

***Electromagnetic Emissions Test Report  
and  
Application for Grant of Equipment Authorization  
pursuant to***

***Industry Canada RSS-Gen Issue 1 / RSS 210 Issue 6  
FCC Part 15 Subpart C***

***on the  
GE MDS LLC  
Transmitter  
Model: MDS FIVE Series Sonet***

UPN: 3738A-58002  
FCC ID: E5MDS-5800-2

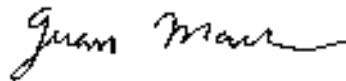
GRANTEE: GE MDS LLC  
175 Science Parkway  
Rochester, NY 14620

TEST SITE: Elliott Laboratories, Inc.  
684 W. Maude Ave  
Sunnyvale, CA 94086

REPORT DATE: February 14, 2007

FINAL TEST DATE: January 24 and January 26, 2007

AUTHORIZED SIGNATORY: \_\_\_\_\_



Juan Martinez  
Senior EMC Engineer



2016-01

Elliott Laboratories, Inc. is accredited by the A2LA, certificate number 2016-01, to perform the test(s) listed in this report. This report shall not be reproduced, except in its entirety, without the written approval of Elliott Laboratories, Inc.

**REVISION HISTORY**

Revision #	Date	Comments	Modified By
1	February 15, 2007	Initial Release	David Guidotti

**TABLE OF CONTENTS**

<b>COVER PAGE</b> .....	<b>1</b>
<b>REVISION HISTORY</b> .....	<b>2</b>
<b>TABLE OF CONTENTS</b> .....	<b>3</b>
<b>SCOPE</b> .....	<b>5</b>
<b>OBJECTIVE</b> .....	<b>6</b>
<b>STATEMENT OF COMPLIANCE</b> .....	<b>7</b>
<b>TEST RESULTS SUMMARY</b> .....	<b>8</b>
DIGITAL TRANSMISSION SYSTEMS (5725 –5850 MHZ).....	8
GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS.....	9
<b>MEASUREMENT UNCERTAINTIES</b> .....	<b>10</b>
<b>EQUIPMENT UNDER TEST (EUT) DETAILS</b> .....	<b>11</b>
GENERAL.....	11
ANTENNA SYSTEM .....	11
ENCLOSURE.....	11
MODIFICATIONS.....	11
SUPPORT EQUIPMENT.....	11
EUT INTERFACE PORTS.....	12
EUT OPERATION.....	12
<b>TEST SITE</b> .....	<b>13</b>
GENERAL INFORMATION.....	13
CONDUCTED EMISSIONS CONSIDERATIONS.....	13
RADIATED EMISSIONS CONSIDERATIONS.....	13
<b>MEASUREMENT INSTRUMENTATION</b> .....	<b>14</b>
RECEIVER SYSTEM.....	14
INSTRUMENT CONTROL COMPUTER.....	14
LINE IMPEDANCE STABILIZATION NETWORK (LISN).....	14
FILTERS/ATTENUATORS.....	15
ANTENNAS.....	15
ANTENNA MAST AND EQUIPMENT TURNTABLE.....	15
INSTRUMENT CALIBRATION.....	15
<b>TEST PROCEDURES</b> .....	<b>16</b>
EUT AND CABLE PLACEMENT.....	16
CONDUCTED EMISSIONS.....	16
RADIATED EMISSIONS.....	16
RADIATED EMISSIONS.....	17
BANDWIDTH MEASUREMENTS.....	19
SPECIFICATION LIMITS AND SAMPLE CALCULATIONS.....	19
GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS.....	20
RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS.....	20
OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS.....	20
TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS AND DTS SYSTEMS.....	21
SAMPLE CALCULATIONS - CONDUCTED EMISSIONS.....	22
SAMPLE CALCULATIONS - RADIATED EMISSIONS.....	22
SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION.....	23

---

**TABLE OF CONTENTS (Continued)**

*EXHIBIT 1: Test Equipment Calibration Data..... 1*  
*EXHIBIT 2: Test Measurement Data..... 2*  
*EXHIBIT 3: Photographs of Test Configurations..... 3*  
*EXHIBIT 4: Proposed FCC ID Label & Label Location ..... 4*  
*EXHIBIT 5: Detailed Photographs..... 5*  
*EXHIBIT 6: Operator's Manual..... 6*  
*EXHIBIT 7: Block Diagram..... 7*  
*EXHIBIT 8: Schematic Diagrams..... 8*  
*EXHIBIT 9: Theory of Operation..... 9*  
*EXHIBIT 10: RF Exposure Information ..... 10*

---

## SCOPE

An electromagnetic emissions test has been performed on the GE MDS LLC model MDS FIVE Series Sonet pursuant to the following rules:

Industry Canada RSS-Gen Issue 1  
RSS 210 Issue 6 “Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment”  
FCC Part 15 Subpart C

Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in the following reference standards and as outlined in Elliott Laboratories test procedures:

ANSI C63.4:2003  
RSS-212 Issue 1 Test Facilities and Test Methods for Radio Equipment

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant Industry Canada performance and procedural standards.

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

The test results recorded herein are based on a single type test of the GE MDS LLC model MDS FIVE Series Sonet and therefore apply only to the tested sample. The sample was selected and prepared by Dennis McCarthy of GE MDS LLC

## **OBJECTIVE**

The primary objective of the manufacturer is compliance with the regulations outlined in the previous section.

Prior to marketing in the USA, all unlicensed transmitters and transceivers require certification. Receive-only devices operating between 30 MHz and 960 MHz are subject to either certification or a manufacturer's declaration of conformity, with all other receive-only devices exempt from the technical requirements.

Prior to marketing in Canada, Class I transmitters, receivers and transceivers require certification. Class II devices are required to meet the appropriate technical requirements but are exempt from certification requirements.

Certification is a procedure where the manufacturer submits test data and technical information to a certification body and receives a certificate or grant of equipment authorization upon successful completion of the certification body's review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units, which are subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

## **STATEMENT OF COMPLIANCE**

The tested sample of GE MDS LLC model MDS FIVE Series Sonet complied with the requirements of the following regulations:

Industry Canada RSS-Gen Issue 1  
RSS 210 Issue 6 “Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment”  
FCC Part 15 Subpart C

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

**TEST RESULTS SUMMARY****DIGITAL TRANSMISSION SYSTEMS (5725 –5850 MHz)**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	Systems uses OFDM techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	42.5MHz	>500kHz	Complies
	RSP100	99% Bandwidth	44.5MHz	Information only	Complies
15.247 (b) (3) 15.247 (b) (4) (ii)	RSS 210 A8.2 (4)	Output Power (point-point systems)	23 dBm (.199 Watts) EIRP = 1862 W <sup>Note 1</sup>	1Watt, unlimited EIRP.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	-17.9 dBm dBm / kHz	Maximum permitted is 8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions – 30MHz – 40 GHz	All spurious emissions < -20dBc	< -30dBc <sup>Note 2</sup>	Complies
15.247(c) / 15.209	RSS 210 A8.5 Table 2, 3	Radiated Spurious Emissions 30MHz – 40 GHz	45.9dBμV/m (197.2μV/m) @ 17524.8MHz (-8.1dB)	15.207 in restricted bands, all others <-30dBc <sup>Note 2</sup>	Complies

Note 1: EIRP calculated using antenna gain of 39.7 dBi for the highest EIRP point-to-point system.

Note 2: Limit of -30dBc used because the power was measured using the UNII test procedure (maximum power averaged over a transmission burst).



**GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS**

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	Standard N-Type connector. Device will be professionally installed		Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	41.5dB $\mu$ V/m (118.9 $\mu$ V/m) @ 16801.3MHz		Complies (-12.6 dB)
15.207	RSS GEN Table 2	AC Conducted Emissions	This is a class II change	Refer to standard	Complies
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11, RSS 102 declaration and User Manual statements.	Refer to OET 65, FCC Part 1 and RSS 102	Complies
	RSP 100 RSS GEN 7.1.5	User Manual	This is a class II change	Statement required regarding non-interference	
	RSP 100 RSS GEN 7.1.5	User Manual	This is a class II change	Statement required regarding detachable antenna	

---

**MEASUREMENT UNCERTAINTIES**

ISO Guide 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level and were calculated in accordance with UKAS document LAB 34.

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	$\pm 2.4$
Radiated Emissions	0.015 to 30	$\pm 3.0$
Radiated Emissions	30 to 1000	$\pm 3.6$
Radiated Emissions	1000 to 40000	$\pm 6.0$

**EQUIPMENT UNDER TEST (EUT) DETAILS****GENERAL**

The GE MDS LLC model MDS FIVE Series Sonet is a Point to point fixed outdoor radio which is designed to provide wireless internet and network environments. Normally, the EUT would be fix mounted on permanent outdoor structures. The EUT was, therefore, treated as table-top equipment during testing. The electrical rating of the EUT is -48VDC, 2 Amps.

