



Test Report: 5W50141 Issue 2

Applicant: Dekolink Wireless Ltd.
16 Bazel St, Qiryat-Arieh
Petah-Tikva
49510 Israel

Apparatus: MW-DBDA-SMR-50W90-PS8

FCC ID: OIWDBDAPS850W90

In Accordance With: FCC Part 90, Boosters
Private Land Mobile Radio Services

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

Authorized By: 
Sim Jagpal, Resource Manager

Date: 8 September 2005

Total Number of Pages: 39

Report Summary

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 90. 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:	MW-DBDA-SMR-50W90-PS8
Specification:	FCC Part 90 Private Land Mobile Radio Services
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None
Report Release History:	Issue 2 – Corrected EUT Model number

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:

MW-DBDA-SMR-50W90-PS8

1.2 Samples Submitted for Assessment

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

Sample No.	Description	Serial No.
1	Digital Repeater MW-DBDA-SMR-50W90-PS8	0508D9054

The first samples were received on: August 16, 2005

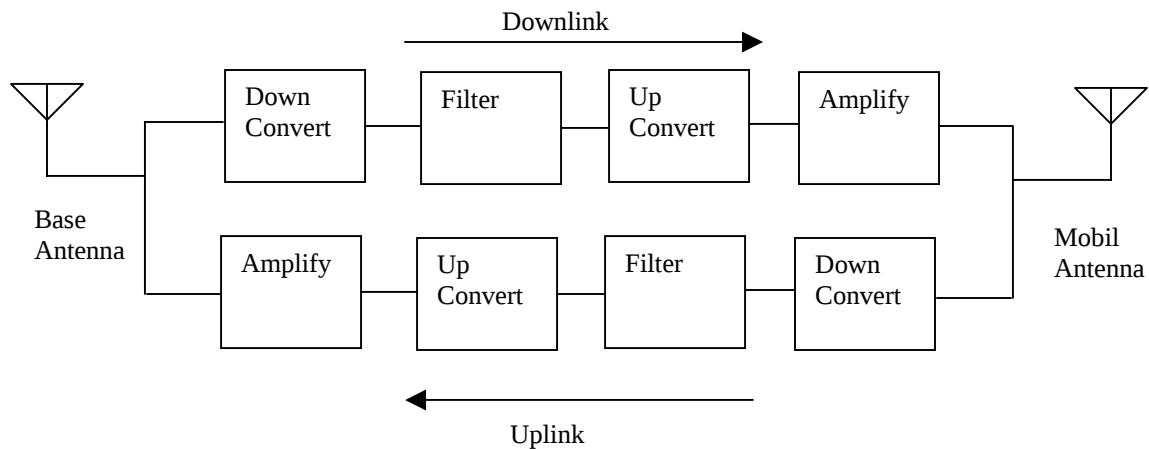
1.3 Theory of Operation

The RF signals at either the Base or Mobil antenna are converted to digital signals and filtered, using up to 8 programmable filters. Then converted back to RF signals and then amplified and transmitted using the opposite antenna direction.

1.4 Technical Specifications of the EUT

Manufacturer:	Dekolink Wireless Ltd.
Operating Frequency:	Uplink: 806-824MHz Downlink: 851-869MHz
Emission Designator:	GXW, F1D
Rated Power:	Uplink: 30dBm Downlink: 39dBm
Measured Power:	Uplink: 30.11dBm Downlink: 38.96dBm
Modulation:	iDEN and FM
Rated Gain:	90dB
Power Source:	90-260VAC

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 90 Private Land Mobile Radio 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 Analyzer	Rohde & Schwarz	FSP	FA001920	March 22/05	March 22/06
Spectrum Analyzer	Hewlett-Packard	8565E	FA000981	March 10/05	March 10/06
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
Bilog	Schaffner	CBL6112B	FA001504	NCR	NCR
Horn Antenna #1	EMCO	3115	FA000649	Dec. 22/04	Dec. 22/05
0.1 – 1300 MHz Amplifier	Hewlett Packard	8447D	FA001909	Jan. 13/05	Jan. 13/06
1.0 – 2.0 GHz Amplifier	JCA	12-400	FA001498	July 14/05	July 14/06
2.0 – 4.0 GHz Amplifier	JCA	24-600	FA001496	July 14/05	July 14/06
4.0 – 8.0 GHz Amplifier	JCA	48-600	FA001497	July 14/05	July 14/06
5.0 – 18.0 GHz Amplifier	NARDA	DWT-186N23U40	FA001409	COU	COU
Receiver	Rohde & Schwarz	ESVS-30	FA001437	July 27/05	July 27/06
Log Periodic Antenna #2	EMCO	3148	FA001355	May 16/05	May 16/06
Signal Generator	Rohde & Schwarz	SMIQ03	FA001091	Sept. 25/03	Sept. 25/06
Signal Generator	Rohde & Schwarz	SMIQ03E	FA001269	March 02/05	March 02/06
Attenuator	Narda	769-20	FA001394	COU	COU
Attenuator	Narda	776B-20	FA001153	COU	COU
Splitter	Mini-circuits	ZA3PD-2	FA001155	NCR	NCR
Power Meter	Agilent	E4418B	FA001678	Mar 8/05	Mar 8/06
Power Sensor	Agilent	8487A	FA001741	May 26/05	May 26/06

COU – Cal. On Use

NCR – No Cal. Required

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.

3.5 Additional Observations

There were no additional observations made during this assessment.

Section 4 : Results Summary

This section contains the following:

FCC Part 90 : 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 90 : Test Results

Clause	Test Method	Test Description	Required	Result
90.205	2.1046	Output power	Y	PASS
90.210	2.1051	Conducted spurious emissions	Y	PASS
90.210	2.1053	Radiated spurious emissions	Y	PASS
90.213	2.1055	Frequency stability	Y (1)	PASS
90.214	—	Transient Behavior	N (2)	
90.219	—	Use of boosters	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 apparatus does not have any frequency translating circuitry. Whoever, the apparatus does convert the RF signal to a digital signal, filter and then convert the received signal back to an RF signal. Therefore, a signal was injected in the Uplink and Downlink directions and observed to remain the same frequency at the output, using a frequency counter.
- (2) The apparatus does not operate in the 150 to 174 MHz or 421 to 512 MHz Bands.

Appendix A : Test Results

Clause 90.205 Output Power

Applicants for licenses must request and use no more power than the actual power necessary for satisfactory operation. Except where otherwise specifically provided for, the maximum power that will be authorized for new stations authorized after August 16, 1995 is as follows in FCC Part 90.205(a) through (r).

Test Conditions:

Sample Number:	1	Temperature:	25
Date:	August 30, 2005	Humidity:	49
Modification State:	0	Tester:	Jason Nixon
		Laboratory:	Wireless

Test Results:

	Rated Power (dBm)	Measured Power (dBm)
Uplink FM	30	30.11
Uplink iDEN	30	27.44
Downlink FM	39	38.94
Downlink iDEN	39	38.96

Additional Observations

Testing was performed using 2 carriers spaced apart by 1MHz. Each was set for 3dB below the rated output power. The output power was then measured with both carriers turned on.

Clause 90.210 Conducted Spurious Emissions

Except as indicated elsewhere in this part, transmitters used in the radio services governed by this part must comply with the emission masks outlined in this section. Unless otherwise stated, per paragraphs (d)(4), (e)(4), and (m) of this section, measurements of emission power can be expressed in either peak or average values provided that emission powers are expressed with the same parameters used to specify the unmodulated transmitter carrier power. For transmitters that do not produce a full power unmodulated carrier, reference to the unmodulated transmitter carrier power refers to the total power contained in the channel bandwidth. Unless indicated elsewhere, the Table below specifies the emission masks for equipment operating in the frequency bands governed under this part.

Test Conditions:

Sample Number:	1	Temperature:	25
Date:	August 30, 2005	Humidity:	49
Modification State:	0	Tester:	Jason Nixon
		Laboratory:	Wireless

Test Results:

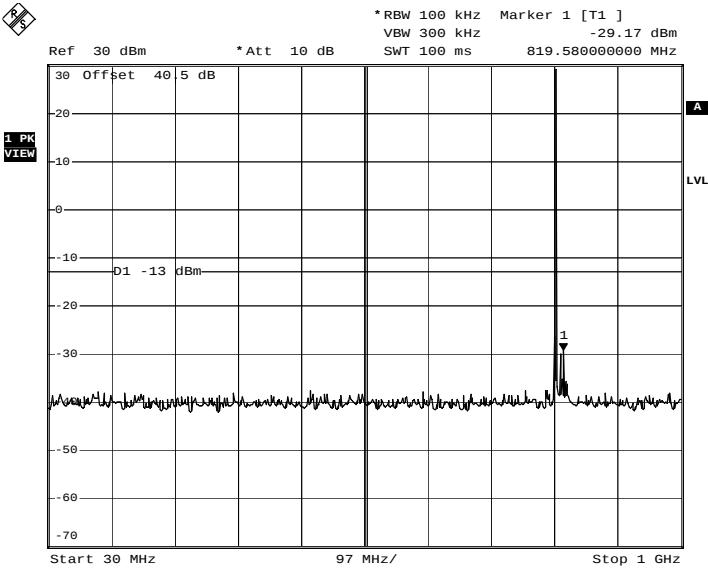
See Attached Plots.

Additional Observations:

Testing was performed on all modulation types and at the High, Middle and Low channels.

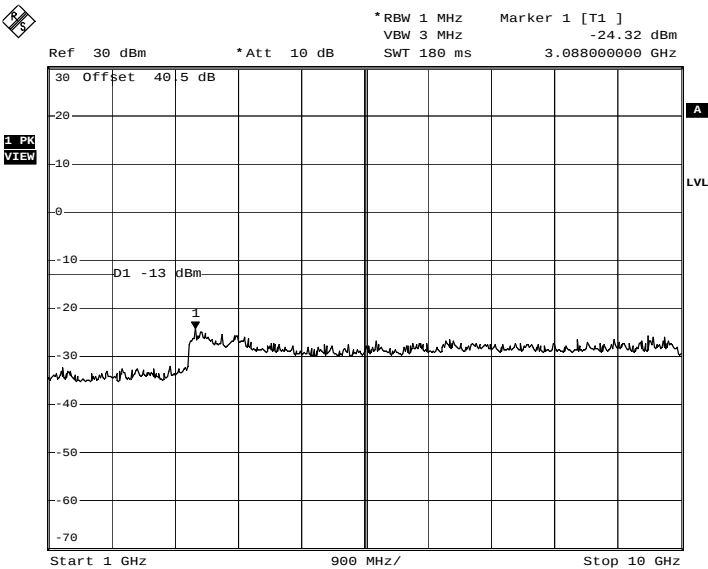
The apparatus has up to 8 programmable digital channels. For the 3rd order intermodulation testing they were set with a 1MHz spacing.

Uplink
Low Channel - FM



Uplink Lower Conducted Emissions - FM - Low Channel

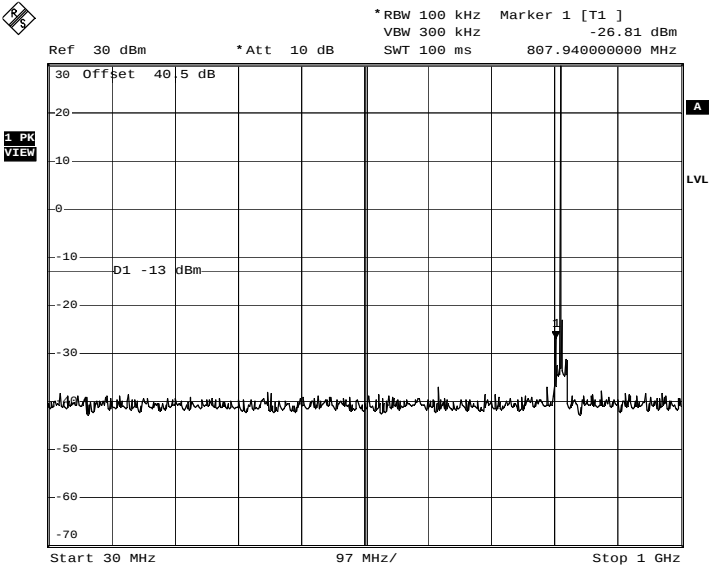
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Uplink Upper Conducted Emissions - FM - Low Channel

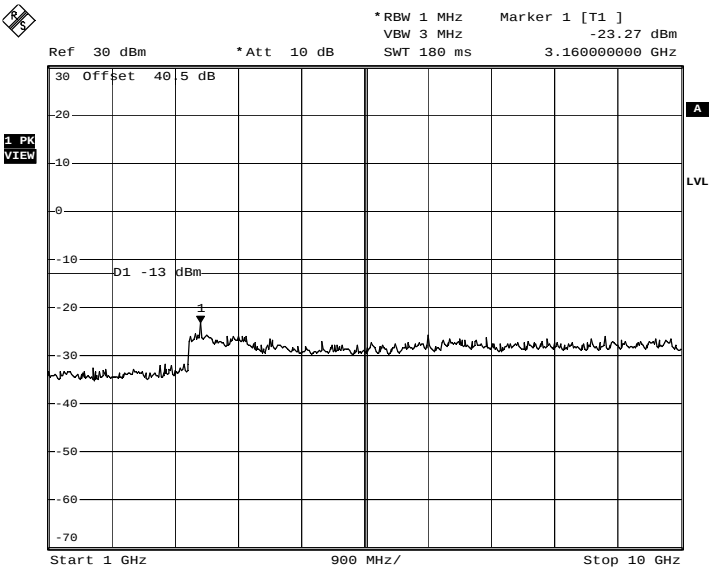
Date: 30.AUG.2005 17:55:59

Mid Channel - FM



Uplink Lower Conducted Emissions - FM - Mid Channel

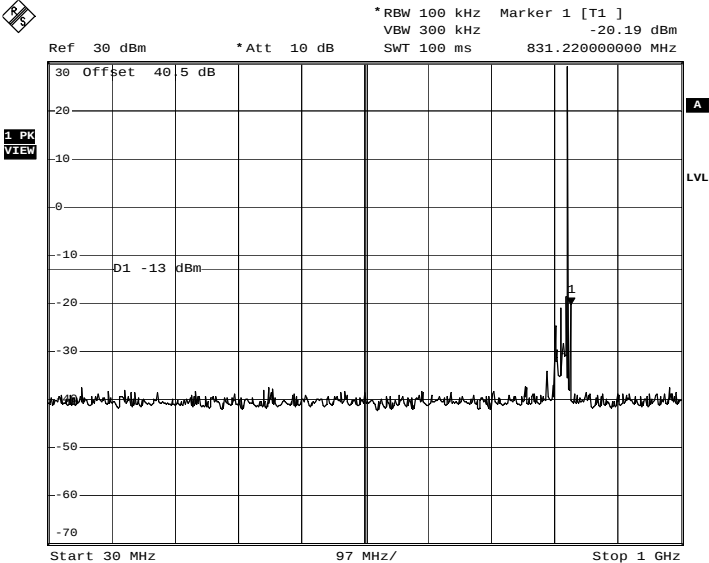
Date: 30.AUG.2005 17:44:39



Uplink Upper Conducted Emissions - FM - Mid Channel

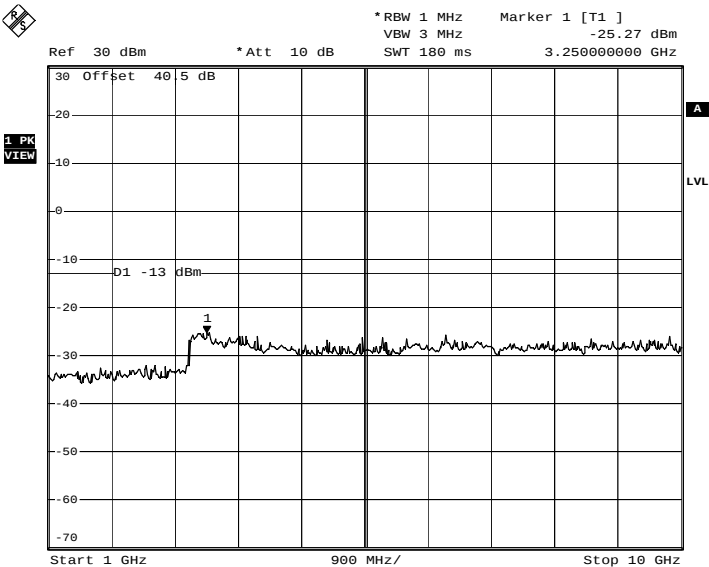
Date: 30.AUG.2005 17:45:49

High Channel - FM



Uplink Lower Conducted Emissions - FM - High Channel

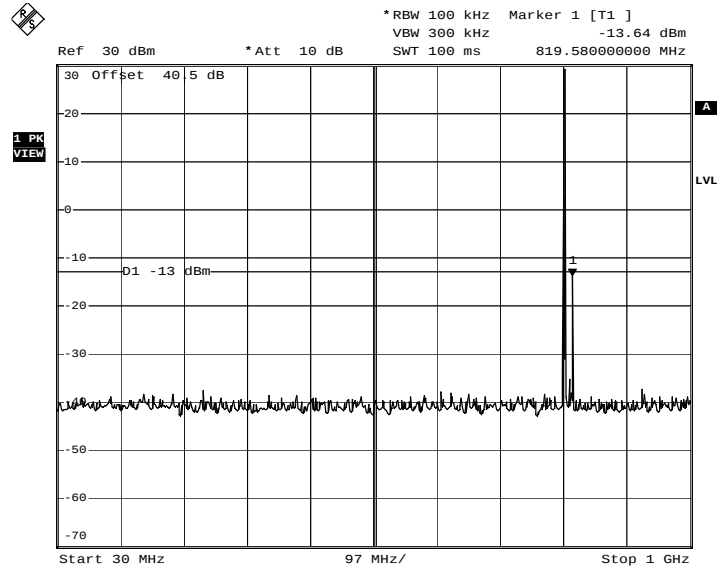
Date: 30.AUG.2005 17:53:17



Uplink Upper Conducted Emissions - FM - High Channel

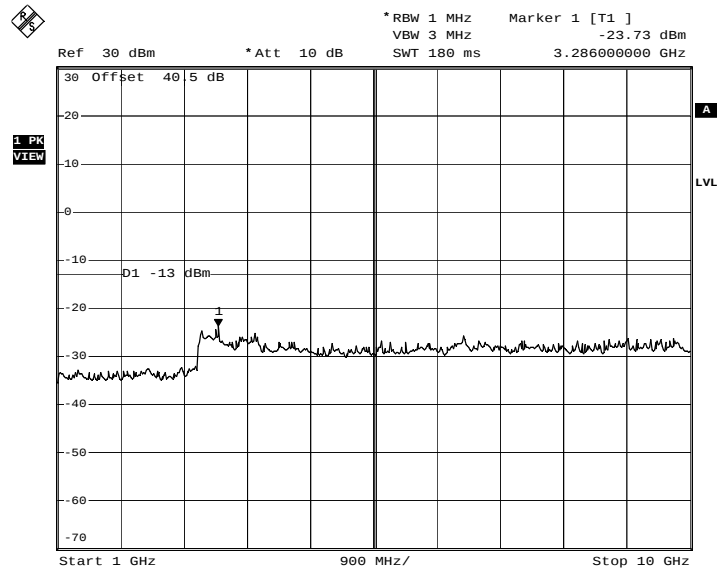
Date: 30.AUG.2005 17:52:13

Uplink Low Channel - iDEN



Uplink Lower Conducted Emissions - iDEN - Low Channel

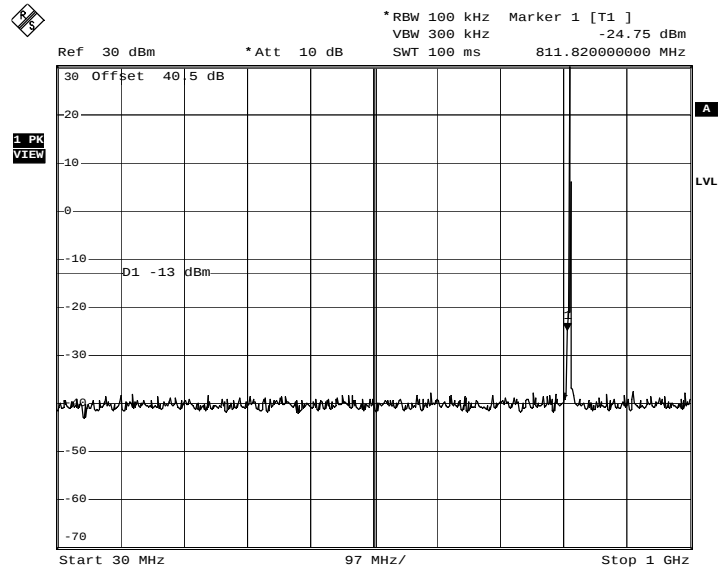
Date: 30.AUG.2005 18:38:49



Uplink Upper Conducted Emissions - iDEN - Low Channel

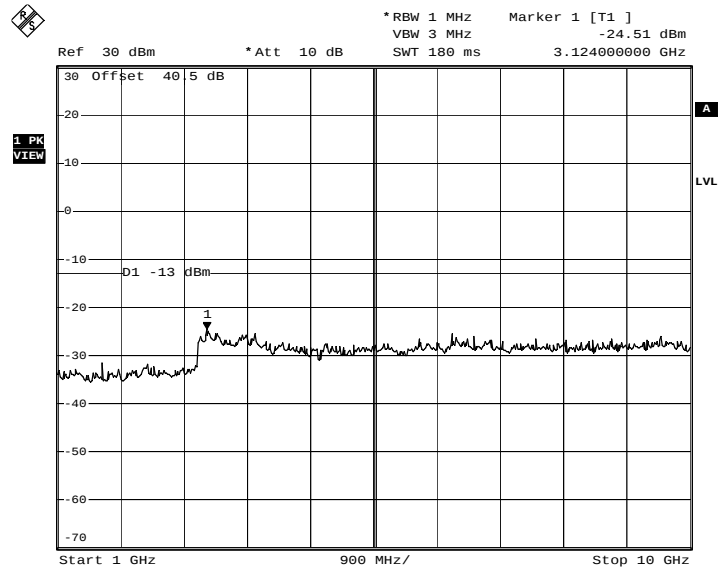
Date: 30.AUG.2005 18:37:40

Mid Channel - iDEN



Uplink Lower Conducted Emissions - iDEN - Mid Channel

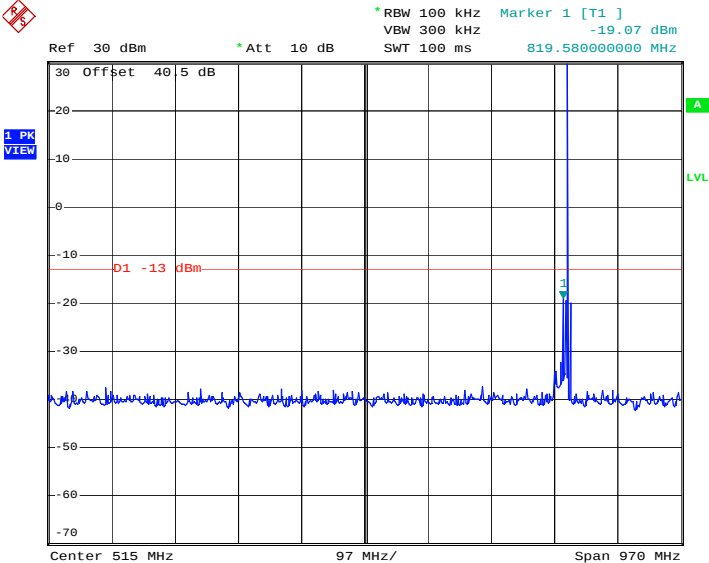
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Uplink Upper Conducted Emissions - iDEN - Mid Channel

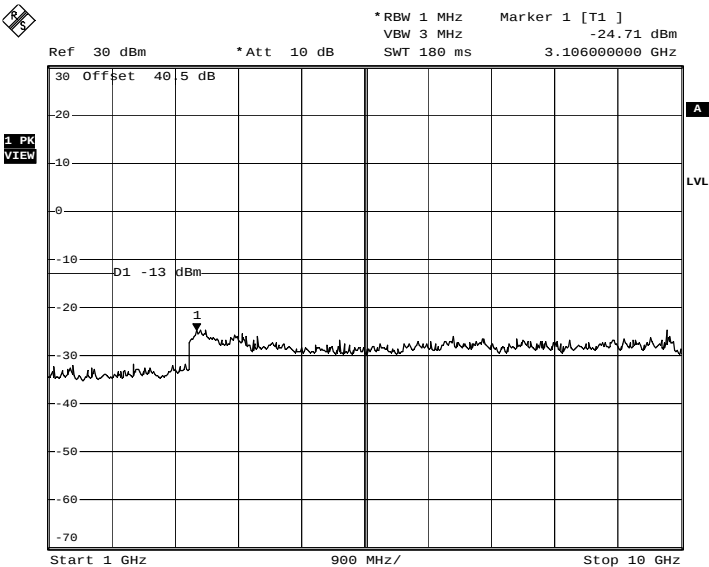
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High Channel - iDEN



Uplink Lower Conducted Emissions - iDEN - High Channel

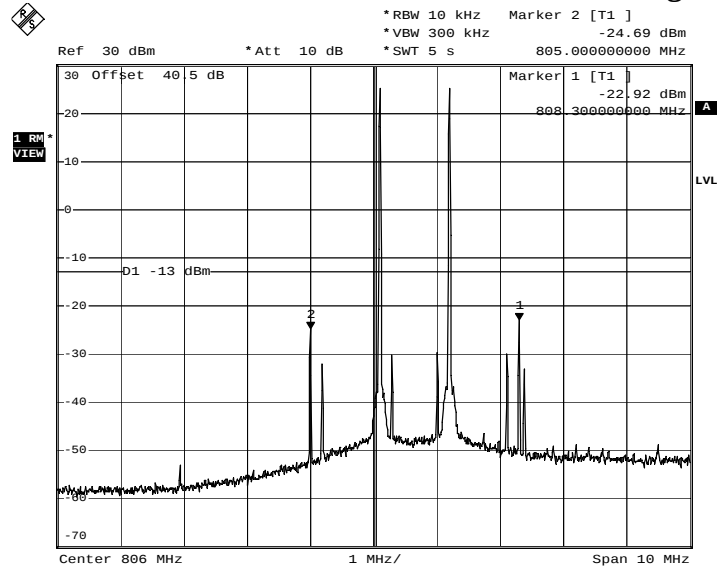
Date: 30.AUG.2005 18:47:13



Uplink Upper Conducted Emissions - iDEN - High Channel

Date: 30.AUG.2005 18:45:38

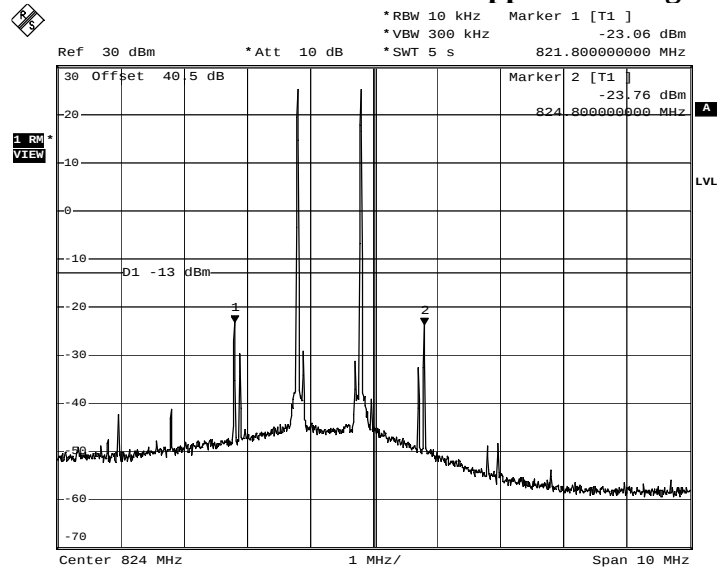
Uplink 3rd Order Intermodulation – FM Lower Bandedge



Uplink Intermodulation Lower Bandedge - FM

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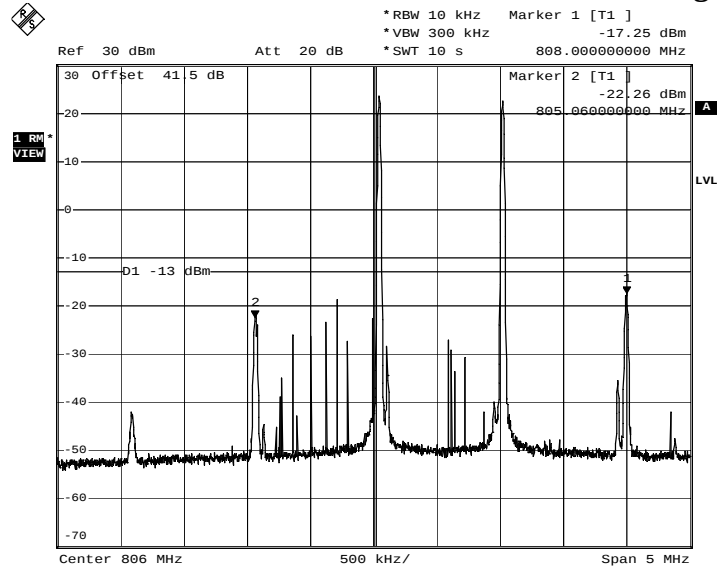
3rd Order Intermodulation – FM Upper Bandedge



Uplink Intermodulation Upper Bandedge - FM

Date: 30.AUG.2005 17:40:43

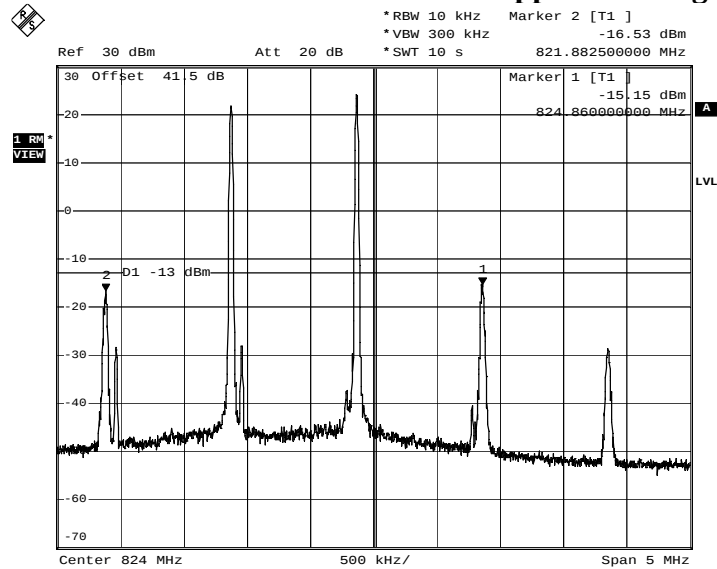
Uplink 3rd Order Intermodulation – iDEN Lower Bandedge



Uplink Lower Bandedge - iDEN

Date: 18.AUG.2005 19:48:47

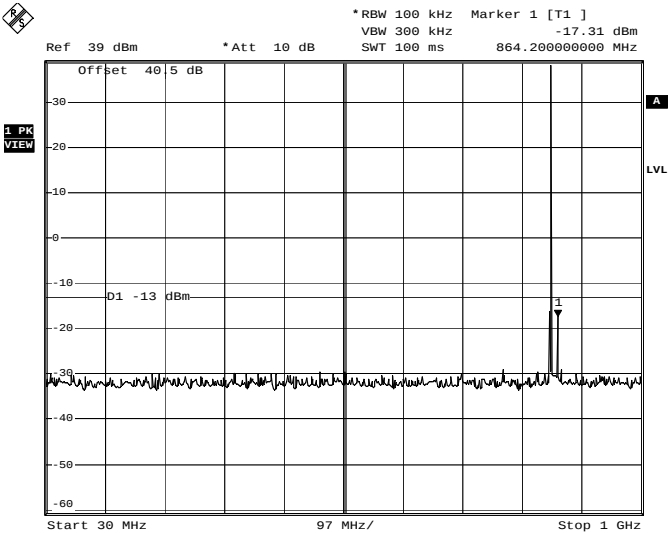
3rd Order Intermodulation – iDEN Upper Bandedge



Uplink Upper Bandedge - iDEN

Date: 18.AUG.2005 20:19:49

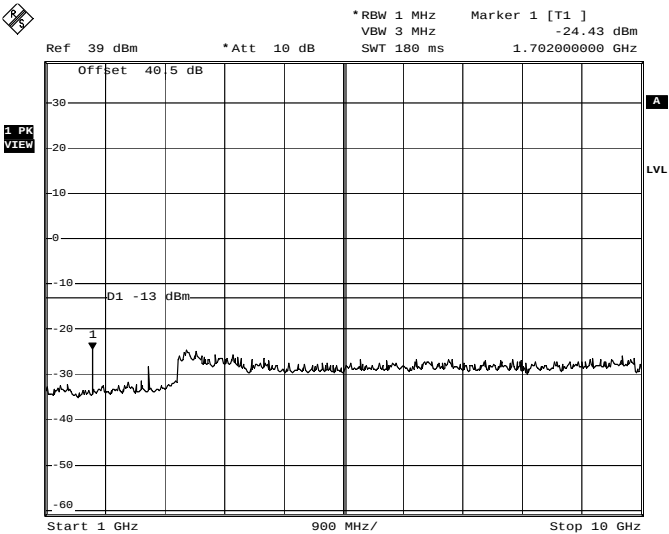
Downlink
Low Channel - FM



Downlink Lower Conducted Spurious Emissions - FM - Low Chann

e1

Date: 30.AUG.2005 16:16:36

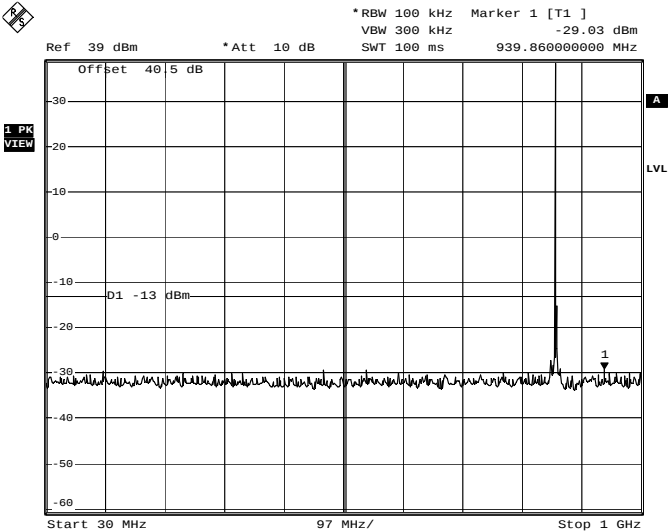


Downlink Upper Conducted Spurious Emissions - FM - Low Chann

e1

Date: 30.AUG.2005 16:17:33

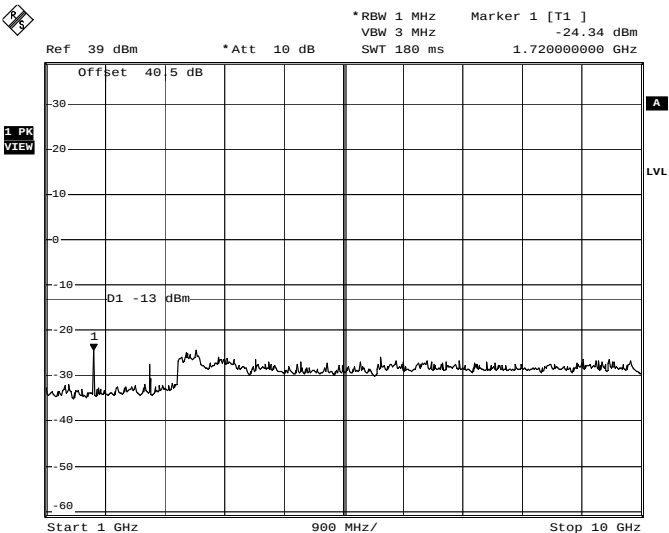
Mid Channel - FM



Downlink Lower Conducted Spurious Emissions - FM - Mid Chann

e1

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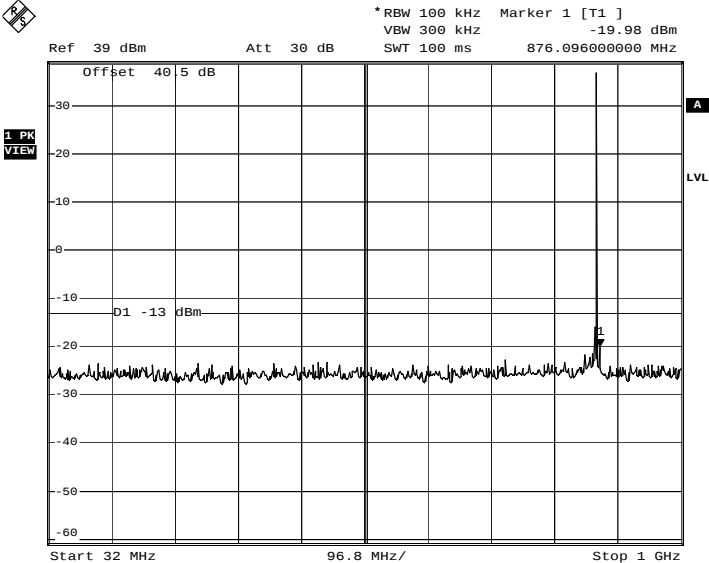


Downlink Upper Conducted Spurious Emissions - FM - Mid Chann

e1

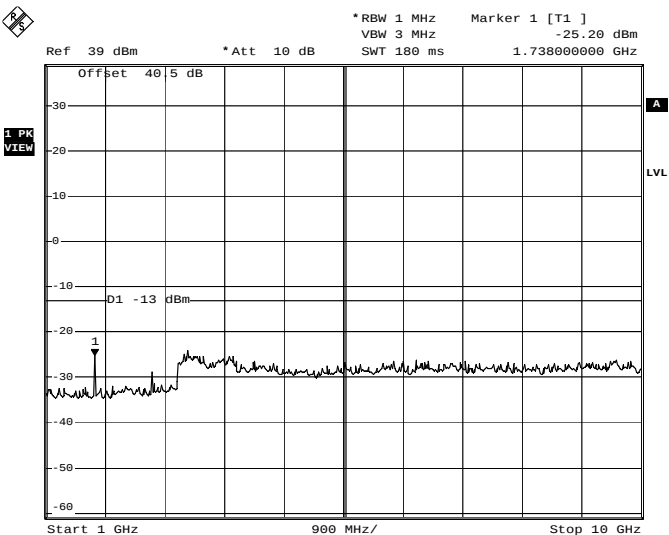
Date: 30.AUG.2005 16:13:22

High Channel - FM



Downlink Lower Conducted Spurious Emissions - FM

Date: 30.AUG.2005 16:09:11

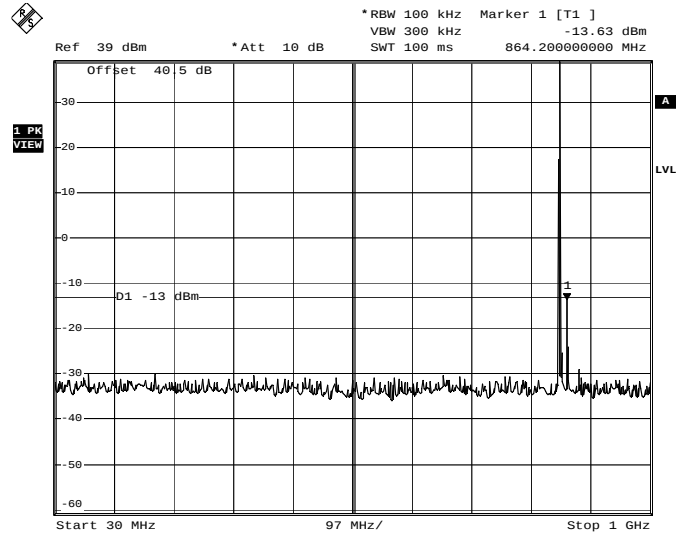


Downlink Upper Conducted Spurious Emissions - FM - High Chan

nel

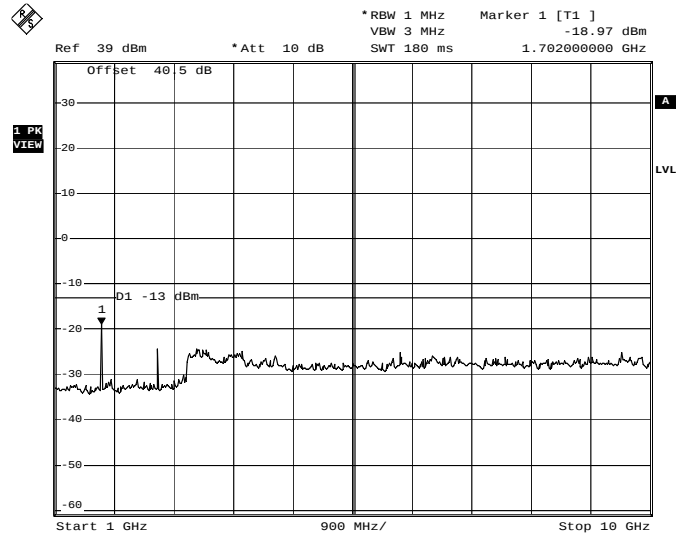
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Downlink Low Channel - iDEN



Downlink Lower Conducted Spurious Emissions - iDEN - Low Cha
nnel

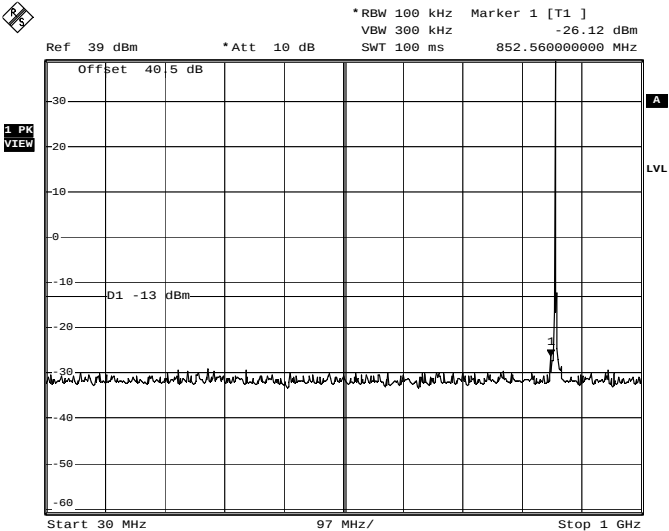
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Downlink Upper Conducted Spurious Emissions - iDEN - Low Cha
nnel

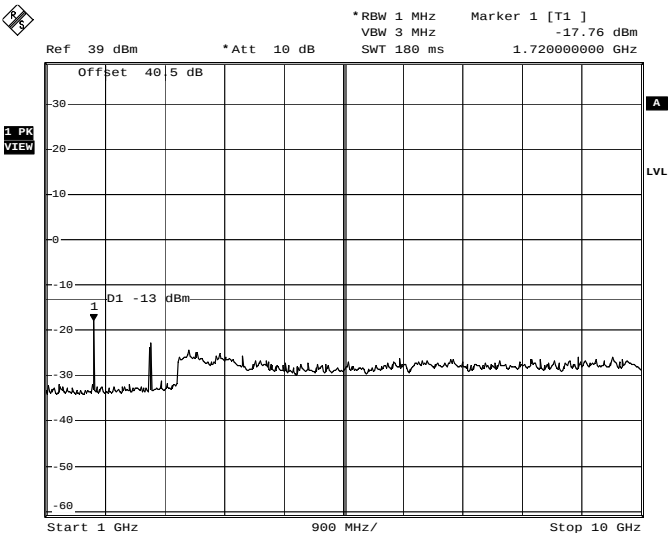
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Mid Channel - iDEN



Downlink Lower Conducted Spurious Emissions - iDEN - Mid Cha
nnel

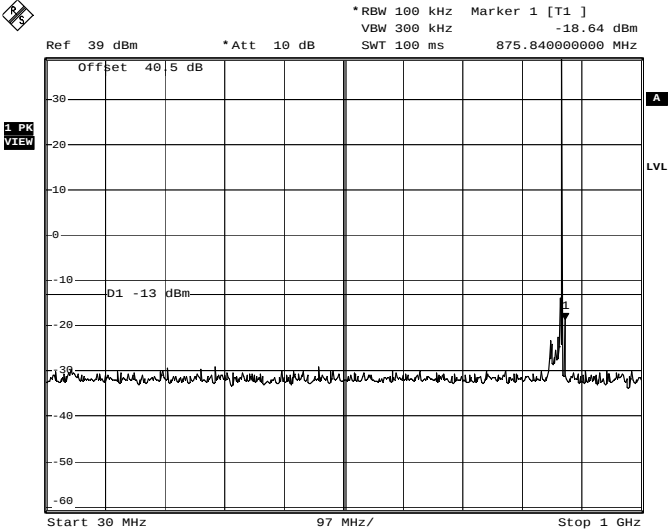
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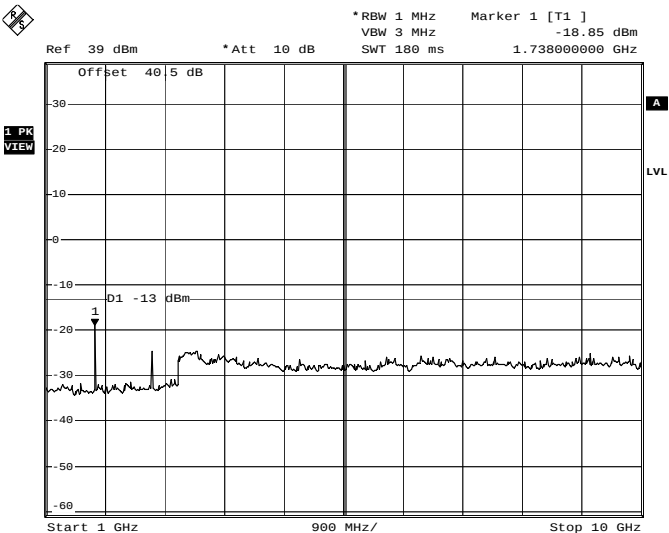
Downlink Upper Conducted Spurious Emissions - iDEN - Mid Cha
nnel

Date: 30.AUG.2005 16:29:40

High Channel - iDEN

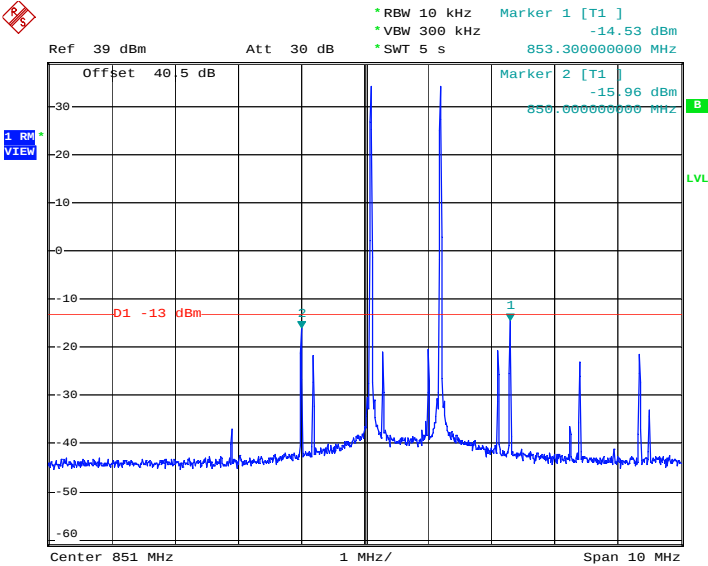


Downlink Lower Conducted Spurious Emissions - iDEN - High Ch
annel
Date: 30.AUG.2005 16:26:28



Downlink Upper Conducted Spurious Emissions - iDEN - High Ch
annel
Date: 30.AUG.2005 16:21:28

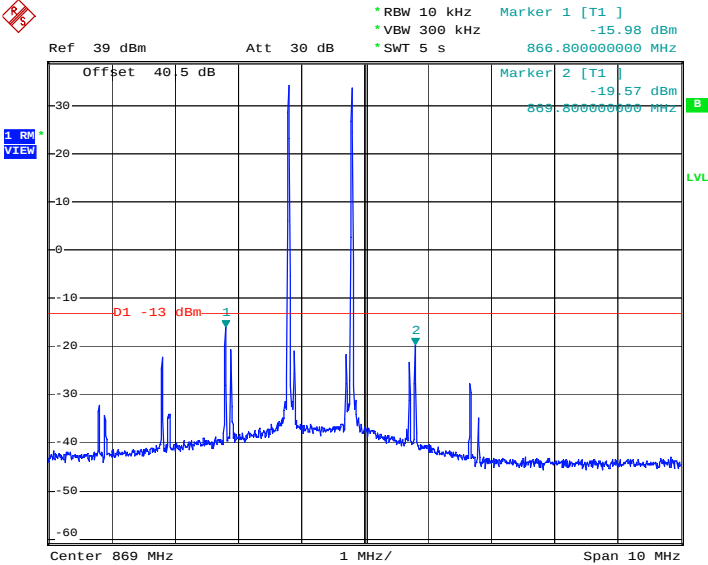
Downlink
3rd Order Intermodulation – FM Lower Bandedge



Downlink Lower Bandedge - FM

Date: 30.AUG.2005 15:46:21

3rd Order Intermodulation – FM Upper Bandedge

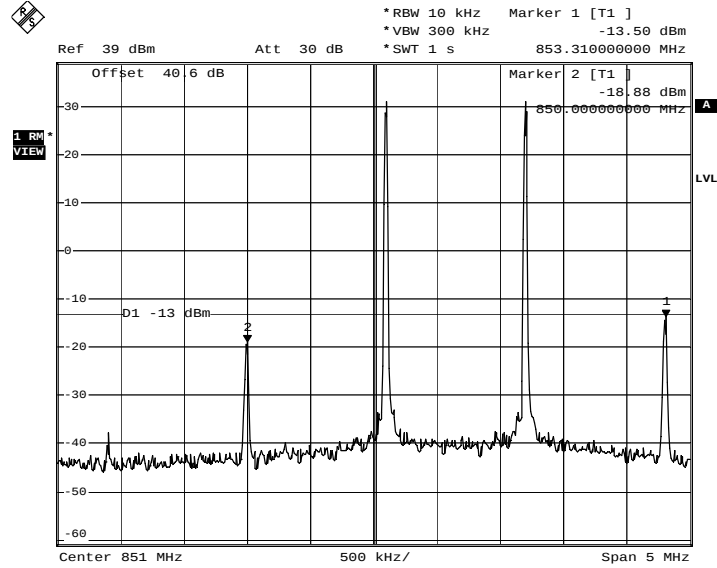


Downlink Upper Bandedge - FM

Date: 30.AUG.2005 15:51:31

Downlink

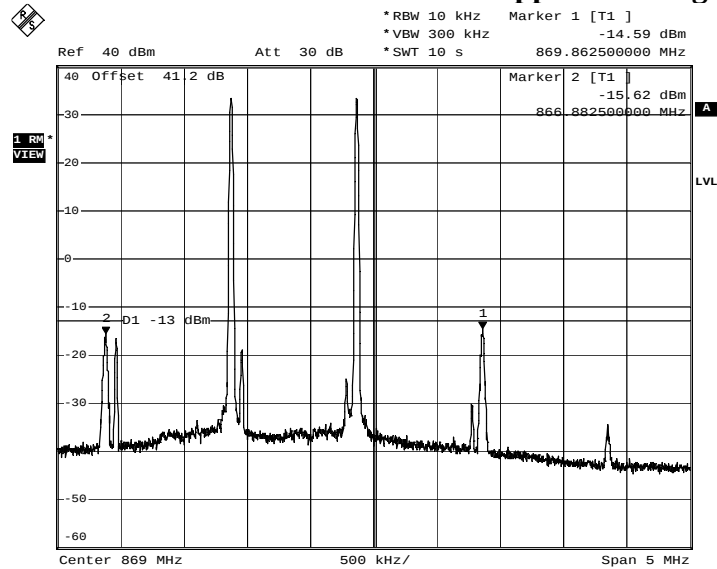
3rd Order Intermodulation – iDEN Lower Bandedge



Downlink Lower Bandedge - iDEN

Date: 22.AUG.2005 16:23:27

3rd Order Intermodulation – iDEN Upper Bandedge



Downlink Upper Bandedge - iDEN

Date: 18.AUG.2005 20:25:34

Clause 90.210 Radiated Spurious Emissions

Except as indicated elsewhere in this part, transmitters used in the radio services governed by this part must comply with the emission masks outlined in this section. Unless otherwise stated, per paragraphs (d)(4), (e)(4), and (m) of this section, measurements of emission power can be expressed in either peak or average values provided that emission powers are expressed with the same parameters used to specify the unmodulated transmitter carrier power. For transmitters that do not produce a full power unmodulated carrier, reference to the unmodulated transmitter carrier power refers to the total power contained in the channel bandwidth. Unless indicated elsewhere, the Table below specifies the emission masks for equipment operating in the frequency bands governed under this part.

Test Conditions:

Sample Number:	1	Temperature:	18
Date:	September 1, 2005	Humidity:	83
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.

The apparatus was pre-scanned on a High, Mid and Low channel for both the Uplink and Downlink and only the worst case were tested.

All measurements were performed using a Peak Detector with 100kHz RBW below 1GHz and a 1MHz RBW above 1GHz at a distance of 3 meters.

Freq. (MHz)	Ant	Pol. V/H	RCVD Signal (dBμV)	Signal Sub Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)
Downlink							
1720.0000	Horn1	V	72.5	-117.9	-45.4	-13.0	32.4
1720.0000	Horn1	H	65.2	-117.9	-52.8	-13.0	39.8
2580.0000	Horn1	V	69.2	-123.9	-54.7	-13.0	41.7
2580.0000	Horn1	H	65.8	-124.9	-59.1	-13.0	46.1
Uplink							
1647.8000	Horn1	V	52.4	-118.2	-65.8	-13.0	52.8
1647.8000	Horn1	H	53.5	-118.8	-65.3	-13.0	52.3
786.4316	LP2	V	9.0	-72.1	-63.1	-13.0	50.1
786.4316	LP2	H	10.5	-73.2	-62.7	-13.0	49.7
720.8959	LP2	V	11.1	-73.3	-62.2	-13.0	49.2
720.8959	LP2	H	11.4	-75.1	-63.7	-13.0	50.7
917.5036	LP2	V	15.6	-70.5	-54.9	-13.0	41.9
917.5036	LP2	H	14.4	-70.6	-56.2	-13.0	43.2
655.3595	LP2	V	14.0	-75.0	-61.0	-13.0	48.0
655.3595	LP2	H	10.2	-76.5	-66.3	-13.0	53.3
838.9820	LP2	V	15.1	-71.4	-56.3	-13.0	43.3
838.9820	LP2	H	13.4	-72.0	-58.6	-13.0	45.6
524.2877	LP2	V	24.8	-78.1	-53.3	-13.0	40.3
524.2877	LP2	H	21.6	-79.1	-57.5	-13.0	44.5
327.6797	LP2	V	16.7	-82.0	-65.3	-13.0	52.3
327.6797	LP2	H	18.4	-83.0	-64.6	-13.0	51.6
393.2157	LP2	V	31.3	-81.6	-50.3	-13.0	37.3
393.2157	LP2	H	26.7	-83.5	-56.8	-13.0	43.8
793.9817	LP2	V	15.1	-71.9	-56.8	-13.0	43.8
793.9817	LP2	H	13.7	-73.0	-59.3	-13.0	46.3
131.0718	BC1	V	12.4	-82.6	-70.2	-13.0	57.2
131.0718	BC1	H	13.5	-87.3	-73.8	-13.0	60.8
262.1438	BC1	V	16.6	-77.2	-60.6	-13.0	47.6
262.1438	BC1	H	17.5	-80.0	-62.5	-13.0	49.5
196.6077	BC1	V	30.3	-78.8	-48.5	-13.0	35.5
196.6077	BC1	H	31.0	-84.1	-53.1	-13.0	40.1
Note 1: Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole							

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:

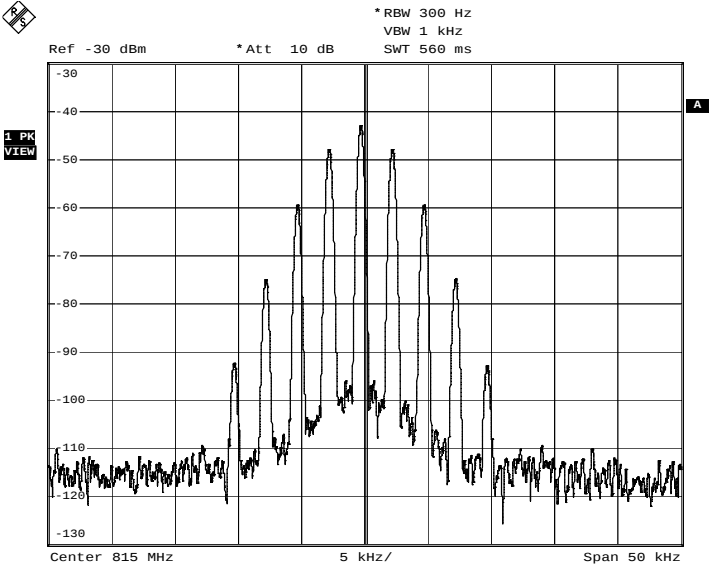
Sample Number:	1	Temperature:	22
Date:	August 18, 2005	Humidity:	38
Modification State:	0	Tester:	Jason Nixon
		Laboratory:	Wireless

Test Results:

See Attached Plots.

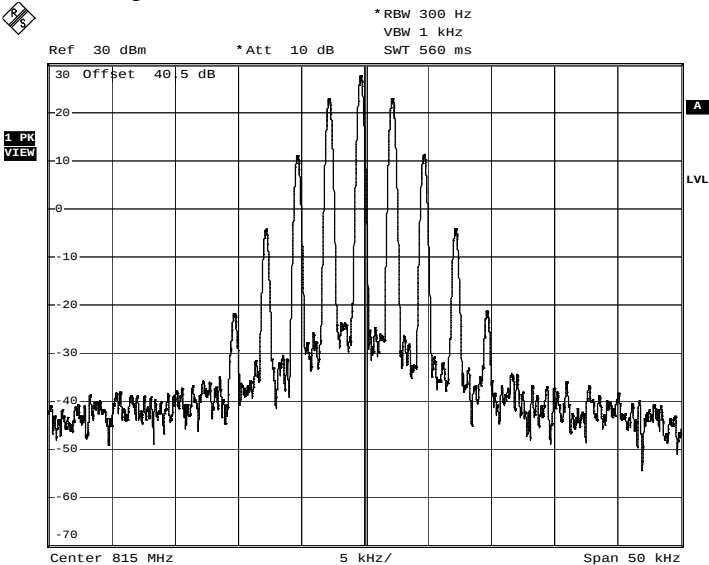
Additional Observations:

Uplink
FM - Input



Uplink Input - FM
Date: 30.AUG.2005 17:16:11

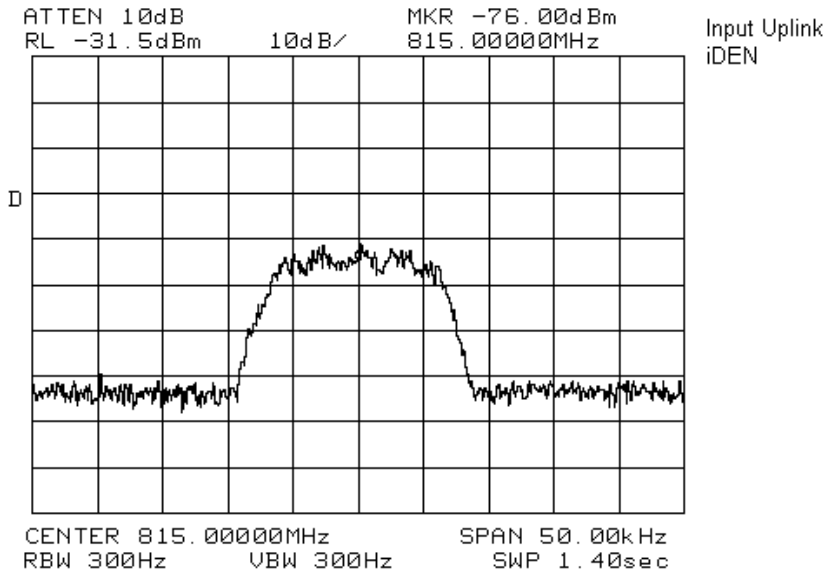
FM - Output



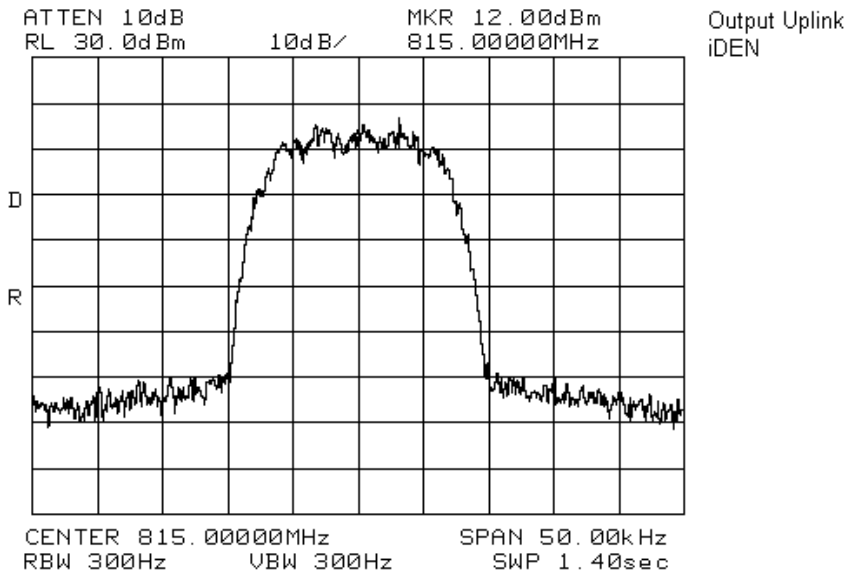
Uplink Output - FM
Date: 30.AUG.2005 17:18:45

Uplink

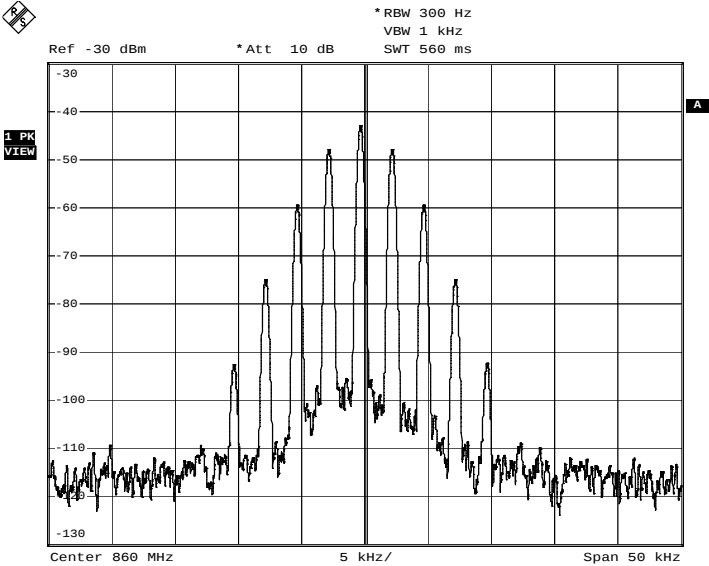
iDEN - Input



iDEN - Output



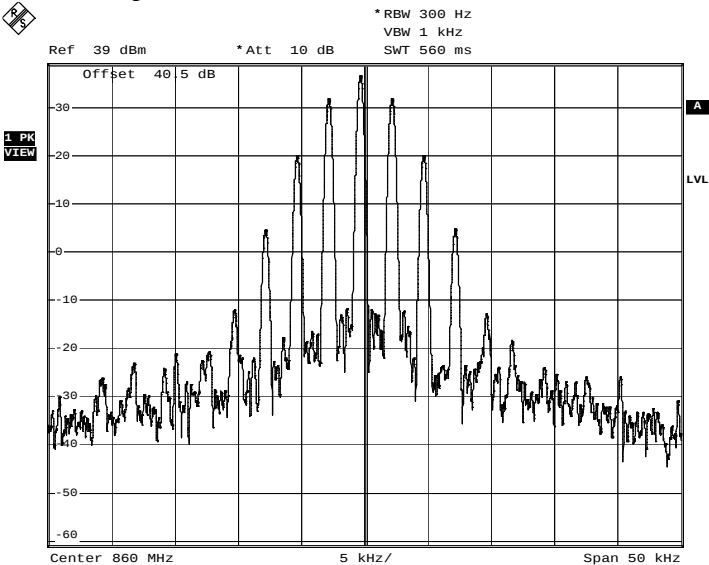
Downlink
FM - Input



Downlink Input - FM

Date: 30.AUG.2005 17:12:24

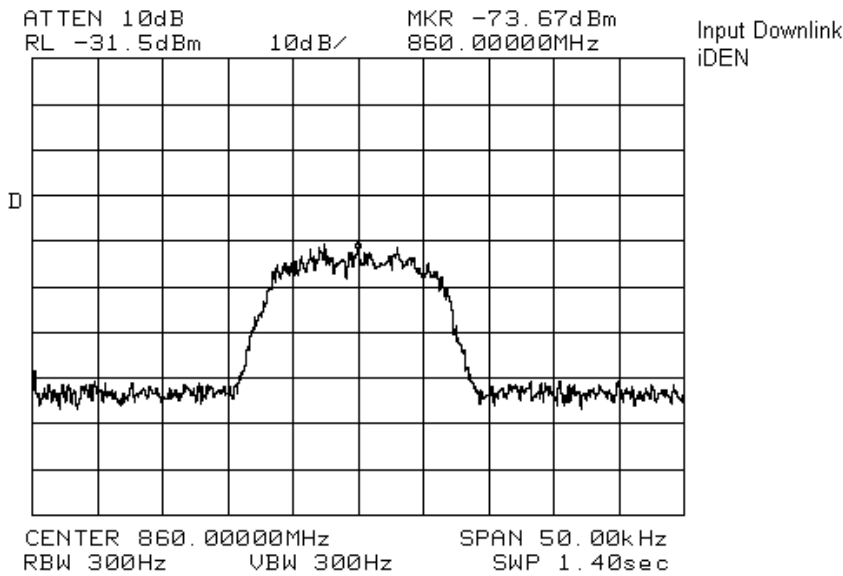
FM - Output



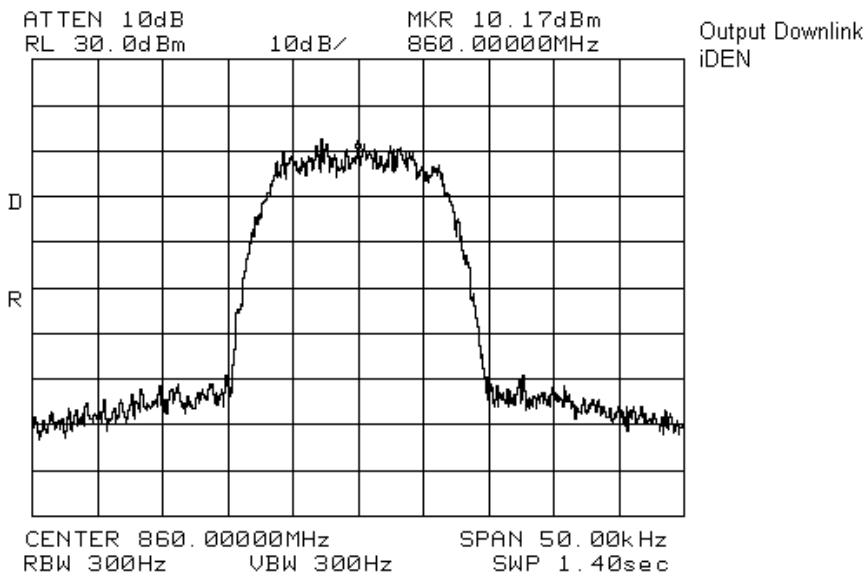
Downlink Output - FM

Date: 30.AUG.2005 17:07:57

Downlink
iDEN - Input



iDEN - Output



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

Plots showing the filter frequency response.

Test Conditions:

Sample Number:	1	Temperature:	25
Date:	August 30, 2005	Humidity:	49
Modification State:	0	Tester:	Jason Nixon
		Laboratory:	Wireless

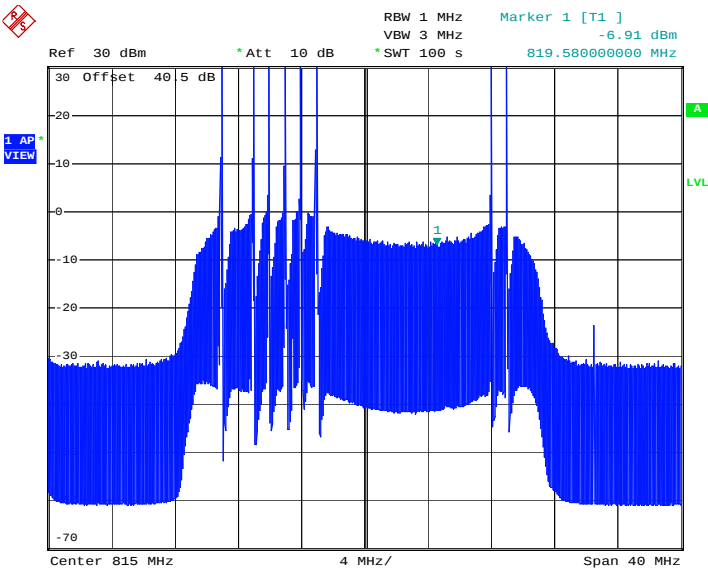
Test Results:

See Attached Plots.

Additional Observations:

The apparatus has up to 8 programmable filters, which can be located throughout the frequency band. The full band was swept to show the 8 filters and then one single filter was monitored.

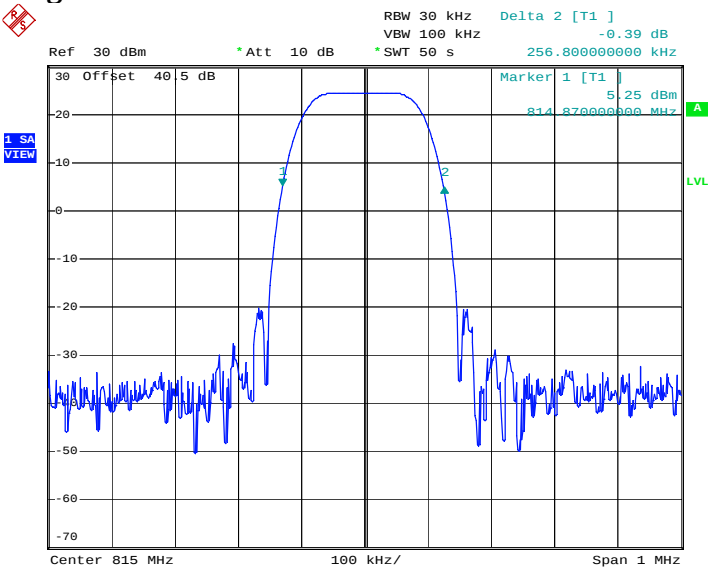
Uplink
Full Band



Uplink Full Band sweep with 8 filter channels

Date: 30.AUG.2005 19:28:06

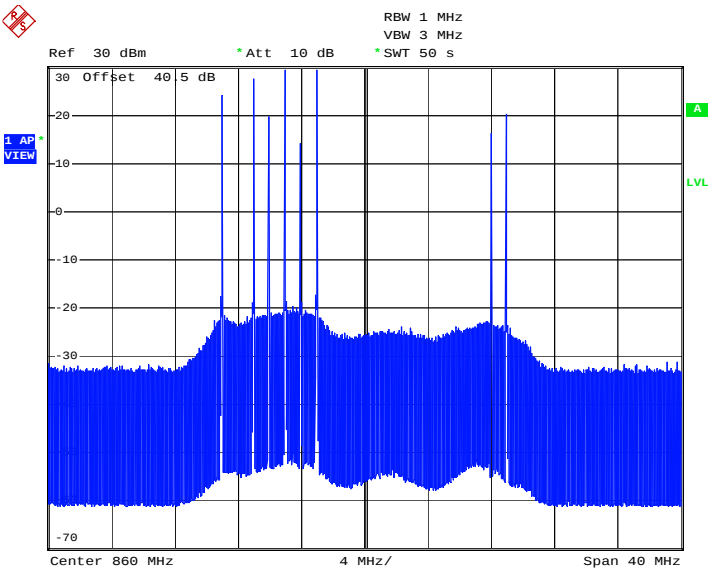
Single Channel



Uplink Single Channel

Date: 30.AUG.2005 19:52:11

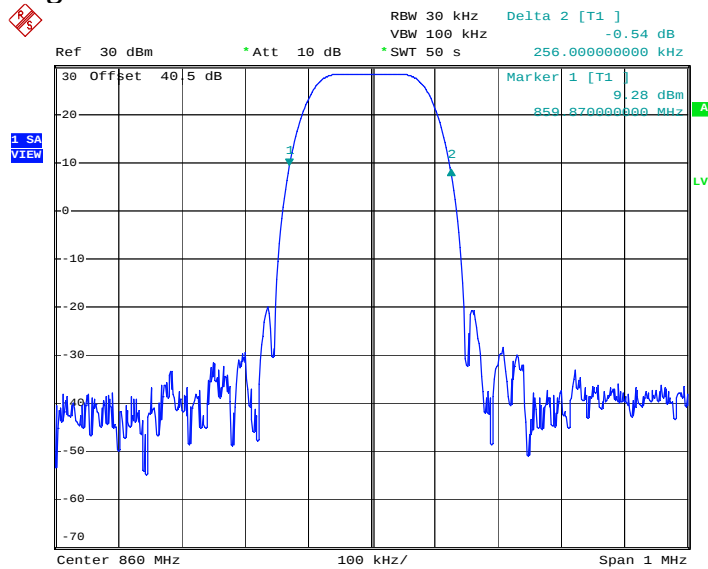
Downlink
Full Band



Downlink Full Band with 8 Single Channels

Date: 30.AUG.2005 20:17:13

Single Channel

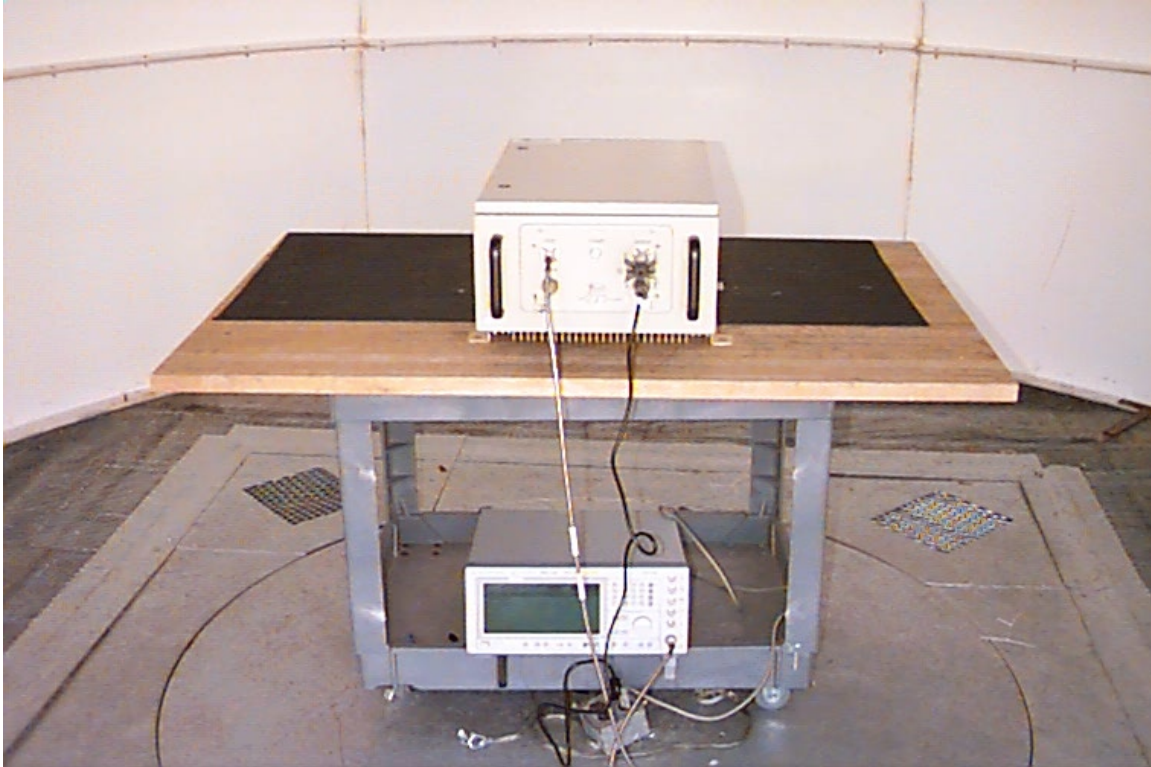


Downlink Single Channel

Date: 30.AUG.2005 19:59:26

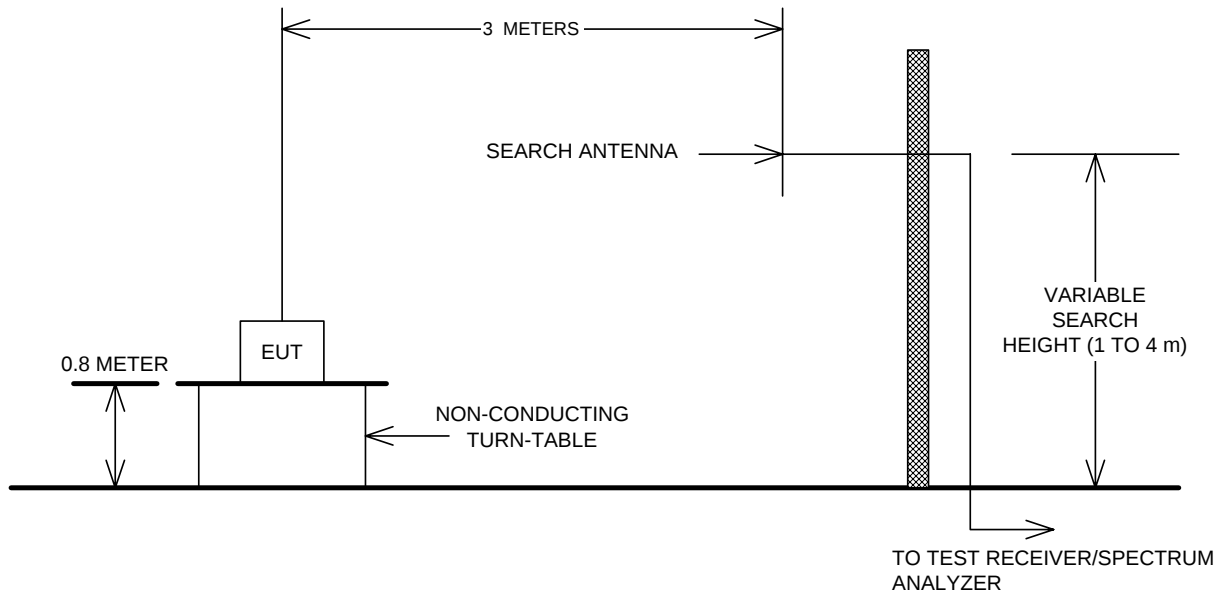
Appendix B : Setup Photographs

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

