



Nemko Test Report: 41239RUS1

Applicant: Andrew Corporation
620 N. Greenfield Parkway
Garner, NC 27529
USA

**Equipment Under Test:
(E.U.T.)** MR1918

FCC Identifier: BCR-MR1918

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:

A handwritten signature in black ink, appearing to read 'David Light', is written over a horizontal line.

David Light, Senior Wireless Engineer

DATE: 28 January 2010

APPROVED BY:

A handwritten signature in black ink, appearing to read 'Tom Tidwell', is written over a horizontal line.

Tom Tidwell, Telecom Direct

DATE: 29 January 2010

Number of Pages: 54

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EQUIPMENT: MR1918

Section 1. Summary of Test Results

Manufacturer: Andrew Corporation

Model No.: MR1918

Serial No.: 10

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.

<input type="checkbox"/>	New Submission	<input checked="" type="checkbox"/>	Production Unit
<input checked="" type="checkbox"/>	Class II Permissive Change	<input type="checkbox"/>	Pre-Production Unit

Reason for Class II change: Gain has been increased from 70 dB to 78 dB. Output power remains at 22 dBm. The gain of the amplifier is increased by the removal of attenuation in the system. There was no degradation of the characteristics of the device.

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".



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Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	RESULT
RF Power Output	24.232	100W	Not tested
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.	Not tested
Frequency Stability	24.235		NA

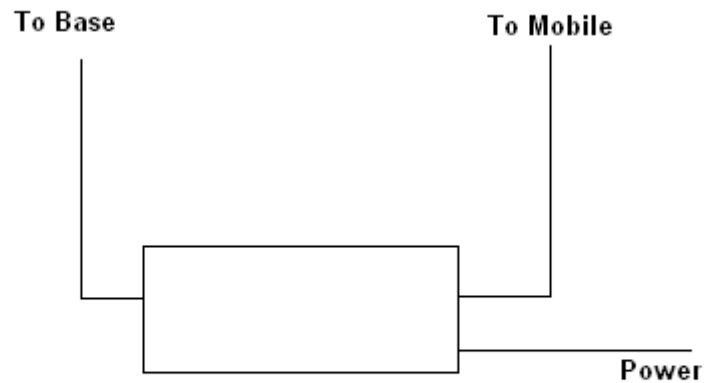
Footnotes:

Section 2. General Equipment Specification

Supply Voltage Input:		120 Vac			
Frequency Range:		Downlink:	1930 to 1990 MHz		
Frequency Range:		Uplink:	1850 to 1910 MHz		
Type of Modulation and Designator:		CDMA (G7W)	GSM (GXW)	EDGE (G7W)	W-CDMA (G7W)
Output Impedance:		50 ohms			
RF Output (Rated):		Downlink	22 dBm (158 mW)		
RF Output (Rated):		Uplink	22 dBm (158 mW)		
Frequency Translation:		F1-F1 <input checked="" type="checkbox"/>	F1-F2 <input type="checkbox"/>	N/A <input type="checkbox"/>	
Band Selection:		Software <input checked="" type="checkbox"/>	Duplexer Change <input type="checkbox"/>	Fullband Coverage <input type="checkbox"/>	

Description of EUT

The MR1918 is a bi-directional amplifier used to enhance signals between a mobile and a base station in a wireless network. It has been designed to increase signal strength in small and medium sized areas such as offices, shops, basements and manufacturing facilities.

System Diagram

Section 3. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 24.238
TESTED BY: David Light	DATE: 28 January 2010

