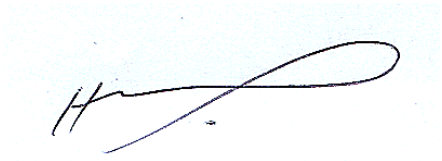
Nemko Test Report:	5057RUS1
Applicant:	Andrew Corporation 108 Rand Park Drive Garner, NC 27529 USA
Equipment Under Test: (E.U.T.)	ION-M80/19P
In Accordance With:	**CFR 47, Part 24, Subpart E** Broadband PCS Repeaters
Tested By:	Nemko USA, Inc. 802 N. Kealy Lewisville, TX 75057-3136

TESTED BY: _____ **DATE:** **29 June 2007**

David Light, Senior Wireless Engineer



APPROVED BY: _____ **DATE:** **29 June 2007**

Harry Ward, Verifier

Number of Pages: 45

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Section 1. Summary of Test Results

Manufacturer Andrew Corporation

Model No.: ION-M80/19P

Serial No.: 12

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.

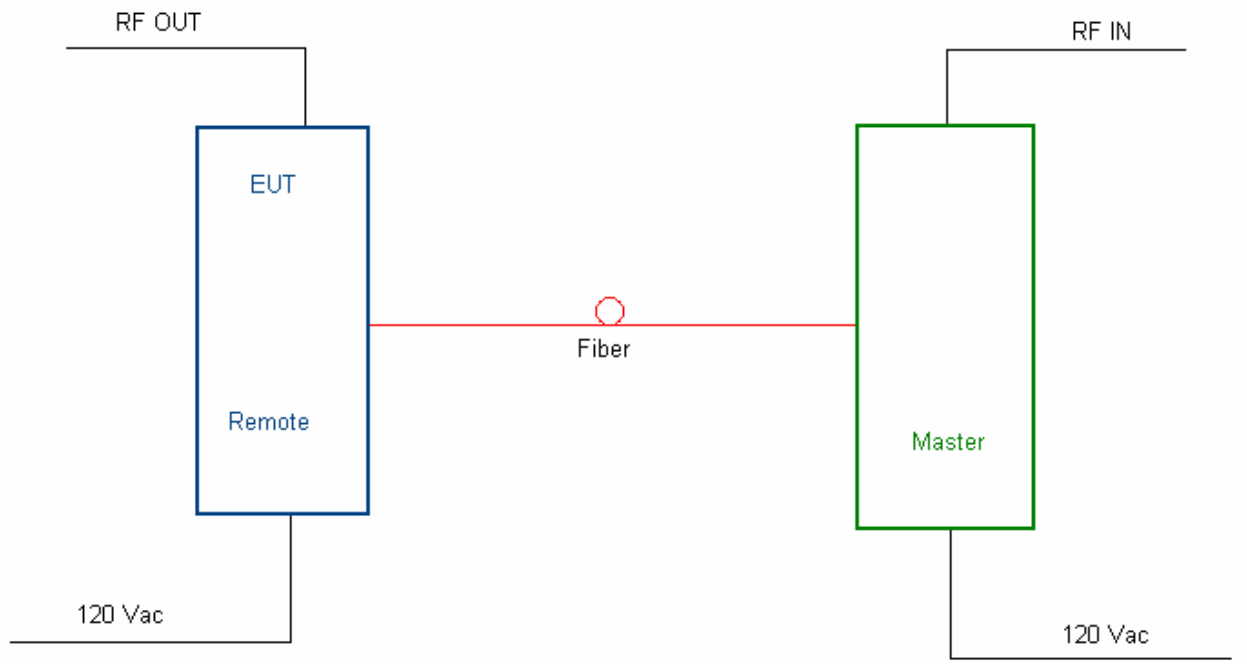
Section 2. General Equipment Specification

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 B : 1865 – 1870 MHz ☐ Block C : 1870 – 1885 MHz ☐ Block D : 1885 – 1890 MHz ☐ Block E : 1890 – 1895 MHz ☐ Block F : 1895 – 1910 MHz
Type of Modulation and Designator:		**CDMA (F9W)** ☒ **GSM (GXW)** ☒ **NADC (DXW)** ☒ **W-CDMA (F9W)** ☒ **EDGE (G7W)** ☒
System Gain:		40 dB
Output Impedance:		50 ohms
RF Output (Rated):	**Uplink**	_____ W _____ dBm
RF Output (Rated):	**Downlink**	20 W 43 dBm
Frequency Translation:		**F1-F1** ☒ **F1-F2** ☐ **N/A** ☐
Band Selection:		**Software** ☐ **Duplexer** ☐ **Fullband** ☒

Description of EUT

Andrew ION-M80/19P is a multiband multi-operator remote unit with various extension units. It is used in conjunction with a master unit in the ION optical distribution system. This system transports multiple frequency bands simultaneously (800 MHz, 1900 MHz and AWS), providing a cost-efficient solution for distributing capacity from one or more base stations.

System Diagram



Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 24.232
TESTED BY: David Light	DATE: 28 June 2007

Test Results: Complies.

Measurement Data:

Direction	Frequency (MHz)	Modulation	RF Power (dBm)	RF Power (W)
Downlink Only	1930.2	GSM	43.07	20.3
	1960.0	GSM	43.19	20.8
	1989.8	GSM	42.98	19.9
	1930.2	EDGE	43.00	20.0
	1960.0	EDGE	43.08	20.3
	1989.8	EDGE	43.06	20.2
	1930.04	TDMA	43.29	21.4
	1960.0	TDMA	43.03	20.1
	1989.97	TDMA	43.16	20.7
	1931.25	CDMA	43.18	20.8
	1960.0	CDMA	43.28	21.4
	1988.78	CDMA	43.13	20.6
	1932.5	W-CDMA	42.07	16.1
	1960.0	W-CDMA	42.12	16.3
	1987.5	W-CDMA	42.19	16.6

Equipment Used: 1604-1064-1082-1036

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: 28 June 2007

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1064-1604-10821036

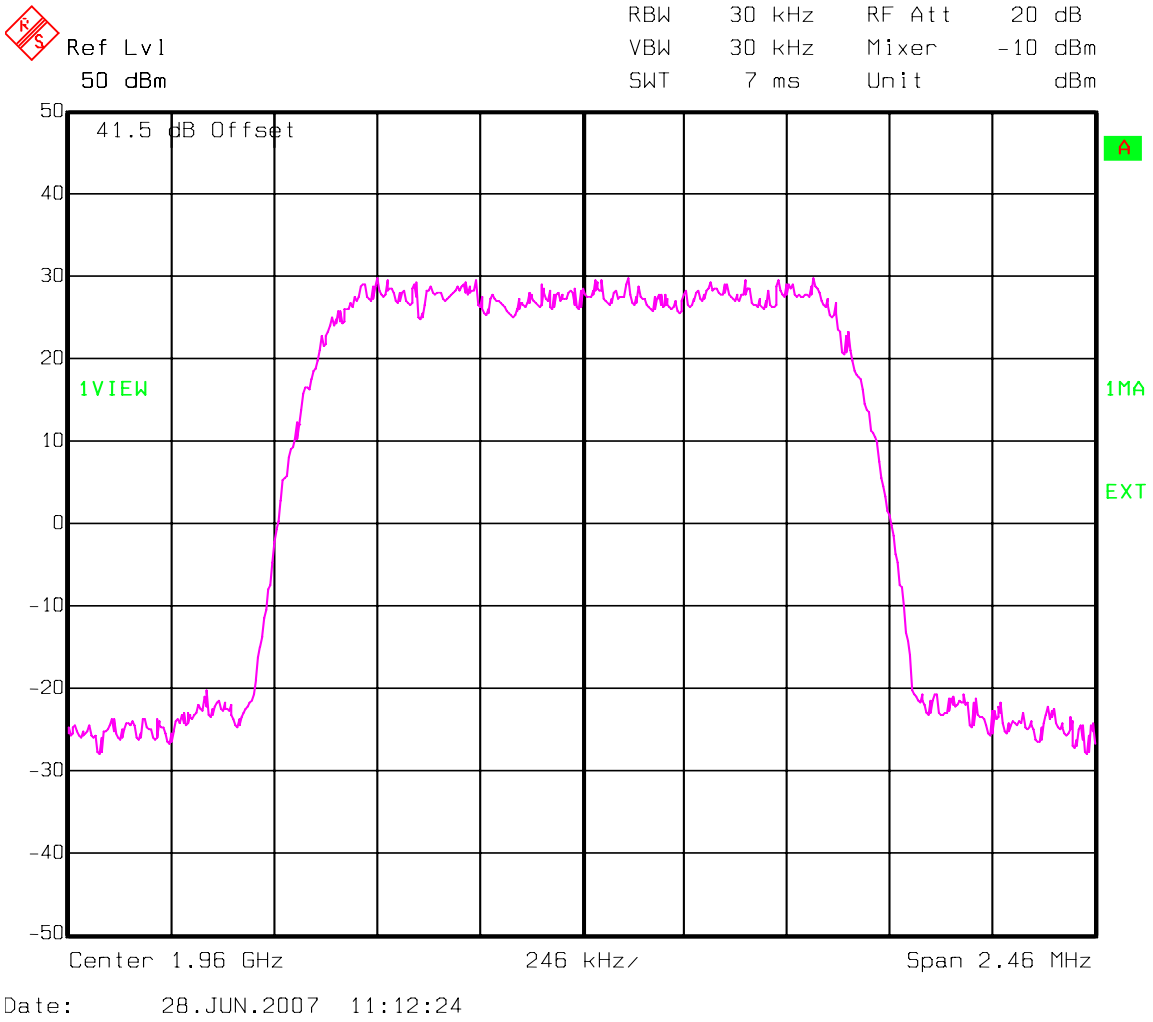
Measurement Uncertainty: $1X10^{-7}$ ppm

