Nemko Test Report:	16266RUS1
Applicant:	Andrew Corporation 108 Rand Park Drive Garner, NC 27529 USA
Equipment Under Test: (E.U.T.)	AF1937
In Accordance With:	**CFR 47, Part 24, Subpart E** Broadband PCS Repeaters
Tested By:	Nemko USA, Inc. 802 N. Kealy Lewisville, TX 75057-3136

TESTED BY: _____ **DATE:** 20 October, 2008

David Light, Senior Wireless Engineer

APPROVED BY: _____ **DATE:** 27 October, 2008

Tom Tidwell, Telecom Direct

Number of Pages: 60

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Section 1. Summary of Test Results

Manufacturer Andrew Corporation

Model No.: AF1937

Serial No.: 13

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 24, Subpart E.

☒	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	24.232	100W	Complies
Occupied Bandwidth	2.1049	Input/Output	Complies
Spurious Emissions at Antenna Terminals	24.238(a)	-13 dBm	Complies
Field Strength of Spurious Emissions	24.238(a)	-13 dBm E.I.R.P.	Complies
Frequency Stability	24.235		NA

Footnotes:

(1) Modulation characteristics were not tested since the E.U.T. processes but does not produce a modulated waveform.
(2) Frequency stability was not performed because the device under test uses a common oscillator for down-conversion of the signal to an intermediate frequency and up-conversion of the signal from IF to the transmit frequency. The output frequency is the same as the input frequency.

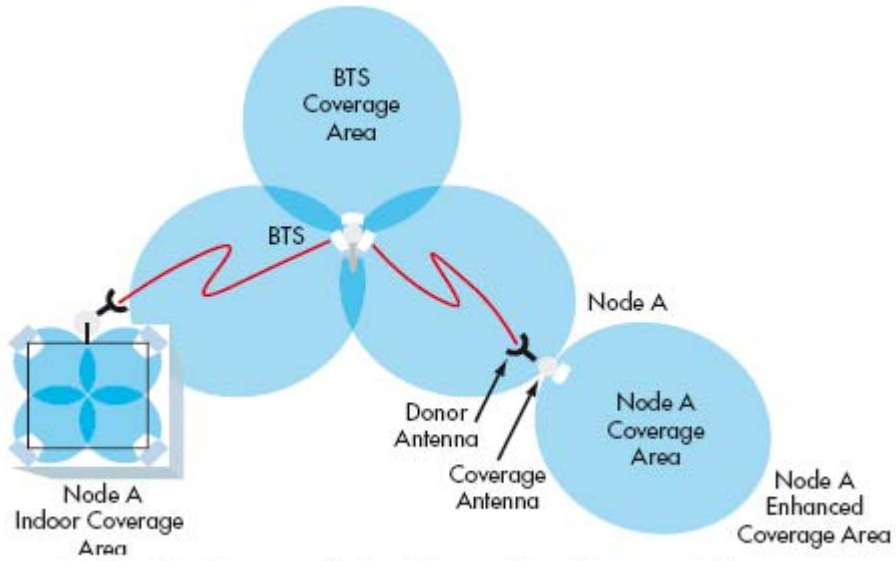
Section 2. General Equipment Specification

Supply Voltage Input:		120 Vac
Frequency Bands:	**Downlink:**	☒ Block A : 1930 – 1945 MHz ☒ Block D : 1945 – 1950 MHz ☒ Block B : 1950 – 1965 MHz ☒ Block E : 1965 – 1970 MHz ☒ Block F : 1970 – 1975 MHz ☒ Block C : 1975 – 1990 MHz
Frequency Bands:	**Uplink:**	☒ Block A : 1850 – 1865 MHz ☒ Block D : 1865 – 1870 MHz ☒ Block B : 1870 – 1885 MHz ☒ Block E : 1885 – 1890 MHz ☒ Block F : 1890 – 1895 MHz ☒ Block C : 1895 – 1910 MHz
Type of Modulation and Designator:		**CDMA (F9W)** ☒ **GSM (GXW)** ☒ **W-CDMA (F9W)** ☒ **EDGE (G7W)** ☒
System Gain:		94 dB
Output Impedance:		50 ohms
RF Output (Rated):	**Uplink**	5.0 W 37 dBm
RF Output (Rated):	**Downlink**	0.50 W 27 dBm
Frequency Translation:		**F1-F1** ☒ **F1-F2** ☐ **N/A** ☐
Band Selection:		**Software** ☒ **Duplexer** ☐ **Fullband** ☐

Description of EUT

The Node A is an RF enhancer which is capable of filtering and amplifying a multitude of distinct sub-bands up to 120 MHz in total anywhere within multiple frequency bands. It is designed to be part of the primary infrastructure

System Diagram



Scenario: Extending Coverage for buildings and small coverage holes

Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 24.232
TESTED BY: David Light	DATE: 20 October 2008

Test Results: Complies.

Measurement Data:

Direction	Modulation	Composite Power (dBm)	RF Power (W)
Downlink	CDMA	37	5.0
	GSM	37	5.0
	EDGE	37	5.0
	WCDMA	37	5.0
Uplink	CDMA	30	1.0
	GSM	30	1.0
	EDGE	30	1.0
	WCDMA	30	1.0

Equipment Used: 1604-1064-1082-1659

Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 48 %

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 24.238
TESTED BY: David Light	DATE: 06 October 2008