The sample was received on January 24, 2007 and tested on January 24 and January 26, 2007. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number
Microwave Data Systems	ODU5300MEDML	ODU	1367022
Microwave Data Systems	ODU5300MIDML	ODU	1367621
Microwave Data Systems	ODU5800MEDML	ODU	1367936
Microwave Data Systems	UDO5300 MIDML	ODU	1367934
Microwave Data Systems	SDIDUPHDID	IDU	42050001

**ANTENNA SYSTEM**

The EUT external antenna is a 39.7dBi directional antenna.

**ENCLOSURE**

The IDU EUT enclosure is primarily constructed of fabricated sheet steel. It measures approximately 24 cm wide by 44 cm deep by 4 cm high.

The ODU EUT enclosure is primarily constructed of cast aluminum. It measures approximately 37 cm wide by 7 cm deep by 39 cm high.

**MODIFICATIONS**

The EUT did not require modifications during testing in order to comply with emissions specifications.

**SUPPORT EQUIPMENT**

The following equipment was used as local support equipment for emissions testing:

Manufacturer	Model	Description	Serial Number	FCC ID
Kepeco	-	48VDC supply	-	-

No remote support equipment was used during emissions testing.

**EUT INTERFACE PORTS**

The I/O cabling configuration during emissions testing was as follows:

**IDU**

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
User 10/100 1	Terminated	CAT 5	Shielded	5
User 10/100 2	Terminated	CAT 5	Shielded	5
VOW	Terminated	CAT 5	Shielded	5
AUX	Terminated	CAT 5	Shielded	5
E1/T1 1	Terminated	CAT 5	Shielded	5
E1/T1 2	Terminated	CAT 5	Shielded	5
E1/T1 3-16	Terminated	Multiwire	Shielded	
ODU	IF port on ODU	Coax	Shielded	2
-48V in	DC supply	2 wire	Unshielded	2

**ODU**

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
IF Out	ODU port on IDU	Coax	Shielded	2
BNC	Terminated	-	-	-
Antenna	Terminated	-	-	-

Note: The Serial/Alarm and the two 10/100 ports were not connected as the manufacturer stated that these are for configuration purpose and therefore would not normally be connected.

**EUT OPERATION**

During digital emissions testing the EUT was in receive mode

## **TEST SITE**

### **GENERAL INFORMATION**

Final test measurements were taken on January 24 and January 26, 2007 at the Elliott Laboratories Open Area Test Site #2 located at 684 West Maude Avenue, Sunnyvale, California or 41039 Boyce Road, Fremont, California Pursuant to section 2.948 of the FCC's Rules and section 3.3 of RSP-100, construction, calibration, and equipment data has been filed with the Commission.

ANSI C63.4:2003 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement with the exception of predictable local TV, radio, and mobile communications traffic. The test site contains separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4:2003 and RSS 212.

### **CONDUCTED EMISSIONS CONSIDERATIONS**

Conducted emissions testing is performed in conformance with ANSI C63.4:2003 and RSS 212. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

### **RADIATED EMISSIONS CONSIDERATIONS**

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment or in a semi-anechoic chamber. The test sites are maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4:2003 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4:2003 / RSS 212.

---

## MEASUREMENT INSTRUMENTATION

### RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements. If the repetition frequency of the signal being measured is below 20Hz, peak measurements are made in lieu of Quasi-Peak measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz, unless the signal is pulsed in which case the average (or video) bandwidth of the measuring instrument is reduced to onset of pulse desensitization and then increased.

### INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde & Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer run automated data collection programs which control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

### LINE IMPEDANCE STABILIZATION NETWORK (LISN)

Line conducted measurements utilize a fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.

---

### **FILTERS/ATTENUATORS**

External filters and precision attenuators are often connected between the receiving antenna or LISN and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

### **ANTENNAS**

A loop antenna is used below 30 MHz. For the measurement range 30 MHz to 1000 MHz either a combination of a biconical antenna and a log periodic or a bi-log antenna is used. Above 1000 MHz, horn antennas are used. The antenna calibration factors to convert the received voltage to an electric field strength are included with appropriate cable loss and amplifier gain factors to determine an overall site factor, which is then programmed into the test receivers or incorporated into the test software.

### **ANTENNA MAST AND EQUIPMENT TURNTABLE**

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height. Measurements below 30 MHz are made with the loop antenna at a fixed height of 1m above the ground plane.

ANSI C63.4:2003 and RSS 212 specify that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

### **INSTRUMENT CALIBRATION**

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

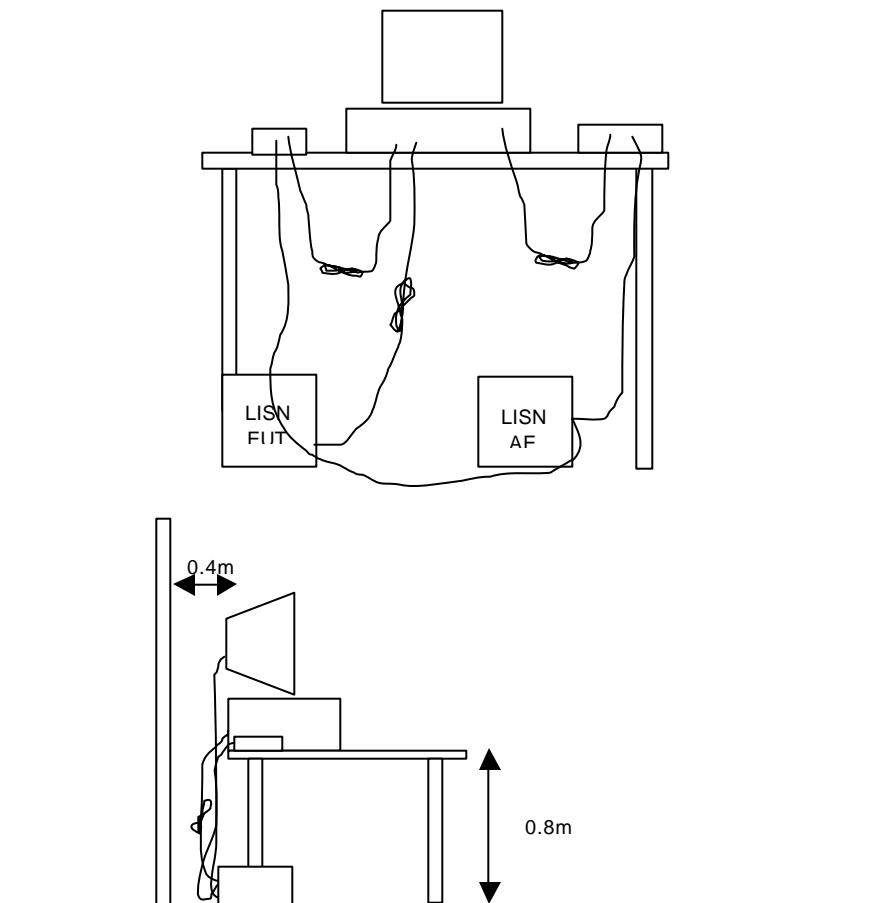
## TEST PROCEDURES

### EUT AND CABLE PLACEMENT

The regulations require that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.4:2003, and the worst-case orientation is used for final measurements.

### CONDUCTED EMISSIONS

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord.



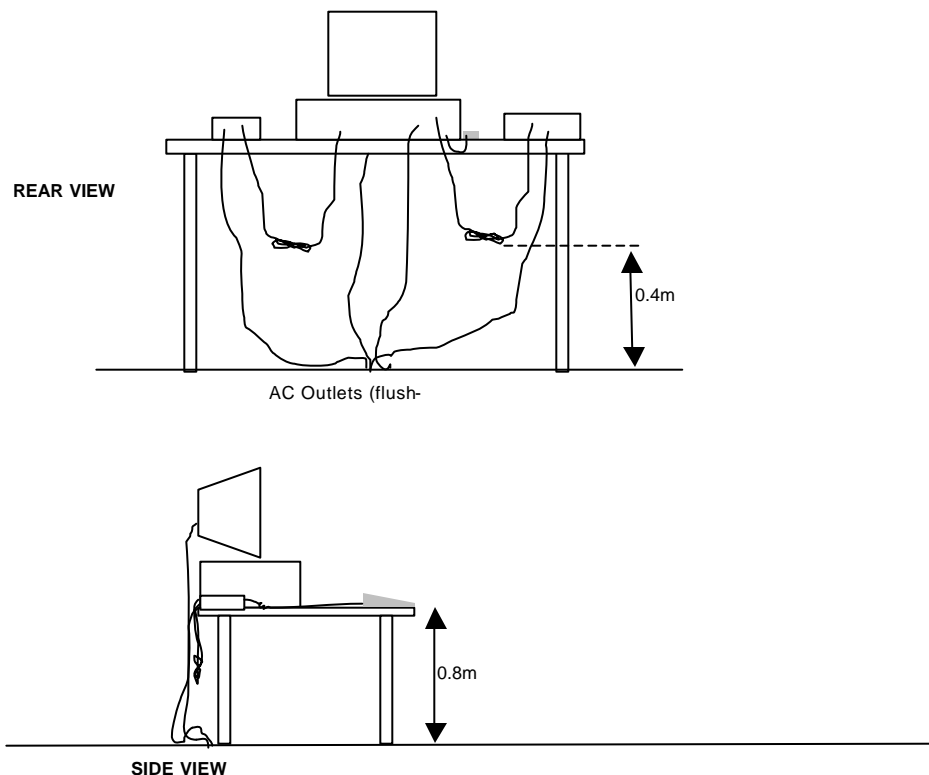


**RADIATED EMISSIONS**

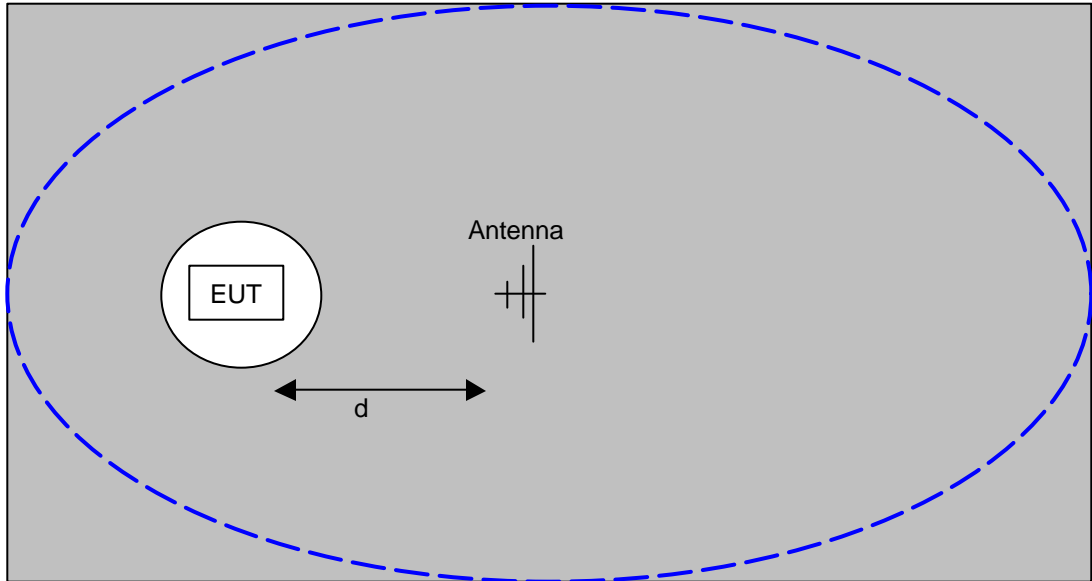
A preliminary scan of the radiated emissions is performed in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed, one scan for each antenna polarization (horizontal and vertical; loop parallel and perpendicular to the EUT). During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied (for measurements above 30 MHz) and cable positions are varied to determine the highest emission relative to the limit. Preliminary scans may be performed in a fully anechoic chamber for the purposes of identifying the frequencies of the highest emissions from the EUT.

A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

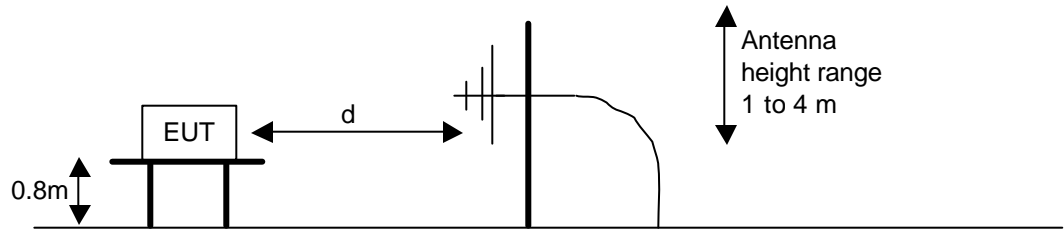
Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth, which results in the highest emission is then maintained while varying the antenna height from one to four meters (for measurements above 30 MHz, measurements below 30 MHz are made with the loop antenna at a fixed height of 1m). The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain.



Typical Test Configuration for Radiated Field Strength Measurements



The ground plane extends beyond the ellipse defined in CISPR 16 / CISPR 22 / ANSI C63.4 and is large enough to accommodate test distances (d) of 3m and 10m. Refer to the test data tables for the actual measurement distance.



Test Configuration for Radiated Field Strength Measurements  
OATS- Plan and Side Views

#### **BANDWIDTH MEASUREMENTS**

The 6dB, 20dB and/or 26dB signal bandwidth is measured in using the bandwidths recommended by ANSI C63.4. When required, the 99% bandwidth is measured using the methods detailed in RSS GEN.

#### **SPECIFICATION LIMITS AND SAMPLE CALCULATIONS**

The limits for conducted emissions are given in units of microvolts, and the limits for radiated emissions are given in units of microvolts per meter at a specified test distance. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBuV/m). The results are then converted to the linear forms of uV and uV/m for comparison to published specifications.

For reference, converting the specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. These limits in both linear and logarithmic form are as follows:

**GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS**

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands<sup>1</sup> (with the exception of transmitters operating under FCC Part 15 Subpart D and RSS 210 Annex 9), the limits for all emissions from a low power device operating under the general rules of RSS 310 (tables 3 and 4), RSS 210 (table 2) and FCC Part 15 Subpart C section 15.209.

Frequency Range (MHz)	Limit (uV/m)	Limit (dBuV/m @ 3m)
0.009-0.490	$2400/F_{\text{KHz}} @ 300\text{m}$	$67.6-20*\log_{10}(F_{\text{KHz}}) @ 300\text{m}$
0.490-1.705	$24000/F_{\text{KHz}} @ 30\text{m}$	$87.6-20*\log_{10}(F_{\text{KHz}}) @ 30\text{m}$
1.705 to 30	30 @ 30m	29.5 @ 30m
30 to 88	100 @ 3m	40 @ 3m
88 to 216	150 @ 3m	43.5 @ 3m
216 to 960	200 @ 3m	46.0 @ 3m
Above 960	500 @ 3m	54.0 @ 3m

**RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS**

The table below shows the limits for the spurious emissions from receivers as detailed in FCC Part 15.109, RSS 210 Table 2, RSS GEN Table 1 and RSS 310 Table 3. Note that receivers operating outside of the frequency range 30 MHz – 960 MHz are exempt from the requirements of 15.109.

Frequency Range (MHz)	Limit (uV/m @ 3m)	Limit (dBuV/m @ 3m)
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

**OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS**

The table below shows the limits for output power and output power density. Where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

<sup>1</sup> The restricted bands are detailed in FCC 15.203, RSS 210 Table 1 and RSS 310 Table 2

---

Operating Frequency (MHz)	Output Power	Power Spectral Density
902 – 928	1 Watt (30 dBm)	8 dBm/3kHz
2400 – 2483.5	1 Watt (30 dBm)	8 dBm/3kHz
5725 – 5850	1 Watt (30 dBm)	8 dBm/3kHz

The maximum permitted output power is reduced by 1dB for every dB the antenna gain exceeds 6dBi. Fixed point-to-point applications using the 5725 – 5850 MHz band are not subject to this restriction.

***TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS and DTS SYSTEMS***

The limits for unwanted (spurious) emissions from the transmitter falling in the restricted bands are those specified in the general limits sections of FCC Part 15 and RSS 210. All other unwanted (spurious) emissions shall be at least 20dB below the level of the highest in-band signal level (30dB if the power is measured using the sample detector/power averaging method).

**SAMPLE CALCULATIONS - CONDUCTED EMISSIONS**

Receiver readings are compared directly to the conducted emissions specification limit (decibel form) as follows:

$$R_r - S = M$$

where:

$R_r$  = Receiver Reading in dBuV

$S$  = Specification Limit in dBuV

$M$  = Margin to Specification in +/- dB

**SAMPLE CALCULATIONS - RADIATED EMISSIONS**

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

A distance factor, when used for electric field measurements above 30MHz, is calculated by using the following formula:

$$F_d = 20 * \text{LOG}_{10} (D_m/D_s)$$

where:

$F_d$  = Distance Factor in dB

$D_m$  = Measurement Distance in meters

$D_s$  = Specification Distance in meters

For electric field measurements below 30MHz the extrapolation factor is either determined by making measurements at multiple distances or a theoretical value is calculated using the formula:

$$F_d = 40 * \text{LOG}_{10} (D_m/D_s)$$

Measurement Distance is the distance at which the measurements were taken and Specification Distance is the distance at which the specification limits are based. The antenna factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

---

The margin of a given emission peak relative to the limit is calculated as follows:

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

$$R_r = \text{Receiver Reading in dBuV/m}$$

$$F_d = \text{Distance Factor in dB}$$

$$R_c = \text{Corrected Reading in dBuV/m}$$

$$L_s = \text{Specification Limit in dBuV/m}$$

$$M = \text{Margin in dB Relative to Spec}$$

#### **SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION**

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp), or where a field strength measurement of output power is made in lieu of a direct measurement, the following formula is used to convert between eirp and field strength at a distance of 3m from the equipment under test:

$$E = \frac{1000000 \sqrt{30 P}}{3} \text{ microvolts per meter}$$

where P is the eirp (Watts)

## **EXHIBIT 1: Test Equipment Calibration Data**

1 Page



**Radiated Emissions, 1000 - 40,000 MHz, 26-Jan-07****Engineer: Juan Martinez**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	16-Mar-07
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	10-May-08
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	19-May-07

---

**Radiated Emissions, 30 - 1,000 MHz, 26-Jan-07****Engineer: Mehran Birgani**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Elliott Laboratories	Biconical Antenna, 30-300 MHz	EL30.300	54	07-Mar-07
EMCO	Log Periodic Antenna, 0.2-1 GHz	3146	1294	25-May-07
Rohde & Schwarz	Test Receiver, 0.009-2750 MHz	ESN	1332	21-Nov-07

---

**Radio Antenna Port (Power and Spurious Emissions), 24-Jan-07****Engineer: Mehran Birgani**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	EMC Spectrum Analyzer, 9 kHz - `6.5 GHz	8595EM	780	05-Sep-07

**EXHIBIT 2: Test Measurement Data**

17 Pages



## EMC Test Data

Client:	GE MDS LLC	Job Number:	J66499
Model:	MDS FIVE Series Sonet	T-Log Number:	T66765
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Emissions Spec:	FCC 15.247 / 15.401	Class:	Radio
Immunity Spec:		Environment:	

# EMC Test Data

For The

## GE MDS LLC

Model

### MDS FIVE Series Sonet

Date of Last Test: 1/26/2007



## EMC Test Data

Client:	GE MDS LLC	Job Number:	J66499
Model:	MDS FIVE Series Sonet	T-Log Number:	T66765
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Emissions Spec:	FCC 15.247 / 15.401	Class:	Radio
Immunity Spec:	Enter immunity spec on cover	Environment:	

### EUT INFORMATION

#### General Description

The EUT is a Point to point fixed outdoor radio which is designed to provide wireless internet and network environments. Normally, the EUT would be fix mounted on permanent outdoor structures. The EUT was, therefore, treated as table-top equipment during testing. The electrical rating of the EUT is -48VDC, 2 Amps.

#### Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Microwave Data	ODU5300MEDML	ODU	1367022	E5MDS-5800-2
Microwave Data	ODU5300MIDML	ODU	1367621	E5MDS-5800-2
Microwave Data	ODU5800MEDML	ODU	1367936	E5MDS-5800-2
Microwave Data	UDO5300 MIDML	ODU	1367934	-
Microwave Data	SDIDUPHDID	IDU	42050001	-

#### EUT Antenna

The EUT external 8' dish antenna is a 39.7dBi directional antenna.

#### EUT Enclosure

The IDU EUT enclosure is primarily constructed of fabricated sheet steel. It measures approximately 24 cm wide by 44 cm deep by 4 cm high.

The ODU EUT enclosure is primarily constructed of cast aluminum. It measures approximately 37 cm wide by 7 cm deep by 39 cm high.

#### Modification History

Mod. #	Test	Date	Modification

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.



## EMC Test Data

Client:	GE MDS LLC	Job Number:	J66499
Model:	MDS FIVE Series Sonet	T-Log Number:	T66765
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Emissions Spec:	FCC 15.247 / 15.401	Class:	Radio
Immunity Spec:	Enter immunity spec on cover	Environment:	

### Test Configuration #1

#### Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Kepeco		48VDC supply		

#### Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None				

#### IDU Interface Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
User 10/100 1	Terminated	CAT 5	Shielded	5
User 10/100 2	Terminated	CAT 5	Shielded	5
VOW	Terminated	CAT 5	Shielded	5
AUX	Terminated	CAT 5	Shielded	5
E1/T1 1	Terminated	CAT 5	Shielded	5
E1/T1 2	Terminated	CAT 5	Shielded	5
E1/T1 3-16	Terminated	Multiwire	Shielded	
ODU	IF port on ODU	Coax	Shielded	2
-48V in	DC supply	2 wire	Unshielded	2

#### ODU Interface Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
IF Out	ODU port on IDU	Coax	Shielded	2
BNC	Terminated	-	-	-
Antenna	Terminated	-	-	-

Note: The Serial/Alarm and the two 10/100 ports were not connected as the manufacturer stated that these are for configuration purpose and therefore would not normally be connected.

#### EUT Operation During Emissions Tests

During digital emissions testing the EUT was in receive mode



## EMC Test Data

Client:	GE MDS LLC	Job Number:	J66499
Model:	MDS FIVE Series Sonet	T-Log Number:	T66765
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Spec:	FCC 15.247 / 15.401	Class:	Radio

### Radiated Emissions

#### Test Specifics

Objective: The objective of this test session is to perform engineering evaluation testing of the EUT with respect to the specification listed above.

Date of Test: 1/26/2007	Config. Used: 1
Test Engineer: Mehran Birgani	Config Change: -
Test Location: SVOATS #2	EUT Voltage: -48Vdc

#### General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated emissions testing.

In the anechoic chamber the measurement antenna was located 3m from the EUT. The measurement data has been extrapolated to the appropriate distance.

Note, for testing above 1 GHz, the FCC specifies the limit as an average measurement. In addition, the FCC states that the peak reading of any emission above 1 GHz, can not exceed the average limit by more than 20 dB.

**Ambient Conditions:**

Temperature:	12 °C
Rel. Humidity:	58 %

#### Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, 30 -1000 MHz Transmit Mode (ODU)	FCC Class B	Pass	28.0dBμV/m @ 157.581MHz (-15.5dB)
2	RE, 30 -18000 MHz IDU & ODU Receive	FCC Class A	Pass	38.7dBμV/m @ 500.012MHz (-7.7dB)

#### Modifications Made During Testing:

No modifications were made to the EUT during testing

#### Deviations From The Standard

No deviations were made from the requirements of the standard.



# EMC Test Data

Client:	GE MDS LLC	Job Number:	J66499
Model:	MDS FIVE Series Sonet	T-Log Number:	T66765
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Spec:	FCC 15.247 / 15.401	Class:	Radio

## Run #1: Maximized Radiated Emissions, 30-1000 MHz (Tx)

### 5750 MHz

Frequency MHz	Level dB $\mu$ V/m	Pol V/H	FCC Class B		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
157.581	28.0	H	43.5	-15.5	QP	275	1.0	Unrestricted with restricted limit
168.040	21.8	H	43.5	-21.7	QP	23	1.0	
119.470	19.0	V	43.5	-24.5	QP	360	1.0	
147.463	17.9	V	43.5	-25.6	QP	60	1.0	Unrestricted with restricted limit
550.000	59.1	V	128.2	-69.1	QP	297	1.0	Note 1
500.015	55.7	V	128.2	-72.5	QP	360	1.1	Note 1
625.000	47.5	V	128.2	-80.7	QP	19	1.0	Note 1

Note 1: For unrestricted band the limit was set to 30dBc below the fundamental level.  
 23dB (EUT Power)+40dB (Antenna gain) + 95.2 -30dBc = 128.2 dBuV/m at 3m

## Run #2: Maximized Radiated Emissions, 30-1000 MHz (IDU)

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	FCC Class A		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
500.012	38.7	V	46.4	-7.7	QP	0	1.0	
562.502	38.7	V	46.4	-7.7	QP	248	1.0	
125.014	34.1	V	43.5	-9.4	QP	101	1.0	
525.005	34.5	V	46.4	-11.9	QP	80	1.0	
250.004	32.5	H	46.4	-13.9	QP	11	1.0	
583.232	29.1	V	46.4	-17.3	QP	45	1.0	
157.500	13.8	H	43.5	-29.7	QP	168	1.0	

Note 1: Prescan showed that Receive mode of ODU and IDU are similar.



# EMC Test Data

Client:	GE MDS LLC	Job Number:	J66499
Model:	MDS FIVE Series Sonet	T-Log Number:	T66765
		Account Manager:	Susan Pelzi
Contact:	Dennis McCarthy		
Standard:	FCC 15.247 / 15.401	Class:	Radio

## Receive Radiated Emissions

### Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 1/26/2007 9:30  
 Test Engineer: Juan Martinez  
 Test Location: SVOATS #2

Config. Used: **1**  
 Config Change: **None**  
 EUT Voltage: -48Vdc

### General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated emissions testing.

The test distance and extrapolation factor (if applicable) are detailed under each run description.

**Ambient Conditions:**            Temperature:            12 °C  
    Rel. Humidity:            58 %

### Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, 1000 - 18,000 MHz, Maximized Emissions	RSS-Gen	Pass	41.5dBµV/m (118.9µV/m) @ 16801.3MHz (-12.6dB)

### Modifications Made During Testing:

No modifications were made to the EUT during testing

### Deviations From The Standard

No deviations were made from the requirements of the standard.





# EMC Test Data

Client:	GE MDS LLC	Job Number:	J66499
Model:	MDS FIVE Series Sonet	T-Log Number:	T66765
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzi
Standard:	FCC 15.247 / 15.401	Class:	Radio

**Run #3: Maximized readings, 1000 - 18,000 MHz**

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 18,000 MHz	3	3	0.0

Frequency MHz	Level dBuV/m	Pol v/h	RSS-GEN		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
16801.314	41.5	H	54.0	-12.6	AVG	191	1.0	
16799.365	41.4	V	54.0	-12.6	AVG	55	1.0	
12598.705	37.6	H	54.0	-16.4	AVG	12	1.0	
12599.886	37.5	V	54.0	-16.5	AVG	180	1.0	
16799.365	53.7	V	74.0	-20.3	PK	55	1.0	
16801.314	53.1	H	74.0	-21.0	PK	191	1.0	
8399.340	32.7	V	54.0	-21.3	AVG	184	1.0	
8401.315	32.6	H	54.0	-21.4	AVG	348	1.0	
12598.705	49.6	H	74.0	-24.4	PK	12	1.0	
4250.001	28.9	V	54.0	-25.1	AVG	269	1.0	
12599.886	48.7	V	74.0	-25.3	PK	180	1.0	
4198.975	27.8	H	54.0	-26.2	AVG	360	1.0	
8399.340	44.4	V	74.0	-29.6	PK	184	1.0	
8401.315	43.4	H	74.0	-30.6	PK	348	1.0	
4250.001	40.5	V	74.0	-33.5	PK	269	1.0	
4198.975	39.7	H	74.0	-34.3	PK	360	1.0	

Note 1: Above 1 GHz, the FCC specifies the limit as an average measurement. In addition, the FCC states that the peak reading of any emission above 1 GHz, can not exceed the average limit by more than 20 dB.



# EMC Test Data

Client:	GE MDS LLC	Job Number:	J66499
Model:	MDS FIVE Series Sonet	T-Log Number:	T66765
		Account Manager:	Susan Pelzi
Contact:	Dennis McCarthy		
Standard:	FCC 15.247 / 15.401	Class:	N/A

## RSS 210 and FCC 15.247 Radiated Spurious Emissions

### Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 1/26/2007	Config. Used: <b>1</b>
Test Engineer: Juan Martinez	Config Change: <b>None</b>
Test Location: SVOATS #2	EUT Voltage: -48Vdc

### General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

<b>Ambient Conditions:</b>	Temperature:	12 °C
	Rel. Humidity:	58 %

### Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1-2	RE, 1000 - 40,000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247( c)	Pass	45.9dBµV/m (197.2µV/m) @ 17524.8MHz (-8.1dB)

### Modifications Made During Testing:

No modifications were made to the EUT during testing

### Deviations From The Standard

No deviations were made from the requirements of the standard.



# EMC Test Data

Client:	GE MDS LLC	Job Number:	J66499
Model:	MDS FIVE Series Sonet	T-Log Number:	T66765
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzi
Standard:	FCC 15.247 / 15.401	Class:	N/A

**Run #1: Radiated Spurious Emissions, 30 - 40,000 MHz.**

**Run #1a: Low Channel @ 5750 MHz**

**Other Spurious Emissions**

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11455.500	37.8	V	54.0	-16.2	AVG	133	1.0	
11455.500	49.5	V	74.0	-24.5	PK	133	1.0	
17280.168	45.5	V	54.0	-8.5	AVG	266	1.0	
17280.168	56.5	V	74.0	-17.5	PK	266	1.0	
11464.667	37.5	H	54.0	-16.5	AVG	0	1.0	
11464.667	49.2	H	74.0	-24.8	PK	0	1.0	
17252.000	45.3	H	54.0	-8.7	AVG	132	0.0	
17252.000	56.8	H	74.0	-17.2	PK	132	0.0	

- Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
- Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

**Run #1b: High Channel @ 5825 MHz**

**Other Spurious Emissions**

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
17524.834	45.9	H	54.0	-8.1	AVG	194	1.0	
17524.834	57.4	H	74.0	-16.6	PK	194	1.0	
11676.500	37.4	H	54.0	-16.7	AVG	180	1.0	
11676.500	48.5	H	74.0	-25.5	PK	180	1.0	
11684.833	37.2	V	54.0	-16.8	AVG	23	1.0	
11684.833	49.4	V	74.0	-24.6	PK	23	1.0	
17517.166	45.4	V	54.0	-8.6	AVG	288	1.0	
17517.166	58.0	V	74.0	-16.1	PK	288	1.0	

- Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
- Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.



# EMC Test Data

Client:	GE MDS LLC	Job Number:	J66499
Model:	MDS FIVE Series Sonet	T-Log Number:	T66765
		Account Manager:	Susan Pelzi
Contact:	Dennis McCarthy		
Standard:	FCC 15.247 / 15.401	Class:	N/A

## RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements Power, Bandwidth and Spurious Emissions

### Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 1/24/2007	Config. Used: -
Test Engineer: Mehran Birgani	Config Change: -
Test Location: Chamber #2	EUT Voltage: -48Vdc

### General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator. All measurements were made on a single chain.

All measurements have been corrected to allow for the external attenuators used.

**Ambient Conditions:**            Temperature:            - °C  
    Rel. Humidity:            - %

### Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Output Power	15.247(b)	Pass	23.0 dBm
2	Power spectral Density (PSD)	15.247(d)	Pass	-17.9 dBm
3	6dB Bandwidth	15.247(a)	Pass	42.5MHz
3	99% Bandwidth	RSS GEN	-	44.5MHz
4	Spurious emissions	15.247(b)	Pass	Refer to test run

### Modifications Made During Testing:

No modifications were made to the EUT during testing

### Deviations From The Standard

No deviations were made from the requirements of the standard.



# EMC Test Data

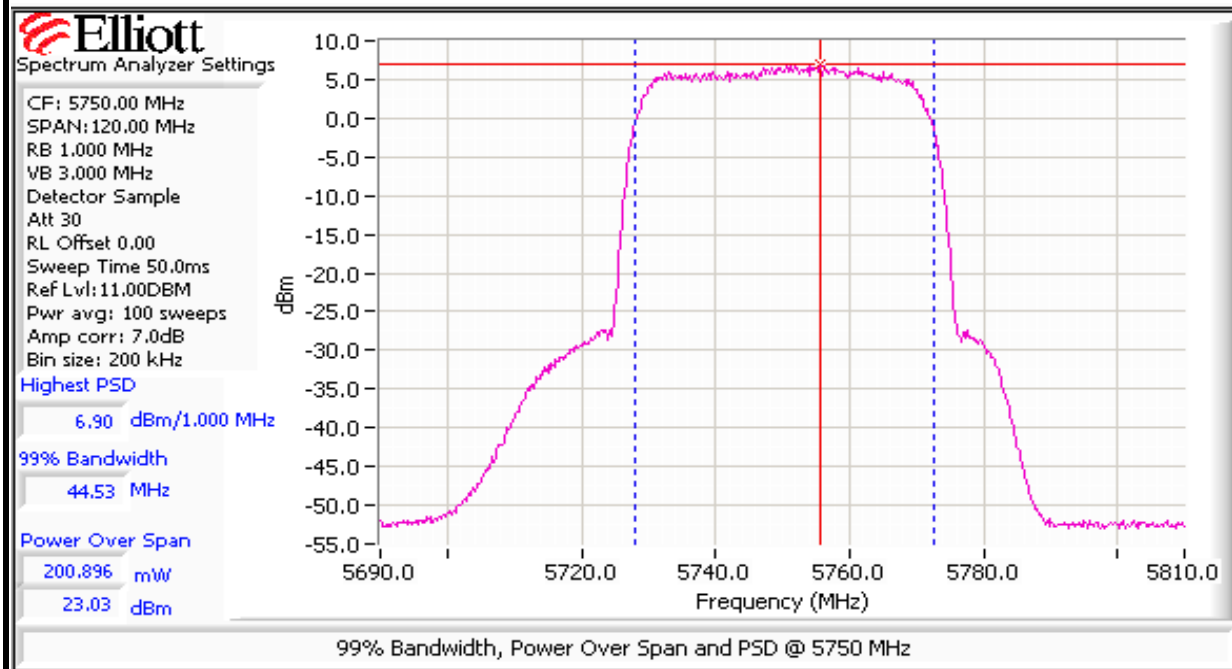
Client:	GE MDS LLC	Job Number:	J66499
Model:	MDS FIVE Series Sonet	T-Log Number:	T66765
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzi
Standard:	FCC 15.247 / 15.401	Class:	N/A

## Run #1: Output Power

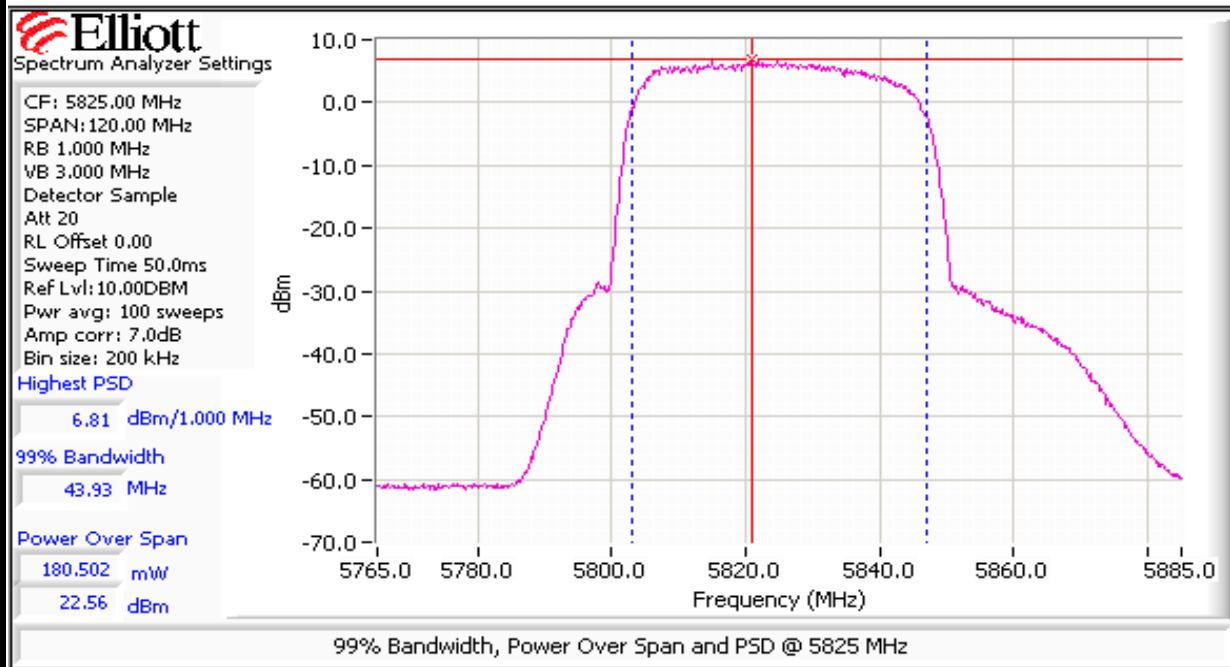
Power Setting <sup>2</sup>	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP <sup>Note 2</sup>		Output Power	
		(dBm) <sup>1</sup>	mW			dBm	W	(dBm) <sup>3</sup>	mW
24	5750	23.0	199.5	39.7	Pass	62.7	1862.087		
24	5825	22.6	182.0	39.7	Pass	62.3	1698.244		

Note 1: Output power measured using a spectrum analyzer (see plots below):  
 RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 120 MHz

Note 2: Power setting - the software power setting used during testing, included for reference only.



Client: GE MDS LLC	Job Number: J66499
Model: MDS FIVE Series Sonet	T-Log Number: T66765
Contact: Dennis McCarthy	Account Manager: Susan Pelzi
Standard: FCC 15.247 / 15.401	Class: N/A



### Run #2: Power spectral Density

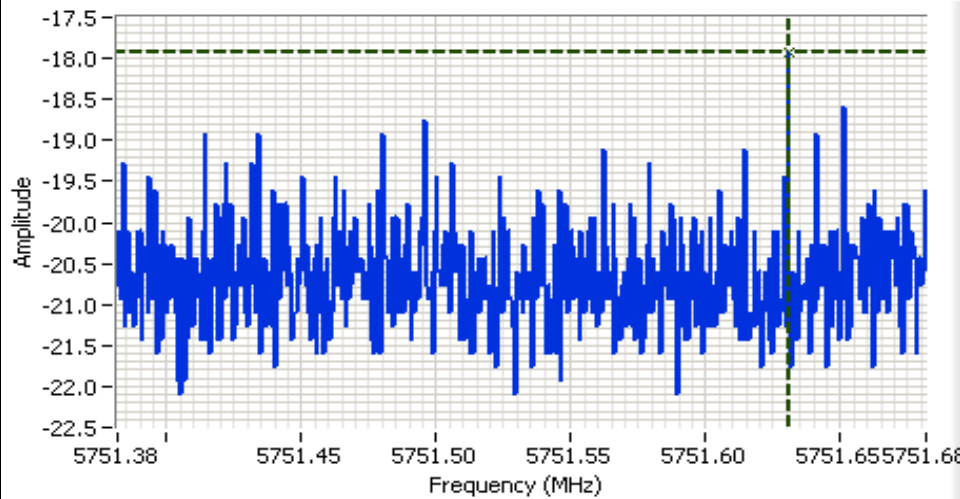
Power Setting	Frequency (MHz)	PSD	Limit	Result
		(dBm/3kHz) <sup>Note 1</sup>	dBm/3kHz	
24	5750	-17.9	8.0	Pass
24	5825	-18.8	8.0	Pass

Note 1: Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using RB=3kHz using multiple sweeps at a faster rate over the 6dB bandwidth of the signal.



# EMC Test Data

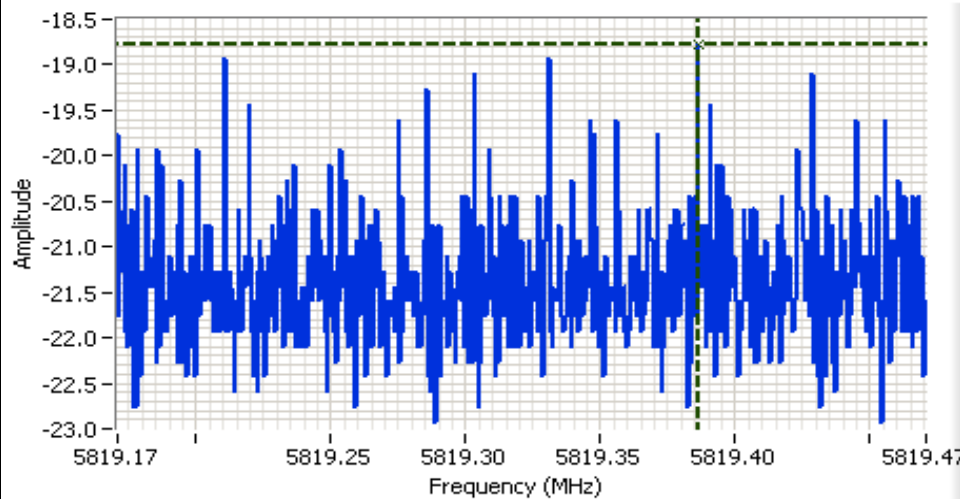
Client: GE MDS LLC	Job Number: J66499
Model: MDS FIVE Series Sonet	T-Log Number: T66765
Contact: Dennis McCarthy	Account Manager: Susan Pelzi
Standard: FCC 15.247 / 15.401	Class: N/A



**Analyzer Settings**  
HP8564E,006,EMI,UK6  
CF: 5751.53 MHz  
SPAN:300 kHz  
RB 3 kHz  
VB 10 kHz  
Detector POS  
Att 10  
RL Offset -7.00  
Sweep Time 100.0s  
Ref Lvl:-15.60DBM

**Comments**  
5750 MHz  
PSD

Cursor 1 5751.63: -17.93  
0.000 0.00



**Analyzer Settings**  
HP8564E,006,EMI,UK6  
CF: 5819.32 MHz  
SPAN:300 kHz  
RB 3 kHz  
VB 10 kHz  
Detector POS  
Att 10  
RL Offset -7.00  
Sweep Time 100.0s  
Ref Lvl:-15.60DBM

**Comments**  
5825 MHz  
PSD

Cursor 1 5819.38: -18.77  
0.000 0.00

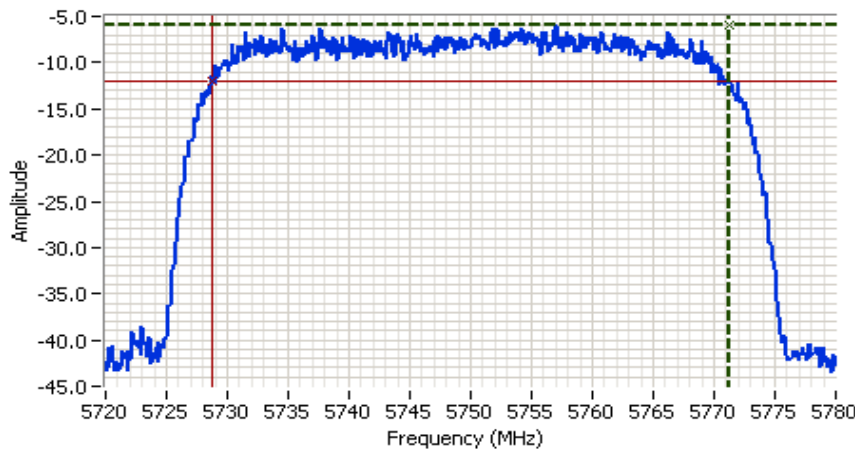


Client: GE MDS LLC	Job Number: J66499
Model: MDS FIVE Series Sonet	T-Log Number: T66765
Contact: Dennis McCarthy	Account Manager: Susan Pelzi
Standard: FCC 15.247 / 15.401	Class: N/A

### Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz)	
			6dB	99%
24	5750	100 kHz	42.5 MHz	44.5 MHz
24	5825	100 kHz	41.2 MHz	43.8 MHz

Note 1: 99% bandwidth measured in accordance with RSS GEN, with RB > 1% of the span and VB > 3xRB. Signal bandwidth was 50MHz (1MHz RBW and 3MHz VBW was used).



#### Analyzer Settings

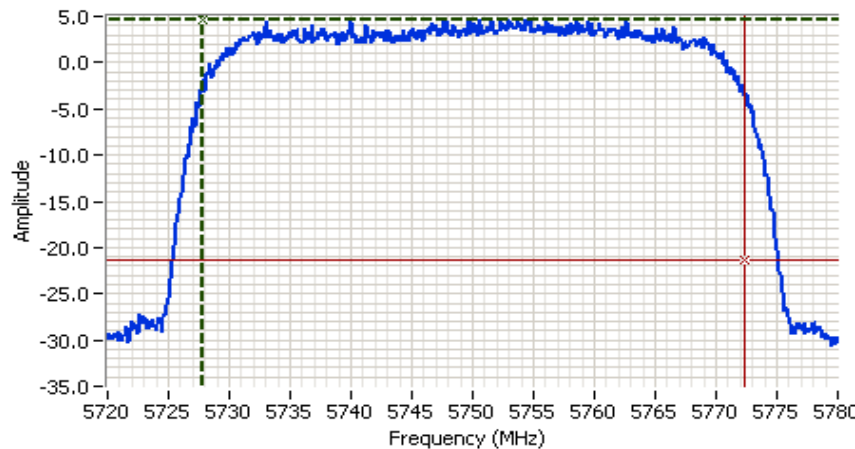
HP8564E,006,EMI,UK6  
 CF: 5750.00 MHz  
 SPAN:60.00 MHz  
 RB 100 kHz  
 VB 100 kHz  
 Detector POS  
 Att 20  
 RL Offset -7.00  
 Sweep Time 50.0ms  
 Ref Lvl:-6.70DBM

#### Comments

5750 MHz  
 6dB Bandwidth

Cursor 1	5771.20	-6.03	
Cursor 2	5728.70	-12.03	

Delta Freq. 42.50  
 Delta Amplitude 6.00



#### Analyzer Settings

HP8564E,006,EMI,UK6  
 CF: 5750.00 MHz  
 SPAN:60.00 MHz  
 RB 1.000 MHz  
 VB 3.000 MHz  
 Detector POS  
 Att 20  
 RL Offset -7.00  
 Sweep Time 50.0ms  
 Ref Lvl:2.90DBM

#### Comments

99% power bandwidth:  
 44.53 MHz  
 Power over span:  
 20.58dBm

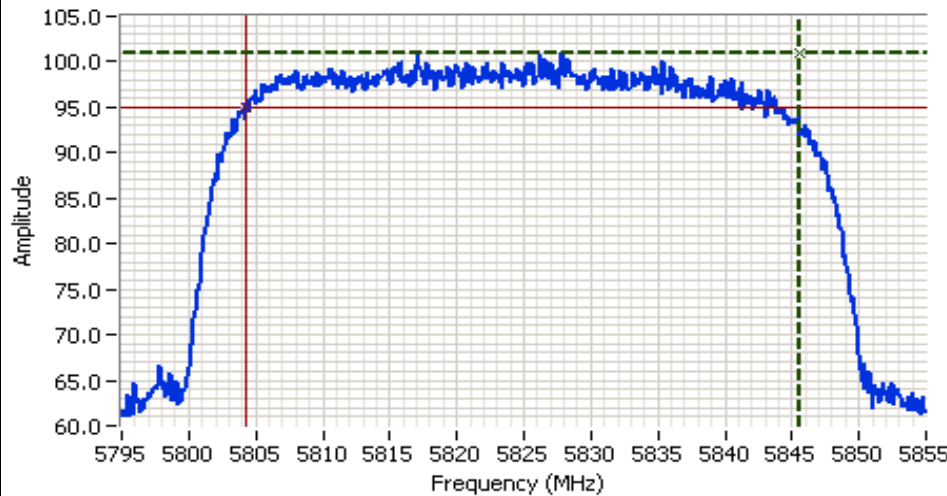
Cursor 1	5727.88	4.57	
Cursor 2	5772.41	-21.43	

Delta Freq. 44.53  
 Delta Amplitude 26.00





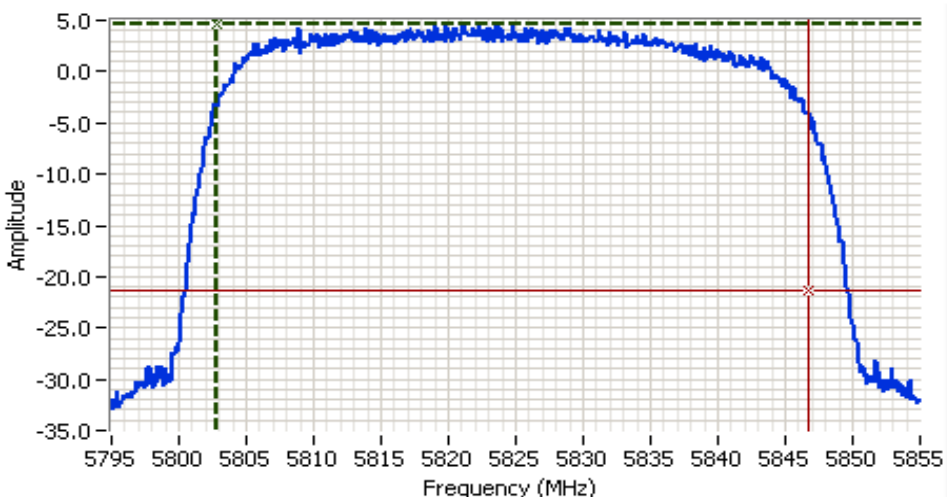
Client: GE MDS LLC	Job Number: J66499
Model: MDS FIVE Series Sonet	T-Log Number: T66765
Contact: Dennis McCarthy	Account Manager: Susan Pelzi
Standard: FCC 15.247 / 15.401	Class: N/A



**Analyzer Settings**  
 HP8564E,006,EMI,UK6  
 CF: 5825.00 MHz  
 SPAN:60.00 MHz  
 RB 100 kHz  
 VB 100 kHz  
 Detector POS  
 Att 10  
 RL Offset -7.00  
 Sweep Time 50.0ms  
 Ref Lvl:99.80DBUV

**Comments**  
 5825 MHz  
 6dB

Cursor 1	5845.50	100.97	⊕ ⊖ ⊞ ⊚	Delta Freq.	41.20
Cursor 2	5804.30	94.97	⊕ ⊖ ⊞ ⊚	Delta Amplitude	6.00



**Analyzer Settings**  
 HP8564E,006,EMI,UK6  
 CF: 5825.00 MHz  
 SPAN:60.00 MHz  
 RB 1.000 MHz  
 VB 3.000 MHz  
 Detector POS  
 Att 20  
 RL Offset -7.00  
 Sweep Time 50.0ms  
 Ref Lvl:3.00DBM

**Comments**  
 99% power bandwidth:  
 43.83 MHz  
 Power over span:  
 20.32dBm

Cursor 1	5802.88	4.67	⊕ ⊖ ⊞ ⊚	Delta Freq.	43.83
Cursor 2	5846.71	-21.33	⊕ ⊖ ⊞ ⊚	Delta Amplitude	26.00

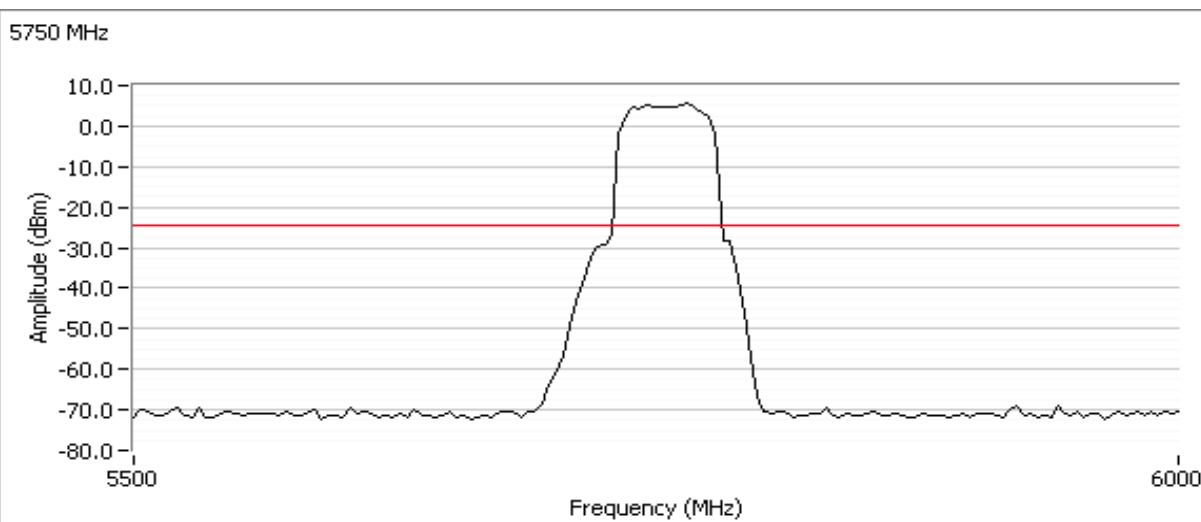
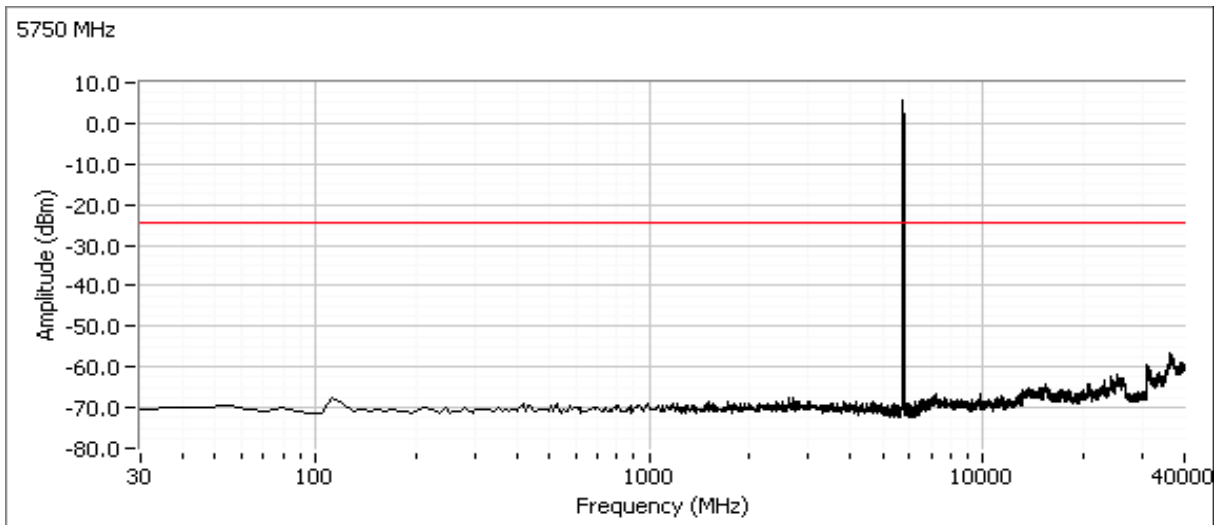


Client: GE MDS LLC	Job Number: J66499
Model: MDS FIVE Series Sonet	T-Log Number: T66765
Contact: Dennis McCarthy	Account Manager: Susan Pelzi
Standard: FCC 15.247 / 15.401	Class: N/A

### Run #4: Out of Band Spurious Emissions

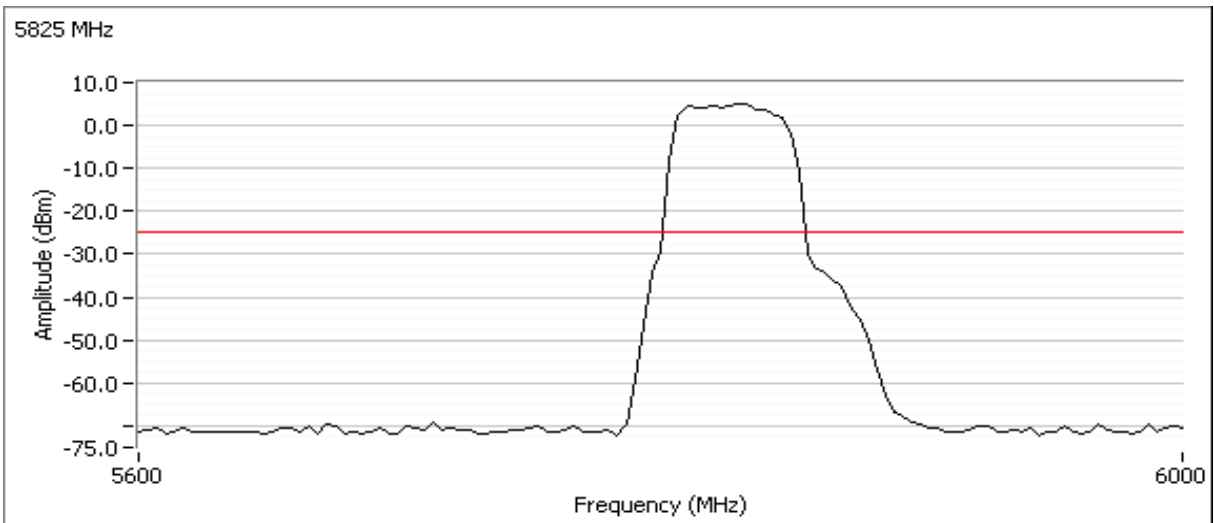
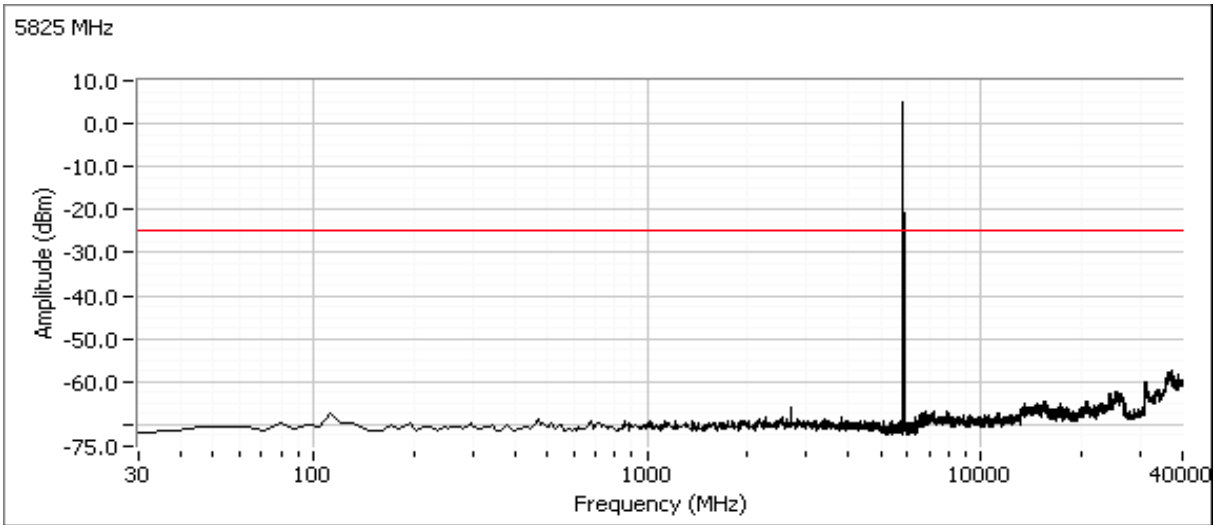
Frequency (MHz)	Limit	Result
5750	-30dBc	Pass
5825	-30dBc	Pass

Plots for low channel, power setting(s) = 24



Client: GE MDS LLC	Job Number: J66499
Model: MDS FIVE Series Sonet	T-Log Number: T66765
Contact: Dennis McCarthy	Account Manager: Susan Pelzi
Standard: FCC 15.247 / 15.401	Class: N/A

Plots for high channel, power setting(s) = 24



**EXHIBIT 3: Photographs of Test Configurations**

2 Pages

**EXHIBIT 4: Proposed FCC ID Label & Label Location**

Unchanged from original application

**EXHIBIT 5: Detailed Photographs  
of GE MDS LLC Model MDS FIVE Series SonetConstruction**

3 Pages

***EXHIBIT 6: Operator's Manual  
for GE MDS LLC Model MDS FIVE Series Sonet***

Unchanged from original application

***EXHIBIT 7: Block Diagram  
of GE MDS LLC Model MDS FIVE Series Sonet***

Unchanged from original application



**EXHIBIT 8: Schematic Diagrams  
for GE MDS LLC Model MDS FIVE Series Sonet**

Unchanged from original application

***EXHIBIT 9: Theory of Operation  
for GE MDS LLC Model MDS FIVE Series Sonet***

Unchanged from original application

**EXHIBIT 10: RF Exposure Information**

3 Pages