Temperature: 22 °C

Relative Humidity: 48 %

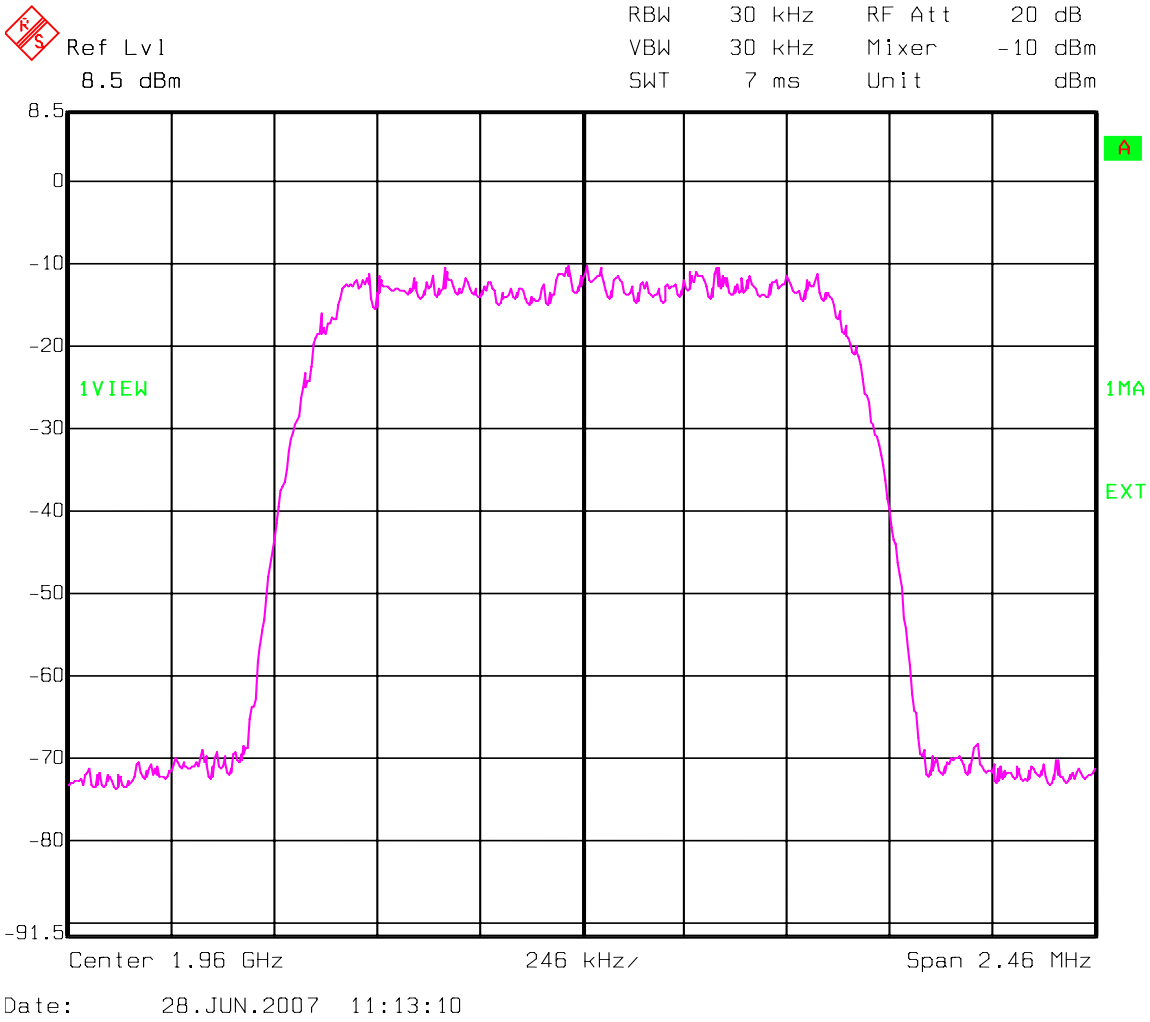
Test Data – Occupied Bandwidth

CDMA/EV-DO
OBW
OUTPUT



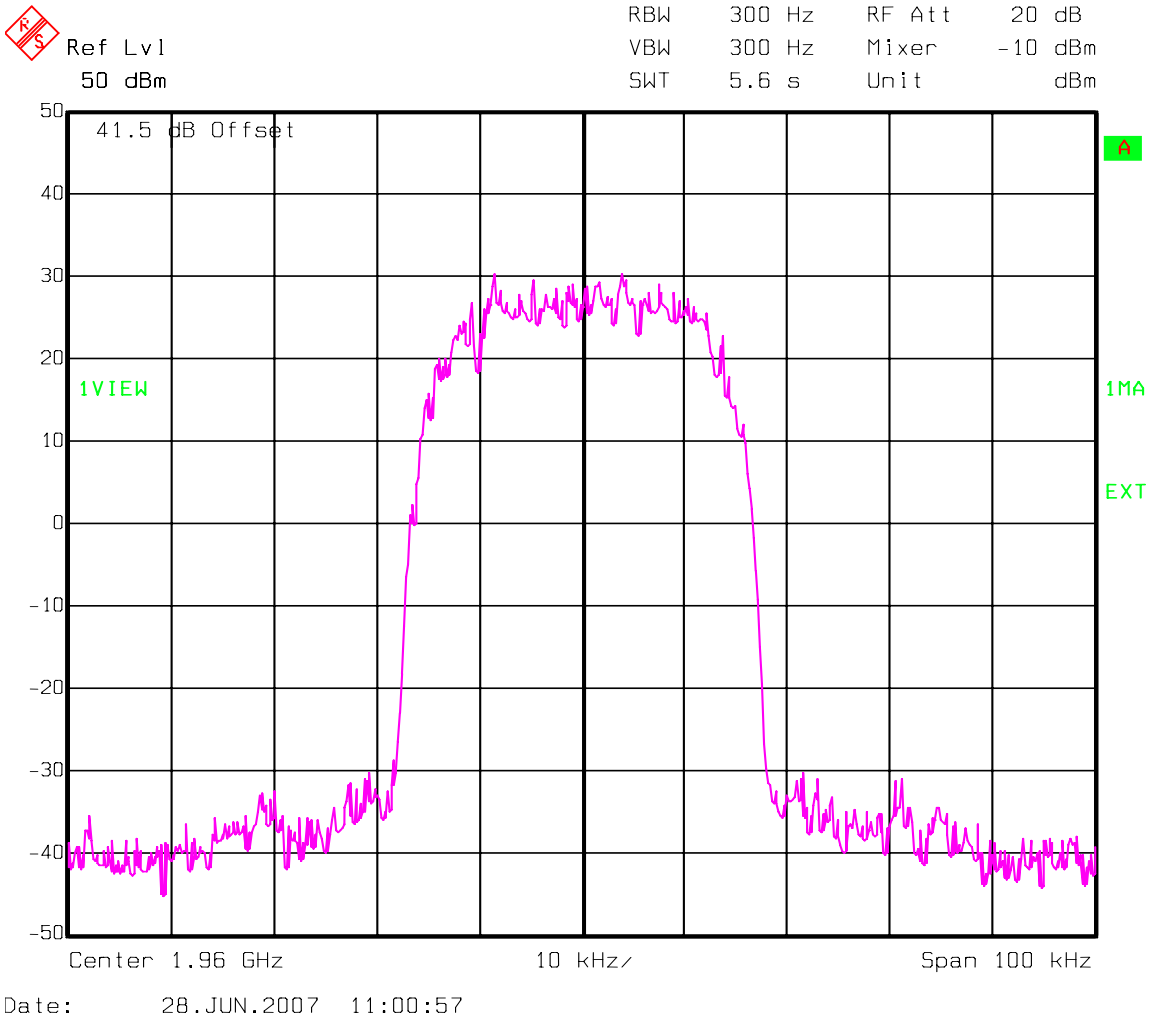
Test Data – Occupied Bandwidth

CDMA/EV-DO
OBW
INPUT



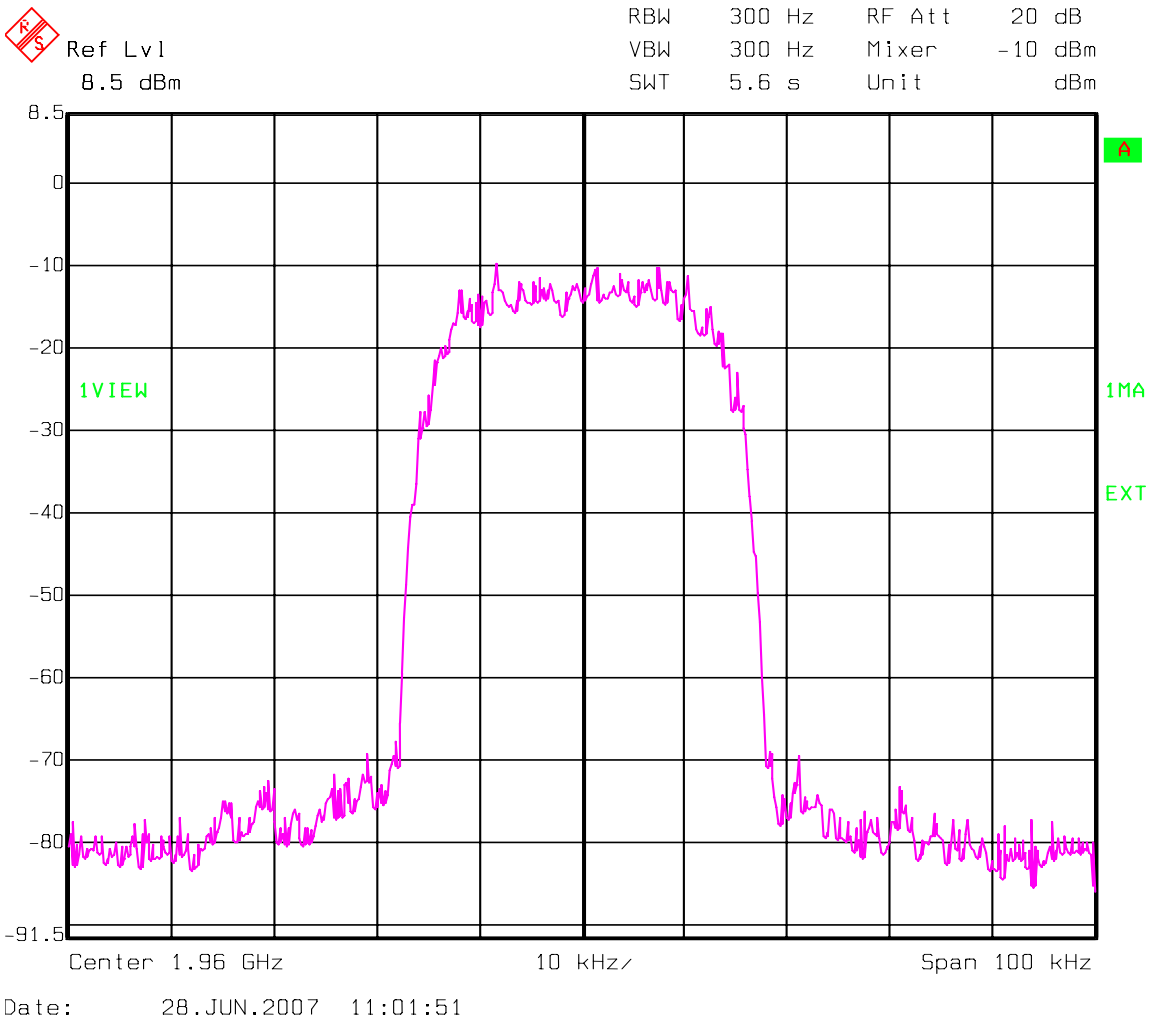
Test Data – Occupied Bandwidth

TDMA
OBW
OUTPUT



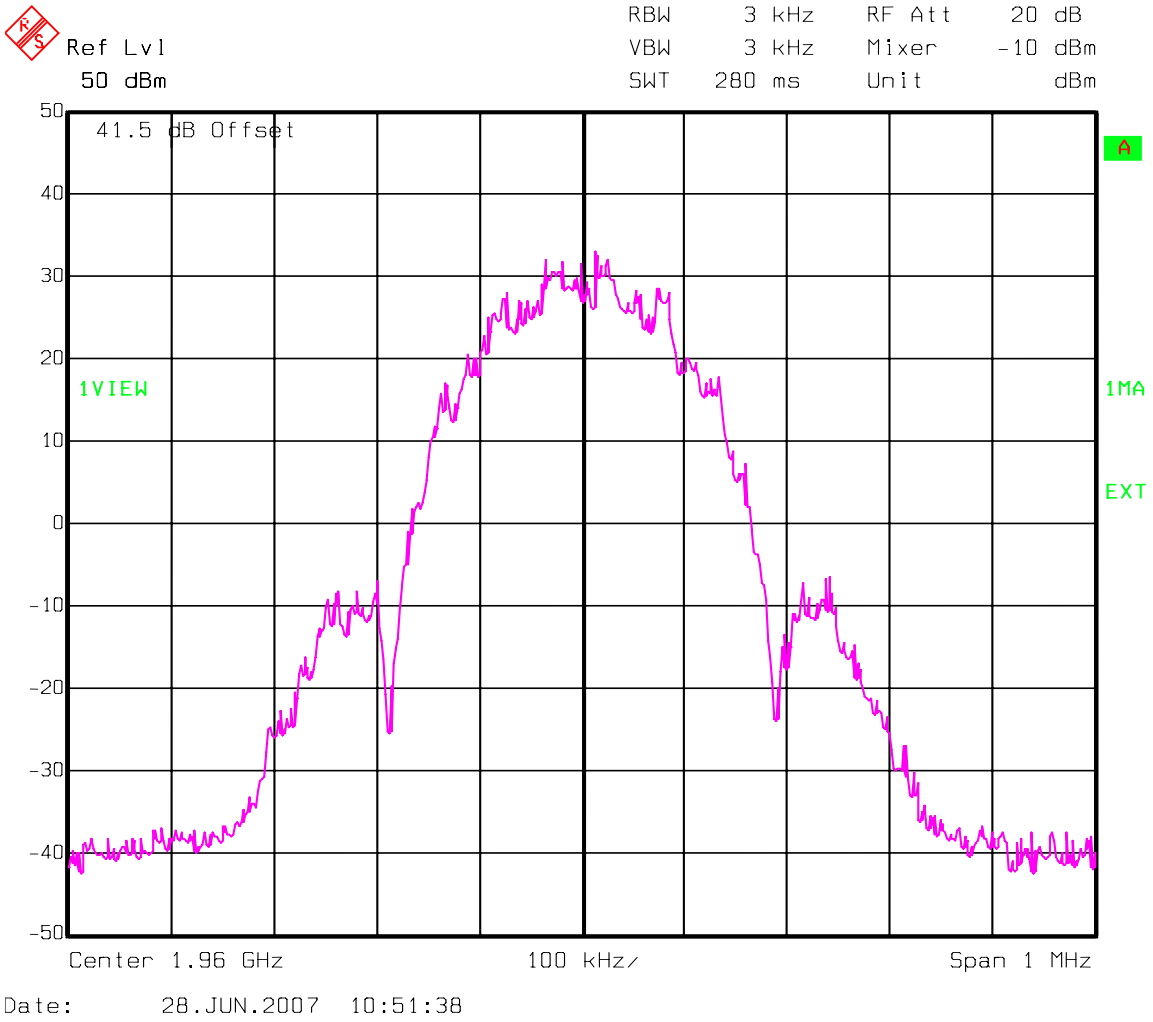
Test Data – Occupied Bandwidth

TDMA
OBW
INPUT



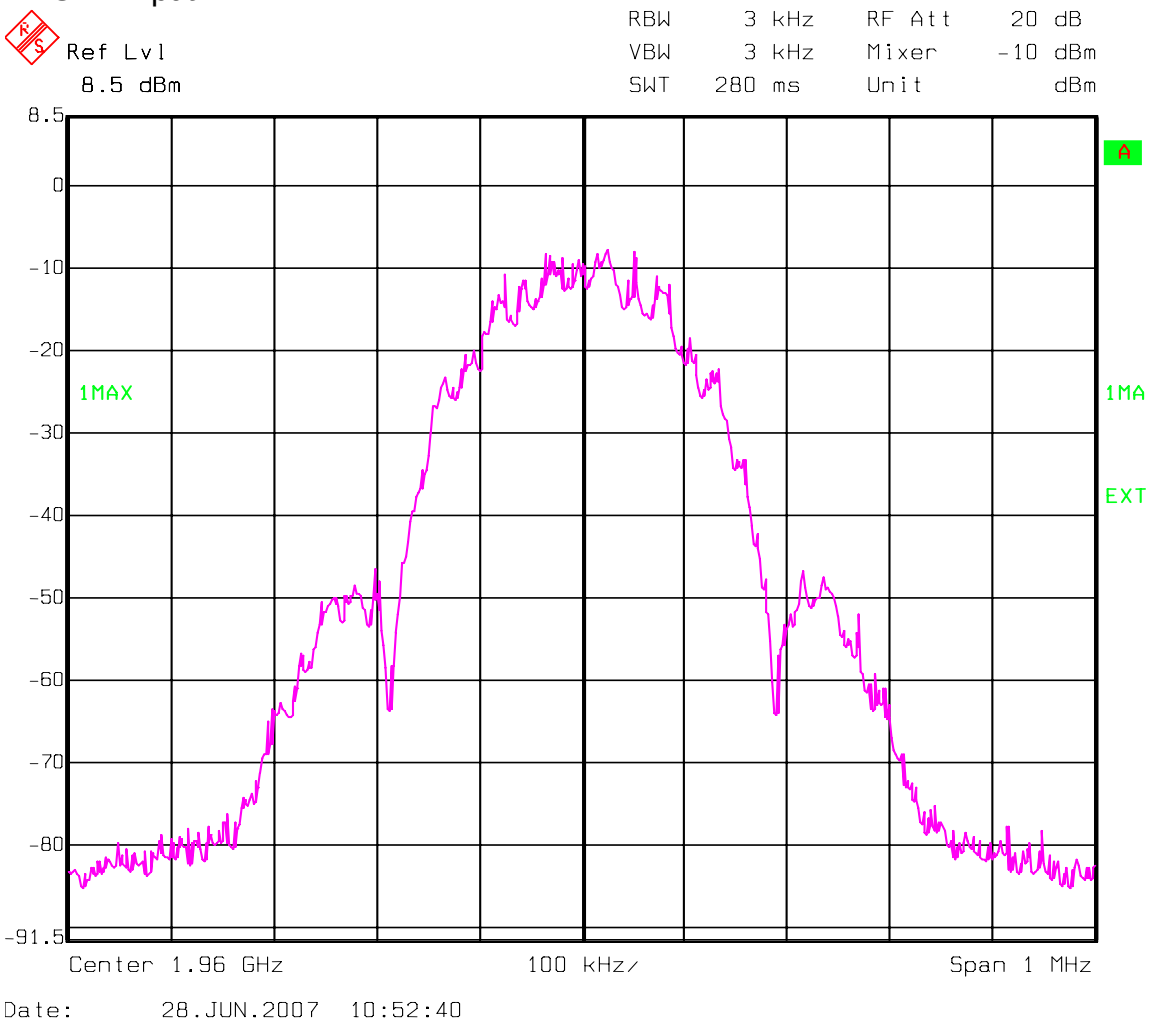
Test Data – Occupied Bandwidth

EDGE
OBW
OUTPUT



