Nemko Test Report:	10235922RUS1
Applicant:	Nokia Siemens Networks 6000 Connection Drive Irving, TX 75039 USA
Equipment Under Test: (E.U.T.)	FXCB
FCC ID:	VBNFXCB-01
IC ID:	661W-FXCB
In Accordance With:	**CFR 47, Part 22, Subpart H and Industry Canada RSS-132, Issue 3** Cellular Base Stations
Tested By:	Nemko USA, Inc. 802 N. Kealy Lewisville, TX 75057-3136

TESTED BY:  **DATE:** 27 February 2013

David Light, Senior Wireless Engineer

APPROVED BY:  **DATE:** **11-Mar-2013**

Michael Cantwell, Reviewer

Number of Pages: 59

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Section 1. Summary of Test Results

Manufacturer: Nokia Siemens Networks

Model No.: FXCB

Serial No.: L9124300880 (WCDMA)
L9124800406 (GSM)

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 FCC Part 22, Subpart H and RSS-132, Issue 3.

☒ 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

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government. Nemko USA, Inc. is a NVLAP accredited laboratory.

Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	RESULT
RF Power Output	22.913(a) / 5.4	500 W	Complies
Occupied Bandwidth	22.917 / 5.5	Not defined	Complies
Spurious Emissions at Antenna Terminals	22.917 / 5.5	-13 dBm	Complies
Field Strength of Spurious Emissions	22.917 / 5.5	-13 dBm E.R.P.	Complies
Frequency Stability	22.355 / 5.3	1.5 ppm	Complies

Footnotes For N/A's:

Section 2. General Equipment Specification

Supply Voltage Input:	-48 Vdc nominal
Frequency Band:	869 to 894 MHz
Type of Modulation and Designator:	**GMSK 300KGXW** **8PSK 300KG7W** **QPSK 300KD7W** **QPSK 5M00D7W** **16QAM 5M00D7W** **64QAM 5M00D7W**
Maximum No. of Carriers:	6
Output Impedance:	50 ohms
RF Output (Rated):	80 W
Band Selection:	**Software** ☒ **Duplexer** ☐ **Fullband** ☐

System Description

The FXCB is an 850 MHz multi-standard multicarrier radio module that consists of three individual transceivers designed to support GSM/EDGE, WCDMA and LTE in dedicated or concurrent mode. Each module supports up to six GSM/EDGE carriers in GSM/EDGE dedicated mode, upto four WCDMA carriers in WCDMA dedicated mode and upto four 5 MHz LTE carriers in LTE dedicated mode with one radio branch. In concurrent mode, a combination of all three radio technologies is supported with a single radio branch. Each module is capable to serve three radio branches with multiradio multicarrier radios of up to 80 Watts output power per branch. The LTE modulation and concurrent mode operation were not tested under this effort.

The transmitter test setup for GSM/EDGE dedicated mode provided GMSK ,QPSK and 8PSK modulation types for both single and multicarrier operation. The transmitter WCDMA dedicated mode provided QPSK, 16QAM and 64QAM modulation types for both single and multicarrier operation.

Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 22.913(a)/5.4
TESTED BY: David Light	DATE: 26 February 2013

Test Results: Complies.

Measurement Data: Refer to table on next page.

Equipment Used: 1036-1082-1054-1065-1472

Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 35 %

Test Data – RF Power Output

Modulation Type	Frequency (MHz)	Measured Output Power (dBm)	Measured Output Power (W)
GSM Carriers			
GMSK	869.2	32.6	1.8
GMSK	869.4	49.3	85.1
GMSK	881.6	49.3	85.1
GMSK	893.6	49.2	83.2
GMSK	893.8	30.8	1.2
8PSK	869.2	38.3	6.8
8PSK	869.4	50.8	120.2
8PSK	881.6	50.8	120.2
8PSK	893.6	50.8	120.2
8PSK	893.8	35.4	3.5
QPSK	869.2	38.6	7.2
QPSK	869.4	50.8	120.2
QPSK	881.6	50.8	120.2
QPSK	893.6	50.8	120.2
QPSK	893.8	37.7	5.9
Wide Band Carriers			
QPSK	871.4	39.9	9.8
QPSK	871.6	48.9	77.6
QPSK	881.6	49.0	79.4
QPSK	891.4	48.8	75.9
QPSK	891.6	39.9	9.8
16QAM	871.4	39.9	9.8
16QAM	871.6	48.9	77.6
16QAM	881.6	49.0	79.4
16QAM	891.4	48.8	75.9
16QAM	891.6	39.9	9.8
64QAM	871.4	39.9	9.8
64QAM	871.6	48.9	77.6
64QAM	881.6	49.0	79.4
64QAM	891.4	48.8	75.8
64QAM	891.6	39.8	9.5

Note: The power needs to be lowered at the lowest and highest frequencies per above to ensure compliance at the band edges.

The FXCB is compliant at the other frequencies operating at full power.

Supply voltage was varied +/- 15%. No fluctuation in output power resulted.

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 22.917/5.5
TESTED BY: David Light	DATE: 26 February 2013

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1036-1082-1054-1065-1472

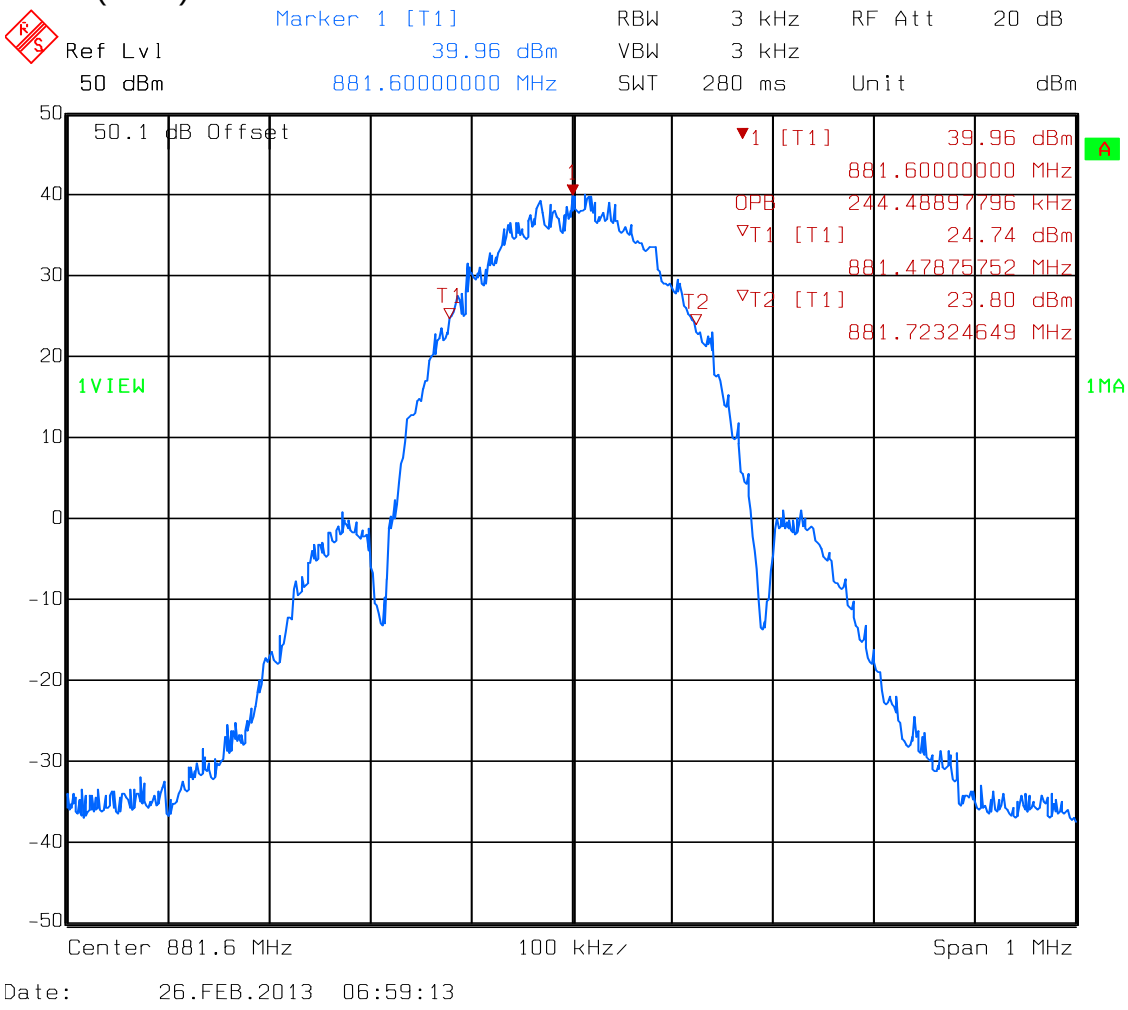
Measurement Uncertainty: +/- 1.6 dB

Temperature: 22 °C

Relative Humidity: 35 %

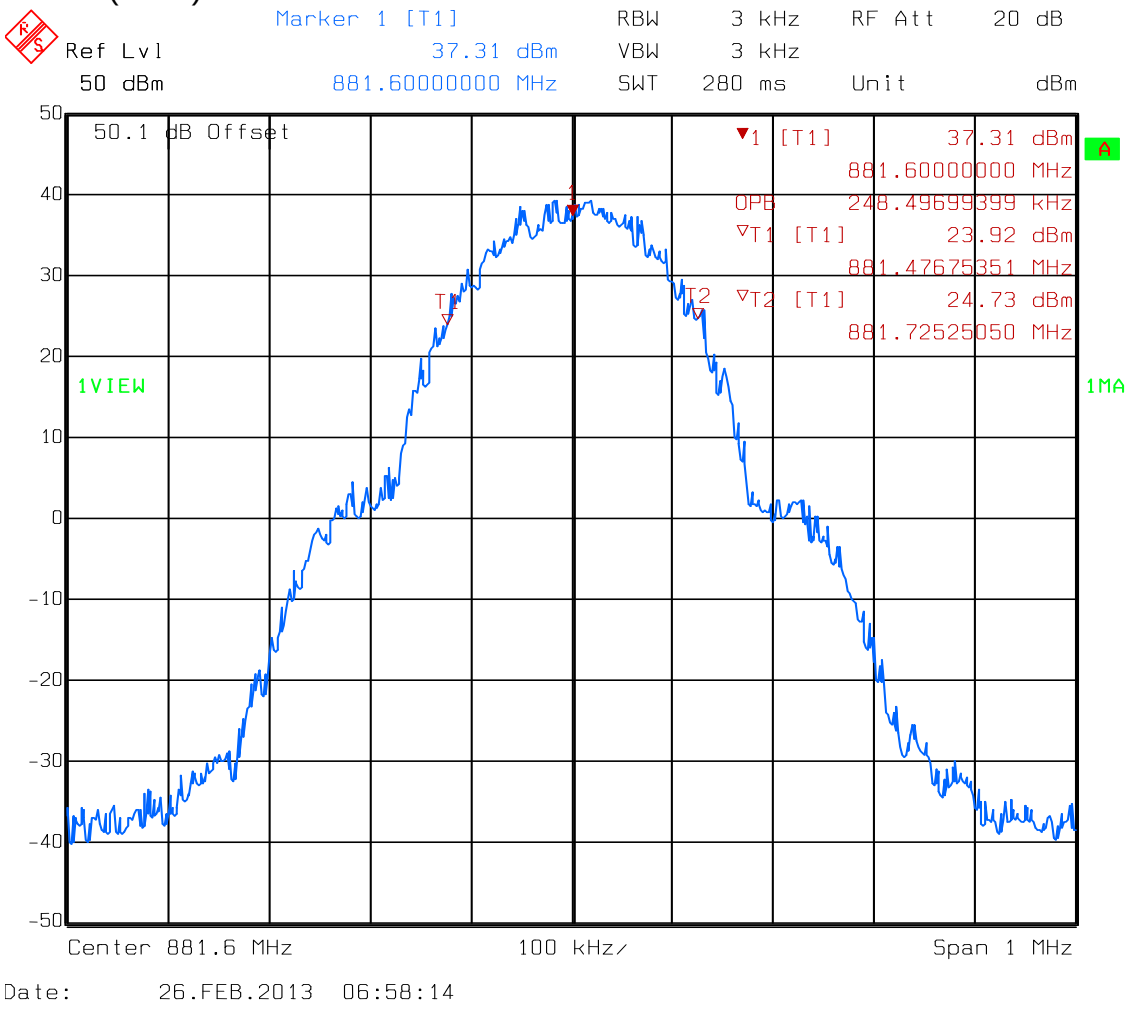
Test Data – Occupied Bandwidth

8PSK (GSM)



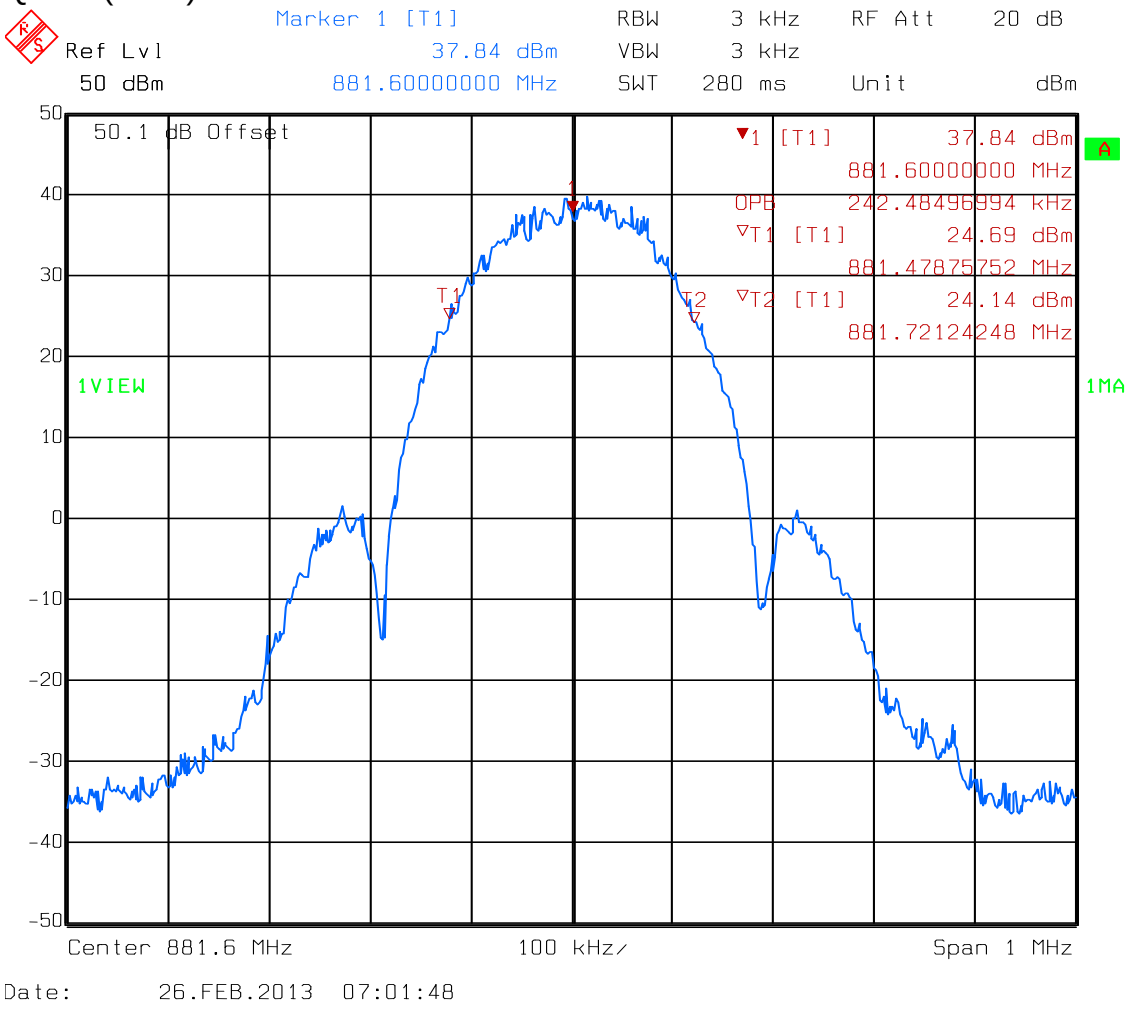
Test Data – Occupied Bandwidth

GMSK (GSM)



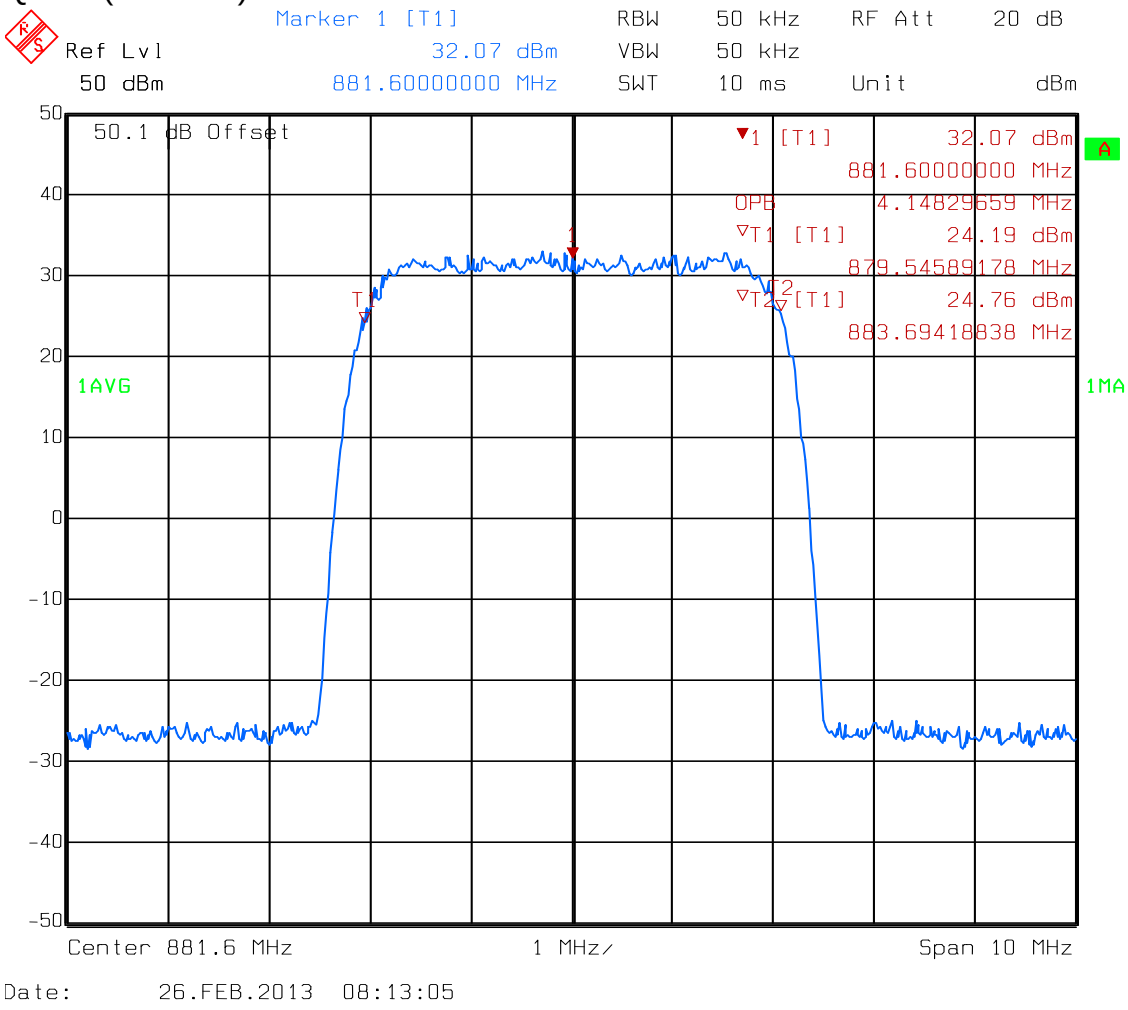
Test Data – Occupied Bandwidth

QPSK (GSM)



