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Electromagnetic Emissions Test Report In Accordance With Industry Canada Radio Standards Specification 119 Issue 9, FCC Part 90 on the GE MDS LLC Transmitter Model: SD4

FCC ID NUMBER:	E5MDS-SD4
UPN:	101D-SD4
GRANTEE:	GE MDS LLC 175 Science Parkway Rochester, NY 14620
TEST SITE:	Elliott Laboratories, Inc. 684 W. Maude Avenue Sunnyvale, CA 94086
REPORT DATE:	January 17, 2008
FINAL TEST DATE:	November 13, November 14, November 15, 2007 and January 9 and January 11, 2008

AUTHORIZED SIGNATORY: David W Bare

David W. Bare
Chief Technical Officer

ACCREDITED

Testing Cert #2016-01

REVISION HISTORY

Revision #	Date	Comments	Modified By
1	January 24, 2008	Initial Release	David Guidotti
2	February 12, 2008	Added necessary bandwidth calculations	David Bare

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

FCC CERTIFICATION INFORMATION

The following information is in accordance with FCC Rules, 47CFR Part 2, Subpart J, Section 2.1033(C) & to Industry Canada RSP-100.

2.1033(c)(1) Applicant:

GE MDS LLC
175 Science Parkway
Rochester, NY 14620

2.1033(c)(2) & RSP-100 (4) FCC ID: E5MDS-SD4
UPN: 101D-SD4

2.1033(c)(3) & RSP-100 (7.2(a)) Instructions/Installation Manual

Please refer to Exhibit 7: User Manual

2.1033(c)(4) & RSP-100 (7.2(b)(iii)) Type of emissions

FCC 90 & RSS-119**: F1D, F2D, F3D**

Necessary bandwidth (2M + 2DK): **12.5kHz channels, D=3.1, M=2.4, K=1**
2(3.1)+2(3.1) = 11.0kHz
25kHz channels, D=5.6, M=6.1, K=1
2(5.6)+2(6.1)=23.4kHz

2.1033(c)(5) & RSP-100 (7.2(a)) Frequency Ranges

FCC 90 & RSS-119**: 406-416, 421-430, 450-512**

2.1033(c)(6) & RSP-100 (7.2(a)) Range of Operation Power

FCC 90 & RSS-119**: 0.1 to 5 Watts**

2.1033(c)(7) & RSP-100 (7.2(a)) Maximum FCC & IC Allowed Power Level

FCC 90 & RSS-119**:** 90.205(g)(h)(i): Depends on frequency and antenna height.

2.1033(c)(8) & RSP-100 (7.2(a)) Applied voltage and currents into the final transistor elements

The final RF stage output amplifier operates at 13.8vdc and draws 1.5adc

2.1033(c)(9) & RSP-100 (7.2(a)) Tune-up Procedure

There is no tune up procedure since is a digital radio. All settings and calibration are done in the factory and stored in memory.

2.1033(c)(10) & RSP 100 (7.2(a)) Schematic Diagram of the Transmitter

Refer to Exhibit 6: Schematic diagram

2.1033(c)(10) & RSP-100 (7.2(a)) Means for Frequency Stabilization

Refer to Exhibit 4: Theory of Operation

2.1033(c)(10) & RSP-100 (7.2(a)) Means for Suppression of Spurious radiation

Refer to Exhibits 4 and 6

2.1033(c)(10) & RSP-100 (7.2(a)) Means for Limiting Modulation

Refer to Exhibits 4 and 6

2.1033(c)(10) & RSP-100 (7.2(a)) Means for Limiting Power

Refer to Exhibit 4: Theory of Operation

2.1033(c)(11) & RSP-100 (7.2(g)) Photographs or Drawing of the Equipment Identification Plate or Label

Refer to Exhibit 4: Theory of Operation

2.1033(c)(12) & RSP-100 (7.2(c)) Photographs of equipment

Refer to Exhibit 5

2.1033(c)(13) & RSP-100 (7.2(a)) Equipment Employing Digital Modulation & 90.203 (Certification Requirements)

90.203(J)(5) Applications for part 90 certification of transmitters designed to operate on frequencies in the 150.8– 162.0125 MHz, 173.2–173.4 MHz, and/or 421–512 MHz bands, received on or after January 1, 2005, must include a certification that the equipment meets a spectrum efficiency standard of one voice channel per 6.25 kHz of channel bandwidth. Additionally, if the equipment is capable of transmitting data, has transmitter output power greater than 500 mW, and has a channel bandwidth of more than 6.25 kHz, the equipment must be capable of supporting a minimum data rate of 4800 bits per second per 6.25 kHz of channel bandwidth.

MODEM	**Symbol Rate (bps)**	**Channel BW KHz**	**TX Response**
4800 *2-level FSK*	4807.69	**12.5 KHz**	Root-raised cosine (alpha = 0.4)
9600 *3-level FSK*	9615.39	**12.5 KHz**	Root-duobinary
19200 *3-level FSK*	18181.82	**25.0 KHz**	Root-duobinary

2.1033(c)(14) & RSP-100 (7.2(b)(ii)) Data taken per Section 2.1046 to 2.1057 and RSS-133 issue 2, Rev. 1.

Refer to Exhibit 2

DECLARATIONS OF COMPLIANCE

Equipment Name and Model:
SD4

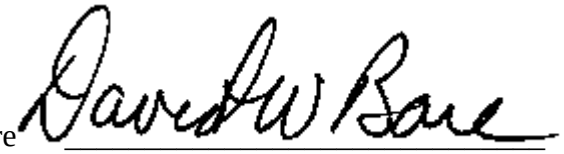
Manufacturer:
GE MDS LLC
175 Science Parkway
Rochester, NY 14620

Tested to applicable standards:
RSS-119, Issue 9 (Land Mobile and Fixed Radio Transmitters and Receivers, 27.41 to 960 MHz).
FCC Part 90 (Private Land Mobile Radio Service)

Measurement Facility Description Filed With Department of Industry:

Departmental Acknowledgement Number: IC2845A-1 Dated August 16, 2007

I declare that the testing was performed or supervised by me; that the test measurements were made in accordance with the above mentioned departmental standards (through the use of TIA/EIA-603 and the specific RSS standards applicable to this device); and that the equipment performed in accordance with the data submitted in this report.



Signature

Name David W. Bare
Title Chief Technical Officer
Elliott Laboratories Inc.
Address 684 W. Maude Ave
Sunnyvale, CA 94086
USA

Date: January 17, 2008

Maintenance of compliance with the above standards 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.).

SCOPE

FCC Part 90 & IC RSS-119 testing was performed for the equipment mentioned in this report. The equipment was tested in accordance with the procedures specified in Sections 2.1046 to 2.1057 of the FCC Rules & IC RSS-119. TIA-603 was also used as a test procedure guideline to perform some of the required tests.

The intentional radiator above was tested in a simulated typical installation to demonstrate compliance with the relevant FCC & RSS 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.

OBJECTIVE

The primary objective of the manufacturer is compliance with the FCC Part 90 & IC RSS-119. Certification of these devices is required as a prerequisite to marketing as defined in Section 2.1033 & RSP-100.

Certification is a procedure where the manufacturer or a contracted laboratory makes measurements and submits the test data and technical information to FCC & Industry Canada. FCC & Industry Canada issues a grant of equipment authorization and a certification number upon successful completion of their review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product that 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.).

SUMMARY OF TEST RESULTS

Part 90 and RSS-119 Test Summary

Measurement Required	FCC Part 2 & 90 Sections	RSS-119 Section	Test Performed	Measured Value	Test Procedure Used	Result
Modulation Tested	GMSK	GMSK	-	-	-	-
Modulation characteristics	2.1047/	5.7	Modulated with appropriated signal	-	H	-
Radiated RF power output (ERP/EIRP)	2.1046 / 90.279 & 90.205(g)	6.2	Radiated Output Power Test	-	-	-
Conducted RF power output	2.1046 / 90.279 & 90.205(g)	6.2	Conducted Output Power Test	37.4dBm (5.5 Watts)	B	Complies
Spurious emissions at antenna Port	2.1051/ 90.210(d)	6.3 & 6.4(d)	Emission Limits and/or Unwanted Emission 30MHz – 5GHz (**Antenna Conducted**)	-22.2dBm @ 812.191MHz (-2.2dB)	J	Complies
Occupied Bandwidth	2.1049/ 90.210(c) & (d)	6.4(c) & 6.4(d)	Emission Mask and 99% Bandwidth	Refer to Plots	C & D	Complies
Field strength of spurious radiation	2.1053 / 90.210(d)	6.3 & 6.4(d)	Radiated Spurious Emissions 30MHz – 5GHz	45.6dBµV/m @ 875.000MHz (-26.8dB)	N	Complies
Frequency stability	2.1055 / 90.213	7	Frequency Vs. Temperature	388 Hz	K	Complies
Frequency stability	2.1055 / 90.213	7	Frequency Vs. Voltage	388Hz	L & M	Complies
Transient Frequency Behavior	90.214	6.5	Transient Behavior	Refer to Plots	I	Complies
Exposure to Mobile devices	2.1091	9	Exposure of Humans to RF Fields	N/A	-	
Receiver	15.109	8	Receiver Spurious Emissions	37.9dBµV/m @ 875.000MHz (-8.1dB)	N/A	Complies

MEASUREMENT UNCERTAINTIES

ISO/IEC 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 were calculated using the approach described in CISPR 16-4-2:2003 using a coverage factor of k=2, which gives a level of confidence of approximately 95%. The levels were found to be below levels of *U*cispr and therefore no adjustment of the data for measurement uncertainty is required.

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	30 to 1000	± 3.6

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The GE MDS LLC model SD4 is a industrial radio operating in the 406-416, 421-430 and 450-512 MHz bands. Since the EUT would be placed on a table top during operation, the EUT was treated as table-top equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 13.8 Volts DC, 2 Amps.

The sample was received on November 13, 2007 and tested on November 13, November 14, November 15, 2007 and January 9 and January 11, 2008. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number	FCC ID
GE MDS LLC	SD4	Industrial Radio	-	E5MDS-SD4

OTHER EUT DETAILS

The following EUT details should be noted: Two versions of the radio are used to cover the two bands. Different lumped element parts are used. The radio can operate on 12.5 and 25 kHz channels (F1D, F2D and F3D modulations).

ENCLOSURE

The EUT enclosure is primarily constructed of aluminum. It measures approximately 16 cm wide by 12 cm deep by 4 cm high.

MODIFICATIONS

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

Mod. #	Test	Date	Modification
1	RE	11/14/2007	Added 10uH inductor and 2 0.1uF capacitors at the DC input.

SUPPORT EQUIPMENT

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

Manufacturer	Model	Description	Serial Number	FCC ID
Topward	3603D	DC Power Supply	-	-

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

Manufacturer	Model	Description	Serial Number	FCC ID
Netgear	RP114	Router	-	-

EUT INTERFACE PORTS

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

Port	Connected to	Description	Shielded or Unshielded	Length (m)
Serial DB9	-	-	-	-
Ethernet	Router	Cat 5	Shielded	30.0
DC Power	Topward DC Supply	DC mains	Unshielded	0.8
RF Output TNC	50 ohm load	Direct connect	Shielded	0.0

Note: The DB9 console port was not connected during testing. The manufacturer stated that this is for setup purposes and therefore would not normally be connected. Either the Ethernet or the Serial DB9 port is used but not both. Emissions tests showed that the highest emissions were observed when using the Ethernet port. Therefore, final tests were done with the Ethernet cable connected.

EUT OPERATION DURING TESTING

During emissions testing the EUT was set to transmit at 37dBm or in receive mode on the selected channel.

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TEST SITE

GENERAL INFORMATION

Final test measurements were taken on November 13, November 14, November 15, 2007 and January 9 and January 11, 2008 at the Elliott Laboratories Open Area Test Site #1, 2 located at 684 West Maude Avenue, Sunnyvale, California. Pursuant to Section 2.948 of the FCC Rules, construction, calibration, and equipment data has been filed with the Commission.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing are performed in conformance with Section 2 of FCC Rules. Measurements are made with the EUT connected to a spectrum analyzer through an attenuator to prevent overloading the analyzer.

RADIATED EMISSIONS CONSIDERATIONS

Radiated measurements are performed in an open field environment or Anechoic Chamber. The test site is maintained free of conductive objects within the CISPR 16-1 defined elliptical area.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1 is used for emissions measurements. The receivers are capable of measuring 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 particular detector used during 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. If average measurements above 1000MHz are performed, the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz is used.

INSTRUMENT CONTROL COMPUTER

A personal computer is utilized to record the receiver measurements of the field strength at the antenna, which is then compared directly with the appropriate specification limit. The receiver is programmed with appropriate factors to convert the received voltage into filed strength at the antenna. Results are printed in a graphic and/or tabular format, as appropriate.

The test receiver also provides a visual display of the signal being measured.

PEAK POWER METER

A peak power meter and thermister mount may be used for output power measurements from transmitters as they provide a broadband indication of the power output.

FILTERS/ATTENUATORS

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

ANTENNAS

A biconical antenna is used to cover the range from 30 MHz to 300 MHz and a log periodic antenna is utilized from 300 MHz to 1000 MHz. Narrowband tuned dipole antennas are used over the 30 to 1000 MHz range for precision measurements of field strength. Above 1000 MHz, a horn antenna is used. The antenna calibration factors are included in site factors programmed into the test receivers

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.

The requirements of ANSI C63.4:2003 were used for configuration of the equipment turntable. It specifies 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 appendix of this report contains the list of test equipment used and calibration information.

TEST PROCEDURES

General: For Transmitters with detachable antenna, direct measurements for output power, modulation characterization, occupied bandwidth, and frequency stability are performed with the antenna port of the EUT connected to either the power meter, modulation analyzer, or spectrum analyzer via a suitable attenuator and/or filter. The attenuators and/or filters are used to ensure that the transmitter fundamental will not overload the front end of the measurement instrument.

Procedure B – Power Measurement (Conducted Method): The following procedure was used for transmitters that do use external antennas.

1) Set the EUT to maximum power and to the lowest channel.
2) Either a power meter or a spectrum analyzer was used to measure the power output.
3) If a spectrum analyzer was used a resolution and video bandwidth 10kHz was used to measure the power output. Corrected for any external attenuation used for the protection of the input of analyzer. In addition, For CDMA or TDMA modulations set spectrum analyzer resolution to 1MHz and video to 30 kHz. Use video averaging with a 100-sample rate.
4) If a power meter was used, corrected for any external attenuation used for the protection of the input of the sensor head. Also set the power sensor correction by setting up the frequency range that will be measured.
5) Repeat this for the high channel and all modulations that will be used and all output ports used for transmission

Procedure C - Occupied Bandwidth (Conducted Method): Either for analog, digital, or data modulations, occupied bandwidth was performed. The EUT was set to transmit the appropriate modulation at maximum power. The bandwidth was measured using following methods:

1) The built-in 99% function of the spectrum analyzer was used.
2) If the built-in 99% is not available then the following method is used:

   26-dB or 20-dB was subtracted to the maximum peak of the emission. Then the display line function was used, in conjunction with the marker delta function, to measure the emissions bandwidth.

3) For the above two methods a resolution and video bandwidth of 100 or 300 Hz was used to measure the emission's bandwidth.

Procedure D - Occupied Bandwidth (Conducted Emission Mask): Either for analog, digital, or data modulations, emission mask was performed. The EUT was set to transmit the appropriate modulation at maximum power. The following method was used:

1) The EUT was connected directly to the spectrum analyzer and used an attenuator to protect the input of the analyzer. The EUT antenna was removable, so conducted measurements was performed. The EUT was set to transmit continuous packets of data and the Fundamental Frequency set to the middle of the EUT frequency range.

2) Since EUT is designed with a 12.5 kHz channel Section 90.210 (d)(1)(2)(3) was used to show compliance to the emission mask.

3) Any emission must be attenuated below the power (P) as follow:

90.210 (d)(1): 5.625 kHz: 0 dB

90.210(d)(2): 5.625 kHz: 20 dB
12.5 kHz: 70 dB

90.210(d)(3): more than 12.5 kHz: -20 dBm (50+10*log(P))

The following Resolution and Video bandwidth was used to show compliance for the above requirement: 100 Hz.

4) Since EUT is designed with a 25 kHz channel Section 90.210 (c)(1)(2)(3) was used to show compliance to the emission mask.

5) Any emission must be attenuated below the power (P) as follow:

90.210 (c)(1): 5 kHz but no more then 10kHz: 83*log(F_d / 5) dB

90.210(c)(2): 10kHz but no more then 250%: At least 29 log (fd 2/11) dB or 50 dB, whichever is the lesser attenuation

90.210(c)(3): more than 250%: -13 dBm (43+10*log(P))

The following Resolution and Video bandwidth was used to show compliance for the above requirement: 300 Hz.

Procedure H - Other Types of Equipment: Either digital or data modulated signals were simulated, by software or external sources, to performed the required tests. The EUT was set to transmit the appropriate digital modulation.

Procedure J – Antenna Conducted Emissions: For spurious emission measurements at the antenna terminal the following procedure was performed:

1) Set the transmitting signal at the middle of the operating range of the transmitter, as specified in the standard. Power is set to maximum and then to minimum.
2) Set the spectrum analyzer display line function to –20-dBm.
3) Set the spectrum analyzer bandwidth to 10kHz <1GHz and 1 MHz >1GHz.
4) For the spectrum analyzer, the start frequency was set to 30 MHz and the stop frequency set to the 10^{th} harmonic of the fundamental. All spurious or intermodulation emission must not exceed the –20dBm limit.
5) Steps 1 to 4 were repeated for all modulations and output ports that will be used for transmission.

Procedure K - Frequency Stability: The EUT is placed inside a temperature chamber with all support and test equipment located outside of the chamber. The spectrum analyzer is configured to give a 6-digit display for the marker-frequency function. The spectrum analyzer's built-in frequency counter is used to measure the maximum deviation of the fundamental frequency at each temperature. The Temperature chamber was varied from –30 to +50° C (or +60° C for some IC RSS standards, if applicable) in 10 degrees increment. The EUT was allowed enough time to stabilize for each temperature variation.

Procedure L - Frequency Stability: For AC or DC operated devices the nominal voltage is varied to 85% and to 115% at either room temperature or at a controlled +20°C temperature.

Procedure M - Frequency Stability: For battery-powered devices the voltage battery end-point is determined by reducing the dc voltage until the unit ceases to function. This is performed at either room temperature or at a controlled +20°C temperature.

Procedure N - Field Strength Measurement: The EUT was set on the turntable and the search antenna position 3 meters away. The output antenna terminal was terminated with a 50-ohm terminator. The EUT was set at the middle of the frequency band and set at maximum output power.

For the first scan, a pre-liminary measurement is performed. A preliminary scan of emissions is conducted in which all significant EUT frequencies are identified with the system in a nominal configuration. One or more of these is with the antenna polarized vertically while the one or more of these are with the antenna polarized horizontally. During the preliminary scans, the EUT is rotated through 360˚, the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit.

For the final measurement, Substitution method is performed on spurious emissions not being 20-dB below the calculated radiated limit. Substitution method is performed by replacing the EUT with a horn antenna and signal generator. The horn antenna factors can be reference to a half-wave dipole in dBi. The signal generator power level was adjusted until a similar level, which was measured on the first scan, is achieved on the spectrum analyzer. The level on the signal generator is than added to the antenna factor, in dBi, which will give the corrected value.

Procedure I – Transient Frequency Behavior: The TIA/EIA 603 procedure was used to determine compliance to radio being keyed on and off.

1) Connected the Test Receiver DOP or Video Output to Channel 1 of the oscilloscope. The output of the RF crystal detector was connected to Auxiliary channel 1, which served as a trigger input. The output of the combiner was connected to the Test Receiver.

2) Set the EUT to maximum power and connected as illustrated above. Set the signal generator to the assigned transmitter frequency and modulate it with a 1 kHz tone at 6.25kHz, 12.5 kHz, or 25 kHz deviation and set its output to –100 dBm, then turn on the EUT.

3) The Combiner output side was connected to the Test Receiver, which was used to measure the Power. Used enough external attenuation so that the output at the combiner was set to 40 dB below the maximum input of the Test Receiver, then turn off the EUT.

4) Set the signal generator output to the same level in step 3. This level was maintained for the remainder of the test.

5) Set the horizontal sweep rate on the storage oscilloscope to 10 milliseconds per division and adjusted the display to continuously view the 1 kHz tone from the DOP or Video Output. Adjusted the vertical amplitude control to display the 1 kHz at +/- 4 divisions vertically centered on the display.

6) Set the oscilloscope to trigger at the AUX channel 1 input port.

7) Removed enough external attenuation so that the input to the RF detector and combiner is increased by 30 dB.

8) Turn on the transmitter and plotted the result for **Ton**, **T1**, and **T2**.

9) Set the oscilloscope to trigger in decreasing magnitude from the RF crystal detector.

10) Turn off the transmitter and plotted the result for **T3**.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

RADIATED EMISSIONS SPECIFICATION LIMITS

The limits for radiated emissions are based on the power of the transmitter at the operating frequency. Data is measured in the logarithmic form of decibels relative to one milliwatt (dBm) or one microvolt/meter (dBuV/m,). The field strength of the emissions from the EUT is measured on a test site with a receiver.

Below is a formula example used to calculate the attenuation requirement, relative to the transmitters power output, in dBuV/m. For this example an operating power range of 3 watts is used. The radiated emissions limit for spurious signals outside of the assigned frequency block is $43+10\text{Log}_{10}$ (mean output power in watts) dB below the measured amplitude at the operating power.

CALCULATIONS – EFFECTIVE RADIATED POWER

$$E(V/m) = \frac{\sqrt{30 * P * G}}{d}$$

E= Field Strength in V/m
P= Power in Watts (for this example we use 3 watts)
G= Gain of antenna in numeric gain (Assume 1.64 for ERP)
d= distance in meters

$$E(V/m) = \frac{\sqrt{30 * 3 \text{ watts} * 1.64 \text{ dB}}}{3 \text{ meters}}$$

20 * log (4.049 V/m * 1,000,000) = 132.14 dBuV/m @ 3 meters

FCC Rules request an attenuation of 43 + 10 log (3) or 47.8 dB for all emissions outside the assigned block, the limit for spurious and harmonic emissions is:

132.1 dBuV/m – 47.8 dB = 84.3 dBuV/m @ 3 meter.

Note: Substitution Method is performed for spurious emission not being 20-dB below the calculated field strength.

EXHIBIT 1: Test Equipment Calibration Data

1 Page

Radiated Emissions, 0.009 - 4,000 MHz, 13-Nov-07
Engineer: David Bare

Manufacturer	Description	Model #	Asset #	Cal Due
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1548	12-Apr-08
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	10-May-08
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	11-Jan-08
Com-Power Corp.	Preamplifier, 30-1000 MHz	PA-103	1632	25-May-08

Radiated Emissions, 30 - 6,500 MHz, 14-Nov-07
Engineer: David Bare

Manufacturer	Description	Model #	Asset #	Cal Due
Elliott Laboratories	Biconical Antenna, 30-300 MHz	EL30.300	54	26-Mar-08
EMCO	Log Periodic Antenna, 0.3-1 GHz	3146A	364	01-Dec-07
EMCO	Antenna, Horn, 1-18 GHz	3117	1662	21-Mar-08
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	30-Nov-07
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	06-Nov-08
Hewlett Packard	Preamplifier	8447D OPT 010	1826	25-May-08

Masks, 14-Nov-07
Engineer: David Bare

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	30-Nov-07

Radiated Emissions, 30 - 5,000 MHz, 15-Nov-07
Engineer: David Bare

Manufacturer	Description	Model #	Asset #	Cal Due
Rohde & Schwarz	Test Receiver, 9 kHz-2750 MHz	ESCS 30	1337	21-Sep-08
EMCO	Log Periodic Antenna, 0.2-2 GHz	3148	1347	03-Jan-08
EMCO	Biconical Antenna, 30-300 MHz	3110B	1498	20-Mar-08
EMCO	Antenna, Horn, 1-18 GHz	3117	1662	21-Mar-08

Radio Antenna Port (Power and Spurious Emissions), 09-Jan-08
Engineer: David Bare

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Aug-08
Rohde & Schwarz	Power Meter, Dual Channel	NRVD	1539	21-Aug-08
Rohde & Schwarz	Power Sensor 100 uW - 10 Watts	NRV-Z53	1796	12-Feb-08

Radiated Emissions, 30 - 5,000 MHz, 11-Jan-08
Engineer: David Bare

Manufacturer	Description	Model #	Asset #	Cal Due
Rohde & Schwarz	Test Receiver, 20-1300 MHz	ESVP	273	16-Feb-09
EMCO	Log Periodic Antenna, 0.2-2 GHz	3148	1404	30-Mar-08
EMCO	Biconical Antenna, 30-300 MHz	3110B	1497	03-Jul-08

Conducted Emissions - AC Power Ports, 11-Jan-08
Engineer: David Bare

Manufacturer	Description	Model #	Asset #	Cal Due
Rohde & Schwarz	Test Receiver, 0.009-30 MHz	ESH3	215	29-Mar-08
Elliott Laboratories	LISN, FCC / CISPR	LISN-4, OATS	362	18-Jul-08
Hewlett Packard	EMC Spectrum Analyzer, 9 kHz - 6.5 GHz	8595EM	780	09-Oct-08
Rohde& Schwarz	Pulse Limiter	ESH3 Z2	1398	05-Feb-08

Radio Antenna Port (Spurious Emissions), 11-Jan-08
Engineer: David Bare

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	EMC Spectrum Analyzer, 9 kHz - 6.5 GHz	8595EM	780	09-Oct-08

EXHIBIT 2: Test Data Log Sheets

ELECTROMAGNETIC EMISSIONS

TEST LOG SHEETS

AND

MEASUREMENT DATA

T69922 37 Pages

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		-
Emissions Standard(s):	FCC	Class:	B
Immunity Standard(s):	-	Environment:	Radio

EMC Test Data

For The

GE MDS LLC

Model

SD4

Date of Last Test: 1/11/2008

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manger:	Susan Pelzl
Contact:	Dennis McCarthy		
Emissions Standard(s):	FCC	Class:	B
Immunity Standard(s):	-	Environment:	Radio

EUT INFORMATION

The following information was collected during the test session(s).

General Description

The EUT is a industrial radio operating in the 406-416, 421-430 and 450-512 MHz bands. Since the EUT would be placed on a table top during operation, the EUT was treated as table-top equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 13.8 Volts DC, 2 Amps.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
GE MDS LLC	SD4	Industrial Radio	-	E5MDS-SD4

Other EUT Details

The following EUT details should be noted: Two versions of the radio are used to cover the two bands. Different lumped element parts are used. The radio can operate on 12.5 and 25 kHz channels (F1D, F2D and F3D modulations).

EUT Antenna (Intentional Radiators Only)

The EUT antenna is a determined at the time of licensing.

EUT Enclosure

The EUT enclosure is primarily constructed of aluminum. It measures approximately 16 cm wide by 12 cm deep by 4 cm high.

Modification History

Mod. #	Test	Date	Modification
1	RE	11/14/2007	Added 10uH inductor and 2 0.1uF capacitors at the DC input.
2			
3			

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

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manger:	Susan Pelzl
Contact:	Dennis McCarthy		
Emissions Standard(s):	FCC	Class:	B
Immunity Standard(s):	-	Environment:	Radio

Test Configuration #1

The following information was collected during the test session(s).

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Topward	3603D	DC Power Supply	-	-
-	-	-	-	-

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Netgear	RP114	Router	-	-

Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Serial DB9	-	-	-	-
Ethernet	Router	Cat 5	Shielded	30.0
DC Power	Topward DC Supply	DC mains	Unshielded	0.8
RF Output TNC	50 ohm load	Direct connect	Shielded	0.0

Note: The DB9 console port was not connected during testing. The manufacturer stated that this is for setup purposes and therefore would not normally be connected. Either the Ethernet or the Serial DB9 port is used but not both. Emissions tests showed that the highest emissions were observed when using the Ethernet port. Therefore, final tests were done with the Ethernet cable connected.

EUT Operation During Emissions Tests

During emissions testing the EUT was set to transmit at 37dBm or in receive mode on the selected channel.

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	B

Radiated Emissions

(Elliott Laboratories Fremont Facility, Semi-Anechoic Chamber)

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: 11/13/2007
Test Engineer: David Bare
Test Location: Fremont Chamber #3

Config. Used: 1
Config Change: None
EUT Voltage: 13.8Vdc

General Test Configuration

The EUT and any local support equipment were located on the turntable for radiated emissions testing. Any remote support equipment was located outside the semi-anechoic chamber. Any cables running to remote support equipment where routed through metal conduit and when possible passed through a ferrite clamp upon exiting the chamber.

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

Note, **preliminary** testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. **Maximized** testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

Ambient Conditions:

Temperature: 21 °C
Rel. Humidity: 44 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, 30 - 1000 MHz, Preliminary Scan	FCC Part 90.210(b)	Pass	
2	RE, 1000 - 5000 MHz, Preliminary Scan	FCC Part 90.210(b)	Pass	

Modifications Made During Testing

No modifications were made to the EUT during testing

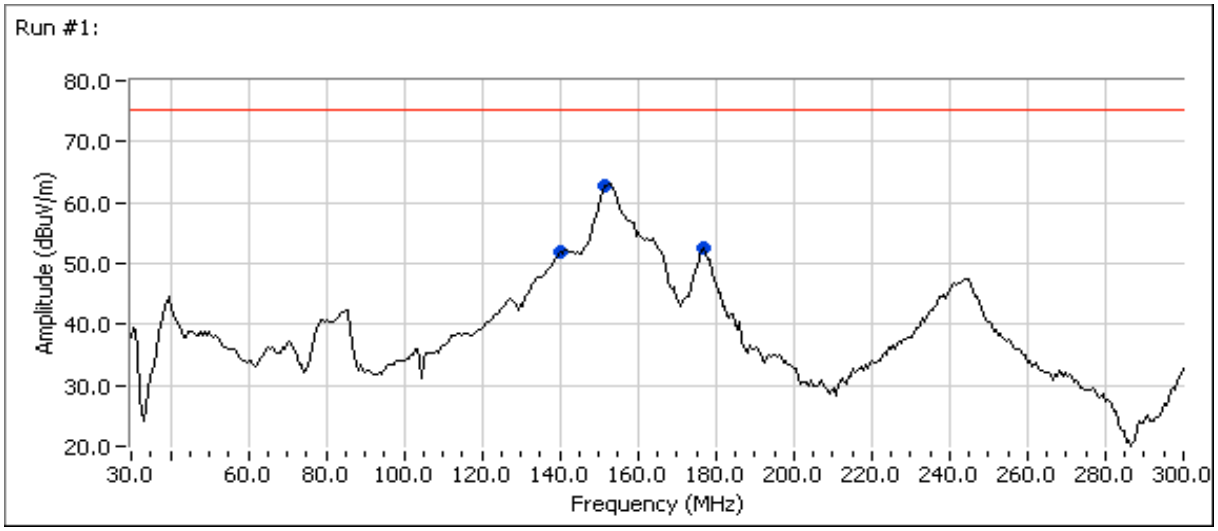
Deviations From The Standard

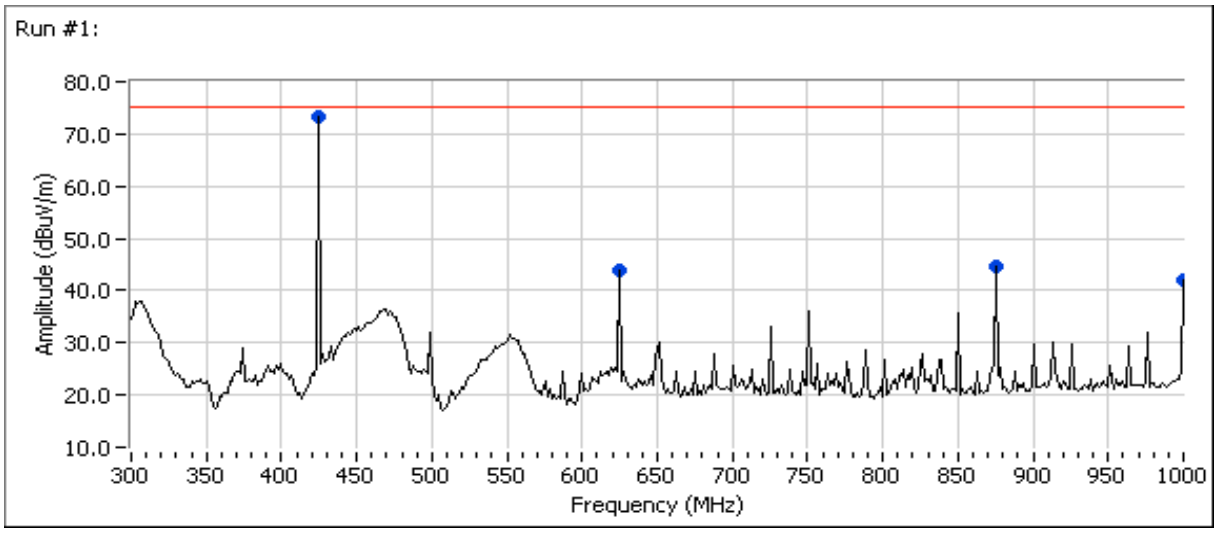
No deviations were made from the requirements of the standard.

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	B

Run #1: Preliminary Radiated Emissions, 30 - 1000 MHz
EUT set at 450 MHz

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
30 - 1000 MHz	3	3	0.0





Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	B

Run #1: Preliminary Radiated Emissions, 30 - 1000 MHz

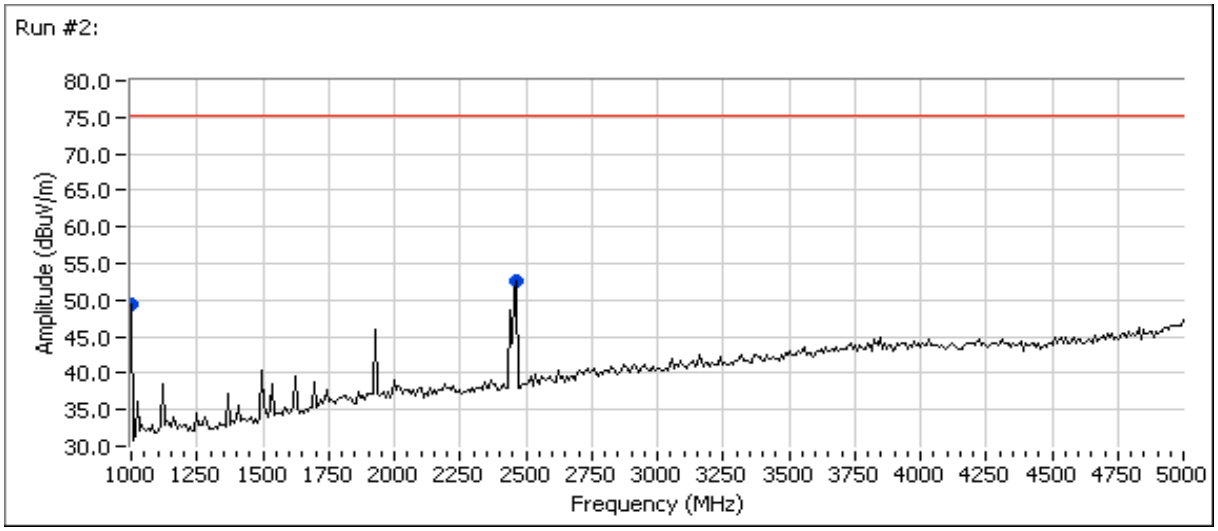
Frequency	Level	Pol	FCC Part 90[1]		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
450.000	73.4	H	-	N/A	Peak	303	1.0	
625.001	44.0	V	72.4	-28.4	Peak	273	1.0	
875.003	44.8	H	72.4	-27.6	Peak	214	1.0	
1000.000	41.9	H	72.4	-30.5	Peak	87	1.0	
140.381	51.9	V	72.4	-20.5	Peak	97	1.0	
151.743	62.7	V	72.4	-9.7	Peak	163	1.0	
176.633	52.7	H	72.4	-19.7	Peak	227	1.5	

Note 1:	Field strength limit calculated from the 55+10log(P) limit of 90.210(b) (ERP)

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	B

Run #2: Preliminary Radiated Emissions, 1000 - 5000 MHz
EUT set at 450 MHz

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 5000 MHz	3	3	0.0



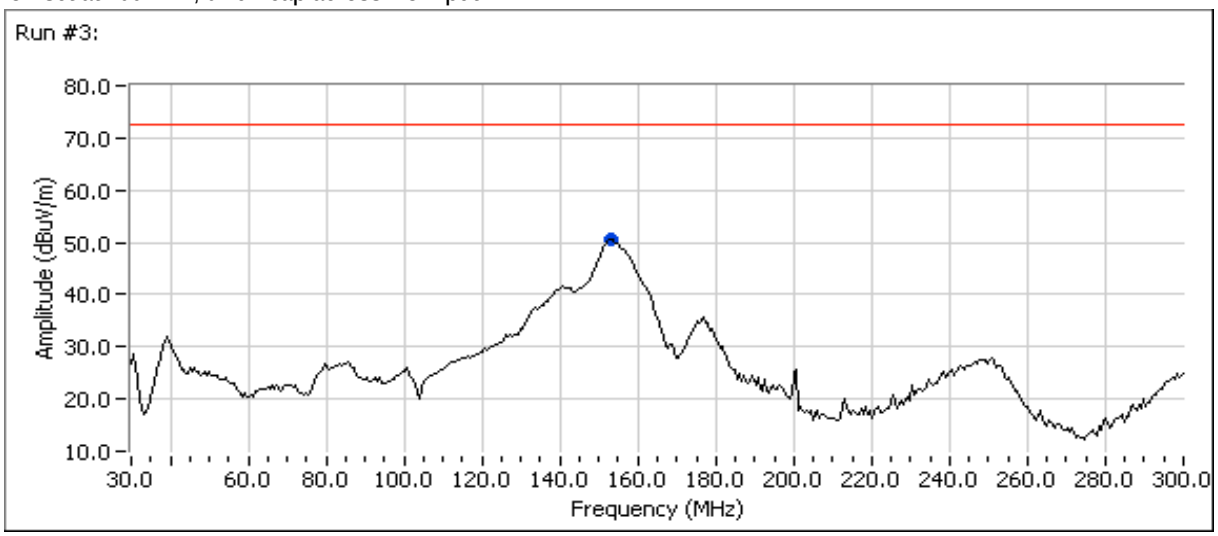
Preliminary peak readings captured during pre-scan (peak readings vs. average limit)

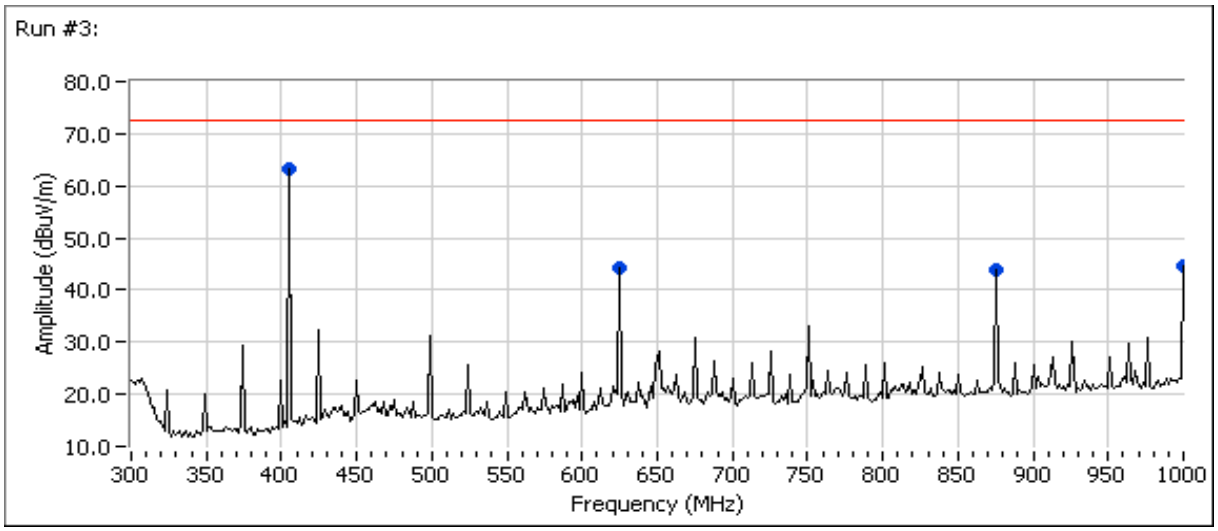
Frequency	Level	Pol	FCC Part 90[1]		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1000.000	49.5	V	72.4	-22.9	Peak	212	1.5	
2463.730	52.7	H	72.4	-19.7	Peak	319	3.0	

Note 1:	Field strength limit calculated from the 55+10log(P) limt of 90.210(b)
Note 2:	The emission at 2463.73 MHz was not from the EUT.

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	B

Run #3: Preliminary Radiated Emissions, 30 - 1000 MHz
EUT set at 406 MHz, 0.1uF cap across DC input





Preliminary peak readings captured during pre-scan

Frequency	Level	Pol	FCC Part 90[1]		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
153.367	51.2	V	72.4	-21.2	Peak	136	1.0	
406.000	63.4	H	-	N/A	Peak	315	1.0	
625.009	44.2	V	72.4	-28.2	Peak	214	1.0	
875.003	43.7	H	72.4	-28.7	Peak	155	1.5	
1000.000	44.5	H	72.4	-27.9	Peak	254	1.0	

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	B

Radiated Emissions

Test Specific Details

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: 11/14/2007 11:37
Test Engineer: David Bare
Test Location: Chamber #2
Config. Used: 1
Config Change: None
EUT Voltage: 13.8 VDC

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated emissions testing. DC supply & Ethernet termination (switch) were located on the turntable floor.

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

Note, **preliminary** testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. **Maximized** testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

Ambient Conditions:

Temperature: 23 °C
Rel. Humidity: 52 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, 30 - 1000MHz	FCC B	Eval	40.0dBµV/m @ 158.020MHz (-3.5dB)
2	RE, 30 - 1000 MHz	FCC B	Eval	43.1dBµV/m @ 375.012MHz (-2.9dB)
3	RE, 1000 - 5000 MHz	FCC B	Eval	44.0dBµV/m @ 1500.1MHz (-10.0dB)

Modifications Made During Testing

Modifications are detailed under each test run.

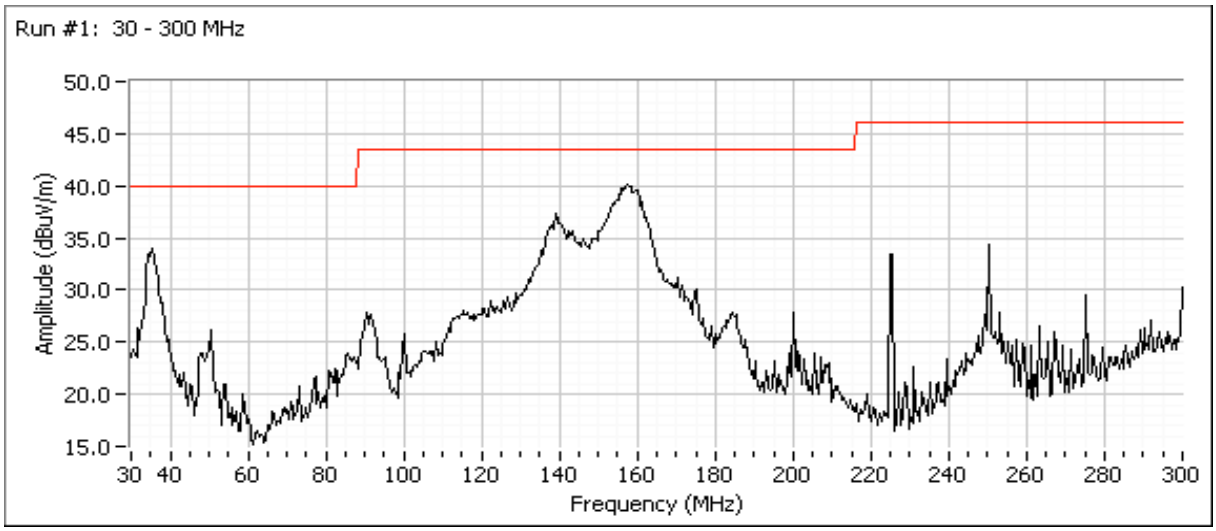
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	B

Run #1: Preliminary Radiated Emissions, 30-1000 MHz, baseline.

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
30 - 1000 MHz	3	3	0.0

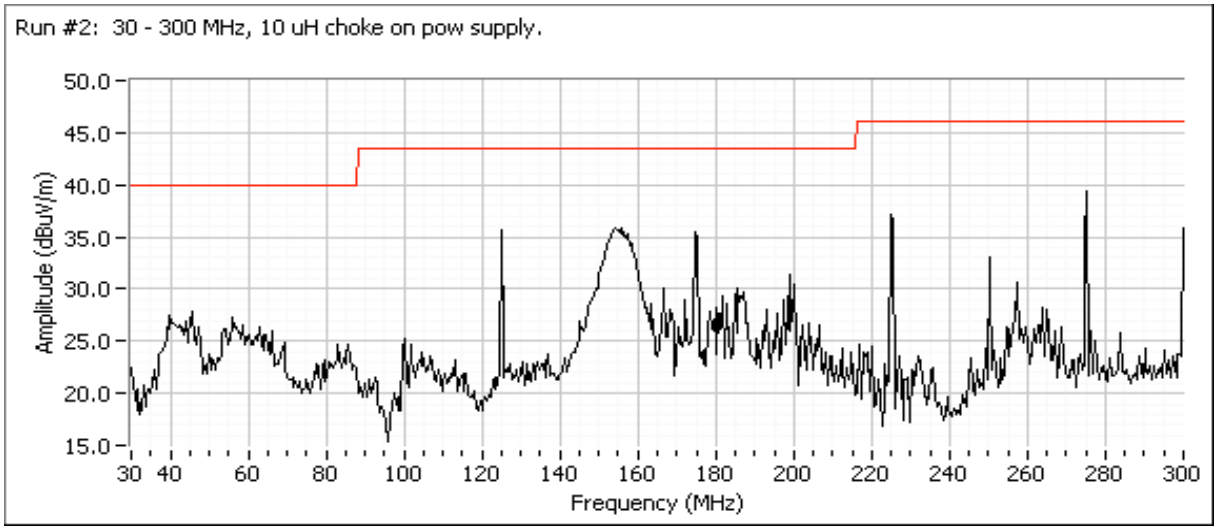


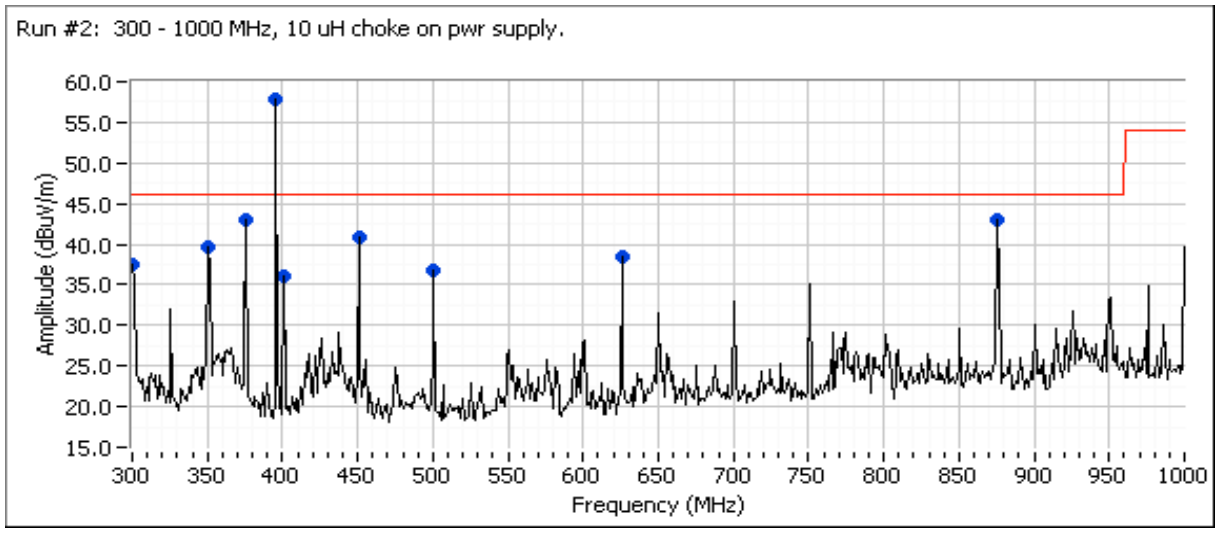
Frequency	Level	Pol	FCC B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
158.020	40.0	H	43.5	-3.5	Peak	301	1.7	
35.586	34.0	V	40.0	-6.0	Peak	239	1.7	
36.024	34.0	V	40.0	-6.0	Peak	239	1.7	
138.660	37.4	V	43.5	-6.1	Peak	89	1.7	
139.125	37.4	V	43.5	-6.1	Peak	89	1.7	
249.998	34.3	H	46.0	-11.7	Peak	226	1.7	
225.003	33.4	V	46.0	-12.6	Peak	179	1.7	

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	B

Run #2: 30-1000 MHz, 10 uH choke on pwr supply.

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
30 - 1000 MHz	3	3	0.0





Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	B

Run #2: 30-1000 MHz, 10 uH choke on pwr supply.

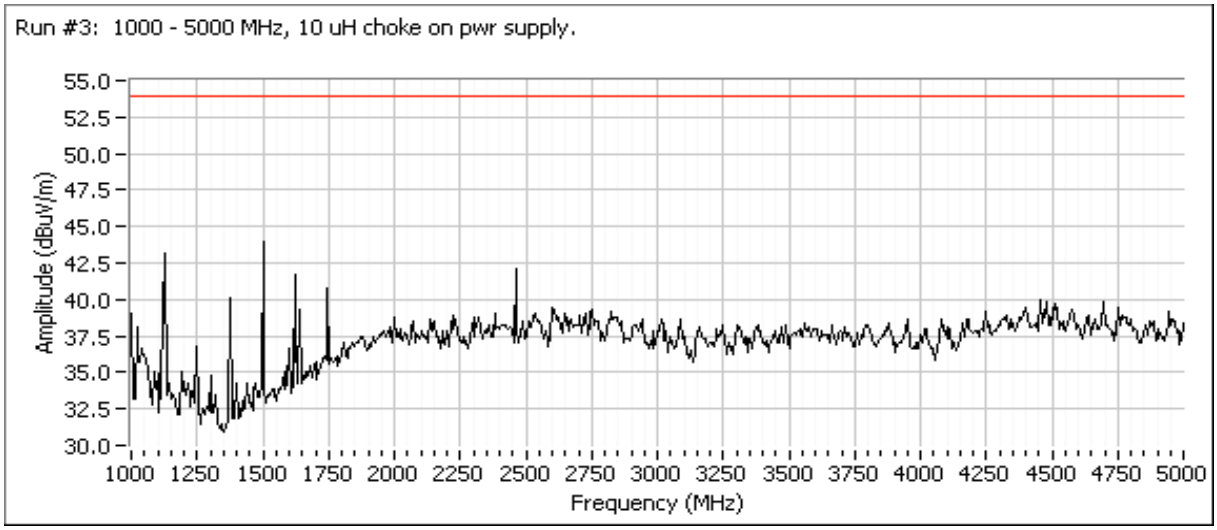
Frequency	Level	Pol	FCC B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
375.012	43.1	H	46.0	-2.9	Peak	360	1.7	
875.021	43.1	H	46.0	-2.9	Peak	302	1.7	
450.015	40.9	H	46.0	-5.1	Peak	314	1.7	
350.021	39.6	H	46.0	-6.4	Peak	5	1.7	
275.001	39.3	H	46.0	-6.7	Peak	14	1.7	
625.015	38.5	V	46.0	-7.5	Peak	208	1.7	
154.595	35.8	H	43.5	-7.7	Peak	74	1.7	
124.997	35.7	V	43.5	-7.8	Peak	226	1.7	
175.003	35.4	H	43.5	-8.1	Peak	164	1.7	
300.000	37.6	H	46.0	-8.4	Peak	22	1.7	
225.001	37.1	H	46.0	-8.9	Peak	14	1.7	
500.017	36.8	H	46.0	-9.2	Peak	63	1.7	
400.022	36.0	H	46.0	-10.0	Peak	10	1.7	

Note 1: The 397 MHz emission was not from the EUT.

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	B

Run #3: Preliminary readings, 1000 - 5000 MHz

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 5000 MHz	3	3	0.0



Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1500.060	44.0	H	54.0	-10.0	Peak	113	1.7	
1125.060	43.2	V	54.0	-10.8	Peak	178	1.7	
2445.190	42.1	V	54.0	-11.9	Peak	324	1.7	

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.

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	B

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: 11/15/2007 7:58
Test Engineer: David Bare
Test Location: SVOATS #1
Config. Used: 1
Config Change: None
EUT Voltage: 13.8Vdc

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated emissions testing. Remote support equipment was located approximately 30 meters from the test area with all I/O connections running under the groundplane.

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

Note, **preliminary** testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. **Maximized** testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

Ambient Conditions:

Temperature: 14 °C
Rel. Humidity: 83 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, 30 - 5000MHz, Maximized Emissions, RX/Digital	FCC / RSS-GEN	Pass	37.9dBµV/m @ 875.000MHz (-8.1dB)
2	RE, 30 - 5000MHz, Maximized Emissions, TX mode (450 MHz)	FCC Pt. 90/ RSS-119	Pass	47.8dBµV/m @ 1000.0MHz (-24.6dB)

Modifications Made During Testing

A 10uH inductor and two 0.1uF capacitors were added to the DC input circuit.

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	B

Run #1: Maximized Emissions found during preliminary scans on November 14, 2007
Receive mode, EUT at 450MHz

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
30 - 5000 MHz	3	3	0.0

Frequency	Level	Pol	FCC / RSS-GEN		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
875.000	37.9	H	46.0	-8.1	QP	232	1.0	Ethernet clock
275.000	36.6	V	46.0	-9.4	QP	222	1.0	Ethernet clock
157.525	32.9	V	43.5	-10.6	QP	238	1.0	Broadband Power Supply
625.000	34.6	H	46.0	-11.4	QP	139	1.7	Ethernet clock
1500.000	41.5	V	54.0	-12.5	AVG	172	1.0	
375.000	32.1	H	46.0	-13.9	QP	233	2.7	Ethernet clock
450.000	28.1	H	46.0	-17.9	QP	4	3.1	
350.000	26.6	H	46.0	-19.4	QP	316	3.2	
1500.000	54.4	V	74.0	-19.6	PK	172	1.0	

Note 1:	The Serial port and Ethernet ports are mutually exclusive. Preliminary tests showed that emissions were highest with respect to the limit when using the Ethernet port. Therefore, this configuration was used for final measurements.
Note 2:	Preliminary testing showed that digital circuit and receiver mode emissions from the EUT are not dependent on the EUT receive frequency. A receive frequency of 450MHz was used for final measurements.

Run #2: Maximized Emissions found during preliminary scans on November 13, 2007
Transmit mode, EUT at 450MHz

Frequency	Level	Pol	FCC Part 90[1]		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1000.000	47.8	V	72.4	-24.6	Peak	164	1.0	Ethernet clock
875.003	44.8	H	72.4	-27.6	Peak	214	1.0	Ethernet clock
157.525	35.4	V	72.4	-37.0	Peak	238	1.0	Broadband Power Supply
625.000	35.3	H	72.4	-37.1	Peak	139	1.7	Ethernet clock
176.633	31.5	H	72.4	-40.9	Peak	167	1.5	Broadband Power Supply
140.381	26.5	V	72.4	-45.9	Peak	172	1.0	Broadband Power Supply

Note 1:	None of the emissions observed were related to spurs of the transmitter. All emissions were more than 20 dB below the calcualted field strength limit, so no substitution measurments were necessary. Calculated limit based on -25dBm ERP.

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	N/A

Radio Performance Test - FCC Part 90 / RSS-119
RF Port Measurements - 25 and 12.5 kHz channels

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: 1/9/2008
Test Engineer: David Bare
Test Location: SVOATS #2

Config. Used: 1
Config Change: None
EUT Voltage: 13.8VDC

General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator.

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

Ambient Conditions:

Temperature: 20 °C
Rel. Humidity: 52 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Maximim Output Power	FCC Part 90	37.0 dBm	Determined at time of licensing
2	Unwanted emissions (Mask)	FCC Part 90	Within Mask	Masks C, D, E
3	Bandwidth	FCC Part 90	Pass	See run for details

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.

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	N/A

Run #1: Maximum Power Measurements, modulated

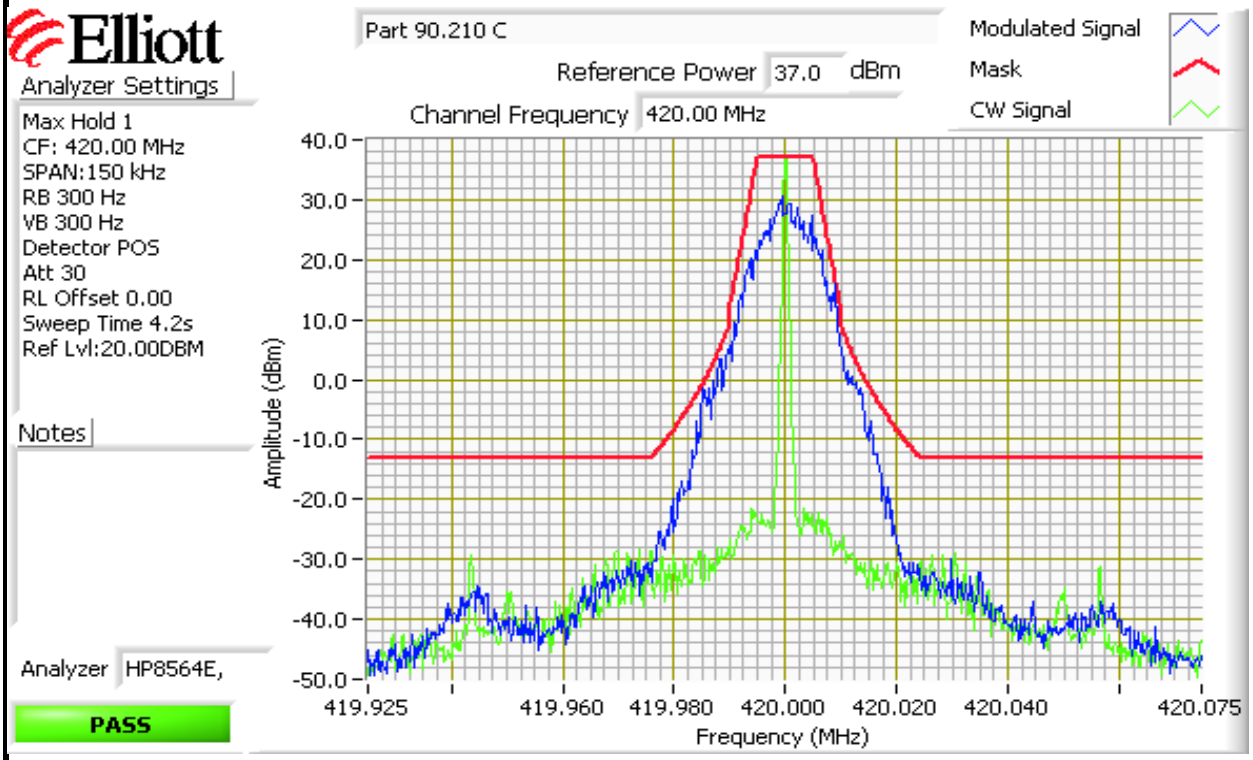
Power settings from 20 to 37 are available corresponding to 0.1 to 5 Watts.

Freq.	Setting[2]	Pmeas	Duty Cycle	Pout
406.1	37	37.1	100%	37.1
450	37	37.4	100%	37.4
460	37	37.1	100%	37.1
470	37	37.0	100%	37.0
512	37	37.4	100%	37.1

Setting: software power setting of EUT
Pmeas: Measured output power (PEP) using power meter
Duty Cycle: Duty cycle of transmissions

Note 1:	Output power measured using a peak power meter
Note 2:	Power setting - the software power setting used during testing, included for reference only.

Run #2: Unwanted emissions (Masks)



Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	N/A

Elliott

Analyzer Settings

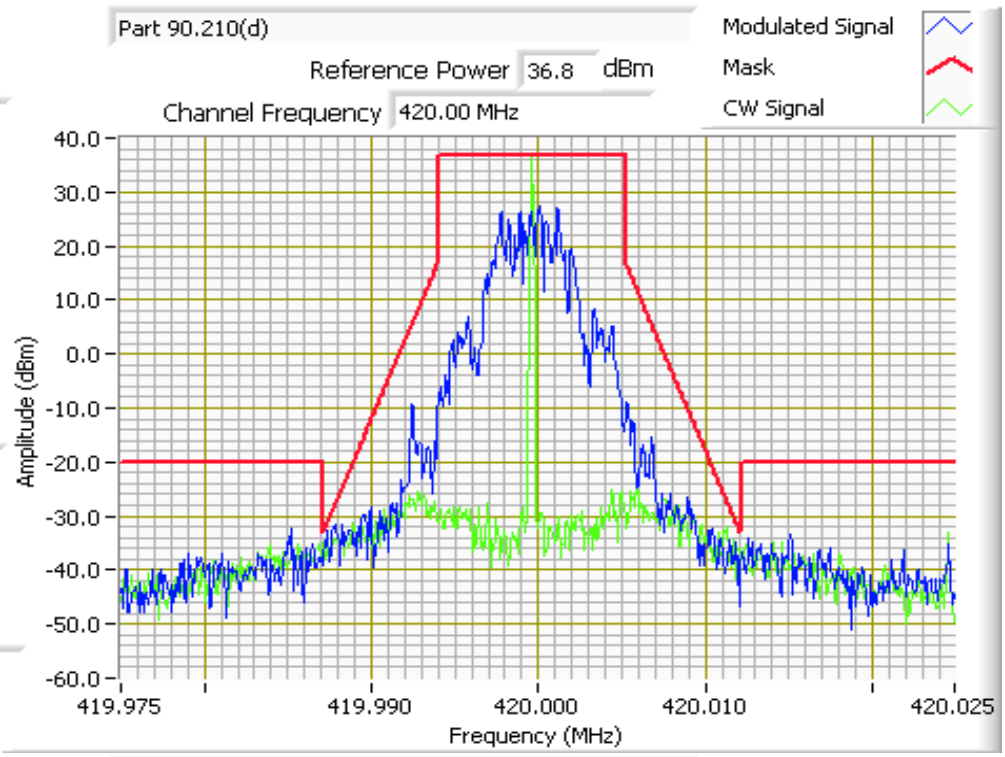
Max Hold 1
CF: 420.00 MHz
SPAN:50 kHz
RB 100 Hz
VB 100 Hz
Detector POS
Att 30
RL Offset 20.00
Sweep Time 4.0s
Ref Lvl:40.00DBM

Notes

2 Level FSK

Analyzer HP8564E,

PASS



Elliott

Analyzer Settings

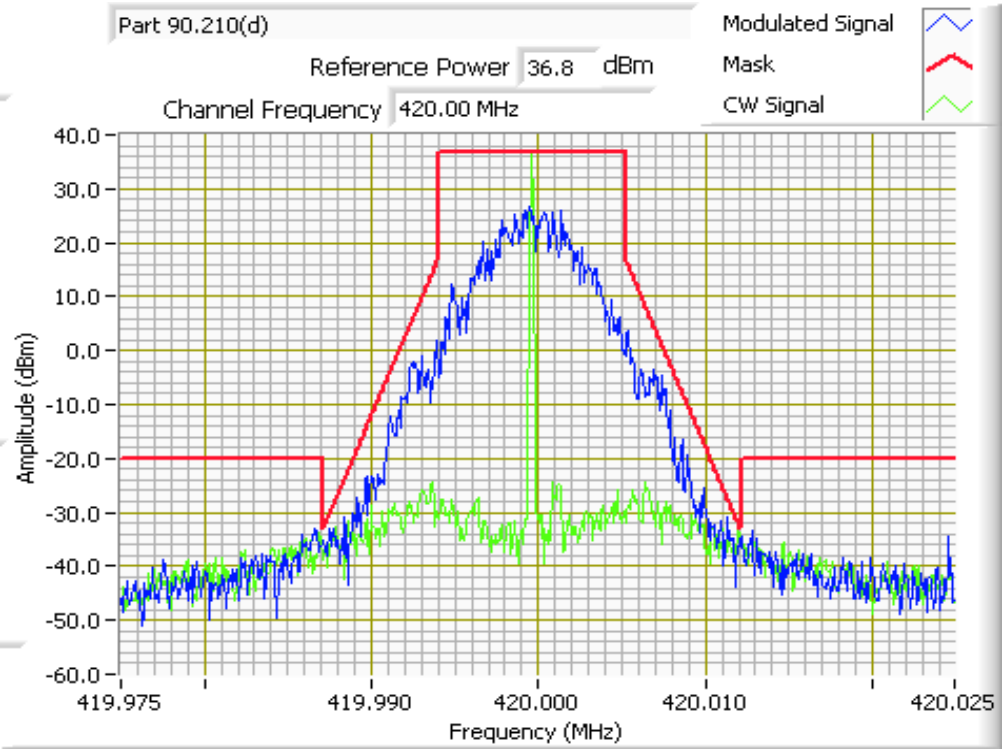
Max Hold 1
CF: 420.00 MHz
SPAN:50 kHz
RB 100 Hz
VB 100 Hz
Detector POS
Att 30
RL Offset 20.00
Sweep Time 4.0s
Ref Lvl:40.00DBM

Notes

3 Level FSK

Analyzer HP8564E,

PASS



Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	N/A

Run #3a: Signal Bandwidth, 12.5kHz, 2 Level FSK (Authorized BW = 11.25kHz)

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (kHz) 99%
37	406.1	100 Hz	5.83
37	450	100 Hz	6.33
37	470	100 Hz	6.27
37	512	100 Hz	6.33

Run #3b: Signal Bandwidth, 12.5kHz, 3 Level FSK (Authorized BW = 11.25kHz)

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (kHz) 99%
37	406.1	100 Hz	9.08
37	450	100 Hz	9.25
37	470	100 Hz	9.17
37	512	100 Hz	8.92

Run #3c: Signal Bandwidth, 25kHz (Authorized BW = 20kHz)

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (kHz) 99%
37	406.1	300 Hz	16.4
37	450	300 Hz	16.5
37	470	300 Hz	16.3
37	512	300 Hz	16.2

Note 1:	99% bandwidth measured in accordance with RSS GEN, with RB > 1% of the span and VB > 3xRB

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	N/A

Radio Performance Test - FCC Part 90 / RSS-119
RF Port Measurements - 25 and 12.5 kHz channels

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: 1/11/2008
Test Engineer: David Bare
Test Location: SVOATS #2

Config. Used: 1
Config Change: None
EUT Voltage: 13.8VDC

General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator.

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

Ambient Conditions:

Temperature: 20 °C
Rel. Humidity: 52 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1a - 1d	Transmitter spurious emissions, 30MHz - 5,120MHz (rf port)	FCC Part 90	Pass	-22.2dBm @ 812.191MHz (-2.2dB)
2	Transient Frequency Behavior	FCC Part 90	Pass	See plots

Modifications Made During Testing

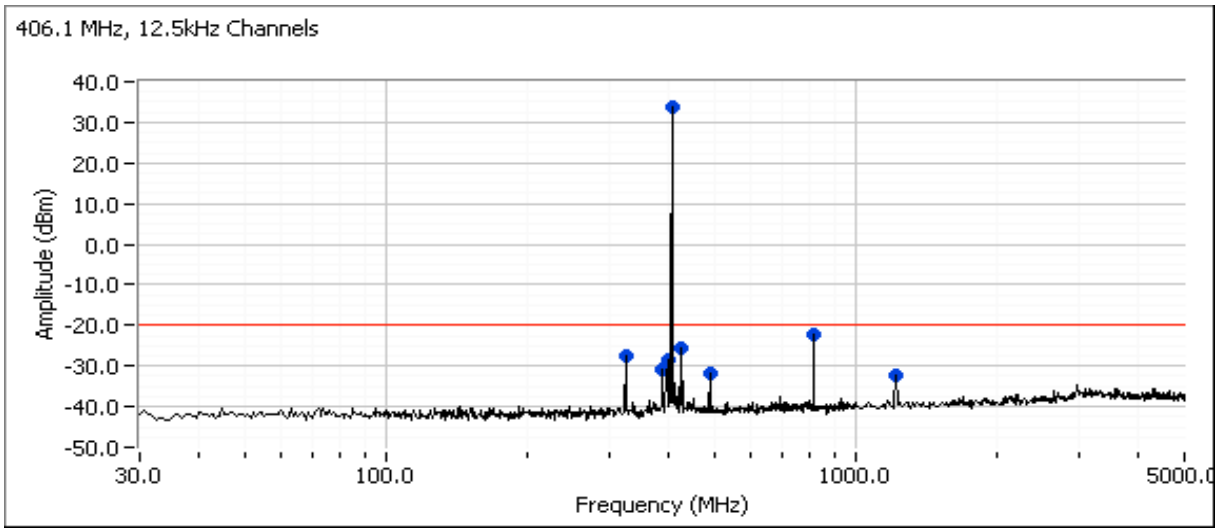
No modifications were made to the EUT during testing

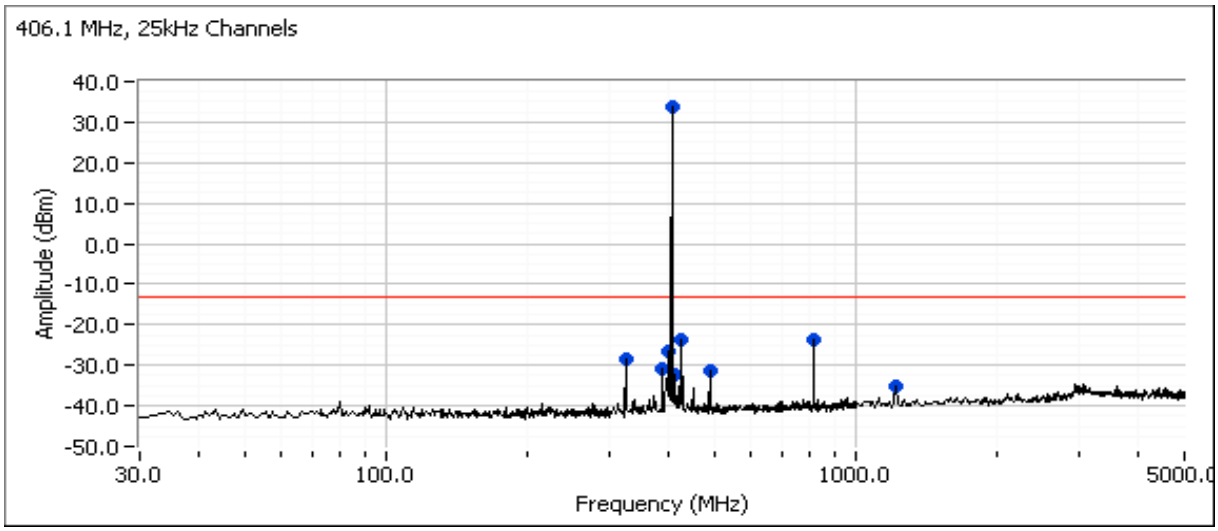
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	N/A

Run #1: Antenna Port Conducted Spurious Emissions 30 - 5000 MHz
Run #1a: 406.1 MHz



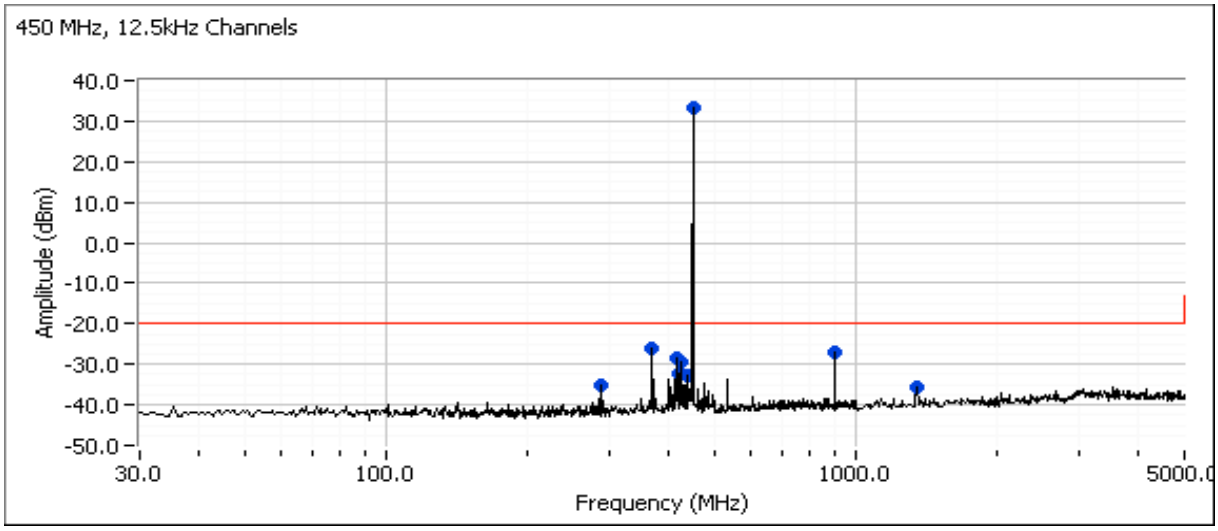


Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	N/A

Run #1a: 406.1 MHz

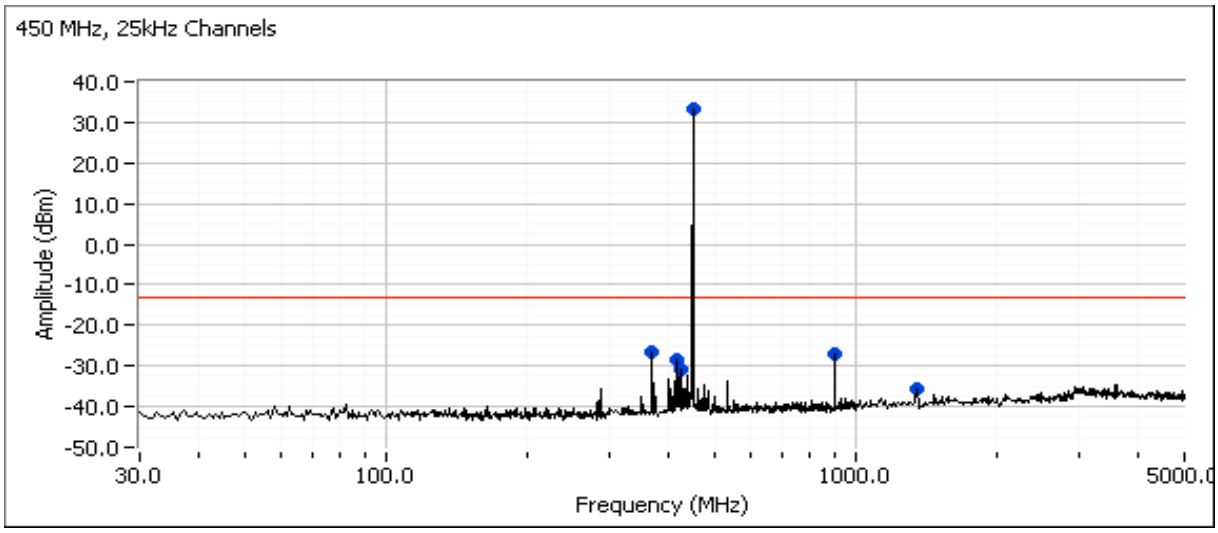
Frequency MHz	Level dBm	Port	FCC Part 90 Limit	FCC Part 90 Margin	Detector	Channel	Mode	Comments
812.191	-22.2	RF Port	-20.0	-2.2	Peak	406.1 MHz	12.5 KHz	
425.005	-25.6	RF Port	-20.0	-5.6	Peak	406.1 MHz	12.5 KHz	
323.898	-27.6	RF Port	-20.0	-7.6	Peak	406.1 MHz	12.5 KHz	
399.994	-28.6	RF Port	-20.0	-8.6	Peak	406.1 MHz	12.5 KHz	
387.203	-30.7	RF Port	-20.0	-10.7	Peak	406.1 MHz	12.5 KHz	
395.403	-31.0	RF Port	-20.0	-11.0	Peak	406.1 MHz	12.5 KHz	
488.293	-31.9	RF Port	-20.0	-11.9	Peak	406.1 MHz	12.5 KHz	
1218.350	-32.5	RF Port	-20.0	-12.5	Peak	406.1 MHz	12.5 KHz	
812.200	-23.6	RF Port	-13.0	-10.6	Peak	406.1 MHz	25 KHz	
425.005	-23.8	RF Port	-13.0	-10.8	Peak	406.1 MHz	25 KHz	
399.994	-26.6	RF Port	-13.0	-13.6	Peak	406.1 MHz	25 KHz	
324.000	-28.5	RF Port	-13.0	-15.5	Peak	406.1 MHz	25 KHz	
387.200	-31.0	RF Port	-13.0	-18.0	Peak	406.1 MHz	25 KHz	
488.293	-31.1	RF Port	-13.0	-18.1	Peak	406.1 MHz	25 KHz	
413.301	-32.2	RF Port	-13.0	-19.2	Peak	406.1 MHz	25 KHz	
1218.350	-35.0	RF Port	-13.0	-22.0	Peak	406.1 MHz	25 KHz	

Run #1b: 450 MHz



Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	N/A

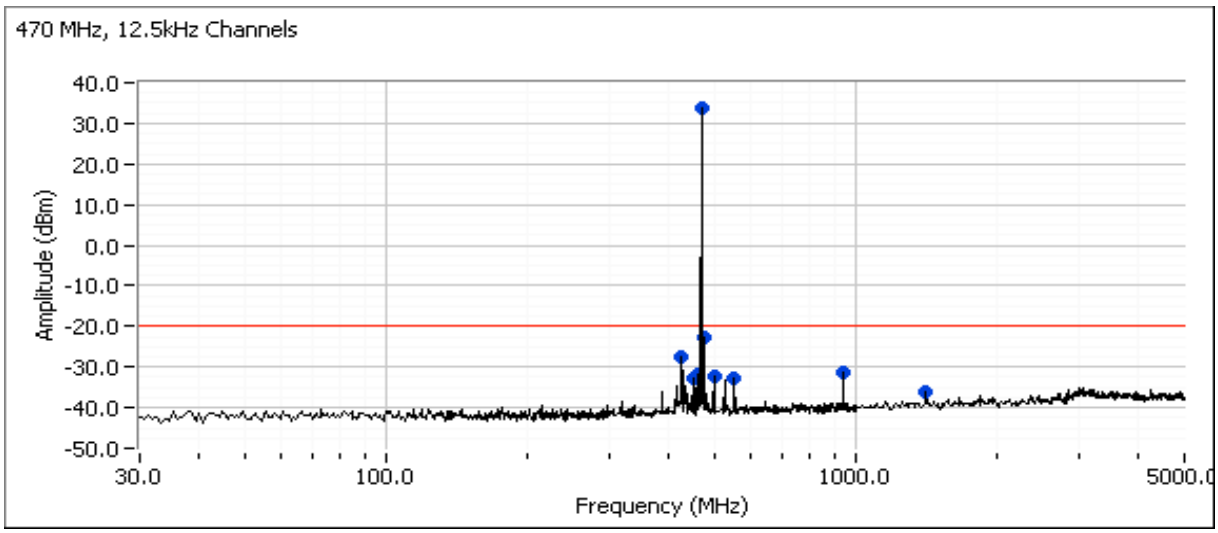
Run #1b: 450 MHz

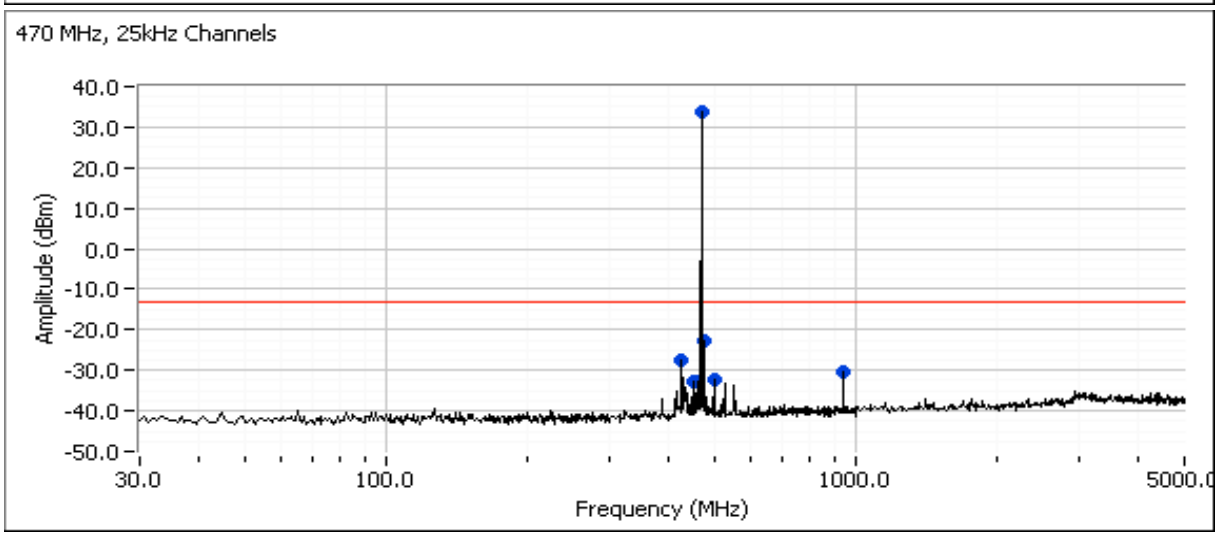


Frequency MHz	Level dBm	Port	FCC Part 90 Limit	FCC Part 90 Margin	Detector	Channel	Mode	Comments
367.796	-26.2	RF Port	-20.0	-6.2	Peak	450 MHz	12.5kHz	
900.000	-26.9	RF Port	-20.0	-6.9	Peak	450 MHz	12.5kHz	
414.400	-28.6	RF Port	-20.0	-8.6	Peak	450 MHz	12.5kHz	
425.005	-29.4	RF Port	-20.0	-9.4	Peak	450 MHz	12.5kHz	
419.703	-32.3	RF Port	-20.0	-12.3	Peak	450 MHz	12.5kHz	
437.499	-32.7	RF Port	-20.0	-12.7	Peak	450 MHz	12.5kHz	
285.589	-35.2	RF Port	-20.0	-15.2	Peak	450 MHz	12.5kHz	
1350.000	-35.8	RF Port	-20.0	-15.8	Peak	450 MHz	12.5kHz	
367.796	-26.6	RF Port	-13.0	-13.6	Peak	450 MHz	25kHz	
900.000	-27.1	RF Port	-13.0	-14.1	Peak	450 MHz	25kHz	
414.400	-28.4	RF Port	-13.0	-15.4	Peak	450 MHz	25kHz	
425.000	-30.9	RF Port	-13.0	-17.9	Peak	450 MHz	25kHz	
1350.000	-35.5	RF Port	-13.0	-22.5	Peak	450 MHz	25kHz	

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	N/A

Run #1c: 470 MHz



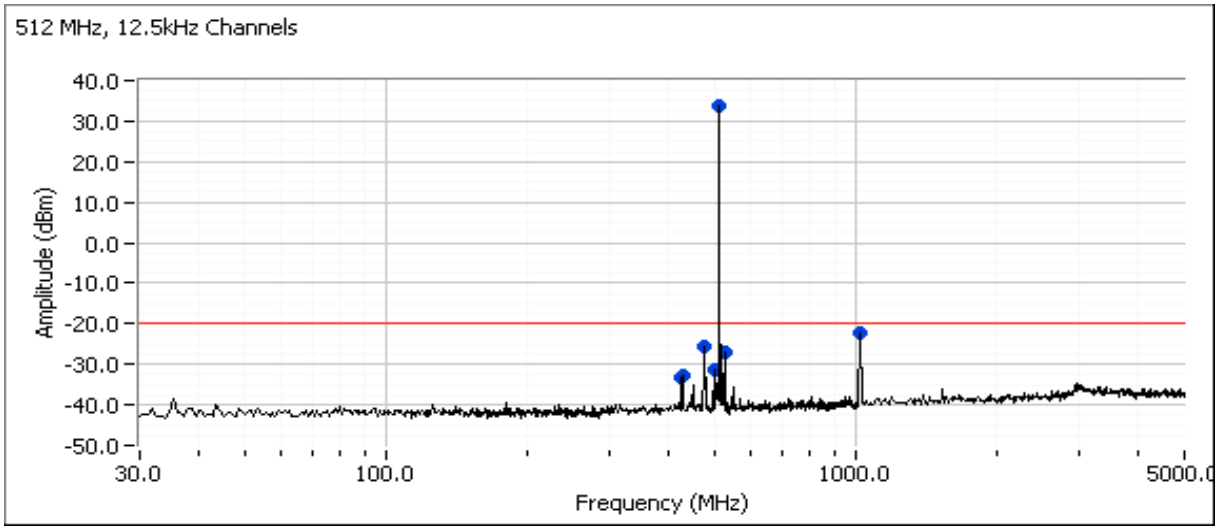


Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	N/A

Run #1c: 470 MHz

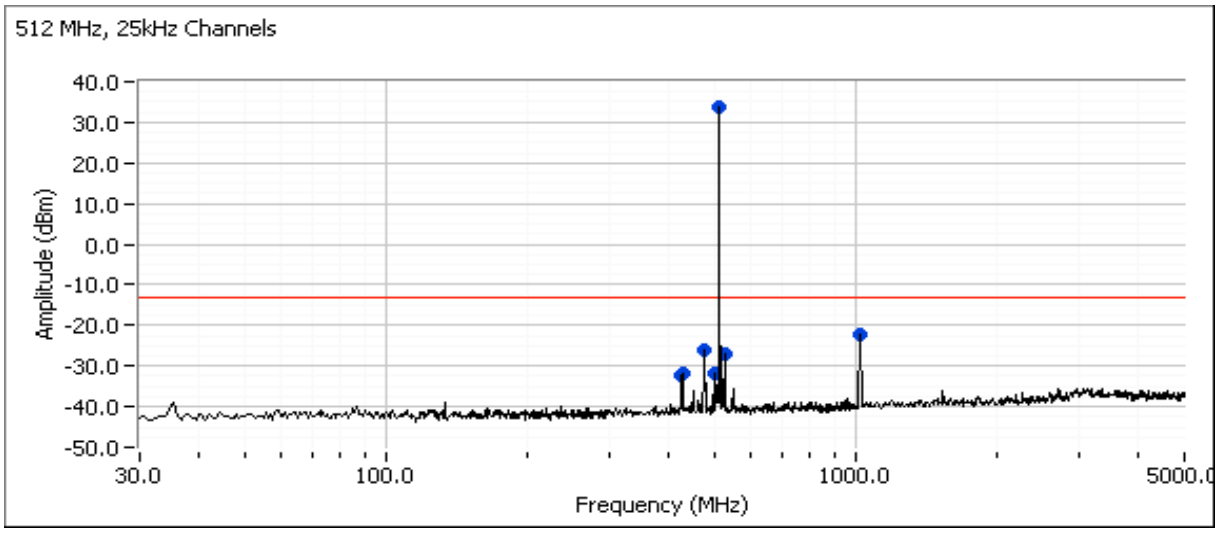
Frequency MHz	Level dBm	Port	FCC Part 90 Limit	FCC Part 90 Margin	Detector	Channel	Mode	Comments
475.013	-22.8	RF Port	-20.0	-2.8	Peak	470 MHz	12.5kHz	
425.018	-27.5	RF Port	-20.0	-7.5	Peak	470 MHz	12.5kHz	
940.016	-31.2	RF Port	-20.0	-11.2	Peak	470 MHz	12.5kHz	
459.315	-31.6	RF Port	-20.0	-11.6	Peak	470 MHz	12.5kHz	
500.024	-32.2	RF Port	-20.0	-12.2	Peak	470 MHz	12.5kHz	
552.223	-32.7	RF Port	-20.0	-12.7	Peak	470 MHz	12.5kHz	
450.016	-32.9	RF Port	-20.0	-12.9	Peak	470 MHz	12.5kHz	
1410.070	-36.2	RF Port	-20.0	-16.2	Peak	470 MHz	12.5kHz	
475.013	-22.9	RF Port	-13.0	-9.9	Peak	470 MHz	25kHz	
425.018	-27.6	RF Port	-13.0	-14.6	Peak	470 MHz	25kHz	
940.011	-30.5	RF Port	-13.0	-17.5	Peak	470 MHz	25kHz	
500.024	-32.3	RF Port	-13.0	-19.3	Peak	470 MHz	25kHz	
450.016	-32.8	RF Port	-13.0	-19.8	Peak	470 MHz	25kHz	
459.315	-33.0	RF Port	-13.0	-20.0	Peak	470 MHz	25kHz	

Run #1d: 512 MHz



Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	N/A

Run #1d: 512 MHz



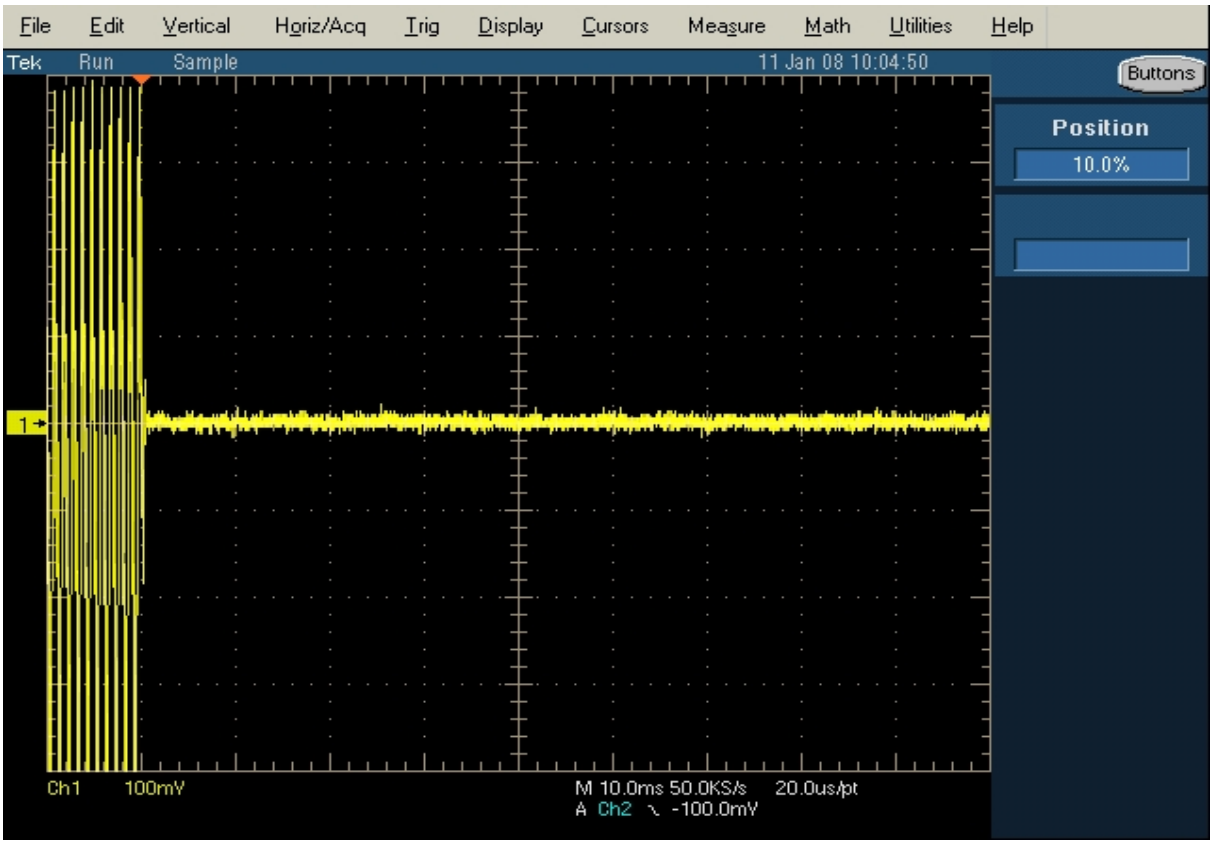
Frequency MHz	Level dBm	Port	FCC Part 90 Limit	FCC Part 90 Margin	Detector	Channel	Mode	Comments
1024.090	-22.3	RF Port	-20.0	-2.3	Peak	512 MHz	12.5kHz	
476.401	-25.8	RF Port	-20.0	-5.8	Peak	512 MHz	12.5kHz	
524.991	-27.2	RF Port	-20.0	-7.2	Peak	512 MHz	12.5kHz	
501.302	-31.1	RF Port	-20.0	-11.1	Peak	512 MHz	12.5kHz	
429.805	-32.8	RF Port	-20.0	-12.8	Peak	512 MHz	12.5kHz	
425.005	-33.2	RF Port	-20.0	-13.2	Peak	512 MHz	12.5kHz	
1024.090	-22.4	RF Port	-13.0	-9.4	Peak	512 MHz	25kHz	
476.401	-25.9	RF Port	-13.0	-12.9	Peak	512 MHz	25kHz	
524.991	-27.1	RF Port	-13.0	-14.1	Peak	512 MHz	25kHz	
429.805	-31.6	RF Port	-13.0	-18.6	Peak	512 MHz	25kHz	
501.302	-31.8	RF Port	-13.0	-18.8	Peak	512 MHz	25kHz	
425.005	-32.3	RF Port	-13.0	-19.3	Peak	512 MHz	25kHz	

Note 1:	No emissions from 5 to 5.12 GHz were observed above the noise floor seen in plot above.

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	N/A

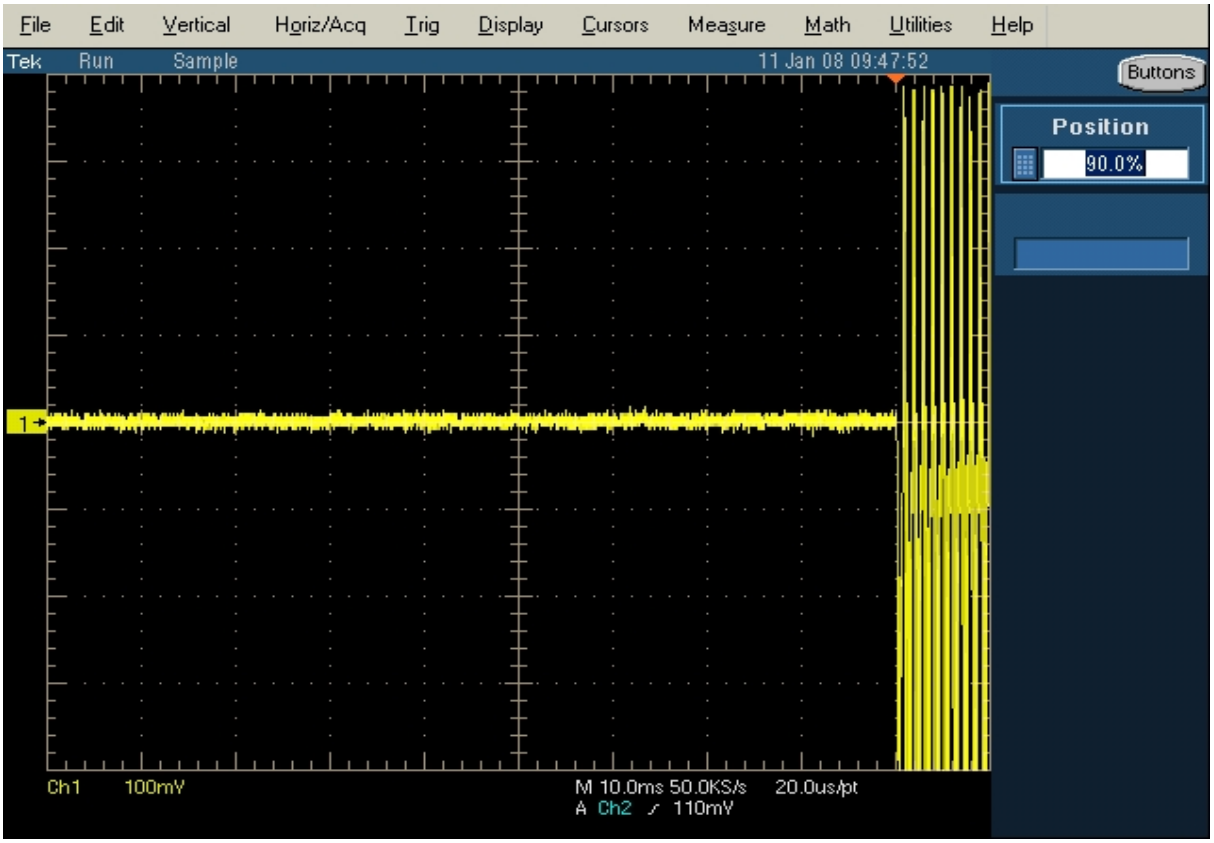
Run #2a: Transient Frequency Behavior

Carrier Frequency: 450 MHz
Channel Spacing: 12.5 kHz
Modulation: FM with 9600 bps data rate.
Description: Switch on condition ton, t1, and t2



Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	N/A

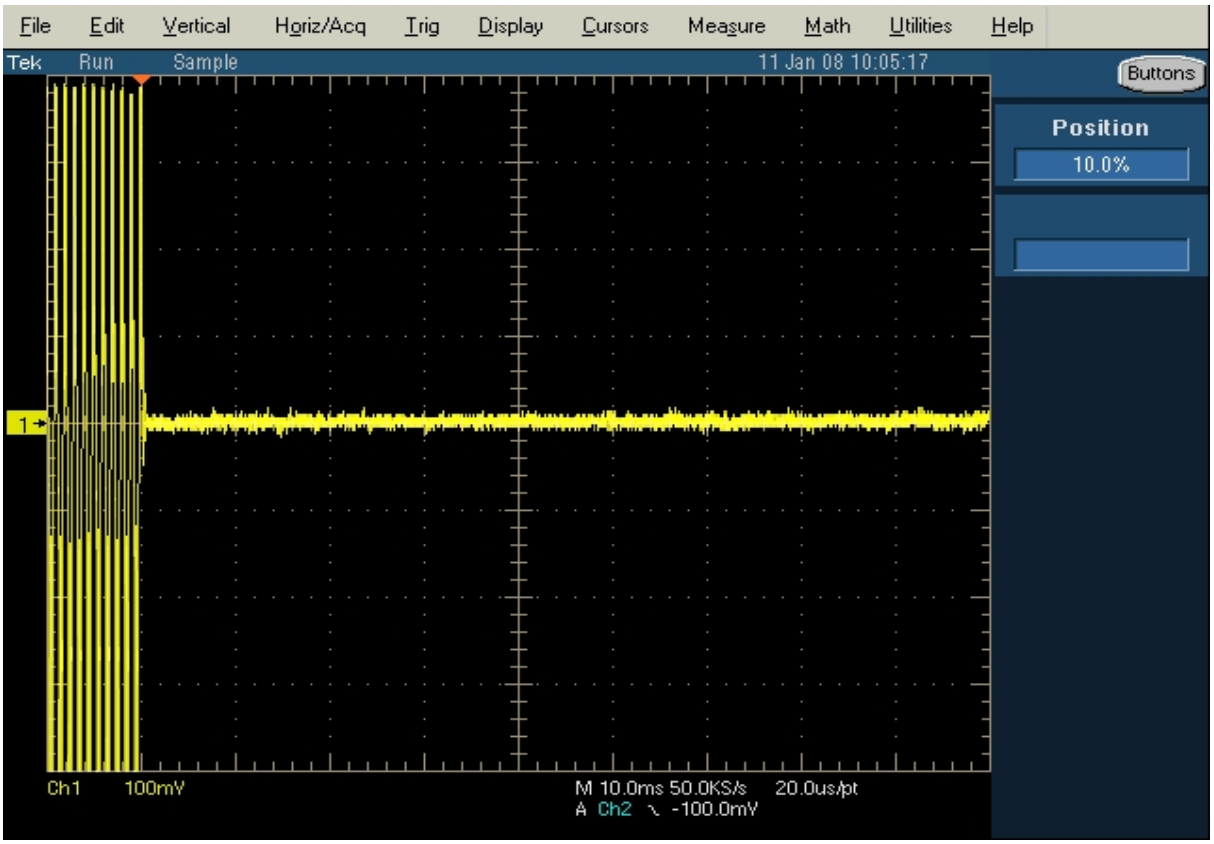
Carrier Frequency: 450 MHz
Channel Spacing: 12.5 kHz
Modulation: FM with 9600 bps data rate.
Description: Switch off condition t3 and toff



Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	N/A

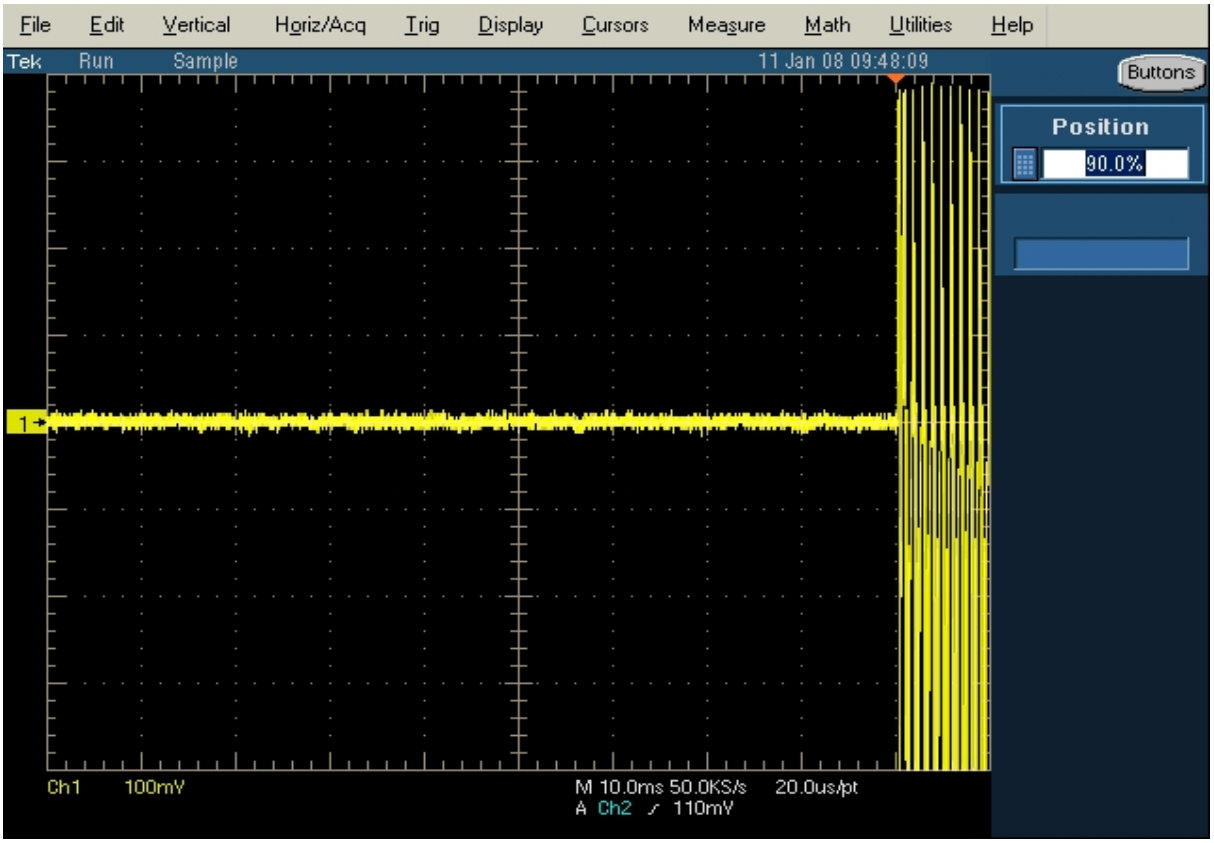
Run #2b: Transient Frequency Behavior

Carrier Frequency: 450 MHz
Channel Spacing: 25 kHz
Modulation: FM with 19200 bps data rate.
Description: Switch on condition ton, t1, and t2



Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	N/A

Carrier Frequency: 450 MHz
Channel Spacing: 25 kHz
Modulation: FM with 19200 bps data rate.
Description: Switch off condition t3 and toff



Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	B

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: 1/11/2008 10:41
Test Engineer: David Bare
Test Location: SVOATS #2
Config. Used: 1
Config Change: None
EUT Voltage: 13.8VDC

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated emissions testing. Remote support equipment was located approximately 30 meters from the test area with all I/O connections running under the groundplane.

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

Note, **preliminary** testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. **Maximized** testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

Ambient Conditions:

Temperature: 12 °C
Rel. Humidity: 79 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, 30 - 5000MHz, Maximized Emissions, TX mode (406.1 MHz)	FCC Pt. 90/ RSS-118	Pass	45.6dBµV/m @ 875.000MHz (-26.8dB)
2	RE, 30 - 5000MHz, Maximized Emissions, TX mode (470 MHz)	FCC Pt. 90/ RSS-119	Pass	45.6dBµV/m @ 875.000MHz (-26.8dB)
3	RE, 30 - 5120MHz, Maximized Emissions, TX mode (512 MHz)	FCC Pt. 90/ RSS-119	Pass	45.6dBµV/m @ 875.000MHz (-26.8dB)

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.

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	B

Run #1: Maximized Emissions found during preliminary scans
Transmit mode, EUT at 406.1MHz

Frequency	Level	Pol	FCC Part 90[1]		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
875.000	45.6	H	72.4	-26.8	PK	225	1.0	Ethernet clock
812.200	38.8	V	72.4	-33.6	PK	154	1.0	2nd Harmonic
1000.000	38.8	V	72.4	-33.6	PK	157	1.5	Ethernet clock
625.000	38.0	H	72.4	-34.4	PK	219	1.0	Ethernet clock
157.606	35.9	H	72.4	-36.5	PK	310	1.0	Broadband Power Supply
176.621	32.4	H	72.4	-40.0	PK	150	1.0	Broadband Power Supply
141.757	26.4	H	72.4	-46.0	PK	330	1.0	Broadband Power Supply

Note 1:	None of the emissions observed were related to spurs of the transmitter except the 2nd harmonic. All emissions were more than 20 dB below the calcualted field strength limit, so no substitution measurments were necessary. Calculated limit based on -25dBm ERP.

Run #2: Maximized Emissions found during preliminary scans
Transmit mode, EUT at 470MHz

Frequency	Level	Pol	FCC Part 90[1]		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
875.000	45.6	H	72.4	-26.8	PK	225	1.0	Ethernet clock
1000.000	38.8	V	72.4	-33.6	PK	157	1.5	Ethernet clock
625.000	38.0	H	72.4	-34.4	PK	219	1.0	Ethernet clock
157.606	35.9	H	72.4	-36.5	PK	310	1.0	Broadband Power Supply
940.000	34.9	V	72.4	-37.5	PK	154	1.0	2nd Harmonic
176.621	32.4	H	72.4	-40.0	PK	150	1.0	Broadband Power Supply
141.757	26.4	H	72.4	-46.0	PK	330	1.0	Broadband Power Supply

Note 1:	None of the emissions observed were related to spurs of the transmitter except the 2nd harmonic. All emissions were more than 20 dB below the calcualted field strength limit, so no substitution measurments were necessary. Calculated limit based on -25dBm ERP.

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	B

Run #3: Maximized Emissions found during preliminary scans
Transmit mode, EUT at 512MHz

Frequency	Level	Pol	FCC Part 90[1]		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
875.000	45.6	H	72.4	-26.8	PK	225	1.0	Ethernet clock
1024.000	42.6	H	72.4	-29.8	PK	231	1.0	2nd Harmonic
1000.000	38.8	V	72.4	-33.6	PK	157	1.5	Ethernet clock
625.000	38.0	H	72.4	-34.4	PK	219	1.0	Ethernet clock
157.606	35.9	H	72.4	-36.5	PK	310	1.0	Broadband Power Supply
176.621	32.4	H	72.4	-40.0	PK	150	1.0	Broadband Power Supply
141.757	26.4	H	72.4	-46.0	PK	330	1.0	Broadband Power Supply

Note 1:	None of the emissions observed were related to spurs of the transmitter except the 2nd harmonic. All emissions were more than 20 dB below the calcualted field strength limit, so no substitution measurments were necessary. Calculated limit based on -25dBm ERP.

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	B

Conducted Emissions - Power Ports

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: 1/11/2008 10:41
Test Engineer: David Bare
Test Location: SVOATS #2
Config. Used: 1
Config Change: None
PS Input Voltage: 120V/60Hz

General Test Configuration

The EUT and power supply were located on a 80cm high wooden table, 40 cm from a vertical coupling plane and 80cm from the LISN. Remote support equipment was located approximately 30 meters from the test area with all I/O connections running on top of the groundplane.

Ambient Conditions:

Temperature: 13 °C
Rel. Humidity: 74 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power,120V/60Hz	FCC 15.107	Pass	60.2dBµV @ 0.266MHz (-1.0dB)

Modifications Made During Testing

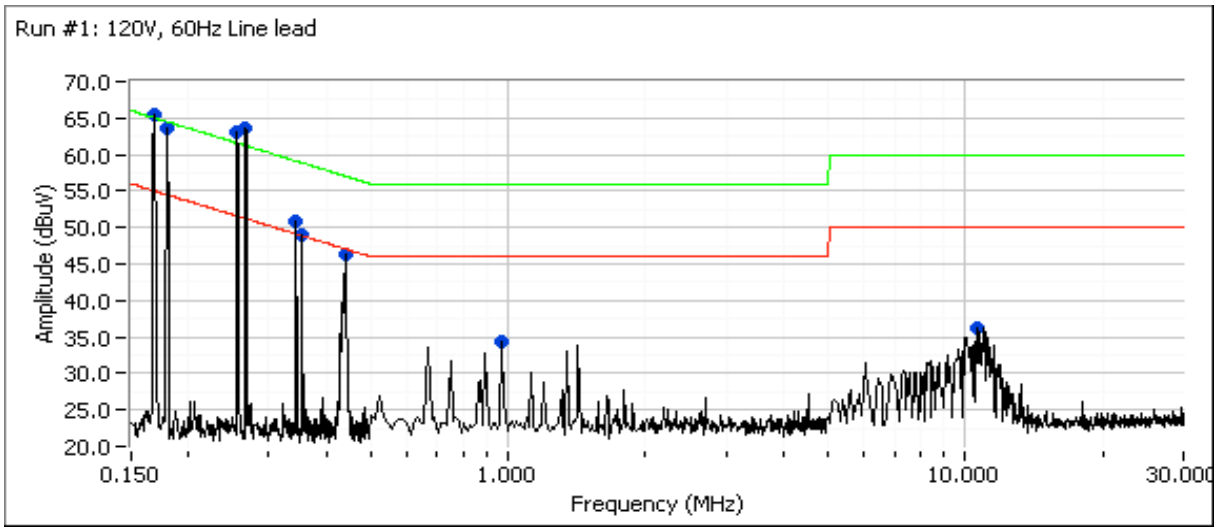
No modifications were made to the EUT during testing

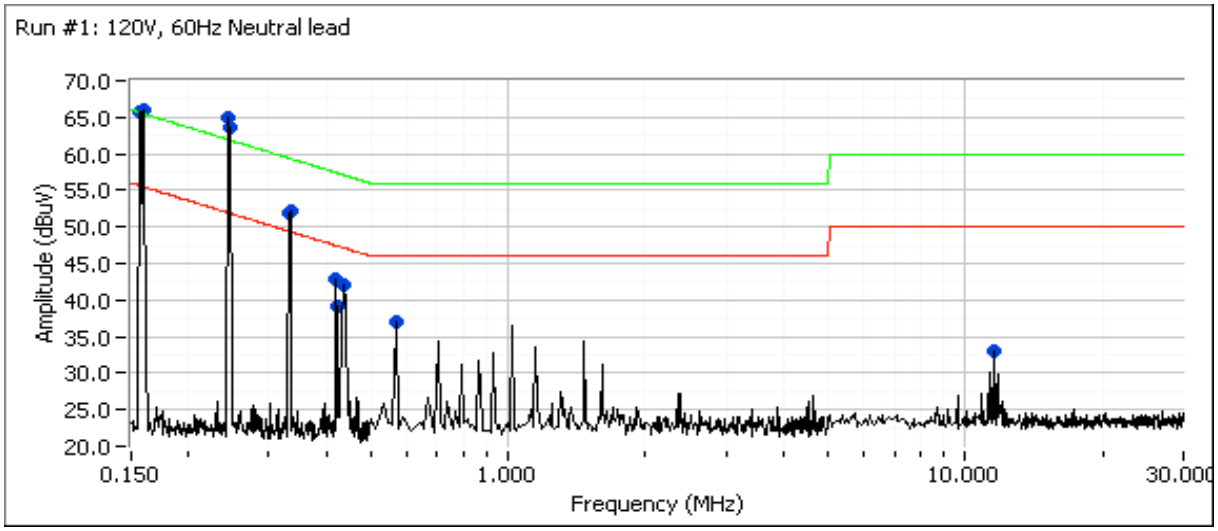
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	B

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz





Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	B

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz
Preliminary peak readings

Frequency	Level	AC	FCC 15.107		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.244	64.9	Neutral	52.0	12.9	Peak	
0.266	63.7	Line 1	51.2	12.5	Peak	
0.247	63.7	Neutral	51.9	11.8	Peak	
0.256	63.2	Line 1	51.6	11.6	Peak	
0.168	65.6	Line 1	55.0	10.6	Peak	
0.160	65.9	Neutral	55.5	10.4	Peak	
0.156	65.7	Neutral	55.7	10.0	Peak	
0.179	63.7	Line 1	54.5	9.2	Peak	
0.335	52.1	Neutral	49.3	2.8	Peak	
0.331	52.0	Neutral	49.4	2.6	Peak	
0.343	50.9	Line 1	49.1	1.8	Peak	
0.354	49.0	Line 1	48.9	0.1	Peak	
0.441	46.3	Line 1	47.0	-0.7	Peak	
0.419	42.8	Neutral	47.5	-4.7	Peak	
0.438	42.2	Neutral	47.1	-4.9	Peak	
0.422	39.1	Neutral	47.4	-8.3	Peak	
0.568	37.0	Neutral	46.0	-9.0	Peak	
0.973	34.4	Line 1	46.0	-11.6	Peak	
10.625	36.2	Line 1	50.0	-13.8	Peak	
11.500	32.9	Neutral	50.0	-17.1	Peak	

Client:	GE MDS LLC	Job Number:	J69634
Model:	SD4	T-Log Number:	T69922
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		
Standard:	FCC	Class:	B

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz
Final QP and Average readings

Frequency	Level	AC	FCC 15.107		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.266	60.2	Line 1	61.2	-1.0	QP	
0.247	60.8	Neutral	61.9	-1.1	QP	
0.256	60.4	Line 1	61.6	-1.2	QP	
0.244	60.2	Neutral	62.0	-1.8	QP	
0.156	63.5	Neutral	65.7	-2.2	QP	
0.160	63.1	Neutral	65.5	-2.4	QP	
0.168	62.0	Line 1	65.0	-3.0	QP	
0.179	61.0	Line 1	64.5	-3.5	QP	
0.438	42.8	Neutral	47.1	-4.3	AVG	
0.331	48.4	Neutral	59.4	-11.0	QP	
0.335	47.9	Neutral	59.3	-11.4	QP	
0.438	45.2	Neutral	57.1	-11.9	QP	
0.343	46.9	Line 1	59.1	-12.2	QP	
0.354	45.7	Line 1	58.9	-13.2	QP	
0.441	29.3	Line 1	47.0	-17.7	AVG	
10.654	30.7	Line 1	50.0	-19.3	AVG	
0.419	38.1	Neutral	57.5	-19.4	QP	
0.422	37.7	Neutral	57.4	-19.7	QP	
11.335	30.3	Neutral	50.0	-19.7	AVG	
0.441	36.1	Line 1	57.0	-20.9	QP	
0.568	33.3	Neutral	56.0	-22.7	QP	
10.654	35.9	Line 1	60.0	-24.1	QP	
0.973	30.9	Line 1	56.0	-25.1	QP	
11.335	33.5	Neutral	60.0	-26.5	QP	
0.266	19.2	Line 1	51.2	-32.0	AVG	
0.256	19.4	Line 1	51.6	-32.2	AVG	
0.247	19.7	Neutral	51.9	-32.2	AVG	
0.244	19.6	Neutral	52.0	-32.4	AVG	
0.343	16.2	Line 1	49.1	-32.9	AVG	
0.331	16.5	Neutral	49.4	-32.9	AVG	
0.335	16.3	Neutral	49.3	-33.0	AVG	
0.354	15.7	Line 1	48.9	-33.2	AVG	
0.419	14.3	Neutral	47.5	-33.2	AVG	
0.422	14.2	Neutral	47.4	-33.2	AVG	
0.156	22.0	Neutral	55.7	-33.7	AVG	
0.160	21.7	Neutral	55.5	-33.8	AVG	
0.179	20.5	Line 1	54.5	-34.0	AVG	
0.168	20.9	Line 1	55.0	-34.1	AVG	
0.568	11.0	Neutral	46.0	-35.0	AVG	

EXHIBIT 3: Test Configuration Photographs

Uploaded as A Separate Attachment

EXHIBIT 4: Theory of Operation GE MDS LLC Model SD4

Uploaded as A Separate Attachment

EXHIBIT 5: Proposed FCC ID Label & Label Location

Uploaded as A Separate Attachment

EXHIBIT 6: Detailed Photographs GE MDS LLC Model SD4

Uploaded as A Separate Attachment

EXHIBIT 7: Installation Guide GE MDS LLC Model SD4

Uploaded as A Separate Attachment

EXHIBIT 8: Block Diagram GE MDS LLC Model SD4

Uploaded as A Separate Attachment

EXHIBIT 9: Schematic Diagrams GE MDS LLC Model SD4

Uploaded as A Separate Attachment

EXHIBIT 10: Advertising Literature

Uploaded as A Separate Attachment