

KTL Test Report: 9L0481RUS

Applicant: Allen Telecom
140 Vista Centre Dr.
Forest, VA. 2451

Equipment Under Test: MR801BI POWER AND MR801BI
SMR BAND REPEATER

FCC ID: BCR-RPT-MR801Bi

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

Tested By: KTL Dallas, Inc
802 North Kealy
Lewisville, Texas 75057

Authorized By: 
Tom Tidwell, Wireless Group Manager

Date: January 26, 2000

Total Number of Pages: 71

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi

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EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi

Section 1. Summary of Test Results

Manufacturer: Allen Telecom

Model No.: MR801BI Power and MR801BI

Serial No.: 12

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



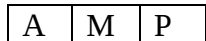
Production Unit



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".



NVLAP LAB CODE: 100351-0

TESTED BY: Ron Gaytan DATE: 12/14/99 – 1/17/00

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EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi**Summary Of Test Data****MR801Bi POWER:**

NAME OF TEST	PARA. NO.	SPEC.	MEAS.	RESULT
RF Power Output	90.205	43 dBm	43 dBm	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	SEE PLOTS	SEE PLOTS	Complies
Spurious Emissions at Antenna Terminals	90.210	-13dBm	-15 dBm	Complies
Field Strength of Spurious Emissions	90.210	-13dBm EIRP	-56.1 dBm	Complies
Frequency Stability	90.213	N/A	N/A	N/A
Transient Frequency Behavior	90.214	N/A	N/A	N/A

MR801Bi:

NAME OF TEST	PARA. NO.	SPEC.	MEAS.	RESULT
RF Power Output	90.205	37 dBm	37 dBm	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	SEE PLOTS	SEE PLOTS	Complies
Spurious Emissions at Antenna Terminals	90.210	-13dBm	-15 dBm	Complies
Field Strength of Spurious Emissions	90.210	-13dBm EIRP	-56.1 dBm	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:

The system is a rf amplifier/repeater and does not contain modulation circuitry; therefore modulation performance tests are not applicable.

The repeater tested does not perform frequency band translation; therefore frequency stability test is not applicable.

Ambient Conditions Temperature: 24 °C
Humidity: 42 %

EQUIPMENT: MR801Bi POWER AND MR801Bi
*FCC ID: BCR-RPT-MR801Bi***Section 2. General Equipment Specification****Transmitter****Supply Voltage Input:** 115 Vac**Frequency Range:** Downlink : 851.0125 MHz - 868.9875 MHz**Tunable Bands:** Uplink 806.0125 MHz - 823.9875 MHz

Type(s) of Modulation:

F3E (Voice)	F1D	F2D	D7W (iDEN)	Other
☒	☐	☐	☒	☐

Output Impedance: 50 ohms**RF Power Output (rated):** See tables below**AVAILABLE POWER PER TECHNOLOGY MR801Bi**

	iDEN	Analog
Pout at 1 channel	31.0 dBm	37.0 dBm
Pout/channel at 2 channels	25.0 dBm	27.5 dBm
Pout/channel at 4 channels	22.0 dBm	27.0 dBm
Pout/channel at 8 channels	19.0 dBm	23.0 dBm
ALC threshold	Adjustable	

AVAILABLE POWER PER TECHNOLOGY MR 801Bi Power

	iDEN	Analog
Pout at 1 channel	37.0 dBm	40.0 dBm
Pout/channel at 2 channels	31.0 dBm	37.0 dBm
Pout/channel at 4 channels	28.0 dBm	33.0 dBm
Pout/channel at 8 channels	25.0 dBm	29.0 dBm
ALC threshold	Adjustable	

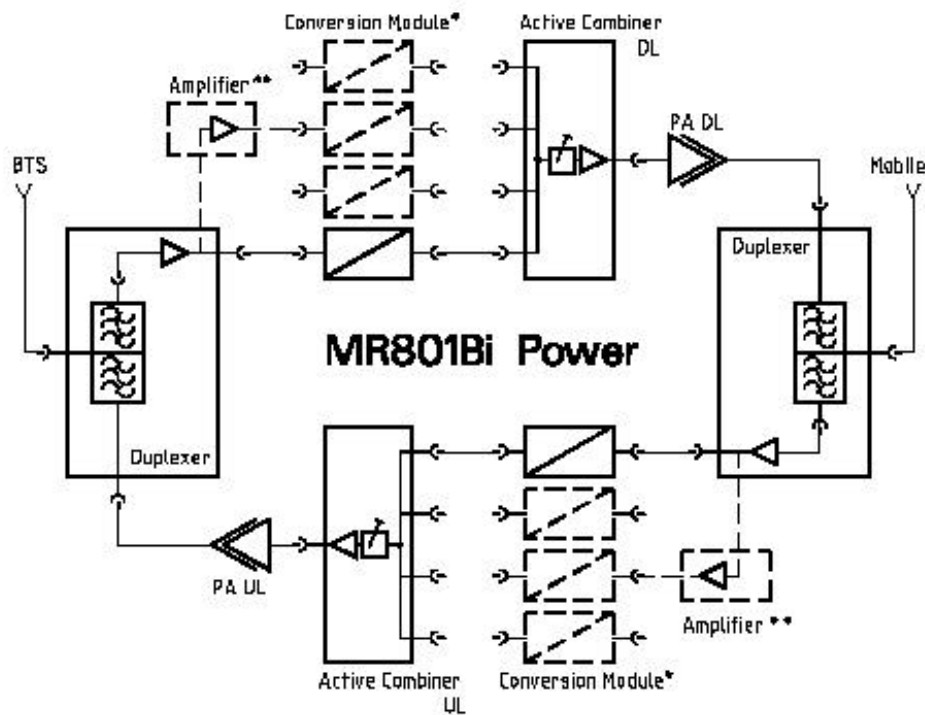
EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi

Description of Operation

The MR801Bi and MR801Bi Power is a signal coverage enhancer used in the SMR(Specialized Mobile Radio) bands. The MR801Bi can operate with both low and high power amplifier modules. A system may operate with both low power (MR801Bi) and high power (MR801Bi Power) amplifiers in the same chassis simultaneously.

The conversion modules shown in the diagram below can be either a variable bandwidth or channelized (1 - 25kHz channel per module). Much of the data presented in this report was performed with the variable bandwidth modules. Testing was also performed on the channelized conversion modules but due to the magnitude of test data, only worst-case results are reported (usually the results with variable bandwidth modules).

System Diagram



*: one physical module contains UL and DL

** : with more than two channels, the amplifiers are included; both are in one housing

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi

Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 2.985
TESTED BY: Ron Gaytan	DATES:12/14, 16, 20-22, 27/99

Test Results: Complies**Measurement Data:****MR801Bi POWER:**

Frequency (MHz)	Measured Power (dBm)		Rated Power (dBm)	
	iDEN	Analogue	iDEN	Analogue
818.0125	38.7	41.4	37.0	40.0
861.3625	38.3	41.6	37.0	40.0

MR801Bi:

Frequency (MHz)	Measured Power (dBm)		Rated Power (dBm)	
	iDEN	Analogue	iDEN	Analogue
816.3625	33.0	37.1	31.0	37.0
861.3625	33.2	37.3	31.0	37.0

EQUIPMENT: MR801Bi POWER AND MR801Bi
*FCC ID: BCR-RPT-MR801Bi***Section 4. Audio Frequency Response**

NAME OF TEST: Audio Frequency Response	PARA. NO.: 2.987(a)
TESTED BY:	DATE:

Audio Frequency Response

Frequency	300	600	900	1.2 k	1.5 k	1.8 k	2.1k	2.3 k	2.6 k	3.0 k	3.5 k	4 k
Frequency	4.5 k	5 k	5.5 k	6 k	6.5 k	7 k	7.5 k	8 k	8.5 k	9 k	9.5 k	10 k

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi

Section 5. Audio Low-Pass Filter Response

NAME OF TEST: Audio Low-Pass Filter Response	PARA. NO.: 2.987(a)
TESTED BY:	DATE:

Audio Low-Pass Filter Response

Frequency	1k	3 k	3.5 k	4 k	4.5 k	5 k	5.5 k	6 k	7 k	8 k	9 k	10 k

Not Applicable

KTL Dallas, Inc.

FCC PART 90, SUBPART I
PRIVATE LAND MOBILE TRANSMITTER
PROJECT NO.: 9L0481RUS

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi

Section 6. Modulation Limiting

NAME OF TEST: Modulation Limiting	PARA. NO.: 2.987(b)
TESTED BY:	DATE:

Maximum deviation for non-voice modulation _____ kHz.

Not Applicable

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi

Section 7. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.989
TESTED BY: Ron Gaytan	DATES:12/14, 16, 20-22, 27/99, 1/13, 14, 17/00

Test Results: Complies**Test Data:** See attached graph(s).

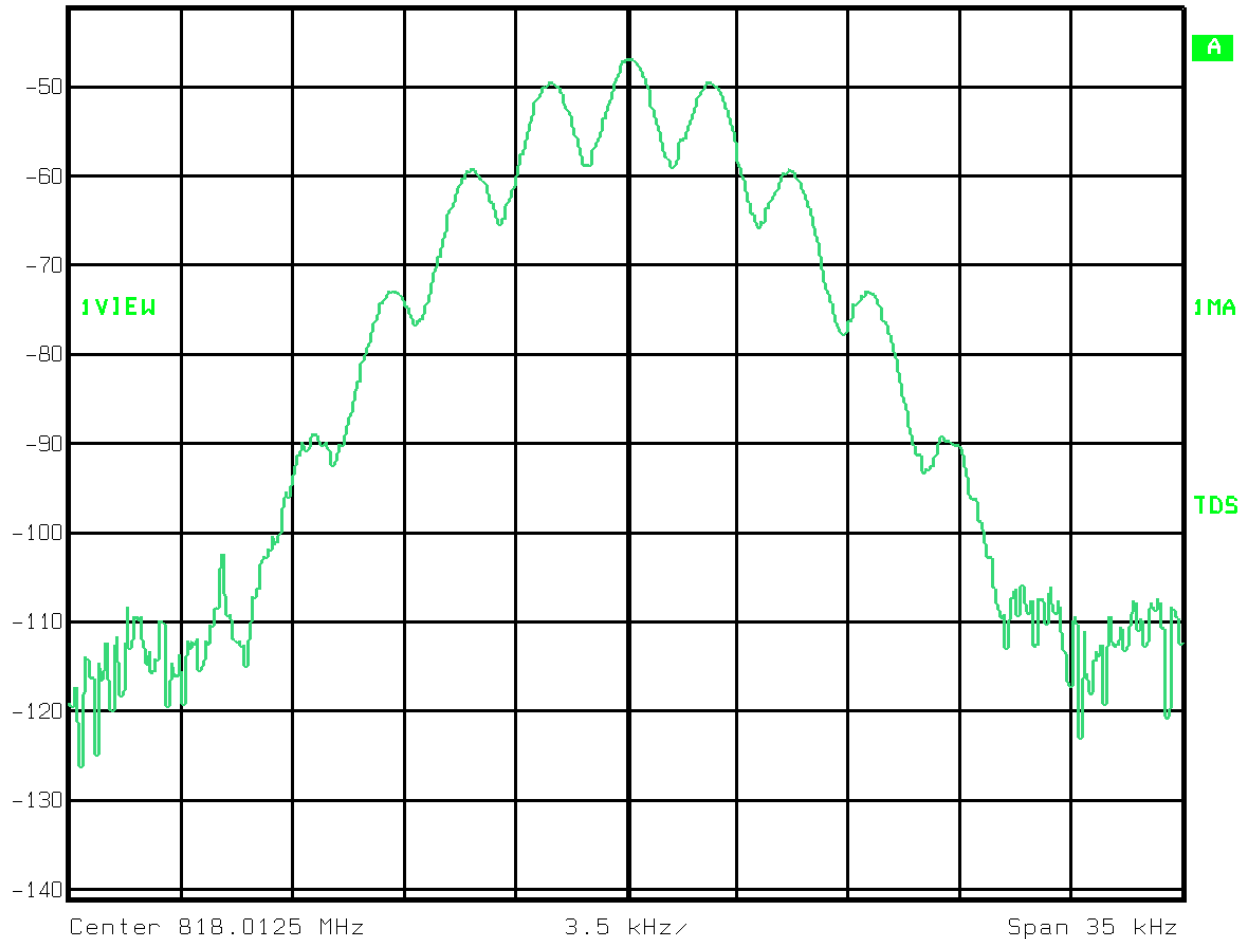
Occupied Bandwidth was evaluated by comparing the output spectrum to the input spectrum. Data is presented for the variable bandwidth module as worst-case. Data for the channelized module was also evaluated but, in the interest of brevity, is not presented here.

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



Ref Lvl
-41 dBm

RBW	1 kHz	RF Att	10 dB
VBW	1 kHz	Mixer	-10 dBm
SWT	150 ms	Unit	dBm



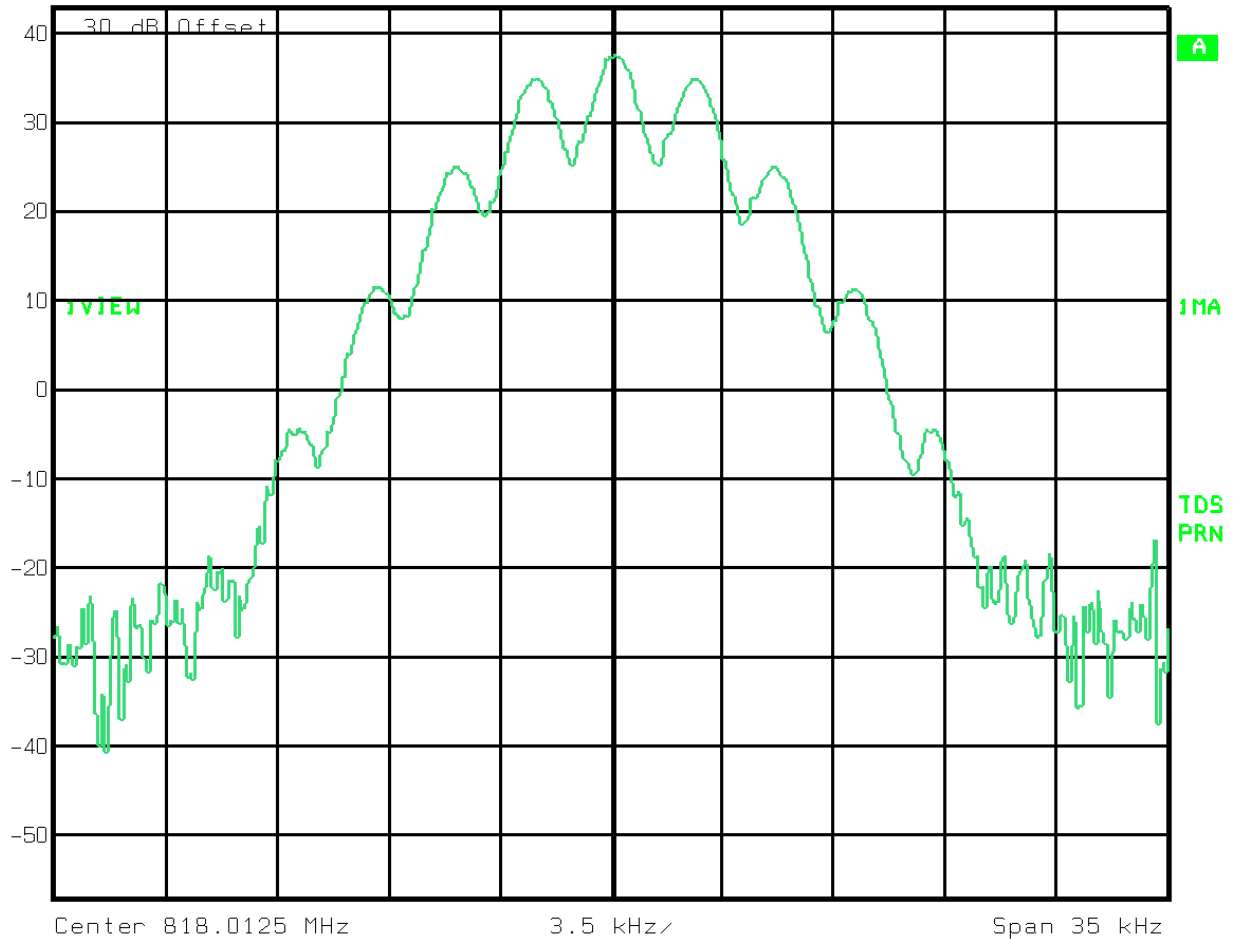
Title: VARIABLE BANDWIDTH MODULE - iDEN BOOSTER (UPLINK)
Comment A: OCCUPIED BANDWIDTH VOICE MODULATION Input Signal(CHANNEL481)
OCBWI02.PCX
Date: 16.DEC.1999 14:46:00

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



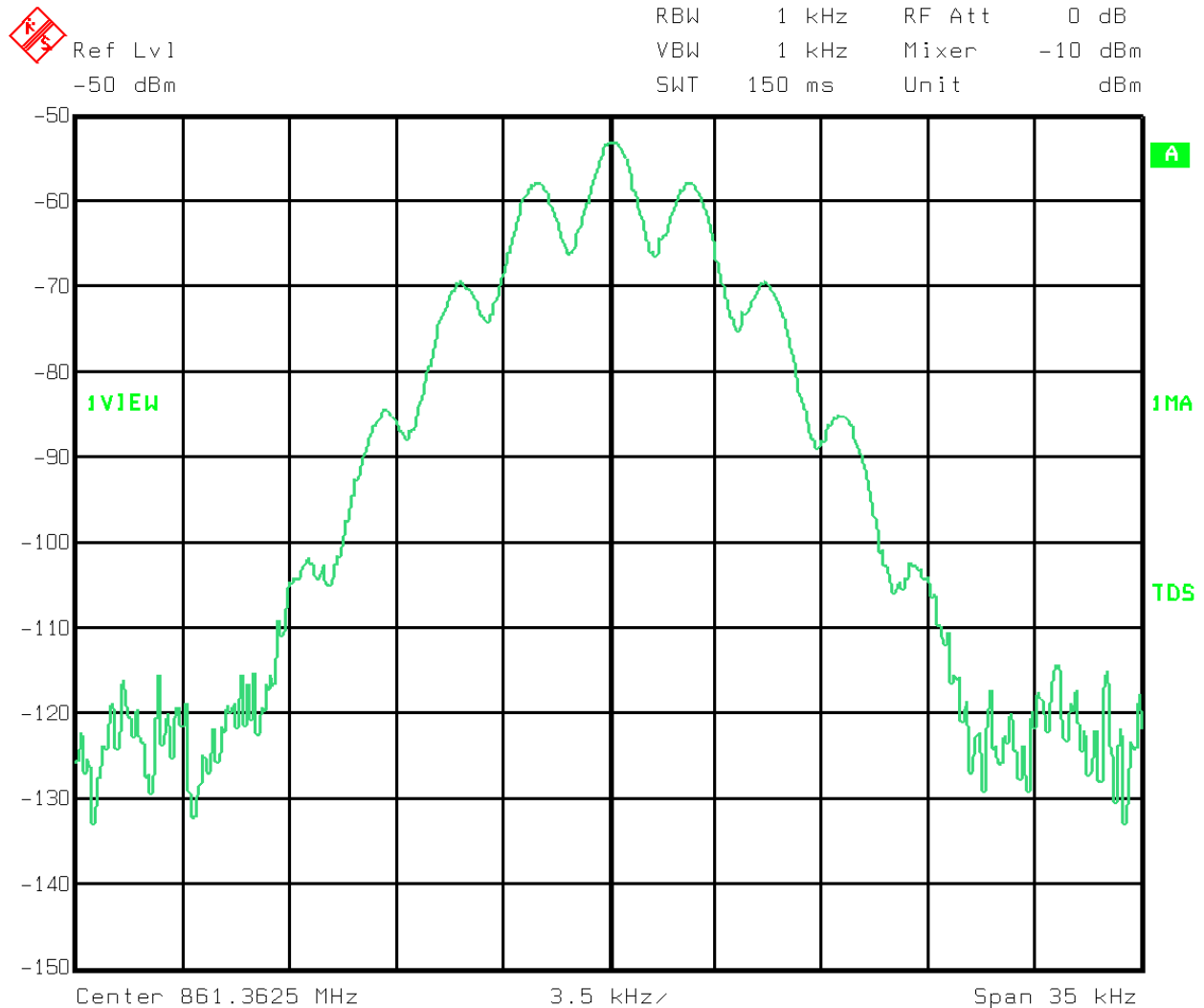
Ref Lvl
43 dBm

RBW	1 kHz	RF Att	30 dB
VBW	1 kHz	Mixer	-10 dBm
SWT	150 ms	Unit	dBm



Title: VARIABLE BANDWIDTH MODULE - iDEN BOOSTER (UPLINK)
Comment A: OCCUPIED BANDWIDTH VOICE MODULATION (CHANNEL 481)
OCBW02.PCX
Date: 16.DEC.1999 14:40:56

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



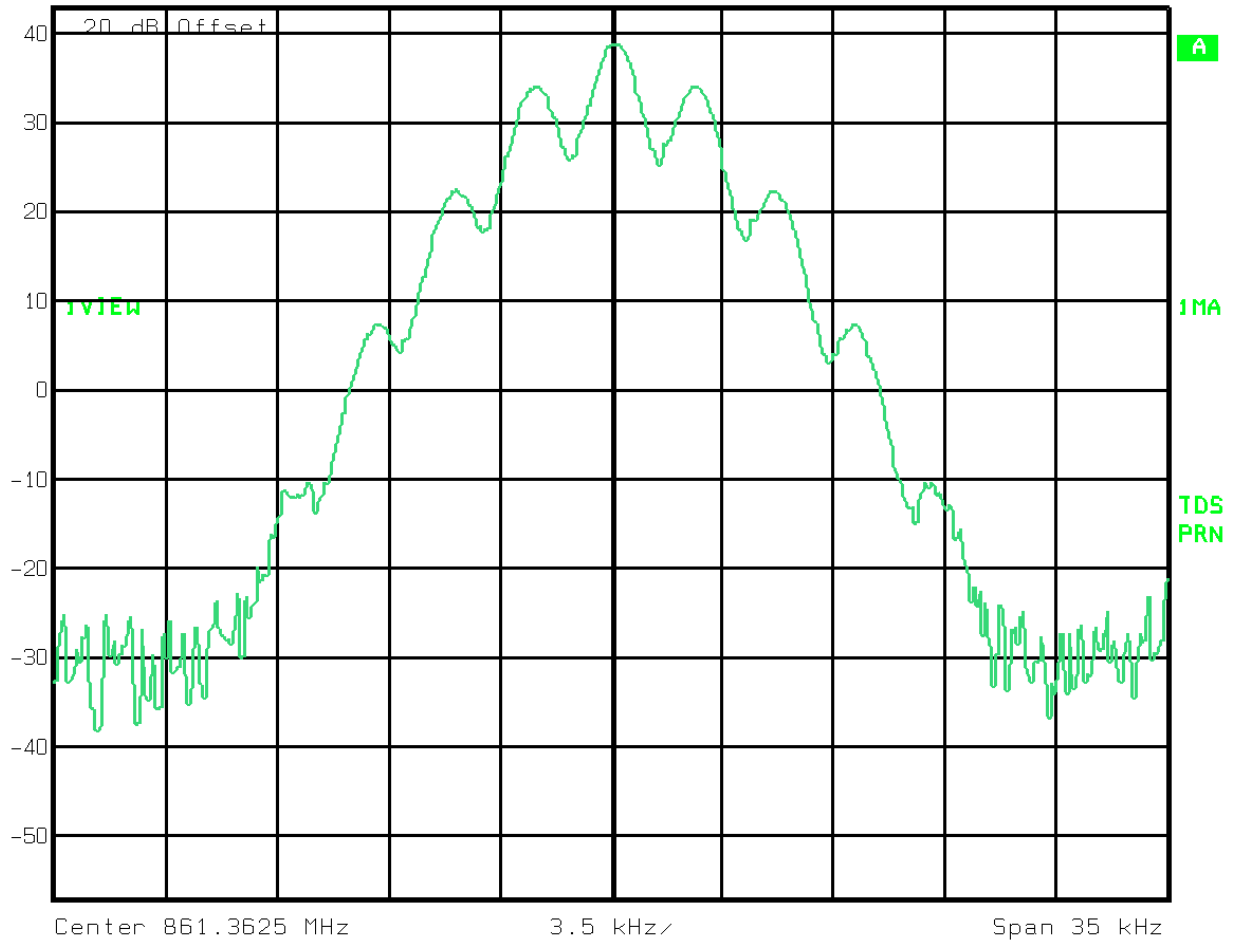
Title: VARIABLE BANDWIDTH MODULE - iDEN BOOSTER
Comment A: OCCUPIED BANDWIDTH VOICE MODULATION INPUT SIGNAL (CHANNEL 4
OCBWI01.PCX
Date: 14.DEC.1999 15:42:03

