Nemko Test Report:	16262RUS1
Applicant:	Andrew Corporation 108 Rand Park Drive Garner, NC 27529 USA
Equipment Under Test: (E.U.T.)	AF8537
In Accordance With:	**CFR 47, Part 22, Subpart H** Cellular Band Repeaters
Tested By:	Nemko USA, Inc. 802 N. Kealy Lewisville, TX 75057-3136

TESTED BY: _____ **DATE:** **06 November, 2008**

David Light, Senior Wireless Engineer

APPROVED BY: _____ **DATE:** **10 November, 2008**

Tom Tidwell, Telecom Direct

Number of Pages: 83

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Section 1. Summary of Test Results

Manufacturer Andrew Corporation

Model No.: AF8537

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 22, Subpart H.

☒	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	22.913(a)	500W ERP	Complies
Occupied Bandwidth	Not defined	Input/Output	Complies
Spurious Emissions at Antenna Terminals	22.917	-13 dBm	Complies
Field Strength of Spurious Emissions	22.917	-13 dBm E.I.R.P.	Complies
Frequency Stability	22.355	1.5 ppm	NA

Footnotes:

(1) Modulation characteristics were not tested since the E.U.T. processes but does not produce a modulated waveform.
(2) The equipment under test uses a common oscillator to down-convert the rf input to an intermediate frequency and to up-convert the IF to rf output. The rf input and output frequency are the same.

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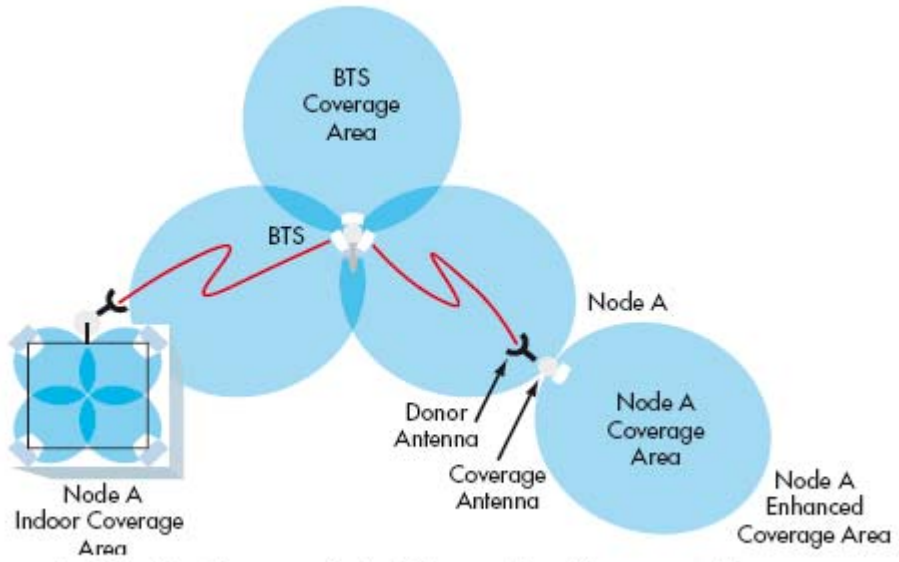
Section 2. General Equipment Specification

Supply Voltage Input:		120 Vac				
Frequency Range:	**Downlink:**	869-894 MHz				
Frequency Range:	**Uplink:**	824-849 Mhz				
Type of Modulation and Designator:		**CDMA W-CDMA (F9W)** ☒	**GSM (GXW)** ☒	**TDMA (DXW)** ☒	**EDGE (G7W)** ☒	**Analog (F3E/F1D)** ☒
Output Impedance:		50 ohms				
RF Output (Rated):	**Downlink:**	5.0 W 37 dBm				
	Uplink:	1.0 W 30 dBm				
Frequency Translation:		**F1-F1** ☒		**F1-F2** ☐		**N/A** ☐
Band Selection:		**Software** ☒		**Duplexer Change** ☐		**Fullband Coverage** ☐

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.: 22.913
TESTED BY: David Light	DATE: 05 November 2008

Test Results: Complies.

Test 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
	TDMA	37	5.0
	Analog	37	5.0
Uplink	CDMA	30	1.0
	GSM	30	1.0
	EDGE	30	1.0
	WCDMA	30	1.0
	TDMA	30	1.0
	Analog	30	1.0

