Standards Council of Canada
Accredited Laboratory
Scope of Accreditation 75

Conseil canadien des normes
Laboratoire accrédité
Portée d'accréditation 75

TM

Test Report:	2W06184.2
Applicant:	Spotwave Wireless Inc. 1 Hines Road Ottawa, Ontario K2K 3C7
Equipment Under Test: (EUT)	SpotCell 100 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

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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.

☒ New Submission ☒ Production Unit

☐ Class II Permissive Change ☐ Pre-Production Unit

A	M	P

Equipment Code

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: _____ DATE: 11 July 2002
Glen Westwell, Wireless Technologist

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 %

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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

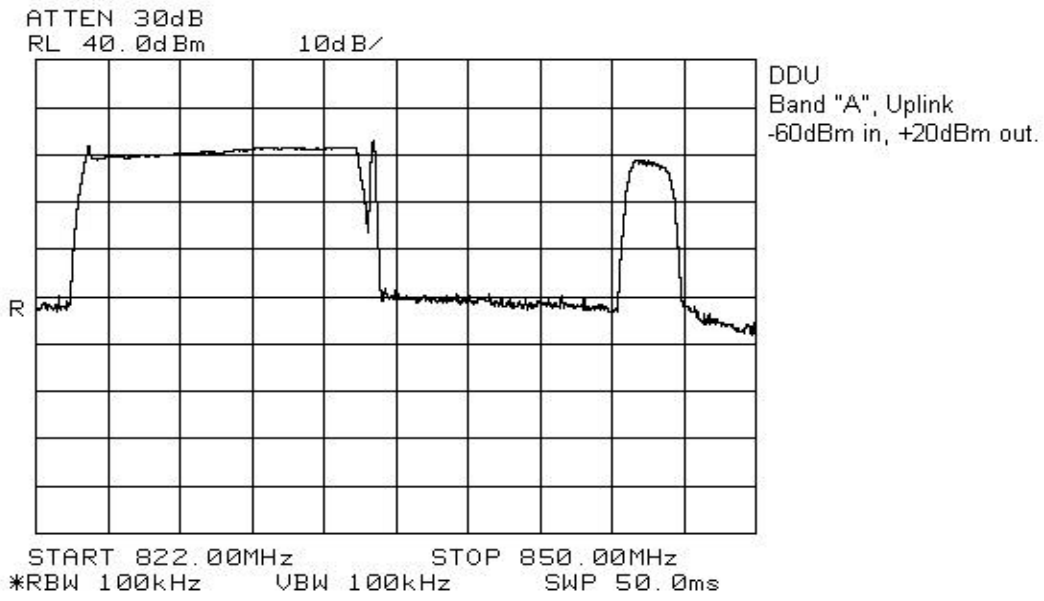
Test Performed By: Glen Westwell	**Date of Test:** 20 June, 2002

Minimum Standard: 22.913(a)

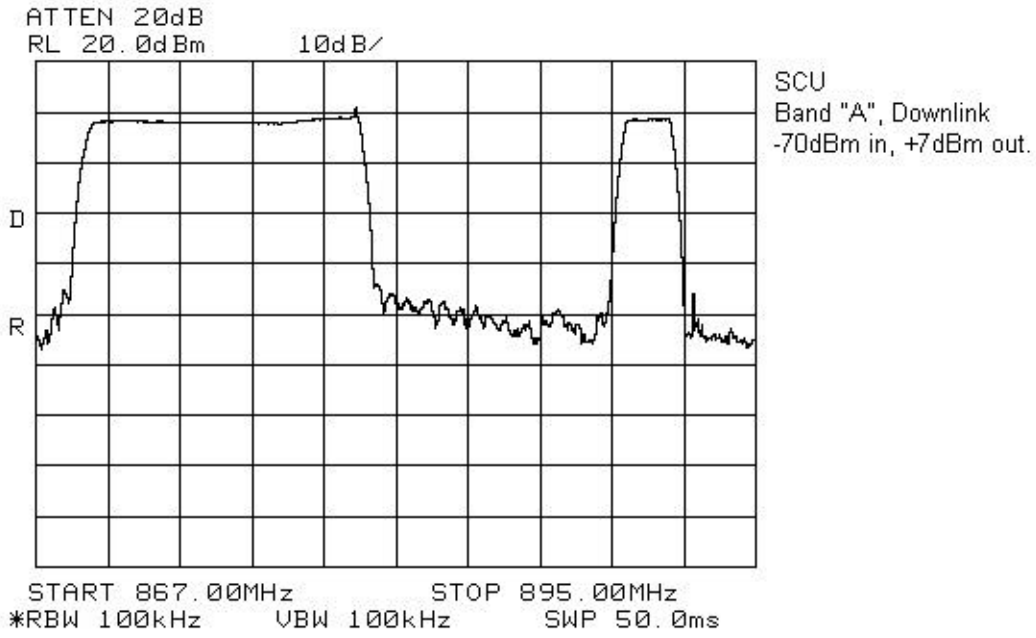
Test Results: Complies.

The maximum RF output power is within ± 1dB of the manufacturer's rating. The RF output power is de-rated according to the number of channels via AGE and is equal to Pmax –10LogN.

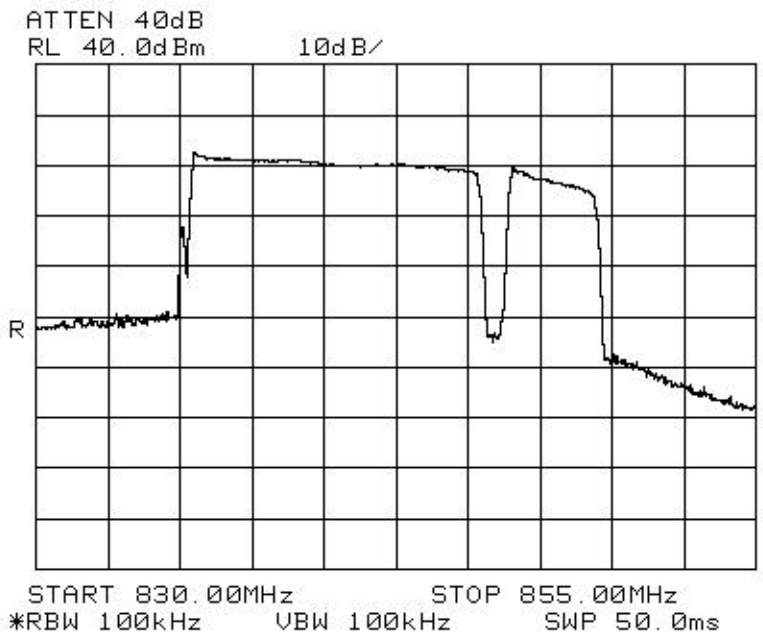
Pmax = Maximum RF Output Power
N = Number Of Channels



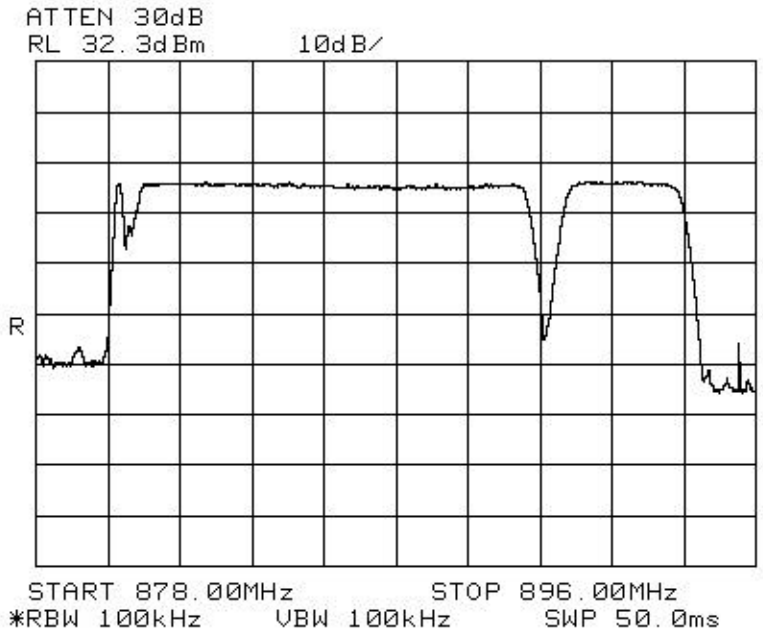
DDU
Band "A", Uplink
-60dBm in, +20dBm out.



SCU
Band "A", Downlink
-70dBm in, +7dBm out.



DDU
Band "B", Uplink
-60dB in, +20dBm out.



SCU
Band "B", Downlink
-69dBm in, +7dBm out.