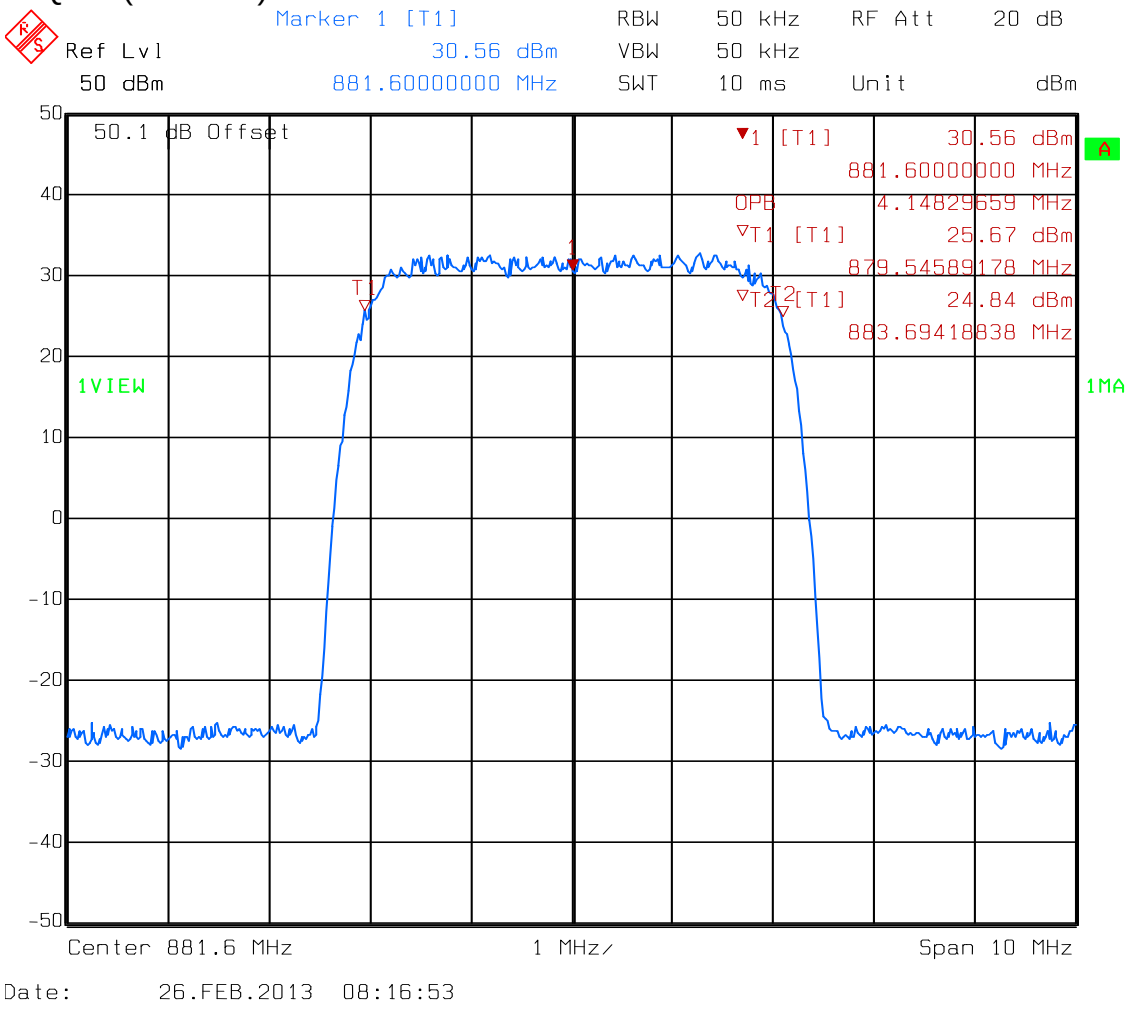
Test Data – Occupied Bandwidth

QPSK (WCDMA)



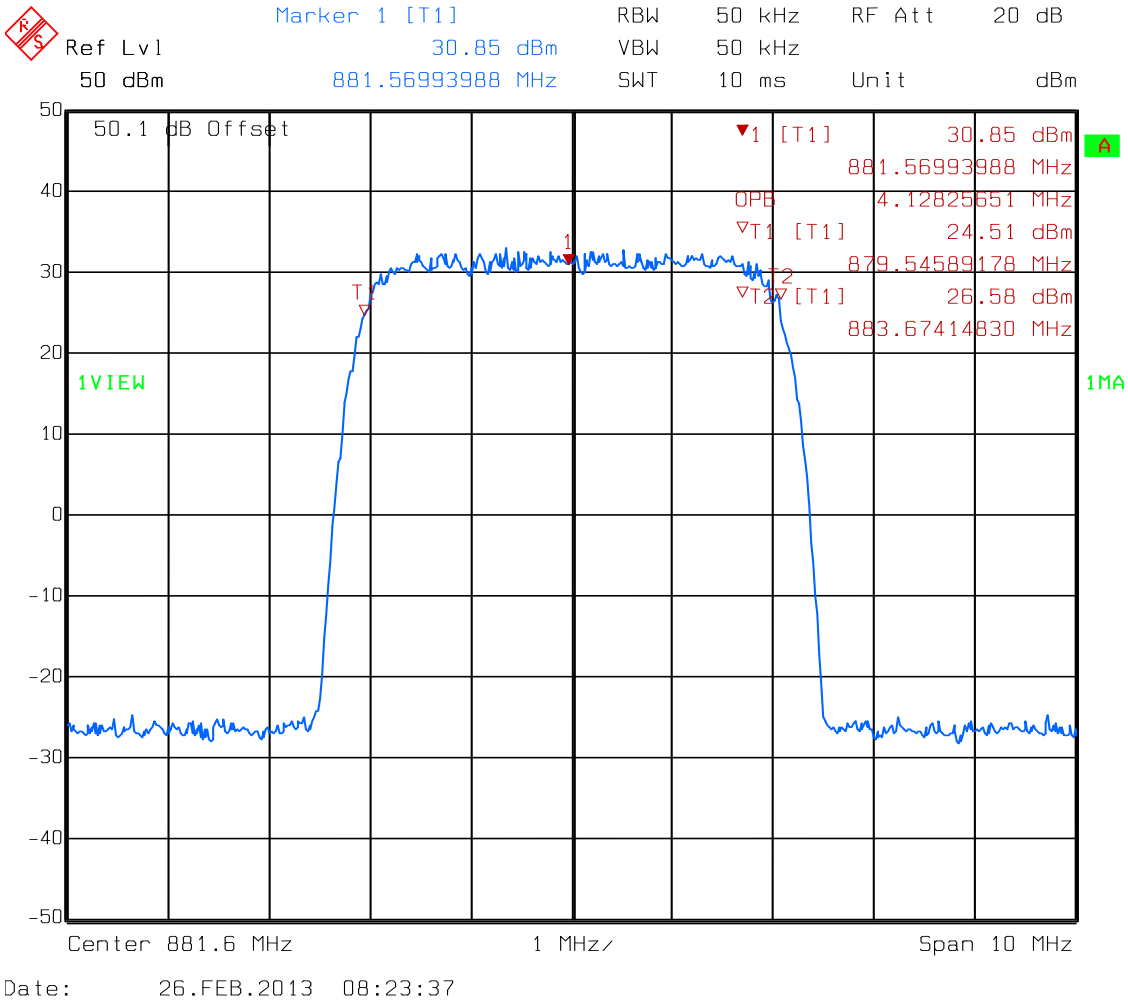
Test Data – Occupied Bandwidth

16QAM (WCDMA)



Test Data – Occupied Bandwidth

64QAM (WCDMA)



Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 22.917/5.5
TESTED BY: David Light	DATE: 26 February 2013

Test Results: Complies.

Test Data: Refer to plots below

Equipment Used: 1036-1082-1054-1065-1472

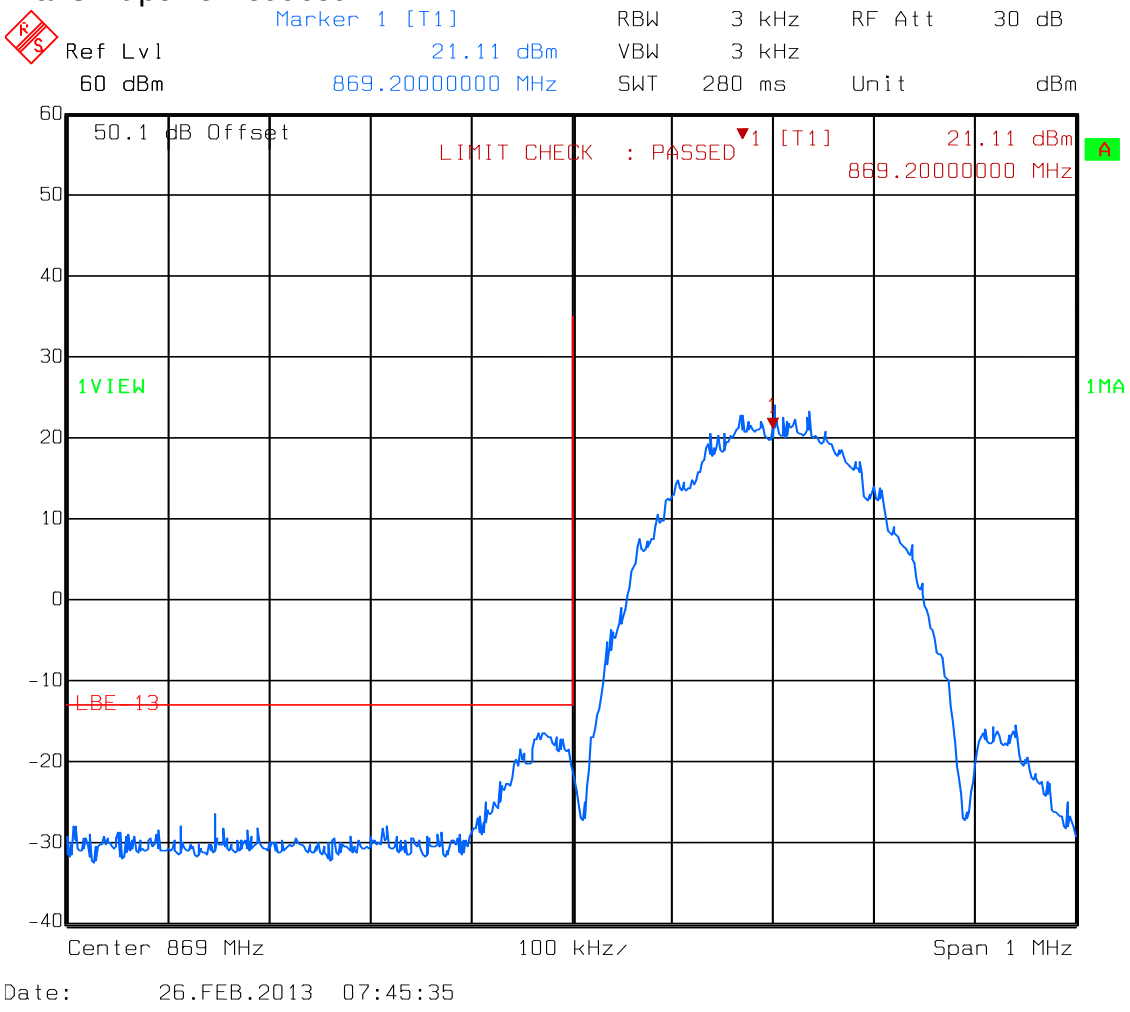
Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 35 %