Equipment Used: 1065-1604-1082-1659-1663

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: 05 November 2008

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1065-1604-1082-1659-1663

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

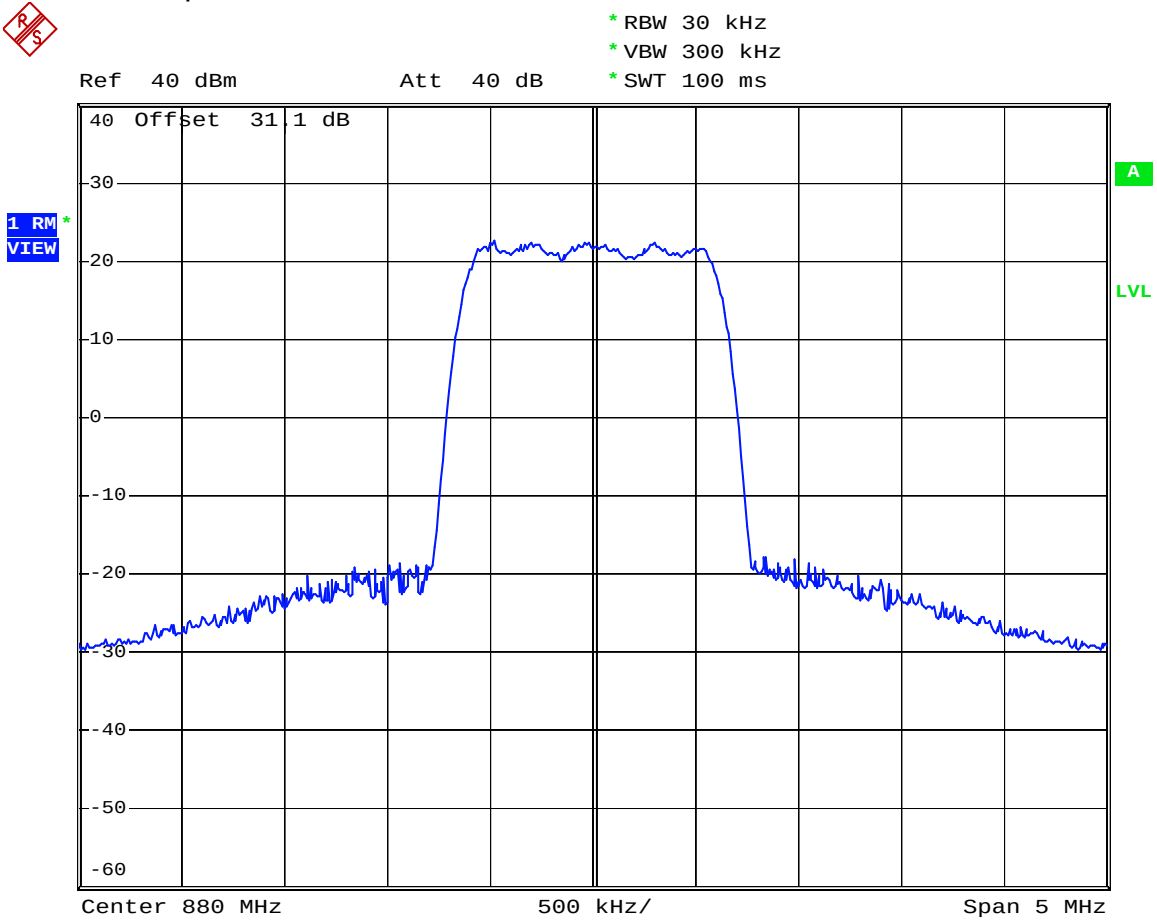
Temperature: 22 °C

Relative Humidity: 48 %

Test Data – Occupied Bandwidth

Downlink

CDMA – Output

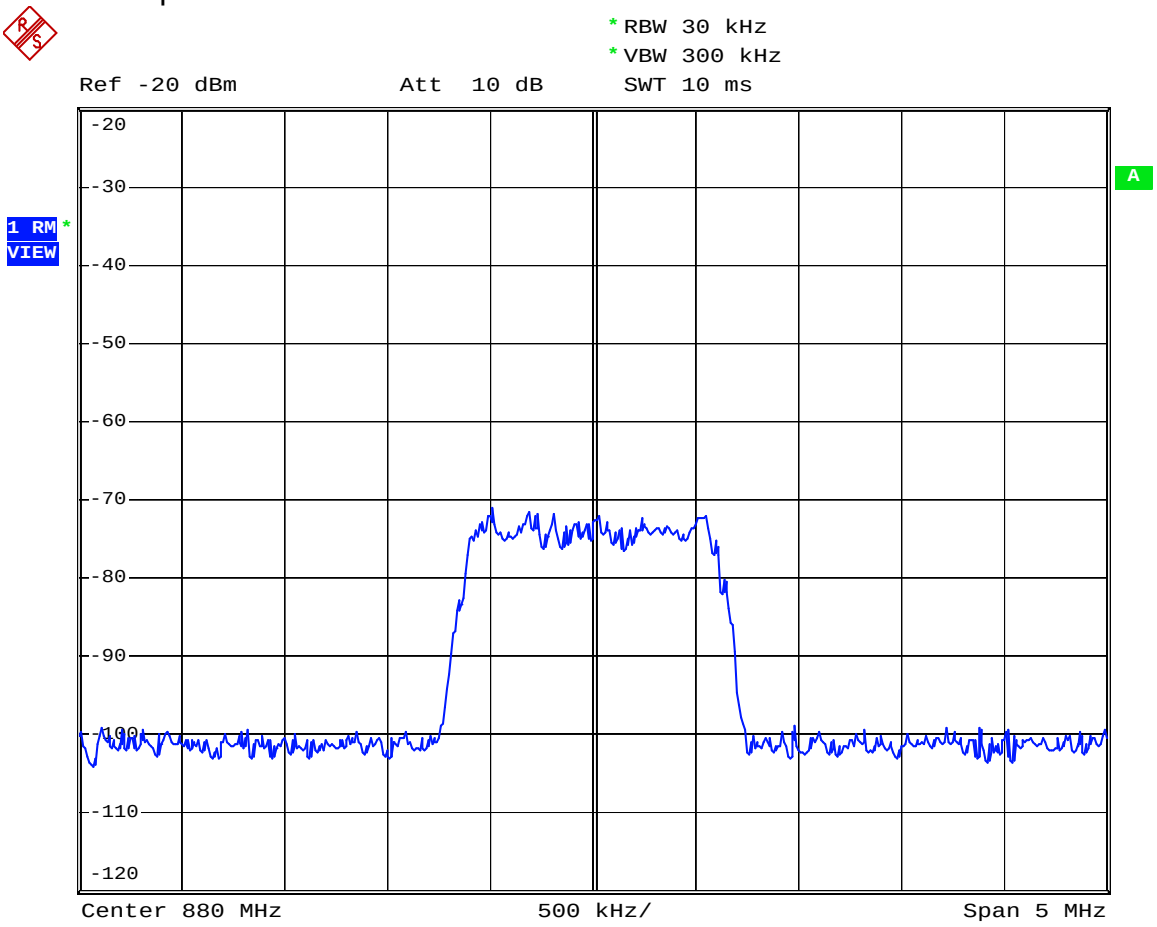


Date: 5.NOV.2008 14:02:56

Test Data – Occupied Bandwidth

Downlink

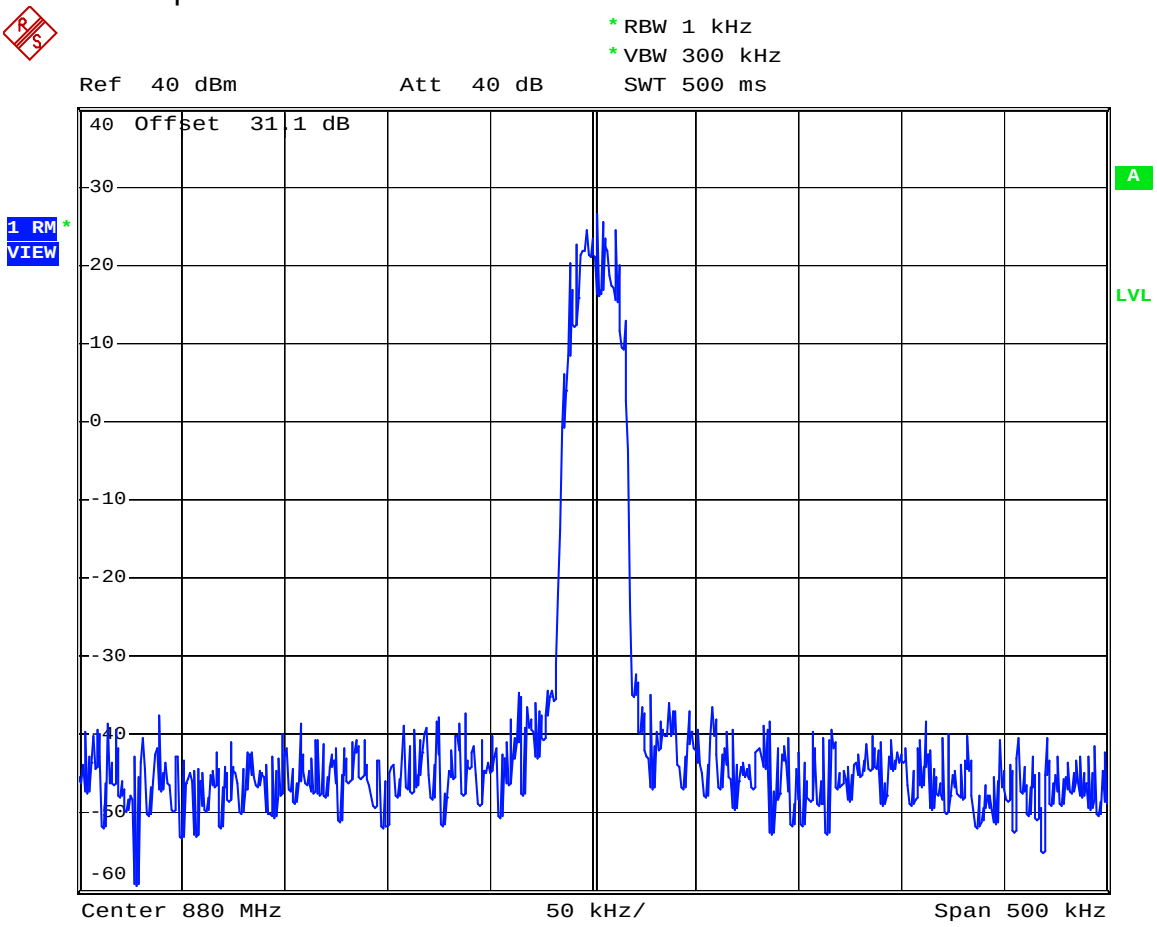
CDMA – Input



Date: 5.NOV.2008 15:07:24

Test Data – Occupied Bandwidth

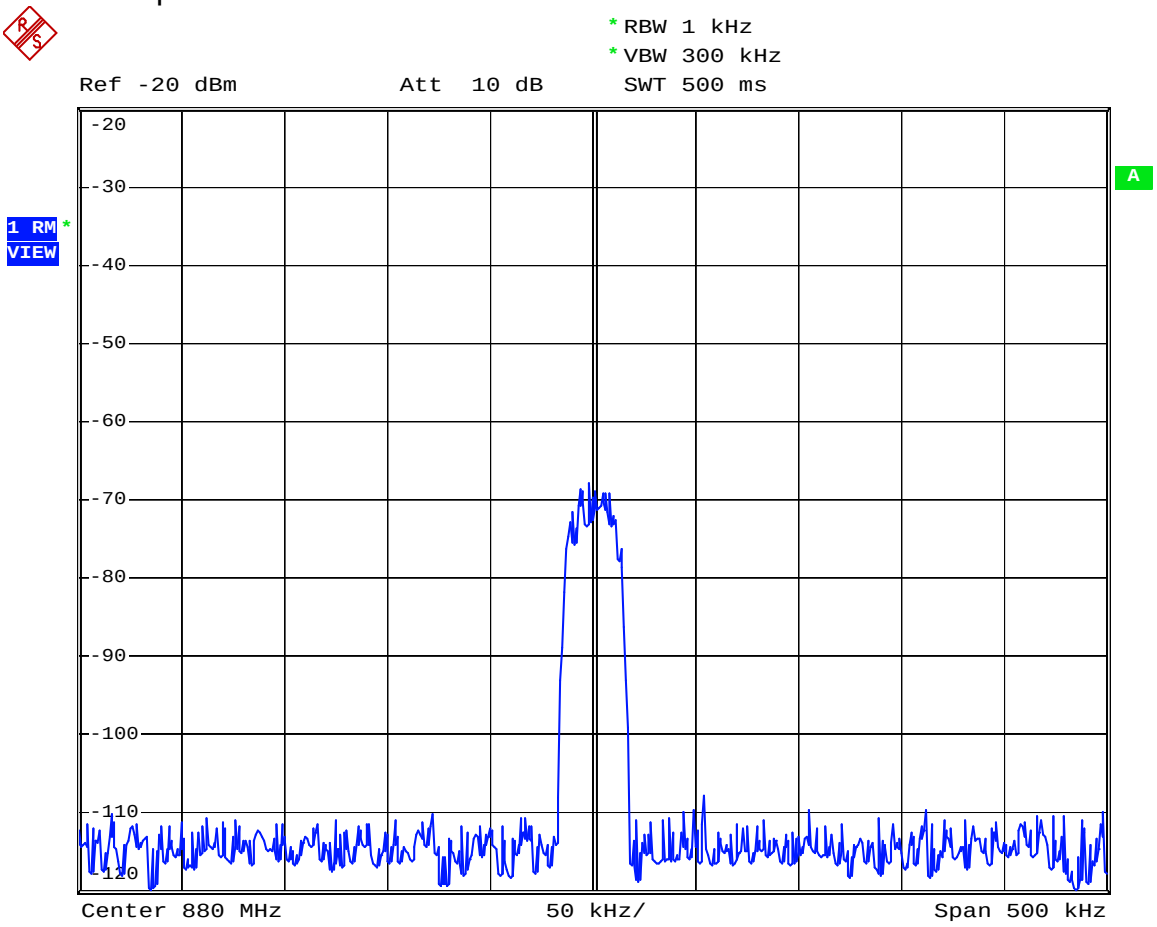
Downlink
TDMA - Output



Date: 5.NOV.2008 14:43:37

Test Data – Occupied Bandwidth

Downlink
TDMA – Input

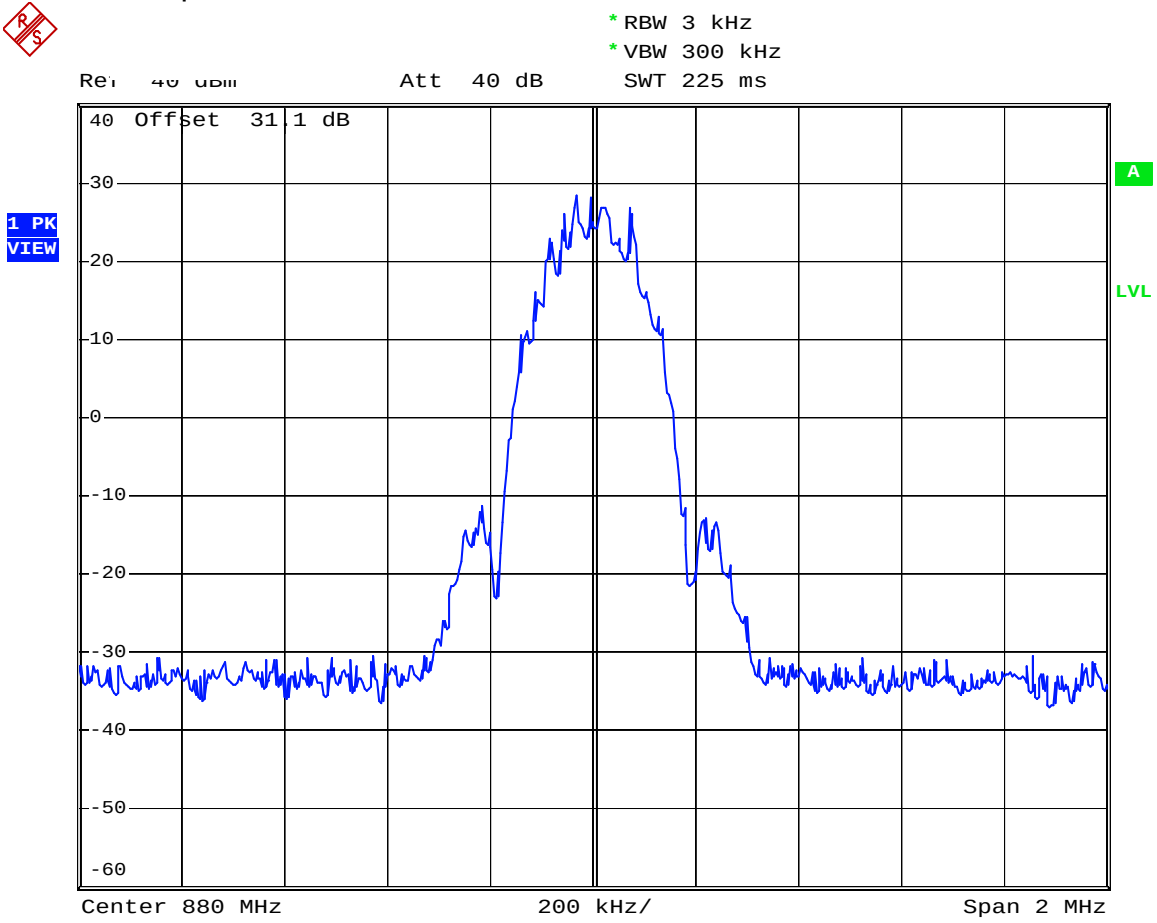


Date: 5.NOV.2008 15:01:45

Test Data – Occupied Bandwidth

Downlink

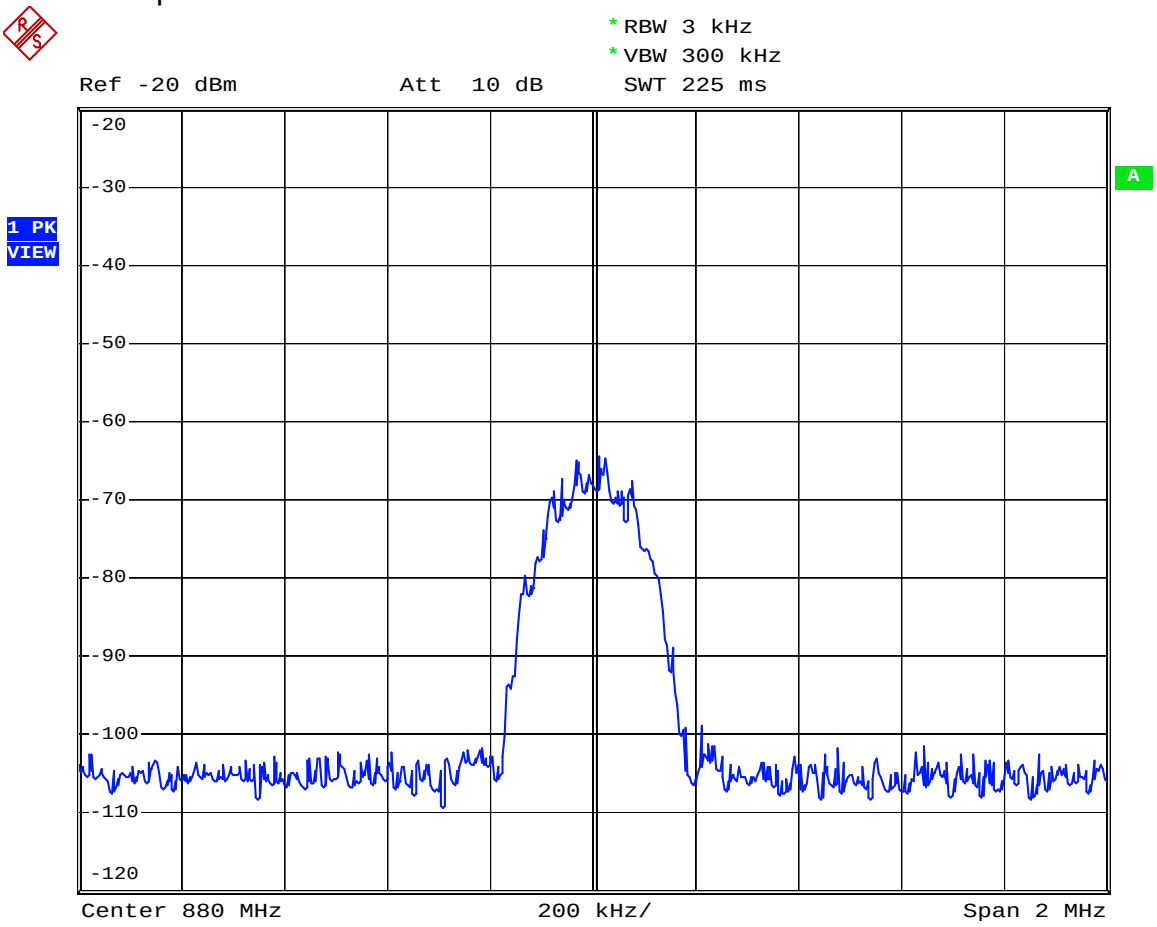
EDGE – Output



Test Data – Occupied Bandwidth

Downlink

EDGE – Input

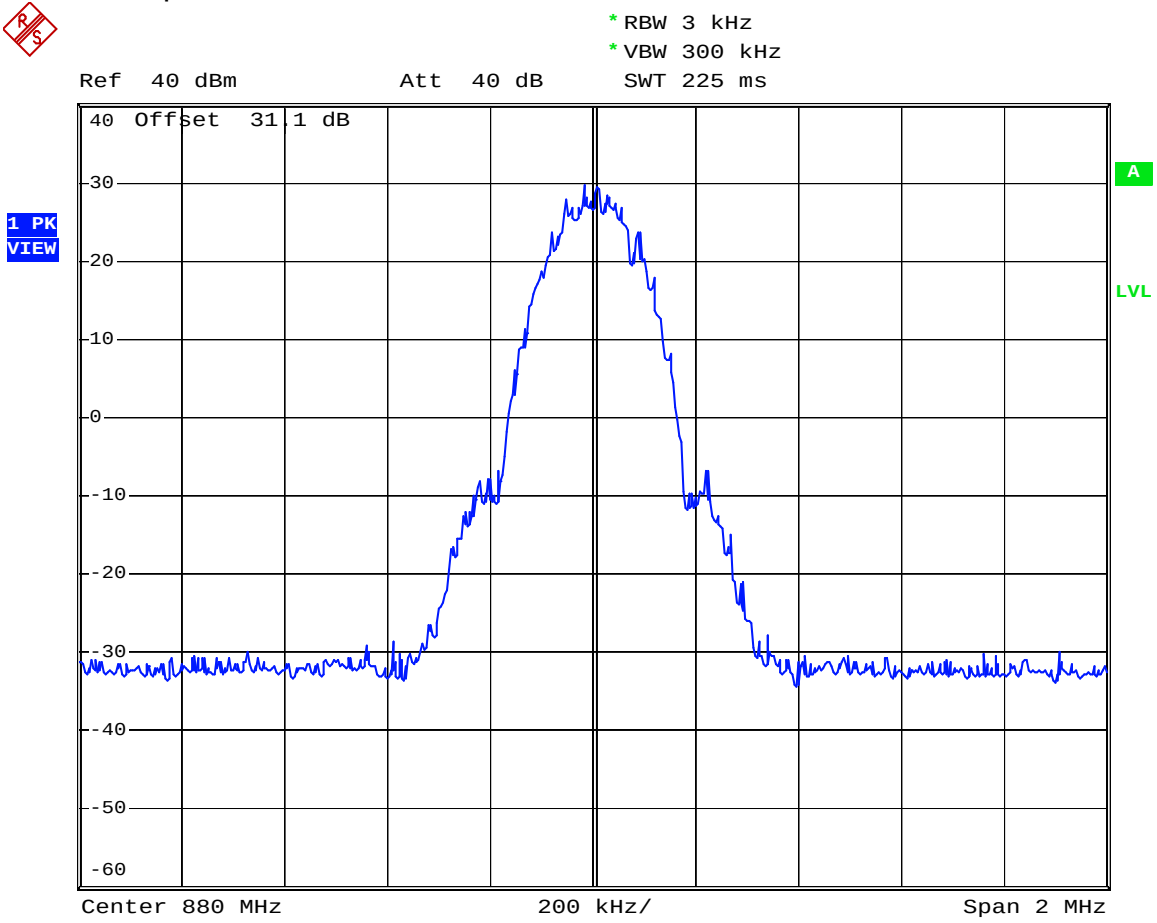


Date: 5.NOV.2008 15:06:04

Test Data – Occupied Bandwidth

Downlink

GSM – Output

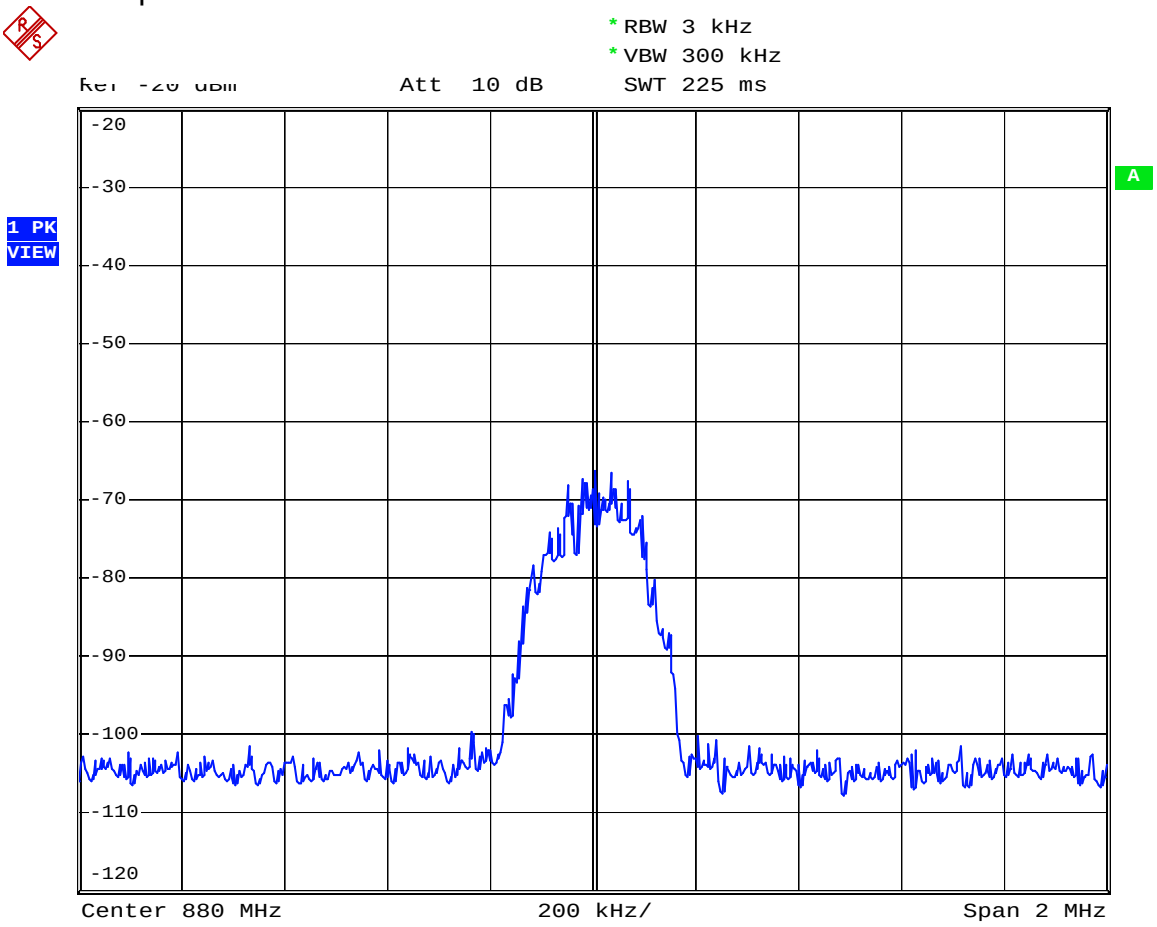


Date: 5.NOV.2008 14:21:45

Test Data – Occupied Bandwidth

Downlink

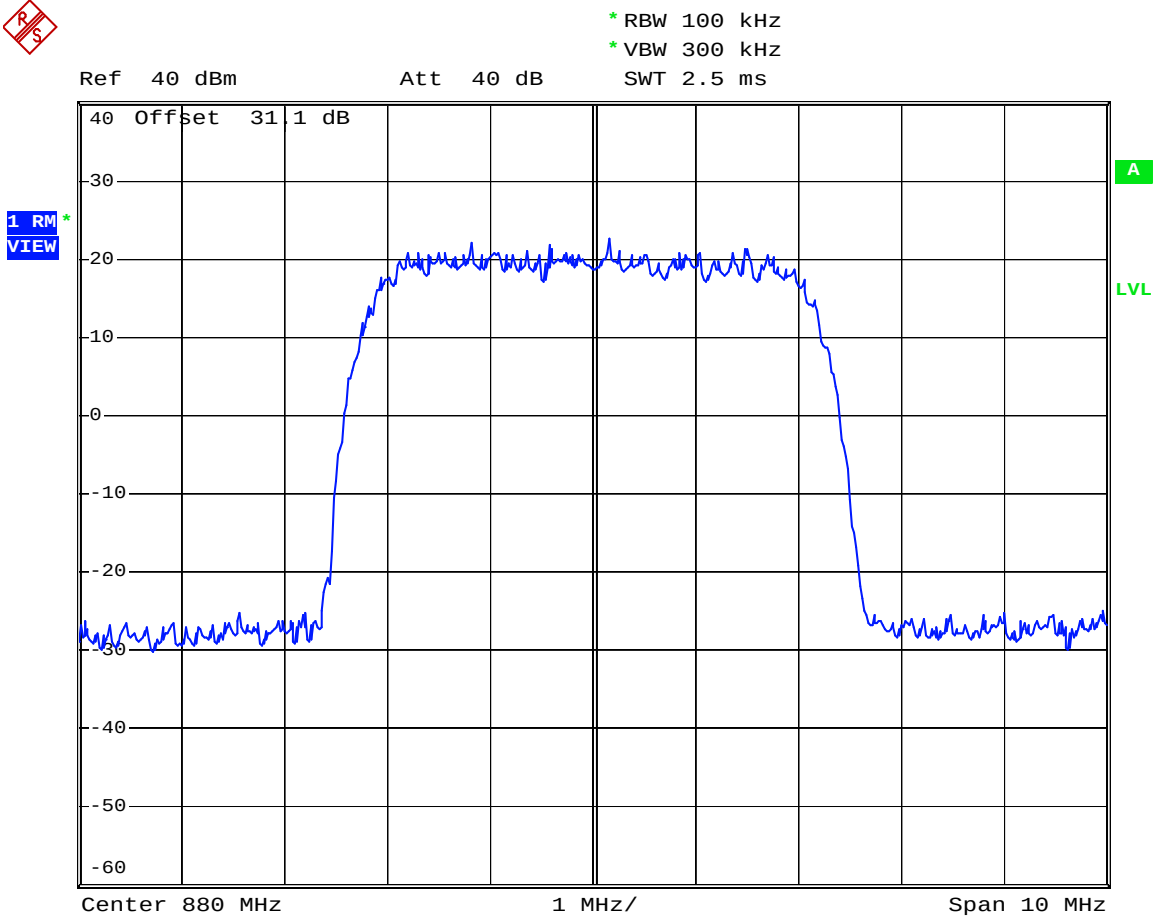
GSM – Input



Date: 5.NOV.2008 15:05:19

Test Data – Occupied Bandwidth

Downlink
W-CDMA - Output



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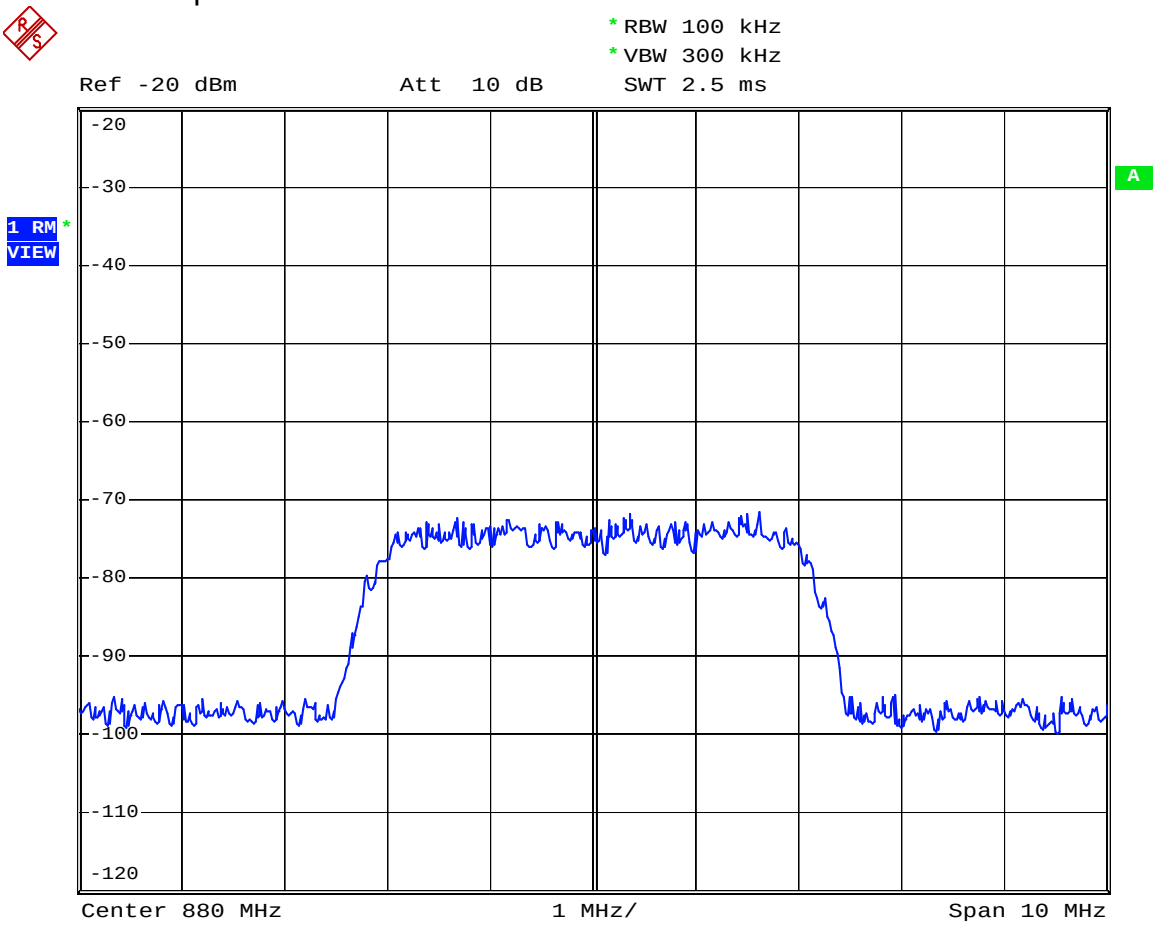
Test Data – Occupied Bandwidth