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1036-1472-1082

Measurement Uncertainty: 1X10⁻⁷ ppm

Temperature: 22 °C

Relative Humidity: 32 %

EQUIPMENT: MR1918

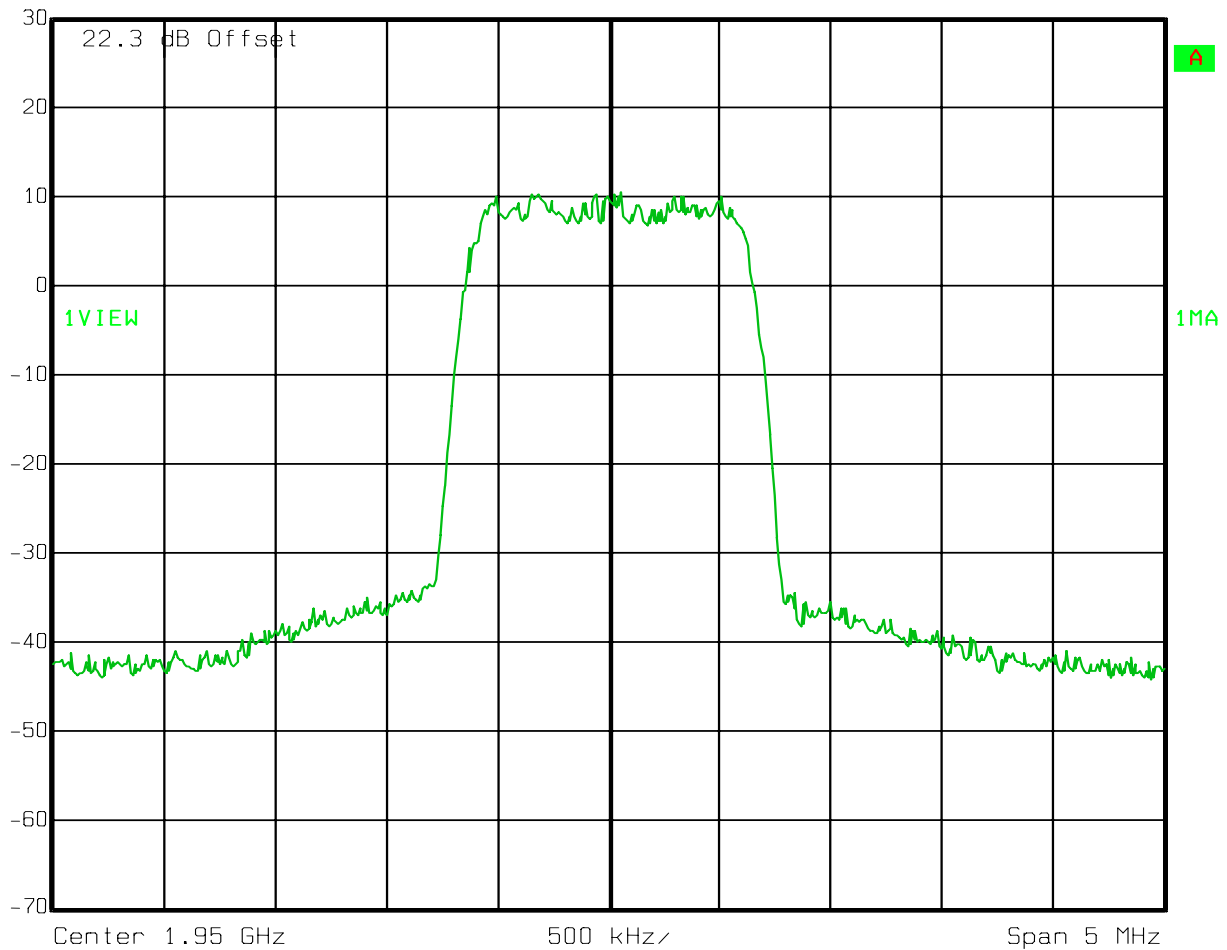
Test Data – Occupied Bandwidth

Downlink
CDMA - Output



Ref Lvl
30 dBm

RBW	30 kHz	RF Att	20 dB
VBW	30 kHz	Mixer	-10 dBm
SWT	14 ms	Unit	dBm



Date: 28.JAN.2010 10:37:03

EQUIPMENT: MR1918

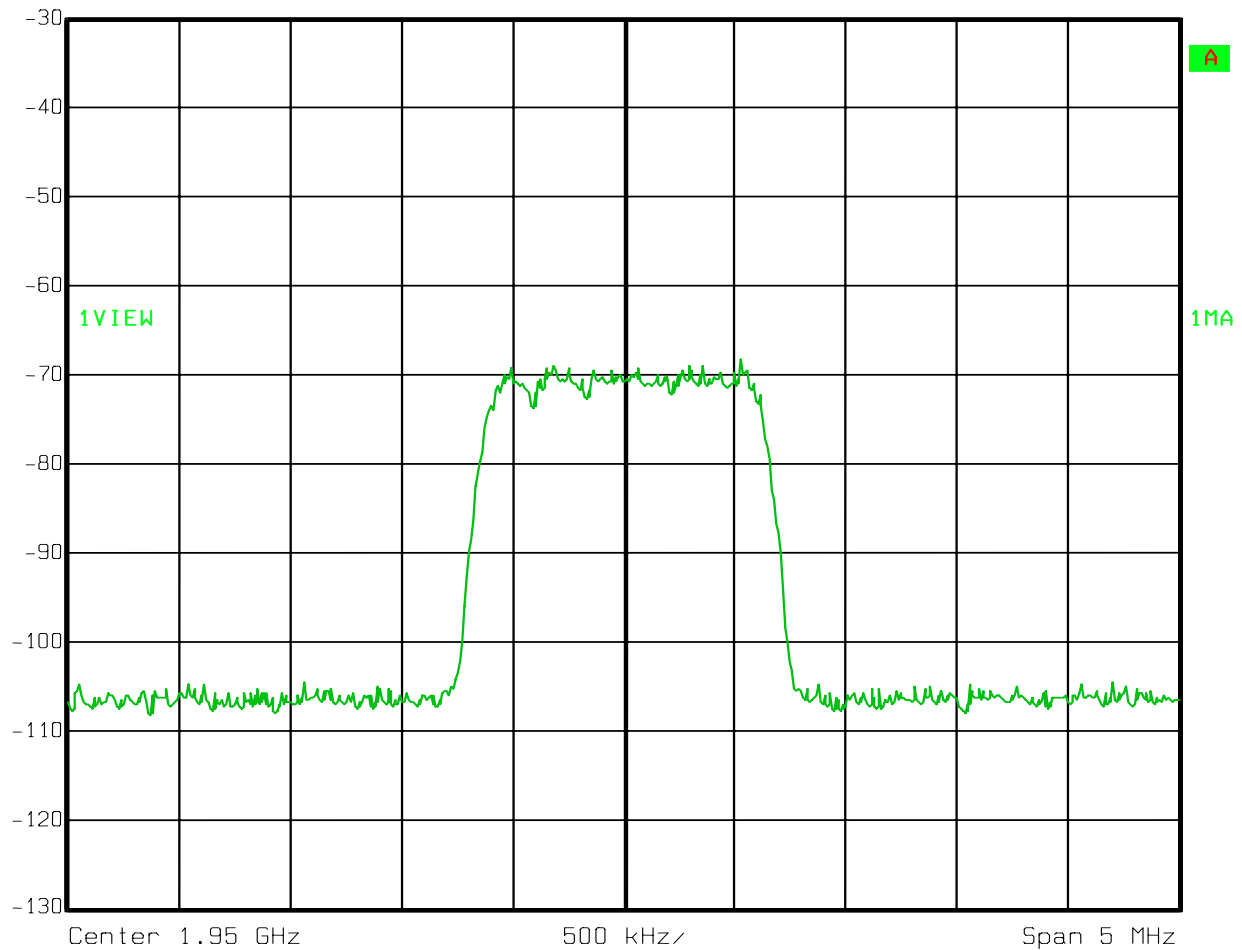
Test Data – Occupied Bandwidth

Downlink
CDMA - Input



Ref Lvl
-30 dBm

RBW	30 kHz	RF Att	0 dB
VBW	30 kHz		
SWT	14 ms	Unit	dBm



Date: 28.JAN.2010 10:48:43

EQUIPMENT: MR1918

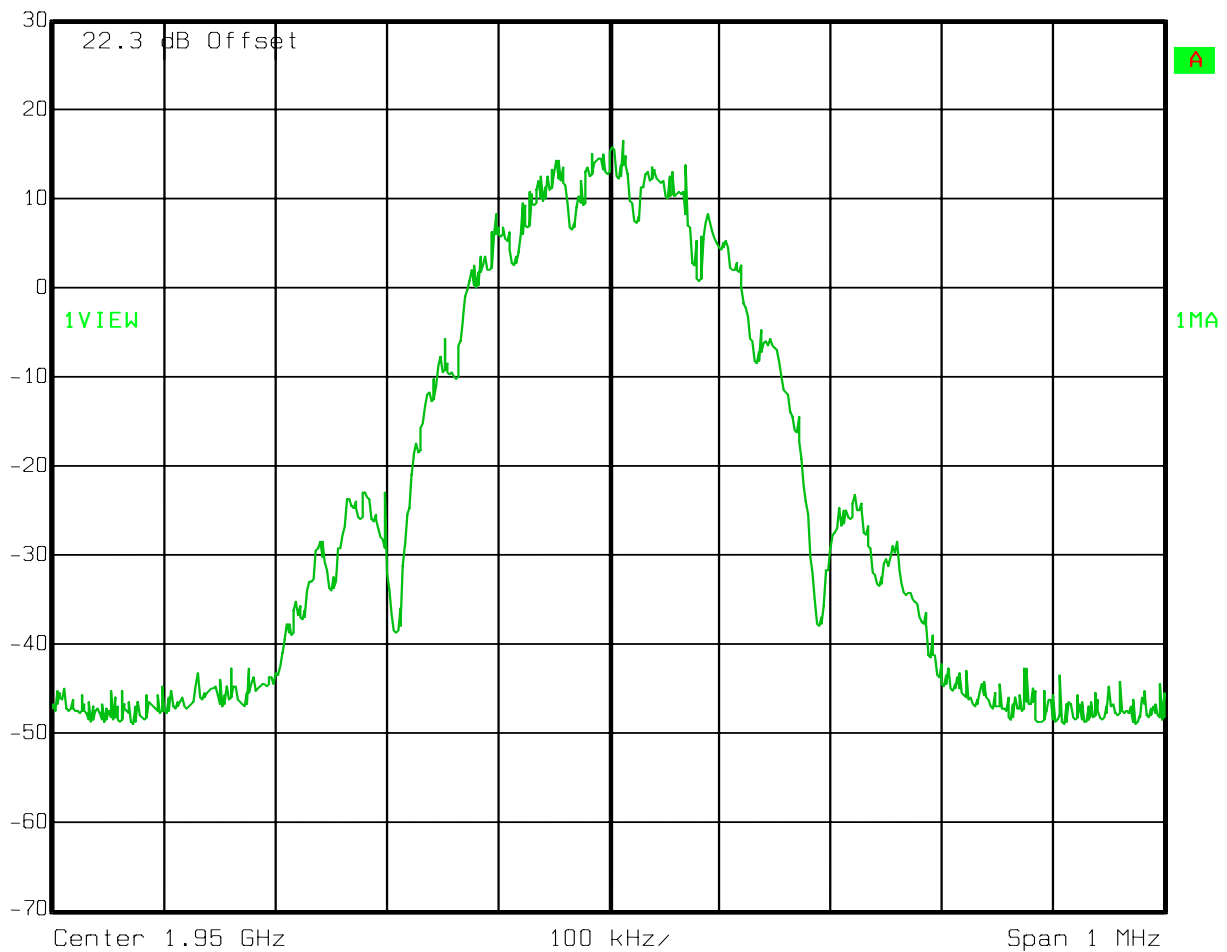
Test Data – Occupied Bandwidth

Downlink
EDGE - Output



Ref Lvl
30 dBm

RBW	3 kHz	RF Att	20 dB
VBW	3 kHz	Mixer	-10 dBm
SWT	280 ms	Unit	dBm



Date: 28.JAN.2010 10:36:13

EQUIPMENT: MR1918

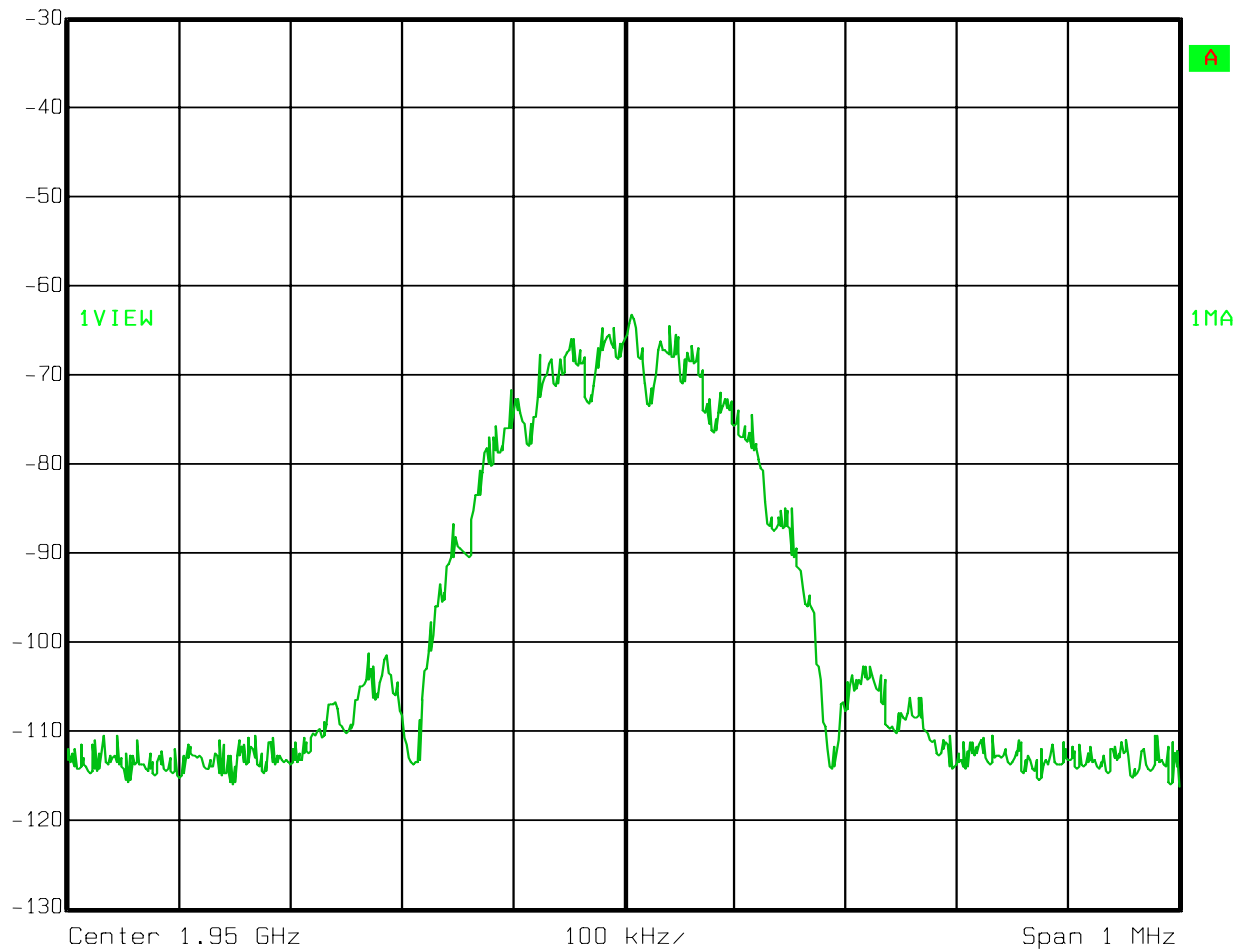
Test Data – Occupied Bandwidth

Downlink
EDGE - Input



Ref Lvl
-30 dBm

RBW	3 kHz	RF Att	0 dB
VBW	3 kHz		
SWT	280 ms	Unit	dBm



Date: 28.JAN.2010 10:49:23

EQUIPMENT: MR1918

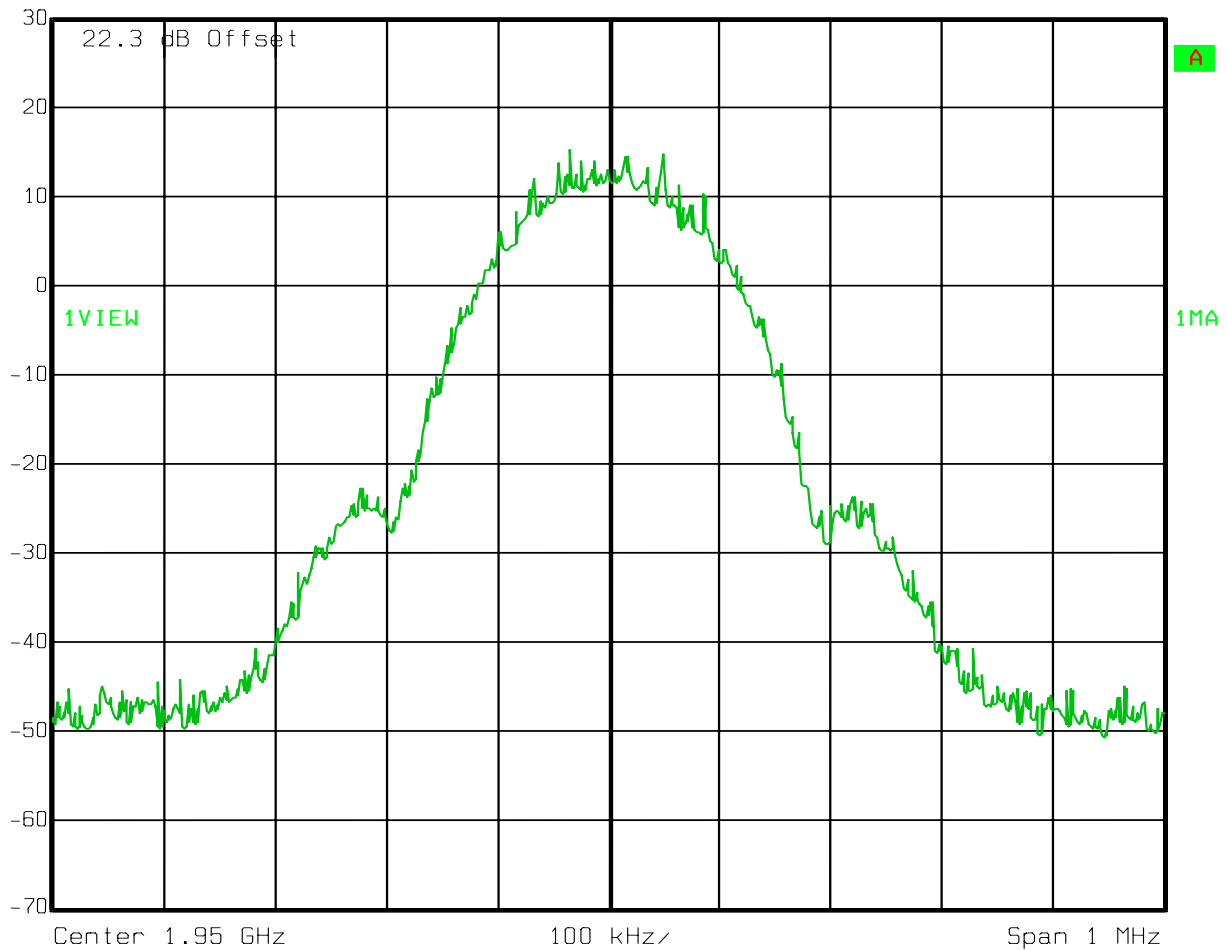
Test Data – Occupied Bandwidth

Downlink
GSM - Output



Ref Lvl
30 dBm

RBW	3 kHz	RF Att	20 dB
VBW	3 kHz	Mixer	-10 dBm
SWT	280 ms	Unit	dBm



Date: 28.JAN.2010 10:35:32

EQUIPMENT: MR1918

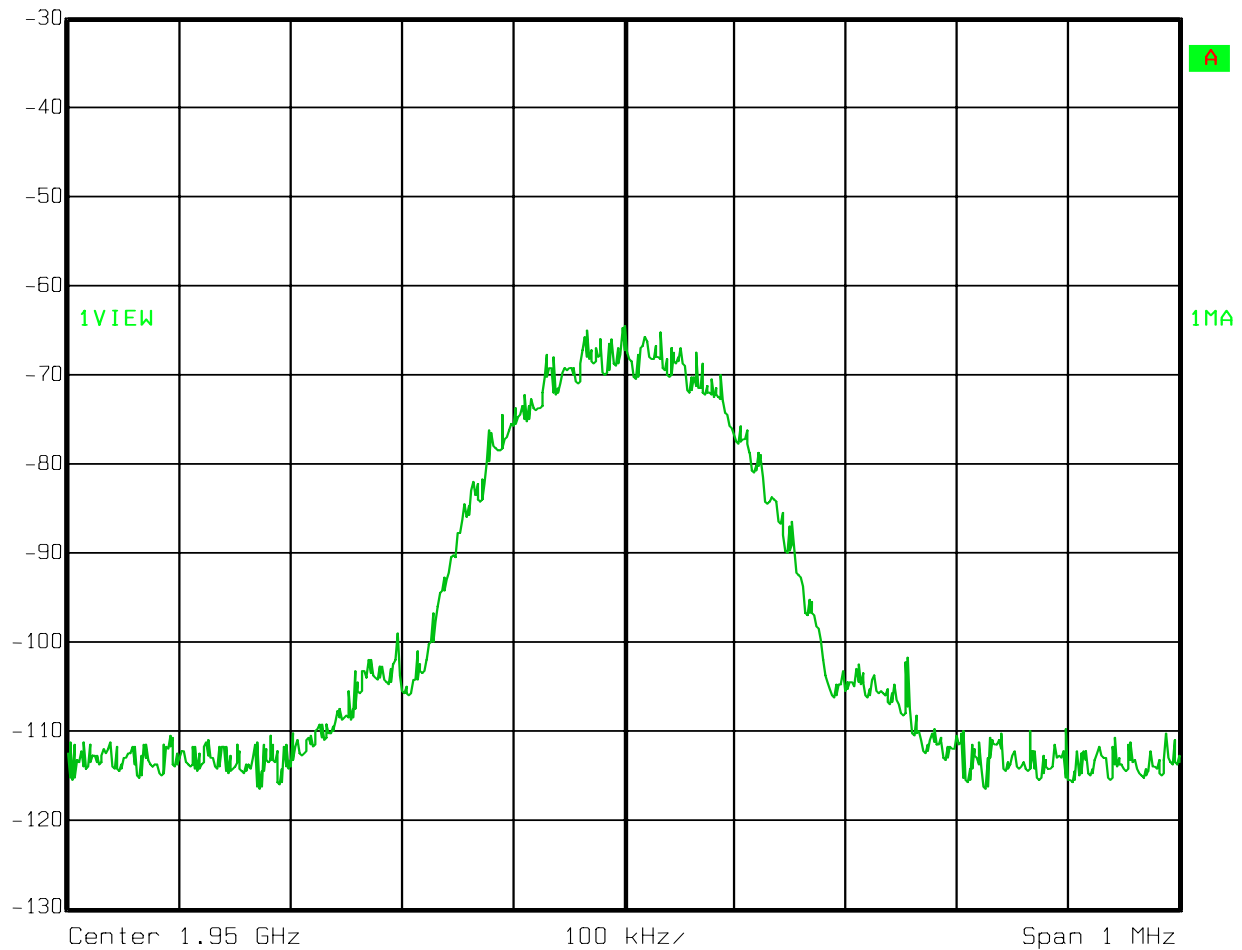
Test Data – Occupied Bandwidth

Downlink
GSM - Input



Ref Lvl
-30 dBm

RBW	3 kHz	RF Att	0 dB
VBW	3 kHz		
SWT	280 ms	Unit	dBm



Date: 28.JAN.2010 10:50:57

EQUIPMENT: MR1918

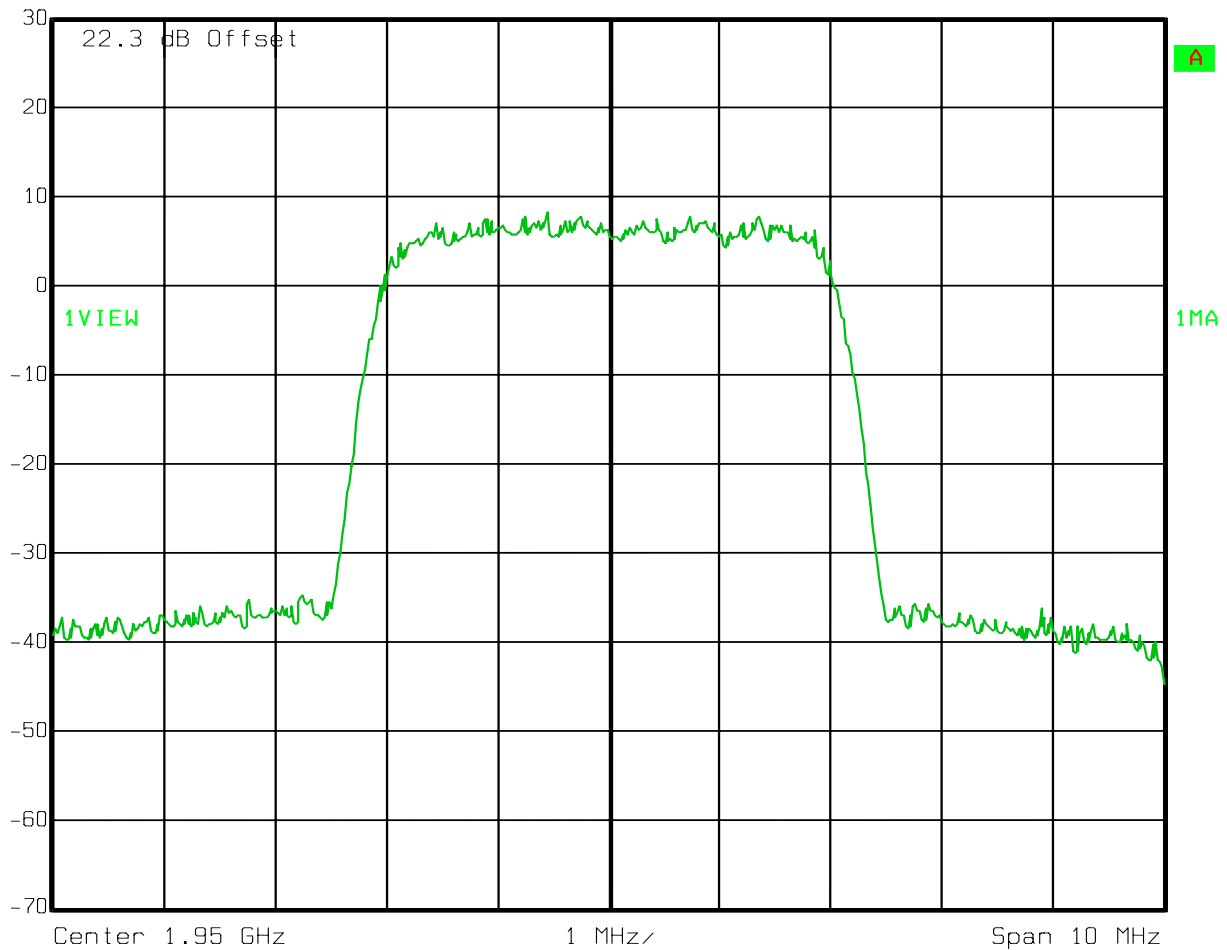
Test Data – Occupied Bandwidth

Downlink
