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Electromagnetic Emissions Test Report
and
Application for Grant of Equipment Authorization
Class II Permissive Change
pursuant to

Industry Canada RSS-Gen Issue 2 / RSS 210 Issue 7
FCC Part 15 Subpart C

on the
GE MDS LLC
Transmitter
Model: INET900

UPN:	3738A-12098
FCC ID:	E5MDS-NH900
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 4, 2008
FINAL TEST DATE:	September 12, 2007 and January 29, 2008

AUTHORIZED SIGNATORY: Mark Briggs

Mark Briggs
Principal Engineer

ACCREDITED

Testing Cert #2016-01

REVISION HISTORY

Rev #	Date	Comments	Modified By
1.0	March 11, 2008	Initial Release	Dave Guidotti

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SCOPE

An electromagnetic emissions test has been performed on the GE MDS LLC model INET900 pursuant to the following rules:

Industry Canada RSS-Gen Issue 2
RSS 210 Issue 7 "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

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 INET900 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 INET900 complied with the requirements of the following regulations:

Industry Canada RSS-Gen Issue 2
RSS 210 Issue 7 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
FCC Part 15 Subpart B (Receivers)
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

FREQUENCY HOPPING SPREAD SPECTRUM (902 – 928 MHz, 50 channels or more)

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247 (a) (1)	RSS 210 A8.1 (1)	20dB Bandwidth	-	Channel spacing > 20dB bandwidth / 25kHz	Not evaluated as they are not affected by the proposed changes.
15.247 (a) (1)	RSS 210 A8.1 (2)	Channel Separation	-		
15.247 (a) (1) (i)	RSS 210 A8.1 (3)	Number of Channels	-	50 or more	
15.247 (a) (1) (i)	RSS 210 A8.1 (3)	Channel Dwell Time	-	<0.4 second within a 20 second period	
15.247 (a) (1)	RSS 210 A8.1 (1)	Channel Utilization	-	All channels shall, on average, be used equally	
15.247	RSS 210 A8.1(2)	Receiver bandwidth	-	Shall match the channel bandwidth	
15.247 (b) (3)	RSS 210 A8.4 (1)	Output Power	29 dBm (0.795 Watts) EIRP = 4 W Note 1	1Watt, EIRP < 4 Watts	
15.247 (c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 9.28 GHz	All spurious emissions < -20dBc	< -20dBc	
15.247 (c) 15.209	RSS 210 A8.5 Table 2, 3	Radiated Spurious Emissions 30MHz – 9.28 GHz	53.0dBµV/m (446.7µV/m) @ 4512.5MHz	15.207 in restricted bands, all others < -20dBc	Complies (-1.0dB)

Note 1: EIRP remains below 36dBm (4 Watts) through adjustment of output power or loss of coaxial cable between rf port and antenna during professional installation. This is detailed in the user manual.

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	Professionally installed, not applicable	Unique antenna connector	Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	38.7dBµV/m @ 32.387MHz	15.109 RSS GEN Table 1	Complies (-1.3dB)
15.207	RSS GEN Table 2	AC Conducted Emissions	No changes to AC power circuitry so test not performed. Original results considered applicable		
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11, RSS 102 declaration	Refer to OET 65, FCC Part 1 and RSS 102	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 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	± 2.4
Radiated Emissions	0.015 to 30	± 3.0
Radiated Emissions	30 to 1000	± 3.6
Radiated Emissions	1000 to 40000	± 6.0

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The GE MDS LLC model INET900 is a wireless transceiver which is designed to transmit and receive data. Normally, the EUT would be placed on a tabletop or Rack mounted during operation. The EUT was, therefore, placed in this position during emissions testing to simulate the end user environment. The electrical rating of the EUT is 10-30vdc, 2 Amps.

The sample was received on September 12, 2007 and tested on September 12, 2007 and January 29, 2008. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number	FCC ID
GE MDS	INET	FHSS Transceiver	-	E5MDS-NH900

ANTENNA SYSTEM

The antenna system used with the GE MDS LLC model INET900 consists of an external antenna connector. Various antennas may be used with the system. This report contains data for the addition of a new, omni-directional antenna with a gain of 9dBd (11.2dBi).

ENCLOSURE

The EUT enclosure is primarily constructed of diecast aluminum. It measures approximately 17 cm wide by 11 cm deep by 3 cm high.

MODIFICATIONS

The EUT was modified during testing by the addition of a 1.5pF capacitor in the low pass filter section of the rf output circuitry.

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	-	-
Dell	-	Laptop	-	DoC

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

Manufacturer	Model	Description	Serial Number	FCC ID
Netgear	-	10/100 Ethernet Hub	-	-

EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Serial - DB9	Dell Laptop	4 wire	Unshielded	1.0
DC Power	DC Power Supply	2 wire	Unshielded	2.0
RF Port	Antenna	Coax	Shielded	1.0
Serial - DB9	Not Connected			
Ethernet - RJ45	Remote Hub	Twisted Pair	Unshielded	10.0

EUT OPERATION

The EUT was configured to continuously transmit on the desired frequency. The output power level was also adjusted, as needed.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on September 12, 2007 and January 29, 2008 at the Elliott Laboratories Open Area Test Site #Chamber 4 and Chamber 5 or semi anechoic chamber #Chamber 4 and Chamber 5 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.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.4:2003. 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.