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1064-1604-1082-1659

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

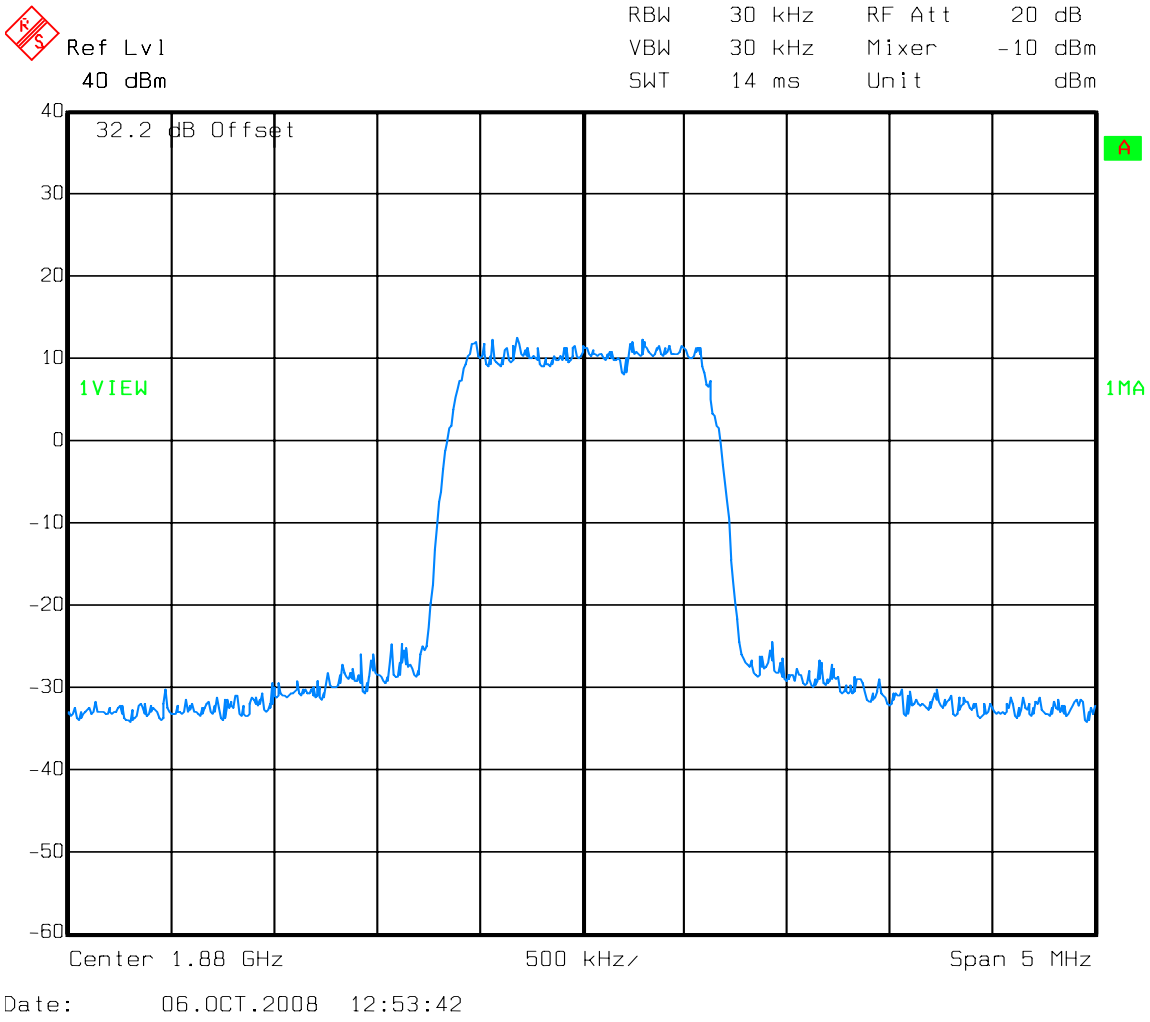
Temperature: 22 °C

Relative Humidity: 48 %

Test Data – Occupied Bandwidth

Output – Uplink

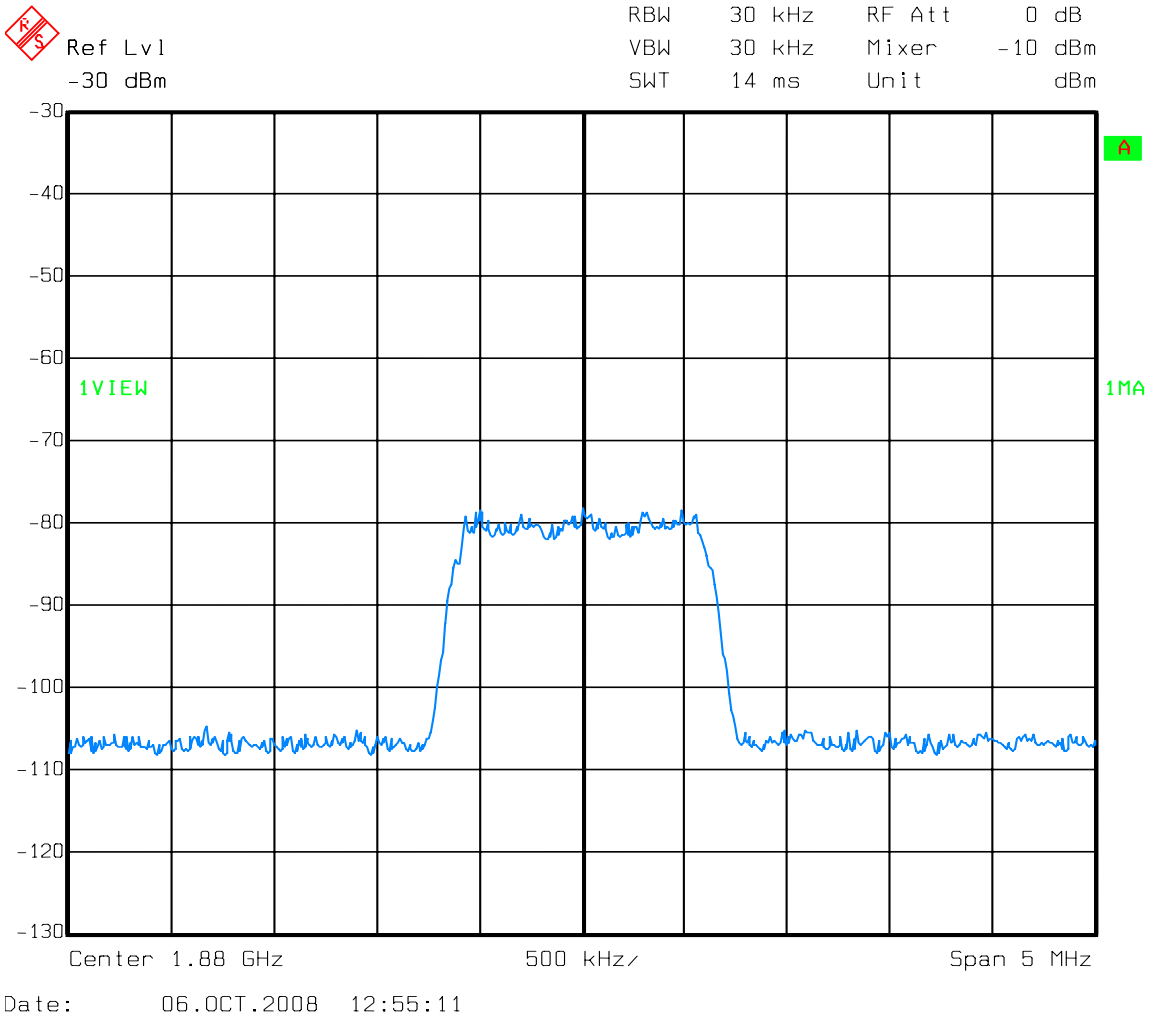
CDMA / EVDO



Test Data – Occupied Bandwidth

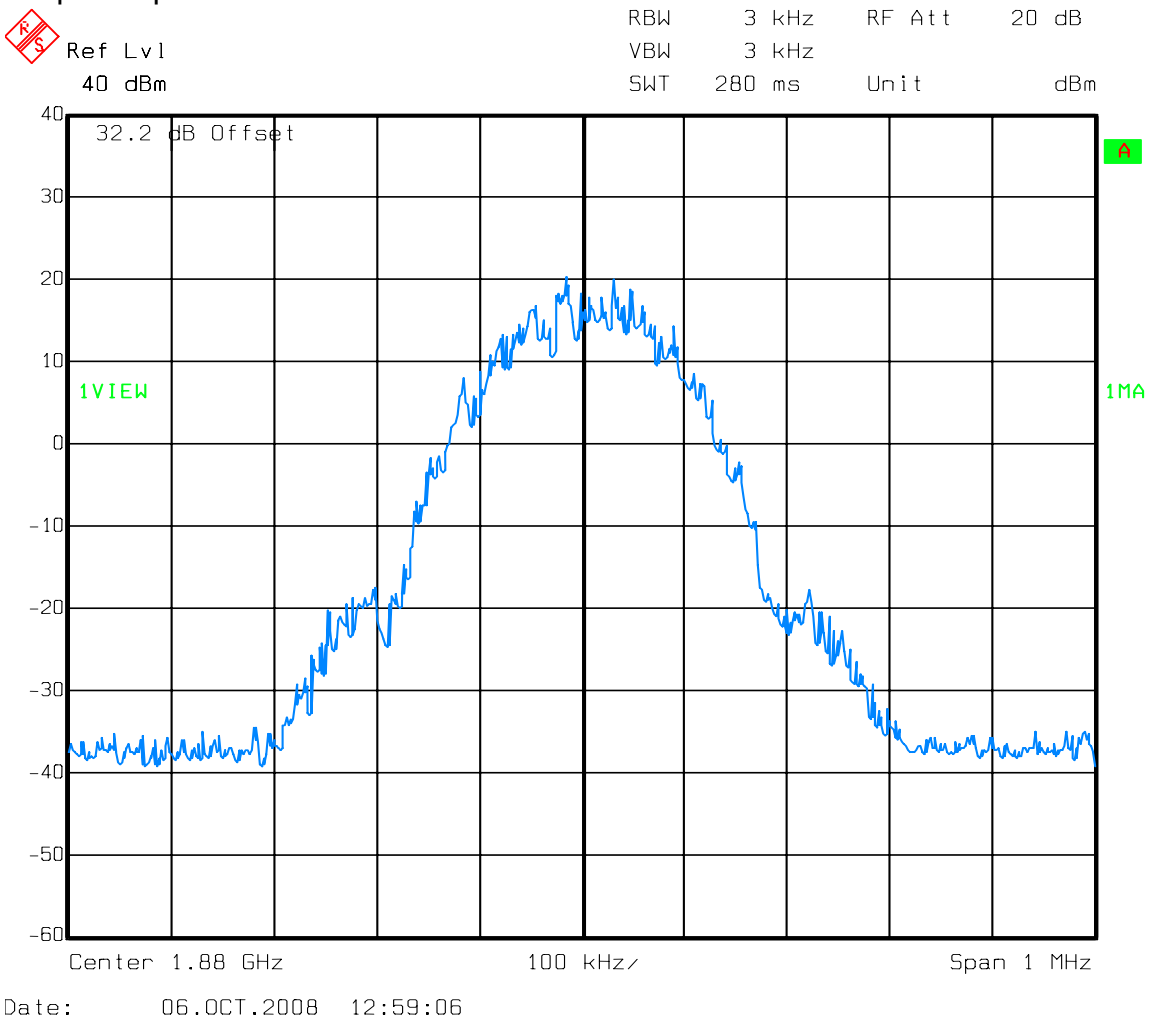
Input – Uplink

CDMA / EVDO



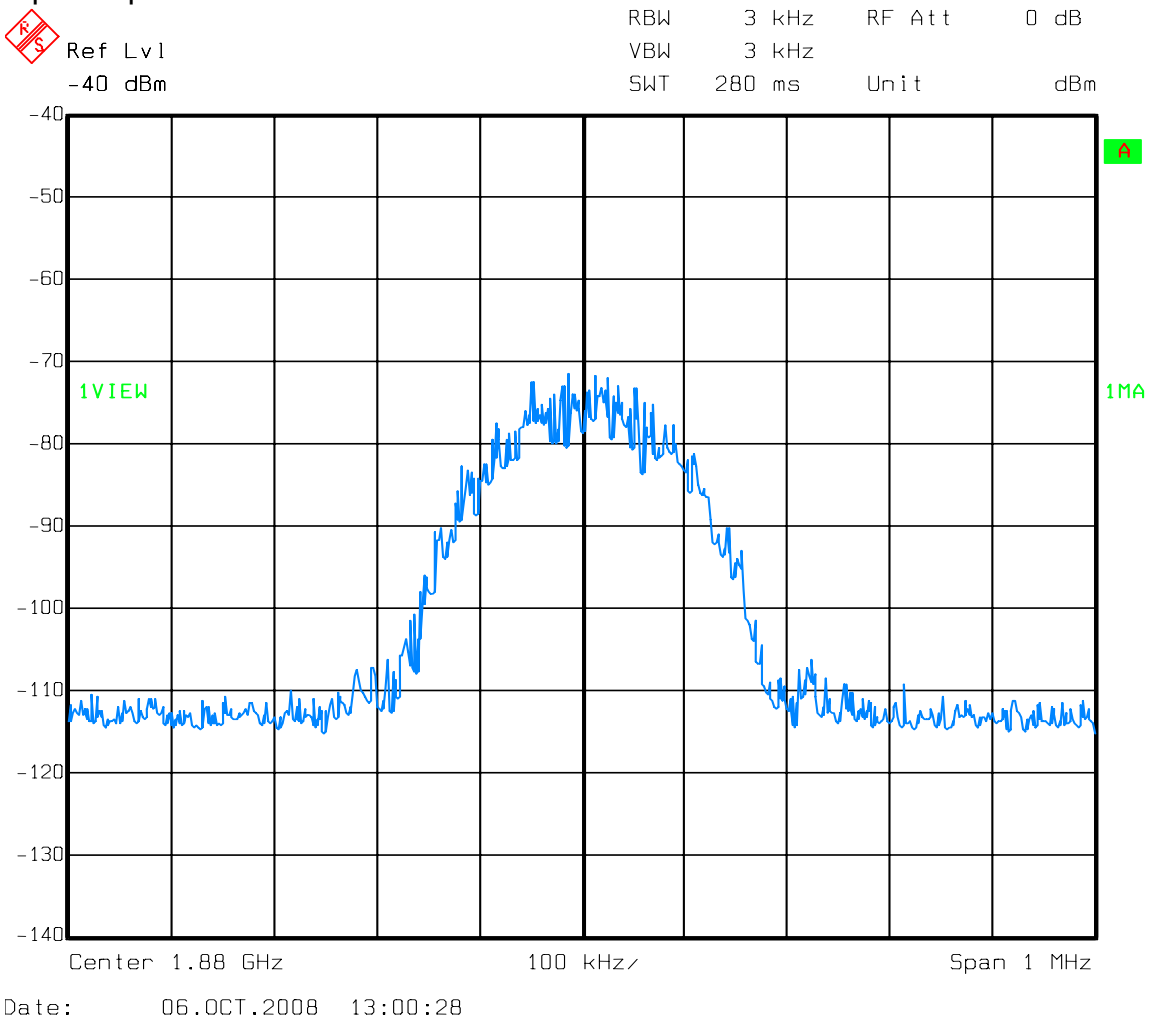
Test Data – Occupied Bandwidth

GSM
Output - Uplink



Test Data – Occupied Bandwidth

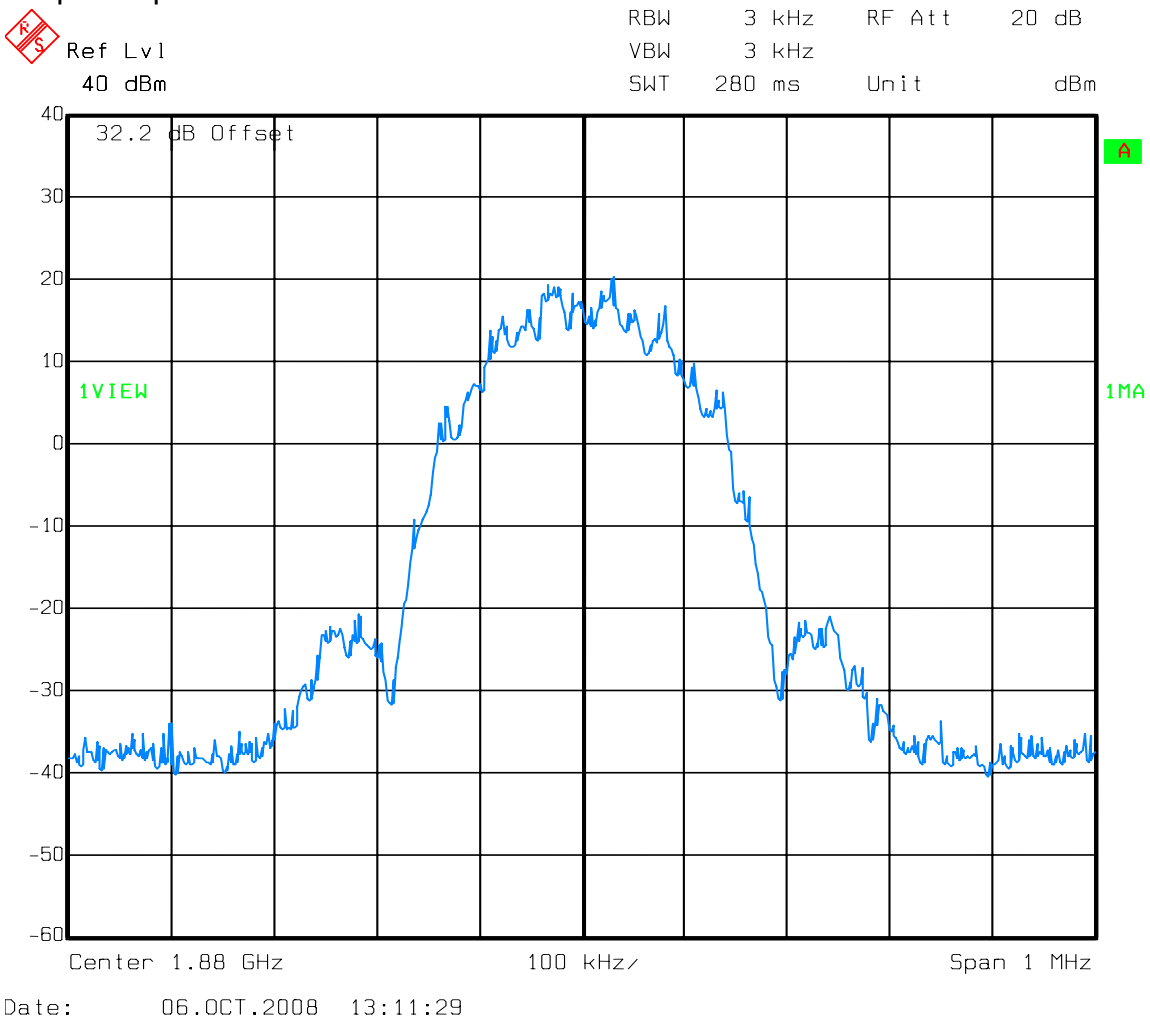
GSM
Input - Uplink



Test Data – Occupied Bandwidth

EDGE

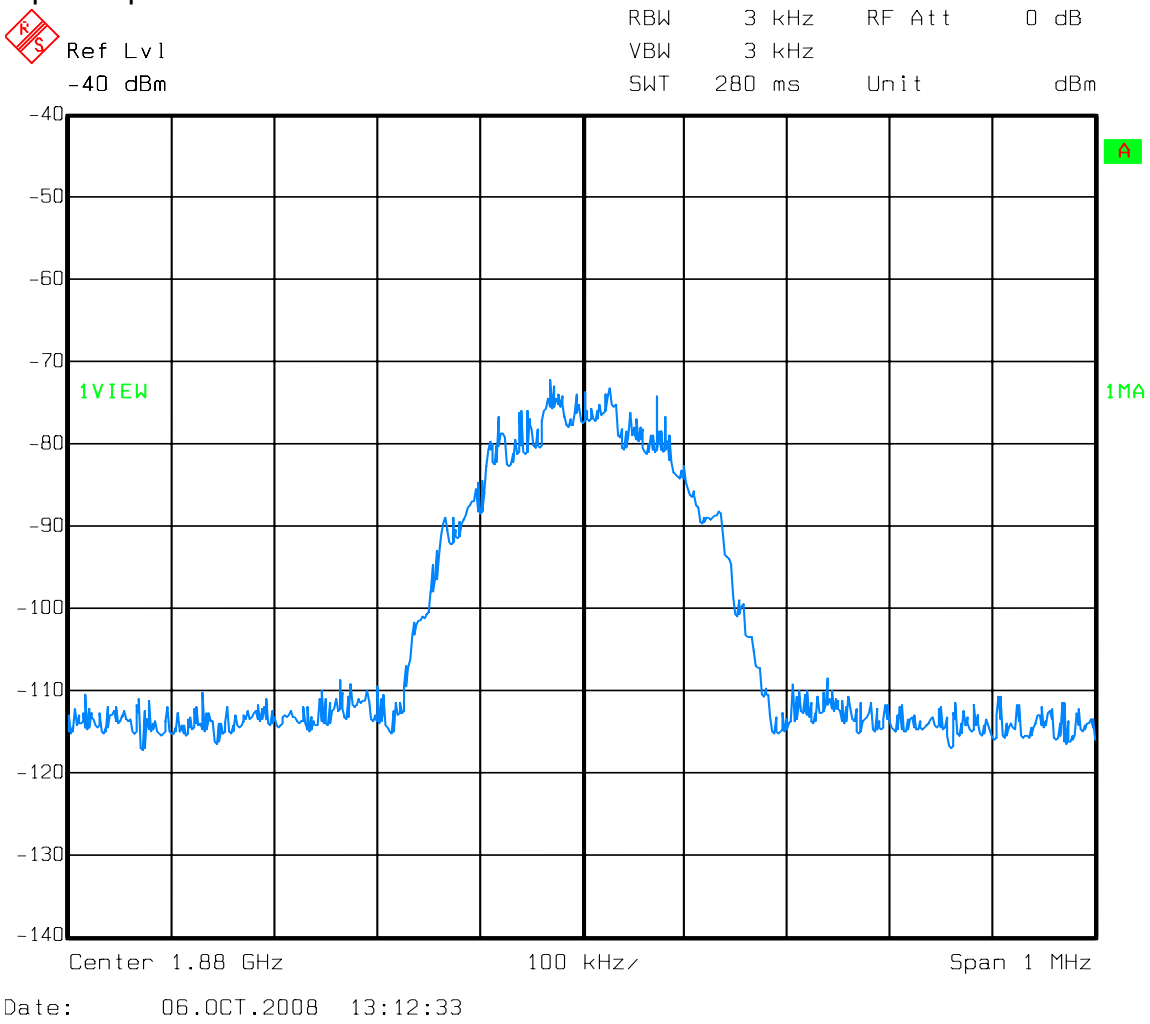
Output - Uplink



Test Data – Occupied Bandwidth

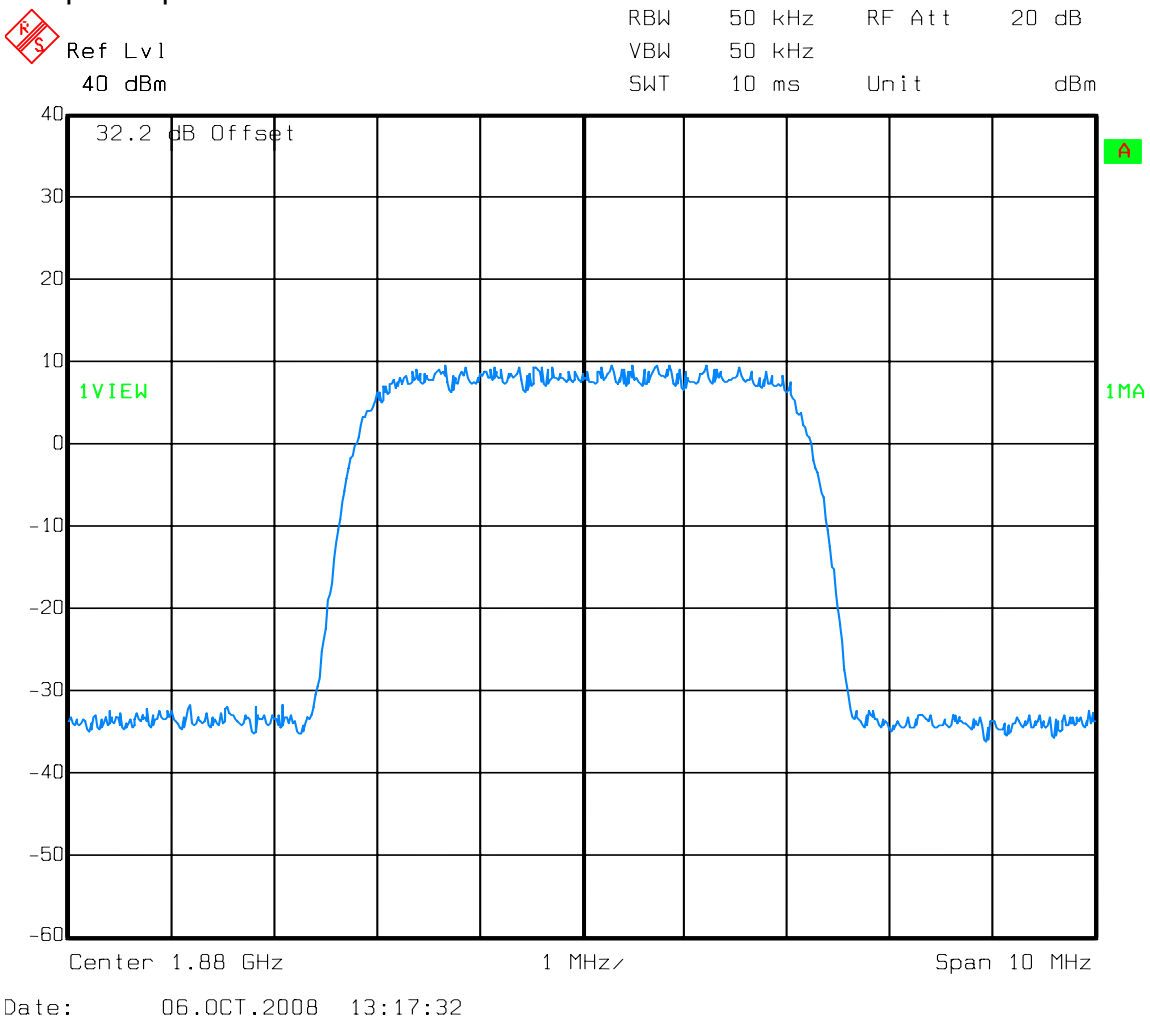
EDGE

Input - Uplink



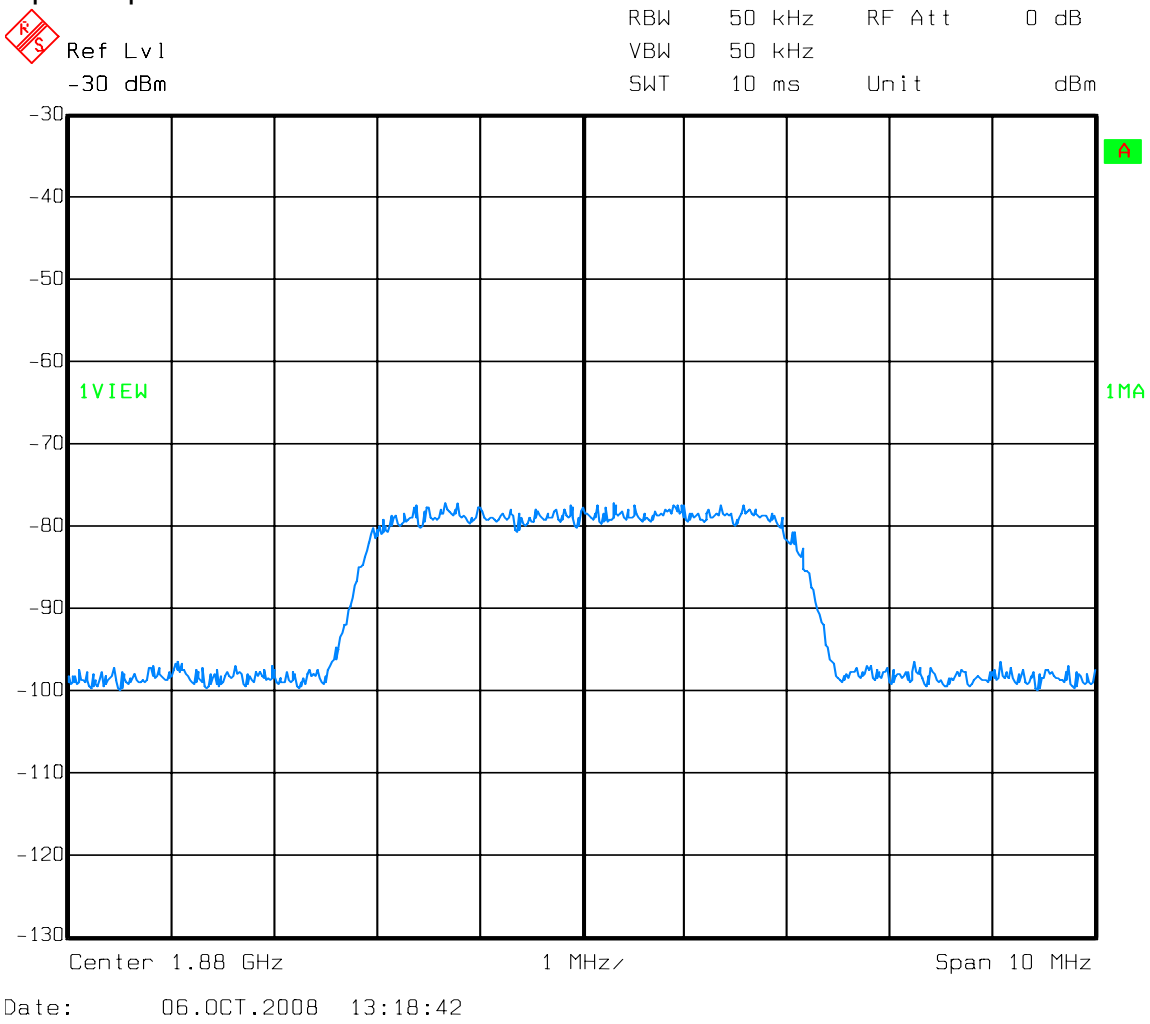
Test Data – Occupied Bandwidth

W-CDMA
Out put - Uplink



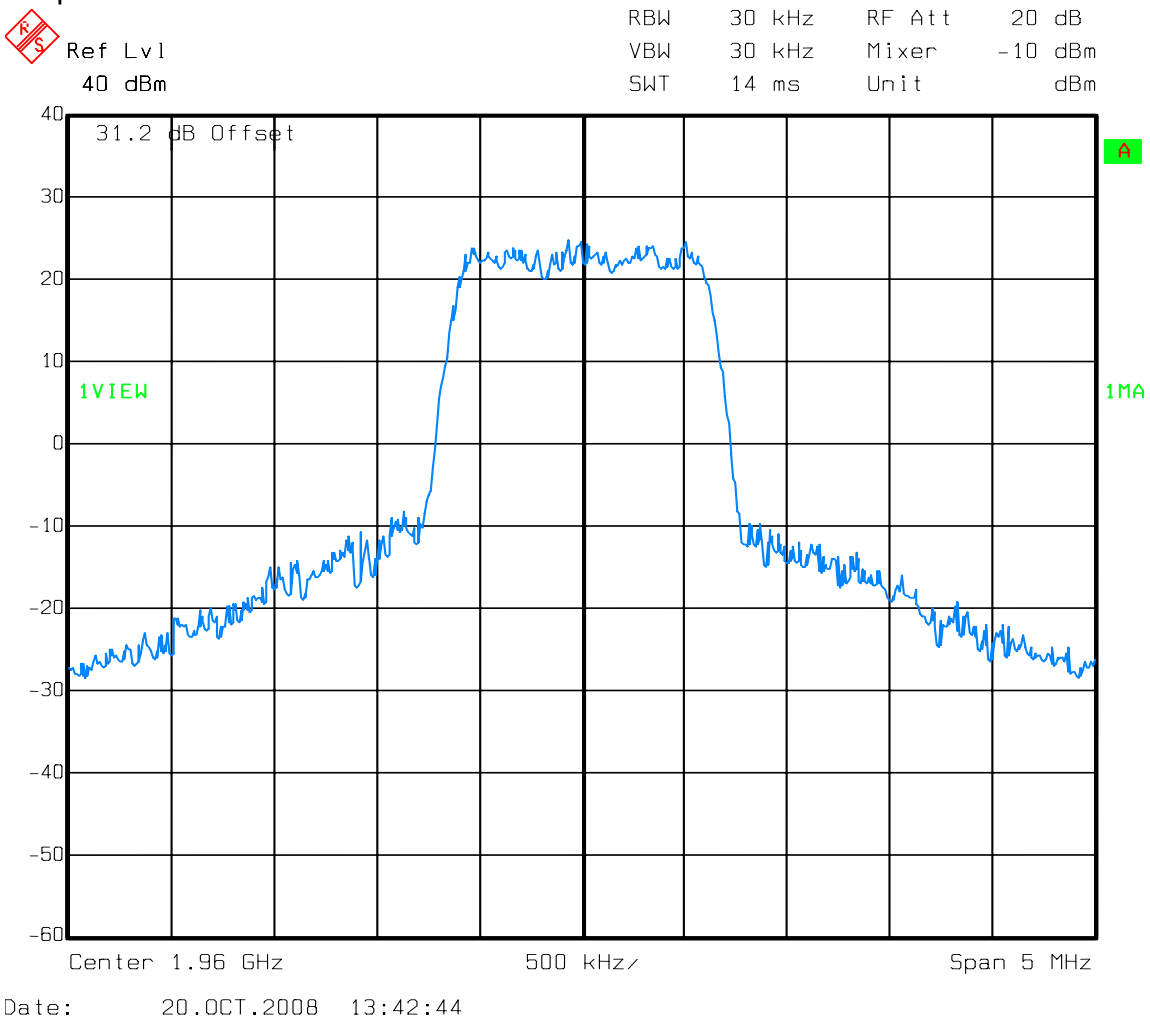