Downlink
W-CDMA - Input

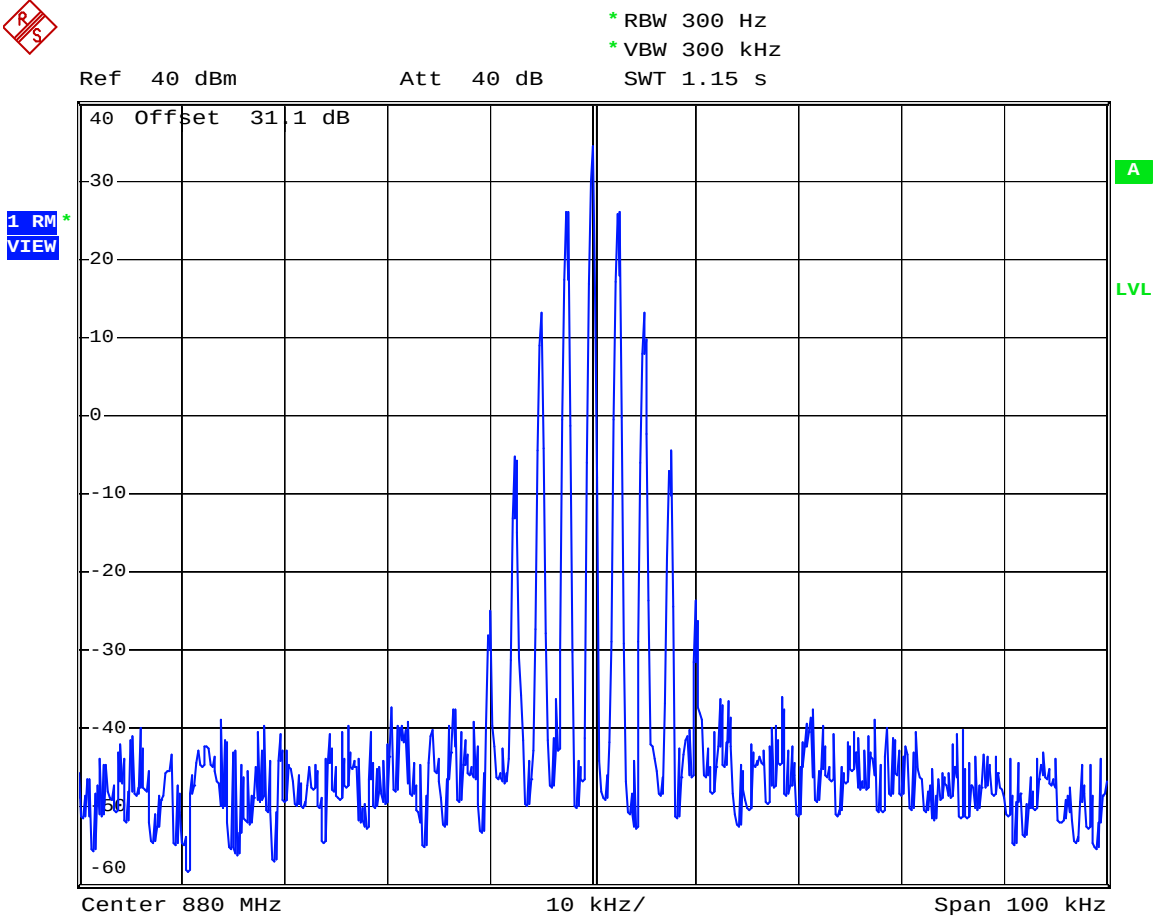


Date: 5.NOV.2008 15:02:55

Test Data – Occupied Bandwidth

Downlink

Analog – Output



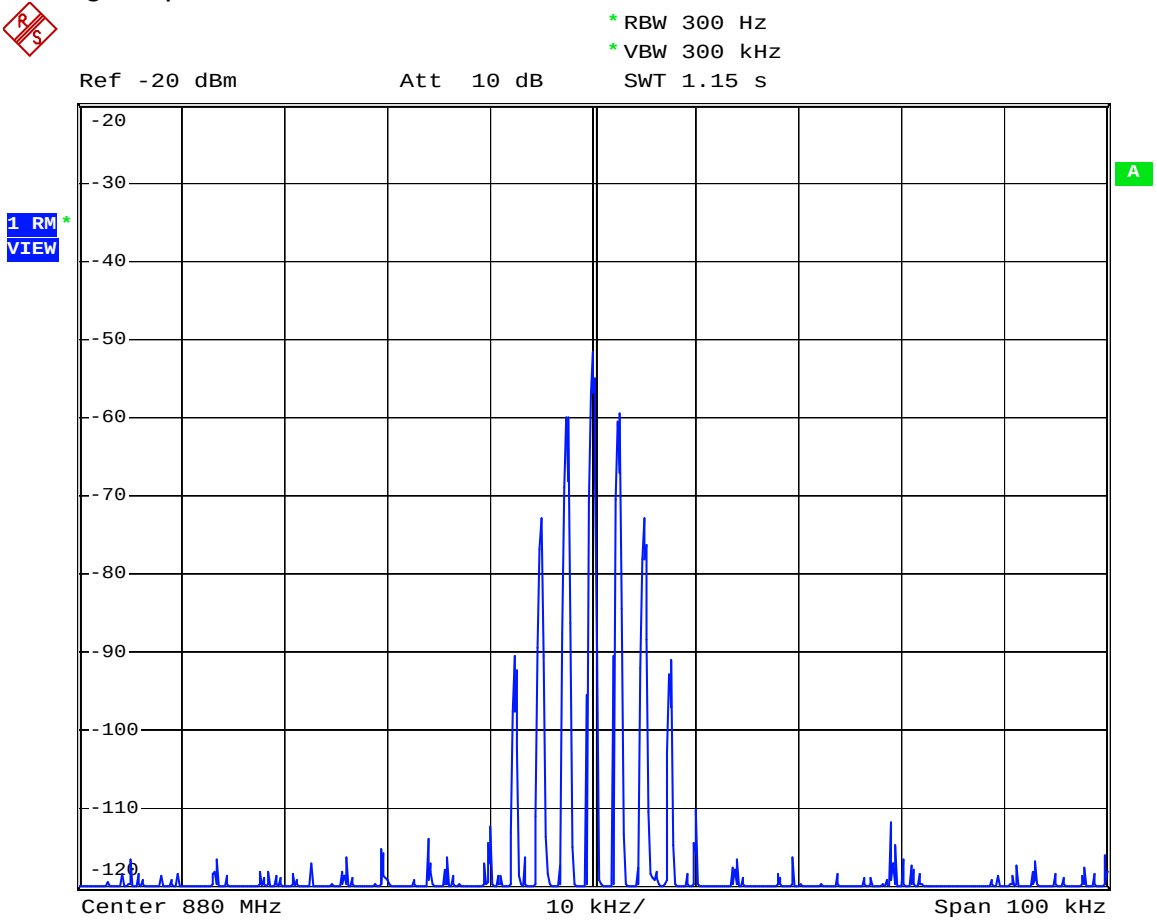
Date: 5.NOV.2008 14:48:14

2 kHz Tone / 2.5 kHz Deviation

Test Data – Occupied Bandwidth

Downlink

Analog – Input



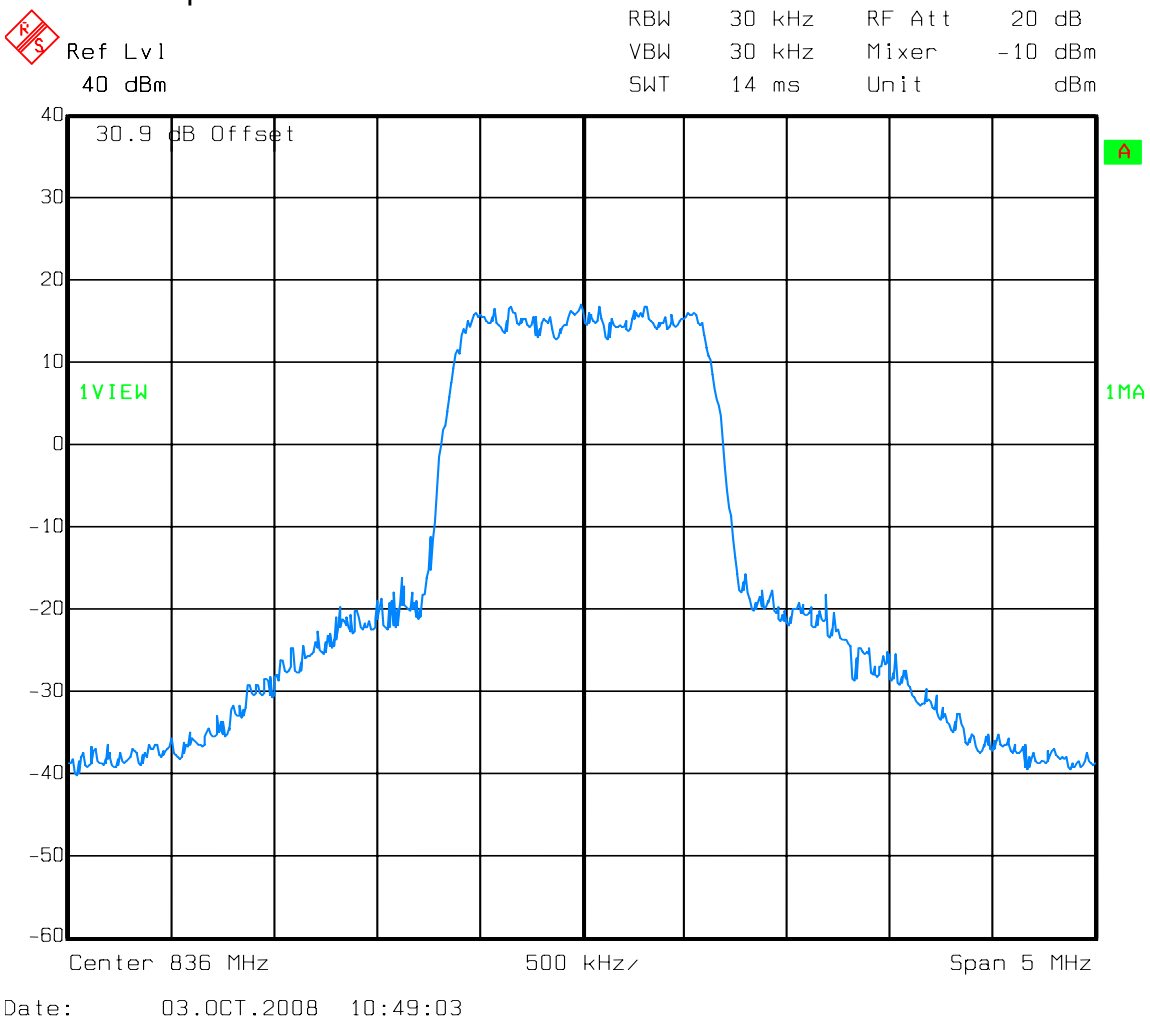
Date: 5.NOV.2008 15:00:16

2 kHz Tone / 2.5 kHz Deviation

Test Data – Occupied Bandwidth

Uplink

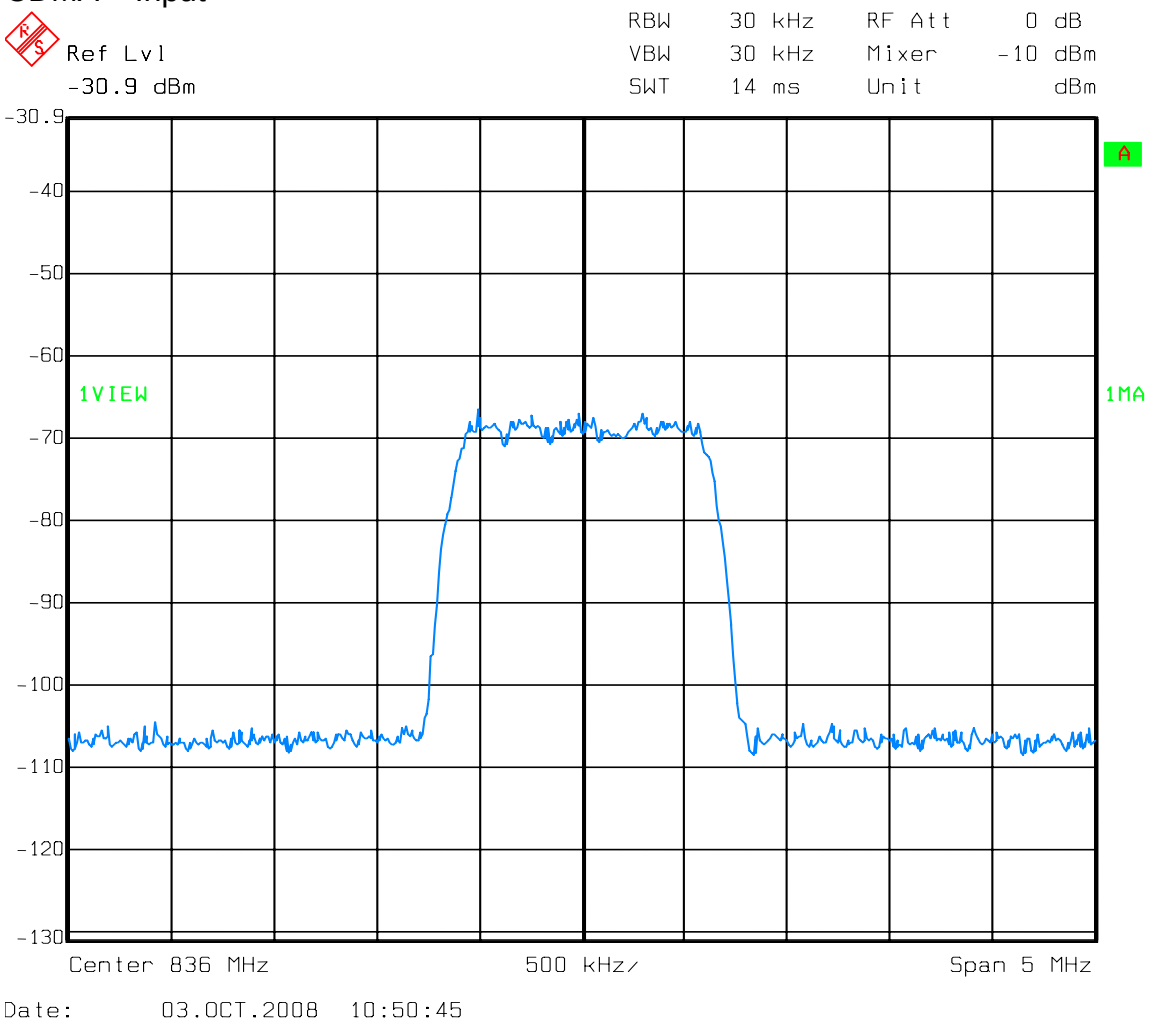
CDMA – Output



Test Data – Occupied Bandwidth

Uplink

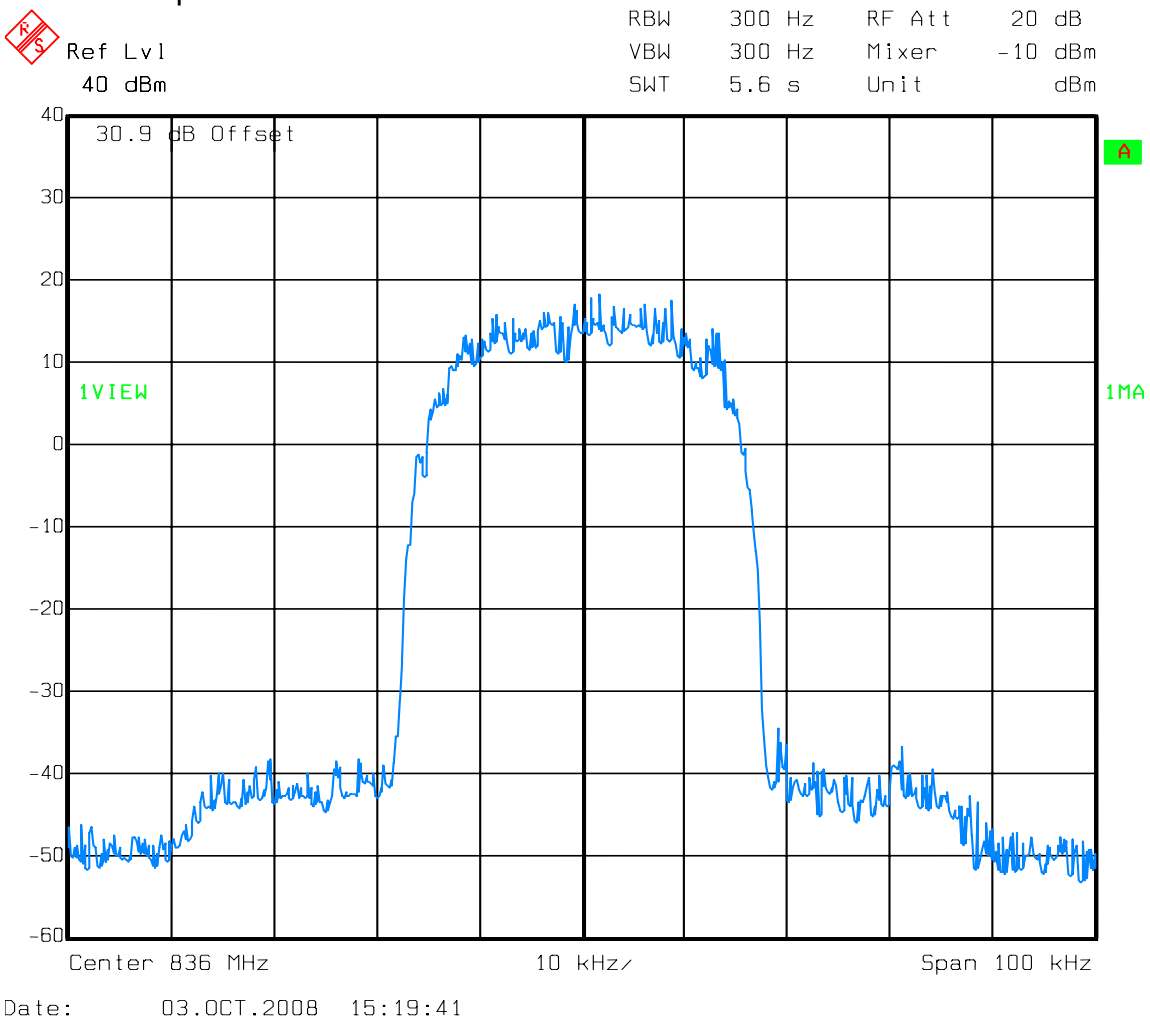
CDMA – Input



Test Data – Occupied Bandwidth

Uplink

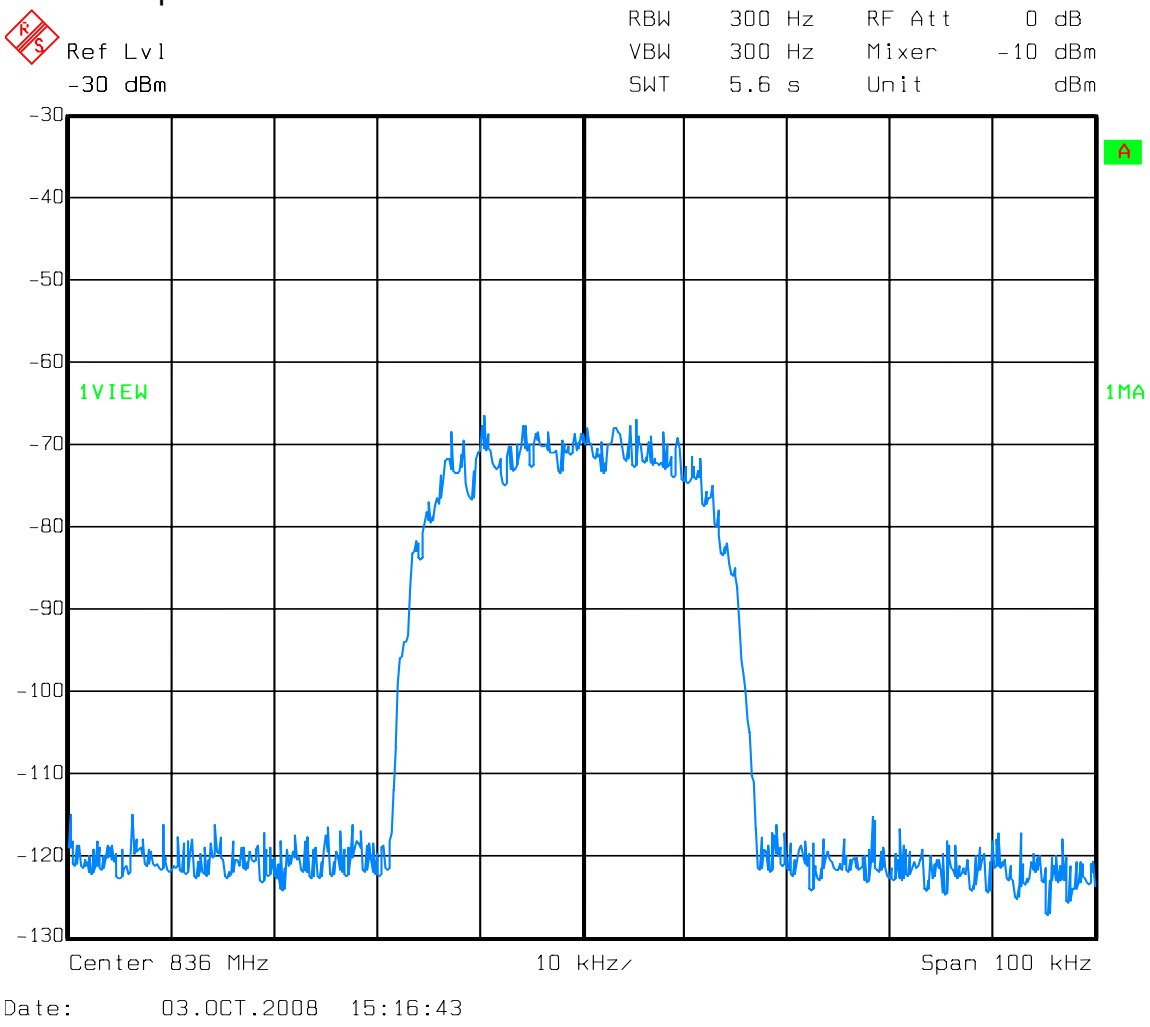
TDMA - Output



Test Data – Occupied Bandwidth

Uplink

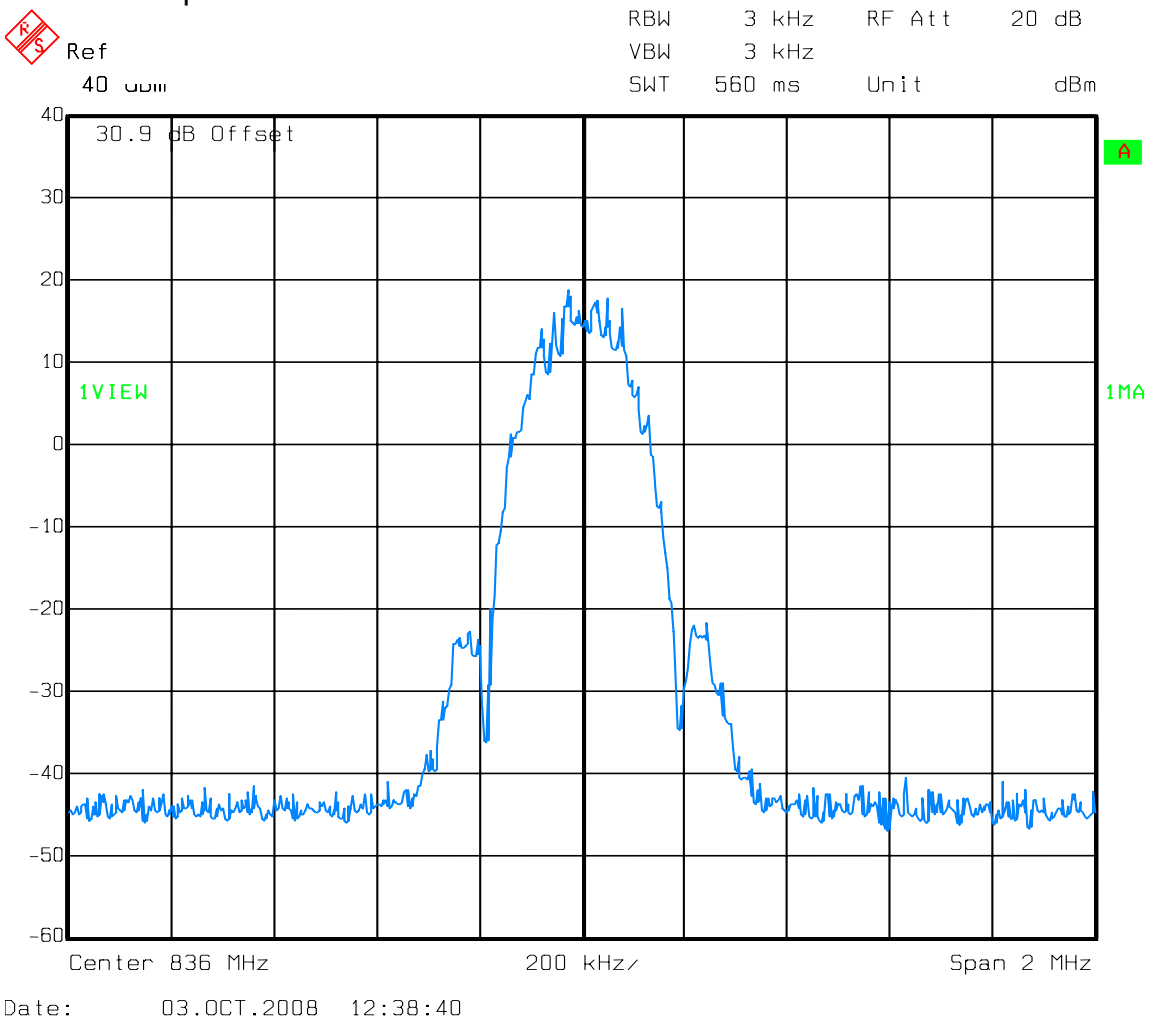
TDMA – Input



Test Data – Occupied Bandwidth

Uplink

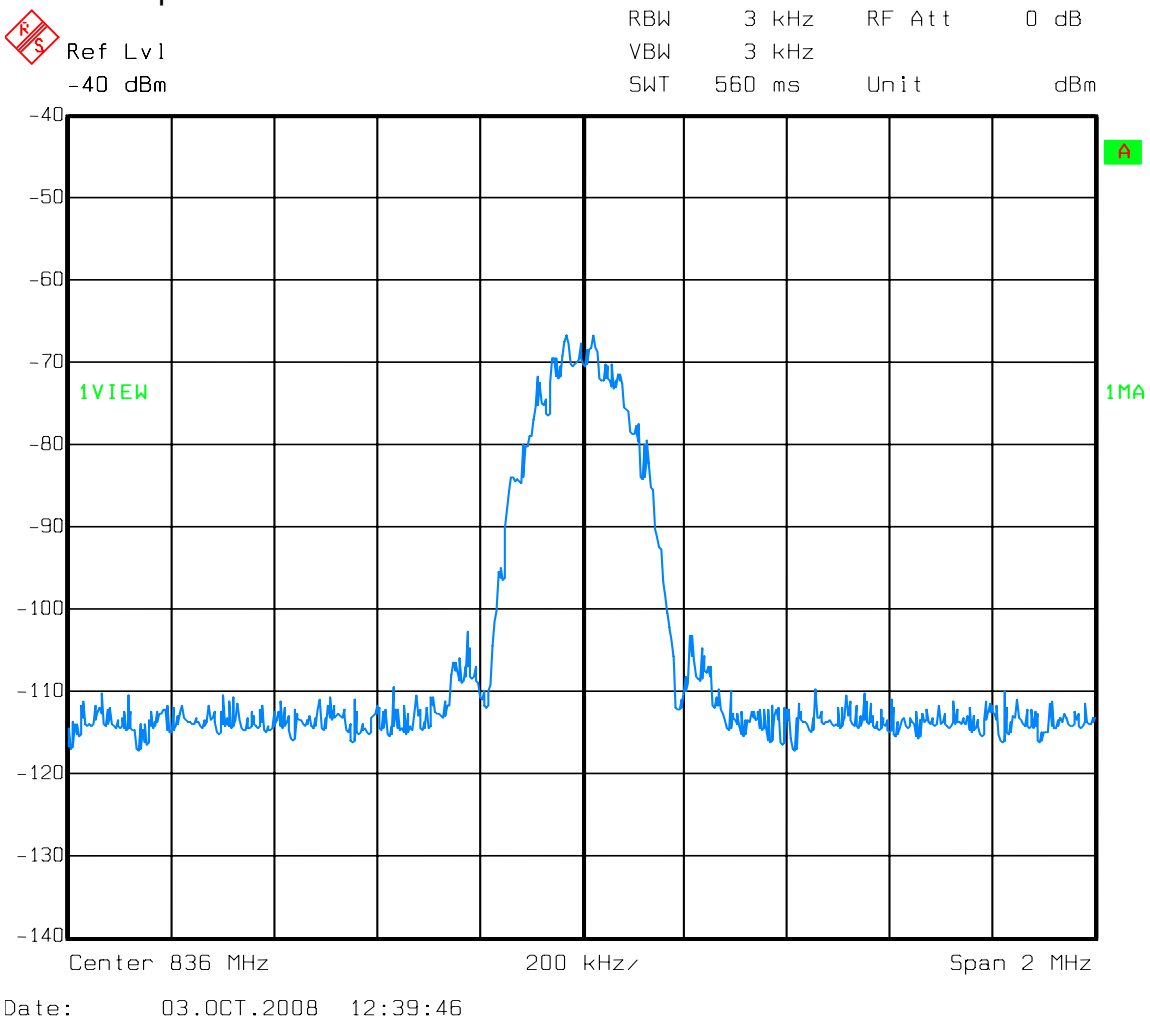
EDGE – Output



Test Data – Occupied Bandwidth

Uplink

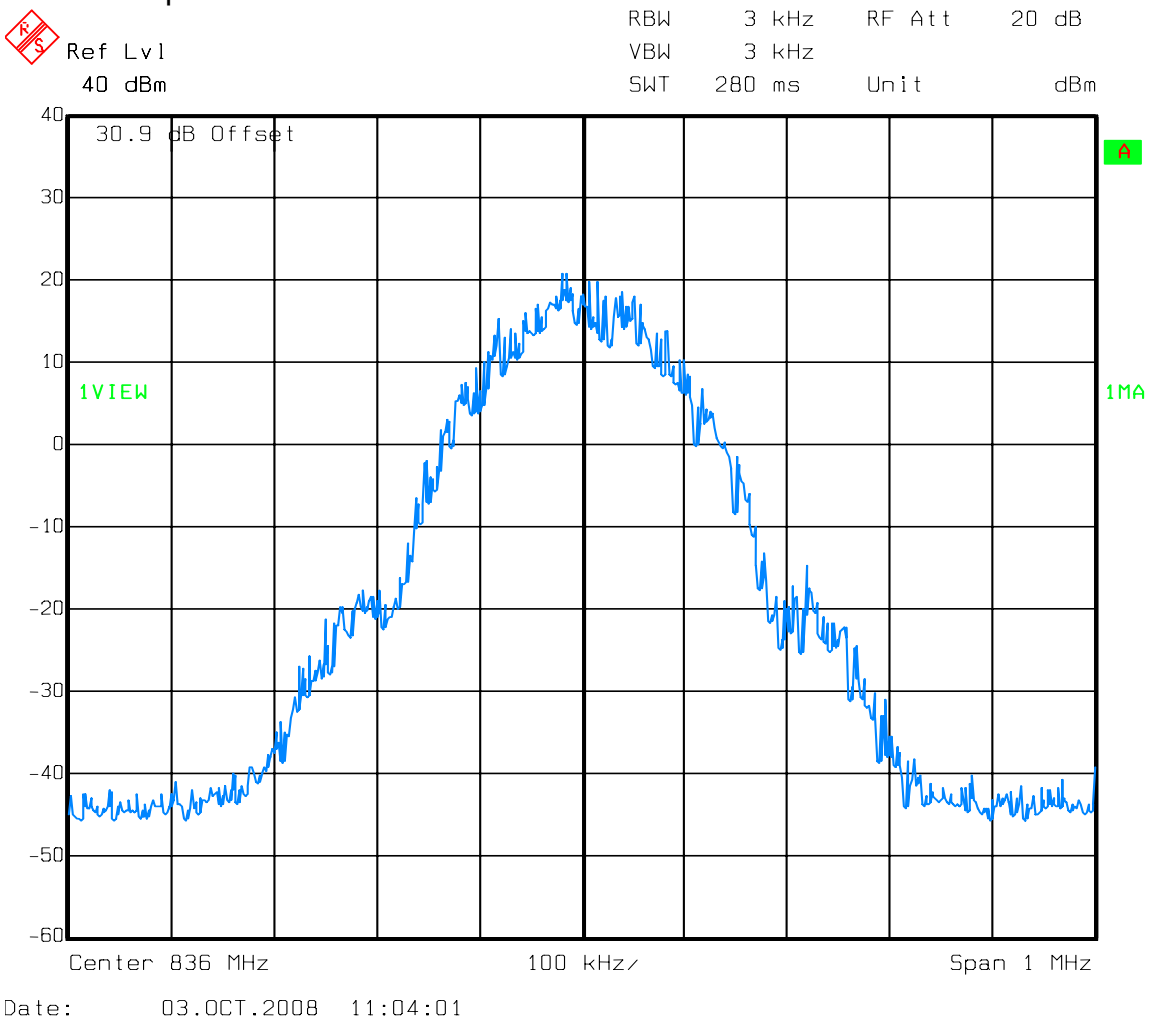
EDGE – Input



Test Data – Occupied Bandwidth

Uplink

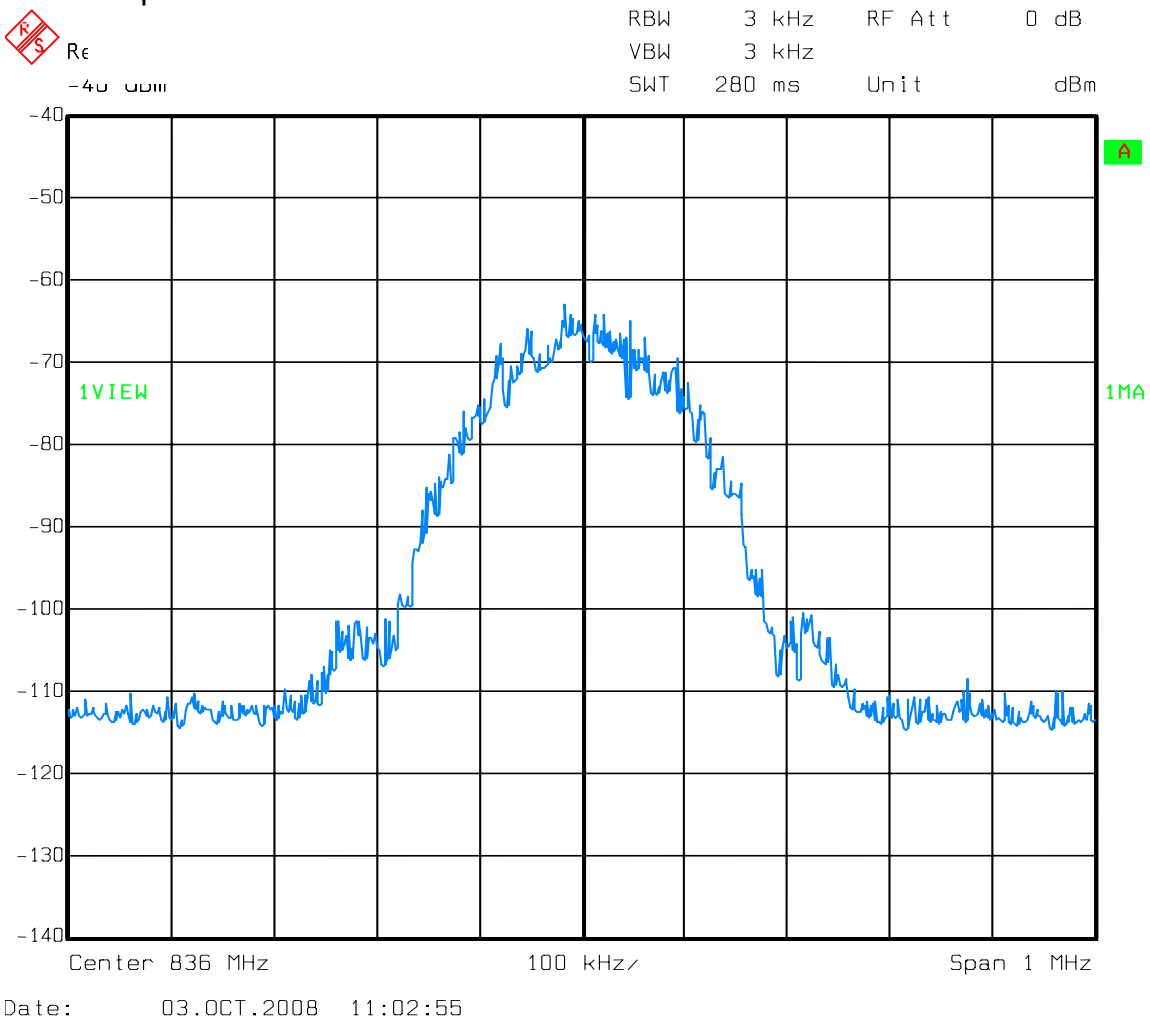
GSM – Output



Test Data – Occupied Bandwidth

Uplink

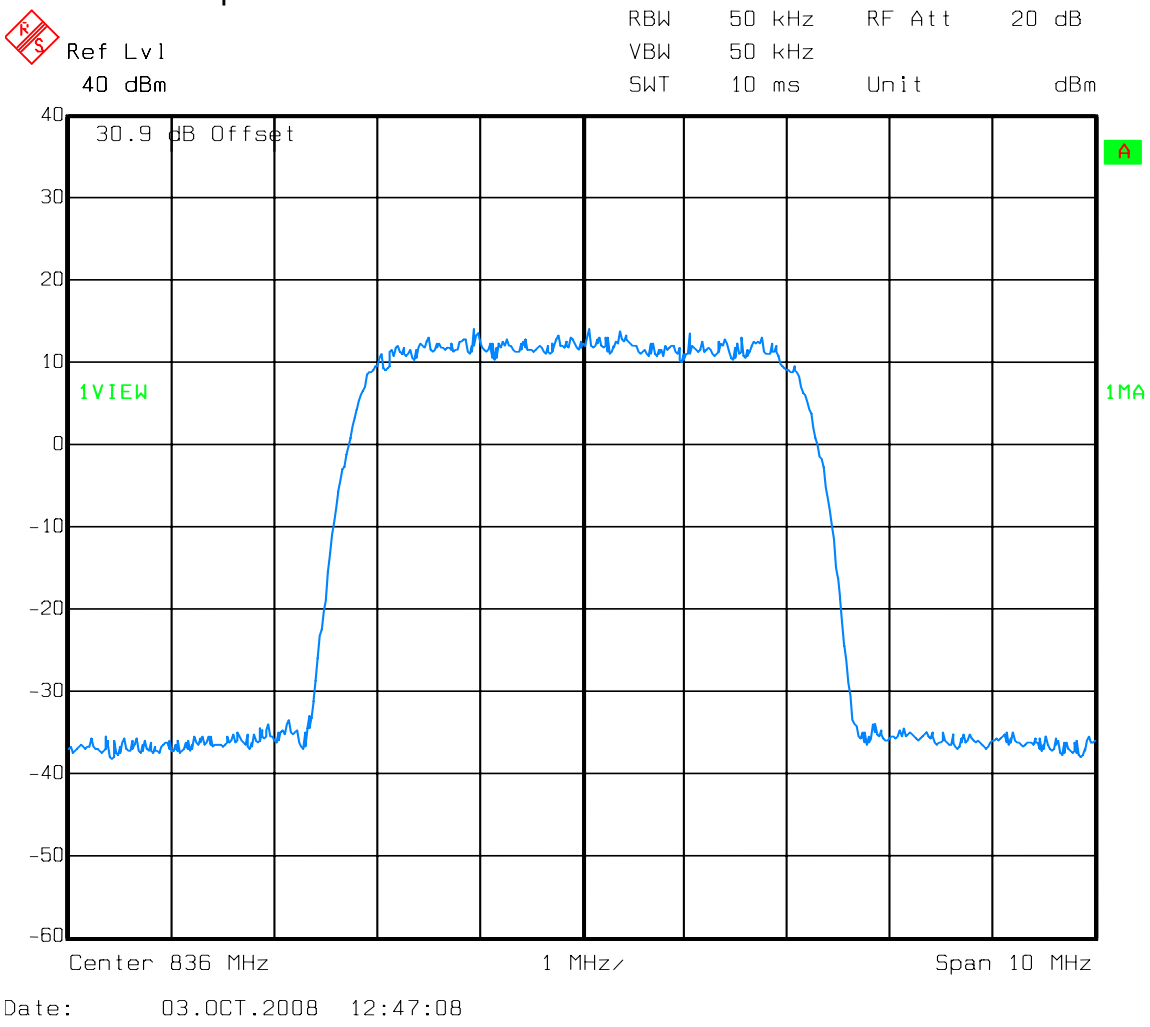
GSM – Input



Test Data – Occupied Bandwidth

Uplink

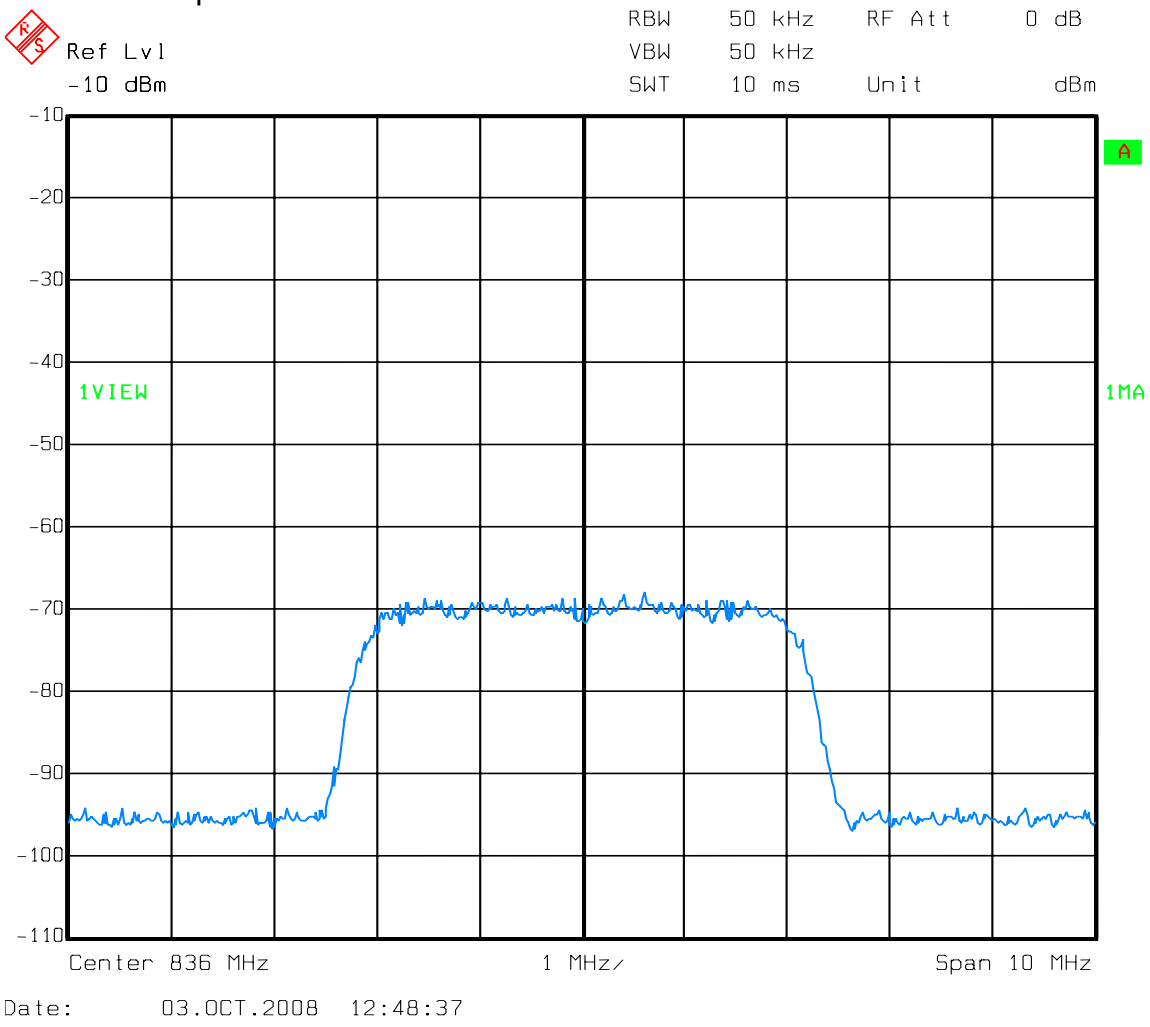
W-CDMA - Output



Test Data – Occupied Bandwidth

Uplink

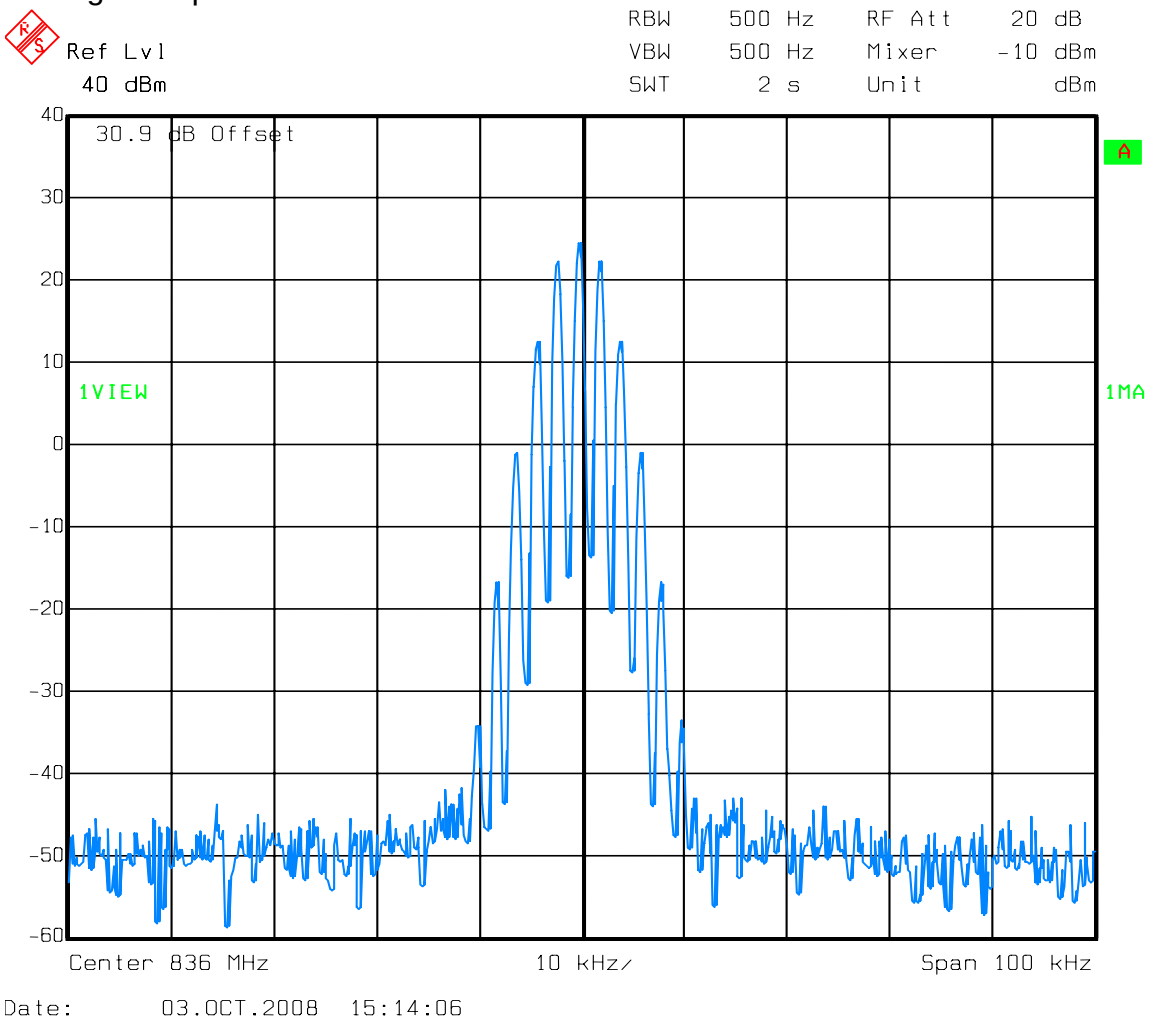
W-CDMA - Input



Test Data – Occupied Bandwidth

Uplink

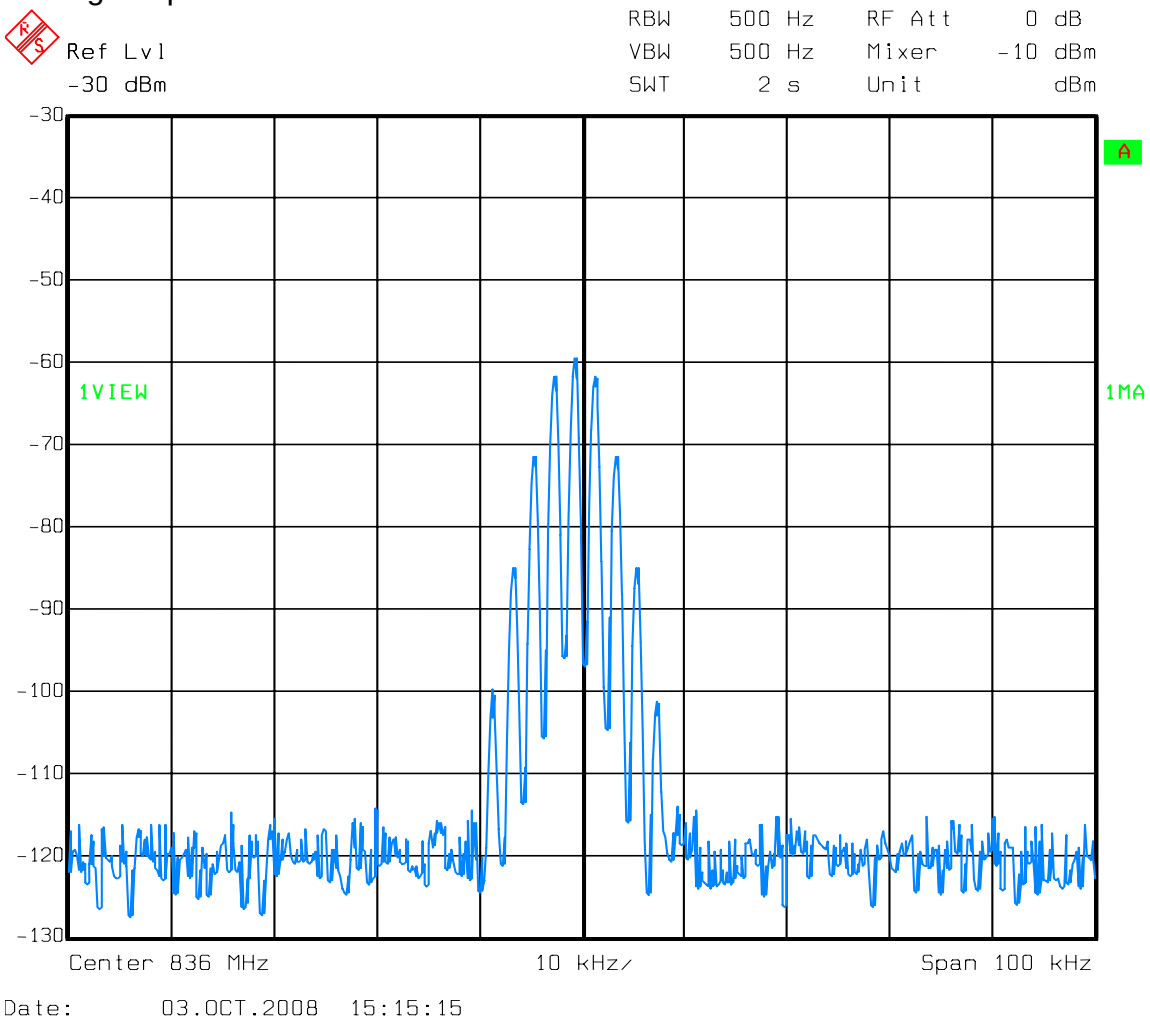
Analog – Output



Test Data – Occupied Bandwidth

Uplink

Analog – Input



Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 22.917
TESTED BY: David Light	DATE: 05 November 2008

