



Test Report: 5W50710

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

Apparatus: iDEN Mini Repeater

FCC ID: OIWCCSRSMR1W80

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: 
Jason Nixon, Telecom Specialist

Date: 20 September 2005

Total Number of Pages: 32

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:	iDEN Mini Repeater
Specification:	FCC Part 90 Private Land Mobile Radio Services
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None
Report Release History:	Original Release

Author: Roman Kuleba

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:

1.2 Samples Submitted for Assessment

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

Sample No.	Description	Serial No.
1	HIGH SLECTIVITY MINI-REPEATER DEKOLINK WIRELESS DEKO 2408	S/N: 0508D9050
2	BLACK POWER CORD	
3	RS-232 BLACK CORD FEMALE TO FEMALE CONNECTION	15799009488
4	HIGH SLECTIVITY MINI-REPEATER PRODUCT MANUAL	

The first samples were received on: August 31, 2005

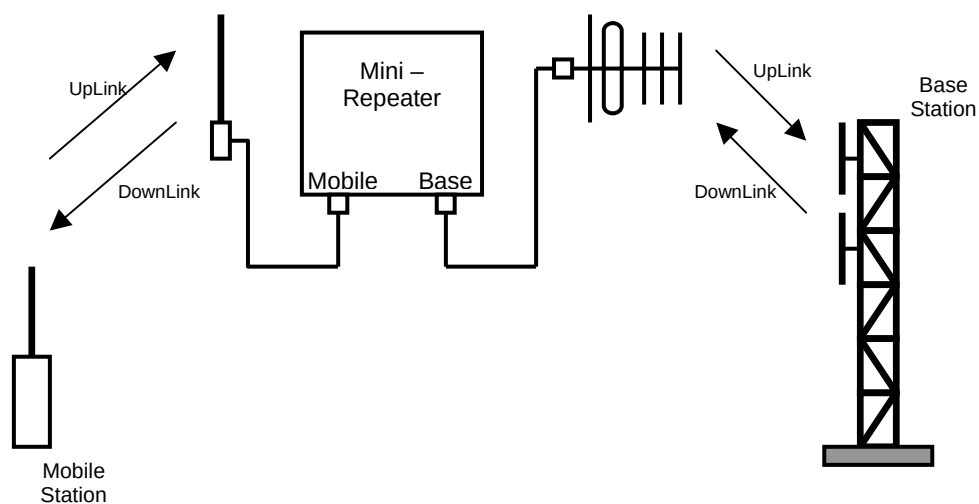
1.3 Theory of Operation

The DUT is a repeater designed for deployment in dense urban environments, tunnels and other areas where physical structures cause low field strengths. It works as a high selectivity amplifier that amplifies signals bi-directionally between base stations and mobile handsets, in cellular and other wireless systems.

1.4 Technical Specifications of the EUT

Manufacturer:	Dekolink Wireless Ltd.
Operating Frequency:	Downlink: 851-869 MHz Uplink: 806-824 MHz
Emission Designator:	GXW
Rated Power:	24.0 dBm
Measured Power:	24.2 dBm
Modulation:	iDEN (16-QAM, Data Rate: 64 kbps)
Antenna Data:	“Base” Port (Downlink): Directional (Yagi or Panel), 8-13 dBi “Mobile” Port (Uplink): Omni-directional, 0-2 dBi
Power Source:	120 VAC

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	Mar 22/05	Mar 22/06
Spectrum Analyzer	Rohde & Schwarz	FSU	FA001877	May 18/05	May 18/06
Power Meter	HP	E4418B	FA001413	May 17/05	May 17/06
Power Sensor	HP	8487A	FA001908	Mar 10/05	Mar 10/06
Signal Generator	Rohde & Schwarz	SMIQ 03E	FA001269	March 3/05	March 3/06
Signal Generator	Rohde & Schwarz	SMIQ 03	FA001091	Aug 20/05	Aug 20/06
Signal Generator	Rohde & Schwarz	SMIQ 06B	FA001878	June 10/05	June 10/06
Receiver	Rohde & Schwarz	ESVS-30	FA001437	July 27/05	July 27/06
Biconical (1) Antenna	EMCO	3109	FA000805	April 22/05	April 22/06
Horn Antenna #2	EMCO	3115	FA000825	Dec. 14/04	Dec. 14/05
1.0 – 2.0 GHz Amplifier	JCA	12-400	FA001498	June 18/04	June 18/06
2.0 – 4.0 GHz Amplifier	JCA	24-600	FA001496	June 18/04	June 18/06
4.0 – 8.0 GHz Amplifier	JCA	48-600	FA001497	June 18/04	June 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.

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	PASS
90.214	—	Transient Behavior	N	N/A
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:

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:	23 °C
Date:	September 8, 2005	Humidity:	45 %
Modification State:	0	Tester:	Roman Kuleba
		Laboratory:	Ottawa

Test Results:

UpLink

Channel Frequency (MHz)	Measured Mean Power (dBm)	Rated Power (dBm)
806	23.6	24.0
815	24.2	24.0
824	23.1	24.0

DownLink

Channel Frequency (MHz)	Measured Mean Power (dBm)	Rated Power (dBm)
851	23.8	24.0
860	24.1	24.0
869	23.5	24.0

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:	23 °C
Date:	September 9 and 16, 2005	Humidity:	45 %
Modification State:	0	Tester:	Roman Kuleba
		Laboratory:	Ottawa

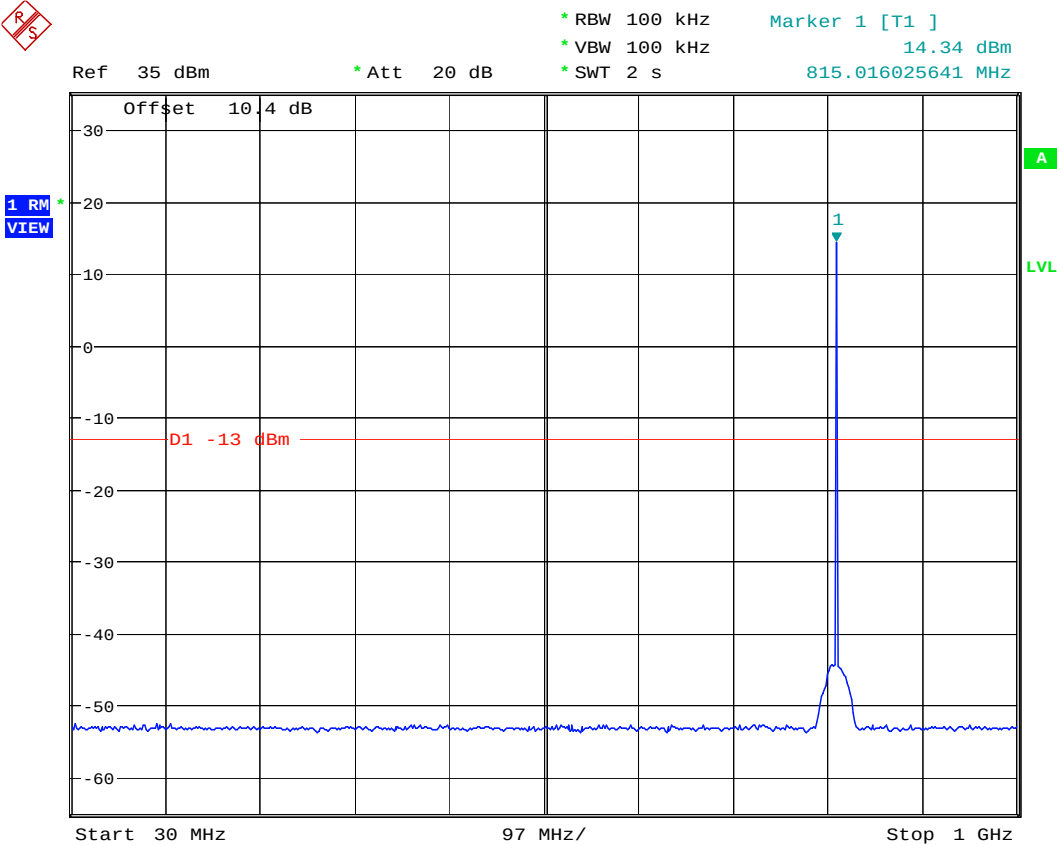
Criteria: -13 dBm

Test Results: Complies.

Additional Observations: The spectrum was investigated for spurious emissions from 30 MHz to 10 GHz. Test data is presented on the plots below.

Conducted Spurious Emissions at Antenna Port

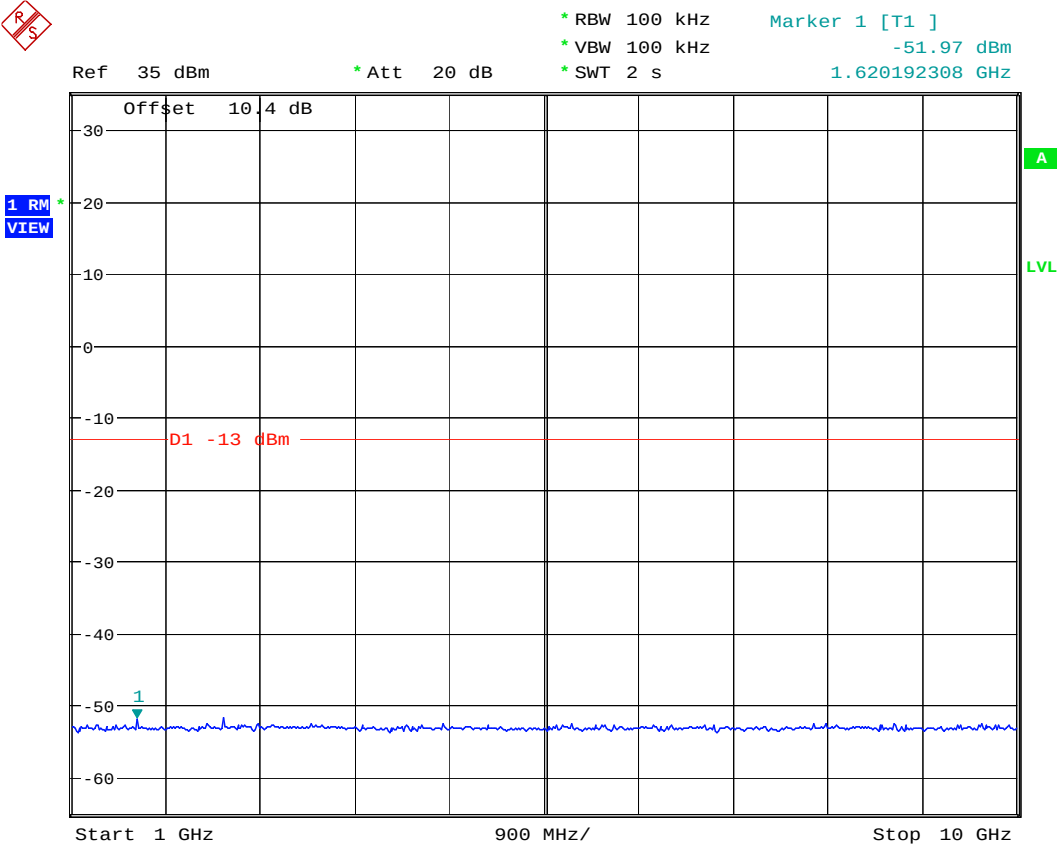
iDEN – UpLink
Conducted Spurious Emissions



Date: 9.SEP.2005 14:46:43

Conducted Spurious Emissions at Antenna Port, Continued

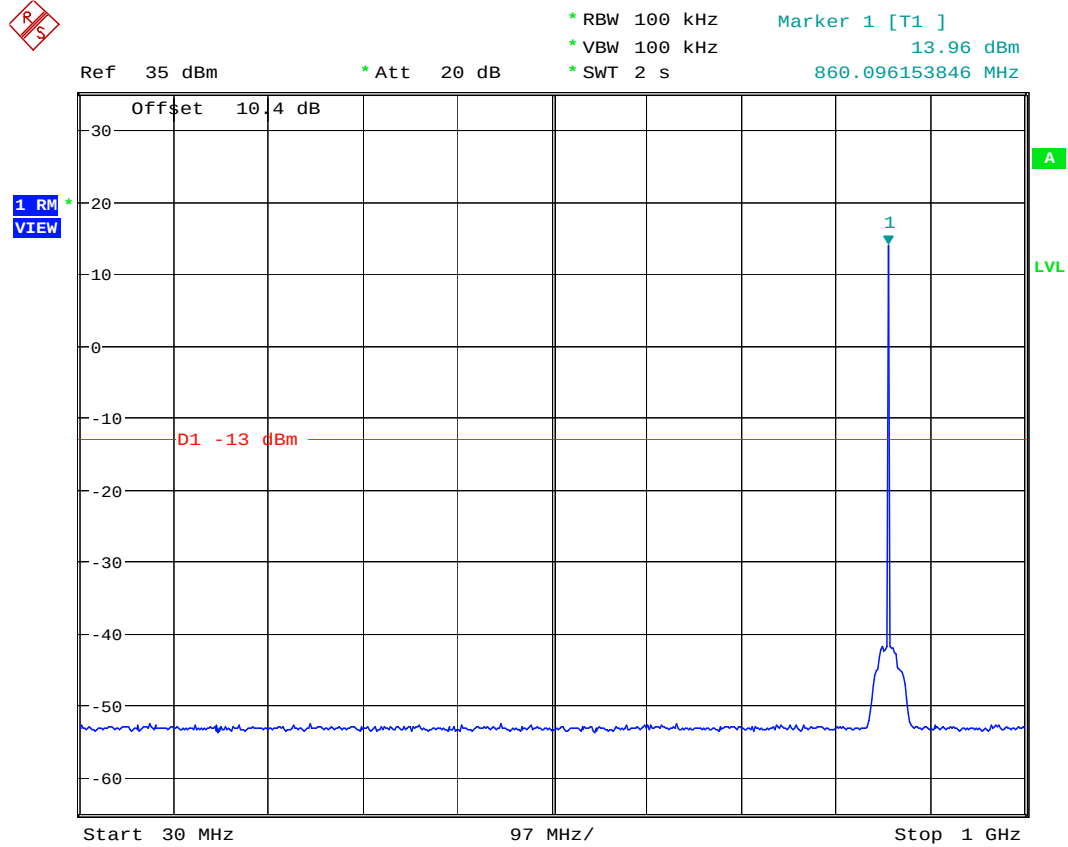
iDEN – UpLink
Conducted Spurious Emissions



Date: 9.SEP.2005 15:00:17

Conducted Spurious Emissions at Antenna Port, Continued

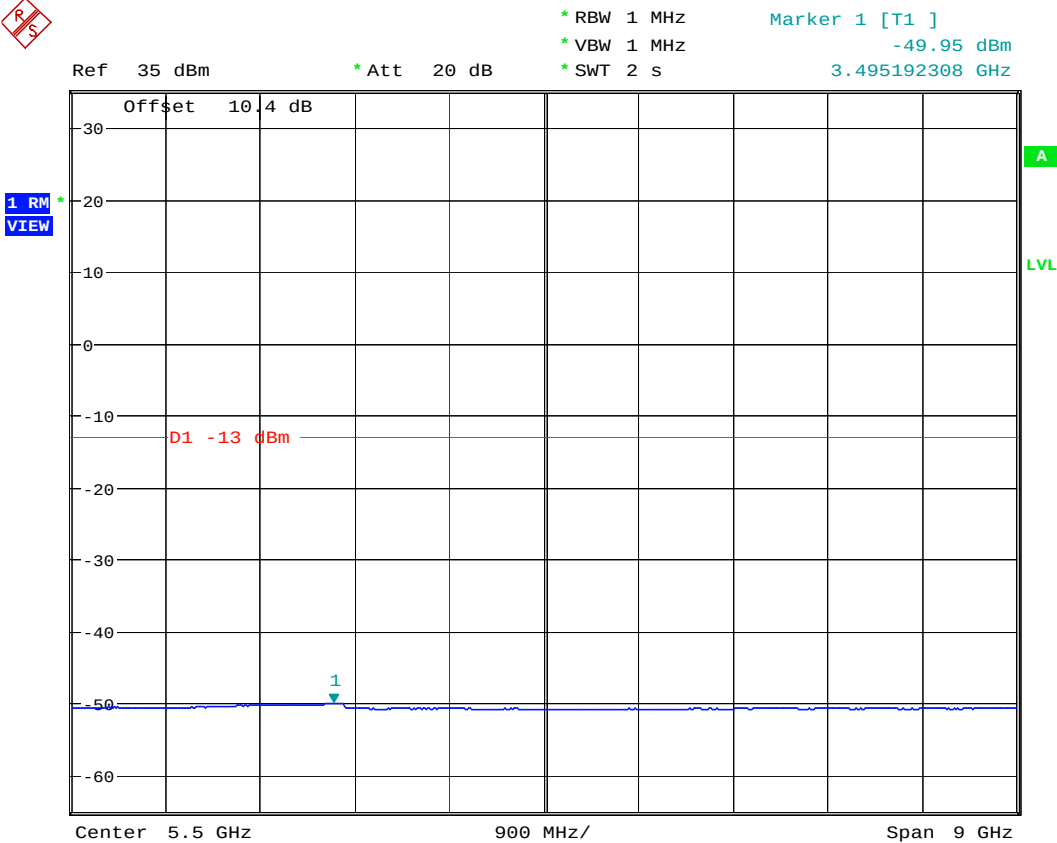
iDEN – DownLink
Conducted Spurious Emissions



Date: 9.SEP.2005 14:24:44

Conducted Spurious Emissions at Antenna Port, Continued

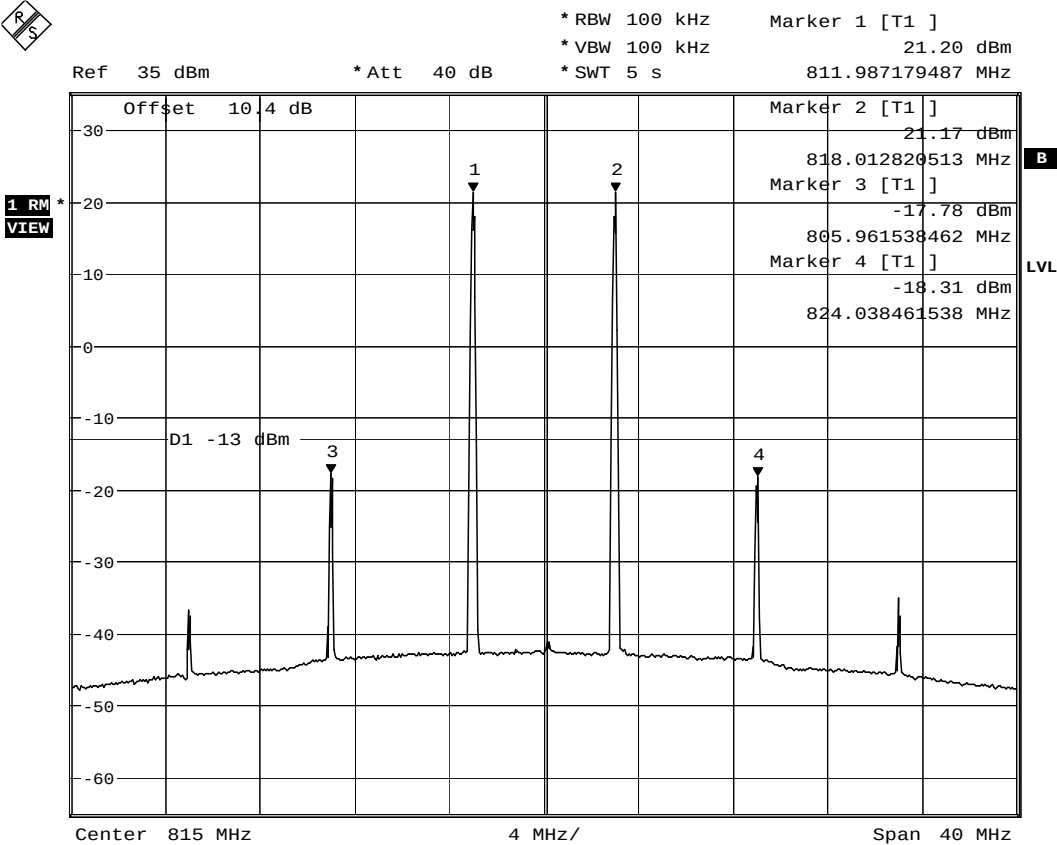
iDEN – DownLink
Conducted Spurious Emissions



Date: 9.SEP.2005 14:12:58

Conducted Spurious Emissions at Antenna Port, Continued

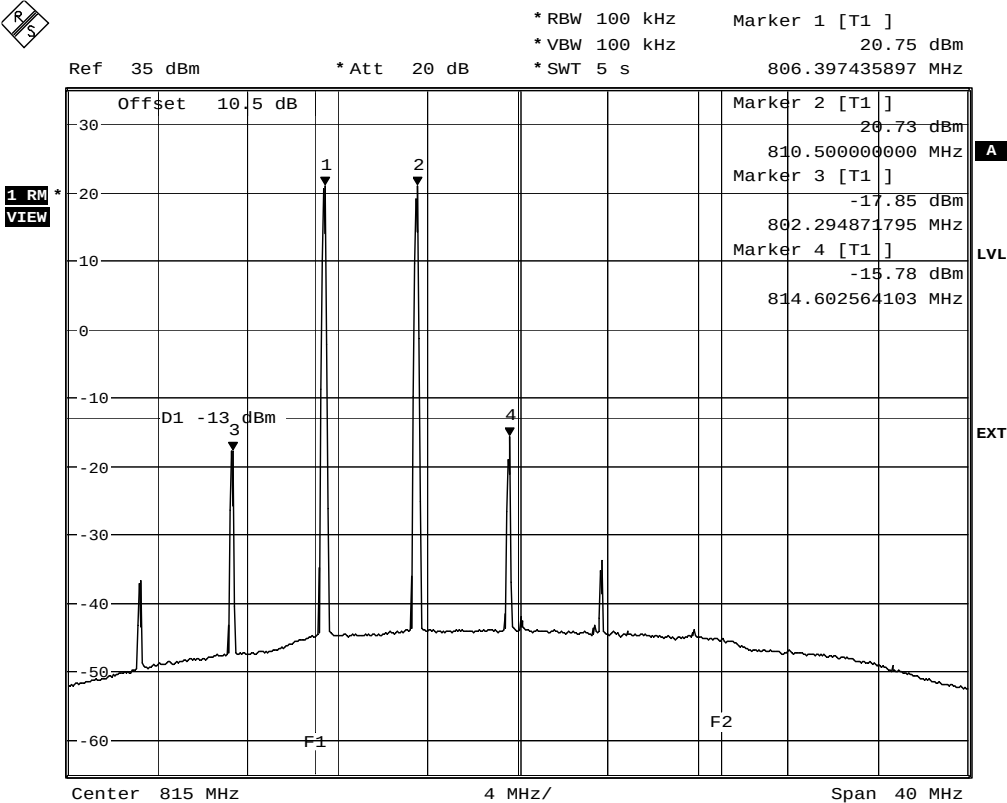
iDEN – UpLink
3rd Order Inter-modulation Products



Date: 9.SEP.2005 10:50:21

Conducted Spurious Emissions at Antenna Port, Continued

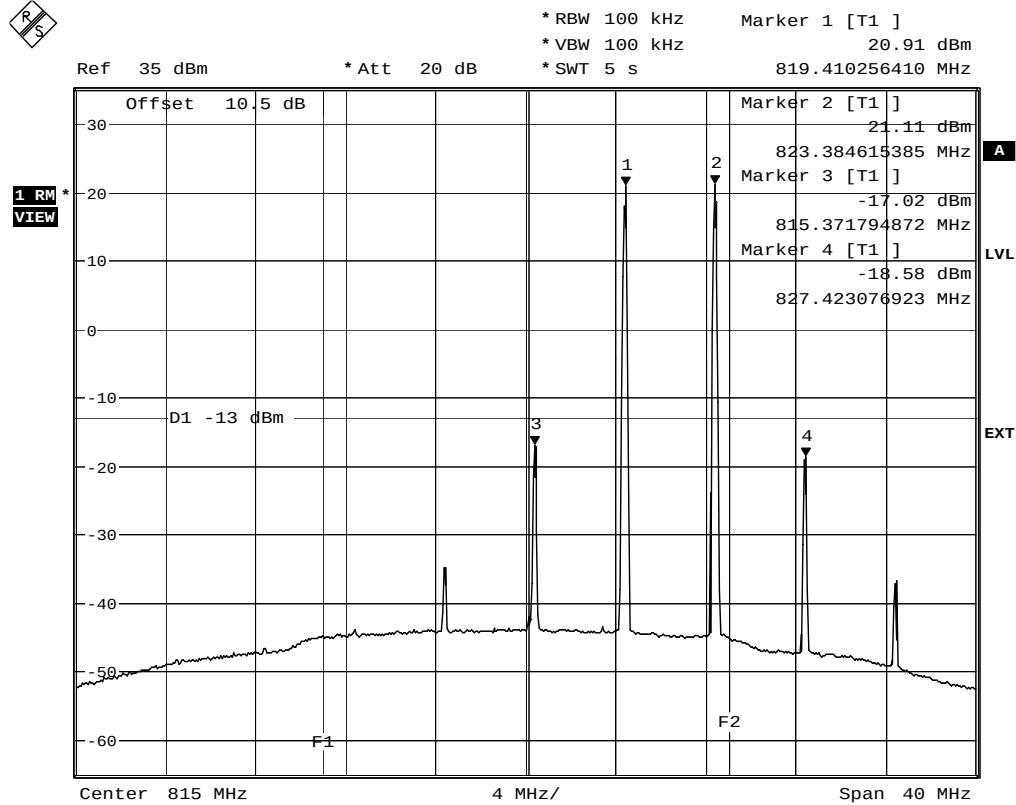
iDEN – UpLink
3rd Order Inter-modulation Products (Out of Band)



Date: 16.SEP.2005 19:44:40

Conducted Spurious Emissions at Antenna Port, Continued

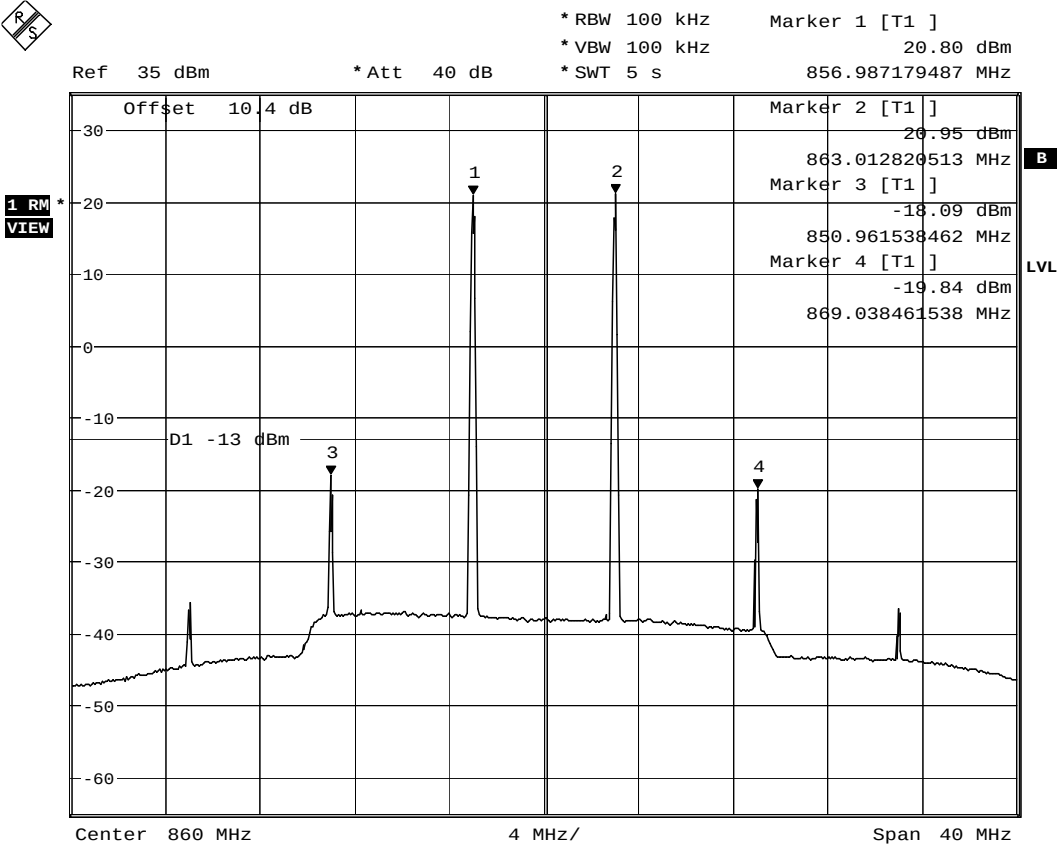
iDEN – UpLink
3rd Order Inter-modulation Products (Out of Band)



Date: 16.SEP.2005 19:52:10

Conducted Spurious Emissions at Antenna Port, Continued

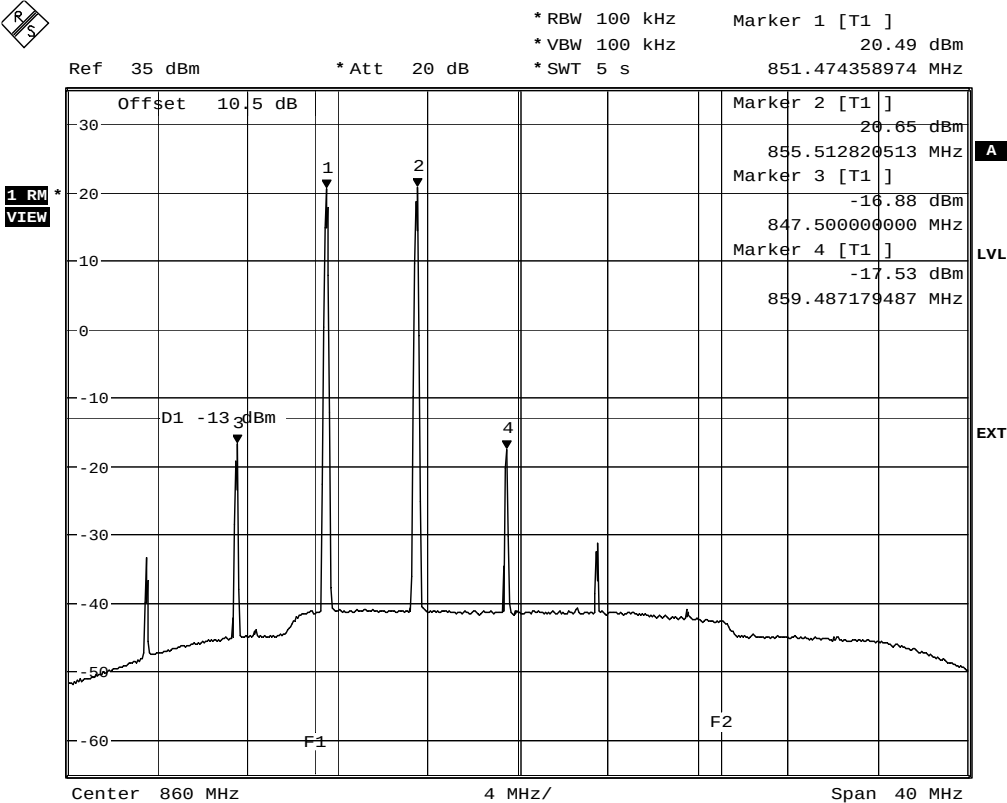
iDEN – DownLink
3rd Order Inter-modulation Products



Date: 9.SEP.2005 09:25:45

Conducted Spurious Emissions at Antenna Port, Continued

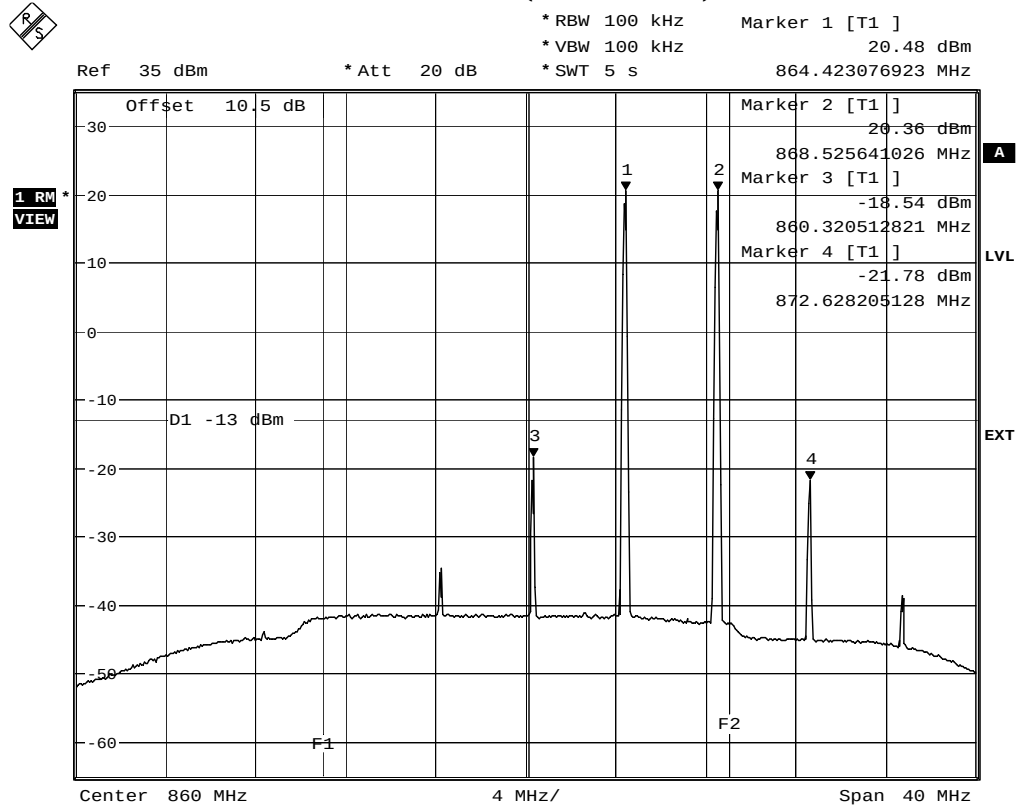
iDEN – DownLink
3rd Order Inter-modulation Products (Out of Band)



Date: 16.SEP.2005 20:13:16

Conducted Spurious Emissions at Antenna Port, Continued

iDEN – DownLink
3rd Order Inter-modulation Products (Out of Band)



Date: 16.SEP.2005 20:21:28

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:	23 °C
Date:	September 9, 2005	Humidity:	45 %
Modification State:	0	Tester:	Roman Kuleba
		Laboratory:	Ottawa

Test Results: Complies (no emissions were detected within 20 dB below the limit).

Additional Observations:

The Spectrum was searched from 30MHz to the 10th Harmonic.

The EUT was measured on three orthogonal axis.

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

Clause 90.213 Frequency Stability

a) Unless noted elsewhere, transmitters used in the services governed by this part must have a minimum frequency stability as specified in the following Table.

Minimum Frequency Stability
parts per million (ppm)

Frequency range (MHz)	Fixed and base stations 2 watts output power	Mobile stations Over power	2 watts or less output
Below 25	100	100	200
25-50	20	20	50
72-76	5	---	50
150-174	50	5	50
216-220	1.0	---	1.0
220-222	0.1	1.5	1.5
421-512	2.5	5	5
806-809	1.0	1.5	1.5
809-824	1.5	2.5	2.5
851-854	1.0	1.5	1.5
854-869	1.5	2.5	2.5
896-901	0.1	1.5	1.5
902-928	2.5	2.5	2.5
929-930	1.5	---	---
935-940	0.1	1.5	1.5
1427-1435	300	300	300
Above 2450	---	---	---

Test Conditions:

Sample Number:	1	Temperature:	23 °C
Date:	September 8, 2005	Humidity:	45 %
Modification State:	0	Tester:	Roman Kuleba
		Laboratory:	Ottawa

Test Results: Complies.

Additional Observations:

The tested repeater uses the same LO for frequency conversion; therefore the transmitted signal is identical in frequency to the received signal. This was verified by measuring the transmitted (output) signal frequency with a frequency counter that was phase-locked to a signal generator used to generate input RF signal. Measured frequency deviation was 0 Hz and the DUT was deemed to comply with frequency stability requirement.

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 °C
Date:	September 8, 2005	Humidity:	45 %
Modification State:	0	Tester:	Roman Kuleba
		Laboratory:	Ottawa

Test Results: Complies (see attached plots).

UpLink – Input: OccBW = 16.587 MHz

UpLink – Output: OccBW = 16.667 MHz

DownLink – Input: OccBW = 16.587 MHz

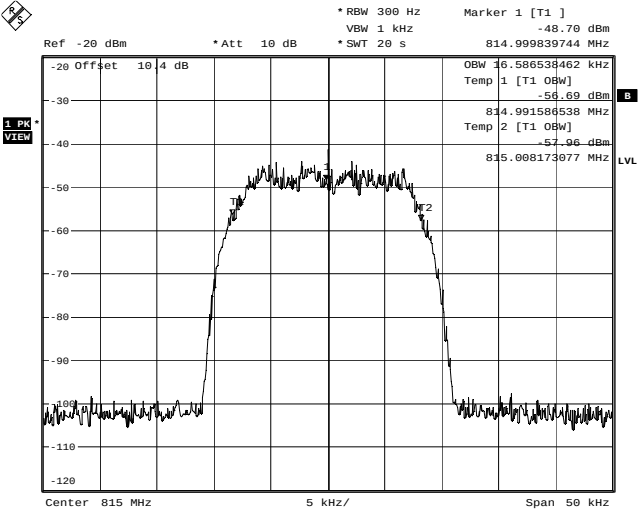
DownLink – Output: OccBW = 16.506 MHz

Additional Observations:

Input and output signals were compared to verify that there was no any degradation to the signal due to amplification and conversion in the DUT.

