



*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: SDC-MSD30AG***

IC CERTIFICATION #: 6616A-SDCMSD30AG  
FCC ID: TWG-SDCMSD30AG

APPLICANT: Summit Data Communications Inc.  
526 South Main St. Suite 805  
Akron, OH 44311

TEST SITE(S): Elliott Laboratories  
41039 Boyce Road.  
Fremont, CA. 94538-2435

IC SITE REGISTRATION #: 2845B-3; 2845B-4, 2845B-5

REPORT DATE: April 12, 2010

FINAL TEST DATES: January 6, 8, 13, 14, 21, 22, and February 26,  
2010

AUTHORIZED SIGNATORY:

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Testing Cert #2016-01

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***REVISION HISTORY***

Rev#	Date	Comments	Modified By
-	April 12, 2010	First release	

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## SCOPE

An electromagnetic emissions test has been performed on the Summit Data Communications Inc. model SDC-MSD30AG, 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 Summit Data Communications Inc. model SDC-MSD30AG 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 Summit Data Communications Inc. model SDC-MSD30AG and therefore apply only to the tested sample. The sample was selected and prepared by Jerry Pohmurski of Summit Data Communications Inc.

**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 OFDM / DSSS techniques	-	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	802.11b: 12.41 MHz 802.11g: 16.5 MHz	>500kHz	Complies
15.247 (b) (3)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	802.11b: 17.4 dBm (0.056 Watts) EIRP = 0.111 W <sup>Note 1</sup>  802.11g: 20.9 dBm (0.123 Watts) EIRP = 0.245 W <sup>Note 1</sup>	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	802.11b: -6.7 dBm / MHz  802.11g: -7.9 dBm / MHz	8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	All emissions < -30dBc or <-20dBc <sup>Note 2</sup>	< -30dBc or < -20dBc <sup>Note 2</sup>	Complies
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	53.8dBμV/m @ 4924.0MHz (-0.2dB)	15.207 in restricted bands, all others < -20dBc <-30dBc <sup>Note 2</sup>	Complies

Note 1: EIRP calculated using antenna gain of 3 dBi for the highest EIRP multi-point system.

Note 2: Limit of -30dBc used when 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). When peak power was measured, -20dBc was used.

**DIGITAL TRANSMISSION SYSTEMS (5725 –5850 MHz)**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	Systems uses OFDM / DSSS techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	16.5 MHz	>500kHz	Complies
15.247 (b)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	11.5 dBm (0.014 Watts) EIRP = 0.063 W <sup>Note 1</sup>	1 Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	7.5 dBm / MHz	Maximum permitted is 8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions – 30MHz – 40 GHz	All spurious emissions < -30dBc	< -30dBc <sup>Note 2</sup>	Complies
15.247(c) / 15.209	RSS 210 A8.5 Table 2, 3	Radiated Spurious Emissions 30MHz – 40 GHz	51.6dBμV/m @ 5236.3MHz (-2.4dB)	15.207 in restricted bands, all others <-30dBc <sup>Note 2</sup>	Complies

Note 1: EIRP calculated using antenna gain of 6.5 dBi for the highest EIRP multi-point system.

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

**GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS**

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	The EUT uses u.FL connectors	Refer to standard	Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	42.6dB $\mu$ V/m (134.9 $\mu$ V/m) @ 3856.7MHz (-11.4dB)	Refer to standard	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	45.1dB $\mu$ V @ 0.176MHz (-19.6dB)	Refer to standard	Complies
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11, RSS 102 declaration and User Manual statements.	Refer to OET 65, FCC Part 1 and RSS 102	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual		Statement required regarding non-interference	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual		Statement for products with detachable antenna	Complies
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	802.11b: 16.1 MHz 802.11g: 17.2 MHz 802.1a: 17.1 MHz	Information only	N/A

**MEASUREMENT UNCERTAINTIES**

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

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	$\pm 2.4$
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 Summit Data Communications Inc. model SDC-MSD30AG is a 802.11ag compliant wireless LAN radio Module which is designed to provide wireless local area networking connectivity. Normally, the EUT would be embedded in various types of mobile and stationary computing devices such as handheld and vehicle mounted data terminals during operation. The EUT was, therefore, placed in this position during emissions testing to simulate the end user environment. The electrical rating of the EUT is 3.3 VDC  $\pm$ 5%. It's typical power consumption is 400mA (1320mW) while in transmit mode, 180mA (594mW) while in receive mode and 10mA (33mW) while in standby mode.

The sample was received on November 8, 2009 and tested on January 6, 8, 13, 14, 21, 22, and February 26, 2010. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Summit Data Communications Inc.	SDC-MSD30AG	802.11AG Mini Compact Flash Module with antenna connectors		TWG-SDCMSD30AG

**ANTENNA SYSTEM**

The SDC-MSD30AG will be marketed with the following antenna options:

Monopole Antenna - 2.4 and 5GHz bands, Huber+Suhner, SOA 2459/360/5/0/V\_C, 3dBi (2.4GHz), 6.5dBi (5GHz)

Dipole Antenna #1 - 2.4 and 5GHz bands - Larsen, R380.500.314, 1.6dBi (2.4GHz), 5dBi (5GHz)

Dipole Antenna #2 - 2.4 GHz only - Cisco Air-Ant 4941 2dBi(2.4GHz)

Dipole Antenna #3 - 5GHz only - Cisco Air-Ant 5135 3.5dBi(5GHz)

Dipole Antenna #4 - 2.4GHz only - Summit SDC-CF22G - 0dBi

**ENCLOSURE**

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

**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
Hewlett Packard	iPAQ	Handheld Computer	-	-

No remote support equipment was used during testing.

**EUT INTERFACE PORTS**

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
iPAQ Power	AC Mains	2wire	Unshielded	1.5
Flash Module	iPAQ Module Port	-	-	-

**EUT OPERATION**

During emissions testing the EUT was configured to transmit at the Low, Middle, and High Channel. Testing performed at 6Mbps for 802.11g and 802.11a modes and 1Mbps for 802.11b mode.

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

Final test measurements were taken on January 6, 8, 13, 14, 21, 22, and February 26, 2010 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	
Chamber 3	769238	2845B-3	41039 Boyce Road Fremont, CA 94538-2435
Chamber 4	211948	2845B-4	
Chamber 5	211948	2845B-5	

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. 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.

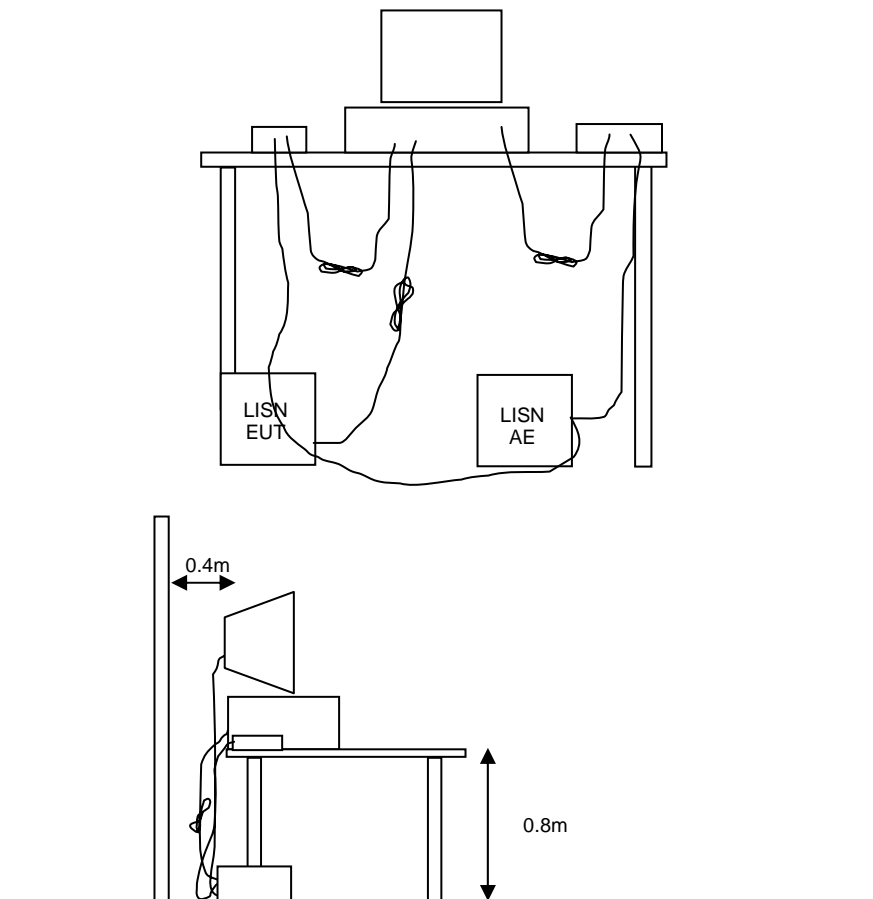
## TEST PROCEDURES

### 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.



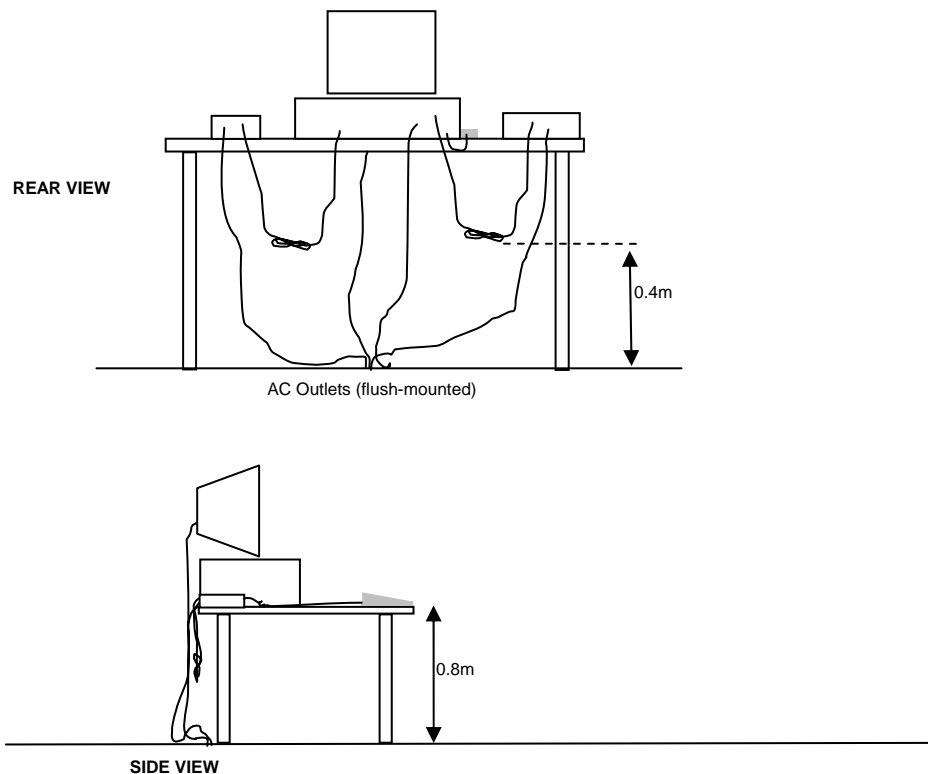
**RADIATED EMISSIONS**

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.

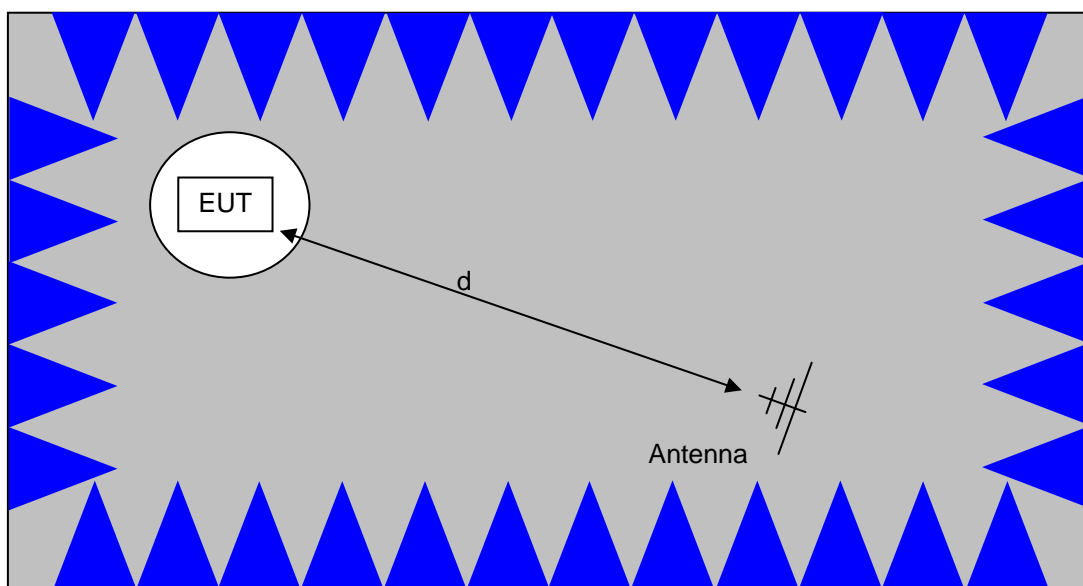
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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.

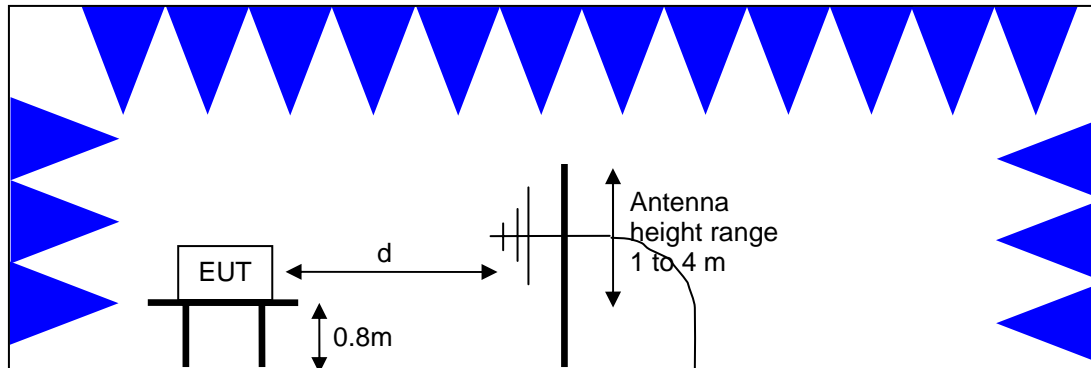


Typical Test Configuration for Radiated Field Strength Measurements



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

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



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

#### **BANDWIDTH MEASUREMENTS**

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



**SPECIFICATION LIMITS AND SAMPLE CALCULATIONS**

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

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

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

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

**RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS**

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

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

**OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS**

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

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:

$F_d$  = Distance Factor in dB

$D_m$  = Measurement Distance in meters

$D_s$  = Specification Distance in meters

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

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

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

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

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

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

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

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

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

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

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

where P is the eirp (Watts)

**Appendix A Test Equipment Calibration Data****Radiated Emissions, 30 - 6,500 MHz, 11-Nov-09**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz	3115	786	12/6/2009
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/10/2010

**Radio Spurious Emissions, 11-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	785	6/3/2010
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/2/2010
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1731	11/4/2010
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	9/30/2010

**Radio Spurious Emissions, 02-Dec-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	785	6/3/2010
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/10/2010
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/10/2010
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1731	11/4/2010

**Radiated Emissions, DTS, 04-Dec-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	785	6/3/2010
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/10/2010
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/10/2010
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1731	11/4/2010

**Radiated Emissions, 30 - 26,500 MHz, 09-Dec-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	785	6/3/2010
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/10/2010
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/10/2010
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1731	11/4/2010

**Radiated Emissions, 1000 - 40000MHz, 10-Dec-09**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/2/2010
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/10/2010
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1728	9/25/2010
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1731	11/4/2010
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	9/17/2010
A.H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	3/17/2010

**Radiated Emissions, 30 - 18,000 MHz, 06-Jan-10**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/2/2010
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/10/2010
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1731	11/4/2010
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	9/17/2010

**DTS Spurious, 1000-25,000 MHz, 08-Jan-10**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/2/2010
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/10/2010
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1731	11/4/2010
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	9/17/2010

**Radiated Emissions, 30 - 40,000 MHz, 08-Jan-10**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/2/2010
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/10/2010
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	7/29/2010
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1728	9/25/2010

Hewlett Packard	HF Amplifier, 45 MHz -50 GHz (with 1620)	83051A (84125C)	1742	5/6/2010
Hewlett Packard	HF Amplifier, 45 MHz -50 GHz (with 1620)	83051A (84125C)	1743	5/6/2010
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	9/17/2010
A.H. Systems	Blue System Horn, 18-40GHz	SAS-574, p/n: 2581	2159	3/17/2010

**Conducted Emissions - AC Power Ports, 14-Jan-10**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	LISN, 10 kHz-100 MHz	3825/2	1293	3/18/2010
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1401	4/6/2010
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	10/15/2010

**Radio Antenna Port (Power and Spurious Emissions), 15-Jan-10**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/10/2010
Weinschel Corp	Attenuator, 10dB , 50ohms, 25W, DC-18 GHz	SA18N-10	2099	N/A

**Radio Antenna Port (Power and Spurious Emissions), 22-Jan-10**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1290	10/22/2010
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/10/2010
Rohde & Schwarz	Power Sensor 100 uW - 2 Watts	NRV-Z32	1423	10/23/2010
Rohde & Schwarz	Power Sensor 100 uW - 10 Watts	NRV-Z53	1555	1/28/2010

## *Appendix B Test Data*

T77316 48 Pages

T77317 19 Pages



## EMC Test Data

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Emissions Standard(s):	FCC 15.247/RSS 210	Class:	-
Immunity Standard(s):	-	Environment:	-

## EMC Test Data

For The

## Summit Data Communications

Model

SDC-MSD30AG

Date of Last Test: 2/26/2010



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions (Summit Antenna)

### 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.

### 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.

### Ambient Conditions:

Temperature: 10-20 °C

Rel. Humidity: 30-50 %

Date of Test: Refer to each run

Test Engineer: Refer to each run

Test Location: Refer to each run

Config. Used: 1

Config Change: None

Host Unit Voltage 120V/ 60Hz

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

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

NOTE 1: A preliminary check of output power was performed. The port with the highest power was used for the final testing. Preliminary tests showed no radio related emissions below 1 GHz.

NOTE 2: Preliminary scan showed that EUT located at its side has highest field strength. All test were performed with EUT at its side orientation.

Run #	Mode	Channel	Power Setting	Port	Test Performed	Limit	Result / Margin
1a	b mode	Low 2412 MHz	19	Main	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	42.2dBμV/m @ 2385.7MHz (-11.8dB)
			19	Main	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	48.5dBμV/m @ 4824.0MHz (-5.5dB)
1b	b mode	Center 2437 MHz	19	Main	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	52.6dBμV/m @ 4874.0MHz (-1.4dB)
1c	b mode	High 2462 MHz	19	Main	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	44.9dBμV/m @ 2487.9MHz (-9.1dB)
			17	Main	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	53.8dBμV/m @ 4924.0MHz (-0.2dB)
2a	g mode	Low 2412 MHz	19	Main	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	52.0dBμV/m @ 2389.9MHz (-2.0dB)
			19	Main	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	46.8dBμV/m @ 1302.5MHz (-7.2dB)
2b	g mode	Center 2437 MHz	19	Main	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	45.8dBμV/m @ 1302.5MHz (-8.2dB)
2c	g mode	High 2462 MHz	19	Main	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	52.0dBμV/m @ 2483.5MHz (-2.0dB)
			19	Main	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	45.5dBμV/m @ 1302.5MHz (-8.5dB)

Antenna: Johanson 0 dBi dipole antenna (Elliott 2009-1604)

Module: 00000002A

**DRIVER:** V3.00.50

SCU: V2.03.18

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions (Cisco Air-Ant 4941, 2.4GHz)

### 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.

### 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.

### Ambient Conditions:

Temperature: 10-20 °C

Rel. Humidity: 30-50 %

Date of Test: Refer to each run

Test Engineer: Refer to each run

Test Location: Refer to each run

Config. Used: 1

Config Change: None

Host Unit Voltage 120V/ 60Hz

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

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

NOTE 1: A preliminary check of output power was performed. The port with the highest power was used for the final testing. Preliminary tests showed no radio related emissions below 1 GHz and above 18GHz.

Run #	Mode	Channel	Power Setting	Port	Test Performed	Limit	Result / Margin
1a	b mode	Low 2412 MHz	19 dBm	Main	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	49.9dBµV/m @ 2386.2MHz (-4.1dB)
			19 dBm	Main	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247( c)	52.5dBµV/m @ 4824.0MHz (-1.5dB)
1b	b mode	Center 2437 MHz	19 dBm	Main	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247( c)	49.0dBµV/m @ 4874.0MHz (-5.0dB)
1c	b mode	High 2462 MHz	19 dBm	Main	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	46.4dBµV/m @ 2487.7MHz (-7.6dB)
			19dBm	Main	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247( c)	53.0dBµV/m @ 4924.1MHz (-1.0dB)
2a	g mode	Low 2412 MHz	16 dBm	Main	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	52.6dBµV/m @ 2390.0MHz (-1.4dB)
			19dBm	Main	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247( c)	44.8dBµV/m @ 1345.4MHz (-9.2dB)
2b	g mode	Ch 2 2417 MHz	19dBm	Main	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	48.3dBµV/m @ 2389.9MHz (-5.7dB)
2c	g mode	Center 2437 MHz	19dBm	Main	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247( c)	46.5dBµV/m @ 3249.4MHz (-7.5dB)
2e	g mode	High 2462 MHz	19dBm	Main	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	49.2dBµV/m @ 2483.6MHz (-4.8dB)
			19dBm	Main	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247( c)	44.8dBµV/m @ 1302.5MHz (-9.2dB)

Antenna: Air Dipole Antenna (Elliott 2009-1387)

Module: 00000002A

DRIVER: V3.00.50

SCU: V2.03.18

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 10000 MHz	3	3	0.0
10000 - 26500 MHz	1	3	-9.5

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

Run #1: Radiated Spurious Emissions, 30 - 26000 MHz. Operating Mode: 802.11b

Run #1a: Low Channel @ 2412 MHz with Power Setting of 19 dBm.

Date: 1/21/2010

Engineer: Suhaila Khushzad

Location: FT Chamber #4

**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	
2410.400	101.9	V	-	-	AVG	150	1.2	RB 1 MHz; VB: 10 Hz
2409.600	104.3	V	-	-	PK	150	1.2	RB 1 MHz; VB: 1 MHz
2410.400	95.3	H	-	-	AVG	224	1.5	RB 1 MHz; VB: 10 Hz
2409.670	98.5	H	-	-	PK	224	1.5	RB 1 MHz; VB: 1 MHz
2410.400	92.8	H	-	-	PK	224	1.5	RB 100 kHz; VB: 100 kHz
2411.330	98.5	V	-	-	PK	150	1.2	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW: 98.5 dB $\mu$ V/m

Limit for emissions outside of restricted bands:

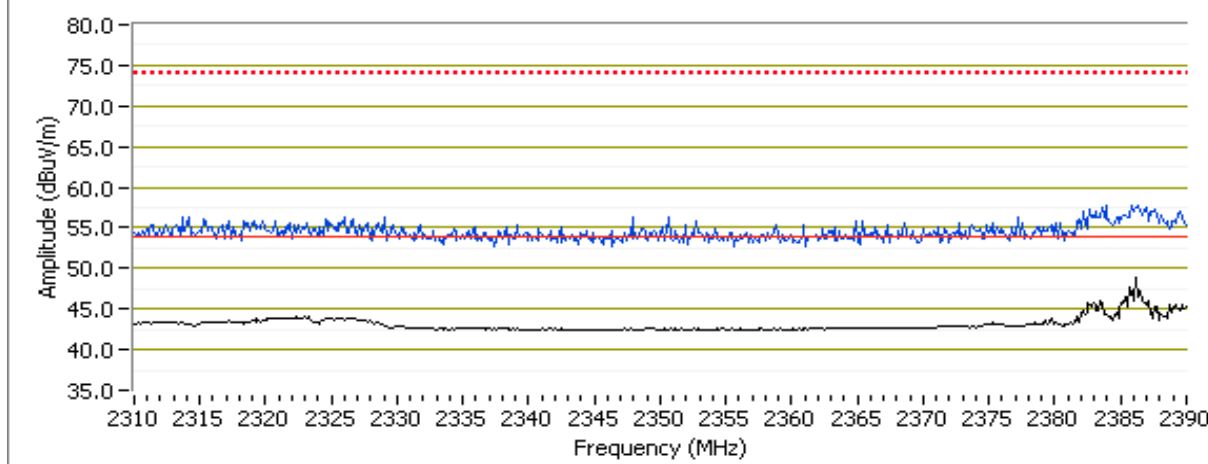
68.5 dB $\mu$ V/m

Limit is -30dBc (UNII power measurement)

**Band Edge Signal Field Strength**

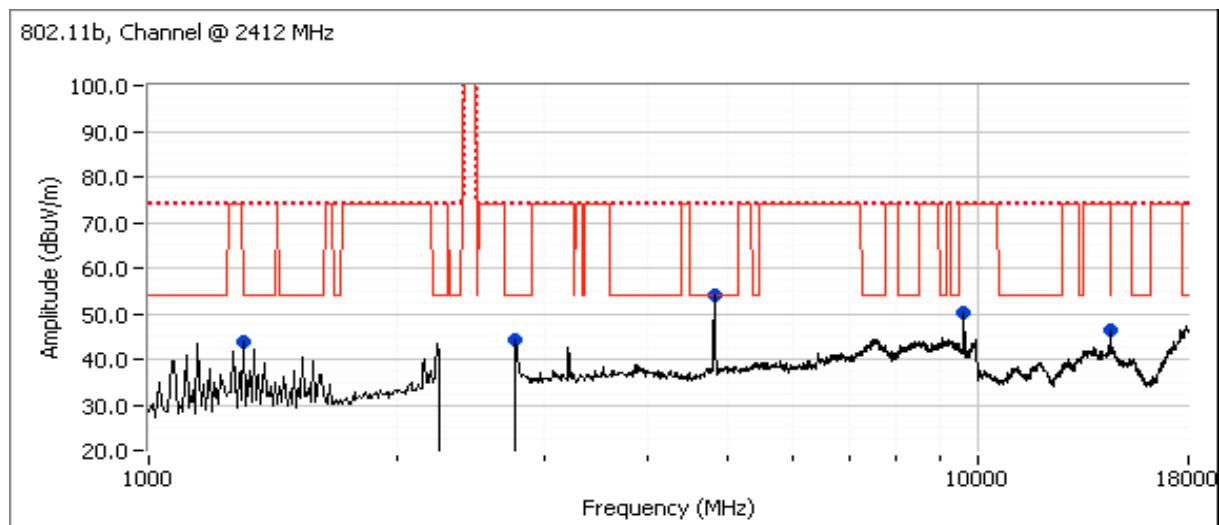
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	PK/QP/Avg	degrees	meters	
2386.200	49.9	V	54.0	-4.1	AVG	150	1.2	RB 1 MHz; VB: 10 Hz
2386.470	57.9	V	74.0	-16.1	PK	150	1.2	RB 1 MHz; VB: 1 MHz
2386.330	45.9	H	54.0	-8.1	AVG	224	1.5	RB 1 MHz; VB: 10 Hz
2386.400	56.8	H	74.0	-17.2	PK	224	1.5	RB 1 MHz; VB: 1 MHz

RB 1 MHz; VB 10 Hz, BE @ 2390 MHz, Blue Trace=Peak, Black Trace=Avg



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Other Spurious Emissions

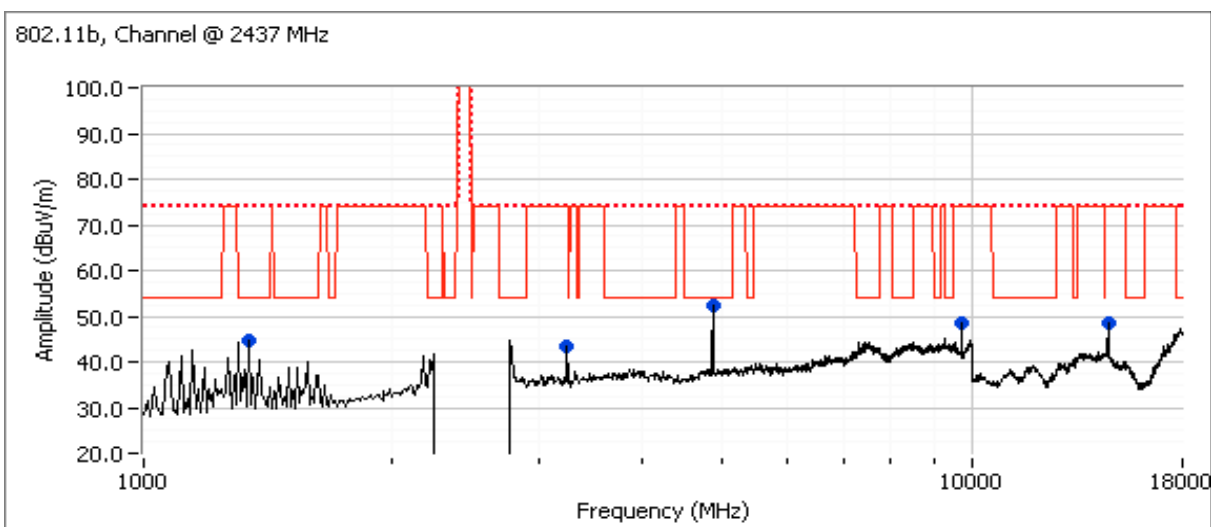


Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4823.970	52.5	V	54.0	-1.5	AVG	200	1.3	RB 1 MHz; VB: 10 Hz
4824.030	54.2	V	74.0	-19.8	PK	200	1.3	RB 1 MHz; VB: 1 MHz
1306.320	45.1	V	54.0	-8.9	AVG	124	1.1	RB 1 MHz; VB: 10 Hz
1306.390	48.0	V	74.0	-26.0	PK	124	1.1	RB 1 MHz; VB: 1 MHz
2768.460	38.9	H	54.0	-15.1	AVG	282	1.0	RB 1 MHz; VB: 10 Hz
2779.990	51.5	H	74.0	-22.5	PK	282	1.0	RB 1 MHz; VB: 1 MHz
9648.020	42.0	V	54.0	-12.0	AVG	95	1.0	RB 1 MHz; VB: 10 Hz, Note 1
9631.350	48.7	V	74.0	-25.3	PK	95	1.0	RB 1 MHz; VB: 1 MHz
14472.010	43.6	V	54.0	-10.4	AVG	248	1.0	RB 1 MHz; VB: 10 Hz
14472.040	48.9	V	74.0	-25.1	PK	248	1.0	RB 1 MHz; VB: 1 MHz

Note 1: Restricted band limit used for emission in non-restricted band.

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

Run #1b: Center Channel @ 2437 MHz with Power Setting of 19dBm.



## Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4873.990	49.0	V	54.0	-5.0	AVG	73	1.8	RB 1 MHz; VB: 10 Hz
4873.890	51.9	V	74.0	-22.1	PK	73	1.8	RB 1 MHz; VB: 1 MHz
1345.380	44.6	V	54.0	-9.4	AVG	120	1.1	RB 1 MHz; VB: 10 Hz
1345.550	44.3	V	74.0	-29.7	PK	120	1.1	RB 1 MHz; VB: 1 MHz
14622.010	47.1	V	54.0	-6.9	AVG	248	1.0	RB 1 MHz; VB: 10 Hz, note 2
14621.980	50.9	V	74.0	-23.1	PK	248	1.0	RB 1 MHz; VB: 1 MHz
9748.050	48.6	V	54.0	-5.4	Peak	316	1.3	Peak vs Avg Limit, Note 2
3249.310	43.2	V	54.0	-10.8	Peak	360	1.3	Peak vs Avg Limit

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: Restricted band limit used for emission in non-restricted band.

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Run #1c: High Channel @ 2462 MHz with power setting of 19 dBm.

Date: 1/21/2010

Engineer: Suhaila Khushzad

Location: FT Chamber #4

## 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	
2461.000	99.5	V	-	-	AVG	184	1.0	RB 1 MHz; VB: 10 Hz
2461.400	102.4	V	-	-	PK	184	1.0	RB 1 MHz; VB: 1 MHz
2460.530	95.5	H	-	-	AVG	225	1.2	RB 1 MHz; VB: 10 Hz
2461.330	98.5	H	-	-	PK	225	1.2	RB 1 MHz; VB: 1 MHz
2461.730	92.1	H	-	-	PK	225	1.2	RB 100 kHz; VB: 100 kHz
2461.330	96.2	V	-	-	PK	184	1.0	RB 100 kHz; VB: 100 kHz

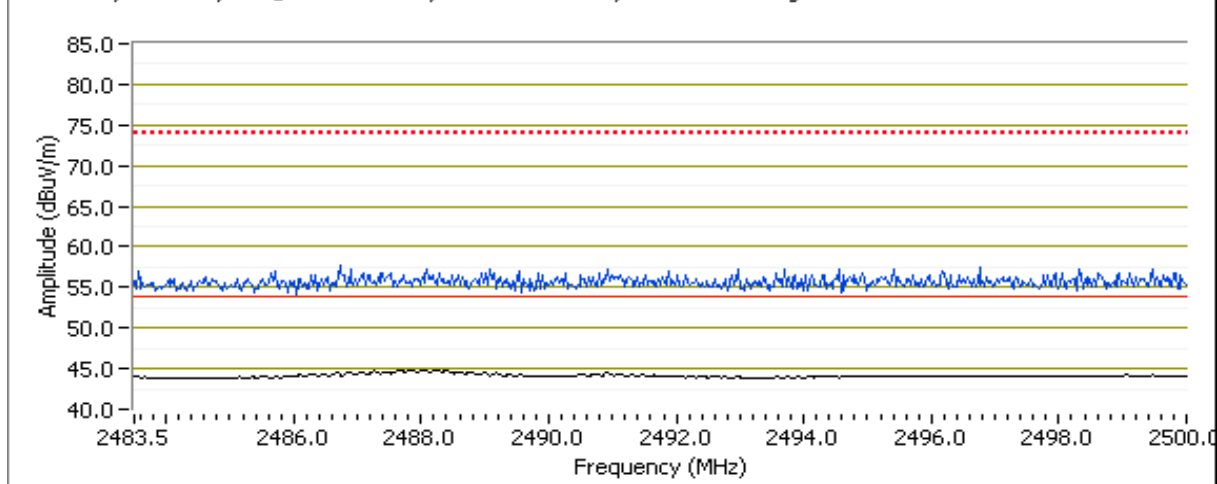
Fundamental emission level @ 3m in 100kHz RBW: 96.2 dB $\mu$ V/m

Limit for emissions outside of restricted bands: 66.2 dB $\mu$ V/m Limit is -30dBc (UNII power measurement)

## Band Edge Signal Field Strength

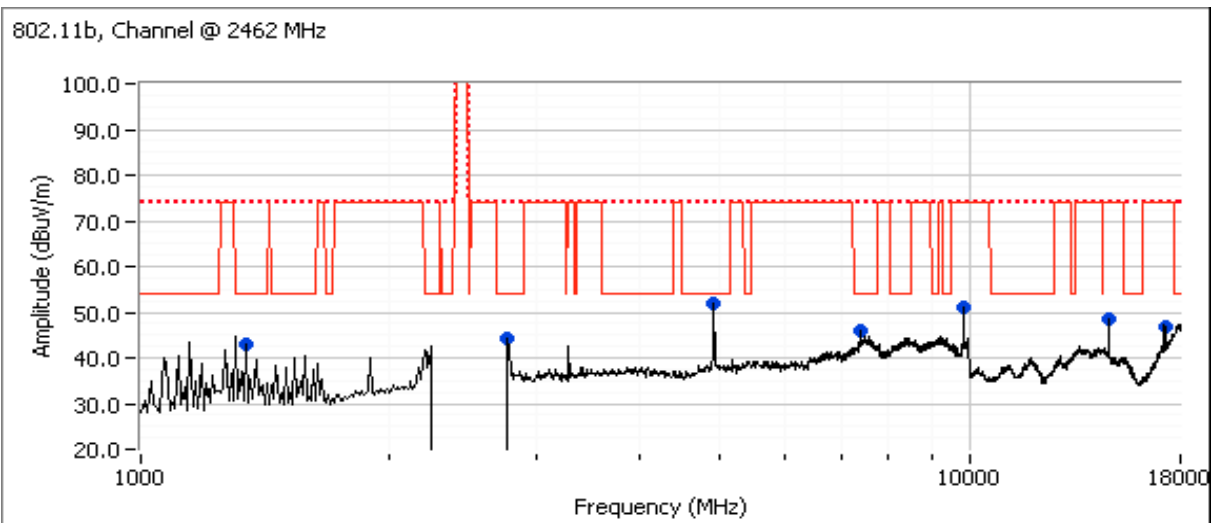
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	PK/QP/Avg	degrees	meters	
2487.730	46.4	V	54.0	-7.6	AVG	184	1.0	RB 1 MHz; VB: 10 Hz
2495.570	56.9	V	74.0	-17.1	PK	184	1.0	RB 1 MHz; VB: 1 MHz
2487.760	45.8	H	54.0	-8.2	AVG	225	1.2	RB 1 MHz; VB: 10 Hz
2486.880	56.7	H	74.0	-17.3	PK	225	1.2	RB 1 MHz; VB: 1 MHz

RB 1 MHz; VB 10 Hz, BE @ 2483.50 MHz, Blue Trace=Peak, Black Trace=Avg





Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A



## Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4924.050	53.0	V	54.0	-1.0	AVG	35	2.2	RB 1 MHz; VB: 10 Hz
4924.050	54.5	V	74.0	-19.5	PK	35	2.2	RB 1 MHz; VB: 1 MHz
7388.830	42.0	V	54.0	-12.0	AVG	52	1.4	RB 1 MHz; VB: 10 Hz
7383.500	50.4	V	74.0	-23.6	PK	52	1.4	RB 1 MHz; VB: 1 MHz
2762.270	38.9	V	54.0	-15.1	AVG	184	2.2	RB 1 MHz; VB: 10 Hz
2771.170	50.9	V	74.0	-23.1	PK	184	2.2	RB 1 MHz; VB: 1 MHz
1345.350	42.9	V	54.0	-11.1	Peak	122	1.0	Peak vs Avg Limit
9848.010	51.1	V	54.0	-2.9	Peak	334	1.3	Peak vs Avg Limit, note 2
14772.130	48.6	V	54.0	-5.4	Peak	247	1.0	Peak vs Avg Limit, note 2
17238.470	46.8	H	54.0	-7.2	Peak	45	1.0	Peak vs Avg Limit, note 2

Note 2: Restricted band limit used for emission in non-restricted band.

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

Run #2: Radiated Spurious Emissions, 30 - 26000 MHz. Operating Mode: 802.11g

Run #2a: Low Channel @ 2412 MHz with power setting of 16 dBm.

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

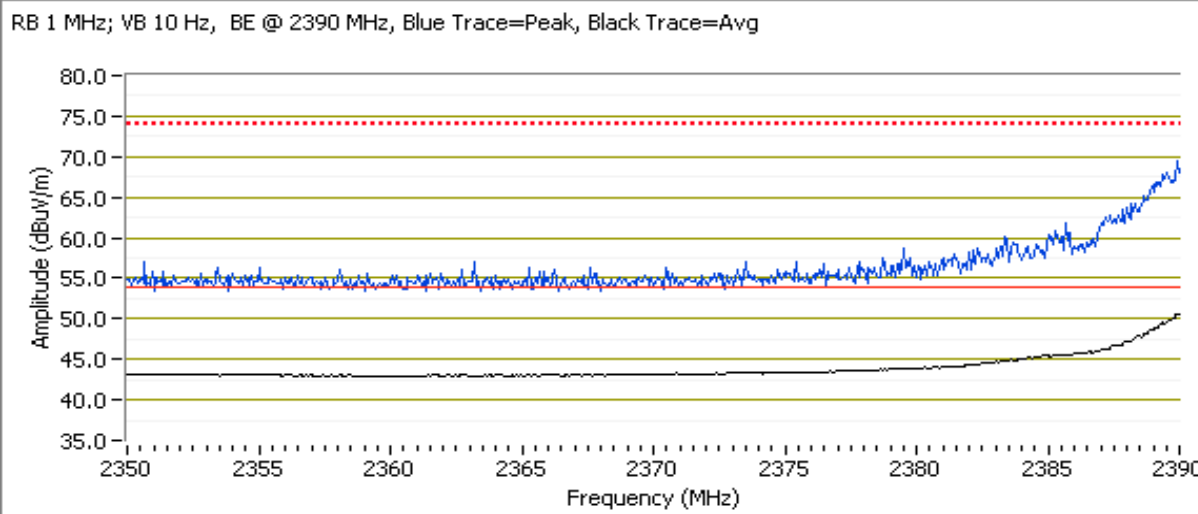
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	PK/QP/Avg	degrees	meters	
2405.000	97.2	V	-	-	AVG	150	1.5	RB 1 MHz; VB: 10 Hz pwr 16dBm
2405.200	104.9	V	-	-	PK	150	1.5	RB 1 MHz; VB: 1 MHz pwr 16dBm
2408.470	97.8	V	-	-	PK	150	1.5	RB 100 kHz; VB: 100 kHz pwr 16dBm
2405.270	90.9	H	-	-	AVG	222	1.5	RB 1 MHz; VB: 10 Hz pwr 16dBm
2405.070	98.7	H	-	-	PK	222	1.5	RB 1 MHz; VB: 1 MHz pwr 16dBm
2405.930	88.9	H	-	-	PK	222	1.5	RB 100 kHz; VB: 100 kHz pwr 16dBm

Fundamental emission level @ 3m in 100kHz RBW: 97.8 dB $\mu$ V/m

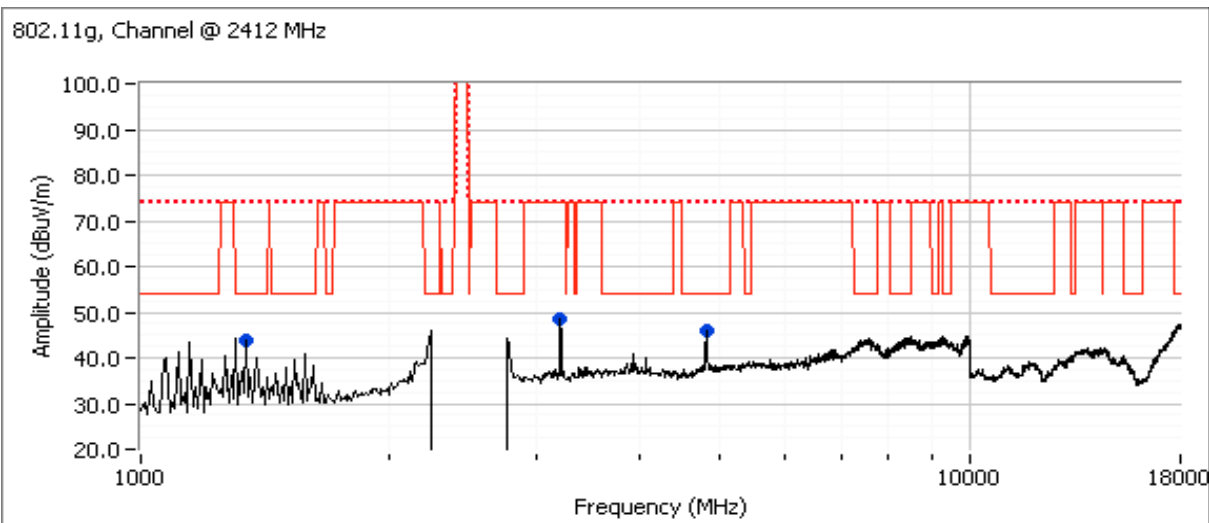
Limit for emissions outside of restricted bands: 67.8 dB $\mu$ V/m Limit is -30dBc (UNII power measurement)

**Band Edge Signal 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	
2390.000	52.6	V	54.0	-1.4	AVG	150	1.5	RB 1 MHz; VB: 10 Hz pwr 16dBm
2389.400	67.9	V	74.0	-6.1	PK	150	1.5	RB 1 MHz; VB: 1 MHz pwr 16dBm
2390.000	47.6	H	54.0	-6.4	AVG	222	1.5	RB 1 MHz; VB: 10 Hz pwr 16dBm
2389.800	60.0	H	74.0	-14.0	PK	222	1.5	RB 1 MHz; VB: 1 MHz pwr 16dBm



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A



## Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1345.400	44.8	V	54.0	-9.2	AVG	120	1.1	RB 1 MHz; VB: 10 Hz pwr 19dBm
1345.380	47.7	V	74.0	-26.3	PK	120	1.1	RB 1 MHz; VB: 1 MHz pwr 19dBm
4823.960	40.0	V	54.0	-14.0	AVG	201	1.2	RB 1 MHz; VB: 10 Hz pwr 19dBm
4826.430	51.8	V	74.0	-22.2	PK	201	1.2	RB 1 MHz; VB: 1 MHz pwr 19dBm
3216.050	47.9	V	54.0	-6.1	AVG	268	1.2	RB 1 MHz; VB: 10 Hz pwr 19dBm
3215.960	50.7	V	74.0	-23.3	PK	268	1.2	RB 1 MHz; VB: 1 MHz pwr 19dBm

Note 2: Restricted band limit used for emission in non-restricted band.

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Run #2b: 2nd Channel @ 2417 MHz with Power Setting of 19 dBm.

Date: 1/21/2010

Engineer: Suhaila Khushzad

Location: FT Chamber #4

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

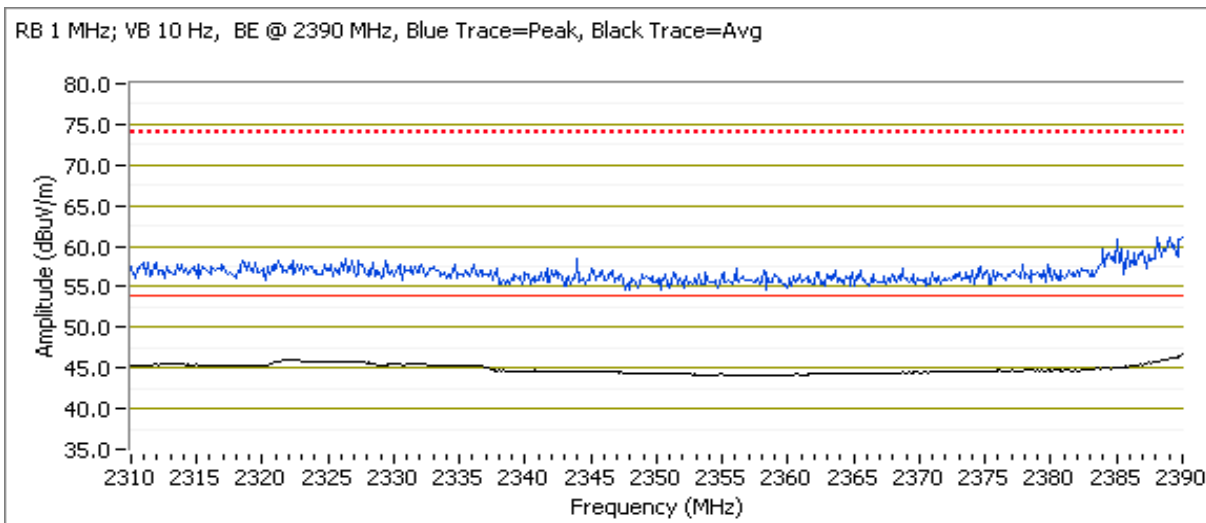
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2409.870	97.6	V	-	-	AVG	152	1.2	RB 1 MHz; VB: 10 Hz
2409.800	105.2	V	-	-	PK	152	1.2	RB 1 MHz; VB: 1 MHz
2415.930	97.2	V	-	-	PK	152	1.2	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	97.2 dB $\mu$ V/m
Limit for emissions outside of restricted bands:	67.2 dB $\mu$ V/m

Limit is -30dBc (UNII power measurement)

## Band Edge Signal 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	
2389.870	48.3	V	54.0	-5.7	AVG	152	1.2	RB 1 MHz; VB: 10 Hz
2389.930	60.0	V	74.0	-14.0	PK	152	1.2	RB 1 MHz; VB: 1 MHz



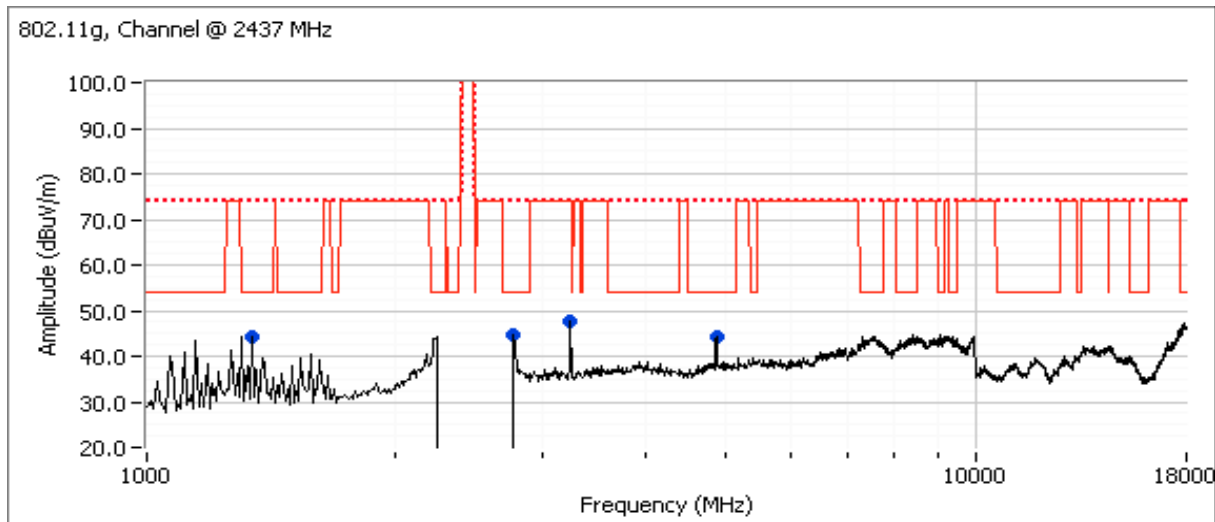
Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Run #2c: Center Channel @ 2437 MHz with power setting of 19dBm.

Date: 1/21/2010

Engineer: Suhaila Khushzad

Location: FT Chamber #4



## Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1345.420	44.9	V	54.0	-9.1	AVG	123	1.1	RB 1 MHz; VB: 10 Hz
2768.190	38.8	V	54.0	-15.2	AVG	180	1.3	RB 1 MHz; VB: 10 Hz
<b>3249.370</b>	<b>46.5</b>	<b>V</b>	<b>54.0</b>	<b>-7.5</b>	AVG	282	1.2	RB 1 MHz; VB: 10 Hz note 2
4874.090	39.4	V	54.0	-14.6	AVG	268	1.0	RB 1 MHz; VB: 10 Hz
1345.400	48.0	V	74.0	-26.0	PK	123	1.1	RB 1 MHz; VB: 1 MHz
2765.140	50.2	V	74.0	-23.8	PK	180	1.3	RB 1 MHz; VB: 1 MHz
3249.330	49.8	V	74.0	-24.2	PK	282	1.2	RB 1 MHz; VB: 1 MHz
4876.350	51.0	V	74.0	-23.0	PK	268	1.0	RB 1 MHz; VB: 1 MHz

Note 2: Restricted band limit used for emission in non-restricted band.

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Run #2e: High Channel @ 2462 MHz with power setting of 19 dBm.

Date: 1/21/2010

Engineer: Suhaila Khushzad

Location: FT Chamber #4

## 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	
2455.000	95.0	V	-	-	AVG	185	1.0	RB 1 MHz; VB: 10 Hz
2458.400	102.7	V	-	-	PK	185	1.0	RB 1 MHz; VB: 1 MHz
2455.730	90.6	H	-	-	AVG	222	1.2	RB 1 MHz; VB: 10 Hz
2456.270	98.2	H	-	-	PK	222	1.2	RB 1 MHz; VB: 1 MHz
2468.600	91.2	H	-	-	PK	222	1.2	RB 100 kHz; VB: 100 kHz
2457.270	95.8	V	-	-	PK	185	1.0	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW: 95.8 dB $\mu$ V/m

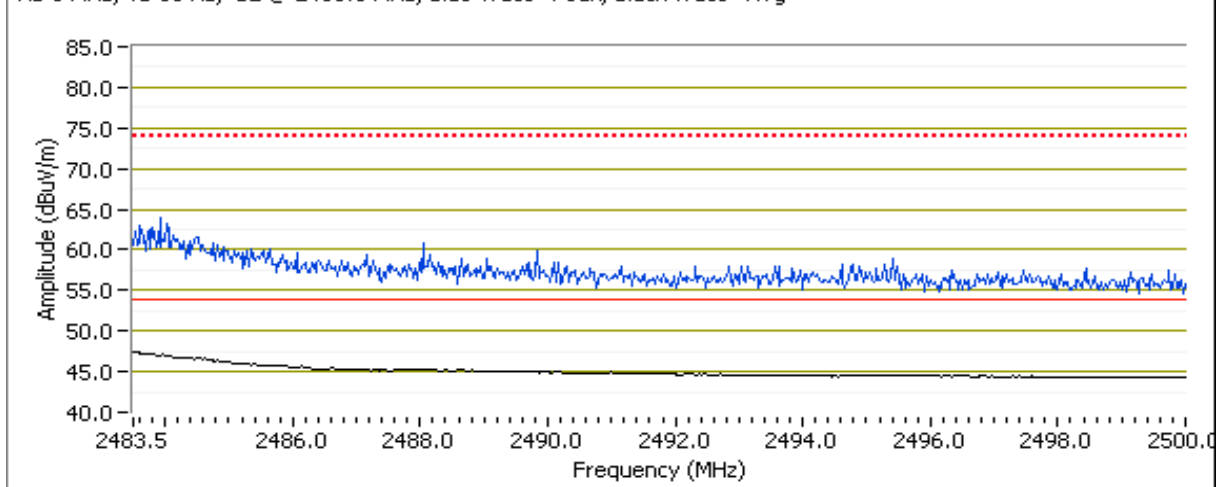
Limit for emissions outside of restricted bands: 65.8 dB $\mu$ V/m

Limit is -30dBc (UNII power measurement)

## Band Edge Signal 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	
2483.550	49.2	V	54.0	-4.8	AVG	185	1.0	RB 1 MHz; VB: 10 Hz
2483.530	62.0	V	74.0	-12.0	PK	185	1.0	RB 1 MHz; VB: 1 MHz
2483.500	47.6	H	54.0	-6.4	AVG	222	1.2	RB 1 MHz; VB: 10 Hz
2483.690	59.6	H	74.0	-14.4	PK	222	1.2	RB 1 MHz; VB: 1 MHz

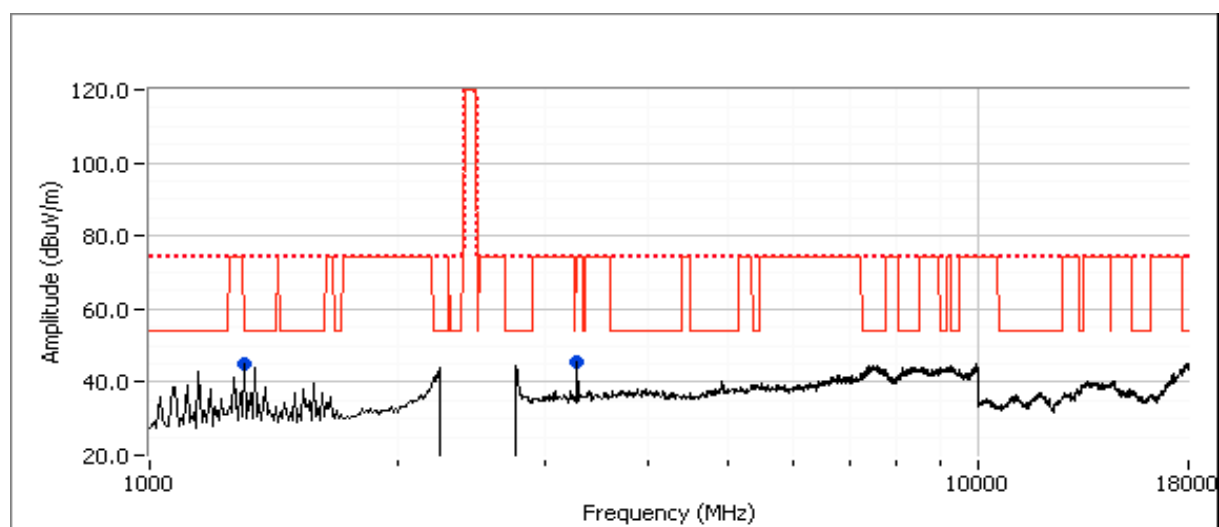
RB 1 MHz; VB 10 Hz, BE @ 2483.5 MHz, Blue Trace=Peak, Black Trace=Avg



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1302.500	44.8	V	54.0	-9.2	Peak	125	1.3	Peak reading with average limit
3282.500	45.6	V	74.0	-28.4	Peak	316	1.3	Peak reading with average limit



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions (Hubert & Suhner Antenna, 2.4GHz)

### 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.

### 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.

### Ambient Conditions:

Temperature: 10-20 °C

Rel. Humidity: 30-50 %

Date of Test: Refer to each run

Test Engineer: Refer to each run

Test Location: Refer to each run

Config. Used: 1

Config Change: None

Host Unit Voltage 120V/ 60Hz



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

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

NOTE 1: A preliminary check of output power was performed. The port with the highest power was used for the final testing. Preliminary tests showed no radio related emissions below 1 GHz.

Run #	Mode	Channel	Power Setting	Port	Test Performed	Limit	Result / Margin
1a	b mode	Low 2412 MHz	19 dBm	Main	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	51.0dBμV/m @ 2386.5MHz (-3.0dB)
			19 dBm	Main	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247( c)	52.6dBμV/m @ 4824.0MHz (-1.4dB)
1b	b mode	Center 2437 MHz	19 dBm	Main	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247( c)	50.4dBμV/m @ 4874.1MHz (-3.6dB)
1c	b mode	High 2462 MHz	19 dBm	Main	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	49.5dBμV/m @ 2488.0MHz (-4.5dB)
			19dBm	Main	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247( c)	49.8dBμV/m @ 4924.0MHz (-4.2dB)
2a	g mode	Low 2412 MHz	16 dBm	Main	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	52.6dBμV/m @ 2389.9MHz (-1.4dB)
			19dBm	Main	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247( c)	50.2dBμV/m @ 3209.2MHz (-3.8dB)
2b	g mode	Ch 2 2417 MHz	19dBm	Main	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	51.1dBμV/m @ 2389.6MHz (-2.9dB)
2c	g mode	Center 2437 MHz	19dBm	Main	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247( c)	47.6dBμV/m @ 3245.8MHz (-6.4dB)
2d	g mode	Ch 10 2457 MHz	19 dBm	Main	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	49.9dBμV/m @ 2483.5MHz (-4.1dB)
2e	g mode	High 2462 MHz	16 dBm	Main	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	51.9dBμV/m @ 2483.5MHz (-2.1dB)
			19dBm	Main	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247( c)	46.8dBμV/m @ 3282.6MHz (-7.2dB)

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

**Antenna:** Hubert & Suhner monopole antenna (Elliott 2009-1388)

**Module:** 00000002A

**DRIVER:** V3.00.50

**SCU:** V2.03.18

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 10000 MHz	3	3	0.0
10000 - 26500 MHz	1	3	-9.5

**Run #1: Radiated Spurious Emissions, 30 - 26000 MHz. Operating Mode: 802.11b**

**Run #1a: Low Channel @ 2412 MHz with Power Setting of 19 dBm.**

Date: 1/8/2010

Engineer: John Caizzi

Location: FT Chamber #3

**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	104.8	V	-	-	AVG	217	1.28
2413.200	107.9	V	-	-	PK	217	1.28

Fundamental emission level @ 3m in 100kHz RBW: 102.0 dBμV/m

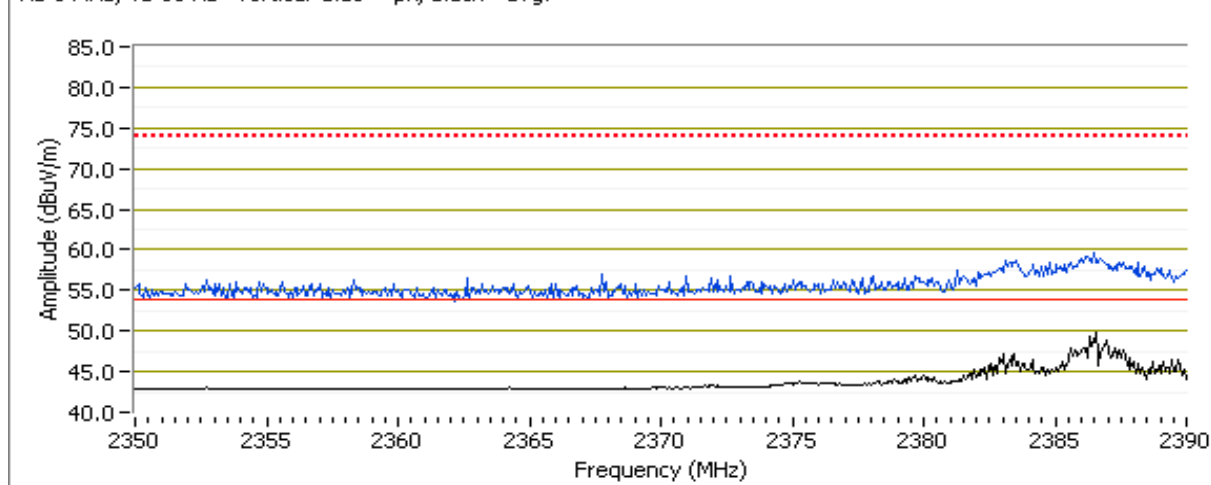
Limit for emissions outside of restricted bands: 72.0 dBμV/m

Limit is -30dBc (UNII power measurement)

## Band Edge Signal 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
2386.470	51.0	V	54.0	-3.0	AVG	217	1.28
2385.930	58.5	V	74.0	-15.5	PK	217	1.28

RB 1 MHz; VB 10 Hz Vertical Blue = pk, black = avg.



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Other Spurious Emissions

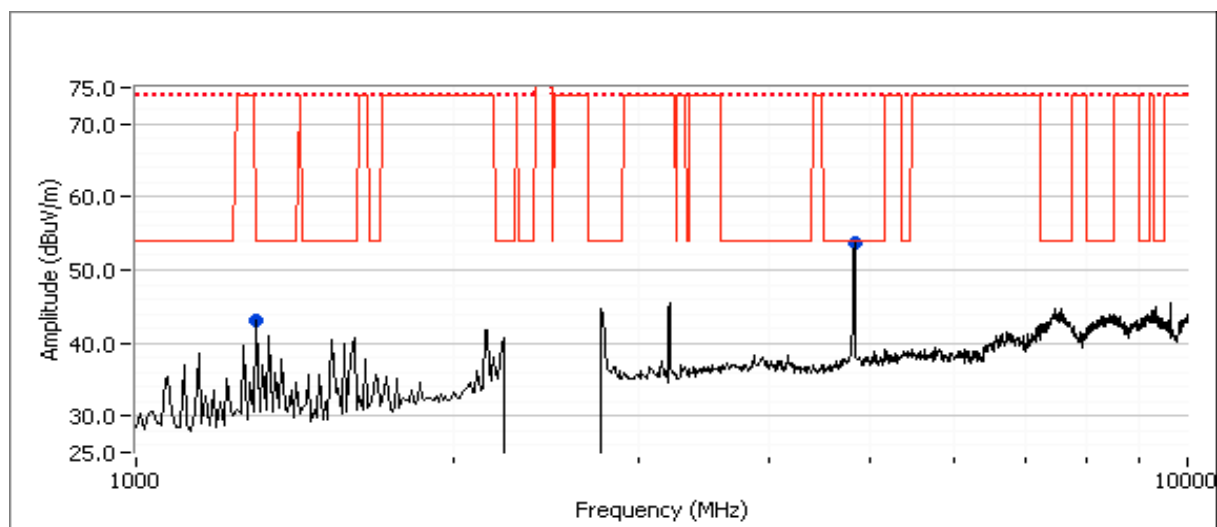
Date: 1/8/2010

Engineer: Mehran Birgani

Location: FT Chamber #3

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	
4823.990	52.6	V	54.0	-1.4	AVG	66	1.0	
1318.550	43.2	H	54.0	-10.8	PK	112	1.3	Peak reading with average limit
4823.930	54.8	V	74.0	-19.2	PK	66	1.0	

Note 1: No significant emissions found above 10 GHz.



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Run #1b: Center Channel @ 2437 MHz with Power Setting of 19dBm.

Date: 1/8/2010

Engineer: Mehran Birgani

Location: FT Chamber #3

## 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	
2435.370	107.2	V	-	-	AVG	268	1.3	
2436.200	110.3	V	-	-	PK	268	1.3	
2438.900	98.2	H	-	-	AVG	207	1.6	
2438.070	101.5	H	-	-	PK	207	1.6	

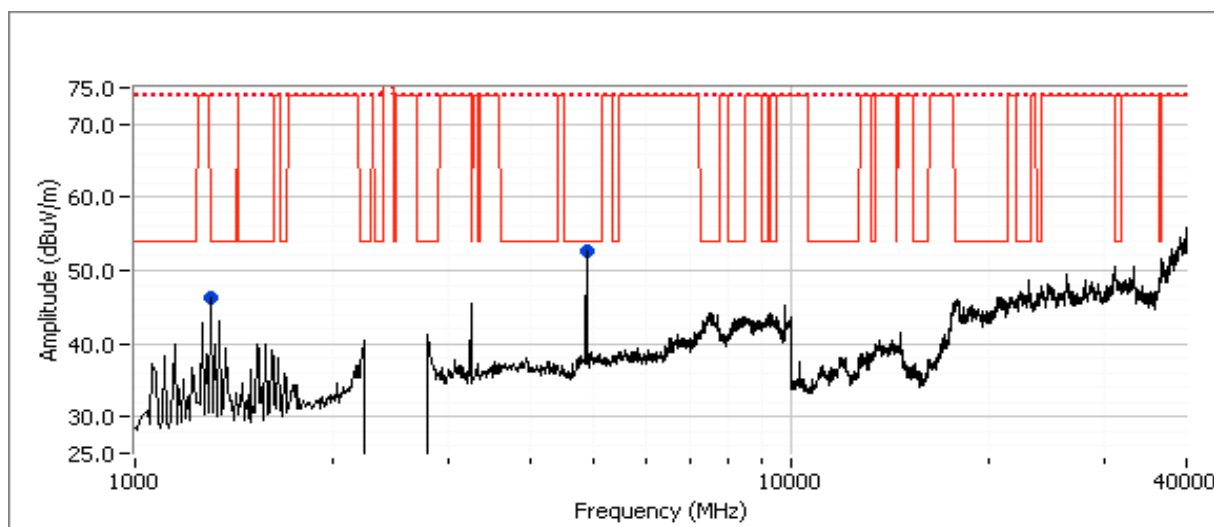
Fundamental emission level @ 3m in 100kHz RBW:	104.8 dB $\mu$ V/m
Limit for emissions outside of restricted bands:	74.8 dB $\mu$ V/m

Limit is -30dBc (UNII power measurement)

## Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4874.050	50.4	V	54.0	-3.6	AVG	86	1.0	
1302.500	46.4	H	54.0	-7.6	PK	105	1.3	Peak reading with average limit
4874.000	53.0	V	74.0	-21.0	PK	86	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:	No significant emissions found above 10 GHz.



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Run #1c: High Channel @ 2462 MHz with power setting of 19 dBm.

Date: 1/8/2010

Engineer: John Caizzi

Location: FT Chamber #3

**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	
2461.270	101.9	V	120.0	-18.1	Pk	217	1.28	
2460.470	104.8	V	120.0	-15.2	AVG	217	1.28	
2463.270	107.8	V	120.0	-12.2	PK	217	1.28	

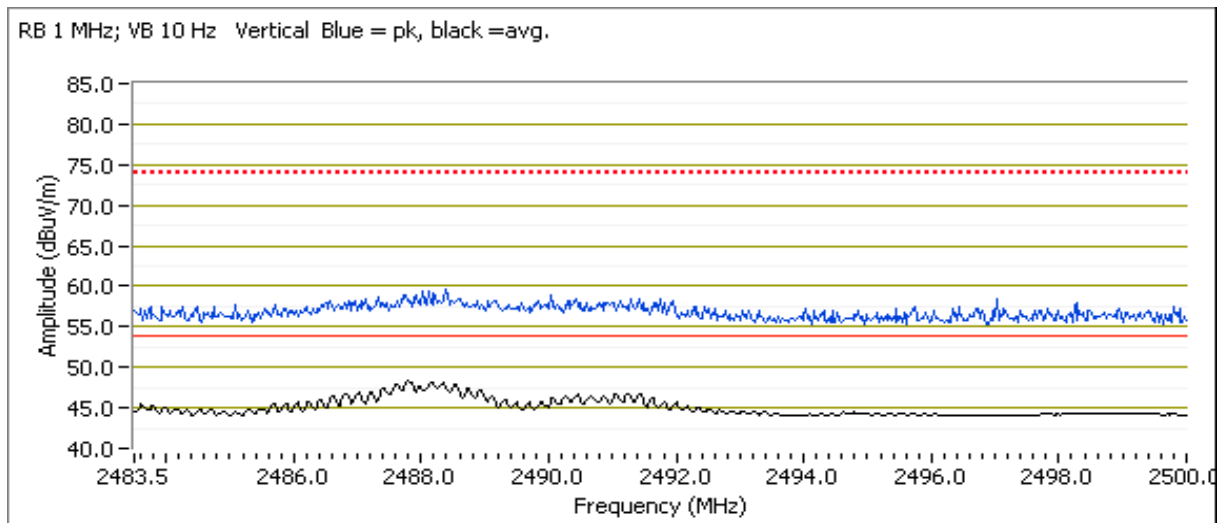
Fundamental emission level @ 3m in 100kHz RBW:	101.9 dB $\mu$ V/m
Limit for emissions outside of restricted bands:	71.9 dB $\mu$ V/m

Limit is -30dBc (UNII power measurement)

## Band Edge Signal 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	
2488.010	49.5	V	54.0	-4.5	AVG	217	1.28	
2491.090	58.0	V	74.0	-16.0	PK	217	1.28	

RB 1 MHz; VB 10 Hz Vertical Blue = pk, black = avg.



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Other Spurious Emissions

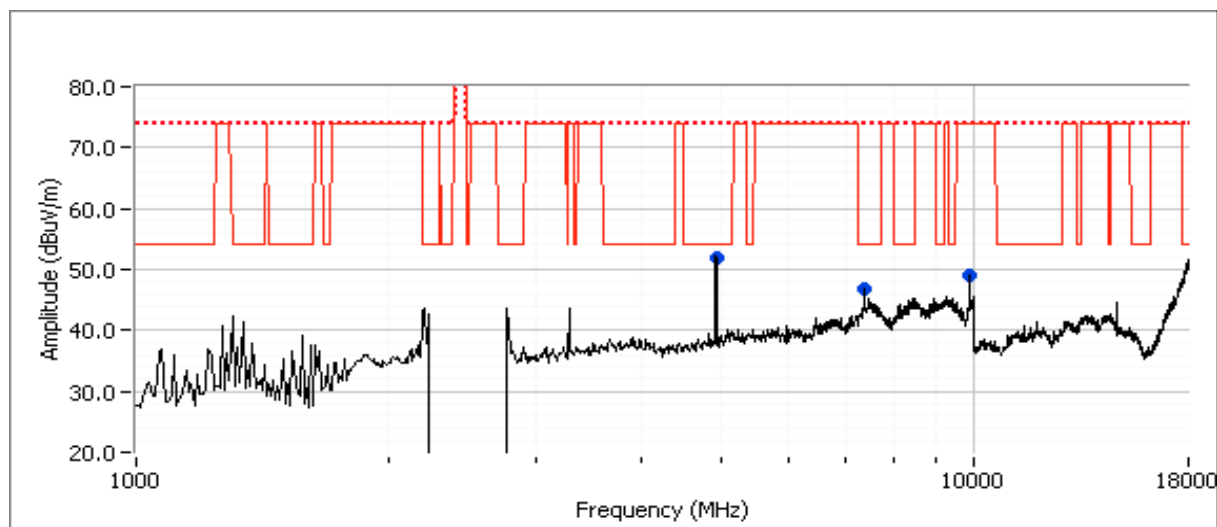
Date: 2/26/2010

Engineer: Rafael Varelas

Location: Ft Chamber #4

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4924.000	49.8	V	54.0	-4.2	AVG	0	1.8	RB 1 MHz; VB: 10 Hz
4924.010	52.5	V	74.0	-21.5	PK	0	1.8	RB 1 MHz; VB: 1 MHz
7389.010	45.6	V	54.0	-8.4	AVG	0	1.5	RB 1 MHz; VB: 10 Hz
7382.960	53.7	V	74.0	-20.3	PK	0	1.5	RB 1 MHz; VB: 1 MHz
9848.040	47.8	V	54.0	-6.2	Peak	88	1.9	Peak reading vs avg limit, note 2

Note 2: Restricted band limit was used.



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

Run #2: Radiated Spurious Emissions, 30 - 26000 MHz. Operating Mode: 802.11g

Run #2a: Low Channel @ 2412 MHz with power setting of 16 dBm.

Date: 1/8/2010

Engineer: John Caizzi

Location: FT Chamber #3

**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	
2407.070	99.1	V	120.0	-20.9	Pk	319	1.00	16 dBm
2405.400	100.6	V	120.0	-19.4	AVG	319	1.00	16 dBm
2405.400	108.9	V	120.0	-11.1	PK	319	1.00	16 dBm
2407.400	92.7	H	120.0	-27.3	Pk	207	1.35	16 dBm
2404.930	94.2	H	120.0	-25.8	AVG	207	1.35	16 dBm
2405.470	102.4	H	120.0	-17.6	PK	207	1.35	16 dBm

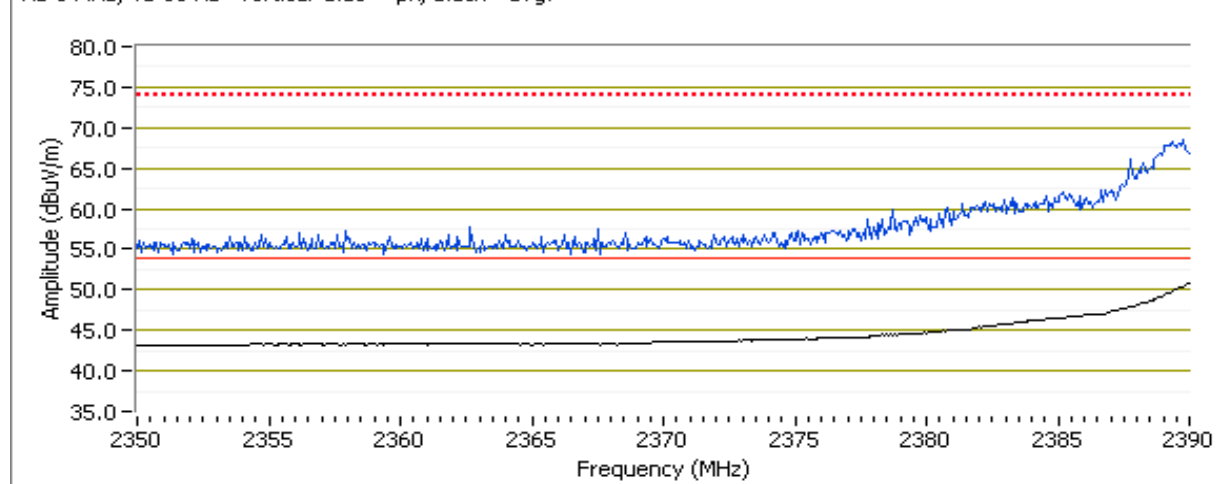
Fundamental emission level @ 3m in 100kHz RBW: 99.1 dB $\mu$ V/m

Limit for emissions outside of restricted bands: 69.1 dB $\mu$ V/m Limit is -30dBc (UNII power measurement)

**Band Edge Signal 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	
2389.930	52.6	V	54.0	-1.4	AVG	319	1.00	16 dBm
2389.200	68.3	V	74.0	-5.7	PK	319	1.00	16 dBm

RB 1 MHz; VB 10 Hz Vertical Blue = pk, black = avg.



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Other Spurious Emissions

Date: 2/26/2010

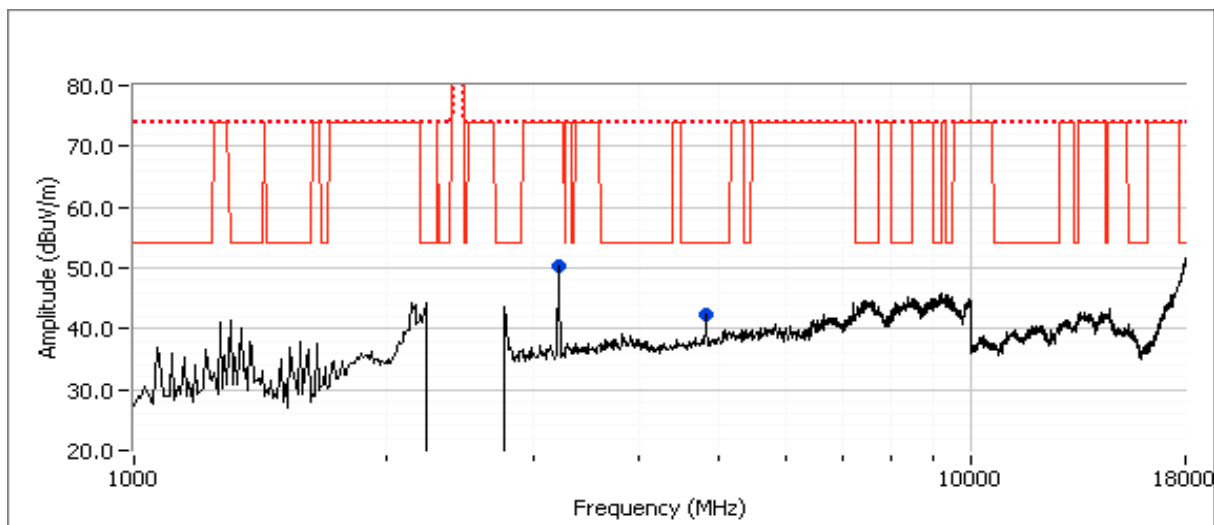
Engineer: Rafael Varelas

Location: Ft Chamber #4

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	
4824.040	36.2	V	54.0	-17.8	AVG	346	1.6	RB 1 MHz; VB: 10 Hz
3209.170	50.2	V	54.0	-3.8	Peak	349	1.3	Peak reading vs avg limit, note 2
4827.780	48.6	V	74.0	-25.4	PK	346	1.6	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: Restricted band limit was used.





Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Run #2b: 2nd Channel @ 2417 MHz with Power Setting of 19 dBm.

Date: 2/26/2010

Engineer: Rafael Varelas

Location: Ft Chamber #4

## 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	
2411.700	101.4	V	120.0	-18.6	AVG	202	1.2	RB 1 MHz; VB: 10 Hz
2413.170	109.6	V	120.0	-10.4	PK	202	1.2	RB 1 MHz; VB: 1 MHz
2424.700	100.8	V	120.0	-19.2	PK	202	1.2	RB 100 kHz; VB: 100 kHz
2413.200	93.4	H	120.0	-26.6	AVG	138	1.6	RB 1 MHz; VB: 10 Hz
2419.830	101.3	H	120.0	-18.7	PK	138	1.6	RB 1 MHz; VB: 1 MHz

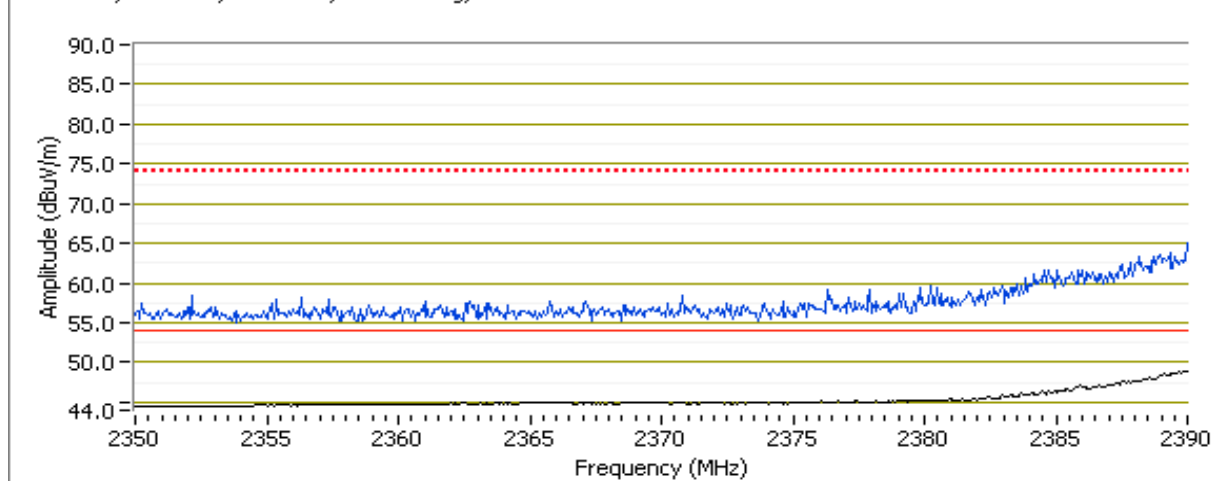
Fundamental emission level @ 3m in 100kHz RBW: 100.8 dB $\mu$ V/m

Limit for emissions outside of restricted bands: 70.8 dB $\mu$ V/m Limit is -30dBc (UNII power measurement)

## Band Edge Signal 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	
2389.640	51.1	V	54.0	-2.9	AVG	202	1.2	RB 1 MHz; VB: 10 Hz
2388.880	64.8	V	74.0	-9.2	PK	202	1.2	RB 1 MHz; VB: 1 MHz
2389.950	46.6	H	54.0	-7.4	AVG	138	1.6	RB 1 MHz; VB: 10 Hz
2389.840	58.7	H	74.0	-15.3	PK	138	1.6	RB 1 MHz; VB: 1 MHz

RB 1 MHz; VB 10 Hz, Blue = PK, Black = Avg, Vertical



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

**Run #2c: Center Channel @ 2437 MHz with power setting of 19dBm.**

Date: 2/26/2010

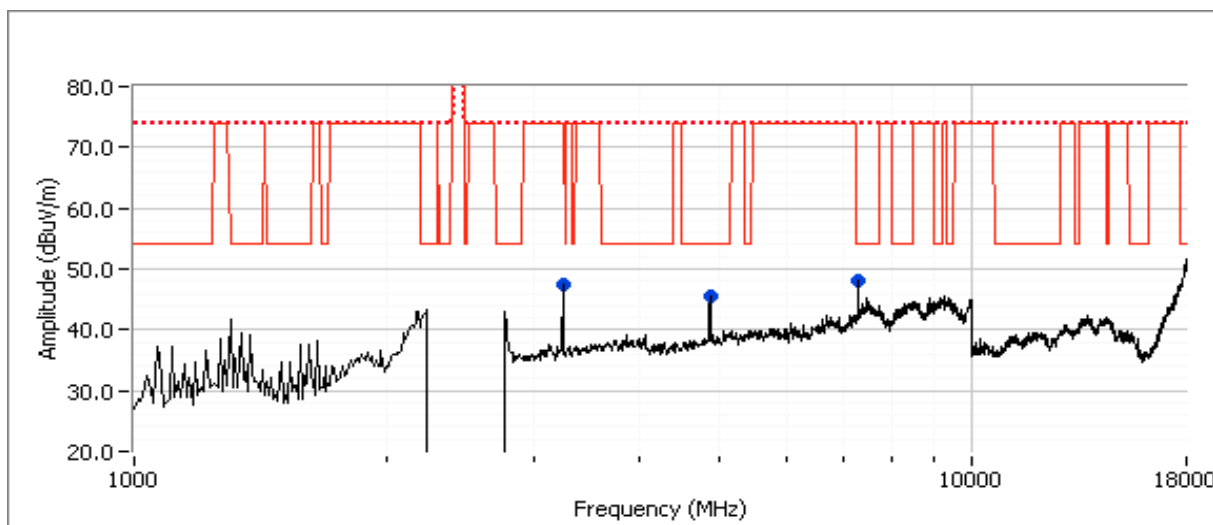
Engineer: Rafael Varelas

Location: Ft Chamber #4

## Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4874.010	38.6	V	54.0	-15.4	AVG	172	1.6	RB 1 MHz; VB: 10 Hz
7310.170	40.4	V	54.0	-13.6	AVG	350	1.6	RB 1 MHz; VB: 10 Hz
<b>3245.830</b>	<b>47.6</b>	<b>V</b>	<b>54.0</b>	<b>-6.4</b>	Peak	101	1.3	Peak reading vs avg limit, note 2
4867.770	51.0	V	74.0	-23.0	PK	172	1.6	RB 1 MHz; VB: 1 MHz
7310.190	52.2	V	74.0	-21.8	PK	350	1.6	RB 1 MHz; VB: 1 MHz

Note 2: Restricted band limit was used.



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Run #2d: Center Channel @ 2457 MHz with power setting of 19dBm.

Date: 2/26/2010

Engineer: Rafael Varelas

Location: Ft Chamber #4

## 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	
2450.200	100.5	V	120.0	-19.5	AVG	176	1.5	RB 1 MHz; VB: 10 Hz
2450.700	108.4	V	120.0	-11.6	PK	176	1.5	RB 1 MHz; VB: 1 MHz
2449.630	99.9	V	120.0	-20.1	PK	176	1.5	RB 100 kHz; VB: 100 kHz
2450.100	93.7	H	120.0	-26.3	AVG	128	1.6	RB 1 MHz; VB: 10 Hz
2450.630	101.8	H	120.0	-18.2	PK	128	1.6	RB 1 MHz; VB: 1 MHz

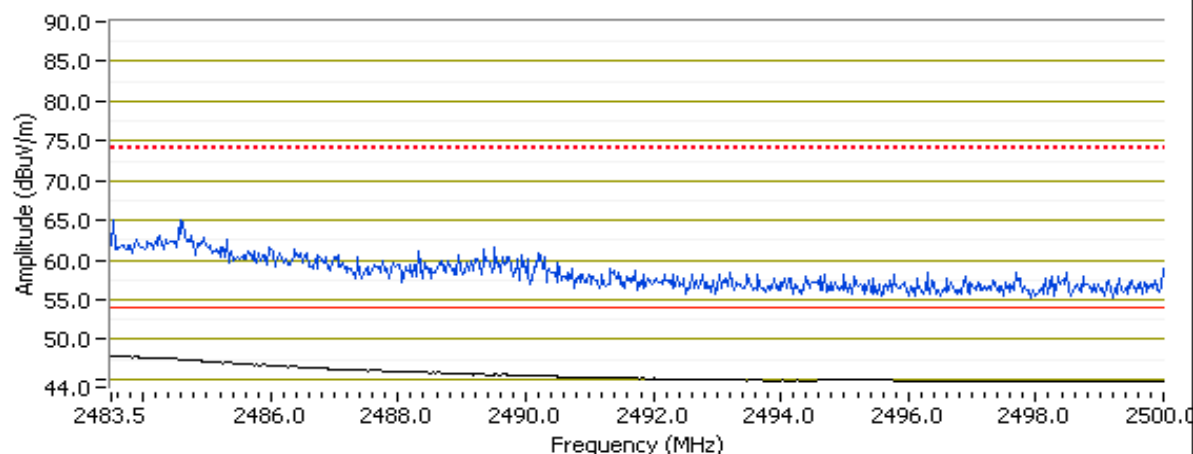
Fundamental emission level @ 3m in 100kHz RBW: 99.9 dB $\mu$ V/m

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

## Band Edge Signal Field Strength

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	
2483.500	49.9	V	54.0	-4.1	AVG	176	1.5	RB 1 MHz; VB: 10 Hz
2484.840	64.2	V	74.0	-9.8	PK	176	1.5	RB 1 MHz; VB: 1 MHz
2483.520	46.0	H	54.0	-8.0	AVG	128	1.6	RB 1 MHz; VB: 10 Hz
2483.800	58.7	H	74.0	-15.3	PK	128	1.6	RB 1 MHz; VB: 1 MHz

RB 1 MHz; VB 10 Hz, Blue = PK, Black = Avg, Vertical



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Run #2e: High Channel @ 2462 MHz with power setting of 16 dBm.

Date: 1/8/2010

Engineer: John Caizzi

Location: FT Chamber #3

**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	
2464.200	98.0	V	120.0	-22.0	Pk	254	1.28	
2467.070	99.3	V	120.0	-20.7	AVG	254	1.28	
2465.530	107.2	V	120.0	-12.8	PK	254	1.28	

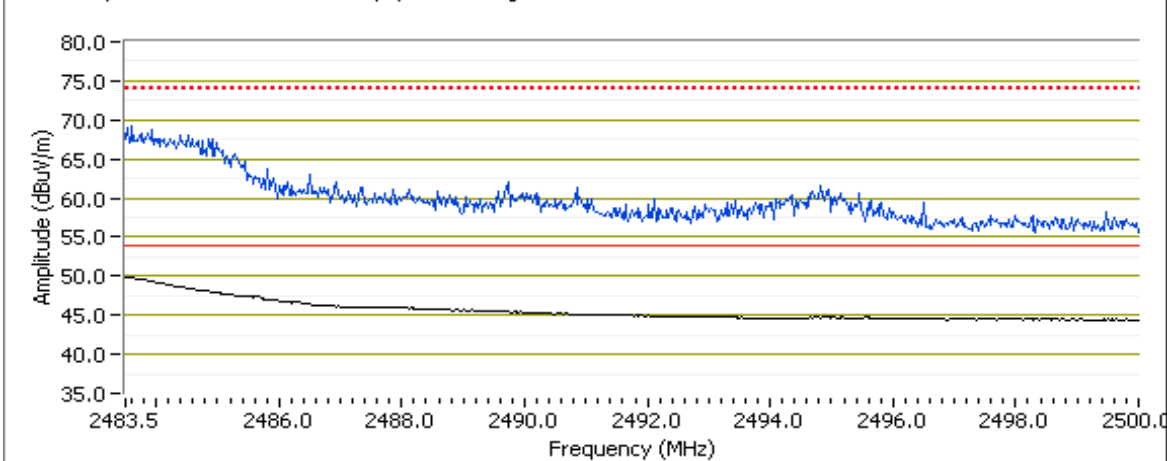
Fundamental emission level @ 3m in 100kHz RBW:	98.0 dB $\mu$ V/m
Limit for emissions outside of restricted bands:	68.0 dB $\mu$ V/m

Limit is -30dBc (UNII power measurement)

## Band Edge Signal 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	
2483.500	51.9	V	54.0	-2.1	AVG	254	1.28	16 dBm
2483.800	68.8	V	74.0	-5.2	PK	254	1.28	16 dBm

RB 1 MHz; VB 10 Hz Vertical Blue = pk, black = avg.

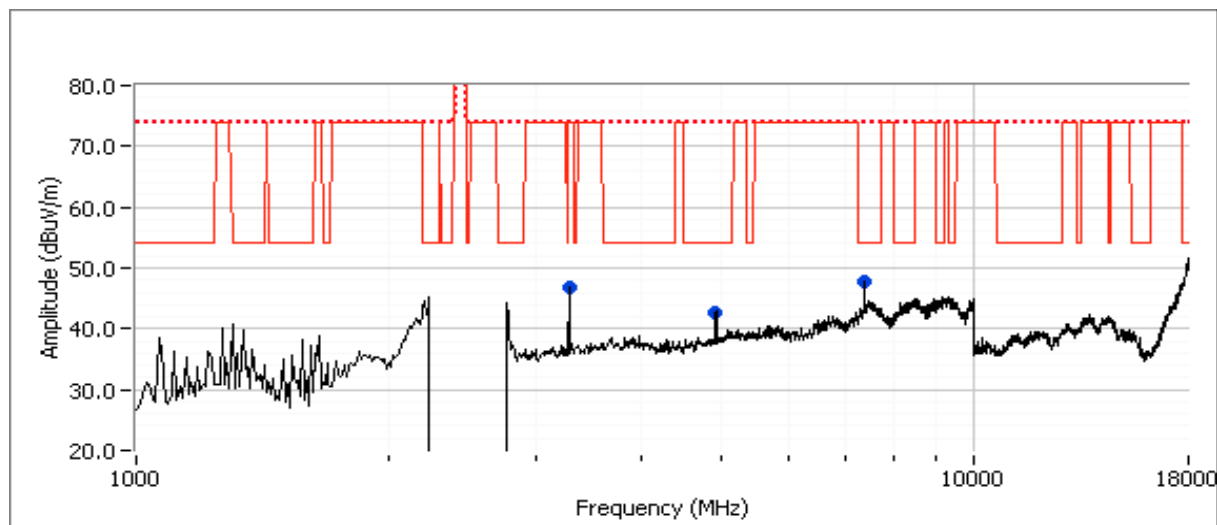


## Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4924.130	37.1	V	54.0	-16.9	AVG	197	1.7	RB 1 MHz; VB: 10 Hz
7385.100	40.7	V	54.0	-13.3	AVG	1	1.7	RB 1 MHz; VB: 10 Hz
3282.610	46.8	V	54.0	-7.2	Peak	90	1.3	Peak reading vs avg limit, note 2
4925.460	49.4	V	74.0	-24.6	PK	197	1.7	RB 1 MHz; VB: 1 MHz
7386.480	52.5	V	74.0	-21.5	PK	1	1.7	RB 1 MHz; VB: 1 MHz

Note 2: Restricted band limit was used.

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions (Monopole Antennas)

### 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.

### Summary of Results - Device Operating in the 5745-5805 MHz Band

NOTE: A preliminary check of output power was performed. The port with the highest power was used for the final testing. Preliminary tests showed no radio related emissions below 1 GHz.

Run #	Mode	Channel	Power Setting	Port	Test Performed	Limit	Result / Margin
1a	a mode	low - 5745	19	Main	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247( c)	51.6dBμV/m @ 5236.3MHz (-2.4dB)
1b	a mode	center - 5785	19	Main	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247( c)	51.1dBμV/m @ 5262.6MHz (-2.9dB)
1c	a mode	high - 5805	19	Main	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247( c)	51.6dBμV/m @ 5279.7MHz (-2.4dB)

### 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.

Antenna: Larson antenna (Elliott 2009-2119)

Module: 00000002C

DRIVER: v3.01.03

SCU: v2.03.30

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 10000 MHz	3	3	0.0
10000 - 40000 MHz	1	3	-9.5

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Run #1: Radiated Spurious Emissions, 30 - 40000 MHz. Operating Mode: 802.11a

Date: 2/26/2010

Engineer: Rafael Varelas

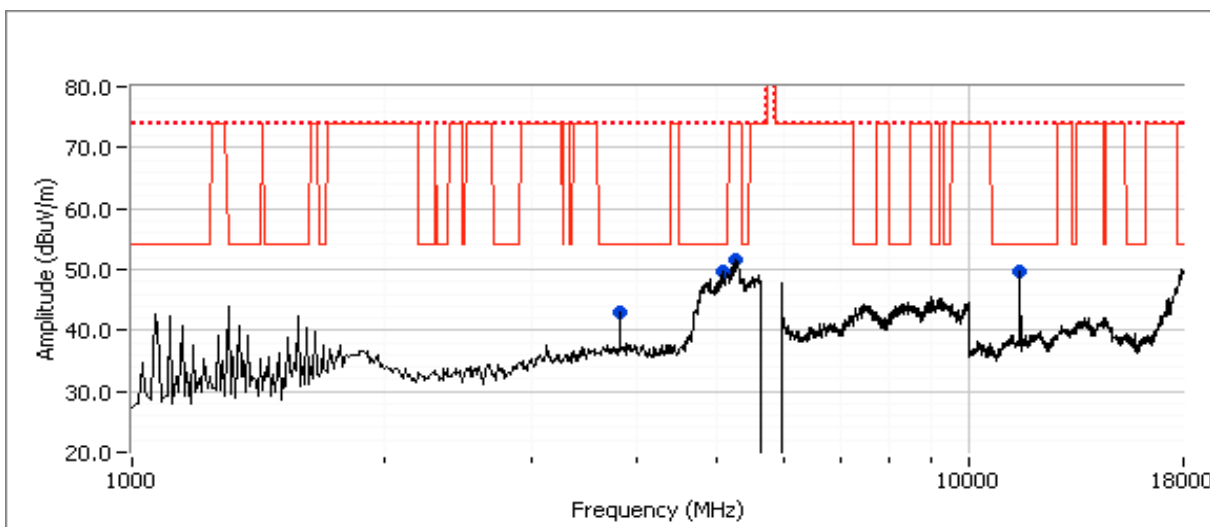
Location: Ft Chamber #4

## Run #3a: Low Channel @ 5745 MHz

### Other Spurious Emissions

Frequency MHz	Level dB $\mu$ V/m	Pol V/H	15.209 / 15.247 Limit	Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
3830.010	43.2	H	54.0	-10.8	AVG	330	1.8	RB 1 MHz; VB: 10 Hz
5060.980	42.8	V	54.0	-11.2	AVG	56	1.0	RB 1 MHz; VB: 10 Hz
11490.110	41.0	V	54.0	-13.0	AVG	7	1.3	RB 1 MHz; VB: 10 Hz
<b>5236.270</b>	<b>51.6</b>	<b>V</b>	<b>54.0</b>	<b>-2.4</b>	Peak	79	1.0	peak reading vs avg limit, note 1
3829.820	47.9	H	74.0	-26.1	PK	330	1.8	RB 1 MHz; VB: 1 MHz
5058.930	54.9	V	74.0	-19.1	PK	56	1.0	RB 1 MHz; VB: 1 MHz
11492.440	57.0	V	74.0	-17.0	PK	7	1.3	RB 1 MHz; VB: 1 MHz

Note 1: Restricted band limit used.



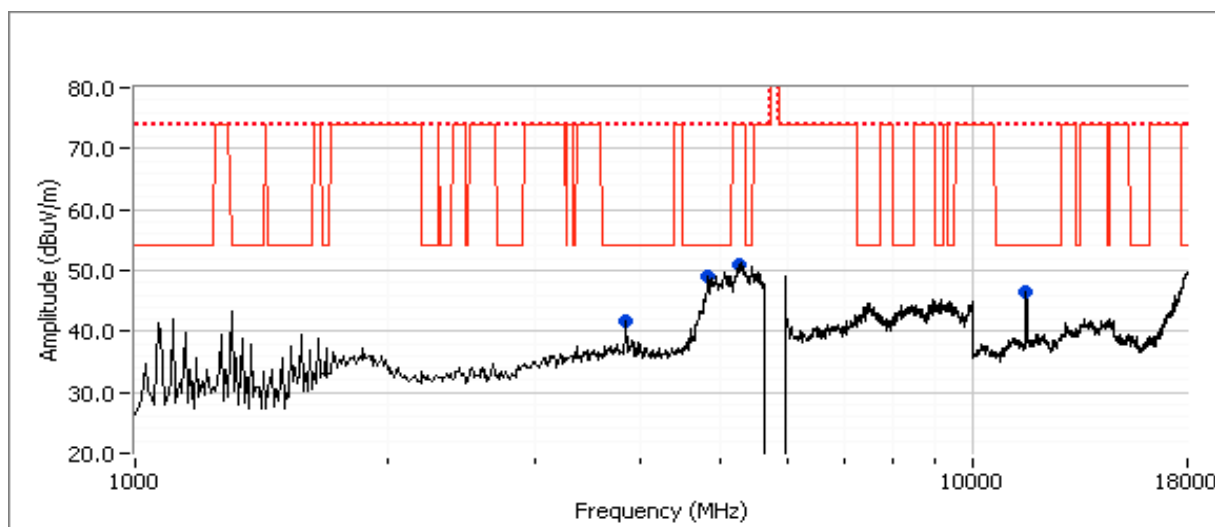
Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Run #1b: Center Channel @ 5785 MHz

### Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
3856.680	42.1	H	54.0	-11.9	AVG	329	1.8	RB 1 MHz; VB: 10 Hz
4829.690	44.8	V	54.0	-9.2	AVG	69	1.0	RB 1 MHz; VB: 10 Hz
11568.490	37.3	V	54.0	-16.7	AVG	9	1.2	RB 1 MHz; VB: 10 Hz
<b>5262.640</b>	<b>51.1</b>	<b>V</b>	<b>54.0</b>	<b>-2.9</b>	Peak	52	1.0	peak reading vs avg limit, note 1
3856.620	47.7	H	74.0	-26.3	PK	329	1.8	RB 1 MHz; VB: 1 MHz
4830.420	56.8	V	74.0	-17.2	PK	69	1.0	RB 1 MHz; VB: 1 MHz
11566.190	54.5	V	74.0	-19.5	PK	9	1.2	RB 1 MHz; VB: 1 MHz

Note 1: Restricted band limit used.





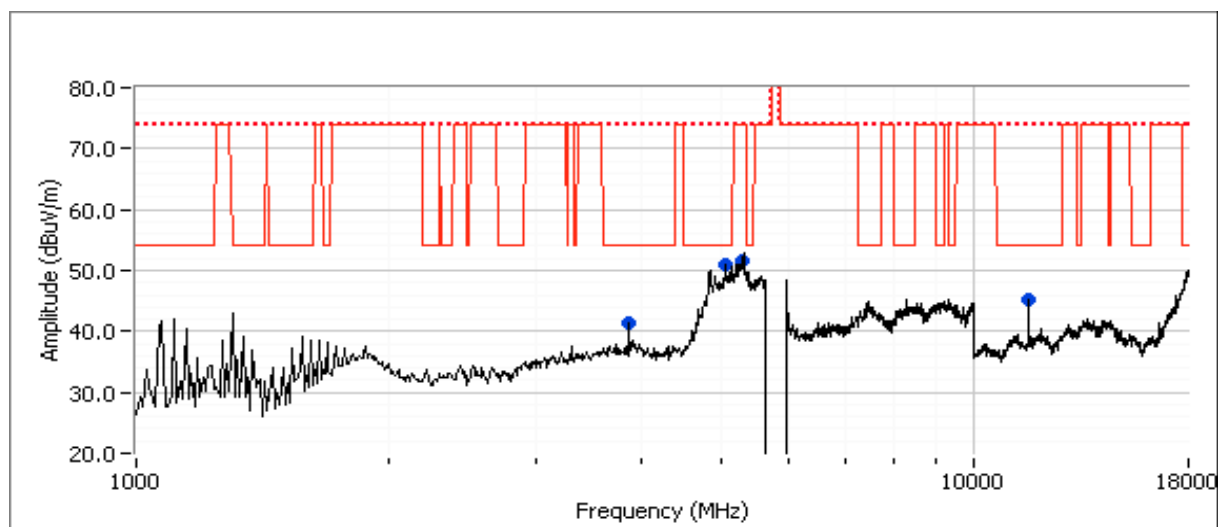
Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Run #1c: High Channel @ 5805 MHz (channel 161)

### Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
3870.010	42.2	H	54.0	-11.8	AVG	334	1.8	RB 1 MHz; VB: 10 Hz
5073.310	45.5	V	54.0	-8.5	AVG	300	1.0	RB 1 MHz; VB: 10 Hz
11611.430	36.5	V	54.0	-17.5	AVG	135	1.2	RB 1 MHz; VB: 10 Hz
5279.740	51.6	V	54.0	-2.4	Peak	68	1.0	peak reading vs avg limit, note 1
3869.850	47.3	H	74.0	-26.7	PK	334	1.8	RB 1 MHz; VB: 1 MHz
5072.210	57.6	V	74.0	-16.4	PK	300	1.0	RB 1 MHz; VB: 1 MHz
11611.160	53.9	V	74.0	-20.1	PK	135	1.2	RB 1 MHz; VB: 1 MHz

Note 1: Restricted band limit used.



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions (Hubert & Suhner Antenna, 5GHz)

### 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: 10-20 °C  
Rel. Humidity: 30-50 %

Date of Test: Refer to each run  
Test Engineer: Refer to each run  
Test Location: Refer to each run

Config. Used: 1  
Config Change: None  
Host Unit Voltage 120V/ 60Hz

### Summary of Results - Device Operating in the 5745-5805 MHz Band

NOTE: A preliminary check of output power was performed. The port with the highest power was used for the final testing. Preliminary tests showed no radio related emissions below 1 GHz.

Run #	Mode	Channel	Power Setting	Port	Test Performed	Limit	Result / Margin
1a	a mode	Low	18	Main	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247( c)	49.2dBμV/m @ 3883.3MHz (-5.1dB)
1b	a mode	Center	18	Main	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247( c)	47.8dBμV/m @ 3856.7MHz (-6.2dB)
1c	a mode	High	18	Main	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247( c)	49.2dBμV/m @ 3883.3MHz (-4.8dB)

Antenna: Hubert & Suhner monopole antenna (Elliott 2009-1388)

Module: 00000002A

DRIVER: V3.00.50

SCU: V2.03.18

### 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:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 12000 MHz	3	3	0.0
12000 - 40000 MHz	1	3	-9.5

## Run #1: Radiated Spurious Emissions, 30 - 40000 MHz. Operating Mode: 802.11a

Date: 1/8/2010

Engineer: Mehran Birgani

Location: FT Chamber #3

## Run #1a: Low Channel @ 5745 MHz with power setting of 18dBm.

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

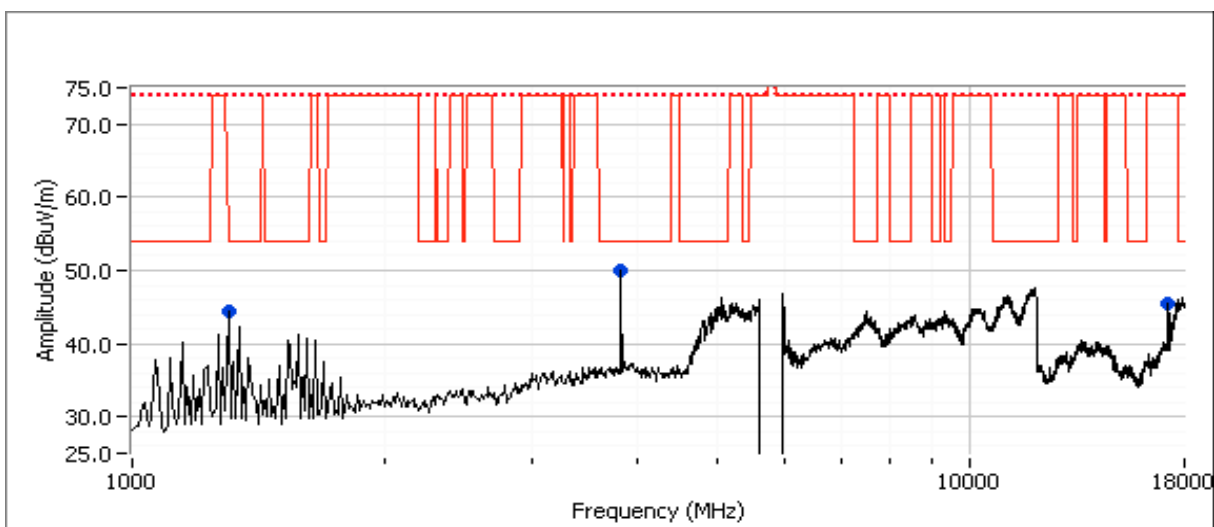
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5745.100	97.7	V	-	-	AVG	318	1.4	
5745.070	104.2	V	-	-	PK	318	1.4	

## Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
3883.330	49.2	V	54.0	-5.1	AVG	244	1.4	
1302.500	44.3	V	54.0	-9.7	PK	341	1.0	Peak reading with average limit
3883.410	52.7	V	74.0	-21.3	PK	244	1.4	
17231.670	45.6	H	74.0	-28.4	PK	237	1.0	Peak reading with average limit

Note 1: Signal is not in a restricted band but the more stringent restricted band limit was used.

Note 2: Near field scan showed there were no signal above 18GHz.



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

Run #2b: Center Channel @ 5785 MHz with power setting of 18dBm.

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

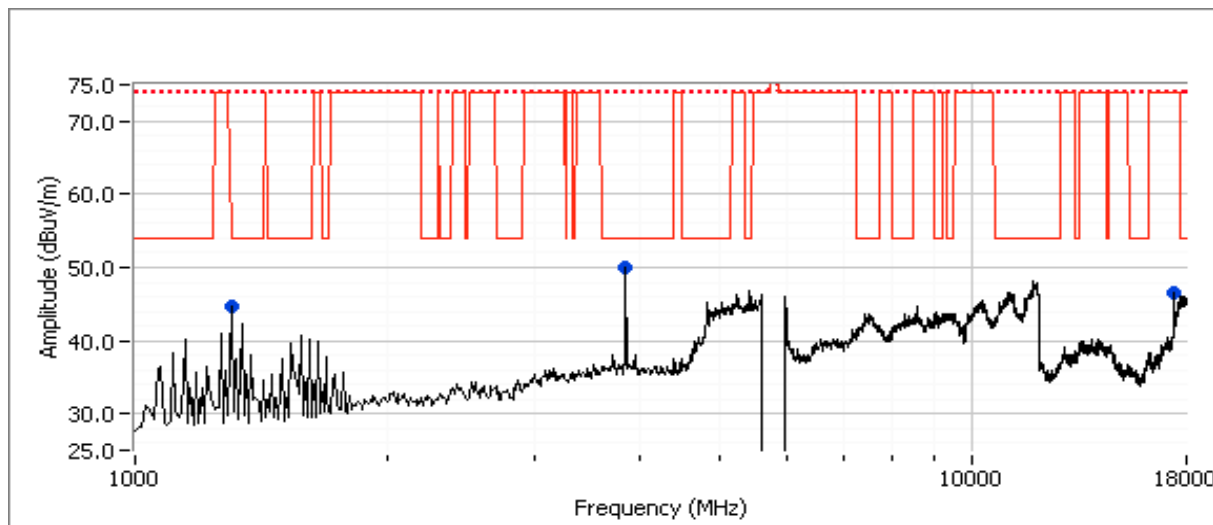
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5785.100	94.0	V	-	-	AVG	211	1.1	
5785.100	103.7	V	-	-	PK	211	1.1	

## Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
3856.690	47.8	H	54.0	-6.2	AVG	20	1.2	
1306.390	44.8	H	54.0	-9.2	PK	105	1.3	Peak reading with average limit
3856.450	51.3	H	74.0	-22.7	PK	20	1.2	
17355.060	46.5	H	74.0	-27.5	PK	236	1.0	Peak reading with average limit

Note 1: Signal is not in a restricted band but the more stringent restricted band limit was used.

Note 2: Near field scan showed there were no signal above 18GHz.



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

Run #1c: High Channel @ 5805 MHz with power setting of 18dBm.

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

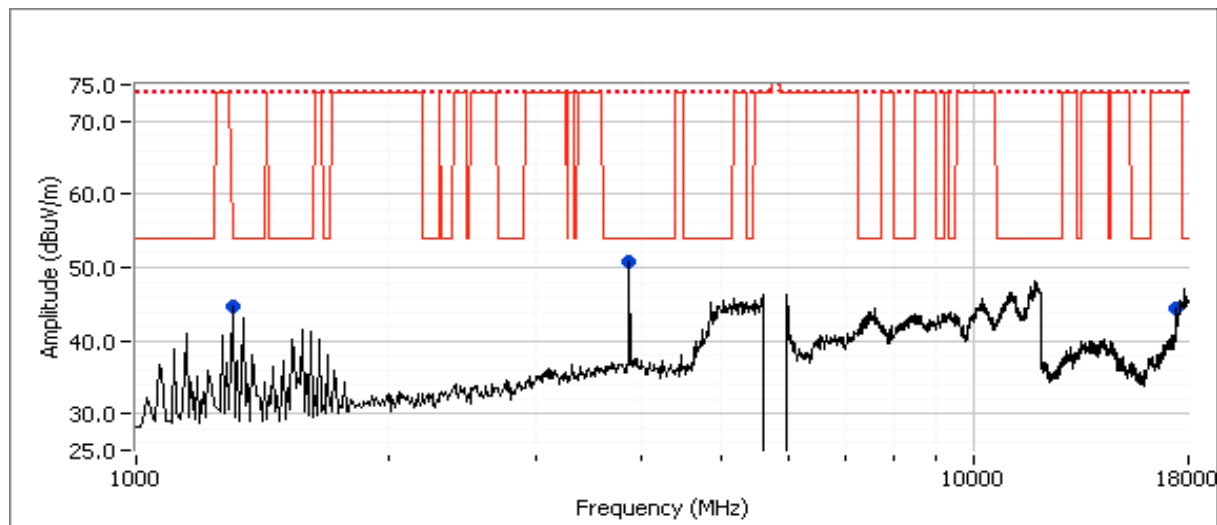
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5805.100	99.4	V	-	-	AVG	176	1.8	
5804.830	104.2	V	-	-	PK	176	1.8	

## Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3883.330	49.2	V	54.0	-4.8	AVG	246	1.4	
1306.340	44.6	H	54.0	-9.4	PK	106	1.3	Peak reading with average limit
3883.410	52.7	V	74.0	-21.3	PK	246	1.4	
17417.190	44.4	H	74.0	-29.6	PK	233	1.0	Peak reading with average limit

Note 1: Signal is not in a restricted band but the more stringent restricted band limit was used.

Note 2: Near field scan showed there were no signal above 18GHz.



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	-

## 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 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: 10-15 °C  
Rel. Humidity: 39-50 %

### Summary of Results

Run #	Test Performed	Limit	Result	Margin
1 - 2437MHz Cisco 4941 Antenna	RE, 30 - 8000 MHz Maximized Emissions	RSS-GEN	Pass	40.8dBμV/m (109.6μV/m) @ 3249.4MHz (-13.2dB)
2 - 2437MHz H&S Monopole Antenna	RE, 1000 - 8000 MHz Maximized Emissions	RSS-GEN	Pass	41.7dBμV/m (121.6μV/m) @ 3249.4MHz (-12.3dB)
3 - 5785MHz Larson Antenna	RE, 1000 - 18000 MHz Maximized Emissions	RSS-GEN	Pass	42.6dBμV/m (134.9μV/m) @ 3856.7MHz (-11.4dB)
4 - 5785MHz H&S Monopole Antenna	RE, 30 - 18000 MHz Maximized Emissions	RSS-GEN	Pass	36.4dBμV/m (66.1μV/m) @ 7410.7MHz (-17.6dB)

### Modifications Made During Testing

No modifications were made to the EUT during testing

### Deviations From The Standard

No deviations were made from the requirements of the standard.

**Antenna:** Air Dipole Antenna (Elliott 2009-1387)

**Antenna:** Larsen 5.0 dBi dipole antenna (Elliott 2009-2119)

**Antenna:** H&S 6.5 dBi dipole antenna (Elliott 2009-1388)

**Module:** 00000002A

**DRIVER:** V3.00.50

**SCU:** V2.03.18

Note: For emission from 10-18GHz, the EUT was scanned manually. All signals were within noise floor.

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	-

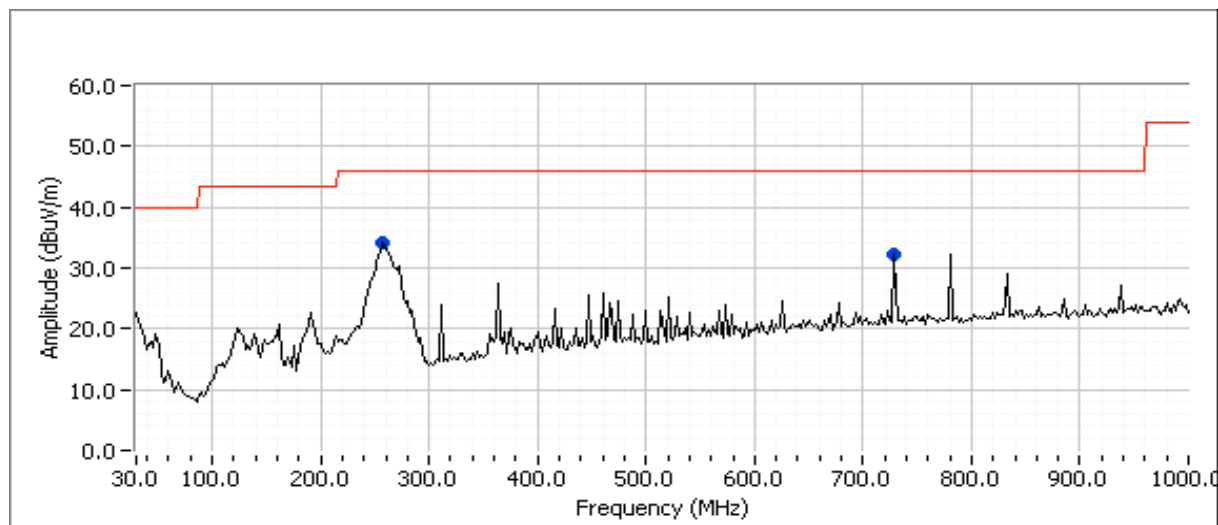
Run #1: Maximized readings, 30 - 8000 MHz (Cisco Air-Ant Dipole Antenna), 2437 MHz

Date: 1/13/2010

Engineer: Joseph Cadigal

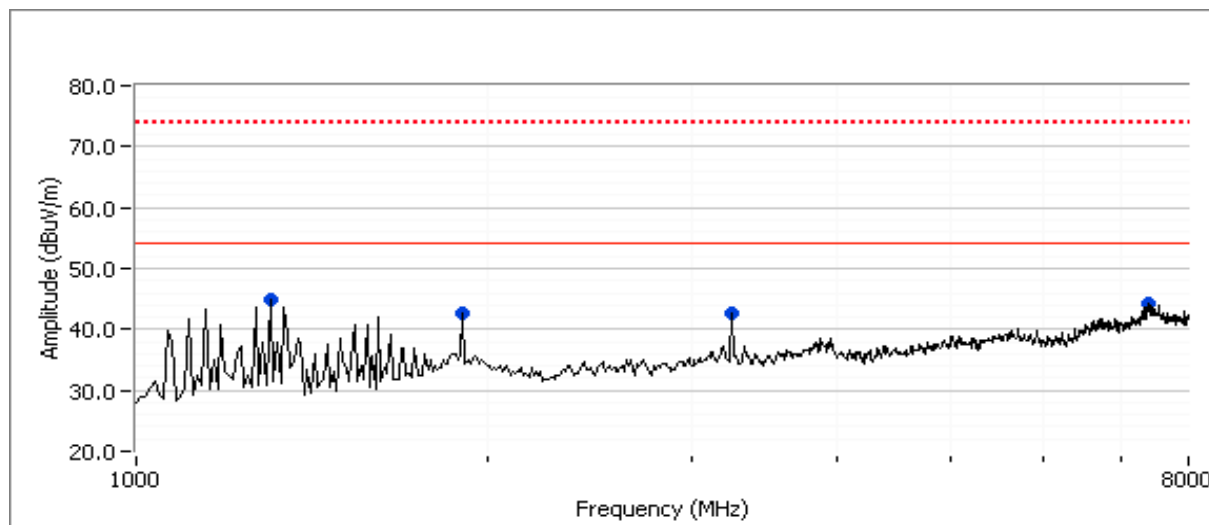
Location: FT Chamber #5

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1267.480	38.5	V	54.0	-15.5	AVG	207	1.0	
1872.090	30.1	H	54.0	-23.9	AVG	222	2.2	
<b>3249.390</b>	<b>40.8</b>	<b>H</b>	<b>54.0</b>	<b>-13.2</b>	AVG	133	1.9	
7396.310	36.8	V	54.0	-17.2	AVG	107	2.2	
1267.460	43.5	V	74.0	-30.5	PK	207	1.0	
1871.380	42.7	H	74.0	-31.3	PK	222	2.2	
3249.230	46.0	H	74.0	-28.0	PK	133	1.9	
7394.990	48.0	V	74.0	-26.0	PK	107	2.2	
258.689	32.7	H	46.0	-13.3	QP	99	1.0	
727.943	29.8	H	46.0	-16.2	QP	240	1.0	



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	-

Run #1: Maximized readings, 30 - 8000 MHz (Cisco Air-Ant Dipole Antenna), 2437 MHz



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



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	-

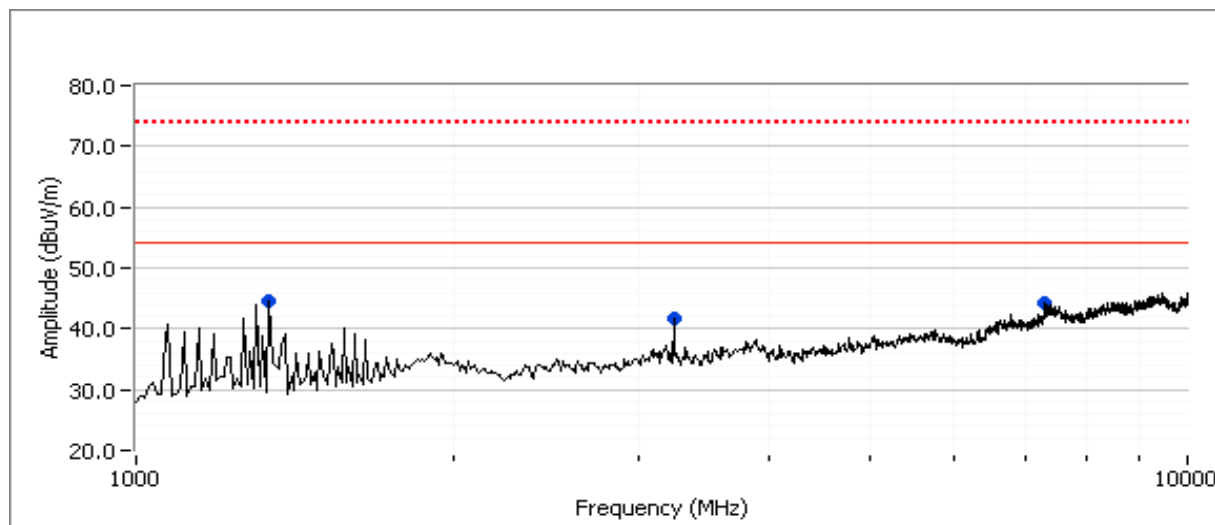
Run #2: Maximized readings, 1000 - 8000 MHz (H&S Monopole Antenna), 2437 MHz

Date: 1/13/2010

Engineer: Joseph Cadigal

Location: FT Chamber #5

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1345.420	40.8	H	54.0	-13.2	AVG	245	1.3	
<b>3249.350</b>	<b>41.7</b>	<b>H</b>	<b>54.0</b>	<b>-12.3</b>	AVG	126	1.6	
7352.980	35.8	V	54.0	-18.2	AVG	32	1.9	
1345.490	45.1	H	74.0	-28.9	PK	245	1.3	
3249.190	46.4	H	74.0	-27.6	PK	126	1.6	
7350.970	47.5	V	74.0	-26.5	PK	32	1.9	



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

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	-

Run #3: Maximized readings, 1000 - 18000 MHz, (Larson Dipole Antenna), 5785 MHz

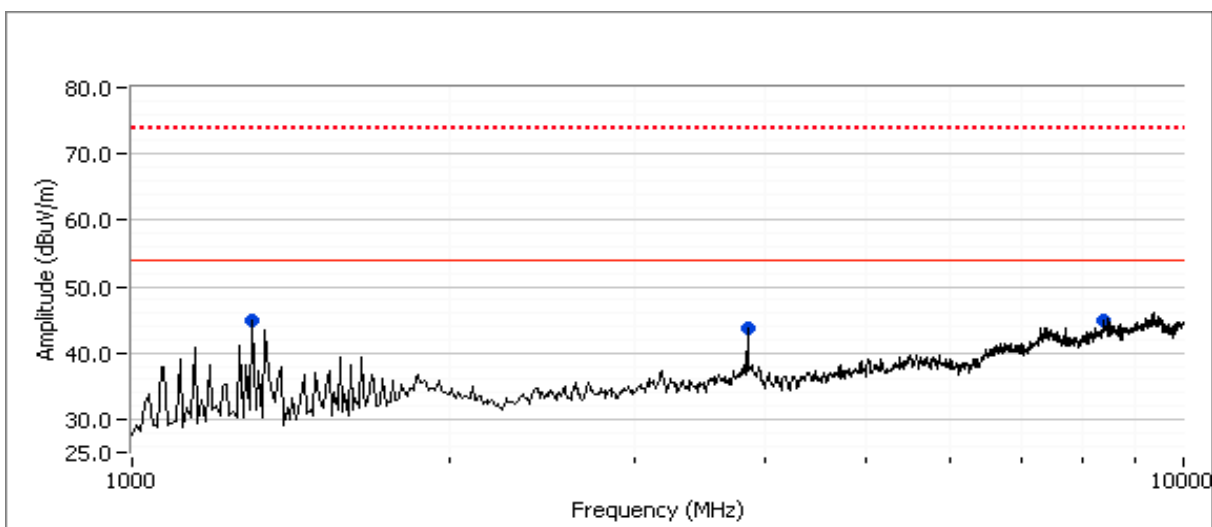
Date: 1/13/2010

Engineer: Joseph Cadigal

Location: FT Chamber #5

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1306.440	41.2	H	54.0	-12.8	AVG	244	1.0	
<b>3856.710</b>	<b>42.6</b>	<b>H</b>	<b>54.0</b>	<b>-11.4</b>	AVG	0	1.6	
8380.270	37.5	H	54.0	-16.5	AVG	0	1.6	
1306.380	44.9	H	74.0	-29.1	PK	244	1.0	
3856.800	47.9	H	74.0	-26.1	PK	0	1.6	
8380.120	50.1	H	74.0	-23.9	PK	0	1.6	

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



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	-

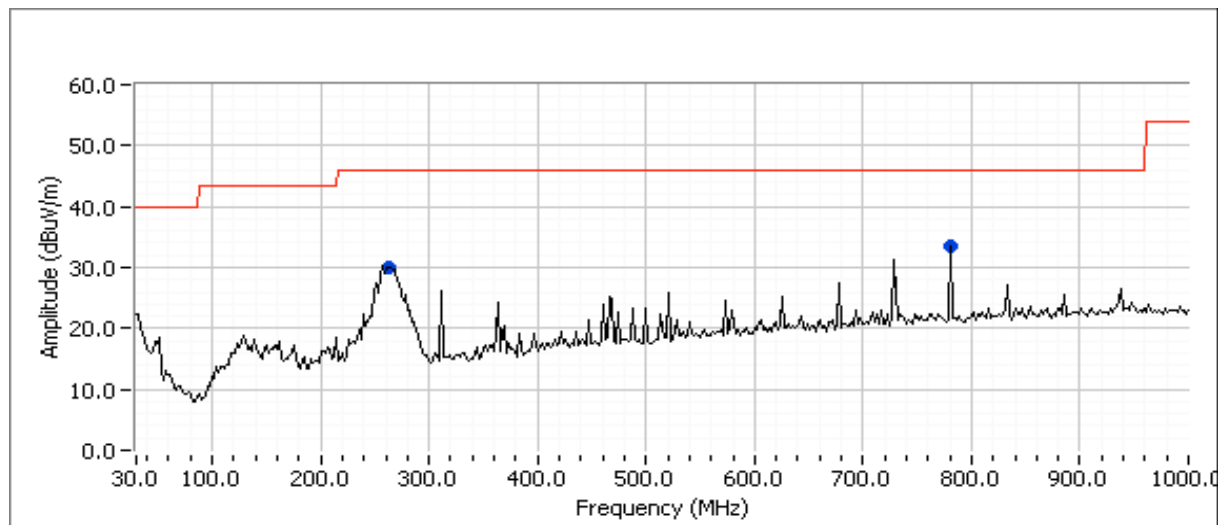
Run #4: Maximized readings, 30 - 18000 MHz (H&S Monopole Antenna), 5785 MHz

Date: 1/13/2010

Engineer: Joseph Cadigal

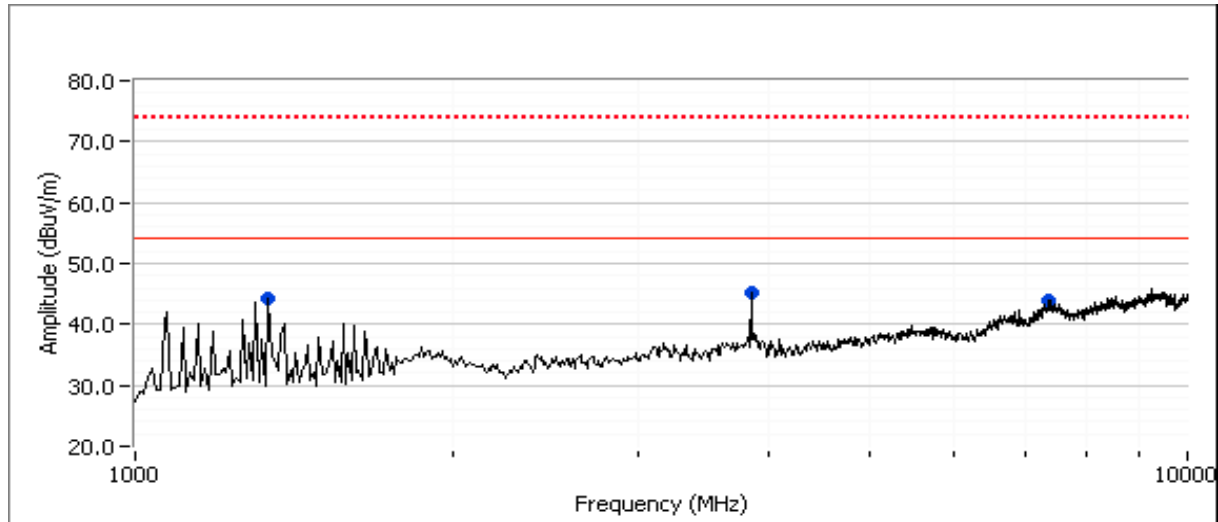
Location: FT Chamber #5

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1293.390	27.3	H	54.0	-26.7	AVG	246	1.3	
3884.190	31.9	H	54.0	-22.1	AVG	34	1.3	
<b>7410.670</b>	<b>36.4</b>	<b>H</b>	<b>54.0</b>	<b>-17.6</b>	AVG	278	2.2	
1294.410	38.6	H	74.0	-35.4	PK	246	1.3	
3884.870	44.5	H	74.0	-29.5	PK	34	1.3	
7411.980	48.3	H	74.0	-25.7	PK	278	2.2	
253.499	23.3	H	46.0	-22.7	QP	298	1.0	
778.504	19.1	H	46.0	-26.9	QP	234	1.0	



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	-

Run #4: Maximized readings, 30 - 18000 MHz (H&S Monopole Antenna), 5785 MHz



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

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	-

## Conducted Emissions

*(Elliott Laboratories Fremont Facility, Semi-Anechoic Chamber)*

### Test Specific Details

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

Date of Test: 1/14/2010  
Test Engineer: John Caizzi  
Test Location: Fremont Chamber #5

Config. Used: 1  
Config Change: none  
Host Unit Voltage 120V/60Hz

### General Test Configuration

For tabletop equipment, the EUT host system was located on a wooden table inside the semi-anechoic chamber, 40 cm from a vertical coupling plane and 80cm from the LISN.

**Ambient Conditions:**  
Temperature: 22 °C  
Rel. Humidity: 37 %

### Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power, 120V/60Hz	EN 55022 Class B	Pass	45.1dBµV @ 0.176MHz (-19.6dB)

### Modifications Made During Testing

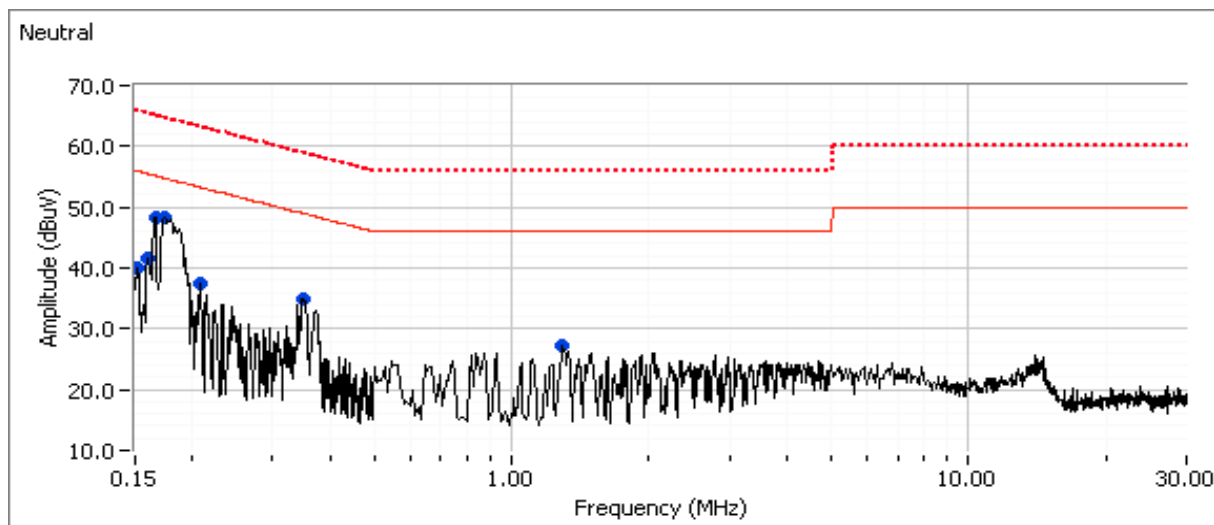
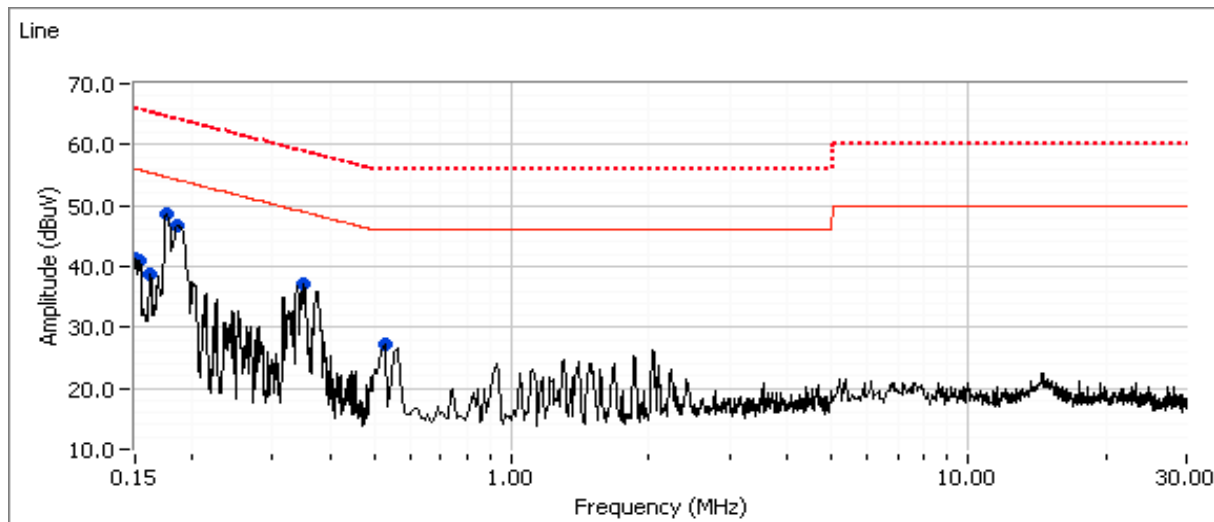
No modifications were made to the EUT during testing

### Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	-

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz. 802.11b, 2412 MHz, 19 dBm, H&S antenna.



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77316
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	-

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

Frequency MHz	Level dBμV	AC Line	EN 55022 Class B Limit	Margin	Detector QP/Ave	Comments
0.176	48.6	Line	54.7	-6.1	Peak	
0.184	46.7	Line	54.2	-7.5	Peak	
0.351	37.2	Line	48.9	-11.7	Peak	
0.151	41.4	Line	56.0	-14.6	Peak	
0.152	40.8	Line	55.8	-15.0	Peak	
0.162	38.7	Line	55.4	-16.7	Peak	
0.527	27.3	Line	46.0	-18.7	Peak	
0.173	48.3	Neutral	54.8	-6.5	Peak	
0.167	48.4	Neutral	55.2	-6.8	Peak	
0.159	41.7	Neutral	55.5	-13.8	Peak	
0.349	34.8	Neutral	49.0	-14.2	Peak	
0.209	37.3	Neutral	53.3	-16.0	Peak	
0.153	39.9	Neutral	55.9	-16.0	Peak	
1.294	27.3	Neutral	46.0	-18.7	Peak	

## Final quasi-peak and average readings

Frequency MHz	Level dBμV	AC Line	EN 55022 Class B Limit	Margin	Detector QP/Ave	Comments
0.176	45.1	Line	64.7	-19.6	QP	
0.184	44.4	Line	64.3	-19.9	QP	
0.176	31.2	Line	54.7	-23.5	AVG	
0.184	30.2	Line	54.3	-24.1	AVG	
0.162	41.1	Line	65.4	-24.3	QP	
0.350	32.1	Line	59.0	-26.9	QP	
0.350	21.2	Line	49.0	-27.8	AVG	
0.151	33.8	Line	65.9	-32.1	QP	
0.152	33.1	Line	65.9	-32.8	QP	
0.162	19.7	Line	55.4	-35.7	AVG	
0.151	14.0	Line	55.9	-41.9	AVG	
0.152	13.6	Line	55.9	-42.3	AVG	
0.173	45.1	Neutral	64.8	-19.7	QP	
0.167	44.8	Neutral	65.1	-20.3	QP	
0.159	38.7	Neutral	65.5	-26.8	QP	
0.349	21.5	Neutral	49.0	-27.5	AVG	
0.173	26.0	Neutral	54.8	-28.8	AVG	
0.167	26.1	Neutral	55.1	-29.0	AVG	
0.349	29.7	Neutral	59.0	-29.3	QP	
0.153	35.7	Neutral	65.8	-30.1	QP	
0.209	27.2	Neutral	63.2	-36.0	QP	
0.159	15.3	Neutral	55.5	-40.2	AVG	
0.153	14.6	Neutral	55.8	-41.2	AVG	
0.209	11.5	Neutral	53.2	-41.7	AVG	



## EMC Test Data

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77317
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Emissions Standard(s):	FCC 15.247/RSS 210	Class:	-
Immunity Standard(s):	-	Environment:	-

## EMC Test Data

For The

## Summit Data Communications

Model

SDC-MSD30AG

Date of Last Test: 1/22/2010



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77317
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
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: 1/21&22/2010	Config. Used: 1
Test Engineer: Rafael Varelas & Suhaila Khushzad	Config Change: None
Test Location: FT Chamber #5	EUT Voltage: 120V/60Hz

### 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:	18.2 °C
	Rel. Humidity:	37 %

### Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
1	100%	-	Output Power	15.247(b)	Pass	17.4dBm
2	100%	-	Power spectral Density (PSD)	15.247(d)	Pass	-6.7 dBm/3kHz
3	100%	-	Minimum 6dB Bandwidth	15.247(a)	Pass	12.41 MHz
3	100%	-	99% Bandwidth	RSS GEN	-	16.1 MHz
4	100%	-	Spurious emissions	15.247(b)	Pass	All signal < -30dBc

### 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:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77317
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Run #1: Output Power

Power Setting <sup>2</sup>	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP <sup>Note 2</sup>		Output Power	
		(dBm) <sup>1</sup>	mW			dBm	W	(dBm) <sup>3</sup>	mW
19	2412	17.4	55.5	3.0	Pass	20.4	0.111	17.7	58.9
19	2437	17.3	53.2	3.0	Pass	20.3	0.106	17.3	53.7
17	2462	16.7	46.7	3.0	Pass	19.7	0.093	16.5	44.7

Note 1:

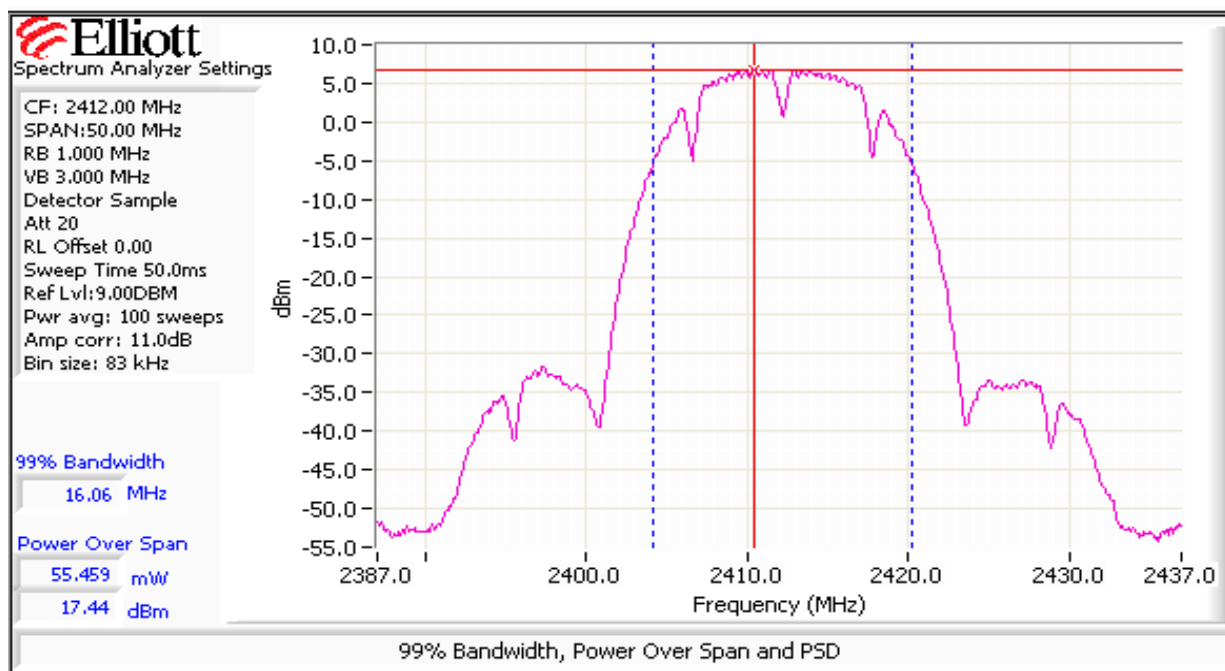
Output power measured using a spectrum analyzer (see plots below):  
RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50 MHz. **Spurious limit is -30dBc because this method was used.**

Note 2:

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

Note 3:

Avg power meter measurement, for reference only.



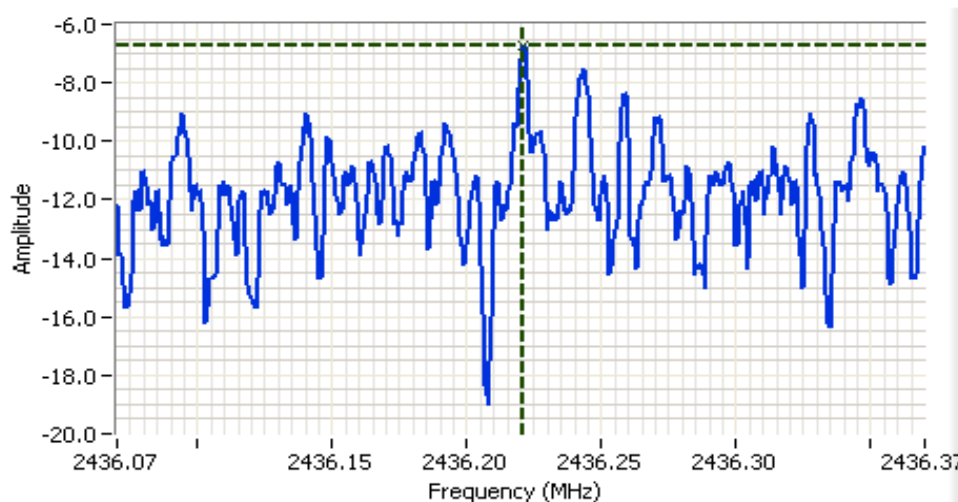
Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77317
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD	Limit dBm/3kHz	Result
		(dBm/3kHz) <small>Note 1</small>		
19	2412	-7.9	8.0	Pass
19	2437	-6.7	8.0	Pass
19	2462	-6.7	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.









### Analyzer Settings

HP8564E,EMI  
CF: 2436.220 MHz  
SPAN:300 kHz  
RB 3.00 kHz  
VB 10.00 kHz  
Detector POS  
Att 10  
RL Offset 11.00  
Sweep Time 100.0s  
Ref Lvl:0.80DBM

### Comments

PSD @ 2437 MHz  
19dB

Cursor 1	2436.2205	-6.70			
	0.0000	0.00			

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77317
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz)	
			6dB	99%
19	2412	100kHz	12.66	16.06
19	2437	100kHz	12.41	16.06
19	2462	100kHz	12.58	16.14

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





### Analyzer Settings

HP8564E,EMI  
CF: 2437.000 MHz  
SPAN:50.000 MHz  
RB 100 kHz  
VB 100 kHz  
Detector Sample  
Att 20  
RL Offset 11.00  
Sweep Time 50.0ms  
Ref Lvl:20.00DBM

### Comments

6dB BW: 12.417 MHz

Cursor 1	2443.5000	4.50	
Cursor 2	2431.0833	-1.50	

Delta Freq. 12.417

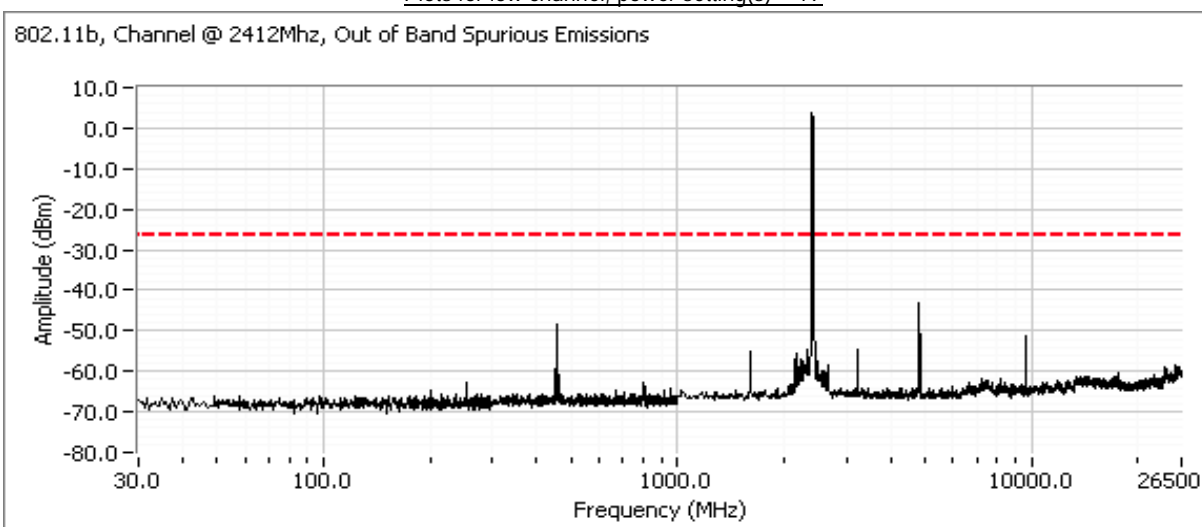
Delta Amplitude 6.00

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77317
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

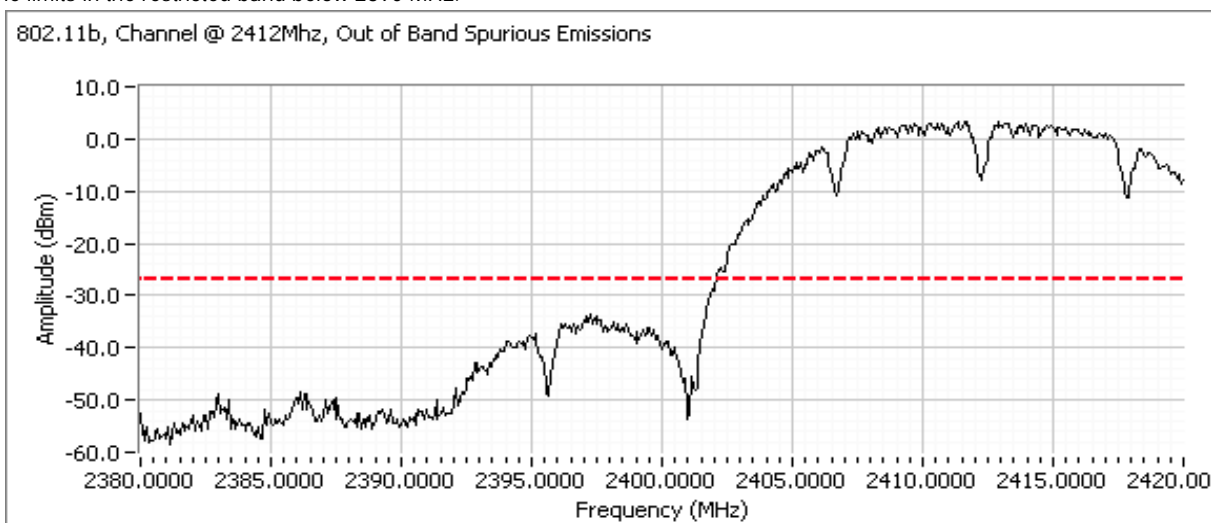
## Run #4: Out of Band Spurious Emissions

Frequency (MHz)	Limit	Result
2412	-30dBc	Pass
2437	-30dBc	Pass
2462	-30dBc	Pass

Plots for low channel, power setting(s) = 19

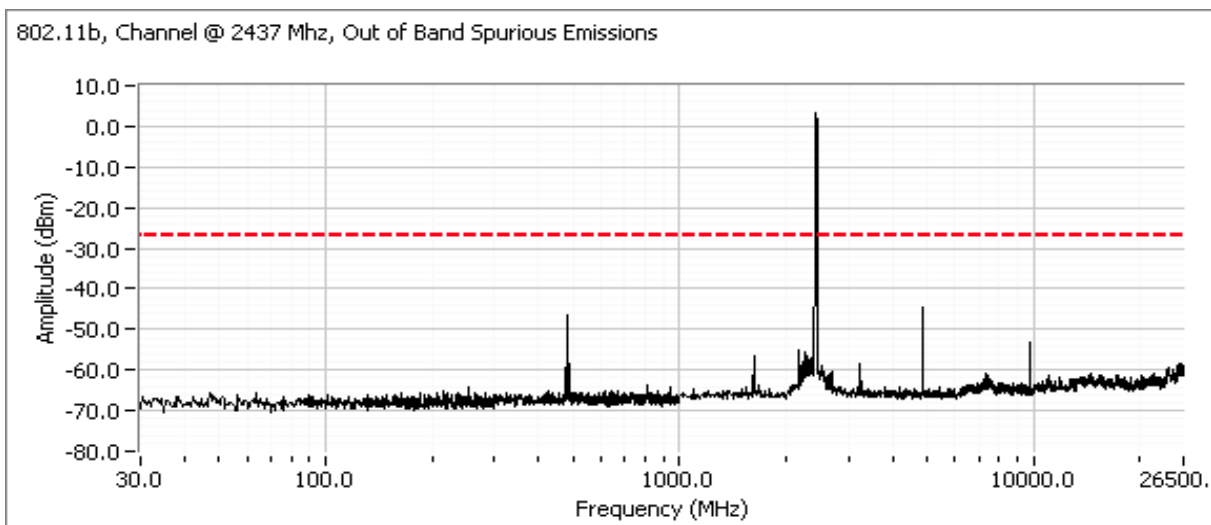


Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.

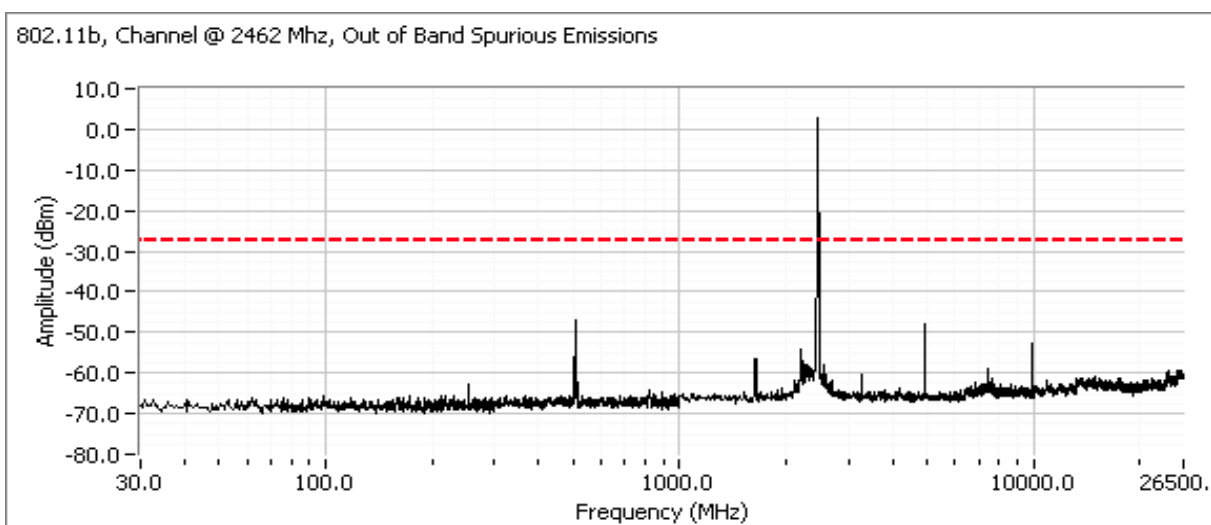


Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77317
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

Plots for center channel, power setting(s) = 19



Plots for high channel, power setting(s) = 19



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77317
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
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:  
Test Engineer: Rafael Varelas  
Test Location: FT Chamber #5

Config. Used: 1  
Config Change: None  
EUT Voltage: 120V/60Hz

### General Test Configuration

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

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

**Ambient Conditions:**  
Temperature: 18.2 °C  
Rel. Humidity: 37 %

### Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
1	-	-	Output Power	15.247(b)	Pass	16.5dBm
2	100%	-	Power spectral Density (PSD)	15.247(d)	Pass	-7.9 dBm/3kHz
3	100%	-	Minimum 6dB Bandwidth	15.247(a)	Pass	16.5 MHz
3	100%	-	99% Bandwidth	RSS GEN	-	17.2 MHz
4	100%	-	Spurious emissions	15.247(b)	Pass	All signal < -20dBc

### 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:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77317
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Run #1: Output Power

Power Setting <sup>2</sup>	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP <sup>Note 2</sup>		Output Power	
		(dBm) <sup>1</sup>	mW			dBm	W	(dBm) <sup>3</sup>	mW
19	2412	20.6	114.8	3.0	Pass	23.6	0.229	16.3	42.7
19	2437	20.9	123.0	3.0	Pass	23.9	0.245	17.4	55.0
19	2462	20.7	117.5	3.0	Pass	23.7	0.234	16.0	39.8

Note 1: Output power measured using a peak power meter.  
Spurious limit is -20dBc because this method was used.

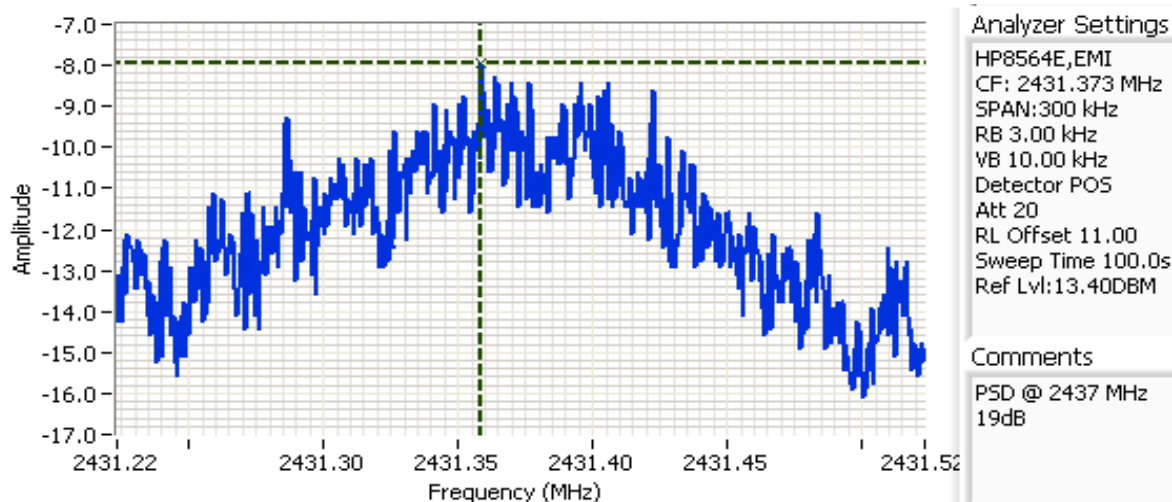
Note 2: Power setting - the software power setting used during testing, included for reference only.

Note 3: Avg power meter measurement, for reference only.

## Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD	Limit	Result
		(dBm/3kHz) <sup>Note 1</sup>		
19	2412	-8.5	8.0	Pass
19	2437	-7.9	8.0	Pass
19	2462	-9.4	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.



Cursor 1 2431.3588 -7.93

0.0000 0.00

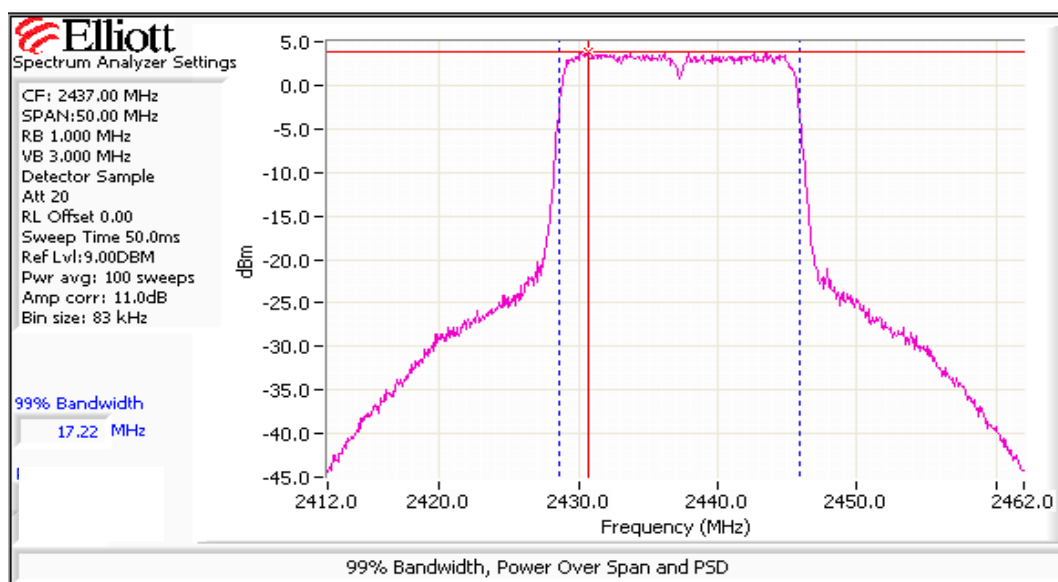
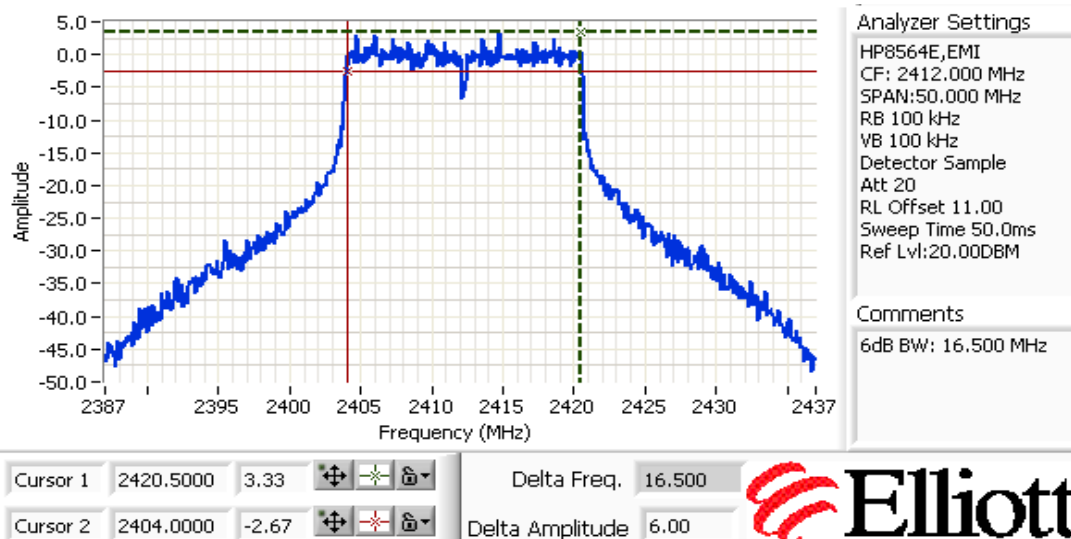


Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77317
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz)	
			6dB	99%
19	2412	100kHz	16.5	17.22
19	2437	100kHz	16.58	17.22
19	2462	100kHz	16.58	17.22

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



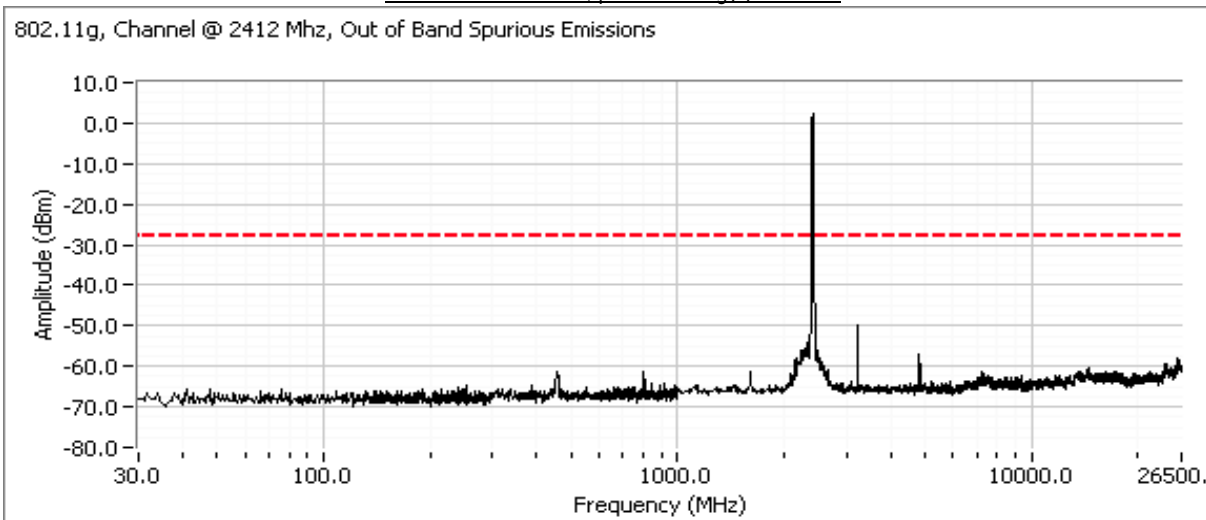
Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77317
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Run #4: Out of Band Spurious Emissions

Frequency (MHz)	Limit	Result
2412	-20dBc	Pass
2437	-20dBc	Pass
2462	-20dBc	Pass

Note: The limit lines on the wideband plots show a -30dBc limit. Peak power measurement was use, actual limit is -20dBc.

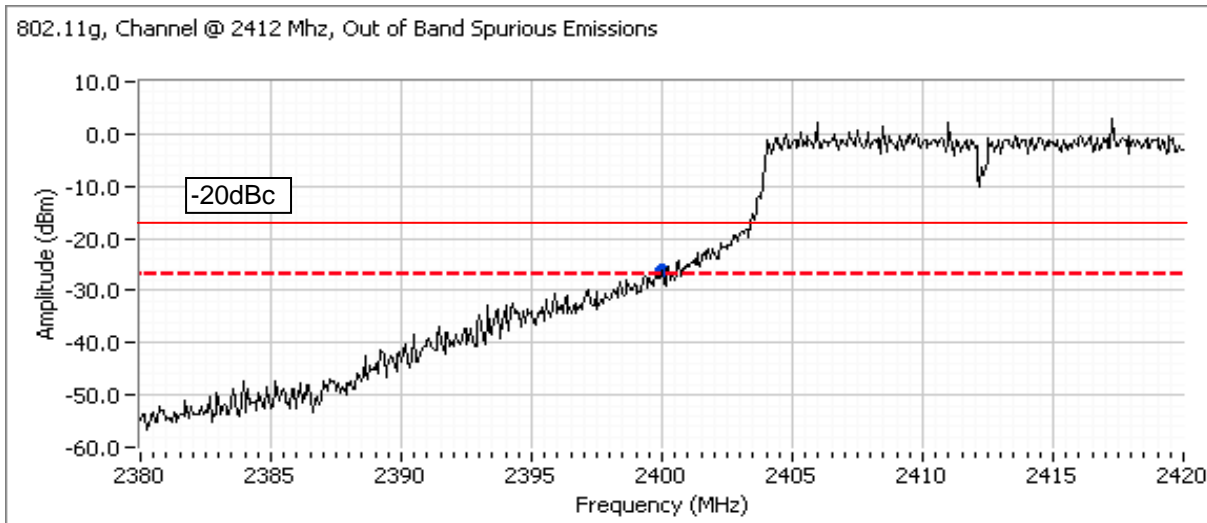
Plots for low channel, power setting(s) = 100 %



Plot at power setting 19dBm

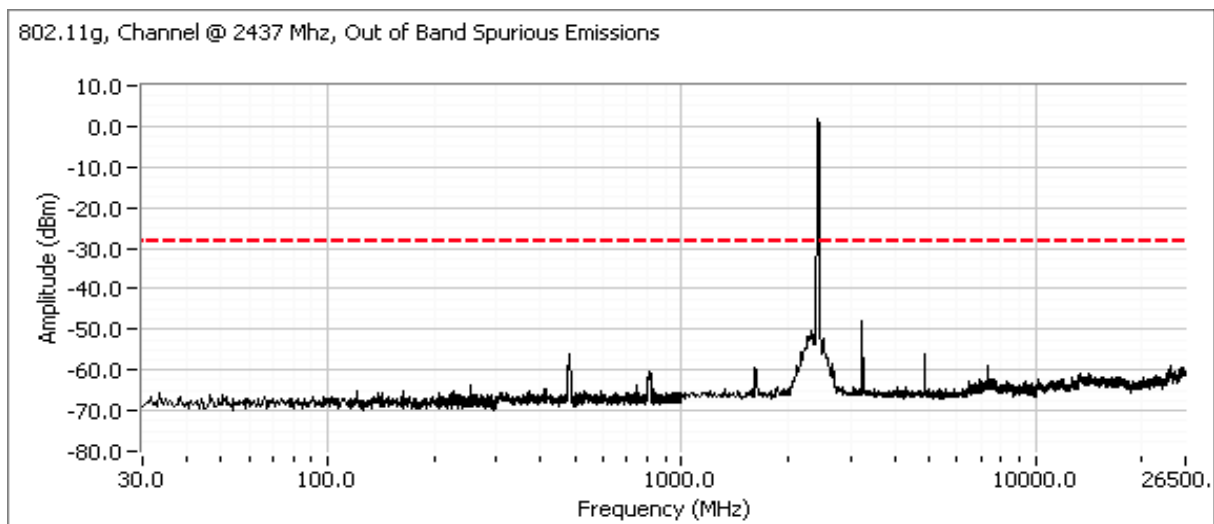
Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77317
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.



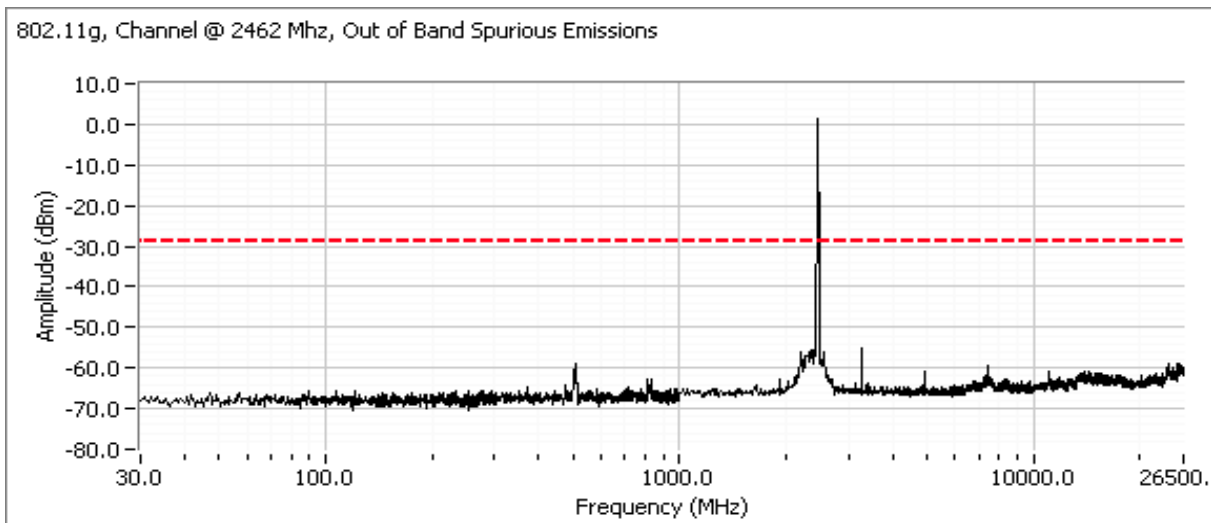
Plot at power setting 19dBm

Plots for center channel, power setting(s) = 19



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77317
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

Plots for high channel, power setting(s) = 19



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77317
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
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: 1/14/2010  
 Test Engineer: Joseph Cadigal  
 Test Location: FT Chamber#5

Config. Used: 1  
 Config Change: None  
 EUT Voltage: 120V/60Hz

### General Test Configuration

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

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

### Ambient Conditions:

Temperature: 10-15 °C  
 Rel. Humidity: 30-50 %

### Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
1	-	-	Output Power	15.247(b)	Pass	15.3dBm (33.7mW)
2	-	-	Power spectral Density (PSD)	15.247(d)	Pass	7.5 dBm/3kHz
3	-	-	Minimum 6dB Bandwidth	15.247(a)	Pass	16.5 MHz
3	-	-	99% Bandwidth	RSS GEN	-	16.8 MHz
4	18.0	-	Spurious emissions	15.247(b)	Pass	All signals were below the limit

### 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:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77317
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

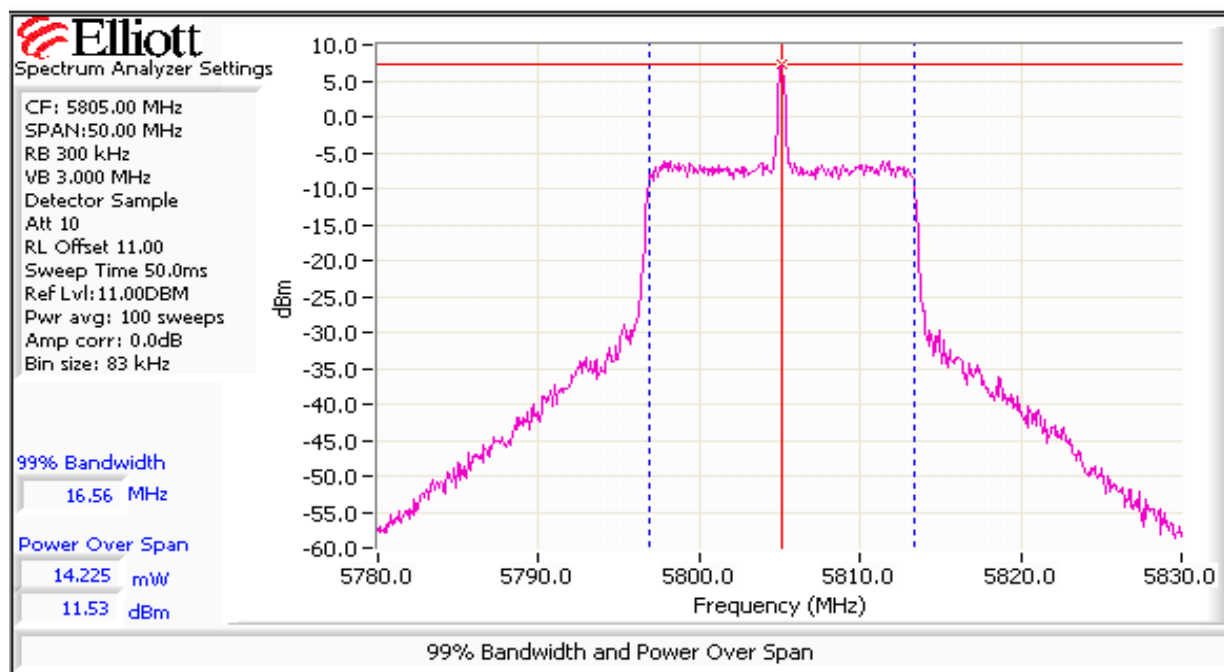
## Run #1: Output Power

Power Setting <sup>2</sup>	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP <sup>Note 2</sup>		Output Power	
		(dBm) <sup>1</sup>	mW			dBm	W	(dBm) <sup>3</sup>	mW
18.0	5745	10.5	11.2	6.5	Pass	17.0	0.050	20.5	112.2
18.0	5785	11.5	14.1	6.5	Pass	18.0	0.063	19.6	91.2
17.0	5805	11.5	14.1	6.5	Pass	18.0	0.063	19.5	89.1

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 50 MHz. **Spurious limit is -30dBc because this method was used.**  
For Channel 161 (5805 MHz), the RBW=1MHz, VB=3 MHz, sample detector, max hold for at least 60 seconds (transmitted signal was not continuous) and power integration over 50 MHz.

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

Note 3: Avg power meter measurement, for reference only.

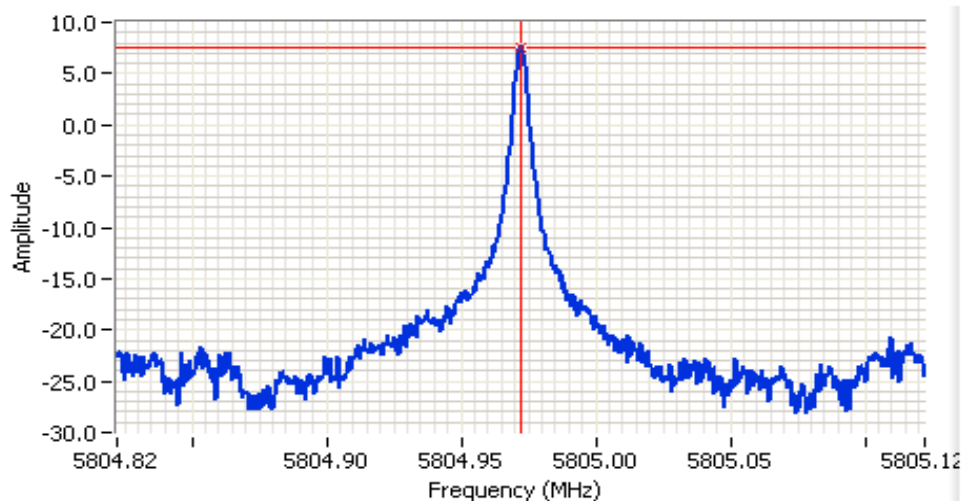


Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77317
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD	Limit dBm/3kHz	Result
		(dBm/3kHz) <small>Note 1</small>		
18.0	5745	2.0	8.0	Pass
18.0	5785	-12.7	8.0	Pass
17.0	5805	7.5	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.



### Analyzer Settings

HP8564E,EMI  
 CF: 5804.972 MHz  
 SPAN:300 kHz  
 RB 3.00 kHz  
 VB 10.00 kHz  
 Detector POS  
 Att 20  
 RL Offset 11.00  
 Sweep Time 100.0s  
 Ref Lvl:15.70DBM

### Comments

PSD @ Channel 161,  
 power setting @ 17dBm

Cursor 1 5804.9722 7.53

0.0000

0.00

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77317
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

## Run #3: Signal Bandwidth

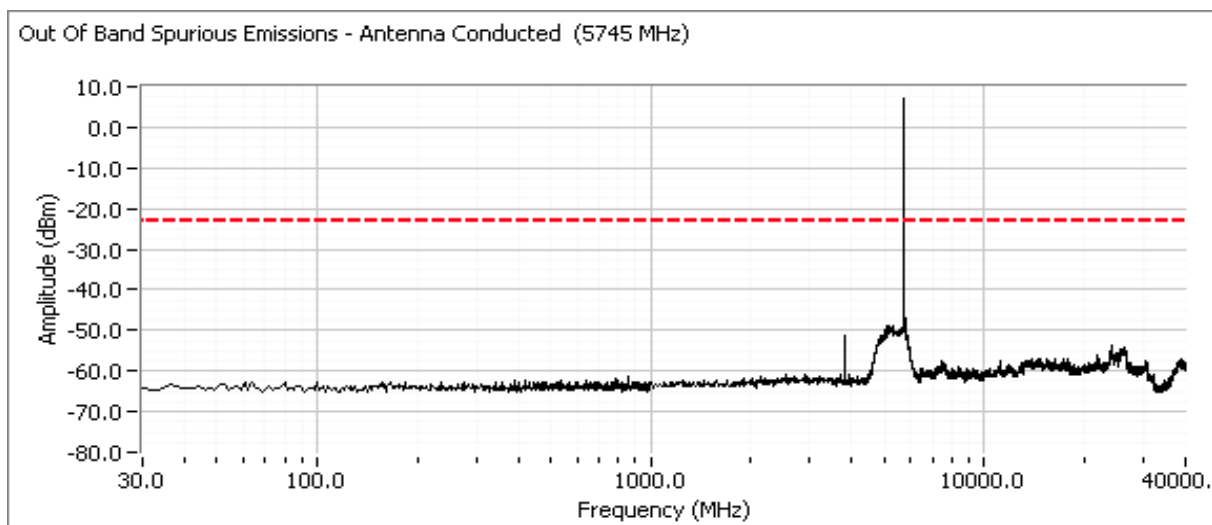
Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz)	
			6dB	99%
18.0	5745	100kHz	16.6	17.1
18.0	5785	100kHz	16.5	16.8
17.0	5805	100kHz	16.5	16.6

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

## Run #4: Out of Band Spurious Emissions

Frequency (MHz)	Limit	Result
5745	-30dBc	Pass
5785	-30dBc	Pass
5805	-30dBc	Pass

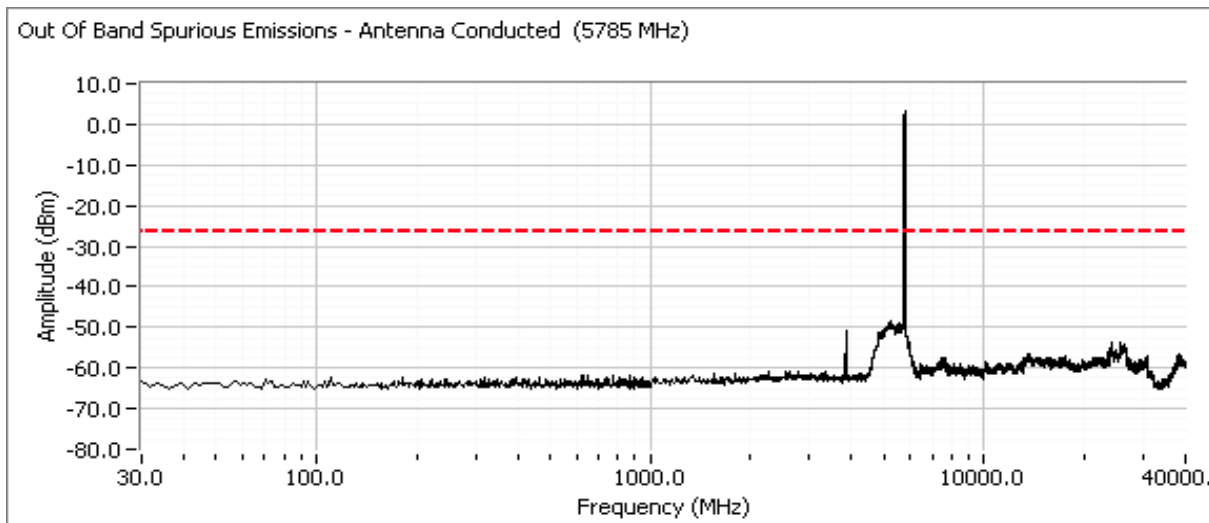
Plots for low channel, power setting(s) = 18.0dBm



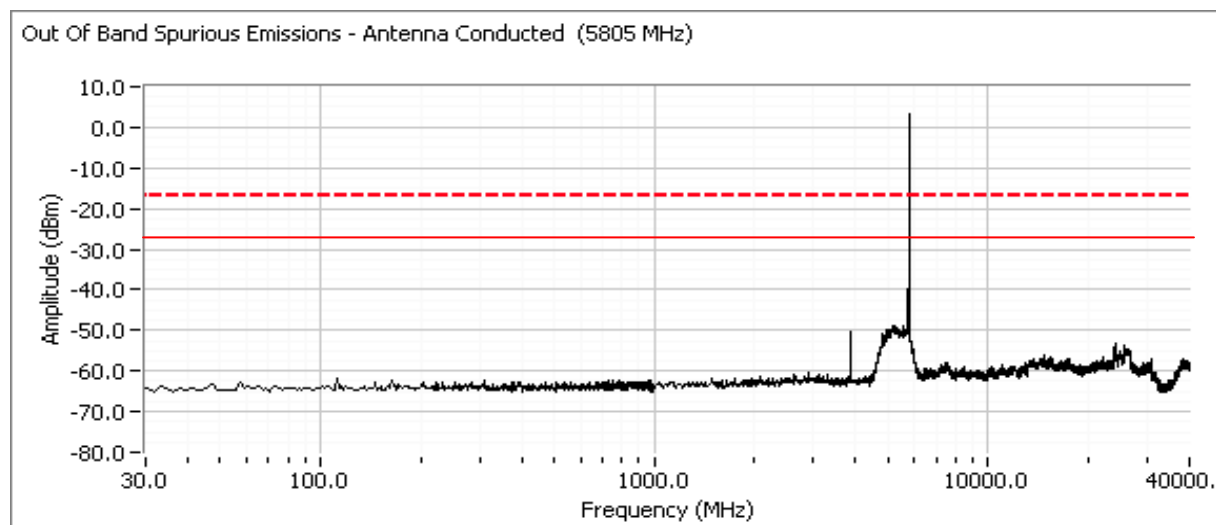


Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77317
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

Plots for center channel, power setting(s) = 18.0dBm

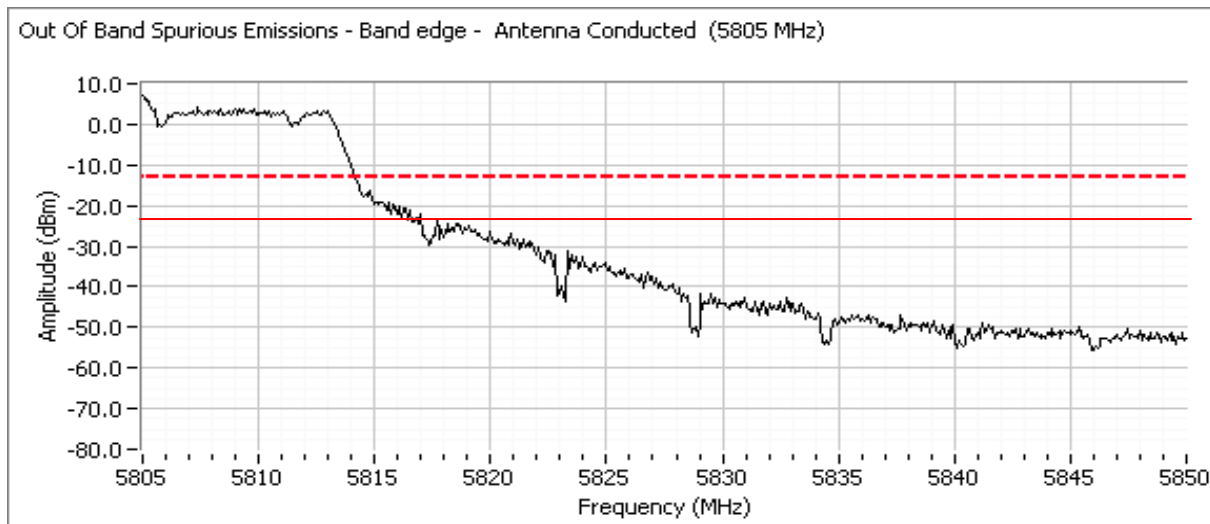


Plots for high channel, power setting(s) = 18.0dBm



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77317
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.247/RSS 210	Class:	N/A

Additional plot from 5810 - 5850 MHz showing compliance with -20dBc at the band edge.



**TEST REPORT**

***Covering the  
DYNAMIC FREQUENCY SELECTION (DFS)  
REQUIREMENTS  
OF***

***FCC Part 15 Subpart E (UNII)***

***Summit Data Communications Inc  
SDC-MSD30AG***

UPN: 6616A-SDCMSD30AG  
FCCID: TWG-SDCMSD30AG

COMPANY: Summit Data Communications Inc  
526 South Main Street Suite 805  
Akron, OH, 44311

TEST SITE: Elliott Laboratories  
684 W. Maude Ave  
Sunnyvale, CA 94085

REPORT DATE: April 12, 2010

FINAL TEST DATE: February 8-9, 2010

TEST ENGINEER: Mehran Birgani

AUTHORIZED SIGNATORY:

  
\_\_\_\_\_  
Mark Hill  
Staff Engineer



2016-01

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***REVISION HISTORY***

Rev #	Date	Comments	Modified By
-	April 12, 2010	First Release	-

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## **SCOPE**

The Federal Communications Commission and the European Telecommunications Standards Institute (ETSI) publish standards regarding ElectroMagnetic Compatibility and Radio spectrum Matters for radio-communications devices. Tests have been performed on the Summit Data Communications Inc. SDC-MSD30AG in accordance with these standards.

Test data has been taken pursuant to the relevant DFS requirements of the following standard(s):

- FCC Part 15 Subpart E Unlicensed National Information Infrastructure (U-NII) Devices

Tests were performed in accordance with these standards together with the current published versions of the basic standards referenced therein as outlined in Elliott Laboratories test procedures.

The test results recorded herein are based on a single type test of the Summit Data Communications Inc SDC-MSD30AG and therefore apply only to the tested sample. The sample was selected and prepared by Jerry Pohmurski of Summit Data Communications Inc.

## **OBJECTIVE**

The objective of the manufacturer is to comply with the standards identified in the previous section. In order to demonstrate compliance, the manufacturer or a contracted laboratory makes measurements and takes the necessary steps to ensure that the equipment complies with the appropriate technical standards. Compliance with some DFS features is covered through a manufacturer statement or through observation of the device.

## **STATEMENT OF COMPLIANCE**

The tested sample of Summit Data Communications Inc SDC-MSD30AG complied with the DFS requirements of:

FCC Part 15.407(h)(2)

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.

## **DEVIATIONS FROM THE STANDARD**

The following deviations were made from the test methods and requirements covered by the scope of this report:

As the typical host system for this product is unable to play the FCC movie file specified in FCC 06-96, an alternate method of exercising the EUT was used. This method was approved by the FCC, see Appendix F.

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

The Summit Data Communications Inc SDC-MSD30AG is an 802.11a/g wireless LAN radio module, which is designed to send and receive wireless data communication. Normally, the EUT would be installed in a mobile device during operation. The EUT was, therefore, placed in this position during emissions testing to simulate the end user environment. The electrical rating of the EUT is 3.3V.

The sample was received on February 8, 2010 and tested on February 8-9, 2010. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number
Summit Data Communications	SDC-MSD30AG	802.11 abg Compact Flash Adapter with Antenna Connectors	00000002C

The manufacturer declared values for the EUT operational characteristics that affect DFS are as follows:

**Operating Modes (5250 – 5350 MHz, 5470 – 5725 MHz)**

☒ Client Device (no In Service Monitoring, no Ad-Hoc mode)

**Antenna Gains / EIRP (5250 – 5350 MHz, 5470 – 5725 MHz)**

	5250 – 5350 MHz	5470 – 5725 MHz
Lowest Antenna Gain (dBi)	3.5	3.5
Highest Antenna Gain (dBi)	6.5	6.5
Output Power (dBm)	10.3	10.5

**Channel Protocol**

☒ IP Based

**ENCLOSURE**

The EUT does not have an enclosure as it is designed to be installed within the enclosure of a host computer or system. It measures approximately 4.3 cm wide by 5.5 cm deep by 0.5 cm high.

**MODIFICATIONS**

The EUT did not require modifications during testing in order to comply with the requirements of the standard(s) referenced in this test report.



**SUPPORT EQUIPMENT**

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

Manufacturer	Model	Description	Serial Number	FCC ID
<i>Cisco Systems</i>	<i>Air-AP 1252G-AK9</i>	<i>Access Point</i>	<i>FTX1209906U</i>	<i>AIR-RM1252G</i>
HP	iPAQ	PDA	2CK5510K22	X11-21264
Dell	Inspiron 8600	Laptop	-	DoC
Airlink	Airlink 101	Router	030008256167	RRK-AR430W

The italicized device was the master device.

**EUT INTERFACE PORTS**

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length (m)
None	-	-	-	-

**EUT OPERATION**

The EUT was operating with the following software. The software is secured by binary encryption to prevent the user from disabling the DFS function.

Client Device: 3.00.50

During the channel move tests the system was configured with a FTP file transfer of the FCC video file from the master device (sourced by the PC connected to the master device via an Ethernet interface) to the client device.

The transferred file was the "FCC" test file and the client device was using an FTP as a FCC approved alternate method, required by FCC Part 15 Subpart E.

**RADAR WAVEFORMS**

<b>Table 1 FCC Short Pulse Radar Test Waveforms</b>					
Radar Type	Pulse Width (μsec)	PRI (μsec)	Pulses / burst	Minimum Detection Percentage	Minimum Number of Trials
1	1	1428	18	60%	30
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120

<b>Table 2 FCC Long Pulse Radar Test Waveforms</b>							
Radar Type	Pulse Width (μsec)	Chirp Width (MHz)	PRI (μsec)	Pulses / burst	Number of Bursts	Minimum Detection Percentage	Minimum Number of Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

<b>Table 3 FCC Frequency Hopping Radar Test Waveforms</b>							
Radar Type	Pulse Width (μsec)	PRI (μsec)	Pulses / hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Detection Percentage	Minimum Number of Trials
6	1	333	9	0.333	300	70%	30

**TEST RESULTS****TEST RESULTS SUMMARY – FCC Part 15, CLIENT DEVICE**

<b>Table 4 FCC Part 15 Subpart E Client Device Test Result Summary</b>						
Description	Radar Type	Radar Frequency	Measured Value	Requirement	Test Data	Status
Channel closing transmission time	Type 1	5280MHz	1.5 ms	<60 ms	Appendix B	Complied
Channel move time	Type 1	5280MHz	1.7 s	<10 s	Appendix B	Complied
Non-occupancy period - associated	Type 1	5280MHz	> 30 minutes	> 30 minutes	Appendix B	Complied
Passive Scanning	N/A	N/A	Refer to manufacturer attestation			

Notes:

- 1) Tests were performed using the radiated test method.
- 2) Channel availability check, detection threshold and non-occupancy period are not applicable to client devices.

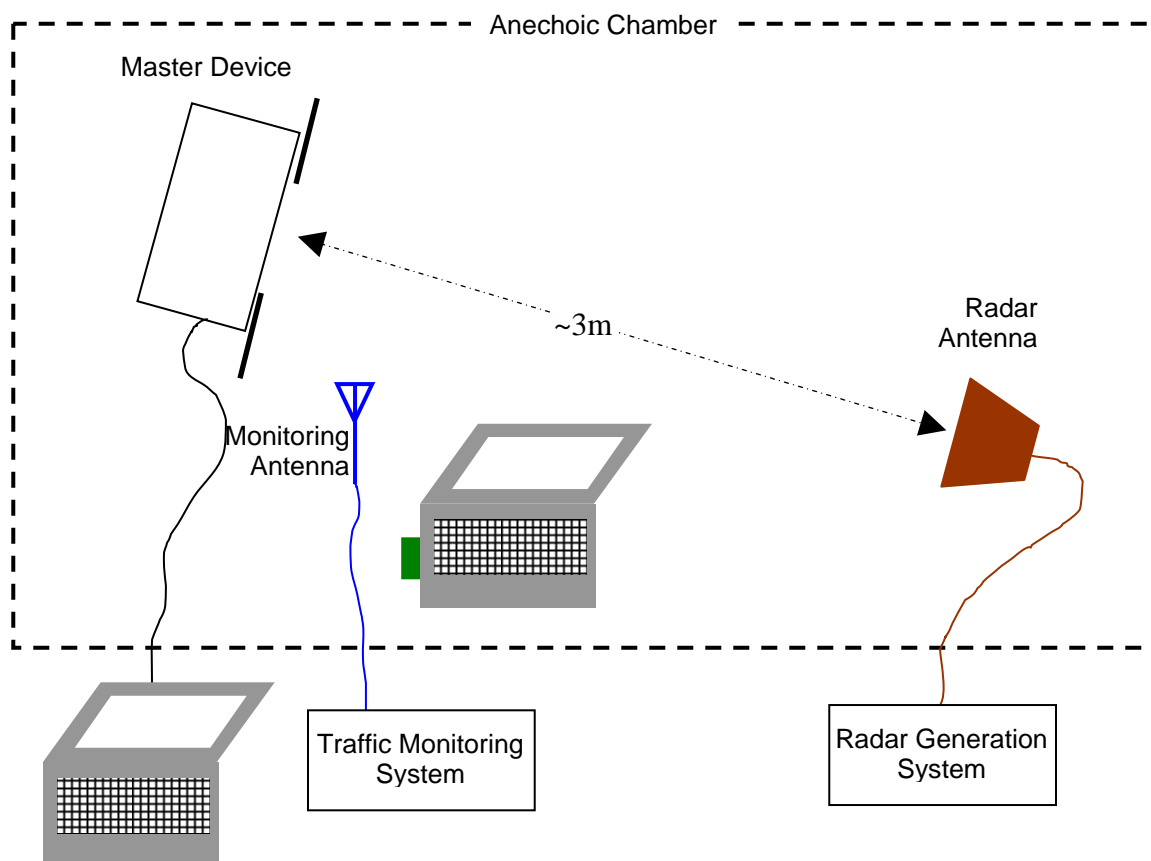
**MEASUREMENT UNCERTAINTIES**

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, with a coverage factor (k=2) and were calculated in accordance with UKAS document LAB 34.

Measurement	Measurement Unit	Expanded Uncertainty
Timing (Channel move time, aggregate transmission time)	ms	Timing resolution +/- 0.24%
Timing (non occupancy period)	seconds	5 seconds
DFS Threshold (radiated)	dBm	1.6
DFS Threshold (conducted)	dBm	1.2

**DFS TEST METHODS****RADIATED TEST METHOD**

The combination of master and slave devices is located in an anechoic chamber. The simulated radar waveform is transmitted from a directional horn antenna (typically an EMCO 3115) toward the unit performing the radar detection (radar detection device, RDD). Every effort is made to ensure that the main beam of the EUT's antenna is aligned with the radar-generating antenna.



**Figure 1 Test Configuration for radiated Measurement Method**

The signal level of the simulated waveform is set to a reference level equal to the threshold level (plus 1dB if testing against FCC requirements). Lower levels may also be applied on request of the manufacturer. The level reported is the level at the RDD antenna and so it is not corrected for the RDD's antenna gain. The RDD is configured with the lowest gain antenna assembly intended for use with the device.

The signal level is verified by measuring the CW signal level from the radar generation system using a reference antenna of gain  $G$  (dBi). The radar signal level is calculated from the measured level,  $R$  (dBm), and any cable loss,  $L$  (dB), between the reference antenna and the measuring instrument:

$$\text{Applied level (dBm)} = R - \text{GREF} + L$$

If both master and client devices have radar detection capability then the device not under test is positioned with absorbing material between its antenna and the radar generating antenna, and the radar level at the non RDD is verified to be at least 20dB below the threshold level to ensure that any responses are due to the RDD detecting radar.

The antenna connected to the channel monitoring subsystem is positioned to allow both master and client transmissions to be observed, with the level of the EUT's transmissions between 6 and 10dB higher than those from the other device.

The combination of master and slave devices is located in an anechoic chamber. The simulated radar waveform is coupled into the unit performing the radar detection (radar detection device, RDD) via couplers and attenuators.

The signal level of the simulated waveform is set to a reference level equal to the threshold level (plus 1dB if testing against FCC requirements). Lower levels may also be applied on request of the manufacturer.

The signal level is verified by measuring the CW signal level at the coupling point to the RDD antenna port. The radar signal level is calculated from the measured level,  $R$  (dBm) and the lowest gain antenna assembly intended for use with the RDD, GRDD (dBi):

$$\text{Applied level (dBm)} = R - \text{GRDD}$$

If both master and client devices have radar detection capability then the radar level at the non RDD is verified to be at least 20dB below the threshold level to ensure that any responses are due to the RDD detecting radar.

The antenna connected to the channel monitoring subsystem is positioned to allow both master and client transmissions to be observed, with the level of the EUT's transmissions between 6 and 10dB higher than those from the other device.

## **DFS MEASUREMENT INSTRUMENTATION**

### **RADAR GENERATION SYSTEM**

An Agilent PSG is used as the radar-generating source. The integral arbitrary waveform generators are programmed using Agilent's "Pulse Building" software and Elliott custom software to produce the required waveforms, with the capability to produce both unmodulated and modulated (FM Chirp) pulses. Where there are multiple values for a specific radar parameter then the software selects a value at random and, for FCC tests, the software verifies that the resulting waveform is truly unique.

With the exception of the hopping waveforms required by the FCC's rules (see below), the radar generator is set to a single frequency within the radar detection bandwidth of the EUT. The frequency is varied from trial to trial by stepping in 5MHz steps.

Frequency hopping radar waveforms are simulated using a time domain model. A randomly hopping sequence algorithm (which uses each channel in the hopping radar's range once in a hopping sequence) generates a hop sequence. A segment of the first 100 elements of the hop sequence are then examined to determine if it contains one or more frequencies within the radar detection bandwidth of the EUT. If it does not then the first element of the segment is discarded and the next frequency in the sequence is added. The process repeats until a valid segment is produced. The radar system is then programmed to produce bursts at time slots coincident with the frequencies within the segment that fall in the detection bandwidth. The frequency of the generator is stepped in 1 MHz increments across the EUT's detection range.

The radar signal level is verified during testing using a CW signal with the AGC function switched on. Correction factors to account for the fact that pulses are generated with the AGC functions switched off are measured annually and an offset is used to account for this in the software.

The generator output is connected to the coupling port of the conducted set-up or to the radar-generating antenna.

**CHANNEL MONITORING SYSTEM**

Channel monitoring is achieved using a spectrum analyzer and digital storage oscilloscope. The analyzer is configured in a zero-span mode, center frequency set to the radar waveform's frequency or the center frequency of the EUT's operating channel. The IF output of the analyzer is connected to one input of the oscilloscope.

A signal generator output is set to send either the modulating signal directly or a pulse gate with an output pulse co-incident with each radar pulse. This output is connected to a second input on the oscilloscope and the oscilloscope displays both the channel traffic (via the if input) and the radar pulses on its display.

For in service monitoring tests the analyzer sweep time is set to  $> 20$  seconds and the oscilloscope is configured with a data record length of 10 seconds for the short duration and frequency hopping waveforms, 20 seconds for the long duration waveforms. Both instruments are set for a single acquisition sequence. The analyzer is triggered 500ms before the start of the waveform and the oscilloscope is triggered directly by the modulating pulse train. Timing measurements for aggregate channel transmission time and channel move time are made from the oscilloscope data, with the end of the waveform clearly identified by the pulse train on one trace. The analyzer trace data is used to confirm that the last transmission occurred within the 10-second record of the oscilloscope. If necessary the record length of the oscilloscope is expanded to capture the last transmission on the channel prior to the channel move.

Channel availability check time timing plots are made using the analyzer. The analyzer is triggered at start of the EUT's channel availability check and used to verify that the EUT does not transmit when radar is applied during the check time.

The analyzer detector and oscilloscope sampling mode is set to peak detect for all plots.

## **DFS MEASUREMENT METHODS**

### **DFS – CHANNEL CLOSING TRANSMISSION TIME AND CHANNEL MOVE TIME**

Channel clearing and closing times are measured by applying a burst of radar with the device configured to change channel and by observing the channel for transmissions. The time between the end of the applied radar waveform and the final transmission on the channel is the channel move time.

The aggregate transmission closing time is measured in one of two ways:

FCC – the total time of all individual transmissions from the EUT that are observed starting 200ms at the end of the last radar pulse in the waveform. This value is required to be less than 60ms.

### **DFS – CHANNEL NON-OCCUPANCY AND VERIFICATION OF PASSIVE SCANNING**

The channel that was in use prior to radar detection by the master is additionally monitored for 30 minutes to ensure no transmissions on the vacated channel over the required non-occupancy period. This is achieved by tuning the spectrum analyzer to the vacated channel in zero-span mode and connecting the IF output to an oscilloscope. The oscilloscope is triggered by the radar pulse and set to provide a single sweep (in peak detect mode) that lasts for at least 30 minutes after the end of the channel move time.

For devices with a client-mode that are being evaluated against FCC rules the manufacturer must supply an attestation letter stating that the client device does not employ any active scanning techniques (i.e. does not transmit in the DFS bands without authorization from a Master device).

### **DFS CHANNEL AVAILABILITY CHECK TIME**

It is preferred that the EUT report when it starts the radar channel availability check. If the EUT does not report the start of the check time, then the time to start transmitting on a channel after switching the device on is measured to approximate the time from power-on to the end of the channel availability check. The start of the channel availability check is assumed to be 60 seconds prior to the first transmission on the channel.

To evaluate the channel availability check, a single burst of one radar type is applied within the first 2 seconds of the start of the channel availability check and it is verified that the device does not use the channel by continuing to monitor the channel for a period of at least 60 seconds. The test is repeated by applying a burst of radar in the last 2 seconds (i.e. between 58 and 60 seconds after the start of CAC) of the channel availability check.

### **TRANSMIT POWER CONTROL (TPC)**

Compliance with the transmit power control requirements for devices is demonstrated through measurements showing multiple power levels and manufacturer statements explaining how the power control is implemented.



## ***SAMPLE CALCULATIONS***

### ***DETECTION PROBABILITY / SUCCESS RATE***

The detection probability, or success rate, for any one radar waveform equals the number of successful trials divided by the total number of trials for that waveform.

### ***THRESHOLD LEVEL***

The threshold level is the level of the simulated radar waveform at the EUT's antenna. If the test is performed in a conducted fashion then the level at the rf input equals the level at the antenna plus the gain of the antenna assembly, in dBi. The gain of the antenna assembly equals the gain of the antenna minus the loss of the cabling between the rf input and the antenna. The lowest gain value for all antenna assemblies intended for use with the device is used when making this calculation.

If the test is performed using the radiated method then the threshold level is the level at the antenna.

**Appendix A Test Equipment Calibration Data**

<b><u>Manufacturer</u></b>	<b><u>Description</u></b>	<b><u>Model #</u></b>	<b><u>Asset #</u></b>	<b><u>Cal Due</u></b>
Hewlett Packard	Spectrum Analyzer	8595EM	780	5-Jan-11
Tektronix	Digital Oscilloscope	TDS 5052B	2118	28-Sep-10
Agilent Technologies	PSG Vector Signal Generator	E8267C	1877	15-Mar-10
EMCO	1-18GHz Horn Antenna	3115	487	15-Jul-10
ETS Lindgren	1-18GHz Horn Antenna	3117	1662	11-Apr-10

**Appendix B Test Data Tables and Plots for Channel Closing****FCC PART 15 SUBPART E Channel Closing Measurements**

<b>Table 5 FCC Part 15 Subpart E Channel Closing Test Results</b>					
Waveform Type	Channel Closing Transmission Time <sup>1</sup>		Channel Move Time		Result
	Measured	Limit	Measured	Limit	
Radar Type 1	1.5 ms	60 ms	1.7 s	10 s	Complied

After the final channel closing test the channel was monitored for a further 30 minutes. No transmissions occurred on the channel.

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<sup>1</sup> Channel closing time for FCC measurements is the aggregate transmission time starting from 200ms after the end of the radar signal to the completion of the channel move.

## Elliott Timing Plots - Channel Closing

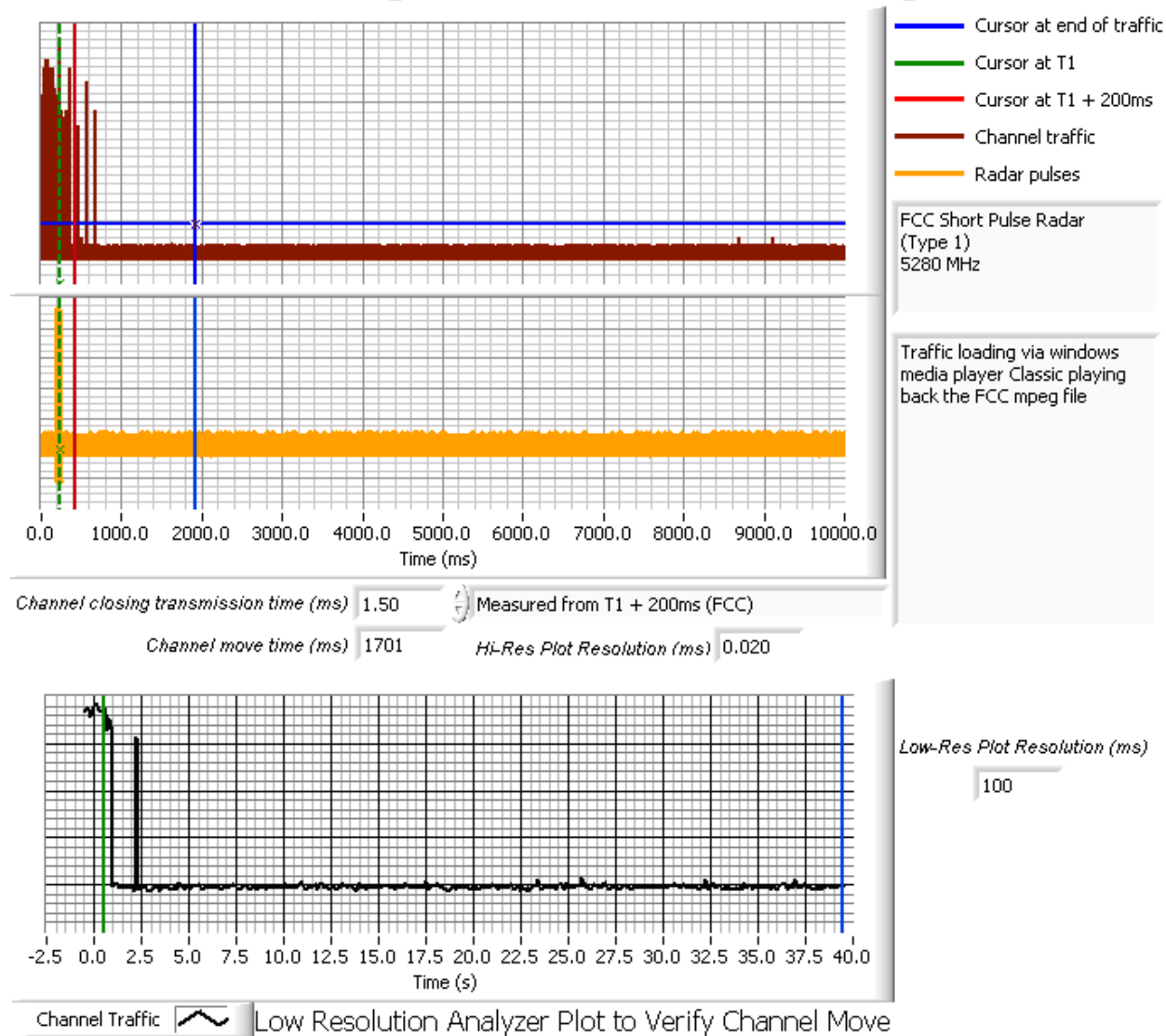


Figure 2 Channel Closing Time and Channel Move Time – 40 second plot

## Elliott Timing Plots - Channel Closing

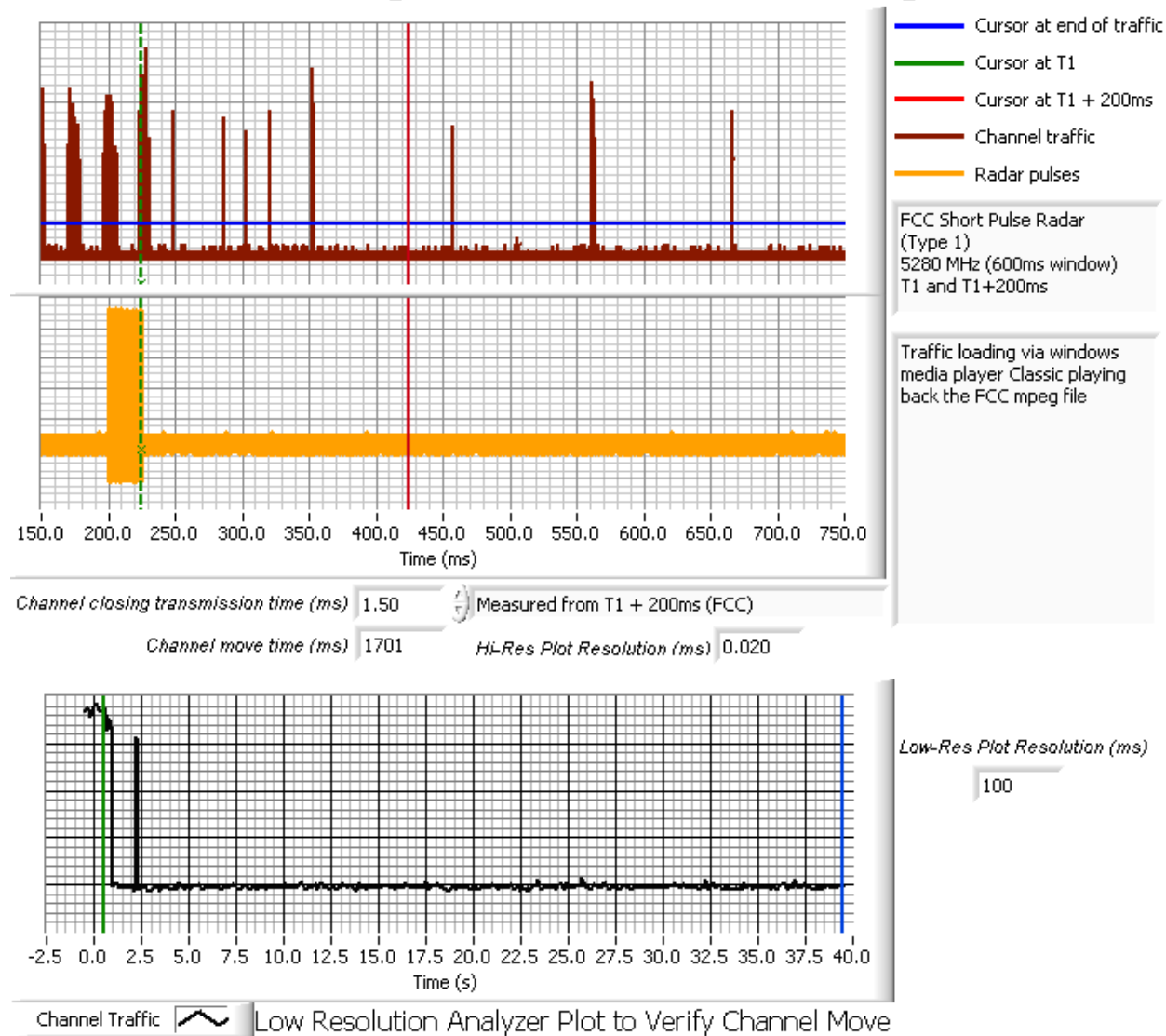
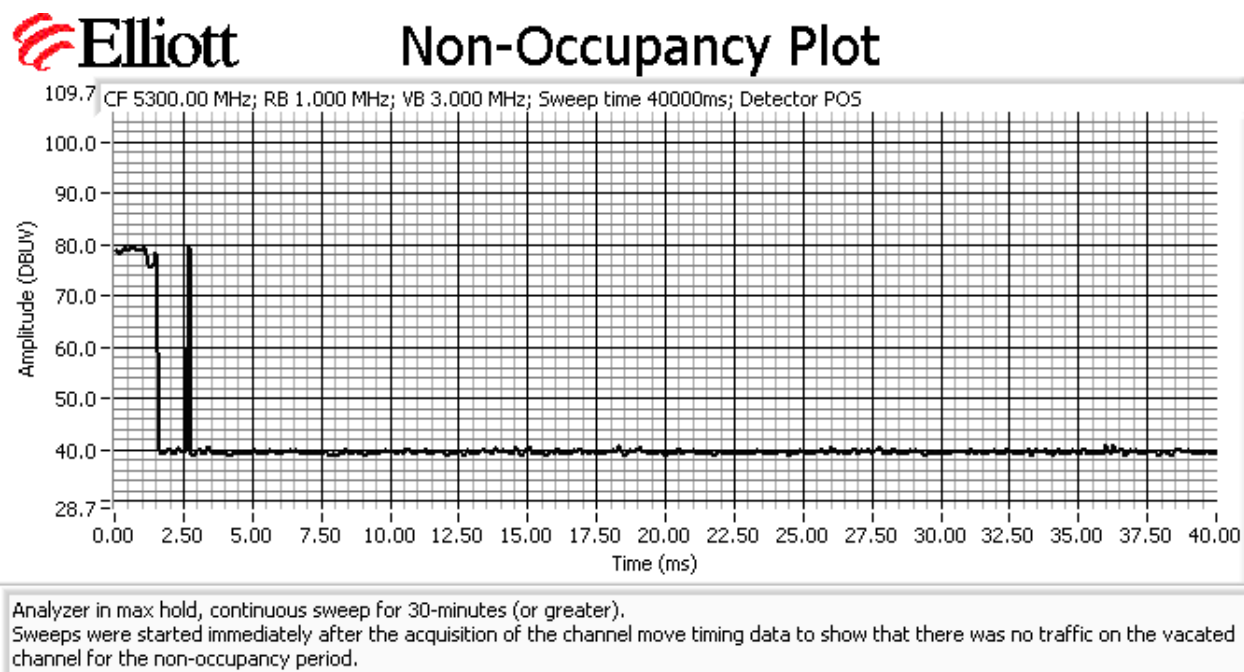
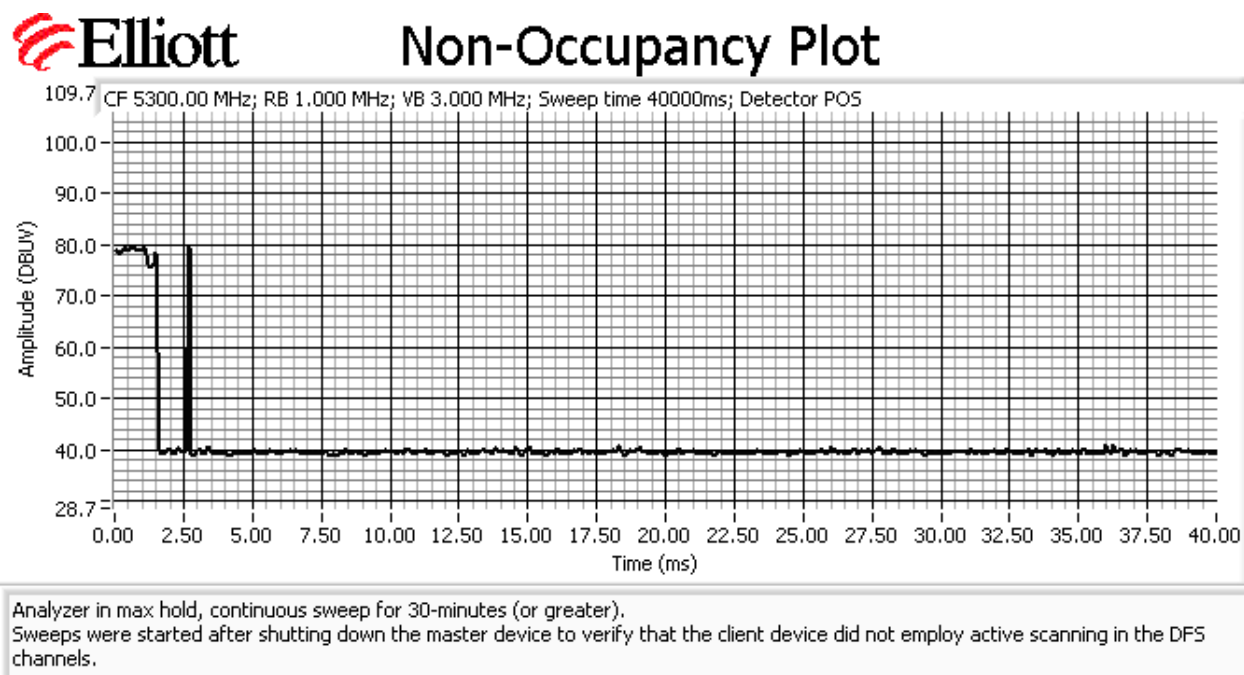


Figure 3 Close-Up of Transmissions Occurring More Than 200ms After The End of Radar



**Figure 4 Radar Channel Non-Occupancy Plot**

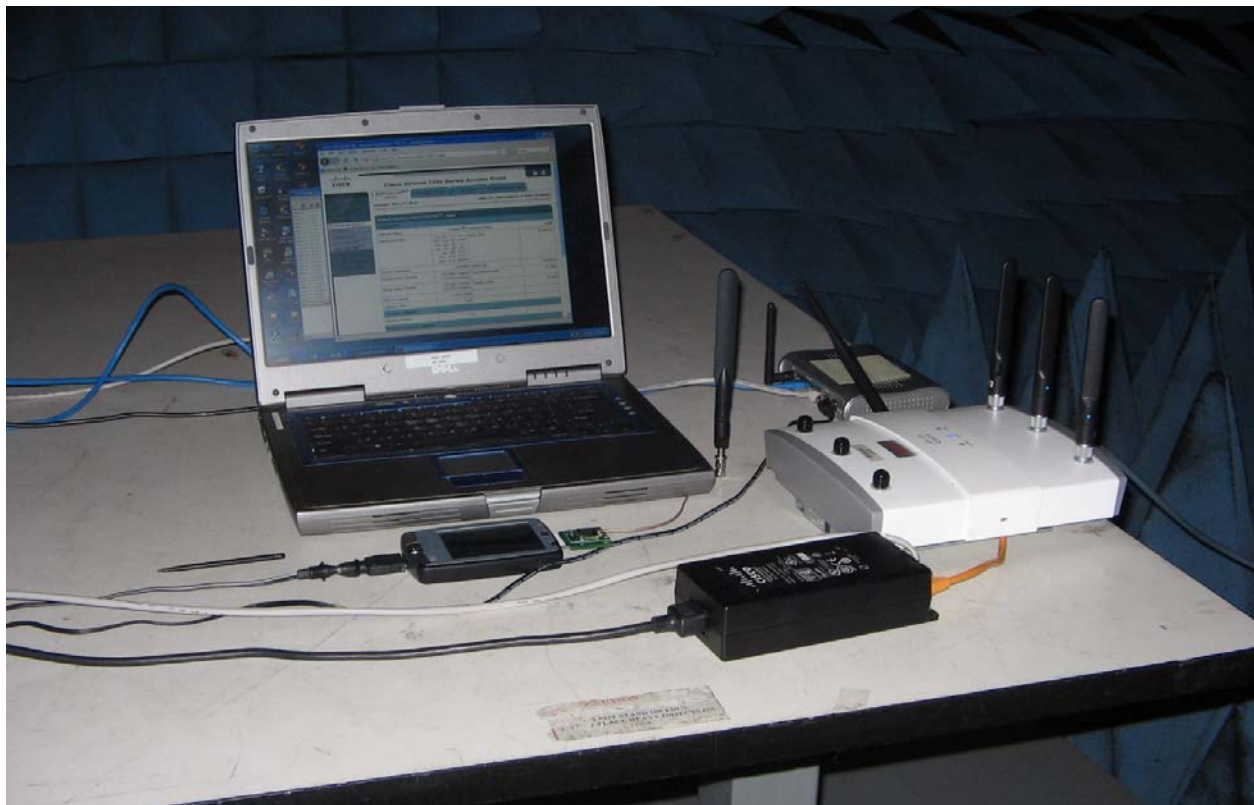
The non-occupancy plot was made over a 30-minute time period following the channel move time with the analyzer IF output connected to the scope and tuned to the vacated channel. No transmissions were observed after the channel move had been completed. After the channel move the client re-associated with the master device on the new channel.



**Figure 5 Radar Channel Non-Occupancy Plot (Passive Scan)**

The non-occupancy plot was made over a 30-minute time period following the powering down of the host access point with the analyzer IF output connected to the scope and tuned to the vacated channel. No transmissions were observed after the channel move had been completed. After the power to the AP host was removed the client device stopped transmitting.

### Appendix C Test Configuration Photographs







*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 E*

***Model: SDC-MSD30AG***

IC CERTIFICATION #: 6616A-SDCMSD30AG  
FCC ID: TWG-SDCMSD30AG

APPLICANT: Summit Data Communications Inc.  
526 South Main St. Suite 805  
Akron, OH 44311

TEST SITE(S): Elliott Laboratories  
41039 Boyce Road.  
Fremont, CA. 94538-2435

IC SITE REGISTRATION #: 2845B-3; 2845B-5

REPORT DATE: April 12, 2010

FINAL TEST DATES: January 11, 12, 13 and 14, 2010

AUTHORIZED SIGNATORY:

---

Mark E. Hill  
Staff Engineer  
Elliott Laboratories



Testing Cert #2016-01

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

***REVISION HISTORY***

Rev#	Date	Comments	Modified By
-	April 12, 2010	First release	

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## SCOPE

An electromagnetic emissions test has been performed on the Summit Data Communications Inc. model SDC-MSD30AG, 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 E requirements for UNII Devices (using FCC DA 02-2138, August 30, 2002)

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 UNII test procedure 2002-08 DA-02-2138, August 2002

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 Summit Data Communications Inc. model SDC-MSD30AG complied with the requirements of the following regulations:

RSS 210 Issue 7 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"  
FCC Part 15, Subpart E requirements for UNII Devices

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 Summit Data Communications Inc. model SDC-MSD30AG and therefore apply only to the tested sample. The sample was selected and prepared by Jerry Pohmurski of Summit Data Communications Inc..

**DEVIATIONS FROM THE STANDARDS**

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

**TEST RESULTS SUMMARY****UNII / LELAN DEVICES****Operation in the 5.15 – 5.25 GHz Band**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.407(e)		Indoor operation only	Refer to user's manual	N/A	Complies
15.407(a)(1)		26dB Bandwidth	26.0 MHz	Limits output power if < 20MHz	N/A
15.407 (a)(1)	A9.2(1)	Output Power	802.11a: 10.8 dBm (0.012W)	17dBm	Complies
15.407 (a)(1)	-	Power Spectral Density	802.11a: -0.8 dBm/MHz	4 dBm/MHz	Complies
-	A9.5 (2)			5 dBm/MHz	Complies
15.407(b)(5) / 15.209	A9.3	Spurious Emissions below 1GHz	No emissions found	Refer to Standard	Complies
15.407(b)(2)	A9.3	Spurious Emissions above 1GHz	51.1dBμV/m @ 5147.7MHz (-2.9dB)	Refer to Standard	Complies
15.407(a)(6)	-	Peak Excursion Ratio	12.8 dB	< 13dB	Complies

**Operation in the 5.25 – 5.35 GHz Band**

Note: The device is restricted to indoor use only, therefore the spectral density of spurious emissions in the 5.15 – 5.25 GHz band were limited to the power spectral limits for intentional signals detailed in FCC 15.407(a)(1) and RSS 210 6.2.2 q1 (i)

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(a)(2)		26dB Bandwidth	26.2 MHz	N/A – limits output power if < 20MHz	N/A
15.407(a)(2)	A9.2(2)	Output Power	802.11a: 10.3 dBm (0.011 W)	24dBm (250mW)	Complies
15.407(a)(2))	-	Power Spectral Density	802.11a: 3.4 dBm/MHz	11 dBm/MHz	Complies
-	A9.5 (2)	Peak Spectral Density	3.4 dBm/MHz	Shall not exceed the average value by more than 3dB	Complies
15.407(b)(5) / 15.209	A9.3	Spurious Emissions below 1GHz	No emissions found	Refer to Standard	Complies
15.407(b)(2)	A9.3	Spurious Emissions above 1GHz	50.6dBμV/m @ 5350.1MHz (-3.4dB)	Refer to Standard	Complies
15.407(a)(6)	-	Peak Excursion Ratio	12.1 dB	< 13dB	Complies

**Operation in the 5.47 – 5.725 GHz Band**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(a)(2)		26dB Bandwidth	26.3 MHz	Limits output power if < 20MHz	N/A
15.407(a)(2)	A9.2(2)	Output Power	802.11a: 10.5 dBm (0.011 W)	24 dBm / 250mW (eirp < 30dBm)	Complies
15.407(a)(2))		Power Spectral Density	802.11a: 1.5 dBm/MHz	11 dBm/MHz	Complies
	A9.2(2) / A9.5 (2)	Power Spectral Density		11 dBm / MHz	Complies
N/A	A9	Non-operation in 5600 – 5650 MHz sub band	Device cannot operate in the 5600 – 5650 MHz band –refer to Operational Description		Complies
15.407(b)(5) / 15.209	A9.3	Spurious Emissions below 1GHz	No emissions found	Refer to Standard	Complies
15.407(b)(2)	A9.3	Spurious Emissions above 1GHz	50.7dBμV/m @ 5458.7MHz (-3.3dB)	Refer to Standard	Complies
15.407(a)(6)	-	Peak Excursion Ratio	12.9 dB	< 13dB	Complies

**Requirements for all U-NII/LELAN bands**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.407	A9.5a	Modulation	Digital Modulation is used	Digital modulation is required	Complies
15.407(b)(5) / 15.209	A9.3	Spurious Emissions below 1GHz	No emissions found	Refer to Standard	Complies
15.407(b)(2)	A9.3	Spurious Emissions above 1GHz	51.1dBμV/m @ 5147.7MHz (-2.9dB)	Refer to Standard	Complies
15.407(a)(6)	-	Peak Excursion Ratio	12.9 dB	< 13dB	Complies
	A9.5 (3)	Channel Selection	Spurious emissions tested at outermost channels in each band	Device was tested on the top, bottom and center channels in each band	N/A
15			Measurements on three channels in each band		Complies
15.407 (c)	A9.5(4)	Operation in the absence of information to transmit	Operation is discontinued in the absence of information	Device shall automatically discontinue operation in the absence of information to transmit	Complies
15.407 (g)	A9.5 (5)	Frequency Stability	Frequency stability is better than 10ppm		Complies
15.407 (h1)	A9.4	Transmit Power Control	TPC is not required as the device operates at below 500mW eirp	The U-NII device shall have the capability to operate with a mean EIRP value lower than 24dBm (250mW)	Complies
15.407 (h2)	A9.4	Dynamic frequency Selection (device without radar detection)	Refer to separate test report, reference R78278	Channel move time < 10s Channel closing transmission time < 260ms	Complies

**GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS**

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	The EUT uses u.FL connectors	Refer to standard	Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	44.3dB $\mu$ V/m (164.1 $\mu$ V/m) @ 3720.0MHz (-9.7dB)	Refer to standard	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	45.1dB $\mu$ V @ 0.176MHz (-19.6dB)	Refer to standard	Complies
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11, RSS 102 declaration and User Manual statements.	Refer to OET 65, FCC Part 1 and RSS 102	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual		Statement required regarding non-interference	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual		Statement for products with detachable antenna	Complies
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	5.1GHz: 16.9 MHz 5.25GHz: 17.1 MHz 5.47GHz: 17.1 MHz	Information only	N/A

**MEASUREMENT UNCERTAINTIES**

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

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	$\pm 2.4$
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 Summit Data Communications Inc. model SDC-MSD30AG is a 802.11ag compliant wireless LAN radio Module which is designed to provide wireless local area networking connectivity. Normally, the EUT would be embedded in various types of mobile and stationary computing devices such as handheld and vehicle mounted data terminals during operation. The EUT was, therefore, placed in this position during emissions testing to simulate the end user environment. The electrical rating of the EUT is 3.3 VDC  $\pm$ 5%. It's typical power consumption is 400mA (1320mW) while in transmit mode, 180mA (594mW) while in receive mode and 10mA (33mW) while in standby mode.

The sample was received on November 8, 2009 and tested on January 11, 12, 13 and 14, 2010. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Summit Data Communications Inc.	SDC-MSD30AG	802.11AG Mini Compact Flash Module with antenna connectors	-	TWG-SDCMSD30AG

**ANTENNA SYSTEM**

The SDC-MSD30AG will be marketed with the following antenna options:

Monopole Antenna - 2.4 and 5GHz bands, Huber+Suhner, SOA 2459/360/5/0/V\_C, 3dBi (2.4GHz), 6.5dBi (5GHz)

Dipole Antenna #1 - 2.4 and 5GHz bands - Larsen, R380.500.314, 1.6dBi (2.4GHz), 5dBi (5GHz)

Dipole Antenna #2 - 2.4 GHz only - Cisco Air-Ant 4941 2dBi(2.4GHz)

Dipole Antenna #3 - 5GHz only - Cisco Air-Ant 5135 3.5dBi(5GHz)

Dipole Antenna #4 - 2.4GHz only - Summit SDC-CF22G - 0dBi

**ENCLOSURE**

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

**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
Hewlett Packard	iPAQ	Handheld Computer	-	-

No remote support equipment was used during testing.

**EUT INTERFACE PORTS**

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
iPAQ Power	AC Mains	2wire	Unshielded	1.5
Flash Module	iPAQ Module Port	-	-	-

**EUT OPERATION**

During emissions testing the EUT was configured to transmit at the Low, Middle, and High Channel. Testing performed at 6Mbps for 802.11a mode.

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

Final test measurements were taken on January 11, 12, 13 and 14, 2010 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	
Chamber 3	769238	2845B-3	41039 Boyce Road Fremont, CA 94538-2435
Chamber 5	211948	2845B-5	

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. 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.

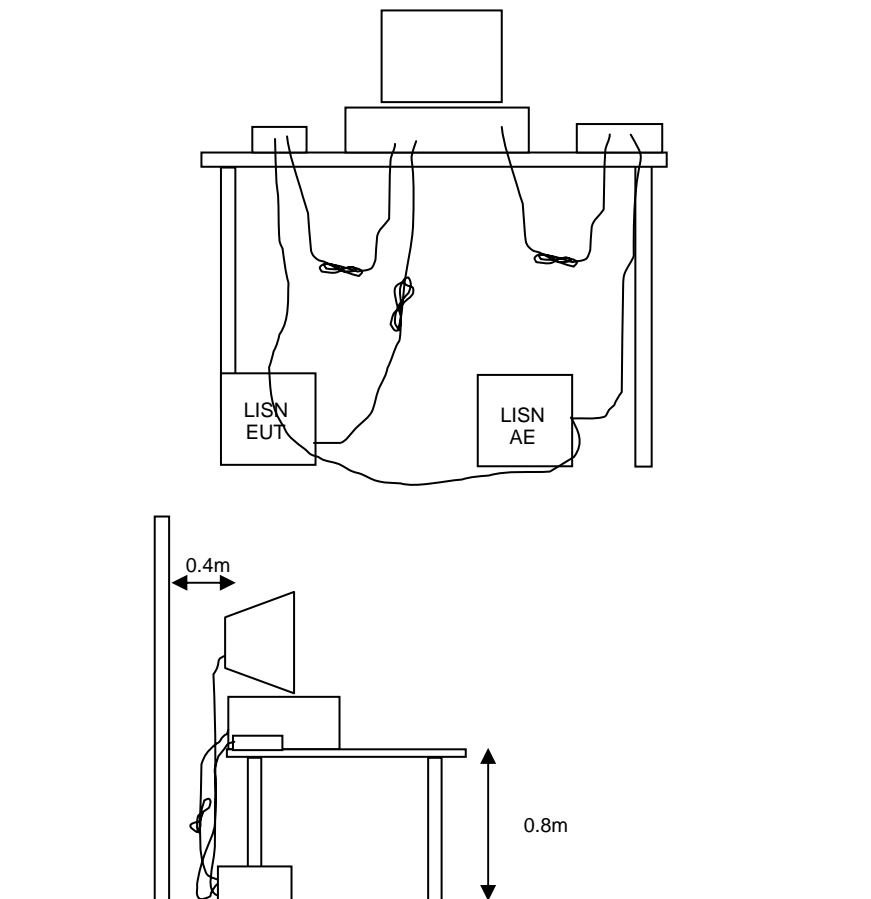
## TEST PROCEDURES

### 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.



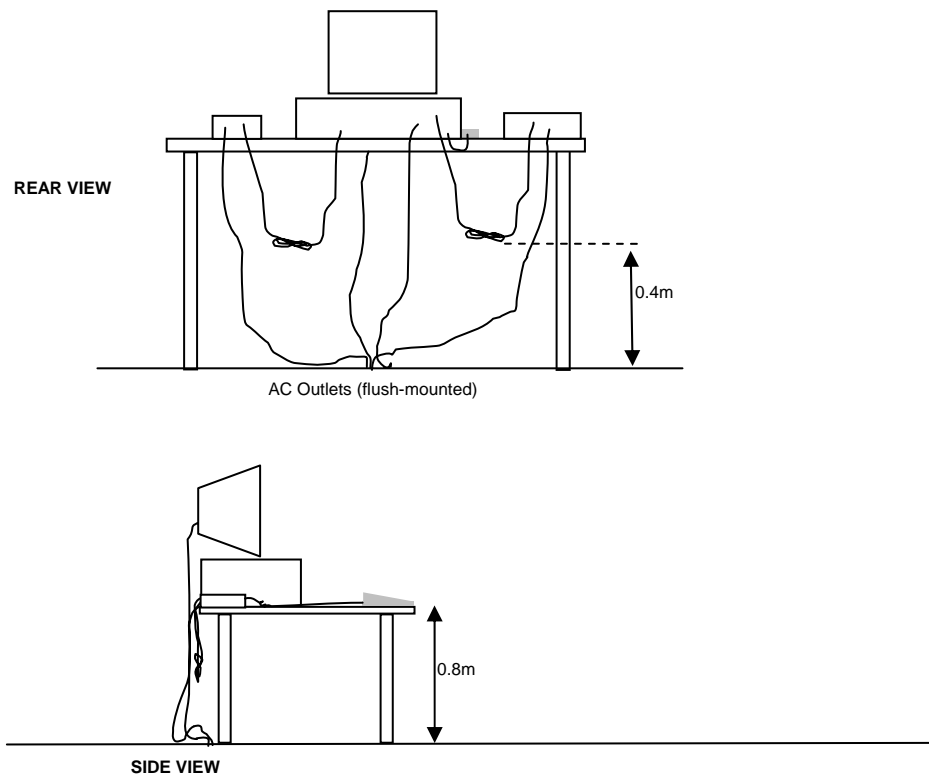
**RADIATED EMISSIONS**

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.

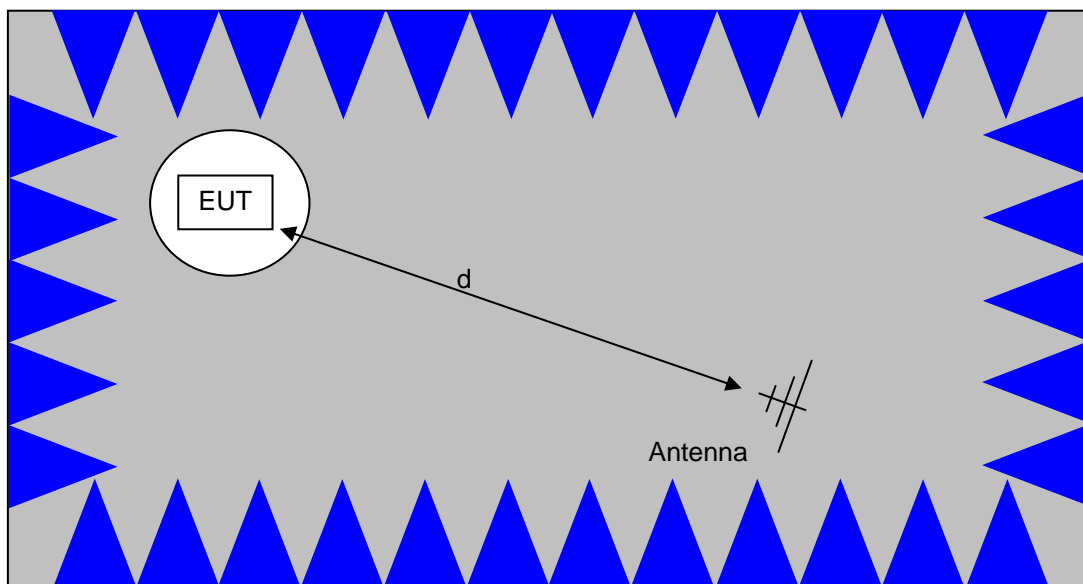
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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.

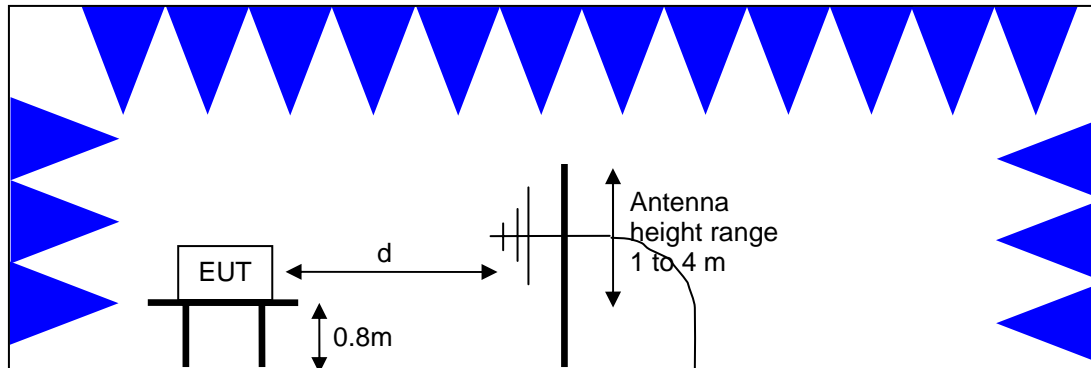


Typical Test Configuration for Radiated Field Strength Measurements



The 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.

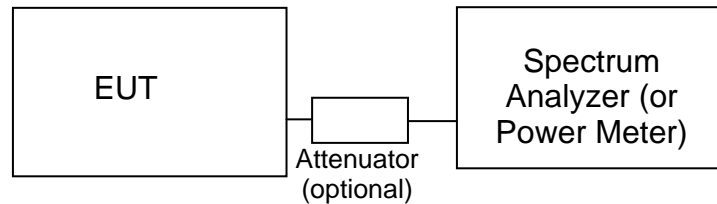


Test Configuration for Radiated Field Strength Measurements  
Semi-Anechoic Chamber, Plan and Side Views



**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

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

*FCC 15.407 (a) OUTPUT POWER LIMITS*

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
5150 - 5250	50mW (17 dBm)	4 dBm/MHz
5250 - 5350	250 mW (24 dBm)	11 dBm/MHz
5725 – 5825	1 Watts (30 dBm)	17 dBm/MHz

For system using antennas with gains exceeding 6dBi, the output power and power spectral density limits are reduced by 1dB for every dB the antenna gain exceeds 6dBi. Fixed point-to-point applications using the 5725 – 5825 MHz band may use antennas with gains of up to 23dBi without this limitation. If the gain exceeds 23dBi then the output power limit of 1 Watt is reduced by 1dB for every dB the gain exceeds 23dBi.

The peak excursion envelope is limited to 13dB.

*OUTPUT POWER LIMITS –LELAN DEVICES*

The table below shows the limits for output power and output power density defined by RSS 210. 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
5150 - 5250	200mW (23 dBm) eirp	10 dBm/MHz eirp
5250 - 5350	250 mW (24 dBm) <sup>2</sup> 1W (30dBm) eirp	11 dBm/MHz
5470 - 5725	250 mW (24 dBm) <sup>3</sup> 1W (30dBm) eirp	11 dBm/MHz
5725 – 5825	1 Watts (30 dBm) 4W eirp	17 dBm/MHz

In addition, the power spectral density limit shall be reduced by 1dB for every dB the highest power spectral density exceeds the “average” power spectral density ) by more than 3dB. The “average” power spectral density is determined by dividing the output power by  $10\log(\text{EBW})$  where EBW is the 99% power bandwidth.

Fixed point-to-point applications using the 5725 – 5825 MHz band may use antennas with gains of up to 23dBi without this limitation. If the gain exceeds 23dBi then the output power limit of 1 Watt is reduced by 1dB for every dB the gain exceeds 23dBi.

<sup>2</sup> If EIRP exceeds 500mW the device must employ TPC

<sup>3</sup> If EIRP exceeds 500mW the device must employ TPC

**OUTPUT POWER AND SPURIOUS LIMITS –UNII and LELAN DEVICES**

The spurious emissions limits for signals below 1GHz are the FCC/RSS-GEN general limits. For emissions above 1GHz, signals in restricted bands are subject to the FCC/RSS GEN general limits. All other signals have a limit of –27dBm/MHz, which is a field strength of 68.3dBuV/m/MHz at a distance of 3m. This is an average limit so the peak value of the emission may not exceed –7dBm/MHz (68.3dBuV/m/MHz at a distance of 3m). For devices operating in the 5725-5850Mhz bands under the LELAN/UNII rules, the limit within 10Mhz of the allocated band is increased to –17dBm/MHz.

**SAMPLE CALCULATIONS - CONDUCTED EMISSIONS**

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

$$R_r - S = M$$

where:

$R_r$  = Receiver Reading in dBuV

$S$  = Specification Limit in dBuV

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

**SAMPLE CALCULATIONS - RADIATED EMISSIONS**

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

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

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

where:

$F_d$  = Distance Factor in dB

$D_m$  = Measurement Distance in meters

$D_s$  = Specification Distance in meters

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

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

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

$R_r$  = Receiver Reading in dBuV/m

$F_d$  = Distance Factor in dB

$R_c$  = Corrected Reading in dBuV/m

$L_s$  = Specification Limit in dBuV/m

$M$  = Margin in dB Relative to Spec

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

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

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

where P is the eirp (Watts)

**Appendix A Test Equipment Calibration Data****Radiated Emissions, 30 - 6,500 MHz, 11-Nov-09**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz	3115	786	12/6/2009
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/10/2010

**Radiated Emissions, 1000 - 40,000 MHz, 11-Dec-09**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/10/2010
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/10/2010
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	1729	9/25/2010
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	9/17/2010

**Radiated Emissions, 30 - 40,000 MHz, 12-Jan-10**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	6/3/2010
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/10/2010
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	1729	9/25/2010
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1730	9/25/2010
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	9/30/2010

**, 10-Mar-09**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	Test Sys (SA40, 30Hz - 40GHz),	85620A	Rental	4/20/2009

**, 12-Mar-09**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	Test Sys (SA40, 30Hz - 40GHz),	85620A	Rental	4/20/2009

**Radio Antenna Port (Power and Spurious Emissions), 14-Jan-10**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/10/2010

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

T77318 34 Pages

T77319 12 Pages



## EMC Test Data

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Emissions Standard(s):	FCC 15.E/RSS 210	Class:	-
Immunity Standard(s):	-	Environment:	-

## EMC Test Data

For The

## Summit Data Communications

Model

SDC-MSD30AG

Date of Last Test: 1/14/2010



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## RSS 210 and FCC 15.407 (UNII) Radiated Spurious Emissions (H&S Antenna)

### 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: 10-15 °C  
Rel. Humidity: 30-50 %

Date of Test: Refer to each run  
Test Engineer: Refer to each run  
Test Location: Refer to each run

Config. Used: 1  
Config Change: None  
Host Unit Voltage 120V/ 60Hz

### 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:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## Summary of Results

NOTE: A preliminary check of output power was performed. The port with the highest power was used for the final testing. Preliminary tests showed no radio related emissions below 1 GHz.

Run #	Mode	Channel	Power Setting	Port	Test Performed	Limit	Result / Margin
1	802.11a Chain A	5150-5250 Low	18	Main	Restricted Band Edge at 5150 MHz	15.209	49.6dBμV/m @ 5135.3MHz (-4.4dB)
	802.11a Chain A	5150-5250 Low	18	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	40.3dBμV/m @ 5433.4MHz (-13.7dB)
	802.11a Chain A	5150-5250 Center	18	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	39.7dBμV/m @ 5428.1MHz (-14.3dB)
	802.11a Chain A	5150-5250 High	18	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	39.9dBμV/m @ 5438.9MHz (-14.1dB)
2	802.11a Chain A	5250-5350 Low	18	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	41.0dBμV/m @ 15835.7MHz (-13.0dB)
	802.11a Chain A	5250-5350 Center	18	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	41.7dBμV/m @ 15902.8MHz (-12.3dB)
	802.11a Chain A	5250-5350 High	18	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	43.5dBμV/m @ 1345.4MHz (-10.5dB)
	802.11a Chain A	5250-5350 High	18	Main	Restricted Band Edge at 5350 MHz	15.209	49.2dBμV/m @ 5350.2MHz (-4.8dB)
3	802.11a Chain A	5470-5725 Low	18	Main	Restricted Band Edge at 5460 MHz	15.209	43.4dBμV/m @ 5350.4MHz (-10.6dB)
	802.11a Chain A	5470-5725 Low	18	Main	Restricted Band Edge at 5470 MHz	15.209	44.5dBμV/m @ 5469.8MHz (-23.8dB)
	802.11a Chain A	5470-5725 Low	18	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	46.9dBμV/m @ 10986.7MHz (-7.1dB)
	802.11a Chain A	5470-5725 Center	18	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	46.9dBμV/m @ 3713.3MHz (-7.1dB)
	802.11a Chain A	5470-5725 High	18	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	47.1dBμV/m @ 3795.8MHz (-6.9dB)

Antenna: H&S 6.5 dBi dipole antenna (Elliott 2009-1388)

Module: 00000002A

**DRIVER:** V3.00.50

**SCU:** V2.03.18

Note: For emission from 18-40GHz, the EUT was scanned manually. All signals were more than 20dB below the limit.

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## Run #1, Radiated Spurious Emissions, 30 - 40,000 MH. Operation in the 5150-5250 MHz Band

Date: 1/11/2010

Engineer: Suhaila Khushzad

Location: FT Chamber #3

### Run #1a: Low Channel @ 5180 MHz

#### Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5179.800	96.0	V	-	-	AVG	62	1.4	
5179.600	105.7	V	-	-	PK	62	1.4	
5179.930	92.3	H	-	-	AVG	134	1.4	
5180.130	103.2	H	-	-	PK	134	1.4	

#### 5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5135.270	49.6	V	54.0	-4.4	AVG	62	1.4	
5142.000	49.4	H	54.0	-4.6	AVG	134	1.4	
5141.000	61.2	V	74.0	-12.8	PK	62	1.4	
5144.870	61.4	H	74.0	-12.6	PK	134	1.4	

#### Spurious Radiated Emissions:

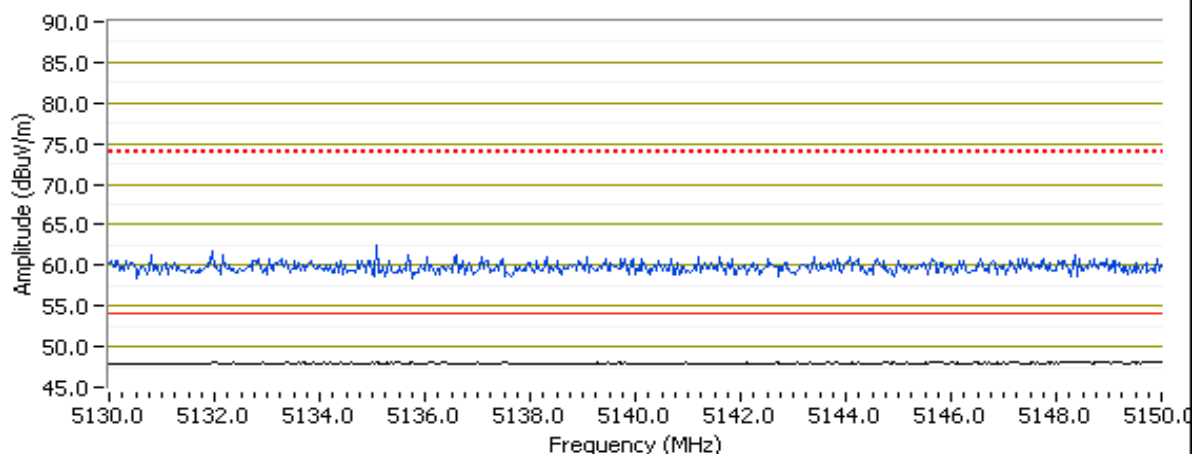
Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5433.400	40.3	V	54.0	-13.7	AVG	310	2.2	
6906.740	47.4	V	68.3	-20.9	AVG	274	1.0	
10360.270	45.3	V	68.3	-23.0	AVG	1	1.0	
3453.360	46.3	V	68.3	-22.0	PK	19	1.0	Peak vs Avg limit
5429.870	54.1	V	74.0	-19.9	PK	310	2.2	
6906.800	53.0	V	88.3	-35.3	PK	274	1.0	
10361.600	58.7	V	88.3	-29.6	PK	1	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the **average** limit was set to -27dBm/MHz (-68dB $\mu$ V/m).

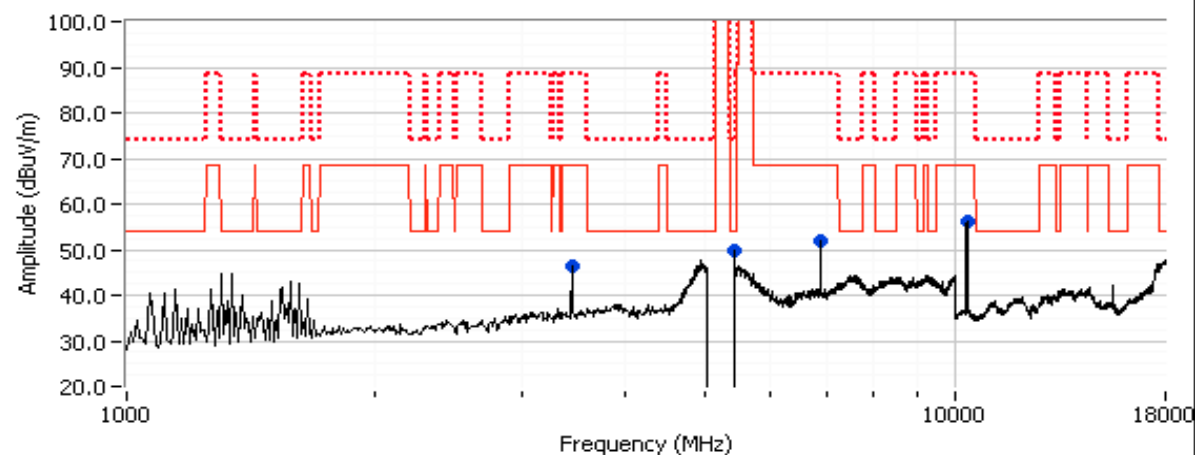
Note 2: No spurious emissions were found above 18GHz

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

RB 1 MHz; VB 10 HzBE @ 5150 MHz, Vertical, Blue Trace=Peak, Black Trace=Avg



802.11a, Channel @ 5180 MHz



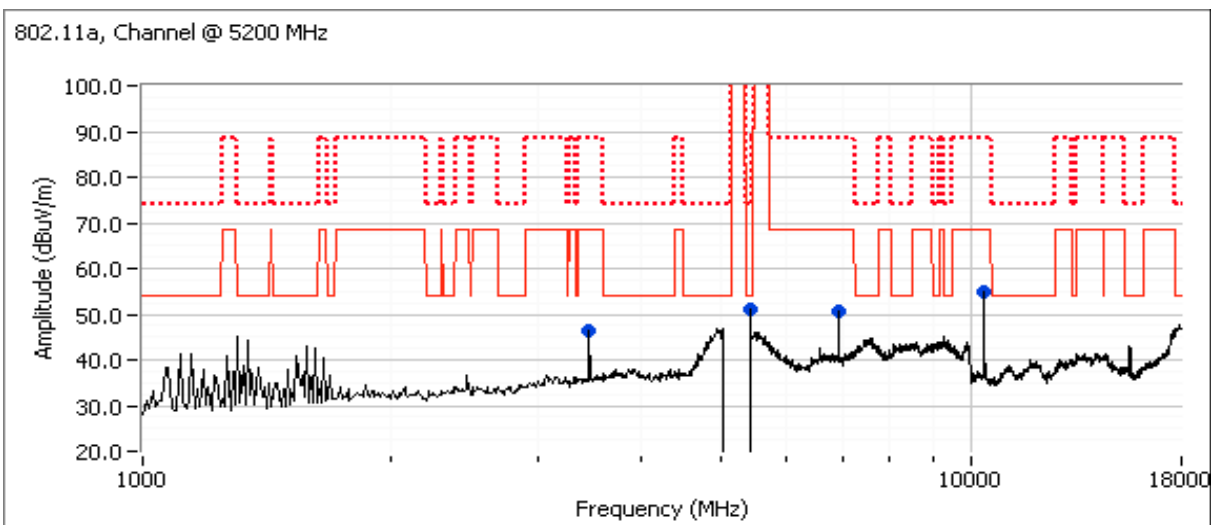
Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## Run #1b: Center Channel @ 5200 MHz

### Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5428.090	39.7	V	54.0	-14.3	AVG	65	2.2	
10400.200	44.8	V	68.3	-23.5	AVG	360	1.0	
3466.750	46.4	V	68.3	-21.9	Peak	19	1.0	Peak vs Avg limit
6933.340	50.7	V	68.3	-17.6	Peak	274	1.3	Peak vs Avg limit
5429.160	52.2	V	74.0	-21.8	PK	65	2.2	
10400.530	59.1	V	88.3	-29.2	PK	360	1.0	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the <b>average</b> limit was set to -27dBm/MHz (~68dBuV/m).
Note 2:	No spurious emissions were found above 18GHz



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## Run #1c: High Channel @ 5240 MHz

### Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
3493.350	44.3	V	68.3	-24.0	AVG	19	1.0	
<b>5438.860</b>	<b>39.9</b>	<b>V</b>	<b>54.0</b>	<b>-14.1</b>	AVG	275	1.5	
6986.750	46.6	V	68.3	-21.7	AVG	77	1.1	
10480.050	42.5	V	68.3	-25.8	AVG	360	1.0	
3493.230	48.4	V	88.3	-39.9	PK	19	1.0	
5436.330	52.4	V	74.0	-21.6	PK	275	1.5	
6986.810	52.5	V	88.3	-35.8	PK	77	1.1	
10482.320	56.1	V	88.3	-32.2	PK	360	1.0	

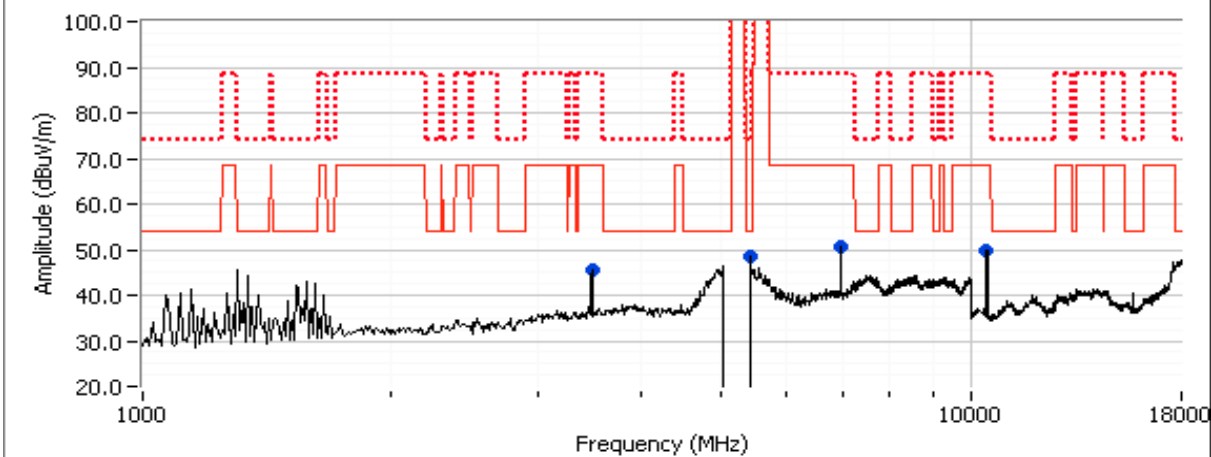
Note 1:

For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the **average** limit was set to -27dBm/MHz (~68dB $\mu$ V/m).

Note 2:

No spurious emissions were found above 18GHz

802.11a, Channel @ 5240 MHz



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## Run #2, Radiated Spurious Emissions, 30 - 40,000 MH. Operation in the 5250-5350 MHz Band

Date: 1/11/2010

Engineer: Suhaila Khushzad

Location: FT Chamber #3

### Run #2a: Low Channel @ 5280 MHz

#### Spurious Radiated Emissions:

Note: If device is not for indoor use only then measure 5250 MHz band edge to comply with -68.3dBuV/m limit

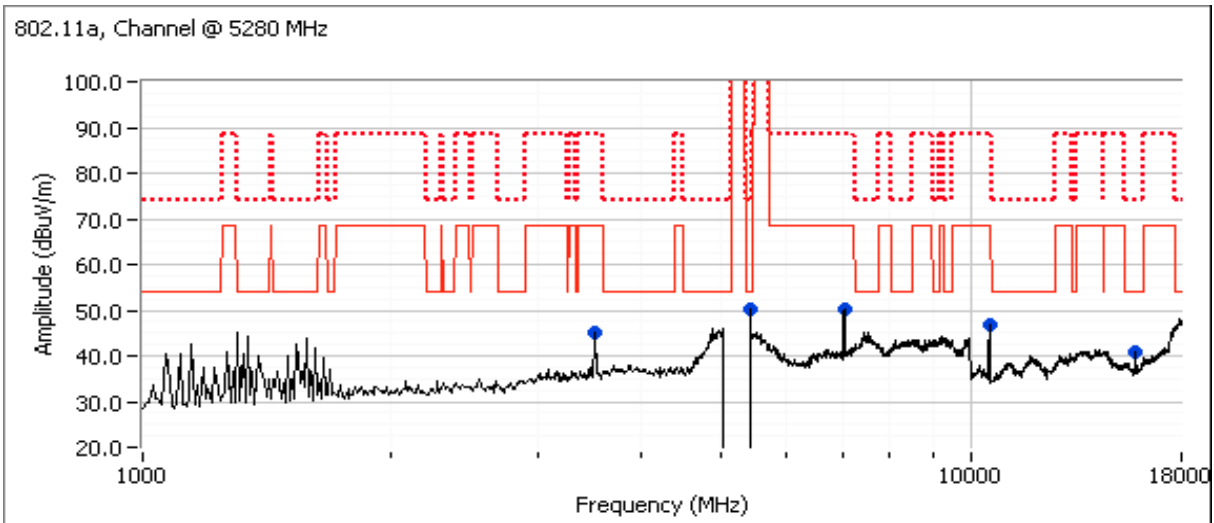
Frequency MHz	Level dBuV/m	Pol V/H	15.209 / 15E Limit Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
5431.330	39.2	V	54.0 -14.8	AVG	274	2.1	
3520.050	45.0	V	68.3 -23.3	Peak	20	1.0	Peak vs Avg limit
7040.020	50.2	V	68.3 -18.1	Peak	272	1.3	Peak vs Avg limit
10561.710	46.6	V	68.3 -21.7	Peak	5	1.3	Peak vs Avg limit
15835.690	41.0	V	54.0 -13.0	Peak	42	1.0	Peak vs Avg limit
5426.600	52.0	V	74.0 -22.0	PK	274	2.1	

Note 1:

For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the **average** limit was set to -27dBm/MHz (~68dBuV/m).

Note 2:

No spurious emissions were found above 18GHz



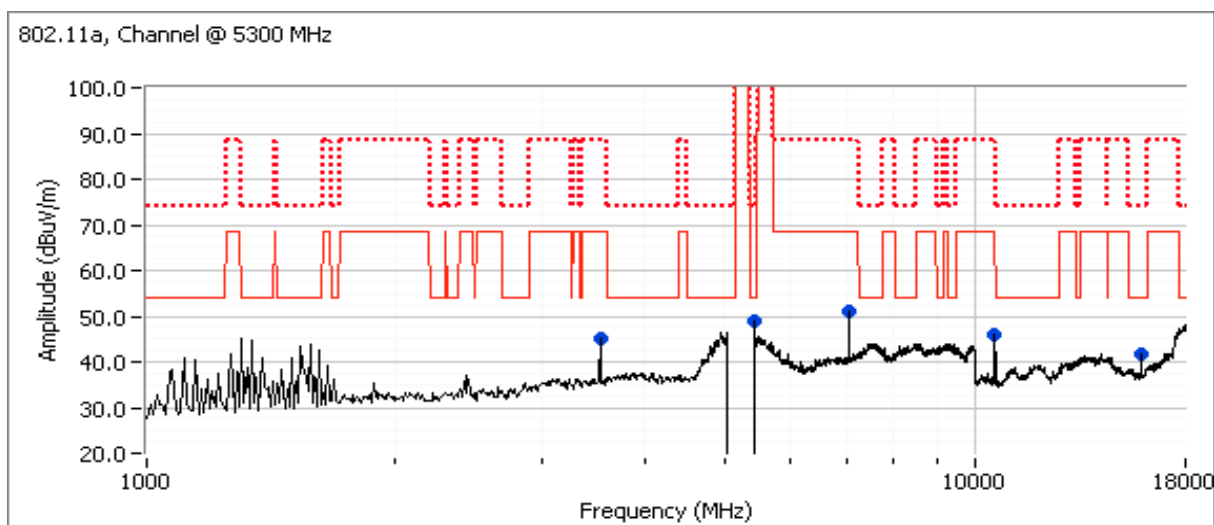
Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## Run #2b: Center Channel @ 5300 MHz

### Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5435.930	39.8	V	54.0	-14.2	AVG	270	2.1	
3533.390	45.3	V	68.3	-23.0	Peak	32	1.3	
7066.730	50.9	V	68.3	-17.4	Peak	101	1.0	
10600.000	45.9	V	68.3	-22.4	Peak	341	1.0	Peak vs Avg limit
<b>15902.810</b>	<b>41.7</b>	<b>H</b>	<b>54.0</b>	<b>-12.3</b>	Peak	61	1.0	Peak vs Avg limit
5427.930	52.6	V	74.0	-21.4	PK	270	2.1	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the <b>average</b> limit was set to -27dBm/MHz (~68dBuV/m).
Note 2:	No spurious emissions were found above 18GHz





Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## Run #2c: High Channel @ 5320 MHz

### Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.E		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.600	49.2	H	-	-	AVG	222	1.3	
5361.370	60.9	H	-	-	PK	222	1.3	
5322.800	93.2	V	-	-	AVG	226	2.1	
5324.270	103.6	V	-	-	PK	226	2.1	

### 5350 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.000	49.1	H	54.0	-4.9	AVG	222	1.3	
5350.230	49.2	V	54.0	-4.8	AVG	226	2.1	
5356.670	61.1	V	74.0	-12.9	PK	226	2.1	
5367.330	60.7	H	74.0	-13.3	PK	222	1.3	

### Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1345.370	43.5	V	54.0	-10.5	AVG	157	1.6	
5460.320	39.1	V	68.3	-29.2	AVG	60	1.9	
10640.510	35.7	V	54.0	-18.3	AVG	360	1.0	
3546.730	45.6	H	68.3	-22.7	Peak	17	1.9	Peak vs Avg limit
7093.370	49.2	V	68.3	-19.1	Peak	88	1.0	Peak vs Avg limit
1345.500	46.5	V	74.0	-27.5	PK	157	1.6	
5440.520	51.6	V	74.0	-22.4	PK	60	1.9	
10637.570	49.9	V	74.0	-24.1	PK	360	1.0	

Note 1:

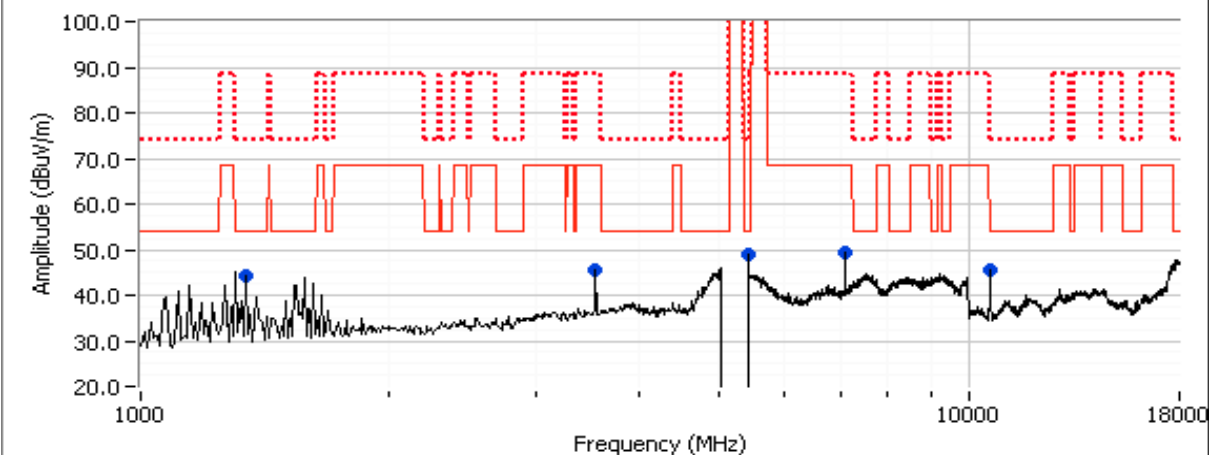
For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the **average** limit was set to -27dBm/MHz (~68dBuV/m).

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

RB 1 MHz; VB 10 HzBE @ 5350 MHz, Vertical, Blue Trace=Peak, Black Trace=Avg



802.11a, Channel @ 5320 MHz



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## Run #3, Radiated Spurious Emissions, 30 - 40,000 MH. Operation in the 5470-5725 MHz Band

Date: 1/11/2010

Engineer: Mehran Birgani

Location: FT Chamber #3

### Run #3a: Low Channel

#### Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5500.100	94.5	V	112.3	-17.8	AVG	60	1.4	
5499.700	105.2	V	132.3	-27.1	PK	60	1.4	
5499.930	93.6	H	112.3	-18.7	AVG	151	1.3	
5493.330	104.1	H	132.3	-28.2	PK	151	1.3	

#### 5350-5460 MHz Restricted Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.370	43.4	V	54.0	-10.6	AVG	60	1.4	
5389.600	55.8	V	74.0	-18.2	PK	60	1.4	

#### 5460-5470 MHz Restricted Band Edge Signal Radiated Field Strength

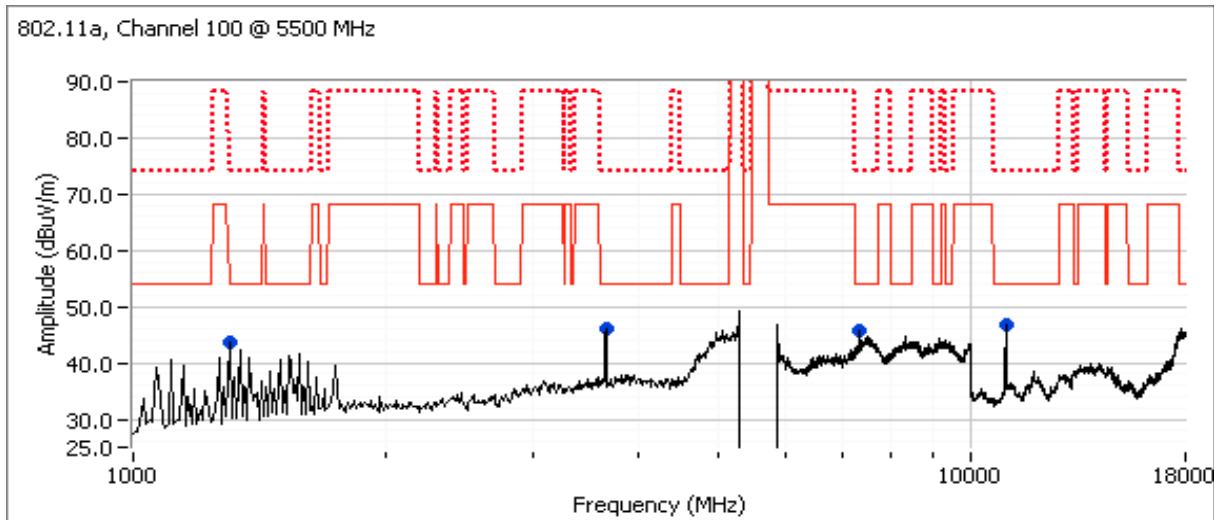
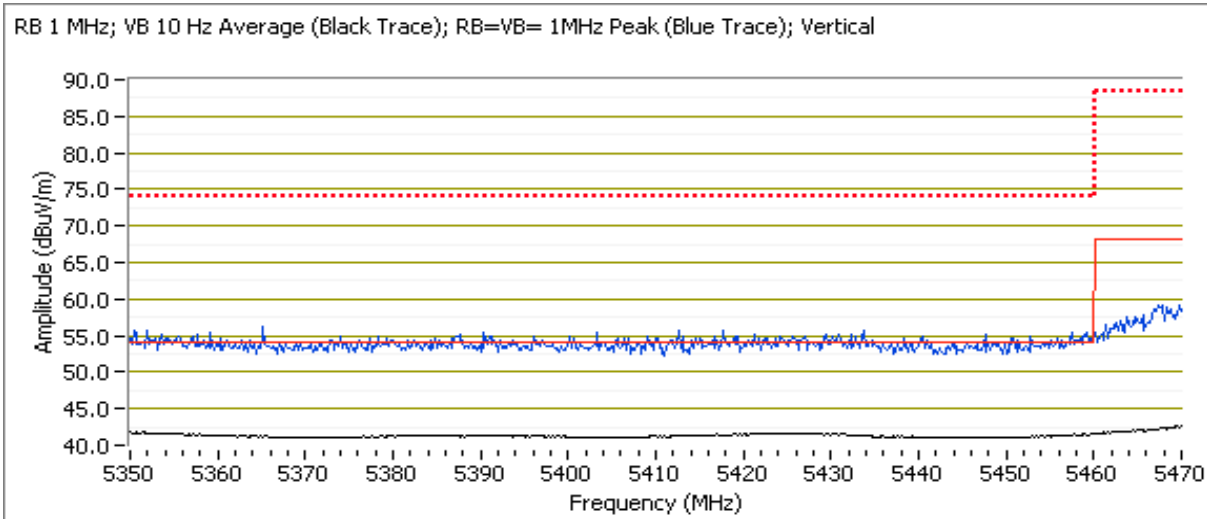
Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5469.750	44.5	V	68.3	-23.8	AVG	60	1.4	
5468.100	60.0	V	88.3	-28.3	PK	60	1.4	

#### Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1302.500	43.6	V	54.0	-10.4	Peak	177	1.6	Peak reading with average limit
3713.330	46.1	V	54.0	-7.9	Peak	96	1.3	Peak reading with average limit
7334.170	45.7	V	54.0	-8.3	Peak	287	1.9	Peak reading with average limit
10986.670	46.9	V	54.0	-7.1	Peak	14	1.3	Peak reading with average limit

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the **average** limit was set to -27dBm/MHz (~68dB $\mu$ V/m).

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A



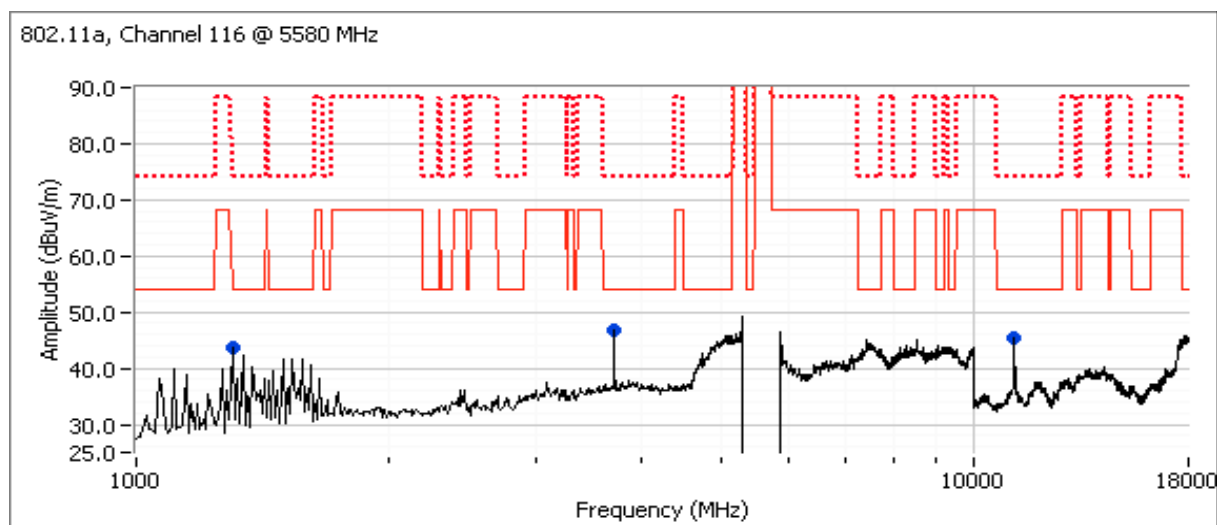
Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## Run #3b: Center Channel

### Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1302.500	43.8	V	54.0	-10.2	Peak	177	1.6	Peak reading with average limit
3713.330	46.9	V	54.0	-7.1	Peak	96	1.3	Peak reading with average limit
11146.670	45.3	V	54.0	-8.7	Peak	6	1.3	Peak reading with average limit

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the **average** limit was set to -27dBm/MHz (~68dBuV/m).



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

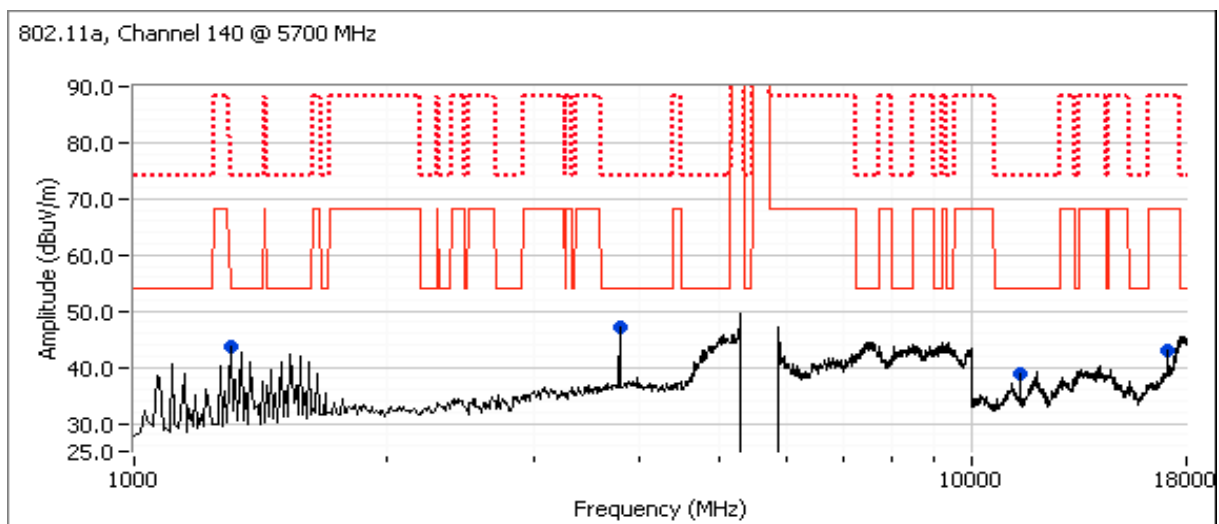
## Run #3c: High Channel

### Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1302.500	43.5	V	54.0	-10.5	Peak	197	1.6	Peak reading with average limit
3795.830	47.1	H	54.0	-6.9	Peak	143	1.3	Peak reading with average limit
11386.670	39.0	H	54.0	-15.0	Peak	40	1.2	Peak reading with average limit
17093.330	43.0	H	68.3	-25.3	Peak	237	1.0	Peak reading with average limit

Note 1:

For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the **average** limit was set to -27dBm/MHz (~68dB $\mu$ V/m).



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## RSS 210 and FCC 15.407 (UNII) Radiated Spurious Emissions (Larsen Antenna)

### 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: 10-15 °C  
Rel. Humidity: 30-50 %

Date of Test: Refer to each run  
Test Engineer: Refer to each run  
Test Location: Refer to each run

Config. Used: 1  
Config Change: None  
Host Unit Voltage 120V/ 60Hz

### 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:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## Summary of Results

NOTE: A preliminary check of output power was performed. The port with the highest power was used for the final testing. Preliminary tests showed no radio related emissions below 1 GHz.

Run #	Mode	Channel	Power Setting	Port	Test Performed	Limit	Result / Margin
1	802.11a Chain A	5150-5250 Low	18	Main	Restricted Band Edge at 5150 MHz	15.209	51.1dBμV/m @ 5147.7MHz (-2.9dB)
	802.11a Chain A	5150-5250 Low	18	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	44.4dBμV/m @ 5418.4MHz (-9.6dB)
	802.11a Chain A	5150-5250 Center	18	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	44.9dBμV/m @ 5415.8MHz (-9.1dB)
	802.11a Chain A	5150-5250 High	18	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	43.4dBμV/m @ 1306.3MHz (-10.6dB)
2	802.11a Chain A	5250-5350 Low	18	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	43.5dBμV/m @ 5415.9MHz (-10.5dB)
	802.11a Chain A	5250-5350 Center	18	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	46.4dBμV/m @ 1306.5MHz (-7.6dB)
	802.11a Chain A	5250-5350 High	18	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	44.9dBμV/m @ 1302.5MHz (-9.1dB)
	802.11a Chain A	5250-5350 High	18	Main	Restricted Band Edge at 5350 MHz	15.209	50.6dBμV/m @ 5350.1MHz (-3.4dB)
3	802.11a Chain A	5470-5725 Low	18	Main	Restricted Band Edge at 5460 MHz	15.209	50.7dBμV/m @ 5458.7MHz (-3.3dB)
	802.11a Chain A	5470-5725 Low	18	Main	Restricted Band Edge at 5470 MHz	15.209	51.4dBμV/m @ 5469.9MHz (-16.9dB)
	802.11a Chain A	5470-5725 Low	18	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	46.4dBμV/m @ 3658.3MHz (-7.6dB)
	802.11a Chain A	5470-5725 Center	18	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	45.7dBμV/m @ 1339.2MHz (-8.3dB)
	802.11a Chain A	5470-5725 High	18	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	46.2dBμV/m @ 3795.8MHz (-7.8dB)

Antenna: Larsen 5 dBi dipole antenna (Elliott 2009-2119)

Module: 00000002A

DRIVER: V3.00.50

SCU: V2.03.18

Note: For emission from 18-40GHz, the EUT was scanned manually. All signals were more than 20dB below the limit.

## Ambient Conditions:

Temperature: 10-15 °C

Rel. Humidity: 30-50 %



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## Run #1, Radiated Spurious Emissions, 30 - 40,000 MH. Operation in the 5150-5250 MHz Band

Date: 1/11/2010

Engineer: Joseph Cadigal

Location: FT Chamber #3

### Run #1a: Low Channel @ 5180 MHz

#### Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5179.920	101.0	V	-	-	AVG	162	1.0	
5180.000	110.8	V	-	-	PK	162	1.0	
5180.000	85.7	H	-	-	AVG	121	1.5	
5179.930	95.0	H	-	-	PK	121	1.5	

#### 5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5130.600	50.1	H	54.0	-3.9	AVG	120	1.5	
<b>5147.670</b>	<b>51.1</b>	<b>V</b>	<b>54.0</b>	<b>-2.9</b>	AVG	162	1.0	
5130.530	61.7	H	74.0	-12.3	PK	120	1.5	
5149.300	64.2	V	74.0	-9.8	PK	162	1.0	

#### Spurious Radiated Emissions:

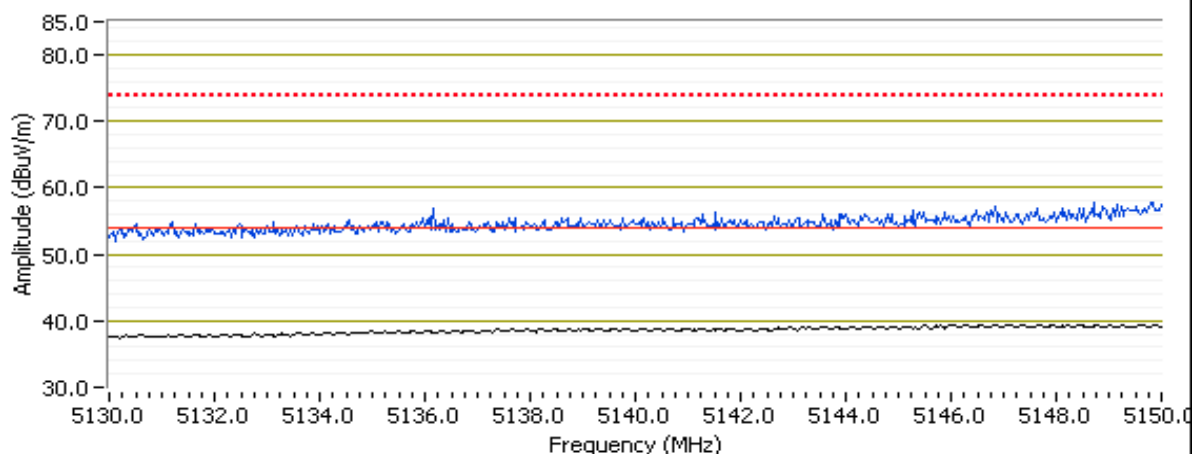
Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1306.370	42.8	H	54.0	-11.2	AVG	229	1.5	
3453.340	44.3	V	68.3	-24.0	AVG	348	1.3	
4926.560	43.7	V	54.0	-10.3	AVG	32	1.0	
<b>5418.440</b>	<b>44.4</b>	<b>V</b>	<b>54.0</b>	<b>-9.6</b>	AVG	209	1.0	
6906.670	47.4	V	68.3	-20.9	AVG	123	1.5	
10359.920	49.6	V	68.3	-18.7	AVG	141	1.0	
1306.420	46.3	H	74.0	-27.7	PK	229	1.5	
3453.340	48.3	V	88.3	-40.0	PK	348	1.3	
4926.510	56.1	V	74.0	-17.9	PK	32	1.0	
5418.360	56.8	V	74.0	-17.2	PK	209	1.0	
6906.810	53.3	V	88.3	-35.0	PK	123	1.5	
10360.140	62.9	V	88.3	-25.4	PK	141	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the **average** limit was set to -27dBm/MHz (~68dB $\mu$ V/m).

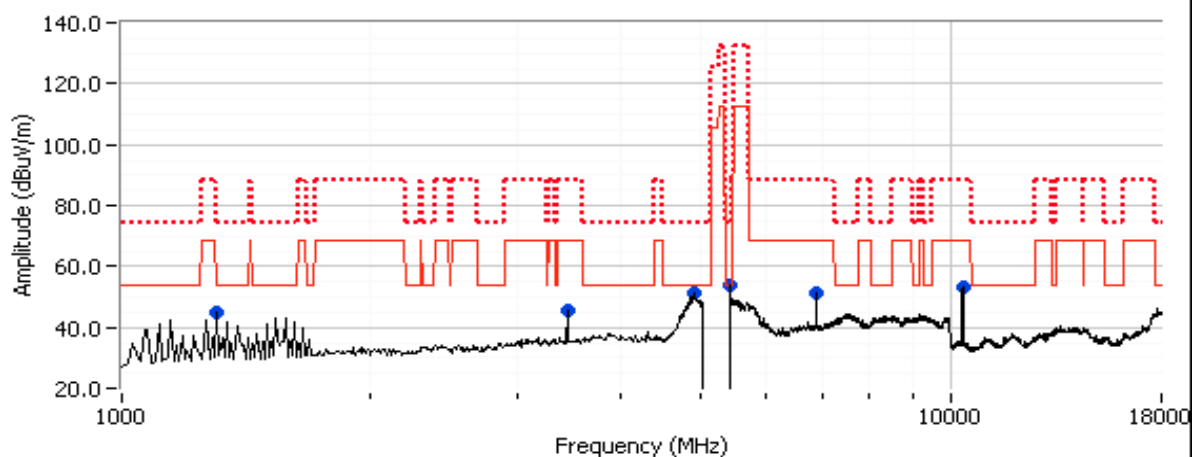
Note 2: No spurious emissions were found above 18GHz

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

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



802.11a, Channel 36 @ 5180 MHz



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

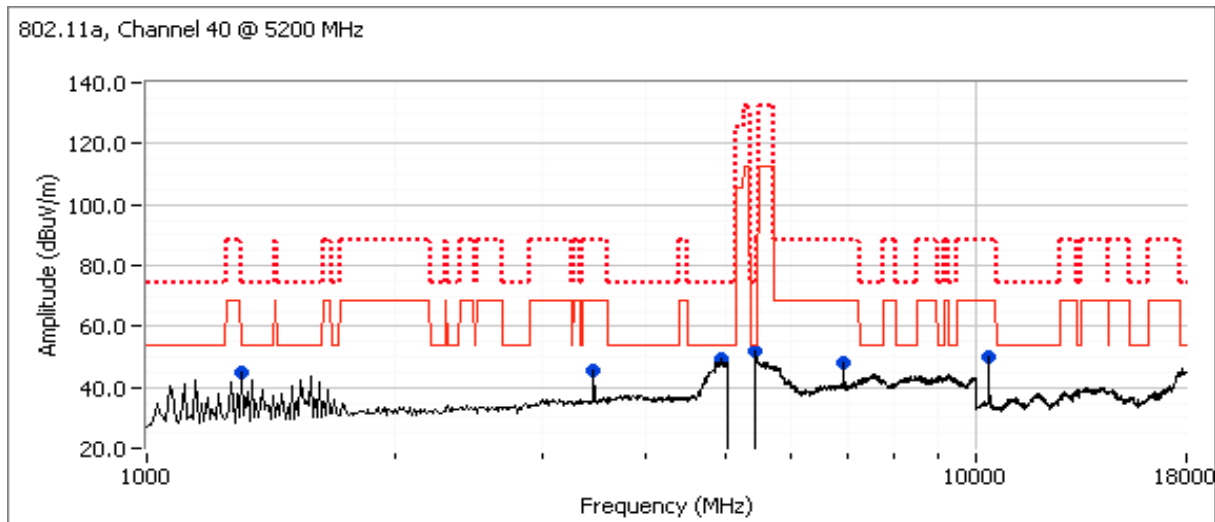
## Run #1b: Center Channel @ 5200 MHz

### Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1306.410	42.7	V	54.0	-11.3	AVG	336	1.3	
3466.690	44.7	H	68.3	-23.6	AVG	28	1.5	
4946.480	42.3	V	54.0	-11.7	AVG	203	1.0	
<b>5415.830</b>	<b>44.9</b>	<b>V</b>	<b>54.0</b>	<b>-9.1</b>	AVG	191	1.0	
6933.360	44.4	V	68.3	-23.9	AVG	94	1.5	
10389.450	35.1	V	68.3	-33.2	AVG	66	1.3	
1306.360	46.5	V	74.0	-27.5	PK	336	1.3	
3466.660	48.5	H	88.3	-39.8	PK	28	1.5	
4946.300	55.9	V	74.0	-18.1	PK	203	1.0	
5413.720	56.7	V	74.0	-17.3	PK	191	1.0	
6933.190	50.7	V	88.3	-37.6	PK	94	1.5	
10389.310	51.8	V	88.3	-36.5	PK	66	1.3	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the **average** limit was set to -27dBm/MHz (~68dBuV/m).

Note 2: No spurious emissions were found above 18GHz



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

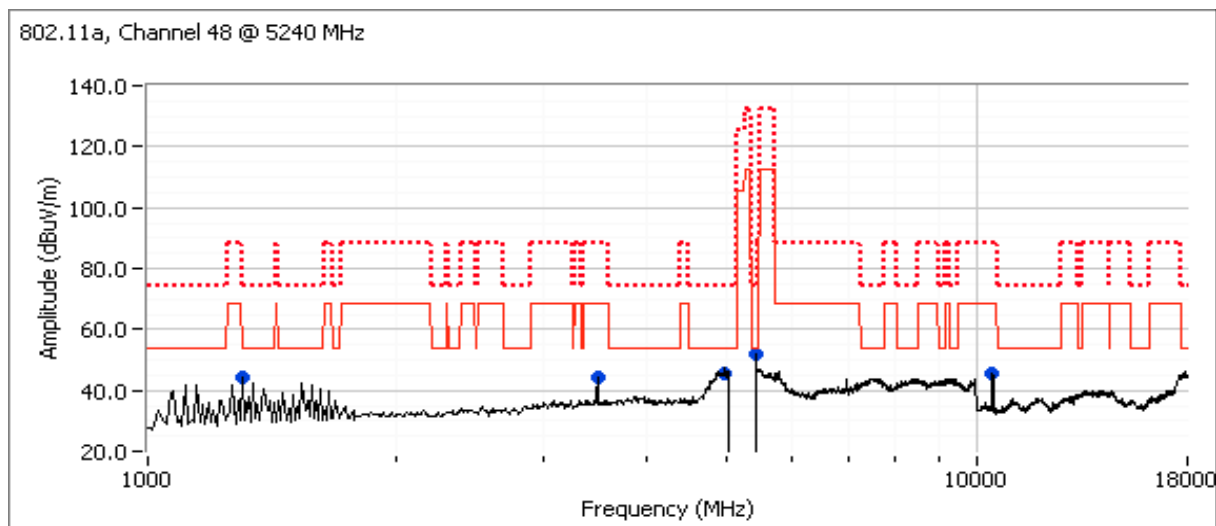
## Run #1c: High Channel @ 5240 MHz

### Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
10479.960	31.9	V	68.3	-36.4	AVG	319	1.5	
10481.440	45.0	V	88.3	-43.3	PK	319	1.5	
<b>1306.340</b>	<b>43.4</b>	<b>V</b>	<b>54.0</b>	<b>-10.6</b>	AVG	343	1.3	
3493.340	44.0	V	68.3	-24.3	AVG	156	1.0	
4972.310	39.8	V	54.0	-14.2	AVG	192	1.0	
5417.270	43.2	V	54.0	-10.8	AVG	181	1.3	
1306.320	46.9	V	74.0	-27.1	PK	343	1.3	
3493.350	48.3	V	88.3	-40.0	PK	156	1.0	
4973.090	53.0	V	74.0	-21.0	PK	192	1.0	
5416.520	55.4	V	74.0	-18.6	PK	181	1.3	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the **average** limit was set to -27dBm/MHz (~68dBuV/m).

Note 2: No spurious emissions were found above 18GHz



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## Run #2, Radiated Spurious Emissions, 30 - 40,000 MH. Operation in the 5250-5350 MHz Band

### Run #2a: Low Channel @ 5280 MHz

Date: 1/11/2010

Engineer: Joseph Cadigal

Location: FT Chamber #3

### Spurious Radiated Emissions:

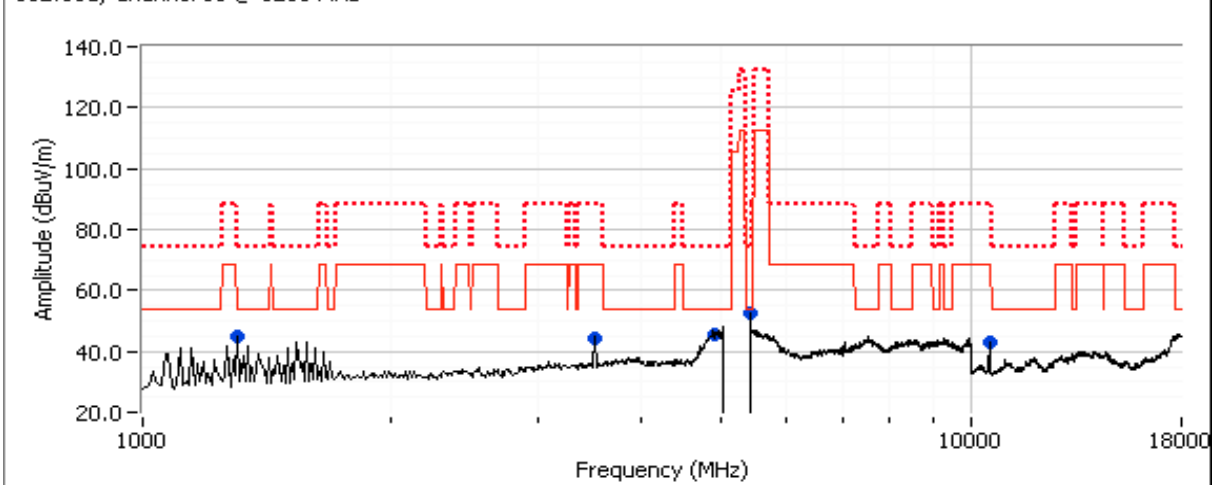
Note: If device is not for indoor use only then measure 5250 MHz band edge to comply with -68.3dBuV/m limit

Frequency MHz	Level dBuV/m	Pol V/H	15.209 / 15E Limit	Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
1306.370	41.7	V	54.0	-12.3	AVG	335	1.0	
3520.000	43.7	V	68.3	-24.6	AVG	146	1.0	
4925.540	38.7	V	54.0	-15.3	AVG	216	1.0	
5415.880	43.5	V	54.0	-10.5	AVG	241	1.0	
10560.060	35.0	V	68.3	-33.3	AVG	336	1.3	
1306.440	45.5	V	74.0	-28.5	PK	335	1.0	
3519.900	47.8	V	88.3	-40.5	PK	146	1.0	
4925.230	52.0	V	74.0	-22.0	PK	216	1.0	
5414.170	55.1	V	74.0	-18.9	PK	241	1.0	
10560.390	49.3	V	88.3	-39.0	PK	336	1.3	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the average limit was set to -27dBm/MHz (~68dBuV/m).

Note 2: No spurious emissions were found above 18GHz

802.11a, Channel 56 @ 5280 MHz



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## Run #2b: Center Channel @ 5300 MHz

Date: 1/12/2010

Engineer: Mehran Birgani

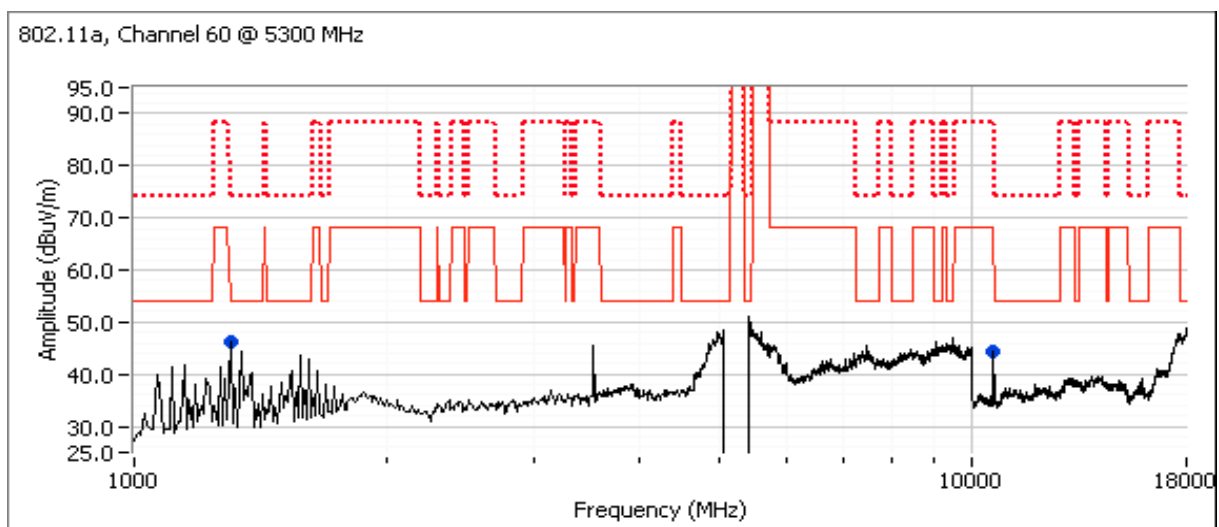
Location: FT Chamber #5

### Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1306.450	46.4	H	54.0	-7.6	Peak	276	1.3	Peak reading with average limit
10600.000	44.2	V	68.3	-24.1	Peak	106	1.3	Peak reading with average limit

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the **average** limit was set to -27dBm/MHz (~68dB $\mu$ V/m).

Note 2: No spurious emissions were found above 18GHz



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## Run #2c: High Channel @ 5320 MHz

Date: 1/11/2010

Engineer: Joseph Cadigal

Location: FT Chamber #3

## High Channel @ 5320 MHz

### Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5320.000	104.9	V	-	-	AVG	181	1.0	
5319.990	112.3	V	-	-	PK	181	1.0	
5320.040	89.3	H	-	-	AVG	70	1.0	
5320.060	97.7	H	-	-	PK	70	1.0	

### 5350 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.120	50.6	V	54.0	-3.4	AVG	181	1.0	
5350.400	49.9	H	54.0	-4.1	AVG	69	1.0	
5350.680	62.1	H	74.0	-11.9	PK	69	1.0	
5352.980	62.2	V	74.0	-11.8	PK	181	1.0	

### Spurious Radiated Emissions:

Date: 1/12/2010

Engineer: Mehran Birgani

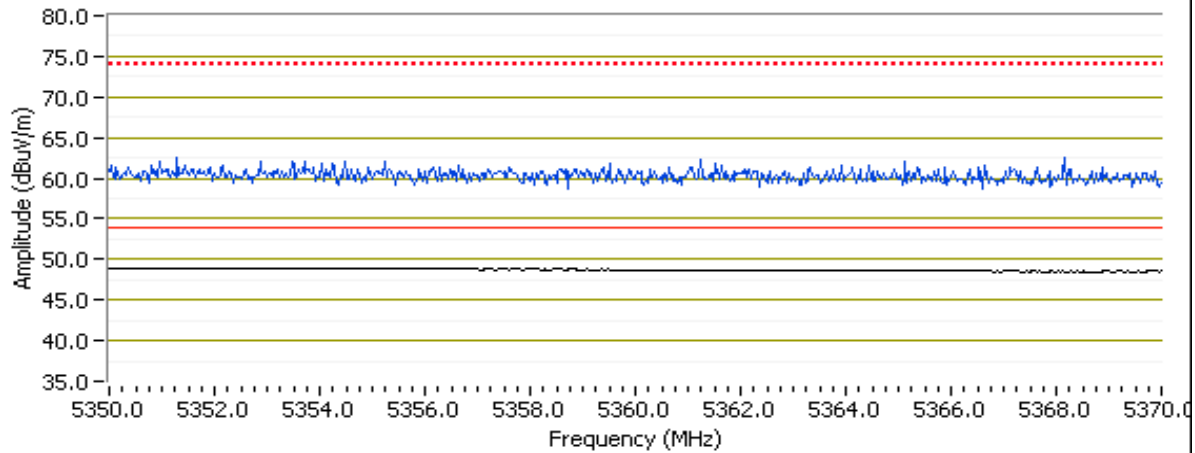
Location: FT Chamber #5

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1302.500	44.9	V	54.0	-9.1	Peak	196	1.6	Peak reading with average limit
3548.330	46.9	H	68.3	-21.4	Peak	27	1.3	Peak reading with average limit
10640.000	43.4	H	54.0	-10.6	Peak	93	1.2	Peak reading with average limit

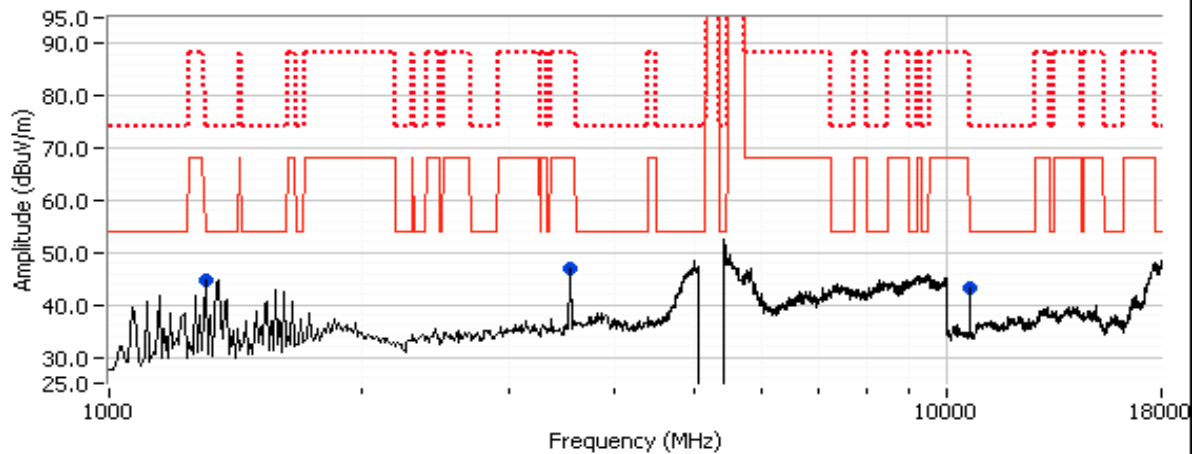
Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the **average** limit was set to -27dBm/MHz (~68dB $\mu$ V/m).

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

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



802.11a, Channel 64 @ 5320 MHz





Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## Run #3, Radiated Spurious Emissions, 30 - 40,000 MH. Operation in the 5470-5725 MHz Band

### Run #3a: Low Channel @ 5500 MHz

Date: 1/11/2010

Engineer: Joseph Cadigal

Location: FT Chamber #3

### Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5500.000	103.5	V	-	-	AVG	225	1.0	
5500.040	111.5	V	-	-	PK	225	1.0	
5499.980	89.9	H	-	-	AVG	124	1.1	
5500.100	98.2	H	-	-	PK	124	1.1	

### 5350-5460 MHz Restricted Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5457.300	50.2	H	54.0	-3.8	AVG	123	1.1	
<b>5458.690</b>	<b>50.7</b>	<b>V</b>	<b>54.0</b>	<b>-3.3</b>	AVG	225	1.0	
5455.570	61.7	H	74.0	-12.3	PK	123	1.1	
5460.340	62.8	V	88.3	-25.5	PK	225	1.0	

### 5460-5470 MHz Restricted Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5469.260	50.2	H	68.3	-18.1	AVG	123	1.1	
<b>5469.880</b>	<b>51.4</b>	<b>V</b>	<b>68.3</b>	<b>-16.9</b>	AVG	225	1.0	
5465.080	65.0	V	88.3	-23.3	PK	225	1.0	
5469.060	62.0	H	88.3	-26.3	PK	123	1.1	

### Spurious Radiated Emissions:

Date: 1/12/2010

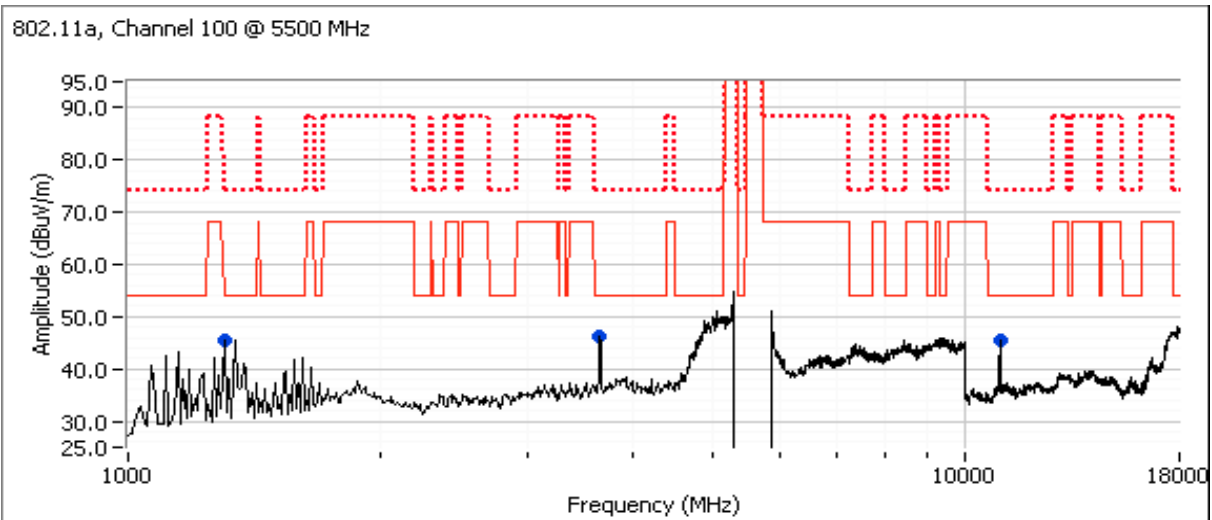
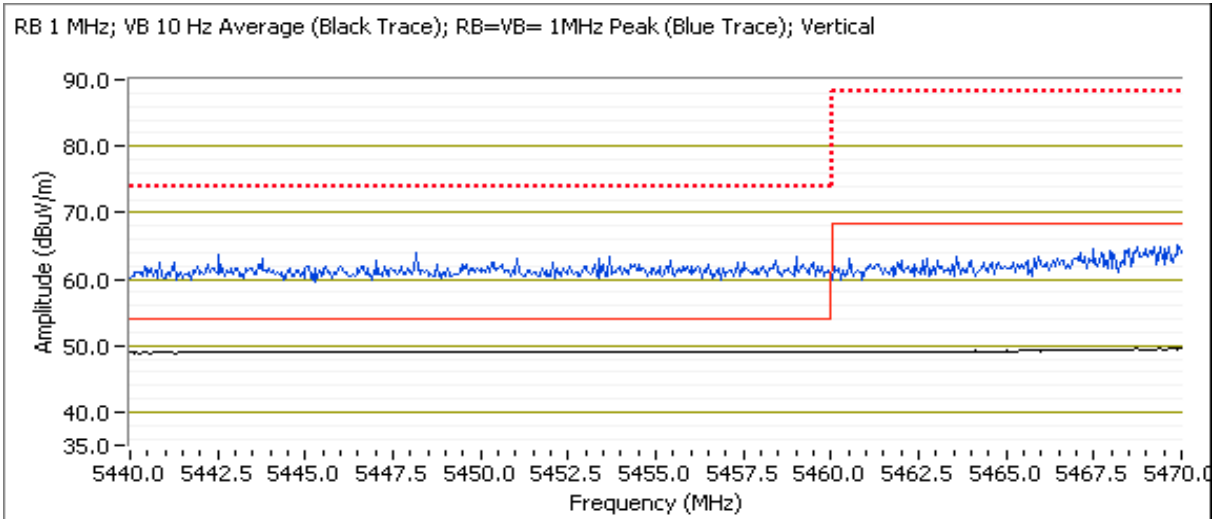
Engineer: Mehran Birgani

Location: FT Chamber #5

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1302.500	45.5	H	54.0	-8.5	Peak	276	1.3	Peak reading with average limit
<b>3658.330</b>	<b>46.4</b>	<b>H</b>	<b>54.0</b>	<b>-7.6</b>	Peak	24	1.9	Peak reading with average limit
10986.670	45.6	V	54.0	-8.4	Peak	23	1.5	Peak reading with average limit

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the **average** limit was set to -27dBm/MHz (-68dB $\mu$ V/m).

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## Run #3b: Center Channel @ 5580 MHz

Date: 1/12/2010

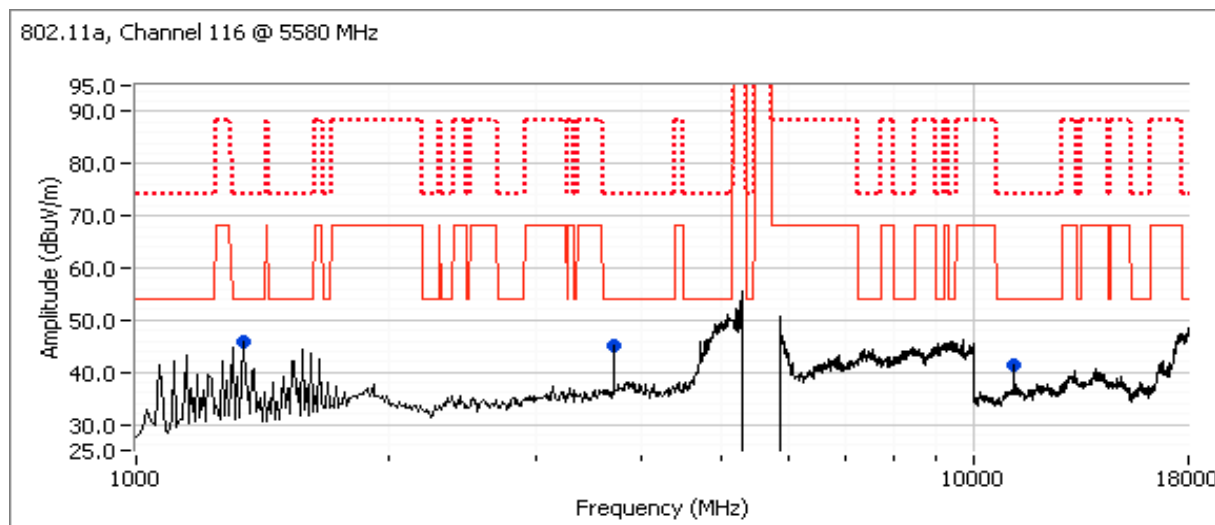
Engineer: Mehran Birgani

Location: FT Chamber #5

### Spurious Radiated Emissions:

Frequency MHz	Level dB $\mu$ V/m	Pol V/H	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
1339.170	45.7	V	54.0	-8.3	Peak	209	1.0	Peak reading with average limit
3713.330	45.0	H	54.0	-9.0	Peak	20	1.9	Peak reading with average limit
11146.670	41.2	V	54.0	-12.8	Peak	181	1.3	Peak reading with average limit

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the **average** limit was set to -27dBm/MHz (-68dB $\mu$ V/m).



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## Run #3c: High Channel @ 5700 MHz

Date: 1/12/2010

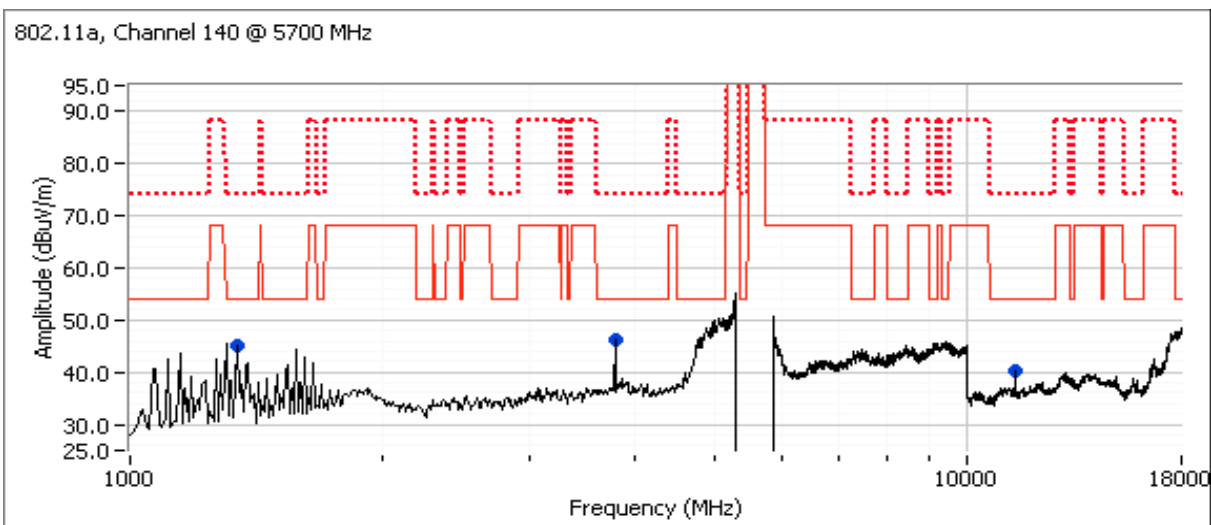
Engineer: Mehran Birgani

Location: FT Chamber #5

### Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1339.170	45.2	H	54.0	-8.8	Peak	249	1.3	Peak reading with average limit
3795.830	46.2	H	54.0	-7.8	Peak	17	1.6	Peak reading with average limit
11386.670	40.1	V	54.0	-13.9	Peak	21	1.3	Peak reading with average limit

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the **average** limit was set to -27dBm/MHz (-68dBuV/m).



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## 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 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: 10-15 °C

Rel. Humidity: 30-50 %

### Summary of Results

Run #	Test Performed	Limit	Result	Margin
1 (802.11a), 5300MHz Larson Antenna, MAIN	RE, 1000 - 18000 MHz Maximized Emissions	RSS-GEN	Pass	44.2dBμV/m (162.2μV/m) @ 3533.4MHz (-9.8dB)
2 (802.11a), 5300MHz H/S Antenna, MAIN	RE, 1000 - 18000 MHz Maximized Emissions	RSS-GEN	Pass	42.6dBμV/m (134.9μV/m) @ 3533.4MHz (-11.4dB)
3 (802.11a), 5580MHz Larson Antenna, MAIN	RE, 1000 - 18000 MHz Maximized Emissions	RSS-GEN	Pass	44.3dBμV/m (164.1μV/m) @ 3720.0MHz (-9.7dB)
4 (802.11a), 5580MHz H/S Antenna, MAIN	RE, 1000 - 18000 MHz Maximized Emissions	RSS-GEN	Pass	42.6dBμV/m (134.9μV/m) @ 3720.1MHz (-11.4dB)

### 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.

Antenna: Larsen 5.0 dBi dipole antenna (Elliott 2009-2119)

Antenna: H&S 6.5 dBi dipole antenna (Elliott 2009-1388)

Module: 00000002A

DRIVER: V3.00.50

SCU: V2.03.18

Note: For emission from 10-18GHz, the EUT was scanned manually. All signals were within noise floor.

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

Run #1: Maximized readings, 1000 - 18000 MHz (Larson Dipole Antenna), 5300 MHz

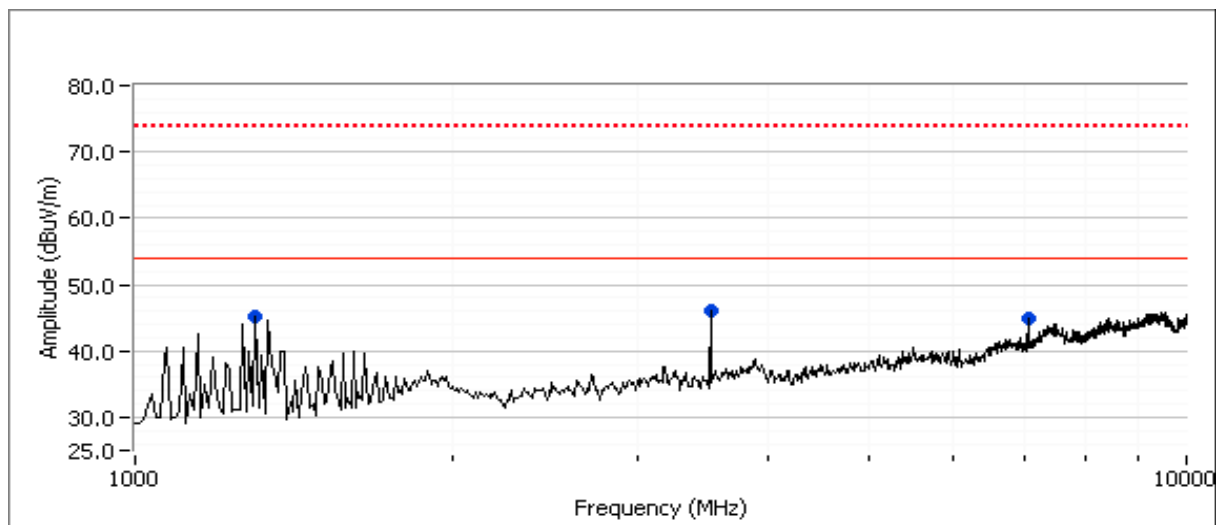
Date: 1/13/2010

Engineer: Mehran Birgani

Location: FT Chamber #5

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1306.440	41.2	H	54.0	-12.8	AVG	249	1.0	
<b>3533.350</b>	<b>44.2</b>	<b>H</b>	<b>54.0</b>	<b>-9.8</b>	AVG	148	2.1	
7066.700	41.5	V	54.0	-12.5	AVG	359	2.1	
1306.380	44.9	H	74.0	-29.1	PK	249	1.0	
3533.340	47.9	H	74.0	-26.1	PK	148	2.1	
7066.530	48.6	V	74.0	-25.4	PK	359	2.1	

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



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

Run #2: Maximized readings, 1000 - 18000 MHz (H&S Monopole Antenna), 5300 MHz

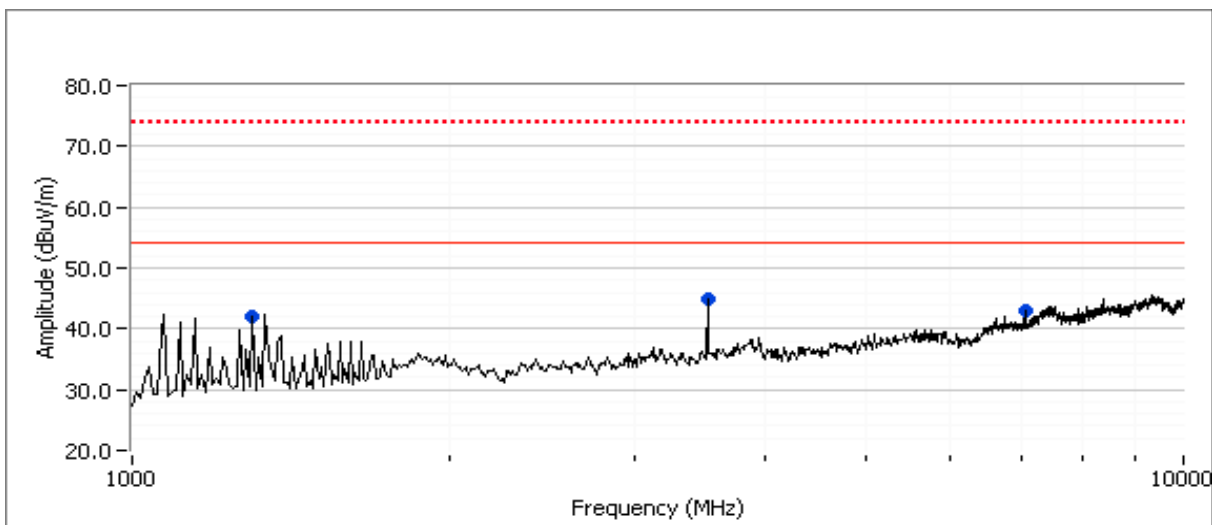
Date: 1/13/2010

Engineer: Joseph Cadigal

Location: FT Chamber #5

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBuV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1306.390	40.0	H	54.0	-14.0	AVG	248	1.6	
<b>3533.390</b>	<b>42.6</b>	<b>H</b>	<b>54.0</b>	<b>-11.4</b>	AVG	139	1.0	
7096.650	34.3	V	54.0	-19.7	AVG	342	1.9	
1306.420	44.2	H	74.0	-29.8	PK	248	1.6	
3533.400	47.0	H	74.0	-27.0	PK	139	1.0	
7099.070	46.2	V	74.0	-27.8	PK	342	1.9	

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



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

Run #3: Maximized readings, 1000 - 18000 MHz (Larson Dipole Antenna), 5580 MHz

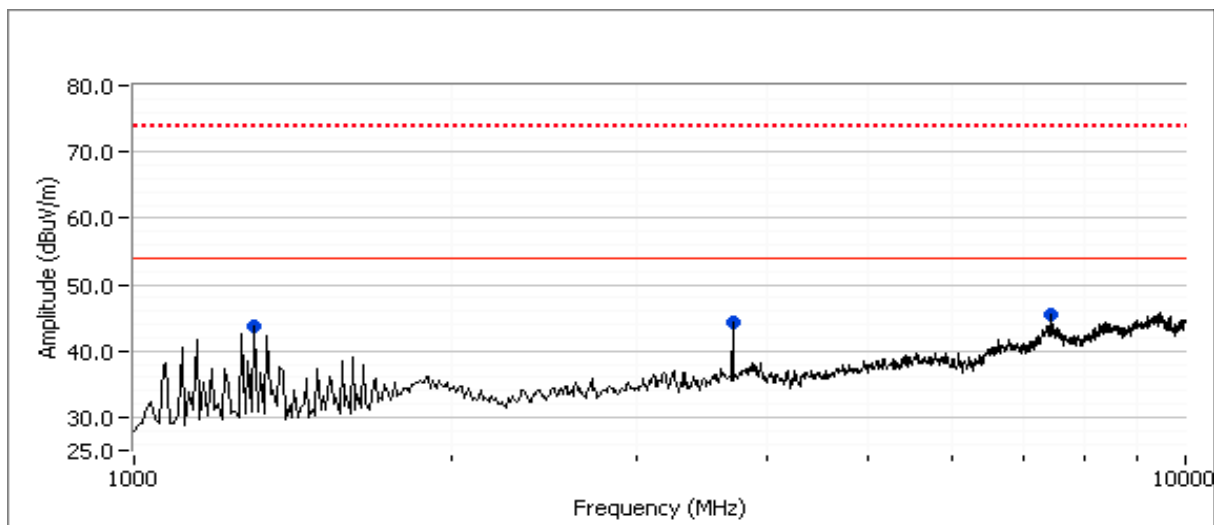
Date: 1/13/2010

Engineer: Mehran Birgani

Location: FT Chamber #5

Frequency MHz	Level dBuV/m	Pol V/H	FCC Class B		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
1306.440	41.2	H	54.0	-12.8	AVG	244	1.0	
<b>3720.020</b>	<b>44.3</b>	<b>H</b>	<b>54.0</b>	<b>-9.7</b>	AVG	190	2.0	
7428.750	36.0	V	54.0	-18.0	AVG	22	1.1	
1306.380	44.9	H	74.0	-29.1	PK	244	1.0	
3719.970	48.5	H	74.0	-25.5	PK	190	2.0	
7429.980	47.3	V	74.0	-26.7	PK	22	1.1	

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





Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

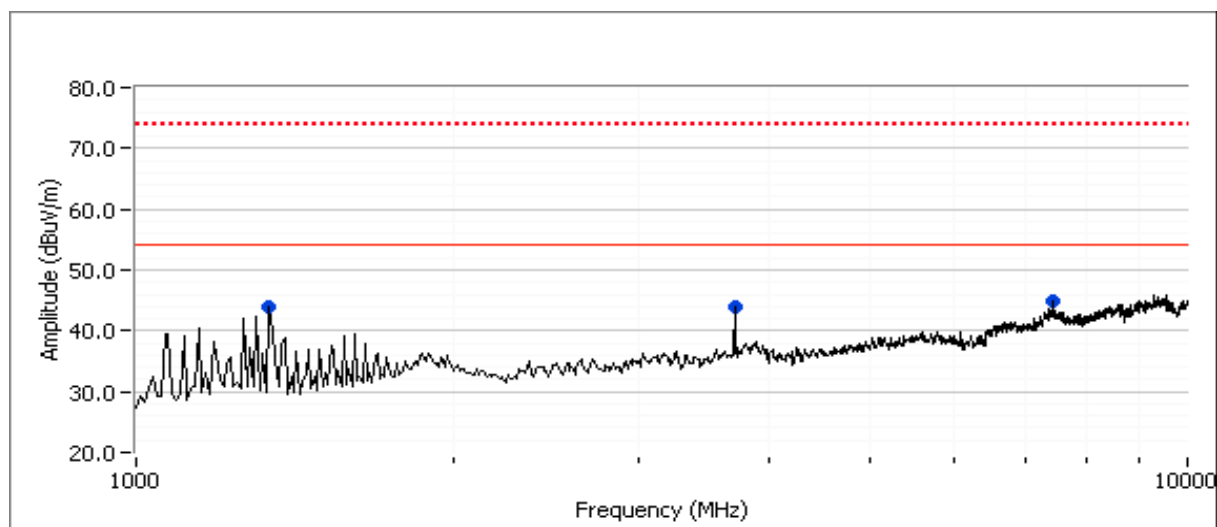
Run #4: Maximized readings, 1000 - 18000 MHz (H&S Monopole Antenna), 5580 MHz

Date: 1/13/2010

Engineer: Joseph Cadigal

Location: FT Chamber #5

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBuV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1289.850	25.5	V	54.0	-28.5	AVG	274	1.0	
<b>3720.060</b>	<b>42.6</b>	<b>H</b>	<b>54.0</b>	<b>-11.4</b>	AVG	47	1.6	
7450.490	36.3	V	54.0	-17.7	AVG	162	1.6	
1291.420	37.4	V	74.0	-36.6	PK	274	1.0	
3720.170	47.3	H	74.0	-26.7	PK	47	1.6	
7448.720	47.8	V	74.0	-26.2	PK	162	1.6	



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



## EMC Test Data

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77319
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Emissions Standard(s):	FCC 15.E/RSS 210	Class:	-
Immunity Standard(s):	-	Environment:	-

## EMC Test Data

For The

## Summit Data Communications

Model

SDC-MSD30AG

Date of Last Test: 1/15/2010

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77319
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## RSS-210 (LELAN) and FCC 15.407(UNII)

### Antenna Port Measurements

#### Power, PSD, Peak Excursion, 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.

#### Ambient Conditions:

Temperature: 10-15 °C

Rel. Humidity: 30-50 %

Date of Test: 1/14/2010

Config. Used: 1

Test Engineer: Mehran Birgani

Config Change: None

Test Location: FT Chamber #5

Host Unit Voltage 120V/ 60Hz

#### General Test Configuration

When measuring the conducted emissions from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected to allow for the external attenuators and cables used.

#### Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	10.8dBm (0.012W)
1	Power, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	10.3dBm (0.011W)
1	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	10.5dBm (0.011W)
1	PSD, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	-0.8 dBm/MHz
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	3.4 dBm/MHz
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	1.5 dBm/MHz
1	26dB Bandwidth	15.407	-	27.6 MHz
1	99% Bandwidth	RSS 210	-	17.1 MHz
2	Peak Excursion Envelope	15.407(a) (6)	Pass	12.9 dBm/ MHz
3	Antenna Conducted Out of Band Spurious	15.407(b)	Pass	All emissions below the -27dBm/MHz limit

Module: 00000002A

DRIVER: V3.00.50

SCU: V2.03.18

#### 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:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77319
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

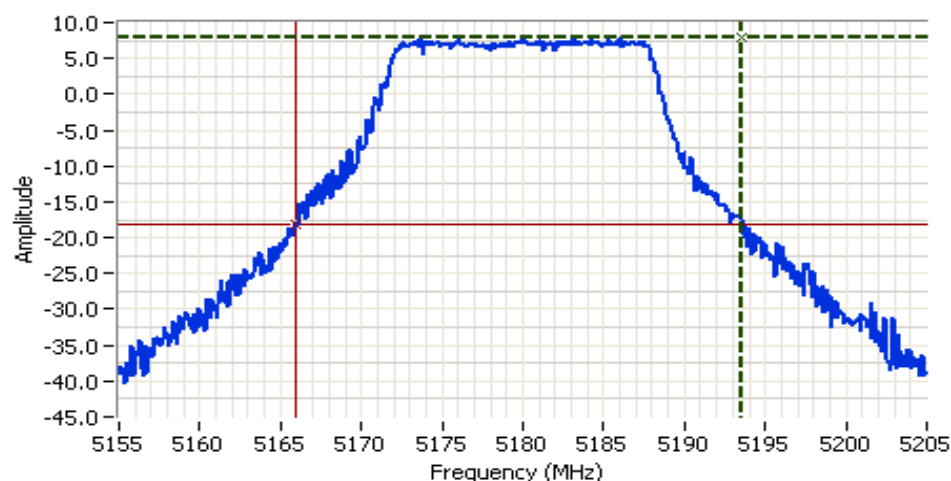
## Run #1: Bandwidth, Output Power and Power spectral Density

Antenna Gain (dBi): 6.5

Frequency (MHz)	Software Setting	Bandwidth		Output Power <sup>1</sup> dBm		Power (Watts)	PSD <sup>2</sup> dBm/MHz			Result
		26dB	99% <sup>4</sup>	Measured	Limit		Measured	FCC Limit	RSS Limit <sup>3</sup>	
5180	18.0	27.6	16.9	10.8	16.5	0.012	-1.7	3.5	3.5	Pass
5200	18.0	28.3	16.9	10.3	16.5	0.011	-2.0	3.5	3.5	Pass
5240	17.0	26.0	16.6	10.6	16.5	0.011	-0.8	3.5	3.5	Pass
5260	18.0	26.2	16.9	10.3	23.5	0.011	3.4	10.5	8.6	Pass
5300	18.0	27.8	17.0	10.0	23.5	0.010	-1.5	10.5	11.0	Pass
5320	18.0	25.8	17.1	9.1	23.5	0.008	1.1	10.5	9.6	Pass
5500	18.0	27.6	17.1	10.5	23.5	0.011	1.5	10.5	10.7	Pass
5580	18.0	26.3	16.9	9.9	23.5	0.010	1.5	10.5	10.1	Pass
5700	18.0	27.6	17.1	10.5	23.5	0.011	0.9	10.5	11.0	Pass

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 50 MHz
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >= 3xRB

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77319
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A



## Analyzer Settings

HP8564E,EMI  
 CF: 5180.000 MHz  
 SPAN:50.000 MHz  
 RB 1.000 MHz  
 VB 3.000 MHz  
 Detector POS  
 Att 20  
 RL Offset 10.00  
 Sweep Time 50.0ms  
 Ref Lvl:18.00DBM

## Comments

26dB BW: 27.6 MHz

Cursor 1 5193.5833 7.83

Cursor 2 5166.0000 -18.17

Delta Freq. 27.583

Delta Amplitude 26.00



## Spectrum Analyzer Settings

CF: 5240.00 MHz  
 SPAN:50.00 MHz  
 RB 1.000 MHz  
 VB 3.000 MHz  
 Detector Sample  
 Att 20  
 RL Offset 10.00  
 Sweep Time 50.0ms  
 Ref Lvl:18.00DBM  
 Pwr avg: 100 sweeps  
 Amp corr: 0.0dB  
 Bin size: 83 kHz

## Highest PSD

3.90 dBm/1.000 MHz

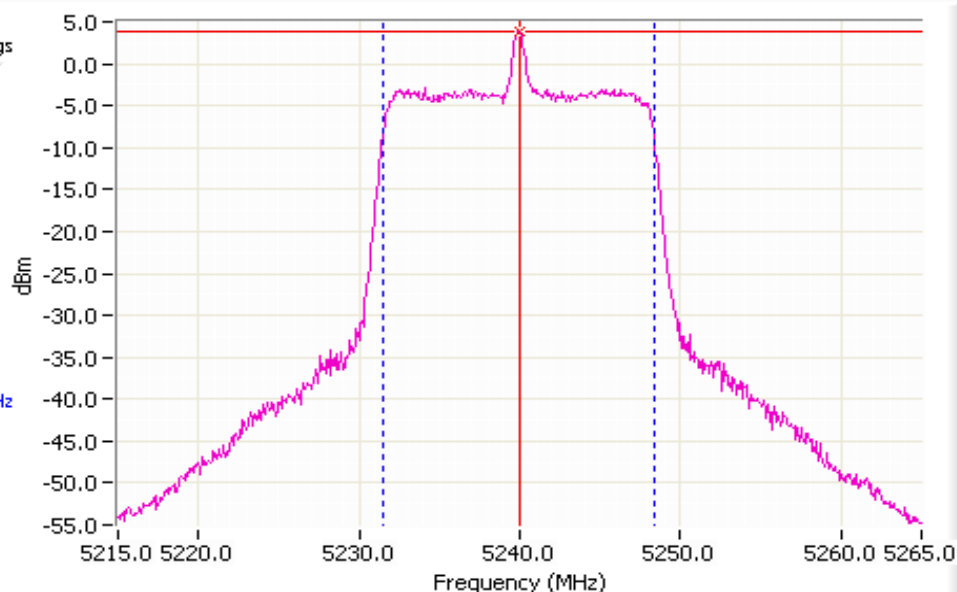
## 99% Bandwidth

16.89 MHz

## Power Over Span

11.055 mW

10.44 dBm



99% Bandwidth, Power Over Span and PSD

Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77319
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## Run #2: Peak Excursion Measurement

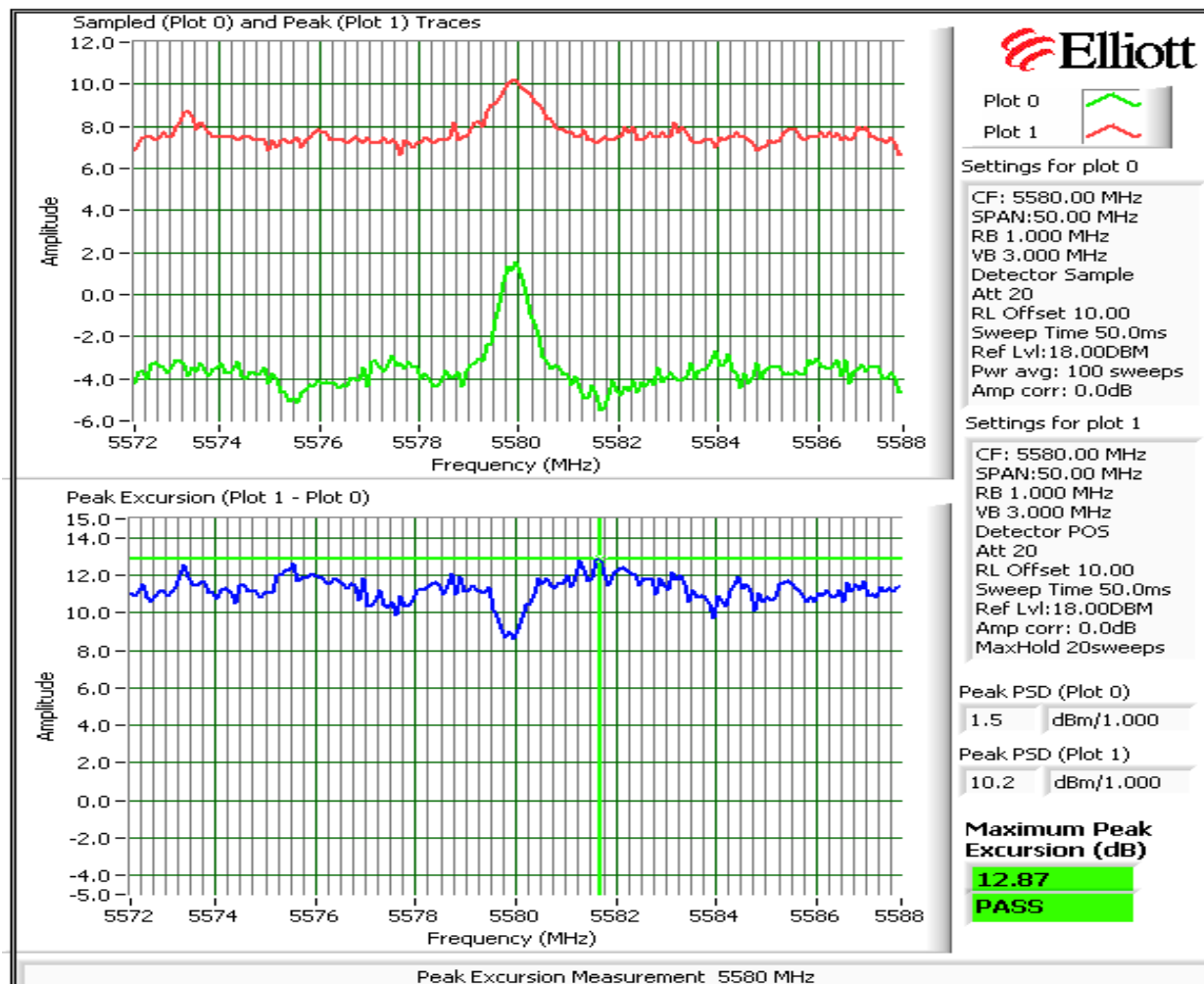
Device meets the requirement for the peak excursion

Device meets the requirement for the peak excursion								
Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)	
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit
5180	11.3	13.0	5260	10.6	13.0	5500	12.7	13.0
5200	12.4	13.0	5300	11.7	13.0	5580	12.9	13.0
5240	12.8	13.0	5320	12.1	13.0	5700	12.8	13.0

### Plots Showing Peak Excursion

Trace A: RBW = 1MHz, VBW = 3MHz, Peak hold

Trace B: Same settings as used for power/PSD measurements (RBW = 1 MHz, VBW = 3MHz, Integrated average power)



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77319
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## Run #3: Out Of Band Spurious Emissions - Antenna Conducted

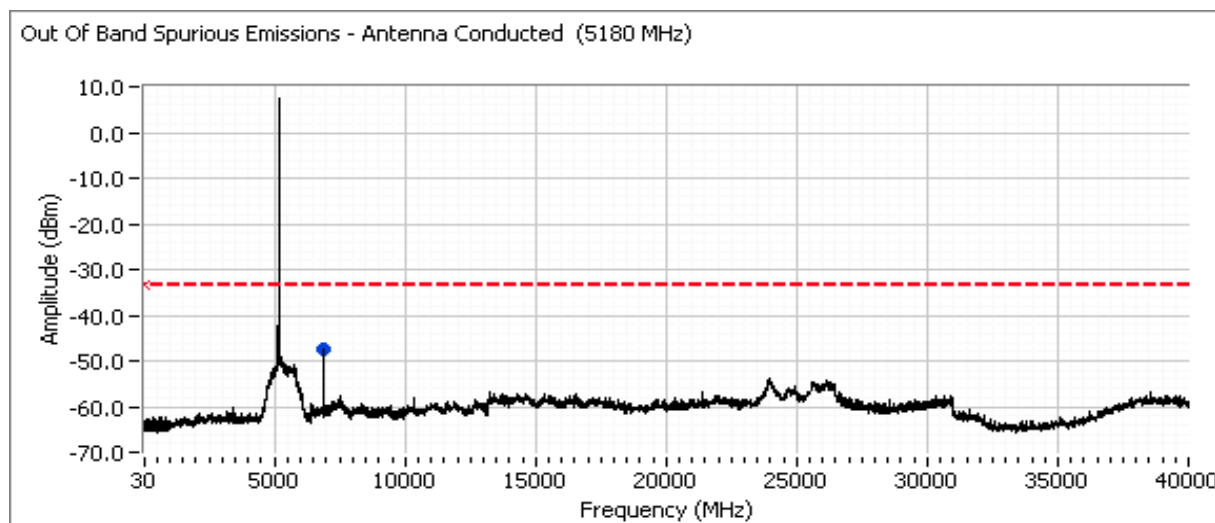
Maximum Antenna Gain:	6.5 dBi
Spurious Limit:	-27.0 dBm/MHz eirp
Limit Used On Plots <sup>Note 1</sup> :	-33.5 dBm/MHz    Average Limit (RB=1MHz, VB=10Hz)
	-13.5 dBm/MHz    Peak Limit (RB=VB=1MHz)

Note 1:	The -27dBm/MHz limit is an eirp limit. The limit for antenna port conducted measurements is adjusted to take into consideration the maximum antenna gain (limit = -27dBm - antenna gain). Radiated field strength measurements for signals more than 50MHz from the bands and that are close to the limit are made to determine compliance as the antenna gain is not known at these frequencies.
Note 2:	All spurious signals below 1GHz are measured during digital device radiated emissions test.
Note 3:	Signals within 10MHz of the 5.725 or 5.825 Band edge are subject to a limit of -17dBm EIRP
Note 4:	If the device is for outdoor use then the -27dBm eirp limit also applies in the 5150 - 5250 MHz band.
Note 5:	Signals that fall in the restricted bands of 15.205 are subject to the limit of 15.209.

### Plots Showing Out-Of-Band Emissions (RBW=VBW=1MHz) with Average Limit of -33.5 dBm

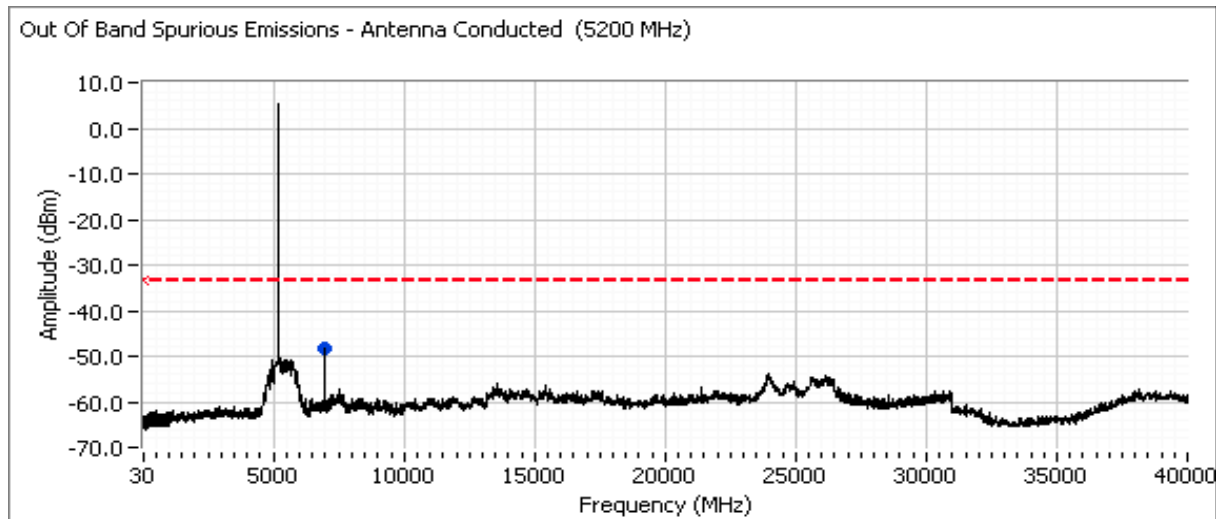
#### Low channel, 5150 - 5250 MHz Band (channel 36, 5180 MHz)

Compliance with the radiated limits for the restricted band immediately below 5150MHz is demonstrated through the radiated emissions tests.

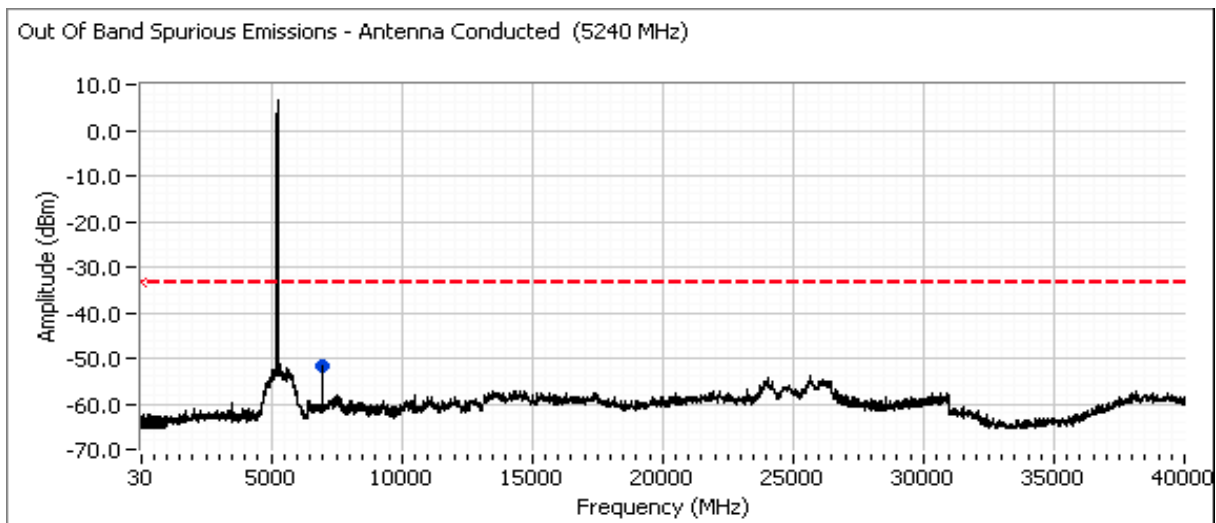


Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77319
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## Center channel, 5150 - 5250 MHz Band (Channel 40, 5200 MHz)



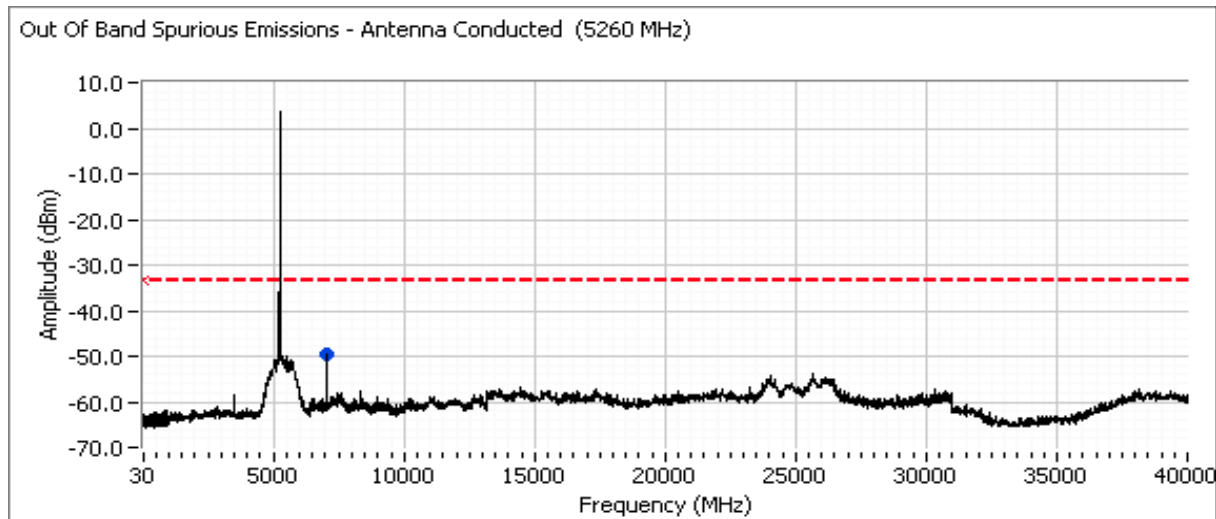
## High channel, 5150 - 5250 MHz Band (Channel 48, 5240MHz)



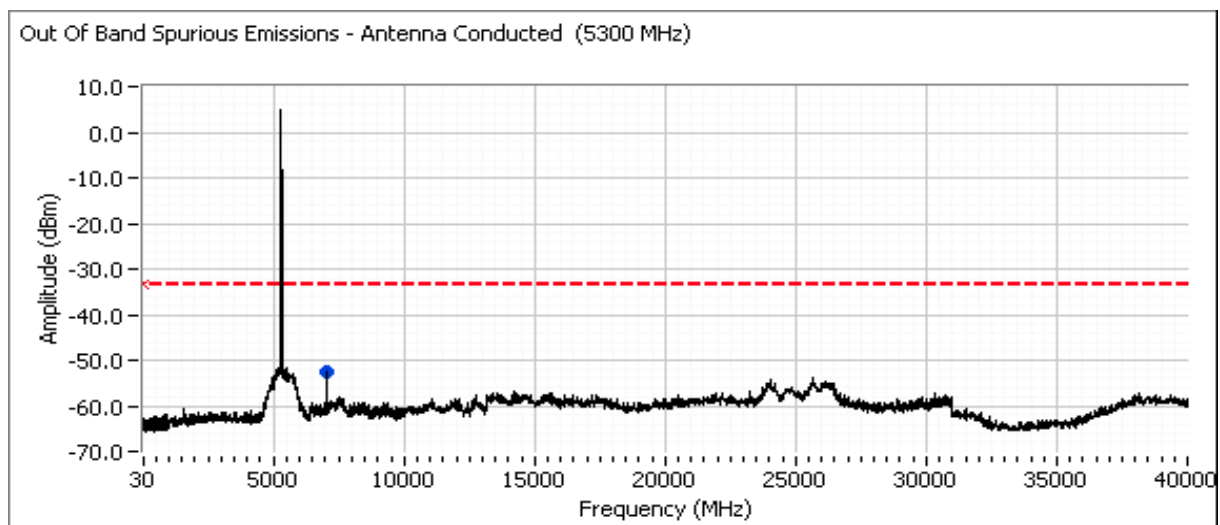


Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77319
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## Low channel, 5250 - 5350 MHz Band (Channel 52, 5260MHz)



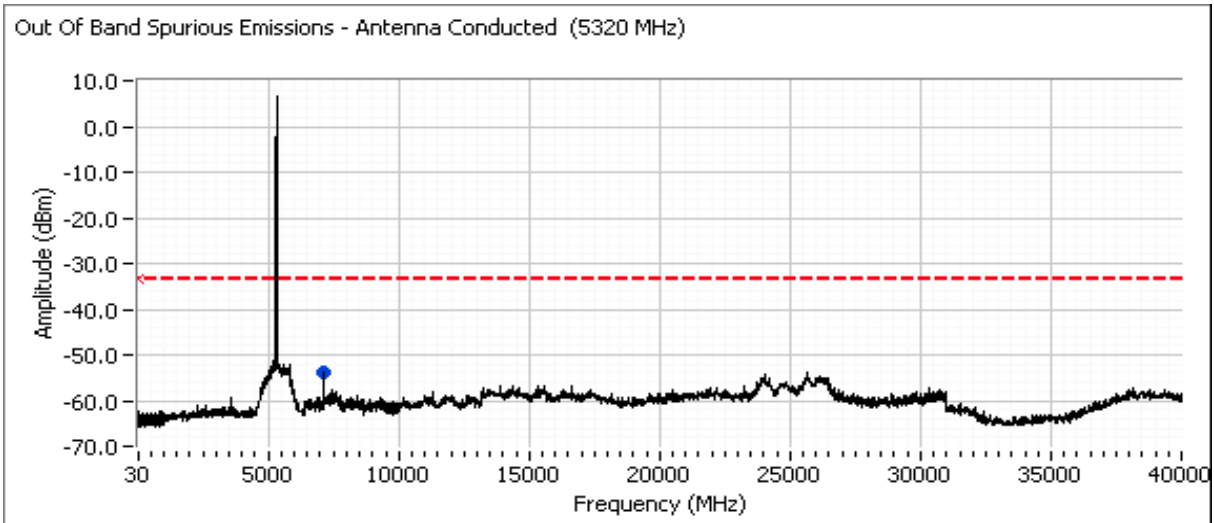
## Center channel, 5250 - 5350 MHz Band (Channel 60, 5300MHz)



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77319
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

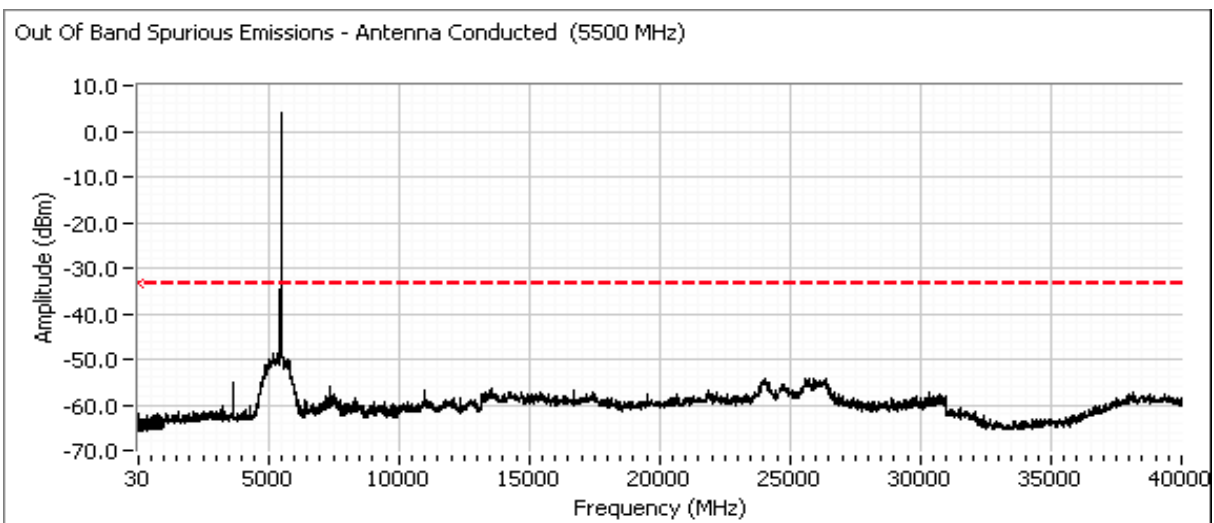
## High channel, 5250 - 5350 MHz Band (Channel 64, 5320MHz)

Compliance with the radiated limits for the restricted band immediately above 5350MHz is demonstrated through the radiated emissions tests.



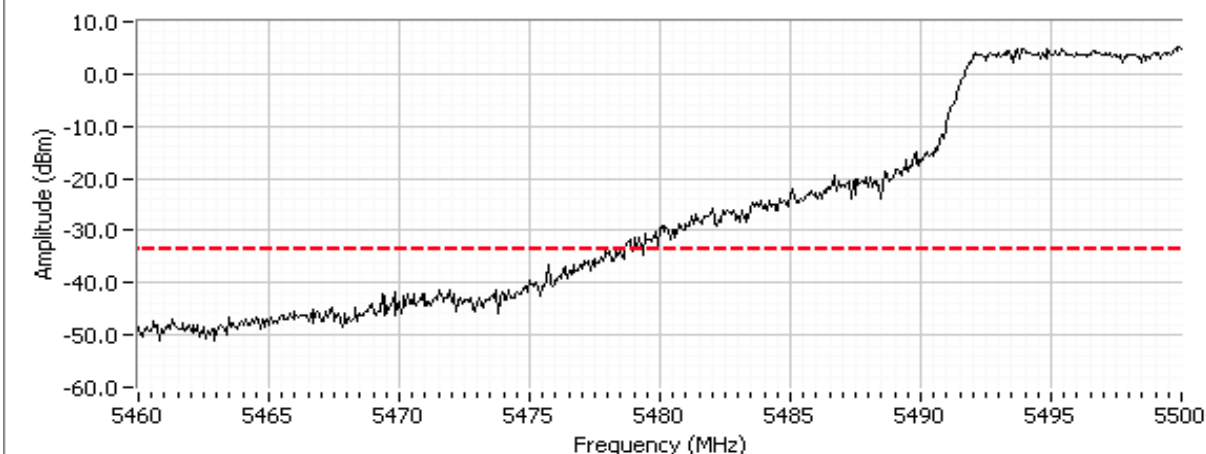
## Low channel, 5470 - 5725 MHz Band (Channel 100, 5500MHz)

Includes a plot from 5460 - 5500 MHz showing compliance with the limit immediately below the allocated band from 5460-5470 MHz. Compliance with the radiated limits for the restricted band below 5460 MHz is demonstrated through the radiated emissions tests.



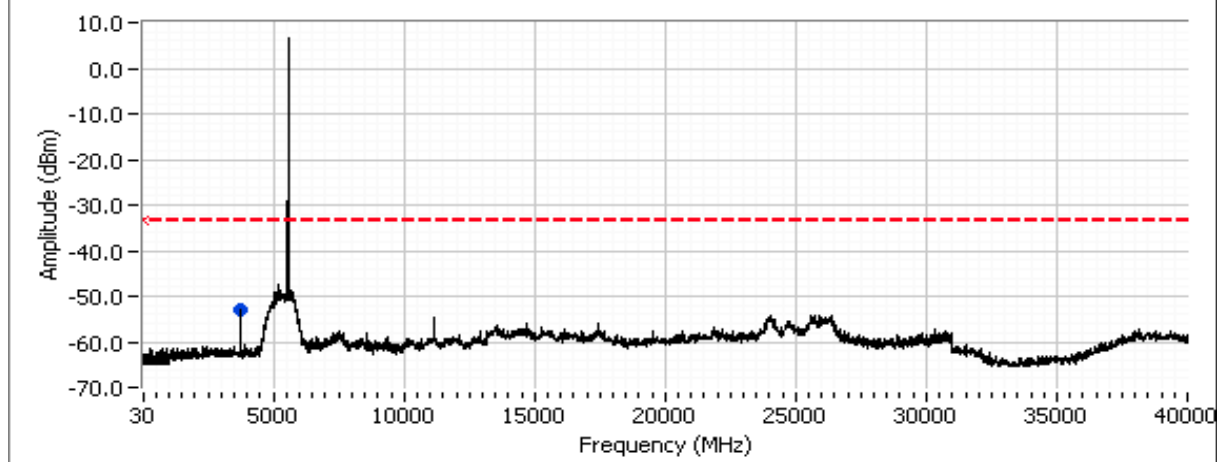
Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77319
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

Out Of Band Spurious Emissions - Antenna Conducted (5460-5470MHz)

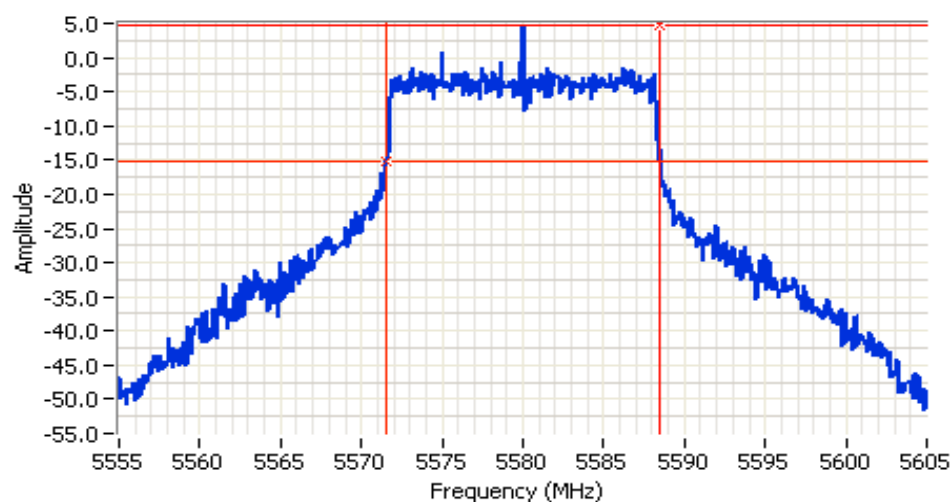


Center channel, 5470 - 5725 MHz Band (Channel 116, 5580MHz)

Out Of Band Spurious Emissions - Antenna Conducted (5580 MHz)



Client: Summit Data Communications	Job Number: J77268
Model: SDC-MSD30AG	T-Log Number: T77319
Contact: Jerry Pohmurski	Account Manager: Christine Krebill
Standard: FCC 15.E/RSS 210	Class: N/A



## Analyzer Settings

HP8564E,EMI  
CF: 5580.000 MHz  
SPAN:50.000 MHz  
RB 100 kHz  
VB 100 kHz  
Detector POS  
Att 10  
RL Offset 10.00  
Sweep Time 50.0ms  
Ref Lvl:10.00DBM

## Comments

20dB BW: 16.9 MHz  
FH: 5588.5 MHz

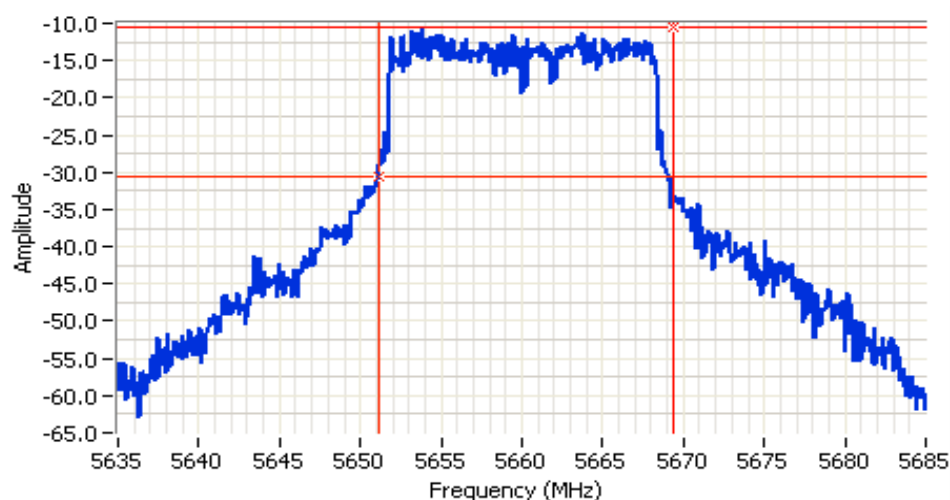
Cursor 1	5588.5000	4.83	
Cursor 2	5571.5833	-15.17	

Delta Freq. 16.917

Delta Amplitude 20.00



Channel adjacent to 5650 MHz



## Analyzer Settings

HP8564E,EMI  
CF: 5660.000 MHz  
SPAN:50.000 MHz  
RB 100 kHz  
VB 100 kHz  
Detector POS  
Att 10  
RL Offset 0.00  
Sweep Time 50.0ms  
Ref Lvl:0.00DBM

## Comments

20dB BW: 18.3 MHz  
FL: 5651.08 MHz

Cursor 1	5669.3333	-10.50	
Cursor 2	5651.0833	-30.50	

Delta Freq. 18.250

Delta Amplitude 20.00



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77319
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Standard:	FCC 15.E/RSS 210	Class:	N/A

## High channel, 5470 - 5725 MHz Band

Includes a plot from 5700 - 5780 MHz showing compliance with the -27dBm/MHz eirp limit immediately above the allocated band (5725 MHz).