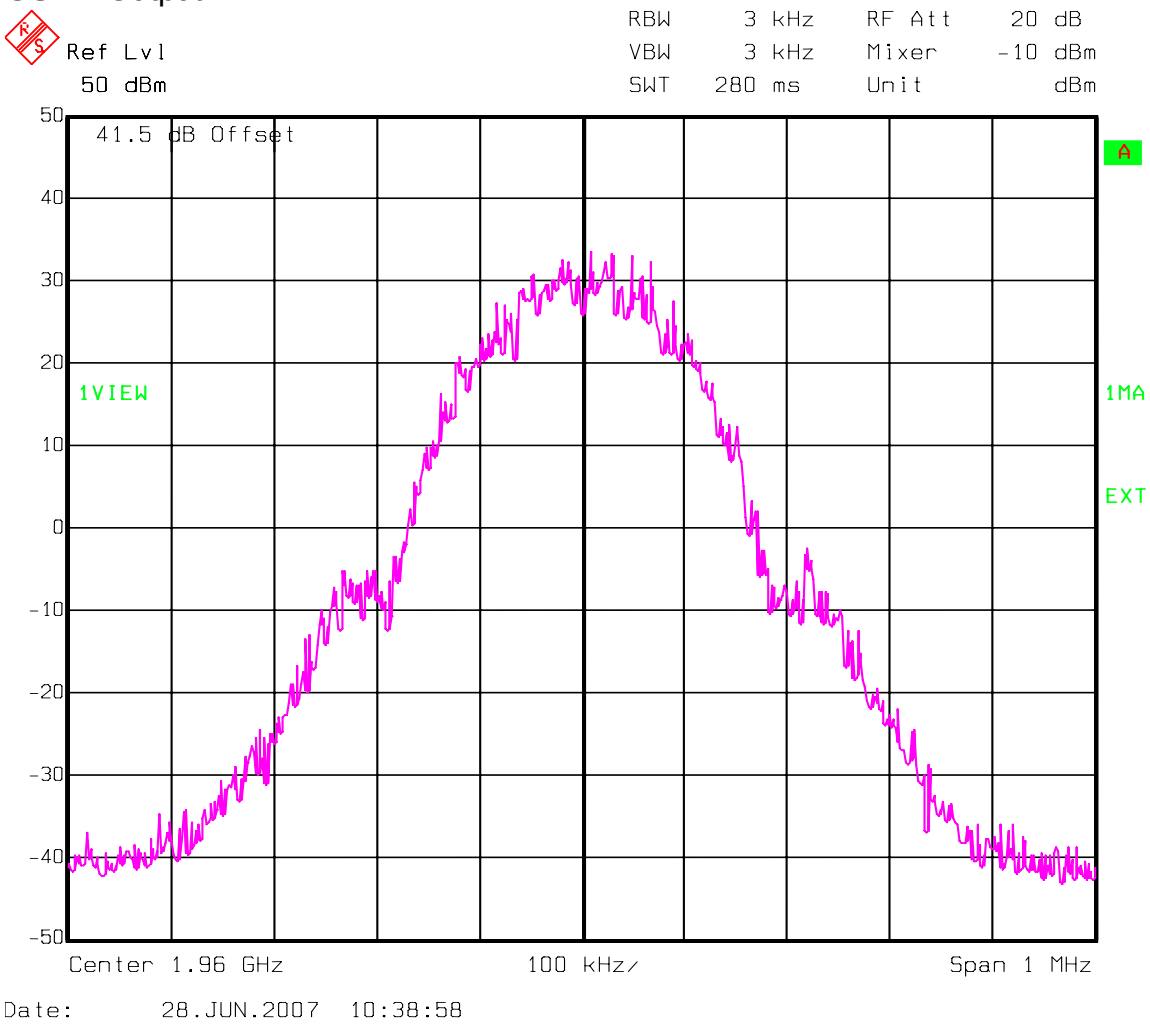
Test Data – Occupied Bandwidth

EDGE - Input



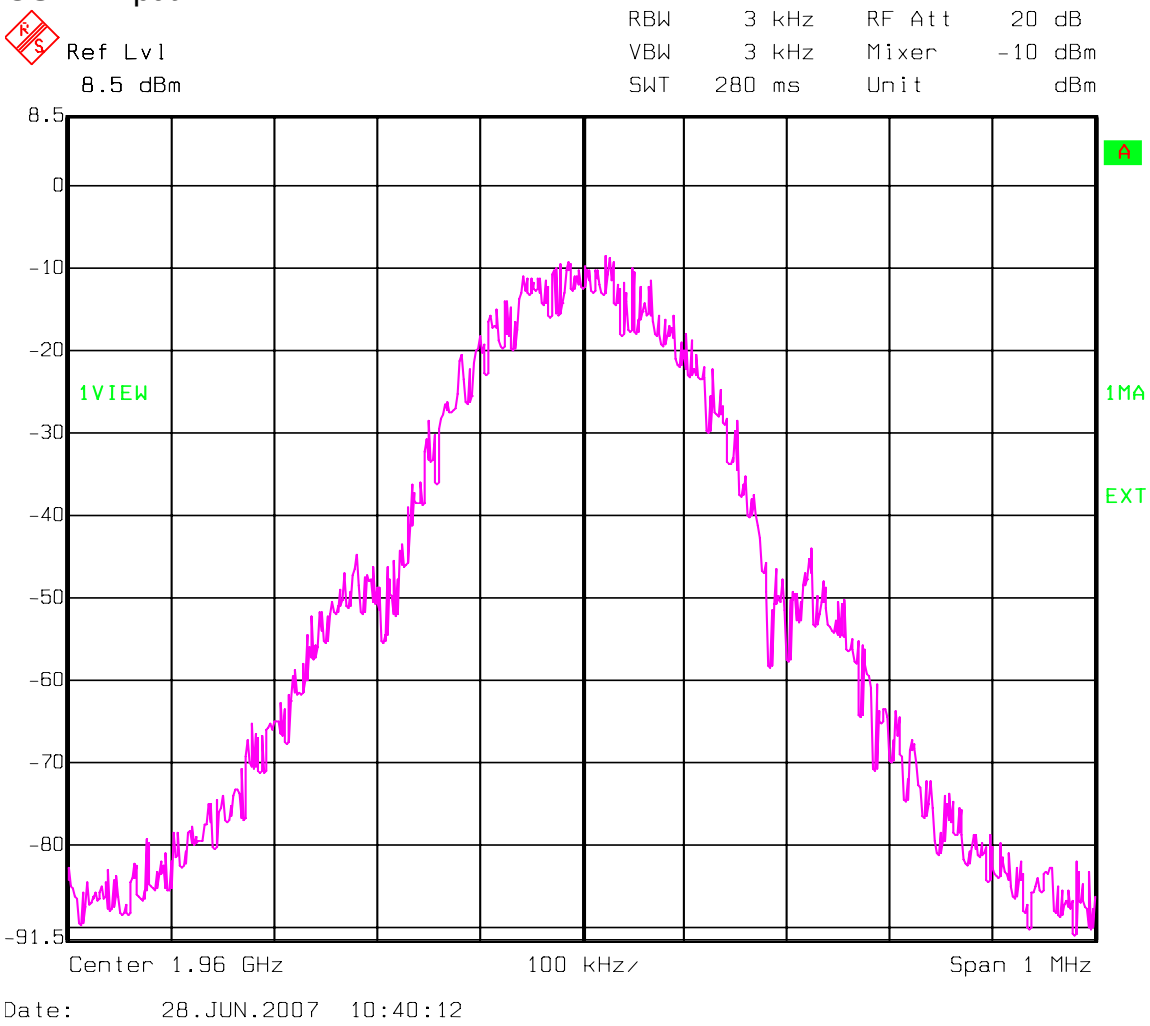
Test Data – Occupied Bandwidth

GSM - Output



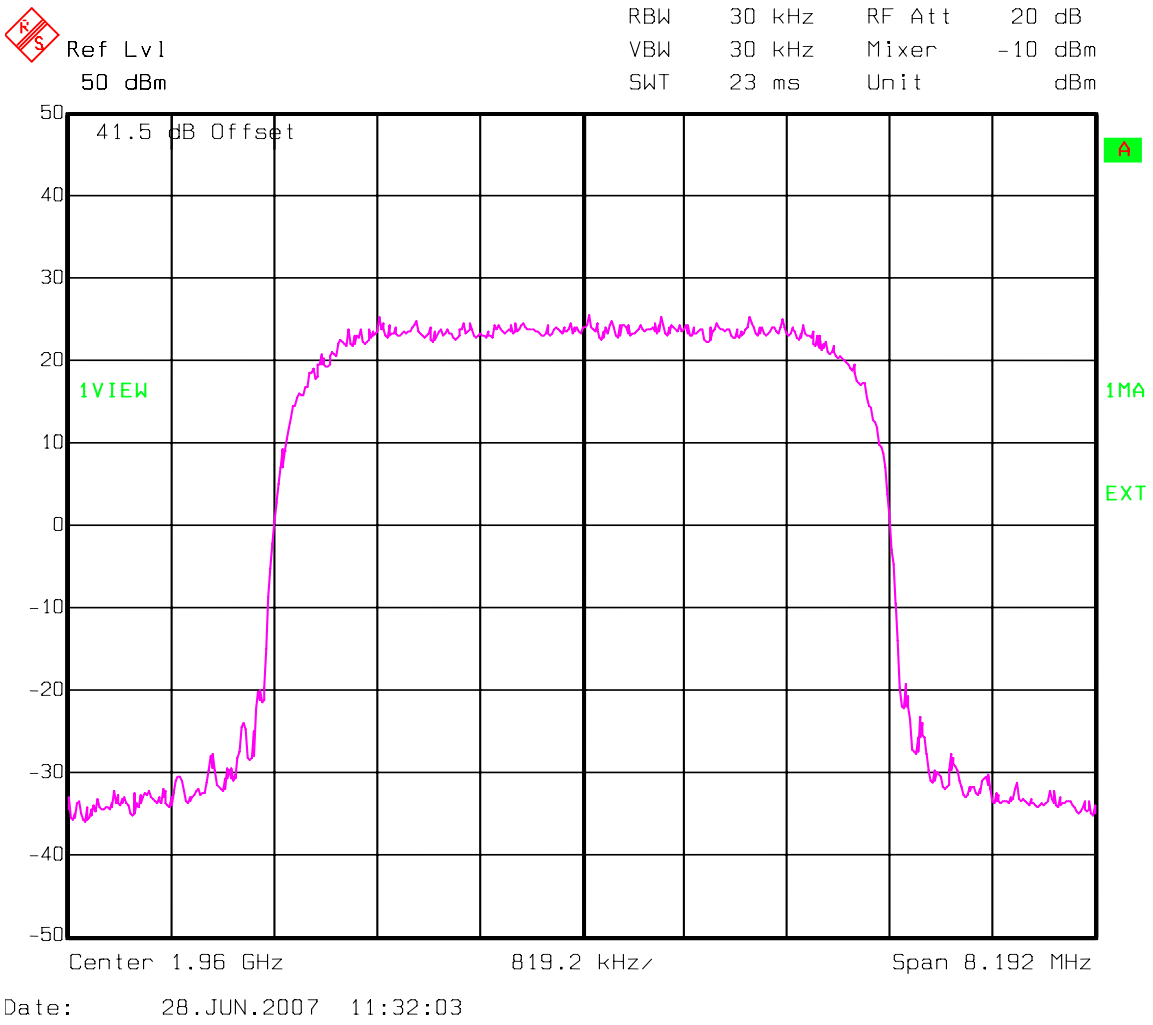
Test Data – Occupied Bandwidth

GSM - Input



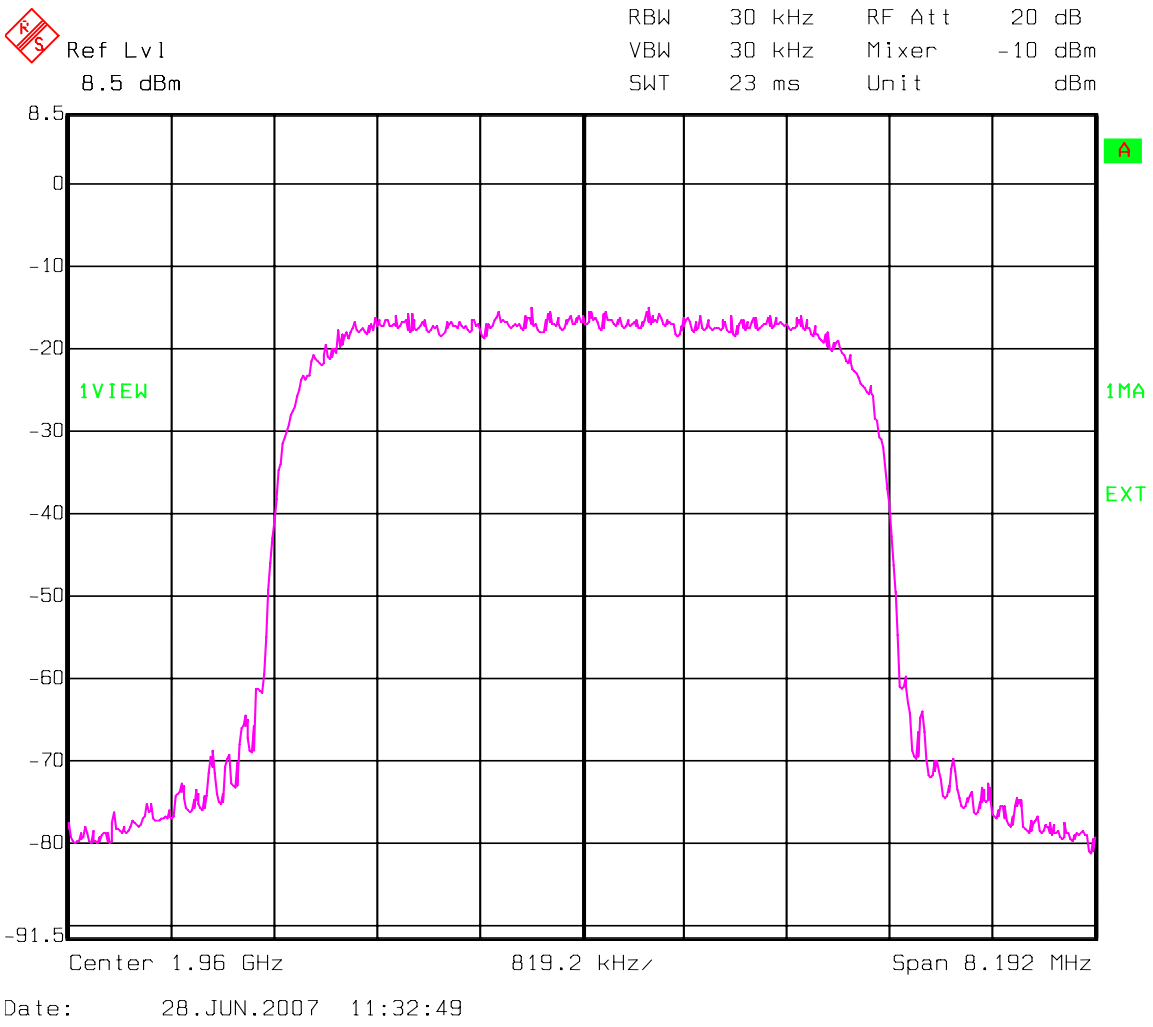
Test Data – Occupied Bandwidth

W-CDMA - Output
WCDMA/HSDPA
OBW
OUTPUT



Test Data – Occupied Bandwidth

WCDMA/HSDPA
OBW
INPUT



Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 24.238
TESTED BY: David Light	DATE: 28 June 2007