W-CDMA - Output



Ref Lvl
30 dBm

RBW	50 kHz	RF Att	20 dB
VBW	50 kHz	Mixer	-10 dBm
SWT	10 ms	Unit	dBm



Date: 28.JAN.2010 10:37:43

EQUIPMENT: MR1918

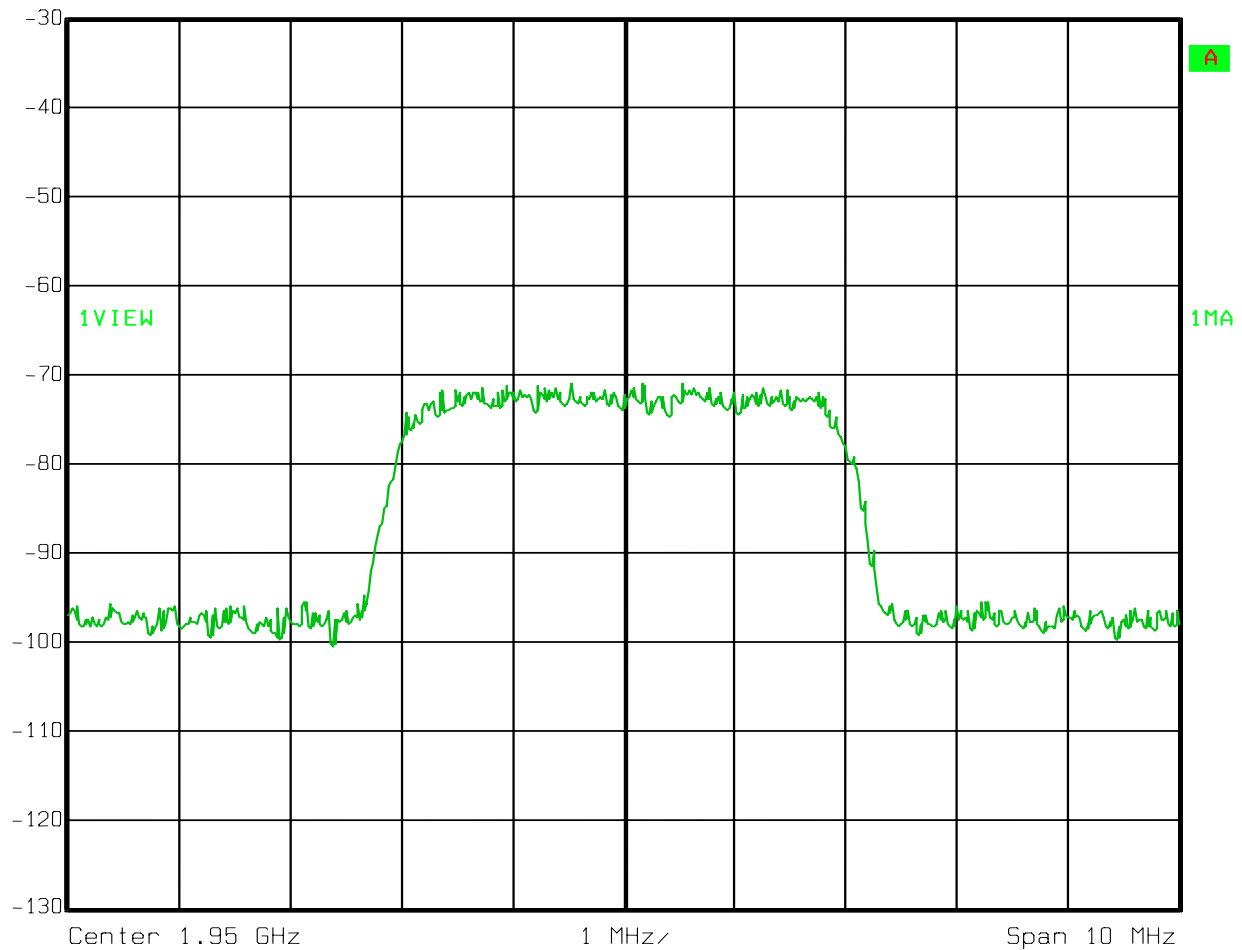
Test Data – Occupied Bandwidth

Downlink
W-CDMA - Input



Ref Lvl
-30 dBm

RBW	50 kHz	RF Att	0 dB
VBW	50 kHz		
SWT	10 ms	Unit	dBm



Date: 28.JAN.2010 10:51:32

EQUIPMENT: MR1918

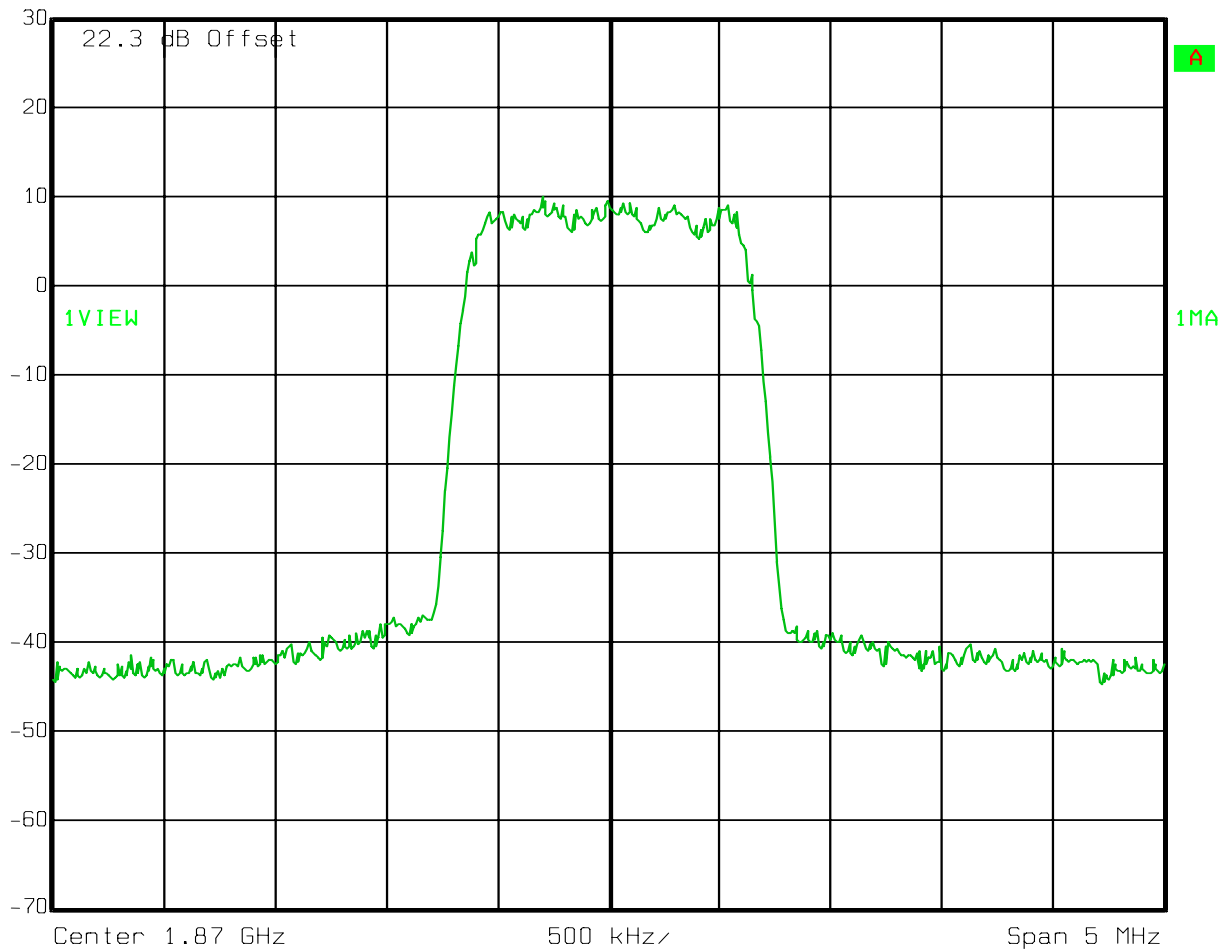
Test Data – Occupied Bandwidth

Uplink
CDMA - Output



Ref Lvl
30 dBm

RBW	30 kHz	RF Att	20 dB
VBW	30 kHz	Mixer	-10 dBm
SWT	14 ms	Unit	dBm



Date: 28.JAN.2010 10:28:47

EQUIPMENT: MR1918

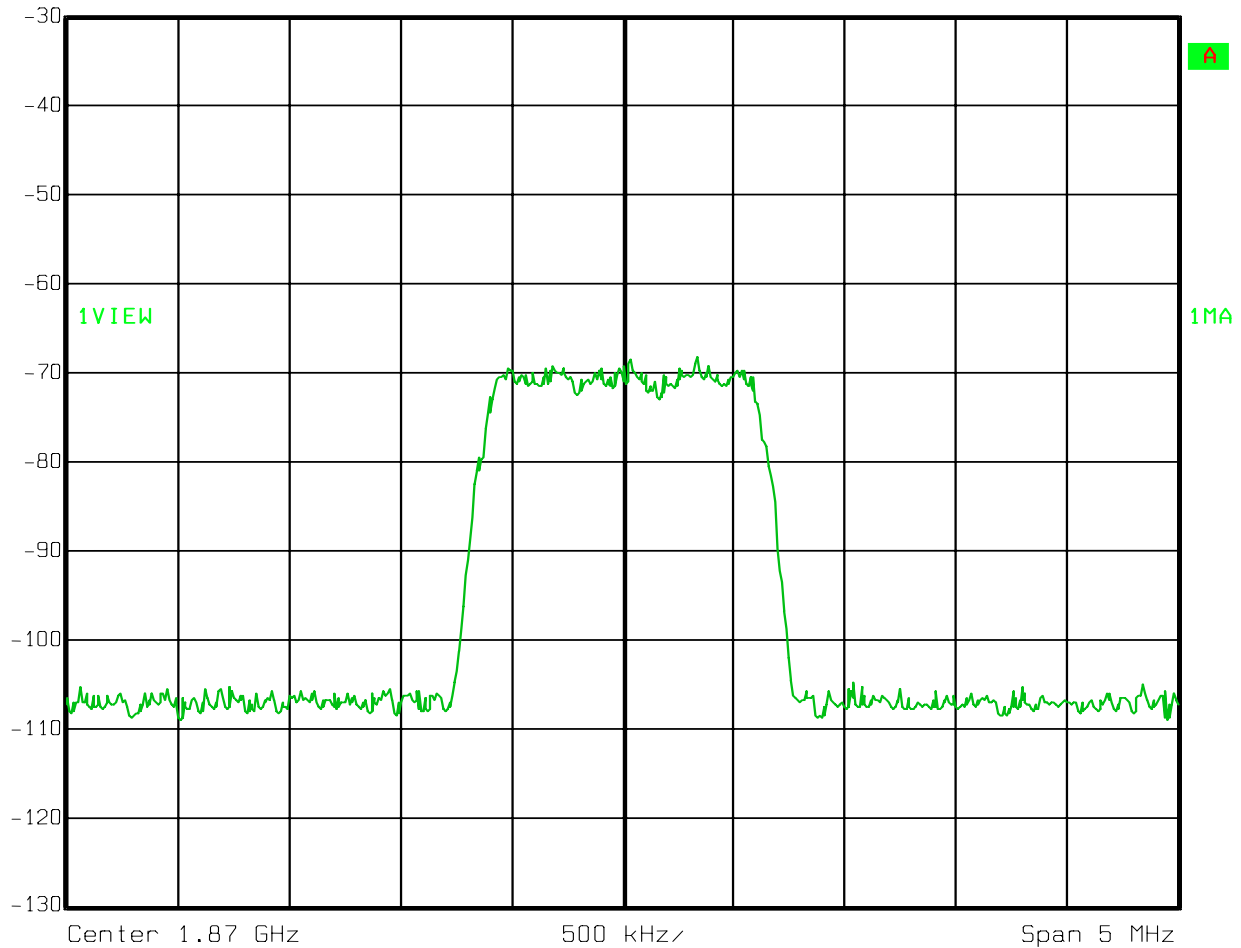
Test Data – Occupied Bandwidth

Uplink
CDMA - Input



Ref Lvl
-30 dBm

RBW	30 kHz	RF Att	0 dB
VBW	30 kHz		
SWT	14 ms	Unit	dBm



Date: 28.JAN.2010 10:48:09

EQUIPMENT: MR1918

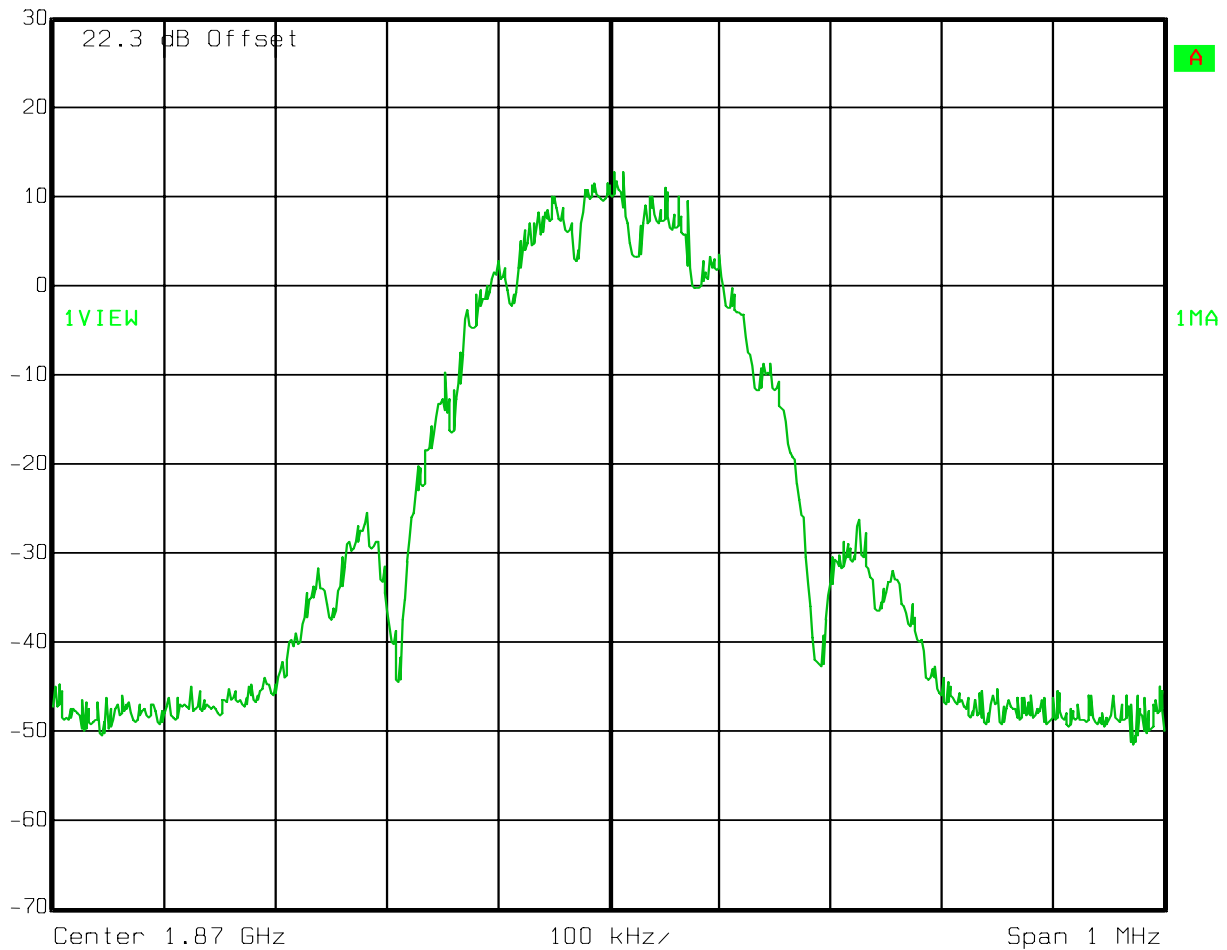
Test Data – Occupied Bandwidth

Uplink
EDGE - Output



Ref Lvl
30 dBm

RBW	3 kHz	RF Att	20 dB
VBW	3 kHz	Mixer	-10 dBm
SWT	280 ms	Unit	dBm



Date: 28.JAN.2010 10:30:04

EQUIPMENT: MR1918

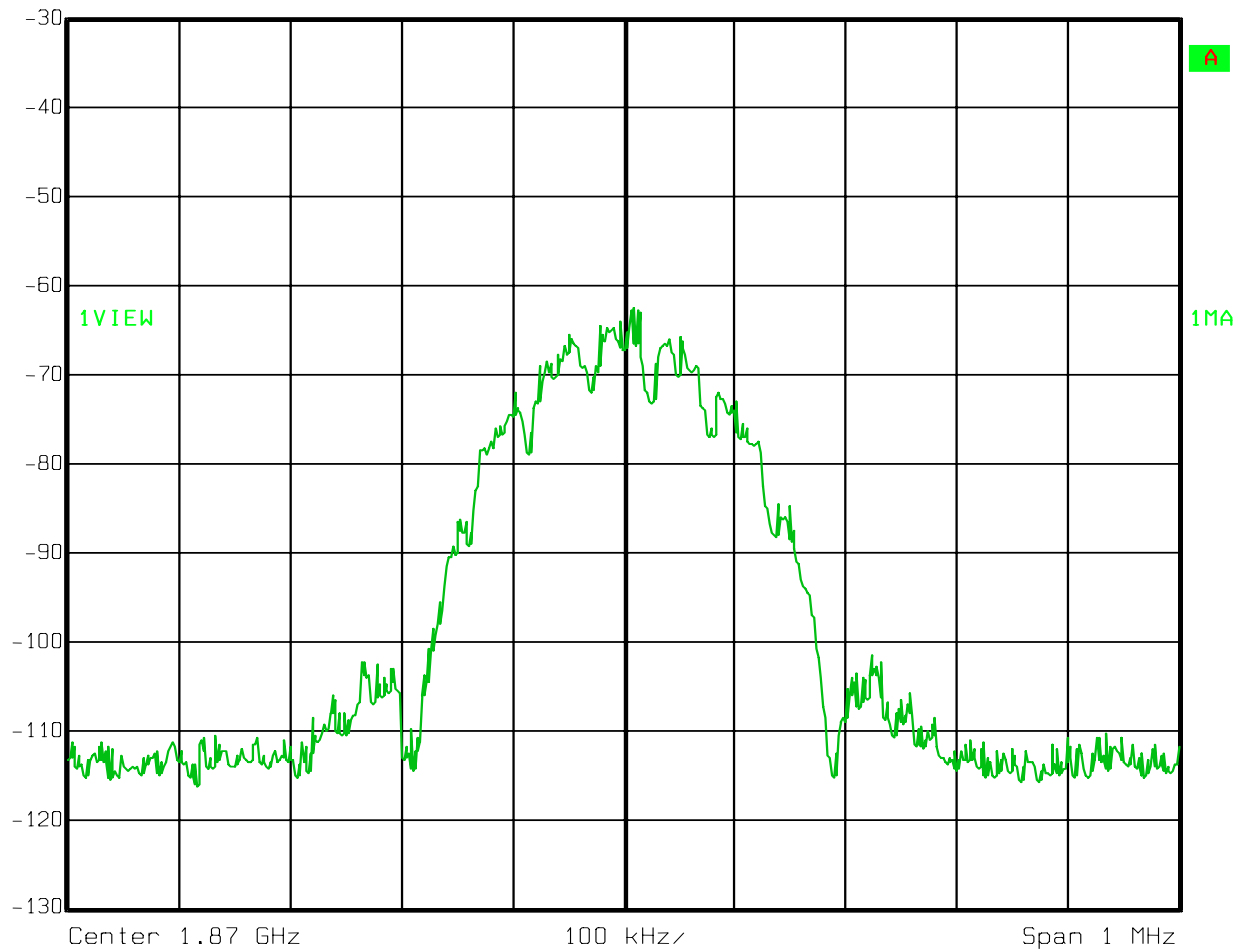
Test Data – Occupied Bandwidth

Uplink
EDGE - Input



Ref Lvl
-30 dBm

RBW	3 kHz	RF Att	0 dB
VBW	3 kHz		
SWT	280 ms	Unit	dBm



Date: 28.JAN.2010 10:49:55

EQUIPMENT: MR1918

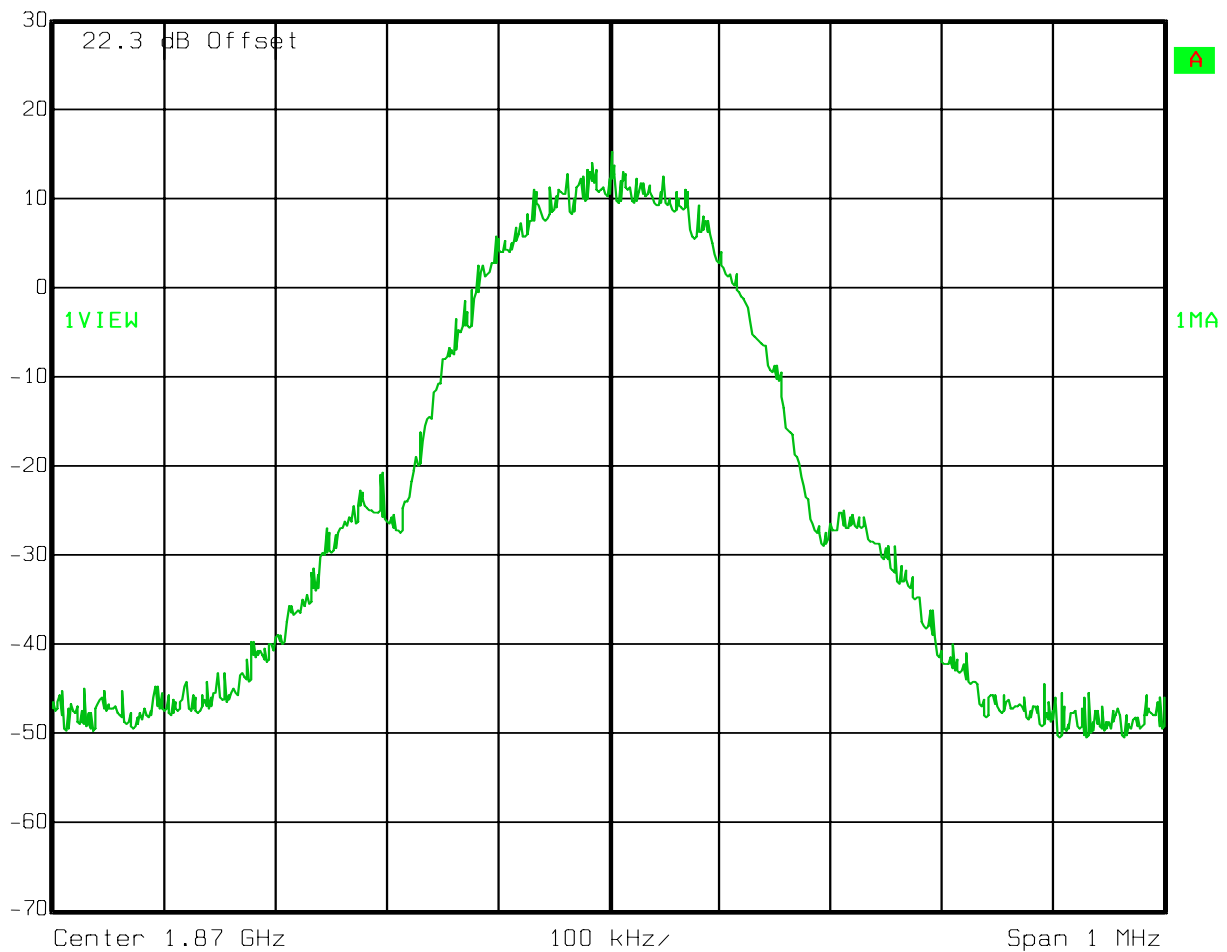
Test Data – Occupied Bandwidth

Uplink
GSM - Output



Ref Lvl
30 dBm

RBW	3 kHz	RF Att	20 dB
VBW	3 kHz	Mixer	-10 dBm
SWT	280 ms	Unit	dBm



Date: 28.JAN.2010 10:30:50

EQUIPMENT: MR1918

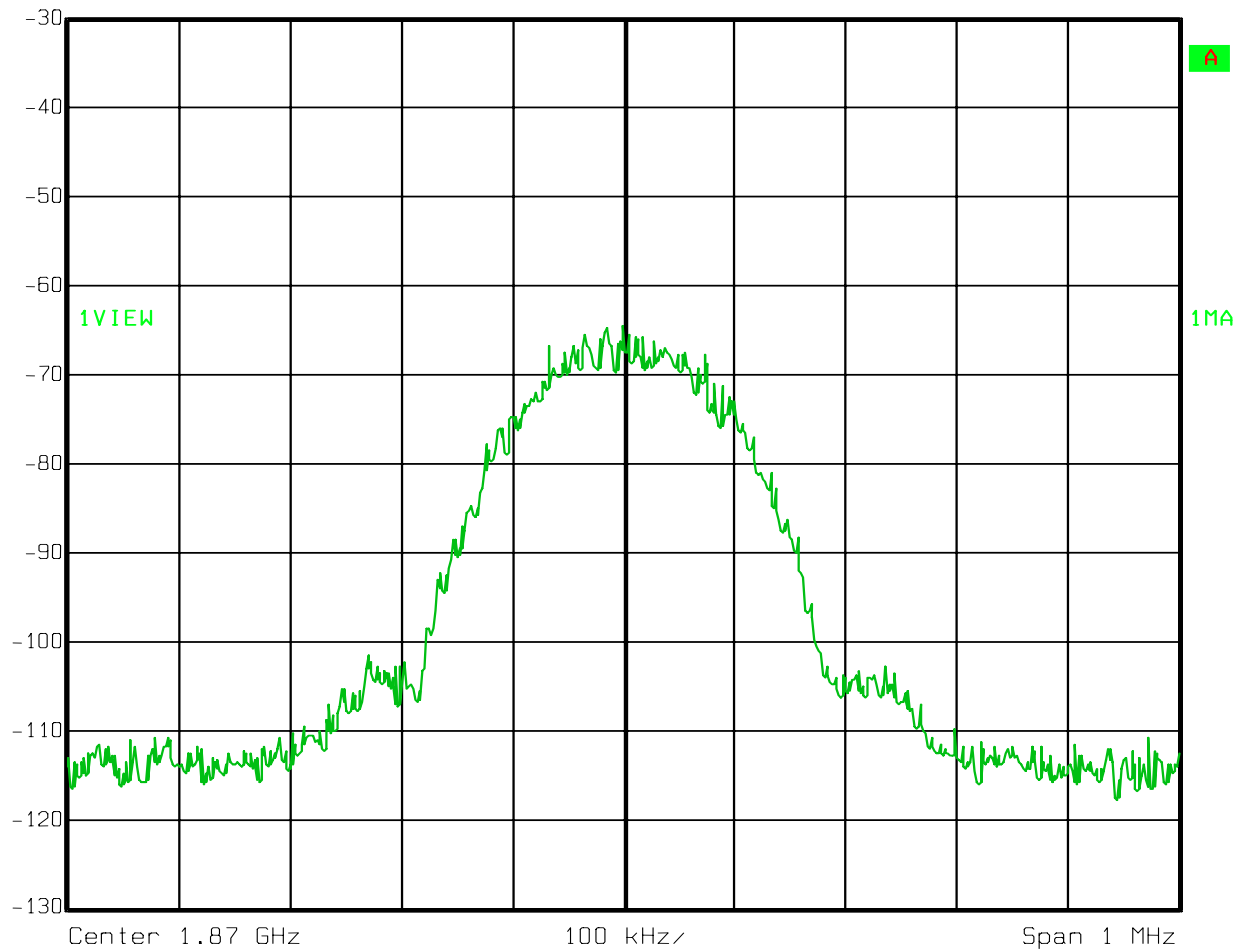
Test Data – Occupied Bandwidth

Uplink
GSM - Input



Ref Lvl
-30 dBm

RBW	3 kHz	RF Att	0 dB
VBW	3 kHz		
SWT	280 ms	Unit	dBm



Date: 28.JAN.2010 10:50:25

EQUIPMENT: MR1918

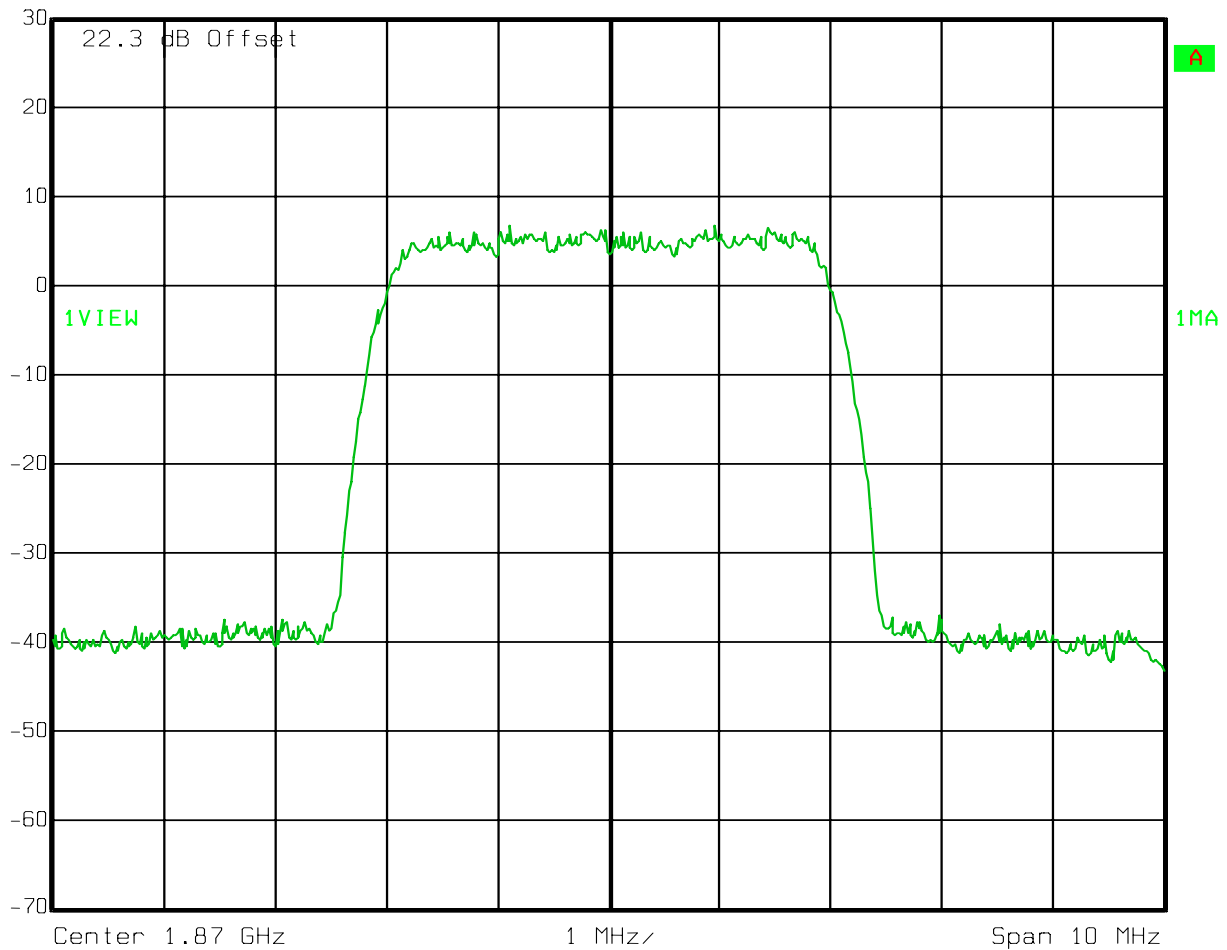
Test Data – Occupied Bandwidth

Uplink
W-CDMA - Output



Ref Lvl
30 dBm

RBW	50 kHz	RF Att	20 dB
VBW	50 kHz	Mixer	-10 dBm
SWT	10 ms	Unit	dBm



Date: 28.JAN.2010 10:39:17

EQUIPMENT: MR1918

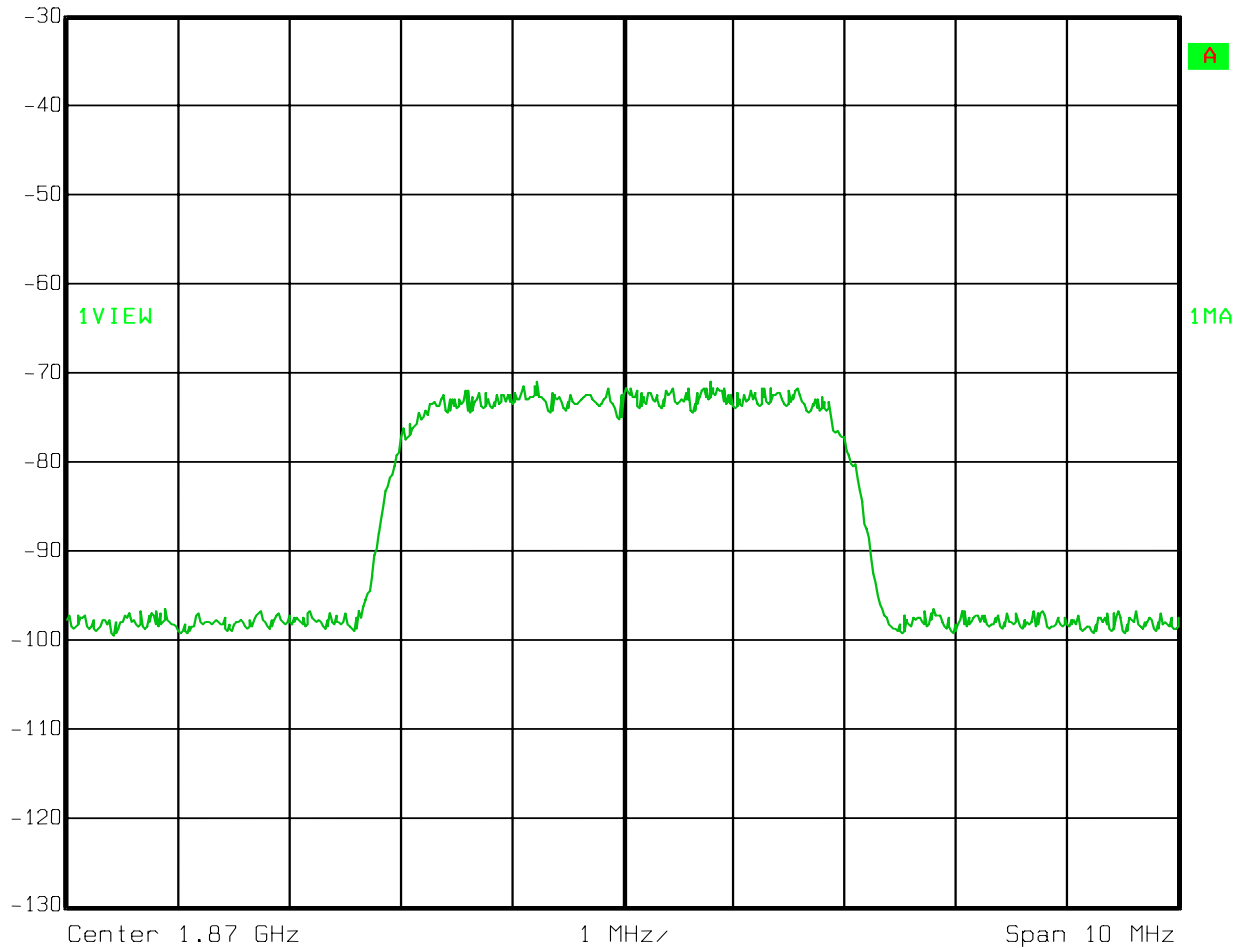
Test Data – Occupied Bandwidth

Uplink
W-CDMA - Input



Ref Lvl
-30 dBm

RBW	50 kHz	RF Att	0 dB
VBW	50 kHz		
SWT	10 ms	Unit	dBm



Date: 28.JAN.2010 10:52:03

Section 4. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 24.238
TESTED BY: David Light	DATE: 28 January 2010

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1036-1472-1082

Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 32 %

EQUIPMENT: MR1918

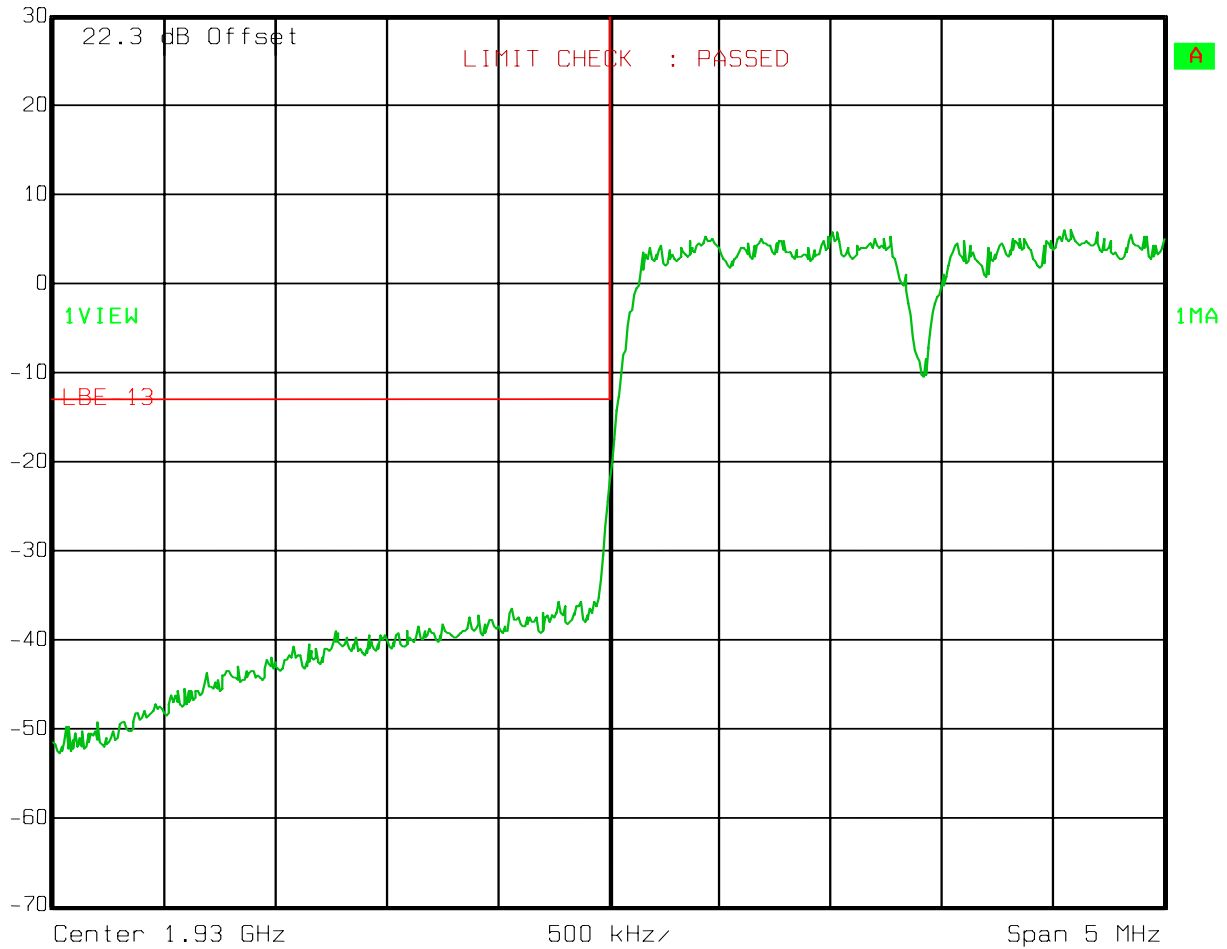
Test Data – Spurious Emissions at Antenna Terminals

Downlink
Lower Bandedge Intermodulation
CDMA



Ref Lvl
30 dBm

RBW	30 kHz	RF Att	20 dB
VBW	30 kHz	Mixer	-10 dBm
SWT	14 ms	Unit	dBm



Date: 28.JAN.2010 11:18:59

EQUIPMENT: MR1918

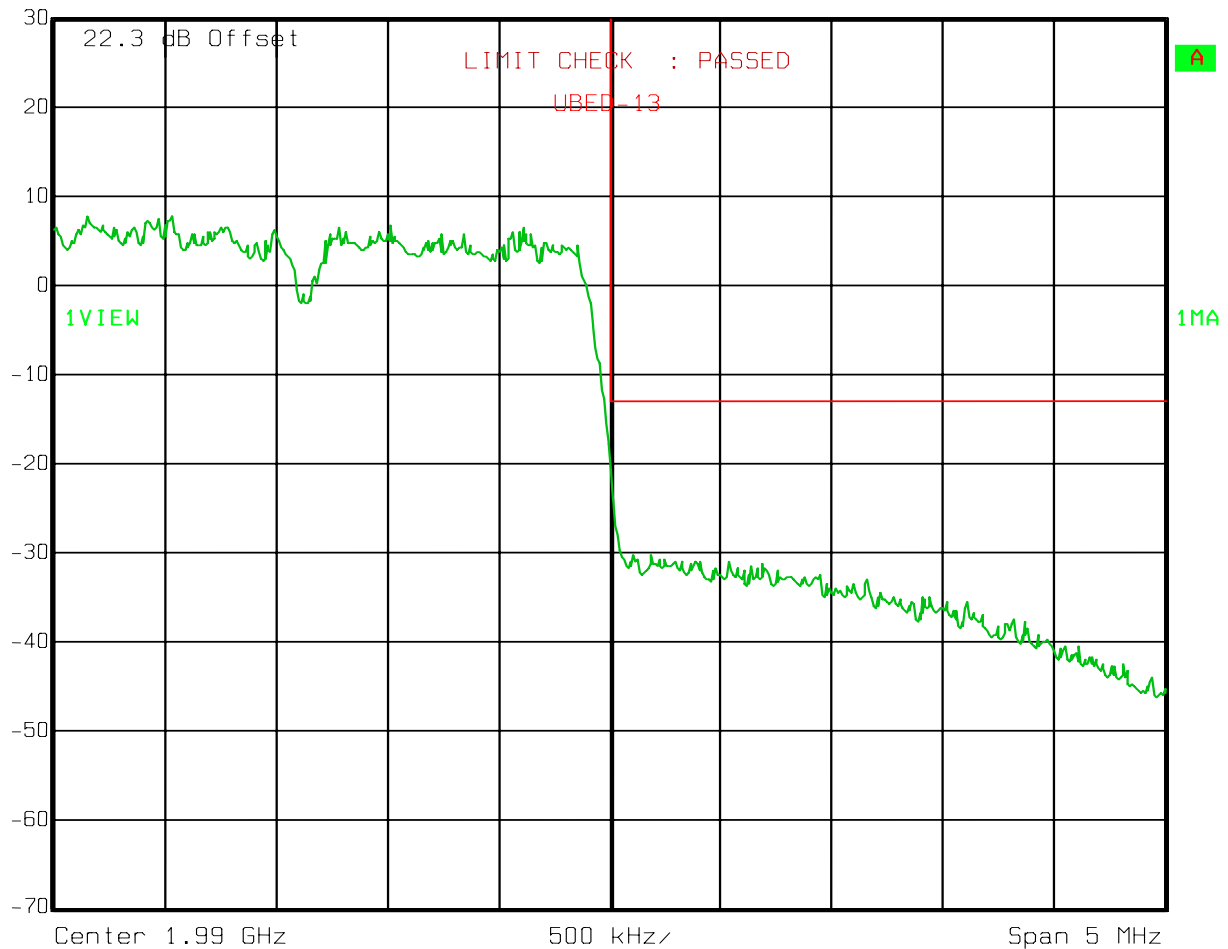
Test Data – Spurious Emissions at Antenna Terminals

Downlink
Upper Bandedge Intermodulation
CDMA



Ref Lvl
30 dBm

RBW	30 kHz	RF Att	20 dB
VBW	30 kHz	Mixer	-10 dBm
SWT	14 ms	Unit	dBm



Date: 28.JAN.2010 11:25:06

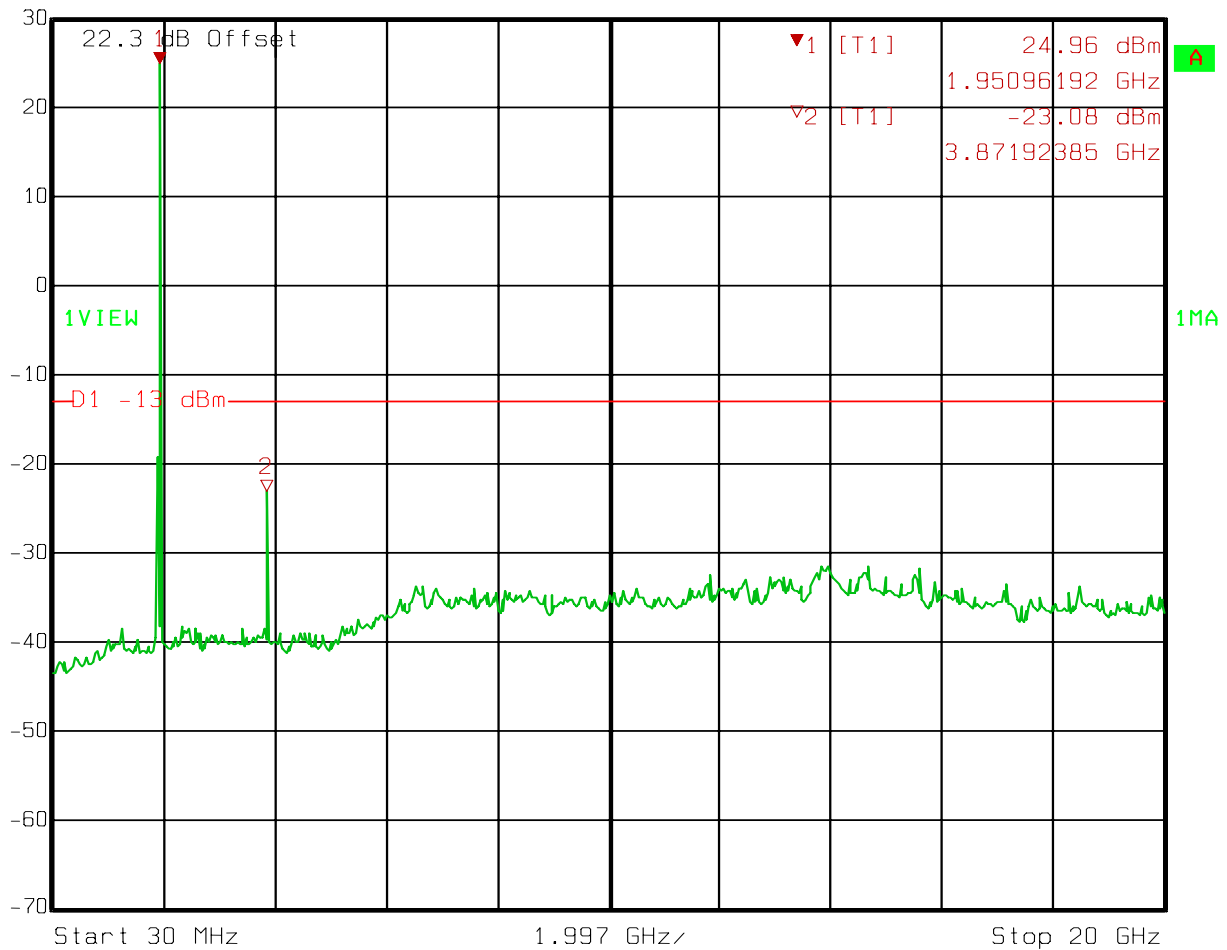
EQUIPMENT: MR1918

Test Data – Spurious Emissions at Antenna Terminals

Downlink
Spurs – CDMA



Ref Lvl	Marker 1 [T1]	RBW	1 MHz	RF Att	20 dB
30 dBm	24.96 dBm	VBW	1 MHz	Mixer	-10 dBm
	1.95096192 GHz	SWT	200 ms	Unit	dBm