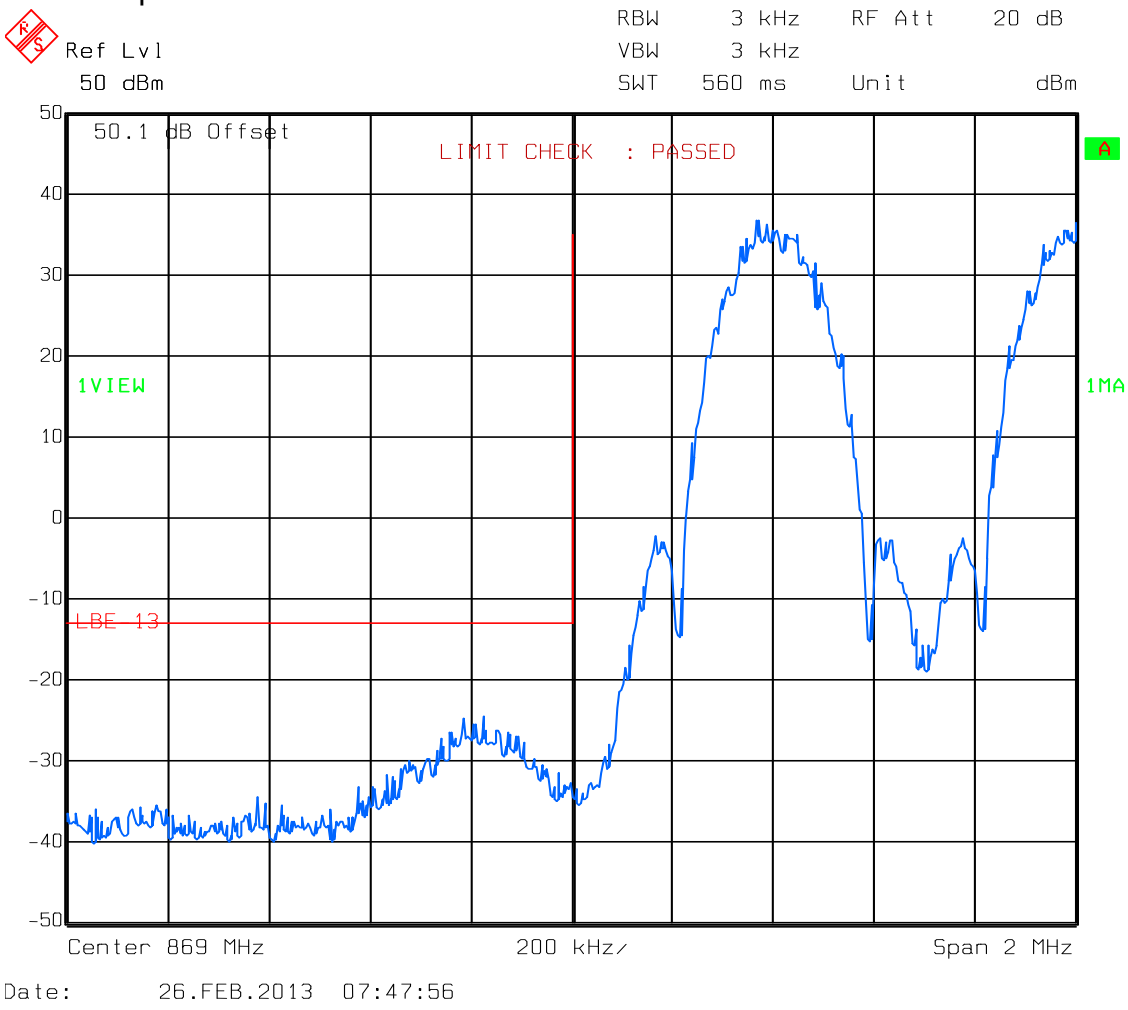
Test Data – Spurious Emissions

Low Band Edge
8PSK (GSM)
Transmit Frequency: 869.2 MHz
Transmit power reduced



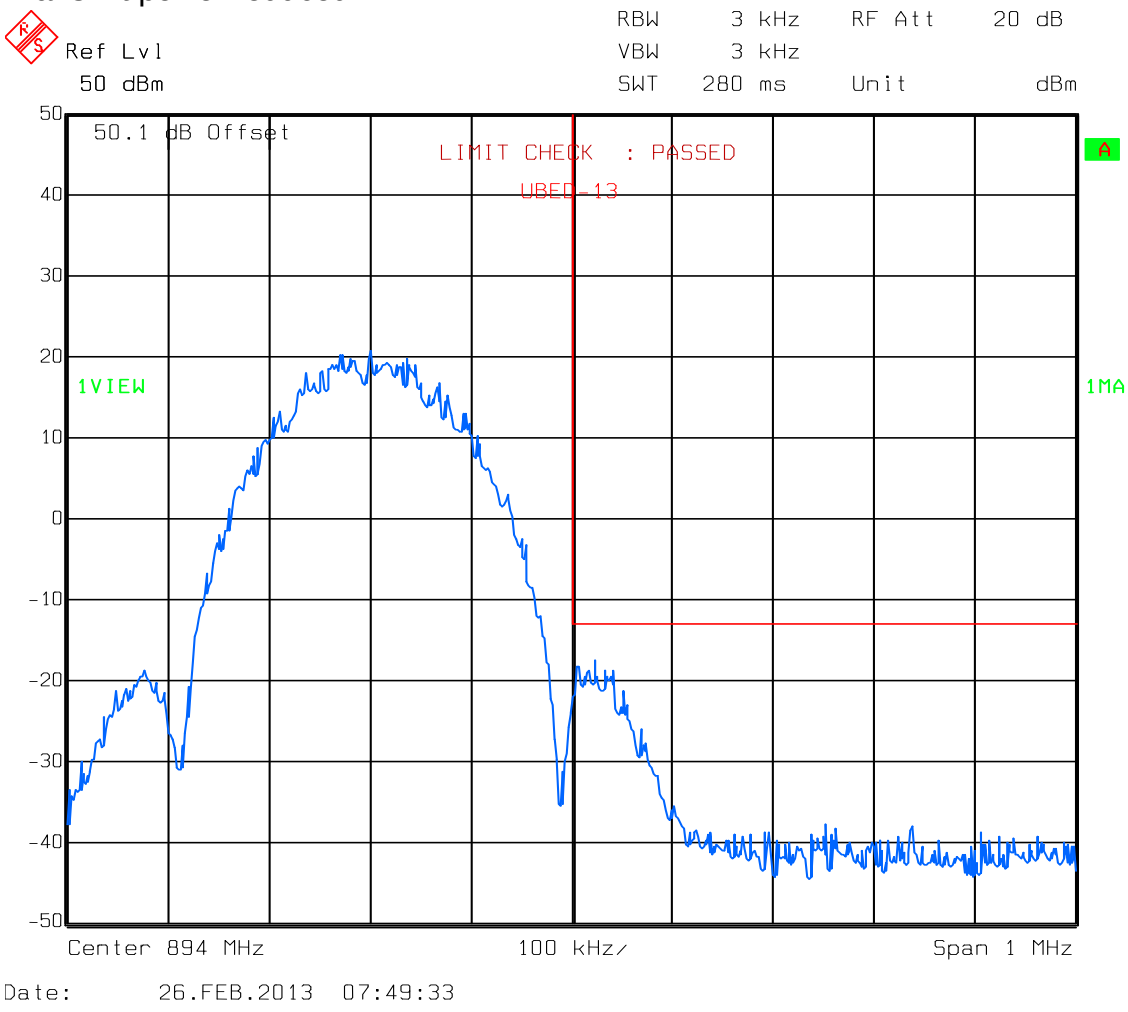
Test Data – Spurious Emissions

Low Band Edge Intermodulation
8PSK (GSM)
Transmit power maximum



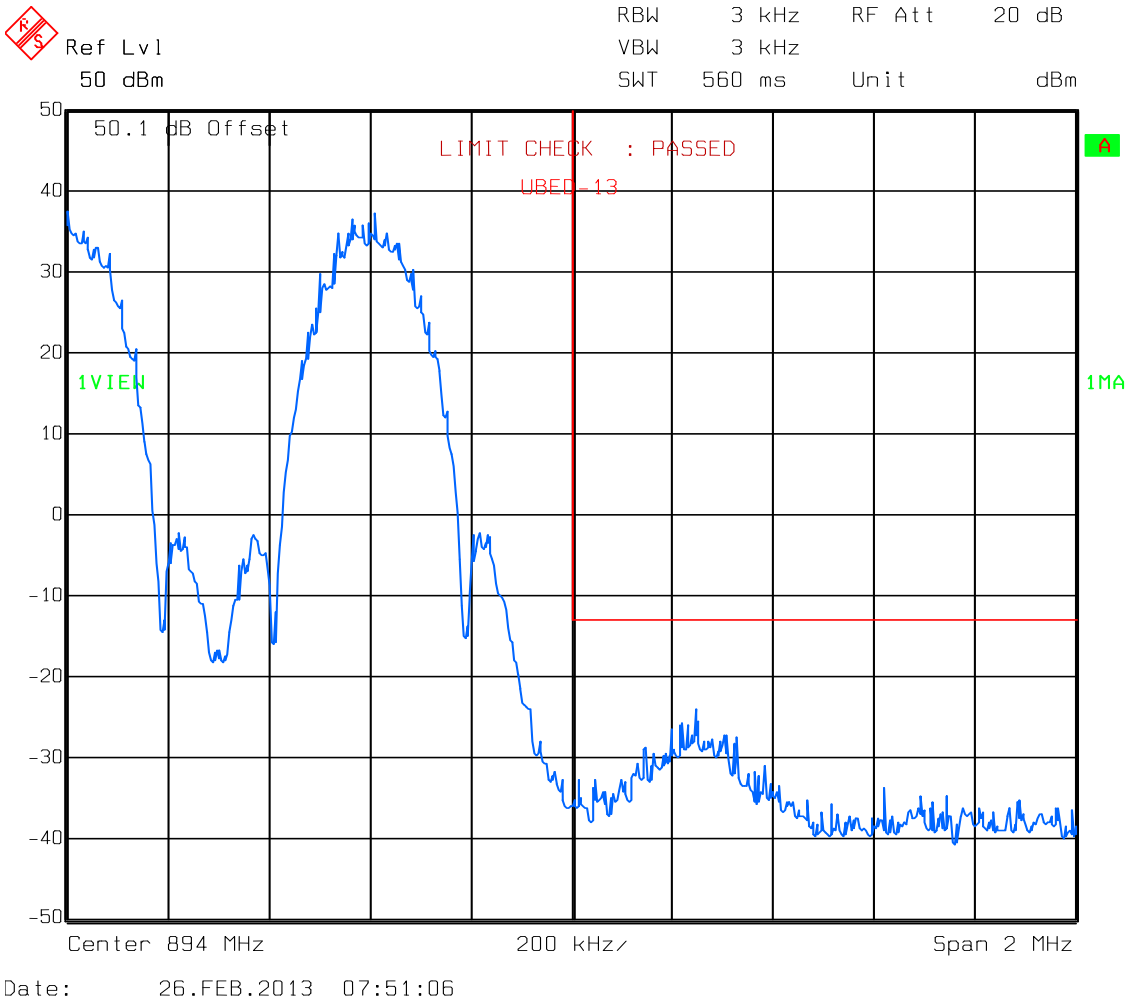
Test Data – Spurious Emissions

Upper Band Edge
8PSK (GSM)
Transmit Frequency: 893.8 MHz
Transmit power reduced



Test Data – Spurious Emissions

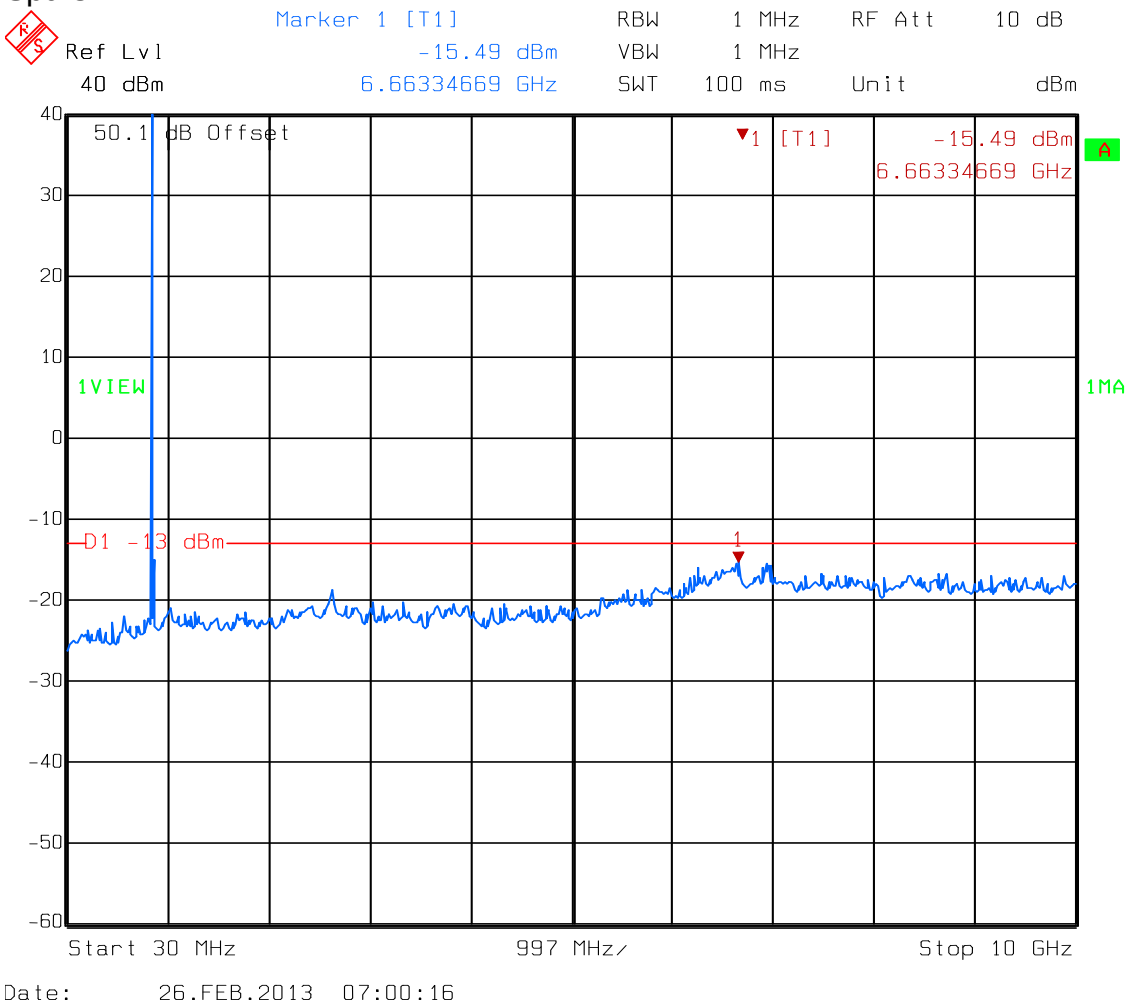
Upper Band Edge Intermodulation
8PSK (GSM)
Transmit power maximum



Test Data – Spurious Emissions

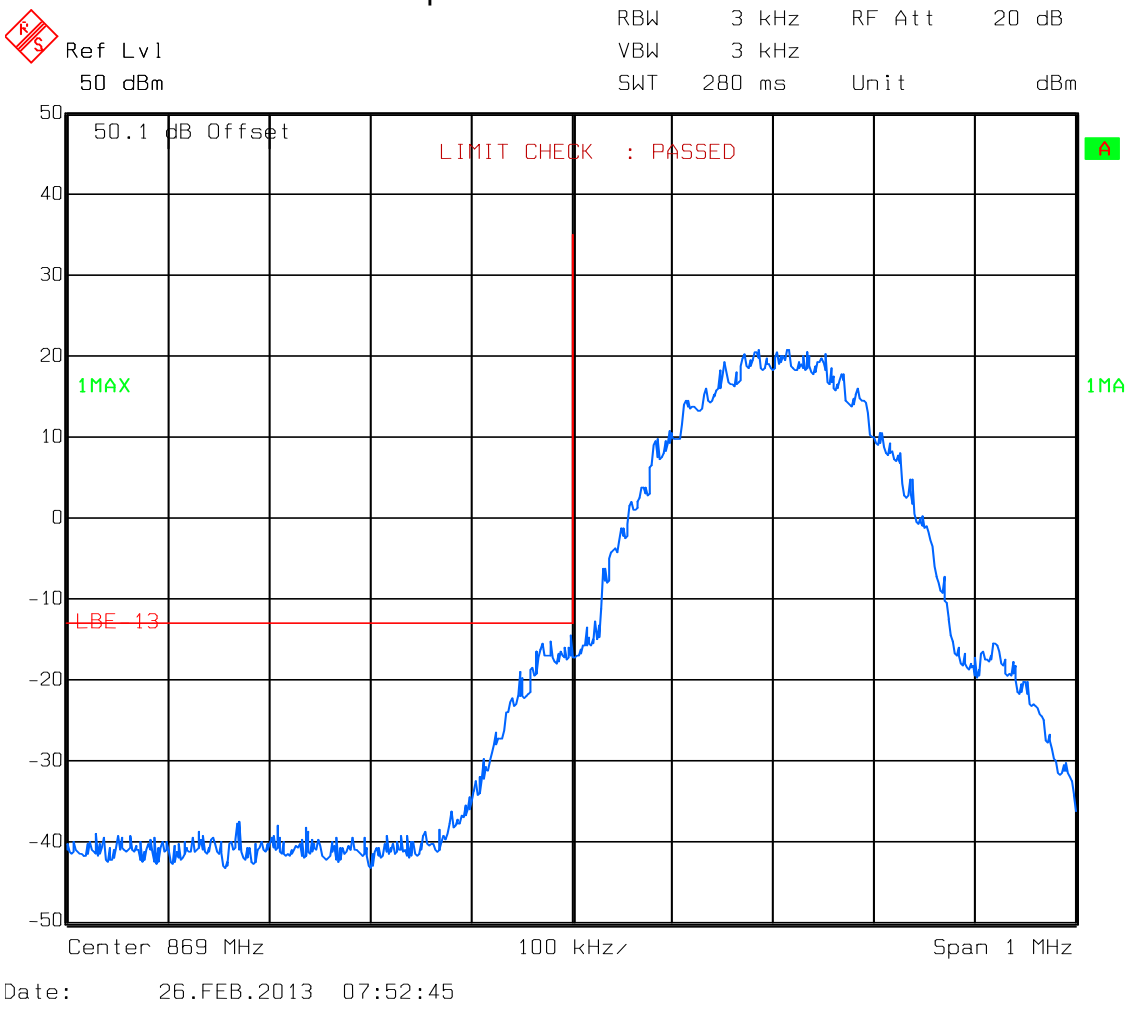
8PSK (GSM)

