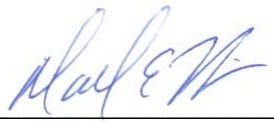
EMC Test Report
Application for Grant of Equipment Authorization
pursuant to
Industry Canada RSS-Gen Issue 2 / RSS 210 Issue 7
FCC Part 15, Subpart E

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

ACCREDITED

Testing Cert #2016-01

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	44.3dBµV/m (164.1µV/m) @ 3720.0MHz (-9.7dB)	Refer to standard	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	45.1dBµV @ 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	± 2.4
Radiated Emissions	0.015 to 30	± 3.0
Radiated Emissions	30 to 1000	± 3.6
Radiated Emissions	1000 to 40000	± 6.0

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The 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 =/-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 6Mbs 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.

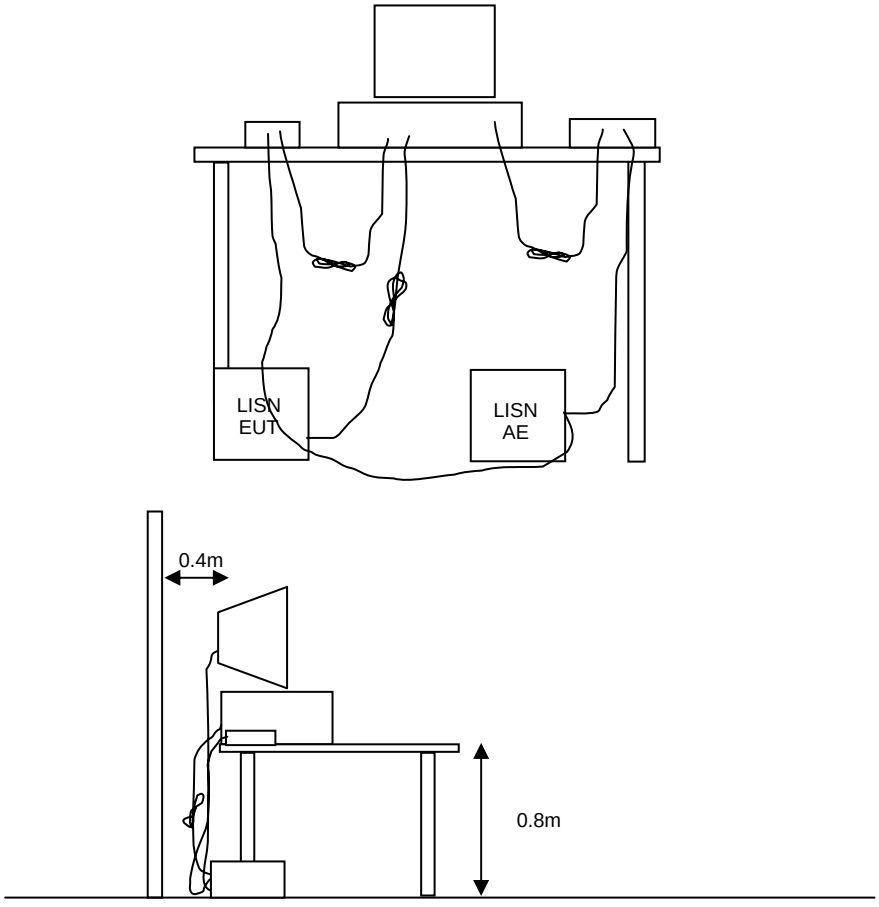
TEST PROCEDURES

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.



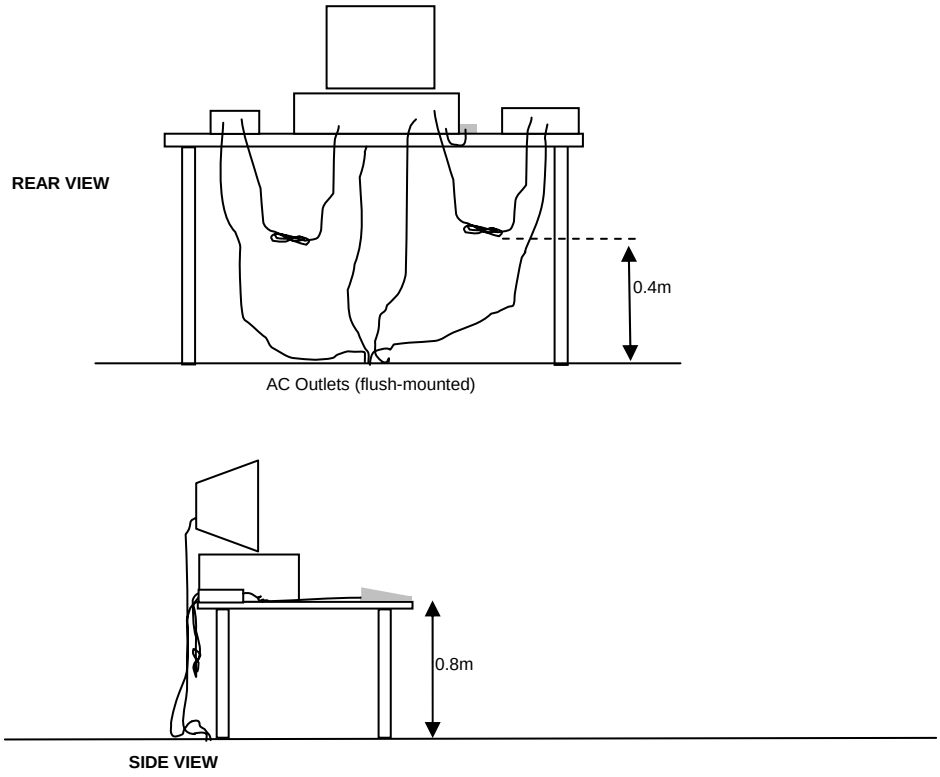
RADIATED EMISSIONS

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.

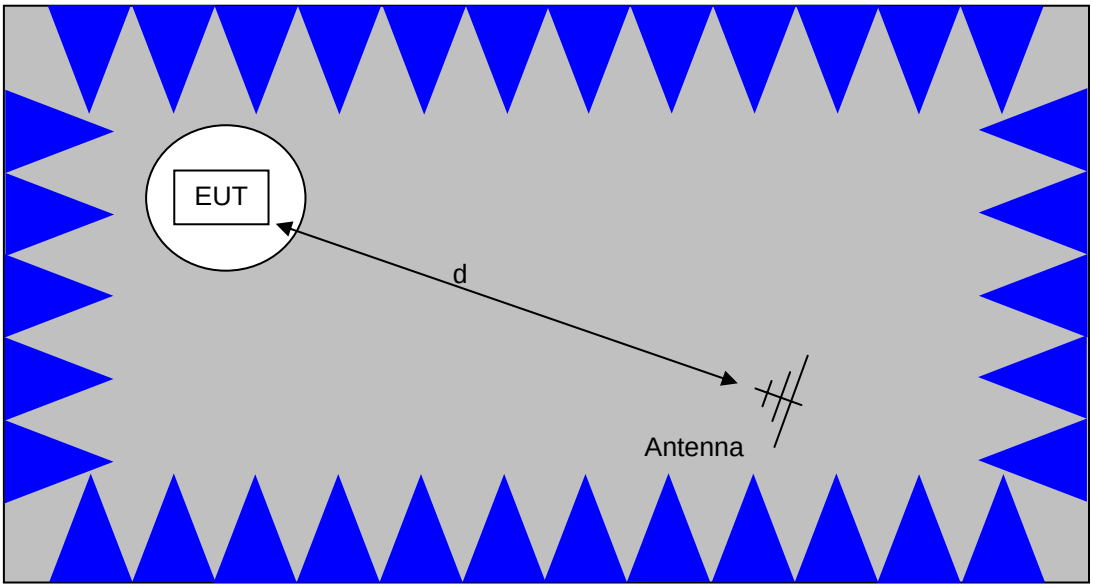
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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 1meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.

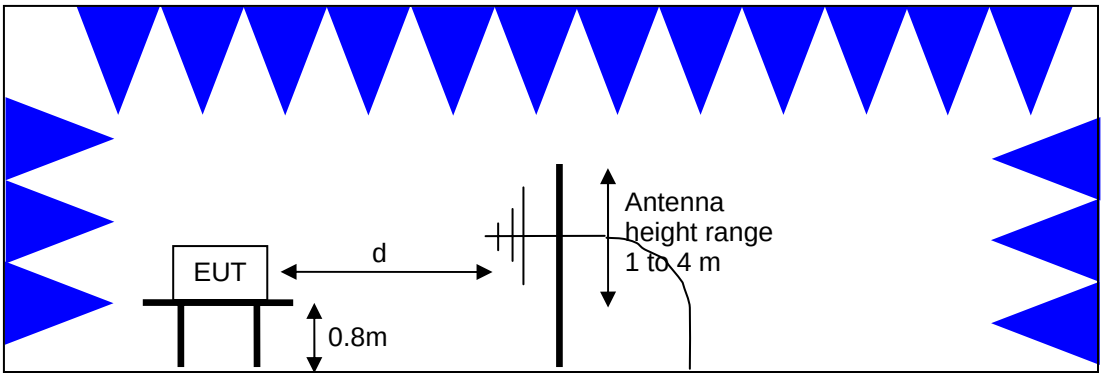


Typical Test Configuration for Radiated Field Strength Measurements



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

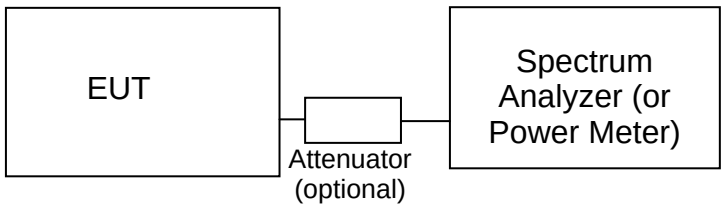
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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

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[1] (with the exception of transmitters operating under FCC Part 15 Subpart D and RSS 210 Annex 9), the limits for all emissions from a low power device operating under the general rules of RSS 310 (tables 3 and 4), RSS 210 (table 2) and FCC Part 15 Subpart C section 15.209.

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

[1] 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)[2] 1W (30dBm) eirp	11 dBm/MHz
5470 - 5725	250 mW (24 dBm)[3] 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 10log(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.

[2] If EIRP exceeds 500mW the device must employ TPC
[3] 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:

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

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

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

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

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION

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

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

where P is the eirp (Watts)

Appendix A Test Equipment Calibration Data

Radiated Emissions, 30 - 6,500 MHz, 11-Nov-09

Manufacturer	Description	Model	Asset #	Cal Due
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

Manufacturer	Description	Model	Asset #	Cal Due
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

Manufacturer	Description	Model	Asset #	Cal Due
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

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

, 12-Mar-09

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

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

Manufacturer	Description	Model	Asset #	Cal Due
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

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
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
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
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
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
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
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	dBµV/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

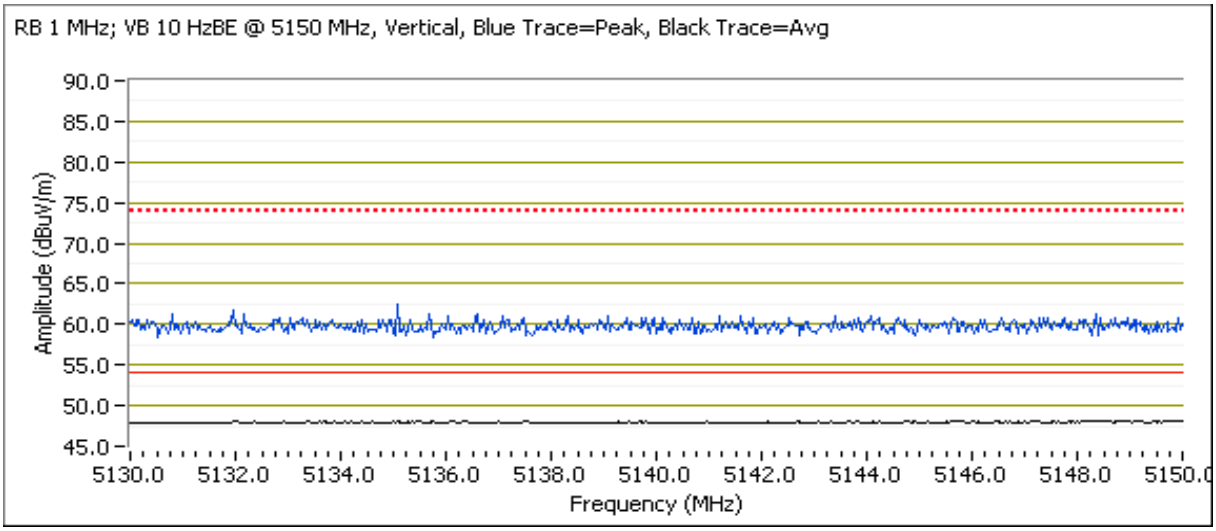
Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5135.270	49.6	V	54.0	-4.4	AVG	62	1.4	
5142.000	49.4	H	54.0	-4.6	AVG	134	1.4	
5141.000	61.2	V	74.0	-12.8	PK	62	1.4	
5144.870	61.4	H	74.0	-12.6	PK	134	1.4	