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1065-1604-1082-1659-1663-1464

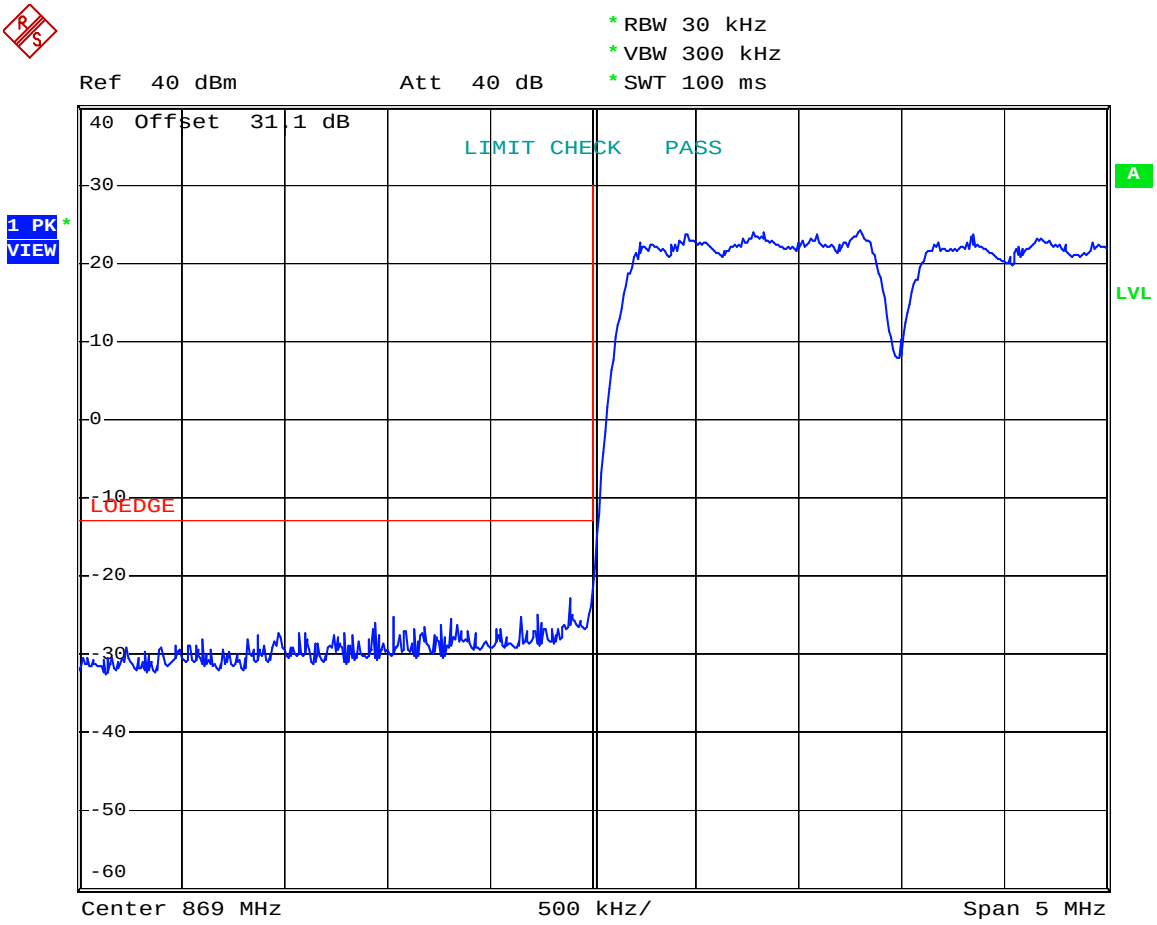
Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 35 %

Test Data – Spurious Emissions at Antenna Terminals

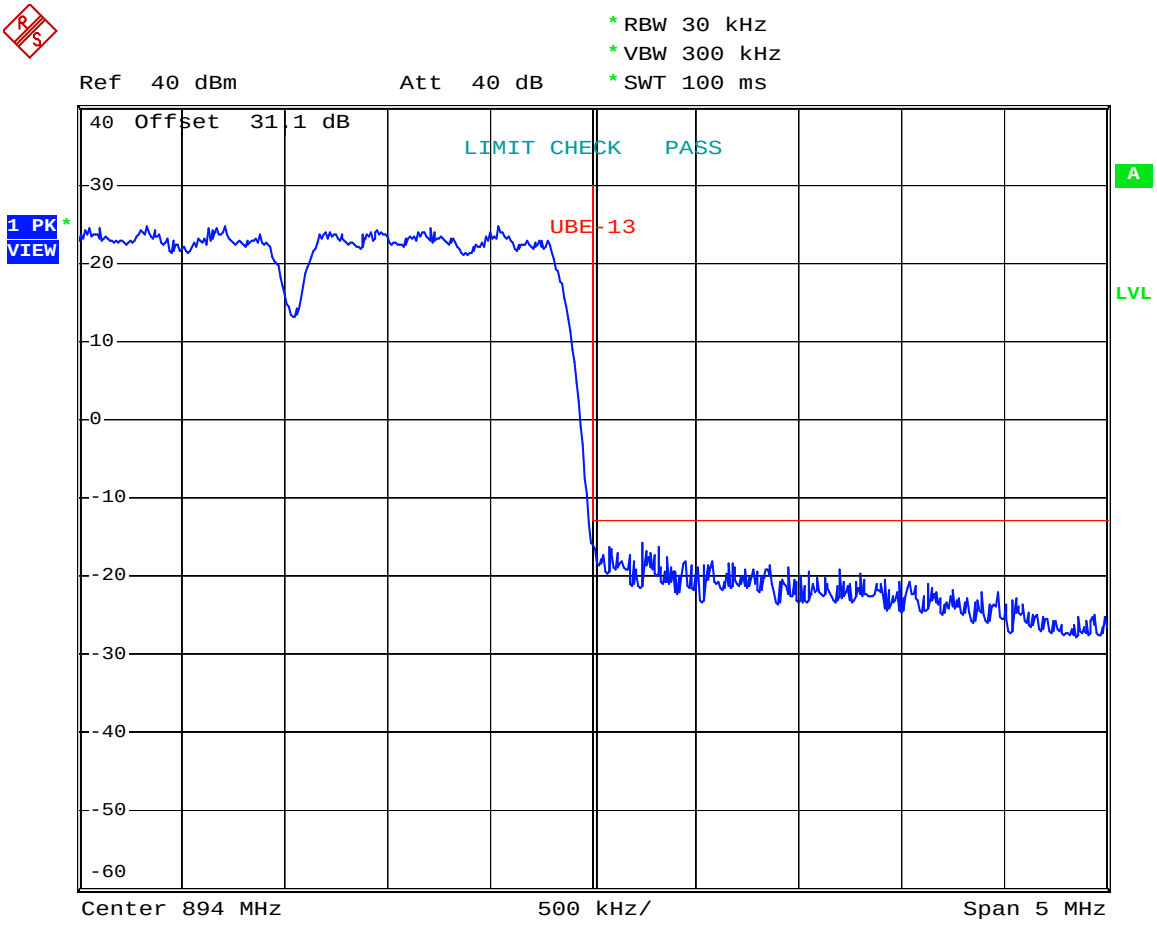
Downlink - Lower Bandedge Intermodulation
CDMA



Date: 5.NOV.2008 14:07:35

Test Data – Spurious Emissions at Antenna Terminals

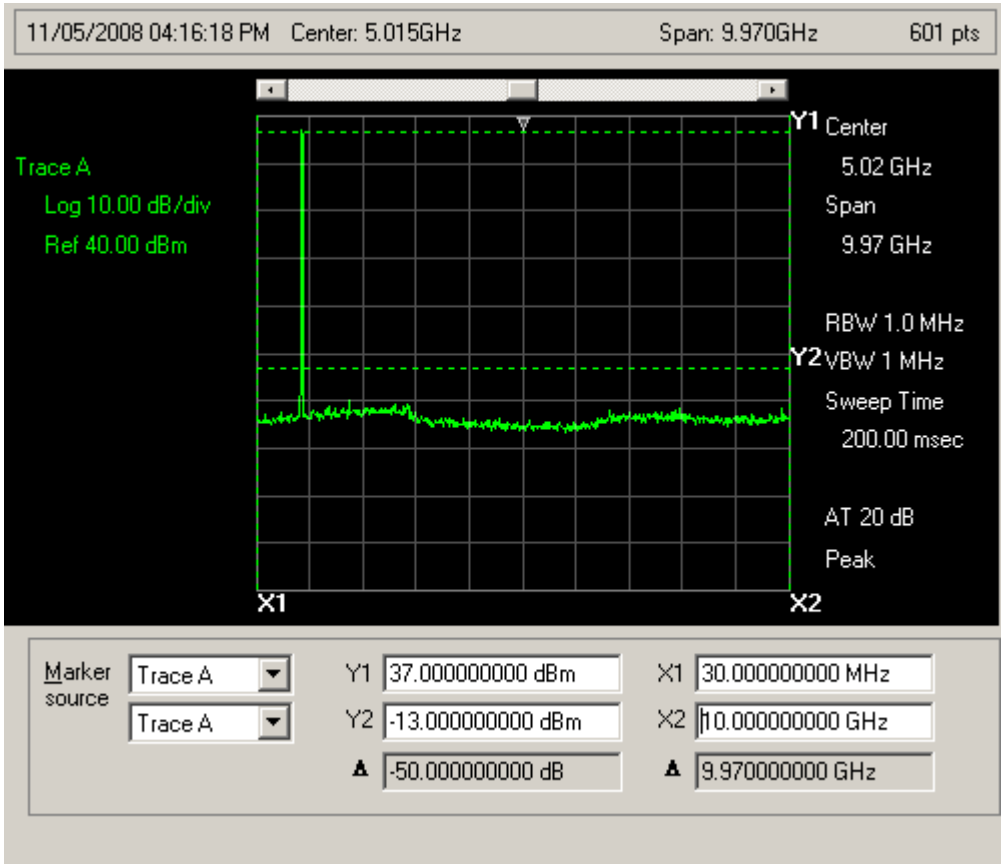
Downlink - Upper Bandedge Intermodulation
CDMA



Date: 5.NOV.2008 14:10:33

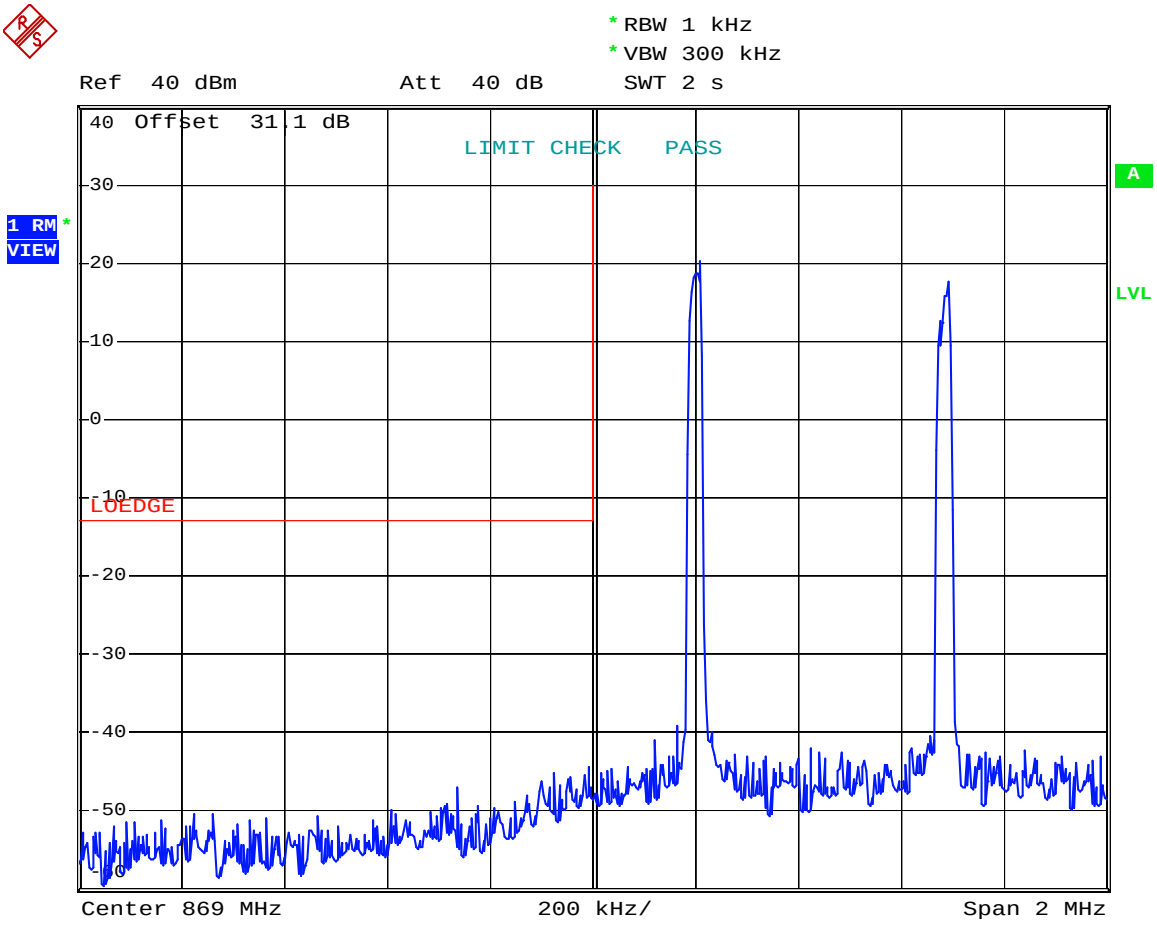
Test Data – Spurious Emissions at Antenna Terminals

Spurs – CDMA - Downlink



Test Data – Spurious Emissions at Antenna Terminals

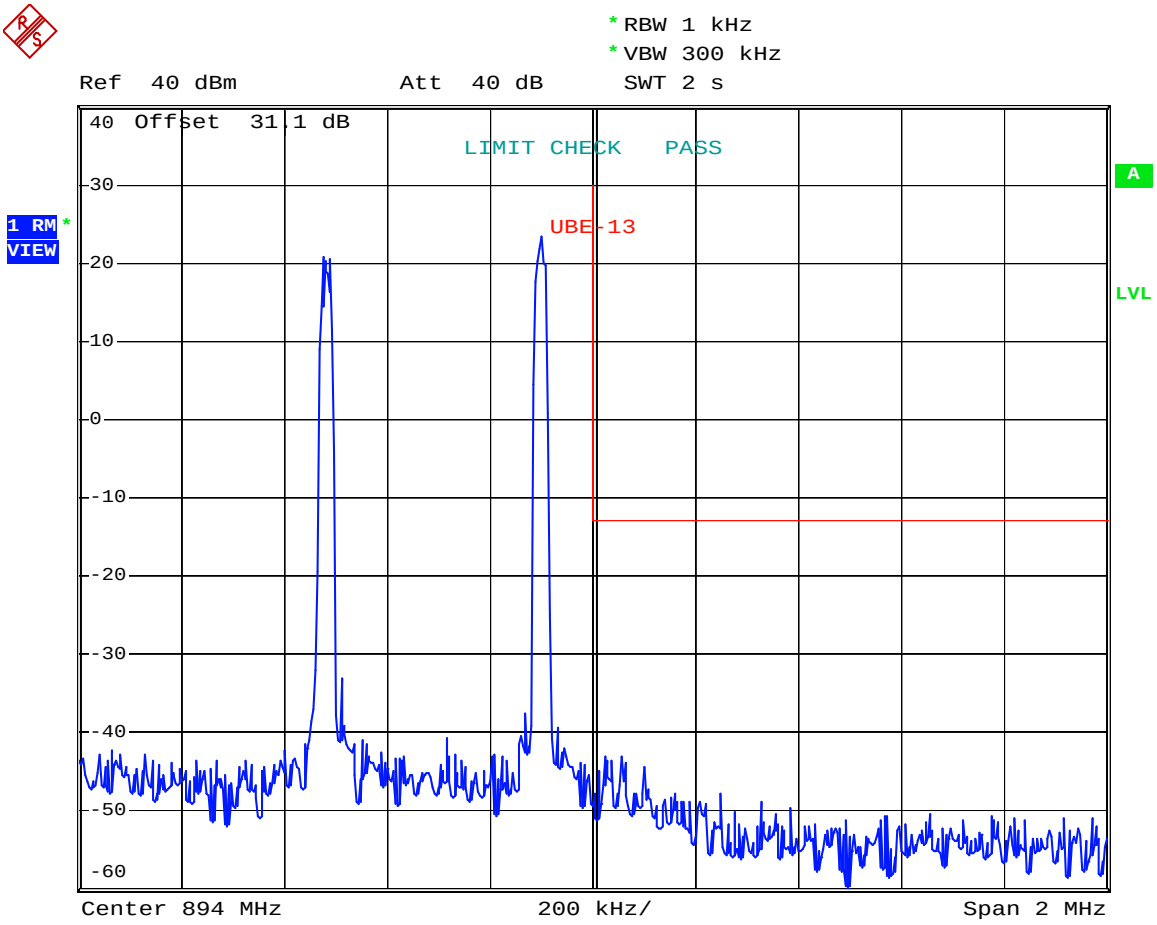
Downlink - Lower Bandedge Intermodulation
TDMA



Date: 5.NOV.2008 14:41:10

Test Data – Spurious Emissions at Antenna Terminals

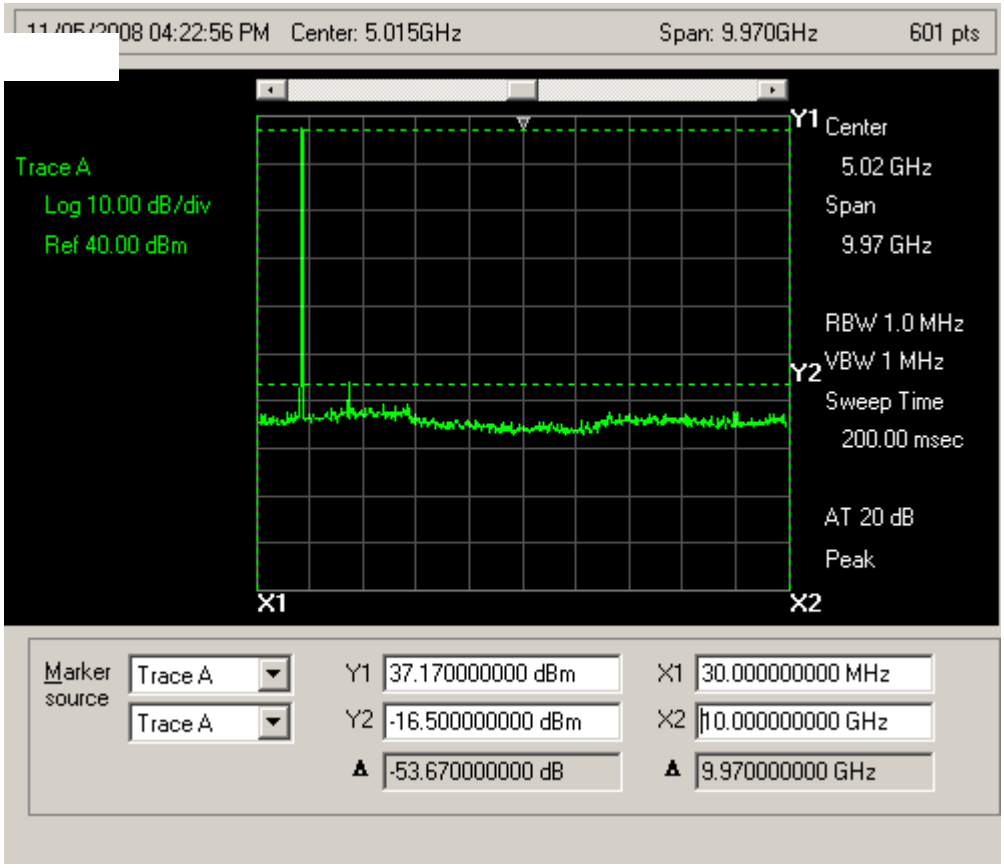
Downlink - Upper Bandedge Intermodulation
TDMA



Date: 5.NOV.2008 14:42:02

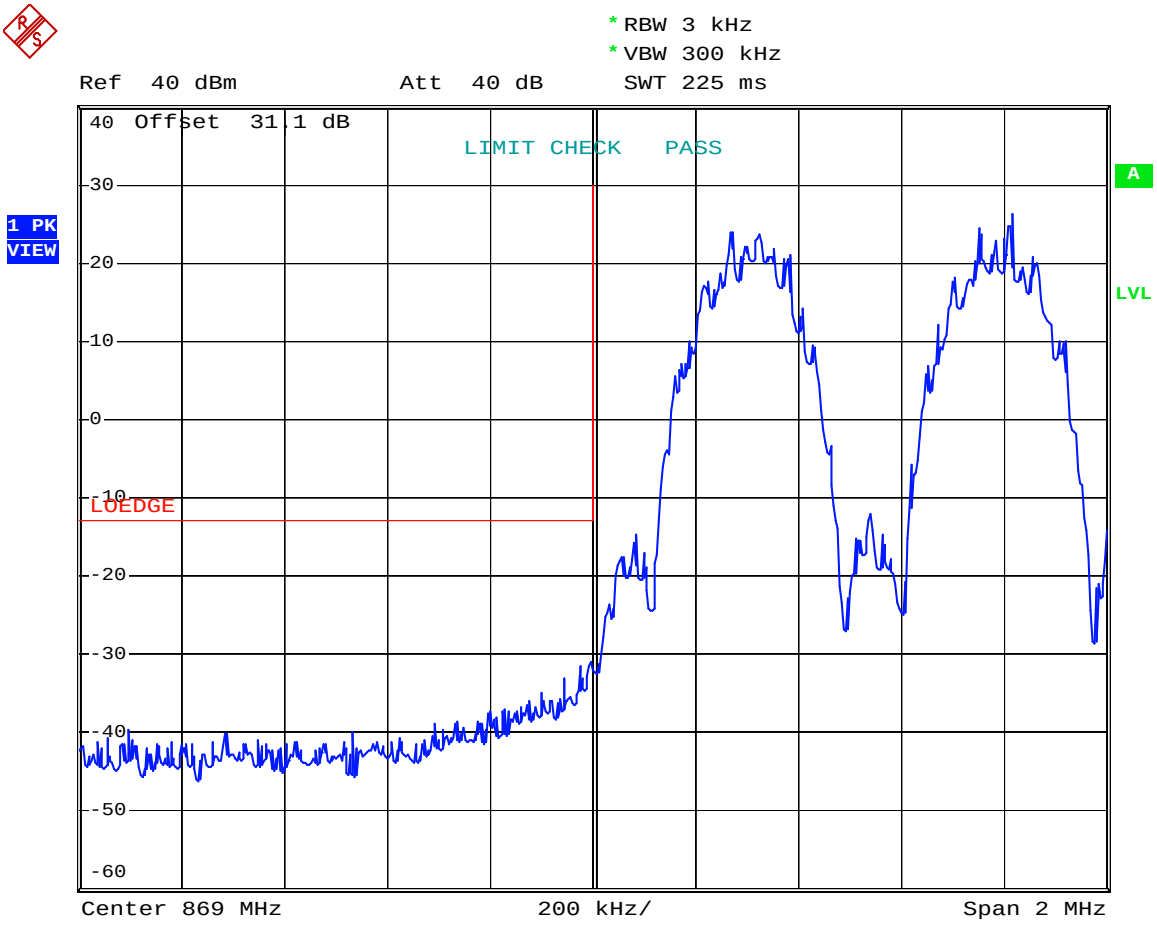
Test Data – Spurious Emissions at Antenna Terminals

Spurs – TDMA – Downlink



Test Data – Spurious Emissions at Antenna Terminals

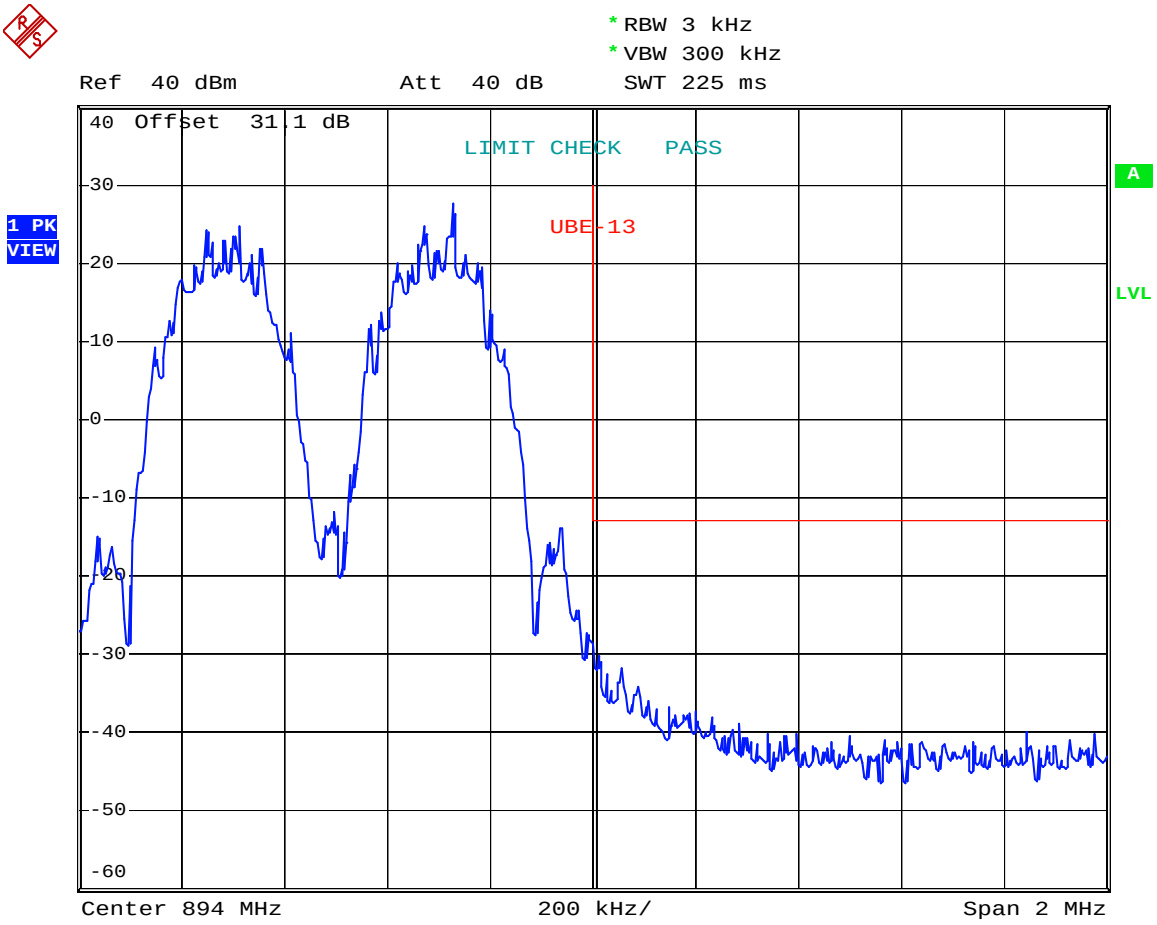
Downlink - Lower Bandedge Intermodulation
EDGE



