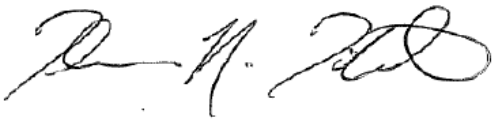
Nemko Test Report:	37201RUS1
Applicant:	Andrew Corporation 620 N. Greenfield Parkway Garner, NC 27529 USA
Equipment Under Test: (E.U.T.)	AF727
FCC Identifier:	BCR-AF727
In Accordance With:	**CFR 47, Part 27, Subpart C** Miscellaneous Wireless Communication Services
Tested By:	Nemko USA, Inc. 802 N. Kealy Lewisville, TX 75057-3136

TESTED BY: _____ **DATE:** **16 October 2009**
David Light, Senior Wireless Engineer



APPROVED BY: _____ **DATE:** **16 October 2009**
Tom Tidwell, Telecom Direct

Number of Pages: 39

Table of Contents

Section 1. Summary of Test Results

Manufacturer Andrew Corporation

Model No.: AF727

Serial No.: 101

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

Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	RESULT
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[1]

[1]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:		84 dB
Output Impedance:		50 ohms
RF Output (Rated):	**Downlink**	0.5 W 27 dBm
RF Output (Rated):	**Uplink**	0.5 W 27 dBm
Frequency Translation:		**F1-F1** ☒ **F1-F2** ☐ **N/A** ☐
Band Selection:		**Software** ☒ **Duplexer** ☐ **Fullband** ☐

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: 15 October 2009

Test Results: Complies.

Measurement Data:

Direction	Block	Composite Power (dBm)	RF Power (W)
Downlink	ABC Lower	27	0.5
	C Upper	27	0.5
Uplink	ABC Lower	27	0.5
	C Lower	27	0.5

Equipment Used: 1036-1082-1472

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: 15 October 2009

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1036-1082-1472

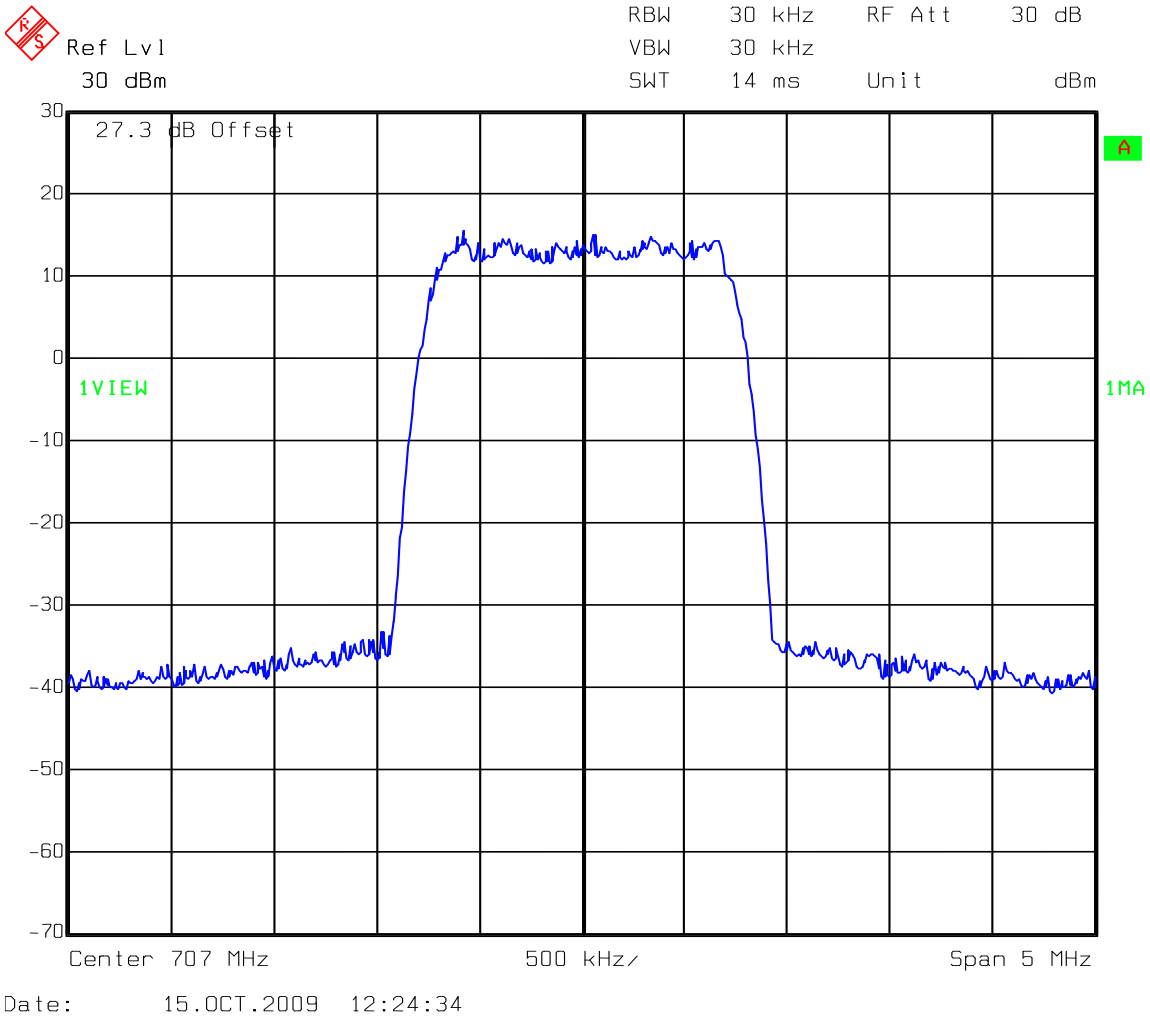
Measurement Uncertainty: $1X10^{-7}$ ppm