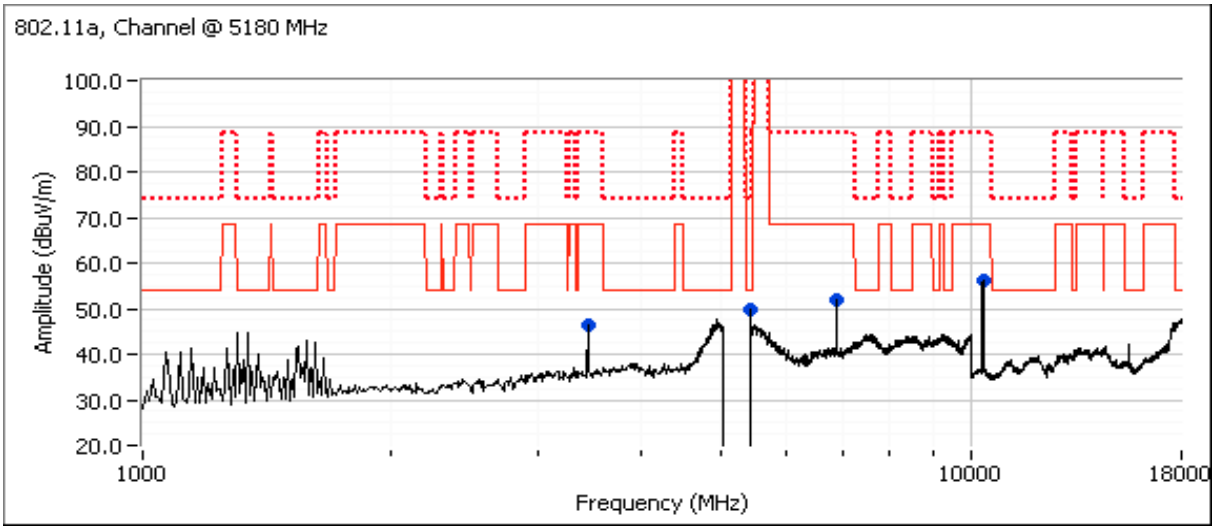
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/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 (~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
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A





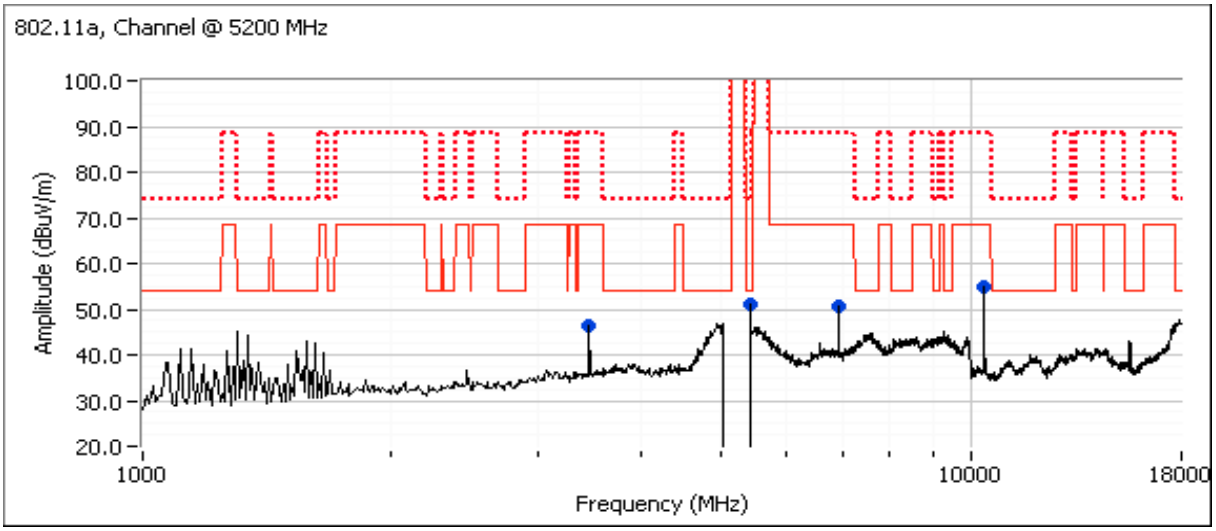
Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

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 average limit was set to -27dBm/MHz (~68dBuV/m).
Note 2:	No spurious emissions were found above 18GHz



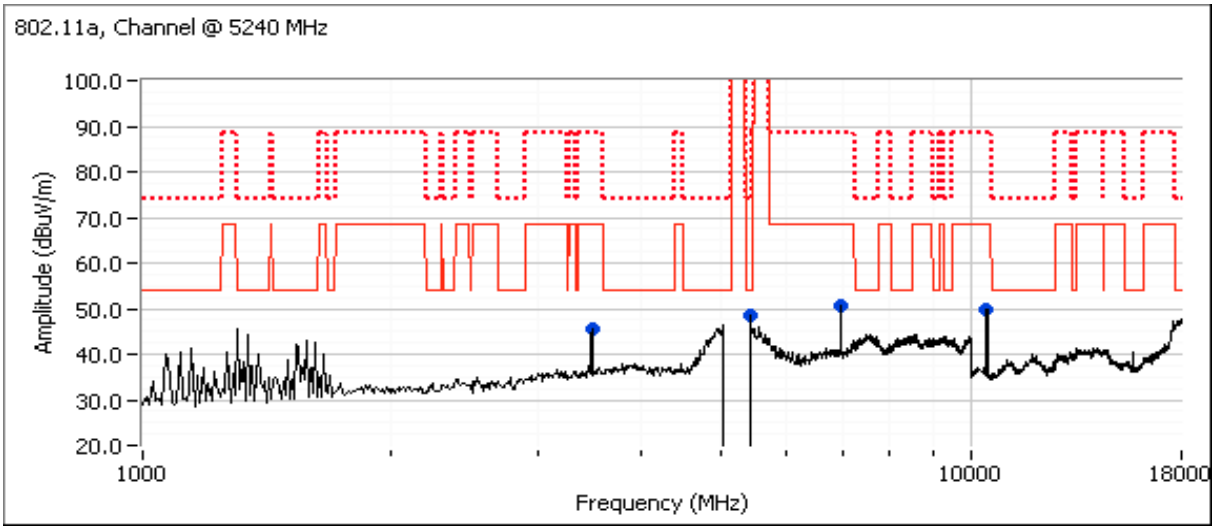
Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

Run #1c: High Channel @ 5240 MHz

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
3493.350	44.3	V	68.3	-24.0	AVG	19	1.0	
5438.860	39.9	V	54.0	-14.1	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 (~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
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
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

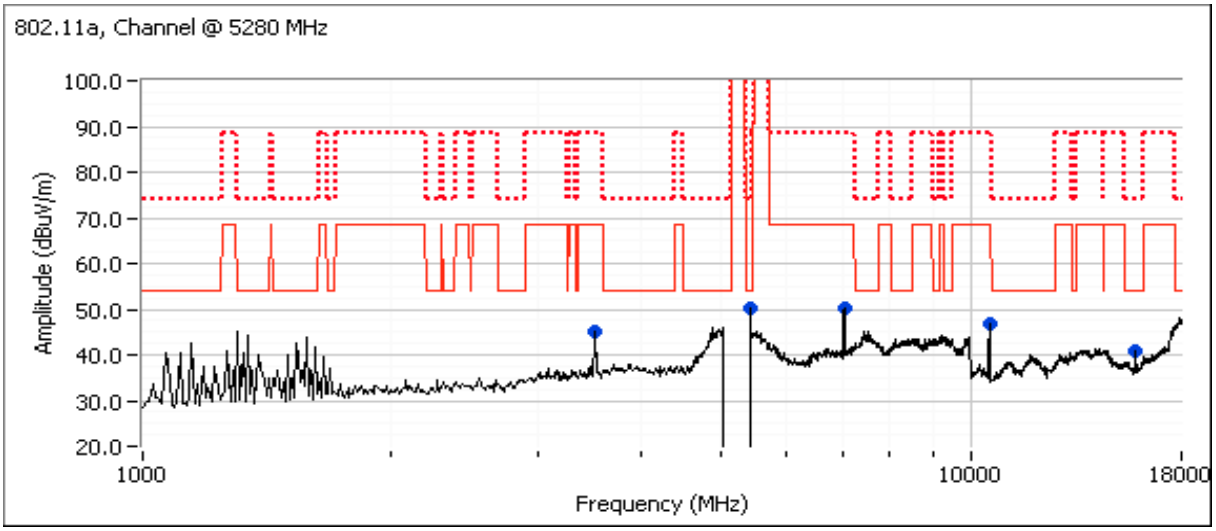
Run #2a: Low Channel @ 5280 MHz

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	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
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



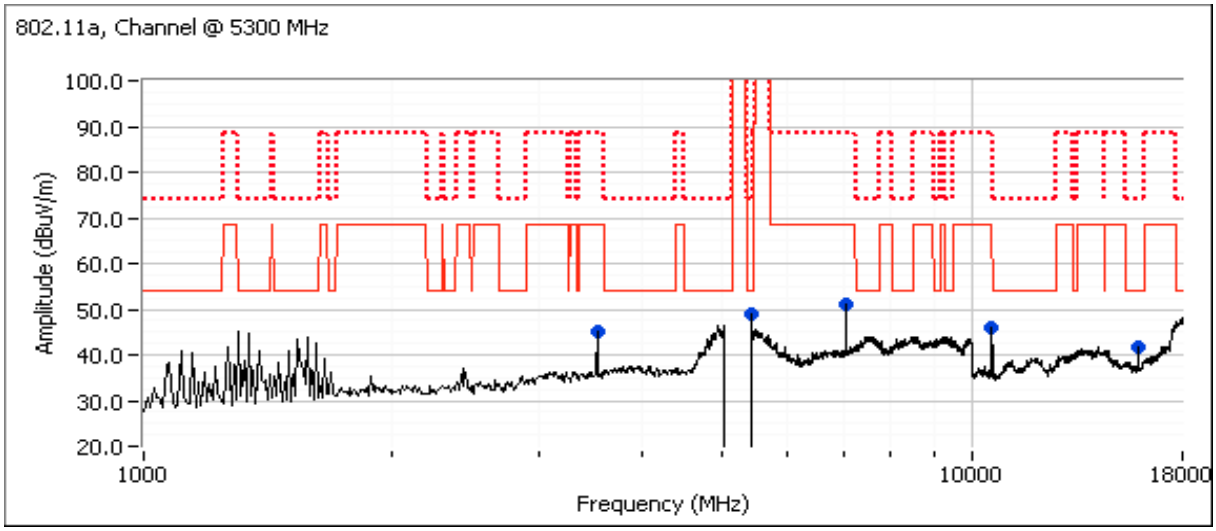
Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

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
15902.810	41.7	H	54.0	-12.3	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 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
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
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

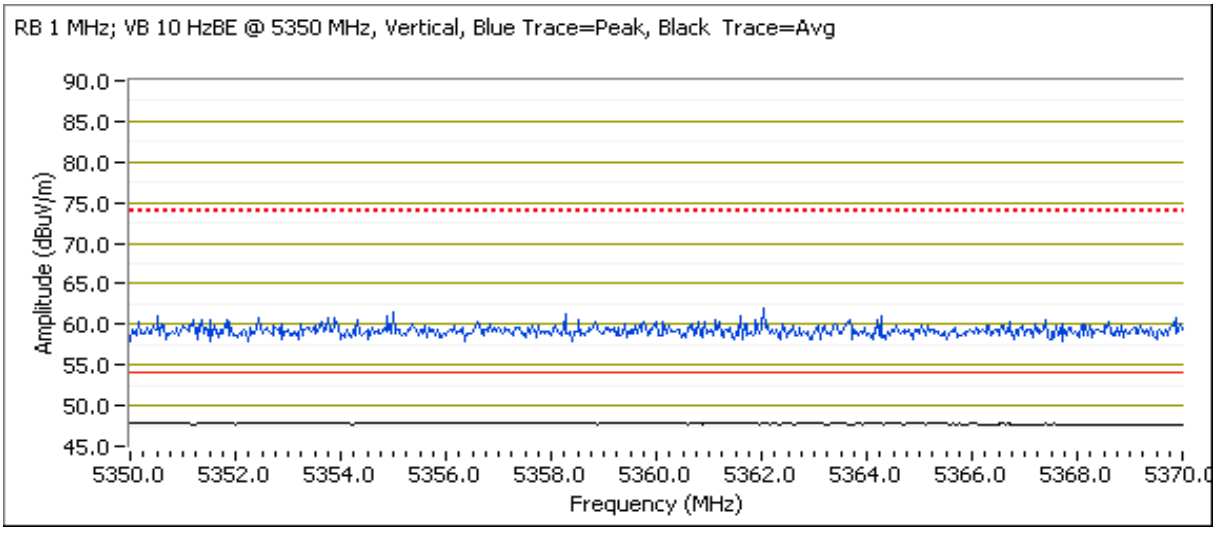
Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.000	49.1	H	54.0	-4.9	AVG	222	1.3	
5350.230	49.2	V	54.0	-4.8	AVG	226	2.1	
5356.670	61.1	V	74.0	-12.9	PK	226	2.1	
5367.330	60.7	H	74.0	-13.3	PK	222	1.3	

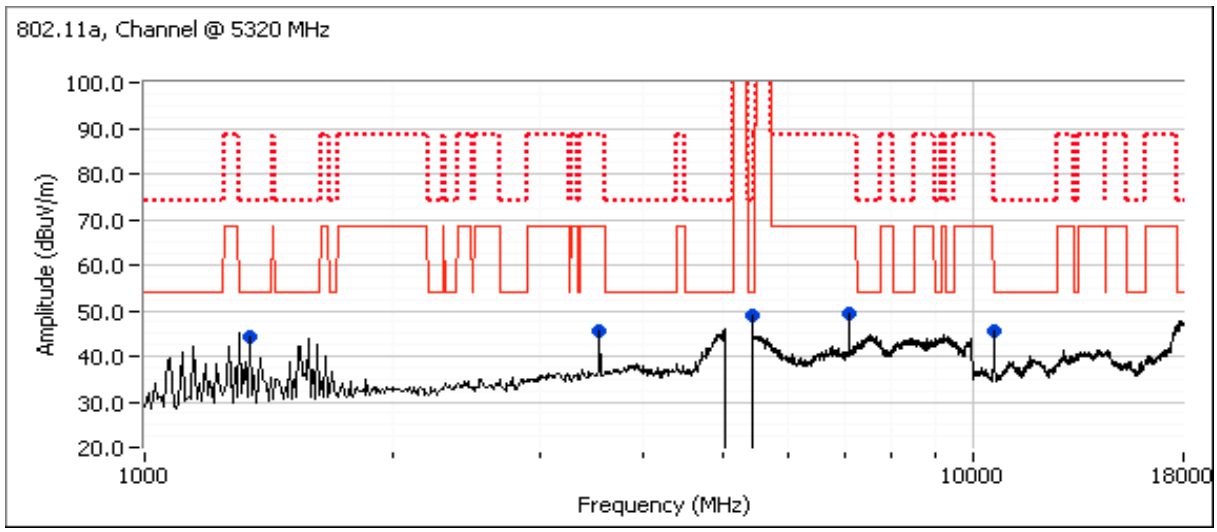
Spurious Radiated Emissions:

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
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A





Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
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	dBµV/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	dBµV/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

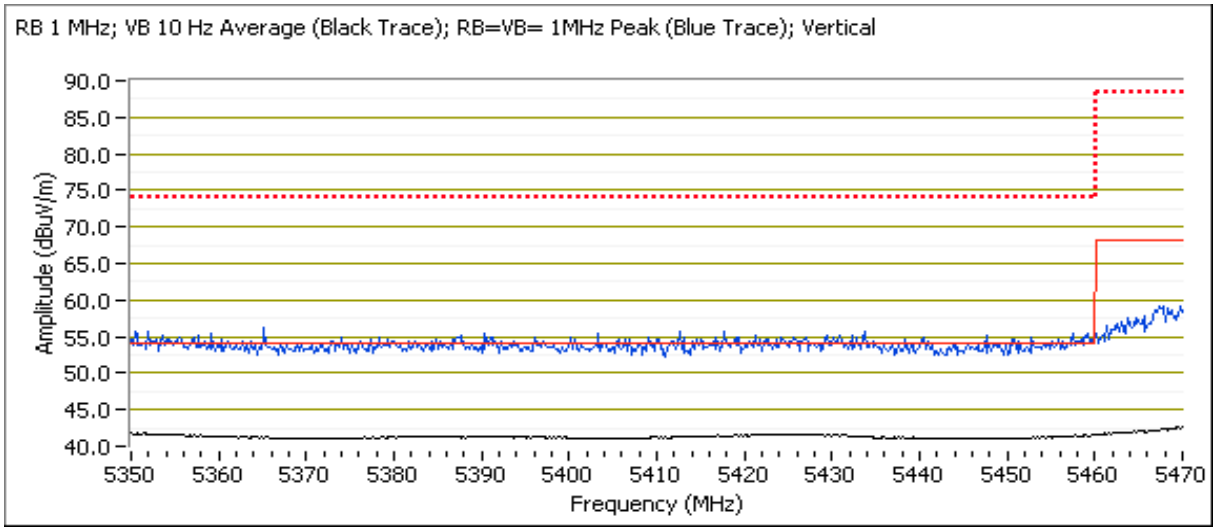
Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5469.750	44.5	V	68.3	-23.8	AVG	60	1.4	
5468.100	60.0	V	88.3	-28.3	PK	60	1.4	

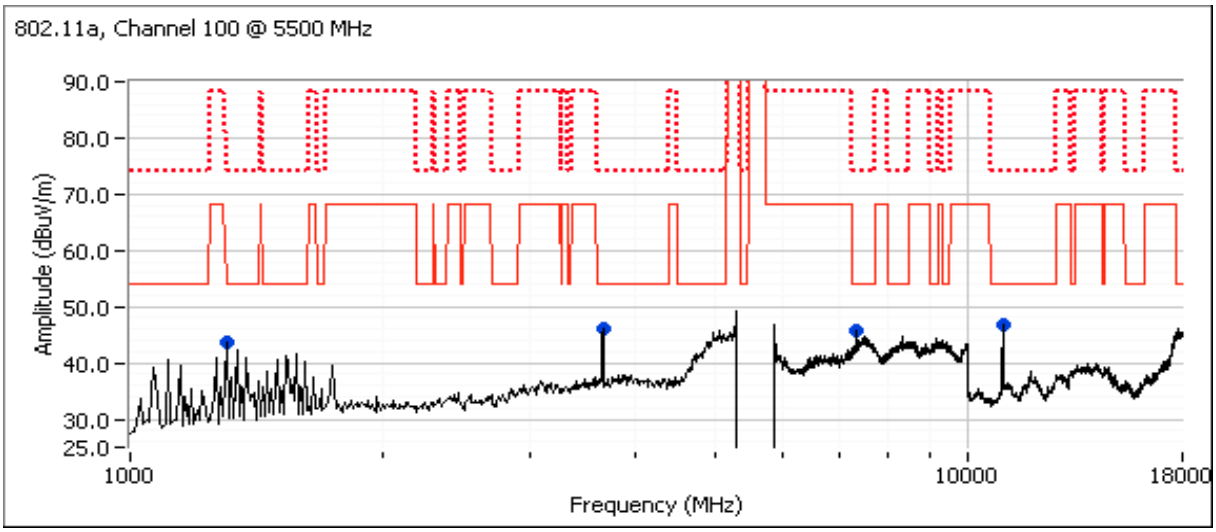
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/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 (~68dBuV/m).

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





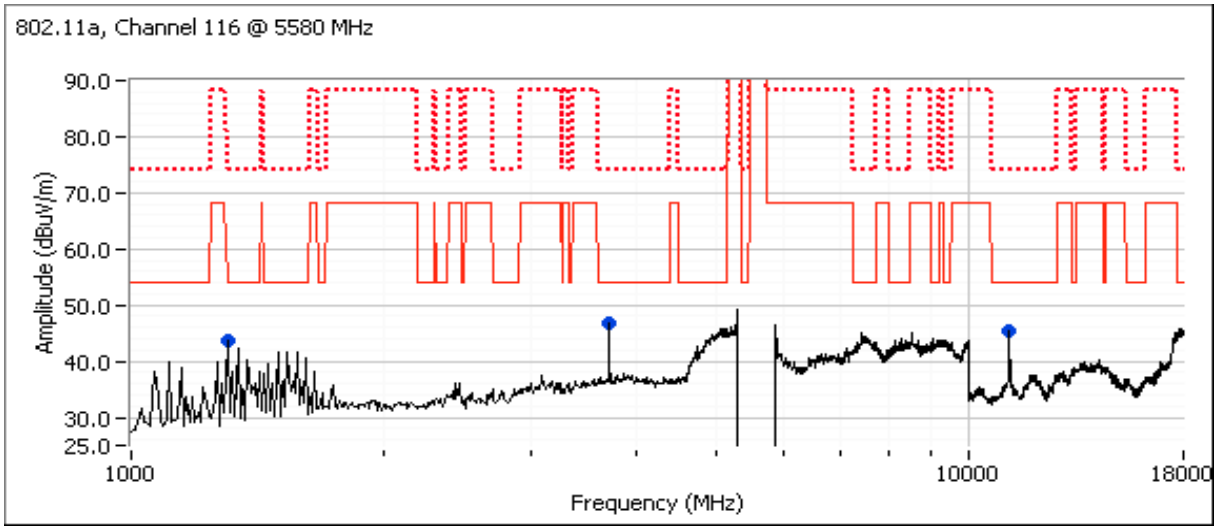
Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

Run #3b: Center Channel

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/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).



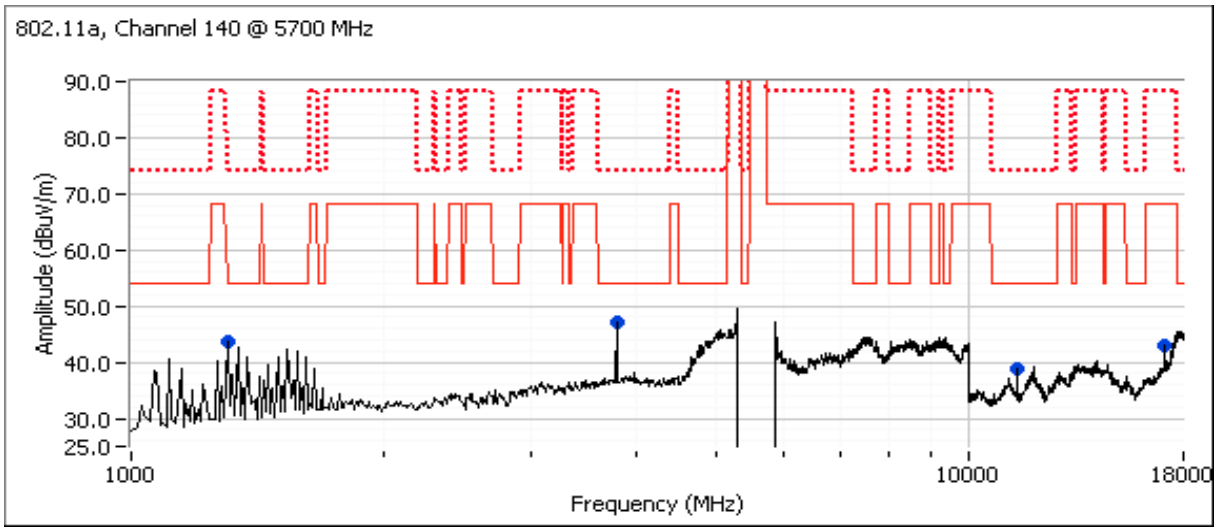
Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

Run #3c: High Channel

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/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 (~68dBuV/m).



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
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
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
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
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
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	dBµV/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

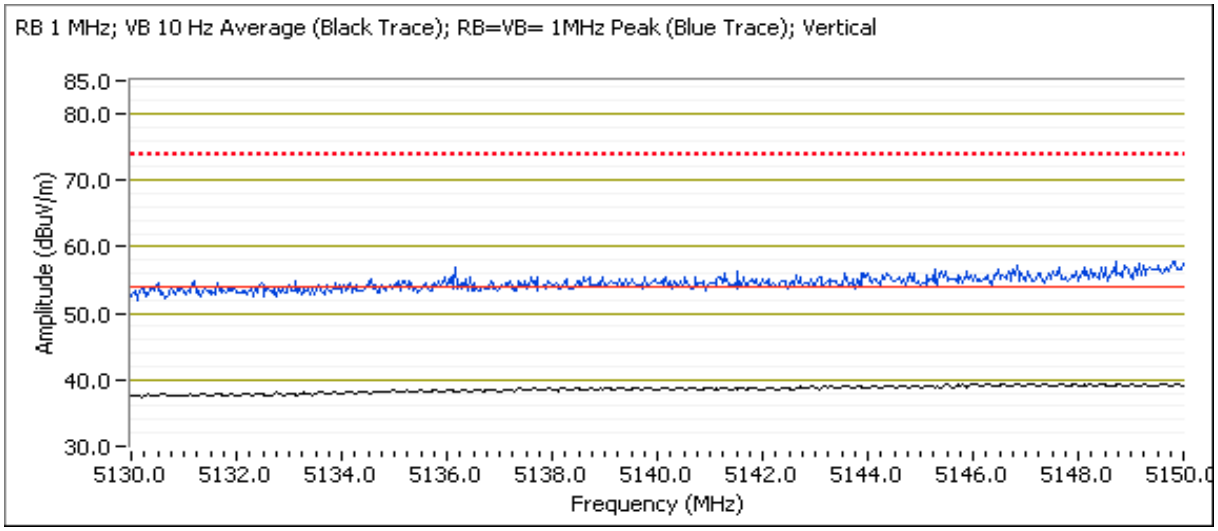
Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5130.600	50.1	H	54.0	-3.9	AVG	120	1.5	
5147.670	51.1	V	54.0	-2.9	AVG	162	1.0	
5130.530	61.7	H	74.0	-12.3	PK	120	1.5	
5149.300	64.2	V	74.0	-9.8	PK	162	1.0	

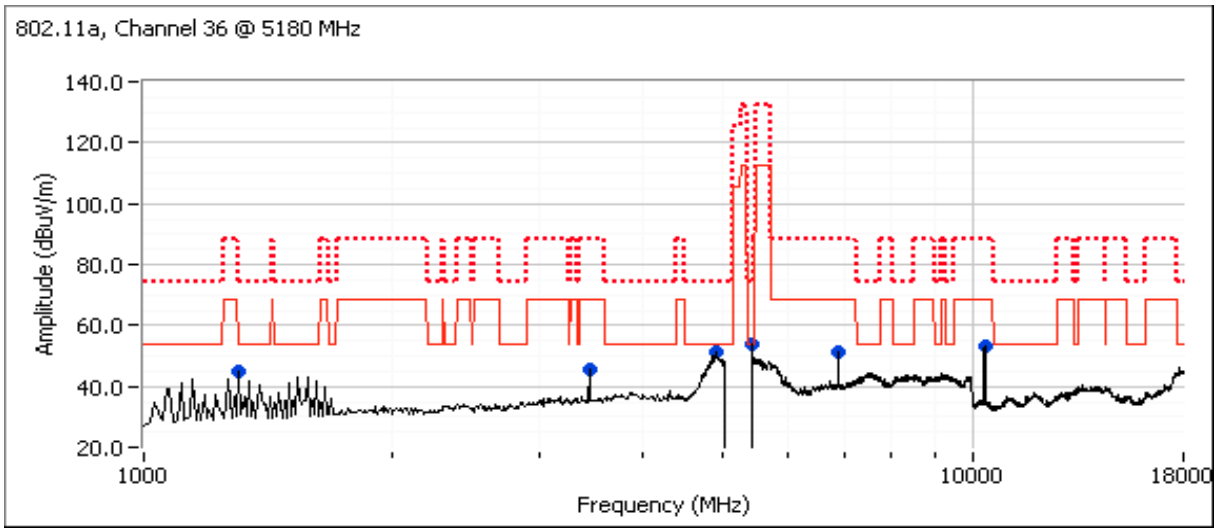
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/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	
5418.440	44.4	V	54.0	-9.6	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 (~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
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A





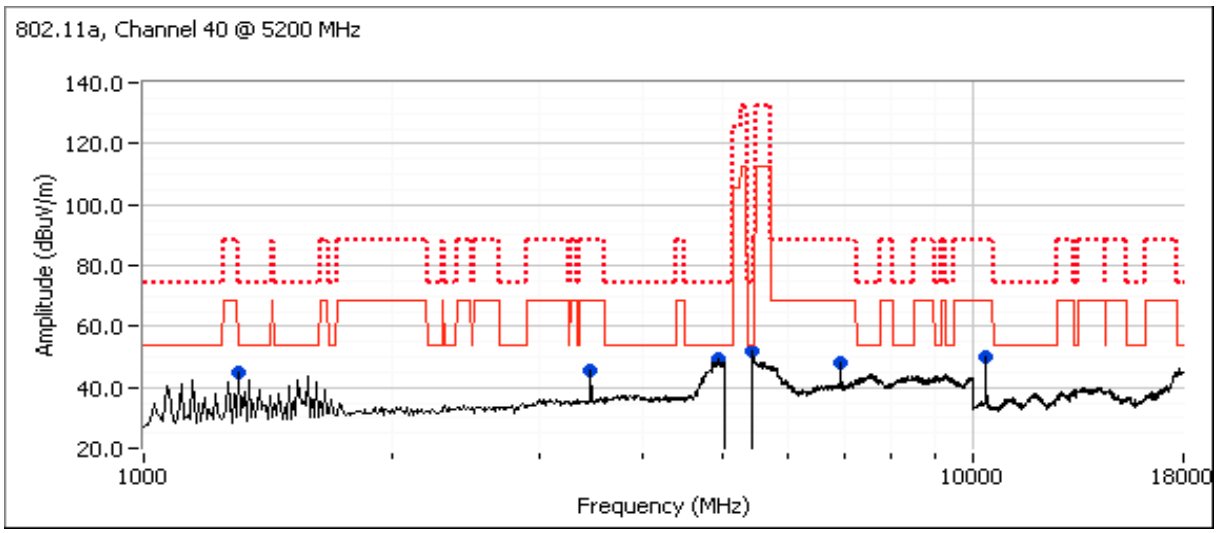
Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

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	
5415.830	44.9	V	54.0	-9.1	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



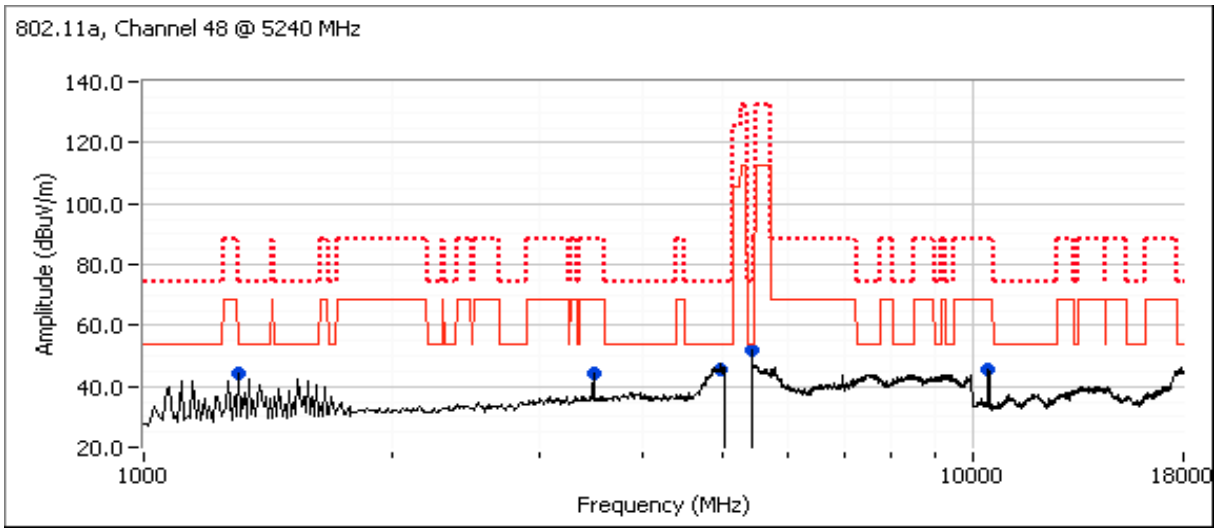
Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

Run #1c: High Channel @ 5240 MHz

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/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	
1306.340	43.4	V	54.0	-10.6	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
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
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

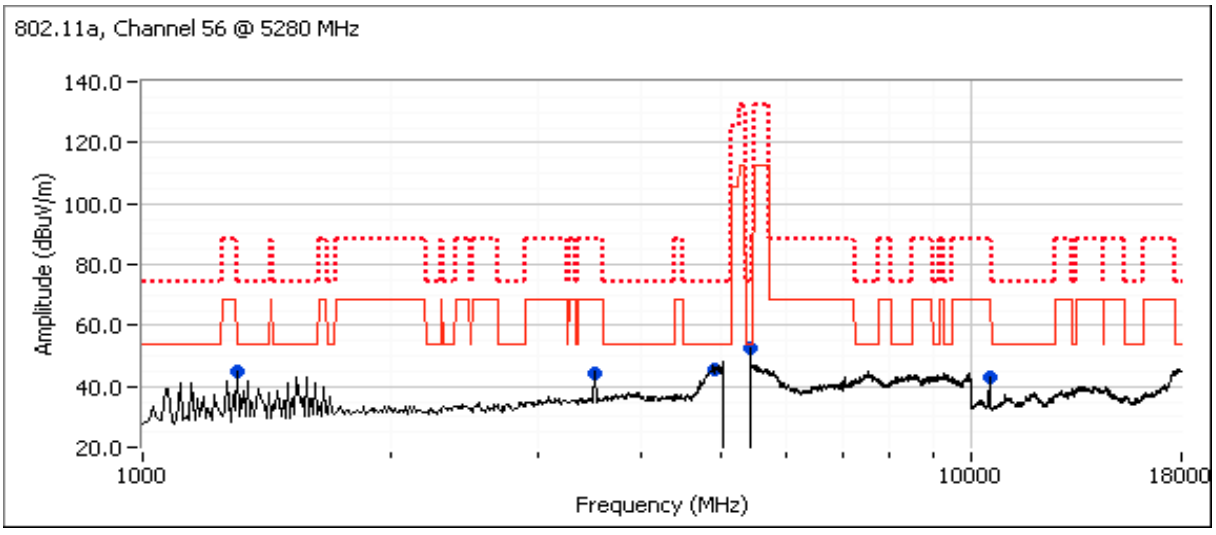
Date: 1/11/2010 Engineer: Joseph Cadigal Location: FT Chamber #3

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	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
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



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

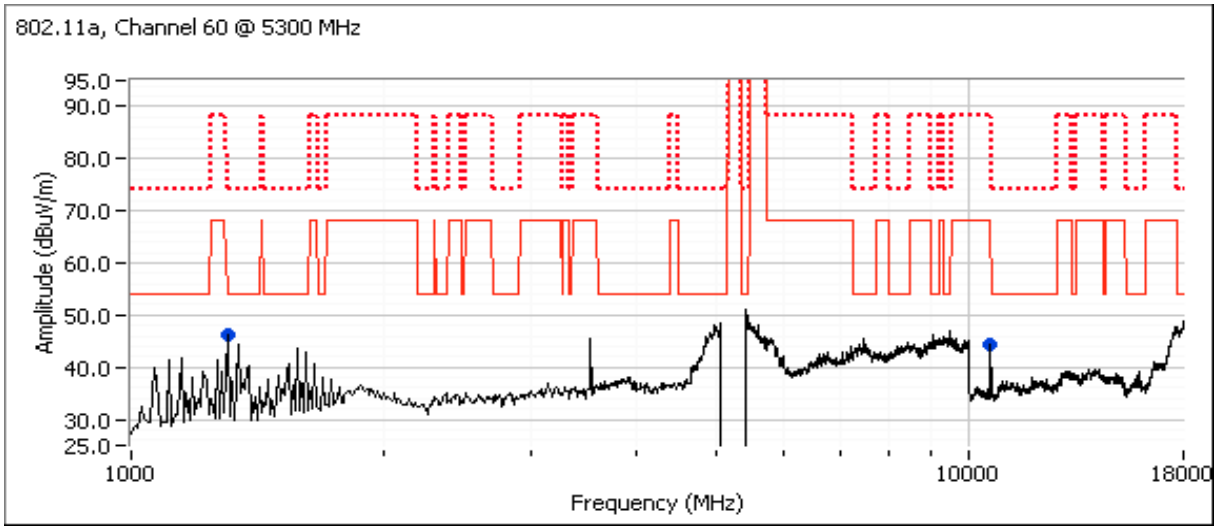
Run #2b: Center Channel @ 5300 MHz

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	dBµV/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 (~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
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
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	dBµV/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	dBµV/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	

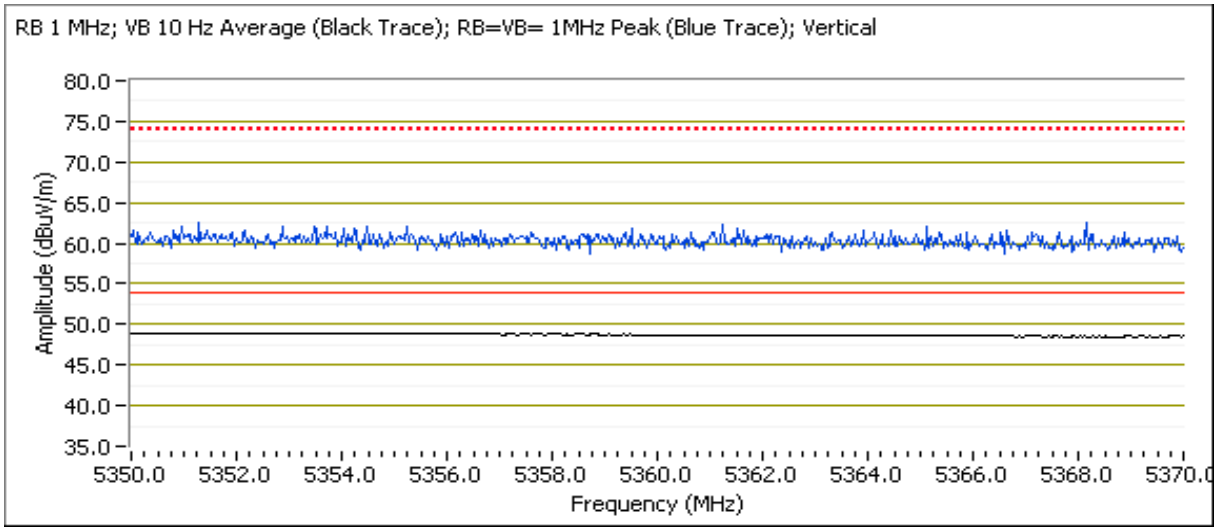
Spurious Radiated Emissions:

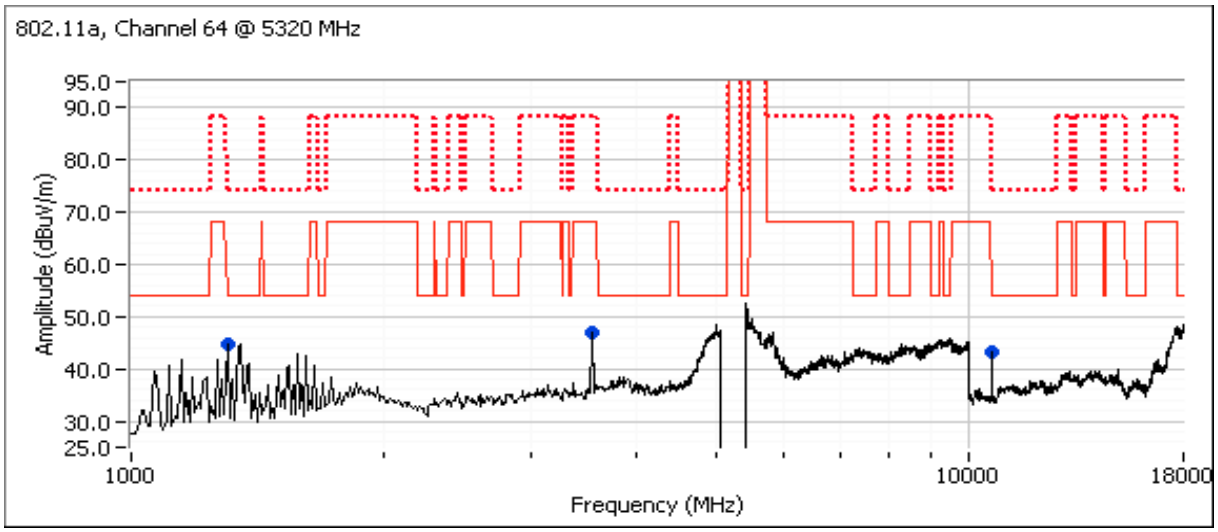
Date: 1/12/2010 Engineer: Mehran Birgani Location: FT Chamber #5

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/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 (~68dBuV/m).

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





Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
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	dBµV/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	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5457.300	50.2	H	54.0	-3.8	AVG	123	1.1	
5458.690	50.7	V	54.0	-3.3	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	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5469.260	50.2	H	68.3	-18.1	AVG	123	1.1	
5469.880	51.4	V	68.3	-16.9	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	

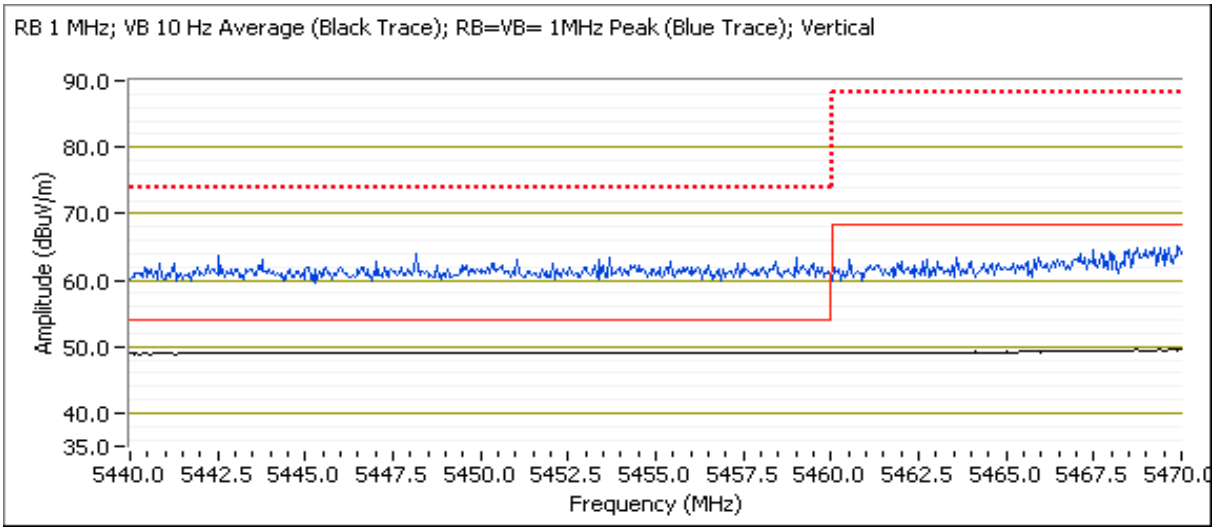
Spurious Radiated Emissions:

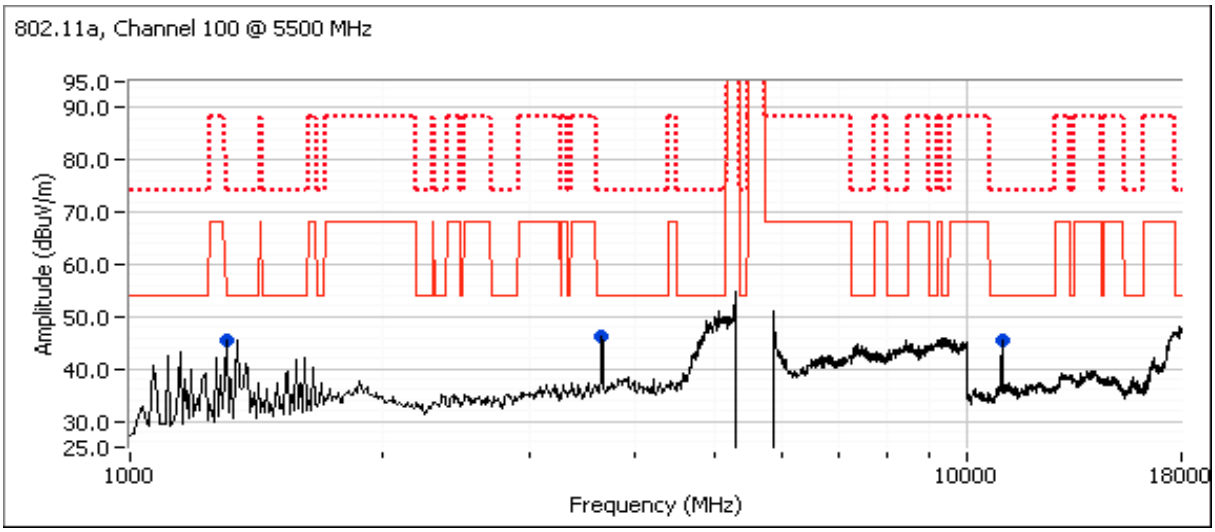
Date: 1/12/2010 Engineer: Mehran Birgani Location: FT Chamber #5

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/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
3658.330	46.4	H	54.0	-7.6	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 (~68dBuV/m).

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





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

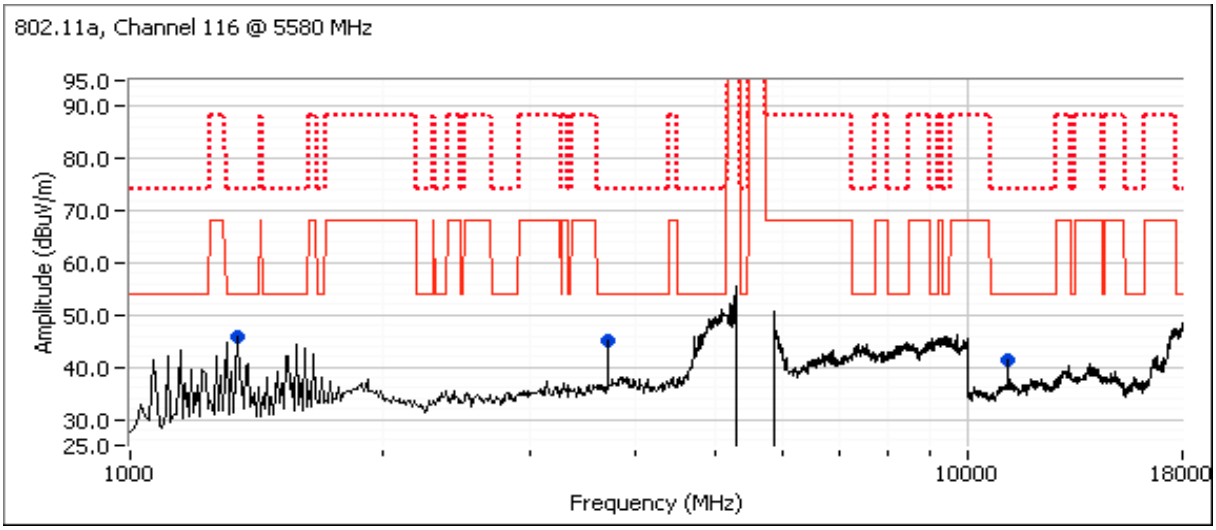
Run #3b: Center Channel @ 5580 MHz

Date: 1/12/2010 Engineer: Mehran Birgani Location: FT Chamber #5

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
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 (~68dBuV/m).



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

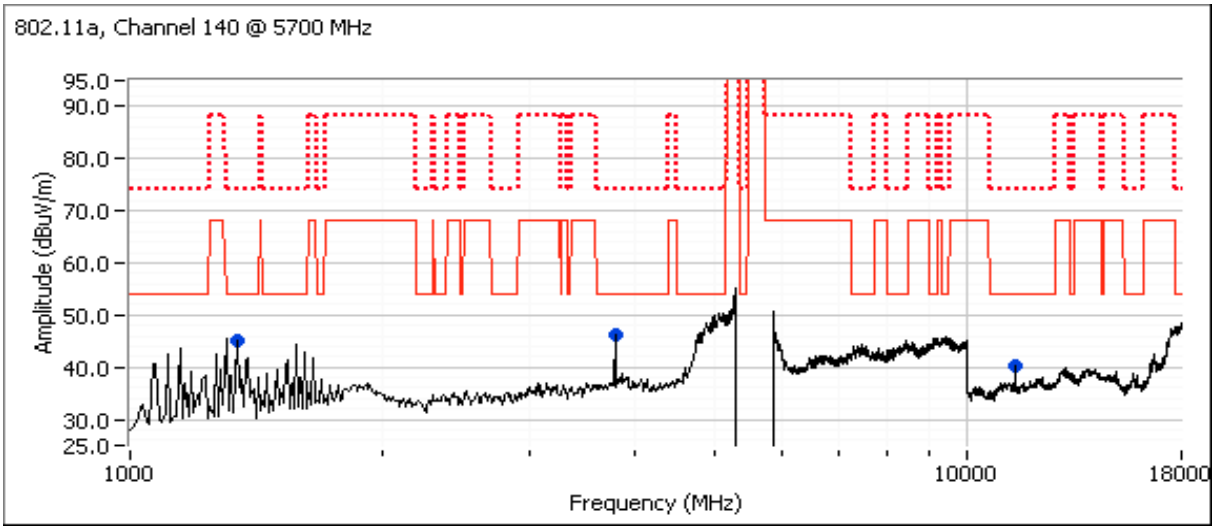
Run #3c: High Channel @ 5700 MHz

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
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
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.

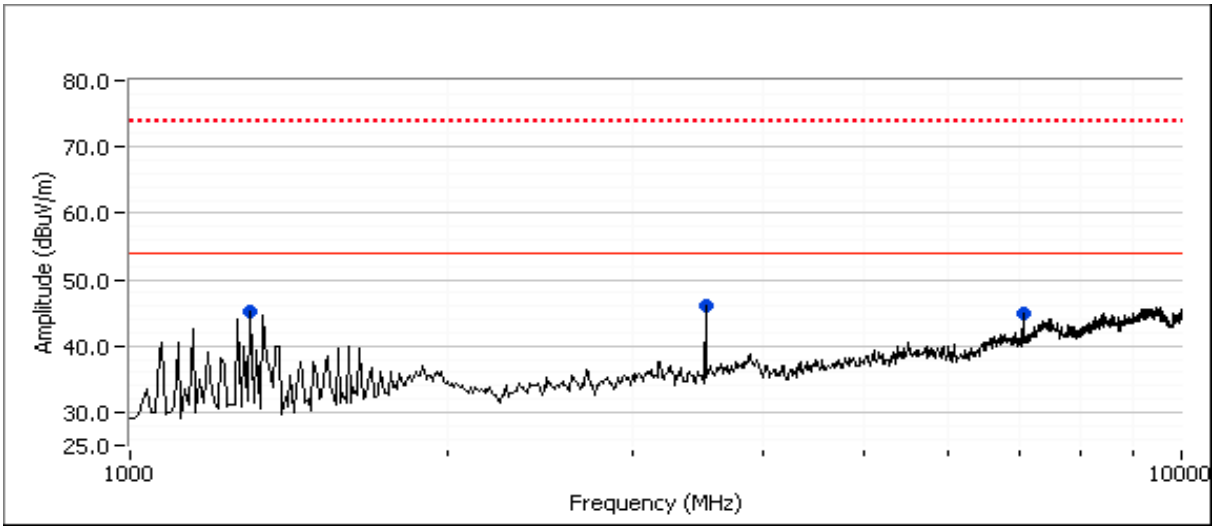
Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

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	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1306.440	41.2	H	54.0	-12.8	AVG	249	1.0	
3533.350	44.2	H	54.0	-9.8	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.



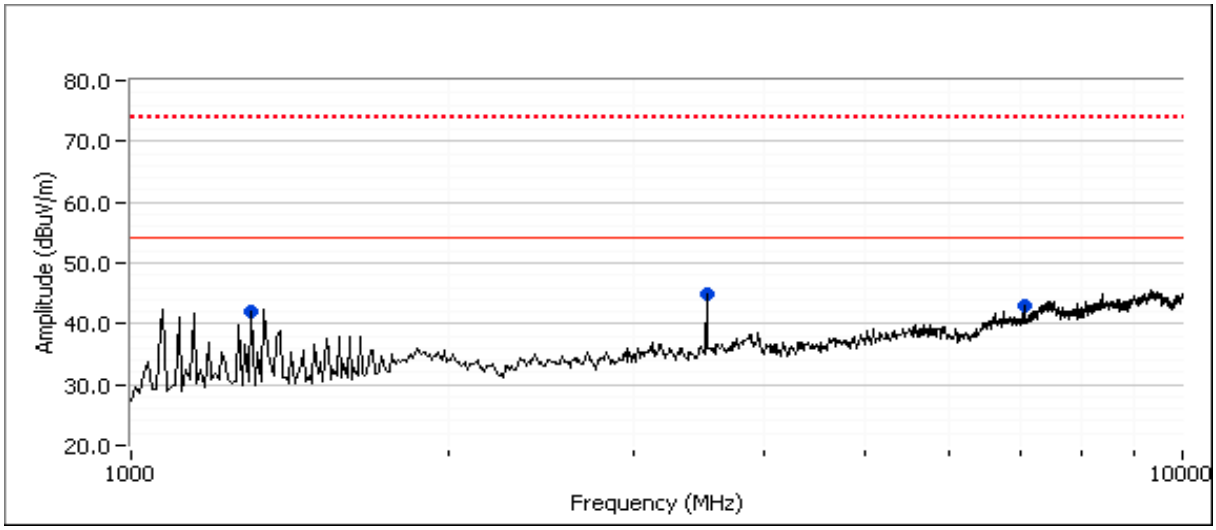
Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

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	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1306.390	40.0	H	54.0	-14.0	AVG	248	1.6	
3533.390	42.6	H	54.0	-11.4	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.



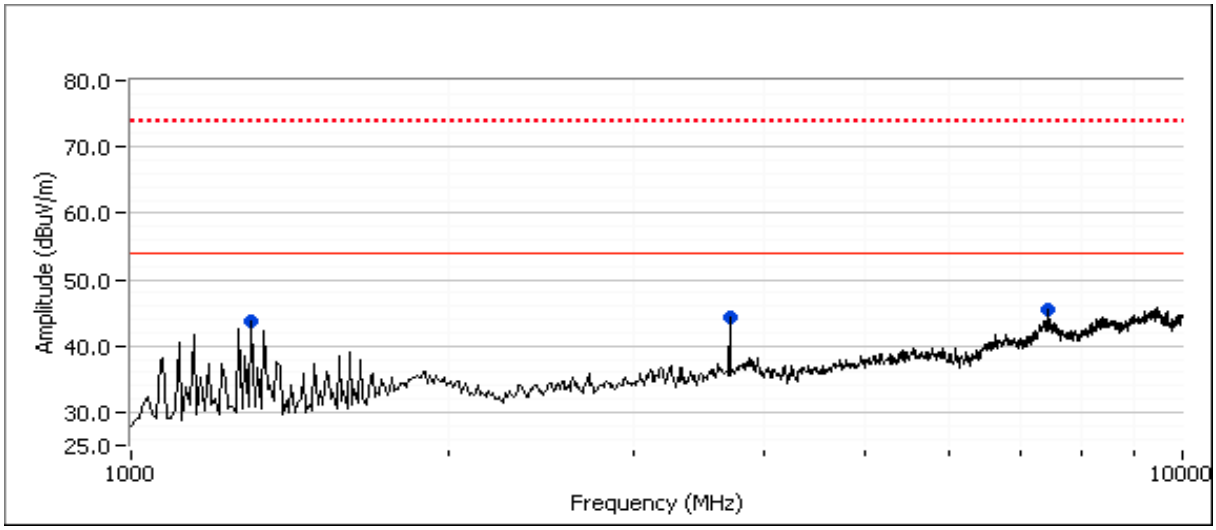
Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

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

Date: 1/13/2010 Engineer: Mehran Birgani Location: FT Chamber #5

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1306.440	41.2	H	54.0	-12.8	AVG	244	1.0	
3720.020	44.3	H	54.0	-9.7	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.

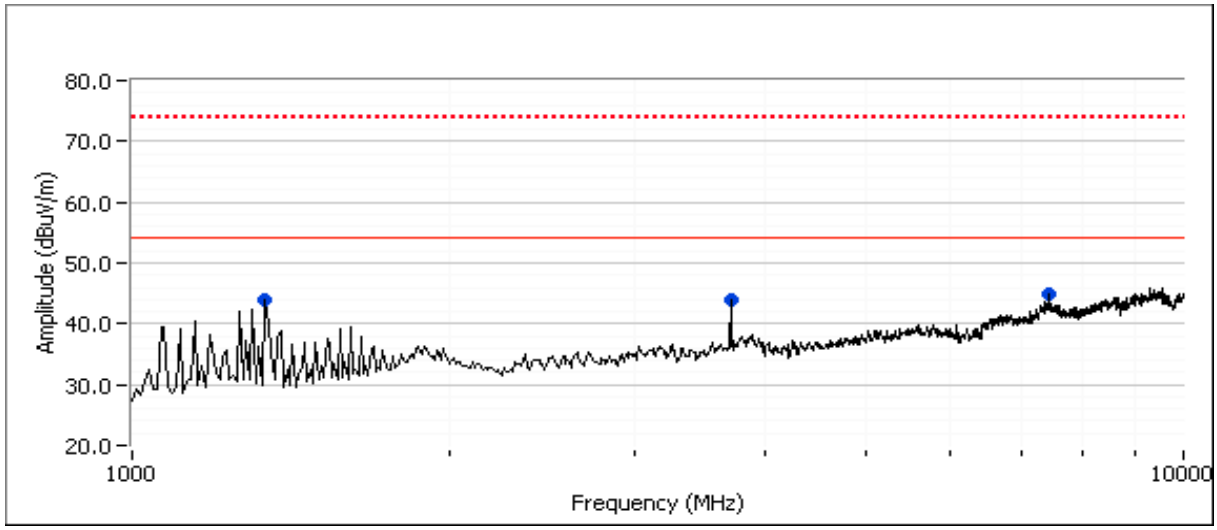


Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77318
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

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	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1289.850	25.5	V	54.0	-28.5	AVG	274	1.0	
3720.060	42.6	H	54.0	-11.4	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.

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
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
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
Test Engineer: Mehran Birgani
Test Location: FT Chamber #5

Config. Used: 1
Config Change: None
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
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

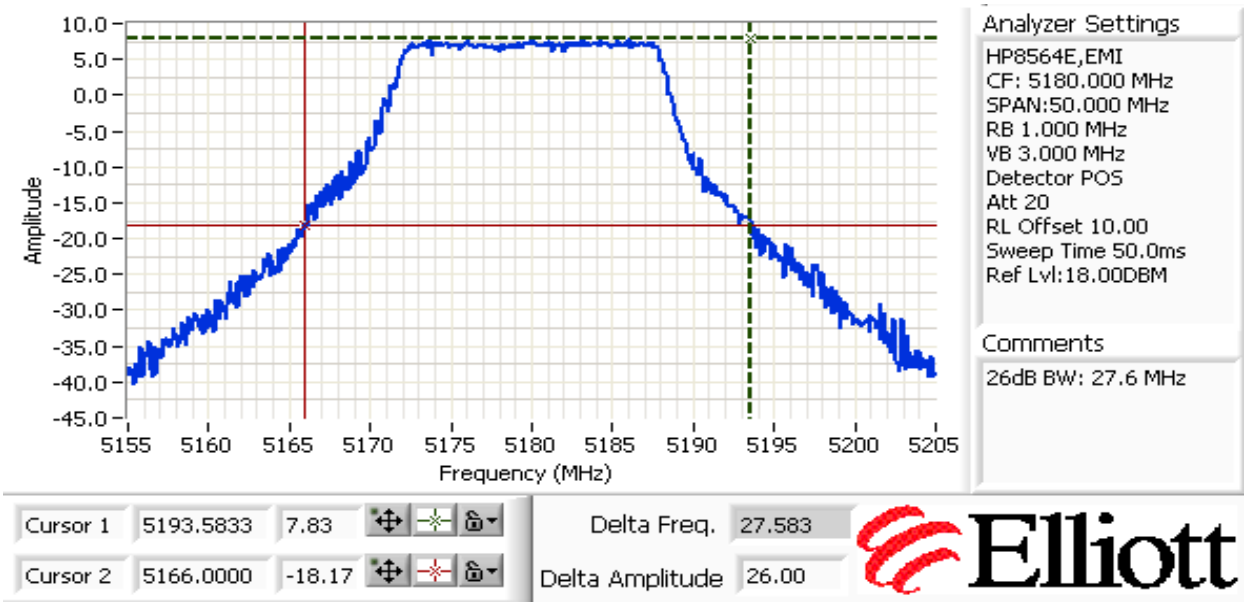
Run #1: Bandwidth, Output Power and Power spectral Density

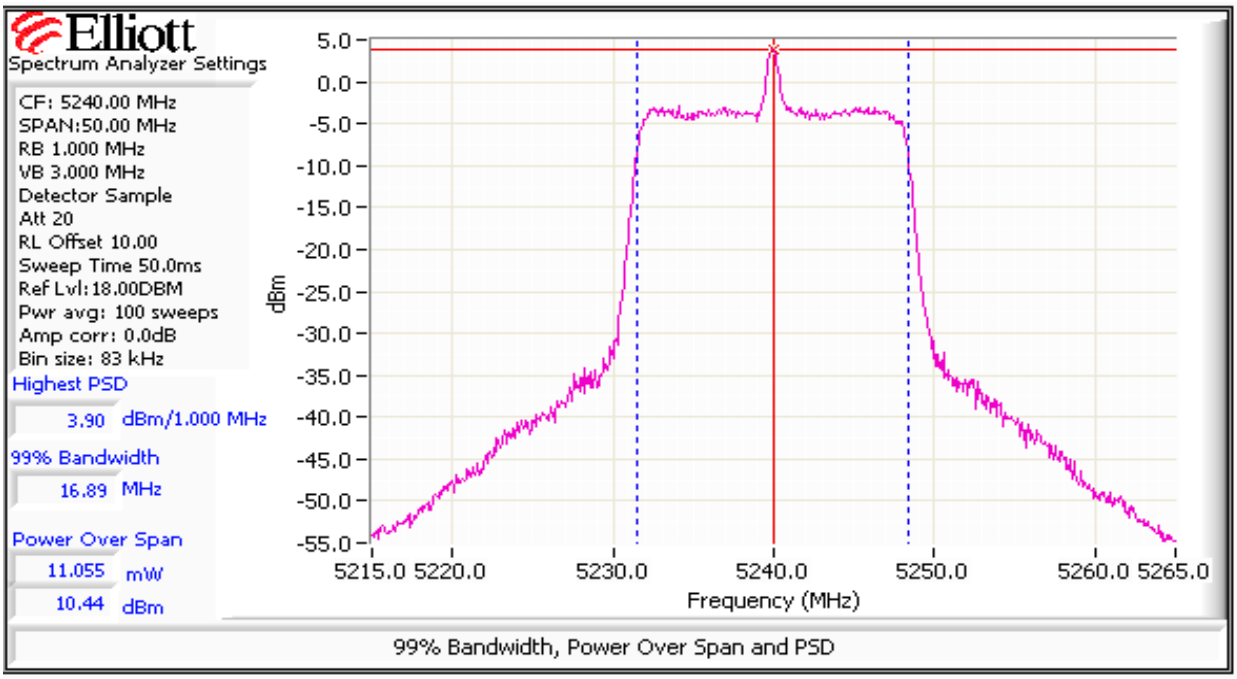
Antenna Gain (dBi): 6.5

Frequency (MHz)	Software Setting	Bandwidth		Output Power[1] dBm		Power (Watts)	PSD[2] dBm/MHz			Result
		26dB	99%[4]	Measured	Limit		Measured	FCC Limit	RSS Limit[3]	
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
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A





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

Run #2: Peak Excursion Measurement

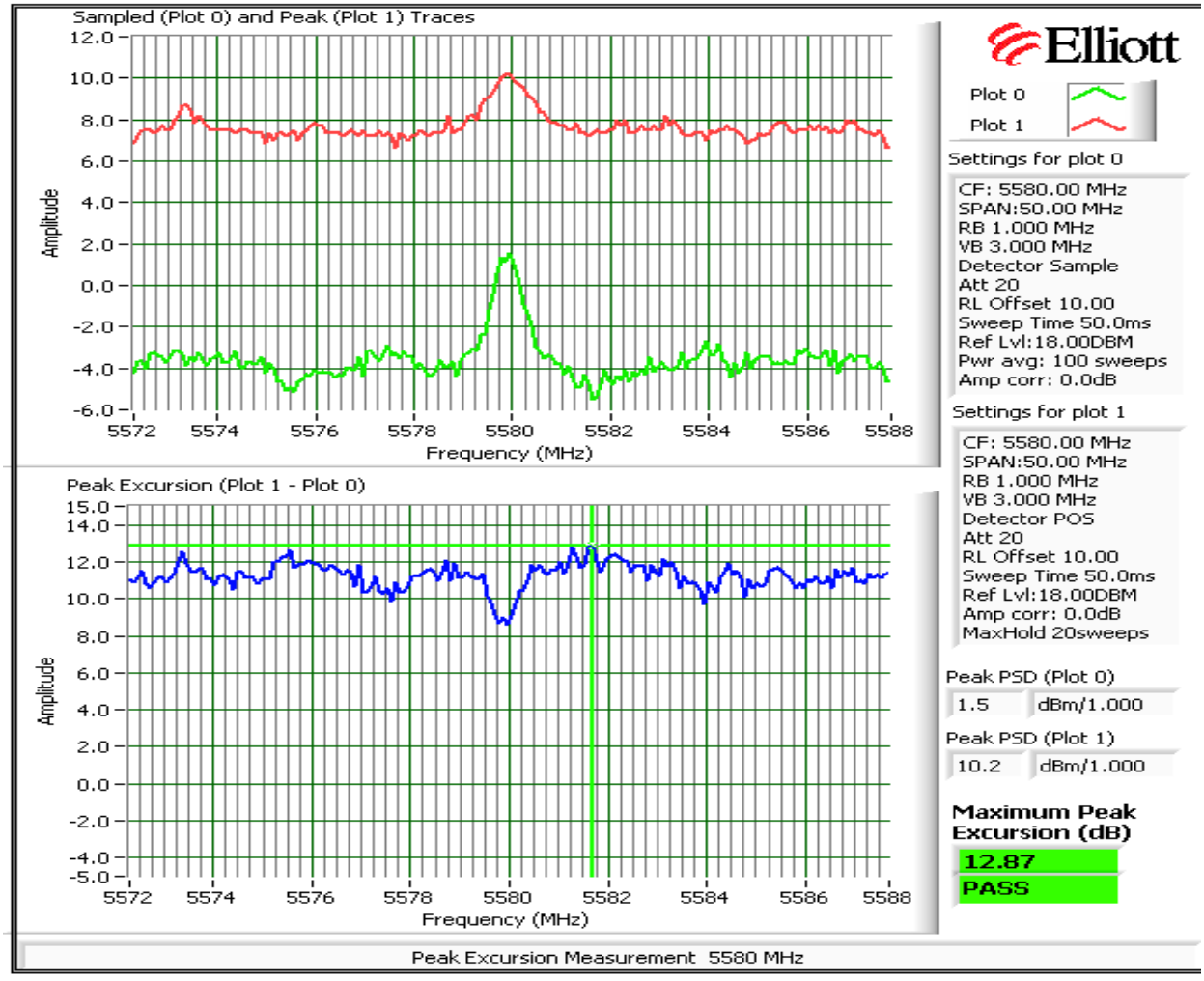
Device meets the requirement for the peak excursion

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
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

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

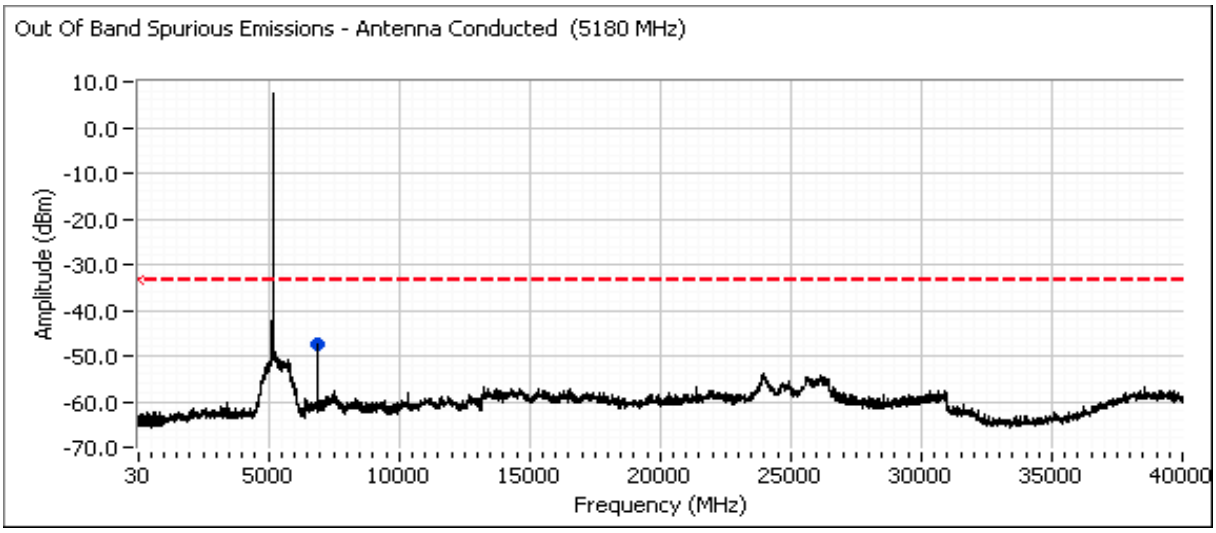
Maximum Antenna Gain:	6.5	dBi	
Spurious Limit:	-27.0	dBm/MHz eirp	
Limit Used On Plots [Note 1]:	-33.5	dBm/MHz	Average Limit (RB=1MHz, VB=10Hz)
	-13.5	dBm/MHz	Peak Limit (RB=VB=1MHz)

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

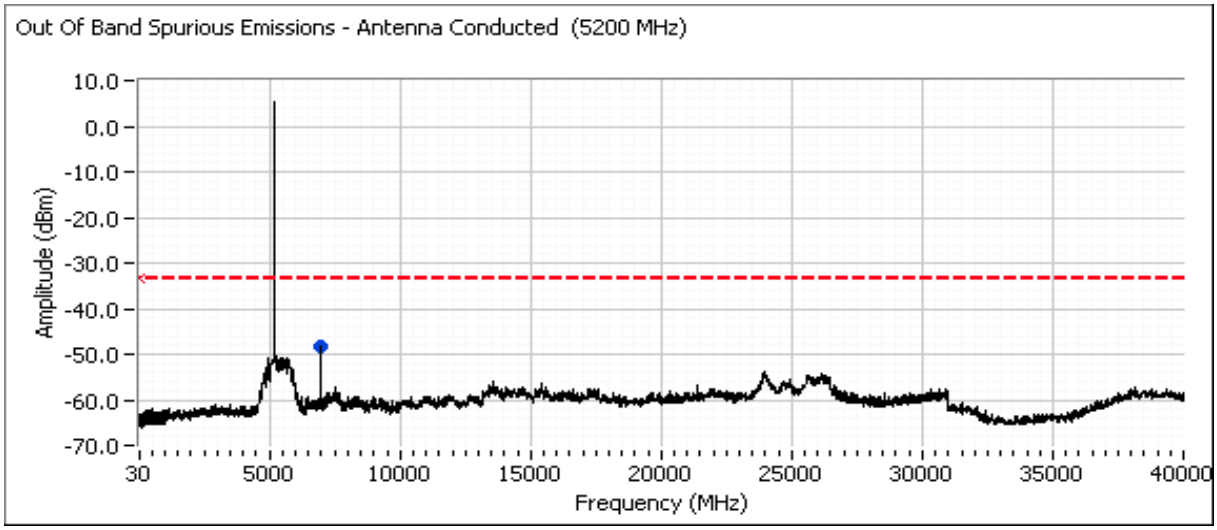
Low channel, 5150 - 5250 MHz Band (channel 36, 5180 MHz)

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

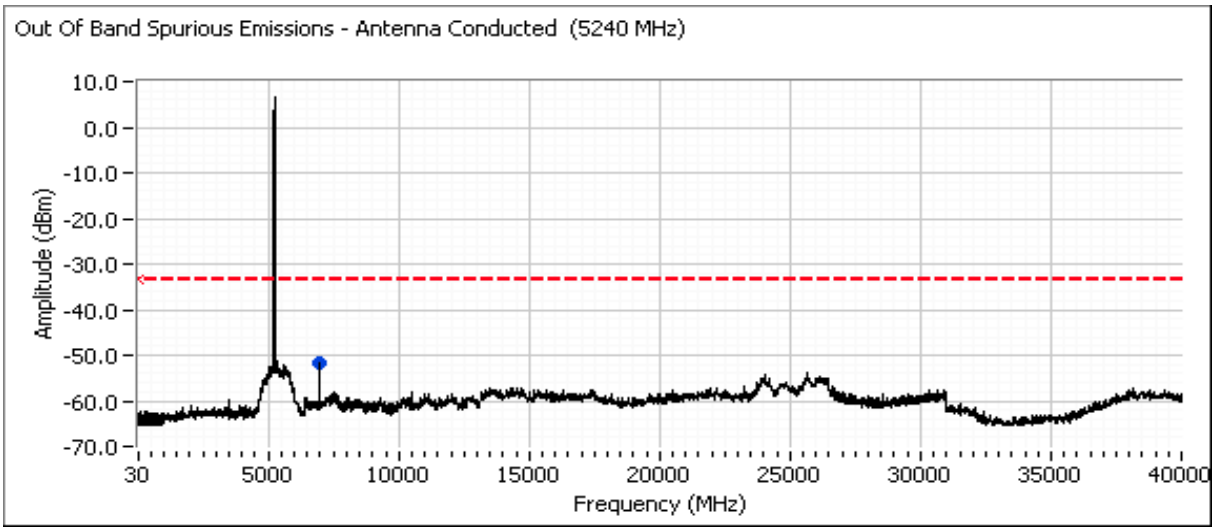


Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77319
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

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

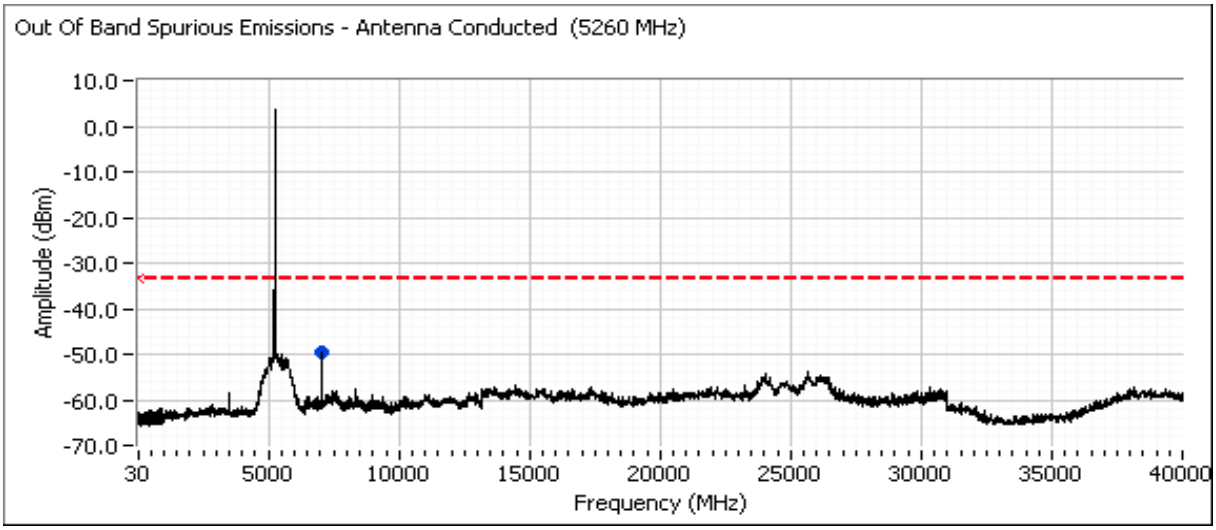


High channel, 5150 - 5250 MHz Band (Channel 48, 5240MHz)

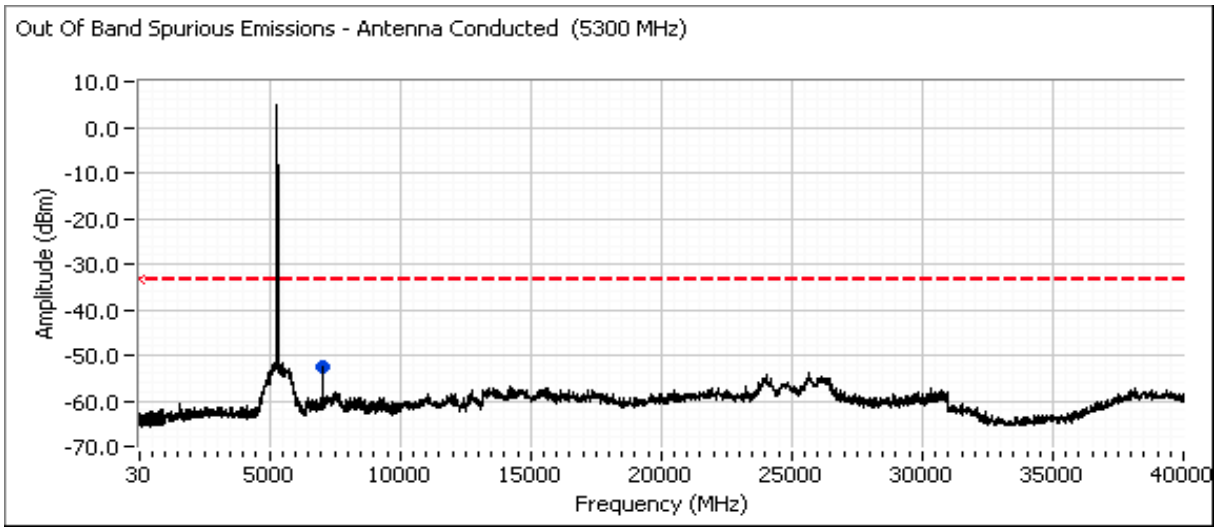


Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77319
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

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



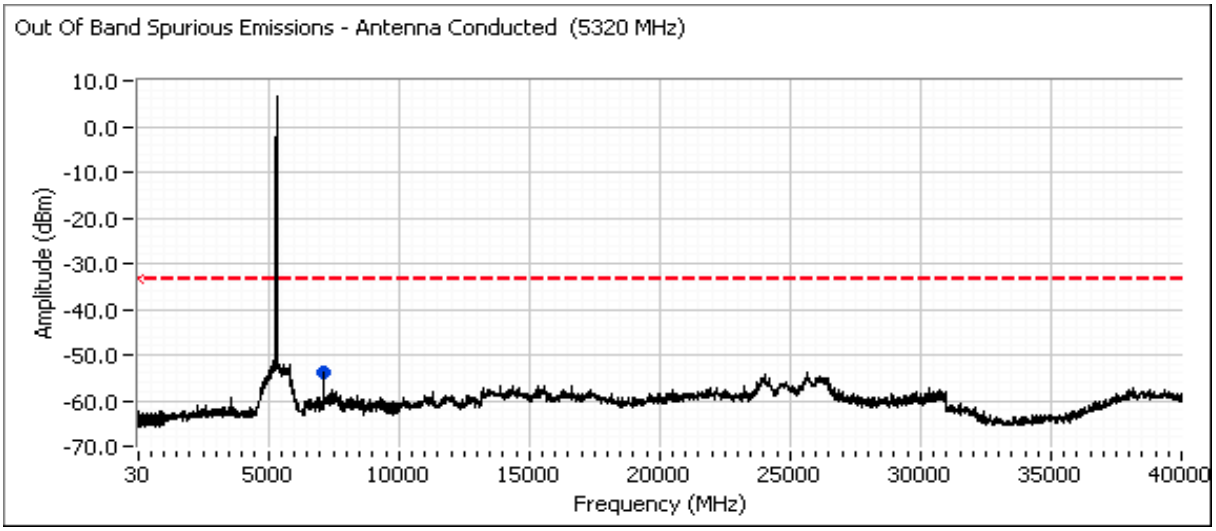
Center channel, 5250 - 5350 MHz Band (Channel 60, 5300MHz)



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

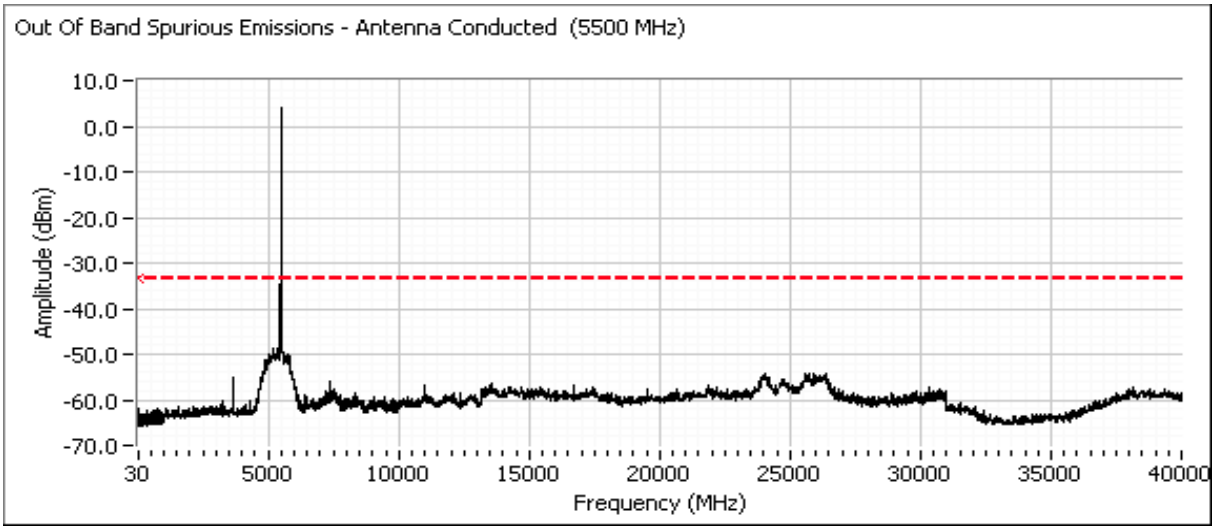
High channel, 5250 - 5350 MHz Band (Channel 64, 5320MHz)

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

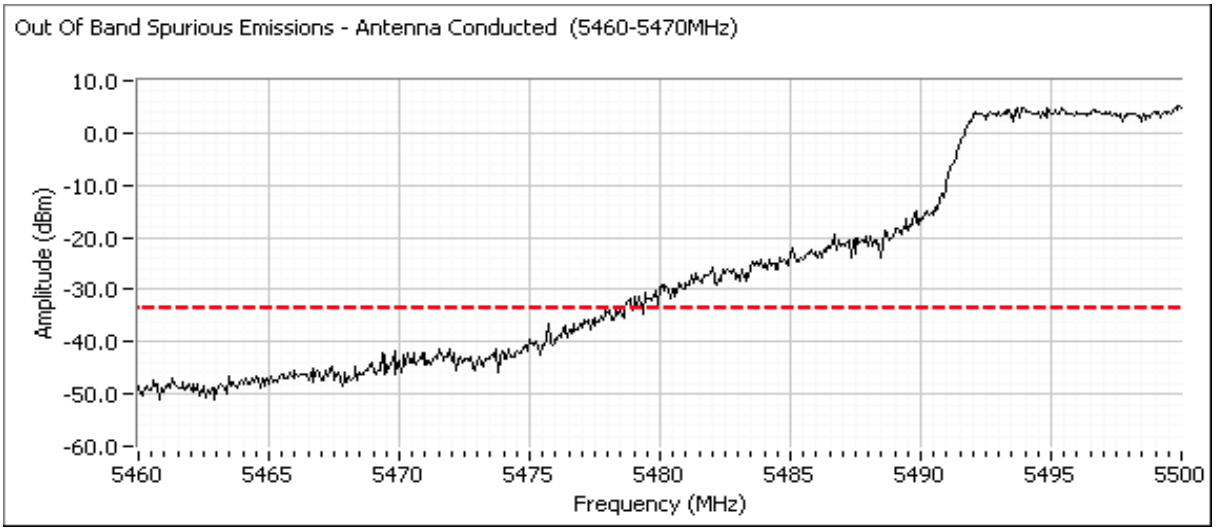


Low channel, 5470 - 5725 MHz Band (Channel 100, 5500MHz)

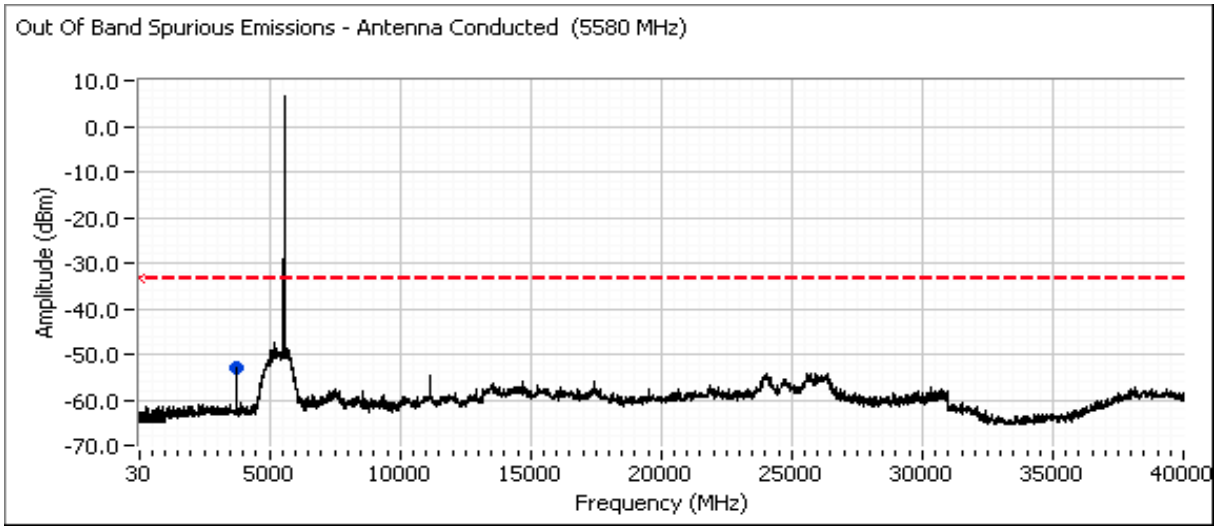
Includes a plot from 5460 - 5500 MHz showing compliance with the limit immediately below the allocated band from 5460-5470 MHz. Compliance with the radiated limits for the restricted band below 5460 MHz is demonstrated through the radiated emissions tests.



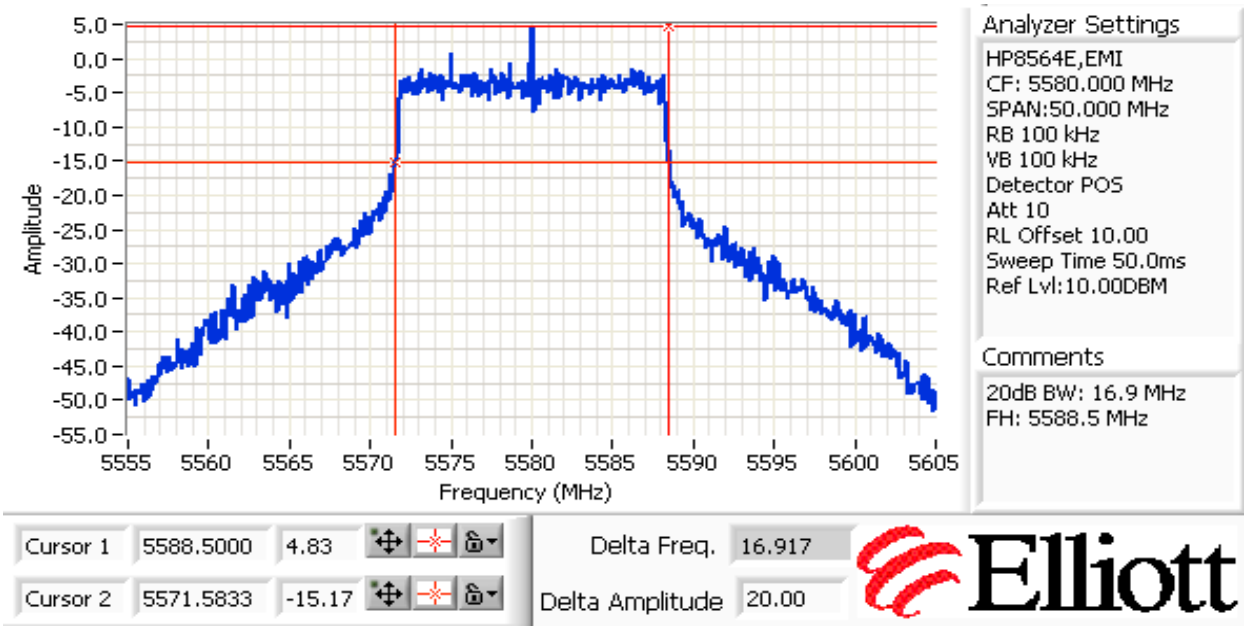
Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77319
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A



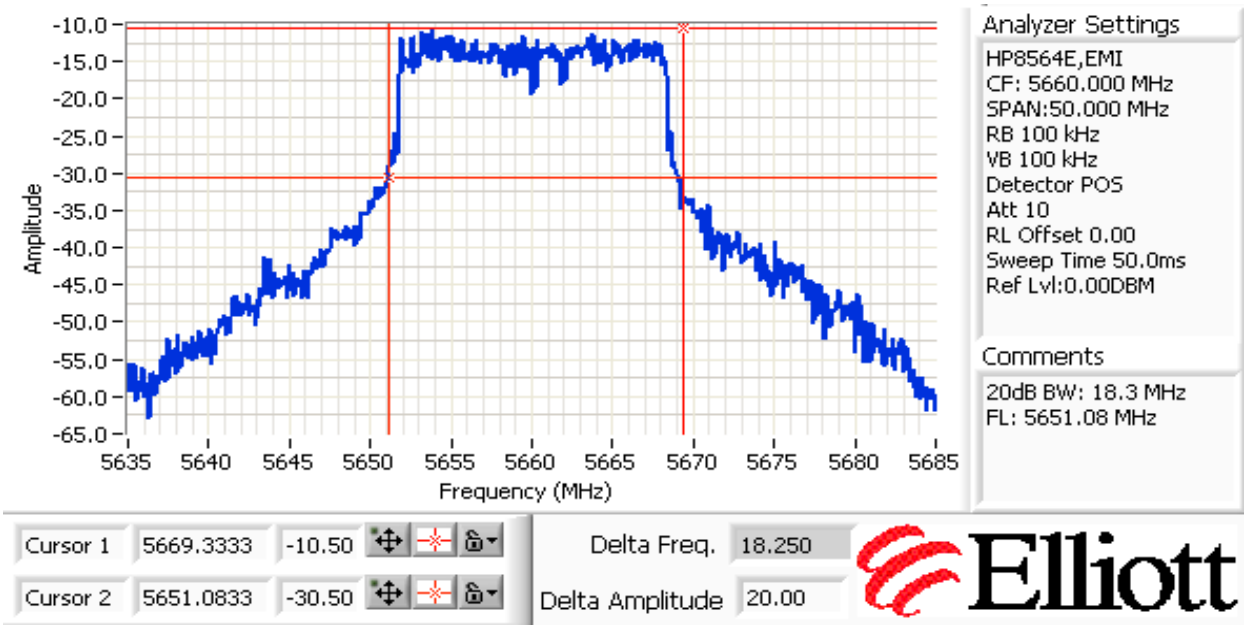
Center channel, 5470 - 5725 MHz Band (Channel 116, 5580MHz)



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



Channel adjacent to 5650 MHz



Client:	Summit Data Communications	Job Number:	J77268
Model:	SDC-MSD30AG	T-Log Number:	T77319
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
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).