



Nemko



Test Report: 2W06184.2

Applicant: Spotwave Wireless Inc.
1 Hines Road
Ottawa, Ontario
K2K 3C7

Equipment Under Test: SpotCell 100
(EUT) Low Power Cellular Band Repeater

In Accordance With: **FCC Part 22, Subpart H**

FCC ID. : P3YSPOTCELL0004

Tested By: Nemko Canada Inc.
303 River Road, R.R. 5
Ottawa, Ontario K1V 1H2

Authorized By:

J. Harrington, RF Group Manager

Date: 11 July 2002

Total Number of Pages: 41

Table of Contents

Section 1. Summary of Test Results.....	3
Section 2. General Equipment Specification	5
Section 3. RF Power Output.....	6
Section 4. Occupied Bandwidth	9
Section 5. Spurious Emissions At Antenna Terminals	25
Section 6. Field Strength of Spurious Emissions	35
Section 7. Frequency Stability.....	38
Section 8. Block Diagrams.....	39
Section 9. Test Equipment List	41

Section 1. Summary of Test Results**General****All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 22, Subpart H.

<input checked="" type="checkbox"/>	New Submission	<input checked="" type="checkbox"/>	Production Unit			
<input type="checkbox"/>	Class II Permissive Change	<input type="checkbox"/>	Pre-Production Unit			
<table><tbody><tr><td>A</td><td>M</td><td>P</td></tr></tbody></table>	A	M	P	Equipment Code		
A	M	P				

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".



TESTED BY: _____
Glen Westwell, Wireless Technologist

DATE: 11 July 2002

Nemko Canada Inc., a testing laboratory, is accredited by the Standards Council of Canada. The tests included in this report are within the scope of this accreditation. The results apply only to the samples tested.

Nemko Canada Inc. authorizes the above named company to reproduce this report provided it is reproduced in its entirety and for use by the company's employees only.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Nemko Canada Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

This report applies only to the items tested.

Summary Of Test Data

Name Of Test	Para. No.	Result
RF Power Output	2.1046	Complies
Audio Frequency Response	2.1047	N/A
Audio Low-Pass Filter Response	2.1047	N/A
Modulation Limiting	2.1047	N/A
Occupied Bandwidth	2.1049	Complies
Spurious Emissions at Antenna Terminals	2.1051	Complies
Field Strength of Spurious Emissions	2.1053	Complies
Frequency Stability	2.1055	Complies
Transient Frequency Behavior	—	N/A

Note: These amplifiers have been certified previously under the following FCC ID's.

Reference:

FCC ID. DDU P3YSPOTCELL0003
SCU (Block A) P3YSPOTCELL0001
SCU (Block B) P3YSPOTCELL0002

Change data:

- (1) SCU maximum output power increased from 0dBm to 7dBm.
- (2) SCU 2nd IF changed from 45MHz to 150MHz.
- (3) SCU downlink gain increased by 10dB.
- (4) DDU downlink gain reduced by 10dB (Class I Permissive Change).

Indoor Temperature: 22 °C
 Humidity: 31 %

Outdoor Temperature: 10 °C
 Humidity: 38 %

Section 2. General Equipment Specification**Manufacturer:** Spotwave Wireless Inc.**Model No.:** SpotCell 100**Serial No.:**
DDU S/N SPO-100000000001
SCU "A" S/N SPO-020001500006
SCU "B" S/N SPO-020001510010**Date Received In Laboratory:** June 5, 2002**Nemko Identification No.:**
DDU #5
SCU "A">#7
SCU "B">#1**Supply Input Voltage:** 120 VAC**Frequency Range:**
Downlink (SCU TX): 869 – 894 MHz
Uplink (DDU TX): 824 – 849 MHz**RF Output (Rated):**
Downlink (SCU): 7dBm
Uplink (DDU): 20 dBm**Antenna Gain (Integral):**
SCU (Downlink) = 3dBi
DDU (Uplink) = 10dBi**Emission Designator:**
CDMA DXW
TDMA F9W
AMPS F8W

Section 3. RF Power Output**Para. No.: 2.1046**

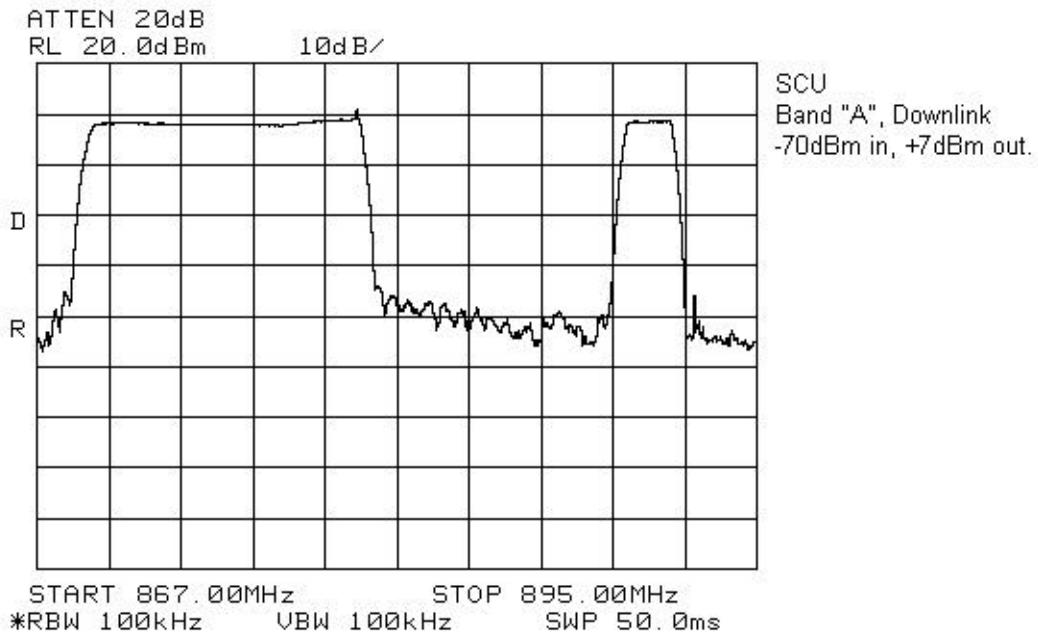
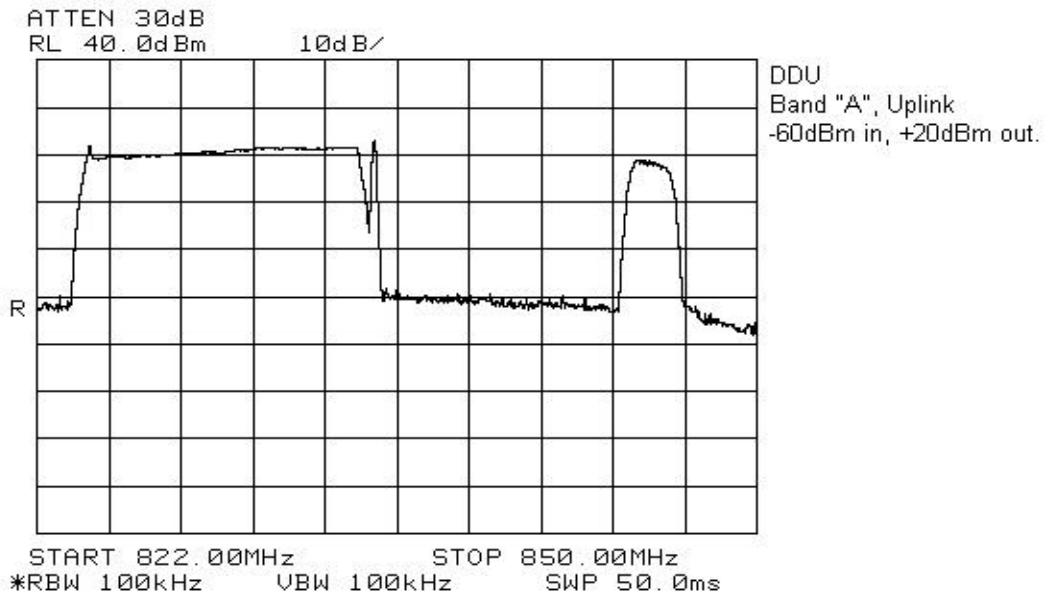
Test Performed By: Glen Westwell	Date of Test: 20 June, 2002
---	------------------------------------