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 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 exhibit of this report contains the list of test equipment used and calibration information.

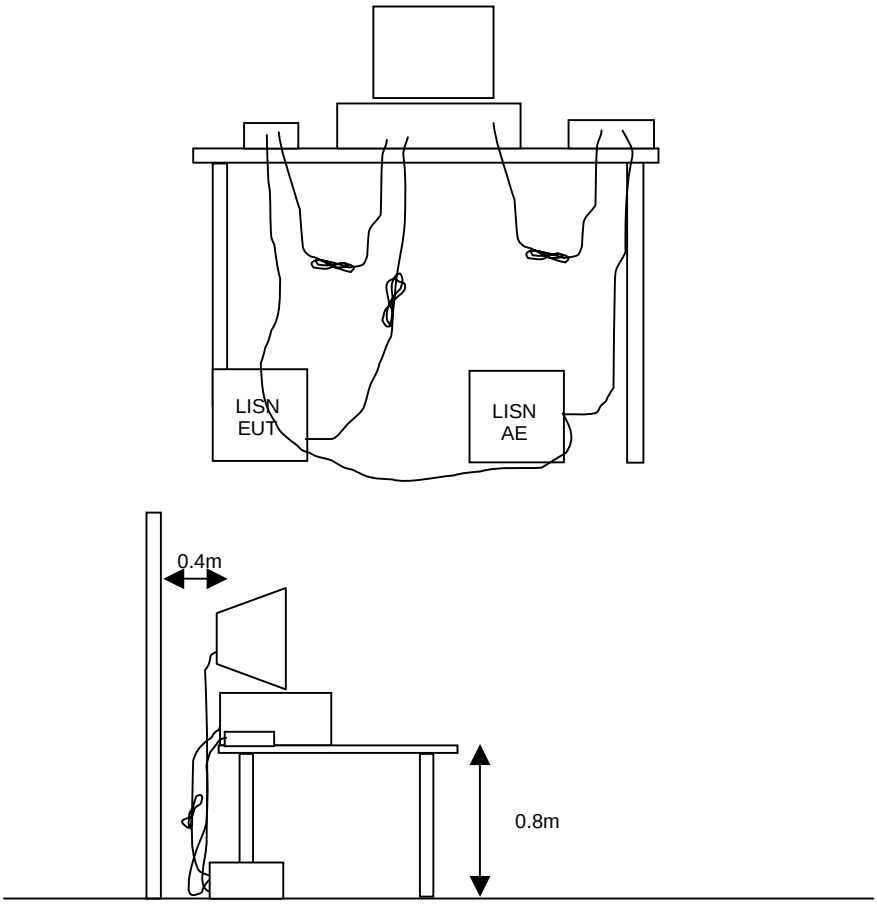
TEST PROCEDURES

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.

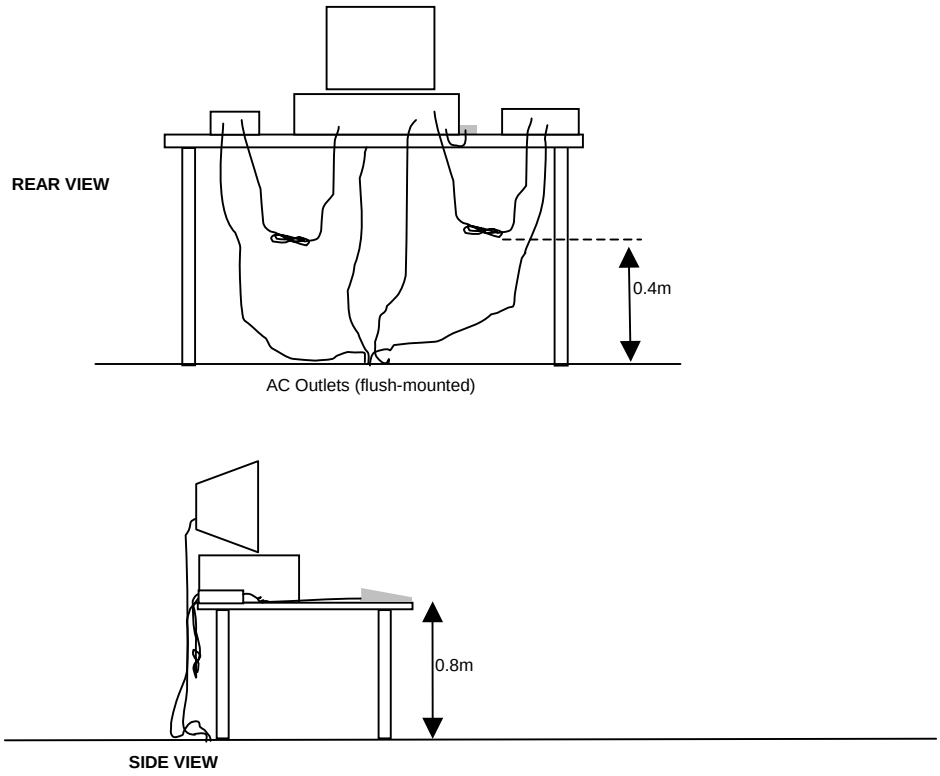


A preliminary scan of the radiated emissions is performed in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed, one scan for each antenna polarization (horizontal and vertical; loop parallel and perpendicular to the EUT). 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.

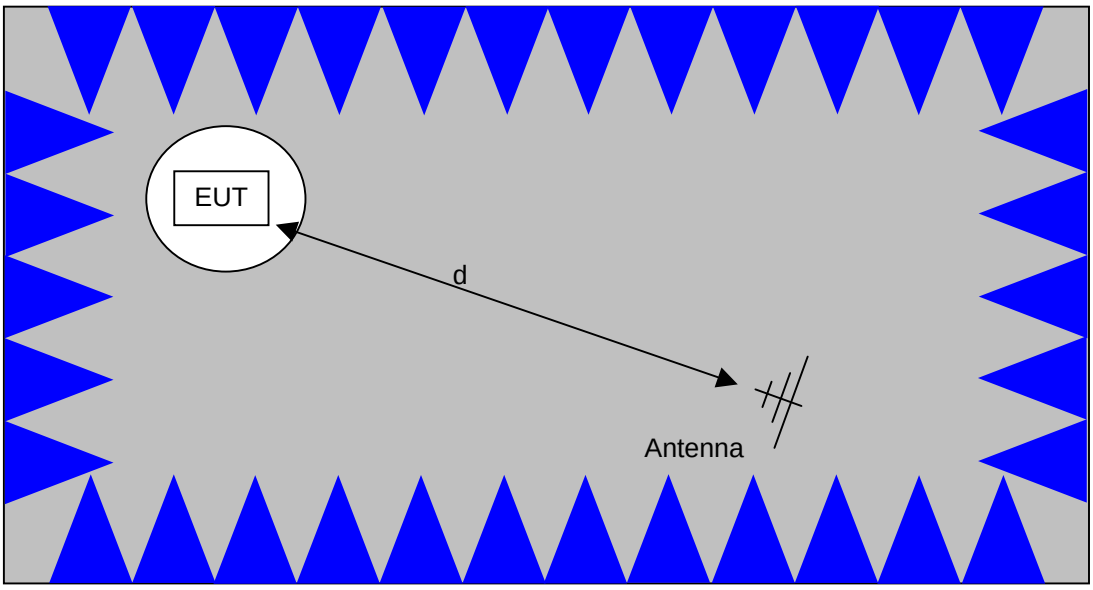
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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.

When testing above 18 GHz, the receive antenna is located at 1meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.

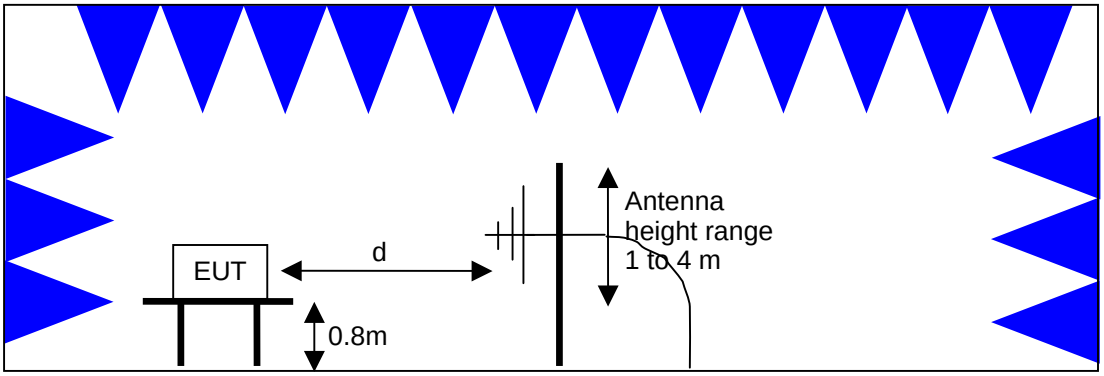


Typical Test Configuration for Radiated Field Strength Measurements



The anechoic materials on the walls and ceiling ensure compliance with the normalized site attenuation requirements of CISPR 16 / CISPR 22 / ANSI C63.4 for an alternate test site at the measurement distances used.

Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



Test Configuration for Radiated Field Strength Measurements
Semi-Anechoic Chamber, 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[1] (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	$2400/F_{KHz}$ @ 300m	$67.6-20*\log_{10}(F_{KHz})$ @ 300m
0.490-1.705	$24000/F_{KHz}$ @ 30m	$87.6-20*\log_{10}(F_{KHz})$ @ 30m
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

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).

[1] The restricted bands are detailed in FCC 15.203, RSS 210 Table 1 and RSS 310 Table 2

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:

$$F_d = 20*LOG_{10} (D_m/D_s)$$

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:

$$F_d = 40*LOG_{10} (D_m/D_s)$$

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 = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = 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 - 10,000 MHz, 15-Nov-07
Engineer: David Bare

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	High Pass filter, 1.5 GHz (Blu System)	P/N 84300-80037 (84125C)	1389	29-May-08
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FMT (SA40) Blue	8564E (84125C)	1393	17-Jan-08
EMCO	Antenna, Horn, 1-18 GHz	3117	1662	21-Mar-08
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	06-Nov-08

Radio Spurious Emissions, 30-Nov-07
Engineer: skhushzad

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	16-Mar-08
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E	Rental	20-Jul-08
EMCO	Antenna, Horn, 1-18 GHz (SA40-Purple)	3115	1779	07-Feb-08

Radio Spurious Emissions, 29-Jan-08
Engineer: skhushzad

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	11-Jul-08
Hewlett Packard	High Pass filter, 8.2 GHz (Blu System)	P/N 84300-80039 (84125C)	1392	29-May-08
Hewlett Packard	Test Sys (SA40, 9kHz - 40GHz) Purple	84125C	1770	06-Nov-08

EXHIBIT 2: Test Measurement Data

10 Pages

Client:	GE MDS LLC	Job Number:	J69051
Model:	INET900 (FCC ID: E5MDS-NH900)	T-Log Number:	T69274
		Account Manager:	Susan Pelzl
Contact:	Dennis Mccathy		-
Emissions Standard(s):	15.209, 15.247, RSS 210	Class:	-
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

GE MDS LLC

Model

INET900 (FCC ID: E5MDS-NH900)

Date of Last Test: 1/29/2008

Client:	GE MDS LLC	Job Number:	J69051
Model:	INET900 (FCC ID: E5MDS-NH900)	T-Log Number:	T69274
		Account Manger:	Susan Pelzl
Contact:	Dennis Mccathy		
Emissions Standard(s):	15.209, 15.247, RSS 210	Class:	-
Immunity Standard(s):	-	Environment:	-

EUT INFORMATION

General Description

The EUT is a wireless transceiver which is designed to Transmit and receive data. Normally, the EUT would be placed on a tabletop or Rack mounted during operation. The EUT was, therefore, placed in this position during emissions testing to simulate the end user environment. The electrical rating of the EUT is 10-30vdc, 2 Amps.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
GE MDS	INET	FHSS Transceiver	-	E5MDS-NH900

EUT Antenna (Intentional Radiators Only)

The EUT antenna is Katherein, model OGB9-915, Omnidirectional antenna, 9 dBd (11.2 dBi).

The EUT requires professional installation and therefore is exempt from the requirement of 15.203. The output power is configured for each antenna to ensure the EIRP does not exceed 4 Watts, and the output power at the rf connector cannot exceed the maximum value reported in this test data. Radiated emissions were measured with the output power set to maximum and with the EUT antennas

EUT Enclosure

The EUT enclosure is primarily constructed of diecast aluminum . It measures approximately 17 cm wide by 11 cm deep by 3 cm high.

Modification History

Mod. #	Test	Date	Modification
1	Tx RE	1/29/2008	LPF 1.5pF Parallel
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:	J69051
Model:	INET900 (FCC ID: E5MDS-NH900)	T-Log Number:	T69274
		Account Manger:	Susan Pelzl
Contact:	Dennis Mccathy		
Emissions Standard(s):	15.209, 15.247, RSS 210	Class:	-
Immunity Standard(s):	-	Environment:	-

Test Configuration #1

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
TopWard	3603D	DC Power Supply	-	-
Dell	-	Laptop	-	DoC

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Netgear	-	10/100 Ethernet Hub	-	-

Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Serial - DB9	Dell Laptop	4 wire	Unshielded	1.0
DC Power	DC Power Supply	2 wire	Unshielded	2.0
RF Port	Antenna	Coax	Shielded	1.0
Serial - DB9	Not Connected			
Ethernet - RJ45	Remote Hub	Twisted Pair	Unshielded	10.0

EUT Operation During Emissions Tests

The EUT was configured to continuously transmit on the desired frequency. The output power level was also adjusted, as needed.

Client:	GE MDS LLC	Job Number:	J69051
Model:	INET900 (FCC ID: E5MDS-NH900)	T-Log Number:	T69274
		Account Manager:	Susan Pelzl
Contact:	Dennis Mccathy		
Standard:	15.209, 15.247, RSS 210	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: 9/12/2007
Test Engineer: Rafael Varelas
Test Location: FT Chamber #5
Config. Used: 1
Config Change: None
EUT Voltage: 10-30VDC

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.

Ambient Conditions:

Temperature: 24.2 °C
Rel. Humidity: 49 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	RE, 30 - 10,000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	38.7dBµV/m @ 32.387MHz (-1.3dB)

Modifications Made During Testing

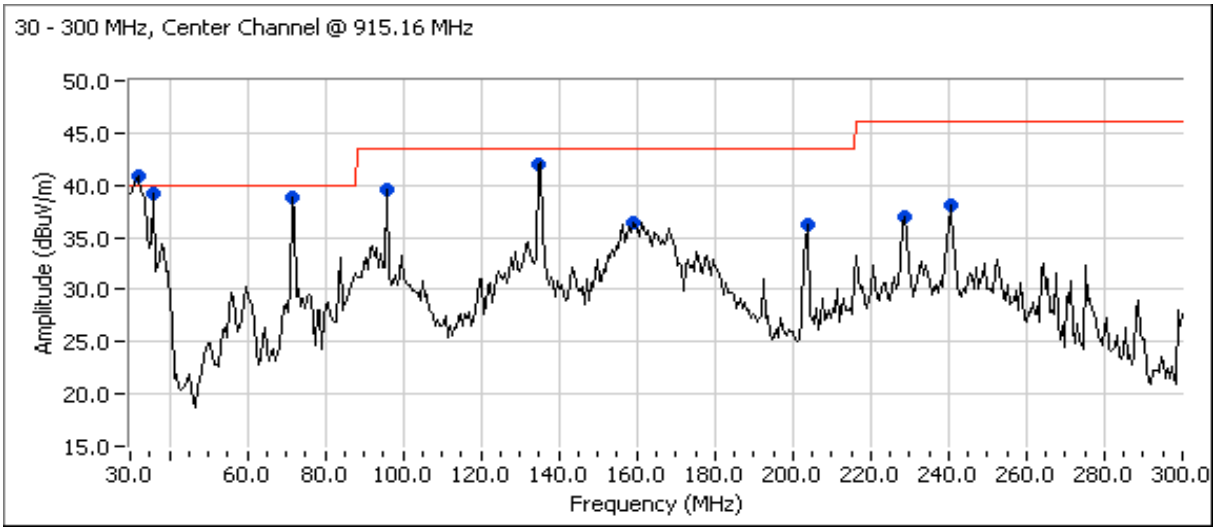
No modifications were made to the EUT during testing

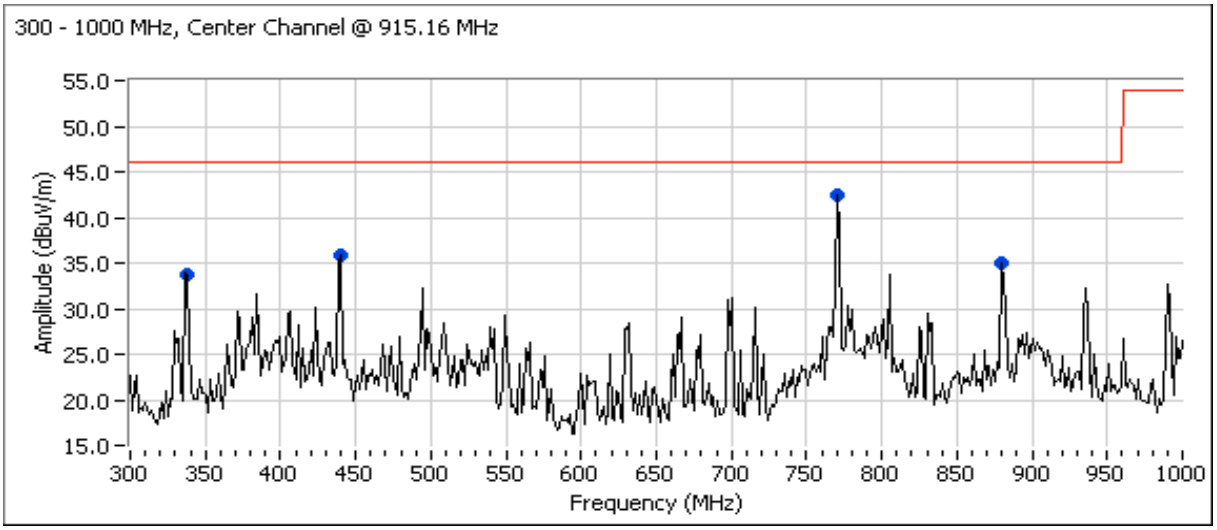
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	GE MDS LLC	Job Number:	J69051
Model:	INET900 (FCC ID: E5MDS-NH900)	T-Log Number:	T69274
		Account Manager:	Susan Pelzl
Contact:	Dennis Mccathy		
Standard:	15.209, 15.247, RSS 210	Class:	N/A

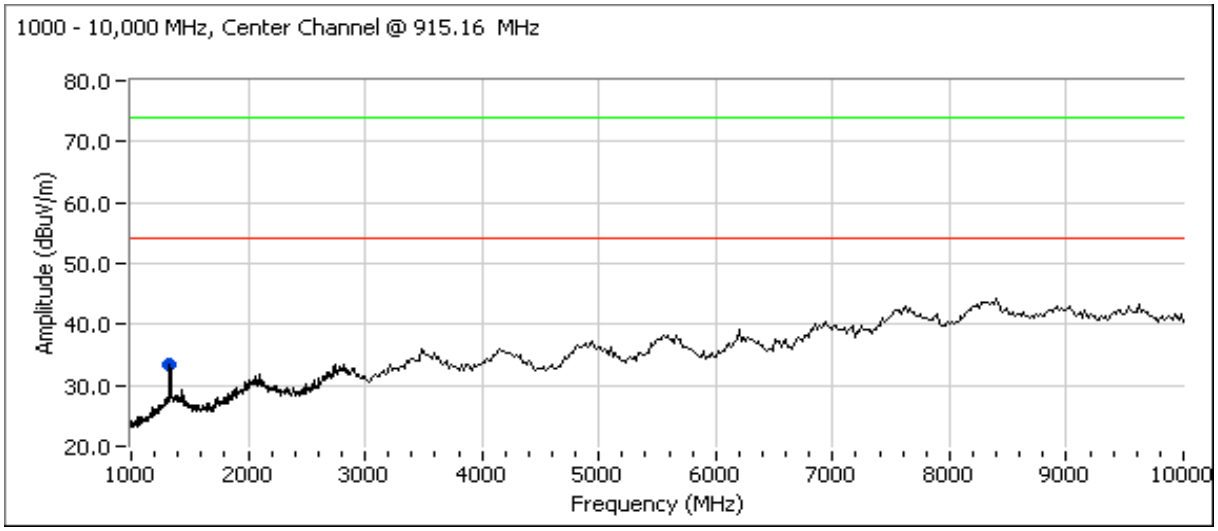
Run #1: Radiated Spurious Emissions, 30 - 10,000 MHz. Rx Mode
9dB Omni antenna
Middle Channel @ 915.16 MHz





Client:	GE MDS LLC	Job Number:	J69051
Model:	INET900 (FCC ID: E5MDS-NH900)	T-Log Number:	T69274
		Account Manager:	Susan Pelzl
Contact:	Dennis Mccathy		
Standard:	15.209, 15.247, RSS 210	Class:	N/A

Run #1: Continued



Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
32.387	38.7	V	40.0	-1.3	QP	31	1.0	
35.062	31.8	V	40.0	-8.2	QP	299	1.0	
72.023	37.4	V	40.0	-2.6	QP	319	1.0	
135.171	40.2	H	43.5	-3.3	QP	280	2.0	
202.850	32.1	H	43.5	-11.4	QP	266	2.0	
96.023	38.9	H	43.5	-4.6	QP	110	1.5	
159.857	33.9	H	43.5	-9.6	QP	64	2.0	
227.971	34.7	H	46.0	-11.3	QP	151	1.0	
240.061	37.4	H	46.0	-8.6	QP	151	1.5	
880.449	31.6	V	46.0	-14.4	QP	24	1.0	
770.009	42.3	V	46.0	-3.7	QP	31	1.0	
339.045	32.4	H	46.0	-13.6	QP	79	2.5	
439.996	36.1	H	46.0	-9.9	QP	110	2.5	
1332.500	33.5	V	54.0	-20.5	Peak	86	1.6	

Client:	GE MDS LLC	Job Number:	J69051
Model:	INET900 (FCC ID: E5MDS-NH900)	T-Log Number:	T69274
		Account Manager:	Susan Pelzl
Contact:	Dennis Mccathy		
Standard:	15.209, 15.247, RSS 210	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: 1/29/2008
Test Engineer: Suhaila Khushzad
Test Location: Fremont Chamber # 4
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 spurious emissions testing.

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

Ambient Conditions:

Temperature: 18 °C
Rel. Humidity: 36 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
2a - c	RE, 30 - 10000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	53.0dBµV/m (446.7µV/m) @ 4512.5MHz (-1.0dB)

Modifications Made During Testing

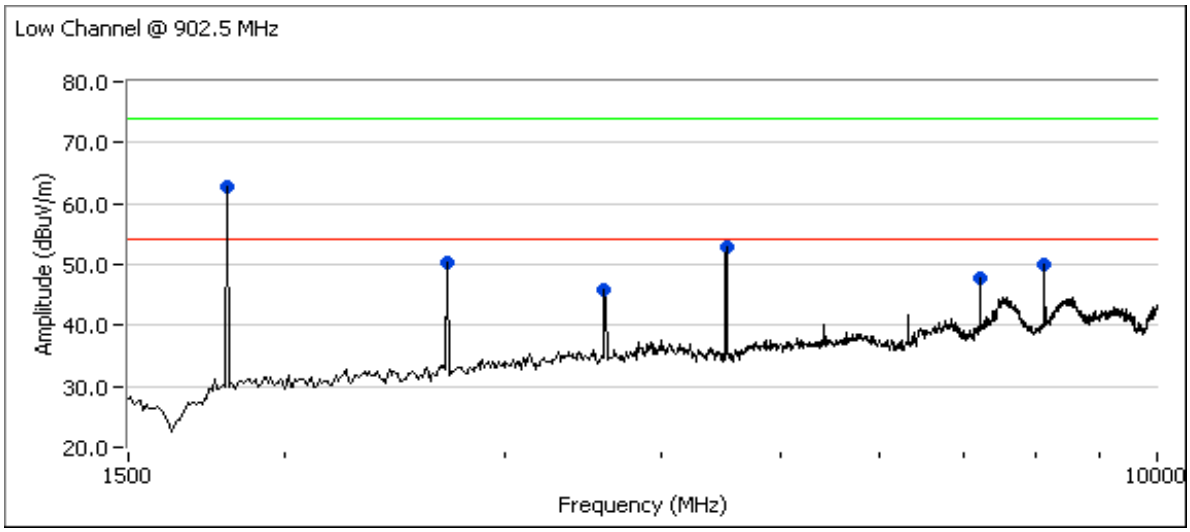
The low pass filter stage was modified with an additional 1.5pF capacitor.

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	GE MDS LLC	Job Number:	J69051
Model:	INET900 (FCC ID: E5MDS-NH900)	T-Log Number:	T69274
		Account Manager:	Susan Pelzl
Contact:	Dennis Mccathy		
Standard:	15.209, 15.247, RSS 210	Class:	N/A

Run # 2a: Tx Radiated Spurious Emissions, 30 - 10000 MHz.
Low Channel @ 902.5 MHz, with 9dB Omni antenna, Power Setting 24
LPF 1.5pF Parallel



Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4512.530	53.0	V	54.0	-1.0	AVG	278	1.2	
7219.900	47.2	H	54.0	-6.8	AVG	183	1.3	
8122.460	46.4	V	54.0	-7.6	AVG	163	1.4	
3609.980	45.0	V	54.0	-9.0	AVG	209	1.0	
2707.480	41.5	V	54.0	-12.5	AVG	167	1.0	
4512.530	54.4	V	74.0	-19.6	PK	278	1.2	
7219.900	51.7	H	74.0	-22.3	PK	183	1.3	
8122.460	50.4	V	74.0	-23.6	PK	163	1.4	
3609.980	48.1	V	74.0	-25.9	PK	209	1.0	
2707.480	44.8	V	74.0	-29.2	PK	167	1.0	
1804.990	62.7	V			AVG	360	1.5	Non restricted
1804.990	63.0	V			PK	360	1.5	Non restricted

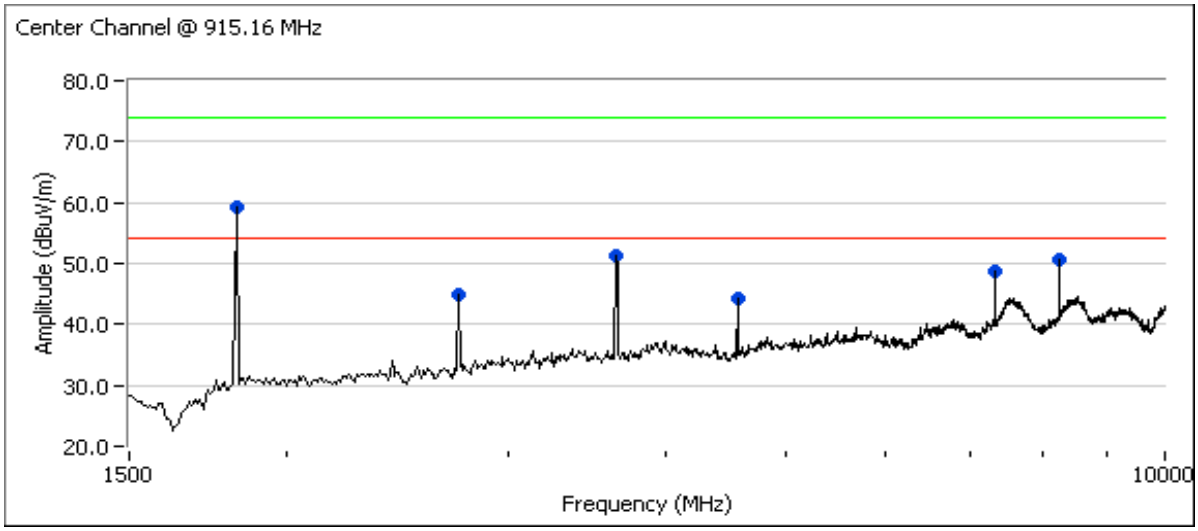
Emissions in restricted bands covered by original test report and conducted measurements demonstrating compliance with -20dBc limit. For an eirp of 36dBm the approximate field strength would be 130dBuV/m at 3m, so the -20dBc level would be approximately 110 dBuV/m.

Elliott

EMC Test Data

Client:	GE MDS LLC	Job Number:	J69051
Model:	INET900 (FCC ID: E5MDS-NH900)	T-Log Number:	T69274
		Account Manager:	Susan Pelzl
Contact:	Dennis Mccathy		
Standard:	15.209, 15.247, RSS 210	Class:	N/A

Run # 2b: Tx Radiated Spurious Emissions, 30 - 10000 MHz.
Center Channel @ 915.16 MHz, with 9dB Omni antenna, Power Setting 24
LPF 1.5pF Parallel



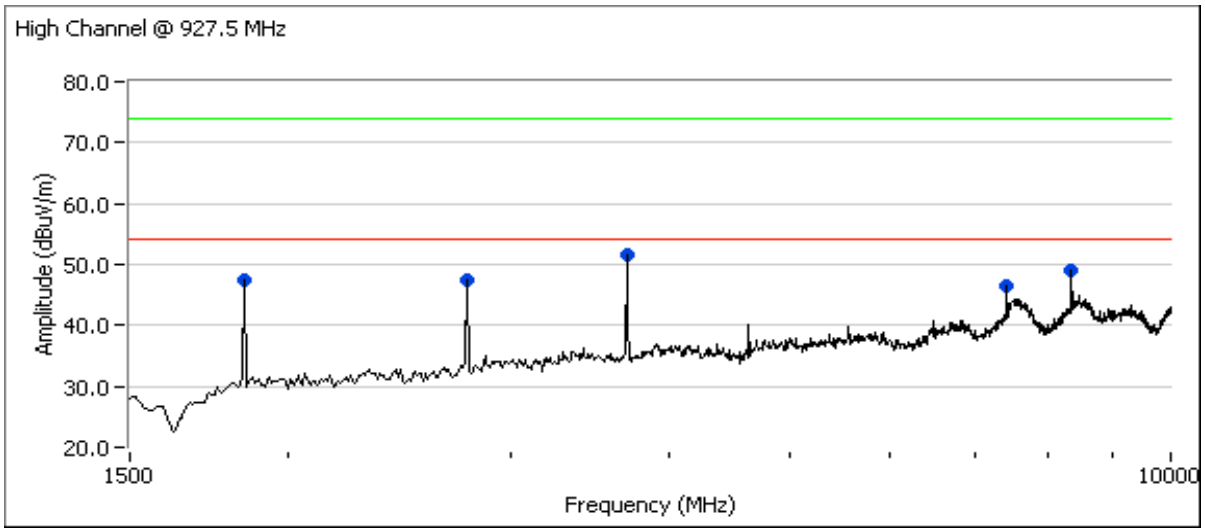
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3660.570	50.8	V	54.0	-3.2	AVG	148	1.2	
8236.480	48.6	H	54.0	-5.4	AVG	186	1.3	
7321.200	48.1	V	54.0	-5.9	AVG	276	1.4	
4575.780	42.7	V	54.0	-11.3	AVG	252	2.3	
2745.440	42.2	V	54.0	-11.8	AVG	163	1.6	
8236.480	52.9	H	74.0	-21.1	PK	186	1.3	
3660.570	52.7	V	74.0	-21.3	PK	148	1.2	
7321.200	52.1	V	74.0	-21.9	PK	276	1.4	
4575.780	46.6	V	74.0	-27.4	PK	252	2.3	
2745.440	45.7	V	74.0	-28.3	PK	163	1.6	
1830.300	60.9	V			AVG	319	1.8	Non restricted
1830.300	61.3	V			PK	319	1.8	Non restricted

Emissions in restricted bands covered by original test report and conducted measurements demonstrating compliance with -20dBc limit. For an eirp of 36dBm the approximate field strength would be 130dBuV/m at 3m, so the -20dBc level would be approximately 110 dBuV/m.

EMC Test Data

Client:	GE MDS LLC	Job Number:	J69051
Model:	INET900 (FCC ID: E5MDS-NH900)	T-Log Number:	T69274
		Account Manager:	Susan Pelzl
Contact:	Dennis Mccathy		
Standard:	15.209, 15.247, RSS 210	Class:	N/A

Run # 2c: Tx Radiated Spurious Emissions, 30 - 10000 MHz.
High Channel @ 927.5 MHz, with 9dB Omni antenna, Power Setting 24
LPF 1.5pF Parallel



Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3709.980	51.3	V	54.0	-2.7	AVG	251	2.1	
2782.510	41.6	V	54.0	-12.4	AVG	165	1.3	
7420.040	39.8	V	54.0	-14.2	AVG	293	1.0	
8341.310	36.1	V	54.0	-17.9	AVG	203	1.0	
3709.980	53.0	V	74.0	-21.0	PK	251	2.1	
7420.040	48.2	V	74.0	-25.8	PK	293	1.0	
8341.310	47.9	V	74.0	-26.1	PK	203	1.0	
2782.510	45.4	V	74.0	-28.6	PK	165	1.3	
1855.030	47.6	V			AVG	307	1.6	Non restricted
1855.030	49.1	V			PK	307	1.6	Non restricted

Emissions in restricted bands covered by original test report and conducted measurements demonstrating compliance with -20dBc limit. For an eirp of 36dBm the approximate field strength would be 130dBuV/m at 3m, so the -20dBc level would be approximately 110 dBuV/m.

EXHIBIT 3: Photographs of Test Configurations

2 Pages