Standards Council of Canada
Accredited Laboratory
Scope of Accreditation 75

Conseil canadien des normes
Laboratoire accrédité
Portée d'accréditation 75

TM

Test Report:	6W78091
Applicant:	Dekolink Wireless Ltd. 16 Bazel St. Qiryat Arieh Petah-Tikva, 49510 Istael
Apparatus:	MW-MBDA-SMR-025W60-800 DEKO 1408S 800 MHz SMR RF Micro-Repeater
FCC ID:	OIWMBDASMR025W
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:	 Xu Jin, Wireless Specialist
Date:	
Total Number of Pages:	24

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 is 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-MBDA-SMR-025W60-800 DEKO 1408S 800 MHz SMR RF Micro-Repeater
Specification:	FCC Part 90 Private Land Mobile Radio Services
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None
Report Release History:	Original Release

Author: Heng Lin, EMC / Wireless Test 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-MBDA-SMR-025W60-800
DEKO 1408S 800 MHz SMR RF Micro-Repeater

1.2 Samples Submitted for Assessment

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

Sample No.	Description	Serial No.
1	Micro Mini repeater MN # MW-MBDA-SMR-025W60-800	06110010
2	AC/DC switching adaptor MN # ES25UO7-075	N/A

The first samples were received on: Dec. 14, 2006

1.3 Technical Specifications of the EUT

Manufacturer:	Dekolink Wireless Ltd.	
Operating Frequency:	Uplink:	806 - 824 MHz
	Downlink:	851 - 869 MHz
Emission Designator:	GXW	
Rated Power:	Uplink:	11 dBm
	Downlink:	11 dBm
Measured Power:	Uplink:	10.98 dBm
	Downlink:	11.40 dBm
Modulation:	iDEN	
Power Supply:	7.5VDC	

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 ^{o}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.	Next Cal.
Spectrum Analyzer	Rohde & Schwarz	FSP	FA001920	March 17/07
Receiver	Rohde & Schwarz	ESVS-30	FA001445	July 14/07
Signal Generator	Rohde & Schwarz	SMIQ03E	FA001269	March 29/07
Signal Generator	Rohde & Schwarz	SMIQ06B	FA001878	June 28/07
Biconical (1) Antenna	EMCO	3109	FA000805	May 03/07
Log Periodic Antenna #2	EMCO	3148	FA001355	May 16/07
Horn Antenna #1	EMCO	3115	FA000649	Jan. 12/07
1.0 – 2.0 GHz Amplifier	JCA	12-400	FA001498	Aug. 02/07
2.0 – 4.0 GHz Amplifier	JCA	24-600	FA001496	Aug. 02/07
4.0 – 8.0 GHz Amplifier	JCA	48-600	FA001497	Aug. 02/07
5.0 – 18.0 GHz Amplifier	NARDA	DWT-186N23U40	FA001409	COU
DC-18GHz 10 dB Attenuator	Weinschel Corp.	47-10-34	FA001739	COU

COU – Calibrate on Use

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

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:	December 19, 2006	**Humidity:**	45 %
Modification State:	0	**Tester:**	Heng Lin
		Laboratory:	Ottawa

Test Results: Complies

Test Data: See attached tables

Uplink

Channel Frequency (MHz)	Measured Mean Power (dBm)	Rated Power (dBm)
806	10.84	11.0
815	10.98	11.0
824	10.27	11.0

Downlink

Channel Frequency (MHz)	Measured Mean Power (dBm)	Rated Power (dBm)
851	11.20	11.0
860	11.40	11.0
869	10.24	11.0

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:	December 21, 2006	**Humidity:**	45 %
Modification State:	0	**Tester:**	Heng Lin
		Laboratory:	Ottawa

Criteria: -13 dBm

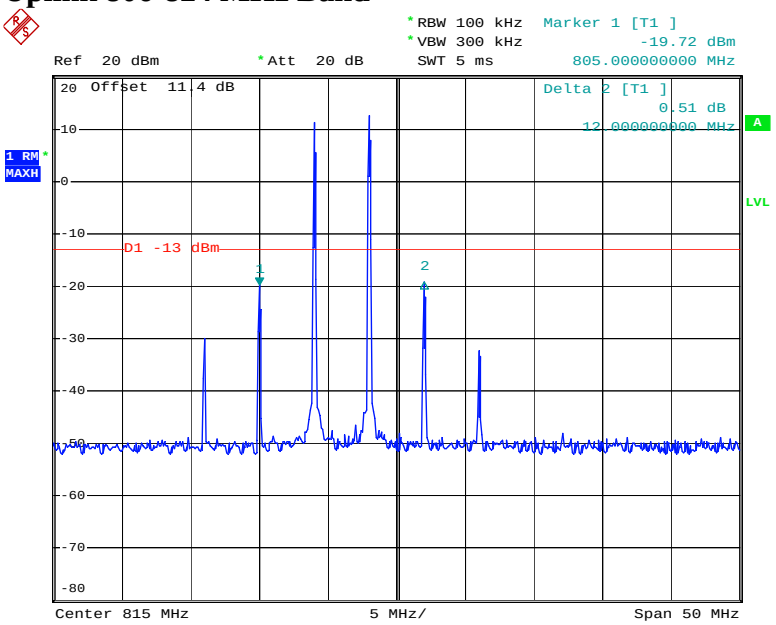
Test Results: Complies.