Section 4. Occupied Bandwidth

Para. No.: 2.1049

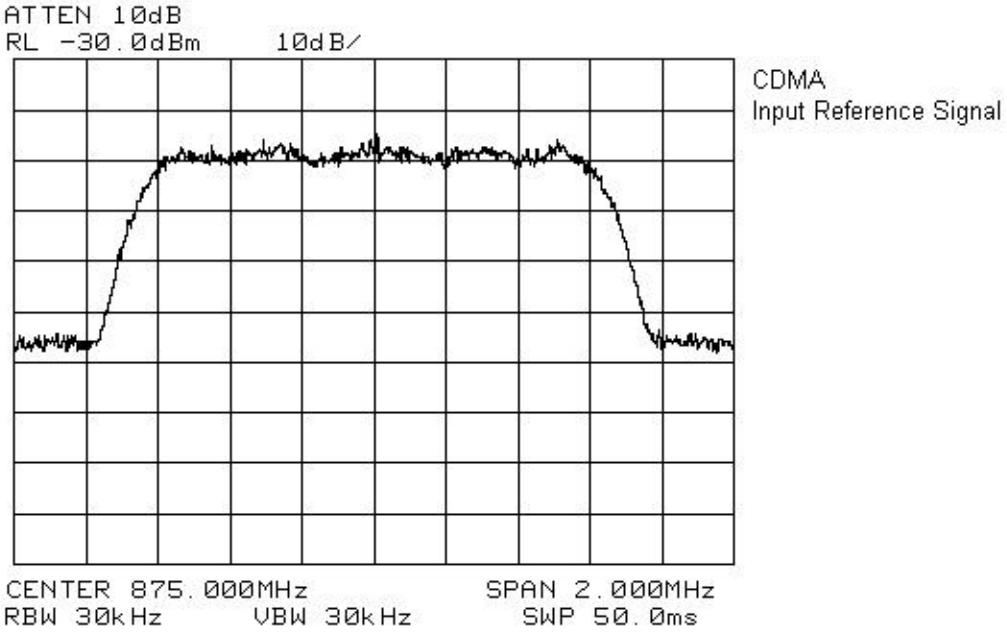
Test Performed By: Glen Westwell	**Date of Test:** 20 June, 2002

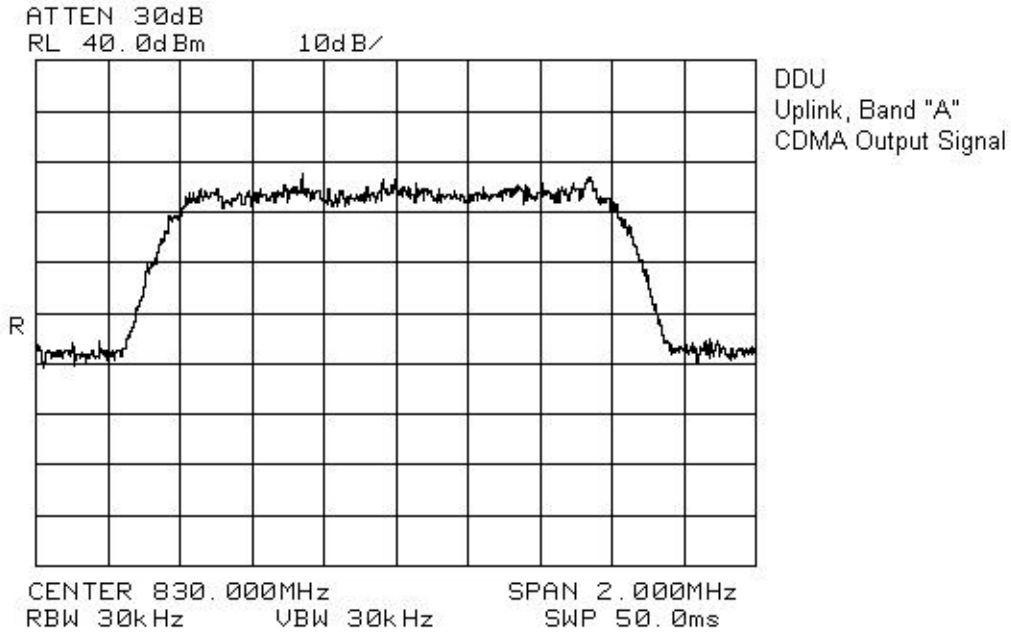
Minimum Standard: 22.917

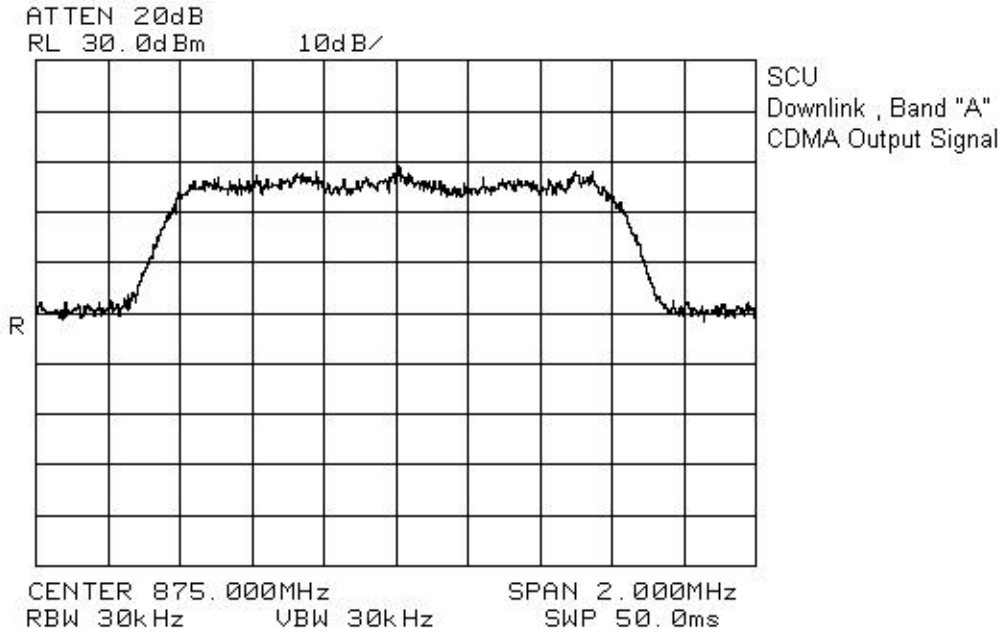
Test Results: Complies.

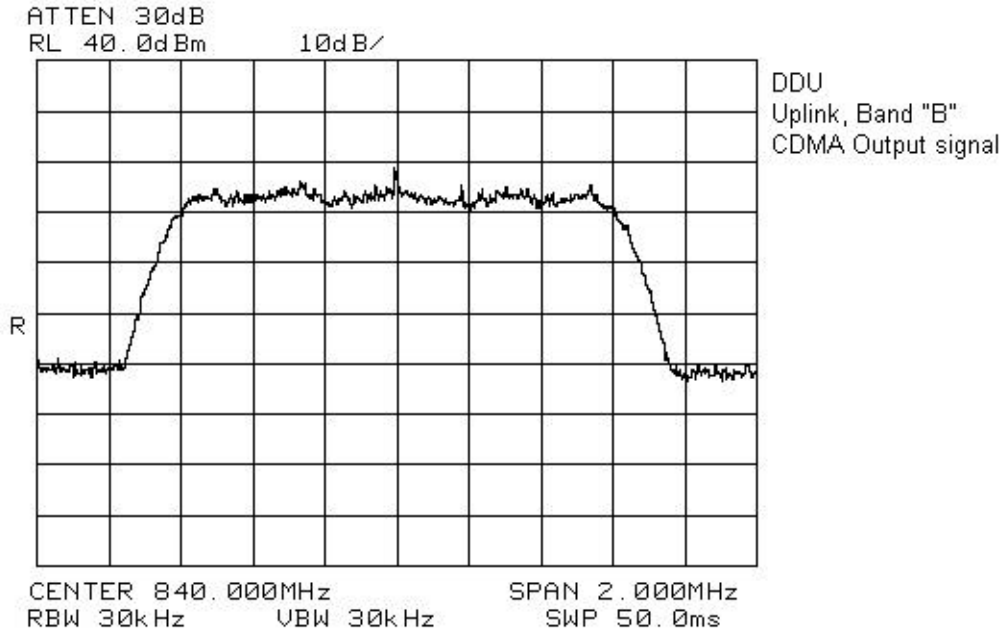
Measurement Data: See attached graphs.

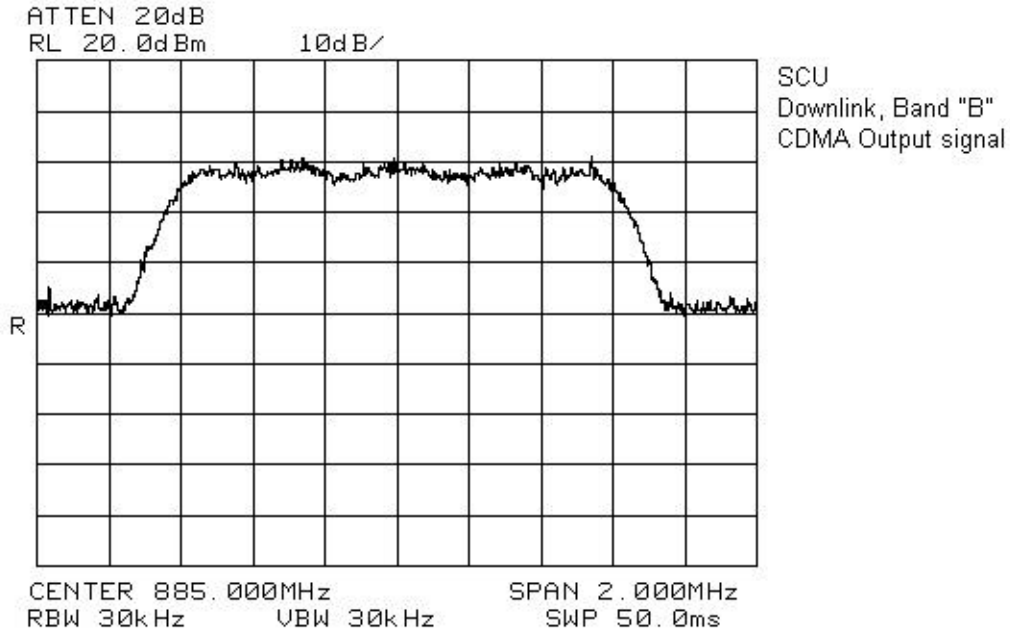
The occupied bandwidth was measured by comparison of input to the output signal. This was done in order to determine if there was any degradation to the output signal due to the amplification through the repeater.