Temperature: 22 °C

Relative Humidity: 48 %

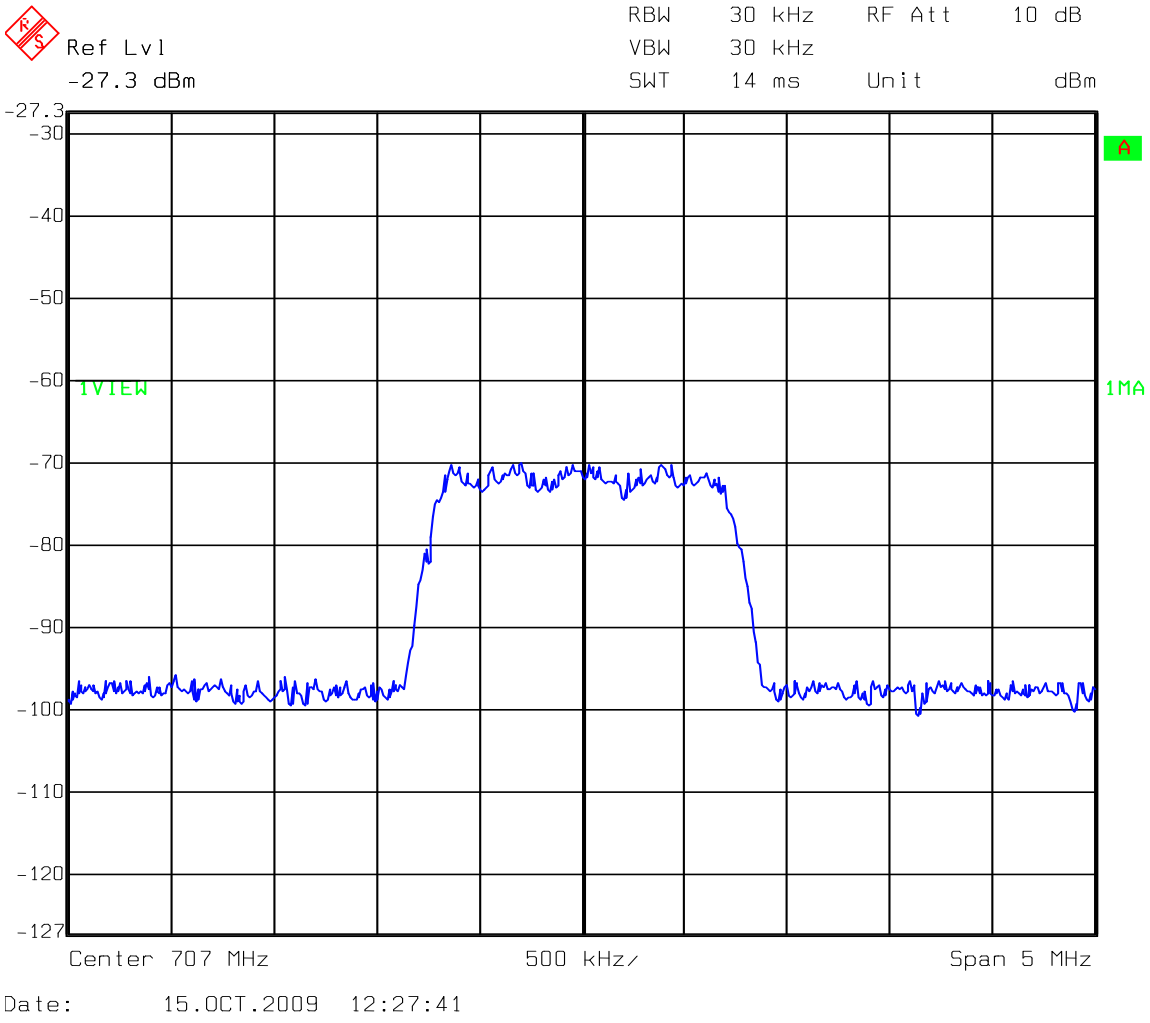
Test Data – Occupied Bandwidth

Output
Uplink
Lower 700 Band



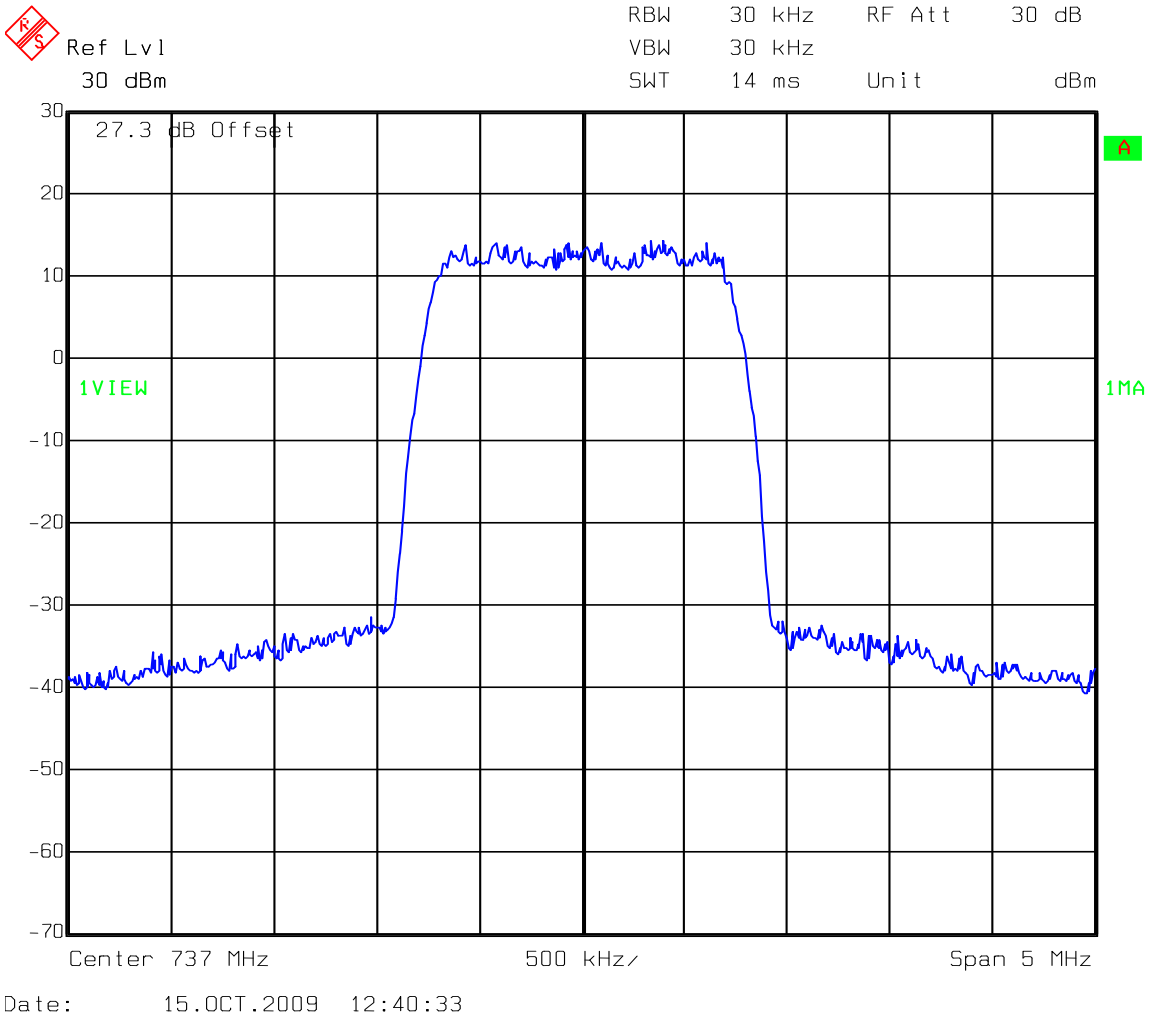
Test Data – Occupied Bandwidth

Input
Uplink
Lower 700 Band



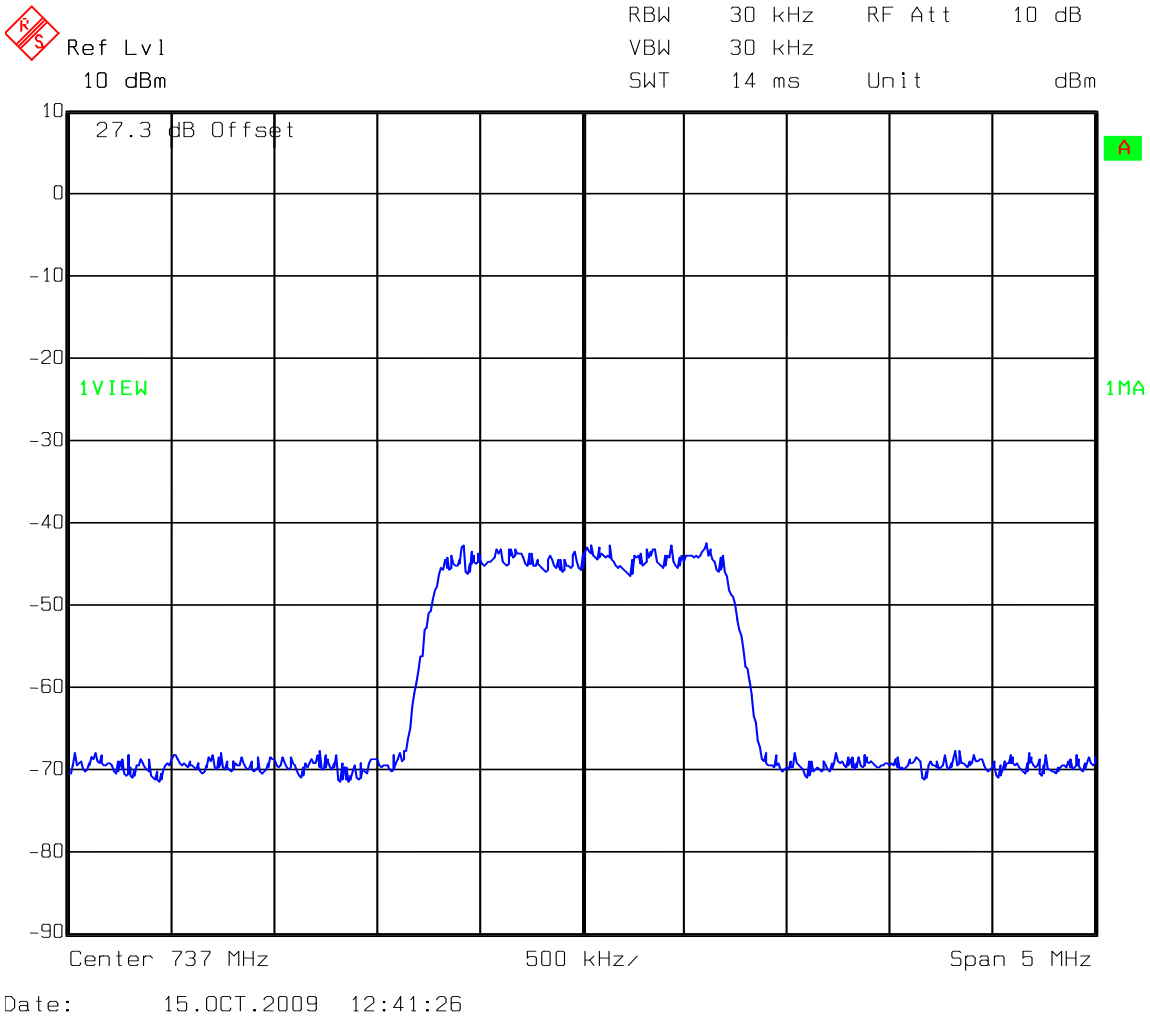
Test Data – Occupied Bandwidth

Output
Downlink
Lower 700 Band



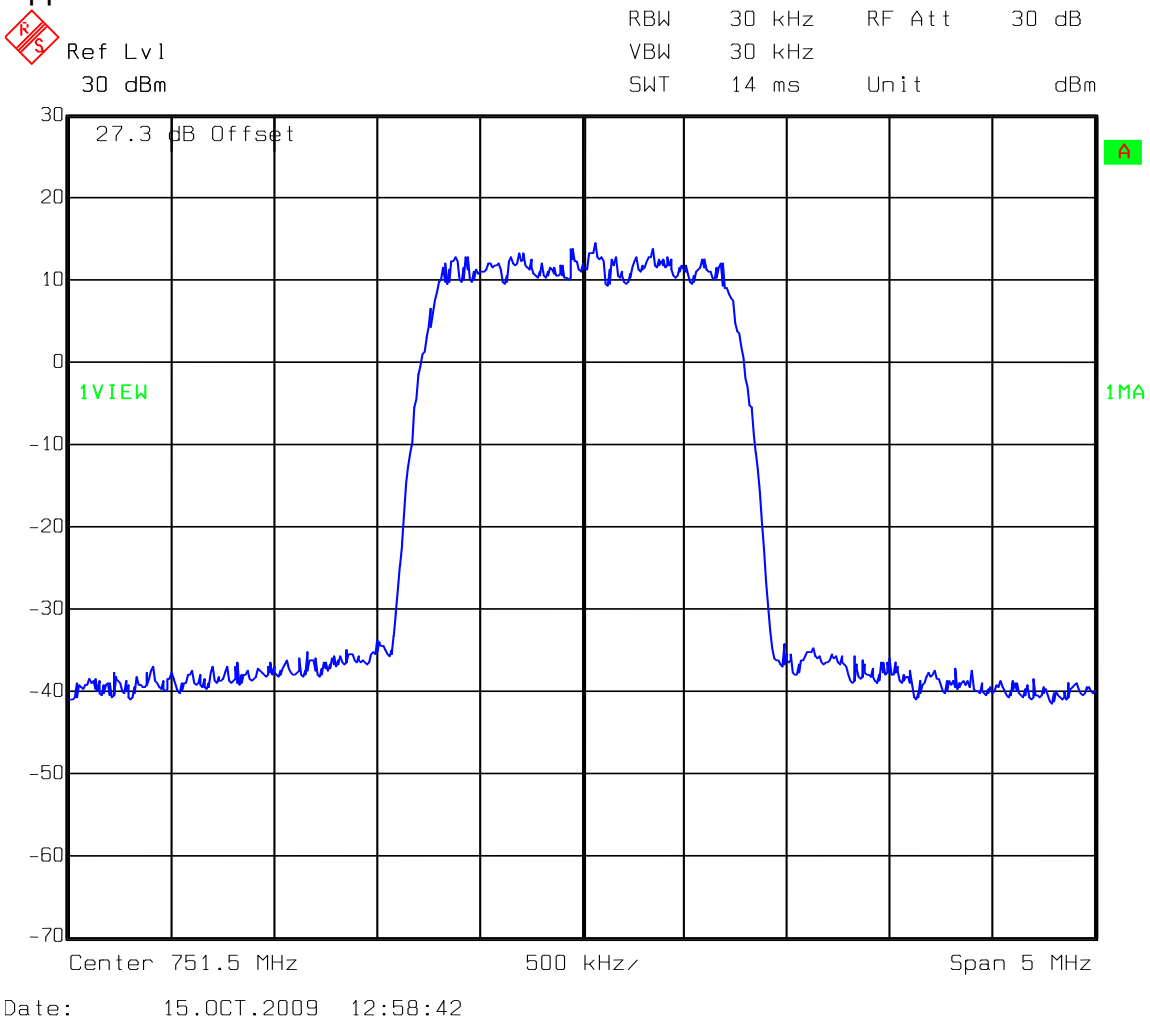
Test Data – Occupied Bandwidth

Input
Downlink
Lower 700 Band



