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Electromagnetic Emissions Test Report
Application for Grant of Equipment Authorization
pursuant to
Industry Canada RSS-Gen Issue 2 / RSS 210 Issue 7
FCC Part 15, Subpart E
on the
Summit Data Communications Inc.
Transmitter
802.11abg Compact Flash Card model SDC-MCF10AG

UPN:	6616A-SDCMCF10AG
FCC ID:	TWG-SDCMCF10AG
GRANTEE:	Summit Data Communications Inc. 526 South Main St, Suite 805 Akron, OH 44311
TEST SITE(S):	Elliott Laboratories 684 W. Maude Ave Sunnyvale, CA 94086 IC Site Registration #: IC 2845-1
REPORT DATE:	March 26, 2009
FINAL TEST DATE:	February 23, February 26, February 27, March 4, March 6, March 10 and March 12, 2009
AUTHORIZED SIGNATORY:	Mark E. Hill Staff Engineer

ACCREDITED

Testing Cert #2016-01

REVISION HISTORY

Rev #	Date	Comments	Modified By
1	May 13, 2009	First Release	-

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

SCOPE

An electromagnetic emissions test has been performed on the Summit Data Communications Inc. 802.11abg Compact Flash Card model SDC-MCF10AG pursuant to the following rules:

Industry Canada RSS-Gen Issue 2
RSS 210 Issue 7 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
FCC Part 15, Subpart E requirements for UNII Devices (using FCC DA 02-2138, August 30, 2002)

Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in the following reference standards and as outlined in Elliott Laboratories test procedures:

ANSI C63.4:2003
FCC UNII test procedure 2002-08 DA-02-2138, August 2002

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

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

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

The test results recorded herein are based on a single type test of the Summit Data Communications Inc. 802.11abg Compact Flash Card model SDC-MCF10AG and therefore apply only to the tested sample. The sample was selected and prepared by Jerry Pohmurski of Summit Data Communications Inc.

OBJECTIVE

The primary objective of the manufacturer is compliance with the regulations outlined in the previous section.

Prior to marketing in the USA, all unlicensed transmitters and transceivers require certification. Receive-only devices operating between 30 MHz and 960 MHz are subject to either certification or a manufacturer's declaration of conformity, with all other receive-only devices exempt from the technical requirements.

Prior to marketing in Canada, Class I transmitters, receivers and transceivers require certification. Class II devices are required to meet the appropriate technical requirements but are exempt from certification requirements.

Certification is a procedure where the manufacturer submits test data and technical information to a certification body and receives a certificate or grant of equipment authorization upon successful completion of the certification body's review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units, which are subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

STATEMENT OF COMPLIANCE

The tested sample of Summit Data Communications Inc. 802.11abg Compact Flash Card model SDC-MCF10AG complied with the requirements of the following regulations:

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

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

TEST RESULTS SUMMARY

UNII / LELAN DEVICES

Operation in the 5.15 – 5.25 GHz Band

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.407(e)		Indoor operation only	Refer to user's manual	N/A	Complies
15.407(a) (1)		26dB Bandwidth	20.9 MHz	N/A – limits output power if < 20MHz	N/A
15.407 (a) (1)	A9.2(1)	Output Power	12.3 dBm (0.017W)	17dBm	Complies
15.407 (a) (1)		Power Spectral Density	-0.2 dBm/MHz	4 dBm/MHz	Complies
	A9.5 (2)		-0.2 dBm/MHz	5 dBm/MHz	Complies

Operation in the 5.25 – 5.35 GHz Band

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

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(a) (2)		26dB Bandwidth	20.9 MHz	N/A – limits output power if < 20MHz	N/A
15.407(a) (2)	A9.2(2)	Output Power	14.2 dBm (0.026W)	24dBm	Complies
15.407(a) (2))		Power Spectral Density	1.6 dBm/MHz	11 dBm/MHz	Complies
	A9.2(2) / A9.5 (2)	Power Spectral Density		11 dBm / MHz[1]	Complies
	A9.5 (2)	Peak Spectral Density	1.6 dBm/MHz	Shall not exceed the average value by more than 3dB	Complies

Operation in the 5.47 – 5.725 GHz Band

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(a) (2)		26dB Bandwidth	21.0 MHz	N/A – limits output power if < 20MHz	N/A
15.407(a) (2)	A9.2(2)	Output Power	22 dBm (0.159W)	24 dBm / 250mW (eirp < 30dBm)	Complies
15.407(a) (2))		Power Spectral Density	10.1 dBm/MHz	11 dBm/MHz	Complies
	A9.2(2) / A9.5 (2)	Power Spectral Density		11 dBm / MHz[2]	Complies
N/A		Non-operation in 5600 – 5650 MHz sub band	Device cannot operate in the 5600 – 5650 MHz band –refer to Operational Description		Complies

General requirements for all bands

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
	A9.5a	Modulation	Digital Modulation is used (OFDM)	Digital modulation is required	Complies
	RSP 100	99% bandwidth	18.2 MHz	Information only	
15.407(b) (5) / 15.209	A9.3	Spurious Emissions below 1GHz	No radio emissions below 1 GHz detected	Refer to Standard	Complies
15.407(b) (2)	A9.3	Spurious Emissions above 1GHz	50.0dBµV/m @ 11200.7MHz (-4.0dB)	Refer to Standard	Complies
15.407(a)(6)	-	Peak Excursion Ratio	10.9 dB	< 13dB	Complies
	A9.5 (3)	Channel Selection	Spurious emissions tested at outermost channels in each band	Device was tested on the top, bottom and center channels in each band	N/A
15			Measurements on three channels in each band		

[1] Reduced from 11dBm because highest value exceeded the average value by more than 3dB
[2] Reduced from 11dBm because highest value exceeded the average value by more than 3dB

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.407 (c)	A9.5(4)	Operation in the absence of information to transmit	Operation is discontinued in the absence of information	Device shall automatically discontinue operation in the absence of information to transmit	Complies
15.407 (g)	A9.5 (5)	Frequency Stability	Frequency stability is better than 20ppm		Complies
15.407 (h1)	A9.4	Transmit Power Control	TPC is not required as the device operates at below 500mW eirp	The U-NII device shall have the capability to operate with a mean EIRP value lower than 24dBm (250mW)	Complies
15.407 (h2)	A9.4	Dynamic frequency Selection (device without radar detection)	Refer to separate test report, reference R74895	Channel move time < 10s Channel closing transmission time < 260ms	Complies

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	The EUT uses a u.FL connector.		Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	40.9dBµV/m (110.9µV/m) @ 16798.5MHz (-13.1dB)	Refer to standard	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	31.1dBµV @ 0.810MHz (-14.9dB)	Refer to standard	Complies
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11, RSS 102 declaration and User Manual statements.	Refer to OET 65, FCC Part 1 and RSS 102	Complies
	RSP 100 RSS GEN 7.1.5	User Manual		Statement required regarding non-interference	
	RSP 100 RSS GEN 7.1.5	User Manual		Statement required regarding detachable antenna	

MEASUREMENT UNCERTAINTIES

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

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	0.015 to 30	± 3.0
Radiated Emissions	30 to 1000	± 3.6
Radiated Emissions	1000 to 40000	± 6.0

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Summit Data Communications Inc. 802.11abg Compact Flash Card model SDC-MCF10AG is a 802.11ag compliant wireless LAN radio Module which is designed to provide wireless local area networking connectivity. Normally, the EUT would be embedded in various types of mobile and stationary computing devices such as handheld and vehicle mounted data terminals during operation. The EUT was, therefore, placed in this position during emissions testing to simulate the end user environment. The electrical rating of the EUT is 3.3 VDC =/-5%. It's typical power consumption is 400mA (1320mW) while in transmit mode, 180mA (594mW) while in receive mode and 10mA (33mW) while in standby mode.

The sample was received on February 23, 2009 and tested on February 23, February 26, February 27, March 4, March 6, March 10 and March 12, 2009. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number
Summit Data Communications Inc.	MCF10AG	802.11AG Mini Compact Flash Module with antenna connectors	

ANTENNA SYSTEM

The antenna connects to the EUT via a standard u.f1 antenna connector, thereby meeting the requirements of FCC 15.203.

There were two antennas included in the testing:
Laird Centurion, m/n NanoBlade, pcb antenna, 3.8dBi @ 2.45GHz, 5.1dBi @ 5.25GHz, 4.5dBi @ 5.8GHz
Larson, p/n R380.500.314, Omni, 1.6dBi @ 2.4GHz, 5dBi @ 5GHz

ENCLOSURE

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

MODIFICATIONS

The EUT did not require modifications during testing in order to comply with emissions specifications.

SUPPORT EQUIPMENT

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

Manufacturer	Model	Description	Serial Number	FCC ID
Hewlett Packard	iPAQ	Handheld Computer	-	-

EUT INTERFACE PORTS

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

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

EUT OPERATION

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

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on February 23, February 26, February 27, March 4, March 6, March 10 and March 12, 2009 at the test sites listed below. Pursuant to section 2.948 of the FCC's Rules and section 3.3 of RSP-100, construction, calibration, and equipment data has been filed with the Commission and with Industry Canada.

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

ANSI C63.4:2003 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement with the exception, on OATS sites, of predictable local TV, radio, and mobile communications traffic. The test site(s) contain separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4:2003.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.4:2003. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

RADIATED EMISSIONS CONSIDERATIONS

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment or in a semi-anechoic chamber. The test sites are maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4:2003 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4:2003.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements. If the repetition frequency of the signal being measured is below 20Hz, peak measurements are made in lieu of Quasi-Peak measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz, unless the signal is pulsed in which case the average (or video) bandwidth of the measuring instrument is reduced to onset of pulse desensitization and then increased.

INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde & Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer run automated data collection programs which control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

Line conducted measurements utilize a fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the receiving antenna or LISN and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

ANTENNAS

A loop antenna is used below 30 MHz. For the measurement range 30 MHz to 1000 MHz either a combination of a biconical antenna and a log periodic or a bi-log antenna is used. Above 1000 MHz, horn antennas are used. The antenna calibration factors to convert the received voltage to an electric field strength are included with appropriate cable loss and amplifier gain factors to determine an overall site factor, which is then programmed into the test receivers or incorporated into the test software.

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height. Measurements below 30 MHz are made with the loop antenna at a fixed height of 1m above the ground plane.

ANSI C63.4:2003 specifies that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

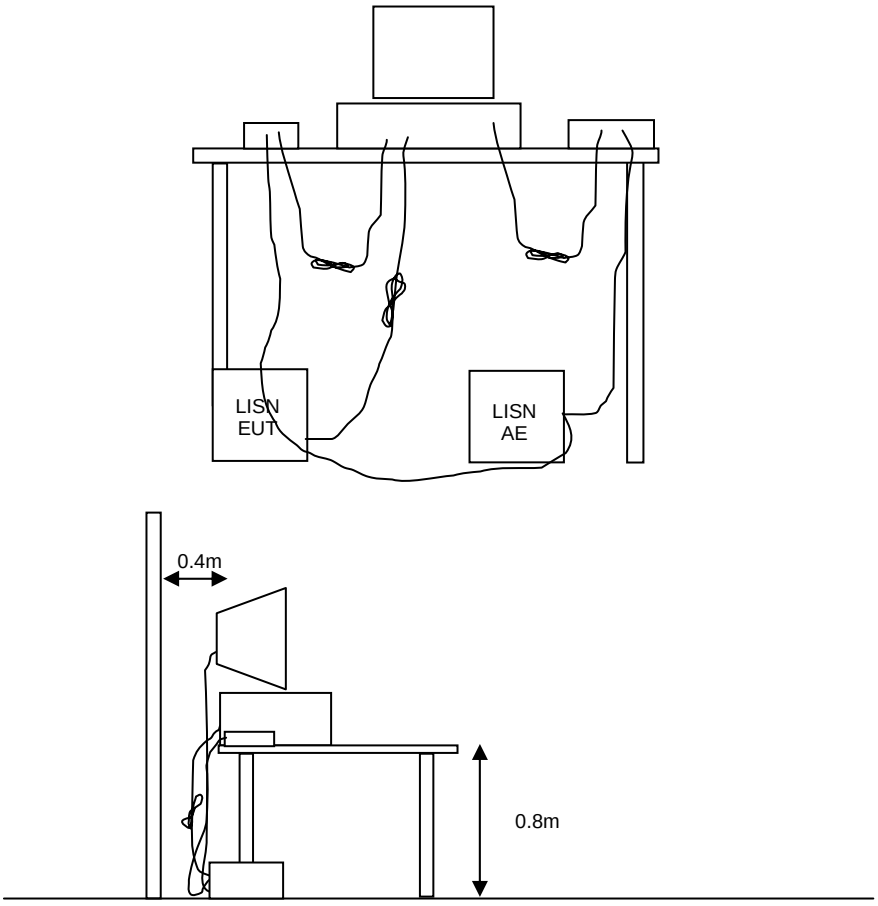
TEST PROCEDURES

EUT AND CABLE PLACEMENT

The regulations require that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.4:2003, and the worst-case orientation is used for final measurements.

CONDUCTED EMISSIONS

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord.

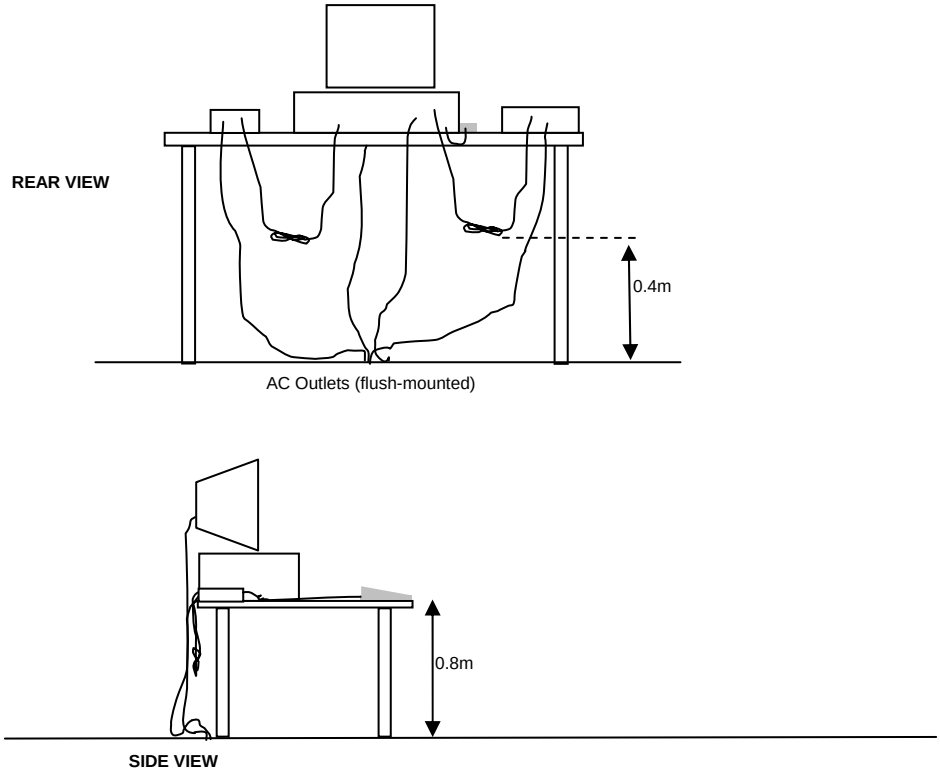


A preliminary scan of the radiated emissions is performed in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed, one scan for each antenna polarization (horizontal and vertical; loop parallel and perpendicular to the EUT).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

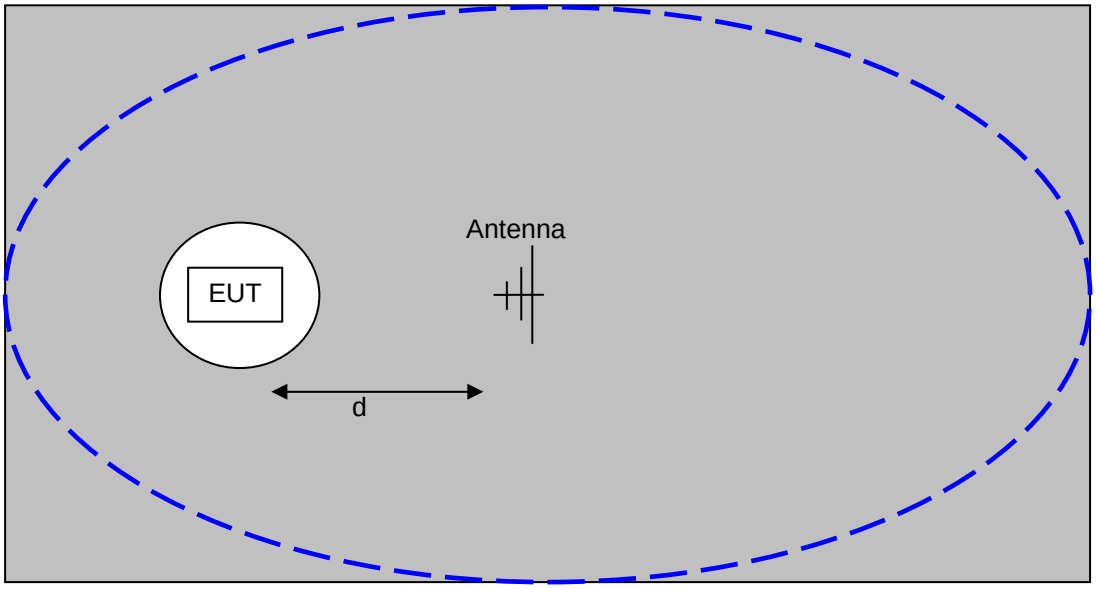
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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

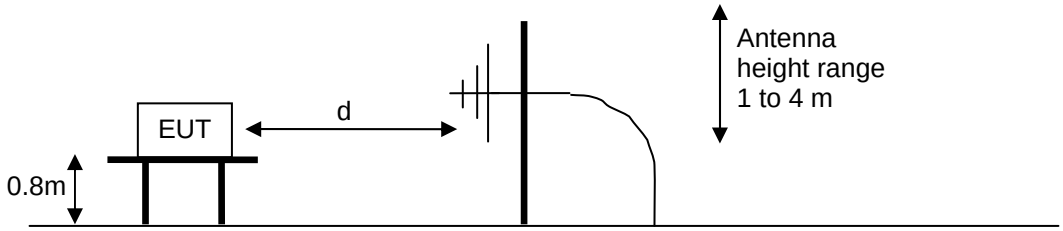
When testing above 18 GHz, the receive antenna is located at 1meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.



Typical Test Configuration for Radiated Field Strength Measurements



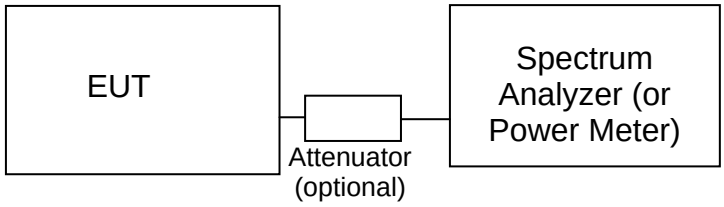
The ground plane extends beyond the ellipse defined in CISPR 16 / CISPR 22 / ANSI C63.4 and is large enough to accommodate test distances (d) of 3m and 10m. Refer to the test data tables for the actual measurement distance.



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

CONDUCTED EMISSIONS FROM ANTENNA PORT

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



Test Configuration for Antenna Port Measurements

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

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

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

BANDWIDTH MEASUREMENTS

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

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

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

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

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

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

FCC 15.407 (a) OUTPUT POWER LIMITS

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

Operating Frequency (MHz)	Output Power	Power Spectral Density
5150 - 5250	50mW (17 dBm)	4 dBm/MHz
5250 - 5350	250 mW (24 dBm)	11 dBm/MHz
5725 – 5825	1 Watts (30 dBm)	17 dBm/MHz

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

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

The peak excursion envelope is limited to 13dB.

OUTPUT POWER LIMITS –LELAN DEVICES

The table below shows the limits for output power and output power density defined by RSS 210. Where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

Operating Frequency (MHz)	Output Power	Power Spectral Density
5150 - 5250	200mW (23 dBm) eirp	10 dBm/MHz eirp
5250 - 5350	250 mW (24 dBm)[1] 1W (30dBm) eirp	11 dBm/MHz
5470 - 5725	250 mW (24 dBm)[2] 1W (30dBm) eirp	11 dBm/MHz
5725 – 5825	1 Watts (30 dBm) 4W eirp	17 dBm/MHz

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

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

OUTPUT POWER AND SPURIOUS LIMITS –UNII and LELAN DEVICES

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

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

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

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

$$R_r - S = M$$

where:

R_r = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

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

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

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

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

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

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

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION

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

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

where P is the eirp (Watts)

EXHIBIT 1: Test Equipment Calibration Data

2 Pages

Radiated Emissions, 1000 - 26,500 MHz, 24-Feb-09
Engineer: Rafael Varelas

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	06-Jun-09
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	15-Jul-10
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	12-Mar-10
Hewlett Packard	High Pass filter, 3.5 GHz (Red System)	P/N 84300-80038 (84125C)	1403	28-Aug-09

Radio Spurious Emissions, 26-Feb-09
Engineer: Suhaila Khushzad

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	09-Oct-09
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	15-Jul-10
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	12-Mar-10

Radio Spurious Emissions, 27-Feb-09
Engineer: Suhaila Khushzad

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	09-Oct-09
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	15-Jul-10
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Mar-09

Radiated Emissions, 1,000 - 18,000 MHz, 04-Mar-09
Engineer: Mehran Birgani

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	09-Oct-09
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	15-Jul-10
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Mar-09

, 10-Mar-09
Engineer: Suhaila Khushzad

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	Test Sys (SA40, 30Hz - 40GHz),	85620A	Rental	20-Apr-09

, 12-Mar-09
Engineer: Suhaila Khushzad

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	Test Sys (SA40, 30Hz - 40GHz),	85620A	Rental	20-Apr-09

EXHIBIT 2: Test Measurement Data

T74642 34 Pages
T74643 30 Pages

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Emissions Standard(s):	FCC 15.E/RSS 210	Class:	-
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Summit Data Communications

Model

802.11abg Compact Flash Card

Date of Last Test: 3/9/2009

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manger:	Christine Krebill
Contact:	Jerry Pohmurski		
Emissions Standard(s):	FCC 15.E/RSS 210	Class:	-
Immunity Standard(s):	-	Environment:	-

EUT INFORMATION

The following information was collected during the test session(s).
The client agreed to provide the following information after the test session(s).

General Description

The EUT is a 802.11ag compliant wireless LAN radio Module which is designed to provide wireless local area networking connectivity. Normally, the EUT would be embedded in various types of mobile and stationary computing devices such as handheld and vehicle mounted data terminals during operation. The EUT was, therefore, placed in this position during emissions testing to simulate the end user environment. The electrical rating of the EUT is 3.3 VDC =/-5%. It's typical power consumption is 400mA (1320mW) while in transmit mode, 180mA (594mW) while in receive mode and 10mA (33mW) while in standby mode.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Summit Data Communications Inc.	MCF10AG	802.11AG Mini Compact Flash Module with antenna connectors		TWG-SDCMCF10AG

EUT Antenna (Intentional Radiators Only)

The antenna connects to the EUT via a standard u.f1 antenna connector, thereby meeting the requirements of FCC 15.203.
There were two antennas included in the testing:
Laird Centurion, m/n NanoBlade, pcb antenna, 3.8dBi @ 2.45GHz, 5.1dBi @ 5.25GHz, 4.5dBi @ 5.8GHz
Larson, p/n R380.500.314, Omni, 1.6dBi @ 2.4GHz, 5dBi @ 5GHz

EUT Enclosure

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

Modification History

Mod. #	Test	Date	Modification
1			No modifications were made to the EUT during testing.
2			
3			

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manger:	Christine Krebill
Contact:	Jerry Pohmurski		
Emissions Standard(s):	FCC 15.E/RSS 210	Class:	-
Immunity Standard(s):	-	Environment:	-

Test Configuration #1

The following information was collected during the test session(s).
The client agreed to provide the following information after the test session(s).

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Hewlett Packard	iPAQ	Handheld Computer	-	-

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None	-	-	-	-

Cabling and Ports

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

EUT Operation During Emissions Tests

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

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

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

Test Specific Details

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

General Test Configuration

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

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

Summary of Results

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

Run #	Mode	Channel	Power Setting	Port	Test Performed	Limit	Result / Margin
1	802.11a Chain A	5150-5250 Low	100%	Aux	Restricted Band Edge at 5150 MHz	15.209	49.4dBµV/m @ 5147.0MHz (-4.6dB)
	802.11a Chain A	5150-5250 Low	100%	Aux	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	39.2dBµV/m @ 15557.1MHz (-14.8dB)
	802.11a Chain A	5150-5250 Center	100%	Aux	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	39.3dBµV/m @ 15579.5MHz (-14.7dB)
	802.11a Chain A	5150-5250 High	100%	Aux	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	38.9dBµV/m @ 15700.5MHz (-15.1dB)
2	802.11a Chain A	5250-5350 Low	100%	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	40.4dBµV/m @ 15778.5MHz (-13.6dB)
	802.11a Chain A	5250-5350 Center	100%	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	47.1dBµV/m @ 10600.2MHz (-6.9dB)
	802.11a Chain A	5250-5350 High	100%	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	48.2dBµV/m @ 10640.0MHz (-5.8dB)
	802.11a Chain A	5250-5350 High	100%	Main	Restricted Band Edge at 5350 MHz	15.209	49.7dBµV/m @ 5350.0MHz (-4.3dB)

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

3	802.11a Chain A	5470-5725 Low	100%	Main	Restricted Band Edge at 5460 MHz	15.209	49.7dBµV/m @ 5457.9MHz (-4.3dB)
	802.11a Chain A	5470-5725 Low	100%	Main	Restricted Band Edge at 5470 MHz	15.209	49.7dBµV/m @ 5469.3MHz (-18.6dB)
	802.11a Chain A	5470-5725 Low	100%	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	44.6dBµV/m @ 11000.2MHz (-9.4dB)
	802.11a Chain A	5470-5725 Center	100%	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	50.0dBµV/m @ 11200.7MHz (-4.0dB)
	802.11a Chain A	5470-5725 High	100%	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	39.4dBµV/m @ 11398.1MHz (-14.6dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

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

Date of Test: 2/23&26/2009 Config. Used: 1
Test Engineer: Rafael Varelas & Suhaila Config Change: None
Test Location: SV OATS #1 Host Unit Voltage 120V/60Hz

Ambient Conditions: Temperature: 12 °C
Rel. Humidity: 89 %

Run #1a: Low Channel @ 5180 MHz

Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5184.800	80.9	H	-	-	AVG	87	1.0	RB 1 MHz; VB: 10 Hz
5184.900	89.0	H	-	-	PK	87	1.0	RB 1 MHz; VB: 1 MHz
5185.670	94.4	V	-	-	AVG	357	1.0	RB 1 MHz; VB: 10 Hz
5184.900	102.7	V	-	-	PK	357	1.0	RB 1 MHz; VB: 1 MHz

5150 MHz Band Edge Signal Radiated Field Strength

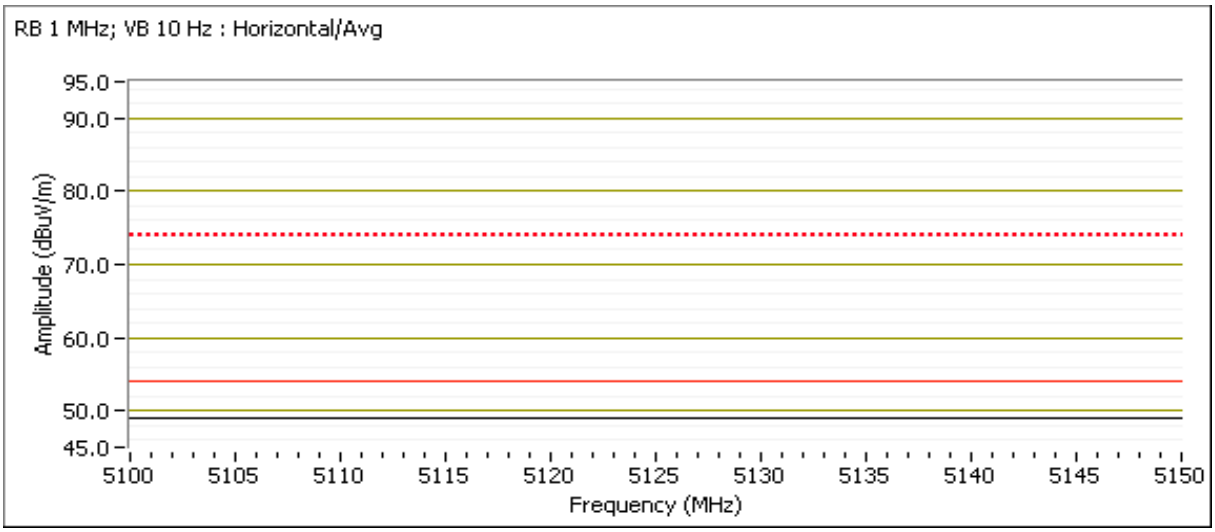
Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5147.000	49.4	V	54.0	-4.6	Avg	357	1.0	RB 1 MHz; VB: 10 Hz
5149.440	62.1	V	74.0	-11.9	PK	357	1.0	RB 1 MHz; VB: 1 MHz
5147.010	49.1	H	54.0	-4.9	Avg	87	1.0	RB 1 MHz; VB: 10 Hz
5147.610	61.6	H	74.0	-12.4	PK	87	1.0	RB 1 MHz; VB: 1 MHz

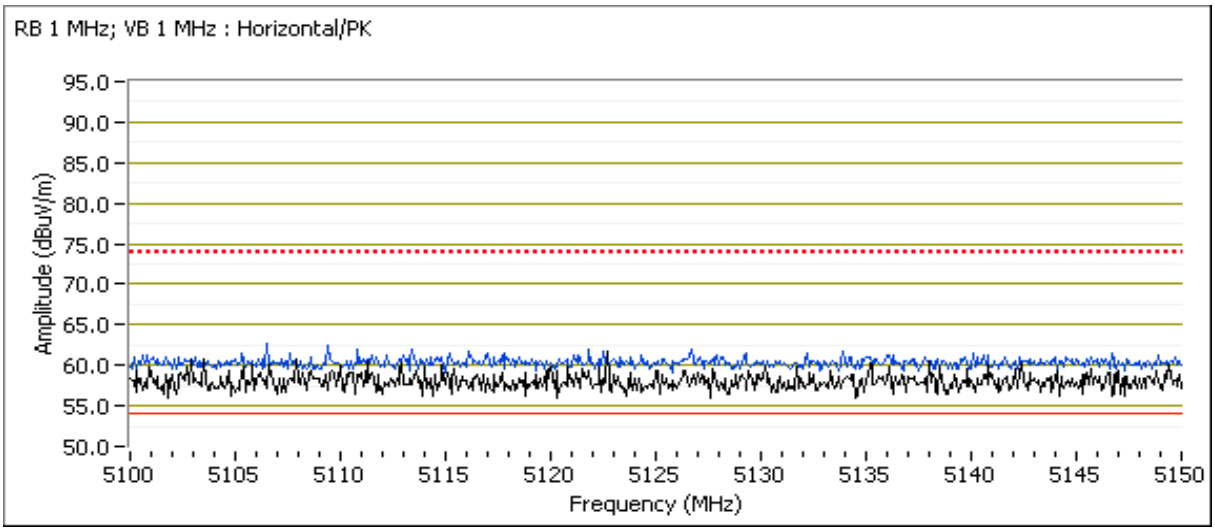
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
15557.060	39.2	H	54.0	-14.8	AVG	157	1.0	RB 1 MHz; VB: 10 Hz
15534.340	49.5	H	74.0	-24.5	PK	157	1.0	RB 1 MHz; VB: 1 MHz
10526.080	41.5	V	68.3	-26.8	AVG	134	1.1	RB 1 MHz; VB: 10 Hz
10527.740	61.2	V	88.3	-27.1	PK	134	1.1	RB 1 MHz; VB: 1 MHz
15557.200	39.1	V	54.0	-14.9	AVG	108	1.0	RB 1 MHz; VB: 10 Hz
15543.510	50.8	V	74.0	-23.2	PK	108	1.0	RB 1 MHz; VB: 1 MHz
10361.500	39.3	H	68.3	-29.0	AVG	216	1.0	RB 1 MHz; VB: 10 Hz
10360.240	50.4	H	88.3	-37.9	PK	216	1.0	RB 1 MHz; VB: 1 MHz

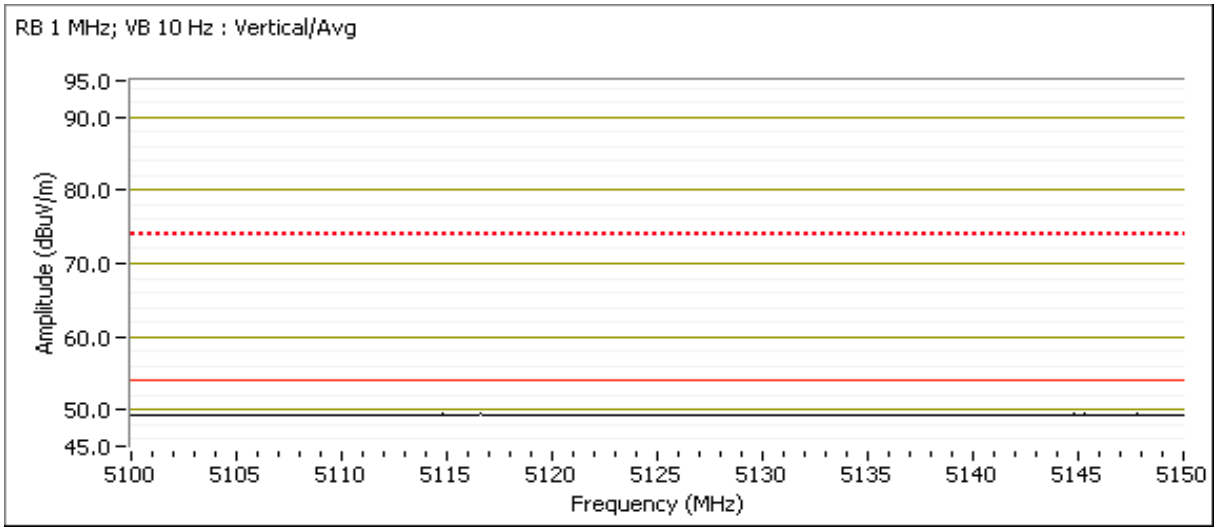
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the average limit was set to -27dBm/MHz (~68dBuV/m).

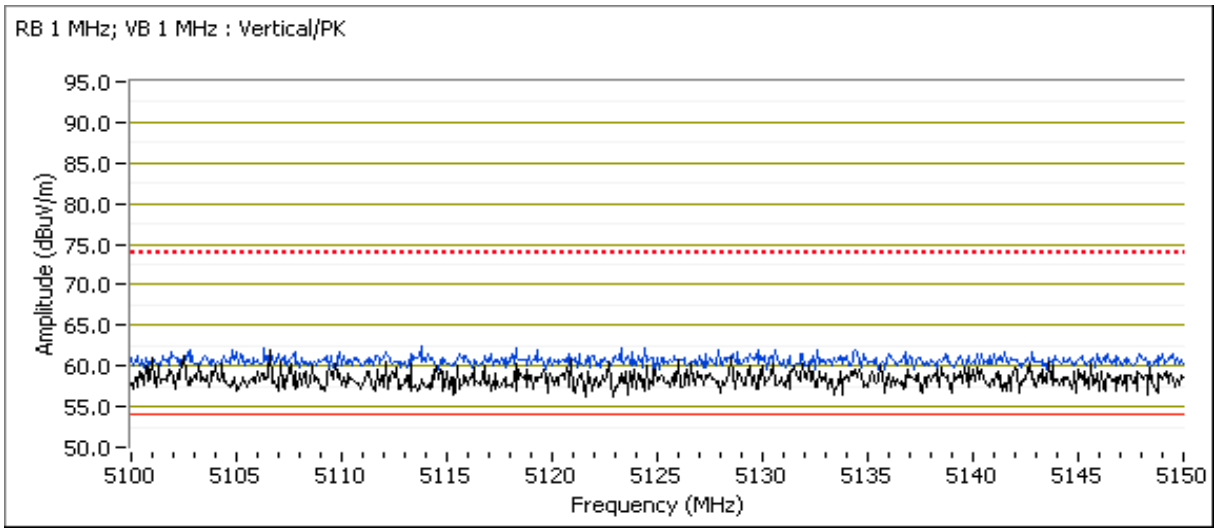
Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A





Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A





Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

Run #1b: Center Channel @ 5200 MHz

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
15579.470	39.3	V	54.0	-14.7	AVG	217	1.0	RB 1 MHz; VB: 10 Hz
15617.540	50.8	V	74.0	-23.2	PK	217	1.0	RB 1 MHz; VB: 1 MHz
10400.410	44.2	V	68.3	-24.1	AVG	279	1.5	RB 1 MHz; VB: 10 Hz
10397.320	54.5	V	88.3	-33.8	PK	279	1.5	RB 1 MHz; VB: 1 MHz
15578.500	39.1	H	54.0	-14.9	AVG	59	1.0	RB 1 MHz; VB: 10 Hz
15602.970	50.2	H	74.0	-23.8	PK	59	1.0	RB 1 MHz; VB: 1 MHz
10400.230	41.3	H	68.3	-27.0	AVG	112	1.6	RB 1 MHz; VB: 10 Hz
10404.910	52.2	H	88.3	-36.1	PK	112	1.6	RB 1 MHz; VB: 1 MHz

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

Run #1c: High Channel @ 5240 MHz

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
15700.500	38.9	H	54.0	-15.1	AVG	12	2.5	RB 1 MHz; VB: 10 Hz
15740.270	49.9	H	74.0	-24.1	PK	12	2.5	RB 1 MHz; VB: 1 MHz
10480.300	43.6	V	68.3	-24.7	AVG	100	1.6	RB 1 MHz; VB: 10 Hz
10479.000	55.6	V	88.3	-32.7	PK	100	1.6	RB 1 MHz; VB: 1 MHz
15700.500	38.8	V	54.0	-15.2	AVG	83	1.0	RB 1 MHz; VB: 10 Hz
15735.210	50.1	V	74.0	-23.9	PK	83	1.0	RB 1 MHz; VB: 1 MHz
10480.020	38.3	H	68.3	-30.0	AVG	149	1.0	RB 1 MHz; VB: 10 Hz
10498.820	58.6	H	88.3	-29.7	PK	149	1.0	RB 1 MHz; VB: 1 MHz

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

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

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

Date of Test: 2/26/2009 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: SVOATS #1 Host Unit Voltage 120V/60Hz

Ambient Conditions: Temperature: 11 °C
Rel. Humidity: 91 %

Run #2a: Low Channel

Spurious Radiated Emissions:

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

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
15778.500	40.4	V	54.0	-13.6	AVG	0	1.0	RB 1 MHz; VB: 10 Hz
15778.500	40.4	H	54.0	-13.6	AVG	0	1.0	RB 1 MHz; VB: 10 Hz
15779.990	52.3	V	74.0	-21.7	PK	0	1.0	RB 1 MHz; VB: 1 MHz
15779.680	51.5	H	74.0	-22.5	PK	0	1.0	RB 1 MHz; VB: 1 MHz
10520.000	45.5	V	68.3	-22.8	AVG	110	1.8	RB 1 MHz; VB: 10 Hz
10518.500	42.7	H	68.3	-25.6	AVG	197	1.8	RB 1 MHz; VB: 10 Hz
10518.670	62.1	H	88.3	-26.2	PK	197	1.8	RB 1 MHz; VB: 1 MHz
10518.540	57.9	V	88.3	-30.4	PK	110	1.8	RB 1 MHz; VB: 1 MHz

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

Run #2b: Center Channel

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
10600.210	47.1	V	54.0	-6.9	AVG	213	1.4	RB 1 MHz; VB: 10 Hz
15898.500	41.6	V	54.0	-12.4	AVG	354	1.8	RB 1 MHz; VB: 10 Hz
15898.500	41.6	H	54.0	-12.4	AVG	199	1.6	RB 1 MHz; VB: 10 Hz
10601.500	40.4	H	54.0	-13.6	AVG	176	1.0	RB 1 MHz; VB: 10 Hz
10600.410	58.8	V	74.0	-15.2	PK	213	1.4	RB 1 MHz; VB: 1 MHz
15898.650	53.5	H	74.0	-20.5	PK	199	1.6	RB 1 MHz; VB: 1 MHz
15901.040	52.8	V	74.0	-21.2	PK	354	1.8	RB 1 MHz; VB: 1 MHz
10599.510	51.5	H	88.3	-36.8	PK	176	1.0	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the average limit was set to -27dBm/MHz (~68dBuV/m).
Note 2:	

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

Run #2c: High Channel

Date of Test: 2/23/2009 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: SV OATS #1 Host Unit Voltage 120V/60Hz

Ambient Conditions: Temperature: 12 °C
Rel. Humidity: 89 %

Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5317.030	95.5	V	-	-	AVG	0	1.0	RB 1 MHz; VB: 10 Hz
5318.670	104.2	V	-	-	PK	0	1.0	RB 1 MHz; VB: 1 MHz
5313.900	82.1	H	-	-	AVG	55	1.0	RB 1 MHz; VB: 10 Hz
5313.770	90.5	H	-	-	PK	55	1.0	RB 1 MHz; VB: 1 MHz

5350 MHz Band Edge Signal Radiated Field Strength

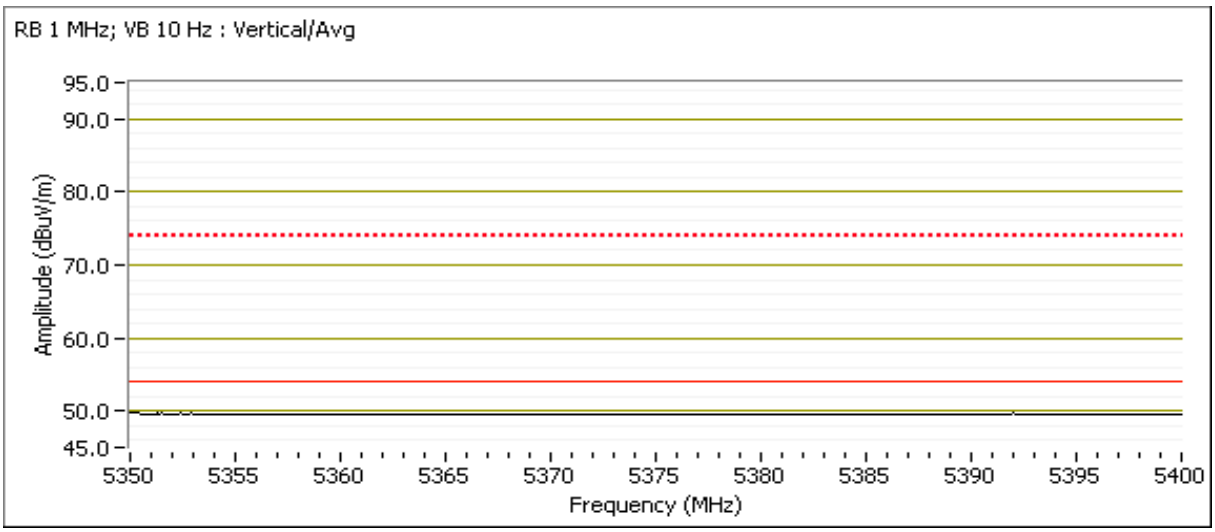
Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.000	49.7	V	54.0	-4.3	Avg	0	1.0	RB 1 MHz; VB: 10 Hz
5351.180	62.3	V	74.0	-11.7	PK	0	1.0	RB 1 MHz; VB: 1 MHz
5351.950	49.4	H	54.0	-4.6	Avg	55	1.0	RB 1 MHz; VB: 10 Hz
5350.050	61.9	H	74.0	-12.1	PK	55	1.0	RB 1 MHz; VB: 1 MHz

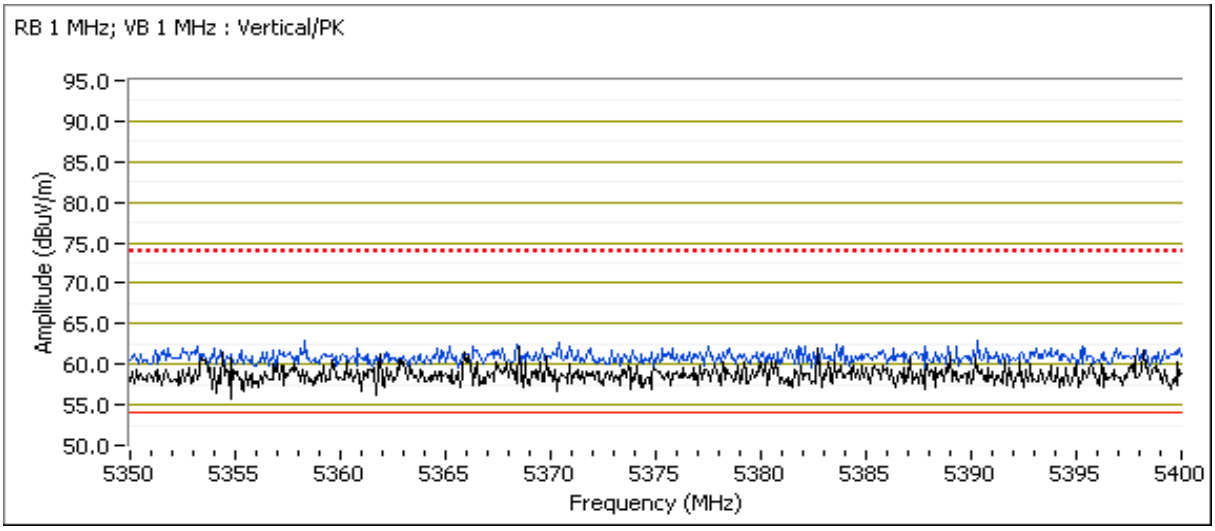
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
10639.960	48.2	V	54.0	-5.8	AVG	302	1.4	RB 1 MHz; VB: 10 Hz
10640.160	44.5	H	54.0	-9.5	AVG	255	1.6	RB 1 MHz; VB: 10 Hz
15958.500	41.4	H	54.0	-12.6	AVG	360	1.0	RB 1 MHz; VB: 10 Hz
15958.500	41.4	V	54.0	-12.6	AVG	336	1.0	RB 1 MHz; VB: 10 Hz
10638.710	60.0	V	74.0	-14.0	PK	302	1.4	RB 1 MHz; VB: 1 MHz
10638.590	56.4	H	74.0	-17.6	PK	255	1.6	RB 1 MHz; VB: 1 MHz
15958.860	52.9	V	74.0	-21.1	PK	336	1.0	RB 1 MHz; VB: 1 MHz
15959.210	52.8	H	74.0	-21.2	PK	360	1.0	RB 1 MHz; VB: 1 MHz

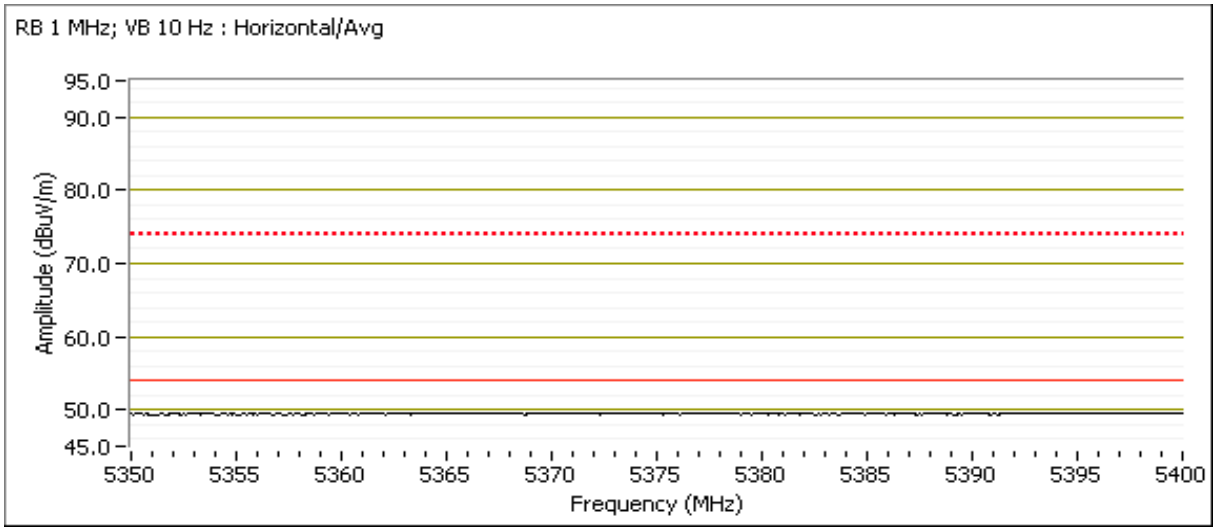
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the average limit was set to -27dBm/MHz (~68dBuV/m).

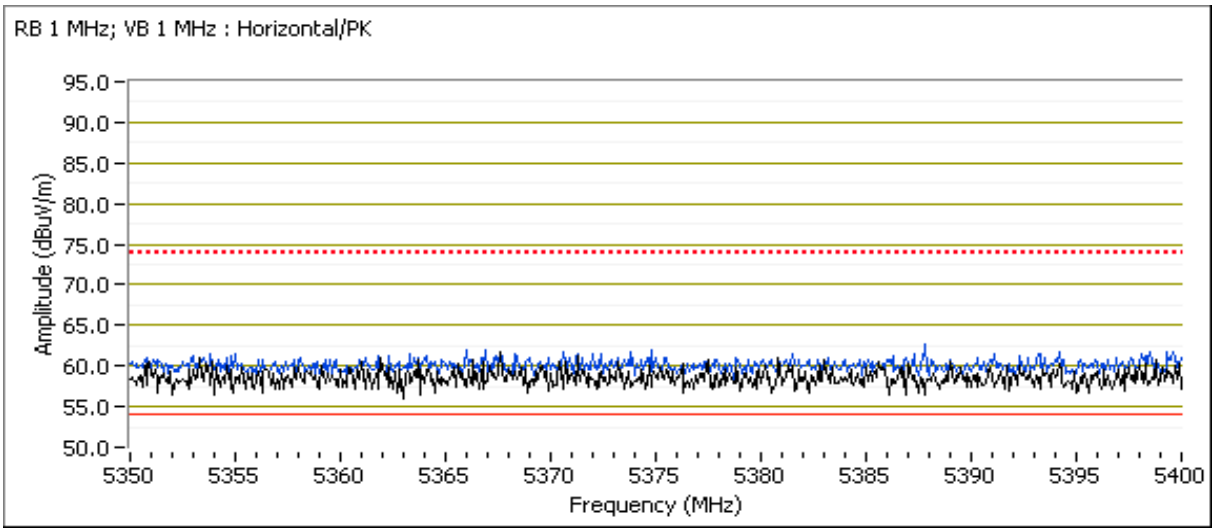
Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A





Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A





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

Date of Test:	2/23&272009	Config. Used:	1
Test Engineer:	Rafael Varelas & Suhaila	Config Change:	None
Test Location:	SV OATS #1	Host Unit Voltage	120V/60Hz

Ambient Conditions:

Temperature:	12 °C
Rel. Humidity:	89 %

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

Run #3a: Low Channel

Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5496.400	80.8	H	-	-	AVG	71	1.0	RB 1 MHz; VB: 10 Hz
5505.070	90.1	H	-	-	PK	71	1.0	RB 1 MHz; VB: 1 MHz
5495.570	93.3	V	-	-	AVG	301	1.0	RB 1 MHz; VB: 10 Hz
5501.670	103.2	V	-	-	PK	301	1.0	RB 1 MHz; VB: 1 MHz

5350-5460 MHz Restricted Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5457.920	49.7	V	54.0	-4.3	Avg	301	1.0	RB 1 MHz; VB: 10 Hz
5459.940	62.6	V	74.0	-11.4	PK	301	1.0	RB 1 MHz; VB: 1 MHz
5457.060	49.5	H	54.0	-4.5	Avg	71	1.0	RB 1 MHz; VB: 10 Hz
5458.230	61.4	H	74.0	-12.6	PK	71	1.0	RB 1 MHz; VB: 1 MHz

5460-5470 MHz Restricted Band Edge Signal Radiated Field Strength

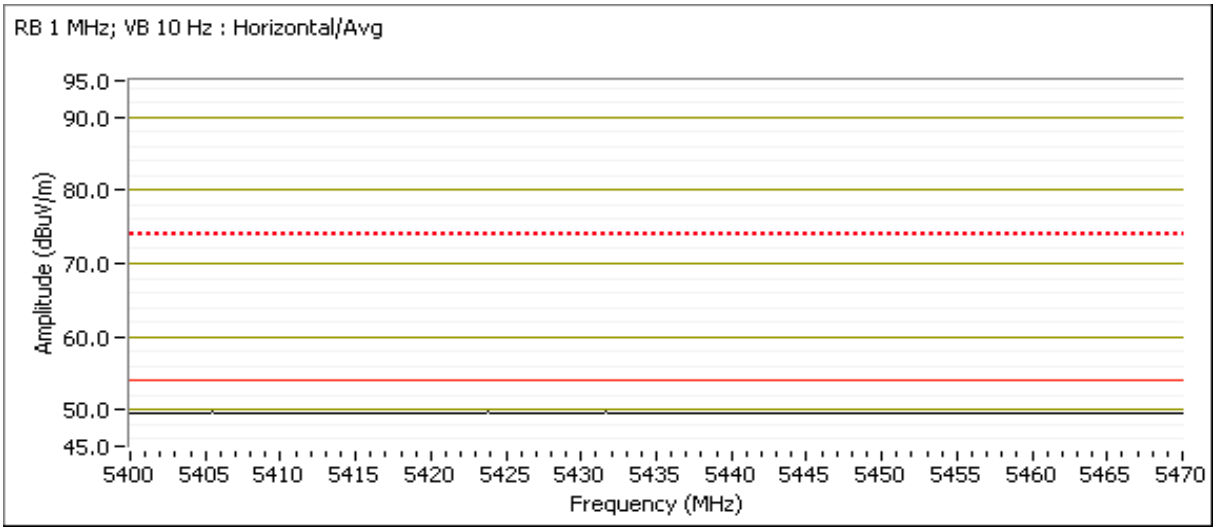
Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5469.290	49.7	V	68.3	-18.6	Avg	301	1.0	RB 1 MHz; VB: 10 Hz
5467.870	62.6	V	88.3	-25.7	PK	301	1.0	RB 1 MHz; VB: 1 MHz
5467.170	49.5	H	68.3	-18.8	Avg	71	1.0	RB 1 MHz; VB: 10 Hz
5467.670	61.6	H	88.3	-26.7	PK	71	1.0	RB 1 MHz; VB: 1 MHz

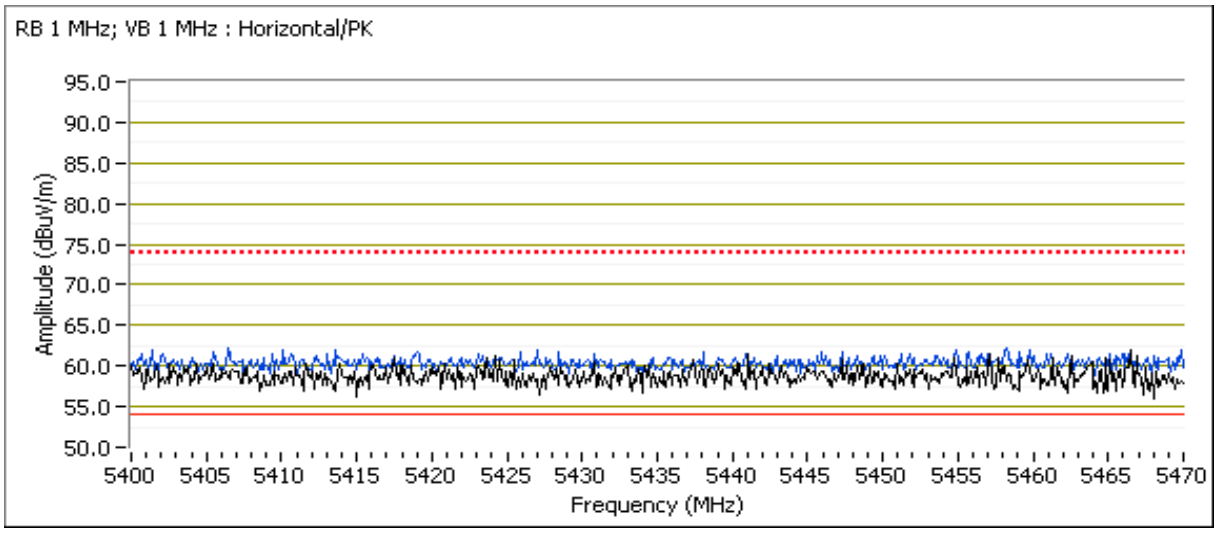
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11000.230	44.6	V	54.0	-9.4	AVG	134	1.5	RB 1 MHz; VB: 10 Hz
11012.970	39.1	H	54.0	-14.9	AVG	54	1.0	RB 1 MHz; VB: 10 Hz
11002.440	56.9	V	74.0	-17.1	PK	134	1.5	RB 1 MHz; VB: 1 MHz
10978.720	51.0	H	74.0	-23.0	PK	54	1.0	RB 1 MHz; VB: 1 MHz
16508.270	40.4	H	68.3	-27.9	AVG	324	1.0	RB 1 MHz; VB: 10 Hz
16510.920	40.4	V	68.3	-27.9	AVG	126	1.0	RB 1 MHz; VB: 10 Hz
16484.510	51.6	H	88.3	-36.7	PK	324	1.0	RB 1 MHz; VB: 1 MHz
16508.090	51.0	V	88.3	-37.3	PK	126	1.0	RB 1 MHz; VB: 1 MHz

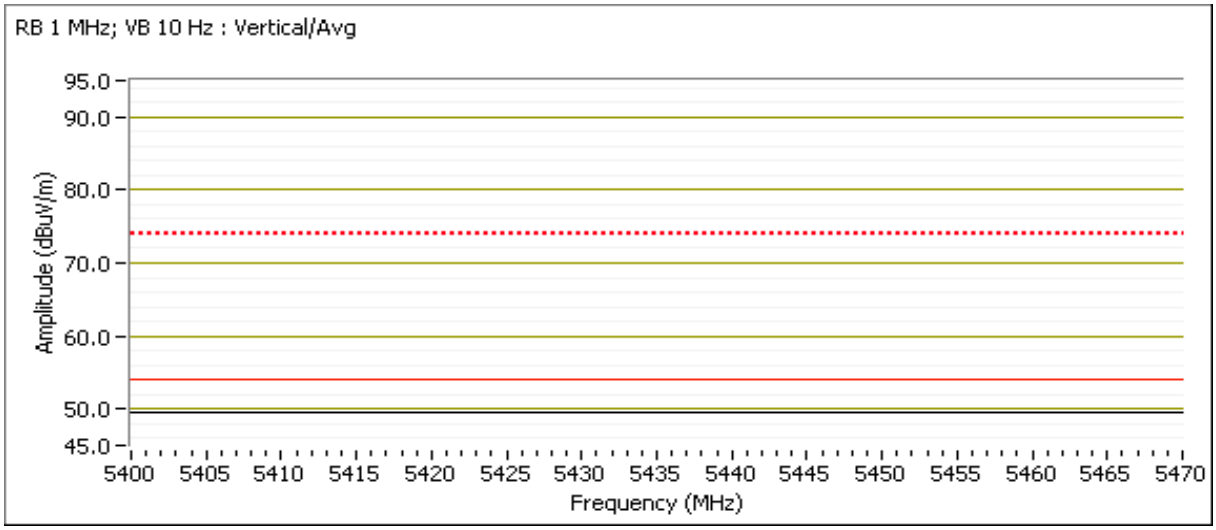
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the average limit was set to -27dBm/MHz (~68dBuV/m).

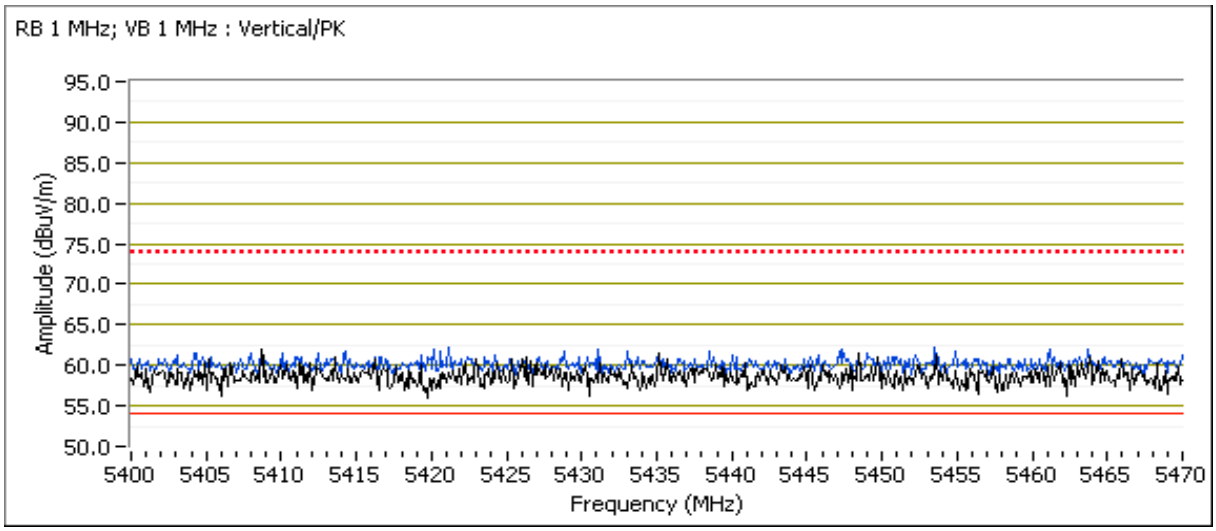
Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A





Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A





Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

Run #3b: Center Channel

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11200.670	50.0	V	54.0	-4.0	AVG	314	1.3	RB 1 MHz; VB: 10 Hz
11200.320	46.3	H	54.0	-7.7	AVG	263	1.5	RB 1 MHz; VB: 10 Hz
11202.440	65.5	V	74.0	-8.5	PK	314	1.3	RB 1 MHz; VB: 1 MHz
11202.790	61.4	H	74.0	-12.6	PK	263	1.5	RB 1 MHz; VB: 1 MHz
16778.500	41.9	H	68.3	-26.4	AVG	355	1.0	RB 1 MHz; VB: 10 Hz
16778.500	41.8	V	68.3	-26.5	AVG	27	1.0	RB 1 MHz; VB: 10 Hz
16820.020	52.8	V	88.3	-35.5	PK	27	1.0	RB 1 MHz; VB: 1 MHz
16778.680	52.7	H	88.3	-35.6	PK	355	1.0	RB 1 MHz; VB: 1 MHz

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

Run #3c: High Channel

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11398.110	39.4	H	54.0	-14.6	AVG	252	1.0	RB 1 MHz; VB: 10 Hz
11399.080	39.1	V	54.0	-14.9	AVG	347	1.0	RB 1 MHz; VB: 10 Hz
11419.750	50.8	V	74.0	-23.2	PK	347	1.0	RB 1 MHz; VB: 1 MHz
11382.740	50.4	H	74.0	-23.6	PK	252	1.0	RB 1 MHz; VB: 1 MHz
17081.590	43.9	H	68.3	-24.4	AVG	203	1.0	RB 1 MHz; VB: 10 Hz
17081.770	43.9	V	68.3	-24.4	AVG	332	1.0	RB 1 MHz; VB: 10 Hz
17101.470	55.7	V	88.3	-32.6	PK	332	1.0	RB 1 MHz; VB: 1 MHz
17082.120	55.0	H	88.3	-33.3	PK	203	1.0	RB 1 MHz; VB: 1 MHz

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

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

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

Test Specific Details

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

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. All remote support equipment was located approximately 30 meters from the EUT with all I/O connections running on top of the groundplane or routed in overhead in the GR-1089 test configuration.

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

Summary of Results

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

Run #	Mode	Channel	Power Setting	Port	Test Performed	Limit	Result / Margin
1	802.11a Chain A	5150-5250 Low	100%	Aux	Restricted Band Edge at 5150 MHz	15.209	49.4dBµV/m @ 5148.2MHz (-4.6dB)
	802.11a Chain A	5150-5250 Low	100%	Aux	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	39.3dBµV/m @ 15575.7MHz (-14.7dB)
	802.11a Chain A	5150-5250 Center	100%	Aux	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	39.3dBµV/m @ 15578.7MHz (-14.7dB)
	802.11a Chain A	5150-5250 High	100%	Aux	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	39.2dBµV/m @ 15748.8MHz (-14.8dB)
2	802.11a Chain A	5250-5350 Low	100%	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	80.0dBµV/m @ 10521.7MHz (-8.3dB)
	802.11a Chain A	5250-5350 Center	100%	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	42.2dBµV/m @ 10600.3MHz (-11.8dB)
	802.11a Chain A	5250-5350 High	100%	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	44.6dBµV/m @ 10640.0MHz (-9.4dB)
	802.11a Chain A	5250-5350 High	100%	Main	Restricted Band Edge at 5350 MHz	15.209	49.7dBµV/m @ 5350.0MHz (-4.3dB)

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

3	802.11a Chain A	5470-5725 Low	100%	Main	Restricted Band Edge at 5460 MHz	15.209	49.5dBµV/m @ 5457.0MHz (-4.5dB)
	802.11a Chain A	5470-5725 Low	100%	Main	Restricted Band Edge at 5470 MHz	15.209	49.6dBµV/m @ 5467.4MHz (-18.7dB)
	802.11a Chain A	5470-5725 Low	100%	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	45.0dBµV/m @ 10998.2MHz (-9.0dB)
	802.11a Chain A	5470-5725 Center	100%	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	47.5dBµV/m @ 11201.3MHz (-6.5dB)
	802.11a Chain A	5470-5725 High	100%	Main	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	39.1dBµV/m @ 11403.5MHz (-14.9dB)

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:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

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

Date of Test: 2/23&26/2009 Config. Used: 1
Test Engineer: Rafael Varelas & Suhaila Config Change: None
Test Location: SV OATS #1 Host Unit Voltage 120V/60Hz

Ambient Conditions: Temperature: 12 °C
Rel. Humidity: 89 %

Run #1a: Low Channel

Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5175.300	88.5	V	-	-	AVG	136	1.5	RB 1 MHz; VB: 10 Hz
5174.630	96.6	V	-	-	PK	136	1.5	RB 1 MHz; VB: 1 MHz
5184.200	89.0	H	-	-	AVG	67	1.0	RB 1 MHz; VB: 10 Hz
5185.030	97.4	H	-	-	PK	67	1.0	RB 1 MHz; VB: 1 MHz

5150 MHz Band Edge Signal Radiated Field Strength

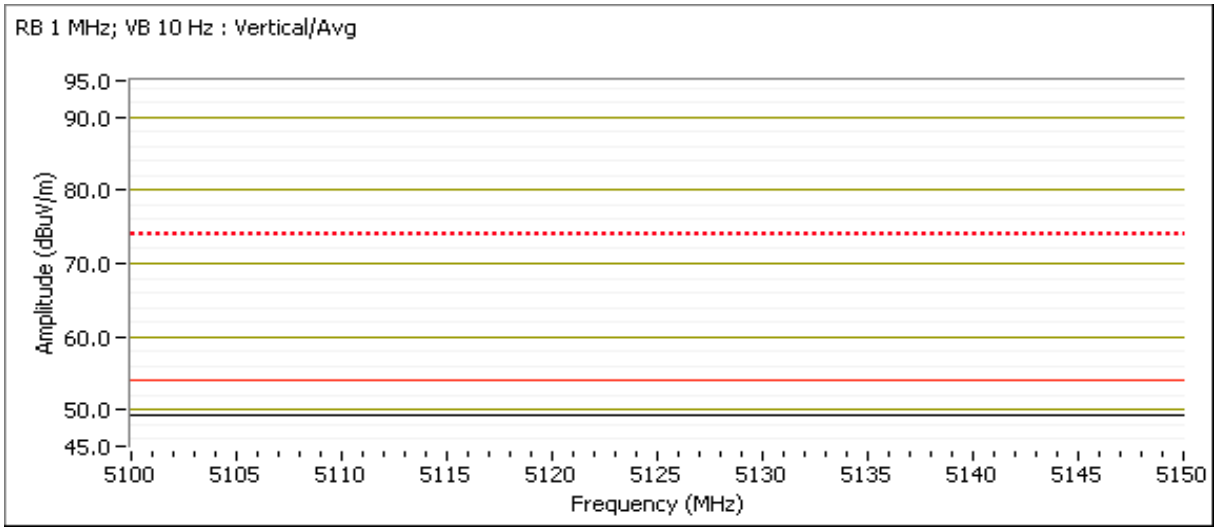
Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5148.190	49.4	V	54.0	-4.6	Avg	136	1.5	RB 1 MHz; VB: 10 Hz
5149.750	62.0	V	74.0	-12.0	PK	136	1.5	RB 1 MHz; VB: 1 MHz
5147.040	49.4	H	54.0	-4.6	Avg	67	1.0	RB 1 MHz; VB: 10 Hz
5148.920	61.6	H	74.0	-12.4	PK	67	1.0	RB 1 MHz; VB: 1 MHz

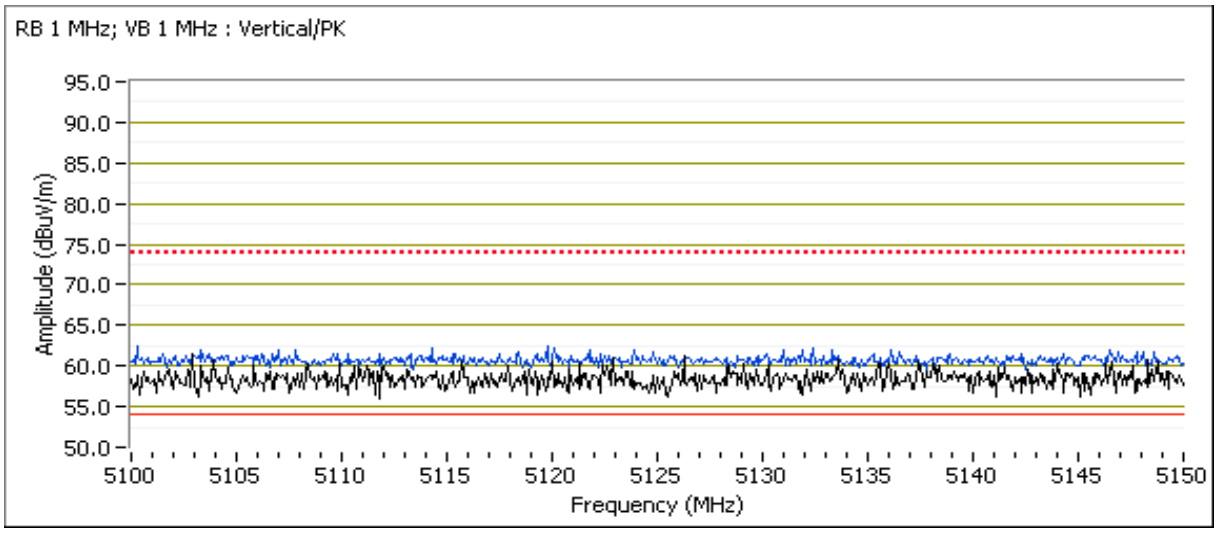
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
15575.700	39.3	V	54.0	-14.7	AVG	154	1.0	RB 1 MHz; VB: 10 Hz
15554.090	50.6	V	74.0	-23.4	PK	154	1.0	RB 1 MHz; VB: 1 MHz
15519.430	39.0	H	54.0	-15.0	AVG	67	1.0	RB 1 MHz; VB: 10 Hz
15557.270	50.6	H	74.0	-23.4	PK	67	1.0	RB 1 MHz; VB: 1 MHz
10347.760	39.4	H	68.3	-28.9	AVG	336	1.0	RB 1 MHz; VB: 10 Hz
10354.740	50.4	H	88.3	-37.9	PK	336	1.0	RB 1 MHz; VB: 1 MHz
10360.390	42.0	V	68.3	-26.3	AVG	86	1.4	RB 1 MHz; VB: 10 Hz
10363.570	53.9	V	88.3	-34.4	PK	86	1.4	RB 1 MHz; VB: 1 MHz

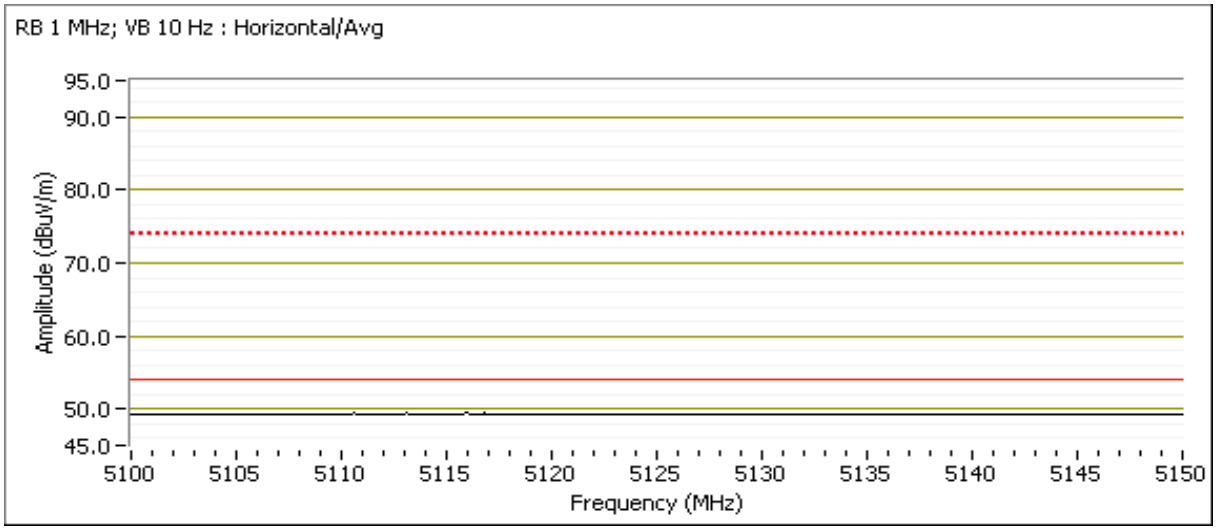
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the average limit was set to -27dBm/MHz (~68dBuV/m).

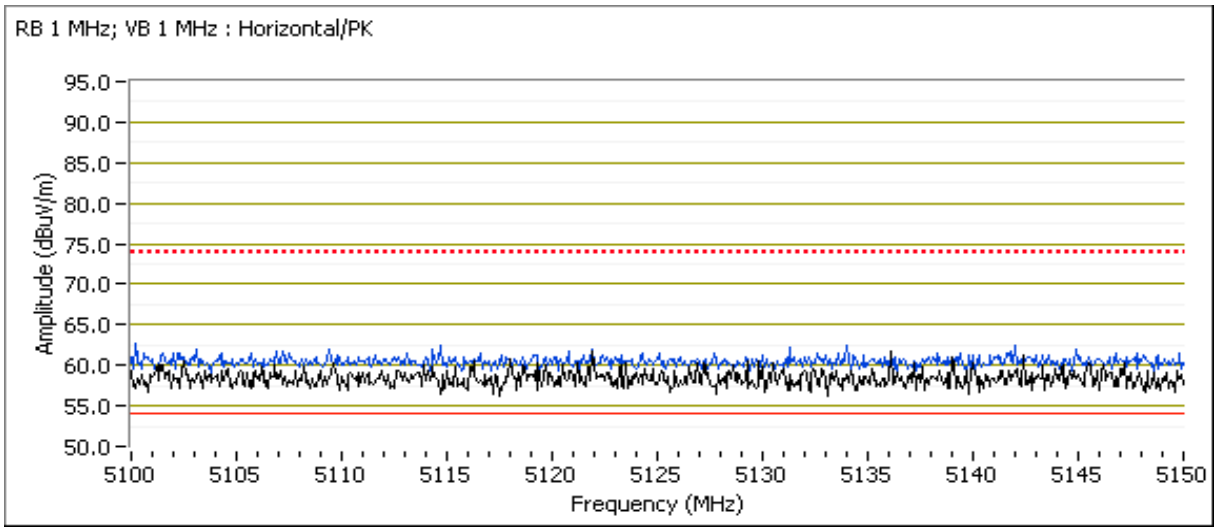
Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A





Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A





Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

Run #1b: Center Channel @ 5200 MHz

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
15578.680	39.3	V	54.0	-14.7	AVG	32	1.0	RB 1 MHz; VB: 10 Hz
15620.460	50.6	V	74.0	-23.4	PK	32	1.0	RB 1 MHz; VB: 1 MHz
10397.930	43.1	V	68.3	-25.2	AVG	261	1.5	RB 1 MHz; VB: 10 Hz
10398.910	57.2	V	88.3	-31.1	PK	261	1.5	RB 1 MHz; VB: 1 MHz
15578.640	39.2	H	54.0	-14.8	AVG	40	1.0	RB 1 MHz; VB: 10 Hz
15581.370	50.0	H	74.0	-24.0	PK	40	1.0	RB 1 MHz; VB: 1 MHz
10400.670	38.6	H	68.3	-29.7	AVG	339	1.7	RB 1 MHz; VB: 10 Hz
10386.710	49.9	H	88.3	-38.4	PK	339	1.7	RB 1 MHz; VB: 1 MHz

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

Run #1c: High Channel @ 5240 MHz

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
15748.780	39.2	H	54.0	-14.8	AVG	103	1.0	RB 1 MHz; VB: 10 Hz
15724.730	49.9	H	74.0	-24.1	PK	103	1.0	RB 1 MHz; VB: 1 MHz
10478.520	40.0	H	68.3	-28.3	AVG	266	1.4	RB 1 MHz; VB: 10 Hz
10484.240	53.4	H	88.3	-34.9	PK	266	1.4	RB 1 MHz; VB: 1 MHz
15738.080	38.9	V	54.0	-15.1	AVG	328	1.0	RB 1 MHz; VB: 10 Hz
15709.660	49.7	V	74.0	-24.3	PK	328	1.0	RB 1 MHz; VB: 1 MHz
10483.850	42.2	V	68.3	-26.1	AVG	74	1.4	RB 1 MHz; VB: 10 Hz
10483.800	56.8	V	88.3	-31.5	PK	74	1.4	RB 1 MHz; VB: 1 MHz

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

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

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

Date of Test: 2/26/2009
Test Engineer: Suhaila Khushzad
Test Location: OATS # 1

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

Ambient Conditions:

Temperature: 15 °C
Rel. Humidity: 69 %

Run #2a: Low Channel @ 5260 MHz

Spurious Radiated Emissions:

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

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
10521.680	80.0	H	88.3	-8.3	PK	80	1.5	RB 1 MHz; VB: 1 MHz
10520.660	42.0	H	68.3	-26.3	AVG	80	1.5	RB 1 MHz; VB: 10 Hz
10521.960	44.2	V	68.3	-24.1	AVG	251	1.4	RB 1 MHz; VB: 10 Hz
10523.530	64.9	V	88.3	-23.4	PK	251	1.4	RB 1 MHz; VB: 1 MHz
15758.990	39.6	V	54.0	-14.4	AVG	290	1.0	RB 1 MHz; VB: 10 Hz
15789.020	51.1	V	74.0	-22.9	PK	290	1.0	RB 1 MHz; VB: 1 MHz
15758.500	39.4	H	54.0	-14.6	AVG	94	1.0	RB 1 MHz; VB: 10 Hz
15776.480	50.9	H	74.0	-23.1	PK	94	1.0	RB 1 MHz; VB: 1 MHz

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

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

Run #2b: Center Channel

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
10600.300	42.2	V	54.0	-11.8	AVG	282	1.7	RB 1 MHz; VB: 10 Hz
15898.500	41.7	V	54.0	-12.3	AVG	22	1.0	RB 1 MHz; VB: 10 Hz
15898.500	41.6	H	54.0	-12.4	AVG	261	1.0	RB 1 MHz; VB: 10 Hz
10600.120	40.4	H	54.0	-13.6	AVG	122	1.5	RB 1 MHz; VB: 10 Hz
10600.790	53.3	V	74.0	-20.7	PK	282	1.7	RB 1 MHz; VB: 1 MHz
15900.610	53.2	V	74.0	-20.8	PK	22	1.0	RB 1 MHz; VB: 1 MHz
15899.260	52.8	H	74.0	-21.2	PK	261	1.0	RB 1 MHz; VB: 1 MHz
10598.800	51.8	H	88.3	-36.5	PK	122	1.5	RB 1 MHz; VB: 1 MHz

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

Run #2c: High Channel

Date of Test: 2/23/2009 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: SV OATS #1 Host Unit Voltage 120V/60Hz

Ambient Conditions: Temperature: 12 °C
Rel. Humidity: 89 %

Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5317.030	94.8	H	-	-	AVG	63	1.9	RB 1 MHz; VB: 10 Hz
5325.000	103.2	H	-	-	PK	63	1.9	RB 1 MHz; VB: 1 MHz
5318.870	87.7	V	-	-	AVG	196	1.0	RB 1 MHz; VB: 10 Hz
5316.900	95.6	V	-	-	PK	196	1.0	RB 1 MHz; VB: 1 MHz

5350 MHz Band Edge Signal Radiated Field Strength

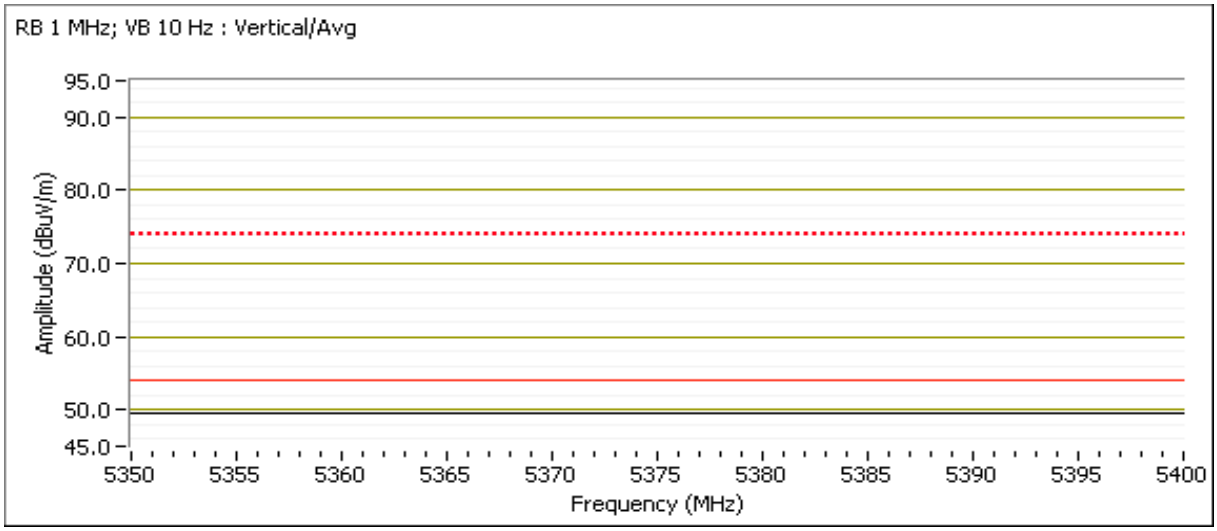
Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.000	49.7	H	54.0	-4.3	Avg	63	1.9	RB 1 MHz; VB: 10 Hz
5350.830	62.6	H	74.0	-11.4	PK	63	1.9	RB 1 MHz; VB: 1 MHz
5350.200	49.5	V	54.0	-4.5	Avg	196	1.0	RB 1 MHz; VB: 10 Hz
5352.630	62.6	V	74.0	-11.4	PK	196	1.0	RB 1 MHz; VB: 1 MHz

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

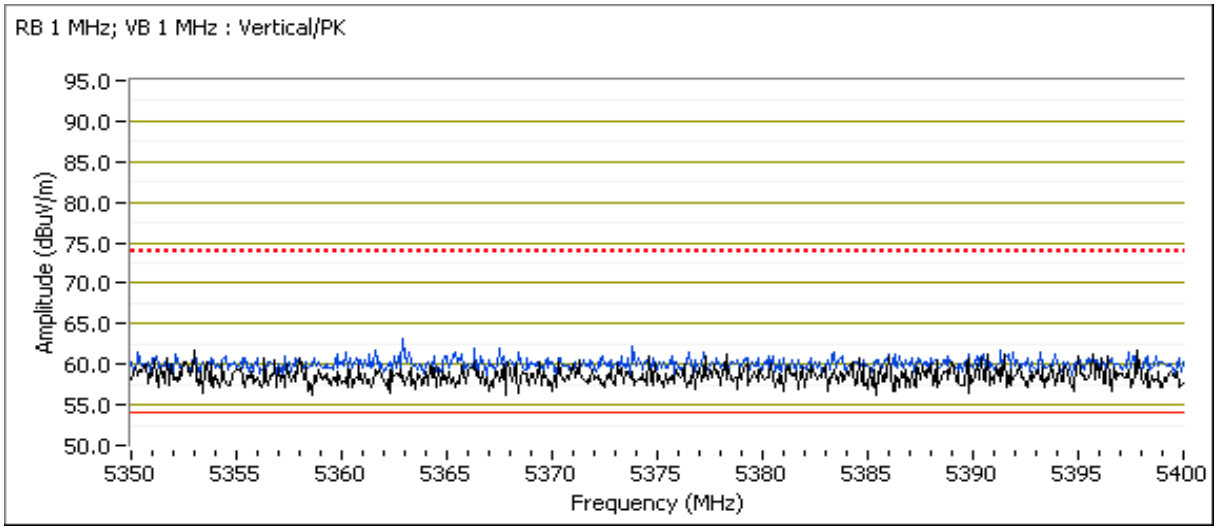
Spurious Radiated Emissions:

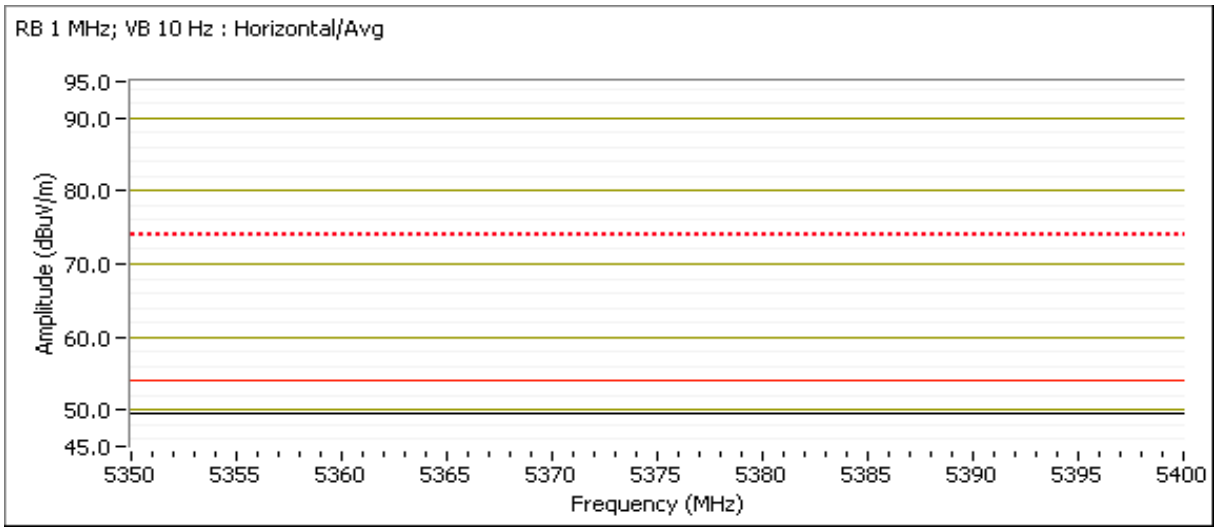
Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
10640.040	44.6	V	54.0	-9.4	AVG	285	1.5	RB 1 MHz; VB: 10 Hz
15958.500	41.4	V	54.0	-12.6	AVG	95	1.4	RB 1 MHz; VB: 10 Hz
15958.500	41.4	H	54.0	-12.6	AVG	0	2.0	RB 1 MHz; VB: 10 Hz
10638.500	39.6	H	54.0	-14.4	AVG	14	2.0	RB 1 MHz; VB: 10 Hz
10639.170	55.7	V	74.0	-18.3	PK	285	1.5	RB 1 MHz; VB: 1 MHz
15959.370	52.8	V	74.0	-21.2	PK	95	1.4	RB 1 MHz; VB: 1 MHz
15959.800	52.8	H	74.0	-21.2	PK	0	2.0	RB 1 MHz; VB: 1 MHz
10640.910	51.4	H	74.0	-22.6	PK	14	2.0	RB 1 MHz; VB: 1 MHz

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

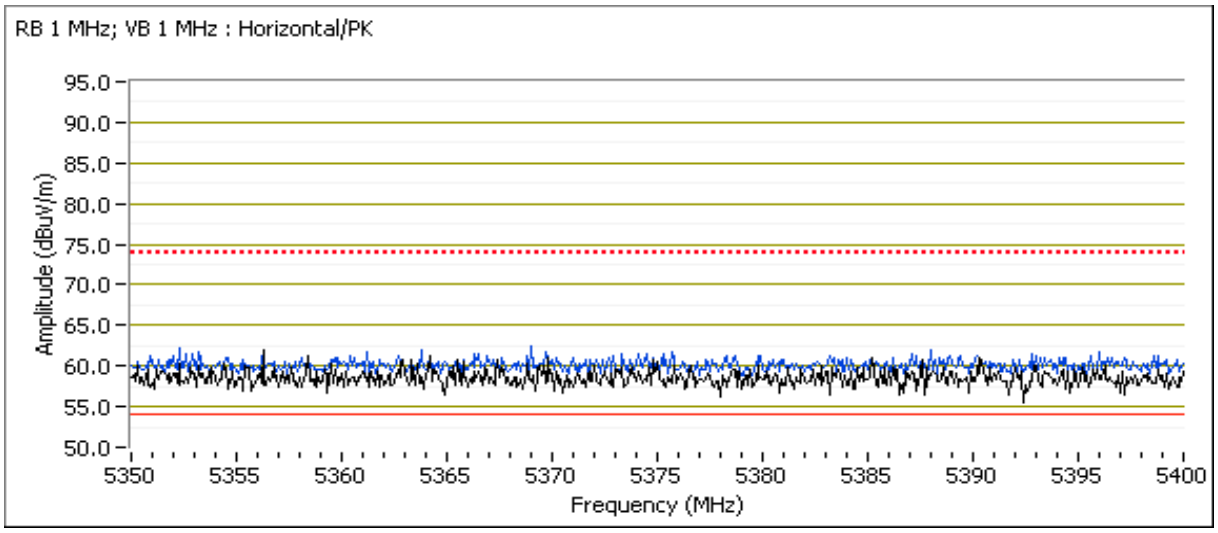


Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A





Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A



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

Date of Test:	2/23&27/2009	Config. Used:	1
Test Engineer:	Rafael Varelas & Suhaila	Config Change:	None
Test Location:	SV OATS #1	Host Unit Voltage	120V/60Hz

Ambient Conditions:

Temperature:	12 °C
Rel. Humidity:	89 %

Run #3a: Low Channel

Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5495.970	92.1	V	-	-	AVG	155	1.1	RB 1 MHz; VB: 10 Hz
5497.030	101.3	V	-	-	PK	155	1.1	RB 1 MHz; VB: 1 MHz
5493.170	93.4	H	-	-	AVG	114	1.8	RB 1 MHz; VB: 10 Hz
5493.800	102.5	H	-	-	PK	114	1.8	RB 1 MHz; VB: 1 MHz

5350-5460 MHz Restricted Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5457.000	49.5	V	54.0	-4.5	Avg	155	1.1	RB 1 MHz; VB: 10 Hz
5457.430	61.8	V	74.0	-12.2	PK	155	1.1	RB 1 MHz; VB: 1 MHz
5457.000	49.5	H	54.0	-4.5	Avg	114	1.8	RB 1 MHz; VB: 10 Hz
5459.230	61.8	H	74.0	-12.2	PK	114	1.8	RB 1 MHz; VB: 1 MHz

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

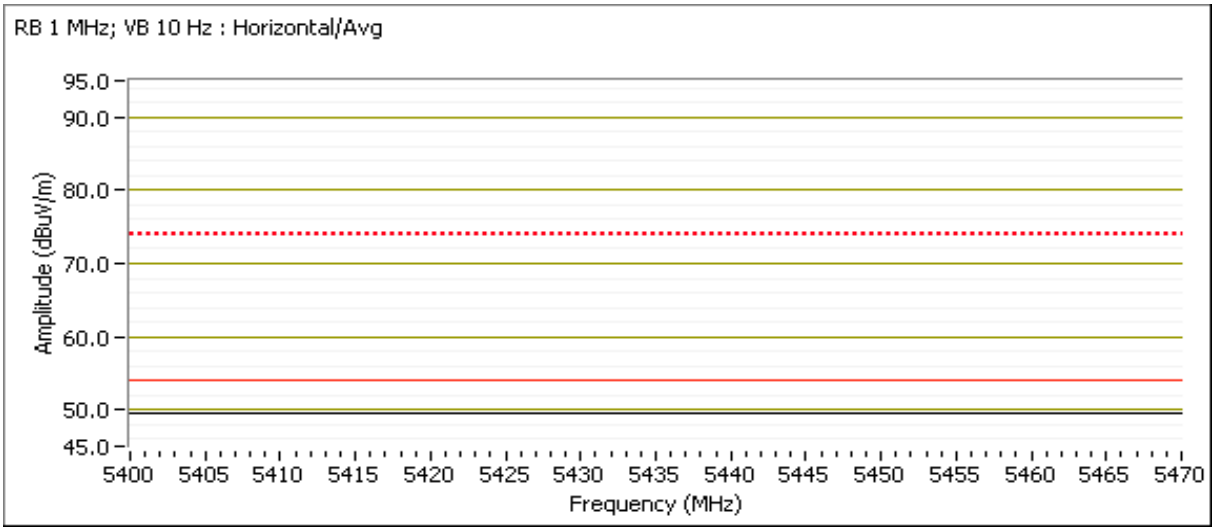
5460-5470 MHz Restricted Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5467.430	49.6	H	68.3	-18.7	Avg	114	1.8	RB 1 MHz; VB: 10 Hz
5468.620	61.9	H	88.3	-26.4	PK	114	1.8	RB 1 MHz; VB: 1 MHz
5467.000	49.5	V	68.3	-18.8	Avg	155	1.1	RB 1 MHz; VB: 10 Hz
5469.290	63.4	V	88.3	-24.9	PK	155	1.1	RB 1 MHz; VB: 1 MHz

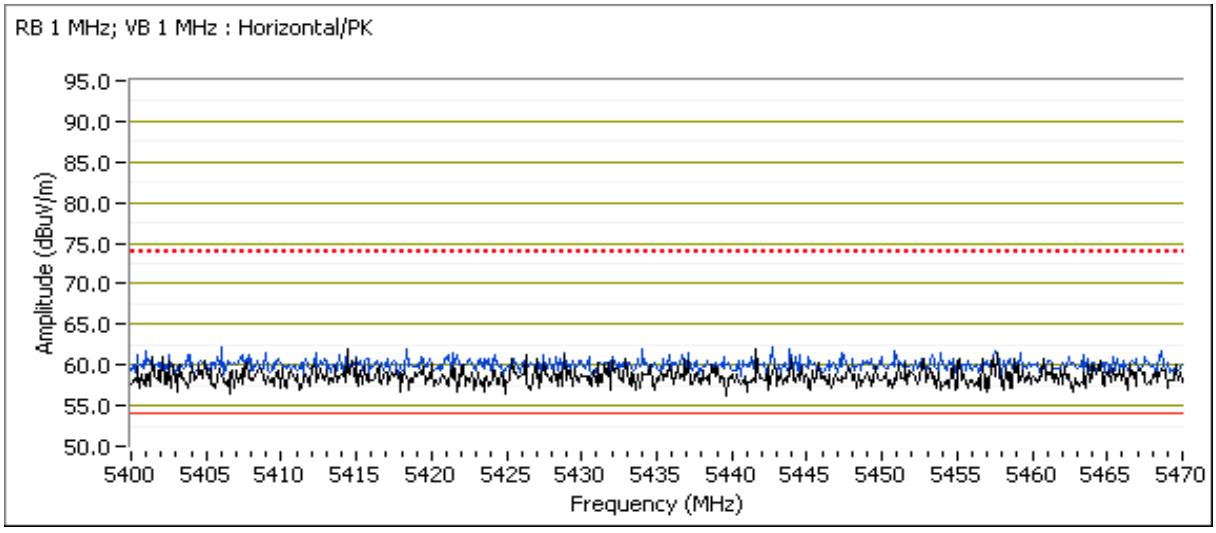
Spurious Radiated Emissions:

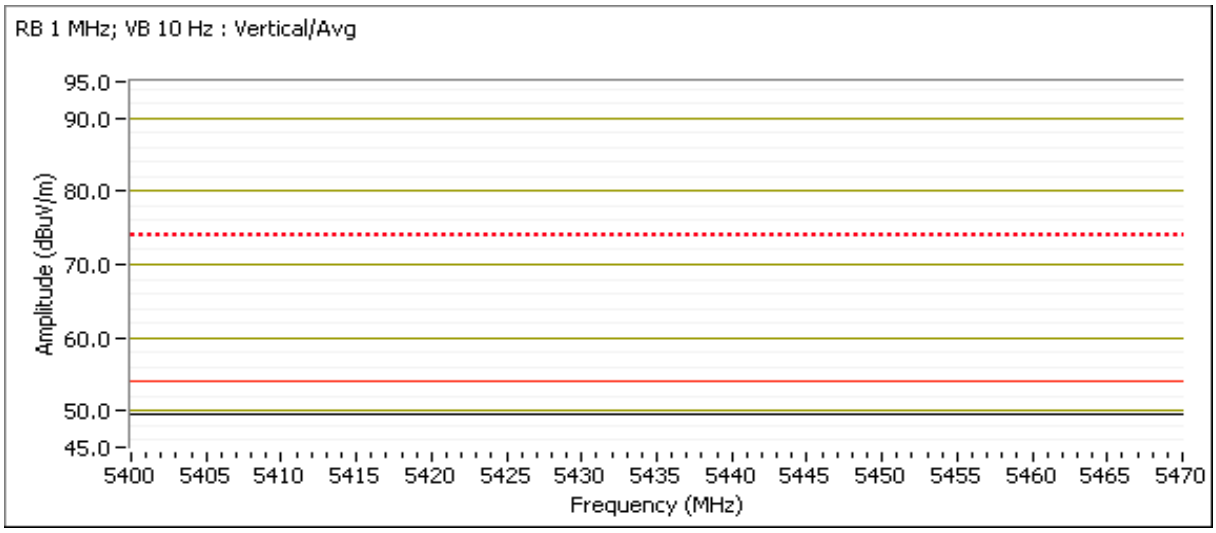
Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
10998.200	45.0	V	54.0	-9.0	AVG	114	1.4	RB 1 MHz; VB: 10 Hz
11003.230	62.5	V	74.0	-11.5	PK	114	1.4	RB 1 MHz; VB: 1 MHz
10996.250	41.6	H	54.0	-12.4	AVG	239	1.5	RB 1 MHz; VB: 10 Hz
11003.850	56.5	H	74.0	-17.5	PK	239	1.5	RB 1 MHz; VB: 1 MHz
16509.590	40.4	V	68.3	-27.9	AVG	171	1.0	RB 1 MHz; VB: 10 Hz
16510.300	40.4	H	68.3	-27.9	AVG	183	1.3	RB 1 MHz; VB: 10 Hz
16483.450	52.0	H	88.3	-36.3	PK	183	1.3	RB 1 MHz; VB: 1 MHz
16493.070	51.7	V	88.3	-36.6	PK	171	1.0	RB 1 MHz; VB: 1 MHz

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

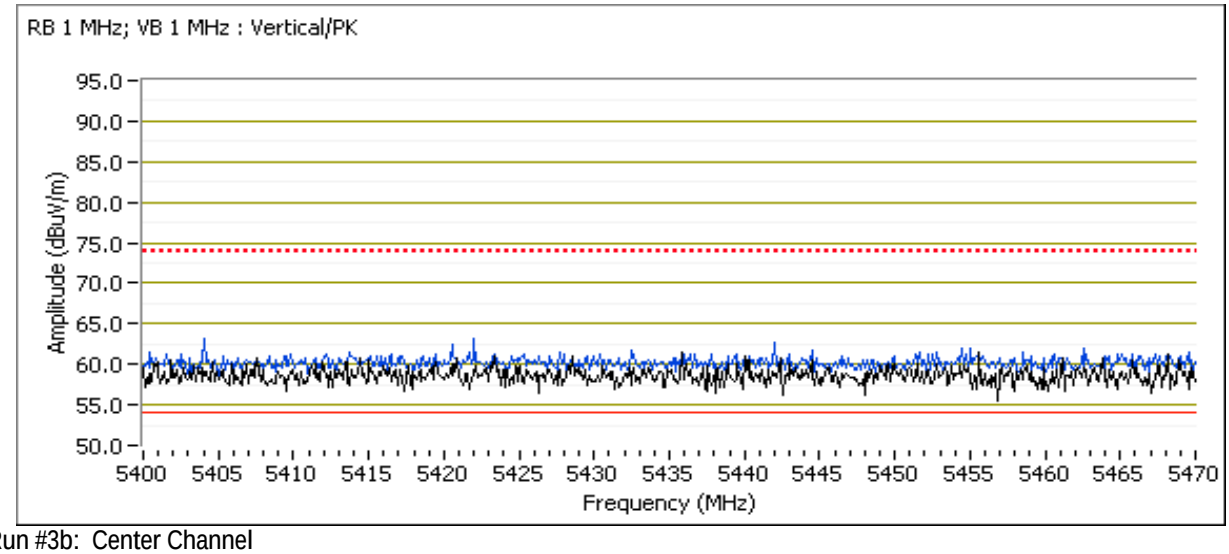


Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A





Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A



Run #3b: Center Channel

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11201.290	47.5	V	54.0	-6.5	AVG	103	1.4	RB 1 MHz; VB: 10 Hz
11199.960	65.2	V	74.0	-8.8	PK	103	1.4	RB 1 MHz; VB: 1 MHz
11202.260	44.5	H	54.0	-9.5	AVG	32	1.5	RB 1 MHz; VB: 10 Hz
11204.290	61.1	H	74.0	-12.9	PK	32	1.5	RB 1 MHz; VB: 1 MHz
16778.500	41.9	H	68.3	-26.4	AVG	145	1.0	RB 1 MHz; VB: 10 Hz
16778.500	41.8	V	68.3	-26.5	AVG	35	1.0	RB 1 MHz; VB: 10 Hz
16785.920	52.6	V	88.3	-35.7	PK	35	1.0	RB 1 MHz; VB: 1 MHz
16812.950	52.3	H	88.3	-36.0	PK	145	1.0	RB 1 MHz; VB: 1 MHz
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the average limit was set to -27dBm/MHz (~68dBuV/m).							

Run #3c: High Channel

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11403.500	39.1	V	54.0	-14.9	AVG	121	1.0	RB 1 MHz; VB: 10 Hz
11402.790	38.9	H	54.0	-15.1	AVG	360	1.0	RB 1 MHz; VB: 10 Hz
11397.140	50.6	H	74.0	-23.4	PK	360	1.0	RB 1 MHz; VB: 1 MHz
11407.560	50.3	V	74.0	-23.7	PK	121	1.0	RB 1 MHz; VB: 1 MHz
17079.210	43.9	V	68.3	-24.4	AVG	294	2.5	RB 1 MHz; VB: 10 Hz
17081.770	43.8	H	68.3	-24.5	AVG	334	1.0	RB 1 MHz; VB: 10 Hz
17084.770	55.6	V	88.3	-32.7	PK	294	2.5	RB 1 MHz; VB: 1 MHz
17107.470	55.4	H	88.3	-32.9	PK	334	1.0	RB 1 MHz; VB: 1 MHz
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the average limit was set to -27dBm/MHz (~68dBuV/m).							

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

Radiated Spurious Emissions

Test Specific Details

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

General Test Configuration

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

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

Note, **preliminary** testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. **Maximized** testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

Ambient Conditions:

Temperature: 10-15 °C

Rel. Humidity: 39-50 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1 (802.11a), 5300MHz Larson Antenna, MAIN	RE, 1000 - 18000 MHz, Maximized Emissions	RSS-GEN	Pass	39.7dBµV/m (96.6µV/m) @ 15898.6MHz (-14.3dB)
2 (802.11a), 5300MHz PCB Antenna, MAIN	RE, 1000 - 18000 MHz, Maximized Emissions	RSS-GEN	Pass	39.7dBµV/m (96.6µV/m) @ 15898.5MHz (-14.3dB)
3 (802.11a), 5600MHz Larson Antenna, MAIN	RE, 1000 - 18000 MHz, Maximized Emissions	RSS-GEN	Pass	40.9dBµV/m (110.9µV/m) @ 16798.5MHz (-13.1dB)
4 (802.11a), 5600MHz PCB Antenna, MAIN	RE, 1000 - 18000 MHz, Maximized Emissions	RSS-GEN	Pass	40.9dBµV/m (110.9µV/m) @ 16798.5MHz (-13.1dB)

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:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

Run #1: Maximized readings, 1000 - 18000 MHz (802.11a at 5300MHz with 5.0dBi Antenna (Larson), MAIN)

Date of Test: 3/4/2009 Config. Used: 1
Test Engineer: Mehran Birgani Config Change: None
Test Location: SVOATS #1 Host Unit Voltage 120V/60Hz

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5300.080	38.4	V	54.0	-15.6	AVG	371	1.0	
5300.170	37.8	H	54.0	-16.2	AVG	5	1.0	
10599.740	38.1	H	54.0	-15.9	AVG	55	1.0	
10600.800	38.1	V	54.0	-15.9	AVG	20	1.0	
15898.610	39.7	V	54.0	-14.3	AVG	28	1.0	
5300.130	46.0	H	74.0	-28.0	PK	5	1.0	
5300.350	45.6	V	74.0	-28.4	PK	371	1.0	
10600.330	49.4	H	74.0	-24.6	PK	55	1.0	
10600.980	49.9	V	74.0	-24.1	PK	20	1.0	
15899.800	50.6	V	74.0	-23.4	PK	28	1.0	

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

Run #2: Maximized readings, 1000 - 18000 MHz (802.11a at 5300MHz with 5.1dBi Antenna (PCB), MAIN)

Date of Test: 3/4/2009 Config. Used: 1
Test Engineer: Mehran Birgani Config Change: None
Test Location: SVOATS #1 Host Unit Voltage 120V/60Hz

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5300.120	38.4	V	54.0	-15.6	AVG	171	1.0	
5300.160	37.8	H	54.0	-16.2	AVG	305	1.0	
10599.760	38.1	H	54.0	-15.9	AVG	246	1.0	
10600.780	38.1	V	54.0	-15.9	AVG	220	1.0	
15898.500	39.7	V	54.0	-14.3	AVG	331	1.0	
5300.030	46.0	H	74.0	-28.0	PK	305	1.0	
5300.370	45.6	V	74.0	-28.4	PK	171	1.0	
10600.290	49.4	H	74.0	-24.6	PK	246	1.0	
10601.080	49.9	V	74.0	-24.1	PK	220	1.0	
15899.820	50.6	V	74.0	-23.4	PK	331	1.0	

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

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.E/RSS 210	Class:	N/A

Run #3: Maximized readings, 1000 - 18000 MHz (802.11a at 5600MHz with 5.0dBi Antenna (Larson), MAIN)

Date of Test: 3/4/2009 Config. Used: 1
Test Engineer: Mehran Birgani Config Change: None
Test Location: SVOATS #1 Host Unit Voltage 120V/60Hz

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5600.140	38.7	V	54.0	-15.3	AVG	53	1.0	
5600.180	35.1	H	54.0	-18.9	AVG	3	1.0	
11201.070	38.9	H	54.0	-15.1	AVG	17	1.0	
11201.160	38.8	V	54.0	-15.2	AVG	33	1.0	
16798.540	40.9	V	54.0	-13.1	AVG	300	1.0	
5600.220	47.0	V	74.0	-27.0	PK	53	1.0	
5600.610	45.2	H	74.0	-28.8	PK	3	1.0	
11199.010	50.1	V	74.0	-23.9	PK	33	1.0	
11201.480	52.2	H	74.0	-21.8	PK	17	1.0	
16798.910	53.0	V	74.0	-21.0	PK	300	1.0	

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

Run #4: Maximized readings, 1000 - 18000 MHz (802.11a at 5600MHz with 5.1dBi Antenna (PCB), MAIN)

Date of Test: 3/4/2009 Config. Used: 1
Test Engineer: Mehran Birgani Config Change: None
Test Location: SVOATS #1 Host Unit Voltage 120V/60Hz

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5600.150	38.7	V	54.0	-15.3	AVG	83	1.1	
5600.150	35.1	H	54.0	-18.9	AVG	303	1.0	
11201.070	38.9	H	54.0	-15.1	AVG	178	1.0	
11201.170	38.8	V	54.0	-15.2	AVG	12	1.0	
16798.500	40.9	V	54.0	-13.1	AVG	169	1.0	
5600.190	47.0	V	74.0	-27.0	PK	83	1.1	
5600.600	45.2	H	74.0	-28.8	PK	303	1.0	
11198.990	50.1	V	74.0	-23.9	PK	12	1.0	
11201.460	52.2	H	74.0	-21.8	PK	178	1.0	
16798.940	53.0	V	74.0	-21.0	PK	169	1.0	

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

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Emissions Standard(s):	FCC 15.247/RSS 210	Class:	-
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Summit Data Communications

Model

802.11abg Compact Flash Card

Date of Last Test: 3/12/2009

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manger:	Christine Krebill
Contact:	Jerry Pohmurski		
Emissions Standard(s):	FCC 15.247/RSS 210	Class:	-
Immunity Standard(s):	-	Environment:	-

EUT INFORMATION

The following information was collected during the test session(s).
The client agreed to provide the following information after the test session(s).

General Description

The EUT is a 802.11ag compliant wireless LAN radio Module which is designed to provide wireless local area networking connectivity. Normally, the EUT would be embedded in various types of mobile and stationary computing devices such as handheld and vehicle mounted data terminals during operation. The EUT was, therefore, placed in this position during emissions testing to simulate the end user environment. The electrical rating of the EUT is 3.3 VDC =/-5%. It's typical power consumption is 400mA (1320mW) while in transmit mode, 180mA (594mW) while in receive mode and 10mA (33mW) while in standby mode.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Summit Data Communications Inc.	MCF10AG	802.11AG Mini Compact Flash Module with antenna connectors		TWG-SDCMCF10AG

EUT Antenna (Intentional Radiators Only)

The antenna connects to the EUT via a standard u.f1 antenna connector, thereby meeting the requirements of FCC 15.203.
There were two antennas included in the testing:
Laird Centurion, m/n NanoBlade, pcb antenna, 3.8dBi @ 2.45GHz, 5.1dBi @ 5.25GHz, 4.5dBi @ 5.8GHz
Larson, p/n R380.500.314, Omni, 1.6dBi @ 2.4GHz, 5dBi @ 5GHz

EUT Enclosure

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

Modification History

Mod. #	Test	Date	Modification
1			No modifications were made to the EUT during testing.
2			
3			

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.

Client:	Summit Data Communications	Job Number:	J74548
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		Account Manger:	Christine Krebill
Contact:	Jerry Pohmurski		
Emissions Standard(s):	FCC 15.247/RSS 210	Class:	-
Immunity Standard(s):	-	Environment:	-

Test Configuration #1

The following information was collected during the test session(s).

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Hewlett Packard	iPAQ	Handheld Computer	-	-

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None	-	-	-	-

Cabling and Ports

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

EUT Operation During Emissions Tests

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

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Contact:	Jerry Pohmurski		
Standard:	FCC 15.247/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: 3/6&10&12/2009
Test Engineer: Suhaila Khushzad
Test Location: SVOATS #2

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

General Test Configuration

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

Ambient Conditions:

Temperature:	11.1	°C
Rel. Humidity:	63	%

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	12.3 dBm
1	Power, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	14.2 dBm
1	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	15.8 dBm
1	PSD, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	-0.2 dBm/MHz
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	1.6 dBm/MHz
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	3.02 dBm/MHz
1	26dB Bandwidth	15.407	-	20.9 MHz
1	99% Bandwidth	RSS 210	-	17.1 MHz
2	Peak Excursion Envelope	15.407(a) (6)	Pass	10.9 dB
3	Antenna Conducted - Out of Band Spurious	15.407(b)	Pass	All emissions below the -27dBm/MHz limit

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.247/RSS 210	Class:	N/A

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

Antenna Gain (dBi): 5.1

Frequency (MHz)	Software Setting	Bandwidth		Output Power[1] dBm		Power (Watts)	PSD[2] dBm/MHz			Result
		26dB	99%[4]	Measured	Limit		Measured	FCC Limit	RSS Limit[3]	
5180	100%	21.1	17.3	12.0	17.0	0.016	-0.6	4.0	4.9	Pass
5200	100%	20.9	17.2	12.3	17.0	0.017	-0.5	4.0	4.9	Pass
5240	100%	21.0	17.3	12.3	17.0	0.017	-0.2	4.0	4.9	Pass
5260	100%	20.9	17.1	12.1	24.0	0.016	-0.6	11.0	11.0	Pass
5300	100%	21.1	17.3	14.1	24.0	0.026	1.6	11.0	11.0	Pass
5320	100%	22.9	17.4	14.2	24.0	0.026	1.6	11.0	11.0	Pass
5500	100%	24.4	17.3	15.0	24.0	0.031	2.2	11.0	11.0	Pass
5600	100%	34.8	17.4	15.8	24.0	0.038	3.0	11.0	11.0	Pass
5700	100%	21.0	18.2	22.0	24.0	0.159	10.1	11.0	11.0	Pass

Note 1:	Output power measured using a spectrum analyzer (see plots below): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50 MHz. For Channel 140 (5700 MHz), the RBW=1MHz, VB=3 MHz, sample detector, max hold for at least 60 seconds (transmitted signal was not continuous) and power integration over 50 MHz.
Note 2:	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

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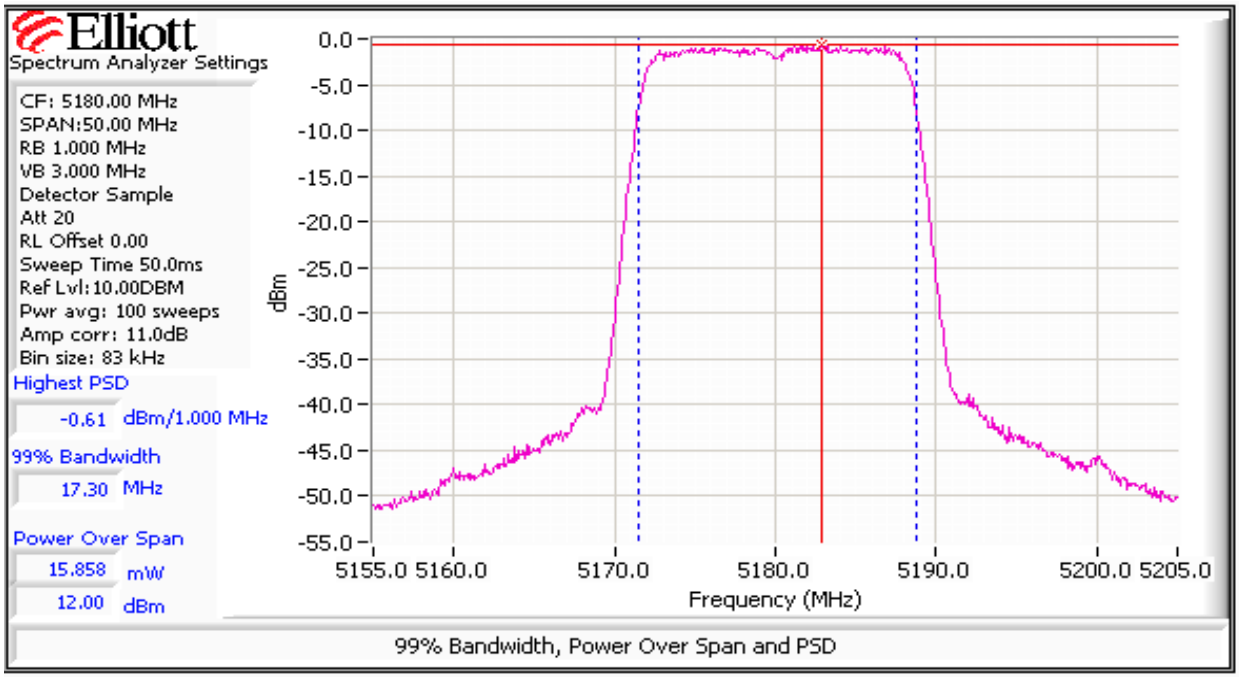
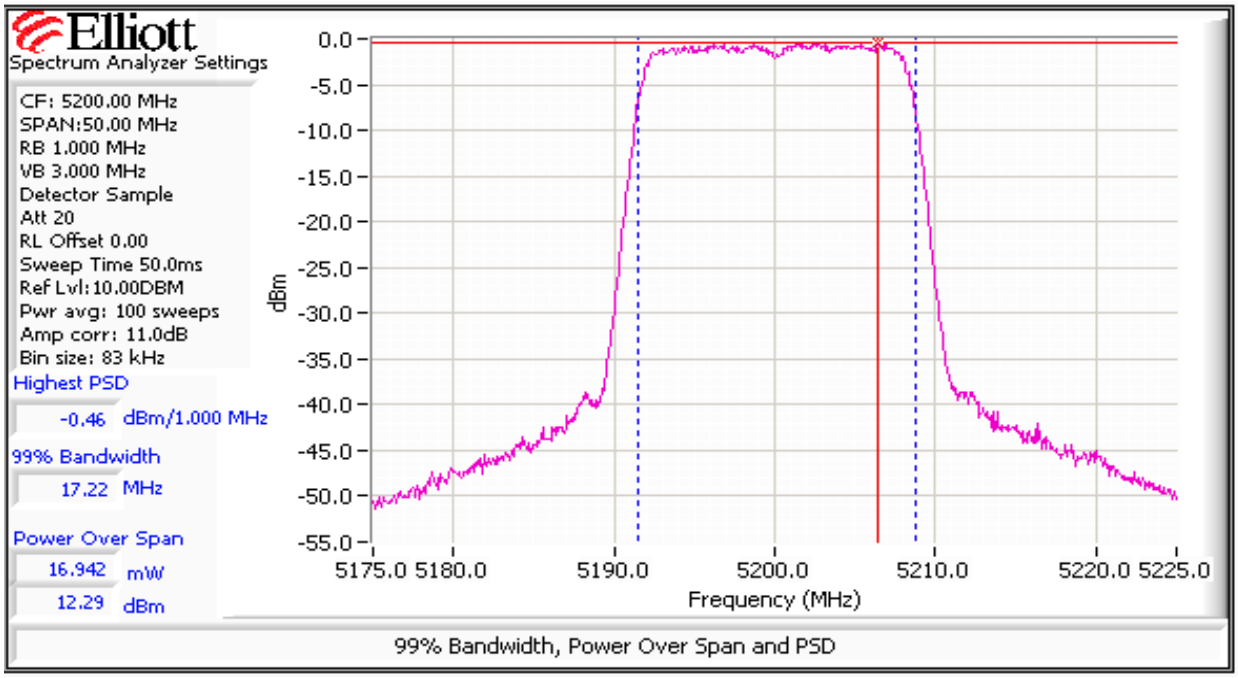
Standard:	FCC 15.247/RSS 210	Class:	N/A





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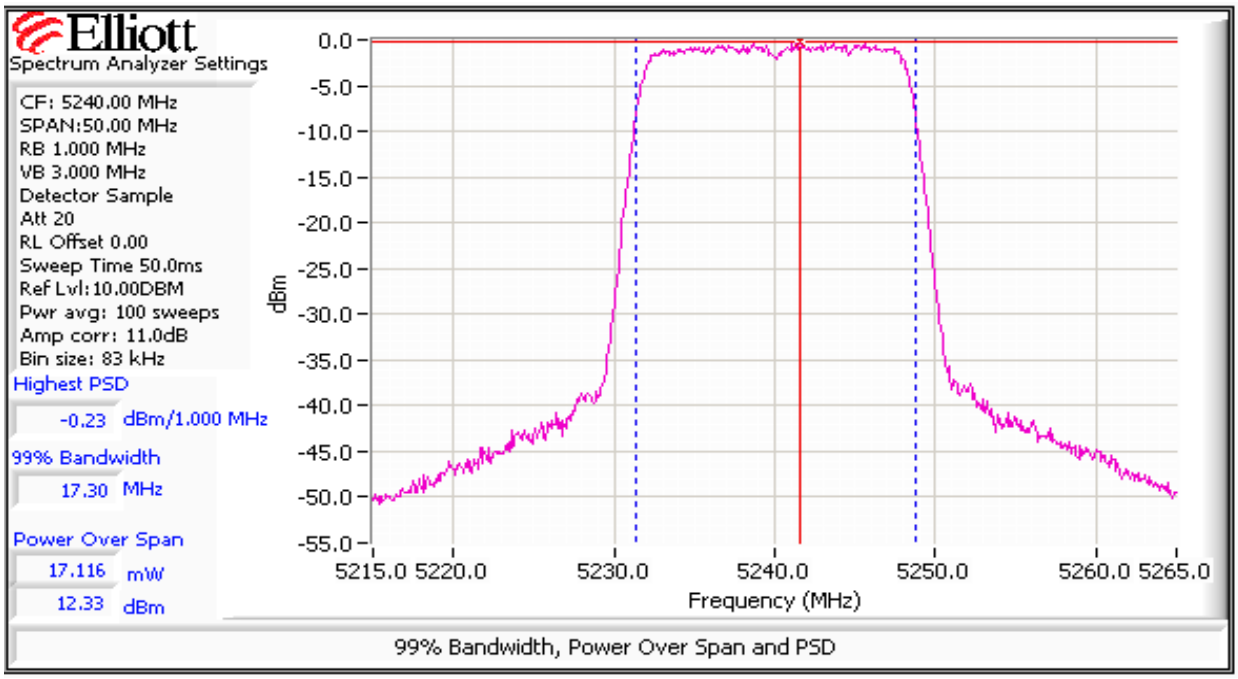
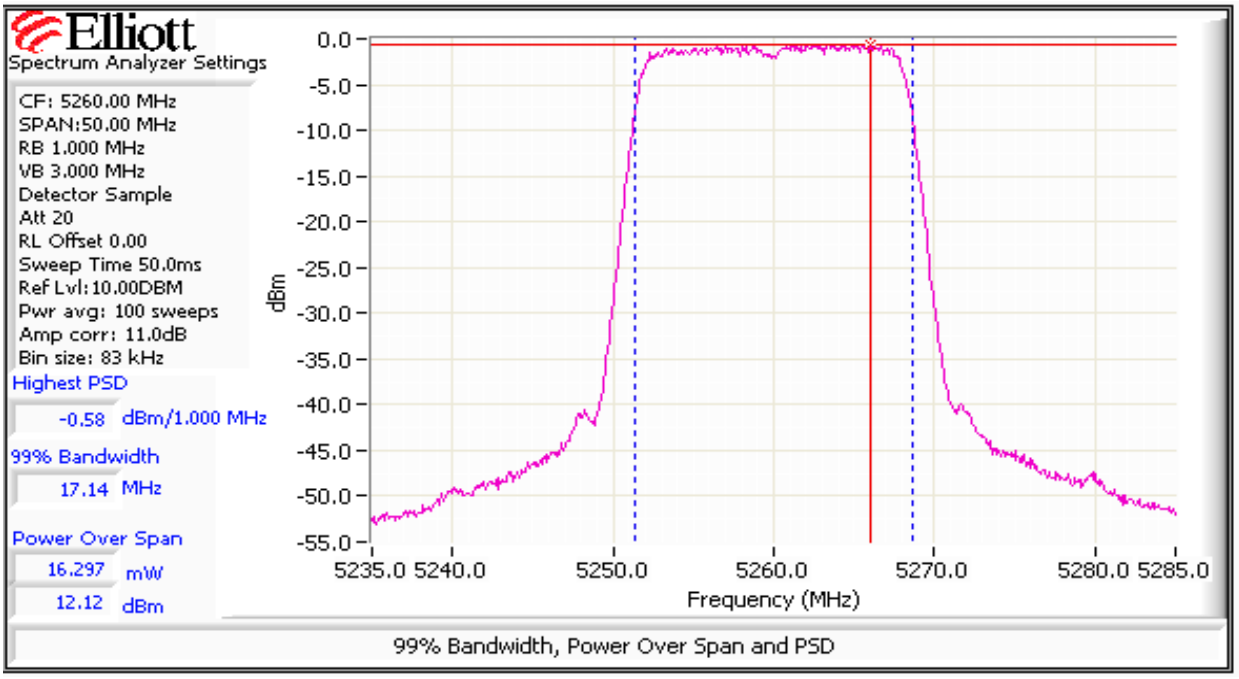
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.247/RSS 210	Class:	N/A





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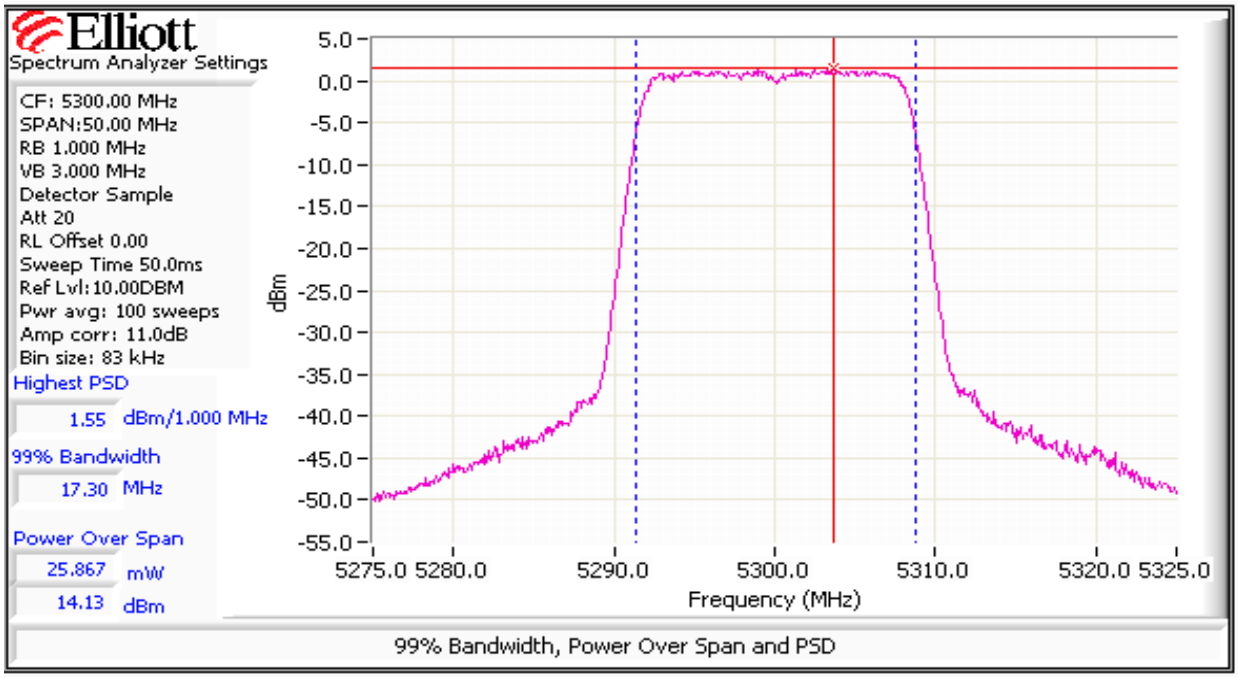
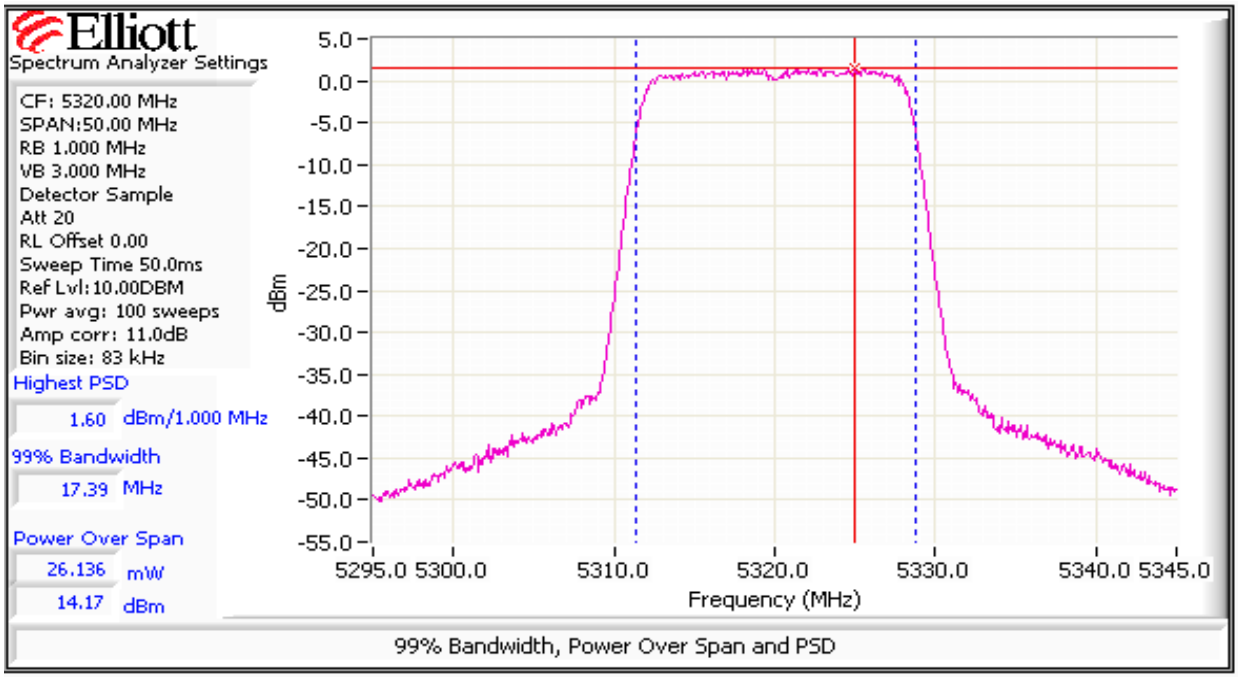
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.247/RSS 210	Class:	N/A





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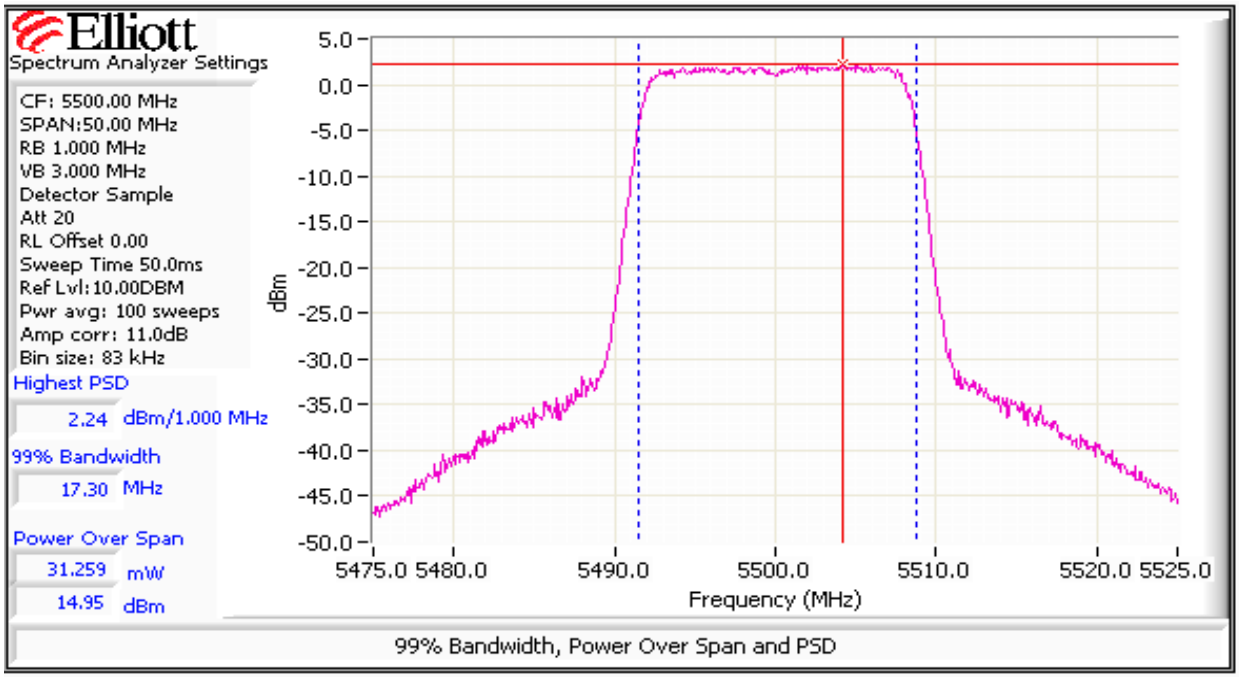

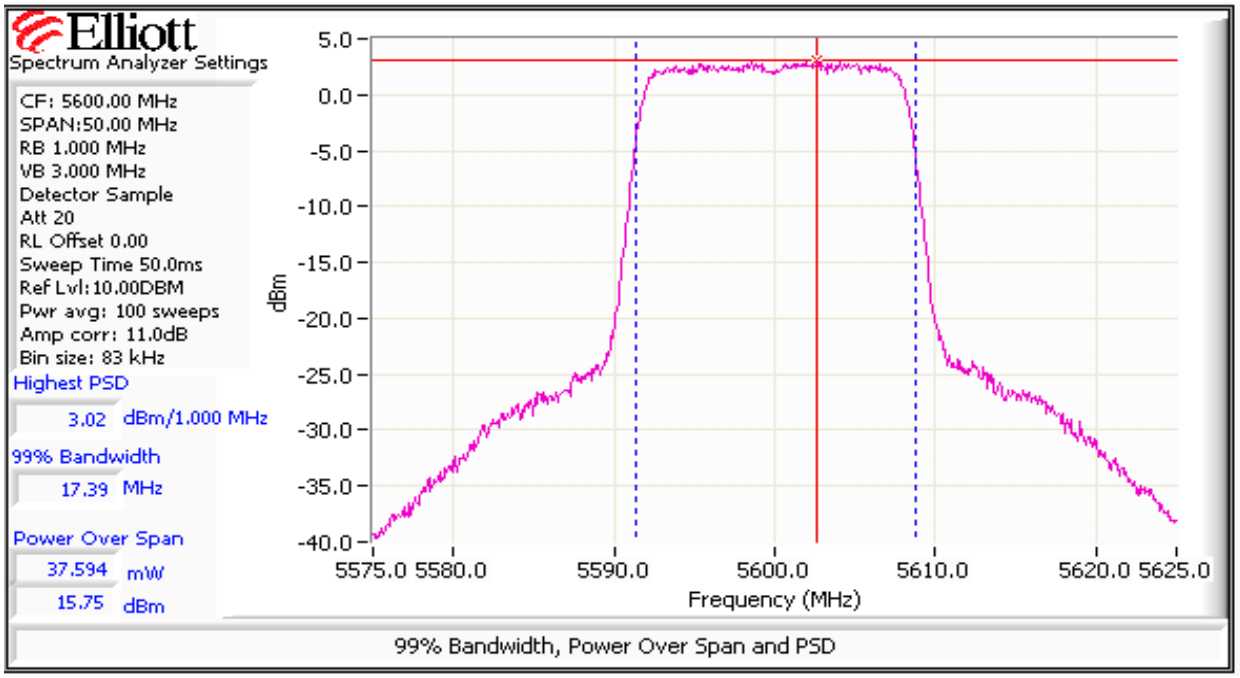

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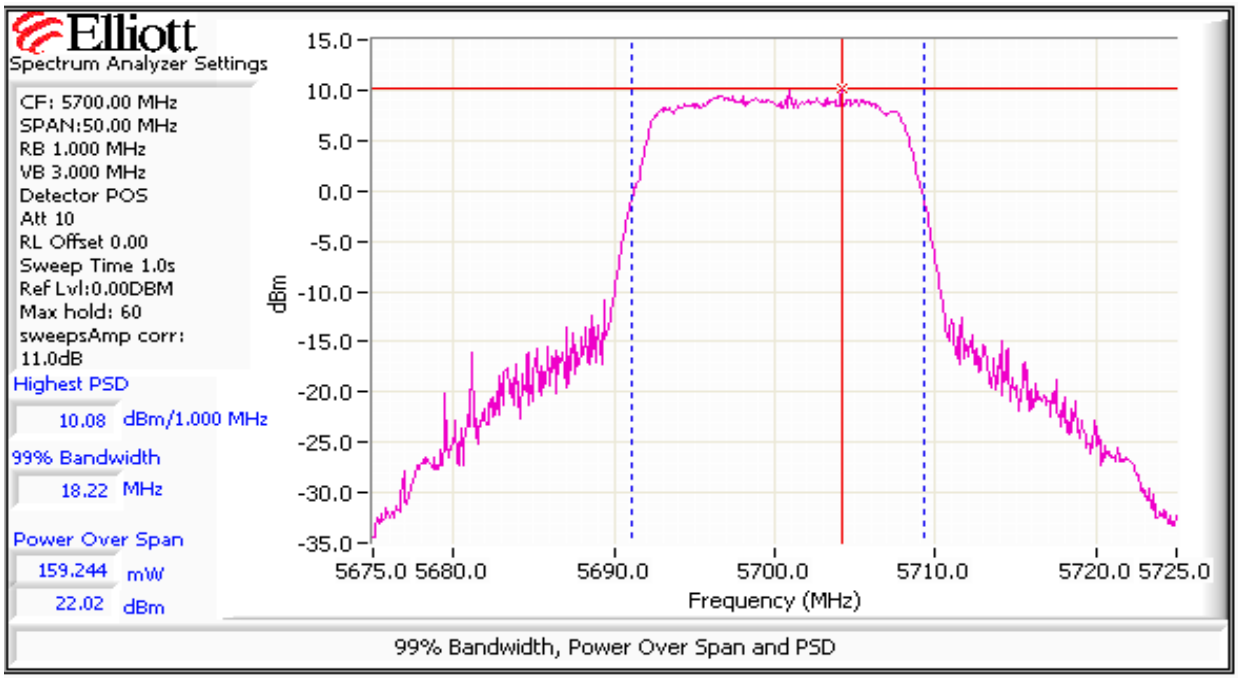
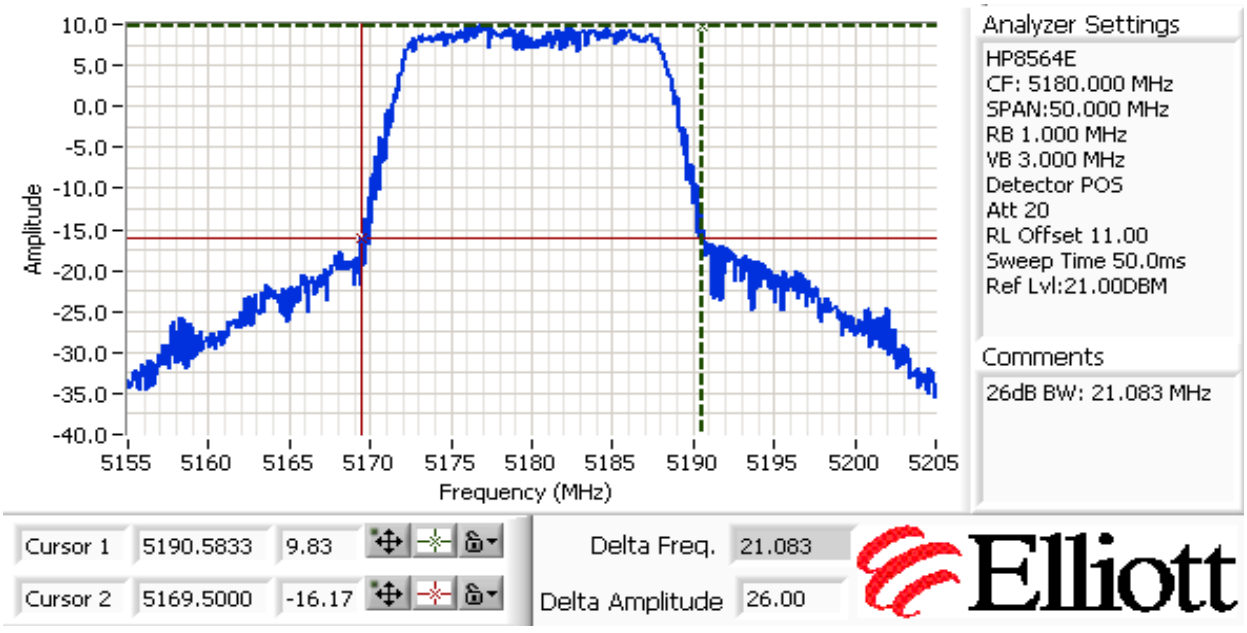
Standard:	FCC 15.247/RSS 210	Class:	N/A



Note :	For Channel 140 (5700 MHz), the RBW=1MHz, VB=3 MHz, sample detector, max hold for at least 60 seconds (transmitted signal was not continuous) and power integration over 50 MHz.



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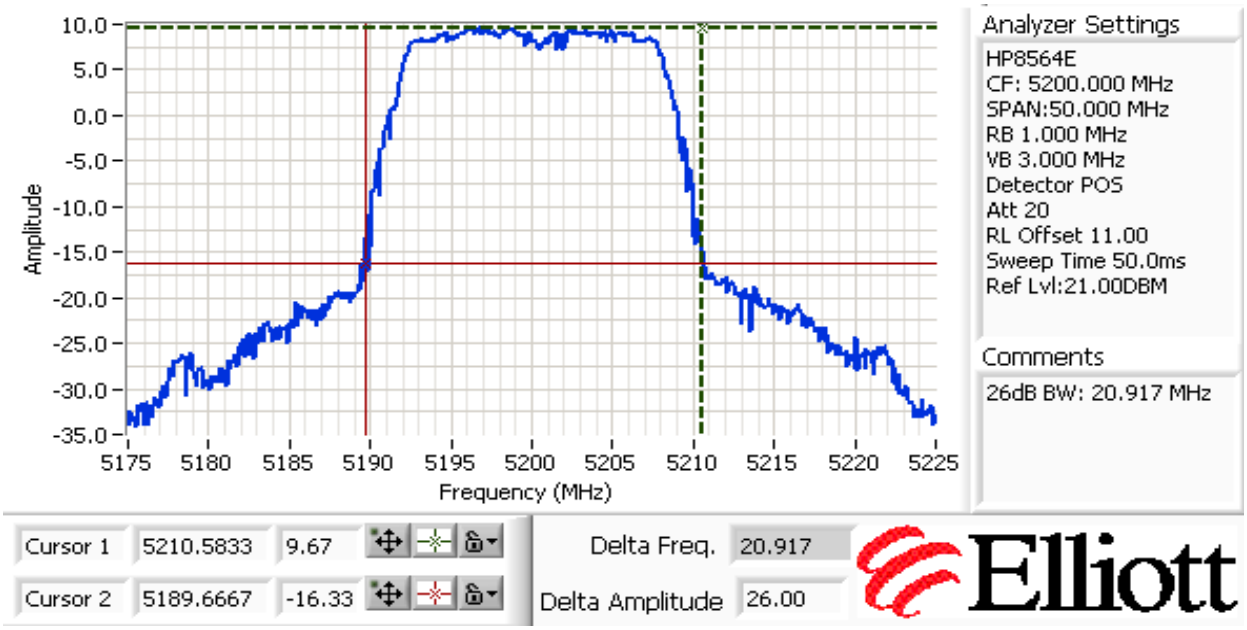
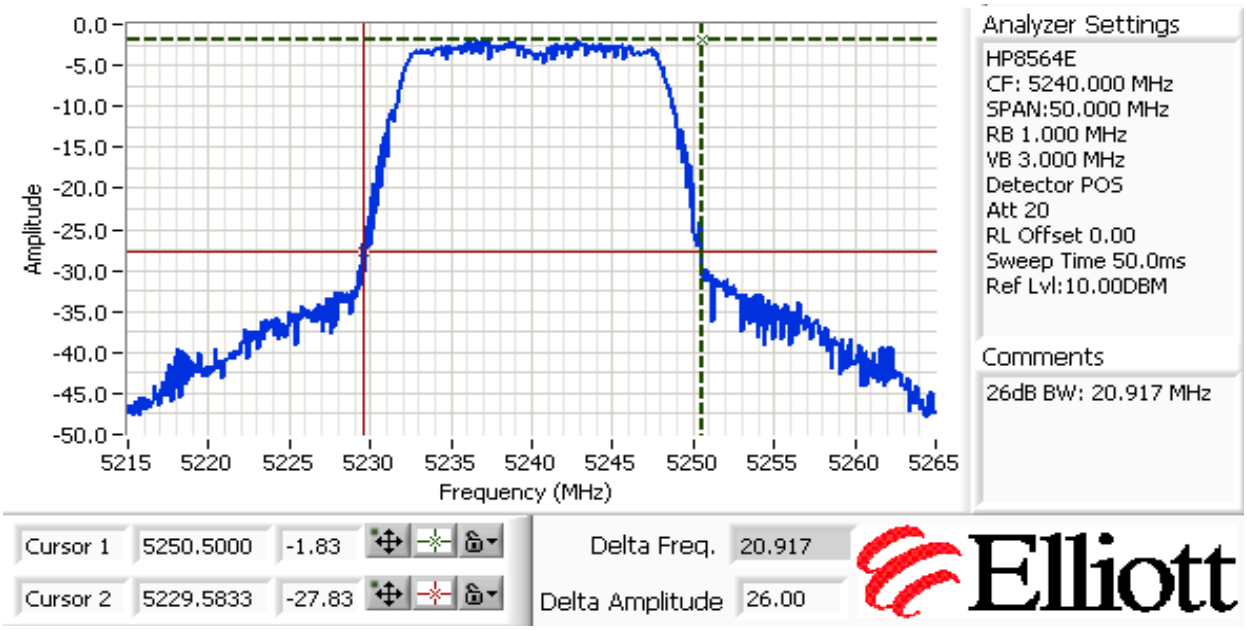
Contact:	Jerry Pohmurski		
Standard:	FCC 15.247/RSS 210	Class:	N/A





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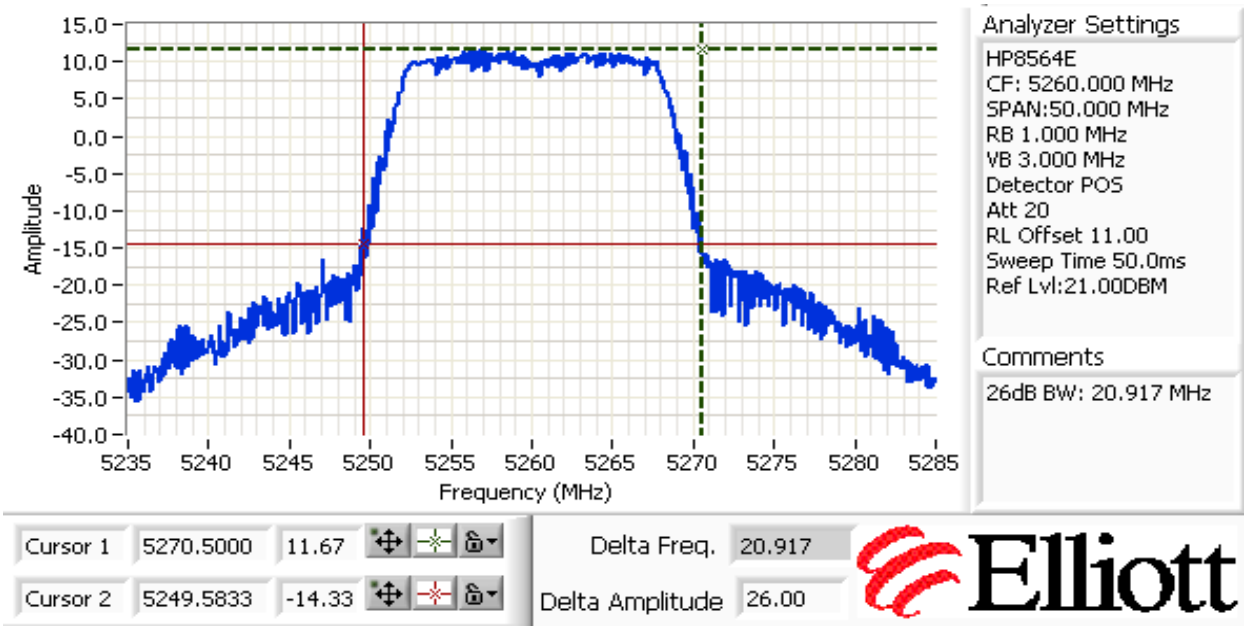

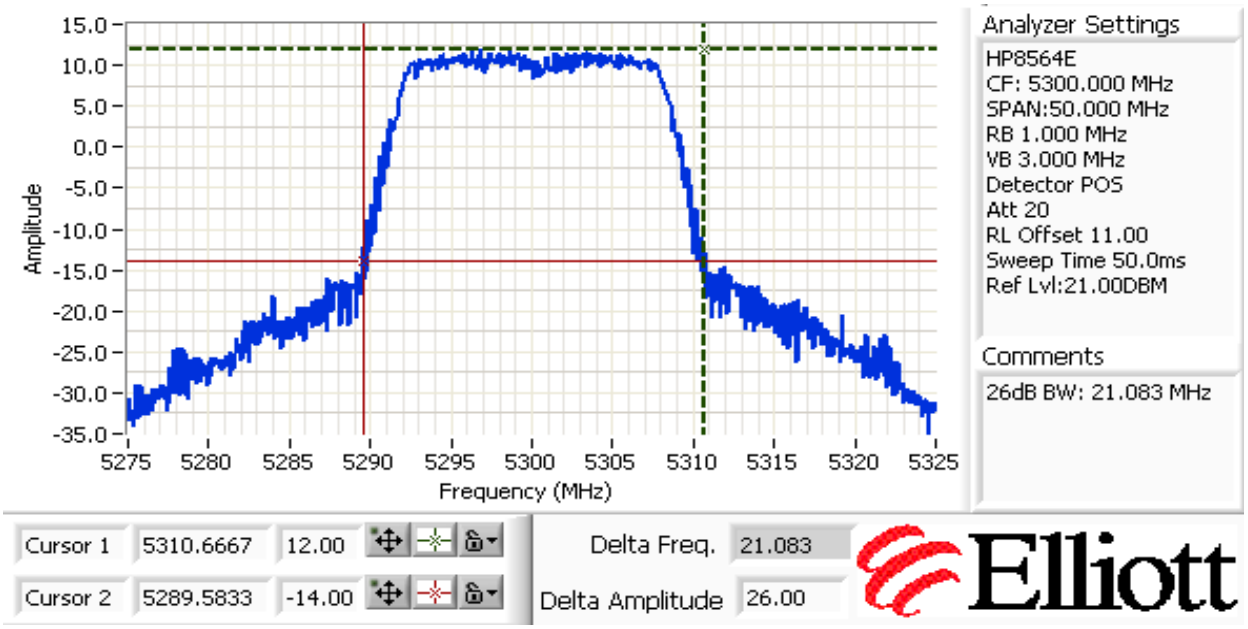

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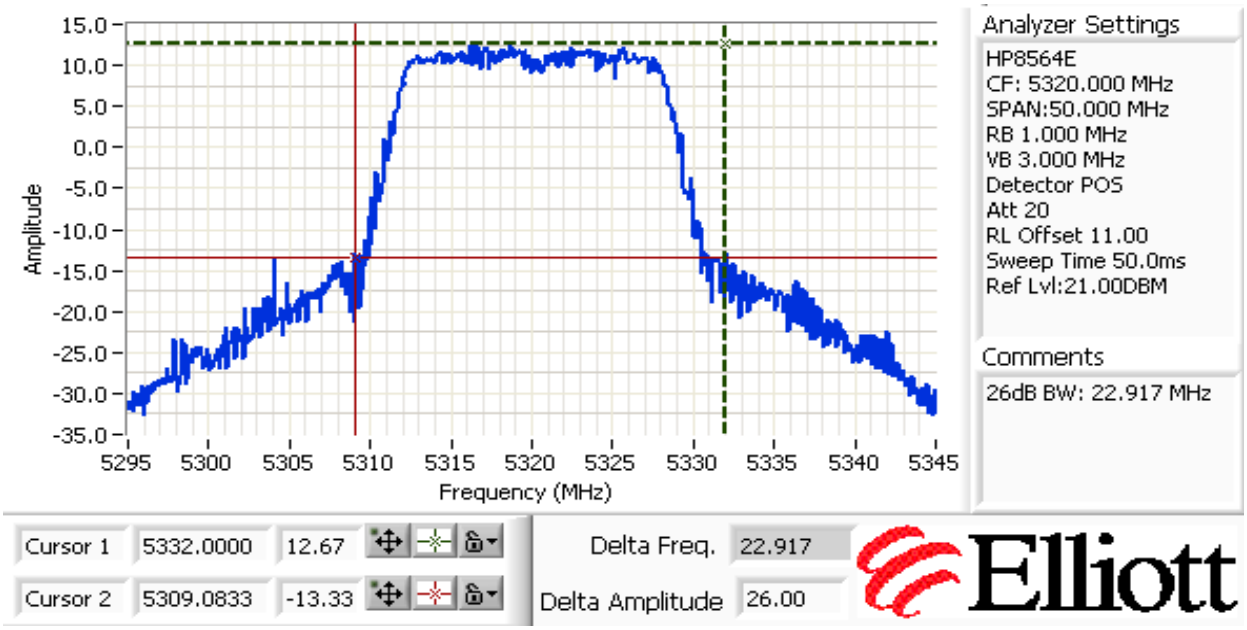
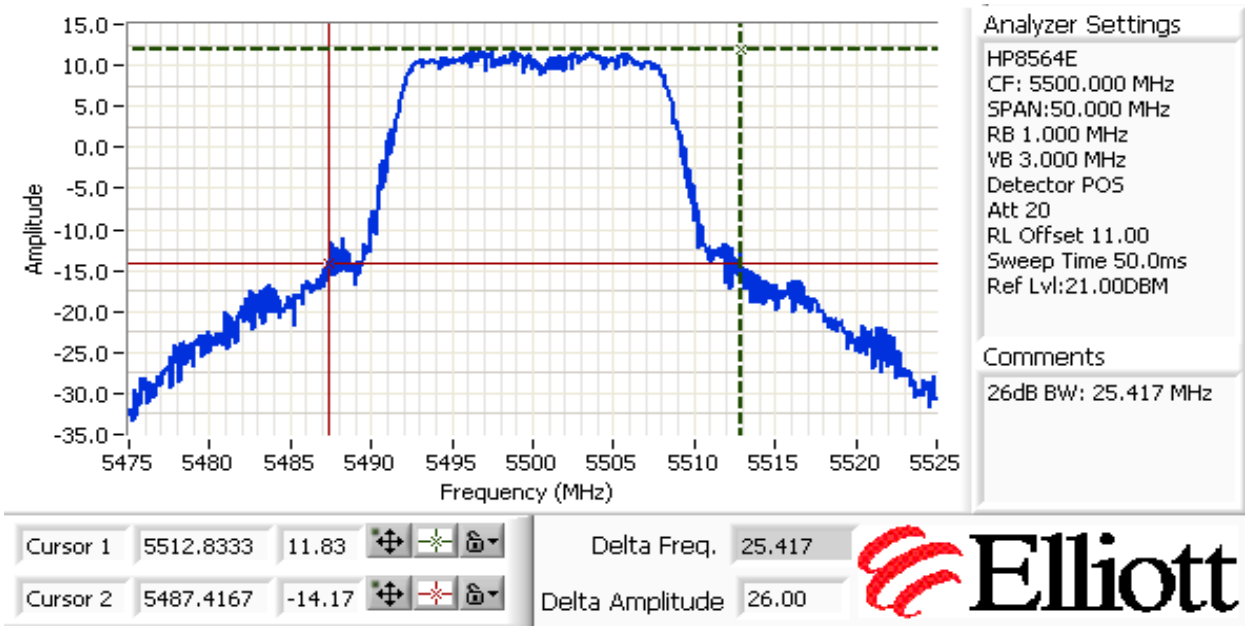
Standard:	FCC 15.247/RSS 210	Class:	N/A





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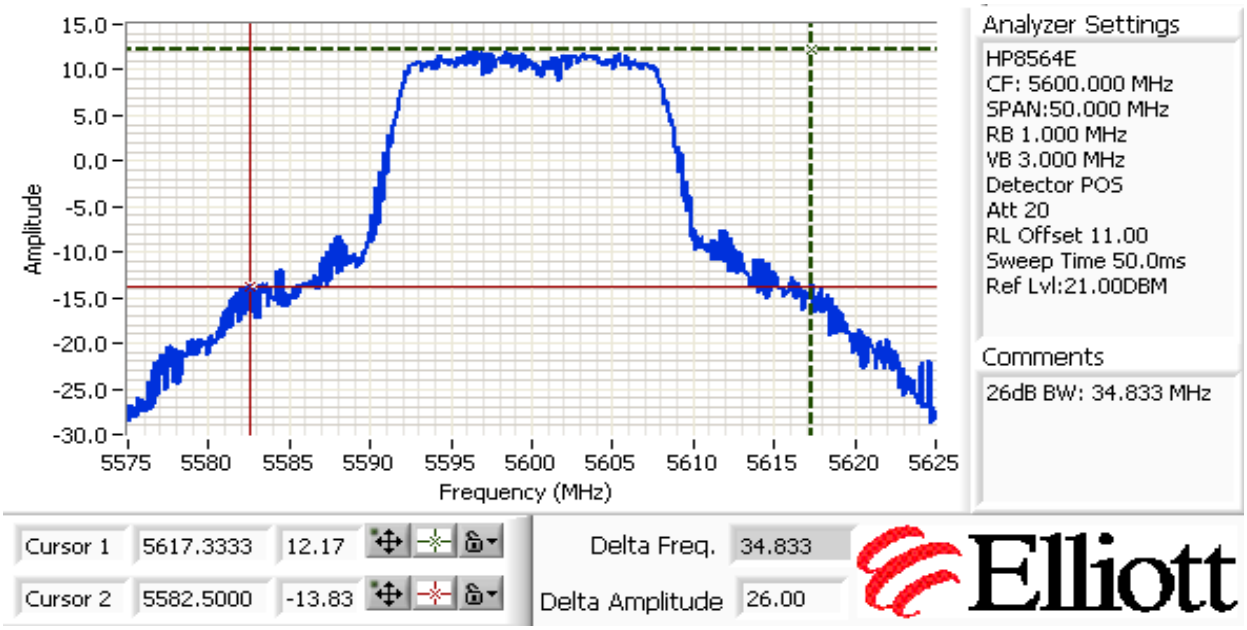

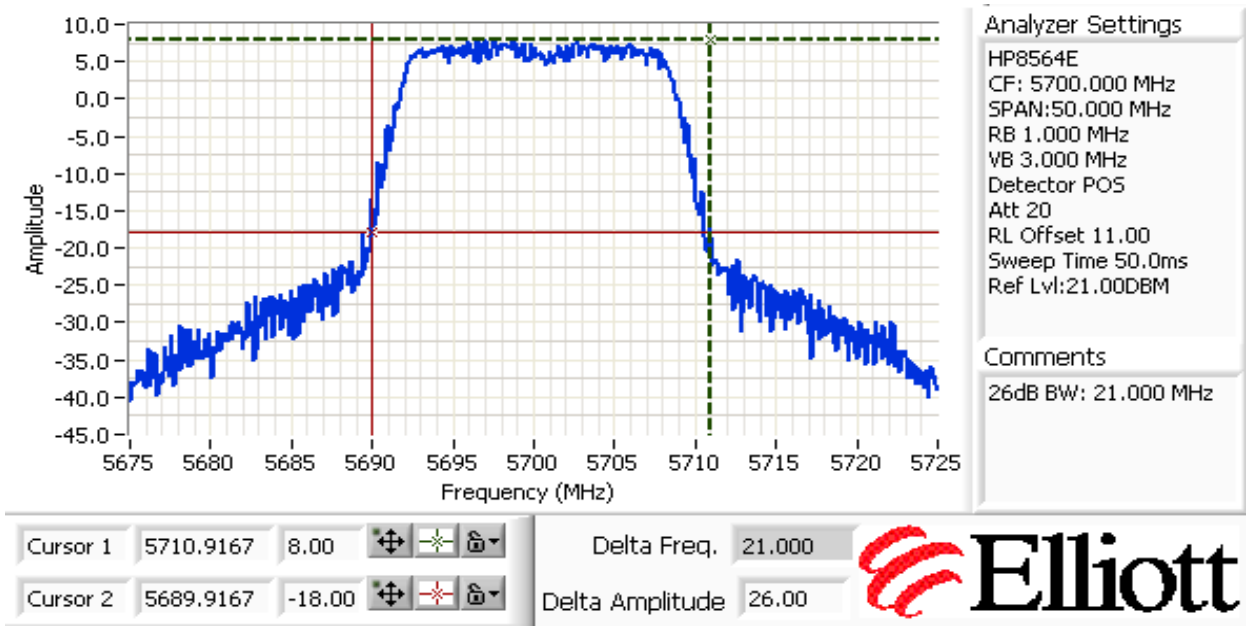

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Contact:	Jerry Pohmurski		
Standard:	FCC 15.247/RSS 210	Class:	N/A

Run #2: Peak Excursion Measurement

Device meets the requirement for the peak excursion

Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)	
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit
5180	10.0	13.0	5260	10.9	13.0	5500	10.6	13.0
5200	10.8	13.0	5300	10.0	13.0	5600	10.1	13.0
5240	10.9	13.0	5320	10.2	13.0	5700	7.8	13.0

Plots Showing Peak Excursion

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

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

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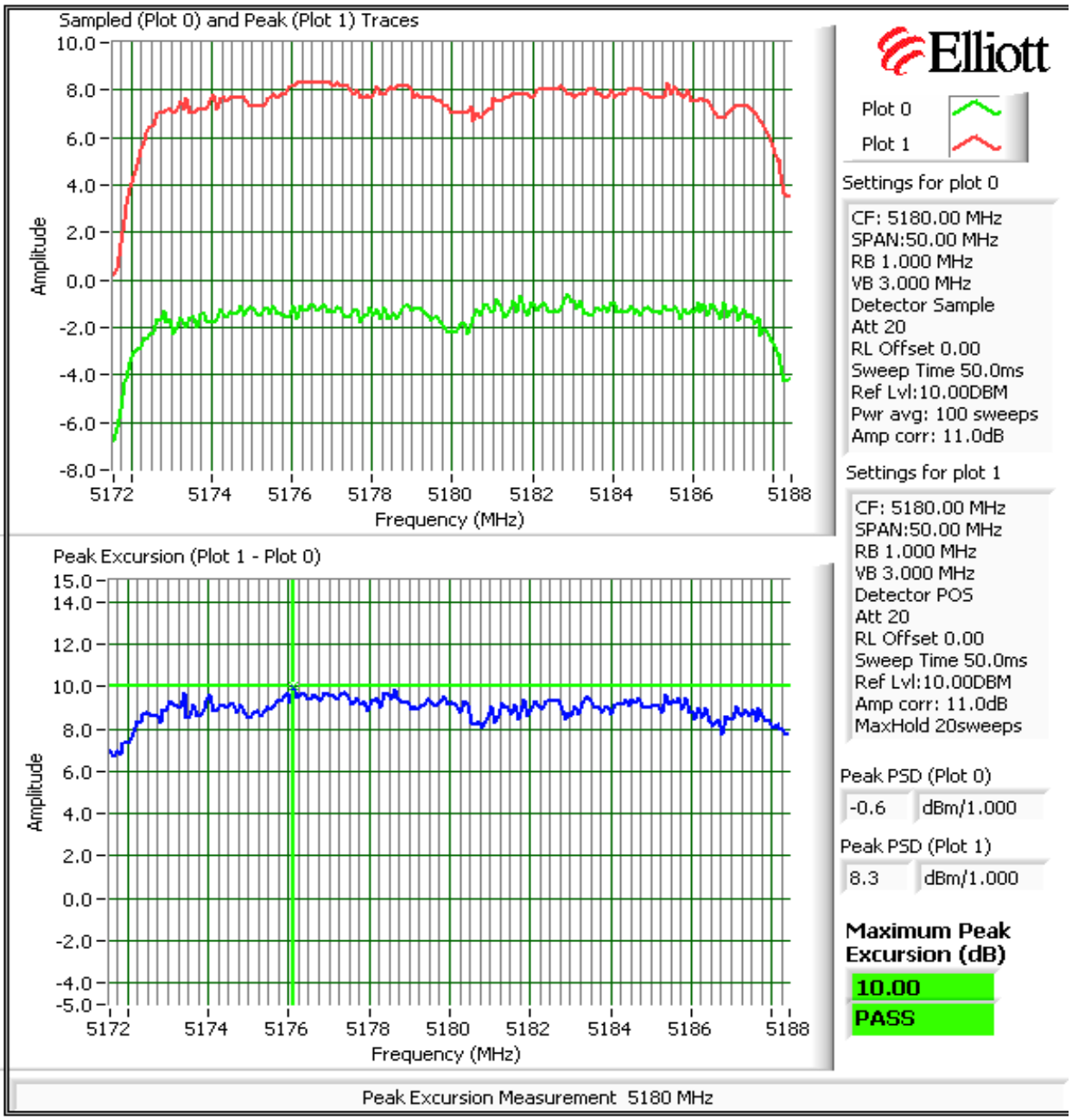
Standard:	FCC 15.247/RSS 210	Class:	N/A



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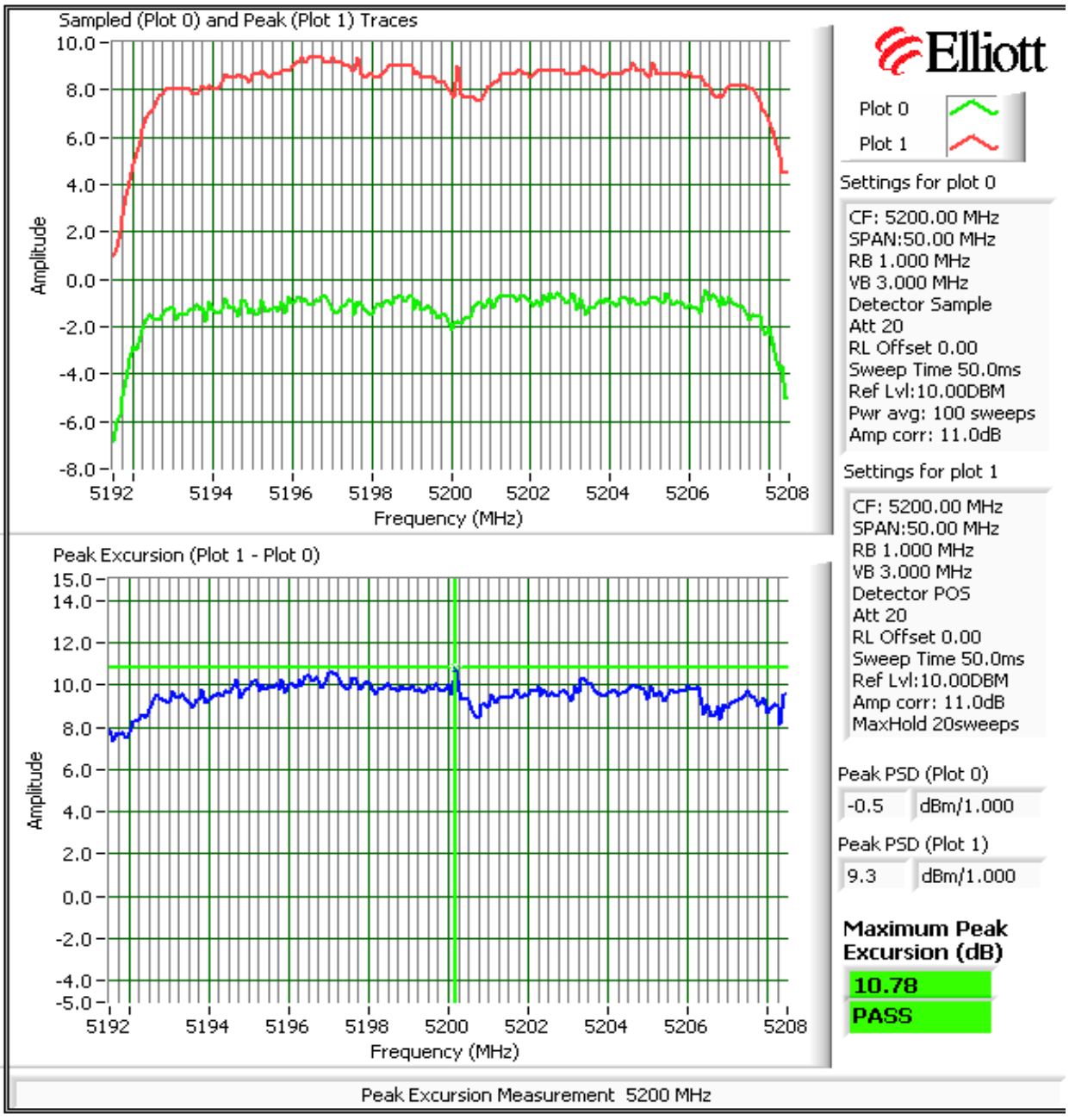
Contact:	Jerry Pohmurski		
Standard:	FCC 15.247/RSS 210	Class:	N/A



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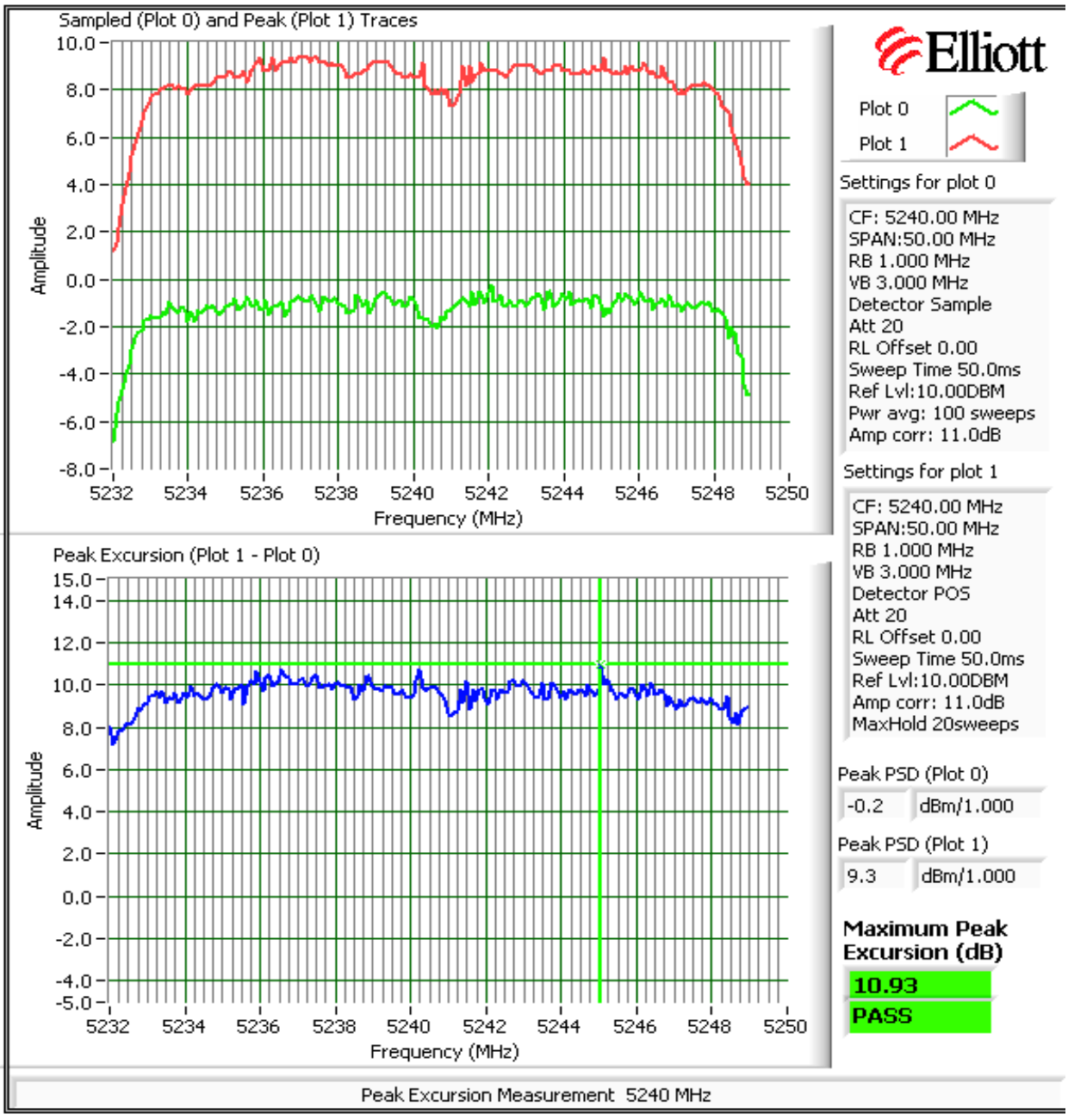

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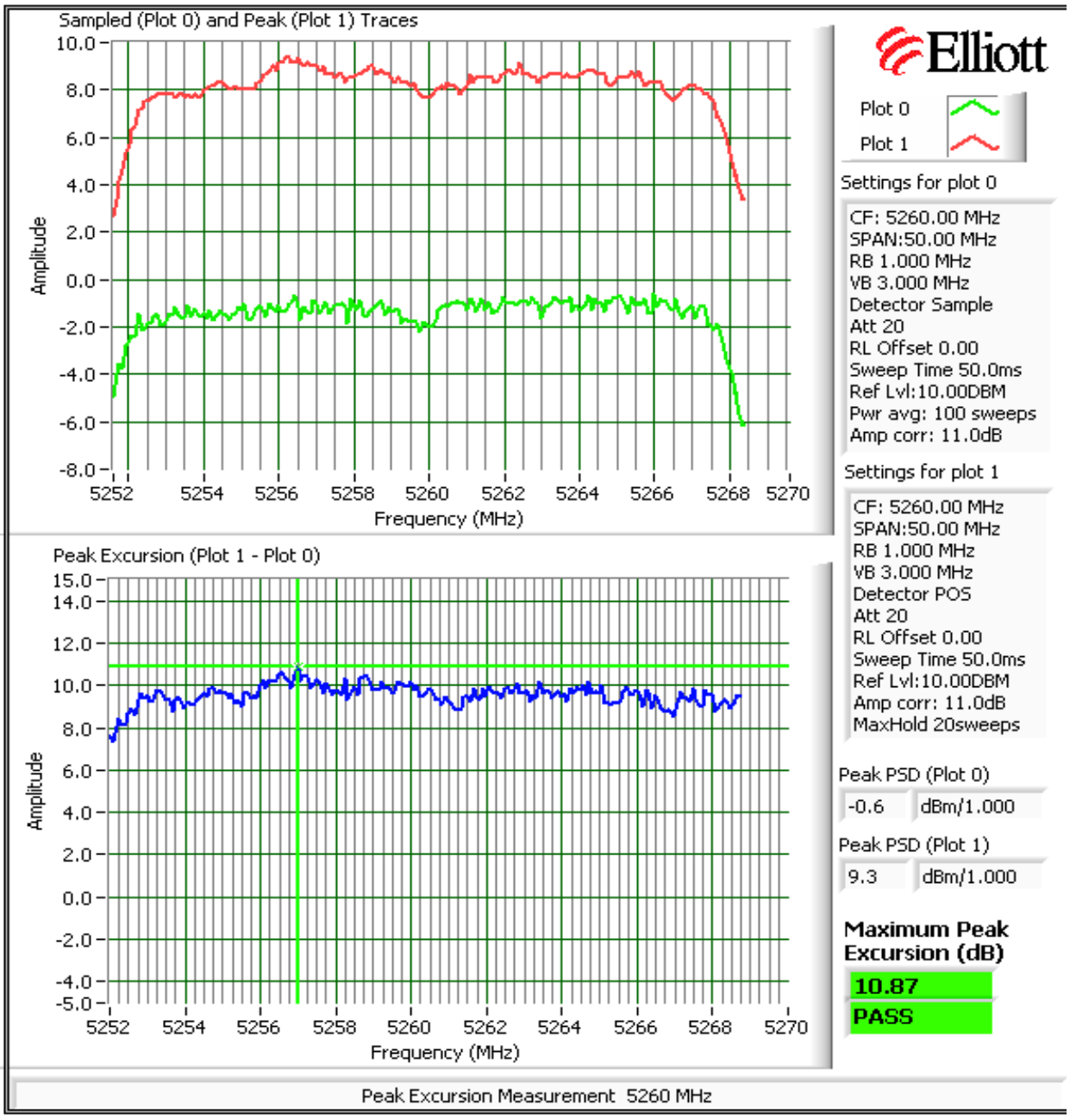

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Contact:	Jerry Pohmurski		
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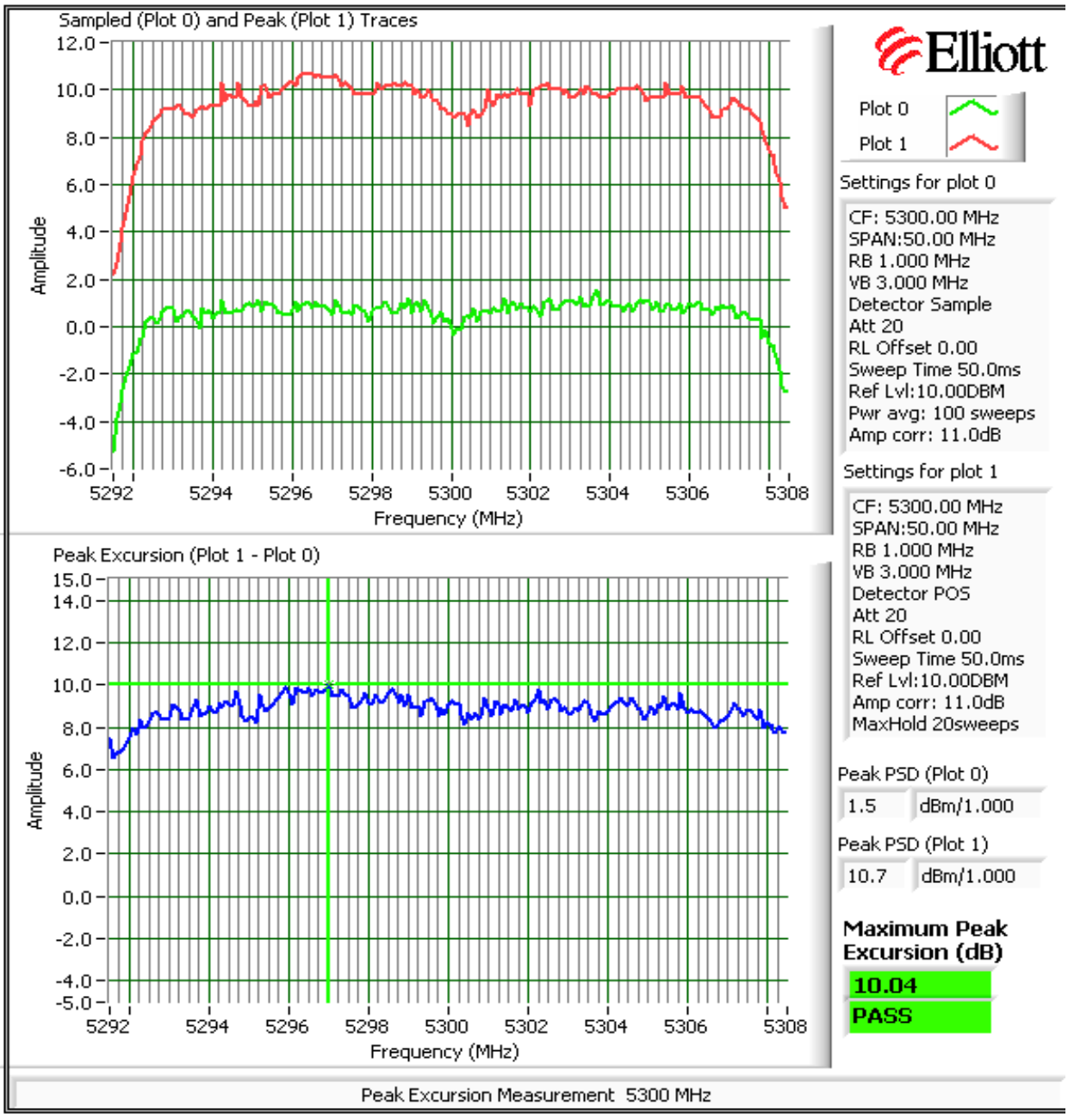

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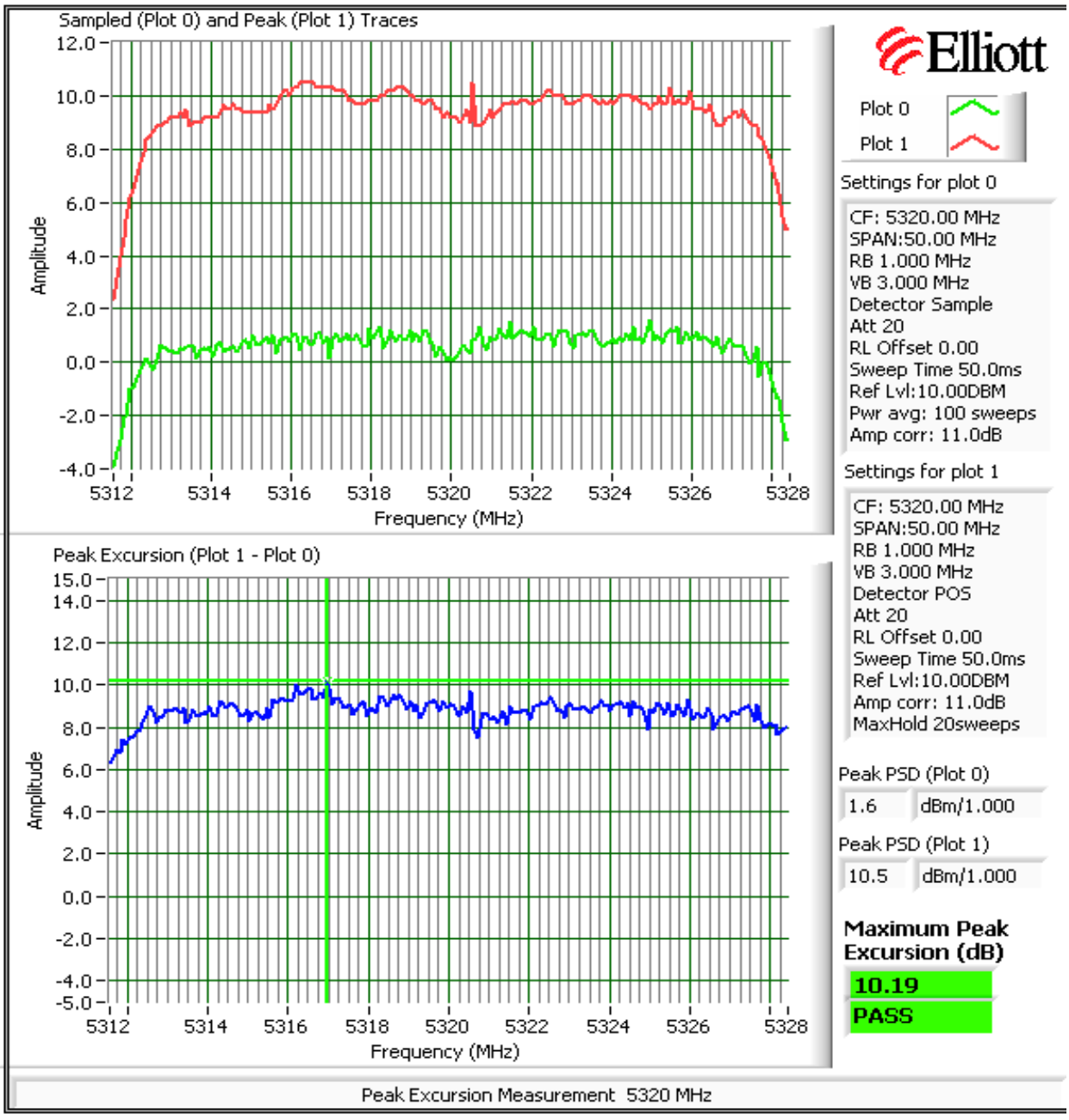

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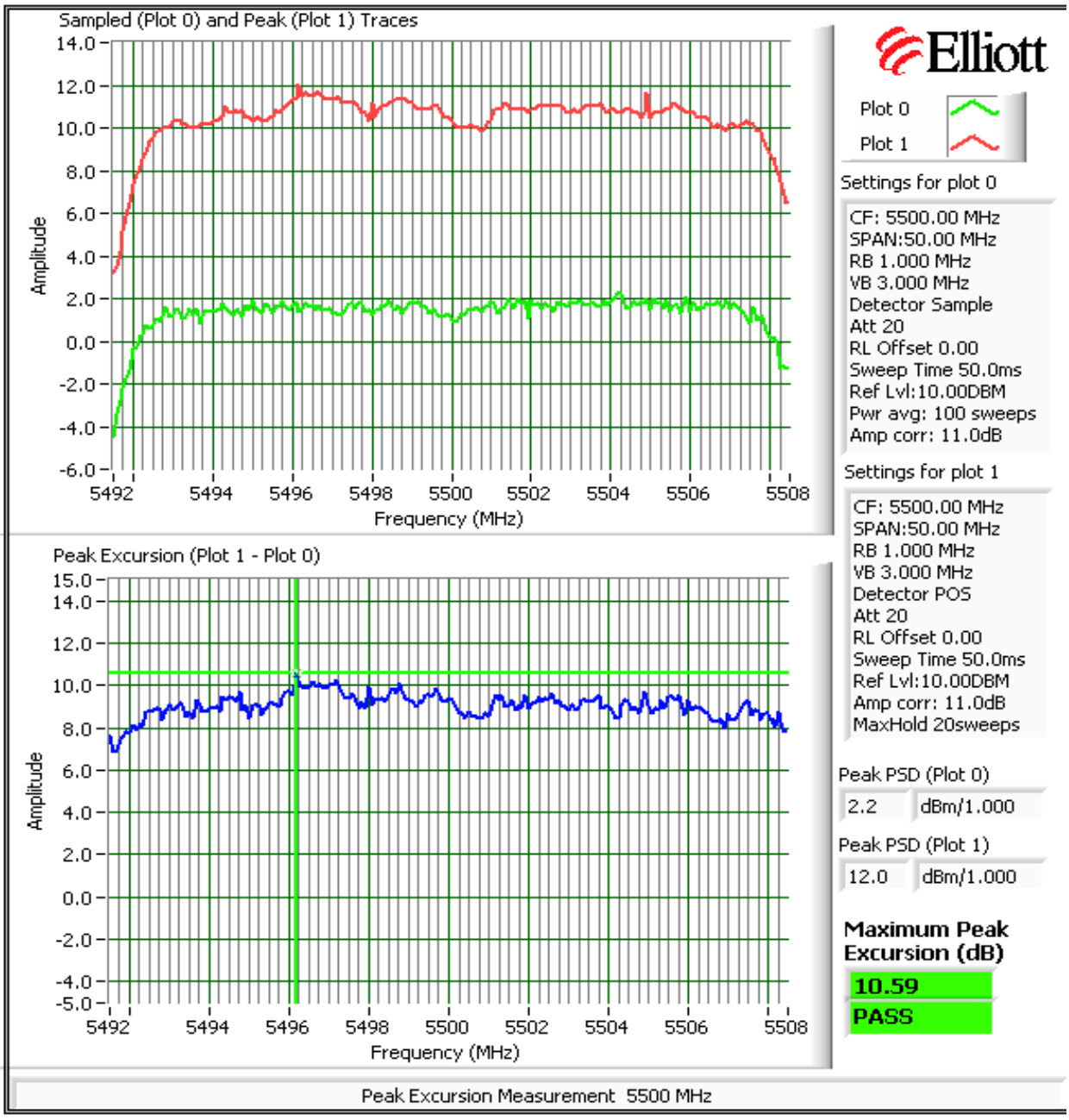

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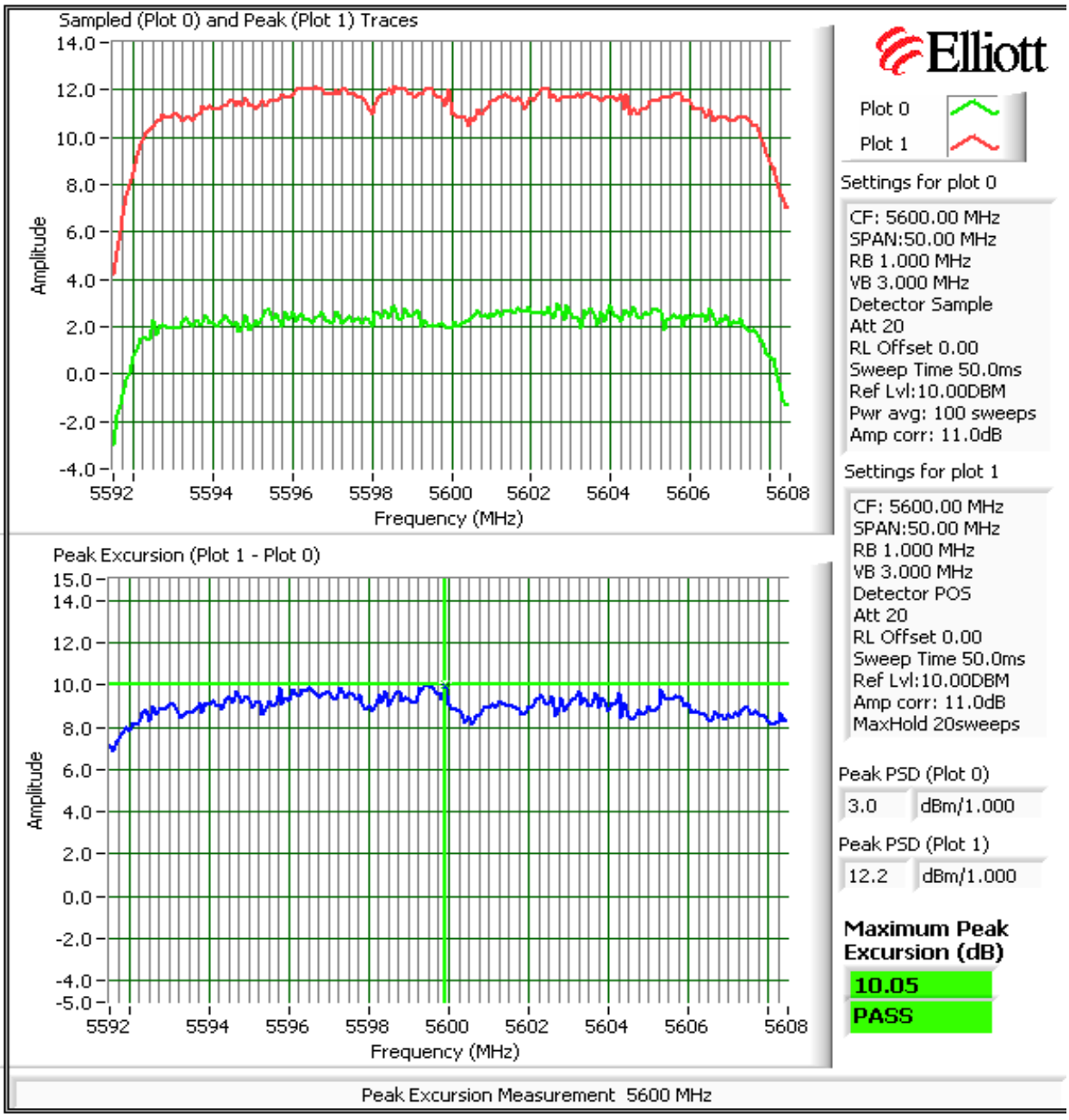

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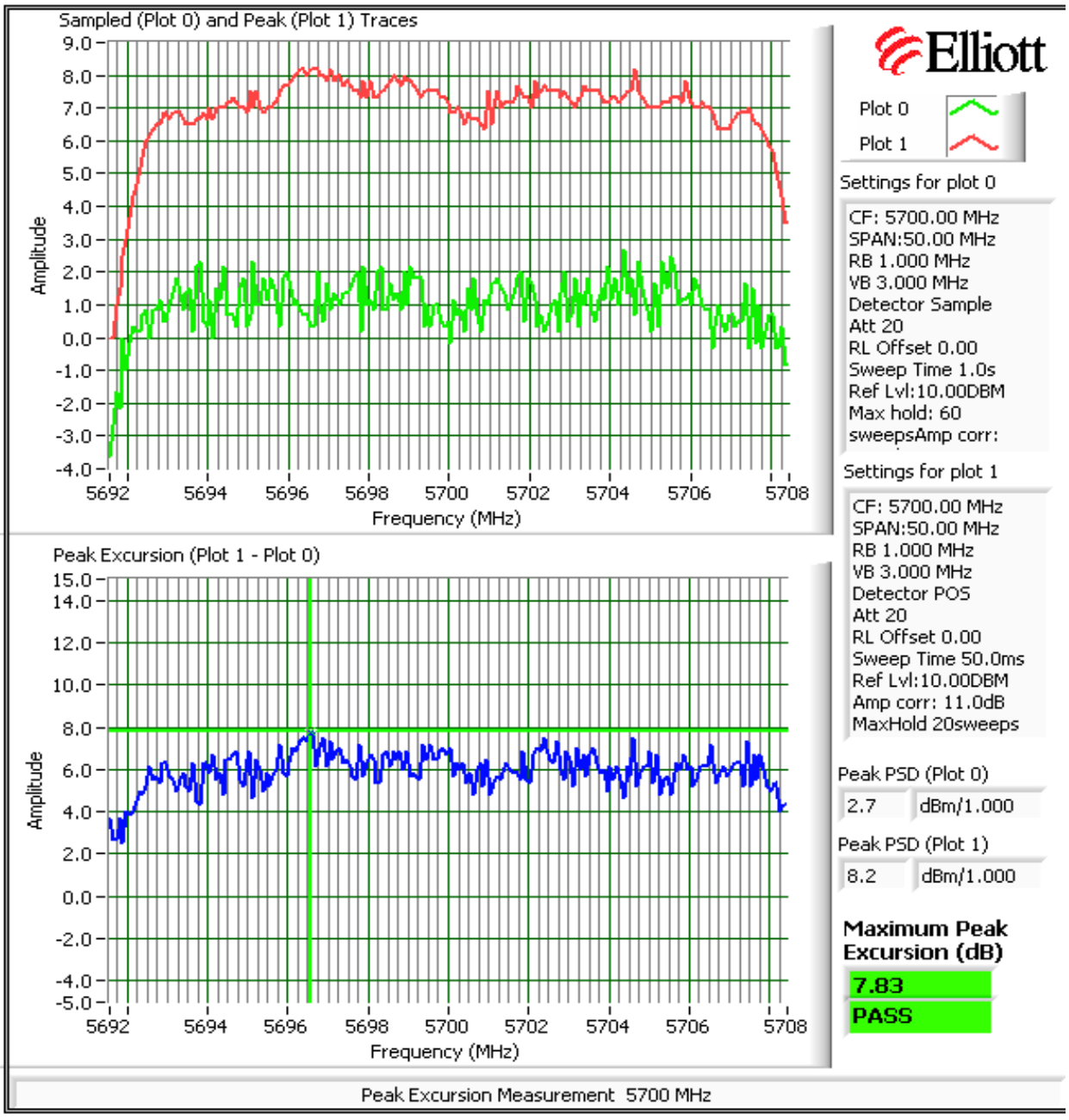

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		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.247/RSS 210	Class:	N/A

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

Maximum Antenna Gain: 5.1 dBi

Spurious Limit: -27.0 dBm/MHz eirp

Limit Used On Plots [Note 1]: -32.1 dBm/MHz Average Limit (RB=1MHz, VB=10Hz)

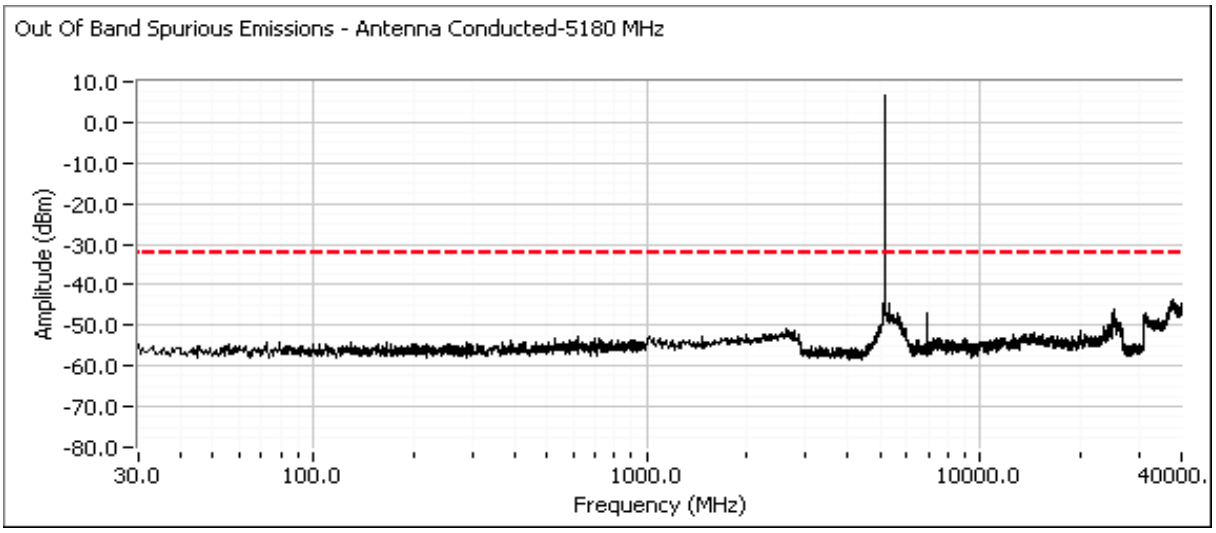
-12.1 dBm/MHz Peak Limit (RB=VB=1MHz)

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)

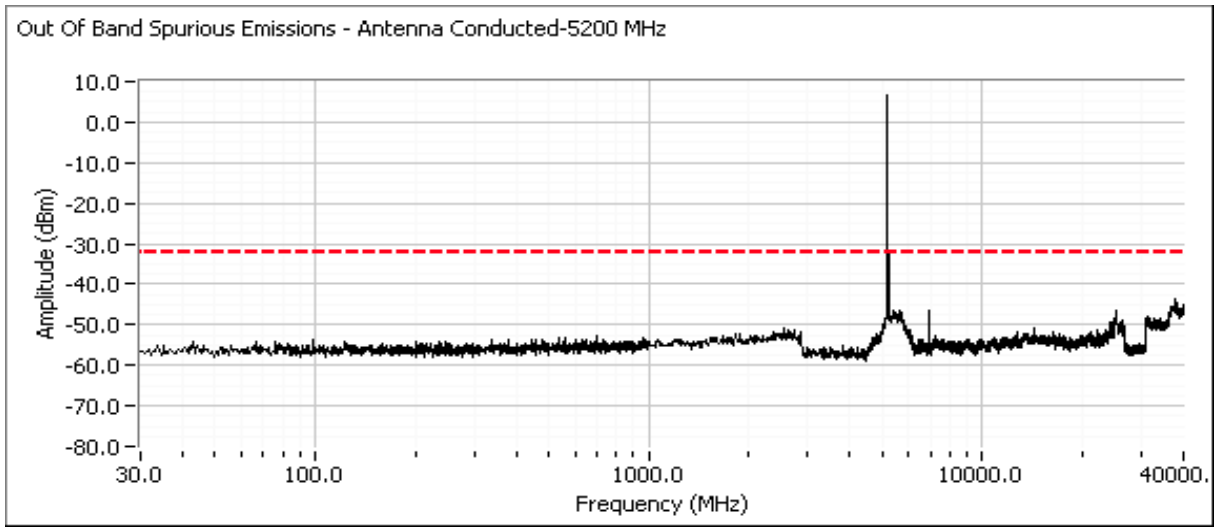
Low channel 5150 - 5250 MHz Band

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

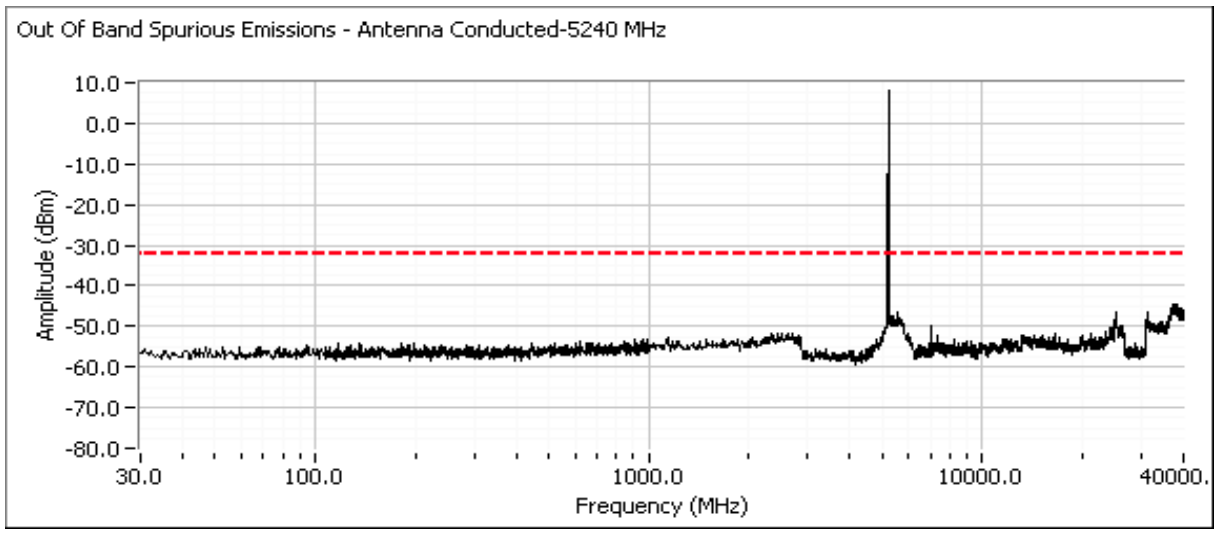


Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.247/RSS 210	Class:	N/A

Center channel 5150 - 5250 MHz Band

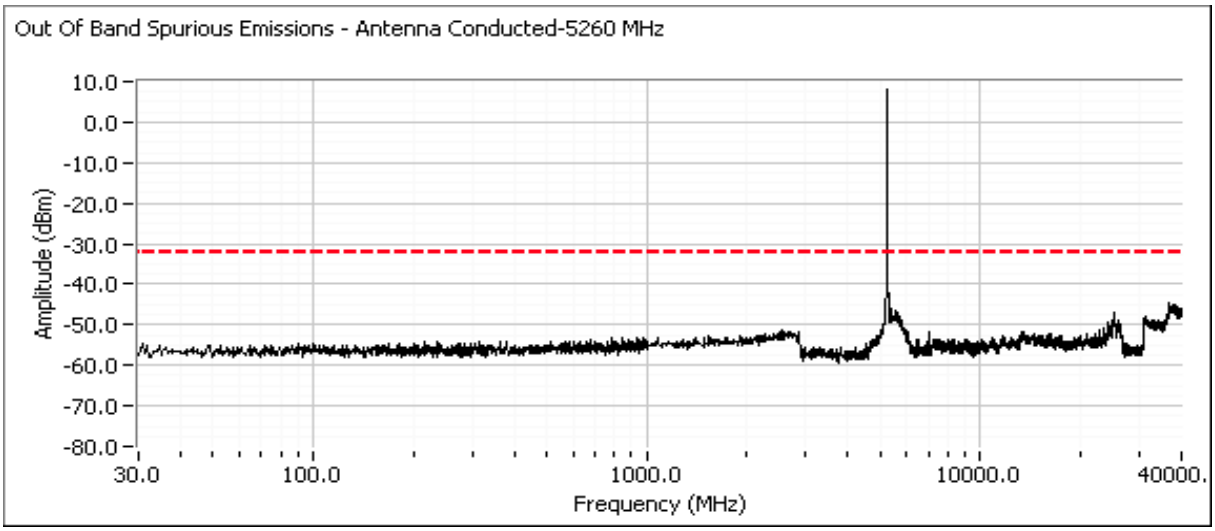


High channel 5150 - 5250 MHz Band

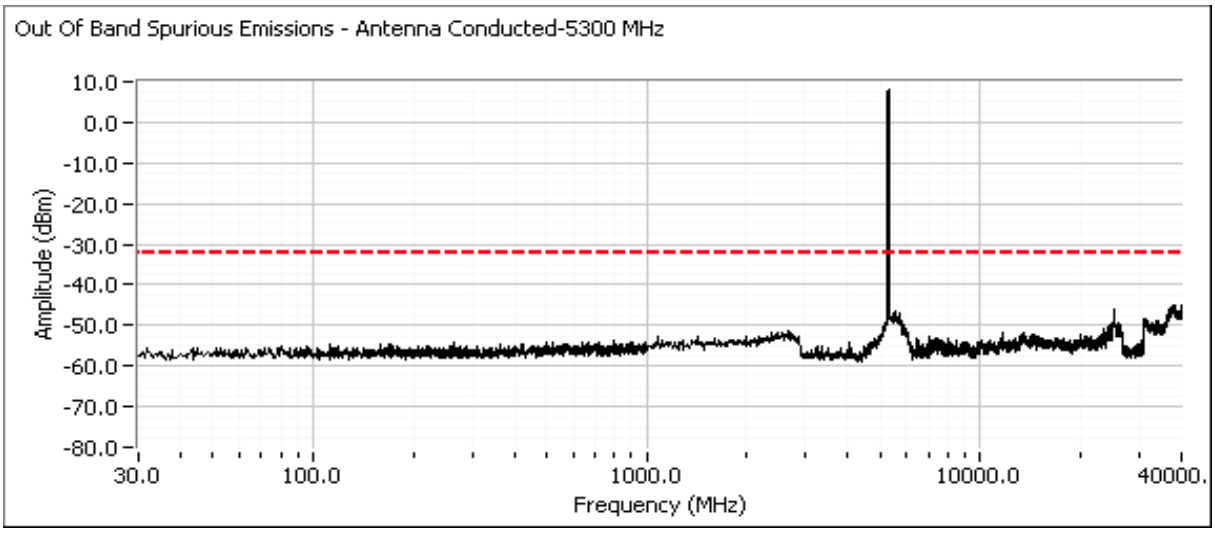


Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.247/RSS 210	Class:	N/A

Low channe, 5250 - 5350 MHz Band



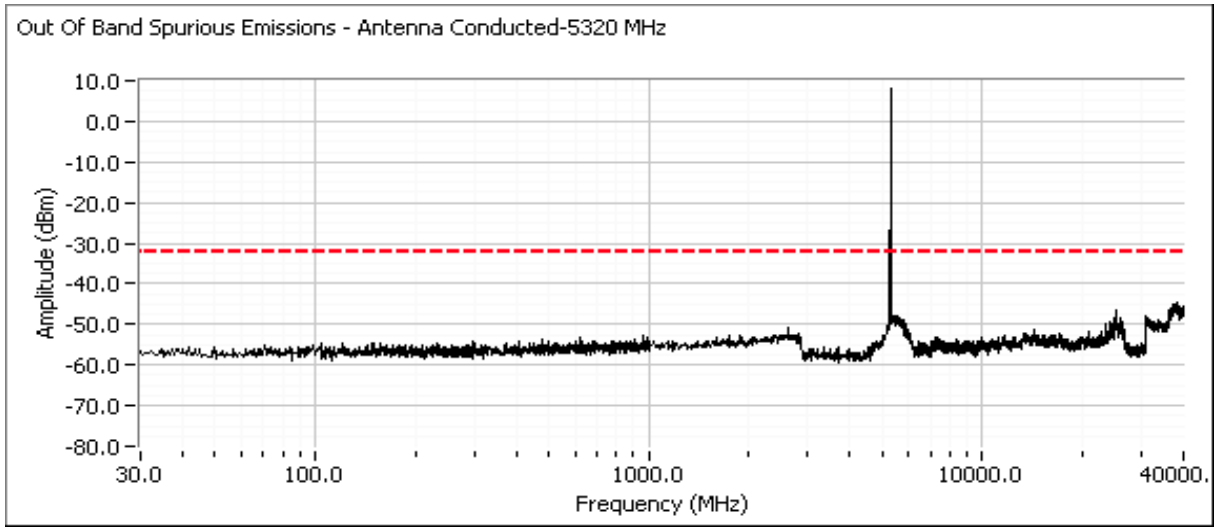
Center channel, 5250 - 5350 MHz Band



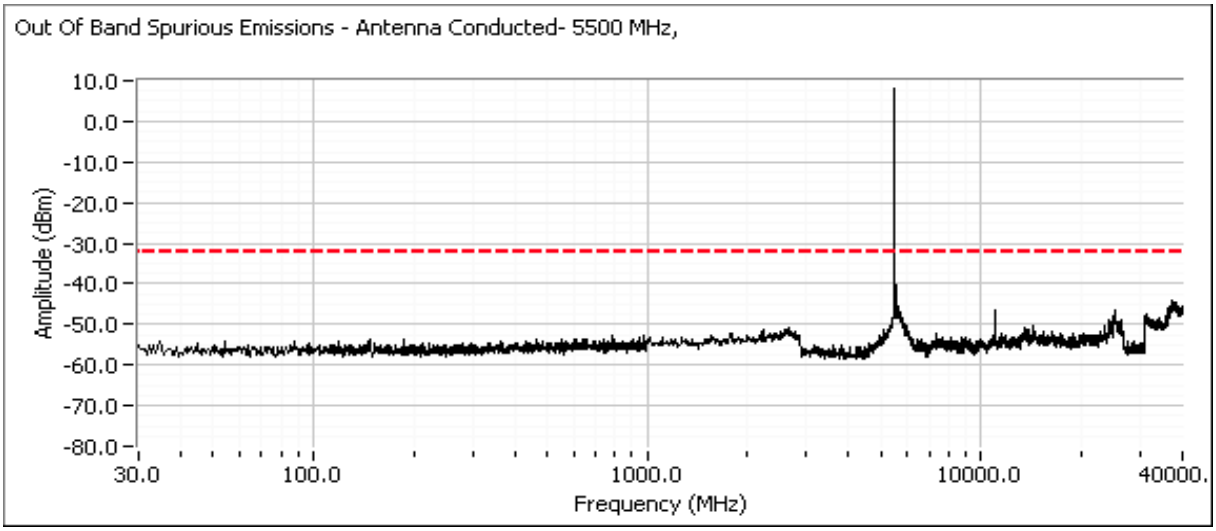
Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.247/RSS 210	Class:	N/A

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.

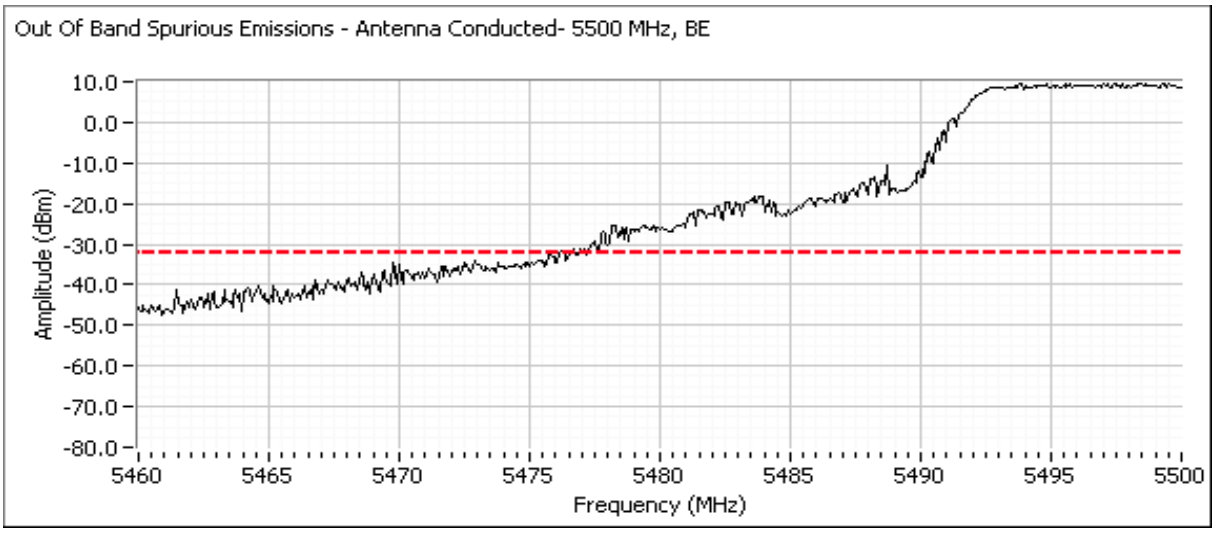


Low channel, 5470 - 5725 MHz Band

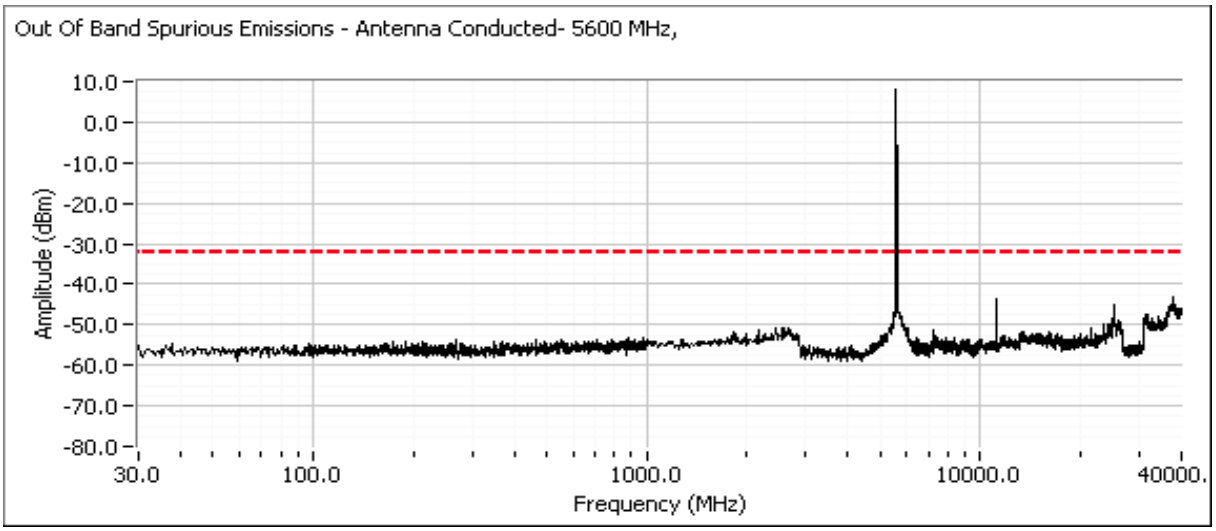


Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.247/RSS 210	Class:	N/A

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



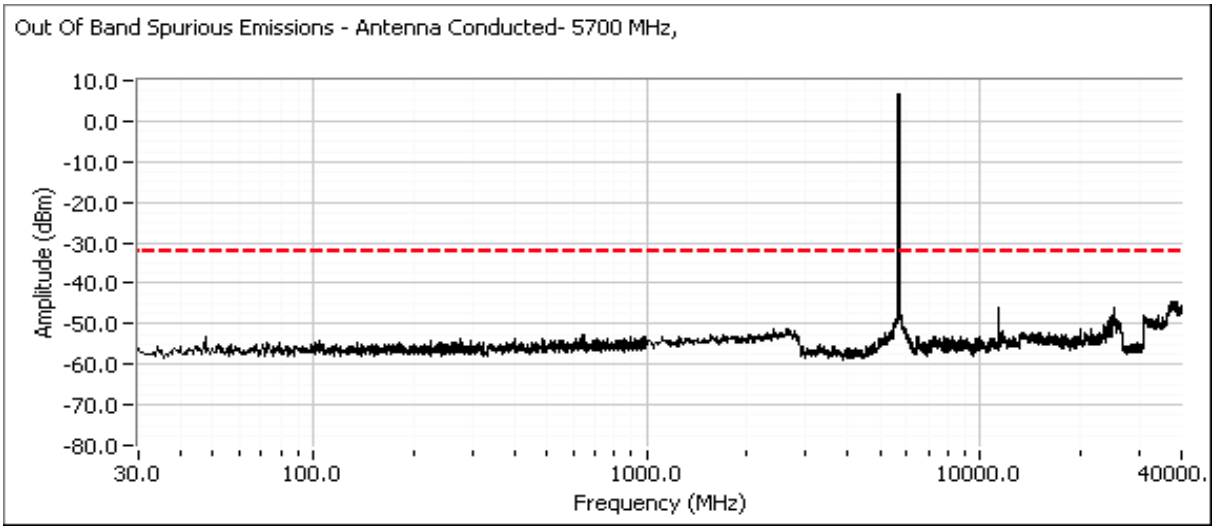
Center channel, 5470 - 5725 MHz Band



Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74642
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.247/RSS 210	Class:	N/A

High channel, 5470 - 5725 MHz Band

Includes a plot from 5700 - 5780 MHz showing compliance with the limit immediately above the allocated band.



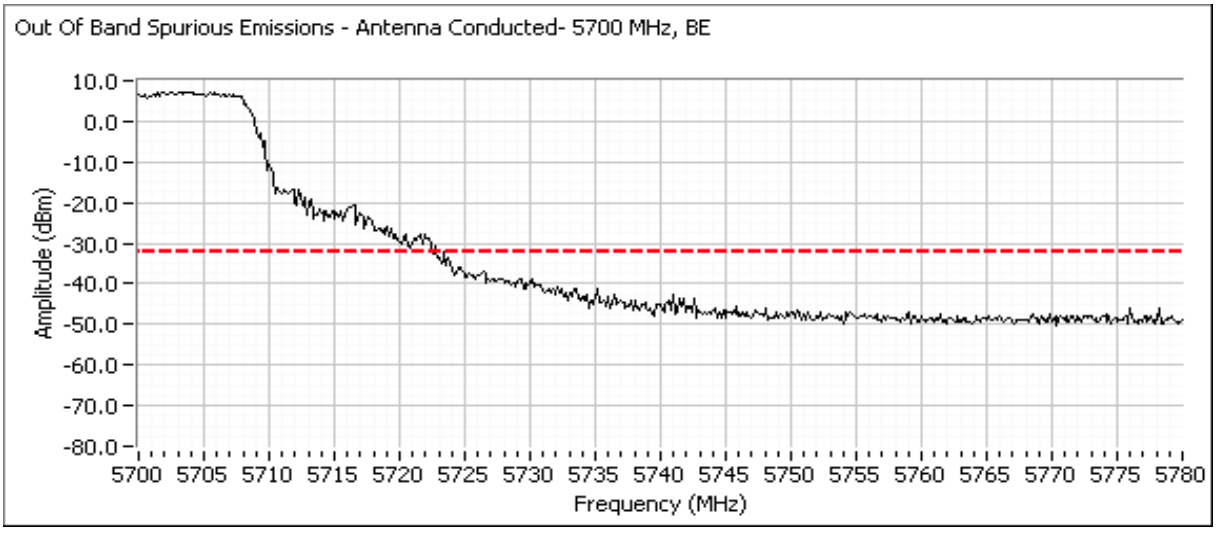


EXHIBIT 3: Photographs of Test Configurations

EXHIBIT 4: Proposed FCC ID Label & Label Location

EXHIBIT 5: Detailed Photographs

EXHIBIT 6: Operator's Manual

EXHIBIT 7: Block Diagram

EXHIBIT 8: Schematic Diagrams

EXHIBIT 9: Theory of Operation

EXHIBIT 10: RF Exposure Information