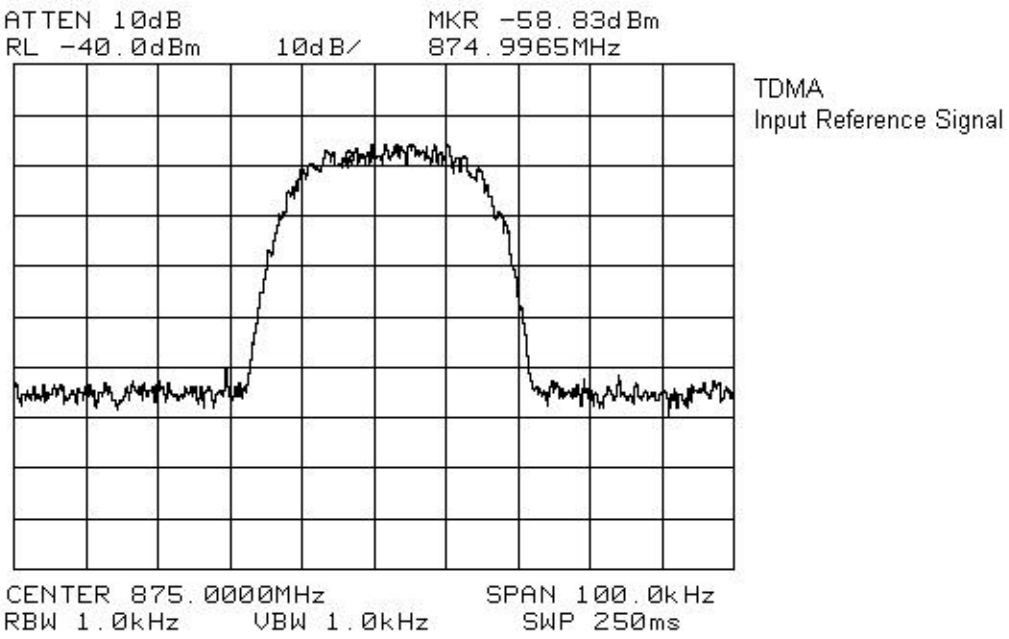

ATTEN 10dB
RL -30.0dBm
10dB/
CDMA
Input Reference Signal
CENTER 875.000MHz
SPAN 2.000MHz
RBW 30kHz
VBW 30kHz
SWP 50.0ms

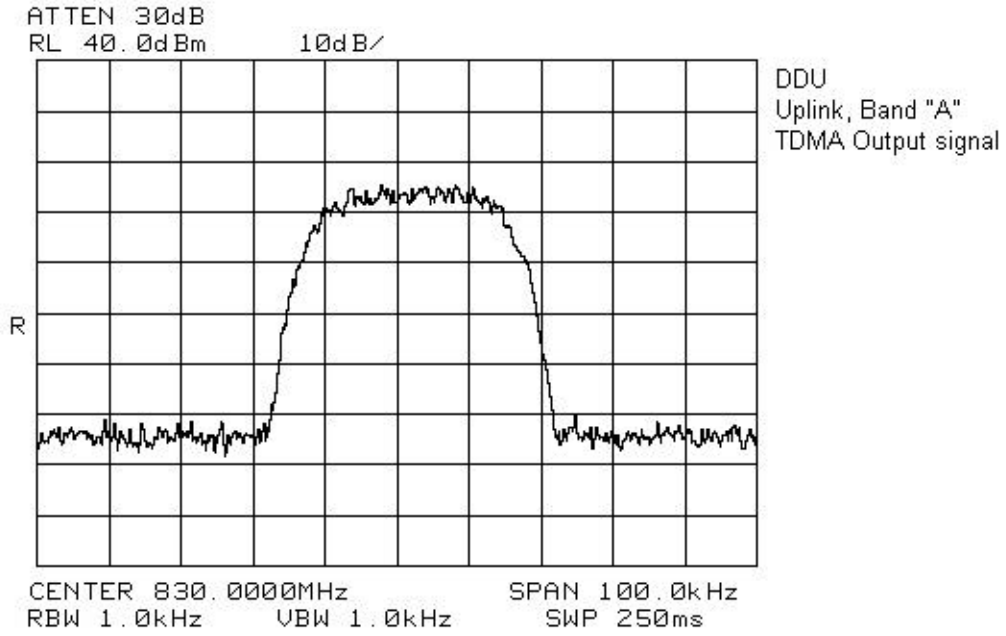

ATTEN 30dB
RL 40.0dBm
10dB/
R
DDU
Uplink, Band "A"
CDMA Output Signal
CENTER 830.000MHz
SPAN 2.000MHz
RBW 30kHz
VBW 30kHz
SWP 50.0ms

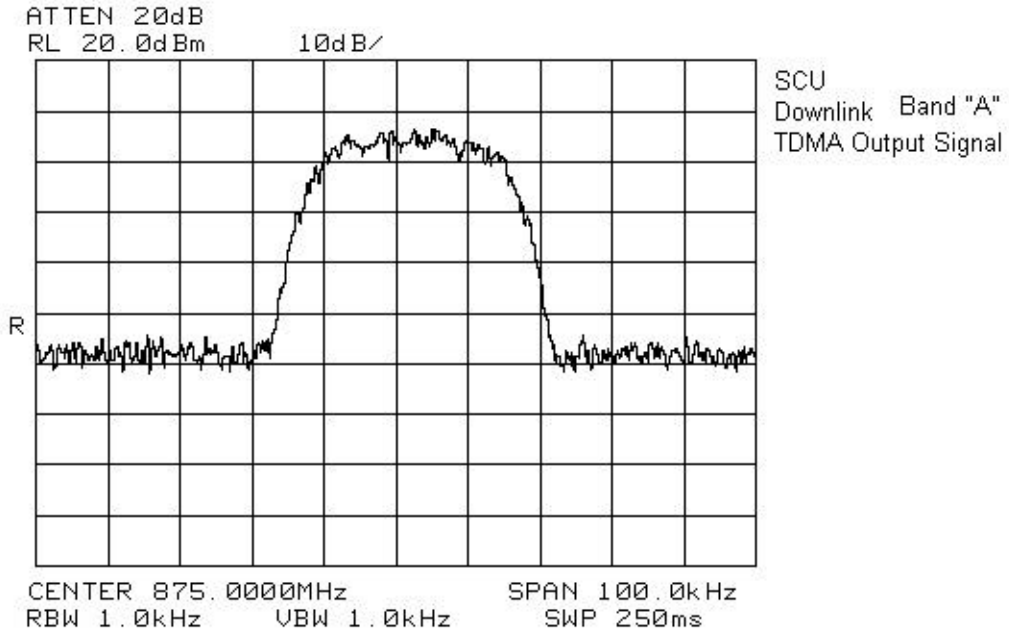

ATTEN 20dB
RL 30.0dBm
10dB/
SCU
Downlink , Band "A"
CDMA Output Signal
R
CENTER 875.000MHz
SPAN 2.000MHz
RBW 30kHz
VBW 30kHz
SWP 50.0ms

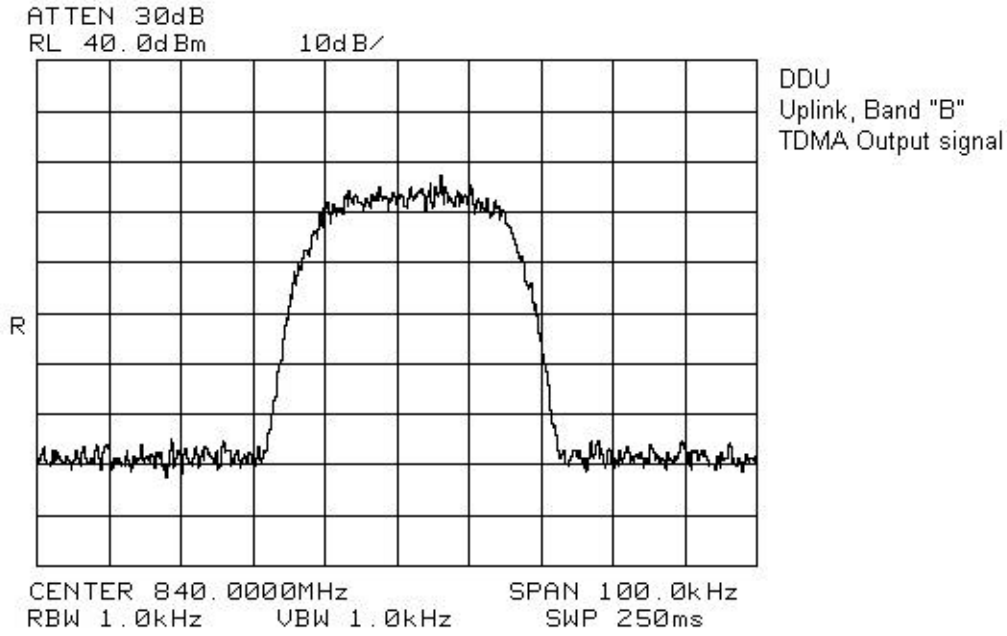

ATTEN 30dB
RL 40.0dBm
10dB/
R
DDU
Uplink, Band "B"
CDMA Output signal
CENTER 840.000MHz
SPAN 2.000MHz
RBW 30kHz
VBW 30kHz
SWP 50.0ms