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

3rd Order Inter-modulation Products

iDEN

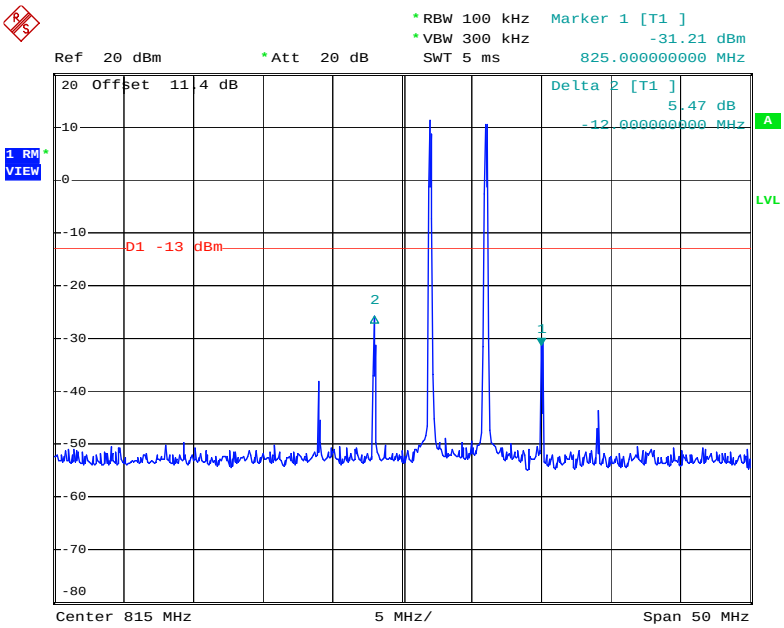
Uplink 806-824 MHz Band



f_1 = 809 MHz
f_2 = 813 MHz

Output power:
P_{f1} = 8.0 dBm
P_{f2} = 8.0 dBm
P_{sum} = 11 dBm

Date: 3.JAN.2007 18:55:44

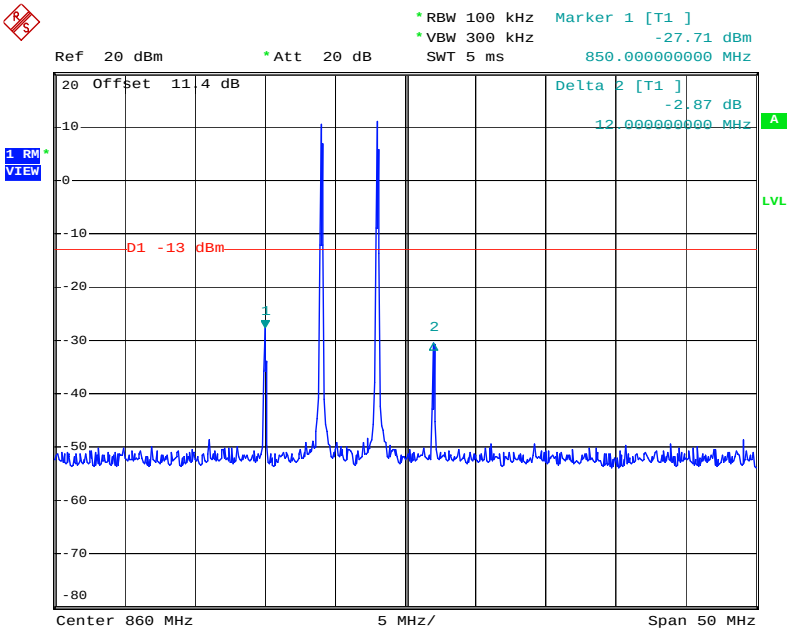


f_1 = 817 MHz
f_2 = 821 MHz

Output power:
P_{f1} = 8.0 dBm
P_{f2} = 8.0 dBm
P_{sum} = 11 dBm

Date: 3.JAN.2007 19:00:01

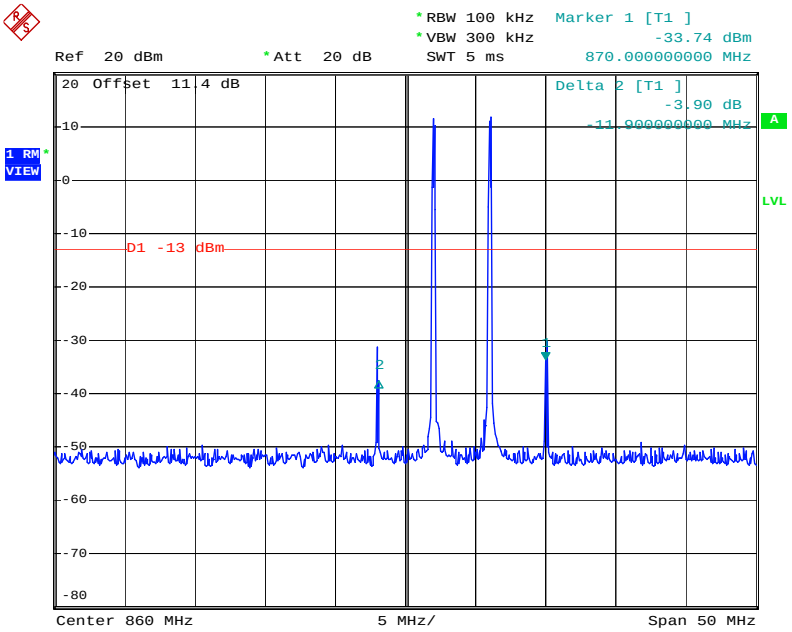
DownLink 851-869 MHz Band



f_1 = 854 MHz