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1064-1604-1082-1036

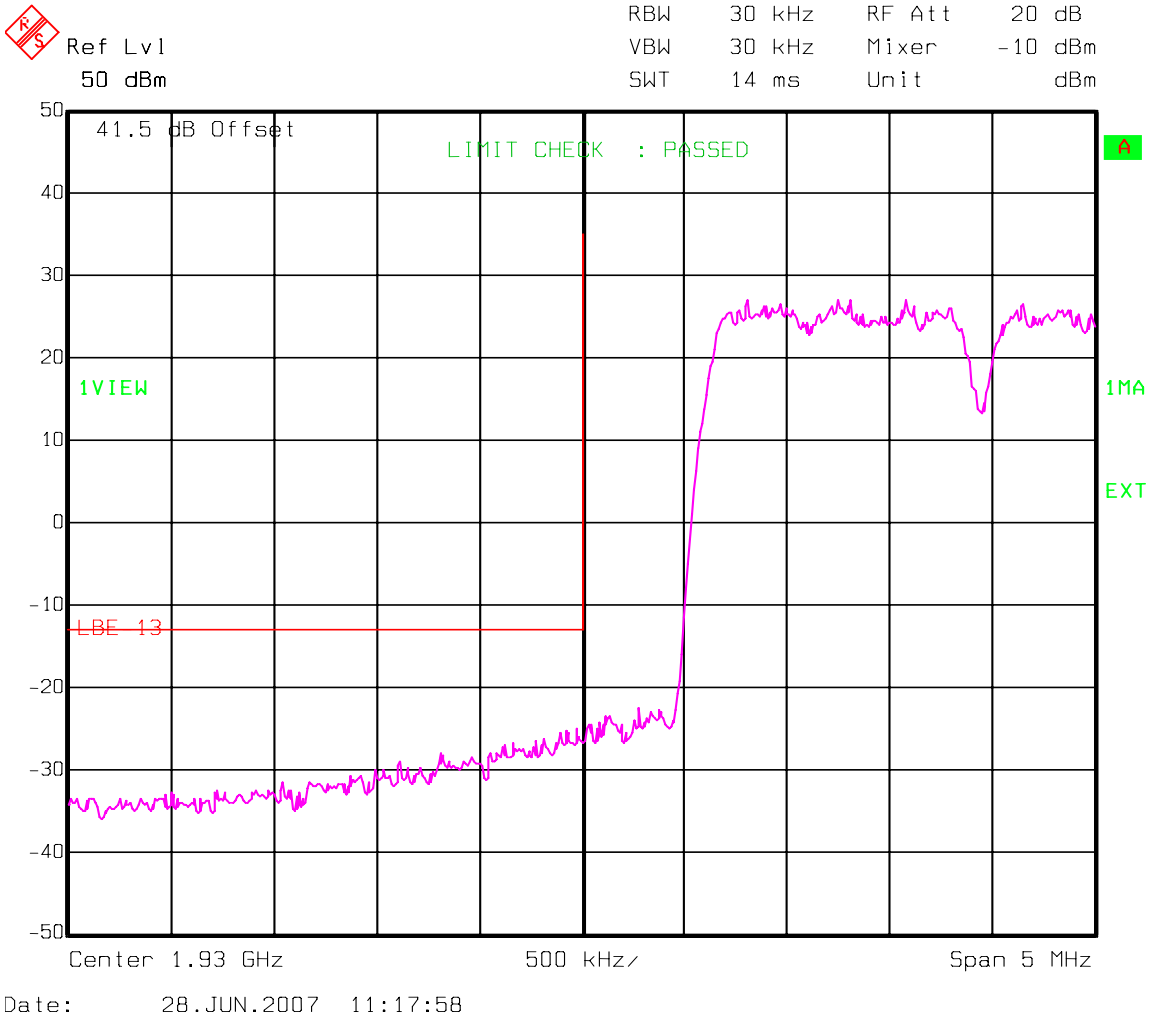
Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 48 %

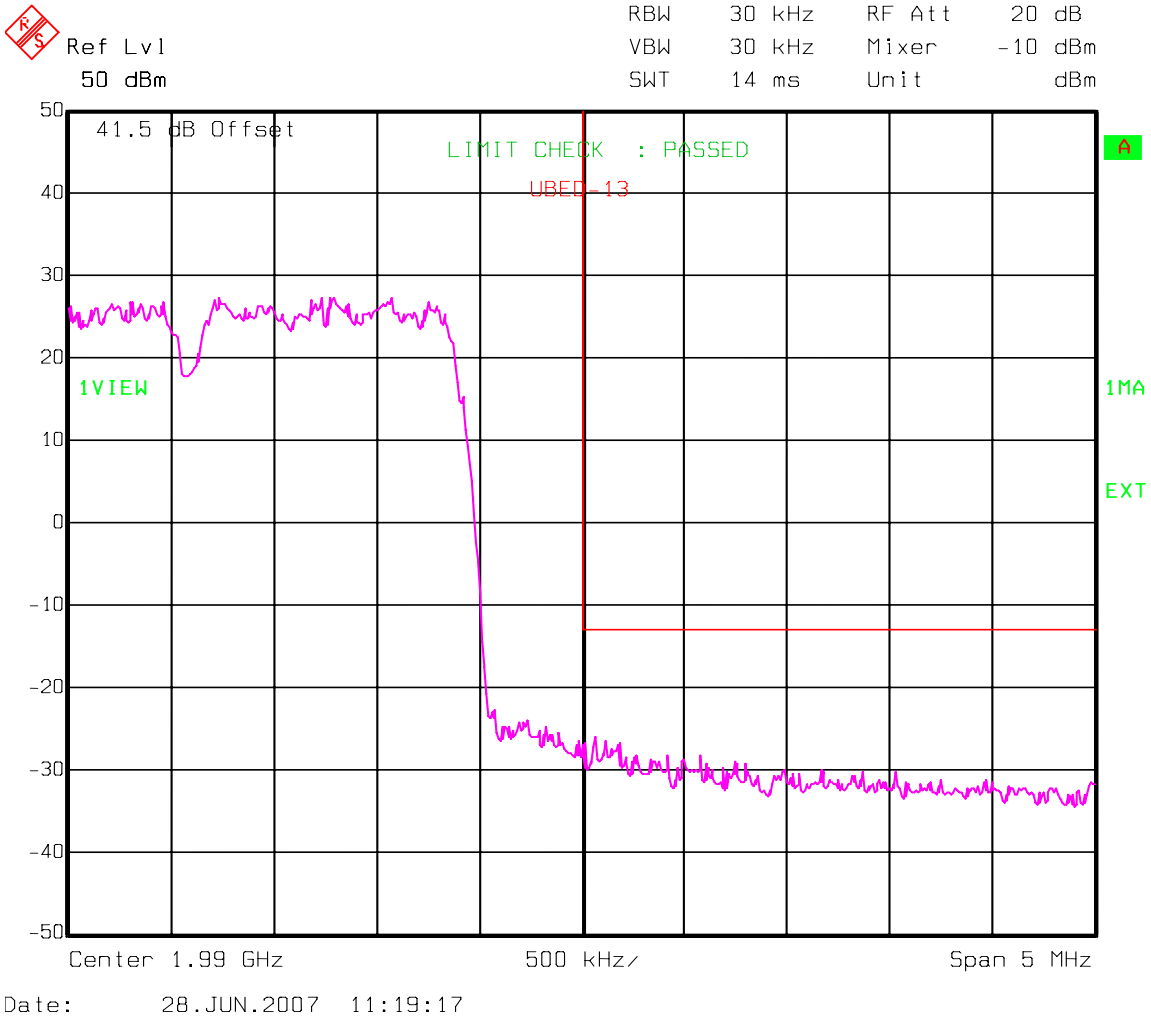
Test Data – Spurious Emissions at Antenna Terminals

CDMA/EV-DO
LOW BANDEDGE INTERMOD



Test Data – Spurious Emissions at Antenna Terminals

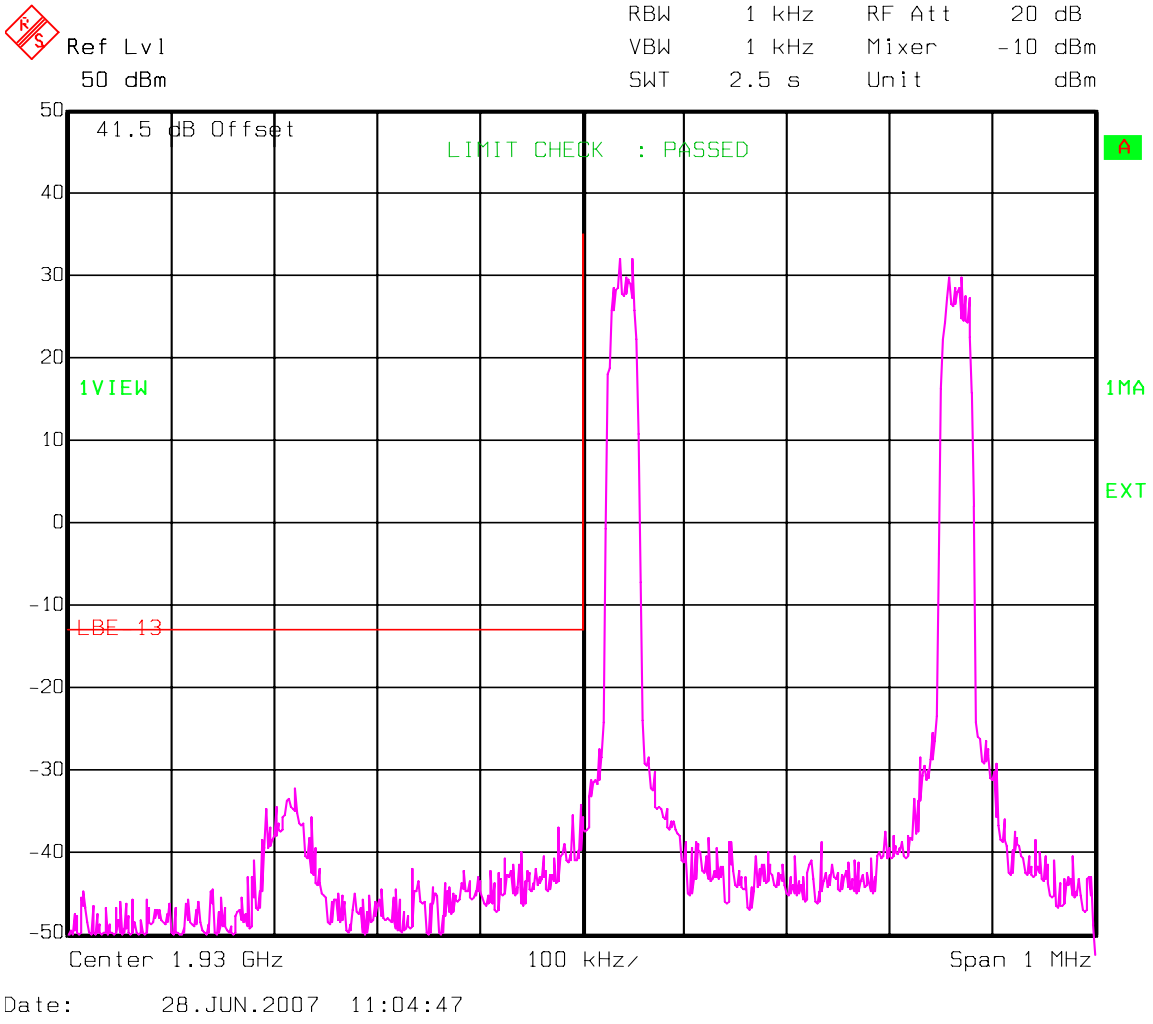
CDMA/EV-DO
HIGH BAND EDGE



Test Data – Spurious Emissions at Antenna Terminals

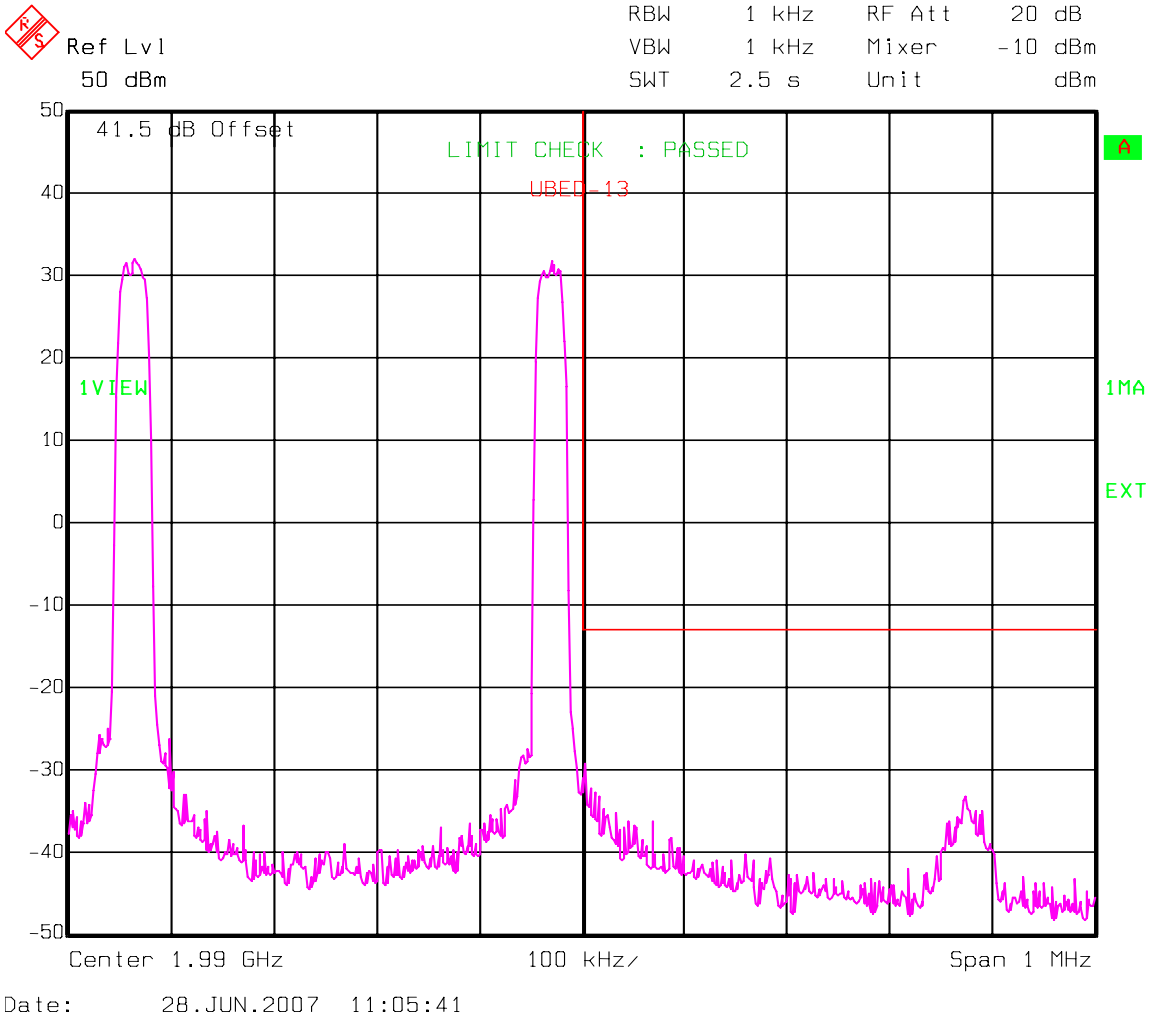
TDMA

LOW BANDEDGE INTERMOD



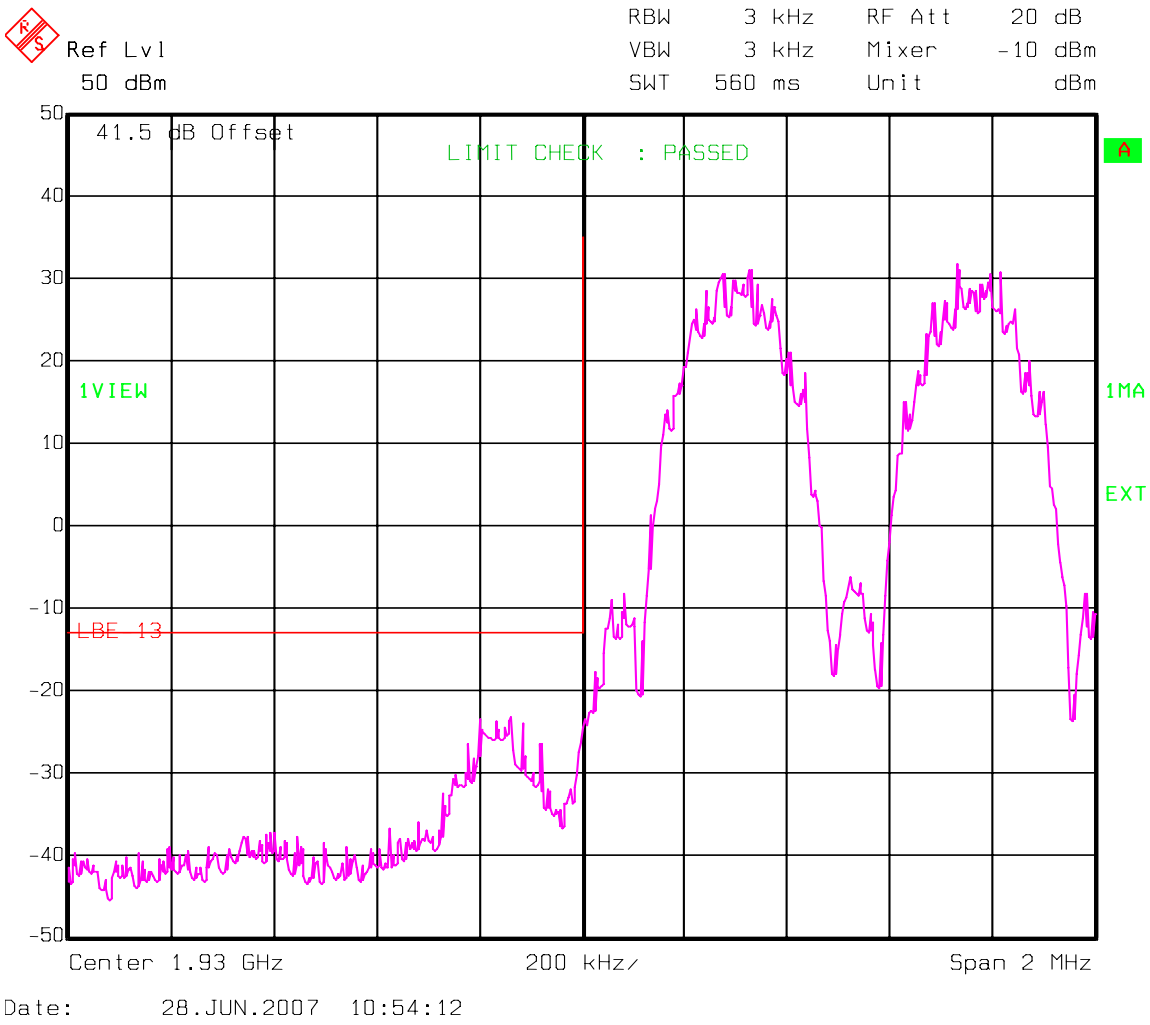
Test Data – Spurious Emissions at Antenna Terminals

