

KTL Test Report: 0L0367RUS1

Applicant: Allen Telecom Systems
140 Vista Center Drive
Forest, VA 24551

**Equipment Under Test:
(E.U.T.)** MOR801Bi and MOR 801Bi Power

FCC ID: BCR-RPT-MOR801BI

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:



Tom Tidwell, Wireless Group Manager

Date: November, 2000

Total Number of Pages: 54

Table of Contents

Section 1.	Summary of Test Results	3
Section 2.	General Equipment Specification.....	5
Section 3.	RF Power Output.....	7
Section 4.	Occupied Bandwidth	8
Section 5.	Spurious Emissions at Antenna Terminals	9
Section 6.	Field Strength of Spurious Emissions.....	18
Section 7.	Frequency Stability	42
Section 8.	Test Equipment List	44
ANNEX A - TEST METHODOLOGIES		45
ANNEX B - TEST DIAGRAMS		51

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

Section 1. Summary of Test Results

Manufacturer: Allen Telecom Systems

Model No.: MOR801Bi and MOR 801Bi Power

Serial No.: 0013 (MOR 801Bi) 0011 (MOR 801Bi Power)

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**

KTL Dallas Inc. authorizes the above named company to reproduce this report provided it is reproduced in its entirety and for use by the company's employees only.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. KTL Dallas Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. This report applies only to the items tested.

Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	MEAS.	RESULT
RF Power Output	90.205	100 W	1W/20W	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	-13	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. is not a keyed carrier system, Transient Frequency Behavior was not performed.

.

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

Section 2. General Equipment Specification

Transmitter

Supply Voltage Input: 115 VAC

Frequency Range: 851.0125 - 868.9875 MHz

Tunable Bands: 15 MHz

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

Output Impedance: 50 Ω

RF Power Output (rated):	MOR801Bi	1 W single carrier. The per-carrier rf output power is reduced by 3 dB each time the number of carriers is doubled.
	MOR801Bi Power	20W single carrier. The per-carrier rf output power is reduced by 3 dB each time the number of carriers is doubled.

Operator Selection of Operating Frequency: Set upon installation. Not accessible to user.

Power Output Adjustment Capability: Gain set upon installation. Not accessible to user.

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

Band Selection:	Software	Duplexer Change	Fullband Coverage
	☒	☐	☐

Theory of Operation

This amplifier/repeater system is identical to the previously approved MR801Bi (FCC ID. BCR-RPT-MR801BI) except that the downlink input / uplink output from the system is connected to a base station transmitter via fiber optic cables. Since the link between the base station and the MOR801Bi is not wireless, only the downlink transmit direction requires approval. The MOR 801Bi can be operated at 20 W or 1 W maximum rf output, depending on the amplifier module installed.

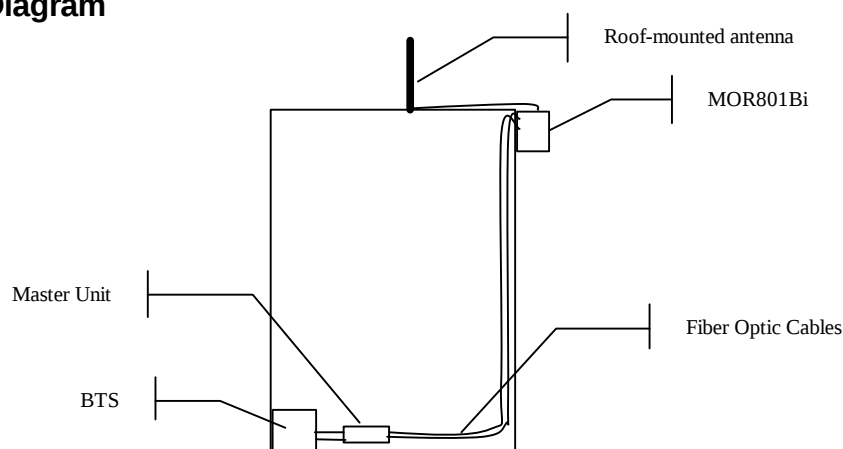
The repeater is comprised of two amplifier chains. The signals to and from the mobiles are combined and forwarded to an antenna by a frequency duplexer. The optical signals to and from the Master Unit are converted by the optical transceiver.

In the downlink direction, the optical signals from the Master Unit are converted into RF-signals by the transceiver. The RF signal passes the four way splitter, which then forwards them to the conversion modules. After the conversion they are combined by the active combiner and afterwards amplified by the feed forward / final amplifier. The feed forward / final amplifier provides the required power output. Finally the signals are fed to the antenna by the duplexer.

In the uplink direction, the signals from the mobiles are separated by the duplexer, go to a pre-amplifier and afterwards to a conversion module. The signals are combined by the active combiner, then are converted to optical signals by the transceiver and are finally transmitted to the Master Unit.

In the downlink path, a power detection measures the output power and controls the gain. In the uplink direction, the gain is controlled by the active combiner, to protect the optical transceiver. This control detection is called the Automatic Level Control (ALC).

System Diagram



EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 2.985
TESTED BY: David LightTom Tidwell & Debbie Jensen	DATE:11/14/00

Test Results: Complies.**Measurement Data:****MOR 801Bi POWER:
iDEN Modulation (Single Carrier)**

Frequency (MHz)	Measured Power (dBm)	Rated Power (dBm)	Measured/Rated (dB)
851.5	+42.2	+43.0	-0.8
860	+43.3	+43.0	+0.3
868.5	+42.9	+43.0	-0.1

Voice Modulation (Single Carrier)

Frequency (MHz)	Measured Power (dBm)	Rated Power (dBm)	Measured/Rated (dB)
851.5	+42.6	+43.0	-0.4
860	+42.4	+43.0	-0.6
868.5	+42.7	+43.0	-0.3

**MOR 801Bi:
iDEN Modulation (Single Carrier)**

Frequency (MHz)	Measured Power (dBm)	Rated Power (dBm)	Measured/Rated (dB)
851.5	+31	+30	+1
860.0	+31	+30	+1
868.5	+31	+30	+1

Voice Modulation (Single Carrier)

Frequency (MHz)	Measured Power (dBm)	Rated Power (dBm)	Measured/Rated (dB)
851.5	+34	+33	+1
860.0	+34	+33	+1
868.5	+34	+33	+1

EQUIPMENT: **MOR 801Bi and MOR 801Bi Power**

PROJECT NO.: **0L0367RUS1**

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.989
TESTED BY: David LightTom Tidwell & Debbie Jensen	DATE: 11/20-21/00

Test Results: Complies.

Test Data: See attached graph(s).

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

Test Data - Occupied Bandwidth

MOR 701Bi

Test Plot: Occupied Bandwidth (Input vs. Output)

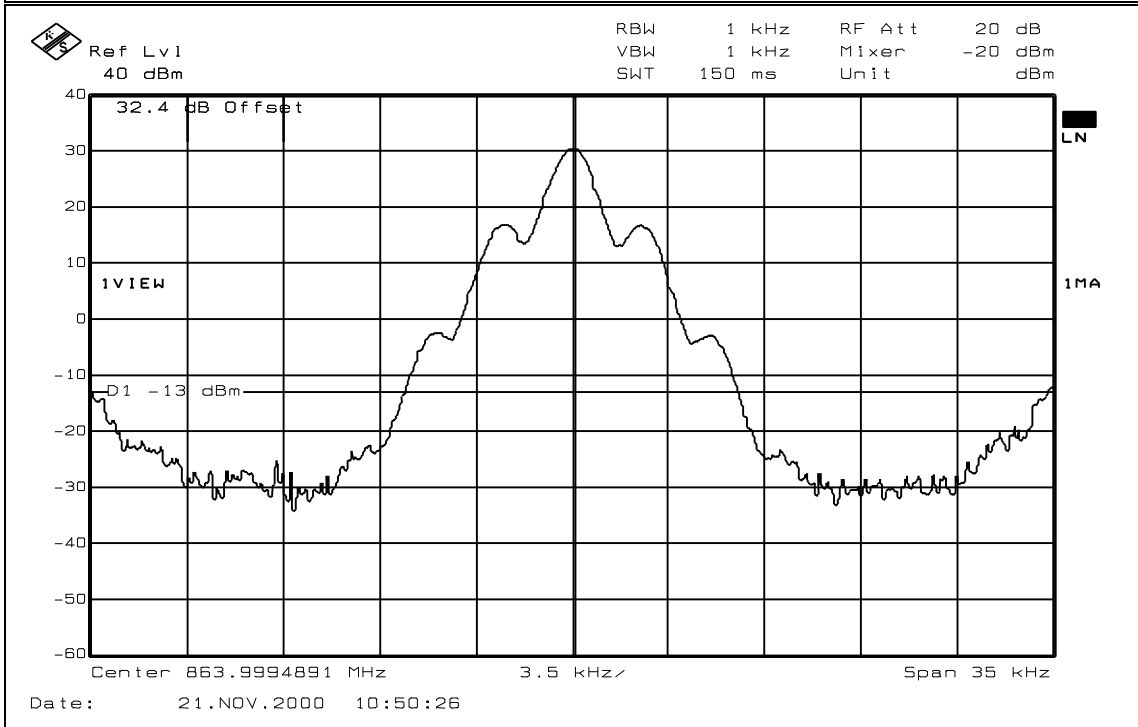
Page 1 of 2

Job No.: 0L0367R Date: 11/21/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit @ 860 MHz -Voice
Serial Number: 0011
Location: Lab 1 RBW: 30 kHz
Detector Type: Peak VBW: 30 kHz

Test Equipment Used

Antenna: #N/A Directional Coupler: #N/A
Pre-Amp: #N/A Cable #1: 1083
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 signal - Voice Modulation

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

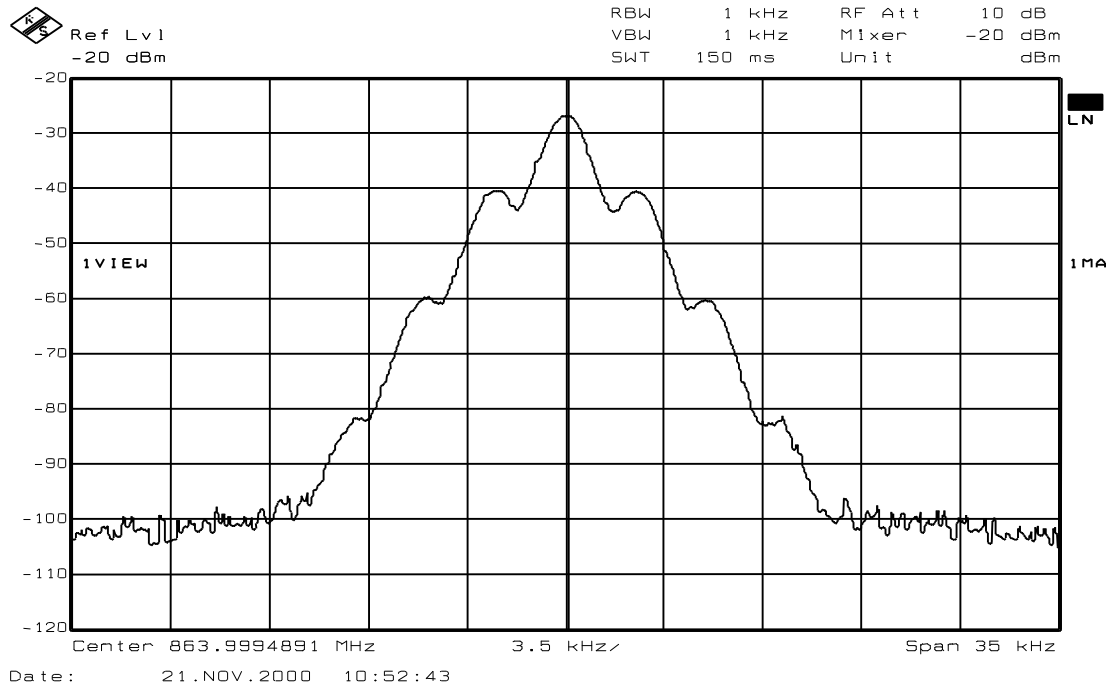
PROJECT NO.: 0L0367RUS1

Test Data - Occupied Bandwidth

MOR 801Bi

Test Plot: Occupied Bandwidth (Input vs. Output)

Page 2 of 2
Job No.: 0L0367R Date: 11/21/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit @ 860 MHz -Voice

Notes: Input signal - Voice Modulation

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

Test Data - Occupied Bandwidth

MOR 801Bi

Test Plot: Occupied Bandwidth (Input vs. Output)