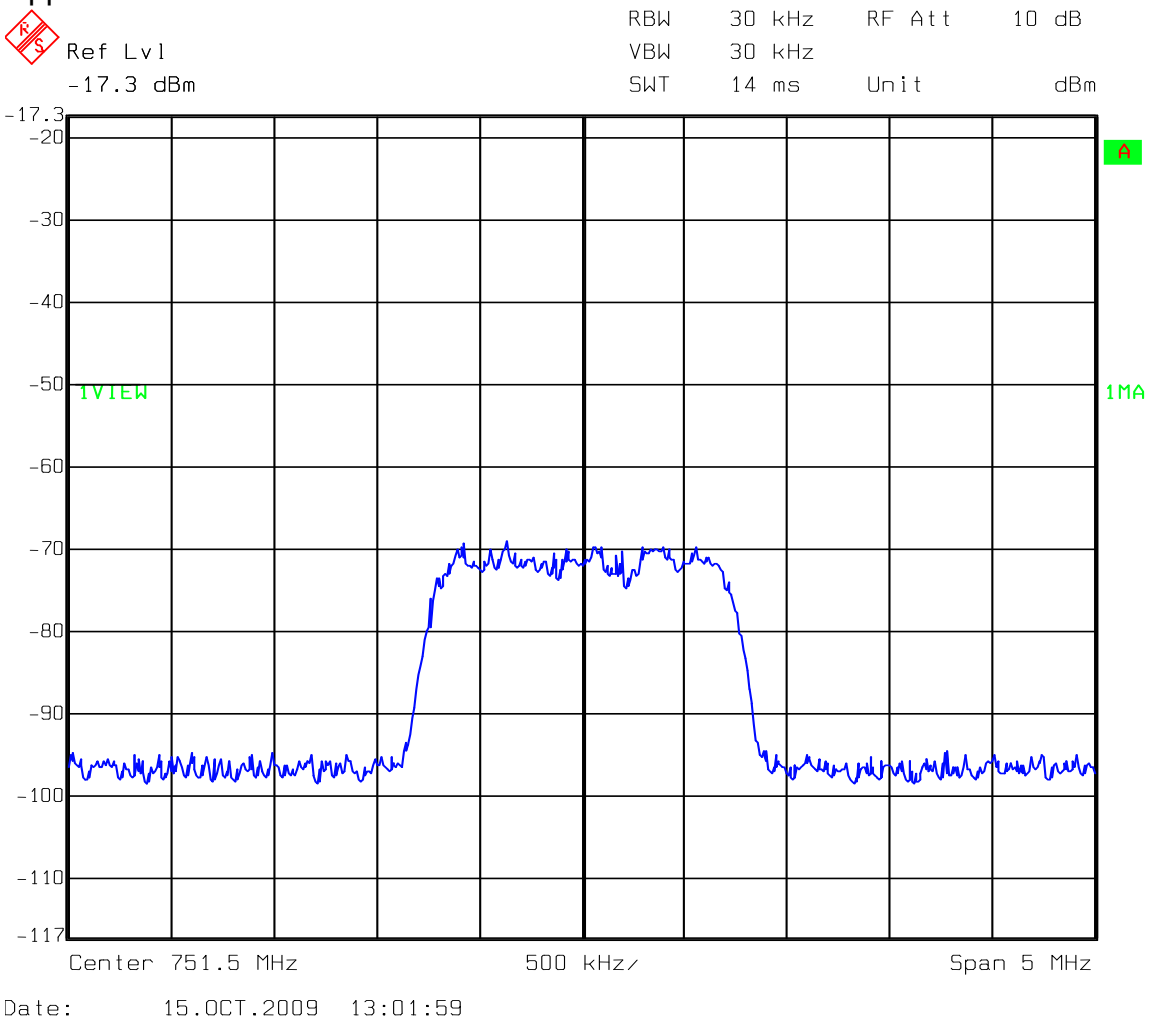
Test Data – Occupied Bandwidth

Output
Uplink
Upper 700 Band



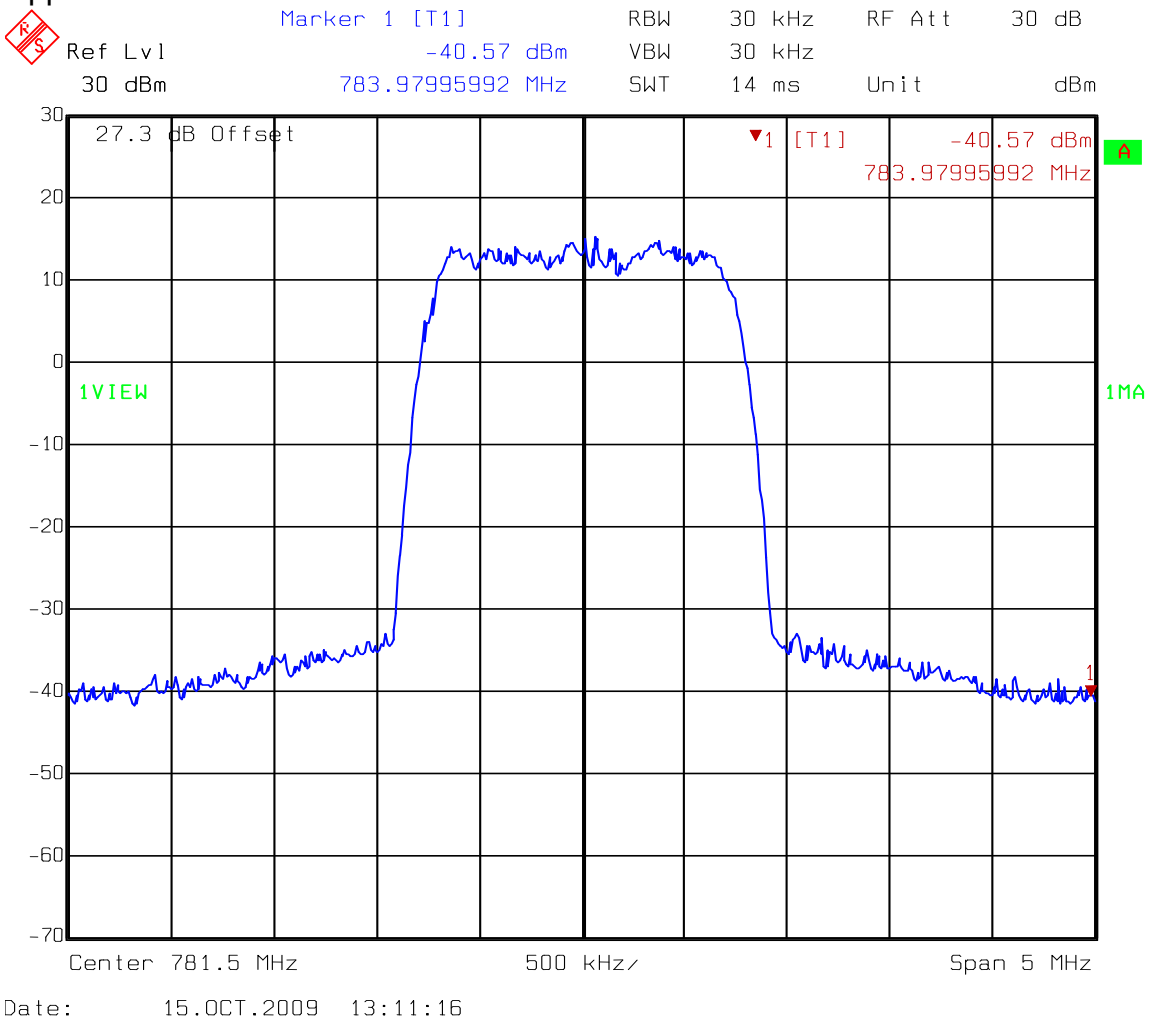
Test Data – Occupied Bandwidth

Input
Uplink
Upper 700 Band



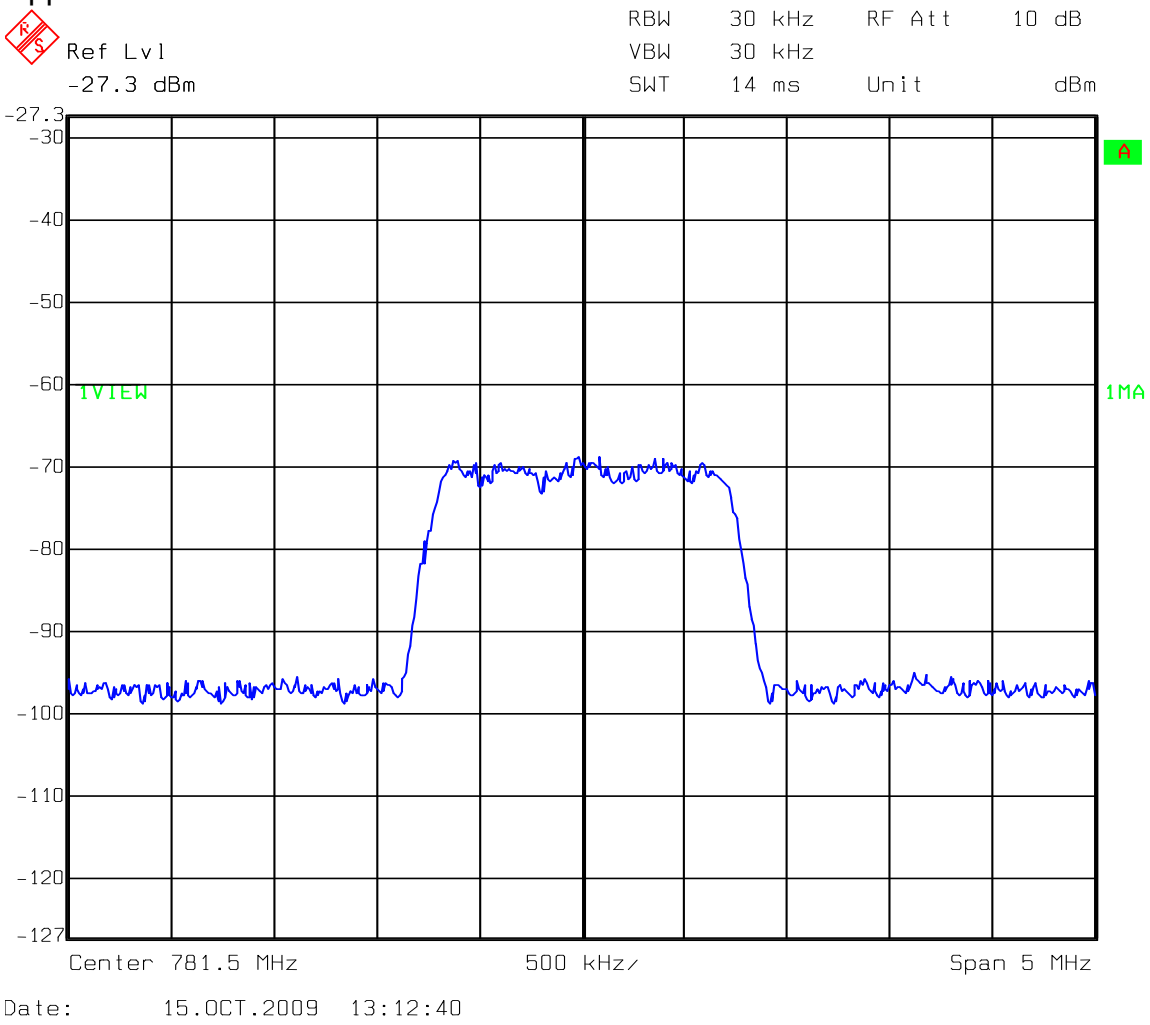
Test Data – Occupied Bandwidth

Output
Downlink
Upper 700 Band



Test Data – Occupied Bandwidth

Input
Downlink
Upper 700 Band



Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 27.53
TESTED BY: David Light	DATE: 15 October 2009