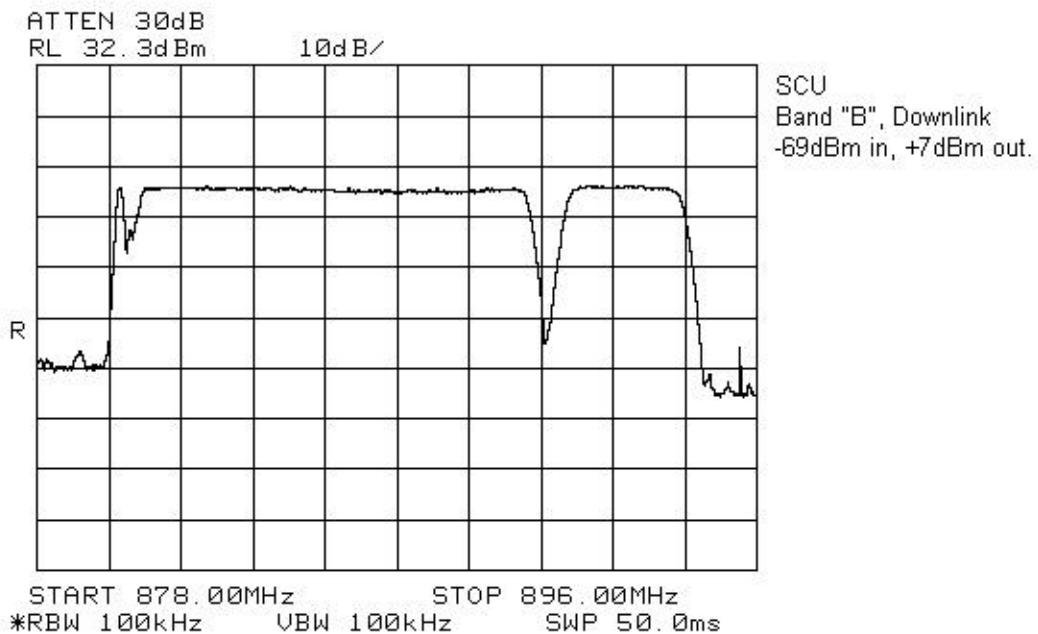
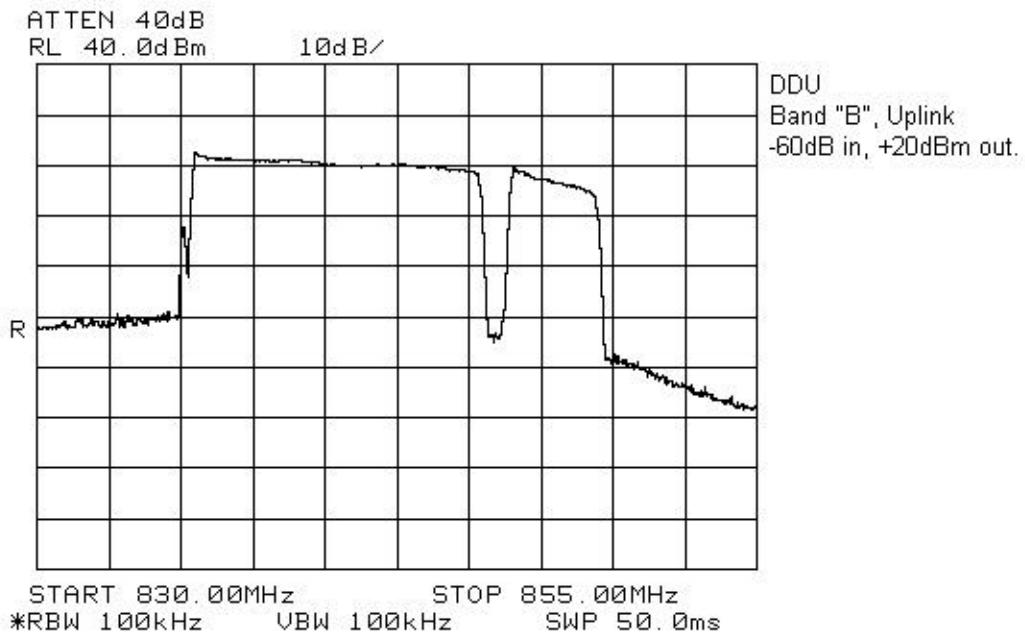
Minimum Standard: 22.913(a)**Test Results:** Complies.

The maximum RF output power is within $\pm 1\text{dB}$ of the manufacturer's rating. The RF output power is de-rated according to the number of channels via AGE and is equal to $P_{\text{max}} - 10\log N$.

Pmax = Maximum RF Output Power

N = Number Of Channels

EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater

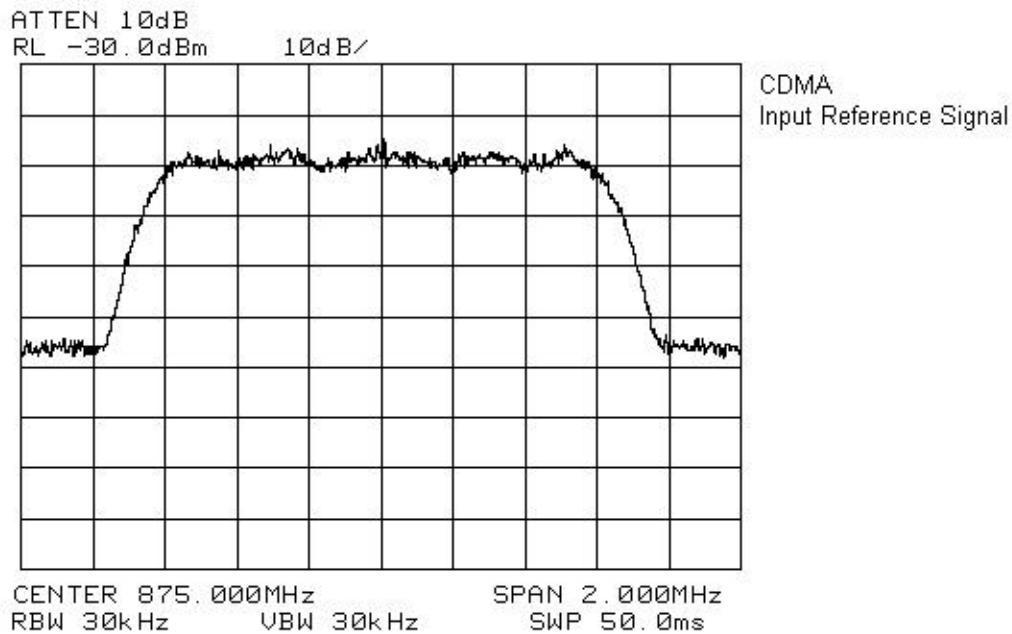
EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater

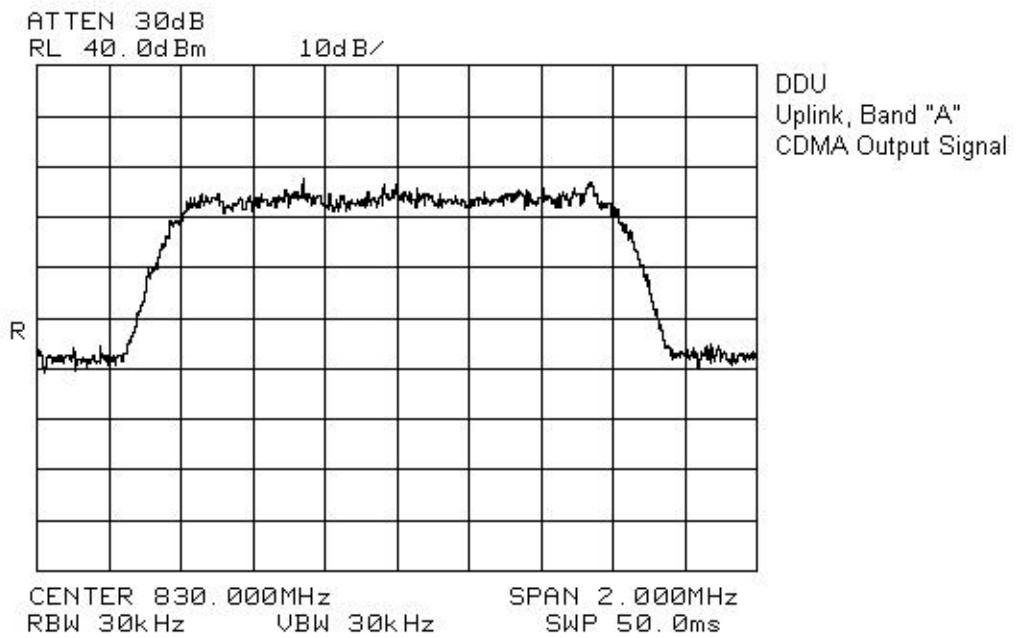
Section 4. Occupied Bandwidth**Para. No.: 2.1049**

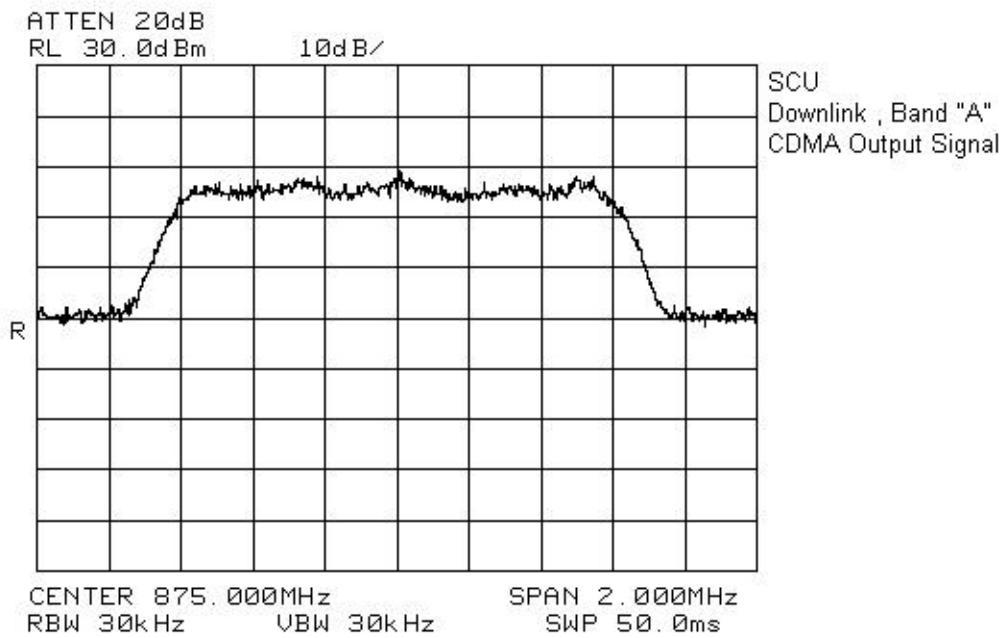
Test Performed By: Glen Westwell	Date of Test: 20 June, 2002
---	------------------------------------

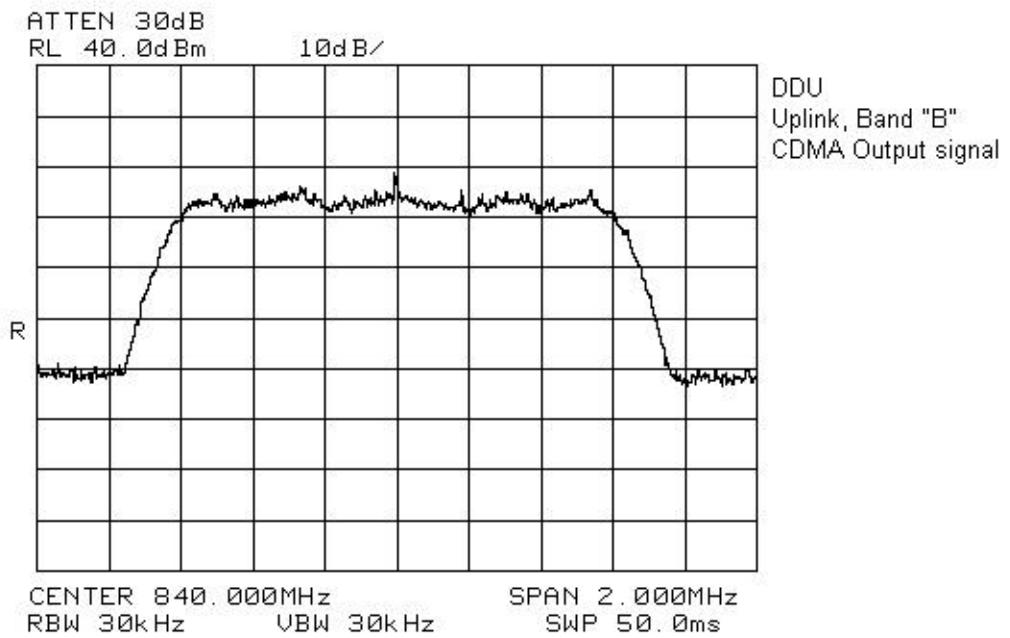
Minimum Standard: 22.917**Test Results:** Complies.**Measurement Data:** See attached graphs.

