



Nemko

Test Report:

5W44735

Applicant:

G-Wave Inc.
15 Ron's Edge Road
Springfield, New Jersey
07081

Apparatus:

BDA-CELLAB-0.5/0.5W-70-A

FCC ID:

Q8KCELLABHW70

In Accordance With:

FCC Part 22, Boosters
Public Mobile Services

Tested By:

Nemko Canada Inc.
303 River Road
Ottawa, Ontario
K1V 1H2

Authorized By:

Jin Xu, Wireless Specialist

Date:

30 May 2005

Total Number of Pages:

35

Report Summary

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 22. Conducted measurements were performed in accordance with ANSI TIA-603-B-2002. Radiated tests were conducted in accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

The assessment summary is as follows:

Apparatus Assessed:	BDA-CELLAB-0.5/0.5W-70-A
Specification:	FCC Part 22 Public Mobile Services
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None
Report Release History:	Original Release

Author: Jason Nixon, Telecom Specialist

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

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Section 1 : Equipment Under Test

1.1 Product Identification

The Equipment Under Test was identified as follows:

BDA-CELLAB-0.5/0.5W-70-A

1.2 Samples Submitted for Assessment

The following samples of the apparatus have been submitted for type assessment:

Sample No.	Description	Serial No.
1	BDA-CELLAB-0.5/0.5W-70-A	05051002
2	CINCON Electronics Power Supply (M/N: TR25150)	251500000703

The first samples were received on: May 18, 2005

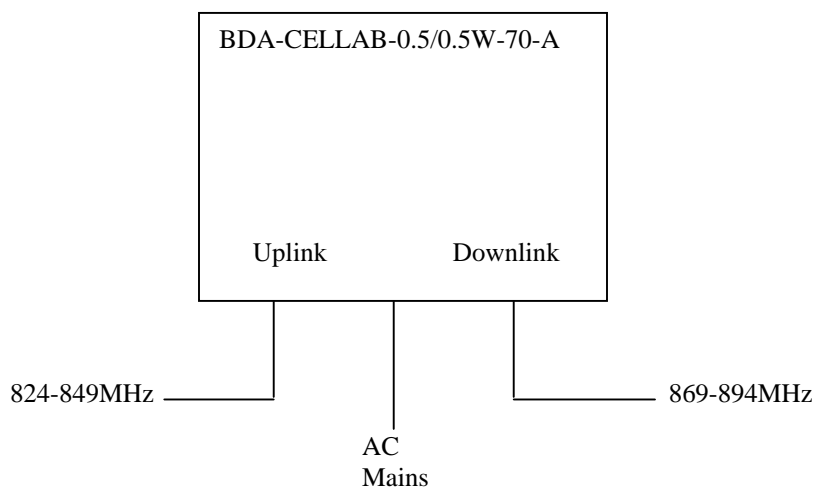
1.3 Theory of Operation

The BDA-CELLAB-0.5/0.5W-70-A Downlink path receives RF signals from the base station and amplifies and transmits them to the subscriber. The BDA-CELLAB-0.5/0.5W-70-A Uplink path receives RF signals from the subscriber and amplifies and transmits them to the base station. The Uplink and Downlink occupy two distinct frequency bands.

1.4 Technical Specifications of the EUT

Manufacturer:	G-Wave Inc.
Operating Frequency:	Uplink: 824-849MHz Downlink: 869-894MHz
Emission Designator:	DXW, F8W, F9W
Rated Power:	Uplink: 0.063W (18dBm) Downlink: 0.063W (18dBm)
Measured Power:	Uplink: 0.065W(18.10dBm) Downlink: 0.061W(17.82dBm)
Rated Gain:	70dB
Modulation:	CDMA, TDMA, AMPS
Power Source:	15Vdc

1.5 Block Diagram of the EUT



Section 2 : Test Conditions

2.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 2 Subpart J, Equipment Authorization Procedures
 FCC Part 22, Public Mobile Services
 FCC 2-11-04/EAB/RF Amplifier, Booster, and Repeater Reminder Sheet

2.2 Deviations From Laboratory Test Procedures

No deviations were made from laboratory test procedures.

2.3 Test Environment

All tests were performed under the following environmental conditions:

Temperature range : 15 – 30 °C
 Humidity range : 20 - 75 %
 Pressure range : 86 - 106 kPa
 Power supply range : +/- 5% of rated voltages

2.4 Test Equipment

Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
Spectrum Analyser	HP	8565E	FA000981	Mar 10/05	Mar 10/06
Signal Generator	Rohde & Schwarz	SMIQ03E	FA001269	Mar 3/05	Mar 3/06
Signal Generator	Rohde & Schwarz	SMIQ03	FA001091	Aug 20/04	Aug 20/05
Power Meter	HP	E4418B	FA001678	Mar 8/05	Mar 8/06
Power Sensor	HP	8487A	1261028D	Mar 29/05	Mar 29/06
20dB Attenuator	Narda	769-20	FA001394	COU	COU
10dB Attenuator	Weinschel Corp	47-10-34	FA001739	COU	COU
10dB Attenuator	Weinschel Corp	47-10-34	FA001740	COU	COU
Receiver	Rohde & Schwarz	ESVS-30	FA001437	July 26/04	July 26/05
Biconical (1) Antenna	EMCO	3109	FA000805	Apr 22/05	Apr 22/06
Log Periodic Antenna #1	EMCO	LPA-25	FA000477	Aug. 26/04	Aug. 26/05
Horn Antenna #1	EMCO	3115	FA000649	Dec. 22/04	Dec. 22/05
1.0 – 2.0 GHz Amplifier	JCA	12-400	FA001498	June 18/04	June 18/05
2.0 – 4.0 GHz Amplifier	JCA	24-600	FA001496	June 18/04	June 18/05
4.0 – 8.0 GHz Amplifier	JCA	48-600	FA001497	June 18/04	June 18/05
5.0 – 18.0 GHz Amplifier	NARDA	DWT-186N23U40	FA001409	COU	COU
Spectrum Analyzer	Hewlett-Packard	8566B	FA001309	May 18/05	May 18/06
Spectrum Analyzer Display	Hewlett-Packard	85662A	FA001309	May 18/05	May 18/06

Section 3 : Observations

3.1 Modifications Performed During Assessment

No modifications were performed during assessment.

3.2 Record Of Technical Judgements

No technical judgements were made during the assessment.

3.3 EUT Parameters Affecting Compliance

The user of the apparatus could not alter parameters that would affect compliance.

3.4 Test Deleted

No Tests were deleted from this assessment.

Section 4 : Results Summary

This section contains the following:

FCC Part 22 : Test Results

The column headed 'Required' indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

- N No : not applicable / not relevant.
- Y Yes : Mandatory i.e. the apparatus shall conform to these tests.
- N/T Not Tested, mandatory but not assessed. (See section 3.4 Test deleted)

The results contained in this section are representative of the operation of the apparatus as originally submitted.

4.1 FCC Part 22 : Test Results

Clause	Test Method	Test Description	Required	Result
22.355	2.1055	Frequency stability	N (1)	
22.383	—	In-building radiation systems	Y	PASS
22.913	2.1046	Output power	Y	PASS
22.917	2.1051	Conducted spurious emissions	Y	PASS
22.917	2.1053	Radiated spurious emissions	Y	PASS
2-11-04/EAB/RF	2.1049	Occupied bandwidth	Y	PASS
2-11-04/EAB/RF	—	Out of band rejection	Y	PASS

Notes:

- (1) The EUT does not contain any frequency translating circuitry.

Appendix A : Test Results**Criteria: Clause 22.913 Output Power**

(a) Maximum ERP. In general, the effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts.

Test Conditions:

Sample Number:	1	Temperature:	23
Date:	May 24, 2005	Humidity:	36
Modification State:	0	Tester:	Jason Nixon
		Laboratory:	Wireless

Test Results:

Band	Rated Power (dBm)	Measured Power (dBm)
Uplink	18	18.10
Downlink	18	17.82

Criteria: Clause 22.917 Conducted Spurious Emissions

a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

Test Conditions:

Sample Number:	1	Temperature:	25
Date:	May 20, 2005	Humidity:	27
Modification State:	0	Tester:	Jason Nixon
		Laboratory:	Wireless

Test Results:

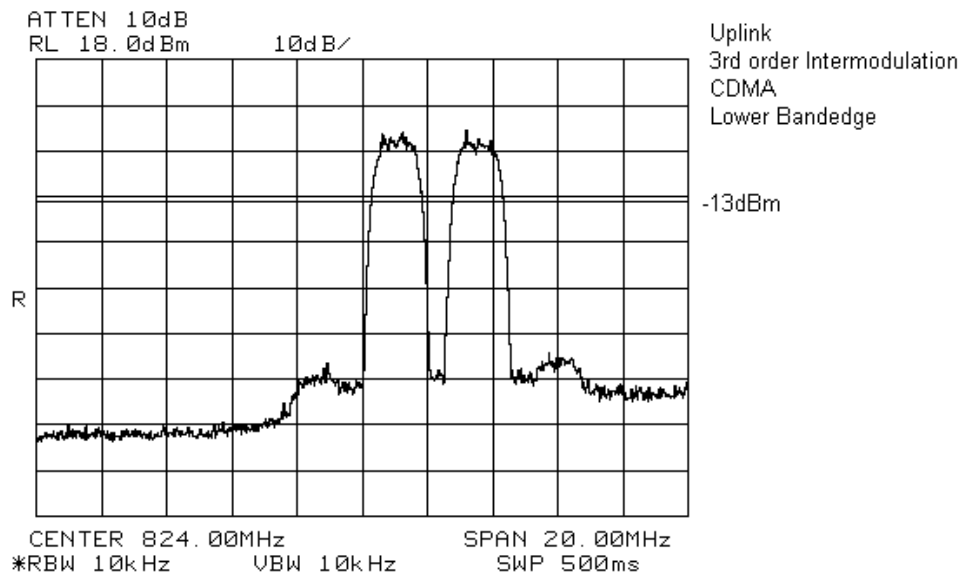
See Attached Plots.

Additional Observations:

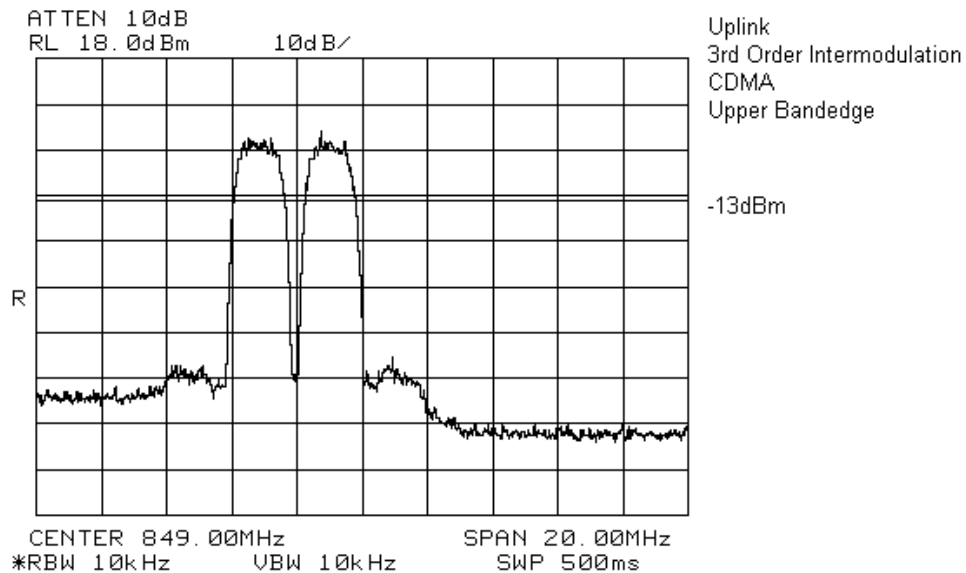
Measurements for conducted emissions outside the operating band were performed at the low, mid and high channels and only the worst case from each band has been included.

The spectrum was searched from 30MHz to 10GHz.

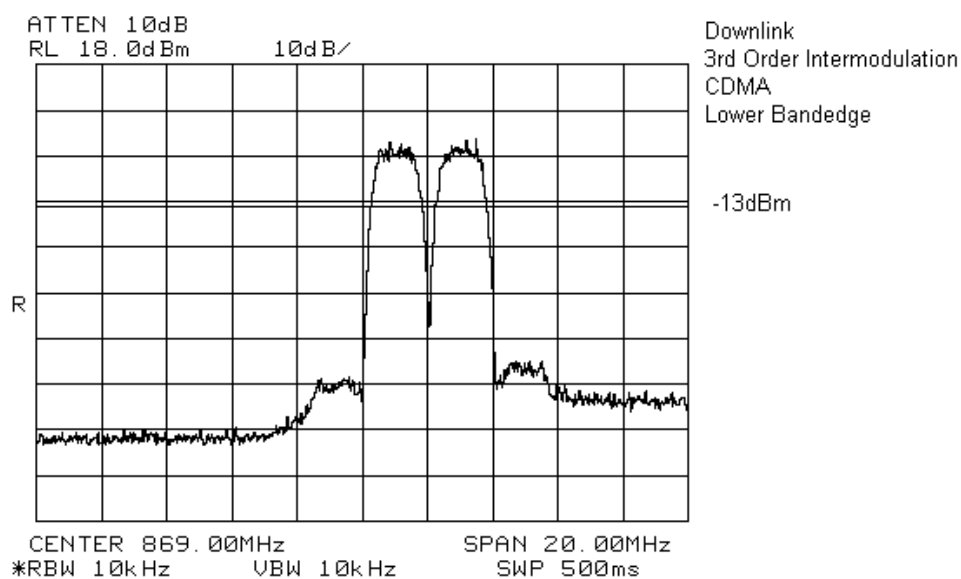
Uplink 3rd Order Intermodulation – Lower Bandedge – CDMA



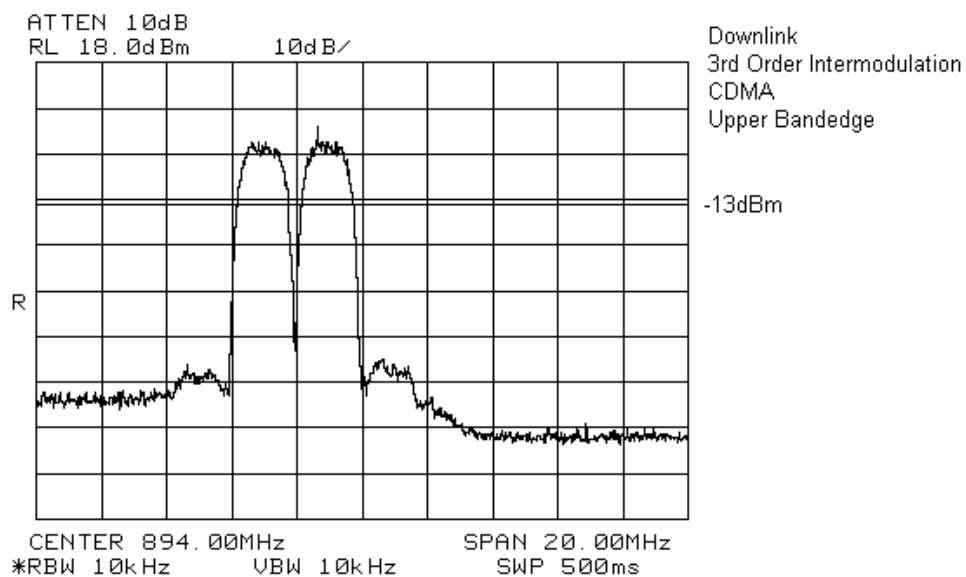
Uplink 3rd Order Intermodulation – Upper Bandedge - CDMA



Downlink 3rd Order Intermodulation - Lower Bandedge - CDMA

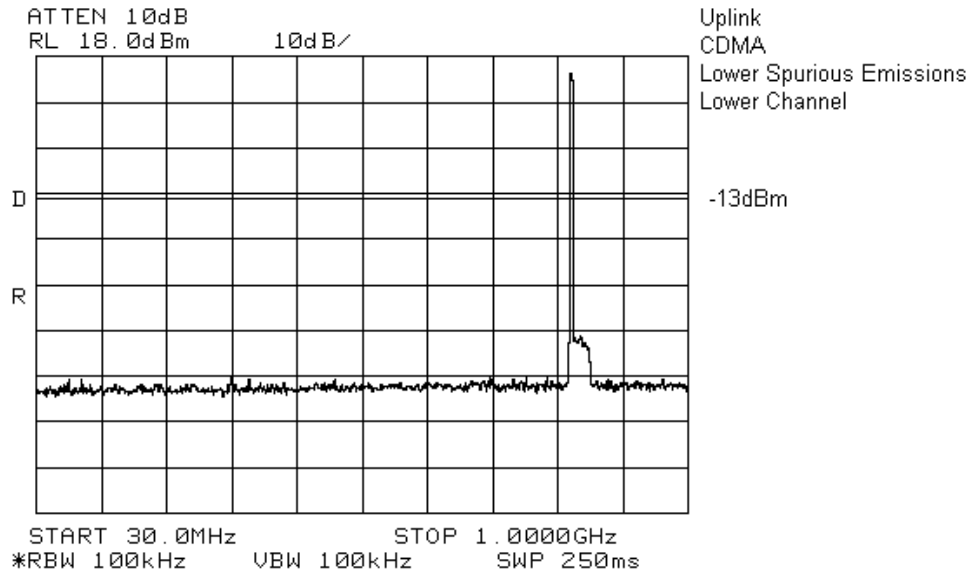


Downlink 3rd Order Intermodulation - Upper Bandedge - CDMA

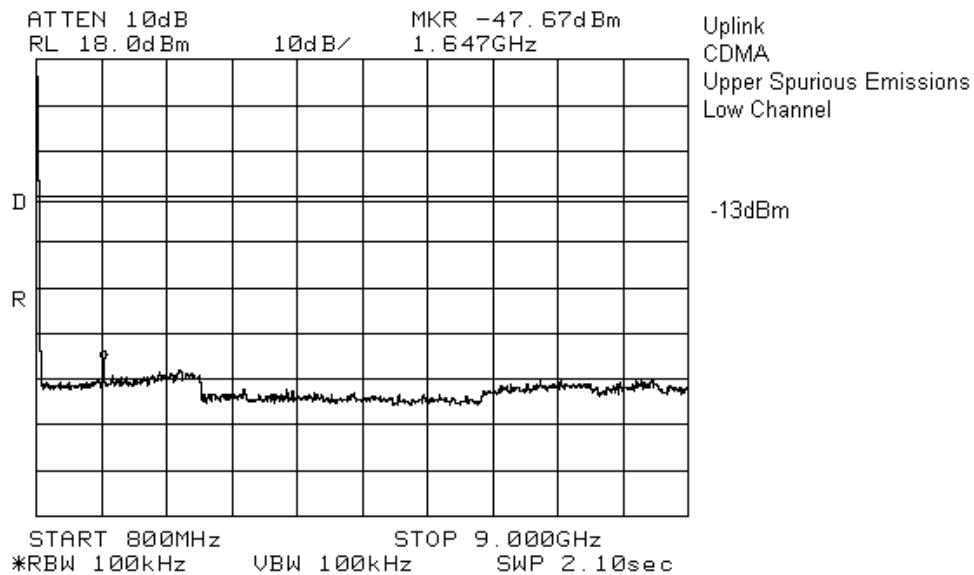


Conducted Emissions

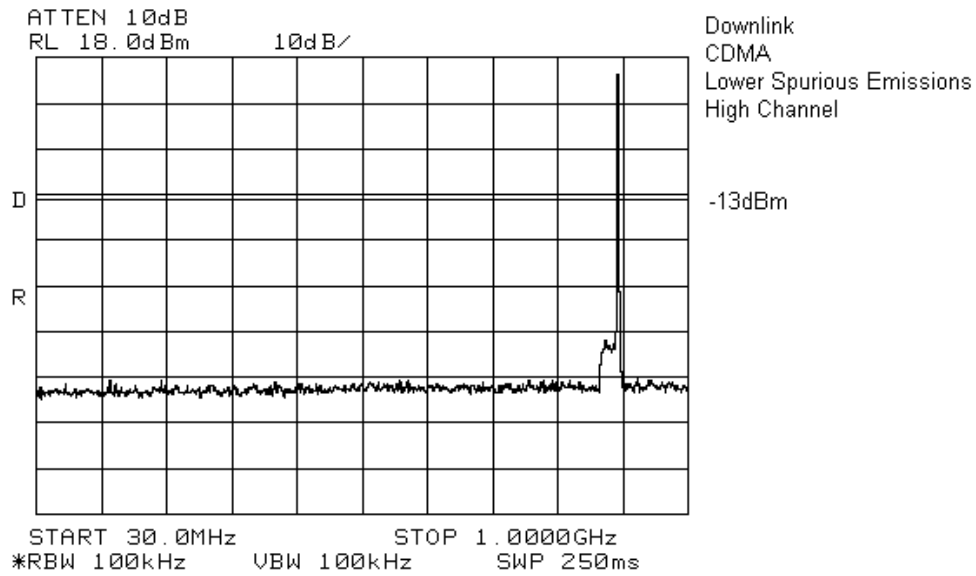
Uplink Conducted Emissions – Lower Frequencies - CDMA



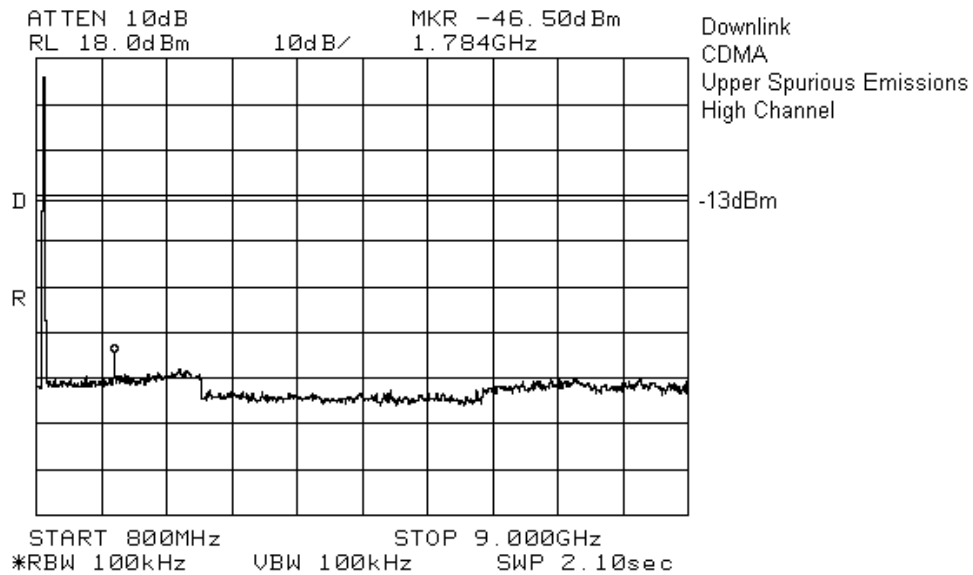
Uplink Conducted Emissions – Upper Frequencies - CDMA



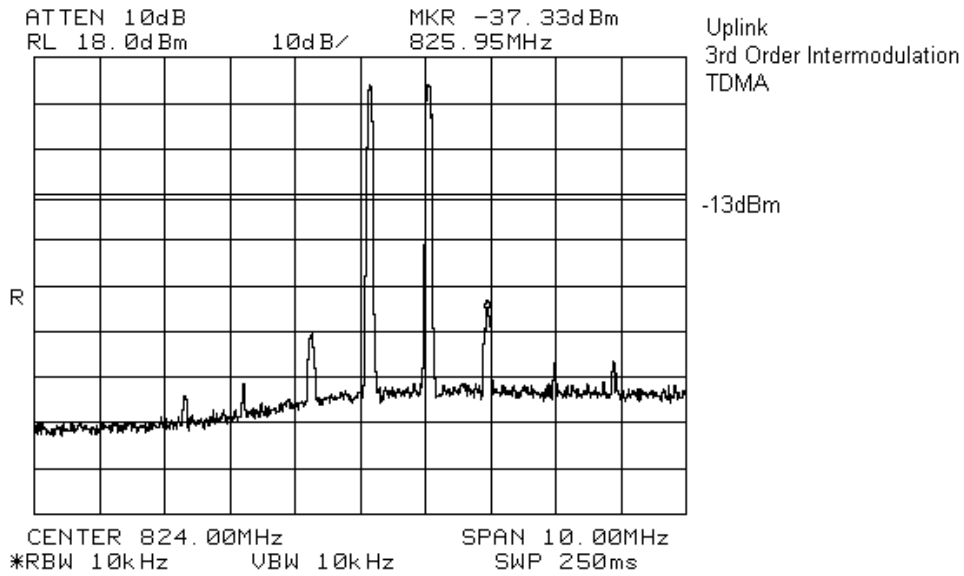
Downlink Conducted Emissions – Lower Frequencies - CDMA



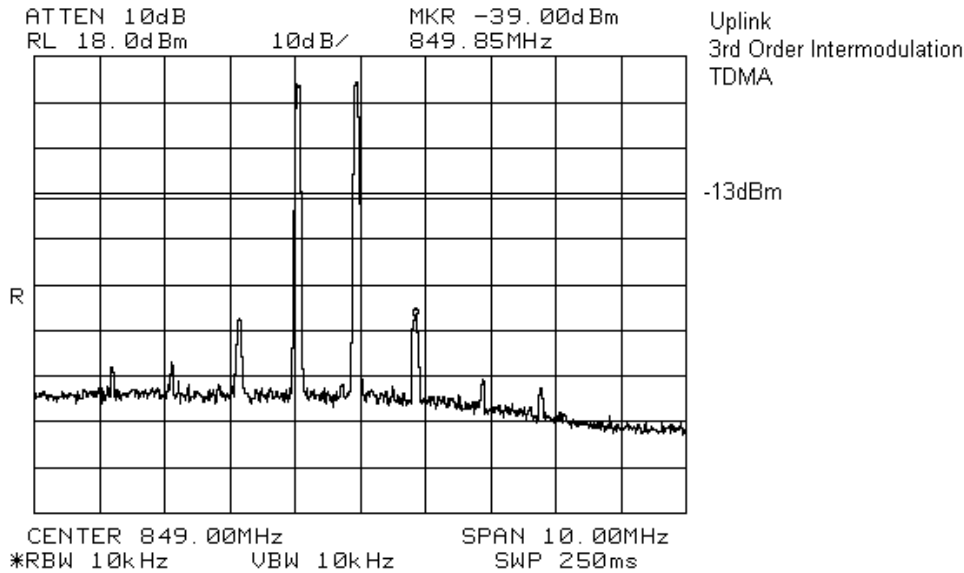
Downlink Conducted Emissions – Upper Frequencies - CDMA



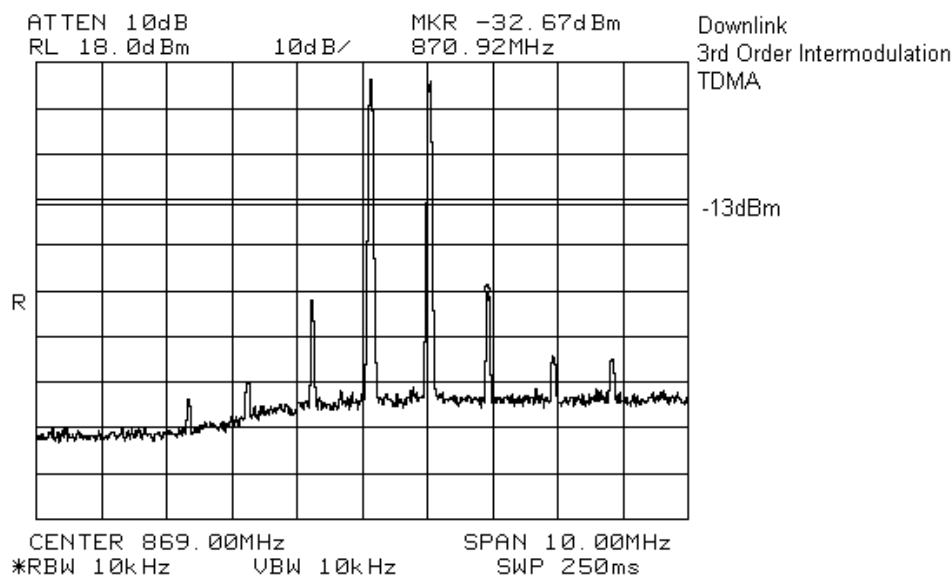
Uplink 3rd Order Intermodulation – Lower Bandedge – TDMA



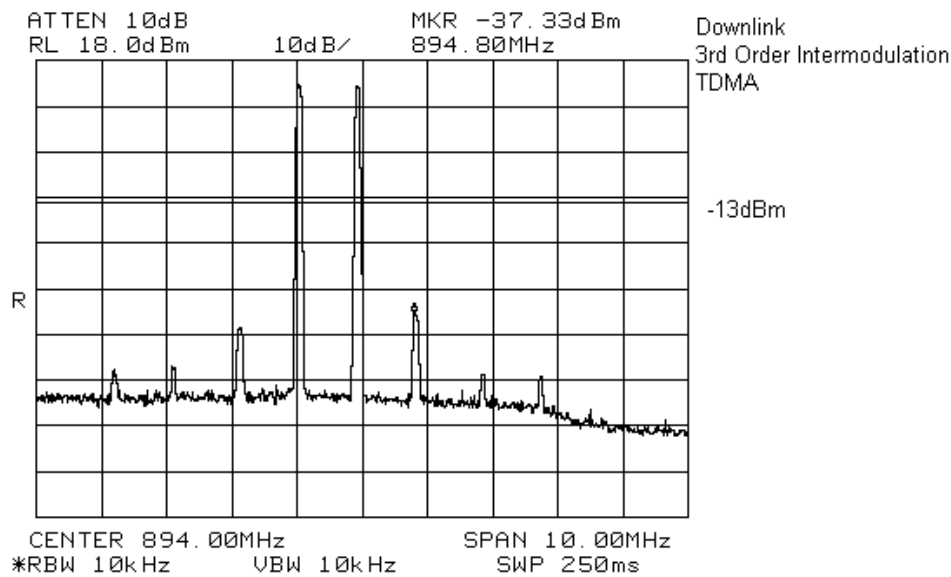
Uplink 3rd Order Intermodulation – Upper Bandedge - TDMA



Downlink 3rd Order Intermodulation - Lower Bandedge - TDMA

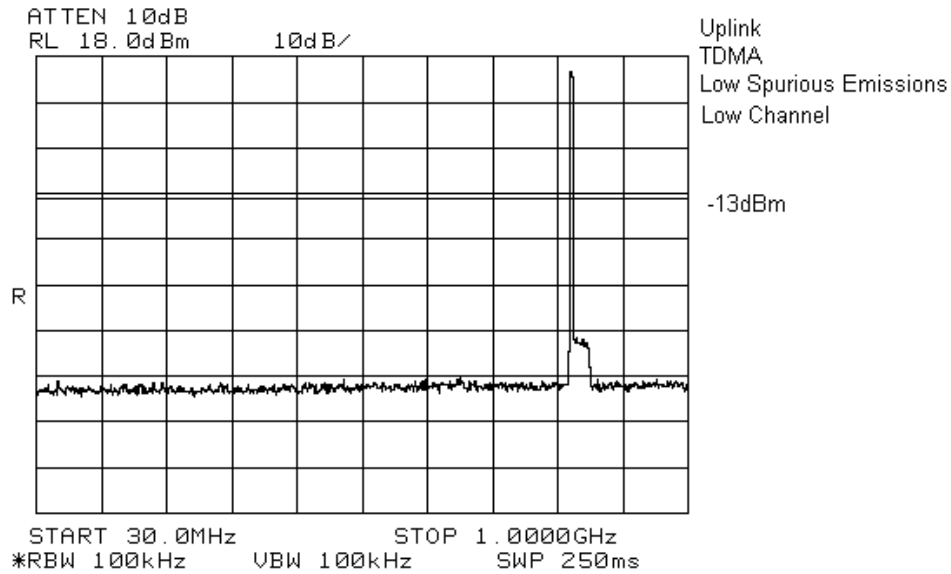


Downlink 3rd Order Intermodulation - Upper Bandedge - TDMA

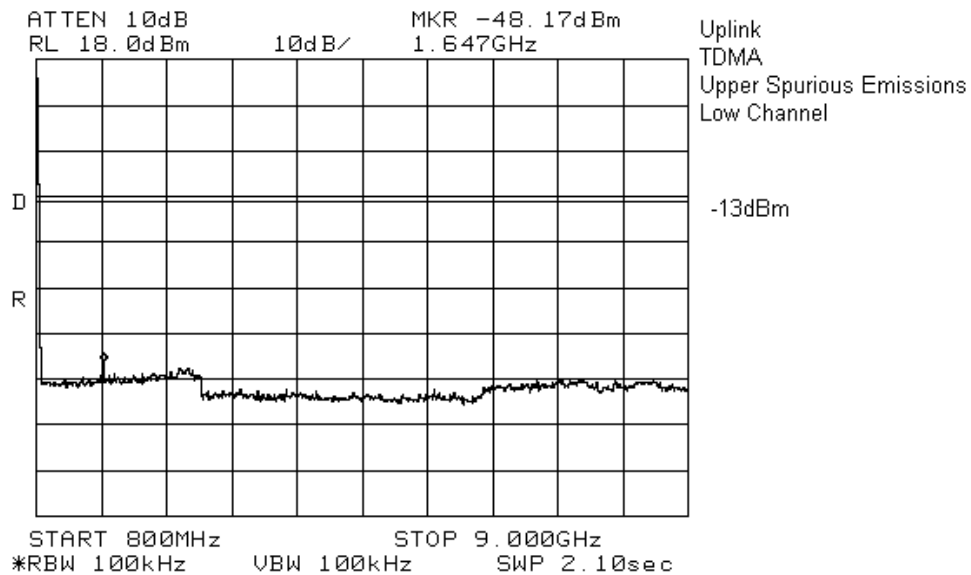


Conducted Emissions

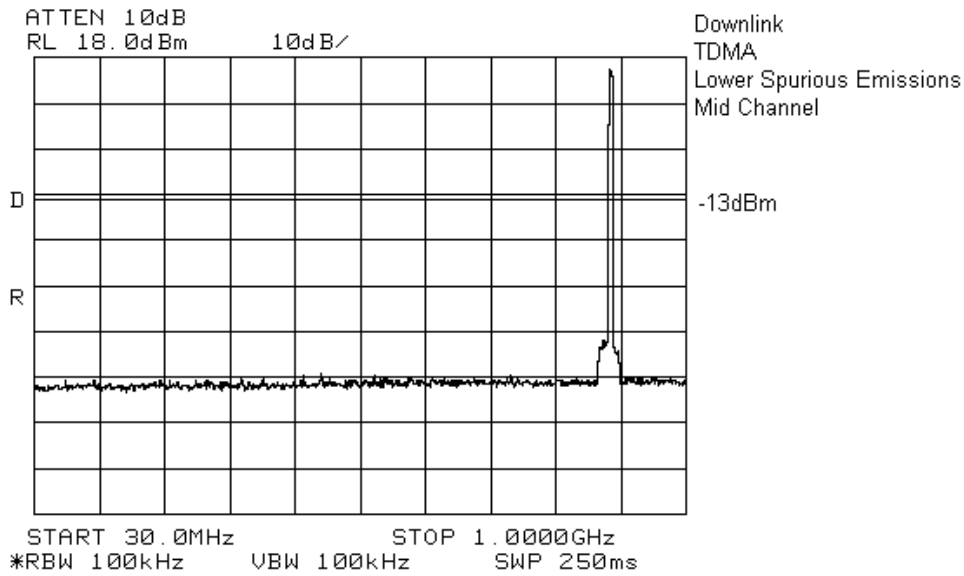
Uplink Conducted Emissions – Lower Frequencies - TDMA



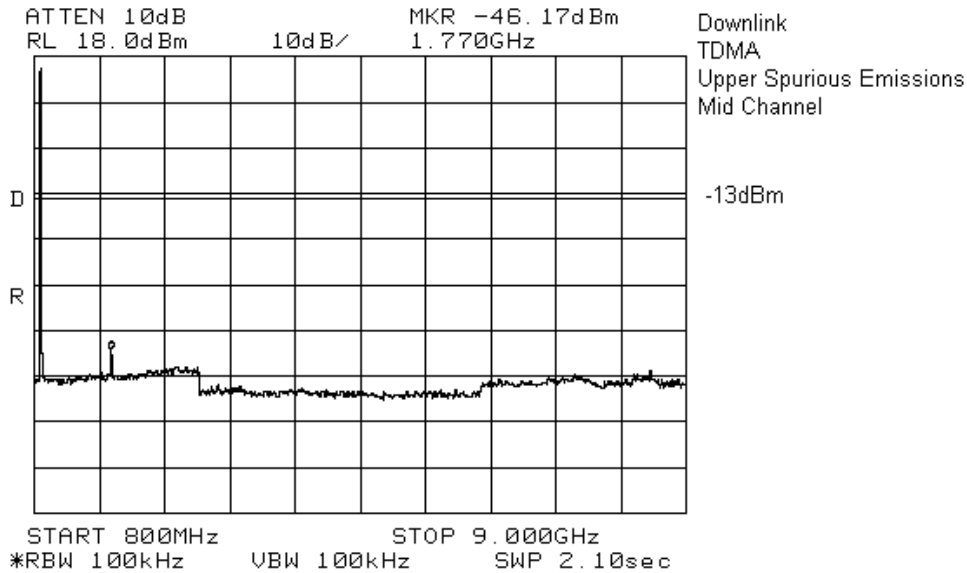
Uplink Conducted Emissions – Upper Frequencies - TDMA



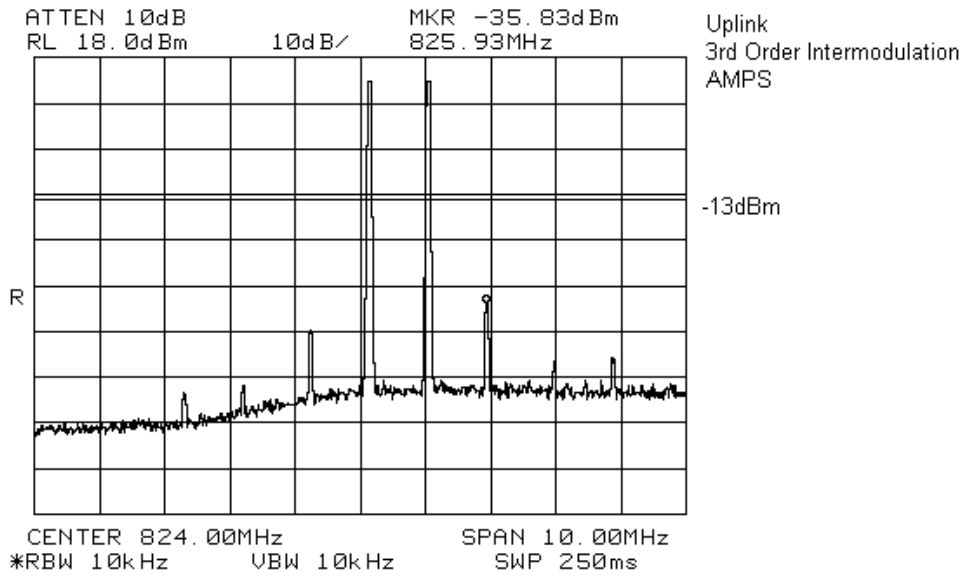
Downlink Conducted Emissions – Lower Frequencies - TDMA



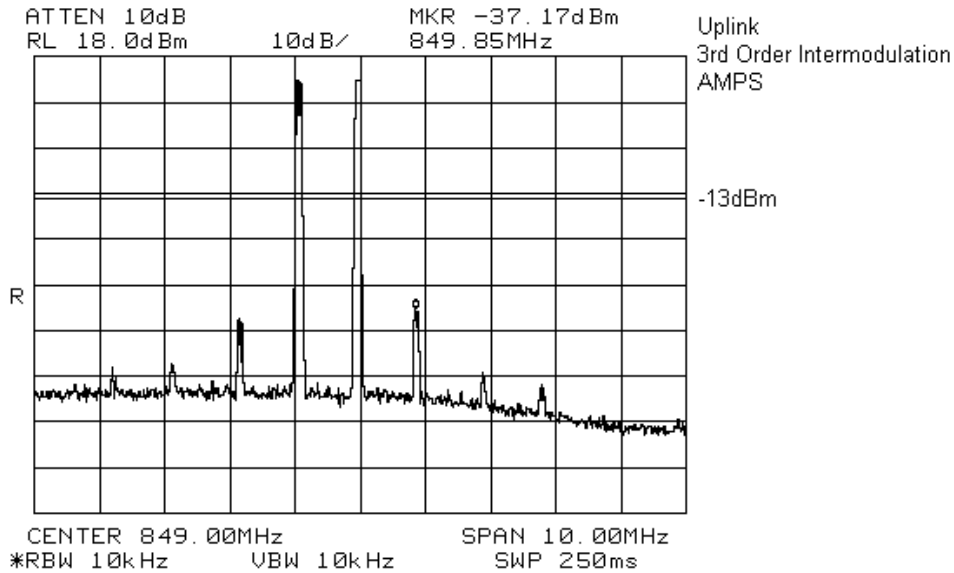
Downlink Conducted Emissions – Upper Frequencies – TDMA



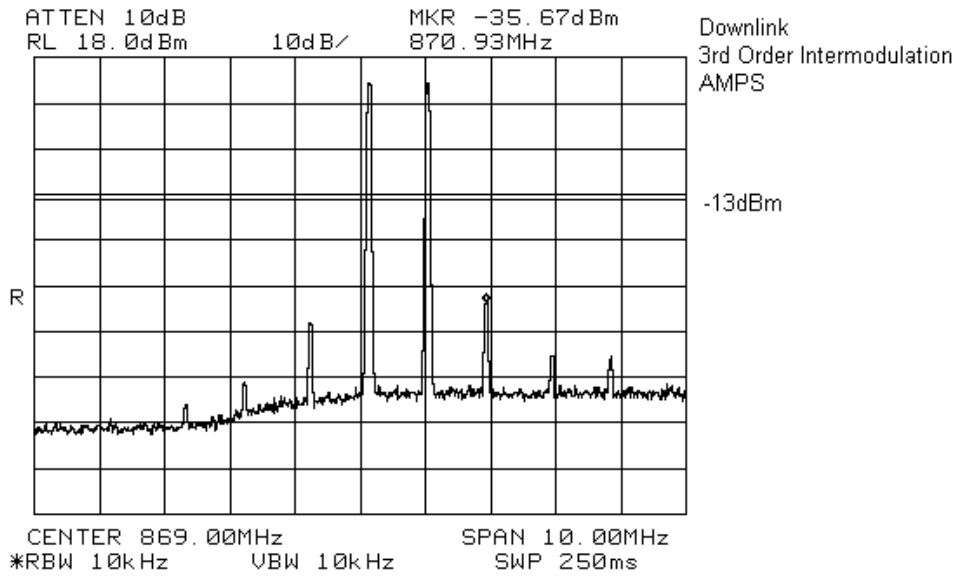
Uplink 3rd Order Intermodulation – Lower Bandedge – AMPS



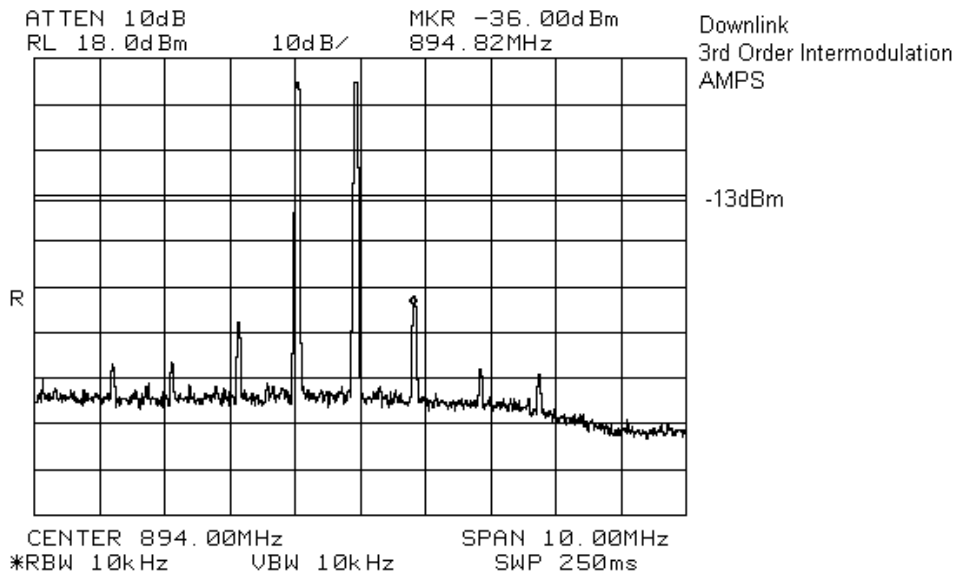
Uplink 3rd Order Intermodulation – Upper Bandedge - AMPS



Downlink 3rd Order Intermodulation - Lower Bandedge - AMPS

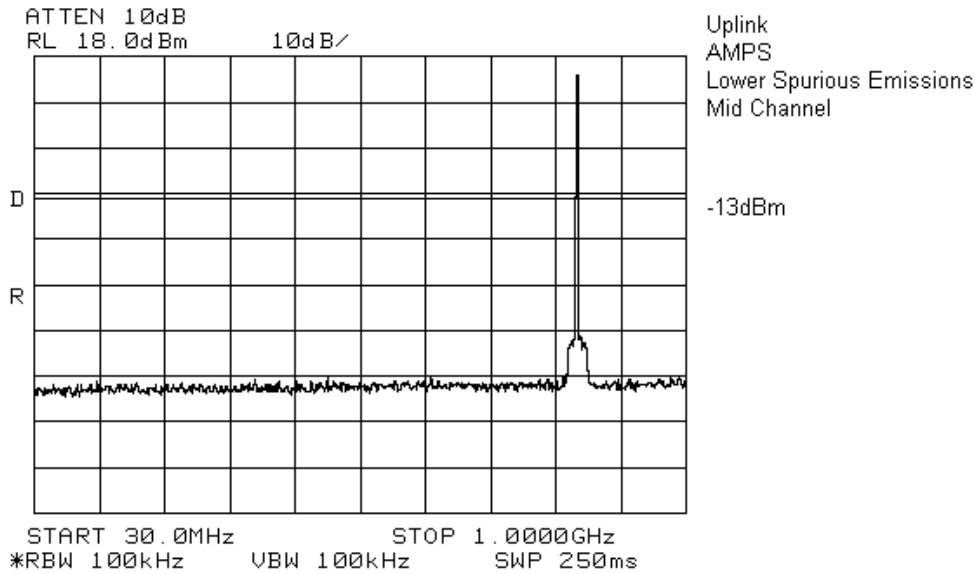


Downlink 3rd Order Intermodulation - Upper Bandedge - AMPS

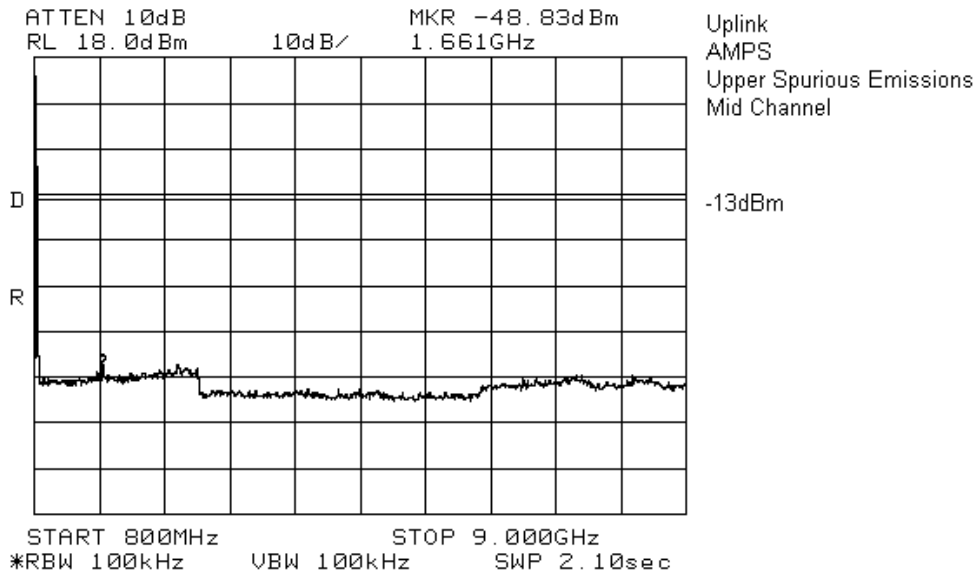


Conducted Emissions

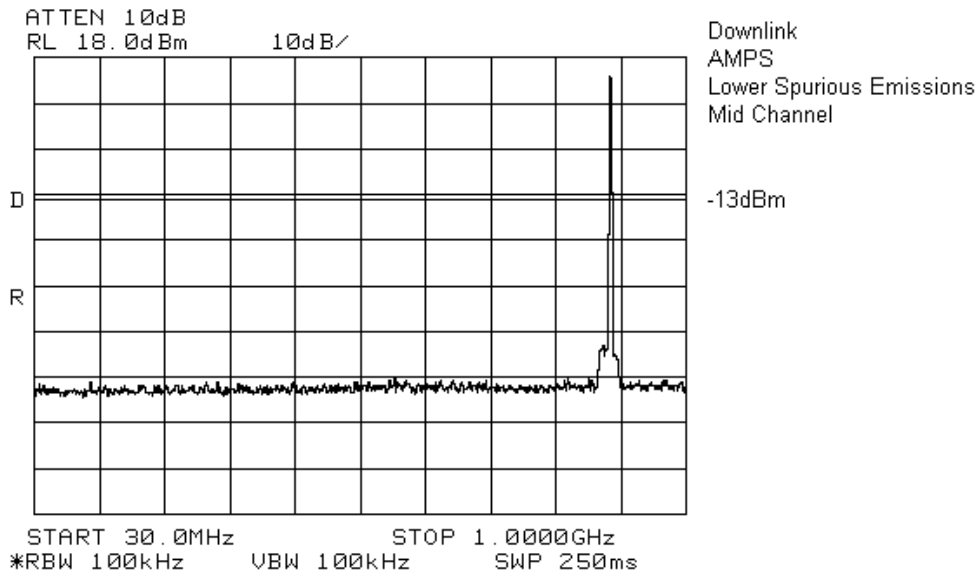
Uplink Conducted Emissions – Lower Frequencies - AMPS



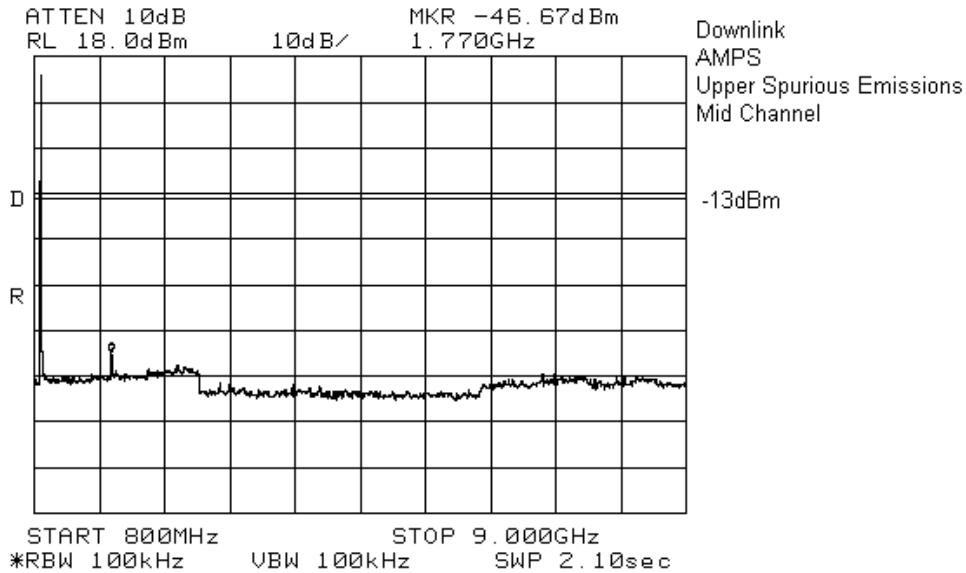
Uplink Conducted Emissions – Upper Frequencies - AMPS



Downlink Conducted Emissions – Lower Frequencies - AMPS



Downlink Conducted Emissions – Upper Frequencies – AMPS



Criteria: Clause 22.917 Radiated Spurious Emissions

a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.
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Test Conditions:

Sample Number:	1	Temperature:	17
Date:	May 26, 2005	Humidity:	26
Modification State:	0	Tester:	Jason Nixon
		Laboratory:	OATS

Test Results:

See Attached Table for Results

Additional Observations:

The Spectrum was searched from 30MHz to the 10GHz. No emissions were detected within 20dB below the limit.

Criteria: Clause 2-11-04/EAB/RF Occupied Bandwidth

Using an RBW of 300Hz or 1% of the emission bandwidth, The spectral shape of the output should look similar to the input for all modulations.

Test Conditions:

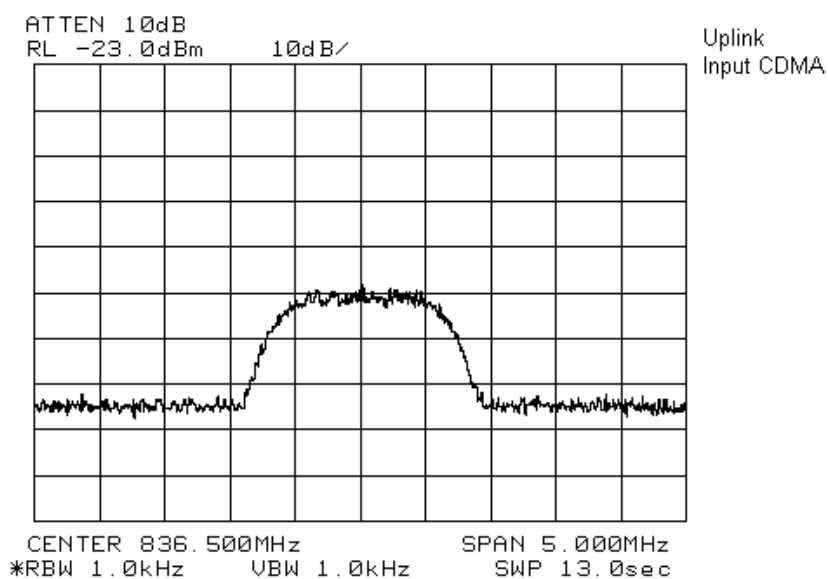
Sample Number:	1	Temperature:	23
Date:	May 24, 2005	Humidity:	36
Modification State:	0	Tester:	Jason Nixon
		Laboratory:	Wireless

Test Results:

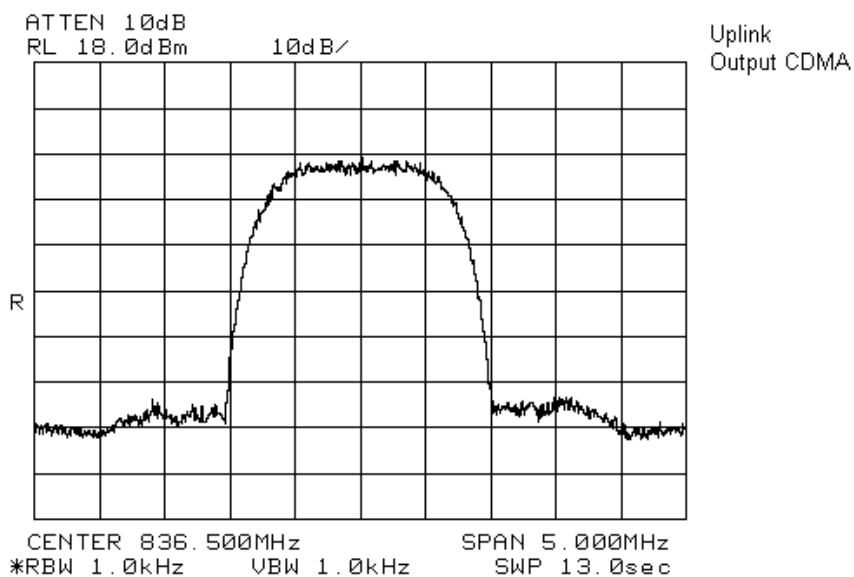
See Attached Plots.

Additional Observations:

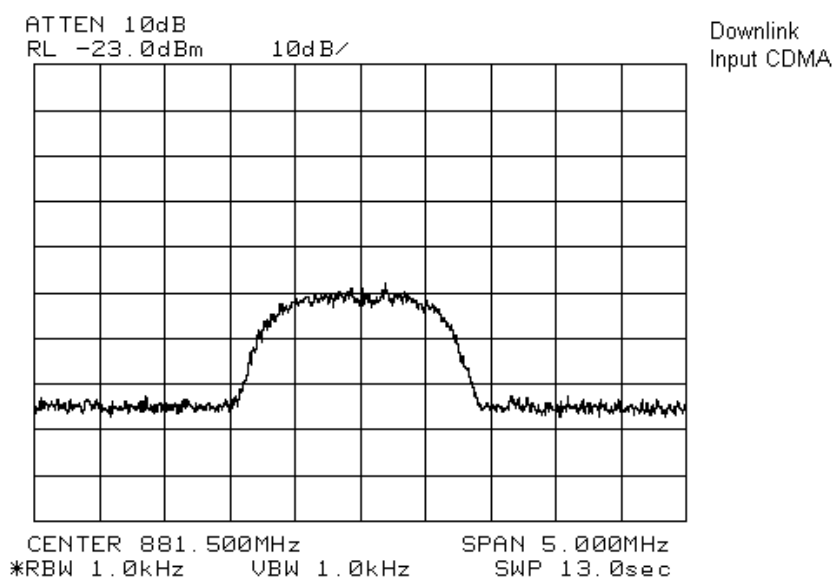
Uplink Input – CDMA



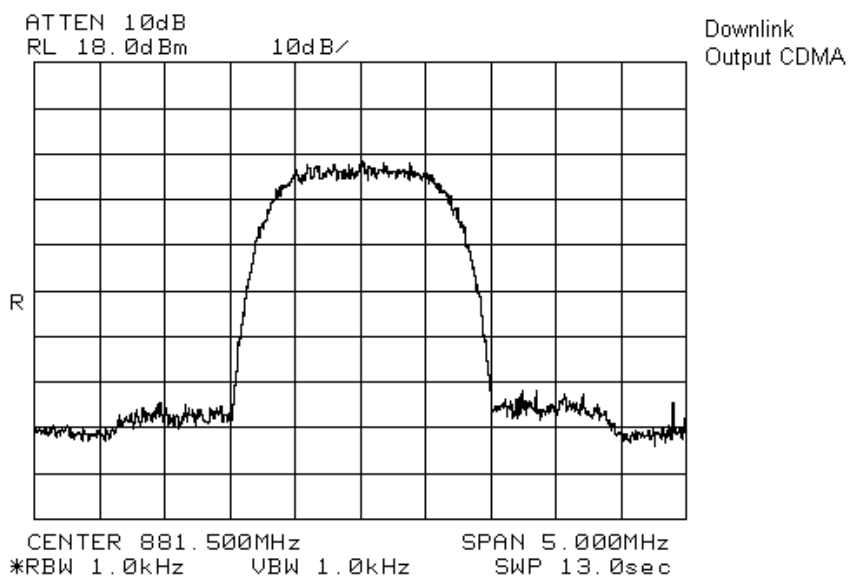
Uplink Output – CDMA



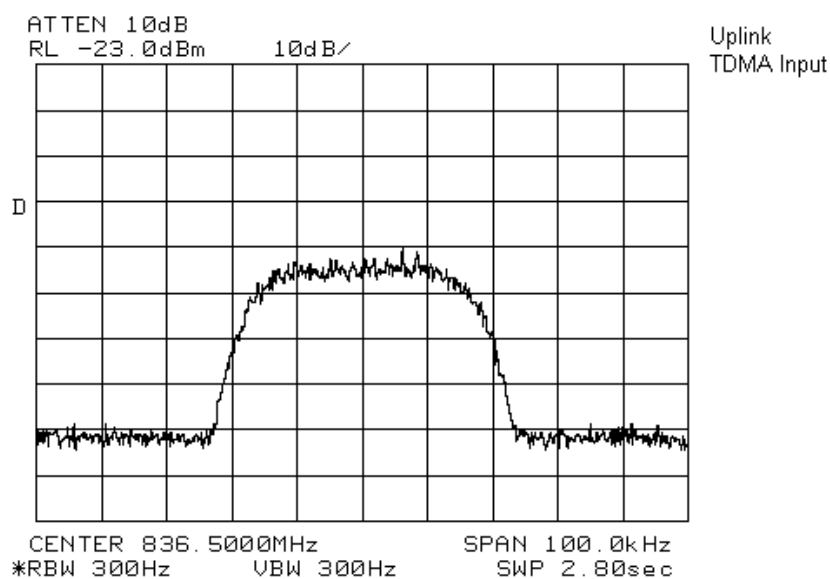
Downlink Input – CDMA



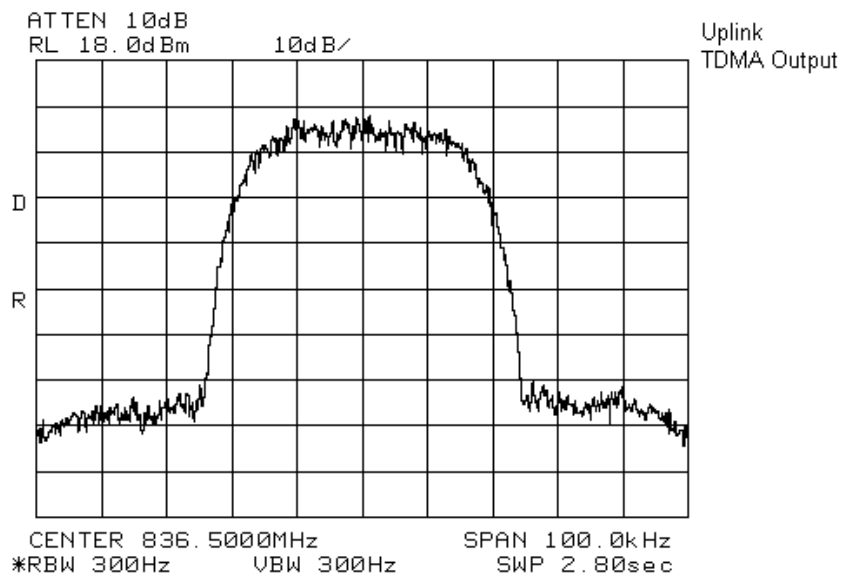
Downlink Output – CDMA



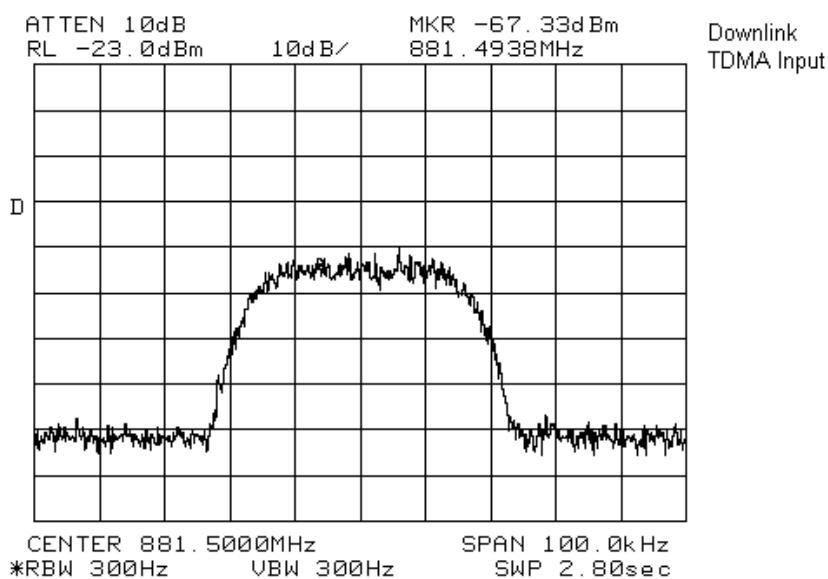
Uplink Input – TDMA



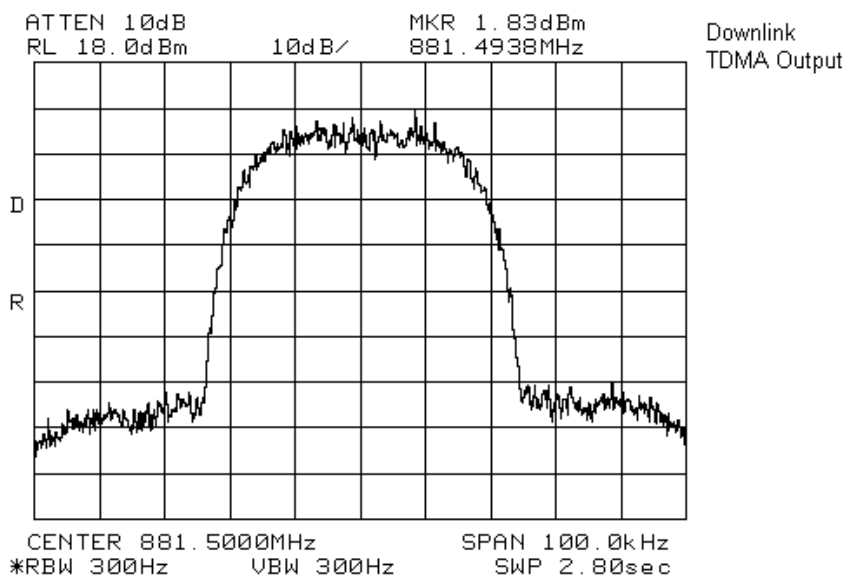
Uplink Output – TDMA



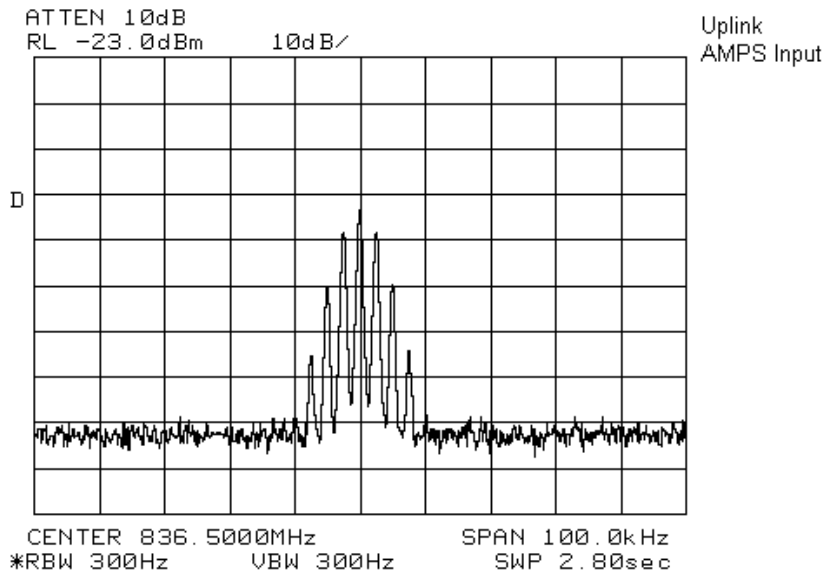
Downlink Input – TDMA



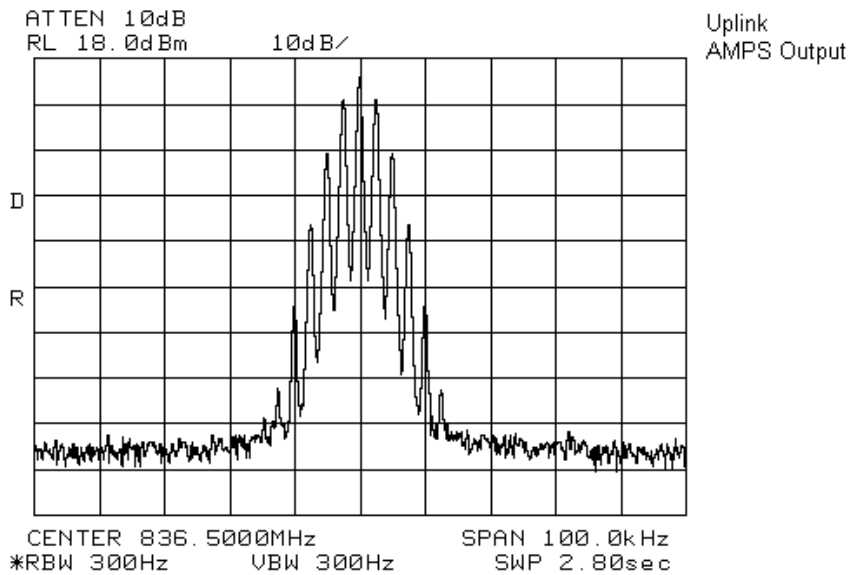
Downlink Output – TDMA



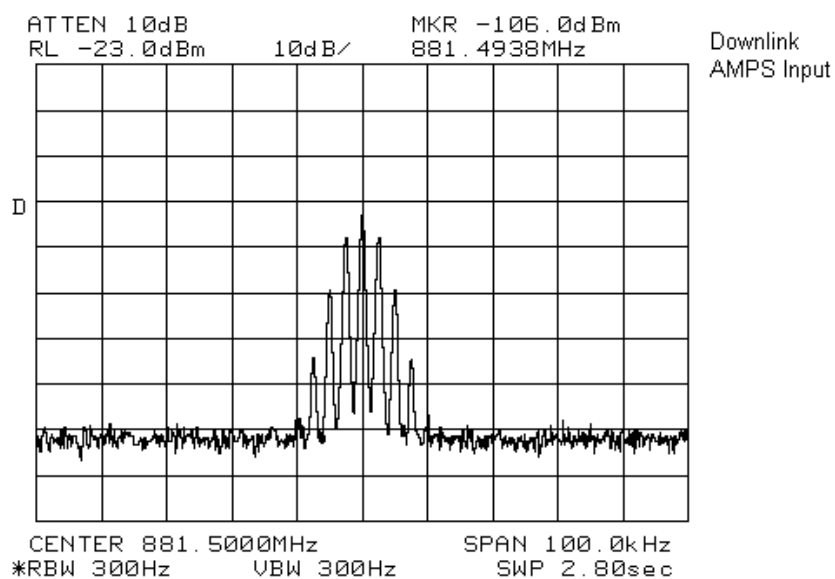
Uplink Input – AMPS



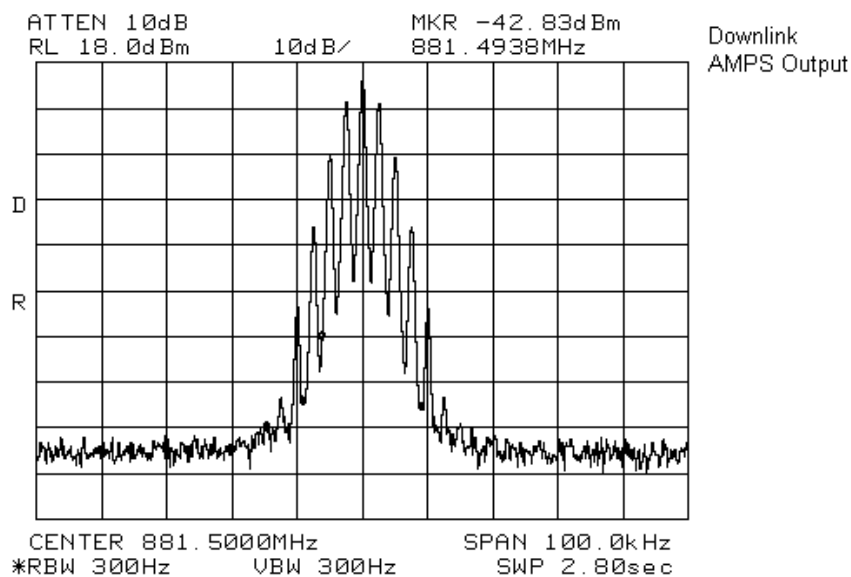
Uplink Output – AMPS



Downlink Input – AMPS



Downlink Output –AMPS



Criteria: Clause 2-11-04/EAB/RF Out of Band Rejection

Plots showing the filter frequency response.
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Test Conditions:

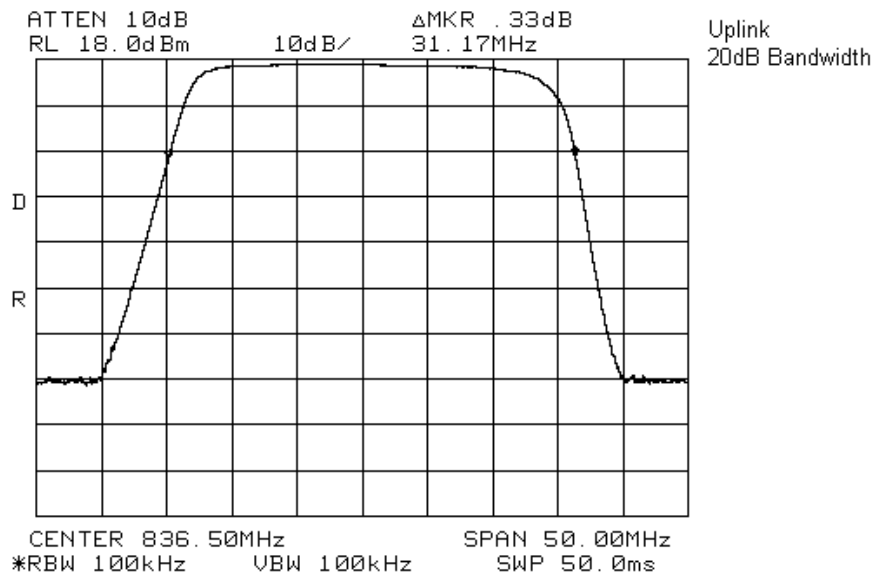
Sample Number:	1	Temperature:	23
Date:	May 24, 2005	Humidity:	36
Modification State:	0	Tester:	Jason Nixon
		Laboratory:	Wireless

Test Results:

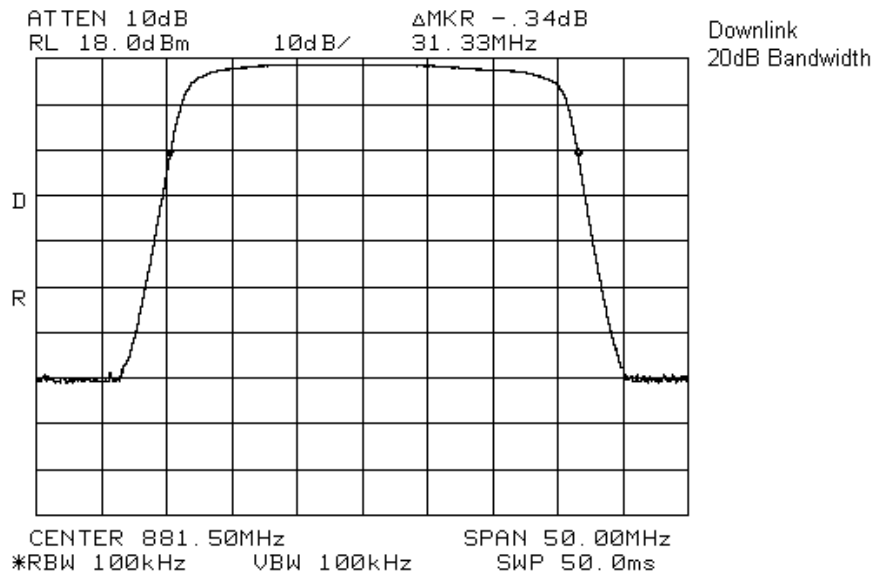
See Attached Plots.

Additional Observations:

Uplink Out of Band Reject

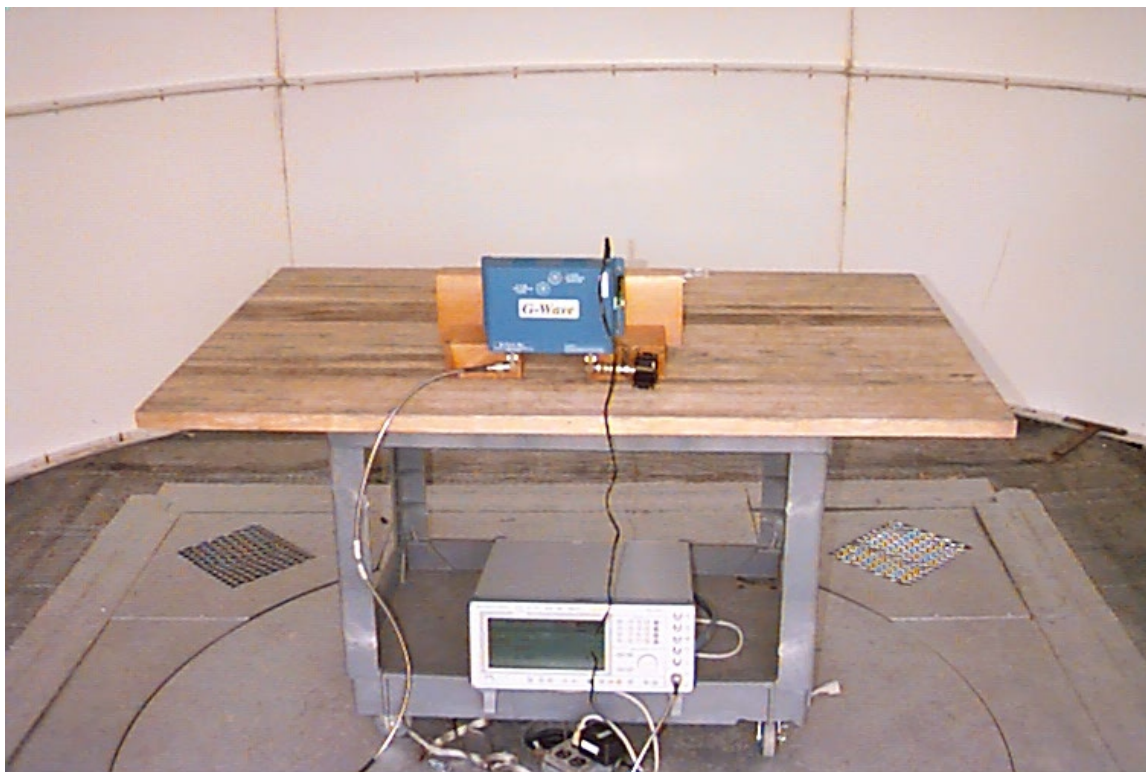


Downlink Out of Band Reject



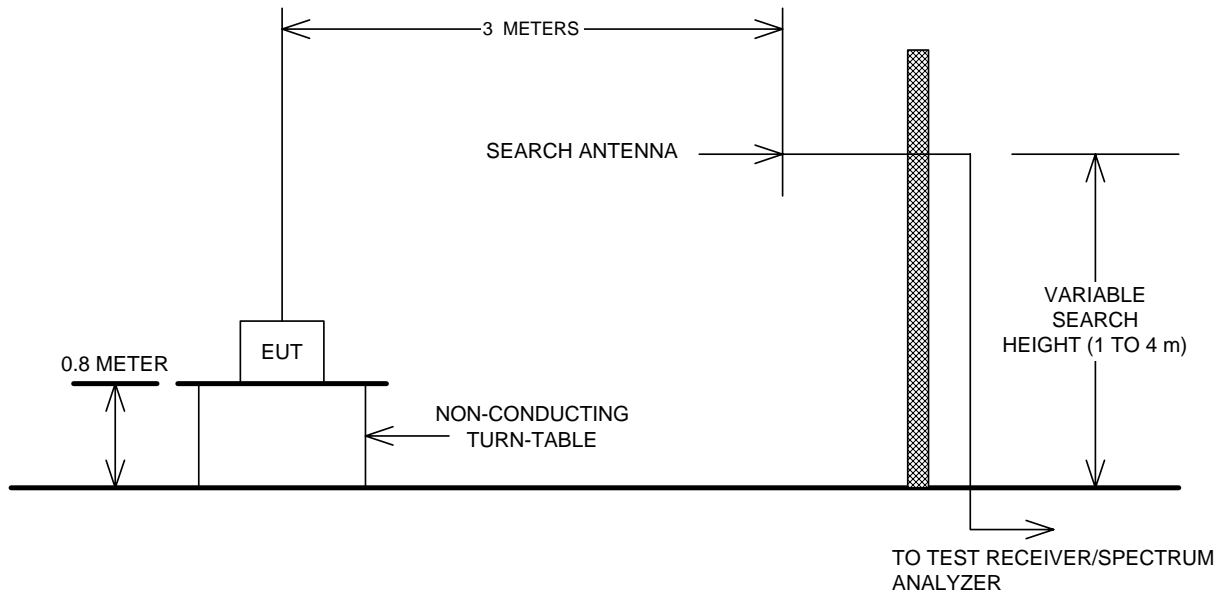
Appendix B : Setup Photographs

Radiated Spurious Emissions Setup:



Appendix C : Block Diagram of Test Setups

Test Site For Radiated Emissions



Conducted Emissions, Output power, Occupied Bandwidth and Out of Band Rejection

