



**Test Report:** 4W08125


**Applicant:** G-Wave Inc.  
15 Ron's Edge Road  
Springfield, NJ 07081

**Equipment Under Test:  
(EUT)** BDA-CELLAB-1/1W-80-A, Bi-Directional Amplifier

**FCC ID:** Q8KCELLAB1W80

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

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

**Authorized By:**   
Kevin Carr, EMC/EMI/Wireless Specialist

**Date:** 18 May 2004

**Total Number of Pages:** 32

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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.

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.



TESTED BY: \_\_\_\_\_  
Daxesh Thakker, Wireless Test Engineer

DATE: 17 May 2004

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This report applies only to the items tested.

*EQUIPMENT: BDA-CELLAB-1/1W-80-A, Bi-Directional Amplifier*

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**Summary Of Test Data**

<b>Name Of Test</b>	<b>Para. No.</b>	<b>Result</b>
RF Power Output	2.1046	Complied
Audio Frequency Response	2.1047	NA(1)
Audio Low-Pass Filter Response	2.1047	NA(1)
Modulation Limiting	2.1047	NA (1)
Occupied Bandwidth	2.1049	Complied
Spurious Emissions at Antenna Terminals	2.1051	Complied
Field Strength of Spurious Emissions	2.1053	Complied
Frequency Stability	2.1055	NA (2)
Transient Frequency Behavior	—	NA (3)

**N/A's:**

- 1– The EUT contains no audio circuitry
- 2 – The EUT contains no Band translator circuitry
- 3 - The EUT is not a PTT device

**Indoor**                      Temperature: 23.4°C  
                                    Humidity:     41 %

**Outdoor**                    Temperature: 21°C  
                                    Humidity:     46 %

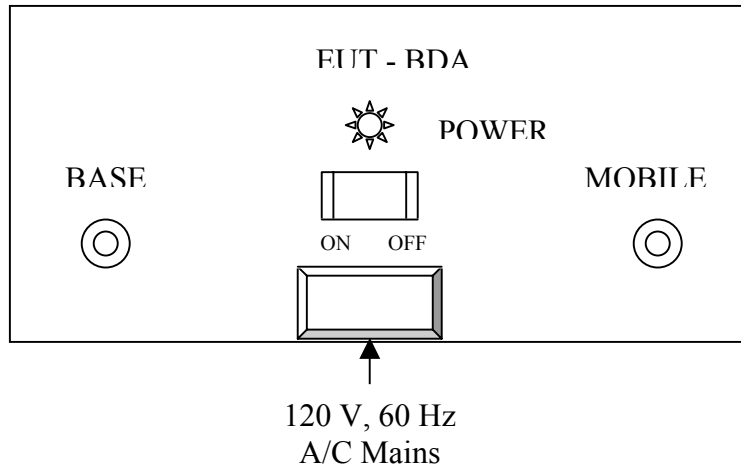
## **Section 2. General Equipment Specification**

<b>Manufacturer:</b>	G-Wave Inc.
<b>Model No.:</b>	BDA-CELLAB-1/1W-80-A
<b>Serial No.:</b>	04041115
<b>Date Received In Laboratory:</b>	May 5, 2004
<b>Nemko Identification No.:</b>	1
<b>Supply Voltage:</b>	120VAC, 60Hz
<b>Frequency Range:</b>	<b>Uplink:</b> 824 – 849 MHz <b>Downlink:</b> 869 – 894 MHz
<b>RF Output Power (Rated)</b>	<b>Uplink:</b> 25.0 dBm, 0.316 watts, Total Comp. Power <b>Downlink:</b> 25.0 dBm, 0.316 watts, Total Comp. Power
<b>RF Output Power (measured)</b>	
<b>Uplink:</b>	<b>TDMA</b> 24.7 dBm, 0.295W <b>CDMA</b> 24.7 dBm, 0.295W <b>AMPS</b> 24.6 dBm, 0.288W
<b>Downlink:</b>	<b>TDMA</b> 24.0 dBm, 0.251W <b>CDMA</b> 24.1 dBm, 0.257W <b>AMPS</b> 24.1 dBm, 0.257W
<b>Emission Designator:</b>	DXW, F9W, F8W

*EQUIPMENT: BDA-CELLAB-1/1W-80-A, Bi-Directional Amplifier*

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**Block Diagram**



### Section 3. RF Power Output

Para. No.: 2.1046

Test Performed By: Daxesh Thakker	Date of Test: May 14, 2004
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Minimum Standard: 22.913(a)

Test Results: Complied

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

$P_{\max}$  = Maximum RF Output Power  
N = Number Of Channels

	UL	DL
	(dBm)	(dBm)
TDMA	24.7	24
CDMA	24.7	24.1
AMPS	24.6	24.1

## **Section 4. Occupied Bandwidth**

**Para. No.: 2.1049**

<b>Test Performed By: Daxesh Thakker</b>	<b>Date of Test: May 14, 2004</b>
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**Minimum Standard:** 22.917, Input vs Output

**Test Results:** Complied

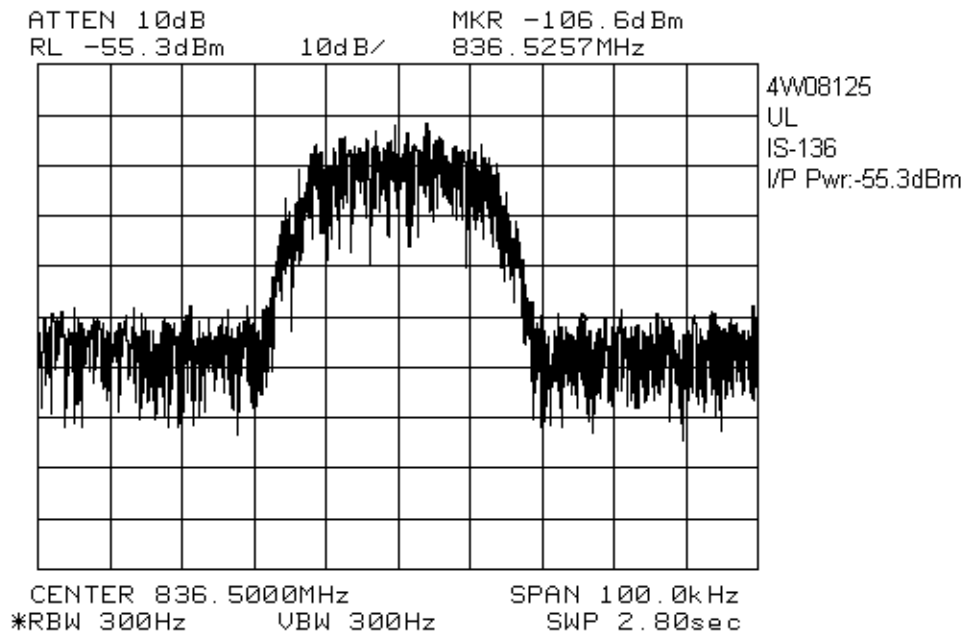
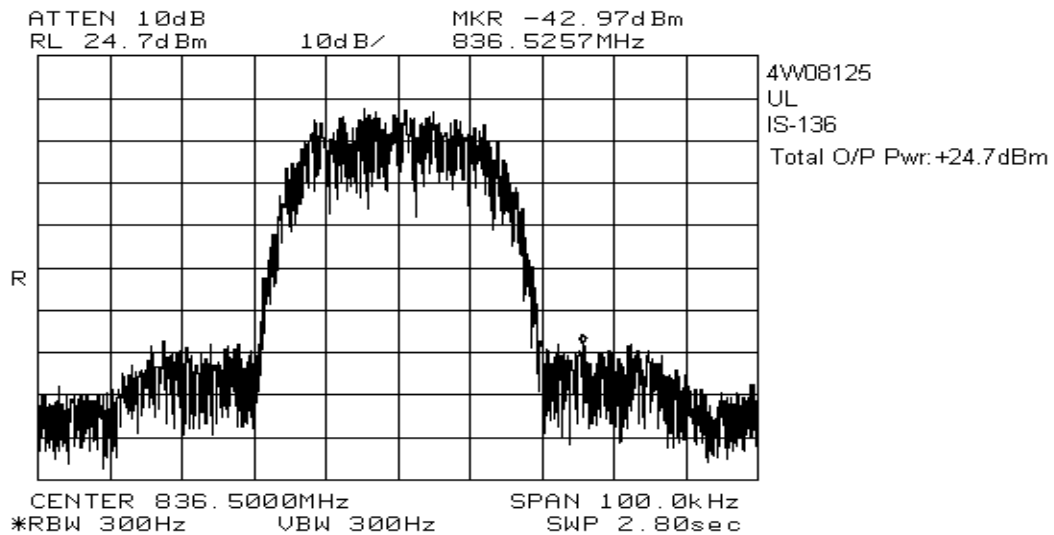
**Measurement Data:** See Attached Graphs

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.



