

Nemko Test Report:	41240RUS1	
Applicant:	Andrew Corporation 108 Rand Park Drive Garner, NC 27529 USA	
Equipment Under Test: (E.U.T.)	MR8518/8518	
FCC Identifier:	BCR-MR8518F	
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: David Light, Se	DATE: 27 January 2010	<u>)</u>
APPROVED BY: Tom Tidw	DATE: 29 January 2010 ell, Telecom Direct	<u>) </u>

Number of Pages: 54

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Section 1.	Summary of Test Results	5		
Manufacturer	Andrew Corporation			
Model No.:	MR8518/8518			
Serial No.:	10			
General:	All measurements are traceable to	national	standards.	
	vere conducted on a sample of the equ g compliance with CFR 47, Part 22, S	•		of
\boxtimes	New Submission		Production Un	it
	Class II Permissive Change		Pre-Production	n Unit
Reason for Cl	ass II change: Gain has been increas	sed 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 in the performance 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	22.913(a)	500W ERP	Not tested
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.	Not tested
Frequency Stability	22.355	1.5 ppm	NA

Footnotes:

Frequency stability was not tested since there is no frequency translation in this device.

.

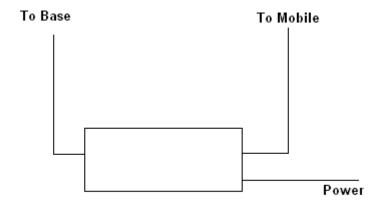
Section 2. General Equipment Specification

Supply Voltage Input:	120 Vac			
Frequency Range: Downlink:	869-894 MHz			
Frequency Range: Uplink:	824-849 Mhz			
Type of Modulation and Designator:	CDMA GSM TDMA EDGE W-CDMA (F9W) (GXW) (DXW) (G7W)			
Output Impedance:	50 ohms			
Downlink: RF Output (Rated): Uplink:	0.158 W 22 dBm 0.158 W 22 dBm			
Frequency Translation:	F1-F1 F1-F2 N/A			
Band Selection:	Software Change Coverage			

Description of EUT

The miniRepeaters are bi-directional amplifiers used to enhance signals between a mobile and a base station in a wireless network. They have been designed to increase signal strength in small and medium sized areas such as offices, shops, basements and manufacturing facilities. The amplifier is programmable across the 850 MHz cellular band using a 10 MHz and 1.8 MHz filter.

System Diagram



Section 3. Occupied Bandwidth

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

TESTED BY: David Light DATE: 27 January 2010

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1472-1036-1082

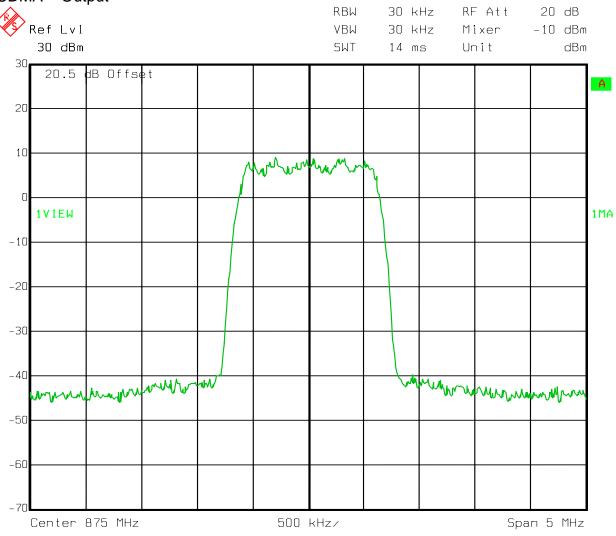
Measurement Uncertainty: 1X10⁻⁷ Ppm

Temperature: 22 °C

Relative Humidity: 48 %

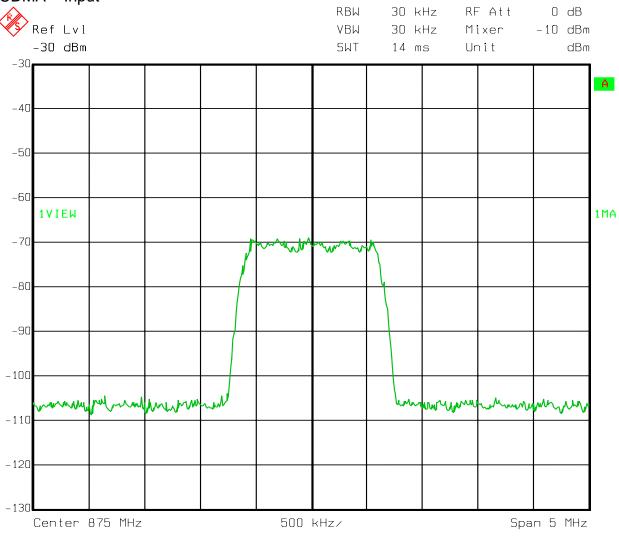
Test Data - Occupied Bandwidth

Downlink CDMA – Output



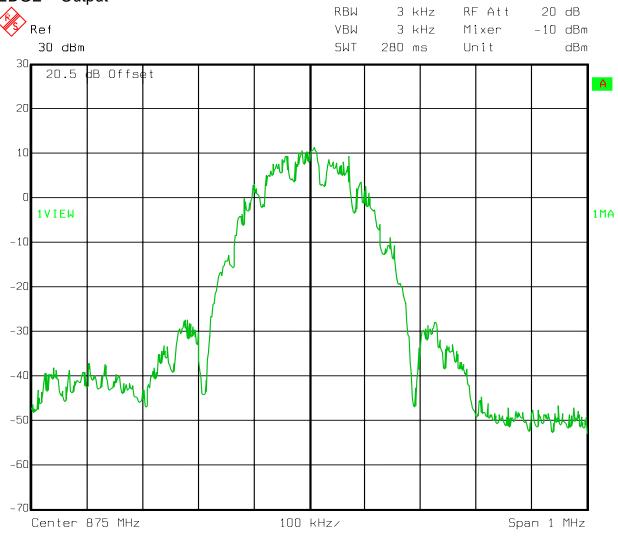
Test Data - Occupied Bandwidth

Downlink CDMA – Input



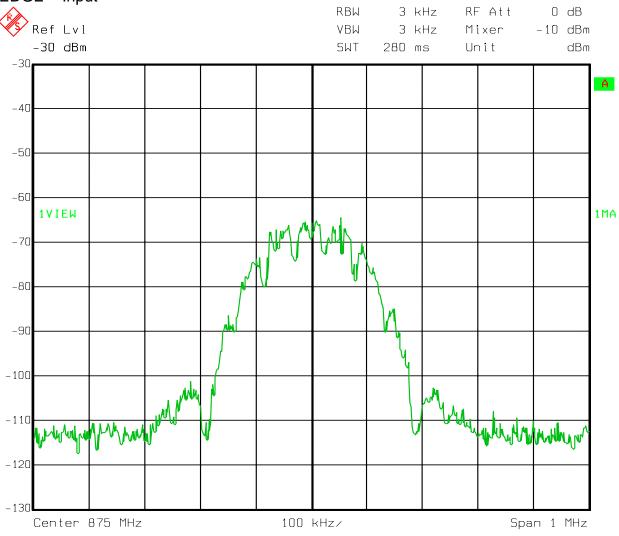
Test Data – Occupied Bandwidth

Downlink EDGE – Output



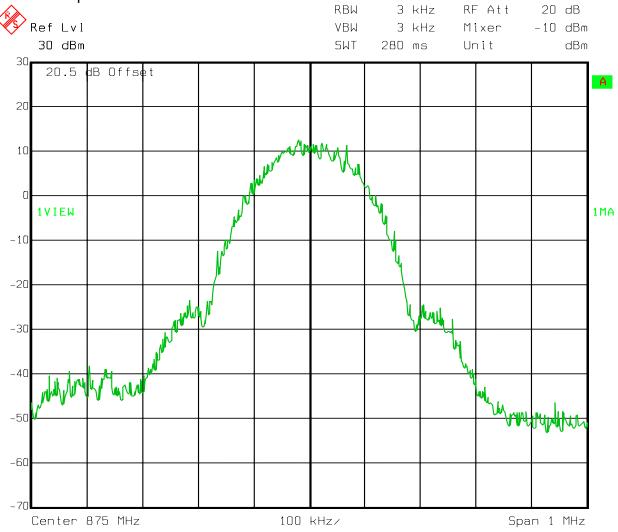
Test Data - Occupied Bandwidth

Downlink EDGE – Input



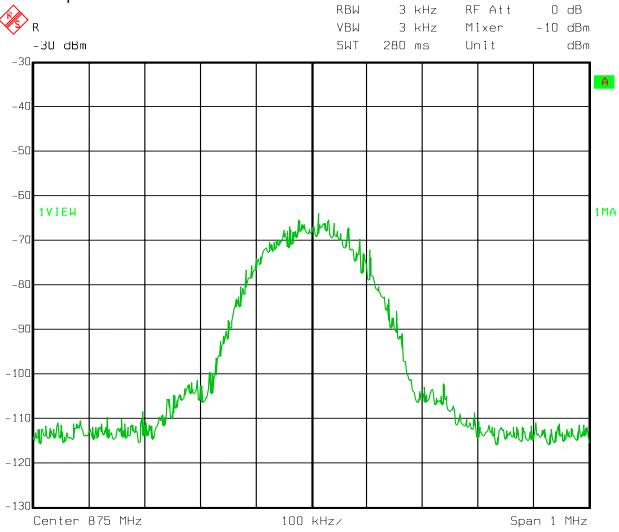
Test Data – Occupied Bandwidth

Downlink GSM – Output



Test Data - Occupied Bandwidth

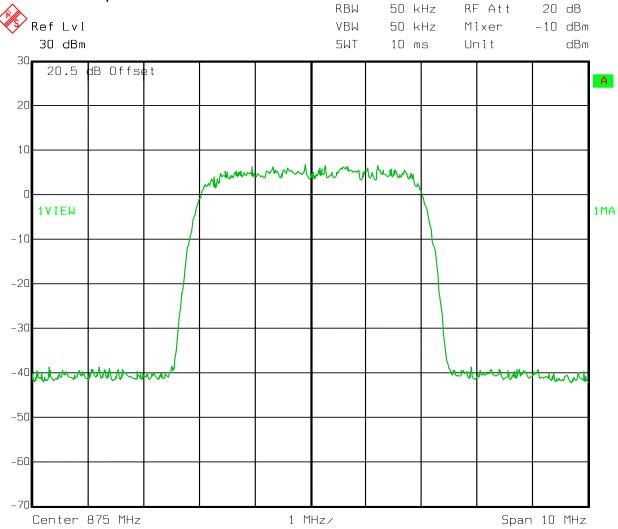
Downlink GSM – Input



Date: 27.JAN.2010 10:48:01

Test Data - Occupied Bandwidth

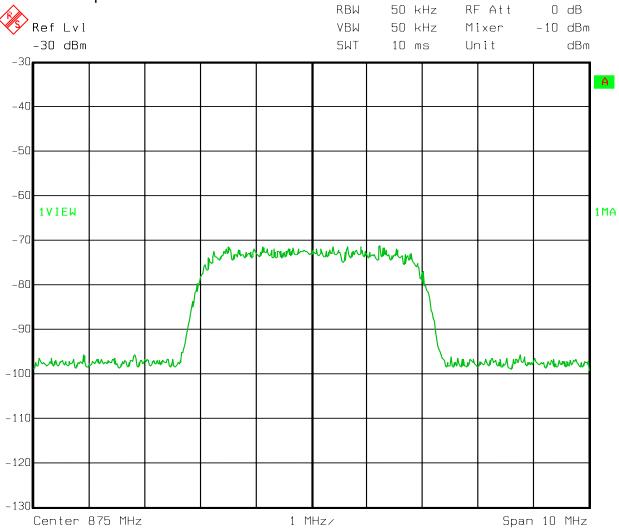
Downlink W-CDMA - Output



Date: 27.JAN.2010 10:44:39

Test Data - Occupied Bandwidth

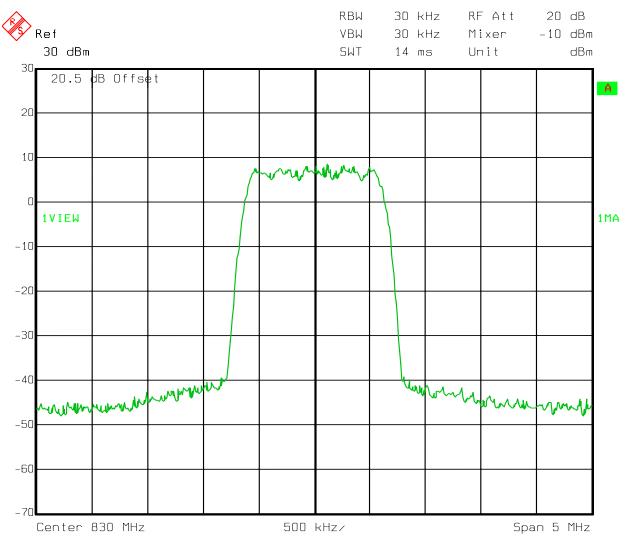
Downlink W-CDMA - Input



Date: 27.JAN.2010 10:46:10

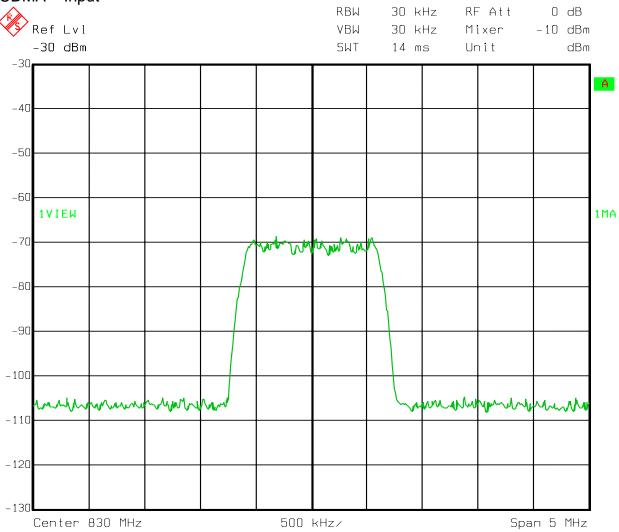
Test Data - Occupied Bandwidth

Uplink CDMA – Output



Test Data - Occupied Bandwidth

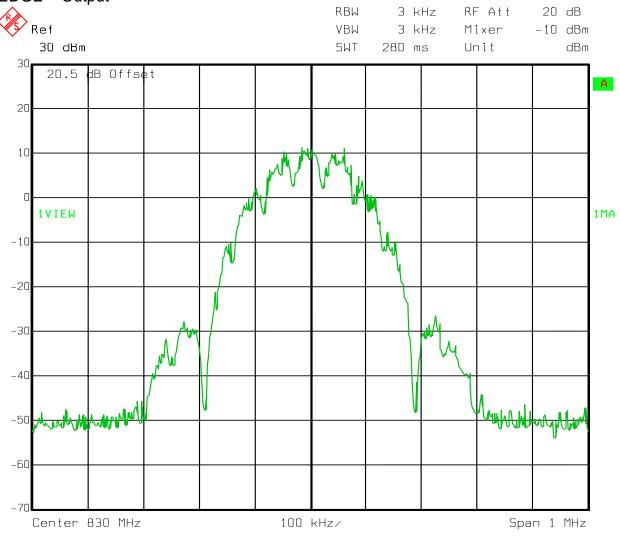
Uplink CDMA – Input



Date: 27.JAN.2010 10:49:37

Test Data – Occupied Bandwidth

Uplink EDGE – Output

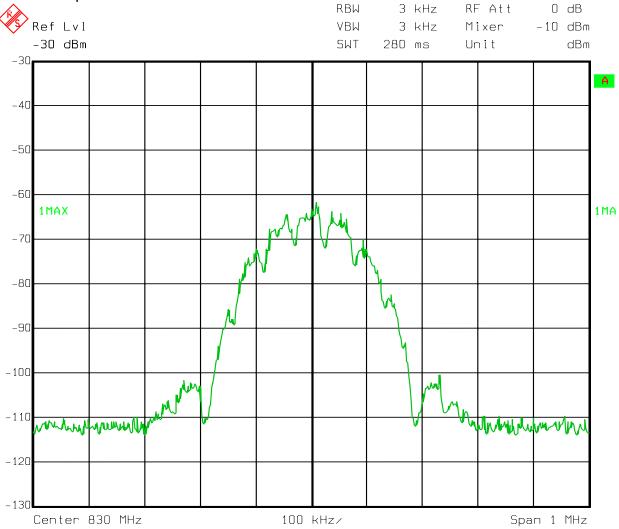


Date: 27.JAN.2010 10:41:11

Test Data - Occupied Bandwidth

Uplink

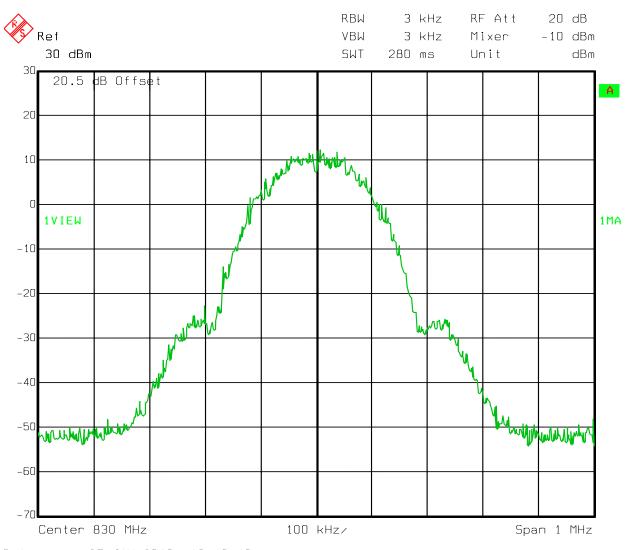
EDGE – Input



Date: 27.JAN.2010 10:48:50

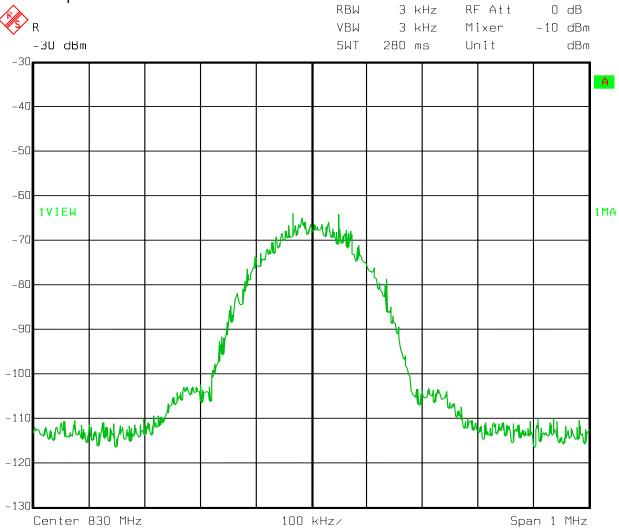
Test Data - Occupied Bandwidth

Uplink GSM – Output



Test Data – Occupied Bandwidth

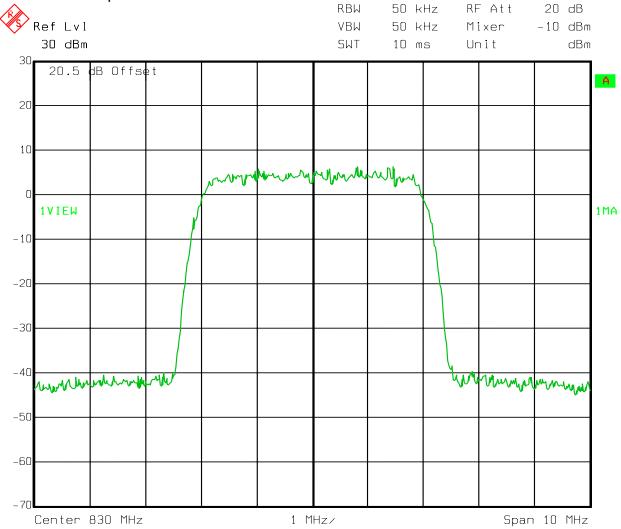
Uplink GSM – Input



Date: 27.JAN.2010 10:47:25

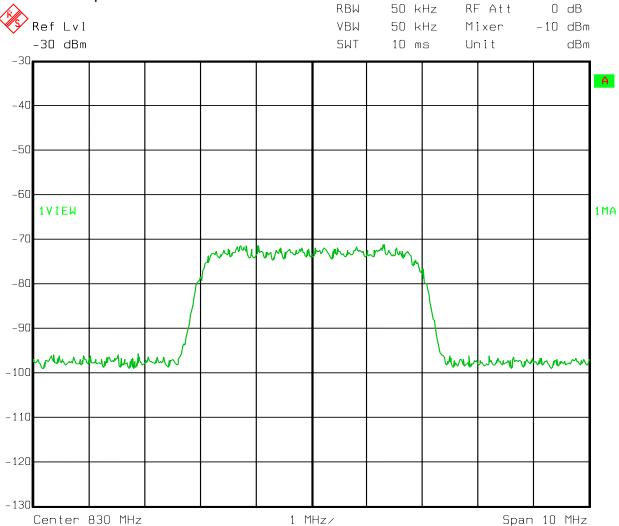
Test Data – Occupied Bandwidth

Uplink W-CDMA - Output



Test Data - Occupied Bandwidth

Uplink W-CDMA - Input



Date: 27.JAN.2010 10:46:44

Nemko USA, Inc.

CFR 47, PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: MR8518/8518 PROJECT NO.: 41240RUS1

Section 4. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals PARA. NO.: 22.917

TESTED BY: David Light DATE: 27 January 2010

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1036-1082-1472

Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

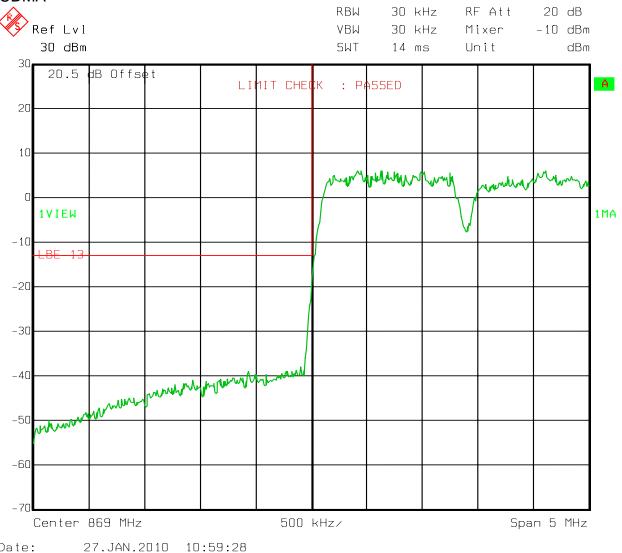
Relative Humidity: 35 %

Date:

PROJECT NO.: 41240RUS1 **EQUIPMENT:** MR8518/8518

Test Data – Spurious Emissions at Antenna Terminals

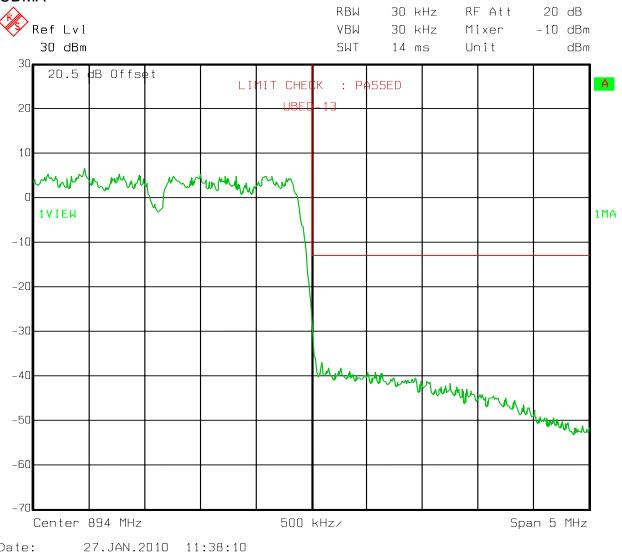
Downlink - Lower Bandedge Intermodulation **CDMA**



PROJECT NO.: 41240RUS1 **EQUIPMENT:** MR8518/8518

Test Data – Spurious Emissions at Antenna Terminals

Downlink - Upper Bandedge Intermodulation CDMA



Date:

Test Data – Spurious Emissions at Antenna Terminals

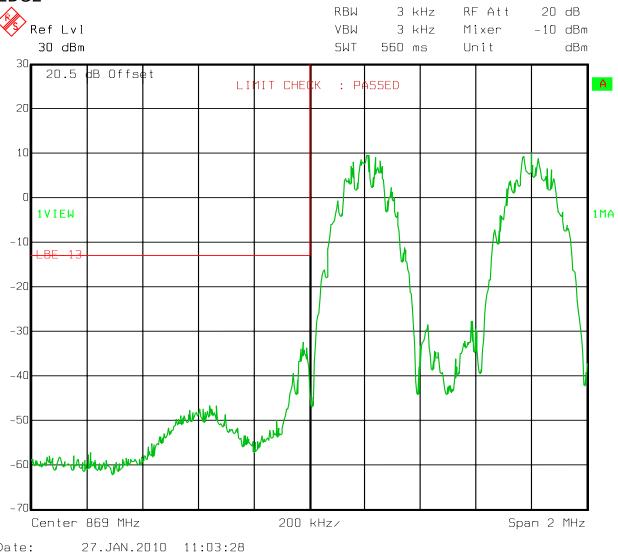
Spurs - CDMA - Downlink Marker 1 [T1] RBW 1 MHz RF Att 20 dB Ref Lvl 22.58 dBm VBW 1 MHz Mixer -10 dBm 30 dBm 869.15831663 MHz SWT 100 ms Unit dBm 20.5 dB Offset **▼**1 [T1] 22.58 dBm Α 869.15831663 MHz 20 -34.64 dBm [T1] 7.98202<mark>405 GHz</mark> 10 1MA **1VIEW** -10 -D1 dBm -20 -30 -40 -50 -60 Start 30 MHz 997 MHz/ Stop 10 GHz

Date:

PROJECT NO.: 41240RUS1 **EQUIPMENT:** MR8518/8518

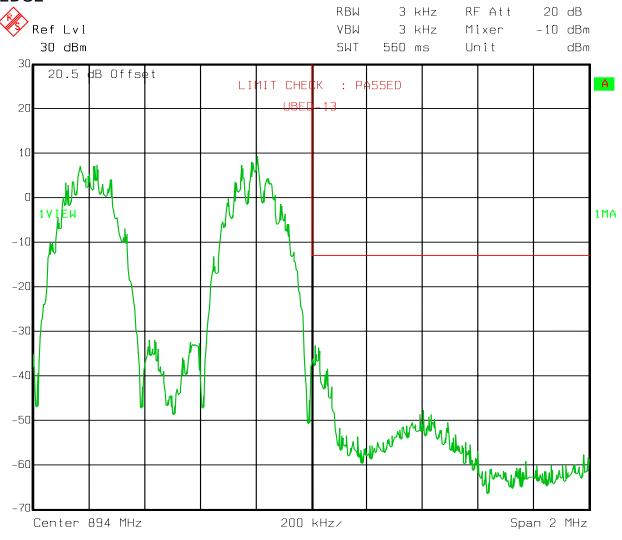
Test Data – Spurious Emissions at Antenna Terminals

Downlink - Lower Bandedge Intermodulation **EDGE**



Test Data – Spurious Emissions at Antenna Terminals

Downlink - Upper Bandedge Intermodulation EDGE

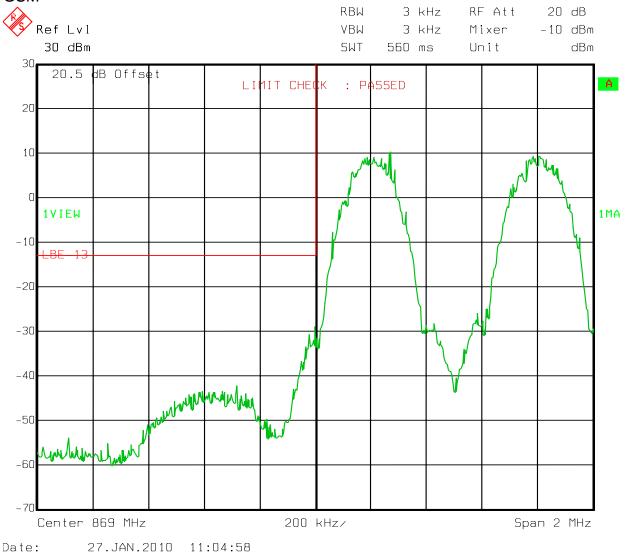


Test Data – Spurious Emissions at Antenna Terminals

Spurs – EDGE – Downlink Marker 1 [T1] RBW 1 MHz RF Att 20 dB Ret 22.13 dBm VBW 1 MHz Mixer -10 dBm 869.15831663 MHz 30 dBm SWT 100 ms Unit dBm dB Offset 20.5 **▼**1 [T1] 22.13 dBm Α 869.15831663 MHz 20 -34.50 dBm √2 [T1] 6.52348<mark>697 GHz</mark> 10 1MA **1VIEW** -10 **-**D1 − dBm--20 -30 -40 -50 -60 Start 30 MHz 997 MHz/ Stop 10 GHz

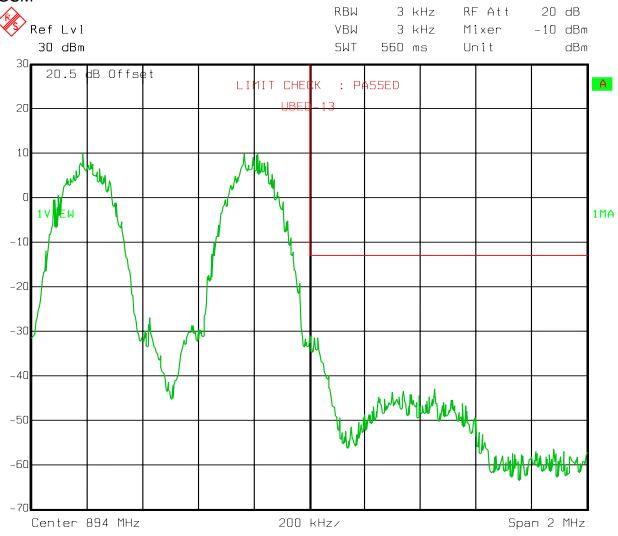
Test Data – Spurious Emissions at Antenna Terminals

Downlink - Lower Bandedge Intermodulation GSM



Test Data – Spurious Emissions at Antenna Terminals

Downlink - Upper Bandedge Intermodulation GSM



Test Data – Spurious Emissions at Antenna Terminals

Spurs – GSM – Downlink Marker 1 [T1] RBW 1 MHz RF Att 20 dB Ref 21.41 dBm VBW 1 MHz Mixer -10 dBm 869.15831663 MHz 30 dBm SWT 100 ms Unit dBm 20.5 dB Offset **▼**1 [T1] 21.41 dBm Α 869.15831663 MHz 20 -34.81 dBm √2 [T1] 7.58242<mark>485 GHz</mark> 10 1MA 1 V I E W -10 **–**D1 −3 dBm--20 -30 -40 -50 -60 Start 30 MHz 997 MHz/ Stop 10 GHz

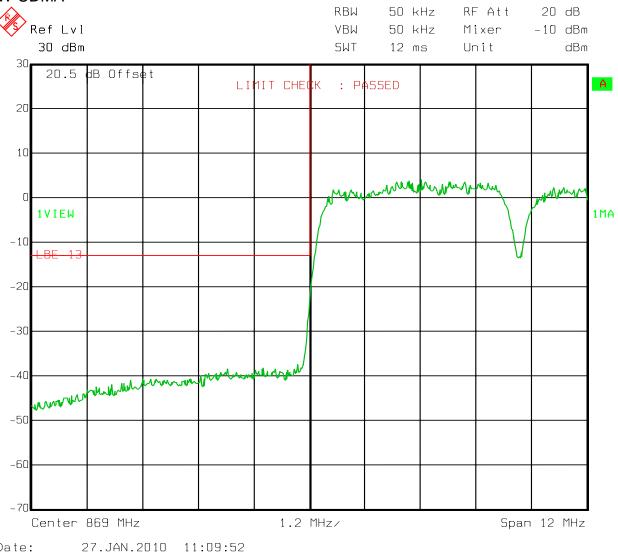
Date: 27.JAN.2010 11:06:25

Date:

PROJECT NO.: 41240RUS1 **EQUIPMENT:** MR8518/8518

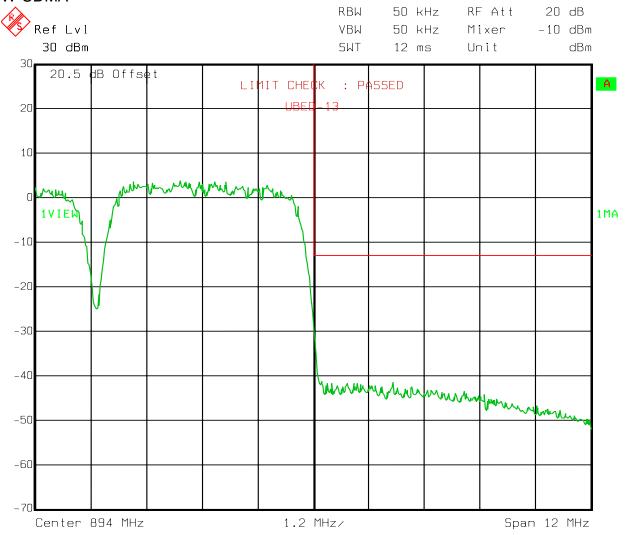
Test Data – Spurious Emissions at Antenna Terminals

Downlink - Lower Bandedge Intermodulation W-CDMA



Test Data – Spurious Emissions at Antenna Terminals

Downlink - Upper Bandedge Intermodulation W-CDMA



Test Data – Spurious Emissions at Antenna Terminals

Spurs – W-CDMA - Downlink Marker 1 [T1] RBW 1 MHz RF Att 20 dB Ref Lvl 21.21 dBm VBW 1 MHz Mixer -10 dBm 30 dBm 869.15831663 MHz SWT 100 ms Unit dBm 20.5 dB Offset **▼**1 [T1] 21.21 dBm Α 869.15831663 MHz 20 -34.58 dBm √2 [T1] 6.94306<mark>613 GHz</mark> 10 1MA 1 V I E W -10 **–**D1 −3 dBm--20 -30 -40 -50 -60 Start 30 MHz 997 MHz/ Stop 10 GHz

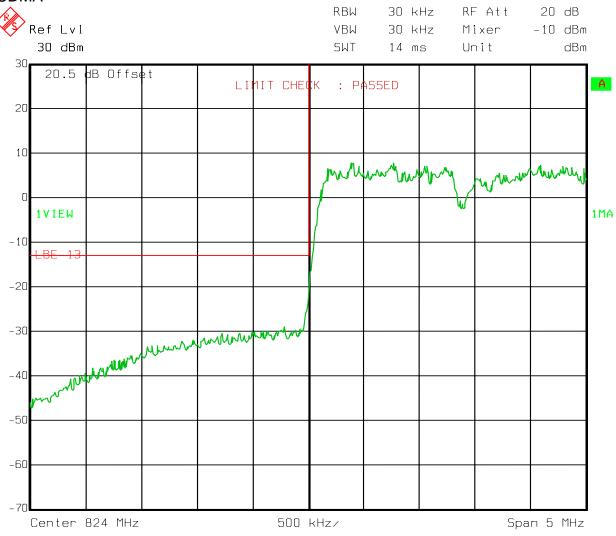
Date:

EQUIPMENT: MR8518/8518 PROJECT NO.: 41240RUS1

Test Data – Spurious Emissions at Antenna Terminals

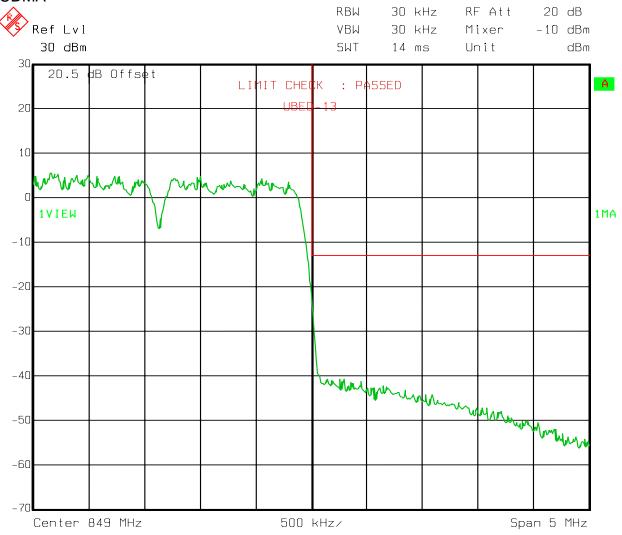
Uplink - Lower Bandedge Intermodulation CDMA

27.JAN.2010 11:17:38



Test Data – Spurious Emissions at Antenna Terminals

Uplink - Upper Bandedge Intermodulation CDMA



-40

-50

-60

Stop 10 GHz

EQUIPMENT: MR8518/8518 PROJECT NO.: 41240RUS1

Test Data – Spurious Emissions at Antenna Terminals

Spurs - CDMA - Uplink Marker 1 [T1] RBW 1 MHz RF Att 20 dB Ref Lvl 23.30 dBm VBW 1 MHz Mixer -10 dBm 30 dBm 829.19839679 MHz SWT 100 ms Unit dBm dB Offset 20.5 **▼**1 [T1] 23.30 dBm Α 829.19839679 MHz 20 -35.46 dBm [T1] 8.40160<mark>321 GHz</mark> 10 1MA 1VIEW -10 **-**D1 dBm--20 -30

Start 30 MHz 997 MHz/
Date: 27.JAN.2010 11:25:41

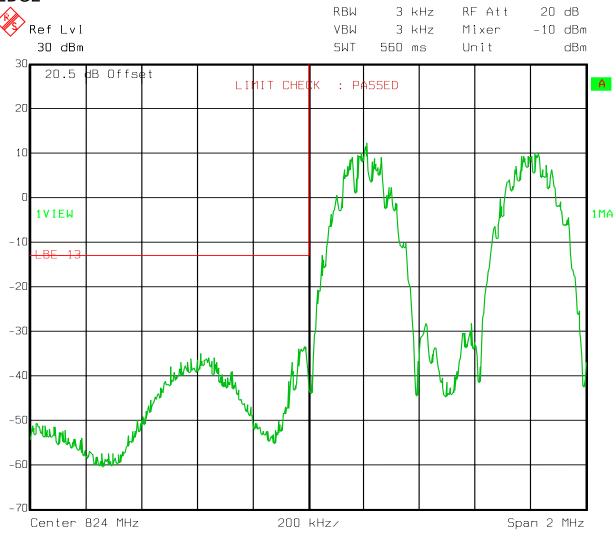
Date:

EQUIPMENT: MR8518/8518 PROJECT NO.: 41240RUS1

Test Data – Spurious Emissions at Antenna Terminals

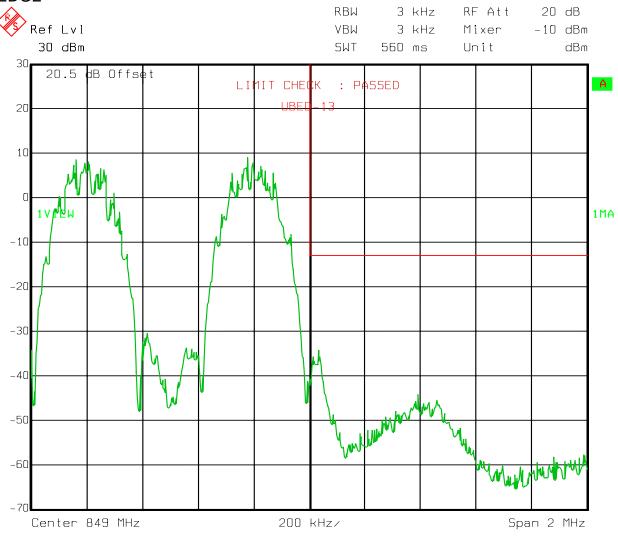
Uplink - Lower Bandedge Intermodulation EDGE

27.JAN.2010 11:19:01



Test Data – Spurious Emissions at Antenna Terminals

Uplink - Upper Bandedge Intermodulation EDGE



Stop 10 GHz

EQUIPMENT: MR8518/8518 PROJECT NO.: 41240RUS1

Test Data – Spurious Emissions at Antenna Terminals

Spurs – EDGE – Uplink Marker 1 [T1] RBW RF Att 1 MHz 20 dB Ref 24.02 dBm VBW 1 MHz Mixer -10 dBm 829.19839679 MHz 30 dBm SWT 100 ms Unit dBm 20.5 dB Offset **▼**1 [T1] 24.02 dBm Α 829.19839679 MHz 20 -34.79 dBm [T1] 6.62338<mark>677 GHz</mark> 10 1MA 1VIEW -10 **-**D1 dBm--20 -30 -40 -50 -60

Date: 27.JAN.2010 11:24:59

Start 30 MHz

997 MHz/

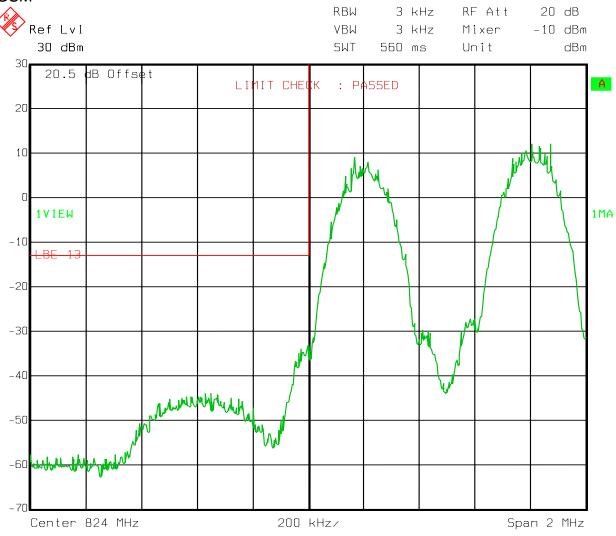
Date:

EQUIPMENT: MR8518/8518 PROJECT NO.: 41240RUS1

Test Data – Spurious Emissions at Antenna Terminals

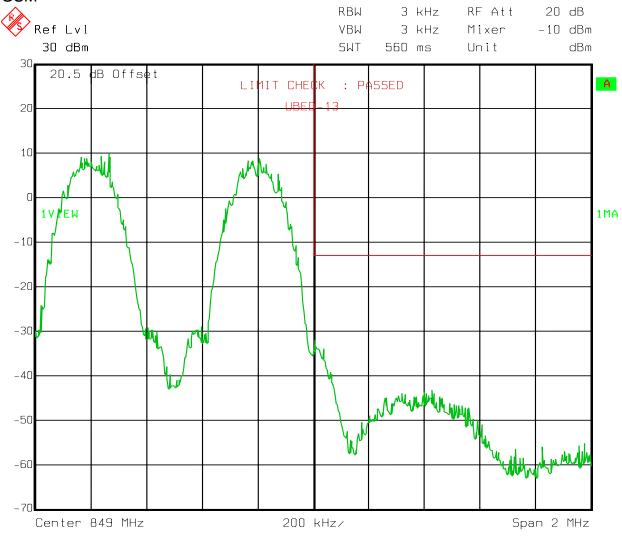
Uplink - Lower Bandedge Intermodulation GSM

27.JAN.2010 11:20:01



Test Data – Spurious Emissions at Antenna Terminals

Uplink - Upper Bandedge Intermodulation GSM



27.JAN.2010 11:33:30

Date:

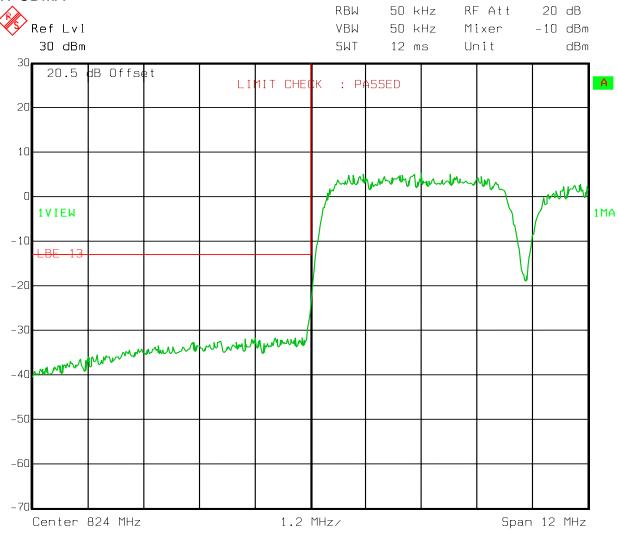
Test Data – Spurious Emissions at Antenna Terminals

Spurs - GSM - Uplink Marker 1 [T1] RBW 1 MHz RF Att 20 dB Ref 21.33 dBm VBW 1 MHz Mixer -10 dBm 829.19839679 MHz 30 dBm SWT 100 ms Unit dBm 20.5 dB Offset **▼**1 [T1] 21.33 dBm Α 829.19839679 MHz 20 -34.74 dBm √2 [T1] 6.48352<mark>705 GHz</mark> 10 1MA 1VIEW -10 **-**D1 dBm--20 -30 -40 -50 -60 Start 30 MHz 997 MHz/ Stop 10 GHz

Date: 27.JAN.2010 11:24:08

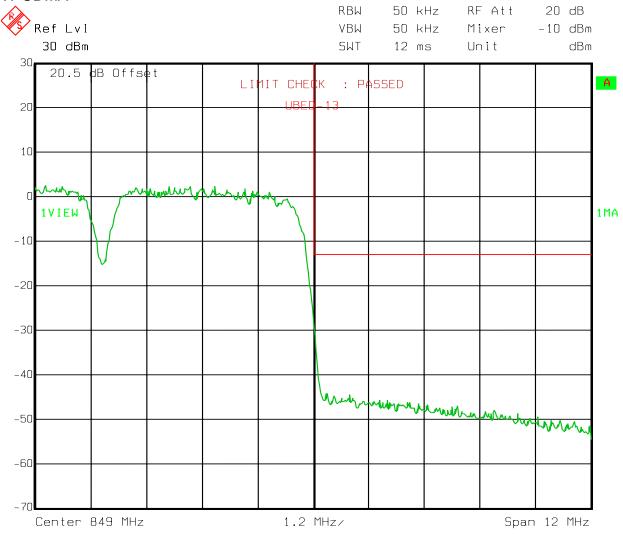
Test Data – Spurious Emissions at Antenna Terminals

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 Marker 1 [T1] RBW RF Att 1 MHz 20 dB Ref Lvl 21.08 dBm VBW 1 MHz Mixer -10 dBm 30 dBm 829.19839679 MHz SWT 100 ms Unit dBm 20.5 dB Offset **▼**1 [T1] 21.08 dBm Α 829.19839679 MHz 20 -35.10 dBm [T1] 6.46354709 GHz 10 1MA 1VIEW -10 **−**D1 dBm--20 -30 -40 -50 -60 Start 30 MHz 997 MHz/ Stop 10 GHz

Section 5. Test Equipment List

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

CFR 47, PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: MR8518/8518 PROJECT NO.: 41240RUS1

ANNEX A - TEST DETAILS

CFR 47, PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: MR8518/8518 PROJECT NO.: 41240RUS1

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

CFR 47, PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: MR8518/8518 PROJECT NO.: 41240RUS1

NAME OF TEST: Spurious Emission at Antenna PARA. NO.: 2.1051

Terminals

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:

Spectrum analyzer settings:

CDMA GSM / EDGE

RBW: 1 MHz (> 1 MHz from Band Edge) RBW: 1 MHz (> 1 MHz from Band Edge) RBW: 30 kHz (< 1 MHz from Band Edge) RBW: 3 kHz (< 1 MHz from Band Edge)

 $VBW: \ge RBW$ $VBW: \ge RBW$ Sweep: Auto Sweep: Auto

Video Avg: 6 Sweeps Video Avg: Disabled

<u>TDMA</u> <u>W-CDMA</u>

RBW: 1 MHz (> 1 MHz from Band Edge) RBW: 1 MHz (> 1 MHz from Band Edge) RBW: 3 kHz (< 1 MHz from Band Edge) RBW: 100 kHz (< 1 MHz from Band Edge)

 $VBW: \ge RBW$ $VBW: \ge RBW$ Sweep: Auto Sweep: Auto

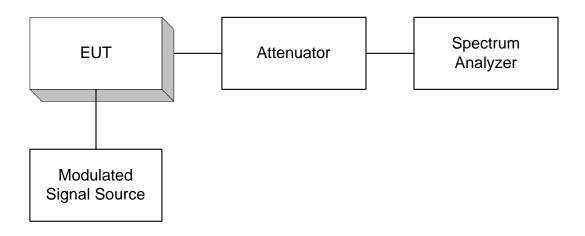
Video Avg: Disabled Video Avg: 6 Sweeps

CFR 47, PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: MR8518/8518 PROJECT NO.: 41240RUS1

ANNEX B - TEST DIAGRAMS

Para. No. 2.1049 - Occupied Bandwidth



Para. No. 2.1051 Spurious Emissions at Antenna Terminals