Spurs



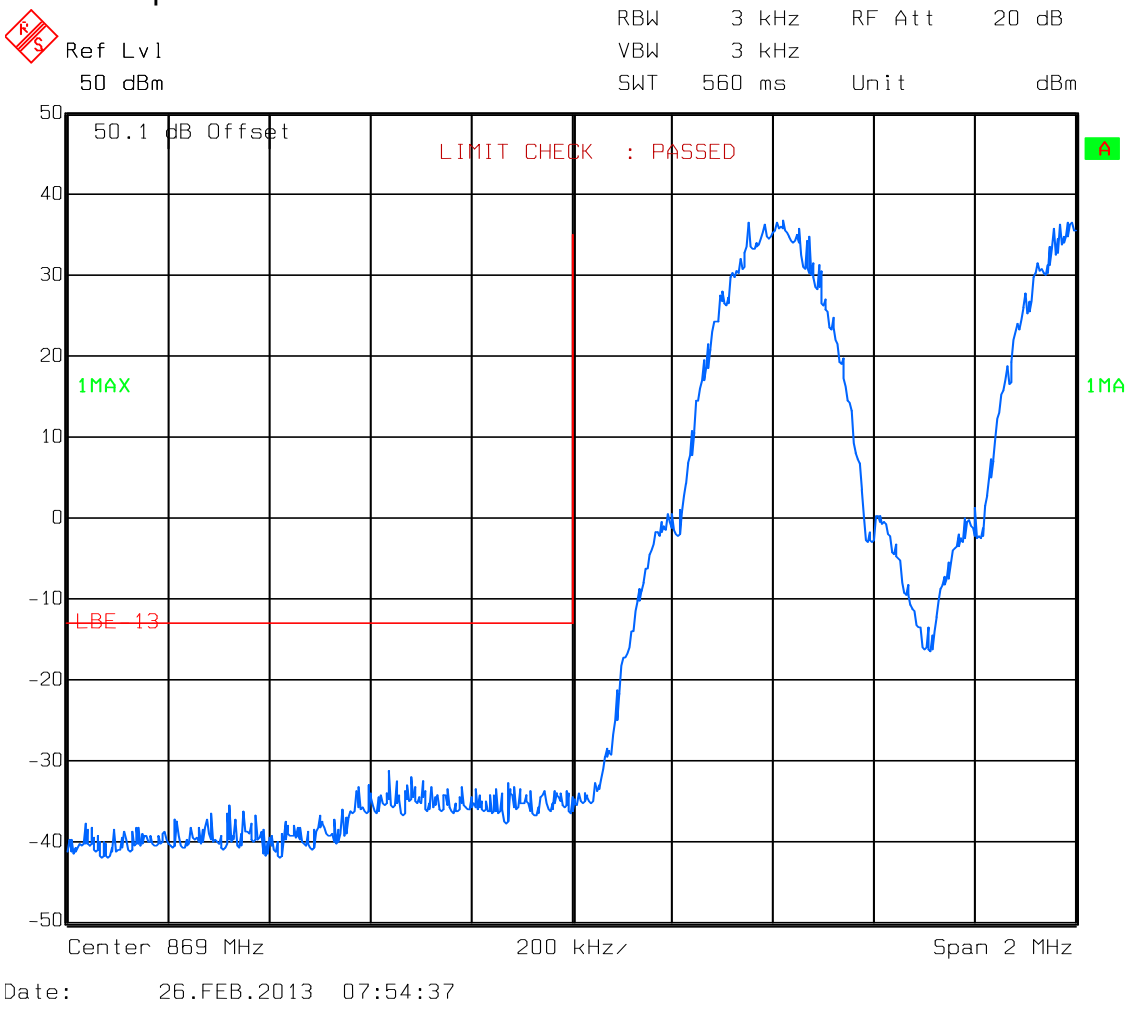
Test Data – Spurious Emissions

GMSK (GSM)
Lower Edge
Transmit 869.2 MHz reduced power



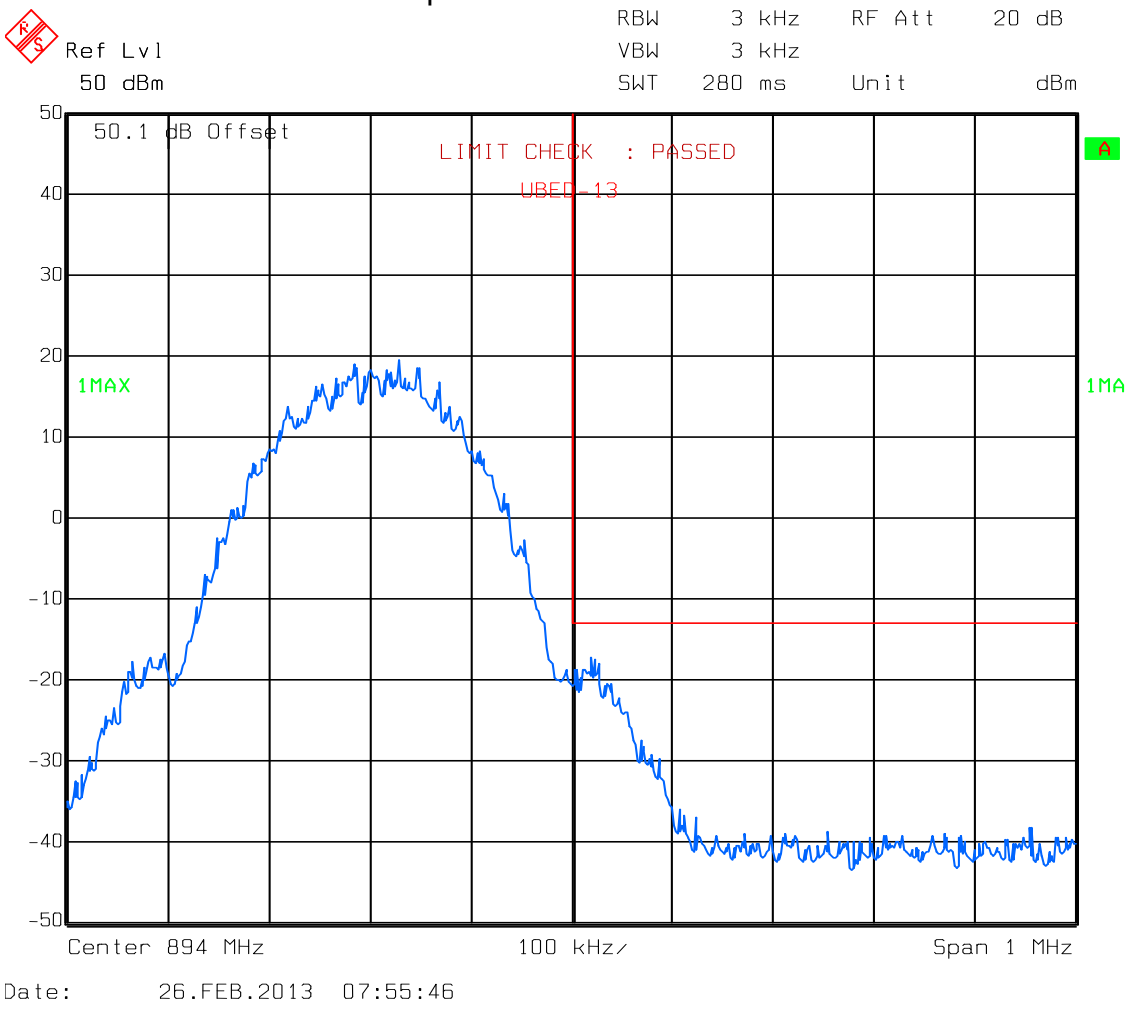
Test Data – Spurious Emissions

GMSK (GSM)
Lower band edge Intermodulation
Maximum power



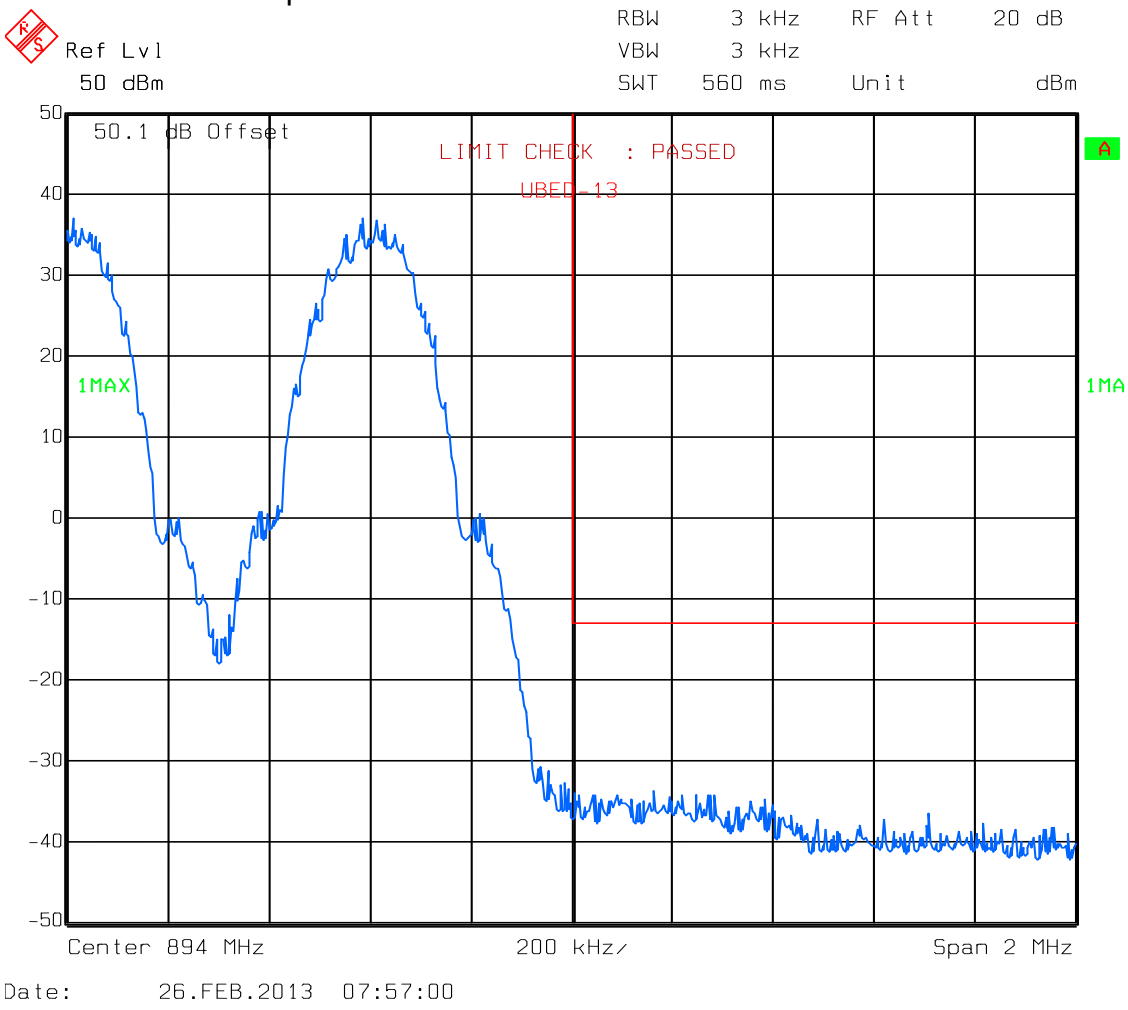
Test Data – Spurious Emissions

GMSK (GSM)
Upper band edge
Transmit 893.8 MHz reduced power



Test Data – Spurious Emissions

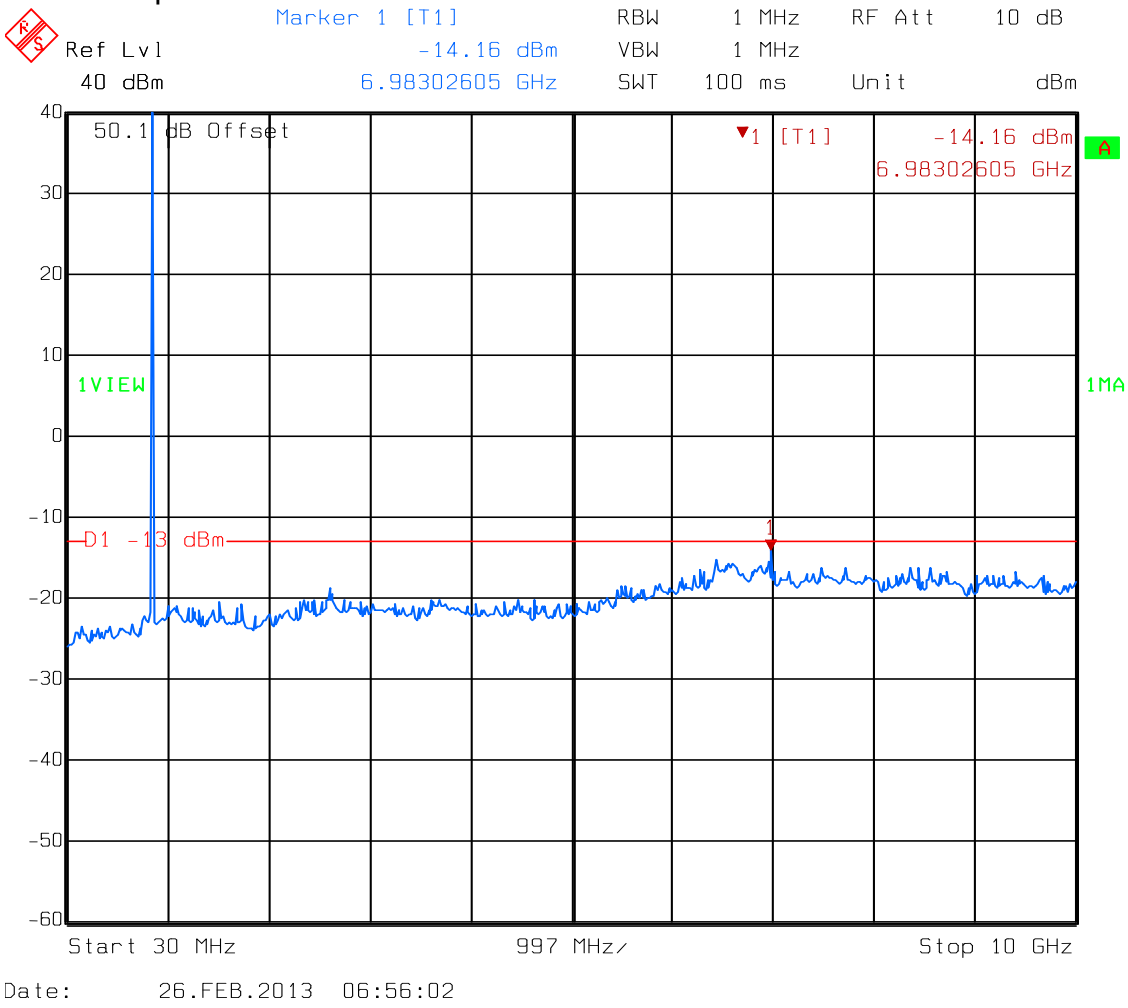
GMSK (GSM)
Upper band edge intermodulation
Transmit maximum power



Test Data – Spurious Emissions

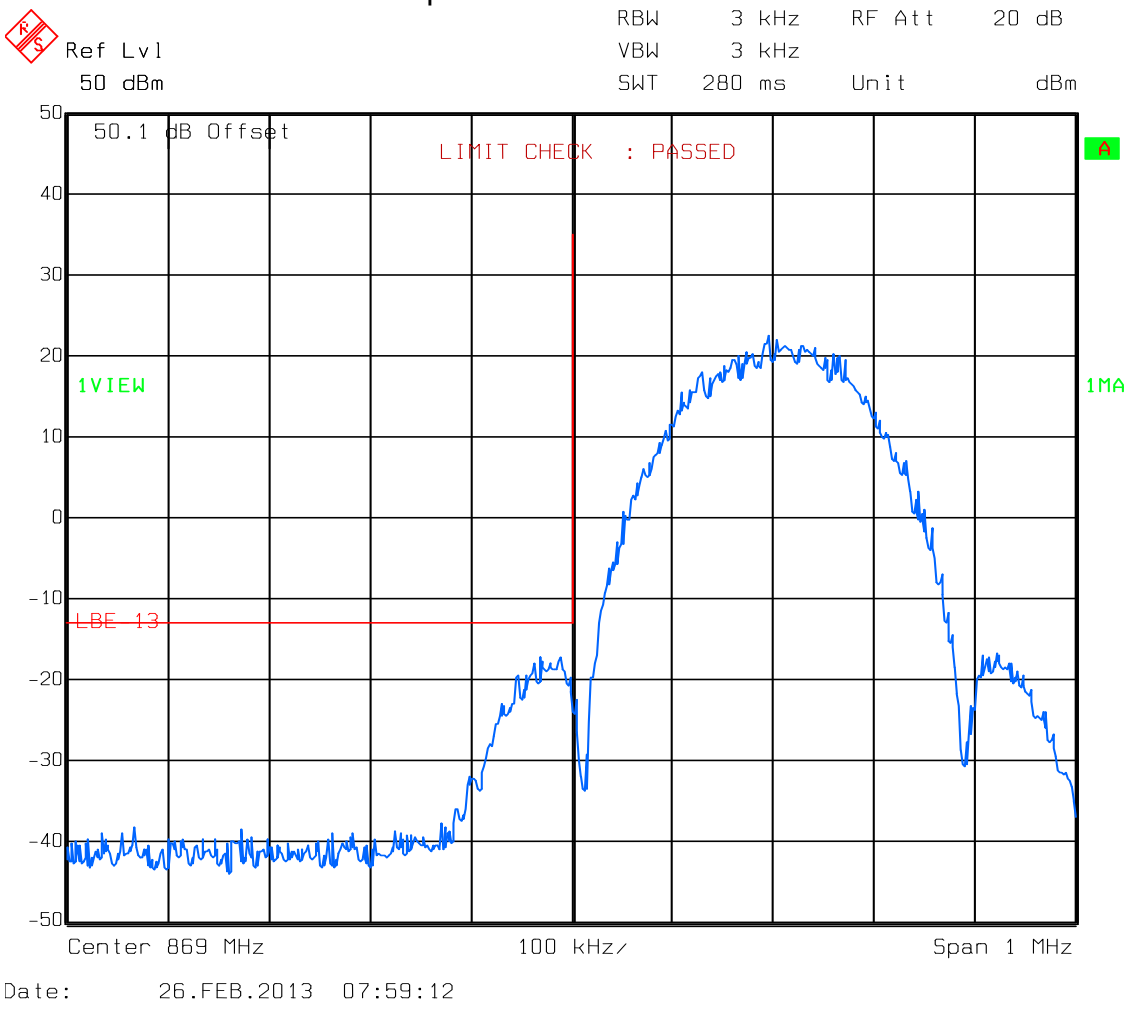
GMSK (GSM)

Transmit spurs



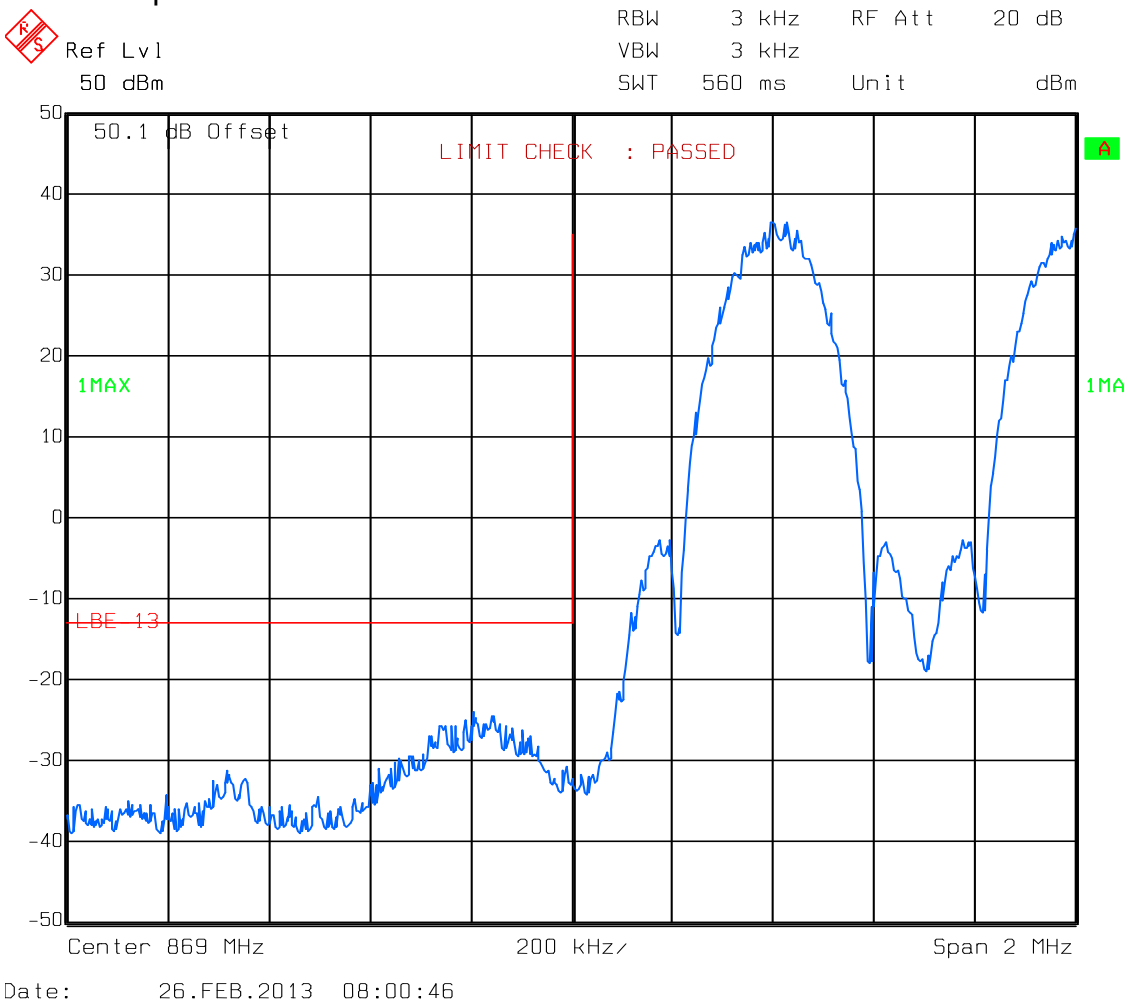
Test Data – Spurious Emissions

8PSK (GSM)
Lower Edge
Transmit 869.2 MHz reduced power



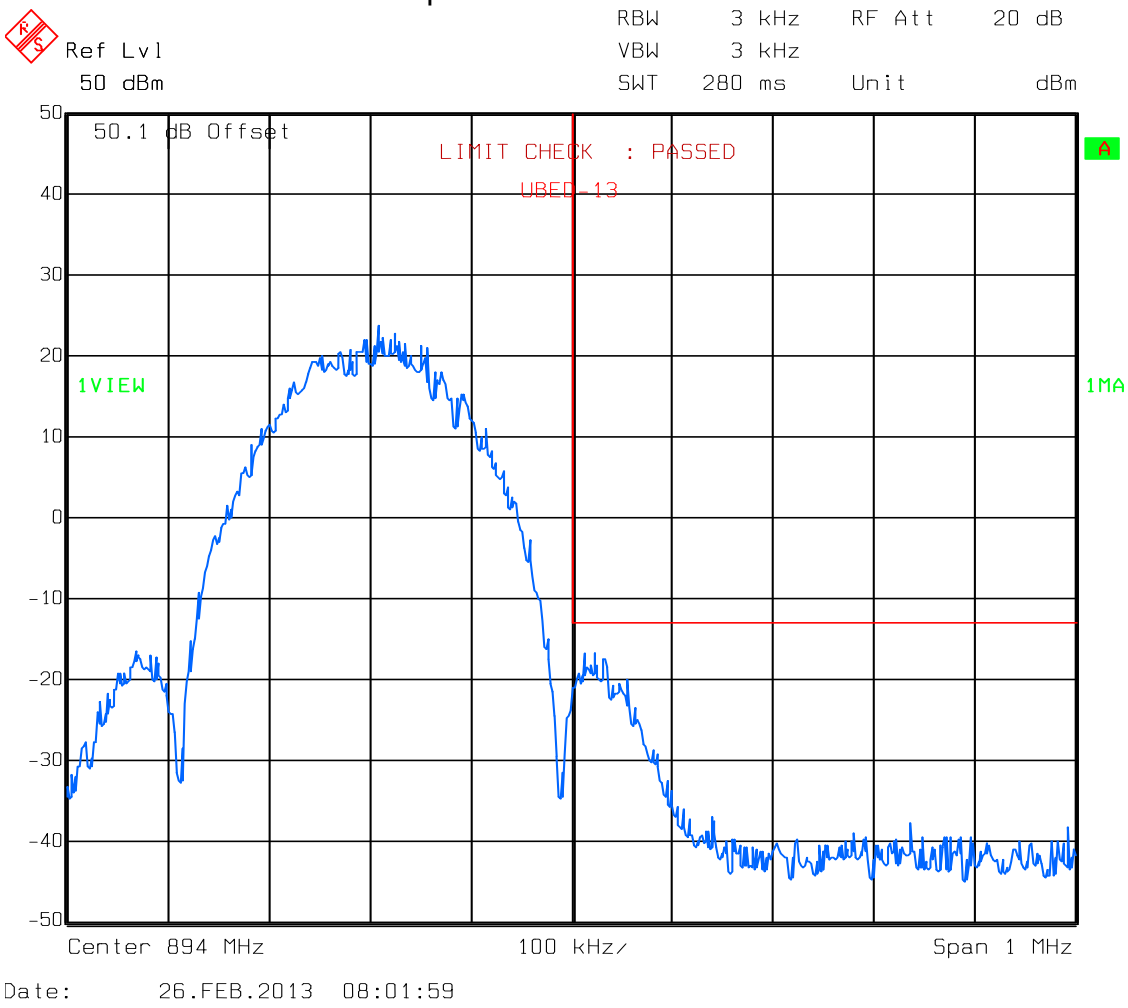
Test Data – Spurious Emissions

8PSK (GSM)
Lower band edge Intermodulation
Maximum power



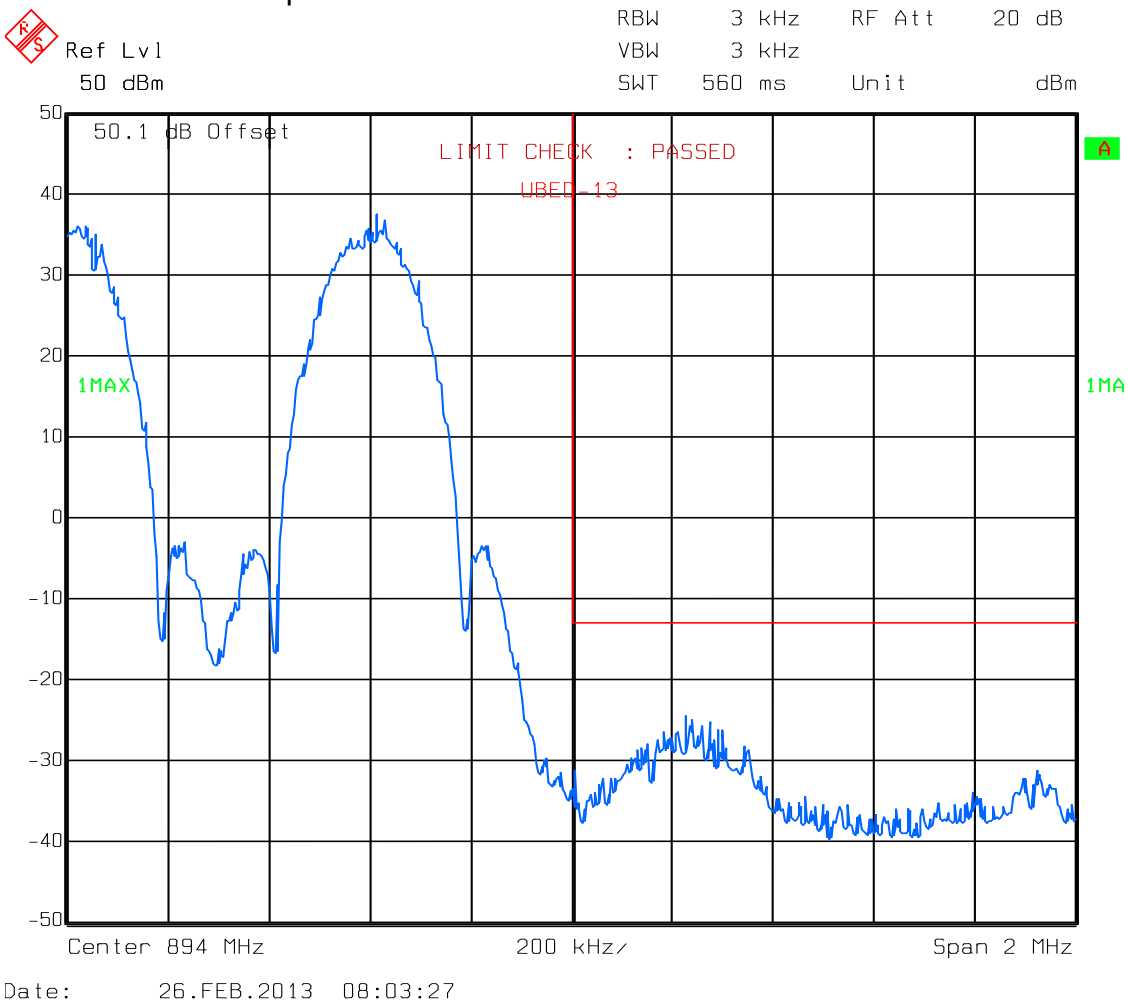
Test Data – Spurious Emissions

8PSK (GSM)
Upper band edge
Transmit 893.8 MHz reduced power



Test Data – Spurious Emissions

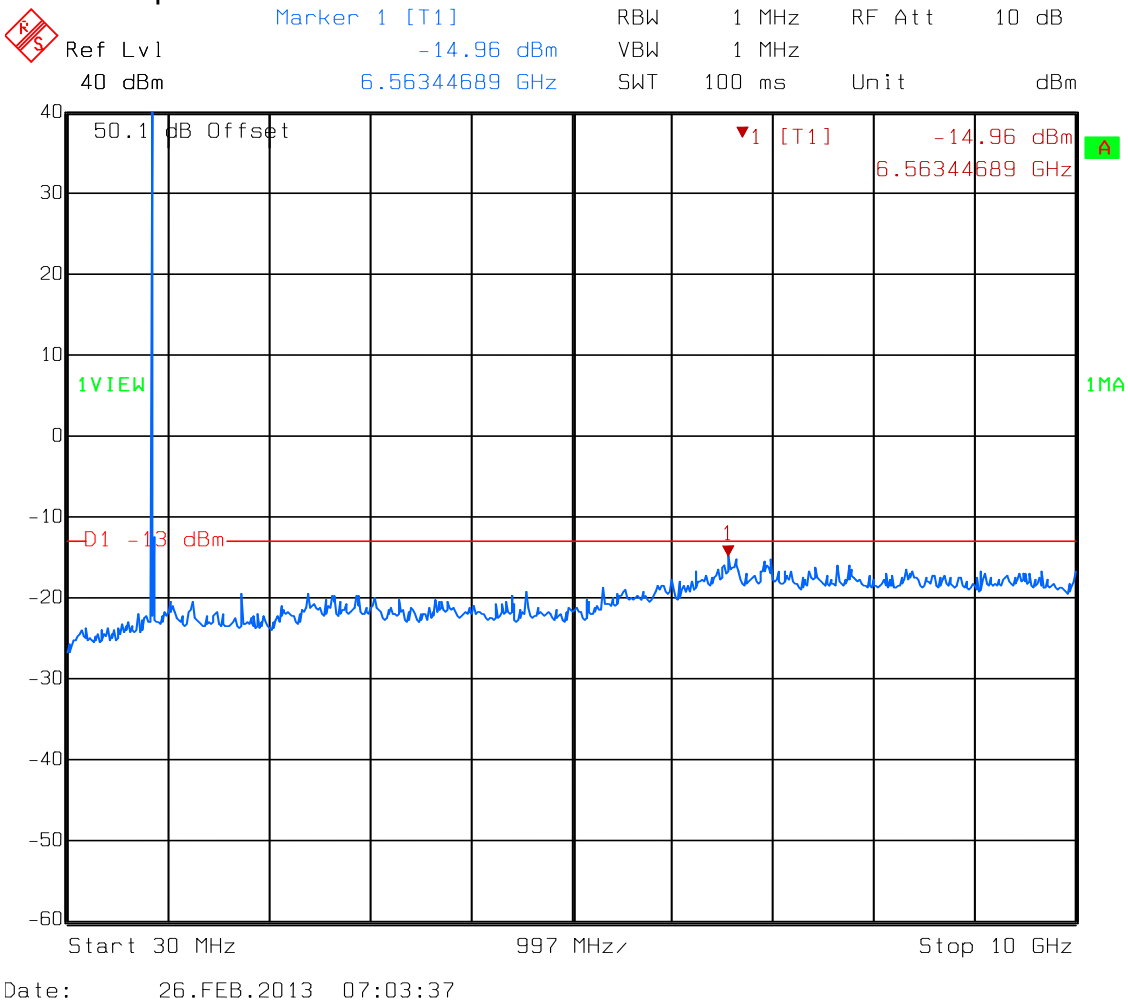
8PSK (GSM)
Upper band edge intermodulation
Transmit maximum power



Test Data – Spurious Emissions

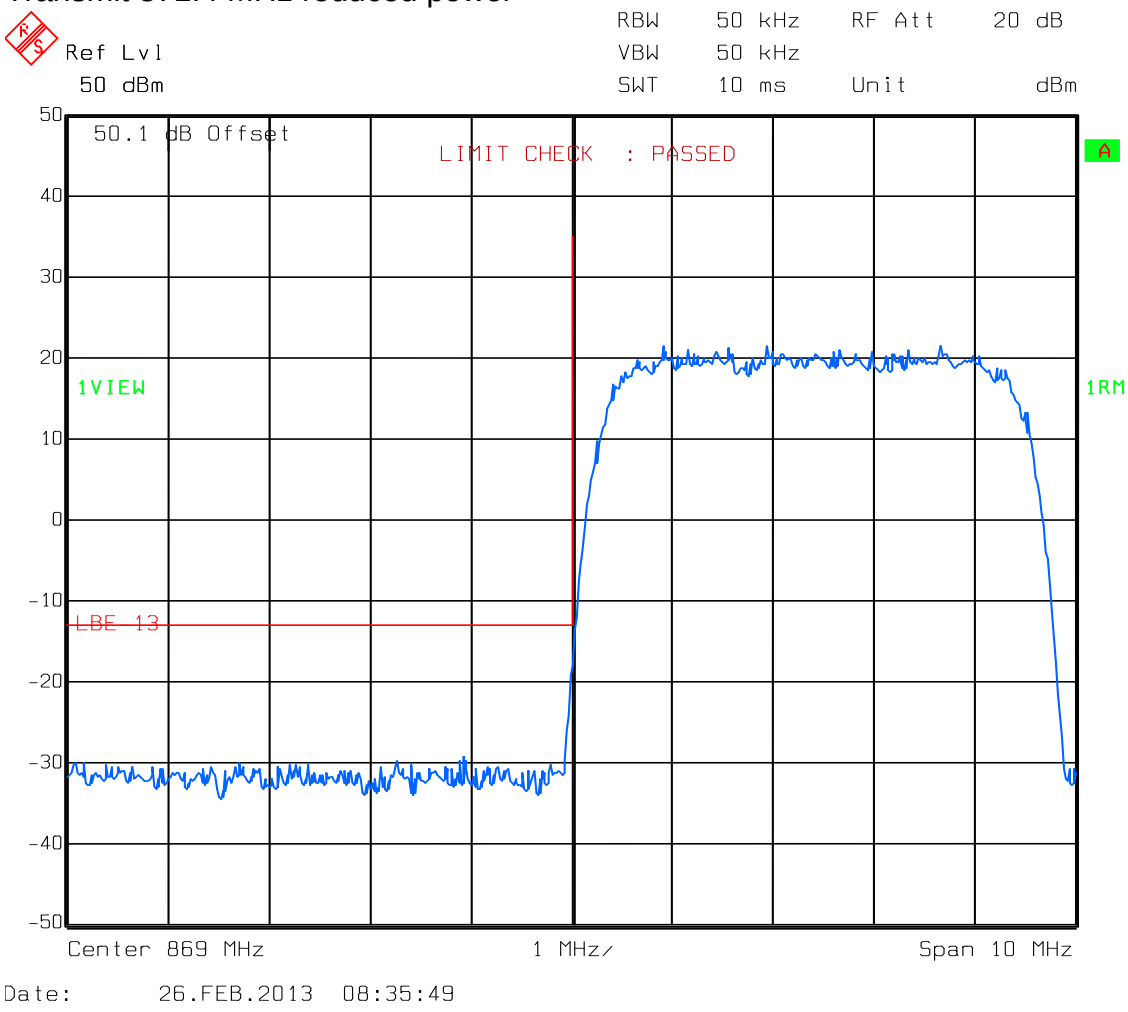
8PSK (GSM)