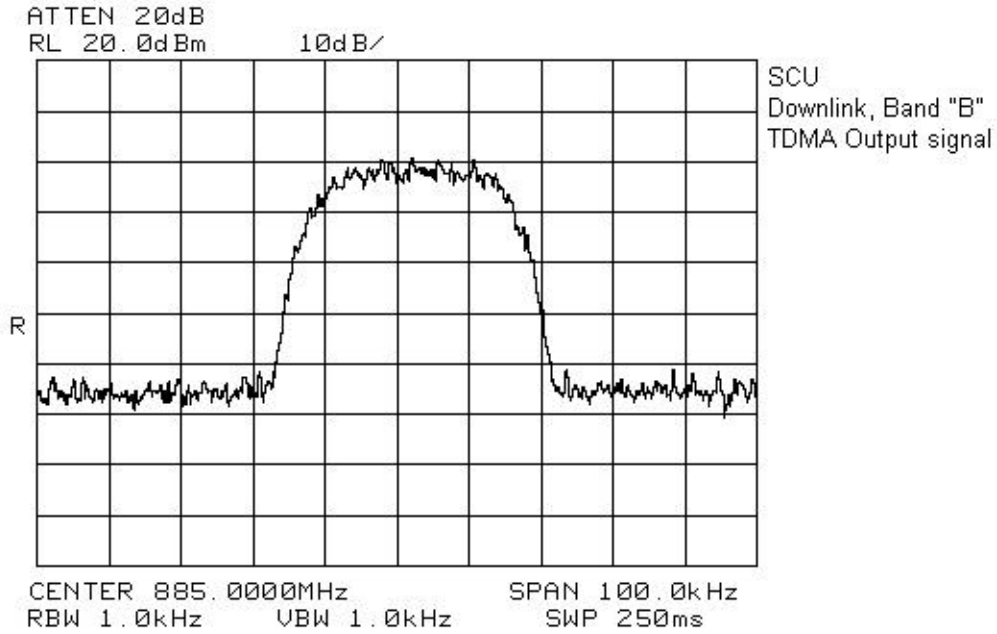

ATTEN 20dB
RL 20.0dBm
10dB/
R
SCU
Downlink, Band "B"
CDMA Output signal
CENTER 885.000MHz
SPAN 2.000MHz
RBW 30kHz
VBW 30kHz
SWP 50.0ms

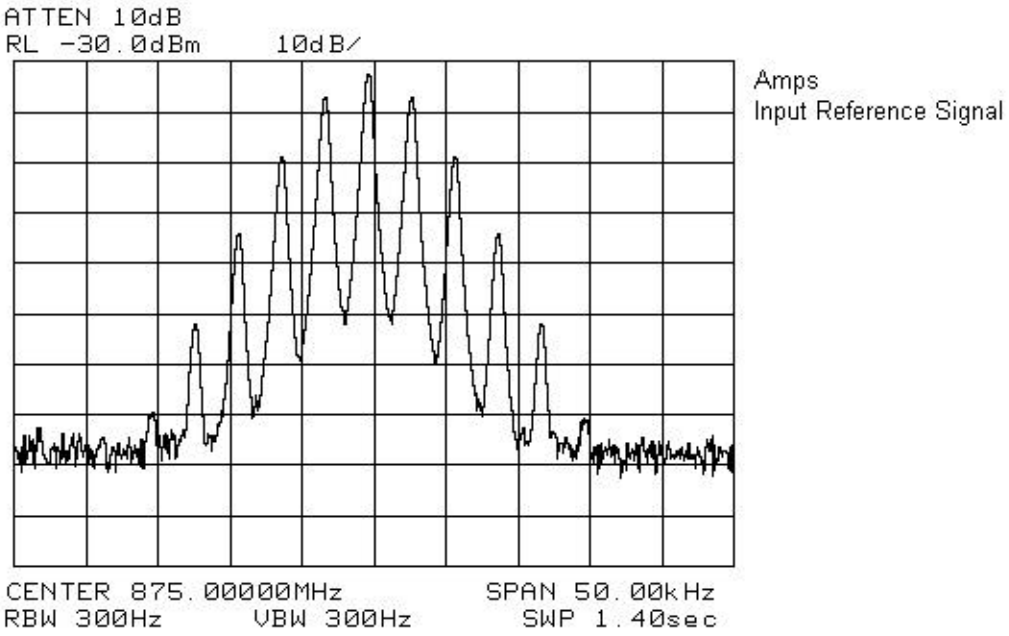

ATTEN 10dB
RL -40.0dBm
10dB/
MKR -58.83dBm
874.9965MHz
TDMA
Input Reference Signal
CENTER 875.0000MHz
SPAN 100.0kHz
RBW 1.0kHz
VBW 1.0kHz
SWP 250ms

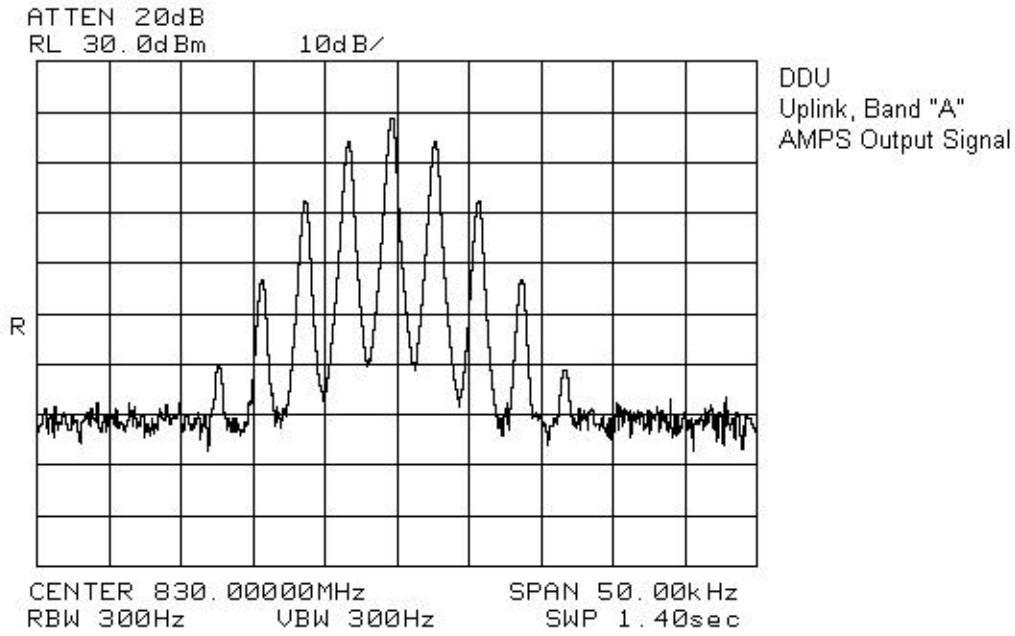

ATTEN 30dB
RL 40.0dBm
10dB/
R
DDU
Uplink, Band "A"
TDMA Output signal
CENTER 830.0000MHz
SPAN 100.0kHz
RBW 1.0kHz
VBW 1.0kHz
SWP 250ms

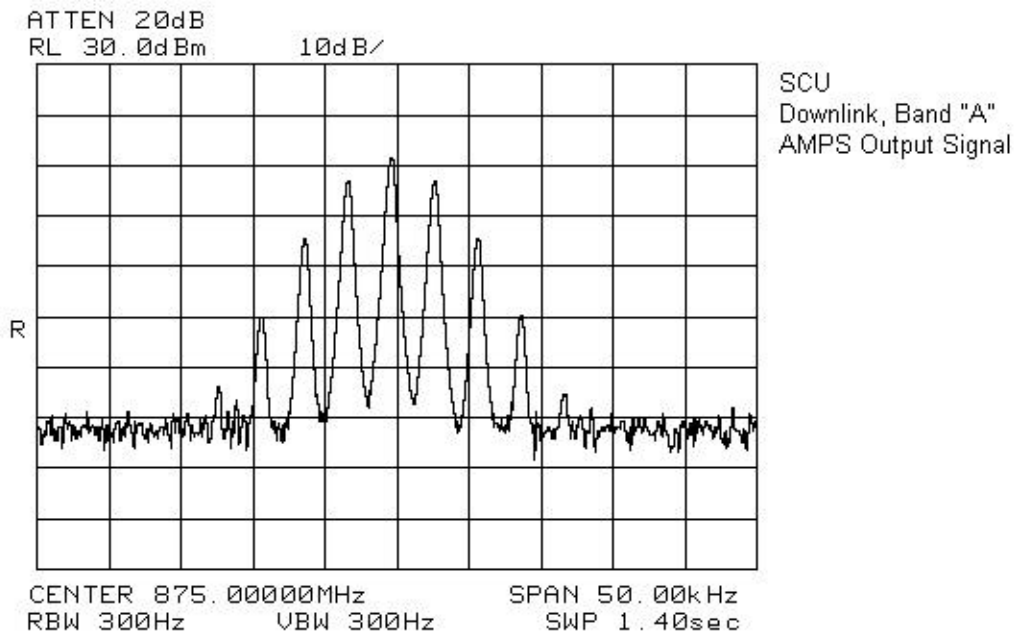

ATTEN 20dB
RL 20.0dBm
10dB/
R
SCU
Downlink Band "A"
TDMA Output Signal
CENTER 875.0000MHz
SPAN 100.0kHz
RBW 1.0kHz
VBW 1.0kHz
SWP 250ms

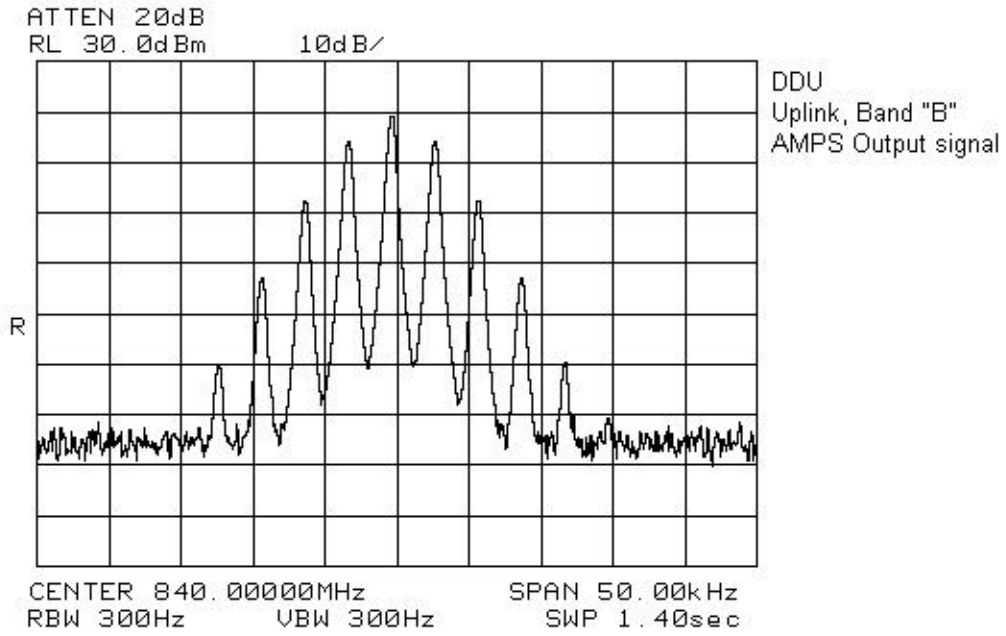

ATTEN 30dB
RL 40.0dBm
10dB/
R
DDU
Uplink, Band "B"
TDMA Output signal
CENTER 840.0000MHz
SPAN 100.0kHz
RBW 1.0kHz
VBW 1.0kHz
SWP 250ms