Date: 28.JAN.2010 11:19:52

EQUIPMENT: MR1918

Test Data – Spurious Emissions at Antenna Terminals

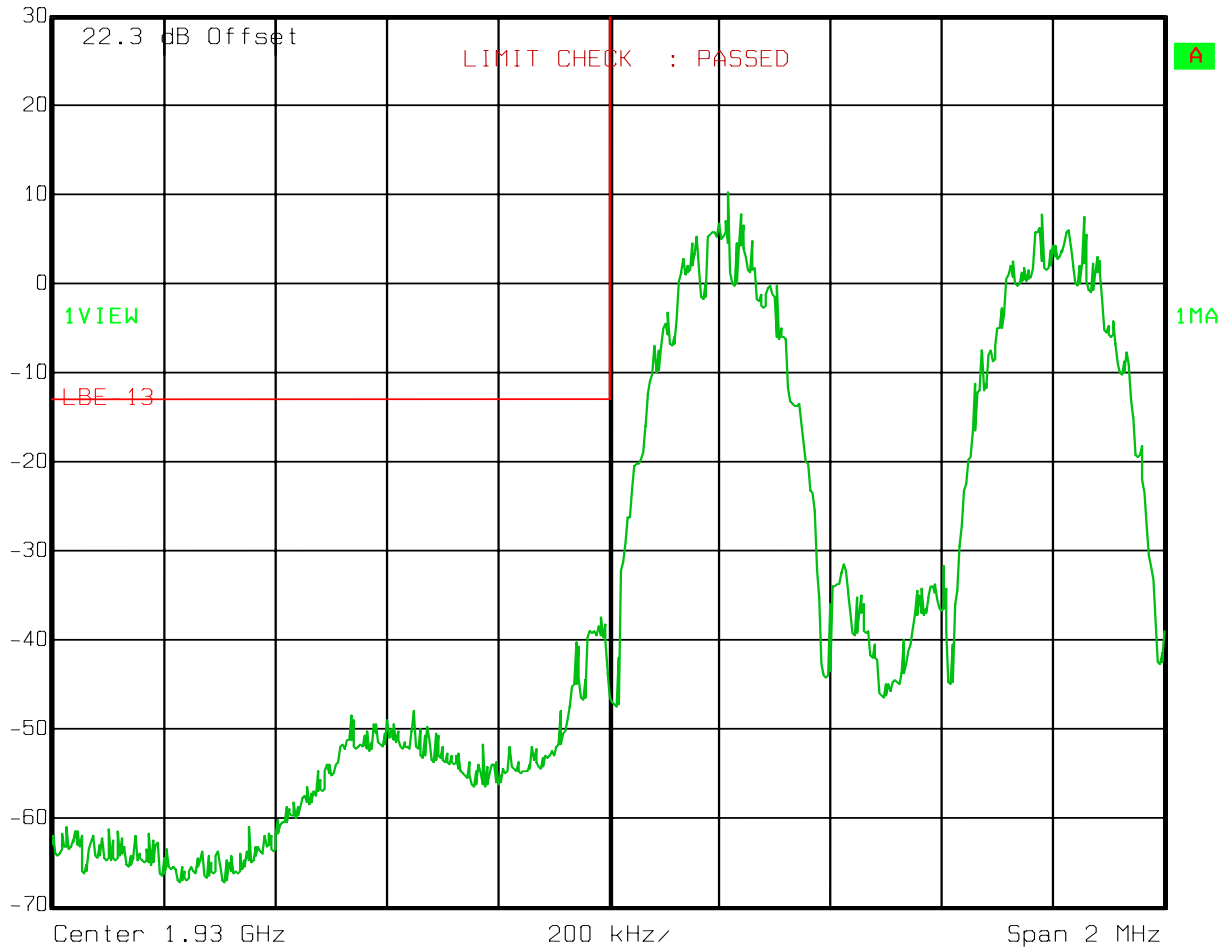
Downlink

Lower Bandedge Intermodulation

EDGE

Ref Lvl
30 dBm

RBW	3 kHz	RF Att	20 dB
VBW	3 kHz	Mixer	-10 dBm
SWT	560 ms	Unit	dBm



Date: 28.JAN.2010 11:17:19

EQUIPMENT: MR1918

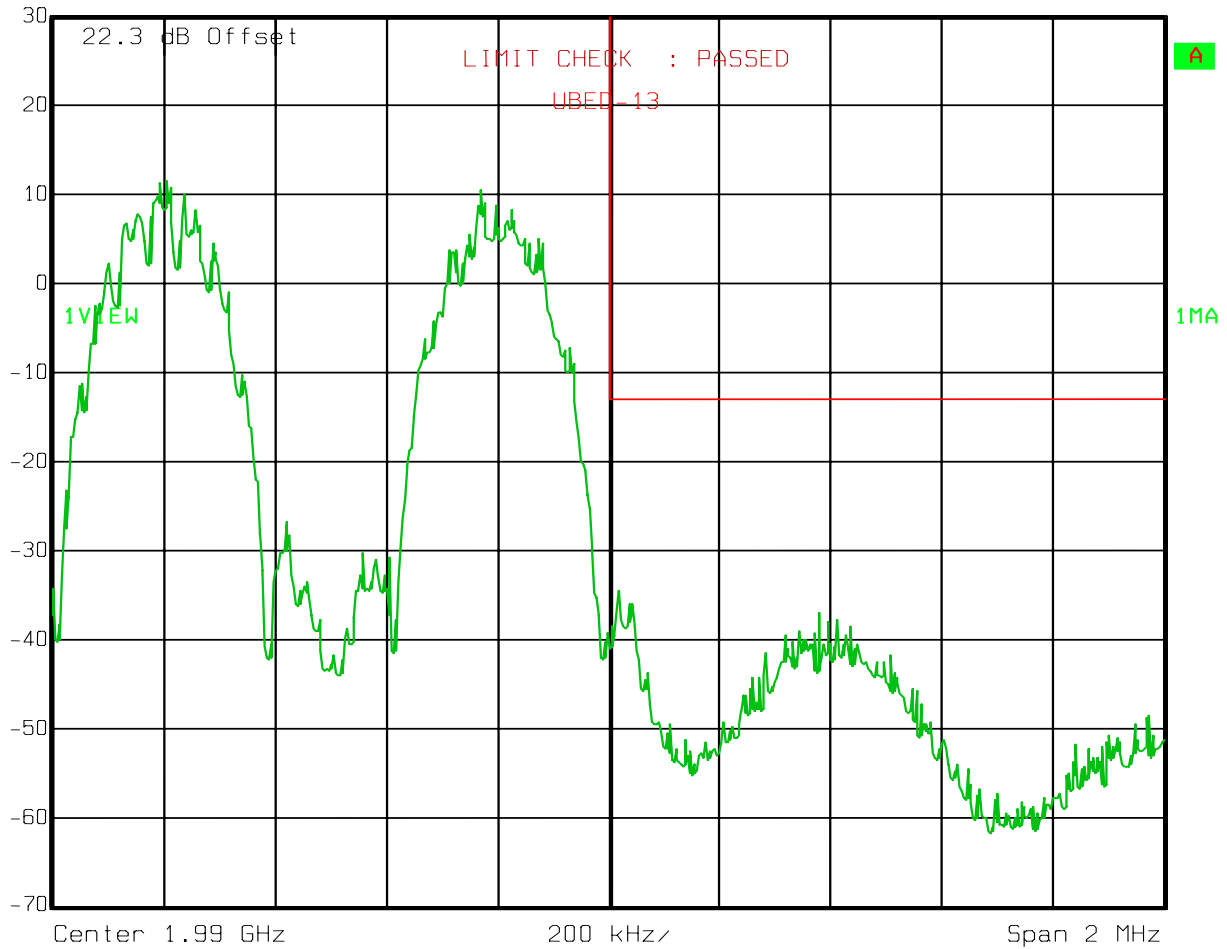
Test Data – Spurious Emissions at Antenna Terminals