Transmit spurs



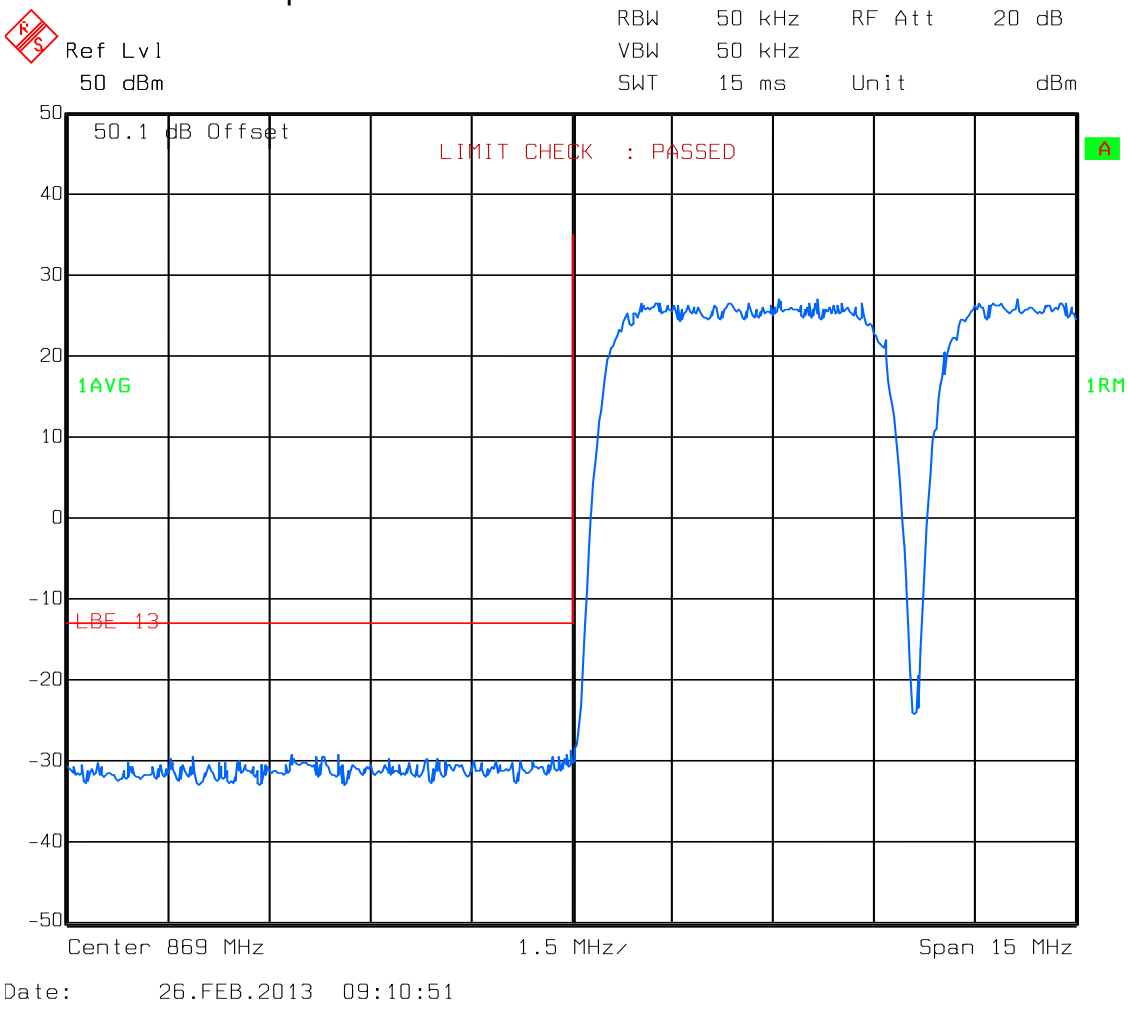
Test Data – Spurious Emissions

QPSK (WCDMA)
Lower band edge
Transmit 871.4 MHz reduced power



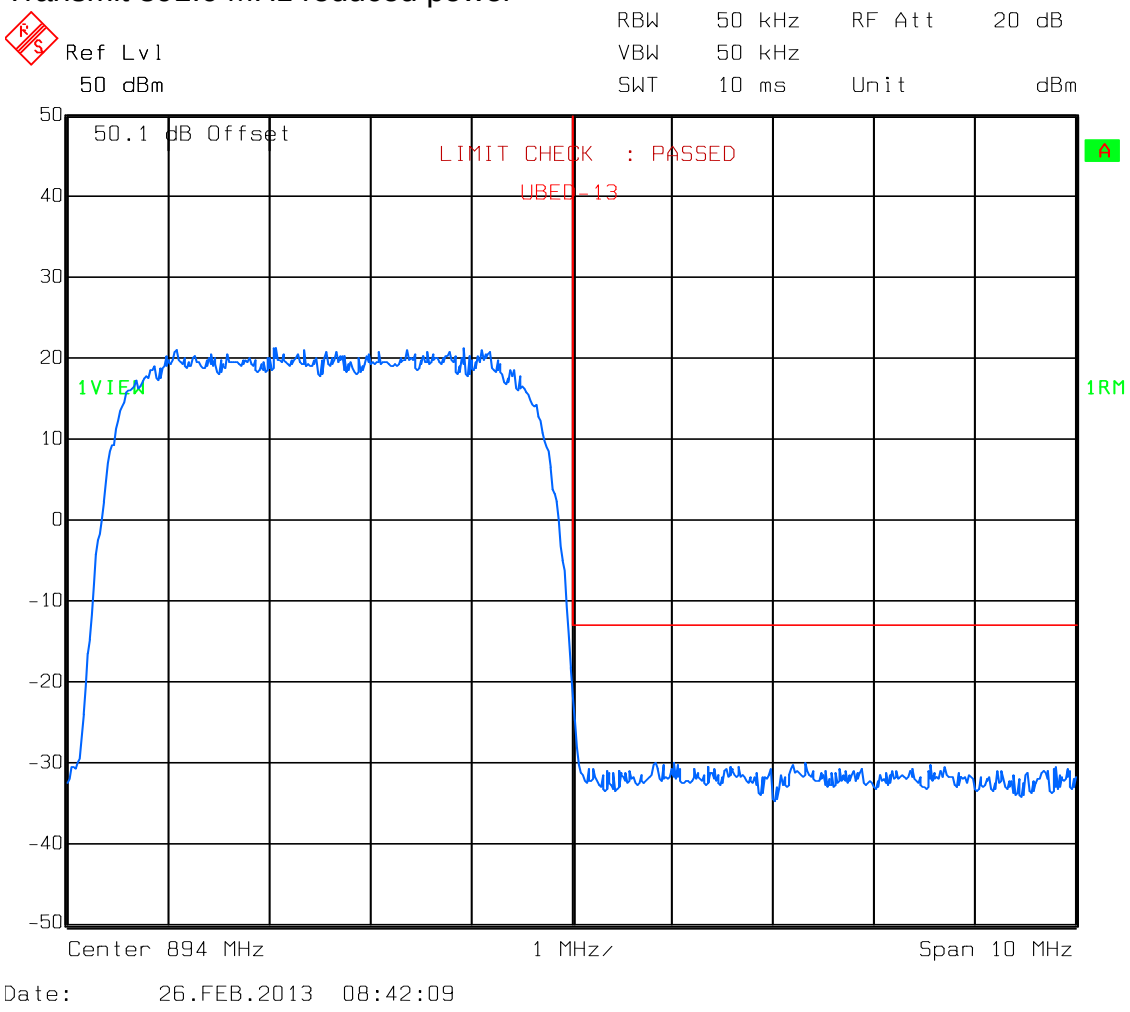
Test Data – Spurious Emissions

QPSK (WCDMA)
Lower band edge intermodulation
Transmit maximum power



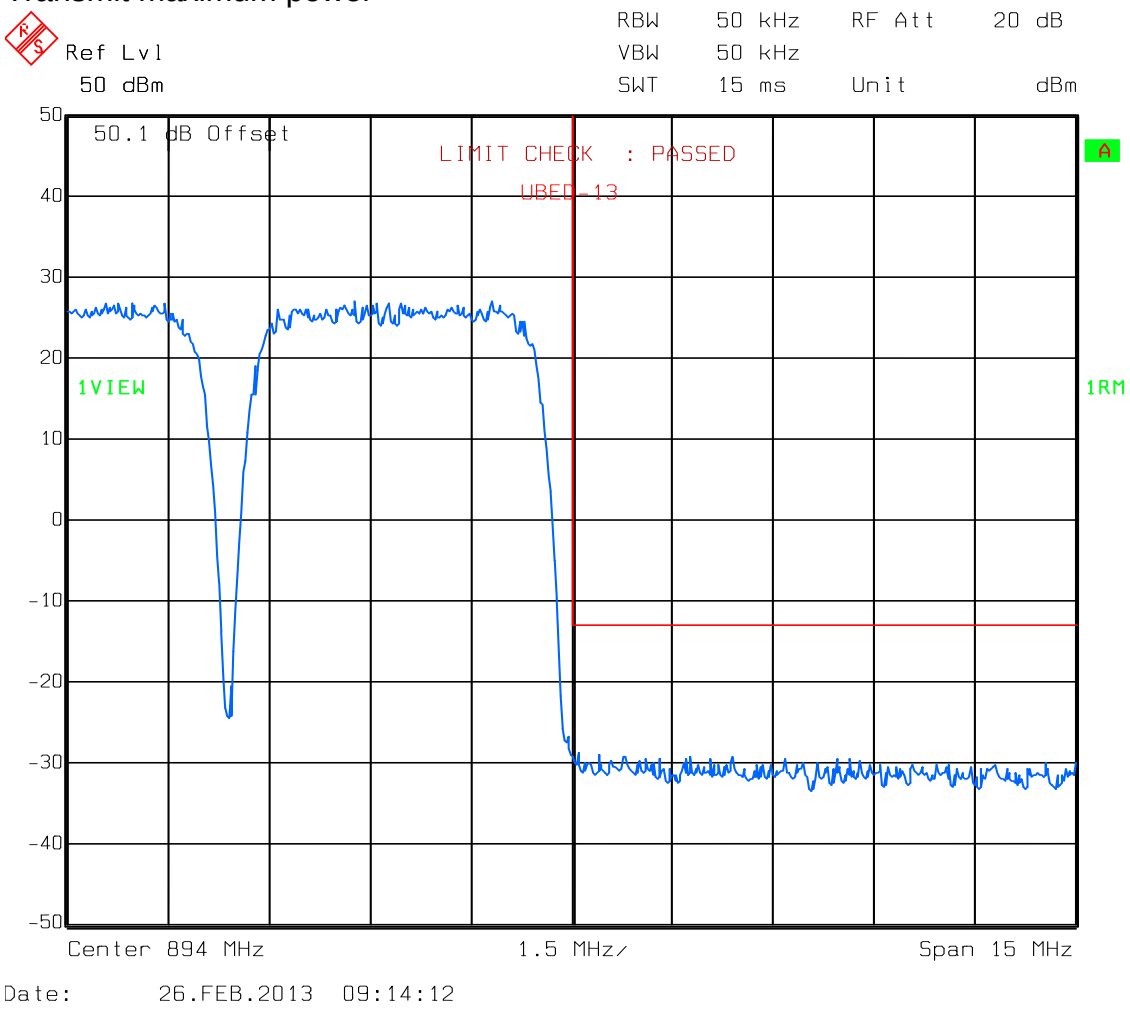
Test Data – Spurious Emissions

QPSK (WCDMA)
Upper band edge
Transmit 891.6 MHz reduced power



Test Data – Spurious Emissions

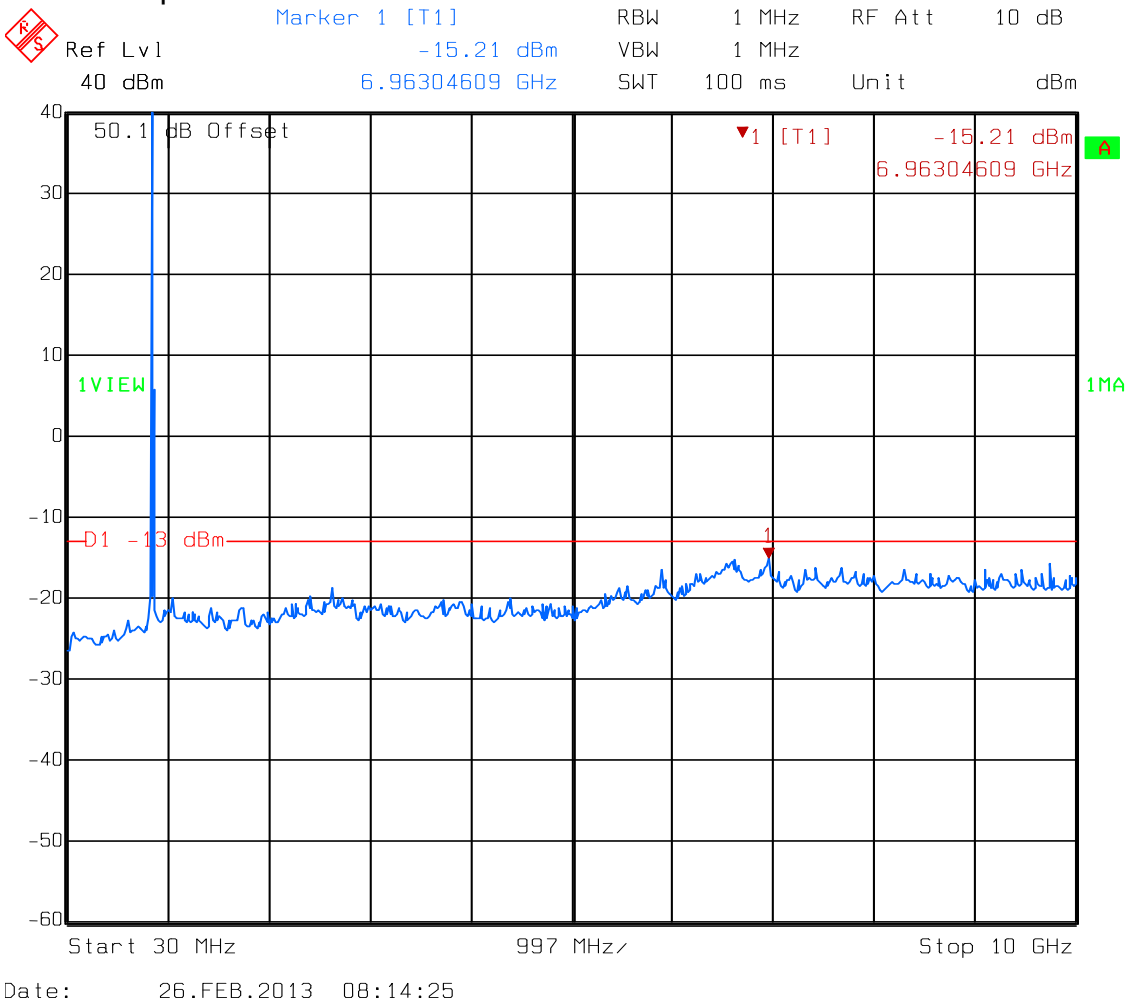
QPSK (WCDMA)
Upper band edge Intermodulation
Transmit maximum power



Test Data – Spurious Emissions

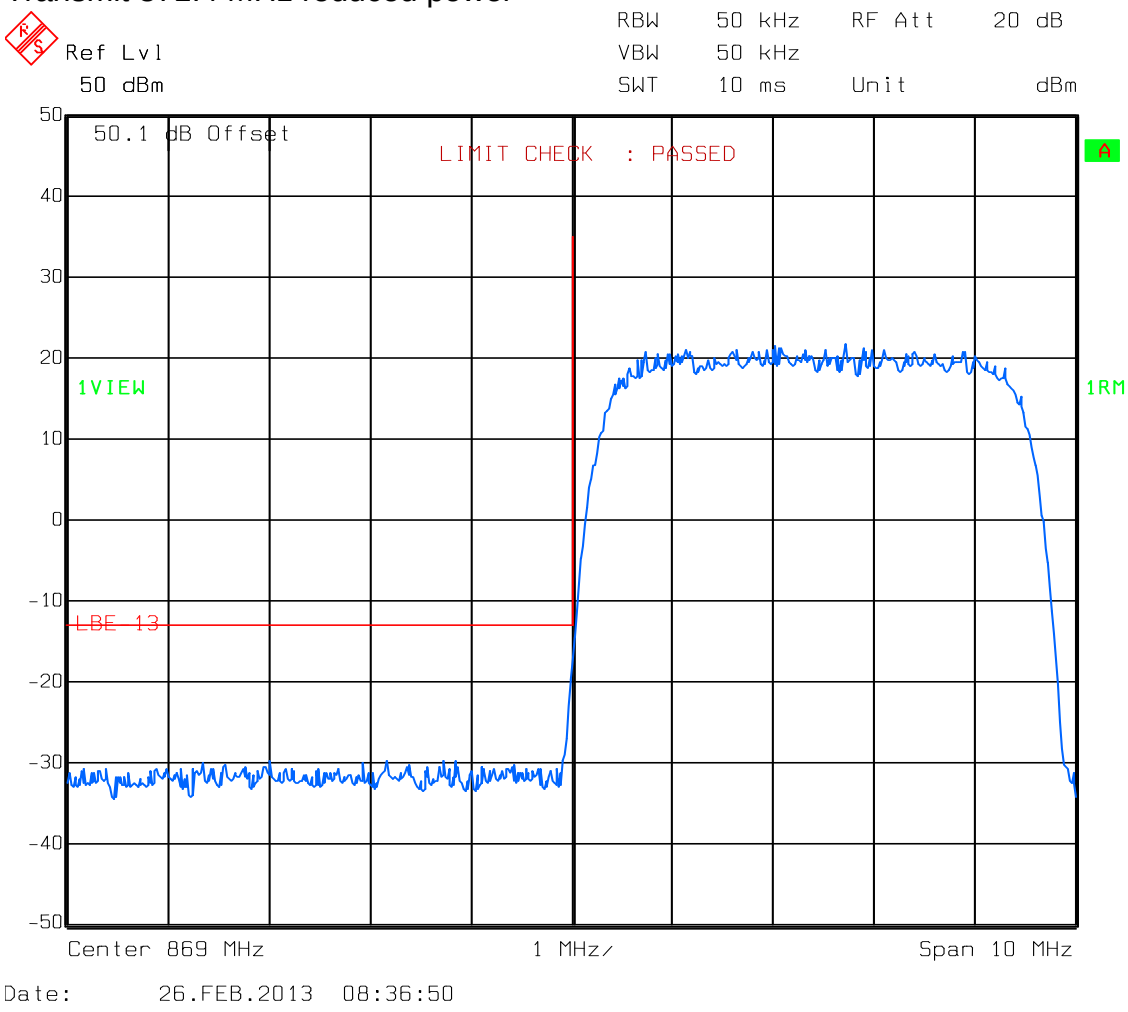
QPSK (WCDMA)

