KTL Test Report:	0R03222 Issue 2.0
Applicant:	Nortel Networks 21 Richardson Side Road Kanata, Ontario K2K 2C1
Equipment Under Test: **(E.U.T.)**	BTR 24-01M, NTVG11BA 66 NNTM532H45HD Also Covers BTR 24-01MO, NTVG11BC
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 Manager
Date:	January 24, 2001
Total Number of Pages:	43
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
☐ Class II Permissive Change

☒ Production Unit
☐ Pre-Production Unit

T	N	B

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: DATE: January 24, 2001
Glen Westwell, Technologist

Summary Of Test Data

Name Of Test	Para. No.	Result
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:	24 °C
	Humidity:	42 %
Outdoor	Temperature:	N/A
	Humidity:	N/A

.

Section 2. General Equipment Specification

Manufacturer:	Nortel Networks
Model No.:	BTR 24-01M, SW Version 1.2 NTVG11BA 66
Serial No.:	NNTM532H45HD
Date Received In Laboratory:	October 23, 2000
KTL Identification No.:	Item #2

Transmitter

Supply Voltage Input:	-48 Vdc
Frequency Range:	Tx 24.255 GHz to 24.445 GHz
Tunable Bands:	Item #1
Types of Modulation:	4, 16, 64 QAM @ 7.488 Msps FDMA
Data Rate(s):	7.488 Msps
Internal/External Data Source:	External
Emission Designator:	7M83D9W 37M8D9W
Output Impedance:	50Ω
RF Power Output (rated):	14.75 dBm to 22.24 dBm
Channel Spacing(s):	10 MHz
Operator Selection of Operating Frequency:	None
Power Output Adjustment Capability:	0-31 dBm Attenuation

Equipment Under Test

(1) BTR 24-01M
NTVG11BA 66
NNTM532H45HD

(2) RPE 9000 (Telemetry Box)
NTVH24AA 25
NNTM532GD728

(3) RSM 9016
NTVH13BA 62
NNTM532G9F7H

(4) RSM 9116
NTVH20BA 16
NNTM53219QEJ

(5) PSM5148 x QTY 05
NTVH10AC 03

(6) SMM 5010C x QTY 04
NTVH06AA – NNTM5337THA2
NTVH06AB19 – NNTM5353P C9P
NTVH06AB03 – NNTM5334XA7R
NTVH06AB03 – NNTM532NV8B7

(7) CIM5000C
NTVH25AA 15
NNTM5324MWH9

(8) AWM5010B
NTVH04AA AD
NNTM535L30ML

(9) SDM5002C
NTV07AB27
NNTM83004BRE

Section 3. RF Power Output

Para. No.: 1.1046

Test Performed By: Glen Westwell	**Date of Test:** November 3, 2000

Minimum Standard: 101.113 (a)

Test Results: Complies.

The RF output power is within 1 dBm of the rated power.

Measurement Data:

	Rated (dBm)	**Measured (dBm)**
1 Carrier	22.24	22.2
	20.24	20.5
	18.24	18.4

4 Carriers	20.74	20.8
	17.74	18.7
	14.74	15.2

Section 4. Occupied Bandwidth

Para. No.: 2.1049

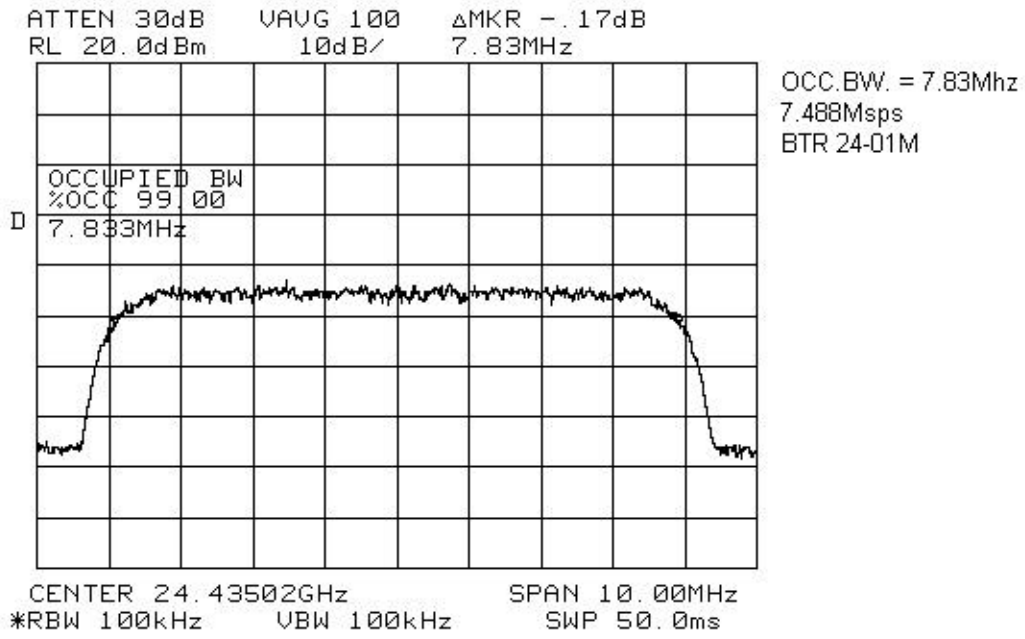
Test Performed By: Glen Westwell	**Date of Test:** November 7, 2000

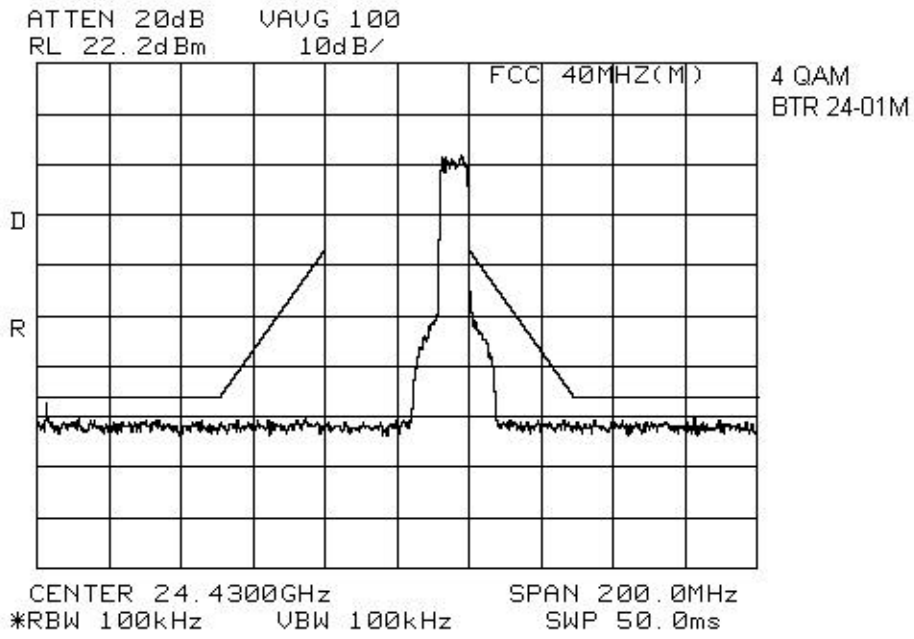
Minimum Standard: 101.111 (a)(2)(ii)

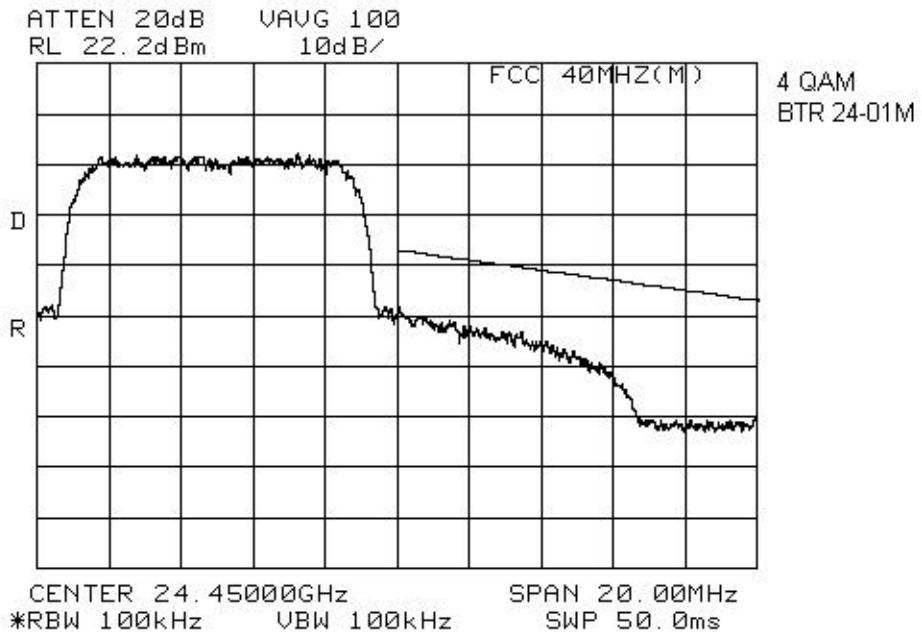
Test Results: Complies.

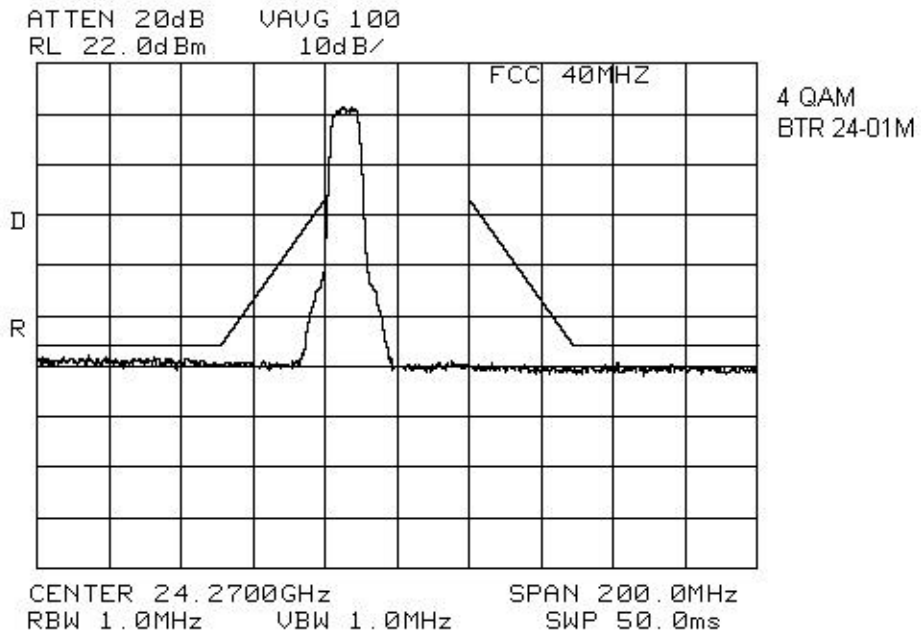
Test Data: See attached graph(s).

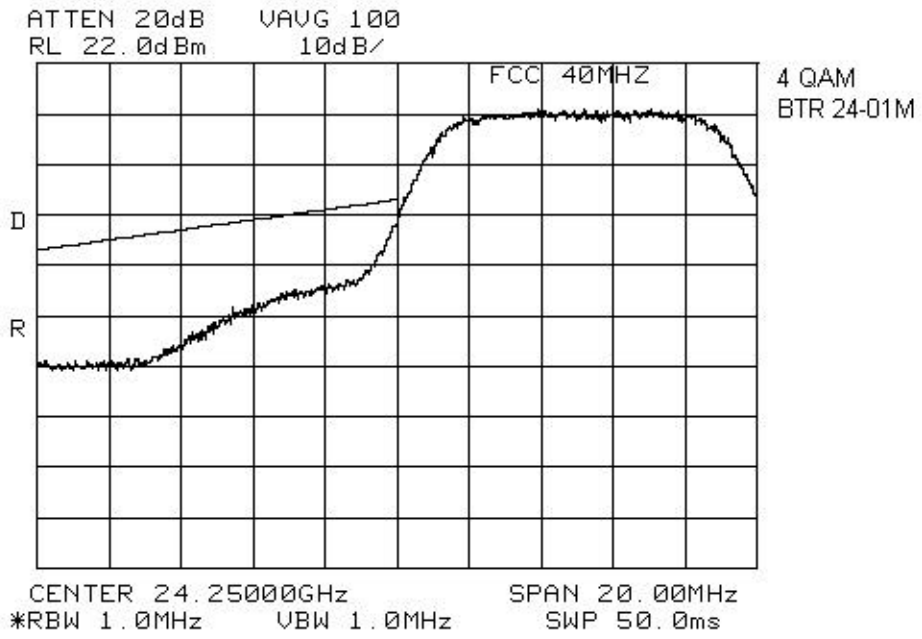
Note: In plots where the RBW has been reduced to 100 kHz, the limit has been decreased by another 10 dB.

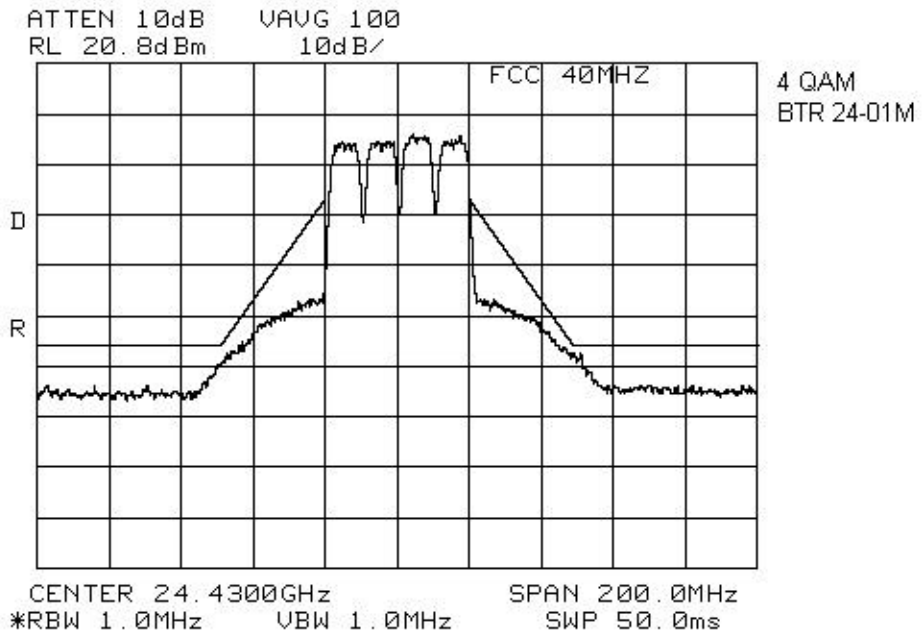

ATTEN 30dB
RL 20.0dBm
VAVG 100
10dB/
ΔMKR -.17dB
7.83MHz
OCC.BW. = 7.83Mhz
7.488Msps
BTR 24-01M
OCCUPIED BW
%OCC 99.00
D
7.833MHz
CENTER 24.43502GHz
SPAN 10.00MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms

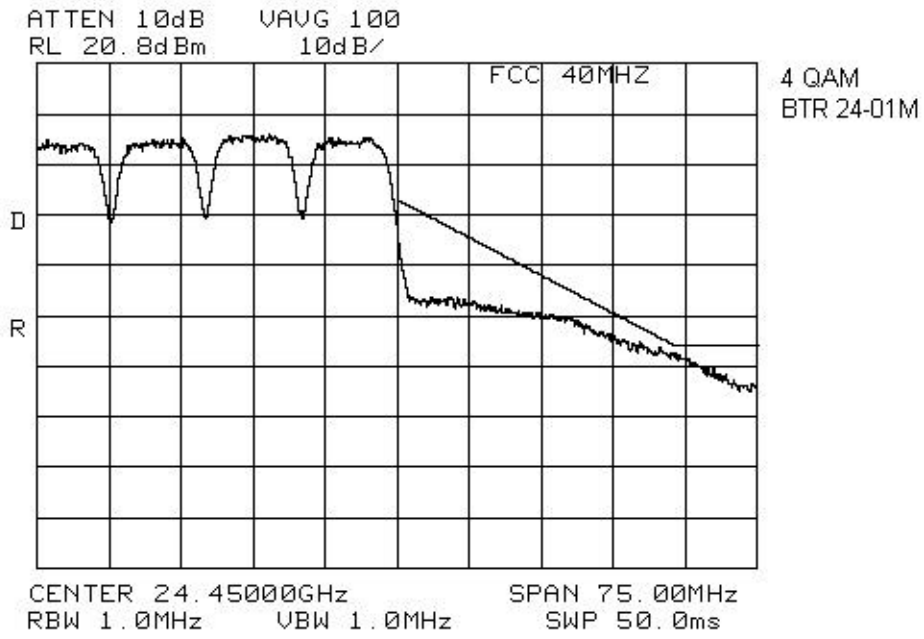

ATTEN 20dB
VAVG 100
RL 22.2dBm
10dB/
FCC 40MHZ(M)
4 QAM
BTR 24-01M
D
R
CENTER 24.4300GHz
SPAN 200.0MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms

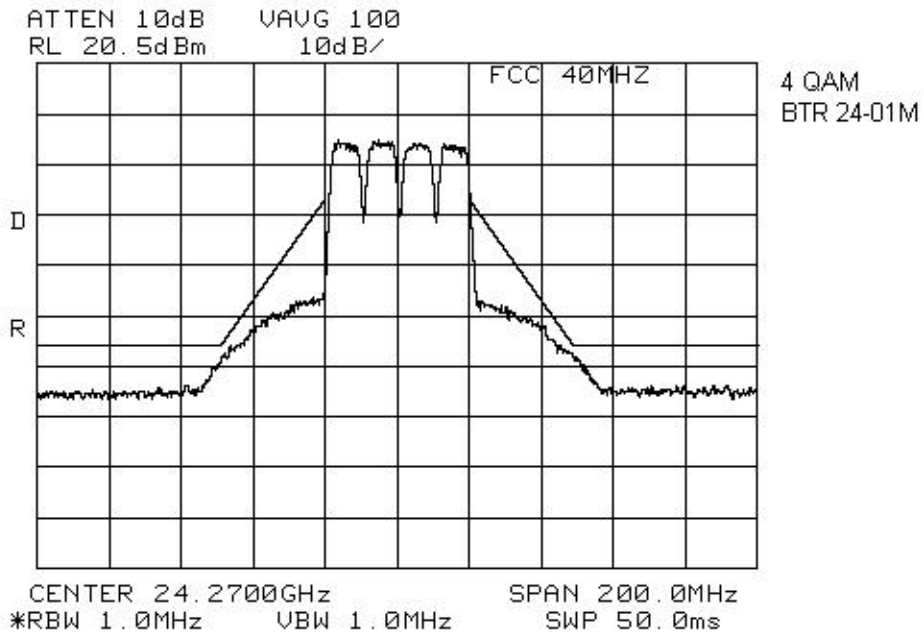

ATTEN 20dB
VAVG 100
RL 22.2dBm
10dB/
FCC 40MHZ(M)
4 QAM
BTR 24-01M
D
R
CENTER 24.45000GHz
SPAN 20.00MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms

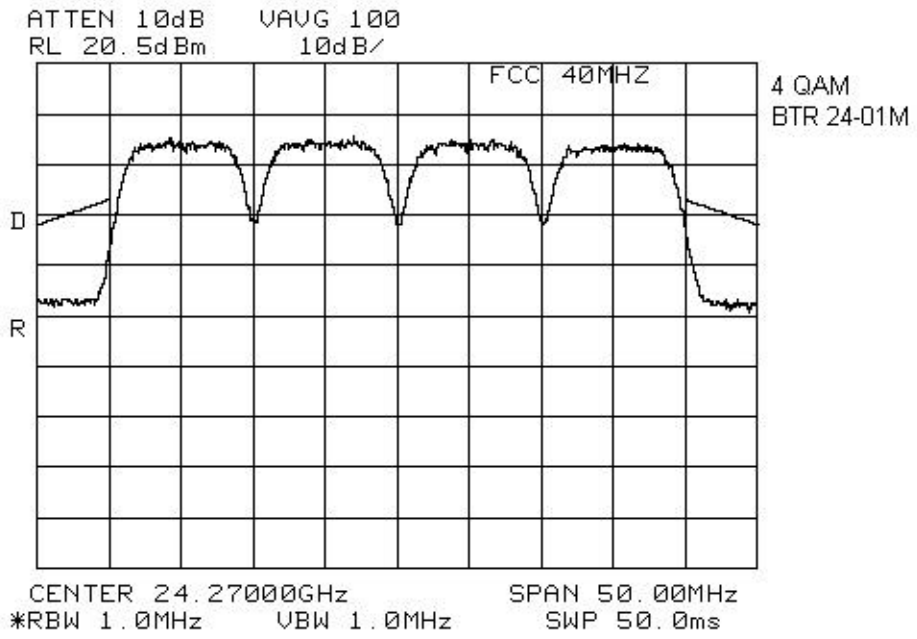

ATTEN 20dB
VAVG 100
RL 22.0dBm
10dB/
FCC 40MHZ
4 QAM
BTR 24-01M
D
R
CENTER 24.2700GHz
SPAN 200.0MHz
RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

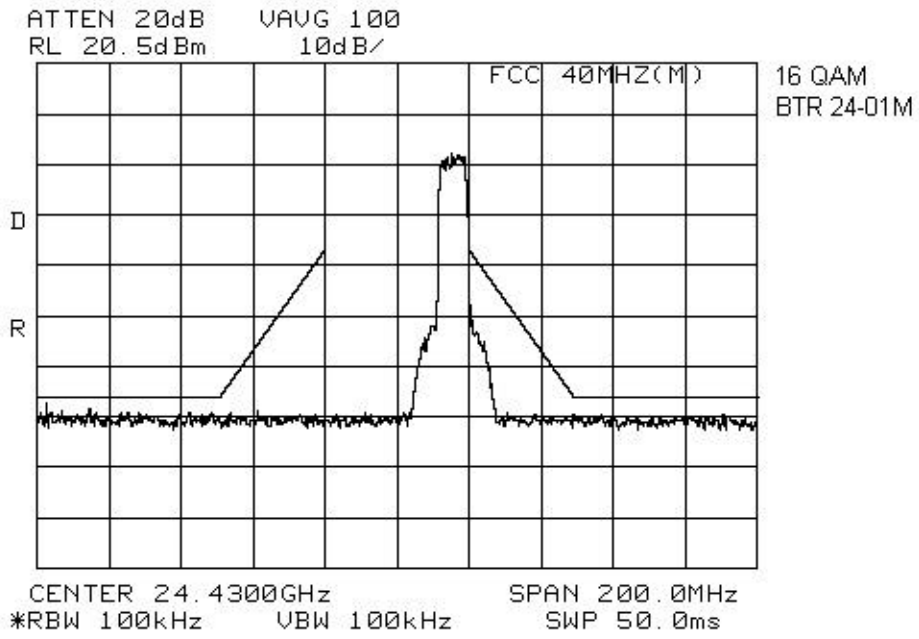

ATTEN 20dB
VAVG 100
RL 22.0dBm
10dB/
FCC 40MHZ
4 QAM
BTR 24-01M
D
R
CENTER 24.25000GHz
SPAN 20.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

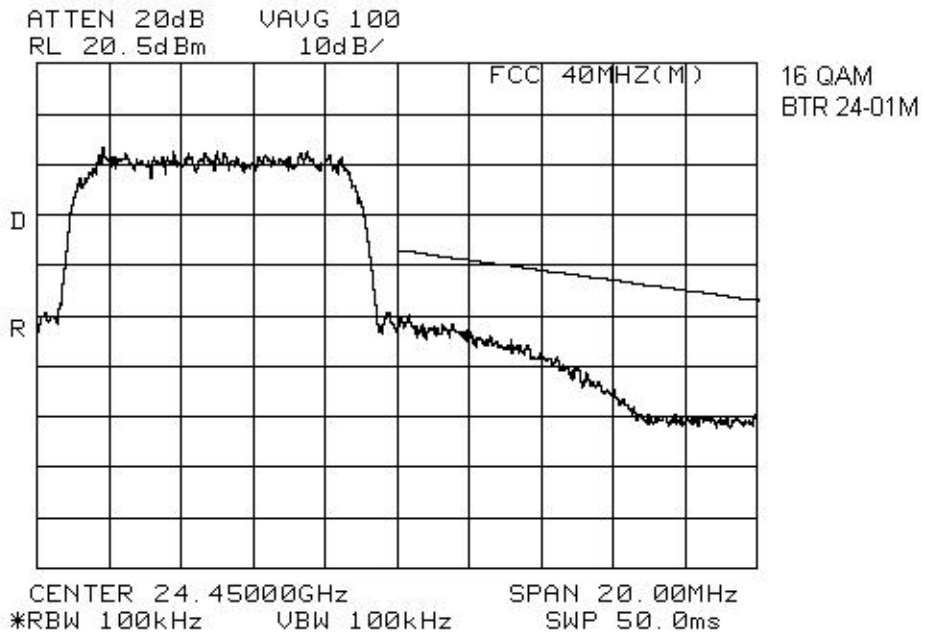

ATTEN 10dB
VAVG 100
RL 20.8dBm
10dB/
FCC 40MHZ
4 QAM
BTR 24-01M
D
R
CENTER 24.4300GHz
SPAN 200.0MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

