



Nemko

Test Report: 4W08124

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

**Equipment Under Test:
(EUT)** BDA-CELLAB-1/1W-60-A, Bi-Directional Amplifier

FCC ID: Q8KCELLAB1W60

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: Glen Westwell, Wireless Technologist

Date: 17 May 2004

Total Number of Pages: 32

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EQUIPMENT: BDA-CELLAB-1/1W-60-A, Bi-Directional Amplifier

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: 14 May 2004



TESTED BY: _____
Kevin Carr, EMC/EMI/Wireless Specialist

DATE: 14 May 2004

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This report applies only to the items tested.

EQUIPMENT: BDA-CELLAB-1/1W-60-A, Bi-Directional Amplifier

Summary Of Test Data

Name Of Test	Para. No.	Result
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

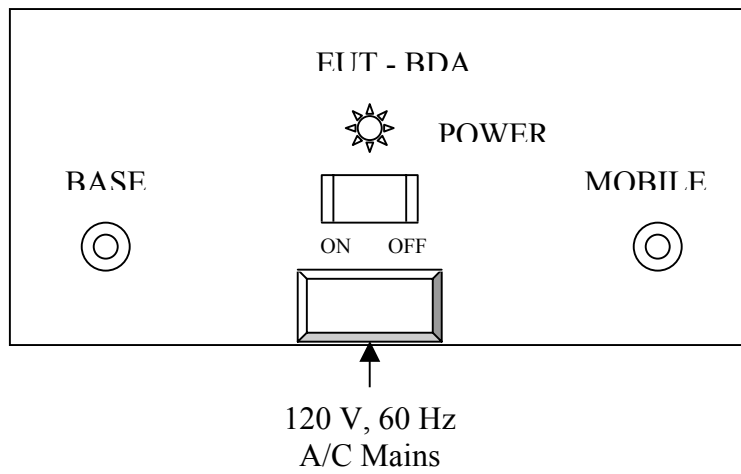
Indoor Temperature: 23.4 °C
 Humidity: 41 %

Outdoor Temperature: 21 °C
 Humidity: 46 %

Section 2. General Equipment Specification

Manufacturer:	G-Wave Inc.
Model No.:	BDA-CELLAB-1/1W-60-A
Serial No.:	04041038
Date Received In Laboratory:	May 5, 2004
Nemko Identification No.:	1
Supply Voltage:	120VAC, 60Hz
Frequency Range:	Uplink: 824 – 849 MHz Downlink: 869 – 894 MHz
RF Output Power (Rated)	Uplink: 25.0 dBm, 0.316 Watts, Total Comp. Power Downlink: 25.0 dBm, 0.316 Watts, Total Comp. Power
RF Output Power (measured)	
Uplink:	CDMA 24.2dBm, 0.263W TDMA 24.0dBm, 0.251W AMP's 24.2dBm, 0.263W
Downlink:	CDMA 24.5dBm, 0.282W TDMA 24.1dBm, 0.257W AMP's 24.8dBm, 0.302W
Emission Designator:	DXW, F9W, F8W

Block Diagram



Section 3. RF Power Output

Para. No.: 2.1046

Test Performed By: Kevin Carr/Daxesh Thakker	Date of Test: May 10, 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 ± 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	24.0	24.1
CDMA	24.2	24.5
AMPS	24.2	24.8

Section 4. Occupied Bandwidth

Para. No.: 2.1049

Test Performed By: Kevin Carr/Daxesh Thakker	Date of Test: May 10, 2004
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Minimum Standard: 22.917, Input vs Output

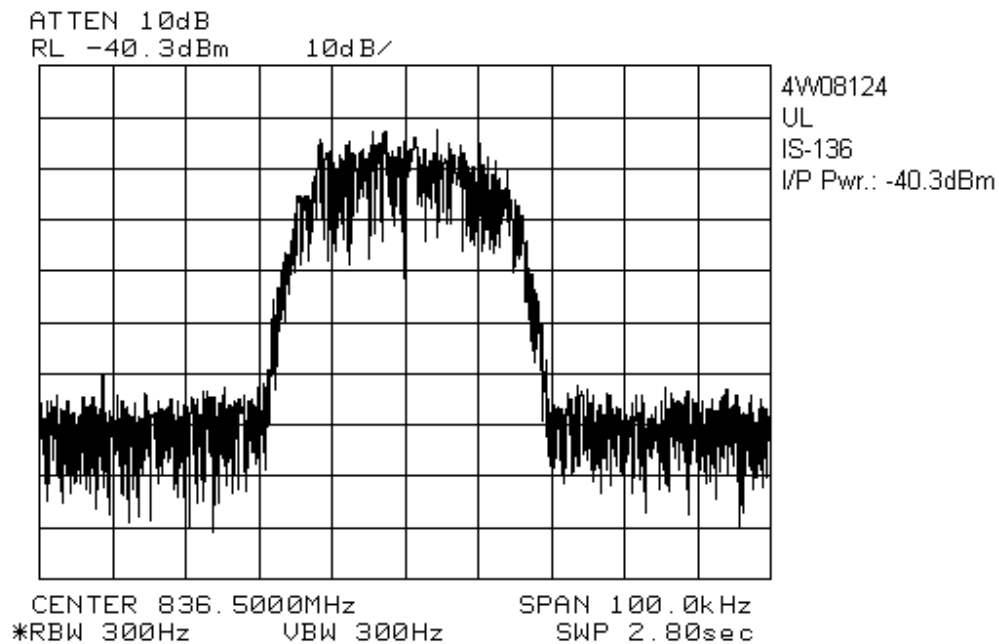
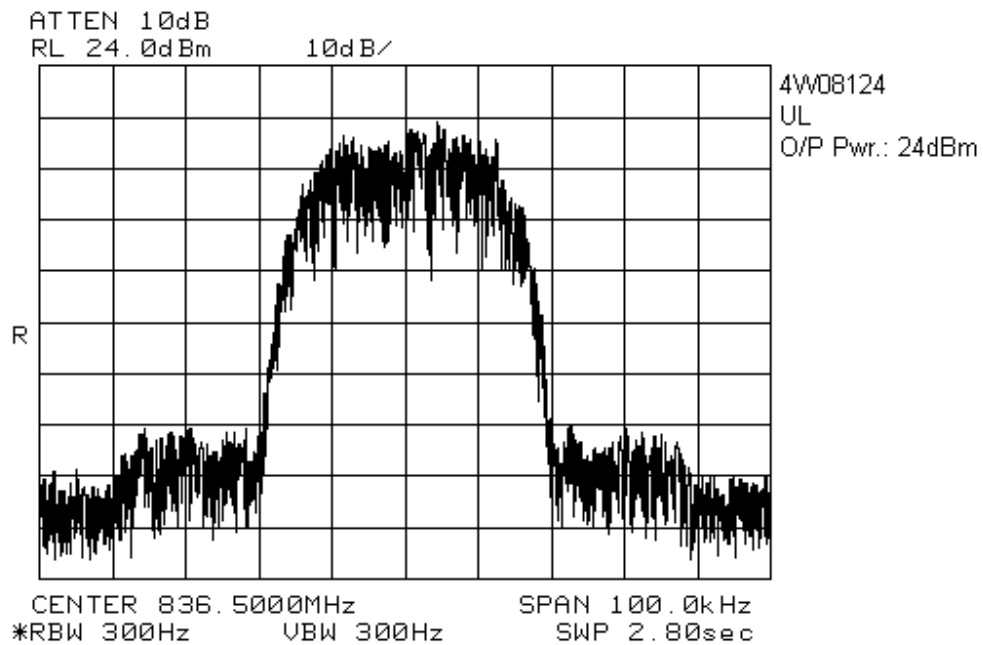
Test Results: Complied

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.

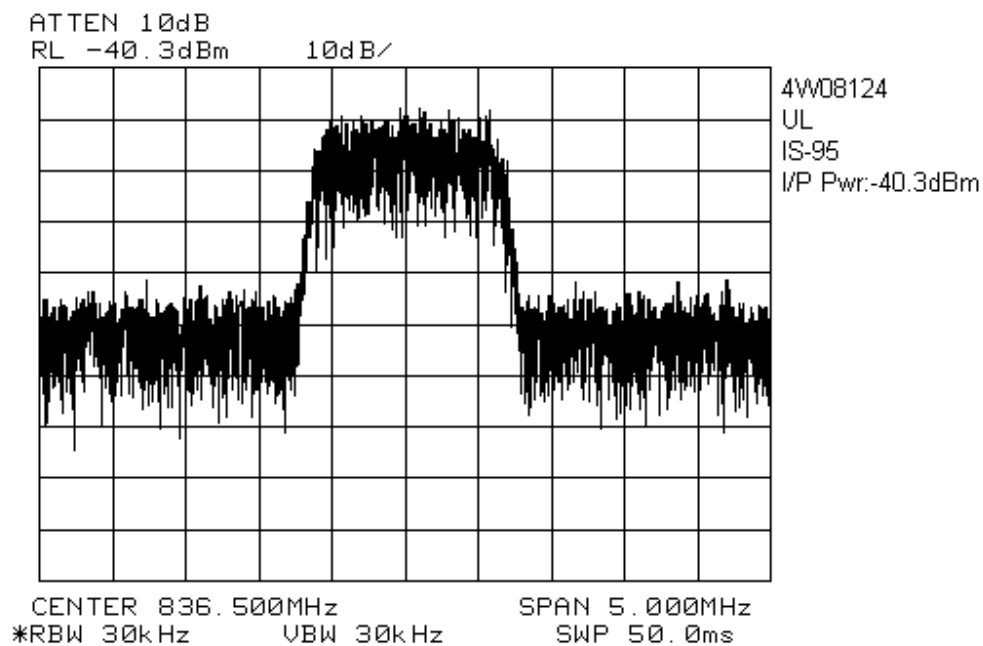
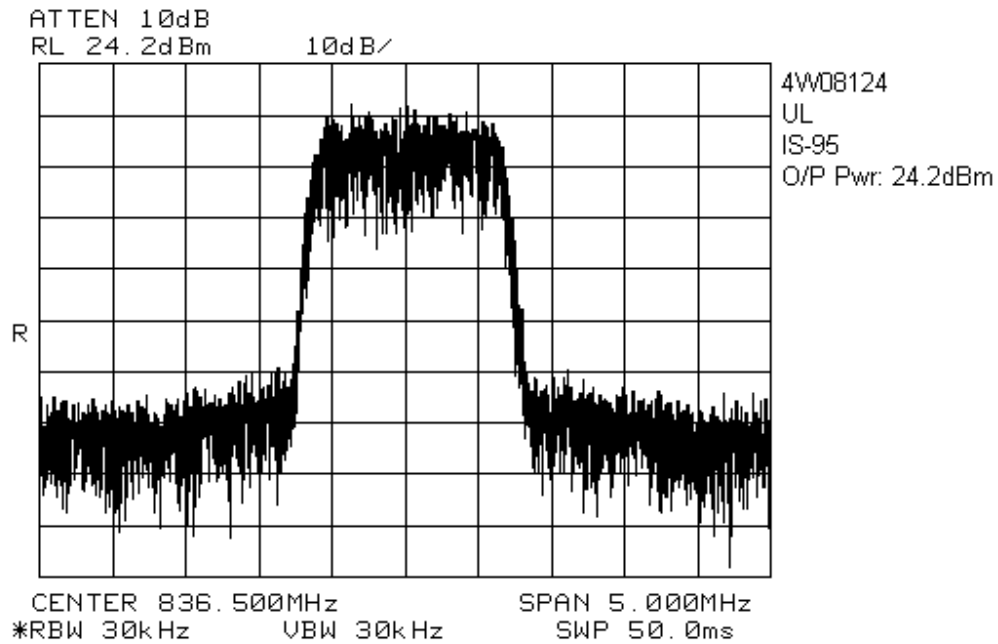
EQUIPMENT: BDA-CELLAB-1/1W-60-A, Bi-Directional Amplifier

UL
TDMA



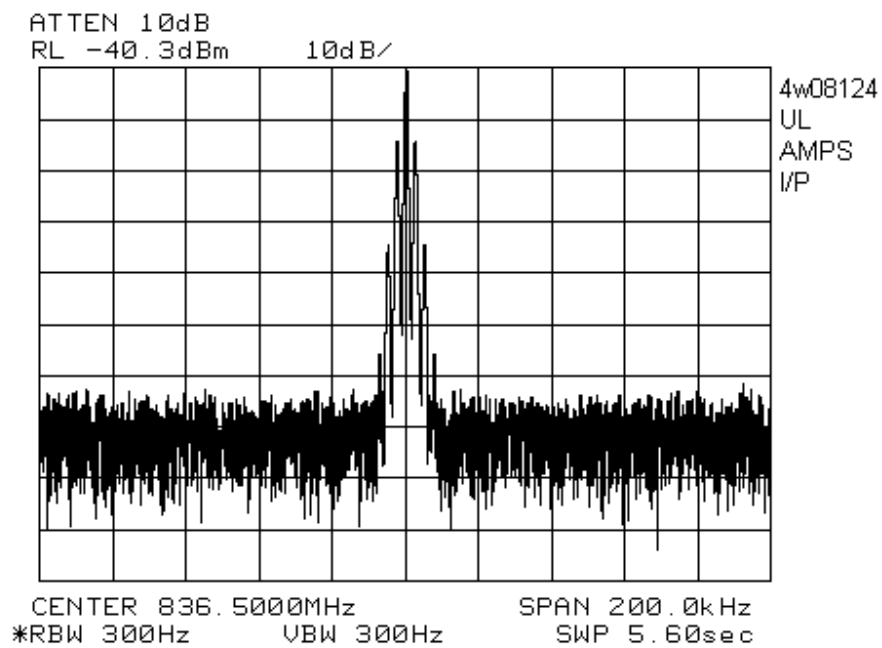
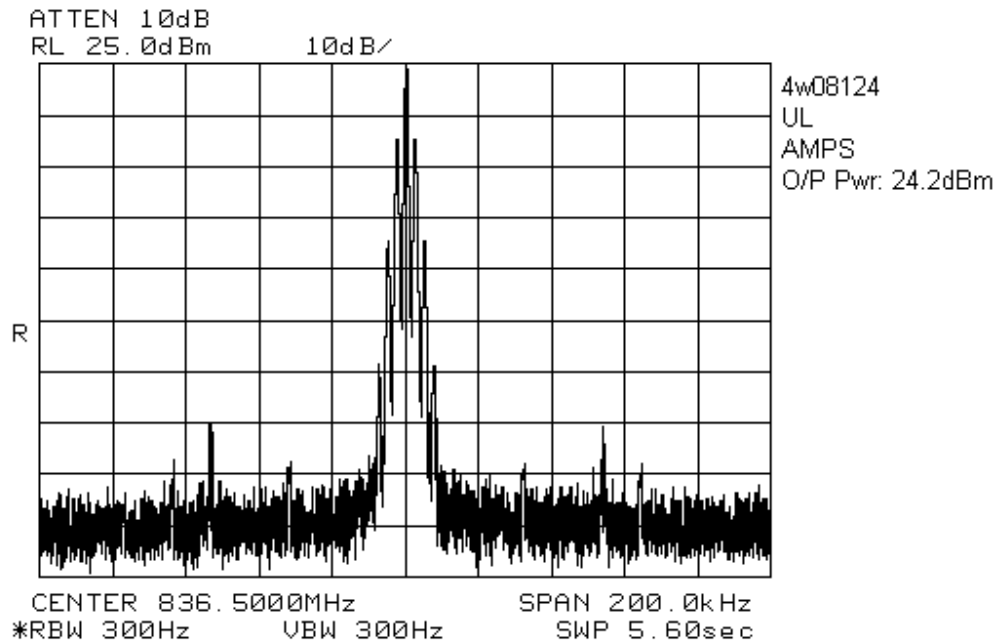
EQUIPMENT: BDA-CELLAB-1/1W-60-A, Bi-Directional Amplifier

CDMA



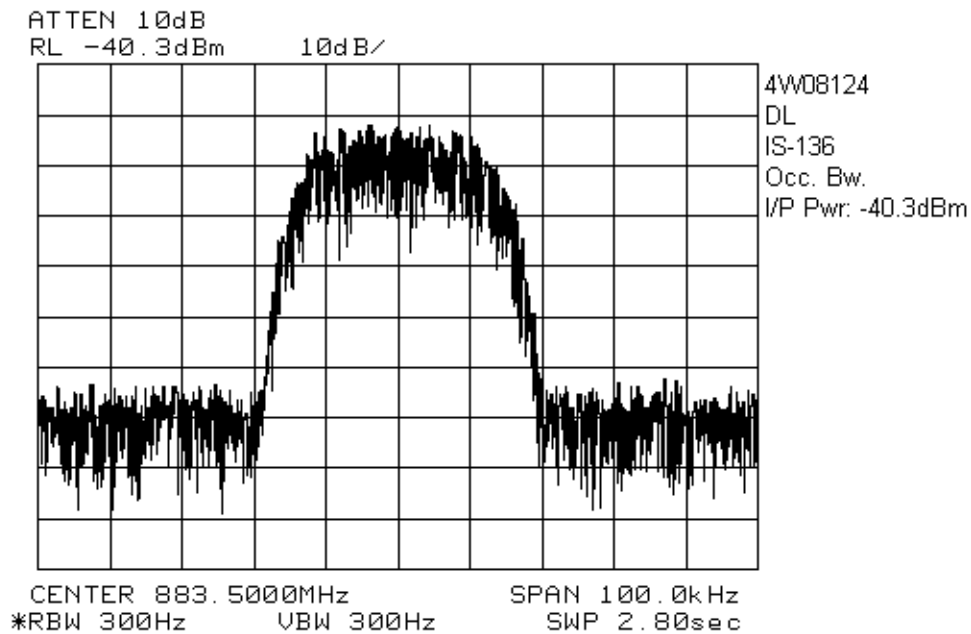
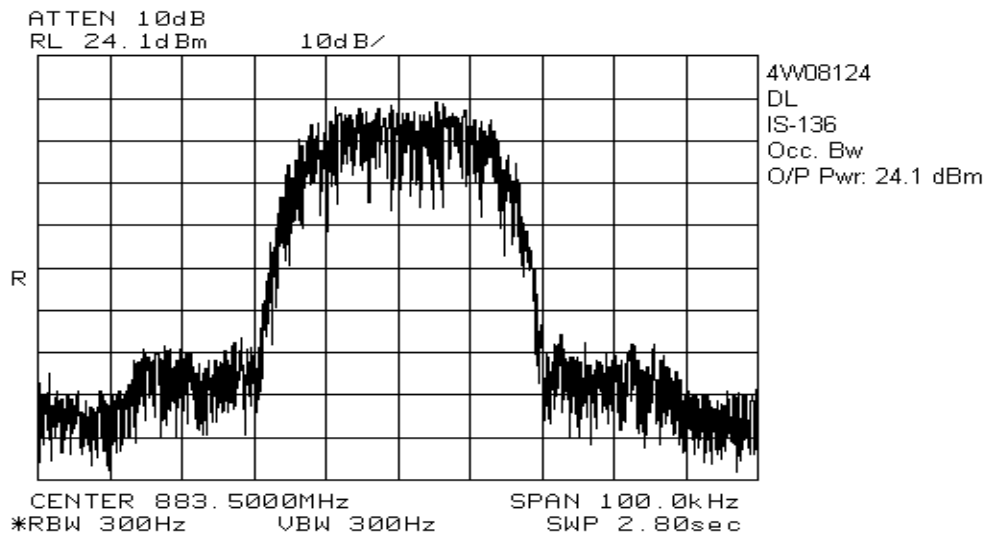
EQUIPMENT: BDA-CELLAB-1/1W-60-A, Bi-Directional Amplifier

AMPS



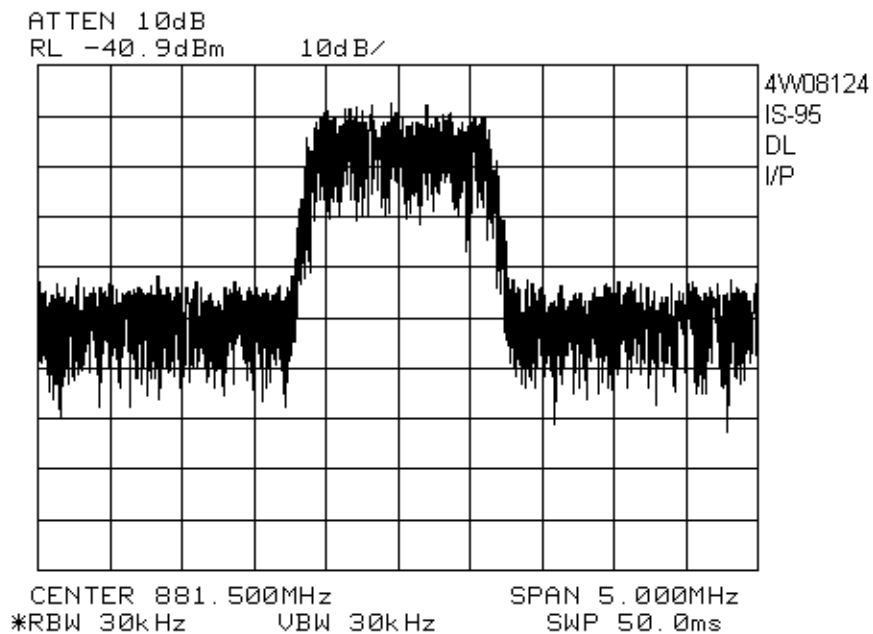
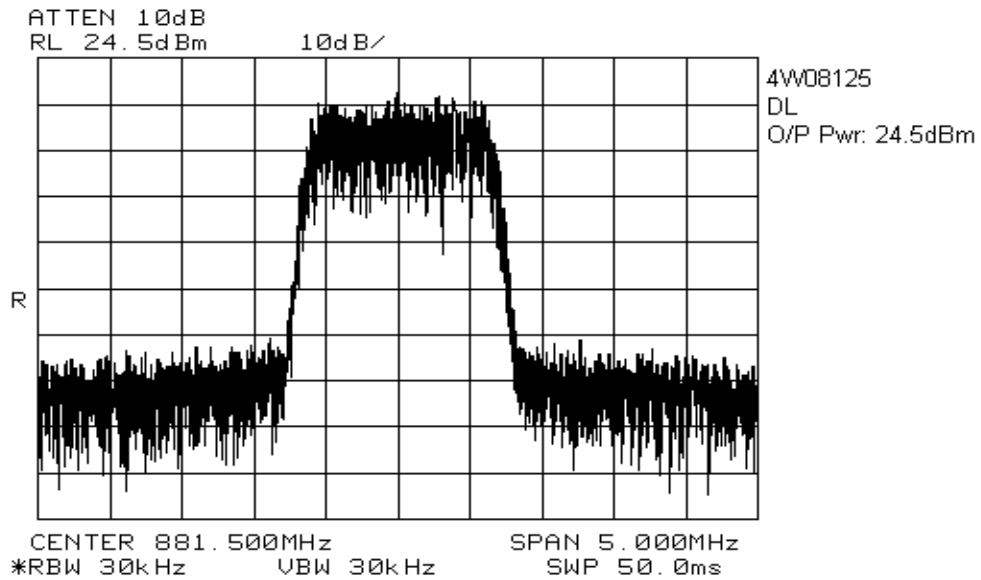
EQUIPMENT: BDA-CELLAB-1/1W-60-A, Bi-Directional Amplifier

DL
TDMA



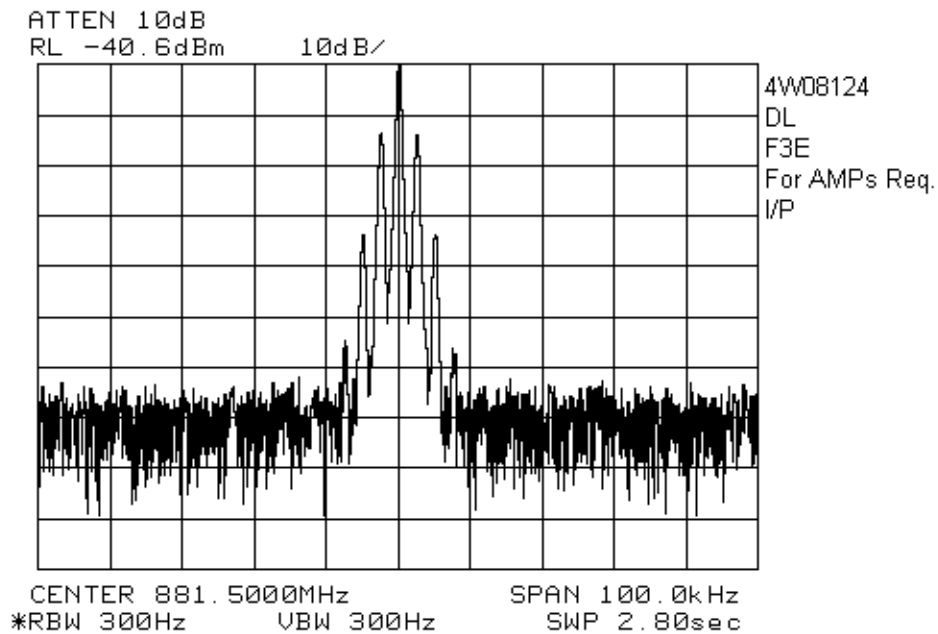
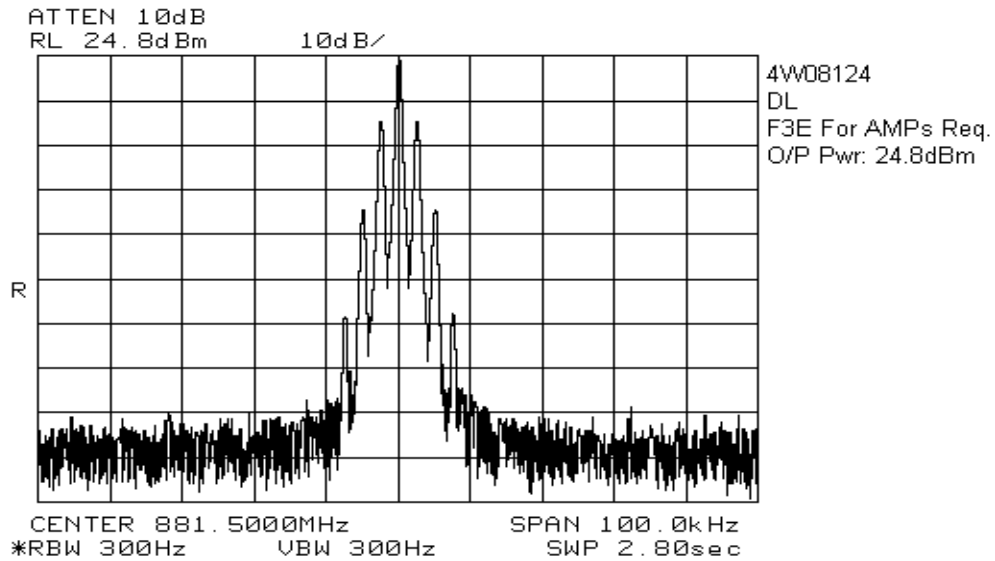
EQUIPMENT: BDA-CELLAB-1/1W-60-A, Bi-Directional Amplifier

CDMA



EQUIPMENT: BDA-CELLAB-1/1W-60-A, Bi-Directional Amplifier

AMPS



Section 5. Spurious Emissions at Antenna Terminals

Para. No.: 2.1051

Test Performed By: Kevin Carr/Daxesh Thakker	Date of Test: May 10, 2004
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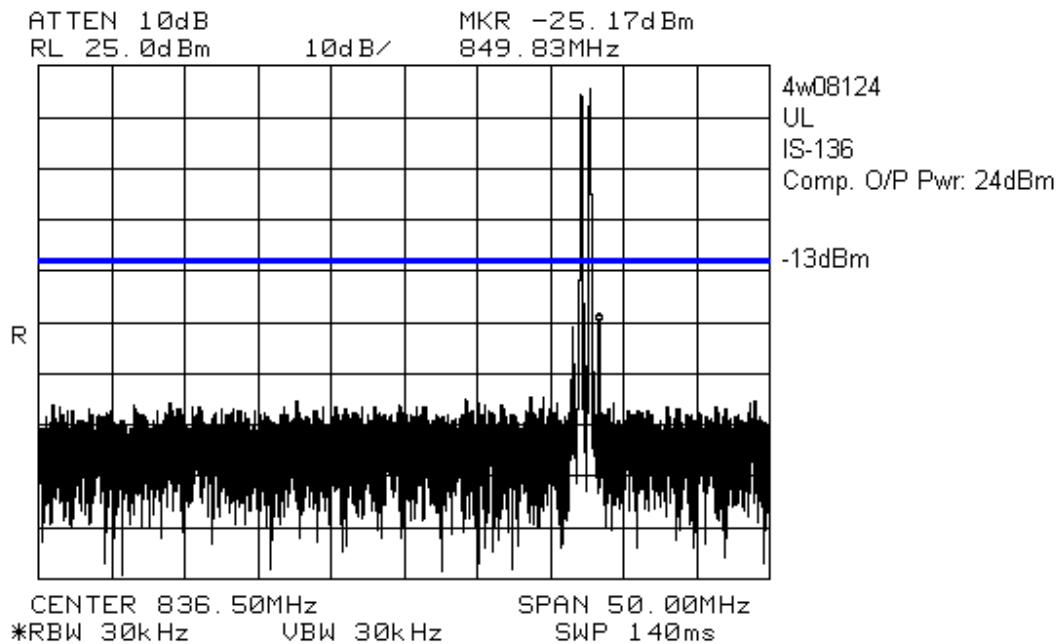
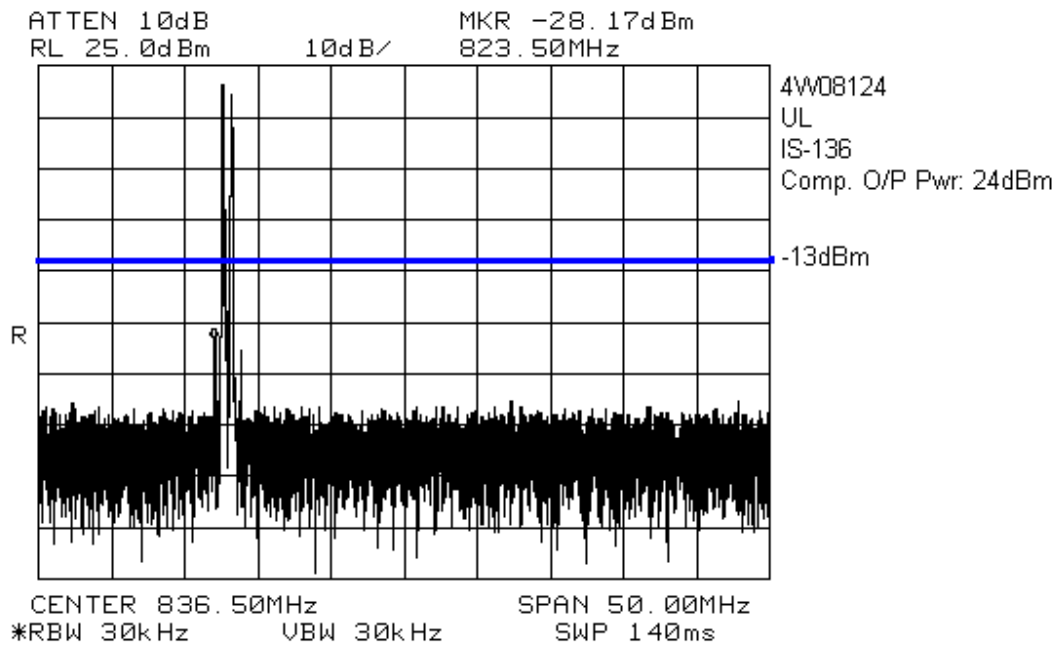
Minimum Standard: 22.917(e): -13dBm
(f): -80dBm

Test Results: Complied

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

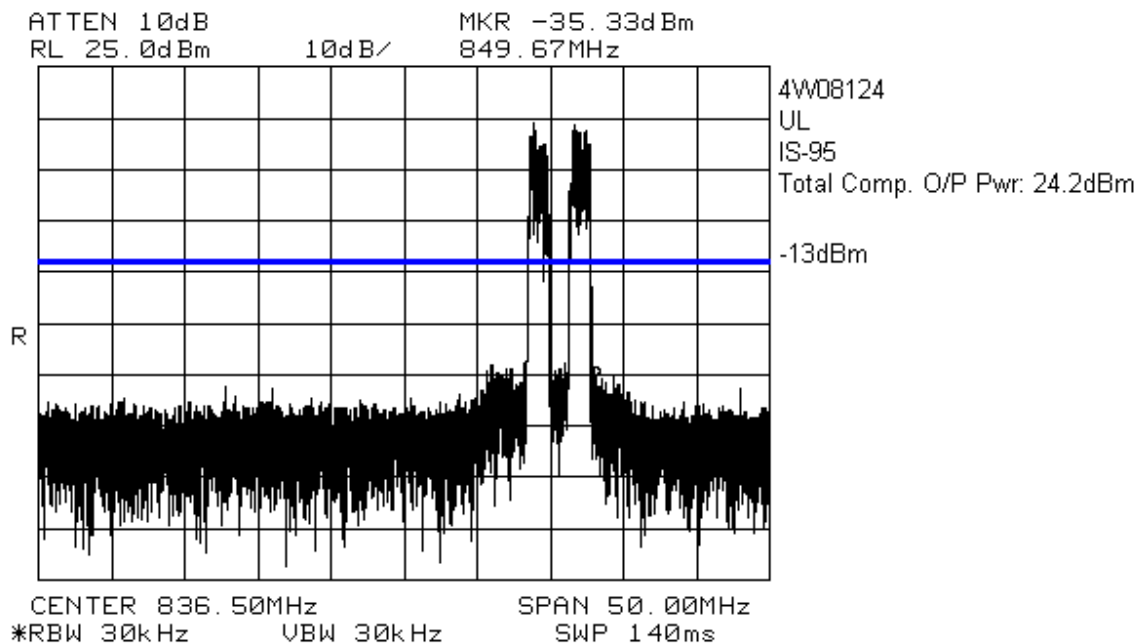
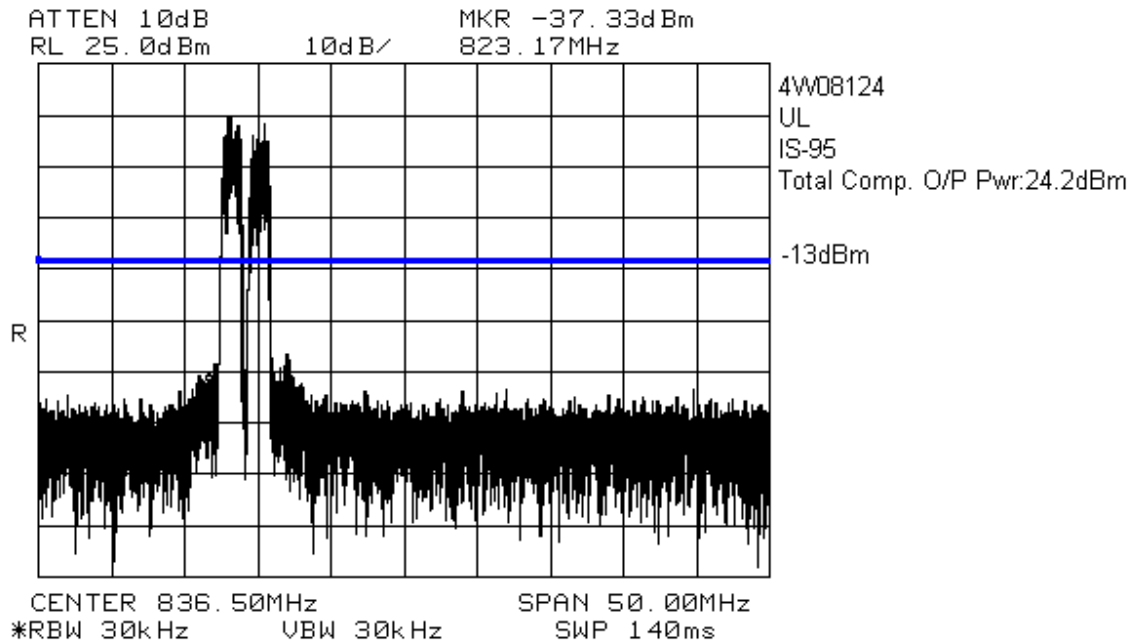
EQUIPMENT: BDA-CELLAB-1/1W-60-A, Bi-Directional Amplifier

UL
TDMA



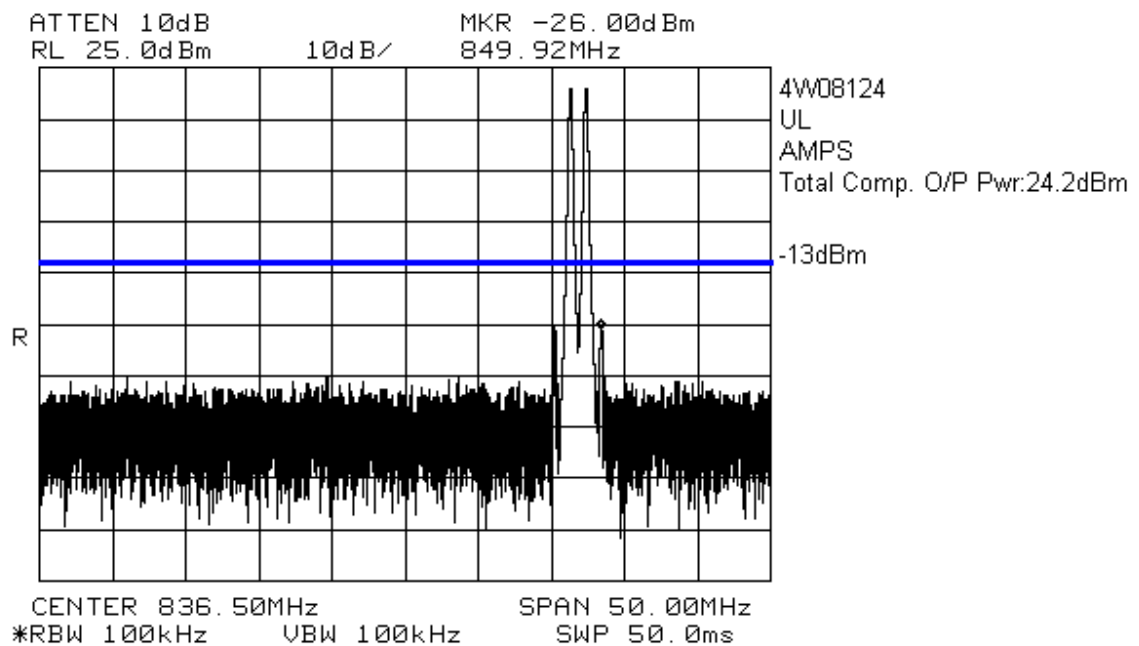
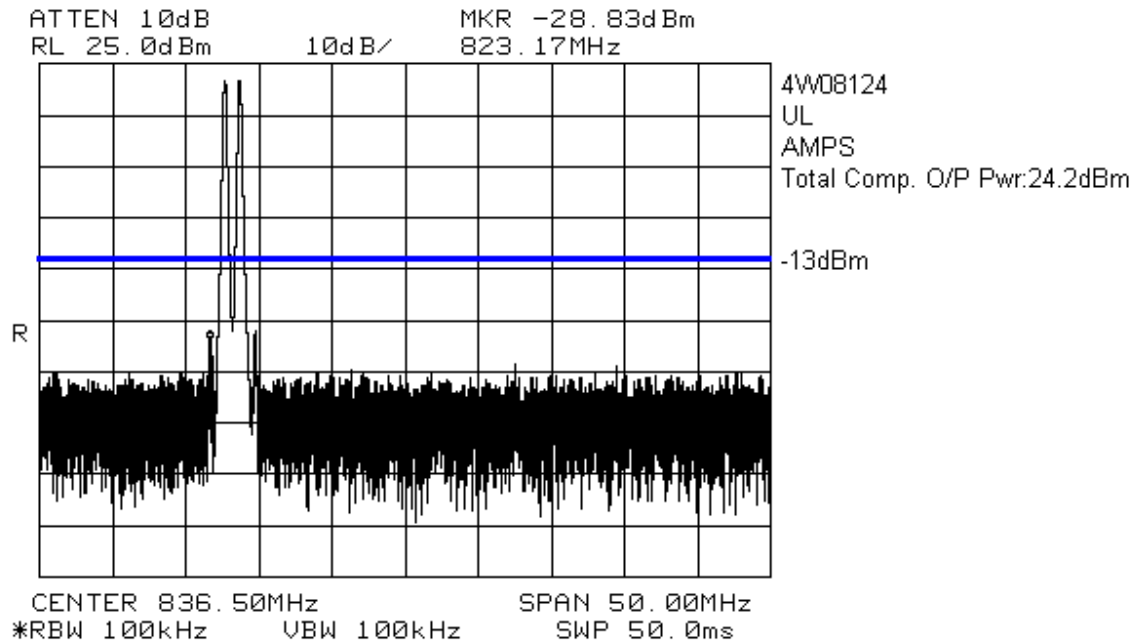
EQUIPMENT: BDA-CELLAB-1/1W-60-A, Bi-Directional Amplifier