TDMA
HIGH BAND EDGE



Test Data – Spurious Emissions at Antenna Terminals

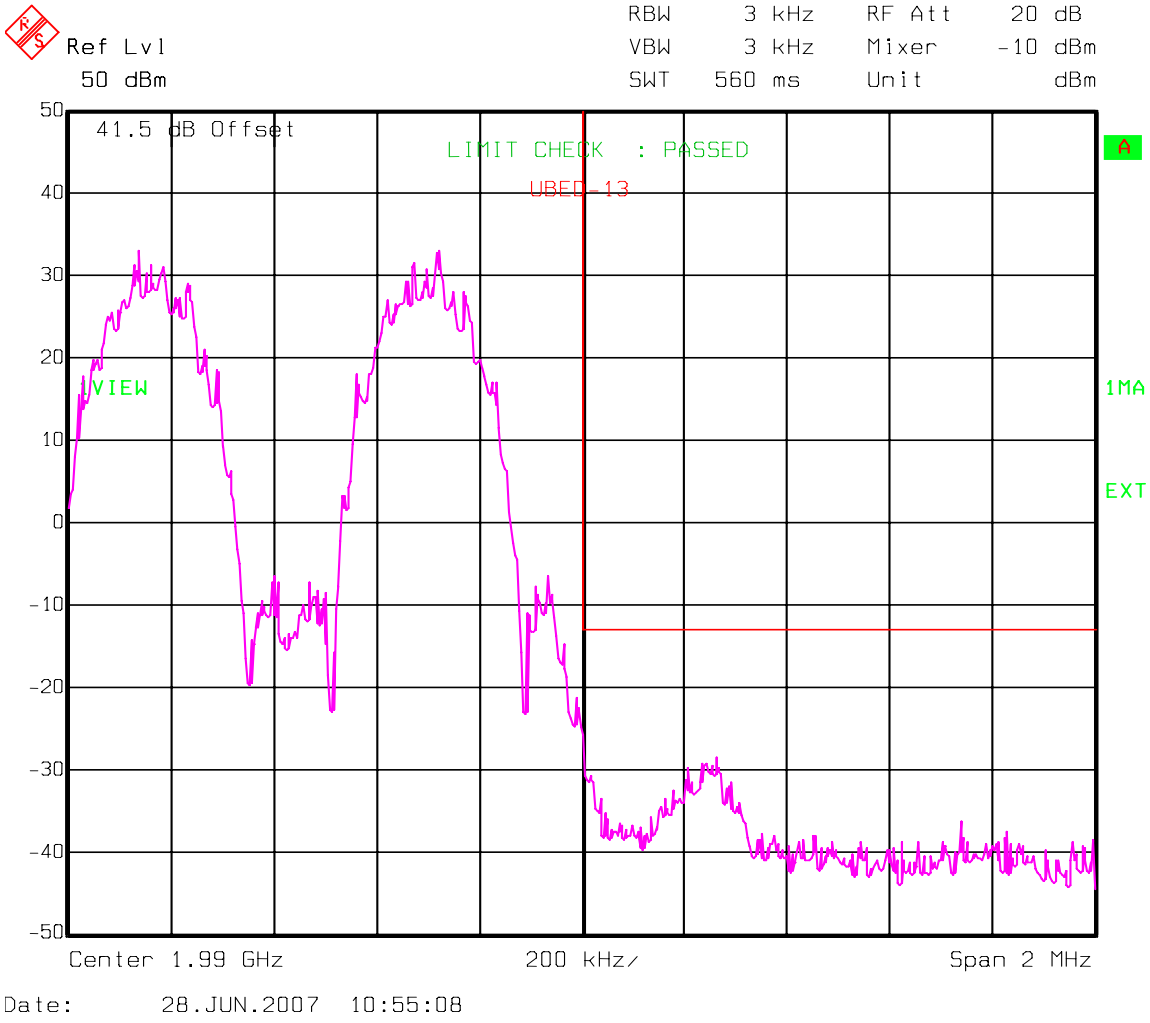
EDGE
LOW BANDEDGE INTERMOD



Test Data – Spurious Emissions at Antenna Terminals

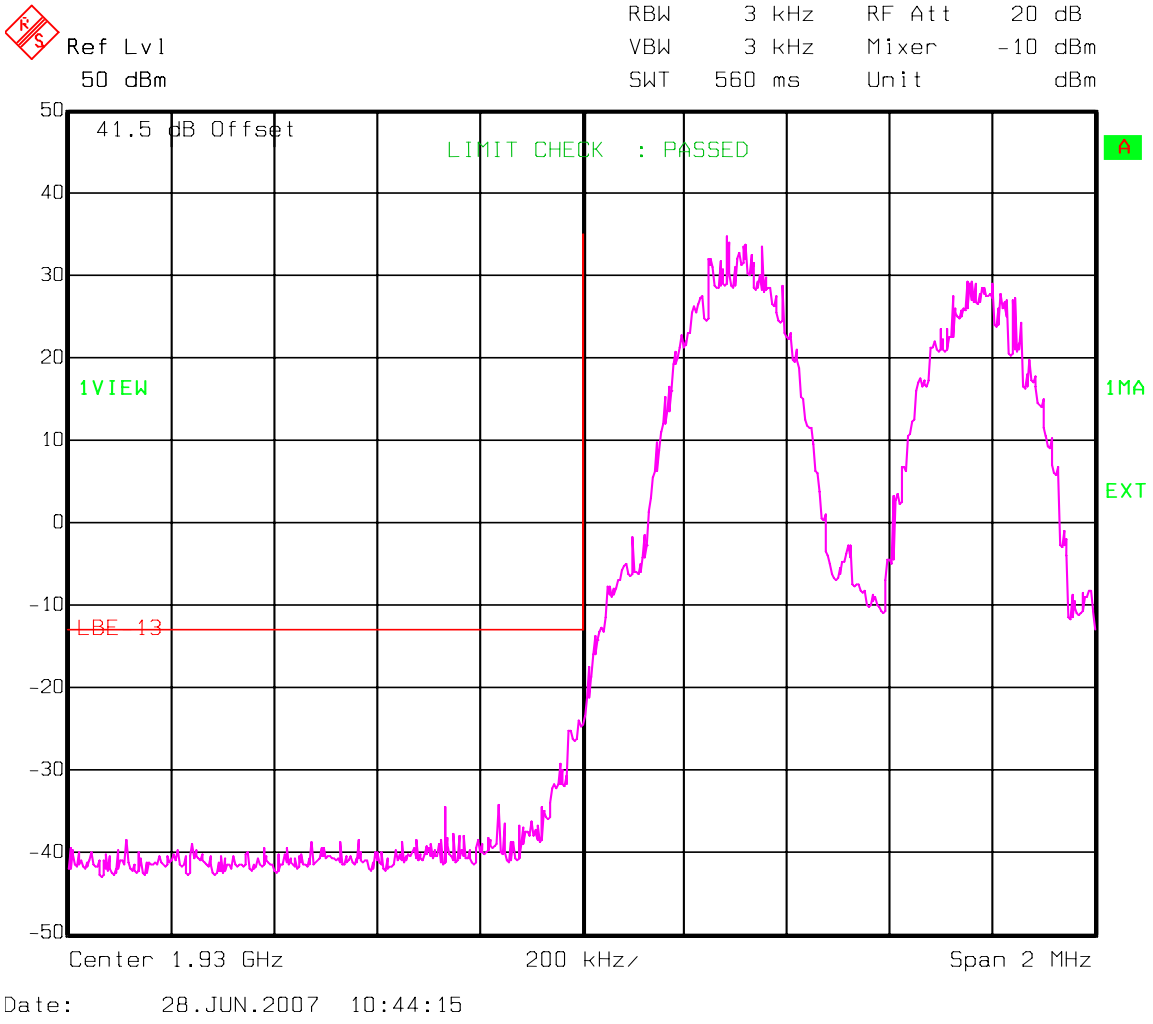
EDGE

HIGH BAND EDGE



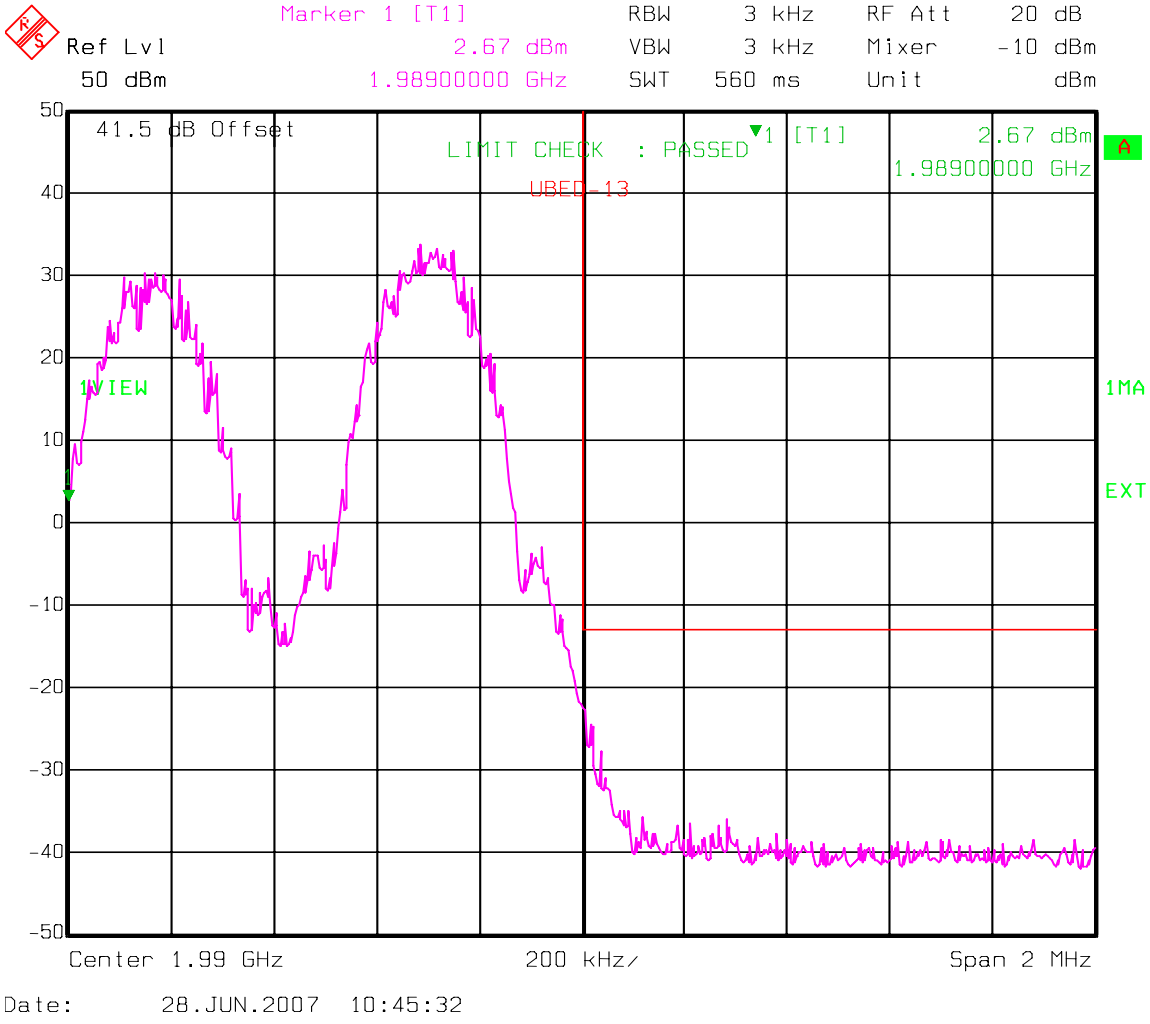
Test Data – Spurious Emissions at Antenna Terminals

GSM
LOW BANDEDGE INTERMOD



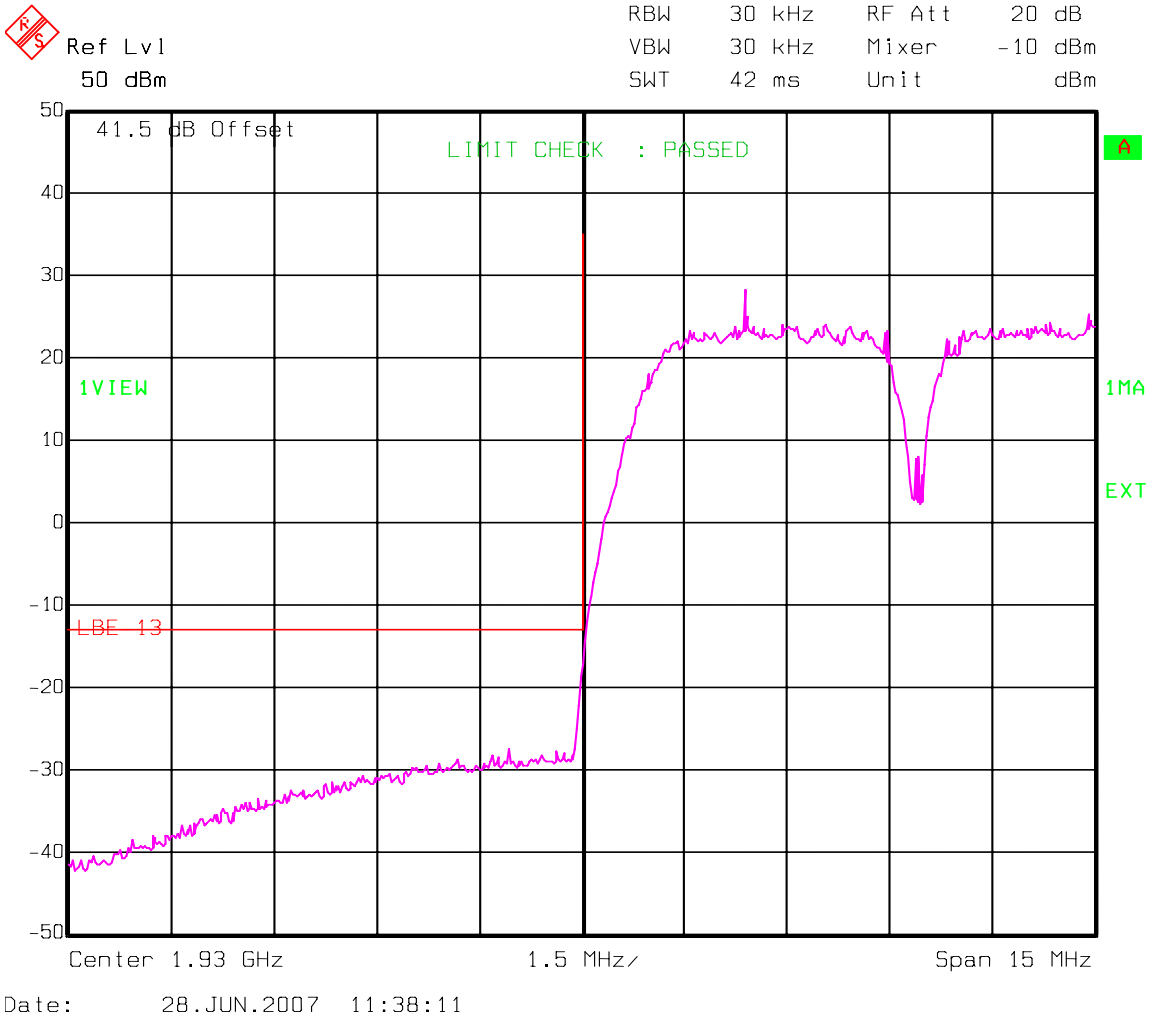
Test Data – Spurious Emissions at Antenna Terminals

GSM
HIGH BAND EDGE



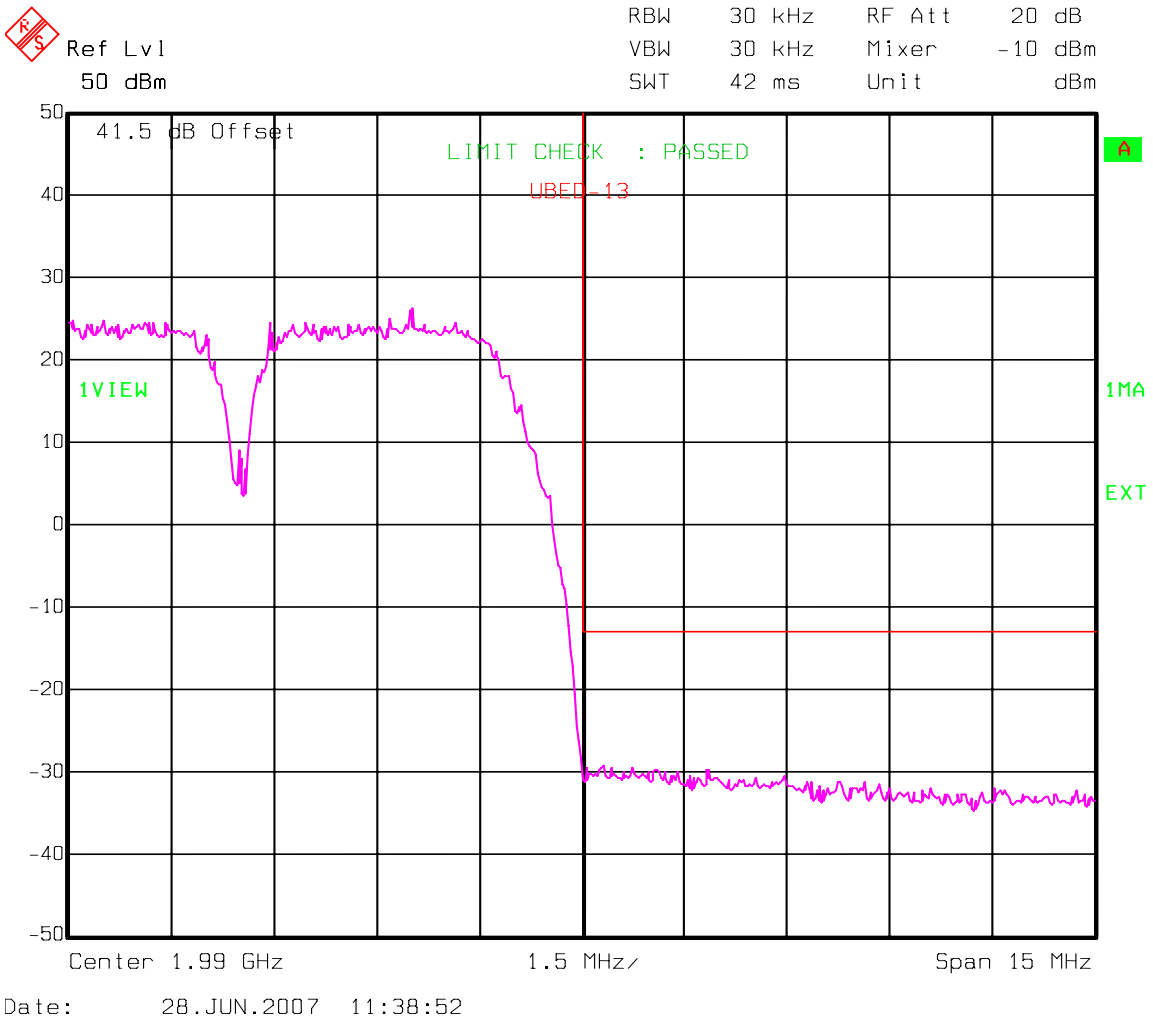
Test Data – Spurious Emissions at Antenna Terminals