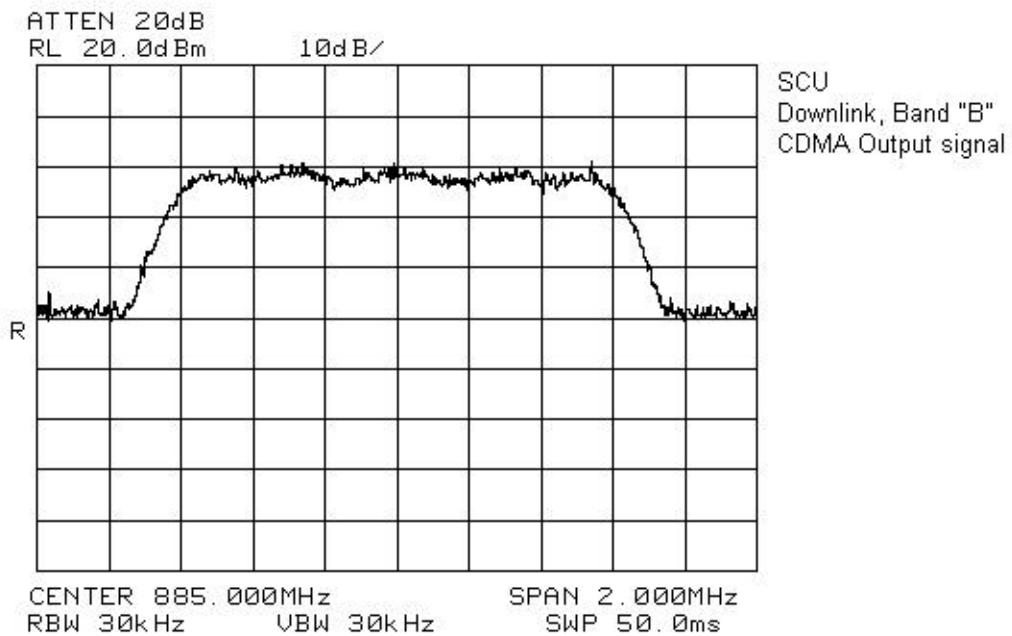
The occupied bandwidth was measured by comparison of input to the output signal. This was done in order to determine if there was any degradation to the output signal due to the amplification through the repeater.

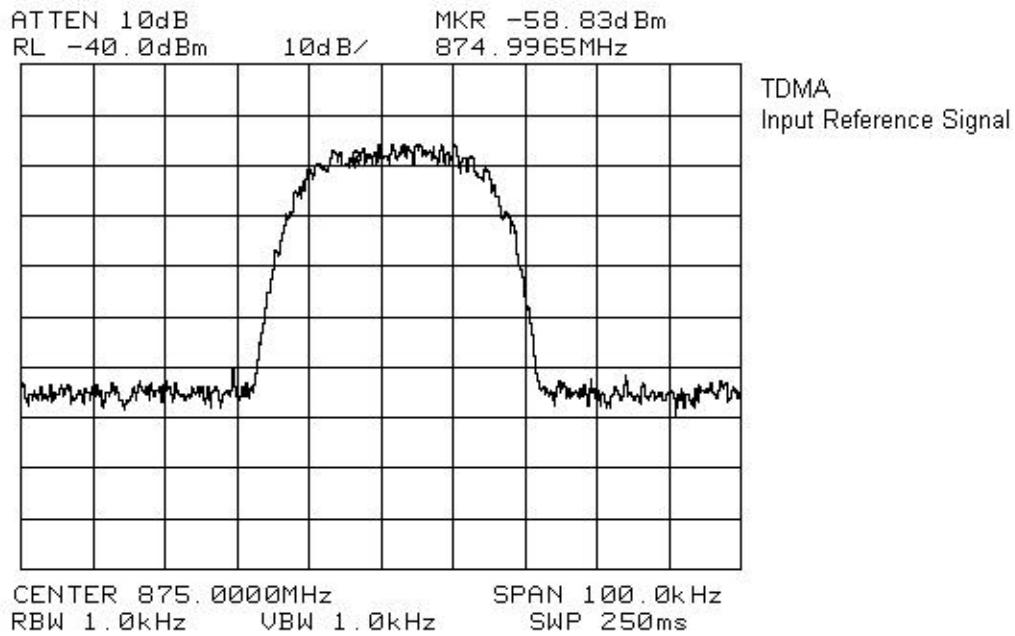
EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater

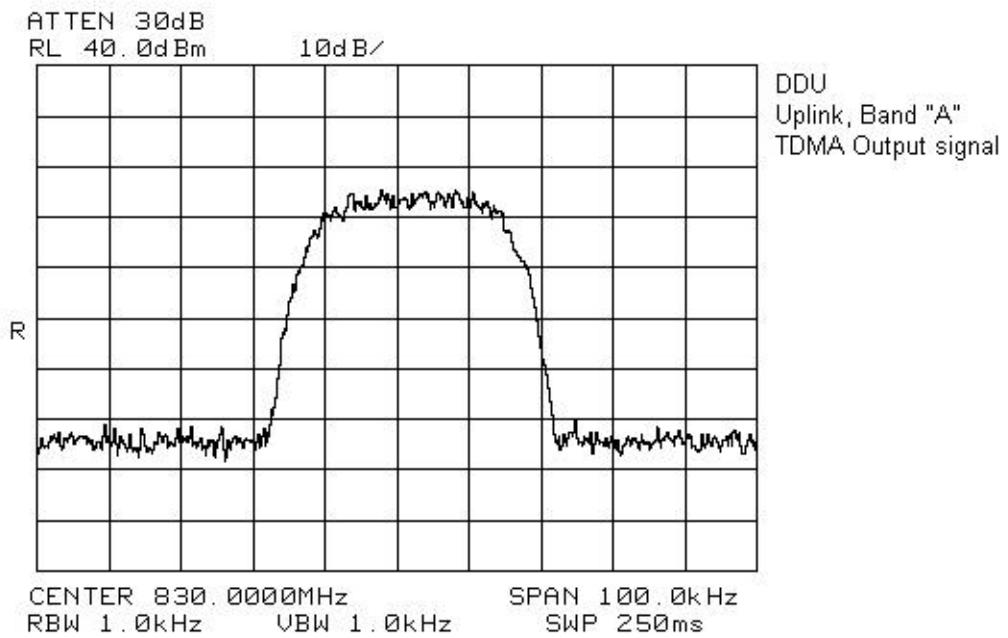
EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater

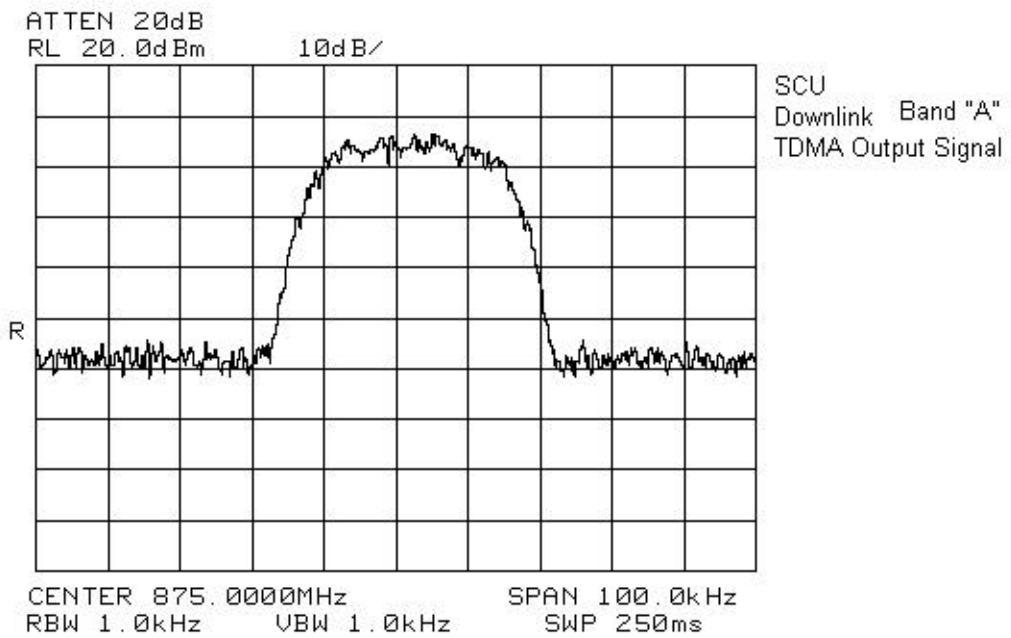
EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater

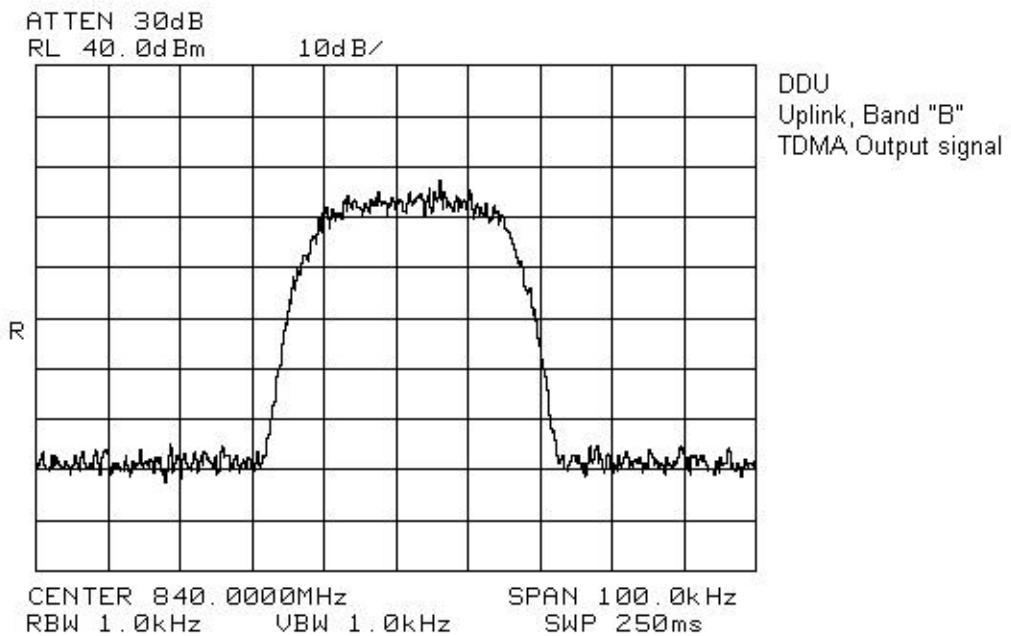


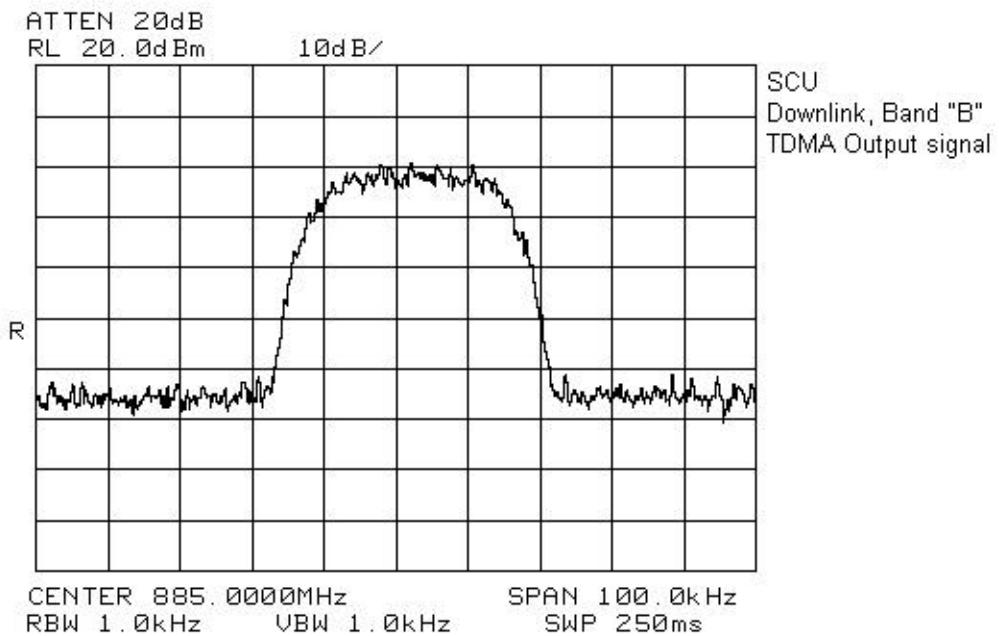
EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater

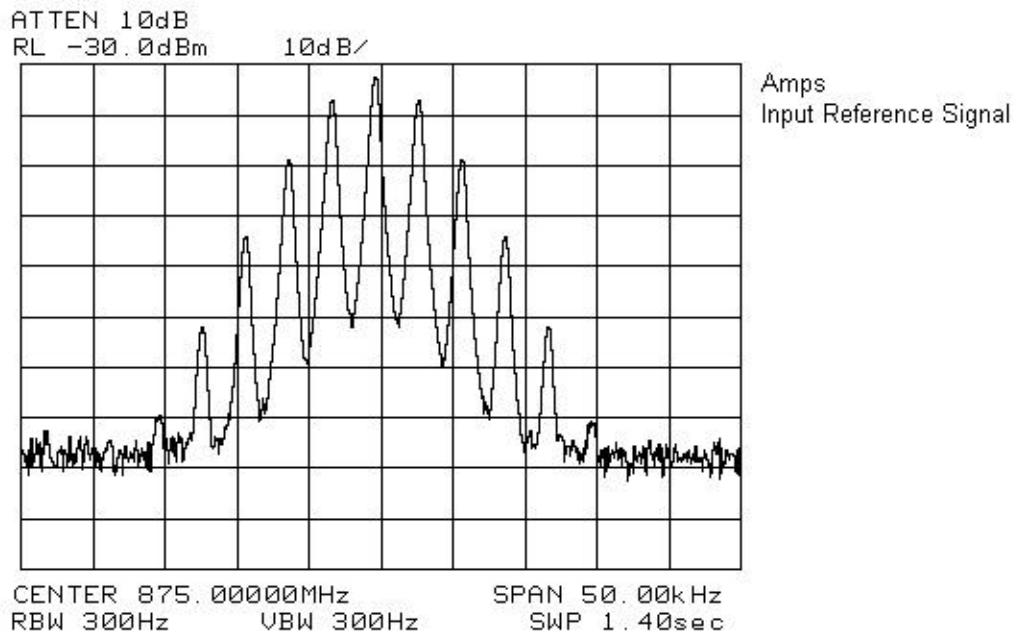
EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater

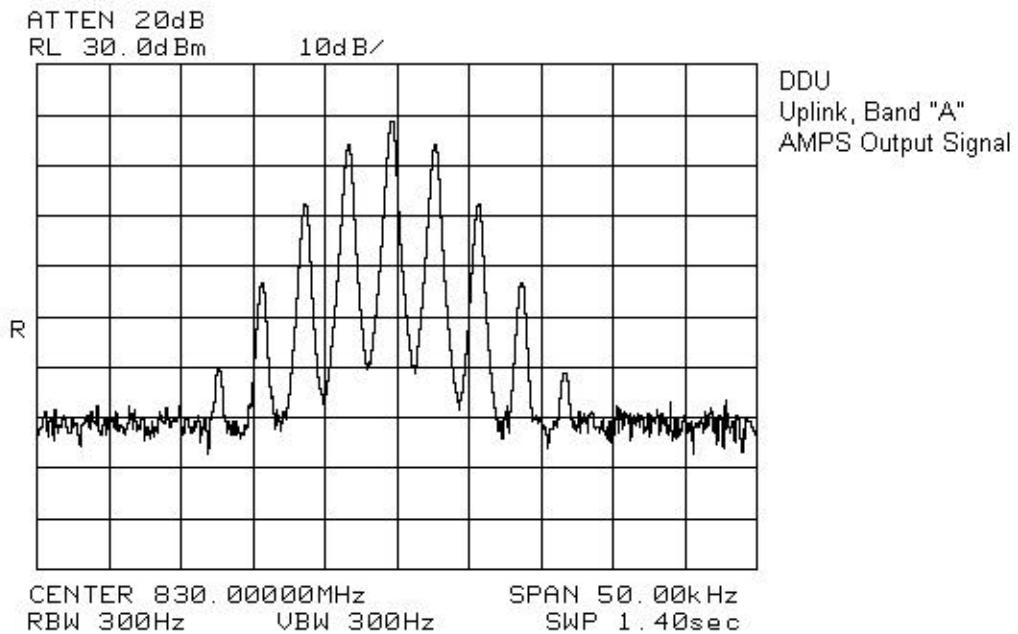
EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater

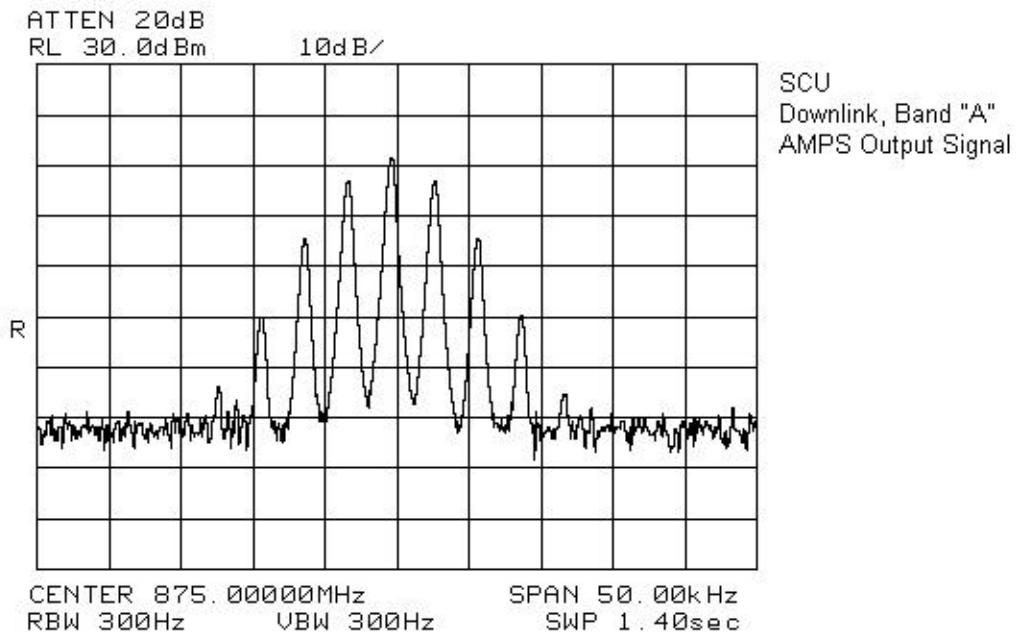
EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater

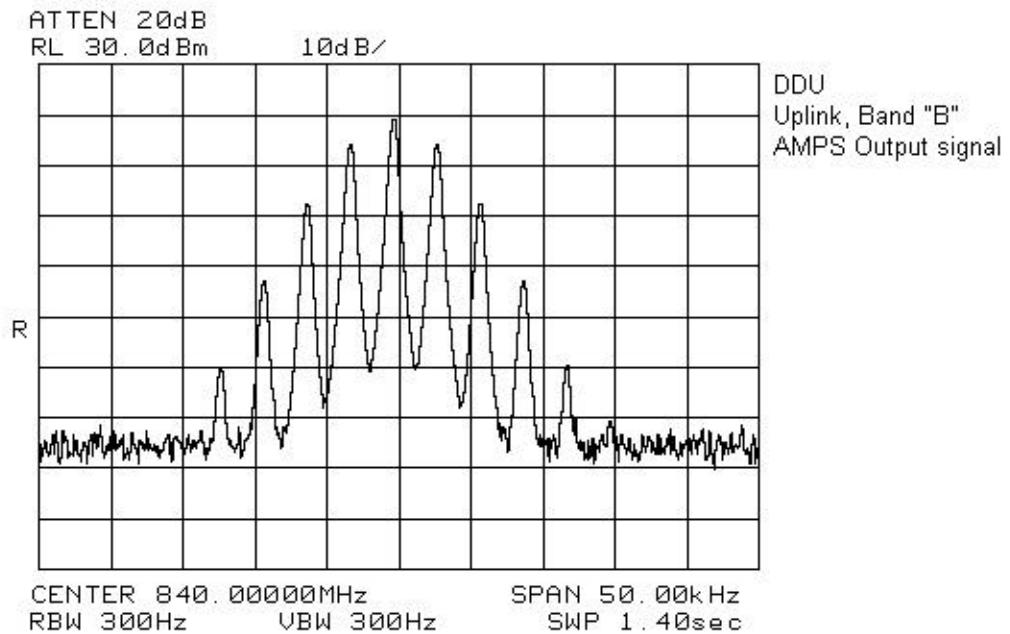
EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater

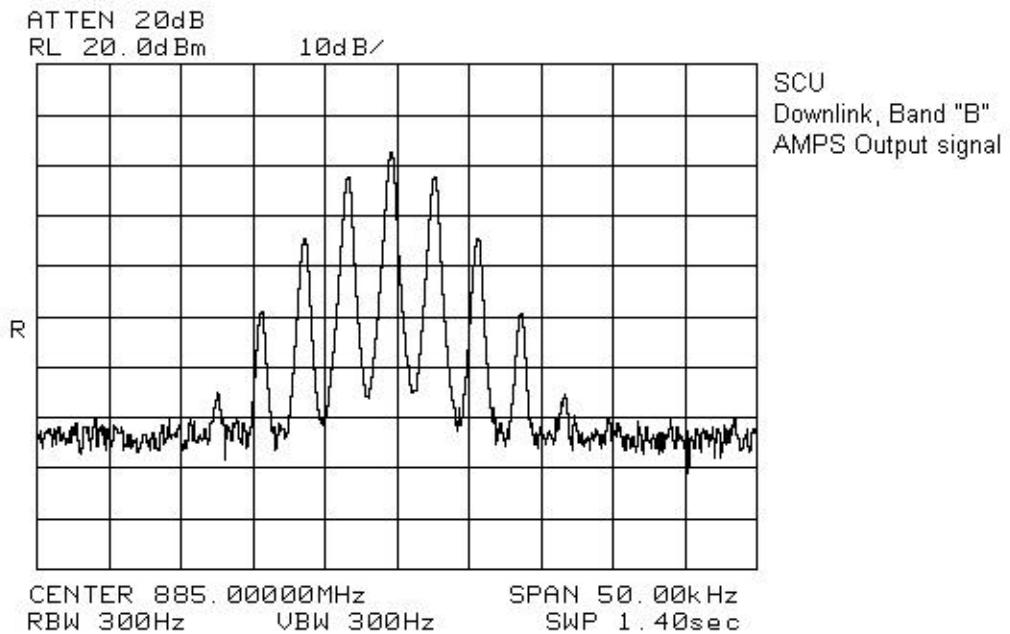
EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater

EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater



EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater

EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater

EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater

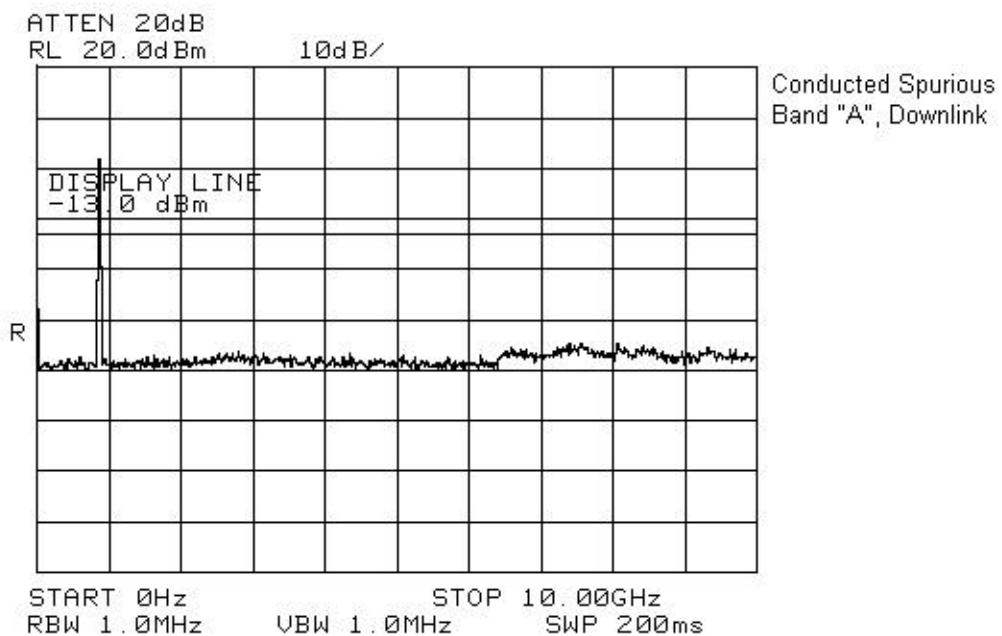
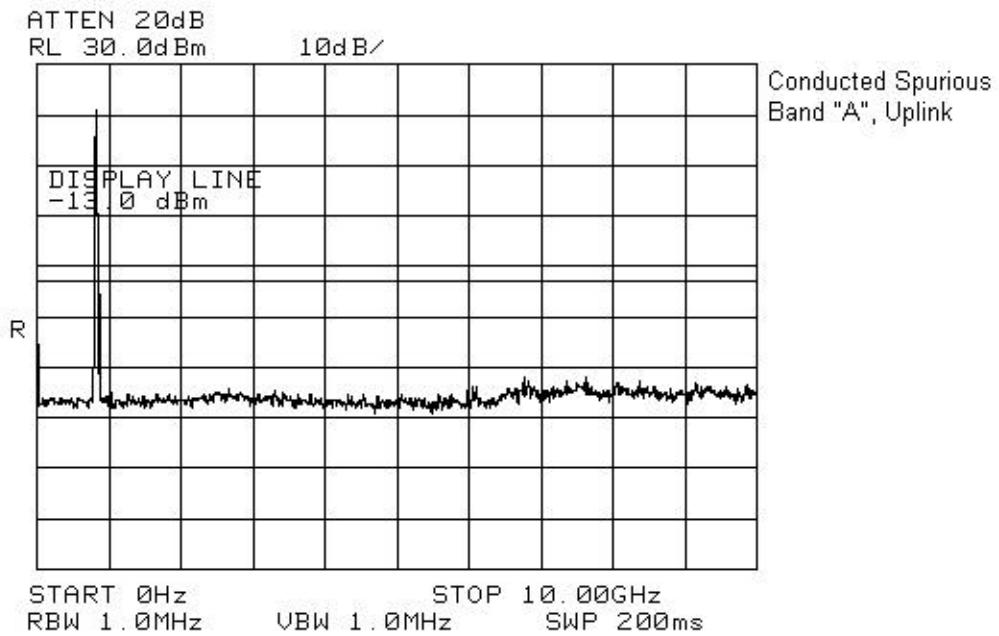
Section 5. Spurious Emissions at Antenna Terminals**Para. No.: 2.1051**

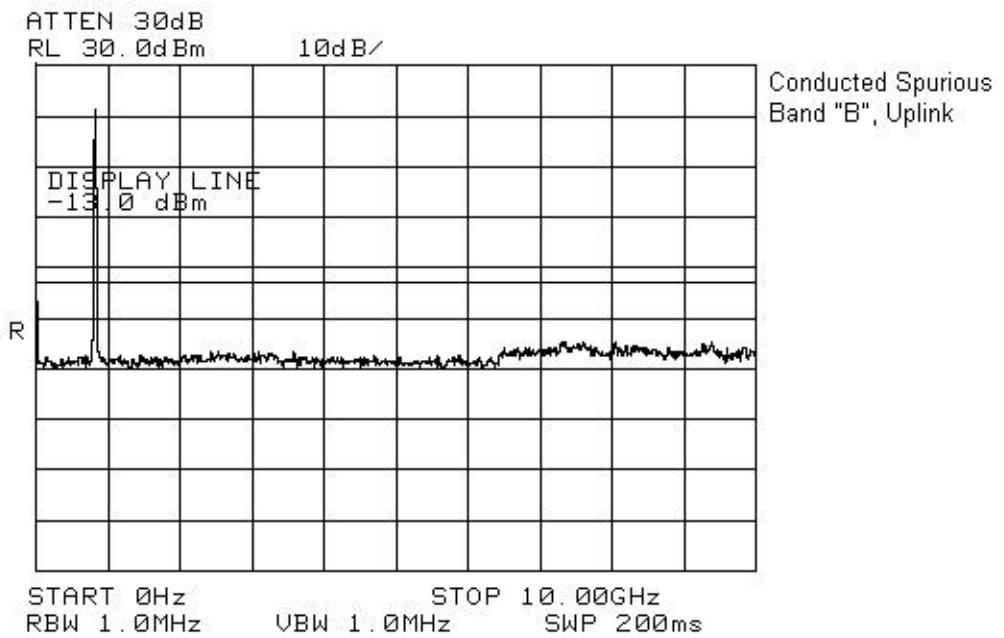
Test Performed By: Glen Westwell	Date of Test: 21 June, 2002
---	------------------------------------

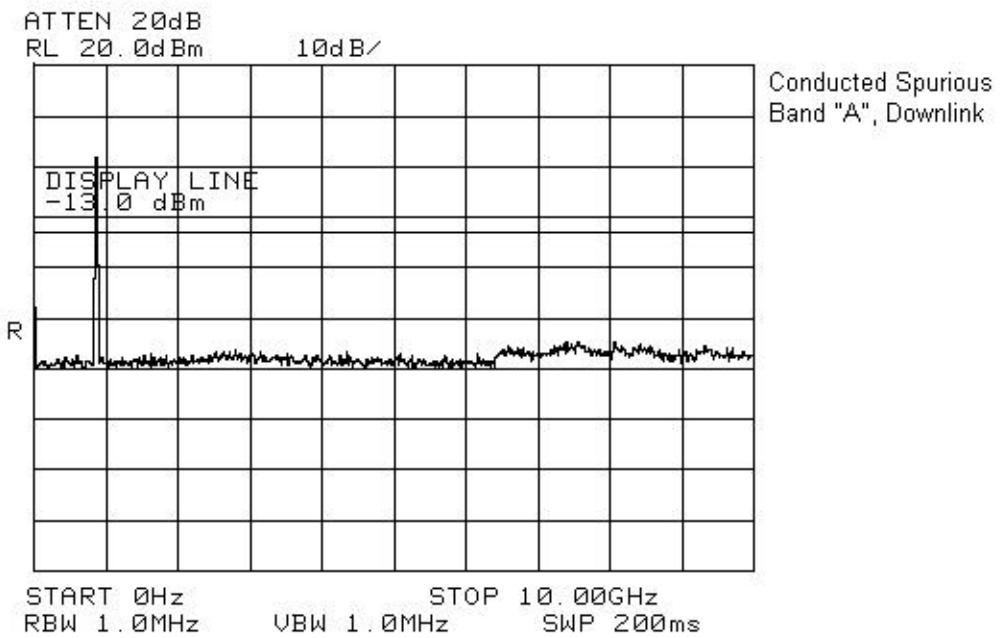
Minimum Standard: 22.917 (e); -13 dBm
(f); -80 dBm Conducted

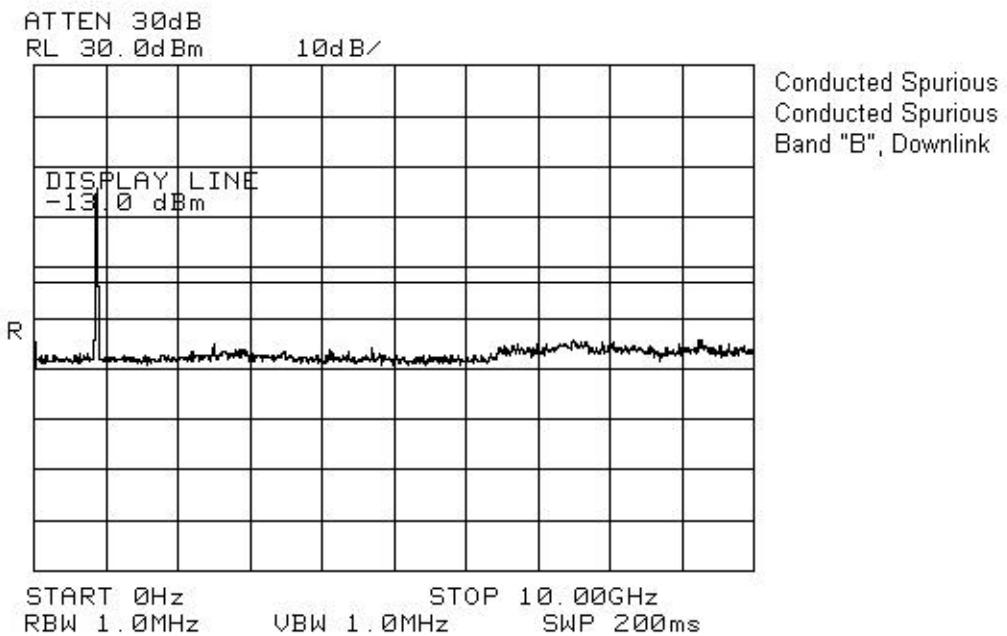
Test Results: Complies.

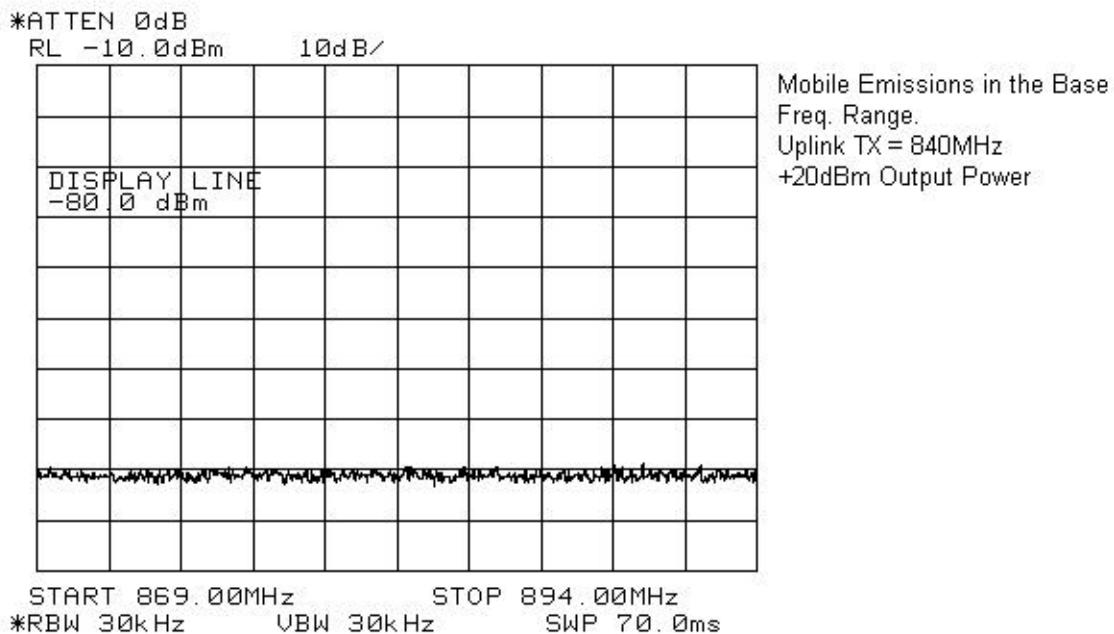
Measurement Data: See attached graphs (worst case).

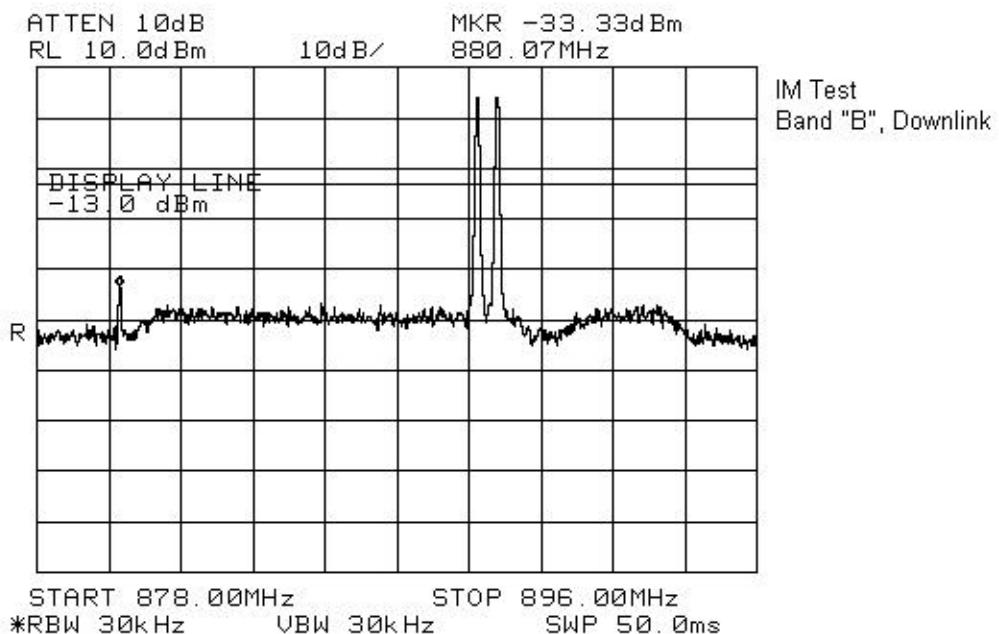
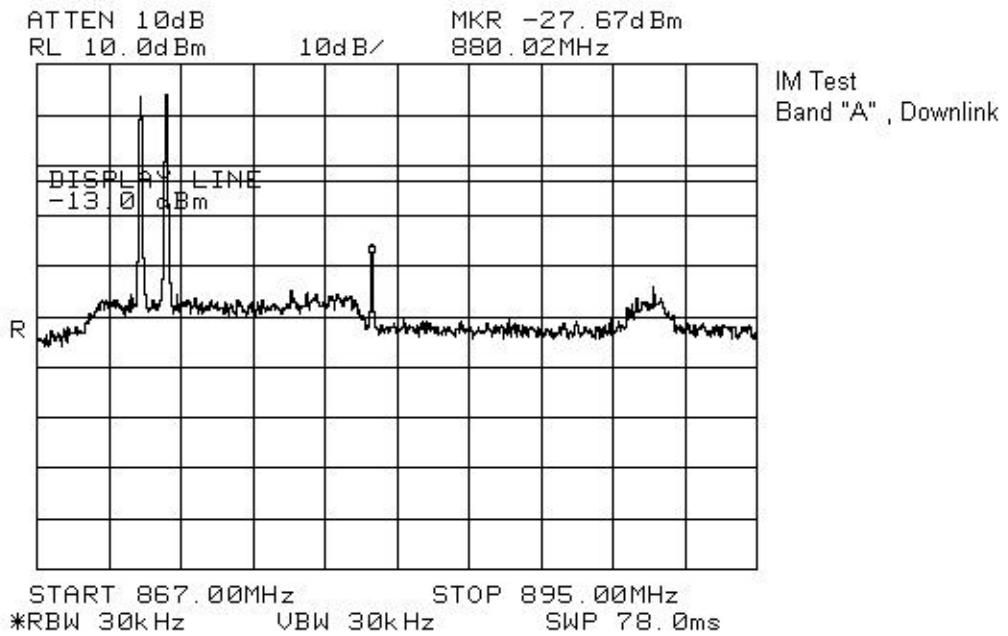
EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater

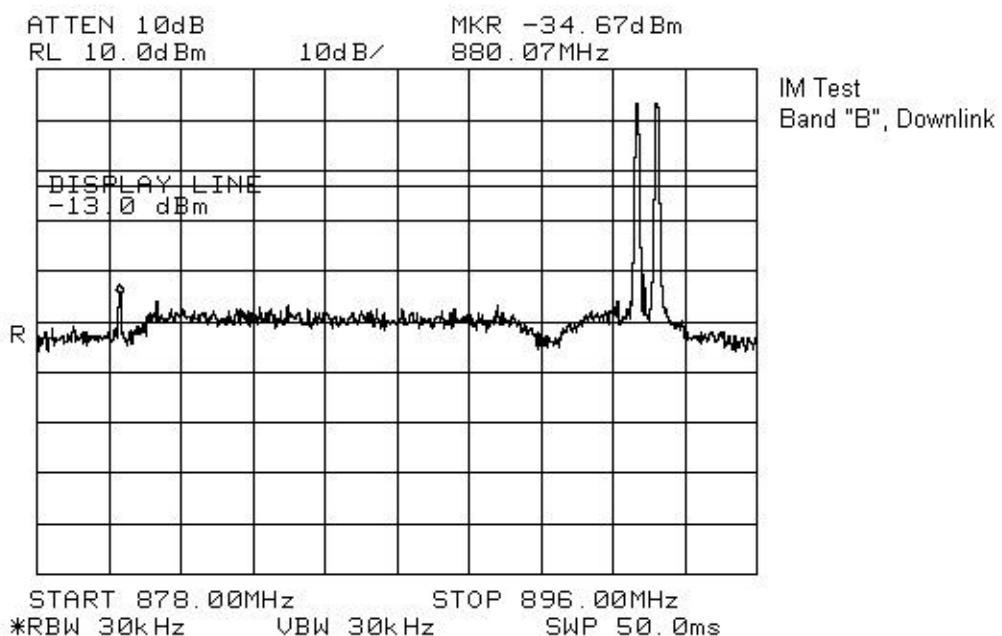
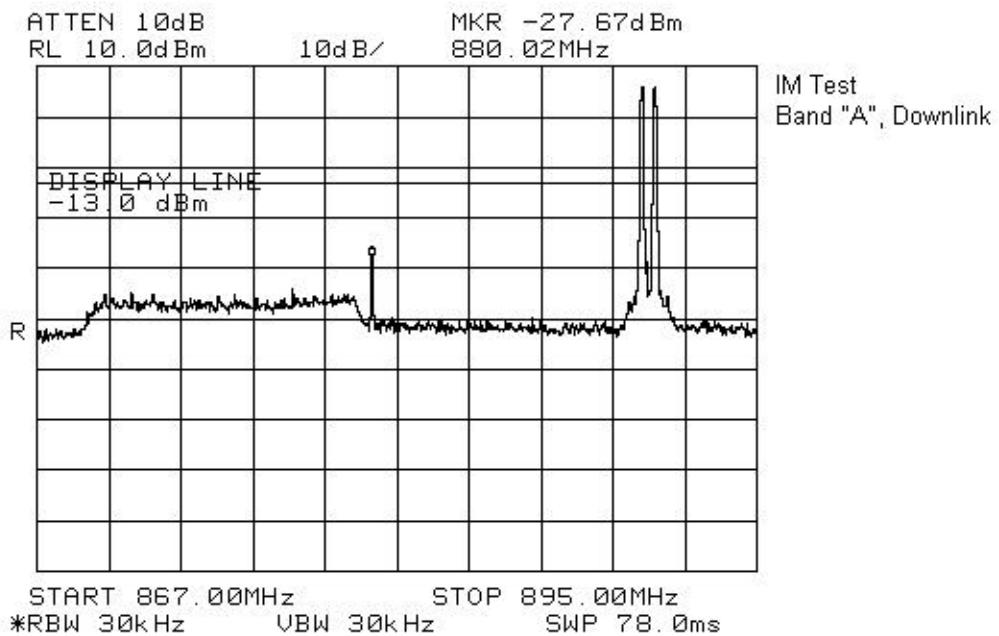
EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater

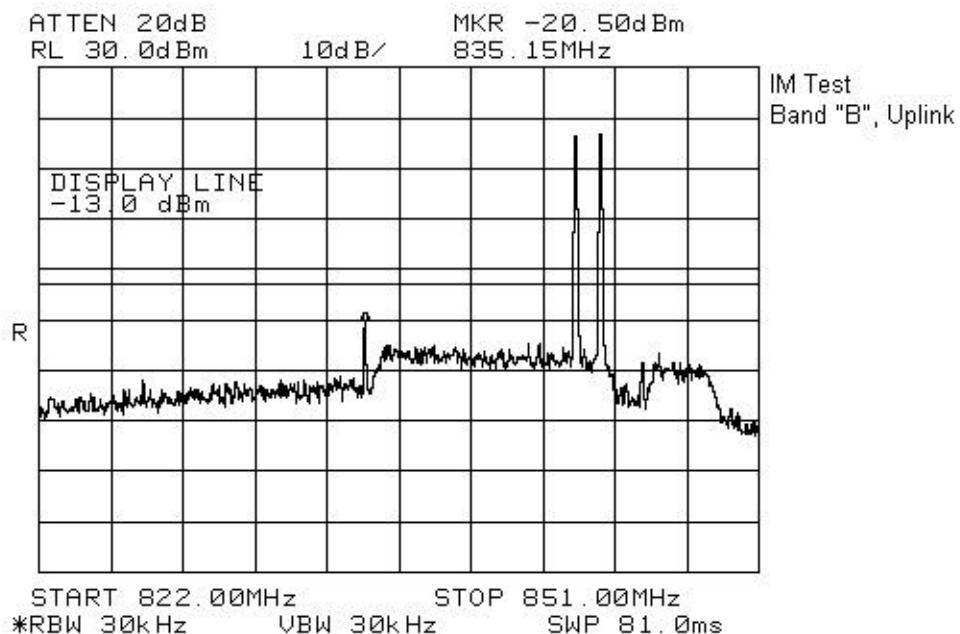
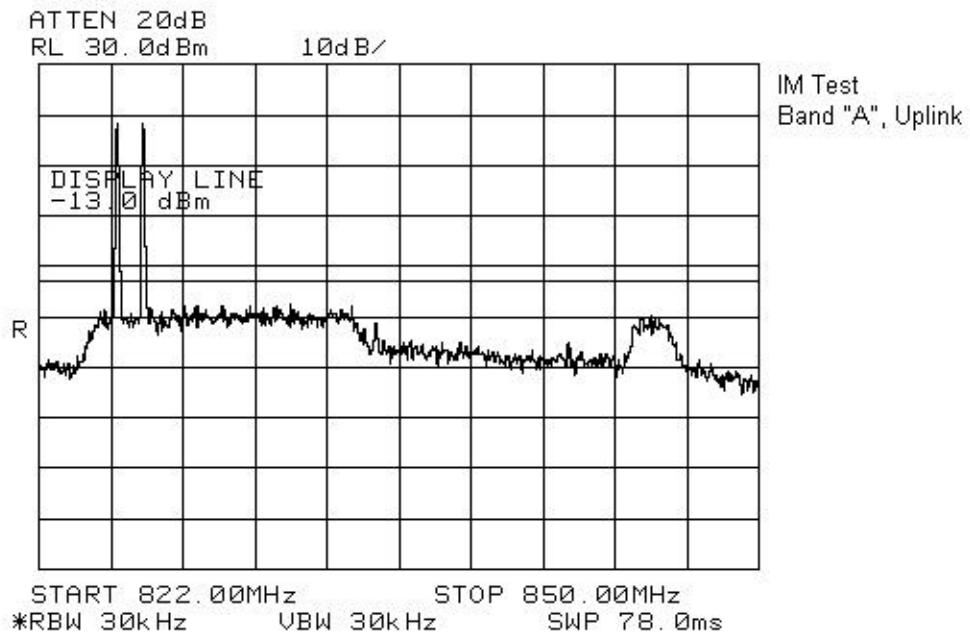