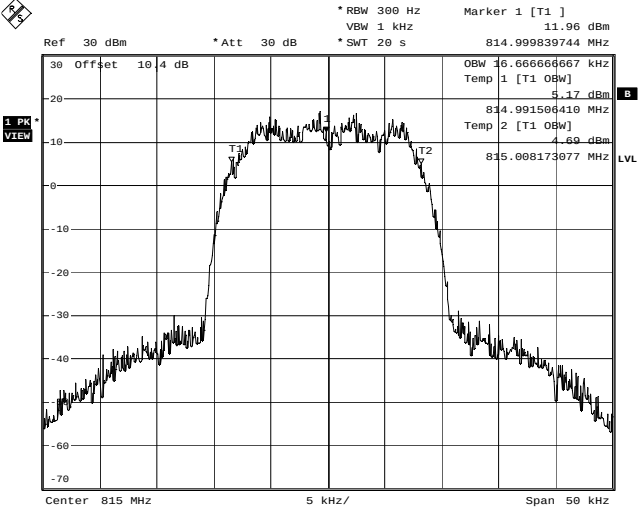
Occupied Bandwidth, continued

iDEN
UpLink – Input



Date: 8,SEP.2005 19:01:13

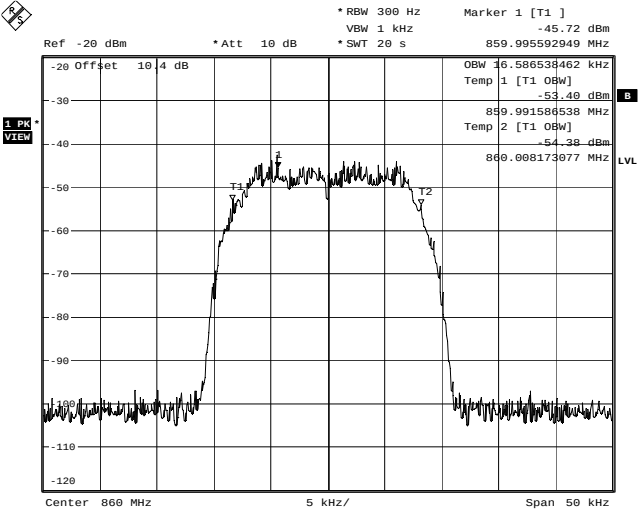
iDEN
UpLink – Output



Date: 8,SEP.2005 18:56:09

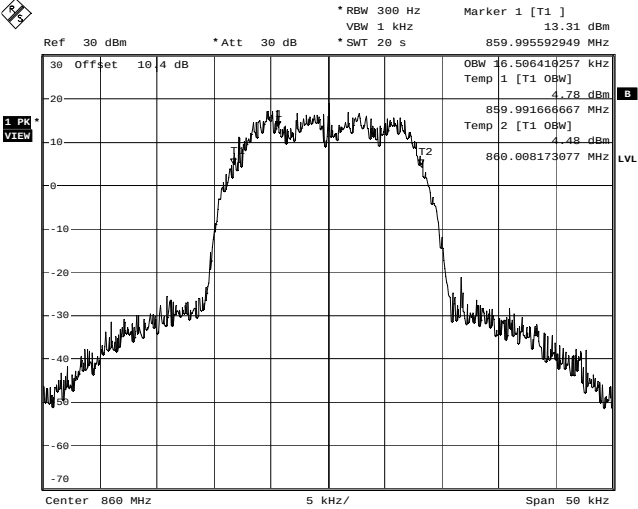
Occupied Bandwidth, continued

iDEN
DownLink – Input



Date: 8,SEP.2005 19:13:55

iDEN
DownLink – Output



Date: 8,SEP.2005 19:10:16

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

Plots showing the filter frequency response.

Test Conditions:

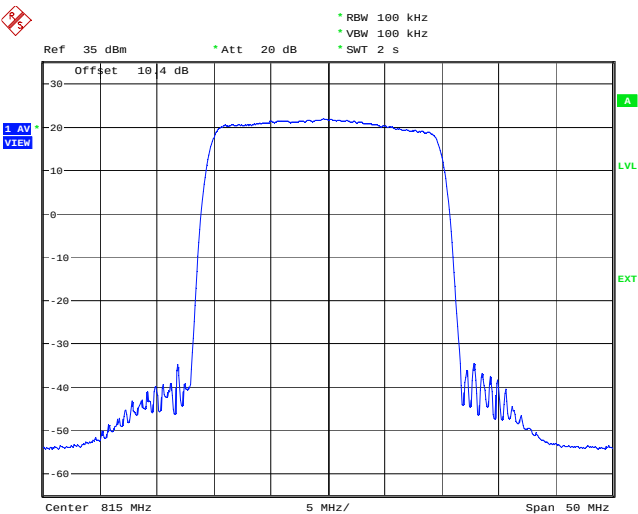
Sample Number:	1	Temperature:	23 °C
Date:	September 9, 2005	Humidity:	45 %
Modification State:	0	Tester:	Roman Kuleba
		Laboratory:	Ottawa

Test Results:

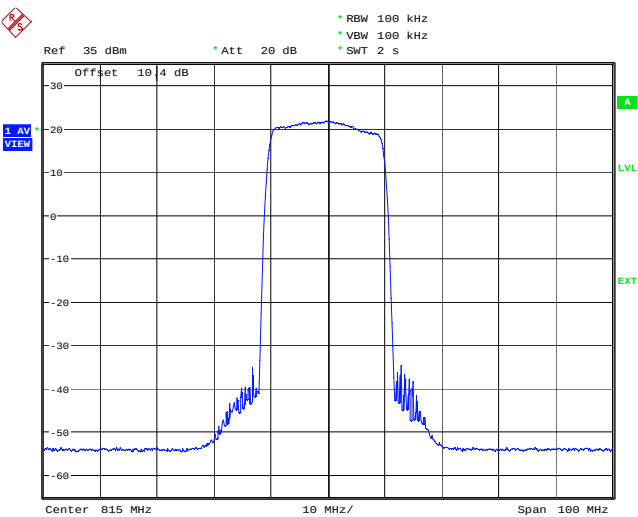
See Attached Plots.

Out of Band Rejection, continued

UpLink



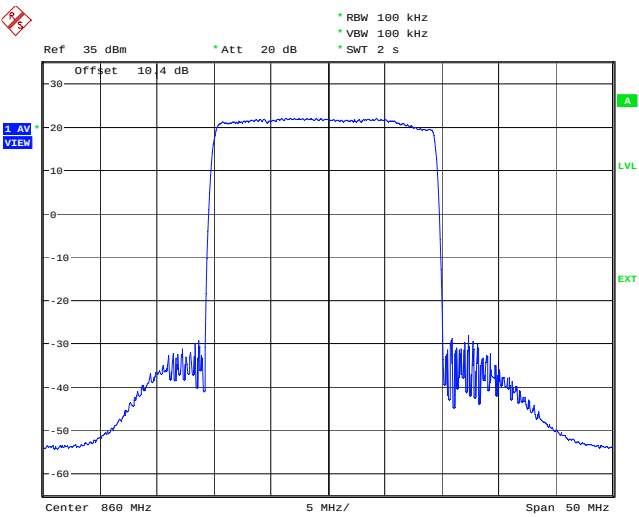
Date: 9.SEP.2005 20:34:49



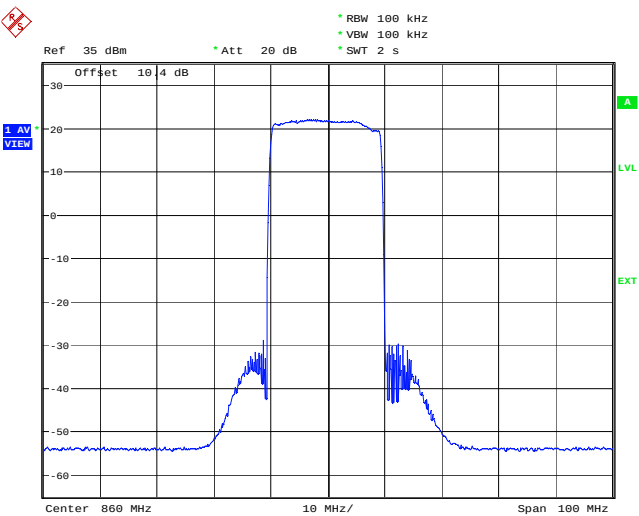
Date: 9.SEP.2005 20:37:16

Out of Band Rejection, continued

DownLink



Date: 9.SEP.2005 20:23:46



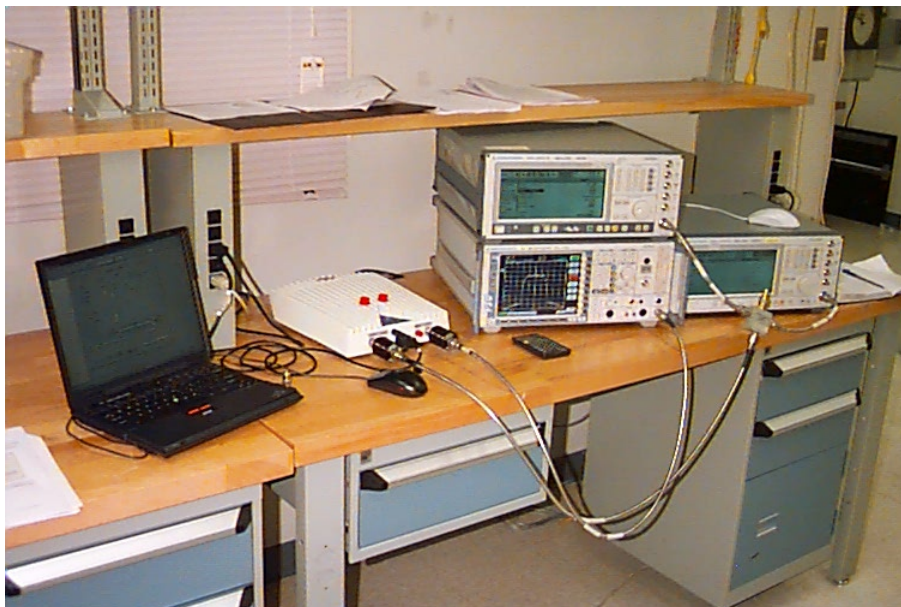
Date: 9.SEP.2005 20:22:51

Appendix B : Setup Photographs

Radiated Spurious Emissions Setup:

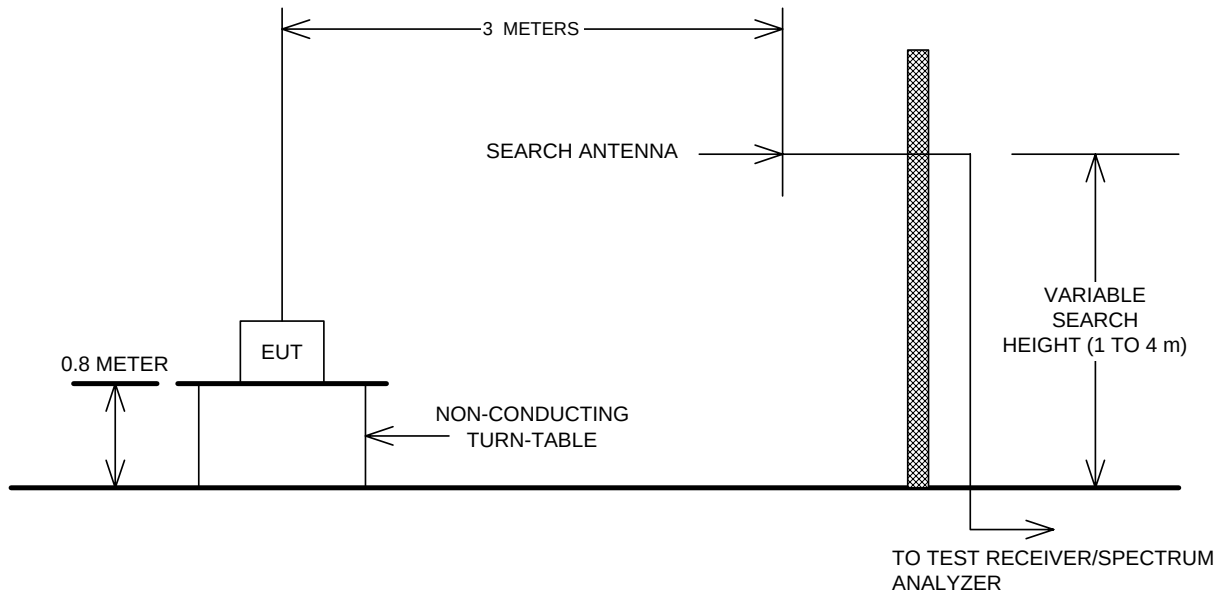


Conducted Measurement at Antenna Port:



Appendix C : Block Diagram of Test Setups

Test Site For Radiated Emissions



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