WCDMA/HSDPA
LOW BANDEDGE INTERMOD



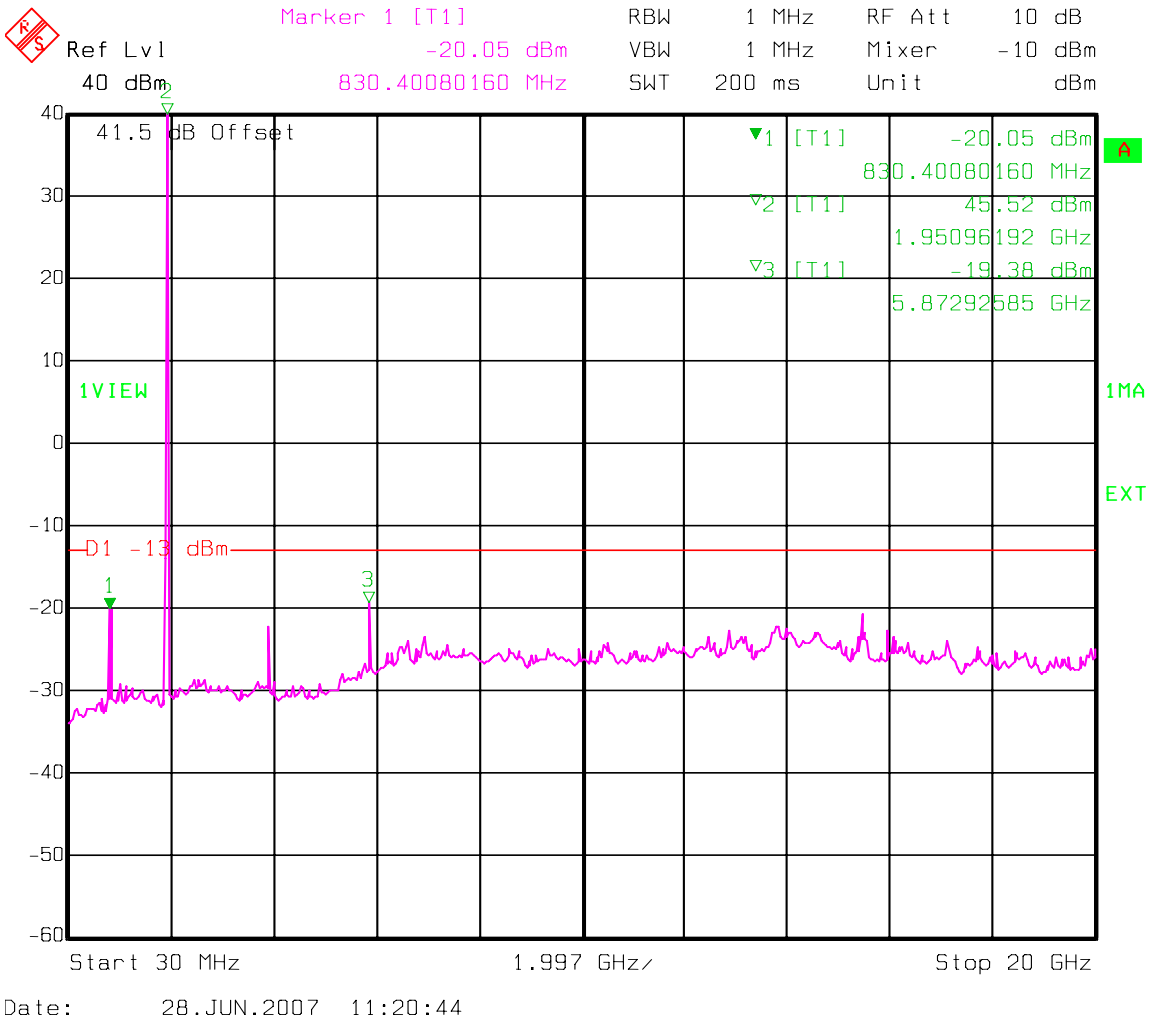
Test Data – Spurious Emissions at Antenna Terminals

WCDMA/HSDPA
HIGH BAND EDGE



Test Data – Spurious Emissions at Antenna Terminals

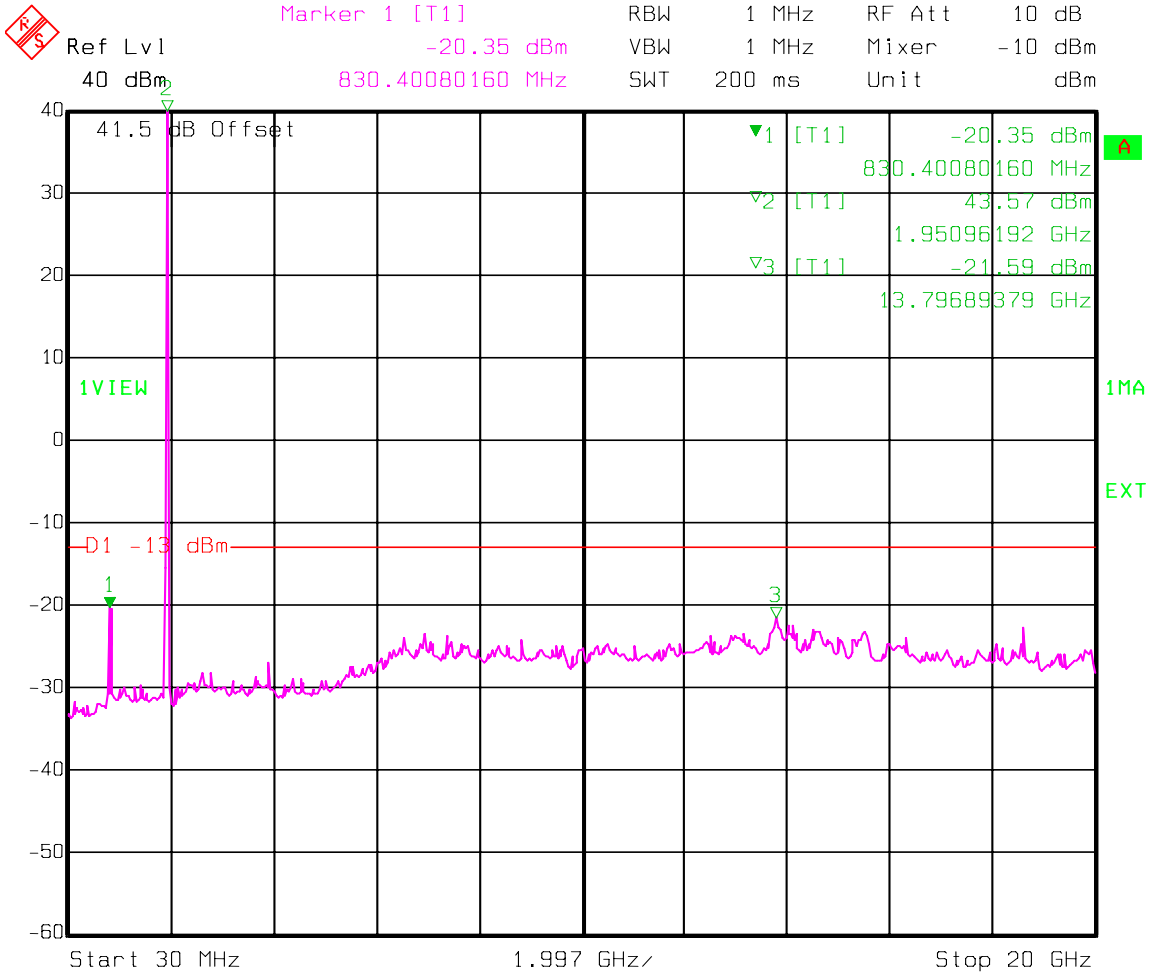
CDMA/EV-DO
SPURS



Marker 1 indicates amplifier response in 800 MHz SMR band
Marker 2 indicates carrier
Marker 3 indicates highest emission

Test Data – Spurious Emissions at Antenna Terminals

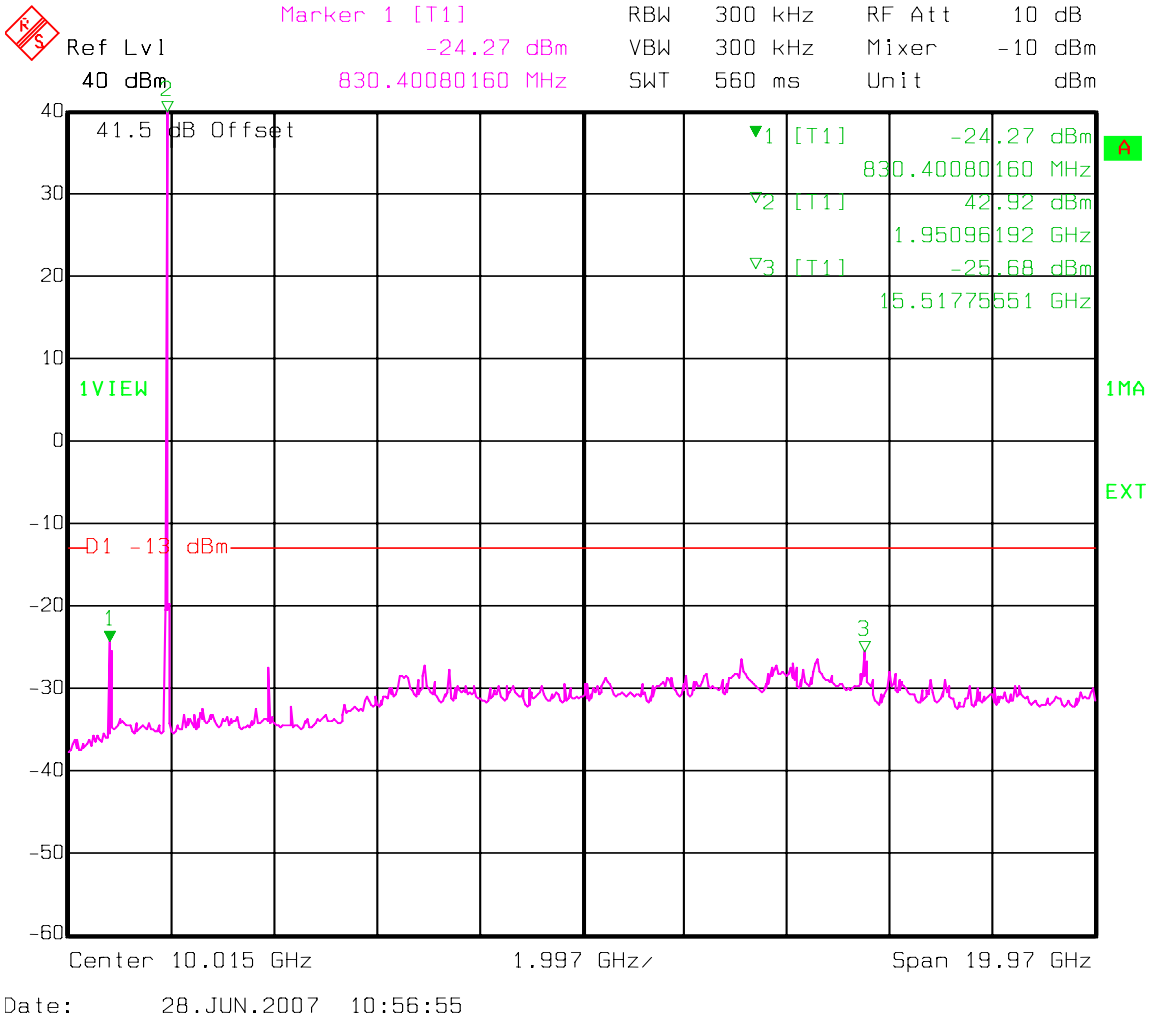
TDMA
SPURS



Marker 1 indicates amplifier response in 800 MHz SMR band
Marker 2 indicates carrier
Marker 3 indicates highest emission

Test Data – Spurious Emissions at Antenna Terminals

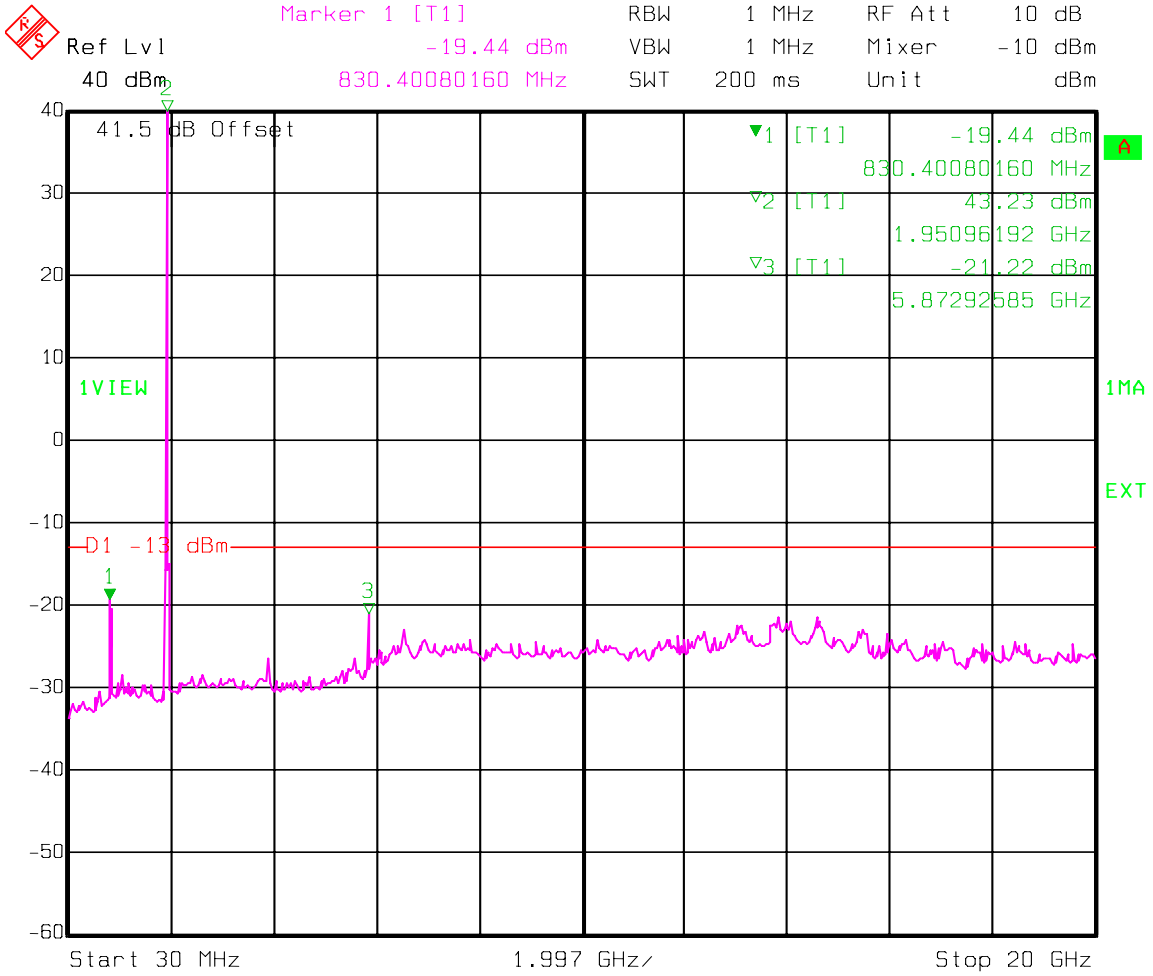
EDGE
SPURS



Marker 1 indicates amplifier response in 800 MHz SMR band
Marker 2 indicates carrier
Marker 3 indicates highest emission