Test Data – Occupied Bandwidth

W-CDMA
Input - Uplink



Test Data – Occupied Bandwidth

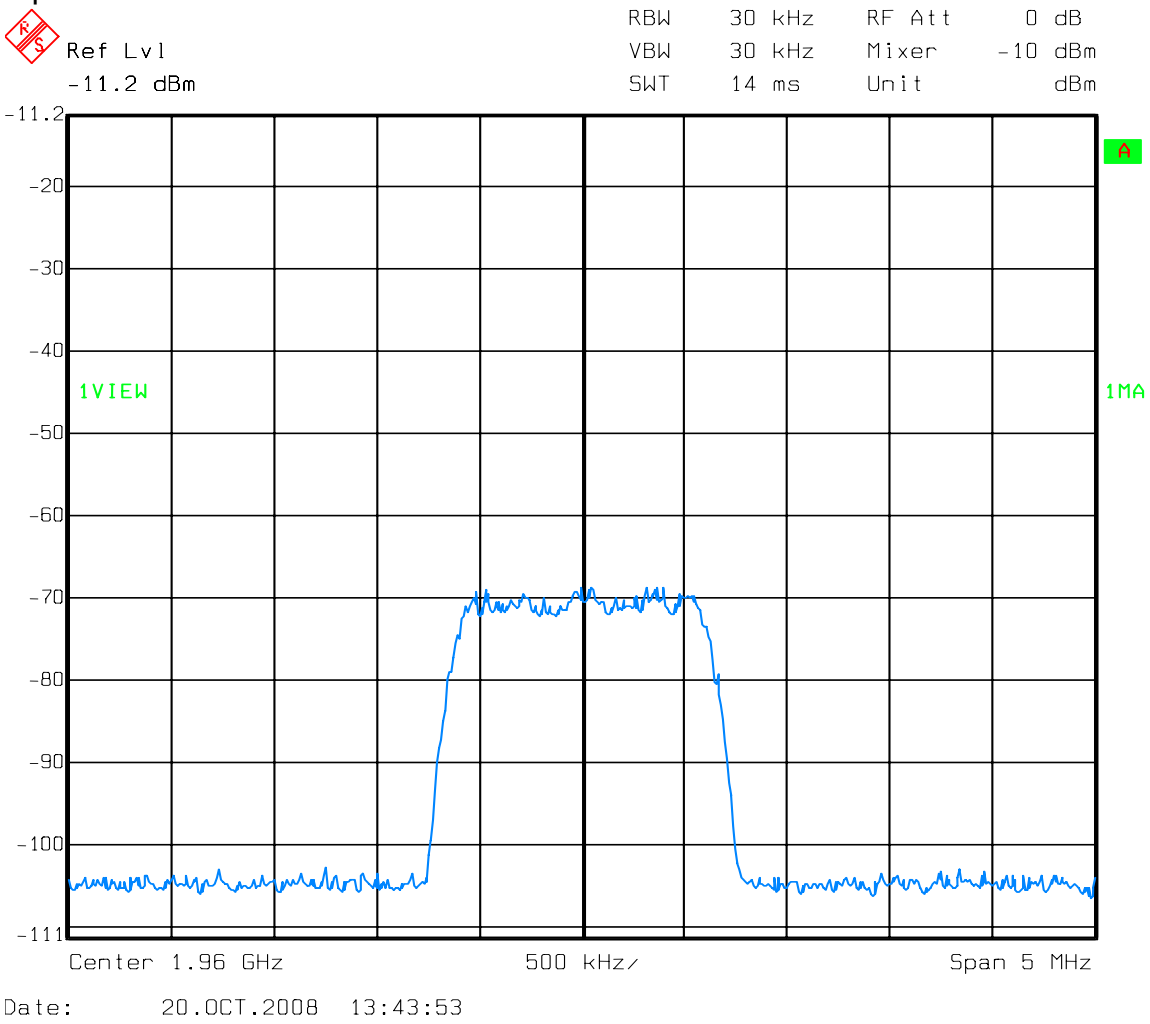
CDMA
Output - Downlink



Test Data – Occupied Bandwidth

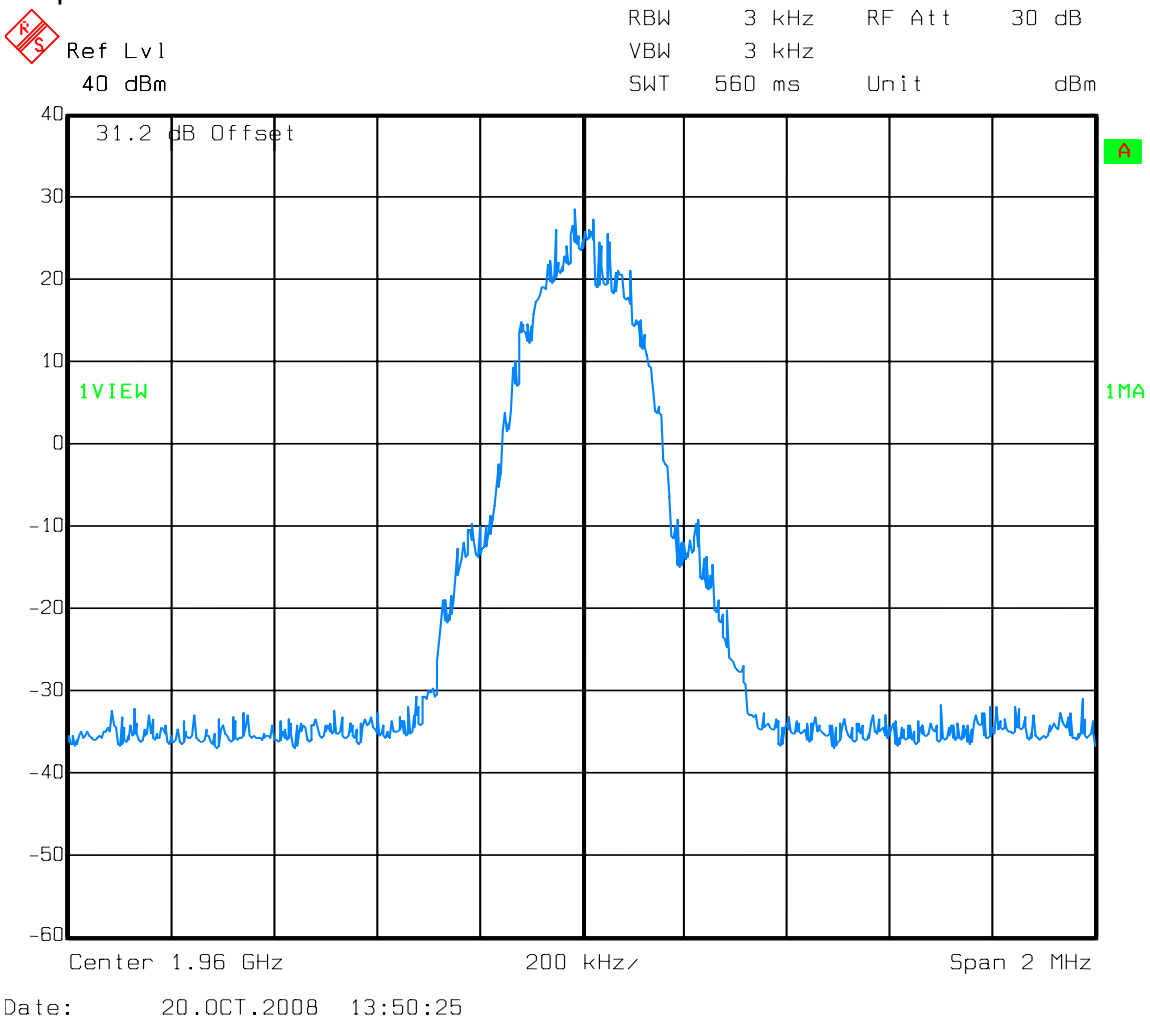
CDMA

Input - Downlink



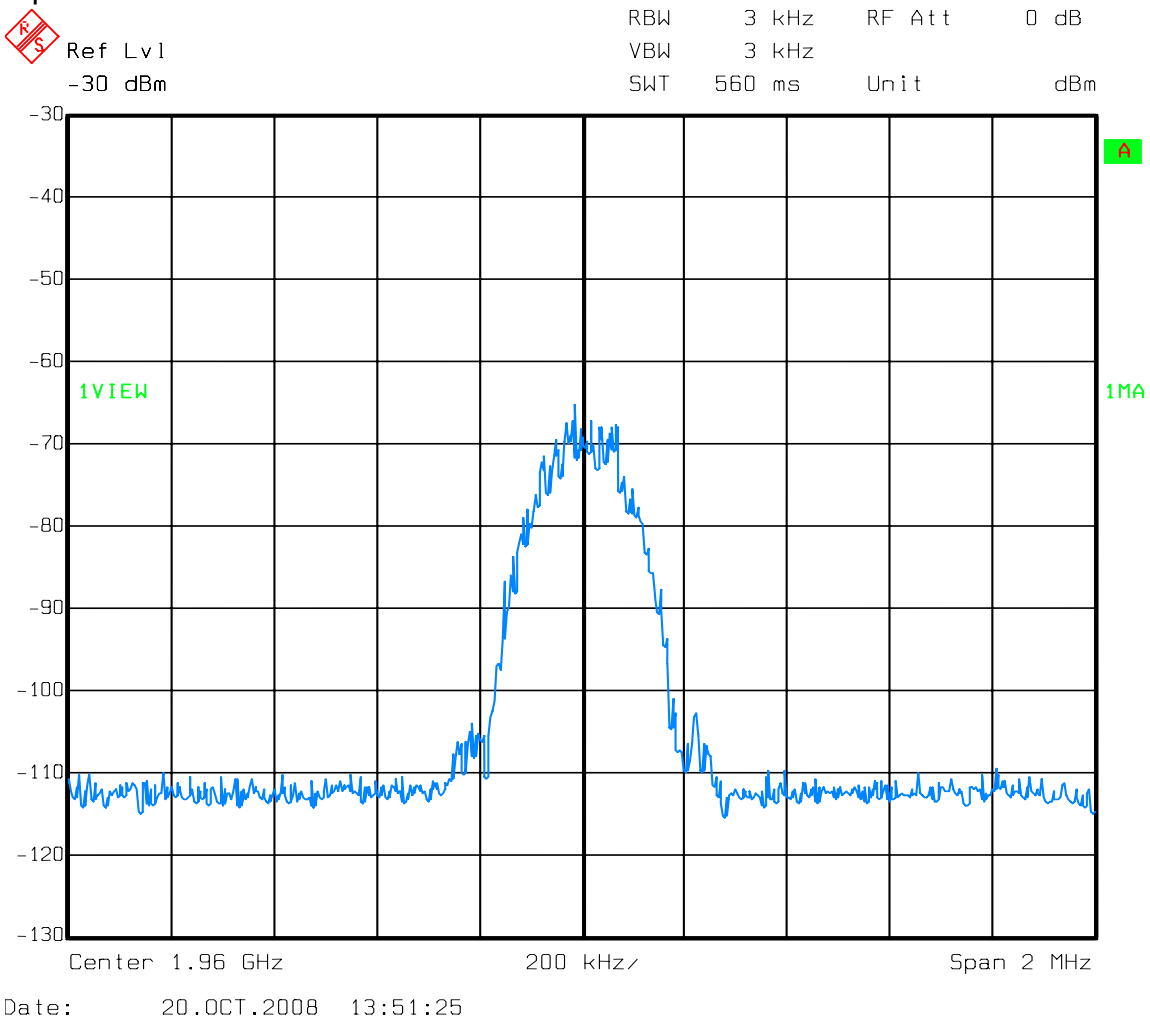
Test Data – Occupied Bandwidth

GSM
Output - Downlink



Test Data – Occupied Bandwidth

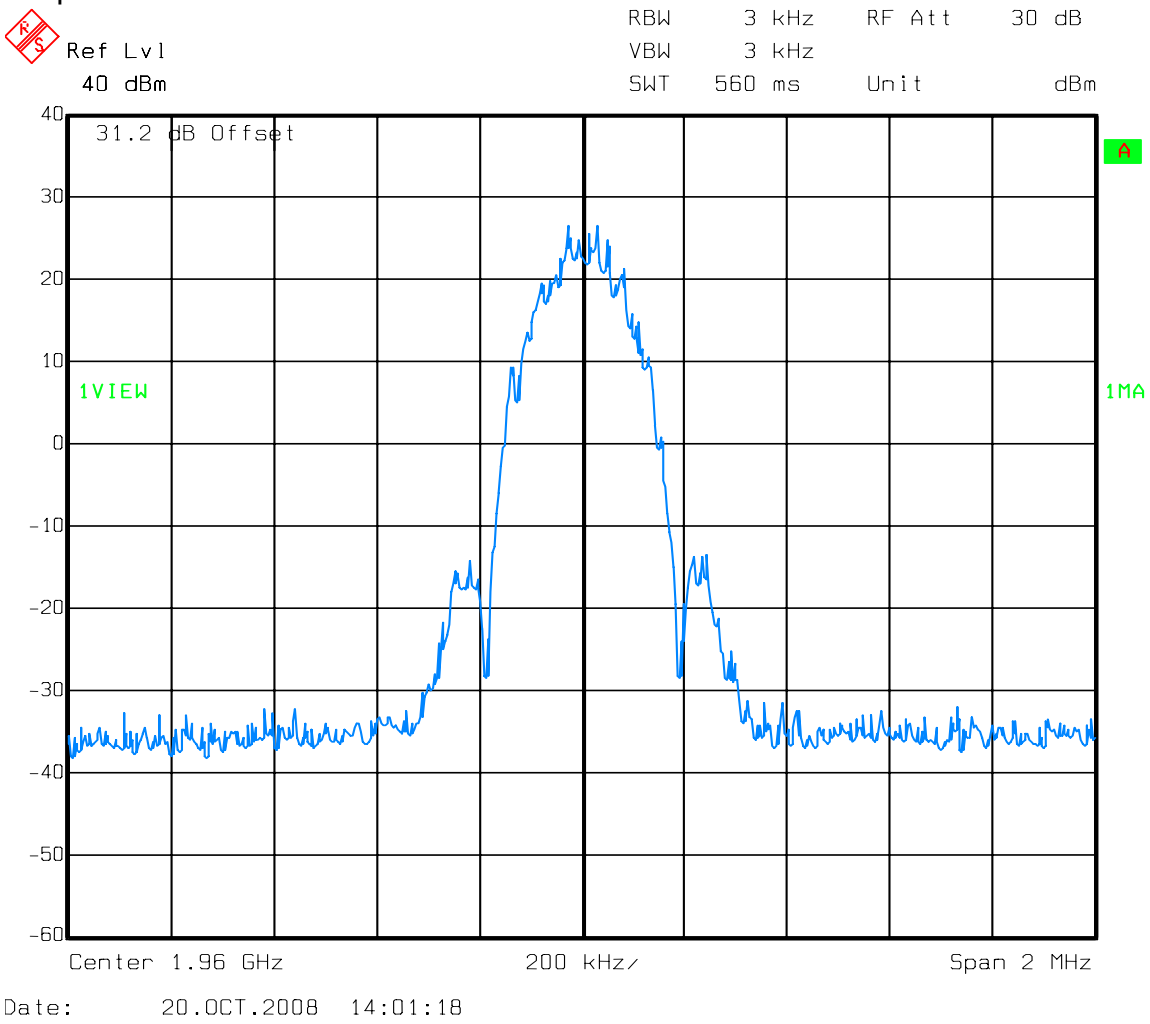
GSM
Input - Downlink



Test Data – Occupied Bandwidth

EDGE

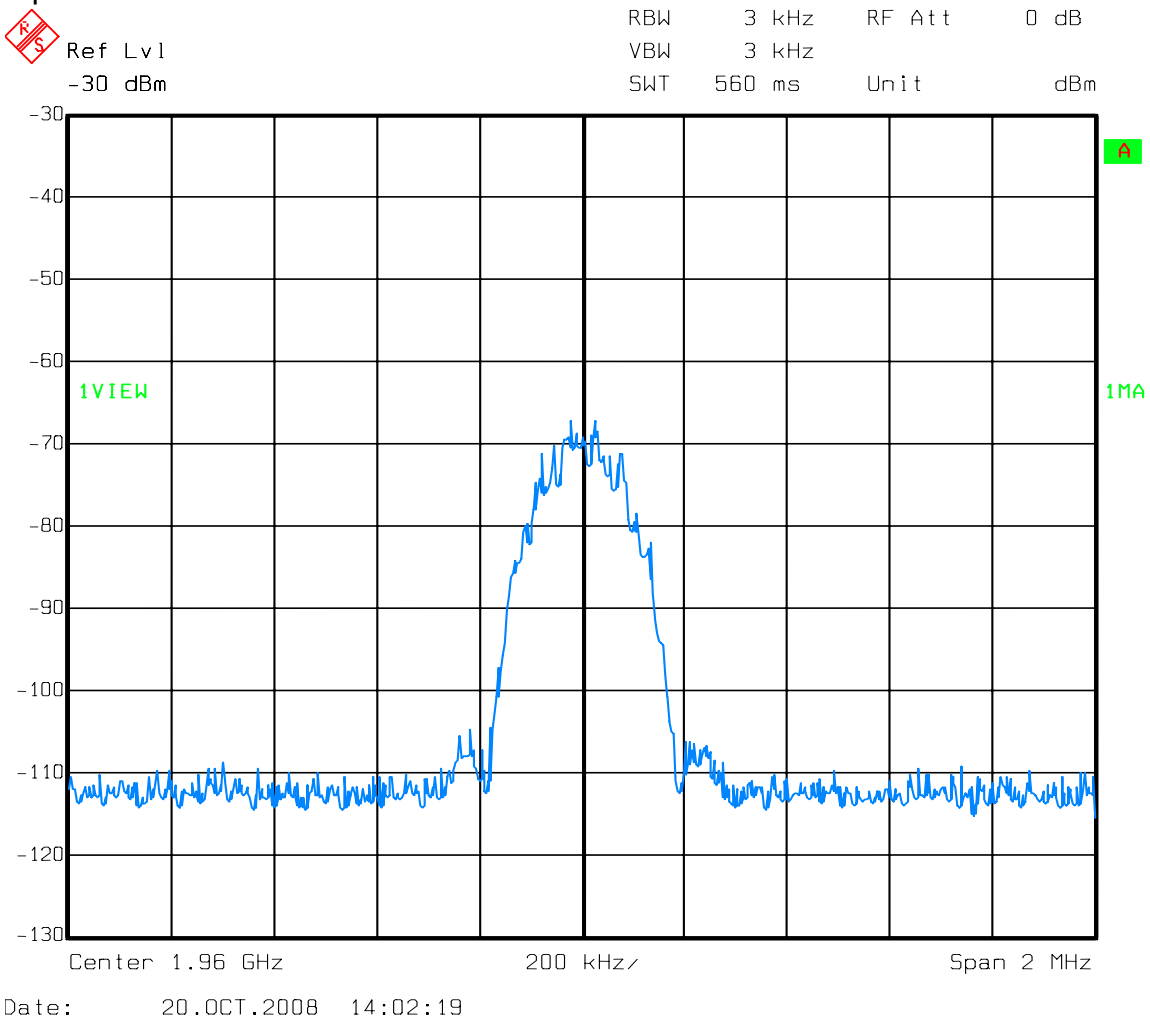
Output - Downlink



Test Data – Occupied Bandwidth

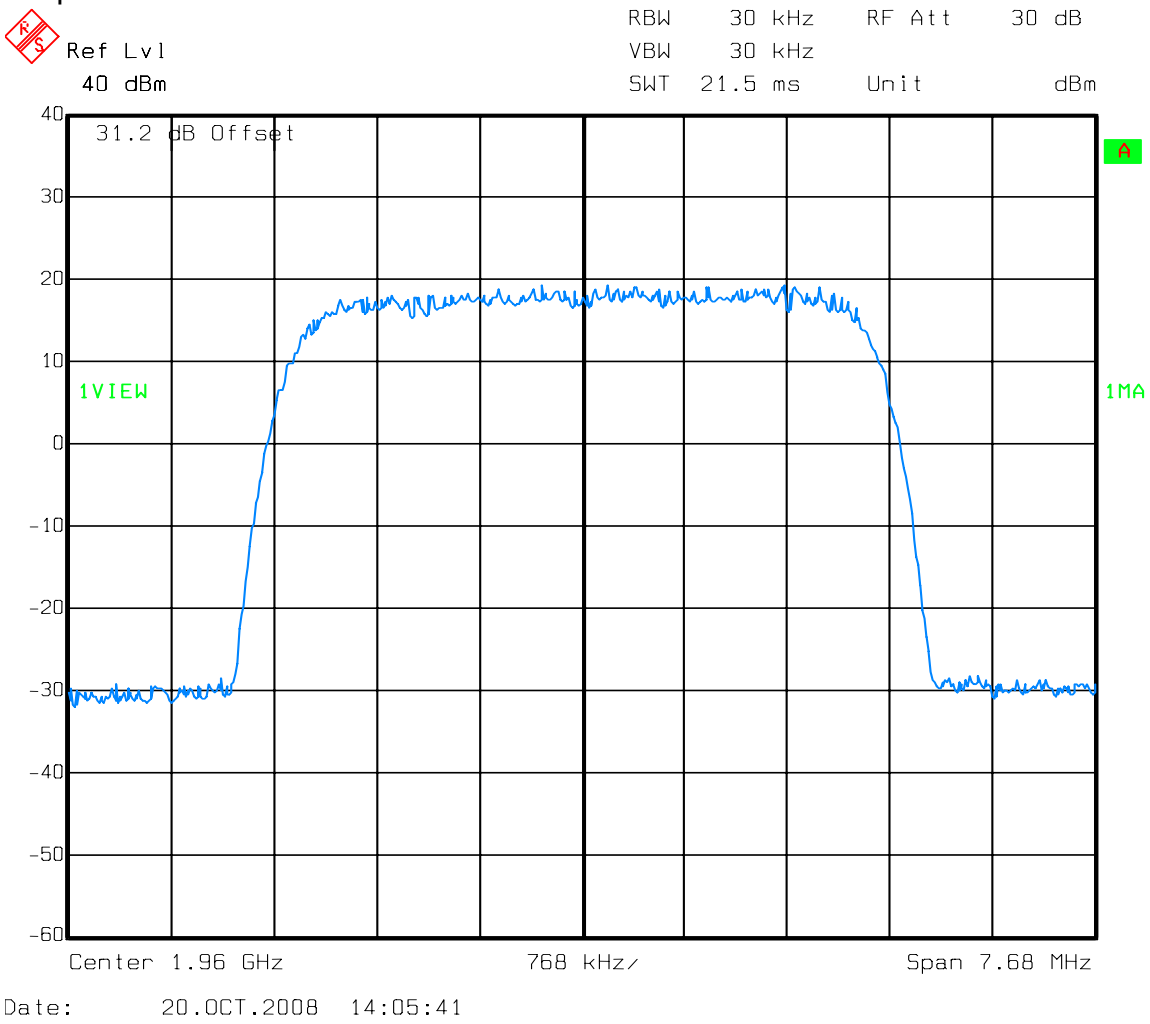
EDGE

Input - Downlink



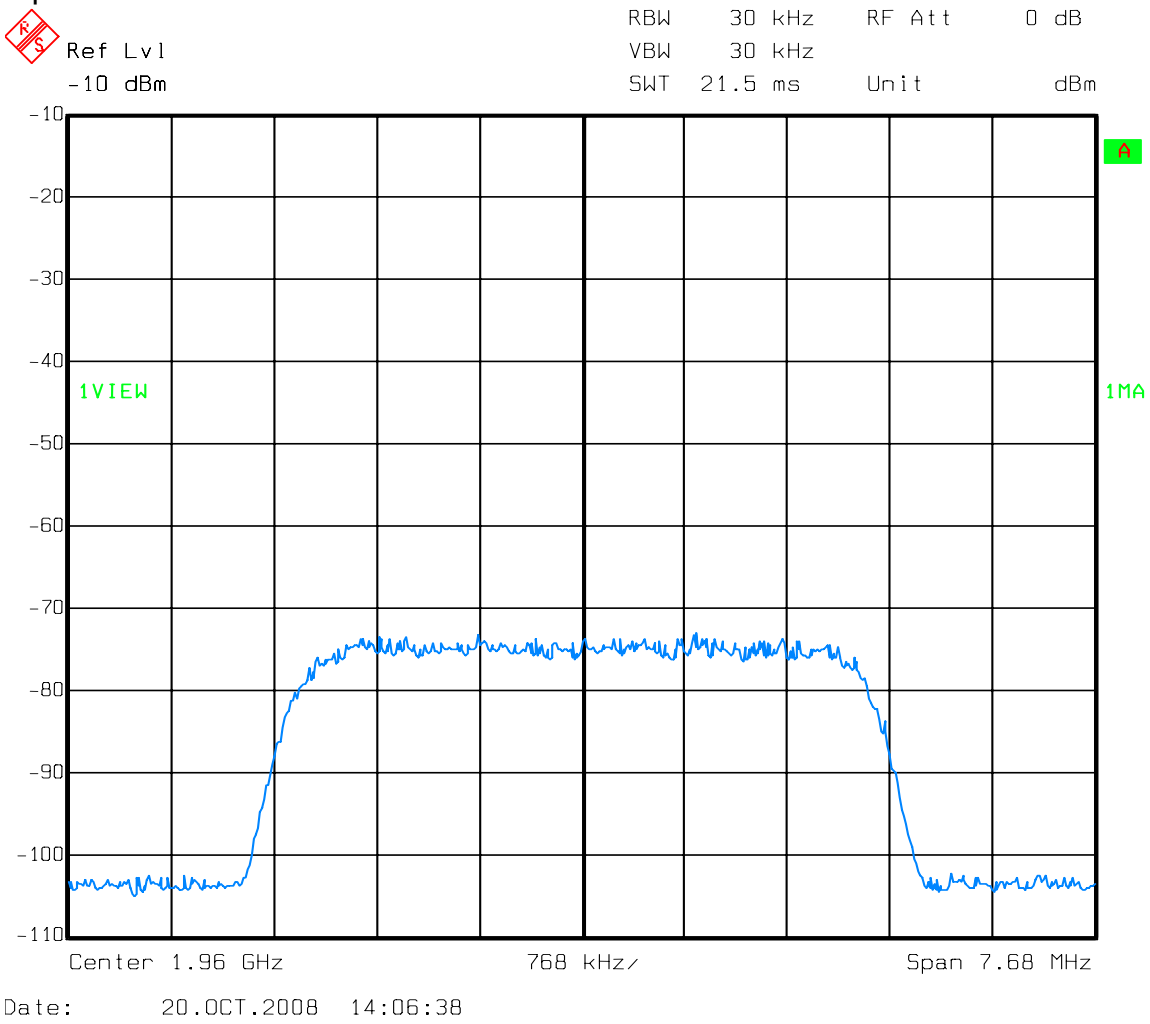
Test Data – Occupied Bandwidth

W-CDMA
Output - Downlink



Test Data – Occupied Bandwidth

W-CDMA
Input - Downlink



Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 24.238
TESTED BY: David Light	DATE: 06 October 2008

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1064-1604-1082-1659

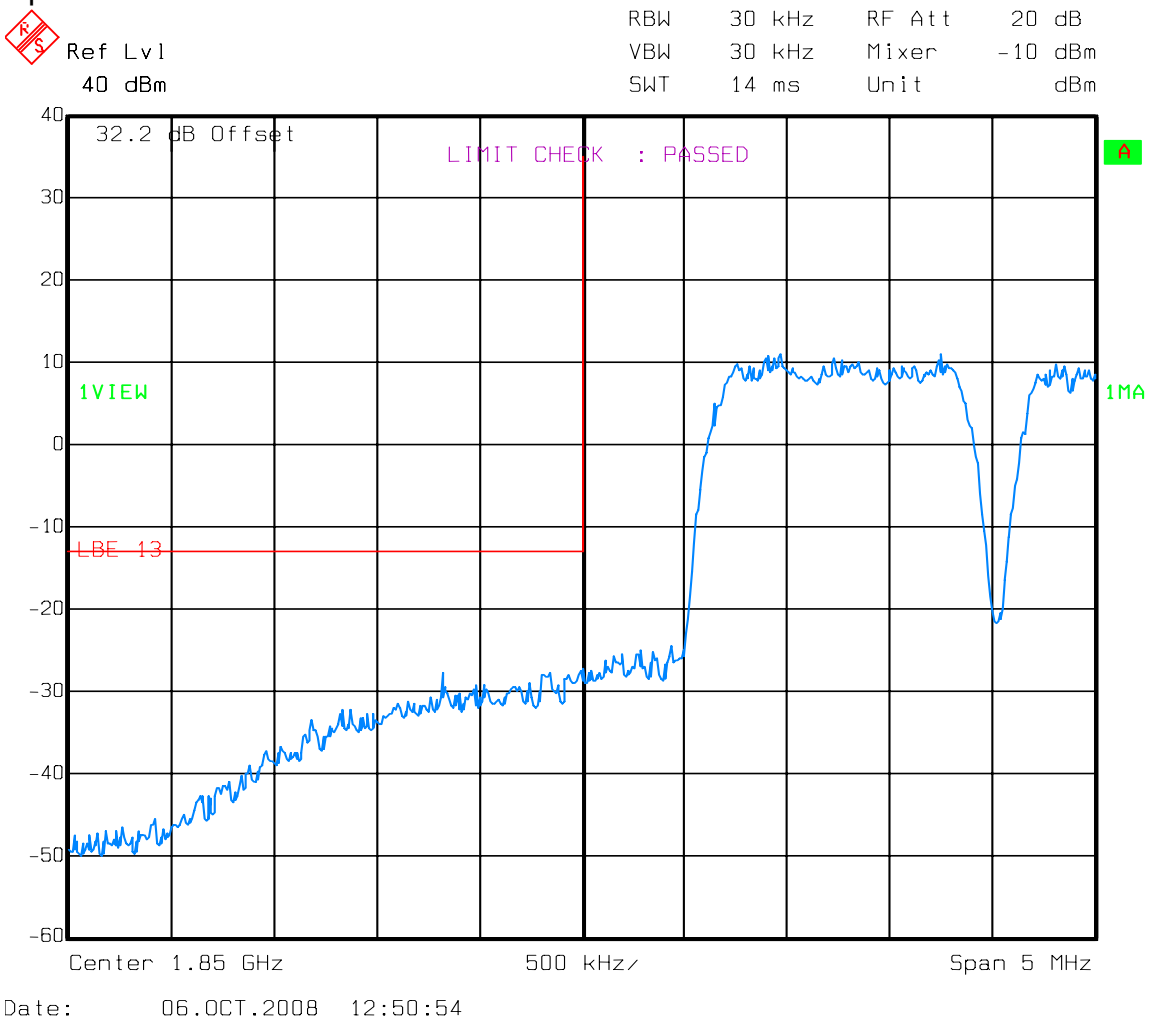
Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 48 %

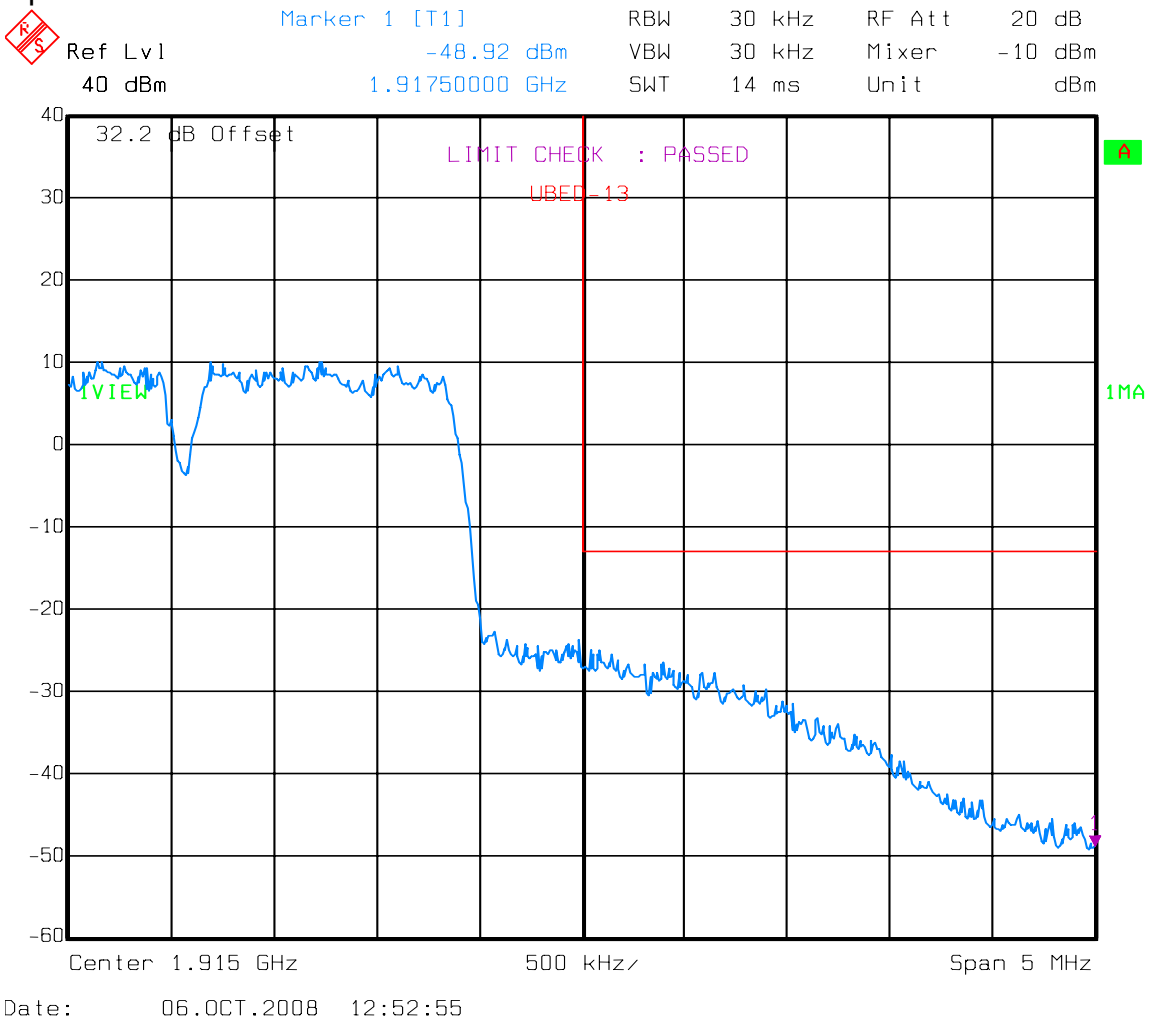
Test Data – Spurious Emissions at Antenna Terminals

CDMA/EV-DO
LOW BANDEDGE INTERMOD
Uplink



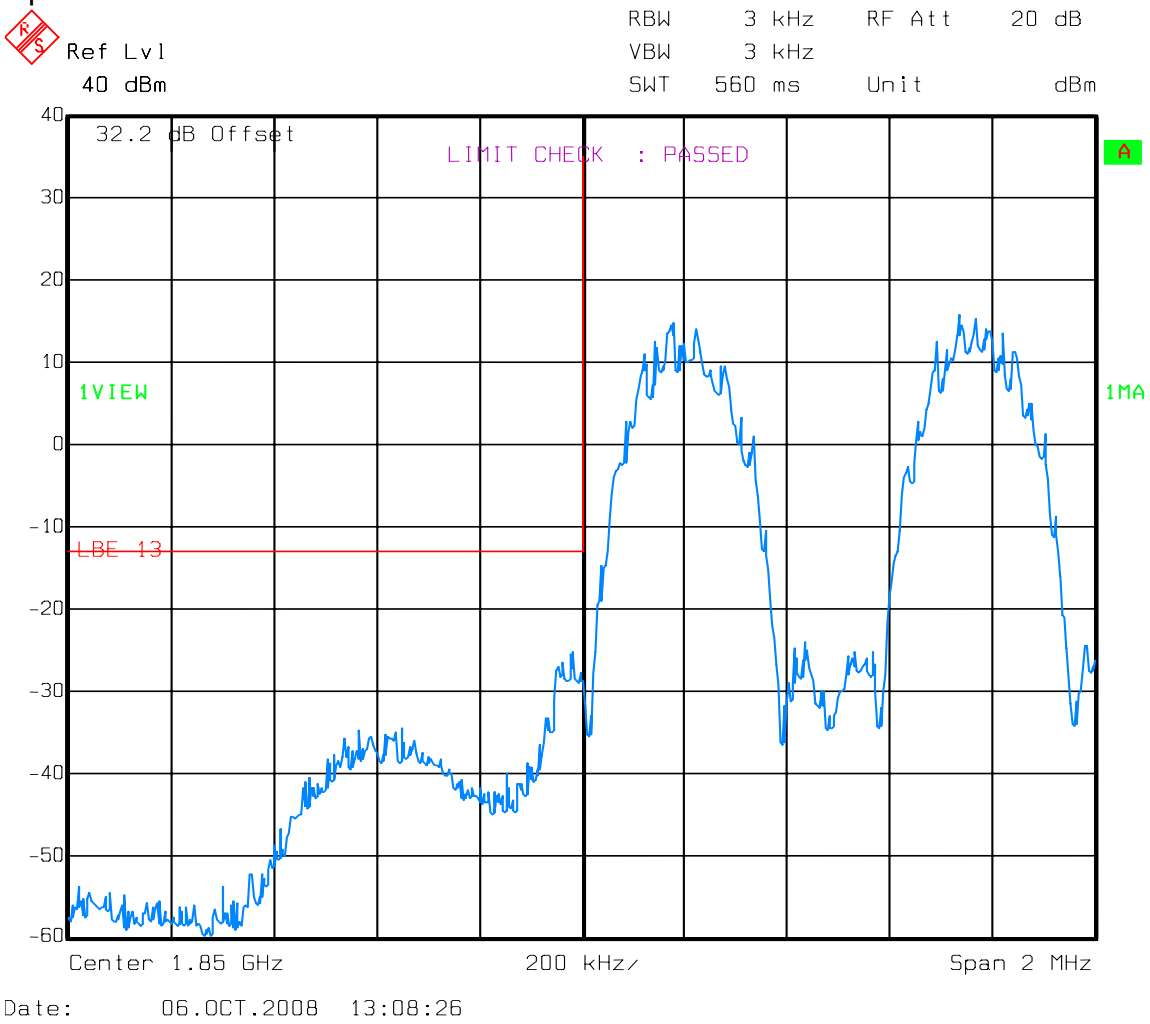
Test Data – Spurious Emissions at Antenna Terminals

CDMA/EV-DO
HIGH BAND EDGE
Uplink



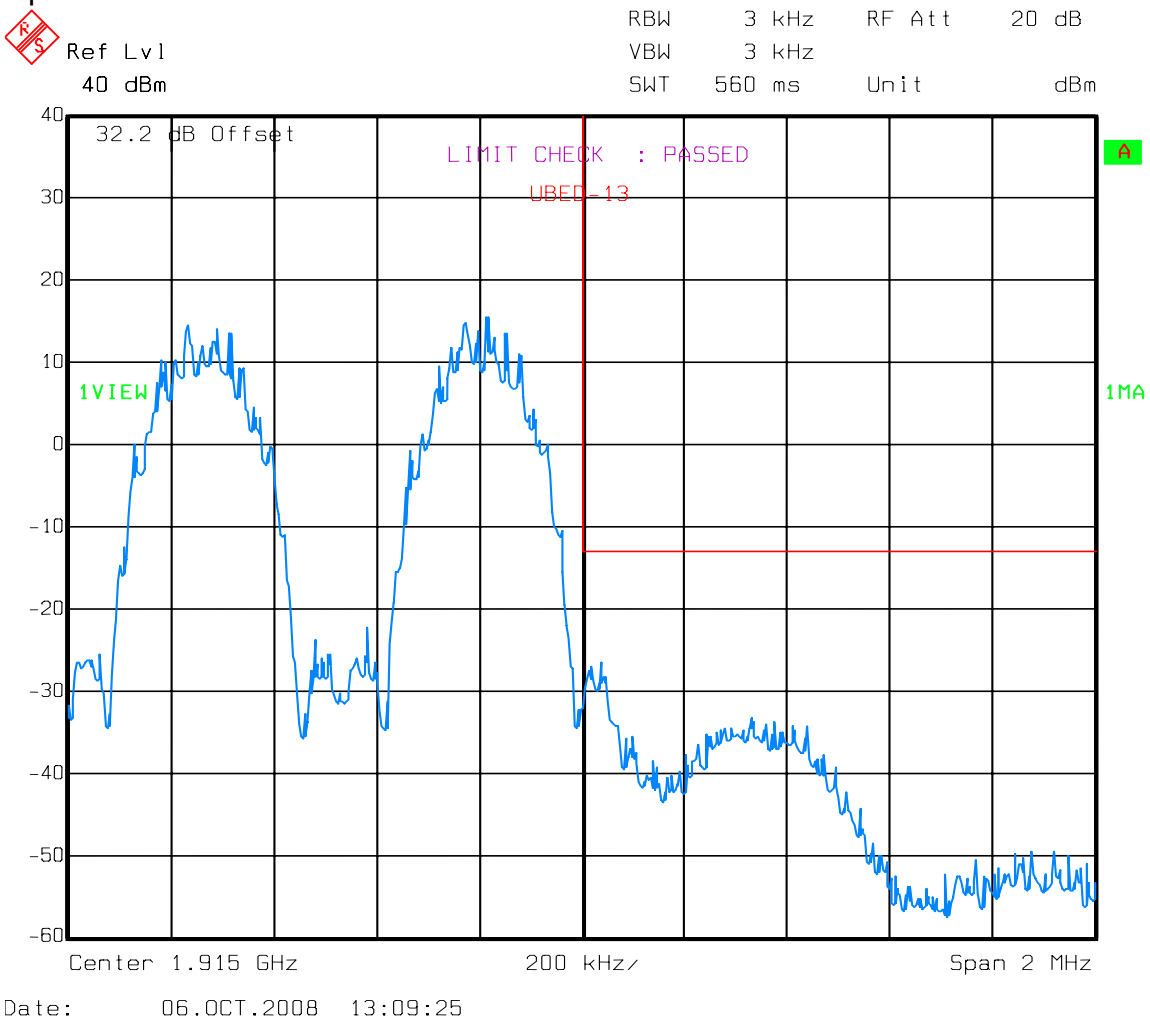
Test Data – Spurious Emissions at Antenna Terminals

EDGE
LOW BANDEDGE INTERMOD
Uplink



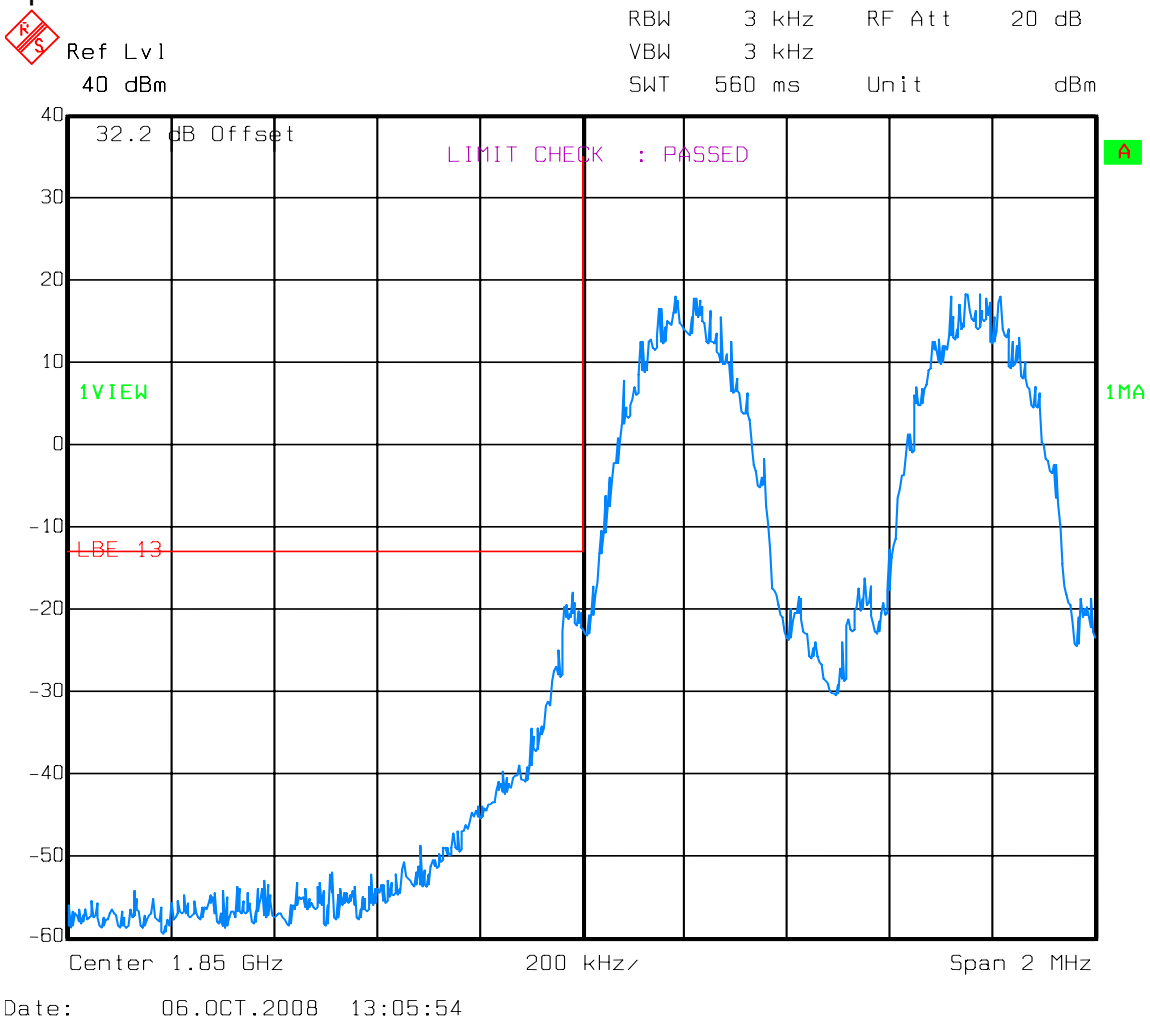
Test Data – Spurious Emissions at Antenna Terminals

EDGE
HIGH BAND EDGE
Uplink



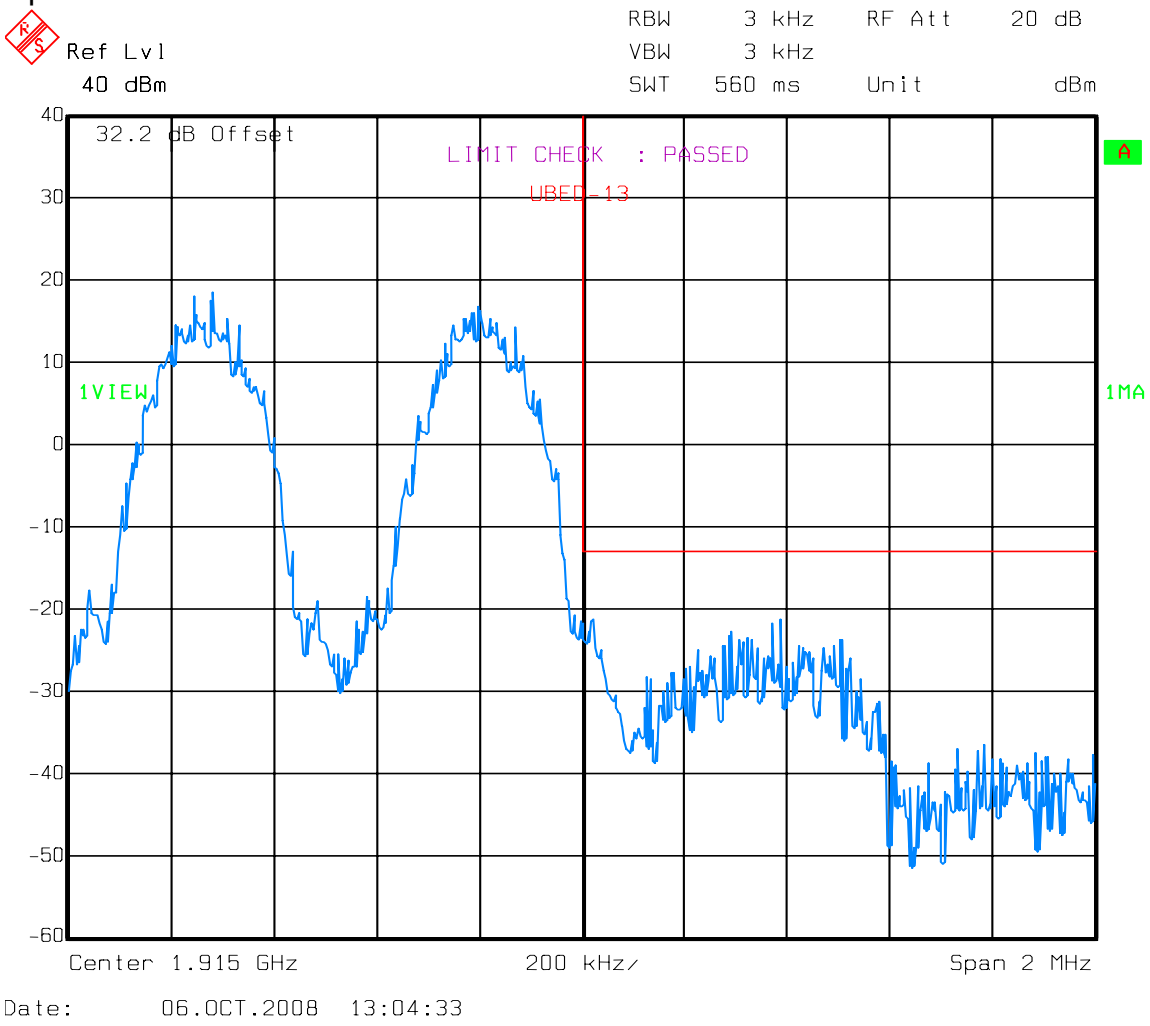
Test Data – Spurious Emissions at Antenna Terminals

GSM
LOW BANDEDGE INTERMOD
Uplink



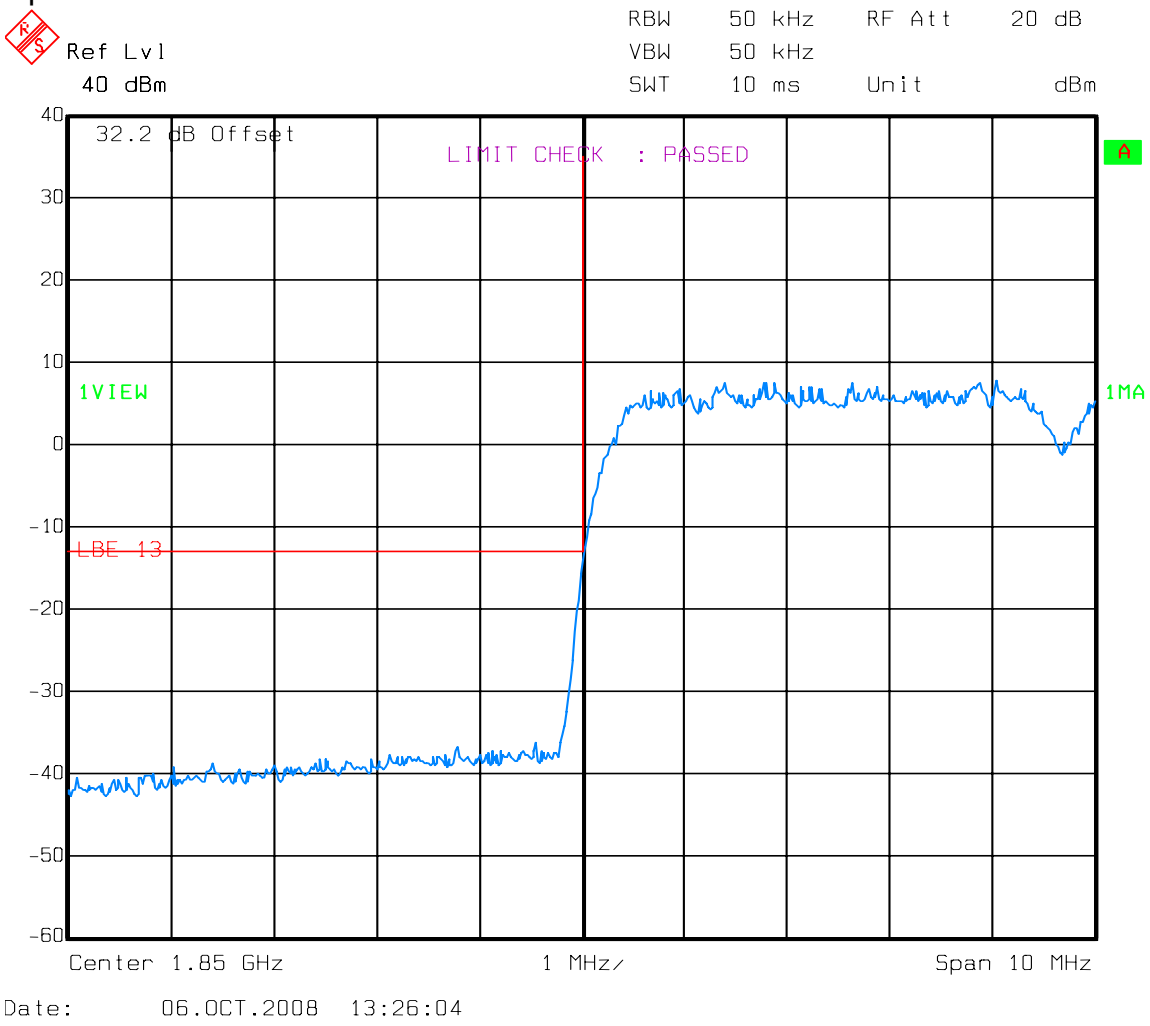
Test Data – Spurious Emissions at Antenna Terminals

GSM
HIGH BAND EDGE
Uplink



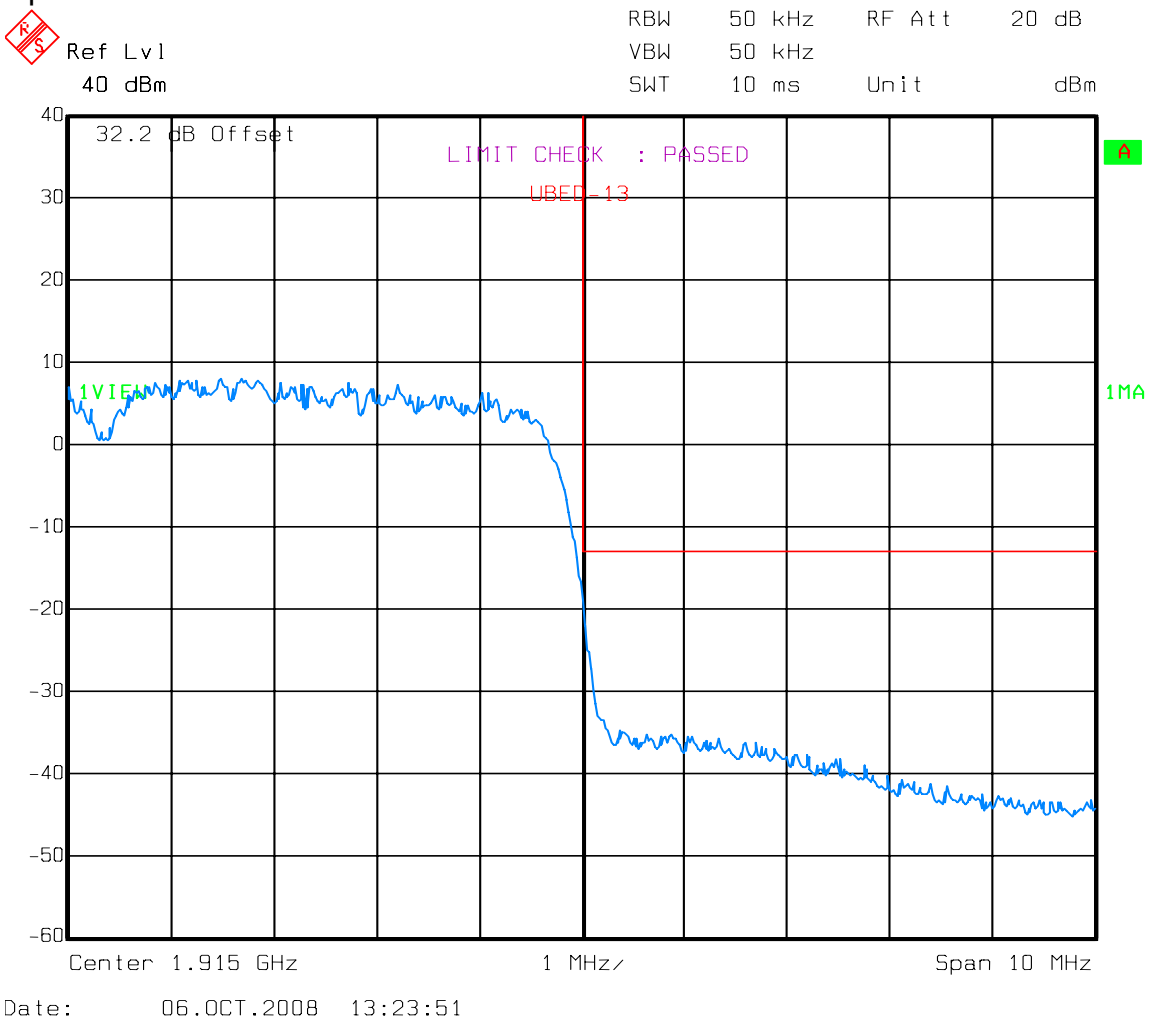
Test Data – Spurious Emissions at Antenna Terminals

WCDMA/HSDPA
LOW BANDEDGE INTERMOD
Uplink



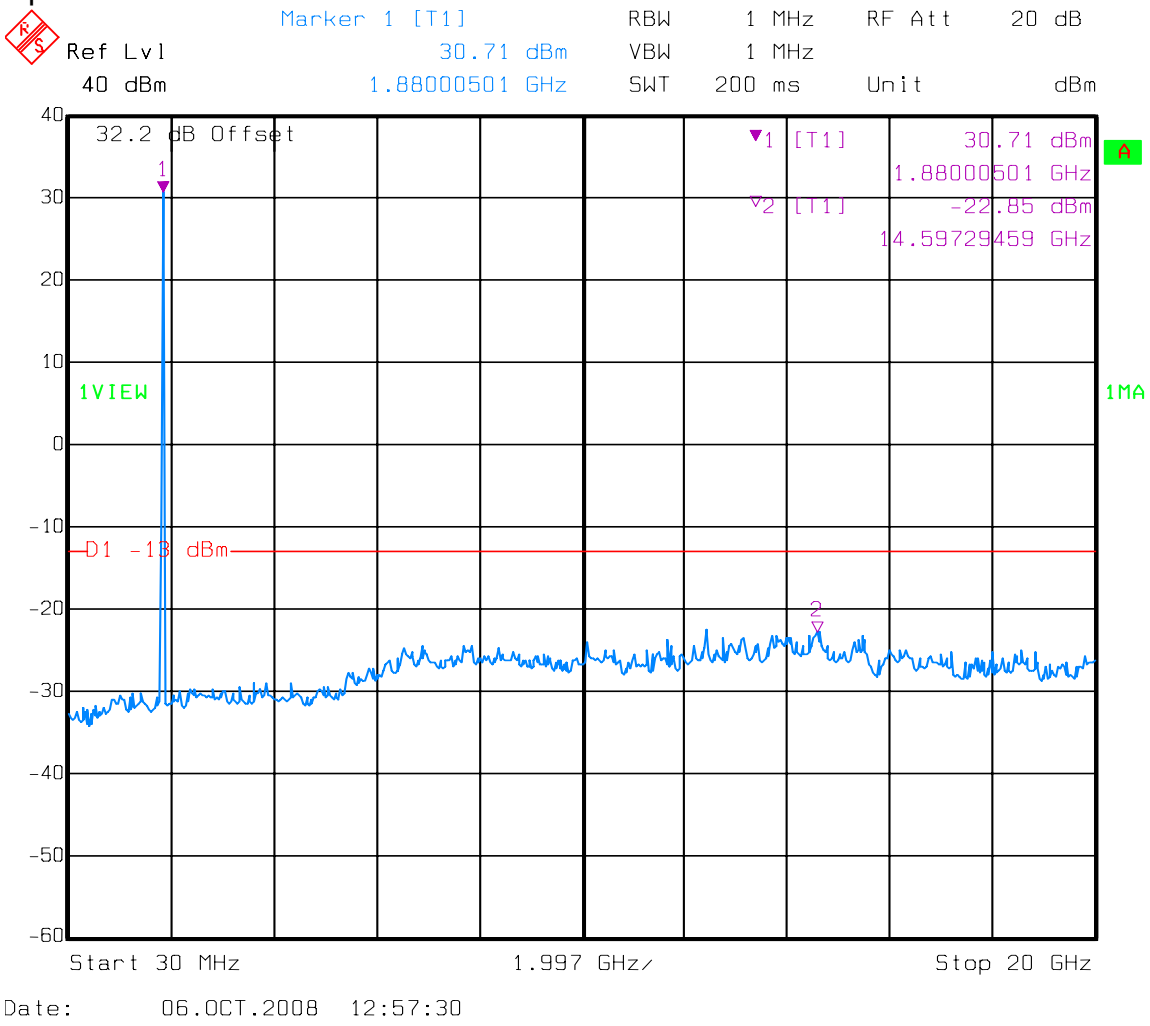
Test Data – Spurious Emissions at Antenna Terminals

WCDMA/HSDPA
HIGH BAND EDGE
Uplink



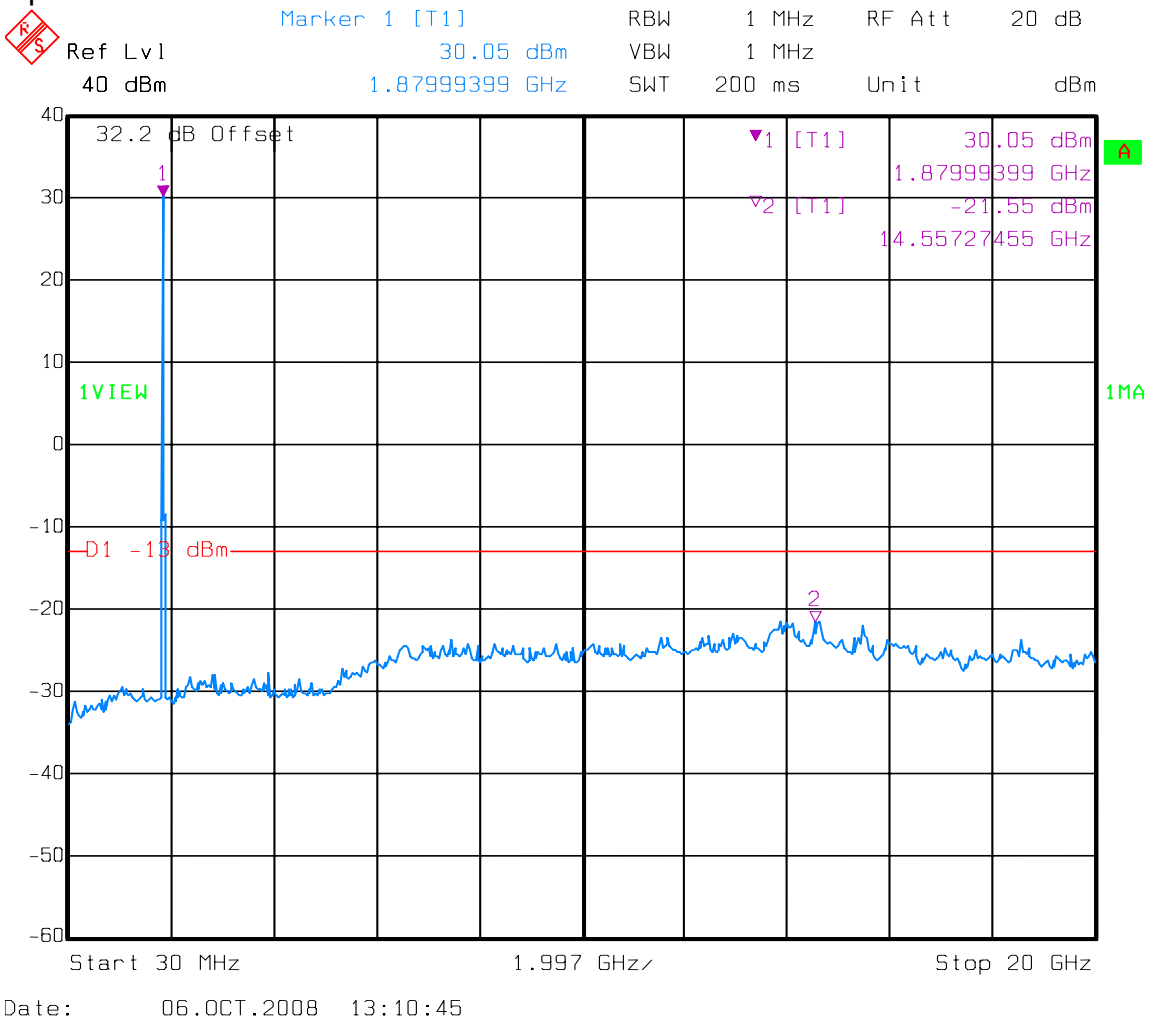
Test Data – Spurious Emissions at Antenna Terminals

CDMA/EV-DO
SPURS
Uplink



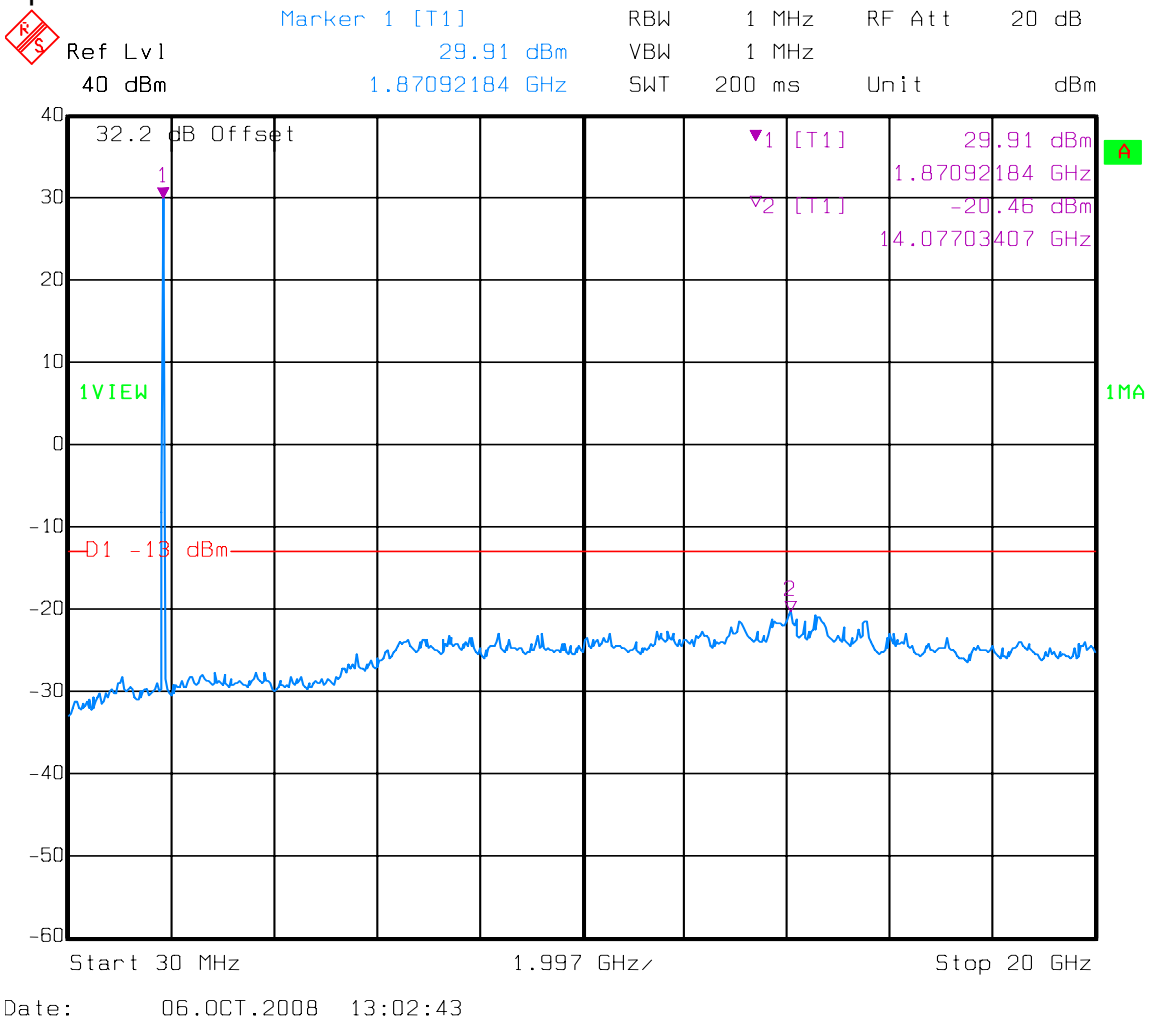
Test Data – Spurious Emissions at Antenna Terminals

EDGE
SPURS
Uplink



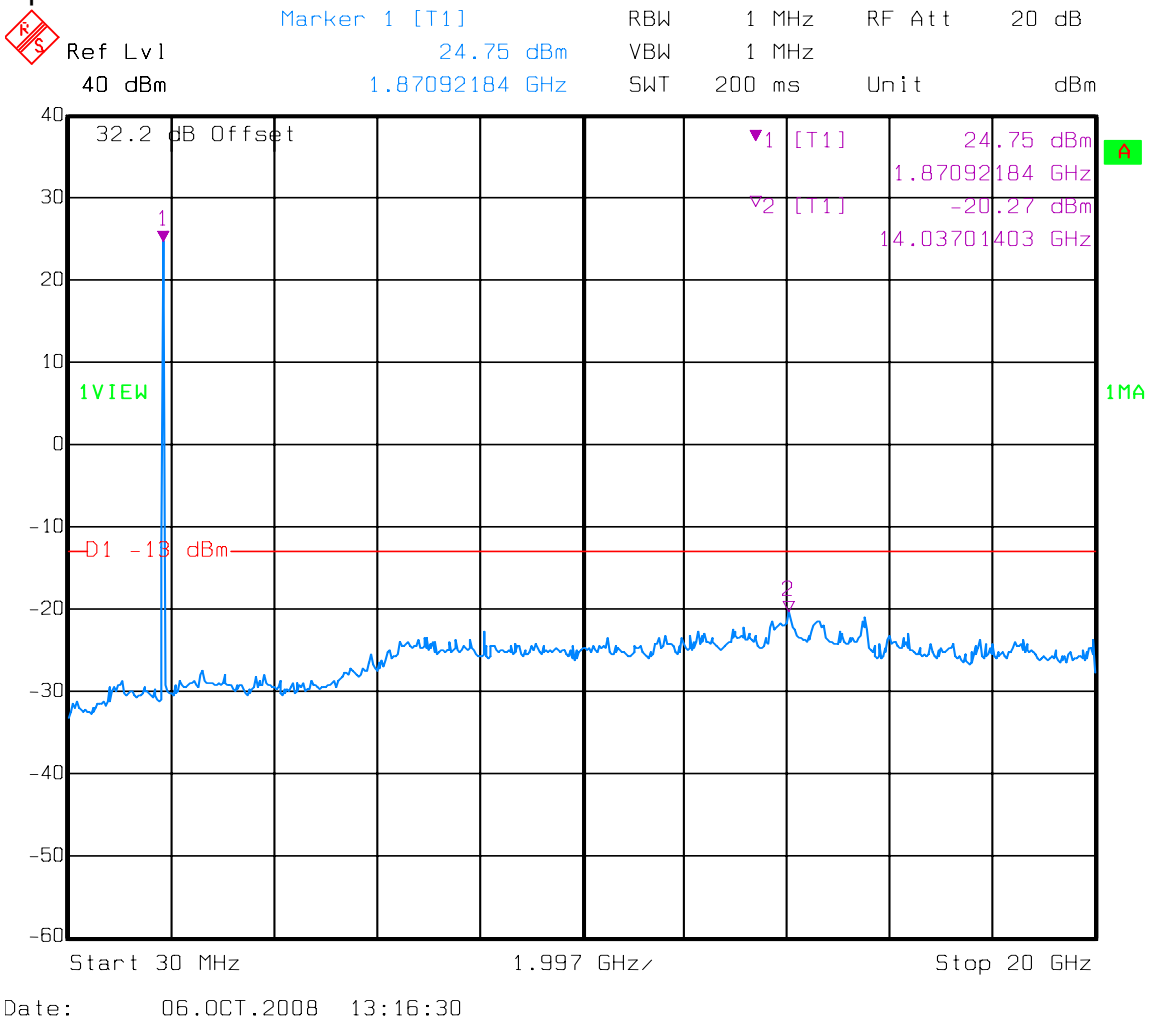
Test Data – Spurious Emissions at Antenna Terminals

GSM
SPURS
Uplink



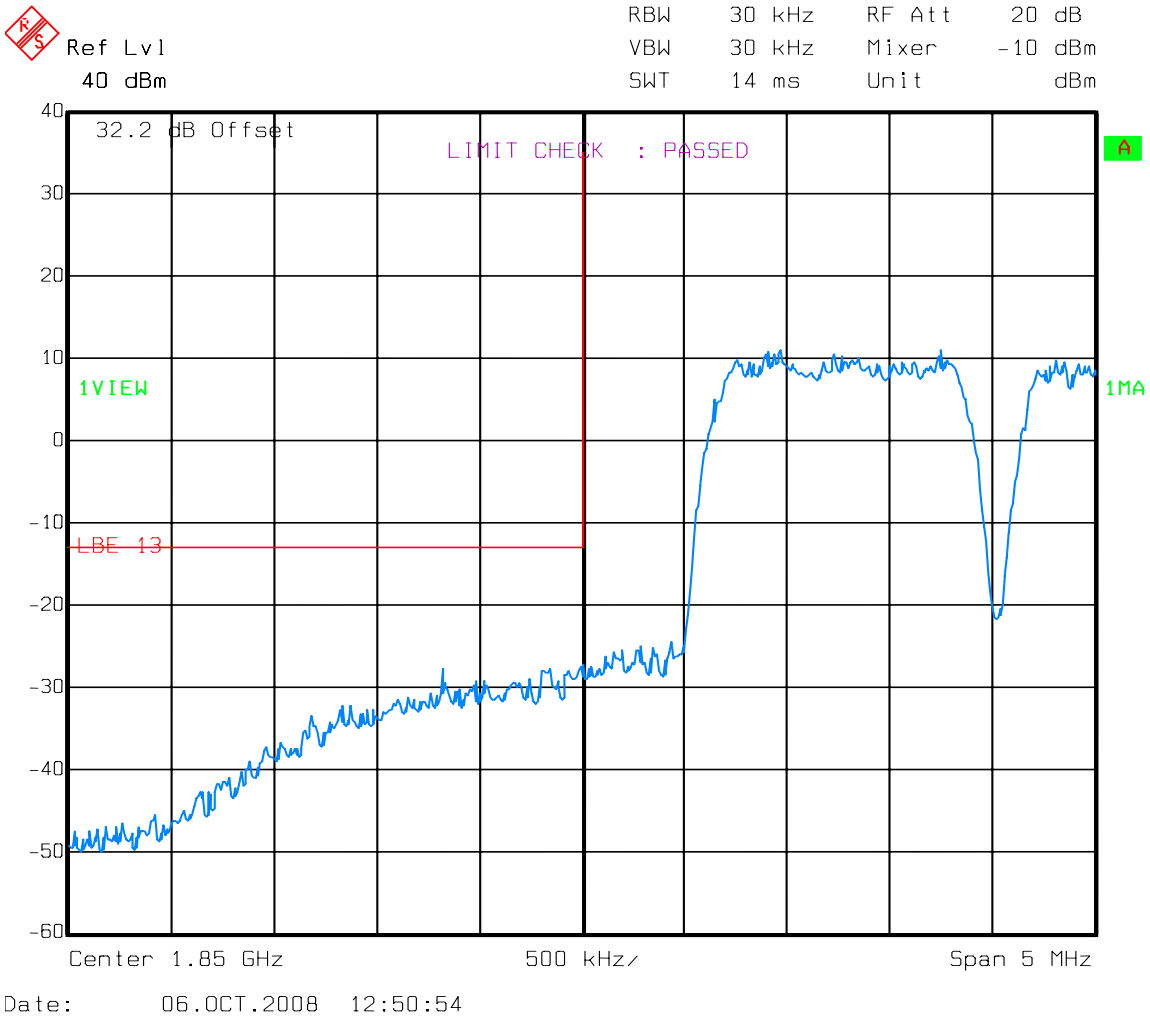
Test Data – Spurious Emissions at Antenna Terminals

WCDMA/HSDPA
SPURS
Uplink



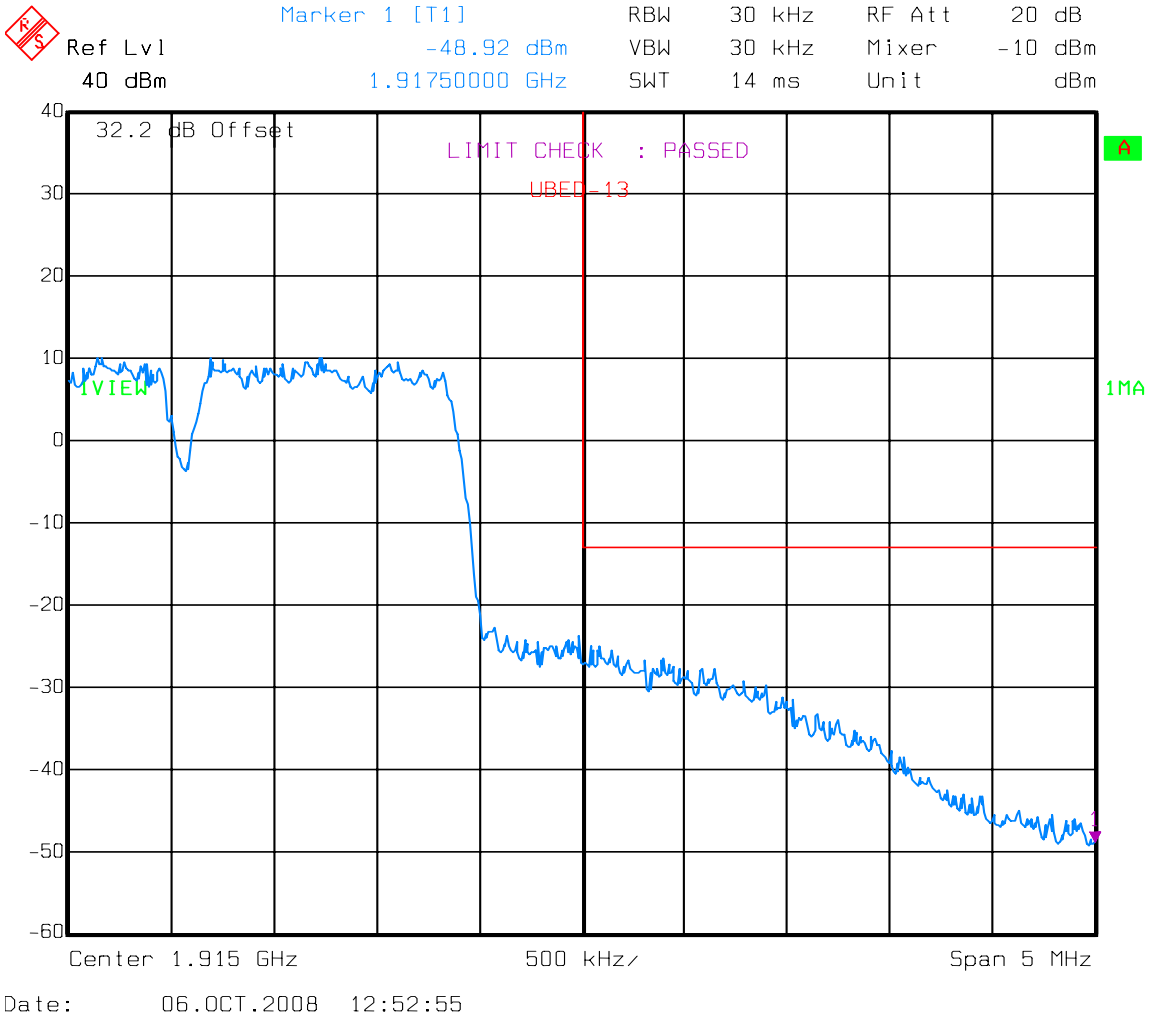
Test Data – Spurious Emissions at Antenna Terminals

CDMA/EV-DO
LOW BANDEDGE INTERMOD
Downlink



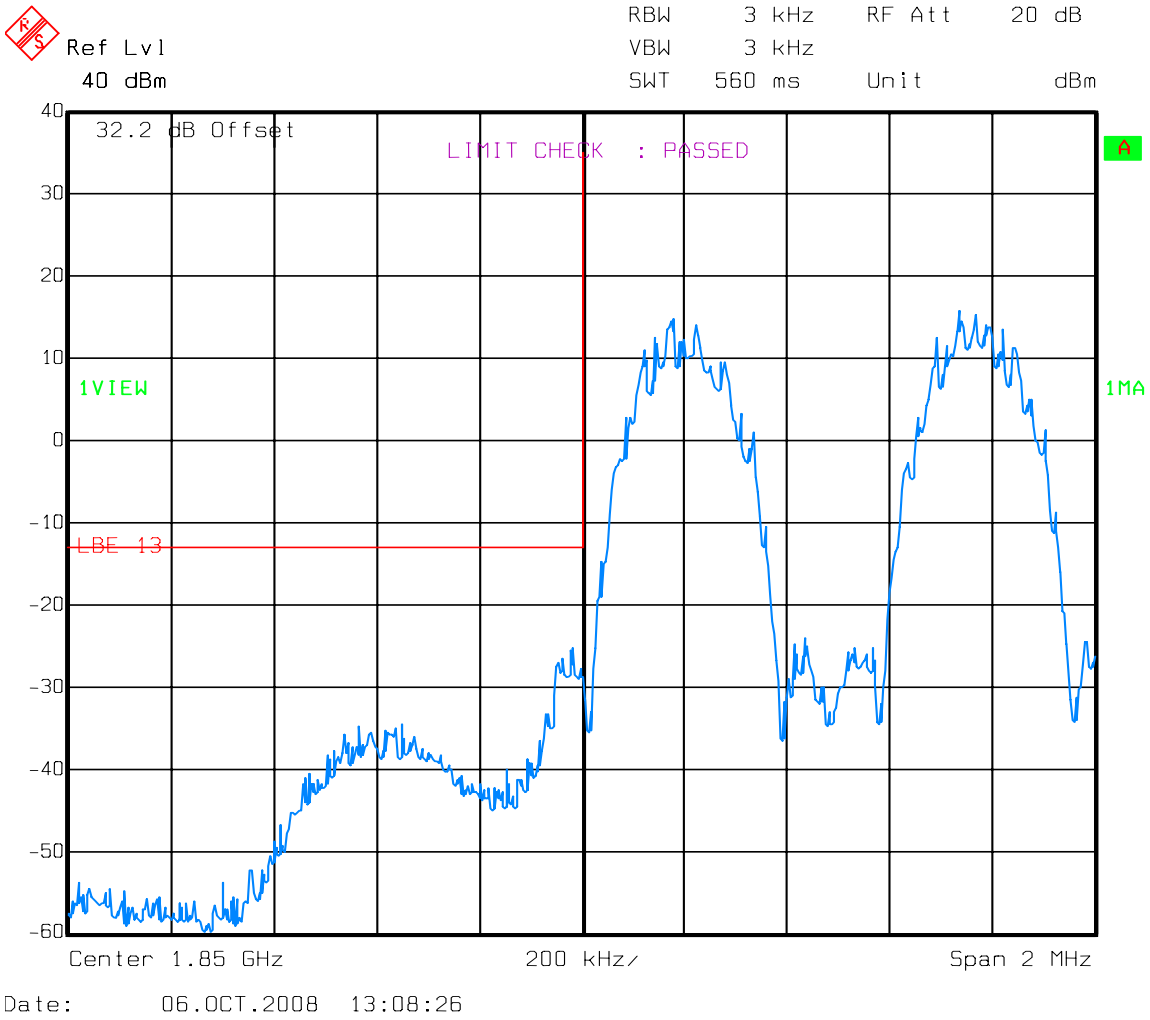
Test Data – Spurious Emissions at Antenna Terminals

CDMA/EV-DO
HIGH BAND EDGE
Downlink



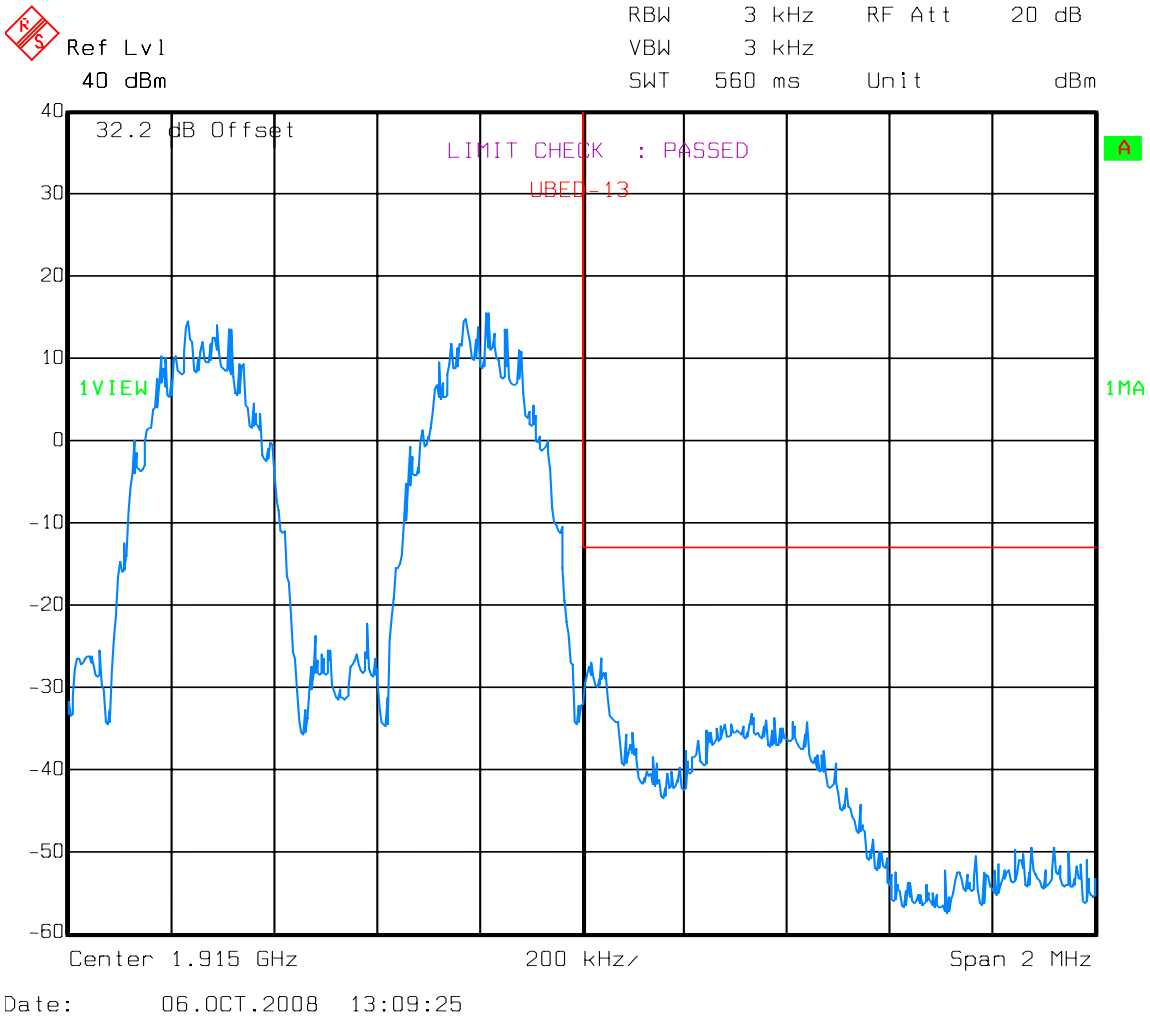
Test Data – Spurious Emissions at Antenna Terminals

EDGE
LOW BANDEDGE INTERMOD
Downlink



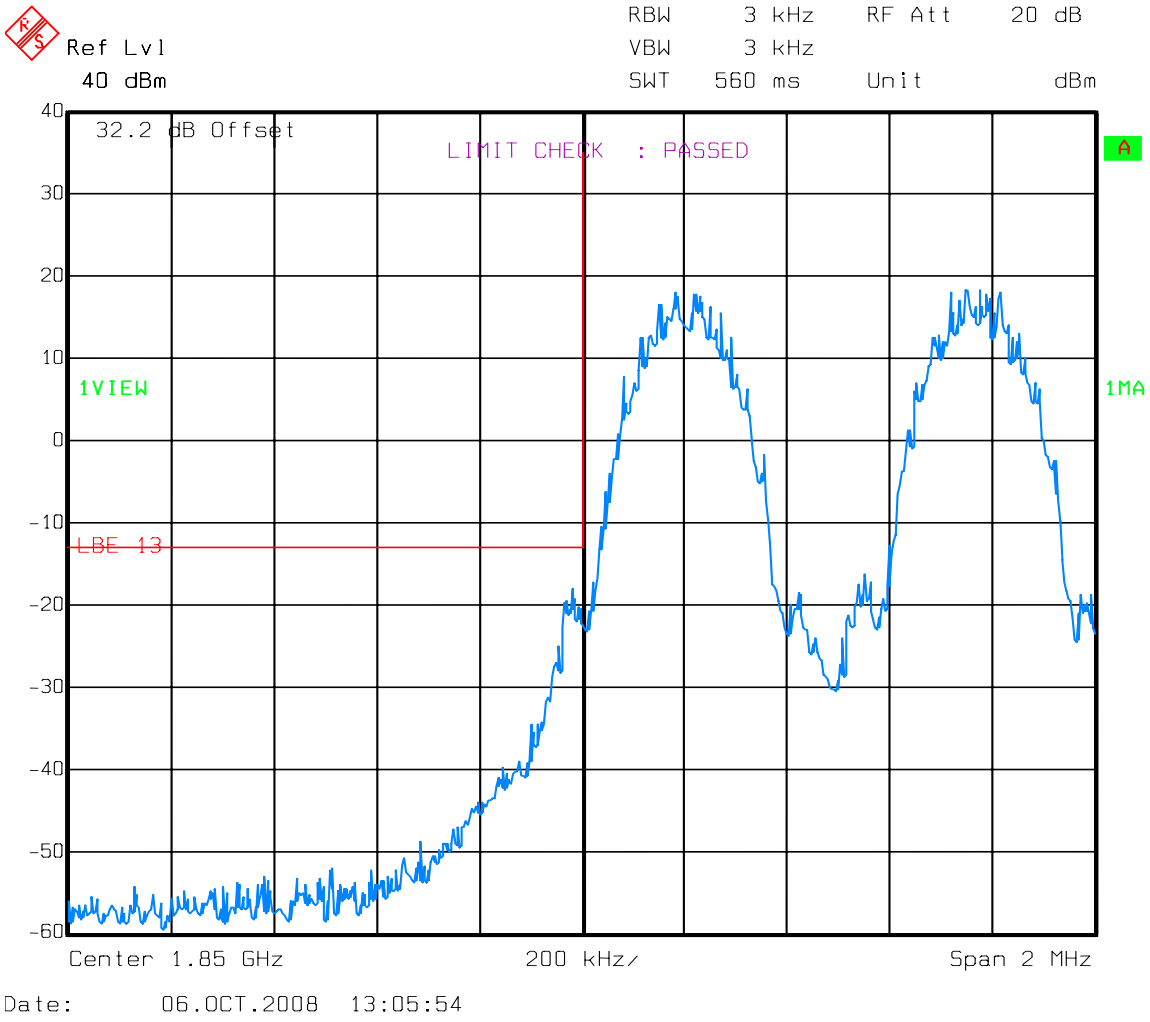
Test Data – Spurious Emissions at Antenna Terminals

EDGE
HIGH BAND EDGE
Downlink



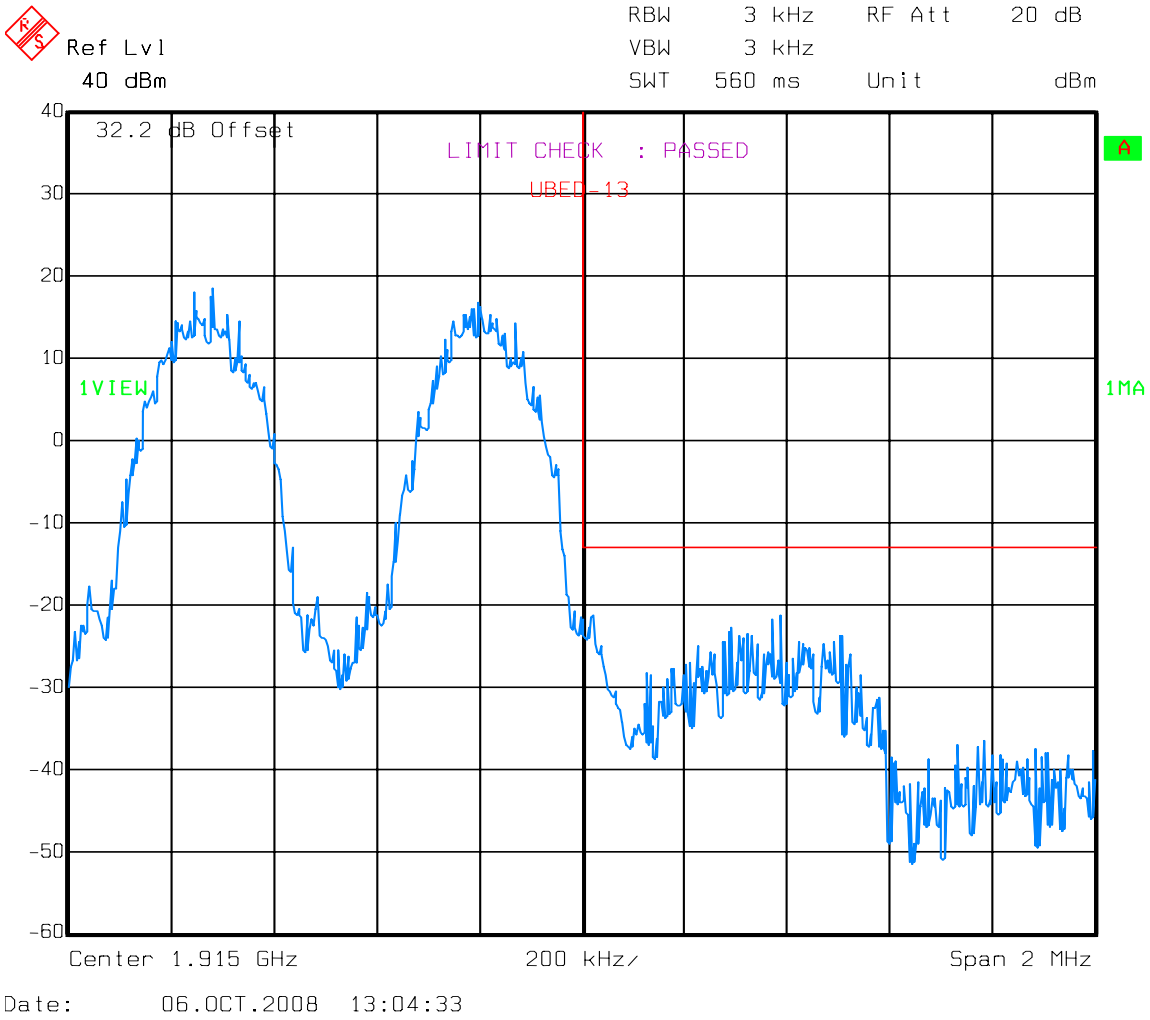
Test Data – Spurious Emissions at Antenna Terminals

GSM
LOW BANDEDGE INTERMOD
Downlink



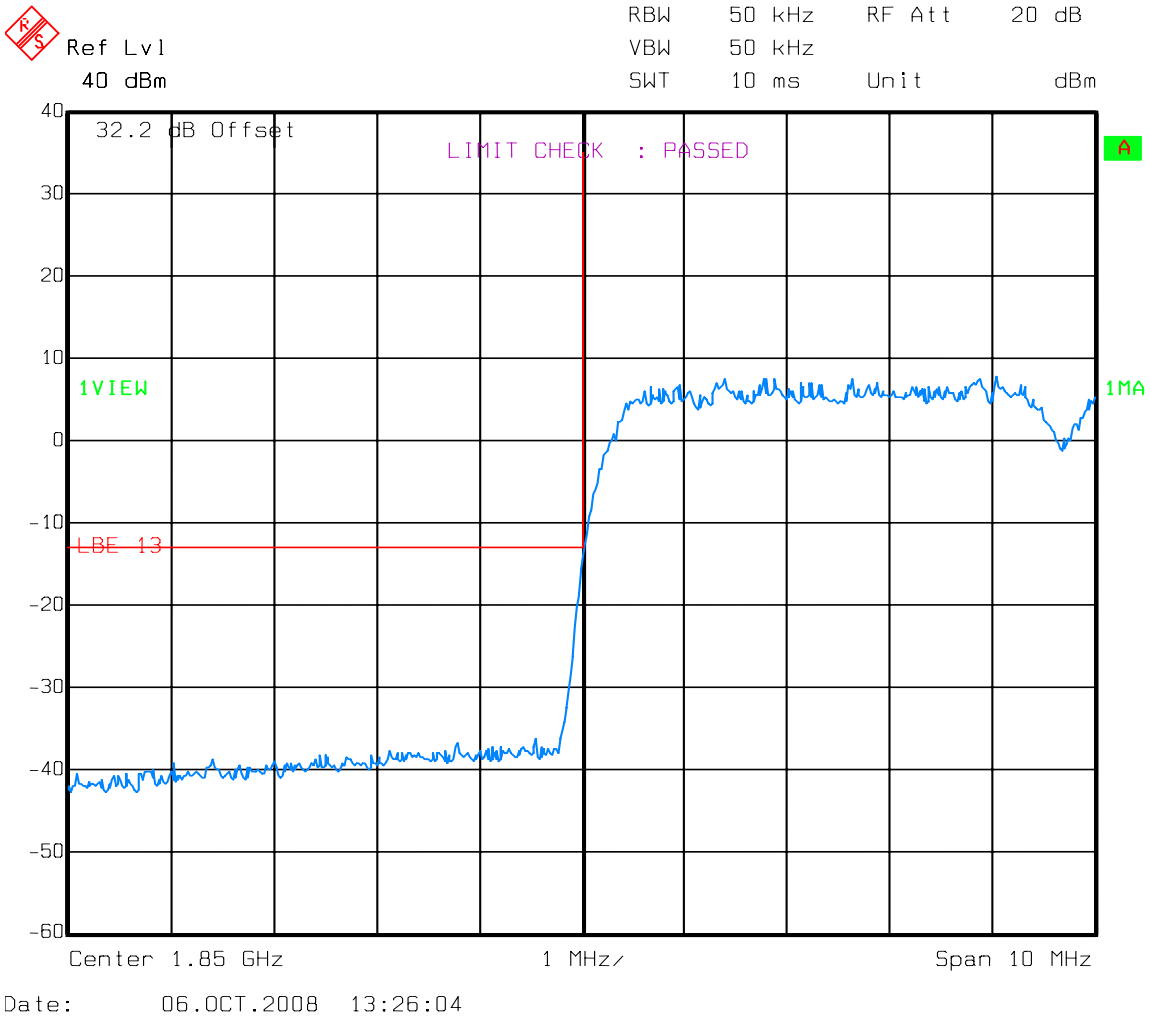
Test Data – Spurious Emissions at Antenna Terminals

GSM
HIGH BAND EDGE
Downlink



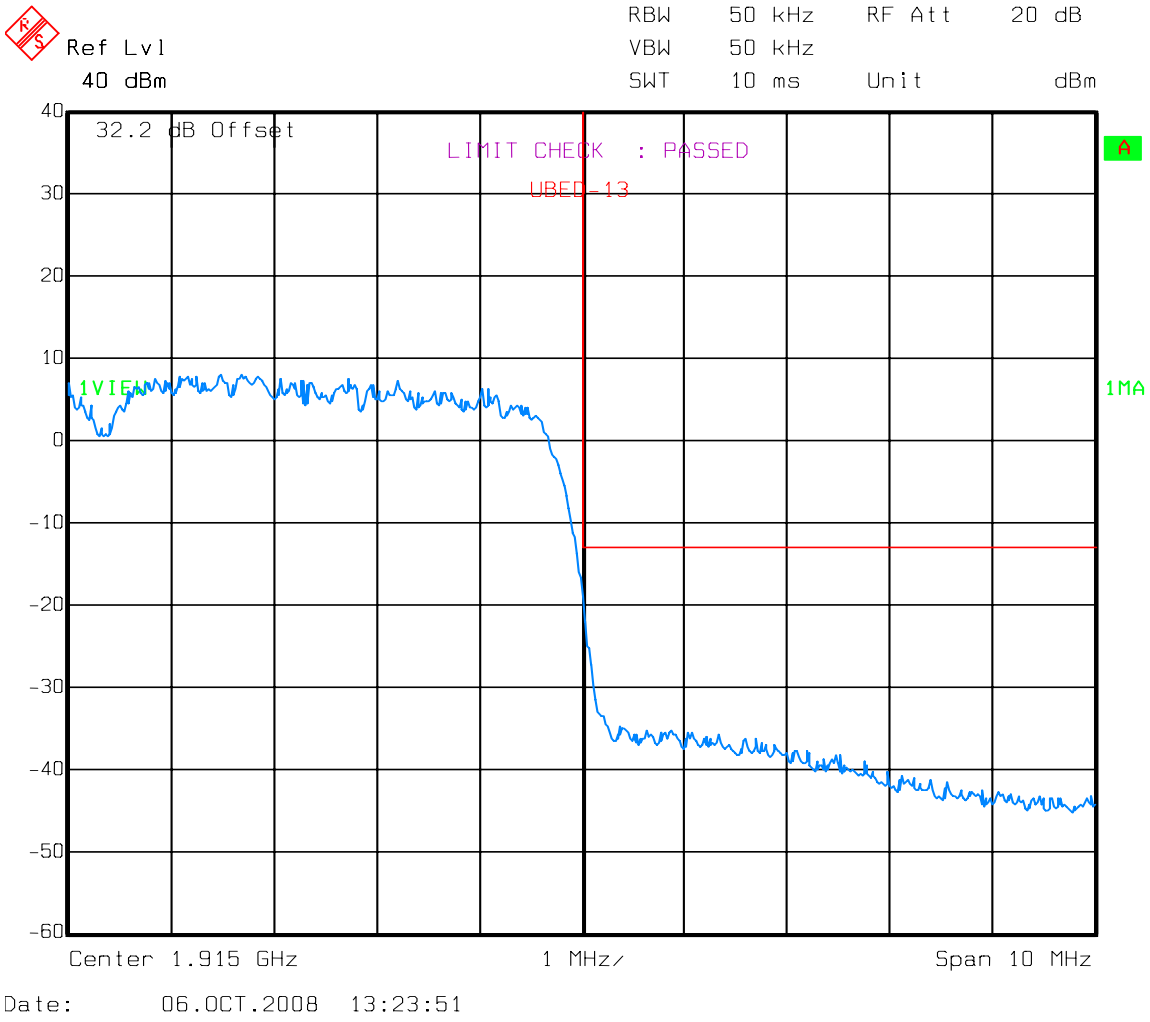
Test Data – Spurious Emissions at Antenna Terminals

WCDMA/HSDPA
LOW BANDEDGE INTERMOD
Downlink



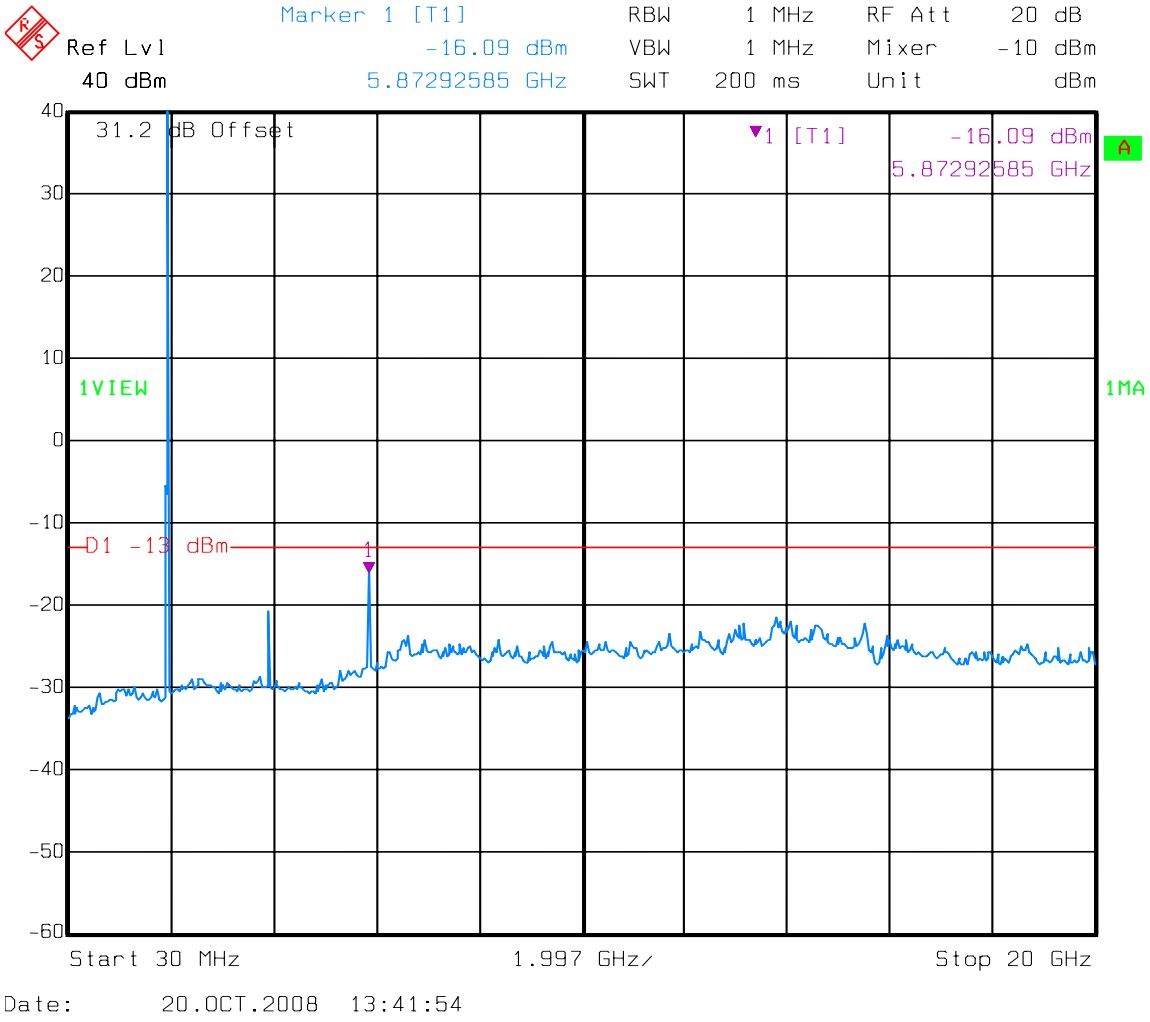
Test Data – Spurious Emissions at Antenna Terminals

WCDMA/HSDPA
HIGH BAND EDGE
Downlink



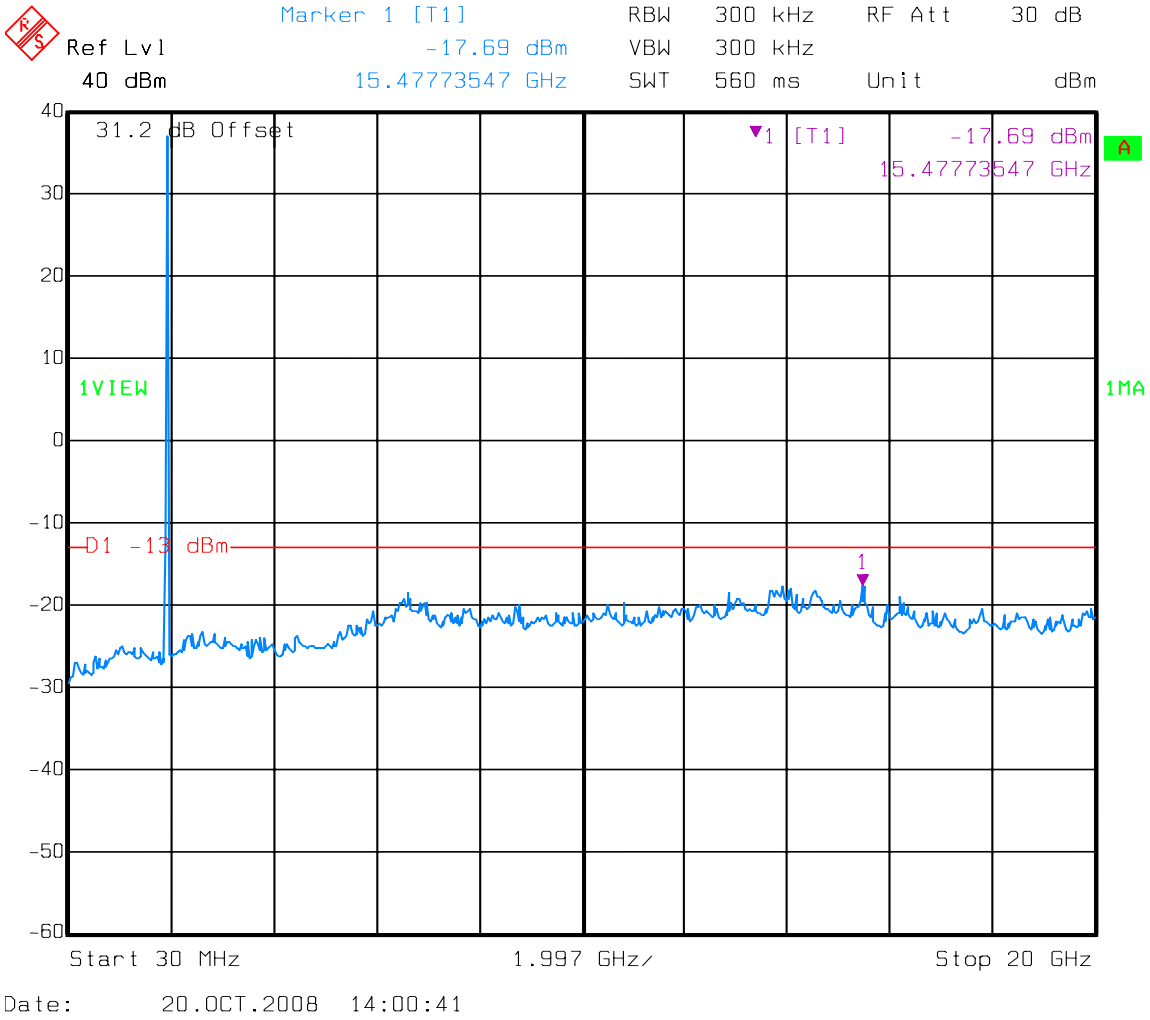
Test Data – Spurious Emissions at Antenna Terminals

CDMA/EV-DO
SPURS
Downlink



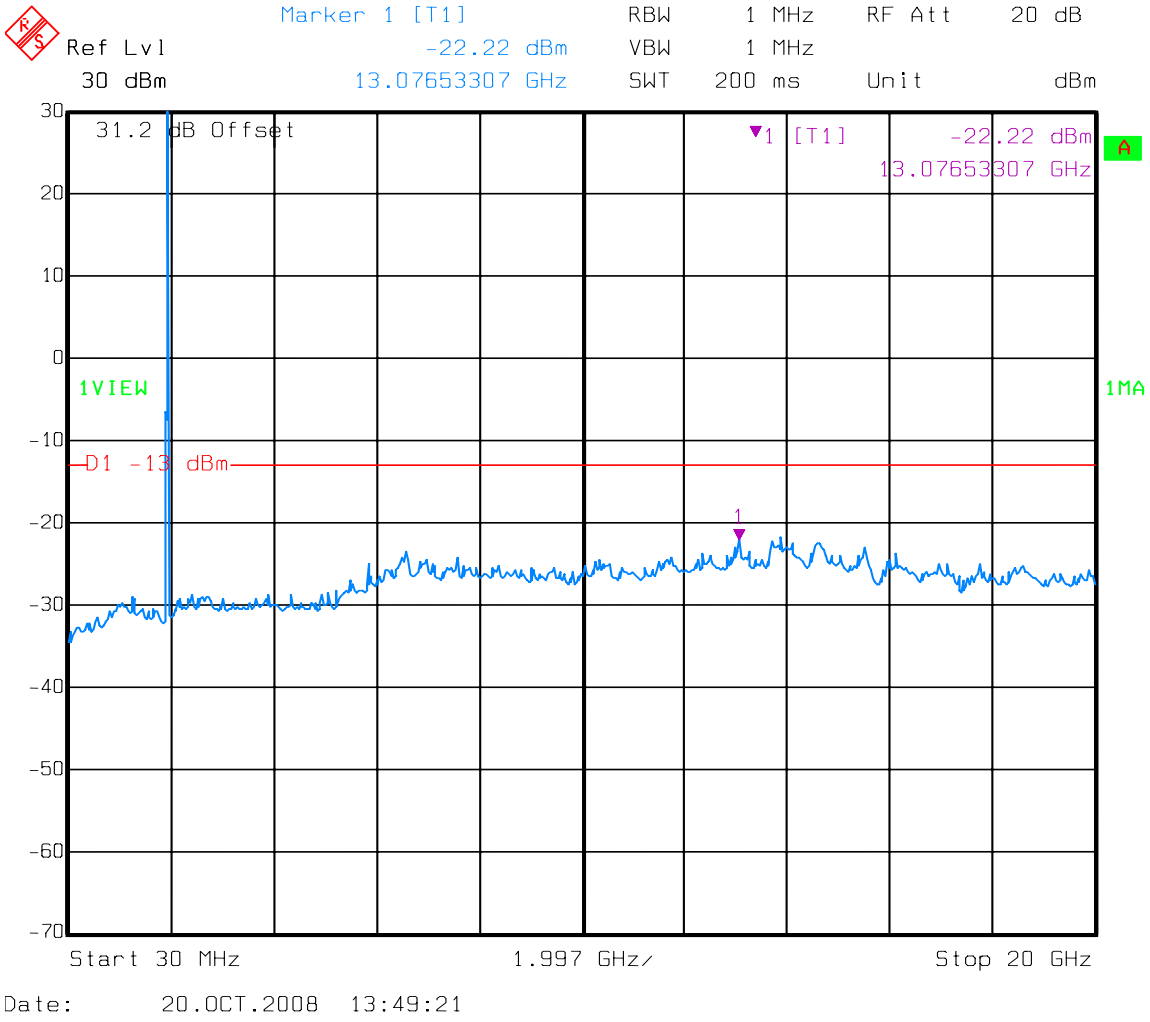
Test Data – Spurious Emissions at Antenna Terminals

EDGE
SPURS
Downlink



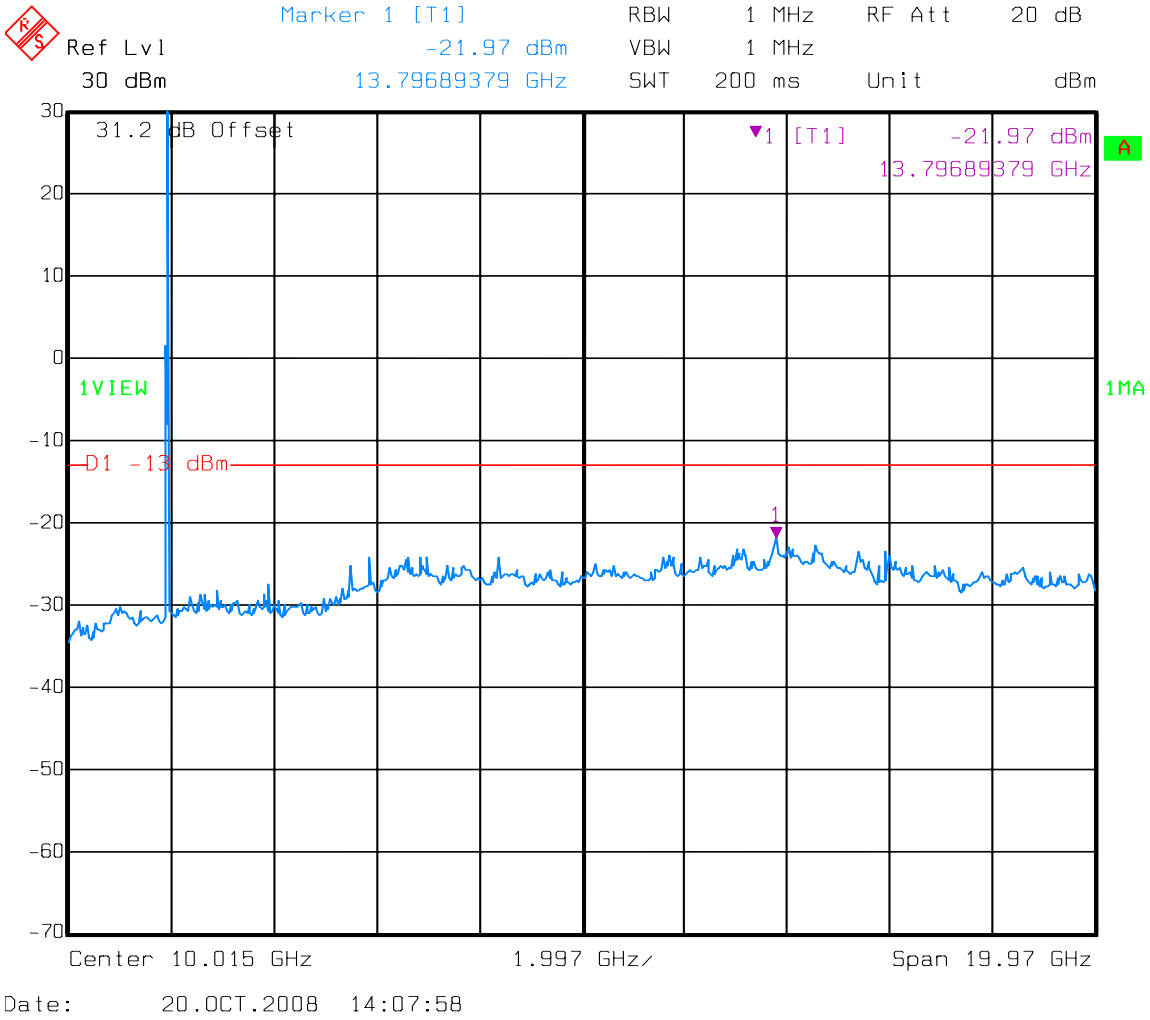
Test Data – Spurious Emissions at Antenna Terminals

GSM
SPURS
Downlink



Test Data – Spurious Emissions at Antenna Terminals

WCDMA/HSDPA
SPURS
Downlink



Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 24.238
TESTED BY: David Light	DATE: 06 October 2008

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.

Analyzer Settings: RBW = VBW = 1 MHz / Peak detector

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

Measurement Uncertainty: +/-1.7 dB

Temperature: 22 °C

Relative Humidity: 48 %

Section 7. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1065	ATTENUATOR	NARDA 776B-10	NONE	CBU	N/A
1604	ATTENUATOR	NARDA 776B-20	NONE	N/A	N/A
1659	Spectrum Analyzer	Rhode & Schwarz FSP	973353	01/24/07	01/24/09
1082	CABLE 2m	Astrolab 32027-2-29094-72TC	N/A	CBU	N/A
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/24/07	01/24/09
1484	Cable	Storm PR90-010-072	N/A	05/07/08	05/07/09
1485	Cable	Storm PR90-010-216	N/A	05/07/08	05/07/09
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	05/07/08	05/07/09
993	Horn antenna	A.H. Systems SAS-200/571	XXX	08/31/07	08/30/09
791	PREAMP, 25dB	Nemko USA, Inc. LNA25	398	05/07/08	05/07/09
1763	Bilog Antenna	Schaffner CBL 6111D	22926	10/21/07	10/20/08

ANNEX A - TEST DETAILS

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

Minimum Standard: Para. No.24.232. Base stations are limited to 1640 watts peak E.I.R.P. with an antenna height up to 300 meters HAAT. In no case may the peak output power of a base station transmitter exceed 100 watts.

Method Of Measurement:

Detachable Antenna:
The peak power at antenna terminals is measured using an in-line peak power meter or 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= 100 kHz
Span: 10 MHz
Sweep: Auto

NAME OF TEST: Spurious Emission at Antenna Terminals PARA. NO.: 24.238

Minimum Standard: Para. No.24.238(a). On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power by at least 43 + 10 log (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: 100 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.: 24.238

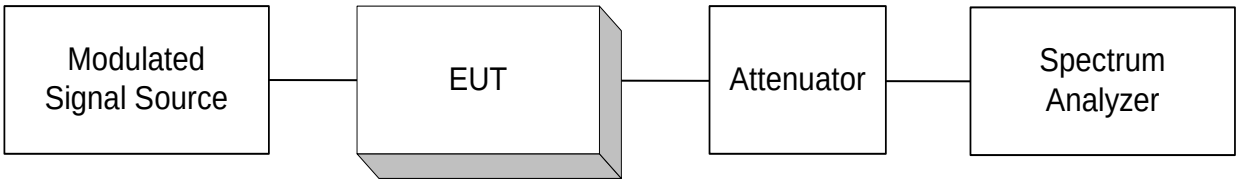
Minimum Standard: Para. No.24.238(a). On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power by at least 43 + 10 log (P) dB.

Method of Measurement TIA/EIA-603-1992

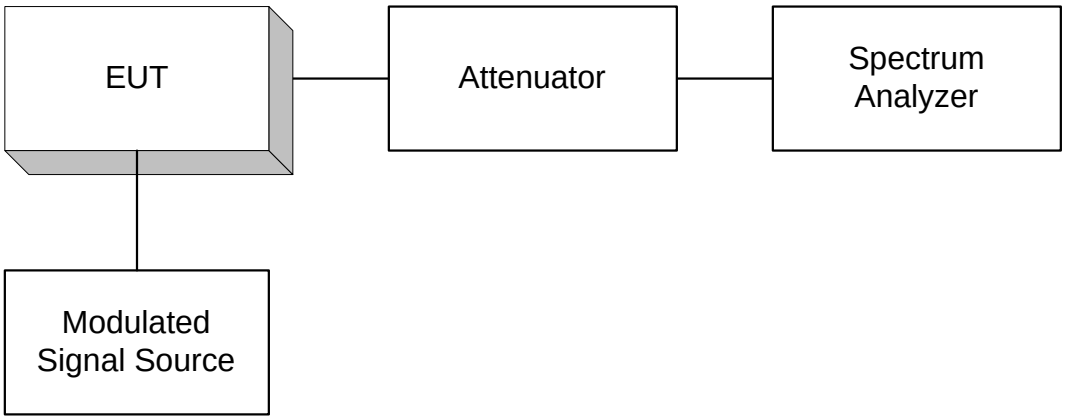
The antenna substitution method is used to determine the equivalent radiated power at spurious frequencies. The spurious emissions are measured at a distance of 3 meters. The EUT is then replaced with a reference substitution antenna with a known gain referenced to an isotropic radiator. This antenna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

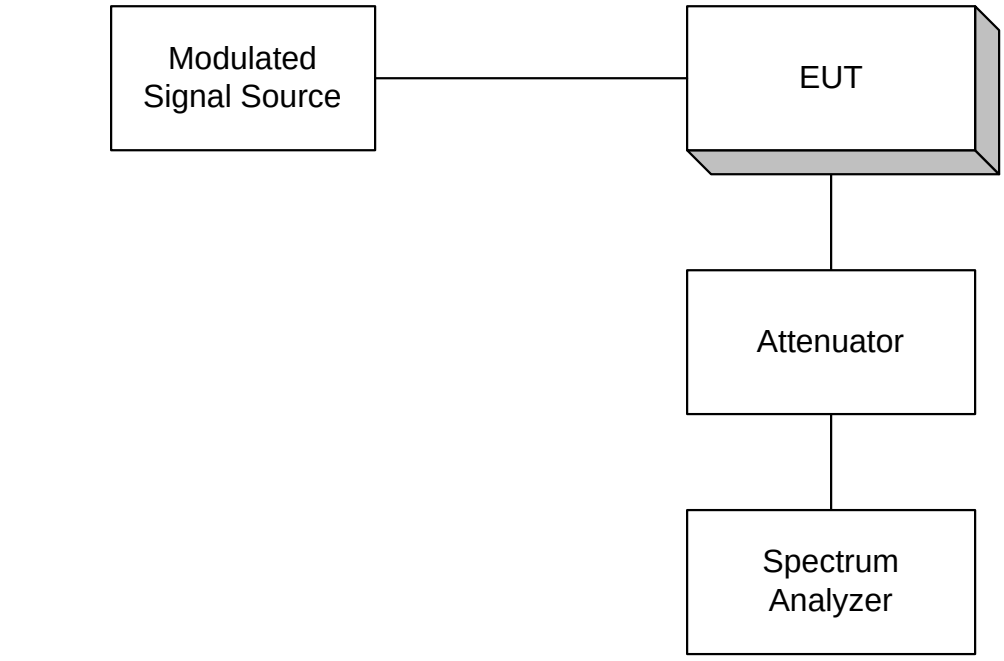
Para. No. 2.985 - R.F. Power Output

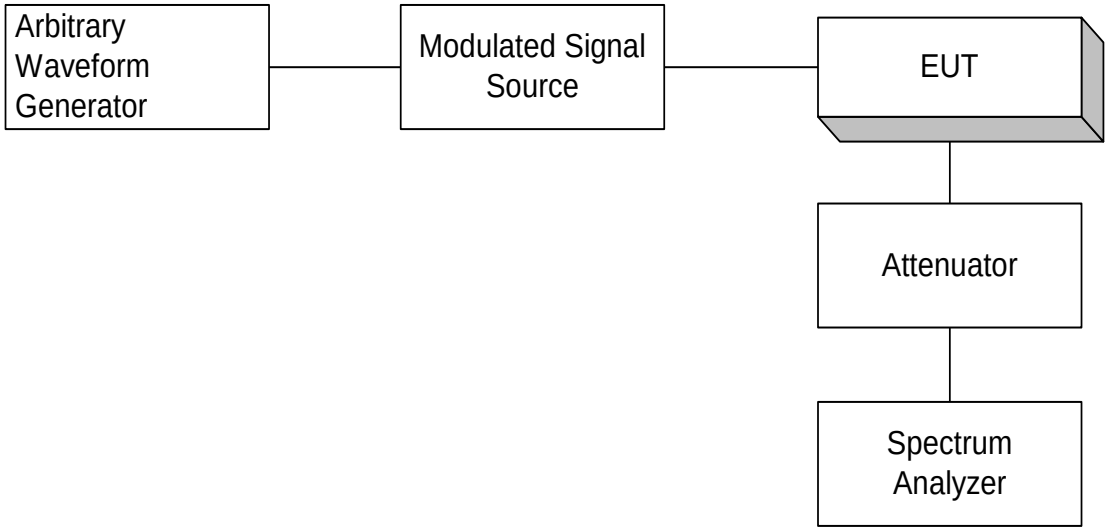


Para. No. 2.989 - Occupied Bandwidth

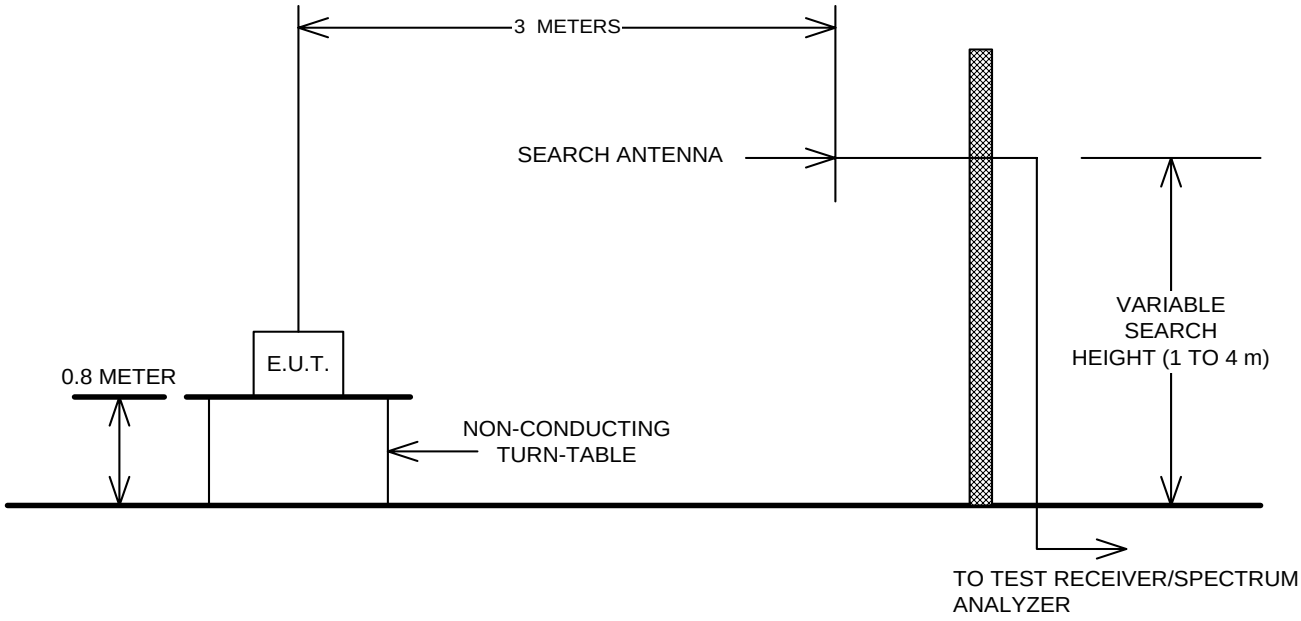


Para. No. 2.991 Spurious Emissions at Antenna Terminals





Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability