

*EMC Test Report
Application for Grant of Equipment Authorization
Class II Permissive Change/Reassessment
Industry Canada RSS-Gen Issue 3 / RSS 210 Issue 8
FCC Part 15 Subpart C*

Model: PH30AG

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

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

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

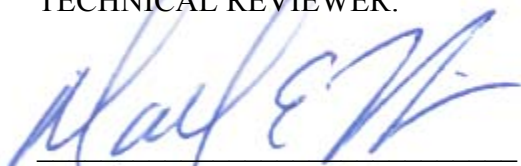
IC SITE REGISTRATION #: 2845B-3; 2845B-4, 2845B-5, 2845B-7

REPORT DATE: September 15, 2011

FINAL TEST DATES: July 19 and 20 and August 9, 2011

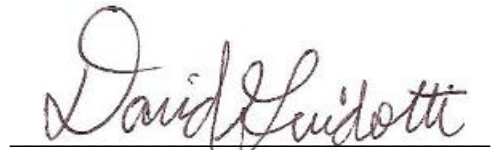
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Testing Cert #2016.01

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REVISION HISTORY

Rev#	Date	Comments	Modified By
-	09-15-2011	First release	

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SCOPE

An electromagnetic emissions test has been performed on the Summit Data Communications model PH30AG, pursuant to the following rules:

Industry Canada RSS-Gen Issue 3

RSS 210 Issue 8 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"

FCC Part 15 Subpart C

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

ANSI C63.4:2003

FCC DTS Measurement Procedure KDB558074, March 2005

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

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

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

OBJECTIVE

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

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

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

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

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

STATEMENT OF COMPLIANCE

The tested sample of Summit Data Communications model PH30AG complied with the requirements of the following regulations:

Industry Canada RSS-Gen Issue 3

RSS 210 Issue 8 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"

FCC Part 15 Subpart C

Maintenance of compliance is the responsibility of the manufacturer. Any modifications to the product should be assessed to determine their potential impact on the compliance status of the device with respect to the standards detailed in this test report.

The test results recorded herein are based on a single type test of Summit Data Communications model PH30AG and therefore apply only to the tested sample. The sample was selected and prepared by Ron Seide of Summit Data Communications.

DEVIATIONS FROM THE STANDARDS

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

TEST RESULTS SUMMARY**DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHz)**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	Systems uses OFDM / DSSS techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	Testing not performed		
15.247 (b) (3)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	Power verified to be within 0.5dB of original filing		
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	Testing not performed		
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	Testing not performed		
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	53.9dB μ V/m @ 2483.5MHz (-0.1dB)	15.207 in restricted bands, all others <-30dBc ^{Note 2}	Complies
Note 2: Limit of -30dBc used because the power was measured using the UNII test procedure (maximum power averaged over a transmission burst).					

DIGITAL TRANSMISSION SYSTEMS (5725 –5850 MHz)

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	Systems uses OFDM / DSSS techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	Testing not performed		
15.247 (b)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	Power verified to be within 0.5dB of original filing		
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	Testing not performed		
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions – 30MHz – 40 GHz	Testing not performed		
15.247(c) / 15.209	RSS 210 A8.5 Table 2, 3	Radiated Spurious Emissions 30MHz – 40 GHz	49.8dB μ V/m @ 5380.8MHz (-4.2dB)	15.207 in restricted bands, all others <-30dBc ^{Note 2}	Complies
Note 2: Limit of -30dBc used because the power was measured using the UNII test procedure (maximum power averaged over a transmission burst).					

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	New module uses MMCX connector	Unique or integral antenna required	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	Testing not performed		
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	Testing not performed		
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	As the output power is the same as the original and the new antenna is lower gain, the RF exposure hazard will be reduced from the original filing.	Refer to OET 65, FCC Part 1 and RSS 102	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual	Unchanged from original	Statement required regarding non-interference	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual	Unchanged from original	Statement for products with detachable antenna	Complies
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	Unchanged from original	Information only	N/A

MEASUREMENT UNCERTAINTIES

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

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

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

The Summit Data Communications model PH30AG is an 802.11ag compliant wireless LAN radio Module which is designed to provide wireless local area networking connectivity. Normally, the EUT would be embedded in various types of mobile and stationary computing devices such as handheld and vehicle mounted data terminals during operation. The EUT was, therefore, placed in this position during emissions testing to simulate the end user environment. The electrical rating of the EUT is 3.3 VDC \pm 5%. It's typical power consumption is 400mA (1320mW) while in transmit mode, 180mA (594mW) while in receive mode and 10mA (33mW) while in standby mode.

