



Test Report: 4W07978

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

**Equipment Under Test:
(EUT)** BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier

FCC ID: Q8KSMR2W70A

In Accordance With: **FCC Part 90, Subpart I**
Private Land Mobile Repeater
SMR Service

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

Authorized By: 
Glen Westwell, Wireless Technologist

Date: 20 April 2004

Total Number of Pages: 30

EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A

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EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A

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 90, Subpart I.



New Submission



Production Unit



Class II Permissive Change



Pre-Production Unit



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: 20 April 2004
Kevin Carr, EMC/EMI/Wireless Specialist

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This report applies only to the items tested.

EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A

Summary Of Test Data

Name Of Test	Para. No.	Result
RF Power Output	2.1046	Complied
Audio Frequency Response	TIA EIA-603.3.2.6	NA(1)
Audio Low-Pass Filter Response	TIA EIA-603.3.2.6	NA(1)
Modulation Limiting	TIA EIA-603.3.2.6	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)

Footnotes For 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°C
 Humidity: 10%

Outdoor Temperature: 10°C
 Humidity: 65%

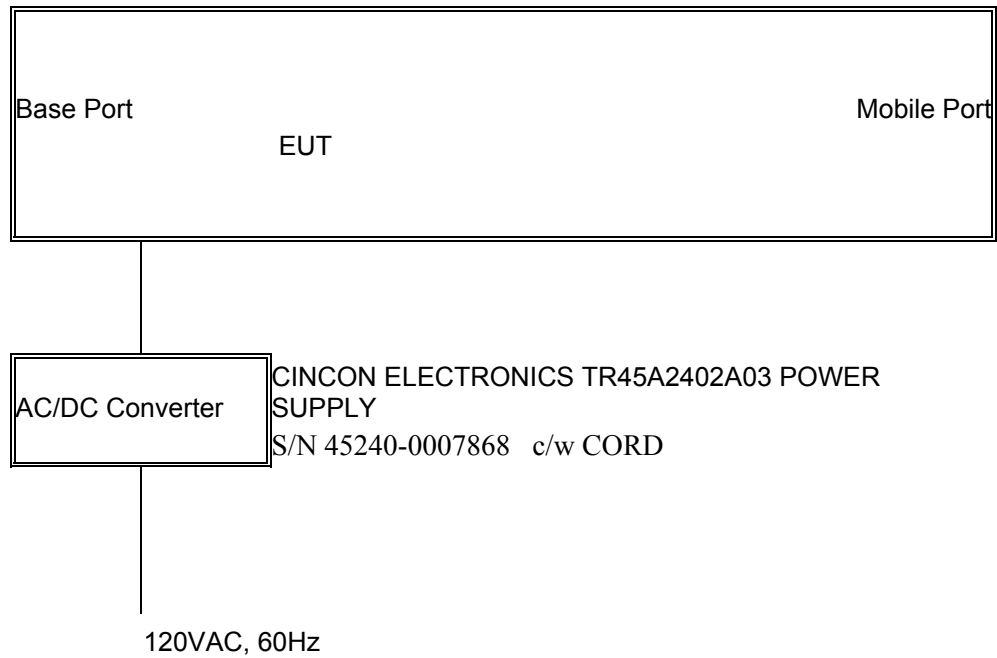
EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A

Section 2. General Equipment Specification

Manufacturer:	G-Wave Inc.
Model No.:	BDA-SMR-.5/2W-70-A
Serial No.:	04021001
Date Received In Laboratory:	15 Mar. 2004
Nemko Identification No.:	1
Supply Voltage:	120VAC, 60Hz
Frequency Range:	Uplink: 806 – 821MHz Downlink: 851 – 866MHz
RF Output Power (Rated)	Uplink: 18.0 Downlink: 27.0
RF Output Power (measured)	Uplink: 18.0 dBm Downlink: 27.0 dBm
Emission Designator:	F2D, D7W

EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A

Block Diagram



EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A

Section 3. RF Power Output

Para. No.: 2.1046

Test Performed By: Kevin Carr	Date of Test: 16 Mar. 2004
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Minimum Standard: Para. No. 90.205(a).

Test Results: Complies

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

	Measured (dBm)	Rated (dBm)	Delta (dBm)
Uplink			
QAM	17.9	18.0	0.1
2FSK	18.0	18.0	0.0
4FSK	18.0	18.0	0.0
Downlink			
QAM	27.0	27.0	0.0
2FSK	27.0	27.0	0.0
4FSK	27.0	27.0	0.0

EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A

Section 4. Occupied Bandwidth

Para. No.: 2.1049

Test Performed By: Kevin Carr	Date of Test: 17 Mar. 2004
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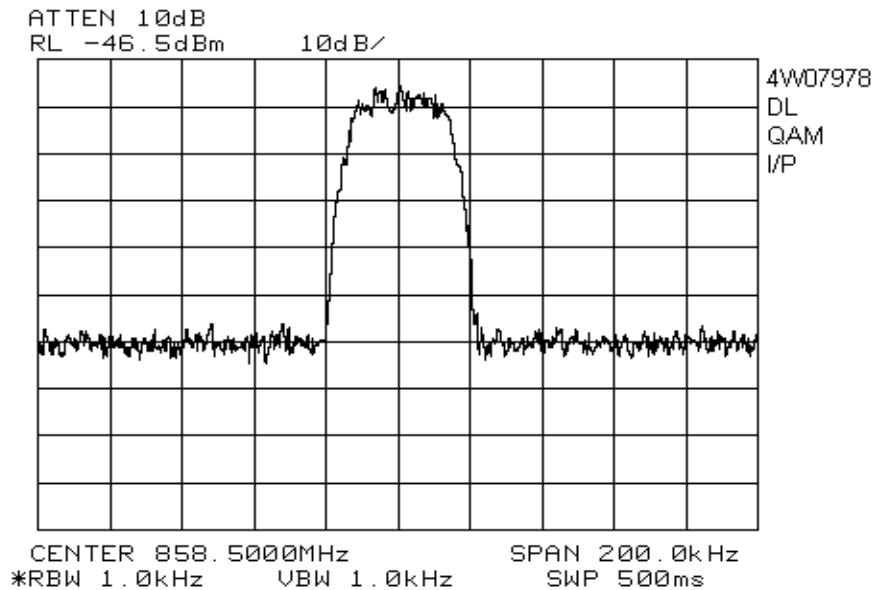
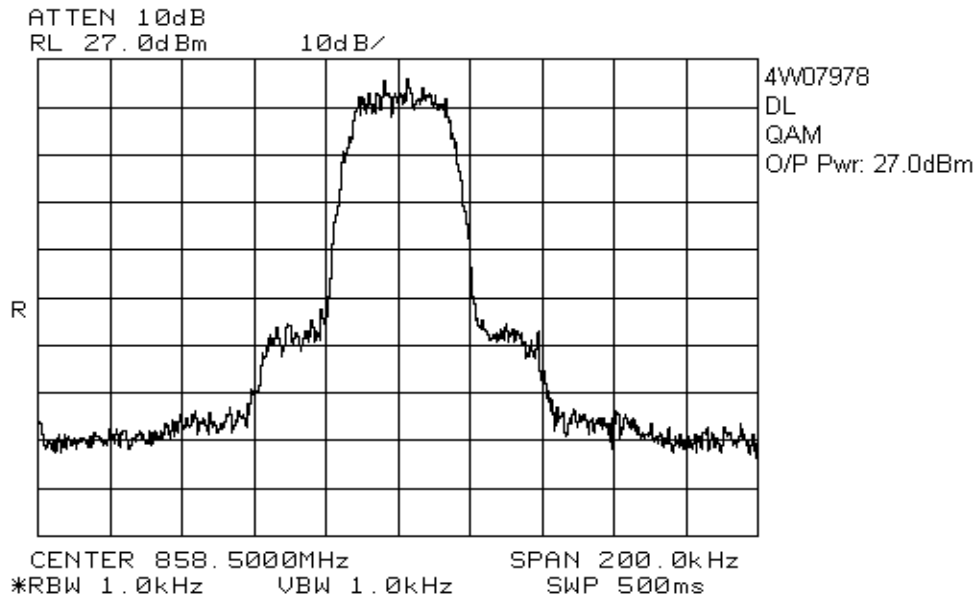
Minimum Standard: Para. No. 90.210

Test Results: Complies

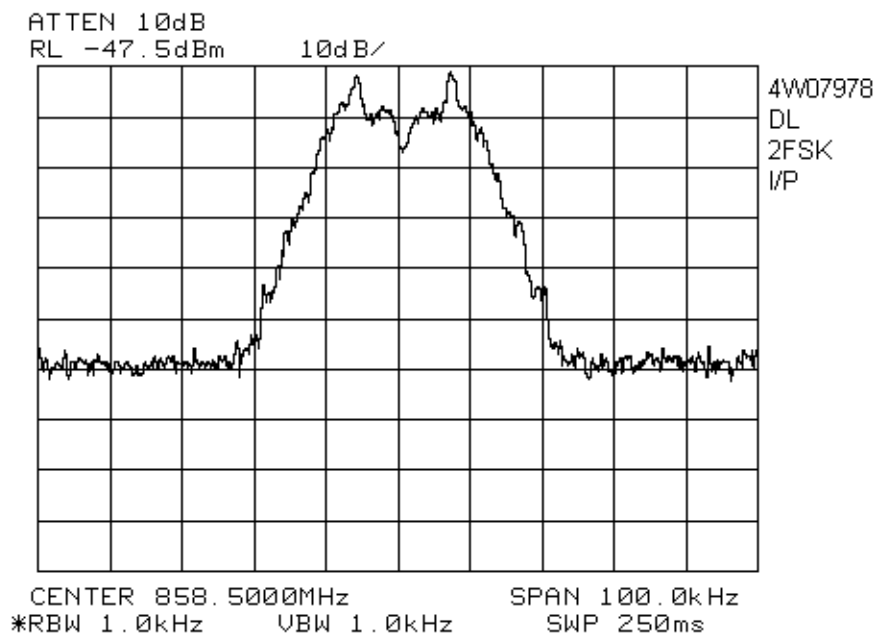
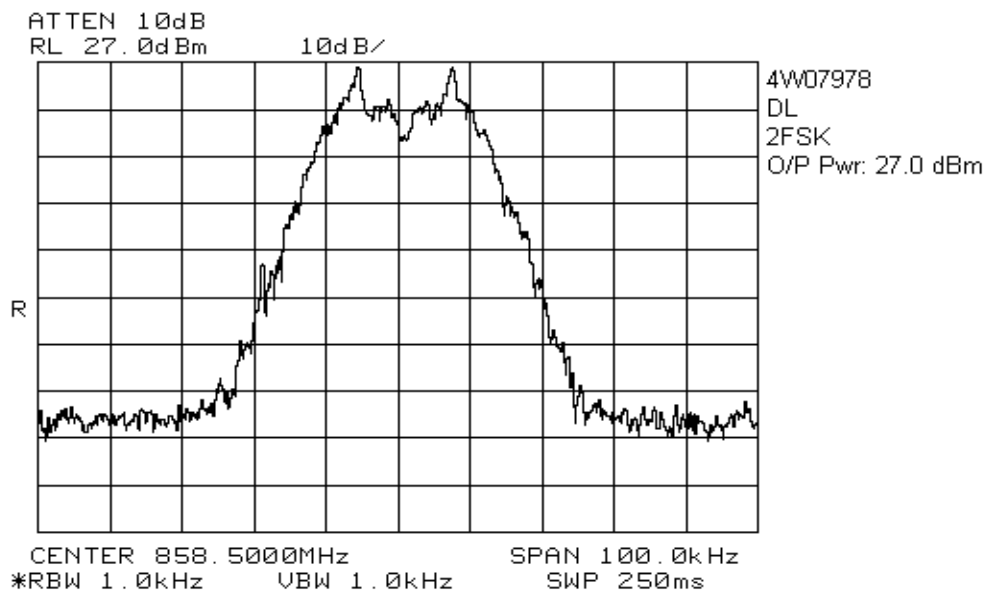
Measurement Data: See attached graph(s). The occupied bandwidth was measured by comparison of input to the output signal. This was done in order to determine if there was any degradation to the output signal due to the amplification through the repeater.

EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
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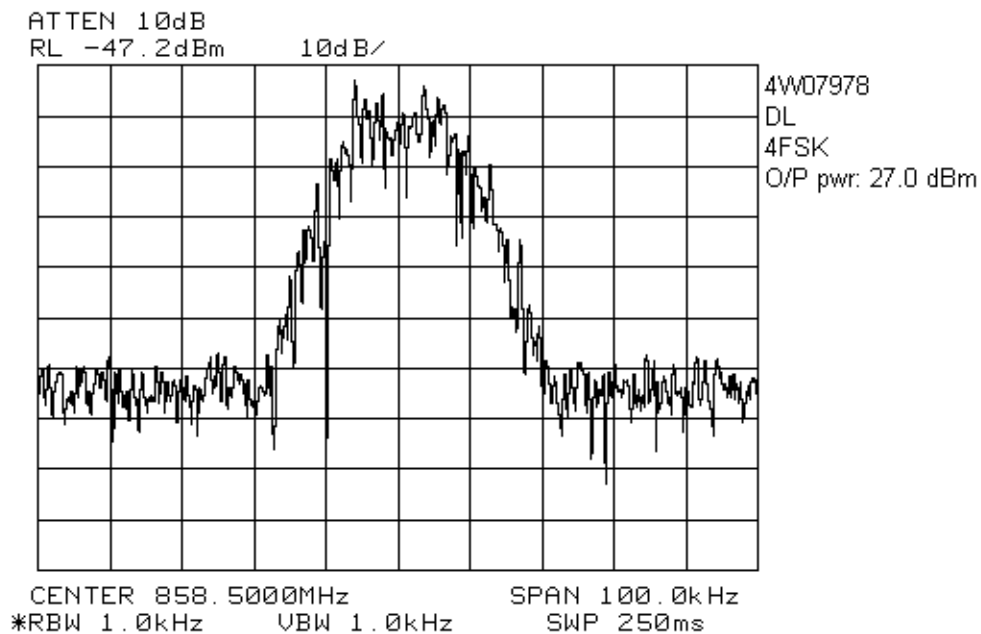
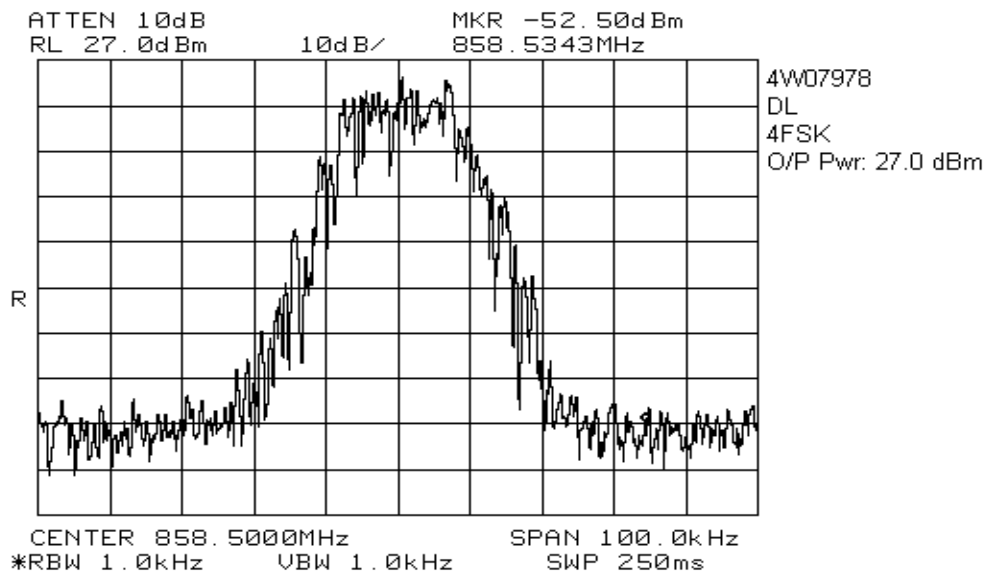
DL



EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A

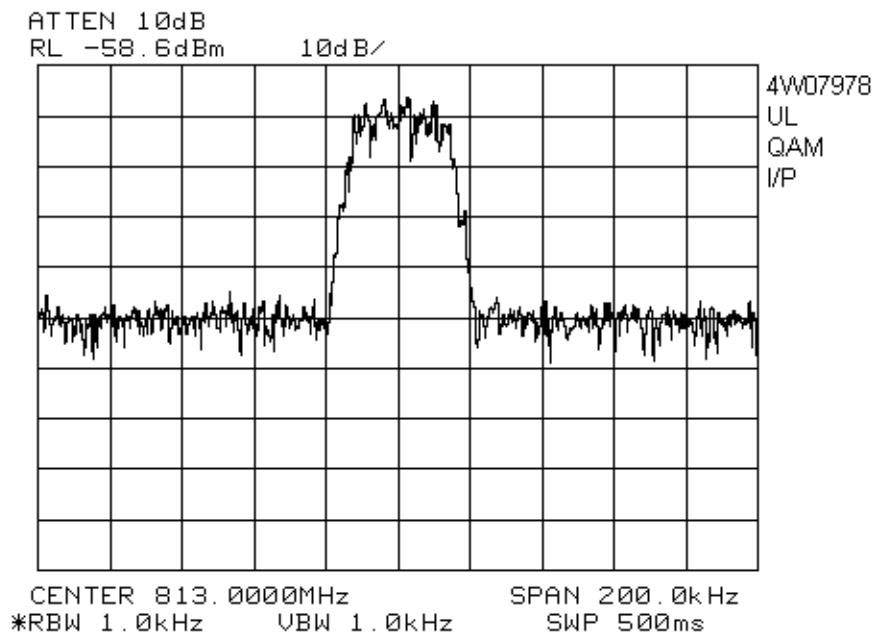
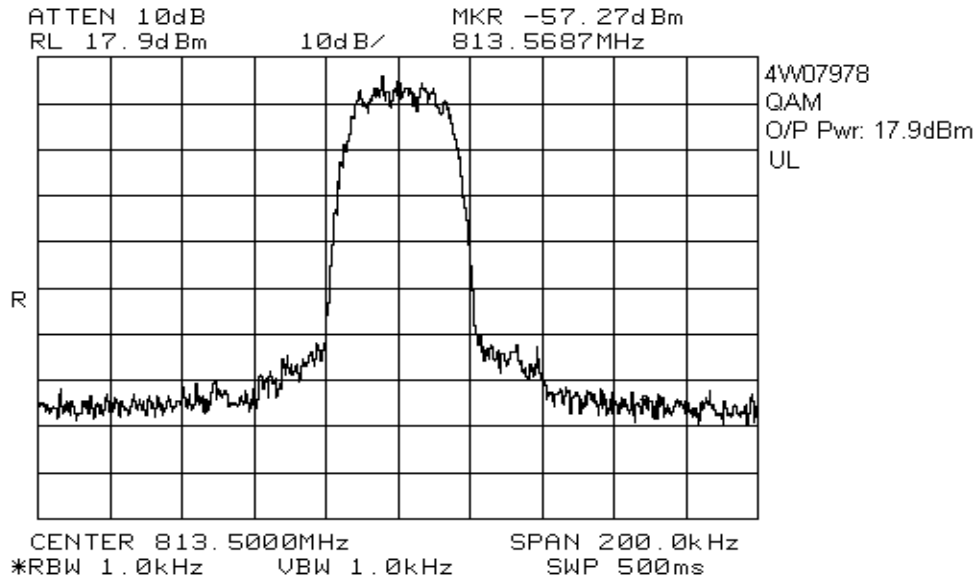


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FCC ID: Q8KSMR2W70A

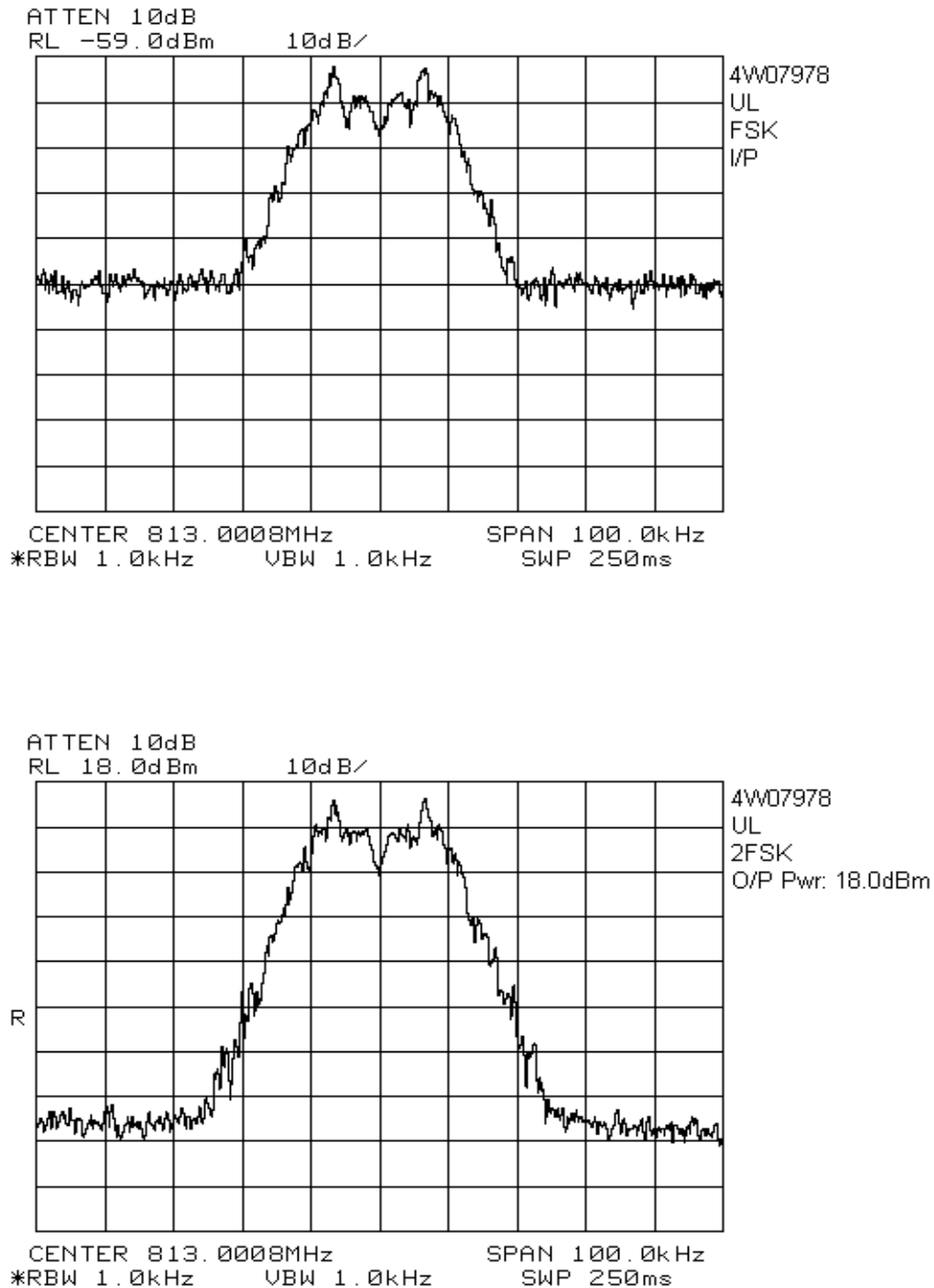


EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A

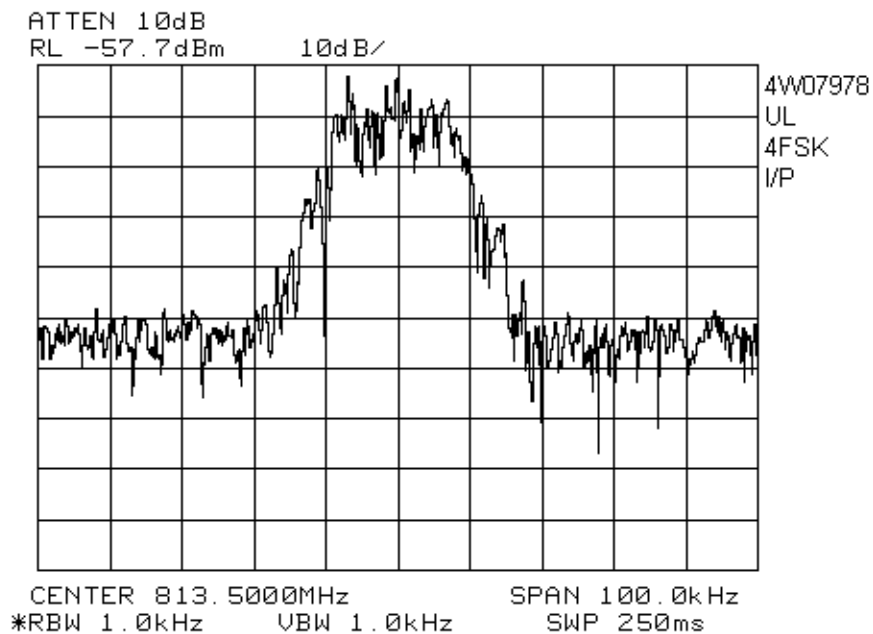
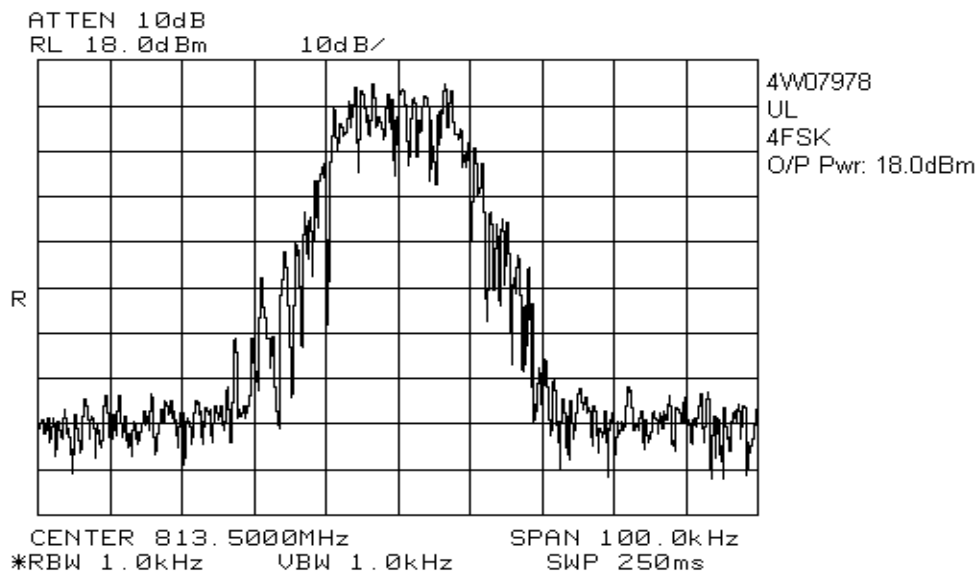
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EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A



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EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A

Section 5. Spurious Emissions at Antenna Terminals

Para. No.: 2.1051

Test Performed By: Kevin Carr	Date of Test: 17 Mar. 04
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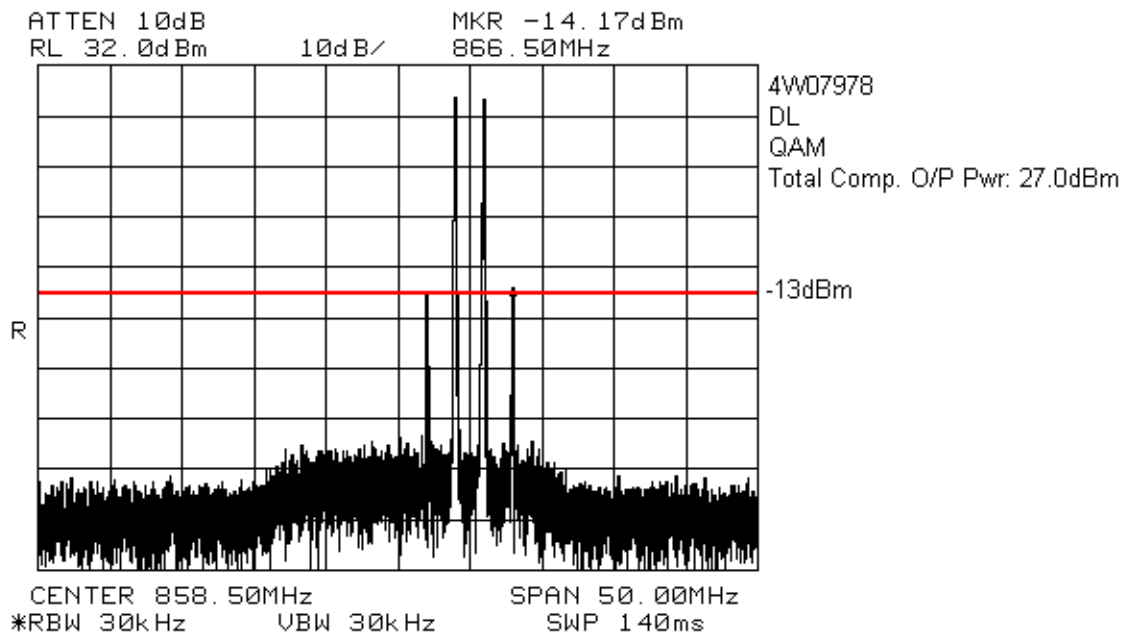
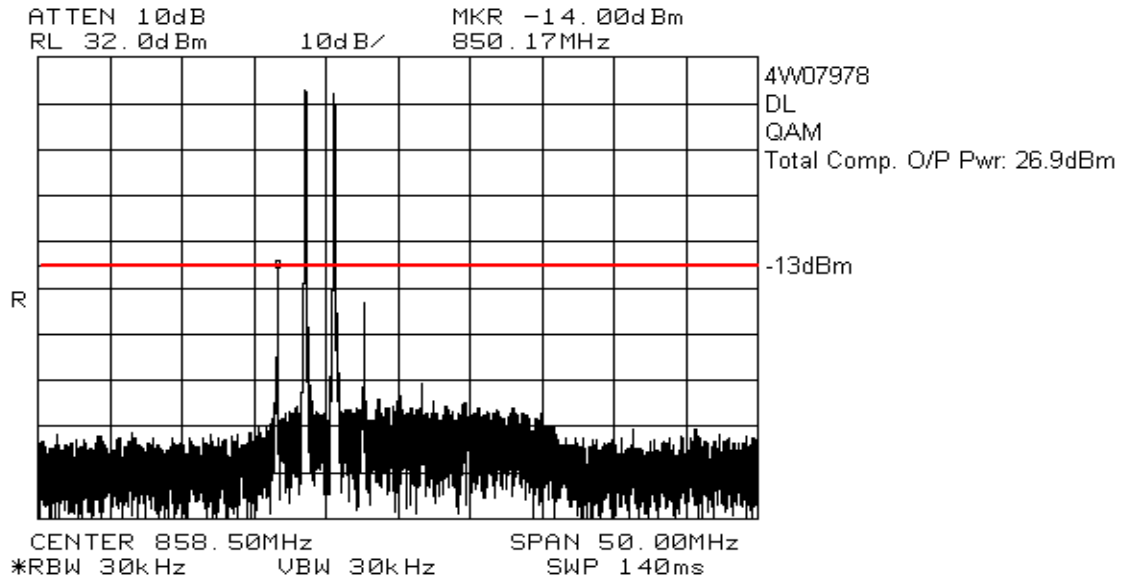
Minimum Standard: -13dBm

Test Results: Complies

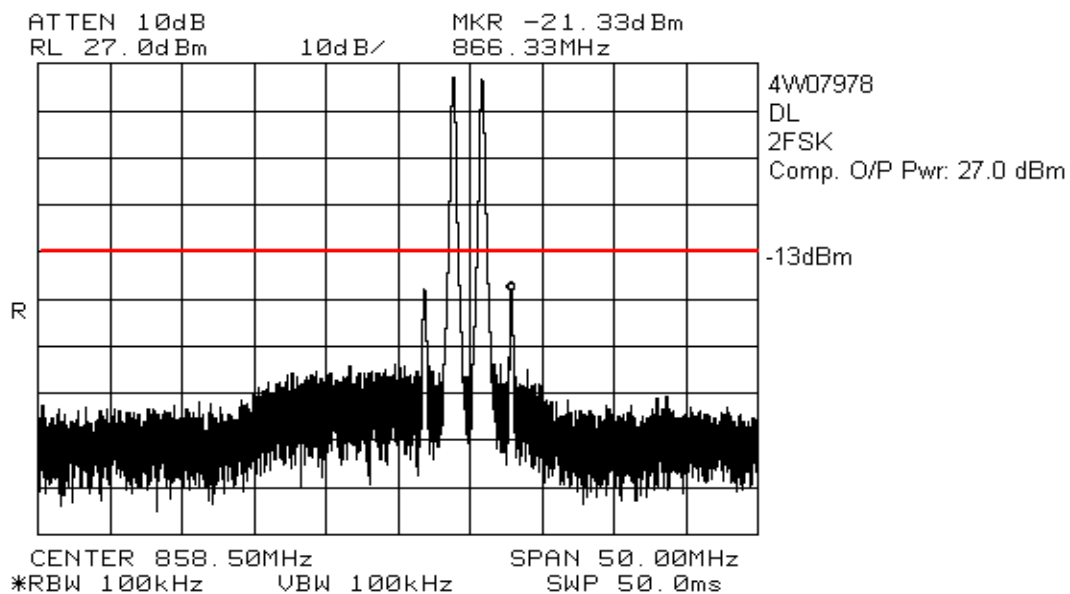
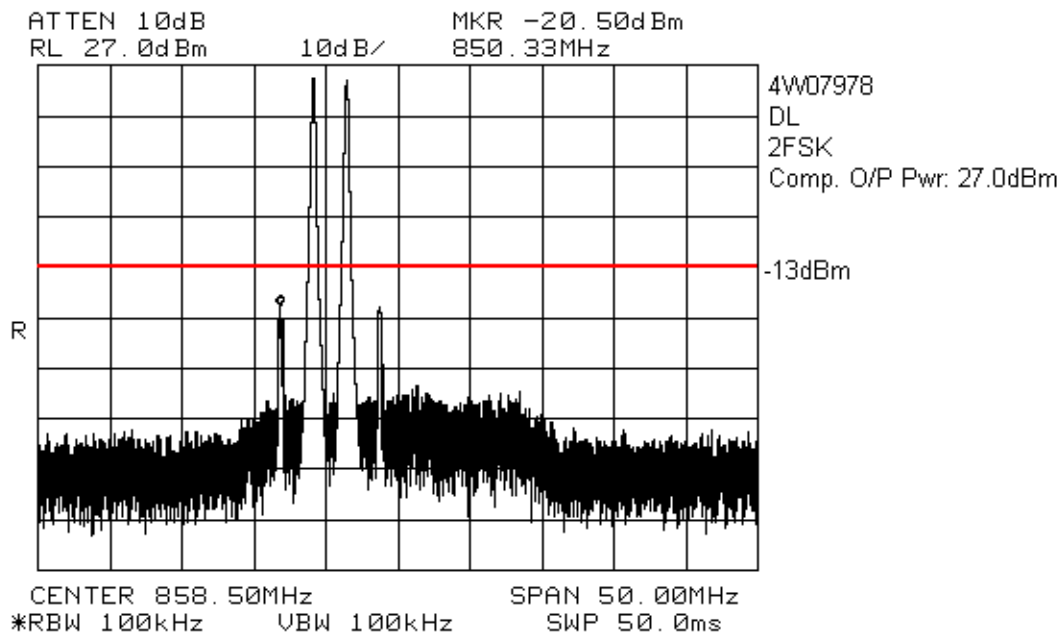
Measurement Data: See attached graph(s).

EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A

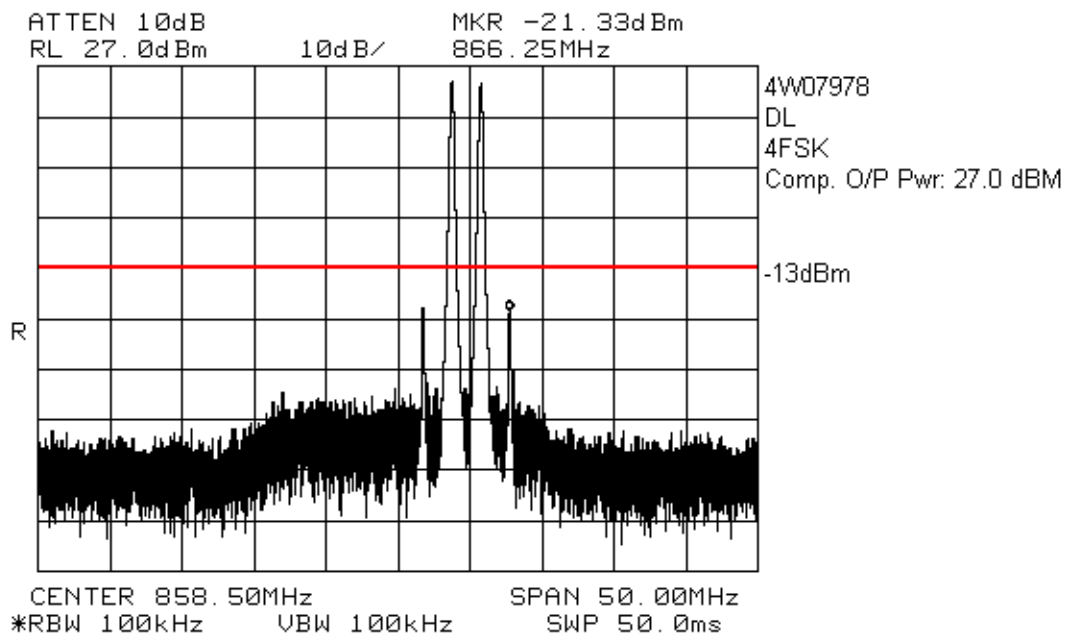
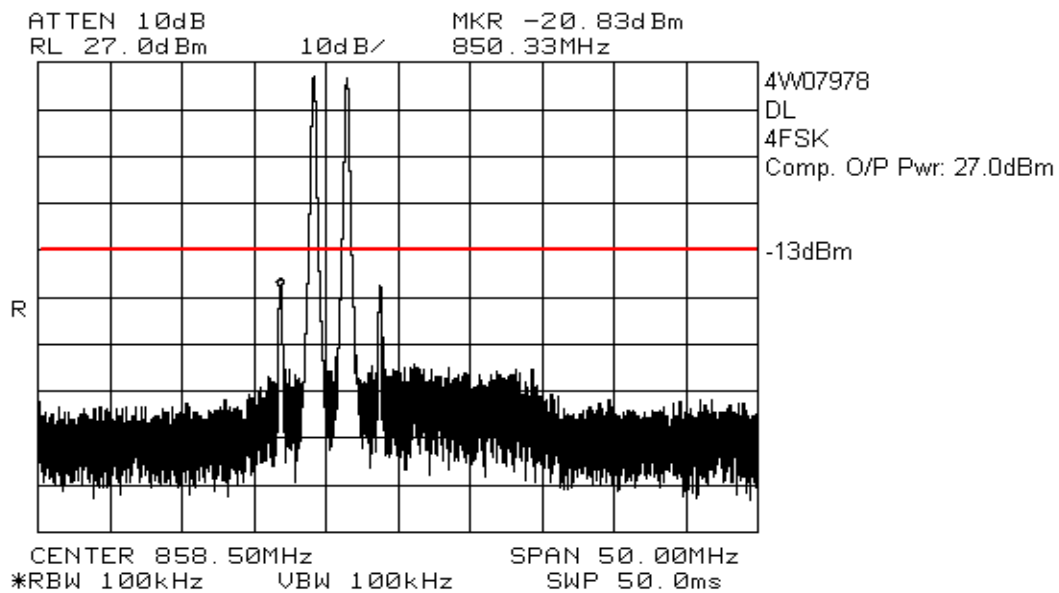
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EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A