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1036-1082-1472

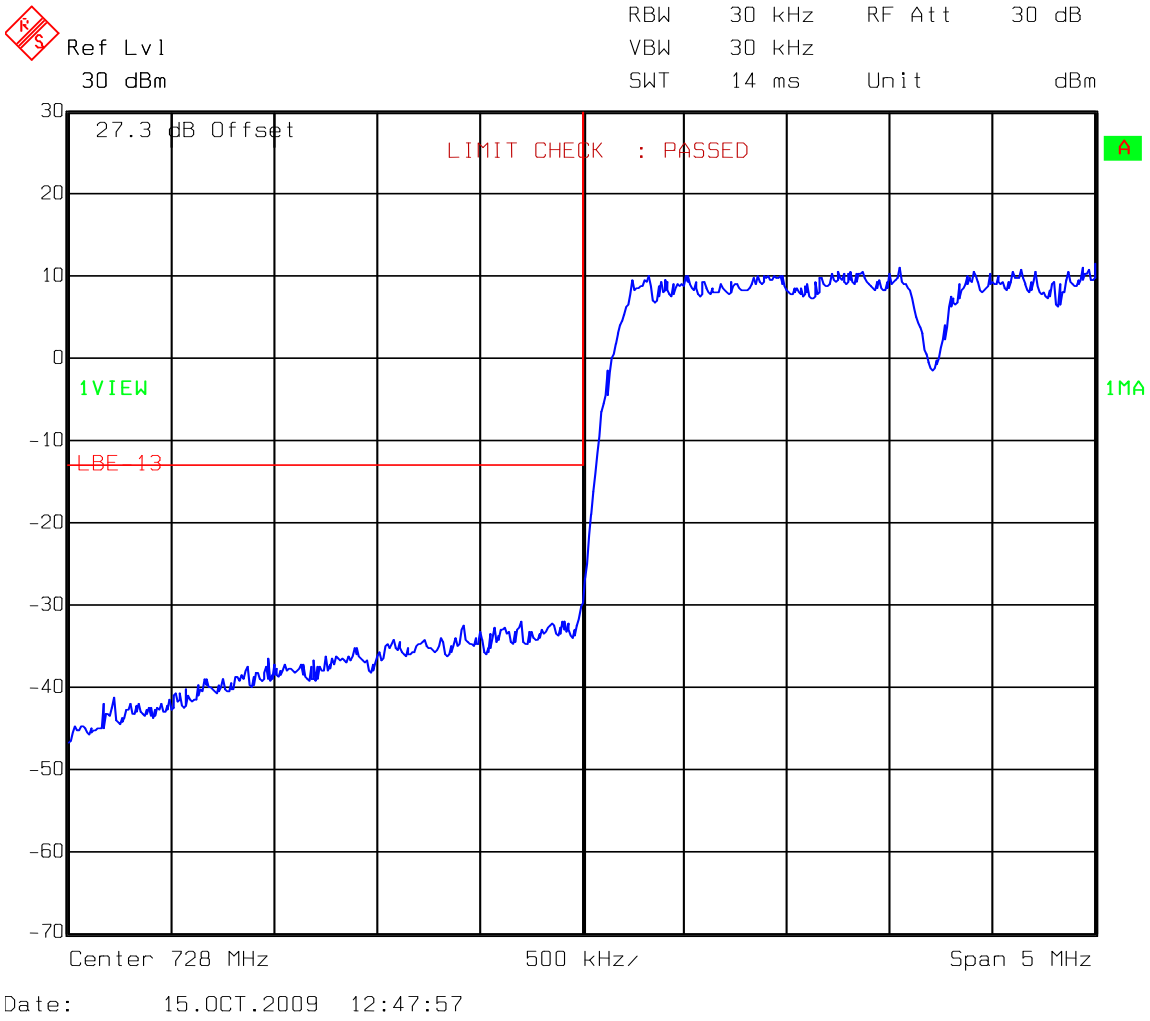
Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 48 %

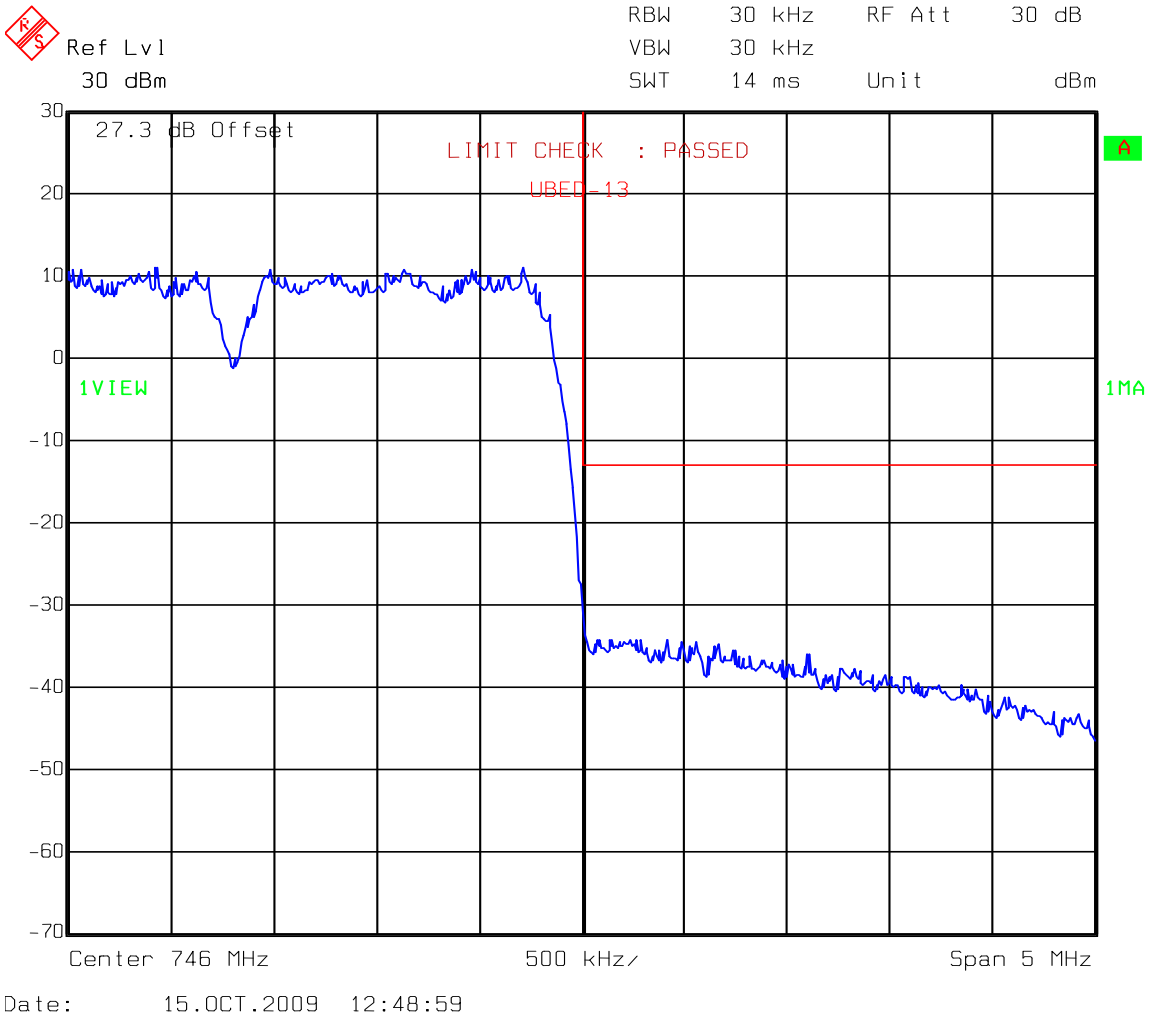
Test Data – Spurious Emissions at Antenna Terminals

Low Band Edge
Downlink
Lower 700 Band



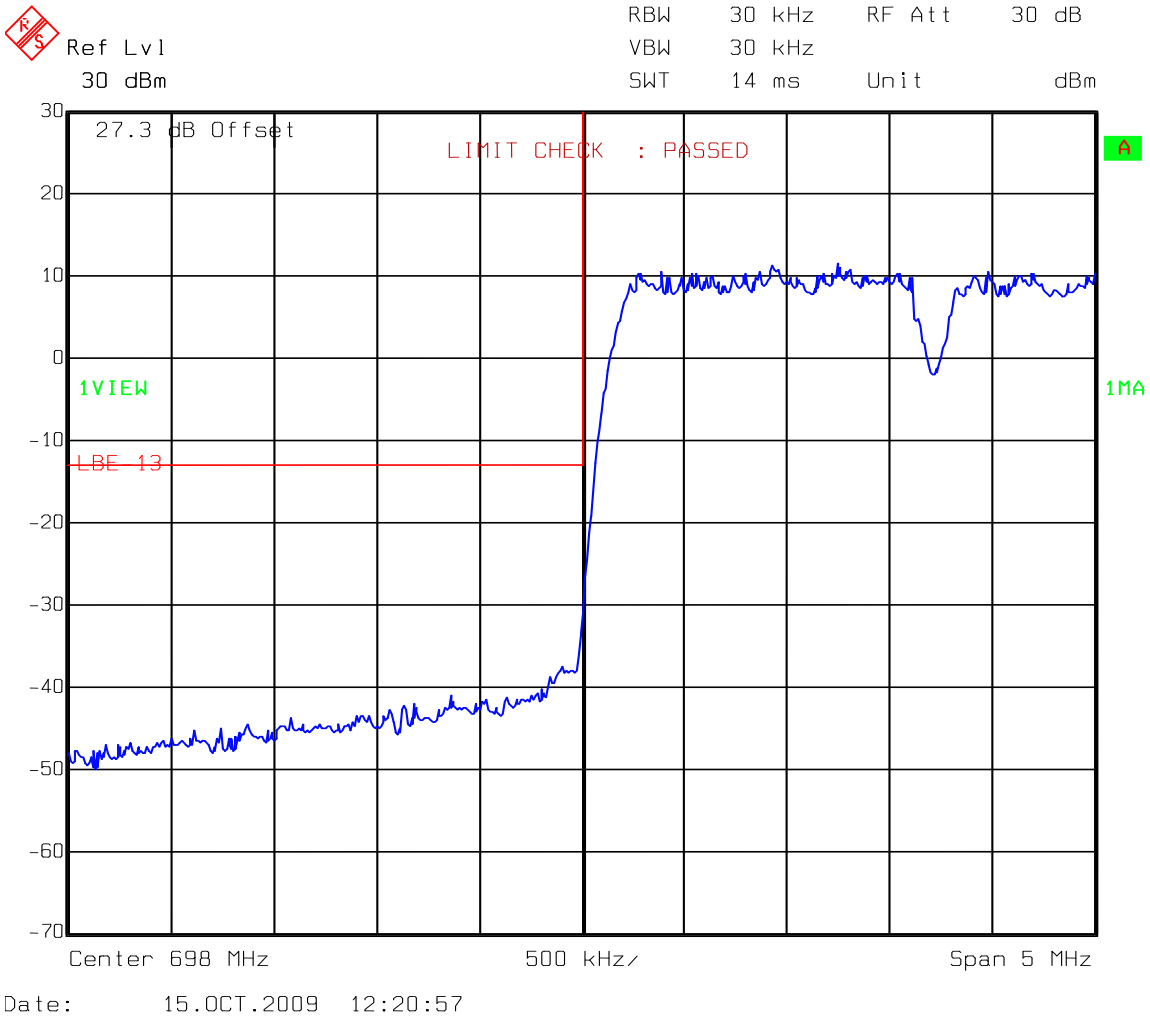
Test Data – Spurious Emissions at Antenna Terminals

High Band Edge
Downlink
Lower 700 Band



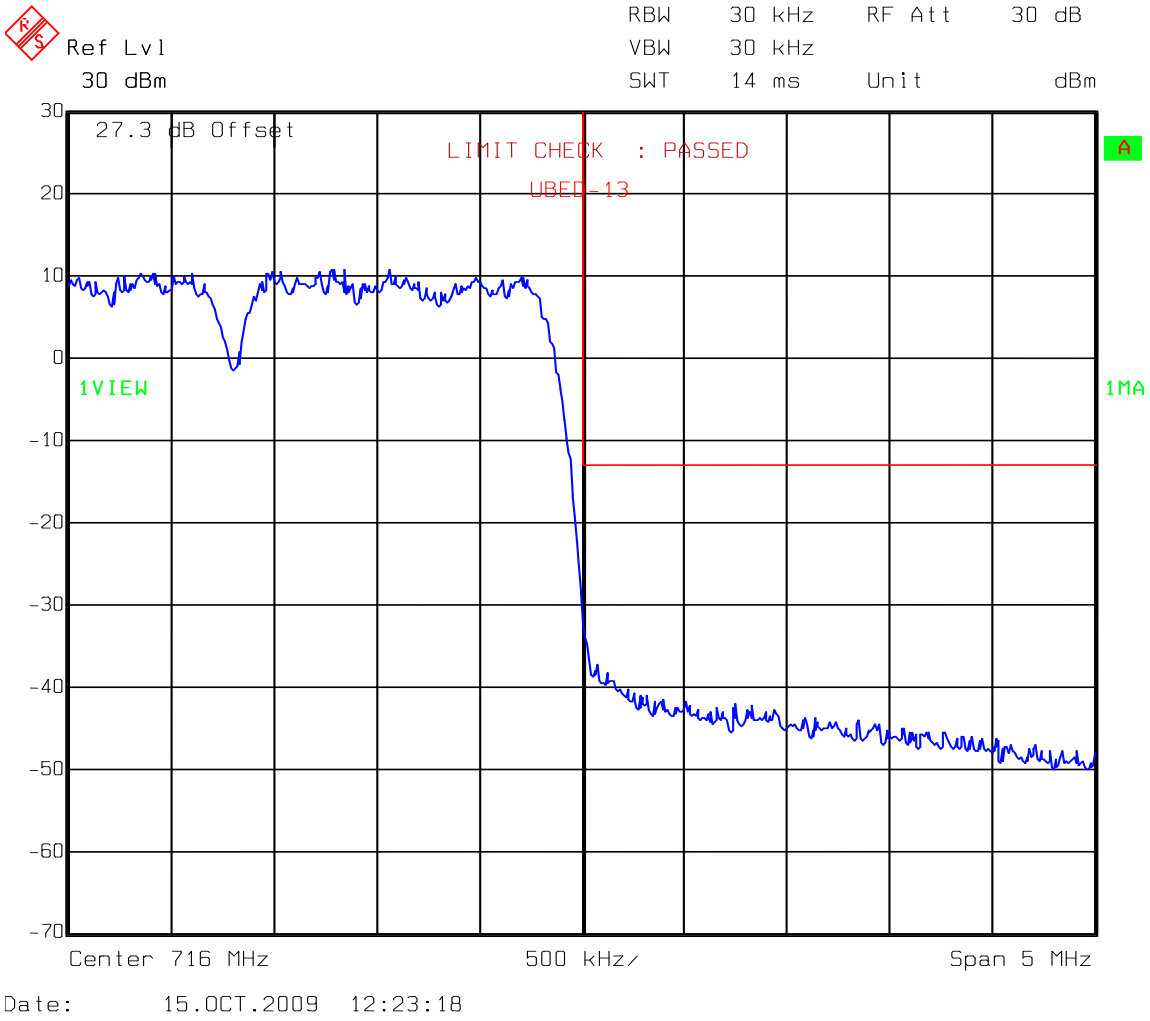
Test Data – Spurious Emissions at Antenna Terminals

Low Band Edge
Uplink
Lower 700 Band



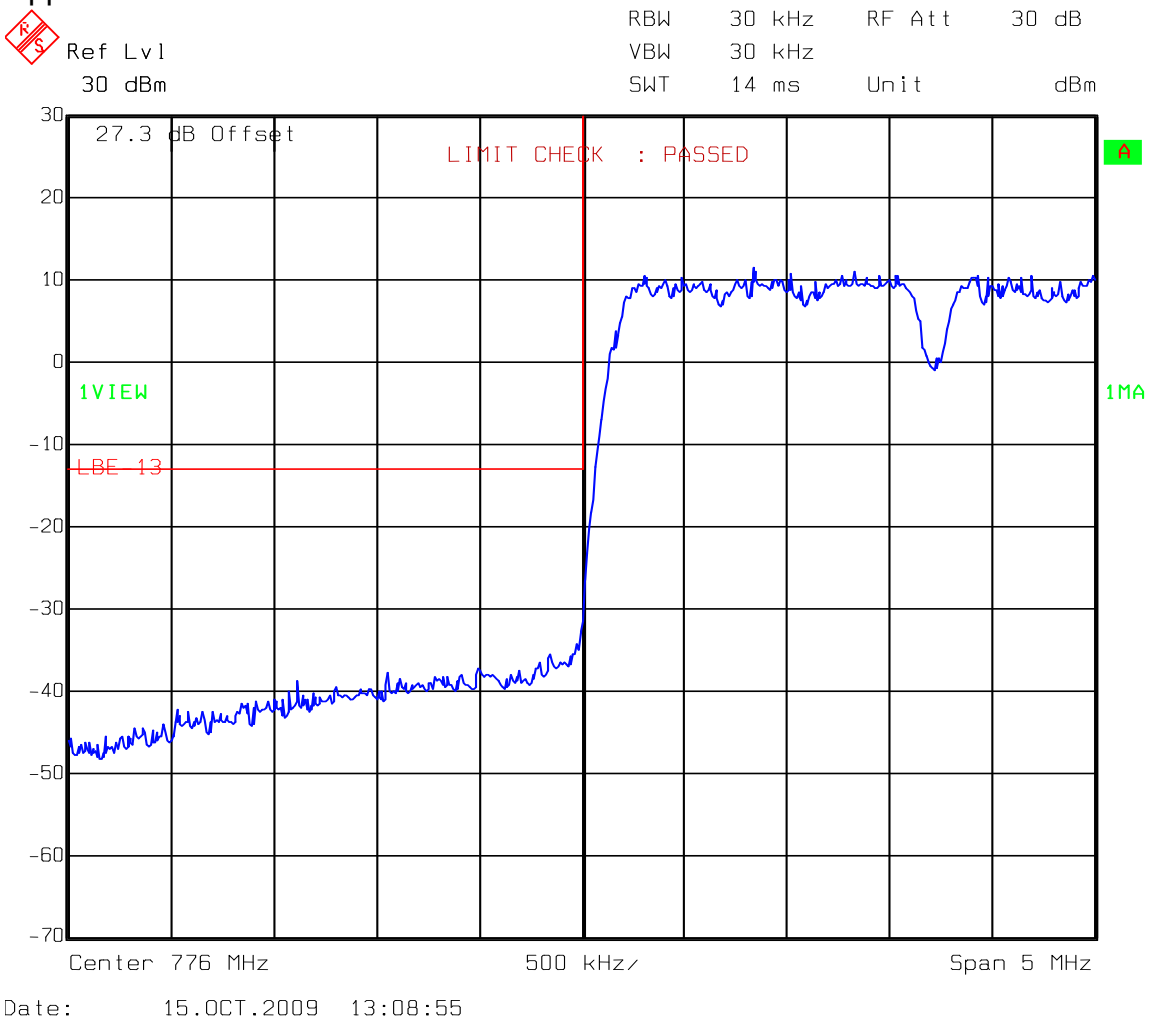
Test Data – Spurious Emissions at Antenna Terminals

High Band Edge
Uplink
Lower 700 Band



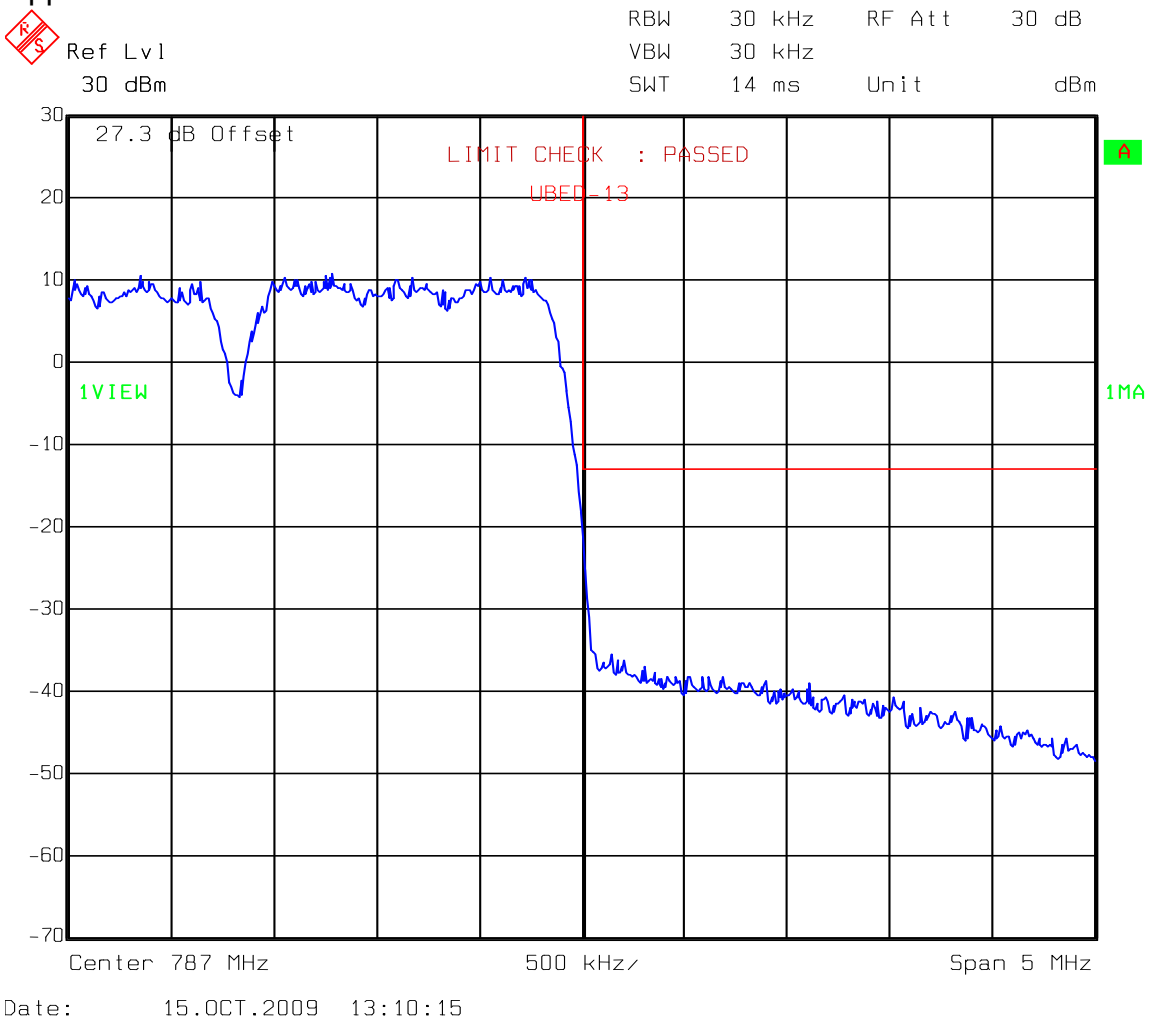
Test Data – Spurious Emissions at Antenna Terminals