The sample was received on July 19, 2011 and tested on July 19 and 20 and August 9, 2011. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Summit Data Communications Inc.	PH30AG	802.11AG Mini SDIO Module with antenna connectors	-	

ANTENNA SYSTEM

The antenna used for this C2PC: Larid, model MAF95291, Dipole Antenna. Gain: 2.15dBi @ 2.4GHz, 3.9 dBi @ 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

No modifications were made to the EUT during the time the product was at Elliott.

SUPPORT EQUIPMENT

The following equipment was used as support equipment for testing:

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

No remote support equipment was used during testing.

EUT INTERFACE PORTS

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

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

EUT OPERATION

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

TEST SITE**GENERAL INFORMATION**

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

Site	Registration Numbers		Location
	FCC	Canada	
Chamber 4	211948	2845B-4	41039 Boyce Road Fremont, CA 94538-2435
Chamber 7	A2LA accreditation	2845B-7	

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

RADIATED EMISSIONS CONSIDERATIONS

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

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

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

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

INSTRUMENT CONTROL COMPUTER

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

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

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.

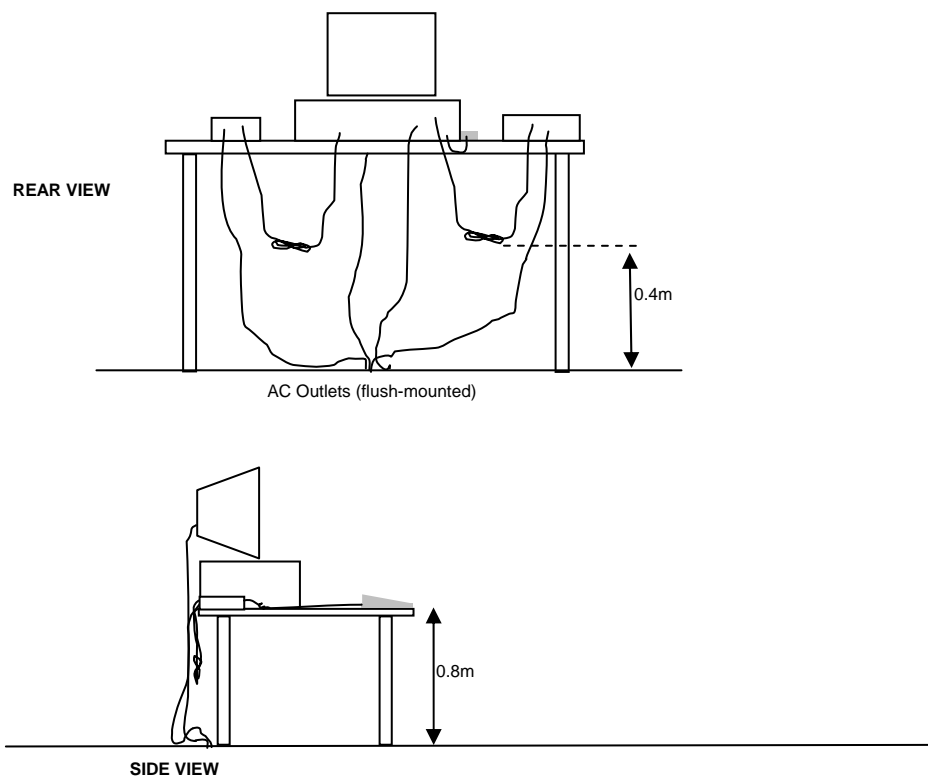
RADIATED EMISSIONS

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

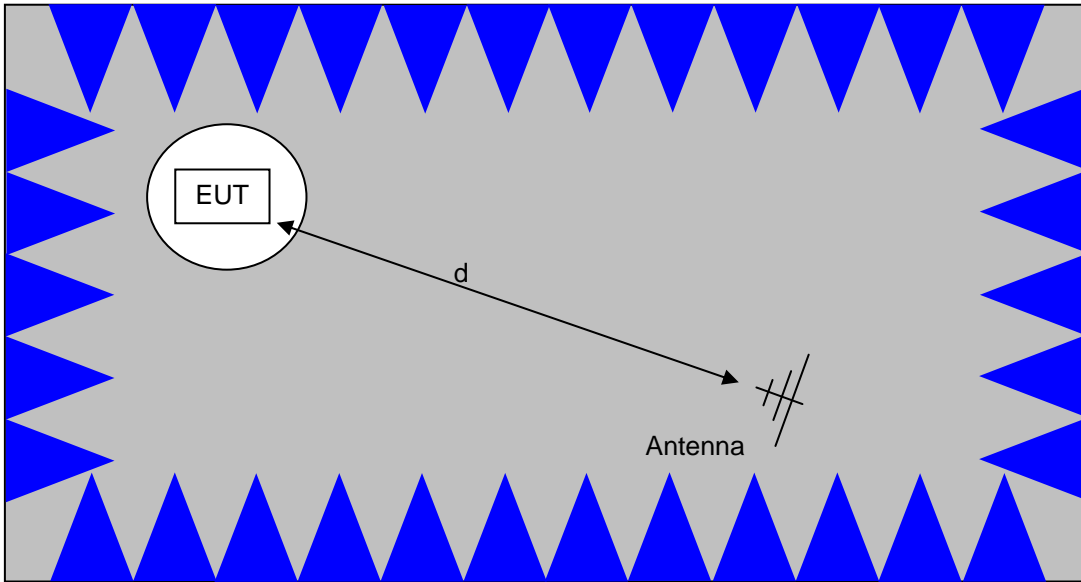
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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

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

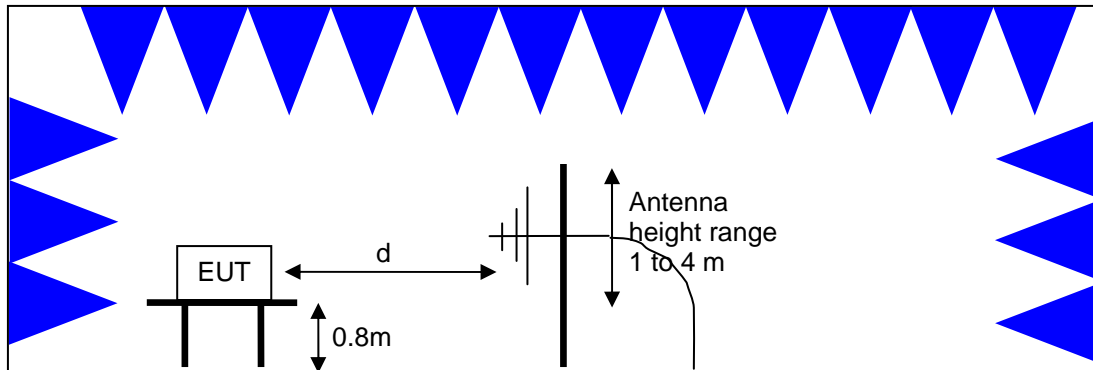


Typical Test Configuration for Radiated Field Strength Measurements



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

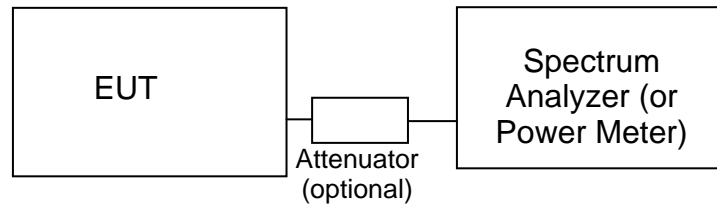
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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

CONDUCTED EMISSIONS FROM ANTENNA PORT

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

**Test Configuration for Antenna Port Measurements**

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

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

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

BANDWIDTH MEASUREMENTS

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

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

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

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

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands¹ (with the exception of transmitters operating under FCC Part 15 Subpart D and RSS 210 Annex 9), the limits for all emissions from a low power device operating under the general rules of RSS 310 (tables 3 and 4), RSS 210 (table 2) and FCC Part 15 Subpart C section 15.209.

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

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

OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS

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

Operating Frequency (MHz)	Output Power	Power Spectral Density
902 – 928	1 Watt (30 dBm)	8 dBm/3kHz
2400 – 2483.5	1 Watt (30 dBm)	8 dBm/3kHz
5725 – 5850	1 Watt (30 dBm)	8 dBm/3kHz

The maximum permitted output power is reduced by 1dB for every dB the antenna gain exceeds 6dBi. Fixed point-to-point applications using the 5725 – 5850 MHz band are not subject to this restriction.

TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS and DTS SYSTEMS

The limits for unwanted (spurious) emissions from the transmitter falling in the restricted bands are those specified in the general limits sections of FCC Part 15 and RSS 210. All other unwanted (spurious) emissions shall be at least 20dB below the level of the highest in-band signal level (30dB if the power is measured using the sample detector/power averaging method).

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

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

$$R_r - S = M$$

where:

R_r = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

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

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

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

where:

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

$$D_m = \text{Measurement Distance in meters}$$

$$D_s = \text{Specification Distance in meters}$$

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

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

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

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

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

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

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

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

SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION

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

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

where P is the eirp (Watts)

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

Appendix A Test Equipment Calibration Data**Radiated Emissions (Spurious Emissions), 20-Jul-11**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	12/8/2011
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/6/2012
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	8/12/2011
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	8/10/2011

Radiated Emissions, Bandedge, 09-Aug-11

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Rohde & Schwarz	Test Receiver, 9 kHz-2750 MHz	ESCS 30	1337	11/24/2011
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1548	6/24/2012

Appendix B Test Data

T83840 Pages 24 - 40



EMC Test Data

Client:	Summit Data Communications	Job Number:	J83780
Model:	PH30AG	T-Log Number:	T83840
		Account Manager:	Christine Krebill
Contact:	Ron Seide		-
Emissions Standard(s):	FCC 15.247/15.E	Class:	-
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Summit Data Communications

Model

PH30AG

Date of Last Test: 8/30/2011

Client:	Summit Data Communications	Job Number:	J83780
Model:	PH30AG	T-Log Number:	T83840
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/15.E	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions

Test Specific Details

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 22 °C
 Rel. Humidity: 38 %

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

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1a	802.11b	low	Max	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	50.7dBµV/m @ 2386.0MHz (-3.3dB)
2a	802.11g	low	Max	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.0dBµV/m @ 2390.0MHz (-1.0dB)

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:	J83780
Model:	PH30AG	T-Log Number:	T83840
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	FCC 15.247/15.E	Class:	N/A

Run #1: Radiated Spurious Emissions, Operating Mode: 802.11b

Date of Test: 8/9/2011

Test Engineer: David Bare

Test Location: Fremont Chamber #7

Run #1a: Low Channel @ 2412 MHz
Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2386.000	50.7	V	54.0	-3.3	AVG	90	1.0	AVG (0.100s)
2386.000	60.6	V	74.0	-13.4	PK	90	1.0	PK (0.100s)
2386.000	48.4	H	54.0	-5.6	AVG	120	1.1	AVG (0.100s)
2386.000	58.5	H	74.0	-15.5	PK	120	1.1	PK (0.100s)

Run #2: Radiated Spurious Emissions, Operating Mode: 802.11g
Run #2a: Low Channel @ 2412 MHz
Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	53.0	V	54.0	-1.0	AVG	360	1.0	AVG (0.100s)
2390.000	72.2	V	74.0	-1.8	PK	360	1.0	PK (0.100s)
2390.000	46.5	H	54.0	-7.5	AVG	154	1.3	AVG (0.100s)
2390.000	61.2	H	74.0	-12.8	PK	154	1.3	PK (0.100s)

Client:	Summit Data Communications	Job Number:	J83780
Model:	PH30AG	T-Log Number:	T83840
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	FCC 15.247/15.E	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions

Test Specific Details

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

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated 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: 25 °C
Rel. Humidity: 37 %

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

Run #	Mode	Channel	Power Setting	Antenna	Test Performed	Limit	Result / Margin
1a	802.11b	low	Max	-	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	53.2dBµV/m @ 4824.1MHz (-0.8dB)
1b	802.11b	center	Max	-	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	52.9dBµV/m @ 4874.1MHz (-1.1dB)
1c	802.11b	high	Max	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	49.6dBµV/m @ 2487.7MHz (-4.4dB)
			Max	-	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	52.8dBµV/m @ 4924.1MHz (-1.2dB)
2a	802.11g	low	Max	-	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	37.3dBµV/m @ 4824.3MHz (-16.7dB)
2b	802.11g	center	Max	-	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	38.9dBµV/m @ 4876.0MHz (-15.1dB)
2c	802.11g	high	Max	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	53.9dBµV/m @ 2483.5MHz (-0.1dB)
			Max	-	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	36.6dBµV/m @ 4930.0MHz (-17.4dB)

Note: No spurious emissions were detected below 1 GHz

802.11b was tested at 1Mbps. 802.11g was tested at 6Mbps. These were the highest output power data rates.

Client:	Summit Data Communications	Job Number:	J83780
Model:	PH30AG	T-Log Number:	T83840
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	FCC 15.247/15.E	Class:	N/A

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

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

Date of Test: 7/19/2011

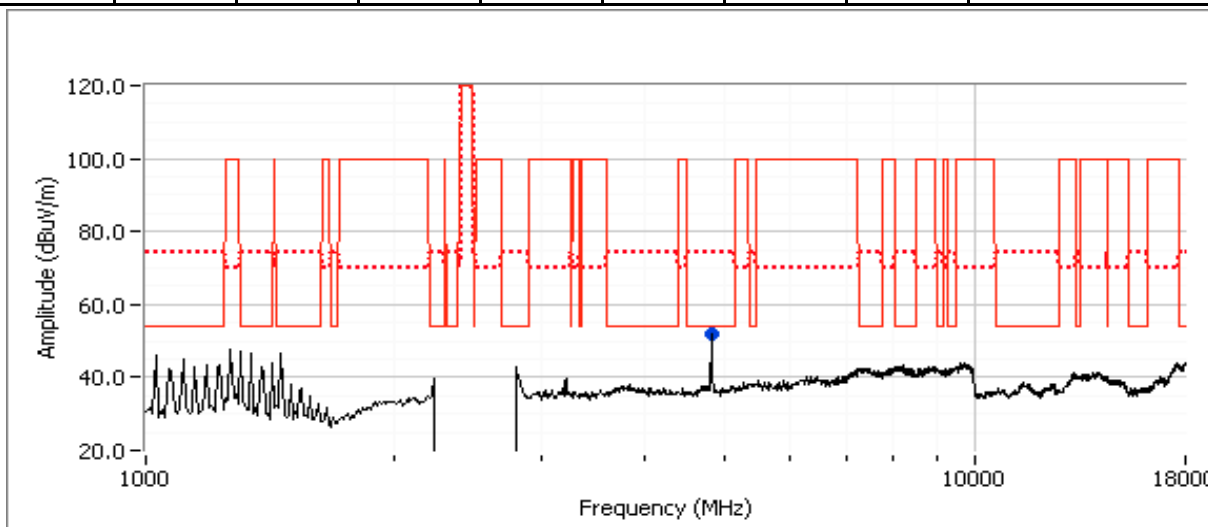
Test Engineer: Joseph Cadigal

Test Location: FT Chamber#7

Run #1a: Low Channel @ 2412 MHz

Other Spurious Emissions

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4824.080	53.2	V	54.0	-0.8	AVG	3	1.3	RB 1 MHz;VB 10 Hz;Pk
4824.050	55.0	V	74.0	-19.0	PK	3	1.3	RB 1 MHz;VB 3 MHz;Pk



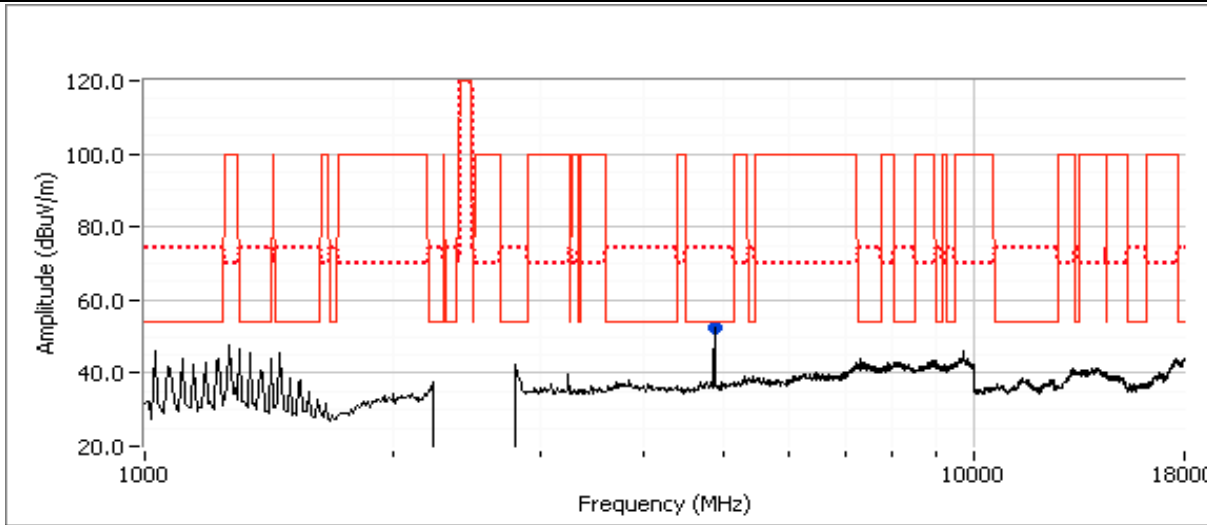
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.
Note 3:	No significant signals found between 18-26GHz

Client: Summit Data Communications	Job Number: J83780
Model: PH30AG	T-Log Number: T83840
Contact: Ron Seide	Account Manager: Christine Krebill
Standard: FCC 15.247/15.E	Class: N/A

Run #1b: Center Channel @ 2437 MHz

Fundamental emission level @ 3m in 100kHz RBW:		dB μ V/m
Limit for emissions outside of restricted bands:	-20 dB μ V/m	Limit is -20dBc (Peak power measurement)
Limit for emissions outside of restricted bands:	-30 dB μ V/m	Limit is -30dBc (UNII power measurement)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
4874.110	52.9	V	54.0	-1.1	AVG	282	1.3	RB 1 MHz;VB 10 Hz;Pk
4873.960	54.8	V	74.0	-19.2	PK	282	1.3	RB 1 MHz;VB 3 MHz;Pk



Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.
Note 3:	No significant signals found between 18-26GHz

Client:	Summit Data Communications	Job Number:	J83780
Model:	PH30AG	T-Log Number:	T83840
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	FCC 15.247/15.E	Class:	N/A

Run #1c: High Channel @ 2462 MHz

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

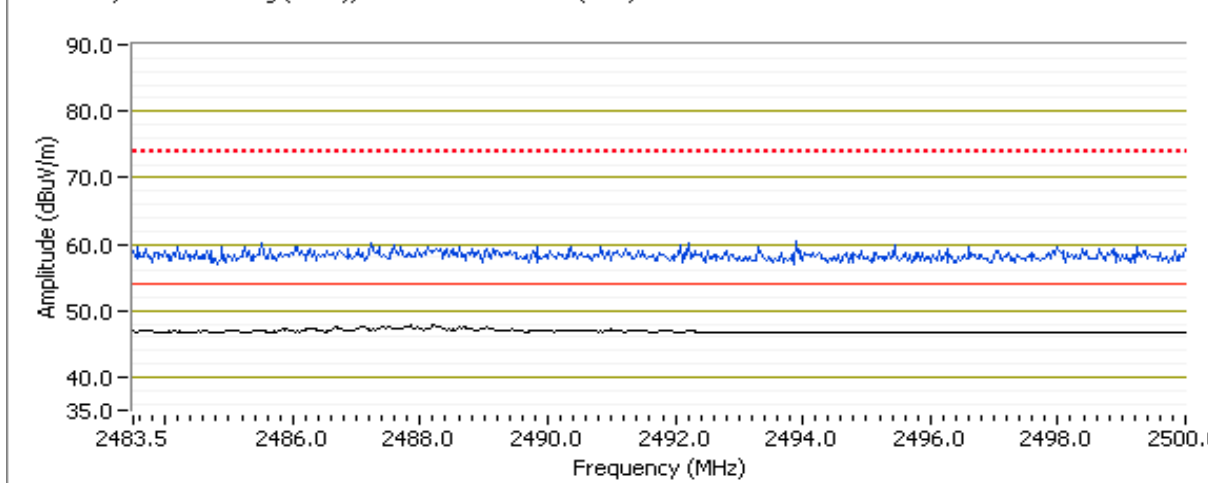
Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2459.370	106.5	V	-	-	AVG	106	1.1	RB 1 MHz;VB 10 Hz;Pk
2461.030	110.2	V	-	-	PK	106	1.1	RB 1 MHz;VB 3 MHz;Pk
2460.670	103.8	V	-	-	PK	106	1.1	RB 100 kHz;VB 100 kHz;Pk
2461.300	96.8	H	-	-	AVG	127	1.1	RB 1 MHz;VB 10 Hz;Pk
2463.300	100.7	H	-	-	PK	127	1.1	RB 1 MHz;VB 3 MHz;Pk
2463.730	94.6	H	-	-	PK	127	1.1	RB 100 kHz;VB 100 kHz;Pk

Fundamental emission level @ 3m in 100kHz RBW:	103.8	dB μ V/m	
Limit for emissions outside of restricted bands:	83.8	dB μ V/m	Limit is -20dBc (Peak power measurement)
Limit for emissions outside of restricted bands:	73.8	dB μ V/m	Limit is -30dBc (UNII power measurement)

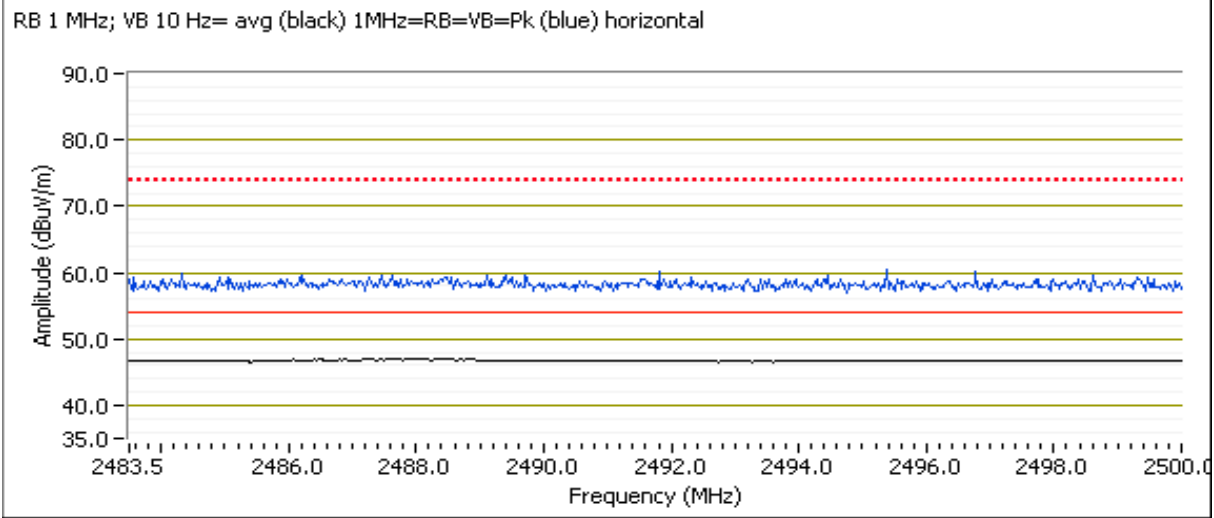
Band Edge Signal Field Strength - Direct measurement of field strength

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2487.730	49.6	V	54.0	-4.4	AVG	106	1.0	RB 1 MHz;VB 10 Hz;Pk
2484.680	60.0	V	74.0	-14.0	PK	106	1.0	RB 1 MHz;VB 3 MHz;Pk
2487.620	48.7	H	54.0	-5.3	AVG	127	1.0	RB 1 MHz;VB 10 Hz;Pk
2490.350	59.8	H	74.0	-14.2	PK	127	1.0	RB 1 MHz;VB 3 MHz;Pk