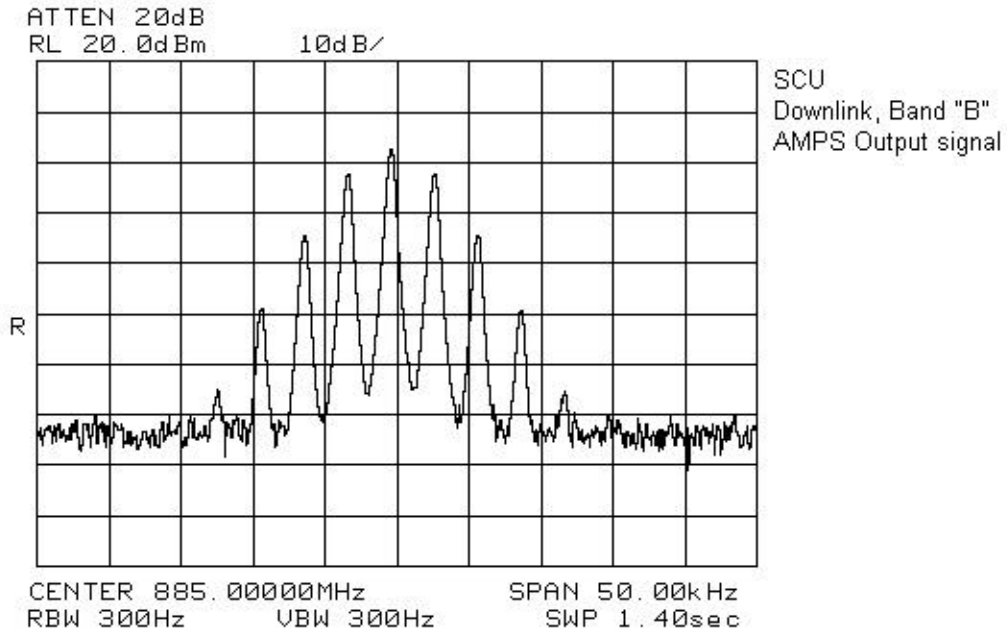

ATTEN 20dB
RL 20.0dBm
10dB/
SCU
Downlink, Band "B"
TDMA Output signal
R
CENTER 885.0000MHz
SPAN 100.0kHz
RBW 1.0kHz
VBW 1.0kHz
SWP 250ms


ATTEN 10dB
RL -30.0dBm
10dB/
Amps
Input Reference Signal
CENTER 875.00000MHz
SPAN 50.00kHz
RBW 300Hz
VBW 300Hz
SWP 1.40sec


ATTEN 20dB
RL 30.0dBm
10dB/
R
DDU
Uplink, Band "A"
AMPS Output Signal
CENTER 830.00000MHz
SPAN 50.00kHz
RBW 300Hz
VBW 300Hz
SWP 1.40sec


ATTEN 20dB
RL 30.0dBm
10dB/
R
SCU
Downlink, Band "A"
AMPS Output Signal
CENTER 875.00000MHz
SPAN 50.00kHz
RBW 300Hz
VBW 300Hz
SWP 1.40sec


ATTEN 20dB
RL 30.0dBm
10dB/
R
DDU
Uplink, Band "B"
AMPS Output signal
CENTER 840.00000MHz
SPAN 50.00kHz
RBW 300Hz
VBW 300Hz
SWP 1.40sec


ATTEN 20dB
RL 20.0dBm
10dB/
R
SCU
Downlink, Band "B"
AMPS Output signal
CENTER 885.00000MHz
SPAN 50.00kHz
RBW 300Hz
VBW 300Hz
SWP 1.40sec

Section 5. Spurious Emissions at Antenna Terminals

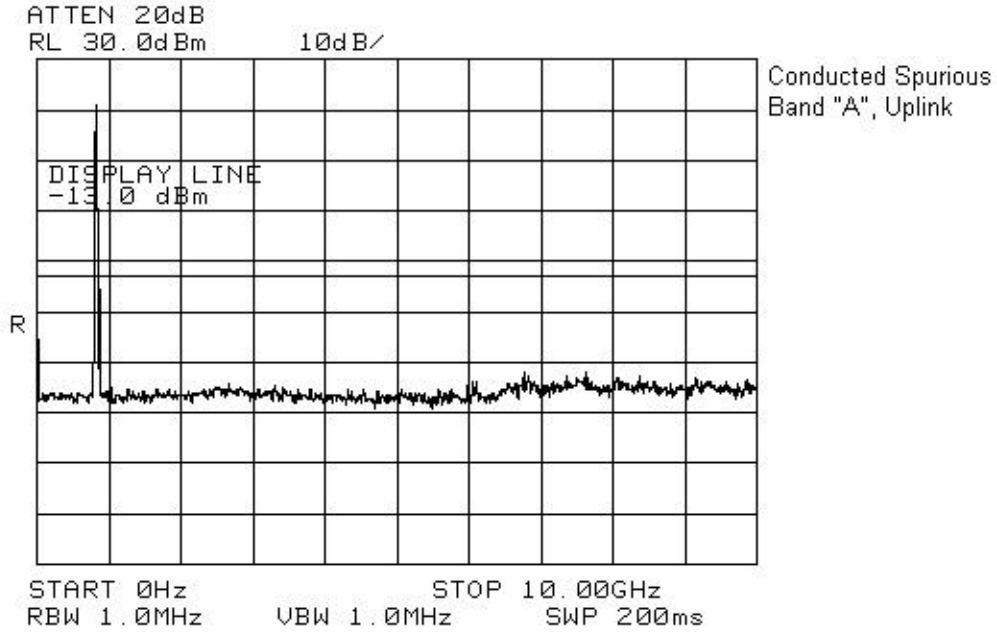
Para. No.: 2.1051

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

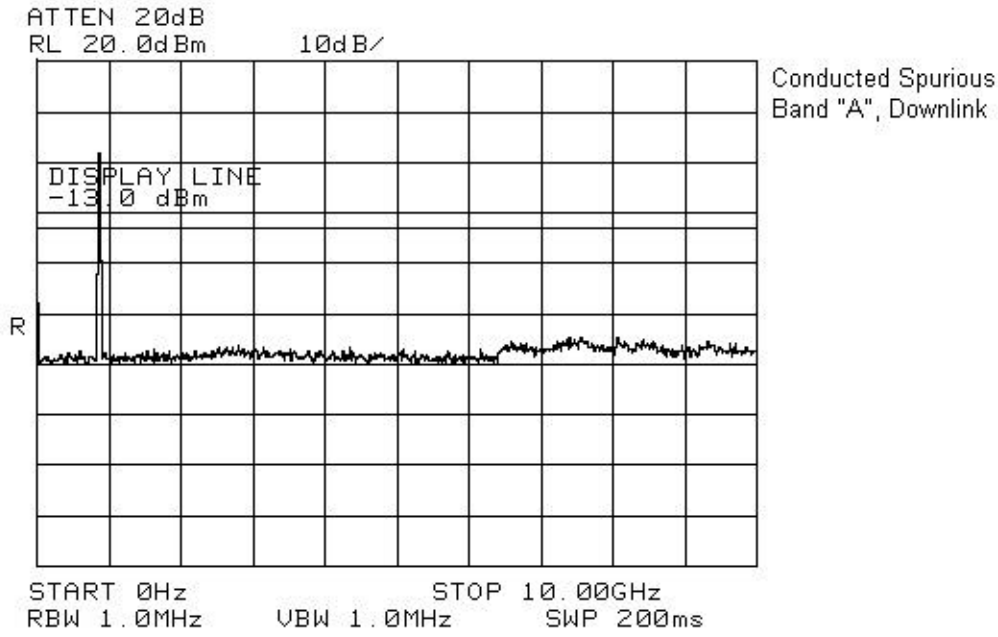
Minimum Standard: 22.917 (e); -13 dBm
(f); -80 dBm Conducted

Test Results: Complies.

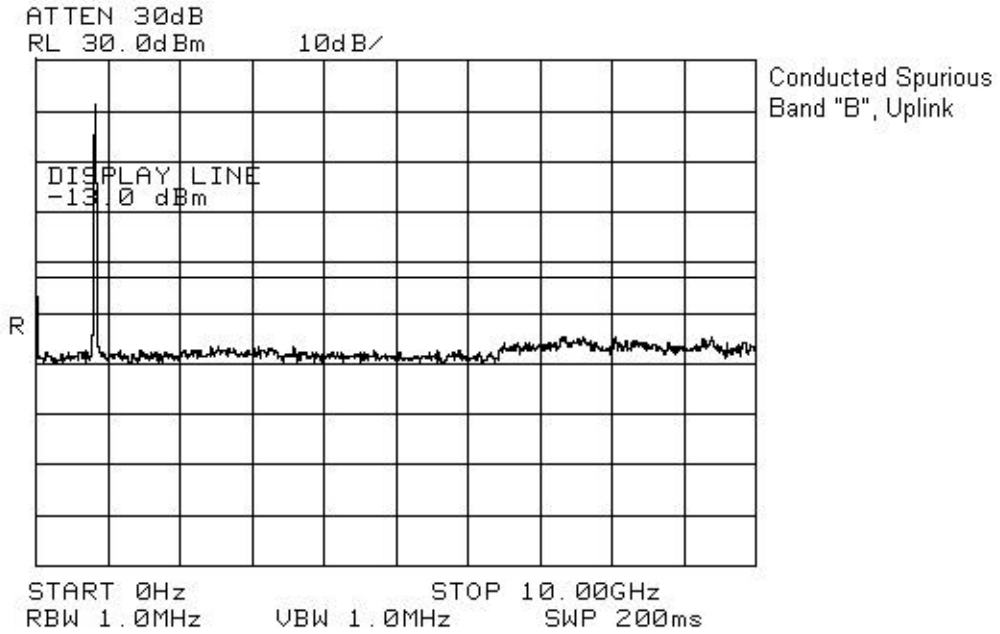
Measurement Data: See attached graphs (worst case).

