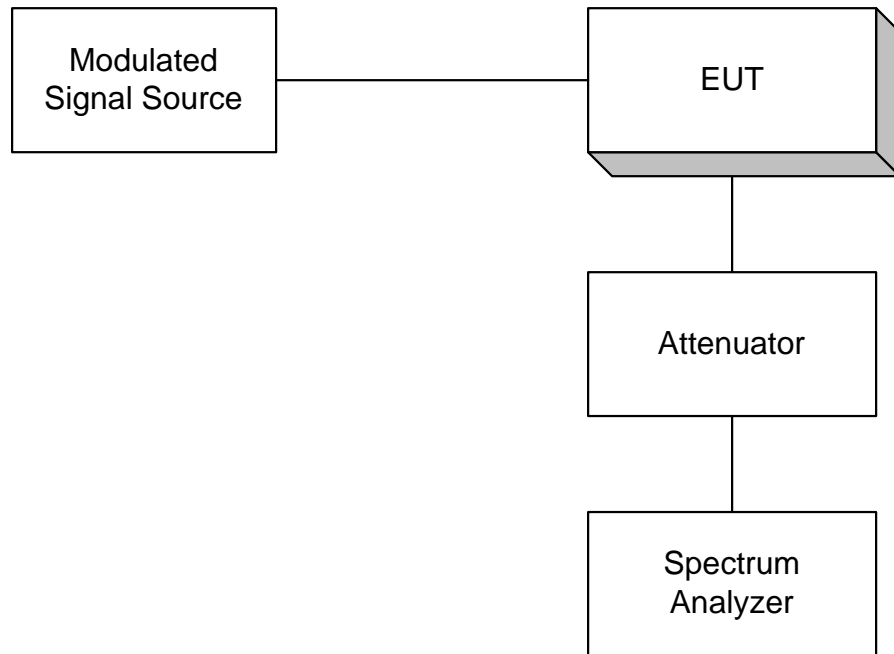
**Para. No. 2.985 - R.F. Power Output**



**Para. No. 2.989 - Occupied Bandwidth**



**Para. No. 2.991 Spurious Emissions at Antenna Terminals**



**Para. No. 2.993 - Field Strength of Spurious Radiation**

