

KTL Test Report: 0L0265RUS1

Applicant: Communication Components, Inc.
299 Forest Ave.
Paramus, NJ 07652

**Equipment Under Test:
(E.U.T.)** BDA-8087-52

FCC ID. No.: NT3BDA8087

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

Tested By: KTL Dallas Inc.
802 N. Kealy
Lewisville, TX 75057-3136

Authorized By:



John J. Fildes, Wireless Group Manager

Date: 11/28/00

Total Number of Pages: 47

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EQUIPMENT: BDA-8087-52

PROJECT NO.: 0L0265RUS1

Section 1. Summary of Test Results

Manufacturer: Communication Components, Inc.

Model No.: BDA-8087-52

Serial No.: 0052

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

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".

**NVLAP LAB CODE: 100351-0**

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EQUIPMENT: **BDA-8087-52**PROJECT NO.: **0L0265RUS1**

Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	MEAS.	RESULT
RF Power Output	90.205	500 Watts	-1.3 dBrated	Complies
Audio Frequency Response	TIA EIA-603.3.2.6	N/A	N/A	N/A
Audio Low-Pass Filter Response	TIA EIA-603.3.2.6	N/A	N/A	N/A
Modulation Limiting	TIA EIA-603.3.2.6	N/A	N/A	N/A
Occupied Bandwidth	90.210	Plots	Plots	Complies
Spurious Emissions at Antenna Terminals	90.210	Plots	Plots	Complies
Field Strength of Spurious Emissions	90.210	-13 dBm eirp	-23.4 dBm eirp	Complies
Frequency Stability	90.213	N/A	N/A	N/A
Transient Frequency Behavior	90.214	N/A	N/A	N/A

Footnotes For N/A's:

- (1) Since the E.U.T. does not contain modulation circuitry modulation testing was not performed.
 - (2) Since the E.U.T. only amplifies the signal it receives, Frequency Stability was not tested.
 - (3) Since the E.U.T. is not a keyed carrier system, Transient Frequency Behavior was not performed.
- .

EQUIPMENT: BDA-8087-52

PROJECT NO.: 0L0265RUS1

Section 2. General Equipment Specification**Transmitter**

Supply Voltage Input: 115 VAC

Frequency Range: 801-821 MHz Uplink / 851-866 MHz Downlink
896-901 MHz Uplink/ 935-940 MHz Downlink

Tunable Bands: 1

Type(s) of Modulation:	F3E (Voice)	F1D	F2D	D7W (QAM)	Other
	☒	☐	☐	☒	☐

Gain: 64 dB

Output Impedance: 50 ohms

RF Power Output (rated):	F3E Uplink:	.460 W (+26.6 dBm)	These power levels are the rf output levels listed on the original Grant of Type Acceptance.
	D7W Uplink:	.250 W (+24.0 dBm)	
	F3E Downlink:	.380 W (+25.8 dBm)	
	D7W Downlink:	.230 W (+23.6 dBm)	

Channel Spacing(s): N/A

Operator Selection of Operating Frequency: N/A

Power Output Adjustment Capability: N/A. ALC is set upon installation and is not accessible to the user.

Frequency Translation:	F1-F1	F1-F2	N/A
	☒	☐	☐

Band Selection:	Software	Duplexer Change	Fullband Coverage
	☐	☒	☐

Description of Modifications For Class II Permissive Change

Automatic Gain Control (AGC) option was added to the uplink amplifier circuit. The amplifier was not modified in any other way. The rf power output is not altered by the modification except that the power output is limited based on the setting of the AGC threshold. The AGC threshold was set to the maximum rf output intended for operation. The rf power may be slightly lower than listed in the original approval but will never exceed the originally granted power output since the testing for the original approval was based on testing performed on the same amplifier without AGC circuit.

Modifications Made During Testing

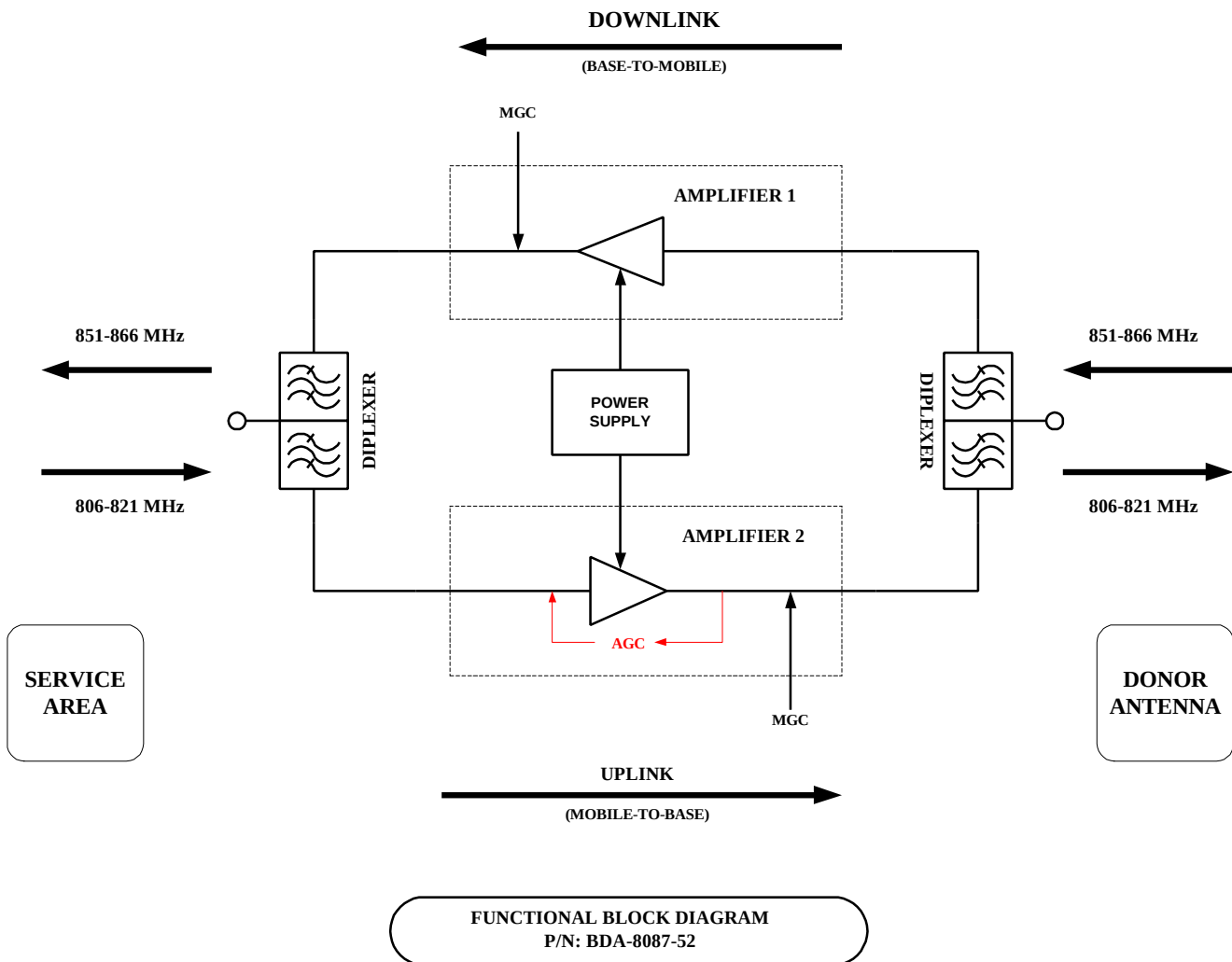
None

Description of Operation

The BDA is a Bi-directional amplifier designed to operate in the Specialized Mobile Radio (SMR) bands. It is designed to exchange radio communications in buildings, basements, tunnels, and other RF shielded environments. It improves the sensitivity of base stations in indoor locations where there is a significant amount of cable loss in RF distribution systems.

It contains two amplifiers providing amplification of RF signals in Uplink and Downlink frequency bands. They are connected to the external cables via frequency selective duplexers in order to attenuate all signals that are not in the designated bands.

System Diagram



Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 2.985
TESTED BY: David Light	DATE: 10/5/00

Test Results: [Complies.](#)

Measurement Data: **Note: The radiated output power listed in the tables below relates to the rf output power granted in the original approval and listed on the grant of certification. Testing was performed with the maximum rf input power fed to the amplifier.**

iDEN Modulation

Uplink			
Frequency (MHz)	Measured Power (dBm)	Rated Power Output (dBm)	Measured/Rated (dB)
806	21.8	+24	-2.2
813.5	22.1	+24	-1.9
821	22	+24	-2.0
Downlink			
Frequency (MHz)	Measured Power (dBm)	Rated Power (dBm)	Measured/Rated (dB)
851	22.2	23.6	-1.4
858.5	22.3	23.6	-1.3
866	21.5	23.6	-2.1

Voice Modulation

Uplink			
Frequency (MHz)	Measured Power (dBm)	Rated Power (dBm)	Measured/Rated (dB)
806	23.1	26.6	-3.5
813.5	23.6	26.6	-3.0
821	25.0	26.6	-1.6
Downlink			
Frequency (MHz)	Measured Power (dBm)	Rated Power (dBm)	Measured/Rated (dB)
851	22.6	25.8	-3.2
858.5	22.5	25.8	-3.3
866	22.3	25.8	-3.5

EQUIPMENT: **BDA-8087-52**

PROJECT NO.: **0L0265RUS1**

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.989
TESTED BY: David Light	DATE: 10/5/00

Test Results: **Complies.**

Test Data: See attached graph(s).

EQUIPMENT: **BDA-8087-52**PROJECT NO.: **0L0265RUS1****Section 4. Occupied Bandwidth - 900 MHz SMR (896-901/935-940 MHz)****Test Plot: Occupied Bandwidth**

Page 1 of 4

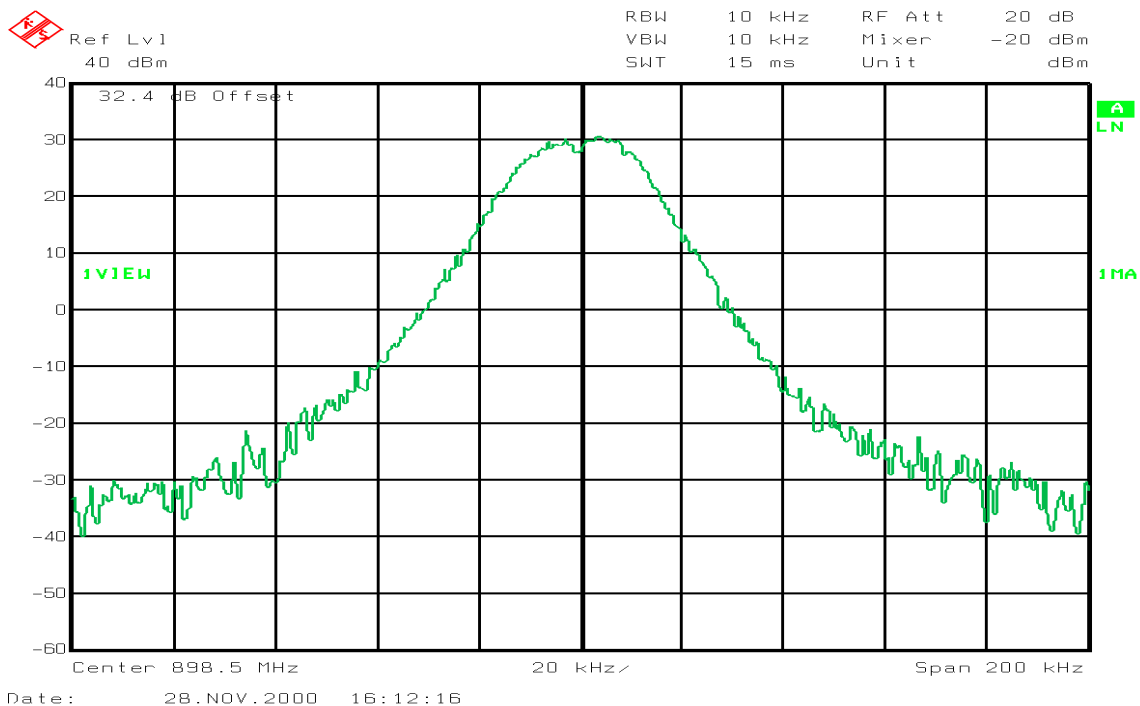
Job No.:	0L0265R	Date:	11/28/00
Specification:	PART 90	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	50
E.U.T.:	BDA-8087-52		
Configuration:	TRANSMIT iDEN MODULATION MID BAND		
Serial Number:	2851	used duplexer samples	S07 & S08
Location:	Lab 1	RBW:	10 kHz
Detector Type:	Peak	VBW:	10 kHz

Test Equipment Used

Antenna:	#N/A	Directional Coupler:	#N/A
Pre-Amp:	#N/A	Cable #1:	1081
Filter:	#N/A	Cable #2:	#N/A
Receiver:	1036	Cable #3:	#N/A
Attenuator #1:	1065	Cable #4:	#N/A
Attenuator #2:	1604	Mixer:	#N/A

Additional equipment used: _____

Measurement Uncertainty: #N/A

Notes: **OUTPUT - UPLINK**

EQUIPMENT: BDA-8087-52

PROJECT NO.: 0L0265RUS1

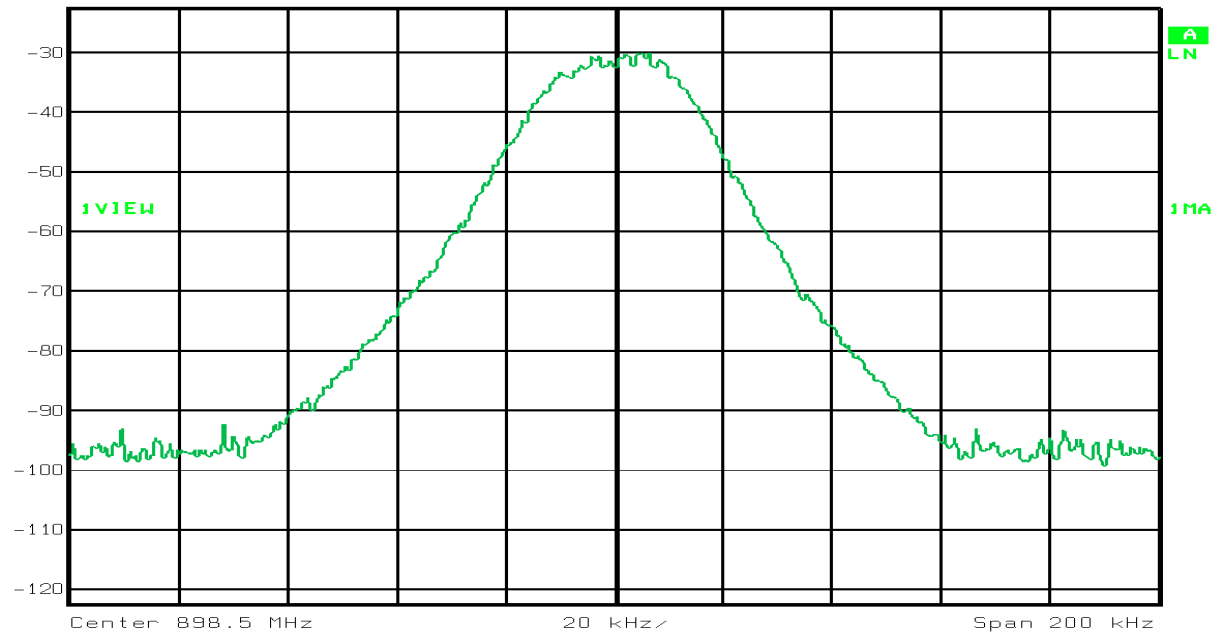
Test Plot: Occupied Bandwidth

Page 2 of 4

Job No.: 0L0265R Date: 11/28/00
Specification: PART 90 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: BDA-8087-52
Configuration: TRANSMIT iDEN MODULATION MID BAND

Ref Lvl
-22.4 dBm

RBW	10 kHz	RF Att	10 dB
VBW	10 kHz	Mixer	-20 dBm
SWT	15 ms	Unit	dBm



Date: 28.NOV.2000 16:13:12

Notes:

INPUT - UPLINK

EQUIPMENT: BDA-8087-52

PROJECT NO.: 0L0265RUS1

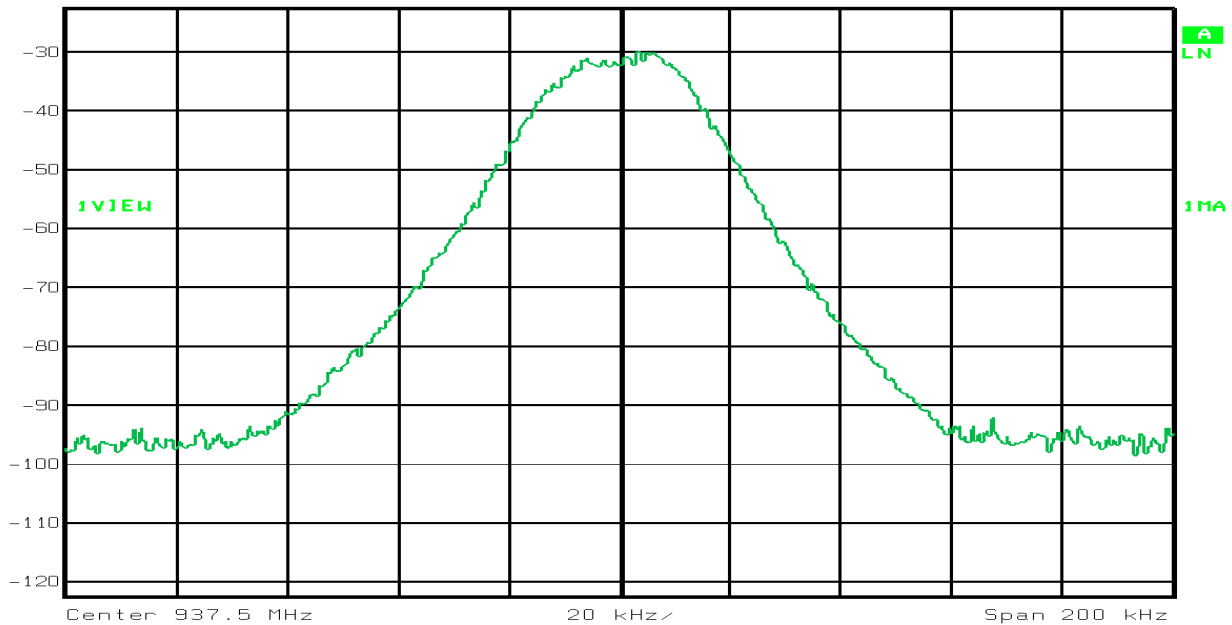
Test Plot: Occupied Bandwidth

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Job No.:	0L0265R	Date:	11/28/00
Specification:	PART 90	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	50
E.U.T.:	BDA-8087-52		
Configuration:	TRANSMIT iDEN MODULATION MID BAND		

Ref Lvl
-22.4 dBm

RBW	10 kHz	RF Att	10 dB
VBW	10 kHz	Mixer	-20 dBm
SWT	15 ms	Unit	dBm



Date: 28.NOV.2000 16:10:28

Notes:

INPUT - DOWNLINK

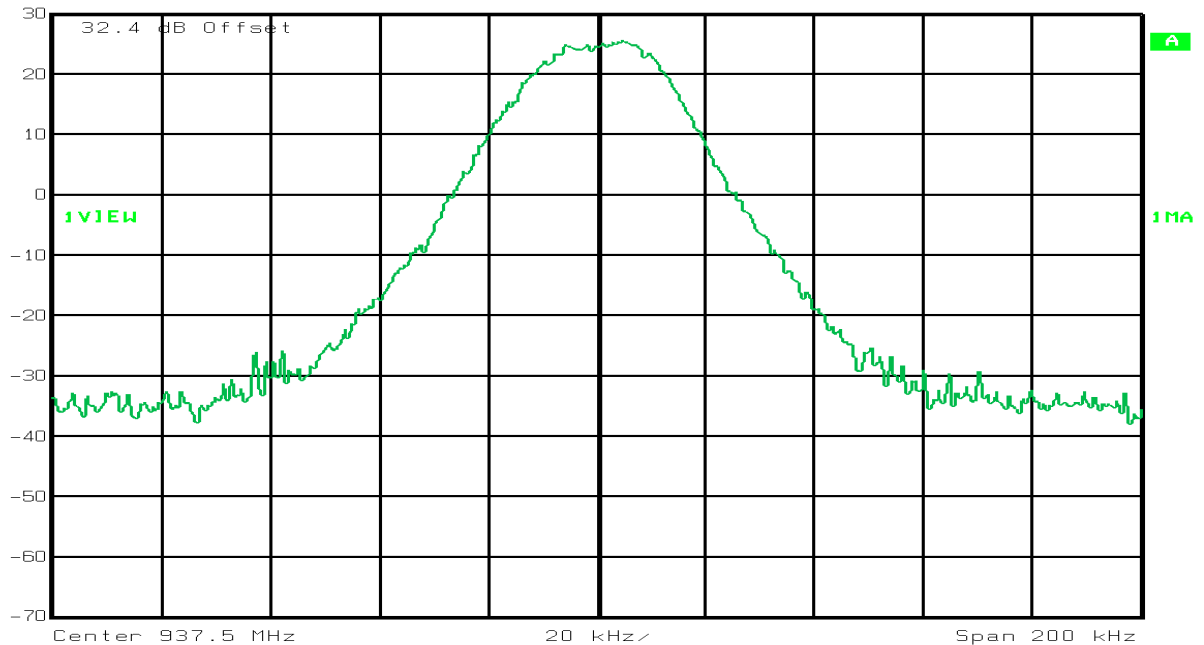
EQUIPMENT: **BDA-8087-52**PROJECT NO.: **0L0265RUS1****Test Plot: Occupied Bandwidth**

Page 3 of 4

Job No.: 0L0265R Date: 11/28/00
Specification: PART 90 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: BDA-8087-52
Configuration: TRANSMIT iDEN MODULATION MID BAND

Ref Lvl
30 dBm

RBW 10 kHz RF Att 40 dB
VBW 10 kHz Mixer -20 dBm
SWT 15 ms Unit dBm



Date: 28.NOV.2000 16:08:30

Notes:

OUTPUT - DOWNLINK

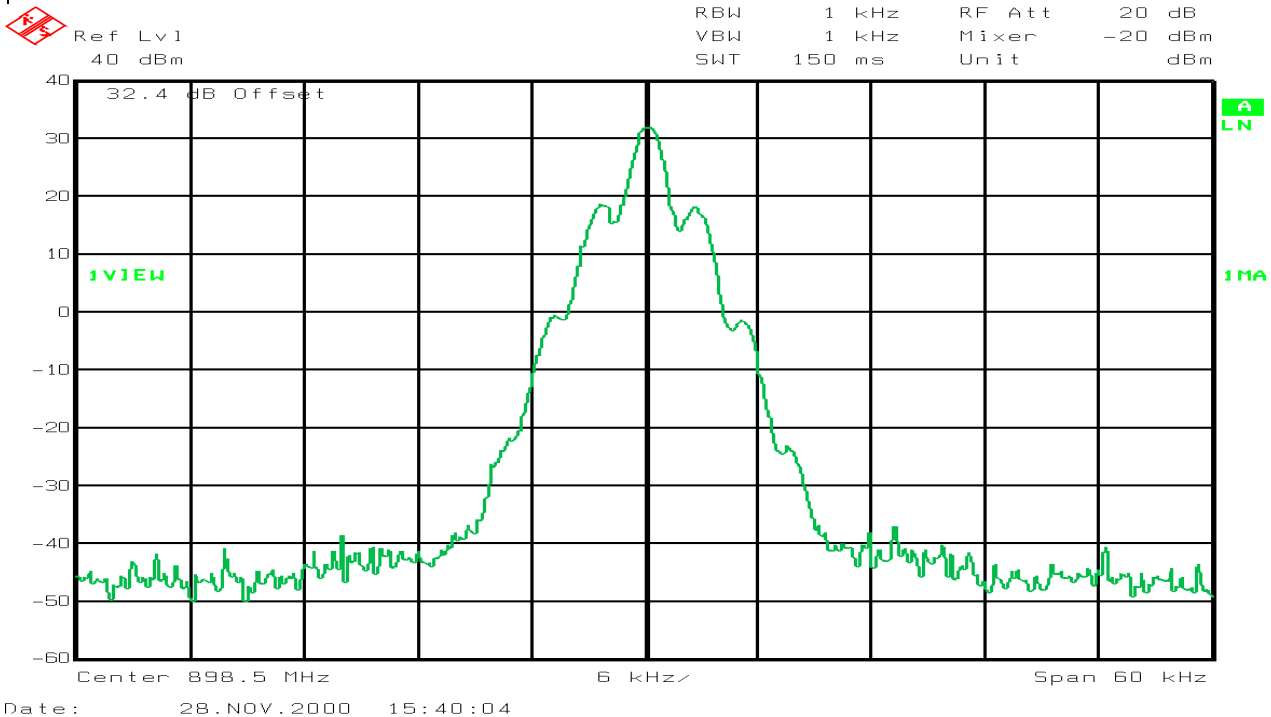
EQUIPMENT: **BDA-8087-52**PROJECT NO.: **0L0265RUS1****Test Plot: Occupied Bandwidth**Page 1 of 4

Job No.: 0L0265R Date: 11/28/00
Specification: PART 90 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: BDA-8087-52
Configuration: TRANSMIT VOICE MODULATION MID BAND
Serial Number: 2851 used duplexer samples S07 & S08
Location: Lab 1 RBW: 1 kHz
Detector Type: Peak VBW: 1 kHz

Test Equipment Used

Antenna: #N/A Directional Coupler: #N/A
Pre-Amp: #N/A Cable #1: 1081
Filter: #N/A Cable #2: #N/A
Receiver: 1036 Cable #3: #N/A
Attenuator #1: 1065 Cable #4: #N/A
Attenuator #2: 1604 Mixer: #N/A

Additional equipment used: _____
Measurement
Uncertainty: #N/A



Notes: OUTPUT - UPLINK

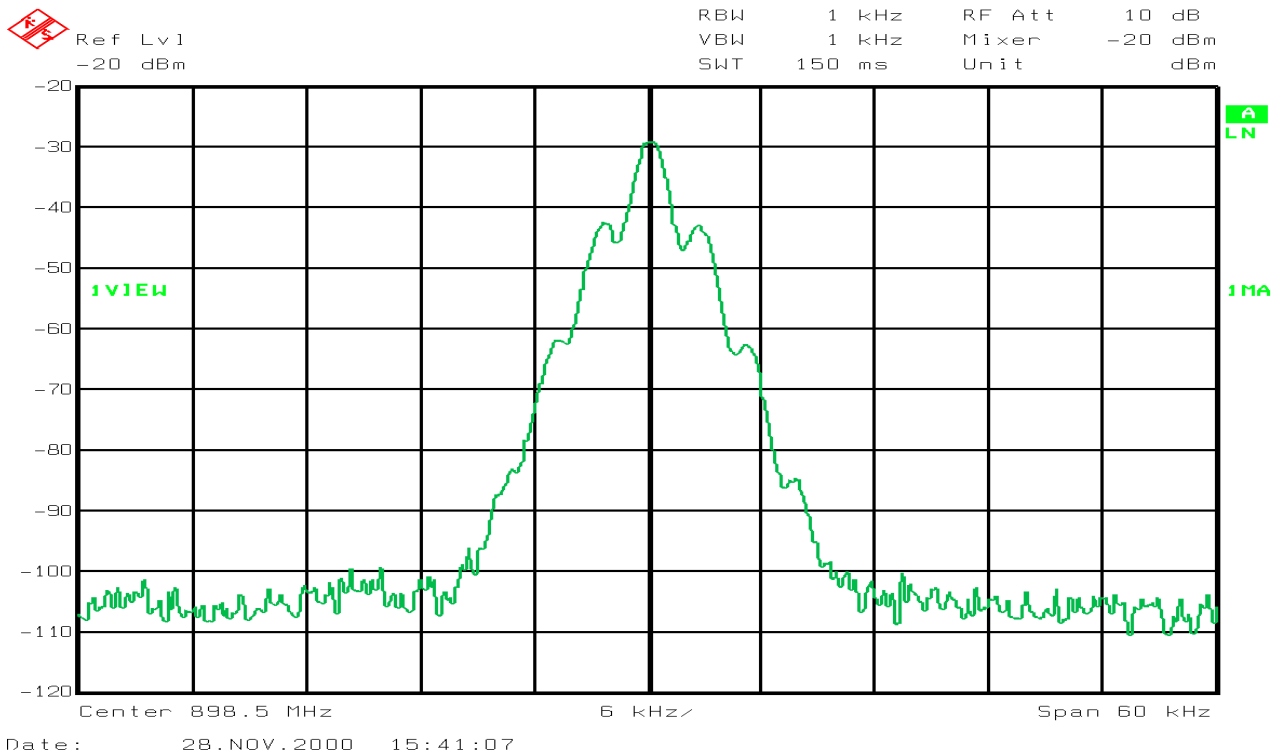
EQUIPMENT: BDA-8087-52

PROJECT NO.: 0L0265RUS1

Test Plot: Occupied Bandwidth

Page 2 of 4

Job No.: 0L0265R Date: 11/28/00
Specification: PART 90 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: BDA-8087-52
Configuration: TRANSMIT VOICE MODULATION MID BAND



Notes:

INPUT - UPLINK

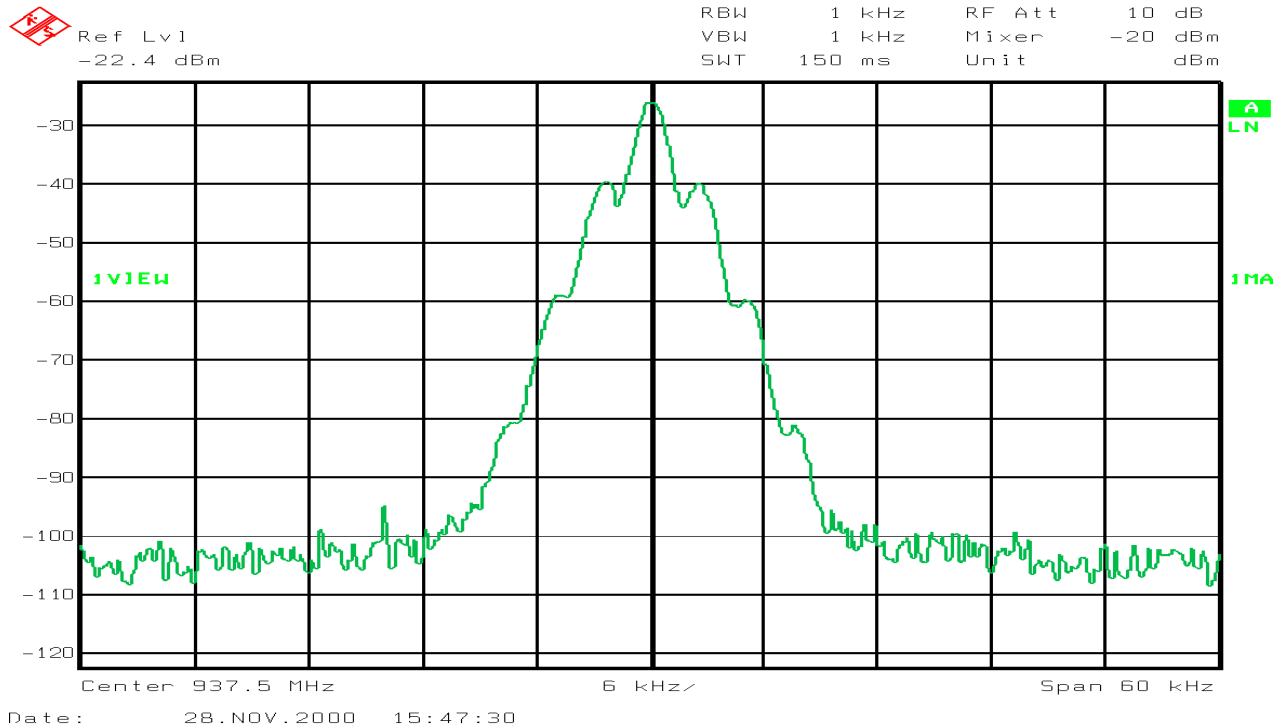
EQUIPMENT: BDA-8087-52

PROJECT NO.: 0L0265RUS1

Test Plot: Occupied Bandwidth

Page 4 of 4

Job No.:	0L0265R	Date:	11/28/00
Specification:	PART 90	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%):	50
E.U.T.:	BDA-8087-52		
Configuration:	TRANSMIT VOICE MODULATION MID BAND		

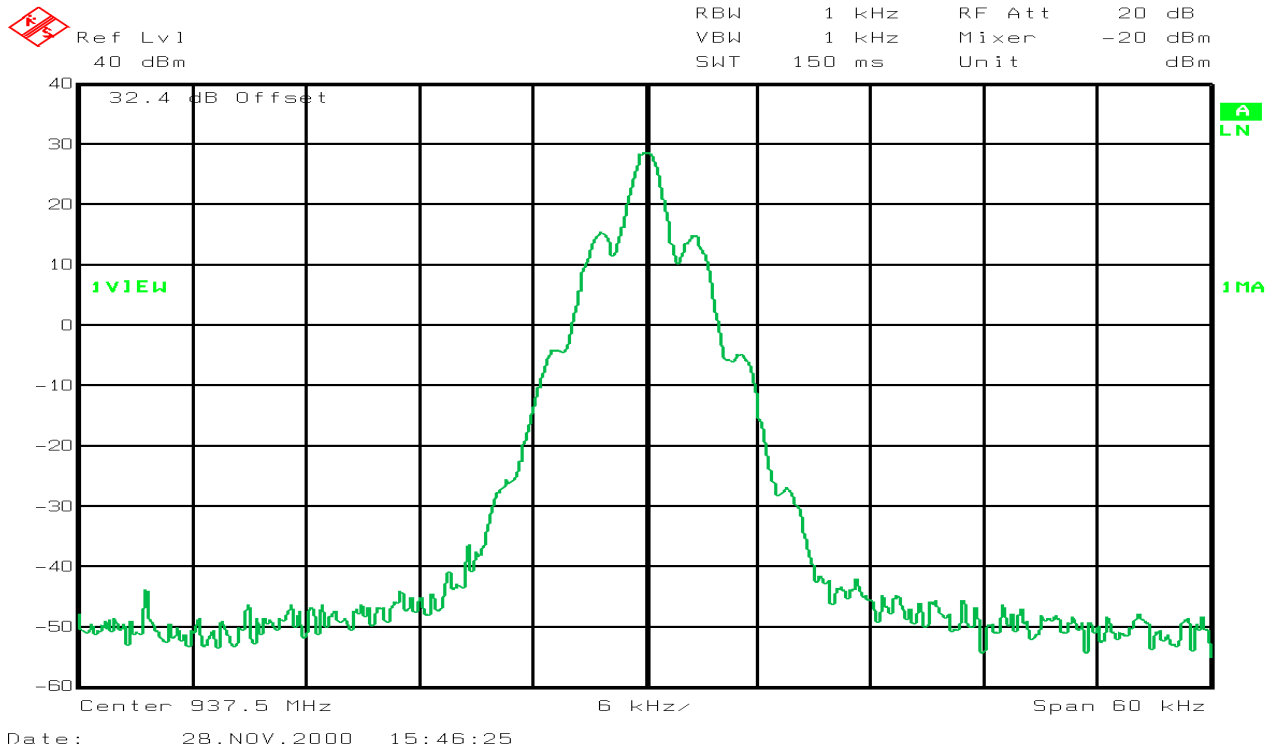


Notes: INPUT - DOWNLINK

EQUIPMENT: **BDA-8087-52**PROJECT NO.: **0L0265RUS1****Test Plot: Occupied Bandwidth**

Page 3 of 4

Job No.: 0L0265R Date: 11/28/00
Specification: PART 90 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: BDA-8087-52
Configuration: TRANSMIT VOICE MODULATION MID BAND



Notes:

OUTPUT - DOWNLINK

EQUIPMENT: **BDA-8087-52**PROJECT NO.: **0L0265RUS1****Occupied Bandwidth - SMR 800 MHz (801-821/851-866 MHz)****Test Plot: EMISSIONS MASK**Page 1 of 4

Job No.: 0L0265R Date: 10/05/00

Specification: 90.210G Temperature(°C): 24

Tested By: David Light Relative Humidity(%) 50

E.U.T.: REPEATER

Configuration: NORMAL OPERATION - Iden input/output

Serial Number:

Location: Lab 1

RBW: 1 kHz

Detector Type: Peak

VBW: 1 kHz

Test Equipment Used

Antenna: #N/A

Directional Coupler: #N/A

Pre-Amp: #N/A

Cable #1: 1045

Filter: #N/A

Cable #2: #N/A

Receiver: 1036

Cable #3: #N/A

Attenuator #1: 1604

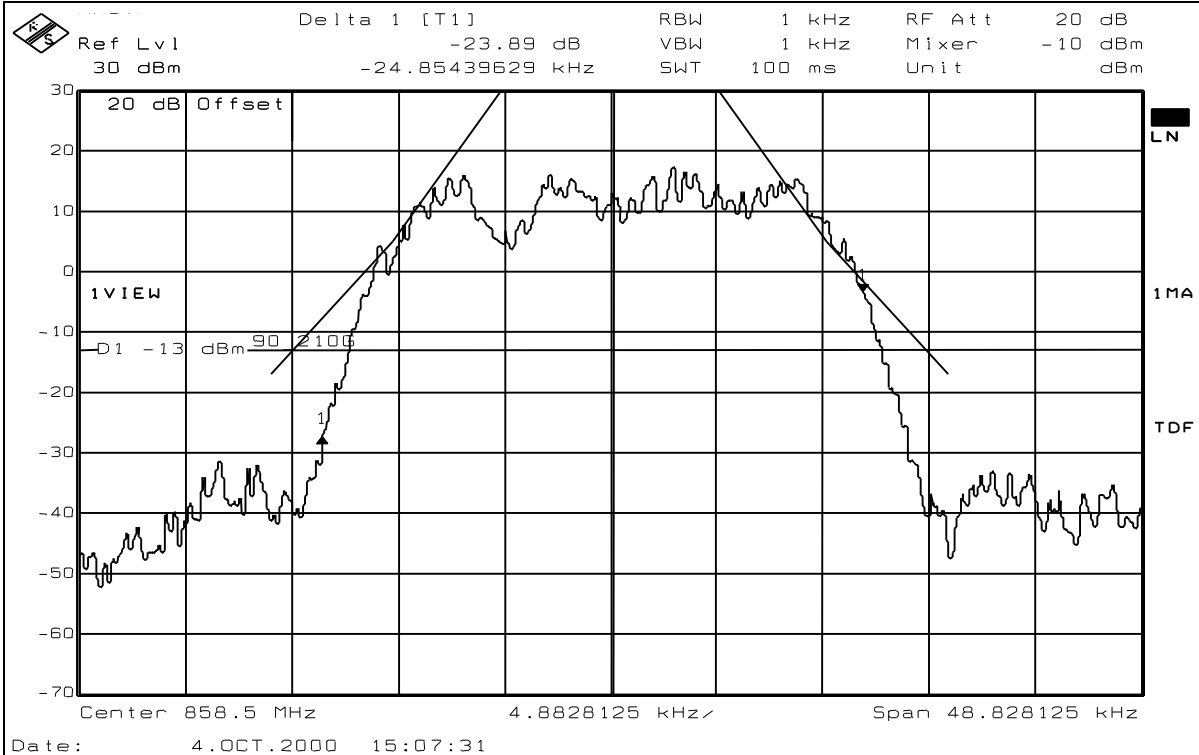
Cable #4: #N/A

Attenuator #2: #N/A

Mixer: #N/A

Additional

equipment used:



Notes:

DOWNLINK OUTPUT

EQUIPMENT: **BDA-8087-52**

PROJECT NO.: **0L0265RUS1**

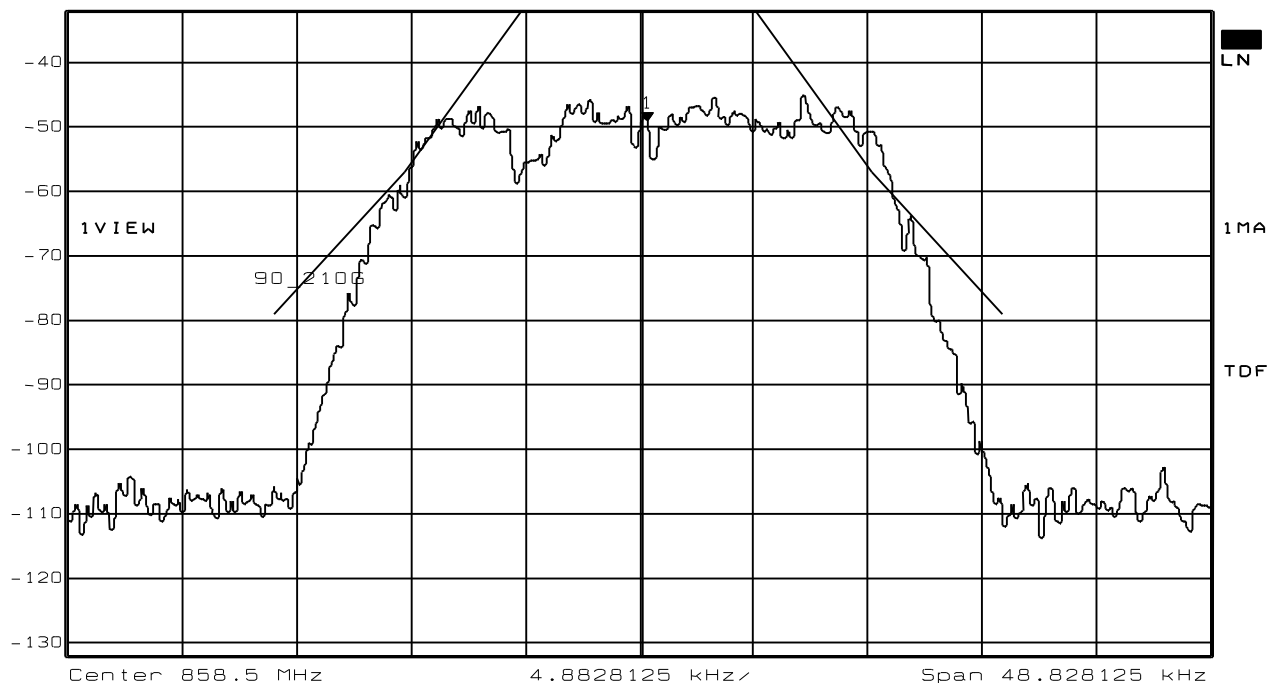
Test Plot: EMISSIONS MASK

Page 2 of 4

Job No.: 0L0265R Date: 10/5/00
 Specification: 90.210G Temperature(°C): 1/24/00
 Tested By: David Light Relative Humidity(%) 2/19/00
 E.U.T.: REPEATER
 Configuration: NORMAL OPERATION - Iden input/output



Ref Lvl -32 dBm Marker 1 [T1] -49.17 dBm RBW 1 kHz RF Att 10 dB
 858.50034248 MHz VBW 1 kHz Mixer -10 dBm
 SWT 100 ms Unit dBm



Date: 4.OCT.2000 15:27:35

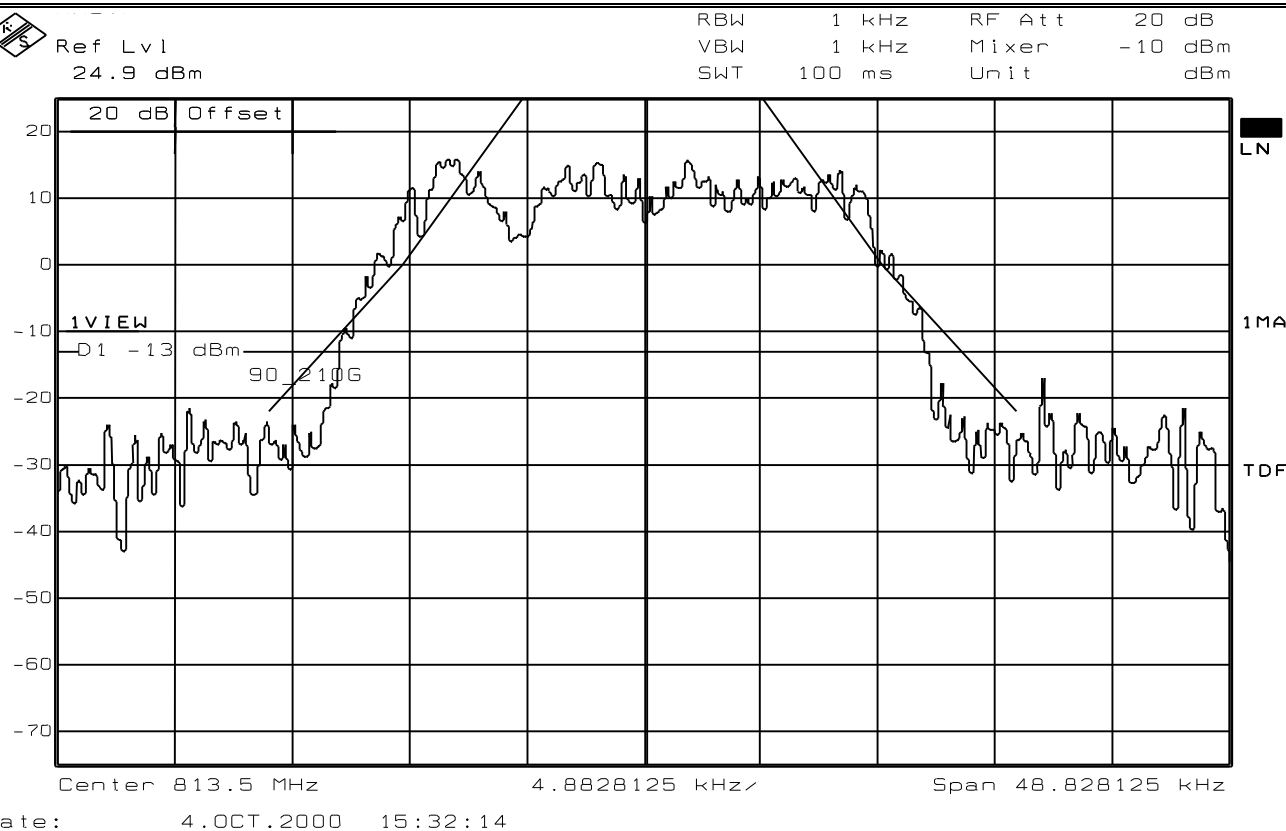
Notes:

DOWNLINK INPUT

EQUIPMENT: **BDA-8087-52**PROJECT NO.: **0L0265RUS1****Test Plot: EMISSIONS MASK**

Page 3 of 4

Job No.: 0L0265R Date: 10/5/00
Specification: 90.210G Temperature(°C): 1/24/00
Tested By: David Light Relative Humidity(%) 2/19/00
E.U.T.: REPEATER
Configuration: NORMAL OPERATION - Iden input/output



Notes: UPLINK OUTPUT

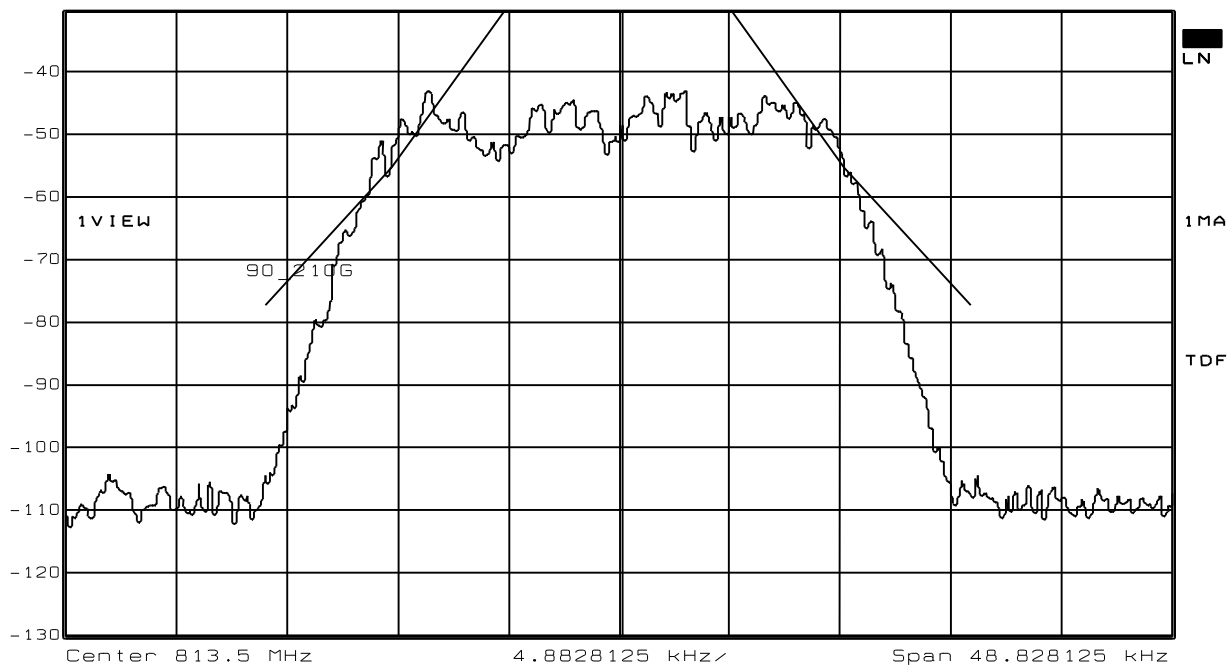
EQUIPMENT: **BDA-8087-52**PROJECT NO.: **0L0265RUS1****Test Plot: EMISSIONS MASK**

Page 4 of 4

Job No.: 0L0265R Date: 10/5/00
Specification: 90.210G Temperature(°C): 1/24/00
Tested By: David Light Relative Humidity(%) 2/19/00
E.U.T.: REPEATER
Configuration: NORMAL OPERATION - Iden input/output

Ref Lvl
-30.2 dBm

RBW 1 kHz RF Att 10 dB
VBW 1 kHz Mixer -10 dBm
SWT 100 ms Unit dBm



Date: 4.OCT.2000 15:34:07

Notes:

UPLINK INPUT

Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.991
TESTED BY: David Light	DATE: 8/15/00

Test Results: **Complies.**

Test Data: See attached graph(s).

EQUIPMENT: BDA-8087-52

PROJECT NO.: 0L0265RUS1

Spurious Emissions at Antenna Terminals-plots



KTL Dallas, Inc.

Dallas Headquarters:

802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667**Test Plot: Antenna Port Spurious Emissions**

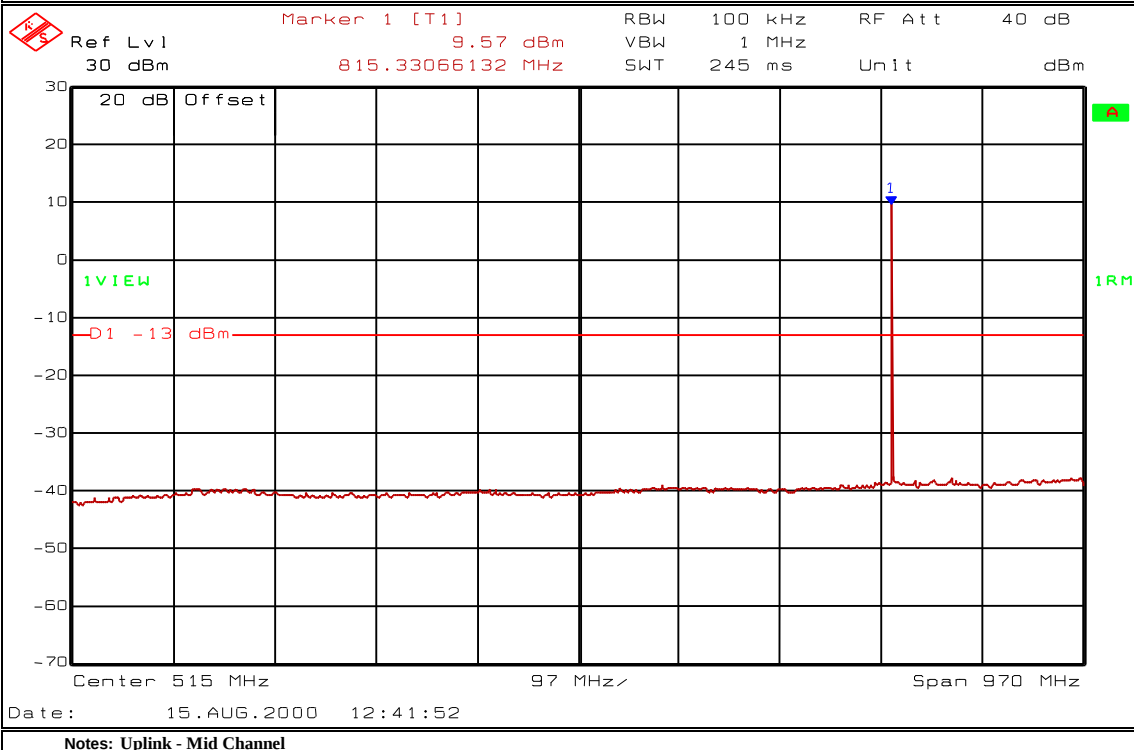
Page 1 of 2

Job No.: 0L0265R Date: 08/15/00
Specification: Part 90 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: BDA-8087-52
Configuration: Transmit -iDEN Modulation
Sample Number: S01
Location: Lab 1 RBW: See Plot
Detector Type: Rms VBW: See Plot

Complete X
Preliminary _____**Test Equipment Used**

Antenna: #N/A Directional Coupler: #N/A
Pre-Amp: #N/A Cable #1: 1081
Filter: #N/A Cable #2: #N/A
Receiver: 1036 Cable #3: #N/A
Attenuator #1: 1604 Cable #4: #N/A
Attenuator #2: #N/A Mixer: #N/A

Additional equipment used: _____
Measurement Uncertainty: #N/A



EQUIPMENT: BDA-8087-52

PROJECT NO.: 0L0265RUS1

Spurious Emissions at Antenna Terminals-plots



Dallas Headquarters:

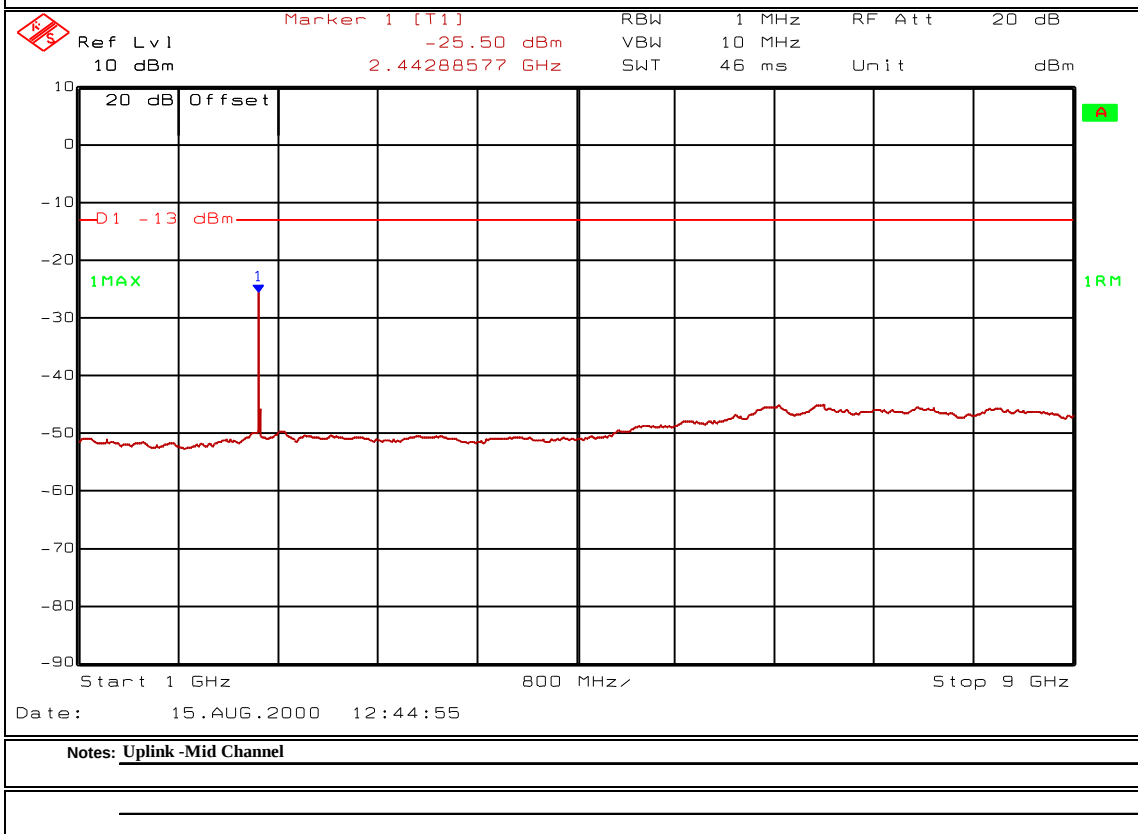
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Test Plot: Antenna Port Spurious Emissions

Page 2 of 2

Job No.: 0L0265R Date: 8/15/00 Complete _____
Specification: Part 90 Temperature(°C): 1/22/00 Preliminary _____
Tested By: David Light Relative Humidity(%) 2/19/00
E.U.T.: BDA-8087-52
Configuration: Transmit -IDEN Modulation



EQUIPMENT: BDA-8087-52

PROJECT NO.: 0L0265RUS1

Spurious Emissions at Antenna Terminals - plots



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Test Plot: Antenna Port Spurious Emissions

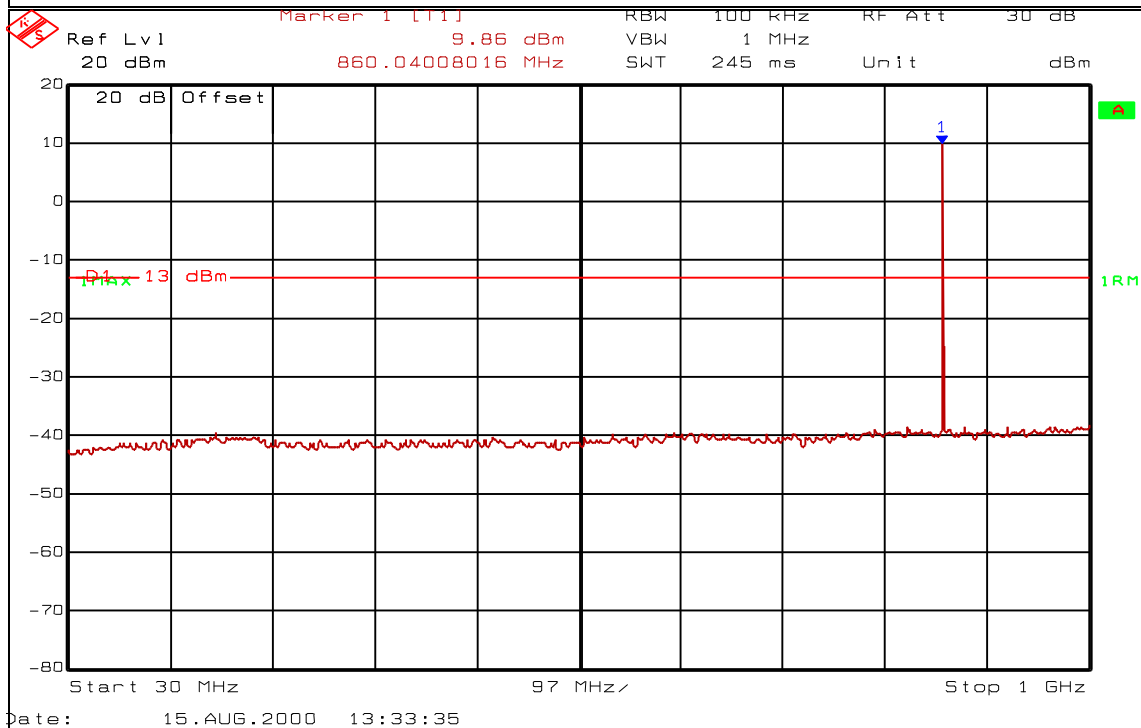
Page 1 of 2

Complete XJob No.: 0L0265R Date: 08/14/00
Specification: Part 90 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: BDA-8087-52
Configuration: Transmit - iDEN Modulation
Sample Number: S01

Preliminary _____

Location: Lab 1 RBW: See plots
Detector Type: Rms VBW: See plots

Test Equipment Used

Antenna: #N/A Directional Coupler: #N/A
Pre-Amp: #N/A Cable #1: 1081
Filter: #N/A Cable #2: #N/A
Receiver: 1036 Cable #3: #N/A
Attenuator #1: 1604 Cable #4: #N/A
Attenuator #2: #N/A Mixer: #N/AAdditional equipment used: _____
Measurement _____
Uncertainty: #N/A

Notes: Downlink - Mid Channel

EQUIPMENT: BDA-8087-52

PROJECT NO.: 0L0265RUS1

Spurious Emissions at Antenna Terminals - plots



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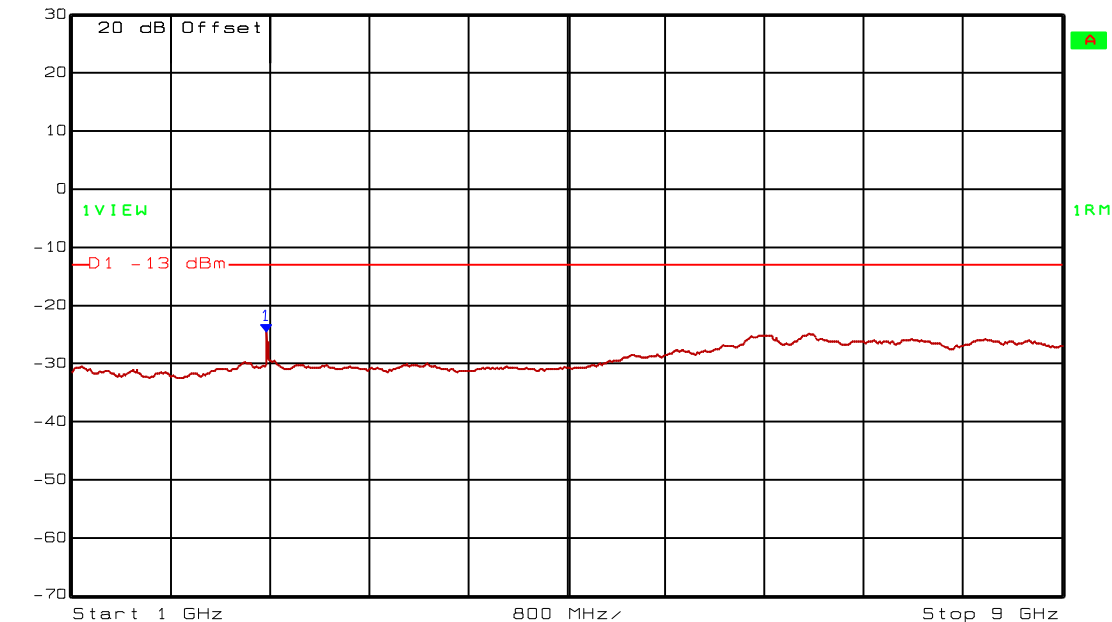
KTL Dallas, Inc.

Test Plot: Antenna Port Spurious Emissions

Page 2 of 2

Job No.: 0L0265R Date: 8/14/00 Complete _____
Specification: Part 90 Temperature(°C): 1/22/00 Preliminary _____
Tested By: David Light Relative Humidity(%) 2/19/00
E.U.T.: BDA-8087-52
Configuration: Transmit - iDEN Modulation

Marker 1 [11]
Ref Lvl 30 dBm -24.74 dBm RBW 1 MHz RF Att 40 dB
2.57114228 GHz VBW 10 MHz Unit dBm
SWT 46 ms



Date: 15.AUG.2000 14:13:01

Notes: Downlink - Mid Channel

EQUIPMENT: **BDA-8087-52**

PROJECT NO.: 0L0265RUS1

Spurious Emissions at Antenna Terminals - plots



KTL Dallas, Inc.

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Test Plot: Antenna Port Spurious Emissions

Page 1 of 2

Complete X

Job No.:	0L0265R	Date:	08/14/00
Specification:	Part 90	Temperature(°C):	<u>22</u>
Tested By:	<u>David Light</u>	Relative Humidity(%)	<u>50</u>
E.U.T.:	<u>BDA-8087-52</u>		
Configuration:	<u>Transmit - Voice Modulation</u>		
Sample Number:	<u>S01</u>		

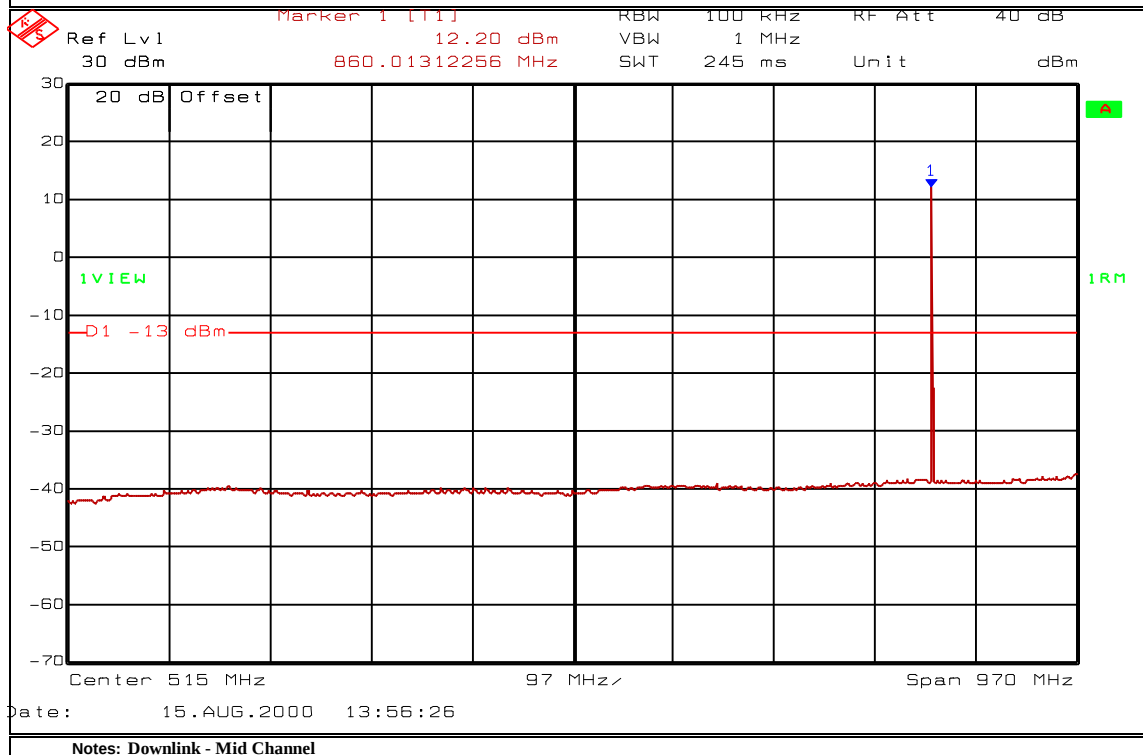
Preliminary

Location:	<u>Lab 1</u>	RBW:	<u>See plots</u>
Detector Type:	<u>Rms</u>	VBW:	<u>See plots</u>

Test Equipment Used

Antenna:	#N/A	Directional Coupler:	#N/A
Pre-Amp:	#N/A	Cable #1:	1081
Filter:	#N/A	Cable #2:	#N/A
Receiver:	1036	Cable #3:	#N/A
Attenuator #1	1604	Cable #4:	#N/A
Attenuator #2:	#N/A	Mixer:	#N/A

Additional
equipment used: _____
Measurement
Uncertainty: #N/A



EQUIPMENT: BDA-8087-52

PROJECT NO.: 0L0265RUS1

Spurious Emissions at Antenna Terminals - plots



Dallas Headquarters:

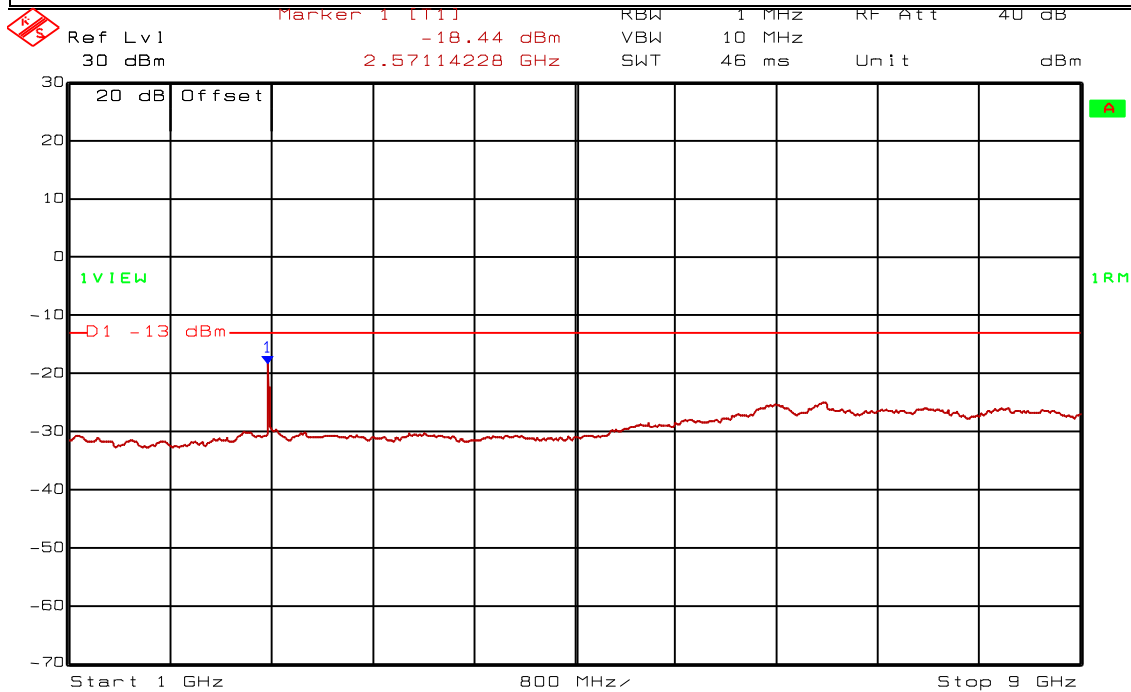
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Fax: (972) 436-2667

KTL Dallas, Inc.

Test Plot: Antenna Port Spurious Emissions

Page 2 of 2

Job No.: 0L0265R Date: 8/14/00
Specification: Part 90 Temperature(°C): 1/22/00
Tested By: David Light Relative Humidity(%) 2/19/00
E.U.T.: BDA-8087-52
Configuration: Transmit - Voice Modulation

Complete _____
Preliminary _____

Date: 15.AUG.2000 13:57:23

Notes: Downlink - Mid Channel

EQUIPMENT: BDA-8087-52

PROJECT NO.: 0L0265RUS1

Spurious Emissions at Antenna Terminals - plots



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Test Plot: Antenna Port Spurious Emissions

Page 1 of 2

Job No.: 0L0265R Date: 08/15/00

Specification: Part 90 Temperature(°C): 22

Tested By: David Light Relative Humidity(%) 50

E.U.T.: BDA-8087-52

Configuration: Transmit -Voice Modulation

Sample Number: S01

Location: Lab 1 RBW: See Plot

Detector Type: Rms VBW: See Plot

Complete X
Preliminary _____

Test Equipment Used

Antenna: #N/A Directional Coupler: #N/A

Pre-Amp: #N/A Cable #1: 1081

Filter: #N/A Cable #2: #N/A

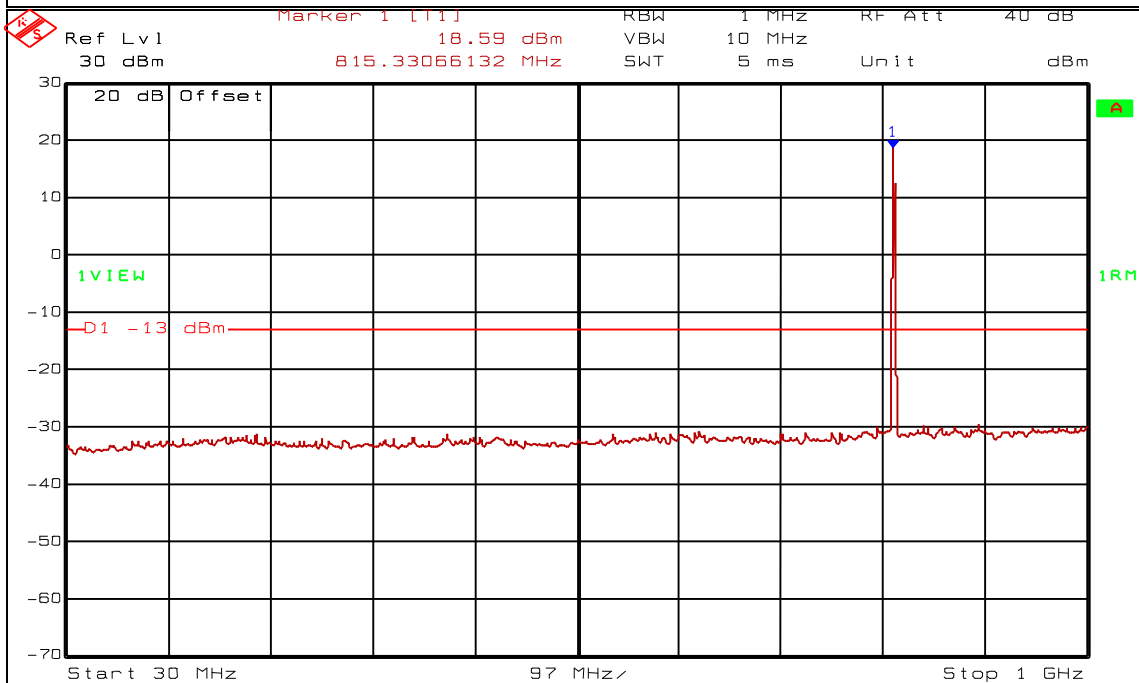
Receiver: 1036 Cable #3: #N/A

Attenuator #1: 1604 Cable #4: #N/A

Attenuator #2: #N/A Mixer: #N/A

Additional equipment used: _____

Measurement Uncertainty: #N/A



Date: 15.AUG.2000 14:34:20

Notes: Uplink - Mid Channel

EQUIPMENT: BDA-8087-52

PROJECT NO.: 0L0265RUS1

Spurious Emissions at Antenna Terminals - plots

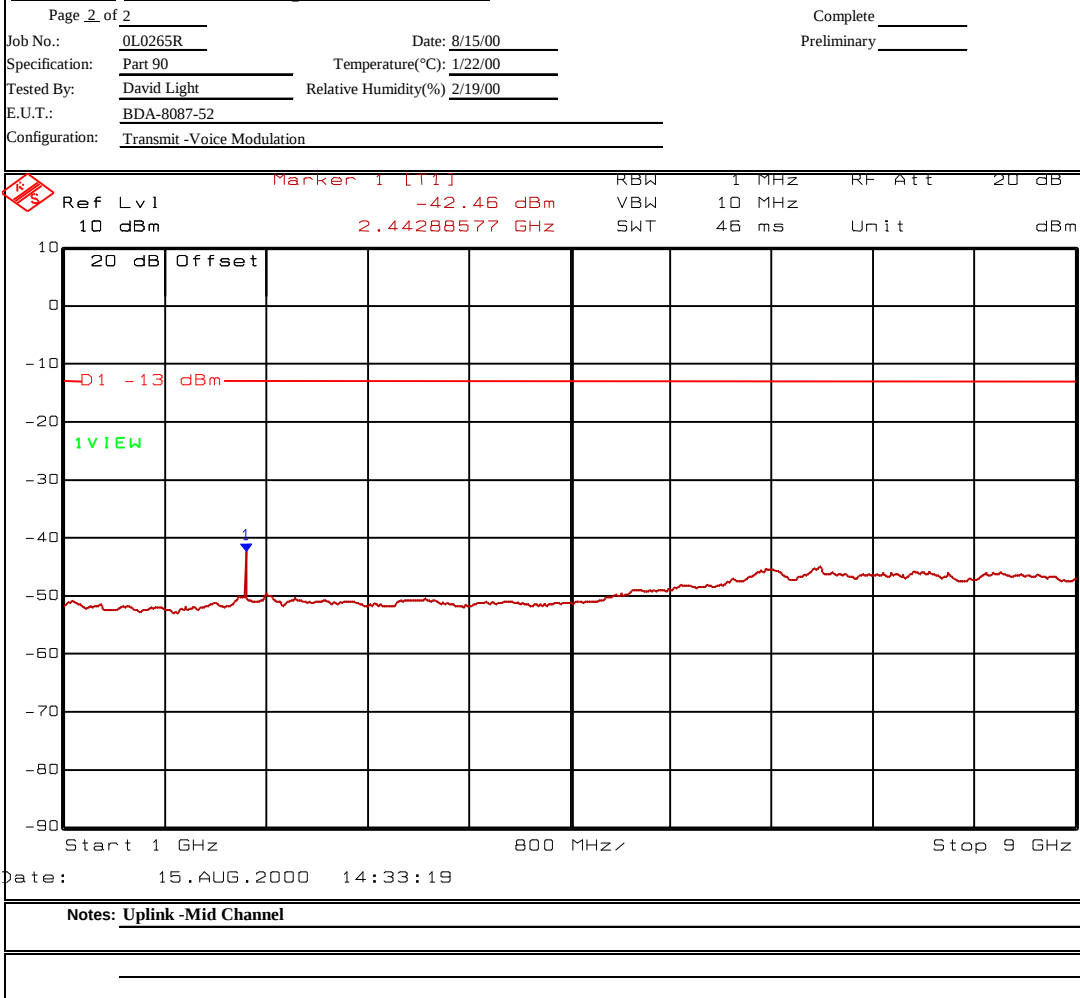


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Test Plot: Antenna Port Spurious Emissions



Section 6. Field Strength of Spurious Emissions

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 2.993
TESTED BY: David Light	DATE: 8/15/00

Test Results: Complies.

Test Data: See attached table.

Note: See page 32 for applicable limit.

EQUIPMENT: **BDA-8087-52**PROJECT NO.: **0L0265RUS1****Test Data - Radiated Emissions**

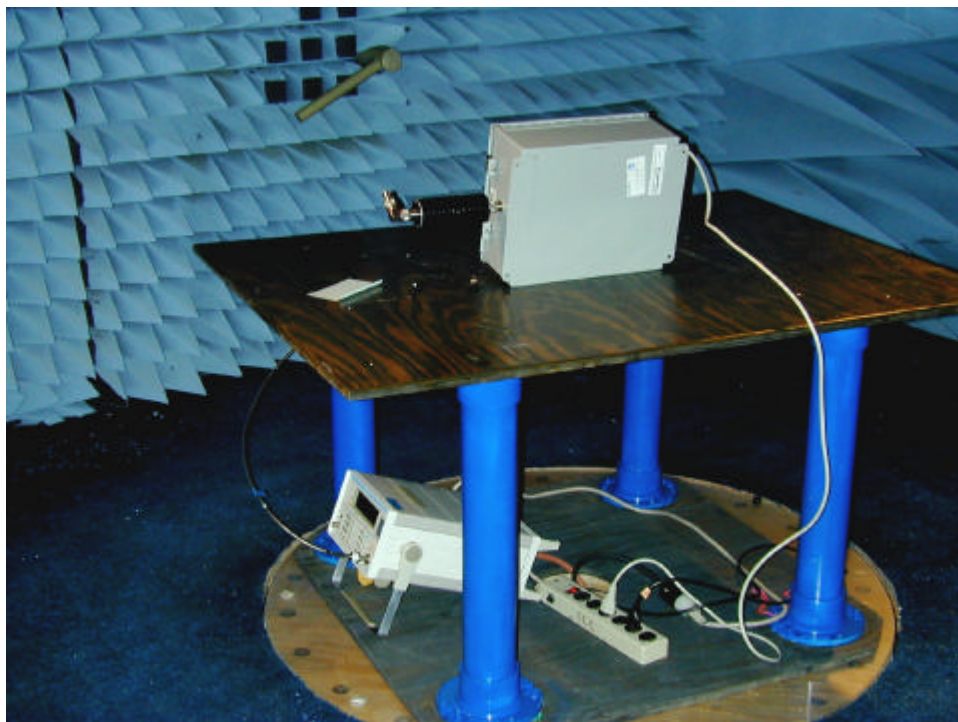
Field Strength of Spurious Emissions										
Page <u>1</u> of <u>1</u>							Complete <u>X</u>			
Job No.:	0L0265R	Date: 8/15/00					Preliminary _____			
Specification:	PART 90	Temperature(°C): <u>22</u>								
Tested By:	David Light	Relative Humidity(%) <u>50</u>								
E.U.T.:	BDA									
Configuration:	TRANSMIT -FULL POWER					Peak rf power output(dBm): <u>24</u>				
Sample Number:	S01									
Location:	AC 3	RBW: <u>1 MHz</u>					Measurement			
Detector Type:	Peak	VBW: <u>1 MHz</u>					Distance <u>3</u> m			
Test Equipment Used										
Antenna:	993	Directional Coupler:					#N/A			
Pre-Amp:	1016	Cable #1:					1484			
Filter:	#N/A	Cable #2:					1485			
Receiver:	1464	Cable #3:					#N/A			
Attenuator #1:	#N/A	Cable #4:					#N/A			
Attenuator #2:	#N/A	Mixer:					#N/A			
Additional equipment used: _____										
Measurement Uncertainty: <u>+/- .7 dB</u>										
Frequency (GHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Pre-Amp Gain (dB)	Corrected Reading (dBuV/m)	EIRP (W)	EIRP (dBm)	dBc	Polarity	Comments
UPLINK										
1.63	42	25.5	2.6	31.5	39	0.00	-26.63	-50.63	H	NOISE FLOOR
2.45	42.5	29	3.1	32	43	0.00	-52.63	-52.63	H	NOISE FLOOR
3.26	38.2	29.8	3.4	32.4	39	0.00	-86.23	-86.23	H	NOISE FLOOR
4.08	39.7	31.7	3.9	31.3	44	0.00	-81.23	-84.23	H	NOISE FLOOR
8.15	38	37.5	5.7	33.1	48	0.00	-77.13	-77.13	H	NOISE FLOOR
1.63	42	25.5	2.6	31.5	39	0.00	-86.63	-86.63	V	NOISE FLOOR
2.45	42.5	29	3.1	32	43	0.00	-82.63	-82.63	V	NOISE FLOOR
3.26	38.2	29.8	3.4	32.4	39	0.00	-86.23	-86.23	V	NOISE FLOOR
4.08	39.7	31.7	3.9	31.3	44	0.00	-81.23	-81.23	V	NOISE FLOOR
8.15	38	37.5	5.7	33.1	48	0.00	-77.13	-77.13	V	NOISE FLOOR
DOWNLINK										
1.72	44.5	26.3	2.6	31.6	42	0.00	-23.43	-47.43	H	NOISE FLOOR
2.58	41.7	29.1	3.1	32.4	42	0.00	-53.73	-53.73	H	NOISE FLOOR
3.44	43.5	29.9	3.4	32.1	45	0.00	-80.53	-80.53	H	NOISE FLOOR
4.3	43.3	31.8	3.9	31.6	47	0.00	-77.83	-80.83	H	NOISE FLOOR
8.6	41.7	36.8	5.7	33	51	0.00	-74.03	-74.03	H	NOISE FLOOR
1.72	44.5	26.3	2.6	31.6	42	0.00	-83.43	-83.43	V	NOISE FLOOR
2.58	41.7	29.1	3.1	32.4	42	0.00	-83.73	-83.73	V	NOISE FLOOR
3.44	43.5	29.9	3.4	32.1	45	0.00	-80.53	-80.53	V	NOISE FLOOR
4.3	43.3	31.8	3.9	31.6	47	0.00	-77.83	-77.83	V	NOISE FLOOR
8.6	41.7	36.8	5.7	33	51	0.00	-74.03	-74.03	V	NOISE FLOOR
Notes: SCANNED TO THE 10TH HARMONIC										

Photographs of Test Setup

FRONT VIEW



REAR VIEW



EQUIPMENT: **BDA-8087-52**

PROJECT NO.: **0L0265RUS1**

Section 7. Frequency Stability

NAME OF TEST: Frequency Stability	PARA. NO.: 2.995
TESTED BY:	DATE:

Test Results:

Measurement Data: See attached documents.

Not Applicable

EQUIPMENT: **BDA-8087-52****PROJECT NO.:** **0L0265RUS1**

Section 8. Test Equipment List

KTL ID	Description	Manufacturer Model Number	Serial Number	Calibration Date
406	POWER METER	HP 436A	2512A22082	02/17/00
1021	Power sensor	Hewlett Packard A (50 ohm, 0.3 uw-100m)	2349A45632	02/17/00
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	06/14/99 2 yr cycle
1045	CABLE 2m	Astrolab 32027-2-29094-72TC	N/A	05/23/00
1604	ATTENUATOR	NARDA 776B-20	NONE	09/30/99 CBU
1081	CABLE 2m	Astrolab 32027-2-29094-72TC	N/A	05/23/00
993	Horn antenna	A.H. Systems SAS-200/571	XXX	07/16/99 2 yr cycle
1016	AMPLIFIER	HEWLETT PACKARD 8449A	2749A00159	05/24/00
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	11/03/99 2 yr cycle
1484	Cable 2.0-18.0 Ghz	Storm PR90-010-072	N/A	05/25/00
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	05/25/00

ANNEX A - TEST METHODOLOGIES

NAME OF TEST: RF Power Output	PARA. NO.: 2.985
--------------------------------------	-------------------------

Minimum Standard: Para. No. 90.205(a). The maximum allowable station ERP is dependent upon the stations HAAT and required service area and will be authorized in accordance with Table 1 of 90.205(d).

Method Of Measurement:

Detachable Antenna:

The peak power at antenna terminals is measured using an in-line peak power meter. Power output is measured with the maximum rated input level.

Integral Antenna:

If the antenna is not detachable from the circuit then the Peak Power Output is derived from the peak radiated field strength of the fundamental emission by using the plane wave relation $GP/4\pi R^2 = E^2/120\pi$ and proceeding as follows:

$$P = \frac{E^2 R^2}{30G} = \frac{E^2 3^2}{30G}$$

where,

P = the equivalent isotropic radiated power in watts

E = the maximum measured field strength in V/m

R = the measurement range (3 meters)

G = the numeric gain of the transmit antenna in relation to an isotropic radiator

KTL Dallas

FCC PART 90, SUBPART I
PRIVATE LAND MOBILE REPEATER

EQUIPMENT: **BDA-8087-52**

PROJECT NO.: **0L0265RUS1**

NAME OF TEST: Spurious Emissions at Antenna Terminals	PARA. NO.: 2.991
--	-------------------------

Test Method: RBW: 1% of emission bandwidth in the 0 - 1 GHz range.
1 MHz at frequencies above 1 GHz.

VBW = RBW

The spectrum is searched up to 10 times the fundamental frequency.

EQUIPMENT: BDA-8087-52

PROJECT NO.: 0L0265RUS1

NAME OF TEST: Occupied Bandwidth**PARA. NO.: 2.989****Minimum Standard:** Para. No. 90.210, see table 1 below for applicable mask.**Table 1**

Frequency Band (MHz)	Mask for equipment with Low Pass Filter	Mask for equipment without Low Pass Filter
Below 25	A or B	A or C
25 - 50	B	C
72 - 76	B	C
150 - 174	B, D or E	C, D or E
150 Paging only	B	C
220 - 222	F	F
421 - 512	B, D or E	C, D or E
450 paging only	B	H
806 - 821/ 851 - 866	B	G
821 - 824/ 866 - 869	B	H
896 - 901/ 935 - 940	I	J
902 - 928	K	K
929 - 930	B	G
Above 940	B	C
All other bands	B	C

NAME OF TEST: Field Strength of Spurious**PARA. NO.: 2.993****Minimum Standard:** Para. No. 90.210, see table 1 for applicable mask.**Calculation of Field Strength Limit**

An example of attenuation requirement of $50 + 10 \log P$ is equivalent to -20 dBm (1×10^{-5} Watts) at the antenna terminal. We determine the field strength limit by using the plane wave relation.

$$GP/4\pi R^2 = E^2/120\pi$$

For emissions ≤ 1 GHz:

G = 1.64 (Dipole Gain)

P = 10^{-5} Watts (Maximum spurious output power)

R = 3m (Measurement Distance)

$$E = \frac{\sqrt{30GP}}{R} = E = \frac{\sqrt{30 \times 1.64 \times 10^{-5}}}{3} = 0.00739 \text{ V / m} = 77.4 \text{ dBmV / m}$$

For emissions > 1 GHz:

G = 1 (Isotropic Gain)

P = 1×10^{-5} Watts (Maximum spurious output power)

R = 3m (Measurement Distance)

$$E = 77.4 - 20 \log \sqrt{1.64} = 75.2 \text{ dBmV / m@3m}$$

MASK	Spurious Limit	FS Limit Below 1 GHz	FS Limit Above 1 GHz
A,B,C,G,H,I	-13dBm	84.4 dBμV/m@3m	82.2 dBμV/m@3m
D,J	-20dBm	77.4 dBμV/m@3m	75.2 dBμV/m@3m
E,F,K	-25dBm	72.4 dBμV/m@3m	70.2 dBμV/m@3m

EQUIPMENT: BDA-8087-52

PROJECT NO.: 0L0265RUS1

NAME OF TEST: Frequency Stability

PARA. NO.: 2.995

Minimum Standard: Para. No. 90.213. The transmitter carrier frequency shall remain within the assigned frequency below in ppm.

Table 2

Frequency Band (MHz)	Fixed And Base Stations	Mobile Stations	
		> 2 Watts o/p pwr	< 2 Watts o/p pwr
Below 25	100	100	200
25 - 50	20	20	50
72 - 76	5	-	50
150 - 174	5	5	5
220 - 222	0.1	1.5	1.5
421 - 512	2.5	5	5
806 - 821	1.5	2.5	2.5
821 - 824	1.0	1.5	15
851 - 866	1.5	2.5	2.5
866 - 869	1.0	1.5	1.5
869 - 901	0.1	1.5	1.5
902 - 928	2.5	2.5	2.5
929 - 930	1.5	-	-
935 - 940	0.1	1.5	1.5
1427 - 1435	300	300	300
Above 2450	-	-	-

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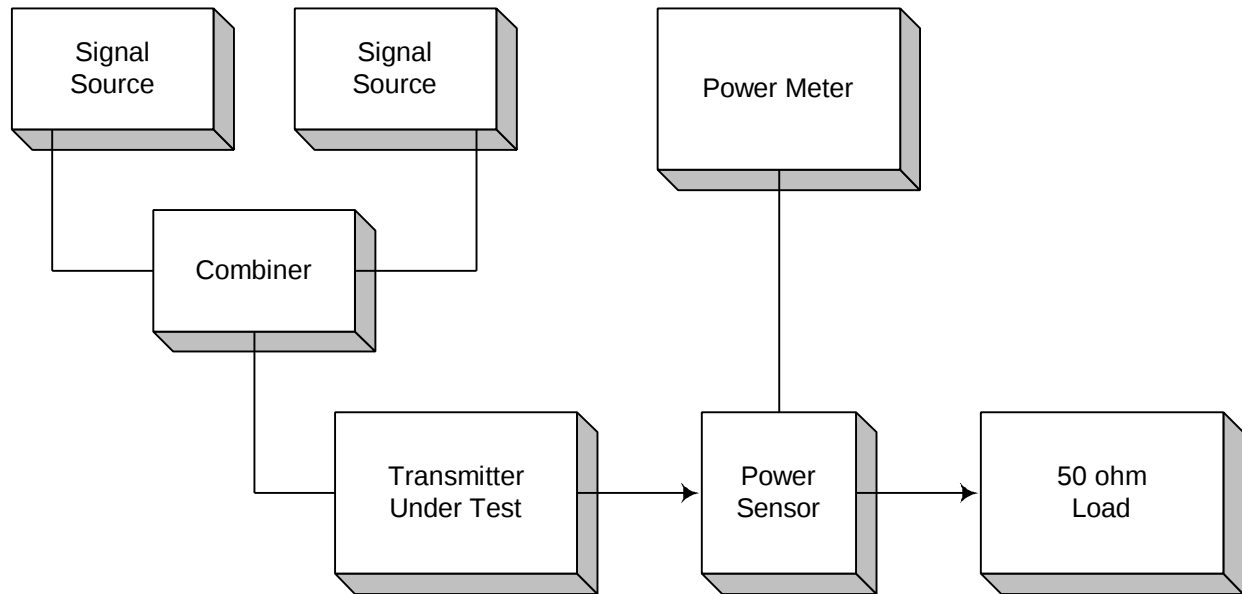
FCC PART 90, SUBPART I
PRIVATE LAND MOBILE REPEATER

EQUIPMENT: **BDA-8087-52**

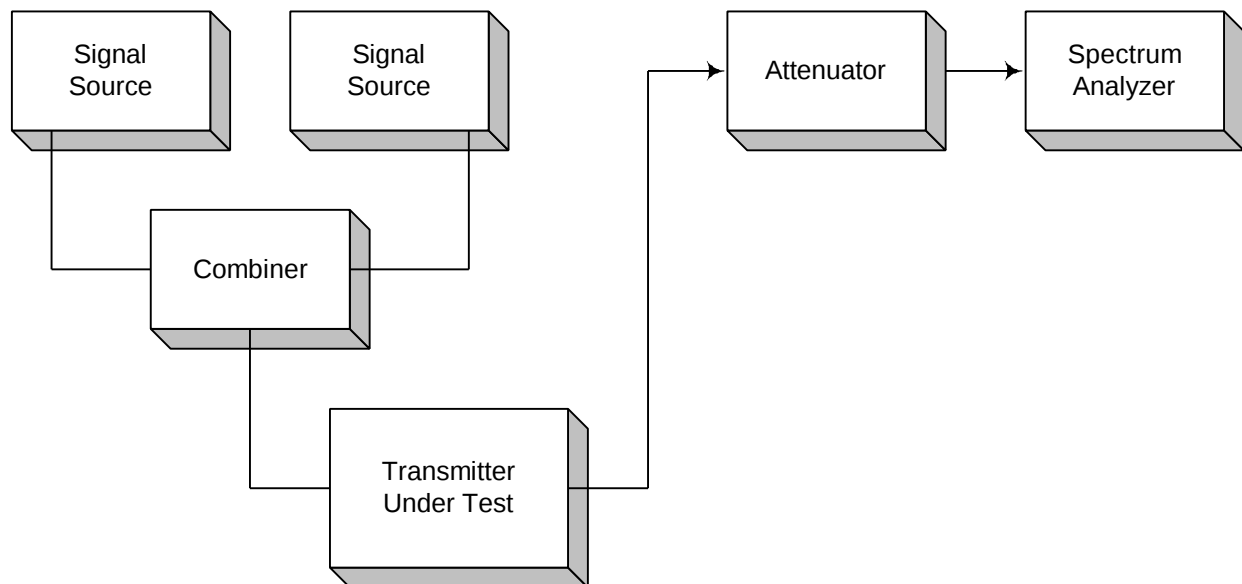
PROJECT NO.: **0L0265RUS1**

ANNEX B - TEST DIAGRAMS

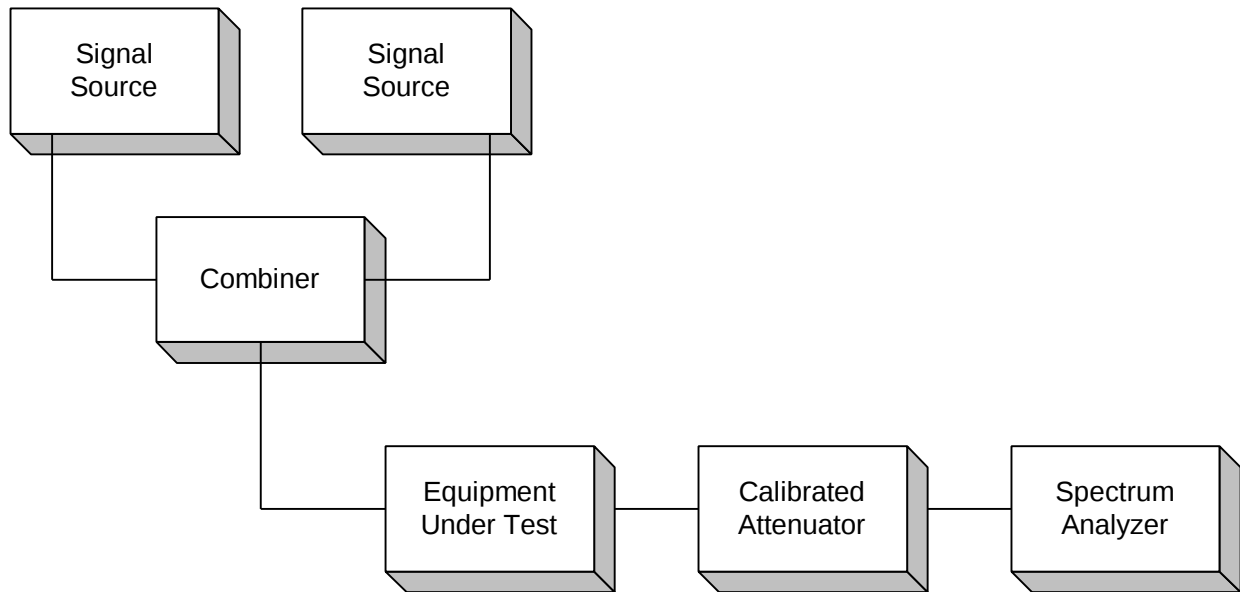
Para. No. 2.985 - R.F. Power Output



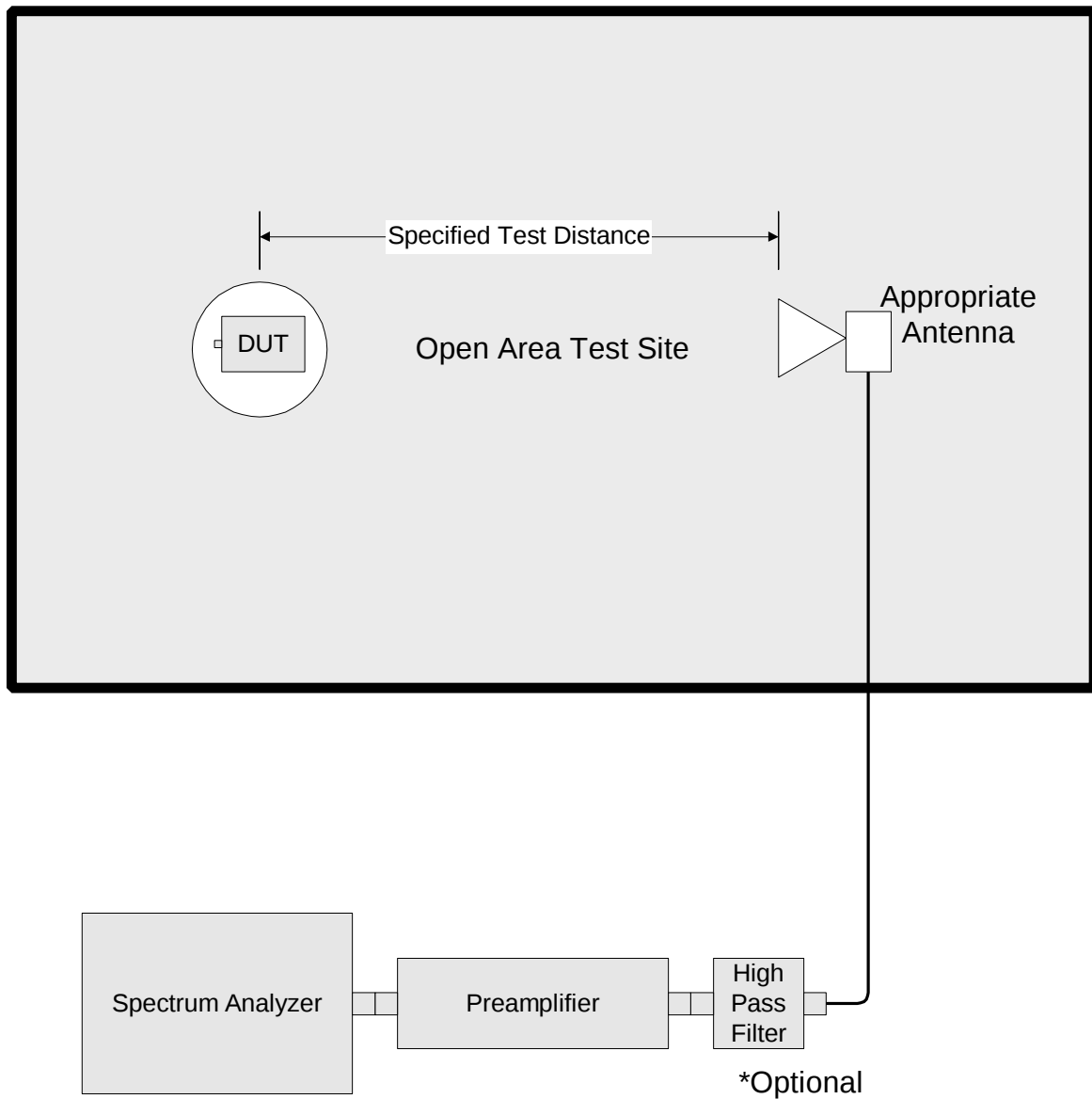
Para. No. 2.989 - Occupied Bandwidth

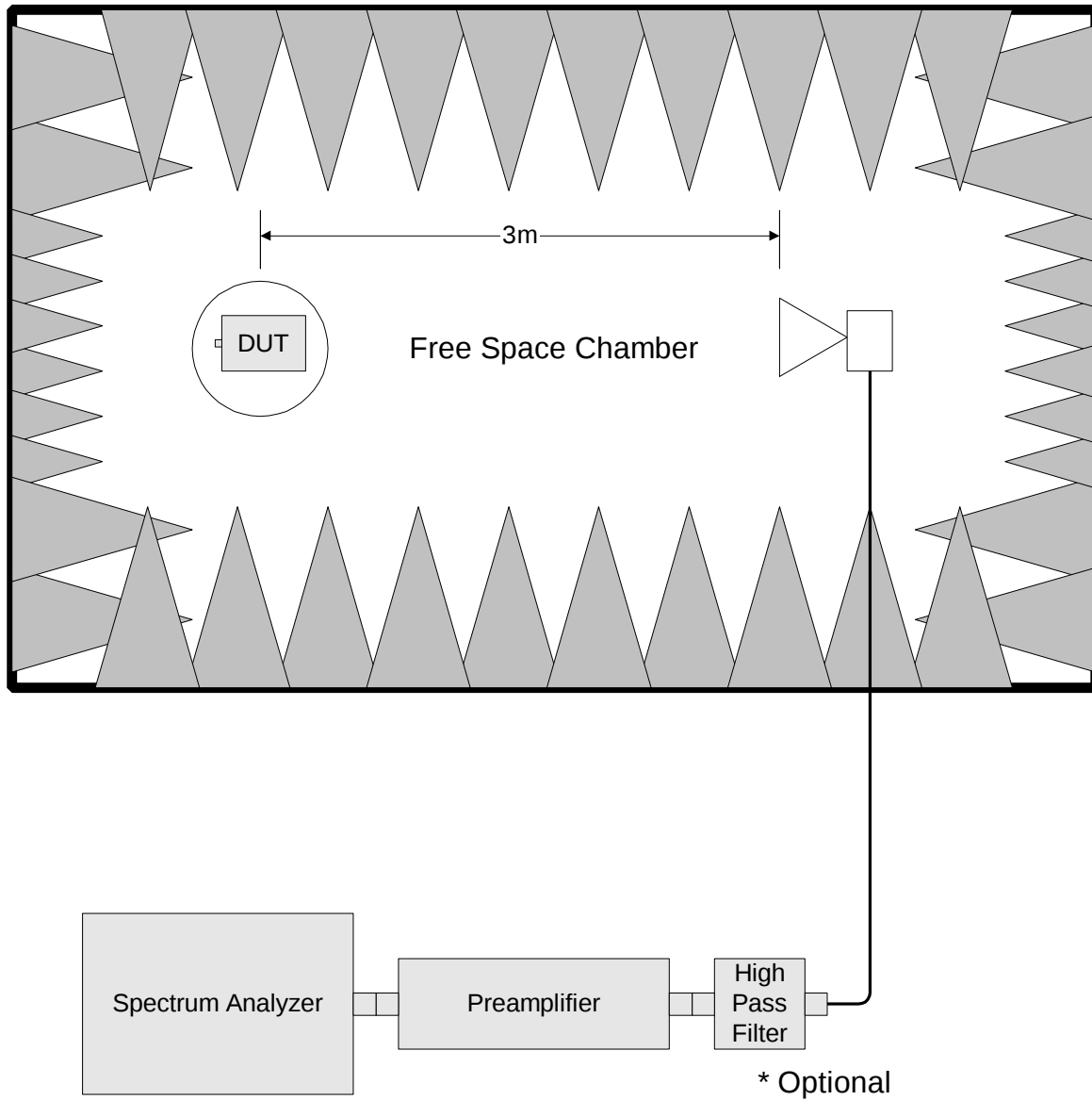


Para. No. 2.991 - Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation





Para. No. 2.995 - Frequency Stability