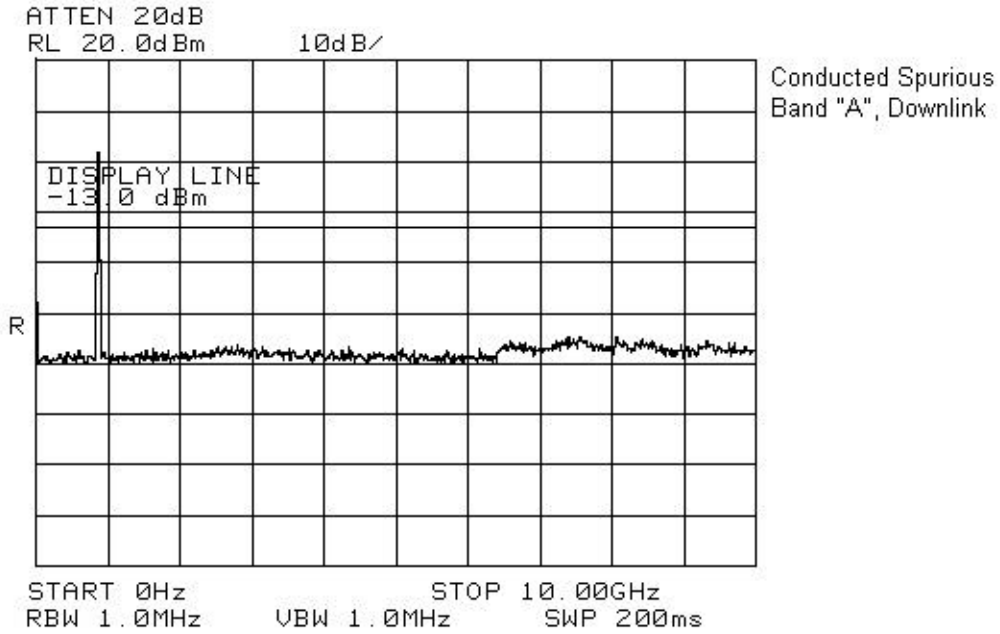


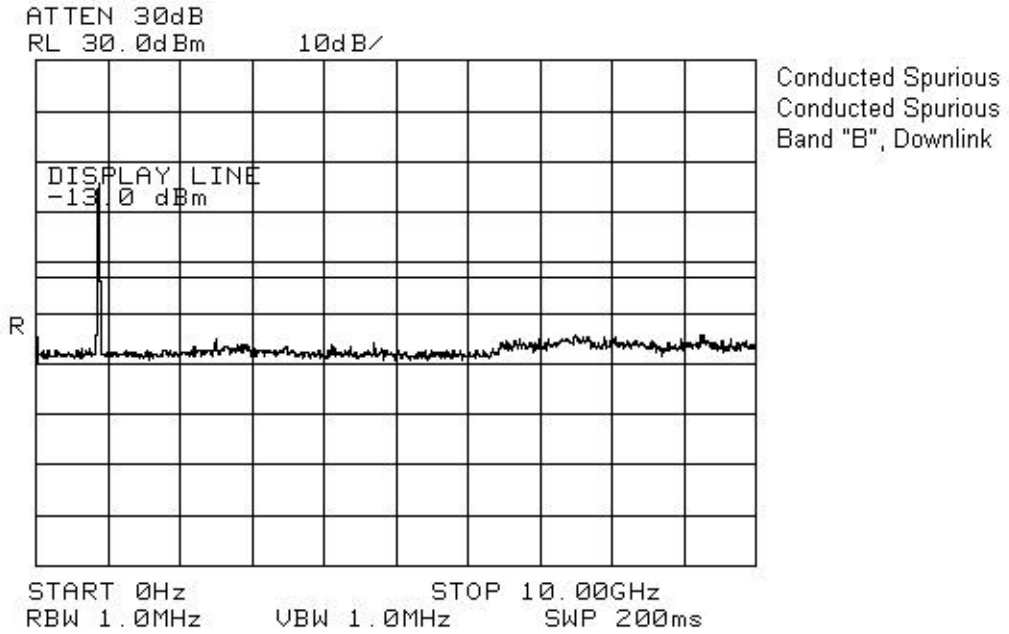
Conducted Spurious
Band "A", Uplink

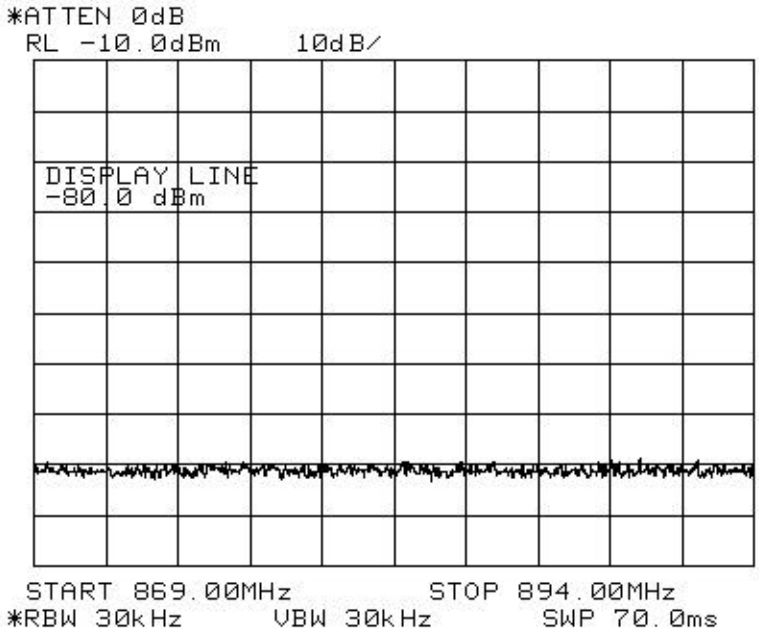


Conducted Spurious
Band "A", Downlink

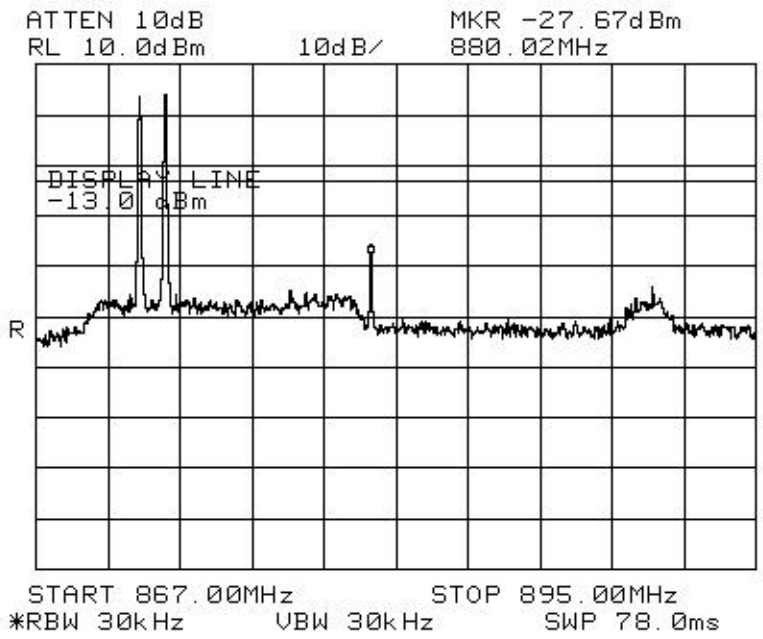

ATTEN 30dB
RL 30.0dBm
10dB/
Conducted Spurious
Band "B", Uplink
DISPLAY LINE
-13.0 dBm
R
START 0Hz
STOP 10.00GHz
RBW 1.0MHz
VBW 1.0MHz
SWP 200ms


ATTEN 20dB
RL 20.0dBm
10dB/
Conducted Spurious
Band "A", Downlink
DISPLAY LINE
-13.0 dBm
R
START 0Hz
STOP 10.00GHz
RBW 1.0MHz
VBW 1.0MHz
SWP 200ms

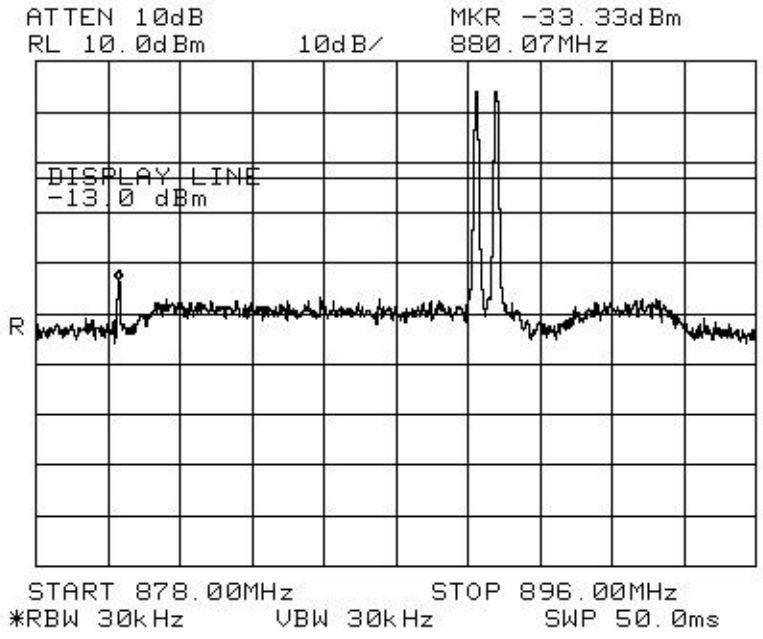

ATTEN 30dB
RL 30.0dBm
10dB/
DISPLAY LINE
-13.0 dBm
R
START 0Hz
STOP 10.00GHz
RBW 1.0MHz
VBW 1.0MHz
SWP 200ms
Conducted Spurious
Conducted Spurious
Band "B", Downlink