Test Data – Spurious Emissions at Antenna Terminals

GSM
SPURS

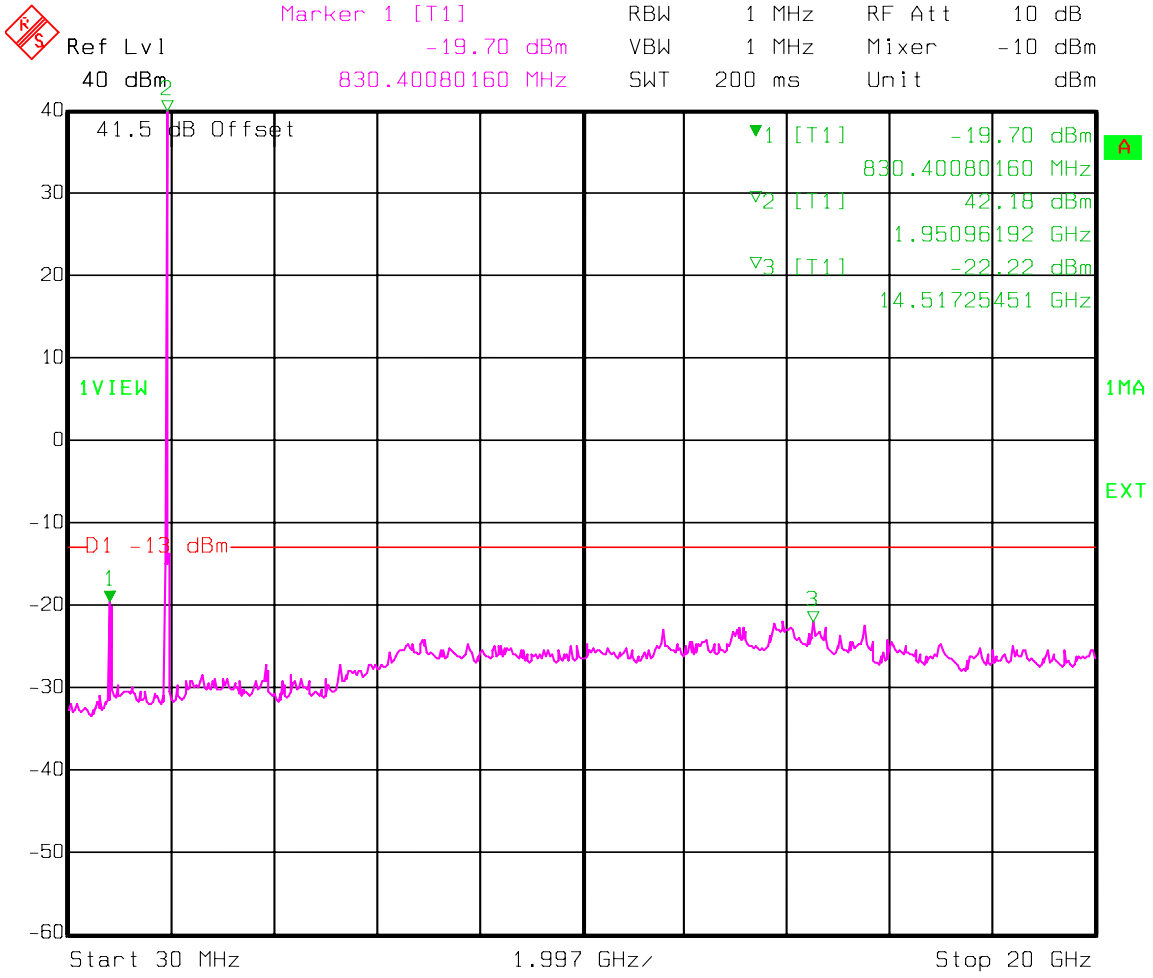


Date: 28.JUN.2007 10:48:20

Marker 1 indicates amplifier response in 800 MHz SMR band
Marker 2 indicates carrier
Marker 3 indicates highest emission

Test Data – Spurious Emissions at Antenna Terminals

WCDMA/HSDPA
SPURS



Marker 1 indicates amplifier response in 800 MHz SMR band
Marker 2 indicates carrier
Marker 3 indicates highest emission

Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 24.238
TESTED BY: David Light	DATE: 28 June 2007

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.

Equipment Used: 1464-1484-1485-1016-791-759-760-993

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	05/26/06	05/26/08
1082	CABLE 2m	Astrolab 32027-2-29094-72TC	N/A	CBU	N/A
1604	ATTENUATOR	NARDA 776B-20	NONE	N/A	N/A
1064	ATTENUATOR	NARDA 776B-20	NONE	CBU	N/A
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/24/07	01/24/09
1484	Cable	Storm PR90-010-072	N/A	05/02/07	05/01/08
1485	Cable	Storm PR90-010-216	N/A	05/02/07	05/01/08
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	05/01/07	04/30/08
993	Horn antenna	A.H. Systems SAS-200/571	XXX	08/01/05	08/02/07
791	PREAMP, 25dB	Nemko USA, Inc. LNA25	398	05/01/07	04/30/08
759	ANTENNA, LOG PERIODIC	A.H. SYSTEMS SAS-200/510	556	03/30/07	03/29/08
760	Antenna biconical	Electro Metrics MFC-25	477	01/19/07	01/19/08

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

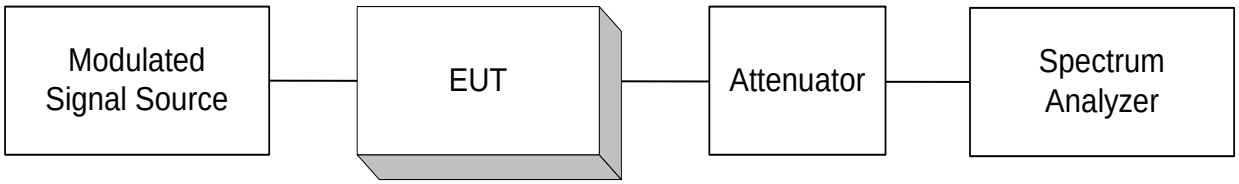
Minimum Standard: Para. No.24.238(a). On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power by at least 43 + 10 log (P) dB.

Method of Measurement TIA/EIA-603-1992

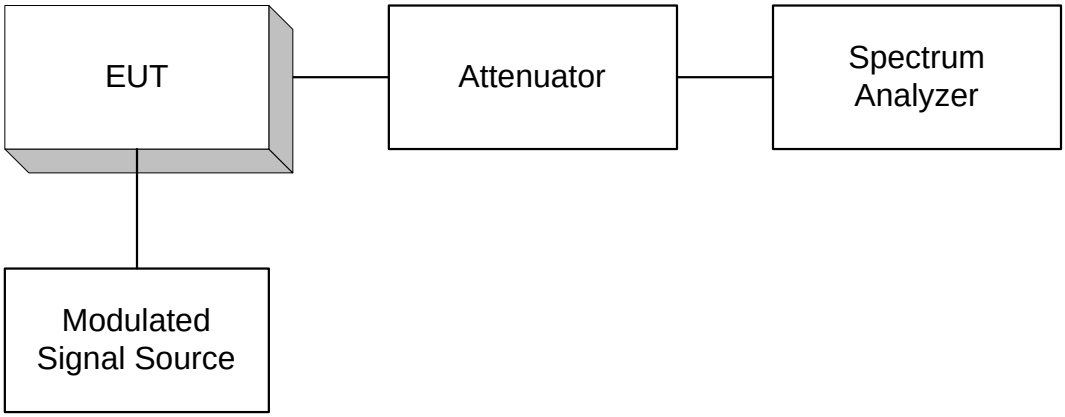
The antenna substitution method is used to determine the equivalent radiated power at spurious frequencies. The spurious emissions are measured at a distance of 3 meters. The EUT is then replaced with a reference substitution antenna with a known gain referenced to an isotropic radiator. This antenna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

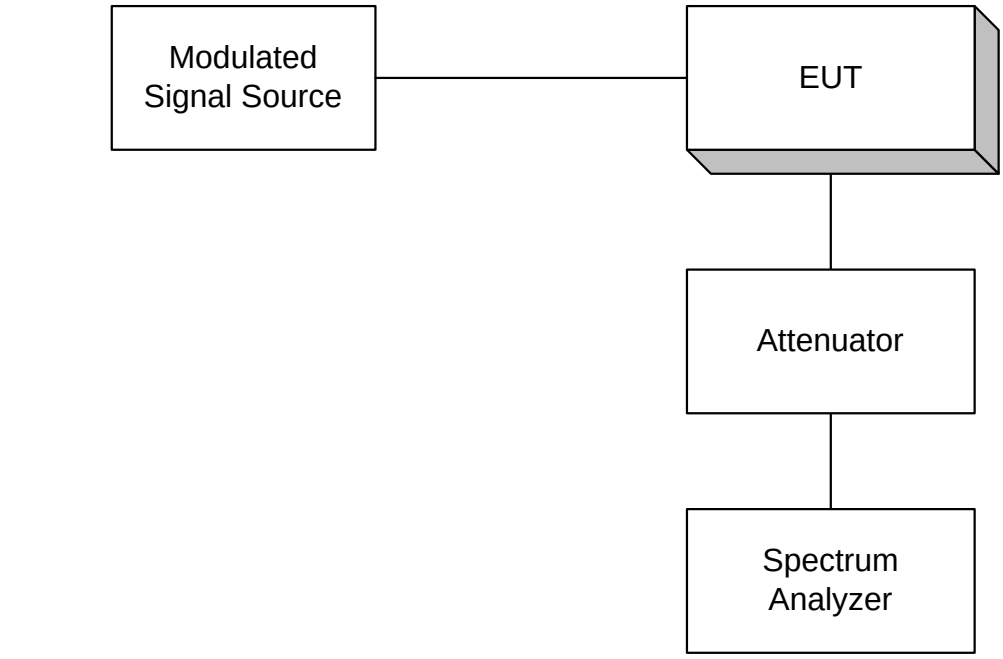
Para. No. 2.985 - R.F. Power Output

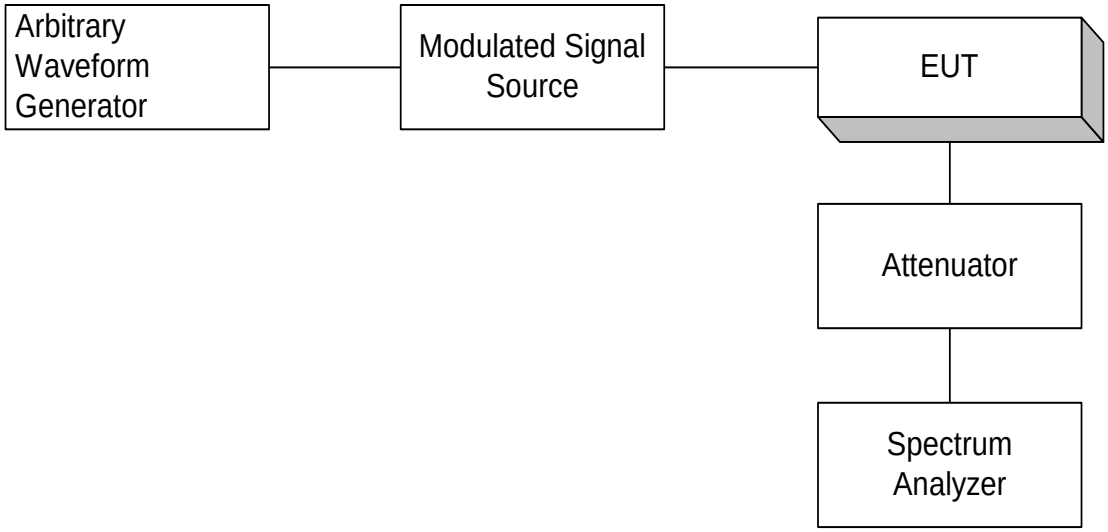


Para. No. 2.989 - Occupied Bandwidth

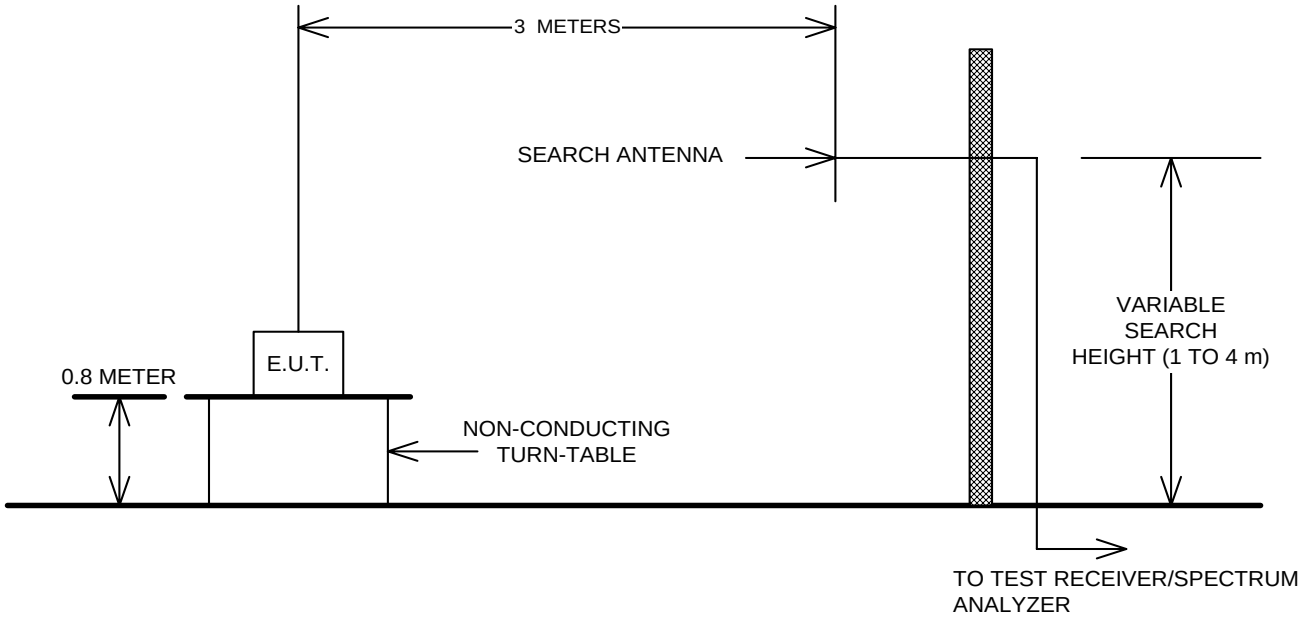


Para. No. 2.991 Spurious Emissions at Antenna Terminals





Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability