



*EMC Test Report  
Application for Grant of Equipment Authorization  
pursuant to  
Industry Canada RSS-Gen Issue 2 / RSS 210 Issue 7  
FCC Part 15 Subpart C*

*Model: WiYZ Mesh Radio*

IC CERTIFICATION #: 101D-MESH2400  
FCC ID: E5MDS-MESH2400

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

TEST SITE(S): Elliott Laboratories  
684 W. Maude Avenue  
Sunnyvale, CA 94085

IC SITE REGISTRATION #: 2845A-1; 2845A-2

REPORT DATE: February 4, 2010

FINAL TEST DATES: November 25, 30, December 21, 29 2009 and  
January 4, 5 2010

AUTHORIZED SIGNATORY:

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Testing Cert #2016.01

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**REVISION HISTORY**

Rev#	Date	Comments	Modified By
-	February 4, 2010	First release	

**TABLE OF CONTENTS**

<b>REVISION HISTORY .....</b>	<b>2</b>
<b>TABLE OF CONTENTS .....</b>	<b>3</b>
<b>SCOPE.....</b>	<b>5</b>
<b>OBJECTIVE .....</b>	<b>5</b>
<b>STATEMENT OF COMPLIANCE.....</b>	<b>6</b>
<b>DEVIATIONS FROM THE STANDARDS.....</b>	<b>6</b>
<b>TEST RESULTS SUMMARY .....</b>	<b>7</b>
DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHz) .....	7
GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS .....	7
MEASUREMENT UNCERTAINTIES.....	8
<b>EQUIPMENT UNDER TEST (EUT) DETAILS.....</b>	<b>9</b>
GENERAL.....	9
OTHER EUT DETAILS.....	9
ANTENNA SYSTEM .....	9
ENCLOSURE.....	9
MODIFICATIONS.....	9
SUPPORT EQUIPMENT .....	9
EUT INTERFACE PORTS .....	10
EUT OPERATION .....	10
<b>TEST SITE.....</b>	<b>11</b>
GENERAL INFORMATION .....	11
CONDUCTED EMISSIONS CONSIDERATIONS .....	11
RADIATED EMISSIONS CONSIDERATIONS .....	11
<b>MEASUREMENT INSTRUMENTATION .....</b>	<b>12</b>
RECEIVER SYSTEM .....	12
INSTRUMENT CONTROL COMPUTER .....	12
LINE IMPEDANCE STABILIZATION NETWORK (LISN) .....	12
FILTERS/ATTENUATORS .....	13
ANTENNAS.....	13
ANTENNA MAST AND EQUIPMENT TURNTABLE .....	13
INSTRUMENT CALIBRATION.....	13
<b>TEST PROCEDURES .....</b>	<b>14</b>
EUT AND CABLE PLACEMENT .....	14
CONDUCTED EMISSIONS.....	14
RADIATED EMISSIONS.....	14
RADIATED EMISSIONS.....	15
CONDUCTED EMISSIONS FROM ANTENNA PORT .....	19
BANDWIDTH MEASUREMENTS .....	19
SPECIFICATION LIMITS AND SAMPLE CALCULATIONS .....	20
CONDUCTED EMISSIONS SPECIFICATION LIMITS: FCC 15.207; FCC 15.107(A), RSS GEN .....	20
GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS .....	21
RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS .....	21
OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS .....	22
TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS AND DTS SYSTEMS.....	22
SAMPLE CALCULATIONS - CONDUCTED EMISSIONS .....	22
SAMPLE CALCULATIONS - RADIATED EMISSIONS.....	23
SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION.....	24

**TABLE OF CONTENTS**

<b>APPENDIX A TEST EQUIPMENT CALIBRATION DATA .....</b>	<b>1</b>
<b>APPENDIX B TEST DATA .....</b>	<b>2</b>
<b>APPENDIX C PHOTOGRAPHS OF TEST CONFIGURATIONS .....</b>	<b>3</b>
<b>APPENDIX D PROPOSED FCC ID LABEL &amp; LABEL LOCATION .....</b>	<b>4</b>
<b>APPENDIX E DETAILED PHOTOGRAPHS .....</b>	<b>5</b>
<b>APPENDIX F OPERATOR'S MANUAL .....</b>	<b>6</b>
<b>APPENDIX G BLOCK DIAGRAM .....</b>	<b>7</b>
<b>APPENDIX H SCHEMATIC DIAGRAMS .....</b>	<b>8</b>
<b>APPENDIX I THEORY OF OPERATION .....</b>	<b>9</b>
<b>APPENDIX J RF EXPOSURE INFORMATION .....</b>	<b>10</b>

## SCOPE

An electromagnetic emissions test has been performed on the GE MDS LLC model WiYZ Mesh Radio, 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

FCC DTS Measurement Procedure KDB558074, March 2005

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.

## 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 WiYZ Mesh Radio 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 C

Maintenance of compliance is the responsibility of the manufacturer. Any modifications to the product should be assessed to determine their potential impact on the compliance status of the device with respect to the standards detailed in this test report.

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

#### **DEVIATIONS FROM THE STANDARDS**

No deviations were made from the published requirements listed in the scope of this report.

**TEST RESULTS SUMMARY****DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHz)**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	Systems uses DSSS techniques	Device must use a digital modulation	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	1.53 MHz	>500kHz	Complies
15.247 (b) (3)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	0.0234 Watts EIRP = 0.037 W <sup>Note 1</sup>	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	7.7 dBm / 3kHz	8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	All spurious below -30dBc	< -30dBc <sup>Note 2</sup>	Complies
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	53.2dBμV/m @ 2386.2MHz (-0.8dB)	15.207 in restricted bands, all others <-30dBc <sup>Note 2</sup>	Complies

Note 1: EIRP calculated using antenna gain of 2 dBi for the highest EIRP multi-point system. The device was tested with three different antenna types. The power settings for each antenna type are different.

Note 2: Limit of -30dBc used because the power was measured using the UNII test procedure (maximum power averaged over a transmission burst) / RMS averaging over a time interval, as permitted under RSS 210 section A8.4(4).

**GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS**

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector		Unique connector or professional installation	Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	43.5dBμV/m @ 1765.9MHz		Complies (-10.5dB)
15.207	RSS GEN Table 2	AC Conducted Emissions	38.2dBμV @ 6.516MHz	Refer to standard	Complies (-11.8dB)
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11, RSS 102 declaration and User Manual statements.	Refer to OET 65, FCC Part 1 and RSS 102	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual		Statements required regarding non-interference and detachable antenna	Complies
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	2.9 MHz	Information only	N/A

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**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)
<hr/>		
Conducted Emissions	0.15 to 30	$\pm 2.4$
Radiated Emissions	0.015 to 30	$\pm 3.0$
Radiated Emissions	30 to 1000	$\pm 3.6$
Radiated Emissions	1000 to 40000	$\pm 6.0$



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

The GE MDS LLC model WiYZ Mesh Radio is a mesh radio module that is designed to be used in complete radio systems. The module uses Zigbee protocol and operates on 5 MHz channels from 2405 MHz to 2475 MHz.

The module was installed onto an adapter card (with no enclosure) and the combination was tested as table-top equipment. The electrical rating of the EUT is 8-25 Vdc (nominally 14Vdc).

The sample was received on November 24, 2009 and tested on November 25, 30, December 21, 29 2009 and January 4, 5 2010. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
GE MDS LLC	WiYZ module (4765A03)	Radio module	1936457	E5MDS-MESH2400

**OTHER EUT DETAILS**

The following EUT details should be noted: The radio module was tested on the GE MDS Zigbee Dev Interface board.

**ANTENNA SYSTEM**

The module uses a non-standard U.FL antenna connector, thereby meeting the requirements of FCC 15.203.

The antennas evaluated with the system were:

- Yagi, GEMDS part number 97-4278A01, 10dBi gain
- Omni, GEMDS part number 97-4278A48, 2dBi gain
- Panel, GEMDS part number 97-4278A16, 13dBi gain

**ENCLOSURE**

The EUT does not have an enclosure as it is designed to be installed within the enclosure of a host.

**MODIFICATIONS**

No modifications were made to the EUT during the time the product was at Elliott.

**SUPPORT EQUIPMENT**

The following equipment was used as support equipment for testing:

Company	Model	Description	Serial Number	FCC ID
Winbook	Winbook XL	Laptop	H1106677	-
GE MDS LLC	Zigbee Dev Interface	Adapter board	-	-

**EUT INTERFACE PORTS**

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

Port	Connected To	Description	Cable(s)	
			Shielded or Unshielded	Length(m)
Adapter Serial	Laptop	Multiwire	Shielded	2.0
Adapter DC Power	Power Source	Two Wire	Unshielded	2.0
RF Out	Antenna	Coax	Shielded	Various

Note: The second serial port on the test adapter board was not connected during testing. The manufacturer stated this port would not normally be connected.

**EUT OPERATION**

The module was installed onto a test fixture (circuit board) so that it was fully exposed on all sides.

The EUT was set to continuously transmit for transmitter-related measurements, including the measurements for conducted emissions on the AC power. Receiver spurious emissions were measured with the module configured for receive mode.

**TEST SITE****GENERAL INFORMATION**

Final test measurements were taken at the test sites listed below. 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 and with industry Canada.

Site	Registration Numbers		Location
	FCC	Canada	
SVOATS #1	90592	2845A-1	684 West Maude Ave, Sunnyvale CA 94085-3518
SVOATS #2	90593	2845A-2	

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, on OATS sites, of predictable local TV, radio, and mobile communications traffic. The test site(s) contain 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 16-1-1 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.

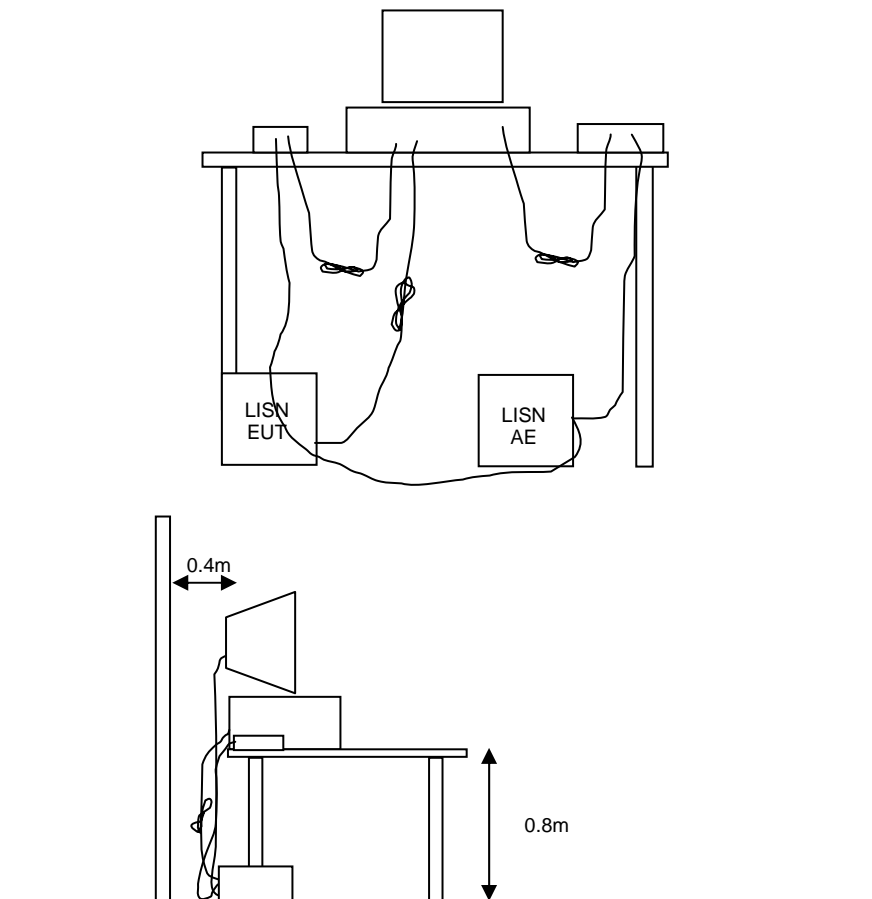
## TEST PROCEDURES

### 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.



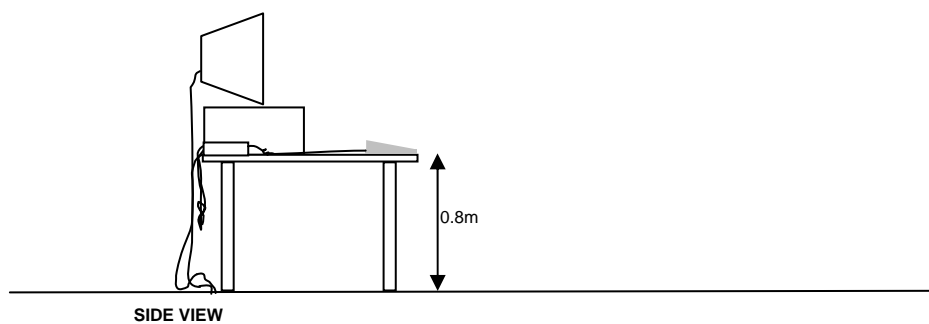
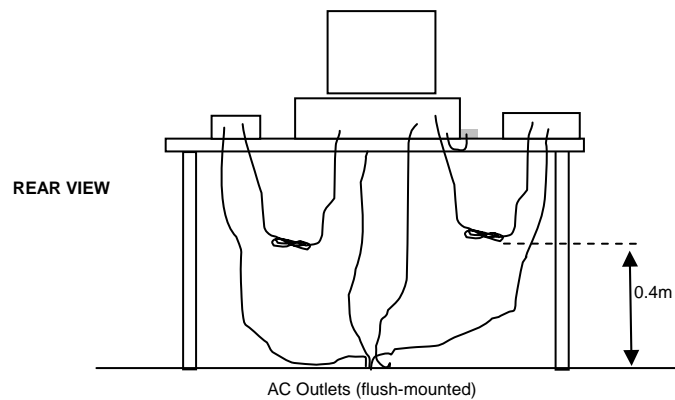
**RADIATED EMISSIONS**

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

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

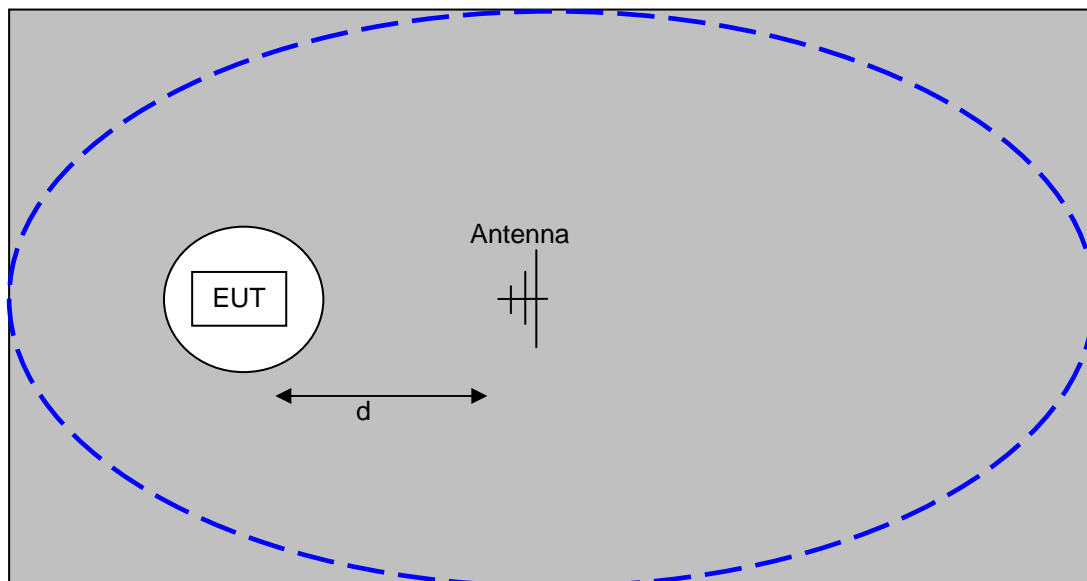
Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth, which results in the highest emission is then maintained while varying the antenna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

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

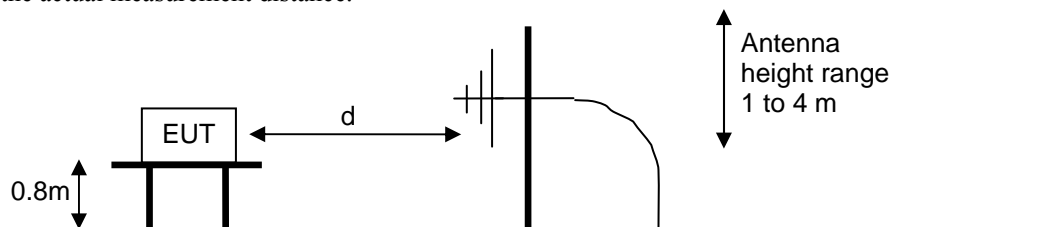


Typical Test Configuration for Radiated Field Strength Measurements

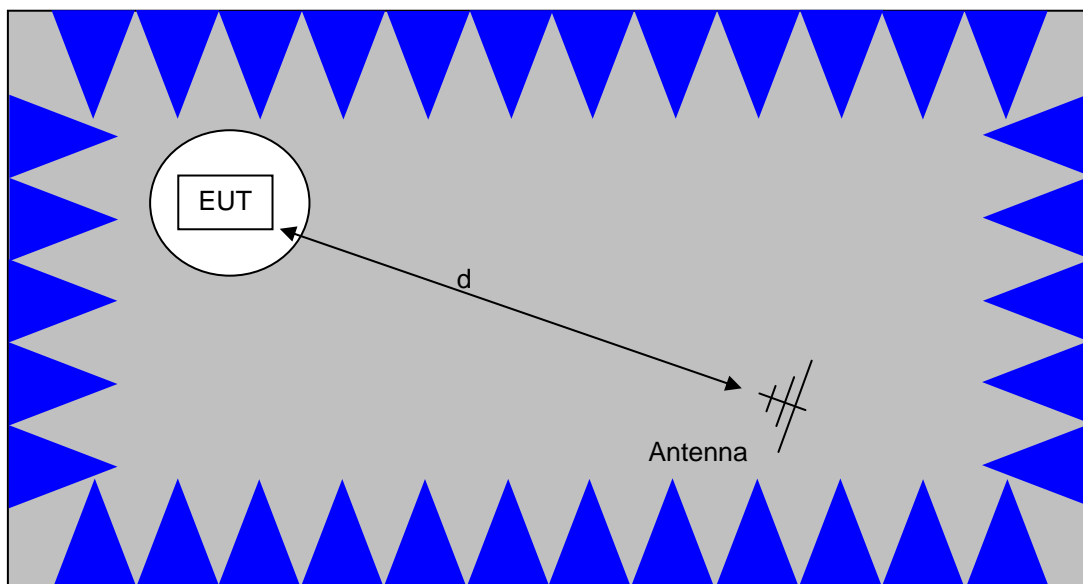




The ground plane extends beyond the ellipse defined in CISPR 16 / CISPR 22 / ANSI C63.4 and is large enough to accommodate test distances ( $d$ ) of 3m and 10m. Refer to the test data tables for the actual measurement distance.

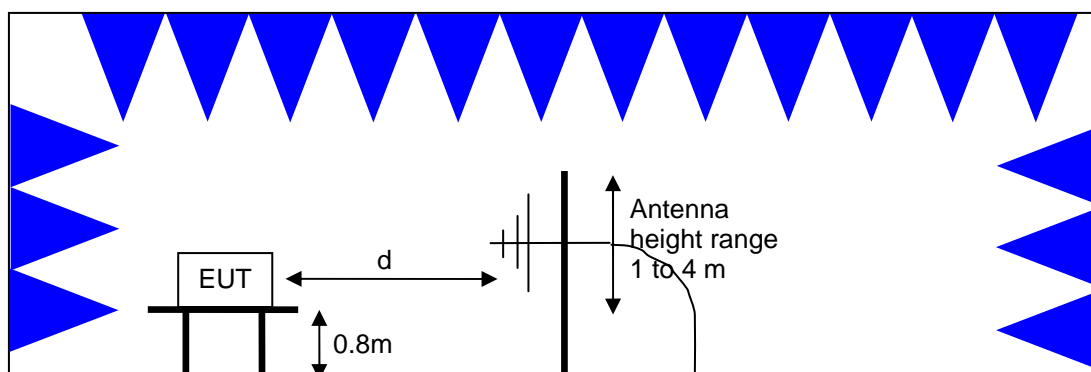


Test Configuration for Radiated Field Strength Measurements  
OATS- Plan and Side Views



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.

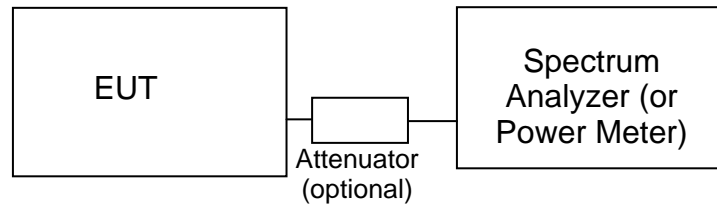
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



Test Configuration for Radiated Field Strength Measurements  
Semi-Anechoic Chamber, Plan and Side Views

**CONDUCTED EMISSIONS FROM ANTENNA PORT**

Direct measurements of power, bandwidth and power spectral density are performed, where possible, with the antenna port of the EUT connected to either the power meter or spectrum analyzer via a suitable attenuator and/or filter. These are used to ensure that the front end of the measurement instrument is not overloaded by the fundamental transmission.

**Test Configuration for Antenna Port Measurements**

Measurement bandwidths (video and resolution) are set in accordance with the relevant standards and Elliott's test procedures for the type of radio being tested. When power measurements are made using a resolution bandwidth less than the signal bandwidth the power is calculated by summing the power across the signal bandwidth using either the analyzer channel power function or by capturing the trace data and calculating the power using software. In both cases the summed power is corrected to account for the equivalent noise bandwidth (ENBW) of the resolution bandwidth used.

If power averaging is used (typically for certain digital modulation techniques), the EUT is configured to transmit continuously. Power averaging is performed using either the built-in function of the analyzer or, if the analyzer does not feature power averaging, using external software. In both cases the average power is calculated over a number of sweeps (typically 100). When the EUT cannot be configured to continuously transmit then either the analyzer is configured to perform a gated sweep to ensure that the power is averaged over periods that the device is transmitting or power averaging is disabled and a max-hold feature is used.

If a power meter is used to make output power measurements the sensor head type (peak or average) is stated in the test data table.

**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:

**CONDUCTED EMISSIONS SPECIFICATION LIMITS: FCC 15.207; FCC 15.107(a), RSS GEN**

The table below shows the limits for the emissions on the AC power line from an intentional radiator and a receiver.

Frequency (MHz)	Average Limit (dBuV)	Quasi Peak Limit (dBuV)
0.150 to 0.500	Linear decrease on logarithmic frequency axis between 56.0 and 46.0	Linear decrease on logarithmic frequency axis between 66.0 and 56.0
0.500 to 5.000	46.0	56.0
5.000 to 30.000	50.0	60.0

**GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS**

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

Frequency Range (MHz)	Limit (uV/m)	Limit (dBuV/m @ 3m)
0.009-0.490	2400/F <sub>KHz</sub> @ 300m	67.6-20*log <sub>10</sub> (F <sub>KHz</sub> ) @ 300m
0.490-1.705	24000/F <sub>KHz</sub> @ 30m	87.6-20*log <sub>10</sub> (F <sub>KHz</sub> ) @ 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

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

**OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS**

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

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

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

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

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

**SAMPLE CALCULATIONS - CONDUCTED EMISSIONS**

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

$$R_T - S = M$$

where:

$R_T$  = Receiver Reading in dBuV

$S$  = Specification Limit in dBuV

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

**SAMPLE CALCULATIONS - RADIATED EMISSIONS**

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

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

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

where:

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

$$D_m = \text{Measurement Distance in meters}$$

$$D_s = \text{Specification Distance in meters}$$

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

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

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

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

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

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

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

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

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

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

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

where P is the eirp (Watts)



**Appendix A Test Equipment Calibration Data****Radiated Emissions, 30 - 40,000 MHz, 25-Nov-09**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	8/19/2010
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	7/15/2010
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	3/12/2010

**Radio Antenna Port (Power and Spurious Emissions), 30-Nov-09**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	3/12/2010

**Radiated Emissions, 30 - 25,000 MHz, 30-Nov-09**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	8/19/2010
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	7/15/2010
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	3/12/2010

**Conducted Emissions - AC Power Ports, 30-Nov-09**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Elliott Laboratories	LISN, FCC / CISPR	LISN-3, OATS	304	7/15/2010
Hewlett Packard	EMC Spectrum Analyzer, 9 kHz - 6.5 GHz	8595EM	780	12/30/2009
Rohde & Schwarz	Test Receiver, 0.009-30 MHz	ESH3	1316	12/6/2009

**Radio Spurious Emissions, 29-Dec-09**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/15/2010
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	8/19/2010
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	3/12/2010
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	7/29/2010

**Radio Spurious Emissions, 04-Jan-10**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/15/2010
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	8/19/2010
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	3/12/2010
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	7/29/2010

**Radio Antenna Port (Power and Spurious Emissions), 05-Jan-10**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	9kHz-40GHz Analyzer	8564E	2190	6/8/2010

## ***Appendix B Test Data***

T77454 38 Pages



## EMC Test Data

Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
		Account Manager:	Susan Pelzl
Contact:	Dennis McCarthy		-
Emissions Standard(s):	FCC 15.247, RSS-210	Class:	-
Immunity Standard(s):	-	Environment:	Radio

## EMC Test Data

For The

**GE MDS LLC**

Model

**WiYZ Mesh Radio module (MESH2400)**

Date of Last Test: 1/5/2010

Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	-

## 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: 11/30/2009  
Test Engineer: Mehran Birgani  
Test Location: SVOATS #2

Config. Used: 1  
Config Change: -  
EUT Voltage: 120V/60Hz

### General Test Configuration

The EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm from the LISN. A second LISN was used for all local support equipment.

### Ambient Conditions:

Temperature: 15-20 °C  
Rel. Humidity: 35-40 %

### Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power, 120V/60Hz	FCC 15.207	Pass	38.2dBµV @ 6.516MHz (-11.8dB)

### 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.

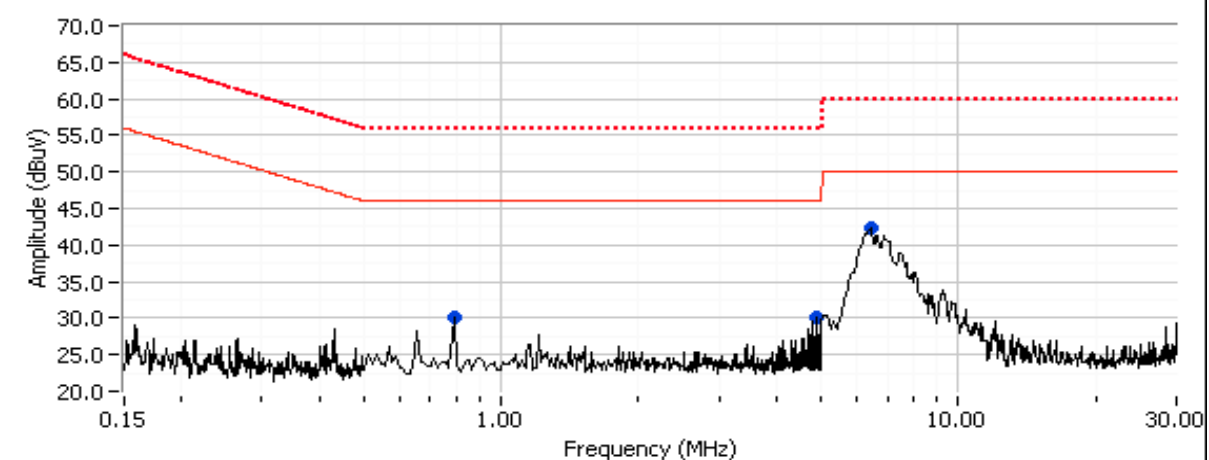
Client: GE MDS LLC	Job Number: J76361
Model: WiYZ Mesh Radio module (MESH2400)	T-Log Number: T77454
Contact: Dennis McCarthy	Account Manager: Susan Pelzl
Standard: FCC 15.247, RSS-210	Class: -

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

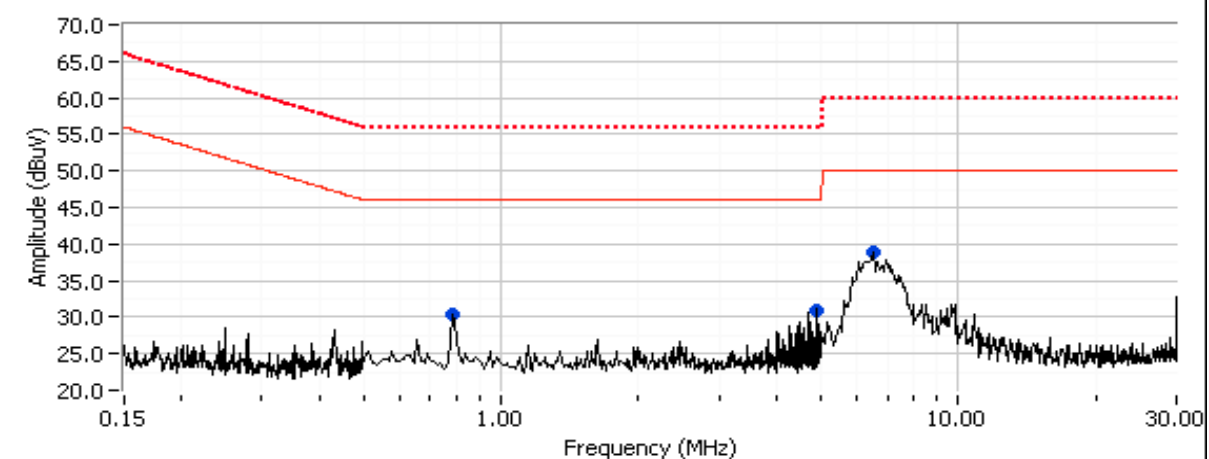
### EUT and Test Configuration Details:

System with Omnidirectional antenna, transmitter mode and set to 0x12, tuned to center channel

AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz (Neutral)



AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz (Line)



Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	-

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

### EUT and Test Configuration Details:

System with Omnidirectional antenna, transmitter mode and set to 0x12, tuned to center channel

Frequency MHz	Level dB $\mu$ V	AC Line	15.207 / RSS GEN		Detector QP/Ave	Comments
			Limit	Margin		
0.765	6.7	Line	46.0	-39.3	AVG	
0.809	27.3	Neutral	46.0	-18.7	AVG	
4.870	25.2	Line	46.0	-20.8	AVG	
4.870	24.1	Neutral	46.0	-21.9	AVG	
<b>6.516</b>	<b>38.2</b>	<b>Neutral</b>	<b>50.0</b>	<b>-11.8</b>	AVG	
6.583	34.8	Line	50.0	-15.2	AVG	
0.765	8.3	Line	56.0	-47.7	QP	
0.809	29.5	Neutral	56.0	-26.5	QP	
4.870	26.9	Line	56.0	-29.1	QP	
4.870	26.2	Neutral	56.0	-29.8	QP	
6.516	40.2	Neutral	60.0	-19.8	QP	
6.583	37.4	Line	60.0	-22.6	QP	

Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

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

### Test Specific Details

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

Date of Test: 11/30/2009 and 1/5/2010	Config. Used: 1
Test Engineer: Suhaila Khushzad / M. Birgani	Config Change: None
Test Location: Chamber #2	EUT Voltage: 14V DC

### General Test Configuration

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

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

<b>Ambient Conditions:</b>	Temperature:	20 °C
	Rel. Humidity:	40 %

### Summary of Results

Run #	Pwr setting	Channel	Test Performed	Limit	Pass / Fail	Result / Margin
1	x09	11	Output Power	15.247(b)	Pass	2.5 mW
	x0C	18				<b>23.4 mW</b>
	x0D	22				20.9 mW
	x09	25				1.7 mW
2	0F	11,18,25	Power spectral Density (PSD)	15.247(d)	Pass	7.7 dBm/3kHz
3	0F	11,18,25	Minimum 6dB Bandwidth	15.247(a)	Pass	1.53 MHz
3	0F	11,18,25	99% Bandwidth	RSS GEN	-	2.8 MHz
4	0F	11,18,25	Spurious emissions	15.247(b)	Pass	All emissions below the -30dBc limit

Note - power measurements are for the highest power settings which can be achieved when using the lowest gain (omni-directional) antenna. The Yagi and Panel antennas must be operated at lower power settings to comply with field strength limits for spurious emissions at the edges of the 2400-2483.5 MHz band.

### 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:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

## Run #1: Output Power

Date of Test: 1/5/2010

Test engineer: Mehran Birgani

### Omni-directional Antenna (gain=2dBi)

Power Setting <sup>2</sup>	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP <sup>Note 2</sup>	
		(dBm) <sup>1</sup>	mW			dBm	W
09	Channel 11 (2405MHz)	3.9	2.5	2.0	Pass	5.9	0.004
0C	Channel 18 (2440 MHz)	<b>13.7</b>	<b>23.4</b>	2.0	Pass	<b>15.7</b>	<b>0.037</b>
0D	Channel 22 (2460 MHz)	13.2	20.9	2.0	Pass	15.2	0.033
09	Channel 25 (2475 MHz)	2.2	1.7	2.0	Pass	4.2	0.003

### Yagi Antenna (gain=10dBi)

Power Setting <sup>2</sup>	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP <sup>Note 2</sup>	
		(dBm) <sup>1</sup>	mW			dBm	W
x05	Channel 11 (2405MHz)	-3.2	0.5	10.0	Pass	6.8	0.005
x06	Channel 18 (2440 MHz)	<b>-0.8</b>	<b>0.8</b>	10.0	Pass	<b>9.2</b>	<b>0.008</b>
x06	Channel 25 (2475 MHz)	-2.2	0.6	10.0	Pass	7.8	0.006

Channels 11 and 12 operate at the lower power setting of x05, all other channels at setting x06

### Panel Antenna (gain=13dBi)

Power Setting <sup>2</sup>	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP <sup>Note 2</sup>	
		(dBm) <sup>1</sup>	mW			dBm	W
x05	Channel 11 (2405MHz)	-3.2	0.5	13.0	Pass	9.8	0.010
x07	Channel 15 (2425 MHz)	<b>1.8</b>	<b>1.5</b>	13.0	Pass	<b>14.8</b>	<b>0.030</b>
x06	Channel 18 (2440 MHz)	-0.8	0.8	13.0	Pass	12.2	0.017
x05	Channel 25 (2475 MHz)	-4.6	0.3	13.0	Pass	8.4	0.007

Channels 11 - 14 and 19 - 25 operate at the lower power setting of x05, channels 15- 17 operate at setting x07 and channel 18 at x06.

Note 1:	Output power measured using a spectrum analyzer (see plots below): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 10 MHz. Spurious limit is -30dBc because this method was used. The output power limit is 30dBm for the omni-directional, 26dBm for the Yagi and 24dBm for the panel antenna.
Note 2:	Power setting - the software power setting used during testing, included for reference only.



Client: GE MDS LLC	Job Number: J76361
Model: WiYZ Mesh Radio module (MESH2400)	T-Log Number: T77454
Contact: Dennis McCarthy	Account Manager: Susan Pelzl
Standard: FCC 15.247, RSS-210	Class: N/A

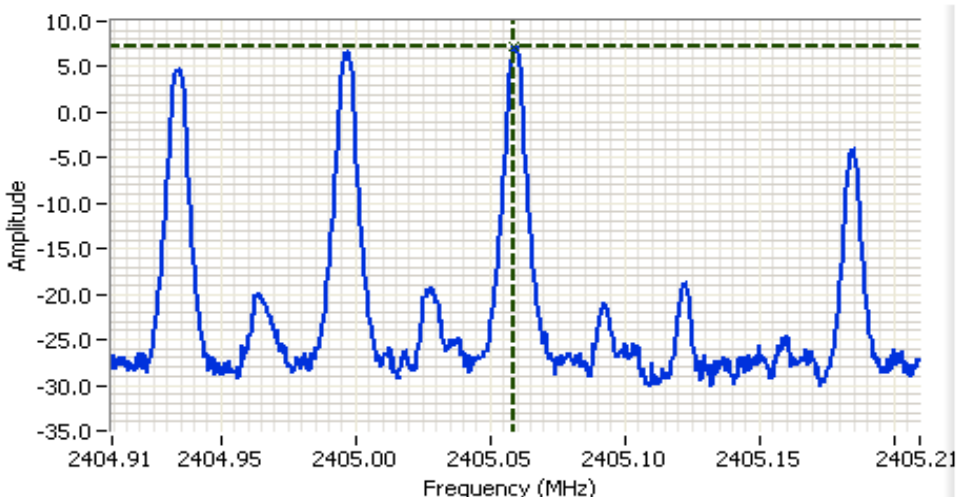
## Run #2: Power spectral Density

Date of Test: 11/30/2009

Test engineer: Suhaila

Power Setting	Frequency (MHz)	PSD	Limit dBm/3kHz	Result
		(dBm/3kHz) <small>Note 1</small>		
0F	Channel 11 (2405MHz)	7.2	8.0	Pass
0F	Channel 18 (2440 MHz)	7.7	8.0	Pass
0F	Channel 25 (2475 MHz)	6.2	8.0	Pass

Note 1:	Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using RB=3kHz using multiple sweeps at a faster rate over the 6dB bandwidth of the signal.
Note 2:	Measurements made at power setting x0F which is a higher output power than the maximum power setting for any channel of x0D. Compliance with the power spectral density requirements at a higher output power than the actual output power is sufficient to indicate compliance at the lower power settings.





### Analyzer Settings

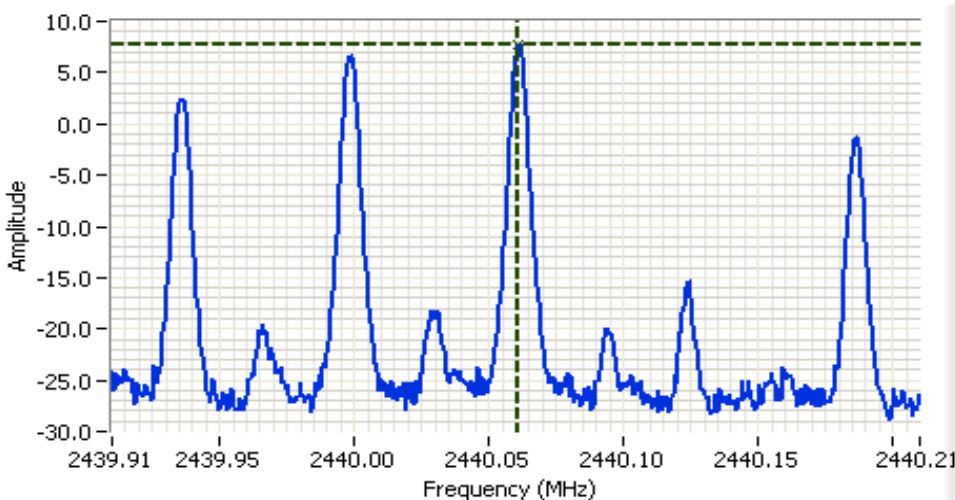
HP8564E  
 CF: 2405.060 MHz  
 SPAN: 300 kHz  
 RB 3.00 kHz  
 VB 10.00 kHz  
 Detector POS  
 Att 30  
 RL Offset 11.00  
 Sweep Time 100.0s  
 Ref Lvl: 31.00DBM

### Comments

PSD: 7.17 dBm/3kHz  
 2405 MHz

Cursor 1	2405.0591	7.17			
	0.0000	0.00			

Client: GE MDS LLC	Job Number: J76361
Model: WiYZ Mesh Radio module (MESH2400)	T-Log Number: T77454
Contact: Dennis McCarthy	Account Manager: Susan Pelzl
Standard: FCC 15.247, RSS-210	Class: N/A



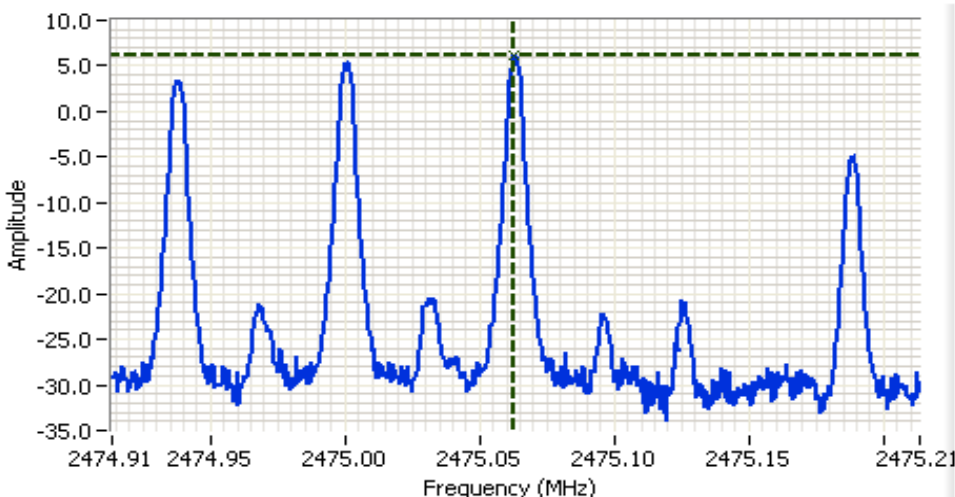
## Analyzer Settings

HP8564E  
 CF: 2440.060 MHz  
 SPAN: 300 kHz  
 RB 3.00 kHz  
 VB 10.00 kHz  
 Detector POS  
 Att 30  
 RL Offset 11.00  
 Sweep Time 100.0s  
 Ref Lvl: 31.00DBM

## Comments

PSD: 7.67 dBm/3kHz  
 2440 MHz

Cursor 1 2440.0611 7.67  
 0.0000 0.00



## Analyzer Settings

HP8564E  
 CF: 2475.063 MHz  
 SPAN: 300 kHz  
 RB 3.00 kHz  
 VB 10.00 kHz  
 Detector POS  
 Att 30  
 RL Offset 11.00  
 Sweep Time 100.0s  
 Ref Lvl: 31.00DBM

## Comments

PSD: 6.17 dBm/3kHz  
 2475 MHz

Cursor 1 2475.0630 6.17  
 0.0000 0.00



Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

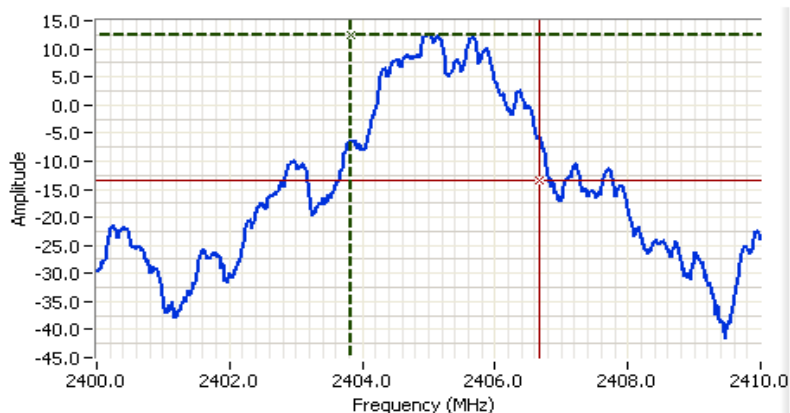
## Run #3: Signal Bandwidth

Date of Test: 11/30/2009

Test engineer: Suhaila

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz)	
			6dB	99%
0F	Channel 11 (2405MHz)	100K	1.63	<b>2.8</b>
0F	Channel 18 (2440 MHz)	100K	<b>1.53</b>	2.9
0F	Channel 25 (2475 MHz)	100K	1.6	2.9

- Note 1: 99% bandwidth measured in accordance with RSS GEN, with RB > 1% of the span and VB > 3xRB
- Note 2: Measurements made at power setting x0F which is a higher output power than the maximum power setting for any channel of x0D. The 6dB bandwidth did not vary significantly with output power setting and power setting x0F is representative of all power settings for both 99% and 6dB bandwidths.



### Analyzer Settings

HP8564E  
CF: 2405.000 MHz  
SPAN: 10.000 MHz  
RB 100 kHz  
VB 300 kHz  
Detector Sample  
Att 30  
RL Offset 11.00  
Sweep Time 50.0ms  
Ref Lvl: 31.00DBM

### Comments

99% power  
BW: 2.829 MHz



### Analyzer Settings

HP8564E  
CF: 2440.000 MHz  
SPAN: 20.000 MHz  
RB 100 kHz  
VB 100 kHz  
Detector POS  
Att 30  
RL Offset 11.00  
Sweep Time 50.0ms  
Ref Lvl: 31.00DBM

### Comments

6dB BW: 1.533 MHz  
2440 MHz

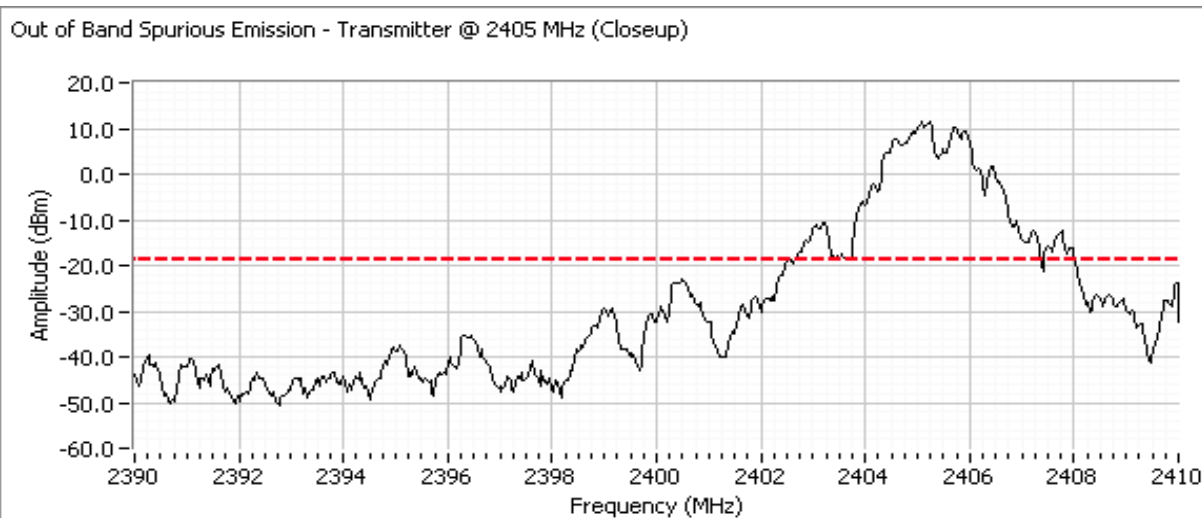
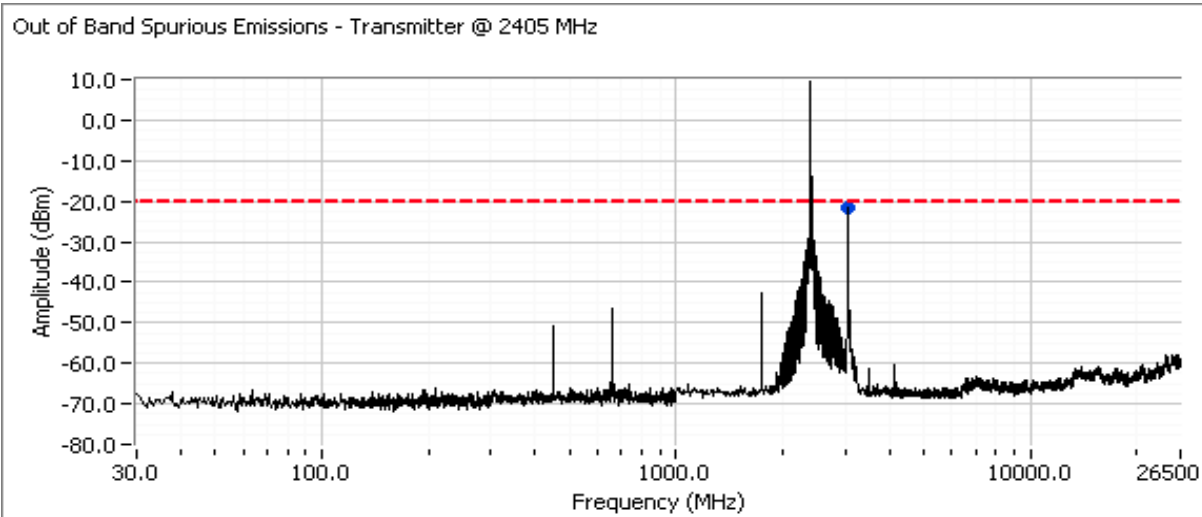
Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

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

Frequency (MHz)	Limit	Result
Channel 11 (2405MHz)	-30dBc	Pass
Channel 18 (2440 MHz)	-30dBc	Pass
Channel 25 (2475 MHz)	-30dBc	Pass

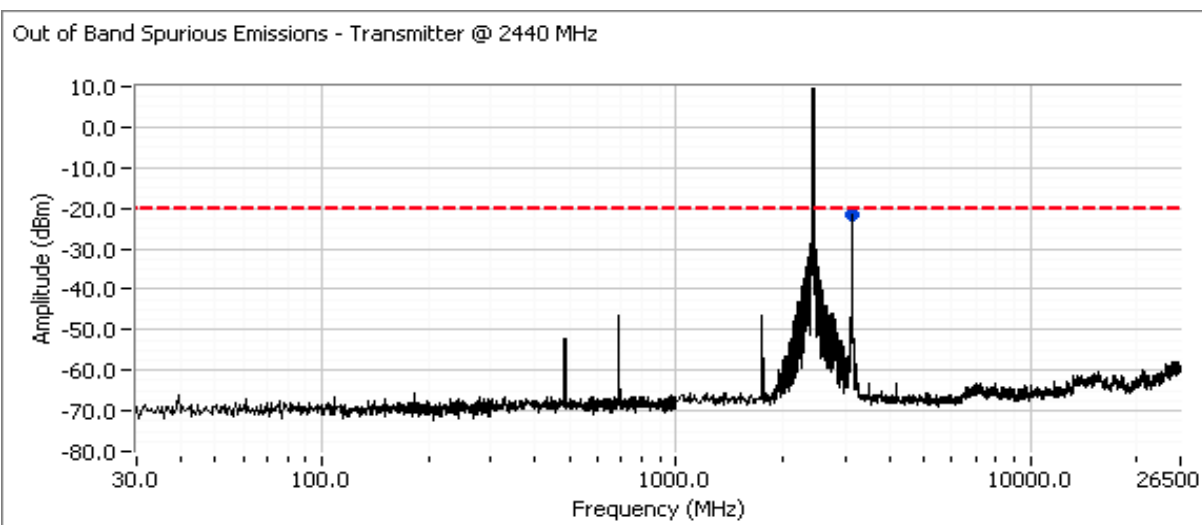
Note: Measurements made at power setting x0F which is a higher output power than the maximum power setting for any channel of x0D. Compliance with the conducted spurious emissions requirements at a higher output power than the actual output power is sufficient to indicate compliance at the lower power settings.

Plots for low channel, power setting = 0F

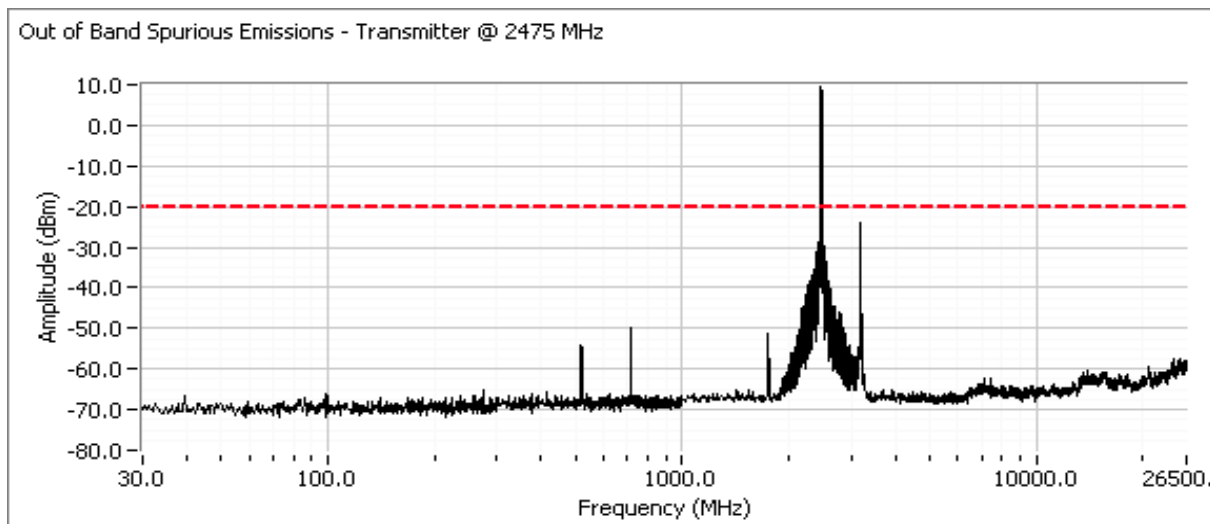


Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

Plots for center channel, power setting = 0F



Plots for high channel, power setting(s) = 0F



Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

## RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions Band Edges

### 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.

### 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: 16-20 °C  
Rel. Humidity: 35-45 %

### Summary of Results - Device Operating in the 2400-2483.5 MHz Band

Run #	Channel #	Channel frequency	Power Setting		Test Performed	Limit	Result / Margin
1 Omni Antenna	11	2405.13	09		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	49.9dBµV/m @ 2381.2MHz (-4.1dB)
	25	2475.13	09		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	50.5dBµV/m @ 2485.1MHz (-3.5dB)
	12	2410.00	09		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	<b>53.2dBµV/m @ 2386.2MHz (-0.8dB)</b>
	13	2415.00	09		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	49.7dBµV/m @ 2367.67MHz (-4.3dB)
	14	2420.00	09		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	50.0dBµV/m @ 2372.60MHz (-4.0dB)
	15	2425.00	09		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	51.4dBµV/m @ 2353.0MHz (-2.6dB)
	18	2440.00	0C		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	53.0dBµV/m @ 2368.07MHz (-1.0dB)
	24	2470.00	09		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	51.8dBµV/m @ 2489.49MHz (-3.5dB)
	23	2465.00	09		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	50.5dBµV/m @ 2489.49MHz (-3..5dB)
	22	2460.00	0D		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	50.1dBµV/m @ 2484.3MHz (-3.9dB)

Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

Run #	Channel #	Channel frequency	Power Setting		Test Performed	Limit	Result / Margin
2 Yagi Antenna	11	2405.13	05		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	<b>52.8dBμV/m @ 2381.1MHz (-1.2dB)</b>
	25	2475.13	06		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	52.8dBμV/m @ 2499.3MHz (-1.2dB)
	12	2410.00	05		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	52.3dBμV/m @ 2386.1MHz (-1.7dB)
	13	2415.00	06		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	49.4dBμV/m @ 2367.3MHz (-4.6dB)
	18	2440.00	06		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	51.6dBμV/m @ 2368.1MHz (-2.4dB)
3 Panel Antenna	11	2405.13	x05		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	<b>52.9dBμV/m @ 2381.1MHz (-1.1dB)</b>
	12	2410.00	x05		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	52.8dBμV/m @ 2390.0MHz (-1.2dB)
	13	2415.00	x07		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	52.8dBμV/m @ 2390.0MHz (-1.2dB)
	18	2440.00	x06		Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	52.0dBμV/m @ 2368.1MHz (-2.0dB)
	23	2465.00	x05		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	52.3dBμV/m @ 2489.6MHz (-1.7dB)
	25	2475.13	x05		Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	52.8dBμV/m @ 2499.39 (-1.2dB)

**Note 1:** The EUT has a maximum duty cycle of 43%. The correction factor to determine the average field strength based on a measurement of the peak field strength is  $20\log(0.43)$ , which is -7.3dB.

## 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:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

## Run #1: Radiated Spurious Emissions, Band Edges at 2390MHz and 2483.5MHz - Omnidirectional Antenna

Date: 11/25/09

Test Engineer: Mehran Birgani

Location: SVOATS #2

## Run #1a: Low Channel @ 2405 MHz - Omnidirectional Antenna with Power Setting: 0x09

**Fundamental Signal Field Strength:** Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2405.100	98.0	V	120.0	-22.0	AVG	274	1.3	eirp ~ 7.2dBm
2405.740	105.3	V	120.0	-14.7	PK	274	1.3	
2405.070	83.1	H	120.0	-36.9	AVG	126	1.6	
2404.720	90.4	H	120.0	-29.6	PK	126	1.6	

Fundamental emission level @ 3m in **100kHz RBW**: 99.9 dB $\mu$ V/m

Limit for emissions outside of restricted bands: 69.9 dB $\mu$ V/m Limit is -30dBc (UNII power measurement)

## Band Edge Signal Field Strength - Direct measurement of field strength

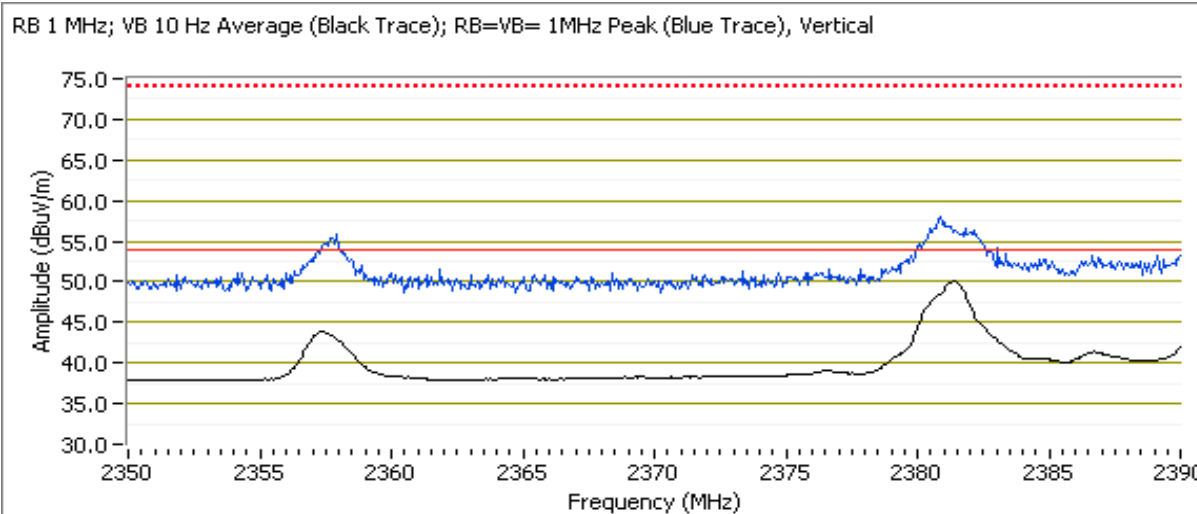
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	

### Power Setting of 0A

2382.070	69.8	V	54.0	15.8	AVG	274	1.3	
2381.930	77.1	V	74.0	3.1	PK	274	1.3	Note 1

### Power Setting of 09

2380.870	40.9	H	54.0	-13.1	AVG	126	1.6	Note 1
<b>2381.200</b>	<b>49.9</b>	<b>V</b>	<b>54.0</b>	<b>-4.1</b>	AVG	274	1.3	Note 1
2378.930	48.2	H	74.0	-25.8	PK	126	1.6	
2381.930	57.2	V	74.0	-16.8	PK	274	1.3	





Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

## Run #1b: High Channel @ 2475 MHz - Omnidirectional Antenna

**Fundamental Signal Field Strength:** Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2475.070	96.5	V	120.0	-23.5	AVG	276	1.3	eirp ~ 5.7dBm
2474.610	103.8	V	120.0	-16.2	PK	276	1.3	
2475.070	82.9	H	120.0	-37.1	AVG	28	1.3	
2474.620	90.2	H	120.0	-29.8	PK	28	1.3	

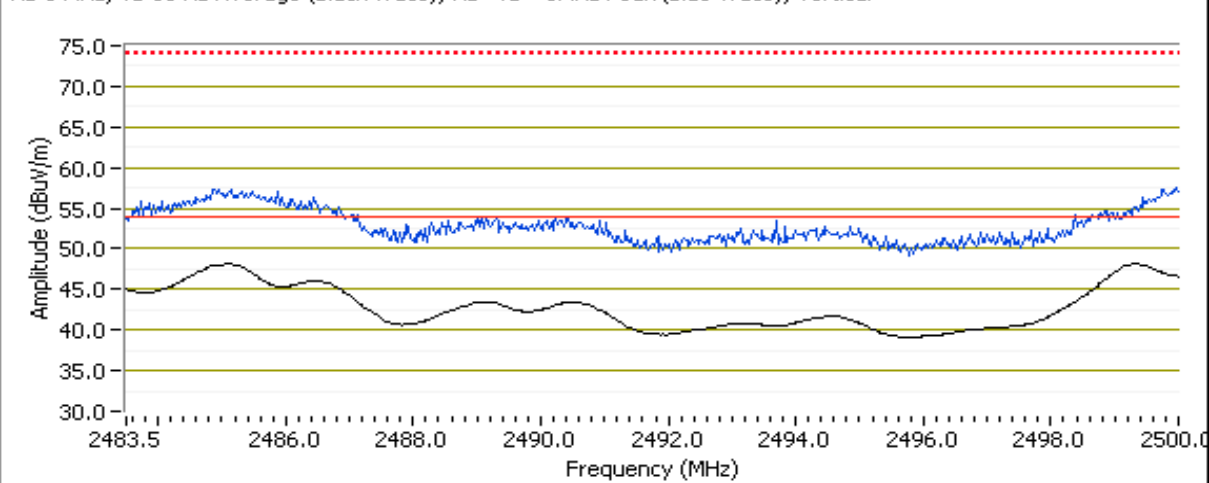
Fundamental emission level @ 3m in <b>100kHz RBW</b> :	98.5 dB $\mu$ V/m
Limit for emissions outside of restricted bands:	68.5 dB $\mu$ V/m

Limit is -30dBc (UNII power measurement)

## Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2485.040	42.6	H	54.0	-11.4	AVG	28	1.3	Note 1
<b>2485.090</b>	<b>50.5</b>	<b>V</b>	<b>54.0</b>	<b>-3.5</b>	AVG	276	1.3	Note 1
2484.850	49.9	H	74.0	-24.1	PK	28	1.3	
2485.070	57.8	V	74.0	-16.2	PK	276	1.3	

RB 1 MHz; VB 10 Hz Average (Black Trace); RB=VB= 1MHz Peak (Blue Trace), Vertical



Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

Date: 12/21/09

Test Engineer: Mark Hill

Location: SVOATS #2

## Run #1c: Channel @ 2410 MHz - Omni Antenna

**Fundamental Signal Field Strength:** Peak and average values measured in 1 MHz, and peak value measured in 100kHz

**Power Setting:** 0x09

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2386.200	53.2	V	54.0	-0.8	AVG	0	1.6	RB 1 MHz; VB: 10 Hz
2385.600	61.1	V	74.0	-12.9	PK	0	1.6	RB 1 MHz; VB: 1 MHz

## Run #1d: Channel @ 2415 MHz - Omni Antenna

**Fundamental Signal Field Strength:** Peak and average values measured in 1 MHz, and peak value measured in 100kHz

**Power Setting:** 0x09

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	

**Power Setting: 0x0C**

2367.670	56.3	V	54.0	2.3	AVG	0	1.6	RB 1 MHz; VB: 10 Hz
2368.000	64.6	V	74.0	-9.4	PK	0	1.6	RB 1 MHz; VB: 1 MHz
2368.000	57.3	V	54.0	3.3	AVG	0	1.6	Note 1

**Power Setting: 0x09**

2367.670	49.7	V	54.0	-4.3	AVG	0	1.6	RB 1 MHz; VB: 10 Hz
2367.730	59.8	V	74.0	-14.2	PK	0	1.6	RB 1 MHz; VB: 1 MHz
2367.730	52.5	V	54.0	-1.5	AVG	0	1.6	Note 1

## Run #1e: Channel @ 2420 MHz - Omni Antenna

**Fundamental Signal Field Strength:** Peak and average values measured in 1 MHz, and peak value measured in 100kHz

**Power Setting:** 0x09

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	

**Power Setting: 0x0C**

2372.600	57.4	V	54.0	3.4	AVG	0	1.6	RB 1 MHz; VB: 10 Hz
2372.800	65.7	V	74.0	-8.3	PK	0	1.6	RB 1 MHz; VB: 1 MHz

**Power Setting: 0x09**

2372.600	50.0	V	54.0	-4.0	AVG	346	1.6	RB 1 MHz; VB: 10 Hz
2372.730	60.3	V	74.0	-13.7	PK	346	1.6	RB 1 MHz; VB: 1 MHz

Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

## Run #1f: Channel @ 2425 MHz - Omni Antenna

**Fundamental Signal Field Strength:** Peak and average values measured in 1 MHz, and peak value measured in 100kHz

**Power Setting:** 0x09

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	

**Power Setting: 0x0C - no measurement taken, definite failure**

**Power Setting: 0x09**

2353.000	51.4	V	54.0	-2.6	AVG	347	1.6	RB 1 MHz; VB: 10 Hz
2352.800	60.1	V	74.0	-13.9	PK	347	1.6	RB 1 MHz; VB: 1 MHz

**Note:** No measurements taken on channels 16 and 17. Observation showed that bandedge would fail at 0x0C, and pass at 0x09

## Run #1g: Channel @ 2540 MHz - Omni Antenna

**Fundamental Signal Field Strength:** Peak and average values measured in 1 MHz, and peak value measured in 100kHz

**Power Setting:** 0x0C

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	

**Power Setting: 0x0C**

2368.070	53.0	V	54.0	-1.0	AVG	345	1.6	RB 1 MHz; VB: 10 Hz
2368.000	61.5	V	74.0	-12.5	PK	345	1.6	RB 1 MHz; VB: 1 MHz

## Run #1h: Channel @ 2470 MHz - Omni Antenna

**Fundamental Signal Field Strength:** Peak and average values measured in 1 MHz, and peak value measured in 100kHz

**Power Setting:** 0x09

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	

**Power Setting: 0x0C**

2493.510	60.4	V	54.0	6.4	AVG	29	1.0	RB 1 MHz; VB: 10 Hz
2494.720	67.7	V	74.0	-6.3	PK	29	1.0	RB 1 MHz; VB: 1 MHz

**Power Setting: 0x09**

2494.610	51.8	V	54.0	-2.2	AVG	29	1.0	RB 1 MHz; VB: 10 Hz
2494.970	61.4	V	74.0	-12.6	PK	29	1.0	RB 1 MHz; VB: 1 MHz

Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

## Run #1i: Channel @ 2465 MHz - Omni Antenna

**Fundamental Signal Field Strength:** Peak and average values measured in 1 MHz, and peak value measured in 100kHz

**Power Setting:** 0x09

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	

**Power Setting:** 0x09

2489.490	50.5	V	54.0	-3.5	AVG	29	1.0	RB 1 MHz; VB: 10 Hz
2489.580	60.2	V	74.0	-13.8	PK	29	1.0	RB 1 MHz; VB: 1 MHz

## Run #1k: Channel @ 2460 MHz - Omni Antenna

**Fundamental Signal Field Strength:** Peak and average values measured in 1 MHz, and peak value measured in 100kHz

**Power Setting:** 0x0D

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	

**Power Setting:** 0x0D

2484.300	50.1	V	54.0	-3.9	AVG	29	1.0	RB 1 MHz; VB: 10 Hz
2485.090	59.8	V	74.0	-14.2	PK	29	1.0	RB 1 MHz; VB: 1 MHz

Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

## Run #2: Radiated Spurious Emissions, Band Edges at 2490MHz and 2483.5MHz - Yagi Antenna

Date: 12/21/09

Test Engineer: Mark Hill

Location: SVOATS #2

### Run #2a: Low Channel @ 2405 MHz - Yagi Antenna

**Fundamental Signal Field Strength:** Peak and average values measured in 1 MHz, and peak value measured in 100kHz

**Power Setting:** 0x05

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2405.110	102.7	V	-	-	AVG	0	1.5	RB 1 MHz; VB: 10 Hz
2405.710	104.7	V	-	-	PK	0	1.5	RB 1 MHz; VB: 1 MHz
2405.090	99.4	V	-	-	PK	0	1.5	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in **100kHz RBW:** 99.4 dBμV/m

Limit for emissions outside of restricted bands: 69.4 dBμV/m Limit is -30dBc (UNII power measurement)

### Band Edge Signal Field Strength - Direct measurement of field strength

**Power Setting:** 0x05

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
<b>2381.130</b>	<b>52.8</b>	<b>V</b>	<b>54.0</b>	<b>-1.2</b>	AVG	360	1.5	RB 1 MHz; VB: 10 Hz
2382.000	60.8	V	74.0	-13.2	PK	360	1.5	RB 1 MHz; VB: 1 MHz

### Run #2b: High Channel @ 2475 MHz - Yagi Antenna

**Power Setting:** 0x06

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
<b>2499.280</b>	<b>52.8</b>	<b>V</b>	<b>54.0</b>	<b>-1.2</b>	AVG	0	1.4	RB 1 MHz; VB: 10 Hz
2499.750	61.7	V	74.0	-12.3	PK	0	1.4	RB 1 MHz; VB: 1 MHz

### Run #2c: Channel @ 2410 MHz - Yagi Antenna

**Fundamental Signal Field Strength:** Peak and average values measured in 1 MHz, and peak value measured in 100kHz

**Power Setting:** 0x05

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
<b>2386.070</b>	<b>52.3</b>	<b>V</b>	<b>54.0</b>	<b>-1.7</b>	AVG	3	1.5	RB 1 MHz; VB: 10 Hz
2387.200	61.3	V	74.0	-12.7	PK	3	1.5	RB 1 MHz; VB: 1 MHz

Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

## Run #2d: Channel @ 2415 MHz - Yagi Antenna

**Fundamental Signal Field Strength:** Peak and average values measured in 1 MHz, and peak value measured in 100kHz

**Power Setting:** 0x06

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2367.330	49.4	V	54.0	-4.6	AVG	3	1.5	RB 1 MHz; VB: 10 Hz
2363.270	59.3	V	74.0	-14.7	PK	3	1.5	RB 1 MHz; VB: 1 MHz

## Run #2e: Channel @ 2440 MHz - Yagi Antenna

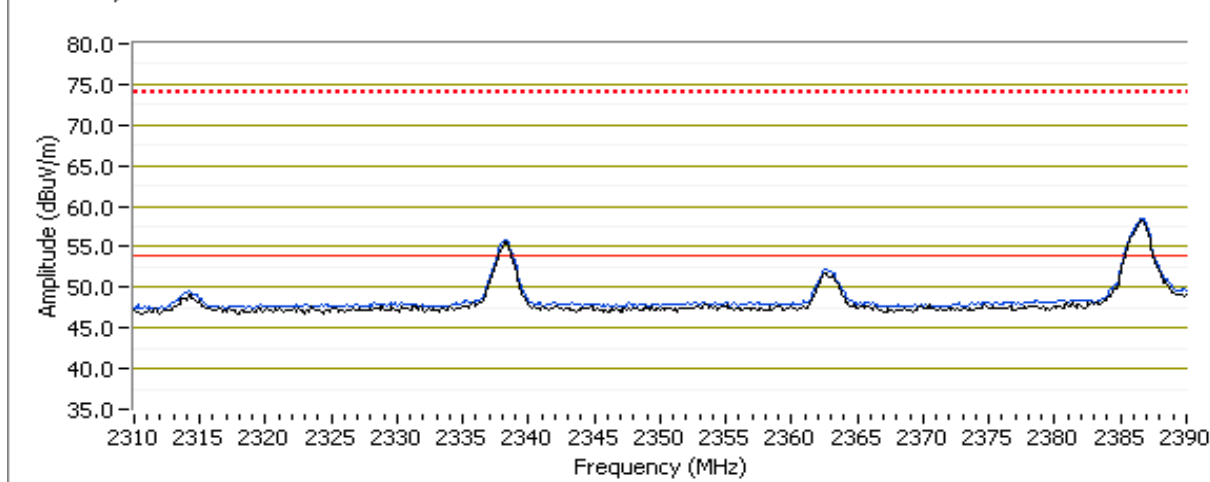
**Fundamental Signal Field Strength:** Peak and average values measured in 1 MHz, and peak value measured in 100kHz

**Power Setting:** 0x06

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2368.070	51.6	V	54.0	-2.4	AVG	360	1.5	RB 1 MHz; VB: 10 Hz
2367.930	61.7	V	74.0	-12.3	PK	360	1.5	RB 1 MHz; VB: 1 MHz

RB 1 MHz; VB 1 kHz Emissions in the restricted band



Plot taken at channel 12 with setting 0x07

Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

## Run #3: Radiated Spurious Emissions, Band Edges at 2490MHz and 2483.5MHz - Panel Antenna

### Run #3a: Channel 11 @ 2405 MHz - Panel Antenna

Date: 12/21/09

Test Engineer: Mark Hill

Location: SVOATS #3

**Fundamental Signal Field Strength:** Peak and average values measured in 1 MHz, and peak value measured in 100kHz

**Power Setting:** 0x05

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2404.920	99.9	V	-	-	??	360	1.4	RB 100 kHz; VB: 100 kHz
2405.040	103.5	V	-	-	AVG	360	1.4	RB 1 MHz; VB: 10 Hz
2405.710	105.4	V	-	-	PK	360	1.4	RB 1 MHz; VB: 1 MHz

Fundamental emission level @ 3m in **100kHz RBW:** 99.9 dBμV/m

Limit for emissions outside of restricted bands: 69.9 dBμV/m

Limit is -30dBc (UNII power measurement)

## Band Edge Signal Field Strength - Direct measurement of field strength

**Power Setting:** 0x05

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
<b>2381.070</b>	<b>52.9</b>	<b>V</b>	<b>54.0</b>	<b>-1.1</b>	AVG	360	1.4	RB 1 MHz; VB: 10 Hz
2381.000	61.0	V	74.0	-13.0	PK	360	1.4	RB 1 MHz; VB: 1 MHz

Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

## Run #3b and #3c: Channel 12 @ 2410 MHz - Panel Antenna

Date: 12/29/09

Test Engineer: Suhaila Khushzad

Location: SVOATS #2

Power Setting: 0x05

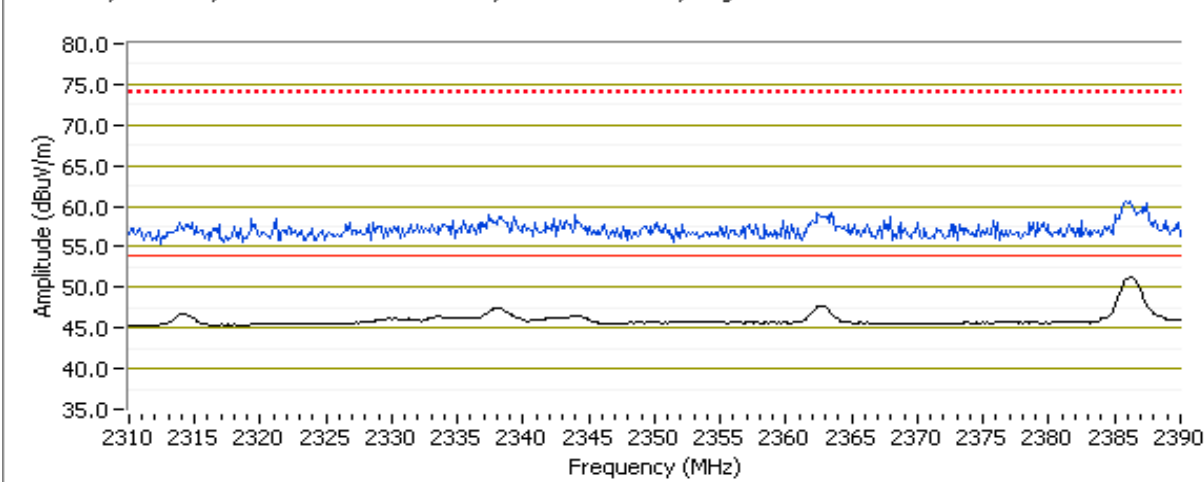
Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2410.400	103.5	V	54.0	49.5	AVG	11	1.3	RB 1 MHz; VB: 10 Hz
2410.930	105.3	V	74.0	31.3	PK	11	1.3	RB 1 MHz; VB: 1 MHz
2410.270	100.0	V	74.0	26.0	PK	11	1.3	RB 100 kHz; VB: 100 kHz

## Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2386.130	52.8	V	54.0	-1.2	AVG	11	1.3	RB 1 MHz; VB: 10 Hz pwr 05
2386.130	61.7	V	74.0	-12.3	PK	11	1.3	RB 1 MHz; VB: 1 MHz pwr 05
Additional measurements at power settings 06, 04 and 03.								
2386.000	53.2	V	54.0	-0.8	AVG	11	1.3	Note 1 pwr 04
2386.000	52.7	V	54.0	-1.3	AVG	11	1.3	RB 1 MHz; VB: 10 Hz pwr 04
2386.200	60.5	V	74.0	-13.5	PK	11	1.3	RB 1 MHz; VB: 1 MHz pwr 04
2386.070	50.9	V	54.0	-3.1	AVG	11	1.3	RB 1 MHz; VB: 10 Hz pwr 03
2386.200	58.9	V	74.0	-15.1	PK	11	1.3	RB 1 MHz; VB: 1 MHz pwr 03
2386.070	51.6	V	54.0	-2.4	AVG	11	1.3	Note 1 pwr 03
2386.270	56.3	V	54.0	2.3	AVG	9	1.3	RB 1 MHz; VB: 10 Hz pwr 06
2386.130	63.1	V	74.0	-10.9	PK	9	1.3	RB 1 MHz; VB: 1 MHz pwr 06

RB 1 MHz; VB 10 Hz, Emission in restricted Band, Peak=Blue Trace, Avg=Black Trace





Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

## Run #3d: Channel 13 @ 2415 MHz - Panel Antenna

Date: 12/21/09

Test Engineer: Mark Hill

Location: SVOATS #3

Power Setting: 0x07

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	52.8	V	54.0	-1.2	AVG	360	1.4	RB 1 MHz; VB: 10 Hz
2367.600	62.2	V	74.0	-11.8	PK	360	1.4	RB 1 MHz; VB: 1 MHz

## Run #3e: Channel 18 @ 2440 MHz - Panel Antenna

Date: 12/29/09

Test Engineer: Suhaila Khushzad

Location: SVOATS #2

Power Setting: 0x06

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2440.270	107.7	V	-	-	AVG	13	1.3	RB 1 MHz; VB: 10 Hz pwr 06
2440.970	109.7	V	-	-	PK	13	1.3	RB 1 MHz; VB: 1 MHz pwr 06
2440.130	104.2	V	-	-	PK	13	1.3	RB 100 kHz; VB: 100 kHz pwr 06

### Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
<b>Power Setting: 0x06</b>								
2368.130	52.0	V	54.0	-2.0	AVG	13	1.3	RB 1 MHz; VB: 10 Hz
2368.400	59.7	V	74.0	-14.3	PK	13	1.3	RB 1 MHz; VB: 1 MHz
<b>Power Setting: 0x07</b>								
2368.270	54.5	V	54.0	0.5	AVG	13	1.3	RB 1 MHz; VB: 10 Hz
2368.400	61.1	V	74.0	-12.9	PK	13	1.3	RB 1 MHz; VB: 1 MHz
<b>Power Setting: 0x09</b>								
2368.270	58.3	V	54.0	4.3	AVG	13	1.3	RB 1 MHz; VB: 10 Hz pwr 09
2368.130	64.5	V	74.0	-9.5	PK	13	1.3	RB 1 MHz; VB: 1 MHz pwr 09
2368.270	57.2	V	54.0	3.2	AVG	13	1.3	Note 1 pwr 09

Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

## Run #3f: Channel 23 @ 2465 MHz - Panel Antenna

Power Setting: 0x05

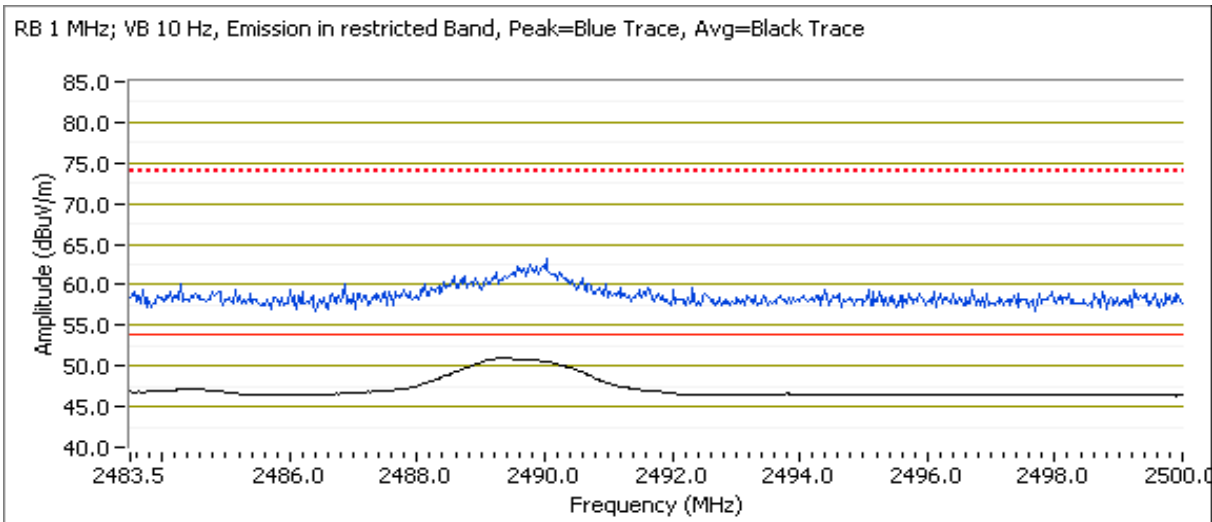
Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2465.230	102.6	V	-	-	AVG	18	1.3	RB 1 MHz; VB: 10 Hz
2465.900	104.5	V	-	-	PK	18	1.3	RB 1 MHz; VB: 1 MHz
2465.100	99.0	V	-	-	PK	18	1.3	RB 100 kHz; VB: 100 kHz

## Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
Power Setting: 0x05								
2489.600	52.3	V	54.0	-1.7	AVG	18	1.3	RB 1 MHz; VB: 10 Hz pwr 05
2489.800	62.4	V	74.0	-11.6	PK	18	1.3	RB 1 MHz; VB: 1 MHz pwr 05
Power Setting: 0x06								
2489.330	54.0	V	54.0	0.0	AVG	18	1.3	RB 1 MHz; VB: 10 Hz pwr 06
2489.990	63.0	V	74.0	-11.0	PK	18	1.3	RB 1 MHz; VB: 1 MHz pwr 06
Power Setting: 0x04								
2489.330	53.9	V	54.0	-0.1	AVG	18	1.3	Note 1 pwr 04
2489.330	51.6	V	54.0	-2.4	AVG	18	1.3	RB 1 MHz; VB: 10 Hz pwr 04
2489.880	61.2	V	74.0	-12.8	PK	18	1.3	RB 1 MHz; VB: 1 MHz pwr 04

Plot @ power setting 05



Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

## Run #3g: High Channel 25 @ 2475 MHz - Panel Antenna

Date: 12/29/09

Test Engineer: Suhaila Khushzad

Location: SVOATS #2

Power Setting: 0x05

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2475.230	104.2	V	-	-	AVG	19	1.3	RB 1 MHz; VB: 10 Hz pwr 05
2474.760	106.0	V	-	-	PK	19	1.3	RB 1 MHz; VB: 1 MHz pwr 05
2475.230	100.5	V	-	-	PK	19	1.3	RB 100 kHz; VB: 100 kHz pwr 05

## Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	

Power Setting: 0x05

2499.390	52.8	V	54.0	-1.2	AVG	19	1.3	RB 1 MHz; VB: 10 Hz pwr 05
2499.860	61.8	V	74.0	-12.2	PK	19	1.3	RB 1 MHz; VB: 1 MHz pwr 05

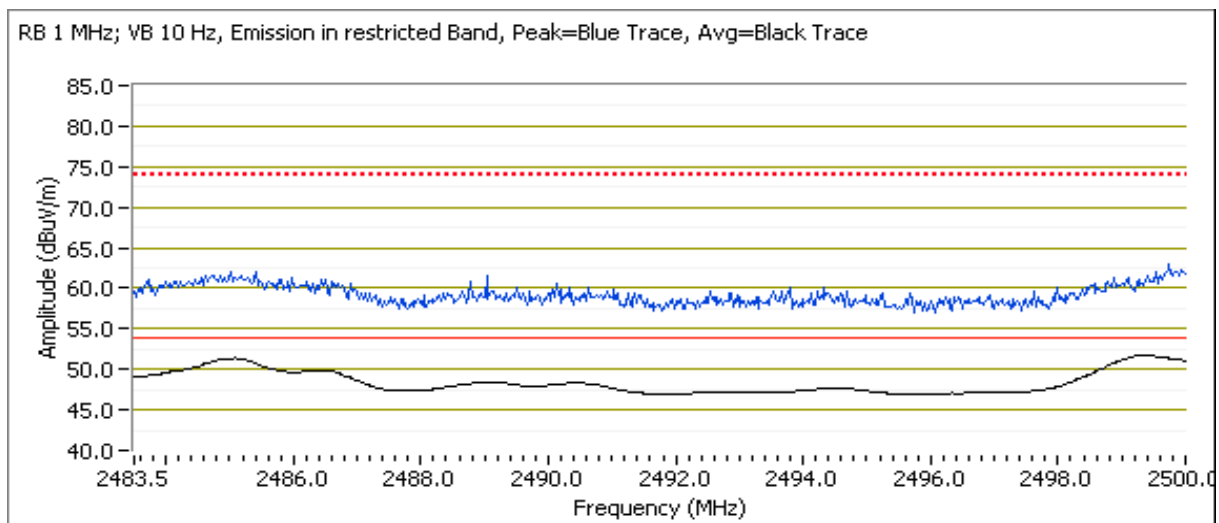
Power Setting: 0x03

2499.590	53.2	V	54.0	-0.8	AVG	19	1.3	Note 1 pwr 03
2499.590	50.4	V	54.0	-3.6	AVG	19	1.3	RB 1 MHz; VB: 10 Hz pwr 03
2499.830	60.5	V	74.0	-13.5	PK	19	1.3	RB 1 MHz; VB: 1 MHz pwr 03

Power Setting: 0x04

2499.340	52.0	V	54.0	-2.0	AVG	19	1.3	RB 1 MHz; VB: 10 Hz pwr 04
2499.920	61.4	V	74.0	-12.6	PK	19	1.3	RB 1 MHz; VB: 1 MHz pwr 04

Plot @ power setting 05



Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

## RSS 210 and FCC 15.247 (DTS) 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.

### 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: 16-20 °C  
Rel. Humidity: 35-45 %

### Summary of Results - Device Operating in the 2400-2483.5 MHz Band

Run #	Channel #	Channel frequency	Power Setting		Test Performed	Limit	Result / Margin
1 Omni Antenna	11	2405	09		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247( c)	41.0dBµV/m @ 12027.3MHz (-13.0dB)
	18	2440	0F		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247( c)	52.6dBµV/m @ 7319.2MHz (-1.4dB)
	25	2475	0A		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247( c)	39.0dBµV/m @ 12372.7MHz (-15.0dB)
2 Yagi Antenna	11	2405	x06		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247( c)	<b>48.0dBµV/m @ 4805.4MHz (-6.0dB)</b>
	18	2440	09		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247( c)	44.3dBµV/m @ 12195.0MHz (-9.7dB)
	25	2475	09		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247( c)	39.5dBµV/m @ 12370.0MHz (-14.5dB)
3 Panel Antenna	11	2405	x07		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247( c)	40.7dBµV/m @ 12026.9MHz (-13.3dB)
	18	2440	x07		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247( c)	40.0dBµV/m @ 12195.0MHz (-14.0dB)
	25	2475	x07		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247( c)	39.6dBµV/m @ 12370.2MHz (-14.4dB)

### 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:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

## Run #1: Radiated Spurious Emissions, 1000 - 26000 MHz, Omnidirectional Antenna

Date: 11/25/09

Test Engineer: Mehran Birgani

Location: SVOATS #2

## Run #1a: Low Channel @ 2405 MHz, Omnidirectional Antenna

Power setting:					09			
Fundamental emission level @ 3m in 100kHz RBW:					99.9 dBμV/m			
Limit for emissions outside of restricted bands:					69.9 dBμV/m		Limit is -30dBc (UNII power measurement)	
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
3049.910	33.4	H	74.0	-40.6	AVG	310	1.6	
4805.560	38.9	H	54.0	-15.1	AVG	323	1.1	
4809.870	38.1	V	54.0	-15.9	AVG	0	1.9	
7215.280	35.4	V	74.0	-38.6	AVG	80	1.5	
7215.920	37.1	H	74.0	-36.9	AVG	200	1.1	
12023.490	40.4	V	54.0	-13.6	AVG	0	1.4	
12027.340	41.0	H	54.0	-13.0	AVG	325	1.1	
3049.320	48.8	H	74.0	-25.2	PK	310	1.6	
4805.580	52.4	H	74.0	-21.6	PK	323	1.1	
4810.700	50.3	V	74.0	-23.7	PK	0	1.9	
7213.400	48.2	H	74.0	-25.8	PK	200	1.1	
7215.650	47.5	V	74.0	-26.5	PK	80	1.5	
12020.040	52.6	H	74.0	-21.4	PK	325	1.1	
12024.260	51.8	V	74.0	-22.2	PK	0	1.4	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.
Note 3:	No significant emissions observed above 18GHz

Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

## Run #1b: Center Channel @ 2440 MHz, Omnidirectional Antenna

Power setting:	<b>0F</b>
Fundamental emission level @ 3m in 100kHz RBW:	110.5 dB $\mu$ V/m
Limit for emissions outside of restricted bands:	80.5 dB $\mu$ V/m

Limit is -30dBc (UNII power measurement)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2239.950	35.7	V	54.0	-18.3	AVG	206	1.0	
3112.830	53.8	V	74.0	-20.2	AVG	92	1.1	
4879.390	41.9	H	54.0	-12.1	AVG	126	1.5	
4879.410	48.2	V	54.0	-5.8	AVG	83	1.0	
7319.060	49.0	H	54.0	-5.0	AVG	32	1.8	
<b>7319.160</b>	<b>52.6</b>	<b>V</b>	<b>54.0</b>	<b>-1.4</b>	AVG	336	1.1	
12198.110	43.2	H	54.0	-10.8	AVG	127	1.5	
12198.210	52.3	V	54.0	-1.7	AVG	224	1.7	
2238.940	45.6	V	74.0	-28.4	PK	206	1.0	
3112.780	62.1	V	74.0	-11.9	PK	92	1.1	
4879.260	55.5	V	74.0	-18.5	PK	83	1.0	
4879.340	49.2	H	74.0	-24.8	PK	126	1.5	
7318.710	56.7	H	74.0	-17.3	PK	32	1.8	
7322.180	59.9	V	74.0	-14.1	PK	336	1.1	
12198.380	59.9	V	74.0	-14.1	PK	224	1.7	
12198.880	53.1	H	74.0	-20.9	PK	127	1.5	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.
Note 3:	No significant emissions observed above 18GHz

Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

## Run #1c: High Channel @ 2475 MHz, Omnidirectional Antenna

Power setting:	<b>0A</b>
Fundamental emission level @ 3m in 100kHz RBW:	98.5 dB $\mu$ V/m
Limit for emissions outside of restricted bands:	68.5 dB $\mu$ V/m

Limit is -30dBc (UNII power measurement)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2235.730	37.2	V	54.0	-16.8	AVG	106	1.0	
2236.130	32.5	H	54.0	-21.5	AVG	10	1.0	
3171.060	29.0	H	74.0	-45.0	AVG	40	1.0	
3171.240	30.8	V	74.0	-43.2	AVG	85	1.0	
4949.330	32.4	V	54.0	-21.6	AVG	264	1.0	
4950.310	30.6	H	54.0	-23.4	AVG	151	1.0	
7423.790	36.5	H	54.0	-17.5	AVG	360	1.0	
7423.820	36.6	V	54.0	-17.4	AVG	0	1.0	
<b>12372.720</b>	<b>39.0</b>	<b>V</b>	<b>54.0</b>	<b>-15.0</b>	AVG	49	1.0	
12372.720	39.0	H	54.0	-15.0	AVG	360	1.0	
2235.790	45.5	V	74.0	-28.5	PK	106	1.0	
2235.880	50.2	H	74.0	-23.8	PK	10	1.0	
3171.210	40.2	H	74.0	-33.8	PK	40	1.0	
3171.600	41.0	V	74.0	-33.0	PK	85	1.0	
4949.330	42.3	H	74.0	-31.7	PK	151	1.0	
4949.500	42.7	V	74.0	-31.3	PK	264	1.0	
7425.150	47.6	V	74.0	-26.4	PK	0	1.0	
7425.630	48.2	H	74.0	-25.8	PK	360	1.0	
12373.270	50.6	V	74.0	-23.4	PK	49	1.0	
12374.900	50.6	H	74.0	-23.4	PK	360	1.0	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.
Note 3:	No significant emissions observed above 18GHz

Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

## Run #2: Radiated Spurious Emissions, 1000 - 26000 MHz, Yagi Antenna

Date: 12/29/09

Test Engineer: Suhaila Khushzad

Location: SVOATS #2

### Run #2a: Low Channel @ 2405 MHz, Yagi Antenna

Power setting:	06
Fundamental emission level @ 3m in 100kHz RBW:	99.4 dBμV/m
Limit for emissions outside of restricted bands:	69.4 dBμV/m

Limit is -30dBc (UNII power measurement)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4805.000	48.0	H	54.0	-6.0	AVG	357	1.0	RB 1 MHz; VB: 10 Hz
<b>4805.350</b>	<b>48.0</b>	<b>V</b>	<b>54.0</b>	<b>-6.0</b>	AVG	90	1.0	RB 1 MHz; VB: 10 Hz
7215.830	55.6	V	74.0	-18.4	AVG	36	1.7	Note 1
7215.830	51.5	V	74.0	-22.5	AVG	36	1.7	RB 1 MHz; VB: 10 Hz
7216.030	51.3	H	74.0	-22.7	AVG	360	2.4	RB 1 MHz; VB: 10 Hz
4808.280	59.4	V	74.0	-14.6	PK	90	1.0	RB 1 MHz; VB: 1 MHz
4812.130	59.6	H	74.0	-14.4	PK	357	1.0	RB 1 MHz; VB: 1 MHz
7212.680	62.4	H	74.0	-11.6	PK	360	2.4	RB 1 MHz; VB: 1 MHz
7219.870	62.9	V	74.0	-11.1	PK	36	1.7	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.
Note 3:	No significant emissions observed above 18GHz



Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

## Run #2b: Center Channel @ 2440 MHz, Yagi Antenna

Power setting:	09
Fundamental emission level @ 3m in 100kHz RBW:	105.9 dBμV/m
Limit for emissions outside of restricted bands:	75.9 dBμV/m

Limit is -30dBc (UNII power measurement)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
12195.000	44.3	V	54.0	-9.7	AVG	0	1.0	Note 1 pwr09
12195.000	39.7	V	54.0	-14.3	AVG	0	1.0	RB 1 MHz; VB: 10 Hz pwr09
12201.270	51.6	V	74.0	-22.4	PK	0	1.0	RB 1 MHz; VB: 1 MHz pwr09
7329.030	37.1	V	54.0	-16.9	AVG	247	1.6	RB 1 MHz; VB: 10 Hz pwr09
7329.030	42.0	V	54.0	-12.0	AVG	247	1.6	Note 1 pwr09
7323.330	49.3	V	74.0	-24.7	PK	247	1.6	RB 1 MHz; VB: 1 MHz pwr09
4878.830	31.8	V	54.0	-22.2	AVG	101	1.0	RB 1 MHz; VB: 10 Hz pwr09
4878.830	36.1	V	54.0	-17.9	AVG	101	1.0	Note 1 pwr09
4883.330	43.4	V	74.0	-30.6	PK	101	1.0	RB 1 MHz; VB: 1 MHz pwr09
4880.180	31.6	H	54.0	-22.4	AVG	134	1.0	RB 1 MHz; VB: 10 Hz pwr09
4880.180	35.4	H	54.0	-18.6	AVG	134	1.0	Note 1 pwr09
4878.080	42.7	H	74.0	-31.3	PK	134	1.0	RB 1 MHz; VB: 1 MHz pwr09
7322.770	36.7	H	54.0	-17.3	AVG	67	1.0	RB 1 MHz; VB: 10 Hz pwr09
7322.770	40.5	H	54.0	-13.5	AVG	67	1.0	Note 1 pwr09
7317.570	47.8	H	74.0	-26.2	PK	67	1.0	RB 1 MHz; VB: 1 MHz pwr09
12195.000	40.1	H	54.0	-13.9	AVG	140	1.0	RB 1 MHz; VB: 10 Hz pwr09
12195.000	43.9	H	54.0	-10.1	AVG	140	1.0	Note 1 pwr09
12196.120	51.2	H	74.0	-22.8	PK	140	1.0	RB 1 MHz; VB: 1 MHz pwr09
7319.100	58.6	V	54.0	<b>4.6</b>	AVG	247	1.6	MHz; VB: 10 Hz pwr10
7322.170	64.4	V	74.0	-9.6	PK	247	1.6	MHz; VB: 1 MHz pwr10
4879.370	51.5	V	54.0	-2.5	AVG	342	1.1	RB 1 MHz; VB: 10 Hz pwr11
4879.420	56.9	V	74.0	-17.1	PK	342	1.1	RB 1 MHz; VB: 1 MHz pwr11
4879.370	49.6	V	54.0	-4.4	AVG	342	1.1	Note 1 pwr11
7319.130	60.2	V	54.0	<b>6.2</b>	AVG	247	1.6	RB 1 MHz; VB: 10 Hz pwr11
7322.030	66.0	V	74.0	-8.0	PK	247	1.6	RB 1 MHz; VB: 1 MHz pwr11
4879.320	51.0	H	54.0	-3.0	AVG	118	1.8	RB 1 MHz; VB: 10 Hz pwr12
4879.520	60.9	H	74.0	-13.1	PK	118	1.8	RB 1 MHz; VB: 1 MHz pwr12
7319.020	56.5	H	54.0	2.5	AVG	19	1.5	RB 1 MHz; VB: 10 Hz pwr12
7319.280	65.9	H	74.0	-8.1	PK	19	1.5	RB 1 MHz; VB: 1 MHz pwr12
7319.170	58.1	H	54.0	4.1	AVG	19	1.5	RB 1 MHz; VB: 10 Hz pwr12
7321.980	63.7	H	74.0	-10.3	PK	19	1.5	RB 1 MHz; VB: 1 MHz pwr12
7319.120	56.5	V	54.0	2.5	AVG	9	1.7	RB 1 MHz; VB: 10 Hz pwr12
7319.030	62.3	V	74.0	-11.7	PK	9	1.7	RB 1 MHz; VB: 1 MHz pwr12
4879.400	58.4	V	54.0	<b>4.4</b>	AVG	342	1.1	RB 1 MHz; VB: 10 Hz pwr12
4879.500	62.9	V	74.0	-11.1	PK	342	1.1	RB 1 MHz; VB: 1 MHz pwr12

Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.

Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

Note 3: No significant emissions observed above 18GHz

## Run #2c: High Channel @ 2475 MHz, Yagi Antenna

Date: 01/04/10

Test Engineer: Suhaila Khushzad

Location: SVOATS #2

Power setting:	9
Fundamental emission level @ 3m in 100kHz RBW:	103.9 dBμV/m
Limit for emissions outside of restricted bands:	73.9 dBμV/m

Limit is -30dBc (UNII power measurement)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
12370.000	39.5	V	54.0	-14.5	AVG	170	1.0	RB 1 MHz; VB: 10 Hz
12376.600	51.2	V	74.0	-22.8	PK	170	1.0	RB 1 MHz; VB: 1 MHz
4950.350	33.0	V	54.0	-21.0	AVG	270	1.0	RB 1 MHz; VB: 10 Hz
4949.770	42.9	V	74.0	-31.1	PK	270	1.0	RB 1 MHz; VB: 1 MHz
7420.000	37.6	V	54.0	-16.4	AVG	235	1.0	RB 1 MHz; VB: 10 Hz
7422.720	49.5	V	74.0	-24.5	PK	235	1.0	RB 1 MHz; VB: 1 MHz
12370.000	39.5	H	54.0	-14.5	AVG	81	1.0	RB 1 MHz; VB: 10 Hz
12374.200	50.9	H	74.0	-23.1	PK	81	1.0	RB 1 MHz; VB: 1 MHz
4950.250	31.9	H	54.0	-22.1	AVG	25	2.0	RB 1 MHz; VB: 10 Hz
4952.280	42.5	H	74.0	-31.5	PK	25	2.0	RB 1 MHz; VB: 1 MHz
7420.000	37.6	H	54.0	-16.4	AVG	180	1.0	RB 1 MHz; VB: 10 Hz
7426.550	48.7	H	74.0	-25.3	PK	180	1.0	RB 1 MHz; VB: 1 MHz

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.

Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

Note 3: No significant emissions observed above 18GHz

Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

## Run #3: Radiated Spurious Emissions, 1000 - 26000 MHz, Panel Antenna

Date: 01/04/10

Test Engineer: Suhaila Khushzad

Location: SVOATS #2

## Run #3a: Low Channel @ 2405 MHz, Panel Antenna

Power setting:	7
Fundamental emission level @ 3m in 100kHz RBW:	dBμV/m
Limit for emissions outside of restricted bands:	-30 dBμV/m

Limit is -30dBc (UNII power measurement)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
12026.880	40.7	H	54.0	-13.3	AVG	182	1.0	RB 1 MHz; VB: 10 Hz
12027.250	52.7	H	74.0	-21.3	PK	182	1.0	RB 1 MHz; VB: 1 MHz
12029.300	40.6	V	54.0	-13.4	AVG	130	1.0	RB 1 MHz; VB: 10 Hz
12026.850	52.1	V	74.0	-21.9	PK	130	1.0	RB 1 MHz; VB: 1 MHz
4814.050	37.8	V	54.0	-16.2	AVG	268	2.5	RB 1 MHz; VB: 10 Hz
4814.070	50.2	V	74.0	-23.8	PK	268	2.5	RB 1 MHz; VB: 1 MHz
7210.020	35.6	V	74.0	-38.4	AVG	100	1.0	RB 1 MHz; VB: 10 Hz
7213.270	46.9	V	74.0	-27.1	PK	100	1.0	RB 1 MHz; VB: 1 MHz
7210.020	35.6	H	74.0	-38.4	AVG	8	1.0	RB 1 MHz; VB: 10 Hz
7219.720	46.8	H	74.0	-27.2	PK	8	1.0	RB 1 MHz; VB: 1 MHz
4805.350	35.5	H	54.0	-18.5	AVG	276	1.0	RB 1 MHz; VB: 10 Hz
4809.870	52.6	H	74.0	-21.4	PK	276	1.0	RB 1 MHz; VB: 1 MHz

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.

Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

Note 3: No significant emissions observed above 18GHz

Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

## Run #3b: Center Channel @ 2440 MHz, Panel Antenna

Power setting:	7
Fundamental emission level @ 3m in 100kHz RBW:	dB $\mu$ V/m
Limit for emissions outside of restricted bands:	-30 dB $\mu$ V/m

Limit is -30dBc (UNII power measurement)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
12195.000	40.0	V	54.0	-14.0	AVG	207	1.0	MHz; VB: 10 Hz
12201.980	51.4	V	74.0	-22.6	PK	207	1.0	MHz; VB: 1 MHz
12195.000	39.9	H	54.0	-14.1	AVG	275	1.0	MHz; VB: 10 Hz
12199.130	51.7	H	74.0	-22.3	PK	275	1.0	MHz; VB: 1 MHz
4880.330	33.7	V	54.0	-20.3	AVG	268	1.1	MHz; VB: 10 Hz
4880.330	43.5	V	74.0	-30.5	PK	268	1.1	MHz; VB: 1 MHz
7323.380	36.8	V	54.0	-17.2	AVG	0	2.0	MHz; VB: 10 Hz
7319.330	48.2	V	74.0	-25.8	PK	0	2.0	MHz; VB: 1 MHz
7322.630	36.8	H	54.0	-17.2	AVG	278	1.0	MHz; VB: 10 Hz
7324.900	47.9	H	74.0	-26.1	PK	278	1.0	MHz; VB: 1 MHz
4880.230	31.5	H	54.0	-22.5	AVG	272	1.0	MHz; VB: 10 Hz
4883.050	42.3	H	74.0	-31.7	PK	272	1.0	MHz; VB: 1 MHz

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.
Note 3:	No significant emissions observed above 18GHz

Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	N/A

## Run #3c: High Channel @ 2475 MHz, Panel Antenna

Power setting:	7
Fundamental emission level @ 3m in 100kHz RBW:	dB $\mu$ V/m
Limit for emissions outside of restricted bands:	-30 dB $\mu$ V/m

Limit is -30dBc (UNII power measurement)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
12370.150	39.6	H	54.0	-14.4	AVG	45	1.7	RB 1 MHz; VB: 10 Hz
12370.520	50.3	H	74.0	-23.7	PK	45	1.7	RB 1 MHz; VB: 1 MHz
4950.330	32.7	V	54.0	-21.3	AVG	280	1.0	RB 1 MHz; VB: 10 Hz
4950.430	43.1	V	74.0	-30.9	PK	280	1.0	RB 1 MHz; VB: 1 MHz
7420.000	37.4	V	54.0	-16.6	AVG	0	1.0	RB 1 MHz; VB: 10 Hz
7425.920	49.0	V	74.0	-25.0	PK	0	1.0	RB 1 MHz; VB: 1 MHz
12370.050	39.5	V	54.0	-14.5	AVG	146	1.0	RB 1 MHz; VB: 10 Hz
12372.450	50.6	V	74.0	-23.4	PK	146	1.0	RB 1 MHz; VB: 1 MHz
7421.150	37.6	H	54.0	-16.4	AVG	257	1.0	RB 1 MHz; VB: 10 Hz
7421.830	49.2	H	74.0	-24.8	PK	257	1.0	RB 1 MHz; VB: 1 MHz
4948.500	31.1	H	54.0	-22.9	AVG	329	1.0	RB 1 MHz; VB: 10 Hz
4949.320	42.2	H	74.0	-31.8	PK	329	1.0	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.
Note 3:	No significant emissions observed above 18GHz

Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	-

## Receiver Spurious 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.

### General Test Configuration

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

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

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: 15-20 °C  
Rel. Humidity: 35-45 %

### Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, 30 - 1000MHz Maximized Emissions	RSS 210	-	All emissions from support equipment
2a (Omni)	RE, 1000 - 7500 MHz Maximized Emissions	RSS 210	Pass	41.6dBμV/m @ 1042.5MHz (-12.4dB)
2b (Yagi)			Pass	41.8dBμV/m @ 1761.8MHz (-12.2dB)
2c (Panel)			Pass	43.5dBμV/m @ 1765.9MHz (-10.5dB)

### 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.

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

Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	-

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

### EUT and Test Configuration Details:

System with Omnidirectional antenna, receive mode, tuned to center channel

### Preliminary Readings

Note 1: Preliminary testing indicated that the significant emissions below 1GHz were from the support laptop and test fixture. Host systems using the module will be tested against the appropriate digital device emissions limits (Class A or Class B as appropriate) with the module installed to demonstrate compliance with digital device requirements.

## Run #2: Maximized readings, 1000 - 7500 MHz

Base on chamber scan

### Run #2a: Omnidirectional Antenna - tuned to 2440MHz

Date of Test: 11/30/09

Test Engineer: Mehran Birgani

Test Location: SVOATS #2

Config. Used: 1

Config Change: -

EUT Voltage: 120V/60Hz

Frequency	Level	Pol	RSS 210		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1042.410	36.3	H	54.0	-17.7	AVG	231	1.0	
<b>1042.470</b>	<b>41.6</b>	<b>V</b>	<b>54.0</b>	<b>-12.4</b>	AVG	165	1.0	
1760.050	40.5	V	74.0	-33.5	AVG	242	1.0	
1760.070	37.3	H	74.0	-36.7	AVG	168	1.9	
1042.370	41.6	H	74.0	-32.4	PK	231	1.0	
1042.390	46.6	V	74.0	-27.4	PK	165	1.0	
1759.960	44.6	V	74.0	-29.4	PK	242	1.0	
1759.960	42.3	H	74.0	-31.7	PK	168	1.9	

Client:	GE MDS LLC	Job Number:	J76361
Model:	WiYZ Mesh Radio module (MESH2400)	T-Log Number:	T77454
Contact:	Dennis McCarthy	Account Manager:	Susan Pelzl
Standard:	FCC 15.247, RSS-210	Class:	-

## Run #2b: Yagi Antenna - tuned to 2440MHz

Date of Test: 01/04/10  
 Test Engineer: Suhaila Khushzad  
 Test Location: SVOATS #2

Config. Used: 1  
 Config Change: -  
 EUT Voltage: 14V DC

Frequency	Level	Pol	RSS 210		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1761.800	41.8	V	54.0	-12.2	AVG	52	2.5	RB 1 MHz; VB: 10 Hz
1761.450	51.7	V	74.0	-22.3	PK	52	2.5	RB 1 MHz; VB: 1 MHz
1761.340	41.6	H	54.0	-12.4	AVG	84	1.0	RB 1 MHz; VB: 10 Hz
1761.340	51.6	H	74.0	-16.4	PK	84	1.0	RB 1 MHz; VB: 1 MHz
1042.480	40.7	V	54.0	-13.3	AVG	165	1.0	RB 1 MHz; VB: 10 Hz
1042.810	49.4	V	74.0	-24.6	PK	165	1.0	RB 1 MHz; VB: 1 MHz
1044.840	39.4	H	54.0	-14.6	AVG	62	1.0	RB 1 MHz; VB: 10 Hz
1043.830	53.6	H	74.0	-20.4	PK	62	1.0	RB 1 MHz; VB: 1 MHz

## Run #2c: Panel Antenna - tuned to 2440MHz

Frequency	Level	Pol	RSS 210		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1765.900	43.5	V	54.0	-10.5	AVG	66	1.0	RB 1 MHz; VB: 10 Hz
1764.560	54.2	V	74.0	-19.8	PK	66	1.0	RB 1 MHz; VB: 1 MHz
1762.430	42.5	H	54.0	-11.5	AVG	86	1.1	RB 1 MHz; VB: 10 Hz
1762.360	52.0	H	74.0	-22.0	PK	86	1.1	RB 1 MHz; VB: 1 MHz
1047.090	41.5	H	54.0	-12.5	AVG	90	1.5	RB 1 MHz; VB: 10 Hz
1045.420	58.2	H	74.0	-15.8	PK	90	1.5	RB 1 MHz; VB: 1 MHz
1042.540	37.4	V	54.0	-16.6	AVG	324	1.0	RB 1 MHz; VB: 10 Hz
1043.240	48.0	V	74.0	-26.0	PK	324	1.0	RB 1 MHz; VB: 1 MHz

Note 1: Above 1 GHz, the limit is based on an average measurement. In addition, the peak reading of any emission above 1 GHz can not exceed the average limit by more than 20 dB.



## *Appendix C Photographs of Test Configurations*

### *Appendix D Proposed FCC ID Label & Label Location*

Uploaded as a separate exhibit

## *Appendix E Detailed Photographs*

Uploaded as a separate exhibit

## *Appendix F Operator's Manual*

Uploaded as a separate exhibit

## *Appendix G Block Diagram*

Uploaded as a separate exhibit

## *Appendix H Schematic Diagrams*

Uploaded as a separate exhibit

## *Appendix I Theory of Operation*

Uploaded as a separate exhibit

## *Appendix J RF Exposure Information*

Uploaded as a separate exhibit