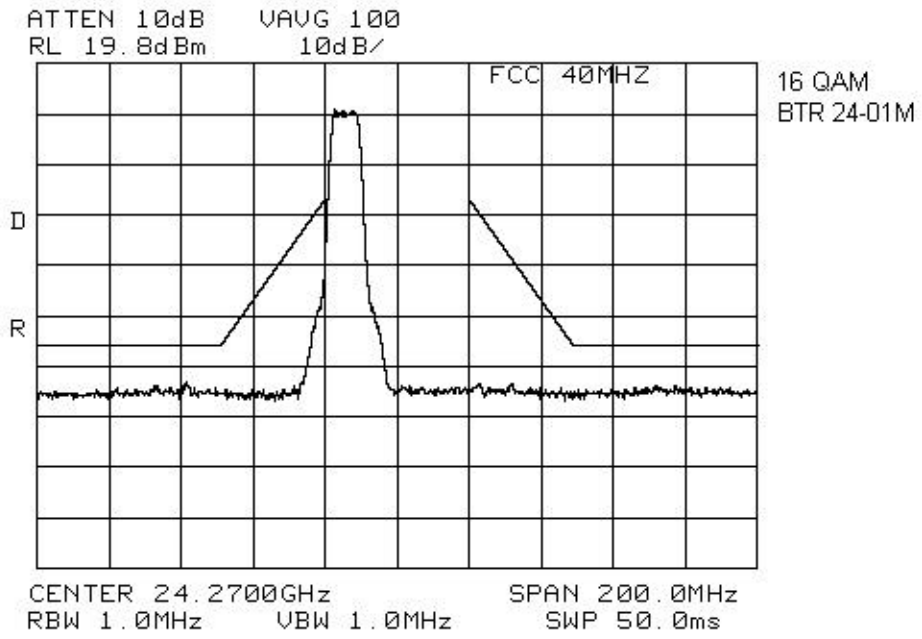

ATTEN 10dB
VAVG 100
RL 20.8dBm
10dB/
FCC 40MHZ
4 QAM
BTR 24-01M
D
R
CENTER 24.45000GHz
SPAN 75.00MHz
RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

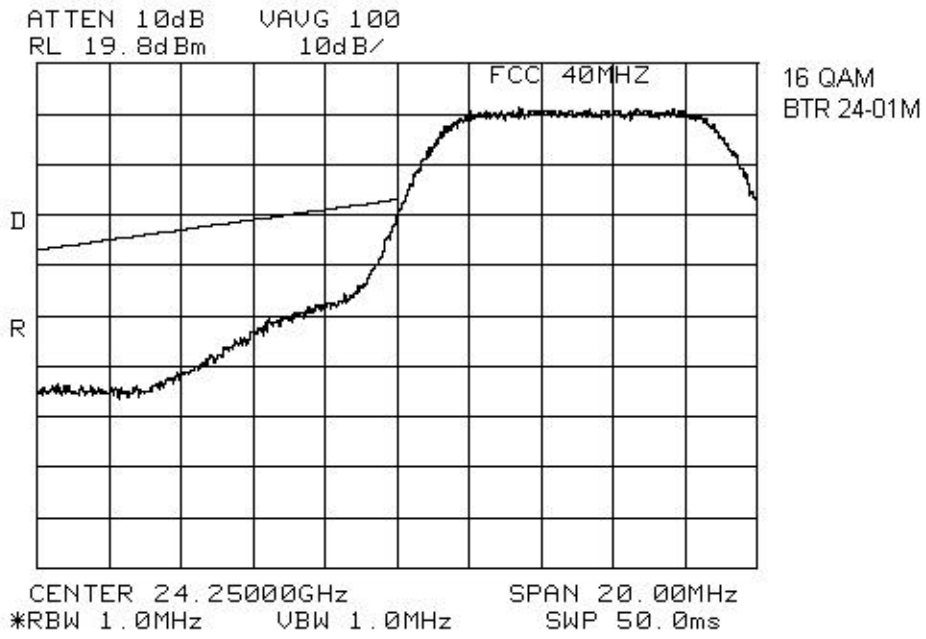

ATTEN 10dB
VAVG 100
RL 20.5dBm
10dB/
FCC 40MHZ
4 QAM
BTR 24-01M
D
R
CENTER 24.2700GHz
SPAN 200.0MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

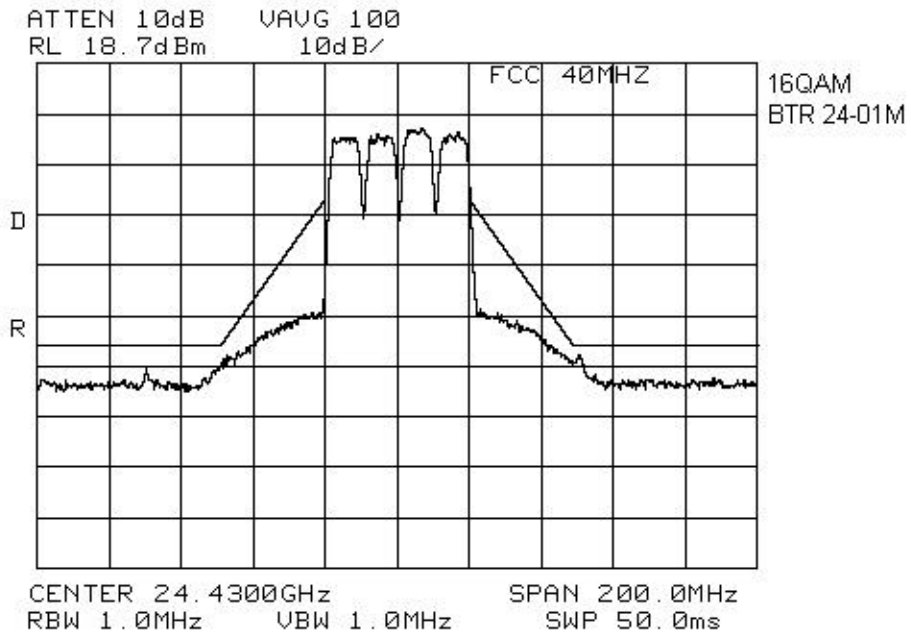

ATTEN 10dB
VAVG 100
RL 20.5dBm
10dB/
FCC 40MHZ
4 QAM
BTR 24-01M
D
R
CENTER 24.27000GHz
SPAN 50.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

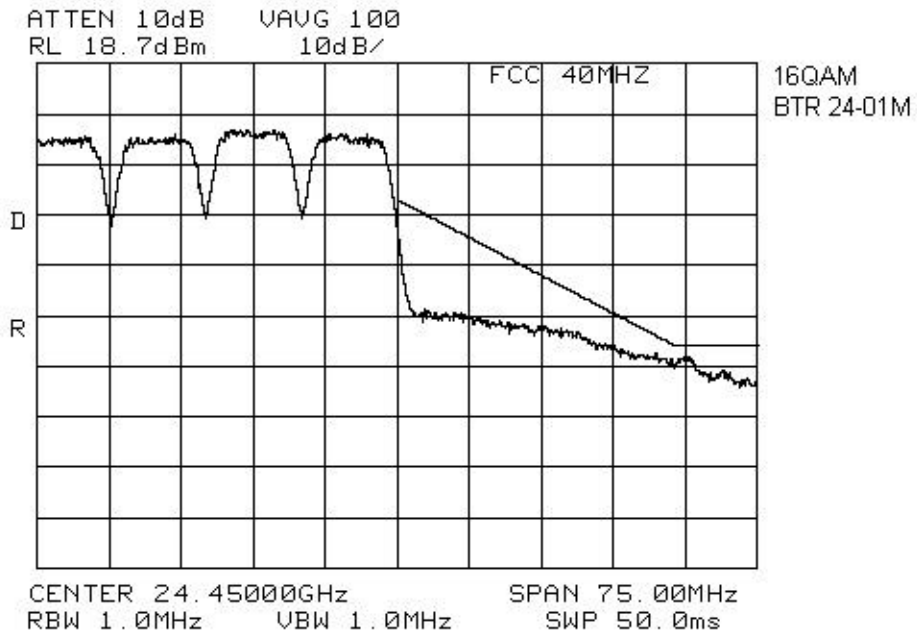

ATTEN 20dB
VAVG 100
RL 20.5dBm
10dB/
FCC 40MHZ(M)
16 QAM
BTR 24-01M
D
R
CENTER 24.4300GHz
SPAN 200.0MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms

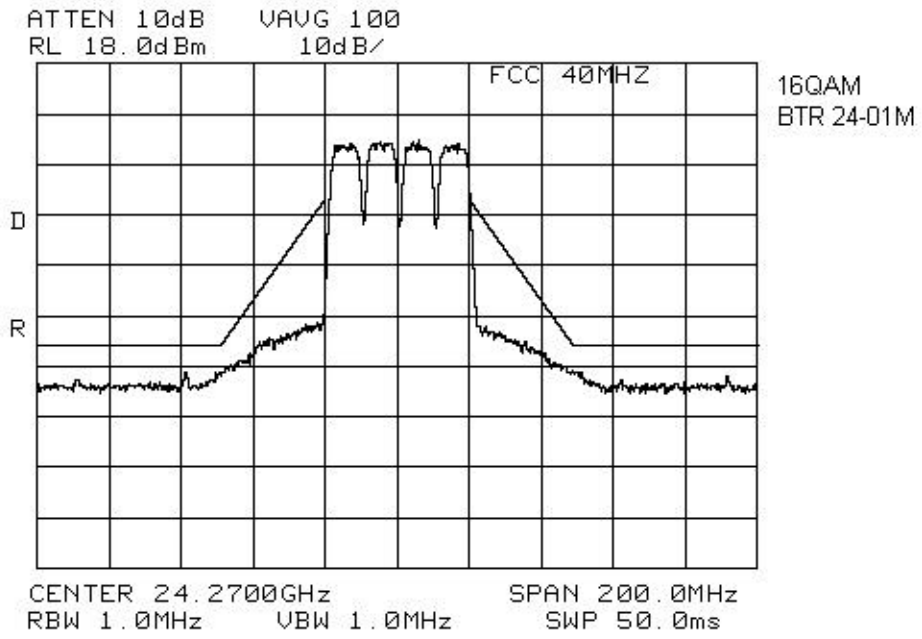

ATTEN 20dB
VAVG 100
RL 20.5dBm
10dB/
FCC 40MHZ(M)
16 QAM
BTR 24-01M
D
R
CENTER 24.45000GHz
SPAN 20.00MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms

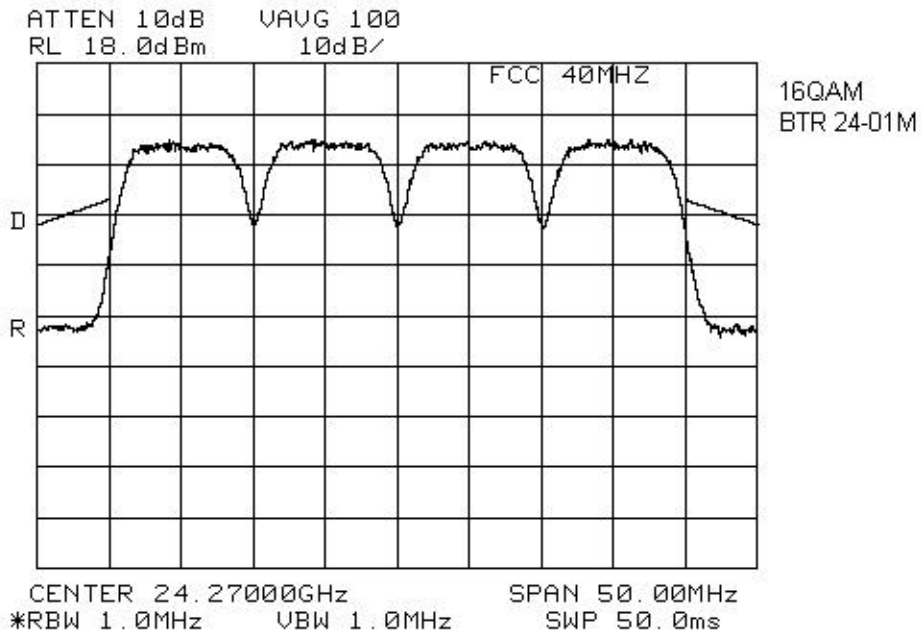

ATTEN 10dB
VAVG 100
RL 19.8dBm
10dB/
FCC 40MHZ
16 QAM
BTR 24-01M
D
R
CENTER 24.2700GHz
SPAN 200.0MHz
RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

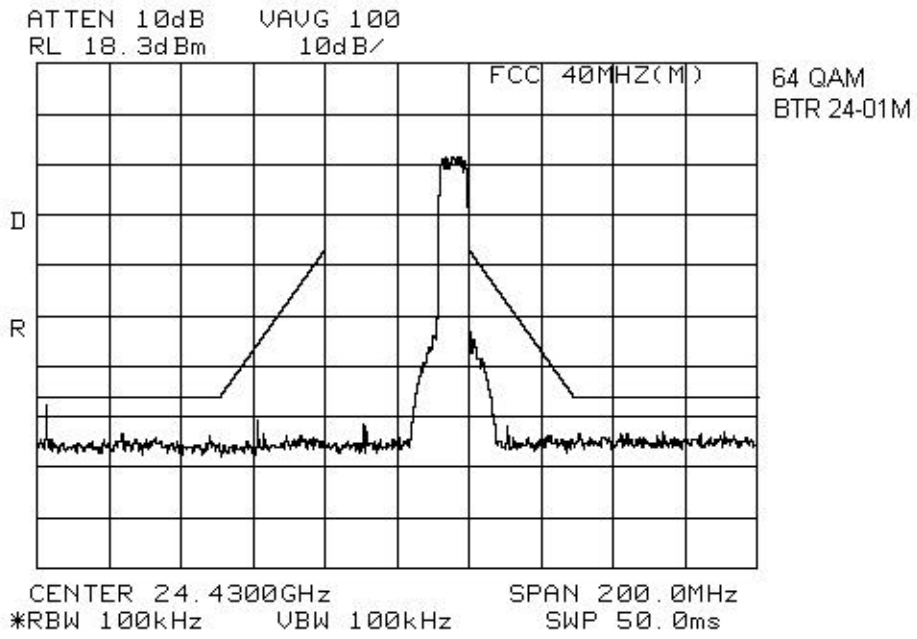

ATTEN 10dB
RL 19.8dBm
VAVG 100
10dB/
FCC 40MHZ
16 QAM
BTR 24-01M
D
R
CENTER 24.25000GHz
SPAN 20.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

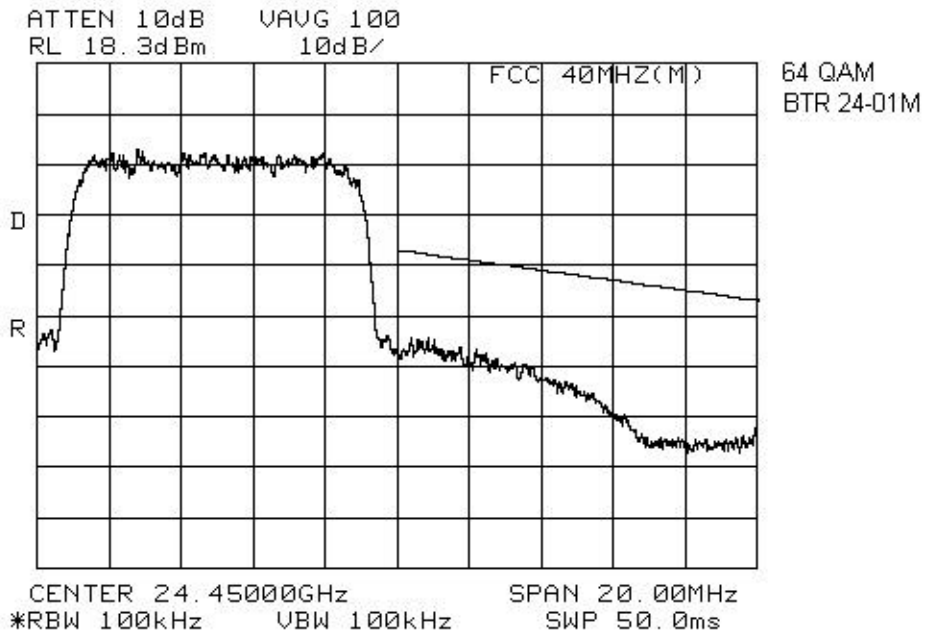

ATTEN 10dB
VAVG 100
RL 18.7dBm
10dB/
FCC 40MHZ
16QAM
BTR 24-01M
D
R
CENTER 24.4300GHz
SPAN 200.0MHz
RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

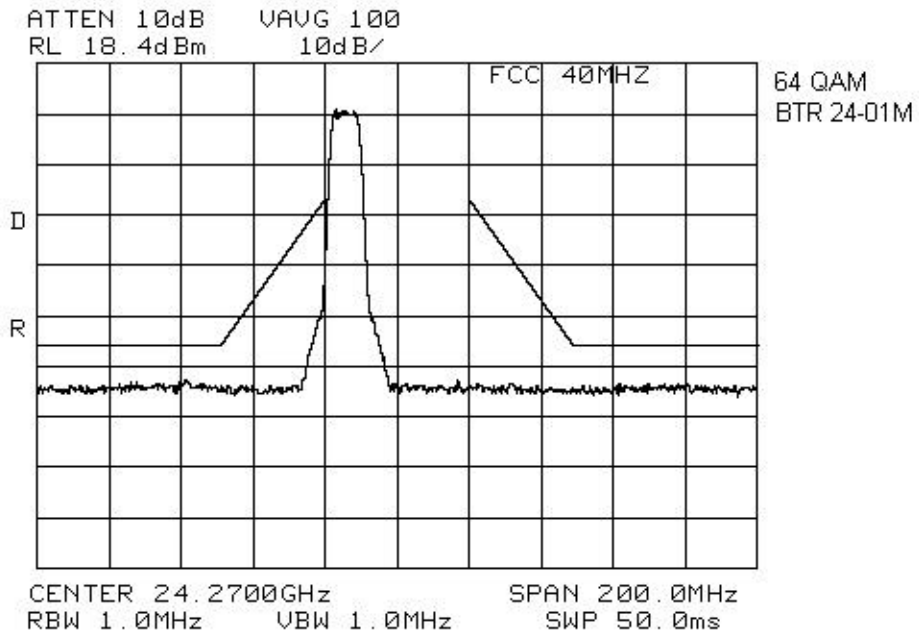

ATTEN 10dB
VAVG 100
RL 18.7dBm
10dB/
FCC 40MHZ
16QAM
BTR 24-01M
D
R
CENTER 24.45000GHz
SPAN 75.00MHz
RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

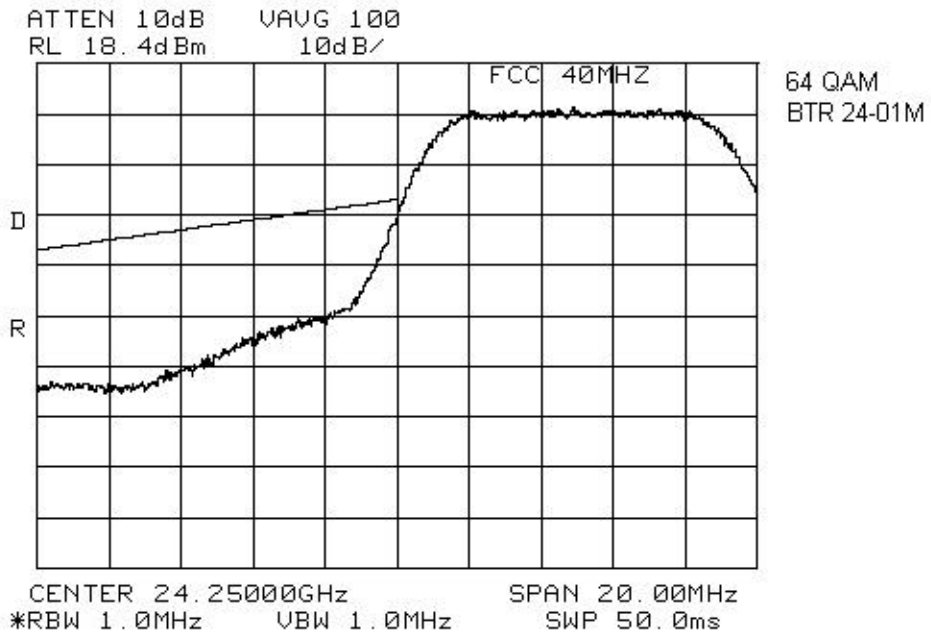

ATTEN 10dB
VAVG 100
RL 18.0dBm
10dB/
FCC 40MHZ
16QAM
BTR 24-01M
D
R
CENTER 24.2700GHz
SPAN 200.0MHz
RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

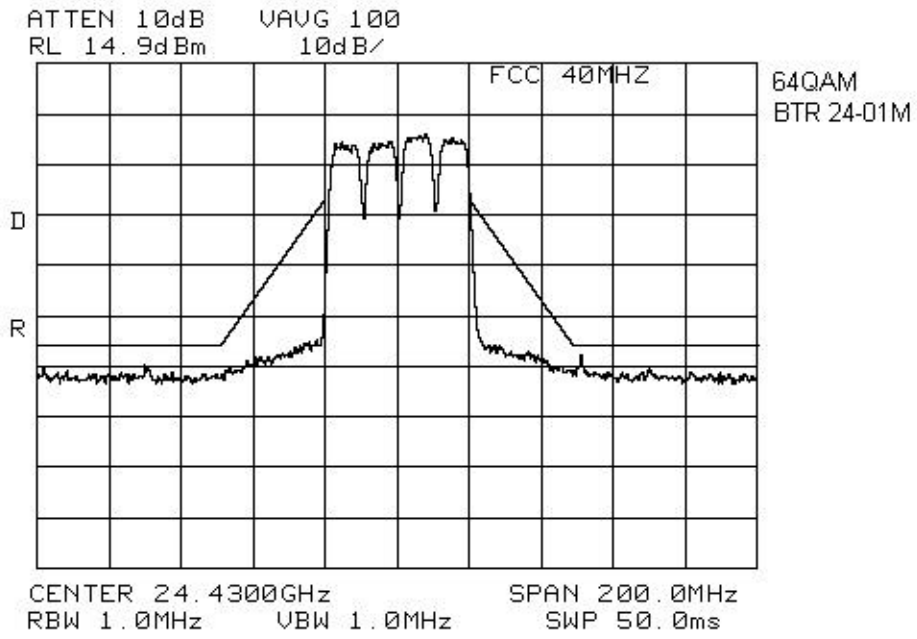

ATTEN 10dB
VAVG 100
RL 18.0dBm
10dB/
FCC 40MHZ
16QAM
BTR 24-01M
D
R
CENTER 24.27000GHz
SPAN 50.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

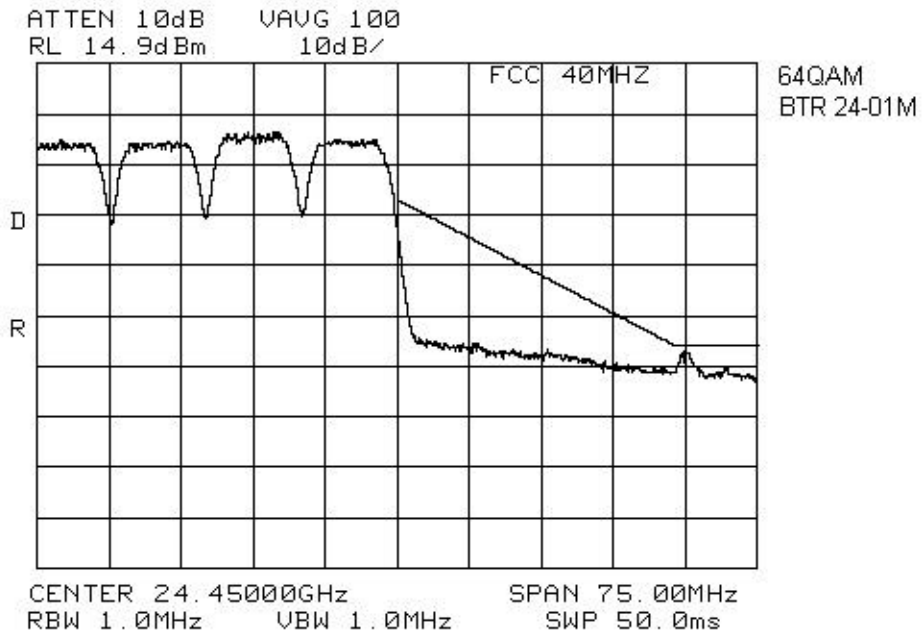

ATTEN 10dB
VAVG 100
RL 18.3dBm
10dB/
FCC 40MHZ(M)
64 QAM
BTR 24-01M
D
R
CENTER 24.4300GHz
SPAN 200.0MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms

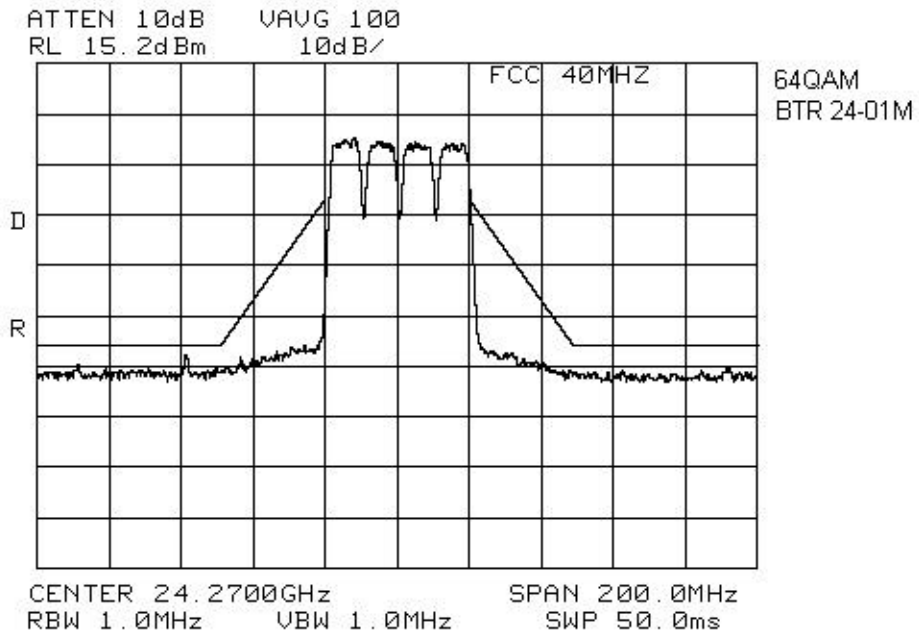

ATTEN 10dB
VAVG 100
RL 18.3dBm
10dB/
FCC 40MHZ(M)
64 QAM
BTR 24-01M
D
R
CENTER 24.45000GHz
SPAN 20.00MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms

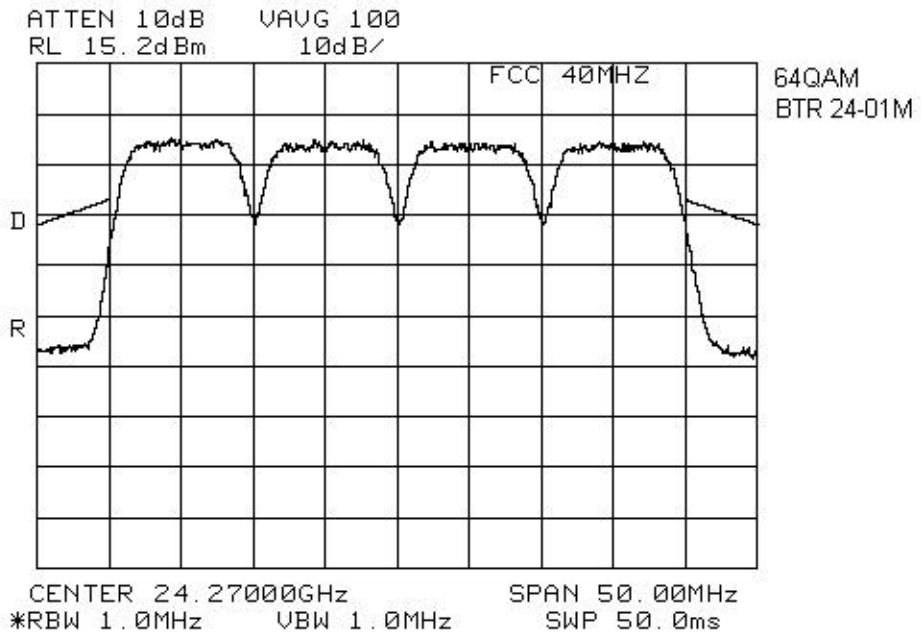

ATTEN 10dB
VAVG 100
RL 18.4dBm
10dB/
FCC 40MHZ
64 QAM
BTR 24-01M
D
R
CENTER 24.2700GHz
SPAN 200.0MHz
RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms


ATTEN 10dB
VAVG 100
RL 18.4dBm
10dB/
FCC 40MHZ
64 QAM
BTR 24-01M
D
R
CENTER 24.25000GHz
SPAN 20.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms


ATTEN 10dB
VAVG 100
RL 14.9dBm
10dB/
FCC 40MHZ
64QAM
BTR 24-01M
D
R
CENTER 24.4300GHz
SPAN 200.0MHz
RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms


ATTEN 10dB
VAVG 100
RL 14.9dBm
10dB/
FCC 40MHZ
64QAM
BTR 24-01M
D
R
CENTER 24.45000GHz
SPAN 75.00MHz
RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms


ATTEN 10dB
VAVG 100
RL 15.2dBm
10dB/
FCC 40MHZ
64QAM
BTR 24-01M
D
R
CENTER 24.2700GHz
SPAN 200.0MHz
RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms


ATTEN 10dB
VAVG 100
RL 15.2dBm
10dB/
FCC 40MHZ
64QAM
BTR 24-01M
D
R
CENTER 24.27000GHz
SPAN 50.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

Section 5. Spurious Emissions at Antenna Terminals

Para. No.: 2.1051

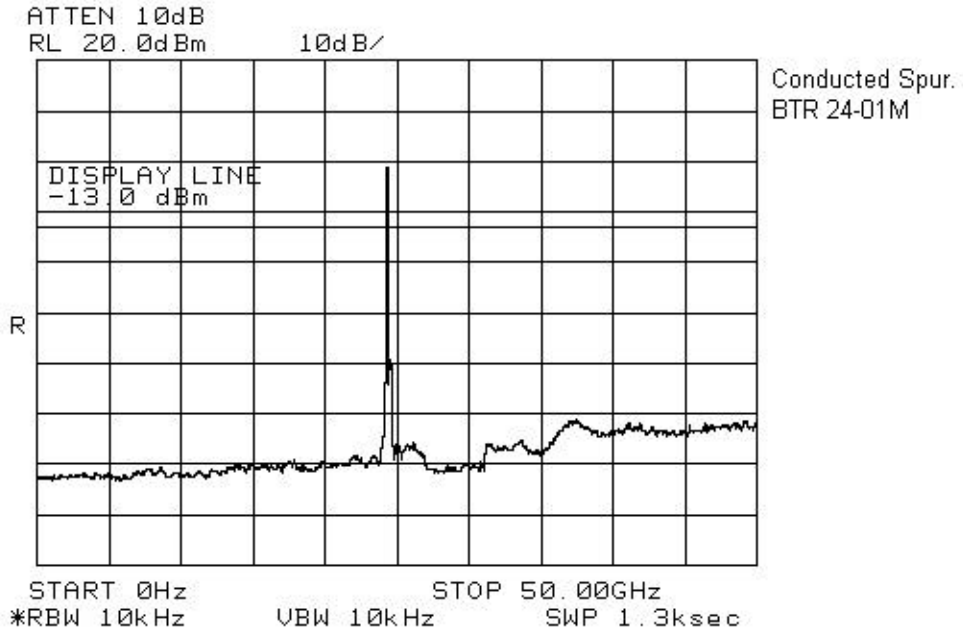
Test Performed By: Glen Westwell	**Date of Test:** November 6, 2000

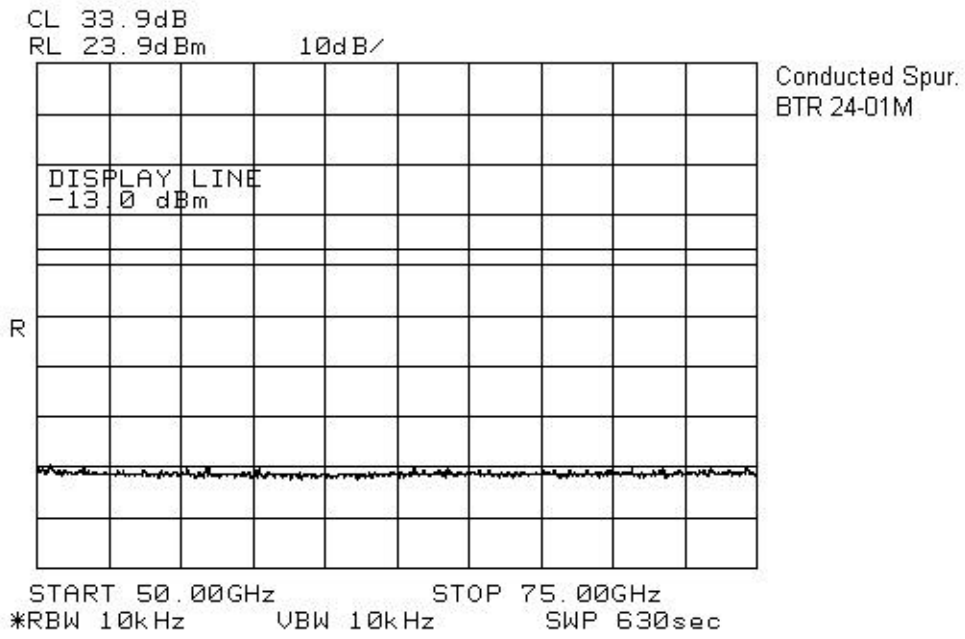
Minimum Standard: 101.111 (a)(2)(iii), -13 dBm

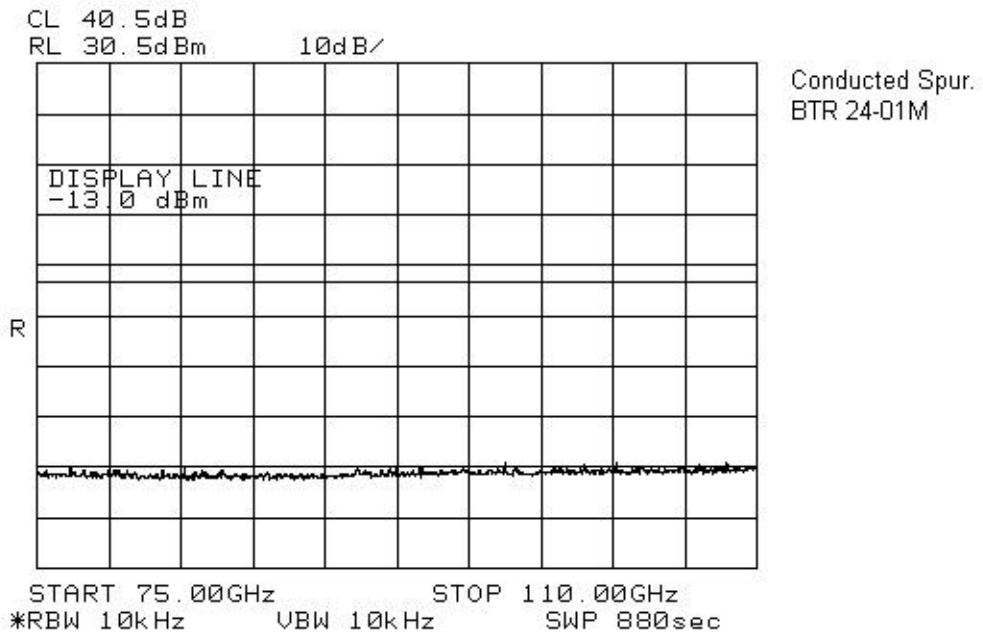
Test Results: Complies.

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

Test Data: See attached graph(s).


ATTEN 10dB
RL 20.0dBm
10dB/
Conducted Spur.
BTR 24-01M
DISPLAY LINE
-13.0 dBm
R
START 0Hz
STOP 50.00GHz
*RBW 10kHz
VBW 10kHz
SWP 1.3ksec


CL 33.9dB
RL 23.9dBm
10dB/
Conducted Spur.
BTR 24-01M
DISPLAY LINE
-13.0 dBm
R
START 50.00GHz
STOP 75.00GHz
*RBW 10kHz
VBW 10kHz
SWP 630sec


CL 40.5dB
RL 30.5dBm
10dB/
DISPLAY LINE
-13.0 dBm
R
START 75.00GHz
STOP 110.00GHz
*RBW 10kHz
VBW 10kHz
SWP 880sec
Conducted Spur.
BTR 24-01M

Section 6. Field Strength of Spurious Emissions

Para. No.: 2.1053

Test Performed By: Glen Westwell	**Date of Test:** November 2, 2000

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 140 GHz.

No emissions were detected.

Section 7. Frequency Stability

Para. No.: 2.1055

Test Performed By: Glen Westwell	**Date of Test:** November 1, 2000

Minimum Standard: ± 0.03 %, 7306 kHz

Test Results: Complies

The maximum frequency drift is 4,000 Hz.
This is 0.0000164%

Measurement Data: Standard Test Voltage: STV –48 VDC
Standard Test Voltage: 24355.000 MHz

Test Condition	Frequency (kHz)	Frequency Drift (kHz)
STV	24 355 001	1
115% STV	24 355 002	2
85% STV	24 355 002	2
-30°C	24 355 996	4
-20°C	24 355 997	3
-10°C	24 355 997	3
0°C	24 355 999	1
+10°C	24 355 000	0
+30°C	24 355 002	2
+40°C	24 355 002	2
+50°C	24 355 003	3

Section 8. Test Equipment List

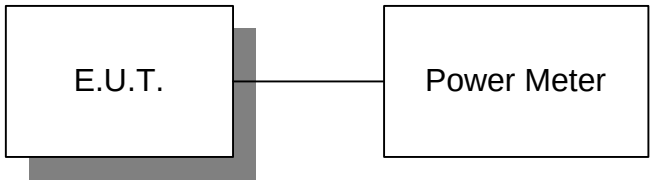
CAL CYCLE	EQUIPMENT	MANUFACTURER	MODEL	SERIAL	LAST CAL.	NEXT CAL.
1 Year	Spectrum Analyzer	Hewlett Packard	8565E	FA000981	June 16/00	June 16/01
1 Year	Climate Chamber	Thermotron	SM-16C	15649-S	COU	COU
2 Year	RF Power Meter	Hewlett Packard	E4418B	FA001413	Nov. 8/99	Dec. 7/00
1 Year	Horn Antenna	EMCO #2	3115	4336	Nov. 11/99	Nov. 11/00
1 Year	Log Periodic Antenna 1	EMCO	LPA-25	1141	Aug. 4/99	Aug. 4/00
3 Year	Standard Gain Horn	Electro-Metrics	SH-50/60-1	FA000479	July 7/00	July 7/01
3 Year	Standard Gain Horn	Electro-Metrics	SH-50/60-2	FA000485	July 7/00	July 7/01
3 year	Harmonic Mixer	H.P.	50-75Ghz	FA001027	Mar. 9/00	Mar. 9/03
3 year	Harmonic Mixer	H.P.	75-110Ghz	FA001302	Oct. 13/98	Oct. 13/01
3 year	Diplexer	Olsen - OML	DPL.26 (H.P)		Mar. 15/00	Mar 15/03
3 year	Mixer/Antenna 40-60Ghz	Olsen – OML	M19HWA (H.P.)		Mar. 15/00	Mar. 15/03
3 year	Mixer /Antenna 60-90Ghz	Olsen – OML	M12HWA (H.P.)		Mar. 15/00	Mar. 15/03
3 year	Mixer / Antenna 90-140Ghz	Olsen – OML	M08HWA (H.P.)		Mar. 15/00	Mar. 15/03

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

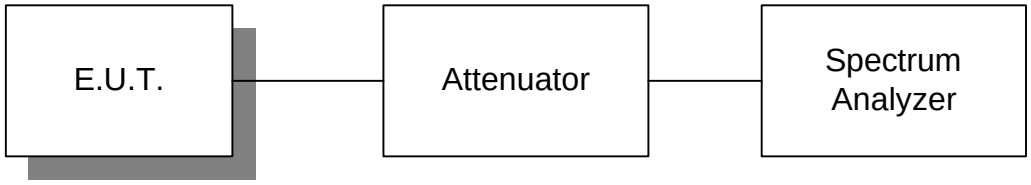
Annex A

Test Diagrams

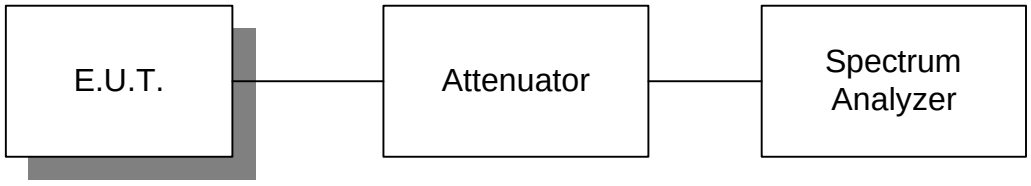
Para. No. 2.1046 - R.F. Power Output



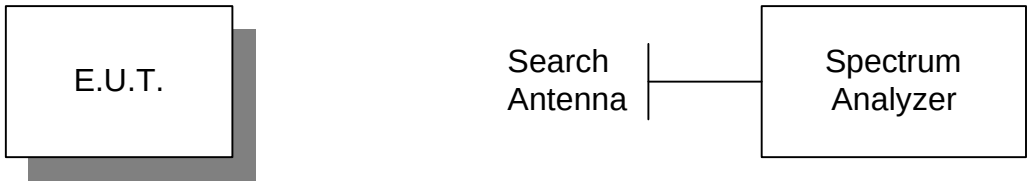
Para. No. 2.1049 - Occupied Bandwidth



Para. No. 2.1051 - Spurious Emissions at Antenna Terminals



Para. No. 2.1053 - Field Strength of Spurious Radiation



Para. No. 2.1055 - Frequency Stability