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Electromagnetic Emissions Test Report and 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 Transmitter Model: SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors

UPN:	6616A-SDCCF10AG
FCC ID:	TWG-SDCCF10AG
GRANTEE:	Summit Data Communications 526 South Market Suite 407 Akron, OH 44311
TEST SITE:	Elliott Laboratories, Inc. 684 W. Maude Ave Sunnyvale, CA 94086
REPORT DATE:	March 5, 2008
FINAL TEST DATE:	November 27, December 11, December 19, 2007, and January 24, February 29, March 4, 2008

AUTHORIZED SIGNATORY: _____

Mark E. Hill
Staff Engineer

ACCREDITED

Testing Cert #2016-01

REVISION HISTORY

Rev #	Date	Comments	Modified By
1	3/6/08	Initial Release	DG

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SCOPE

An electromagnetic emissions test has been performed on the Summit Data Communications model SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors 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

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 model SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors and therefore apply only to the tested sample. The sample was selected and prepared by Ron Seide of Summit Data Communications.

OBJECTIVE

The primary objective of the manufacturer is compliance with 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 model SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors 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	17.7 MHz	N/A – limits output power if < 20MHz	N/A
15.407(a) (1)	A9.2(1)	Output Power	13.9 dBm (0.025W)	16.5 dBm	Complies
15.407(a) (1))	A9.2(1)	Power Spectral Density	3.4 dBm/MHz	4 dBm/MHz	Complies
	A9.5 (2)	Power Spectral Density	3.4 dBm/MHz	Shall not exceed the average value by more than 3dB	Complies

General UNII 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	17.3 MHz	Information only	
15.407(b) (5) / 15.209	A9.3	Spurious Emissions below 1GHz	No Emissions Detected		Complies
15.407(b) (2)	A9.3	Spurious Emissions above 1GHz	65.0dBµV/m (1778.3µV/m) @ 5248.5MHz		Complies (-3.3dB)
15.407(a)(6)	-	Peak Excursion Ratio	7.8 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		N/A
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 (Operational Description page 1)		Complies
15.407 (h1)	A9.4	Transmit Power Control	Not applicable, device does not operate in either 5470 – 5725 or 5250 – 5350 MHz bands.		
15.407 (h2)	A9.4	Dynamic frequency Selection (device with radar detection)	Not applicable, device does not operate in either 5470 – 5725 or 5250 – 5350 MHz bands.		
	A9.9g	User Manual information	Refer to Exhibit 6 for details		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 radio module uses a unique connector type		Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	46.4dBµV/m (208.9µV/m) @ 17735.4MHz		Complies (-7.6dB)
15.207	RSS GEN Table 2	AC Conducted Emissions	55.6dBµV @ 0.167MHz	Refer to standard	Complies (-9.5dB)
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11, RSS 102 declaration and User Manual statements.	Refer to OET 65, FCC Part 1 and RSS 102	Complies
	RSP 100 RSS GEN 7.1.5	User Manual		Statement required regarding non-interference	Complies

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 model SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors is an 802.11a/g 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 on a tabletop during emissions testing to simulate the end user environment. The electrical rating of the EUT is 3.3 VDC +/- 5% With typical power consumption of 400 mA (1320mW) while in transmit mode, 180 mA (594mW) while in receive mode and 10 mA (33 mW) while in standby mode.

The sample was received on November 19, 2007 and tested on November 27, December 11 and December 19, 2007 and January 24, February 29, and March 4, 2008. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number	FCC ID
Summit Data Communications	SDC-CF10AG	Compact Flash Module	-	TWG-SDCCF10AG

Note: The EUT was tested using an extender card that allowed for the card to be outside of the host system.

ANTENNA SYSTEM

There were three antennas included in the testing:
Laird Centurion, m/n NanoBlade, pcb antenna, 3.8dBi @ 2.45GHz, 5.1dBi @ 5.25GHz, 4.5dBi @ 5.8GHz
Volex, p/n VLX-51004-A, Omni, 2.3dBi @ 2.4GHz, 1.9dBi @ 5GHz
Larson, p/n R380.500.314, Omni, 1.6dBi @ 2.4GHz, 5dBi @ 5GHz

Note: The Volex Omni was used in the 2.4GHz band and the Larson Omni was used in the 5GHz bands. The Laird pcb antenna was also tested for both 2.4GHz and 5GHz.

ENCLOSURE

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

MODIFICATIONS

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. Note, the radio was unable to transmit continuously due to limitations of the host device.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on November 27, December 11 and December 19, 2007 and January 24, 2008 at the Elliott Laboratories Open Area Test Site #2 located at 684 West Maude Avenue, Sunnyvale, California. 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.

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 of predictable local TV, radio, and mobile communications traffic. The test site contains 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.

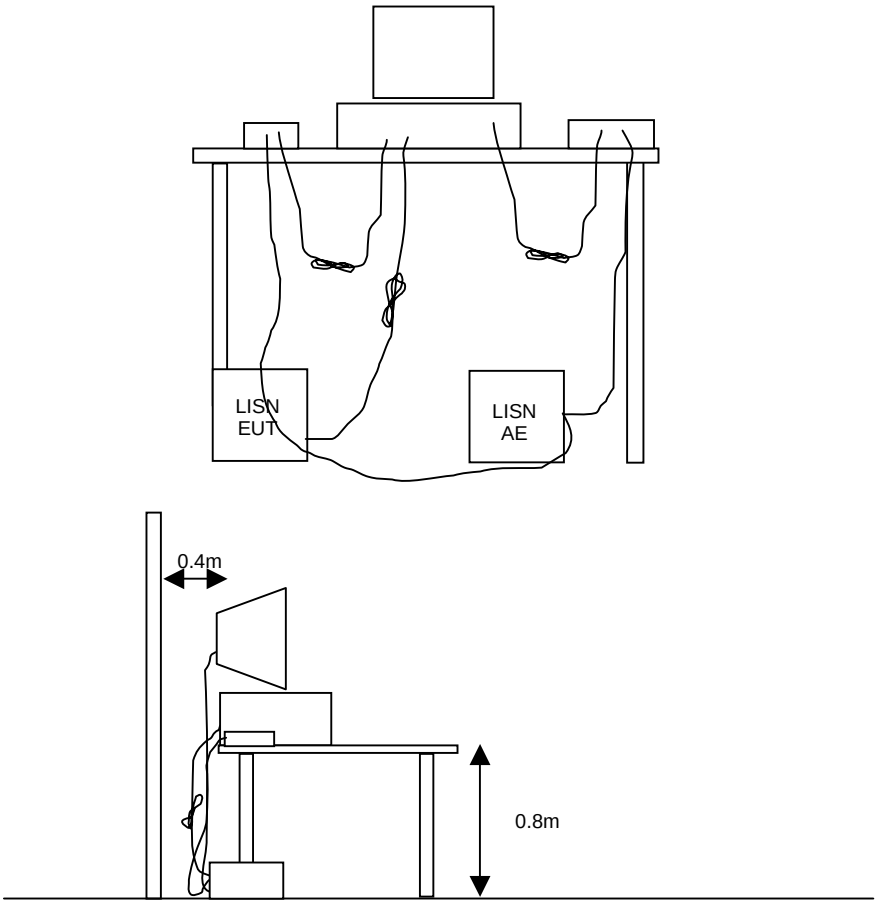
TEST PROCEDURES

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.

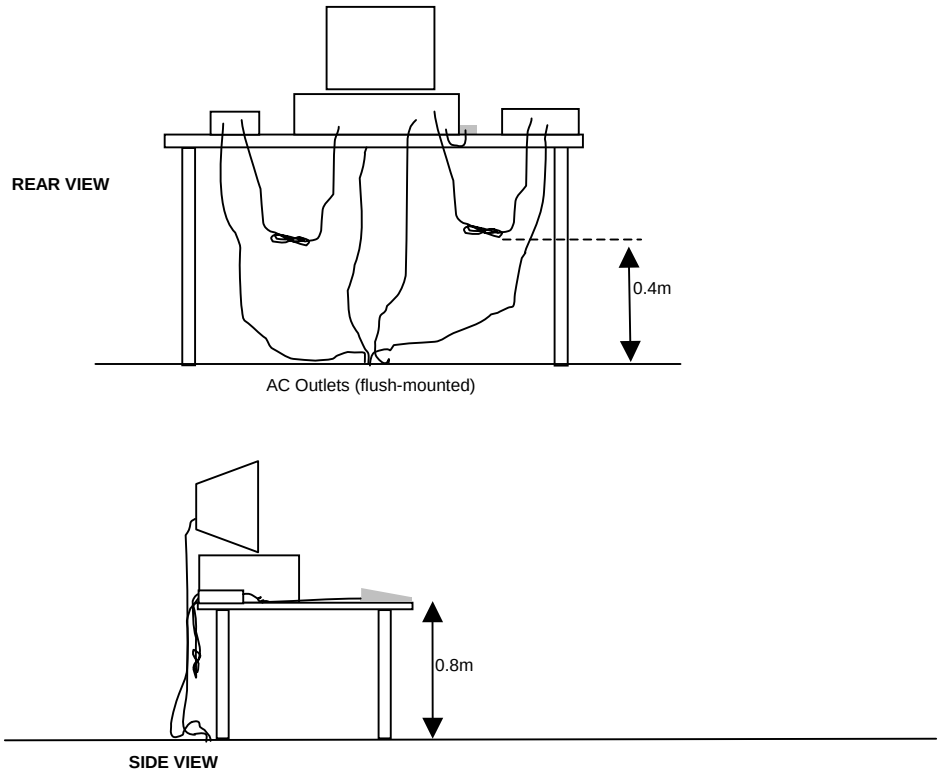


A preliminary scan of the radiated emissions is performed in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed, one scan for each antenna polarization (horizontal and vertical; loop parallel and perpendicular to the EUT). 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.

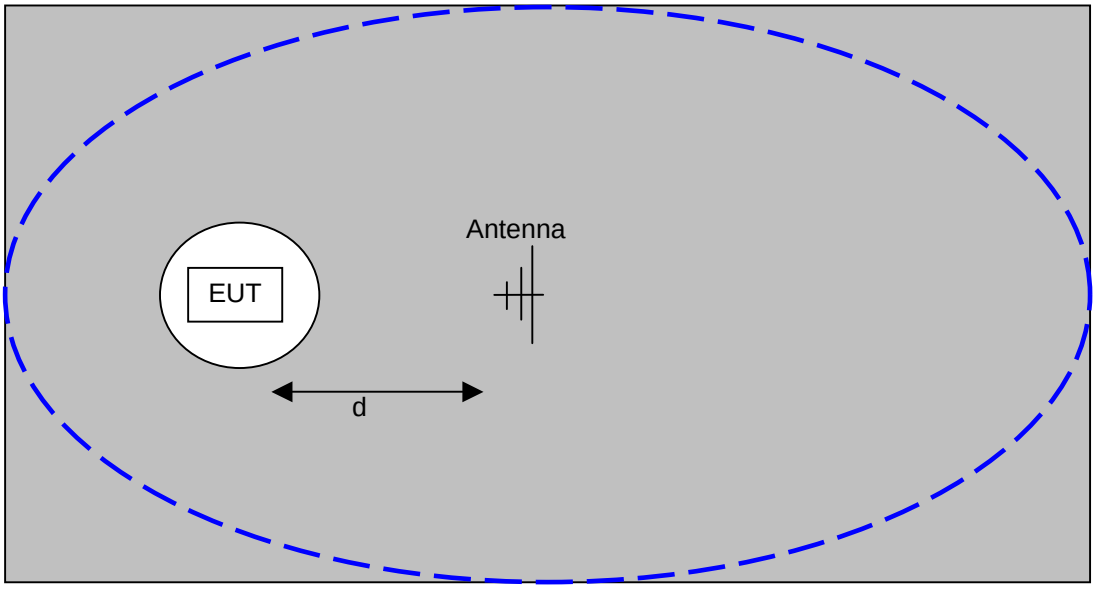
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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.

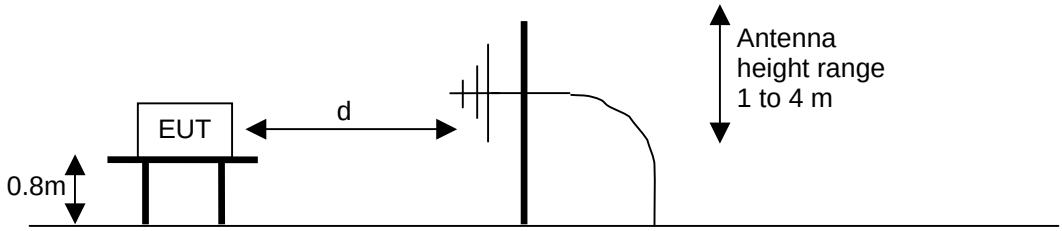
When testing above 18 GHz, the receive antenna is located at 1meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.



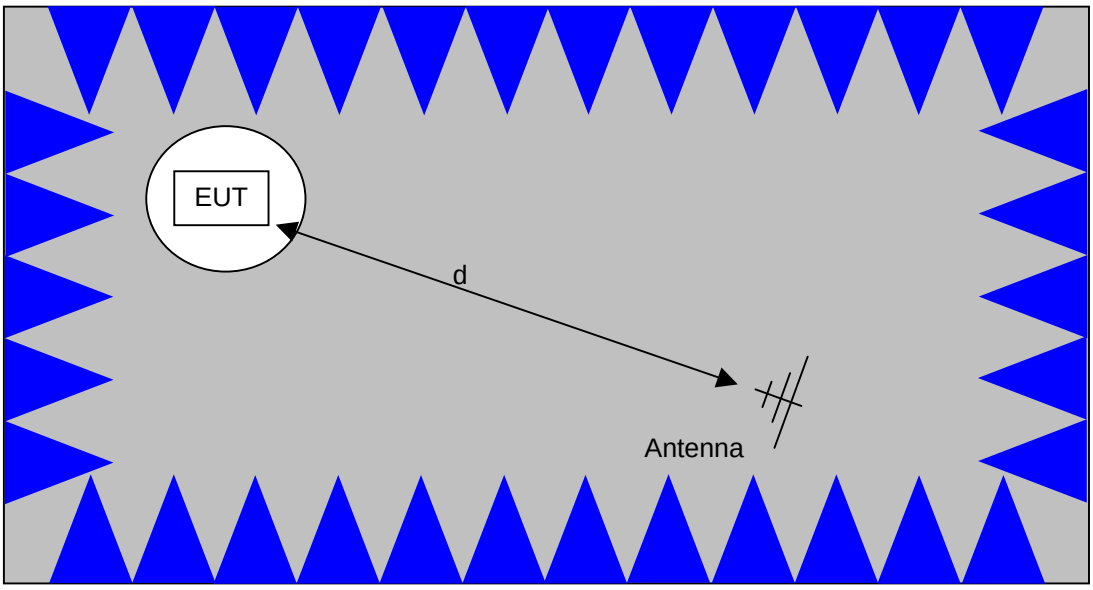
Typical Test Configuration for Radiated Field Strength Measurements



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.

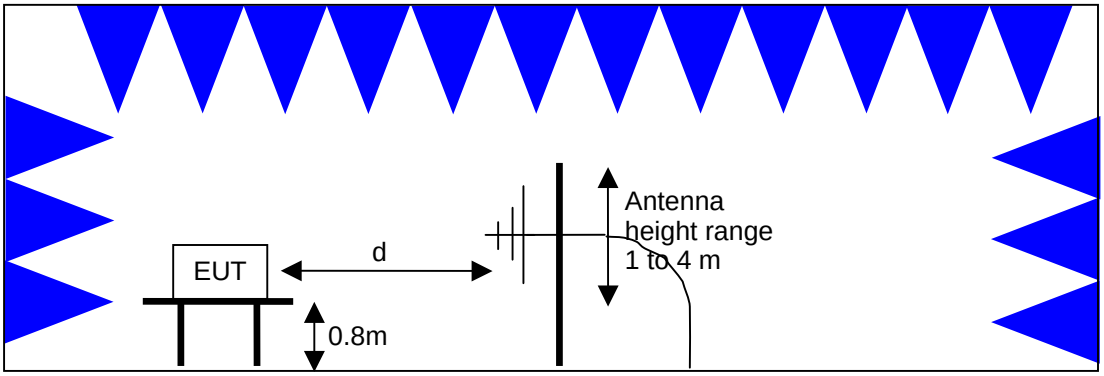


Test Configuration for Radiated Field Strength Measurements
OATS- Plan and Side Views



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

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



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

BANDWIDTH MEASUREMENTS

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

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

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

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

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

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

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

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

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

FCC 15.407 (a) OUTPUT POWER LIMITS

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

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

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

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

OUTPUT POWER AND SPURIOUS LIMITS –UNII DEVICES

The table below shows the limits for output power and output power density defined by FCC Part 15 Subpart E. 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)	10 dBm/MHz
5250 - 5350	250 mW (24 dBm)	11 dBm/MHz
5470 - 5725	250 mW (24 dBm)	11 dBm/MHz
5725 – 5825	1 Watts (30 dBm)	17 dBm/MHz

The peak excursion envelope is limited to 13dB.

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.

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

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

3 Pages

Radiated Emissions, 30 - 26,500 MHz, 11-Oct-07
Engineer: Mehran Birgani

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	15-Nov-07
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	07-Jun-08
Hewlett Packard	High Pass filter, 3.5 GHz (Blu System)	P/N 84300-80038 (84125C)	1391	29-May-08
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FMT (SA40) Blue	8564E (84125C)	1393	17-Jan-08

Radiated Emissions, 30 - 26,500 MHz, 12-Oct-07
Engineer: jcaizzi

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	15-Nov-07
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	07-Jun-08
Hewlett Packard	High Pass filter, 3.5 GHz (Blu System)	P/N 84300-80038 (84125C)	1391	29-May-08
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FMT (SA40) Blue	8564E (84125C)	1393	17-Jan-08

Radiated Emissions, 30 - 18,000 MHz, 31-Oct-07
Engineer: Rafael Varelas

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz	3115	487	24-May-08
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	15-Nov-07
Hewlett Packard	EMC Spectrum Analyzer, 9 KHz - 22 GHz	8593EM	1319	18-May-08
Hewlett Packard	High Pass filter, 3.5 GHz (Blu System)	P/N 84300-80038 (84125C)	1391	29-May-08

Radiated Emissions, 30 - 12,000 MHz, 19-Nov-07
Engineer: Joseph Cadigal

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz	3115	487	24-May-08
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FMT (SA40) Blue	8564E (84125C)	1393	17-Jan-08
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	06-Nov-08

Radio Antenna Port (Power and Spurious Emissions), 26-Nov-07
Engineer: skhushzad

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Aug-08

Radio Spurious Emissions, 27-Nov-07
Engineer: Suhaila Khushzad

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz	3115	487	24-May-08
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	08-Nov-08
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Aug-08
Rohde & Schwarz	Test Receiver, 0.009-2750 MHz	ESN	1332	21-Dec-07
EMCO	Log Periodic Antenna, 0.2-2 GHz	3148	1404	30-Mar-08
EMCO	Biconical Antenna, 30-300 MHz	3110B	1497	03-Jul-08

Radio Spurious Emissions, 11-Dec-07
Engineer: Suhaila Khushzad

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	07-Jun-08
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FMT (SA40) Blue	8564E (84125C)	1393	17-Jan-08
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	06-Nov-08

Radiated Emissions, 30 - 40,000 MHz, 12-Dec-07
Engineer: Mehran Birgani

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz	3115	487	24-May-08
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	08-Nov-08
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Aug-08
EMCO	Antenna, Horn, 18-26.5 GHz (SA40-Red)	3160-09 (84125C)	1150	05-Nov-08
EMCO	Antenna, Horn, 26.5-40 GHz (SA40-Red)	3160-10 (84125C)	1151	05-Nov-08
Hewlett Packard	High Pass filter, 8.2 GHz (Red System)	P/N 84300-80039 (84125C)	1152	15-Oct-08

Radio Spurious Emissions, 14-Dec-07
Engineer: Suhaila Khushzad

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	07-Jun-08
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	06-Nov-08
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FMT (SA40) Blue	8564E (84125C)	1393	17-Jan-08

Radio Spurious Emissions, 19-Dec-07
Engineer: Suhaila Khushzad

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18GHz	3115	868	26-Apr-08
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	08-Nov-08
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Aug-08

Radiated Emissions, 30 - 16,000 MHz, 20-Dec-07
Engineer: Mehran Birgani

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18GHz	3115	868	26-Apr-08
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	08-Nov-08
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Aug-08

Conducted Emissions - AC Power Ports, 21-Dec-07
Engineer: Rafael Varelas

Manufacturer	Description	Model #	Asset #	Cal Due
Elliott Laboratories	LISN, FCC / CISPR	LISN-4, OATS	362	18-Jul-08
Rohde& Schwarz	Pulse Limiter	ESH3 Z2	812	05-Feb-08
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Aug-08
Rohde & Schwarz	Test Receiver, 9 kHz-2750 MHz	ESCS 30	1337	21-Sep-08

Radio Antenna Port (Power and Spurious Emissions), 07-Jan-08
Engineer: Suhaila Khushzad

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz	3115	487	24-May-08
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Aug-08
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	06-Nov-08

Radio Spurious Emissions, 10-Jan-08
Engineer: Suhaila Khushzad

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz	3115	487	24-May-08
Hewlett Packard	EMC Spectrum Analyzer, 9 kHz - 6.5 GHz	8595EM	780	09-Oct-08
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Aug-08

Radio Antenna Port (Power and Spurious Emissions), 14-Jan-08
Engineer: jcaizzi

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	EMC Spectrum Analyzer, 9 kHz - 6.5 GHz	8595EM	787	21-Feb-08

Radiated Emissions, 30 - 26,500 MHz, 18-Jan-08
Engineer: jcaizzi

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz	3115	487	24-May-08
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	08-Nov-08
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Aug-08
Hewlett Packard	High Pass filter, 8.2 GHz	P/N 84300-80039	1156	29-May-08

Radio Antenna Port (Power and Spurious Emissions), 24-Jan-08
Engineer: Mehran Birgani

Manufacturer	Description	Model #	Asset #	Cal Due
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	25-Jan-08

Conducted Emissions - AC Power Ports, 28-Jan-08
Engineer: Peter Sales

Manufacturer	Description	Model #	Asset #	Cal Due
Rohde & Schwarz	Test Receiver, 0.009-30 MHz	ESH3	215	29-Mar-08
Elliott Laboratories	LISN, FCC / CISPR	LISN-3, OATS	304	18-Jul-08
Hewlett Packard	EMC Spectrum Analyzer, 9 KHz-26.5 GHz	8593EM	1141	29-Nov-08
Rohde& Schwarz	Pulse Limiter	ESH3 Z2	1398	05-Feb-08

Radiated Emissions, 1000 - 40000 MHz, 04-Mar-08
Engineer: Pete Sales

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz	3115	487	24-May-08
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	08-Nov-08
Hewlett Packard	Head (Inc W1-W4, 1143, 1144) Red	84125C	1145	16-Nov-08
Hewlett Packard	Spectrum Analyzer 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Aug-08
EMCO	Antenna, Horn, 18-26.5 GHz (SA40-Red)	3160-09 (84125C)	1150	05-Nov-08
EMCO	Antenna, Horn, 26.5-40 GHz (SA40-Red)	3160-10 (84125C)	1151	05-Nov-08

EXHIBIT 2: Test Measurement Data

36 Pages

Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Emissions Standard(s):	15.247 / 15.E / RSS-210	Class:	-
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Summit Data Communications

Model

SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors

Date of Last Test: 3/27/2008

Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manger:	Dean Eriksen
Contact:	Ron Seide		
Emissions Standard(s):	15.247 / 15.E / RSS-210	Class:	-
Immunity Standard(s):	-	Environment:	-

EUT INFORMATION

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

General Description

The EUT is a n 802.11a/g 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 on a tabletop during emissions testing to simulate the end user environment. The electrical rating of the EUT is 3.3 VDC +/- 5% With typical power consumption of 400 mA (1320mW) while in transmit mode, 180 mA (594mW) while in receive mode and 10 mA (33 mW) while in standby mode.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Summit Data Communications	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	Compact Flash Module	TBP	TWG-SDCCF10AG

EUT Antenna (Intentional Radiators Only)

There were three antennas included in the testing:
Laird Centurion, m/n NanoBlade, pcb antenna, 3.8dBi @ 2.45GHz, 5.1dBi @ 5.25GHz, 4.5dBi @ 5.8GHz
Volex, p/n VLX-51004-A, Omni, 2.3dBi @ 2.4GHz, 1.9dBi @ 5GHz
Larson, p/n R380.500.314, Omni, 1.6dBi @ 2.4GHz, 5dBi @ 5GHz

Note: The Volex Omni was used in the 2.4GHz band and the Larson Omni was used in the 5GHz bands. The Laird pcb antenna was also tested for both 2.4GHz and 5GHz.

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

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.

Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manger:	Dean Eriksen
Contact:	Ron Seide		
Emissions Standard(s):	15.247 / 15.E / 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
-	-	-	-	-

Remote Support Equipment

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

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

Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	-

Conducted Emissions - Power Ports

Test Specific Details

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

Date of Test: 1/28/2008 22:01
Test Engineer: Peter Sales
Test Location: SVOATS #2

Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz, 230V/50Hz

General Test Configuration

The EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm from the LISN.

Ambient Conditions:

Temperature: 4 °C
Rel. Humidity: 76 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power, 230V/50Hz	EN 55022 B	Pass	43.1dBµV @ 0.215MHz (-19.9dB)
2	CE, AC Power,120V/60Hz	EN 55022 B	Pass	55.6dBµV @ 0.167MHz (-9.5dB)

Modifications Made During Testing

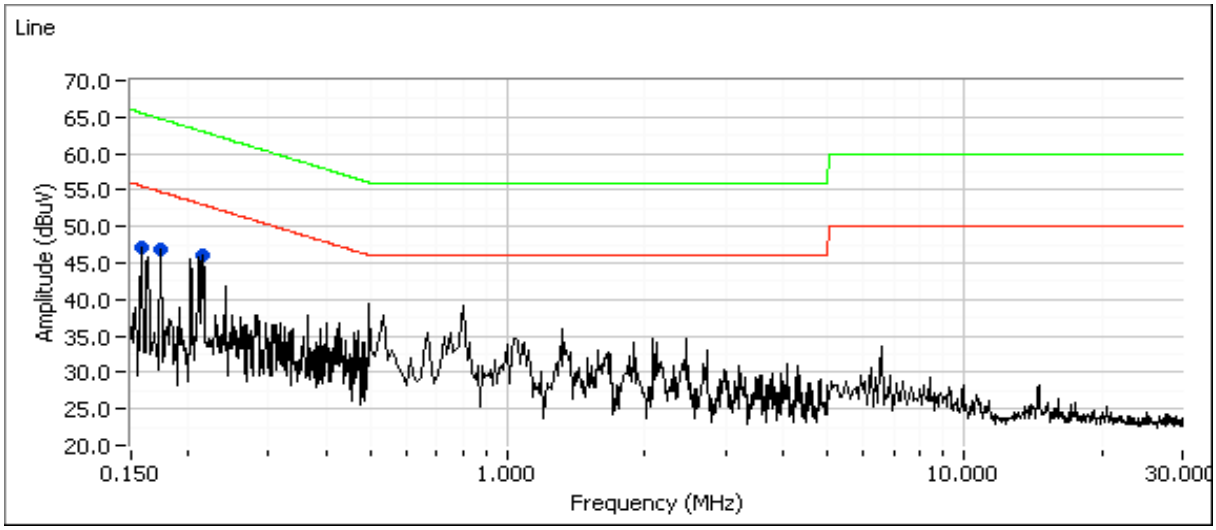
No modifications were made to the EUT during testing

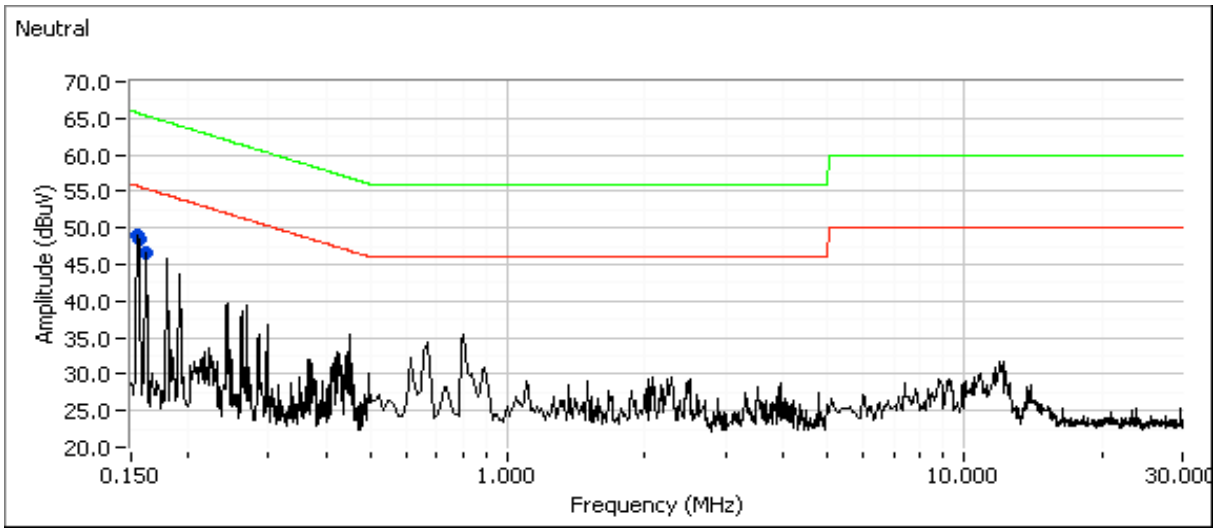
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	-

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





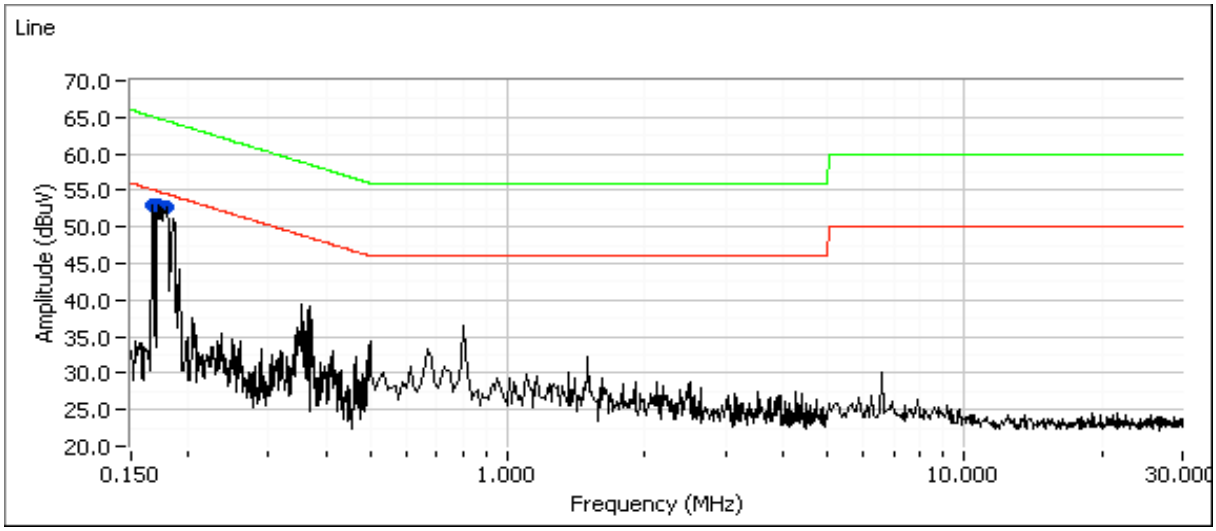
Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 230V/50Hz Continued Next Page...

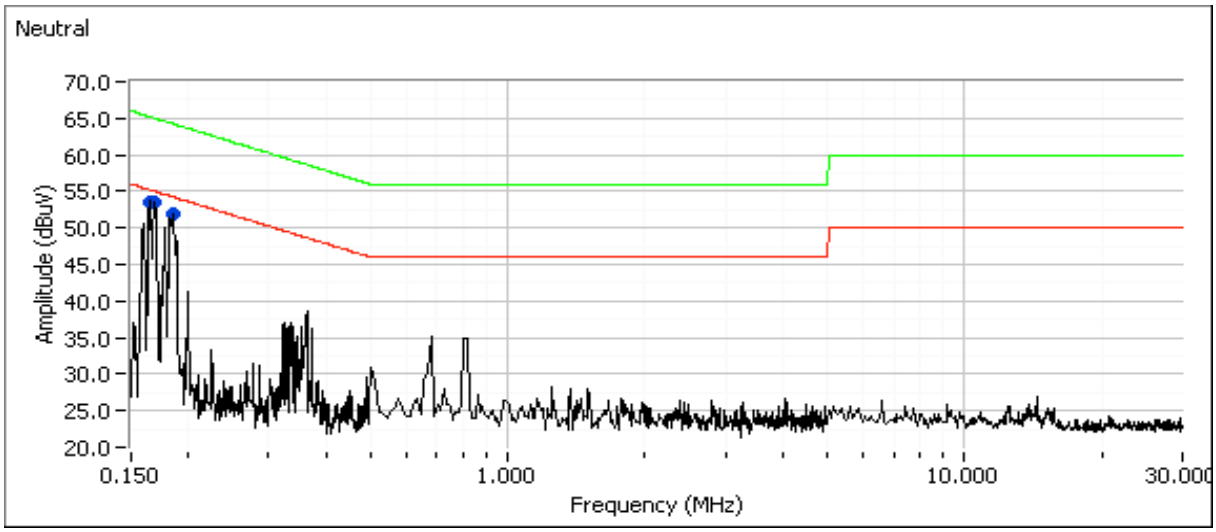
Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	-

Frequency	Level	AC	EN55022 B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.215	43.1	Line 1	63.0	-19.9	QP	
0.153	44.9	Neutral	65.8	-20.9	QP	
0.157	44.5	Neutral	65.6	-21.1	QP	
0.162	43.9	Neutral	65.4	-21.5	QP	
0.159	44.0	Line 1	65.5	-21.5	QP	
0.173	42.5	Line 1	64.8	-22.3	QP	
0.215	21.0	Line 1	53.0	-32.0	AVG	
0.157	17.6	Neutral	55.6	-38.0	AVG	
0.153	17.7	Neutral	55.8	-38.1	AVG	
0.159	17.2	Line 1	55.5	-38.3	AVG	
0.162	17.0	Neutral	55.4	-38.4	AVG	
0.173	16.2	Line 1	54.8	-38.6	AVG	

Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	-

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





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

Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	-

Frequency	Level	AC	EN55022 B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.167	55.6	Line 1	65.1	-9.5	QP	
0.165	55.7	Neutral	65.2	-9.5	QP	
0.169	54.1	Neutral	65.0	-10.9	QP	
0.180	53.4	Line 1	64.5	-11.1	QP	
0.184	52.6	Neutral	64.3	-11.7	QP	
0.172	53.1	Line 1	64.9	-11.8	QP	
0.169	28.7	Neutral	55.0	-26.3	AVG	
0.165	28.7	Neutral	55.2	-26.5	AVG	
0.167	28.1	Line 1	55.1	-27.0	AVG	
0.184	27.1	Neutral	54.3	-27.2	AVG	
0.172	27.6	Line 1	54.9	-27.3	AVG	
0.180	27.0	Line 1	54.5	-27.5	AVG	

Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A

Radiated Emissions (FCC Part 15E/RSS 210 A9/RSS GEN)

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: 3/5/2008
Test Engineer: Peter Sales
Test Location: SVOATS #1

Config. Used: 1
Config Change: None
EUT Voltage: Powered from Host System

General Test Configuration

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

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

Ambient Conditions:

Temperature: 10 °C
Rel. Humidity: 76 %

Summary of Results

Run #1	TX Mode	Channel	Power Setting	Pass/Fail	Margin
1a	a	5180	Full	Pass	45.0dBµV/m (177.8µV/m) @ 10359.7MHz (-9.0dB)
1b	a	5200	Full	Pass	45.0dBµV/m (177.8µV/m) @ 10401.4MHz (-9.0dB)
1c	a	5240	Full	Pass	65.0dBµV/m (1778.3µV/m) @ 5248.5MHz (-3.3dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Note:	All tests will be performed in data rate of 54Mbps. Average band edge plots are for reference only, final measurements made with VB=1khz to avoid desensitization at 10Hz which reduced signal level by 6.6dB.

Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A

Run #1a: Tx Radiated Spurious Emissions, 30 - 40000 MHz. 5150-5250 MHz Band
Low Channel @ 5180 MHz,
Full Power settting,Laird PCB Antenna with 5.1dBi, Rate = 54Mbps

Fundamental Signal Radiated Field Strength

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5178.100	100.4	H	-	-	AVG	319	1.0	Fundamental
5178.100	106.0	H	-	-	PK	319	1.0	Fundamental
5178.520	96.3	V	-	-	AVG	229	1.3	Fundamental
5178.520	102.5	V	-	-	PK	229	1.3	Fundamental

Band Edge Signal Radiated Field Strength at 5150 MHz

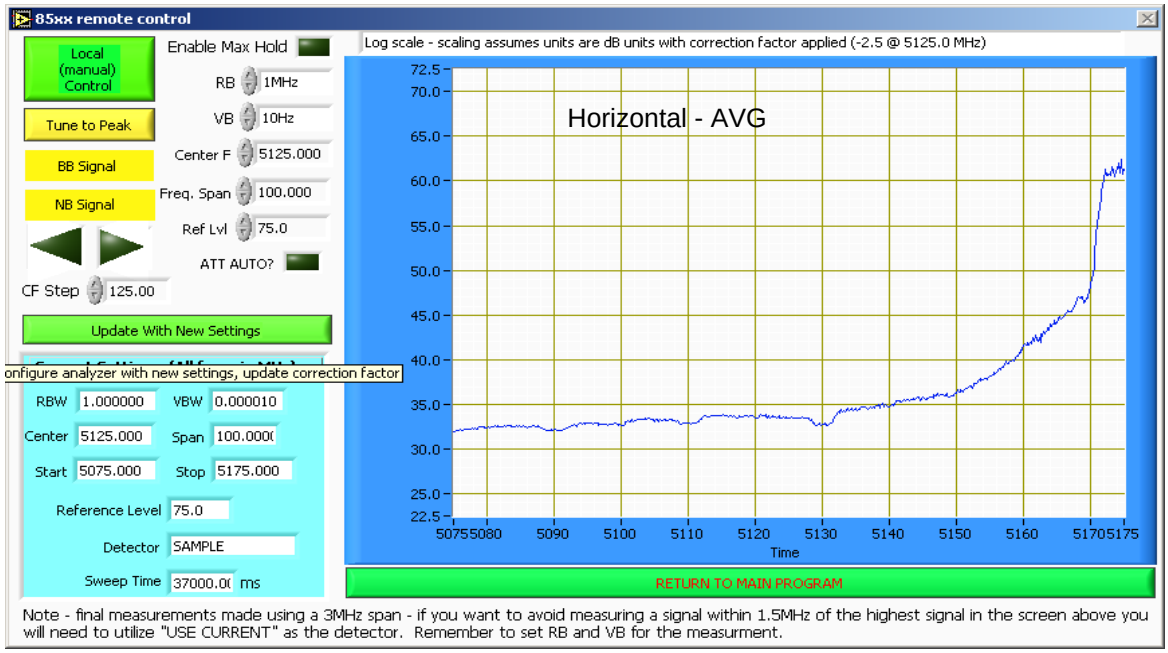
Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.930	43.0	H	54.0	-11.0	AVG	319	1.0	
5149.940	40.8	V	54.0	-13.2	AVG	229	1.3	
5149.170	56.0	V	74.0	-18.0	PK	229	1.3	
5147.520	44.5	H	74.0	-29.5	PK	319	1.0	

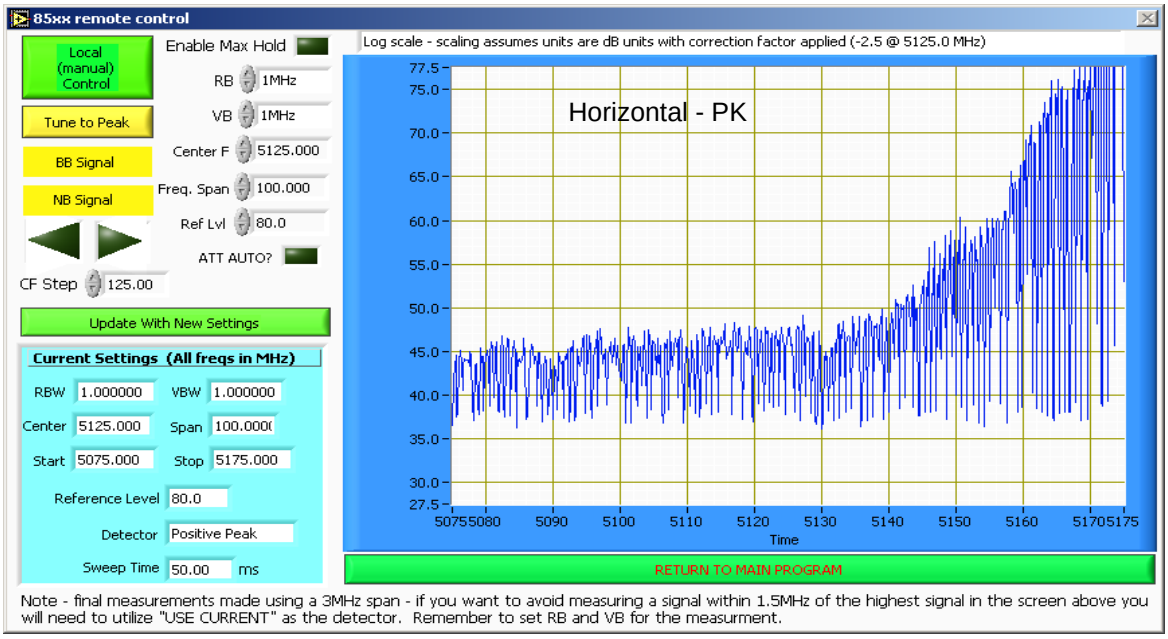
Other Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
10359.740	45.0	V	54.0	-9.0	AVG	273	1.0	
10360.160	44.5	H	55.0	-10.5	AVG	96	1.0	
15538.660	42.5	V	56.0	-13.5	AVG	30	1.9	
10359.740	51.4	V	74.0	-22.6	PK	273	1.0	
10360.160	49.4	H	74.0	-24.6	PK	96	1.0	
15538.660	47.1	V	74.0	-26.9	PK	30	1.9	