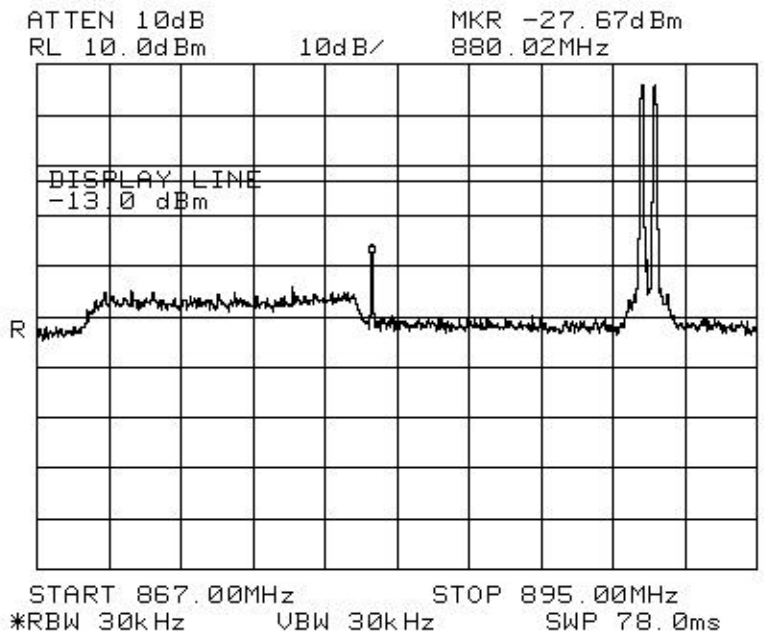
Mobile Emissions in the Base Freq. Range.
Uplink TX = 840MHz
+20dBm Output Power



