

EMISSIONS TEST REPORT

Report Number: 3157578BOX-001a

Project Number: 3157578

Testing performed on the

Remote Pickup

Model: LDK 4454/60

To


CFR47 FCC Part 74 Subpart D "Remote Pickup Broadcast Stations"

For

Grass Valley Inc.

Test Performed by:
Intertek – ETL SEMKO
70 Codman Hill Road
Boxborough, MA 01719

Test Authorized by:
Grass Valley Inc.
2255 North Ontario Road, Suite 150
Burbank, CA, 91504

Prepared by: 
Nicholas Abbondante

Date: 07/29/08

Reviewed by: 
Michael F. Murphy

Date: 07/30/08

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1.0 Job Description

1.1 Client Information

This EUT has been tested at the request of:

Company: Grass Valley Inc.
2255 North Ontario Road, Suite 150
Burbank, CA, 91504
Contact: Mr. Kenneth Yas
Telephone: (818) 729-7728
Fax: N/A
Email: Ken.yas@thomson.net

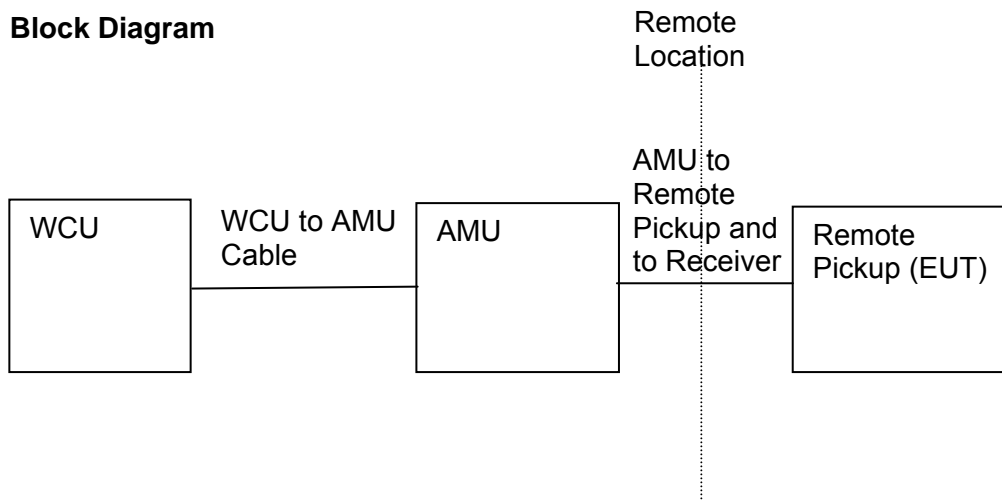
1.2 Equipment Under Test

Equipment Type: Remote Pickup
Model Number(s): LDK 4454/60
Serial number(s): 224W9
Manufacturer: Grass Valley
EUT receive date: 06/05/2008
EUT received condition: Prototype in Good Condition
Test start date: 07/24/2008
Test end date: 07/28/2008

1.3 Test Plan Reference: Tested according to the standards listed and ANSI TIA-603C:2004

1.4 Test Configuration

1.4.1 Block Diagram



1.4.2. Cables:

Cable	Shielding	Connector	Length (m)	Qty.
AMU to WCU Cable	Braid	Metal/LEMO	~14.5	1
AMU to Remote Pickup Cable	Braid	Metal/DB9 and Metal/LEMO	~15.0	1
AMU to Receiver Cable	Braid	Metal/BNC	~17.5	3

1.4.3. Support Equipment:

Name: Wireless Control Unit (WCU)
 Model No.: LDK 4470/01
 Serial No.: 224W3

Name: Antenna Management Unit (AMU)
 Model No.: LDK 4460/10
 Serial No.: 224W6

1.5 Mode(s) of Operation:

During testing, the EUT was transmitting a modulated FSK carrier continuously. DC power was applied from the AMU, which obtained power from the WCU, which was powered from 120V/60Hz AC power.

2.0 Test Summary

TEST STANDARD		RESULTS
CFR47 FCC Part 74 Subpart F		
SUB-TEST	TEST PARAMETER	COMMENT
Power Limitations, FCC 74.461	The maximum authorized ERP is 100 Watts (50 dBm).	Pass
Occupied Bandwidth FCC 74.462(b), 74.463(c)	The maximum authorized bandwidth is 50-100 kHz.	Pass
Emissions Mask, FCC 74.462(c)(1-3)	<p>For operating frequencies below 15 GHz, in any 4 kHz reference bandwidth (B_{REF}), the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 250 percent of the authorized bandwidth: As specified by the following equation but in no event less than 50 decibels:</p> $A = 35 + 0.8 (G - 50) + 10 \text{ Log}10B.$ <p>(Attenuation greater than 80 decibels is not required.)</p> <p>Where: A = Attenuation (in decibels) below the mean output power level. G = Percent removed from the carrier frequency. B = Authorized bandwidth in megahertz.</p> <p>In any 4 kHz reference bandwidth (B_{REF}), the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least $43 + 10 \text{ Log}10(P_{MEAN}$ in watts) decibels, or 80 decibels, whichever is the lesser attenuation.</p>	Pass
Conducted Spurious Emissions FCC 74.462(c)	All spurious emissions must not exceed -13 dBm, using a 100 kHz bandwidth below 1 GHz and a 1 MHz resolution bandwidth above 1 GHz.	Pass
Radiated Spurious Emissions FCC 74.462(c)	All spurious emissions must not exceed -13 dBm, using a 100 kHz bandwidth below 1 GHz and a 1 MHz resolution bandwidth above 1 GHz.	Pass
Frequency Tolerance FCC 74.464	The carrier frequency must remain within 0.00025% (2.5 ppm) of the assigned frequency.	Pass

REVISION SUMMARY – The following changes have been made to this Report:

Date	Project No.	Project Handler	Page(s)	Item	Description of Change
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3.0 Sample Calculations

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dB μ V/m
- RA = Receiver Amplitude (including preamplifier) in dB μ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$\begin{aligned} RA &= 52.0 \text{ dB}\mu\text{V} \\ AF &= 7.4 \text{ dB/m} \\ CF &= 1.6 \text{ dB} \\ AG &= 29.0 \text{ dB} \\ FS &= 32 \text{ dB}\mu\text{V/m} \end{aligned}$$

$$\text{Level in } \mu\text{V/m} = [10(32 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

The following is how net line-conducted readings were determined:

$$NF = RF + LF + CF + AF$$

Where NF = Net Reading in dB μ V

- RF = Reading from receiver in dB μ V
- LF = LISN Correction Factor in dB
- CF = Cable Correction Factor in dB
- AF = Attenuator Loss Factor in dB

To convert from dB μ V to μ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where UF = Net Reading in } \mu\text{V}$$

Example:

$$\begin{aligned} NF &= RF + LF + CF + AF = 28.5 + 0.2 + 0.4 + 20.0 = 49.1 \text{ dB}\mu\text{V} \\ UF &= 10^{(49.1 \text{ dB}\mu\text{V} / 20)} = 254 \mu\text{V/m} \end{aligned}$$

3.1 Measurement Uncertainty

Compliance of the product is based on the measured value. However, the measurement uncertainty is included for informational purposes.