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

Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A





Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A

Run #1b: Tx Radiated Spurious Emissions, 30 - 40000 MHz. 5150 5250 MHz Band
Center Channel @ 5200 MHz,
Full Power settting,Laird PCB Antenna with 5.1dBi, Rate = 54Mbps

Other Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
10401.350	45.0	V	54.0	-9.0	AVG	315	1.0	
10400.580	45.0	H	55.0	-10.0	AVG	335	1.6	
15601.070	42.9	H	56.0	-13.1	AVG	123	1.0	
10400.580	53.6	H	74.0	-20.4	PK	335	1.6	
10401.350	53.1	V	74.0	-20.9	PK	315	1.0	
15601.070	47.7	H	74.0	-26.3	PK	123	1.0	

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

Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A

Run #1c: Tx Radiated Spurious Emissions, 30 - 40000 MHz. 5150 5250 MHz Band
High Channel @ 5240 MHz,
Full Power settting,Laird PCB Antenna with 5.1dBi, Rate = 54Mbps

Fundamental Signal Radiated Field Strength

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5238.200	96.7	V	-	-	AVG	222	1.7	
5238.200	103.0	V	-	-	PK	222	1.7	
5238.130	95.4	H	-	-	AVG	325	1.2	
5238.130	101.3	H	-	-	PK	325	1.2	

Band Edge Signal Radiated Field Strength at 5250 MHz

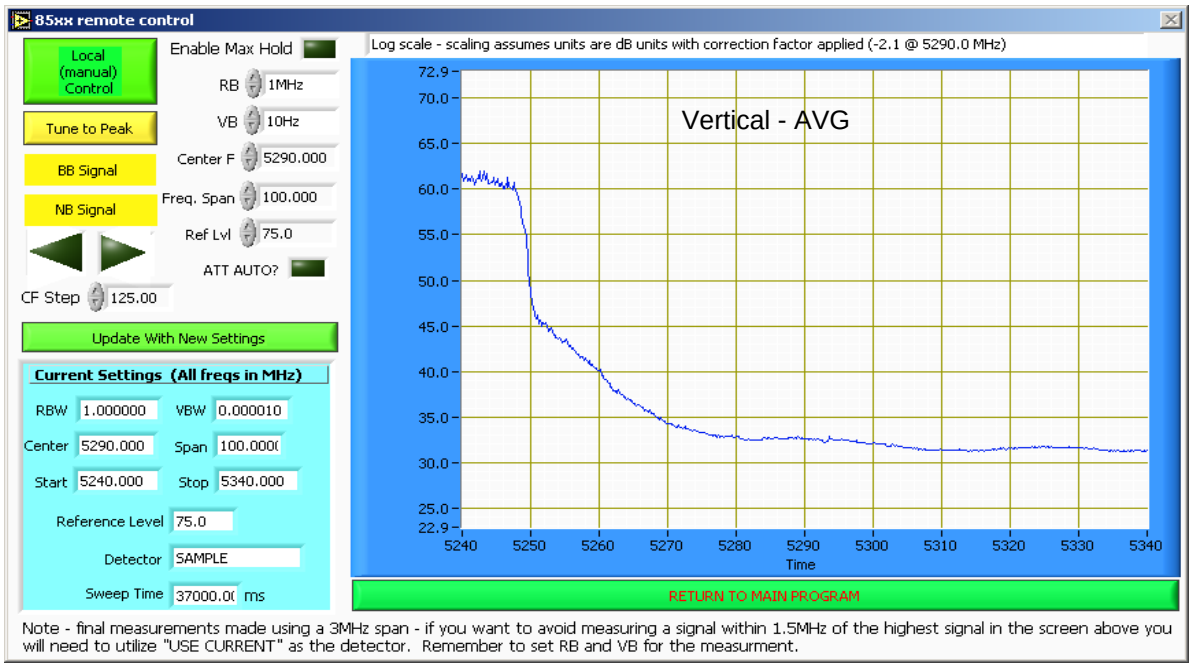
Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5248.530	65.0	V	68.3	-3.3	AVG	222	1.7	
5250.000	77.1	V	88.3	-11.2	PK	222	1.7	
5250.000	76.1	H	88.3	-12.2	PK	325	1.2	
5250.000	53.0	H	68.3	-15.3	AVG	325	1.2	

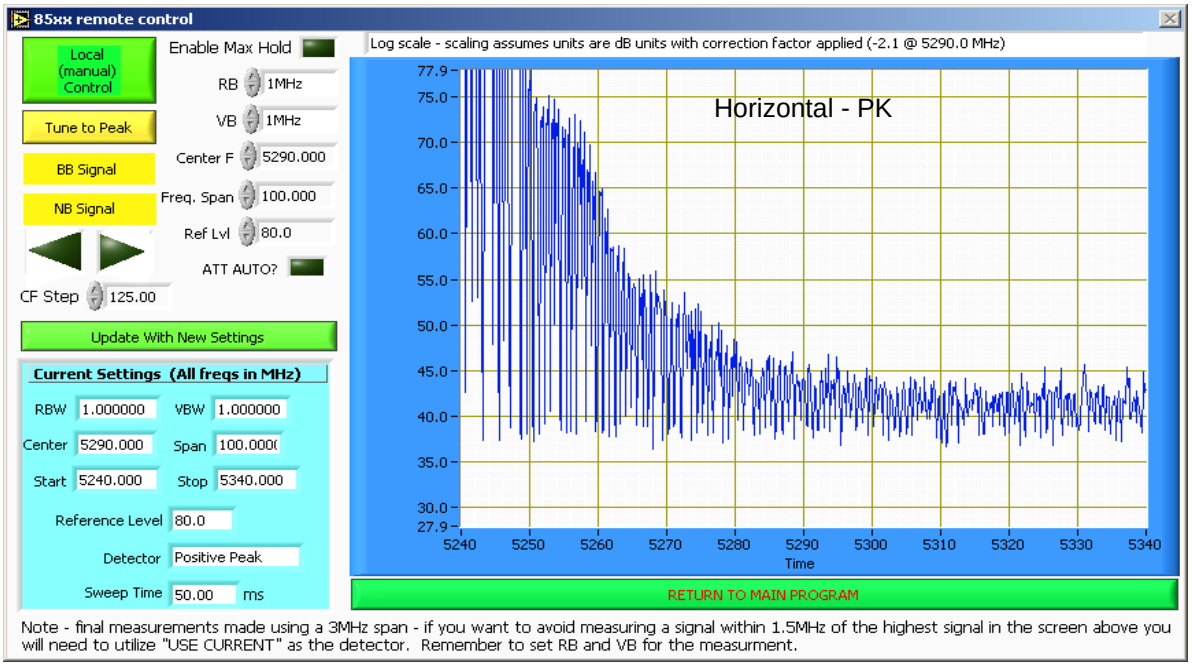
Other Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
10481.410	56.1	V	74.0	-17.9	PK	132	1.9	
10481.410	46.5	V	68.3	-21.8	AVG	132	1.9	
10481.490	50.1	H	74.0	-23.9	PK	298	1.6	
10481.490	44.2	H	68.3	-24.1	AVG	298	1.6	
15718.620	42.6	V	68.3	-25.7	AVG	72	1.0	
15718.620	47.8	V	74.0	-26.2	PK	72	1.0	

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

Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A





Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A

Radiated Emissions

Test Specific Details

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

Date of Test: 3/4/2008 0:00
Test Engineer: Peter Sales
Test Location: SVOATS #1

Config. Used: 1
Config Change: None
EUT Voltage: Powered from Host System

General Test Configuration

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

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

Ambient Conditions:

Temperature: 10 °C
Rel. Humidity: 76 %

Summary of Results

Run #1	TX Mode	Channel	Power Setting	Pass/Fail	Margin
1a	a	5180	Full	Pass	46.9dBµV/m (221.3µV/m) @ 10358.9MHz (-7.1dB)
1b	a	5200	Full	Pass	46.4dBµV/m (208.9µV/m) @ 10400.6MHz (-7.6dB)
1c	a	5240	Full	Pass	48.3dBµV/m (260.0µV/m) @ 10478.9MHz (-5.7dB)

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.

Note:	All tests will be performed in data rate of 54Mbps. Average band edge plots are for reference only, final measurements made with VB=1khz to avoid desensitization at 10Hz which reduced signal level by 6.6dB.

Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A

Run #1a: Tx Radiated Spurious Emissions, 30 - 40000 MHz. 5150-5250 MHz Band
Low Channel @ 5180 MHz,
Full Power settting, Flat Omni Antenna with 5dBi, Rate = 54Mbps

Fundamental Signal Radiated Field Strength

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5175.530	102.5	V	-	-	AVG	113	1.1	
5175.530	108.2	V	-	-	PK	113	1.1	
5178.520	89.0	H	-	-	AVG	342	1.0	
5178.520	95.0	H	-	-	PK	342	1.0	

Band Edge Signal Radiated Field Strength at 5150 MHz

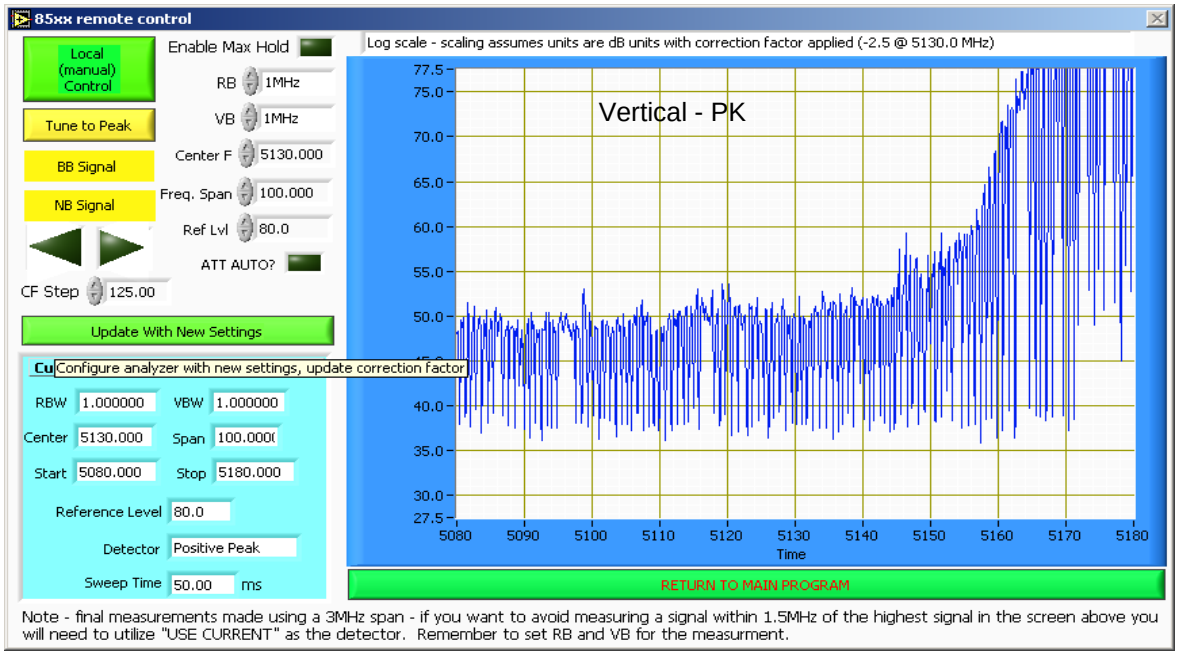
Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5147.380	44.5	V	54.0	-9.5	AVG	113	1.1	
5149.170	61.2	V	74.0	-12.8	PK	113	1.1	
5149.800	37.7	H	54.0	-16.3	AVG	342	1.0	
5149.580	48.8	H	74.0	-25.2	PK	342	1.0	

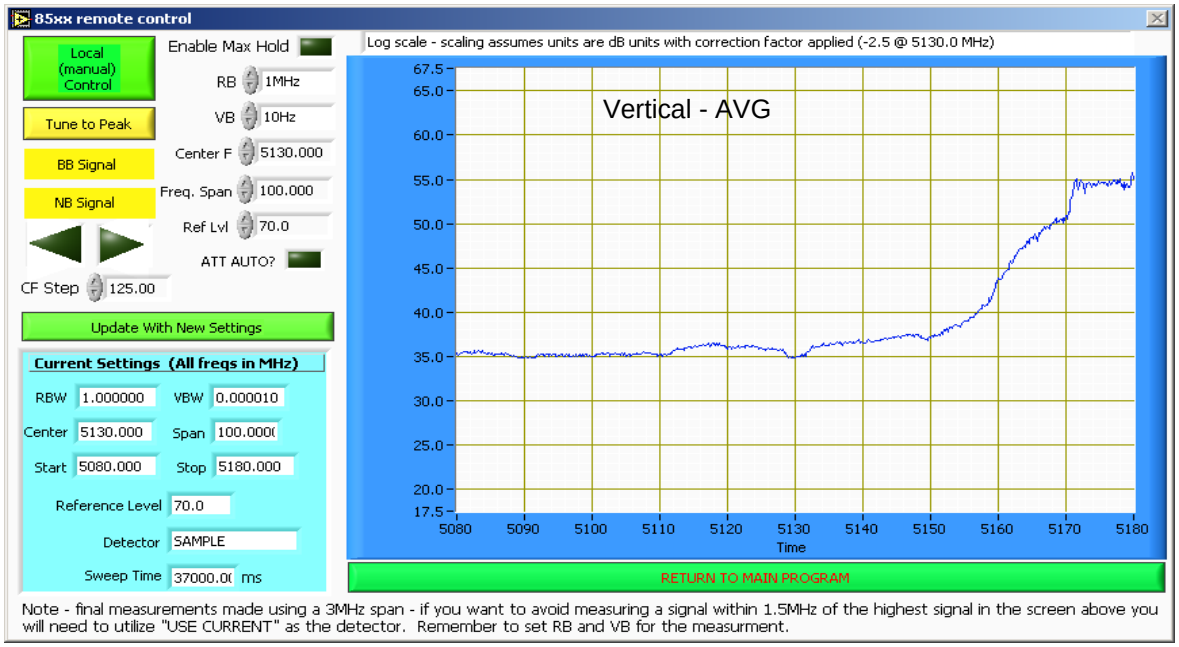
Other Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
10358.870	46.9	V	54.0	-7.1	AVG	22	1.0	
10360.700	45.3	H	55.0	-9.7	AVG	63	1.7	
15539.330	42.3	V	56.0	-13.7	AVG	6	1.0	
10358.870	55.3	V	74.0	-18.7	PK	22	1.0	
10360.700	51.0	H	74.0	-23.0	PK	63	1.7	
15539.330	47.5	V	74.0	-26.5	PK	6	1.0	

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

Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A





Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A

Run #1b: Tx Radiated Spurious Emissions, 30 - 40000 MHz. 5150 5250 MHz Band
Center Channel @ 5200 MHz,
Full Power settting, Flat Omni Antenna with 5dBi, Rate = 54Mbps

Other Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
10400.630	46.4	V	54.0	-7.6	AVG	286	1.0	
10400.060	44.5	H	55.0	-10.5	AVG	330	1.7	
15600.940	43.2	V	56.0	-12.8	AVG	270	1.0	
10400.630	55.7	V	74.0	-18.3	PK	286	1.0	
10400.060	49.6	H	74.0	-24.4	PK	330	1.7	
15600.940	48.5	V	74.0	-25.5	PK	270	1.0	

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

Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A

Run #1c: Tx Radiated Spurious Emissions, 30 - 40000 MHz. 5150 5250 MHz Band
High Channel @ 5240 MHz,
Full Power settting, Flat Omni Antenna with 5dBi, Rate = 54Mbps

Fundamental Signal Radiated Field Strength

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5238.500	90.6	V	-	-	AVG	114	2.0	
5238.500	96.9	V	-	-	PK	114	2.0	
5240.810	88.5	H	-	-	AVG	348	1.0	
5240.810	95.1	H	-	-	PK	348	1.0	

Band Edge Signal Radiated Field Strength at 5250 MHz

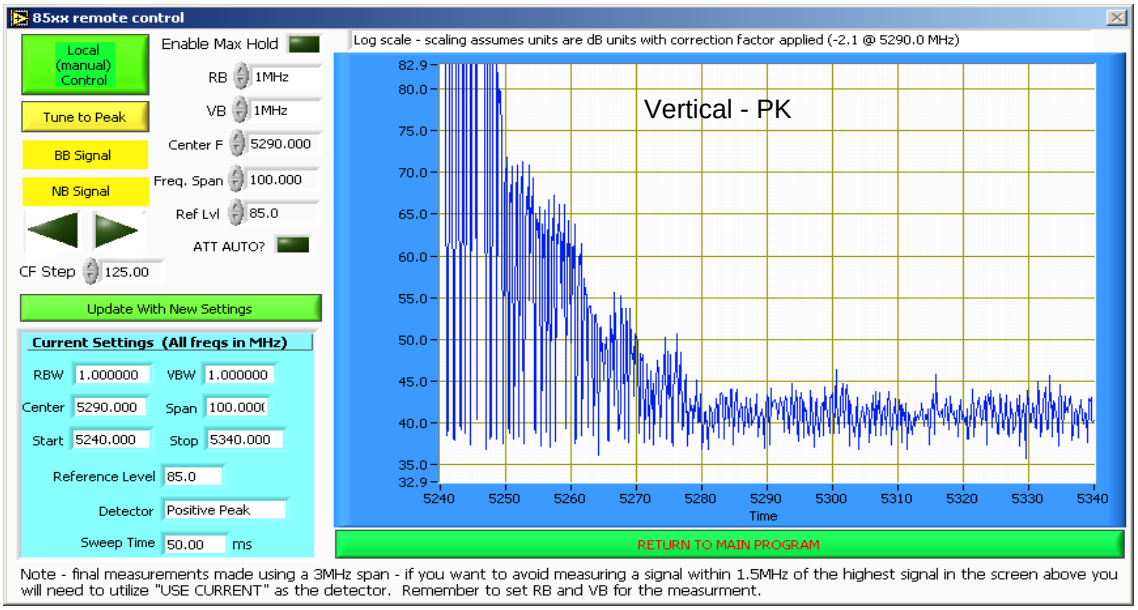
Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5252.690	72.3	V	88.3	-16.0	PK	114	2.0	
5250.030	50.2	V	68.3	-18.1	AVG	114	2.0	
5250.000	69.9	H	88.3	-18.4	PK	348	1.0	
5250.030	49.3	H	68.3	-19.0	AVG	348	1.0	

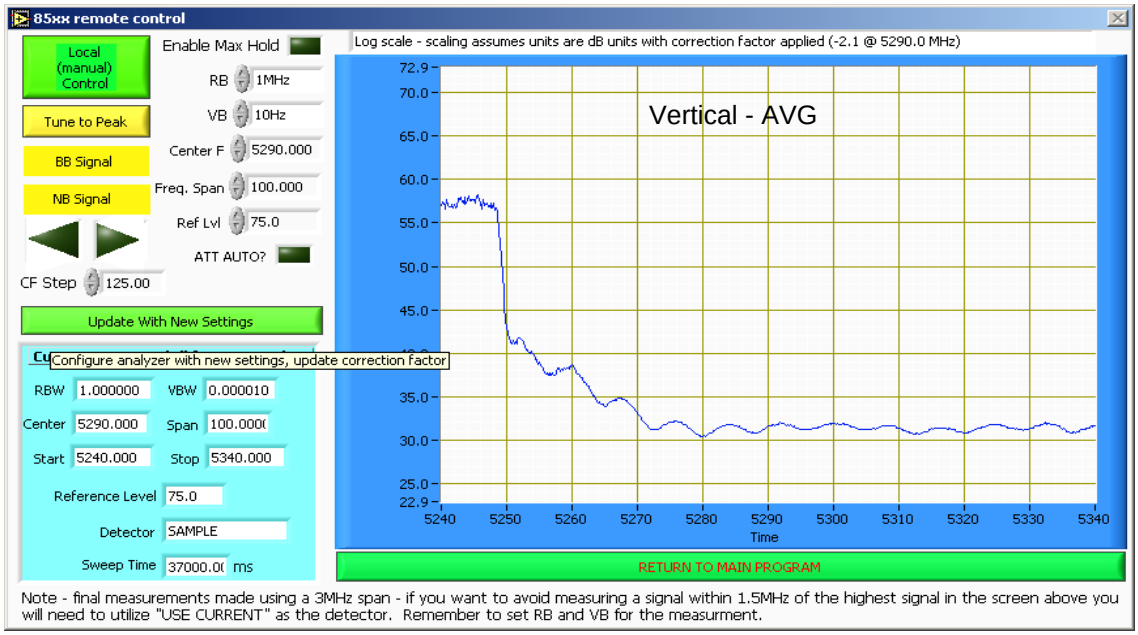
Other Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
10478.910	48.3	V	54.0	-5.7	AVG	114	1.6	
10481.230	44.4	H	54.0	-9.6	AVG	360	1.7	
15718.980	42.2	V	54.0	-11.8	AVG	159	1.0	
10478.910	57.7	V	74.0	-16.3	PK	114	1.6	
10481.230	50.7	H	74.0	-23.3	PK	360	1.7	
15718.980	46.5	V	74.0	-27.5	PK	159	1.0	

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

Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A





Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A

RSS-210 (LELAN) and FCC 15.407(UNII)
Antenna Port Measurements
Power, PSD, Peak Excursion, Bandwidth and Spurious Emissions

Test Specific Details

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

Date of Test: 2/28/2008
Test Engineer: Rafael Varelas
Test Location: Chamber #5

Config. Used: -
Config Change: -
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: 18.9 °C
Rel. Humidity: 39 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	13.9dBm (25mW)
1	PSD, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	3.4 dBm/MHz
1	26dB Bandwidth	15.407	-	17.9 MHz
1	99% Bandwidth	RSS 210	-	17.3 MHz
2	Peak Excursion Envelope	15.407(a) (6)	Pass	7.8dBm
3	Antenna Conducted Out of Band Spurious	15.407(b)	Pass	Emissions at the Bandedges are under 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.

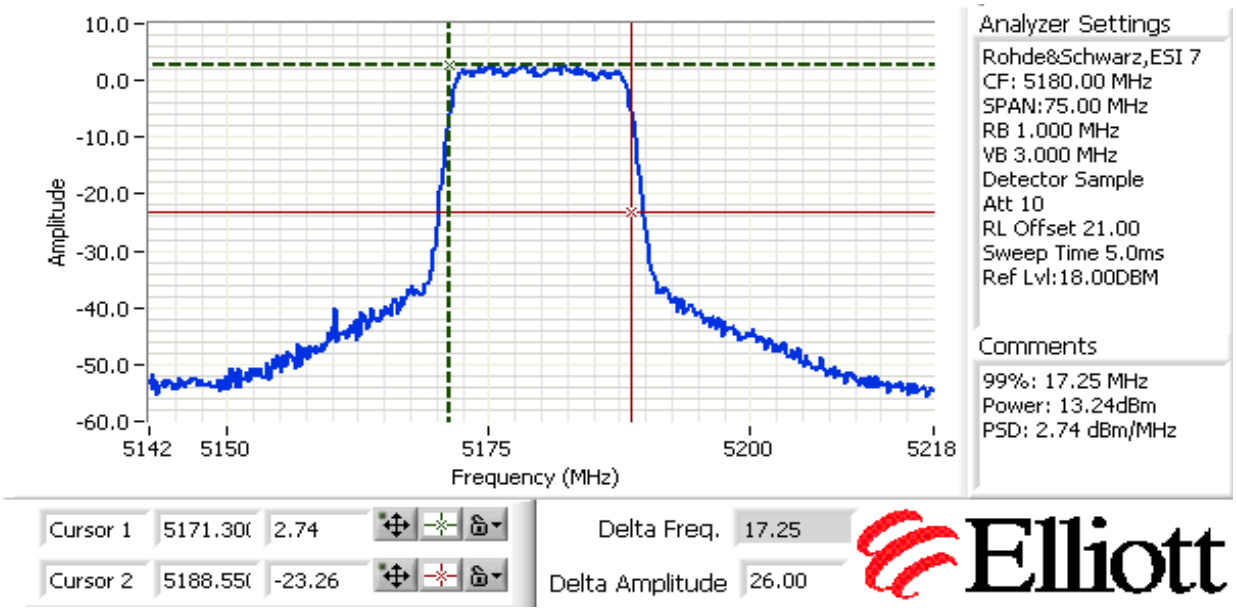
Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A

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

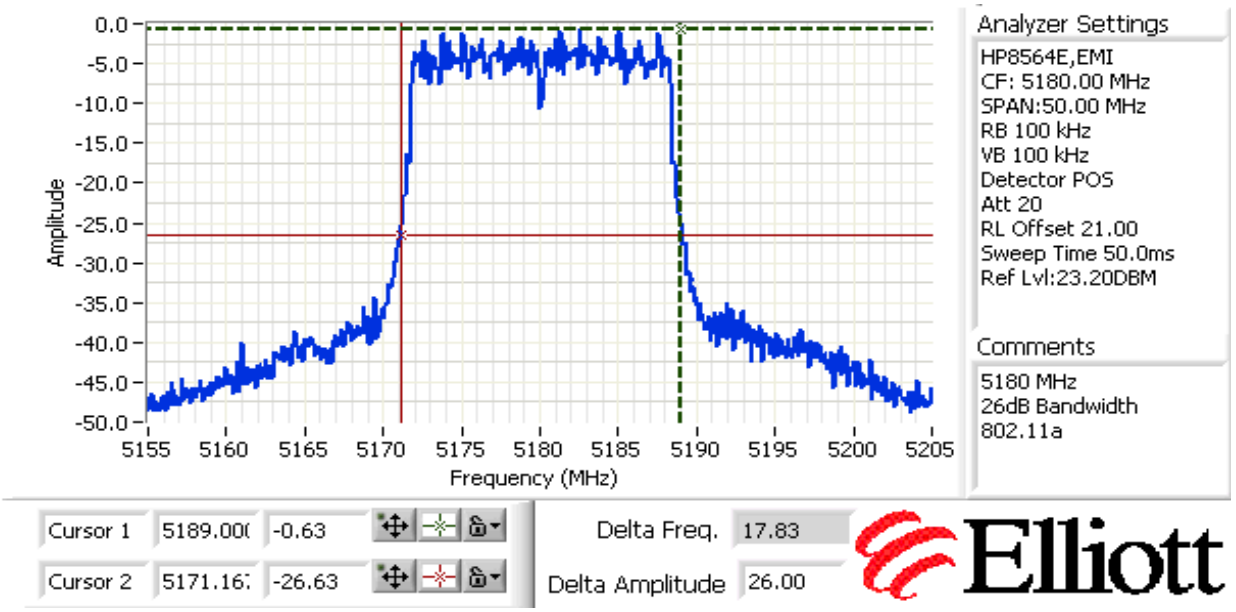
Antenna Gain (dBi): 5.1

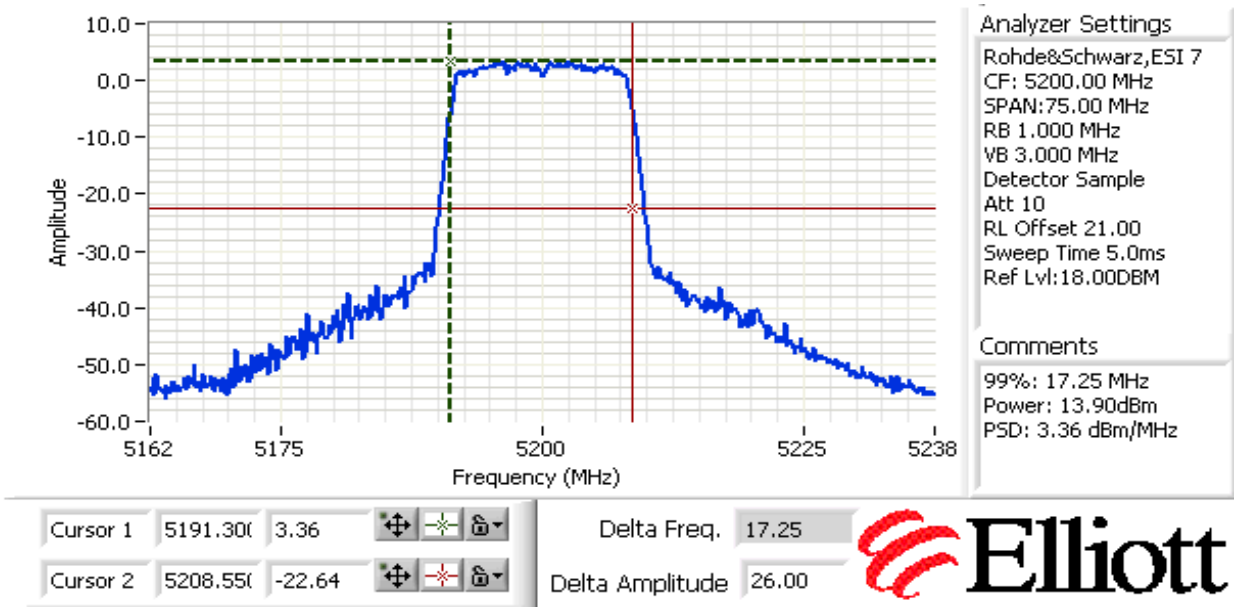
Frequency (MHz)	Software Setting	Bandwidth		Output Power[1] dBm		Power (Watts)	PSD[2] dBm/MHz			Result
		26dB	99%[4]	Measured	Limit		Measured	FCC Limit	RSS Limit[3]	
5180	Max	17.8	17.3	13.2	16.5	0.021	2.7	4.0	4.9	Pass
5200	Max	17.9	17.3	13.9	16.5	0.025	3.4	4.0	4.9	Pass
5240	Max	17.8	17.3	13.6	16.5	0.023	3.0	4.0	4.9	Pass

Note 1:	RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was not continuous but the ESI analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was transmitting) and power integration over 50MHz
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB

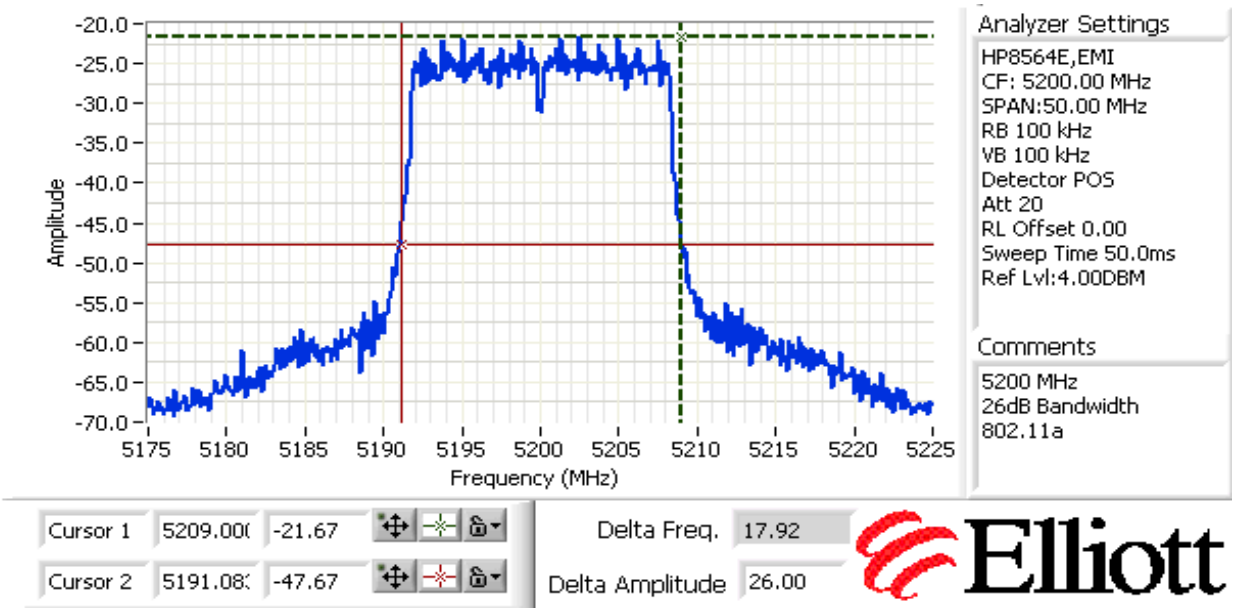


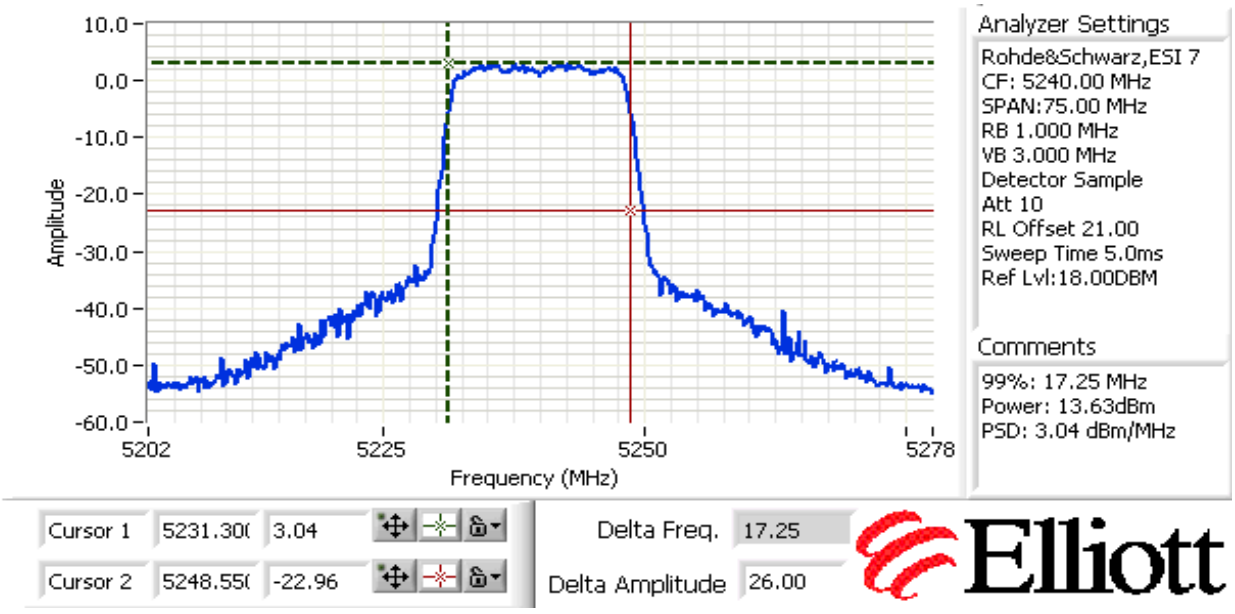
Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A



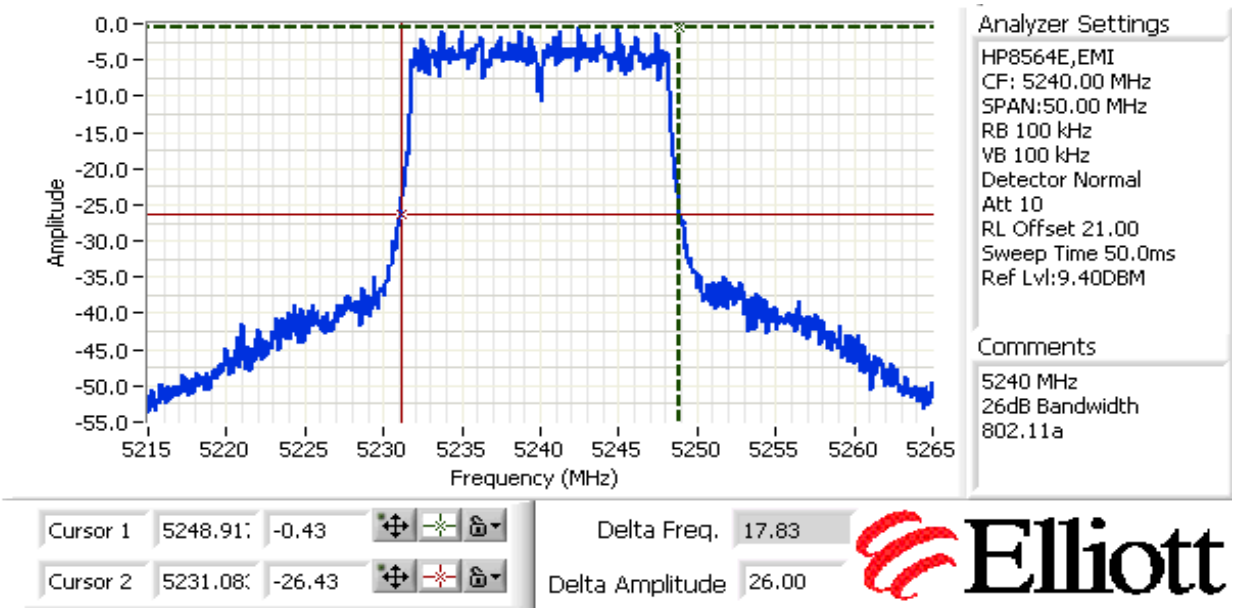


Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A





Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A



Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A

Run #2: Peak Excursion Measurement

Device meets the requirement for the peak excursion

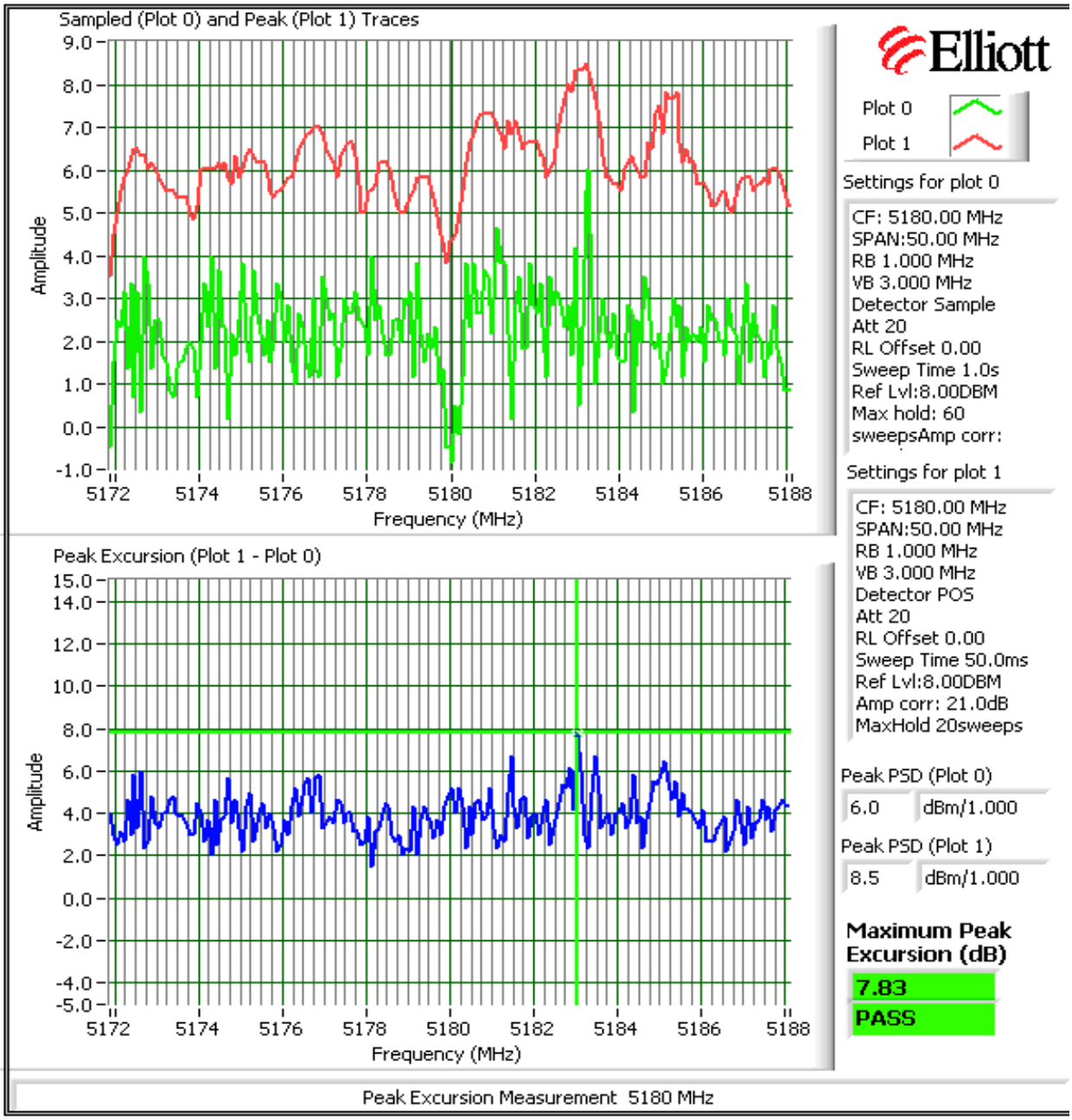
Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)	
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit
5180	7.8	13.0	5260		13.0	5500		13.0
5200	7.3	13.0	5300		13.0	5600		13.0
5240	7.3	13.0	5320		13.0	5700		13.0

Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A

Plots Showing Peak Excursion

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

Trace B: RBW = 1 MHz, VBW = 3MHz, Integrated average power

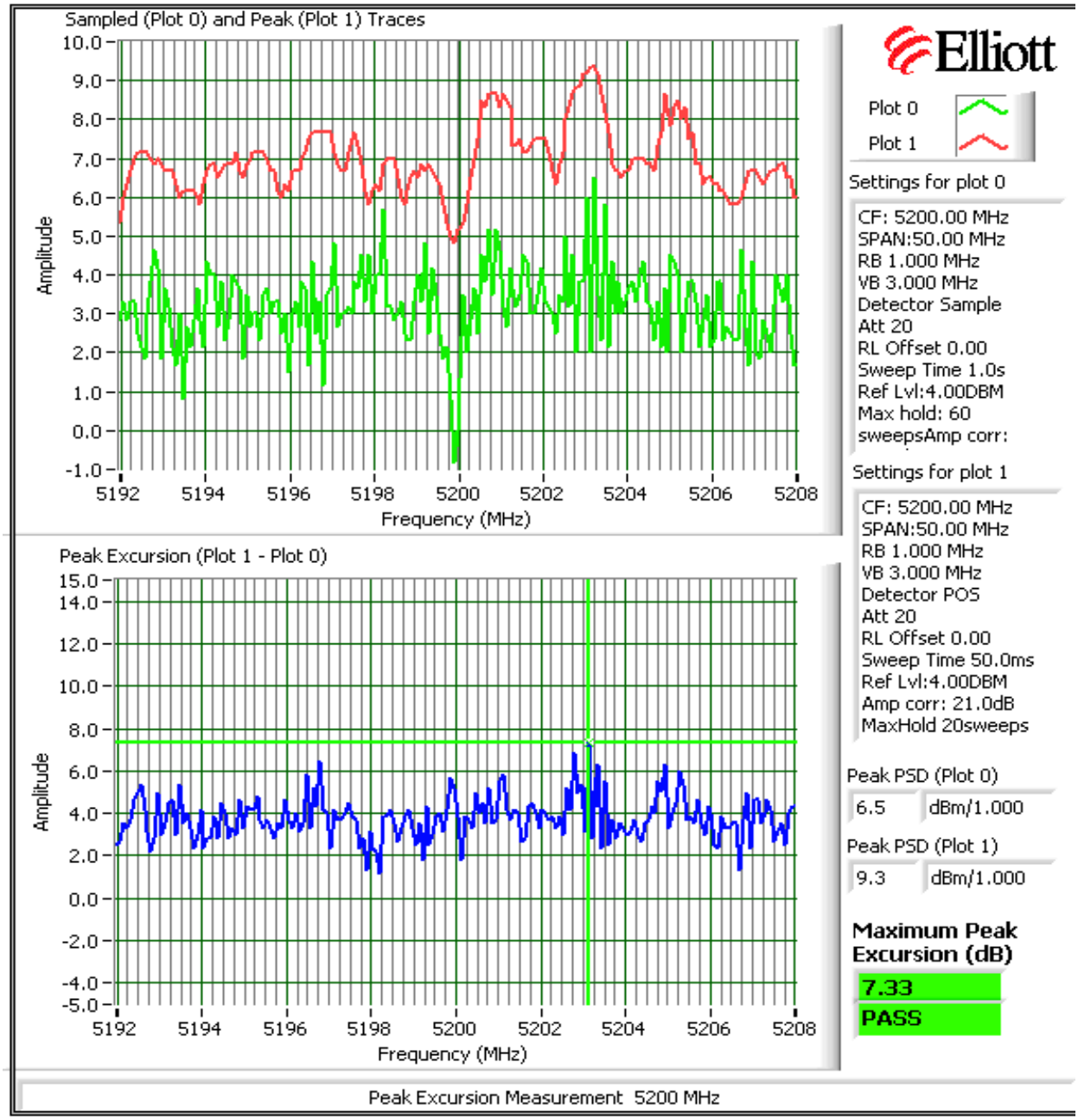


Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A

Plots Showing Peak Excursion

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

Trace B: RBW = 1 MHz, VBW = 3MHz, Integrated average power

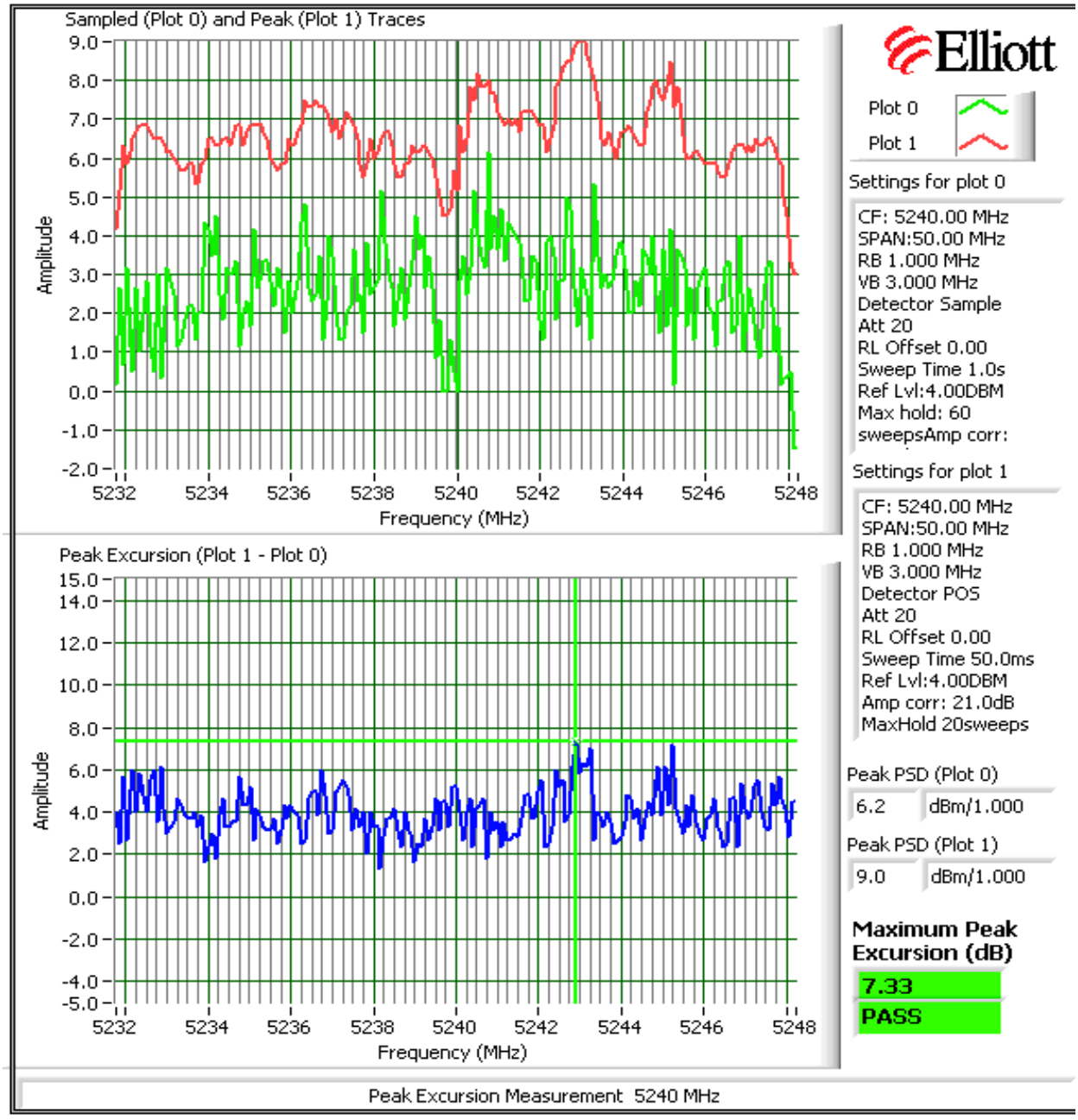


Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A

Plots Showing Peak Excursion

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

Trace B: RBW = 1 MHz, VBW = 3MHz, Integrated average power



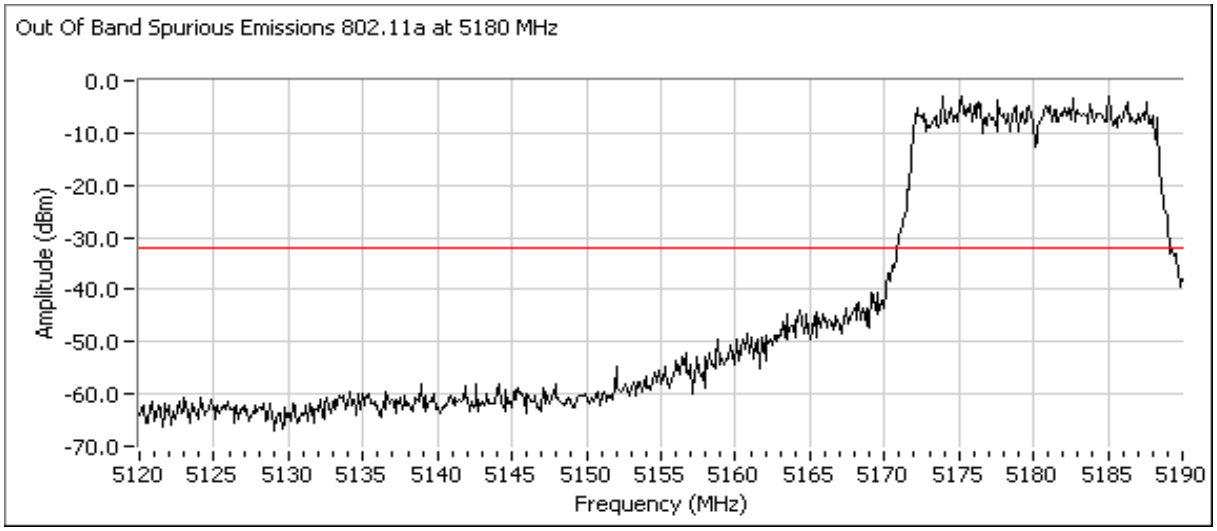
Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A

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

Maximum Antenna Gain:	5.1	dBi
Spurious Limit:	-27	dBm/MHz eirp
Limit Used On Plots [Note 1]:	-32.1	dBm/MHz

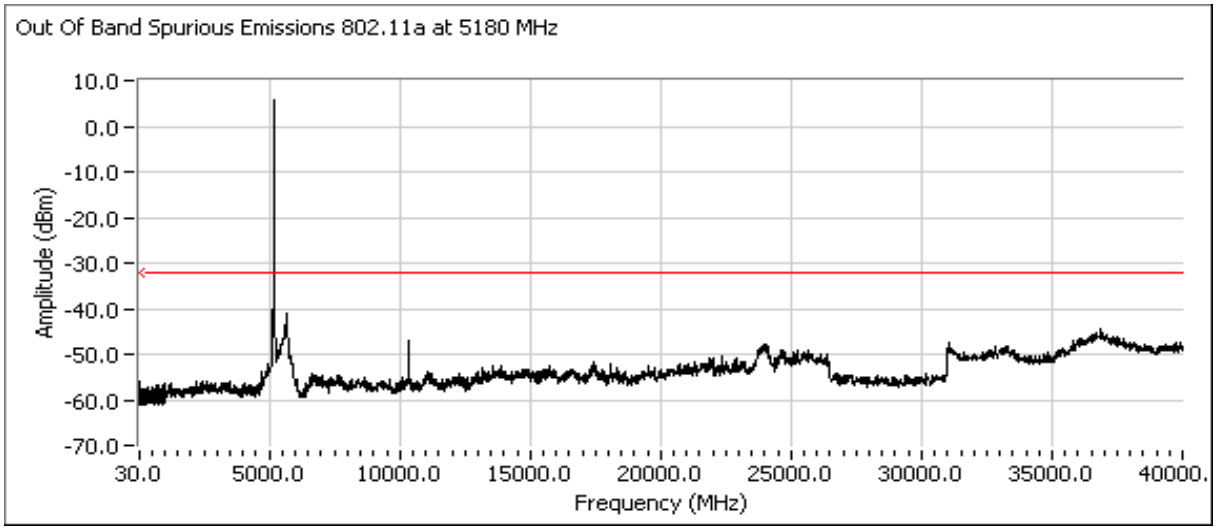
Note 1:	The -27dBm/MHz limit is an eirp limit. The limit for antenna port conducted measurements is adjusted to take into consideration the maximum antenna gain (limit = -27dBm - antenna gain). Radiated field strength measurements for signals more than 50MHz from the bands and that are close to the limit 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=100kHz)

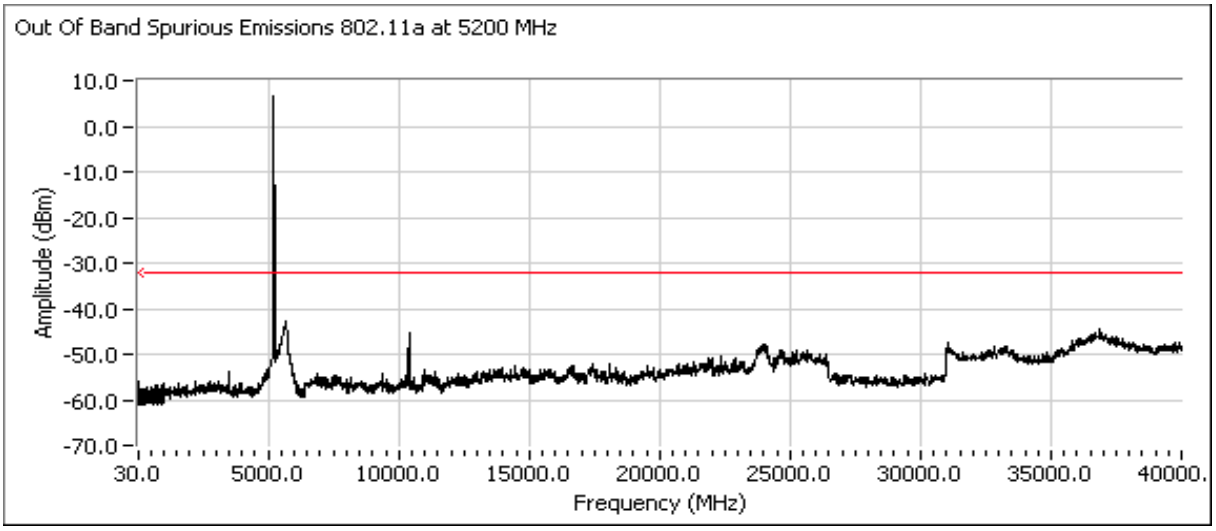


Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A

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

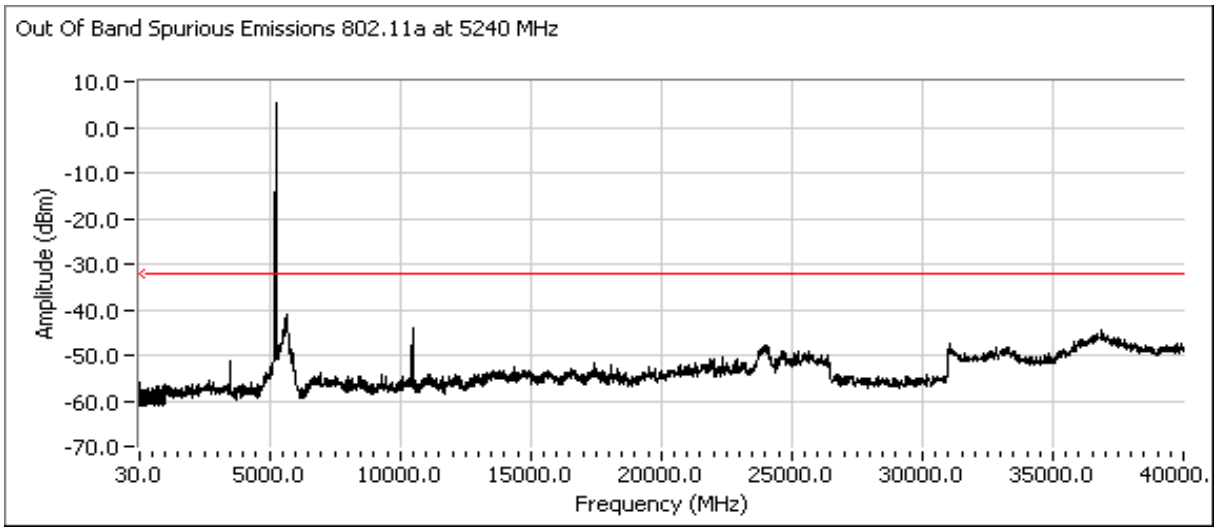


Plots Showing Out-Of-Band Emissions (RBW=VBW=1MHz)

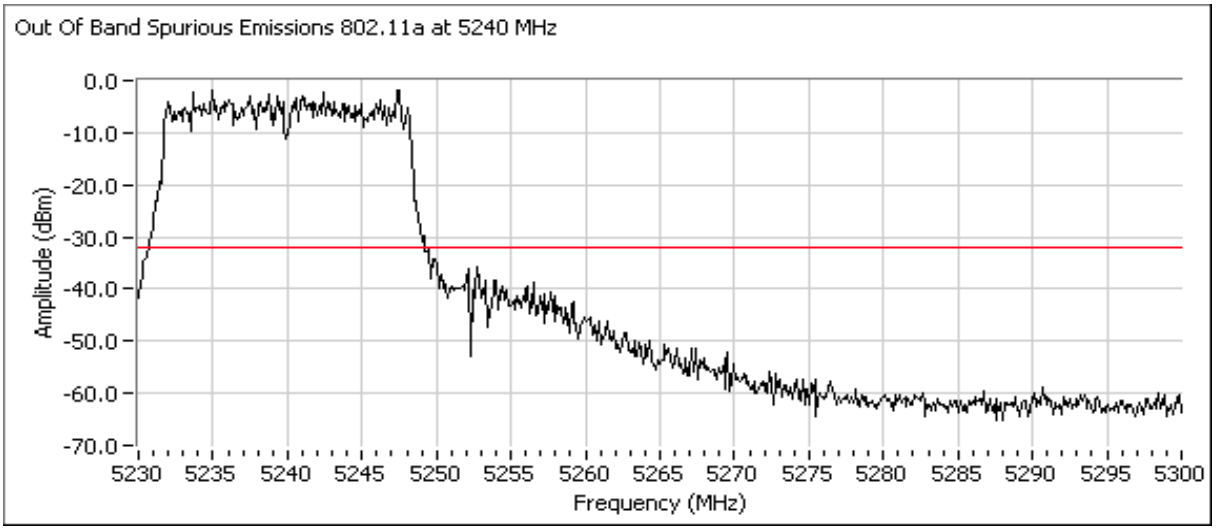


Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A

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



Plots Showing Out-Of-Band Emissions (RBW=VBW=100kHz)



Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A

RSS 210 and FCC 15.247 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.

Date of Test: 11/27/2007 & 12/19/07
Test Engineer: Suhaila Khushzad
Test Location: SVOATS #2
Config. Used: 1
Config Change: None
EUT Voltage: Powered from Host System

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.

Ambient Conditions:

Temperature: 11.7 °C
Rel. Humidity: 63 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
3 (802.11a - 5200 MHz)	RE, 30 - 16000 MHz Spurious Emissions	RSS-GEN	Pass	46.4dBµV/m (208.9µV/m) @ 17735.4MHz (-7.6dB)

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:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A

Run # 3: Rx Mode Radiated Spurious Emissions, 30 - 40000 MHz. Operating Mode: 802.11a
Round Omni Antenna with 1.9dBi Gain, Data Rate 54 Mbps
Center Channel @ 5200 MHz

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
17735.38	46.4	H	54.0	-7.6	AVG	0	1.0	
17733.83	46.4	V	54.0	-7.6	AVG	341	1.0	
17733.83	59.0	V	74.0	-15.0	PK	341	1.0	
17735.38	58.8	H	74.0	-15.2	PK	0	1.0	
10387.08	37.8	H	54.0	-16.2	AVG	162	1.0	
15598.72	37.8	H	54.0	-16.2	AVG	265	1.0	
10376.00	37.6	V	54.0	-16.4	AVG	341	1.0	
15591.33	36.9	V	54.0	-17.1	AVG	200	1.0	
10387.08	49.5	H	74.0	-24.5	PK	162	1.0	
15598.72	49.2	H	74.0	-24.8	PK	265	1.0	
10376.00	48.5	V	74.0	-25.5	PK	341	1.0	
15591.33	48.4	V	74.0	-25.6	PK	200	1.0	

Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A

RSS 210 and FCC 15.247 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.

Date of Test: 12/19/2007
Test Engineer: Suhaila Khushzad
Test Location: SVOATS # 2
Config. Used: 1
Config Change: None
EUT Voltage: Powered form Host System

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.

Ambient Conditions:

Temperature: 14.4 °C
Rel. Humidity: 53 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
3 (802.11a - 5200 MHz)	RE, 30 - 40000 MHz - Spurious Emissions	RSS-GEN	To be Review	45.7dBµV/m @ 17815.0MHz (-8.3dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A

Run # 3: Rx Mode Radiated Spurious Emissions, 30 - 40000 MHz. Operating Mode: 802.11a
Larson PCB Antenna with 3.8 dBi Gain, Data Rate 54 Mbps
Center Channel @ 5200 MHz

Other Spurious Emissions

Frequency	Level	Pol	RSS-GEN		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
17815.00	45.7	V	54.0	-8.3	AVG	271	1.0	
17572.50	45.6	H	54.0	-8.4	AVG	0	1.0	
10369.33	38.8	H	54.0	-15.2	AVG	188	1.0	
10382.17	37.8	V	54.0	-16.2	AVG	126	1.0	
17815.00	57.8	V	74.0	-16.2	PK	271	1.0	
15592.83	36.9	H	54.0	-17.1	AVG	0	1.0	
17572.50	56.8	H	74.0	-17.2	PK	0	1.0	
15602.83	36.7	V	54.0	-17.3	AVG	331	1.0	
10369.33	50.0	H	74.0	-24.0	PK	188	1.0	
10382.17	49.9	V	74.0	-24.1	PK	126	1.0	
15602.83	48.7	V	74.0	-25.3	PK	331	1.0	
15592.83	48.6	H	74.0	-25.4	PK	0	1.0	

Note 1:

EXHIBIT 3: Photographs of Test Configurations

4 Pages

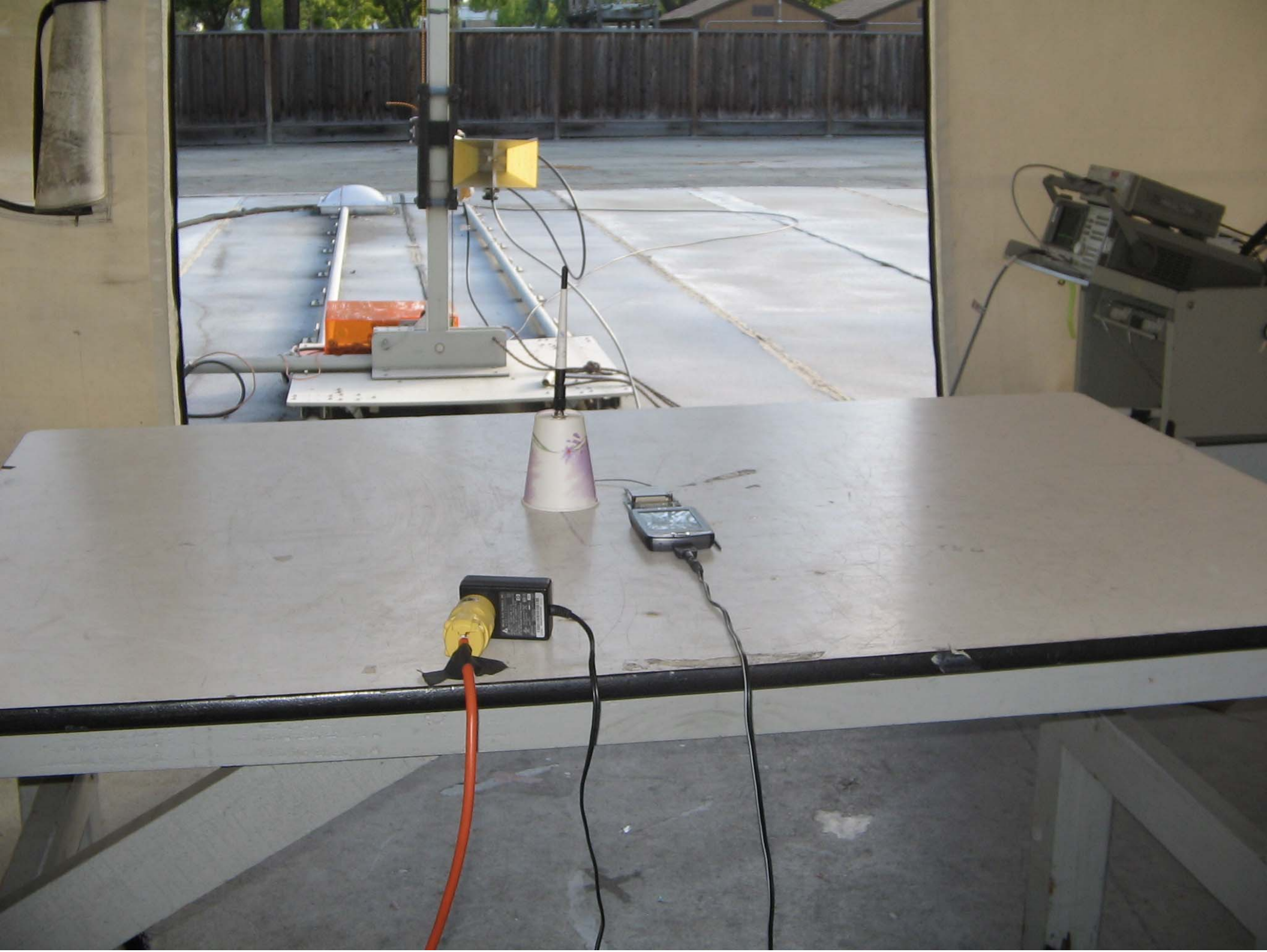


EXHIBIT 4: Proposed FCC ID Label & Label Location

BACK LABEL

Summit Data Communications

Model Name: SDC-CF10AG

S/N : CF10AGYYMMDDxxxx

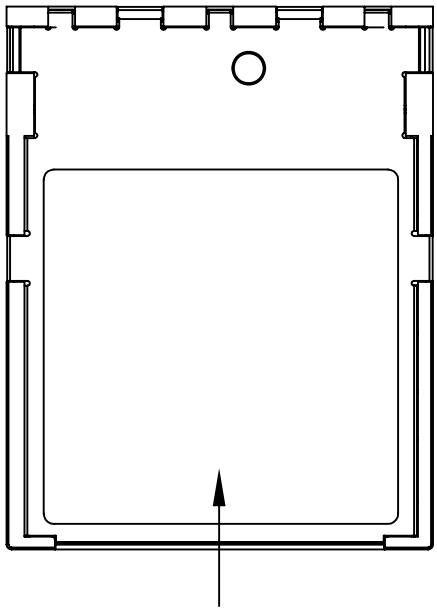
MAC : XXXXXXXXXXXX

FCC ID: TWG-SDCCF10AG

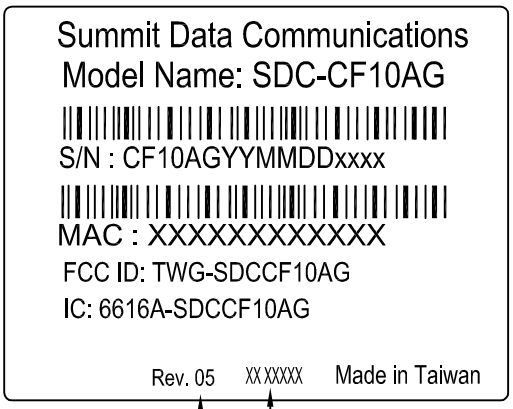
IC: 6616A-SDCCF10AG

Rev. 05 XX XXXX Made in Taiwan

WCFB-108AG133WW



BACK LABEL



請依實際版本變更

Control Code
請依實際版本變更

注意: 1. Label 請依上圖指示位置居中張貼.

2. S/N : CF10AGYYMMDDxxxx
CF10AG- 固定碼, 客戶model name
YYMMDD --- 年月日, xxxx---- 當日產出流水號

3. 請使用客戶之MAC Address, 所有BARCODE TYPE: Code 128

4. CE logo 高度必需大於 5mm

品 名	Back label	P / N	420-900-0025G	規 格	32*25mm R0.5

Gemtek Wireless Broadband Anywhere 正文科技股份有限公司 Gemtek Technology Co ., Ltd.	TITLE : 包裝作業指導書	DOCUMENT NO: 990-600-0004R	REV. 1.1

EXHIBIT 5: Detailed Photographs of Summit Data Communications Model SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors Construction

4 Pages

Elliott

Fig. 1

Elliott

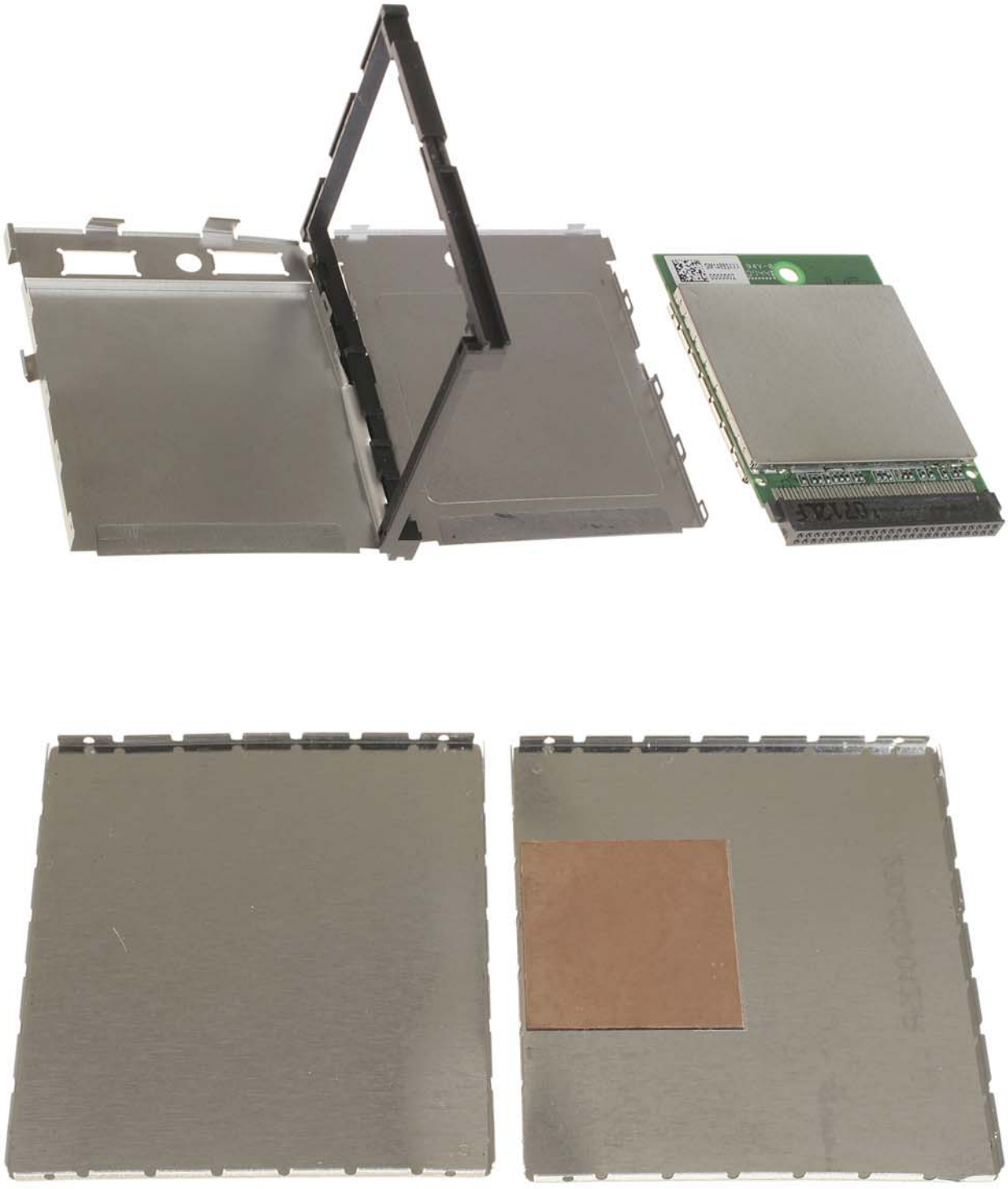


Fig. 2

Fig. 3

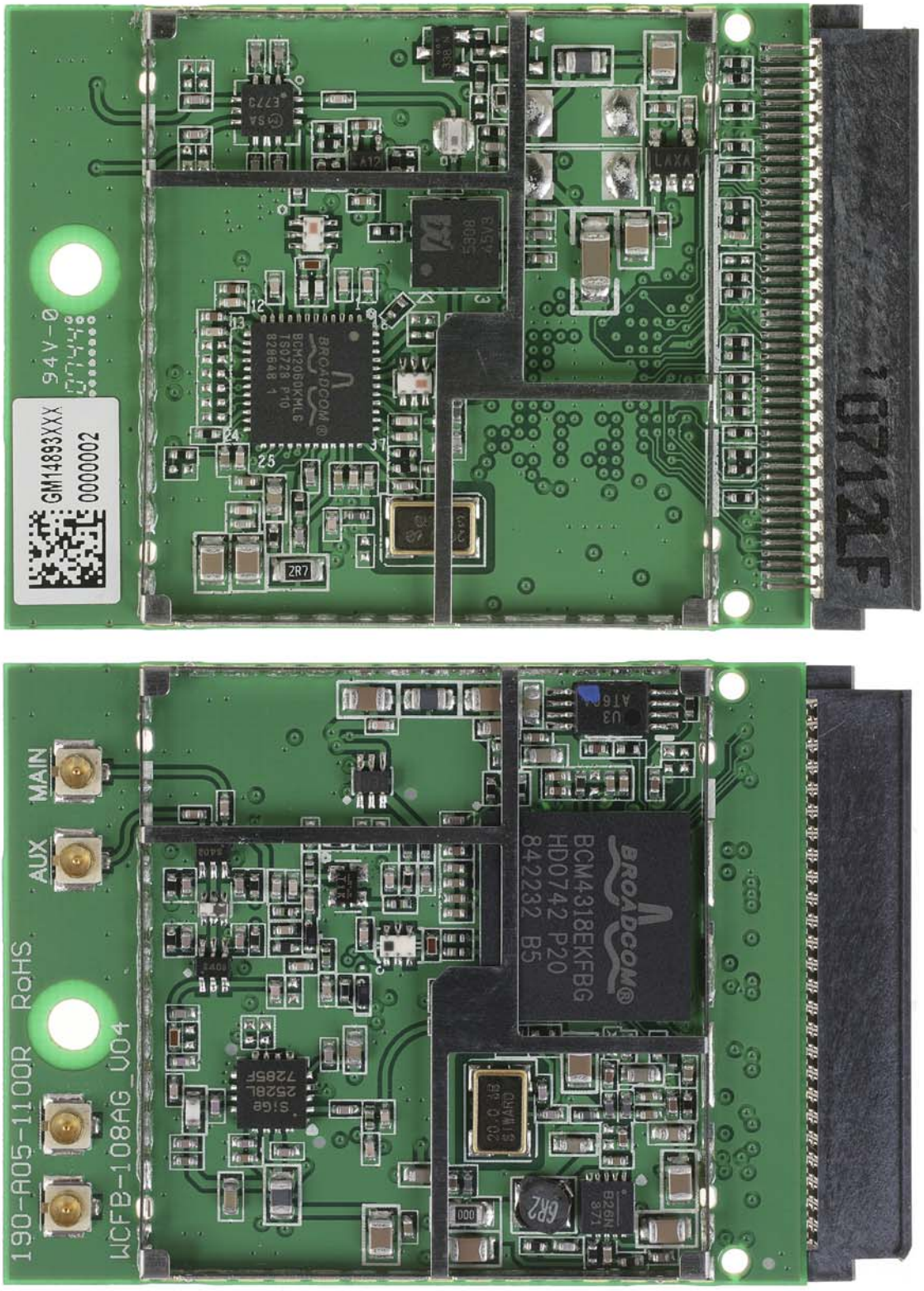

MAIN
AUX
RoHS
190-A05-1100R
WCFB-108AG_U04
BCM4318EKFBG
HD0742 P20
842232 B5
BROADCOM
GM14893XXX
0000002
BCM2050KMLG
94V-0

Fig. 4

EXHIBIT 6: Operator's Manual for Summit Data Communications Model SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors

9 Pages

Summit Data Communications, Inc.
Summit Manufacturing Utility (SMU) Guide

Software Version 2.01 for Windows CE and Windows Mobile

Table of Contents

1.0 Summit Products and Summit Software

Thank you for choosing one of the following radio modules or cards from Summit Data Communications, Inc.:

- SDC-CF10G 802.11g compact flash radio module with antenna connectors
- SDC-PC10G 802.11g PCMCIA radio module with antenna connectors
- SDC-MCF10G 802.11g miniature compact flash radio module with antenna connectors
- SDC-CF20G 802.11g compact flash radio card with integrated antennas
- SDC-PC20G 802.11g PCMCIA radio card with integrated antennas
- SDC-CF10AG 802.11a/g compact flash radio module with antenna connectors
- SDC-PC10AG 802.11a/g PCMCIA radio module with antenna connectors

For an overview of Summit products, go to http://www.summitdatacom.com/products.htm.

Each Summit G radio enables a computing device to communicate to a computing network using the IEEE 802.11g and IEEE 802.11b protocols. The hardware components and software for all Summit G radios are the same. A 20G version is a 10G version with integrated antennas. A PCMCIA version is a CF version in a specially designed CF-to-PCMCIA carrier. The miniature CF version is essentially the CF version with a different layout and a different (Molex) connector.

Each Summit AG radio enables a computing device to communicate to a computing network using the IEEE 802.11a, 802.11g, and IEEE 802.11b protocols. The hardware components and software for all Summit AG radios are the same.

1.1 Summit Software

The software that Summit provides for its radios consists of the following components:

- A device driver for the operating system running on the computing device that houses the radio
- An integrated IEEE 802.1X supplicant
- SCU as well as other utilities that use a software developer's kit (SDK) to interact with the driver
- A service that displays in the Windows System Tray an icon that provides a visual status for the Summit radio and enables the user to launch SCU by tapping the icon

Summit supports its software on the following operating systems:

- Windows CE 4.2, Windows Mobile 2003 or Pocket PC 2003
- Windows CE 5.0, Windows Mobile 5.0, Windows Mobile 6.0
- Windows XP Professional and Windows XP Embedded

SCU is designed for end users and administrators of mobile devices that use a Summit radio module. SCU provides a GUI for access to all of its functions. Access to these functions also is available through an API that is provided to every Summit customer. A Summit customer can use the API to manage the radio from another utility, such as one that the customer provides with its mobile devices.

Using SCU, an administrator can configure radio and security settings in a configuration profile, or config. For a list of config settings, see the Summit User's Guide. An administrator also can use SCU to define a set of global settings, which apply to all configs and to SCU. For a list of global settings that can be configured using SCU, see the Summit User's Guide.

The Summit Manufacturing Utility (SMU) allows for the configuration of certain radio settings that cannot be configured through SCU. Summit offers SMU only to its direct customers:

- Device manufacturers that embed Summit radios in their devices or offer Summit radios as device options
- Value-added distributors that must configure Summit radios for resellers and end-customers

This guide is for SMU V2.01 running on Windows CE or Windows Mobile.

To use SMU in a computing device, you first must perform the following steps:
- Install Summit software on a mobile computing device that runs a supported operating system
- Install the Summit radio on the device
- Load SMU on the device

It is recommended that you complete the steps in the order shown above. If you insert the radio in your device before you install the software, then the operating system will flag the radio as unknown and display the "Found New Hardware Wizard" screen, and you must select "**Cancel**" to cancel the Hardware Wizard.

Once you have finished using SMU, you must remove SMU from the device. SMU is for the exclusive use of those Summit customers to which Summit makes SMU available. Those customers are not permitted to redistribute SMU to anyone.

1.2 Installing Summit Software

Summit software is in a *.cab* file, which is the software equivalent of a "file cabinet". A Summit *.cab* file contains all software components, including the device driver and the Summit Client Utility (SCU). To install the Summit software, perform these tasks:

- Download the appropriate *.cab* file for the operating system and processor of your device. You can obtain your device's operating system and processor from the system information under Windows Control Panel (Tap Start, then Settings, and then System or Control Panel)
  - ***Pocket PC or Mobile:*** Select a *.cab* file with a name that begins with "mobile".
  - ***CE .NET:*** Do a search on your device's processor to determine if it is an ARM v4i processor or an ARM v4 processor. If it is an ARM v4i processor, select a *.cab* file with a name that begins with "sdc_armv4i". If it is an ARM v4 processor, select a *.cab* file with a name that begins with "sdc_armv4".
- Copy the file to your device using a supported file transfer mechanism. Common methods of moving the file include:
  - Place the file on a supported Compact Flash or SD memory card and use that card for copying the file to the device.
  - Use a program such as FTP or Microsoft ActiveSync.
- On the device, use the resident File Explorer program to locate the *.cab* file.
- Run the *.cab* file by single-clicking the file or by right-clicking and selecting "run".
- If asked to replace any existing files on the device, answer "Yes to all".

1.3 Installing the Radio

Once you have installed the Summit software, you must install the Summit radio card or module. To install a 20G Series radio card, you simply insert the card in an external card slot. To install a 10G Series or 10AG Series radio module, you must complete two types of connections:
- Module to device: Mate a connector on the end of the module to a connector on the device
- Antenna(s) to module: Use an antenna cable that mates with the antenna on one end and with the radio module's U.FL connector on the other end

The standard approach is to install the module in the device first and then connect the antenna(s). If the antenna connectors on the radio are not visible when the radio is installed, however, then you will need to connect the antenna(s) before installing the radio.

To install the radio, insert the card into the device until the CF, PCMCIA, or Molex connector mates with a connector on the device.

To connect the antennas, take each antenna and its cable, which is fitted with a Hirose U.FL connector, and attach the antenna cable to the radio module by mating the U.FL connector on the antenna cable with a U.FL connector on the radio module. Connect the primary (or only) antenna to the main connector, which is located nearer to the right edge of the card. If there is a second antenna, connect it to the auxiliary antenna connector, which is located nearer to the left edge of the card.

Locations of antenna connectors for the CF10G are shown at the right.

To comply with FCC RF exposure compliance requirements, the antenna used with a Summit radio module must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

The user's manual for the device that embeds or otherwise uses a Summit radio should not provide information on how to install a radio module within a device or remove an installed radio module from a device.

1.4 Loading SMU

For Windows CE or Mobile, identify the appropriate *smu.exe* file for the operating system and processor of your device. Download the file, and copy it to your mobile device using a supported file transfer mechanism.

For Windows XP, download the *smu.exe* file for XP and copy it to your mobile device.

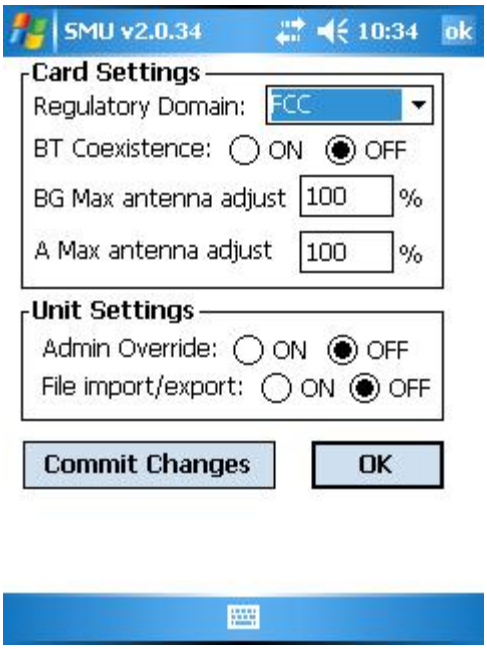
1.5 Removing SMU from the Device

SMU is designed exclusively for Summit direct customers and not for device end-users or administrators. Once you have used SMU to configure radio settings on a device that will be used by someone in another organization, you must remove SMU from the device. To do so, simply erase the file *smu.exe*.

2.0 The Summit Manufacturing Utility

2.1 Using SMU

To run SMU, use File Explorer or Windows Explorer to locate the *smu.exe* file, and tap the file to execute it. SMU will display a graphical user interface (GUI) like the one shown at the right. The values displayed on the SMU window may not reflect what is programmed on the radio or on the device.



Use the selection boxes, radio buttons, and input fields to select the desired card and unit settings, and then tap the Commit Changes button. Once you tap Commit, SMU uses the Summit application programming interface (in the Summit software developer's kit, or SDK) and programmatically does the following:

- Gathers the specified settings
- Calls SetGlobalSettings
- Calls updateSROM

It takes about 30 seconds from when you tap the button to when the settings are stored.

2.2 SMU-Configurable Settings

There are two types of global settings that can be configured only through SMU:

- Unit Settings: Stored in the registry of the unit on which SMU is run.
- Card Settings: Stored in the SROM on the radio module, or card. If you move the card from one device to another, the card will retain these settings, provided that the device is running a version of the driver as current as the version with which SMU was used.

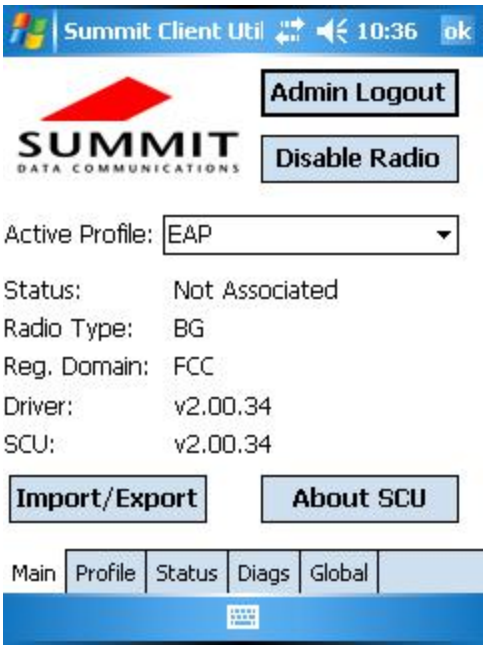
2.2.1 Unit Setting: Administrative Override

When the administrative override setting is On, then the Admin Login button is removed from the SCU Main window, and SCU considers the user in Admin mode.

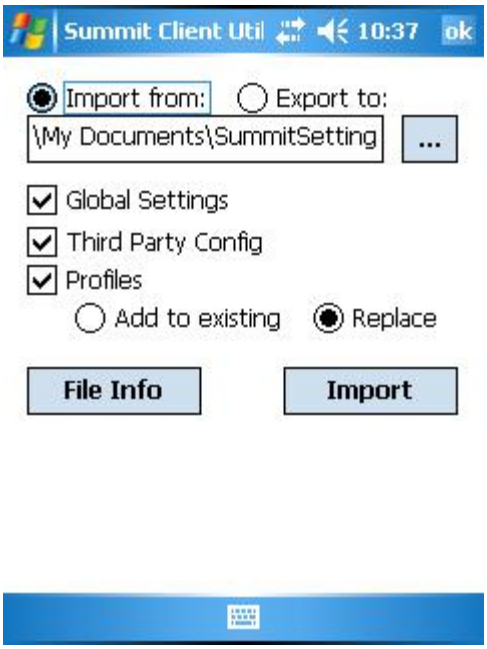
2.2.2 Unit Setting: Import/Export

When the import/export setting is On, then a user logged into SCU as an administrator will see an Import/Export button on the SCU Main window, as shown on the next page. By tapping that button, the user will view a dialog box on which he or she can:

- Export global settings, all standard SCU profiles, and the special ThirdPartyConfig profile from the SCU area of a device's registry to a file that can be transferred to another device
- Import global settings, all standard SCU profiles, and the special ThirdPartyConfig profile from a file (created using the Export facility) to the SCU area of a device's registry so that SCU can use it
  - If "Add to existing" is selected, then the imported information will be merged with information that was in the registry previously
  - If "Replace" is selected, then the imported information will overwrite the information that was in the registry previously



SCU Main window with Import/Export button



Import/Export dialog box

2.2.3 Regulatory Domain

A Summit radio's regulatory domain determines the radio's maximum transmit power and the frequency channels available to the radio. Summit radios are certified for operation in three regulatory domains:

- FCC, which is governed by the Federal Communications Commission, the regulatory agency and standards body for the Americas and parts of Asia
- ETSI, which is governed by the European Telecommunications Standards Institute, the standards body applicable to most of Europe, Africa, the Middle East and parts of Asia
- TELEC, which is governed by the Telecom Engineering Center, the standards body for Japan

A Summit radio can be programmed for any one of these three domains. Alternatively, a Summit radio can be programmed for a Worldwide domain, which enables the radio to be used in any domain. "Worldwide" value is the default value for the setting.

An 802.11g radio, which supports both 802.11b and 802.11g, operates in the 2.4 GHz frequency spectrum, where up to 14 channels, numbered 1 to 14, are defined. Adjacent channels overlap. In fact, there must be five channels of separation to avoid overlap and co-channel interference. As an example, channels 1, 6, and 11 are non-overlapping.

An 802.11a/g radio operates in both the 2.4 GHz spectrum for 802.11b and 802.11g and the 5 GHz spectrum for 802.11a. The 5 GHz frequency spectrum is grouped into sets of channels, or bands:

- UNII-1: 36, 40, 44, 48
- UNII-2: 52, 56, 60, 64
- Intermediate: 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140
- UNII-3: 149, 153, 157, 161

None of the channels in the 5 GHz bands overlap. Dynamic Frequency Selection, or DFS, is required for the UNII-2 and Intermediate bands. With V2.01 of Summit software, a Summit AG radio programmed for the FCC regulatory domain does not support DFS or the bands that require DFS.

The table below shows the channels and the nominal maximum transmit power values that are supported in each regulatory domain with V2.01:

Domain	2.4 GHz		5 GHz (AG radio only)	
	Channels	**Tx (.11b)**	**Channels**	**Tx**
FCC	1-11	18 dBm	UNII-1 and UNII-3	14 dBm
ETSI	1-13	18 dBm	UNII-1, UNII-2, and Intermediate	14 dBm
TELEC	1-14	17 dBm	UNII-1 and UNII-2, plus additional channels: 34, 38, 42, 46	14 dBm
WorldWide: no 802.11d	1-11	17 dBm	UNII-1	14 dBm
WorldWide: 802.11d	All	18 dBm	All	14 dBm

V2.01 of Summit software supports a performance-optimized version of IEEE 802.11d, the ratified standard for the operation of a wireless LAN client radio in multiple regulatory domains. This 802.11d support ensures that a Summit radio that is programmed for the WorldWide regulatory domain can adjust its 2.4 GHz and 5 GHz channel sets and maximum transmit power settings to match those for the country specified in the Country information element transmitted in an access point's (AP's) association response.

To take advantage of 802.11d support in Summit software and ensure optimal performance, an organization that uses devices with Summit radios must make sure that every AP on the wireless LAN supports 802.11d, specifies the correct Country information element, and broadcasts its SSIDs. The device manufacturer or other organization that uses the Summit Manufacturing Utility to program Summit radios must ensure that every Summit radio is programmed for a regulatory domain of WorldWide. A radio that is programmed for a regulatory domain of FCC, ETSI, or TELEC will ignore the Country information elements from APs.

A Summit radio uses 802.11d only when it tries to associate on an SSID for the first time. During the initial association process, if the AP provides a Country information element, then the radio configures its channel set and maximum transmit power for that country. The radio assumes that all APs with the same SSID have the same 802.11d country code; as a result, the radio effectively ignores the country code when roaming from one AP to another. The radio will continue to use the channel set and maximum transmit power for a country until the radio disconnects from the WLAN (with that SSID).

2.2.4 Bluetooth Coexistence

When Bluetooth coexistence is on, pins 39 and 45 of the radio are used for two-wire Bluetooth coexistence handshaking. When Bluetooth coexistence is off, the handshaking lines are not used. The default value is "Off".

2.2.5 BG Max Antenna Adjust and A Max Antenna Adjust

The last two card settings provides for an adjustment to the radio's transmit power to accommodate a 2.4 GHz (802.11b/g) antenna, a 5 GHz (802.11a) antenna, or a dual-band antenna with a gain greater than 0 dBm. The values for each of these settings, "BG Max antenna adjust" and "A Max antenna adjust", is the degree of antenna attenuation expressed as a percentage of dBm, not milliwatts (mW), with the percentage based on a TELEC 50 mW test. On the next page is a table of popular dBm values and their corresponding mW values.

Here is an example: In ETSI, to ensure that the maximum 802.11b transmit power is 50 mW, use 94%:
94% x 18 dBm = 16.92 dBm = 50 mW

The default value is "100%".

dBm	mW
20	100
19	79.4
18	63.1
17	50.1
16	39.8

dBm	mW
15	31.6
14	25.1
13	20
12	15.8
11	12.6

dBm	mW
10	10
8	6.3
6	4
3	2
0	1

Beginning with V1.03.23 of Summit software, the transmit power (Tx Power) value on the SCU Status window accounts for the transmit power adjustment set in SMU. As a result, the displayed value is the true transmit power of the Summit radio. In previous releases, the Status window displayed the transmit power without the adjustment, because SCU assumed that the antenna provided a gain that compensated for the adjustment. With previous releases, therefore, the displayed value was an estimate of EIRP and not a true radio transmit power value.

Appendix: FCC Information

Note: All declarations and instructions for the SDC-CF10G apply to other Summit 802.11g radio modules and cards.

Summit declares that SDC-CF10G (FCC ID: TWG-SDCCF10G) is limited in CH1~CH11 for 2.4 GHz by specified firmware controlled in U.S.A.

This device is intended for host device manufacturers and integrators only under the following conditions:

1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as the two conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing its end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

IMPORTANT NOTE: In the event that the two conditions above cannot be met (for example certain device configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

- **End Product Labeling**

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users, for example, mobile data terminals (MDTs) and vehicle-mounted devices (VMDs). The final end product must be labeled in a visible area with the following: “Contains TX FCC ID: TWG-SDCCF10G”.

- **Manual Information That Must be Included**

The OEM integrator must not provide information to the end user regarding how to install or remove this RF module in the users manual of the end product which integrate this module.

The users manual for OEM integrators must include the following information in a prominent location: “IMPORTANT NOTE: To comply with FCC RF exposure compliance requirements, the antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.”

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

1. Reorient or relocate the receiving antenna
2. Increase the separation between the equipment and receiver

3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
4. Consult the dealer or an experienced radio/TV technician for help

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IMPORTANT NOTE:
FCC Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Industry Canada
To prevent radio interference to the licensed service, this device is intended to be operated indoors and away from windows to provide maximum shielding. Equipment (or its transmit antenna) that is installed outdoors is subject to licensing.

This device has been designed to operate with the antennas listed below, and having a maximum gain of 5.1 dB. Antennas not included in this list or having a gain greater than 5.1 dB are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

Manufacturer: Laird Centurion
Model Name: NanoBlade
Antenna Type: PCB Omnidirectional
Gain at 2.40 GHz : 3.8 dBi
Gain at 5.25 GHz: 5.1 dBi
Gain at 5.80 GHz: 4.5 dBi

Manufacturer: Volex
Part Number: VLX-51004-A
Antenna Type: Dipole
Gain at 2.40 GHz : 2.3 dBi
Gain at 5 GHz: 1.9 dBi

Manufacturer: Larson
Part Number: R380.500.314
Antenna Type: Dipole
Gain at 2.40 GHz : 1.6 dBi
Gain at 5 GHz: 5 dBi

EXHIBIT 7: Block Diagram of Summit Data Communications Model SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors

1 Page

WCFB-108AG Block Diagram

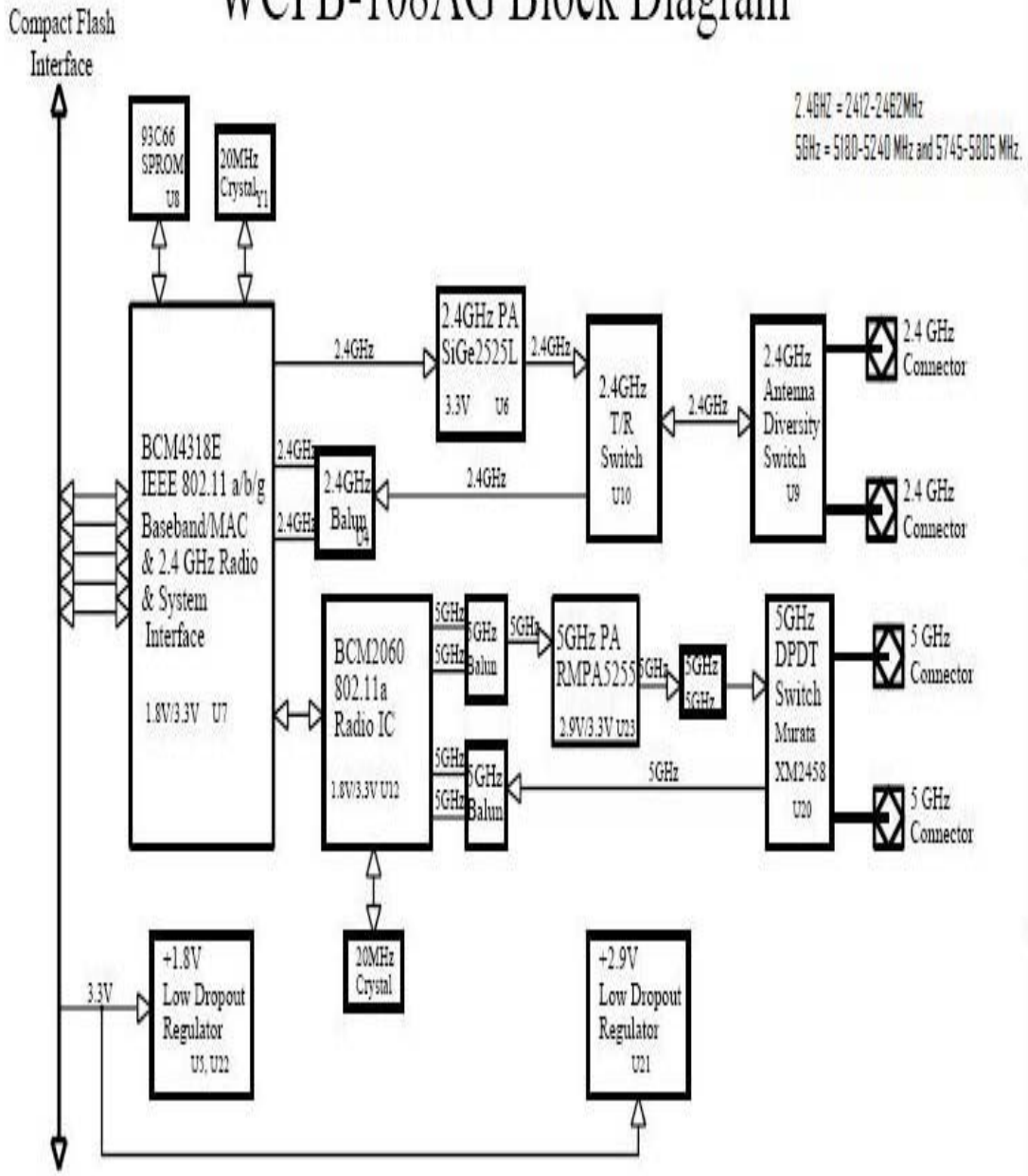


EXHIBIT 8: Schematic Diagrams for Summit Data Communications Model SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors

6 Pages

WCFB-108AG_V04_S1
WCFB-108AG_V04_S1.SCH

WCFB-108AG_V04_S2
WCFB-108AG_V04_S2.SCH

WCFB-108AG_V04_S3
WCFB-108AG_V04_S3.SCH

WCFB-108AG_V04_S4
WCFB-108AG_V04_S4.SCH

WCFB-108AG_V04_S5
WCFB-108AG_V04_S5.SCH

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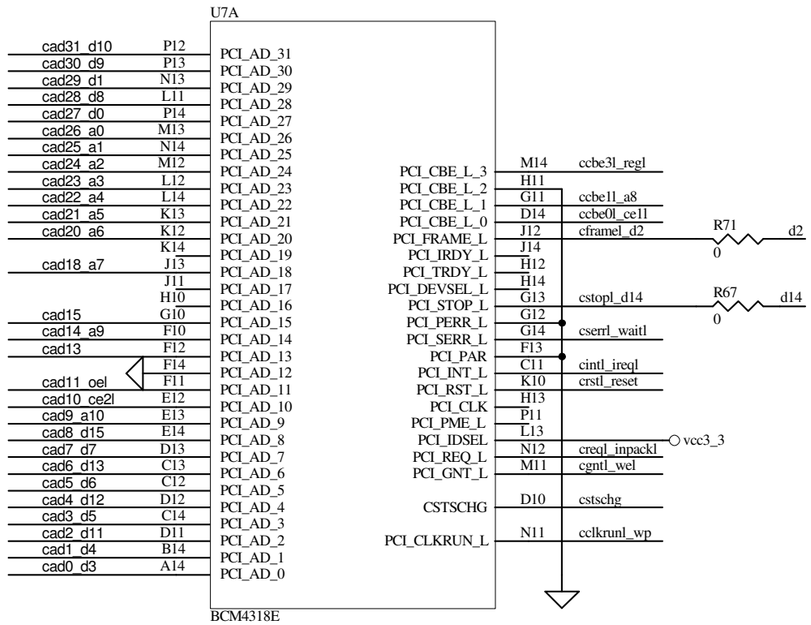

1	2	3	4	5	6

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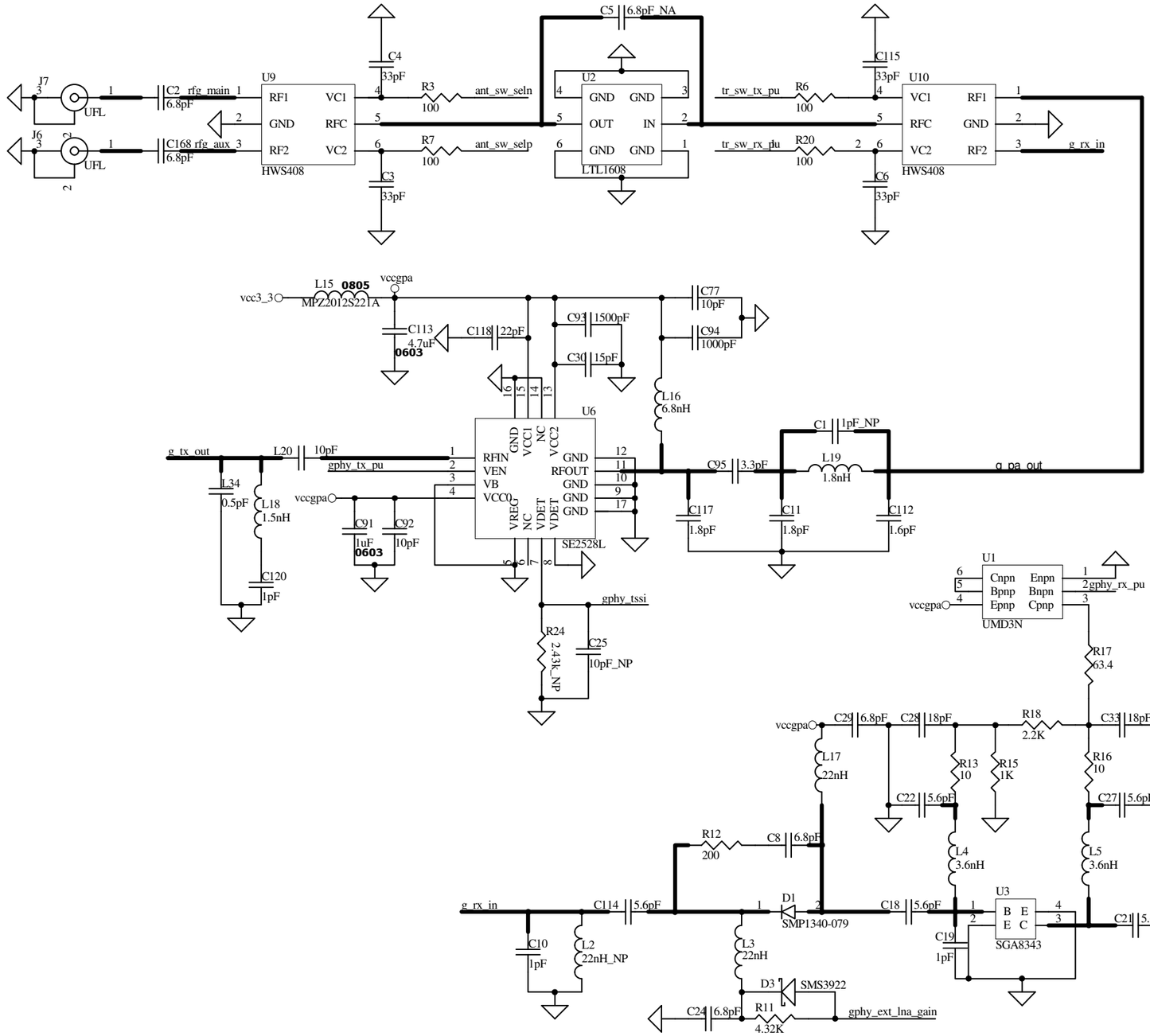

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Date: 6-Dec-2007	Sheet 2 of 6		
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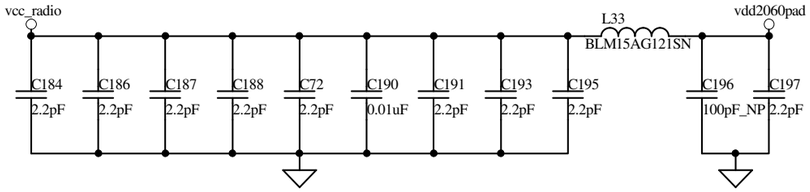

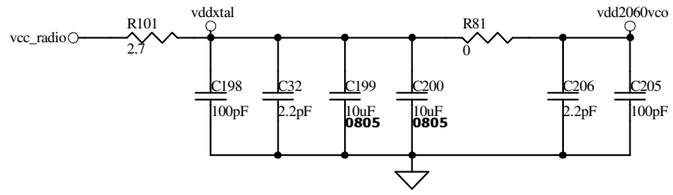

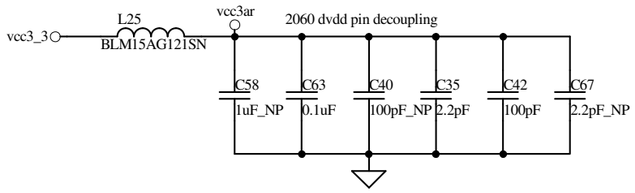

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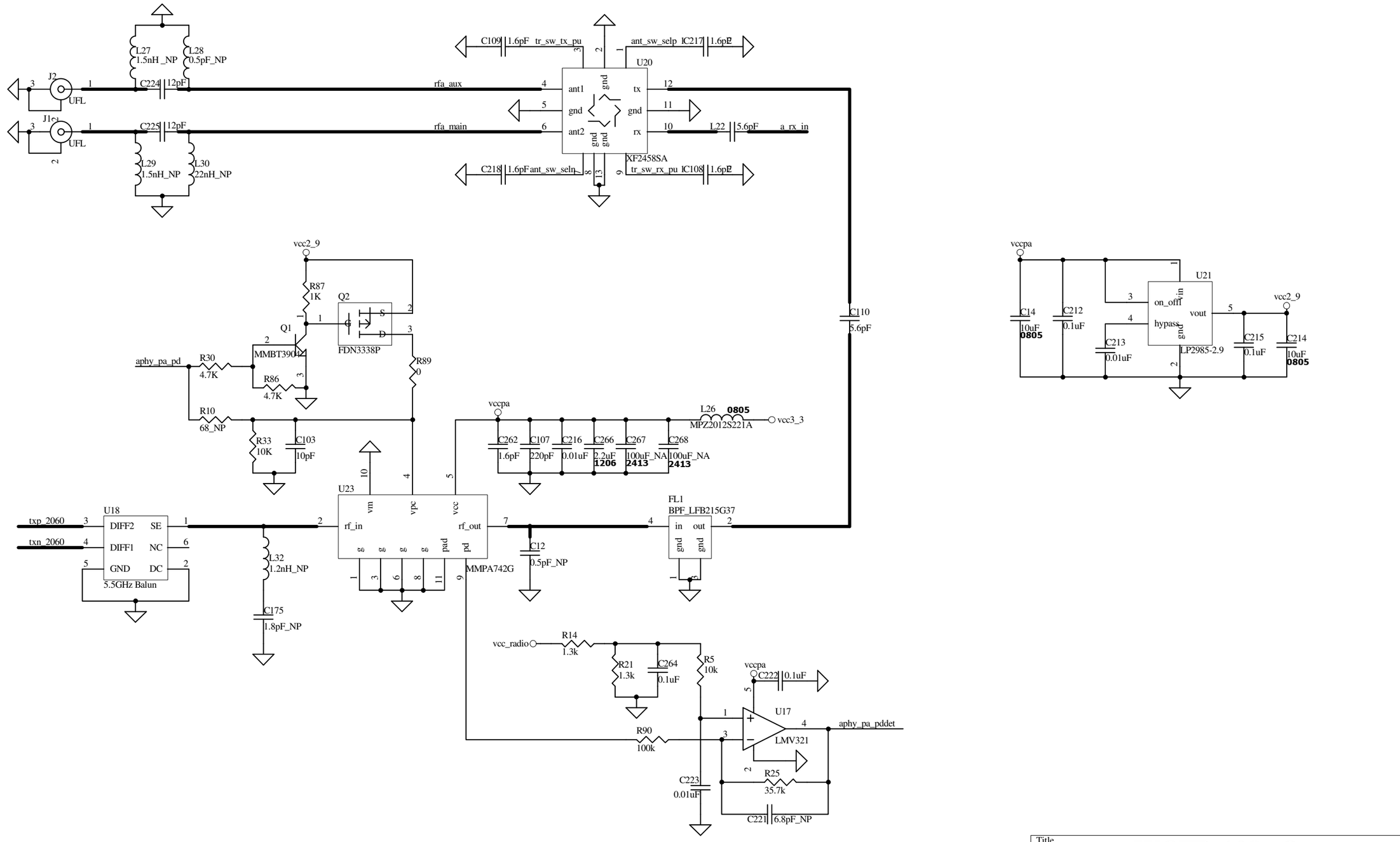

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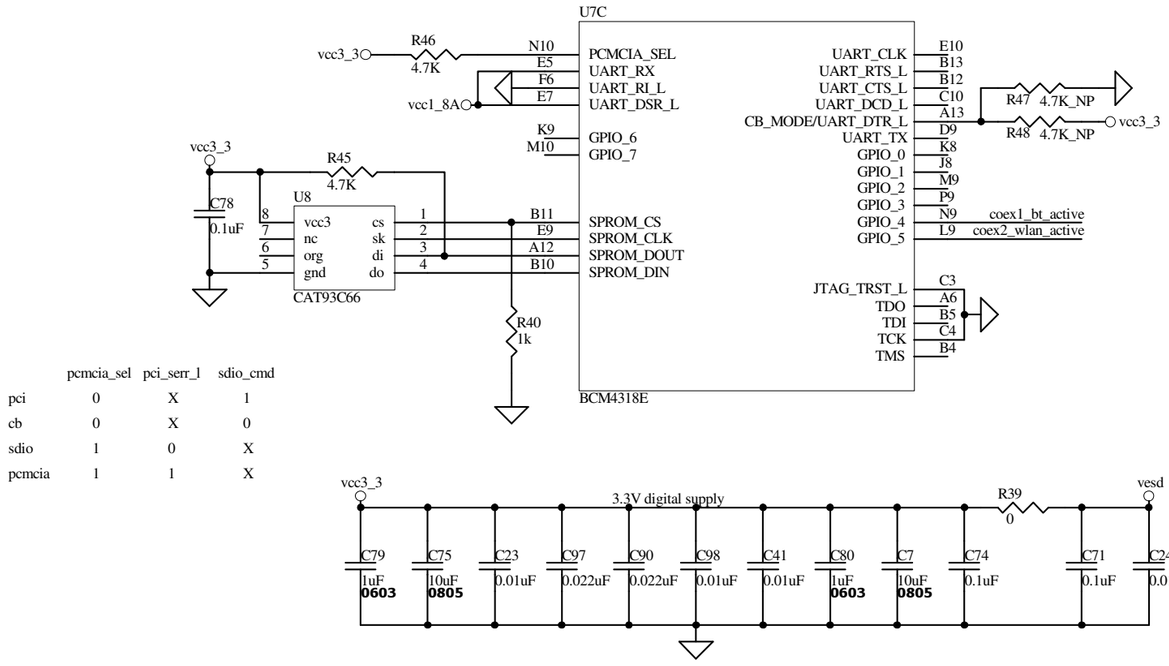
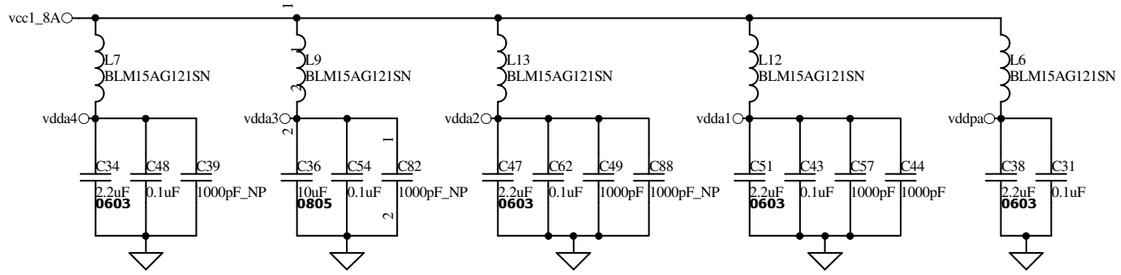
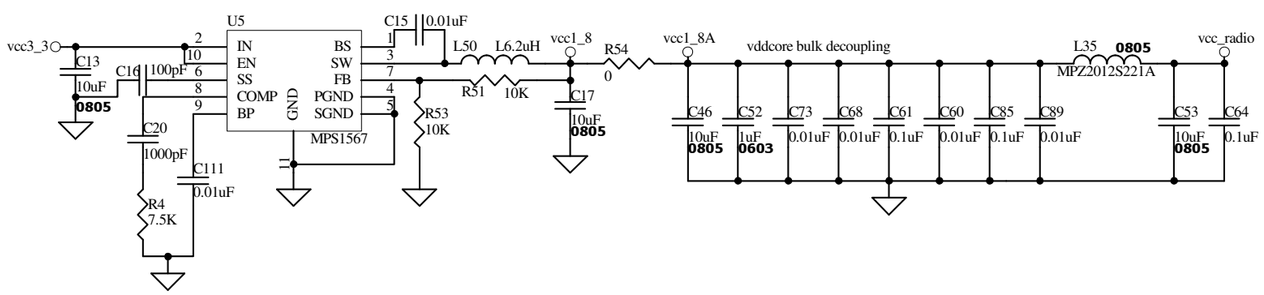
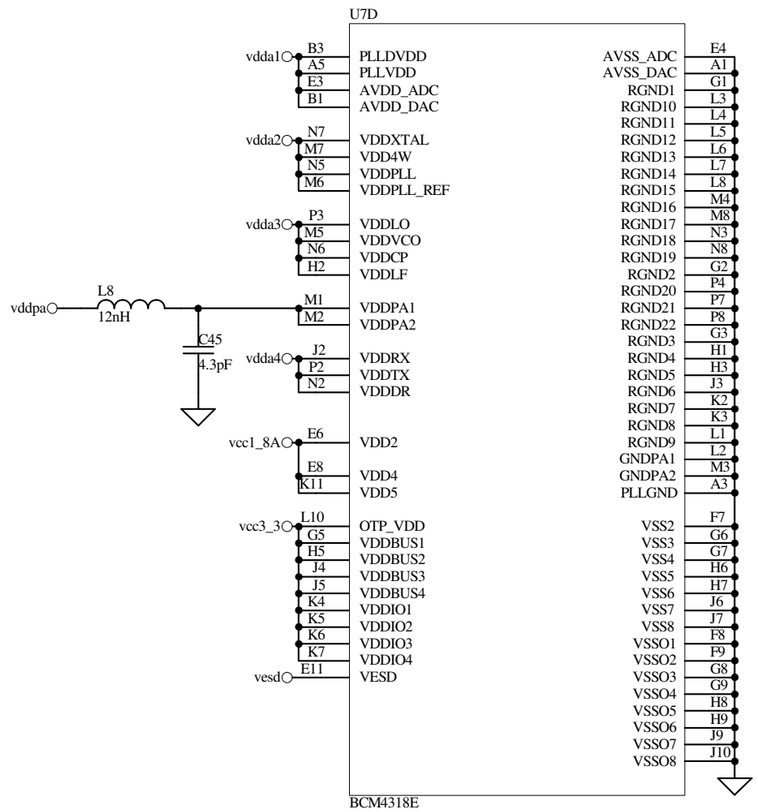


	pcmcia_sel	pci_serr_1	sdio_cmd
pci	0	X	1
cb	0	X	0
sdio	1	0	X
pcmcia	1	1	X







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Date: 6-Dec-2007	Sheet 6 of 6	
File: C:\Documents and Settings\Jimmy_lin\桌面\[illegible]WCFB-108AG_V04.DDB		

EXHIBIT 9: Theory of Operation for Summit Data Communications Model SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors

1 Page

SDC-CF10AG Operational Description

This device is an SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors, which operates in the 2.4 GHz and 5 GHz portions of the radio frequency spectrum. The device is compliant with IEEE 802.11a, 802.11b and 802.11g standards using Direct Sequence Spread Spectrum and Orthogonal Frequency Division Multiplexing. The device supports all 802.11a, 802.11b and 802.11g data rates and automatically adjusts data rates and operational modes based on various environmental factors.

The SDC-CF10AG is compliant with Compact Flash Type 2 mechanical specifications and interfaces to host devices via a 50-pin connector. The device is based on the Broadcom BCM4318e chip which is an integrated device providing a Media Access Controller (MAC), a Physical Layer Controller (PHY or baseband processor) and a 2.4 GHz transceiver. The SDC-CF10AG incorporates an external 5 GHz transceiver to allow for dual band operation. To maximize operational range, the SDC-CF10G incorporates 2.4 GHz and 5 GHz Power Amplifiers to increase transmit power to as much as 19 dBm (80 mW) and a 2.4 GHz Low Noise Amplifier to improve receiver sensitivity. The frequency stability for both 2.4 GHz (802.11b and 802.11g) and 5 GHz (802.11a) operation is +/- 20 ppm. The SDC-CF10G is powered by the host device into which it is installed and uses a DC to DC regulator. The SDC-CF10AG provides four antenna connectors (Hirose U.FL type) to support dual band transmit and receive diversity. Supported host device antenna types include dipole and printed circuit board antennas. Typical host devices include: (1) Portable Data Terminals (PDTs) and (2) Vehicle Mounted Terminals (VMTs).

For additional information please review the User's Guide which may be found at: http://www.summitdatacom.com/documentation.htm.

EXHIBIT 10: RF Exposure Information

4 Pages

RSS-102 Annex A – RF Technical Brief Cover Sheet

(NOTE: Annex A is Only Required When Exemption Clauses of RSS-102 Are Not Met)

All Fields must be completed with the requested information or the following codes: N/A for Not Applicable, N/P for Not Performed or N/V for Not Available. Where applicable, check appropriate box.

1. COMPANY NUMBER: 6616A

2. MODEL NUMBER: SDC-CF10AG

3. APPLICANT: Summit Data Communications

4. TYPE OF EVALUATION (Complete the applicable sections) (a) SAR Evaluation: Device Used in the Vicinity of the Human Head; (b) SAR Evaluation Body worn Device; (c) RF Evaluation

Note: The worst case scenario (i.e. highest measured value obtained) should be reported.

(a) SAR Evaluation: Device used in the Vicinity of the Human Head

- **Multiple transmitters: ☐-Yes ☐-No**
- **Evaluated against exposure limits: ☐-General Public Use ☐-Controlled Use**
- **Duty cycle used in evaluation: %**
- **Standard used for evaluation:**
- **SAR Value: W/kg. ☐-Measured ☐-Computed ☐-Calculated**

(b) SAR Evaluation: Body worn Device

- **Multiple transmitters: ☐-Yes ☐-No**
- **Evaluated against exposure limits: ☐-General Public Use ☐-Controlled Use**
- **Duty cycle used in evaluation: %**
- **Standard used for evaluation:**
- **SAR Value: W/kg. ☐-Measured ☐-Computed ☐-Calculated**

(c) RF Evaluation

- **Evaluated against exposure limits: ☒-General Public Use ☐-Controlled Use**
- **Duty cycle used in evaluation: %**
- **Standard used for evaluation:**
- **Measurement Distance: 20cm**
- **RF Value: 0.16 ☐-V/m ☐-A/m ☒-W/m^2 (Note: 10 W/ m^2 = 1 mW/cm^2**
  ☐-Measured ☐-Computed ☒-Calculated

(NOTE: Annex B Required for All TX Devices)

ATTESTATION: I attest that when SAR or RF Exposure Evaluation testing is required and has been performed, that the information provided in Annex A is correct; that a Technical Brief was prepared and the information it contains is correct; that the device evaluation was performed or supervised by me; that applicable measurement methods and evaluation methodologies have been followed and that the device meets the SAR and/or RF exposure limits of RSS-102.

Signature: 

Date: March 5, 2008

NAME(Please print or type):
Mark Hill

TITLE(Please print or type):
EMC Staff Engineer

COMPANY(Please print or type):
Elliott Labs for Summit Communications

Note 1: To obtain approval under this Standard, each application for certification shall be accompanied by the duly completed RF technical brief cover sheet (see Annex A) and a properly signed declaration of compliance (see Annex B). However if the device in question meets the exemption from routine evaluation limits of Sections 2.5.1 or 2.5.2, only a properly signed declaration of compliance (Annex B) shall be submitted.

Note 2: Although submission of the RF exposure technical brief is not required for certification it shall be made available upon request, for as long as the device model is marketed in Canada.

Note 3: In cases of exemption according to RSS-102, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. or output power was derived.

Client:	Summit Data Communications	Job Number:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A

Maximum Permissible Exposure

Test Specific Details

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

Date of Test: 2/1/2008
Test Engineer: Mark Hill

General Test Configuration

Calculation uses the free space transmission formula:

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

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

Summary of Results

Device complies with Power Density requirements at 20cm separation:	Yes
Maximum Power Density (S) in W/m^2	0.16

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:	J68959
Model:	SDC-CF10AG 802.11a/g Compact Flash Module with Antenna Connectors	T-Log Number:	T69413
		Account Manager:	Dean Eriksen
Contact:	Ron Seide		
Standard:	15.247 / 15.E / RSS-210	Class:	N/A

Use: General
Antenna: 5.1 dBi

Freq. MHz	EUT Power dBm	EUT Power mW*	Cable Loss dB	Ant Gain dBi	Power at Ant dBm	EIRP mW	Power Density (S) at 20 cm mW/cm^2	MPE Limit at 20 cm mW/cm^2
5180	13.2	20.9	0	5.1	13.2	67.61	0.013	1.000
5200	13.9	24.5	0	5.1	13.9	79.43	0.016	1.000
5240	13.6	22.9	0	5.1	13.6	74.13	0.015	1.000

For the cases where S > the MPE Limit

Freq. MHz	S @ 20 cm mW/cm^2	MPE Limit mW/cm^2	Distance where S <= MPE Limit
5180	0.013	1.000	2.3cm
5200	0.016	1.000	2.5cm
5240	0.015	1.000	2.4cm