Low Band Edge
Downlink
Upper 700 Band



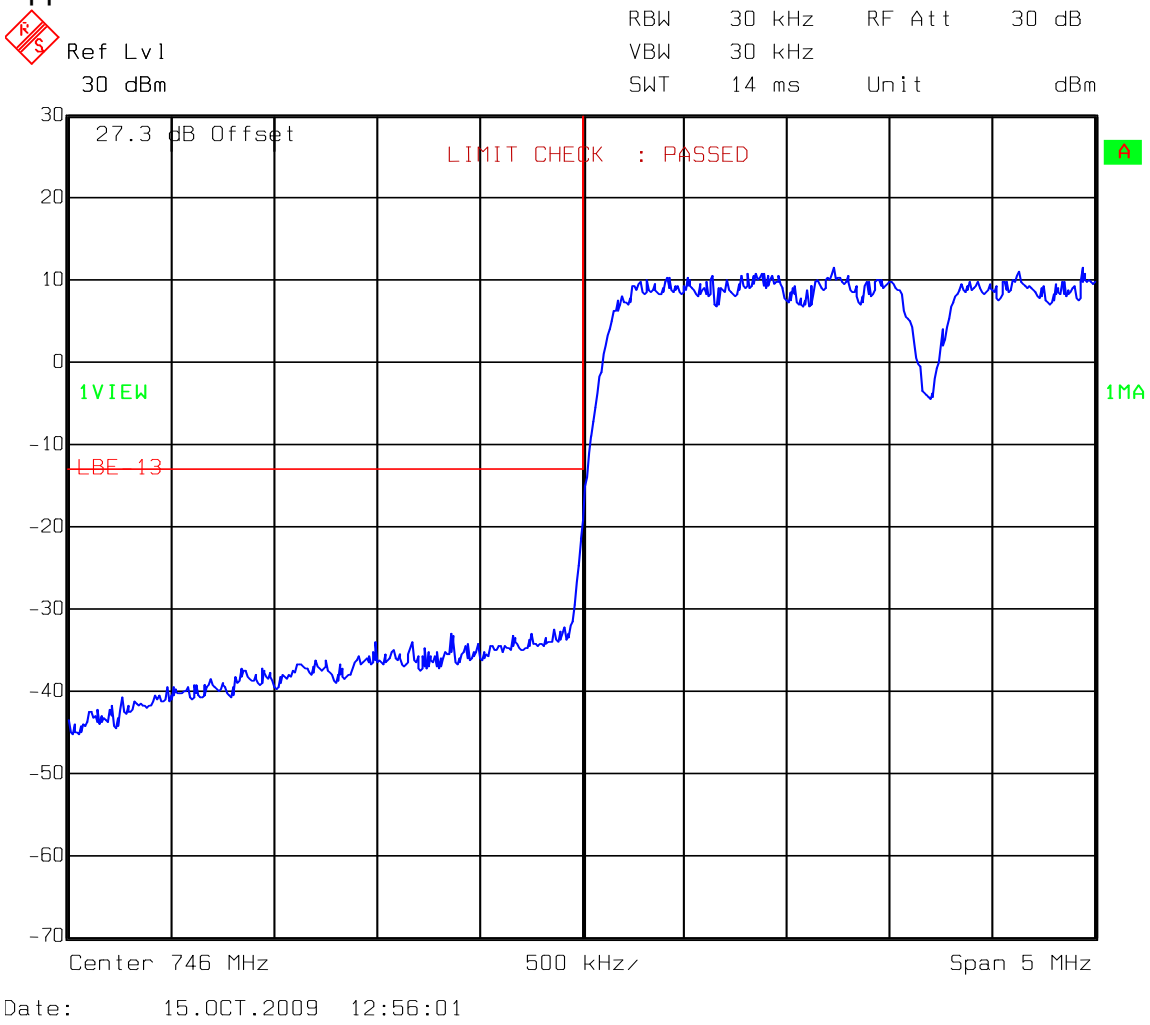
Test Data – Spurious Emissions at Antenna Terminals

High Band Edge
Downlink
Upper 700 Band



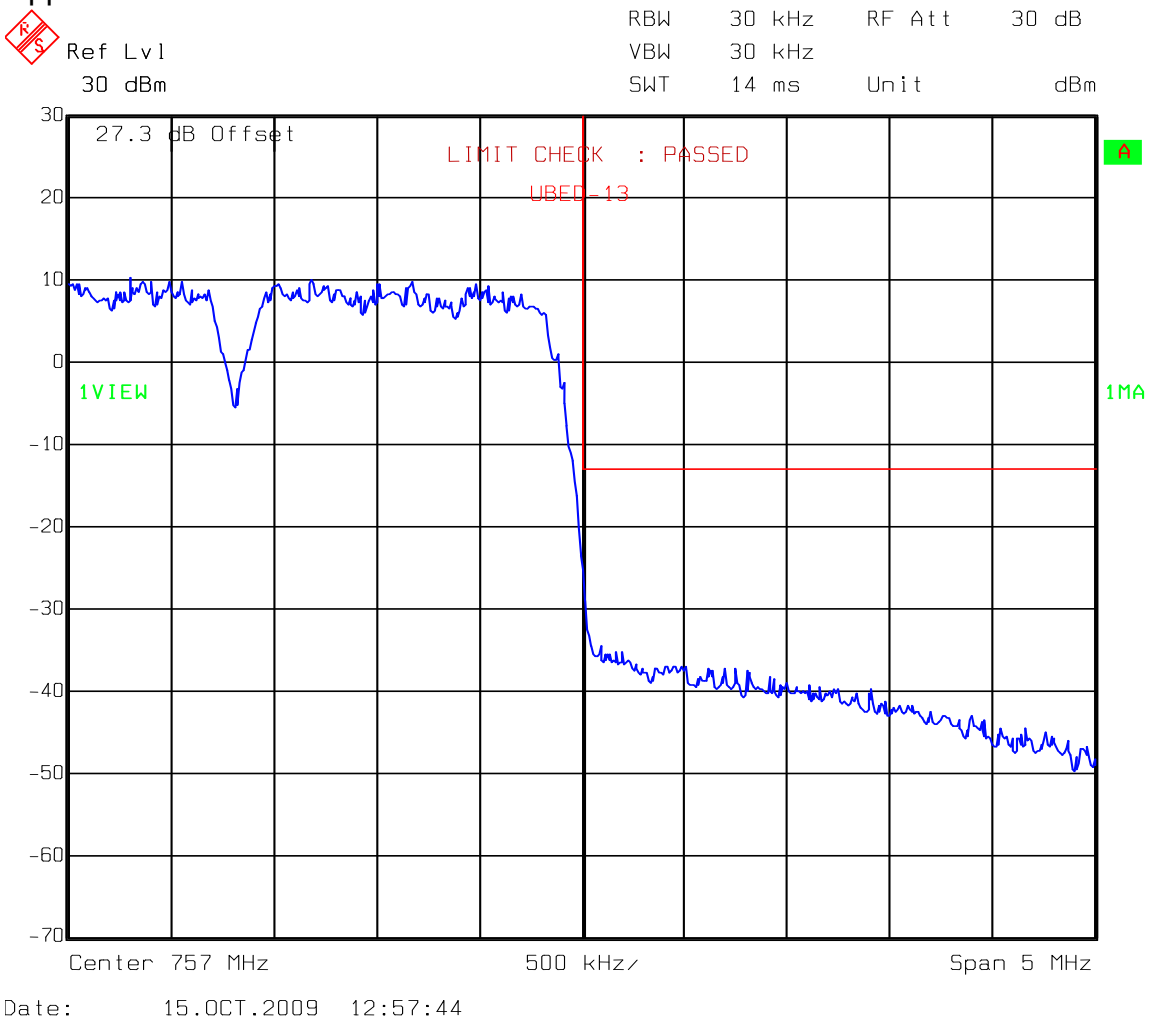
Test Data – Spurious Emissions at Antenna Terminals