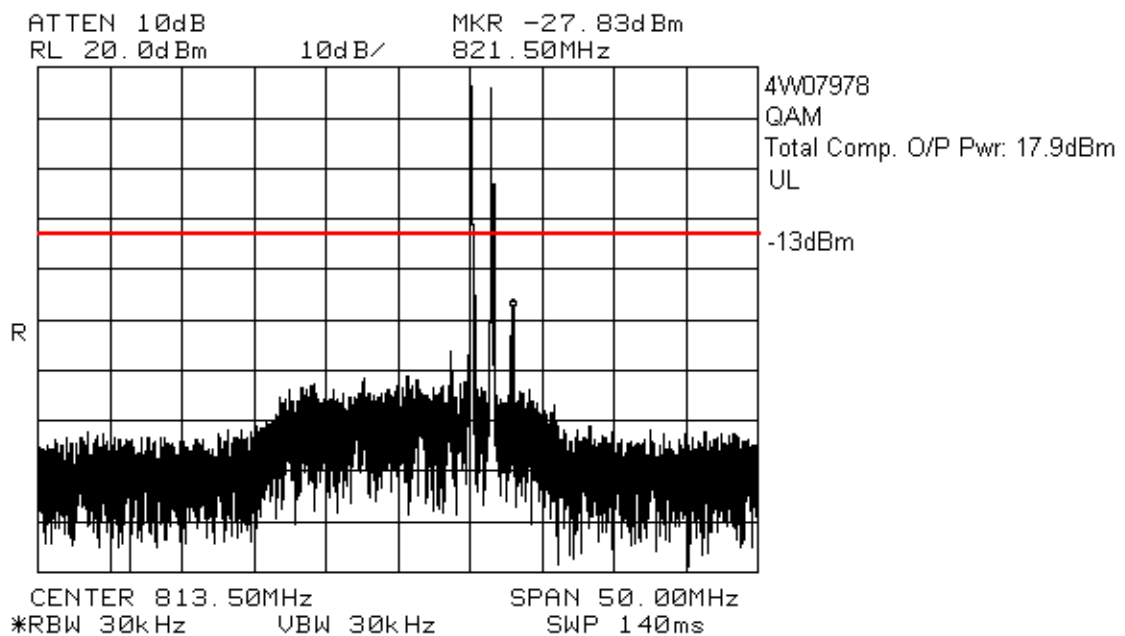
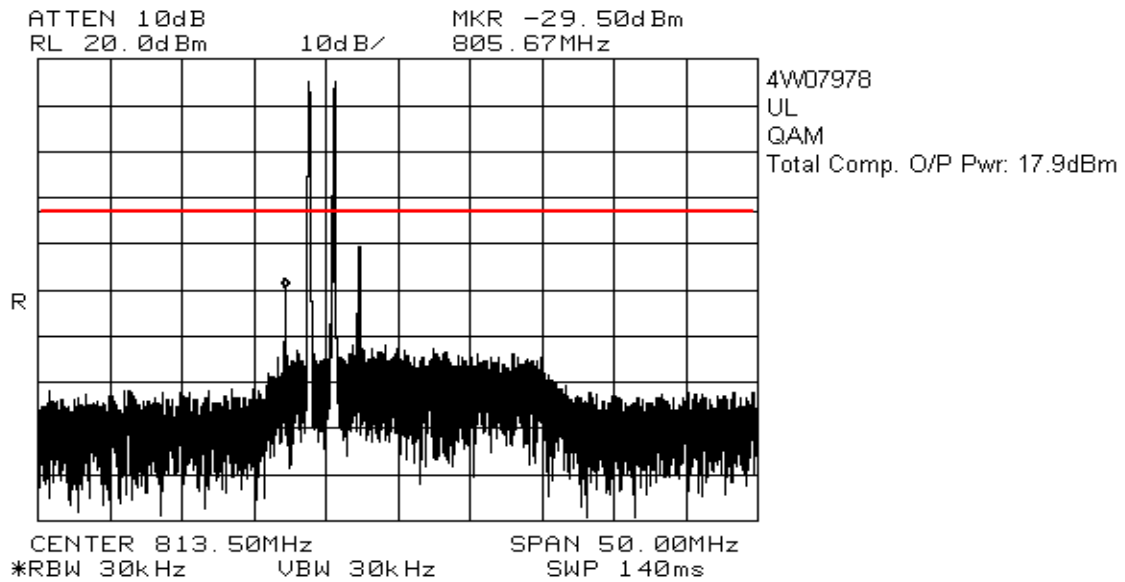


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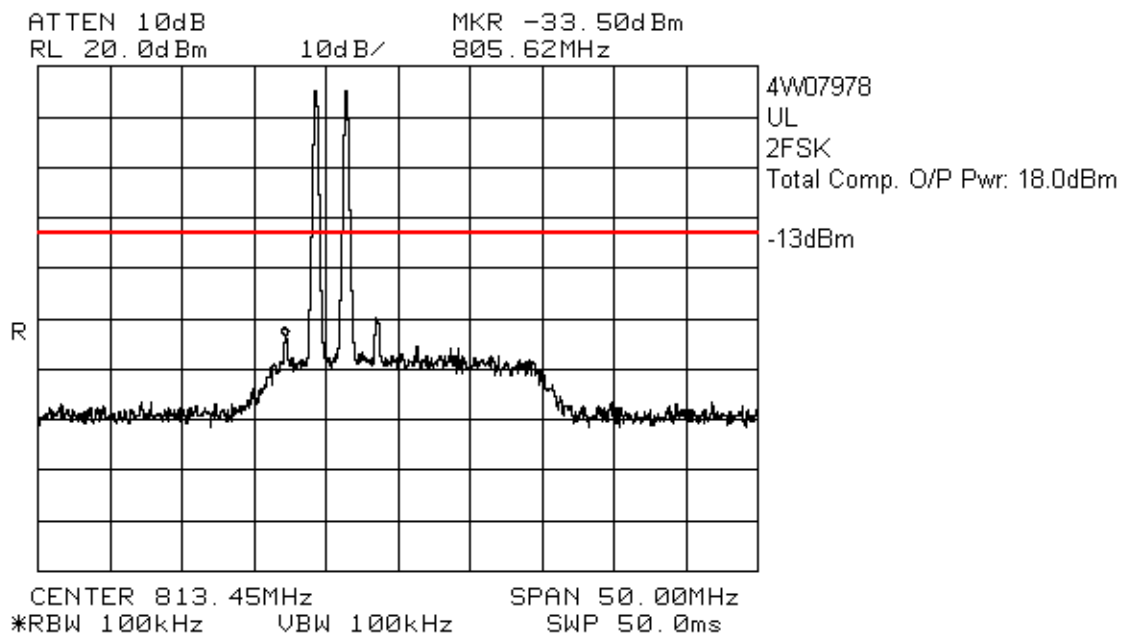
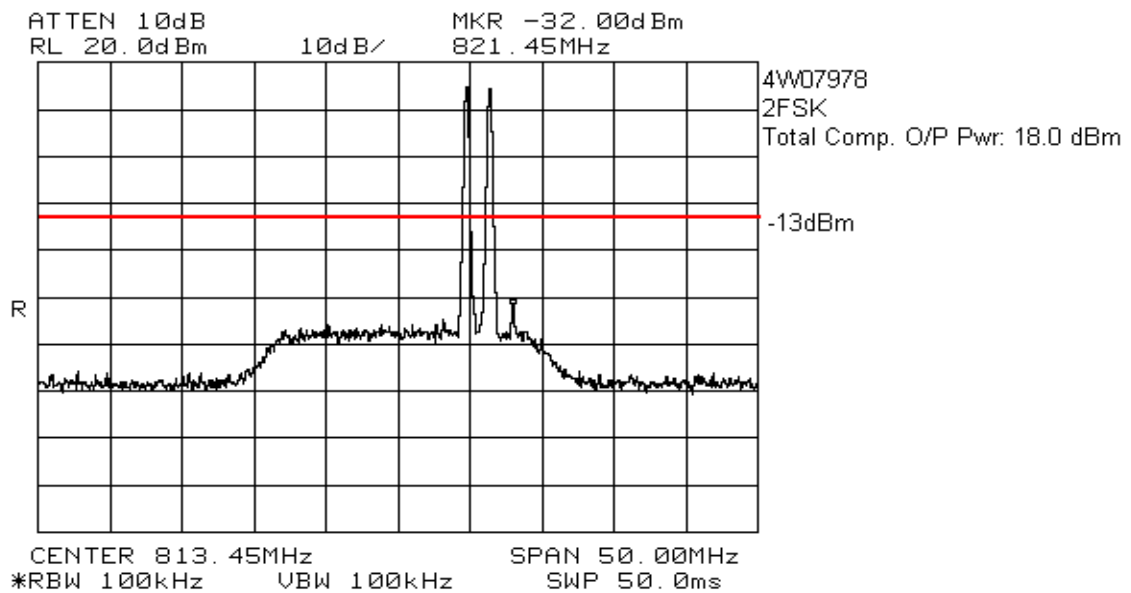