The expanded uncertainty ($k = 2$) for radiated emissions from 30 to 1000 MHz has been determined to be:

± 3.5 dB at 10m, ± 3.8 dB at 3m

The expanded uncertainty ($k = 2$) for mains conducted emissions from 150 kHz to 30 MHz has been determined to be:

± 2.6 dB

The expanded uncertainty ($k = 2$) for telecom port conducted emissions from 150 kHz to 30 MHz has been determined to be:

± 3.2 for ISN and voltage probe measurements

± 3.1 for current probe measurements

3.2 Site Description

Test Site(s): 1

Our OATS are 3m and 10m sheltered emissions measurement ranges located in a light commercial environment in Boxborough, Massachusetts. They meet the technical requirements of ANSI C63.4-2003 and CISPR 22:1993/EN 55022:1994 for radiated and conducted emission measurements. The shelter structure is entirely fiberglass and plastic, with outside dimensions of 33 ft x 57 ft. The structure resembles a quonset hut with a center ceiling height of 16.5 ft.

The testing floor is covered by a galvanized sheet metal groundplane that is earth-grounded via copper rods around the perimeter of the site. The joints between individual metal sheets are bridged with a 2 inch wide metal strips to provide low RF impedance contact throughout. The sheets are screwed in place with stainless steel, round-head screws every three inches. Site illumination and HVAC are provided from beneath the ground reference plane through flush entry ports, the port covers are electrically bonded to the ground plane.

A flush metal turntable with 12 ft. diameter and 5000 lb. load capacity (12,000 lb. in Site 3) is provided for floor-standing equipment. A wooden table 80 cm high is used for table-top equipment. The turntable is electrically connected to the ground plane with three copper straps. The straps are connected to the turntable at the center of it with ground braid. The copper strap is directly connected to the groundplane at the edges of the turntable. The turntable is located on the south end of the structure and the antennas are mounted 3 and 10 meters away to the north. The antenna mast is a non-conductive with remote control of antenna height and polarization. The antenna height is adjustable from 1 to 4 meters.

All final radiated emission measurements are performed with the testing personnel and measurement equipment located below the ground reference plane. The site has a full basement underneath the turntable where support equipment may be remotely located. Operation of the antenna, turntable and equipment under test is controlled by remote controls that manipulate the antenna height and polarization and with a turntable control. Test personnel are located below the ellipse when measurements are performed, however the site maintains the ability of having personnel manipulate cables while monitoring test equipment. Ambient radiated emissions are 6 dB or more below the relevant FCC emission limits.

AC mains power is brought to the equipment under test through a power line filter, to remove ambient conducted noise. 50 Hz (240 VAC single phase), 60 Hz power (120 VAC single phase, 208 VAC three phase), and 60 Hz (480 VAC three phase) are available. Conducted emission measurements are performed with a Line Impedance Stabilization Network (LISN) or Artificial Mains Network (AMN) bonded to the ground reference plane. A removable vertical groundplane (2 meter X 2 meter area) is used for line-conducted measurements for table top equipment. The vertical groundplane is electrically connected to the reference groundplane.

The EMC Lab has two Semi-anechoic Chambers and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference groundplanes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

Test Results: Pass

Test Standard: CFR47 FCC Part 74 Subpart D

Test: Carrier Output Power, 74.461

Performance Criterion: The maximum authorized ERP is 100 Watts (50 dBm).

Test Environment:

Environmental Conditions During Testing:			Ambient (°C):	19	Humidity (%):	74	Pressure (hPa):	1005
Pretest Verification Performed			Yes		Equipment under Test:		Remote Pickup	
Test Engineer(s):		Nicholas Abbondante			EUT Serial Number:		224W9	
Engineer's Initials:	NNA	Date Test Performed:	07/24/2008		Reviewer's Initials:	MFM	Date Reviewed:	07/30/2008

Test Equipment Used:

TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Digital 4 Line Barometer	Mannix	0ABA116	BAR1	06/01/2009
2	METER, POWER	Boonton	4232A	55601	08/27/2008
3	Sensor, Power	Boonton	51011-4B	31990	08/27/2008
4	Attenuator, 30dB	Weinschel Corp	47-30-34	BD4327	09/13/2008

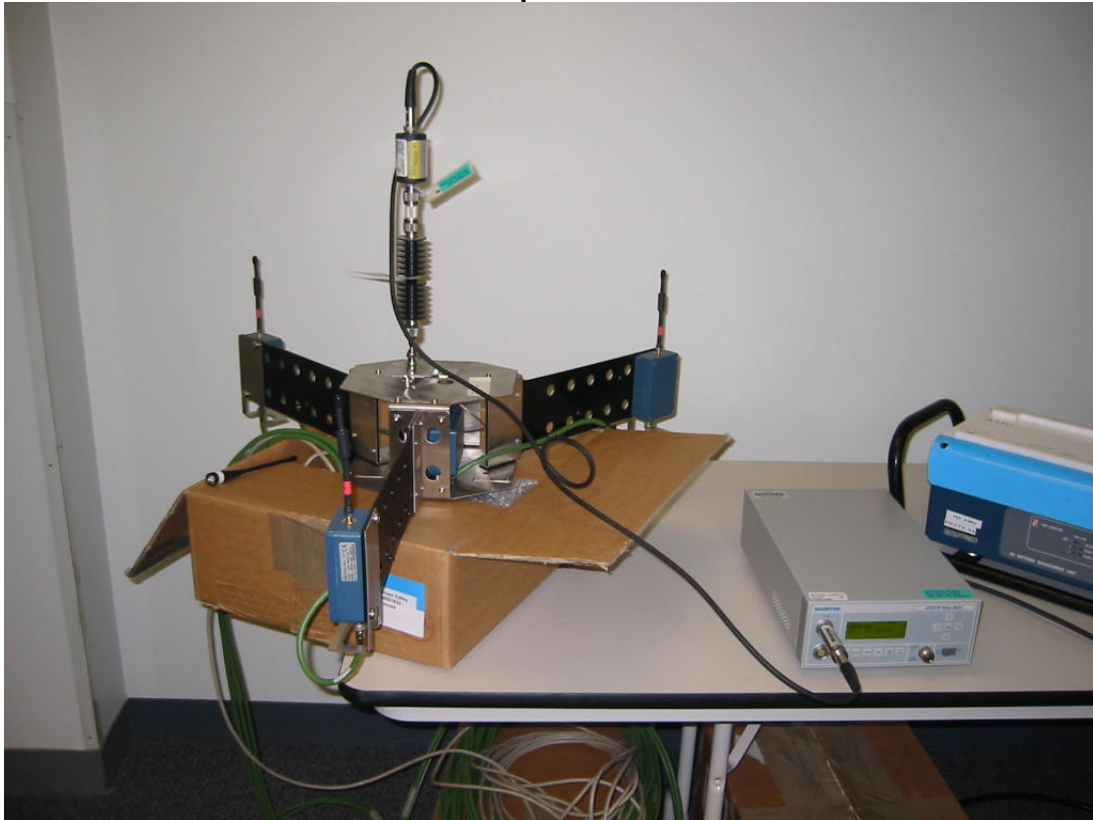
Test Details:

Test Point	Measured Power, (dBm)	Attenuator Loss, (dB)	Net Conducted Power, (dBm)	Antenna Gain, (dBi)	Net ERP (dBm)	ERP Limit (dBm)
BNC Port	-5.13	30.0	24.87	2.0	26.87	50.0

Notes: Antenna gain is 2.0 dBi. The 455.9 MHz channel was measured.

Antenna Name:	Manufacturer:	Model:	Type:	Gain:
Rugged Duck	Cushcraft	BN450RB	Dipole (BNC)	2.0

Setup Photos



Test Results: Pass

Test Standard: CFR47 FCC Part 74 Subpart D

Test: Occupied Bandwidth, 74.462(b), 74.463(c)

Performance Criterion: The maximum authorized bandwidth is 50-100 kHz.