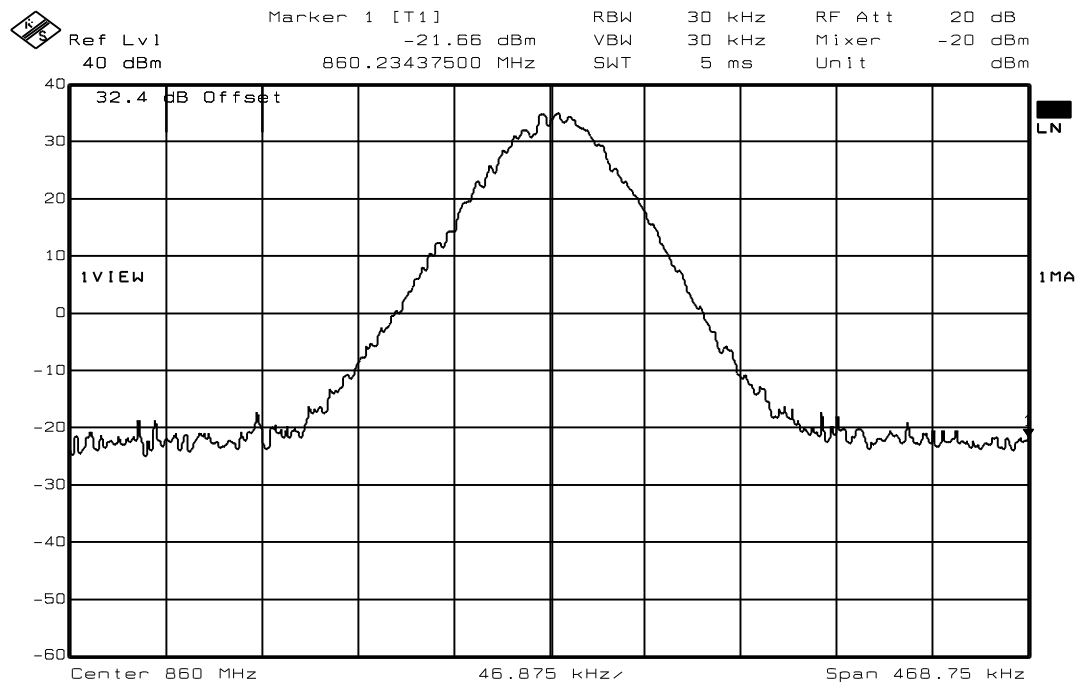
Page 1 of 2

Job No.: 0L0367R Date: 11/21/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit @ 860 MHz -iDEN
Serial Number: 0011
Location: Lab 1 RBW: 30 kHz
Detector Type: Peak VBW: 30 kHz

Test Equipment Used

Antenna: #N/A Directional Coupler: #N/A
Pre-Amp: #N/A Cable #1: 1083
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



Date: 21.NOV.2000 12:14:53

Notes: Output signal - iDEN Modulation

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

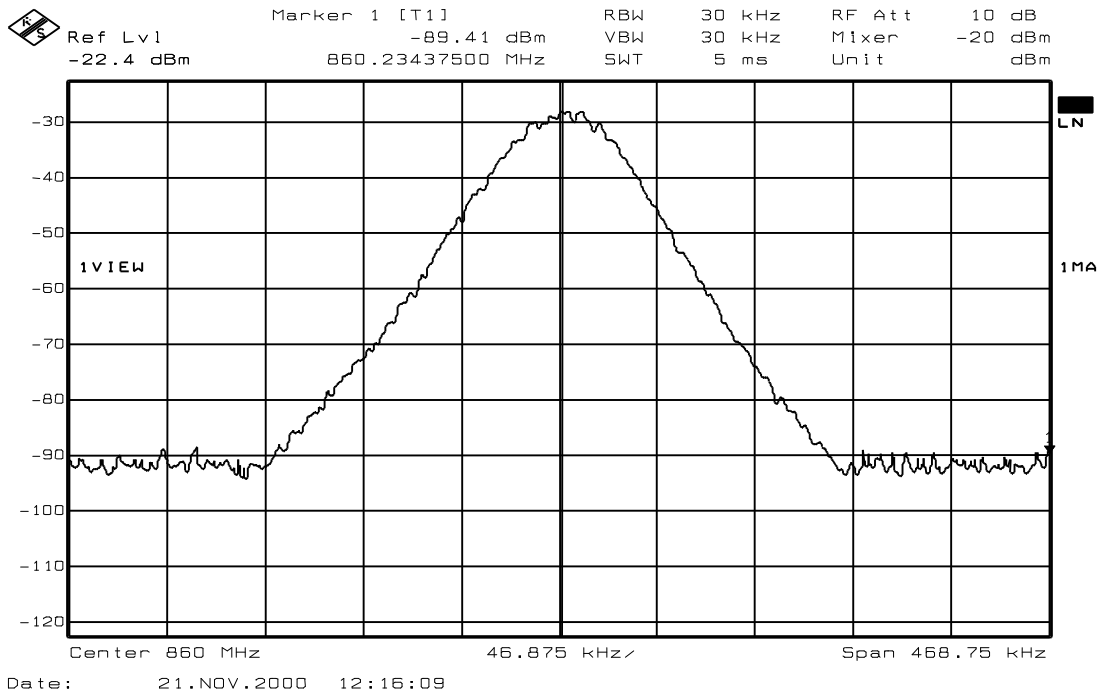
PROJECT NO.: 0L0367RUS1

Test Data - Occupied Bandwidth

MOR 801Bi

Test Plot: Occupied Bandwidth (Input vs. Output)

Page 2 of 2
Job No.: 0L0367R Date: 11/21/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit @ 860 MHz -iDEN

Notes: Input signal - iDEN Modulation

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

Test Data - Occupied Bandwidth**MOR 801Bi Power****Test Plot: Occupied Bandwidth (Input vs. Output)**

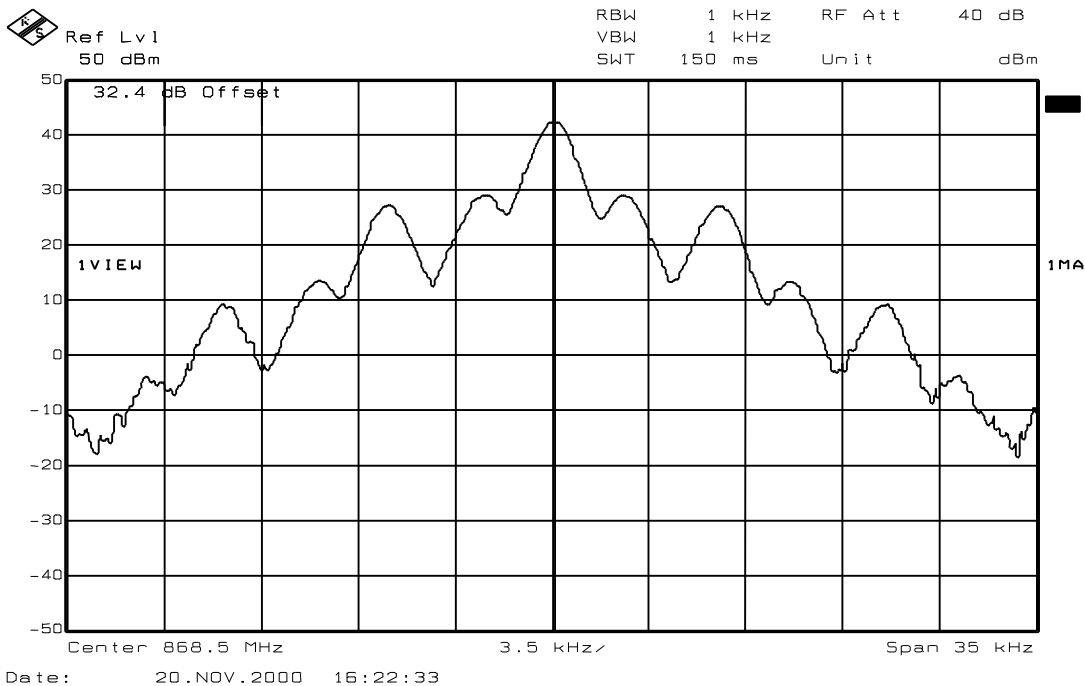
Page 1 of 2

Job No.: 0L0367R Date: 11/20/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit @ 860 MHz -Voice
Serial Number: 0011
Location: Lab 1 RBW: 30 kHz
Detector Type: Peak VBW: 30 kHz

Test Equipment Used

Antenna: #N/A Directional Coupler: #N/A
Pre-Amp: #N/A Cable #1: 1083
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 signal - Voice Modulation

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

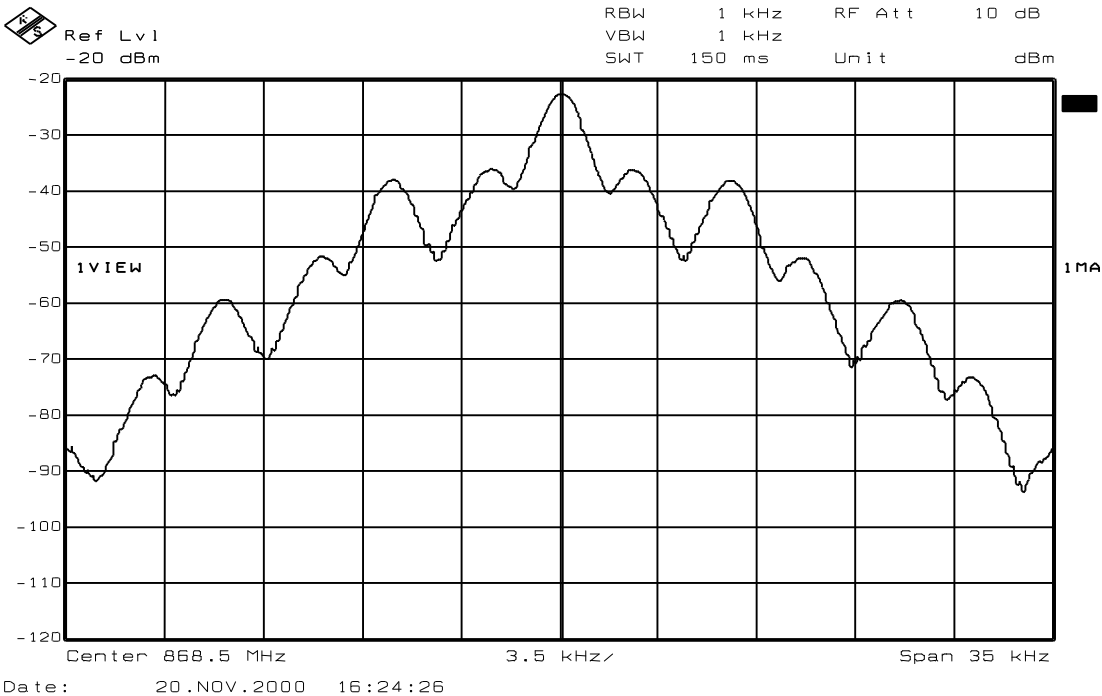
PROJECT NO.: 0L0367RUS1

Test Data - Occupied Bandwidth

MOR 801Bi Power

Test Plot: Occupied Bandwidth (Input vs. Output)

Page 2 of 2
Job No.: 0L0367R Date: 11/20/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit @ 860 MHz -Voice

Notes: Input signal - Voice Modulation

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

Test Data - Occupied Bandwidth

MOR 801Bi Power

Test Plot: Occupied Bandwidth (Input vs. Output)

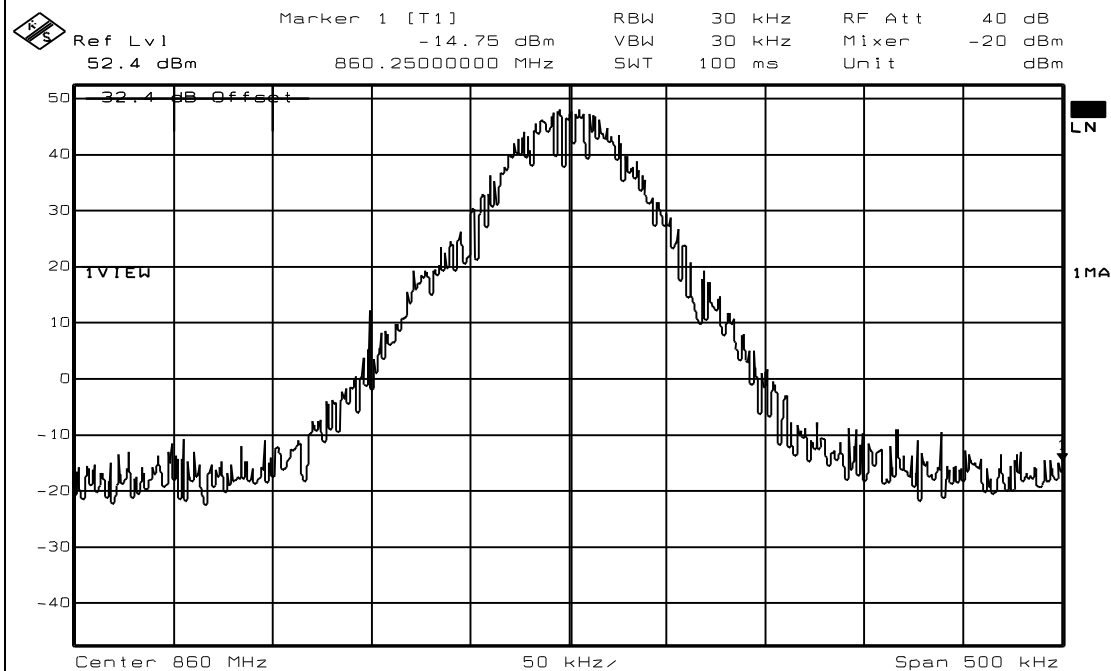
Page 1 of 2

Job No.: 0L0367R Date: 11/20/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit @ 860 MHz -iDEN
Serial Number: 0011
Location: Lab 1 RBW: 30 kHz
Detector Type: Peak VBW: 30 kHz

Test Equipment Used

Antenna: #N/A Directional Coupler: #N/A
Pre-Amp: #N/A Cable #1: 1083
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



Date: 20.NOV.2000 13:24:19

Notes: Output signal - iDEN Modulation

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

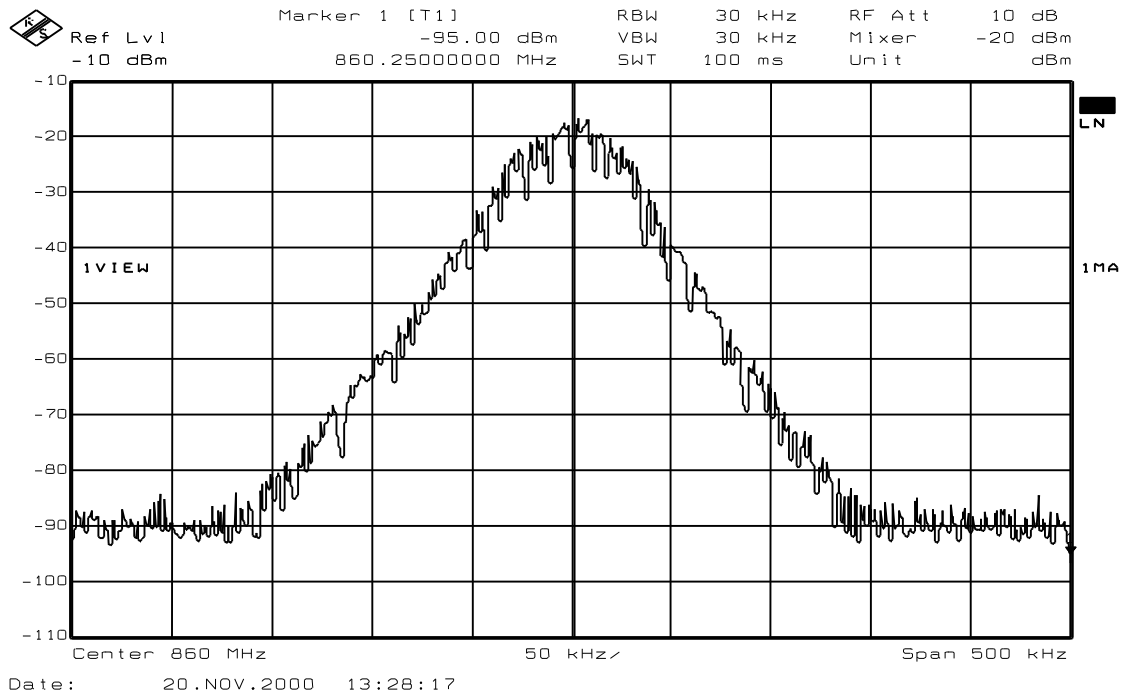
PROJECT NO.: 0L0367RUS1

Test Data - Occupied Bandwidth

MOR 801Bi Power

Test Plot: Occupied Bandwidth (Input vs. Output)

Page 2 of 2
Job No.: 0L0367R Date: 11/20/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit @ 860 MHz -iDEN

Notes: Input signal - iDEN Modulation

EQUIPMENT: **MOR 801Bi and MOR 801Bi Power**

PROJECT NO.: **0L0367RUS1**

Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.991
TESTED BY: David LightTom Tidwell & Debbie Jensen	DATE: 11/20-21/00

Test Results: Complies.

Test Data: See attached graph(s).

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

Test Data - Spurious Emissions at Antenna Terminals

MOR 801Bi

Test Plot: Antenna port spurious emissions

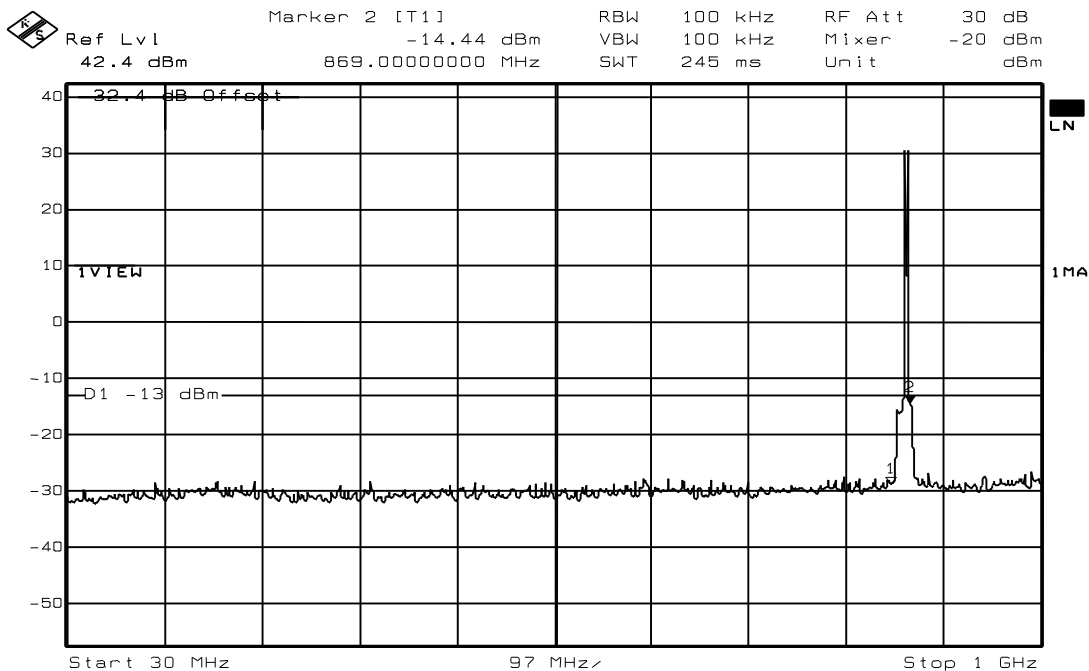
Page 1 of 2

Job No.: 0L0367R Date: 11/21/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit two Voice channels
Serial Number: 0011
Location: Lab 1 RBW: 100 kHz < 1 GHz 1 MHz > 1 GHz
Detector Type: Peak VBW: 100 kHz < 1 GHz 1 MHz > 1 GHz

Test Equipment Used

Antenna: #N/A Directional Coupler: #N/A
Pre-Amp: #N/A Cable #1: 1083
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



Date: 21.NOV.2000 10:57:43

Notes:

Markers indicate transmit band

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

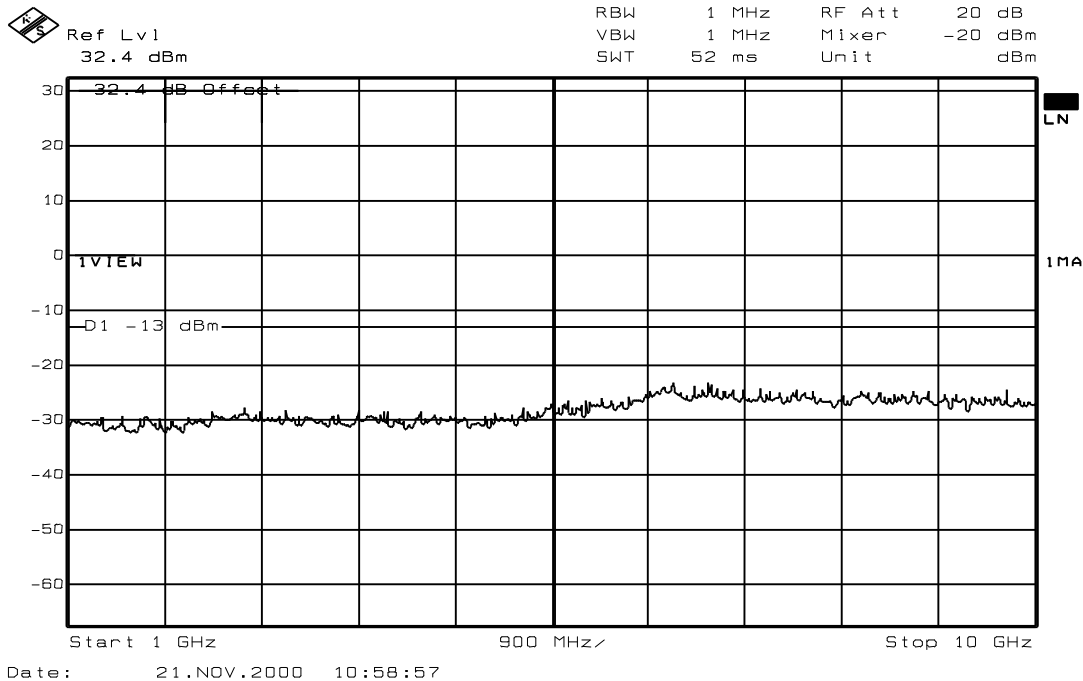
Test Data - Spurious Emissions at Antenna Terminals

MOR 801Bi

Test Plot: Antenna port spurious emissions

Page 2 of 2

Job No.: 0L0367R Date: 11/21/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit two Voice channels



Notes:

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

Test Data - Spurious Emissions at Antenna Terminals

MOR 801Bi

Test Plot: Antenna port spurious emissions

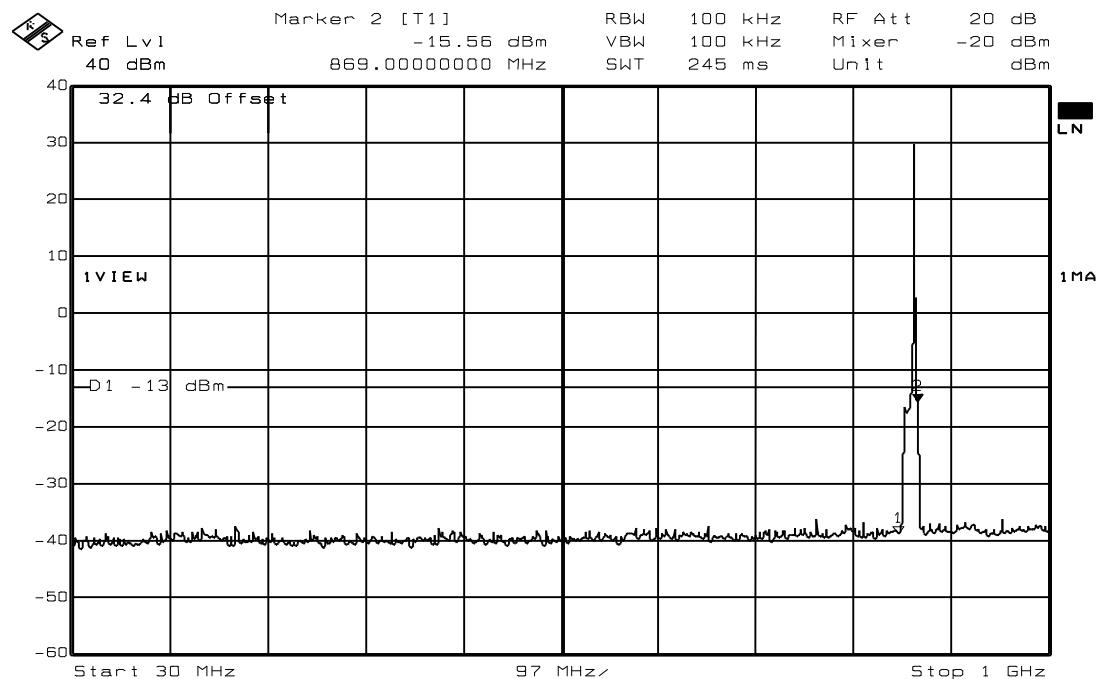
Page 1 of 2

Job No.: 0L0367R Date: 11/21/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit two iDEN channels @ 1.43 MHz spacing
Serial Number: 0011
Location: Lab 1 RBW: < 1 GHz 1 MHz > 1 GHz
Detector Type: Peak VBW: < 1 GHz 1 MHz > 1 GHz

Test Equipment Used

Antenna: #N/A Directional Coupler: #N/A
Pre-Amp: #N/A Cable #1: 1083
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



Date: 21.NOV.2000 12:09:04

Notes:

Markers indicate transmit band

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

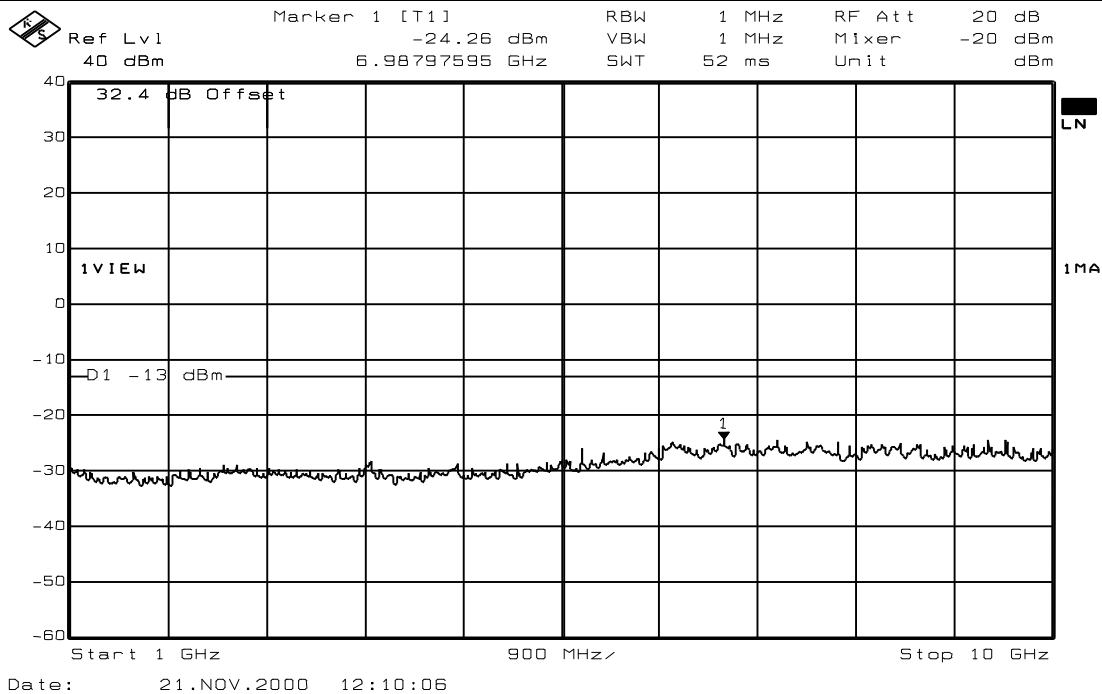
PROJECT NO.: 0L0367RUS1

Test Data - Spurious Emissions at Antenna Terminals

MOR 801Bi

Test Plot: Antenna port spurious emissions

Page 2 of 2
Job No.: 0L0367R Date: 11/21/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit two iDEN channels @ 1.43 MHz spacing



Notes:

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

Test Data - Spurious Emissions at Antenna Terminals

MOR 801Bi

Test Plot: Intermodulation (Voice)

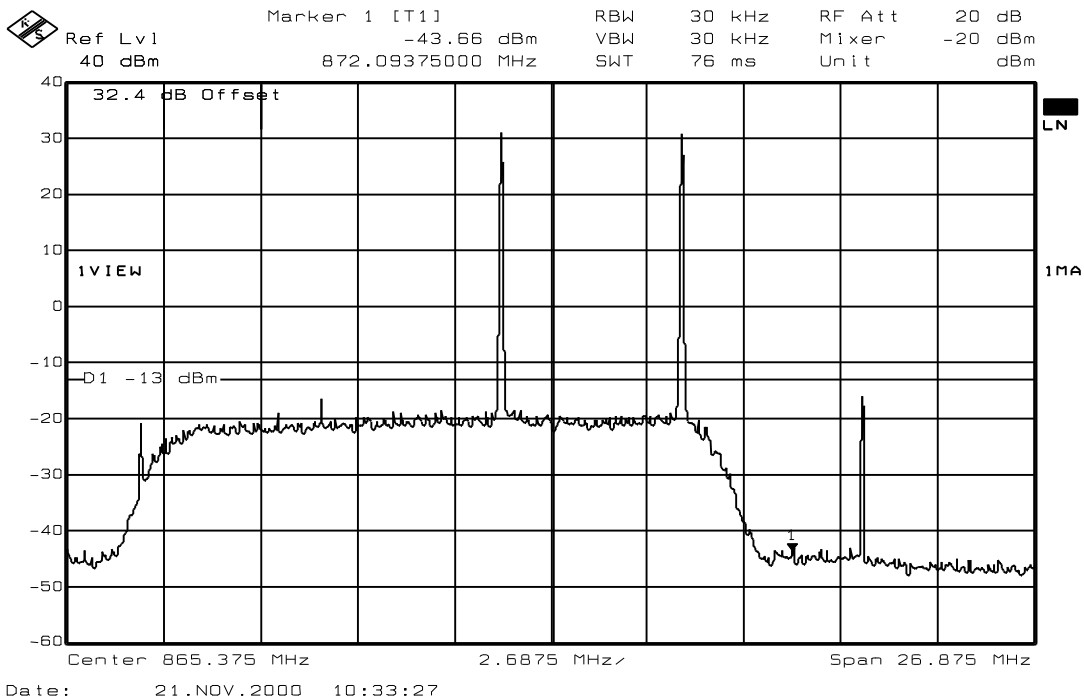
Page 1 of 2

Job No.: 0L0367R Date: 11/21/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit two Voice channels @ 1.43 MHz spacing
Serial Number: 0011
Location: Lab 1 RBW: 30 kHz
Detector Type: Peak VBW: 30 kHz

Test Equipment Used

Antenna: #N/A Directional Coupler: #N/A
Pre-Amp: #N/A Cable #1: 1083
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



Date: 21.NOV.2000 10:33:27

Notes: Inband intermodulation characteristics

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

Test Data - Spurious Emissions at Antenna Terminals

MOR 801Bi

Test Plot: Out of Band Intermodulation (Voice)

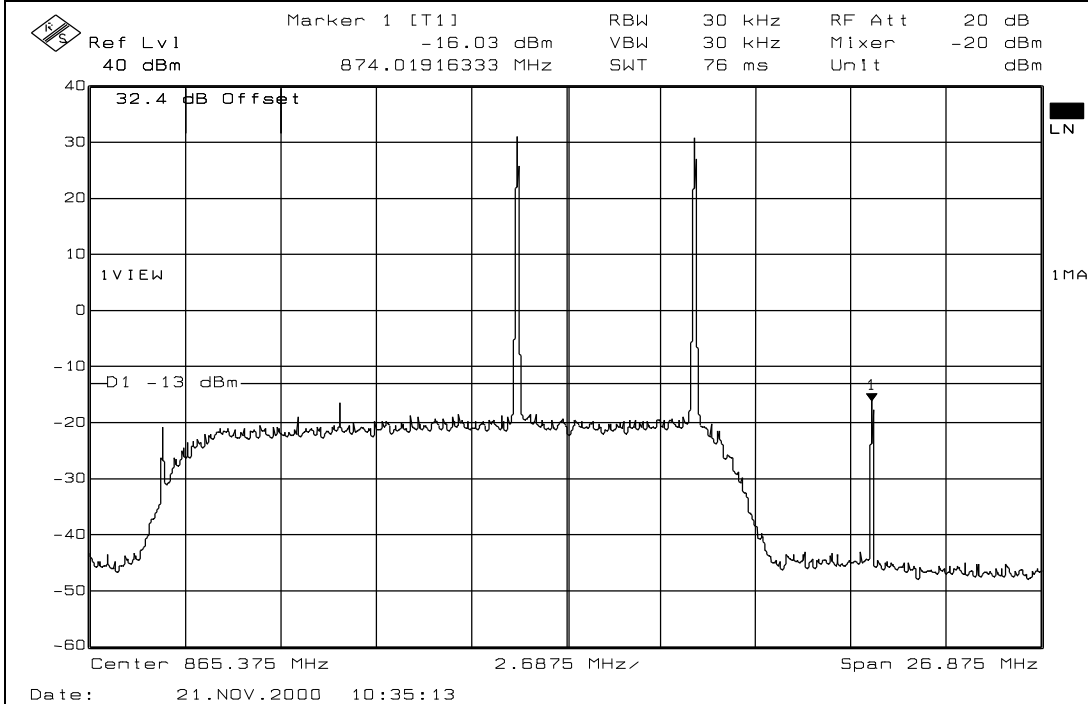
Page 1 of 1

Job No.: 0L0367R Date: 11/21/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit two Voice channels @ 1.43 MHz spacing
Serial Number: 0011
Location: Lab 1 RBW: 30 kHz
Detector Type: Peak VBW: 30 kHz

Test Equipment Used

Antenna: #N/A Directional Coupler: #N/A
Pre-Amp: #N/A Cable #1: 1083
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: Out of band intermodulation characteristics

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

Test Data - Spurious Emissions at Antenna Terminals

MOR 801Bi

Test Plot: Intermodulation (iDEN)

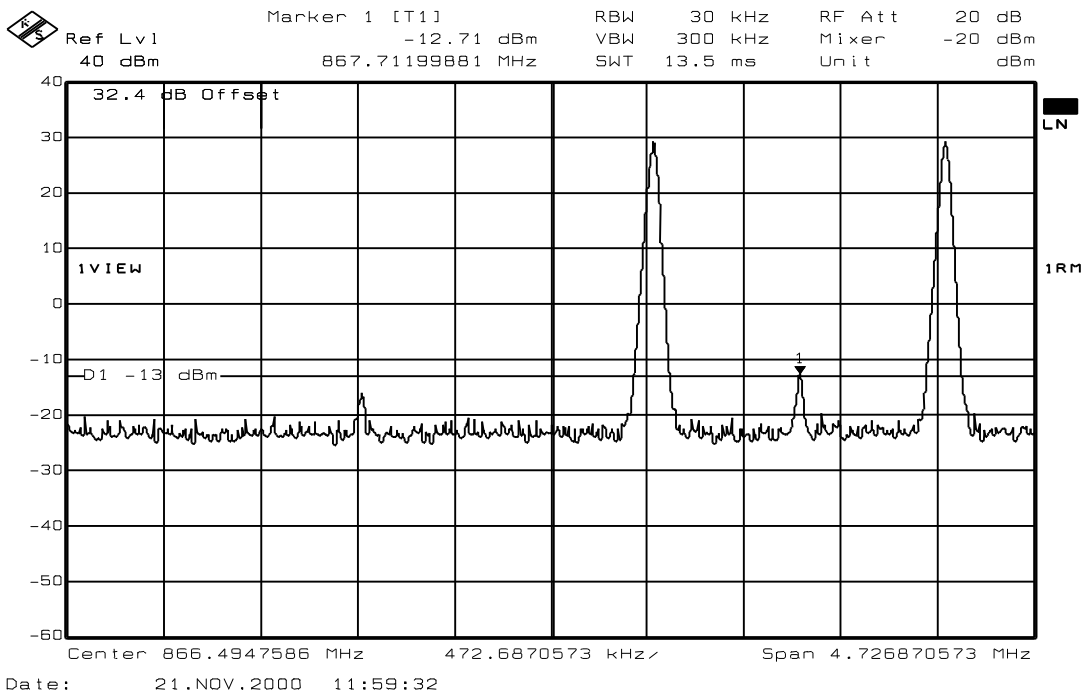
Page 1 of 2

Job No.: 0L0367R Date: 11/21/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit two iDEN channels @ 1.43 MHz spacing
Serial Number: 0011
Location: Lab 1 RBW: 30 kHz
Detector Type: Rms VBW: 30 kHz

Test Equipment Used

Antenna: #N/A Directional Coupler: #N/A
Pre-Amp: #N/A Cable #1: 1083
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: Inband intermodulation characteristics
Marker indicates signal generated by IQ generator

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

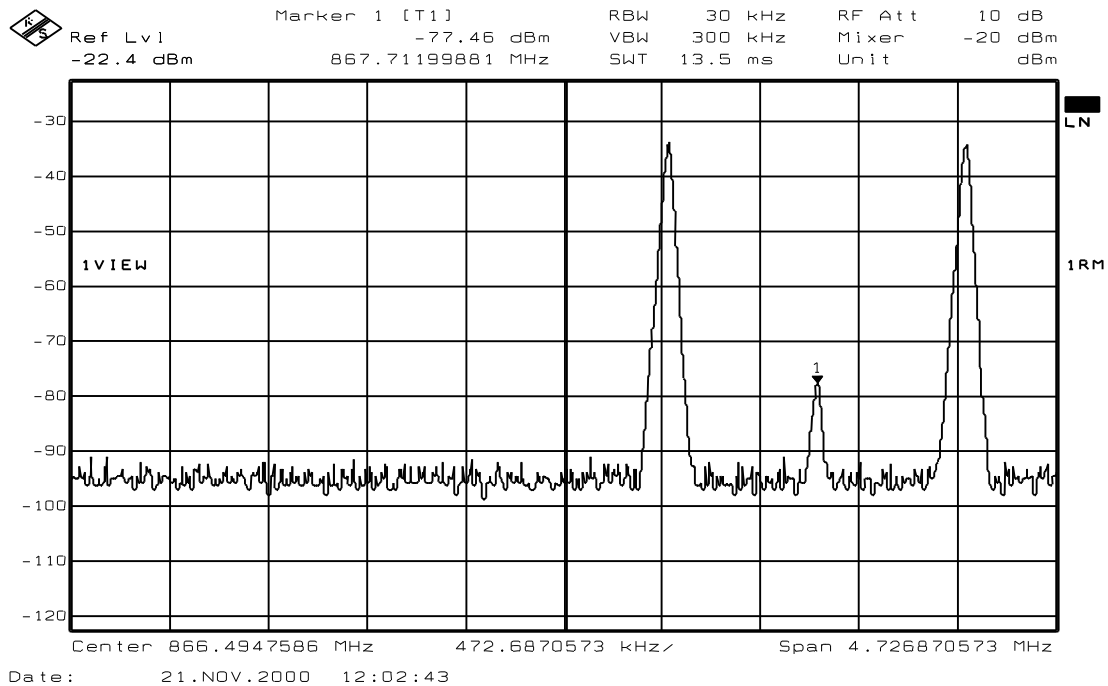
PROJECT NO.: 0L0367RUS1

Test Data - Spurious Emissions at Antenna Terminals

MOR 801Bi

Test Plot: Intermodulation (iDEN)

Page 2 of 2
Job No.: 0L0367R Date: 11/21/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit two iDEN channels @ 1.43 MHz spacing



Notes: Input signal from IQ generator

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

Test Data - Spurious Emissions at Antenna Terminals

MOR 801Bi

Test Plot: Out of Band Intermodulation (iDEN)

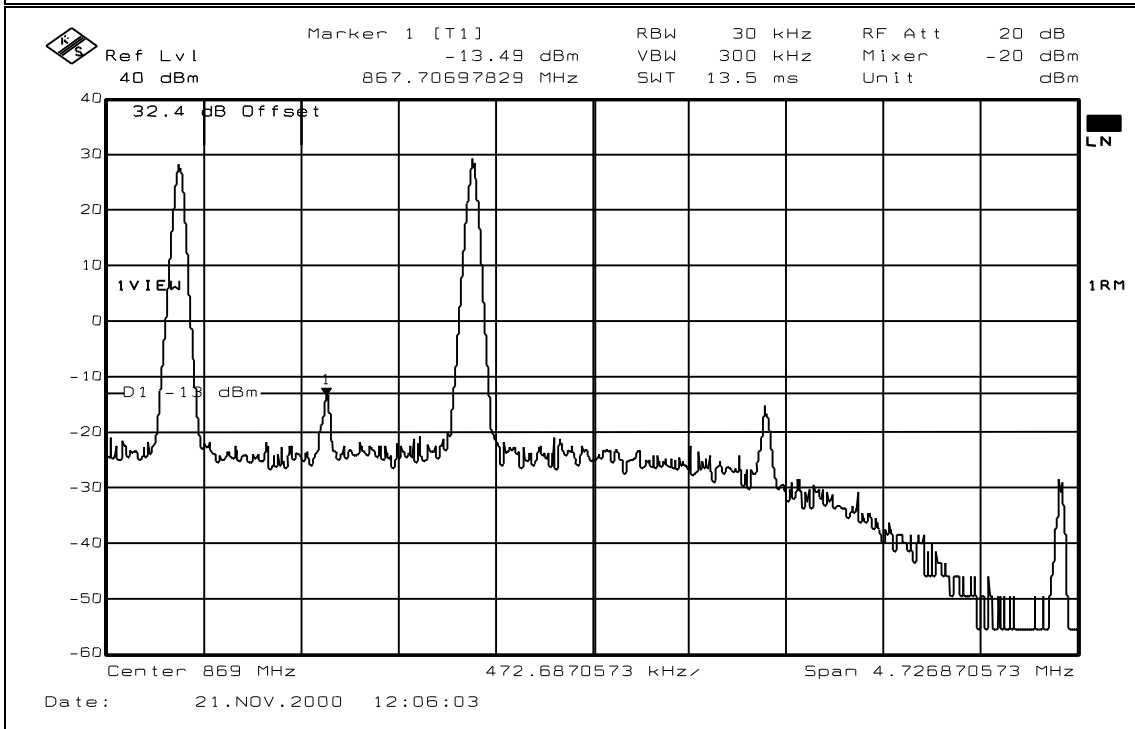
Page 1 of 2

Job No.: 0L0367R Date: 11/21/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit two iDEN channels @ 1.43 MHz spacing
Serial Number: 0011
Location: Lab 1 RBW: 30 kHz
Detector Type: Rms VBW: 30 kHz

Test Equipment Used

Antenna: #N/A Directional Coupler: #N/A
Pre-Amp: #N/A Cable #1: 1083
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: Out of band intermodulation characteristics
Marker indicates signal generated by IQ generator

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

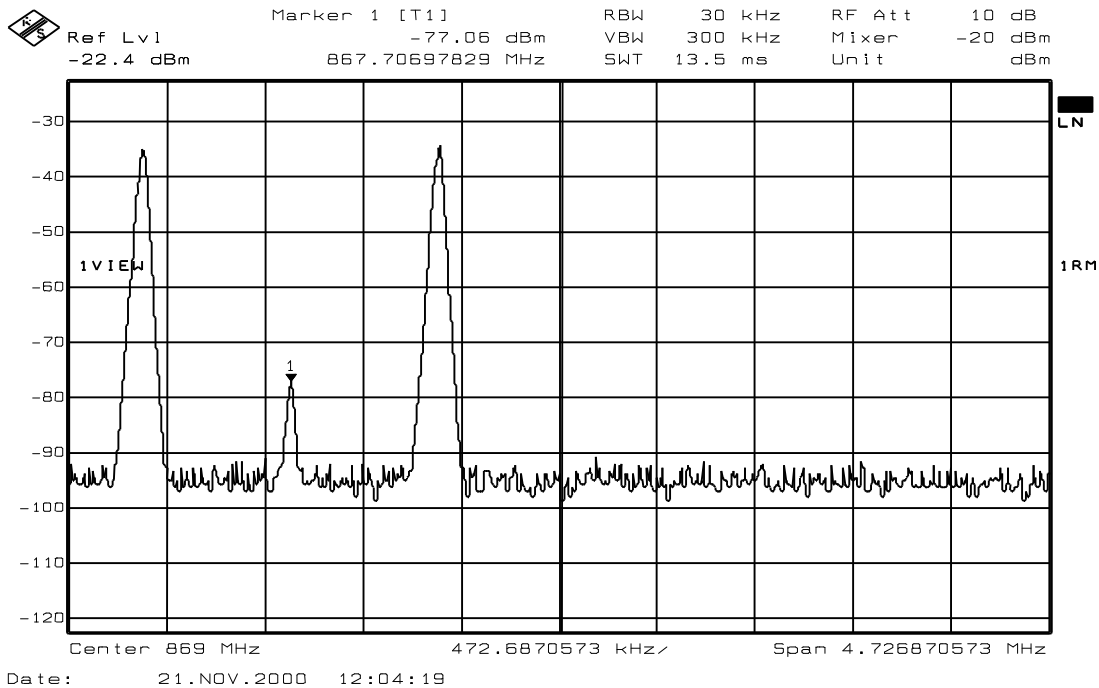
PROJECT NO.: 0L0367RUS1

Test Data - Spurious Emissions at Antenna Terminals

MOR 801Bi

Test Plot: Out of Band Intermodulation (iDEN)

Page 2 of 2
Job No.: 0L0367R Date: 11/21/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit two iDEN channels @ 1.43 MHz spacing



Notes: Input signal from IQ generator

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

Test Data - Spurious Emissions at Antenna Terminals

MOR 801Bi Power

Test Plot: Antenna port spurious emissions

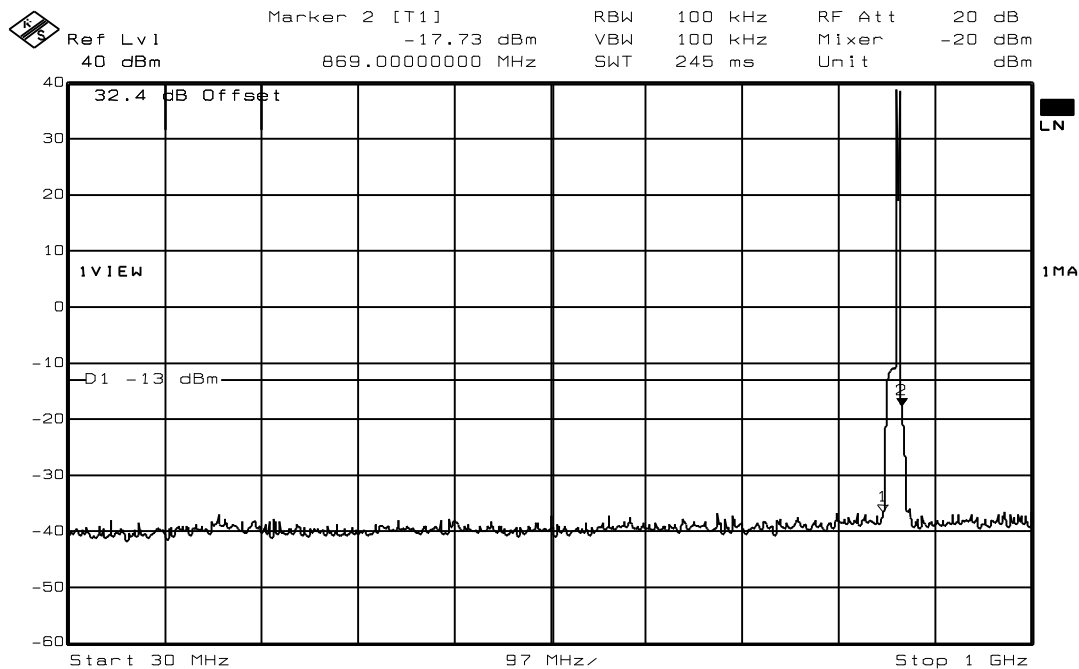
Page 1 of 2

Job No.: 0L0367R Date: 11/21/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit two Voice channels
Serial Number: 0011
Location: Lab 1 RBW: 100 kHz < 1 GHz, 1 MHz > 1 G
Detector Type: Peak VBW: 100 kHz < 1 GHz, 1 MHz > 1 G

Test Equipment Used

Antenna: #N/A Directional Coupler: #N/A
Pre-Amp: #N/A Cable #1: 1083
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



Date: 21.NOV.2000 9:21:16

Notes:

Markers indicate transmit band

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

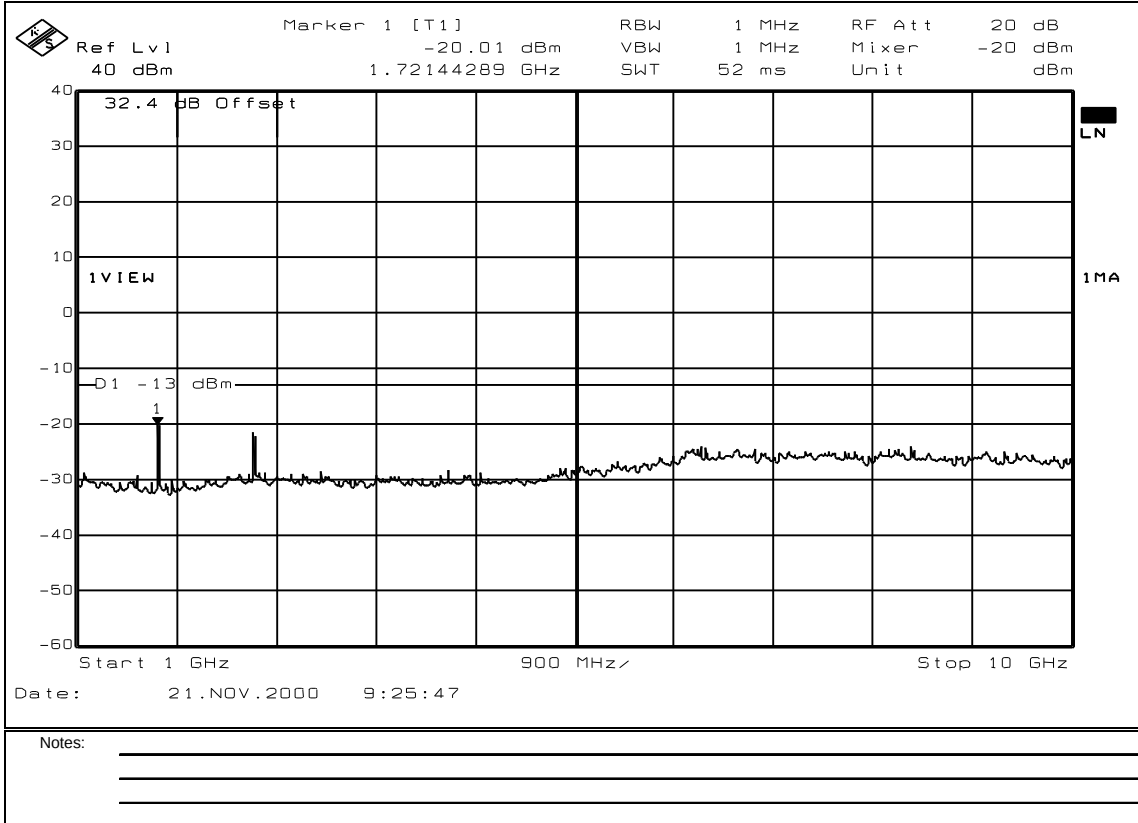
Test Data - Spurious Emissions at Antenna Terminals

MOR 801Bi Power

Test Plot: Antenna port spurious emissions

Page 2 of 2

Job No.: 0L0367R Date: 11/21/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit two Voice channels



EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

Test Data - Spurious Emissions at Antenna Terminals

MOR 801Bi Power

Test Plot: Antenna port spurious emissions

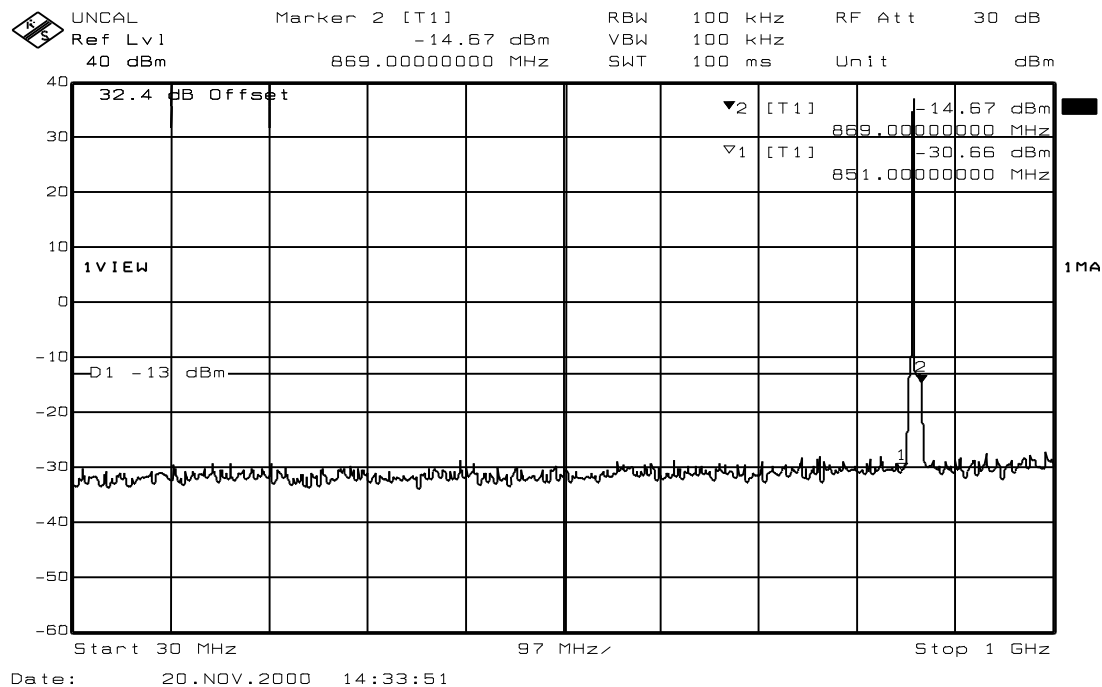
Page 1 of 2

Job No.: 0L0367R Date: 11/20/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit two iDEN channels @ 1.43 MHz spacing
Serial Number: 0011
Location: Lab 1 RBW: 100 kHz, 1 GHz, 1 MHz > 1 GHz
Detector Type: Peak VBW: 100 kHz, 1 GHz, 1 MHz > 1 GHz

Test Equipment Used

Antenna: #N/A Directional Coupler: #N/A
Pre-Amp: #N/A Cable #1: 1083
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:

Markers indicate transmit band

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

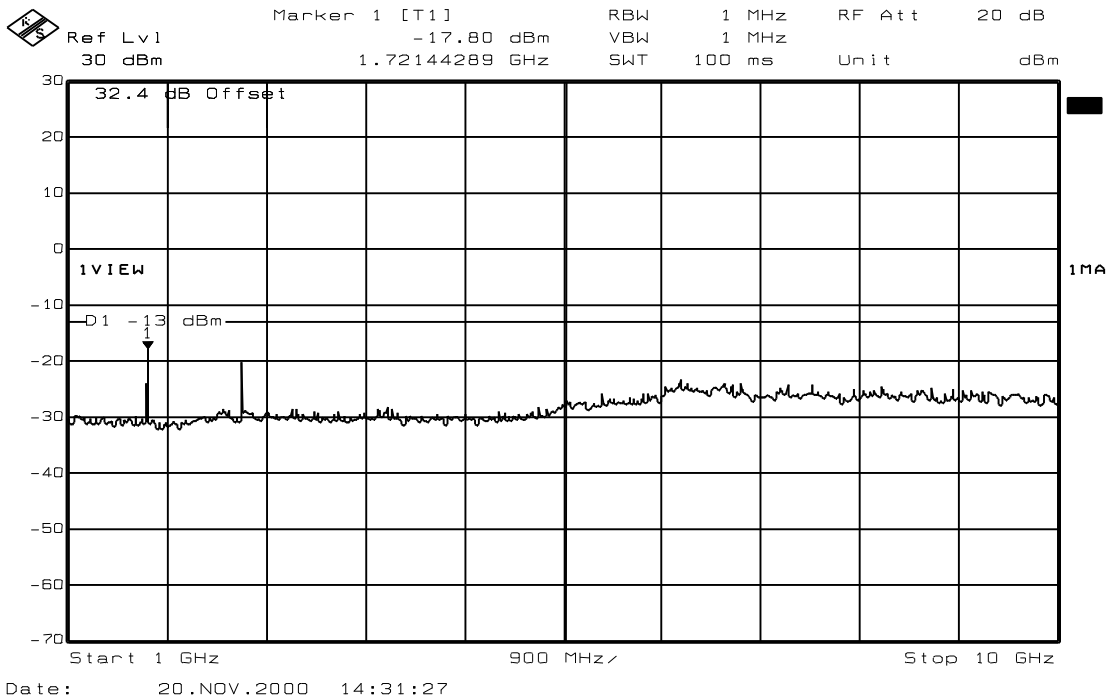
PROJECT NO.: 0L0367RUS1

Test Data - Spurious Emissions at Antenna Terminals

MOR 801Bi Power

Test Plot: Antenna port spurious emissions

Page 2 of 2
Job No.: 0L0367R Date: 11/20/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit two iDEN channels @ 1.43 MHz spacing



Notes:

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

Test Data - Spurious Emissions at Antenna Terminals

MOR 801Bi Power

Test Plot: Intermodulation (Voice)

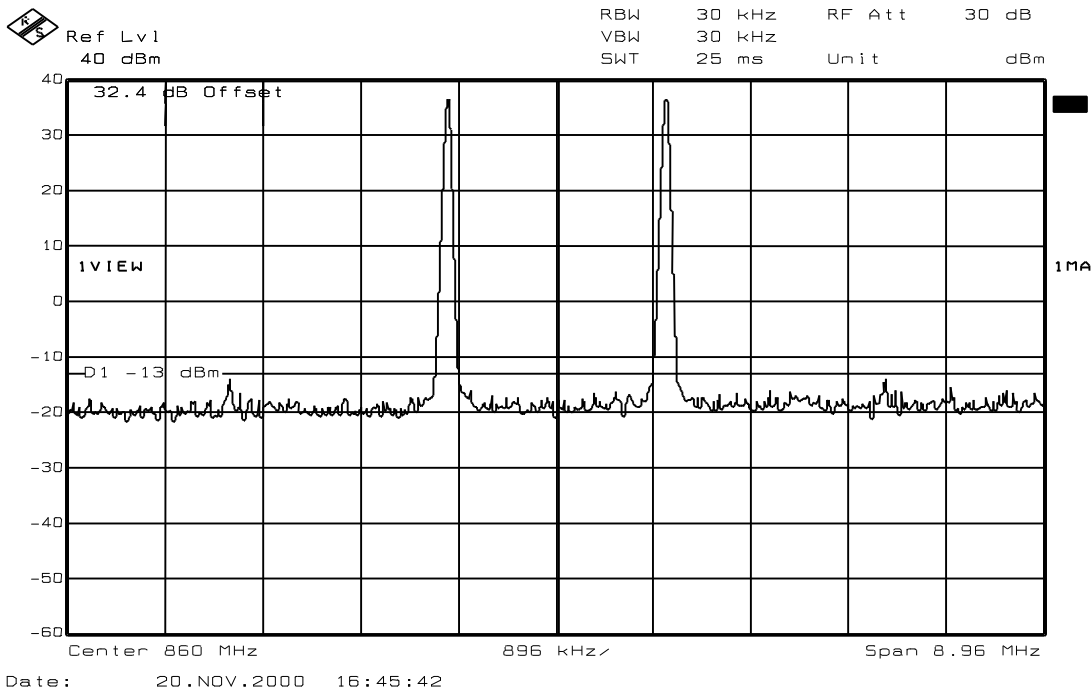
Page 1 of 2

Job No.: 0L0367R Date: 11/20/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit two Voice channels @ 1.43 MHz spacing
Serial Number: 0011
Location: Lab 1 RBW: 30 kHz
Detector Type: Peak VBW: 30 kHz

Test Equipment Used

Antenna: #N/A Directional Coupler: #N/A
Pre-Amp: #N/A Cable #1: 1083
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: Inband intermodulation characteristics

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

Test Data - Spurious Emissions at Antenna Terminals

MOR 801Bi Power

Test Plot: Out of Band Intermodulation (Voice)

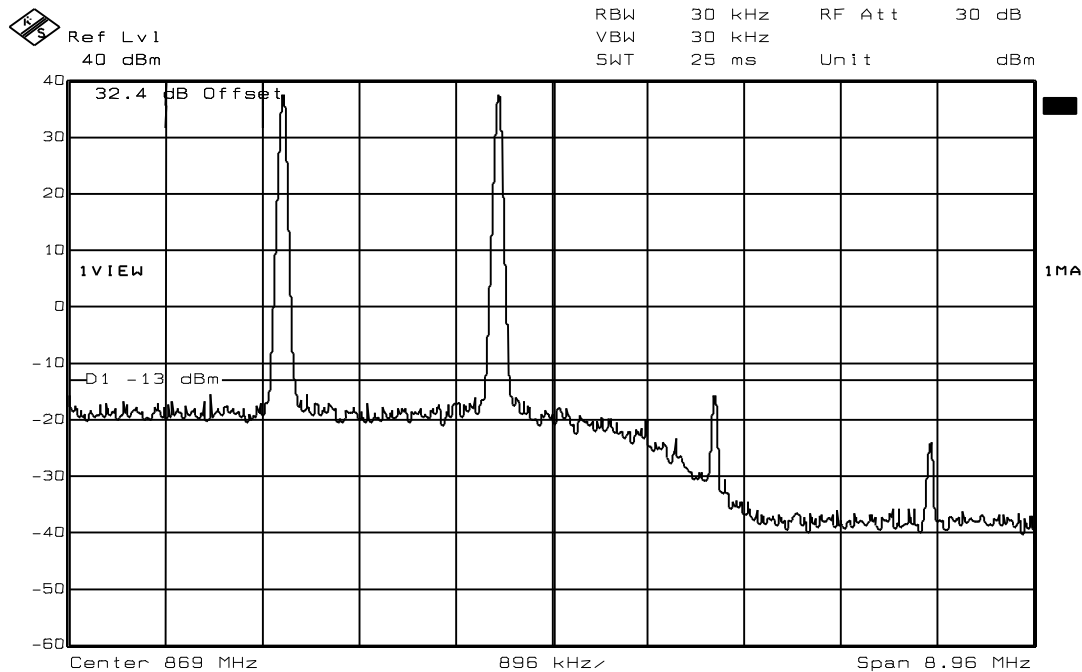
Page 1 of 2

Job No.: 0L0367R Date: 11/20/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit two Voice channels @ 1.43 MHz spacing
Serial Number: 0011
Location: Lab 1 RBW: 30 kHz
Detector Type: Peak VBW: 30 kHz

Test Equipment Used

Antenna: #N/A Directional Coupler: #N/A
Pre-Amp: #N/A Cable #1: 1083
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



Date: 20.NOV.2000 16:38:28

Notes: Out of band intermodulation characteristics

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

Test Data - Spurious Emissions at Antenna Terminals

MOR 801Bi Power

Test Plot: Intermodulation (iDEN)

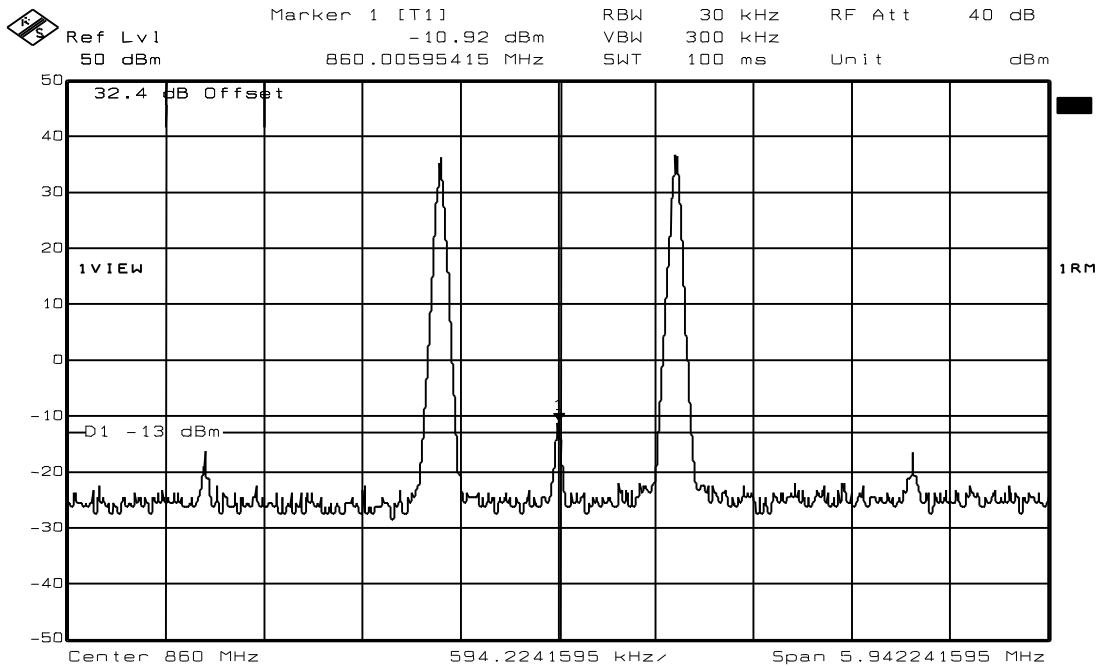
Page 1 of 2

Job No.: 0L0367R Date: 11/20/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit two iDEN channels @ 1.43 MHz spacing
Serial Number: 0011
Location: Lab 1 RBW: 30 kHz
Detector Type: Rms VBW: 30 kHz

Test Equipment Used

Antenna: #N/A Directional Coupler: #N/A
Pre-Amp: #N/A Cable #1: 1083
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



Date: 20.NOV.2000 14:06:57

Notes: Inband intermodulation characteristics
Marker indicates signal generated by IQ generator

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

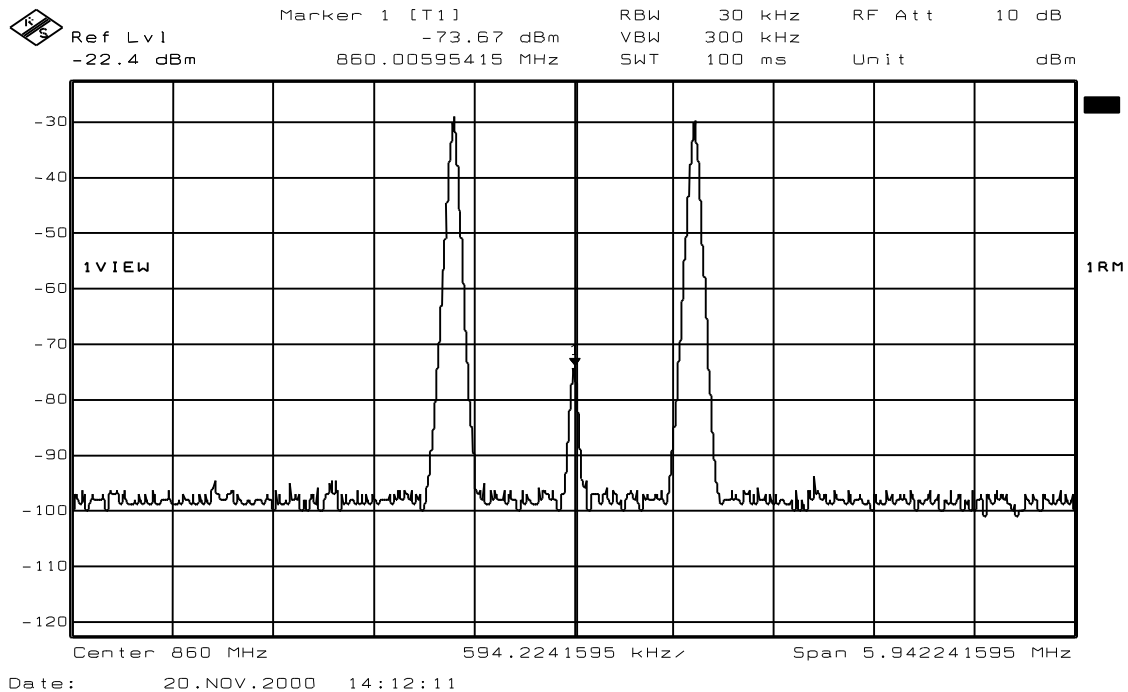
PROJECT NO.: 0L0367RUS1

Test Data - Spurious Emissions at Antenna Terminals

MOR 801Bi Power

Test Plot: Intermodulation (iDEN)

Page 2 of 2
Job No.: 0L0367R Date: 11/20/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit two iDEN channels @ 1.43 MHz spacing



Notes: Input signal from IQ generator

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

Test Data - Spurious Emissions at Antenna Terminals

MOR 801Bi Power

Test Plot: Out of Band Intermodulation (iDEN)

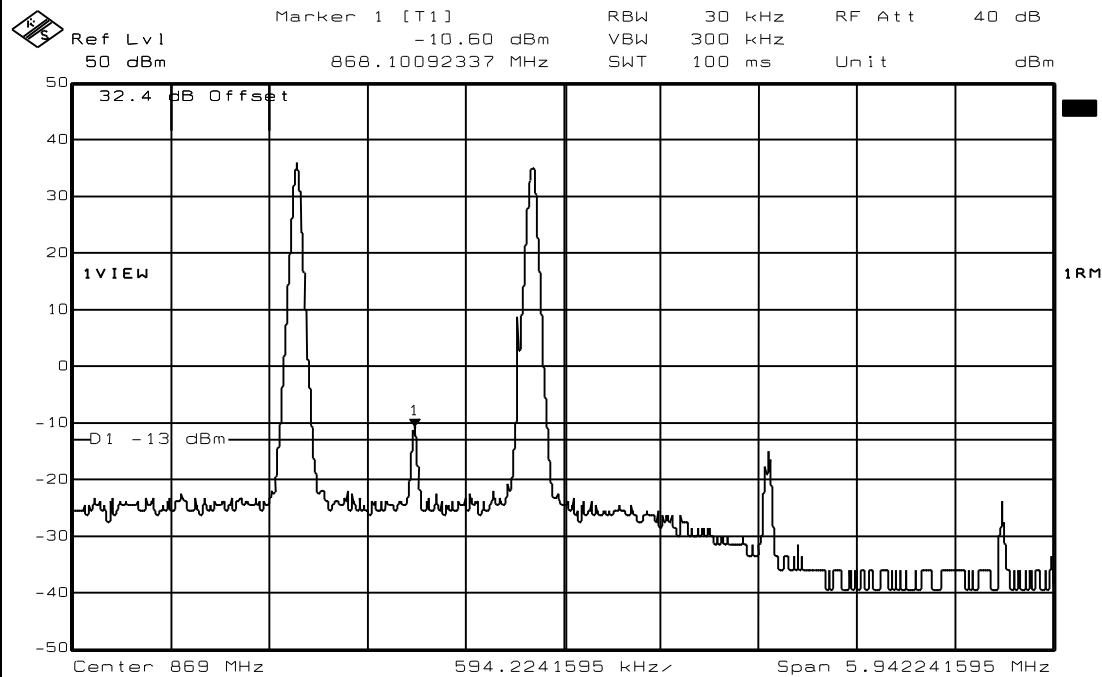
Page 1 of 2

Job No.: 0L0367R Date: 11/20/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit two iDEN channels @ 1.43 MHz spacing
Serial Number: 0011
Location: Lab 1 RBW: 30 kHz
Detector Type: Rms VBW: 30 kHz

Test Equipment Used

Antenna: #N/A Directional Coupler: #N/A
Pre-Amp: #N/A Cable #1: 1083
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



Date: 20.NOV.2000 14:19:04

Notes: Out of band intermodulation characteristics
Marker indicates signal generated by IQ generator

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

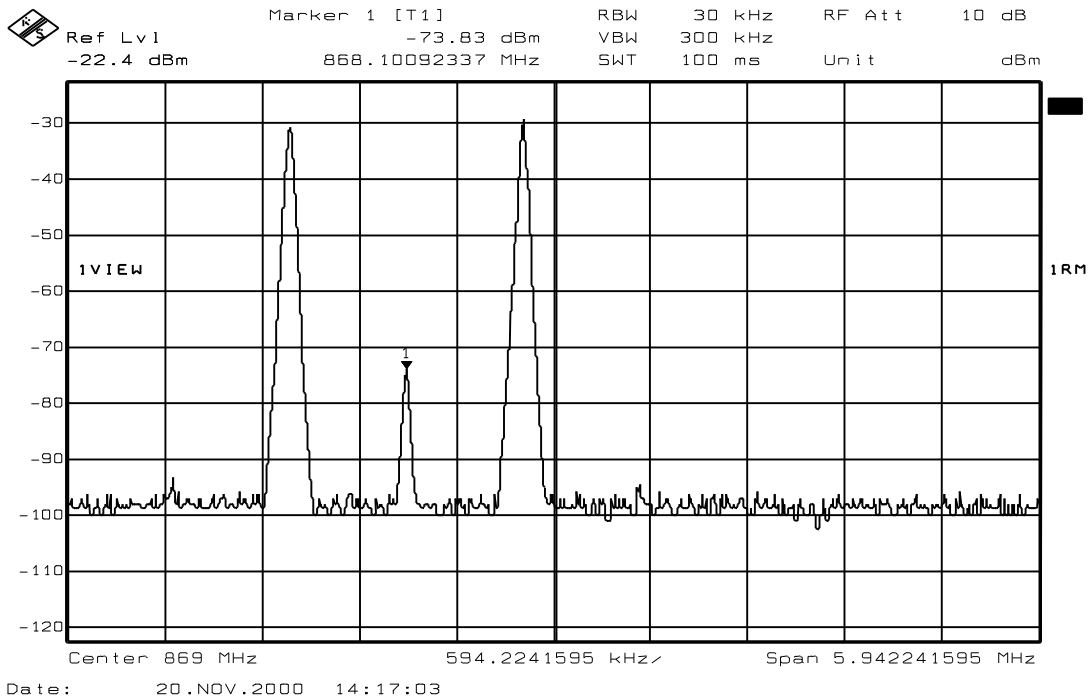
PROJECT NO.: 0L0367RUS1

Test Data - Spurious Emissions at Antenna Terminals

MOR 801Bi Power

Test Plot: Out of Band Intermodulation (iDEN)

Page 2 of 2
Job No.: 0L0367R Date: 11/20/00
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: MOR 801Bi Power
Configuration: Transmit two iDEN channels @ 1.43 MHz spacing



Notes: Input signal from IQ generator

EQUIPMENT: **MOR 801Bi and MOR 801Bi Power**

PROJECT NO.: **0L0367RUS1**

Section 6. Field Strength of Spurious Emissions

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 2.993
TESTED BY: David LightTom Tidwell & Debbie Jensen	DATE:11/22/00

Test Results: Complies.

Test Data: See attached table.

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

Test Data - Radiated Emissions

MOR 801Bi

Dallas Headquarters:

802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

KTL Dallas, Inc.

Field Strength of Spurious Emissions

Page 1 of 1

Job No.: 0L0367

Date: 11/22/00

Complete X

Preliminary

Specification:

Temperature(°C): 22

Tested By: David Light

Relative Humidity(%) 50

E.U.T.:	MOR801Bi
---------	----------

Configuration:	Transmit full power at 860 MHz
----------------	--------------------------------

Sample No:

Location: AC 3RBW: 1 MHz

Measurement

Detector Type:	Peak
----------------	------

VBW:	1 MHz
------	-------

Distance: 3 m

Test Equipment Used

Antenna: 993

Directional Coupler: _____

Pre-Amp:	1016
----------	------

Cable #1:	1484
-----------	------

Filter: _____

Cable #2: 1485

Receiver: 1464

Cable #3: _____

Attenuator #1 _____

Cable #4: _____

Attenuator #2:

Mixer: _____

Additional equipment used:

Measurement Uncertainty:	+/-3.6 dB
--------------------------	-----------

[illegible]

Photographs of Test Setup

MOR 801Bi
FRONT VIEW



REAR VIEW



EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

Photographs of Test Setup

MOR 801Bi Power
FRONT VIEW



REAR VIEW



EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

Section 7. Frequency Stability

NAME OF TEST: Frequency Stability	PARA. NO.: 2.995
TESTED BY: Tom Tidwell & Debbie Jensen	DATE:

Test Results: Compliant/Does Not Comply,

Measurement Data: See attached tables.

Not Applicable

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

Section 8. Test Equipment List

KTL ID	Description	Manufacturer Model Number	Serial Number	Calibration Date
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	11/03/99 2 yr cycle
1016	AMPLIFIER	HEWLETT PACKARD 8449A	2749A00159	05/24/00
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
993	Horn antenna	A.H. Systems SAS-200/571	XXX	07/16/99 2 yr cycle
1604	ATTENUATOR	NARDA 776B-20	NONE	09/30/99 CBU
1065	ATTENUATOR	NARDA 776B-10	NONE	09/30/99 CBU
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	06/14/99 2 yr cycle
1081	CABLE 2m	Astrolab 32027-2-29094-72TC	N/A	05/23/00
1083	Cable 2m	Astrolab 32027-2-29094-72TC	N/A	05/23/00
1051	Radio Communication Analyzer	Rhode & Schwarz CMTA-54	835875/002	03/14/00
1341	COMMUNICATION SERVICE MO	ROHDE & SCHWARZ CMS53	883832/018	CNR
1052	I/Q MODULATION GENERATOR	Rhode & Schwarz AMIQ	DE30619	09/25/00
1053	SIGNAL GENERATOR	ROHDE & SCHWARZ SMIQ 03	DE22081	CNR
1088	COMBINER	MINI-CIRCUITS ZA3PD-1	NONE	CBU
717	SIGNAL GENERATOR	MARCONI 2022D	119144/023	CNR

KTL Dallas

FCC PART 90, SUBPART I
PRIVATE LAND MOBILE REPEATER

EQUIPMENT: **MOR 801Bi and MOR 801Bi Power**

PROJECT NO.: **0L0367RUS1**

ANNEX A - TEST METHODOLOGIES

EQUIPMENT: MOR 801Bi and MOR 801Bi Power

PROJECT NO.: 0L0367RUS1

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

FCC PART 90, SUBPART I
PRIVATE LAND MOBILE REPEATER

PROJECT NO.: 0L0367RUS1

PARA. NO.: 2.991

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

VBW: $\Rightarrow$ RBW

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

EQUIPMENT: MOR 801Bi and MOR 801Bi Power**PROJECT NO.: 0L0367RUS1**

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

EQUIPMENT: MOR 801Bi and MOR 801Bi Power**PROJECT NO.:** 0L0367RUS1

NAME OF TEST: Field Strength of Spurious**PARA. NO.:** 2.993**Minimum Standard:** Para. No. 90.210, see table 1 for applicable mask.**Test Method:** TIA/EIA-603-1992, Section 2.2.12

The antenna substitution method was used to determine the equivalent radiated power at spurious frequencies. The spurious emissions were measured at a distance of 3 meters. The EUT was then replaced with a reference substitution antenna with a known gain referenced to a dipole. This antenna was fed with a signal at the spurious frequency. The level of the signal was adjusted to repeat the previously measured level. The resulting erp is the signal level fed to the reference antenna corrected for gain referenced to a dipole.

MASK	Spurious Limit
A,B,C,G,H,I	-13dBm
D,J	-20dBm
E,F,K	-25dBm

EQUIPMENT: MOR 801Bi and MOR 801Bi Power**PROJECT NO.: 0L0367RUS1**

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	-	-	-

KTL Dallas

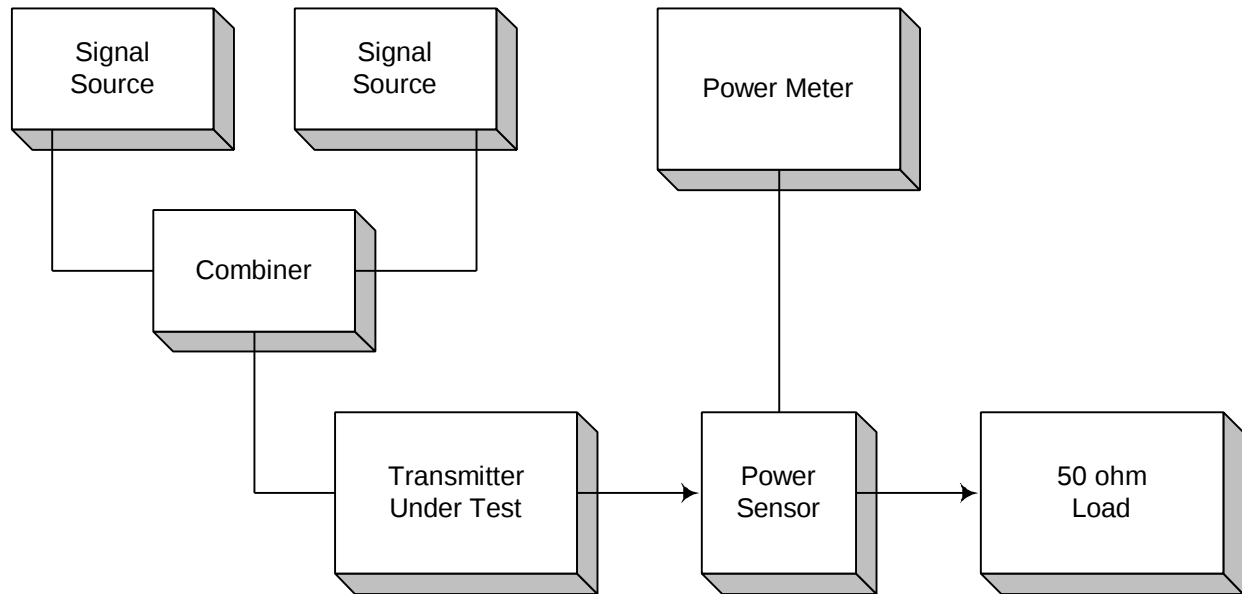
FCC PART 90, SUBPART I
PRIVATE LAND MOBILE REPEATER

EQUIPMENT: **MOR 801Bi and MOR 801Bi Power**

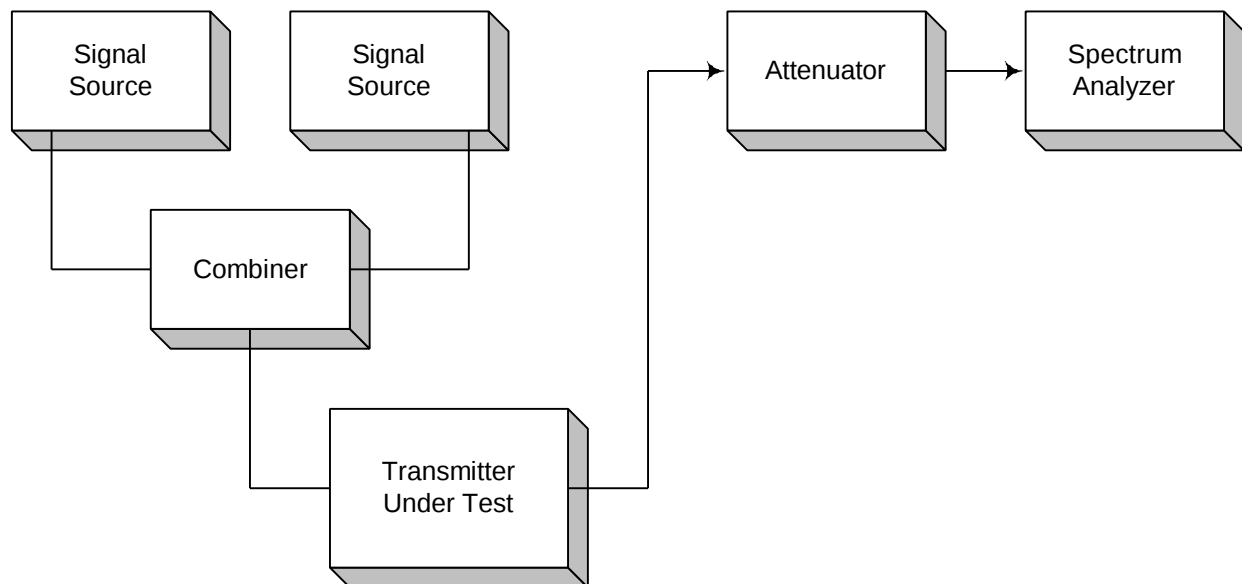
PROJECT NO.: **0L0367RUS1**

ANNEX B - TEST DIAGRAMS

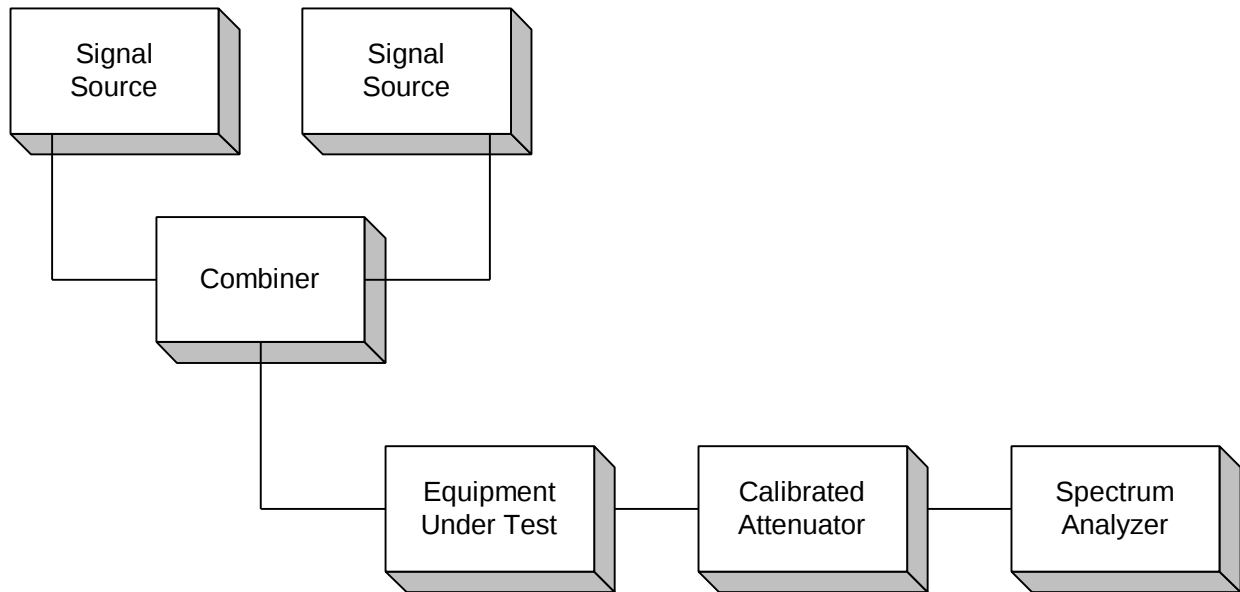
Para. No. 2.985 - R.F. Power Output



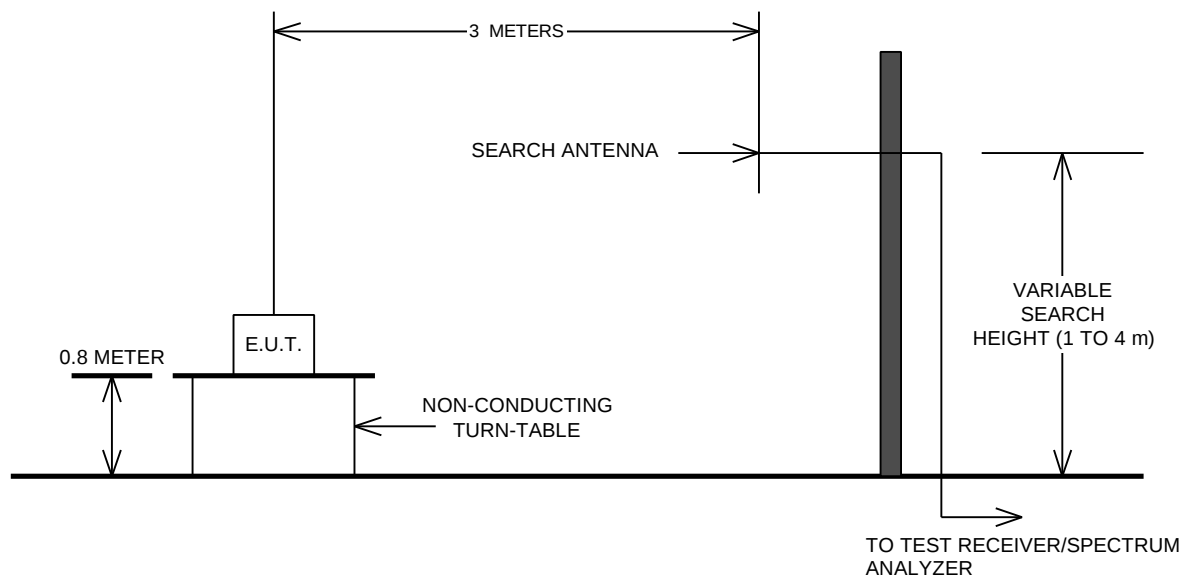
Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 - Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability