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FCC ID: Q8KSMR2W70A

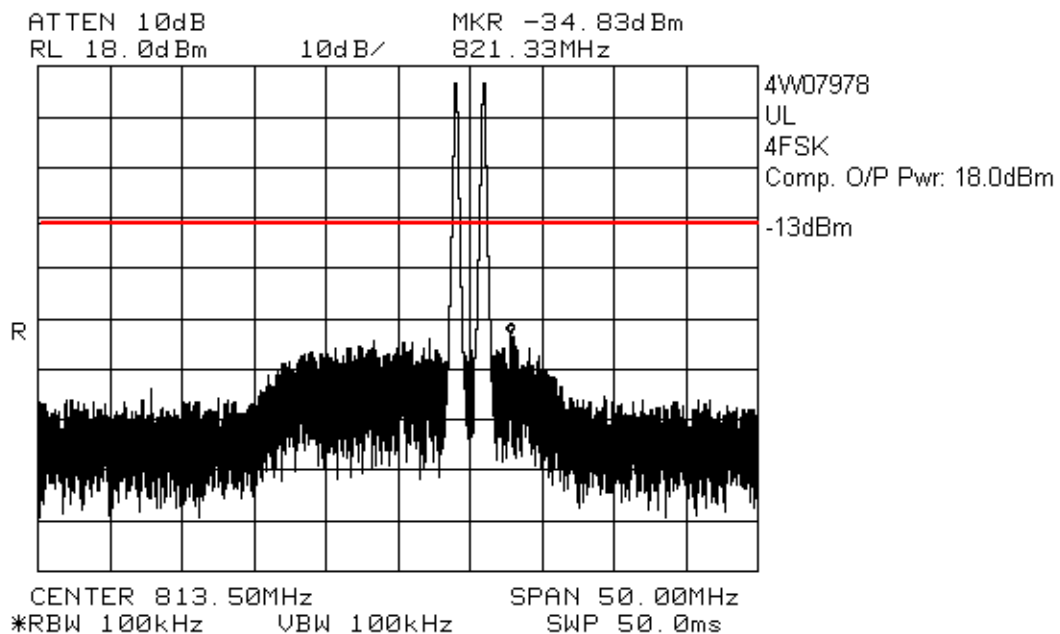
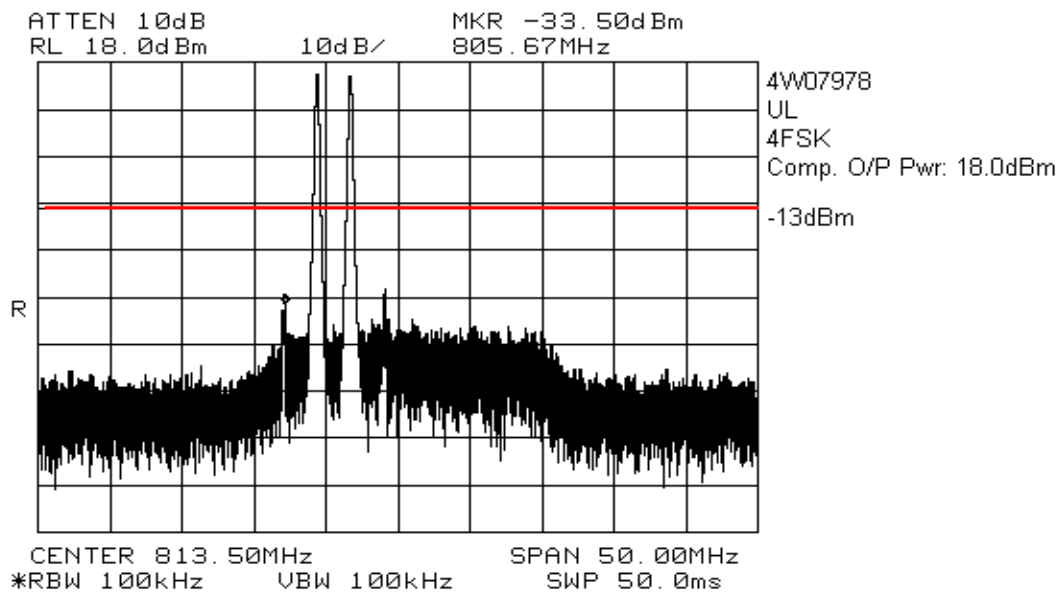
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EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A

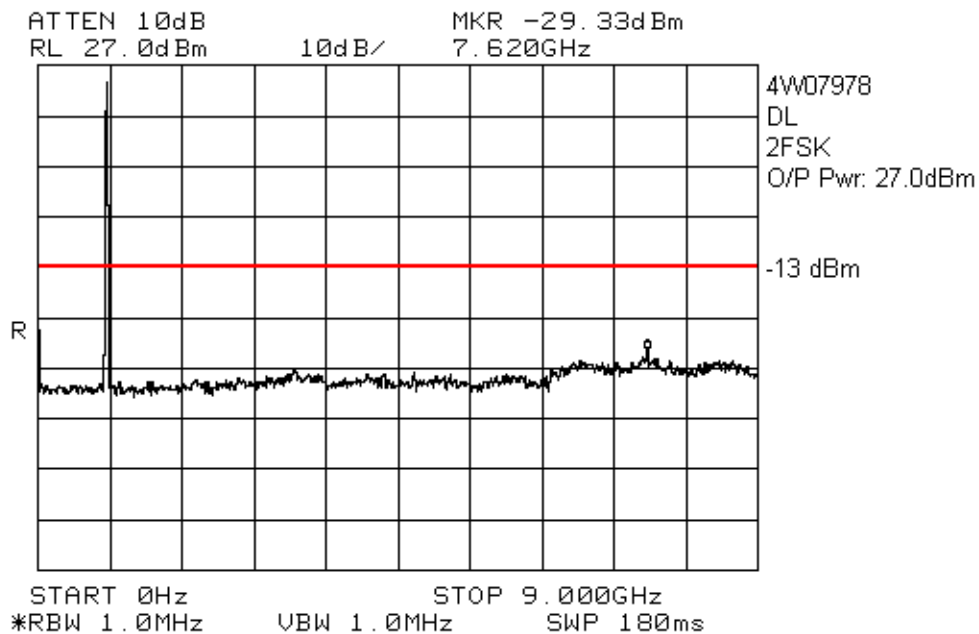
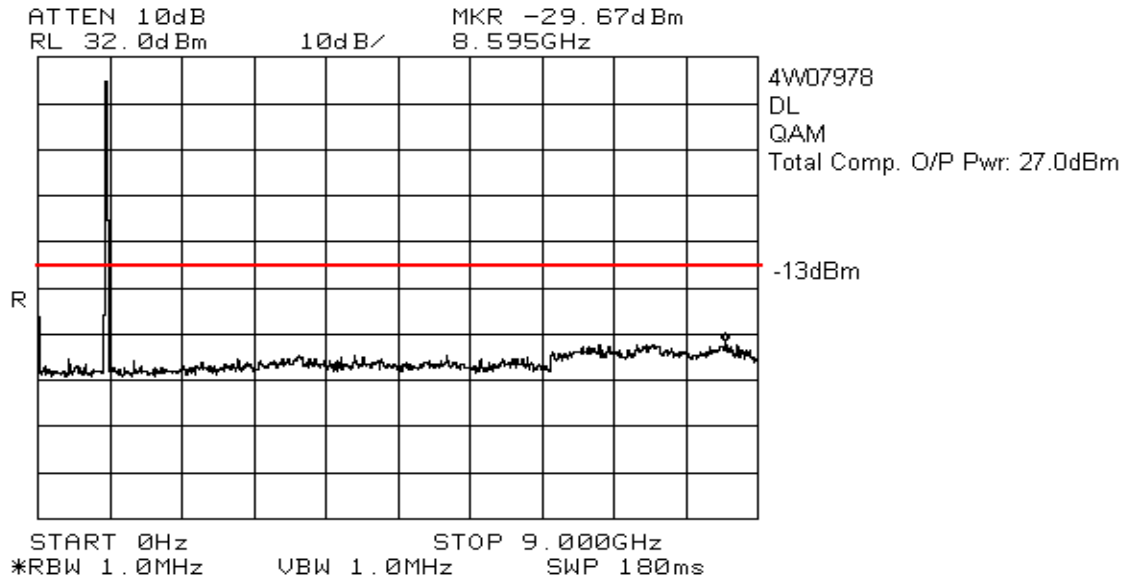