Low Band Edge
Uplink
Upper 700 Band



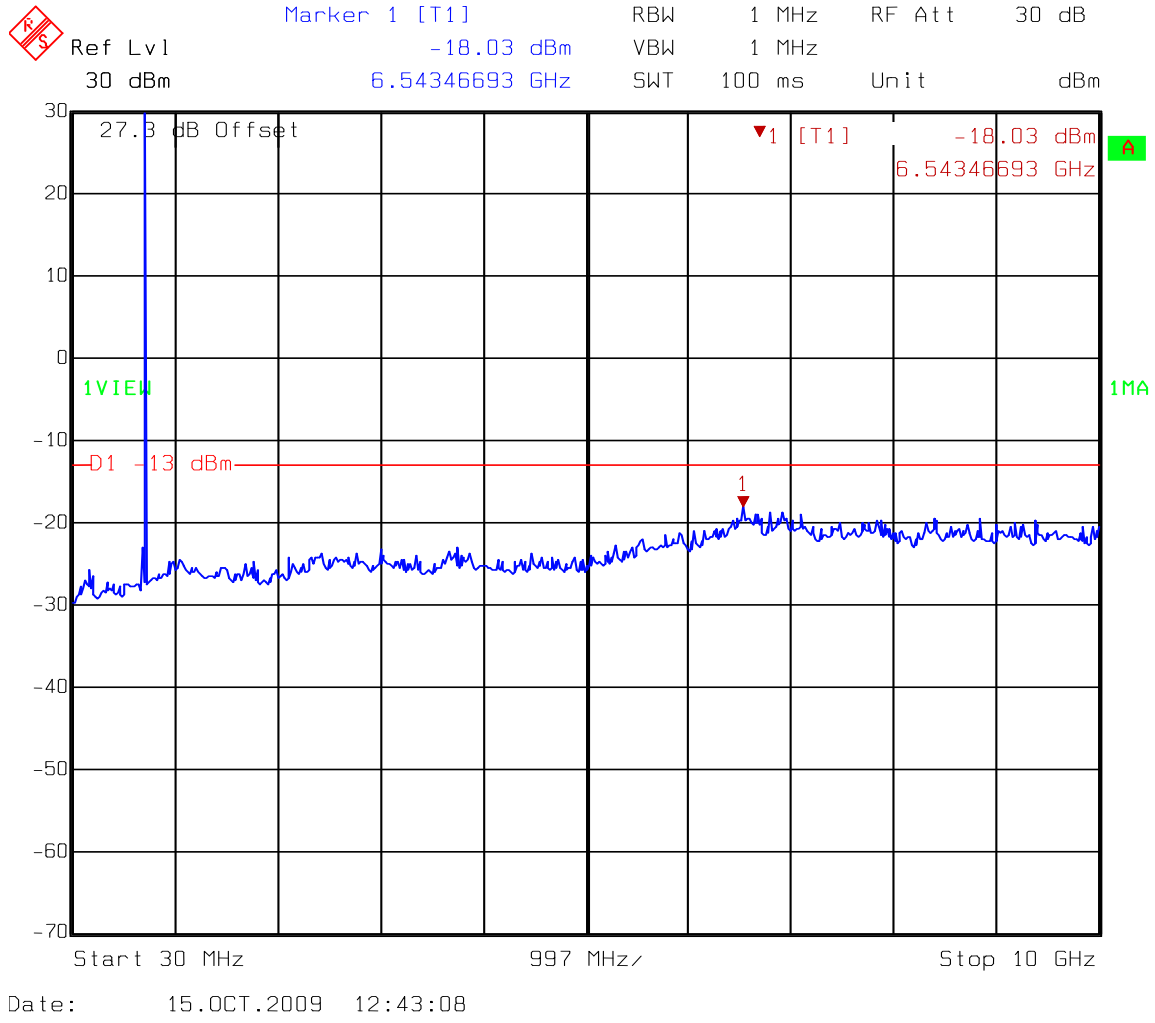
Test Data – Spurious Emissions at Antenna Terminals

High Band Edge
Uplink
Upper 700 Band



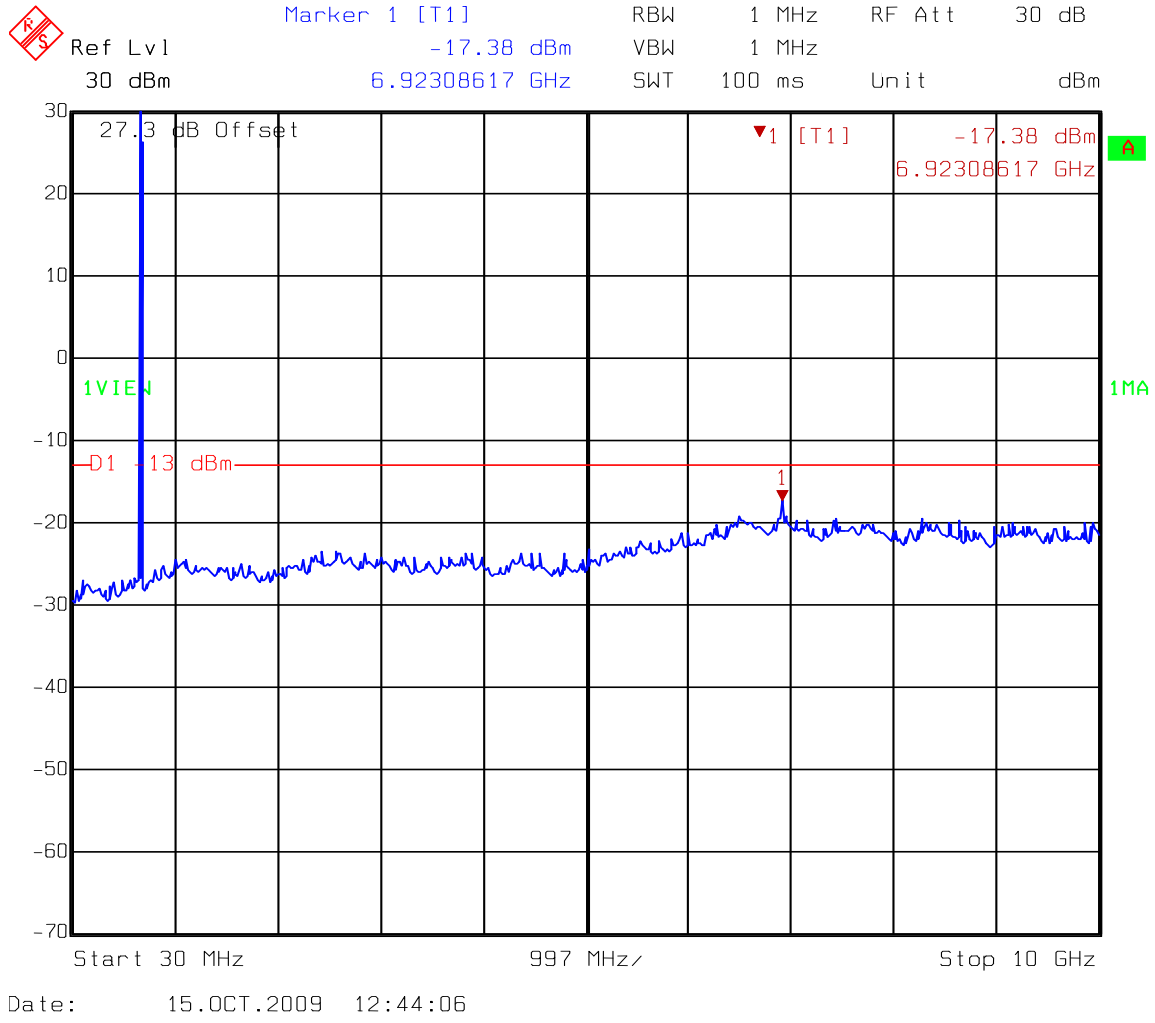
Test Data – Spurious Emissions at Antenna Terminals

SPURS
Downlink
Lower 700 Band



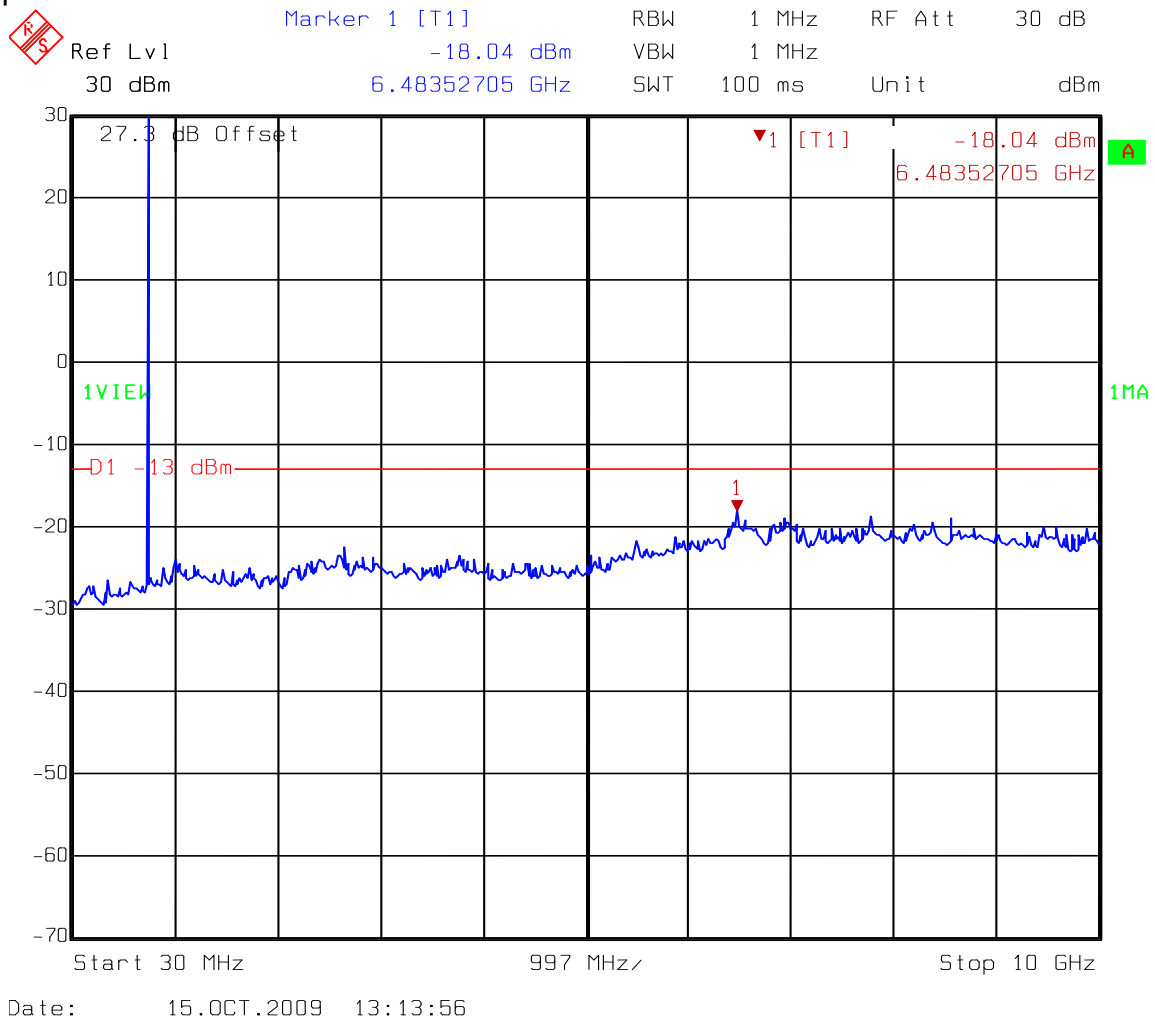
Test Data – Spurious Emissions at Antenna Terminals