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



Ref Lvl
43 dBm

RBW	1 kHz	RF Att	40 dB
VBW	1 kHz	Mixer	-10 dBm
SWT	150 ms	Unit	dBm



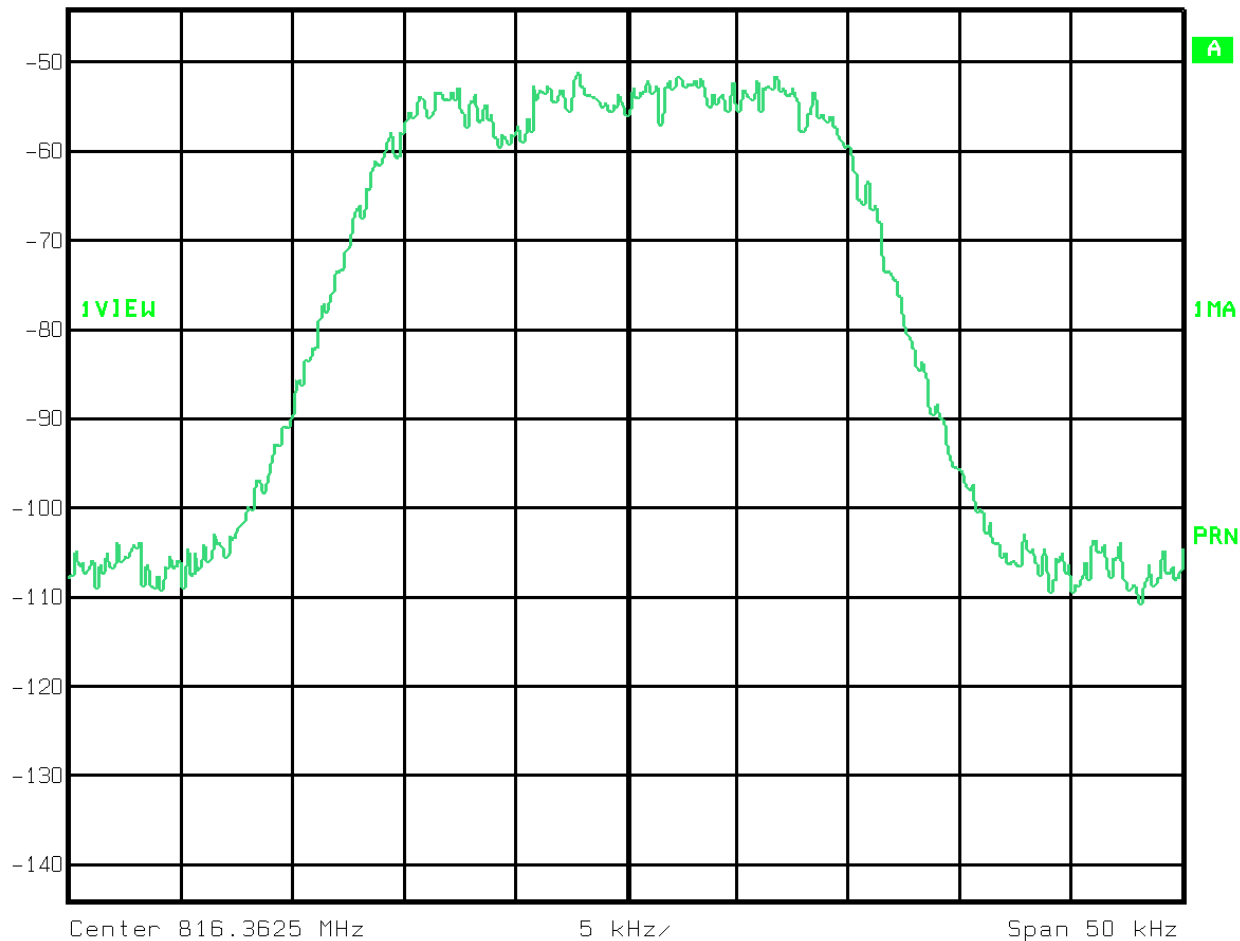
Title: VARIABLE BANDWIDTH MODULE - iDEN BOOSTER
Comment A: OCCUPIED BANDWIDTH VOICE MODULATION (CHANNEL 415)
OCBW01.PCX
Date: 14.DEC.1999 15:37:01

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



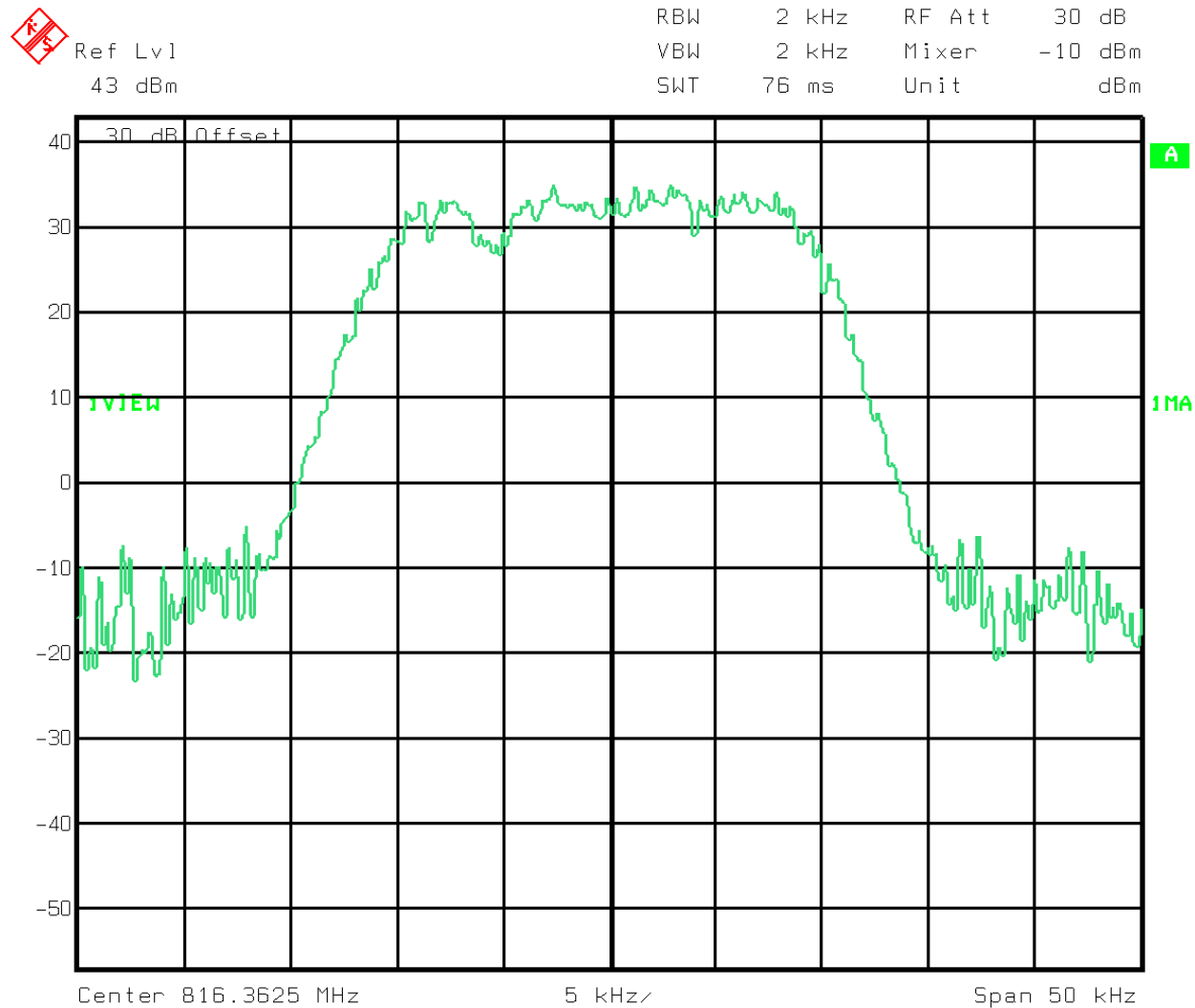
Ref Lvl
-44 dBm

RBW	2 kHz	RF Att	10 dB
VBW	2 kHz	Mixer	-10 dBm
SWT	76 ms	Unit	dBm



Title: VARIABLE BANDWIDTH MODULE - iDEN BOOSTER (UPLINK)
Comment A: OCCUPIED BANDWIDTH INPUT SIGNAL iDEN MODULATION
OCBWI03.PCX
Date: 20.DEC.1999 15:59:20

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



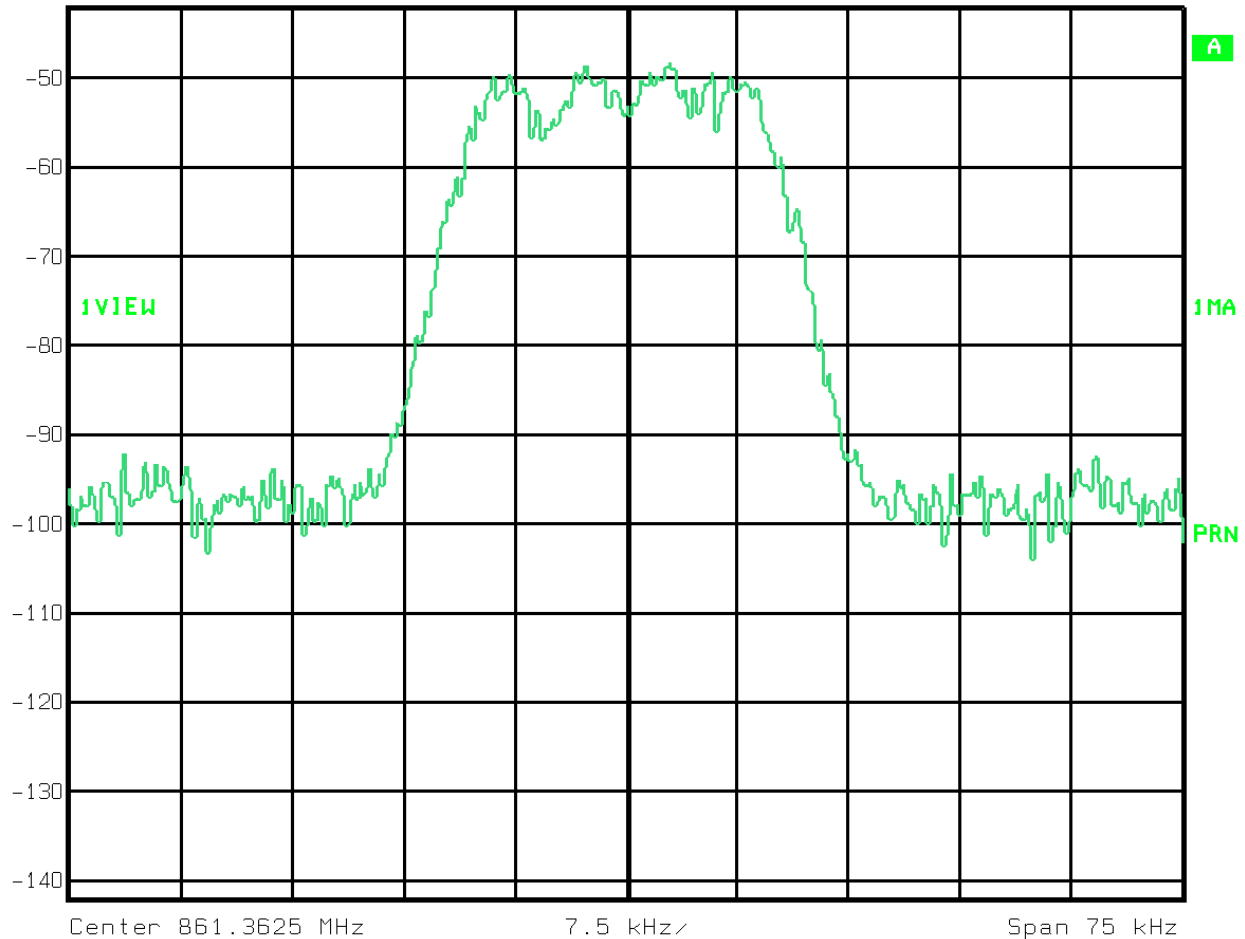
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Comment A: OCCUPIED BANDWIDTH iDEN MODULATION
OCBW003.PCX
Date: 20.DEC.1999 15:54:36

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



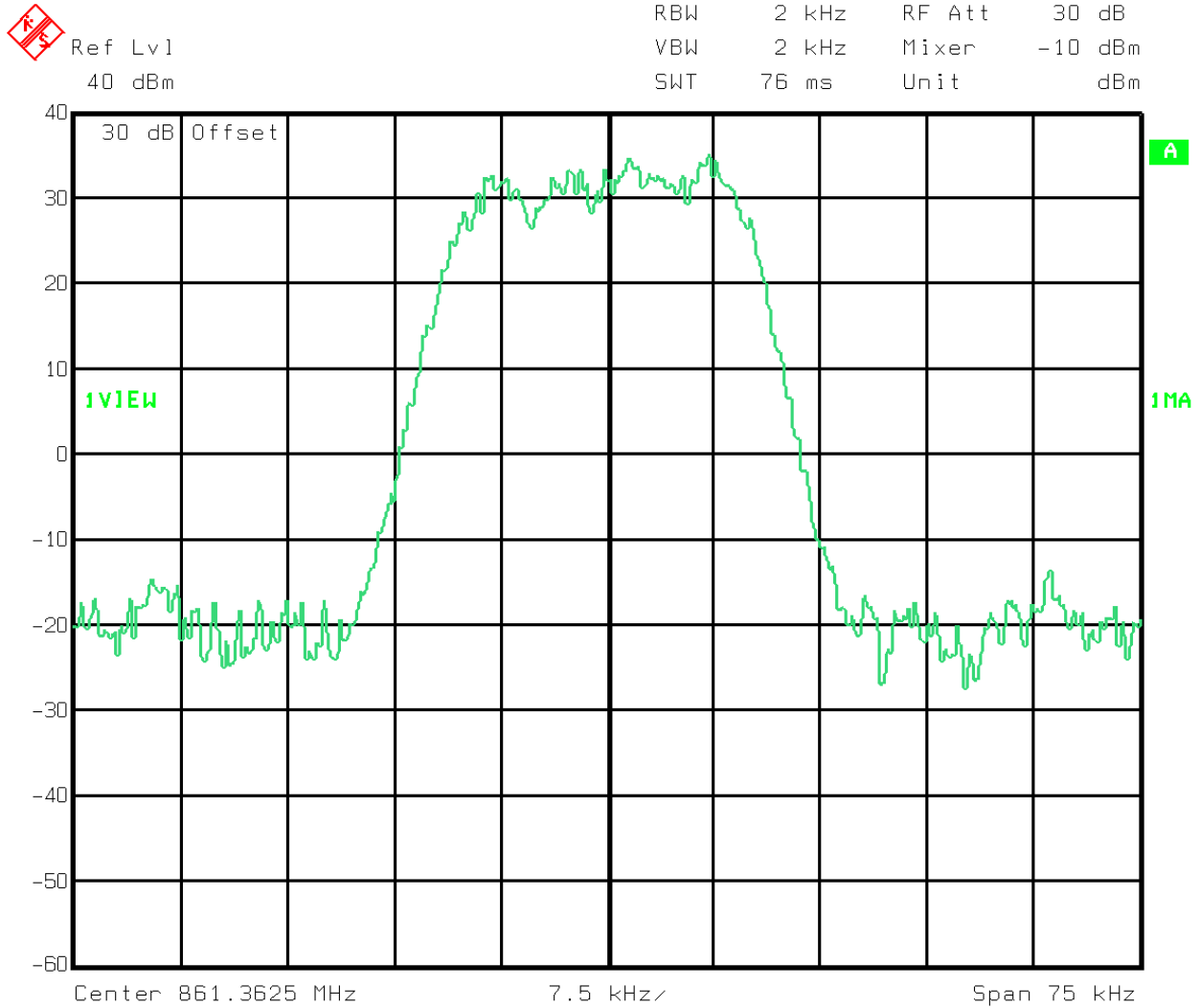
Ref Lvl
-42 dBm

RBW	2 kHz	RF Att	20 dB
VBW	2 kHz	Mixer	-10 dBm
SWT	76 ms	Unit	dBm



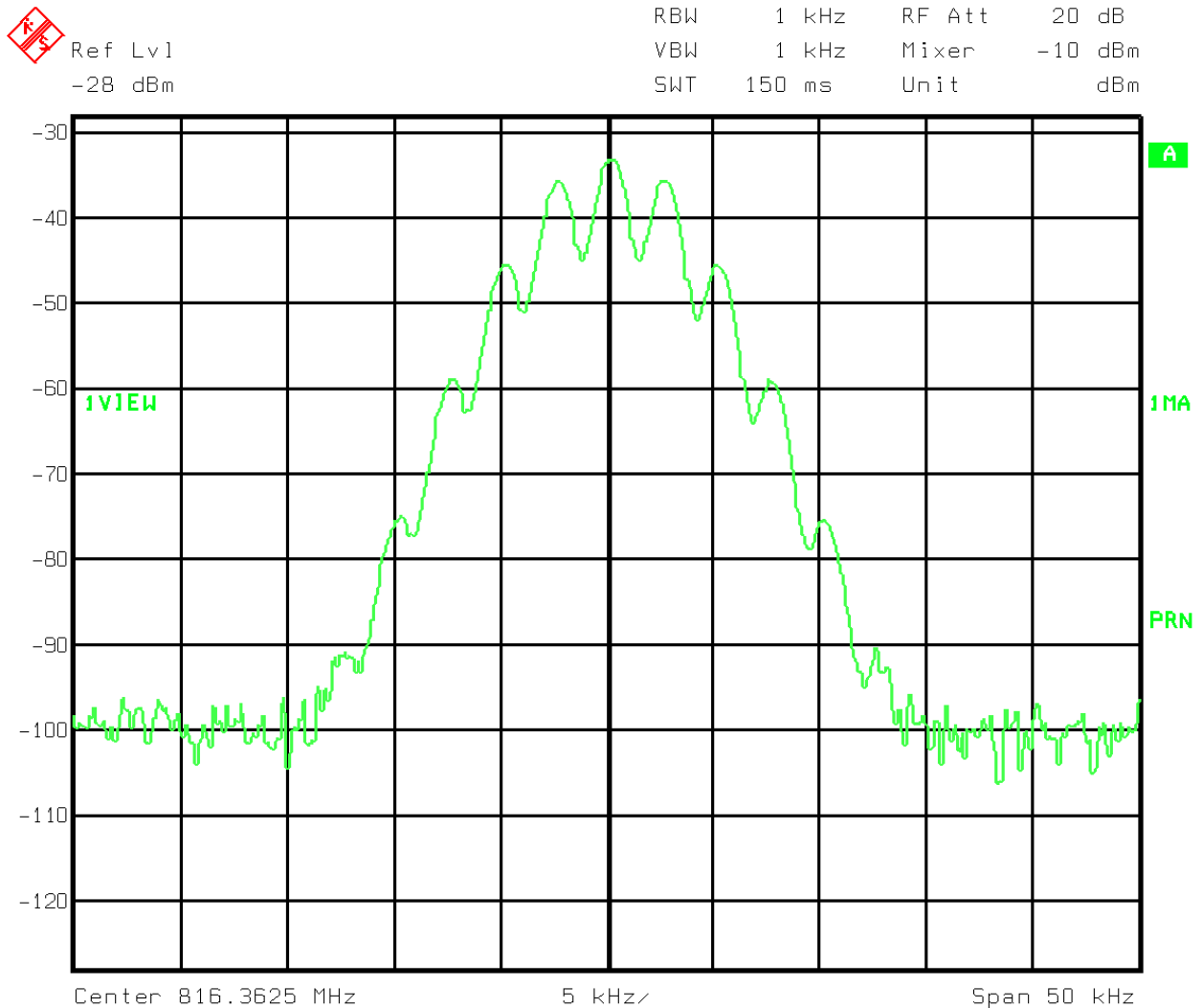
Title: VARIABLE BANDWIDTH MODULE - iDEN BOOSTER (DOWNLINK)
Comment A: OCCUPIED BANDWIDTH INPUT SIGNAL iDEN MODULATION
OCBWID4.PCX (CHANNEL 415)
Date: 21.DEC.1999 10:24:51

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



Title: VARIABLE BANDWIDTH MODULE - iDEN BOOSTER (DOWNLINK)
Comment A: OCCUPIED BANDWIDTH iDEN MODULATION
OCBW004.PCX (CHANNEL 415)
Date: 21.DEC.1999 10:20:46

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



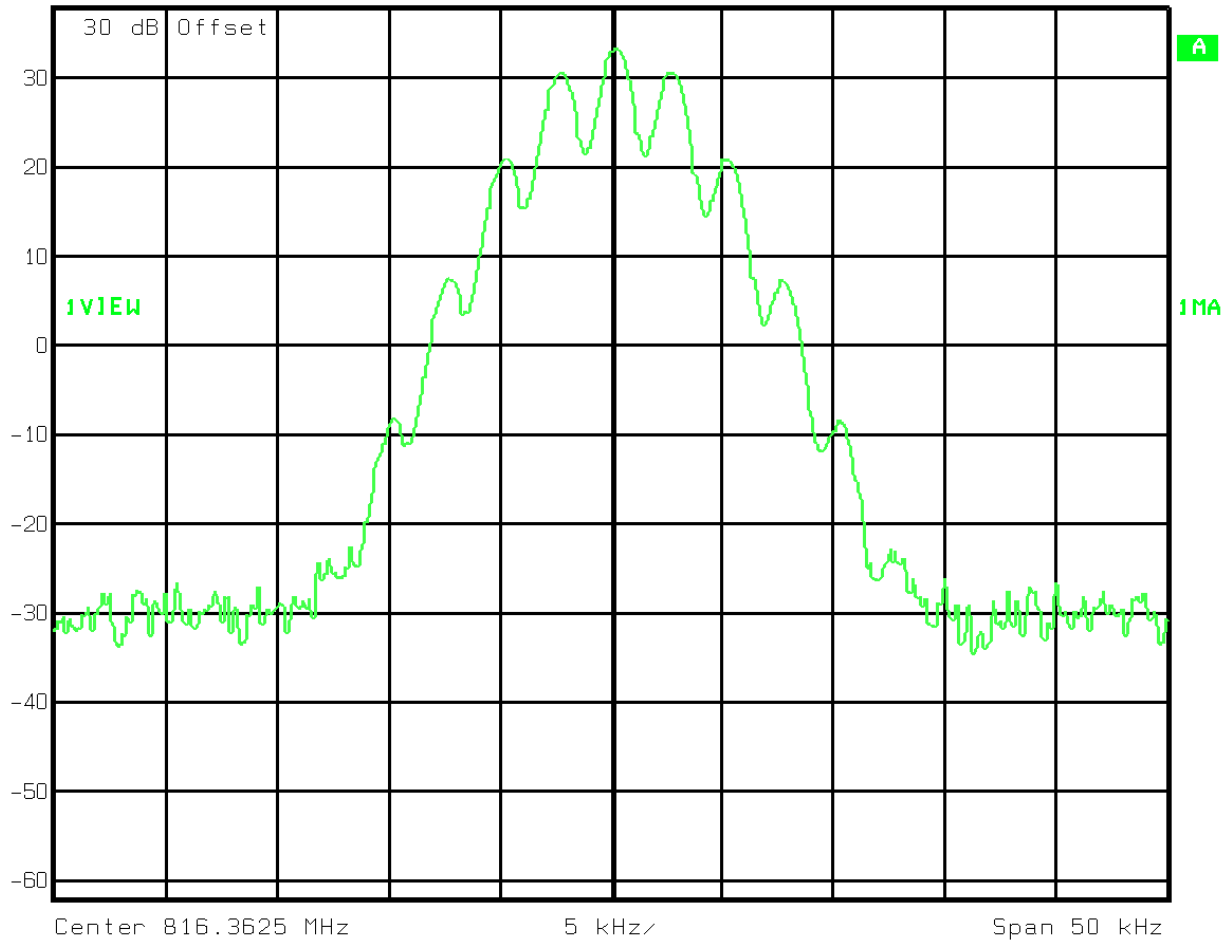
Title: VARIABLE BANDWIDTH MODULE- iDEN BOOSTER (UPLINK)
Comment A: OCCUPIED BANDWIDTH INPUT SIGNAL VOICE MODULATION
OCBWID8.PCX (CHANNEL 415) 8 WATT AMPLIFIER
Date: 27.DEC.1999 12:01:28

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



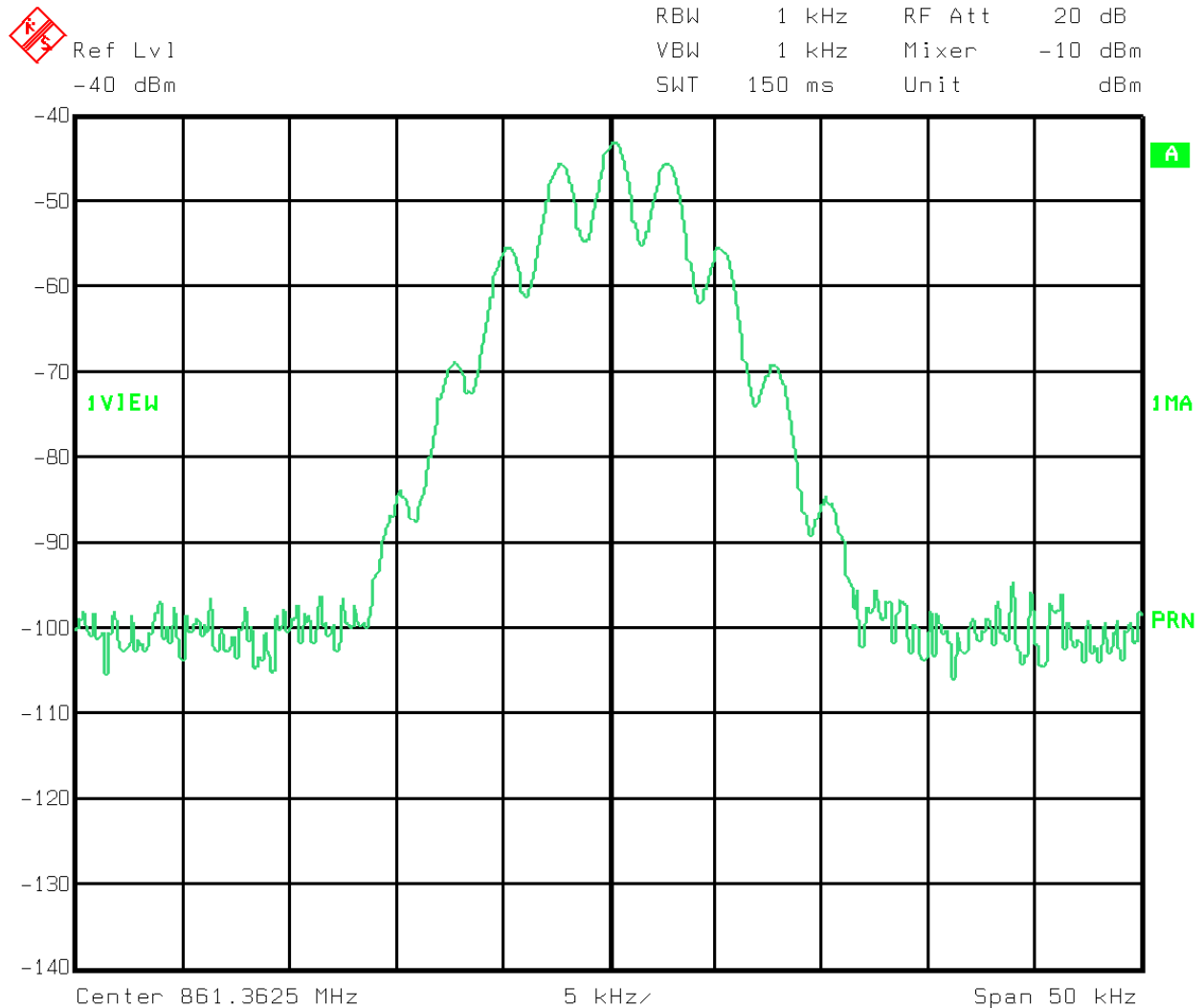
Ref Lvl
38 dBm

RBW	1 kHz	RF Att	30 dB
VBW	1 kHz	Mixer	-10 dBm
SWT	150 ms	Unit	dBm



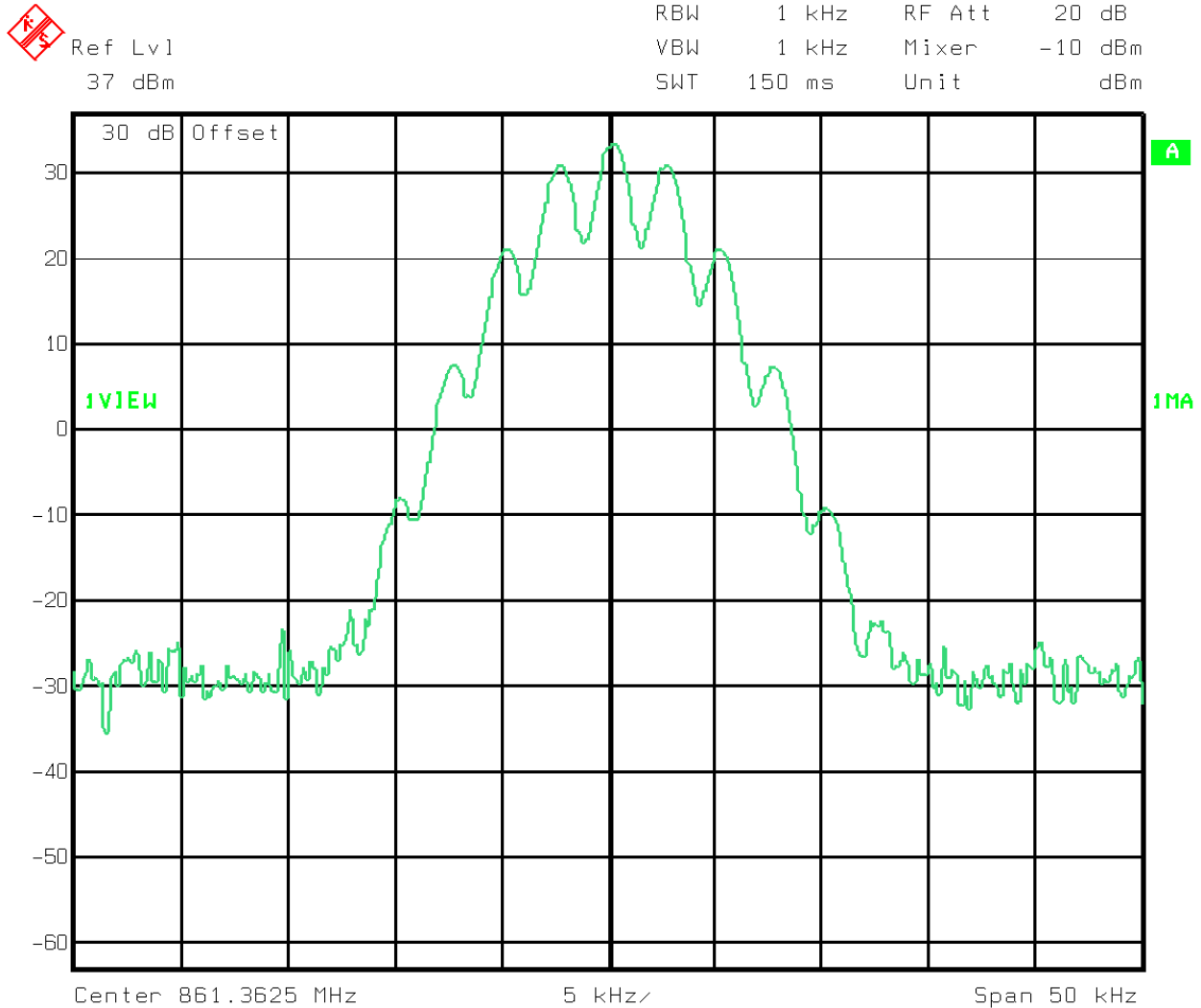
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Comment A: OCCUPIED BANDWIDTH VOICE MODULATION
OCBW008.PCX (CHANNEL 415) 8 WATT AMPLIFIER
Date: 27.DEC.1999 10:29:22

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



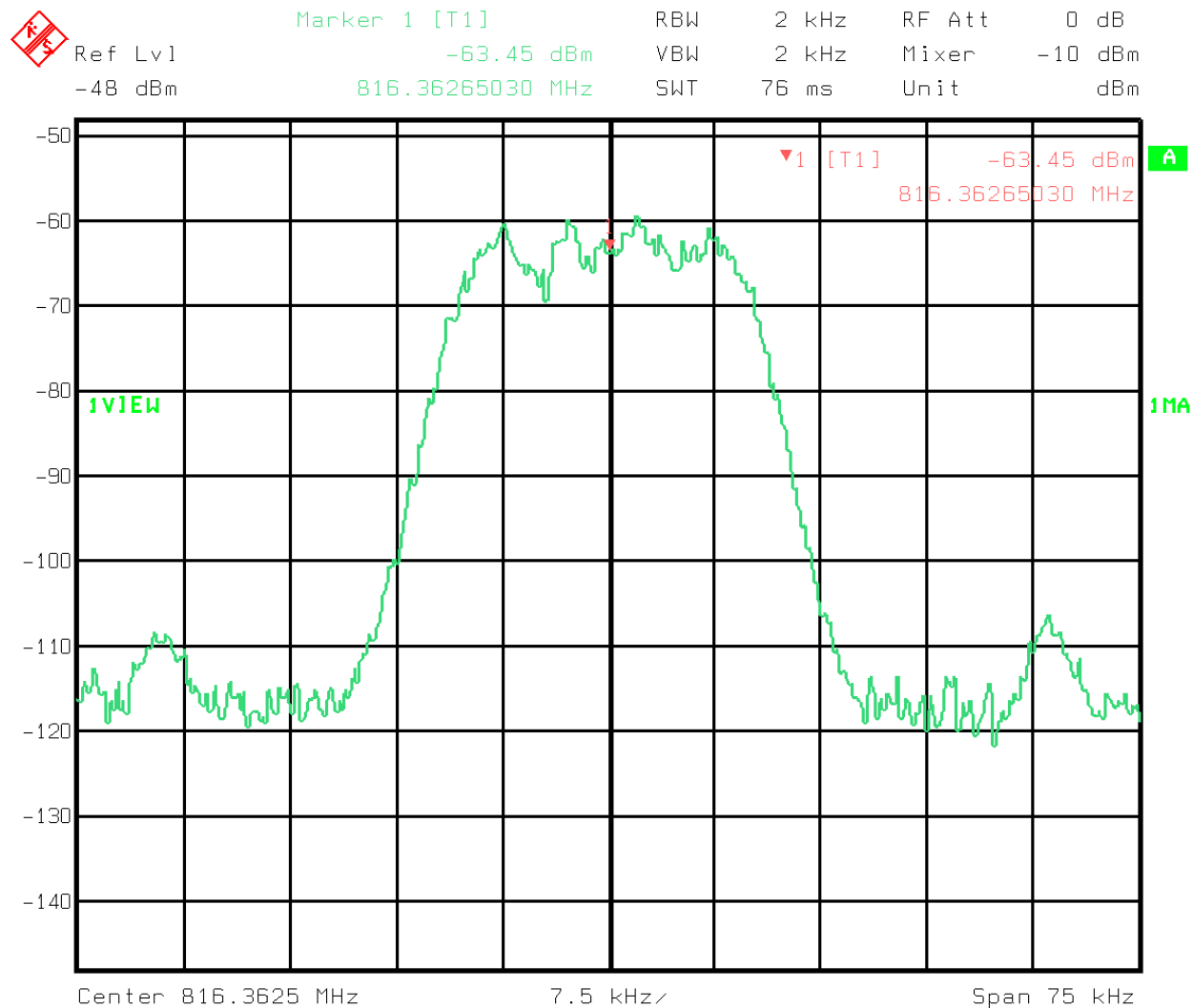
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Comment A: OCCUPIED BANDWIDTH INPUT SIGNAL VOICE MODULATION
OCBWID7.PCX (CHANNEL 415) 8 WATT AMPLIFIER
Date: 22.DEC.1999 12:17:16

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



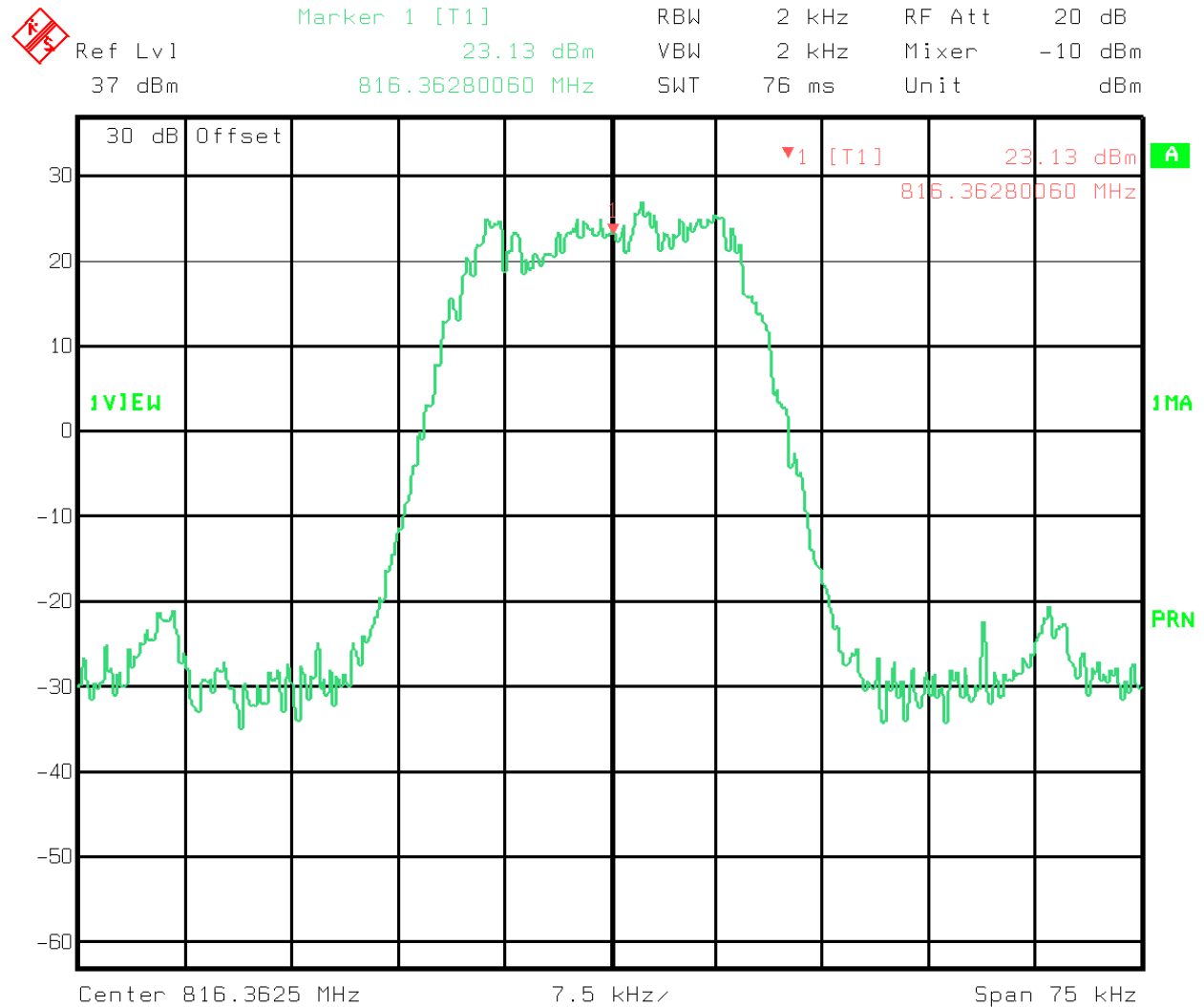
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Comment A: OCCUPIED BANDWIDTH VOICE MODULATION
OCBW007.PCX (CHANNEL 415) 8 WATT AMPLIFIER
Date: 22.DEC.1999 12:14:27

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



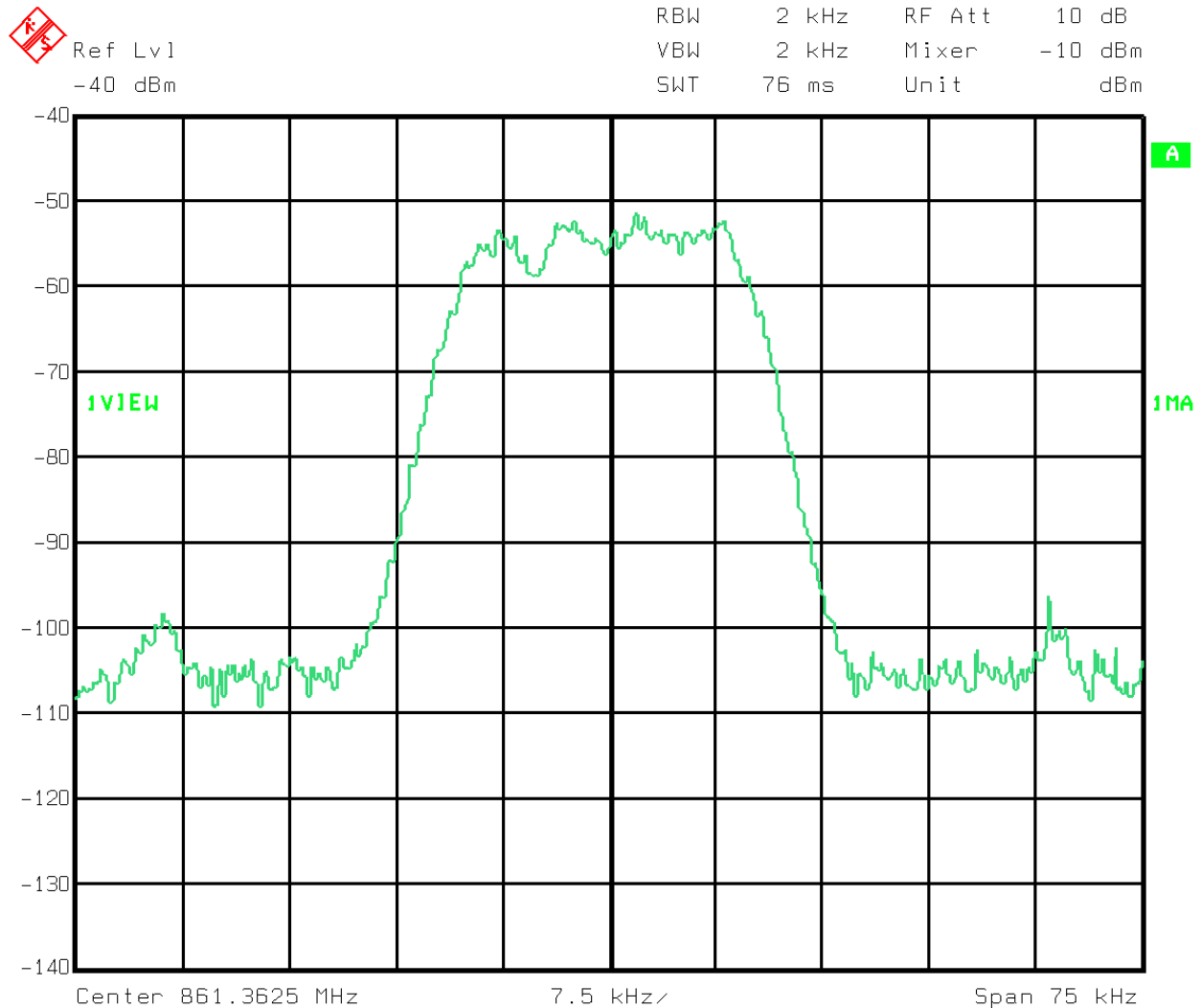
Title: VARIABLE BANDWIDTH MODULE - iDEN BOOSTER (UPLINK)
Comment A: OCCUPIED BANDWIDTH INPUT SIGNAL iDEN MODULATION
OCBWID6.PCX (CHANNEL 415) 8 WATT AMPLIFIER
Date: 21.DEC.1999 14:38:12

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



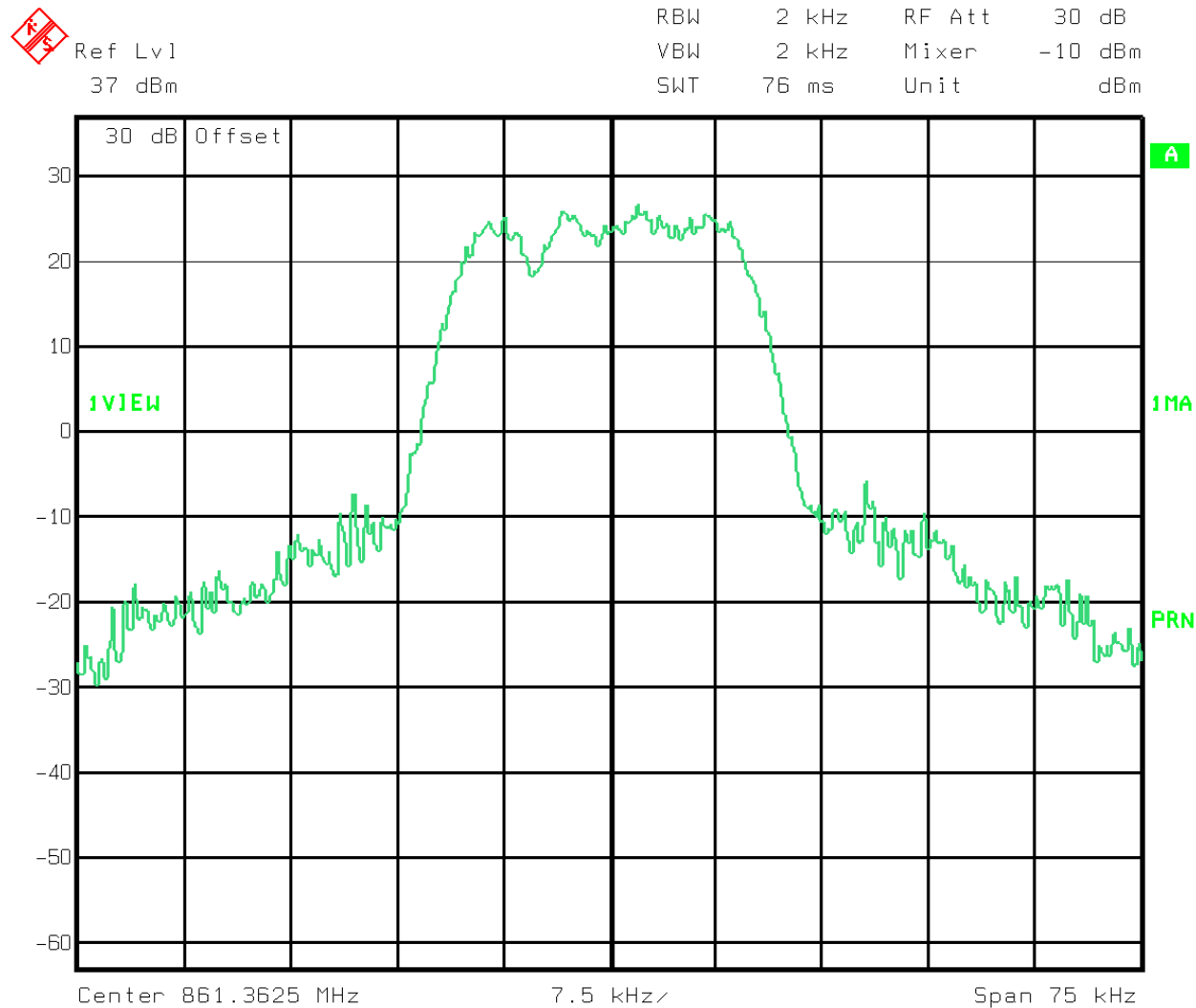
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Comment A: OCCUPIED BANDWIDTH iDEN MODULATION
OCBW006.PCX (CHANNEL 415) 8 WATT AMPLIFIER
Date: 21.DEC.1999 14:33:51

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



Title: VARIABLE BANDWIDTH MODULE - iDEN BOOSTER (DOWNLINK)
Comment A: OCCUPIED BANDWIDTH INPUT SIGNAL iDEN MODULATION
OCBWI05.PCX (CHANNEL 415)@ 8 WATT AMPLIFIER
Date: 21.DEC.1999 11:32:56

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



Title: VARIABLE BANDWIDTH MODULE - iDEN BOOSTER (DOWNLINK)
Comment A: OCCUPIED BANDWIDTH iDEN MODULATION
OCBW005.PCX (CHANNEL 415)@ 8 WATT AMPLIFIER
Date: 21.DEC.1999 11:28:47

KTL Dallas, Inc.

FCC PART 90, SUBPART I
PRIVATE LAND MOBILE TRANSMITTER
PROJECT NO.: 9L0481RUS

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi

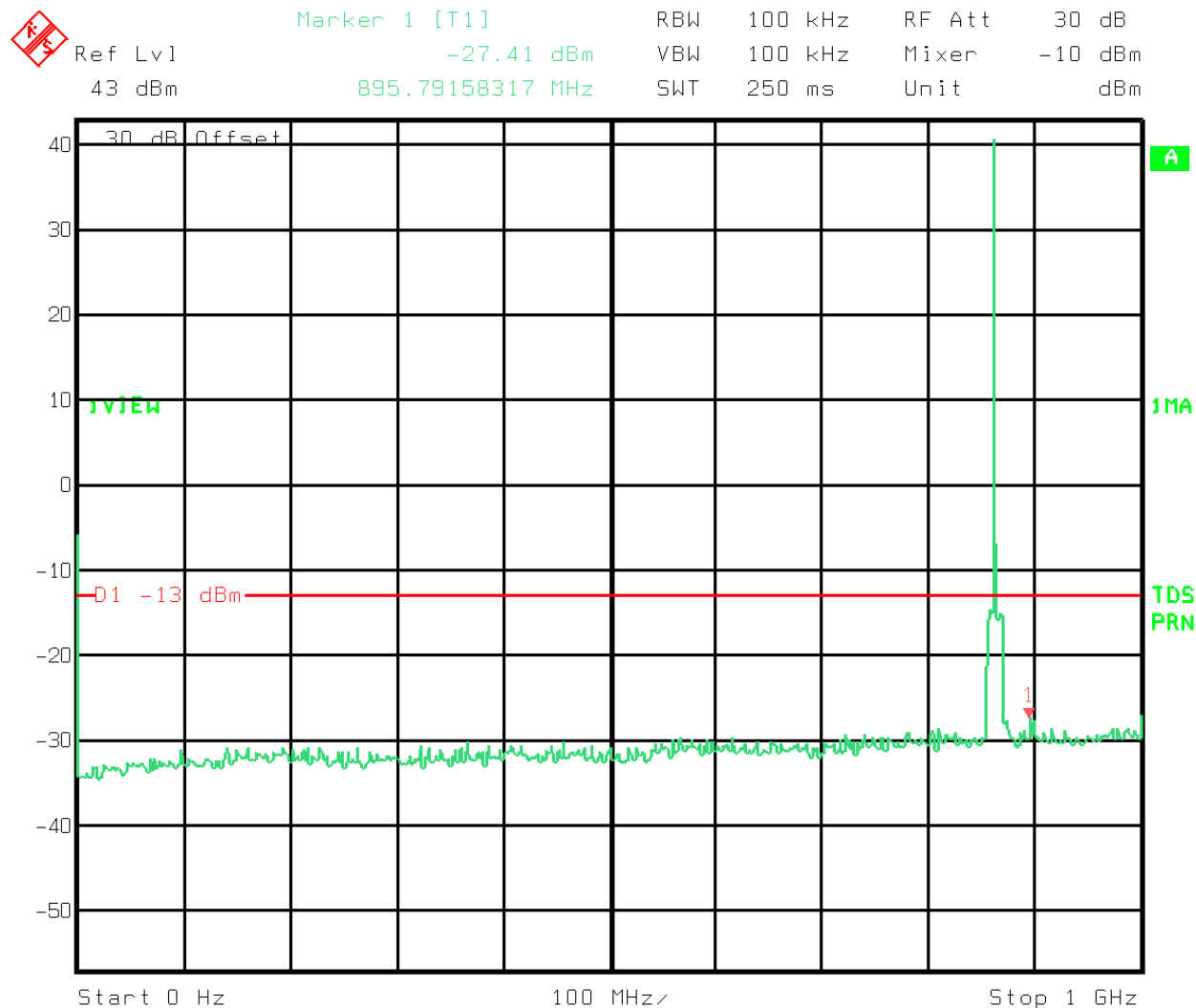
Section 8. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.991
TESTED BY: Ron Gaytan	DATES: 12/14, 16, 20-22, 27/99, 1/13, 14, 17/00

Test Results: Complies.

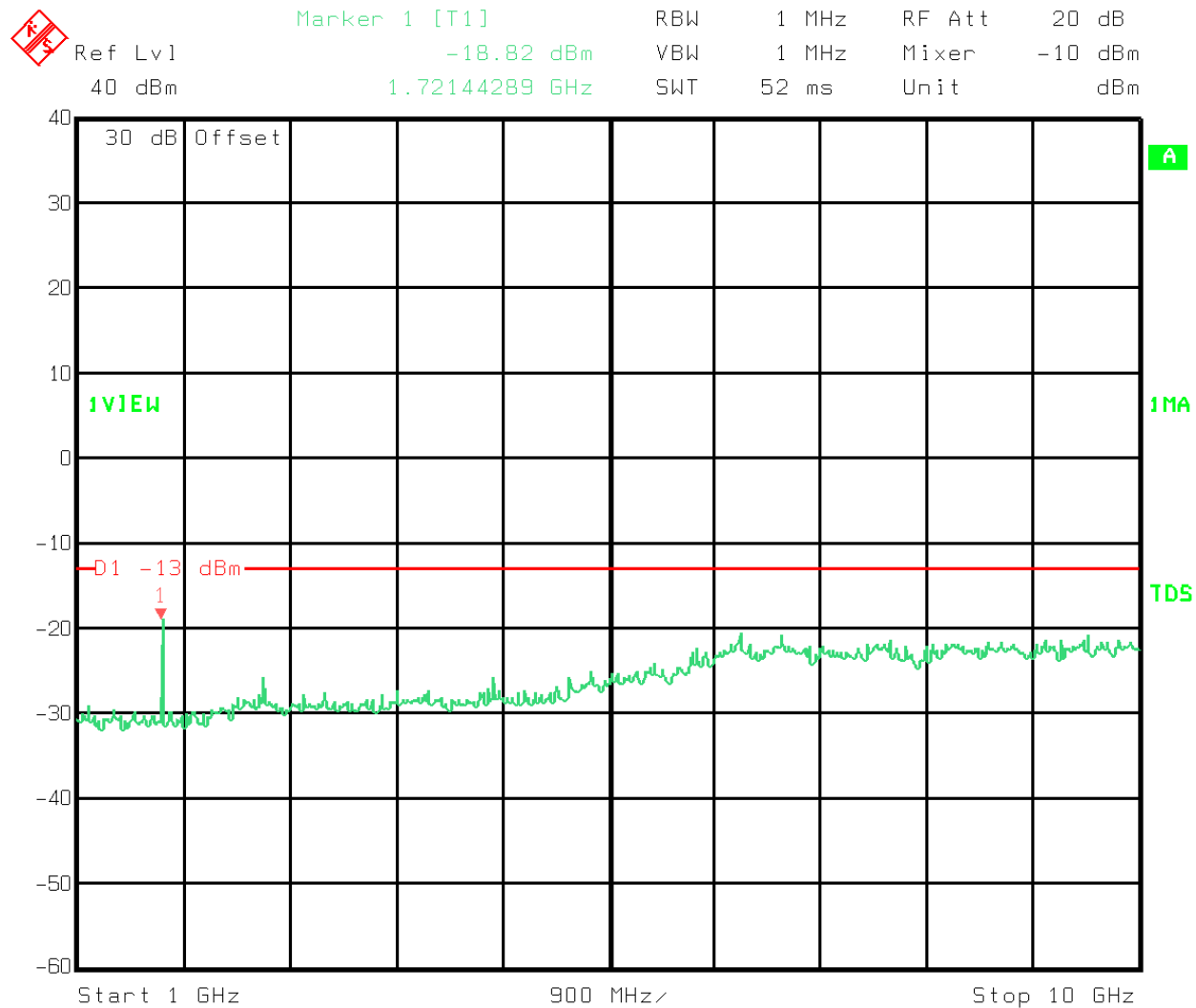
Test Data: See attached graph(s).

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi

SPURIOUS EMISSIONS PLOT(S)

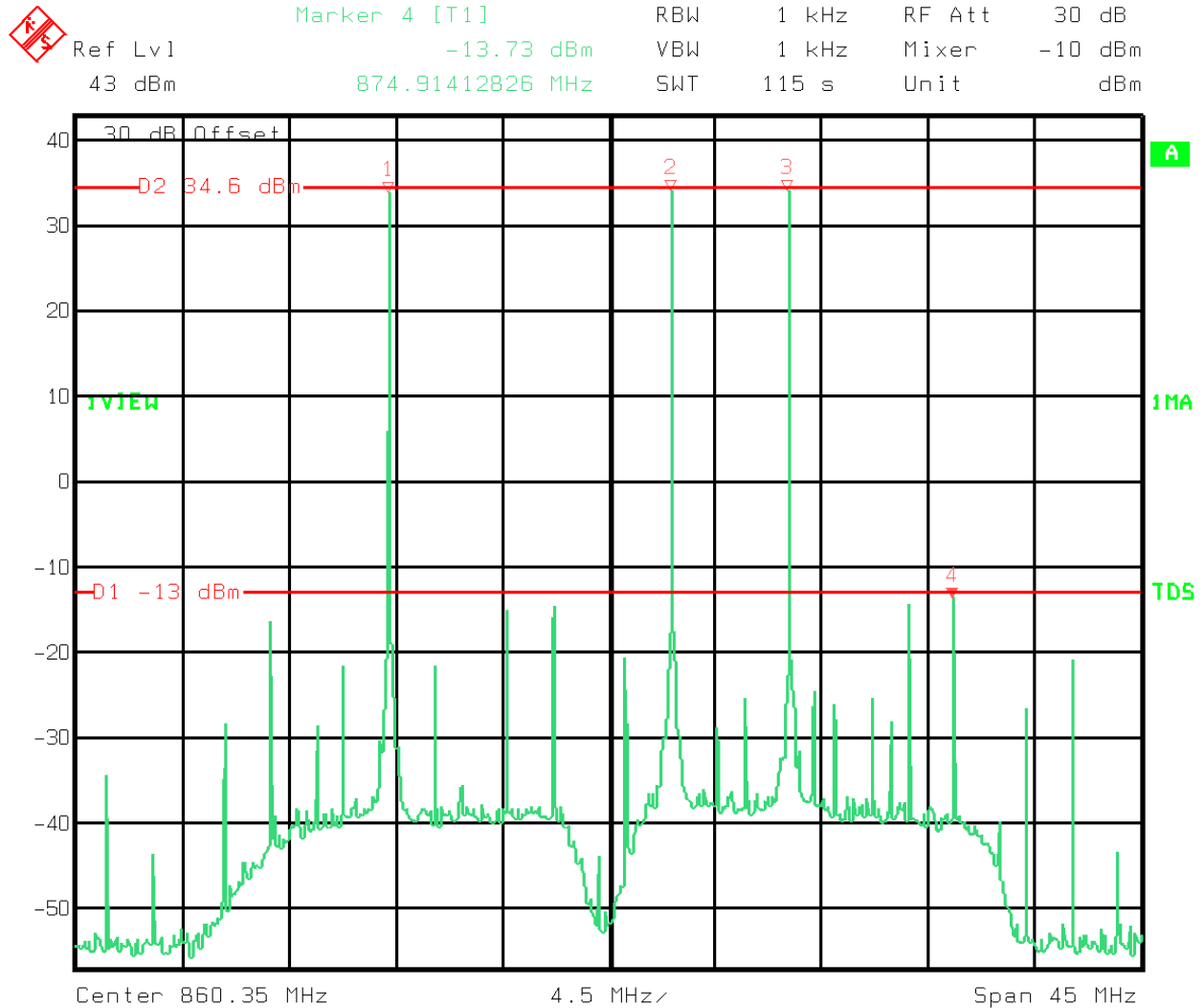
Title: VARIABLE BANDWIDTH MODULE - iDEN BOOSTER
Comment A: ANTENNA PORT SPURIOUS EMISSIONS VOICE MODULATION (CHANNEL 4
APSE01.PCX
Date: 14.DEC.1999 15:54:16

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



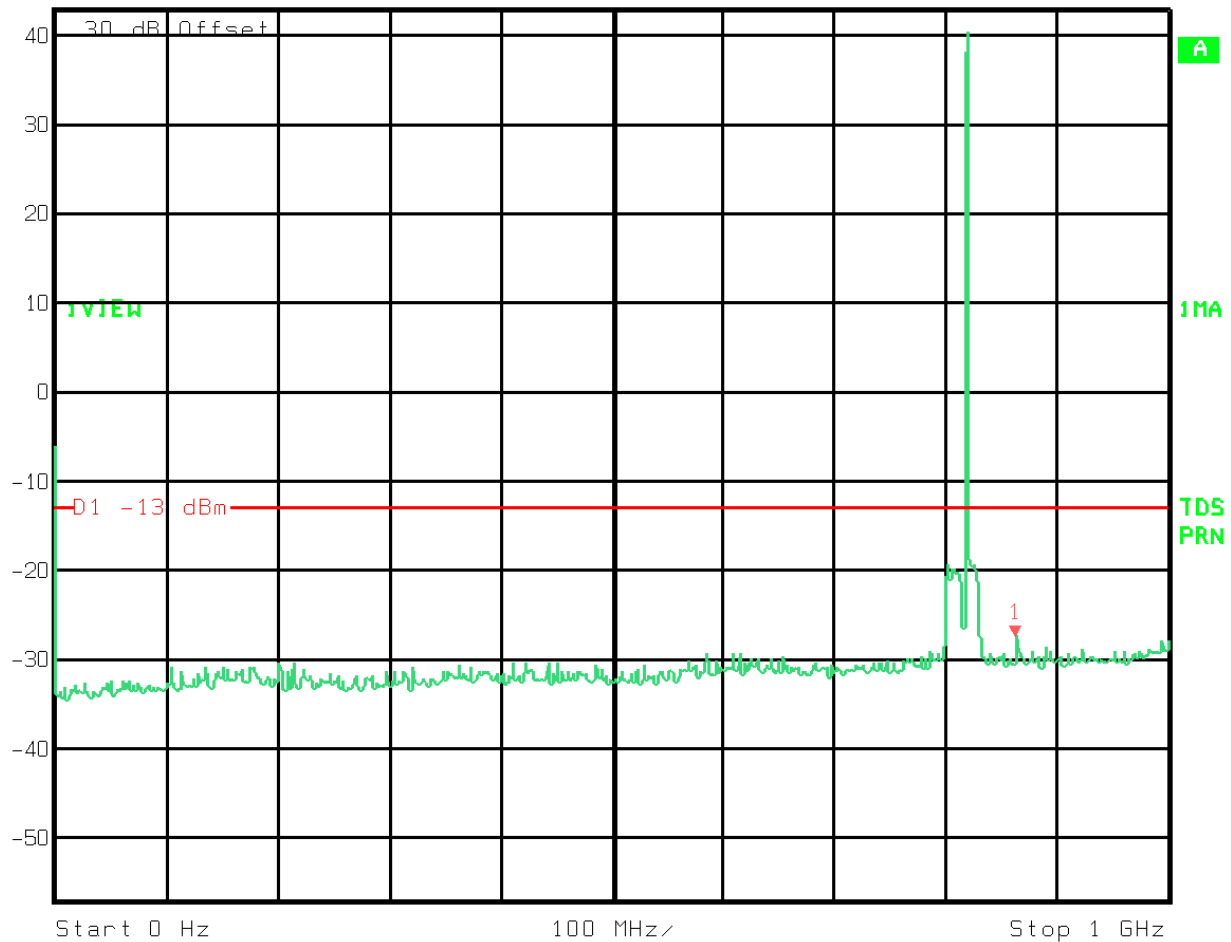
Title: VARIABLE BANDWIDTH MODULE - iDEN BOOSTER
Comment A: ANTENNA PORT SPURIOUS EMISSIONS VOICE MODULATION (CHANNEL 4
APSE01A.PCX
Date: 14.DEC.1999 15:55:37

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



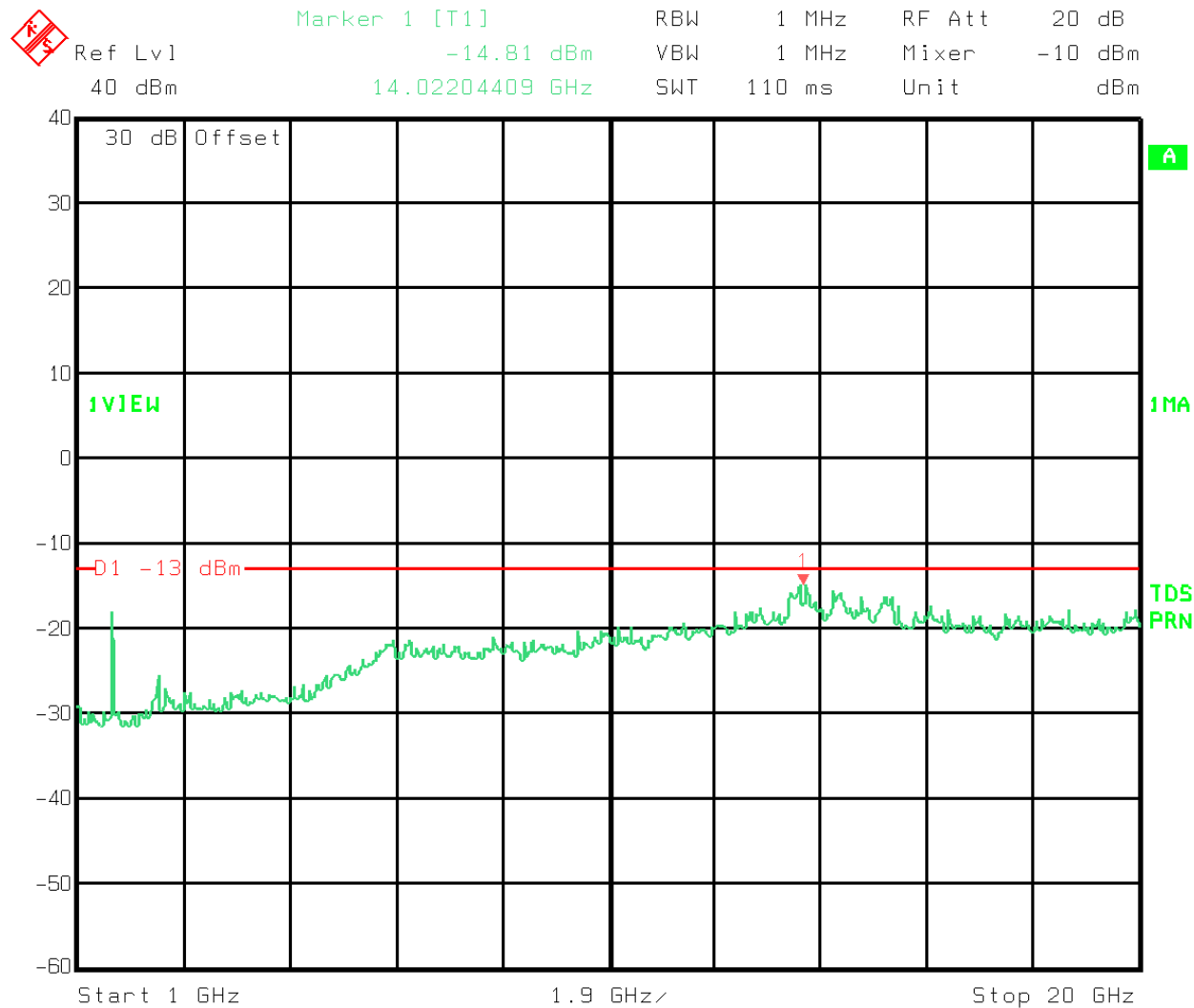
Title: VARIABLE BANDWIDTH MODULE - iDEN BOOSTER
Comment A: INTERMODULATION VOICE MODULATION (CHANNEL 4,481, & 830)
3SIGIM01.PCX
Date: 16.DEC.1999 11:29:04

	Ref Lvl	Marker 1 [T1]	RBW	100 kHz	RF Att	30 dB
		-27.48 dBm	VBW	100 kHz	Mixer	-10 dBm
	43 dBm	863.72745491 MHz	SWT	250 ms	Unit	dBm



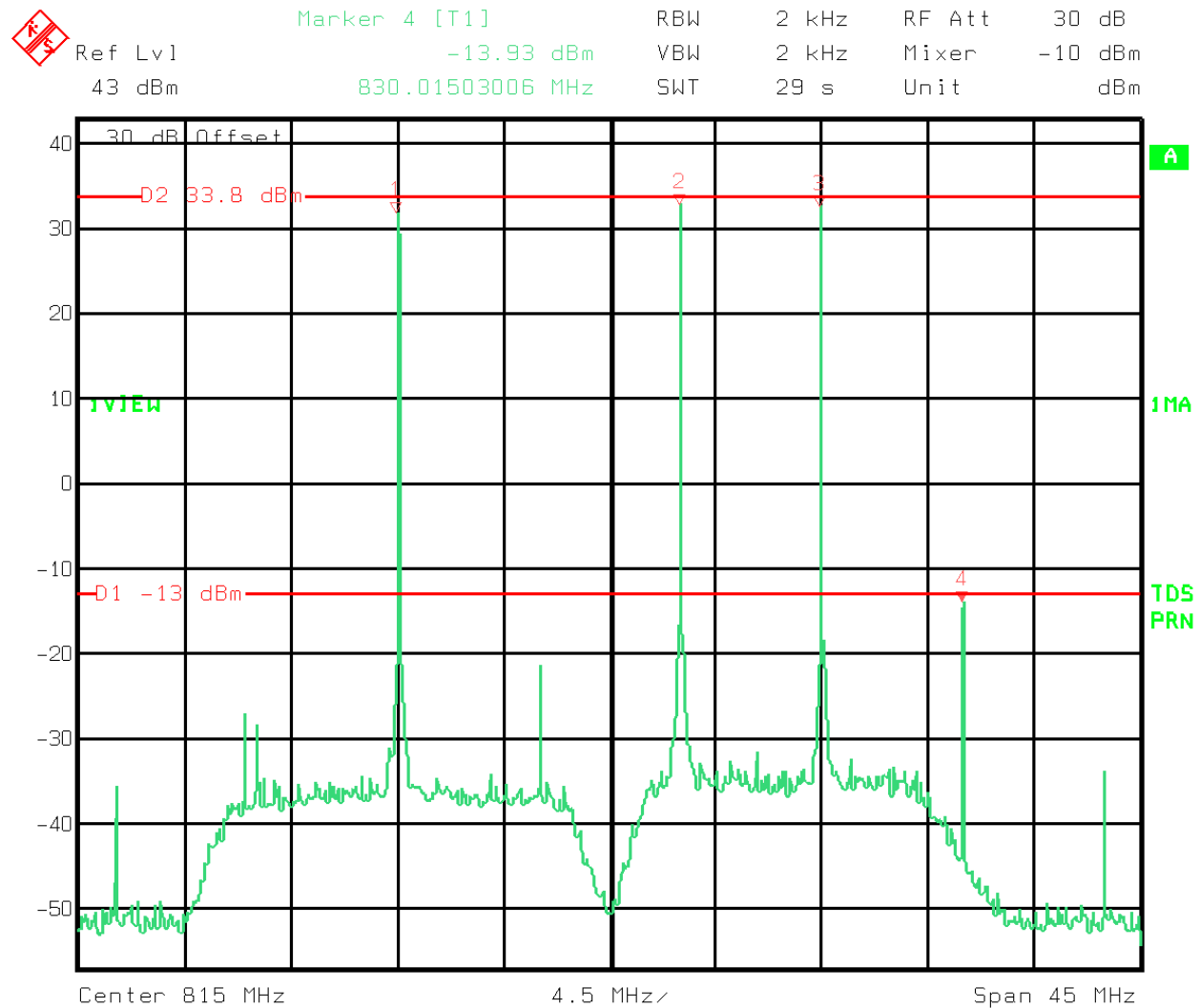
Title: VARIABLE BANDWIDTH MODULE - iDEN BOOSTER (UPLINK)
Comment A: ANTENNA PORT SPURIOUS EMISSIONS VOICE MODULATION (CHANNEL481
APSE02.PCX
Date: 16.DEC.1999 15:13:59

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



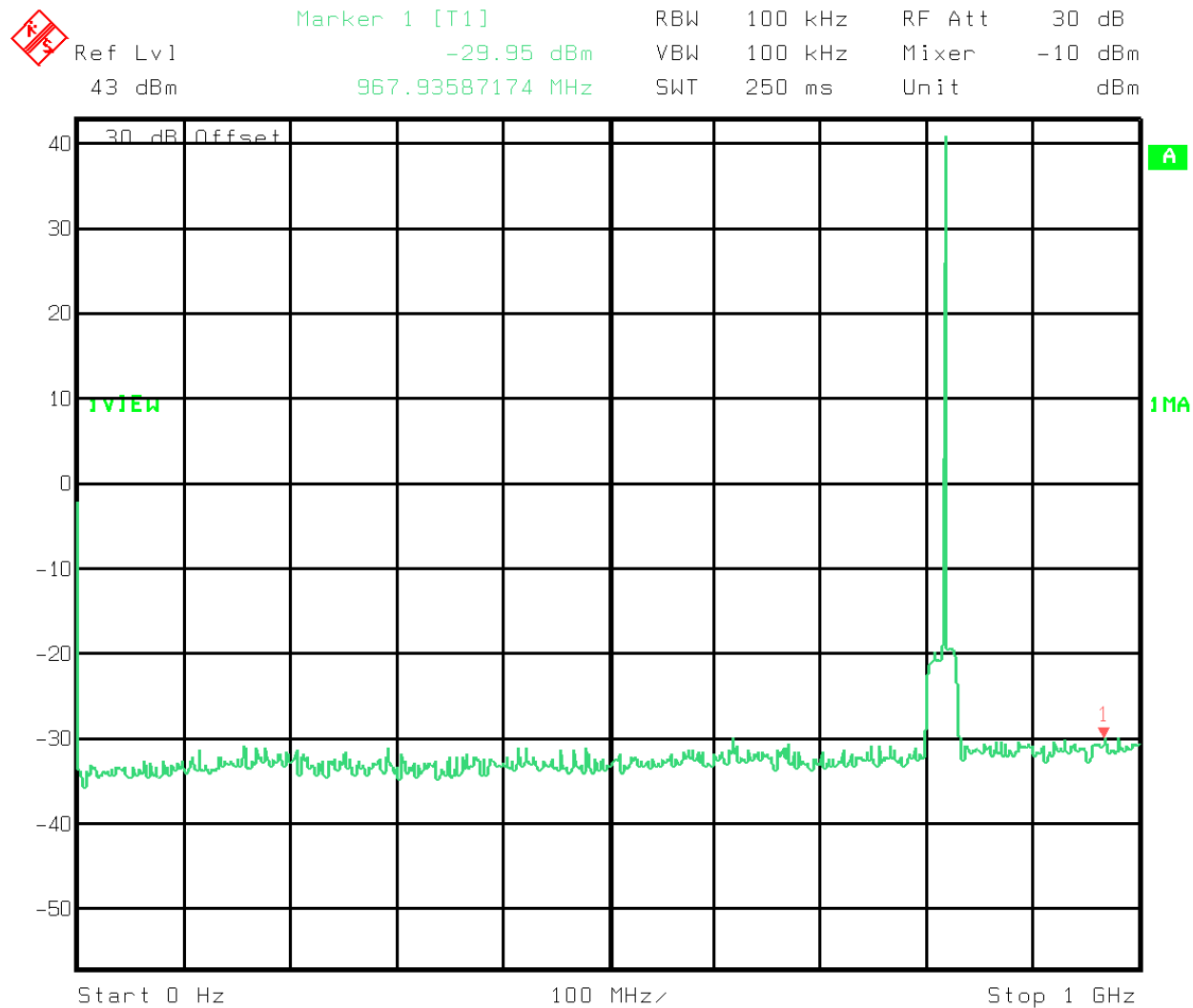
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Comment A: ANTENNA PORT SPURIOUS EMISSIONS VOICE MODULATION (CHANNEL481
APSE02A.PCX
Date: 16.DEC.1999 15:15:32

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



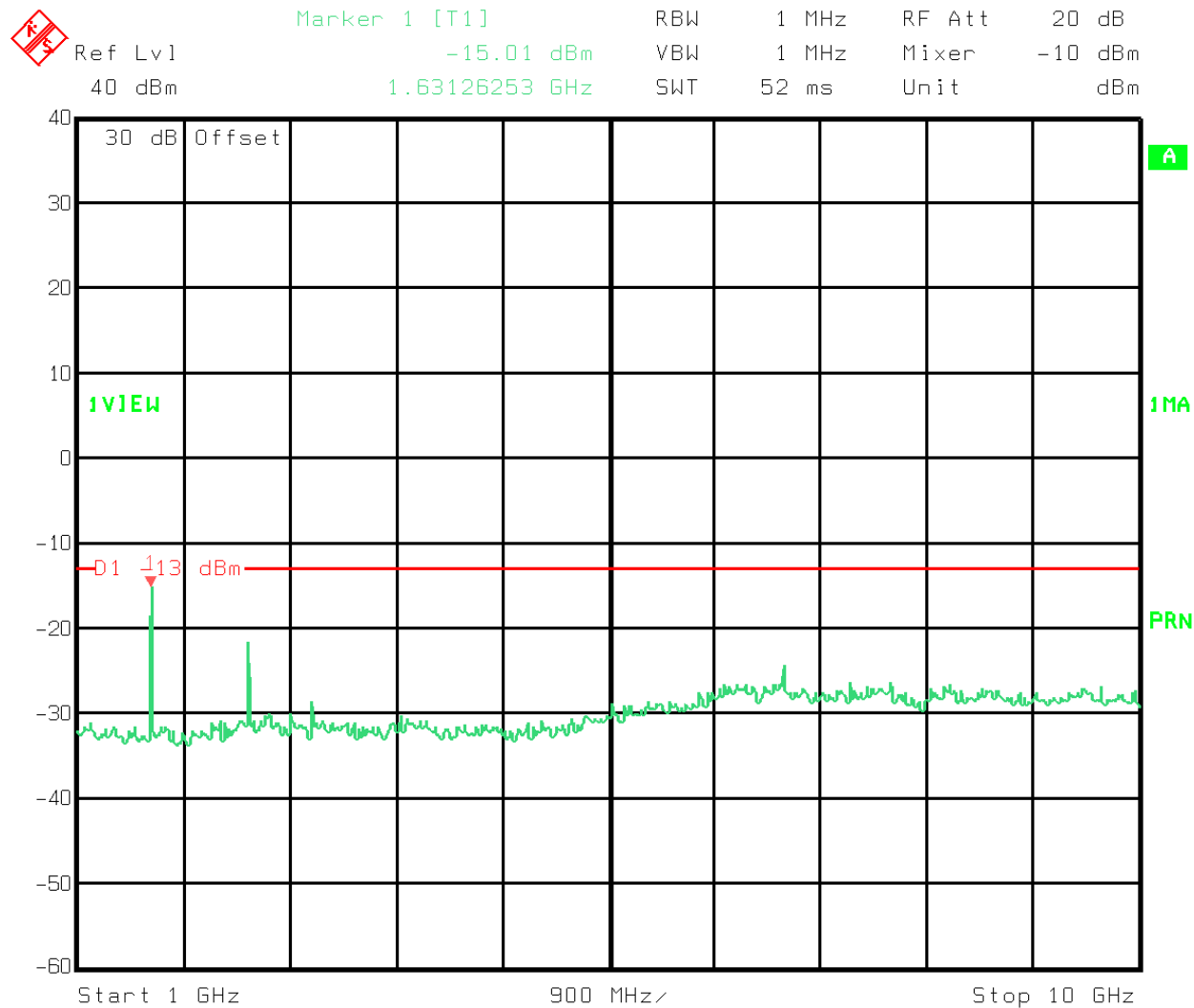
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Comment A: INTERMODULATION VOICE MODULATION (CHANNEL 4,481, & 830)
3SIGIM02.PCX
Date: 16.DEC.1999 12:37:26

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



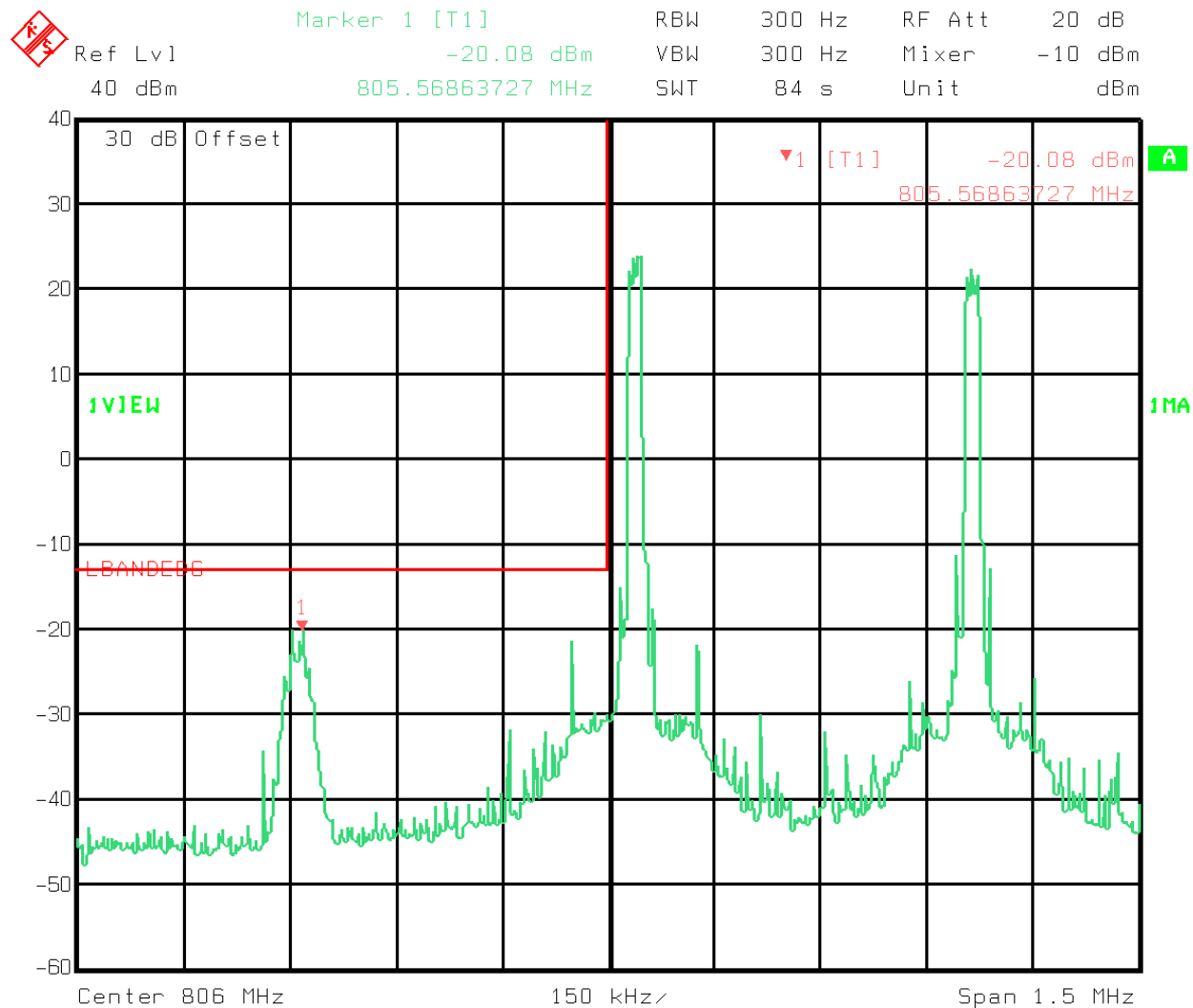
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Comment A: ANTENNA PORT SPURIOUS EMISSIONS iDEN MODULATION
APSE03.PCX
Date: 20.DEC.1999 16:11:02

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



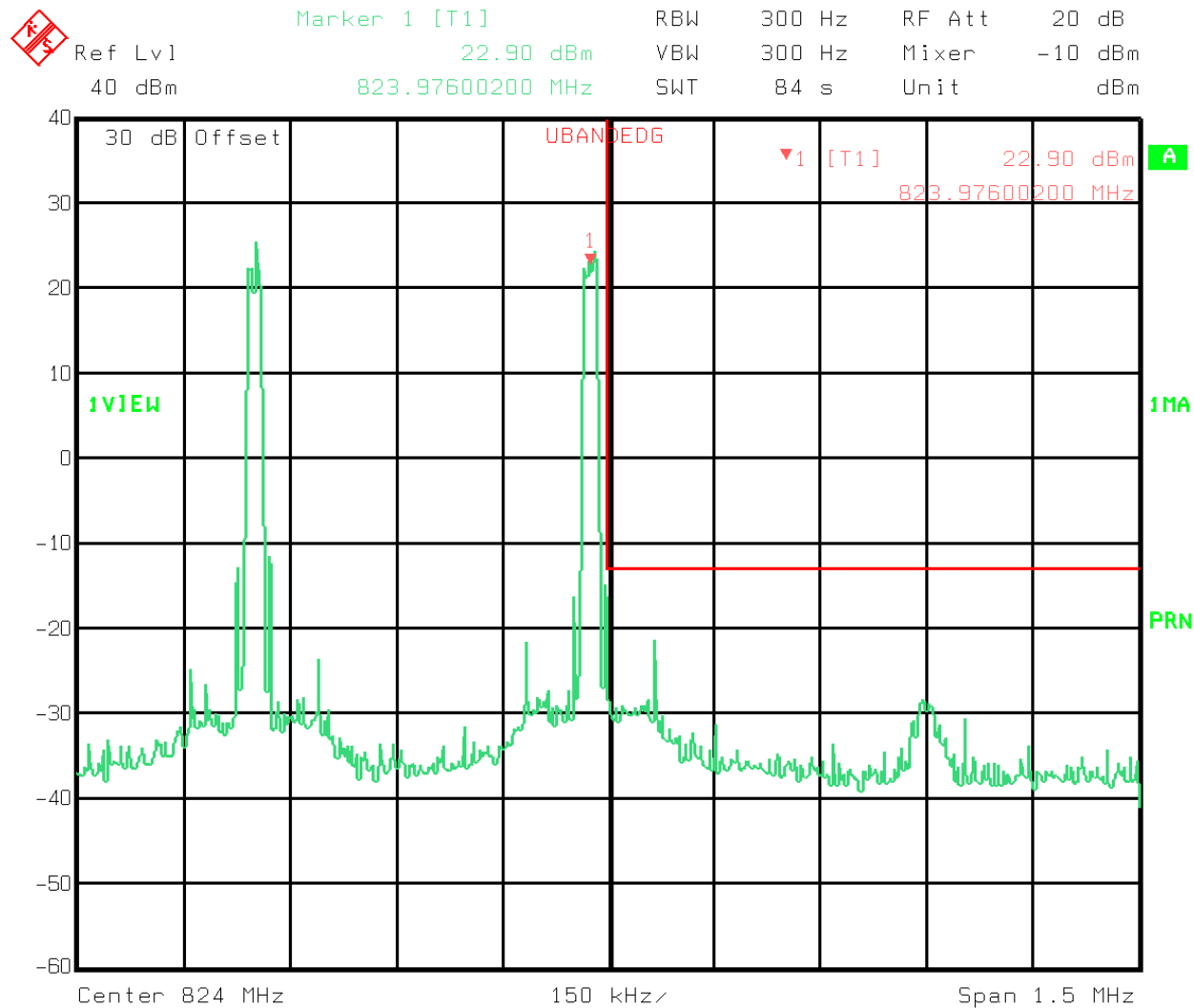
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Comment A: ANTENNA PORT SPURIOUS EMISSIONS iDEN MODULATION
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Date: 20.DEC.1999 16:15:06

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



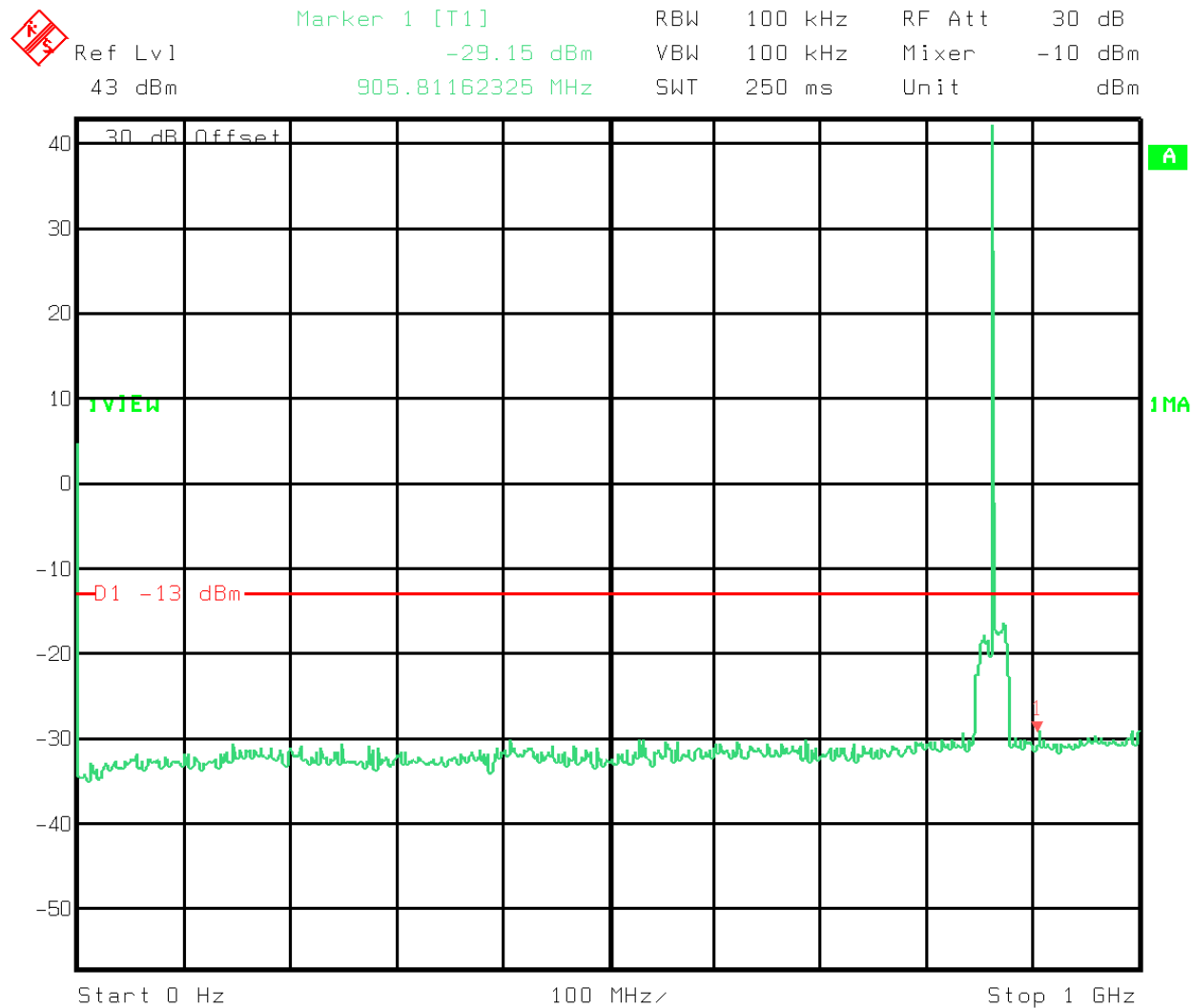
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Date: 22.DEC.1999 9:56:16

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



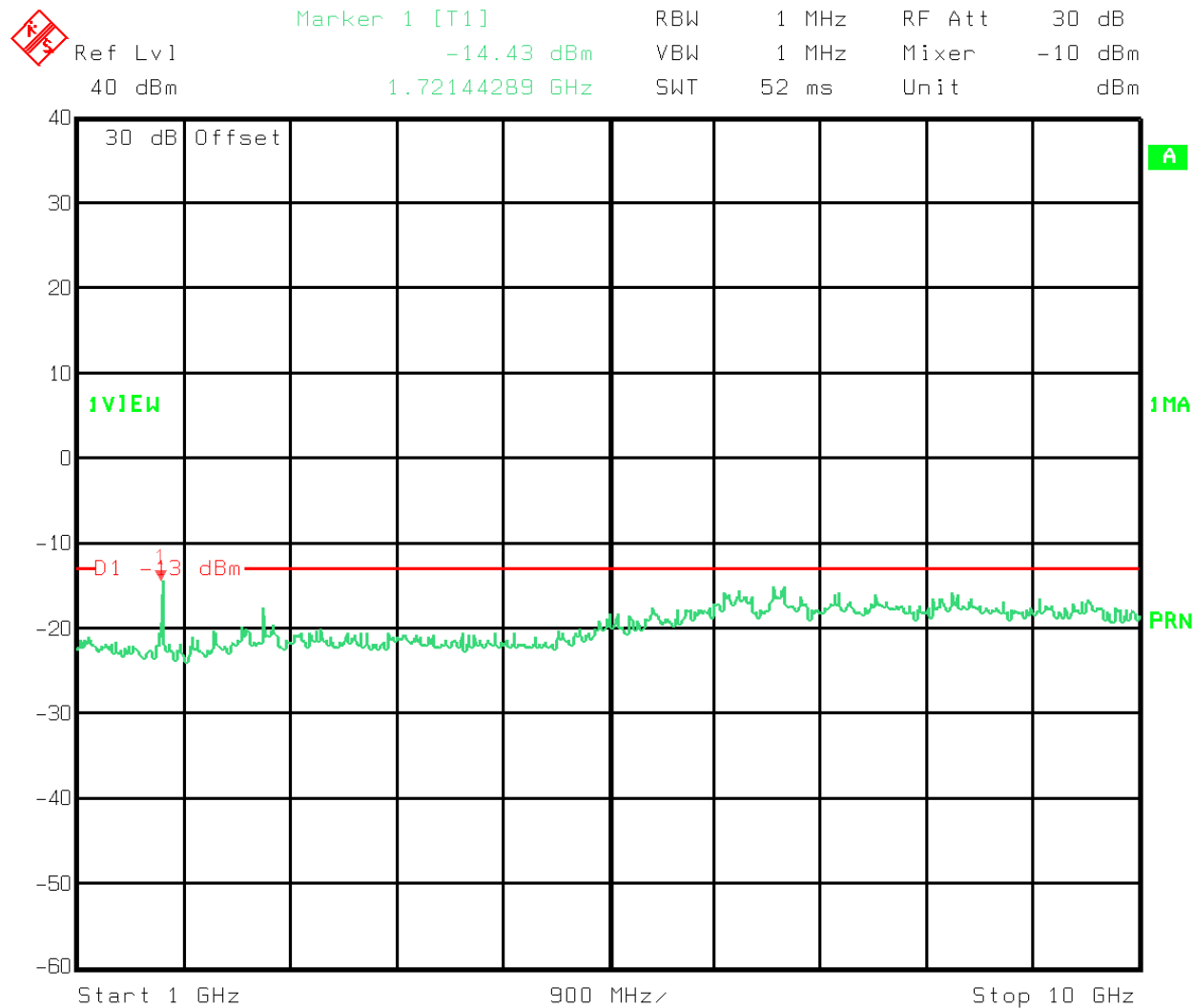
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Date: 22.DEC.1999 9:29:42

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



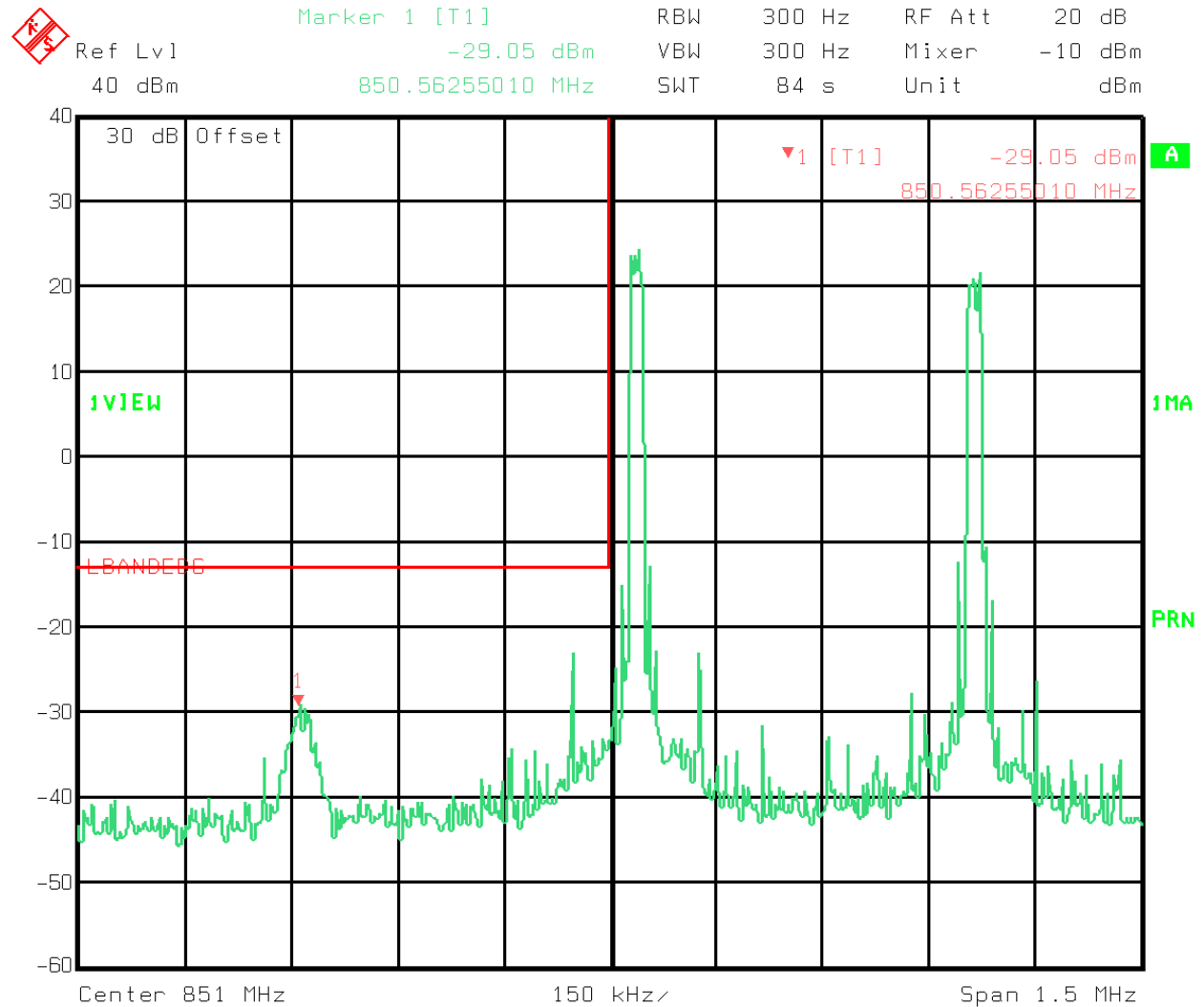
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Date: 21.DEC.1999 10:28:58

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



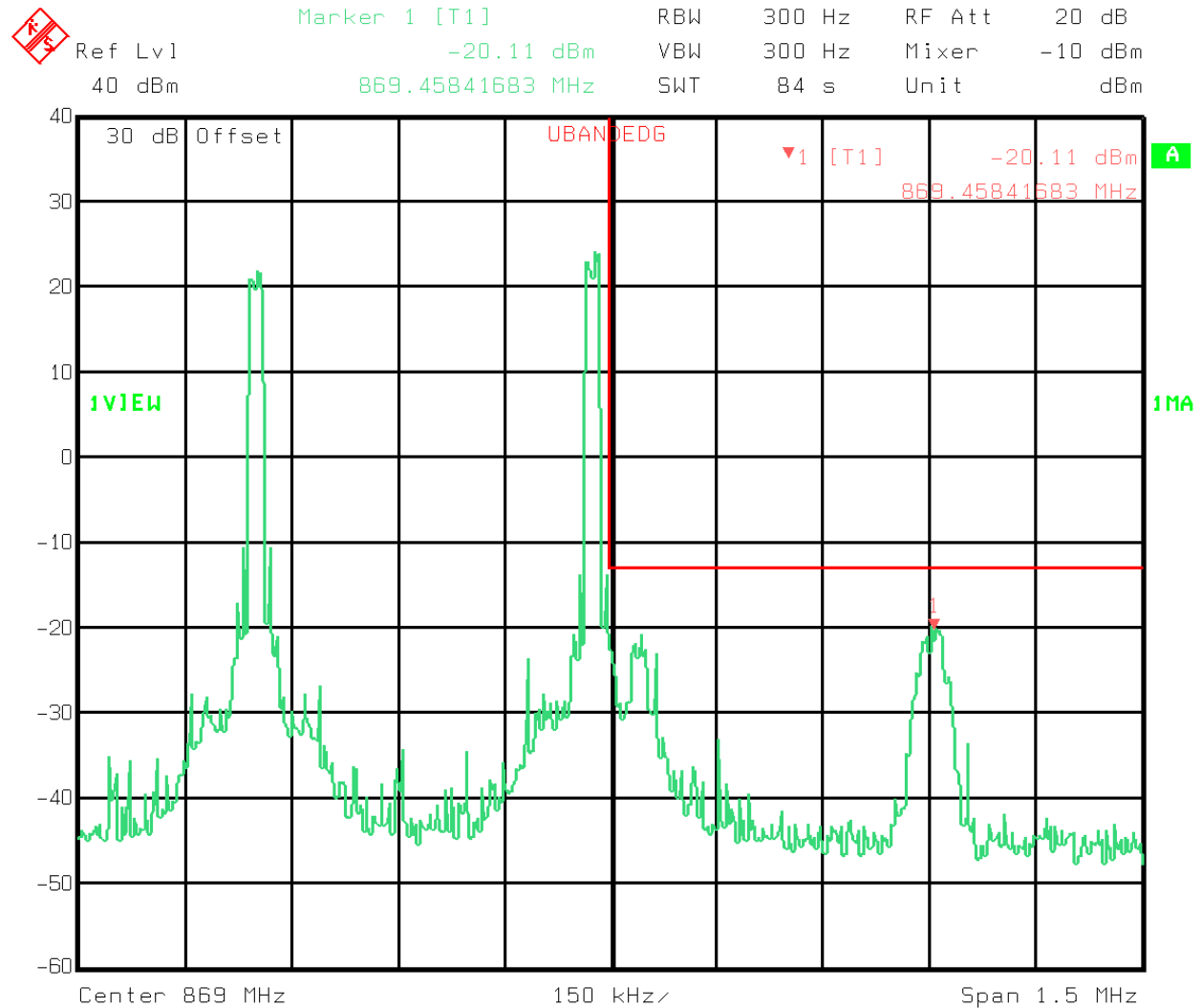
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Date: 21.DEC.1999 10:32:01

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



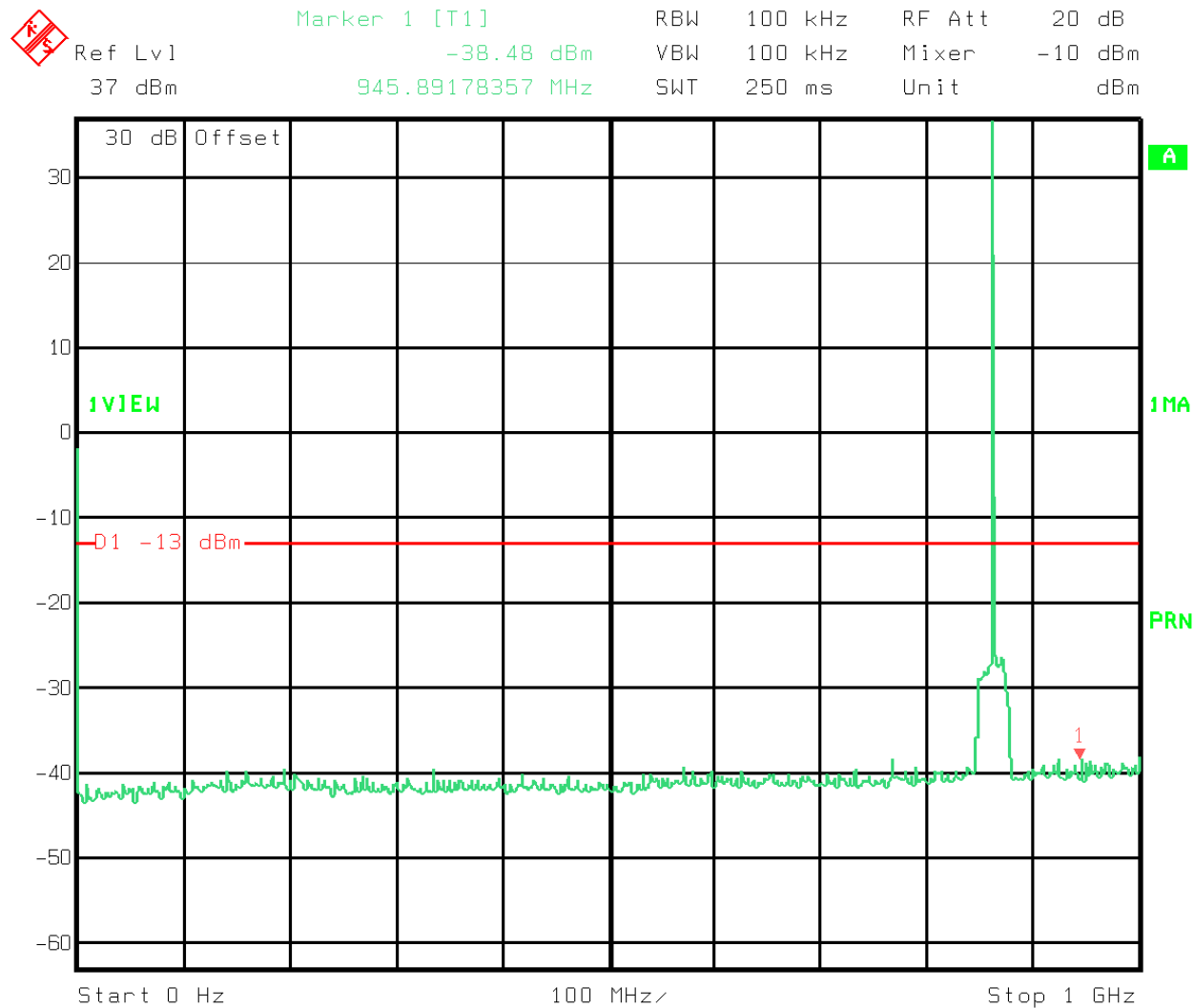
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Comment A: LOWER BAND EDGE INTERMODULATION iDEN MODULATION
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Date: 22.DEC.1999 10:10:06

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



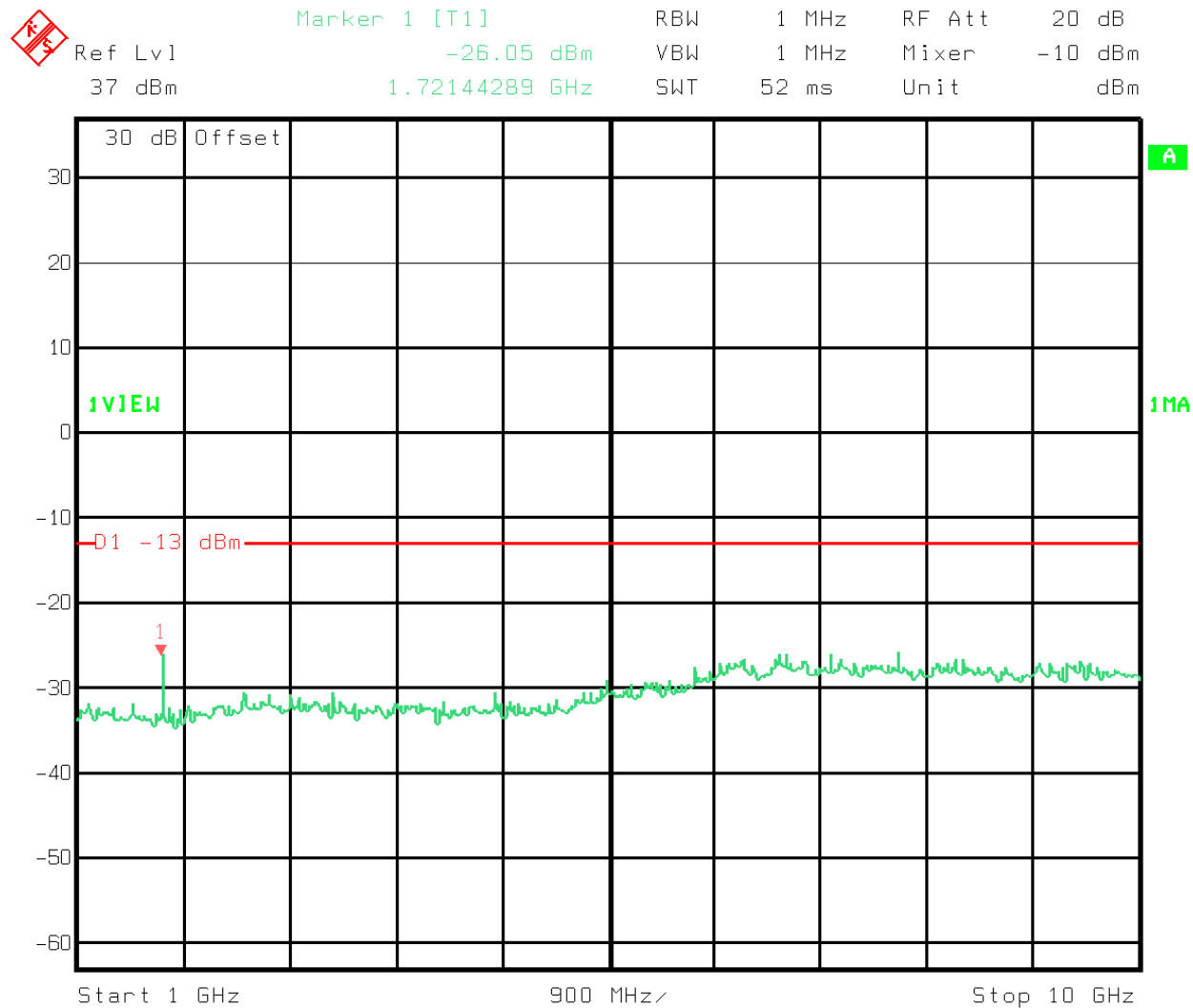
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Comment A: UPPER BAND EDGE INTERMODULATION iDEN MODULATION
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Date: 22.DEC.1999 10:35:32

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



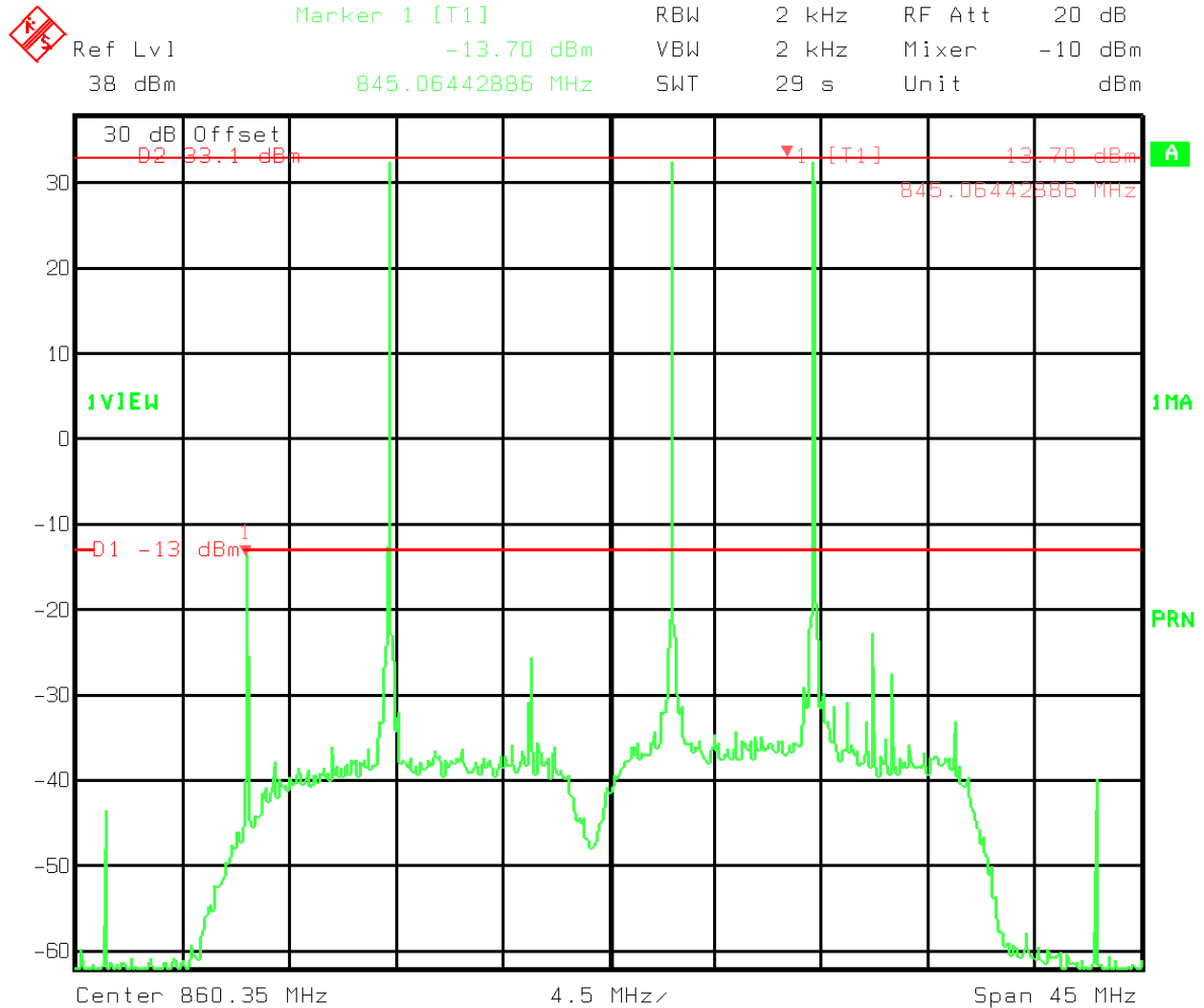
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Comment A: ANTENNA PORT SPURIOUS EMISSIONS VOICE MODULATION
APSE07.PCX (CHANNEL 415) 8 WATT AMPLIFIER
Date: 22.DEC.1999 12:24:05

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



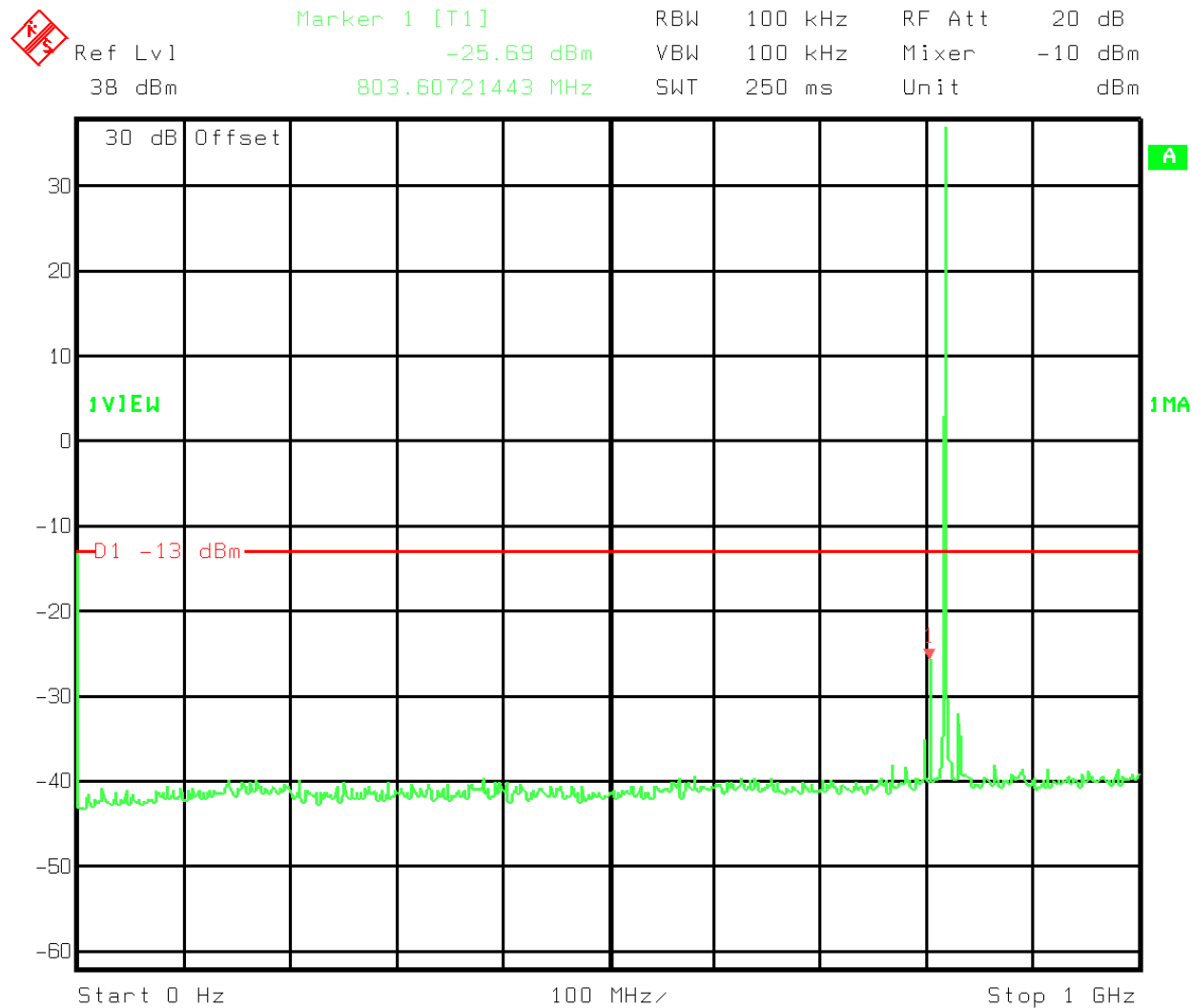
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Date: 22.DEC.1999 12:22:57

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



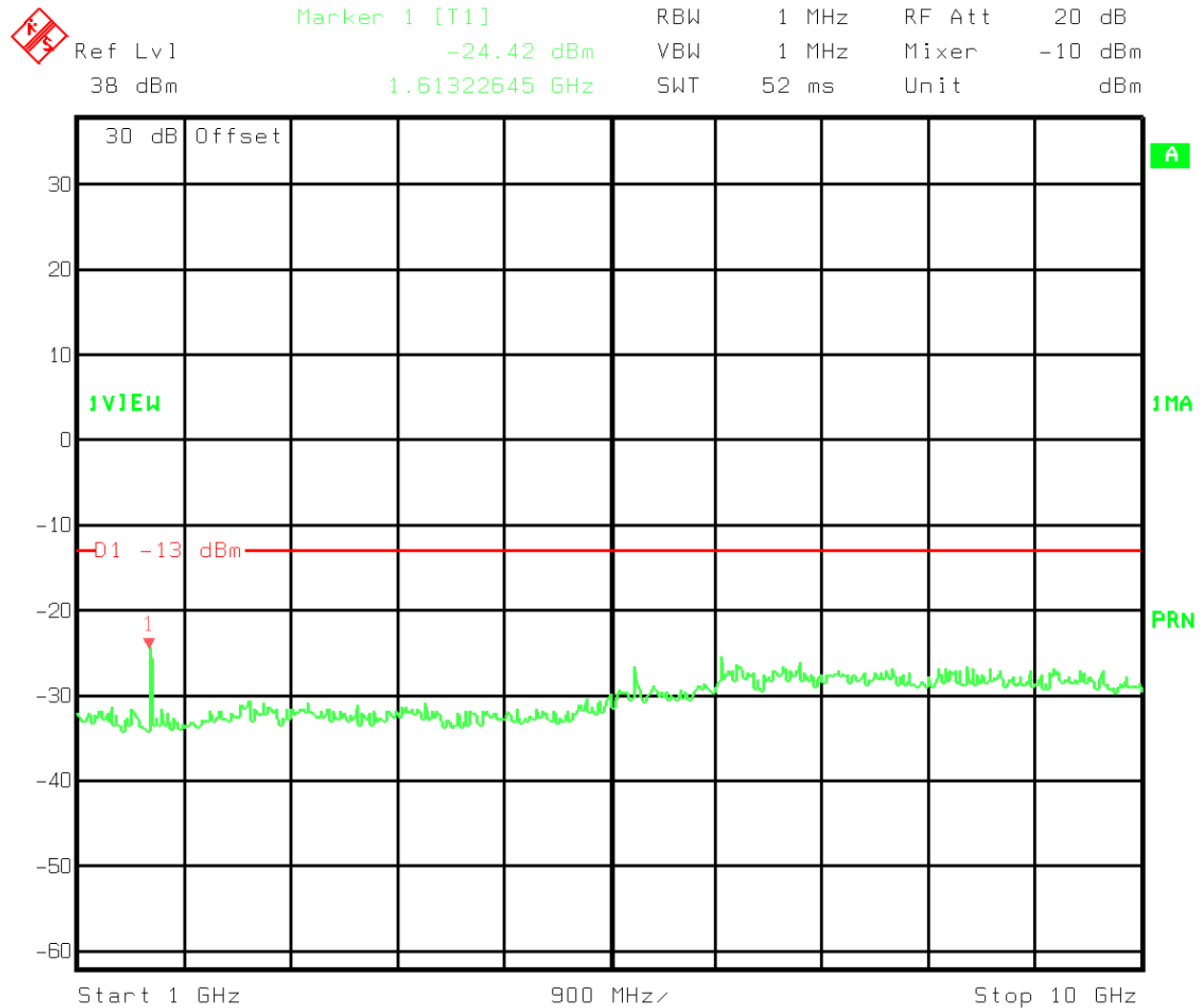
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Comment A: INTERMODULATION VOICE MODULATION
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Date: 27.DEC.1999 15:10:06

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



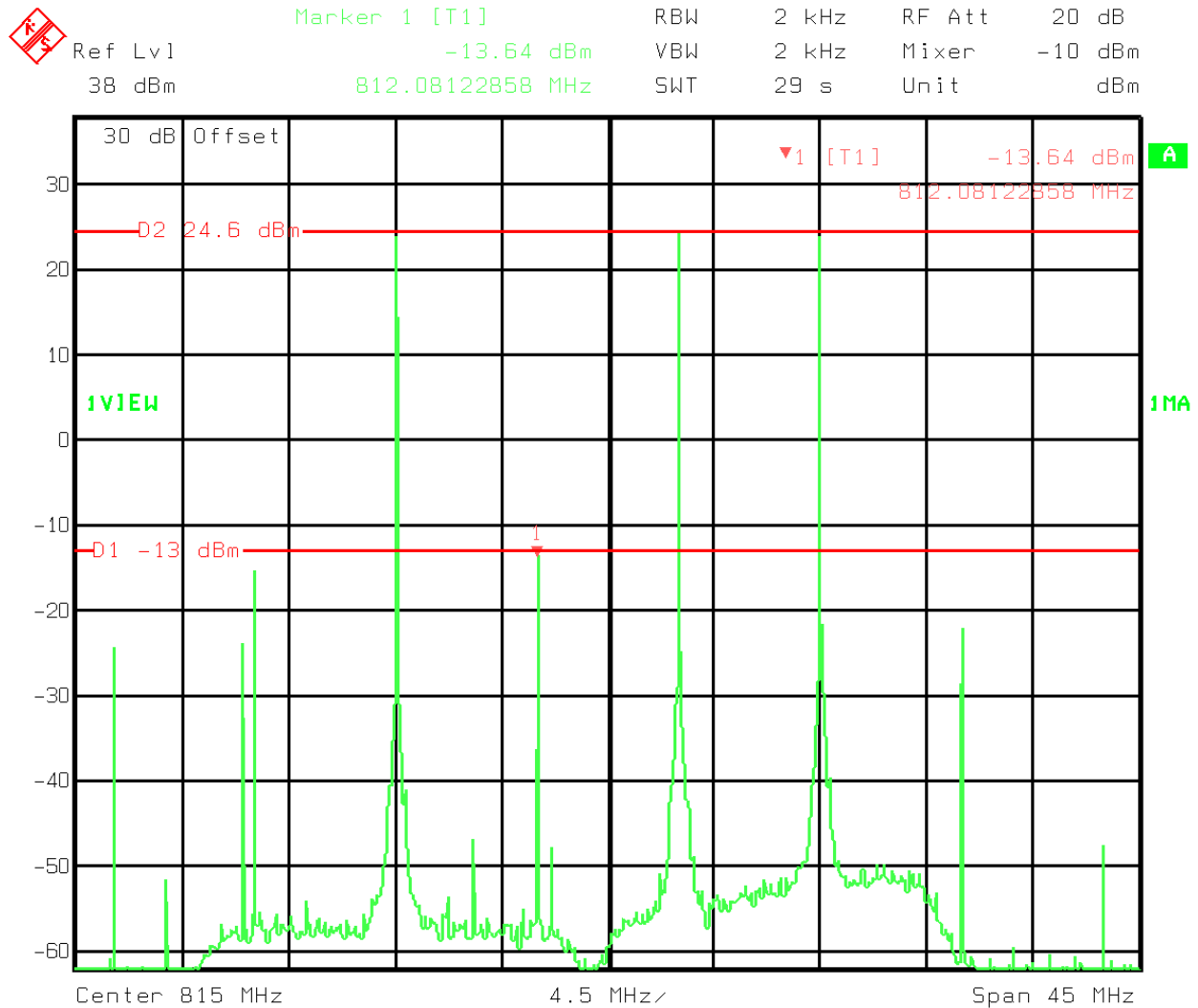
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Comment A: ANTENNA PORT SPURIOUS EMISSIONS VOICE MODULATION
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Date: 27.DEC.1999 12:04:53

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



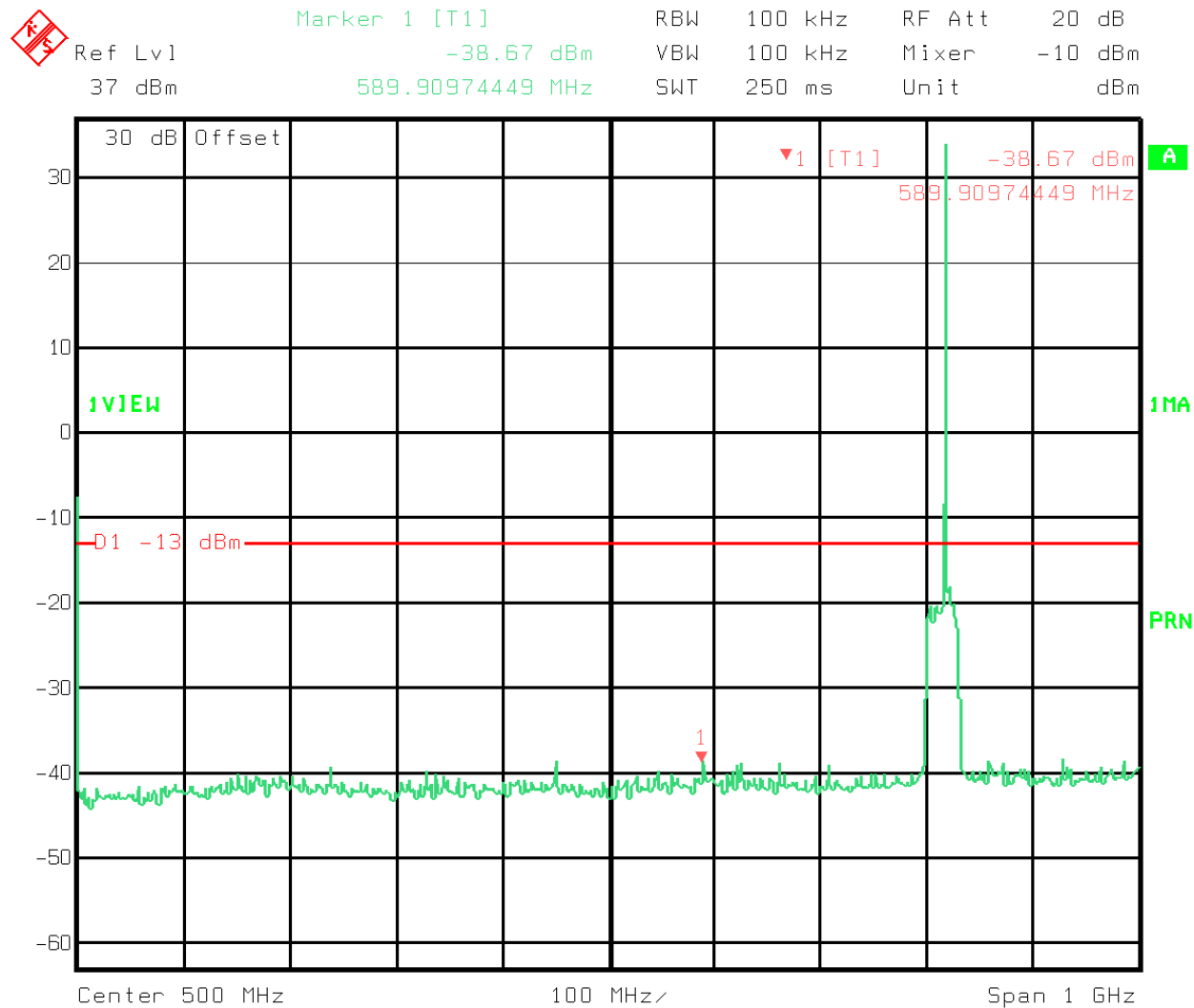
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Date: 27.DEC.1999 12:06:02

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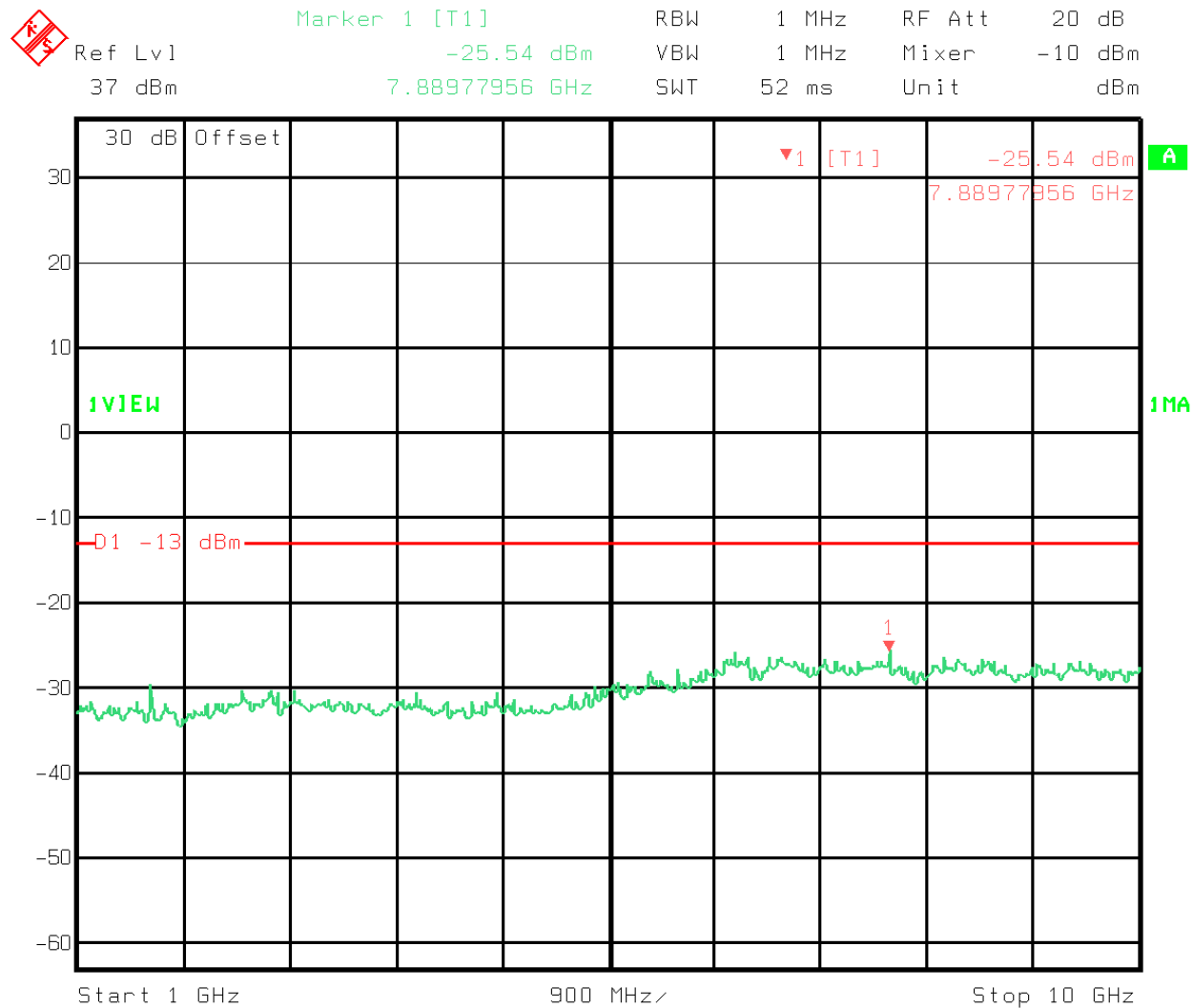
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Comment A: INTERMODULATION VOICE MODULATION
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Date: 27.DEC.1999 14:53:54

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



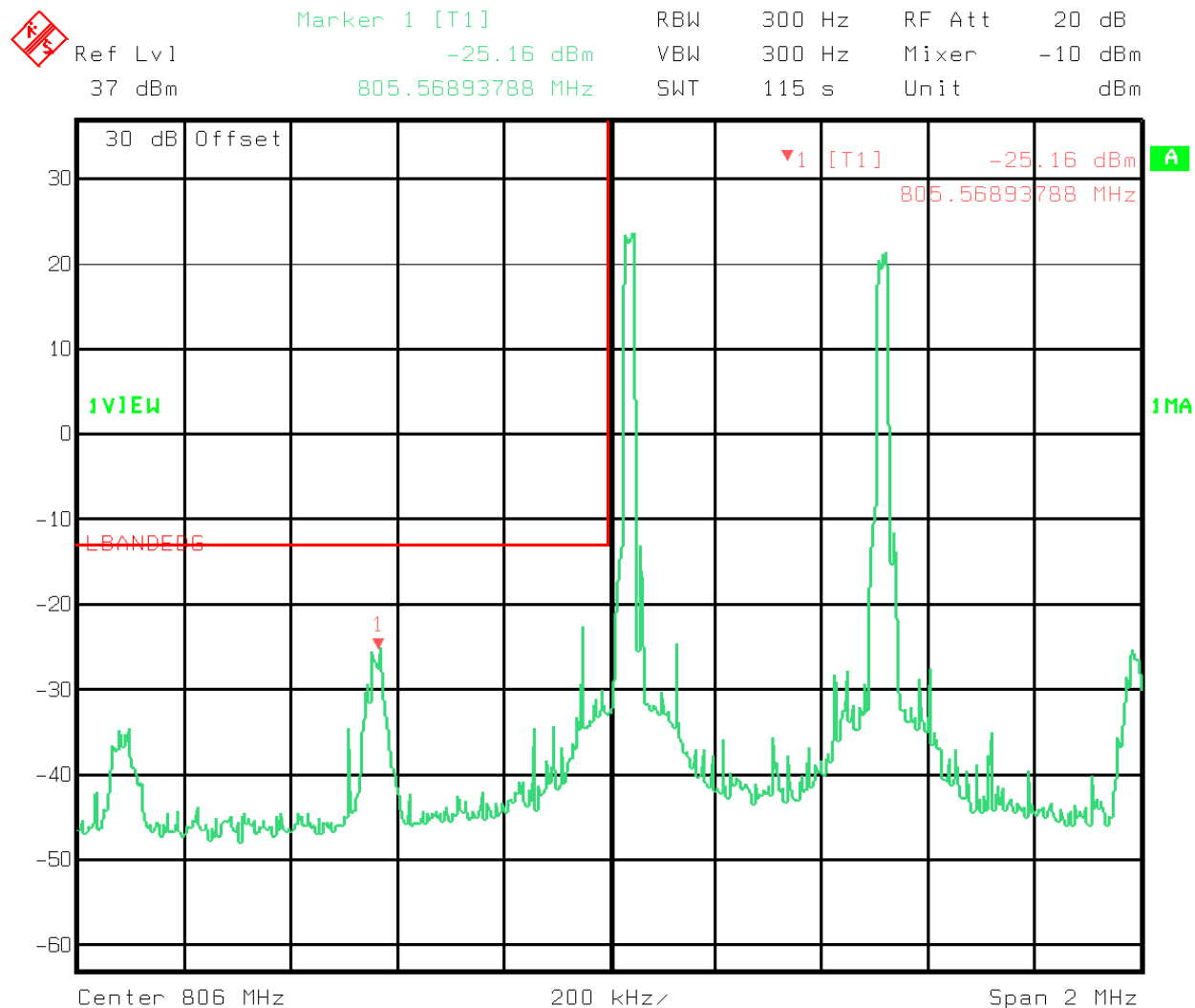
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Comment A: ANTENNA PORT SPURIOUS EMISSIONS iDEN MODULATION
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Date: 21.DEC.1999 14:45:39

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



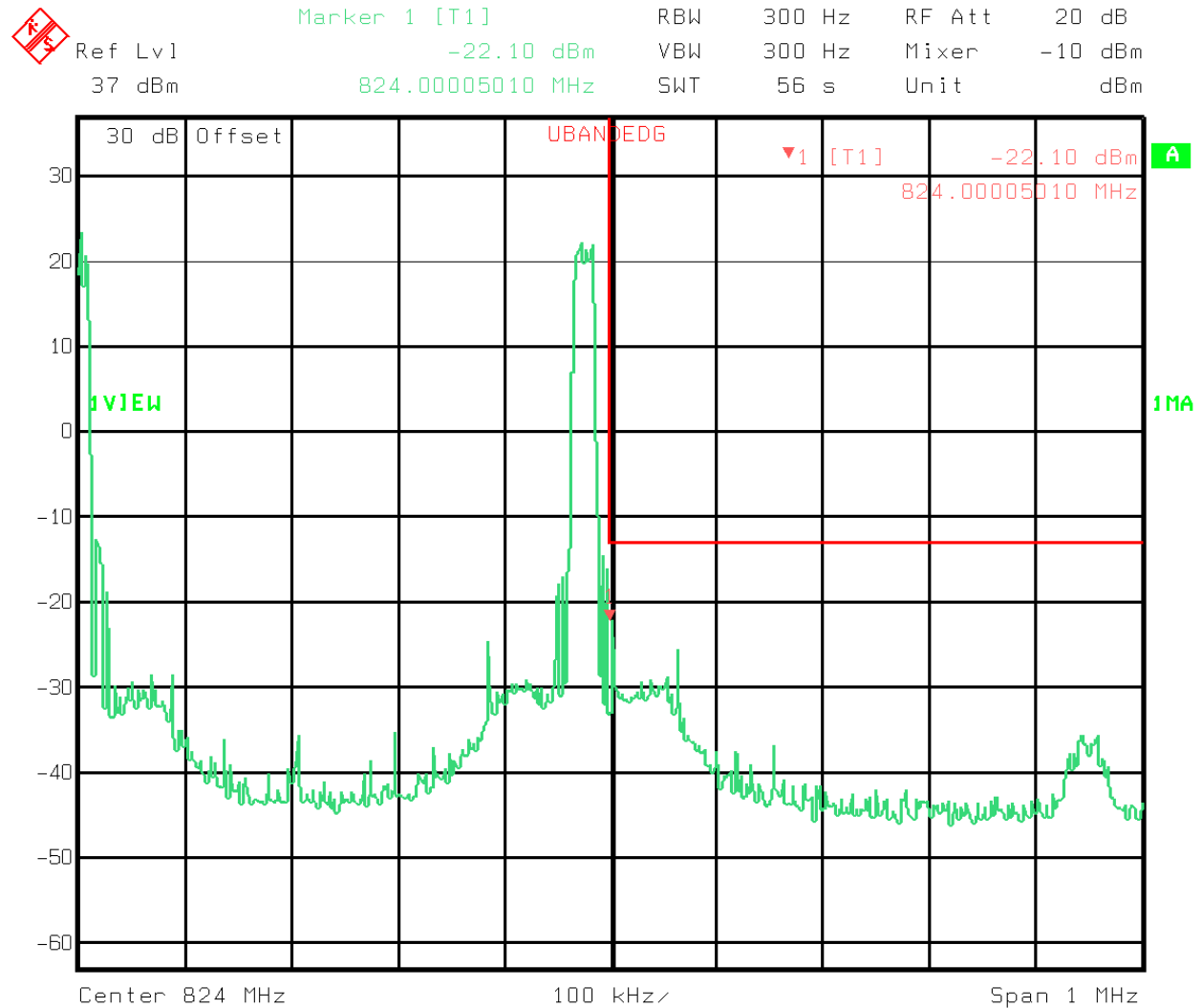
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APSE06B.PCX (CHANNEL 415) 8 WATT AMPLIFIER
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EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



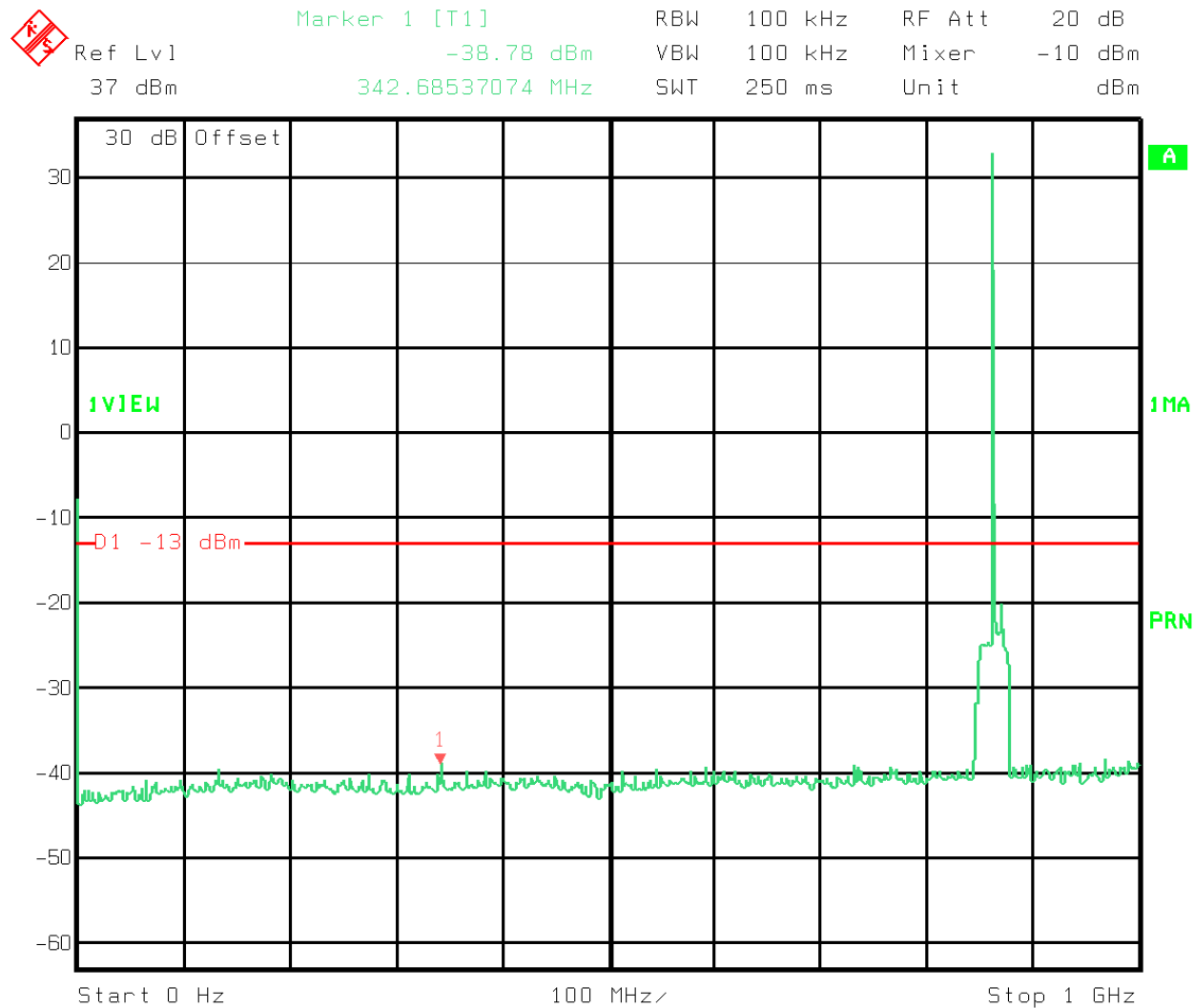
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 Comment A: LOWER BAND EDGE INTERMODULATION iDEN MODULATION
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 Date: 21.DEC.1999 15:43:30

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



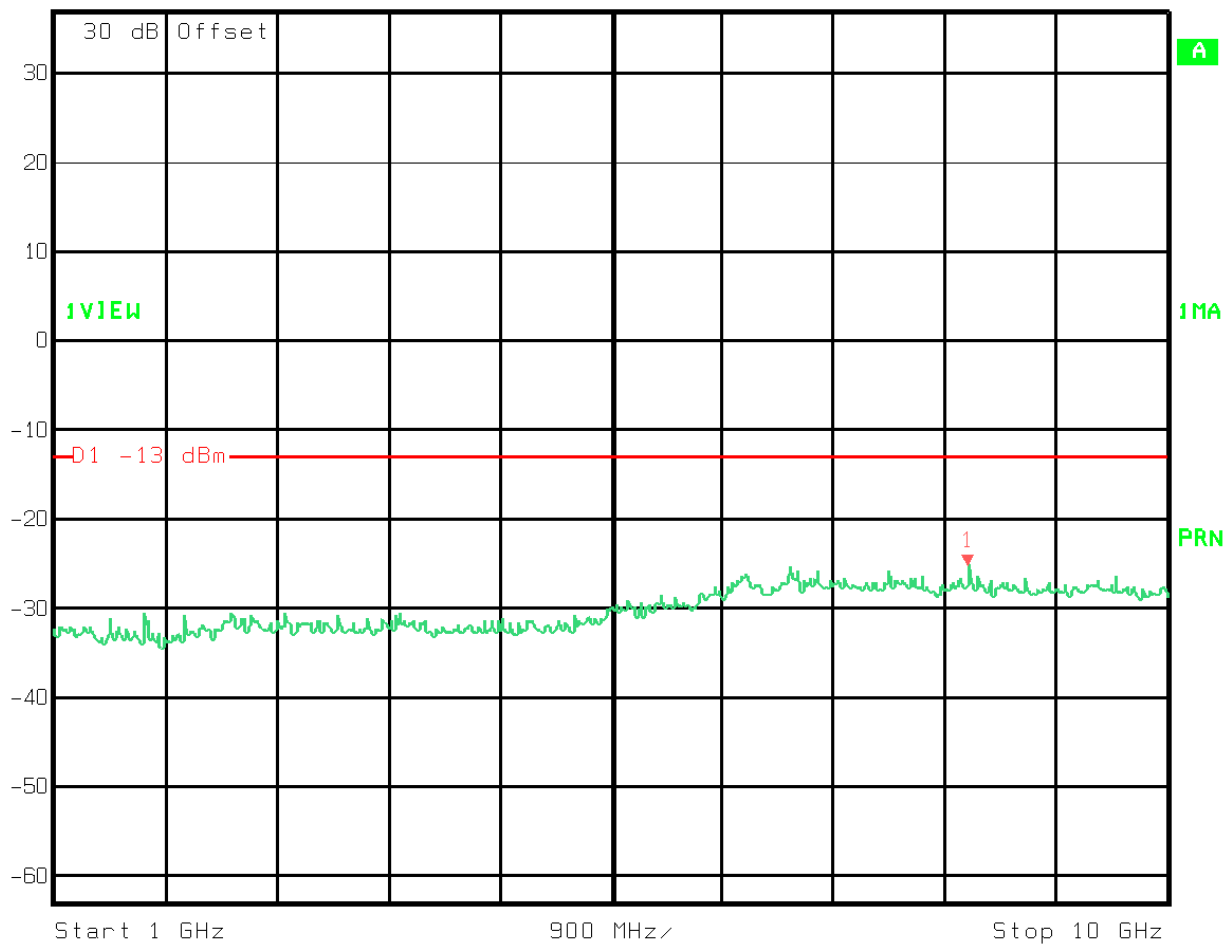
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Comment A: UPPER BAND EDGE INTERMODULATION iDEN MODULATION
UBEIM6.PCX (CHANNEL 791 & 829) 8 WATT AMPLIFIER
Date: 21.DEC.1999 16:13:04