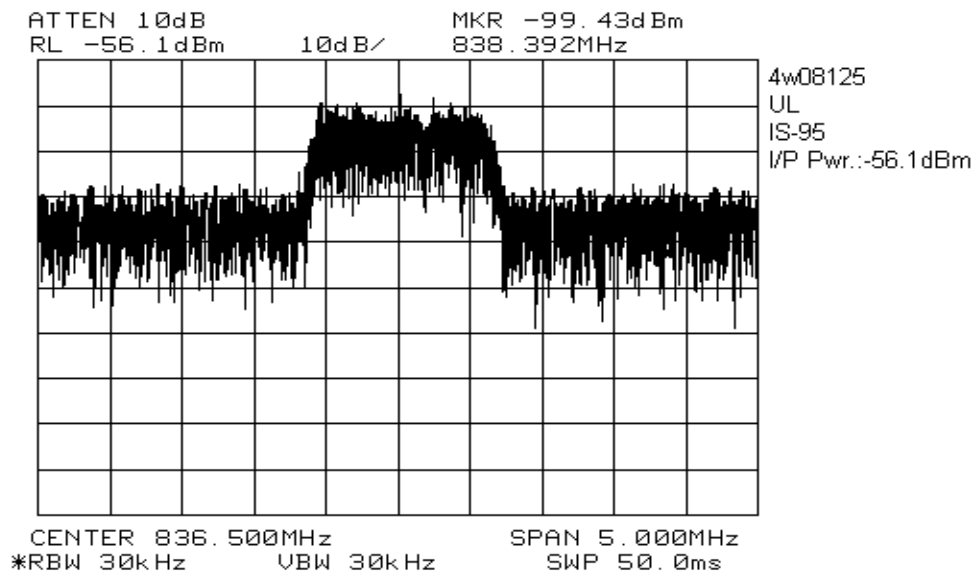
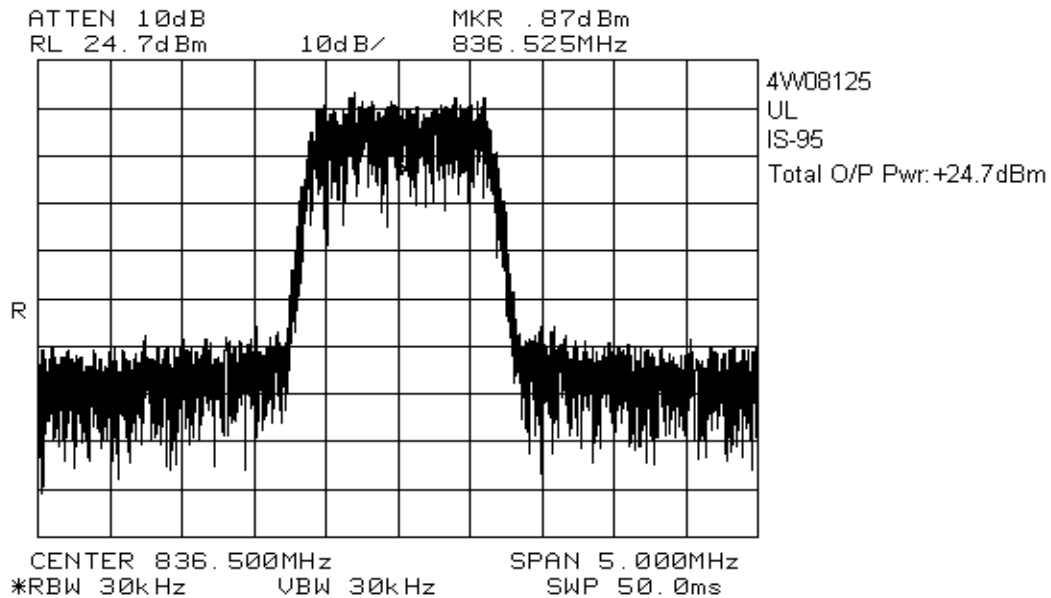
EQUIPMENT: BDA-CELLAB-1/1W-80-A, Bi-Directional Amplifier

UL  
TDMA



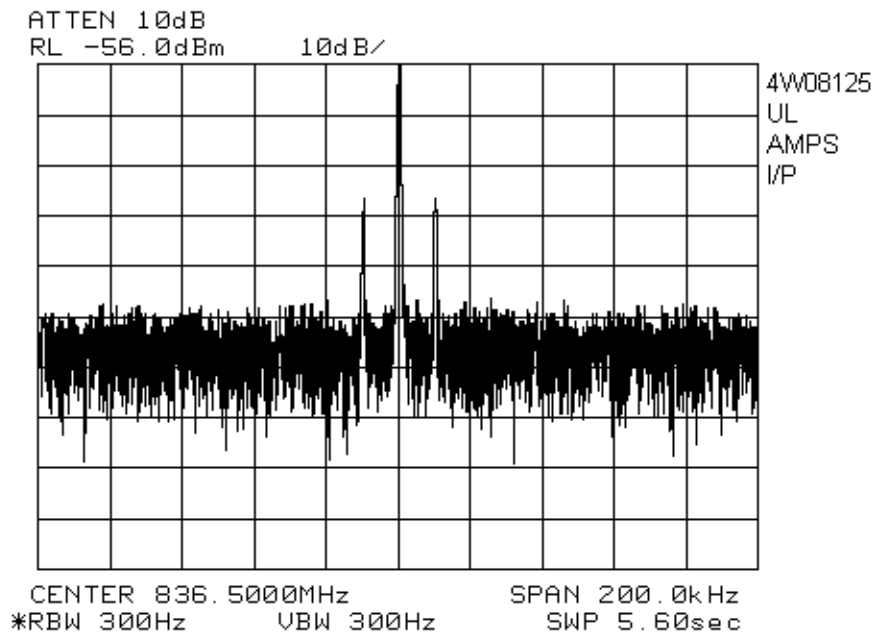
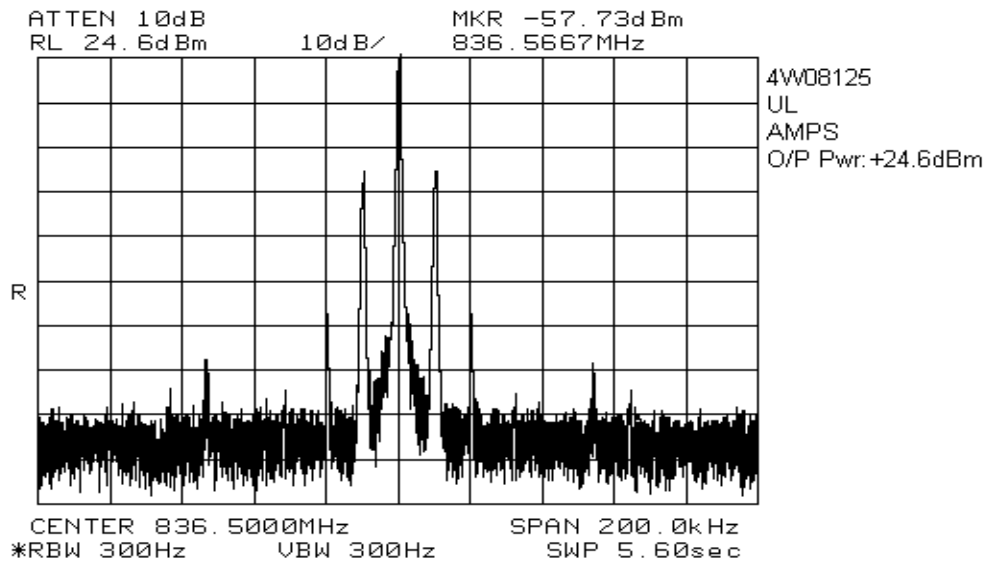
EQUIPMENT: BDA-CELLAB-1/1W-80-A, Bi-Directional Amplifier

CDMA



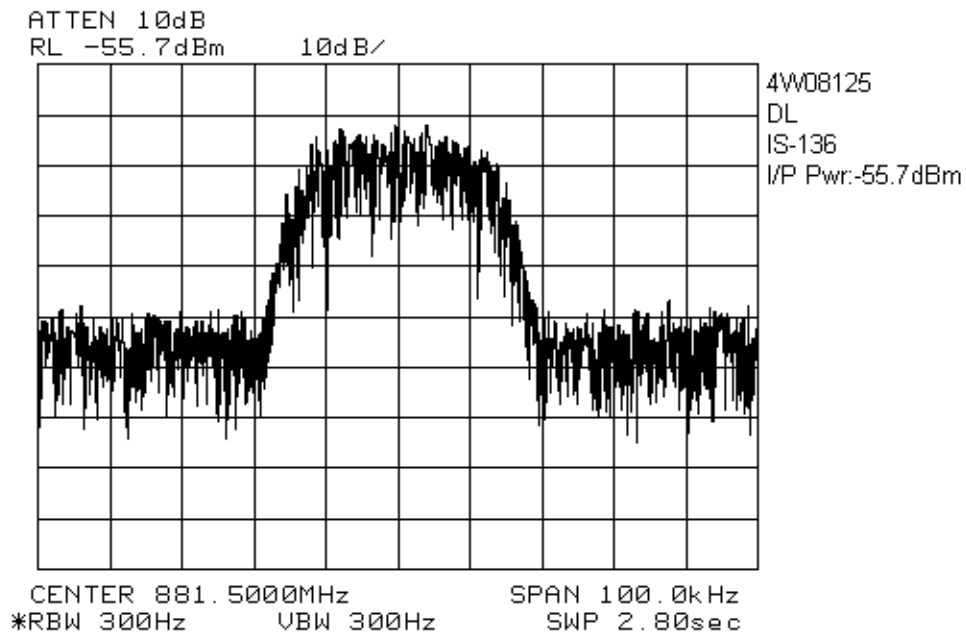
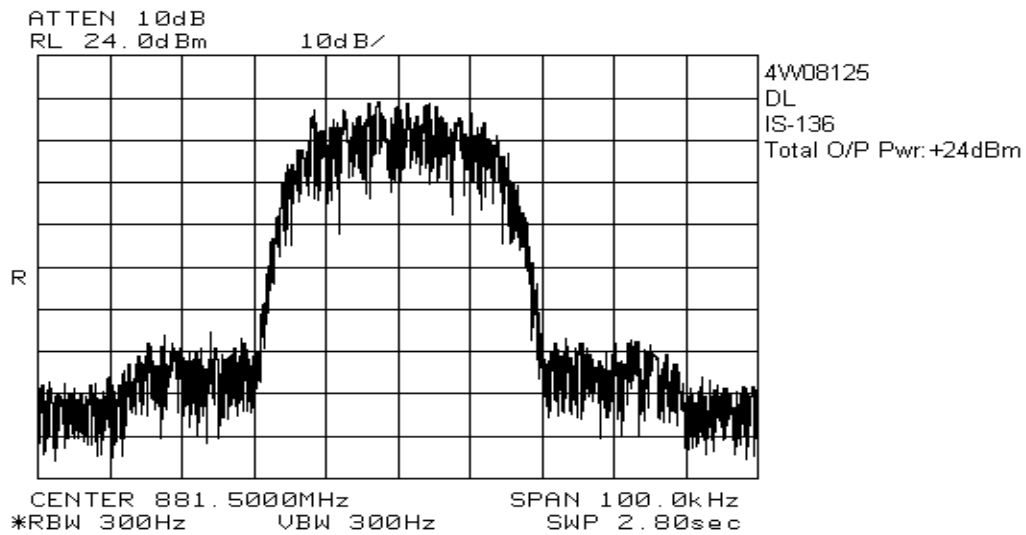
EQUIPMENT: BDA-CELLAB-1/1W-80-A, Bi-Directional Amplifier

AMPS



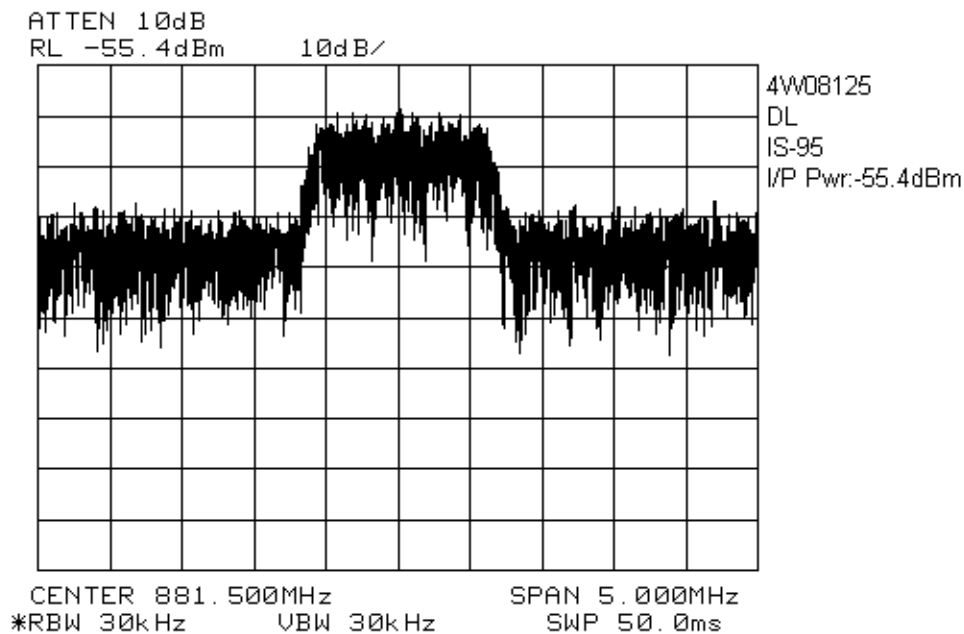
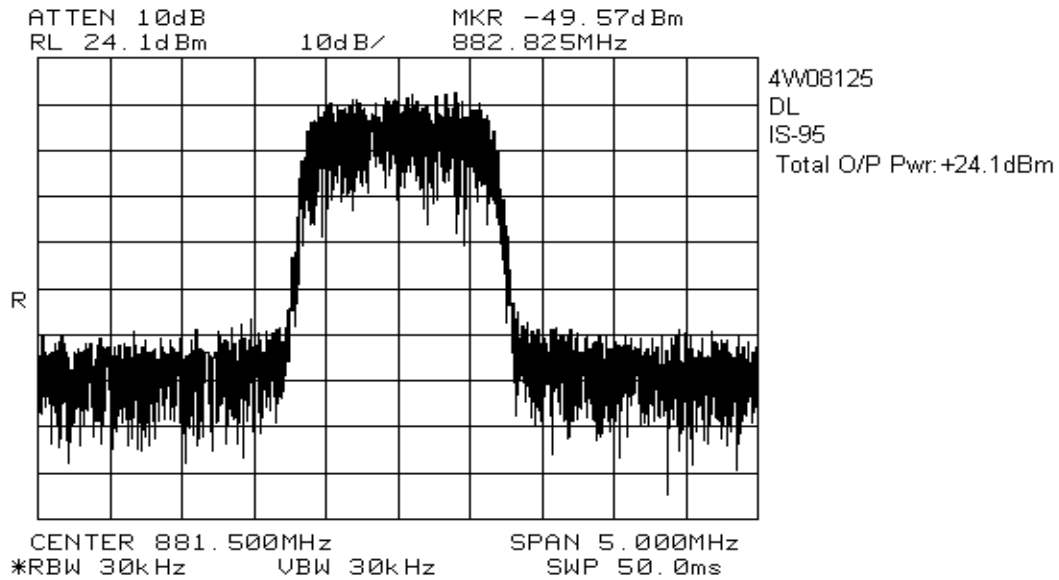
EQUIPMENT: BDA-CELLAB-1/1W-80-A, Bi-Directional Amplifier

DL  
TDMA



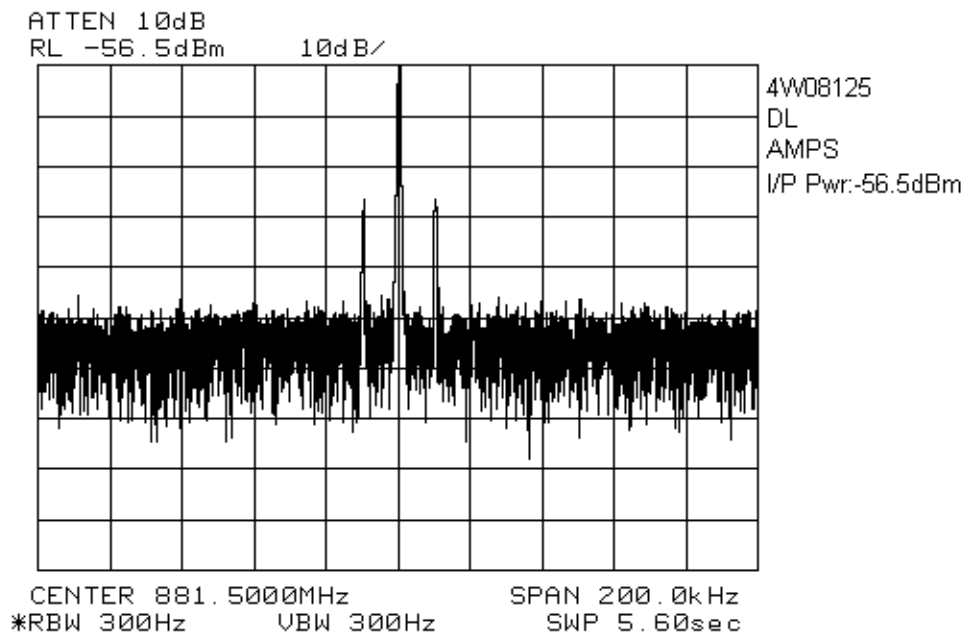
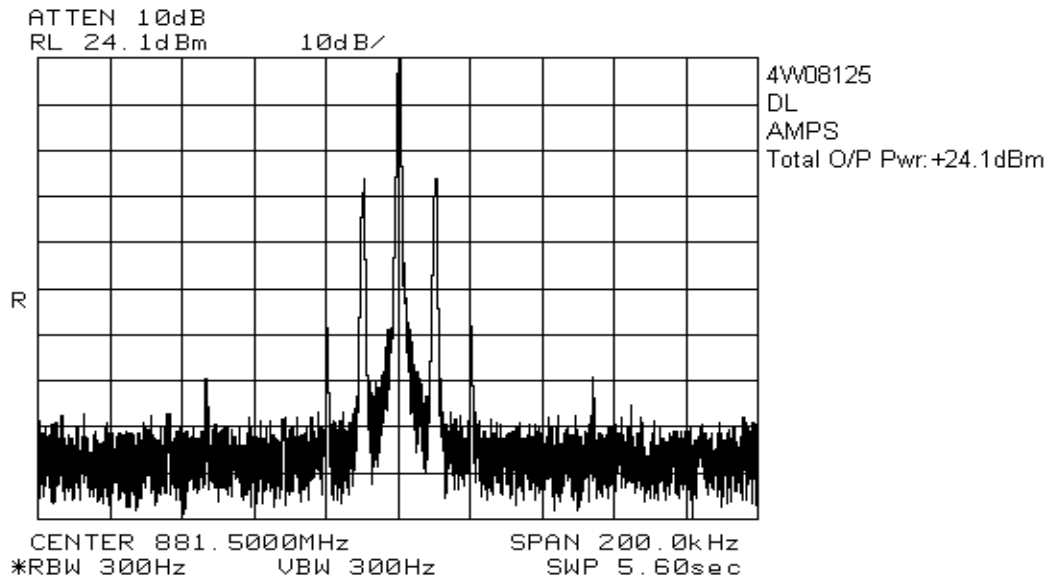
EQUIPMENT: BDA-CELLAB-1/1W-80-A, Bi-Directional Amplifier

CDMA



EQUIPMENT: BDA-CELLAB-1/1W-80-A, Bi-Directional Amplifier

AMPS



## **Section 5. Spurious Emissions at Antenna Terminals**

**Para. No.: 2.1051**

<b>Test Performed By: Daxesh Thakker</b>	<b>Date of Test: May 17, 2004</b>
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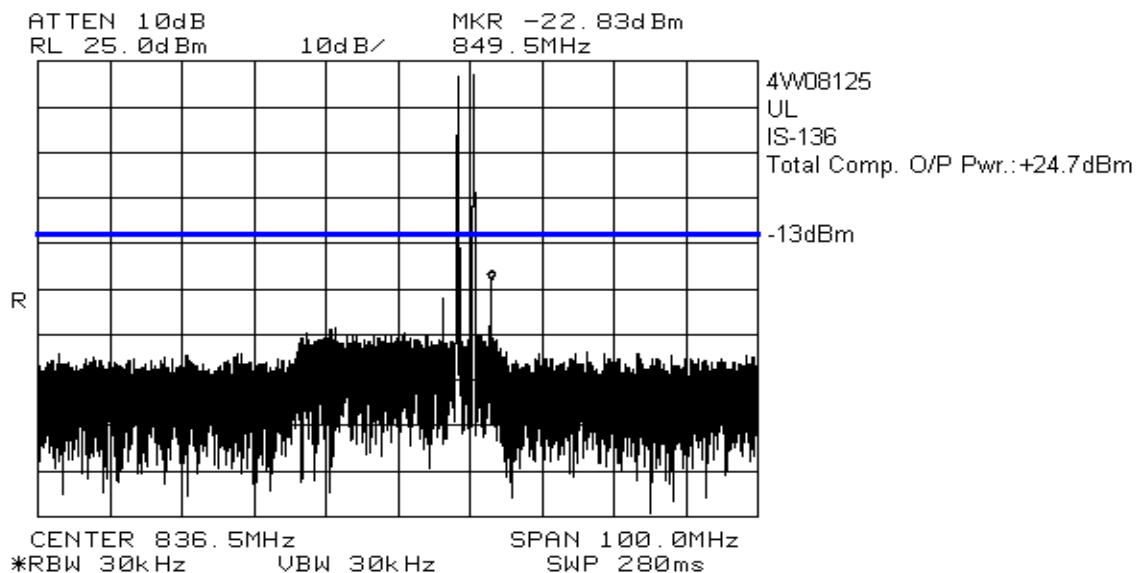
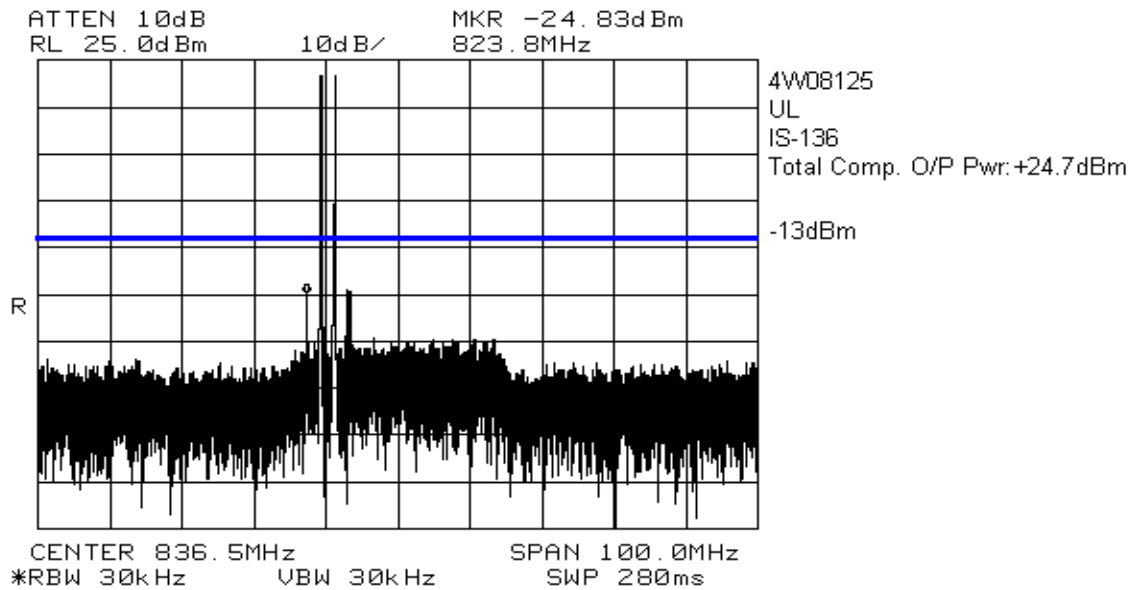
**Minimum Standard:** 22.917(e): -13dBm  
(f): -80dBm

**Test Results:** Complied

**Measurement Data:** See attached graphs. Only worst case has been reported

EQUIPMENT: BDA-CELLAB-1/1W-80-A, Bi-Directional Amplifier

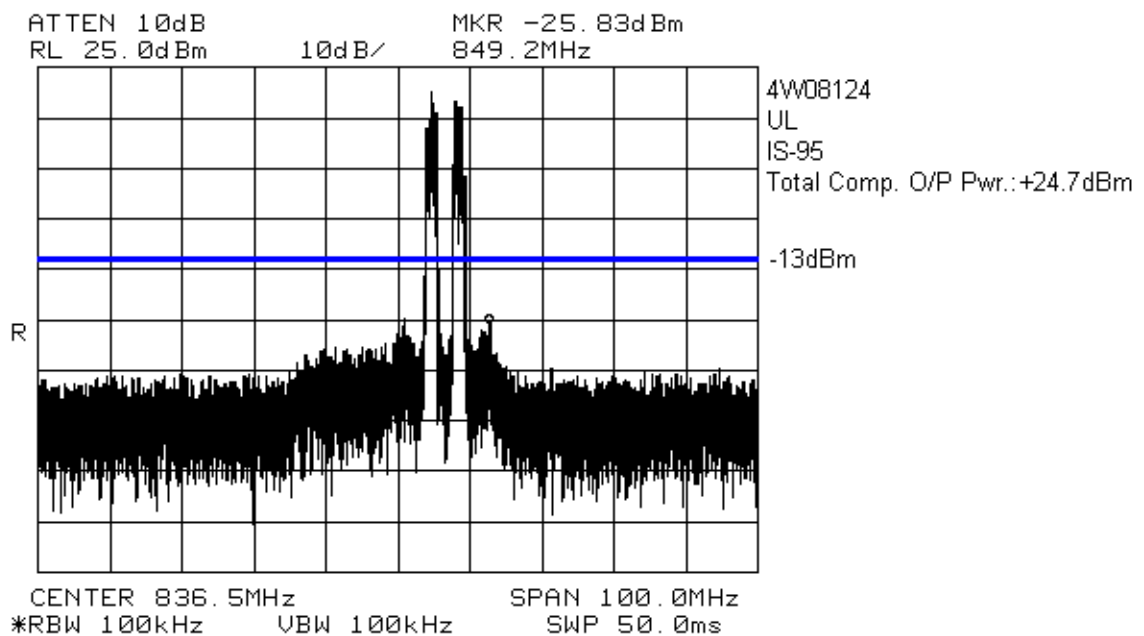
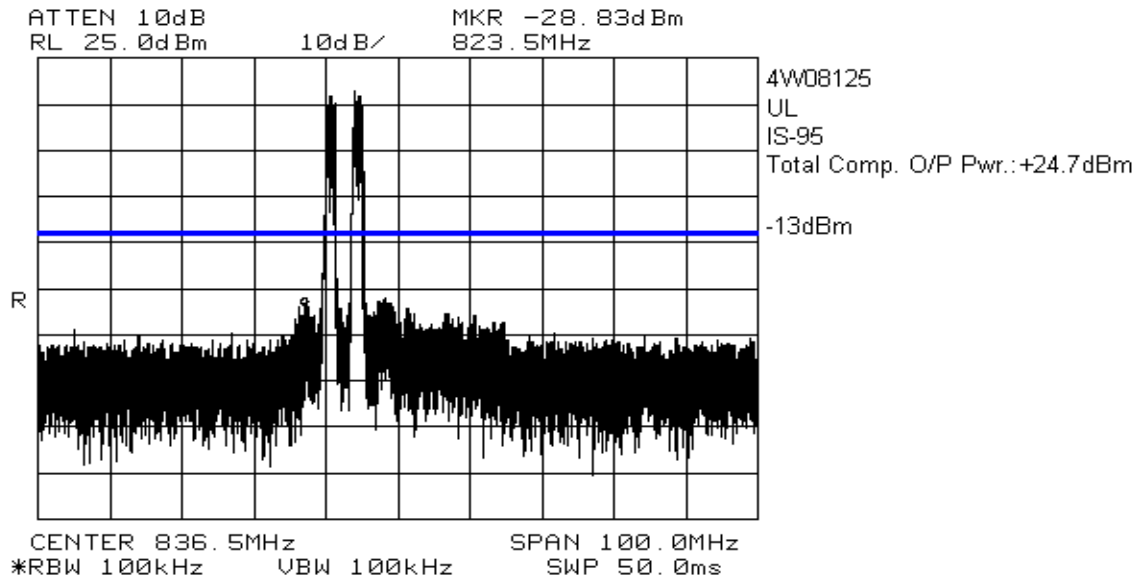
UL  
TDMA



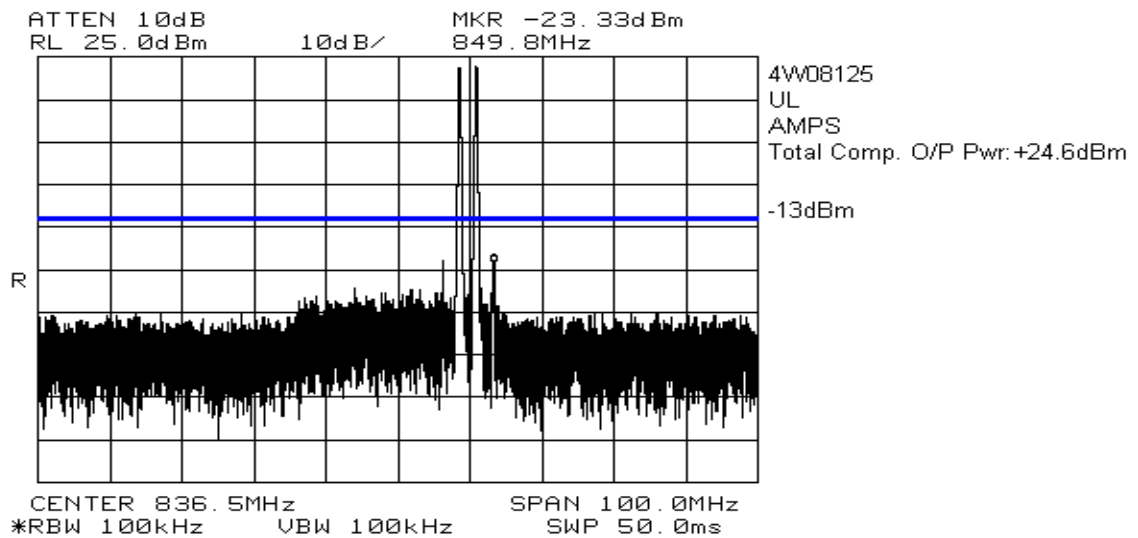
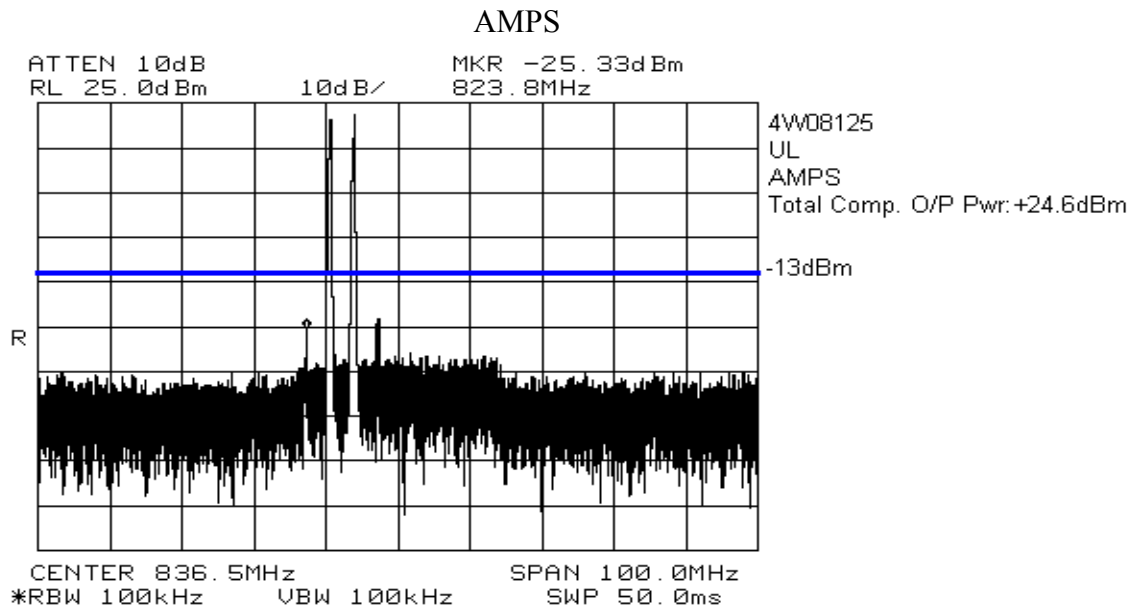


EQUIPMENT: BDA-CELLAB-1/1W-80-A, Bi-Directional Amplifier

CDMA

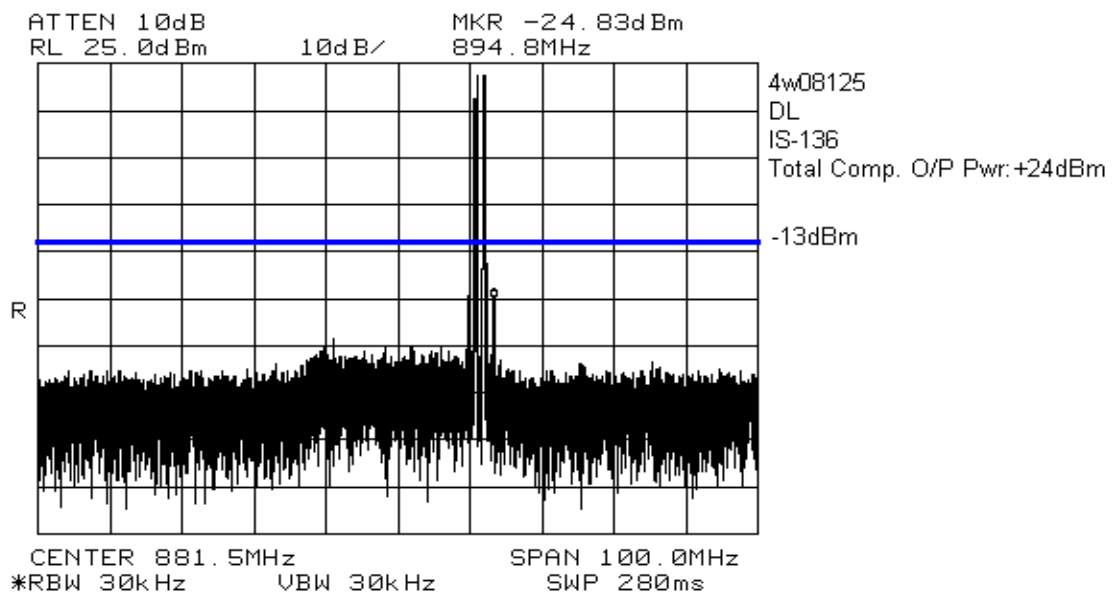
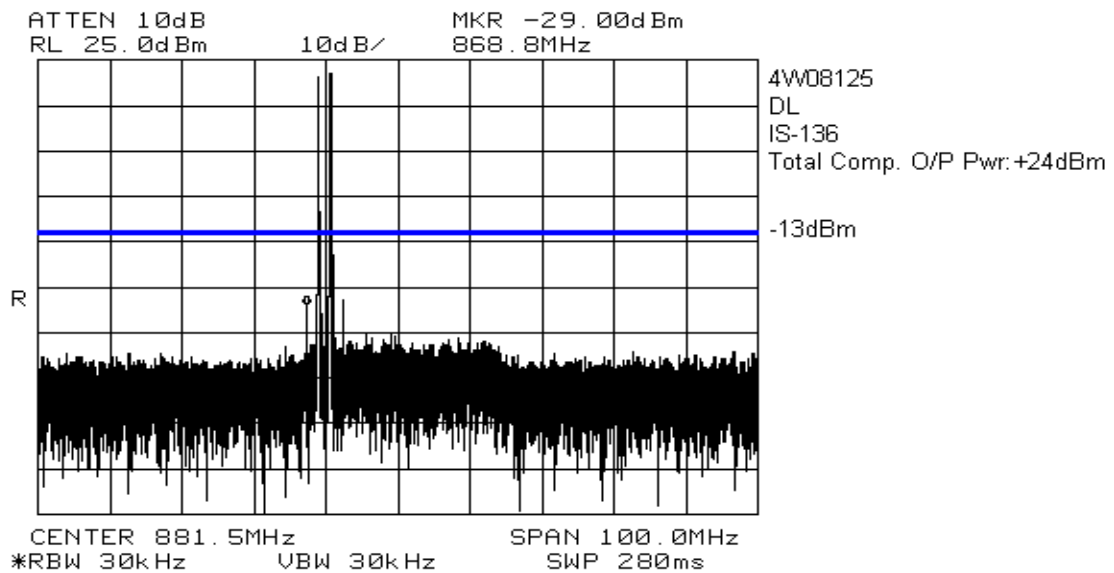


EQUIPMENT: BDA-CELLAB-1/1W-80-A, Bi-Directional Amplifier



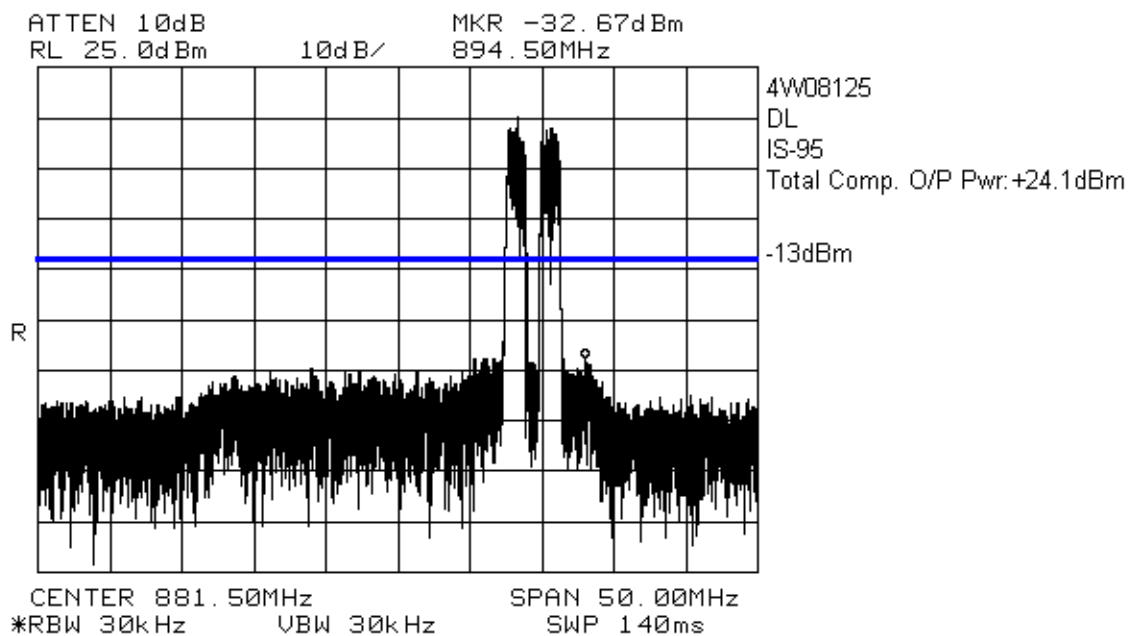
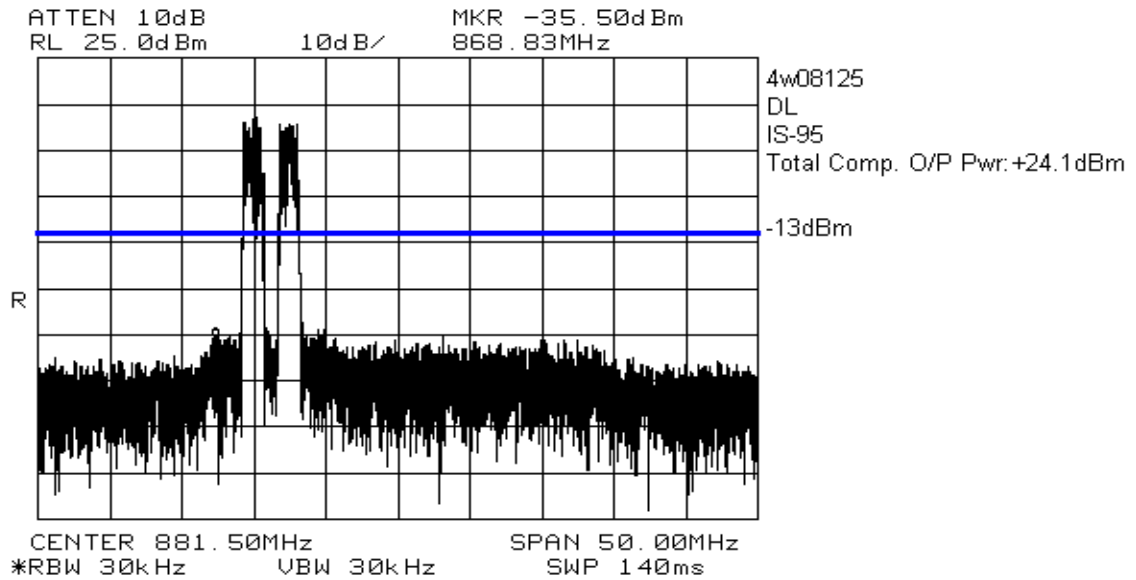
EQUIPMENT: BDA-CELLAB-1/1W-80-A, Bi-Directional Amplifier

DL  
TDMA



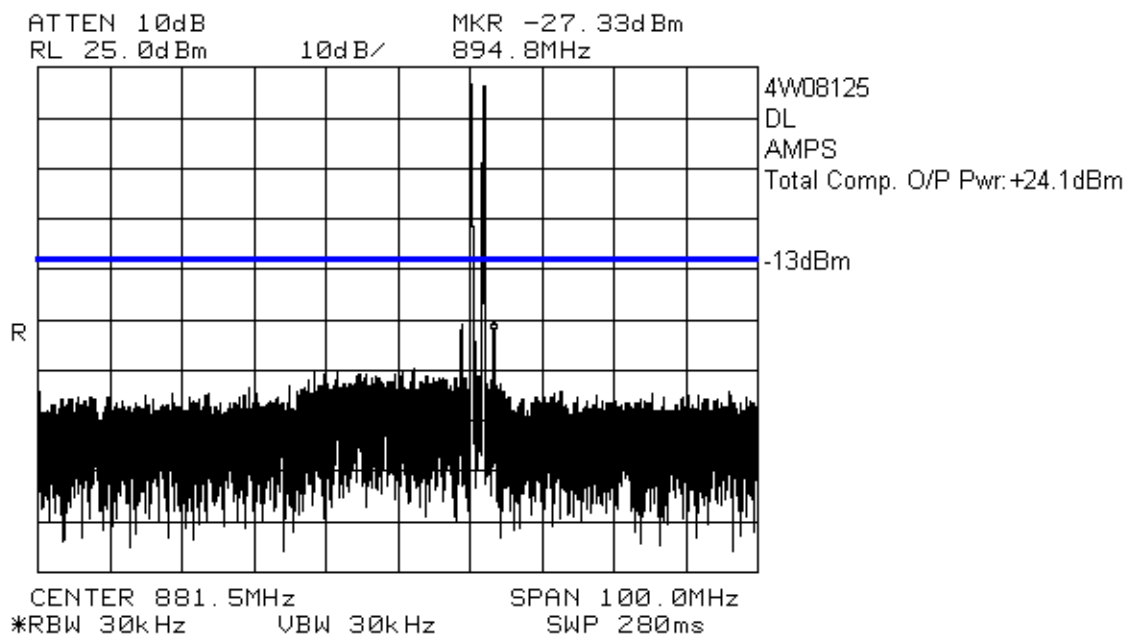
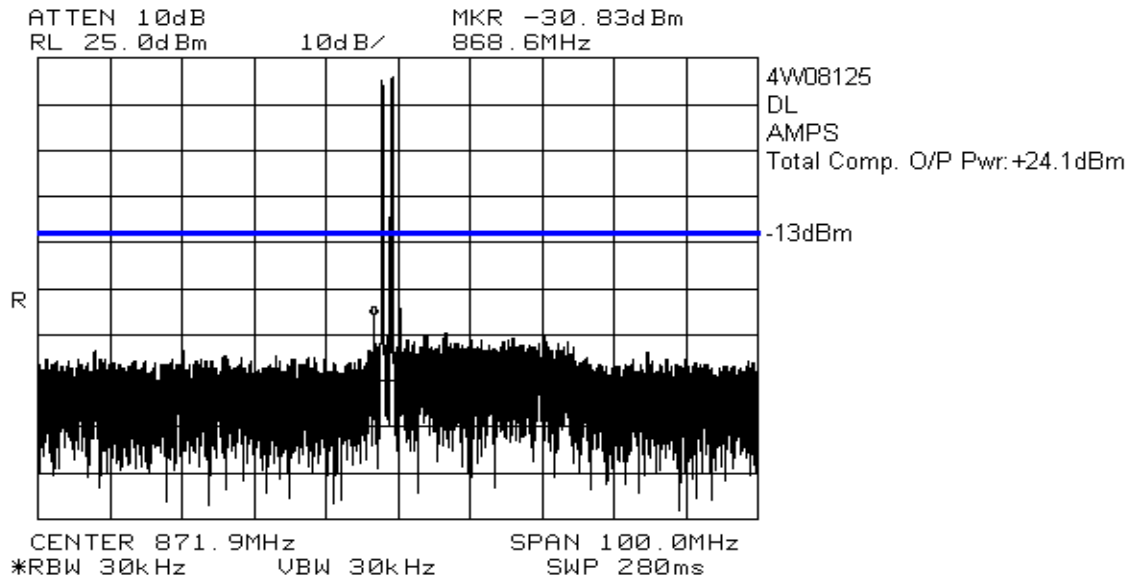
EQUIPMENT: BDA-CELLAB-1/1W-80-A, Bi-Directional Amplifier

CDMA



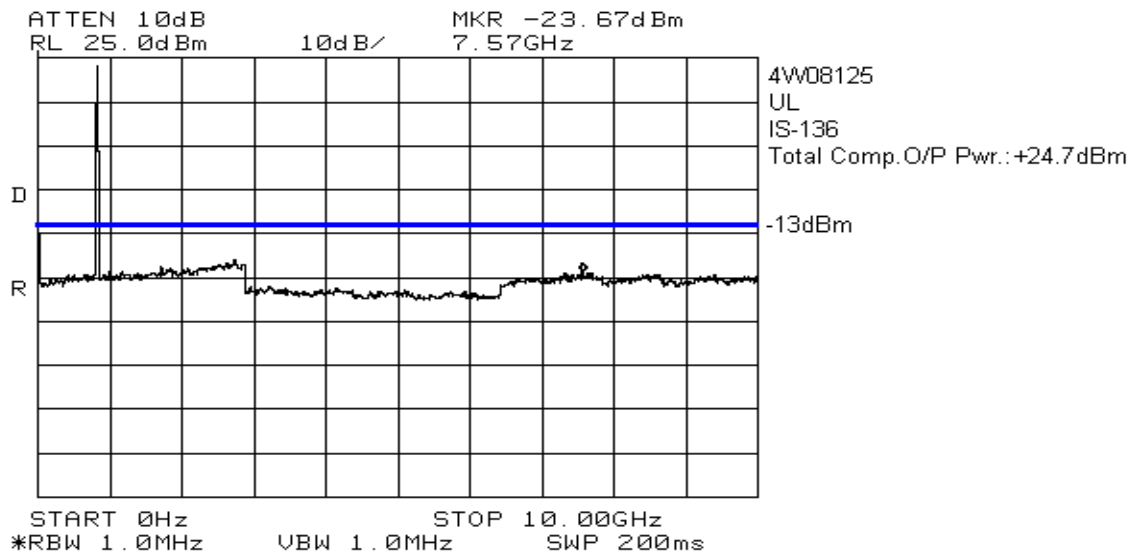
EQUIPMENT: BDA-CELLAB-1/1W-80-A, Bi-Directional Amplifier

AMPS

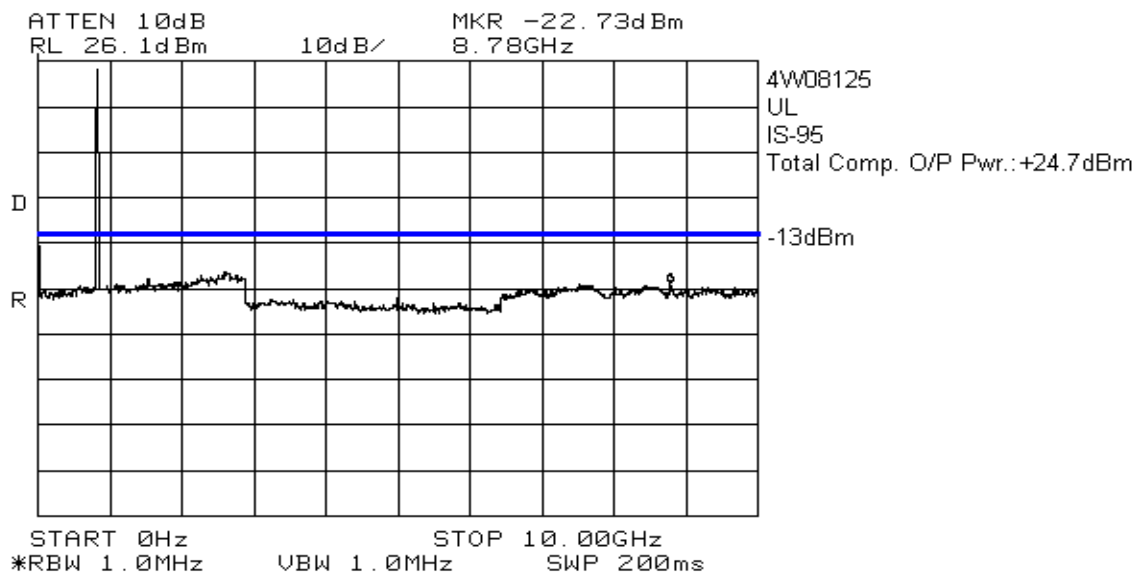


EQUIPMENT: BDA-CELLAB-1/1W-80-A, Bi-Directional Amplifier

UL  
TDMA

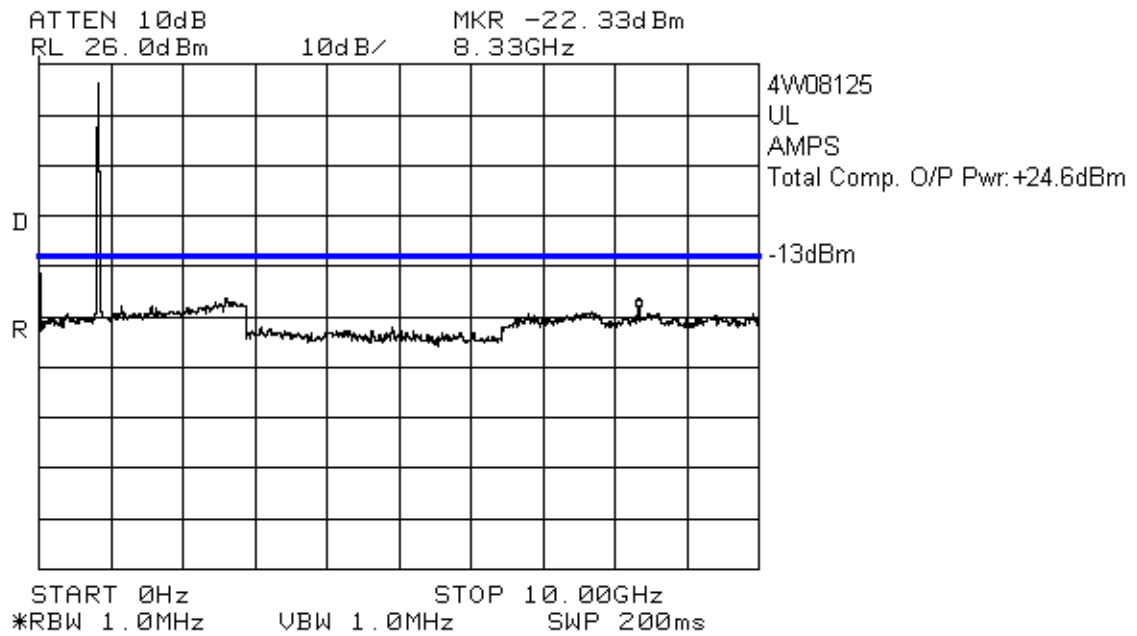


CDMA



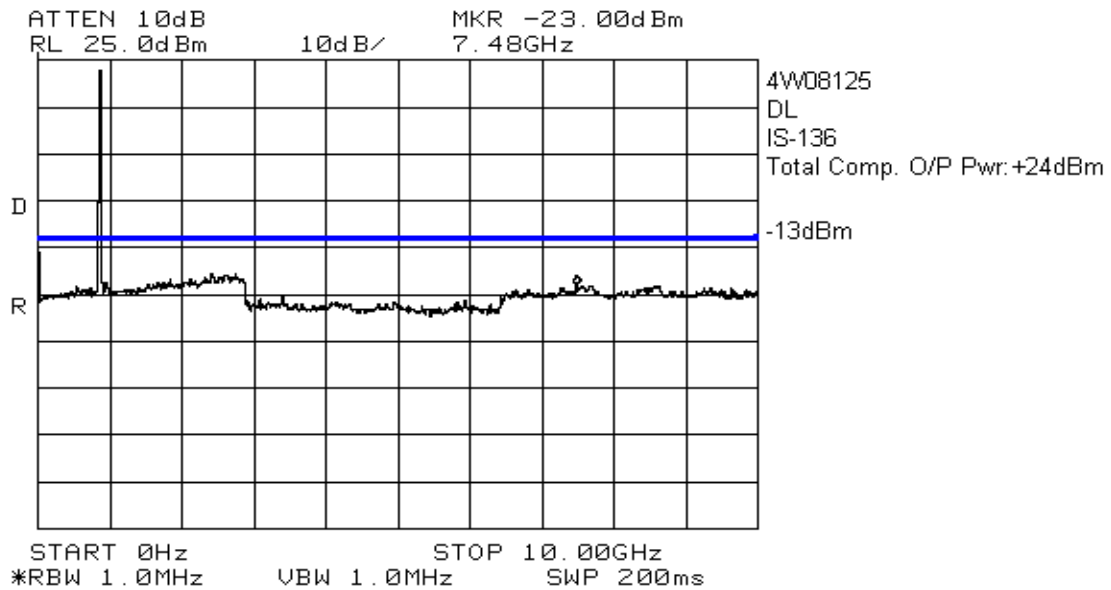
EQUIPMENT: BDA-CELLAB-1/1W-80-A, Bi-Directional Amplifier

AMPS

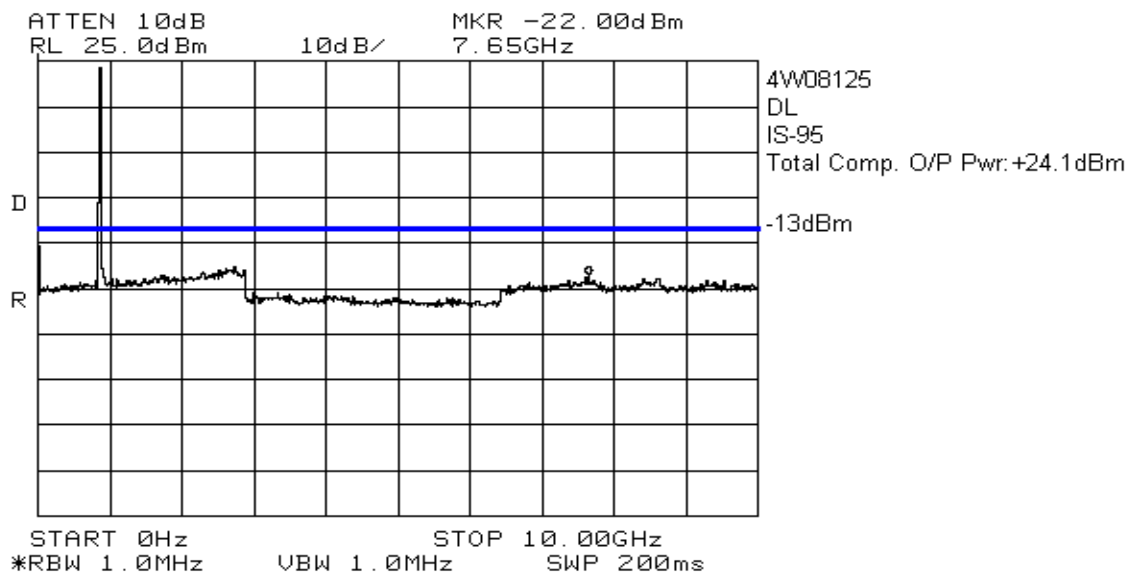


EQUIPMENT: BDA-CELLAB-1/1W-80-A, Bi-Directional Amplifier

DL  
TDMA



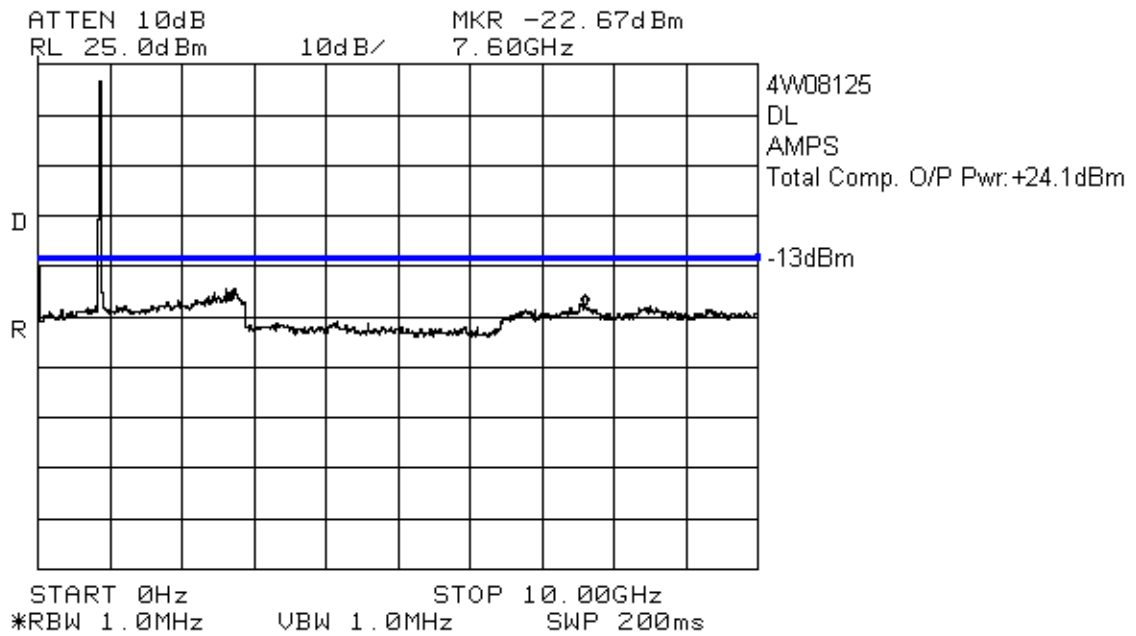
CDMA





EQUIPMENT: BDA-CELLAB-1/1W-80-A, Bi-Directional Amplifier

AMPS



## **Section 6. Field Strength of Spurious Emissions**

**Para. No.: 2.1053**

<b>Test Performed By: Daxesh Thakker</b>	<b>Date of Test: May 11, 2004</b>
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**Minimum Standard:** 22.917(e): -13dBm

**Test Results:** Complied

**Measurement Data:** See attached chart.

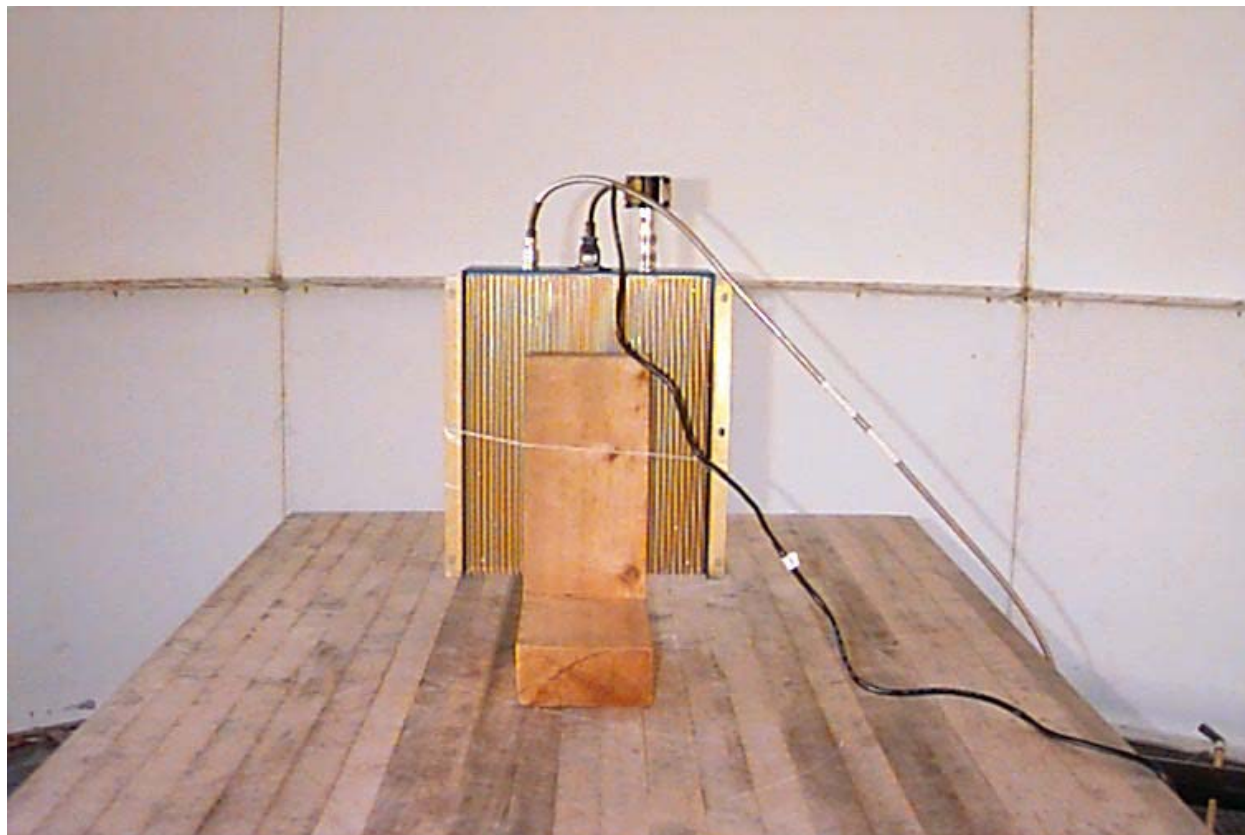
EQUIPMENT: BDA-CELLAB-1/1W-80-A, Bi-Directional Amplifier

**Radiated Disturbance Test Data:**

Test Date: May 11, 2004									
Engineer's Name: Daxesh Thakker									
Temperature (C°): Indoor: 23.4 , Outdoor: 21						Humidity %: Indoor: 41 , Outdoor: 46			
Tested as per (Table Top/Floor Standing): Table Top									
Test Distance (meters): 3 mtr						Range: Ottawa, 1			
Freq. (MHz)	Ant.	Po l. V/ H	RCVD Signal (dBµV)	Sig Sub. Factor (dB)	Signal Substitution Power (dBm)	Limit (dBm)	Margin (dB)	Detector	Amp.
5289.0000	Horn2	V	55.9	-109.9	-54.0	-13.0	41.0	Peak	4-8GHz
5289.0000	Horn2	H	56.3	-108.2	-51.9	-13.0	38.9	Peak	4-8GHz
6170.5000	Horn2	V	57.4	-108.6	-51.2	-13.0	38.2	Peak	4-8GHz
6170.5000	Horn2	H	58.7	-108.3	-49.6	-13.0	36.6	Peak	4-8GHz
7052.0000	Horn2	V	55.8	-105.8	-50.0	-13.0	37.0	Peak	4-8GHz
7052.0000	Horn2	H	56.3	-106.2	-49.9	-13.0	36.9	Peak	4-8GHz
7933.5000	Horn2	V	54.1	-101.6	-47.5	-13.0	34.5	Peak	4-8GHz
7933.5000	Horn2	H	54.9	-102.3	-47.4	-13.0	34.4	Peak	4-8GHz
5019.0000	Horn2	V	57.6	-111.2	-53.6	-13.0	40.6	Peak	4-8GHz
5019.0000	Horn2	H	57.1	-111.2	-54.1	-13.0	41.1	Peak	4-8GHz
5855.5000	Horn2	V	57.1	-109.5	-52.4	-13.0	39.4	Peak	4-8GHz
5855.5000	Horn2	H	57.5	-107.1	-49.6	-13.0	36.6	Peak	4-8GHz
6692.0000	Horn2	V	55.0	-107.8	-52.8	-13.0	39.8	Peak	4-8GHz
6692.0000	Horn2	H	55.6	-108.0	-52.4	-13.0	39.4	Peak	4-8GHz
7528.5000	Horn2	V	53.6	-104.7	-51.1	-13.0	38.1	Peak	4-8GHz
7528.5000	Horn2	H	55.0	-104.1	-49.1	-13.0	36.1	Peak	4-8GHz
Note 1: Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole									
Note 2: Detector Legend: Q-Peak = 120 kHz RBW, Average = 1.0 MHz RBW									
Notes:		AGC ON							

**Radiated Disturbance Detailed Setup Photos:**

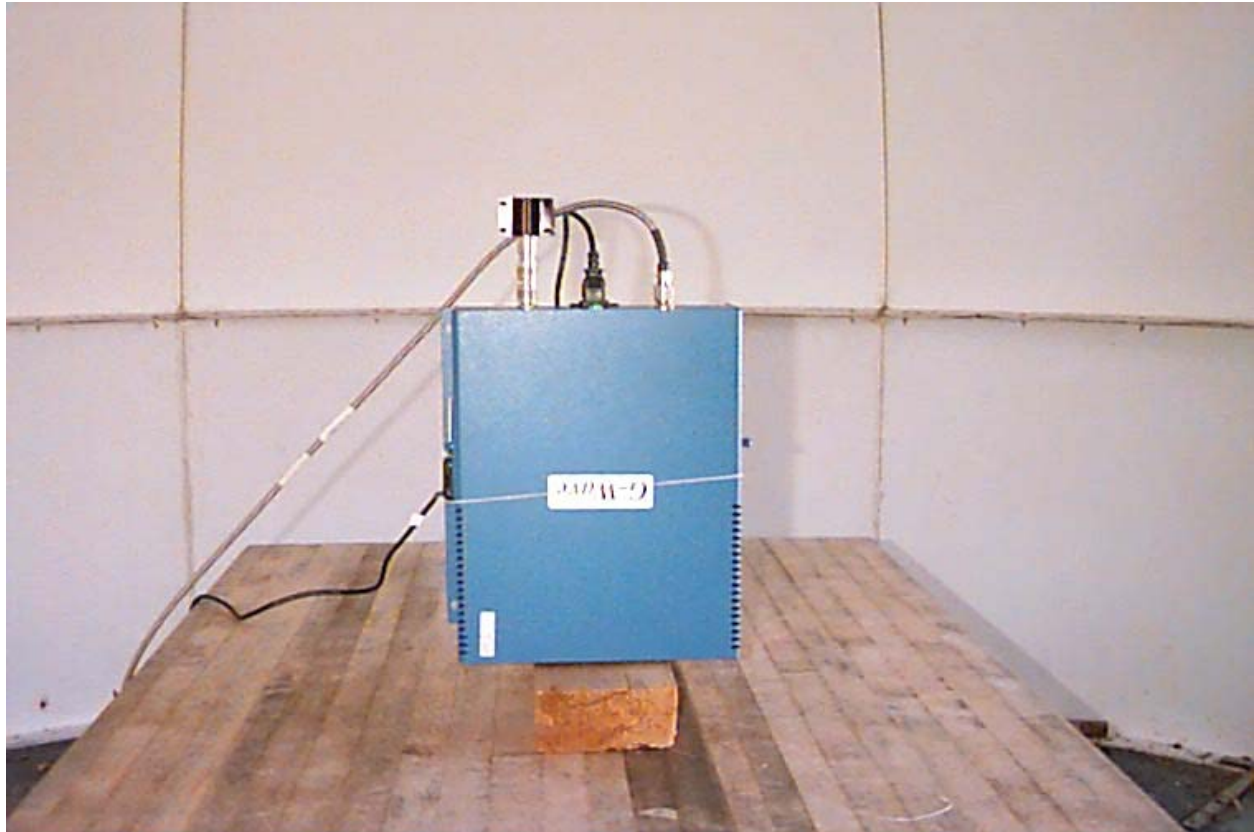
Rear



*EQUIPMENT: BDA-CELLAB-1/1W-80-A, Bi-Directional Amplifier*

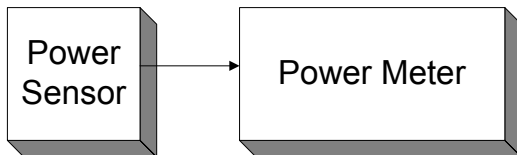
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Front

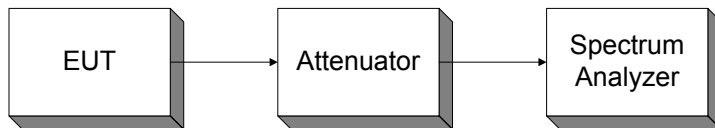


## **Section 7. Block Diagrams**

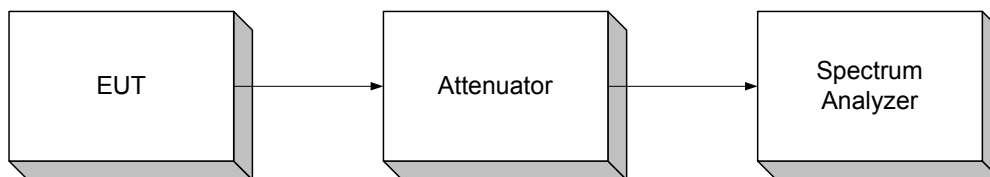
### **Para. No. 2.1046 - R.F. Power Output**



### **Para. No. 2.1049 - Occupied Bandwidth**



### **Para. No. 2.1051 - Spurious Emissions at Antenna Terminals**

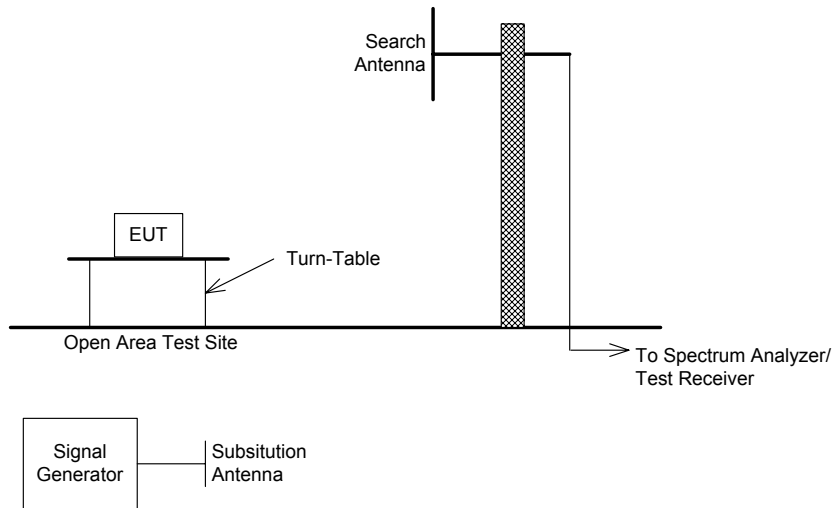


*EQUIPMENT: BDA-CELLAB-1/1W-80-A, Bi-Directional Amplifier*

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**TIA/EIA 603**

Effective Radiated Power  
Spurious Emissions



## Section 8. Test Equipment List

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
1 Year	Spectrum Analyzer	Hewlett-Packard	8565E	FA000981	July. 03/03	July. 03/04
1 Year	Horn Antenna #2	EMCO	3115	FA000825	Dec. 10/03	Dec. 10/04
1 Year	1.0 – 2.0 GHz Amplifier	JCA	12-400	FA001498	June. 18/03	June. 18/04
1 Year	2.0 – 4.0 GHz Amplifier	JCA	24-600	FA001496	June. 18/03	June. 18/04
1 Year	4.0 – 8.0 GHz Amplifier	JCA	48-600	FA001497	June. 18/03	June. 18/04
3 Year	Signal Generator	Rohde & Schwarz	SMIQ03	FA001091	Sept. 25/03	Sept. 25/06
1 Year	Signal Generator	Rohde & Schwarz	SMIQ03E	FA001269	Jan. 09/04	Jan. 09/05
COU	Coupler	Mini-Circuits	ZA3PD-2	FA001155	COU	COU
COU	Isolator	Narda	CIC01A8010-02	FA001580	COU	COU
COU	Isolator	Narda	CIC01A8010-02	FA001579	COU	COU
COU	Attn	Weinschel Corp.	47-10-34	FA001740	COU	COU
COU	Attn	Narda	776B-20	FA001153	COU	COU
COU	Attn	KAY	1/839	FA001548	COU	COU
COU	Attn	Narda	769-20	FA001394	COU	COU
COU	5.0 – 18.0 GHz Amplifier	NARDA	DWT-186N23U40	FA001409	COU	COU
Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use, OUT = Out For CAL/Repair						