CDMA



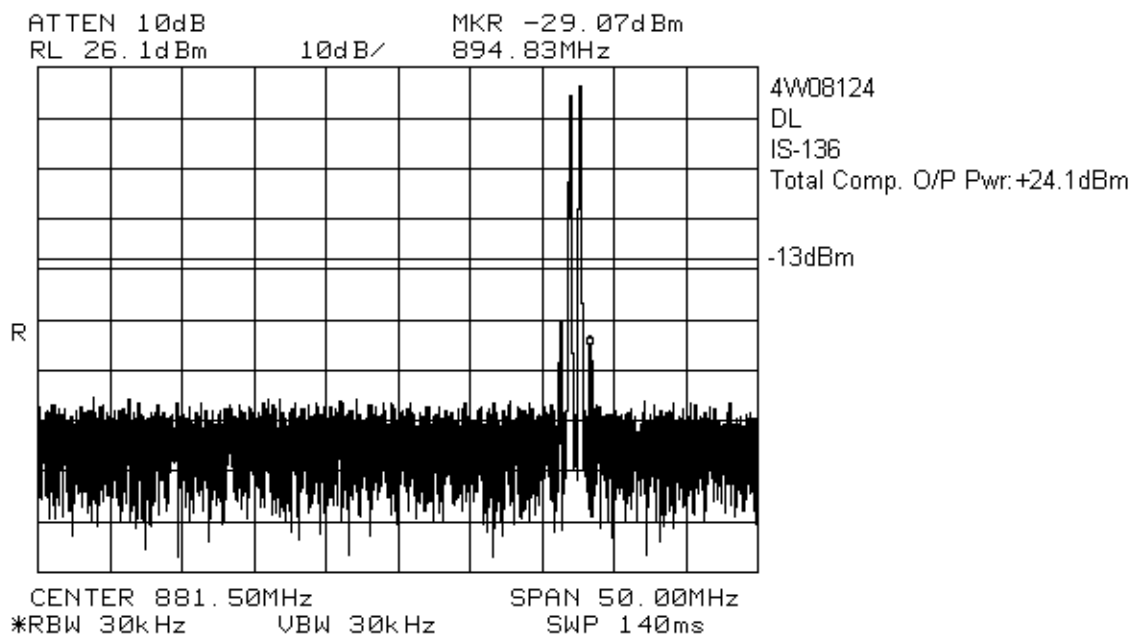
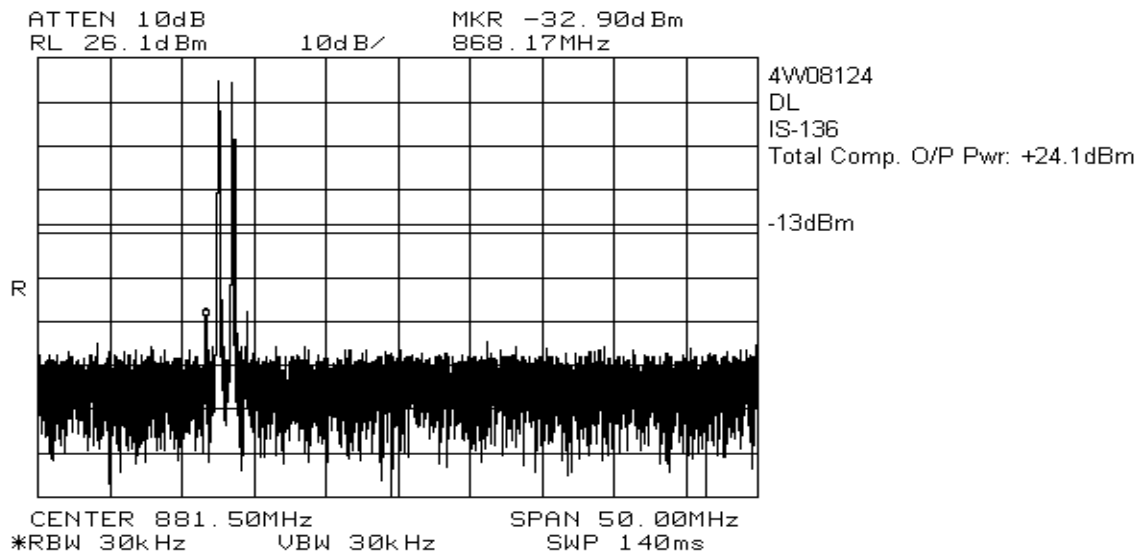
EQUIPMENT: BDA-CELLAB-1/1W-60-A, Bi-Directional Amplifier

AMPS



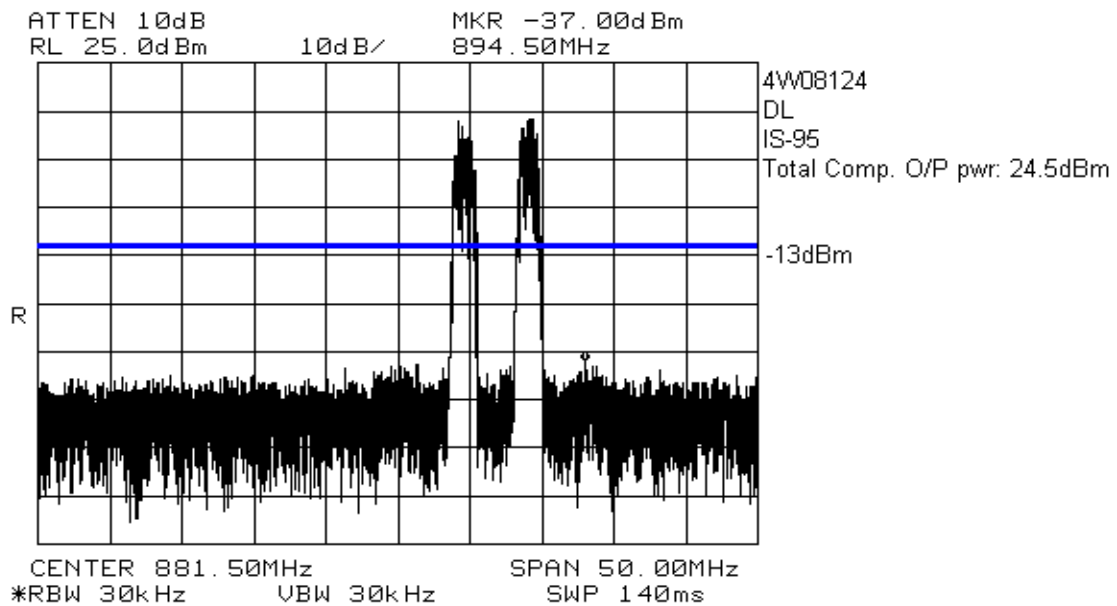
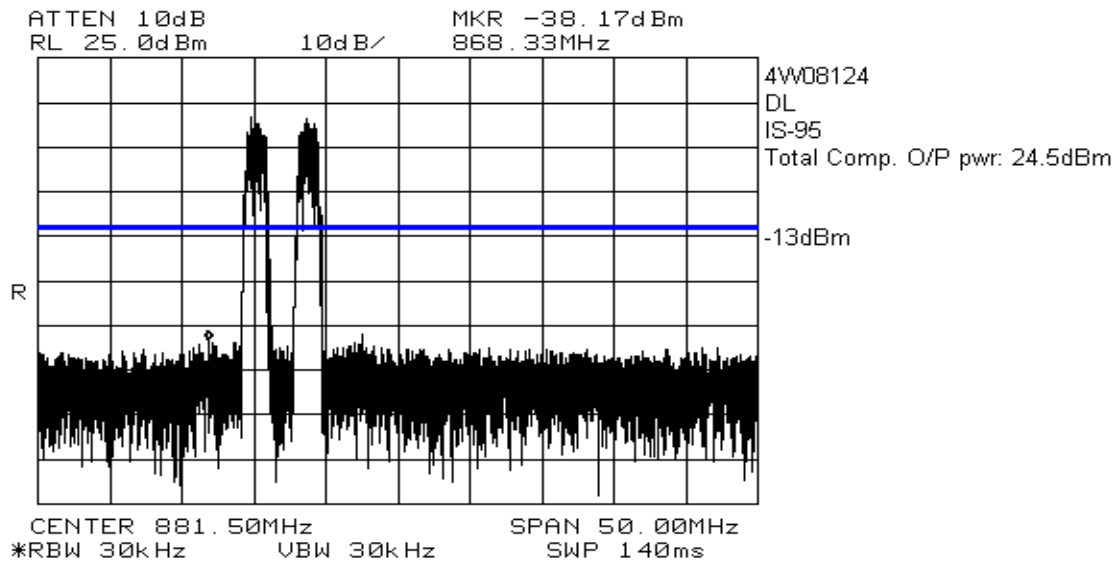
EQUIPMENT: BDA-CELLAB-1/1W-60-A, Bi-Directional Amplifier

DL
TDMA



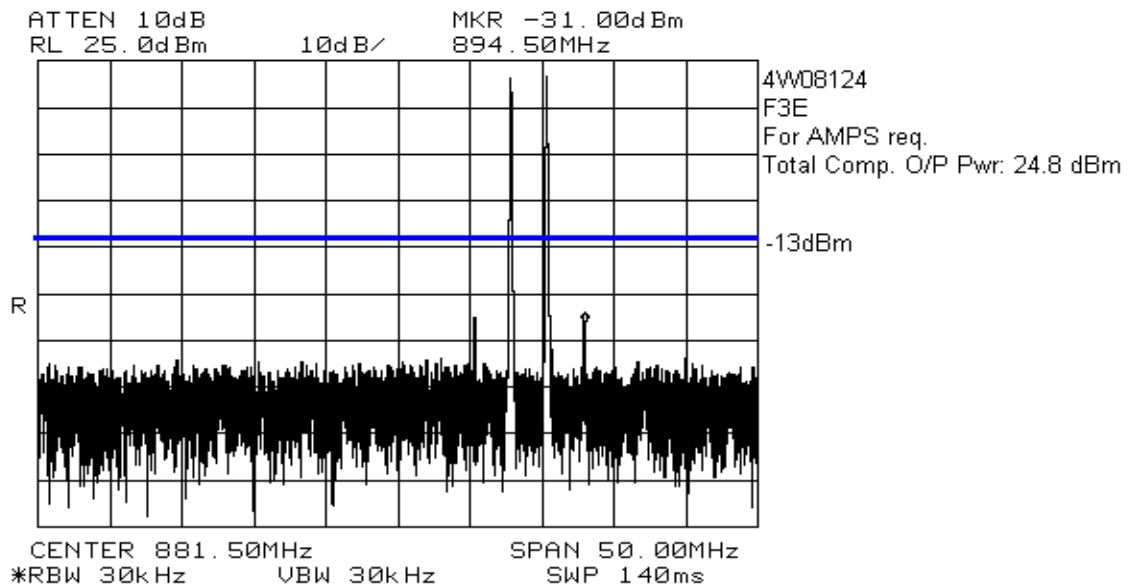
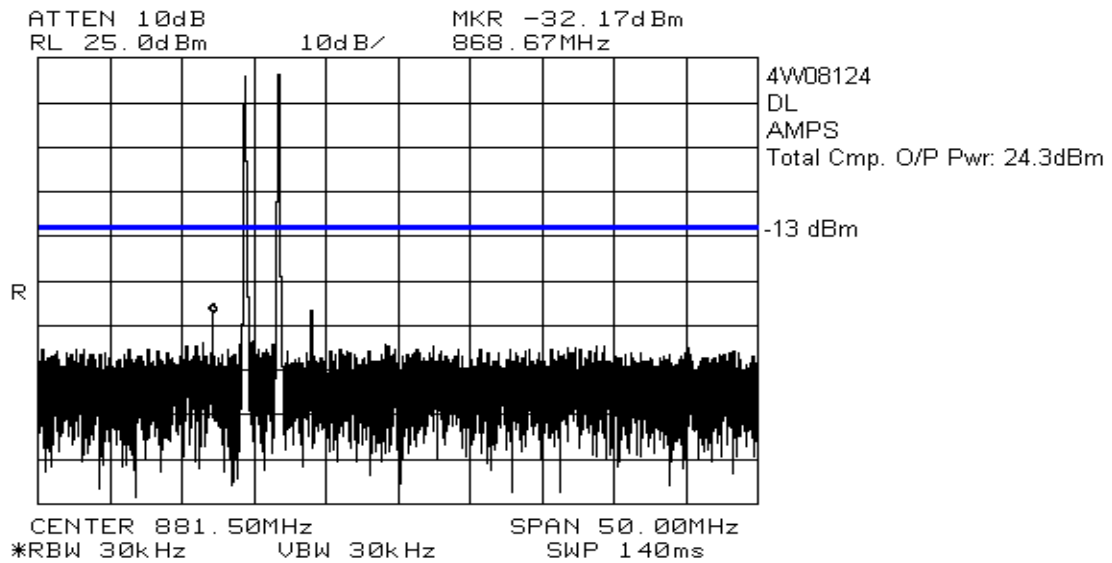
EQUIPMENT: BDA-CELLAB-1/1W-60-A, Bi-Directional Amplifier

CDMA



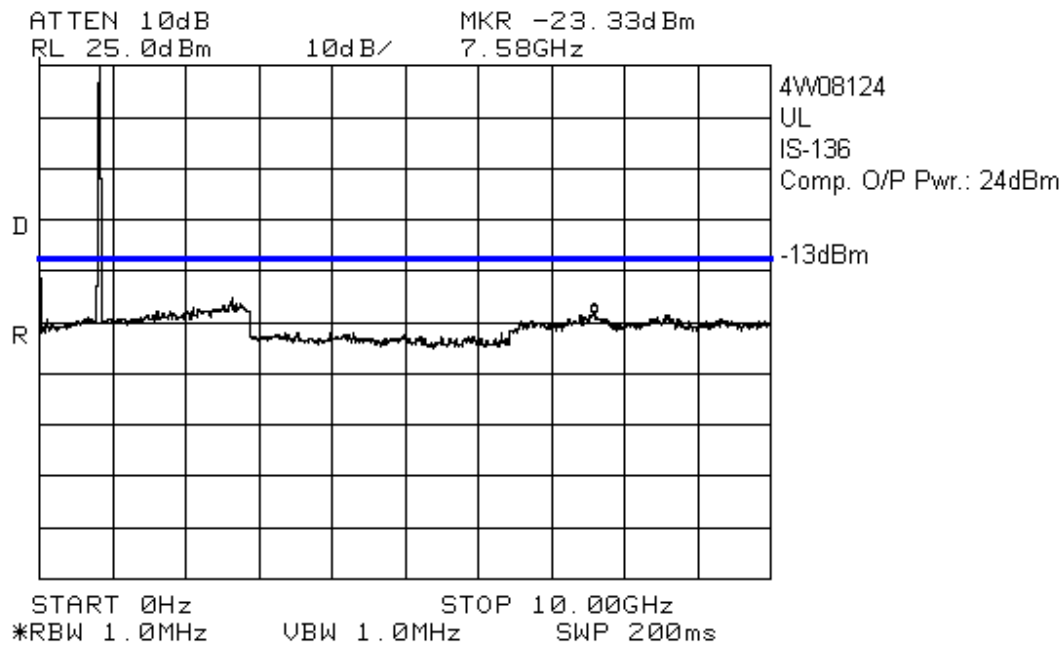
EQUIPMENT: BDA-CELLAB-1/1W-60-A, Bi-Directional Amplifier

AMPS

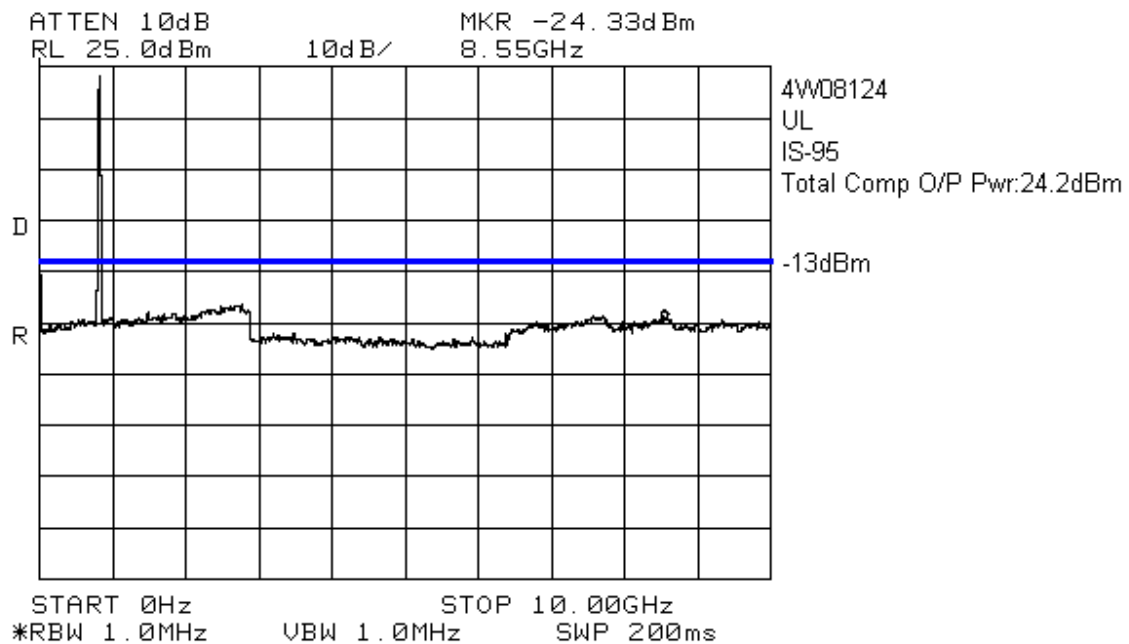


EQUIPMENT: BDA-CELLAB-1/1W-60-A, Bi-Directional Amplifier

UL
TDMA

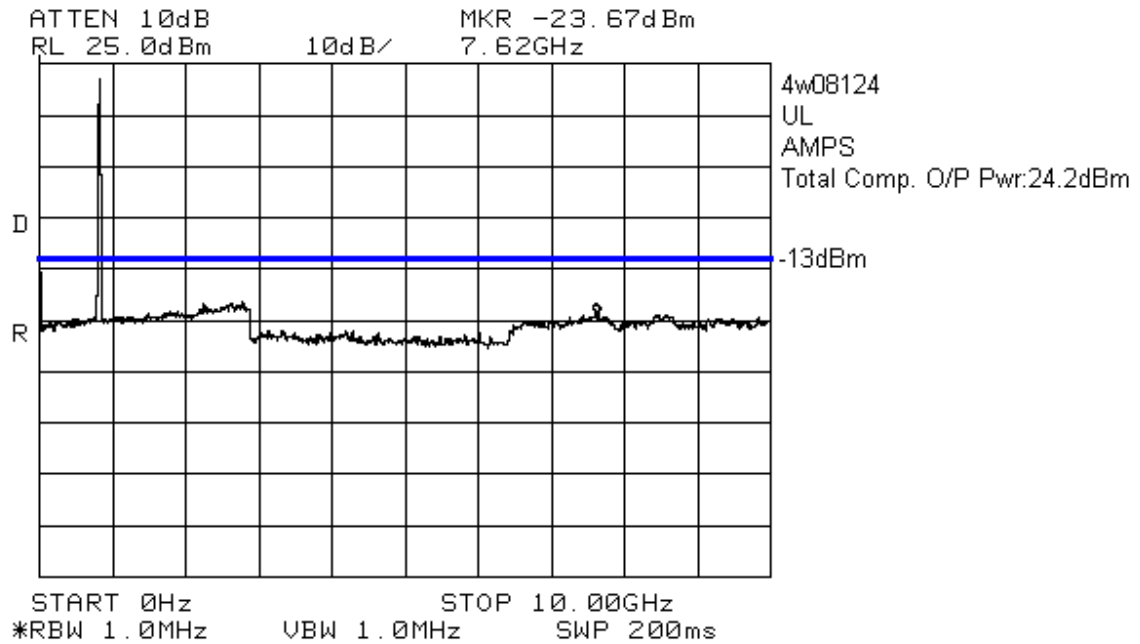


CDMA



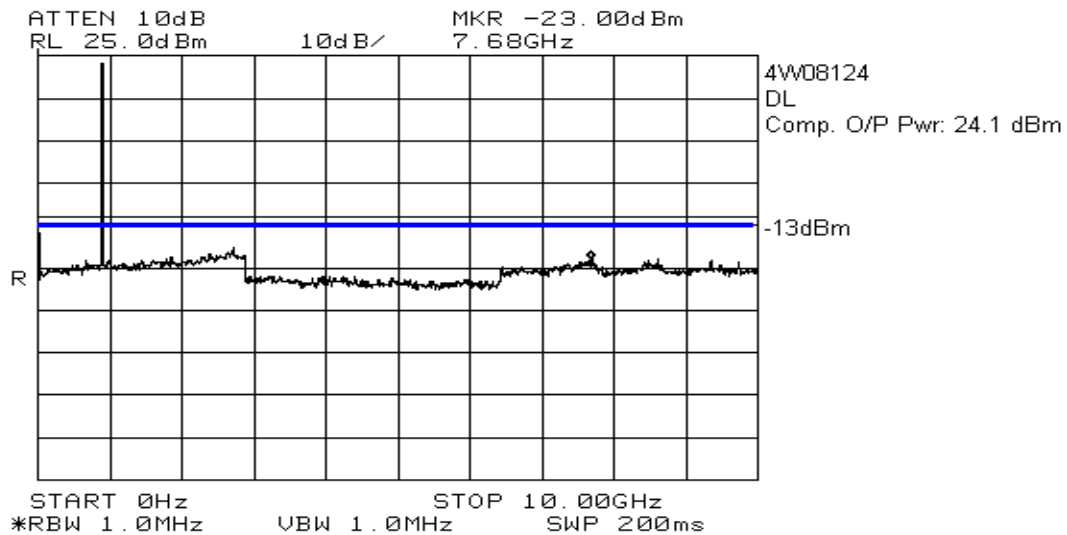
EQUIPMENT: BDA-CELLAB-1/1W-60-A, Bi-Directional Amplifier

AMPS

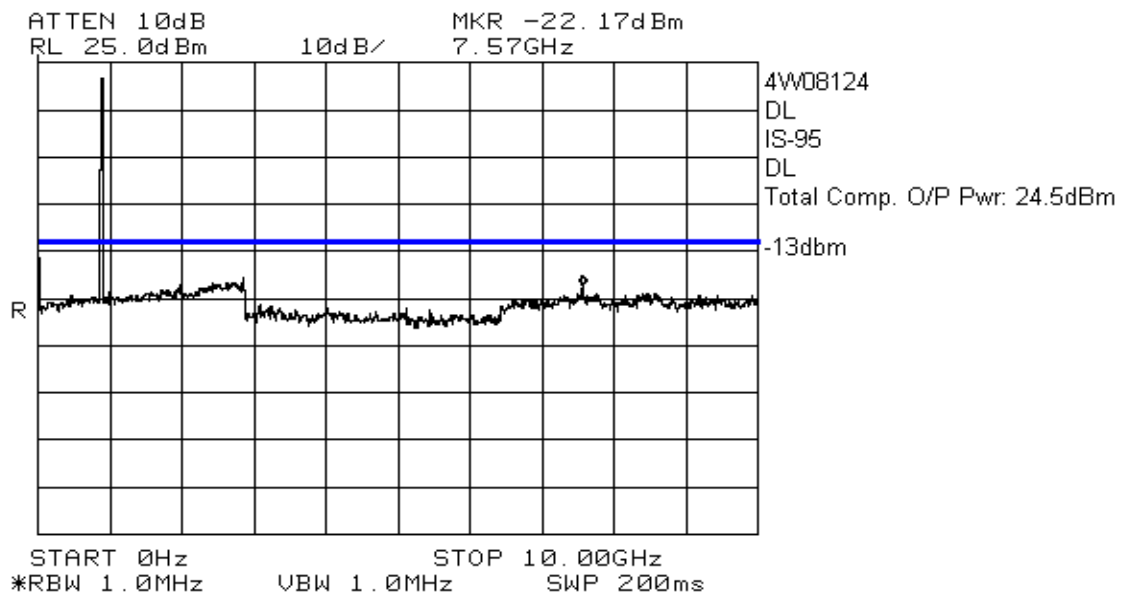


EQUIPMENT: BDA-CELLAB-1/1W-60-A, Bi-Directional Amplifier

DL
TDMA

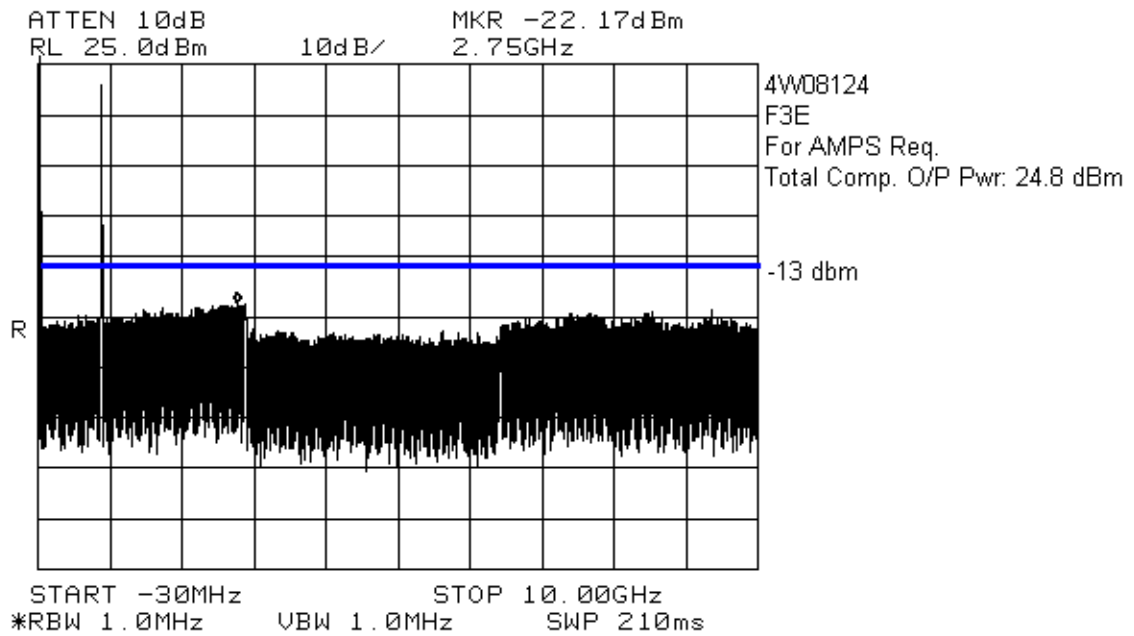


CDMA



EQUIPMENT: BDA-CELLAB-1/1W-60-A, Bi-Directional Amplifier

AMPS



Section 6. Field Strength of Spurious Emissions

Para. No.: 2.1053

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

Test Results: Complied

Measurement Data: See attached chart.

EQUIPMENT: BDA-CELLAB-1/1W-60-A, Bi-Directional Amplifier

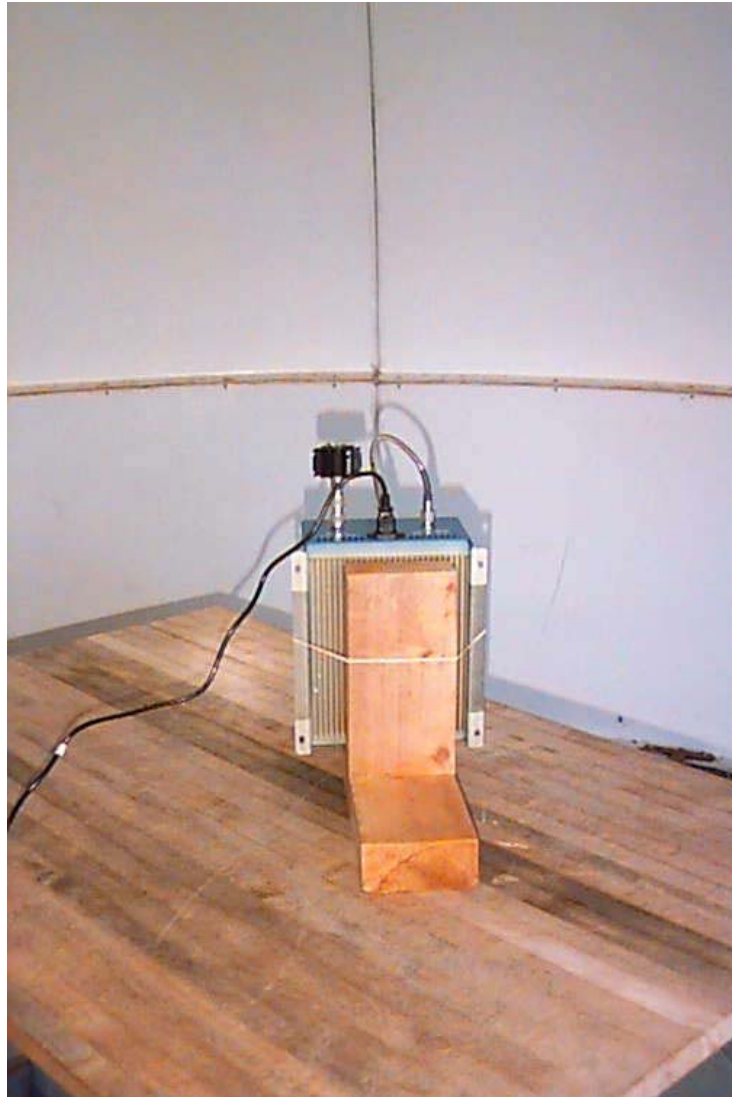
Radiated Disturbance Test Data:

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					Range: Ottawa, 1				
Freq. (MHz)	Ant.	Pol. V/H	RCVD Signal (dBμV)	Sig Sub. Factor (dB)	Signal Substitution Power (dBm)	Limit (dBm)	Margin (dB)	Detector	Amp.
5289.0000	Horn2	V	56.0	-109.9	-53.9	-13.0	40.9	Peak	4-8GHz
5289.0000	Horn2	H	56.3	-108.2	-51.9	-13.0	38.9	Peak	4-8GHz
6170.5000	Horn2	V	53.0	-108.6	-55.6	-13.0	42.6	Peak	4-8GHz
6170.5000	Horn2	H	57.0	-108.3	-51.3	-13.0	38.3	Peak	4-8GHz
7052.0000	Horn2	V	56.0	-105.8	-49.8	-13.0	36.8	Peak	4-8GHz
7052.0000	Horn2	H	57.0	-106.2	-49.2	-13.0	36.2	Peak	4-8GHz
7933.5000	Horn2	V	54.0	-101.6	-47.6	-13.0	34.6	Peak	4-8GHz
7933.5000	Horn2	H	54.4	-102.3	-47.9	-13.0	34.9	Peak	4-8GHz
5019.0000	Horn2	V	57.2	-111.2	-54.0	-13.0	41.0	Peak	4-8GHz
5019.0000	Horn2	H	56.8	-111.2	-54.4	-13.0	41.4	Peak	4-8GHz
5855.5000	Horn2	V	56.3	-109.5	-53.2	-13.0	40.2	Peak	4-8GHz
5855.5000	Horn2	H	56.1	-107.1	-51.0	-13.0	38.0	Peak	4-8GHz
6692.0000	Horn2	V	55.5	-107.8	-52.3	-13.0	39.3	Peak	4-8GHz
6692.0000	Horn2	H	55.3	-108.0	-52.7	-13.0	39.7	Peak	4-8GHz
7528.5000	Horn2	V	54.8	-104.7	-49.9	-13.0	36.9	Peak	4-8GHz
7528.5000	Horn2	H	54.7	-104.1	-49.4	-13.0	36.4	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							

EQUIPMENT: BDA-CELLAB-1/1W-60-A, Bi-Directional Amplifier

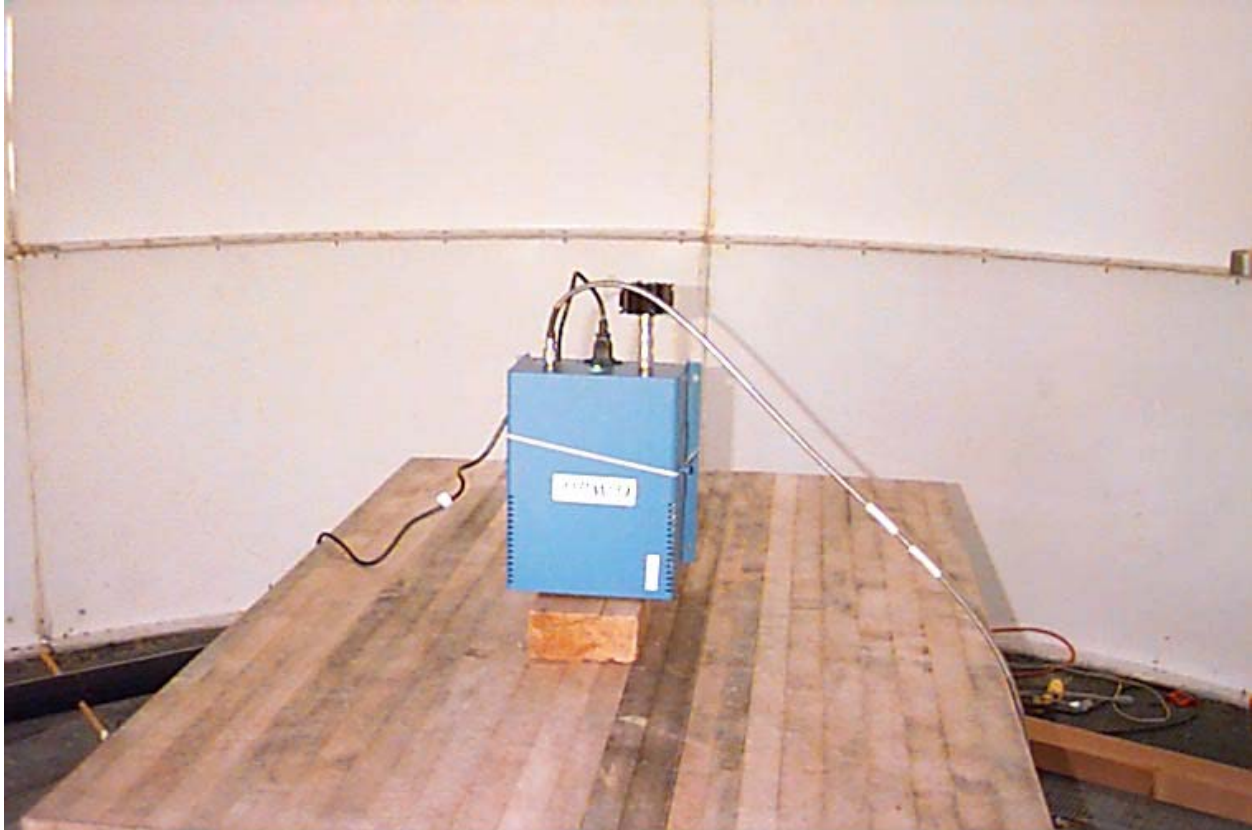
Radiated Disturbance Detailed Setup Photos:

Rear



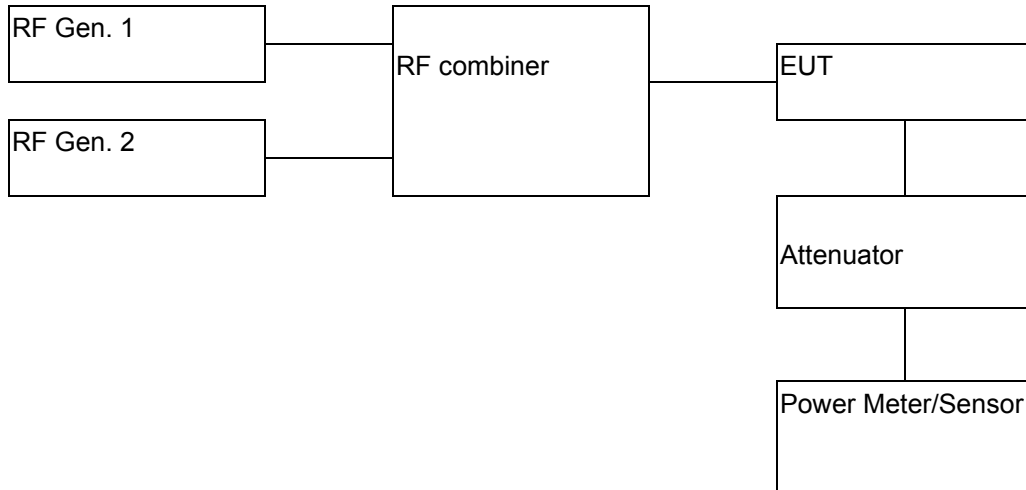
EQUIPMENT: BDA-CELLAB-1/1W-60-A, Bi-Directional Amplifier

Front



Section 7. Block Diagrams

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



Para. No. 2.1049 - Occupied Bandwidth



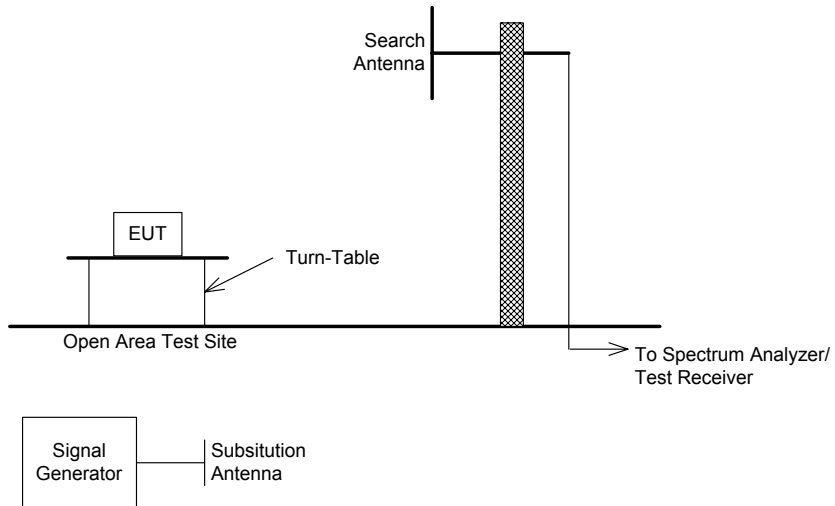
Para. No. 2.1051 - Spurious Emissions at Antenna Terminals



EQUIPMENT: BDA-CELLAB-1/1W-60-A, Bi-Directional Amplifier

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						