f_2 = 858 MHz

Output power:
P_{f1} = 8.0 dBm
P_{f2} = 8.0 dBm
P_{sum} = 11 dBm

Date: 3.JAN.2007 19:04:21

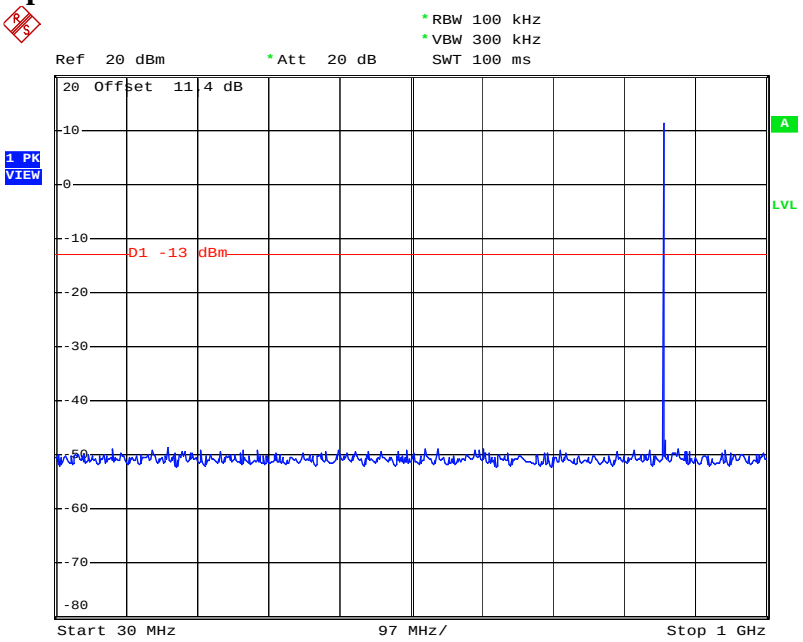


f_1 = 862 MHz
f_2 = 866 MHz

Output power:
P_{f1} = 8.0 dBm
P_{f2} = 8.0 dBm
P_{sum} = 11 dBm

Date: 3.JAN.2007 19:06:27

Conducted emissions
UpLink 806 – 824 MHz Band



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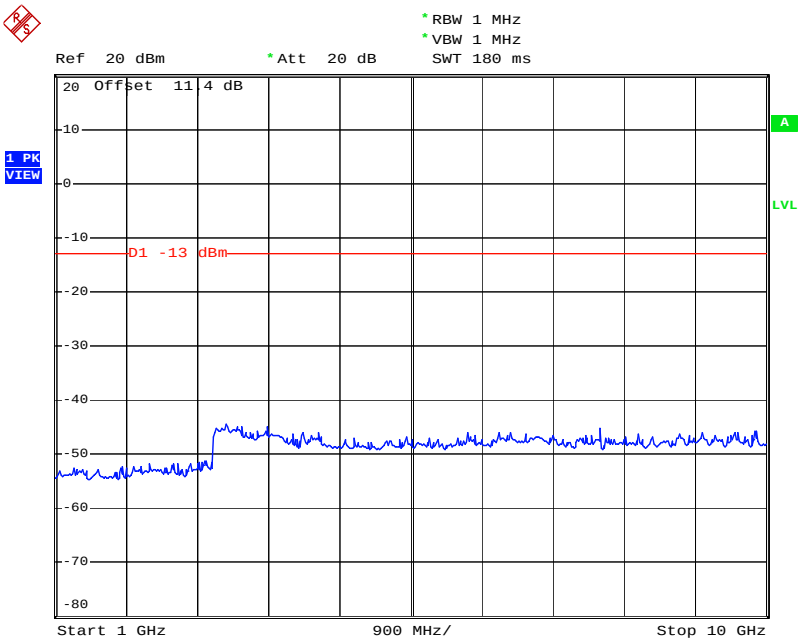

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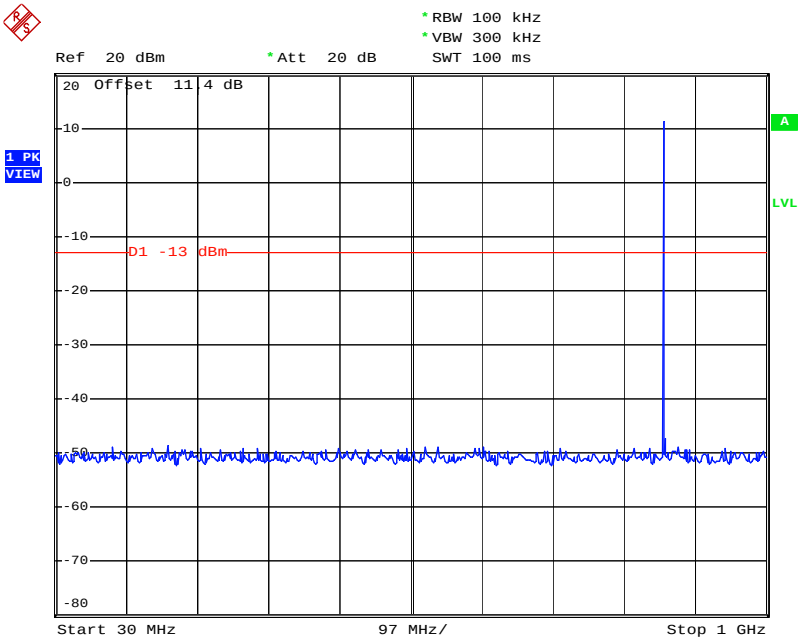
DownLink 851 – 869 MHz Band



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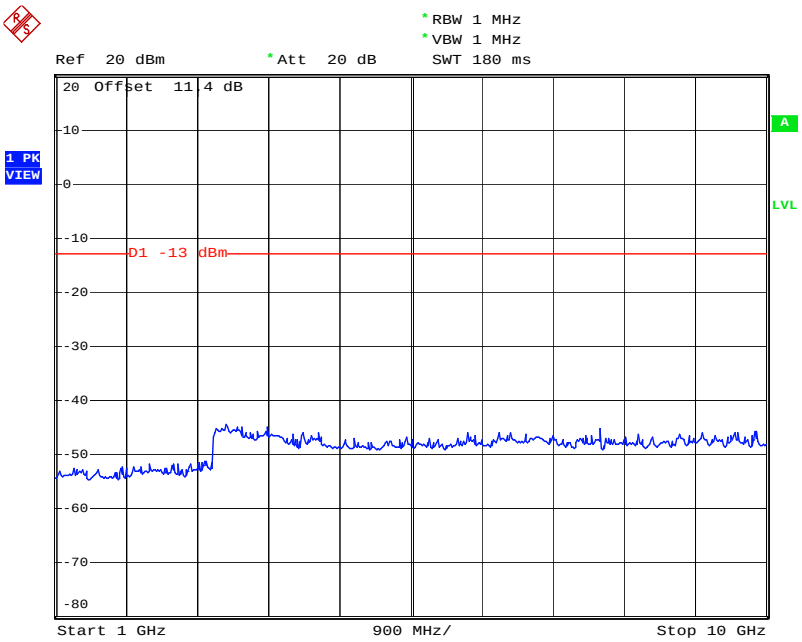


Date: 3.JAN.2007 20:50:28

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:	December 21, 2006	**Humidity:**	45 %
Modification State:	0	**Tester:**	Heng Lin
		Laboratory:	Ottawa

Test Results: Complies.

Additional Observations:

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

All measurements were performed using a Quasi-Peak Detector with RBW/VBW setting as 100 kHz/300KHz below 1 GHz and Peak Detector with RBW/VBW settings as 1 MHz/3MHz above 1 GHz at a distance of 3 meters.

Freq. (MHz)	Ant.	Pol. V/H	RCVD Signal (dBμV)	Ant. Factor (dB)	Amp. Gain (dB)	Cable Loss (dB)	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
30.0000	BC1	V	21.0	11.8	N/A	0.6	33.5	40.0	6.5	Q-Peak
30.0000	BC1	H	9.1	13.0	N/A	0.6	22.8	40.0	17.2	Q-Peak
37.0000	BC1	V	20.0	11.1	N/A	0.6	31.7	40.0	8.3	Q-Peak
37.0000	BC1	H	8.0	12.3	N/A	0.6	20.9	40.0	19.1	Q-Peak
38.0000	BC1	V	23.0	11.0	N/A	0.6	34.6	40.0	5.4	Q-Peak
38.0000	BC1	H	8.4	12.2	N/A	0.6	21.2	40.0	18.8	Q-Peak
80.0000	BC1	V	19.7	7.7	N/A	0.9	28.2	40.0	11.8	Q-Peak
80.0000	BC1	H	12.3	7.3	N/A	0.9	20.5	40.0	19.5	Q-Peak

Note 1: Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole
Note 2: Detector Legend: Below 1GHz, Quasi-Peak detector with 100kHz RBW, 100KHz VBW
Above 1GHz, Peak detector with 1.0MHz RBW, 1.0MHz VBW

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:	December 20, 2006	**Humidity:**	45 %
Modification State:	0	**Tester:**	Heng Lin
		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:	December 20, 2006	**Humidity:**	45 %
Modification State:	0	**Tester:**	Heng Lin
		Laboratory:	Ottawa

