Test Report
LP0002 (100-06-28)
Summit Data Communications
Device Name:SDC-MSD40NBT
Brand: Summit Data Communications
Model: SDC-SSD40NBT

GRANTEE:	Summit Data Communications 526 South Main St. Suite 805 Akron, OH 44311
TEST SITE:	Elliott Laboratories 41039 Boyce Road Fremont, CA 94538
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Testing Cert #0214.26

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REVISION HISTORY

Rev#	Date	Comments	Modified By
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SCOPE

An electromagnetic emissions test has been performed on the Summit Data Communications model SDC-SSD40NBT pursuant to LP0002 (100-06-28) - Technical Regulations for Low-power Radio-frequency Devices. Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in ANSI C63.4:2003 and LP0002 as outlined in Elliott Laboratories test procedures.

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant performance and procedural standards.

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

The test results recorded herein are based on a single type test of the Summit Data Communications model SDC-SSD40NBT and therefore apply only to the tested sample. The sample was selected and prepared by Ron Seide of Summit Data Communications.

OBJECTIVE

The primary objective of the manufacturer is compliance with LP0002 (100-06-28) - Technical Regulations for Low-power Radio-frequency Devices for the radiated and conducted emissions of intentional radiators.

Certification is a procedure where the manufacturer or a contracted laboratory makes measurements and submits the test data and technical information for device approvals. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units that are subsequently manufactured.

SUMMARY OF RESULTS

GENERAL REQUIREMENTS – APPLICABLE TO ALL BANDS

LP0002 Section	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
2.10 (1)	Users/Operational Manual	-	Control, adjust, on/off operation will not cause violation	Complies
2.10 (2)	Users/Operational Manual	-	Warnings against adjustments of the device	Complies
2.10 (3)	Users/Operational Manual	-	Warnings against any replacement of components	Complies
2.10 (4)	Users/Operational Manual	-	Full Contents of Article 14-17	Complies
5.12	Channel Selection	Device was tested on the top, bottom and center channels in each band	Measurements on three channels in each band	N/A

GENERAL TECHNICAL REQUIREMENTS

LP0002 Section	Description	Measured Value	Comments	Refer to:	Result
2.3	AC Conducted Emissions	31.9dBµV @ 19.501MHz (-18.1dB)	AC conducted emissions shall meet the emissions limits detailed in 2.3		Complies
3.10.1(4)	Antenna Gain	See EUT Description Section	Antenna gains in excess of 6dBi may require reduction in output power, see appropriate rule part	-	Complies
3.10.1 (4)	RF Connector	u.FL connectors		-	Complies
5.20	RF Exposure Requirements (minimum 20 cm separation)	0.024 mW/cm^2	MPE shall be less than 1 mW/cm^2		Complies
2.11	Radiated Spurious Emissions – 30MHz – 25 GHz	51.8dBµV/m @ 2994.7MHz (-2.2dB)	Receive mode emissions shall meet the emissions limits detailed in 2.8		Complies
-	99% bandwidth	802.11b: 12.8MHz 802.11g: 18.5MHz 2.4GHz, 802.11n20: 20.1MHz 802.11a: 18.9MHz 5GHz, 802.11n20: 22.8MHz UNII: 802.11a: 17.3MHz 802.11n20: 18.1MHz	Information only		

DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHz)

LP0002 Section	Description	Measured Value	Comments	Refer to:	Result
3.10.1 (2.3)	Output Power, 2400 - 2483.5 MHz	802.11b: 15.9dBm (0.039 Watts) 802.11g: 14.7dBm (0.030 Watts) 802.11n20: 14.2dBm (0.026W) EIRP = 0.062 W Note 1	Maximum power is 1Watt, reduced by the amount in dB that the antenna gain exceeds 6dBi Note 1		Complies
3.10.1 (1)	Digital Modulation	Systems uses OFDM / DSSS techniques	System must utilize a digital transmission technology		Complies
3.10.1 (6.2.2)	Power Spectral Density	802.11b: -5.3dBm/3kHz 802.11g: -12.3dBm/3kHz 802.11n20: -13.6dBm/3kHz	Maximum permitted is 8dBm/3kHz		Complies
3.10.1 (6.2.1)	6dB Bandwidth	802.11b: 9.0MHz 802.11g: 15.1MHz 802.11n20: 15.1MHz	Minimum allowed is 500kHz		Complies
3.10.1 (5)	Antenna Port Spurious Emissions – 30MHz – 25 GHz	All spurious emissions < -20dBc or < -30dBc Note 2	All spurious emissions < -20dBc.		Complies
3.10.1 (5) & 2.8	Radiated Spurious Emissions – 30MHz – 25GHz	53.3dBµV/m @ 2389.7MHz (-0.7dB)	Section 2.8 in restricted bands, all others below -20dBc / -30dBc (Note 2)		Complies

Note 1: EIRP calculated using antenna gain of 2.0 dBi for the highest EIRP system.
Note 2: Limit of -30dBc used because the power was measured using the UNII test procedure (maximum power averaged over a transmission burst).

DIGITAL TRANSMISSION SYSTEMS (5725-5850 MHz)

LP0002 Section	Description	Measured Value	Comments	Refer to:	Result
3.10.1 (2.3)	Output Power (multipoint systems)	802.11a: 15.8dBm (0.038 Watts) 802.11n20: 15.7dBm (0.037 Watts) EIRP = 0.117 W Note 1	Maximum power is 1Watt, reduced by the amount in dB that the antenna gain exceeds 6dBi Note 1		Complies
3.10.1 (1)	Digital Modulation	Systems uses OFDM / DSSS techniques	System must utilize a digital transmission technology		Complies
3.10.1 (6.2.2)	Power Spectral Density	802.11a: -16.6dBm/3kHz 802.11n20: -11.1dBm/3kHz	Maximum permitted is 8dBm/3kHz		Complies
3.10.1 (6.2.1)	6dB Bandwidth	802.11a: 15.0MHz 802.11n20: 15.0MHz	Minimum allowed is 500kHz		Complies
3.10.1 (5)	Antenna Port Spurious Emissions – 30MHz – 25 GHz	All spurious emissions < -20dBc or < -30dBc Note 2	All spurious emissions < -20dBc.		Complies
3.10.1 (5) & 2.8	Radiated Spurious Emissions – 30MHz – 25GHz	47.8dBµV/m @ 11569.4MHz (-6.2dB)	Section 2.8 in restricted bands, all others below -20dBc / -30dBc (Note 2)		Complies

Note 1: EIRP calculated using antenna gain of 5.0 dBi for the highest EIRP system 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).

UNII DEVICES, SECTION 4.7

Requirements Specific To Operation in the 5.25 – 5.35 GHz Band					
LP0002 Section	Description	Measured Value	Comments	Refer to:	Result
4.7.5	Indoor Use	-	Device restricted to indoor use in this band		Complies
4.7.2(1)	26dB Bandwidth	22.2MHz	N/A – limits output power if < 20MHz		N/A
4.7.2(1)	Output Power	802.11a: 14.2dBm (0.026W) n20: 13.2dBm (0.021W) (Max eirp: 0.083)	17 dBm / 50mW (eirp < 30dBm)		Complies
4.7.2(1)	Power Spectral Density	802.11a: 3.1dBm/MHz 802.11n20: 1.7dBm/MHz	4.0 dBm/MHz		Complies

Requirements Specific To Operation in the 5.47 – 5.725 GHz Band					
LP0002 Section	Description	Measured Value	Comments	Refer to:	Result
4.7.2(2)	26dB Bandwidth	22.3MHz	N/A – limits output power if < 20MHz		N/A
4.7.2(2)	Output Power	802.11a: 15.0dBm (0.031W) 802.11n20: 13.2dBm (0.021W) (Max eirp: 0.099W)	24 dBm / 250mW (eirp < 30dBm)		Complies
4.7.2(2)	Power Spectral Density	802.11a: 4.0 dBm/MHz 802.11n20: 2.1dBm/MHz	11 dBm/MHz		Complies
4.7.3	5.60-5.65 GHz Slave use only	20dB bandwidth of all channels falls outside the band.	Applies to Master devices only		Complies

Requirements for All U-NII Devices					
LP0002 Section	Description	Measured Value	Comments	Refer to:	Result
4.7.1 (1)	Modulation	OFDM modulation is used	Digital modulation is required	-	Complies
4.7.3/2.8	Spurious Emissions	47.6dBµV/m @ 5458.7MHz (-6.4dB)	Refer to Standard		Complies
4.7.2(6)	Peak Excursion Ratio	11.8 dB	< 13dB		Complies
4.7.7	Frequency Stability	Frequency stability is better than 10ppm (Operational Description)	Refer to Standard		Complies
4.7.4(2.1)	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
4.7.4(2.2)	Dynamic frequency Selection (device without radar detection)	Refer to separate test report, reference R86484	Channel move time < 10s Channel closing transmission time < 260ms		Complies
4.7.4(1)	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

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	Measurement Unit	Frequency Range	Expanded Uncertainty
RF power, conducted (power meter)	dBm	25 to 7000 MHz	± 0.52 dB
RF power, conducted (Spectrum analyzer)	dBm	25 to 7000 MHz	± 0.7 dB
Conducted emission of transmitter	dBm	25 to 26500 MHz	± 0.7 dB
Conducted emission of receiver	dBm	25 to 26500 MHz	± 0.7 dB
Radiated emission (substitution method)	dBm	25 to 26500 MHz	± 2.5 dB
Radiated emission (field strength)	dBµV/m	25 to 1000 MHz	± 3.6 dB
		1000 to 40000 MHz	± 6.0 dB
Conducted Emissions (AC Power)	dBµV	0.15 to 30 MHz	± 2.4 dB

DEVIATIONS FROM THE STANDARD

All measurements were made in accordance with the requirements of the LP0002 (100-06-28) standard and ANSI C63.4 test methods and procedures.

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Summit Data Communications model SDC-SSD40NBT is an 802.11abgn 1x1 with Bluetooth 2.1 module.

The sample was received on October 19, 2010 and tested on October 19, 20 and 21 and November 19 and 24, 2010 and May 11, August 2, 4, 10, 12, 13, 16, 17, 18 19, 20, 23, 24, 26 and October 6, 7, 19, 20 and 26 and November 3, 4, 7, 8, 9, 15, 2011. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Summit	SDC-SSD40NBT	802.11abgn 1x with BT	Prototype	TWG-SDCSSD40NBT

OTHER EUT DETAILS

The EUT supports single transmit chain operation. The EUT supports 20MHz operation only.
The SSD40NBT Module was tested on a MSD40NBT board.

ANTENNA SYSTEM

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)

In the 2.4GHz range, the Cisco antenna was tested as they represented the highest gain antennas of each available type.

In the 5GHz range, Larsen antenna was tested as the represented the highest gain antennas of each available type.

The antenna connects to the EUT via a non-standard u.FL antenna connector, thereby meeting the requirements of FCC 15.203.

ENCLOSURE

The EUT has no enclosure. It is designed to be installed within the enclosure of a host computer.

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
Delta Electronics	EADP-10BB	AC/DC Adapter	59A401Z9UP42K	N/A
HP	iPaQ	PDA	2CK702010G	N/A

EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
AC/DC Adapter	iPaq	2wire	Unshielded	1.5m
AC/DC Adapter	AC Mains	-	-	-

EUT OPERATION

During testing, the EUT was configured to transmit continuously at the lowest data rate for the mode as this resulted in the highest output power.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken at the test sites listed below. Pursuant to section 2.948 of the FCC's Rules and section 3.3 of RSP-100, construction, calibration, and equipment data has been filed with the Commission and with Industry Canada.

Site	Registration Numbers		Location
	FCC	Canada	
Chamber 3	769238	2845B-3	41039 Boyce Road Fremont, CA 94538-2435
Chamber 4	211948	2845B-4	
Chamber 5	211948	2845B-5	
Chamber 7	A2LA accreditation	2845B-7	
All test sites are covered under the A2LA accreditation and the lab code US0027 for measurements against LP0002.			

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 and LP0002.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.4:2003 and LP0002. 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.

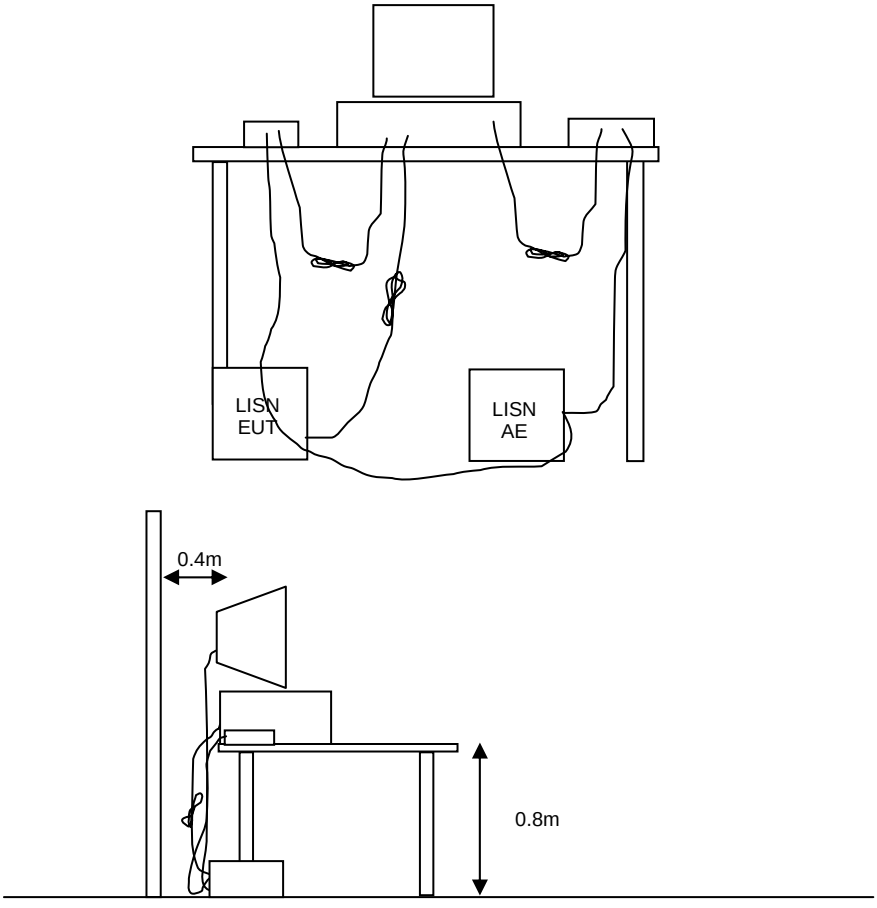
TEST PROCEDURES

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.



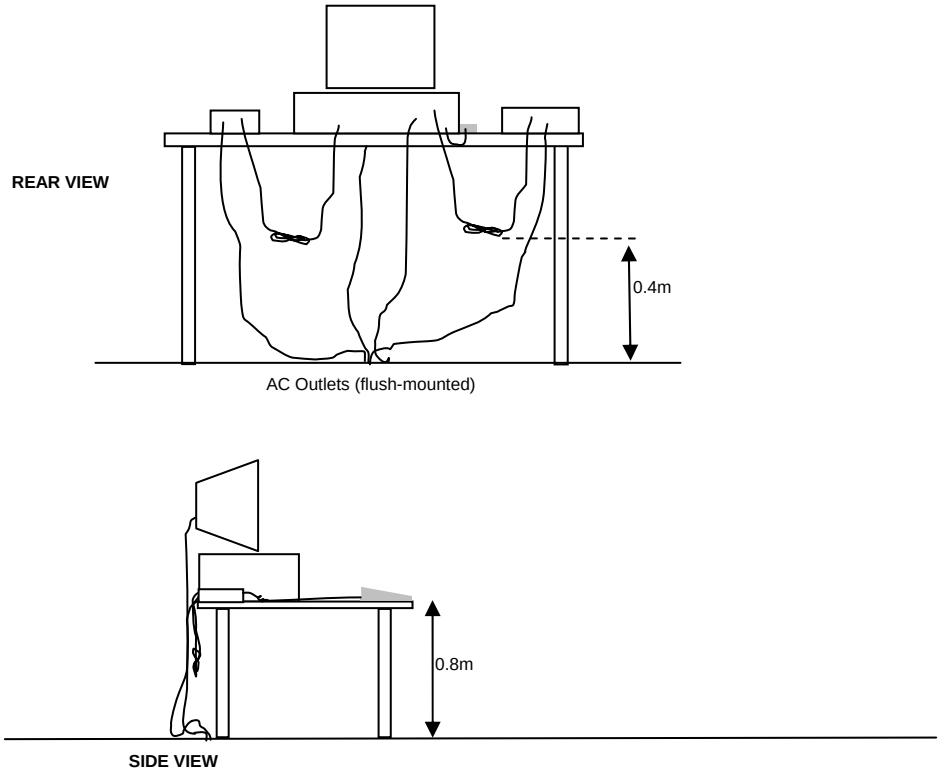
RADIATED EMISSIONS

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.

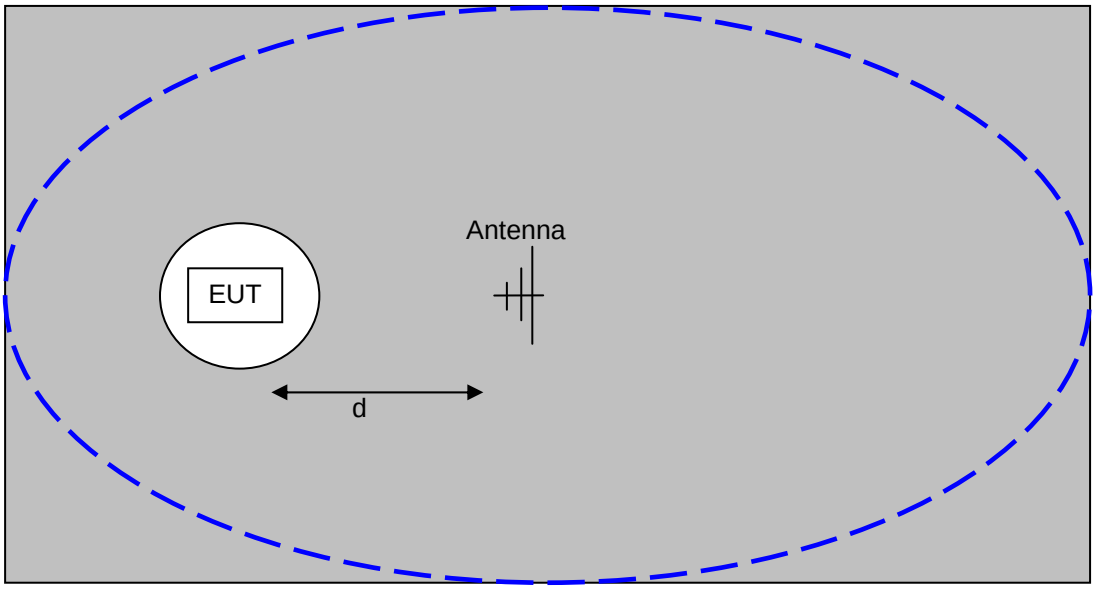
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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.

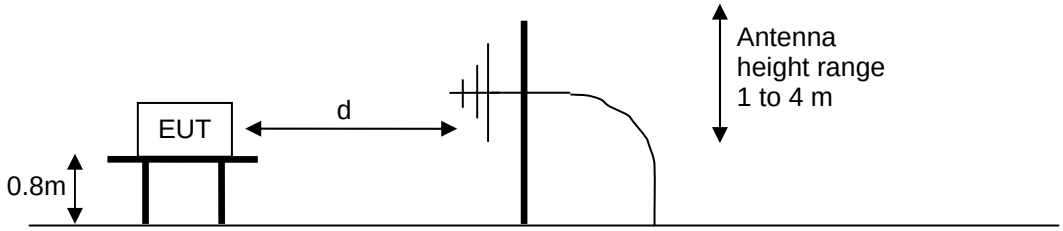
When testing above 18 GHz, the receive antenna is located at 1meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.



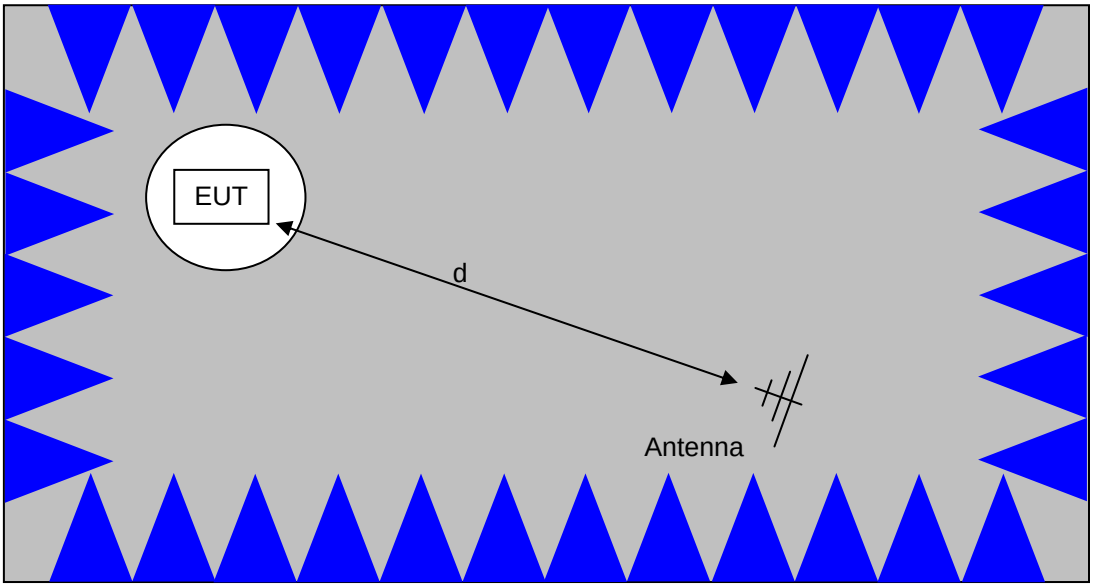
Typical Test Configuration for Radiated Field Strength Measurements



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

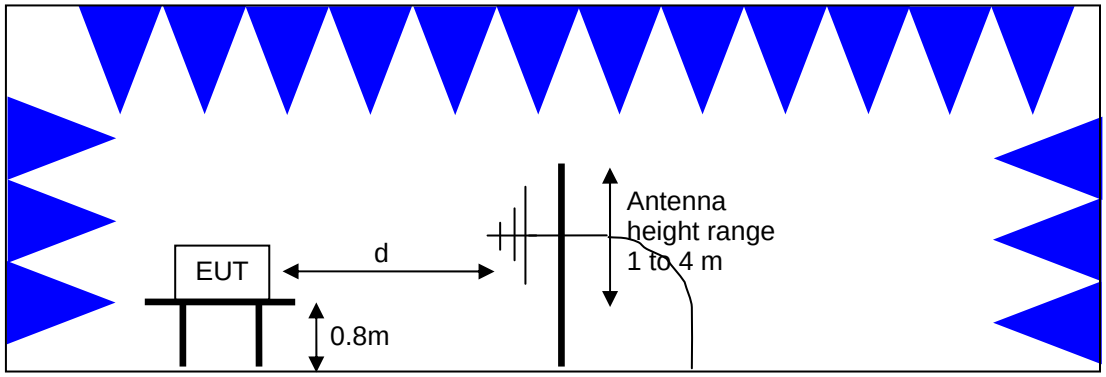


Test Configuration for Radiated Field Strength Measurements
OATS- Plan and Side Views



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

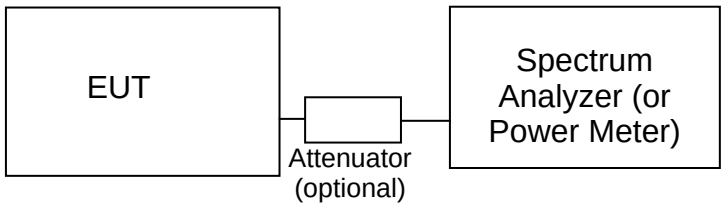
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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

CONDUCTED EMISSIONS FROM ANTENNA PORT

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



Test Configuration for Antenna Port Measurements

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

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

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

BANDWIDTH MEASUREMENTS

The 6dB, 20dB and/or 26dB signal bandwidth is measured in using the bandwidths recommended by ANSI C63.4 and LP0002. 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: LP0002 SECTION 2.3

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 RADIATED EMISSIONS SPECIFICATION LIMITS, LP0002 SECTION 2.8

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands[1], the limits for all emissions from a low power device operating under the general rules of LP0002 and the limits for receiver spurious emissions. Note that receivers operating below 30 MHz are exempt from these requirements and receiver spurious limits do not apply below 30MHz.

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

OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS (LP0002 3.10.1)

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.

TRANSMITTER RADIATED SPURIOUS EMISSIONS LIMITS (LP0002 3.10.1)

The limits for unwanted (spurious) emissions from the transmitter falling in the restricted bands are those specified in section 2.8 of LP0002. All other unwanted (spurious) emissions shall be at least 20dB below the level of the highest in-band signal level (30dB for digitally modulated devices when the average output power is measured rather than peak output power).

[1] The restricted bands are detailed in LP0002 section 2.7

OUTPUT POWER LIMITS FOR UNII DEVICES(LP0002 4.7)

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
5250 – 5350	50mW (17 dBm)	4 dBm/MHz
5470 – 5725	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.

SPURIOUS EMISSIONS LIMITS –UNII DEVICES (LP0002 4.7.2)

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. 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 d (meters) from the equipment under test:

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

where P is the eirp (Watts)

For a measurement at 3m the conversion from a logarithmic value for field strength (dBuV/m) to an eirp power (dBm) is -95.3dB.

APPENDIX A TEST EQUIPMENT CALIBRATION DATA

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Radiated Emissions, 1000 - 26,500 MHz, 19-Oct-10

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	5/26/2011
EMCO	Antenna, Horn, 1-18 GHz	3115	786	12/11/2011
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	7/12/2011

TX Spurious Emissions, 20-Oct-10

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	5/26/2011
EMCO	Antenna, Horn, 1-18 GHz	3115	786	12/11/2011
Hewlett Packard	Head (Inc W1-W4, 1143, 2198) Red	84125C	1145	1/13/2011
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	7/12/2011
A.H. Systems	Spare System Horn, 18-40GHz	SAS-574, p/n: 2581	2162	1/19/2011
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2249	10/11/2011

Radio (Radiated BE), 21-Oct-10

Manufacturer	Description	Model	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/8/2012
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1422	11/10/2010
Rohde & Schwarz	Power Sensor 100 uW - 10 Watts	NRV-Z53	1555	2/5/2011
Rohde & Schwarz	Attenuator, 20 dB , 50 ohm, 10W, DC-18 GHz	20dB, 10W, Type N	1556	2/5/2011
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	8/26/2011

Radiated Emissions, 1000 - 26,500 MHz, 11-May-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	5/26/2011
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/21/2012
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/14/2011
Hewlett Packard	Head (Inc W1-W4, 1742 , 1743) Blue	84125C	1620	5/9/2012
A.H. Systems	Blue System Horn, 18-40GHz	SAS-574, p/n: 2581	2159	3/23/2012
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2249	10/11/2011

Radiated Emissions, 1000 - 26,500 MHz, 14-May-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	5/26/2011
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/8/2012
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/14/2011
Hewlett Packard	Head (Inc W1-W4, 1742 , 1743) Blue	84125C	1620	5/9/2012
A.H. Systems	Blue System Horn, 18-40GHz	SAS-574, p/n: 2581	2159	3/23/2012

Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2238	10/1/2011

Radiated Emissions, 1000 - 26,500 MHz, 17-May-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	12/8/2011
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/8/2012
Hewlett Packard	Head (Inc flex cable, 1143, 2198) Red	84125C	1145	2/17/2012
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	7/12/2011
A.H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	2/9/2012
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2238	10/1/2011

Radiated Emissions, 1000 - 40,000 MHz, 18-May-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	5/26/2011
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/21/2012
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	6/14/2011
Hewlett Packard	Head (Inc W1-W4, 1742 , 1743) Blue	84125C	1620	5/9/2012
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1682	3/23/2012
A.H. Systems	Blue System Horn, 18-40GHz	SAS-574, p/n: 2581	2159	3/23/2012
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2238	10/1/2011

Radiated Emissions, 1000 - 6,500 MHz, 19-May-11

Manufacturer	Description	Model	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/21/2012
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	6/14/2011

Radiated Emissions, 1000 - 18,000 MHz, 20-May-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	12/8/2011
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	7/12/2011
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/22/2012
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2238	10/1/2011

Radio Antenna Port (Power and Spurious Emissions), 20-May-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	7/12/2011
Rohde & Schwarz	Power Meter, Single Channel, +1795+1796	NRVS	1534	5/17/2012
Rohde & Schwarz	Power Sensor 100 uW - 2 Watts (w/ 20 dB pad, SN BJ5155)	NRV-Z32	1536	9/13/2011
Rohde & Schwarz	Power Sensor, 1 uW-100 mW, DC-18 GHz, 50ohms	NRV-Z51	2152	11/6/2011

Radiated Spurious Emissions, Rx mode, 1000 - 7,500 MHz, 20-May-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	12/8/2011
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	7/12/2011
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/22/2012

Radiated Emissions, 1000 - 40,000 MHz, 12-Aug-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	5/18/2012
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	8/14/2011
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/22/2012
Hewlett Packard	Head (Inc W1-W4, 1742 , 1743) Blue	84125C	1620	5/9/2012
A.H. Systems	Blue System Horn, 18-40GHz	SAS-574, p/n: 2581	2159	3/23/2012

Radiated Emissions, 1000 - 40000MHz, 20-Dec-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	12/9/2012
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	8/2/2012
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	8/15/2012

Radio Antenna Port (Power and Spurious Emissions), 07-Feb-12

Manufacturer	Description	Model	Asset #	Cal Due
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	2/14/2012

Radio Antenna Port (PSD), 22-Feb-12

Manufacturer	Description	Model	Asset #	Cal Due
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	4/13/2012

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Radio (2nd Harmonic), 19-Nov-10

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	12/15/2010
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	8/2/2012
Hewlett Packard	High Pass filter, 8.2 GHz	P/N 84300-80039	1156	6/25/2011
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/14/2011
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1422	11/10/2010
Rohde & Schwarz	Power Sensor 100 uW - 10 Watts	NRV-Z53	1555	2/5/2011
Rohde & Schwarz	Attenuator, 20 dB , 50 ohm, 10W, DC-18 GHz	20dB, 10W, Type N	1556	2/5/2011

Radio Antenna Port (Power and Spurious Emissions), 24-Nov-10

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/14/2011
Rohde & Schwarz	Power Sensor 100 uW - 10 Watts	NRV-Z53	1555	2/5/2011
Rohde & Schwarz	Attenuator, 20 dB , 50 ohm, 10W, DC-18 GHz	20dB, 10W, Type N	1556	2/5/2011
Rohde & Schwarz	Power Meter, Dual Channel	NRVD	1787	12/4/2010

Radiated Emissions, 1000 - 18,000 MHz, 04-Aug-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	12/8/2011
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	8/2/2012
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	8/12/2011
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2251	10/21/2011

Radiated Emissions, 30 - 40,000 MHz, 12-Aug-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	12/8/2011
Narda West	High Pass Filter, 8 GHz	HPF 180	821	3/23/2012
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/21/2012
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1730	8/5/2012
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	7/28/2012

Radiated Emissions, 1000 - 40,000 MHz, 13-Aug-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	12/8/2011
Narda West	High Pass Filter, 8 GHz	HPF 180	821	3/23/2012
Hewlett Packard	Head (Inc flex cable, 1143, 2198) Red	84125C	1145	2/17/2012
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/21/2012
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1730	8/5/2012
A.H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	2/9/2012
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	7/28/2012

Radiated Emissions, 1000 - 40,000 MHz, 16-Aug-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	12/8/2011
Hewlett Packard	Head (Inc flex cable, 1143, 2198) Red	84125C	1145	2/17/2012
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/21/2012
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1681	5/3/2012
A.H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	2/9/2012

Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2251	10/21/2011
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	7/28/2012

Radiated Emissions, 1000 - 18,000 MHz, 17-Aug-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	12/8/2011
Narda West	High Pass Filter, 8 GHz	HPF 180	821	3/23/2012
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/21/2012
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2239	10/1/2011
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	7/28/2012

Radiated Emissions, 1000 - 18,000 MHz, 18-Aug-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	12/8/2011
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/21/2012
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2239	10/1/2011
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	2240	10/1/2011
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	7/28/2012

Radio Antenna Port (Power and Spurious Emissions), 24-Aug-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	8/9/2012
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	11/2/2011

Radio Antenna Port (Power and Spurious Emissions), 26-Aug-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	8/15/2012
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	4/6/2012

Radiated Emissions, 1000 - 18,000 MHz, 15-Nov-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	12/8/2011
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	8/15/2012
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/22/2012
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1682	3/23/2012

Radiated Emissions, 1000 - 18,000 MHz, 28-Dec-11

Manufacturer	Description	Model	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/21/2012
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/23/2012
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	7/28/2012

Radiated Emissions, 1000 - 18,000 MHz, 29-Dec-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	12/9/2012
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	8/15/2012
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/22/2012
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2239	10/4/2012

Radiated Emissions, 1000 - 18,000 MHz, 30-Dec-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	12/9/2012
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	8/15/2012
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/22/2012
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1681	9/8/2012
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2239	10/4/2012

Radiated Emissions, 1000 - 18,000 MHz, 04-Jan-12

Manufacturer	Description	Model	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/21/2012
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	1729	8/5/2012
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/23/2012
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	7/28/2012

Radiated Emissions, 1000 - 18,000 MHz, 05-Jan-12

Manufacturer	Description	Model	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/21/2012
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	1729	8/5/2012
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1730	8/5/2012
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/23/2012
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	7/28/2012

Radiated Emissions, 1000 - 40000MHz, 06-Jan-12

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	12/9/2012
Hewlett Packard	Head (Inc flex cable, 1143, 2198) Red	84125C	1145	2/17/2012
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	8/15/2012
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/21/2012
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2239	10/4/2012

Radio Antenna Port, UNII Power , 23-Jan-12

Manufacturer	Description	Model	Asset #	Cal Due
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	12/9/2012

Radio Antenna Port (BW), 22-Feb-12

Manufacturer	Description	Model	Asset #	Cal Due
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	4/13/2012

T83198

Conducted Emissions - AC Power Ports, 16-Dec-11

Manufacturer	Description	Model	Asset #	Cal Due
EMCO	LISN, 10 kHz-100 MHz, 25A	3825/2	1292	3/1/2012
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	4/6/2012

APPENDIX B TEST DATA LOG SHEETS

T83195 Pages 34 – 94
T83196 Pages 95 –131
T83198 Pages 132 - 140

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		-
Emissions Standard(s):	FCC 15.247/RSS-210	Class:	-
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Summit Data Communications

Model

SDC-MSD40NBT (1x1 802.11abg + BT 2.1)

Date of Last Test:

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions

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

SCU:

Run #	Mode	Channel	Antenna	Power Setting	Test Performed	Limit	Result / Margin
Run #1	802.11b Chain A	#1 2412MHz	Cisco	-	Restricted Band Edge at 2390 MHz	15.209	47.0dBµV/m @ 2381.6MHz (-7.0dB)
		#11 2462MHz	Cisco	-	Restricted Band Edge at 2483.5 MHz	15.209	46.2dBµV/m @ 2497.9MHz (-7.8dB)
Run # 2	802.11g Chain A	#1 2412MHz	Cisco	-	Restricted Band Edge at 2390 MHz	15.209	53.2dBµV/m @ 2389.9MHz (-0.8dB)
		#11 2462MHz	Cisco	-	Restricted Band Edge at 2483.5 MHz	15.209	50.5dBµV/m @ 2483.5MHz (-3.5dB)
Run # 3	802.11n20 Chain A	#1 2412MHz	Cisco	-	Restricted Band Edge at 2390 MHz	15.209	53.3dBµV/m @ 2389.7MHz (-0.7dB)
		#11 2462MHz	Cisco	-	Restricted Band Edge at 2483.5 MHz	15.209	50.9dBµV/m @ 2483.5MHz (-3.1dB)

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: 20-25 °C
Rel. Humidity: 40-50 %

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:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Run #1, Band Edge Field Strength - 802.11b, Chain A

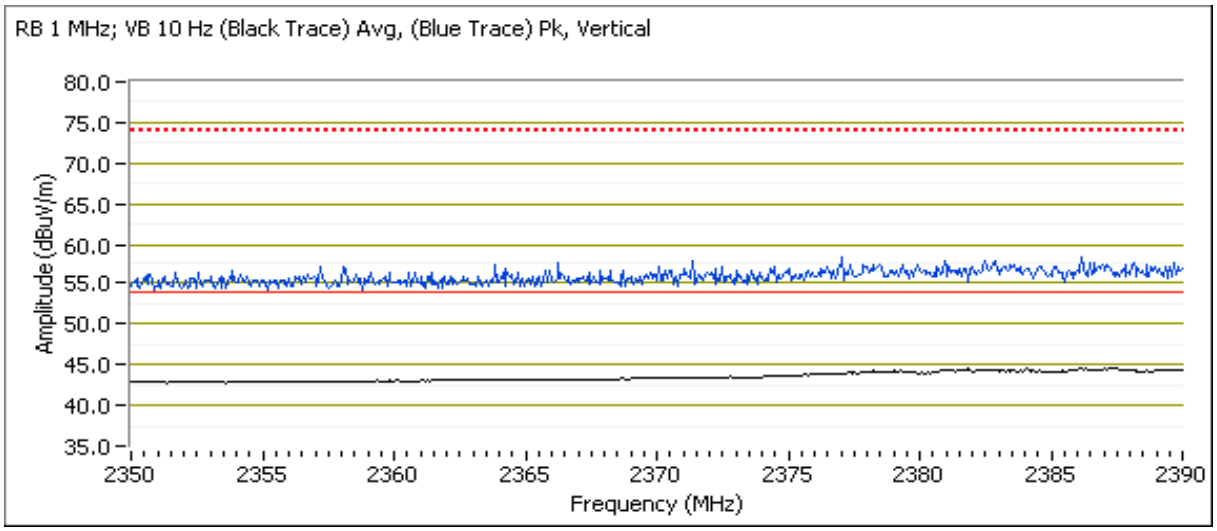
Date of Test: 5/18/2011 Test Location: FT Chamber #7

Test Engineer: Rafael Varelas Config Change: None

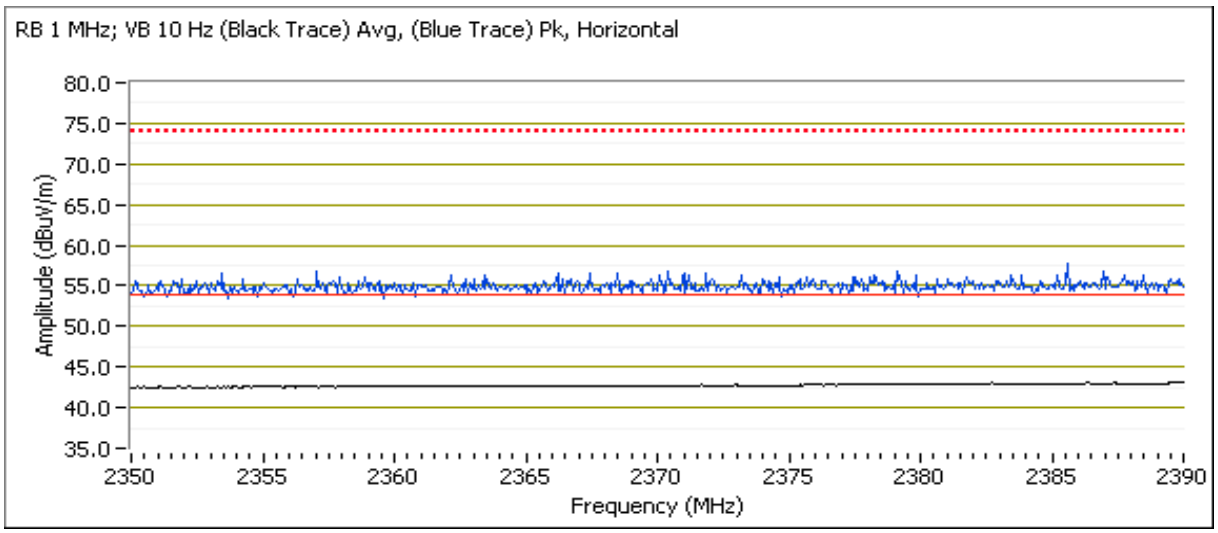
Run #1a, EUT on Channel #1 2412MHz - 802.11b, Chain A

2390 MHz 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	
2381.600	47.0	V	54.0	-7.0	AVG	0	1.0	RB 1 MHz;VB 10 Hz;Pk
2382.600	56.8	V	74.0	-17.2	PK	0	1.0	RB 1 MHz;VB 3 MHz;Pk
2378.470	44.7	H	54.0	-9.3	AVG	112	1.9	RB 1 MHz;VB 10 Hz;Pk
2386.730	56.2	H	74.0	-17.8	PK	112	1.9	RB 1 MHz;VB 3 MHz;Pk



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

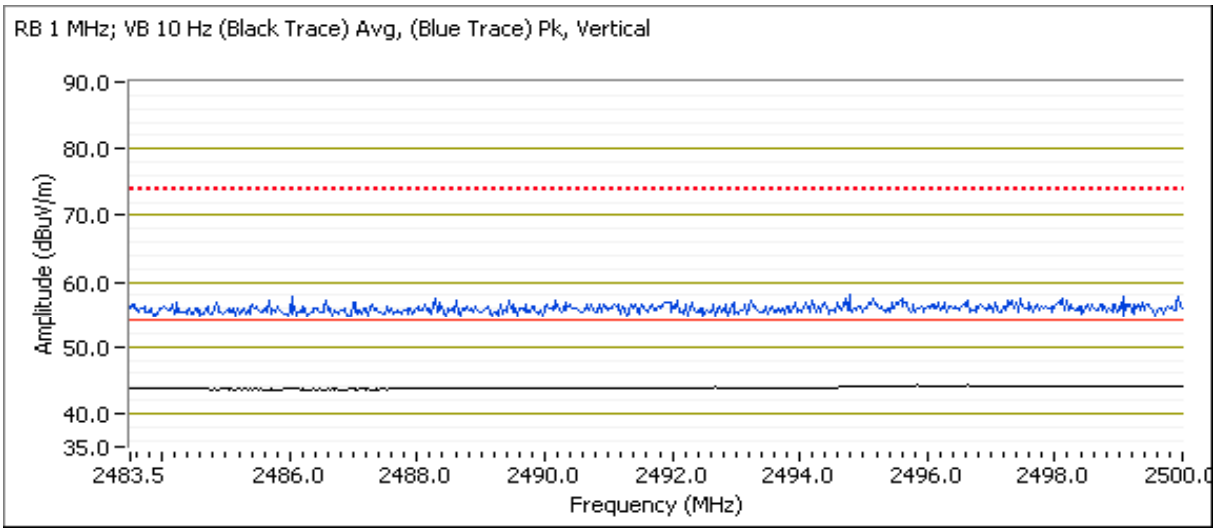


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

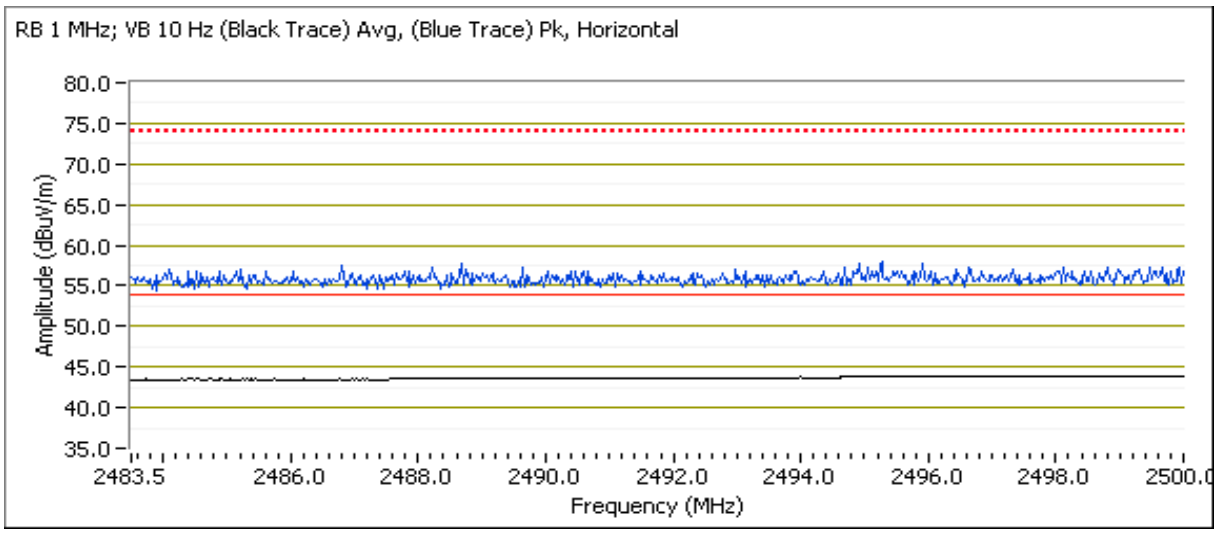
Run #1b, EUT on Channel #11 2462MHz - 802.11b, Chain A

2483.5 MHz Band Edge Signal Radiated 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	
2497.910	46.2	V	54.0	-7.8	AVG	310	1.0	RB 1 MHz;VB 10 Hz;Pk
2486.250	57.0	V	74.0	-17.0	PK	310	1.0	RB 1 MHz;VB 3 MHz;Pk
2499.200	45.6	H	54.0	-8.4	AVG	94	1.7	RB 1 MHz;VB 10 Hz;Pk
2497.960	56.9	H	74.0	-17.1	PK	94	1.7	RB 1 MHz;VB 3 MHz;Pk



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Run # 2, Band Edge Field Strength - 802.11g, Chain A

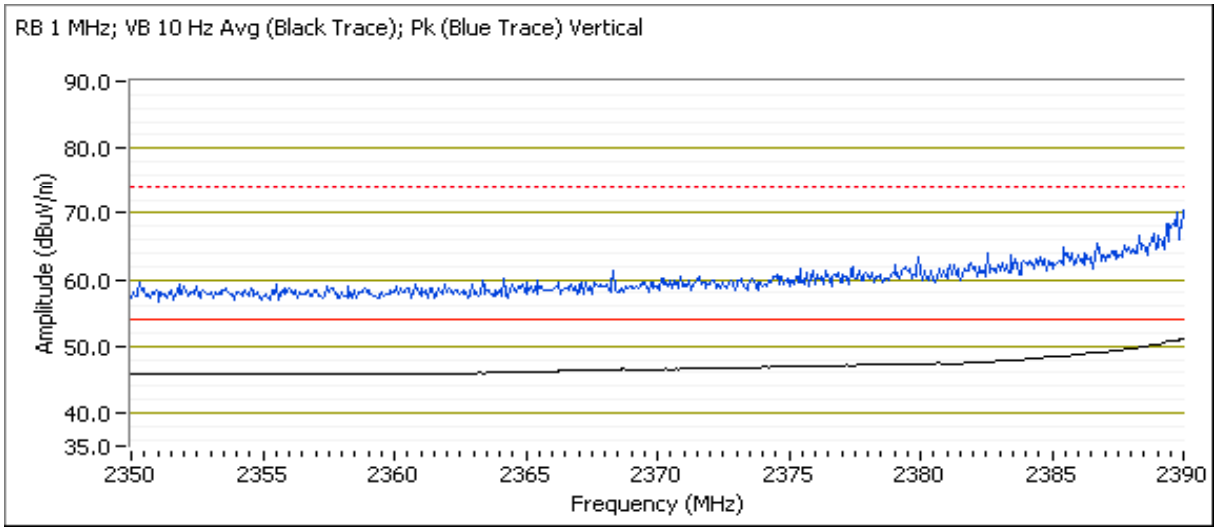
Run # 2a, EUT on Channel #1 2412MHz - 802.11g, Chain A

Date of Test: 12/16/2011 Test Location: FT Chamber #4

Test Engineer: Rafael Varelas Config Change: None

2390 MHz 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	
2389.870	53.2	V	54.0	-0.8	AVG	6	1.3	RB 1 MHz;VB 10 Hz;Pk, 97%
2389.930	65.9	V	74.0	-8.1	PK	6	1.3	RB 1 MHz;VB 3 MHz;Pk, 97%
2390.000	48.4	H	54.0	-5.6	AVG	179	1.2	RB 1 MHz;VB 10 Hz;Pk, 97%
2389.470	59.4	H	74.0	-14.6	PK	179	1.2	RB 1 MHz;VB 3 MHz;Pk, 97%



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

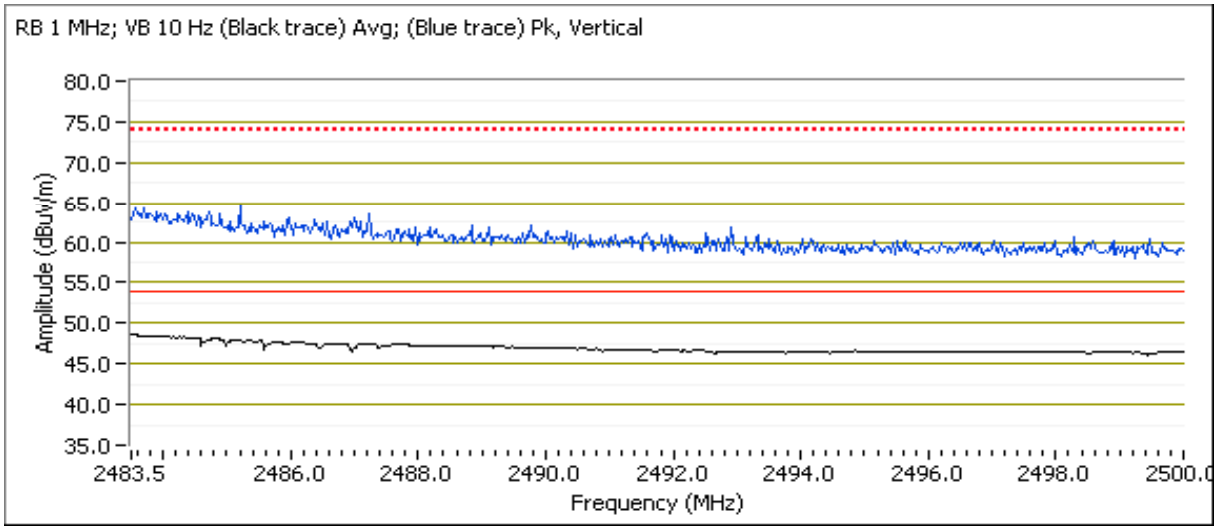
Run # 2b, EUT on Channel #11 2462MHz - 802.11g, Chain A

Date of Test: 5/19/2011 Test Location: FT Chamber #7

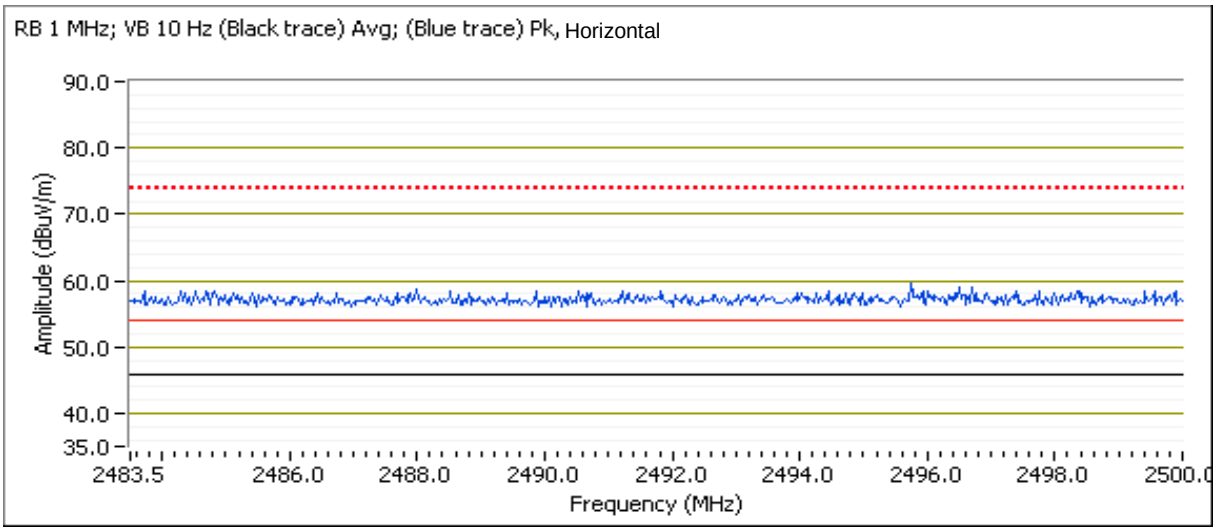
Test Engineer: Rafael Varelas & David Bare Config Change: None

2483.5 MHz Band Edge Signal Radiated 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	
2483.500	50.5	V	54.0	-3.5	AVG	285	1.0	RB 1 MHz;VB 10 Hz;Pk
2484.300	61.9	V	74.0	-12.1	PK	285	1.0	RB 1 MHz;VB 3 MHz;Pk
2496.310	47.4	H	54.0	-6.6	AVG	193	1.1	RB 1 MHz;VB 10 Hz;Pk
2489.440	58.4	H	74.0	-15.6	PK	193	1.1	RB 1 MHz;VB 3 MHz;Pk



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Run # 3, Band Edge Field Strength - 802.11n20

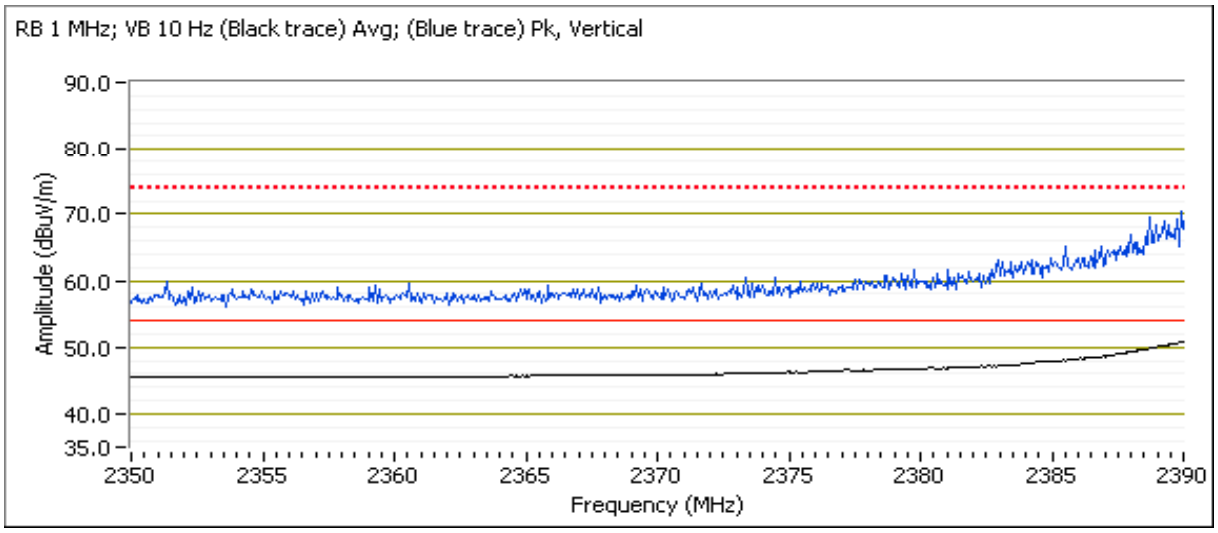
Run # 3a, EUT on Channel #1 2412MHz - 802.11n20

Date of Test: 12/20/2011 Test Location: FT Chamber #4

Test Engineer: Rafael Varelas Config Change: none

2390 MHz 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	
2389.730	53.3	V	54.0	-0.7	AVG	253	1.0	RB 1 MHz;VB 10 Hz;Pk
2389.530	66.8	V	74.0	-7.2	PK	253	1.0	RB 1 MHz;VB 3 MHz;Pk
2389.930	47.4	H	54.0	-6.6	AVG	251	1.1	RB 1 MHz;VB 10 Hz;Pk
2388.930	58.3	H	74.0	-15.7	PK	251	1.1	RB 1 MHz;VB 3 MHz;Pk



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

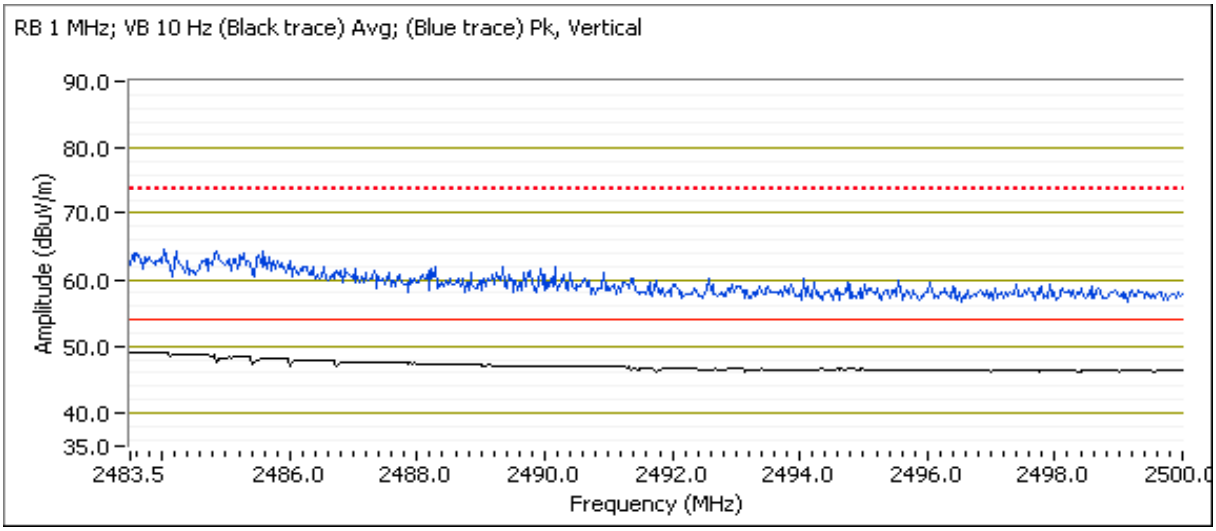
Run # 3b, EUT on Channel #11 2462MHz - 802.11n20

Date of Test: 5/19/2011 Test Location: FT Chamber #7

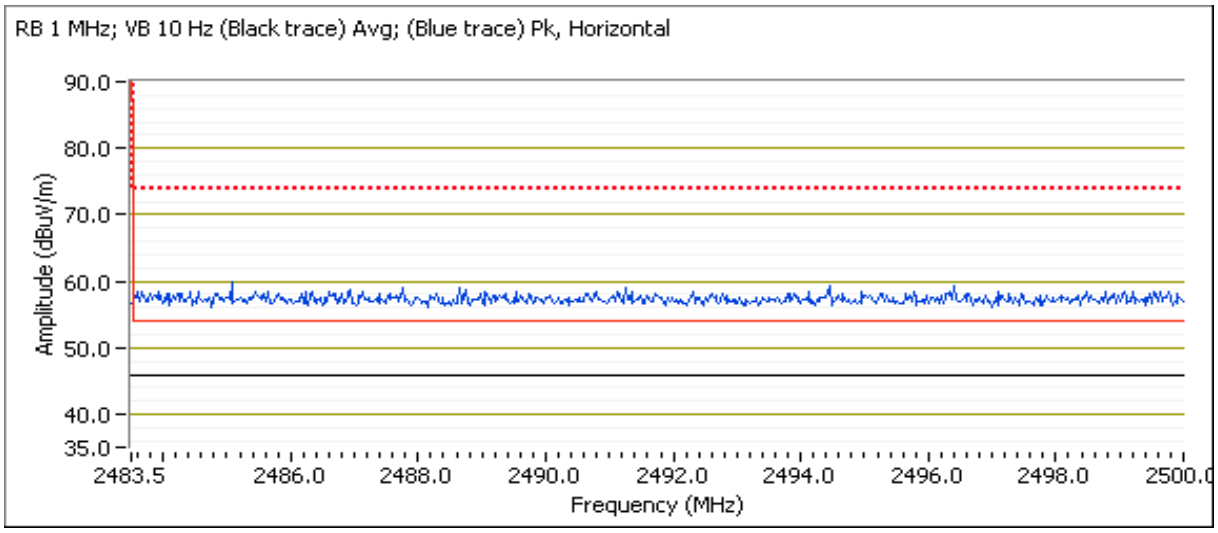
Test Engineer: David Bare Config Change: none

2483.5 MHz Band Edge Signal Radiated 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	
2483.500	50.9	V	54.0	-3.1	AVG	283	1.0	RB 1 MHz;VB 10 Hz;Pk
2483.510	66.1	V	74.0	-7.9	PK	283	1.0	RB 1 MHz;VB 3 MHz;Pk
2484.530	47.6	H	54.0	-6.4	AVG	193	1.1	RB 1 MHz;VB 10 Hz;Pk
2484.180	58.2	H	74.0	-15.8	PK	193	1.1	RB 1 MHz;VB 3 MHz;Pk



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions

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

SCU:

Run #	Mode	Channel	Antenna	Power Setting	Test Performed	Limit	Result / Margin
Run #1	802.11b Chain A	#1 2412MHz	Cisco	-	Radiated Emissions, 1 - 26 GHz	FCC 15.209 / 15.247	52.4dBµV/m @ 4823.9MHz (-1.6dB)
		#6 2437MHz	Cisco	-			50.7dBµV/m @ 4874.0MHz (-3.3dB)
		#11 2462MHz	Cisco	-			46.1dBµV/m @ 3282.7MHz (-7.9dB)
Scans on center channel in all three OFDM modes to determine the worst case							
Run # 2	802.11g Chain A	#6 2437MHz	Cisco	-	Radiated Emissions, 1 - 26 GHz	FCC 15.209 / 15.247	46.8dBµV/m @ 3249.3MHz (-7.2dB)
	802.11n20 Chain A	#6 2437MHz	Cisco	-			46.2dBµV/m @ 3249.3MHz (-7.8dB)
Top and bottom channels in worst case OFDM mode:							
Run # 3	802.11n20 Chain A	#1 2412MHz	Cisco	-	Radiated Emissions, 1 - 26 GHz	FCC 15.209 / 15.247	46.0dBµV/m @ 3216.0MHz (-8.0dB)
		#11 2462MHz	Cisco	-			46.2dBµV/m @ 3282.7MHz (-7.8dB)
Receiver Spurious Emissions							
Run # 4	Receive	#6, Chain A	Cisco	NA	Radiated Emissions, 1 - 7.5 GHz	RSS 210	46.5dBµV/m @ 3249.4MHz (-7.5dB)

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: 20-25 °C
Rel. Humidity: 40-50 %

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

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.

Run #1, Radiated Spurious Emissions, 1-26GHz, 802.11b, Chain A

Date of Test: 5/19/2011 Test Location: FT#7

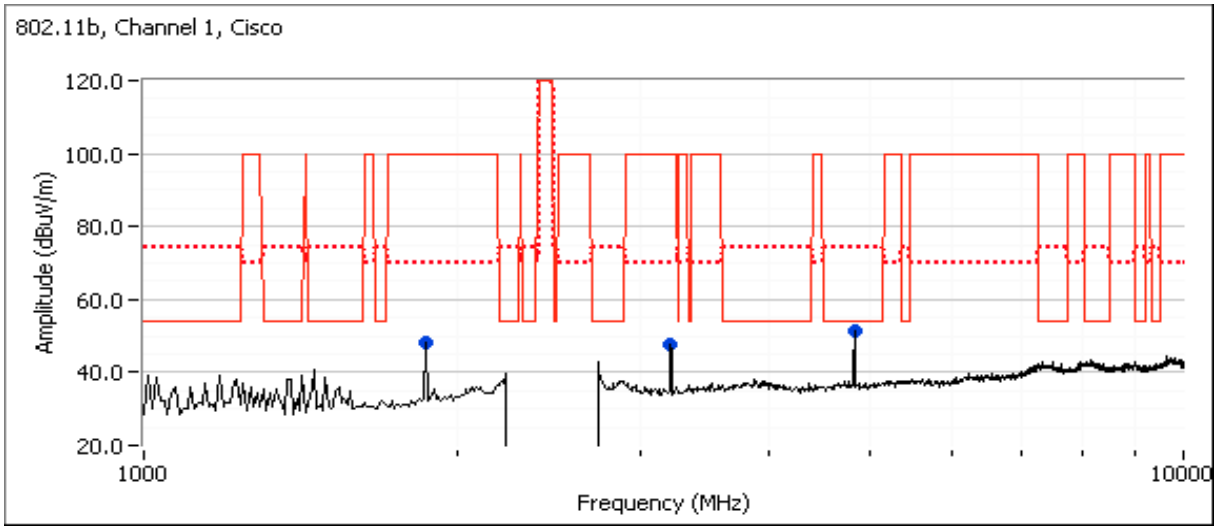
Test Engineer: Mark Hill Config Change: -

Run #1a, EUT on Channel #1 2412MHz - 802.11b, Chain A

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4823.890	52.4	V	54.0	-1.6	AVG	38	1.8	RB 1 MHz;VB 10 Hz;Pk
4823.940	55.3	V	74.0	-18.7	PK	38	1.8	RB 1 MHz;VB 3 MHz;Pk
1891.420	29.2	V	54.0	-24.8	AVG	322	1.0	RB 1 MHz;VB 10 Hz;Pk, note 2
1870.360	40.9	V	74.0	-33.1	PK	322	1.0	RB 1 MHz;VB 3 MHz;Pk, note 2
3216.020	47.5	H	54.0	-6.5	AVG	246	1.0	RB 1 MHz;VB 10 Hz;Pk, note 2
3215.910	50.2	H	74.0	-23.8	PK	246	1.0	RB 1 MHz;VB 3 MHz;Pk, note 2

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.
Note 2:	Restricted band limit used for non-restricted band emission.



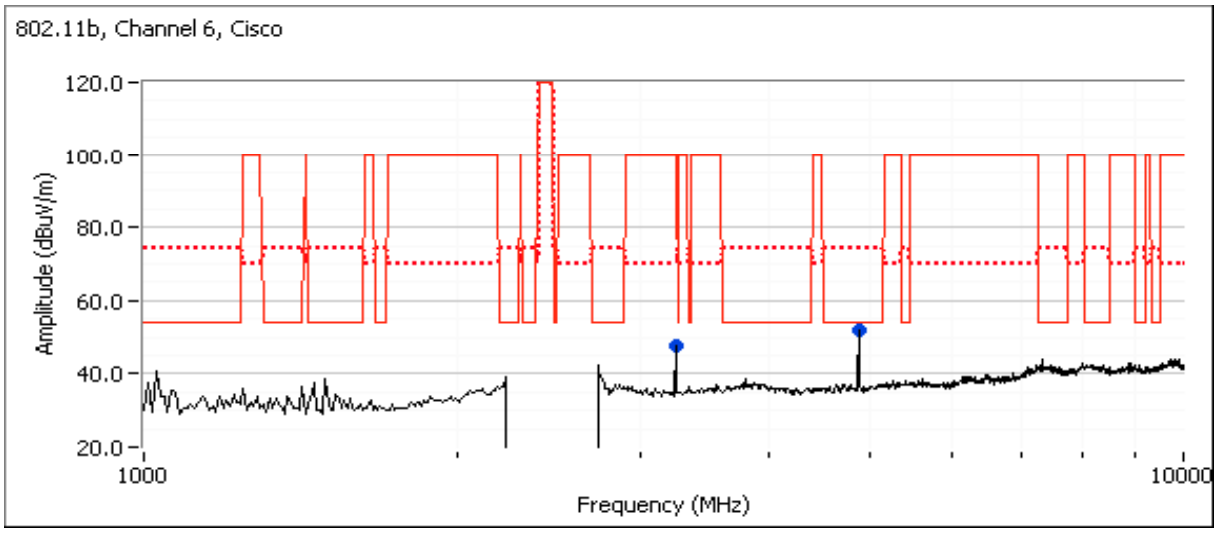
Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Run #1b: , EUT on Channel #6 2437MHz - 802.11b, Chain A

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4873.990	50.7	V	54.0	-3.3	AVG	78	1.0	RB 1 MHz;VB 10 Hz;Pk
4874.000	53.7	V	74.0	-20.3	PK	78	1.0	RB 1 MHz;VB 3 MHz;Pk
3249.330	46.9	H	54.0	-7.1	AVG	256	1.0	RB 1 MHz;VB 10 Hz;Pk., note 2
3249.370	50.0	H	74.0	-24.0	PK	256	1.0	RB 1 MHz;VB 3 MHz;Pk, note 2

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.
Note 2:	Restricted band limit used for non-restricted band emission.
Note 3:	Scans made between 10 - 26GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no signifcant emissions in this frequency range



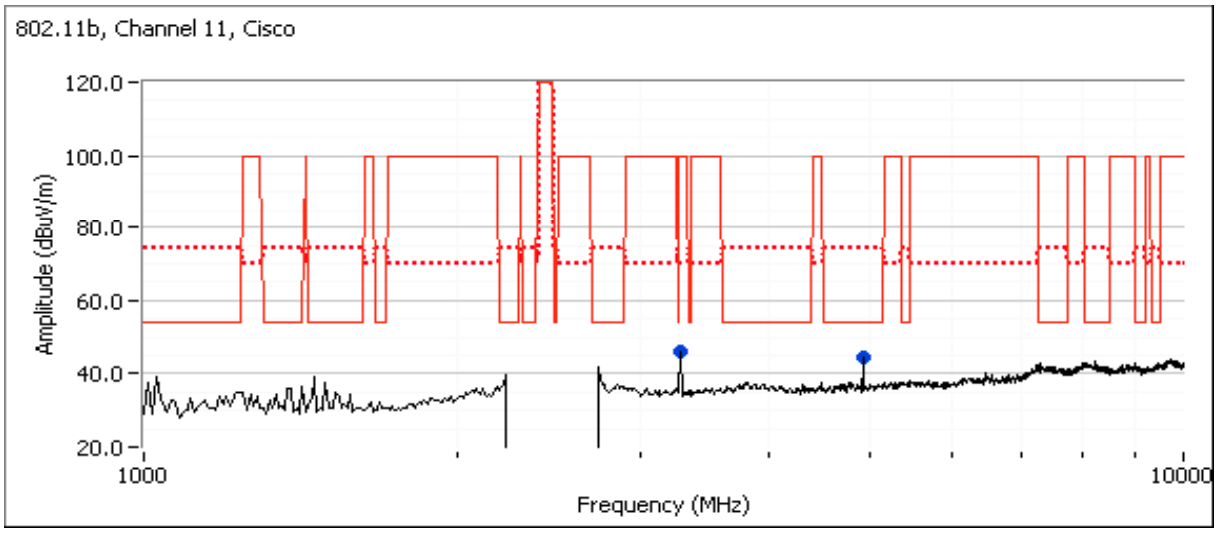
Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Run #1c: , EUT on Channel #11 2462MHz - 802.11b, Chain A

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3282.670	46.1	H	54.0	-7.9	AVG	255	1.0	RB 1 MHz;VB 10 Hz;Pk, note 2
3282.710	49.8	H	74.0	-24.2	PK	255	1.0	RB 1 MHz;VB 3 MHz;Pk, note 2
4923.970	45.6	V	54.0	-8.4	AVG	80	1.1	RB 1 MHz;VB 10 Hz;Pk
4924.170	49.9	V	74.0	-24.1	PK	80	1.1	RB 1 MHz;VB 3 MHz;Pk

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.
Note 2:	Restricted band limit used for non-restricted band emission.



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Run # 2, Radiated Spurious Emissions, 1-26GHz, 802.11g, 802.11n20, Chain A

Date of Test: 5/19/2011 Test Location: FT#7

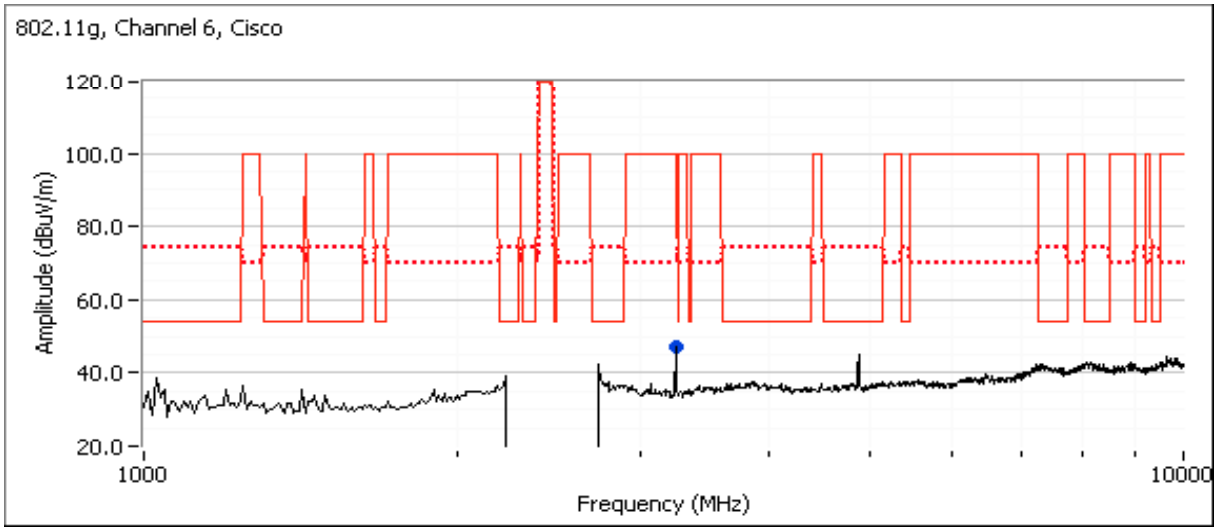
Test Engineer: Mark Hill Config Change: -

Run # 2a, EUT on Channel #6 2437MHz - 802.11g, Chain A

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3249.340	46.8	H	54.0	-7.2	AVG	261	1.0	RB 1 MHz;VB 10 Hz;Pk, note 2
3249.440	50.0	H	74.0	-24.0	PK	261	1.0	RB 1 MHz;VB 3 MHz;Pk, note 2
4874.170	39.9	V	54.0	-14.1	AVG	194	1.0	RB 1 MHz;VB 10 Hz;Pk
4875.500	50.8	V	74.0	-23.2	PK	194	1.0	RB 1 MHz;VB 3 MHz;Pk

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.
Note 2:	Restricted band limit used for non-restricted band emission.



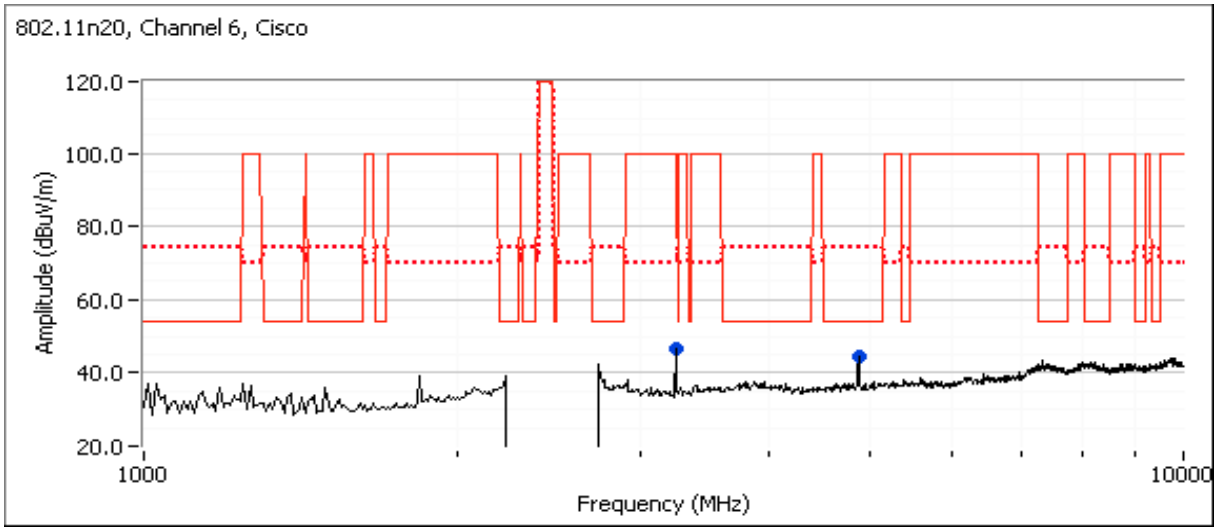
Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Run # 2b: , EUT on Channel #6 2437MHz - 802.11n20, Chain A

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3249.340	46.2	H	54.0	-7.8	AVG	256	1.0	RB 1 MHz;VB 10 Hz;Pk, note 3
3249.330	49.5	H	74.0	-24.5	PK	256	1.0	RB 1 MHz;VB 3 MHz;Pk, note 3
4873.800	41.2	V	54.0	-12.8	AVG	43	1.1	RB 1 MHz;VB 10 Hz;Pk
4874.440	52.5	V	74.0	-21.5	PK	43	1.1	RB 1 MHz;VB 3 MHz;Pk

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.
Note 2:	Scans made between 10 - 26GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no signifcant emissions in this frequency range
Note 3:	Restricted band limit used for non-restricted band emission.



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Run # 3, Radiated Spurious Emissions, 1-26GHz, 802.11n20 MCS0, Chain A

Date of Test: 5/19/2011 Test Location: FT Chamber #7

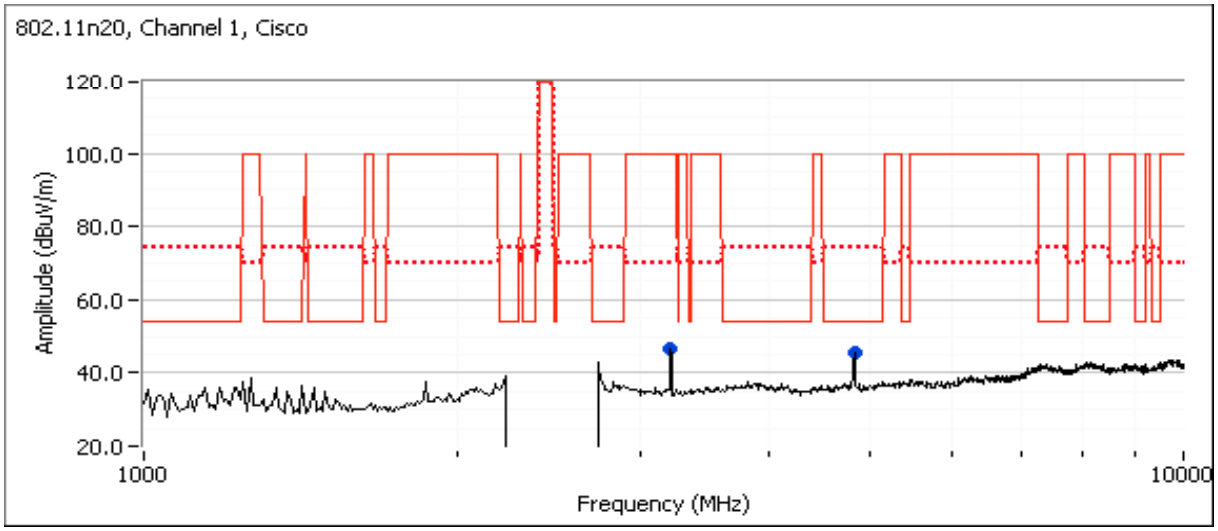
Test Engineer: Rafael Varelas Config Change: None

Run # 3a, EUT on Channel #1 2412MHz - 802.11n20 MCS0, Chain A

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3216.000	46.0	H	54.0	-8.0	AVG	258	1.0	RB 1 MHz;VB 10 Hz;Pk, note 2
3215.970	49.4	H	74.0	-24.6	PK	258	1.0	RB 1 MHz;VB 3 MHz;Pk, note 2
4822.660	39.5	V	54.0	-14.5	AVG	64	1.2	RB 1 MHz;VB 10 Hz;Pk
4821.960	51.8	V	74.0	-22.2	PK	64	1.2	RB 1 MHz;VB 3 MHz;Pk

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.
Note 2:	Restricted band limit used for non-restricted band emission.



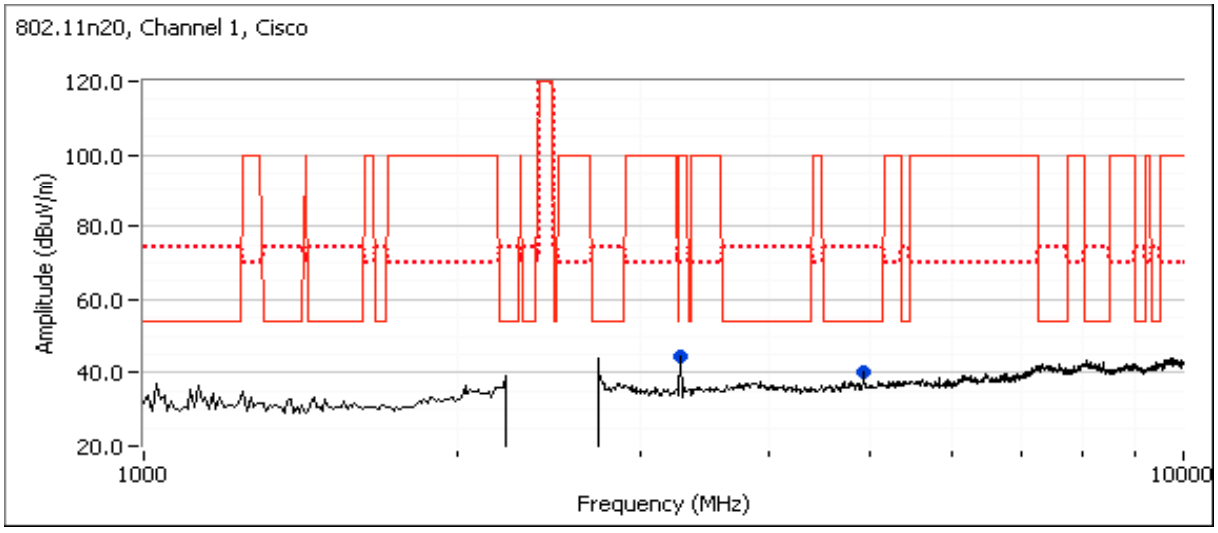
Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Run # 3c: , EUT on Channel #11 2462MHz - 802.11n20 MCS0, Chain A

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3282.650	46.2	H	54.0	-7.8	AVG	248	1.2	RB 1 MHz;VB 10 Hz;Pk, note 2
3282.850	49.5	H	74.0	-24.5	PK	248	1.2	RB 1 MHz;VB 3 MHz;Pk, note 2
4923.650	36.2	V	54.0	-17.8	AVG	24	1.0	RB 1 MHz;VB 10 Hz;Pk
4927.630	49.8	V	74.0	-24.2	PK	24	1.0	RB 1 MHz;VB 3 MHz;Pk

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.
Note 2:	Restricted band limit used for non-restricted band emission.



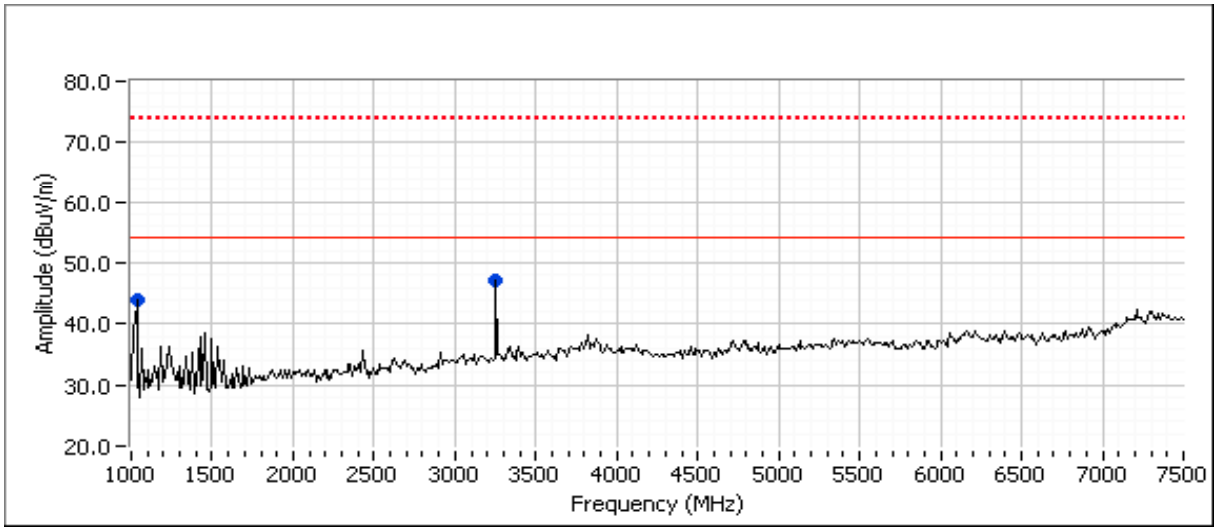
Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Run # 4, Radiated Spurious Emissions, 1-7.5GHz, Receive, Chain A

Date of Test: 5/20/2011 Test Location: FT7
Test Engineer: John Caizzi Config Change: none

Run # 4a, EUT on Channel #6 2437MHz - Receive, Chain A

Frequency	Level	Pol	RSS 210		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3249.350	46.5	H	54.0	-7.5	AVG	269	1.00	
3249.300	49.5	H	74.0	-24.5	PK	269	1.00	
1033.500	45.1	H	54.0	-8.9	AVG	223	1.42	
1033.570	45.4	H	74.0	-28.6	PK	223	1.42	



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions

Summary of Results - Device Operating in the 5725 - 5850 MHz Band

SCU: v3.03.01

Run #	Mode	Channel	Antenna	Measured Power	Test Performed	Limit	Result / Margin
Scans on center channel in all three OFDM modes to determine the worst case							
Run # 1	802.11a Chain A	#157 5785MHz	Larsen	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15.247	46.8dBµV/m @ 11571.8MHz (-7.2dB)
	802.11n20 Chain A	#157 5785MHz	Larsen	-			47.8dBµV/m @ 11569.4MHz (-6.2dB)
Top and bottom channels in worst case OFDM mode:							
Run # 2	802.11n20 Chain A	#149 5745MHz	Larsen	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15.247	46.9dBµV/m @ 11489.8MHz (-7.1dB)
		#161 5805MHz	Larsen	-			45.6dBµV/m @ 11608.9MHz (-8.4dB)
Receiver Spurious Emissions							
Run # 3	Receive Chain A	#157, Chain A	Larsen	-	Radiated Emissions, 1 - 18 GHz	RSS 210	40.9dBµV/m @ 1345.5MHz (-13.1dB)

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: 20-25 °C
Rel. Humidity: 40-50 %

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:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Run # 1, Radiated Spurious Emissions, 1-40GHz, 802.11a, Chain A

Date of Test: 12/23/2011 Test Location: FT Chamber #4

Test Engineer: Rafael Varelas Config Change: None

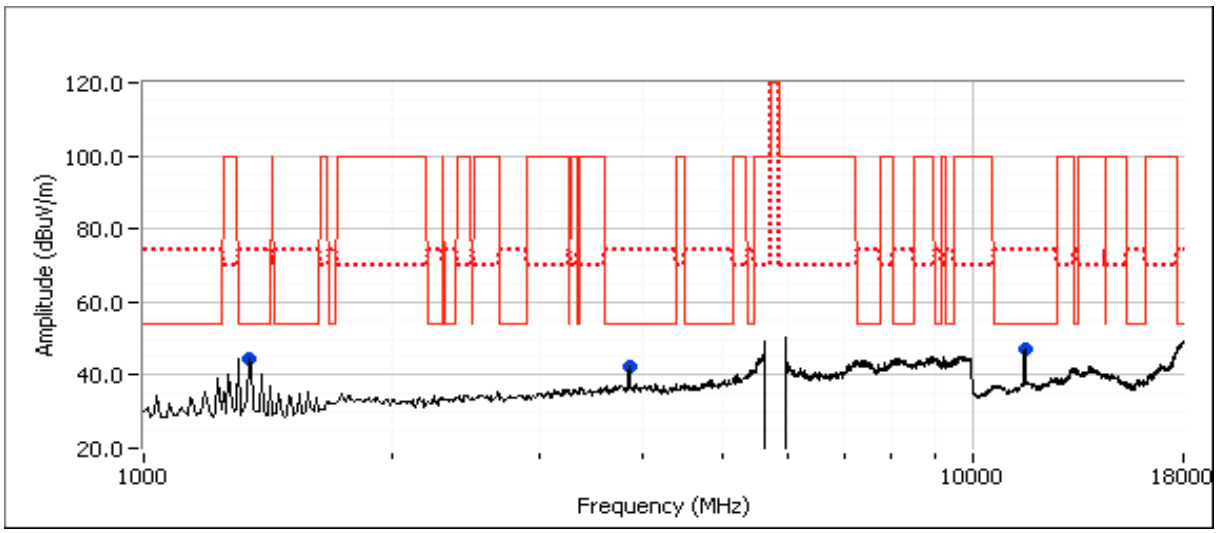
Run # 1a, EUT on Channel #157 5785MHz - 802.11a, Chain A

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	100%		100%

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11571.830	46.8	V	54.0	-7.2	AVG	5	1.8	RB 1 MHz;VB 10 Hz;Pk
11575.900	57.9	V	74.0	-16.1	PK	5	1.8	RB 1 MHz;VB 3 MHz;Pk
11568.470	44.4	H	54.0	-9.6	AVG	111	1.1	RB 1 MHz;VB 10 Hz;Pk
11569.970	56.0	H	74.0	-18.0	PK	111	1.1	RB 1 MHz;VB 3 MHz;Pk
1345.470	44.3	H	54.0	-9.7	AVG	212	1.0	RB 1 MHz;VB 10 Hz;Pk
1345.350	46.1	H	74.0	-27.9	PK	212	1.0	RB 1 MHz;VB 3 MHz;Pk
3856.680	40.4	H	54.0	-13.6	AVG	73	1.1	RB 1 MHz;VB 10 Hz;Pk
3856.620	45.7	H	74.0	-28.3	PK	73	1.1	RB 1 MHz;VB 3 MHz;Pk

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

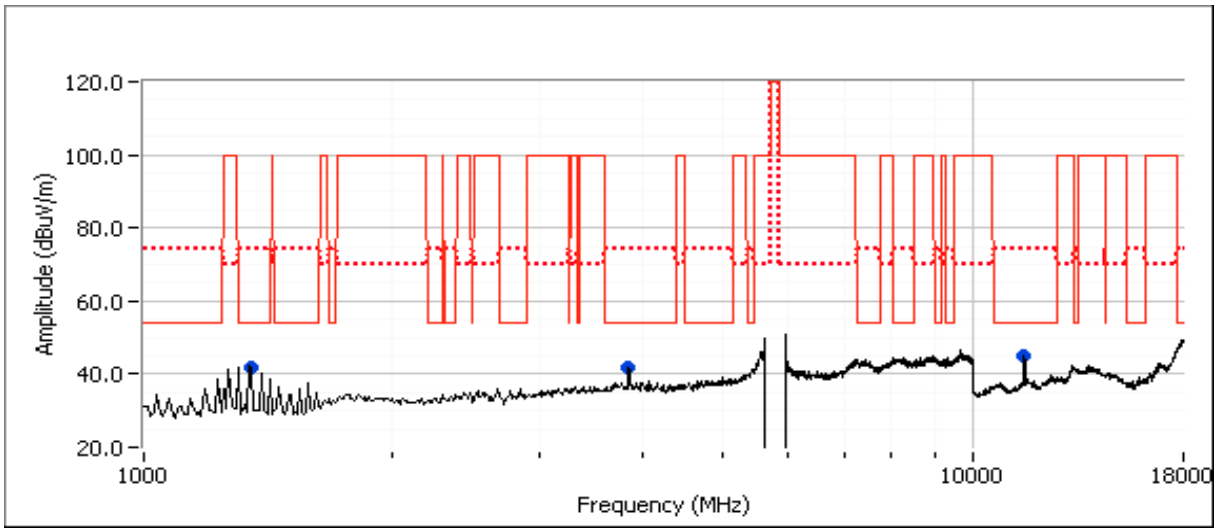
Run # 1b: , EUT on Channel #157 5785MHz - 802.11n20, Chain A

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	100%		100%

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11569.400	47.8	V	54.0	-6.2	AVG	341	1.7	RB 1 MHz;VB 10 Hz;Pk
11568.560	60.0	V	74.0	-14.0	PK	341	1.7	RB 1 MHz;VB 3 MHz;Pk
11569.960	45.2	H	54.0	-8.8	AVG	101	1.1	RB 1 MHz;VB 10 Hz;Pk
11568.530	57.4	H	74.0	-16.6	PK	101	1.1	RB 1 MHz;VB 3 MHz;Pk
3856.680	42.9	H	54.0	-11.1	AVG	330	1.2	RB 1 MHz;VB 10 Hz;Pk
3856.710	47.5	H	74.0	-26.5	PK	330	1.2	RB 1 MHz;VB 3 MHz;Pk
1345.530	40.8	H	54.0	-13.2	AVG	273	1.0	RB 1 MHz;VB 10 Hz;Pk
1345.600	43.9	H	74.0	-30.1	PK	273	1.0	RB 1 MHz;VB 3 MHz;Pk

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.
Note 2:	Scans made between 18 - 40GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no signifcant emissions in this frequency range



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Run # 2, Radiated Spurious Emissions, 1-40GHz, 802.11n20, Chain A

Date of Test: 12/23/2011 Test Location: FT Chamber #4

Test Engineer: Rafael Varelas Config Change: None

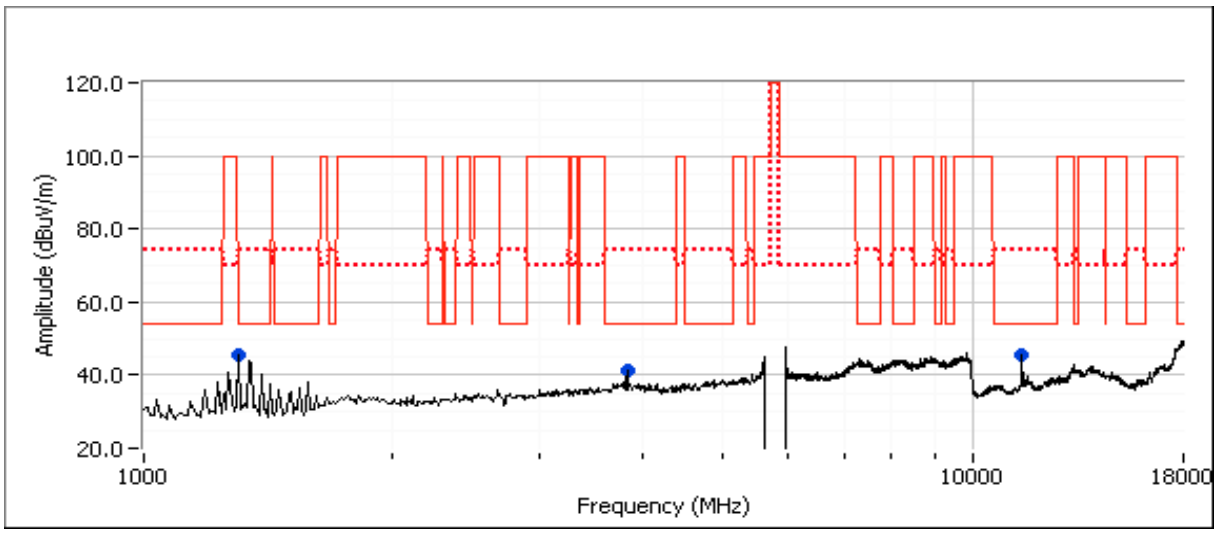
Run # 2a, EUT on Channel #149 5745MHz - 802.11n20, Chain A

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	100%		100%

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11489.770	46.9	V	54.0	-7.1	AVG	95	1.5	RB 1 MHz;VB 10 Hz;Pk
11490.400	59.1	V	74.0	-14.9	PK	95	1.5	RB 1 MHz;VB 3 MHz;Pk
11489.870	45.1	H	54.0	-8.9	AVG	102	1.0	RB 1 MHz;VB 10 Hz;Pk
11487.330	56.5	H	74.0	-17.5	PK	102	1.0	RB 1 MHz;VB 3 MHz;Pk
3830.000	41.6	H	54.0	-12.4	AVG	329	1.0	RB 1 MHz;VB 10 Hz;Pk
3830.000	46.2	H	74.0	-27.8	PK	329	1.0	RB 1 MHz;VB 3 MHz;Pk
1306.370	41.4	V	54.0	-12.6	AVG	169	1.2	RB 1 MHz;VB 10 Hz;Pk
1306.430	44.8	V	74.0	-29.2	PK	169	1.2	RB 1 MHz;VB 3 MHz;Pk

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

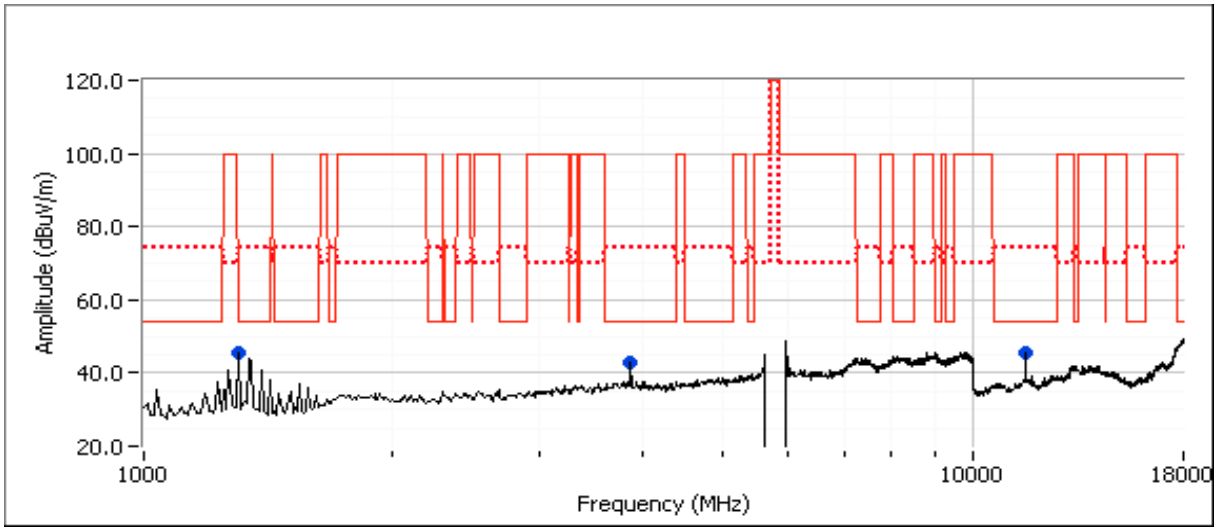
Run # 2c: , EUT on Channel #161 5805MHz - 802.11n20, Chain A

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	100%		100%

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11608.940	45.6	H	54.0	-8.4	AVG	88	1.0	RB 1 MHz;VB 10 Hz;Pk
11612.840	57.5	H	74.0	-16.5	PK	88	1.0	RB 1 MHz;VB 3 MHz;Pk
11608.910	45.4	V	54.0	-8.6	AVG	89	1.0	RB 1 MHz;VB 10 Hz;Pk
11607.080	56.7	V	74.0	-17.3	PK	89	1.0	RB 1 MHz;VB 3 MHz;Pk
1306.550	44.9	V	54.0	-9.1	AVG	206	1.0	RB 1 MHz;VB 10 Hz;Pk
1306.430	46.9	V	74.0	-27.1	PK	206	1.0	RB 1 MHz;VB 3 MHz;Pk
3870.040	42.4	H	54.0	-11.6	AVG	322	1.4	RB 1 MHz;VB 10 Hz;Pk
3869.890	47.5	H	74.0	-26.5	PK	322	1.4	RB 1 MHz;VB 3 MHz;Pk

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

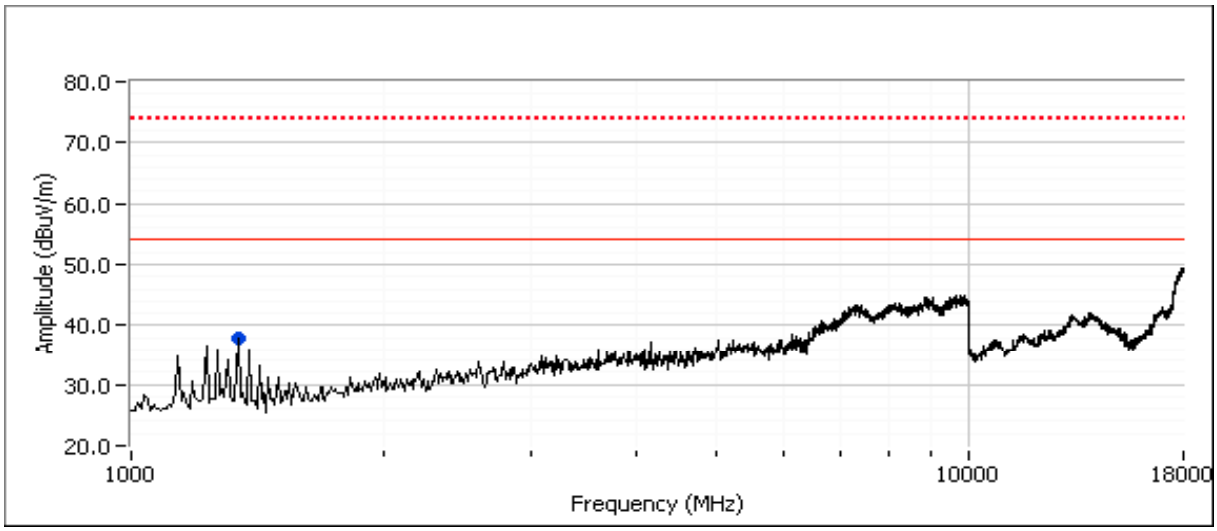
Run # 3, Radiated Spurious Emissions, 1-18GHz, Receive, Chain A

Date of Test: 12/23/2011 Test Location: FT Chamber #4

Test Engineer: Rafael Varelas Config Change: None

Run # 3a, EUT on Channel #157, 5785MHz - Receive, Chain A

Frequency	Level	Pol	RSS 210		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1345.500	40.9	V	54.0	-13.1	AVG	329	1.1	RB 1 MHz;VB 10 Hz;Pk
1345.500	43.8	V	74.0	-30.2	PK	329	1.1	RB 1 MHz;VB 3 MHz;Pk



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
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: 2/6/2012
Test Engineer: Joseph Cadigal
Test Location: FT Lab #4

Config. Used: 2
Config Change: no antennas
EUT Voltage: 3.3 VDC

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: 23 °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	See Below

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:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

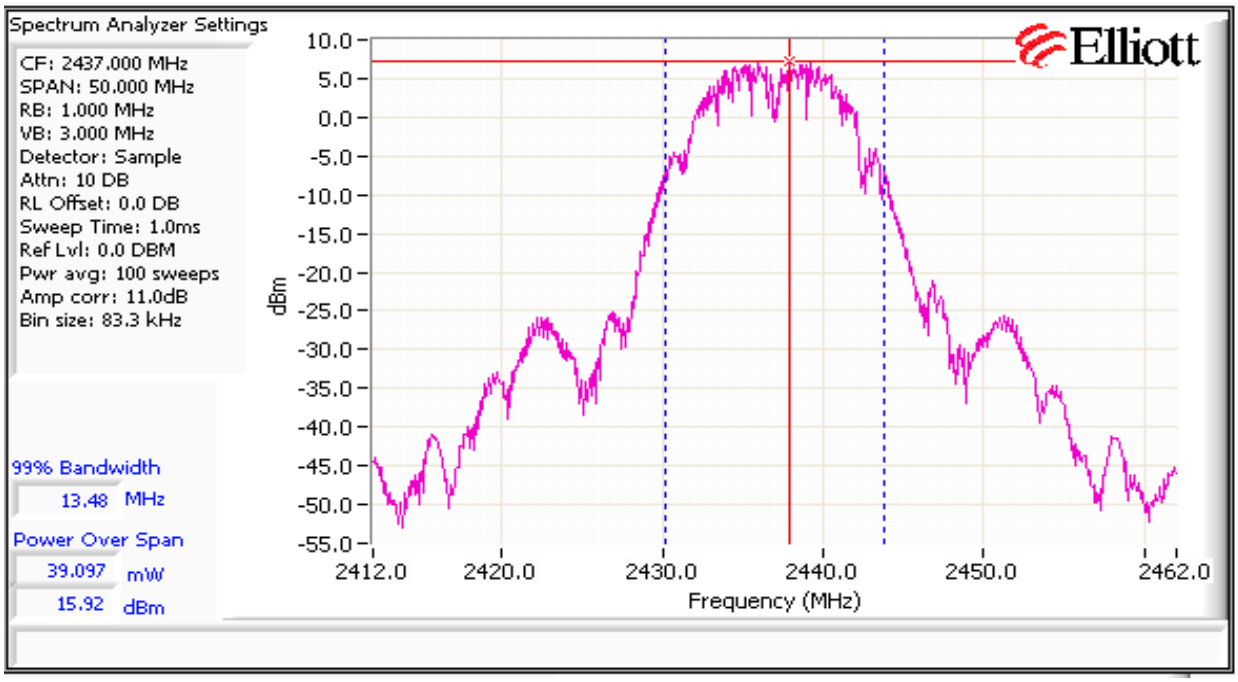
Run #1: Output Power

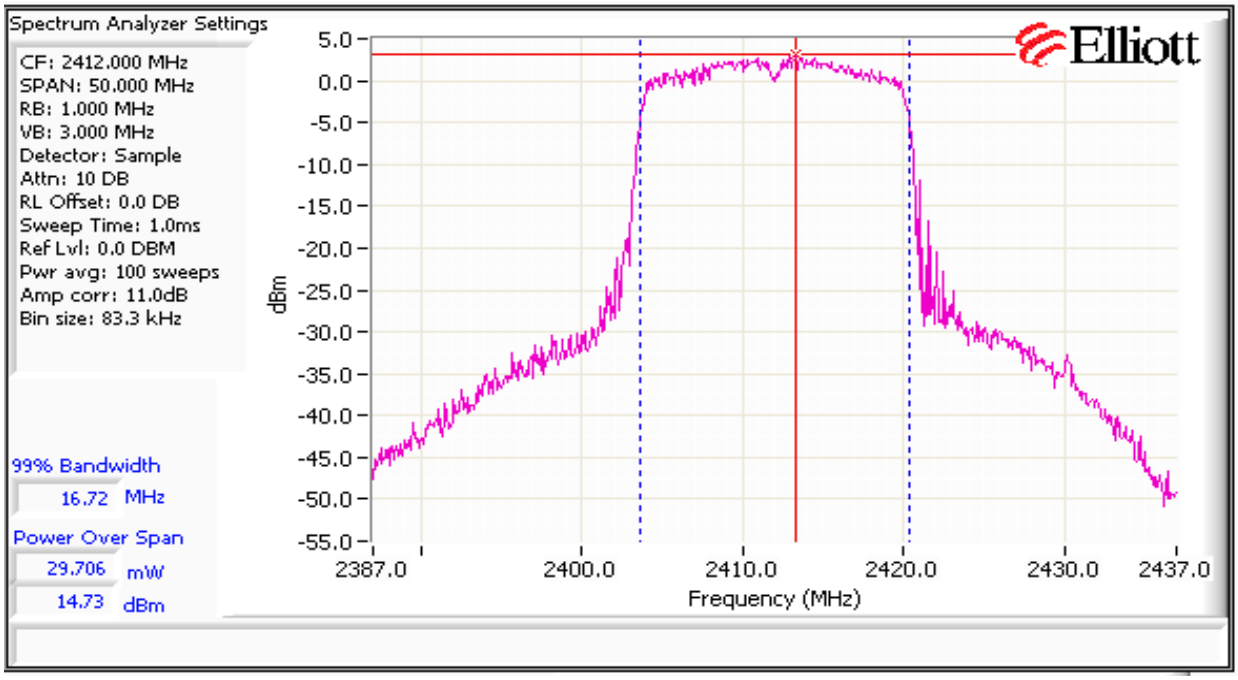
SCU V3.03.14

Power Setting[2]	Frequency (MHz)	Output Power (dBm) [1]	Output Power mW	Antenna Gain (dBi)	Result	EIRP Note 2 dBm	EIRP Note 2 W	Output Power (dBm) [3]	Output Power mW
802.11b mode									
-	2412	15.7	37.2	2.0	Pass	17.7	0.059	17.6	57.5
-	2437	15.9	39.1	2.0	Pass	17.9	0.062	17.5	56.2
-	2462	10.1	10.2	2.0	Pass	12.1	0.016	12.9	19.5
802.11g mode									
-	2412	14.7	29.7	2.0	Pass	16.7	0.047	20.5	112.2
-	2437	14.1	25.7	2.0	Pass	16.1	0.041	20.4	109.6
-	2462	10.7	11.6	2.0	Pass	12.7	0.018	19.4	87.1
802.11n20 mode									
-	2412	14.2	26.3	2.0	Pass	16.2	0.042	20.0	100.0
-	2437	11.6	14.3	2.0	Pass	13.6	0.023	18.5	70.8
-	2462	10.0	10.1	2.0	Pass	12.0	0.016	18.9	77.6

Note 1:	Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was not continuous but the ESI analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was transmitting) and power integration over 50 MHz (option #2, method 1 in KDB 558074, equivalent to method 1 of DA-02-2138A1 for U-NII devices). Spurious limit becomes -30dBc.
Note 2:	Power setting - the software power setting used during testing, included for reference only.
Note 3:	Power measured using peak power meter and is included for reference only.

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

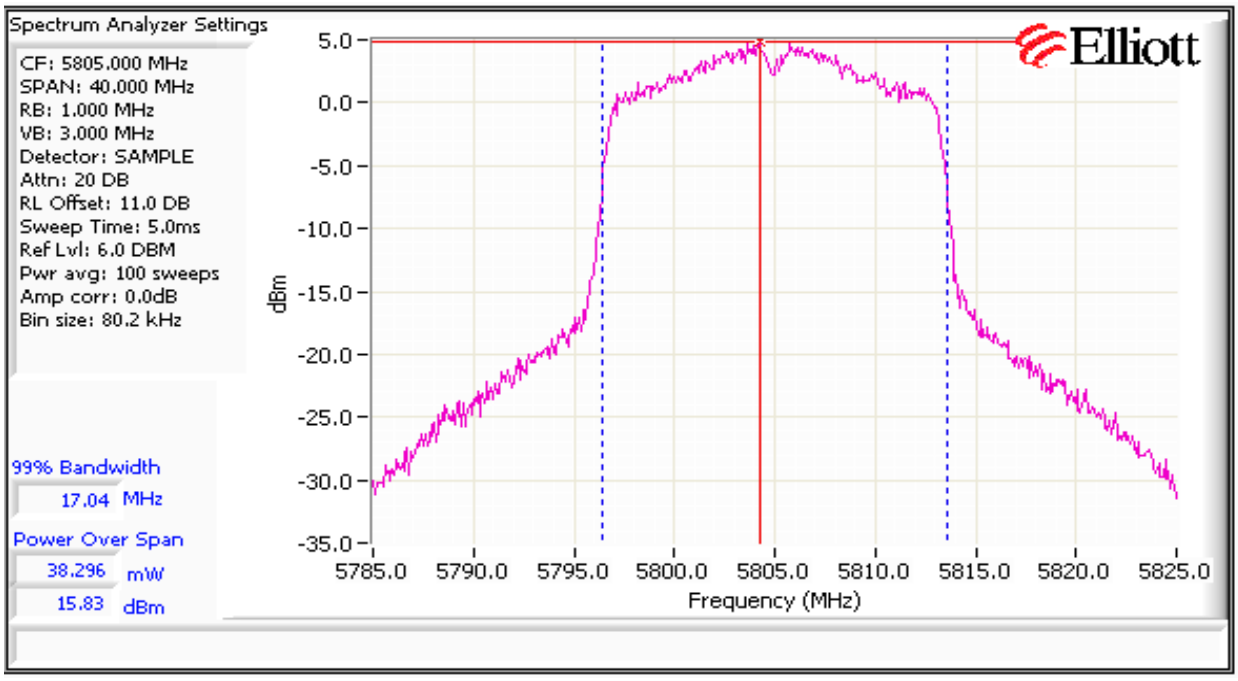




Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Power Setting[2]	Frequency (MHz)	Output Power (dBm) [1]	Output Power mW	Antenna Gain (dBi)	Result	EIRP Note 2 dBm	EIRP Note 2 W	Output Power (dBm) [3]	Output Power mW
802.11a mode									
-	5745	15.7	37.2	5.0	Pass	20.7	0.117	19.1	81.3
-	5785	15.5	35.5	5.0	Pass	20.5	0.112	18.7	74.1
-	5805	15.8	38.0	5.0	Pass	20.8	0.120	18.6	72.4
802.11n20 mode									
-	5745	15.7	37.2	5.0	Pass	20.7	0.117	19.1	81.3
-	5785	15.4	34.7	5.0	Pass	20.4	0.110	18.6	72.4
-	5805	15.3	33.9	5.0	Pass	20.3	0.107	18.4	69.2

Note 1:	Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was not continuous but the ESI analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was transmitting) and power integration over 50 MHz (option #2, method 1 in KDB 558074, equivalent to method 1 of DA-02-2138A1 for U-NII devices). Spurious limit becomes -30dBc.
Note 2:	Power setting - the software power setting used during testing, included for reference only.
Note 3:	Power measured using peak power meter and is included for reference only.



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements (802.11b)

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: 8/23/2011
Test Engineer: John Caizzi / Rafael Varelas
Test Location: FT Lab #4

Config. Used: 2
Config Change: no antennas
EUT Voltage: 3.3 VDC

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: 23 °C
Rel. Humidity: 37 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
2	-	-	Power spectral Density (PSD)	15.247(d)	Pass	-5.3 dBm/3kHz
3	-	-	Minimum 6dB Bandwidth	15.247(a)	Pass	9.0 MHz
3	-	-	99% Bandwidth	RSS GEN	-	12.8 MHz
4	-	-	Spurious emissions	15.247(b)	Pass	All emissions < -30 dBc

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

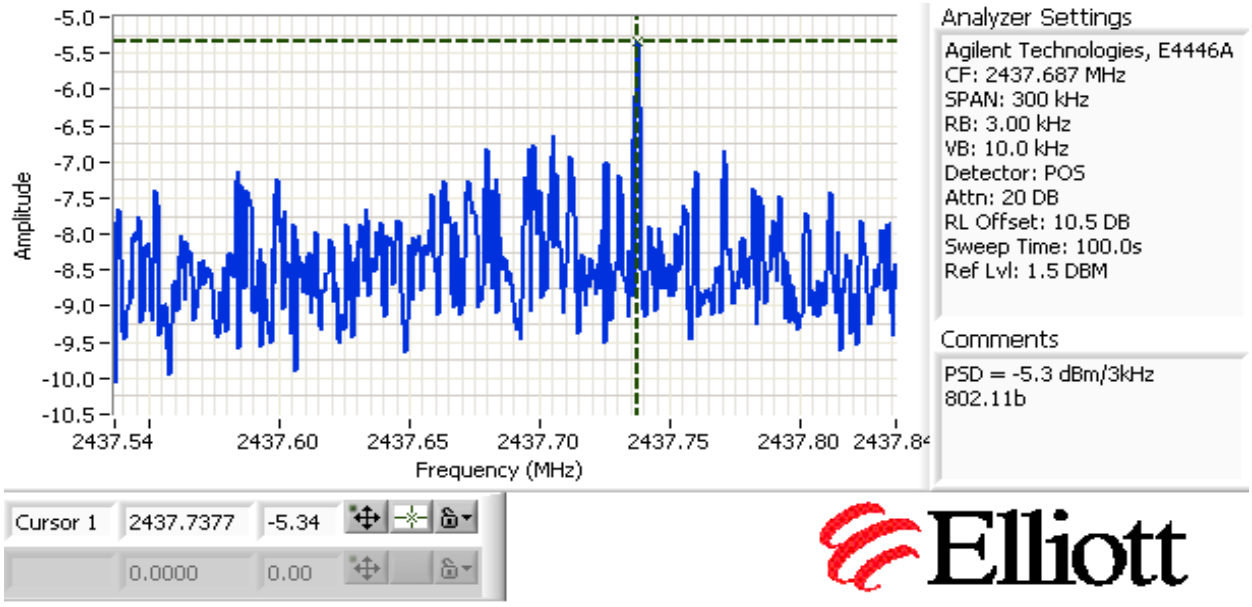
No deviations were made from the requirements of the standard.

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1	Limit dBm/3kHz	Result
-	2412.697	-7.5	8.0	Pass
-	2437.7377	-5.3	8.0	Pass
-	2461.1764	-6.2	8.0	Pass

Note 1:	Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using RB=3kHz using multiple sweeps at a faster rate over the 6dB bandwidth of the signal.

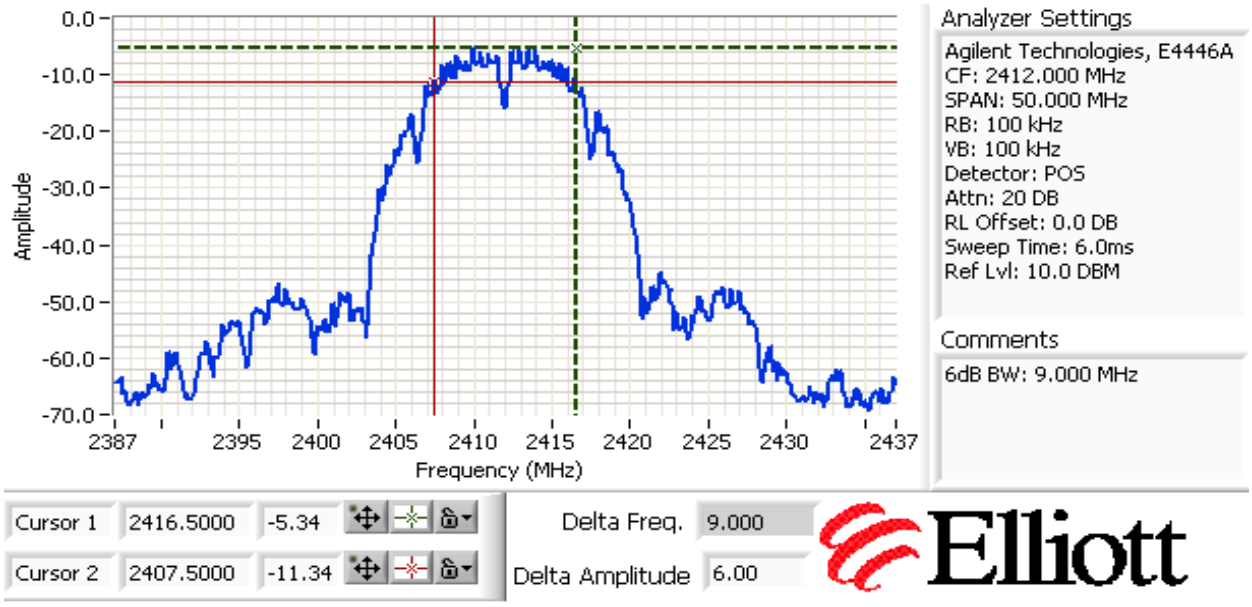


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz) 6dB	99%
-	2412	100kHz	9.0	12.8
-	2437	100kHz	9.1	12.5
-	2462	100kHz	9.1	12.7

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

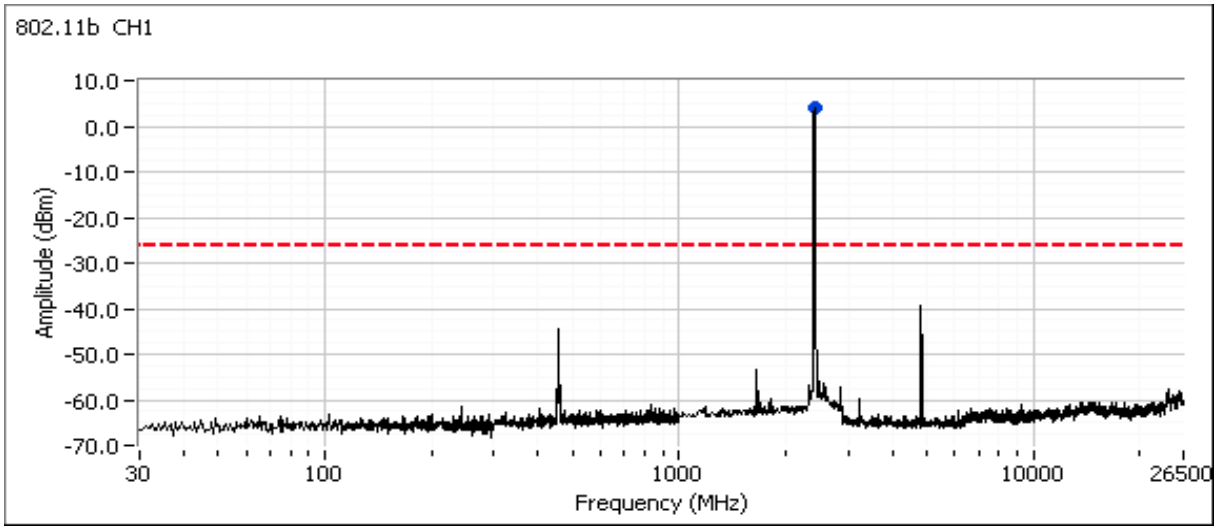


Run #4: Out of Band Spurious Emissions

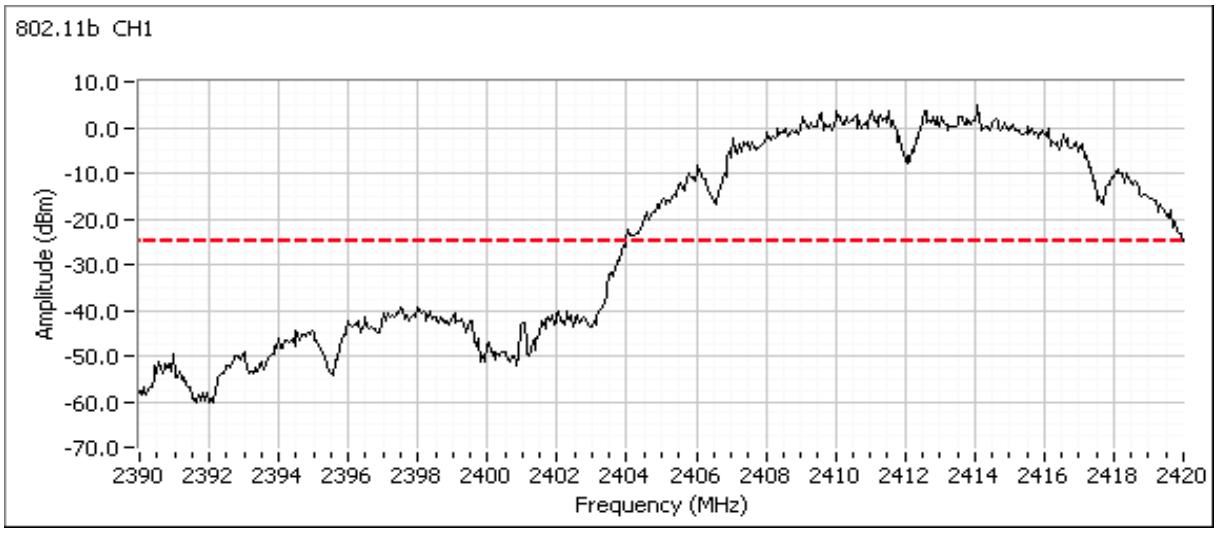
Frequency (MHz)	Limit	Result
2412	-30dBc	Pass
2437	-30dBc	Pass
2462	-30dBc	Pass

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Plots for low channel, power setting = default

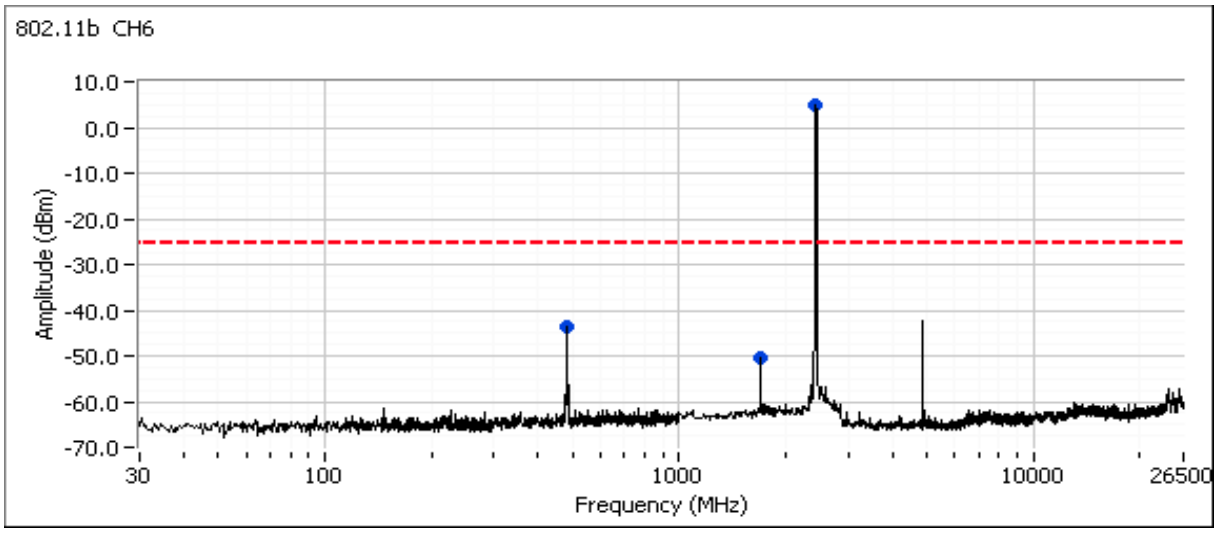


Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.

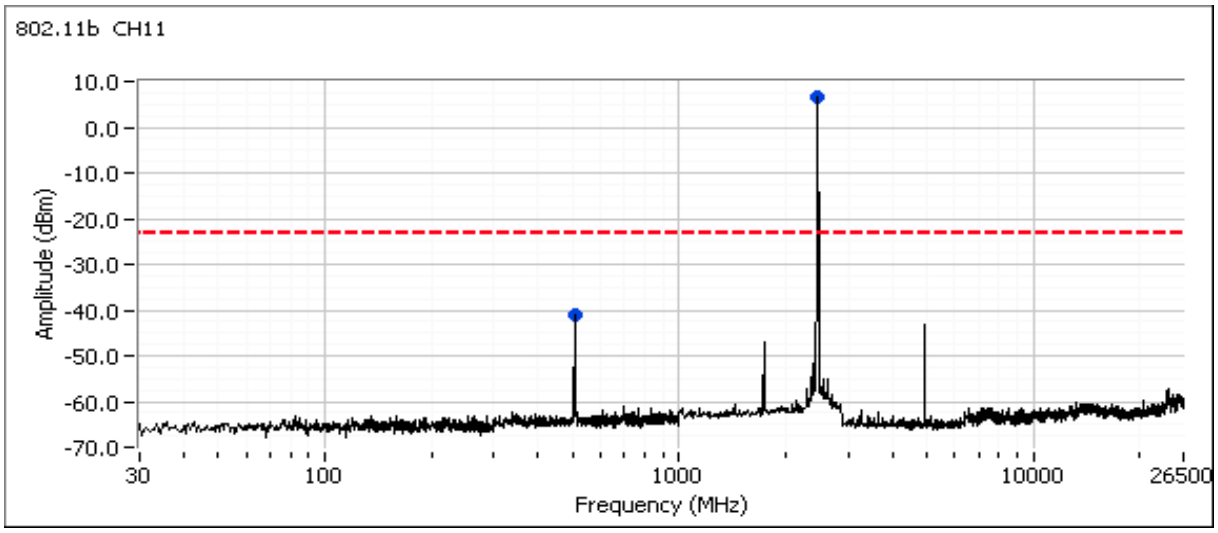


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Plots for center channel, power setting = default



Plots for high channel, power setting = default



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements (802.11g)

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: 2/6/2012
Test Engineer: Joseph Cadigal
Test Location: FT Lab #4

Config. Used: 2
Config Change: no antennas
EUT Voltage: 3.3 VDC

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: 23 °C
Rel. Humidity: 37 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
2	default	-	Power spectral Density (PSD)	15.247(d)	Pass	-12.3 dBm/3kHz
3	default	-	Minimum 6dB Bandwidth	15.247(a)	Pass	15.1 MHz
3	default	-	99% Bandwidth	RSS GEN	-	18.5 MHz
4	default	-	Spurious emissions	15.247(b)	Pass	All emissions < -30 dBc

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

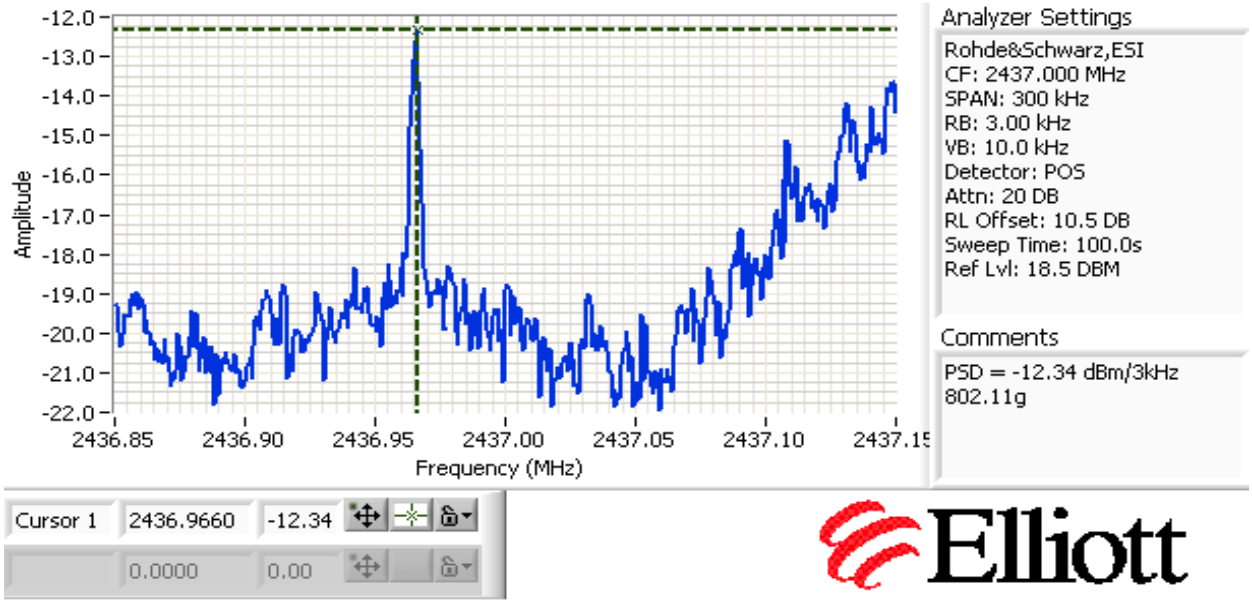
No deviations were made from the requirements of the standard.

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1	Limit dBm/3kHz	Result
-	2412.697	-14.7	8.0	Pass
-	2436.966	-12.3	8.0	Pass
-	2459.4993	-14.1	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.

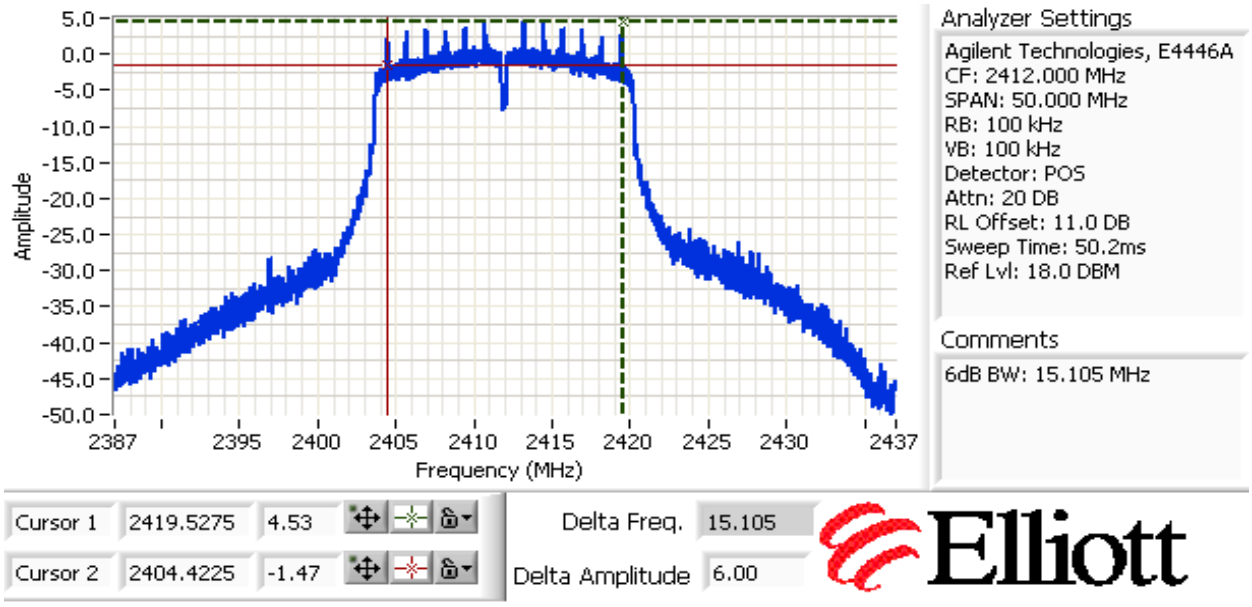


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz) 6dB	99%
-	2412	100kHz	15.1	18.4
-	2437	100kHz	15.1	18.5
-	2462	100kHz	15.1	16.7

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

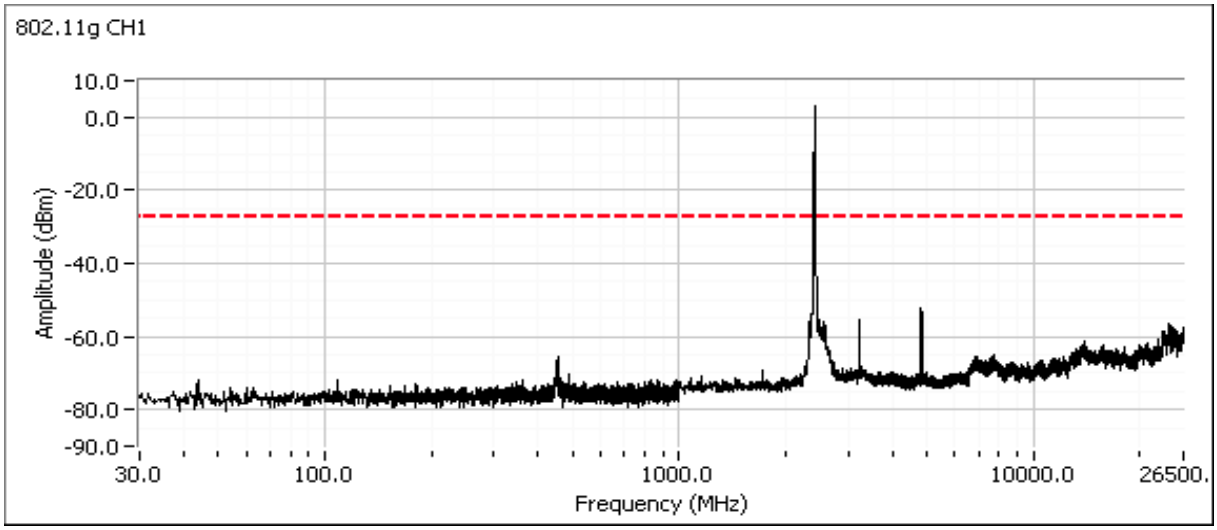


Run #4: Out of Band Spurious Emissions

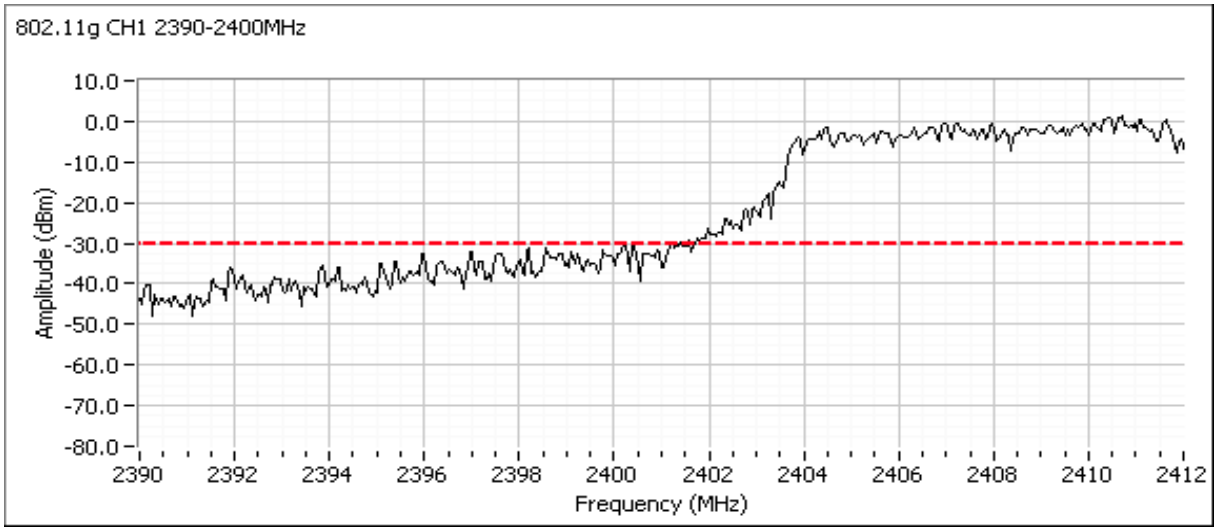
Frequency (MHz)	Limit	Result
2412	-30dBc	Pass
2437	-30dBc	Pass
2462	-30dBc	Pass

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Plots for low channel, power setting = default

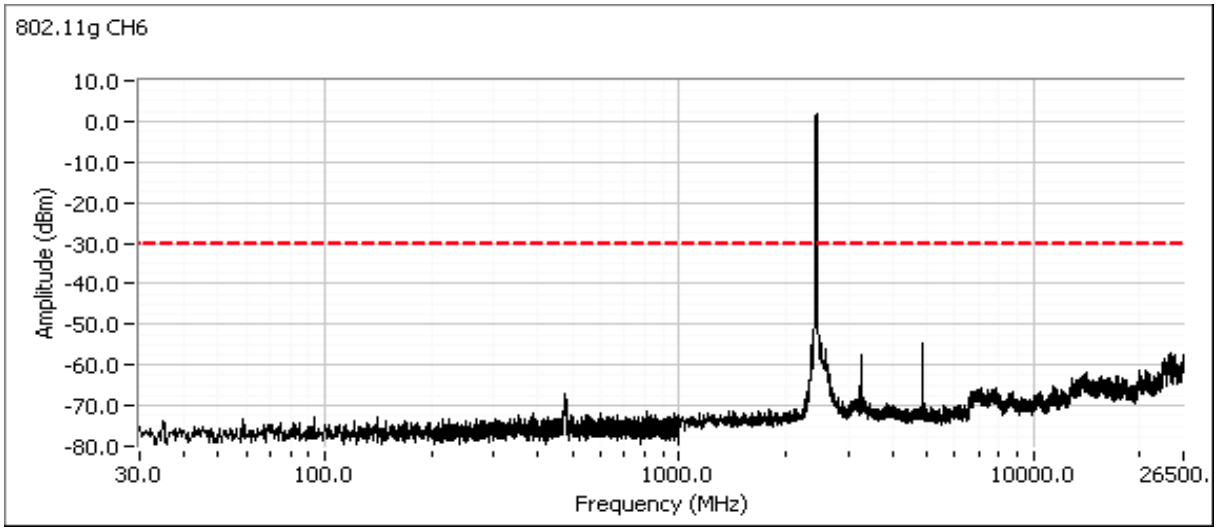


Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.

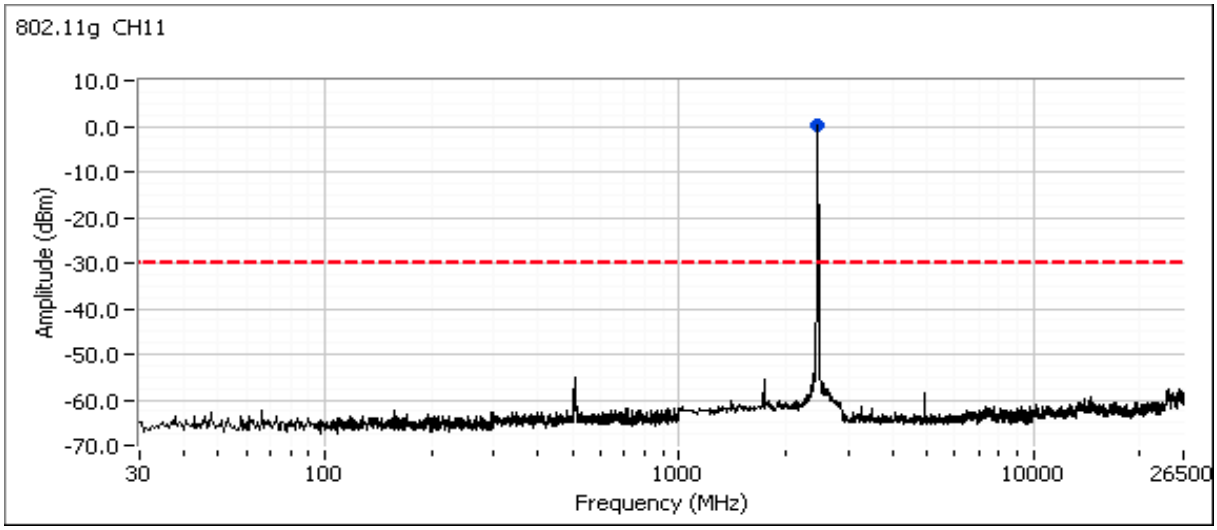


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Plots for center channel, power setting = default



Plots for high channel, power setting = default



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements (2.4GHz - 802.11n20)

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: 2/6/2012
Test Engineer: Joseph Cadigal
Test Location: FT Lab #4

Config. Used: 2
Config Change: no antennas
EUT Voltage: 3.3 VDC

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: 23 °C
Rel. Humidity: 37 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
2	default	-	Power spectral Density (PSD)	15.247(d)	Pass	-13.6 dBm/3kHz
3	default	-	Minimum 6dB Bandwidth	15.247(a)	Pass	15.1 MHz
3	default	-	99% Bandwidth	RSS GEN	-	20.1 MHz
4	default	-	Spurious emissions	15.247(b)	Pass	All emissions < -30 dBc

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

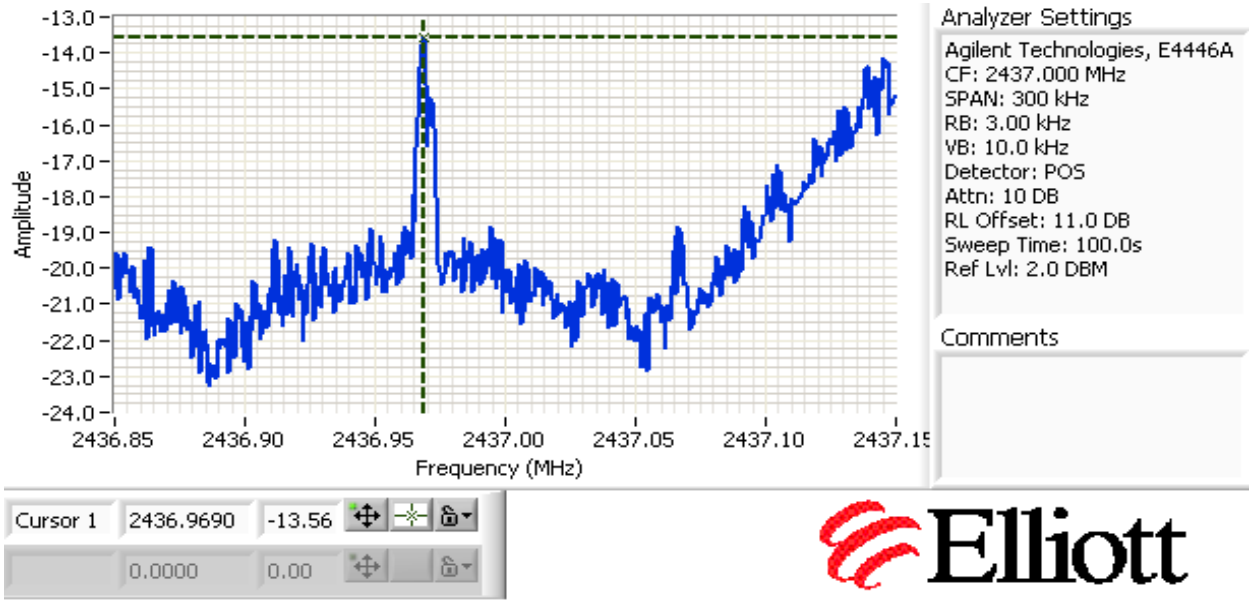
No deviations were made from the requirements of the standard.

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1	Limit dBm/3kHz	Result
100	2412	-15.5	8.0	Pass
100	2437	-13.6	8.0	Pass
100	2462	-14.3	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.

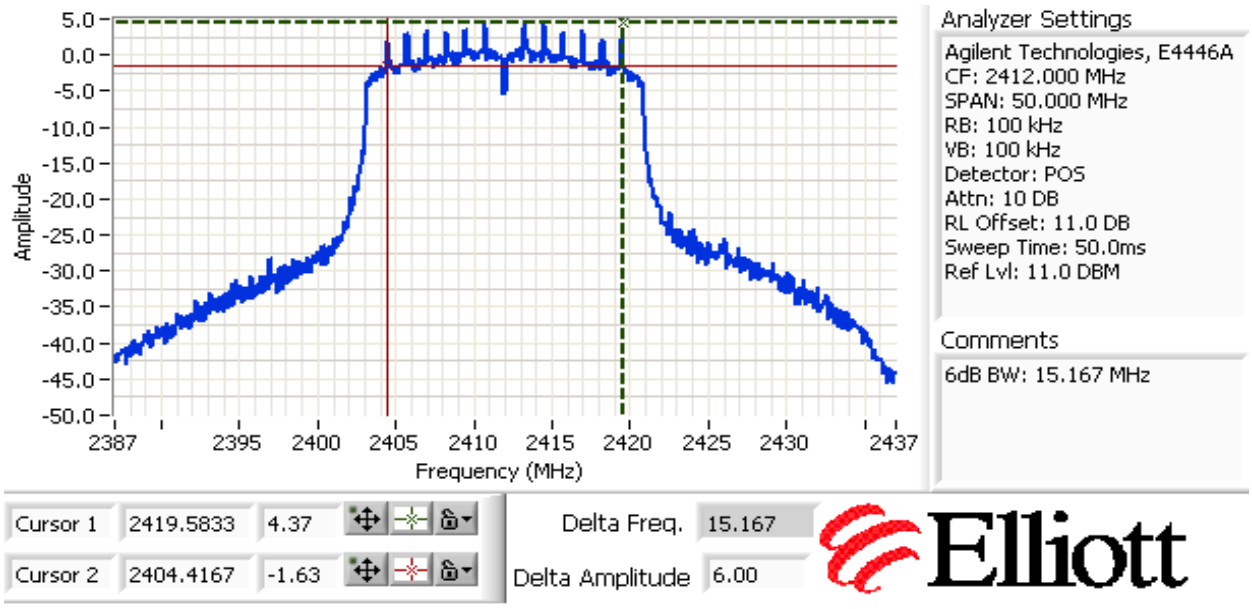


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz) 6dB	99%
100	2412	100kHz	15.2	19.1
100	2437	100kHz	15.1	20.1
100	2462	100kHz	15.1	18.7

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

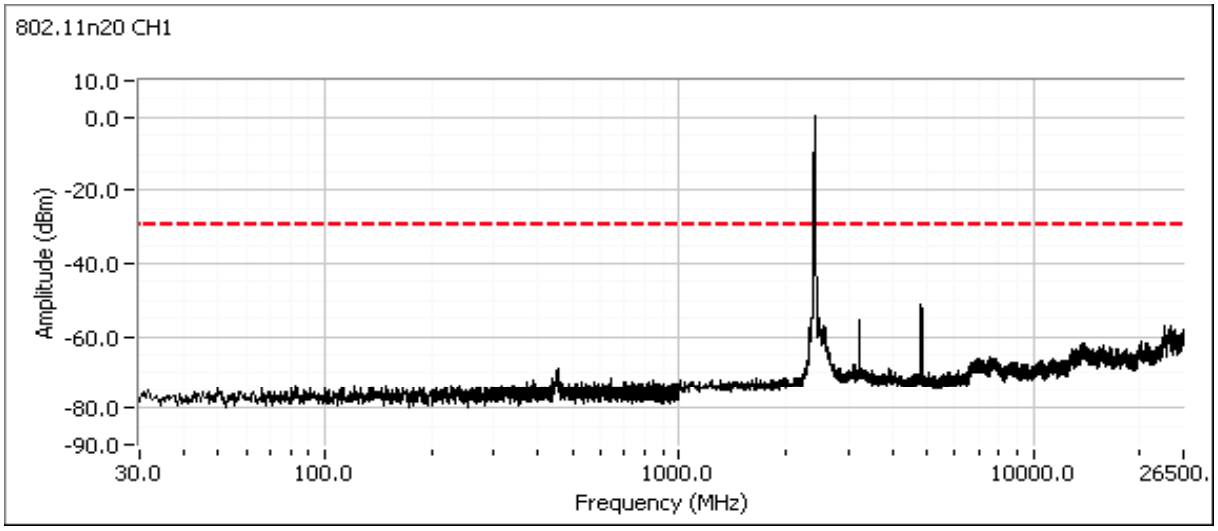


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

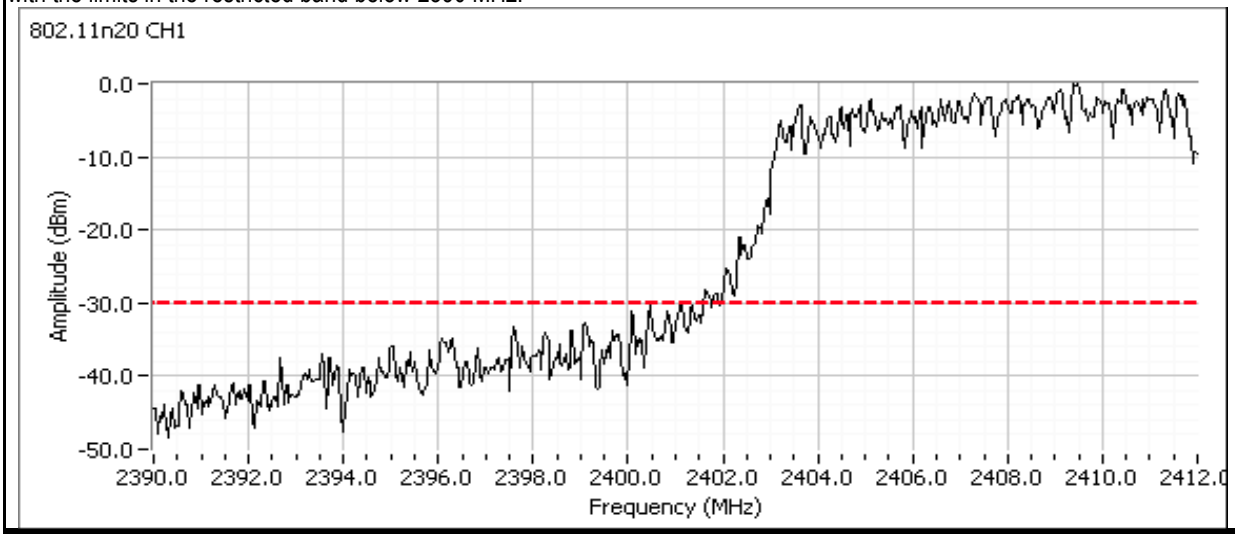
Run #4: Out of Band Spurious Emissions

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

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

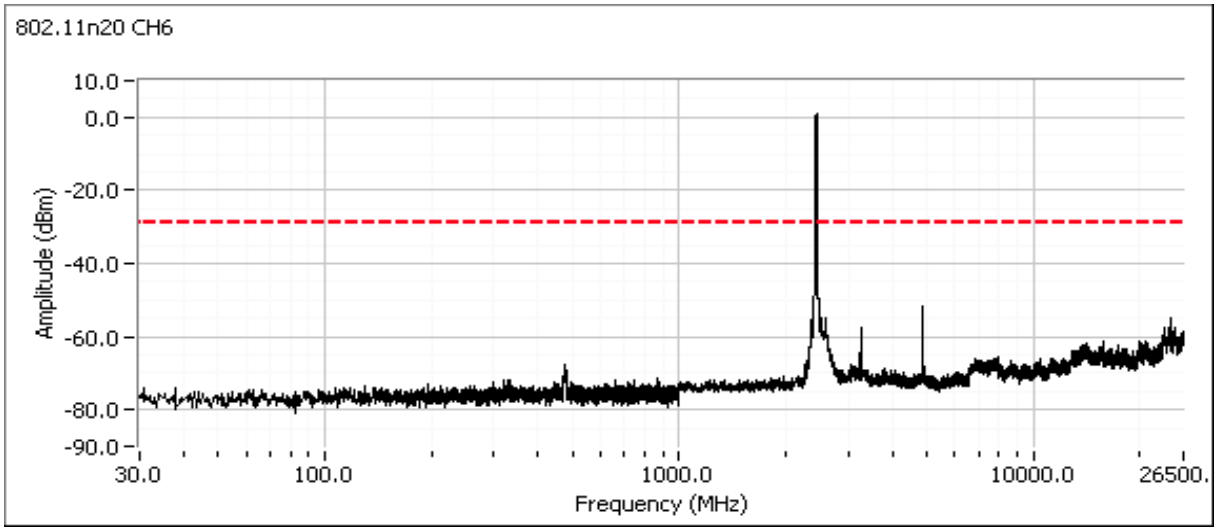


Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.

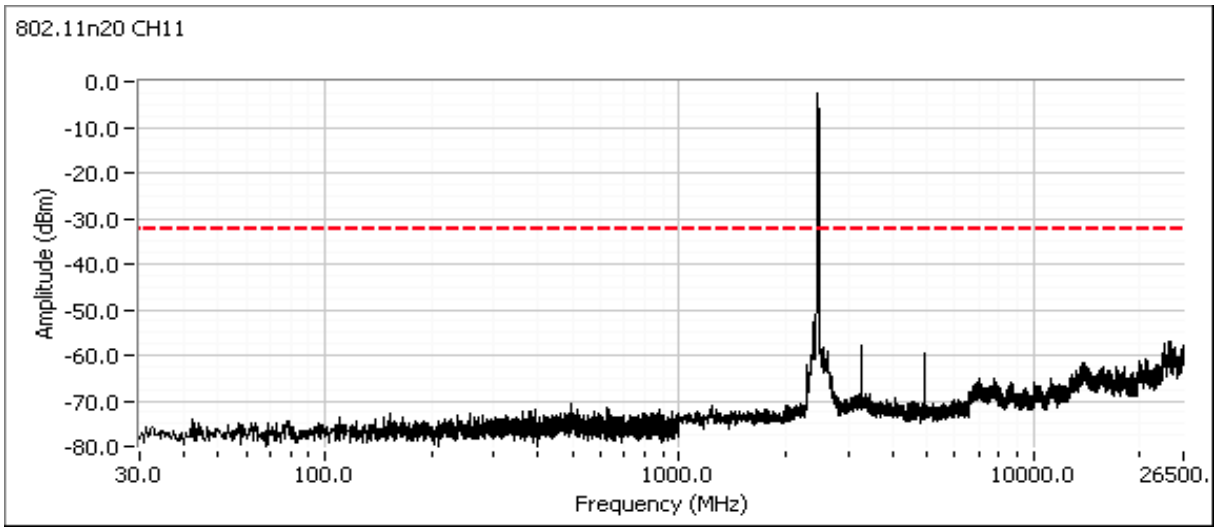


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

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



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



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements (5GHz - 802.11a)

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: 2/8/2012
Test Engineer: Joseph Cadigal
Test Location: FT Lab #4

Config. Used: 2
Config Change: no antennas
EUT Voltage: 3.3 VDC

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: 23 °C
Rel. Humidity: 37 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
2	100%		Power spectral Density (PSD)	15.247(d)	Pass	-16.6 dBm/3kHz
3	100%		Minimum 6dB Bandwidth	15.247(a)	Pass	15.0 MHz
3	100%		99% Bandwidth	RSS GEN	-	18.9 MHz
4	100%		Spurious emissions	15.247(b)	Pass	All emissions < -30 dBc

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

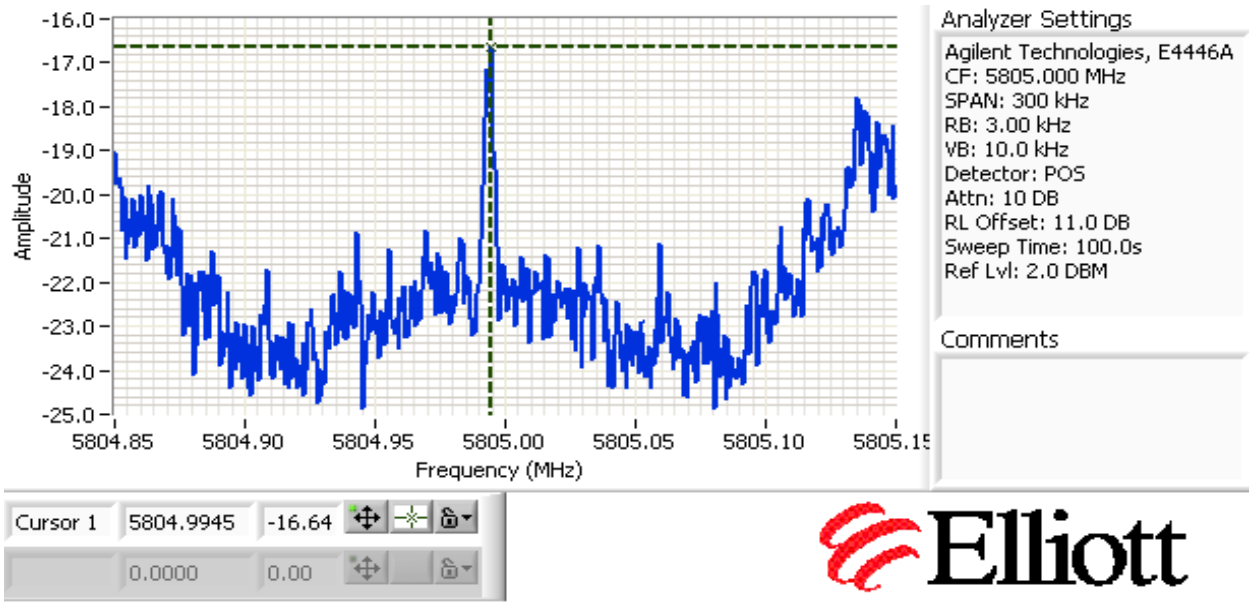
No deviations were made from the requirements of the standard.

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1	Limit dBm/3kHz	Result
100	5745	-17.3	8.0	Pass
100	5785	-19.8	8.0	Pass
100	5805	-16.6	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.

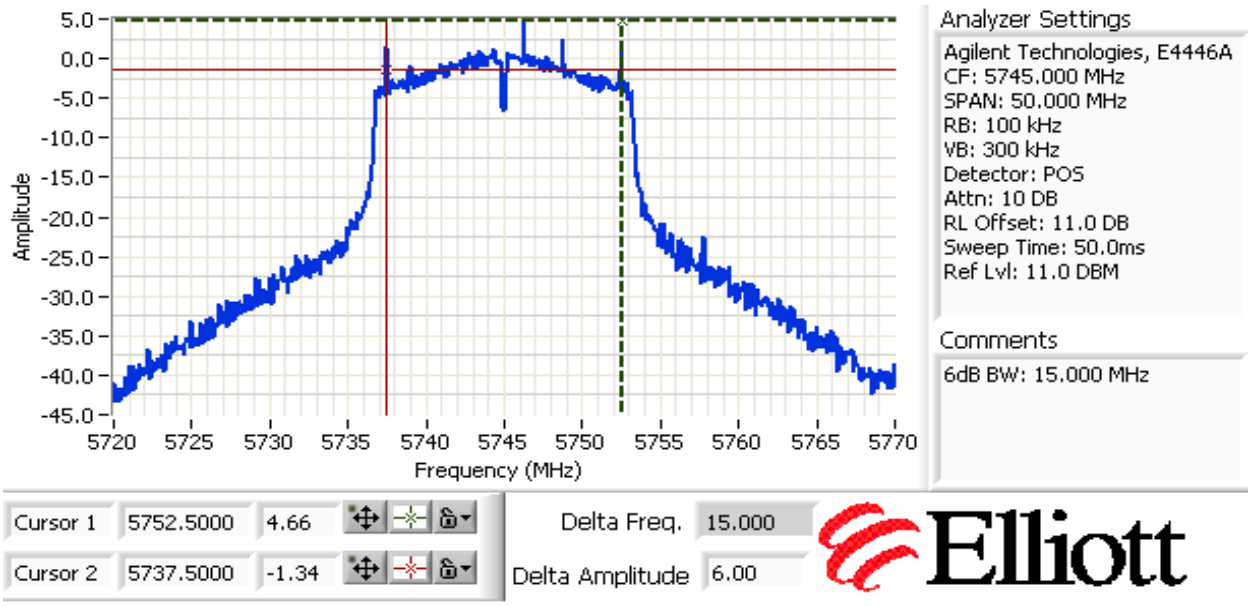


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz) 6dB	99%
100	5745	100kHz	15.0	18.9
100	5785	100kHz	15.1	18.6
100	5805	100kHz	16.3	18.5

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

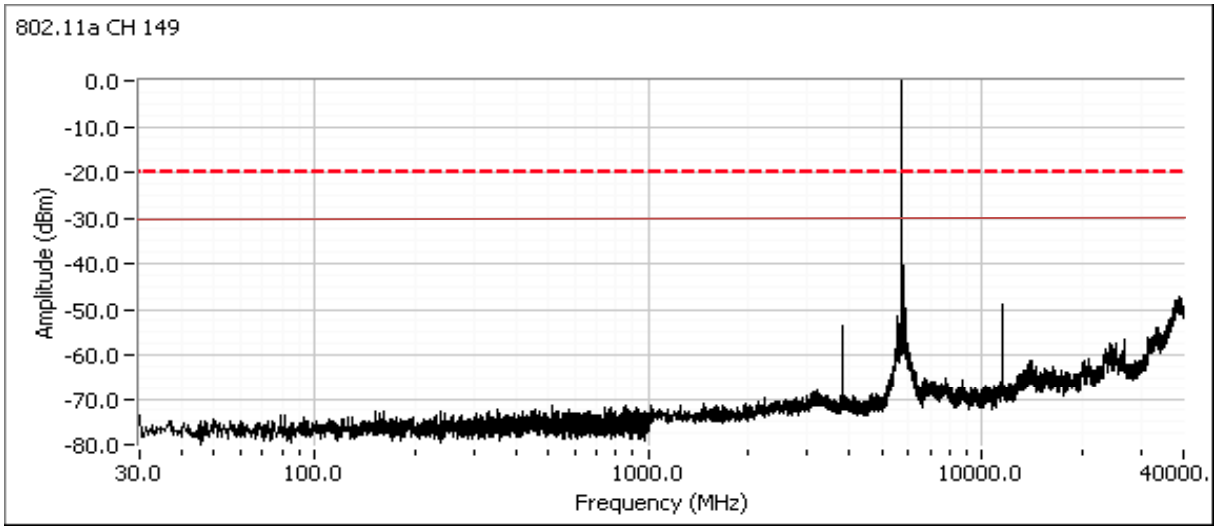


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

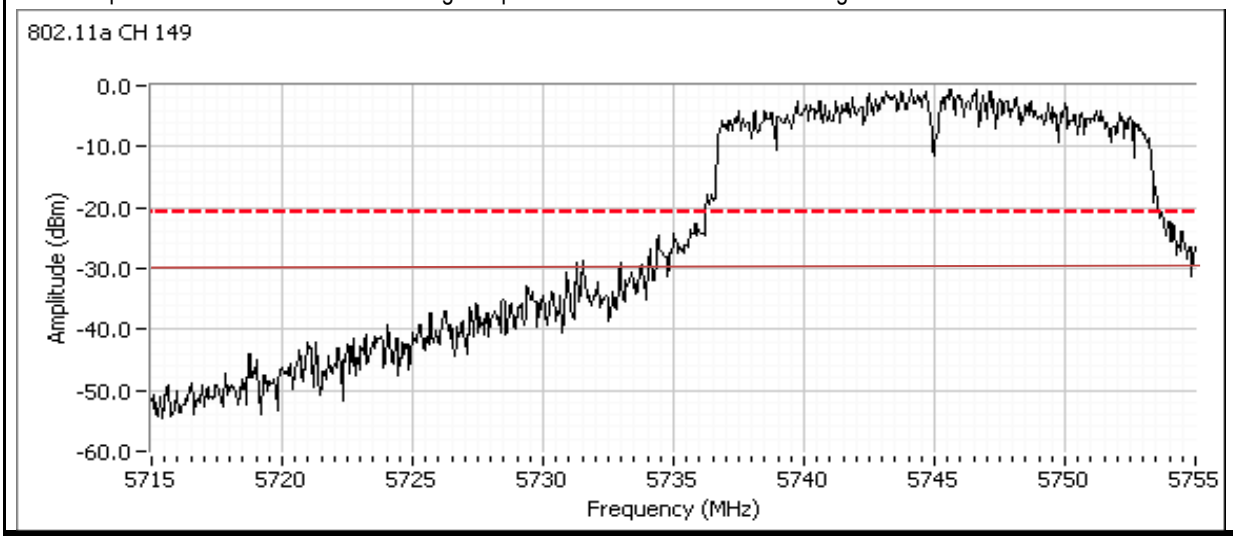
Run #4: Out of Band Spurious Emissions

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

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

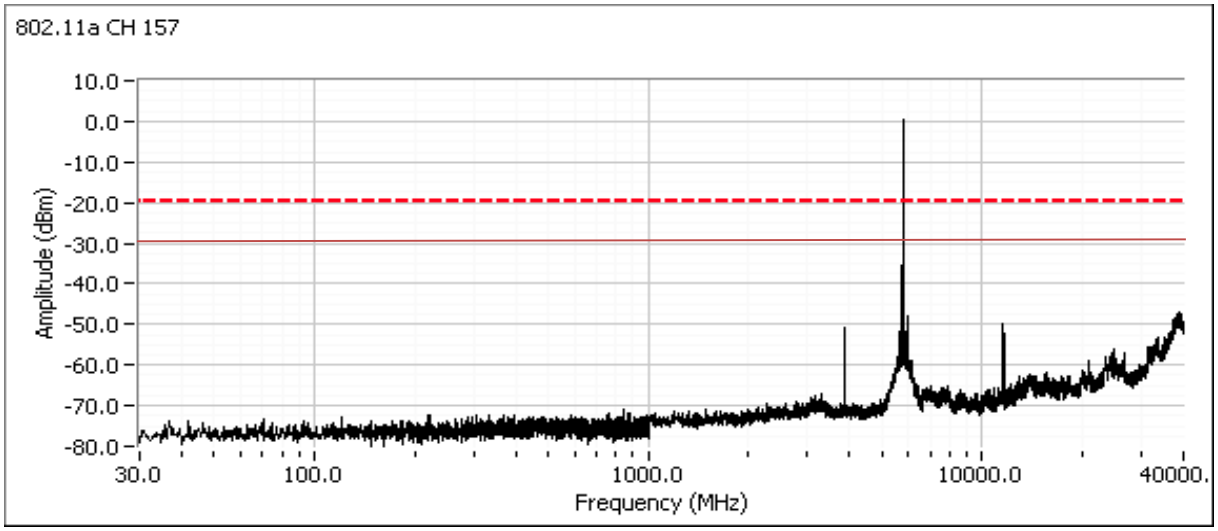


Additional plot from 5715 - 5755 MHz showing compliance with -30dBc at the band edge.

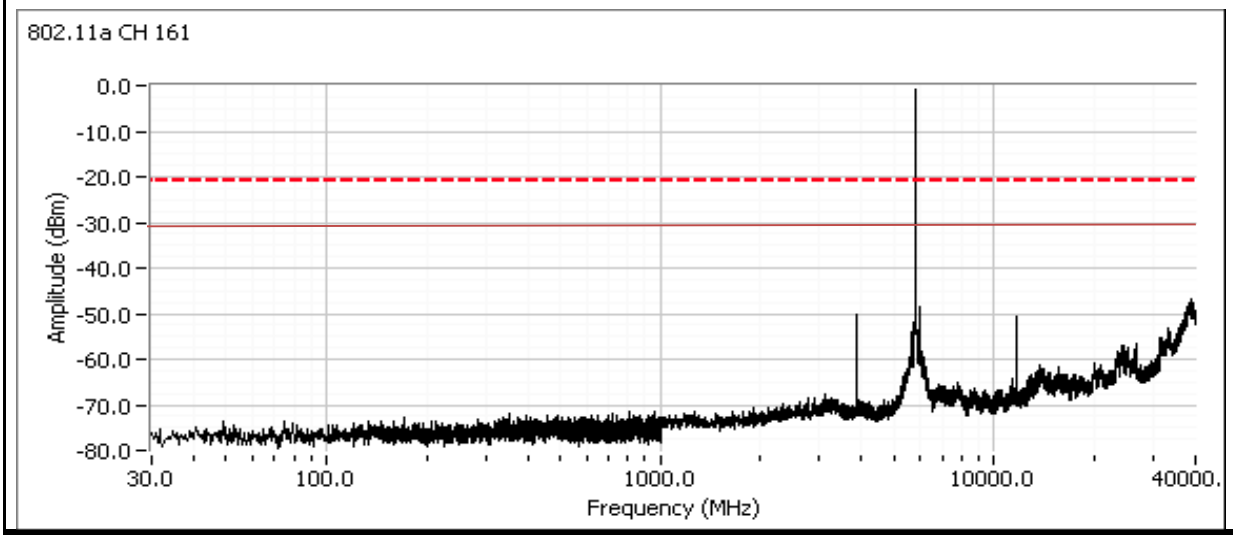


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

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

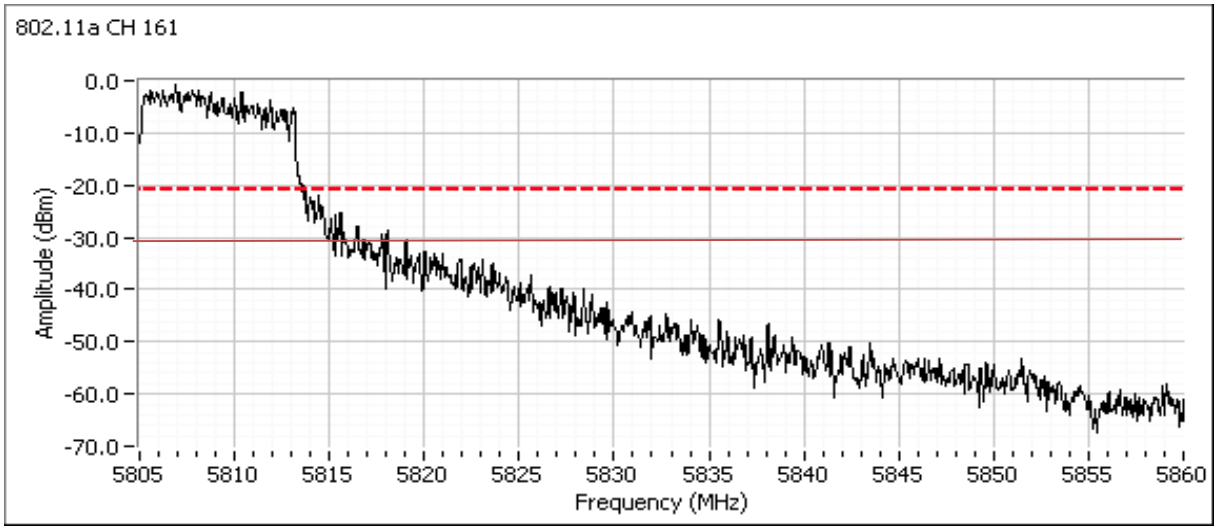


Plots for high channel, power setting(s) = 100%



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Additional plot from 5820 - 5860 MHz showing compliance with -30dBc at the band edge.



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements (5GHz - 802.11n20)

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: 2/6/2012
Test Engineer: Joseph Cadigal
Test Location: FT Lab #4

Config. Used: 2
Config Change: no antennas
EUT Voltage: 3.3 VDC

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: 23 °C
Rel. Humidity: 37 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
2	Default	-	Power spectral Density (PSD)	15.247(d)	Pass	-11.1 dBm/3kHz
3	Default	-	Minimum 6dB Bandwidth	15.247(a)	Pass	15.0 MHz
3	Default	-	99% Bandwidth	RSS GEN	-	22.8 MHz
4	Default	-	Spurious emissions	15.247(b)	Pass	All emissions < -30 dBc

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

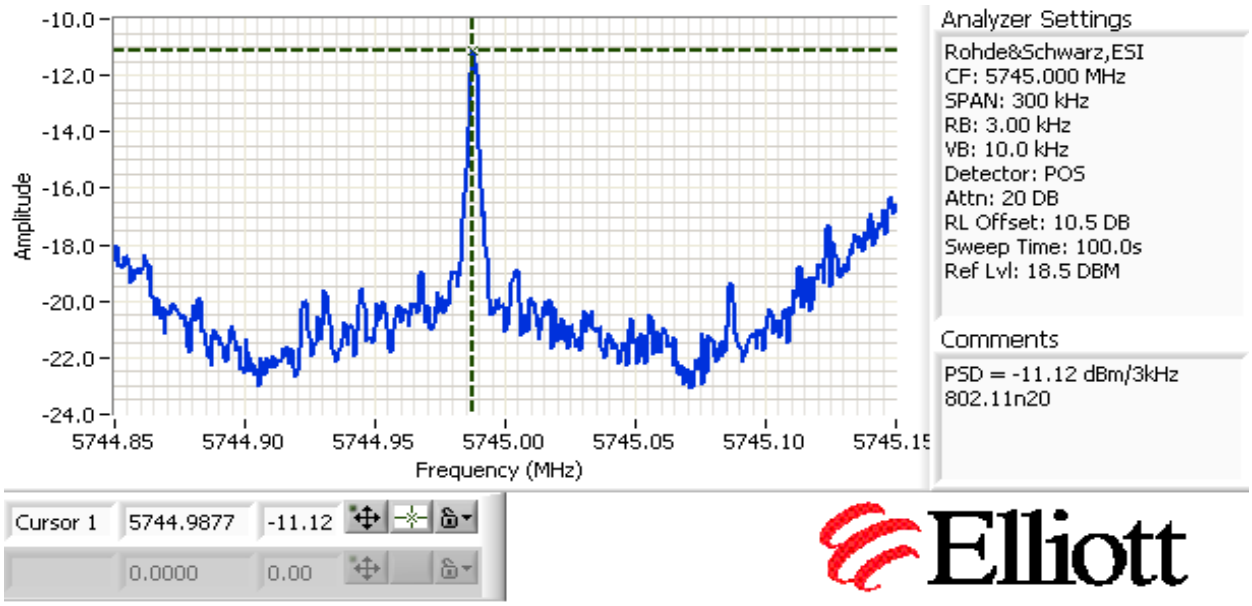
No deviations were made from the requirements of the standard.

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1	Limit dBm/3kHz	Result
100	5745	-11.1	8.0	Pass
100	5785	-13.9	8.0	Pass
100	5805	-14.3	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.

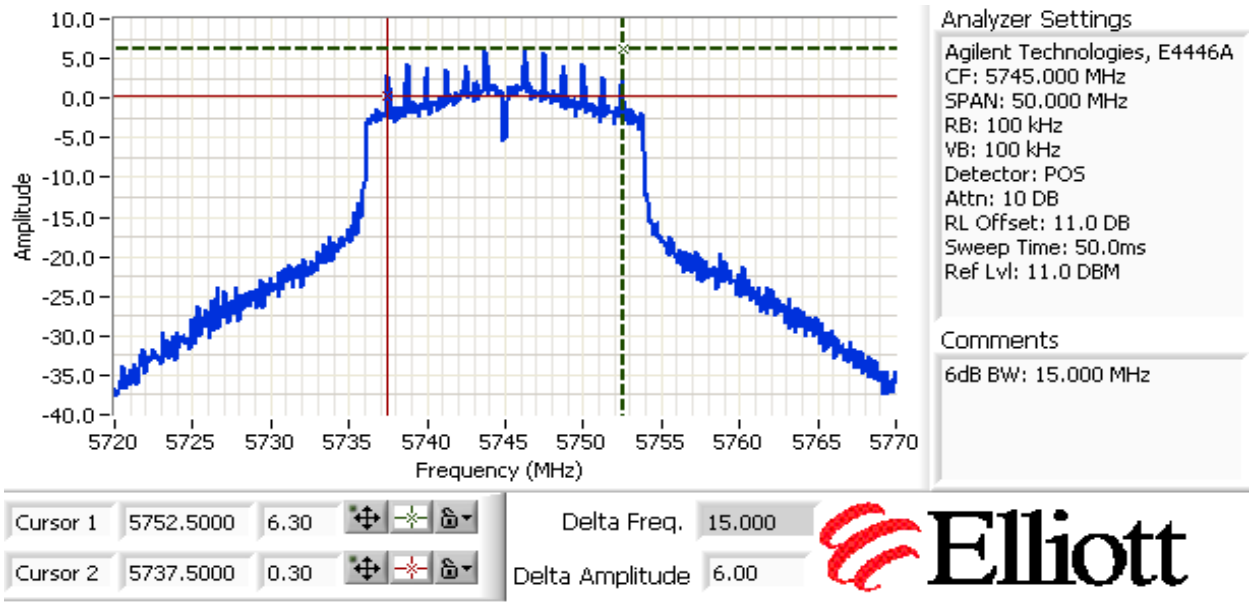


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz) 6dB	99%
100	5745	100kHz	15.0	16.9
100	5785	100kHz	15.2	22.8
100	5805	100kHz	15.1	21.4

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

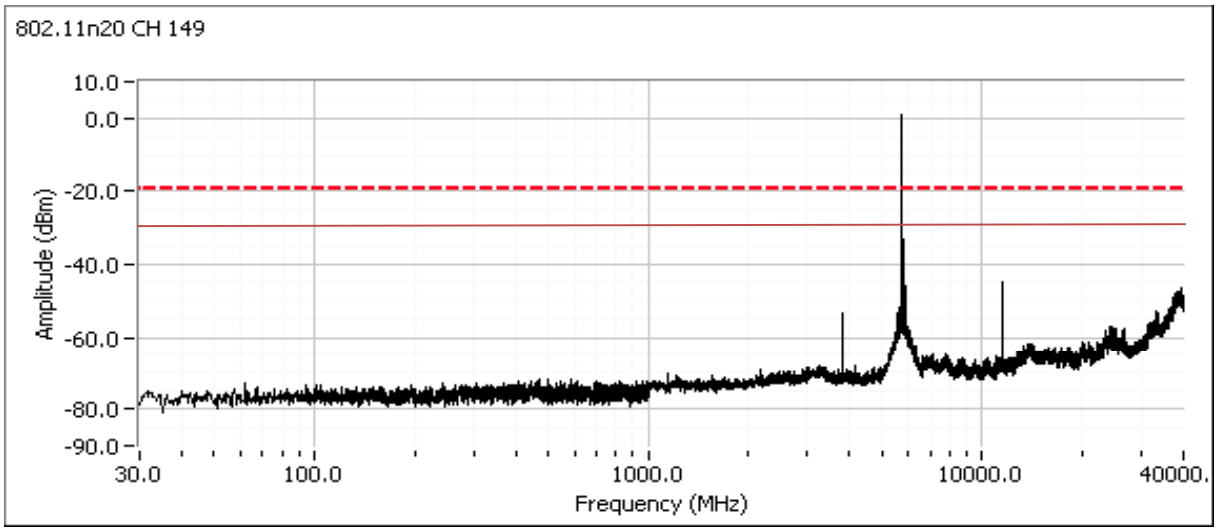


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

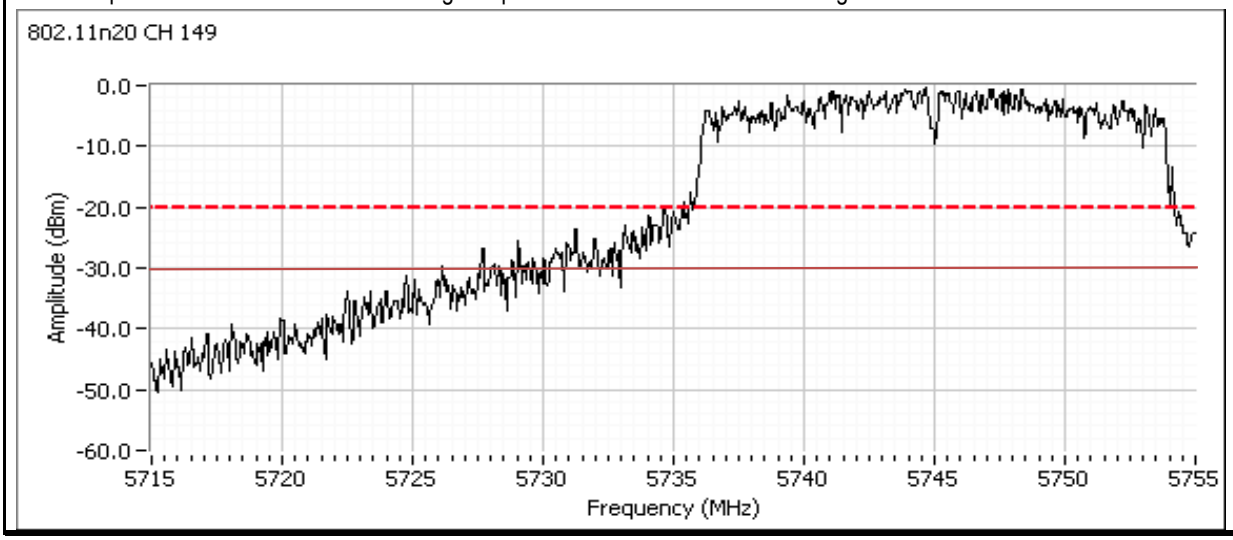
Run #4: Out of Band Spurious Emissions

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

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

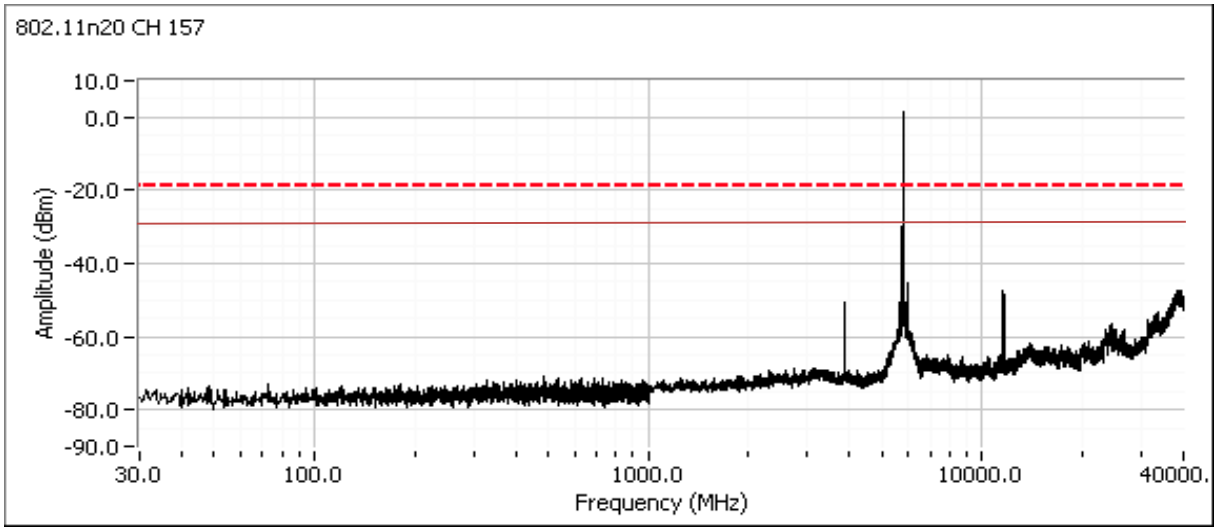


Additional plot from 5715 - 5755 MHz showing compliance with -30dBc at the band edge.

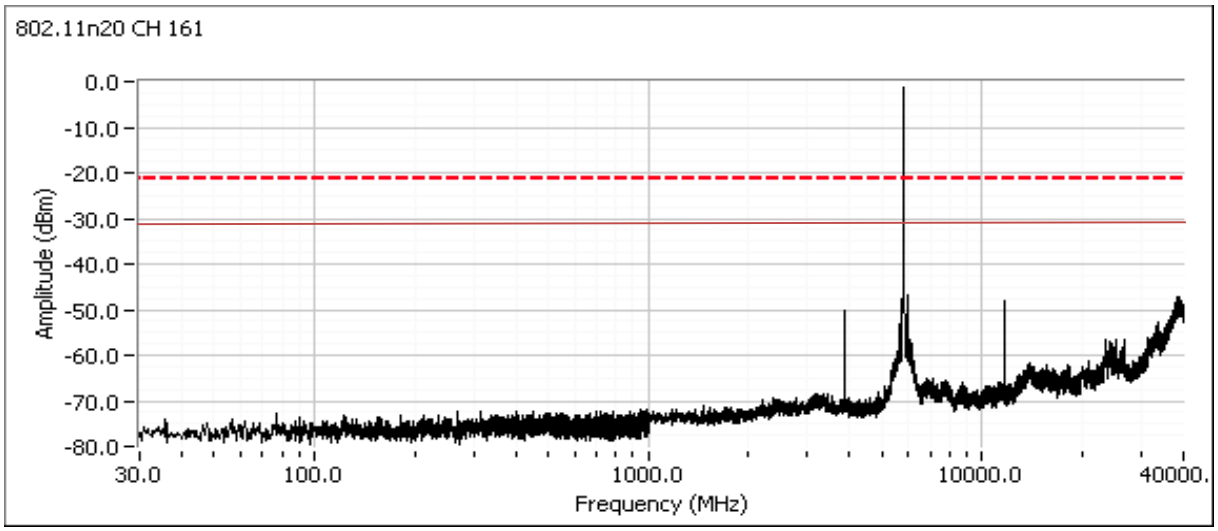


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

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

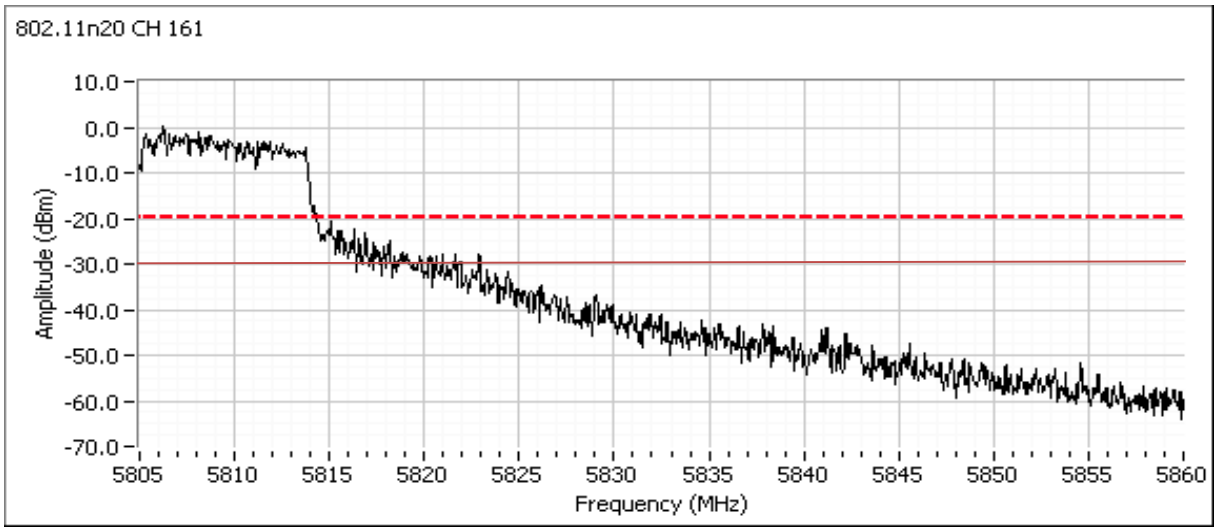


Plots for high channel, power setting(s) = 100%



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Additional plot from 5820 - 5860 MHz showing compliance with -30dBc at the band edge.



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Maximum Permissible Exposure

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: 2/28/2012

Test Engineer: Mark Hill

General Test Configuration

Calculation uses the free space transmission formula:

$$S = (PG)/(4 \pi d^2)$$

Where: S is power density (W/m^2), P is output power (W), G is antenna gain relative to isotropic, d is separation distance from the transmitting antenna (m).

Summary of Results

Device complies with Power Density requirements at 20cm separation:	Yes

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:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

Use: General
Antenna: 2dBi for 2GHz, 5dBi for 5GHz

802.11b

Freq.	EUT Power		Cable Loss	Ant Gain	Power at Ant	EIRP	Power Density (S) at 20 cm	MPE Limit at 20 cm
MHz	dBm	mW*	dB	dBi	dBm	mW	mW/cm^2	mW/cm^2
2412	15.7	37.2	0	2	15.7	59.02	0.012	1.000
2437	15.9	39.1	0	2	15.9	61.94	0.012	1.000
2462	10.1	10.2	0	2	10.1	16.22	0.003	1.000

802.11g

Freq.	EUT Power		Cable Loss	Ant Gain	Power at Ant	EIRP	Power Density (S) at 20 cm	MPE Limit at 20 cm
MHz	dBm	mW*	dB	dBi	dBm	mW	mW/cm^2	mW/cm^2
2412	14.7	29.7	0	2	14.7	47.10	0.009	1.000
2437	14.1	25.7	0	2	14.1	40.74	0.008	1.000
2462	10.7	11.6	0	2	10.7	18.41	0.004	1.000

802.11n20

Freq.	EUT Power		Cable Loss	Ant Gain	Power at Ant	EIRP	Power Density (S) at 20 cm	MPE Limit at 20 cm
MHz	dBm	mW*	dB	dBi	dBm	mW	mW/cm^2	mW/cm^2
2412	14.2	26.3	0	2	14.2	41.69	0.008	1.000
2437	11.6	14.3	0	2	11.6	22.70	0.005	1.000
2462	10.0	10.1	0	2	10.0	15.96	0.003	1.000

802.11a

Freq.	EUT Power		Cable Loss	Ant Gain	Power at Ant	EIRP	Power Density (S) at 20 cm	MPE Limit at 20 cm
MHz	dBm	mW*	dB	dBi	dBm	mW	mW/cm^2	mW/cm^2
5745	15.7	37.2	0	5	15.7	117.49	0.023	1.000
5785	15.5	35.5	0	5	15.5	112.20	0.022	1.000
5805	15.8	38.0	0	5	15.8	120.23	0.024	1.000

802.11n20

Freq.	EUT Power		Cable Loss	Ant Gain	Power at Ant	EIRP	Power Density (S) at 20 cm	MPE Limit at 20 cm
MHz	dBm	mW*	dB	dBi	dBm	mW	mW/cm^2	mW/cm^2
5745	15.7	37.2	0	5	15.7	117.49	0.023	1.000
5785	15.4	34.7	0	5	15.4	109.65	0.022	1.000
5805	15.3	33.9	0	5	15.3	107.15	0.021	1.000

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83195
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/RSS-210	Class:	N/A

UNII Bands

802.11a

Freq.	EUT Power		Cable Loss	Ant Gain	Power at Ant	EIRP	Power Density (S) at 20 cm	MPE Limit at 20 cm
MHz	dBm	mW*	dB	dBi	dBm	mW	mW/cm^2	mW/cm^2
5260	12.8	19.0	0	5	12.8	60.12	0.012	1.000
5300	14.2	26.0	0	5	14.2	82.22	0.016	1.000
5320	10.5	11.2	0	5	10.5	35.48	0.007	1.000
5500	15.0	31.3	0	5	15.0	99.08	0.020	1.000
5580	13.5	22.3	0	5	13.5	70.47	0.014	1.000
5700	8.1	6.4	0	5	8.1	20.28	0.004	1.000

802.11n20

Freq.	EUT Power		Cable Loss	Ant Gain	Power at Ant	EIRP	Power Density (S) at 20 cm	MPE Limit at 20 cm
MHz	dBm	mW*	dB	dBi	dBm	mW	mW/cm^2	mW/cm^2
5260	11.9	15.6	0	5	11.9	49.43	0.010	1.000
5300	13.2	20.7	0	5	13.2	65.61	0.013	1.000
5320	8.5	7.1	0	5	8.5	22.39	0.004	1.000
5500	13.2	20.9	0	5	13.2	66.07	0.013	1.000
5580	12.6	18.2	0	5	12.6	57.54	0.011	1.000
5700	10.7	11.7	0	5	10.7	37.07	0.007	1.000

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		-
Emissions Standard(s):	FCC 15.E/RSS-210	Class:	-
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Summit Data Communications

Model

SDC-MSD40NBT (1x1 802.11abg + BT 2.1)

Date of Last Test: 1/6/2012

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

RSS 210 and FCC 15.407 (UNII) Radiated Spurious Emissions

Summary of Results

SCU: v3.03.07

Run #	Mode	Channel	Antenna	Power Setting	Test Performed	Limit	Result / Margin
Run # 1	802.11a Chain A	#56 5280MHz	Larsen	-	Restricted Band Edge at 5250 MHz	LP0002 (Taiwan Only)	44.9dBµV/m @ 5248.1MHz (-9.1dB)
Run # 1	802.11a Chain A	#64 5320MHz	Larsen	-	Restricted Band Edge at 5350 MHz	15.209	47.3dBµV/m @ 5362.8MHz (-6.7dB)
Run # 1	802.11a Chain A	#100 5500MHz	Larsen	-	Restricted Band Edge at 5460 MHz	15.209	47.6dBµV/m @ 5458.7MHz (-6.4dB)
Run # 2	802.11n20 Chain A	#56 5280MHz	Larsen	-	Restricted Band Edge at 5250 MHz	LP0002 (Taiwan Only)	43.9dBµV/m @ 5241.2MHz (-10.1dB)
Run # 2	802.11n20 Chain A	#64 5320MHz	Larsen	-	Restricted Band Edge at 5350 MHz	15.209	45.8dBµV/m @ 5359.5MHz (-8.2dB)
Run # 2	802.11n20 Chain A	#100 5500MHz	Larsen	-	Restricted Band Edge at 5460 MHz	15.209	43.6dBµV/m @ 5458.7MHz (-10.4dB)

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Test Specific Details

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

General Test Configuration

The EUT ws installed into a test fixture such that the EUT was exposed (i.e. outside of a host PC).
For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Ambient Conditions:

Rel. Humidity:	15 - 55 %
Temperature:	18 - 25 °C

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

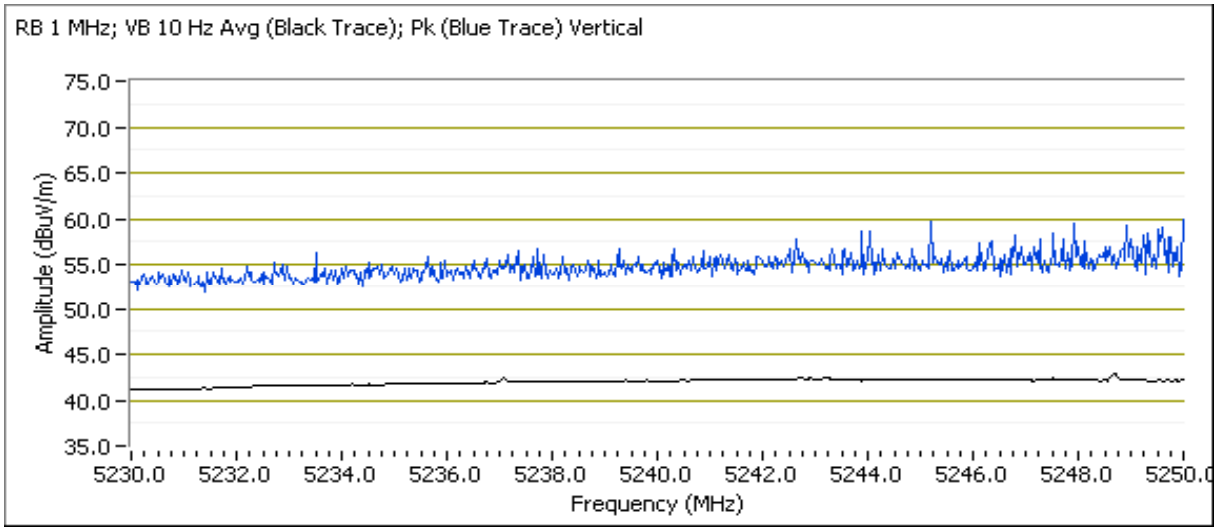
No deviations were made from the requirements of the standard.

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 1, Band Edge Field Strength - 802.11a, Chain A
Run # 1b, EUT on Channel #56 5280MHz - 802.11a, Chain A

For Taiwan Only
5250MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	LP0002		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5248.130	44.9	V	54.0	-9.1	AVG	153	1.0	RB 1 MHz;VB 10 Hz;Pk
5249.570	59.6	V	74.0	-14.4	PK	153	1.0	RB 1 MHz;VB 3 MHz;Pk
5230.470	42.4	H	54.0	-11.6	AVG	349	1.0	RB 1 MHz;VB 10 Hz;Pk
5238.470	53.4	H	74.0	-20.6	PK	349	1.0	RB 1 MHz;VB 3 MHz;Pk



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

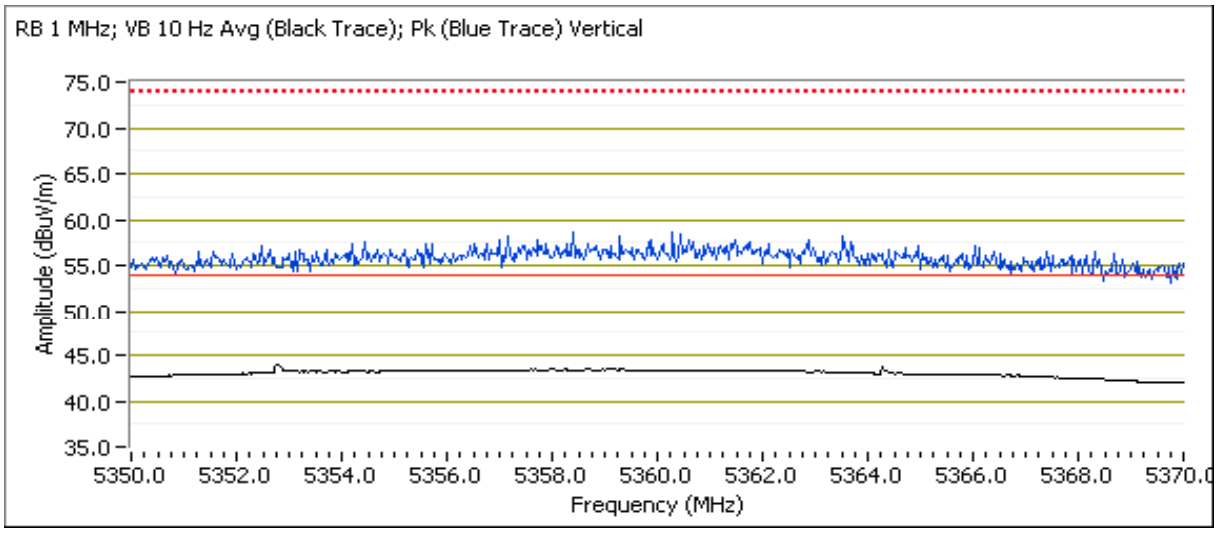
Run # 1c, EUT on Channel #64 5320MHz - 802.11a, Chain A

Date of Test: 12/28/2011 Test Location: FT Chamber #4

Test Engineer: Rafael Varelas Config Change: None

Direct Measurement of Field Strength at the bandedge

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5362.830	47.3	V	54.0	-6.7	AVG	155	1.0	RB 1 MHz;VB 10 Hz;Pk
5363.500	58.4	V	74.0	-15.6	PK	155	1.0	RB 1 MHz;VB 3 MHz;Pk
5364.670	43.5	H	54.0	-10.5	AVG	146	1.0	RB 1 MHz;VB 10 Hz;Pk
5358.630	55.6	H	74.0	-18.4	PK	146	1.0	RB 1 MHz;VB 3 MHz;Pk

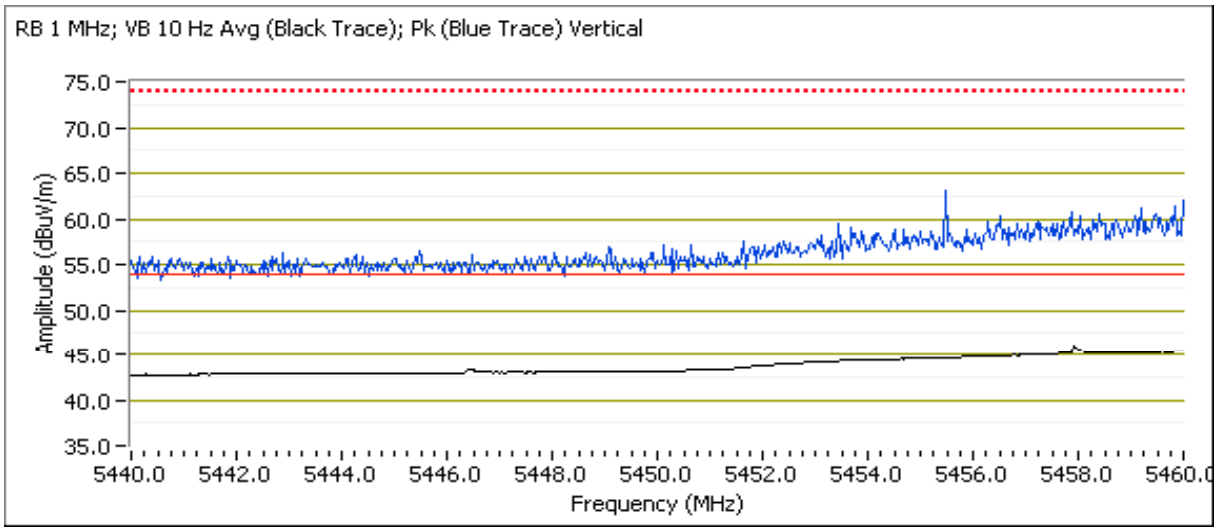


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 1d, EUT on Channel #100 5500MHz - 802.11a, Chain A

Direct Measurement of Field Strength at the bandedge @ 5460 MHz

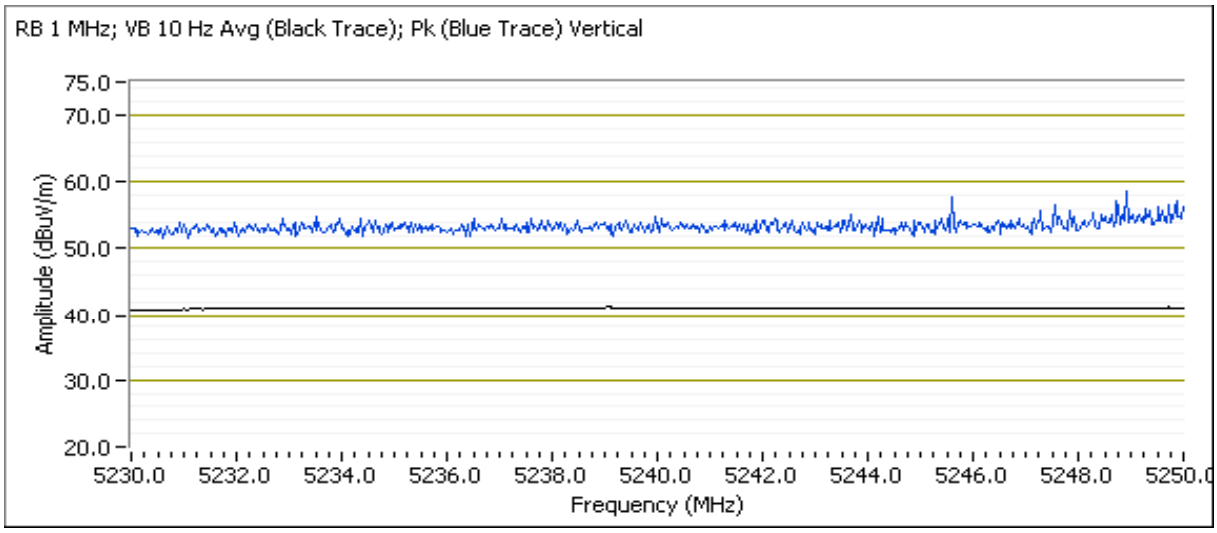
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5458.670	47.6	V	54.0	-6.4	AVG	190	1.0	RB 1 MHz;VB 10 Hz;Pk
5458.200	60.7	V	74.0	-13.3	PK	190	1.0	RB 1 MHz;VB 3 MHz;Pk
5455.200	43.6	H	54.0	-10.4	AVG	89	1.1	RB 1 MHz;VB 10 Hz;Pk
5456.870	55.0	H	74.0	-19.0	PK	89	1.1	RB 1 MHz;VB 3 MHz;Pk



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 2, Band Edge Field Strength - 802.11n20, Chain A
Run # 2b, EUT on Channel #56 5280MHz - 802.11n20, Chain A
For Taiwan Only
5250MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	LP0002		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5241.200	43.9	V	54.0	-10.1	AVG	124	1.0	RB 1 MHz;VB 10 Hz;Pk
5247.100	55.3	V	74.0	-18.7	PK	124	1.0	RB 1 MHz;VB 3 MHz;Pk
5230.170	42.4	H	54.0	-11.6	AVG	281	1.1	RB 1 MHz;VB 10 Hz;Pk
5248.570	53.8	H	74.0	-20.2	PK	281	1.1	RB 1 MHz;VB 3 MHz;Pk



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

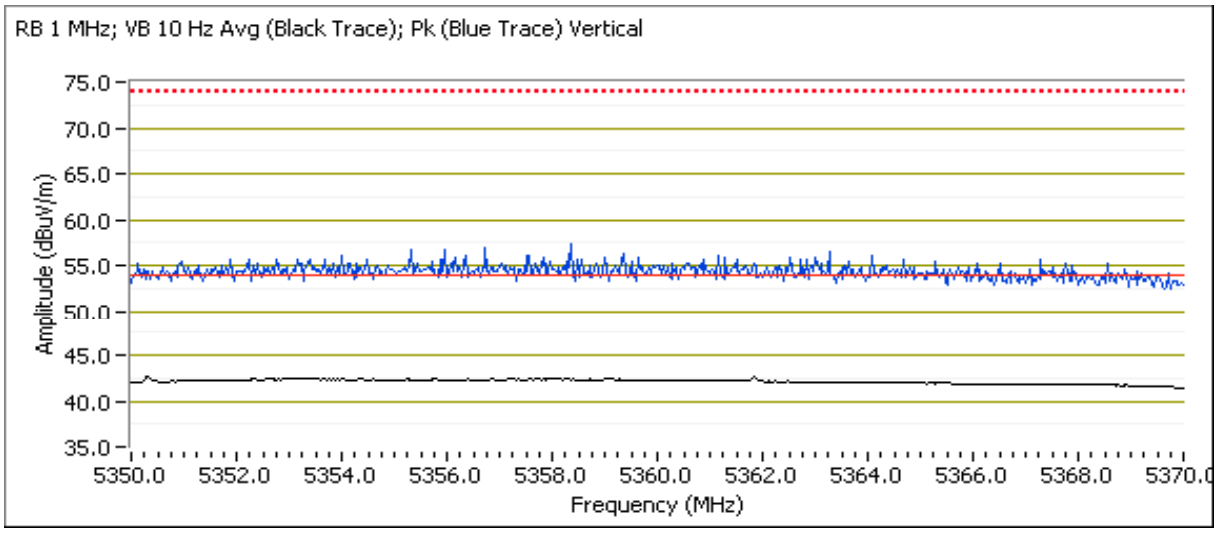
Run # 2c, EUT on Channel #64 5320MHz - 802.11n20, Chain A

Date of Test: 12/28/2011 Test Location: FT Chamber #4

Test Engineer: Rafael Varelas Config Change: None

Direct Measurement of Field Strength at the bandedge

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5359.500	45.8	V	54.0	-8.2	AVG	189	1.0	RB 1 MHz;VB 10 Hz;Pk
5354.830	56.2	V	74.0	-17.8	PK	189	1.0	RB 1 MHz;VB 3 MHz;Pk
5358.670	43.2	H	54.0	-10.8	AVG	107	1.0	RB 1 MHz;VB 10 Hz;Pk
5355.070	54.6	H	74.0	-19.4	PK	107	1.0	RB 1 MHz;VB 3 MHz;Pk

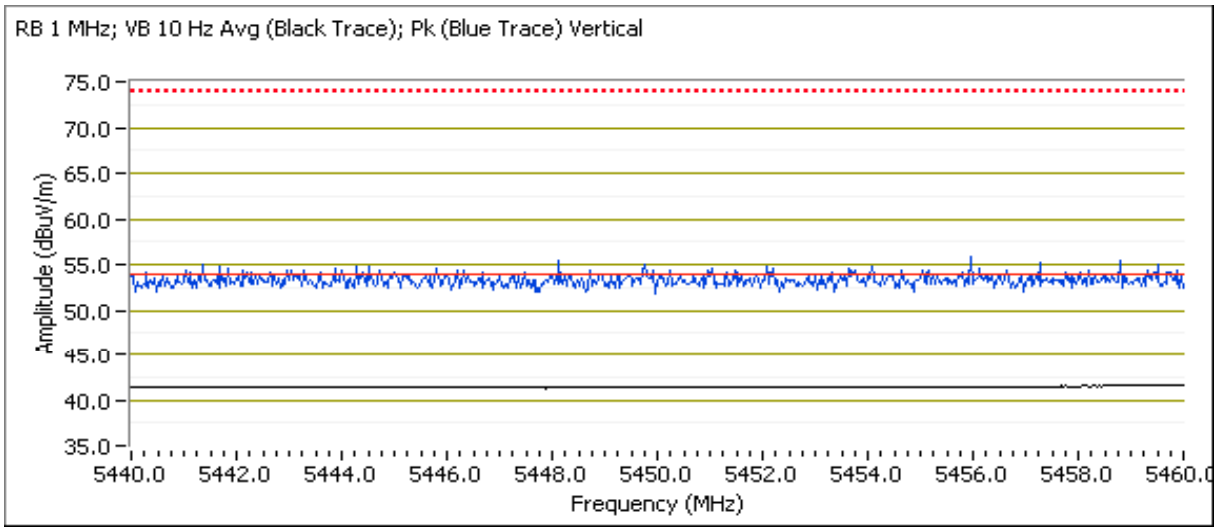


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run # 2d, EUT on Channel #100, 5500MHz - 802.11n20, Chain A

Direct Measurement of Field Strength at the bandedge @ 5460 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5458.700	43.6	V	54.0	-10.4	AVG	89	1.0	RB 1 MHz;VB 10 Hz;Pk
5441.200	54.4	V	74.0	-19.6	PK	89	1.0	RB 1 MHz;VB 3 MHz;Pk
5457.570	43.6	H	54.0	-10.4	AVG	142	1.0	RB 1 MHz;VB 10 Hz;Pk
5443.130	54.9	H	74.0	-19.1	PK	142	1.0	RB 1 MHz;VB 3 MHz;Pk



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

RSS 210 and FCC 15.407 (UNII) Radiated Spurious Emissions

Summary of Results

SCU: v3.03.07

Run #	Mode	Channel	Antenna	Power Setting	Test Performed	Limit	Result / Margin
Run #2 (5250-5350MHz Band)	802.11a Chain A	#60 5300MHz	Larsen	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	40.3dBµV/m @ 1345.6MHz (-13.7dB)
	n20 Chain A	#60 5300MHz	Larsen	-			39.4dBµV/m @ 1345.5MHz (-14.6dB)
	Worst case mode/worse case Chain A top and bottom channels.						
	802.11a Chain A	#52 5260MHz	Larsen	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	40.8dBµV/m @ 1306.5MHz (-13.2dB)
		#64 5320MHz	Larsen	-			40.7dBµV/m @ 1306.5MHz (-13.3dB)
Run #3 (5470-5725MHz Band)	802.11a Chain A	#116 5580MHz	Larsen	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	42.4dBµV/m @ 3720.1MHz (-11.6dB)
	n20 Chain A	#116 5580MHz	Larsen	-			41.3dBµV/m @ 3720.0MHz (-12.7dB)
	Worst case mode/worse case Chain A top and bottom channels.						
	802.11a Chain A	#100 5500MHz	Larsen	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	42.3dBµV/m @ 3666.7MHz (-11.7dB)
		#140 5700MHz	Larsen	-			41.7dBµV/m @ 3800.1MHz (-12.3dB)
Run #4	Receive	#60 5300MHz	Larsen	-	Radiated Emissions, 1 - 18 GHz	RSS 210	44.4dBµV/m @ 1345.5MHz (-9.6dB)
		#116 5580MHz	Larsen	-	Radiated Emissions, 1 - 18 GHz	RSS 210	44.1dBµV/m @ 1306.5MHz (-9.9dB)

Test Specific Details

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

General Test Configuration

The EUT ws installed into a test fixture such that the EUT was exposed (i.e. outside of a host PC).
For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Ambient Conditions:

Rel. Humidity: 15 - 55 %
Temperature: 18 - 25 °C

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #2, Radiated Spurious Emissions, 1-40GHz, Center Channel 5250-5350MHz - 802.11a, n20

Date of Test: 12/29/2011 Test Location: FT Chamber #4

Test Engineer: Rafael Varelas Config Change: None

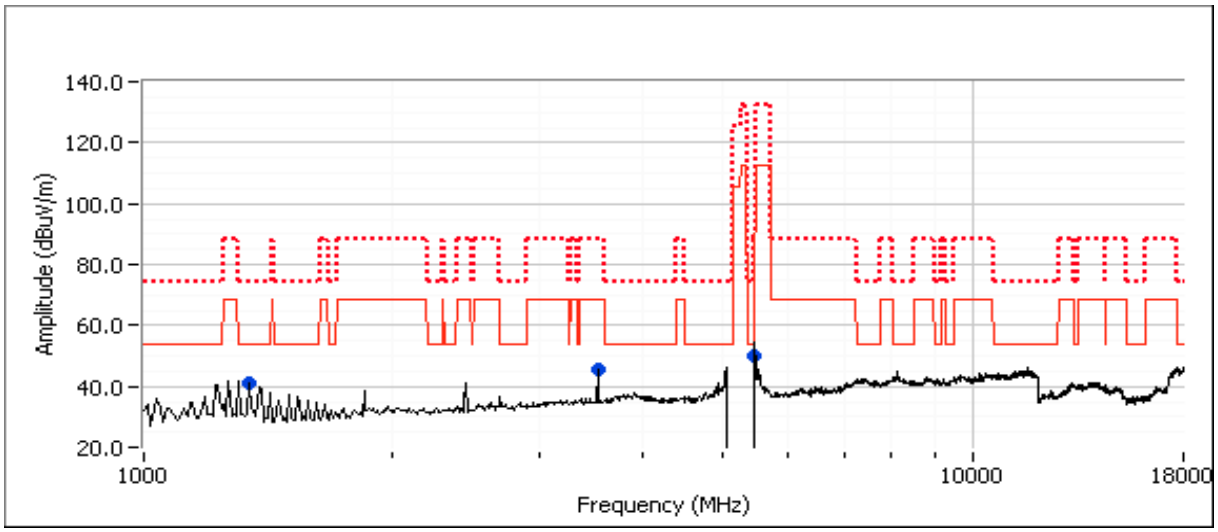
For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -27dBm eirp (68.3dBuV/m @3m).

Run #2a: Channel #60 5300MHz - 802.11a,Chain A

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	
1345.620	40.3	H	54.0	-13.7	AVG	210	1.0	RB 1 MHz;VB 10 Hz;Pk
1345.940	43.3	H	74.0	-30.7	PK	210	1.0	RB 1 MHz;VB 3 MHz;Pk
5449.590	57.2	V	-	-	PK	131	1.0	Note 1
3530.180	45.6	H	-	-	Peak	152	1.3	Note 2

Note 1:	Refer to bandedge data - this frequency band has been evaluated
Note 2:	Emission in non-restricted band, refer to conducted spurious emissions results.



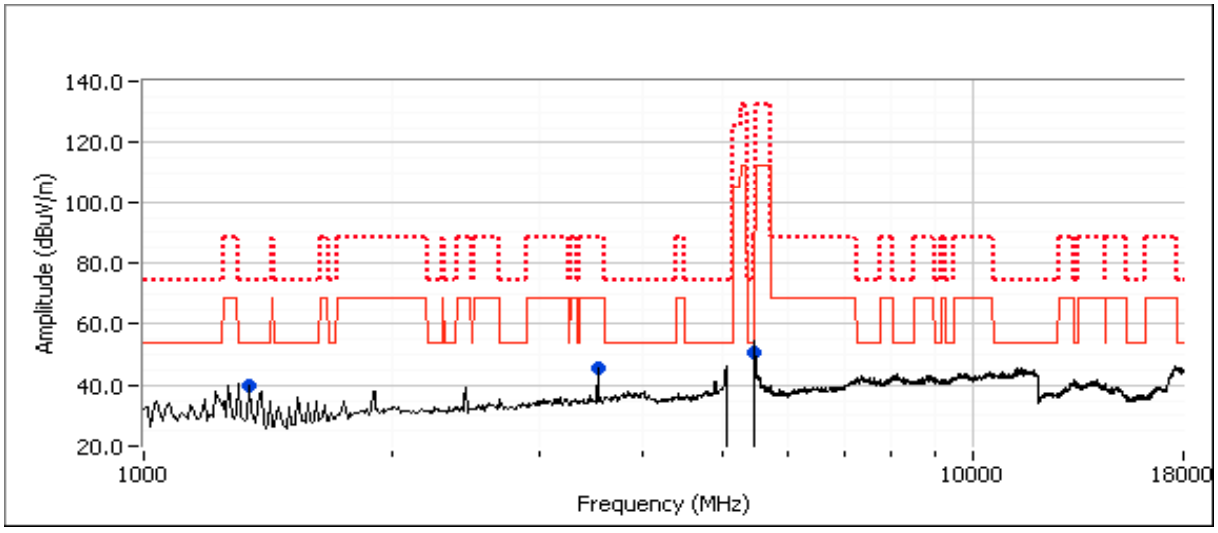
Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #2b: Channel #60 5300MHz - 802.11n20,Chain A

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	
1345.500	39.4	H	54.0	-14.6	AVG	273	1.0	RB 1 MHz;VB 10 Hz;Pk
1345.280	43.1	H	74.0	-30.9	PK	273	1.0	RB 1 MHz;VB 3 MHz;Pk
5457.860	50.7	V	-	-	Peak	157	1.3	Note 1
3533.390	45.6	H	-	-	Peak	10	1.6	Note 2

Note 1:	Refer to bandedge data - this frequency band has been evaluated
Note 2:	Emission in non-restricted band, refer to conducted spurious emissions results.



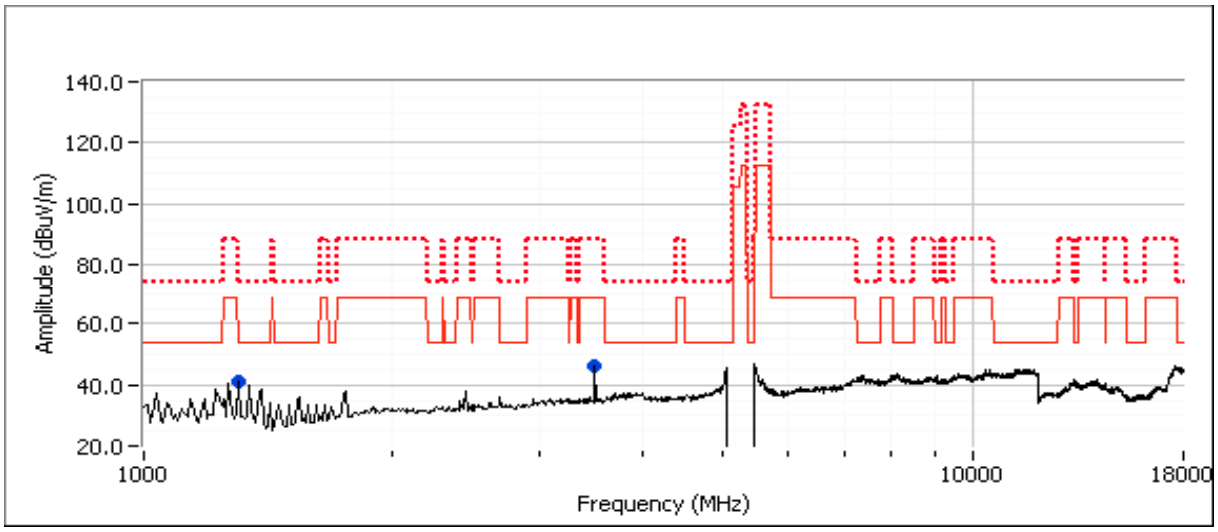
Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #2c: Channel #52 5260MHz - 802.11a

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	
1306.520	40.8	H	54.0	-13.2	AVG	203	1.0	RB 1 MHz;VB 10 Hz;Pk
1306.450	44.0	H	74.0	-30.0	PK	203	1.0	RB 1 MHz;VB 3 MHz;Pk
3506.800	46.2	H	-	-	Peak	12	1.6	Note 1

Note 1: Emission in non-restricted band, refer to conducted spurious emissions results.



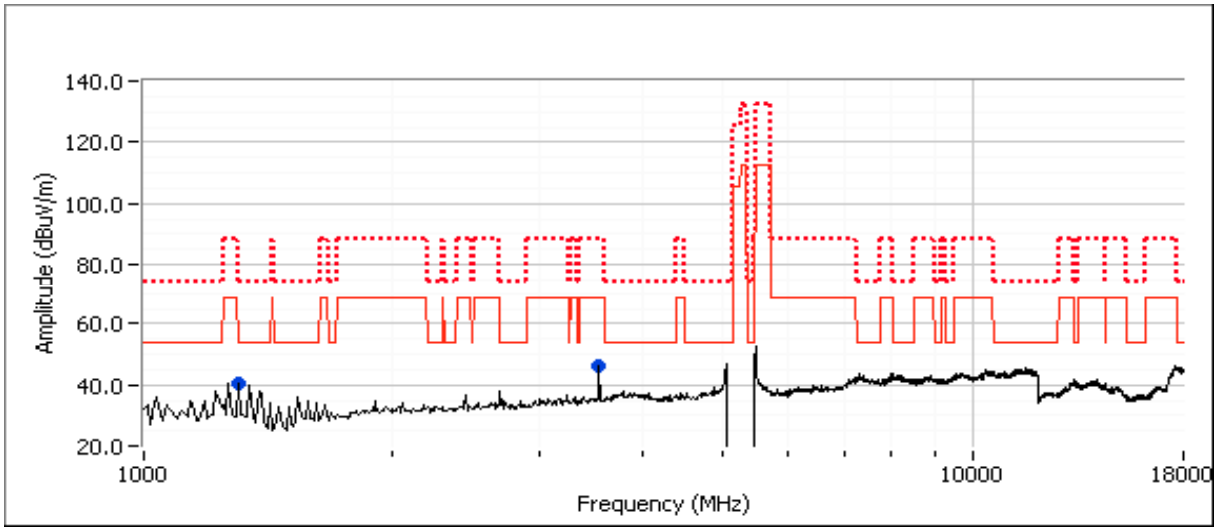
Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #2d: Channel #64 5320MHz - 802.11a

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	
1306.500	40.7	H	54.0	-13.3	AVG	201	1.0	RB 1 MHz;VB 10 Hz;Pk
1306.510	43.8	H	74.0	-30.2	PK	201	1.0	RB 1 MHz;VB 3 MHz;Pk
3546.770	46.3	H	-	-	Peak	153	1.3	Note 1

Note 1:	Emission in non-restricted band, refer to conducted spurious emissions results.



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #3, Radiated Spurious Emissions, 1-40GHz, Center Channel 5470-5725MHz - 802.11a, n20

Date of Test: 12/29/2011 Test Location: FT Chamber #4

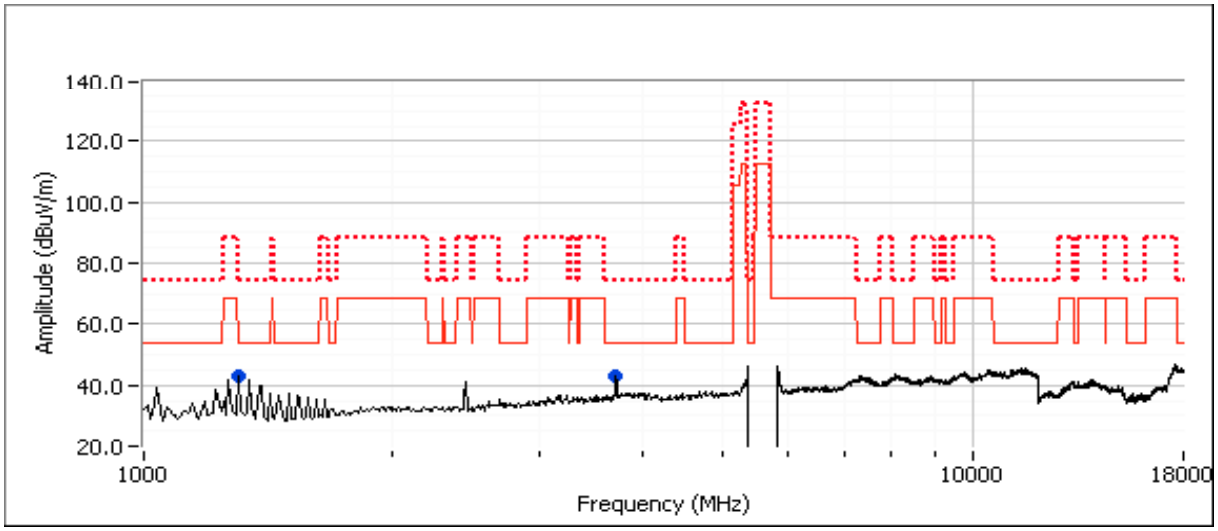
Test Engineer: Rafael Varelas Config Change: None

For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -27dBm eirp (68.3dBuV/m @3m).

Run #3a: Channel #116 5580MHz - 802.11a,Chain A

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	
3720.060	42.4	H	54.0	-11.6	AVG	323	1.4	RB 1 MHz;VB 10 Hz;Pk
3720.090	48.2	H	74.0	-25.8	PK	323	1.4	RB 1 MHz;VB 3 MHz;Pk
1306.530	38.8	V	54.0	-15.2	AVG	191	1.0	RB 1 MHz;VB 10 Hz;Pk
1306.270	42.8	V	74.0	-31.2	PK	191	1.0	RB 1 MHz;VB 3 MHz;Pk

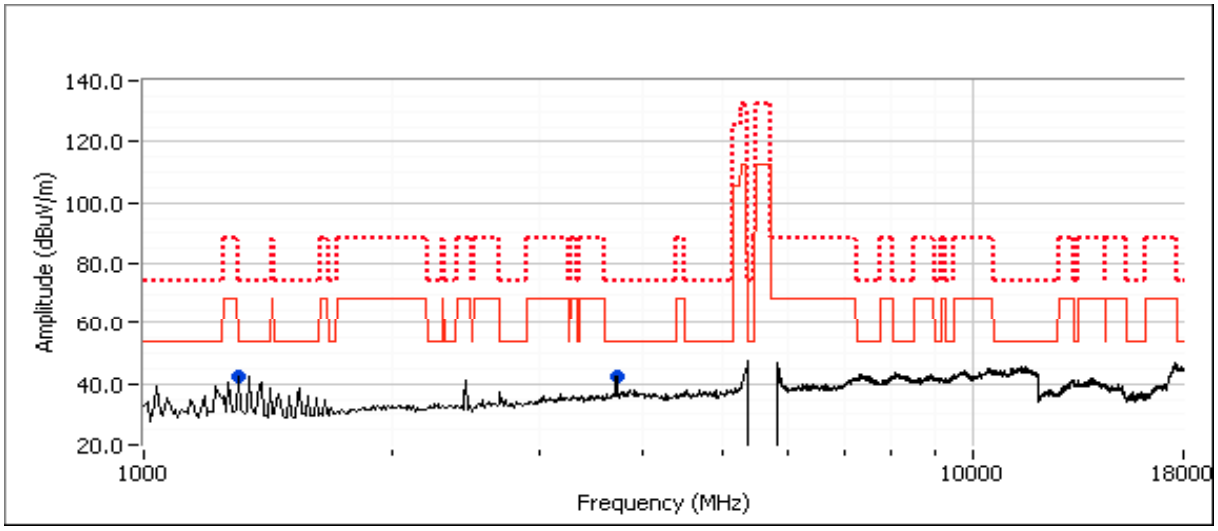


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #3b: Channel #116 5580MHz - 802.11n20, Chain A

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	
3720.040	41.3	H	54.0	-12.7	AVG	46	1.0	MHz;VB 10 Hz;Pk
3720.160	47.8	H	74.0	-26.2	PK	46	1.0	MHz;VB 3 MHz;Pk
1306.560	40.8	H	54.0	-13.2	AVG	194	1.0	MHz;VB 10 Hz;Pk
1306.410	44.0	H	74.0	-30.0	PK	194	1.0	MHz;VB 3 MHz;Pk

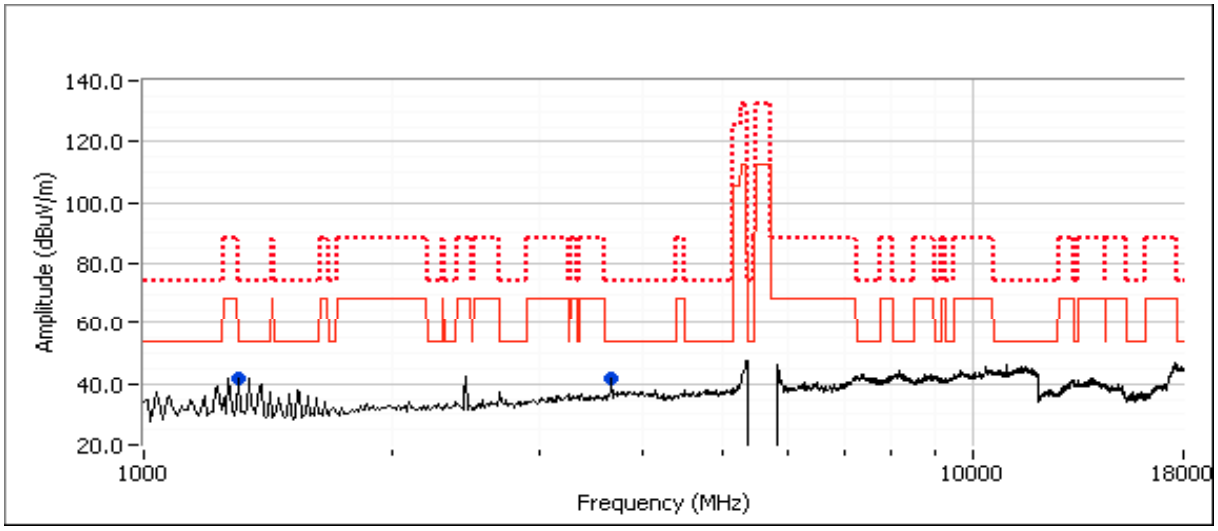


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #3c: Channel #100 5500 MHz - 802.11a

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	
3666.710	42.3	H	54.0	-11.7	AVG	323	1.3	RB 1 MHz;VB 10 Hz;Pk
3666.840	48.1	H	74.0	-25.9	PK	323	1.3	RB 1 MHz;VB 3 MHz;Pk
1306.520	41.0	H	54.0	-13.0	AVG	190	1.0	RB 1 MHz;VB 10 Hz;Pk
1306.230	44.6	H	74.0	-29.4	PK	190	1.0	RB 1 MHz;VB 3 MHz;Pk

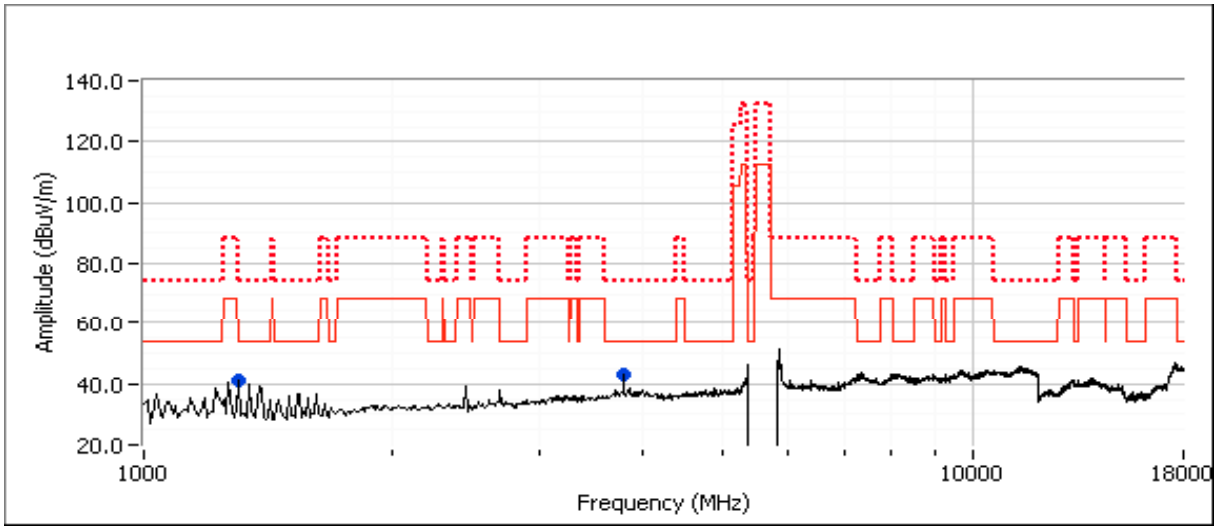


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #3d: Channel #140 5700 MHz - 802.11a

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	
3800.090	41.7	H	54.0	-12.3	AVG	154	1.1	RB 1 MHz;VB 10 Hz;Pk
3799.900	47.6	H	74.0	-26.4	PK	154	1.1	RB 1 MHz;VB 3 MHz;Pk
1306.470	40.9	H	54.0	-13.1	AVG	196	1.0	RB 1 MHz;VB 10 Hz;Pk
1306.670	44.4	H	74.0	-29.6	PK	196	1.0	RB 1 MHz;VB 3 MHz;Pk



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #4, Radiated Spurious Emissions, 1-40GHz, Receive, Chain A

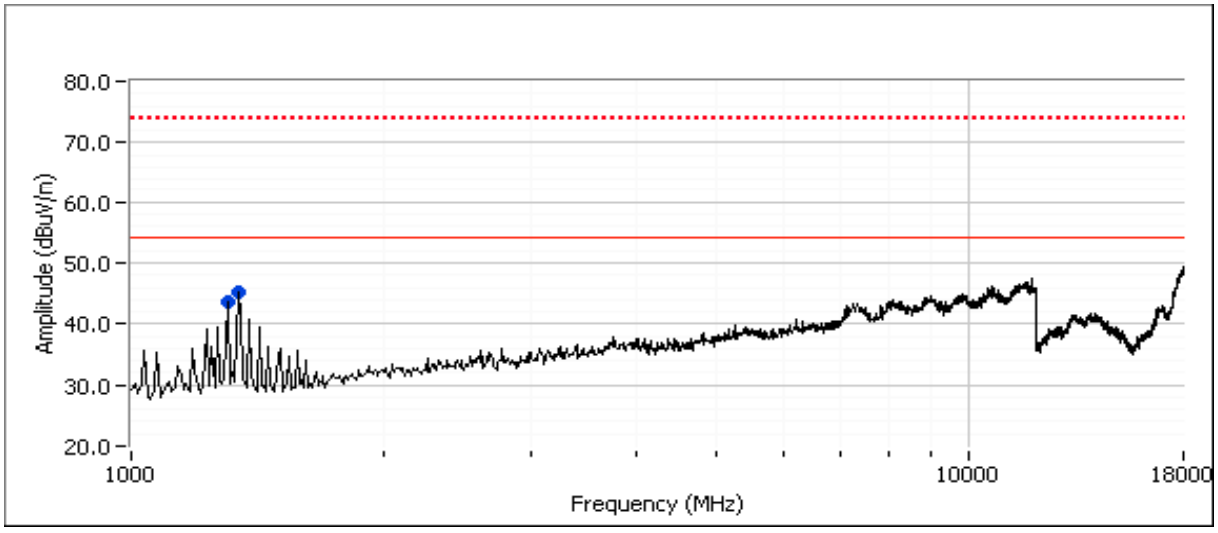
Date of Test: 1/3/2012 Test Location: FT Chamber #7

Test Engineer: Rafael Varelas Config Change: None

Run #4b: EUT on Channel #60 5300MHz - Receive, Chain A

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	
1345.480	44.4	H	54.0	-9.6	AVG	210	1.1	RB 1 MHz;VB 10 Hz;Pk
1345.490	46.7	H	74.0	-27.3	PK	210	1.1	RB 1 MHz;VB 3 MHz;Pk
1306.500	44.1	H	54.0	-9.9	AVG	203	1.0	RB 1 MHz;VB 10 Hz;Pk
1306.560	46.4	H	74.0	-27.6	PK	203	1.0	RB 1 MHz;VB 3 MHz;Pk

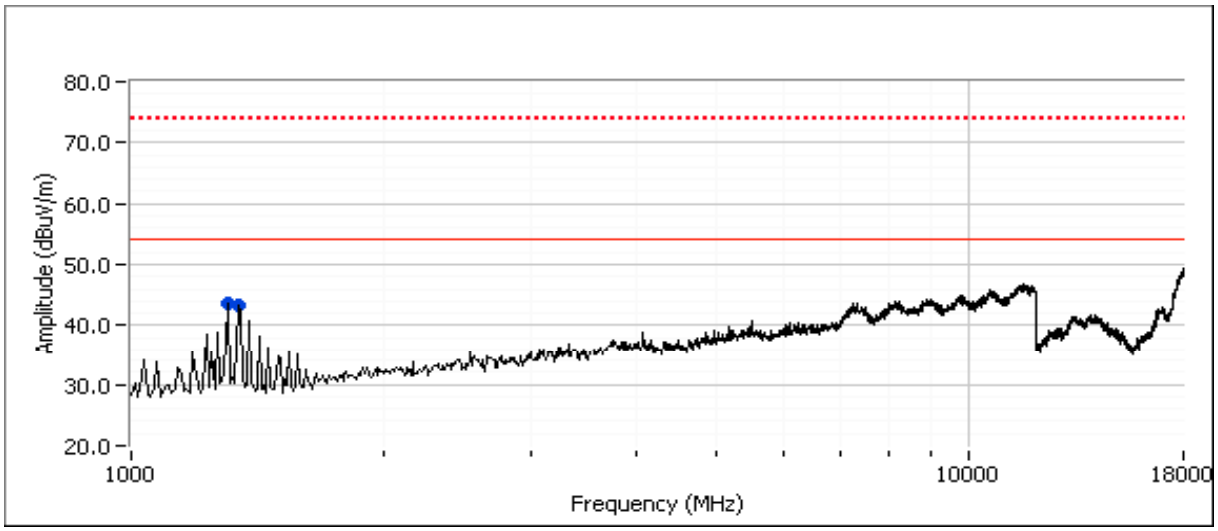


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #4c: EUT on Channel #116 5580MHz - Receive, Chain A

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	
1306.480	44.1	H	54.0	-9.9	AVG	206	1.1	RB 1 MHz;VB 10 Hz;Pk
1306.480	46.1	H	74.0	-27.9	PK	206	1.1	RB 1 MHz;VB 3 MHz;Pk
1345.500	43.9	H	54.0	-10.1	AVG	212	1.0	RB 1 MHz;VB 10 Hz;Pk
1345.540	46.1	H	74.0	-27.9	PK	212	1.0	RB 1 MHz;VB 3 MHz;Pk



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
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.

Date of Test: 8/24/2011 0:00
Test Engineer: John Caizzi / Joseph Cadigal
Test Location: FT5

Config. Used: 2
Config Change: no antennas
EUT Voltage: 3.3 VDC

Summary of Results

New Module #2011-1296, Laptop #2011-2312, Linux Shell

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	802.11a: 26 mW 802.11n 20MHz: 21 mW
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	802.11a: 3.1 dBm/MHz 802.11n 20MHz: 1.7 dBm/MHz
1	Max EIRP 5250 - 5350MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	N/A	EIRP = 19.2 dBm (83.2 mW) TPC not required
1	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	802.11a: 31.6 mW 802.11n 20MHz: 21 mW
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	802.11a: 4 dBm/MHz 802.11n 20MHz: 3.2 dBm/MHz
1	Max EIRP 5470 - 5725MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	N/A	EIRP = 21.5 dBm (140 mW) TPC not required

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	26dB Bandwidth	15.407 (Information only)	-	> 20MHz for all modes
1	99% Bandwidth	RSS 210 (Information only)	N/A	802.11a: 17.2 MHz 802.11n 20MHz: 18 MHz
2	Peak Excursion Envelope	15.407(a) (6) 13dB	-	802.11a: Pass 802.11n 20MHz: Pass
3	Antenna Conducted - Out of Band Spurious	15.407(b) -27dBm/MHz	Pass	All emissions below the -27dBm/MHz limit

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.

Ambient Conditions:

Temperature:	24 °C
Rel. Humidity:	43 %

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:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

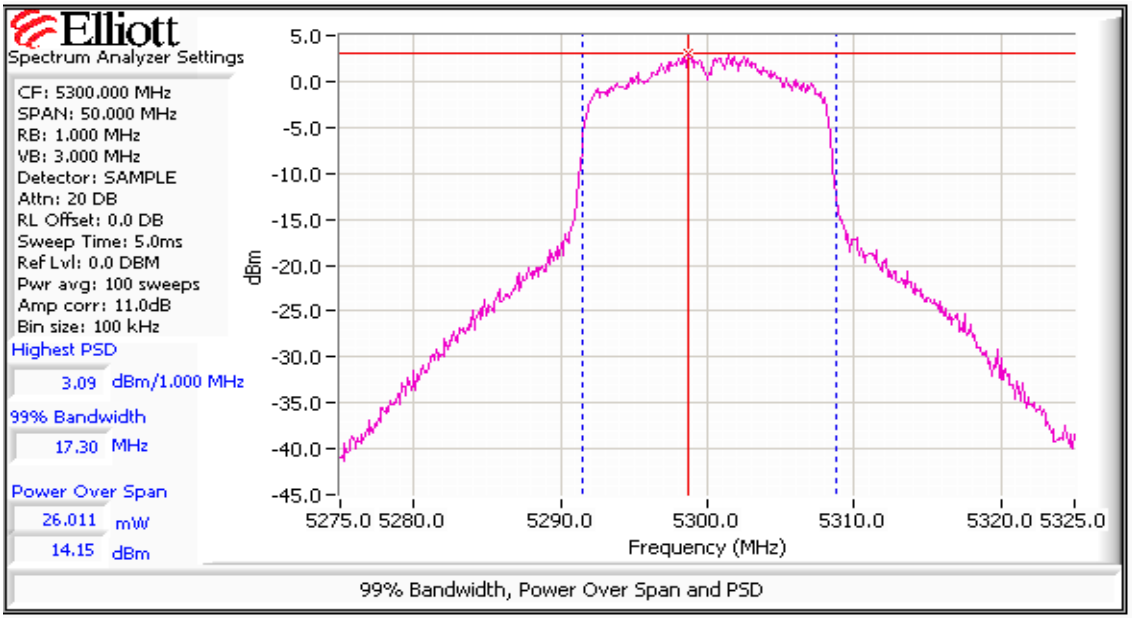
Run #1: Bandwidth, Output Power and Power Spectral Density - Single Chain Systems

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 not continuous but the analyzer was configured with a gated sweep such that it was sweeping only when the device was transmitting) and power integration over 50 MHz (method 1 of DA-02-2138A1).
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

Taiwan LP0002 Power Table
Single Chain Operation, 5250-5350 MHz Band, LP0002 (Taiwan)

Antenna Gain (dBi): 5 EIRP: 83.2 mW 19.2 dBm

Frequency (MHz)	Software Setting	Bandwidth 26dB	Bandwidth 99%[4]	Output Power[1] dBm Measured	Output Power[1] dBm Limit	Power (Watts)	PSD[2] dBm/MHz Measured	PSD[2] dBm/MHz LP0002 Limit	Result
802.11a									
5260	-	29.7	17.1	12.8	17.0	0.019	1.6	4.0	Pass
5300	-	33.7	17.3	14.2	17.0	0.026	3.1	4.0	Pass
5320	-	23.3	16.7	10.5	17.0	0.011	-0.7	4.0	Pass
802.11n 20MHz									
5260	-	29.7	18.1	11.9	17.0	0.015	0.4	4.0	Pass
5300	-	32.8	18.1	13.2	17.0	0.021	1.7	4.0	Pass
5320	-	22.2	17.9	8.5	17.0	0.007	-2.8	4.0	Pass



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Single Chain Operation, 5470- 5725 MHz Band

Antenna Gain (dBi): 5 EIRP: 99.1 mW 20.0 dBm

Frequency (MHz)	Software Setting	Bandwidth 26dB	Bandwidth 99%[4]	Output Power[1] dBm Measured	Output Power[1] dBm Limit	Power (Watts)	PSD[2] dBm/MHz Measured	PSD[2] dBm/MHz FCC Limit	PSD[2] dBm/MHz RSS Limit[3]	Result
802.11a										
5500	Default	31.5	17.2	15.0	24.0	0.031	4.0	11.0	11.0	Pass
5580		30.5	16.9	13.5	24.0	0.022	2.4	11.0	11.0	Pass
5700		25.5	16.6	8.1	24.0	0.006	-2.9	11.0	11.0	Pass
802.11n 20MHz										
5500	Default	29.5	17.9	13.2	24.0	0.021	2.1	11.0	11.0	Pass
5580		28.2	18.0	12.6	24.0	0.018	1.5	11.0	11.0	Pass
5700		29.3	18.0	10.7	24.0	0.012	-0.7	11.0	11.0	Pass

Run #2: Peak Excursion

(802.11n20) 20MHz: Device meets the requirement for the peak excursion

Freq (MHz)	Peak Excursion(dB) Value	Peak Excursion(dB) Limit	Freq (MHz)	Peak Excursion(dB) Value	Peak Excursion(dB) Limit	Freq (MHz)	Peak Excursion(dB) Value	Peak Excursion(dB) Limit
			5260	11.2	13.0	5500	11.8	13.0
			5300	11.7	13.0	5580	11.2	13.0
			5320	11.8	13.0	5700	11.8	13.0

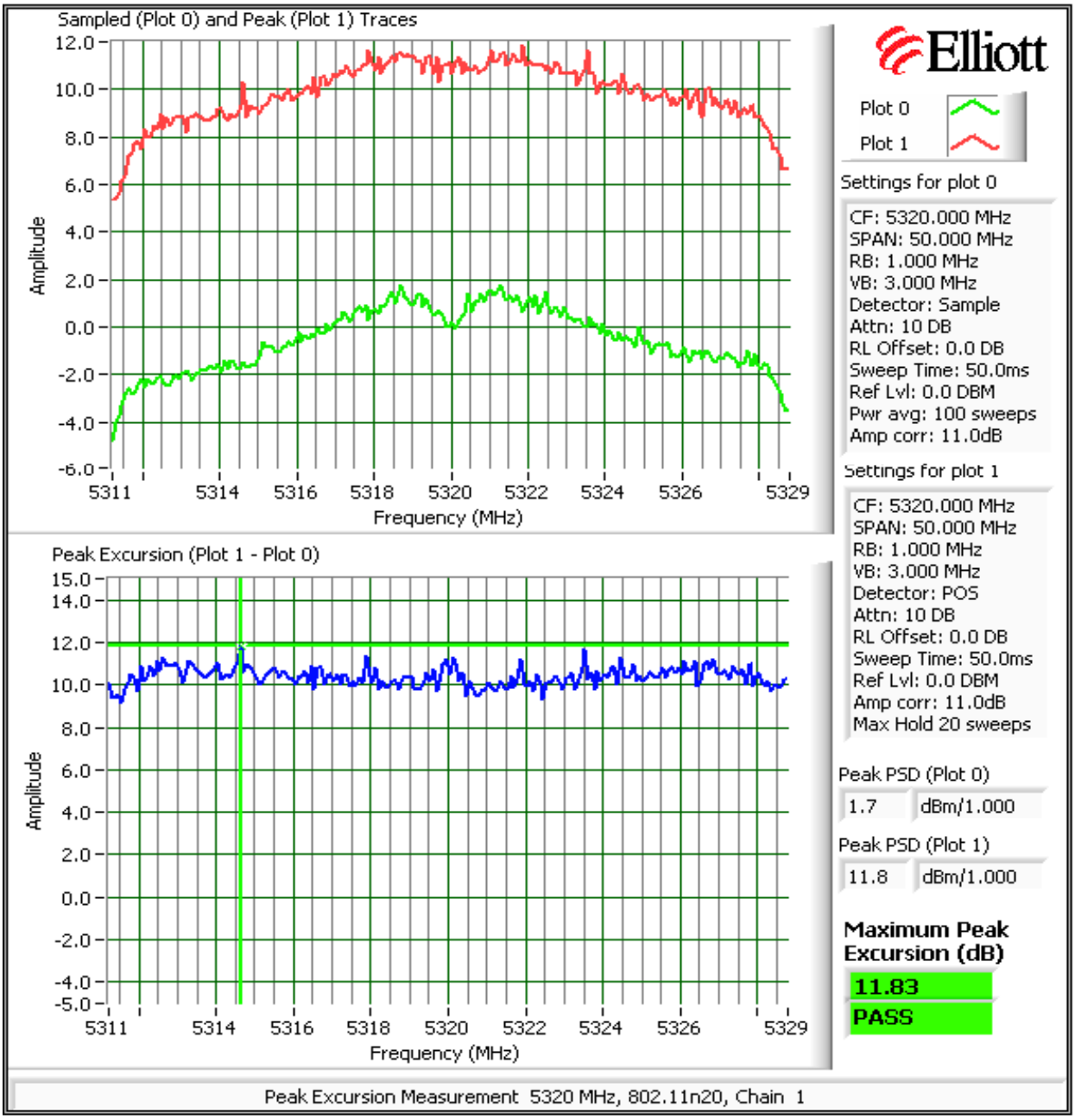
Note: 802.11n20 represented worse case for peak excursion

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

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

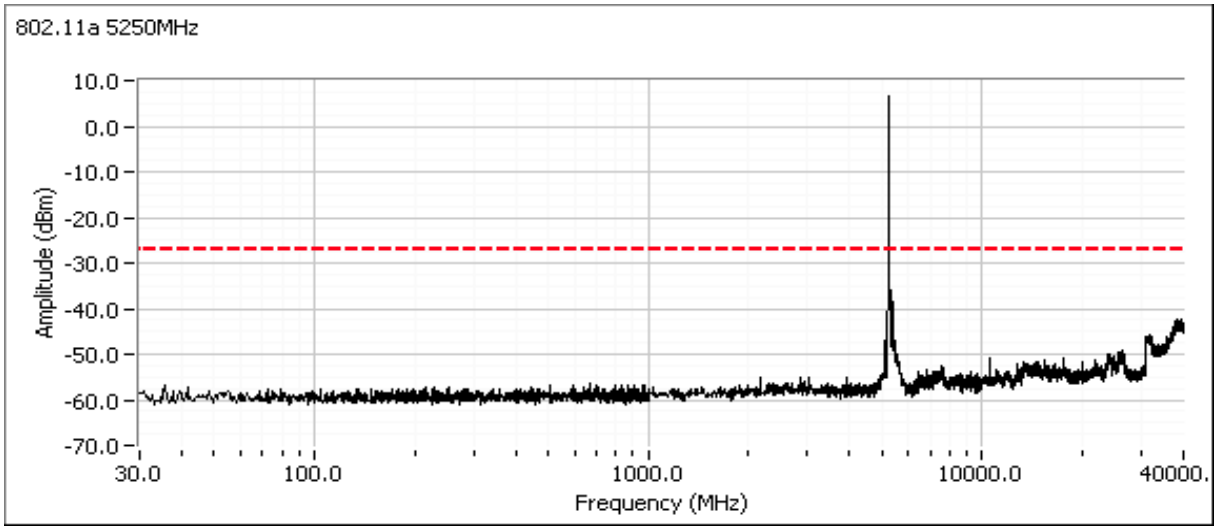
Maximum Antenna Gain:	6.5	dBi	
Spurious Limit:	-27.0	dBm/MHz eirp	
Limit Used On Plots [Note 1]:	-33.5	dBm/MHz	Average Limit (RB=1MHz, VB=10Hz)
	-13.5	dBm/MHz	Peak Limit (RB=VB=1MHz)

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.

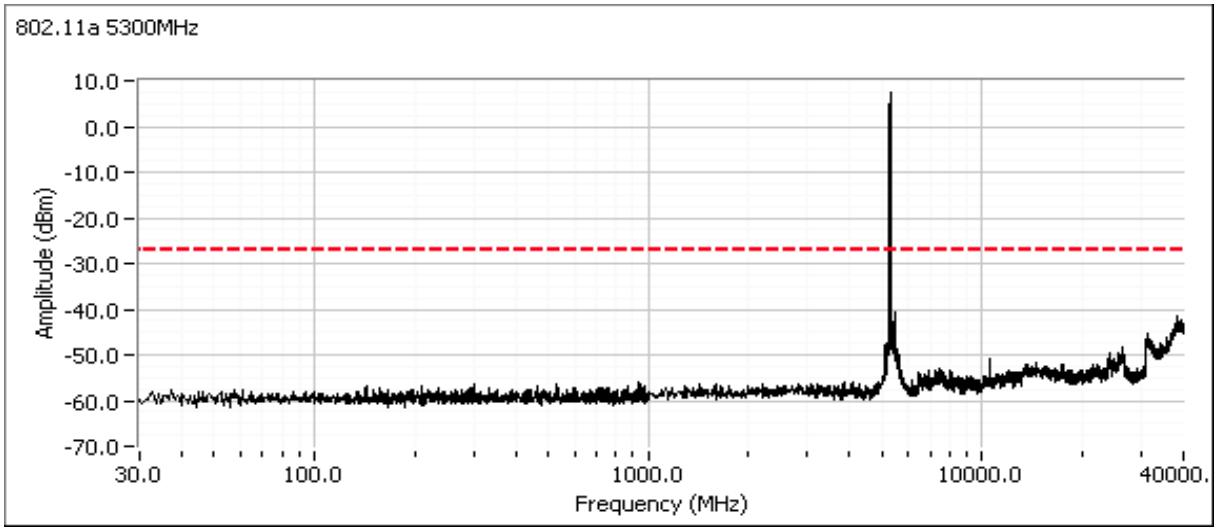
Plots Showing Out-Of-Band Emissions (RBW=VBW=1MHz)

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Low channel, 5250 - 5350 MHz Band



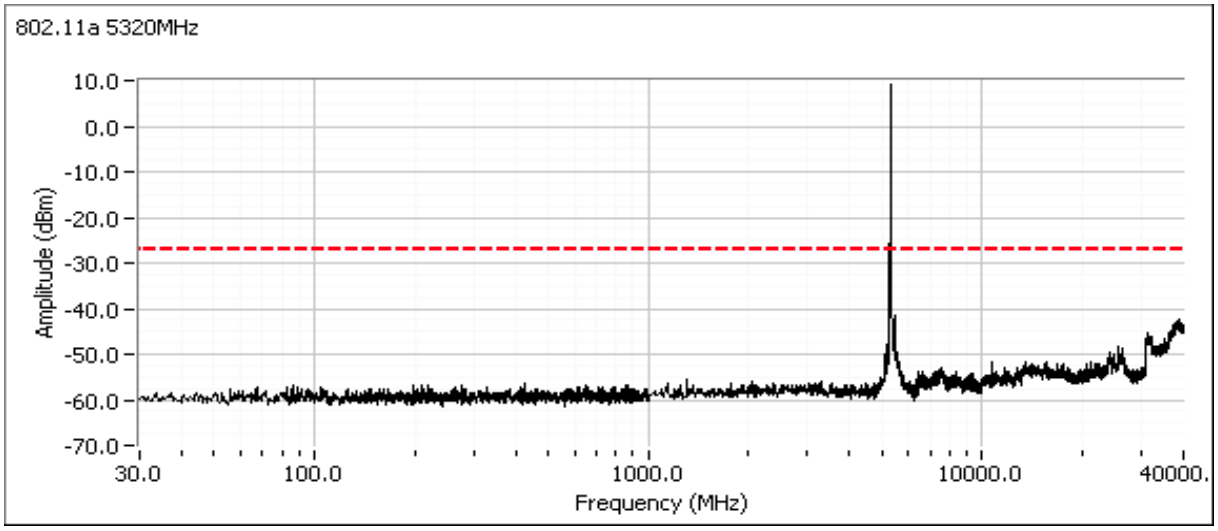
Center channel, 5250 - 5350 MHz Band



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

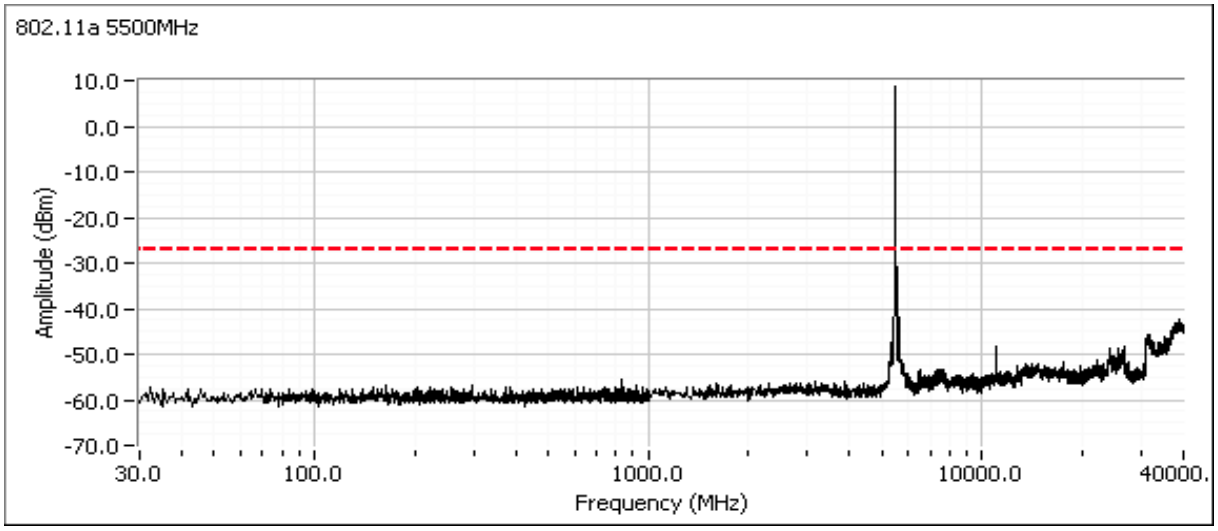
High channel, 5250 - 5350 MHz Band

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

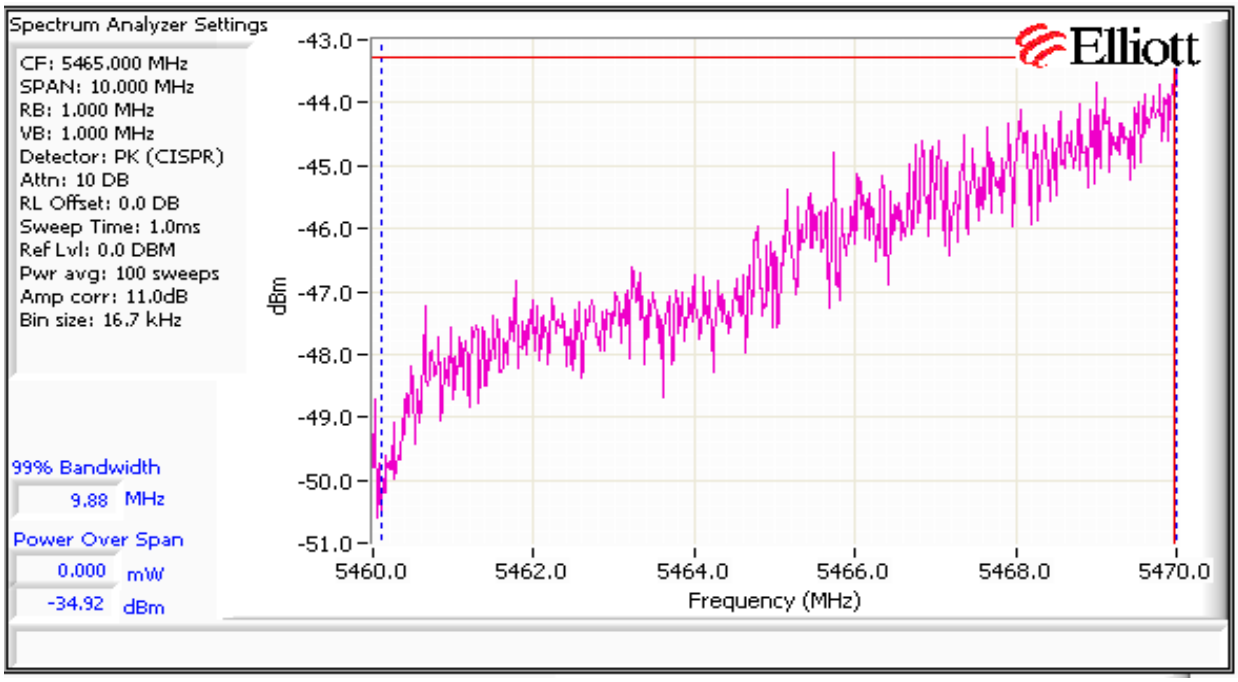


Low channel, 5470 - 5725 MHz Band

Includes a plot from 5460 - 5470 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.

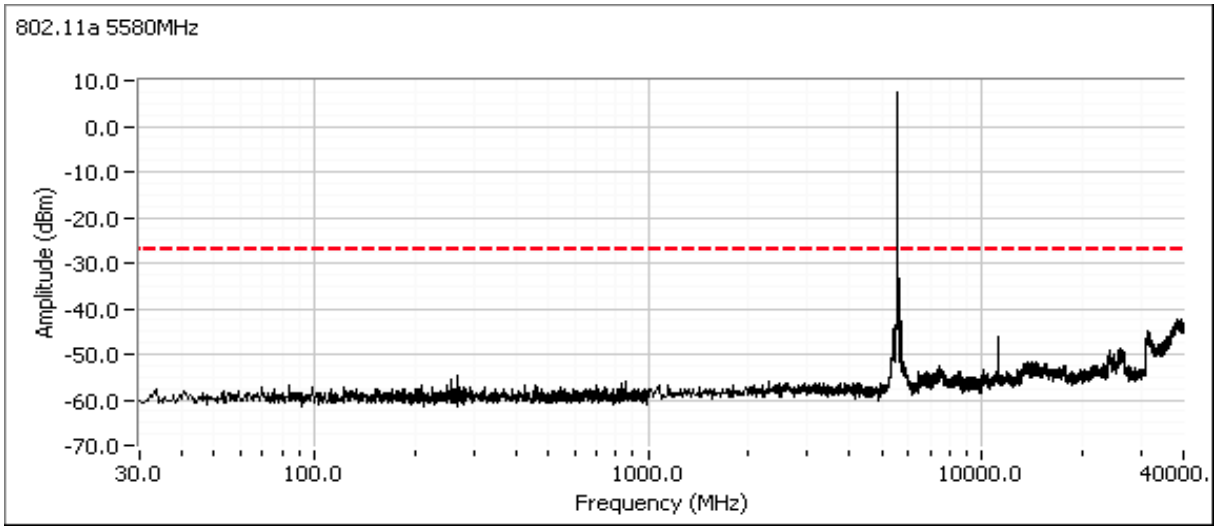


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

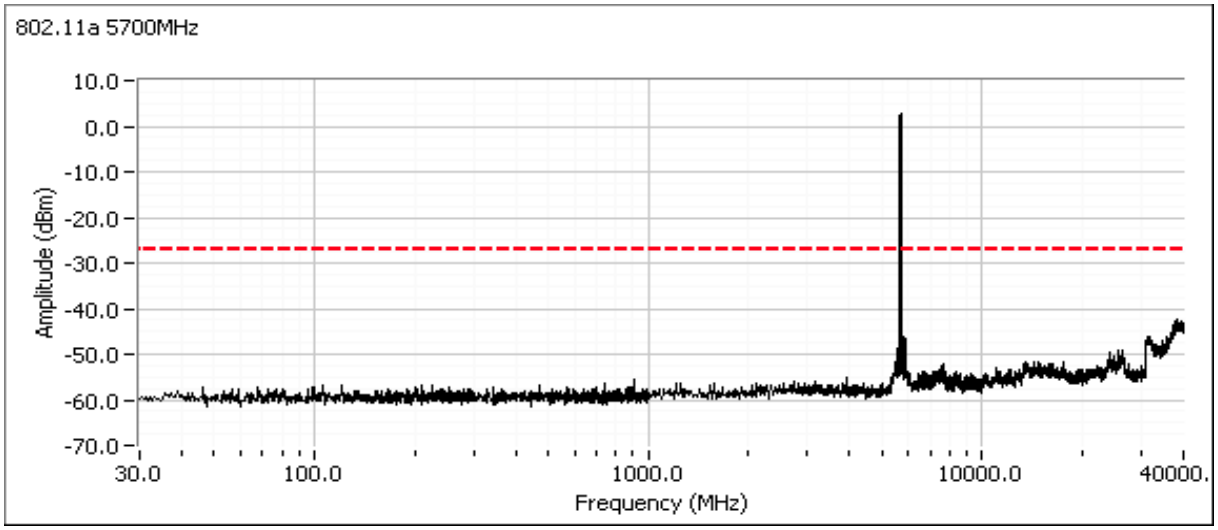
Center channel, 5470 - 5725 MHz Band (20Mhz channel use 5580 MHz, 40MHz channel use 5550 MHz)

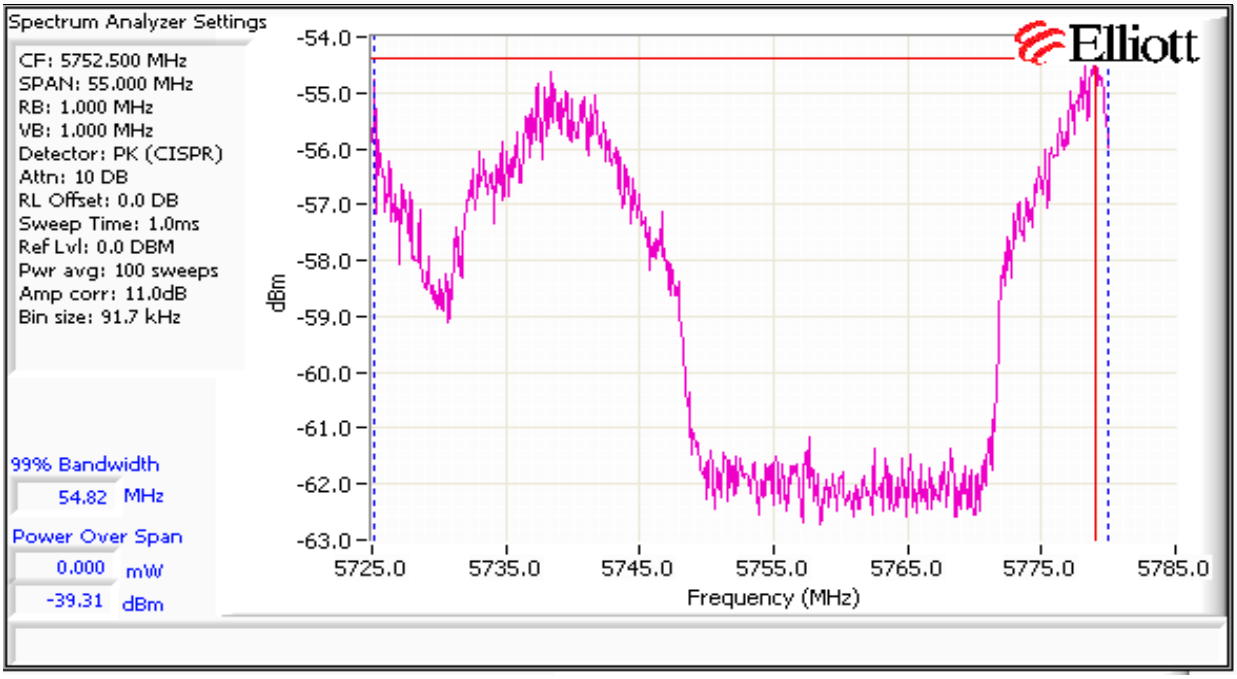


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

High channel, 5470 - 5725 MHz Band

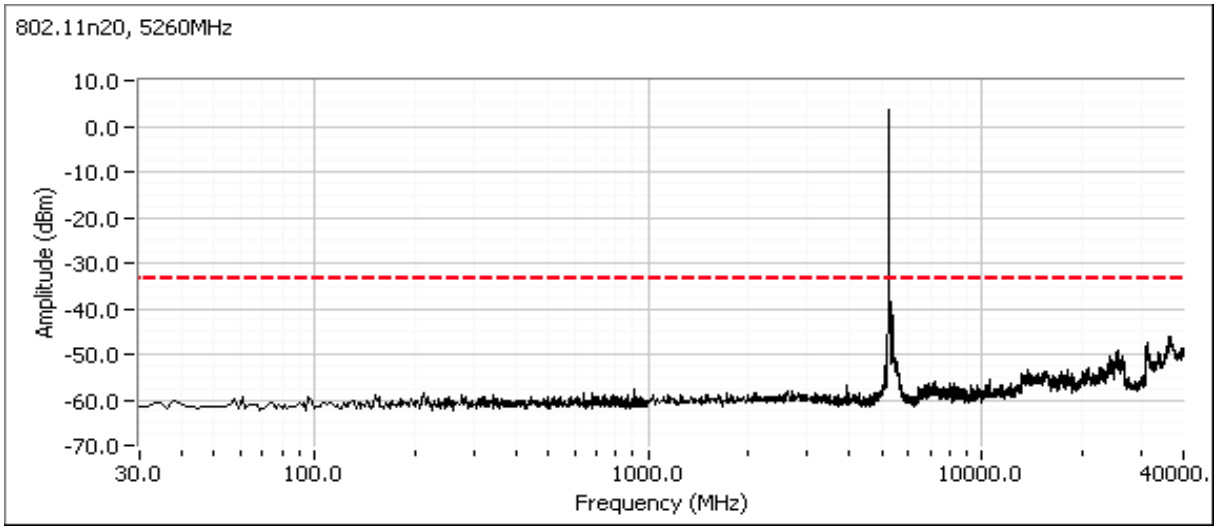
Includes a plot from 5725 - 5780 MHz showing compliance with the -27dBm/MHz eirp limit immediately above the allocated band (5725 MHz).





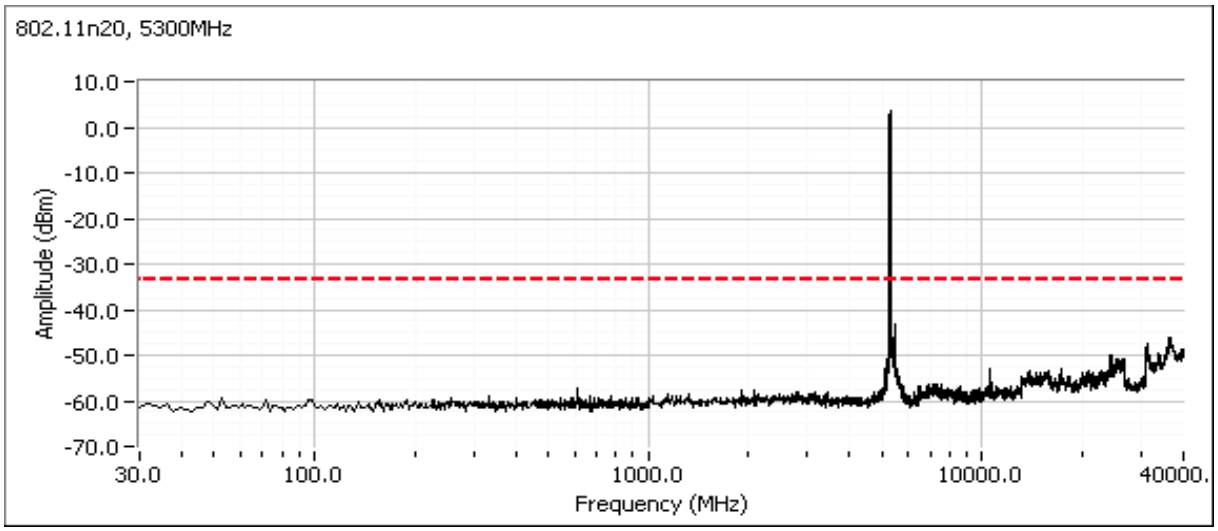
Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

802.11n20
Low channel, 5250 - 5350 MHz Band



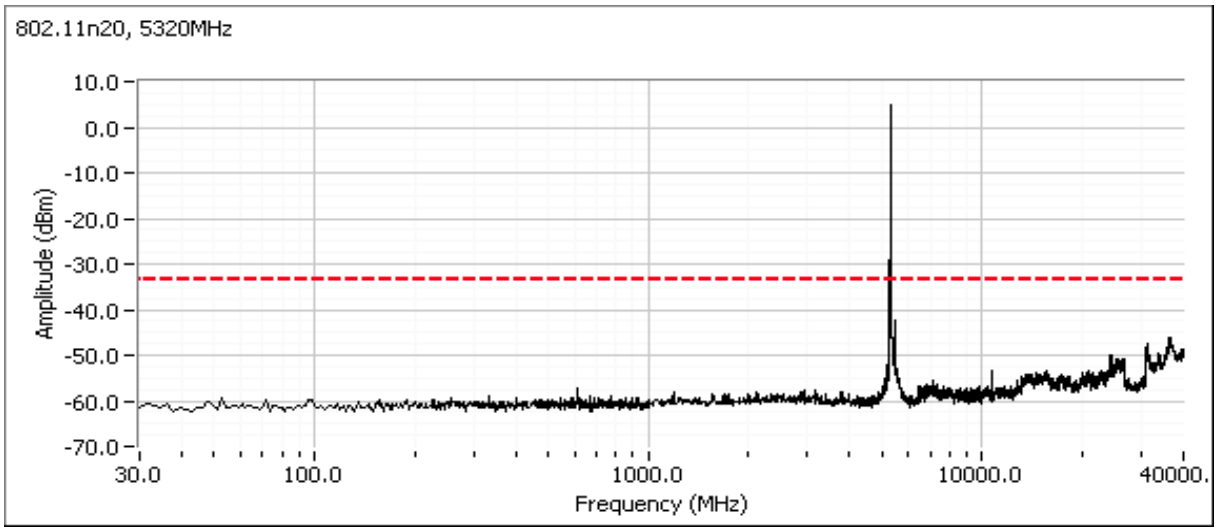
Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Center channel, 5250 - 5350 MHz Band



High channel, 5250 - 5350 MHz Band

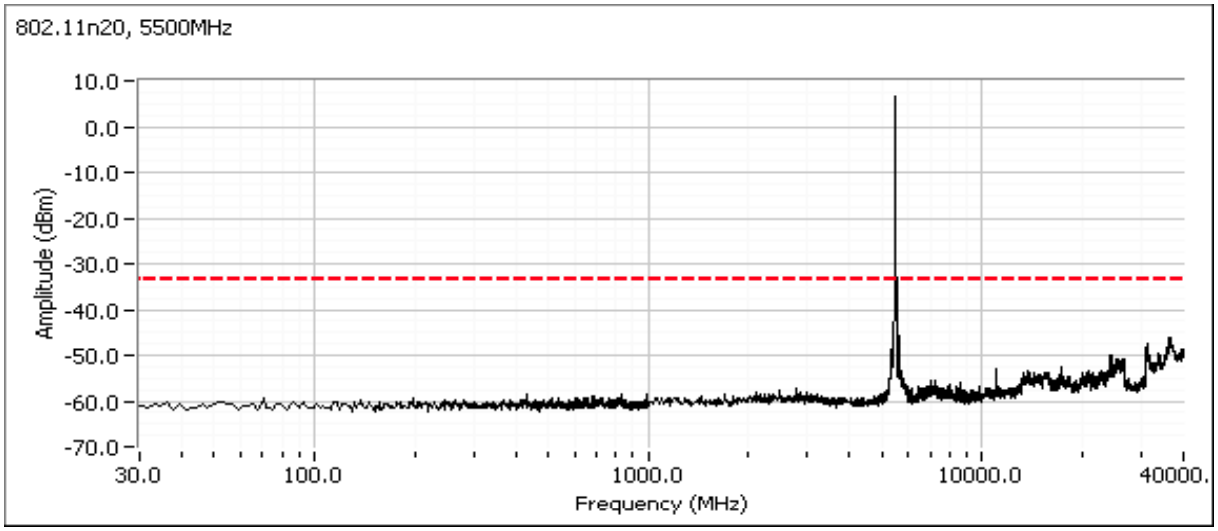
Compliance with the radiated limits for the restricted band immediately above 5350MHz is demonstrated through the radiated emissions tests.

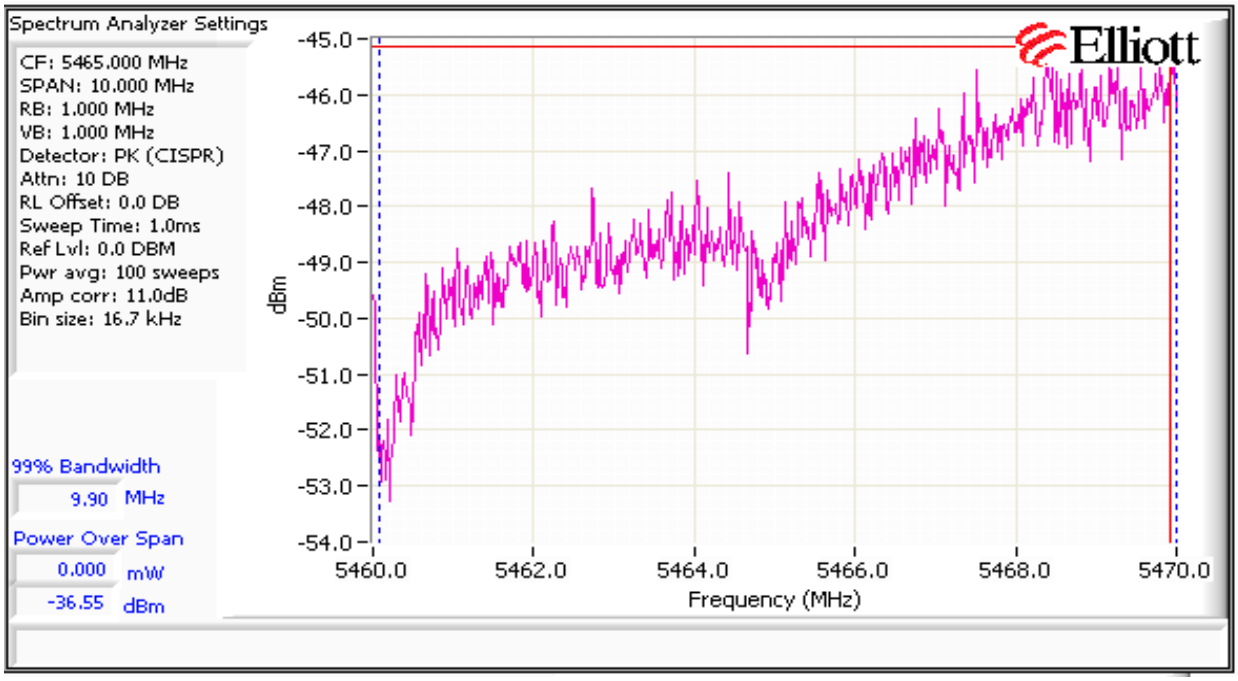


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Low channel, 5470 - 5725 MHz Band

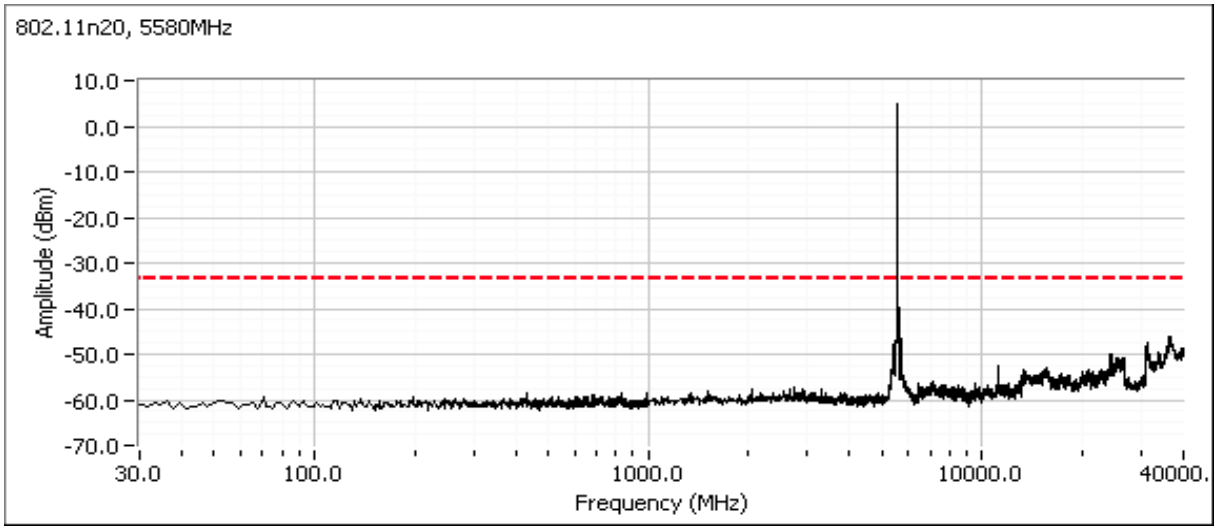
Includes a plot from 5460 - 5470 MHz showing compliance with the limit immediately below the allocated band from 5460-5470 MHz. Compliance with the radiated limits for the restricted band below 5460 MHz is demonstrated through the radiated emissions tests.





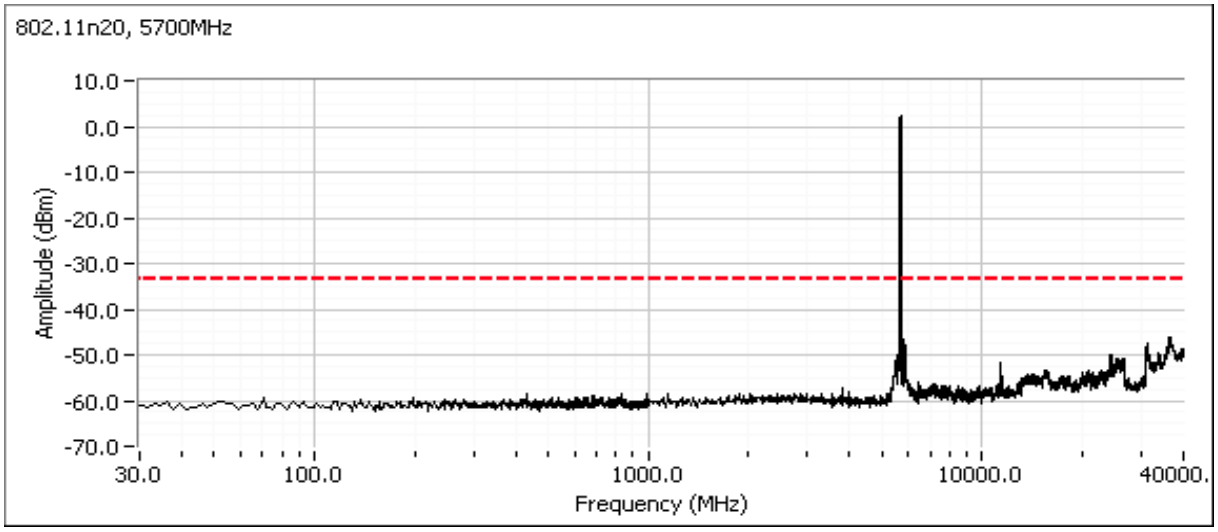
Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A

Center channel, 5470 - 5725 MHz Band (20Mhz channel use 5580 MHz, 40MHz channel use 5550 MHz)

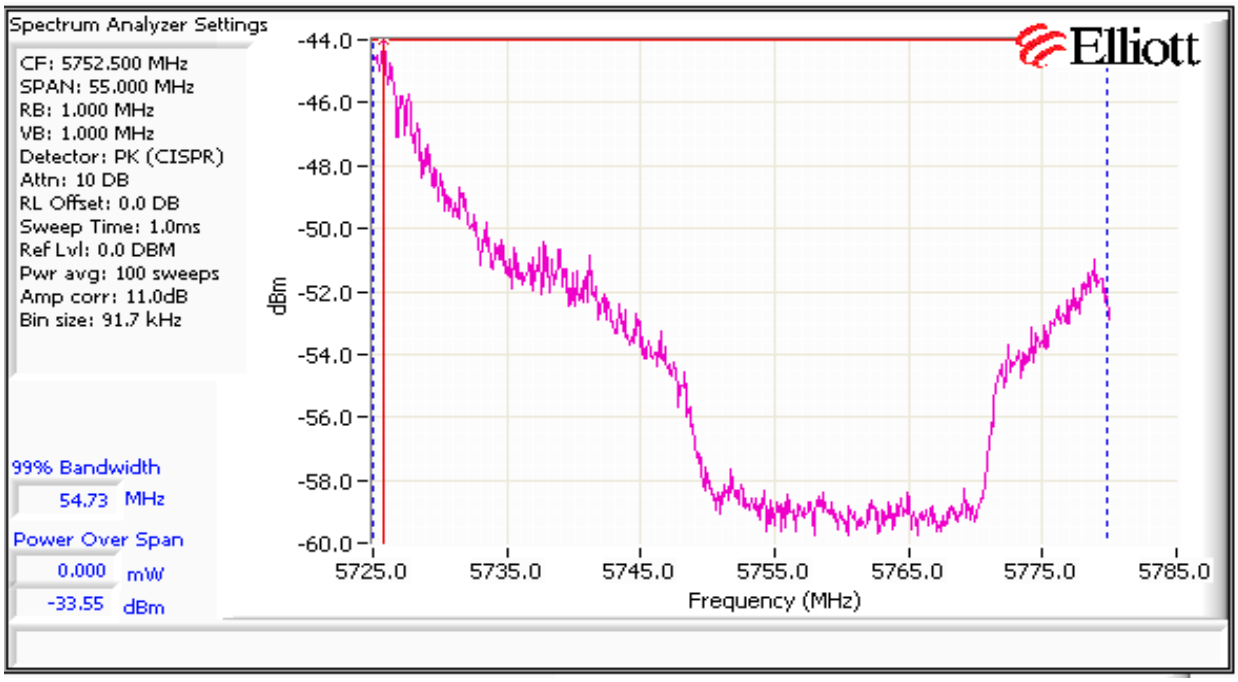


High channel, 5470 - 5725 MHz Band

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



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83196
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.E/RSS-210	Class:	N/A



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40 and SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83198
		Account Manager:	Christine Krebill
Contact:	Ron Seide		-
Emissions Standard(s):	EN 301 489-1 V1.8.1/ FCC Part 15B	Class:	B
Immunity Standard(s):	EN 301 489-1 V1.8.1	Environment:	-

EMC Test Data

For The

Summit Data Communications

Model

SDC-WB40 and SDC-MSD40NBT (1x1 802.11abg + BT 2.1)

Date of Last Test: 12/16/2011

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40 and SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83198
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	EN 301 489-1 V1.8.1/ FCC Part 15B	Class:	B

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: 12/16/2011
Test Engineer: John Caizzi
Test Location: Fremont Chamber #5

Config. Used: 2
Config Change: none
Host Unit Voltage 120V / 60Hz & 230V / 50Hz

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. The EUT was transmitting on 2437 MHz, 802.11g, 6 Mbps.

Ambient Conditions:

Temperature: 21 °C
Rel. Humidity: 33 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power, 230V/50Hz	Class B	Pass	31.0dBµV @ 0.687MHz (-15.0dB)
2	CE, AC Power,120V/60Hz	Class B	Pass	31.9dBµV @ 19.501MHz (-18.1dB)

Modifications Made During Testing

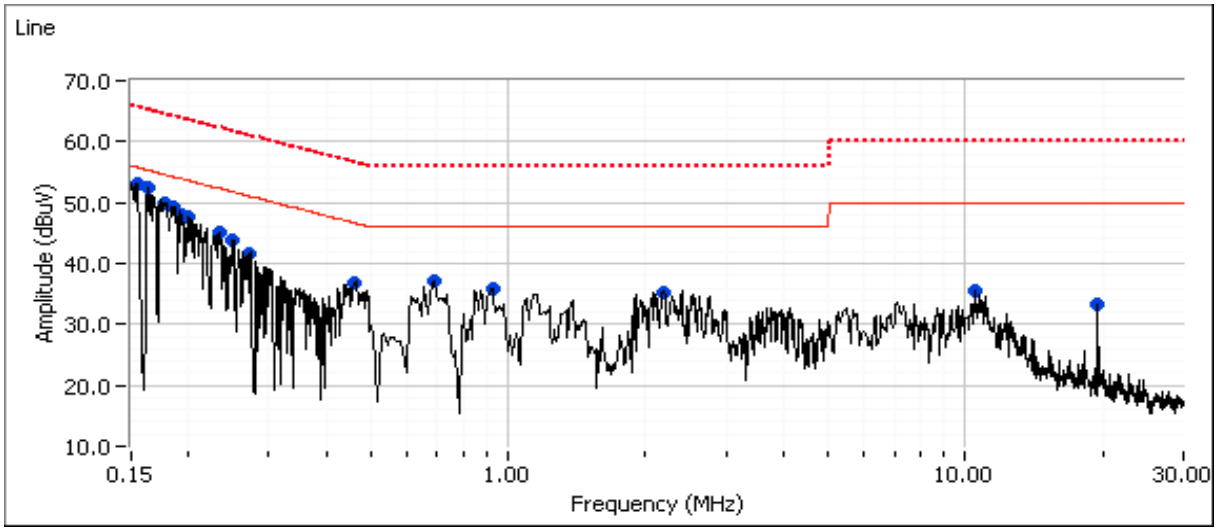
No modifications were made to the EUT during testing

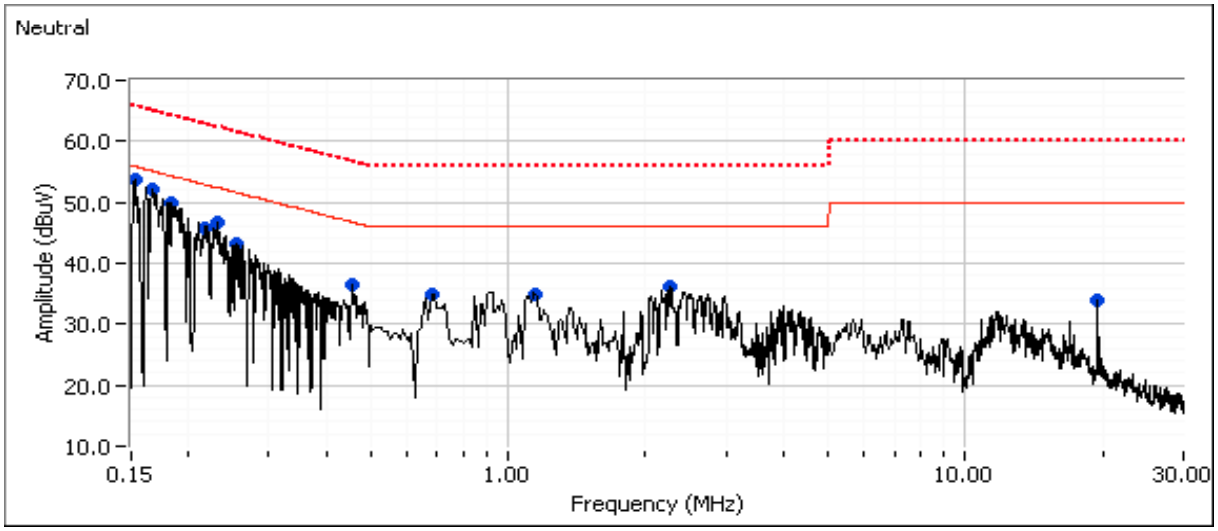
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40 and SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83198
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	EN 301 489-1 V1.8.1/ FCC Part 15B	Class:	B

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 230V/50Hz





Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40 and SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83198
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	EN 301 489-1 V1.8.1/ FCC Part 15B	Class:	B

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

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.153	53.0	Line	55.8	-2.8	Peak	
0.163	52.3	Line	55.3	-3.0	Peak	
0.178	49.8	Line	54.6	-4.8	Peak	
0.185	49.1	Line	54.3	-5.2	Peak	
0.195	48.1	Line	53.9	-5.8	Peak	
0.202	47.6	Line	53.6	-6.0	Peak	
0.234	45.1	Line	52.3	-7.2	Peak	
0.250	43.9	Line	51.7	-7.8	Peak	
0.687	37.0	Line	46.0	-9.0	Peak	
0.271	41.5	Line	51.1	-9.6	Peak	
0.464	36.9	Line	46.6	-9.7	Peak	
0.916	35.9	Line	46.0	-10.1	Peak	
2.173	35.2	Line	46.0	-10.8	Peak	
10.533	35.6	Line	50.0	-14.4	Peak	
19.501	33.3	Line	50.0	-16.7	Peak	
0.153	53.7	Neutral	55.8	-2.1	Peak	
0.167	52.1	Neutral	55.1	-3.0	Peak	
0.185	49.8	Neutral	54.3	-4.5	Peak	
0.232	46.7	Neutral	52.4	-5.7	Peak	
0.217	45.8	Neutral	52.9	-7.1	Peak	
0.255	43.2	Neutral	51.6	-8.4	Peak	
2.279	36.3	Neutral	46.0	-9.7	Peak	
0.458	36.6	Neutral	46.7	-10.1	Peak	
0.685	35.0	Neutral	46.0	-11.0	Peak	
1.141	34.8	Neutral	46.0	-11.2	Peak	
19.502	34.0	Neutral	50.0	-16.0	Peak	

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40 and SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83198
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	EN 301 489-1 V1.8.1/ FCC Part 15B	Class:	B

Final quasi-peak and average readings

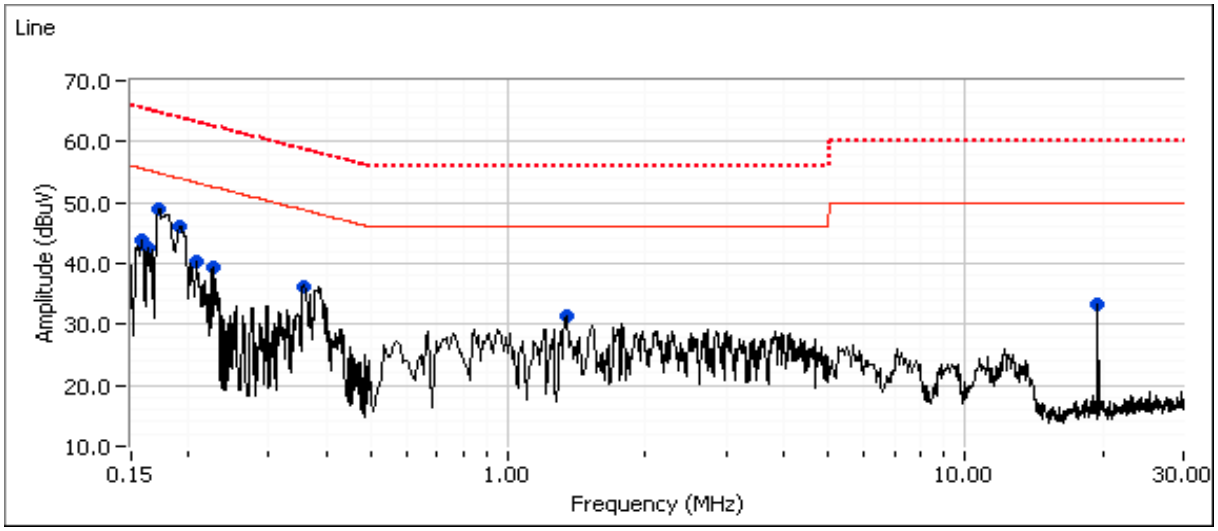
Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.153	17.5	Line	55.8	-38.3	AVG	
0.153	46.1	Line	65.8	-19.7	QP	
0.163	16.8	Line	55.3	-38.5	AVG	
0.163	44.7	Line	65.3	-20.6	QP	
0.178	16.1	Line	54.6	-38.5	AVG	
0.178	42.8	Line	64.6	-21.8	QP	
0.185	15.9	Line	54.3	-38.4	AVG	
0.185	41.8	Line	64.3	-22.5	QP	
0.195	15.7	Line	53.8	-38.1	AVG	
0.195	40.8	Line	63.8	-23.0	QP	
0.202	15.4	Line	53.5	-38.1	AVG	
0.202	40.1	Line	63.5	-23.4	QP	
0.687	31.0	Line	46.0	-15.0	AVG	
0.687	36.5	Line	56.0	-19.5	QP	
0.463	25.5	Line	46.6	-21.1	AVG	
0.463	34.1	Line	56.6	-22.5	QP	
0.916	28.9	Line	46.0	-17.1	AVG	
0.916	34.9	Line	56.0	-21.1	QP	
2.173	7.9	Line	46.0	-38.1	AVG	
2.173	33.6	Line	56.0	-22.4	QP	
10.533	20.5	Line	50.0	-29.5	AVG	
10.533	30.6	Line	60.0	-29.4	QP	
19.501	31.1	Line	50.0	-18.9	AVG	
19.501	32.0	Line	60.0	-28.0	QP	
0.153	17.6	Neutral	55.8	-38.2	AVG	
0.153	46.2	Neutral	65.8	-19.6	QP	
0.167	16.5	Neutral	55.1	-38.6	AVG	
0.167	44.3	Neutral	65.1	-20.8	QP	
0.185	15.8	Neutral	54.3	-38.5	AVG	
0.185	42.1	Neutral	64.3	-22.2	QP	
0.232	21.4	Neutral	52.4	-31.0	AVG	
0.232	37.5	Neutral	62.4	-24.9	QP	
0.216	14.6	Neutral	53.0	-38.4	AVG	
0.216	39.2	Neutral	63.0	-23.8	QP	
2.279	25.1	Neutral	46.0	-20.9	AVG	
2.279	32.6	Neutral	56.0	-23.4	QP	
0.458	28.8	Neutral	46.7	-17.9	AVG	
0.458	33.8	Neutral	56.7	-22.9	QP	

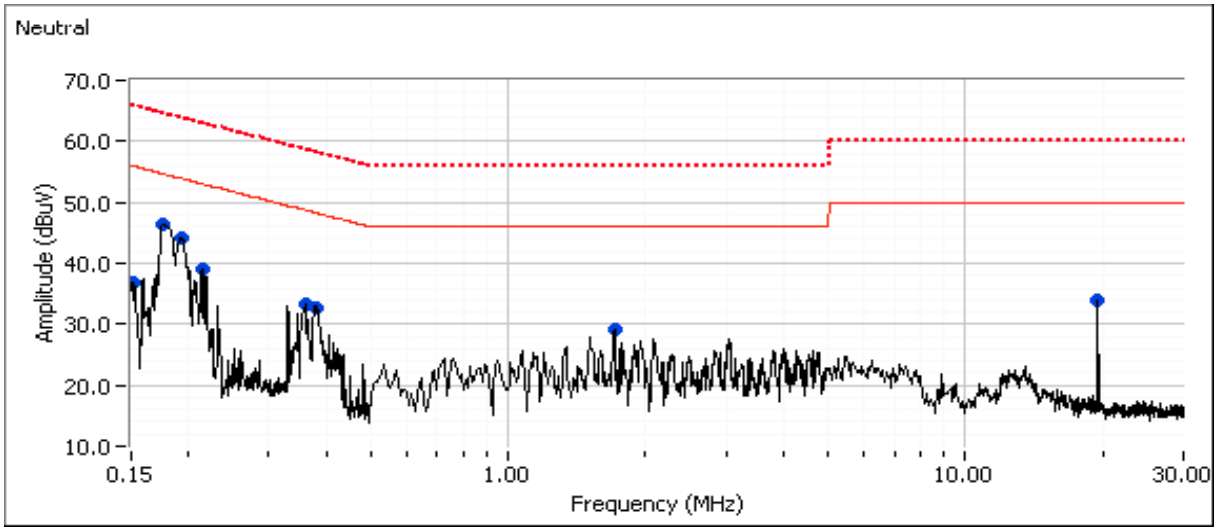
Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40 and SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83198
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	EN 301 489-1 V1.8.1/ FCC Part 15B	Class:	B

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.685	29.4	Neutral	46.0	-16.6	AVG	
0.685	34.8	Neutral	56.0	-21.2	QP	
1.141	27.7	Neutral	46.0	-18.3	AVG	
1.141	34.5	Neutral	56.0	-21.5	QP	
19.502	30.2	Neutral	50.0	-19.8	AVG	
19.502	31.3	Neutral	60.0	-28.7	QP	

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40 and SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83198
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	EN 301 489-1 V1.8.1/ FCC Part 15B	Class:	B

Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz





Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40 and SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83198
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	EN 301 489-1 V1.8.1/ FCC Part 15B	Class:	B

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

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.173	48.8	Line	54.8	-6.0	Peak	
0.190	46.2	Line	53.9	-7.7	Peak	
0.158	43.8	Line	55.5	-11.7	Peak	
0.357	36.3	Line	48.8	-12.5	Peak	
0.164	42.5	Line	55.3	-12.8	Peak	
0.208	40.4	Line	53.3	-12.9	Peak	
0.225	39.3	Line	52.6	-13.3	Peak	
1.337	31.4	Line	46.0	-14.6	Peak	
19.502	33.2	Line	50.0	-16.8	Peak	
0.176	46.4	Neutral	54.7	-8.3	Peak	
0.192	44.0	Neutral	53.9	-9.9	Peak	
0.213	39.1	Neutral	53.0	-13.9	Peak	
0.379	32.8	Neutral	48.3	-15.5	Peak	
0.360	33.2	Neutral	48.7	-15.5	Peak	
19.501	34.0	Neutral	50.0	-16.0	Peak	
1.717	29.2	Neutral	46.0	-16.8	Peak	
0.152	36.9	Neutral	55.9	-19.0	Peak	

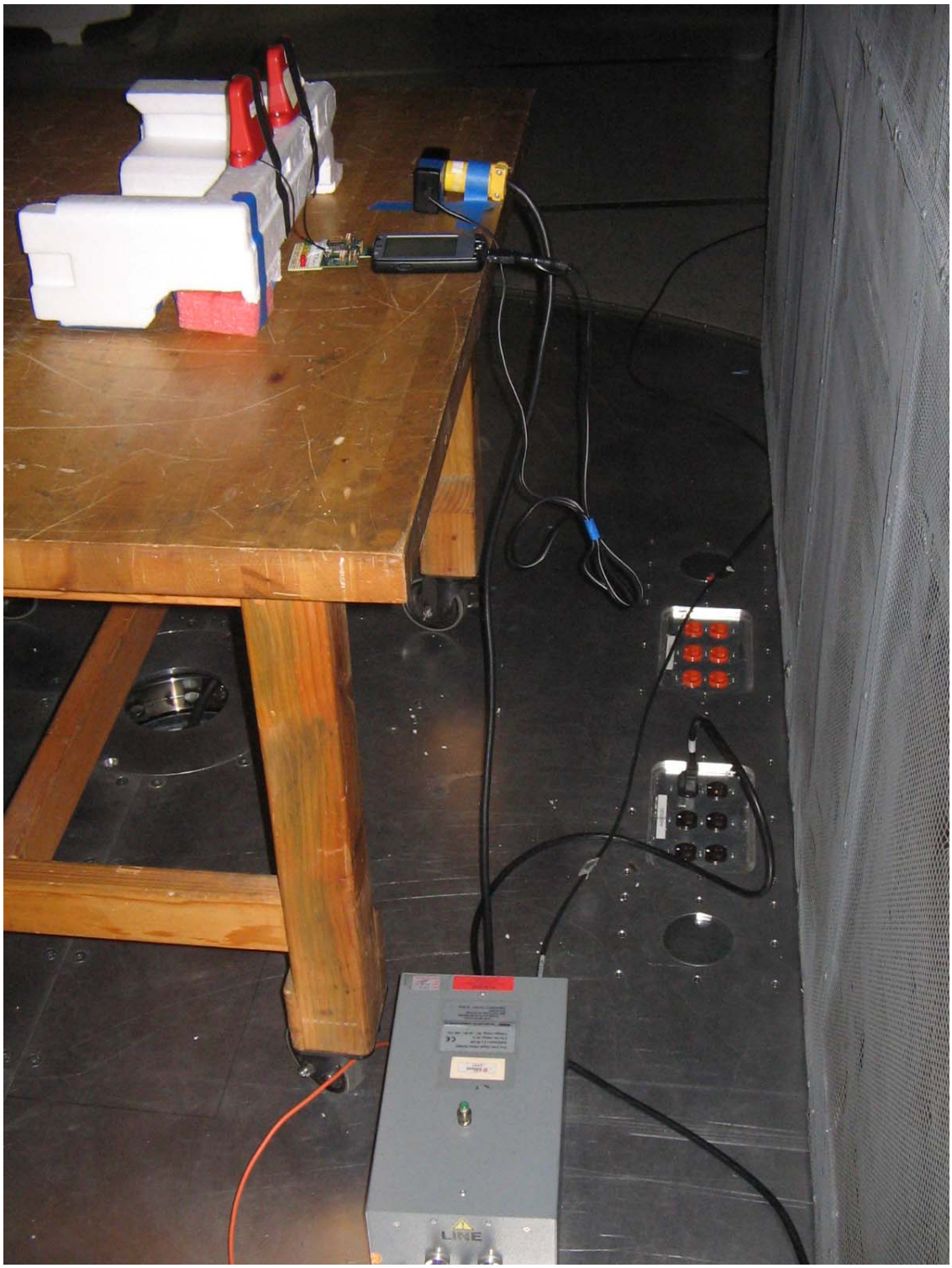
Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40 and SDC-MSD40NBT (1x1 802.11abg + BT 2.1)	T-Log Number:	T83198
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	EN 301 489-1 V1.8.1/ FCC Part 15B	Class:	B

Final quasi-peak and average readings

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.173	14.0	Line	54.8	-40.8	AVG	
0.173	44.3	Line	64.8	-20.5	QP	
0.190	33.5	Line	54.0	-20.5	AVG	
0.190	44.4	Line	64.0	-19.6	QP	
0.158	12.7	Line	55.6	-42.9	AVG	
0.158	31.5	Line	65.6	-34.1	QP	
0.357	10.7	Line	48.8	-38.1	AVG	
0.357	32.2	Line	58.8	-26.6	QP	
0.164	14.3	Line	55.3	-41.0	AVG	
0.164	41.0	Line	65.3	-24.3	QP	
0.208	16.0	Line	53.3	-37.3	AVG	
0.208	34.6	Line	63.3	-28.7	QP	
0.225	11.7	Line	52.6	-40.9	AVG	
0.225	23.9	Line	62.6	-38.7	QP	
1.337	21.3	Line	46.0	-24.7	AVG	
1.337	29.5	Line	56.0	-26.5	QP	
19.502	29.8	Line	50.0	-20.2	AVG	
19.502	30.4	Line	60.0	-29.6	QP	
0.176	16.4	Neutral	54.7	-38.3	AVG	
0.176	44.4	Neutral	64.7	-20.3	QP	
0.192	27.9	Neutral	53.9	-26.0	AVG	
0.192	42.6	Neutral	63.9	-21.3	QP	
0.213	12.2	Neutral	53.1	-40.9	AVG	
0.213	33.1	Neutral	63.1	-30.0	QP	
0.379	23.7	Neutral	48.3	-24.6	AVG	
0.379	30.7	Neutral	58.3	-27.6	QP	
0.360	17.3	Neutral	48.7	-31.4	AVG	
0.360	29.3	Neutral	58.7	-29.4	QP	
19.501	31.9	Neutral	50.0	-18.1	AVG	
19.501	32.6	Neutral	60.0	-27.4	QP	
1.717	10.7	Neutral	46.0	-35.3	AVG	
1.717	18.8	Neutral	56.0	-37.2	QP	
0.152	11.4	Neutral	55.9	-44.5	AVG	
0.152	30.6	Neutral	65.9	-35.3	QP	

APPENDIX C RADIATED EMISSIONS TEST CONFIGURATION PHOTOGRAPHS

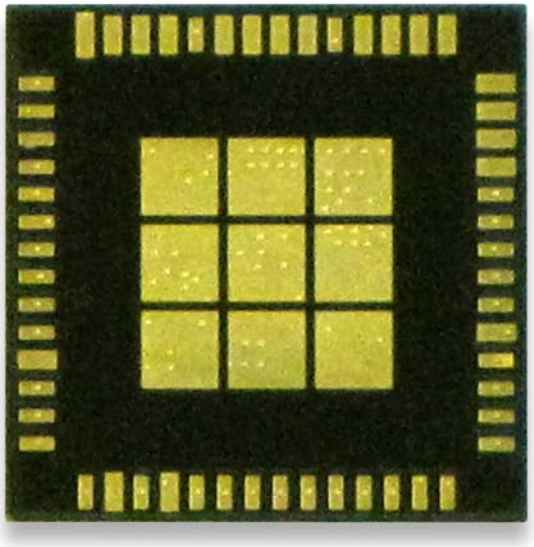
APPENDIX D CONDUCTED EMISSIONS TEST CONFIGURATION PHOTOGRAPHS


LINE

APPENDIX E DETAILED PHOTOGRAPHS OF CONSTRUCTION

Front

Back



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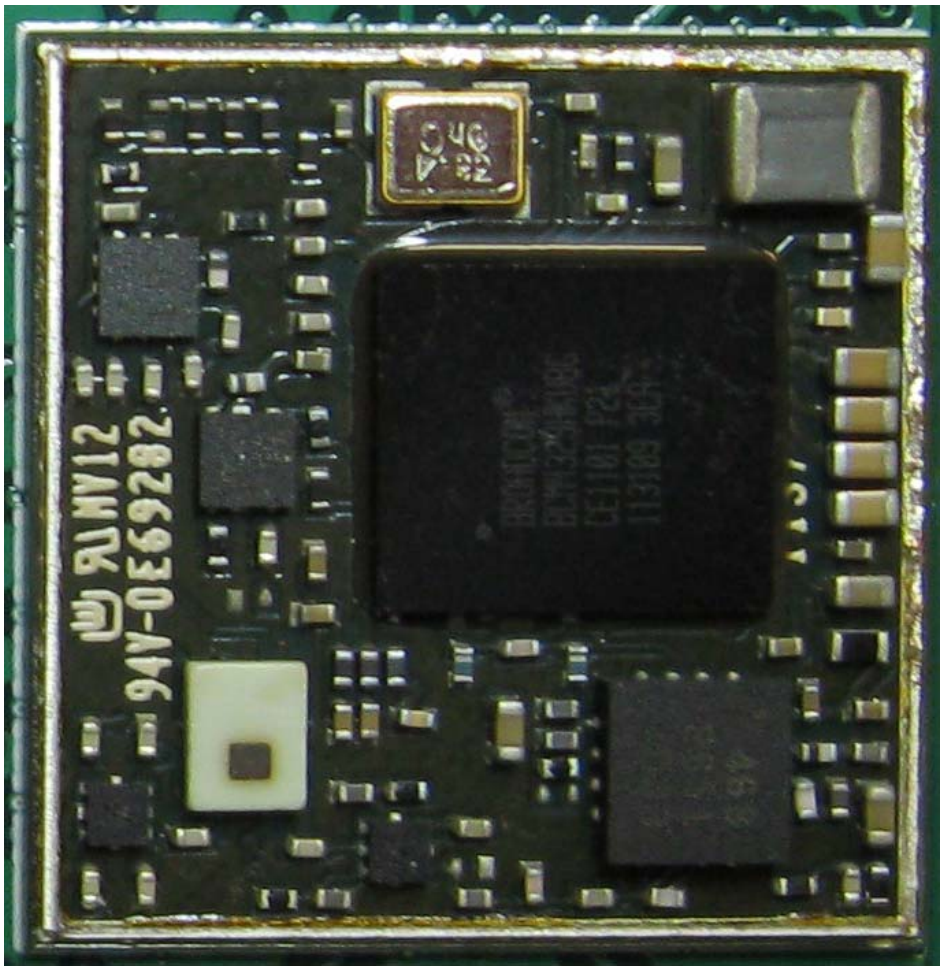

End Of Report

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