Date: 5.NOV.2008 14:25:45

Test Data – Spurious Emissions at Antenna Terminals

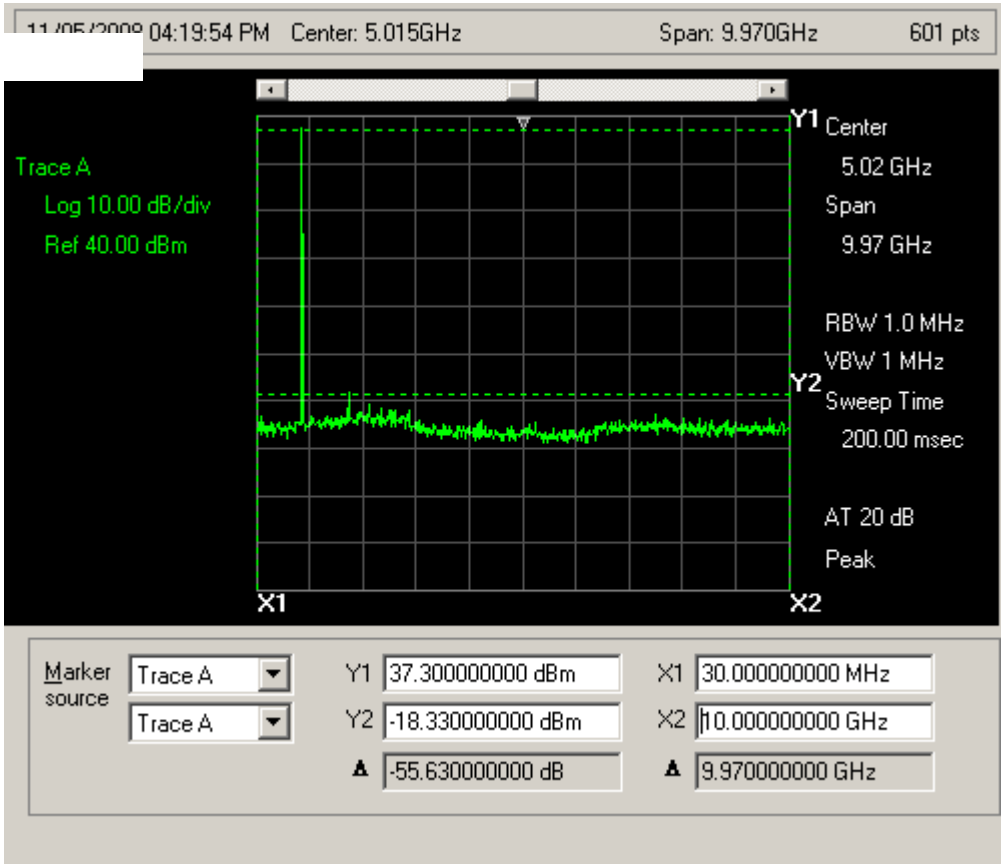
Downlink - Upper Bandedge Intermodulation
EDGE



Date: 5.NOV.2008 14:26:36

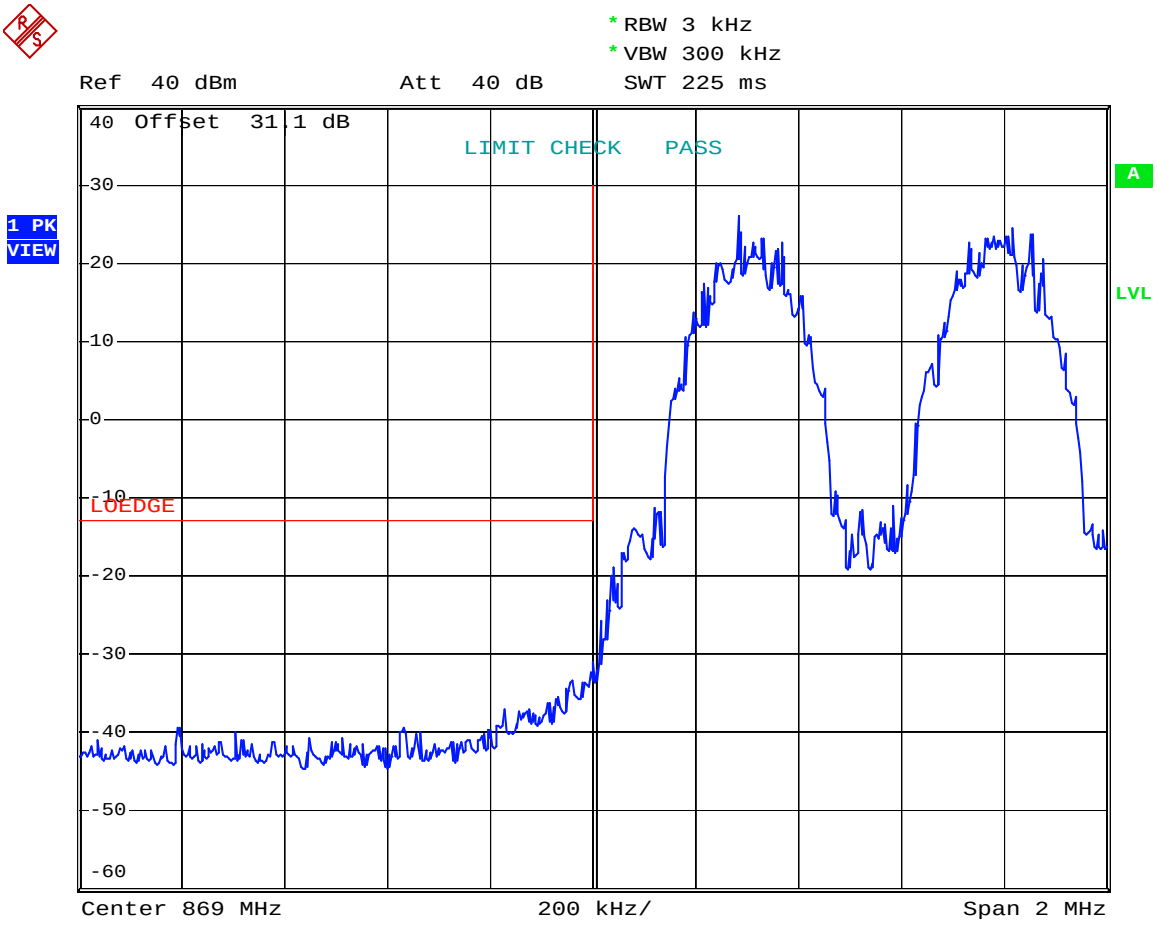
Test Data – Spurious Emissions at Antenna Terminals

Spurs – EDGE – Downlink



Test Data – Spurious Emissions at Antenna Terminals

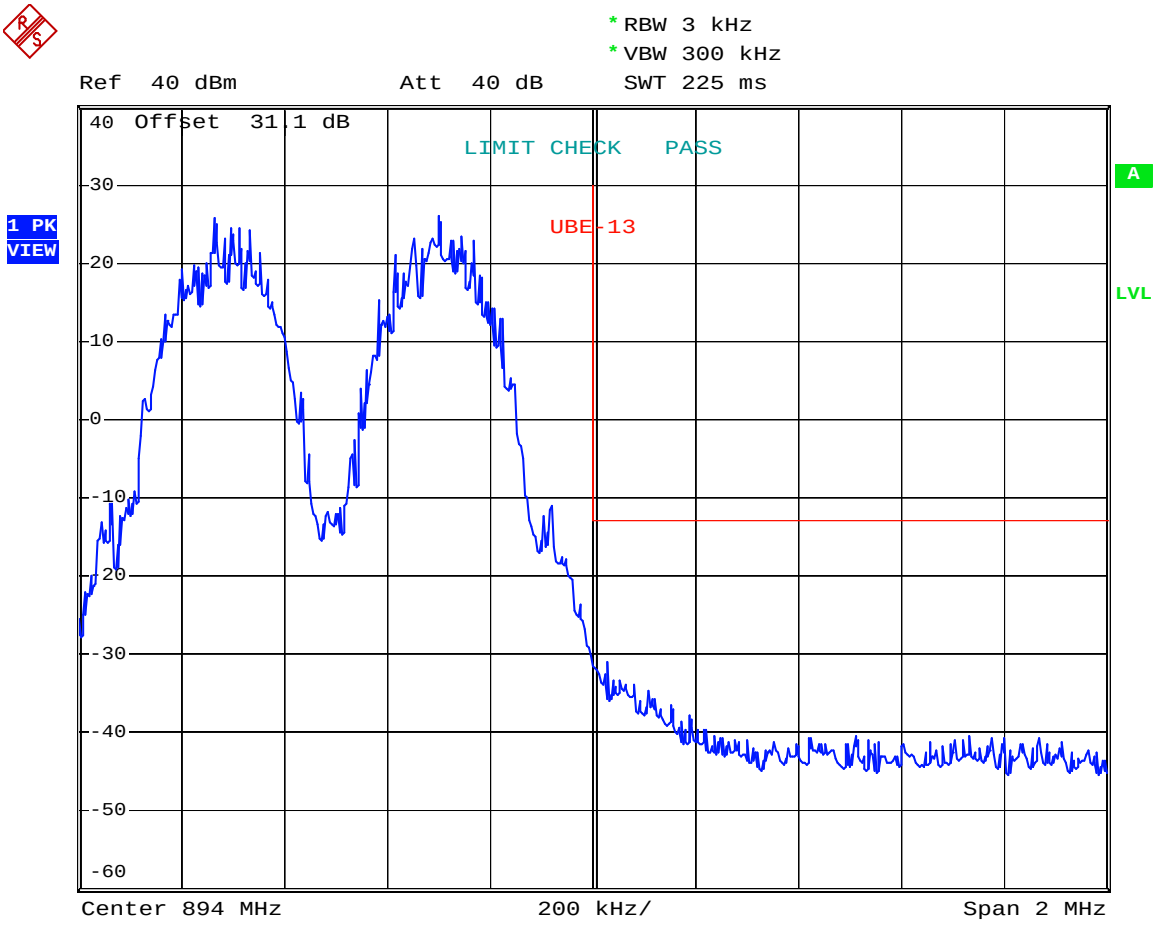
Downlink - Lower Bandedge Intermodulation
GSM



Date: 5.NOV.2008 14:20:14

Test Data – Spurious Emissions at Antenna Terminals

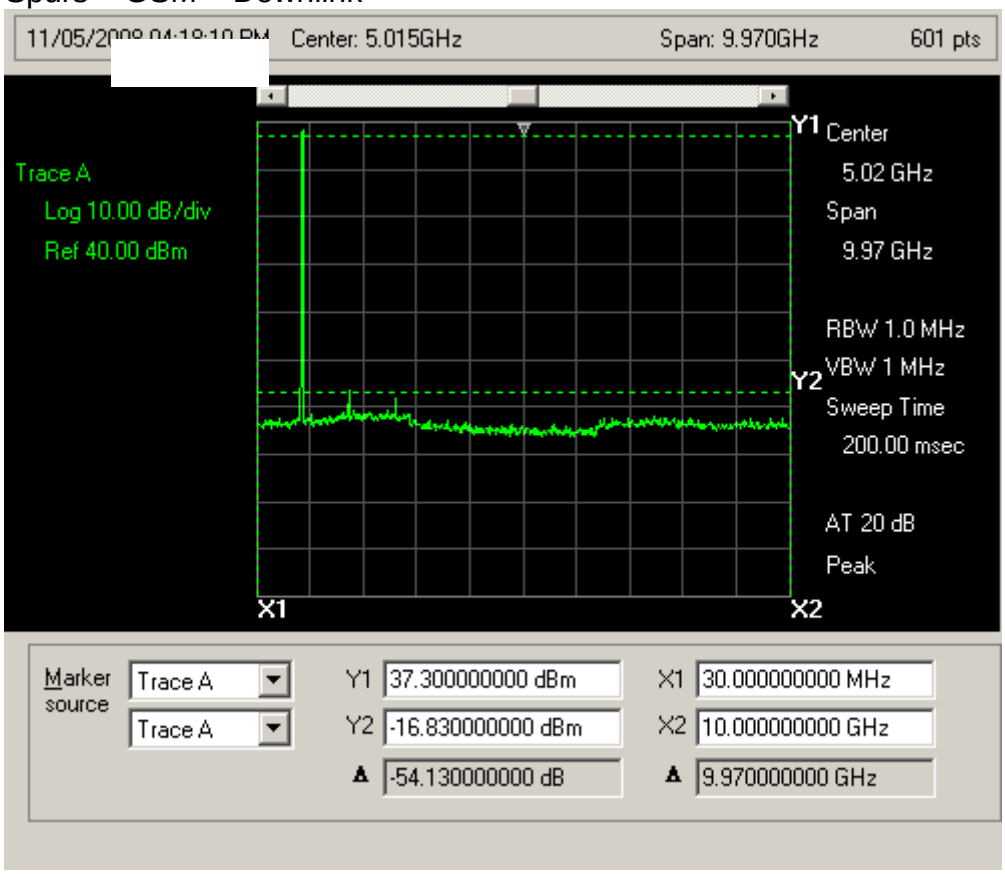
Downlink - Upper Bandedge Intermodulation
GSM



Date: 5.NOV.2008 14:19:07

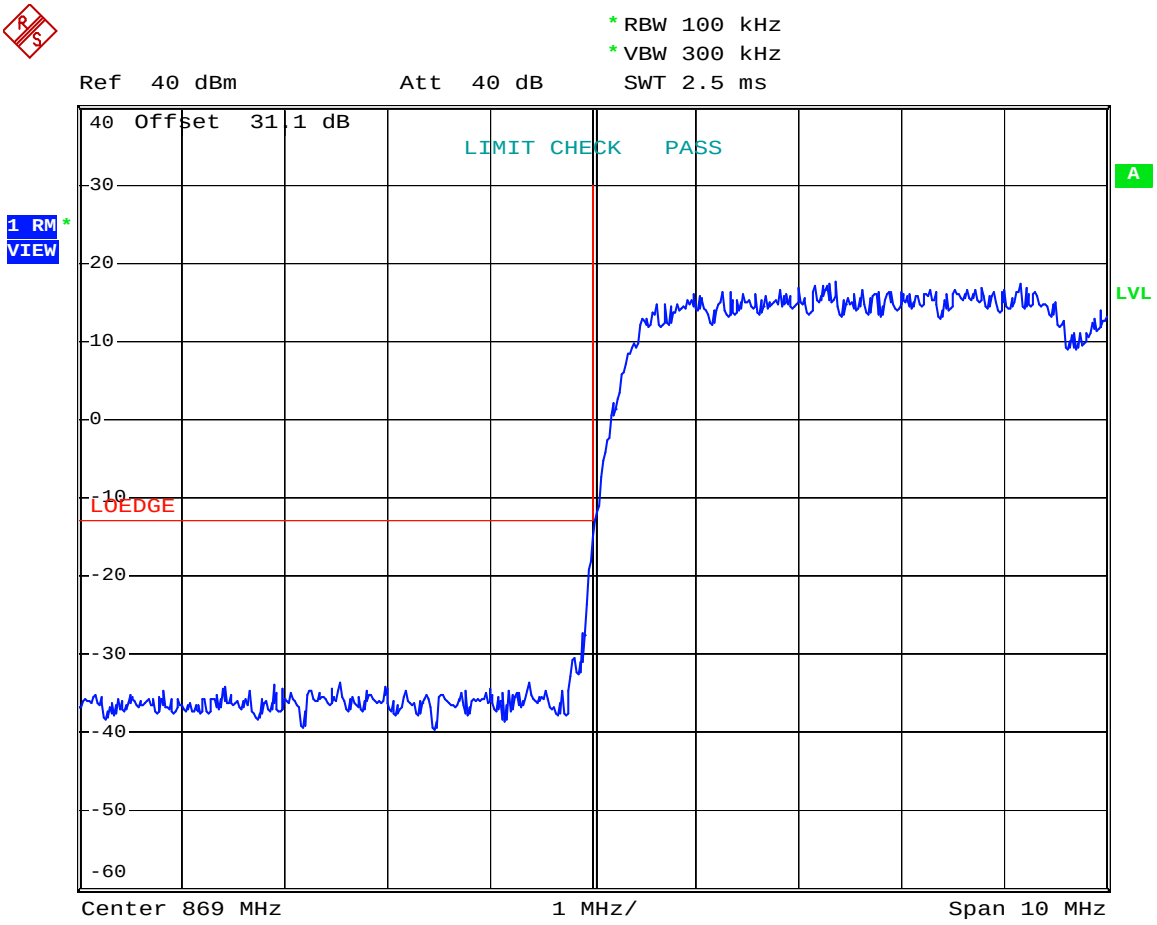
Test Data – Spurious Emissions at Antenna Terminals

Spurs – GSM – Downlink



Test Data – Spurious Emissions at Antenna Terminals

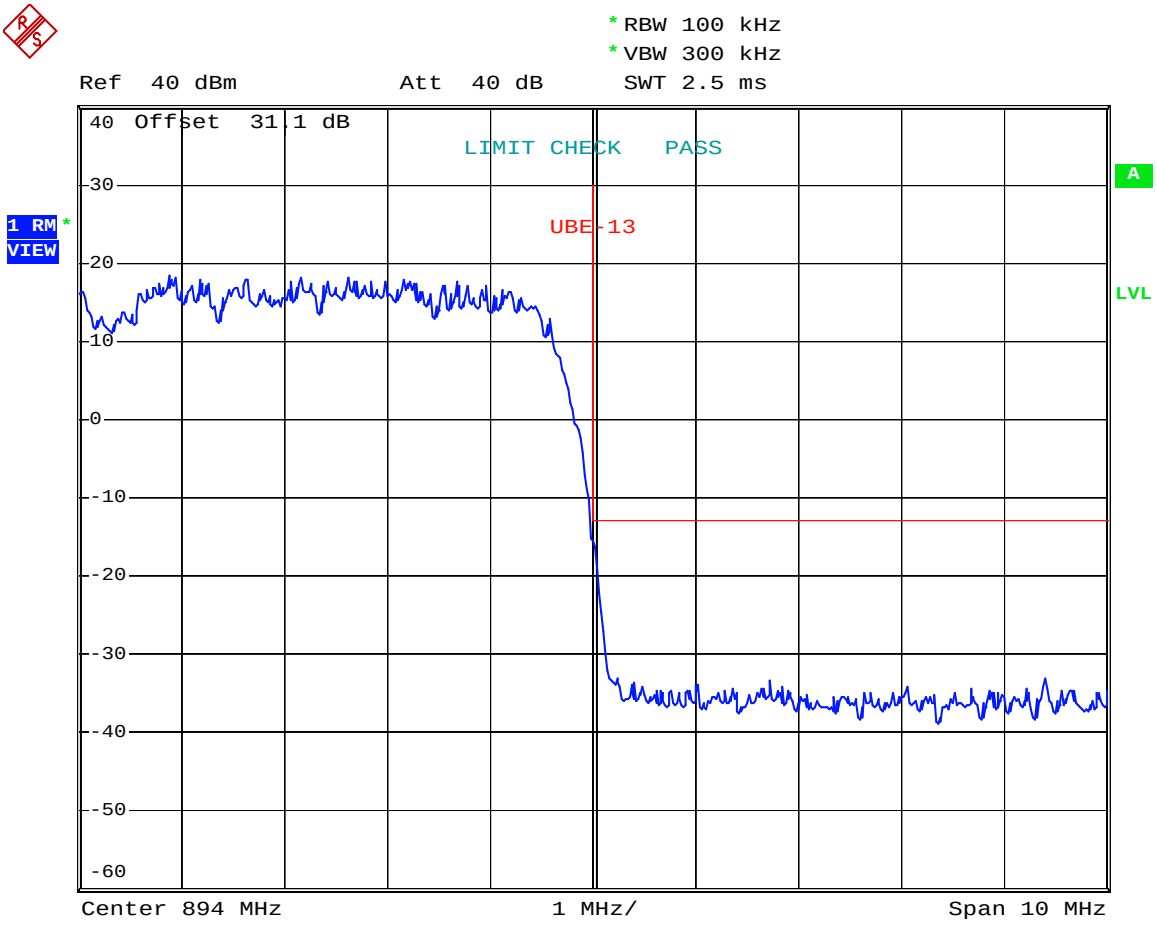
Downlink - Lower Bandedge Intermodulation
W-CDMA



Date: 5.NOV.2008 14:37:54

Test Data – Spurious Emissions at Antenna Terminals

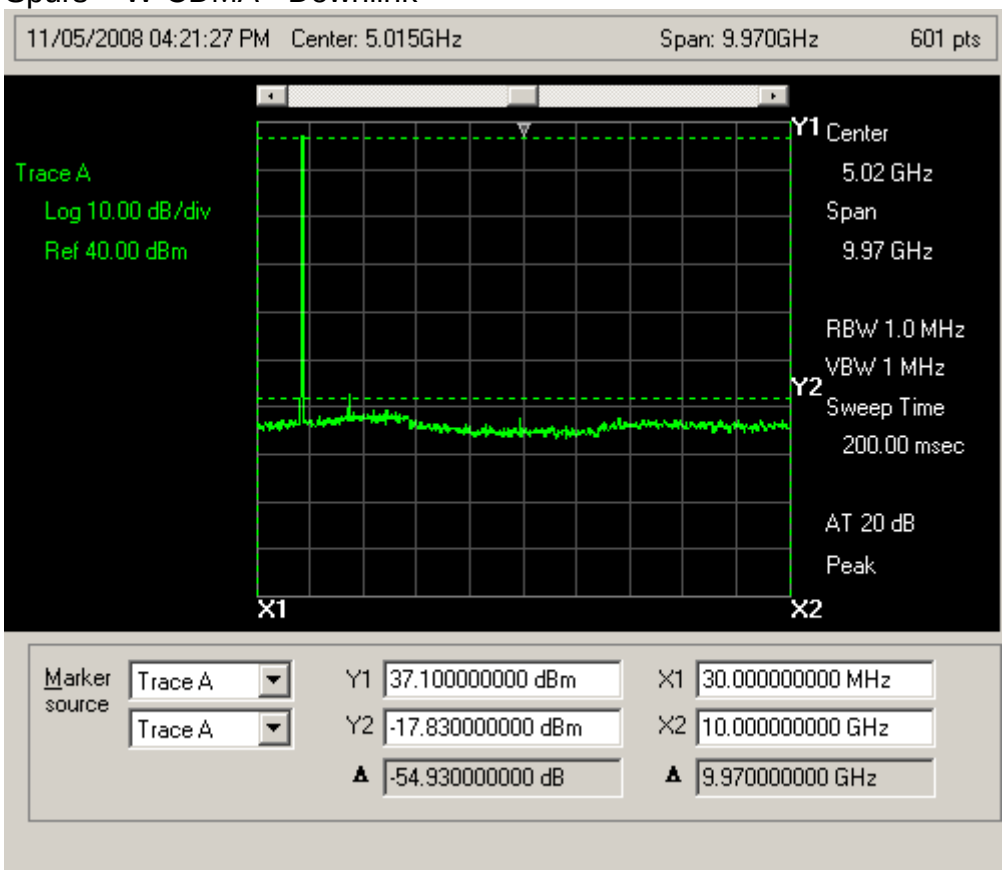
Downlink - Upper Bandedge Intermodulation
W-CDMA



Date: 5.NOV.2008 14:36:20

Test Data – Spurious Emissions at Antenna Terminals

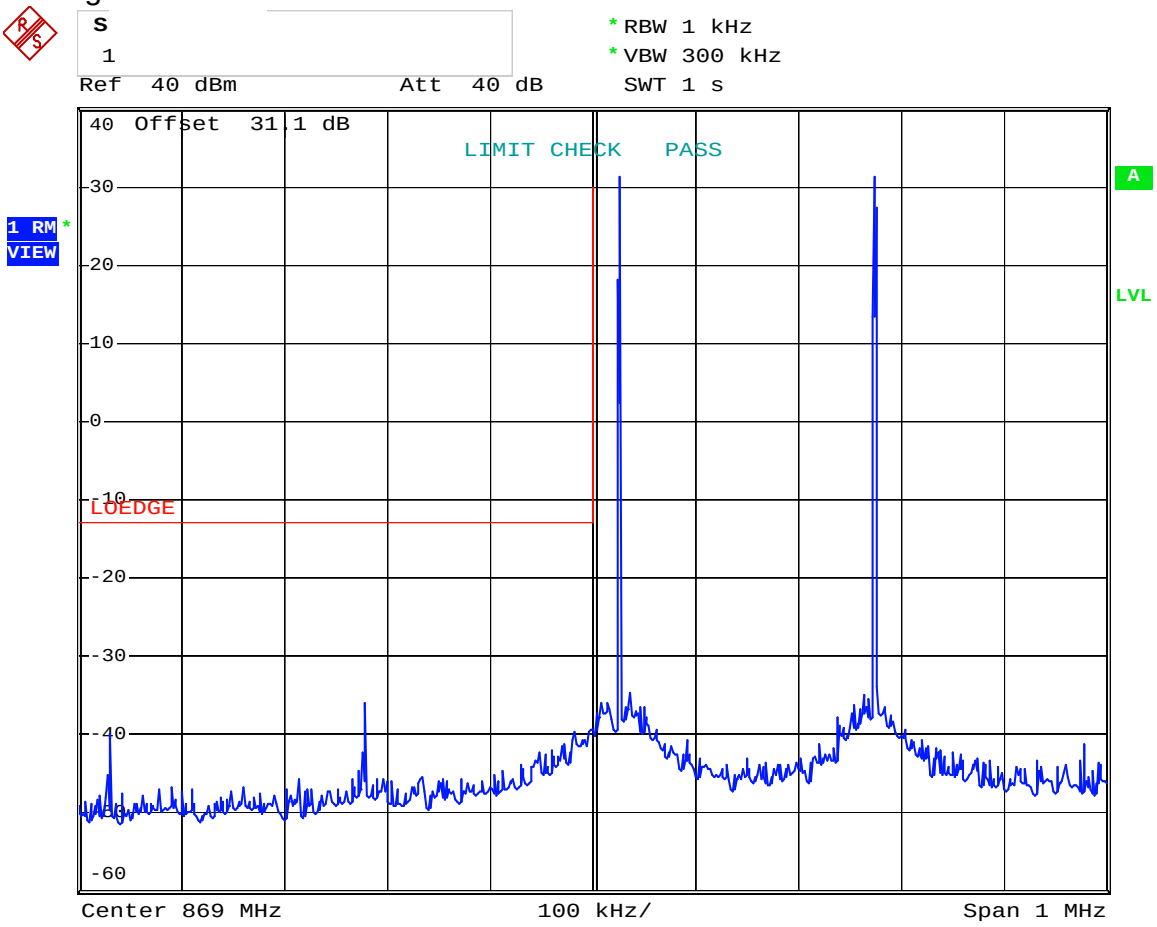
Spurs – W-CDMA - Downlink



Test Data – Spurious Emissions at Antenna Terminals

Downlink - Lower Bandedge Intermodulation

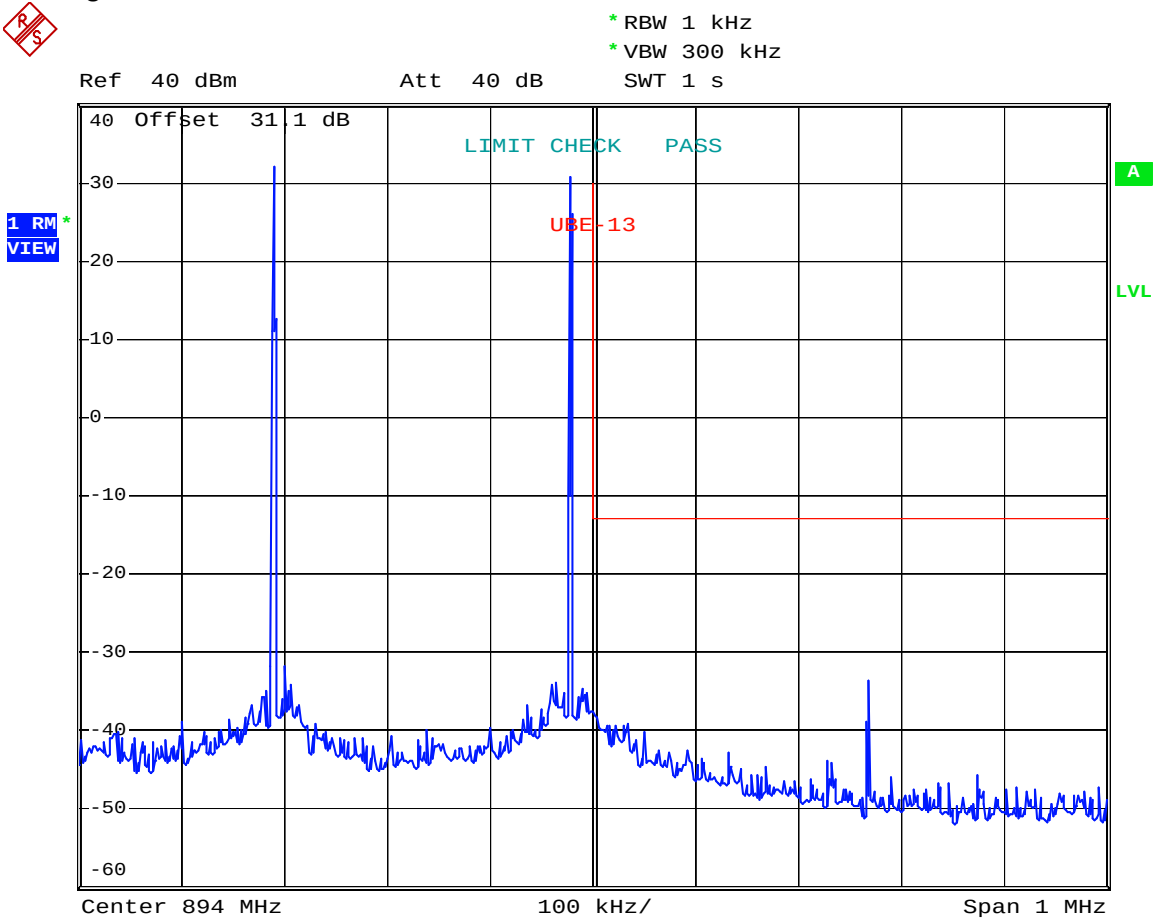
Analog



Date: 5.NOV.2008 14:55:33

Test Data – Spurious Emissions at Antenna Terminals

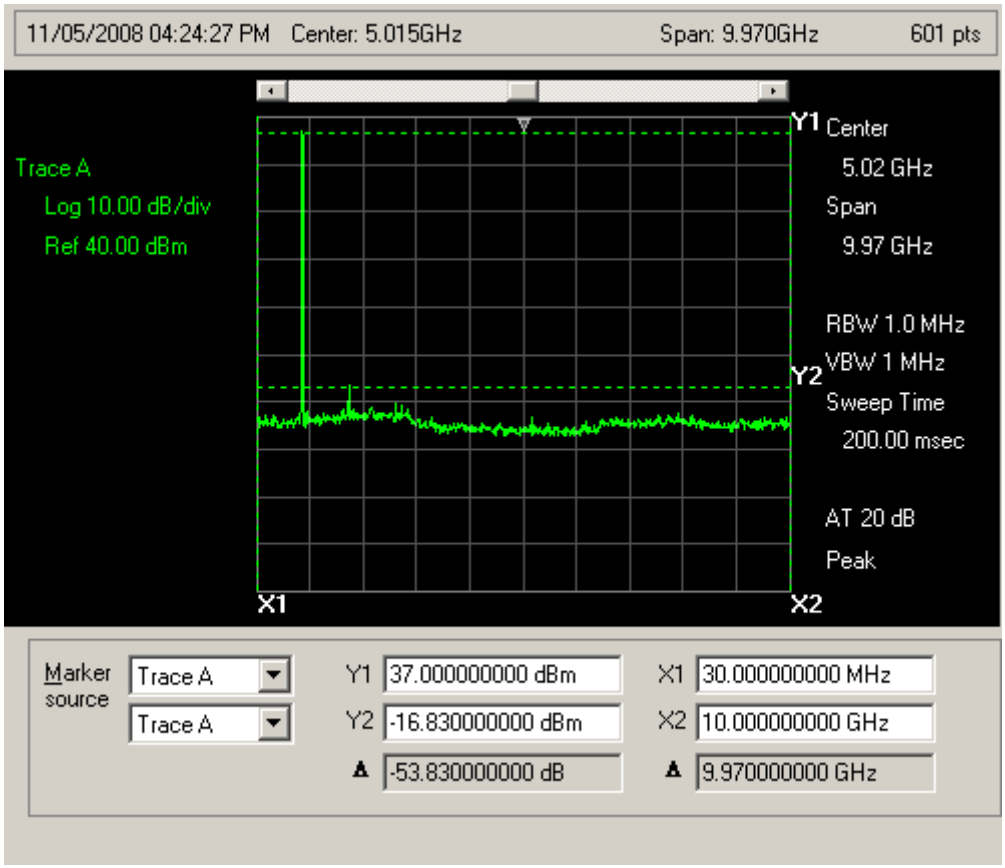
Downlink - Upper Bandedge Intermodulation
Analog



Date: 5.NOV.2008 14:53:15

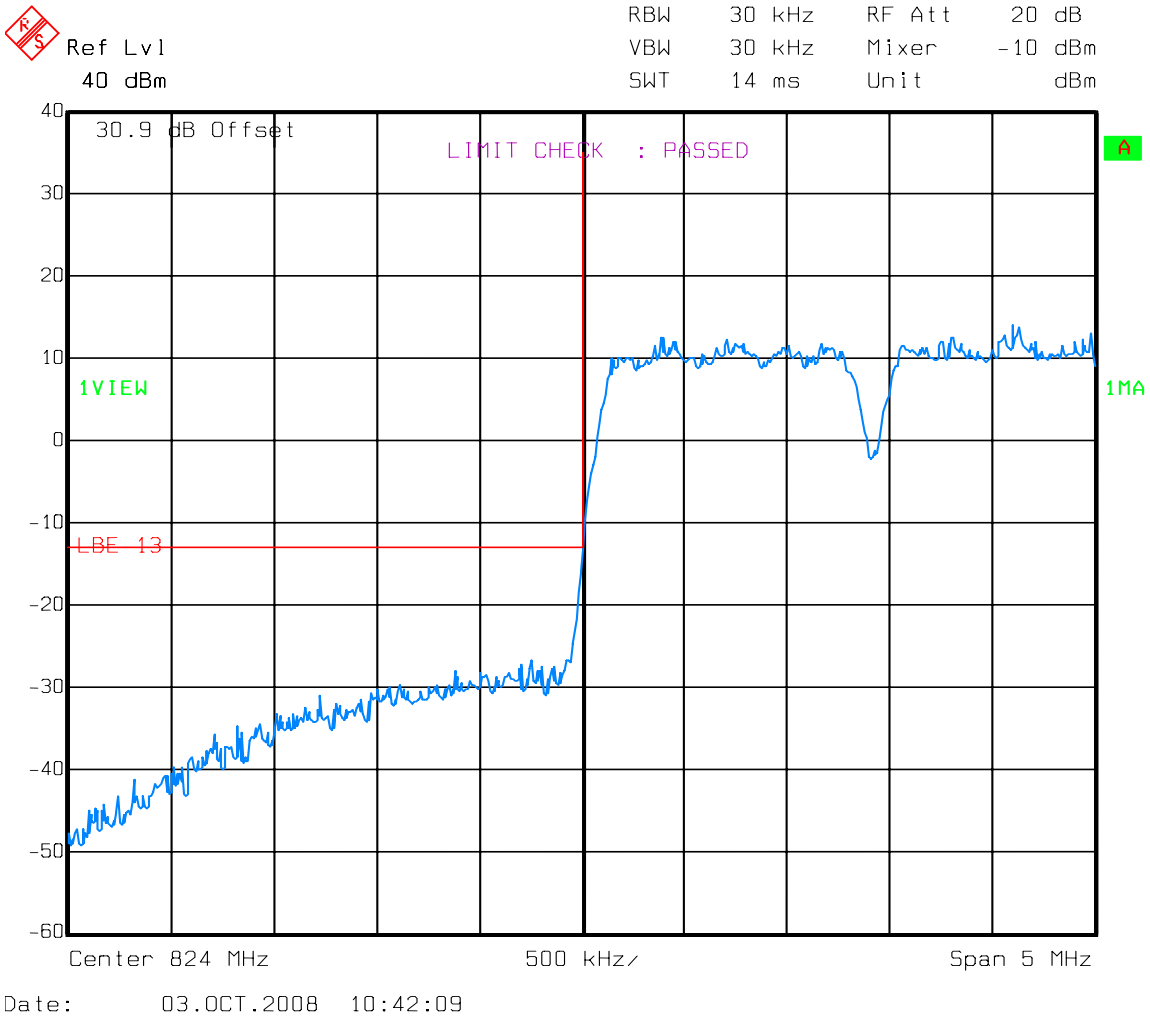
Test Data – Spurious Emissions at Antenna Terminals

Spurs – Analog – Downlink



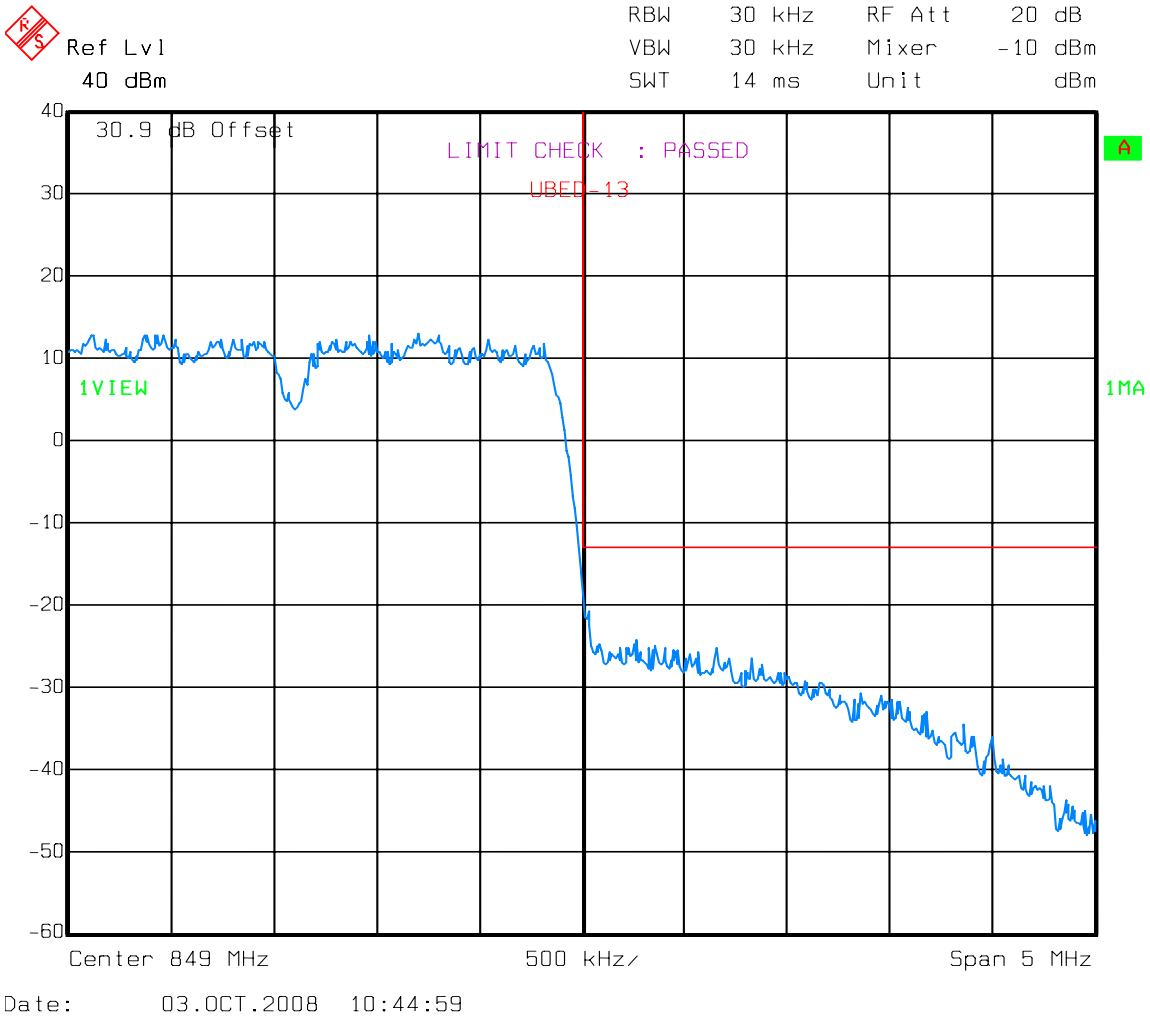
Test Data – Spurious Emissions at Antenna Terminals

Uplink - Lower Bandedge Intermodulation
CDMA



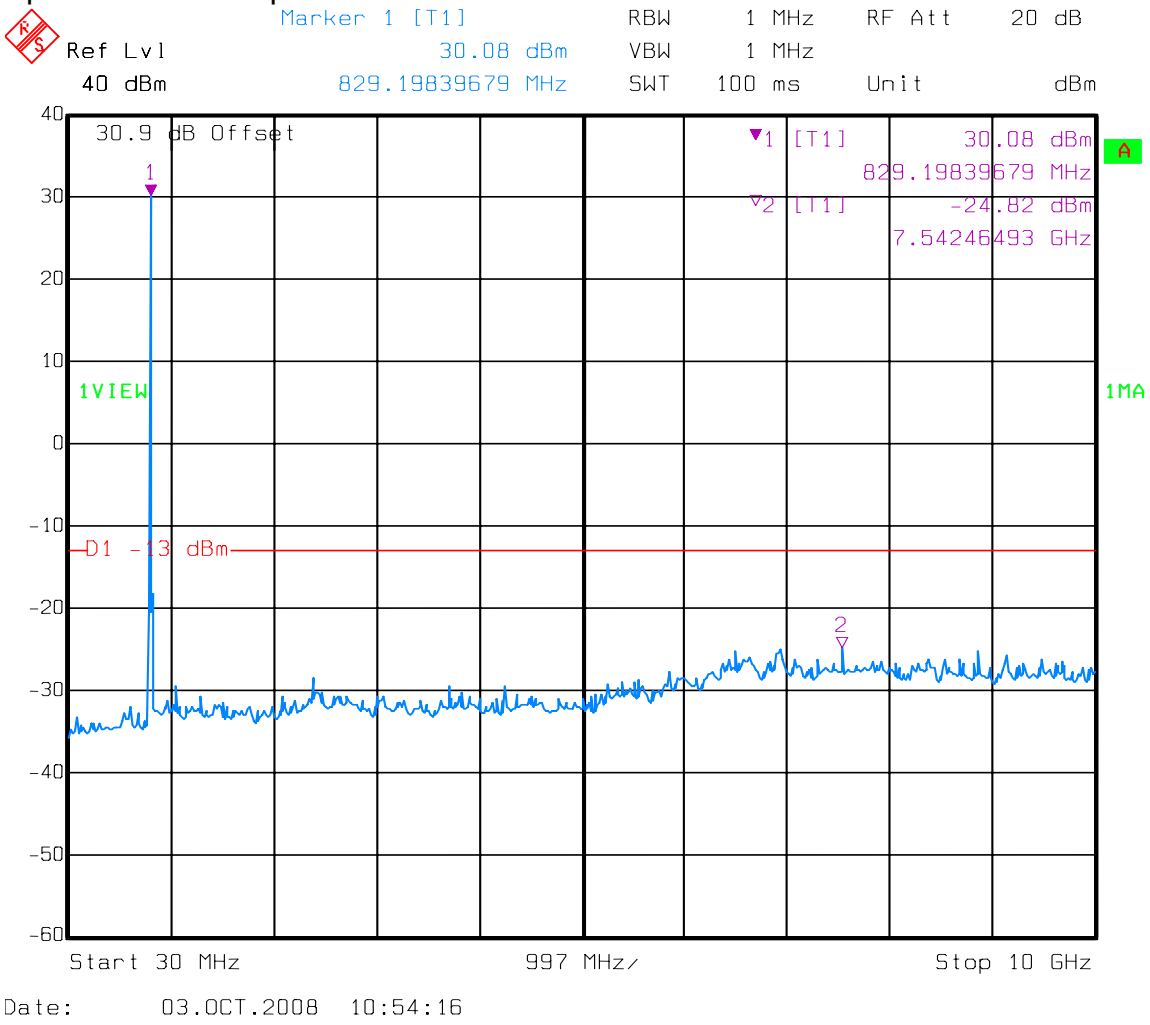
Test Data – Spurious Emissions at Antenna Terminals

Uplink - Upper Bandedge Intermodulation
CDMA



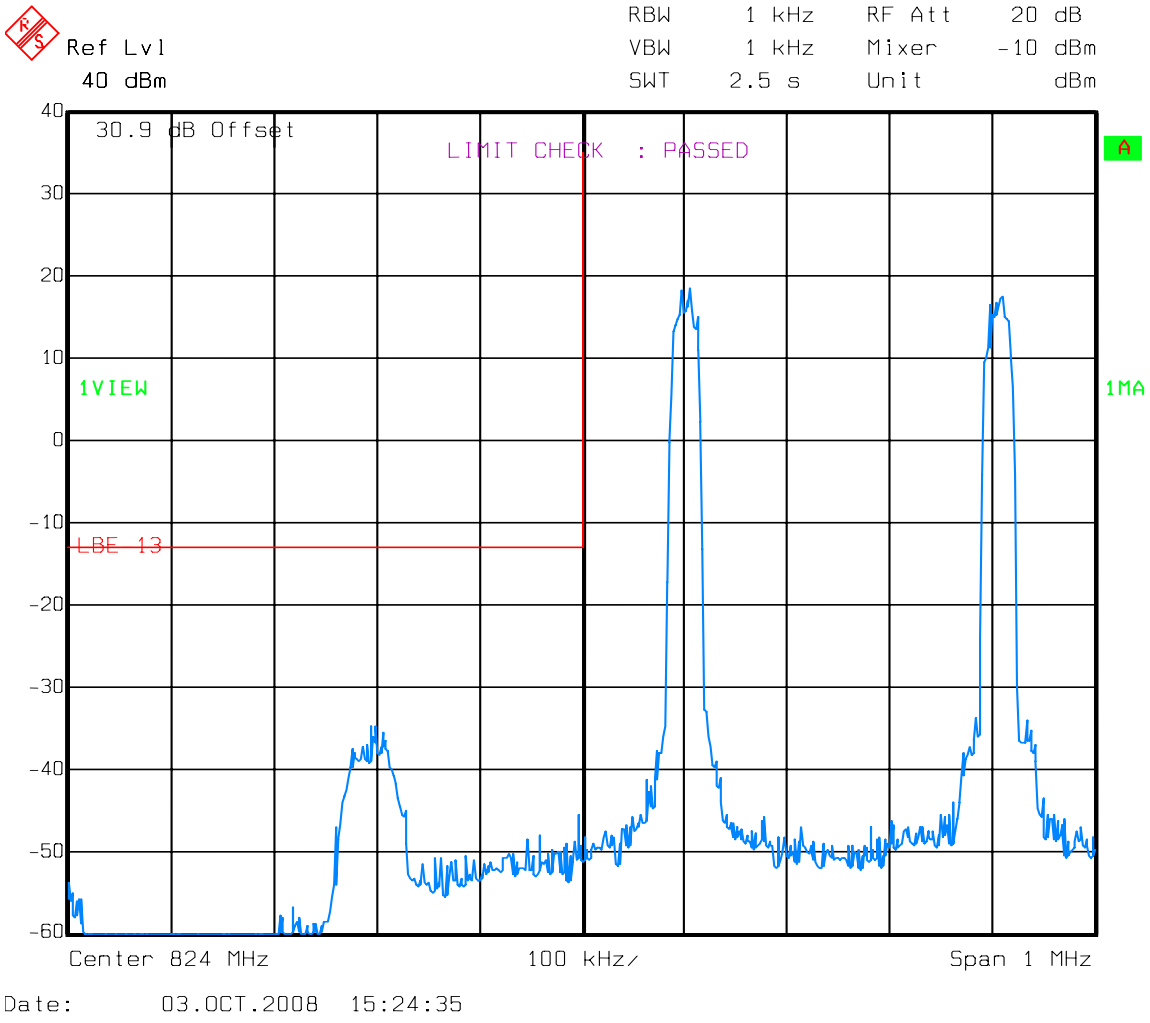
Test Data – Spurious Emissions at Antenna Terminals

Spurs – CDMA - Uplink



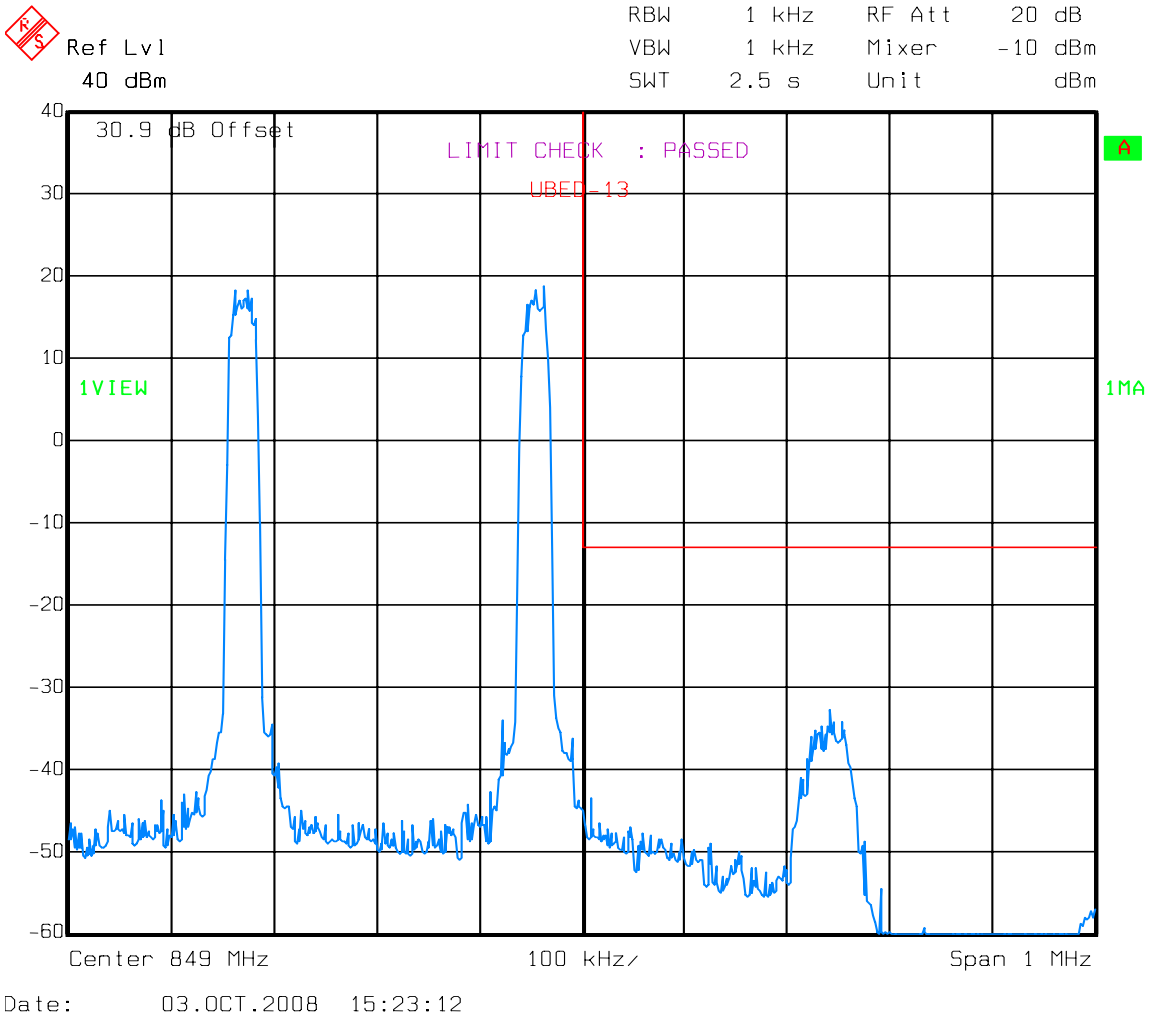
Test Data – Spurious Emissions at Antenna Terminals

Uplink - Lower Bandedge Intermodulation
TDMA



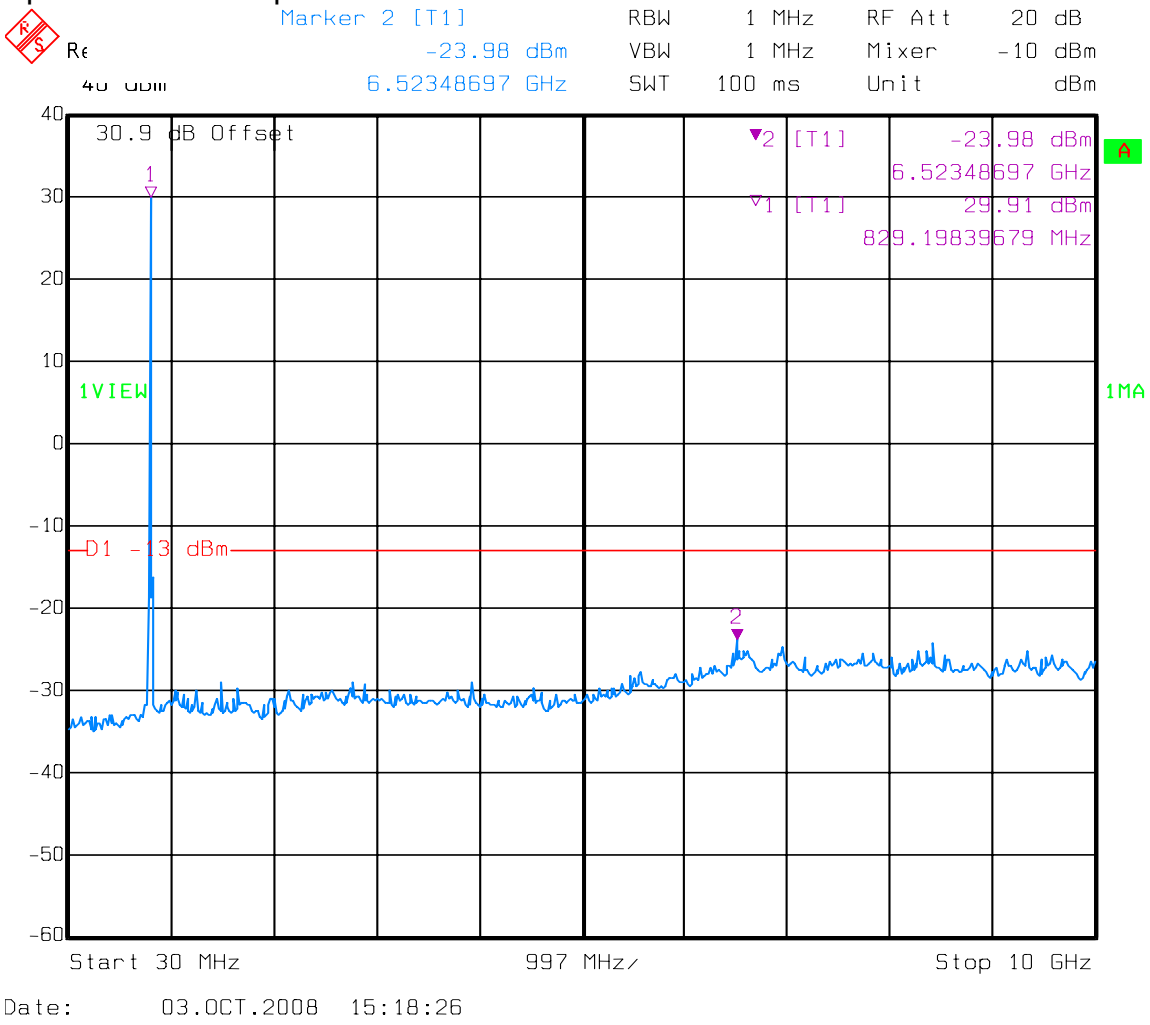
Test Data – Spurious Emissions at Antenna Terminals

Uplink - Upper Bandedge Intermodulation
TDMA



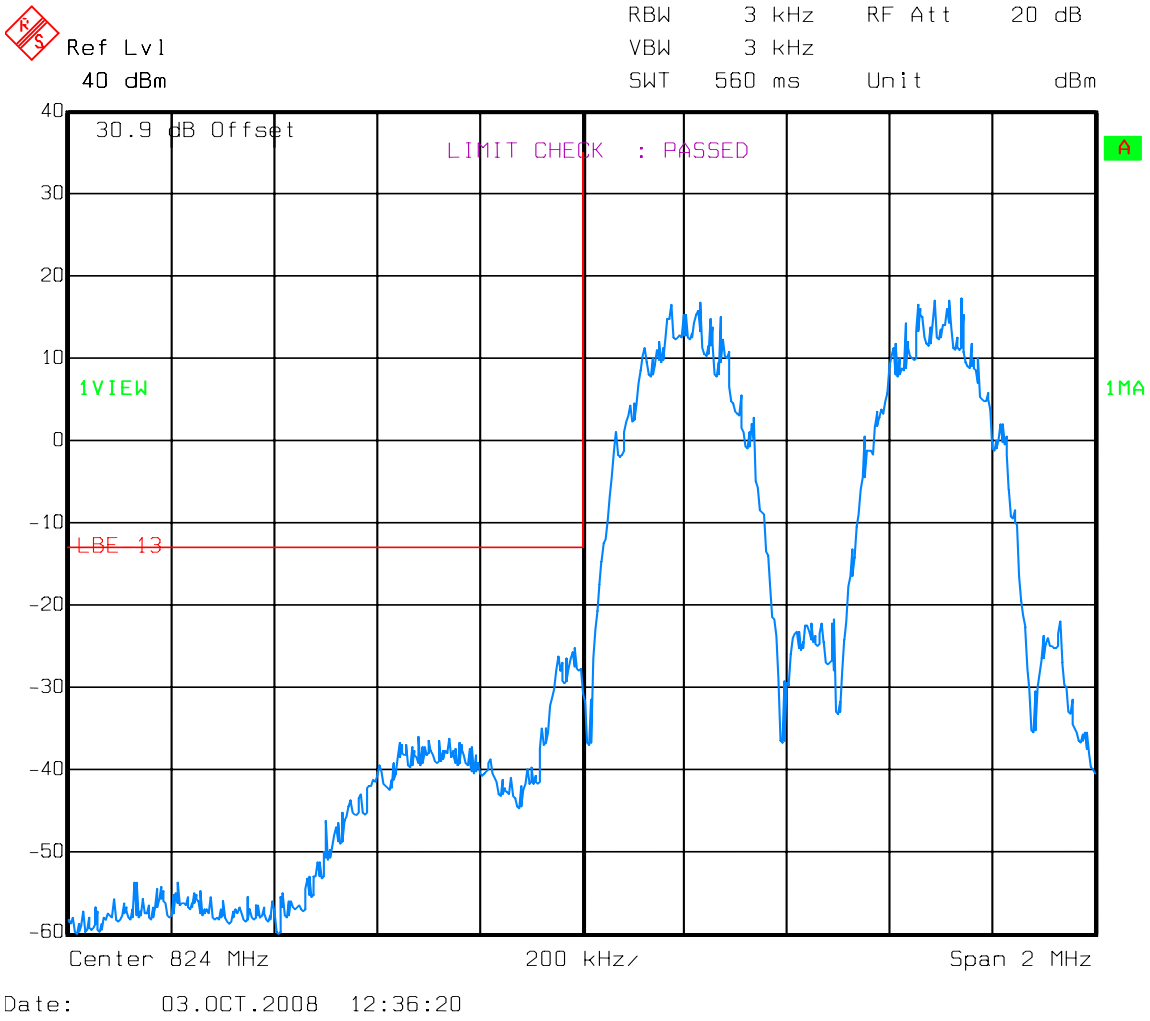
Test Data – Spurious Emissions at Antenna Terminals

Spurs – TDMA – Uplink



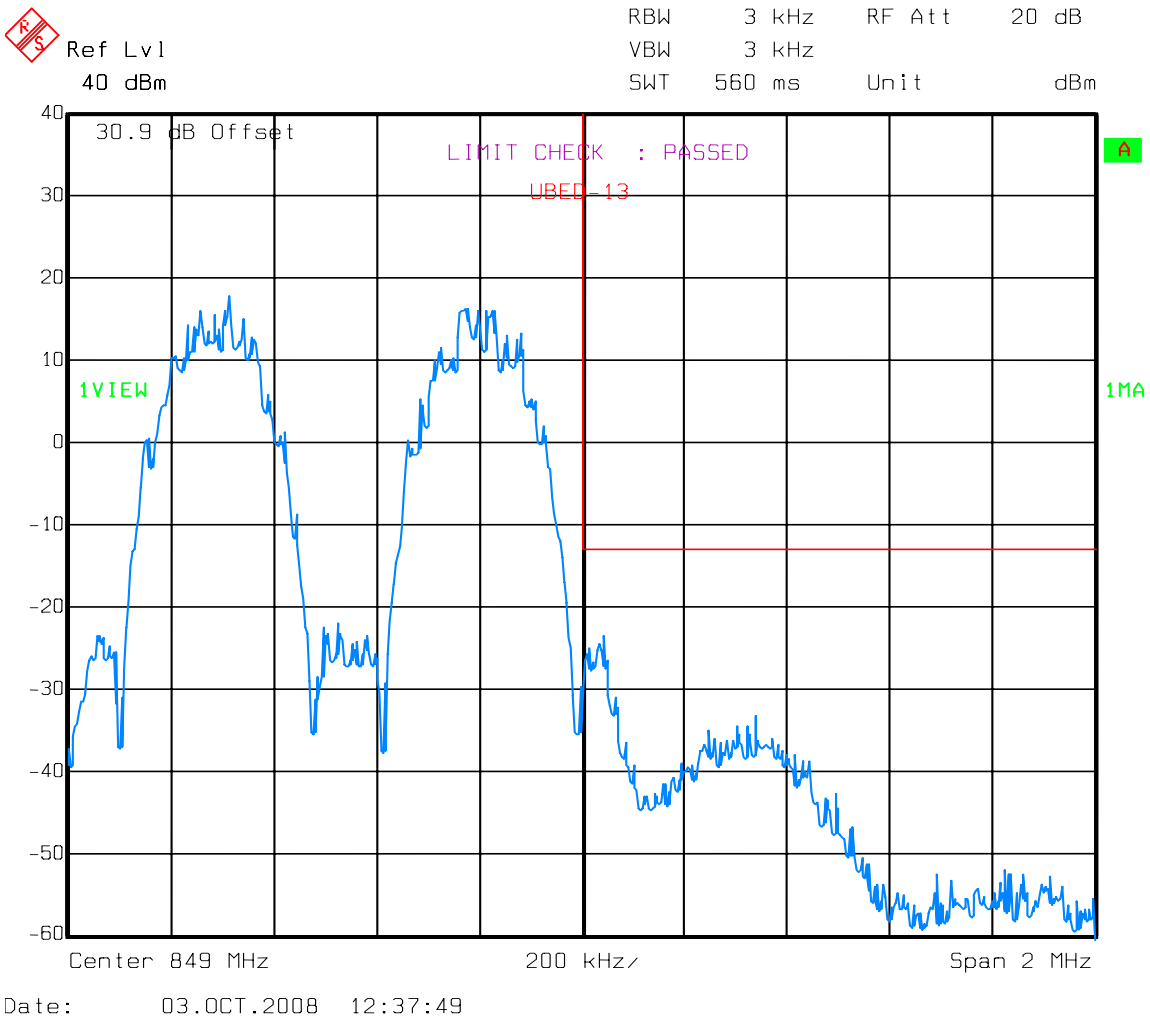
Test Data – Spurious Emissions at Antenna Terminals

Uplink - Lower Bandedge Intermodulation
EDGE



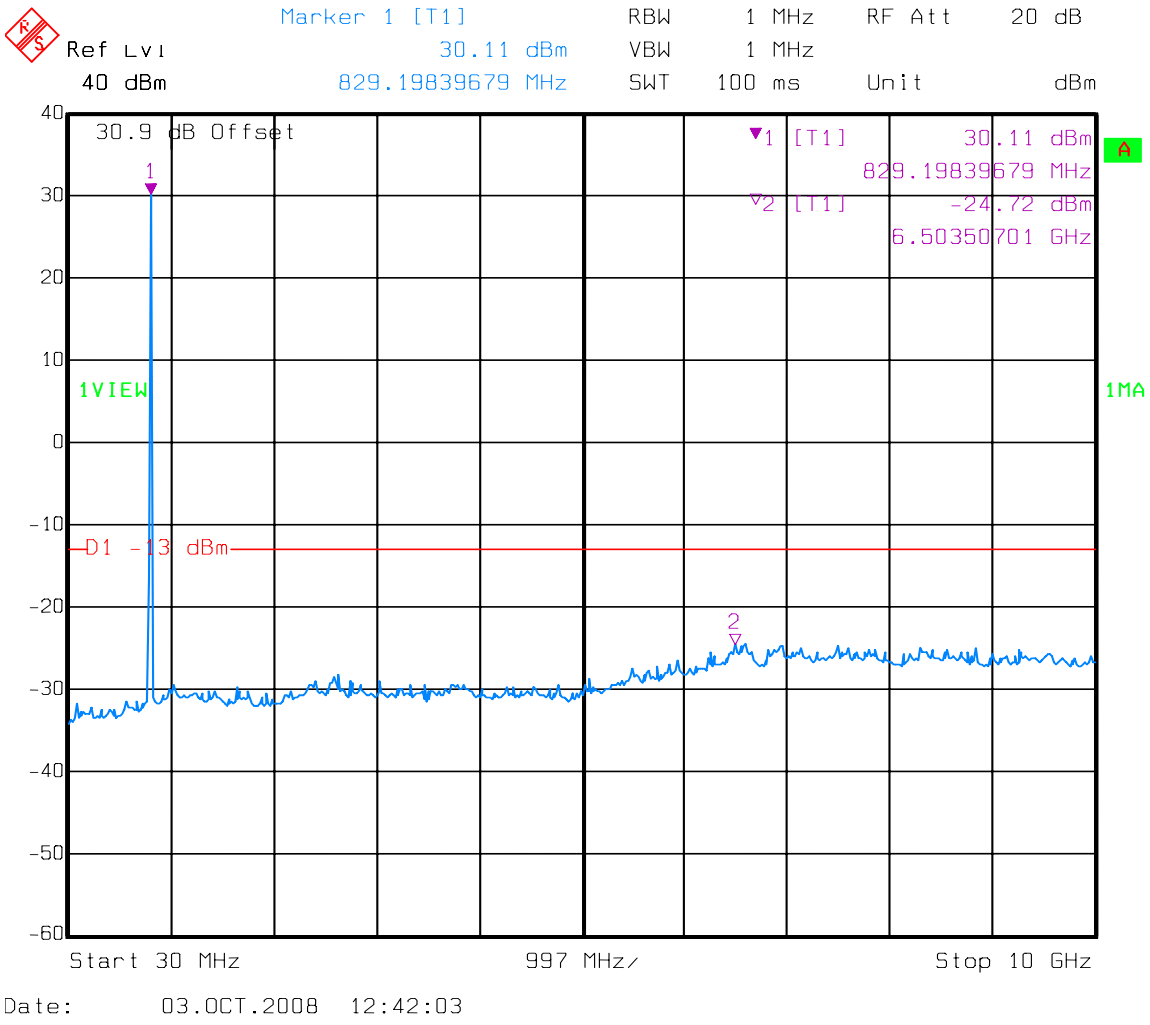
Test Data – Spurious Emissions at Antenna Terminals

Uplink - Upper Bandedge Intermodulation
EDGE



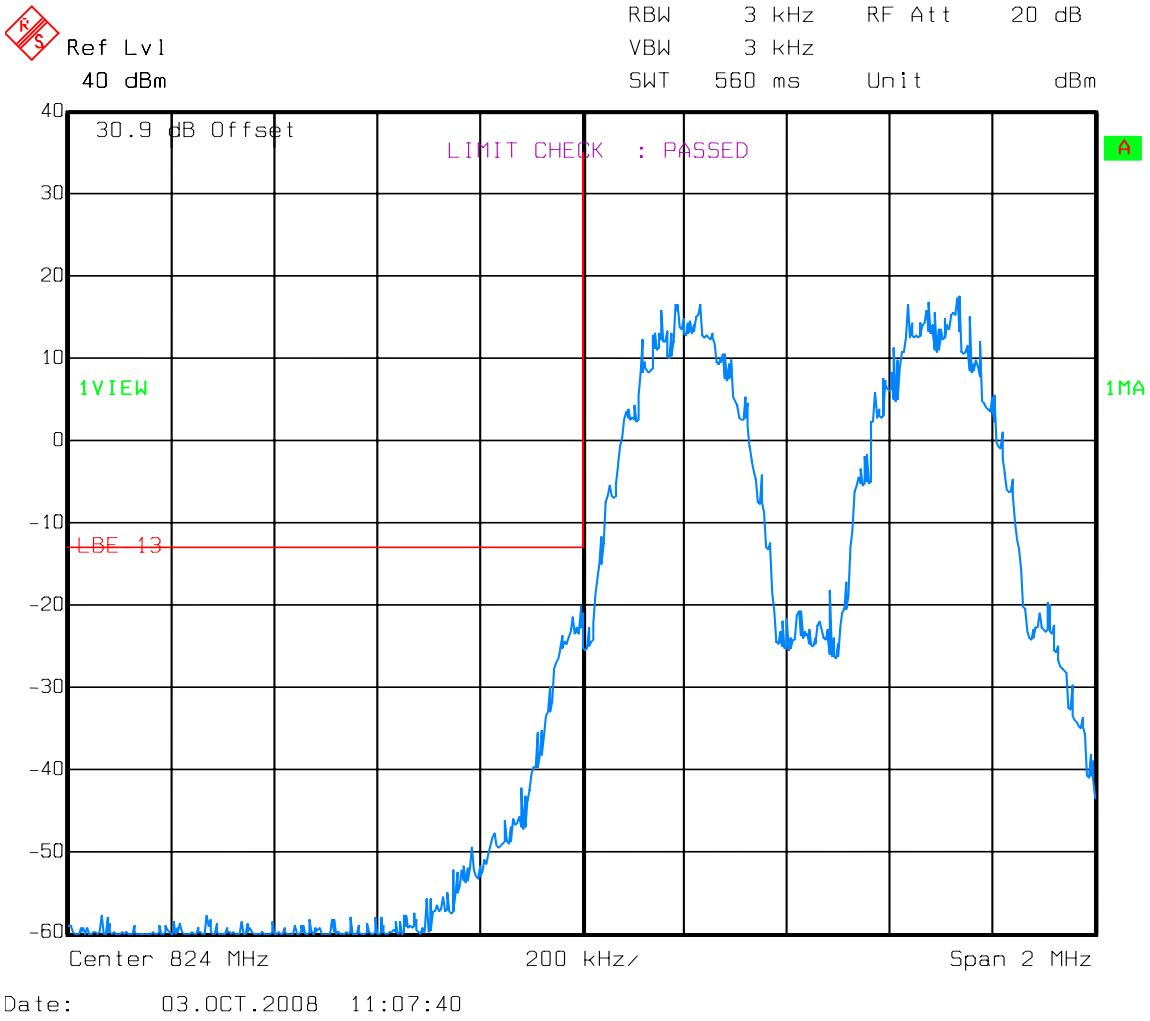
Test Data – Spurious Emissions at Antenna Terminals

Spurs – EDGE – Uplink



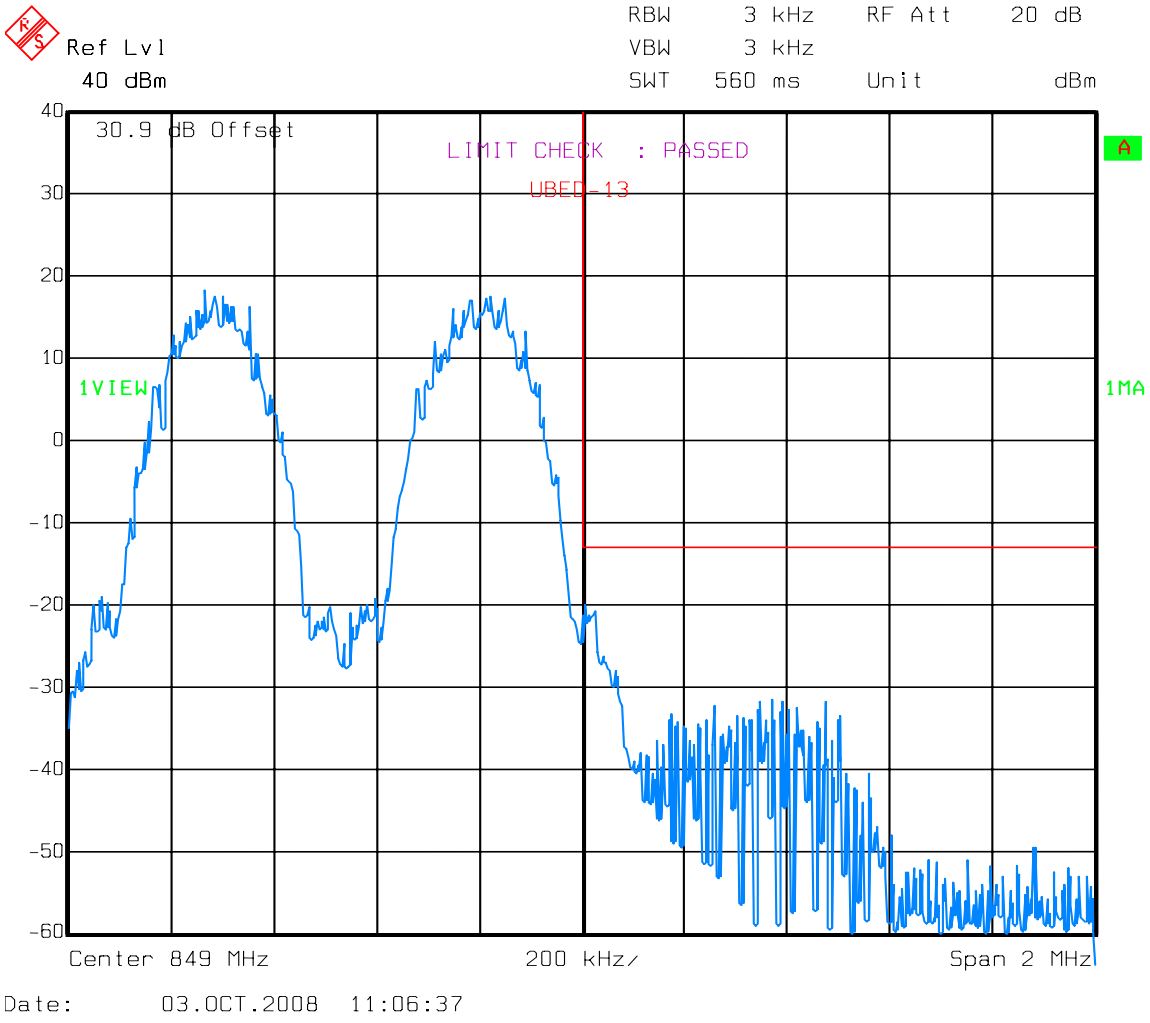
Test Data – Spurious Emissions at Antenna Terminals

Uplink - Lower Bandedge Intermodulation
GSM



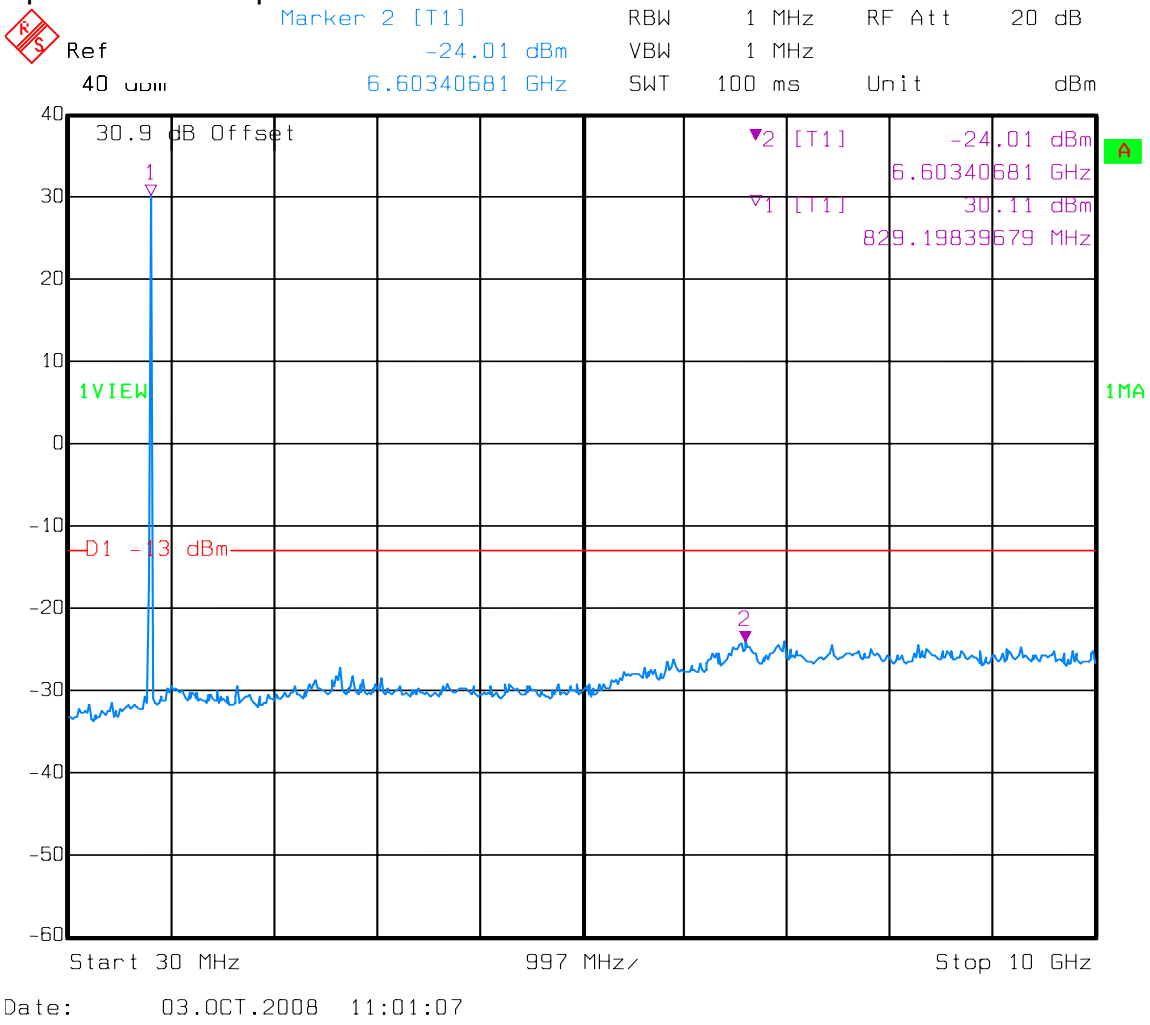
Test Data – Spurious Emissions at Antenna Terminals

Uplink - Upper Bandedge Intermodulation
GSM



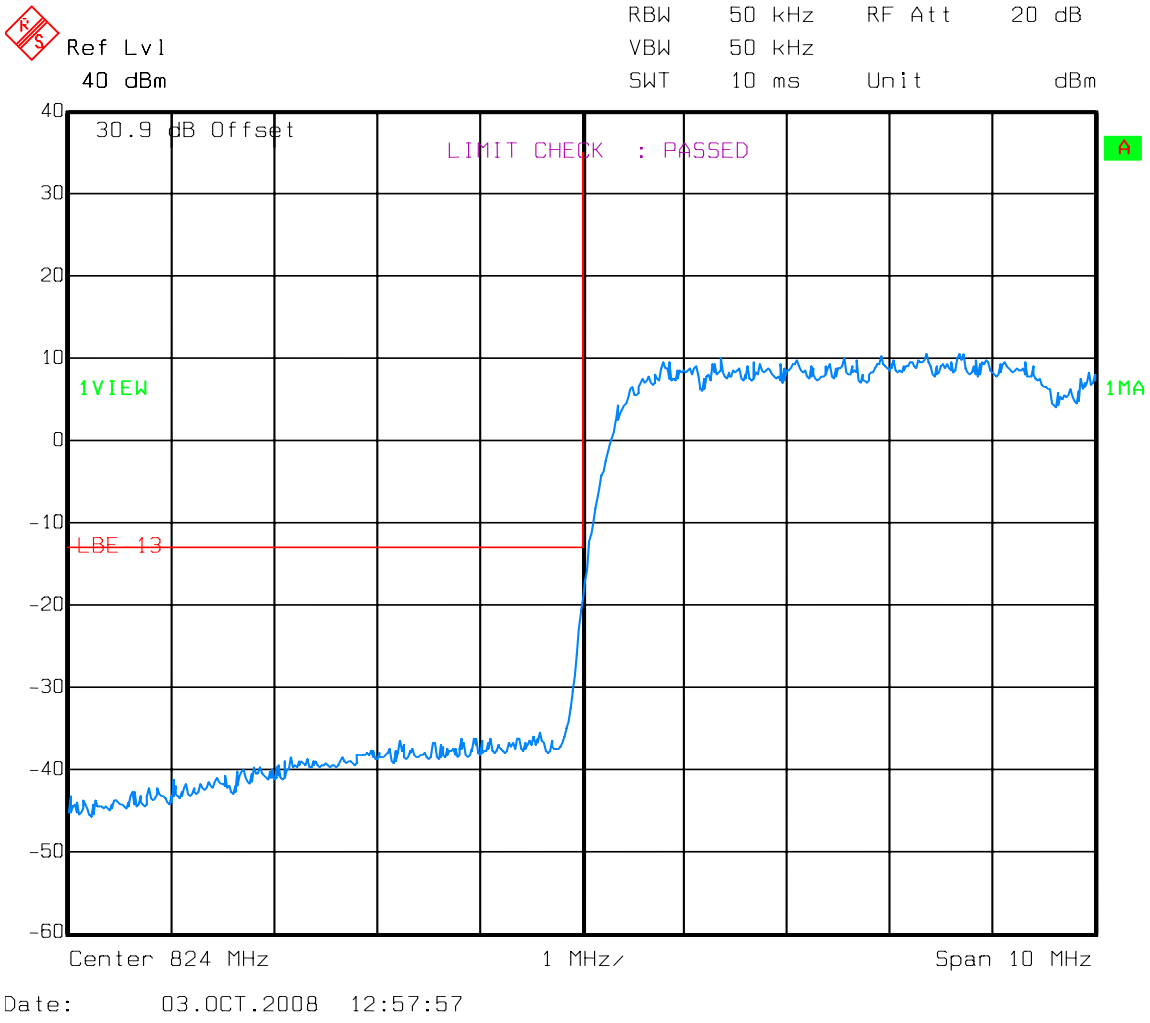
Test Data – Spurious Emissions at Antenna Terminals

Spurs – GSM – Uplink



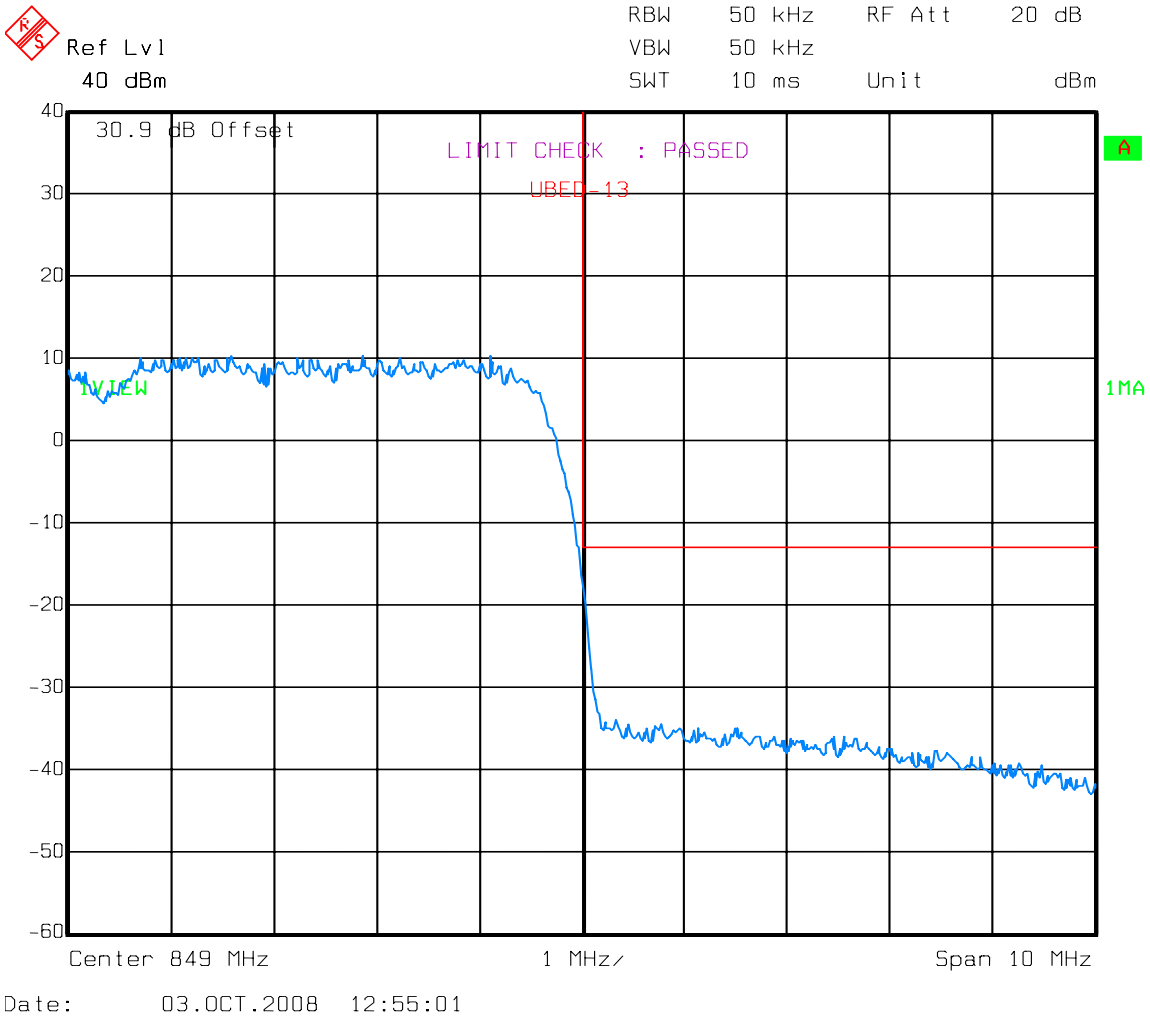
Test Data – Spurious Emissions at Antenna Terminals

Uplink - Lower Bandedge Intermodulation
W-CDMA



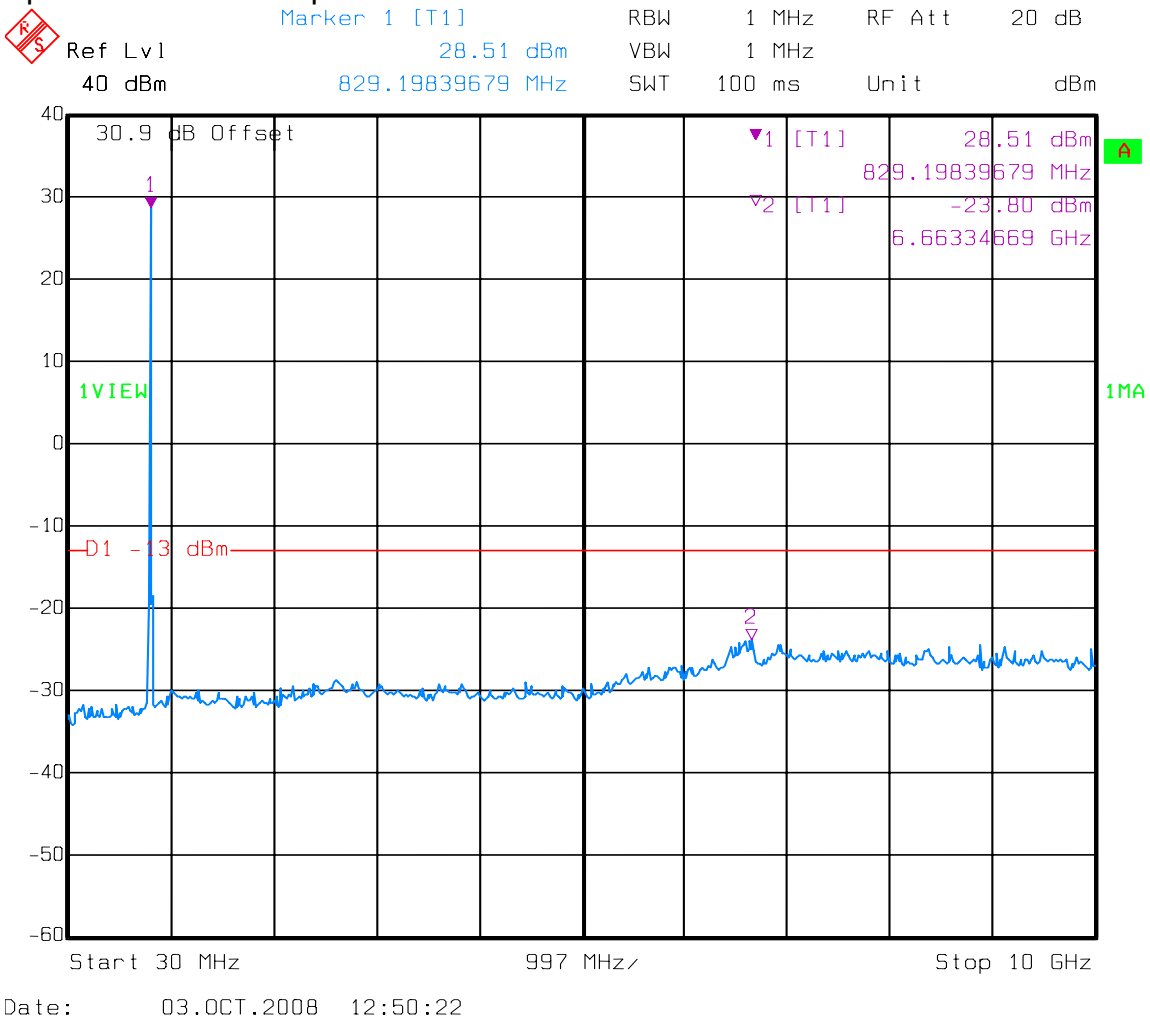
Test Data – Spurious Emissions at Antenna Terminals

Uplink - Upper Bandedge Intermodulation
W-CDMA



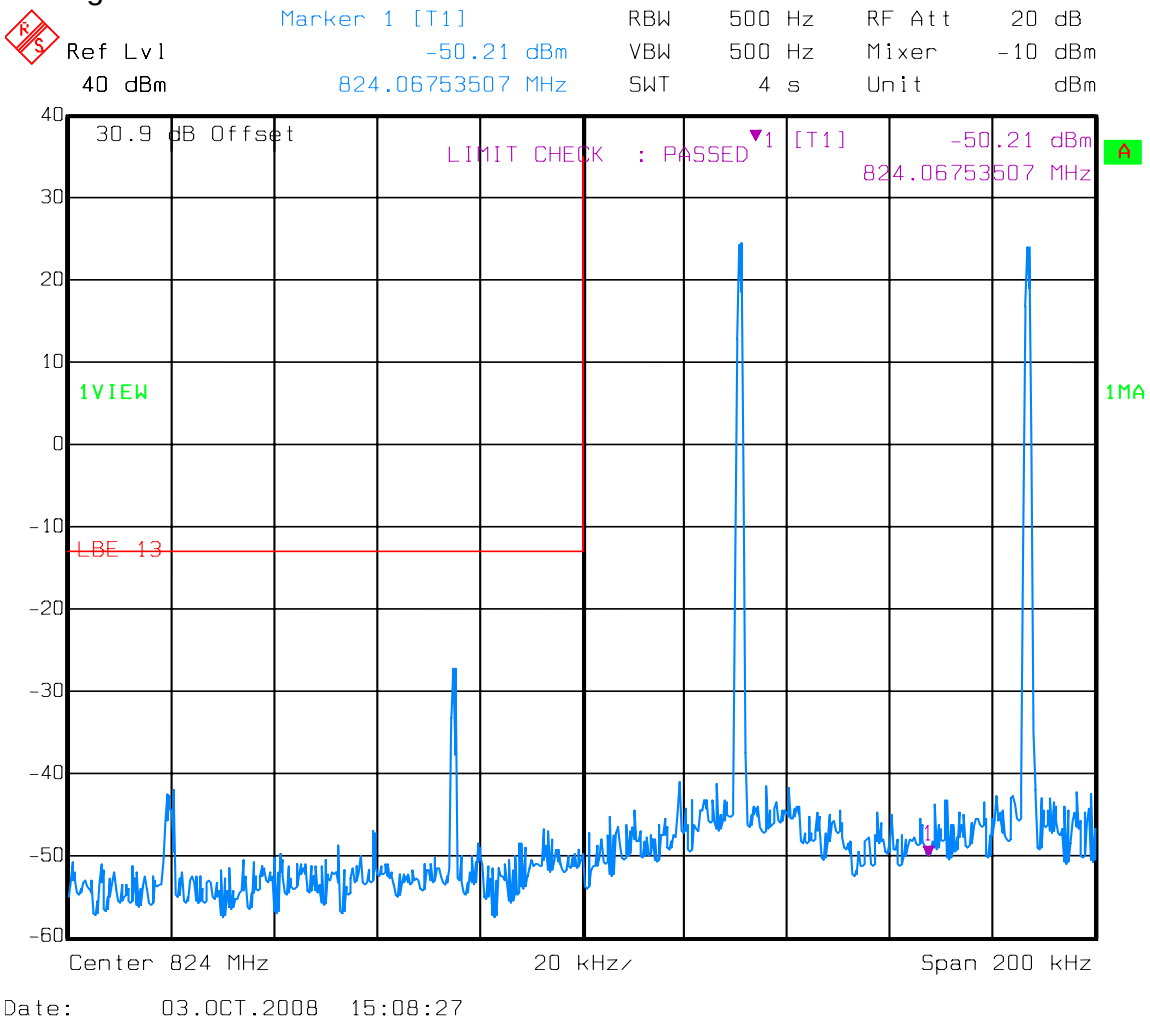
Test Data – Spurious Emissions at Antenna Terminals

Spurs – W-CDMA - Uplink



Test Data – Spurious Emissions at Antenna Terminals

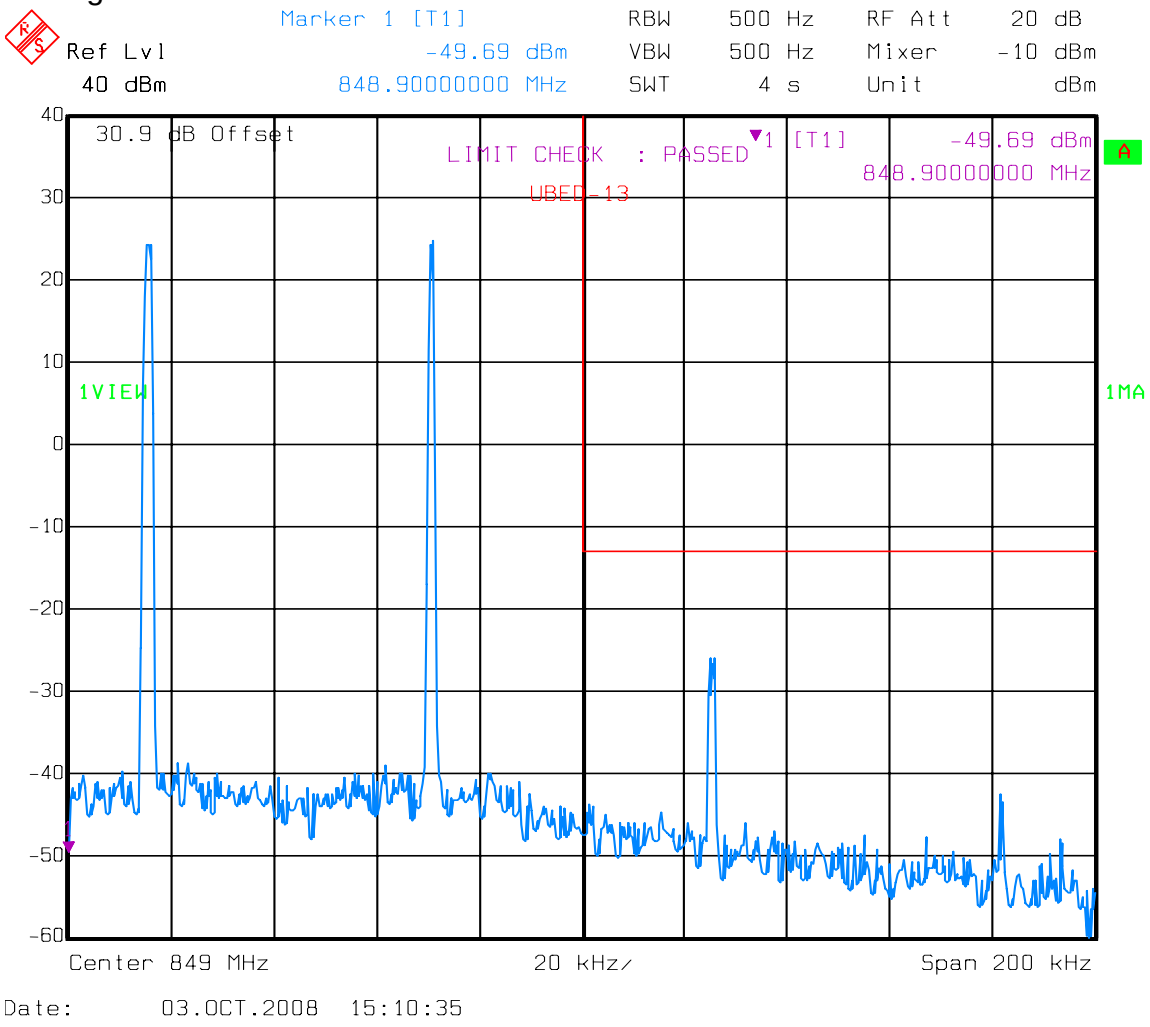
Uplink - Lower Bandedge Intermodulation
Analog



Test Data – Spurious Emissions at Antenna Terminals

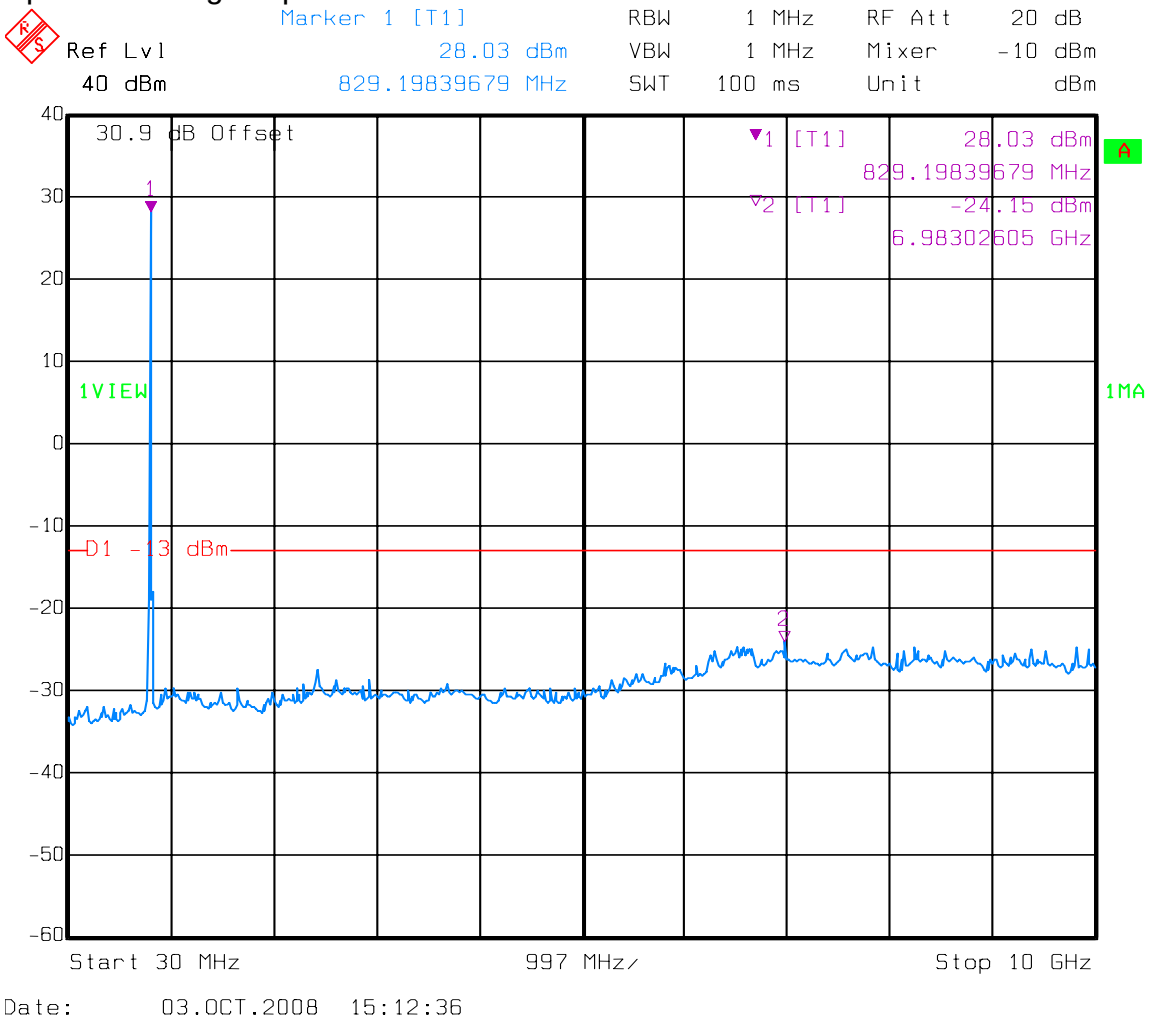
Uplink - Upper Bandedge Intermodulation

Analog



Test Data – Spurious Emissions at Antenna Terminals

Spurs – Analog – Uplink



Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious	PARA. NO.: 22.917
TESTED BY: David Light	DATE: 05 November 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
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/24/07	01/24/09
1663	Spectrum Analyzer	Rhode & Schwarz FSP3	100073	06/03/08	06/03/09

ANNEX A - TEST DETAILS

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

Minimum Standard: Para. No. 22.913(a). The maximum effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 watts.

Method Of Measurement:

Detachable Antenna:
The peak power at antenna terminals is measured using an in-line peak power meter. 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 a dipole. 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 erp is the signal level fed to the reference antenna corrected for gain referenced to a dipole.

NAME OF TEST: Occupied Bandwidth	**PARA. NO.: 2.1049**

Minimum Standard: Not defined (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.: 2.1051**

Minimum Standard: Para. No. 22.917(e). The mean power of emissions must be attenuated below the mean power of the unmodulated carrier on any frequency twice or more than twice the fundamental emission by at least 43 + 10 log P. This is equivalent to -13 dBm absolute power.

Method Of Measurement:

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

NAME OF TEST: Field Strength of Spurious Radiation PARA. NO.: 2.1053

Minimum Standard: Para. No. 22.917(e). The mean power of emissions must be attenuated below the mean power of the unmodulated carrier on any frequency twice or more than twice the fundamental emission by at least 43 + 10 log P. This is equivalent to -13 dBm absolute power.

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 a dipole. 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 erp is the signal level fed to the reference antenna corrected for gain referenced to a dipole.

NAME OF TEST: Frequency Stability **PARA. NO.: 2.1055**

Minimum Standard: Para. No. 22.355. The transmitter carrier frequency shall remain within the tolerances given in Table C-1.

Table C-1

Freq. Range (MHz)	Base, fixed	Mobile > 3 W	Mobile ≤ 3 W
821 to 896	1.5	2.5	2.5

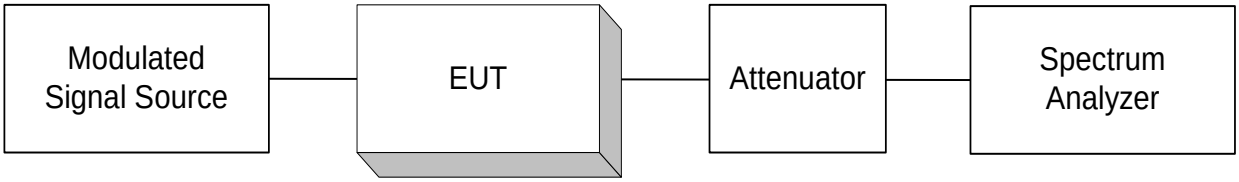
Method Of Measurement:

Frequency Stability With Voltage Variation:
The E.U.T. is placed in an environmental chamber and allowed to stabilize at +20 degrees Celsius for at least 15 minutes. The frequency counter and signal generator are phase locked with the same 10 MHz reference frequency by connecting the 10 MHz ref. out of the counter to the 10 MHz ref, in of the signal generator. With the voltage input to the E.U.T. set to 85% S.T.V., the frequency is measured in 30 second intervals for a period of 5 minutes. This procedure is repeated at 100% S.T.V. and 115% S.T.V.

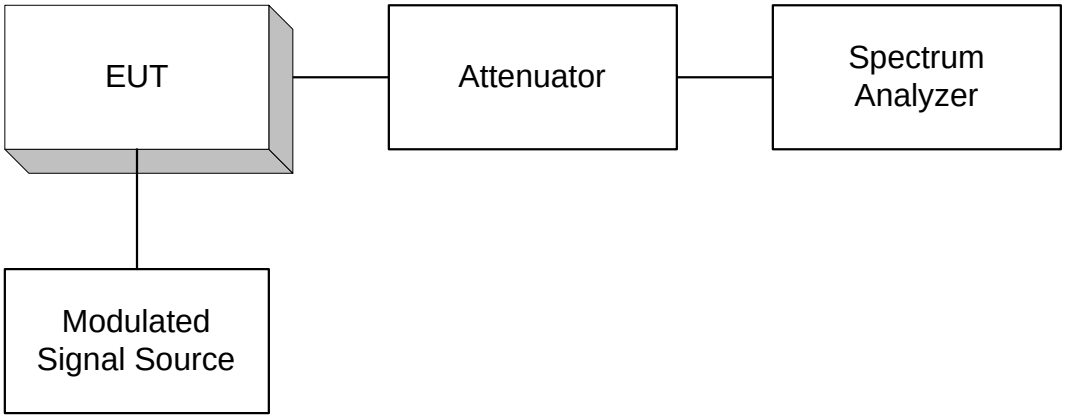
Frequency Stability With Temperature Variation:
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

ANNEX B - TEST DIAGRAMS

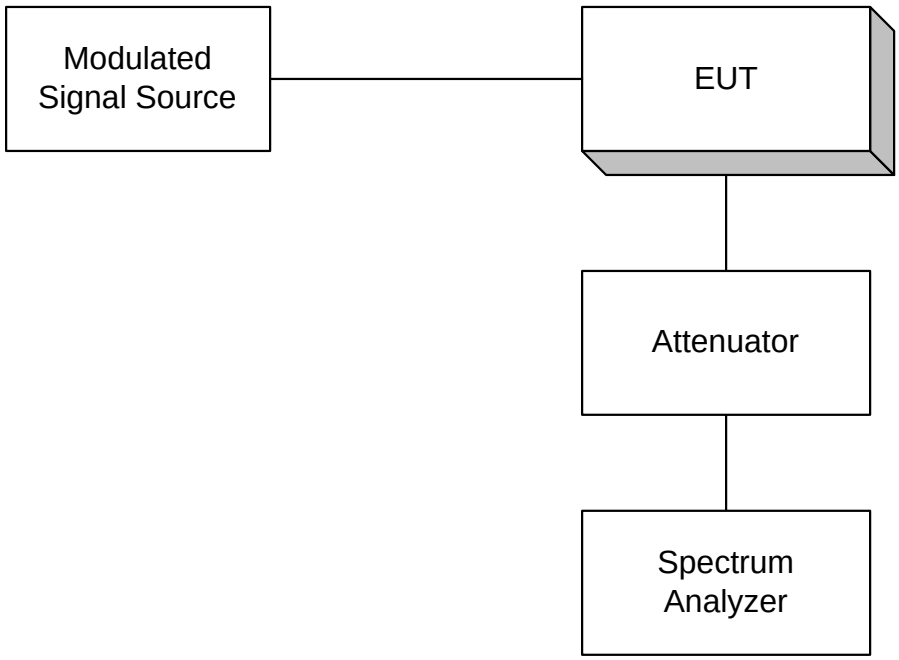
Para. No. 2.1046 - R.F. Power Output



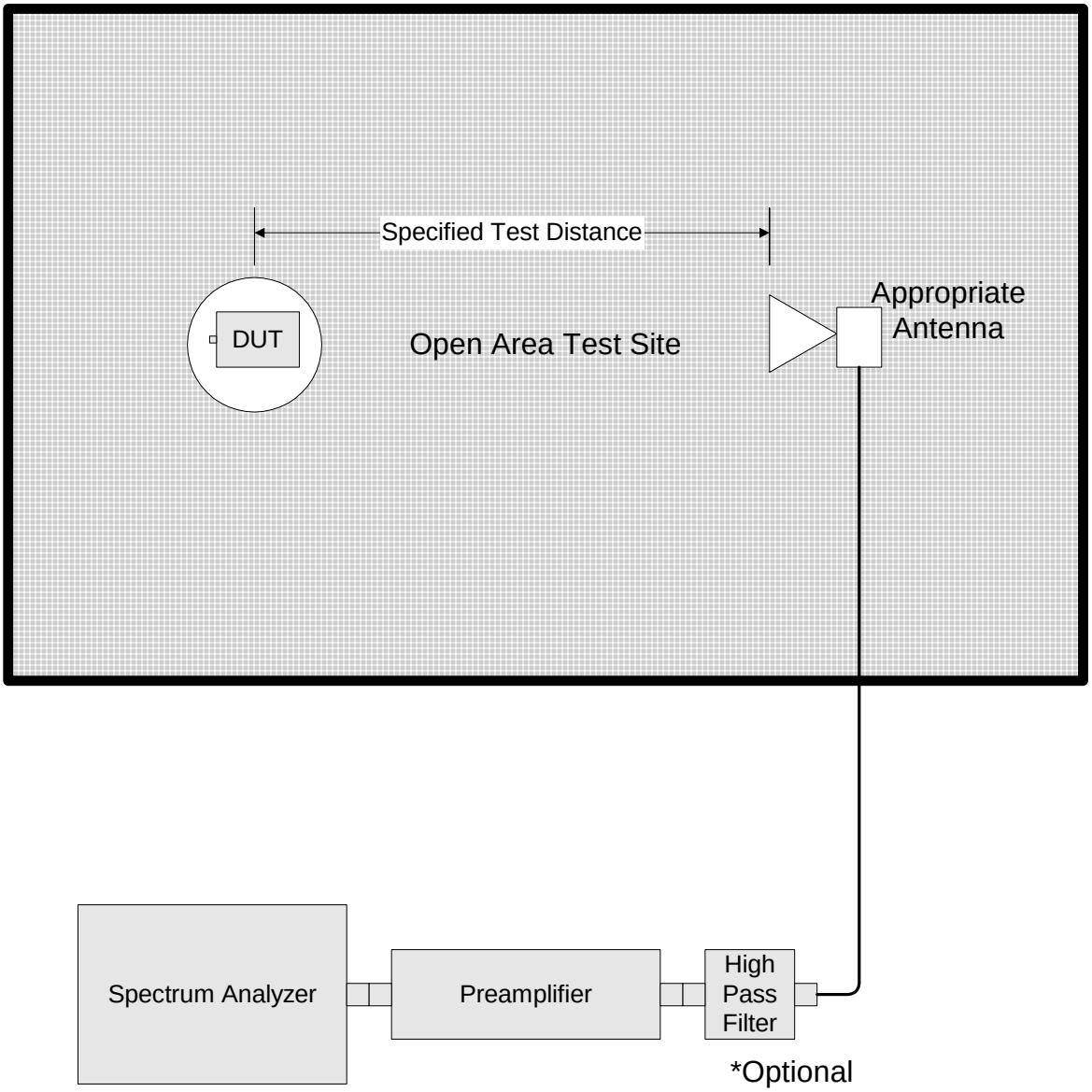
Para. No. 2.1049 - Occupied Bandwidth

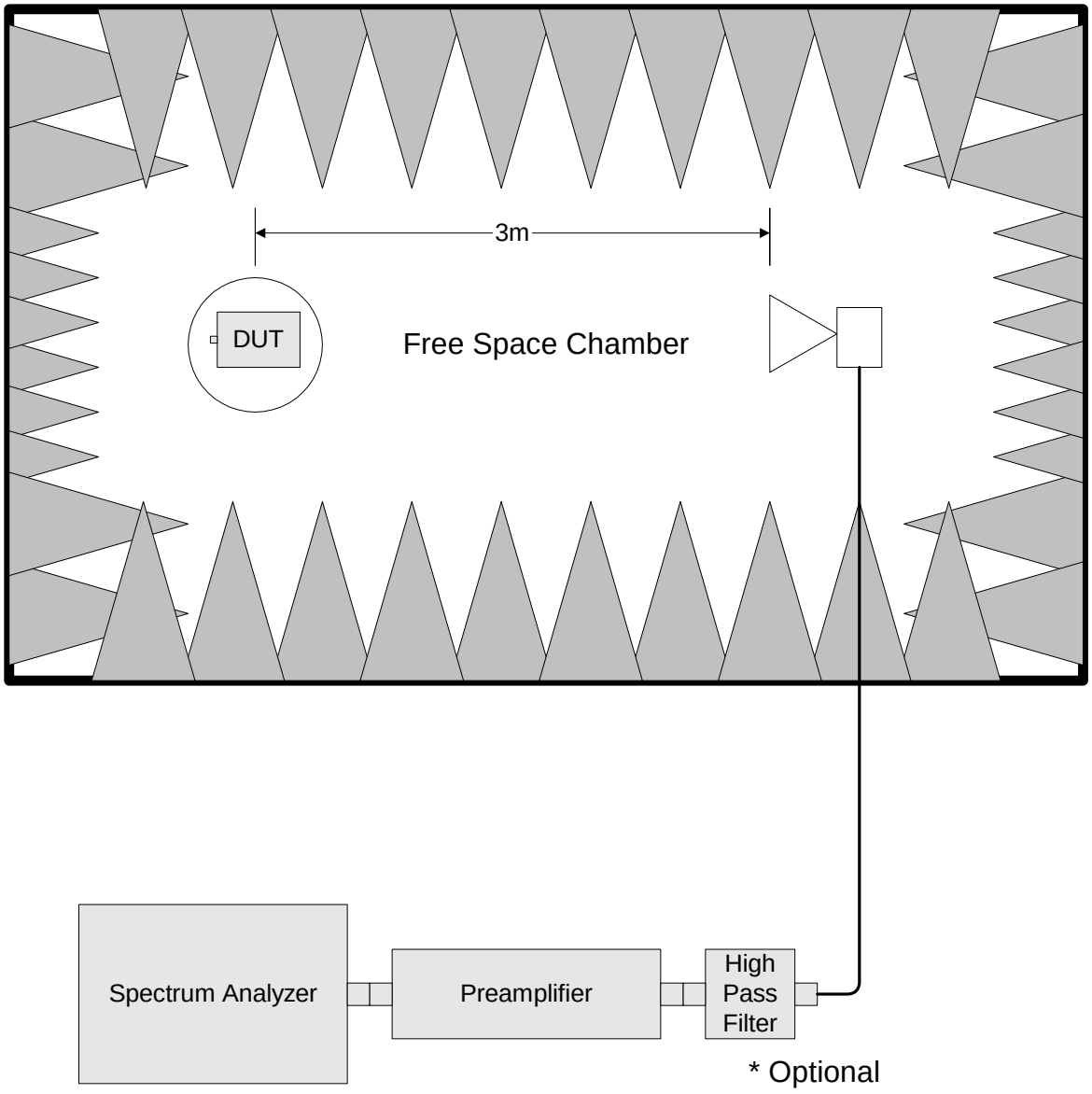


Para. No. 2.1051 Spurious Emissions at Antenna Terminals



Para. No. 2.1053 - Field Strength of Spurious Radiation




3m
DUT
Free Space Chamber
Spectrum Analyzer
Preamplifier
High Pass Filter
* Optional

Para. No. 2.1055 - Frequency Stability