Test Environment:

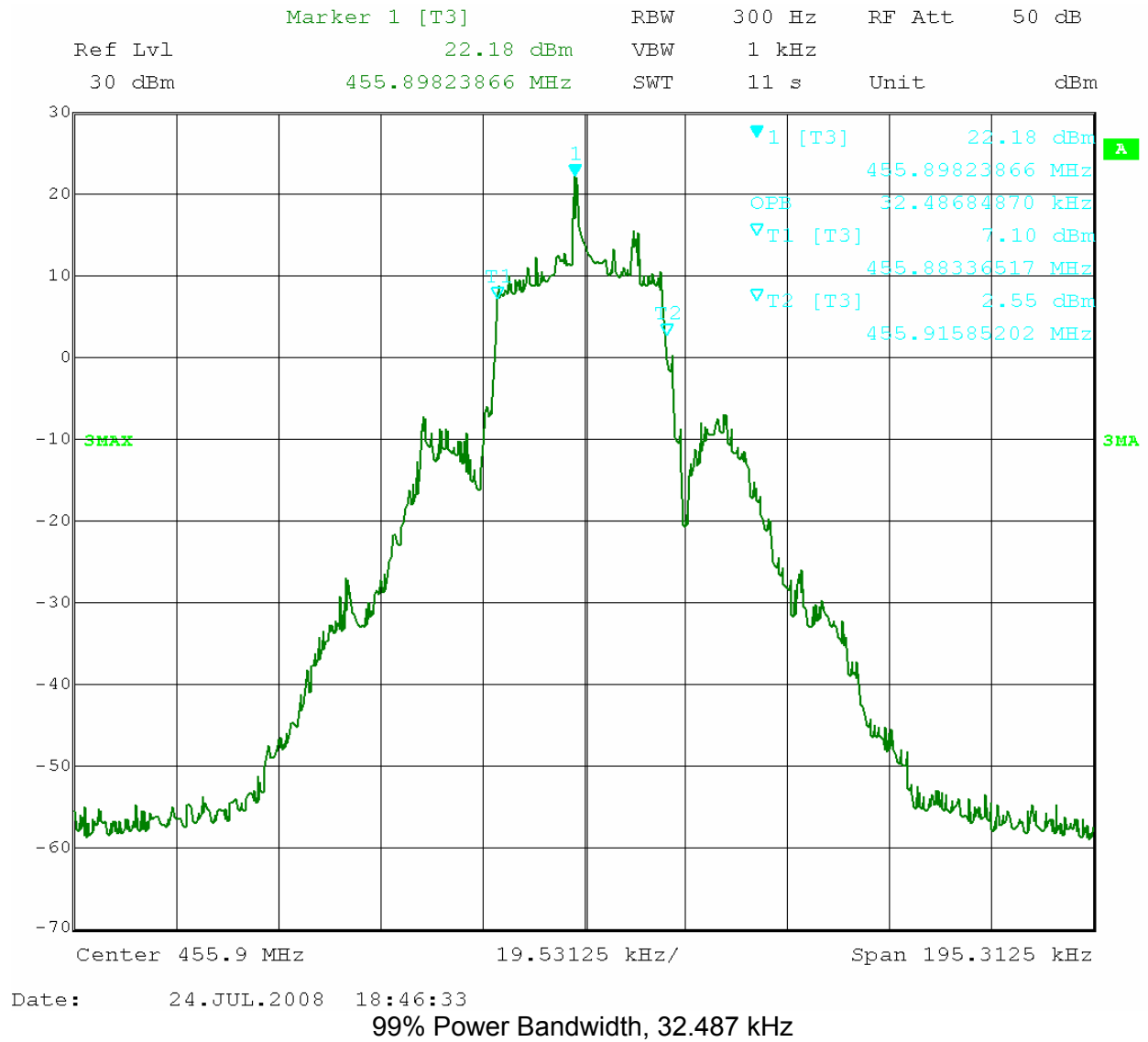
Environmental Conditions During Testing:			Ambient (°C):	19	Humidity (%):	74	Pressure (hPa):	1005
Pretest Verification Performed			Yes		Equipment under Test:		Remote Pickup	
Test Engineer(s):		Nicholas Abbondante			EUT Serial Number:		224W9	
Engineer's Initials:	NNA	Date Test Performed:	07/24/2008	Reviewer's Initials:	MFM	Date Reviewed:	07/30/2008	

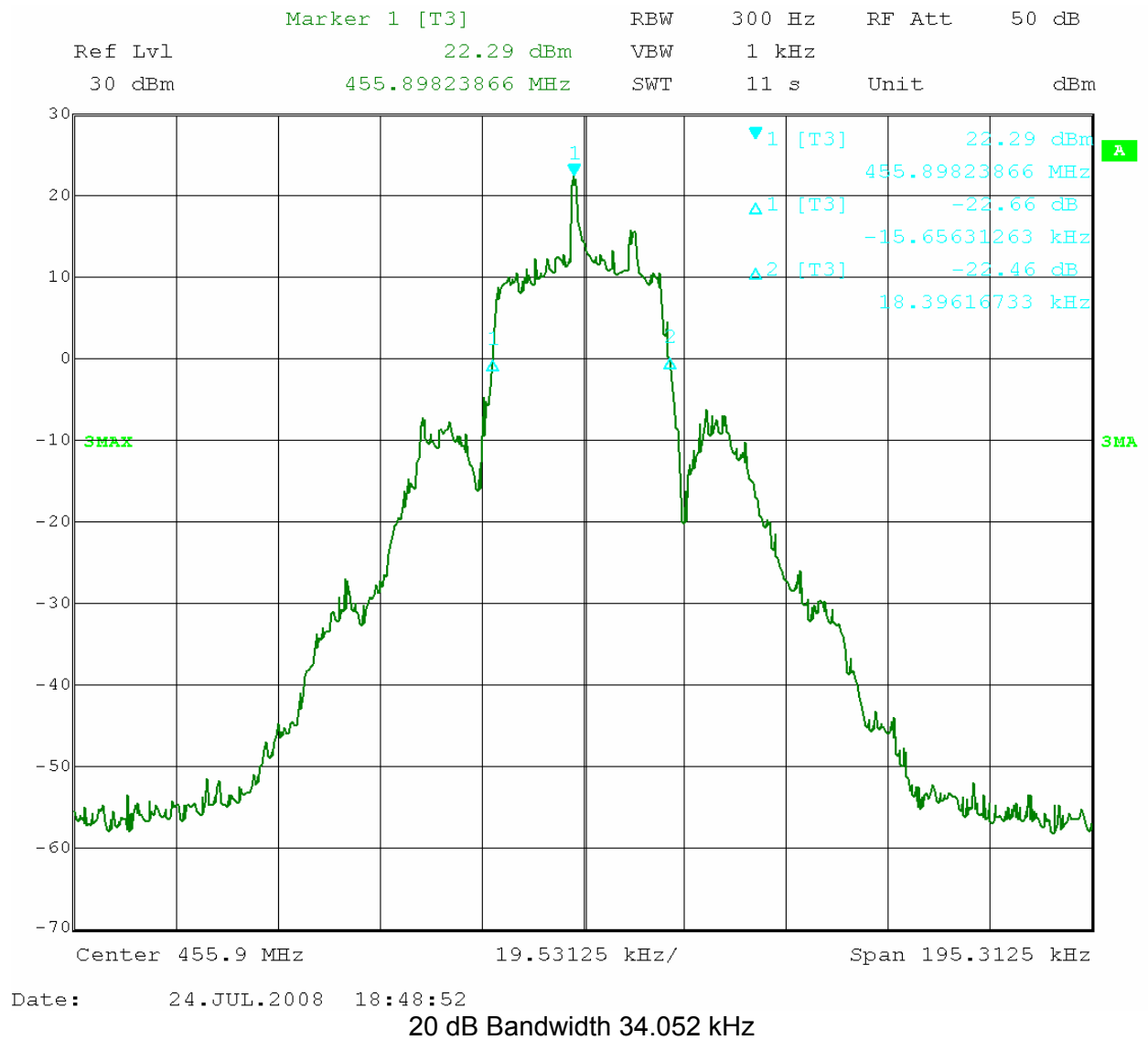
Test Equipment Used:

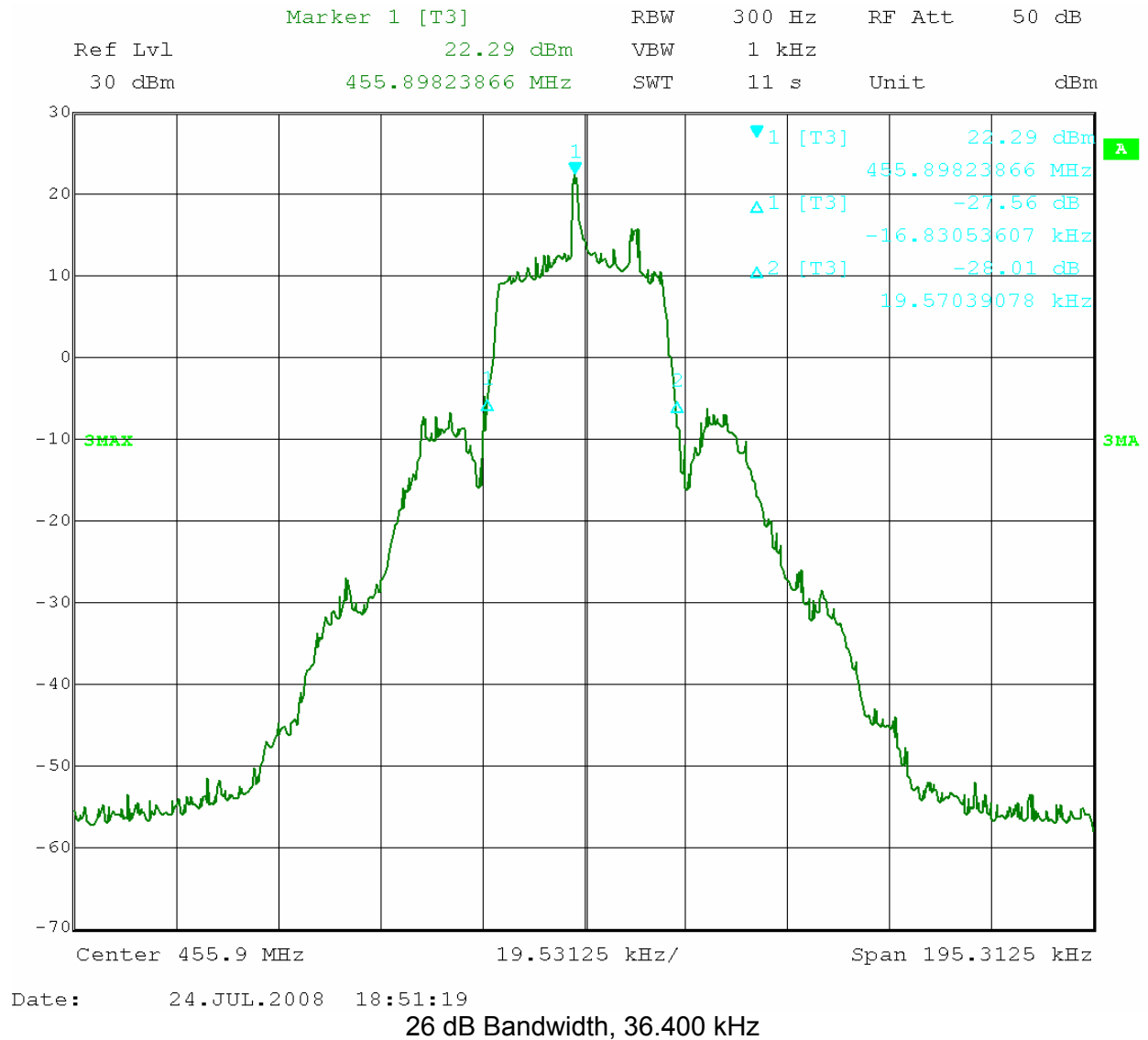
TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Digital 4 Line Barometer	Mannix	0ABA116	BAR1	06/01/2009
2	40GHz Cable	Megaphase	TM40-K1K1-197	7030801 001	06/05/2009
3	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	11/26/2008

Test Details:

Notes: The 99% power bandwidth is 32.487 kHz.







Test Results: Pass

Test Standard: CFR47 FCC Part 74 Subpart D

Test: Emissions Mask, 74.462(c)(1-3)


Performance Criterion: For emissions on frequencies above 25 MHz with authorized bandwidths up to 30 kHz, the emissions shall comply with the emission mask and transient frequency behavior requirements of §§90.210 and 90.214 of this chapter. For all other emissions, the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

(1) On any frequency removed from the assignment frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB:

(2) On any frequency removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB;

(3) On any frequency removed from the assigned frequency by more than 250 percent on the authorized bandwidth; at least 43 plus $10 \log_{10}$ (mean output power, in watts) dB.

Test Environment:

Environmental Conditions During Testing:		Ambient (°C):		19	Humidity (%):		74	Pressure (hPa):		1005
Pretest Verification Performed		Yes			Equipment under Test:			Remote Pickup		
Test Engineer(s):	Nicholas Abbondante				EUT Serial Number:			224W9		
Engineer's Initials:	NNA	Date Test Performed:		07/24/2008	Reviewer's Initials:			Date Reviewed:	07/30/2008	

Test Equipment Used:

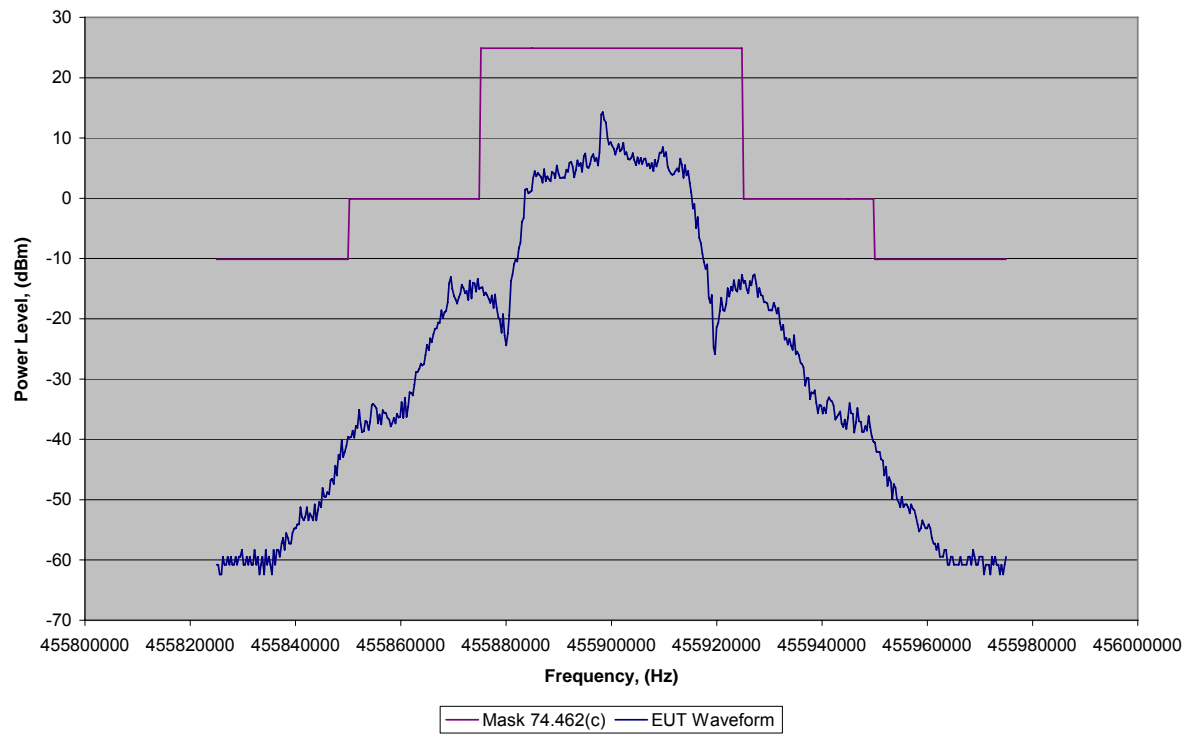
TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Digital 4 Line Barometer	Mannix	0ABA116	BAR1	06/01/2009
2	40GHz Cable	Megaphase	TM40-K1K1-197	7030801 001	06/05/2009
3	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	11/26/2008

Software Utilized:

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	3/07/07 Revision

Test Details:

74.462(c) Emissions Mask, 50 kHz Authorized Bandwidth, RMS Detector




Test Results: Pass

Test Standard: CFR47 FCC Part 74 Subpart D

Test: Conducted Spurious Emissions, 74.462(c)

Performance Criterion: All spurious emissions must not exceed -13 dBm, using a 100 kHz bandwidth below 1 GHz and a 1 MHz resolution bandwidth above 1 GHz.

Test Environment:

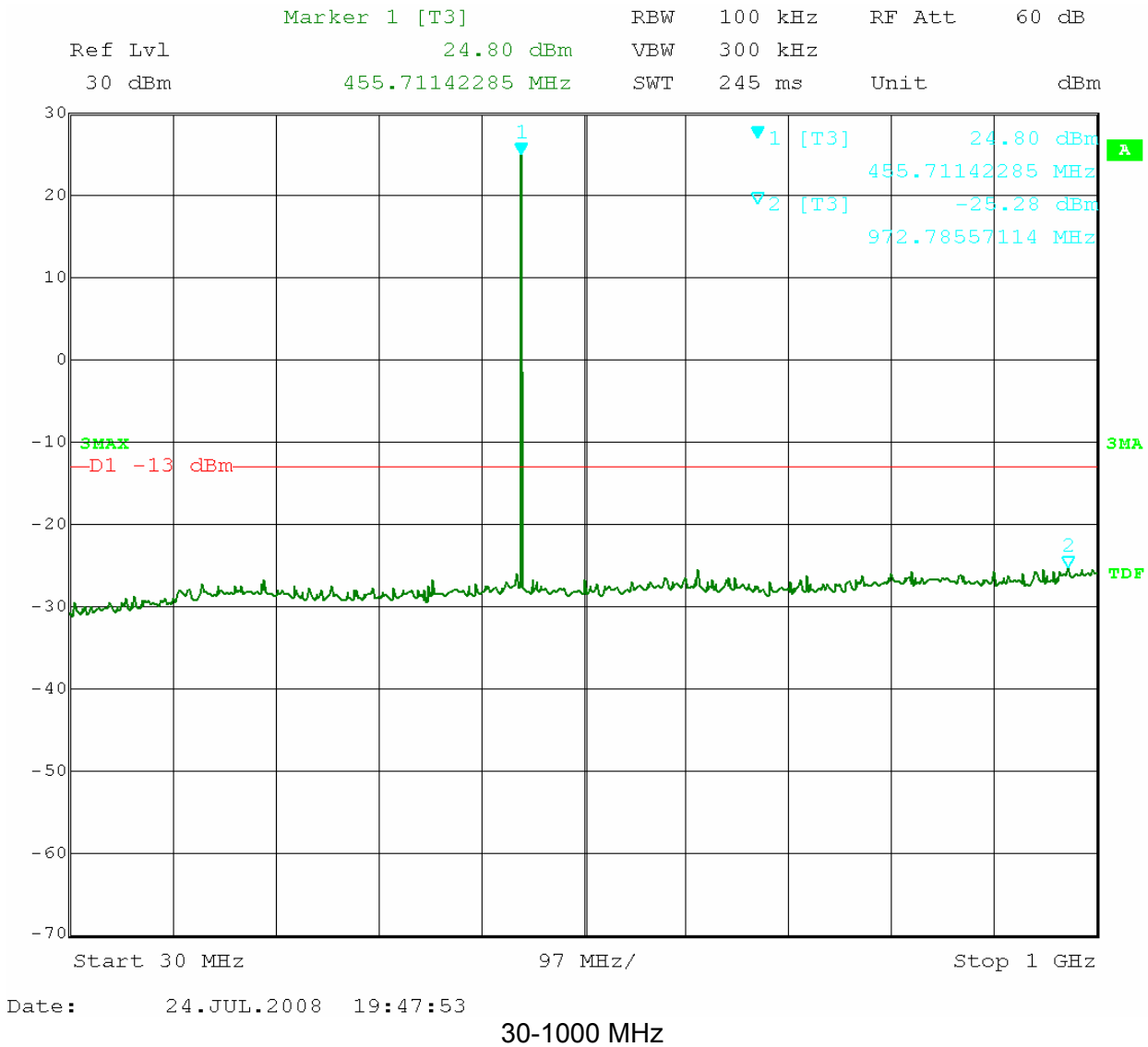
Environmental Conditions During Testing:		Ambient (°C):	19	Humidity (%):	74	Pressure (hPa):	1005
Pretest Verification Performed		Yes		Equipment under Test:		Remote Pickup	
Test Engineer(s):	Nicholas Abbondante			EUT Serial Number:		224W9	
Engineer's Initials:	NNA	Date Test Performed:	07/24/2008	Reviewer's Initials:		Date Reviewed:	07/30/2008