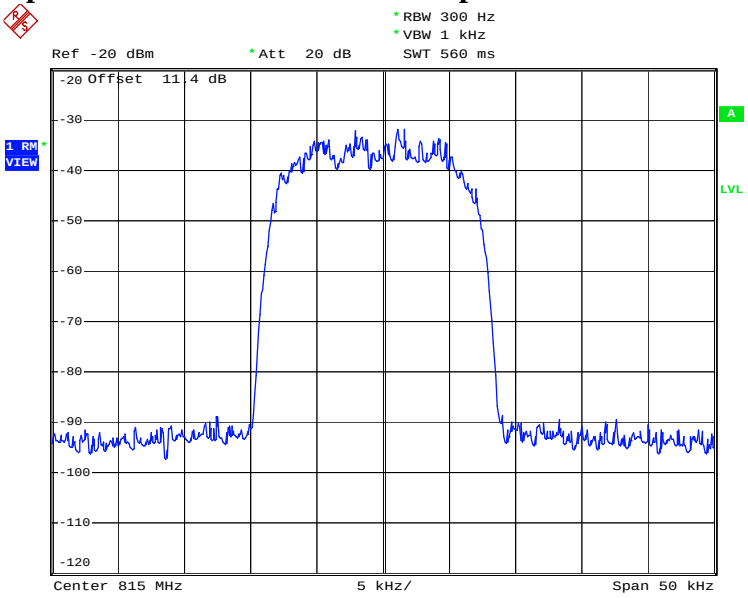
Test Results: Complies.

Test Data: See attached plots.

Additional Observations:

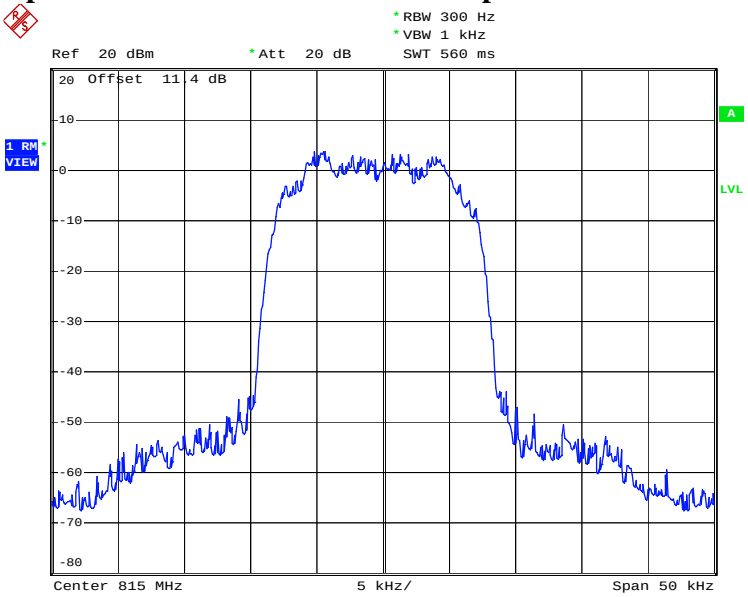
Input and output signals were compared to verify that there was no any degradation to the signal due to amplification and conversion in the DUT.

iDEN
Uplink 806-824 MHz Band ---- Input



Date: 3.JAN.2007 19:39:31

Uplink 806-824 MHz Band ---- Output



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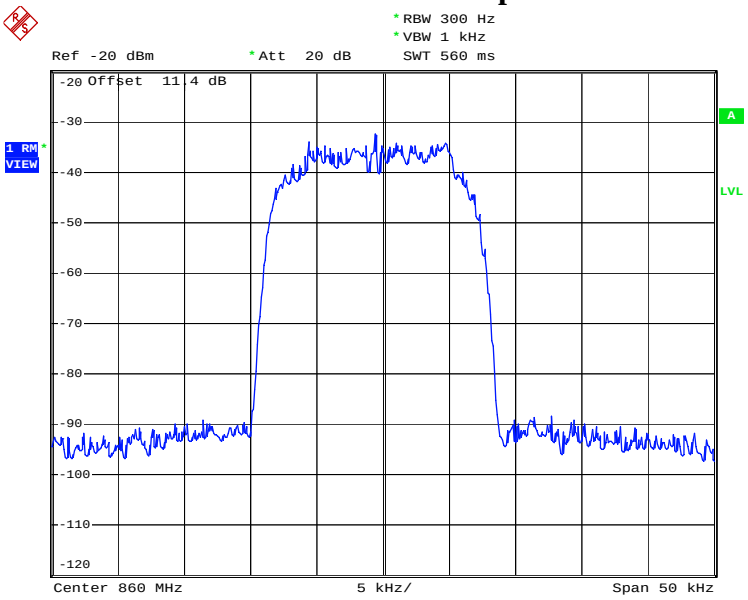
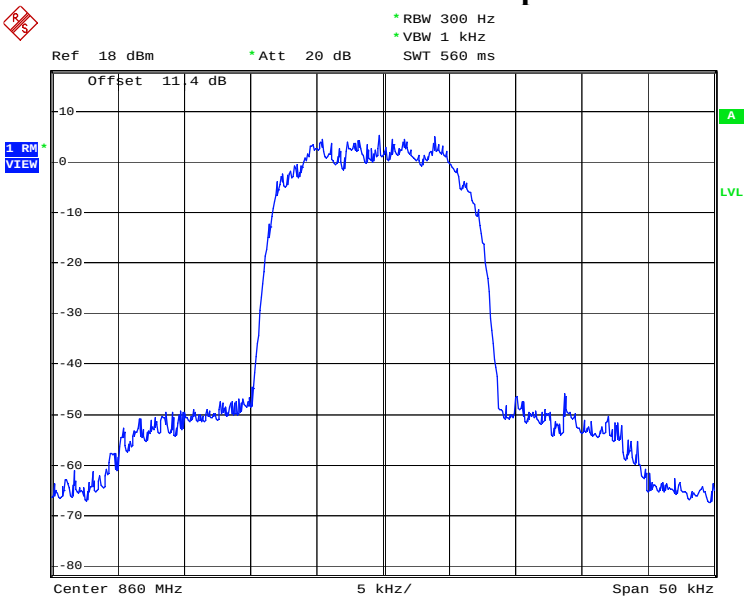
iDEN

Downlink 851-869 MHz Band ---- Input



Date: 3.JAN.2007 19:38:17

Downlink 851-869 MHz Band ---- Output



Date: 3.JAN.2007 19:35:11

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

Plots showing the filter frequency response.

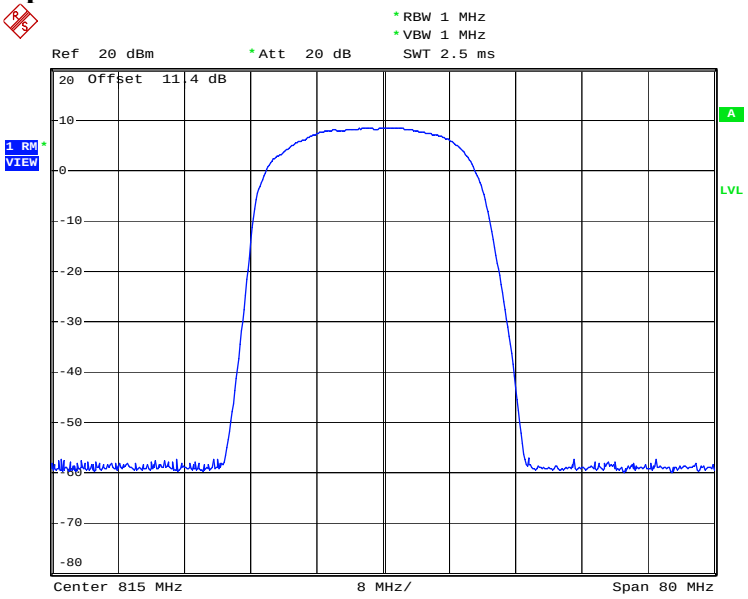
Test Conditions:

Sample Number:	1	**Temperature:**	23 °C
Date:	December 20, 2006	**Humidity:**	45 %
Modification State:	0	**Tester:**	Heng Lin
		Laboratory:	Ottawa

Test Results:

See Attached Plots.

Uplink 806-824 MHz Band



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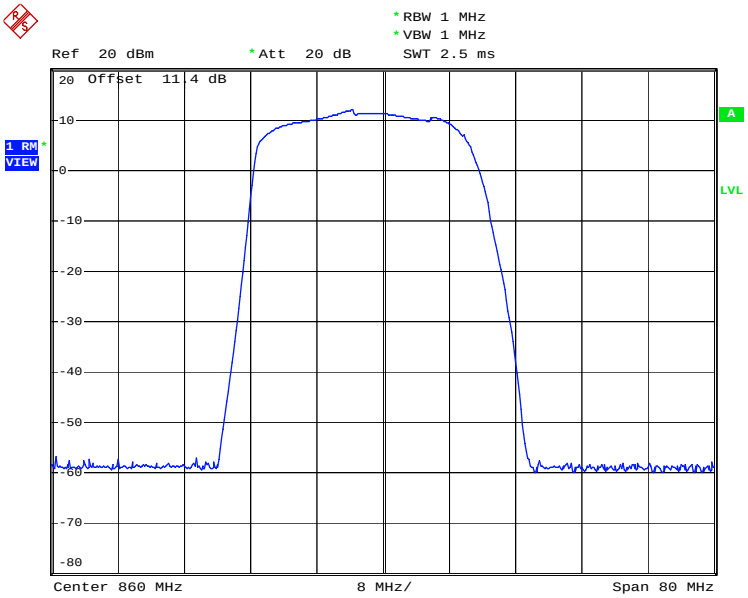
Downlink 851-869 MHz Band



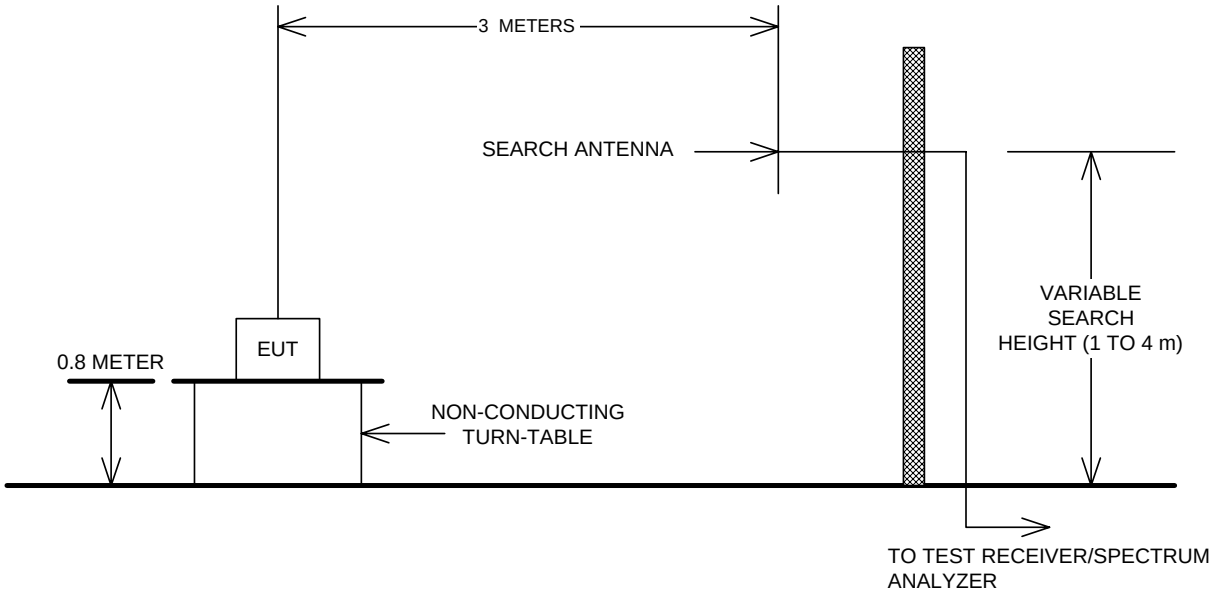
Date: 3.JAN.2007 20:03:23

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