SPURS
Uplink
Lower 700 Band



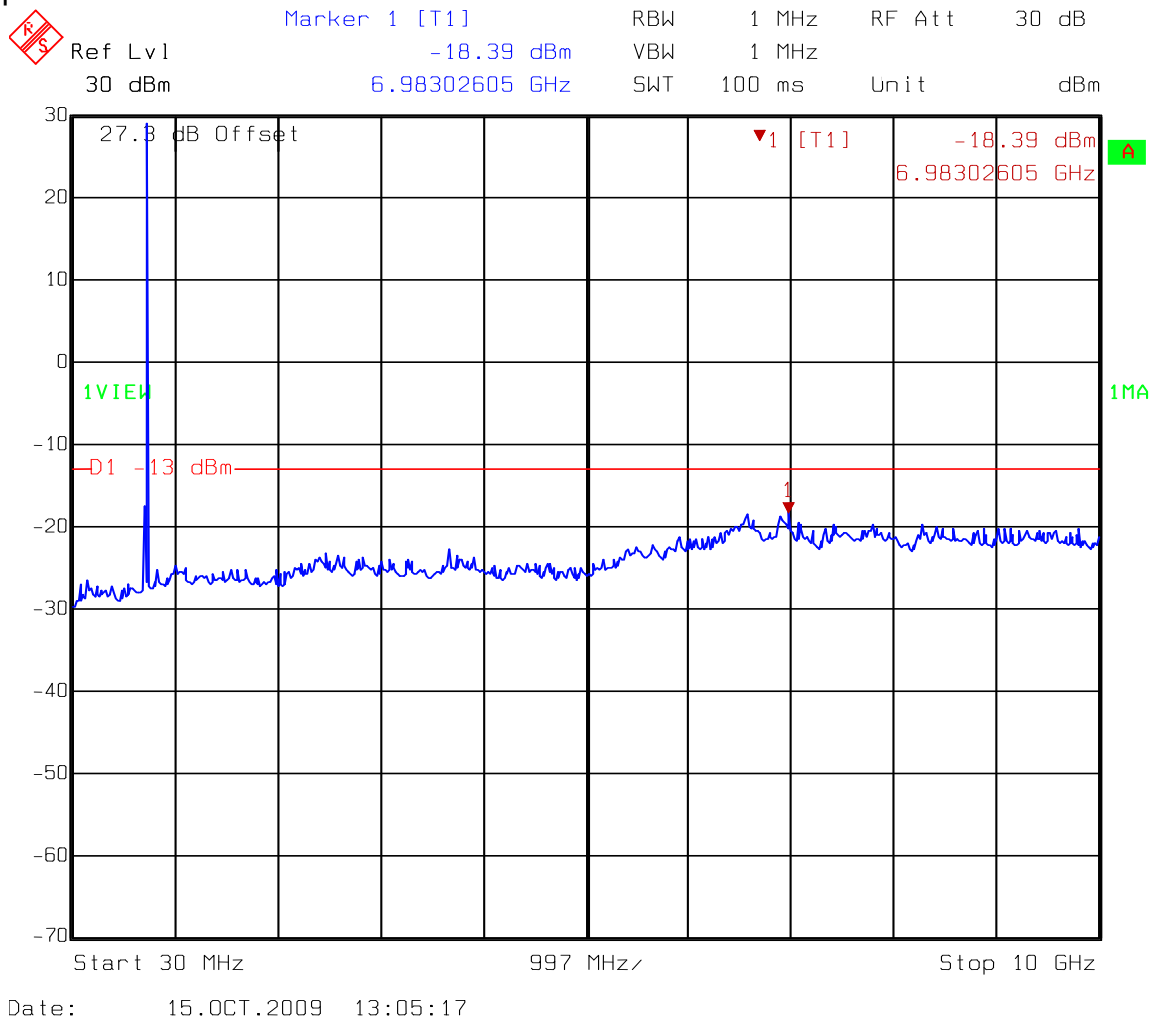
Test Data – Spurious Emissions at Antenna Terminals

SPURS
Downlink
Upper 700 Band



Test Data – Spurious Emissions at Antenna Terminals

SPURS
Uplink
Upper 700 Band



Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 27.53
TESTED BY: David Light	DATE: 16 October 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
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
993	Horn antenna	A.H. Systems SAS-200/571	XXX	08/31/09	08/31/10
791	PREAMP, 25dB	Nemko USA, Inc. LNA25	398	05/28/09	05/28/10
1763	Bilog Antenna	Schaffner CBL 6111D	22926	11/04/08	11/04/09

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 log10 (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: ≥ 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: ≥ RBW
Sweep: Auto
Video Avg: Disabled

TDMA

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

W-CDMA

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 50 kHz (< 1MHz from Band Edge)
VBW: ≥ 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.

NAME OF TEST: Field Strength of Spurious Radiation PARA. NO.: 27.53

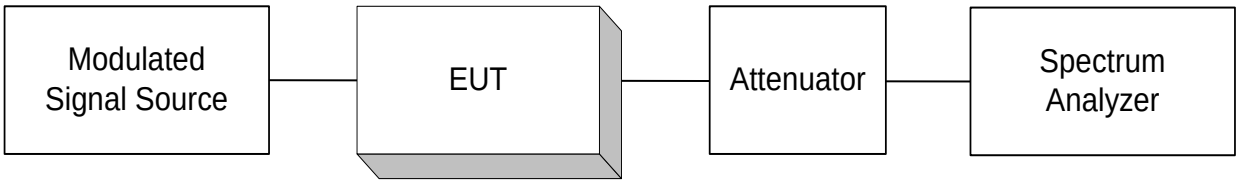
Minimum Standard: Para. No.27.53(g) For operations in the 1710-1755 MHz and 2110-2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 + 10 log10 (P) dB.

Method of Measurement TIA/EIA-603-1992

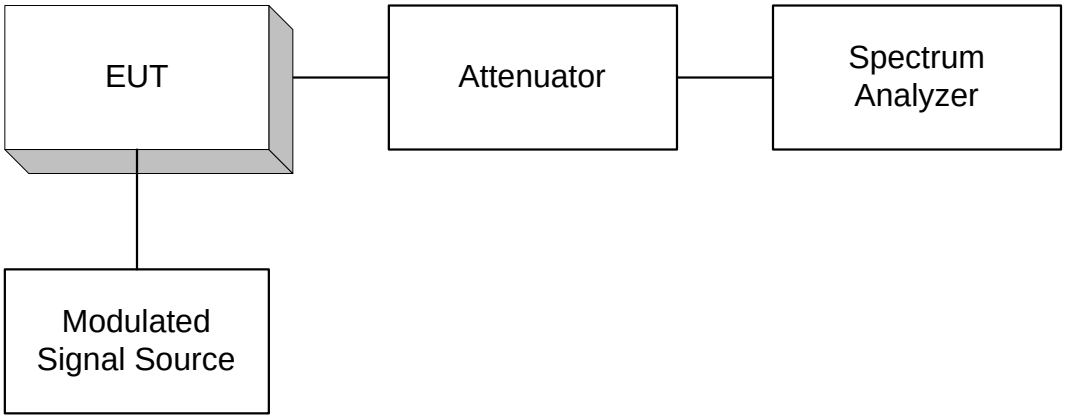
The antenna substitution method is used to determine the equivalent radiated power at spurious frequencies. The spurious emissions are measured at a distance of 3 meters. The EUT is then replaced with a reference substitution antenna with a known gain referenced to an isotropic radiator. This antenna 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

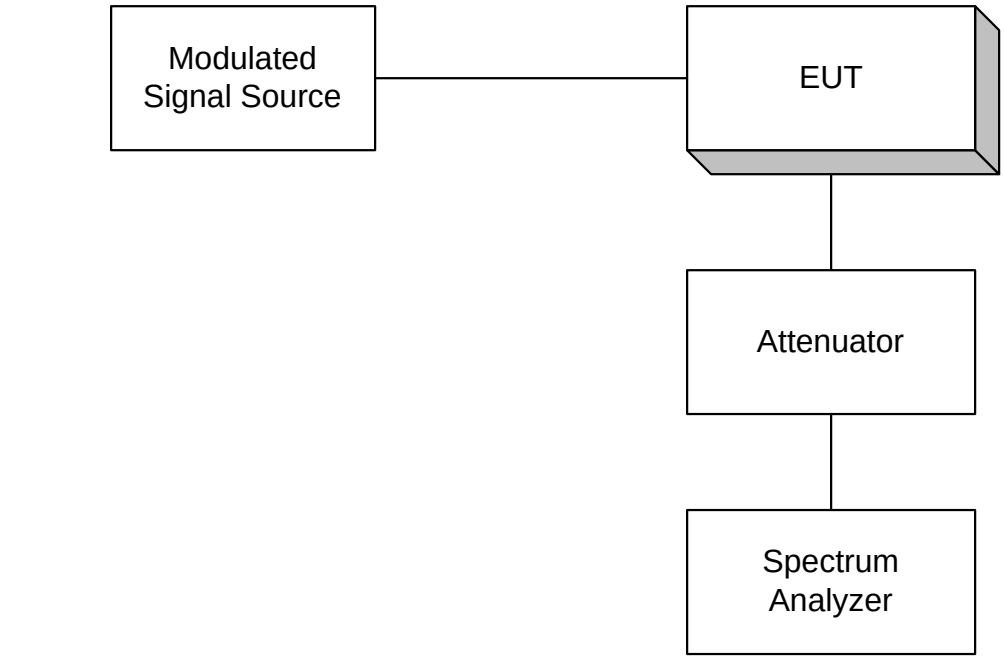
Para. No. 2.985 - R.F. Power Output

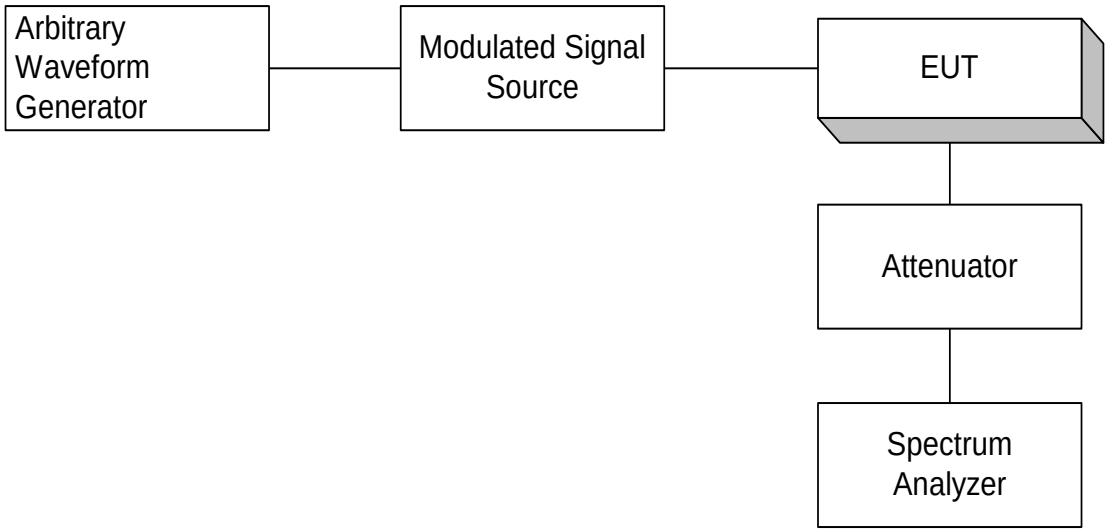


Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 Spurious Emissions at Antenna Terminals





Para. No. 2.993 - Field Strength of Spurious Radiation