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FCC ID: Q8KSMR2W70A

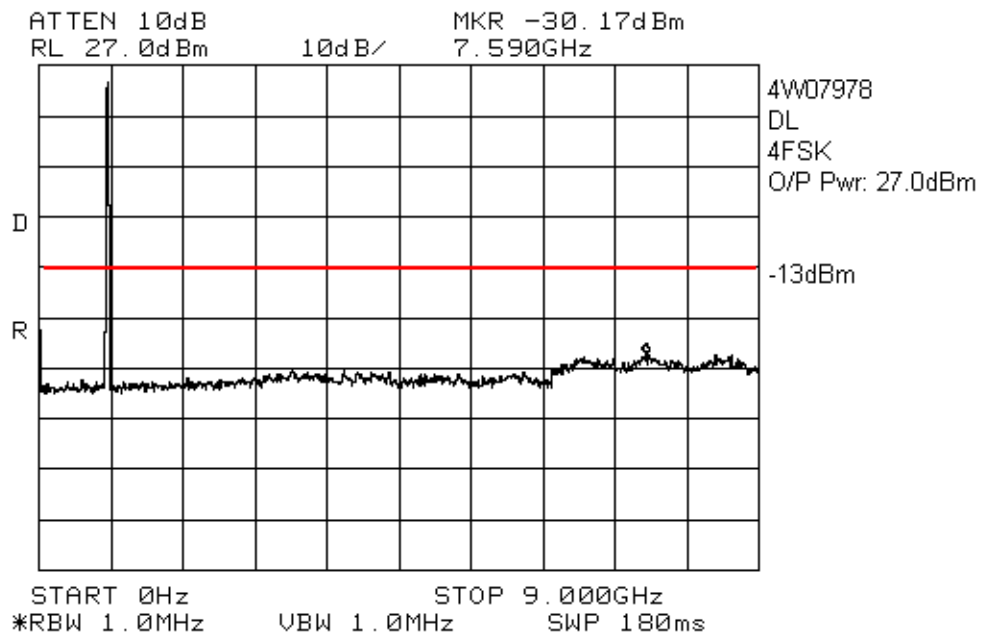


EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A

DL

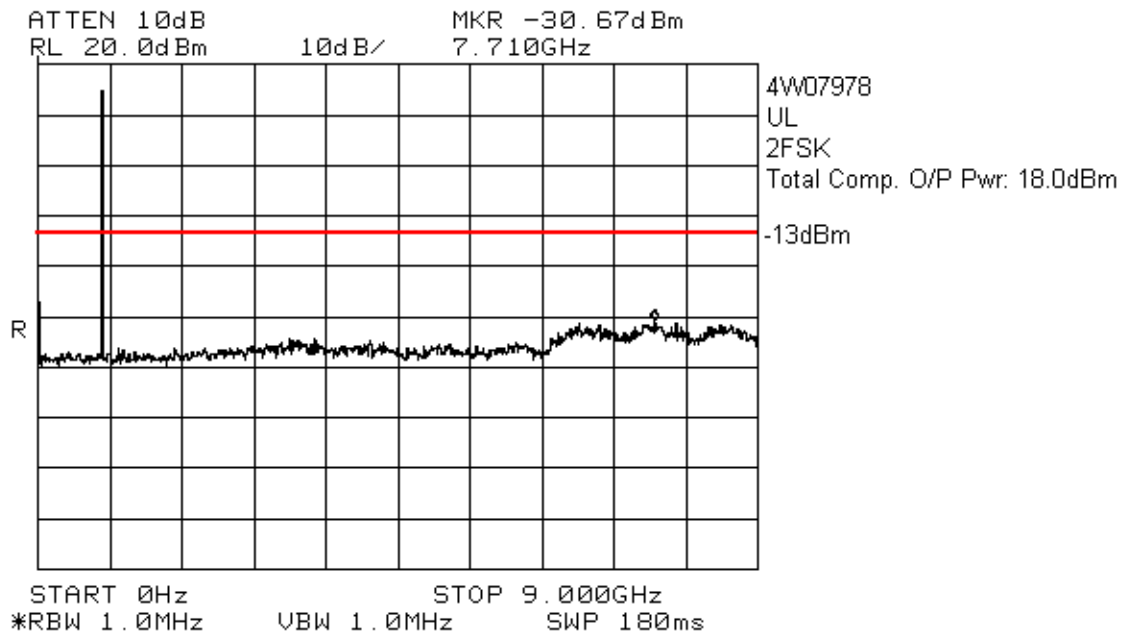
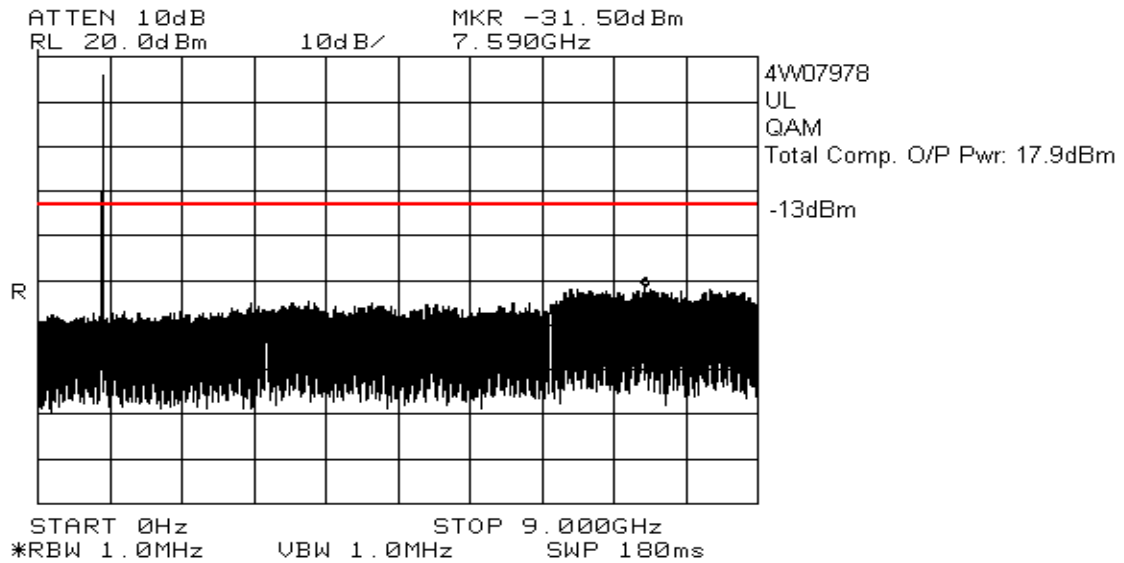


EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A

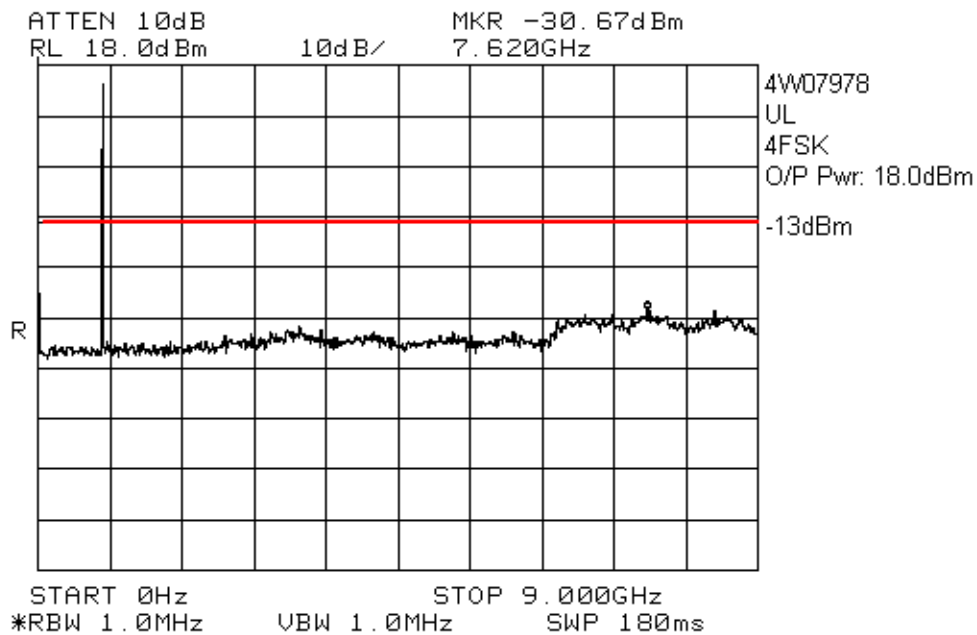


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UL



EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A



EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A

Section 6. Field Strength of Spurious Emissions

Para. No.: 2.1053

Test Performed By: Kevin Carr	Date of Test: 6 April 04
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Minimum Standard: Para. No. 90.210

Test Results: Complies

Measurement Data: See attached graph(s). The spectrum was searched to the 10th Harmonic of the fundamental. No Emissions were detected

EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A

Radiated Disturbance Test Data:

Uplink

Test Date: 6 April 2004								
Engineer's Name: Kevin Carr								
Temperature (C°):Outdoor: 10					Humidity %: Outdoor: 65			
Tested as per (Table Top/Floor Standing): Table Top								
Test Distance (meters): 3					Range: 1			
Freq. (MHz)	Ant.	Pol. V/H	RCVD Signal (dBμV)	Sig Sub. Factor (dB)	Signal Substitution Power (dBm)	Limit (dBm)	Margin (dB)	Detector
1627.0000	Horn2	V	50.2	-118.2	-68.0	-13.0	55.0	Peak
1627.0000	Horn2	H	50.3	-119.0	-68.7	-13.0	55.7	Peak
2440.5000	Horn2	V	60.3	-124.2	-63.9	-13.0	50.9	Peak
2440.5000	Horn2	H	63.0	-125.5	-62.5	-13.0	49.5	Peak
3254.0000	Horn2	V	56.0	-118.9	-62.9	-13.0	49.9	Peak
3254.0000	Horn2	H	56.5	-120.8	-64.3	-13.0	51.3	Peak
4067.5000	Horn2	V	50.2	-112.8	-62.6	-13.0	49.6	Peak
4067.5000	Horn2	H	52.2	-114.0	-61.8	-13.0	48.8	Peak
4881.0000	Horn2	V	54.2	-112.2	-58.0	-13.0	45.0	Peak
4881.0000	Horn2	H	54.7	-112.3	-57.6	-13.0	44.6	Peak
5694.5000	Horn2	V	54.3	-109.4	-55.1	-13.0	42.1	Peak
5694.5000	Horn2	H	55.7	-107.0	-51.3	-13.0	38.3	Peak
6508.0000	Horn2	V	56.7	-108.2	-51.5	-13.0	38.5	Peak
6508.0000	Horn2	H	56.8	-107.6	-50.8	-13.0	37.8	Peak
7321.5000	Horn2	V	57.5	-104.8	-47.3	-13.0	34.3	Peak
7321.5000	Horn2	H	59.0	-104.8	-45.8	-13.0	32.8	Peak
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								

EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A

Downlink

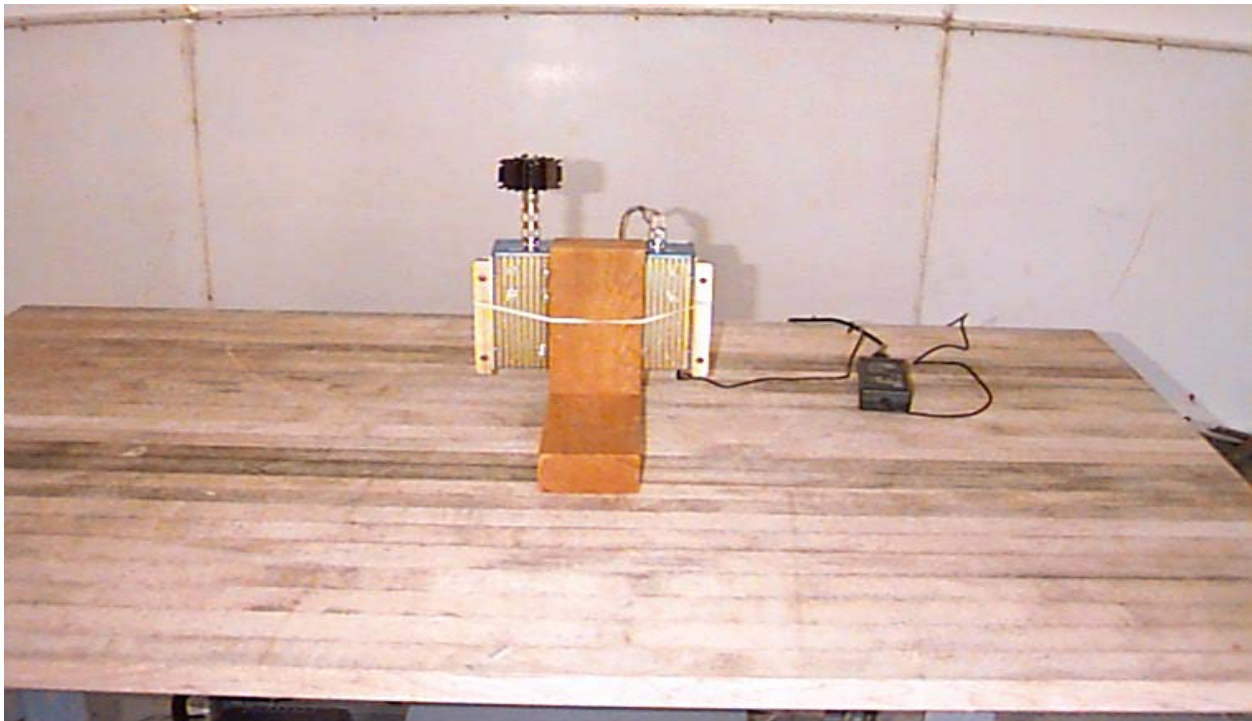
Test Date: 6 April 2004								
Engineer's Name: Kevin Carr								
Temperature (C°):Outdoor: 10					Humidity %: Outdoor: 65			
Tested as per (Table Top/Floor Standing): Table Top								
Test Distance (meters): 3					Range: 1			
Freq. (MHz)	Ant.	Pol. V/H	RCVD Signal (dBμV)	Sig Sub. Factor (dB)	Signal Substitution Power (dBm)	Limit (dBm)	Margin (dB)	Detector
1717.0000	Horn2	V	60.0	-117.9	-57.9	-13.0	44.9	Peak
1717.0000	Horn2	H	61.2	-118.0	-56.8	-13.0	43.8	Peak
2575.5000	Horn2	V	61.0	-123.9	-62.9	-13.0	49.9	Peak
2575.5000	Horn2	H	61.8	-124.9	-63.1	-13.0	50.1	Peak
3434.0000	Horn2	V	57.0	-118.8	-61.8	-13.0	48.8	Peak
3434.0000	Horn2	H	55.6	-120.7	-65.1	-13.0	52.1	Peak
4292.5000	Horn2	V	51.0	-112.9	-61.9	-13.0	48.9	Peak
4292.5000	Horn2	H	53.0	-114.2	-61.2	-13.0	48.2	Peak
5151.0000	Horn2	V	51.2	-110.6	-59.4	-13.0	46.4	Peak
5151.0000	Horn2	H	52.0	-109.5	-57.5	-13.0	44.5	Peak
6009.5000	Horn2	V	54.2	-109.3	-55.1	-13.0	42.1	Peak
6009.5000	Horn2	H	54.0	-107.5	-53.5	-13.0	40.5	Peak
6868.0000	Horn2	V	53.0	-106.9	-53.9	-13.0	40.9	Peak
6868.0000	Horn2	H	53.3	-107.3	-54.0	-13.0	41.0	Peak
7726.5000	Horn2	V	53.4	-104.3	-50.9	-13.0	37.9	Peak
7726.5000	Horn2	H	53.8	-105.4	-51.6	-13.0	38.6	Peak
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								

EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A

Set-Up Photo's



Rear



EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A

Section 7. 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	60583	FA001579	COU	COU
COU	Isolator	Narda	60583	FA001580	COU	COU
COU	Attn	Weinschel Corp.	47-10-34	FA001740	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

Nemko Canada Inc.

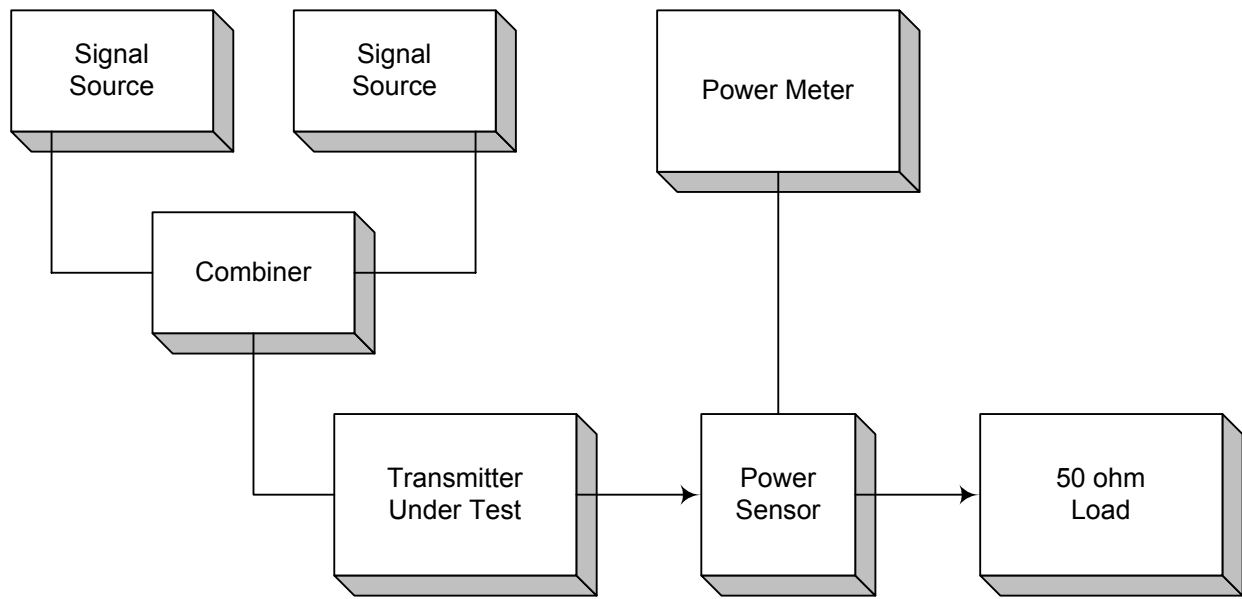
FCC PART 90, SUBPART I
PRIVATE LAND MOBILE REPEATER
PROJECT NO.: 4W07978
ANNEX A

EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A

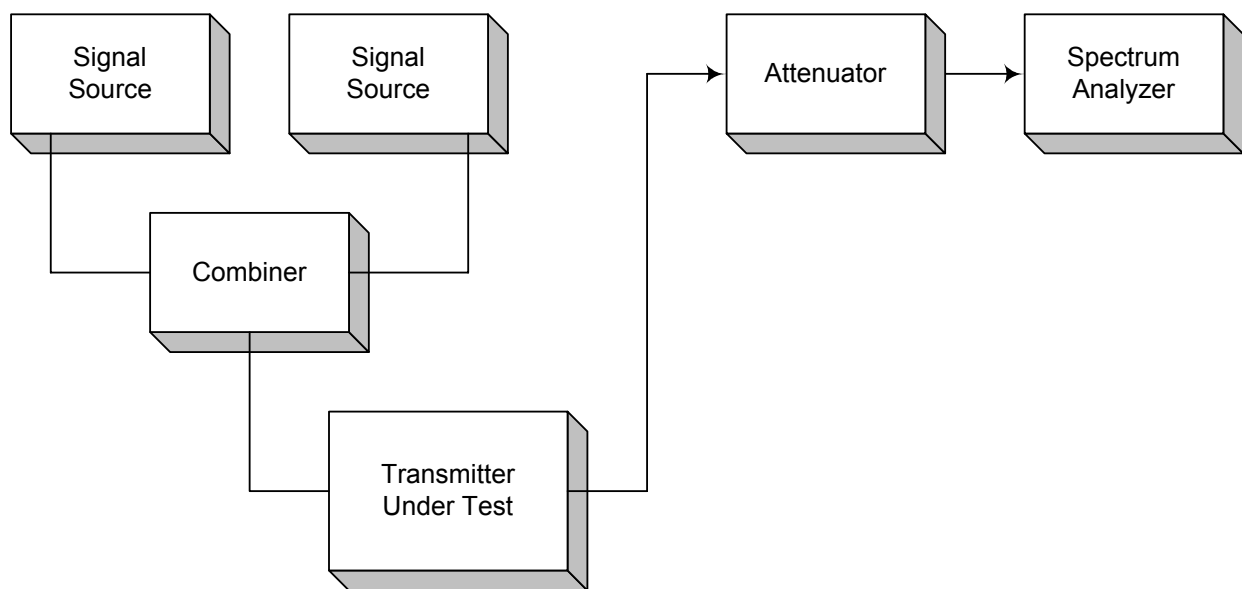
Annex A
Test Diagrams

EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A

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

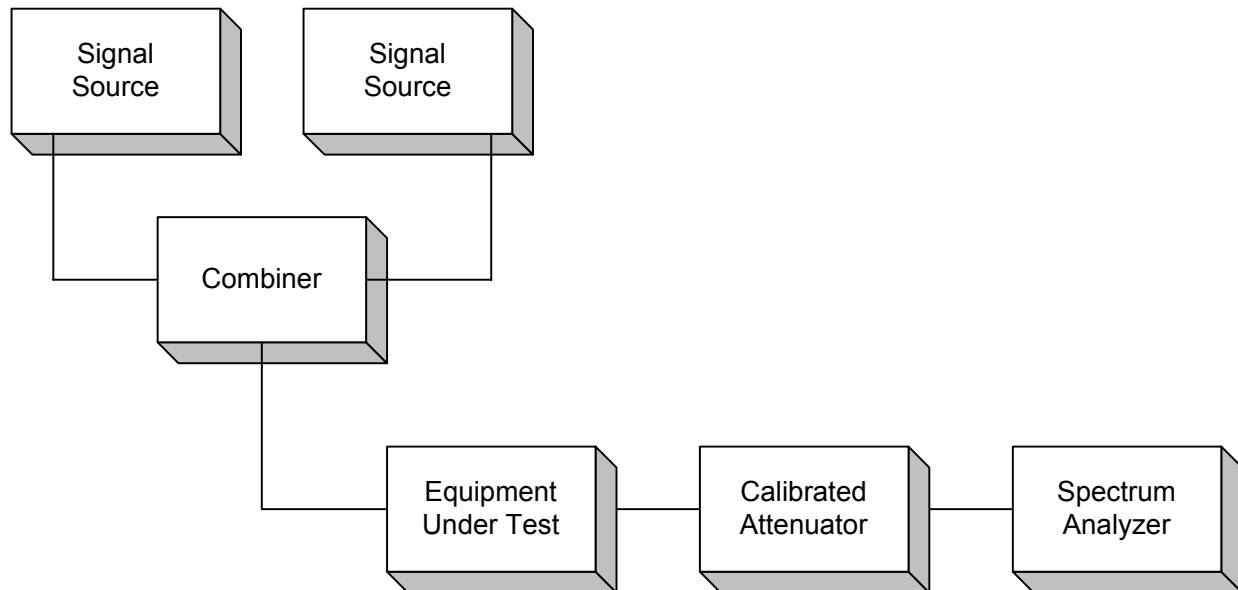


Para. No. 2.1049 - Occupied Bandwidth



EQUIPMENT: BDA-SMR-.5/2W-70-A, Mini Bi-Directional Amplifier
FCC ID: Q8KSMR2W70A

Para. No. 2.1051 - Spurious Emissions at Antenna Terminals



Para. No. 2.1053 - Field Strength of Spurious Radiation

