

**KTL Test Report:**

0R02869  
Issue: 2.0

**Applicant:**

Nortel Networks  
21 Richardson Side Road  
Kanata, Ontario  
K2K 2C1

**Equipment Under Test:  
(E.U.T.)**

CTR 28-07M  
NTVG16CA N1

**In Accordance With:**

**FCC Part 101, Subpart C**

**Tested By:**

KTL Ottawa Inc.  
3325 River Road, R.R. 5  
Ottawa, Ontario K1V 1H2

**Authorized By:**



R. Grant, Wireless Group Manager

**Date:**

November 8, 2000

**Total Number of Pages:**

64

**Authorized Copy:**

Soft Copy

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## **Section 1. Summary of Test Results**

### **General**

**All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 101, Subpart C.

New Submission

Production Unit

Class II Permissive Change

Pre-Production Unit

T	N	B
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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:

Glen Westwell, Technologist

DATE: November 8, 2000

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This report applies only to the items tested.

*EQUIPMENT: CTR 28-07M*

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**Summary Of Test Data**

<b>Name Of Test</b>	<b>Para. No.</b>	<b>Result</b>
RF Power Output	101.113	Complies
Occupied Bandwidth	101.111	Complies
Spurious Emissions at Antenna Terminals	101.111	Complies
Field Strength of Spurious Emissions	101.111	Complies
Frequency Stability	101.107	Complies

**Footnotes For N/A's:**

**Test Conditions:**

**Indoor**                      Temperature: 23 °C  
   Humidity: 44 %

**Outdoor**                    Temperature: N/A  
   Humidity: N/A

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**Section 2. General Equipment Specification**

**Manufacturer:** Nortel Networks

**Model No.:** CTR 28-07M, NTVG16CA N1, S/W Ver. 1.2

**Serial No.:** NNTM532GN88Q

**Date Received In Laboratory:** August 15, 2000

**KTL Identification No.:** Item #1

**Transmitter**

**Supply Voltage Input:** -48 VDC

**Frequency Range:** Tx = 28.2024 GHz to 28.3476 GHz @ 3.3 MHz  
Channel Spacing With 2.048 Msps  
Tx = 28.2035 GHz to 28.3465 GHz @ 5.5 MHz  
Channel Spacing With 4.224 Msps

**Tunable Bands:** 1

**Types of Modulation:** 4, 16, 64 QAM, FDMA

**Data Rate(s)** 2.048 Msps, 4.224 Msps

**Internal/External Data Source:** External

**Emission Designator:** 9M94D9W 5M44D9W  
4M44D9W 2M14D9W

**Output Impedance:** 50Ω

**RF Power Output (rated):** 12 – 18 dBm

**Channel Spacing(s):** 3.3 MHz & 5.5 MHz

**Operator Selection of Operating Frequency:** None

**Power Output Adjustment Capability:** 31 to 0 dB attenuation adjustment

*EQUIPMENT: CTR 28-07M*

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**Section 3. RF Power Output**

**Para. No.: 1.1046**

<b>Test Performed By:</b> Glen Westwell	<b>Date of Test:</b> October 12, 2000
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**Minimum Standard:** 101.113 (c)

**Test Results:** Complies. The RF output power is within 1 dB of the manufacturer's rating.

**Measurement Data:**

	<b>Rated (dBm)</b>	<b>Max. Measured (dBm)</b>
<b>1 Carrier</b>	18.0	18.7
	16.0	16.8
	14.0	14.7
<b>2 Carriers</b>	18.0	18.4
	15.0	15.3
	12.0	12.6

*EQUIPMENT: CTR 28-07M*

*ISSUE: 2.0*

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## **Section 4. Occupied Bandwidth**

**Para. No.: 2.1049**

<b>Test Performed By:</b> Glen Westwell	<b>Date of Test:</b> August 28, 2000
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**Minimum Standard:** 101.111 (a)(2)(ii)

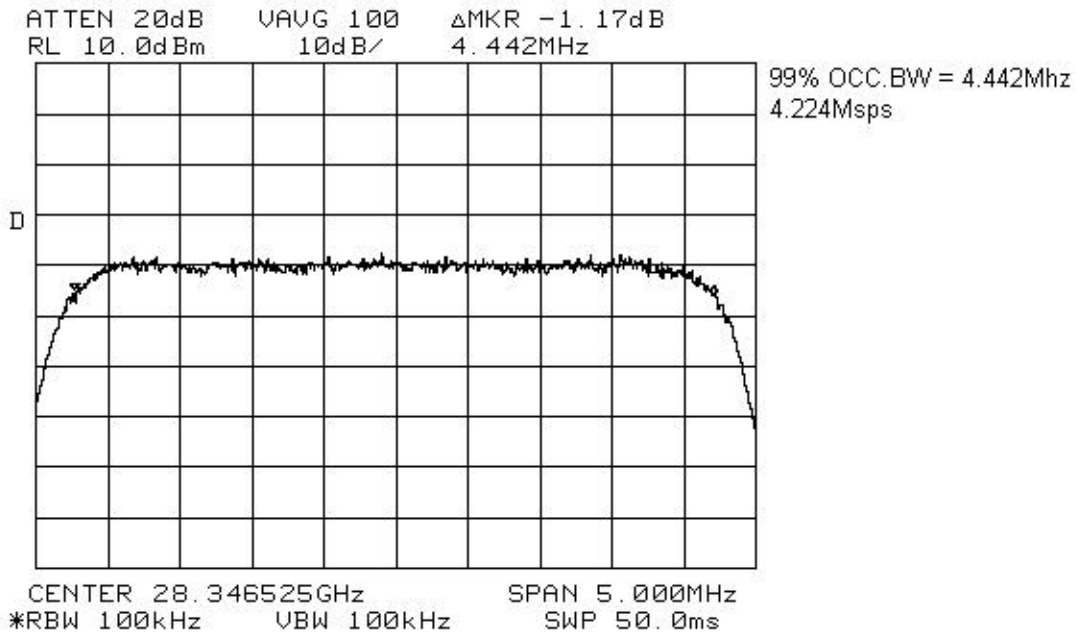
**Test Results:** Complies

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

**Note:** Band Edge Spectral Masks were plotted using 100 kHz RBW instead of 1 MHz. The limit line was adjusted 10dB lower.

EQUIPMENT: CTR 28-07M  
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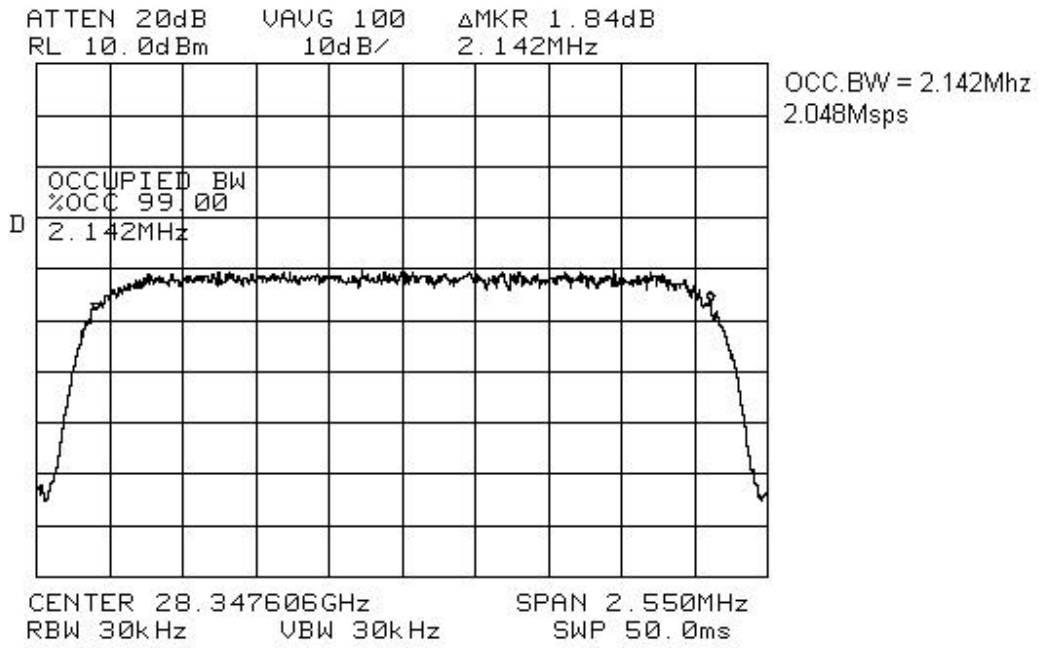
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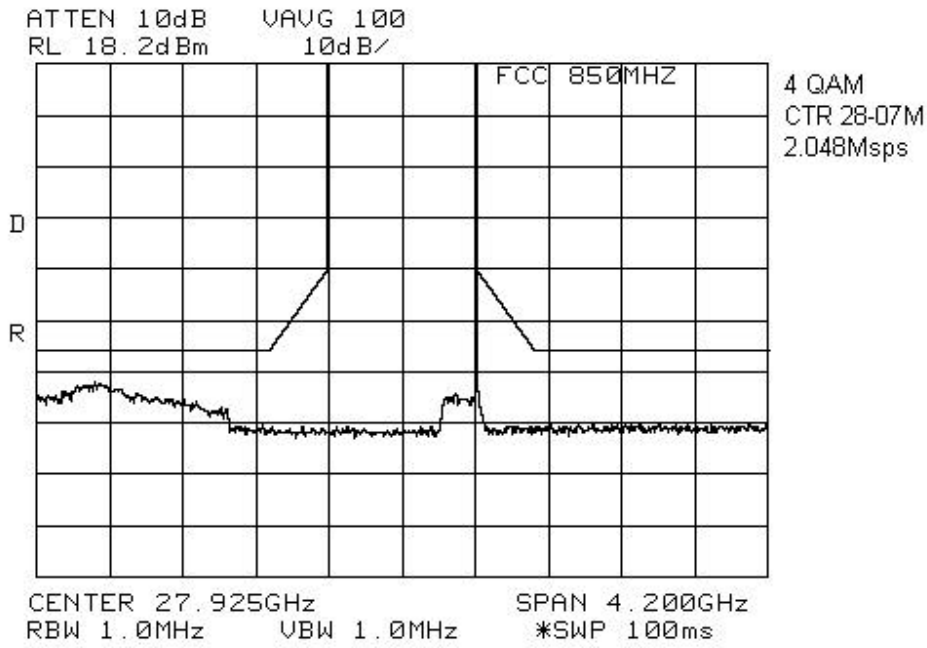
EQUIPMENT: CTR 28-07M

ISSUE: 2.0



EQUIPMENT: CTR 28-07M  
ISSUE: 2.0

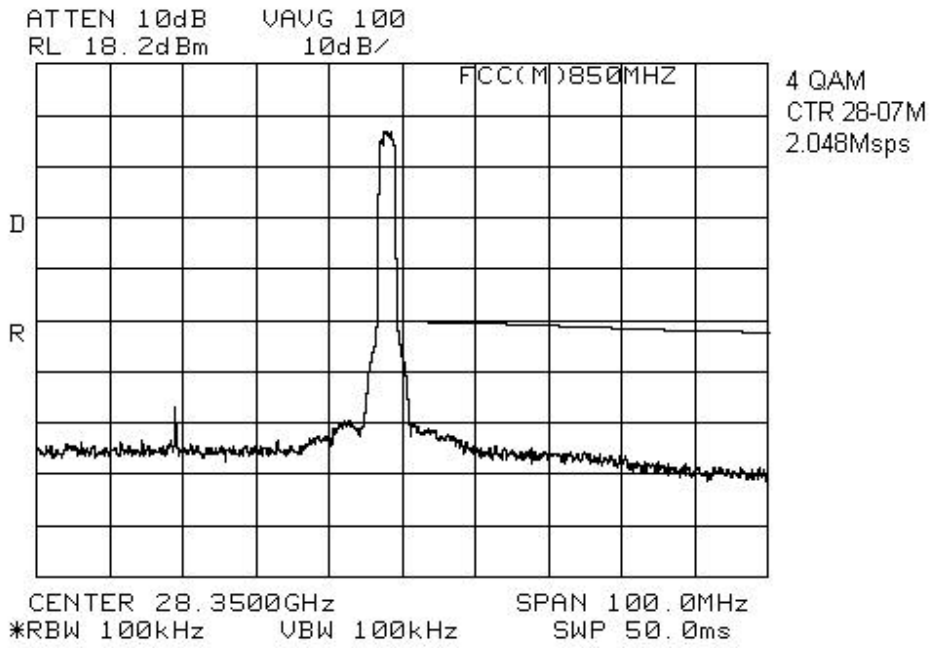
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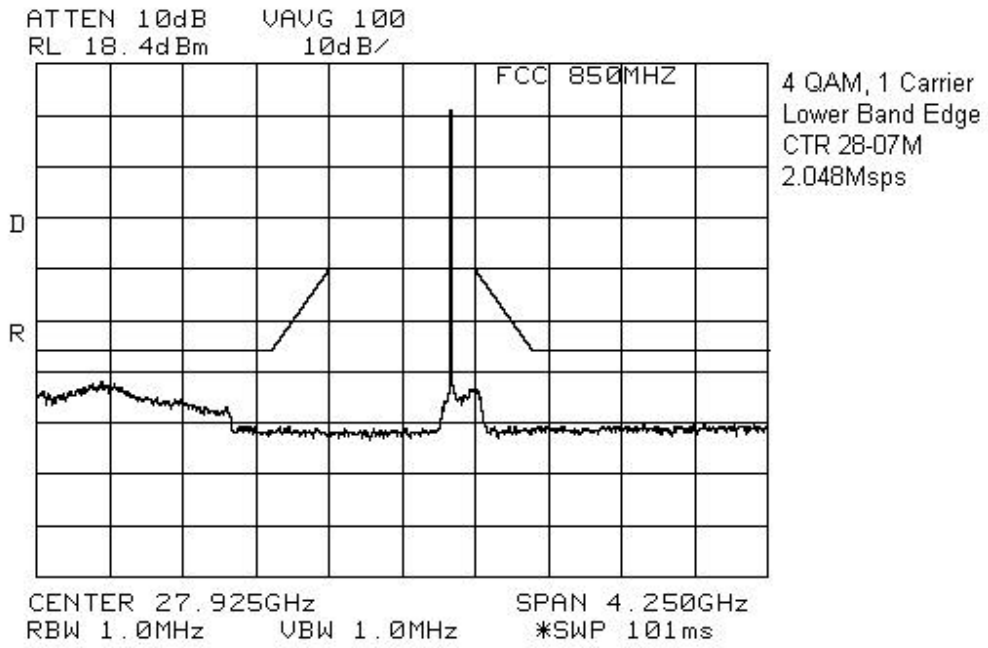
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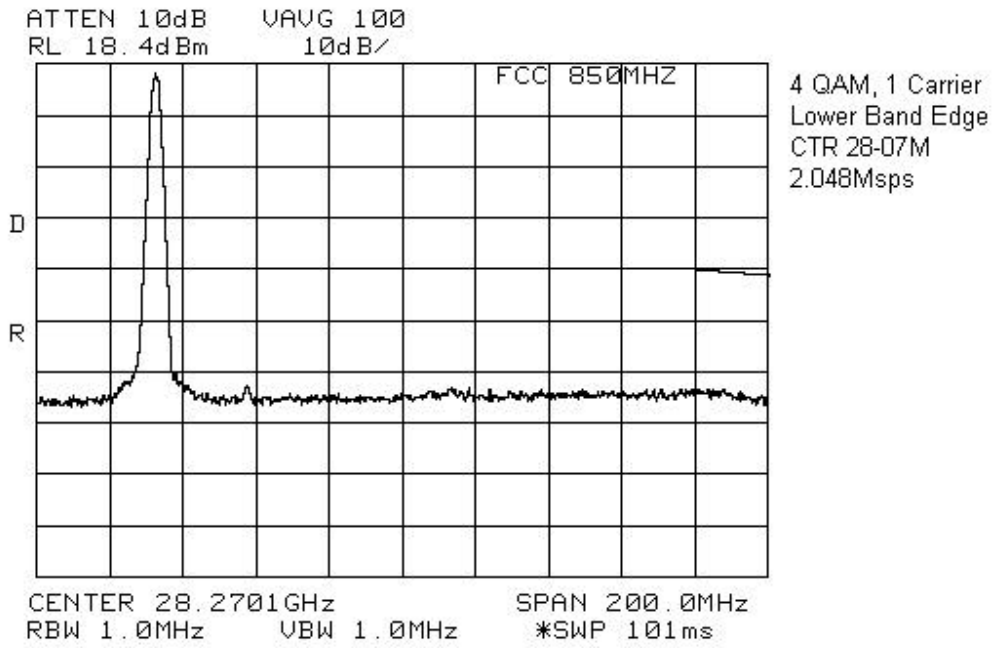
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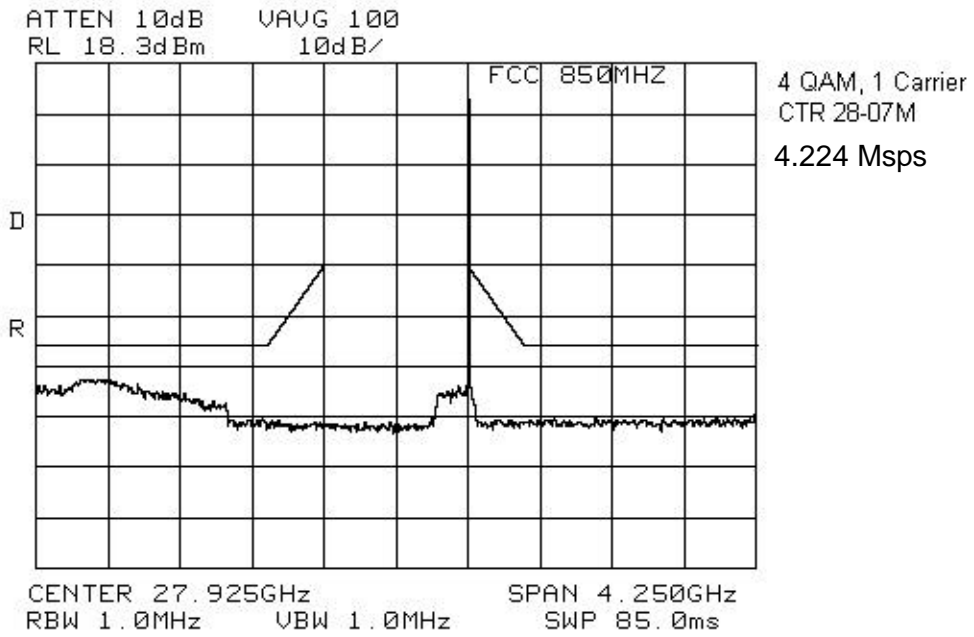
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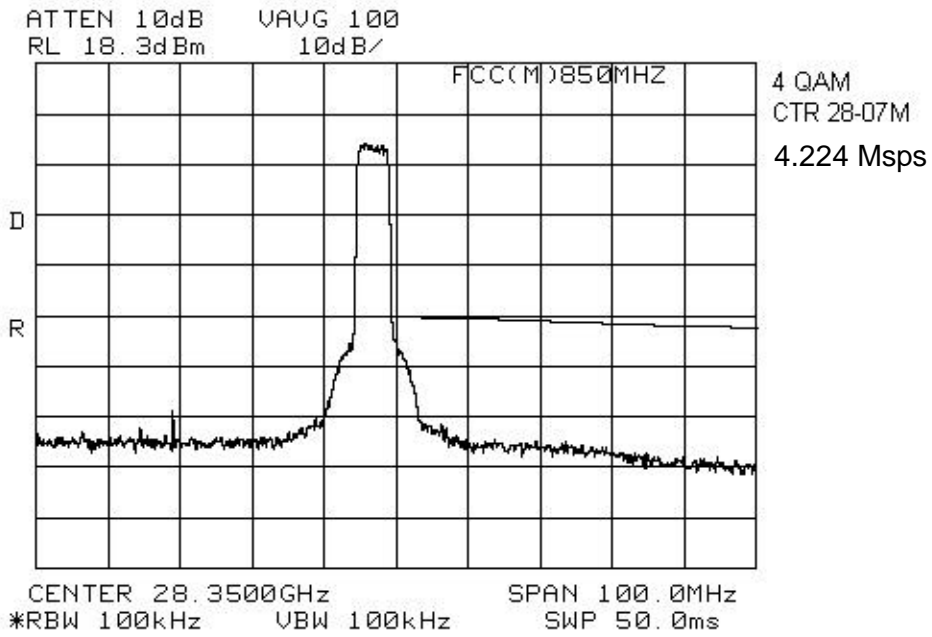
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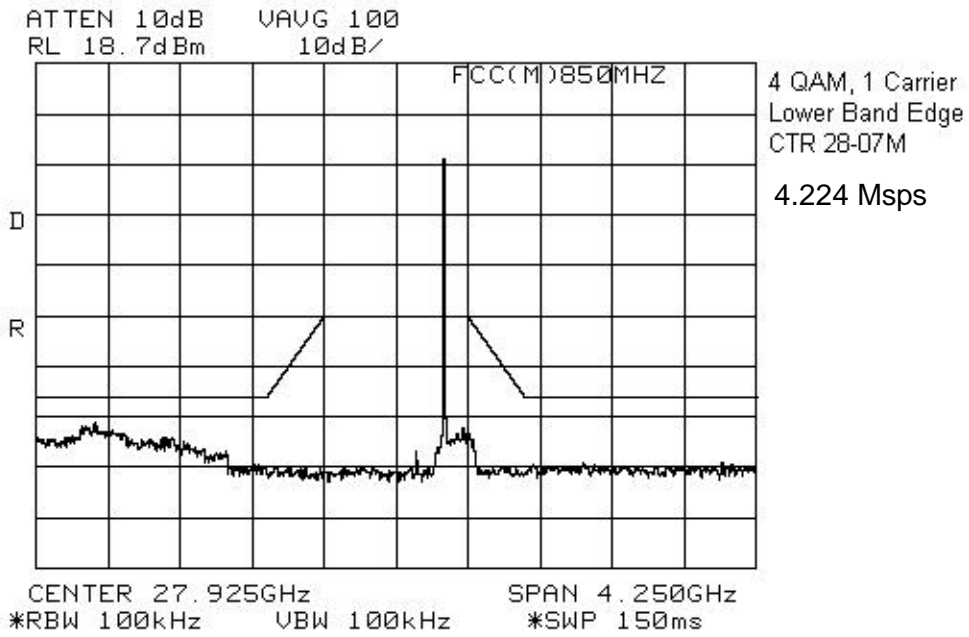
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EQUIPMENT: CTR 28-07M

ISSUE: 2.0

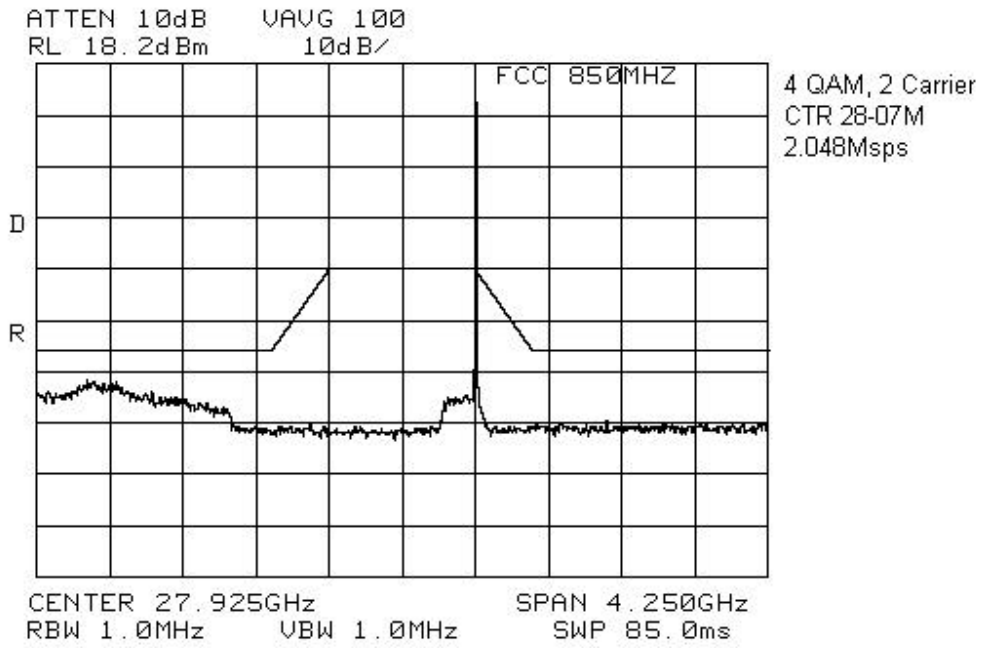
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EQUIPMENT: CTR 28-07M  
ISSUE: 2.0

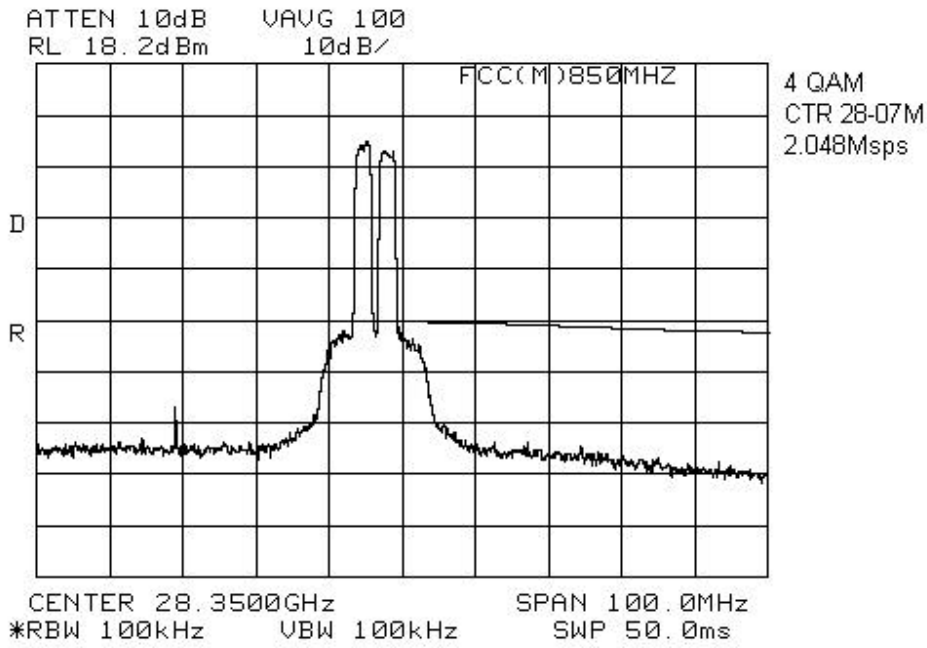
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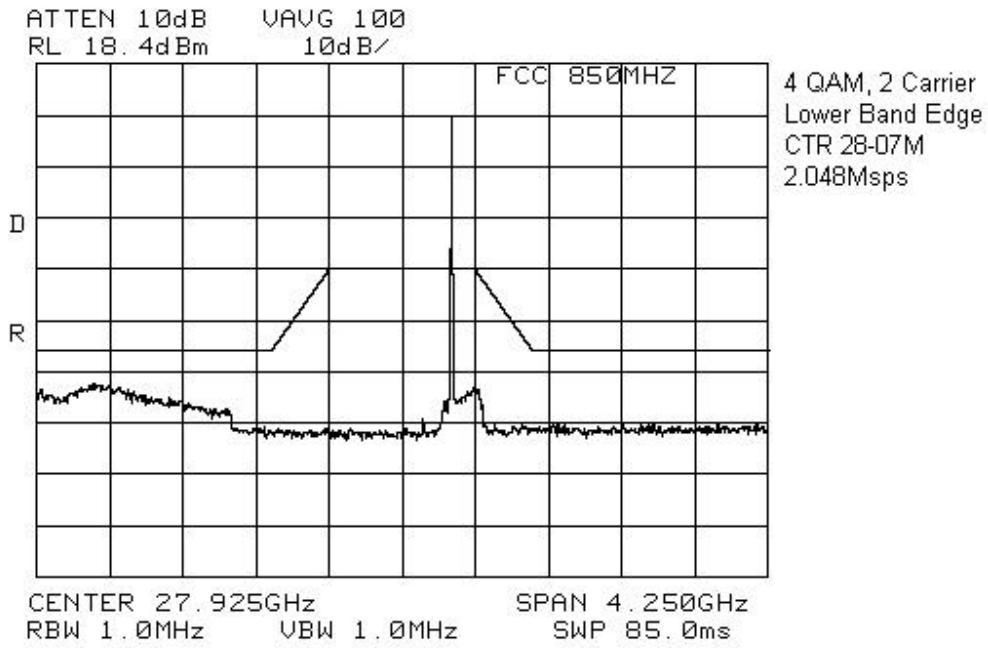
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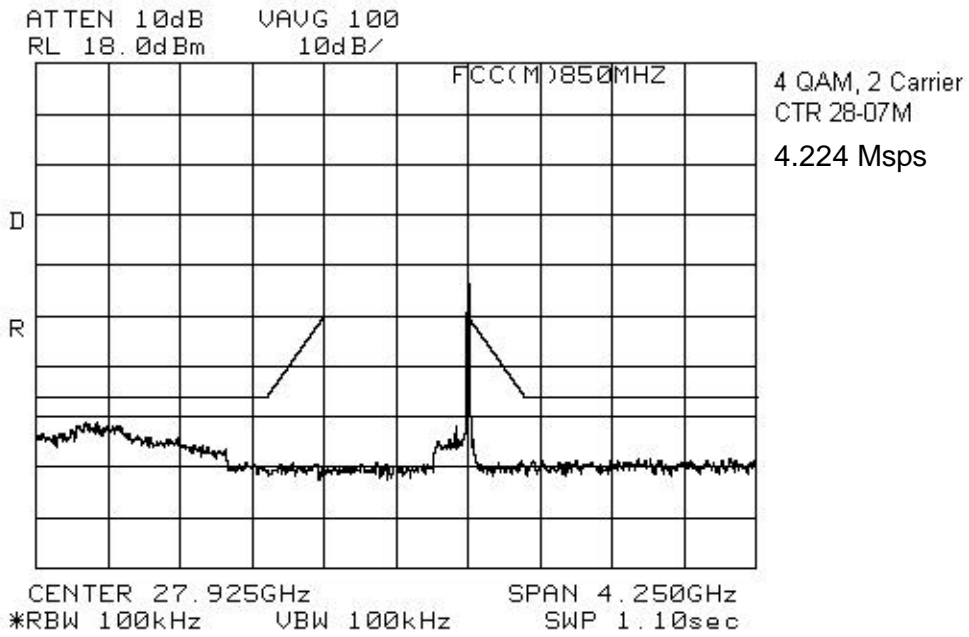
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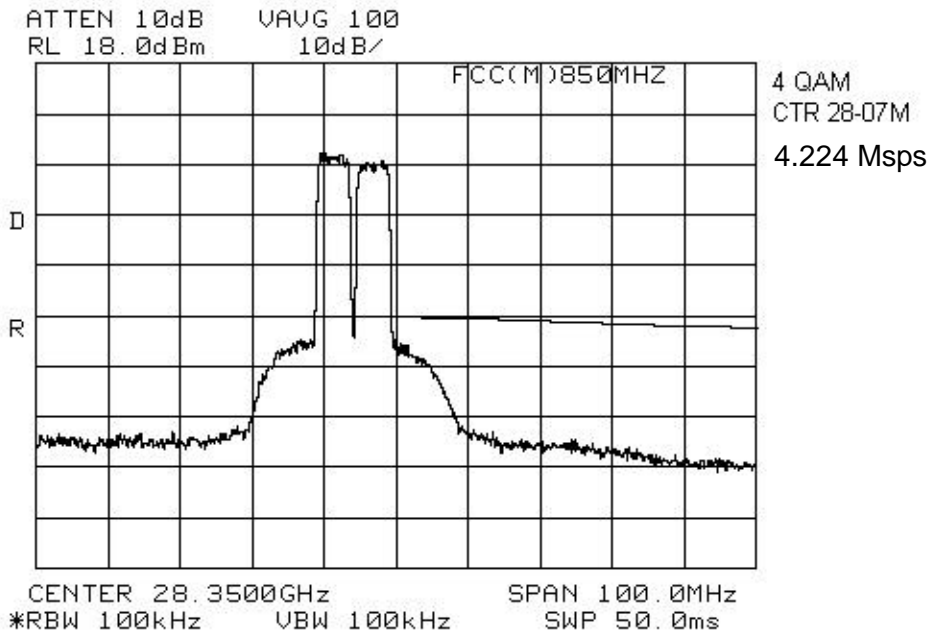
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EQUIPMENT: CTR 28-07M

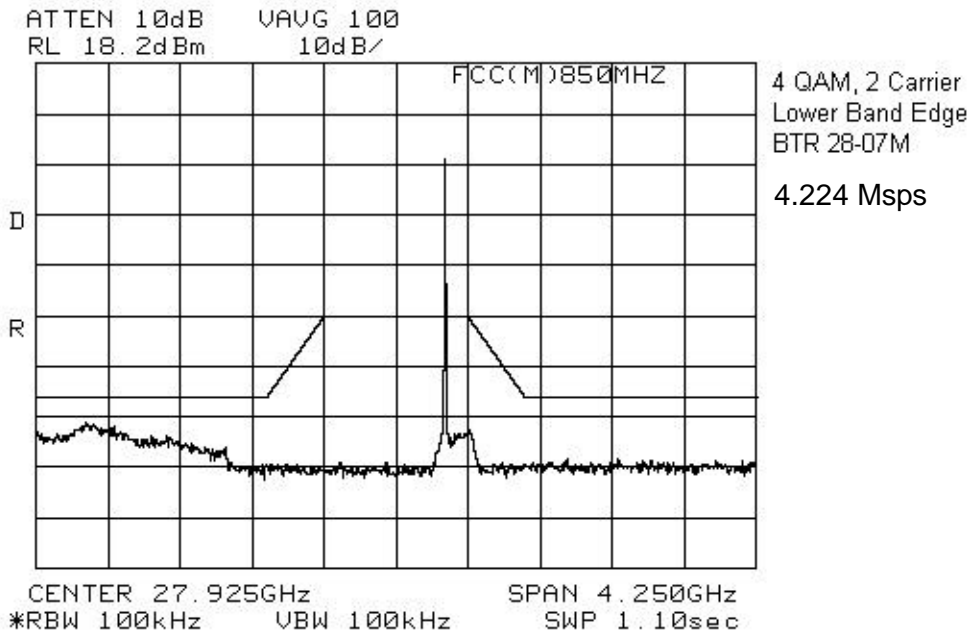
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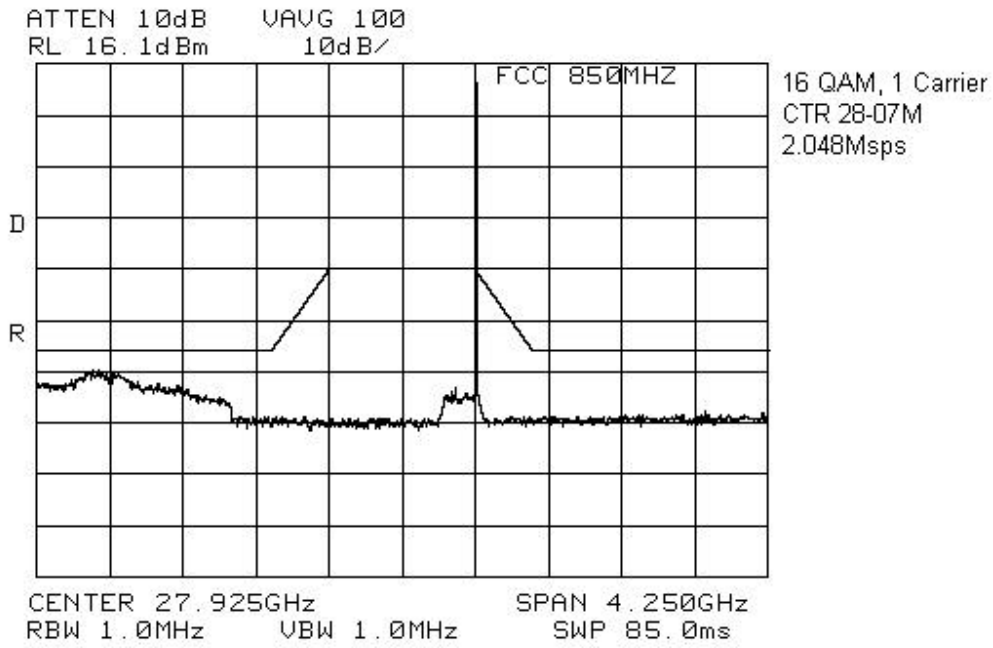
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EQUIPMENT: CTR 28-07M  
ISSUE: 2.0

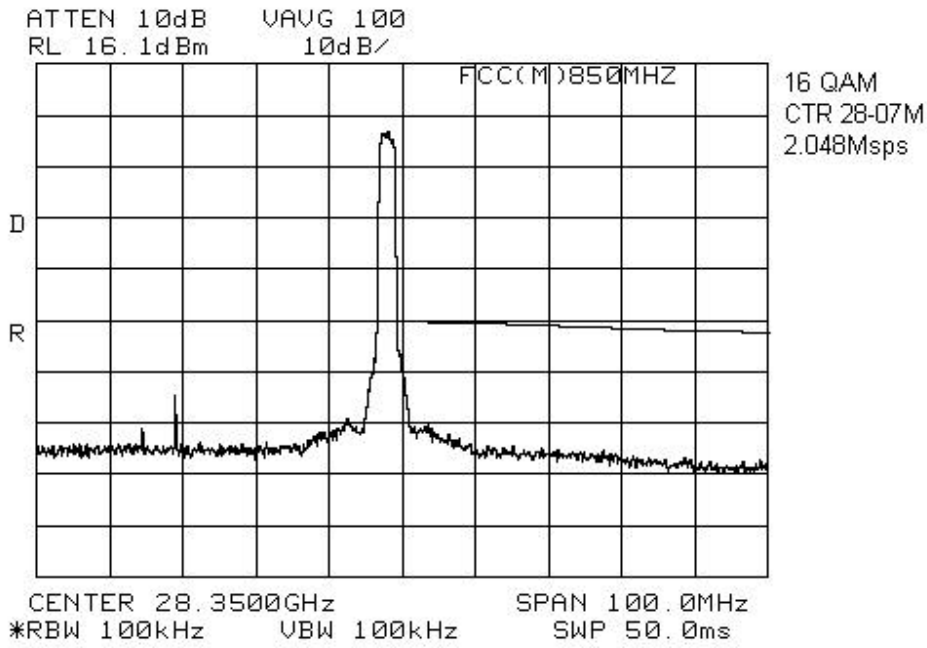
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EQUIPMENT: CTR 28-07M

ISSUE: 2.0

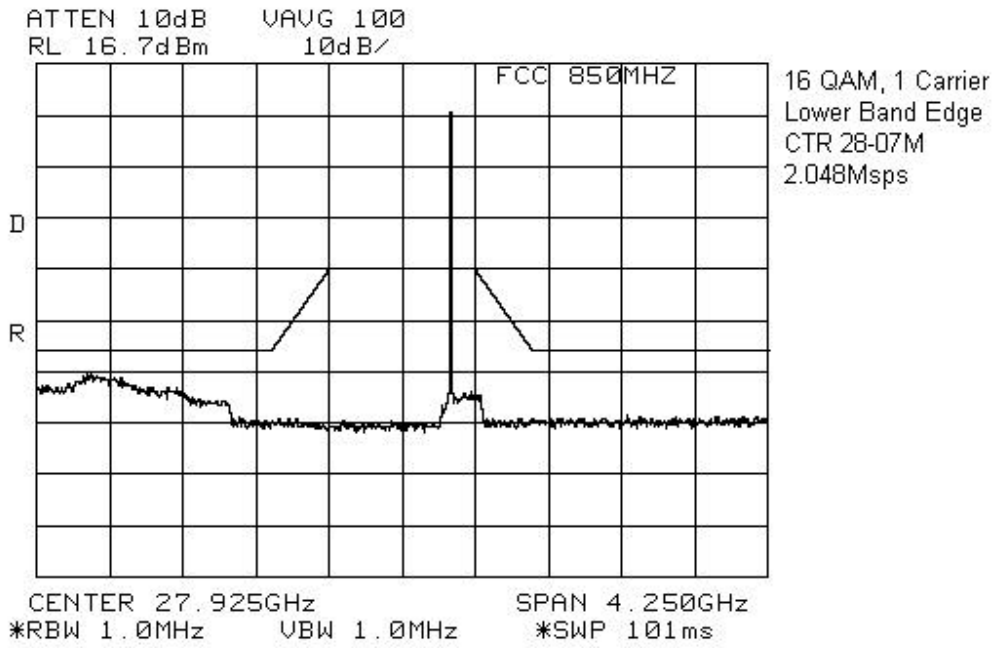
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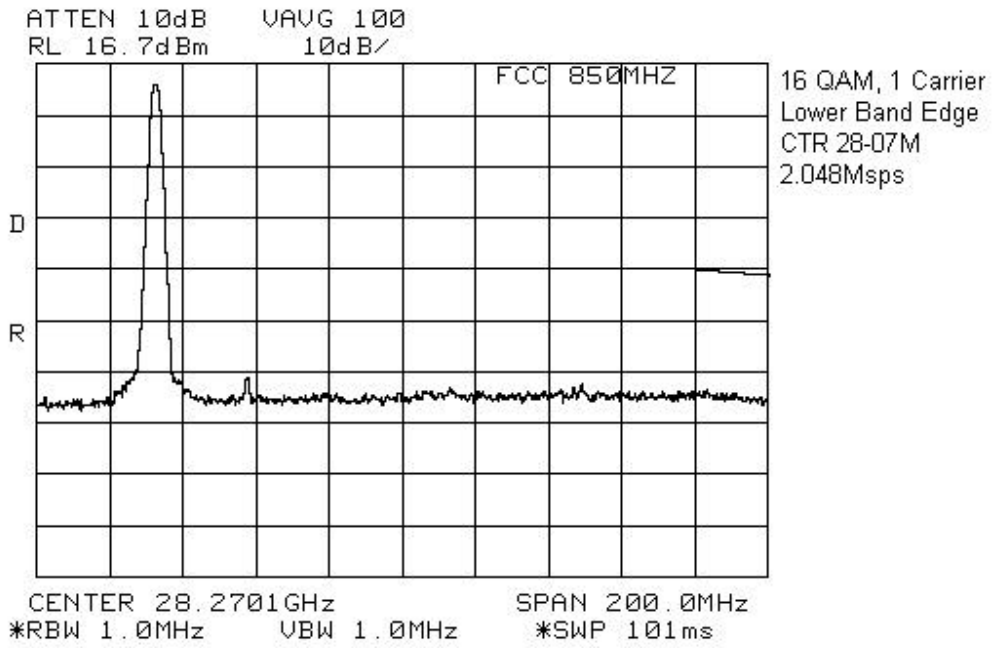
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EQUIPMENT: CTR 28-07M

ISSUE: 2.0

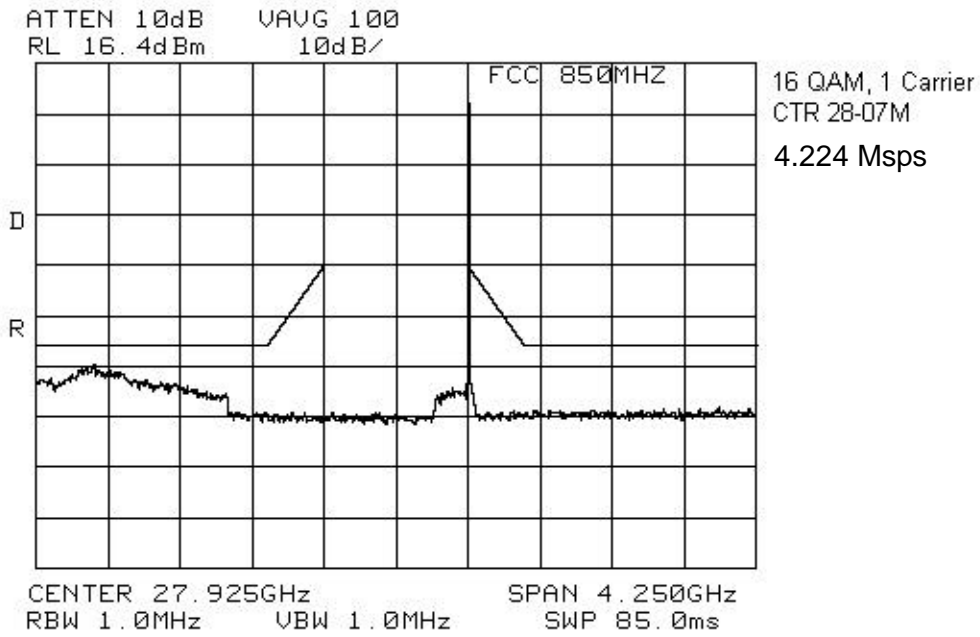
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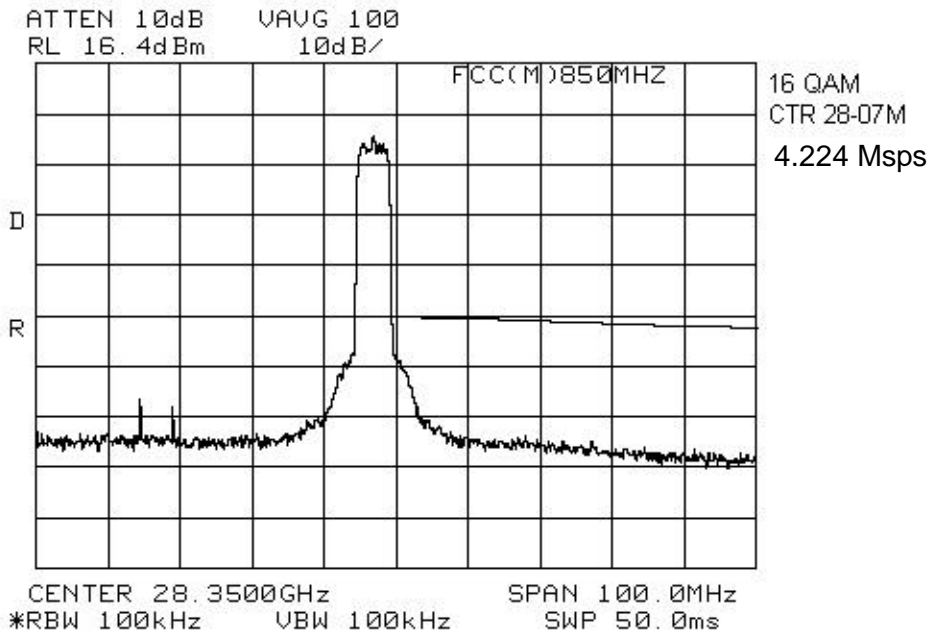
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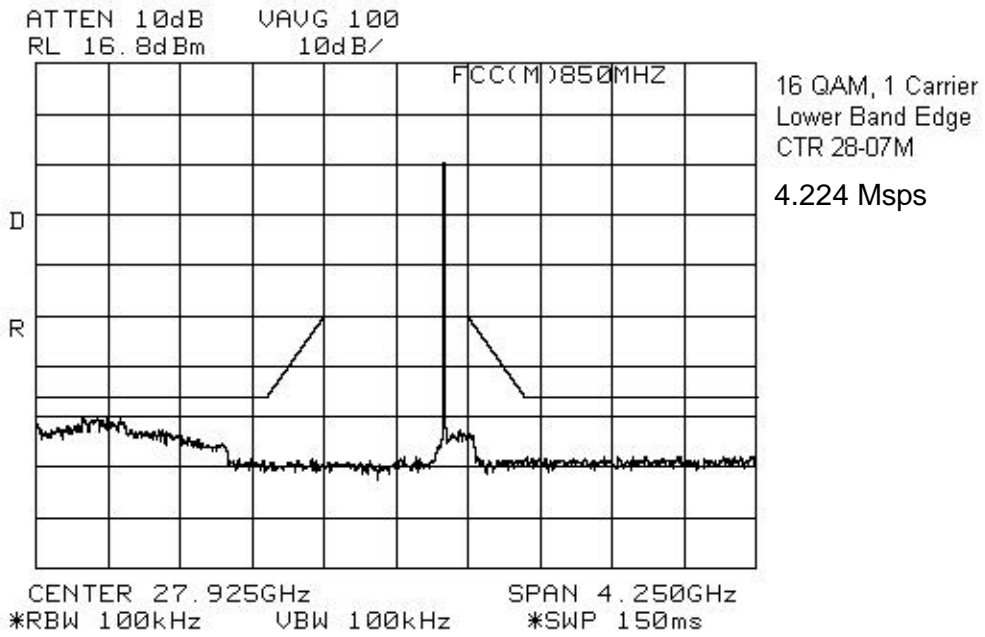
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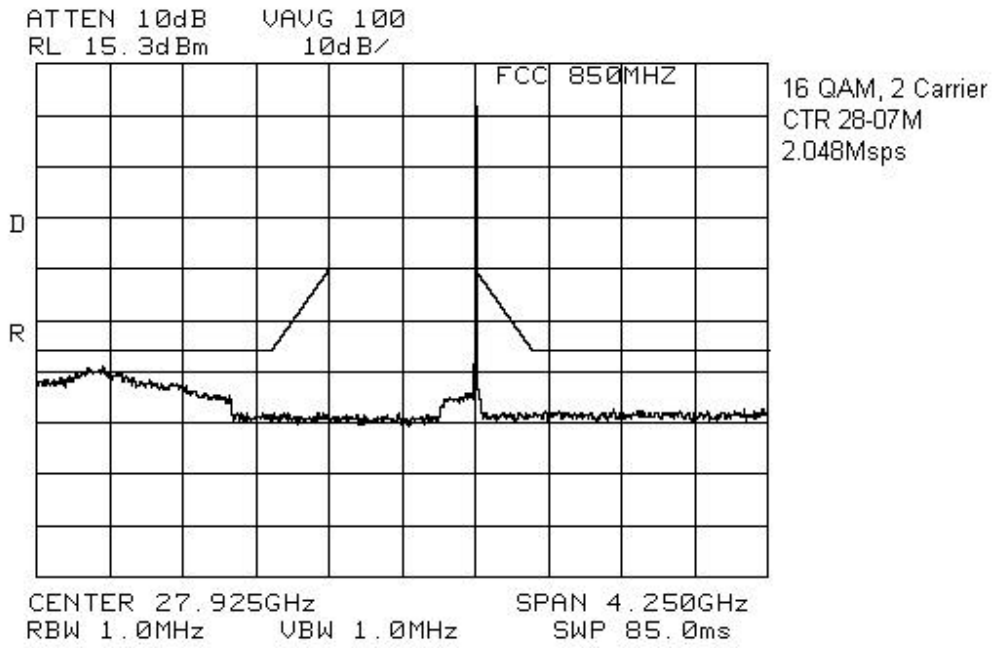
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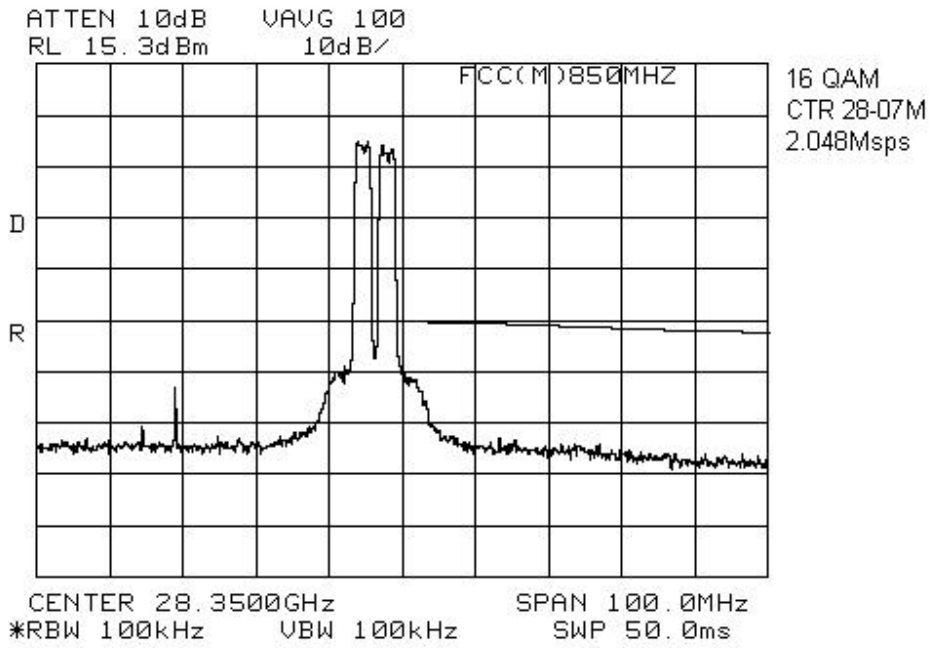
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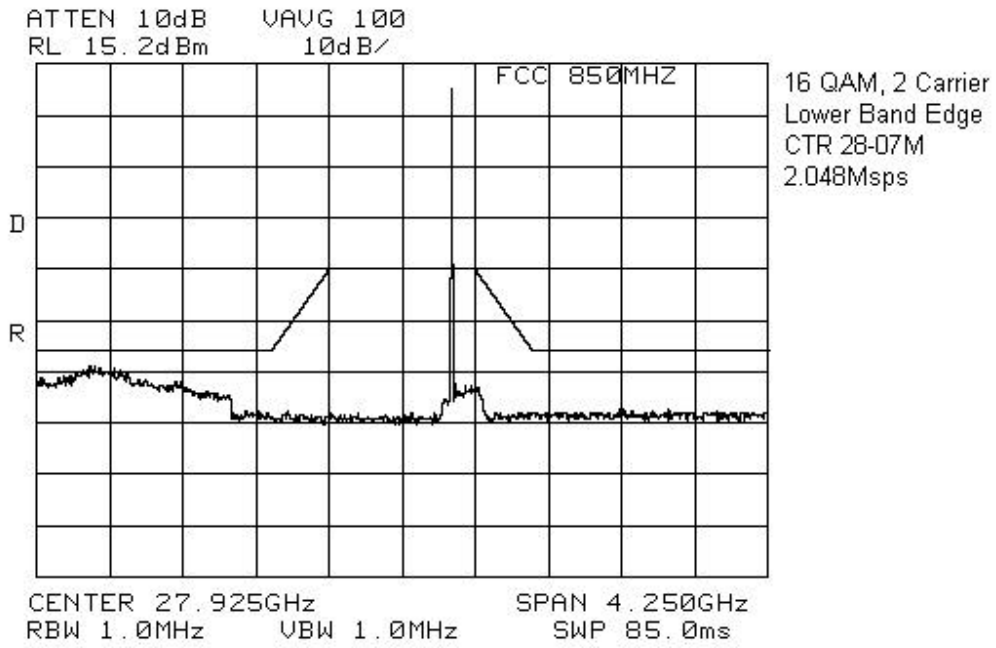
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EQUIPMENT: CTR 28-07M

ISSUE: 2.0

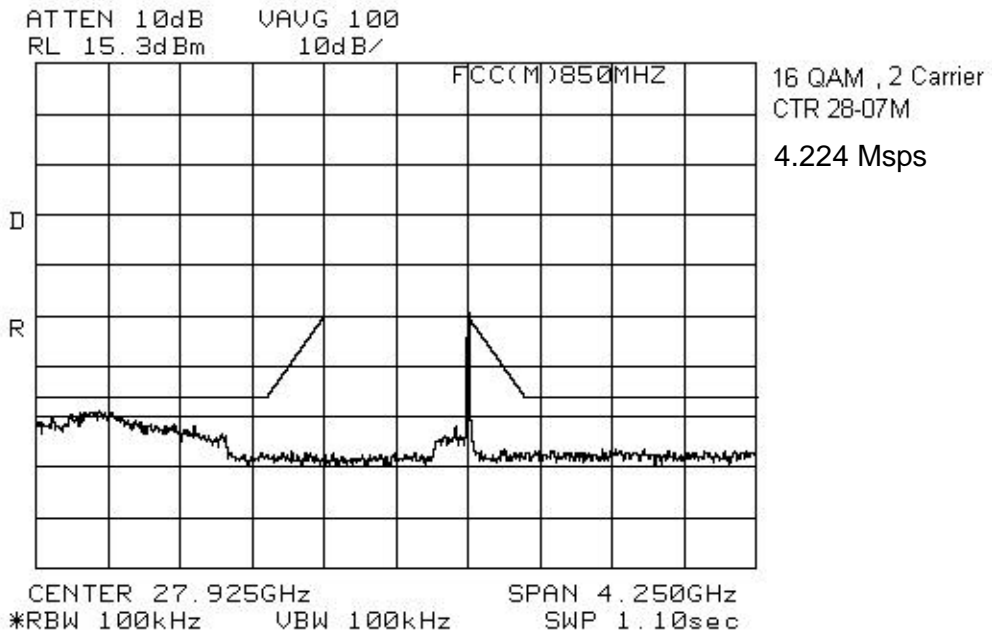




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ISSUE: 2.0

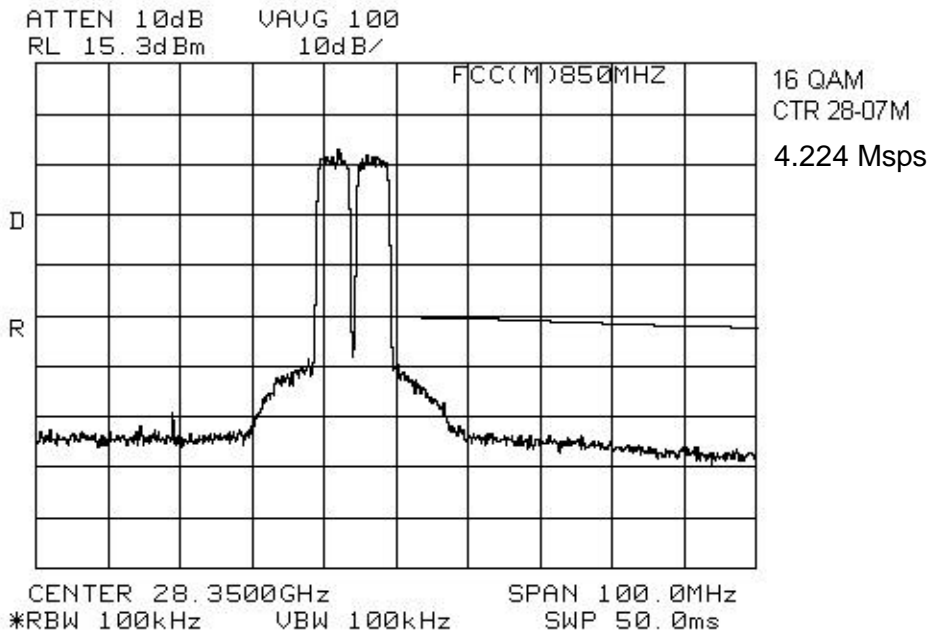
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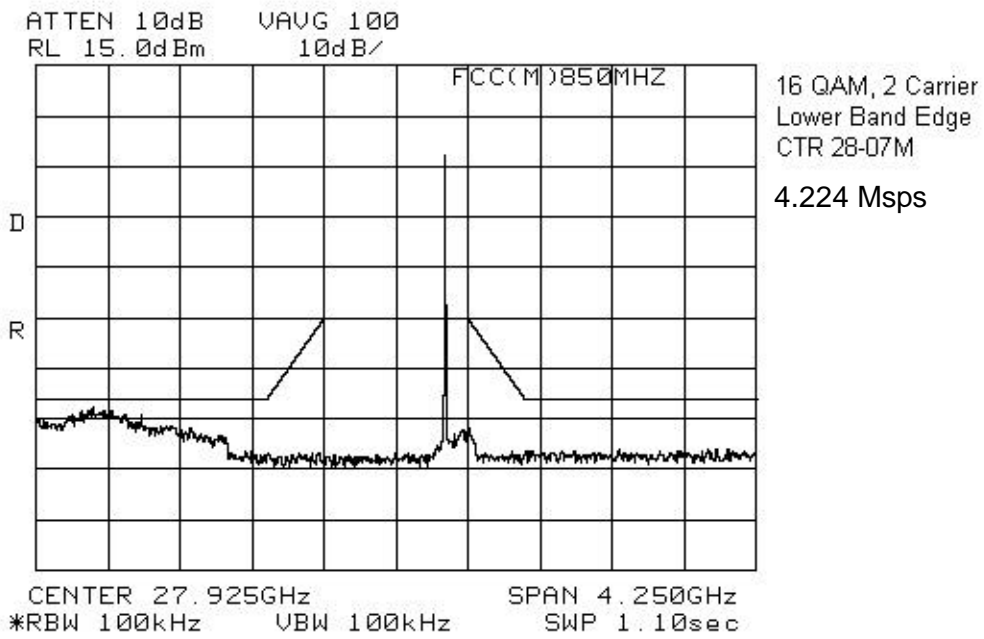
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EQUIPMENT: CTR 28-07M

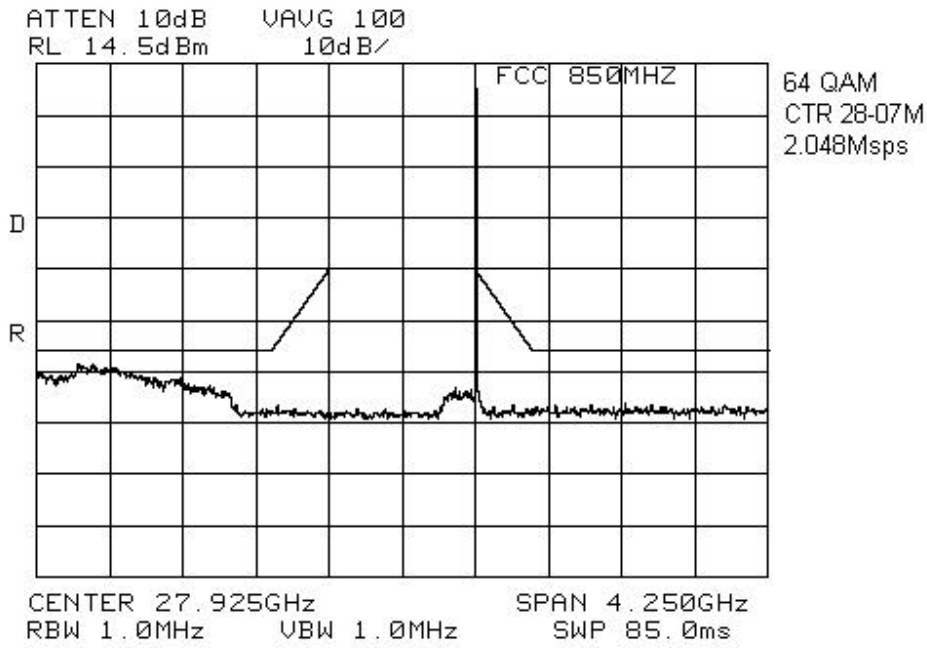
ISSUE: 2.0



EQUIPMENT: CTR 28-07M

ISSUE: 2.0

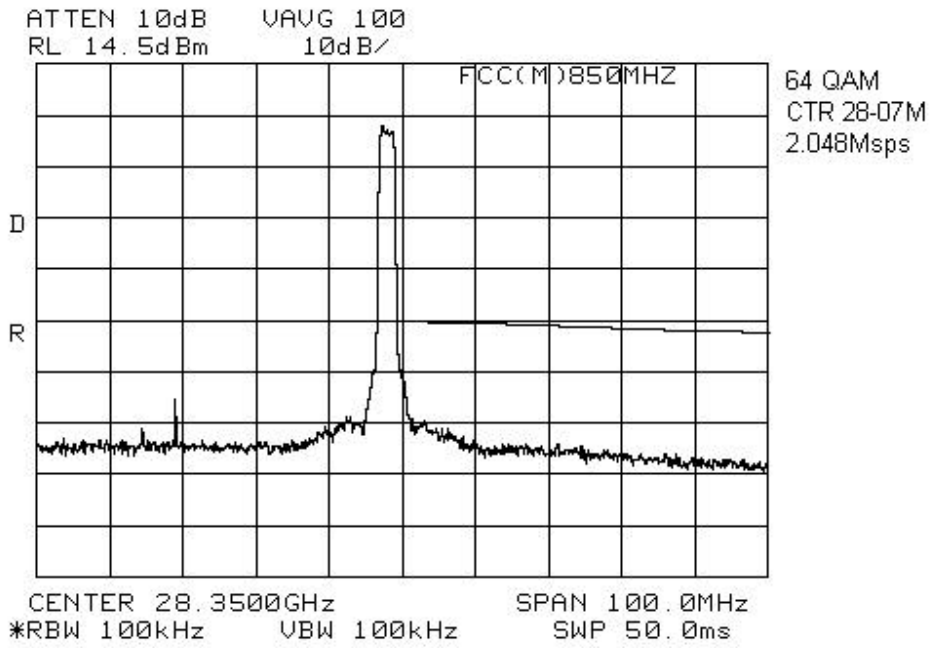
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EQUIPMENT: CTR 28-07M

ISSUE: 2.0

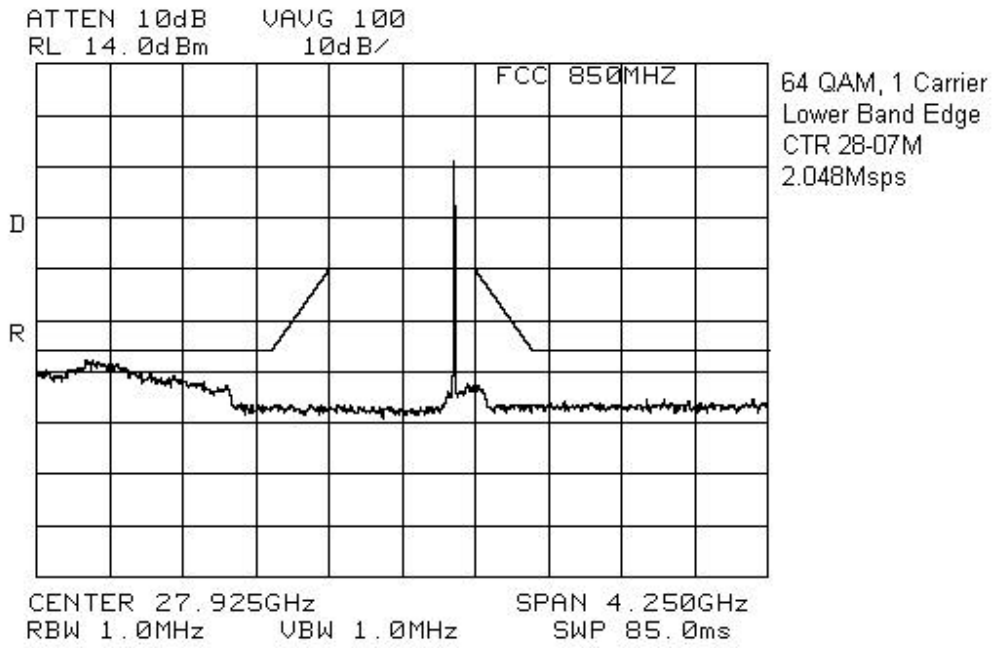
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EQUIPMENT: CTR 28-07M

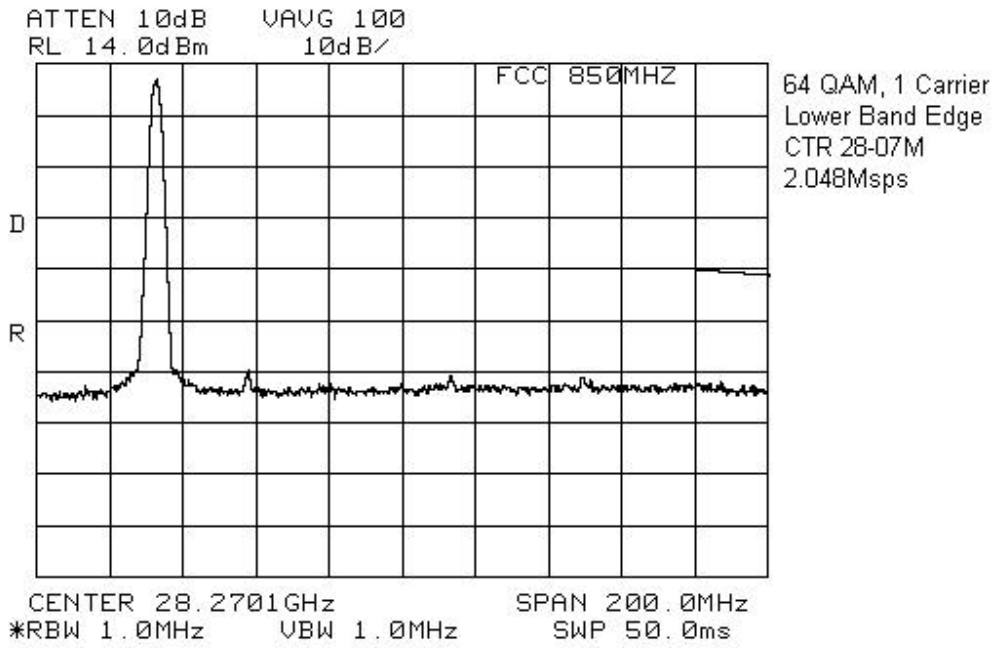
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EQUIPMENT: CTR 28-07M

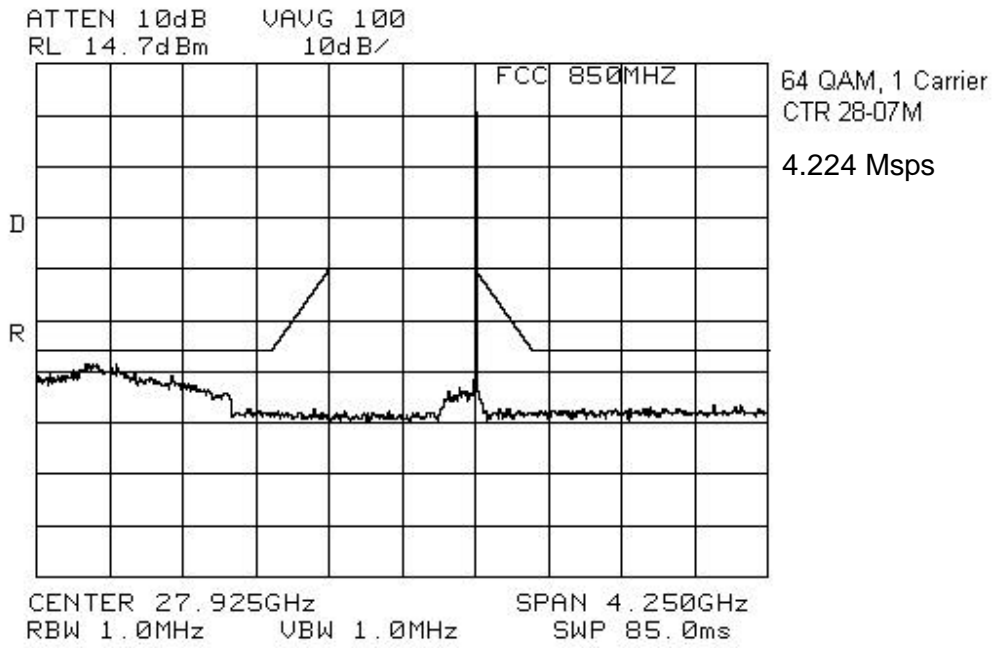
ISSUE: 2.0



EQUIPMENT: CTR 28-07M

ISSUE: 2.0

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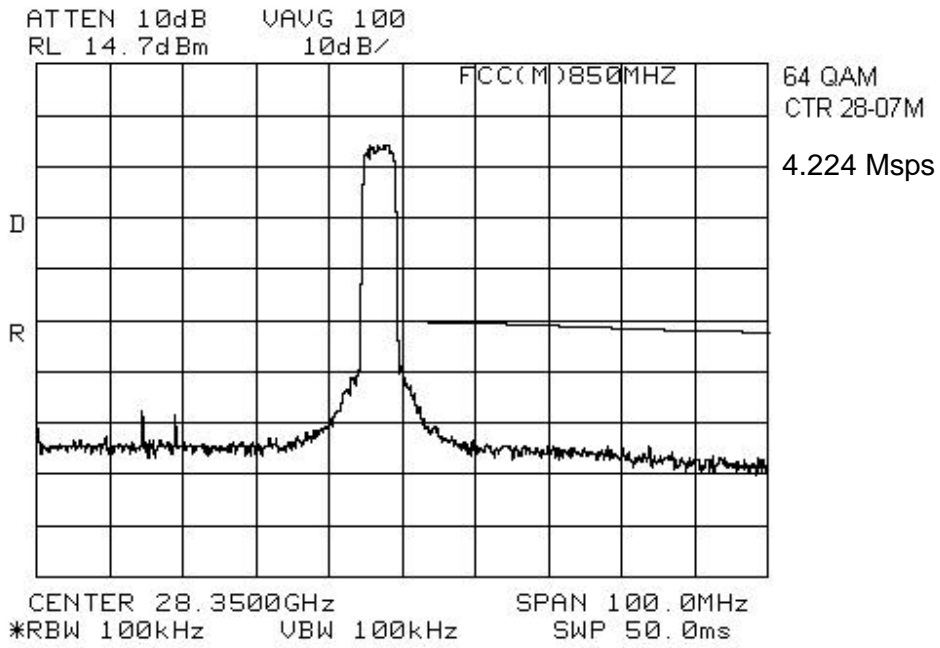




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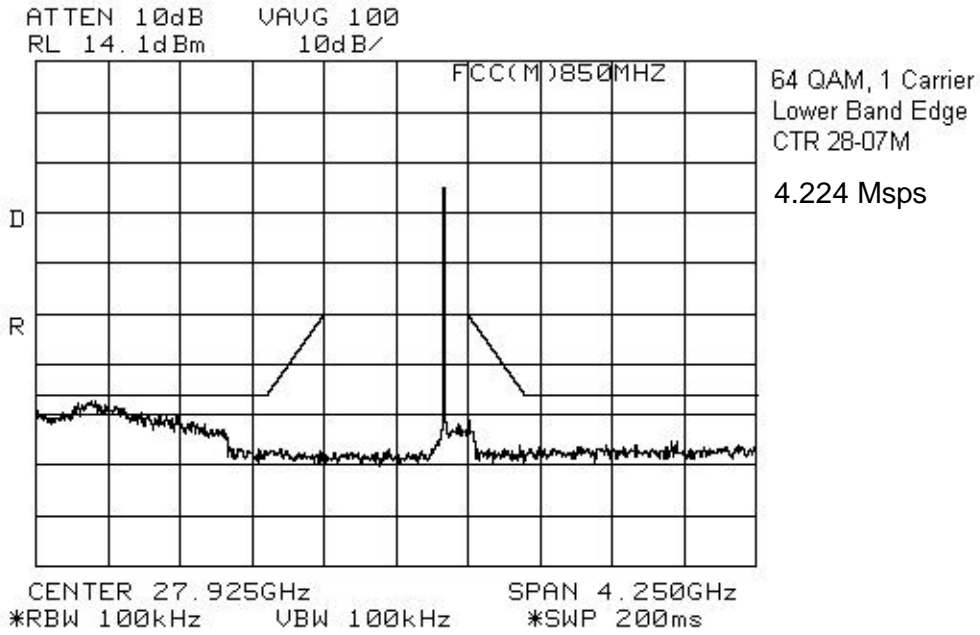
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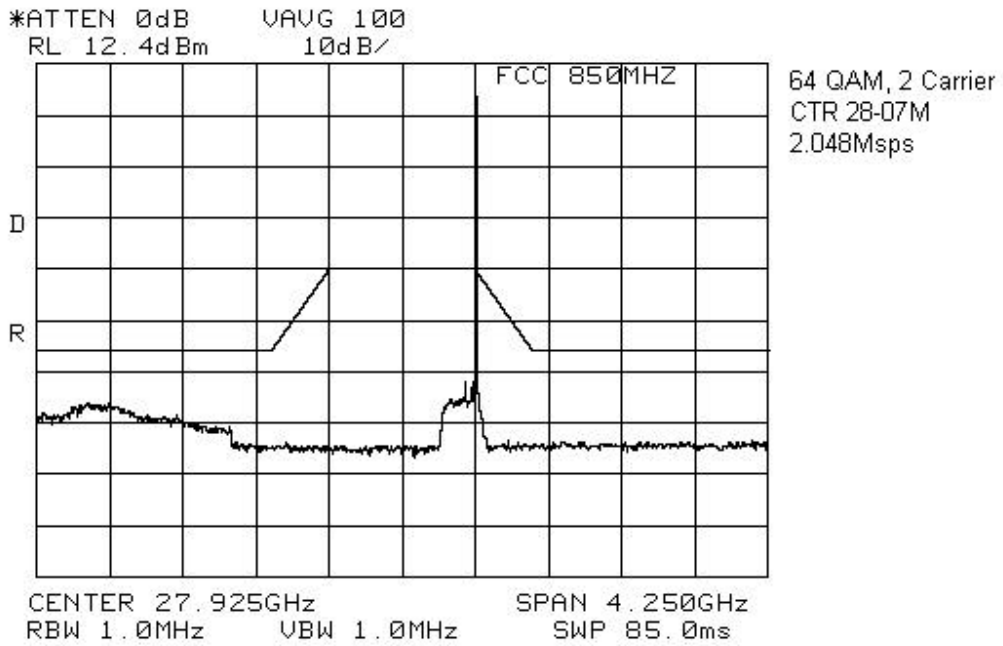
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ISSUE: 2.0

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EQUIPMENT: CTR 28-07M

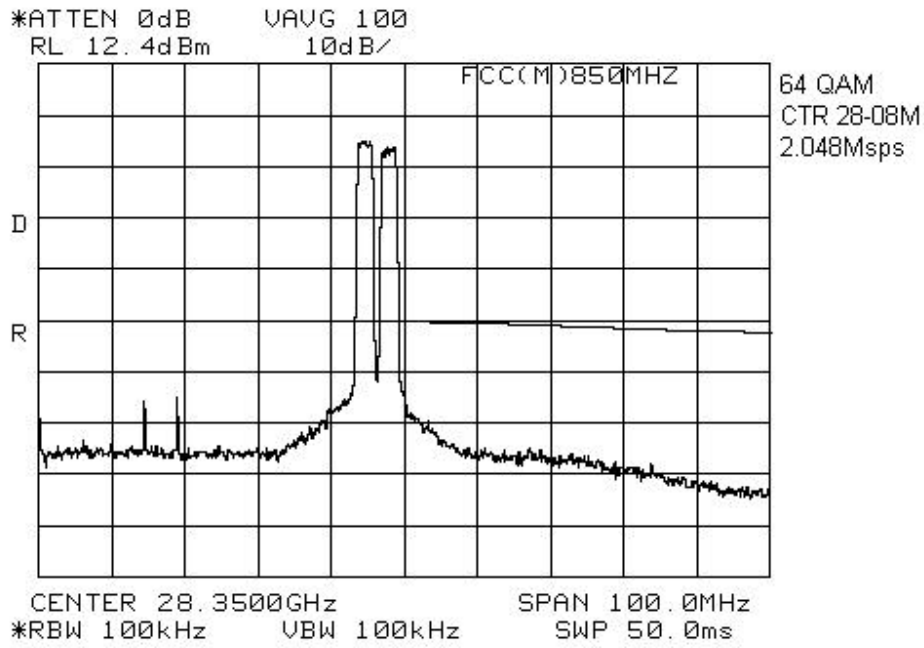
ISSUE: 2.0



EQUIPMENT: CTR 28-07M

ISSUE: 2.0

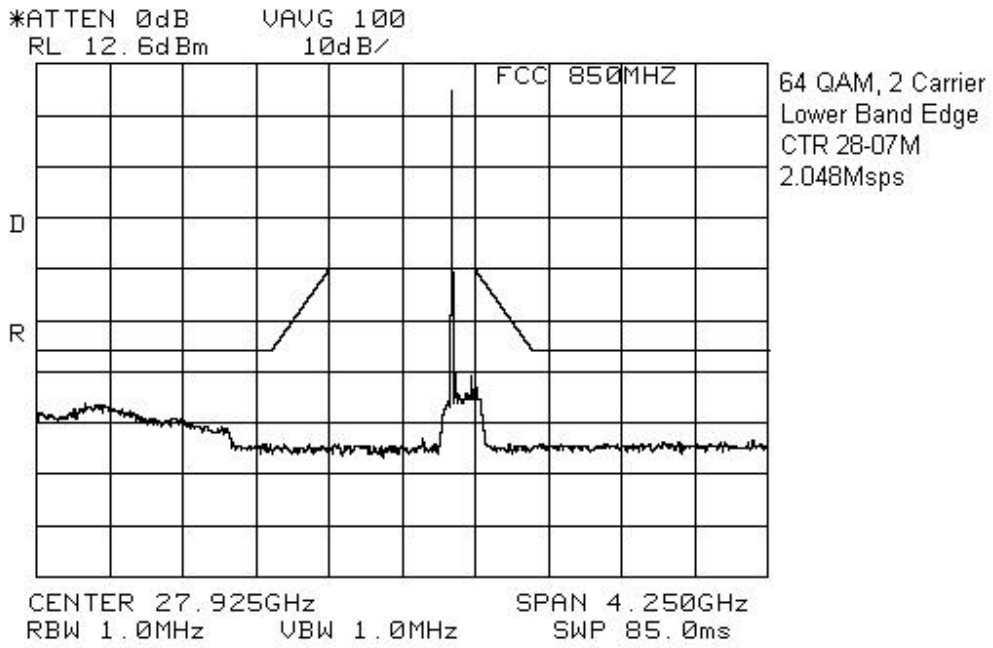
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EQUIPMENT: CTR 28-07M

ISSUE: 2.0

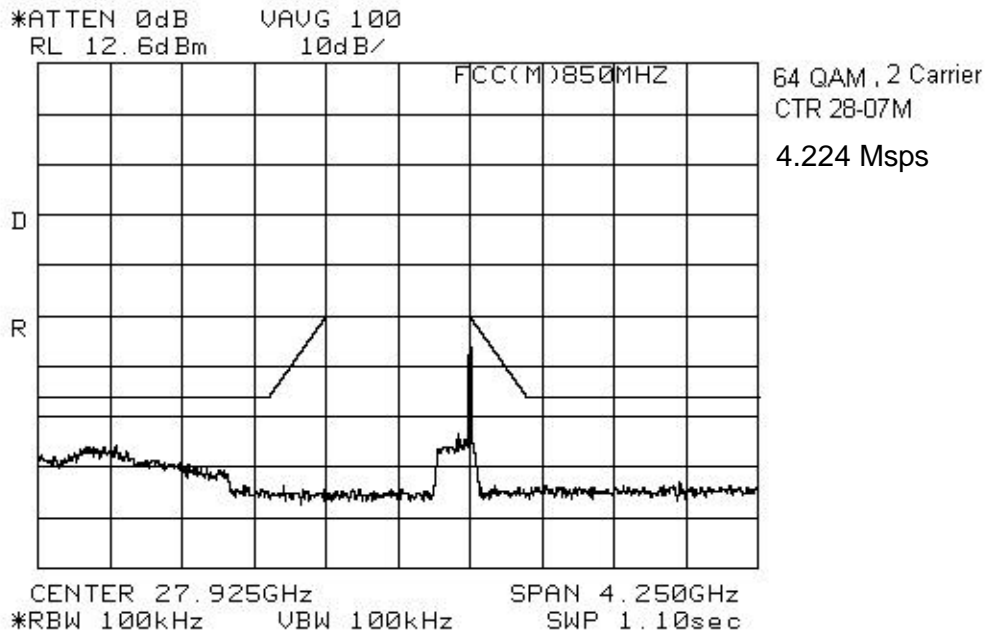
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EQUIPMENT: CTR 28-07M

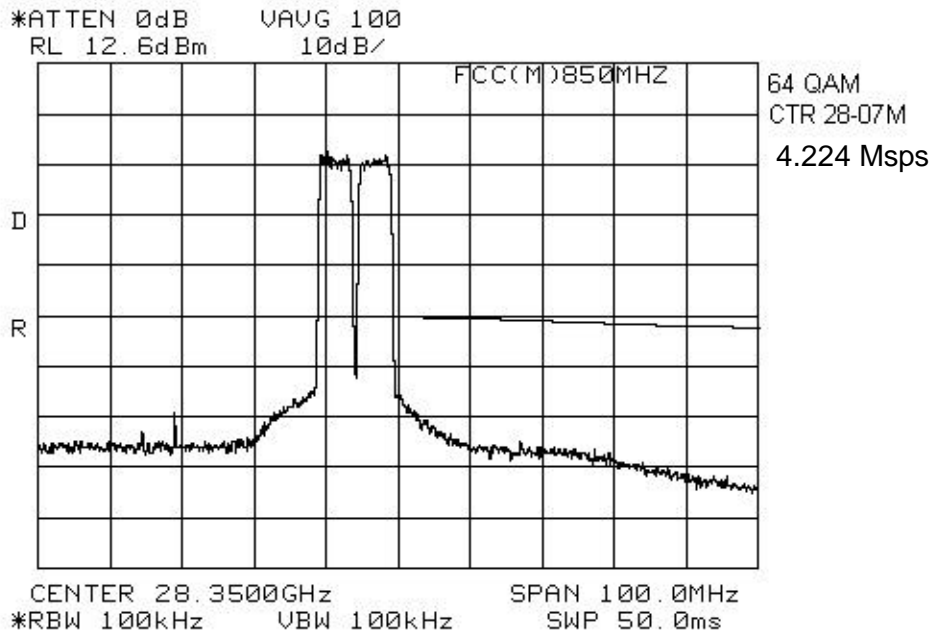
ISSUE: 2.0

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EQUIPMENT: CTR 28-07M  
ISSUE: 2.0

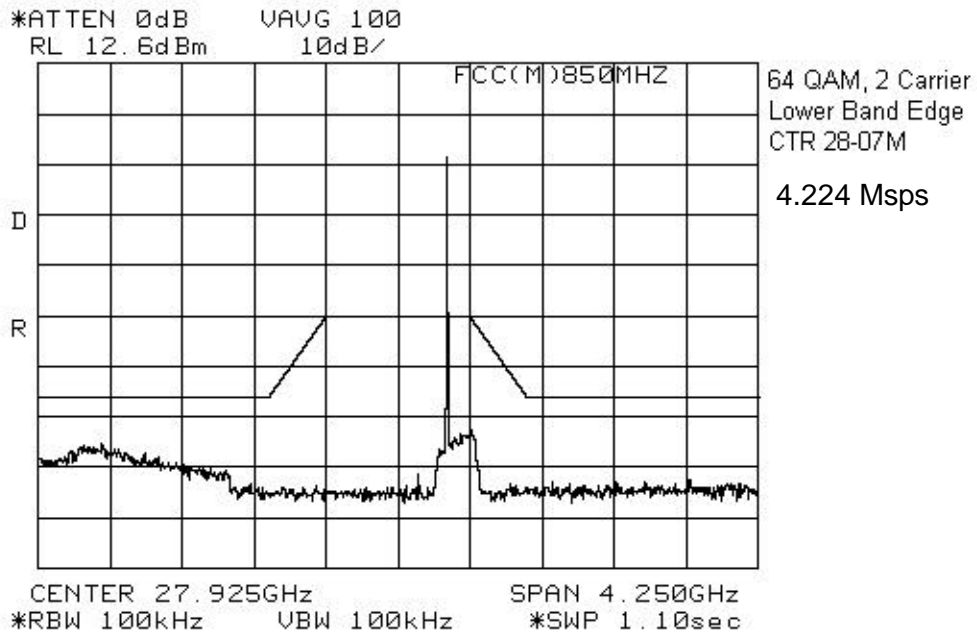
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EQUIPMENT: CTR 28-07M

ISSUE: 2.0

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*EQUIPMENT: CTR 28-07M*

*ISSUE: 2.0*

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## **Section 5. Spurious Emissions at Antenna Terminals**

**Para. No.: 2.1051**

<b>Test Performed By:</b> Glen Westwell	<b>Date of Test:</b> August 29, 2000
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**Minimum Standard:** 101.111 (a)(2)(iii), -13 dBm

**Test Results:** Complies

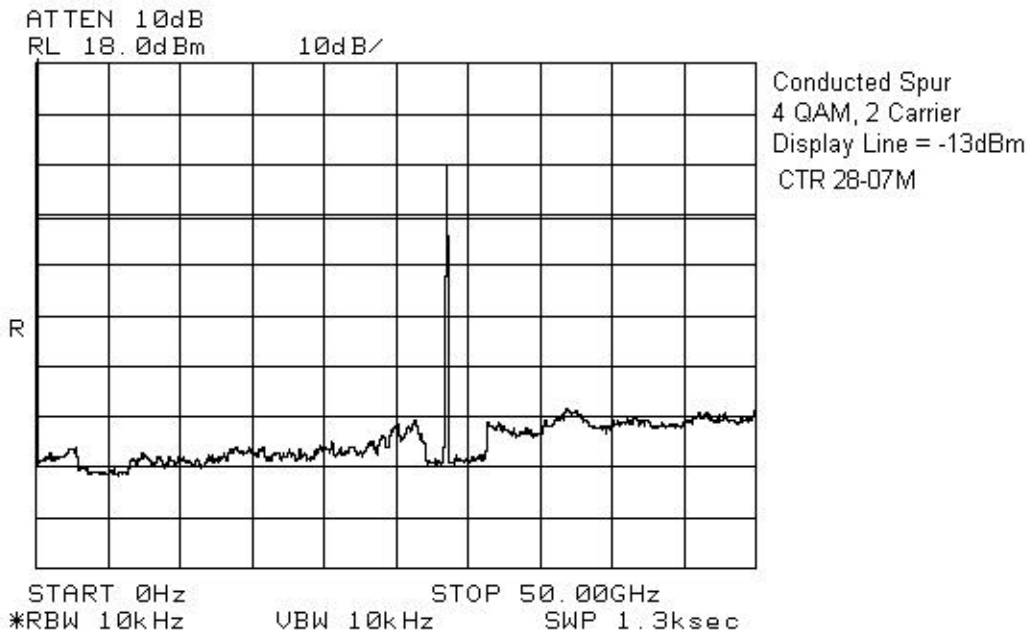
No emissions were detected within 20 dB of the specification limit.

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

EQUIPMENT: CTR 28-07M

ISSUE: 2.0

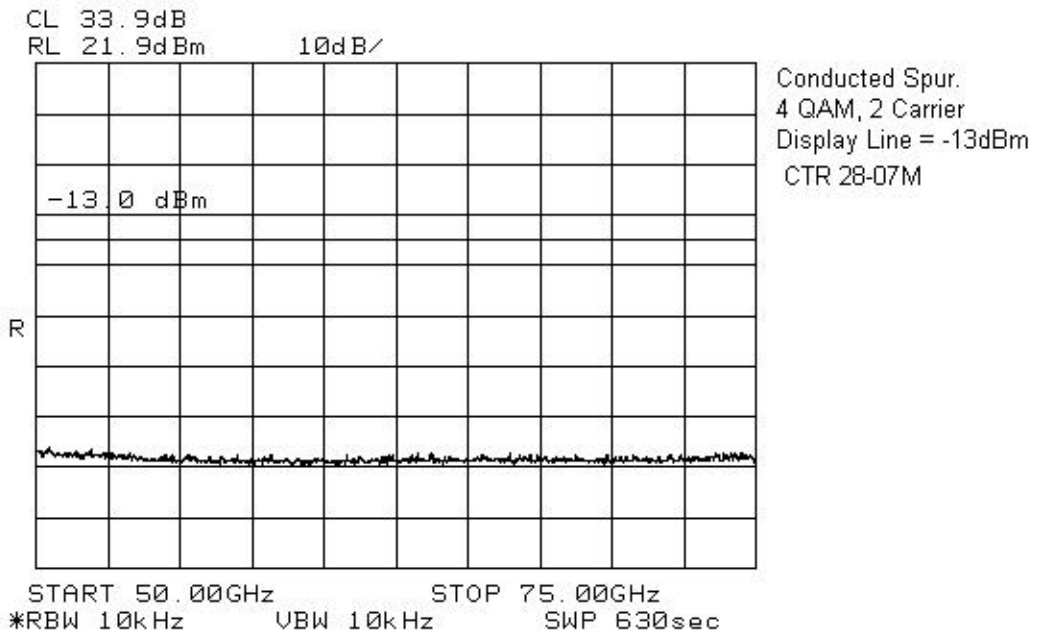
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EQUIPMENT: CTR 28-07M

ISSUE: 2.0

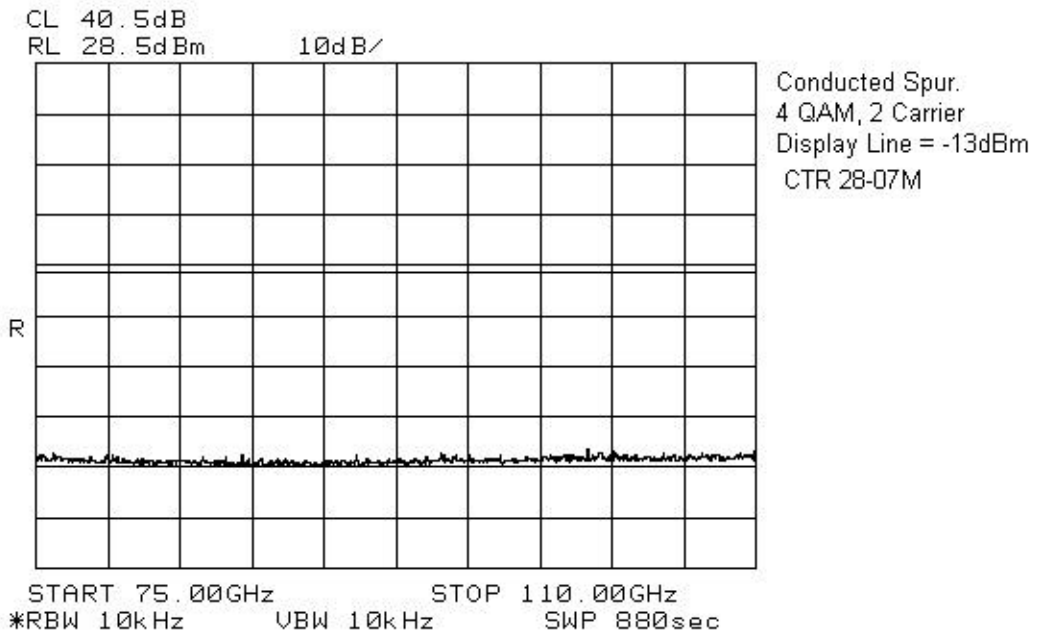
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EQUIPMENT: CTR 28-07M

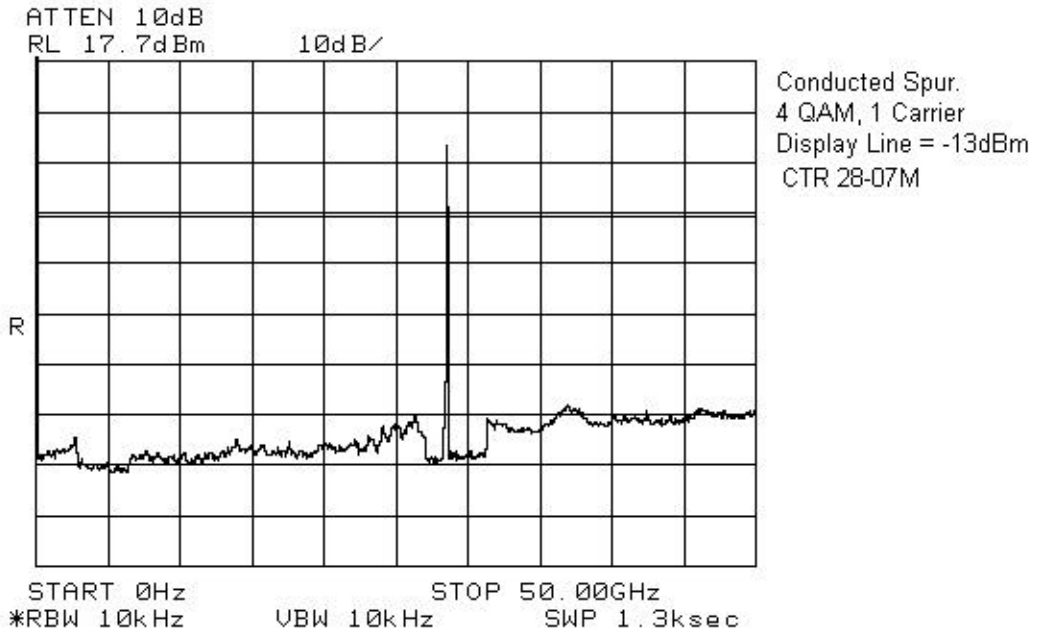
ISSUE: 2.0

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EQUIPMENT: CTR 28-07M  
ISSUE: 2.0

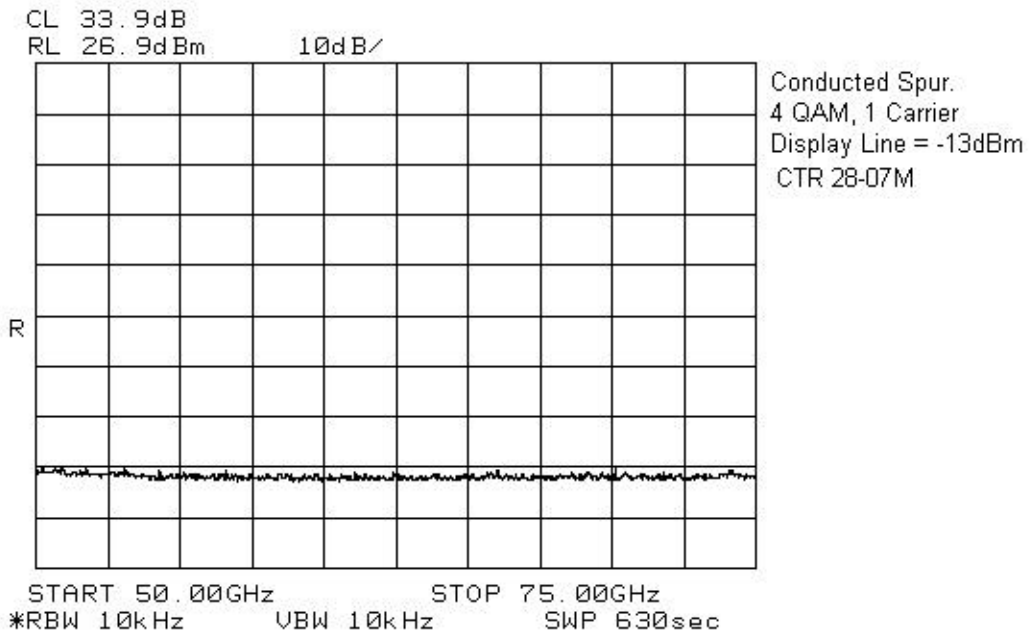
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EQUIPMENT: CTR 28-07M

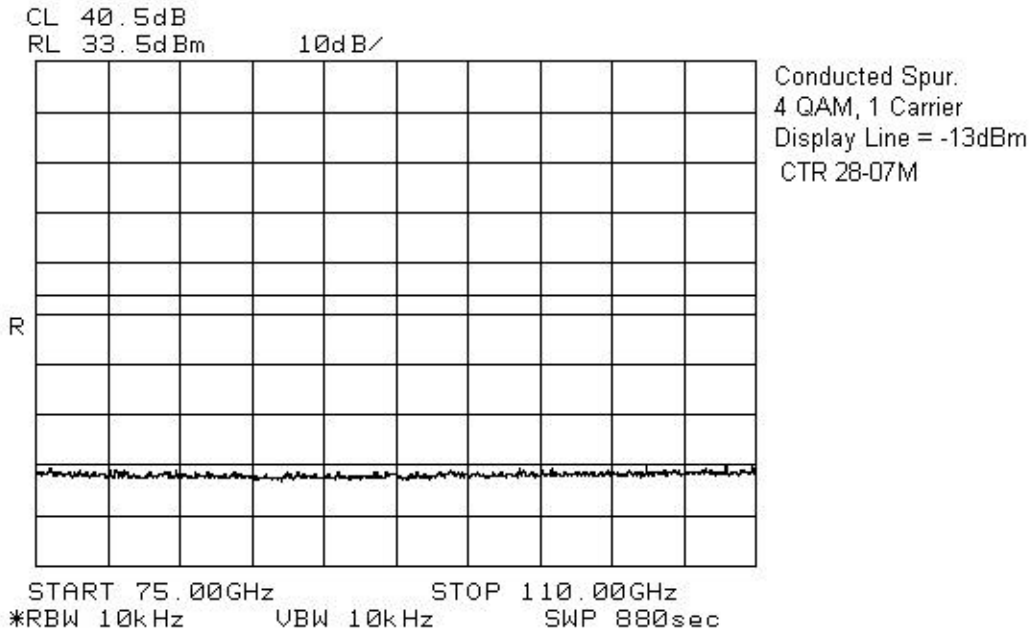
ISSUE: 2.0

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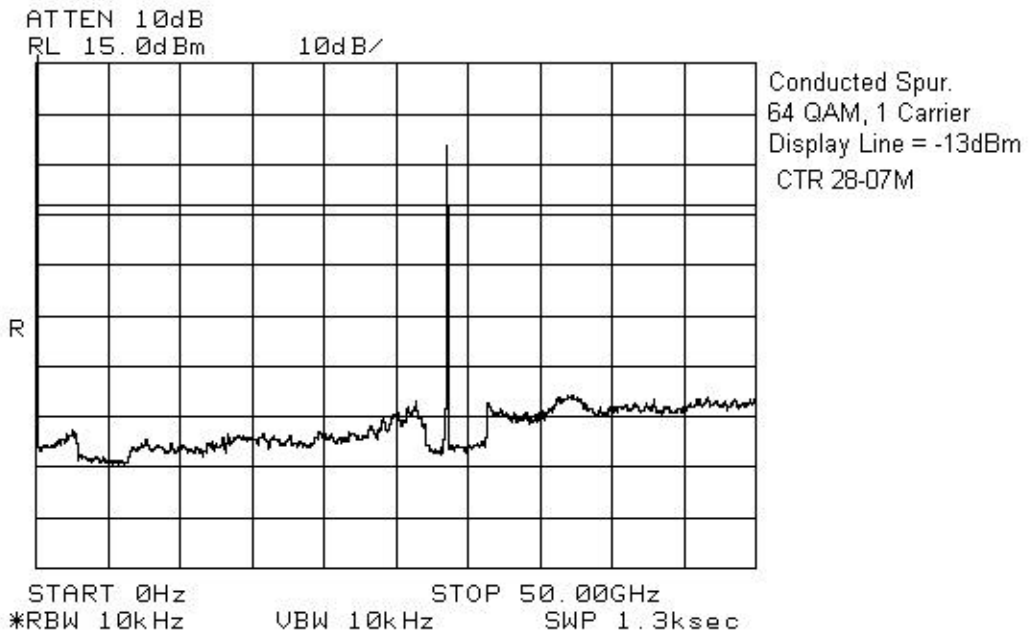
EQUIPMENT: CTR 28-07M  
ISSUE: 2.0

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EQUIPMENT: CTR 28-07M  
ISSUE: 2.0

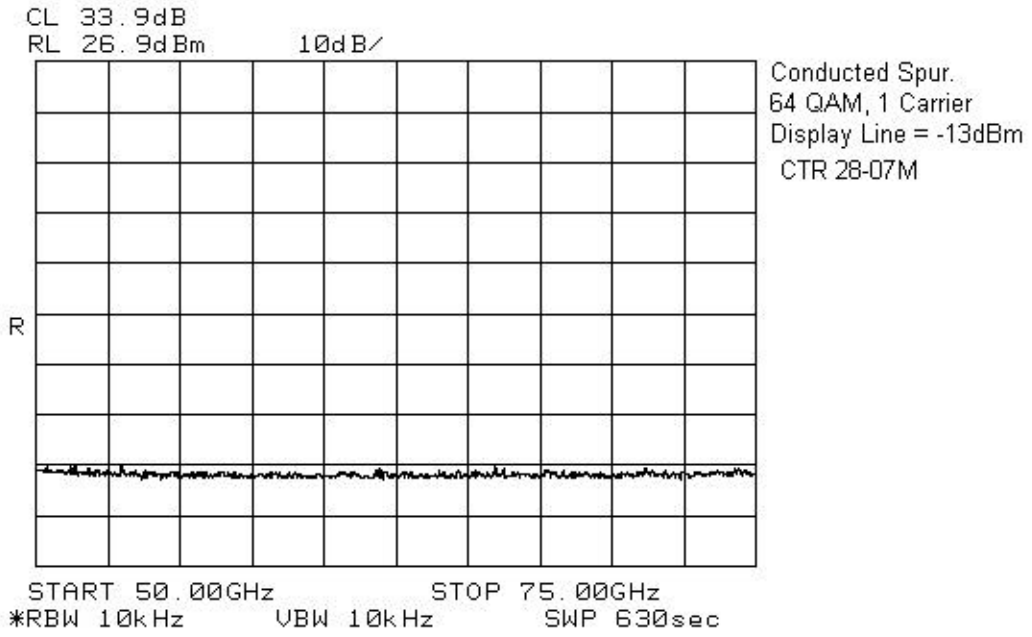
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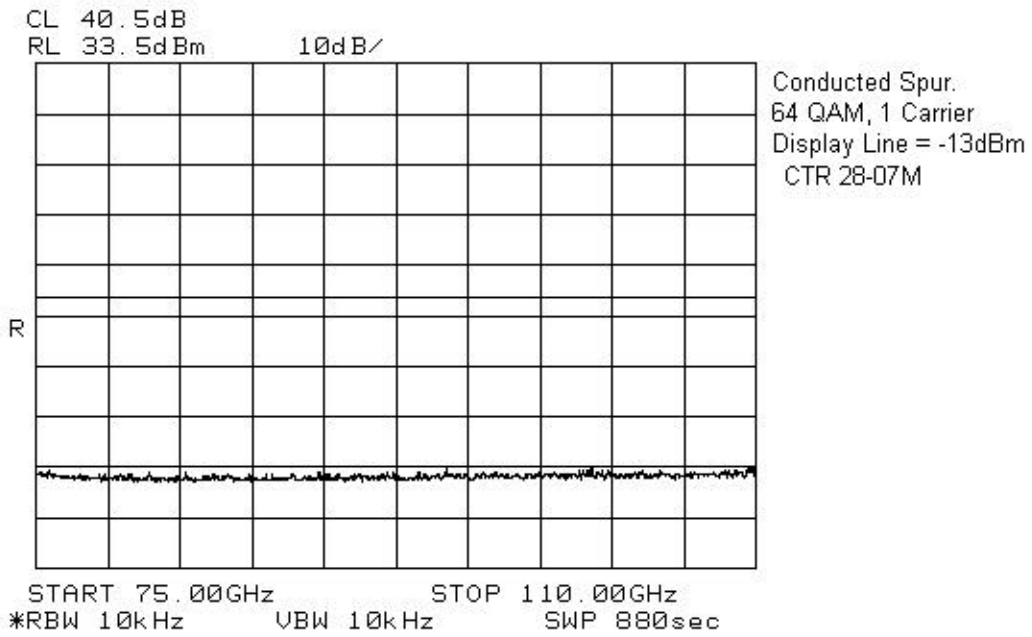
EQUIPMENT: CTR 28-07M  
ISSUE: 2.0

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EQUIPMENT: CTR 28-07M  
ISSUE: 2.0

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*EQUIPMENT: CTR 28-07M*

*ISSUE: 2.0*

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**Section 6. Field Strength of Spurious Emissions**

**Para. No.: 2.1053**

<b>Test Performed By:</b> Glen Westwell	<b>Date of Test:</b> August 30, 2000
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**Minimum Standard:** 101.111 (a)(2)(iii), -13 dBm  
84.4 dBμV/m @ 3m < 1 GHz  
82.2 dBμV/m @ 3m > 1 GHz

**Test Results:** Complies  
No emissions were detected within 20 dB of the specification limit.

**Test Data:** The spectrum was searched from 400 MHz to 110 GHz.  
No emissions were detected.

*EQUIPMENT: CTR 28-07M*

*ISSUE: 2.0*

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**Section 7. Frequency Stability**

**Para. No.: 2.1055**

<b>Test Performed By:</b> Glen Westwell	<b>Date of Test:</b> August 30, 2000
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**Minimum Standard:** 101.107, 0.001% (283 kHz)

**Test Results:** Complies

The maximum frequency drift is 30 kHz.  
This is 0.00011%

**Test Data:** Standard Test Voltage: STV -48 VDC  
Standard Test Frequency: 28 275.000 MHz

Test Condition	Frequency (MHz)	Frequency Drift (kHz)
STV	28 275.020	20
115% STV	28 275.019	19
85% STV	28 275.020	20
-30 °C	28 275.009	9
-20 °C	28 275.017	17
-10 °C	28 275.025	25
0 °C	28 275.029	29
+10 °C	28 275.030	30
+30 °C	28 275.020	20
+40 °C	28 275.010	10
+50 °C	28 275.001	1

*EQUIPMENT: CTR 28-07M*

*ISSUE: 2.0*

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**Section 8. Test Equipment List**

<b>CAL CYCLE</b>	<b>EQUIPMENT</b>	<b>MANUFACTURER</b>	<b>MODEL</b>	<b>SERIAL</b>	<b>LAST CAL.</b>	<b>NEXT CAL.</b>
1 Year	Spectrum Analyzer	Hewlett Packard	8565E	FA000981	June 16/00	June 16/01
1 Year	Climate Chamber	Thermotron	SM-16C	15649-S	COU	COU
3 Year	RF Generator	Rohde & Schwarz	SIMIQ03E	DE24154	Oct. 4/99	Oct. 4/01
	Power Supply	Hewlett Packard	6274B	2552A-08243	NCR	NCR
1 Year	Power Meter	Hewlett Packard	E4418B	FA001413	Nov. 8/99	Dec. 7/00
1 Year	Power Sensor	Hewlett Packard	8487A	FA001419	Nov. 18/99	Dec. 7/00
	20 dB Attenuator	Dorado		20-507	COU	COU
	Waveguide to SMA	Dorado			COU	COU
	Power Supply	Tektronix	PS280	FA001428	NCR	NCR

NA: Not Applicable  
NCR: No Cal Required  
COU: CAL On Use

*EQUIPMENT: CTR 28-07M*

*ISSUE: 2.0*

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## **Annex A**

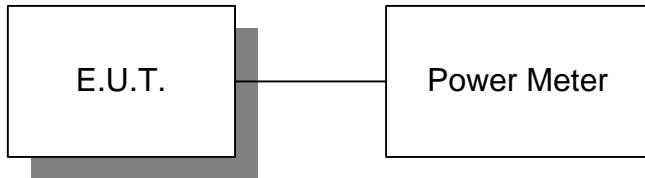
### **Test Diagrams**

EQUIPMENT: CTR 28-07M

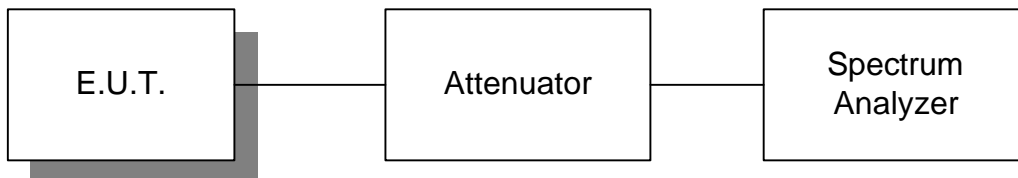
ISSUE: 2.0

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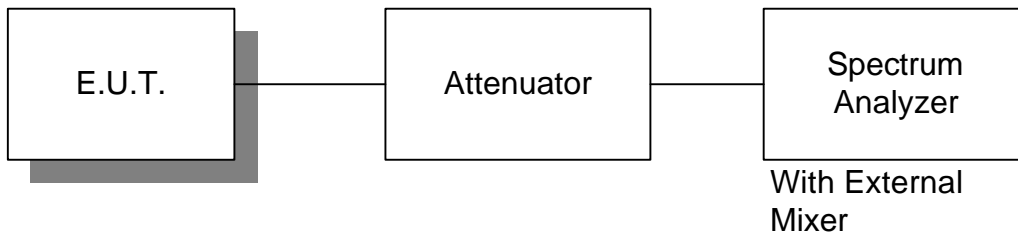
**Para. No. 2.1046 - R.F. Power Output**



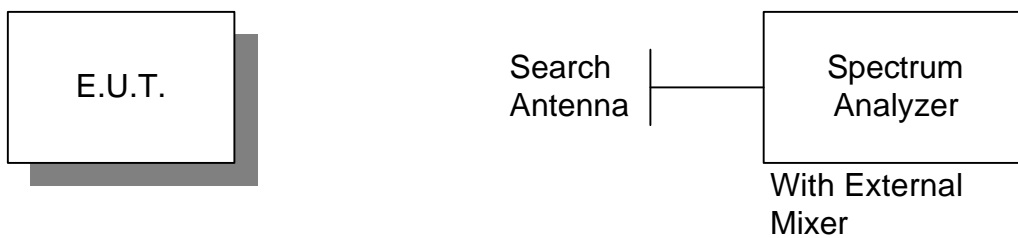
**Para. No. 2.1049 - Occupied Bandwidth**



**Para. No. 2.1051 - Spurious Emissions at Antenna Terminals**



**Para. No. 2.1053 - Field Strength of Spurious Radiation**



*EQUIPMENT: CTR 28-07M*

*ISSUE: 2.0*

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**Para. No. 2.1055 - Frequency Stability**