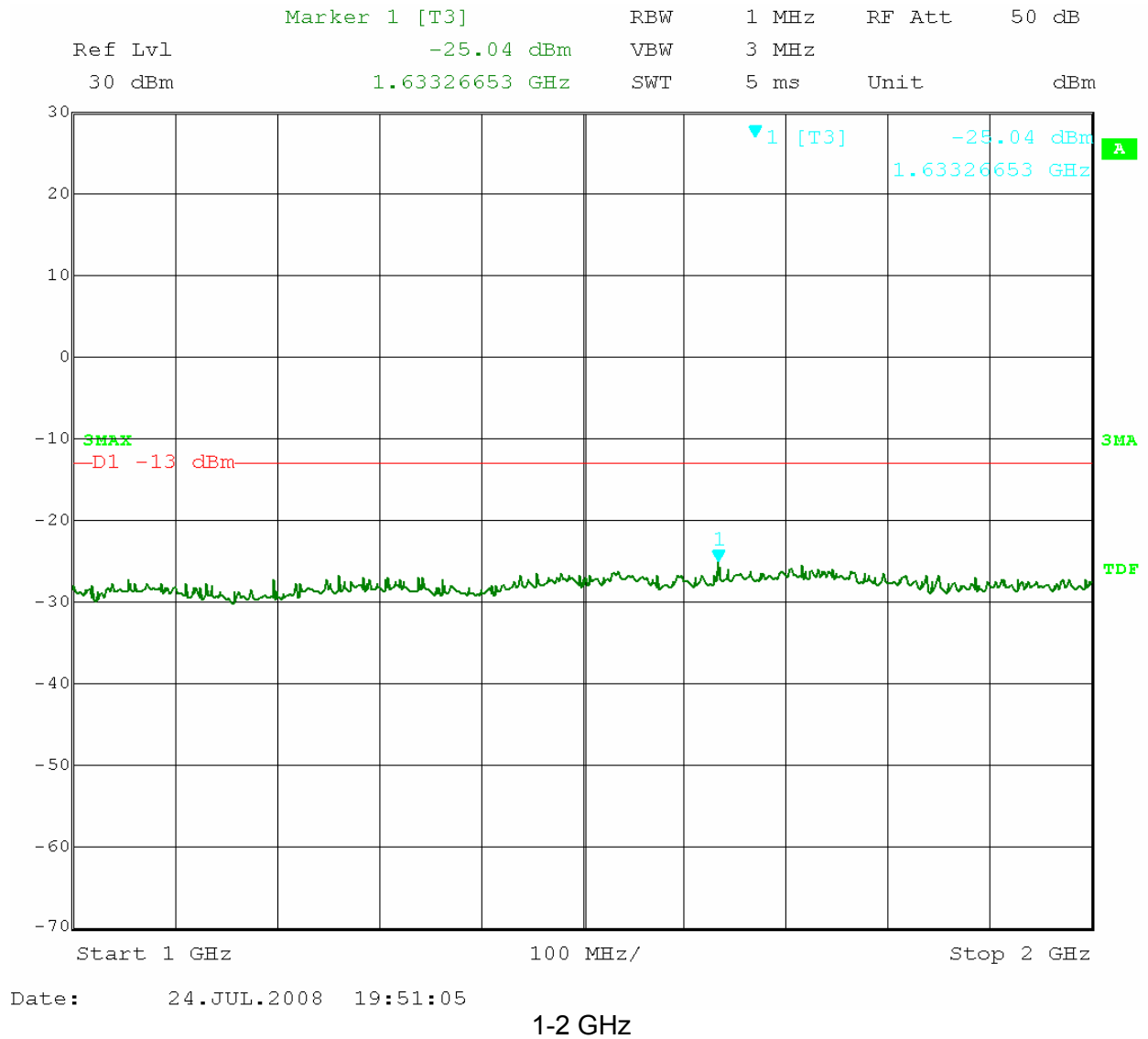
Test Equipment Used:

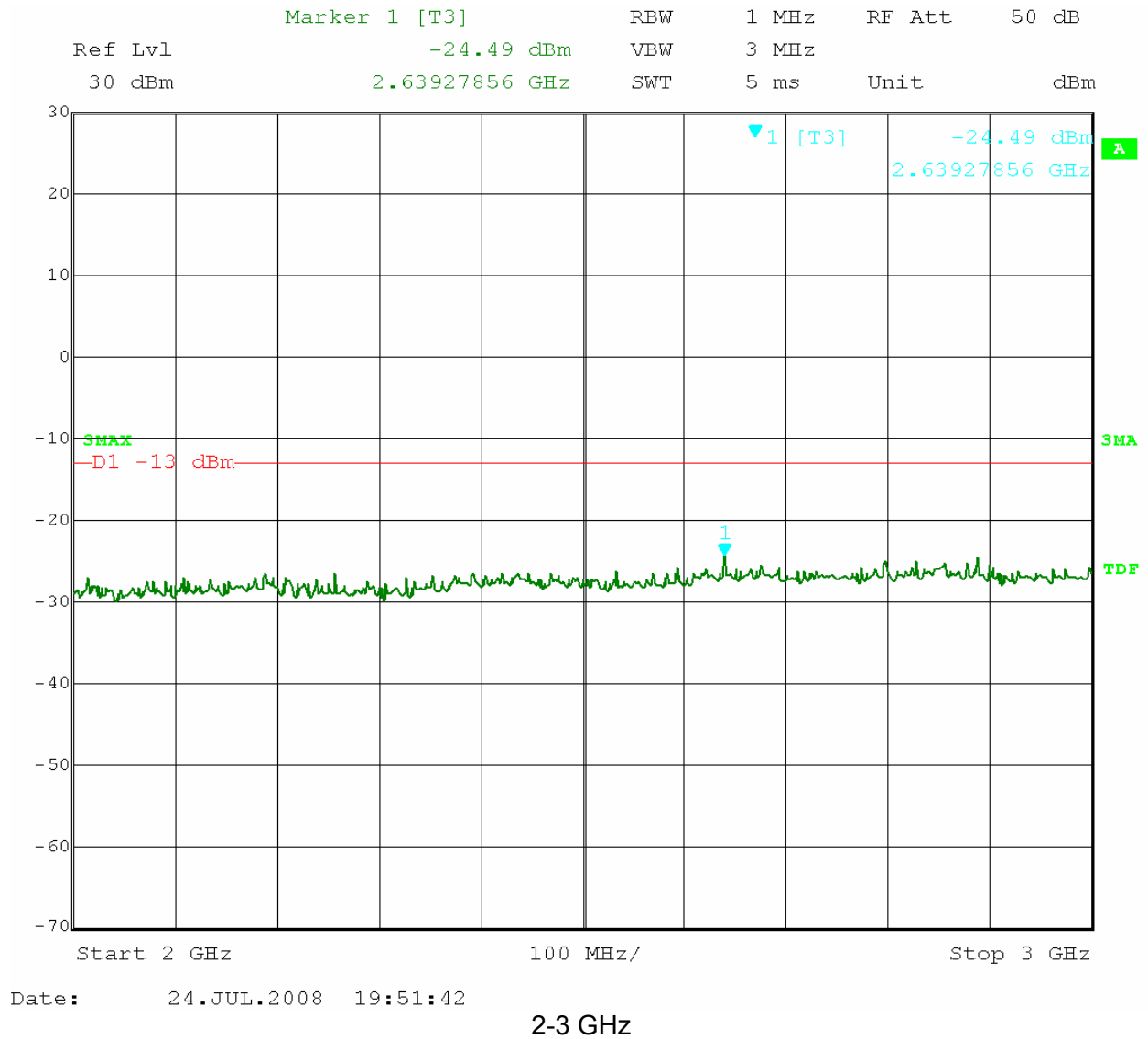
TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Digital 4 Line Barometer	Mannix	0ABA116	BAR1	06/01/2009
2	40GHz Cable	Megaphase	TM40-K1K1-197	7030801 001	06/05/2009
3	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	11/26/2008

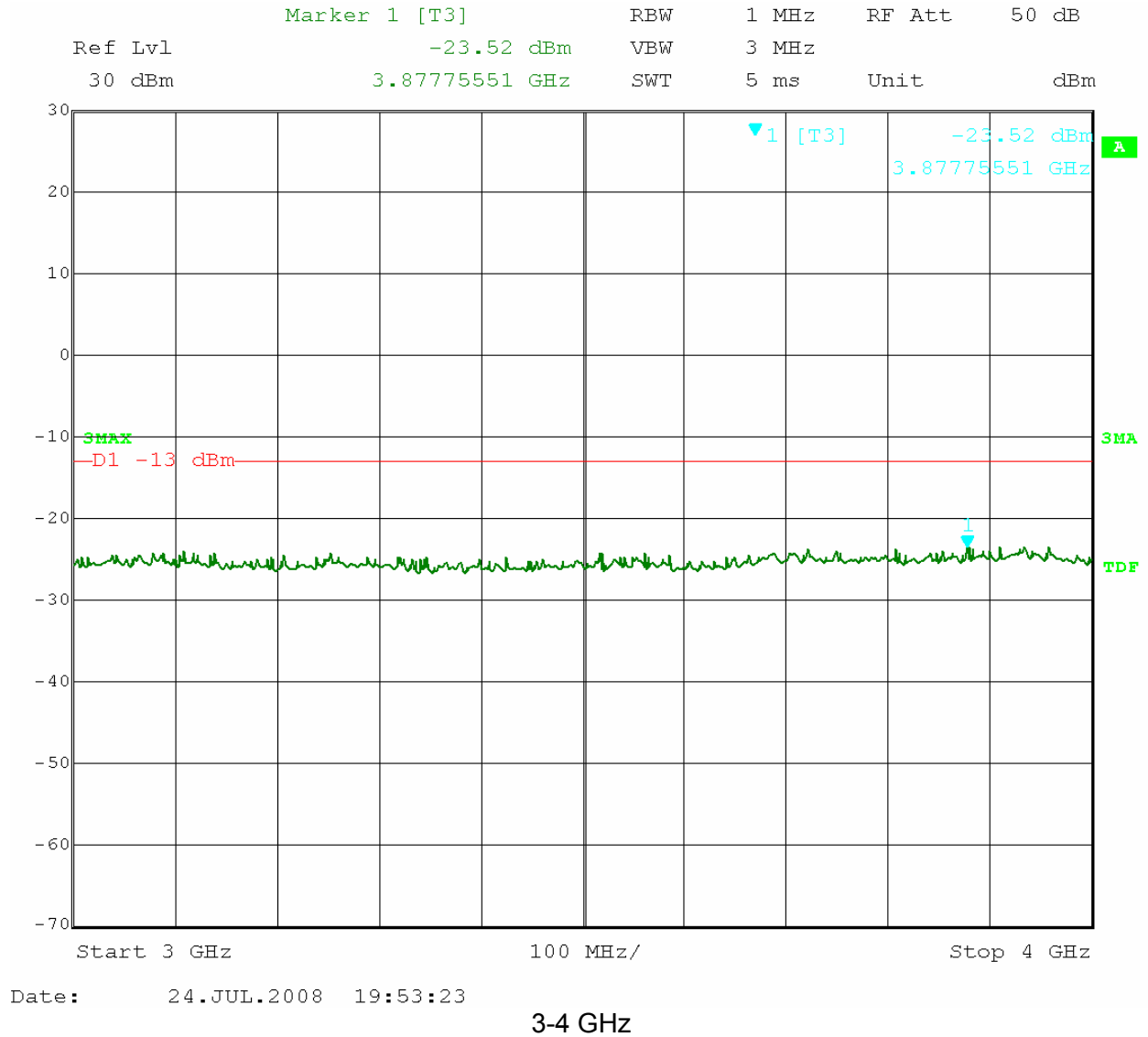
Test Details:

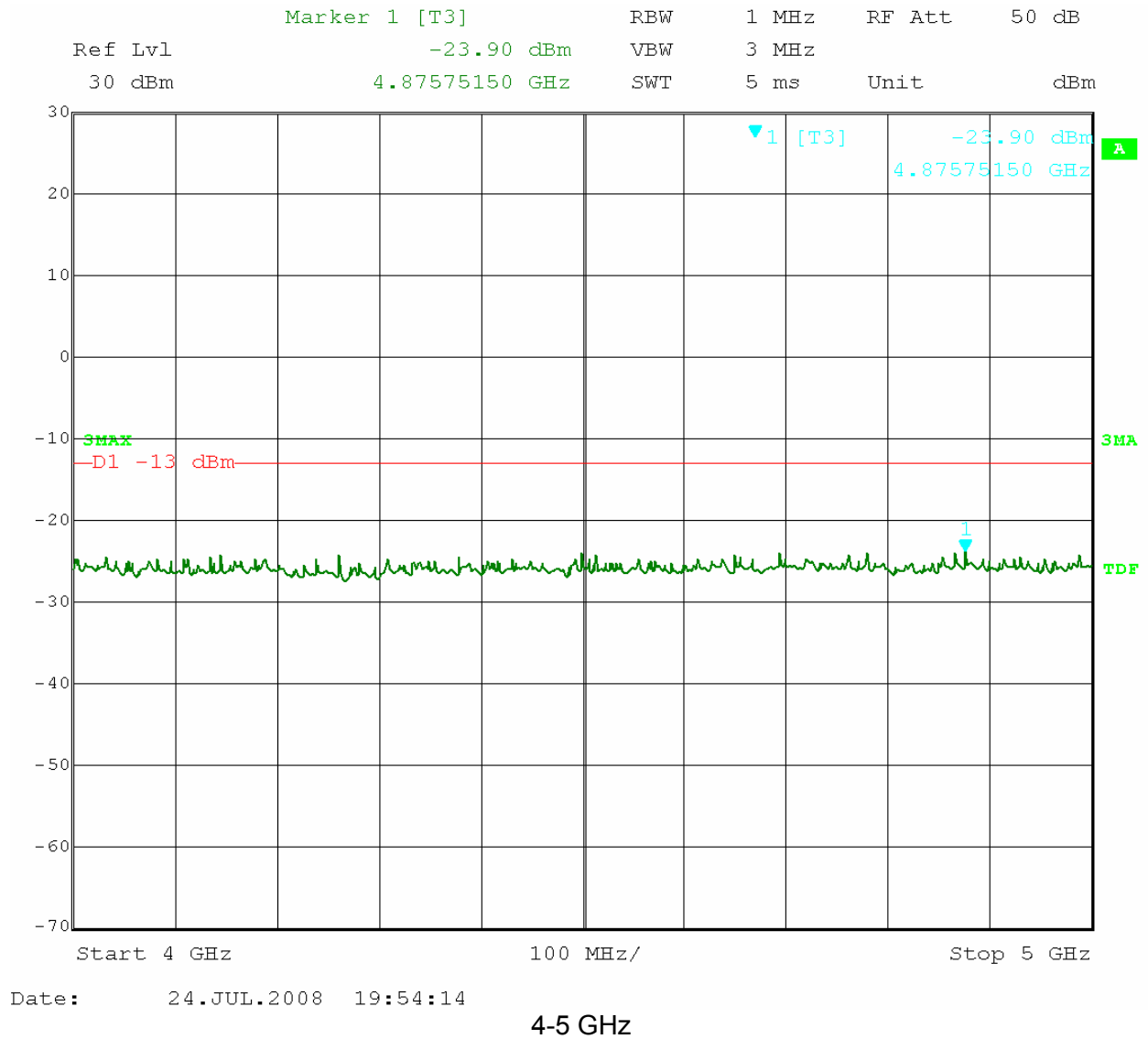
Notes: Cable loss was compensated for in the spectrum analyzer.












Test Results: Pass

Test Standard: CFR47 FCC Part 74 Subpart D

Test: Radiated Emissions, FCC 74.462(c)

Performance Criterion: All spurious emissions must not exceed -13 dBm, using a 100 kHz bandwidth below 1 GHz and a 1 MHz resolution bandwidth above 1 GHz.

Test Environment:

Environmental Conditions During Testing:			Ambient (°C):	19	Humidity (%):	70	Pressure (hPa):	1012
Pretest Verification Performed			Yes		Equipment under Test:		Remote Pickup	
Test Engineer(s):		Nicholas Abbondante			EUT Serial Number:		224W9	
Engineer's Initials:	NNA	Date Test Performed:	07/25/2008		Reviewer's Initials:		Date Reviewed:	07/30/2008

Test Equipment Used:

TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Digital 4 Line Barometer	Mannix	0ABA116	BAR1	06/01/2009
2	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	11/26/2008
3	40GHz Cable	Megaphase	TM40-K1K1-197	7030801 001	06/05/2009
4	40 GHz Cable	Megaphase	TM40-K1K1-197	7030801 002	06/05/2009
5	3 Meter In floor cable for site 1	ITS	RG214B/U	S1 3M FLR	09/07/2008
6	ANTENNA	EMCO	3142	9711-1224	12/05/2008
7	ANTENNA, RIDGED GUIDE, 1-18 GHZ	EMCO	3115	2784	10/04/2008
8	1GHz High Pass Filter	Reactel, Inc	7HS-1G/10G-S11	06-1	09/18/2008
9	100MHz-40GHz Preamp	MITEQ	NSP4000-NFG	1260417	03/27/2009
10	Synthesized Sweep Generator	Hewlett Packard	83620A	3213A01244	02/06/2009
11	HORN ANTENNA	EMCO	3115	9610-4980	03/03/2009
12	BROADBAND ANTENNA	Compliance Design	B100	1852	09/13/2008
13	BROADBAND ANTENNA	Compliance Design	B200	1850	09/13/2008
14	BROADBAND ANTENNA	Compliance Design	B300	00674	09/13/2008
15	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 197	CBL028	12/06/2008

Software Utilized:

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	3/07/07 Revision

Test Results:

Intertek

Radiated Emissions, Substitution

Company: Grass Valley Rx Antenna: LOG3 EMC02
 Model #: Remote Pickup Rx Cable(s): S1 3M FLR MEG001 MEG002
 Serial #: 224W9 Rx Preamp: PRE9 Receiver: ROS001
 Engineer(s): Nicholas Abbondante Location: Site 1 Tx Antenna: ANT2A ANT2B ANT2C
 Project #: 3157578 Date(s): 07/25/08 Tx Cable(s): CBL028 HORN3
 Standard: FCC Part 74 Subpart D Tx Signal Generator: HEW62 REA003
 Barometer: BAR1 Temp/Humidity/Pressure: 19c 70% 1012mB ERP or EIRP?: ERP
 Test Distance (m): 3 Voltage/Frequency: Fresh battery Frequency Range: 30 MHz - 21.5 GHz
 Net = Generator Level (0.00 dBm) + (EUT reading - Generator reading) - Cable Loss + Antenna Gain (dBi or dBd)
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	EUT Reading dB(uV)	Generator Reading dB(uV)	Transmit Cable Loss dB	Transmit Antenna dBi	Generator Level dBm	Net dBm	Limit dBm	Margin dB	Bandwidth
Note: Remote Pickup											
PK	V	455.900	43.3	77.5	1.2	0.0	0.0	-37.6	-13.0	-24.6	100/300 kHz
PK	V	911.800	19.9	68.0	1.8	0.4	0.0	-51.7	-13.0	-38.7	100/300 kHz
PK	V	432.960	23.7	78.5	1.2	0.3	0.0	-57.9	-13.0	-44.9	100/300 kHz

Intertek

Radiated Emissions, Substitution

Company: Grass Valley
 Model #: Remote Pickup
 Serial #: 224W9
 Engineer(s): Nicholas Abbondante
 Project #: 3157578
 Standard: FCC Part 74 Subpart D
 Barometer: BAR1
 Temp/Humidity/Pressure: 19c 70% 1012mB
 Test Distance (m): 3
 Voltage/Frequency: Fresh battery
 Frequency Range: 30 MHz - 21.5 GHz
 Rx Antenna: LOG3 EMC02
 Rx Cable(s): S1 3M FLR MEG001 MEG002
 Rx Preamp: PRE9 Receiver: ROS001
 Tx Antenna: ANT2A ANT2B ANT2C
 Tx Cable(s): CBL028 HORN3
 Tx Signal Generator: HEW62 REA003
 ERP or EIRP?: EIRP
 Net = Generator Level (0.00 dBm) + (EUT reading - Generator reading) - Cable Loss + Antenna Gain (dBi or dBd)
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS: NF = Noise Floor RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	EUT Reading dB(uV)	Generator Reading dB(uV)	Transmit Cable Loss dB	Transmit Antenna dBi	Generator Level dBm	Net dBm	Limit dBm	Margin dB	Bandwidth
Note: Remote Pickup											
PK	V	1367.700	35.3	100.2	2.3	7.6	0.0	-59.6	-13.0	-46.6	1/3 MHz
PK	H	1823.600	36.6	98.0	2.7	8.5	0.0	-55.6	-13.0	-42.6	1/3 MHz
PK	V	2279.500	35.2	95.8	3.0	9.2	0.0	-54.5	-13.0	-41.5	1/3 MHz
PK	V	2735.400	36.4	94.1	3.4	9.6	0.0	-51.5	-13.0	-38.5	1/3 MHz
PK	V	3191.300	36.4	92.2	3.8	9.7	0.0	-49.8	-13.0	-36.8	1/3 MHz
PK	V	3647.200	45.2	92.2	4.1	9.8	0.0	-41.2	-13.0	-28.2	1/3 MHz
PK	V	4103.100	44.5	92.2	4.4	9.9	0.0	-42.1	-13.0	-29.1	1/3 MHz
PK	V	4559.000	41.7	91.6	4.9	10.7	0.0	-44.0	-13.0	-31.0	1/3 MHz

Radiated Emissions Setup Photos



30-1000 MHz

Radiated Emissions Setup Photos



30-1000 MHz

Radiated Emissions Setup Photos



1-5 GHz

Radiated Emissions Setup Photos



1-5 GHz

Test Results: Pass

Test Standard: CFR47 FCC Part 74 Subpart D

Test: Frequency Tolerance, 74.464

Performance Criterion: The carrier frequency must remain within 0.00025% (2.5 ppm) of the assigned frequency.

Test Environment:

Environmental Conditions During Testing:		Ambient (°C):	N/A	Humidity (%):	N/A	Pressure (hPa):	N/A
Pretest Verification Performed		Yes		Equipment under Test:		Remote Pickup	
Test Engineer(s):	Nicholas Abbondante			EUT Serial Number:		224W9	
Engineer's Initials:	NNA	Date Test Performed:	07/28/08	Reviewer's Initials:	MPH	Date Reviewed:	07/30/2008

Test Equipment Used:

TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Variable Transformer	Staco Energy	3PN1520	none	Verified
2	DMM	Fluke	85III	73760202	12/19/2008
3	Spectrum Analyzer	Hewlett Packard	8593A	3009A00659	05/08/2009
4	40 GHz Cable	Megaphase	TM40-K1K1-80	7030802 002	06/05/2009
5	Temp/Humidity Chamber	Envirotronics	SH27C	08015563S11 263	03/18/2009

Software Utilized:

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	3/07/07 Revision

Test Details:

Intertek

Frequency Stability

Company: Grass Valley
Model #: Remote Pickup
Serial #: 224W9

Engineer(s): Nicholas Abbondante
Project #: 3157578
Standard: FCC Part 74 Subpart D

Date(s): 07/28/08

Location: Littleton

Test Equipment Used:

147299 147237 HP3 MEG004
148012

Limit: 2.5 PPM 0.00025% 0.0113975

Nominal f: 455.9 MHz

Voltage: 120 VAC

%	Voltage Volts	Frequency MHz	Deviation kHz	Limit kHz
-15%	102	455.898800	0	1.14
+0%	120	455.898800	0	1.14
+15%	138	455.898800	0	1.14

Temp Celsius	Frequency MHz	Deviation kHz	Limit kHz
-30	455.899000	0.2	1.14
-20	455.899000	0.2	1.14
-10	455.899000	0.2	1.14
0	455.899300	0.5	1.14
10	455.899000	0.2	1.14
20	455.898800	0	1.14
30	455.898800	0	1.14
40	455.898800	0	1.14
50	455.899000	0.2	1.14

Setup Photos