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



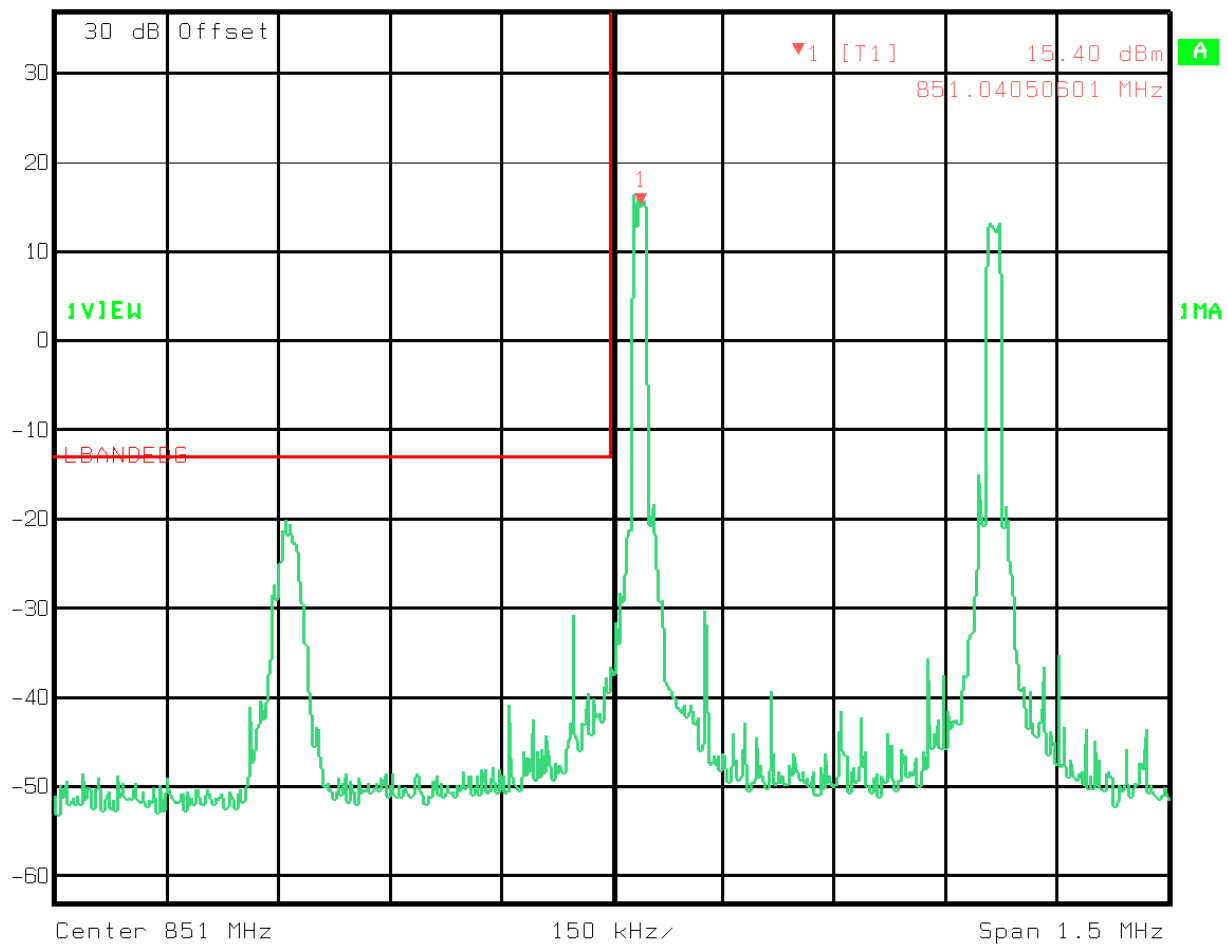
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Comment A: ANTENNA PORT SPURIOUS EMISSIONS iDEN MODULATION
APSE05.PCX (CHANNEL 415) 8 WATT AMPLIFIER
Date: 21.DEC.1999 11:36:44

	Ref Lvl	Marker 1 [T1]	RBW	1 MHz	RF Att	20 dB
		-25.16 dBm	VBW	1 MHz	Mixer	-10 dBm
	37 dBm	8.39478958 GHz	SWT	52 ms	Unit	dBm



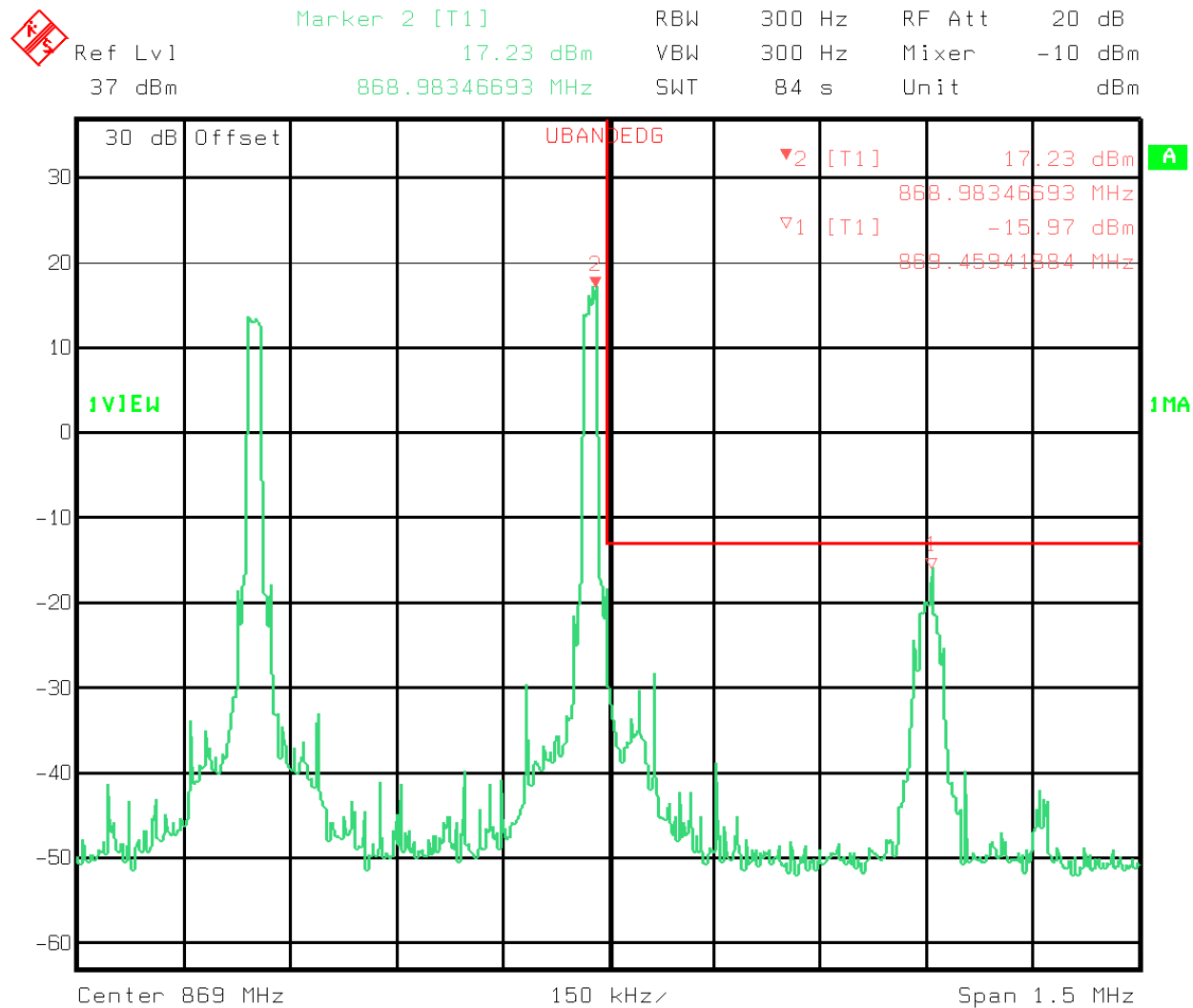
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Comment A: ANTENNA PORT SPURIOUS EMISSIONS iDEN MODULATION
APSE05B.PCX (CHANNEL 415) 8 WATT AMPLIFIER
Date: 21.DEC.1999 11:39:10

	Ref Lvl	15.40 dBm	VBW	300 Hz	Mixer	-10 dBm
	37 dBm	851.04050601 MHz	SWT	84 s	Unit	dBm



Title: VARIABLE BANDWIDTH MODULE - iDEN BOOSTER (DOWNLINK)
Comment A: LOWER BAND EDGE INTERMODULATION iDEN MODULATION
LBEIM5.PCX (CHANNEL 2 & 21) 8 WATT AMPLIFIER
Date: 21.DEC.1999 17:00:32

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi



Title: VARIABLE BANDWIDTH MODULE - iDEN BOOSTER (DOWNLINK)
 Comment A: UPPER BAND EDGE INTERMODULATION iDEN MODULATION
 UBEIM5.PCX (CHANNEL 791 & 829) 8 WATT AMPLIFIER
 Date: 21.DEC.1999 16:34:13

KTL Dallas, Inc.

FCC PART 90, SUBPART I
PRIVATE LAND MOBILE TRANSMITTER
PROJECT NO.: 9L0481RUS

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi

Section 9. Field Strength of Spurious Emissions

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 2.993
TESTED BY: Ron Gaytan	DATE: 1/21/00

Test Results: Complies.

Test Data: See attached table.

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi

Test Data - Radiated Emissions

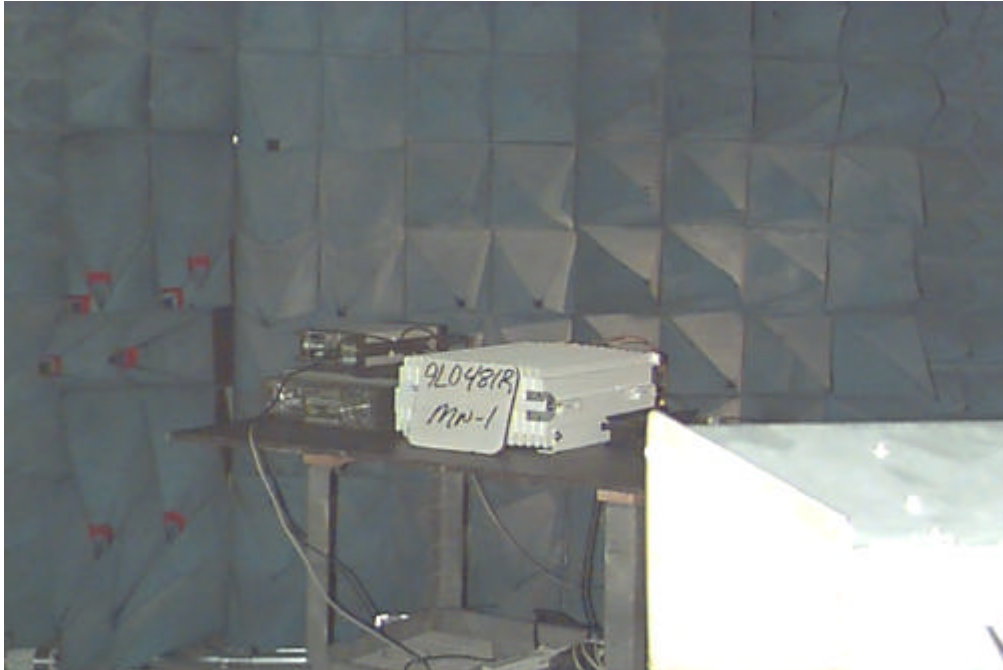
Microwave Radiated Emissions Data								
Complete ☒ Preliminary ☐		Page <u>1</u> of <u>1</u>						
Client: <u>ALLEN TELECOM</u>			Test #: <u>MW-1</u>		W.O.#: <u>9L0481R</u>			
EUT: <u>MR801Bi POWER</u>			S/N: <u>12</u>		Photo ID: <u>9L0481 MW-1</u>			
Technician: <u>Ron Gaytan</u>			Specification: <u>FCC Part 2.1053</u>		Lab: <u>ANC1</u>		Date: <u>1/21/00</u>	
Equipment Used: <u>G2626-G2200-G2023-CF30-CF44-CF45</u>								
Configuration: <u>Variable Bandwidth Module W/ Extension Module (MAX POWER INTO 50 OHM LOAD)</u>								
Bandwidth: <u>1 MHz</u>		Video Bandwidth: <u>1 MHz</u>		Antenna Distance <u>3</u> m		Detector:		
Climatic Conditions:			EUT Power: ☒ 115 V.A.C. ☒ 60 Hz ☐ Peak					
Temperature: <u>23</u> C			☐ 208 V.A.C. ☐ 50 Hz ☒ Average					
Relative Humidity: <u>42</u> %			☐ 230 V.A.C.					
Atmospheric Pressure: <u>998</u> mbar			☐ Other ☐ 1 Phase ☐ 3 Phase					
Freq. (GHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. Limit (dBuV/m)	Pol.	Comments:
861.362							V	FUNDAMENTAL
1.722	38.2	27.0	1.8	31.5	35.5	70.2	V	
2.584	36.9	28.3	2.4	32.5	35.1	70.2	V	Noise Floor
3.445	35.4	30.6	3.1	32.0	37.1	70.2	V	Noise Floor
4.306	35.0	32.1	3.6	31.6	39.1	70.2	V	Noise Floor
861.362							H	FUNDAMENTAL
1.722	36.9	27.0	1.8	31.5	34.2	70.2	H	Noise Floor
2.584	36.9	28.3	2.4	32.5	35.1	70.2	H	Noise Floor
3.445	35.4	30.6	3.1	32.0	37.1	70.2	H	Noise Floor
4.306	35.0	32.1	3.6	31.6	39.1	70.2	H	Noise Floor
								Scanned 1-10 GHz

DATACOMMON\FORMS\TESTDATASHEETS\MICRORE REV 030597

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi

Photographs of Test Setup:

FRONT VIEW



REAR VIEW



EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi

Section 10. Frequency Stability

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

Test Results: Complies/Does Not Comply.

Measurement Data: See attached tables.

Not Applicable

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi

Section 11. Transient Frequency Behavior

NAME OF TEST: Transient Frequency Behaviour	PARA. NO.: 90.214
TESTED BY:	DATE:

Test Results: Complies/Does Not Comply.

Measurement Data: See attached graphs.

Not Applicable

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi**Section 12. Test Equipment List**

<u>KTL ID</u>	<u>Description</u>	<u>Manufacturer Model Number</u>	<u>Serial Number</u>	<u>Calibration Date</u>
CF30	CABLE, 1m	KTL Semi-Flex, Storm	N/A	01/13/99
CF44	CABLE, 4M	STORM PR90-010-144	N/A	10/15/99
CF45	CABLE, 4M	STORM PR90-010-144	N/A	10/15/99
G1017	ATTENUATOR	NARDA 776B-20	NONE	09/30/99
G1018	ATTENUATOR	NARDA 776B-10	NONE	09/30/99
G2023	ANTENNA,HORN	EMCO 3115	8812-3035	07/16/99
G2200	AMPLIFIER	HEWLETT PACKARD 8449A	2749A00159	06/11/99
G2626	SPECTRUM ANALYZER	HEWLETT PACKARD 8566B	2618A02843	04/21/99
G2735	I/Q MODULATION GENERATOR	ROHDE & SCHWARZ AMIQ	830848/005	05/26/99
G2736	SIGNAL GENERATOR	ROHDE & SCHWARZ SMIQ 03	DE22081	05/03/99
ANC1	Anechoic Chamber #1			

Calibration interval on all items is typically 12 months from the calibration date shown. Where relevant, measuring equipment is subjected to in-service checks between testing. Should any measurement be utilized beyond its scheduled calibration date, the measuring equipment is subjected to in service checks prior to use. KTL shall notify clients promptly, in writing, of identification of defective equipment that casts doubt on the validity of results given in this report.

LEGEND:

CNR Calibration not required
N/A Not Applicable
CBU Calibrated before use

KTL Dallas, Inc.

FCC PART 90, SUBPART I
PRIVATE LAND MOBILE TRANSMITTER
PROJECT NO.: 9L0481RUS

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi

ANNEX A - TEST METHODOLOGIES

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi

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

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi

NAME OF TEST: Audio Frequency Response

PARA. NO.: 2.987(a)

Test Method: TIA/EIA-603

Minimum Standard: TIA/EIA-603, Para. 3.2.6 from 300 Hz to 3000 Hz. The transmitter audio frequency response shall have a nominal 6 dB per octave pre-emphasis characteristic.

NAME OF TEST: Audio Low-Pass Filter Frequency Response

PARA. NO.: 2.987(a)

Test Method: TIA/EIA-603

Minimum Standard: TIA/EIA-603

NAME OF TEST: Modulation Limiting
--

PARA. NO.: 2.987(a)

Test Method: TIA/EIA-603

Minimum Standard: TIA/EIA-603

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi

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

Test Method:

RBW: 1% of emission bandwidth in 0 - 1 GHz range. 1 MHz at frequencies above 1 GHz.
VBW: ⇒ RBW

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

EQUIPMENT: MR801Bi POWER AND MR801Bi
*FCC ID: BCR-RPT-MR801Bi***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: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi**NAME OF TEST: Frequency Stability****PARA. NO.: 2.995****Minimum Standard:** Para. No. 990.213. 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	-	-	-

NAME OF TEST: Transient Frequency Behaviour**PARA. NO.: 2.214****Minimum Standard:****Transient Frequency Behaviour for Equipment Designed to Operate on 25 kHz Channels**

Time intervals ^{1,2}	Maximum Frequency difference ³ (kHz)	Frequency ranges (MHz) All equipment					
		Base station and portable radios			Mobile Radios		
		150 - 174 (ms)	450 - 500 (ms)	500 - 512 (ms)	150 - 174 (ms)	450 - 500 (ms)	500 - 512 (ms)
t ₁ ⁴	± 25	5.0	10.0	20.0	5.0	10.0	5.0
t ₂	± 12	20.0	25.0	50.0	20.0	25.0	20.0
t ₃ ⁴	± 25	5.0	10.0	10.0	5.0	10.0	5.0

Transient Frequency Behaviour for Equipment Designed to Operate on 12.5 kHz & 6.25 kHz Channels

Time intervals ^{1,2}	Maximum Frequency difference ³ (kHz)	Frequency ranges (MHz) All equipment		
		150 - 174 (ms)	450 - 500 (ms)	500 - 512 (ms)
t ₁ ⁴	± 12.5 / ± 6.25	5.0	10.0	20.0
t ₂	± 6.25 / ± 3.125	20.0	25.0	50.0
t ₃ ⁴	± 12.5 / ± 6.25	5.0	10.0	10.0

KTL Dallas, Inc.

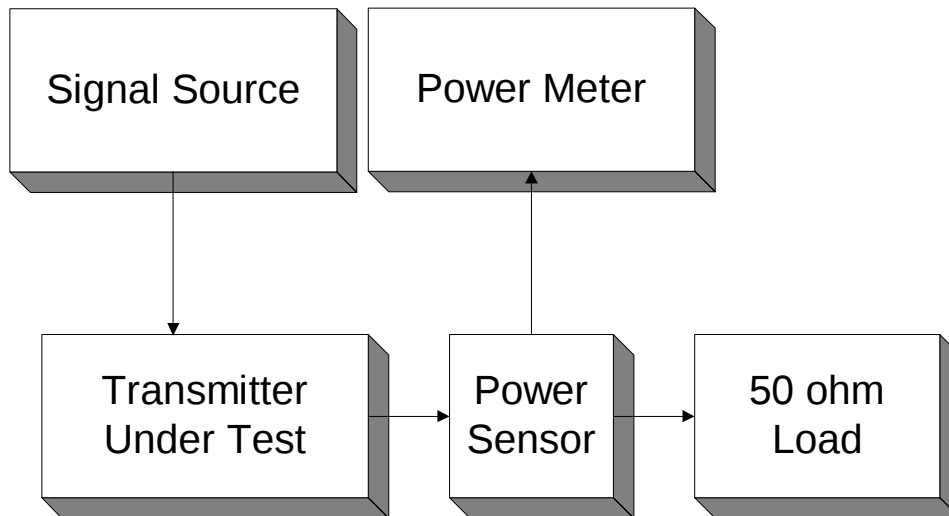
FCC PART 90, SUBPART I
PRIVATE LAND MOBILE TRANSMITTER
PROJECT NO.: 9L0481RUS

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi

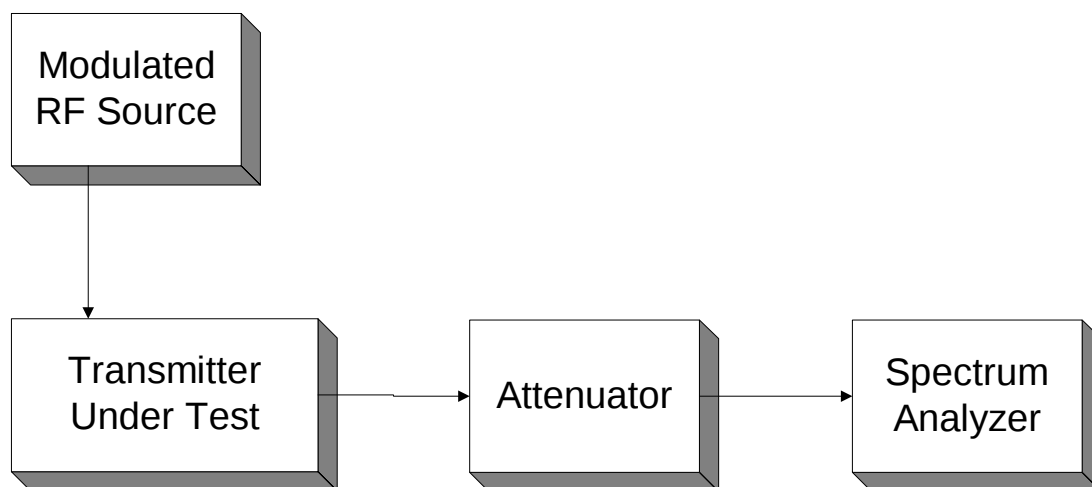
ANNEX B - TEST DIAGRAMS

EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi

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

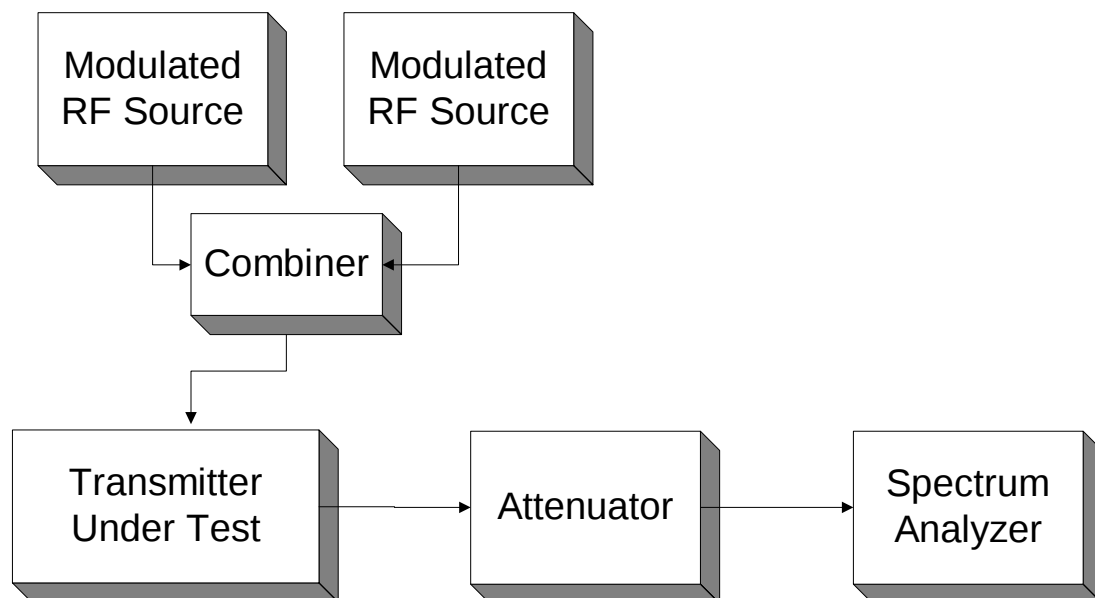


Para. No. 2.989 - Occupied Bandwidth



EQUIPMENT: MR801Bi POWER AND MR801Bi
FCC ID: BCR-RPT-MR801Bi

Para. No. 2.991 - Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation