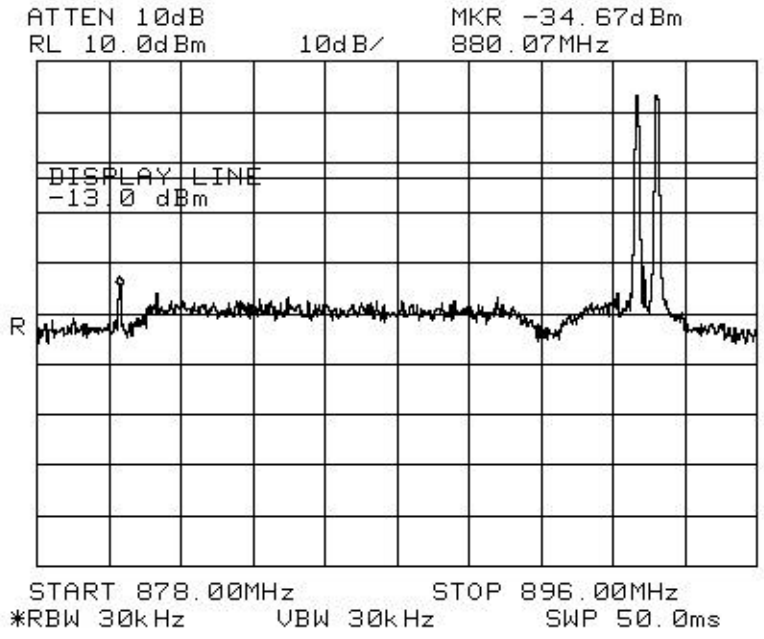
IM Test
Band "A" , Downlink



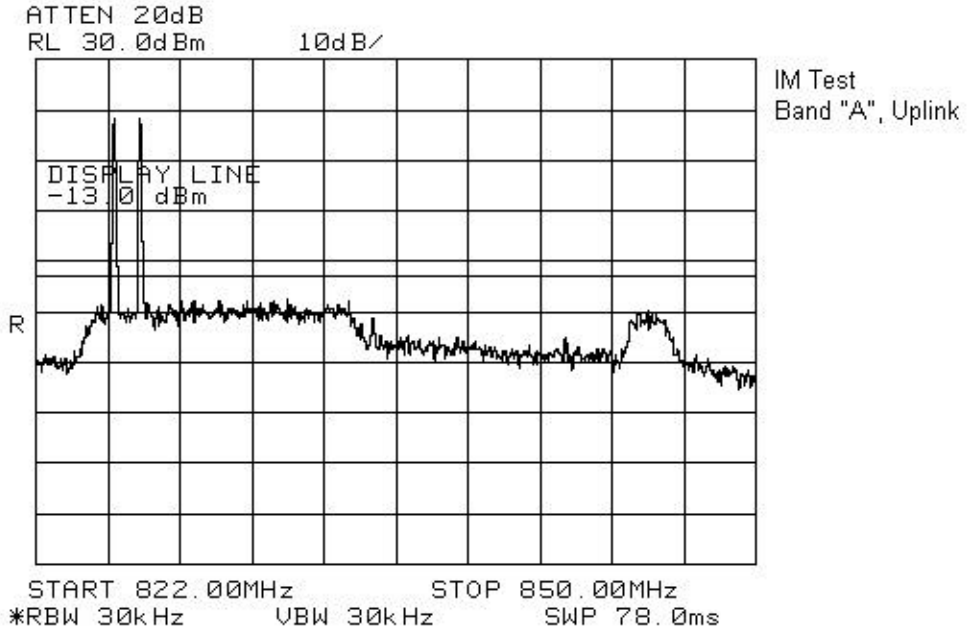
IM Test
Band "B", Downlink

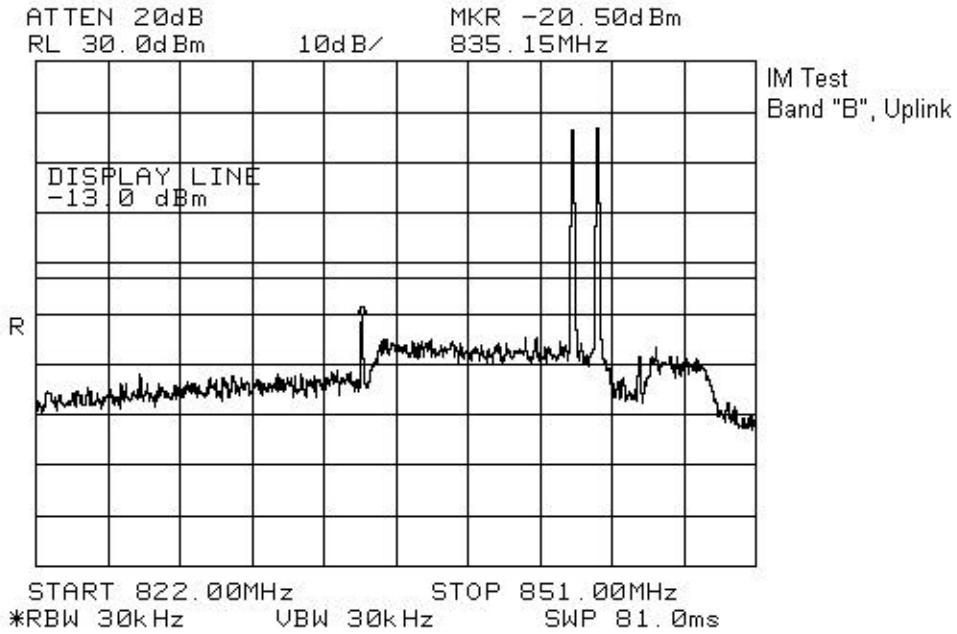


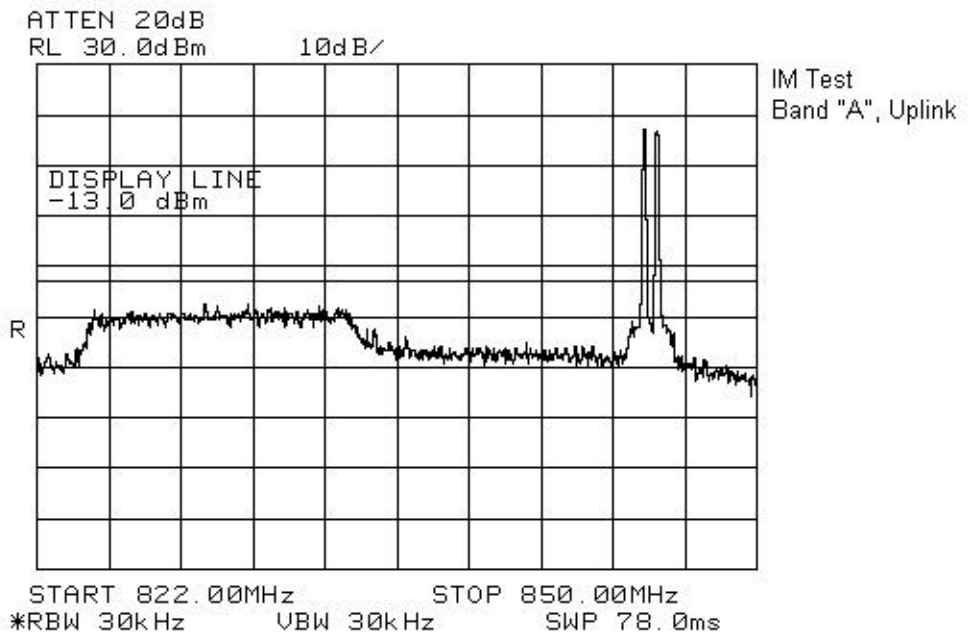
IM Test
Band "A", Downlink

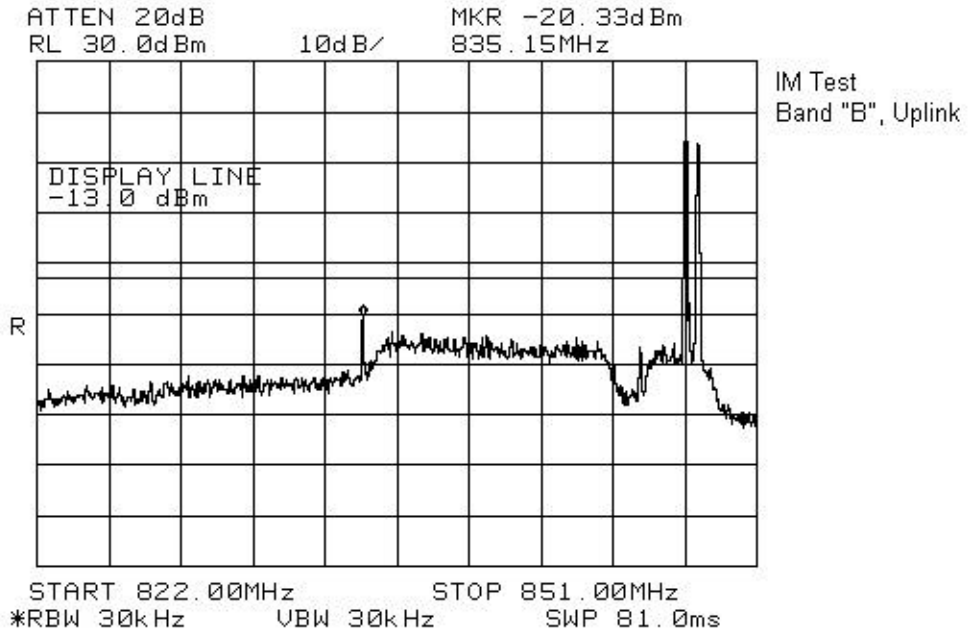


IM Test
Band "B", Downlink


ATTEN 20dB
RL 30.0dBm
10dB/
IM Test
Band "A", Uplink
DISPLAY LINE
-13.0 dBm
R
START 822.00MHz
STOP 850.00MHz
*RBW 30kHz
VBW 30kHz
SWP 78.0ms


ATTEN 20dB
MKR -20.50dBm
RL 30.0dBm
10dB/
835.15MHz
IM Test
Band "B", Uplink
DISPLAY LINE
-13.0 dBm
R
START 822.00MHz
STOP 851.00MHz
*RBW 30kHz
VBW 30kHz
SWP 81.0ms


ATTEN 20dB
RL 30.0dBm
10dB/
DISPLAY LINE
-13.0 dBm
R
START 822.00MHz
STOP 850.00MHz
*RBW 30kHz
VBW 30kHz
SWP 78.0ms
IM Test
Band "A", Uplink


ATTEN 20dB
RL 30.0dBm
10dB/
MKR -20.33dBm
835.15MHz
DISPLAY LINE
-13.0 dBm
R
START 822.00MHz
STOP 851.00MHz
*RBW 30kHz
VBW 30kHz
SWP 81.0ms
IM Test
Band "B", Uplink

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

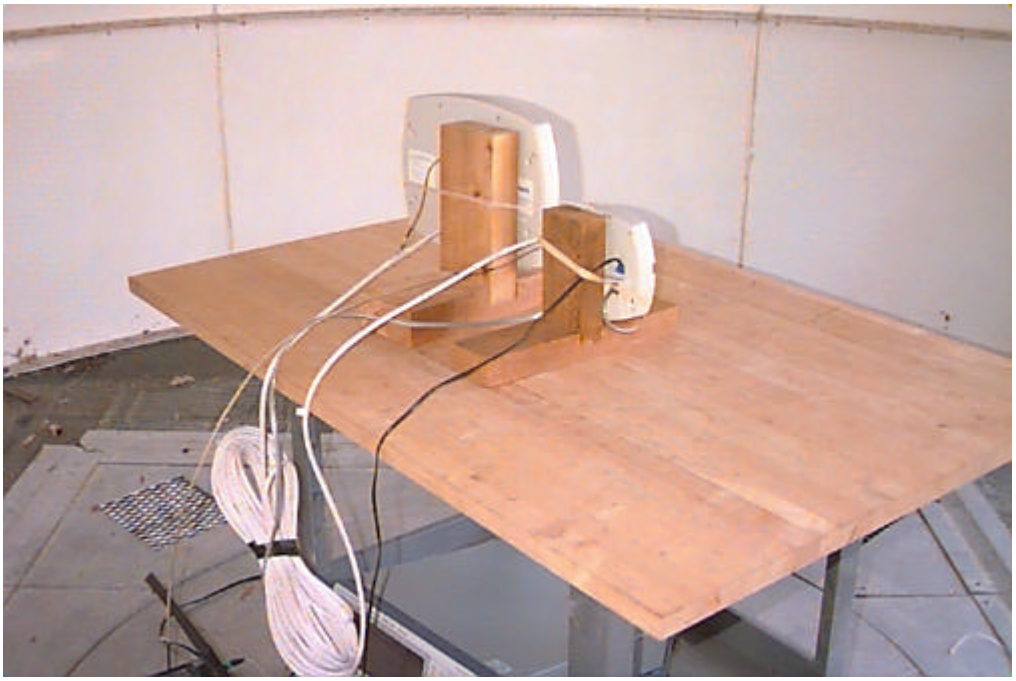
Test Distance (meters) : 3		Range: A Tower		Receiver: 8565E		RBW(kHz): 1000		Detector: Peak	
Freq. (MHz)	Ant. *	Pol. (V/H)	RCVD Signal (dBµV/m)	Signal Substitution Conversion Factor (dB)**	Amp. Gain (dB)***	Dist. Corr. (dB)	Field Strength (dBm)	Limit (dBm)	Margin (dB)
1680.0	SSV	V	85.8	-117.4			-31.6	-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.

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

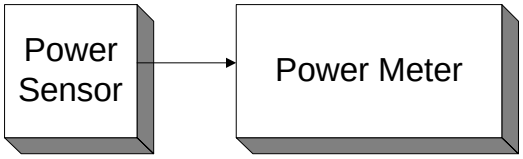
Test Results: Complies. The maximum frequency drift is 0 Hz.

Measurement Data: Standard Test Frequency: (-30°C to +50°C)

Uplink: 840.000 000 MHz
Downlink: 885.000 000 MHz

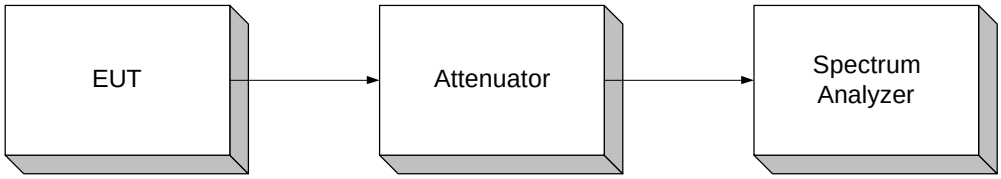
Section 8. Block Diagrams

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

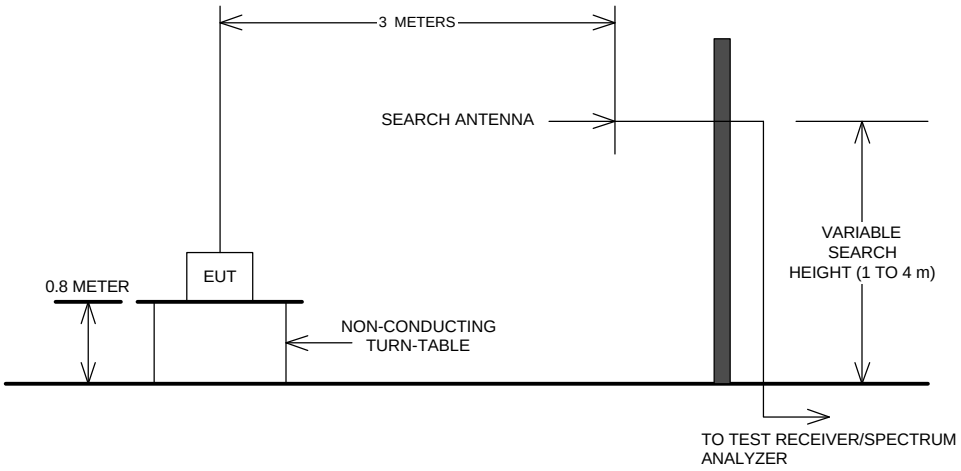


Para. No. 2.1049 - Occupied Bandwidth

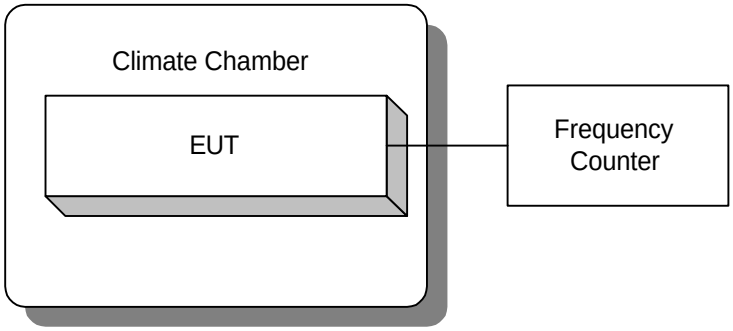
Para. No. 2.1051 - Spurious Emissions at Antenna Terminals



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
1Year	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