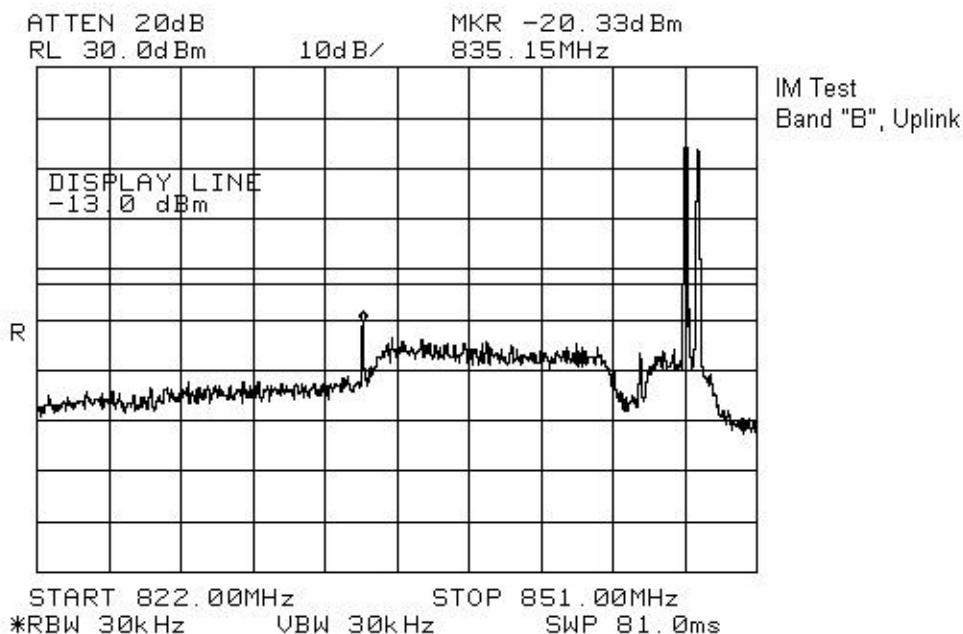
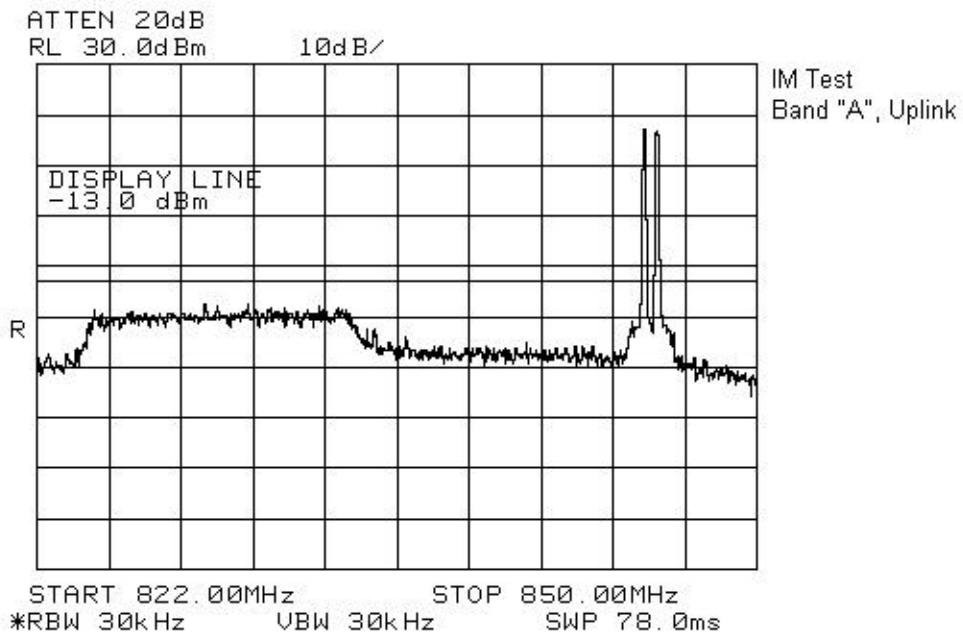
EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater

EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater

EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater

EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater

EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater

EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater

Section 6. Field Strength of Spurious Emissions**Para. No.: 2.1053**

Test Performed By: Glen Westwell	Date of Test: 21 June, 2002
---	------------------------------------

Minimum Standard: 22.917(e); -13dBm**Test Results:** Complies.**Measurement Data:** See attached data (worst case).

Test Data - Field Strength of Spurious Emissions

Test Distance (meters) : 3		Range: A Tower		Receiver: 8565E		RBW(kHz): 1000		Detector: Peak	
Freq. (MHz)	Ant. *	Pol. (V/H)	RCVD Signal (dB μ V/m)	Signal Substitution Conversion Factor (dB)**	Amp. Gain (dB)***	Dist. Corr. (dB)	Field Strength (dBm)	Limit (dBm)	Margin (dB)
1680.0	SSV	V	85.8	-117.4			-31.6	-13.0	18.6
1680.0	SSH	H	60.1	-117.8			-57.7	-13.0	44.7
2520.0	SSV	V	55.2	-123.2			-68.0	-13.0	55.0
2520.0	SSH	H	59.0	-123.0			-64.0	-13.0	51.0
3660.0	SSV	V	74.8	-118.8			-44.0	-13.0	31.0
3660.0	SSH	H	63.4	-120.4			-57.0	-13.0	44.0

Notes:

B/C = Biconical, B/L = Biconilog, L/P = Log-Periodic, H = Horn, D/P = Dipole

* Re-measured using dipole antenna.

** Includes cable loss when amplifier is not used.

*** Includes cable loss.

() Denotes failing emission level.

N.D. = Not Detected

All spurious and harmonic emissions to the 10th harmonic for both uplink and downlink were searched.

EQUIPMENT: SpotCell 100, Low Power Cellular Band Repeater

Field Strength of Spurious Emissions - Photograph

SpotCell 100



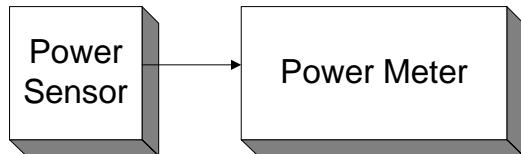
Section 7. Frequency Stability**Para. No.: 2.1055****Test Performed By:** Glen Westwell**Date of Test:** 24 June, 2002**Minimum Standard:** 22.355**Test Results:** Complies. The maximum frequency drift is 0 Hz.**Measurement Data:** Standard Test Frequency: (-30°C to +50°C)

Uplink: 840.000 000 MHz

Downlink: 885.000 000 MHz

Section 8. Block Diagrams

Para. No. 2.1046 - R.F. Power Output

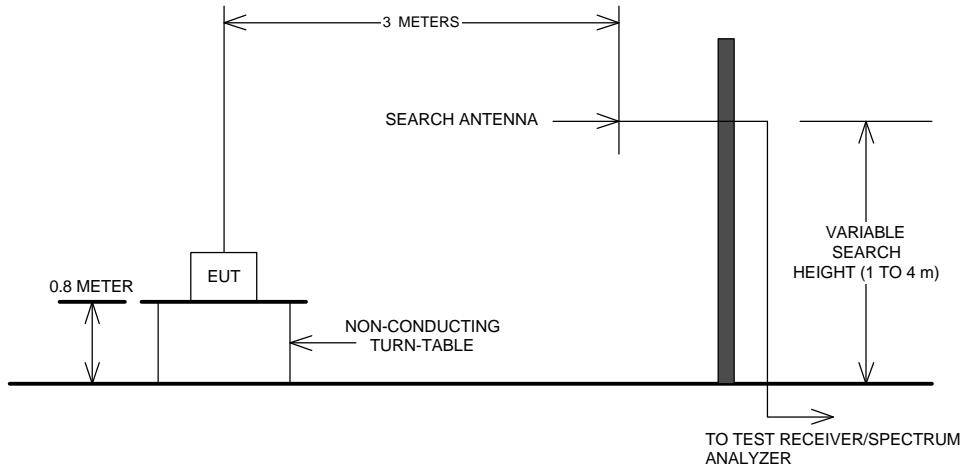
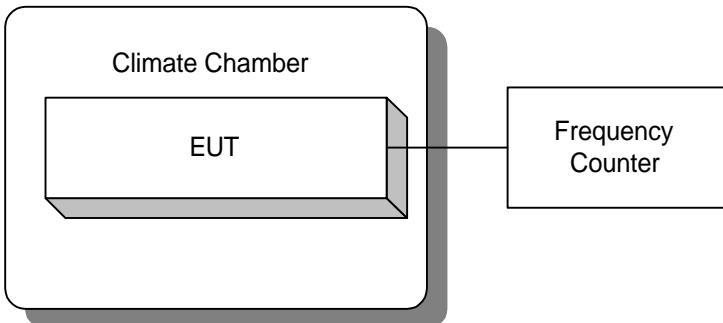


Para. No. 2.1049 - Occupied Bandwidth



Para. No. 2.1051 - Spurious Emissions at Antenna Terminals



Para. No. 2.1053 - Field Strength of Spurious Radiation**Para. No. 2.1055 - Frequency Stability**

Section 9. Test Equipment List

CAL CYCLE	EQUIPMENT	MANUFACTURER	MODEL	SERIAL	LAST CAL.	NEXT CAL.
1 Year	Spectrum Analyzer	Hewlett Packard	8565E	FA000981	6 Mar. 02	6 Mar. 03
1 Year	Spectrum Analyzer-1	Hewlett Packard	8566B	2311A02238	27 Nov 2001	27 Nov 2002
1 Year	Spectrum Analyzer Display-1	Hewlett Packard	8566B	2314A04759	27 Nov 2001	27 Nov 2002
1 Year	Quasi-peak adapter-1	Hewlett-Packard	85650A	2043A00302	27 Nov 2001	27 Nov 2002
1 Year	Climate Chamber	Thermotron	SM-16C	15649-S	COU	COU
1 Year	Horn Antenna	EMCO #2	3115	4336	Dec. 1/01	Dec. 1/02
1 Year	Log Periodic Antenna 1	EMCO	LPA-25	1141	Aug. 28/01	Aug. 28/02
1 Year	RF AMP	JCA	2-4 GHz	FA001496	COU	COU
1 Year	RF AMP	JCA	1-2 GHz	FA001498	COU	COU
1 Year	RF AMP	JCA	4-8 GHz	FA001497	COU	COU
1 Year	Frequency Counter	Hewlett Packard	HP5350A	2444A00135	11 Jan 2002	11 Jan 2003
3 Year	RF Generator	Rohde & Schwarz	SIMIQ03	DE22004	Sept. 10/00	Sept. 18/03
3 Year	RF Generator	Rohde & Schwarz	SIMIQ03E	DE24154	Oct. 4/99	Oct. 4/02

NA: Not Applicable

NCR: No Cal Required

COU: CAL On Use