Transmit Spurs



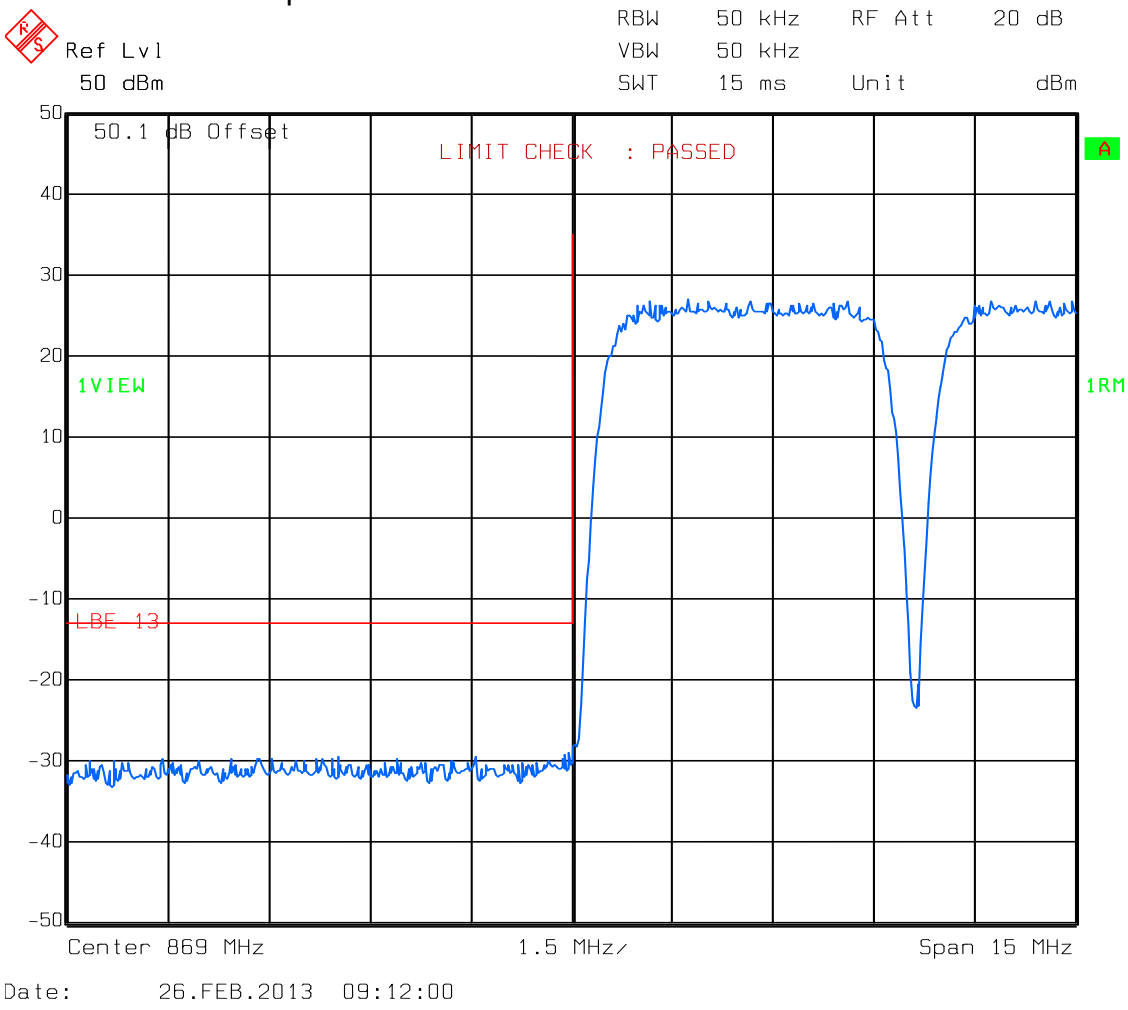
Test Data – Spurious Emissions

16QAM (WCDMA)
Lower band edge
Transmit 871.4 MHz reduced power



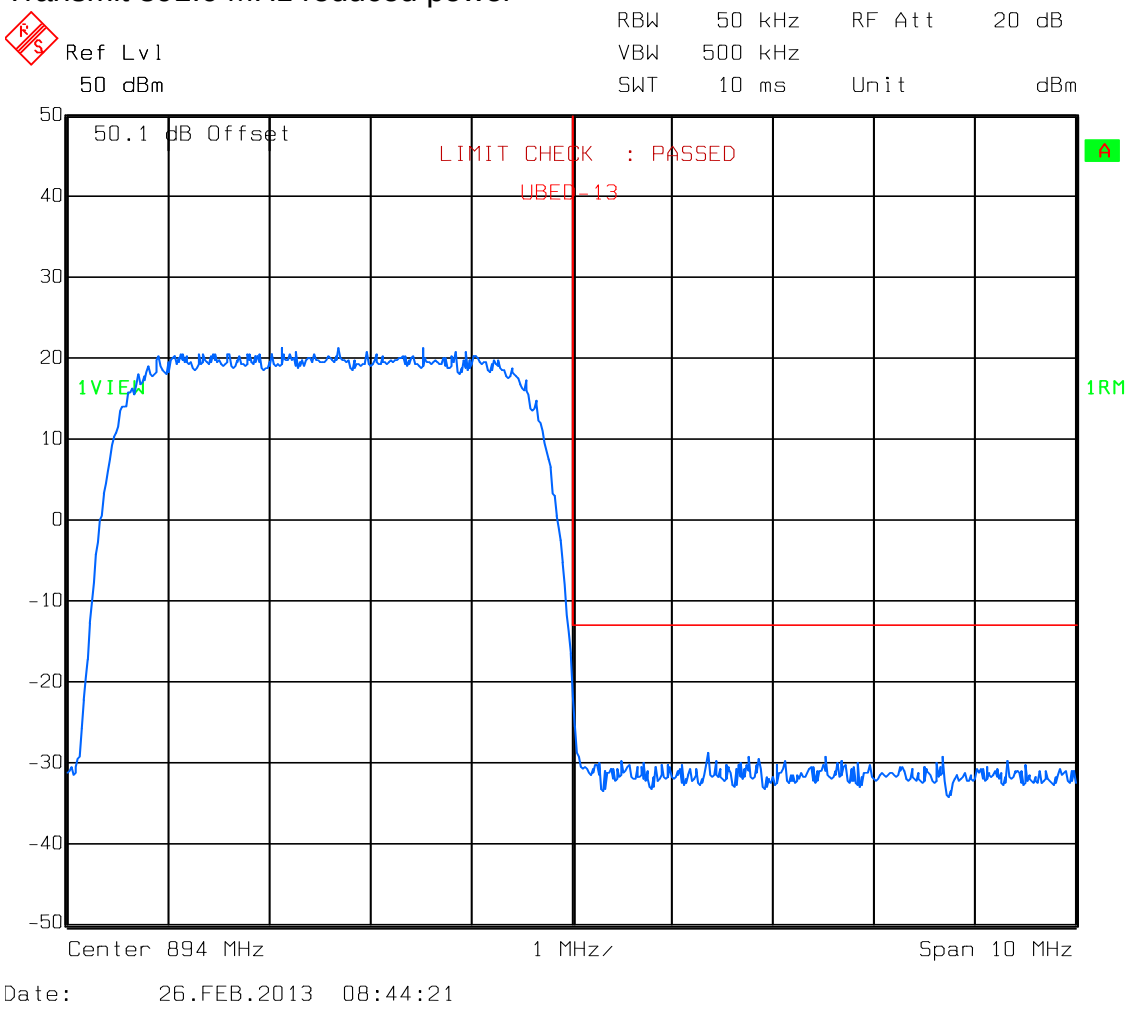
Test Data – Spurious Emissions

16QAM (WCDMA)
Lower band edge intermodulation
Transmit maximum power



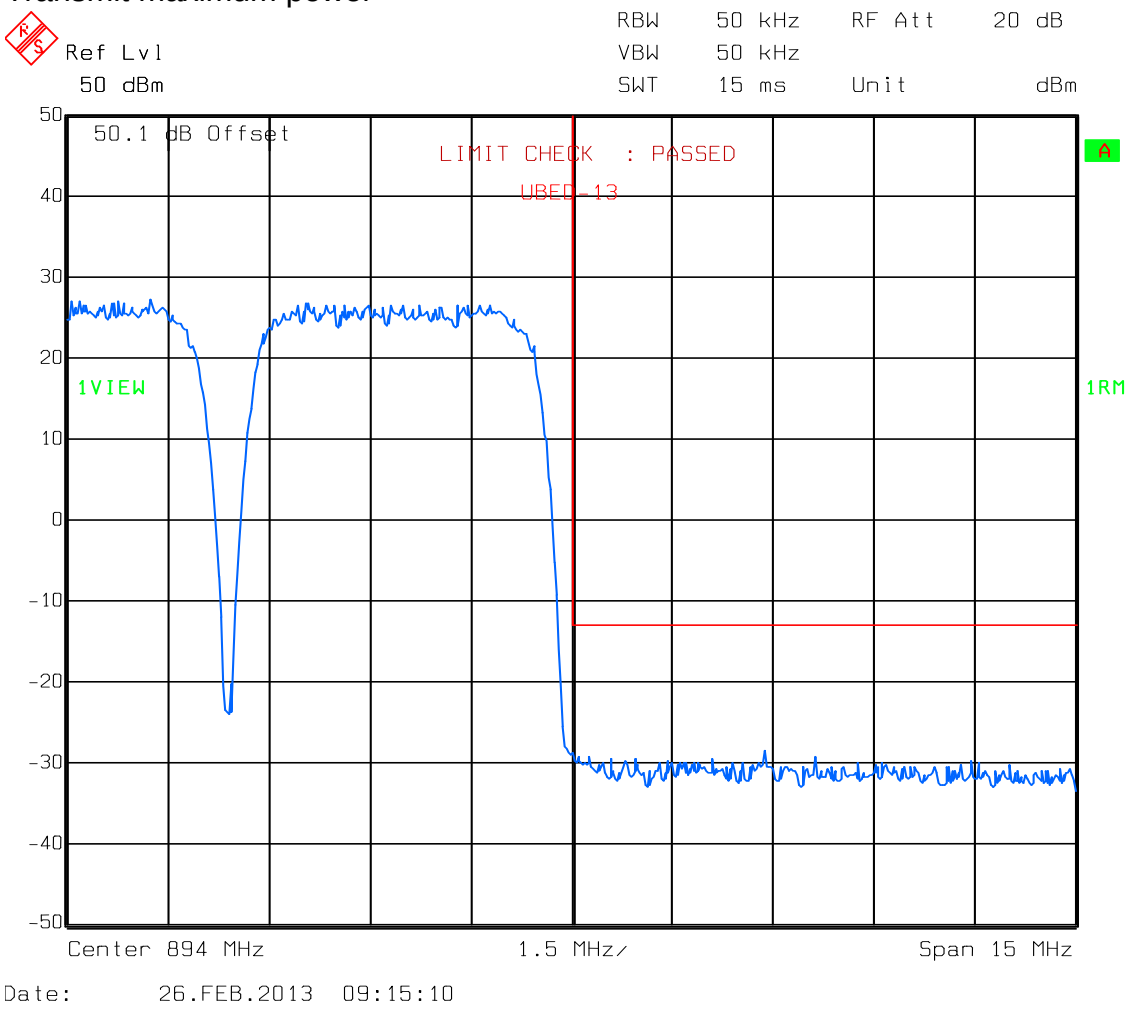
Test Data – Spurious Emissions

16QAM (WCDMA)
Upper band edge
Transmit 891.6 MHz reduced power



Test Data – Spurious Emissions

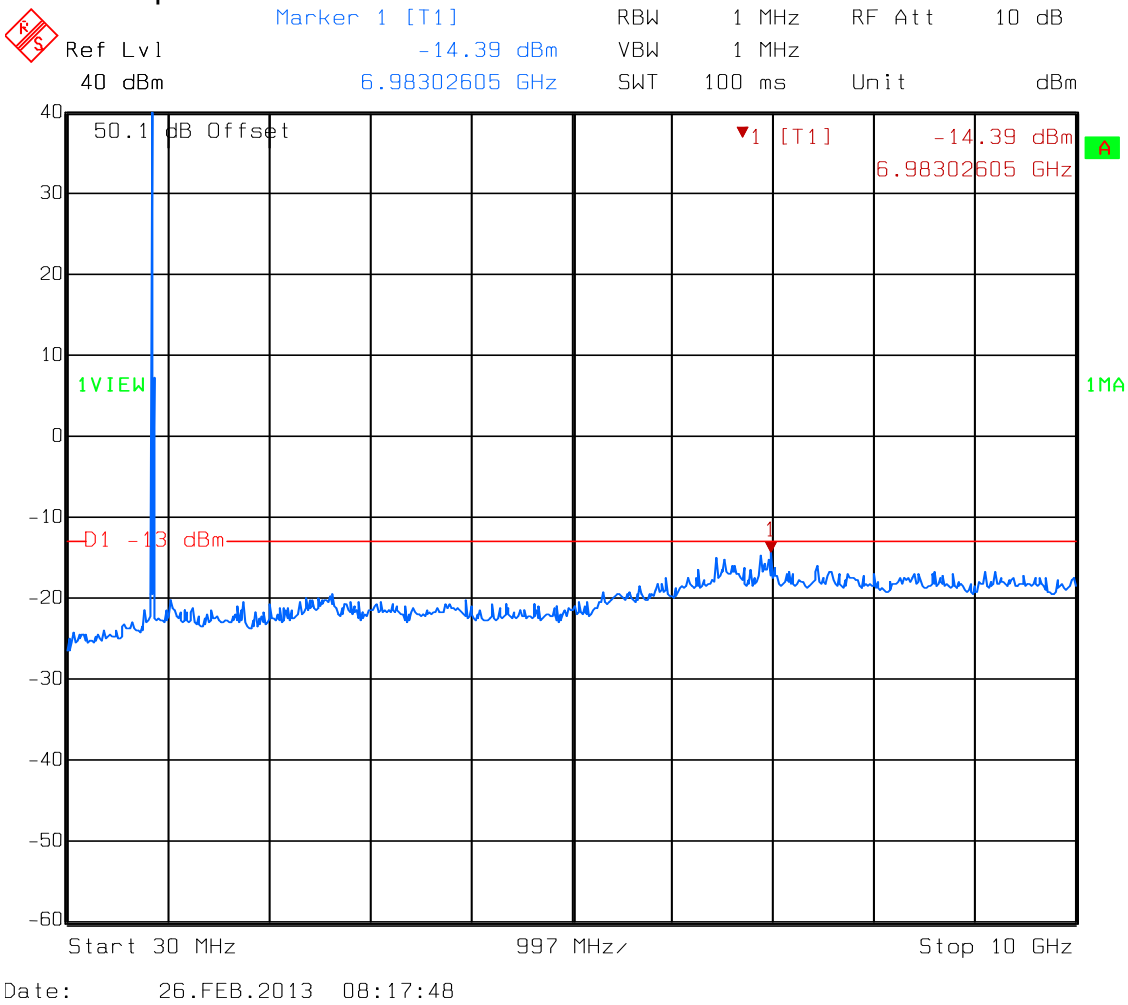
16QAM (WCDMA)
Upper band edge intermodulation
Transmit maximum power



Test Data – Spurious Emissions

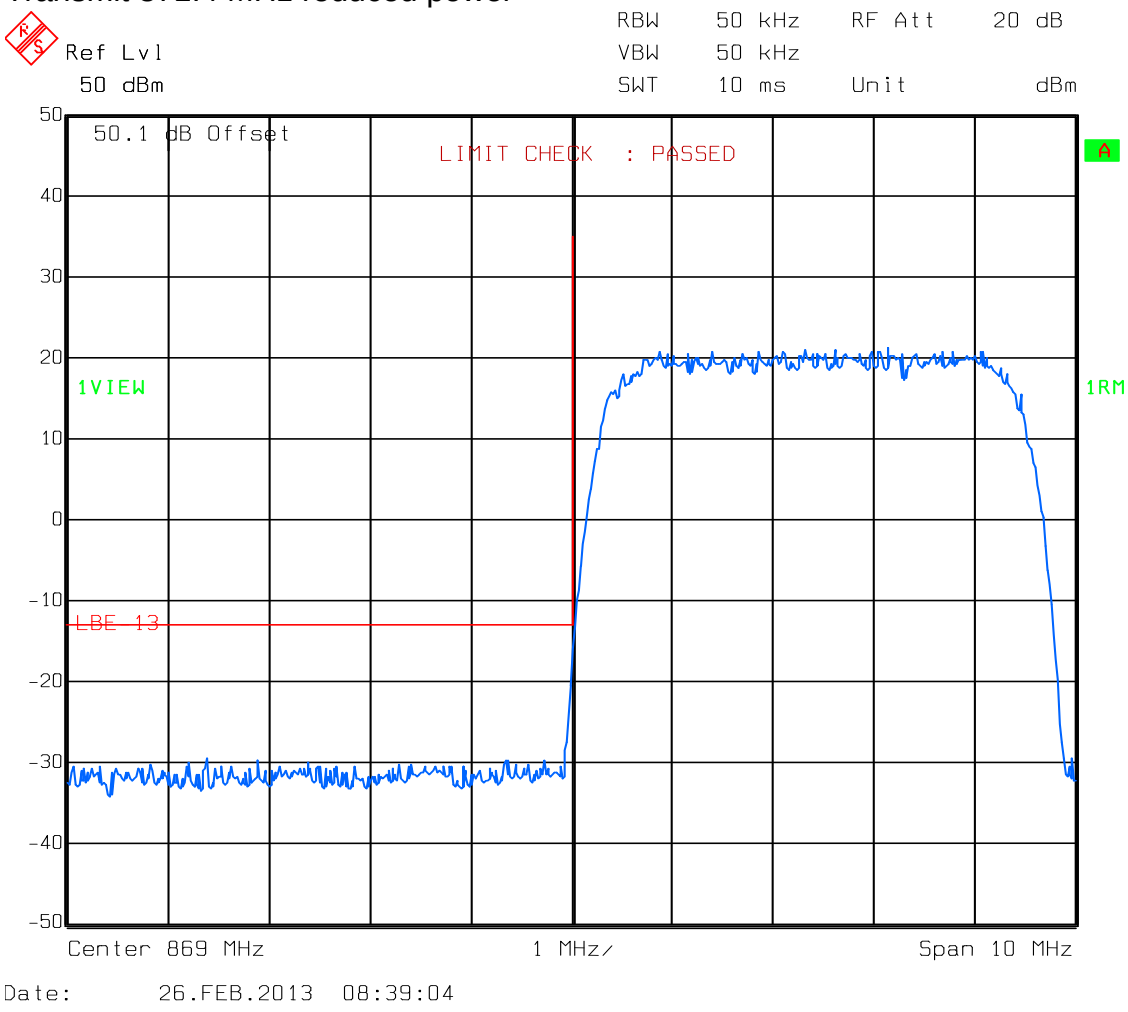
16QAM (WCDMA)

Transmit spurs



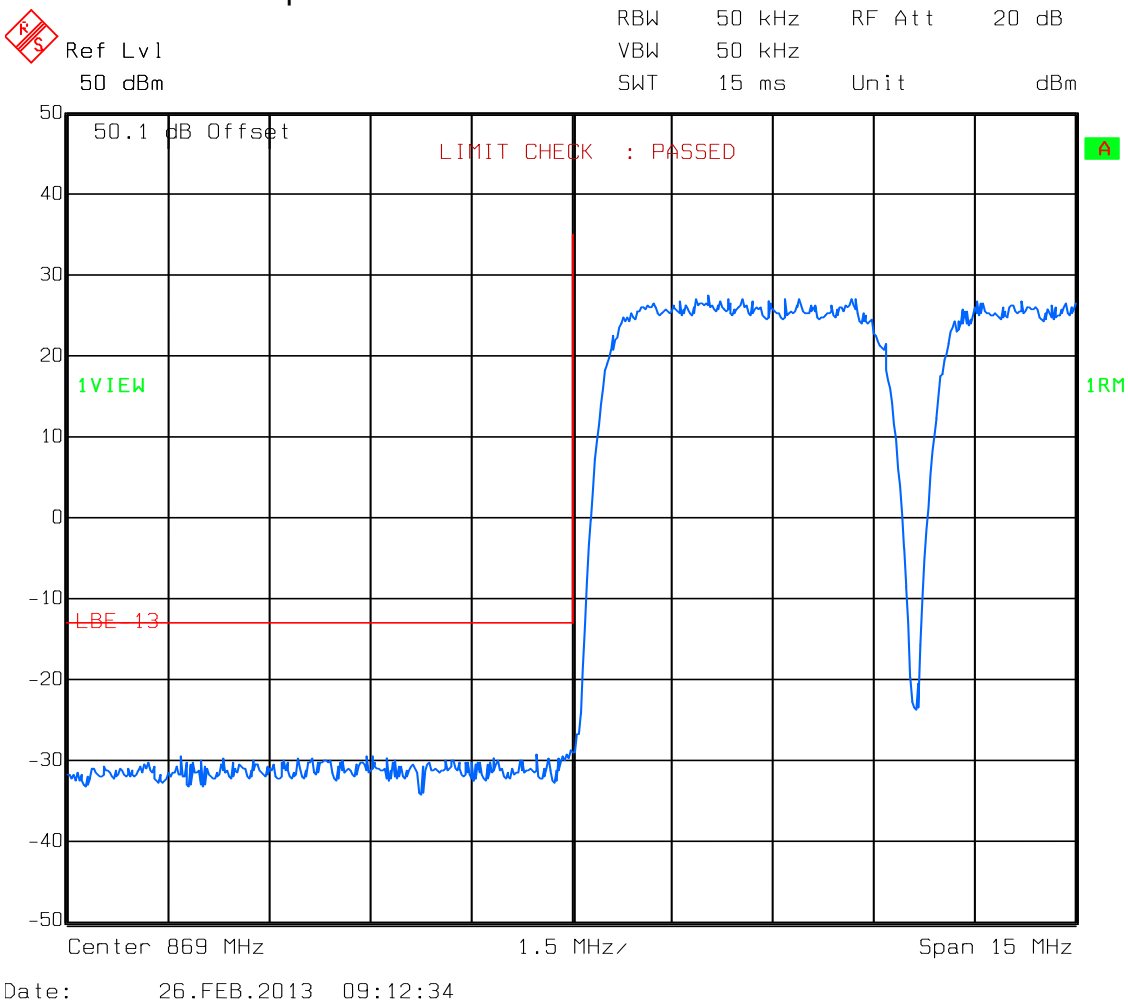
Test Data – Spurious Emissions

64QAM (WCDMA)
Lower band edge
Transmit 871.4 MHz reduced power



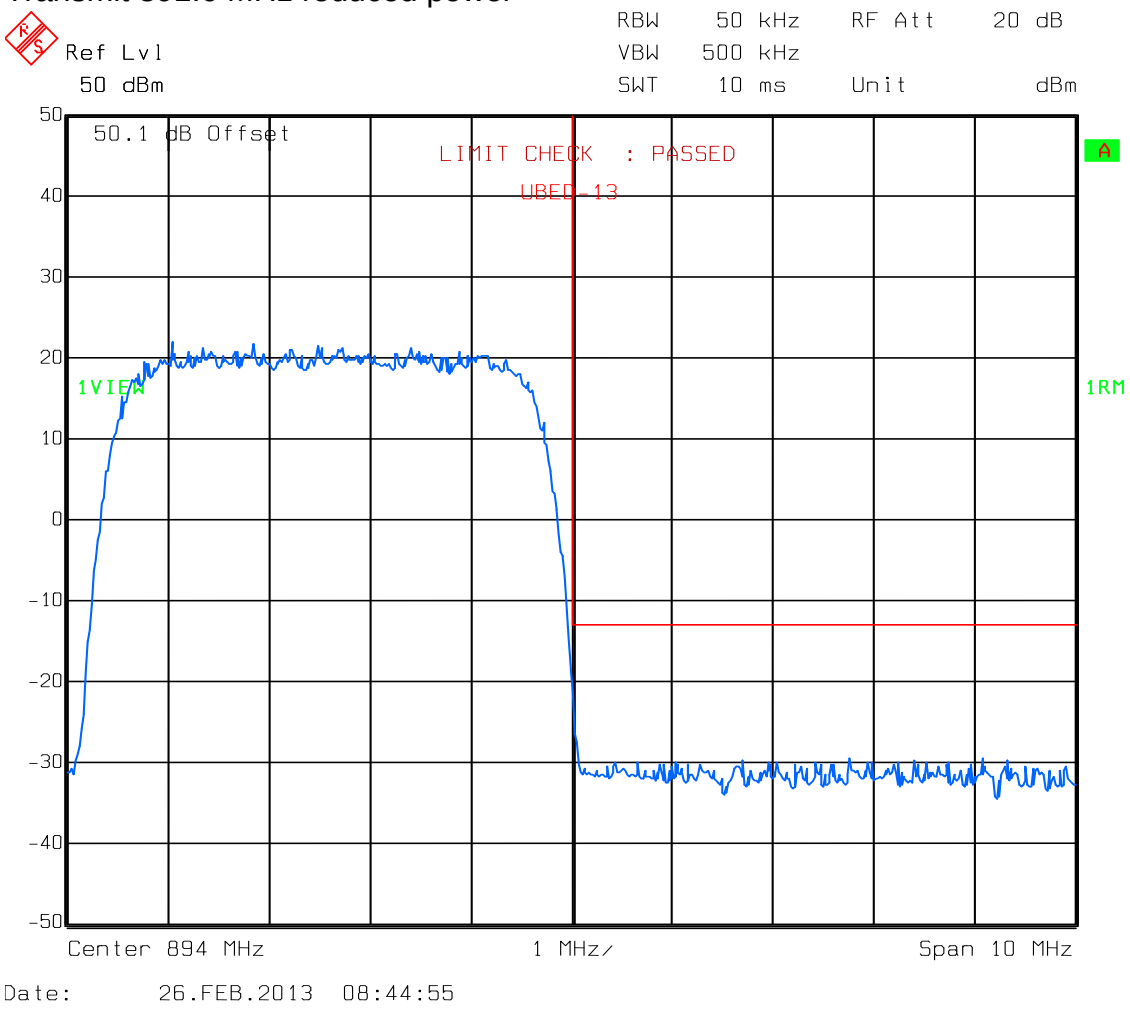
Test Data – Spurious Emissions

64QAM (WCDMA)
Lower band edge intermodulation
Transmit maximum power



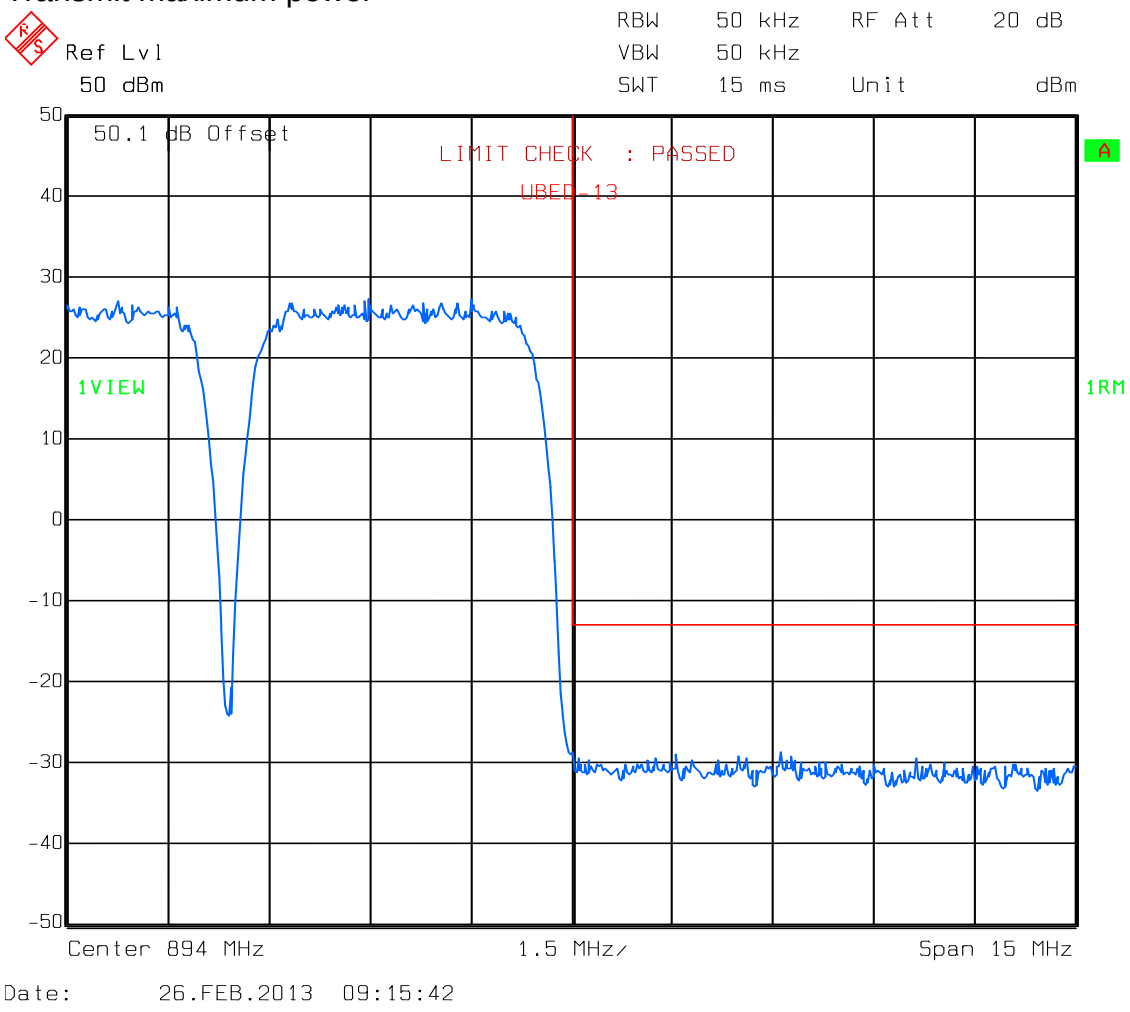
Test Data – Spurious Emissions

64QAM (WCDMA)
Upper band edge
Transmit 891.6 MHz reduced power



Test Data – Spurious Emissions

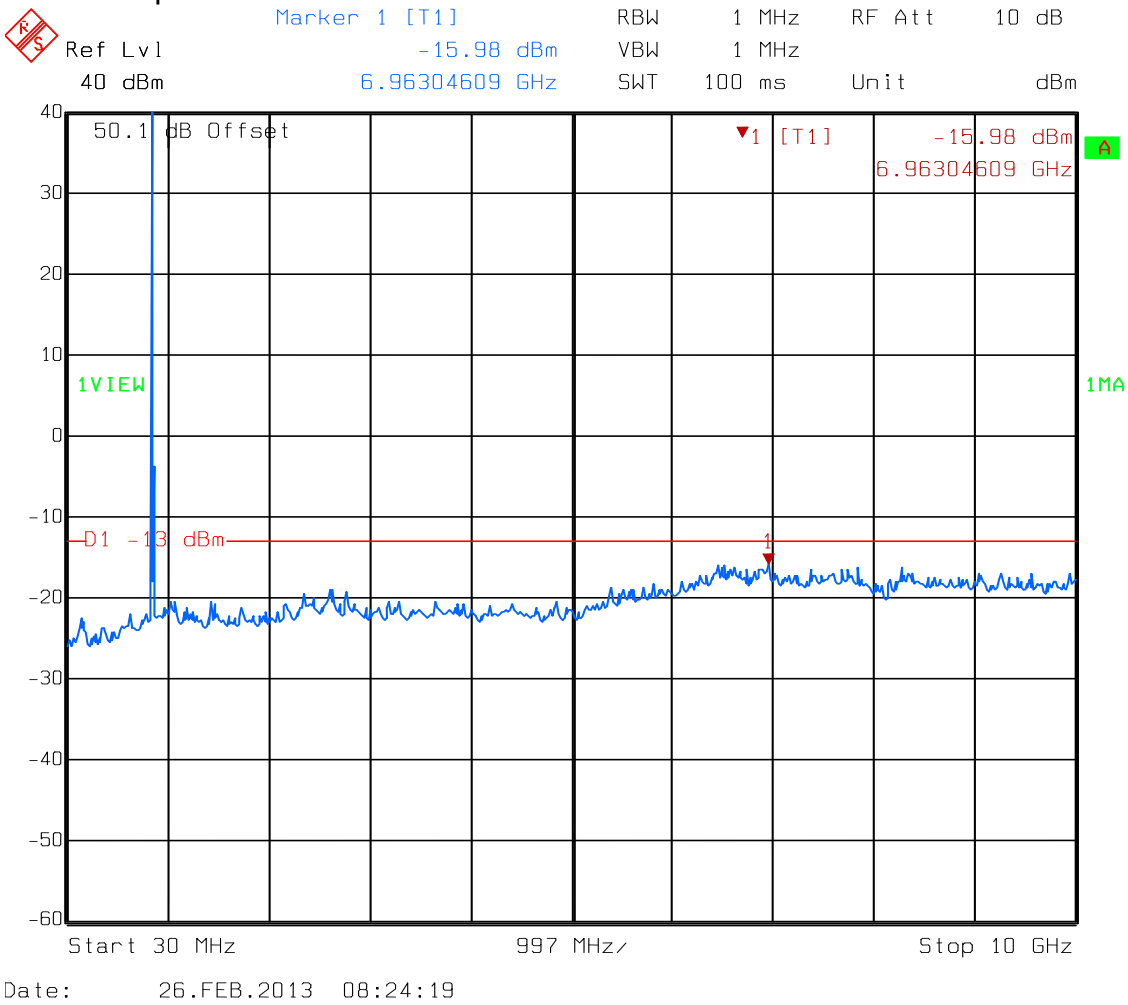
64QAM (WCDMA)
Upper band edge intermodulation
Transmit maximum power



Test Data – Spurious Emissions

64QAM (WCDMA)

Transmit spurs



Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 22.917/5.5
TESTED BY: David Light	DATE: 27 February 2013

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.

RBW/VBW=1 MHz
Detector = Peak
Sweep Time = Auto
.

Equipment Used: 1783-1016-1036-993

Measurement Uncertainty: +/- 1.7 dB

Temperature: 23 °C

Relative Humidity: 40 %

Section 7. Frequency Stability

NAME OF TEST: Frequency Stability	PARA. NO.: 22.355/5.3
TESTED BY: David Light	DATE: 26 February 2013

Test Results: Complies

Measurement Data: Standard Test Frequency: 881.6 MHz
Standard Test Voltage: -48 Vdc

Equipment Used: 1036-1082-1054-1065-1472

Measurement Uncertainty: +/- 1.7 dB

Temperature: 23 °C

Relative Humidity: 40 %

Test Data – Frequency Stability

Measurement Uncertainty:	$1x10^{-7}$ppm		Standard Test Frequency		881.600000		MHz
Temp (^{o}C)	**Measured Frequency (MHz)**		**Test Voltage**	**Freqeuncy Error (Hz)**	**Limit (+/-Hz)**	**Error (ppm)**	**Comment**
20	881.600002		-48Vdc	2	1322.4	0.00	
20	881.600002		-55.2Vdc	2	1322.4	0.00	
20	881.600002		-40.8Vdc	2	1322.4	0.00	
50	881.600007		-48Vdc	7	1322.4	0.01	
40	881.600007		-48Vdc	7	1322.4	0.01	
30	881.600006		-48Vdc	6	1322.4	0.01	
10	881.600007		-48Vdc	7	1322.4	0.01	
0	881.600004		-48Vdc	4	1322.4	0.00	
-10	881.600006		-48Vdc	6	1322.4	0.01	
-20	881.600004		-48Vdc	4	1322.4	0.00	
-30	881.600003		-48Vdc	3	1322.4	0.00	
Notes:							

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Section 8. Test Equipment List

Asset Tag	Description	Manufacturer	Model	Serial #	Last Cal	Next Cal
993	Antenna	A.H. Systems	SAS-200/571	162	22-Sep-2011	22-Sep-2013
1016	Preamplifier	HP	8449A	2749A00159	23-Jul-2012	23-Jul-2013
1036	Spectrum Analyzer	Rohde & Schwartz	FSEK30	830844/006	23-Dec-2011	23-Dec-2013
1054	Directional Coupler	Narda	3020A	34366	N/R	
1065	Attenuator	Narda	776B-10		N/R	
1082	Cable	Astrolab	32027-2-29094-72TC		N/R	
1472	Attenuator,	Omni Spectra	20600-20db		N/R	
1783	Cable Assy,	Nemko	Chamber		26-Sep-2012	26-Sep-2013

ANNEX A - TEST DETAILS

NAME OF TEST: RF Power Output	**PARA. NO.: 22.913(a)/5.4**

Minimum Standard: 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.: 22.917/5.5**

Minimum Standard: Not defined

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.: 22.917/5.5**

Minimum Standard: 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.: 22.917/5.5

Minimum Standard: 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

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.: 22.355/5.3**

Minimum Standard: 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

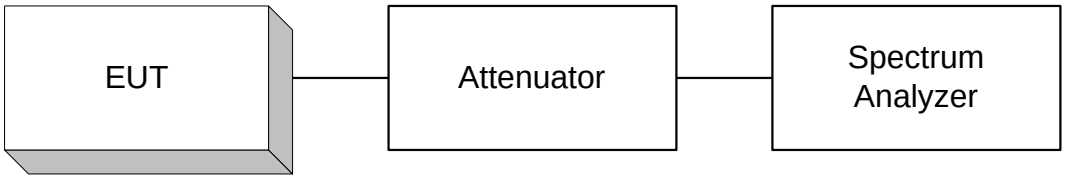
Method Of Measurement:

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.

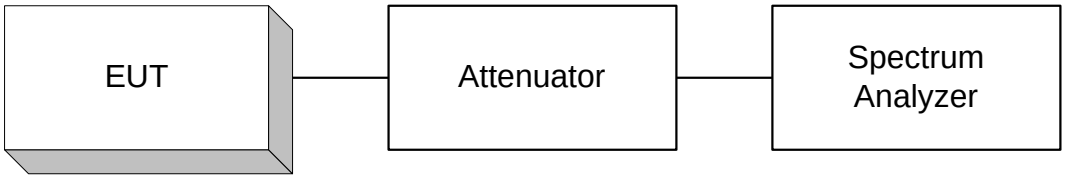
Frequency Stability With Temperature Variation:
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30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

ANNEX B - TEST DIAGRAMS

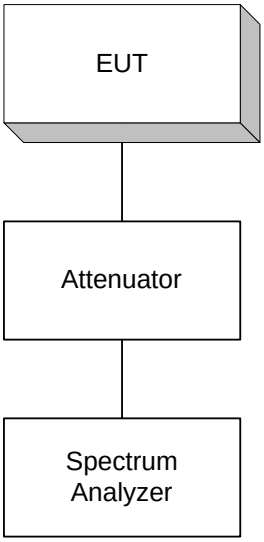
R.F. Power Output



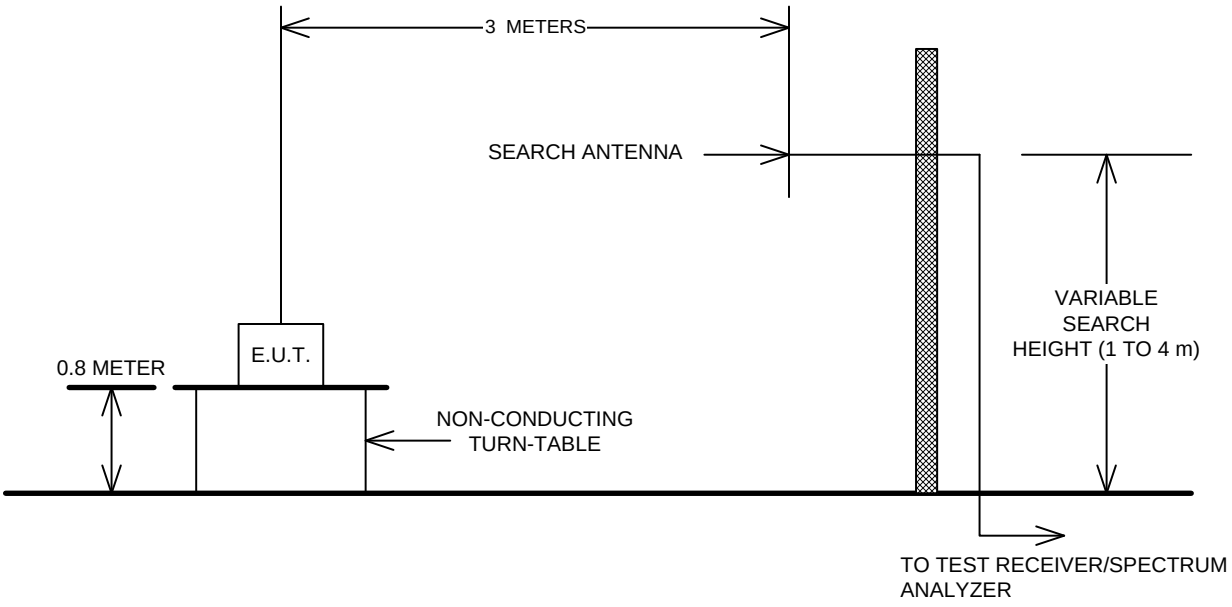
Occupied Bandwidth



Spurious Emissions at Antenna Terminals



Field Strength of Spurious Radiation



Frequency Stability