Downlink
Upper Bandedge Intermodulation
EDGE



Ref Lvl
30 dBm

RBW	3 kHz	RF Att	20 dB
VBW	3 kHz	Mixer	-10 dBm
SWT	560 ms	Unit	dBm



Date: 28.JAN.2010 11:26:29

PROJECT NO.: 41239RUS1

Downlink
Spurs – EDGE



EQUIPMENT: MR1918

Test Data – Spurious Emissions at Antenna Terminals

Downlink

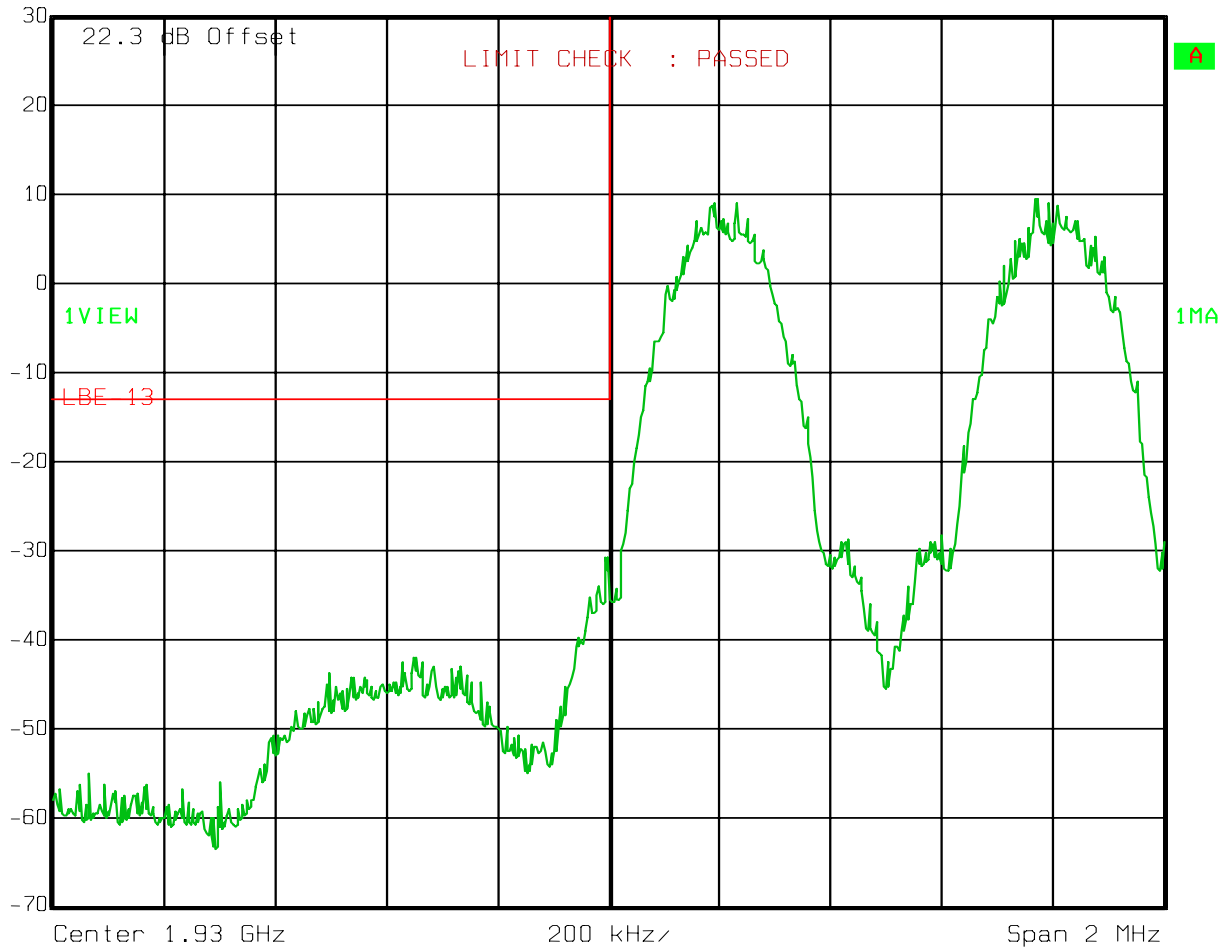
Lower Bandedge Intermodulation

GSM



Ref Lvl
30 dBm

RBW	3 kHz	RF Att	20 dB
VBW	3 kHz	Mixer	-10 dBm
SWT	560 ms	Unit	dBm



Date: 28.JAN.2010 11:13:51

EQUIPMENT: MR1918

Test Data – Spurious Emissions at Antenna Terminals

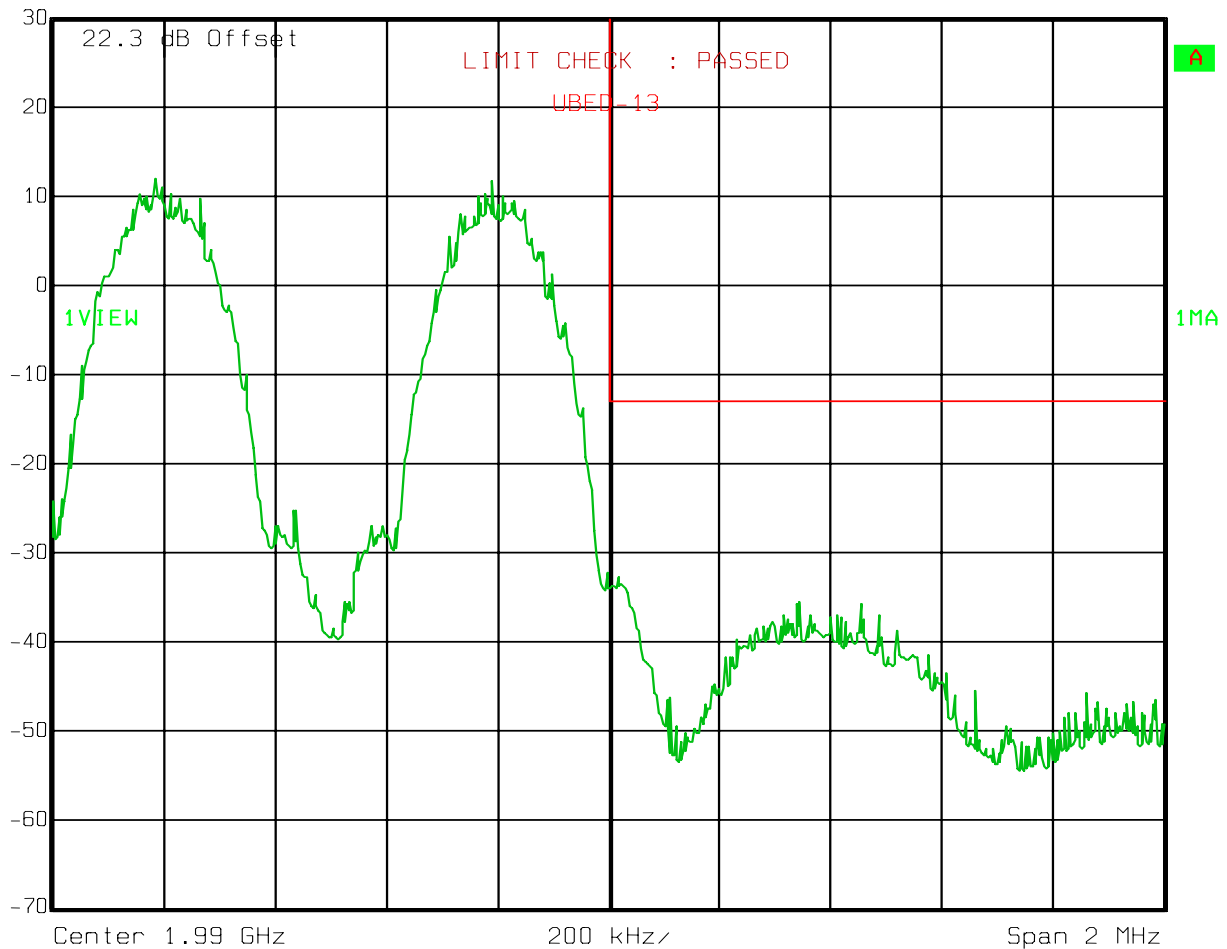
Downlink

Upper Bandedge Intermodulation

GSM

Ref Lvl
30 dBm

RBW	3 kHz	RF Att	20 dB
VBW	3 kHz	Mixer	-10 dBm
SWT	560 ms	Unit	dBm



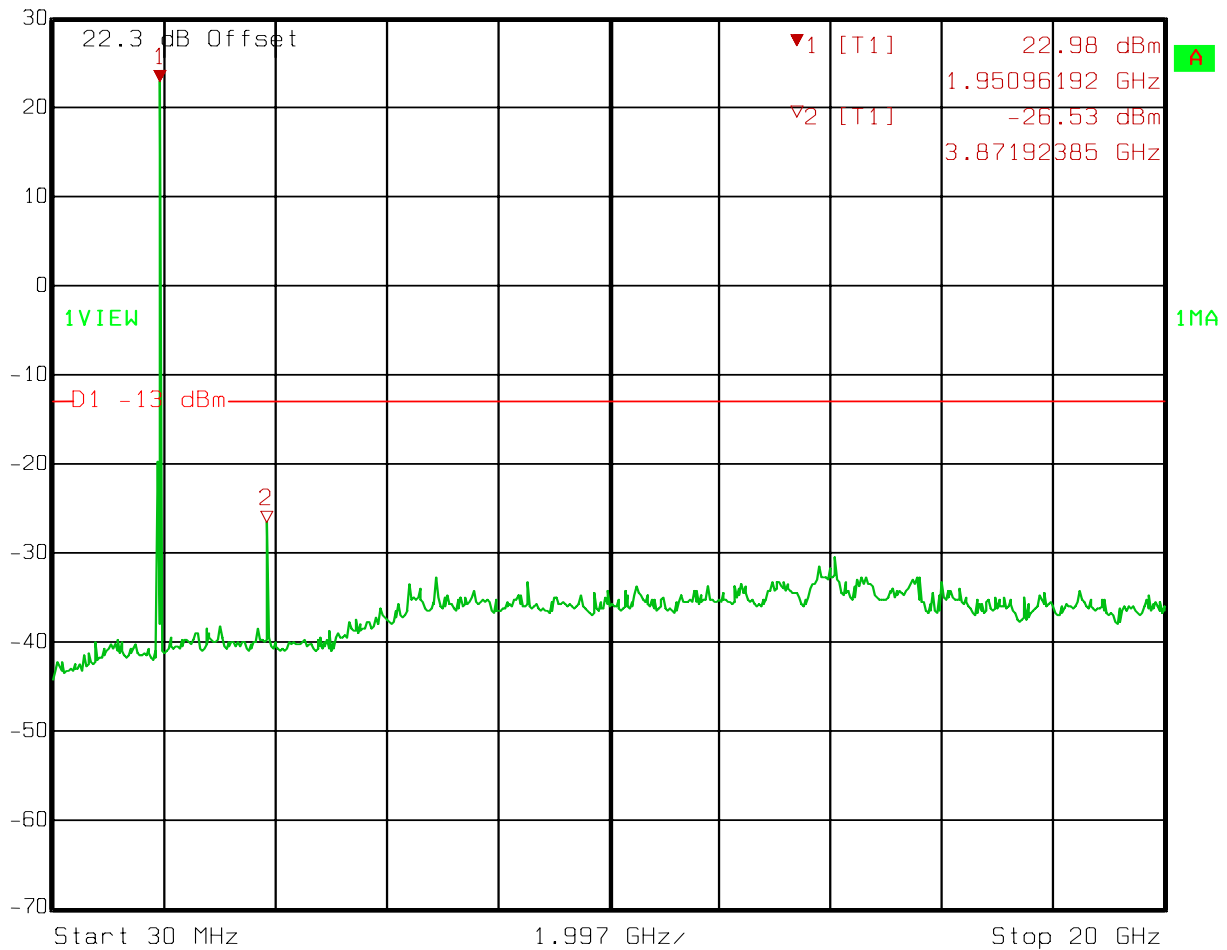
Date: 28.JAN.2010 11:27:14

EQUIPMENT: MR1918

Test Data – Spurious Emissions at Antenna Terminals

Downlink
Spurs – GSM

Ref Lvl	Marker 1 [T1]	RBW	1 MHz	RF Att	20 dB
30 dBm	22.98 dBm	VBW	1 MHz	Mixer	-10 dBm
	1.95096192 GHz	SWT	200 ms	Unit	dBm



Date: 28.JAN.2010 11:15:13

EQUIPMENT: MR1918

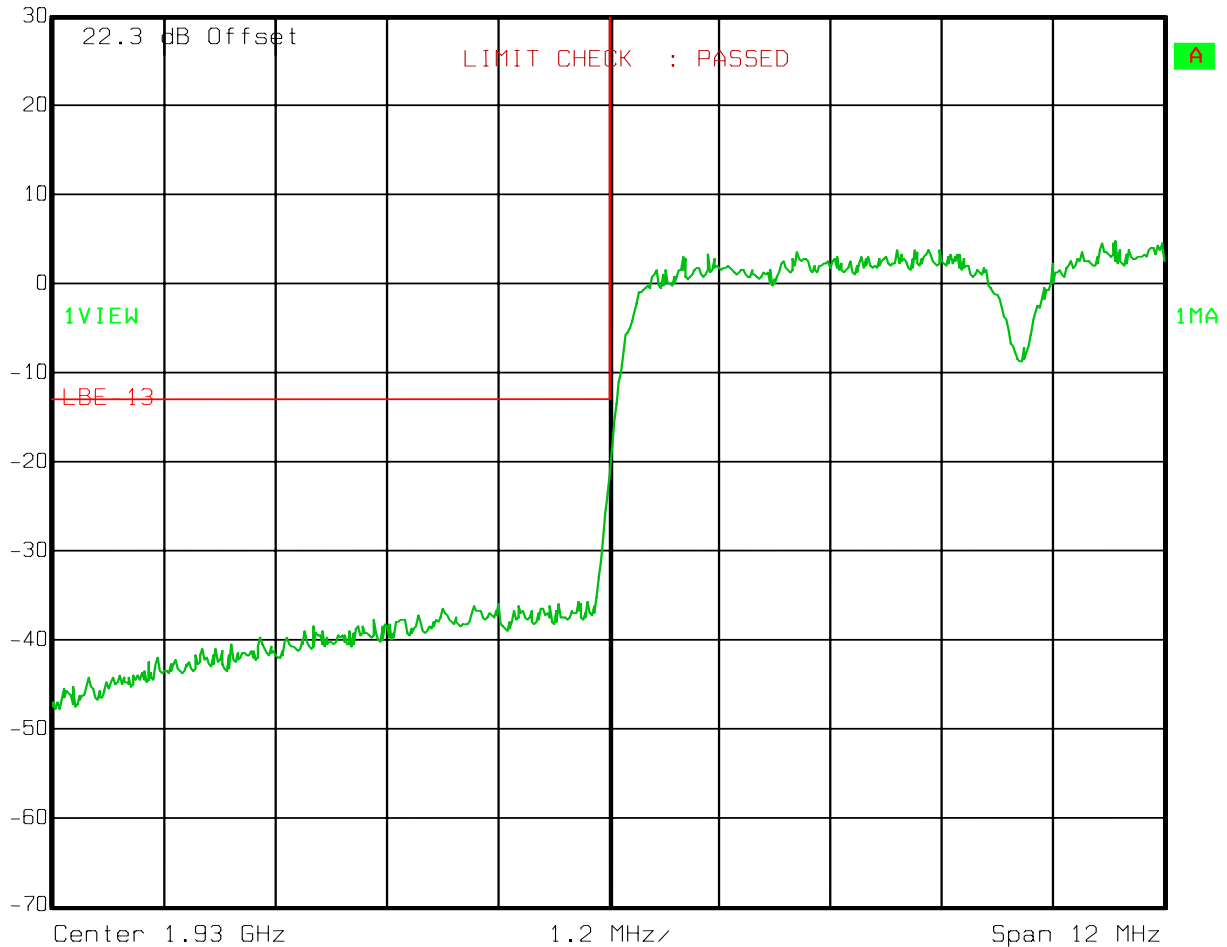
Test Data – Spurious Emissions at Antenna Terminals

Downlink
Lower Bandedge Intermodulation
W-CDMA



Ref Lvl
30 dBm

RBW	50 kHz	RF Att	20 dB
VBW	50 kHz	Mixer	-10 dBm
SWT	12 ms	Unit	dBm



Date: 28.JAN.2010 11:12:48

EQUIPMENT: MR1918

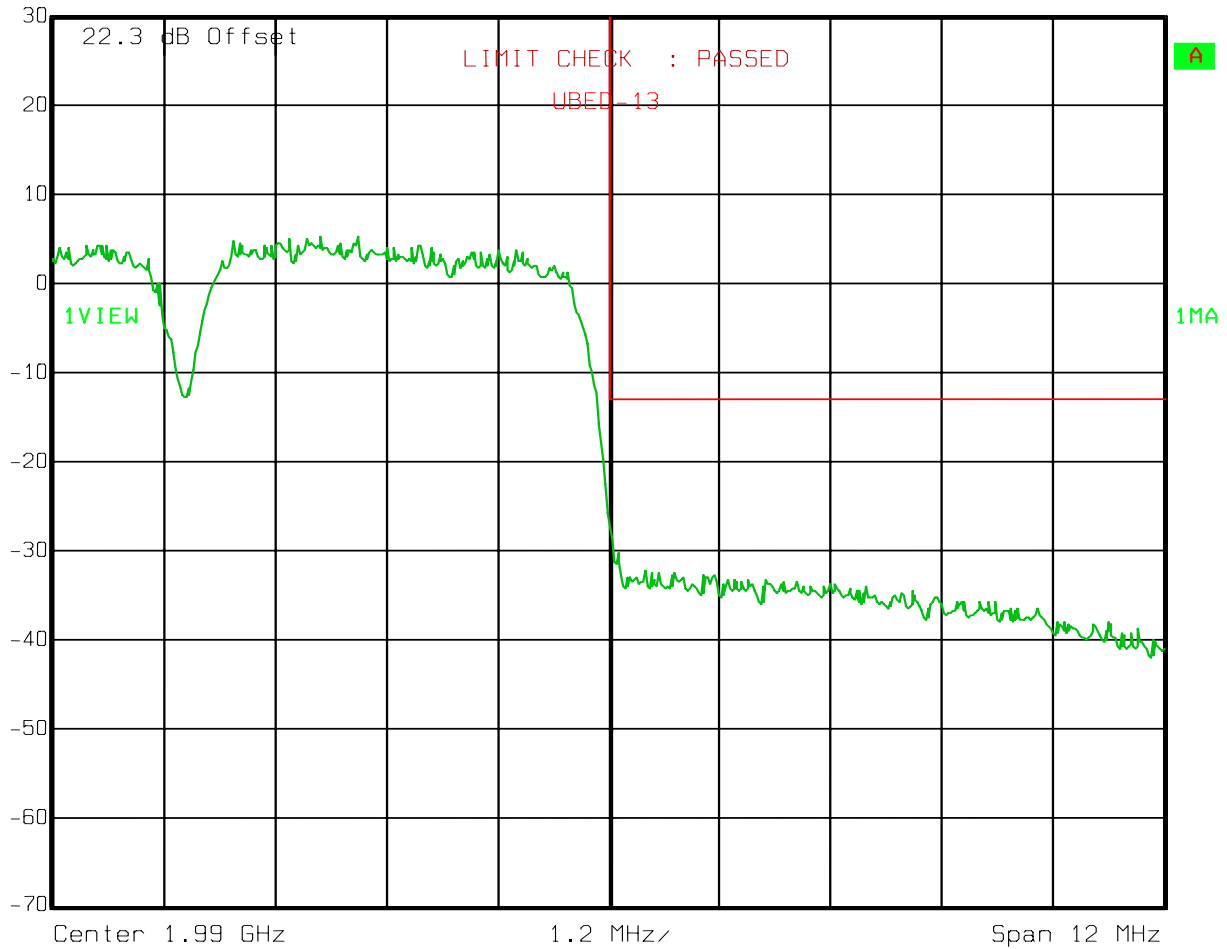
Test Data – Spurious Emissions at Antenna Terminals

Downlink
Upper Bandedge Intermodulation
W-CDMA



Ref Lvl
30 dBm

RBW	50 kHz	RF Att	20 dB
VBW	50 kHz	Mixer	-10 dBm
SWT	12 ms	Unit	dBm



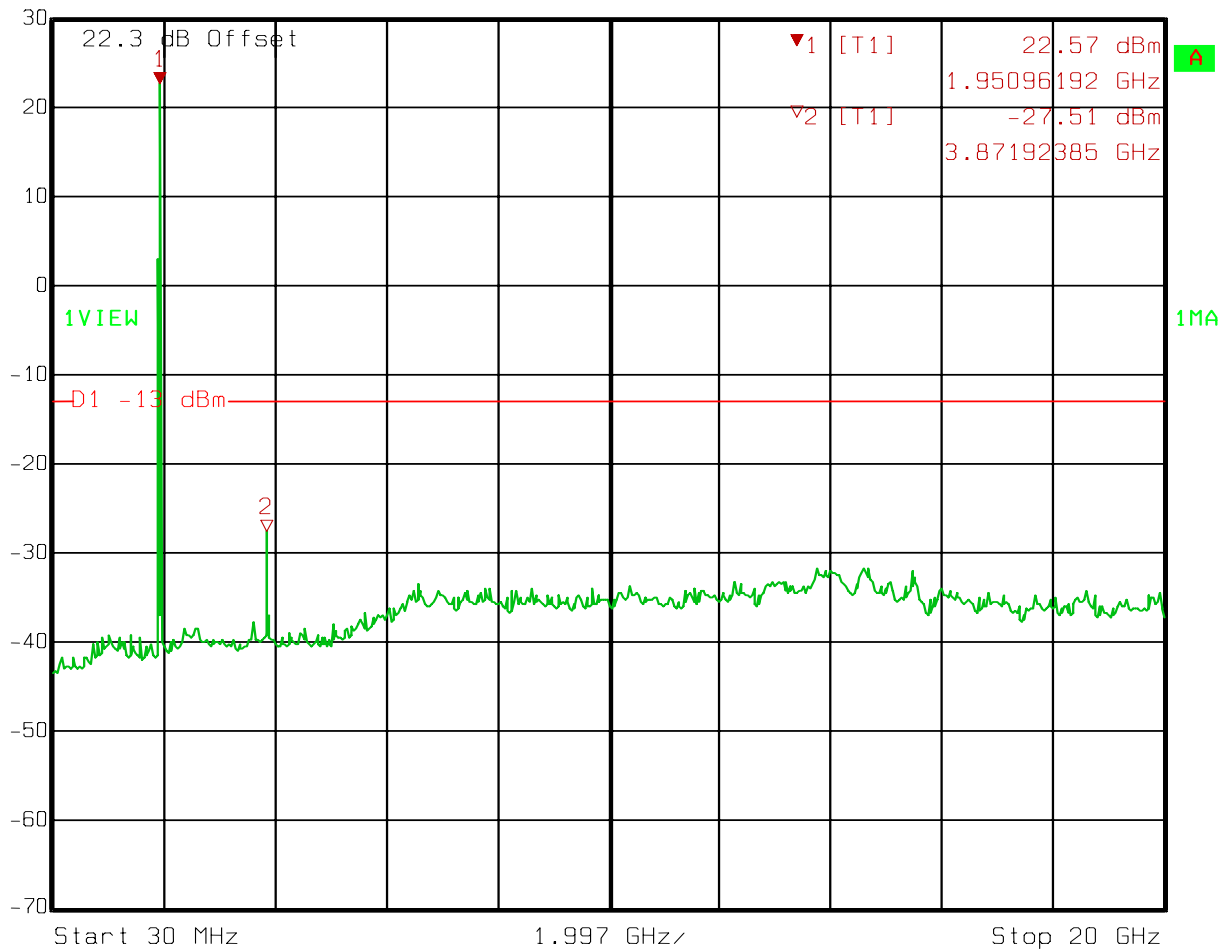
Date: 28.JAN.2010 11:28:29

EQUIPMENT: MR1918

Test Data – Spurious Emissions at Antenna Terminals

Downlink
Spurs – W-CDMA -

Ref Lvl	Marker 1 [T1]	RBW	1 MHz	RF Att	20 dB
30 dBm	22.57 dBm	VBW	1 MHz	Mixer	-10 dBm
	1.95096192 GHz	SWT	200 ms	Unit	dBm



Date: 28.JAN.2010 11:11:15

EQUIPMENT: MR1918

Test Data – Spurious Emissions at Antenna Terminals

Uplink

Lower Bandedge Intermodulation

CDMA

Ref Lvl
30 dBm

RBW	30 kHz	RF Att	20 dB
VBW	30 kHz	Mixer	-10 dBm
SWT	14 ms	Unit	dBm



Date: 28.JAN.2010 10:57:54

EQUIPMENT: MR1918

Test Data – Spurious Emissions at Antenna Terminals

Uplink
Upper Bandedge Intermodulation
CDMARef Lvl
30 dBm

RBW	30 kHz	RF Att	20 dB
VBW	30 kHz	Mixer	-10 dBm
SWT	14 ms	Unit	dBm



Date: 28.JAN.2010 11:33:42

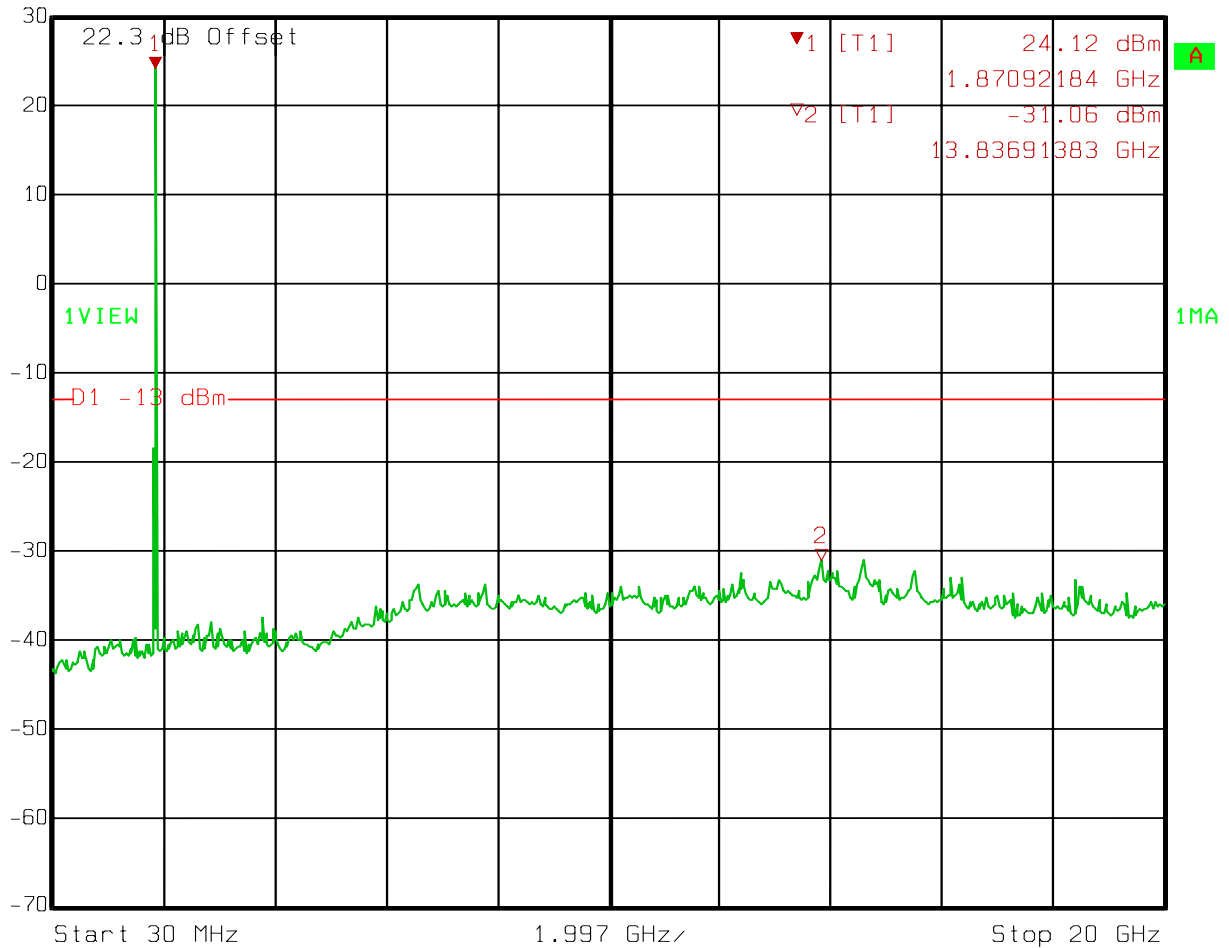
EQUIPMENT: MR1918

Test Data – Spurious Emissions at Antenna Terminals

Uplink
Spurs – CDMA



Ref Lvl	Marker 1 [T1]	RBW	1 MHz	RF Att	20 dB
30 dBm	24.12 dBm	VBW	1 MHz	Mixer	-10 dBm
	1.87092184 GHz	SWT	200 ms	Unit	dBm



Date: 28.JAN.2010 10:59:16

EQUIPMENT: MR1918

Test Data – Spurious Emissions at Antenna Terminals

Uplink

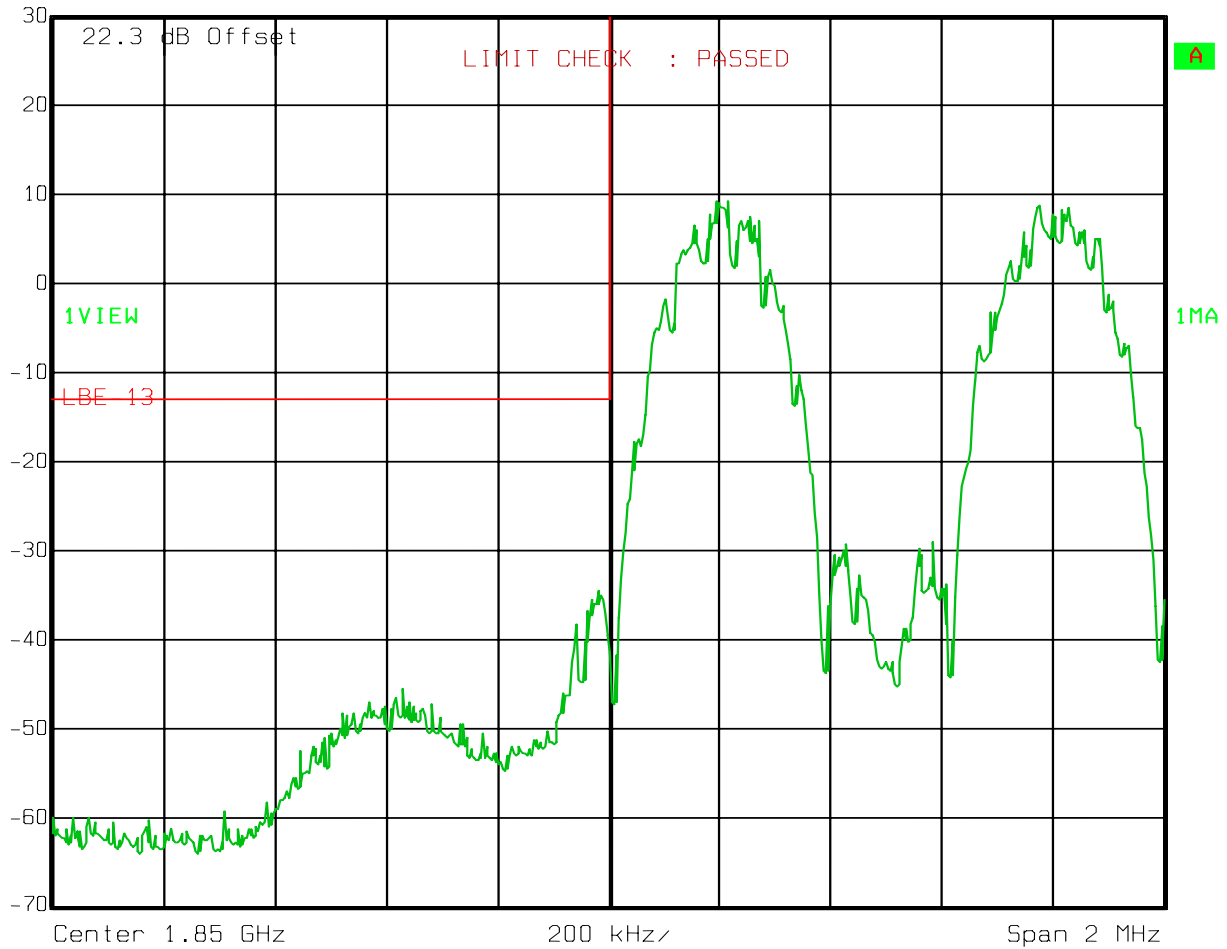
Lower Bandedge Intermodulation

EDGE



Ref Lvl
30 dBm

RBW	3 kHz	RF Att	20 dB
VBW	3 kHz	Mixer	-10 dBm
SWT	560 ms	Unit	dBm



Date: 28.JAN.2010 11:01:23

EQUIPMENT: MR1918

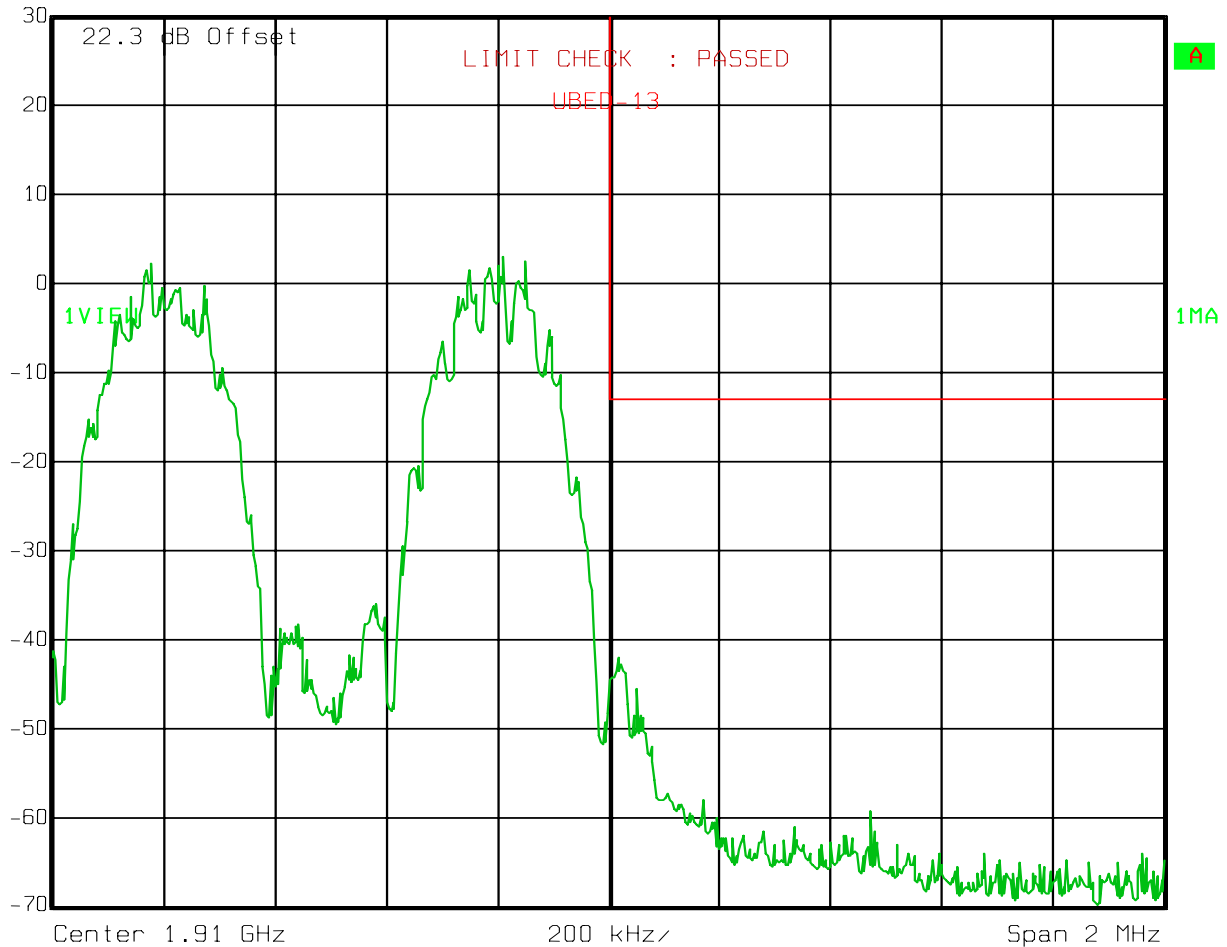
Test Data – Spurious Emissions at Antenna Terminals

Uplink
Upper Bandedge Intermodulation
EDGE



Ref Lvl
30 dBm

RBW	3 kHz	RF Att	20 dB
VBW	3 kHz	Mixer	-10 dBm
SWT	560 ms	Unit	dBm



Date: 28.JAN.2010 11:32:12

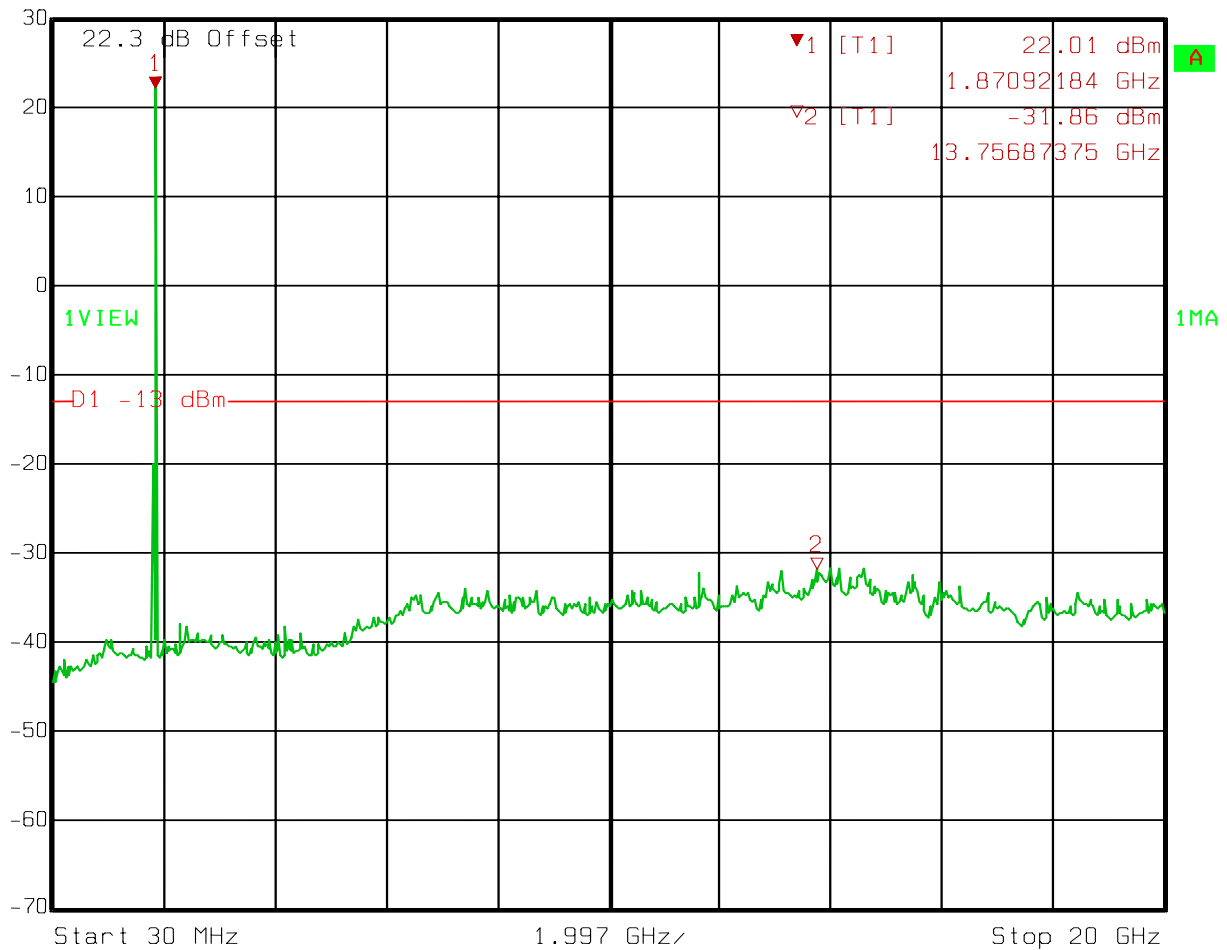
EQUIPMENT: MR1918

Test Data – Spurious Emissions at Antenna Terminals

Uplink
Spurs – EDGE



Ref Lvl	Marker 1 [T1]	RBW	1 MHz	RF Att	20 dB
30 dBm	22.01 dBm	VBW	1 MHz	Mixer	-10 dBm
	1.87092184 GHz	SWT	200 ms	Unit	dBm



Date: 28.JAN.2010 11:02:36

EQUIPMENT: MR1918

Test Data – Spurious Emissions at Antenna Terminals

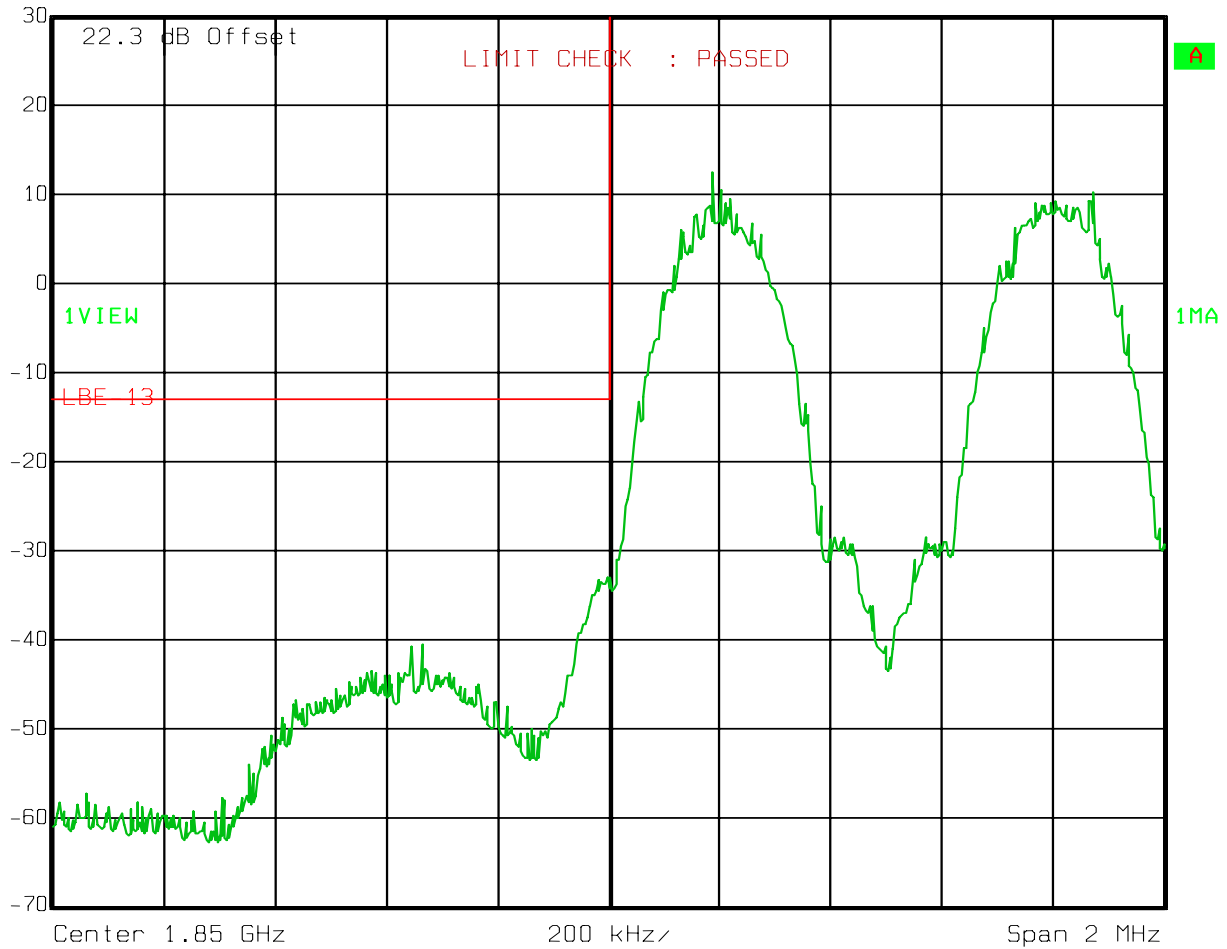
Uplink

Lower Bandedge Intermodulation

GSM

Ref Lvl
30 dBm

RBW	3 kHz	RF Att	20 dB
VBW	3 kHz	Mixer	-10 dBm
SWT	560 ms	Unit	dBm



Date: 28.JAN.2010 11:04:44

EQUIPMENT: MR1918

Test Data – Spurious Emissions at Antenna Terminals

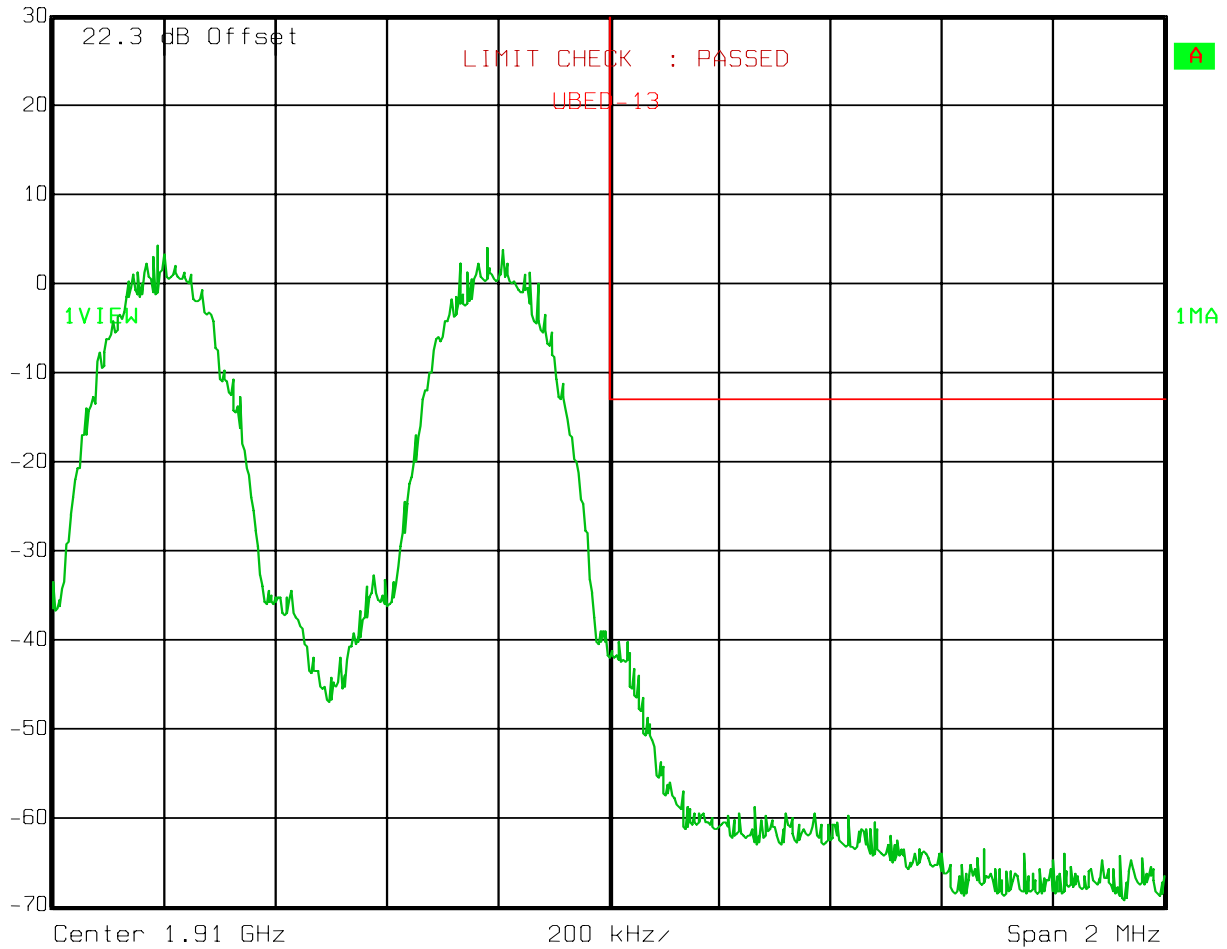
Uplink

Upper Bandedge Intermodulation

GSM

Ref Lvl
30 dBm

RBW	3 kHz	RF Att	20 dB
VBW	3 kHz	Mixer	-10 dBm
SWT	560 ms	Unit	dBm



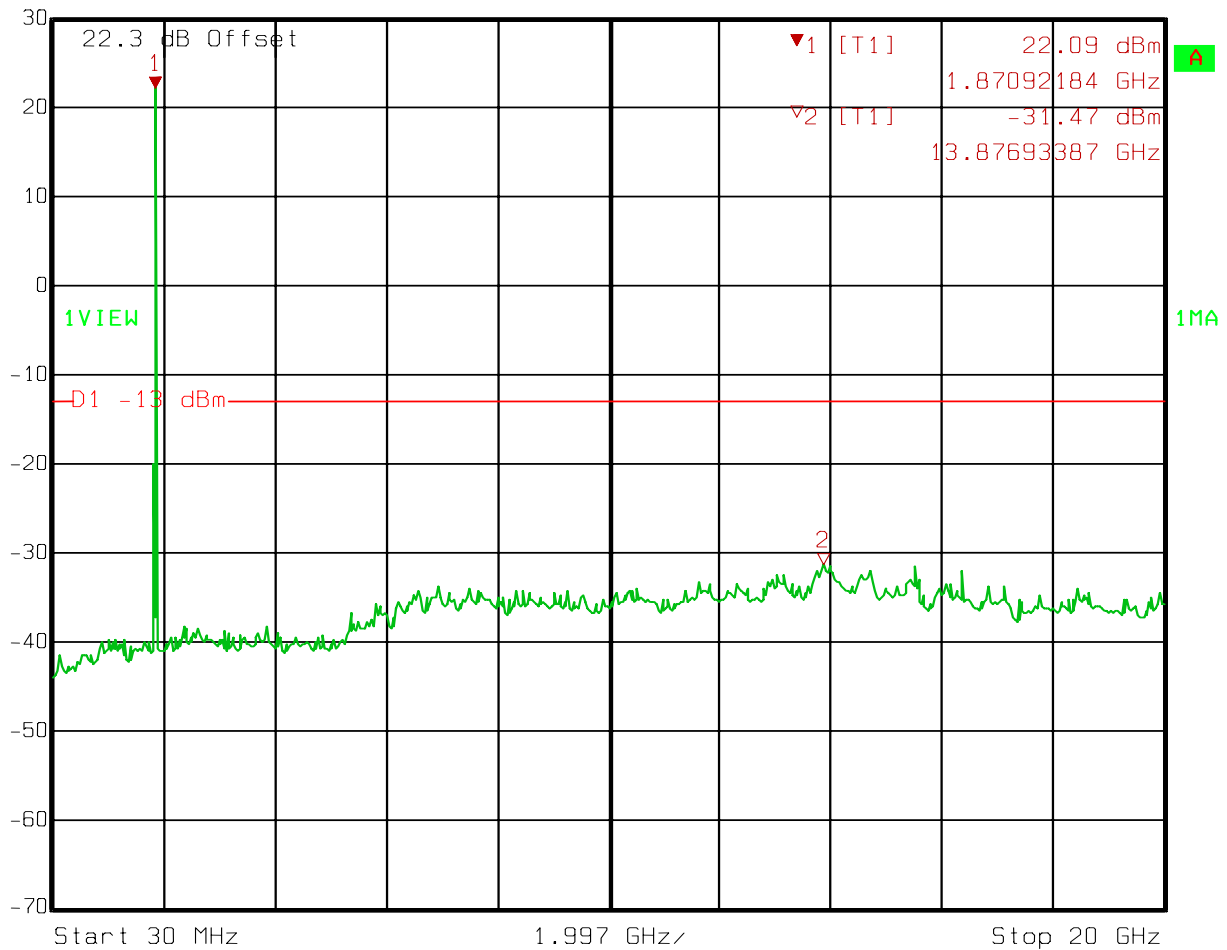
Date: 28.JAN.2010 11:31:16

EQUIPMENT: MR1918

Test Data – Spurious Emissions at Antenna Terminals

Uplink
Spurs – GSM

Ref Lvl	Marker 1 [T1]	RBW	1 MHz	RF Att	20 dB
30 dBm	22.09 dBm	VBW	1 MHz	Mixer	-10 dBm
	1.87092184 GHz	SWT	200 ms	Unit	dBm



Date: 28.JAN.2010 11:03:31

EQUIPMENT: MR1918

Test Data – Spurious Emissions at Antenna Terminals

Uplink

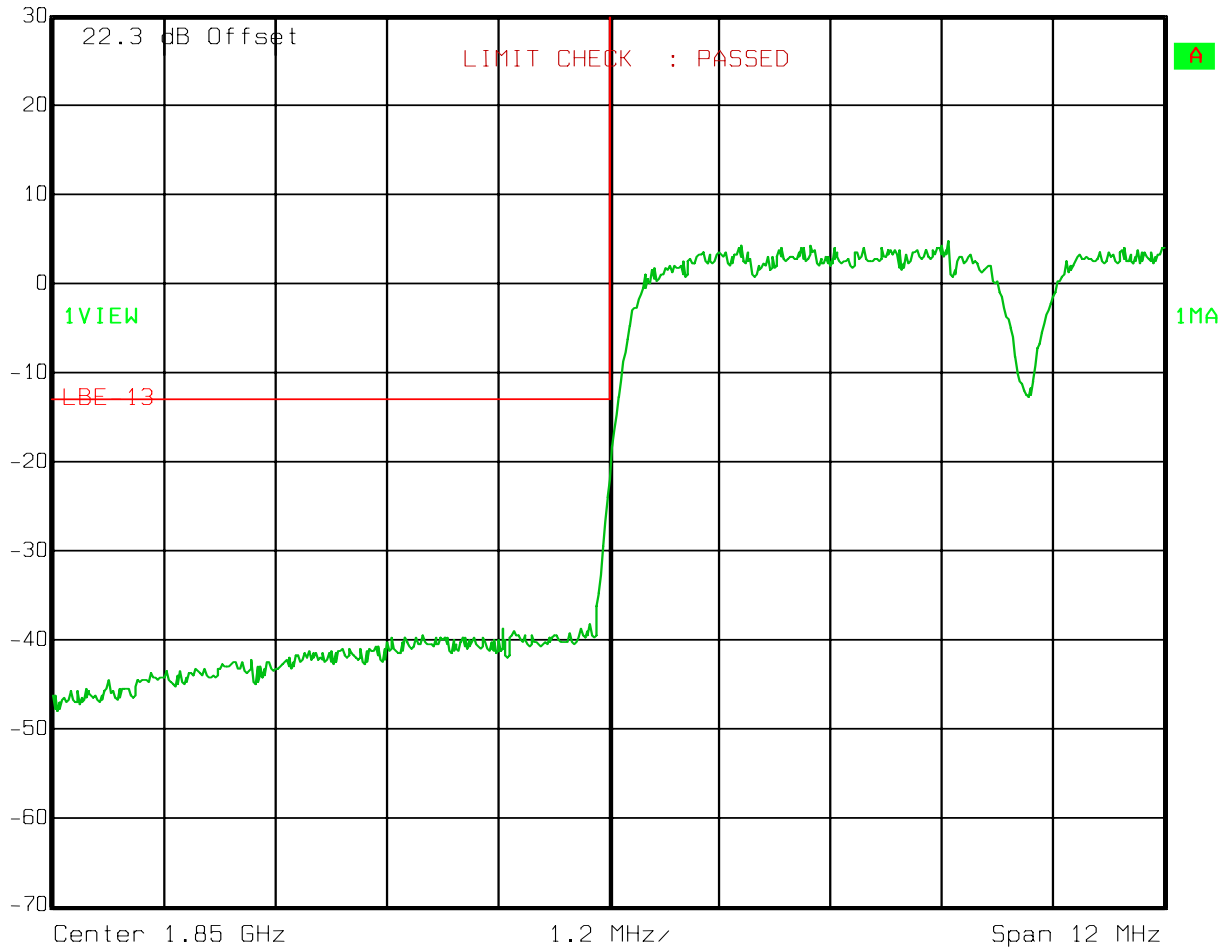
Lower Bandedge Intermodulation

W-CDMA



Ref Lvl
30 dBm

RBW	50 kHz	RF Att	20 dB
VBW	50 kHz	Mixer	-10 dBm
SWT	12 ms	Unit	dBm



Date: 28.JAN.2010 11:07:22

EQUIPMENT: MR1918

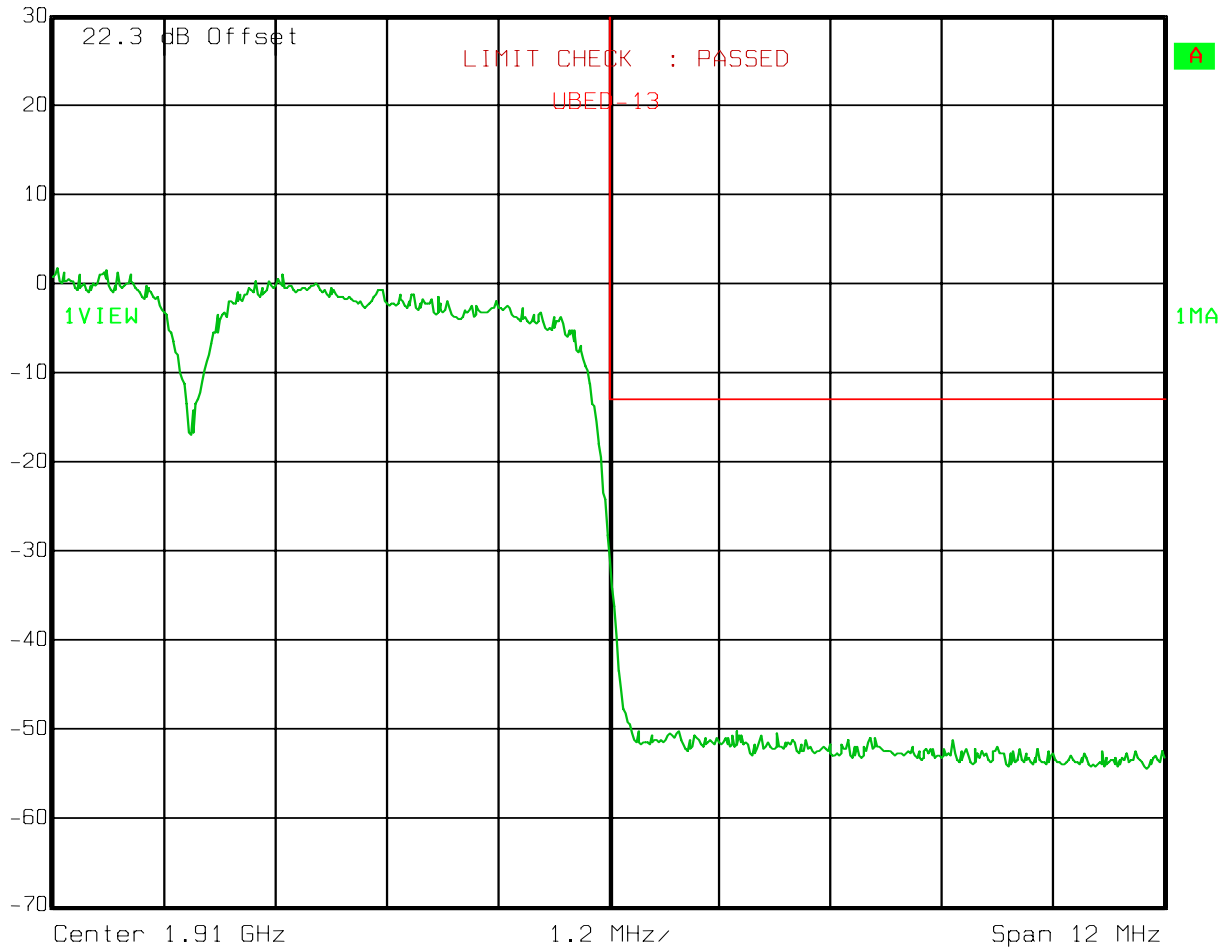
Test Data – Spurious Emissions at Antenna Terminals

Uplink
Upper Bandedge Intermodulation
W-CDMA



Ref Lvl
30 dBm

RBW	50 kHz	RF Att	20 dB
VBW	50 kHz	Mixer	-10 dBm
SWT	12 ms	Unit	dBm



Date: 28.JAN.2010 11:30:19

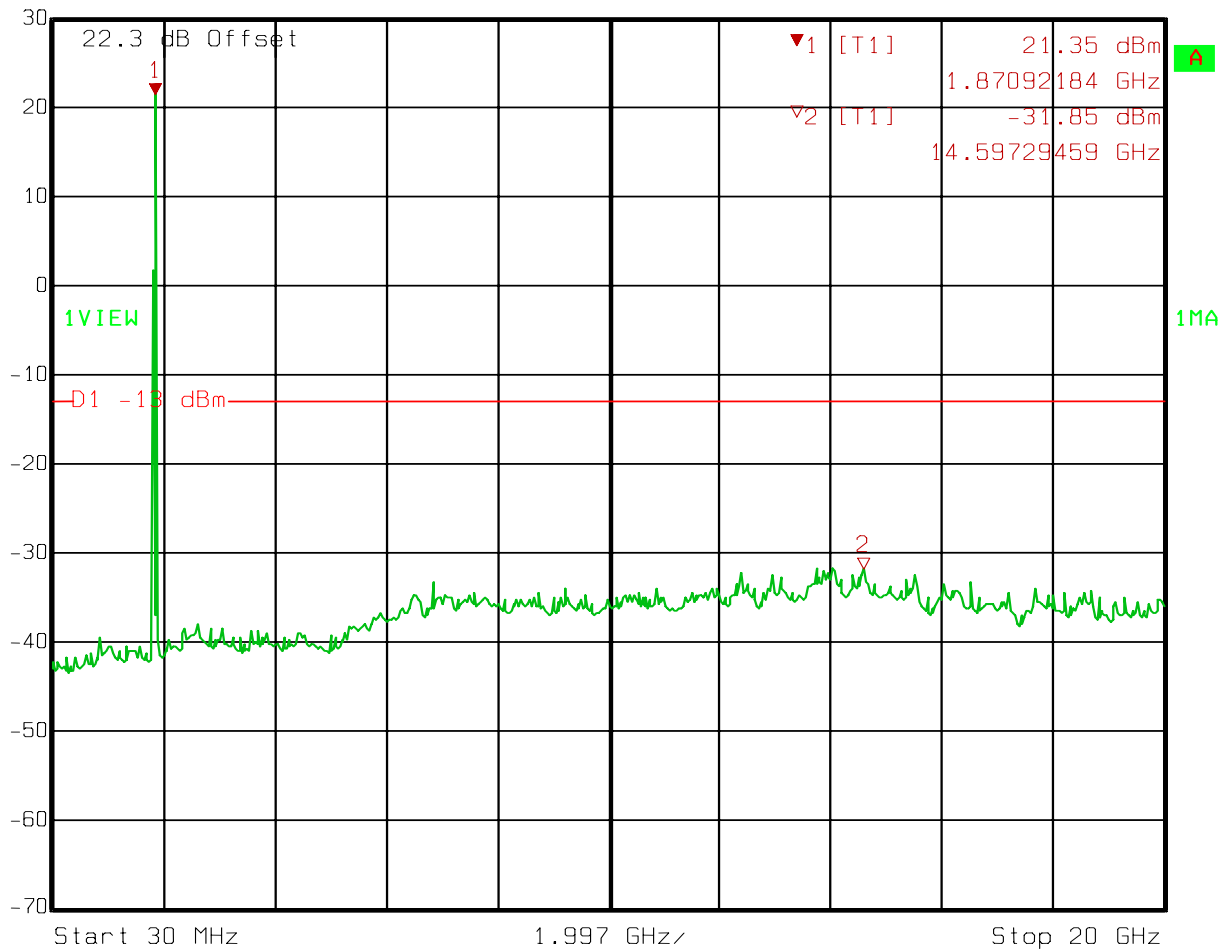
EQUIPMENT: MR1918

Test Data – Spurious Emissions at Antenna Terminals

Uplink
Spurs – W-CDMA -



Ref Lvl	Marker 1 [T1]	RBW	1 MHz	RF Att	20 dB
30 dBm	21.35 dBm	VBW	1 MHz	Mixer	-10 dBm
	1.87092184 GHz	SWT	200 ms	Unit	dBm



Date: 28.JAN.2010 11:08:25

Section 5. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	01/19/09	01/20/11
1082	CABLE 2m	Astrolab 32027-2-29094-72TC	N/A	CBU	N/A
1472	20db Attenuator DC 18 Ghz	Omni Spectra 20600-20db	NONE	CBU	N/A

ANNEX A - TEST DETAILS

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: \geq 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: \geq RBW
Sweep: Auto
Video Avg: Disabled

TDMA

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

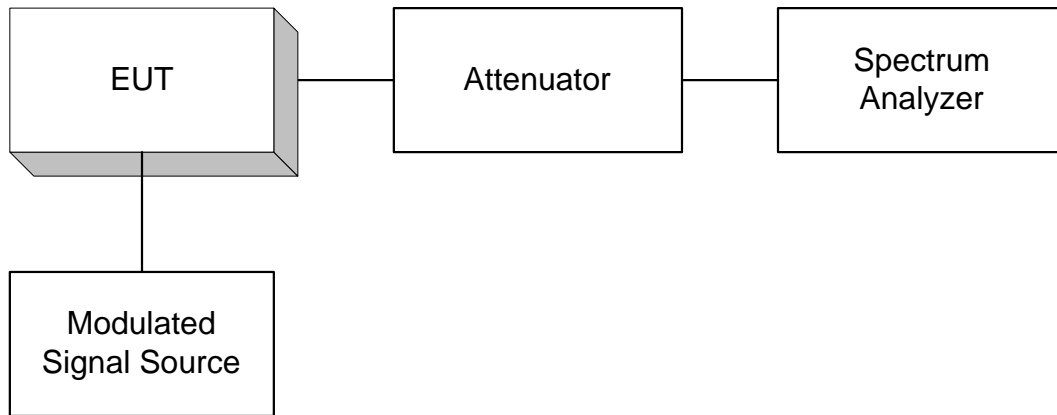
W-CDMA

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 100 kHz (< 1MHz from Band Edge)
VBW: \geq 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.

ANNEX B - TEST DIAGRAMS

Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 Spurious Emissions at Antenna Terminals