RB 1 MHz; VB 10 Hz= avg (black), 1=MHz=WB=RB=Pk (Blue) vertical

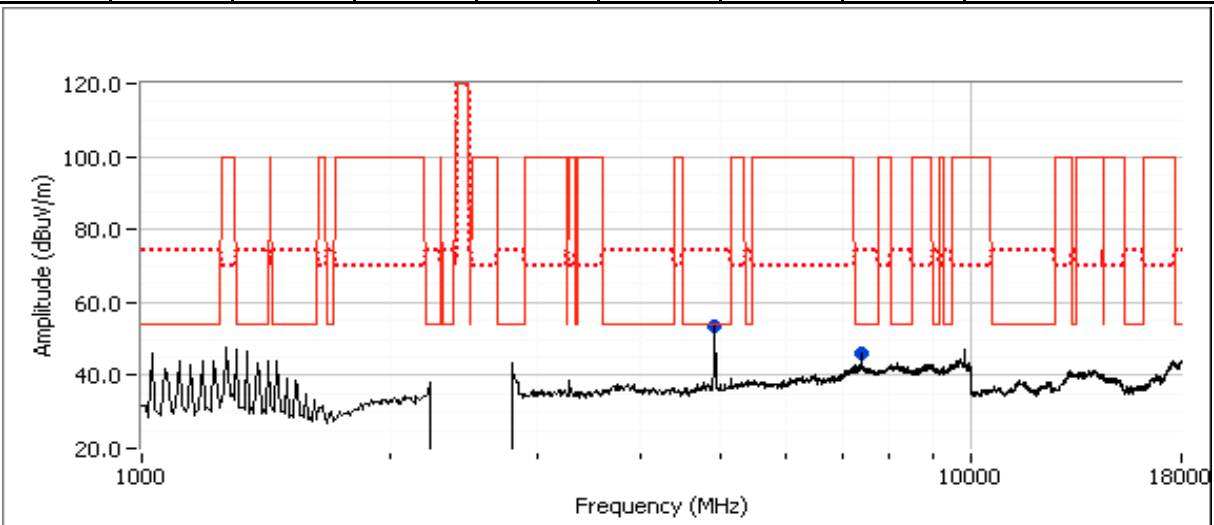


Client:	Summit Data Communications	Job Number:	J83780
Model:	PH30AG	T-Log Number:	T83840
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	FCC 15.247/15.E	Class:	N/A



Other Spurious Emissions

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4924.080	52.8	V	54.0	-1.2	AVG	341	1.0	RB 1 MHz;VB 10 Hz;Pk
7383.920	44.2	V	54.0	-9.8	AVG	118	1.0	RB 1 MHz;VB 10 Hz;Pk
4924.170	54.8	V	74.0	-19.2	PK	341	1.0	RB 1 MHz;VB 3 MHz;Pk
7386.550	52.9	V	74.0	-21.1	PK	118	1.0	RB 1 MHz;VB 3 MHz;Pk



Client:	Summit Data Communications	Job Number:	J83780
Model:	PH30AG	T-Log Number:	T83840
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	FCC 15.247/15.E	Class:	N/A

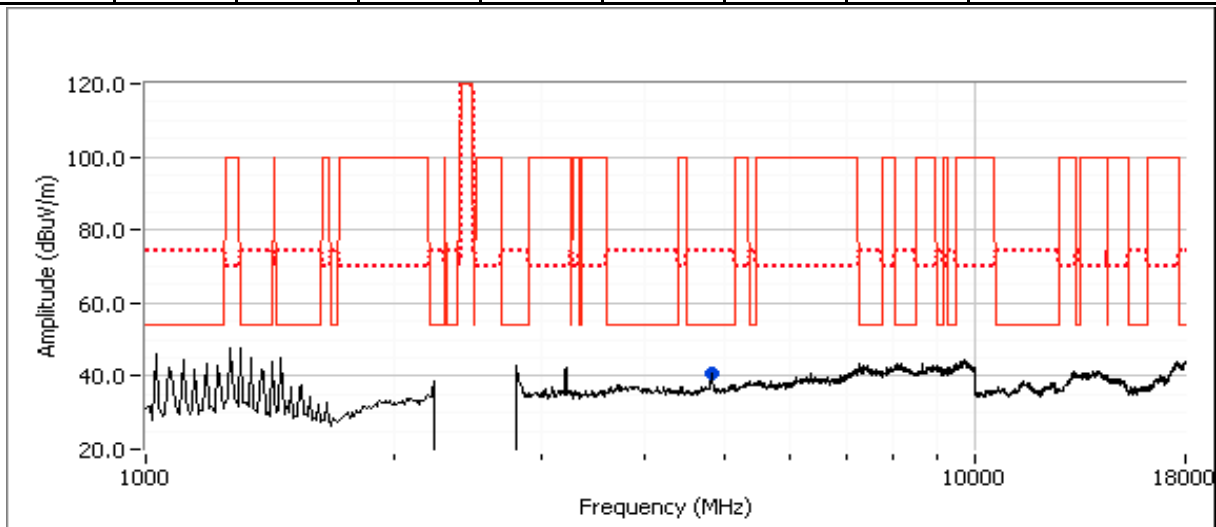
- Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.
- Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.
- Note 3: No significant signals found between 18-26GHz

Run #2: Radiated Spurious Emissions, 30 - 26000 MHz. Operating Mode: 802.11g
 Date of Test: 7/19/2011
 Test Engineer: Joseph Cadigal
 Test Location: FT Chamber#7

Run #2a: Low Channel @ 2412 MHz

Other Spurious Emissions

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4824.310	37.3	V	54.0	-16.7	AVG	30	1.3	RB 1 MHz;VB 10 Hz;Pk
4825.710	49.8	V	74.0	-24.2	PK	30	1.3	RB 1 MHz;VB 3 MHz;Pk



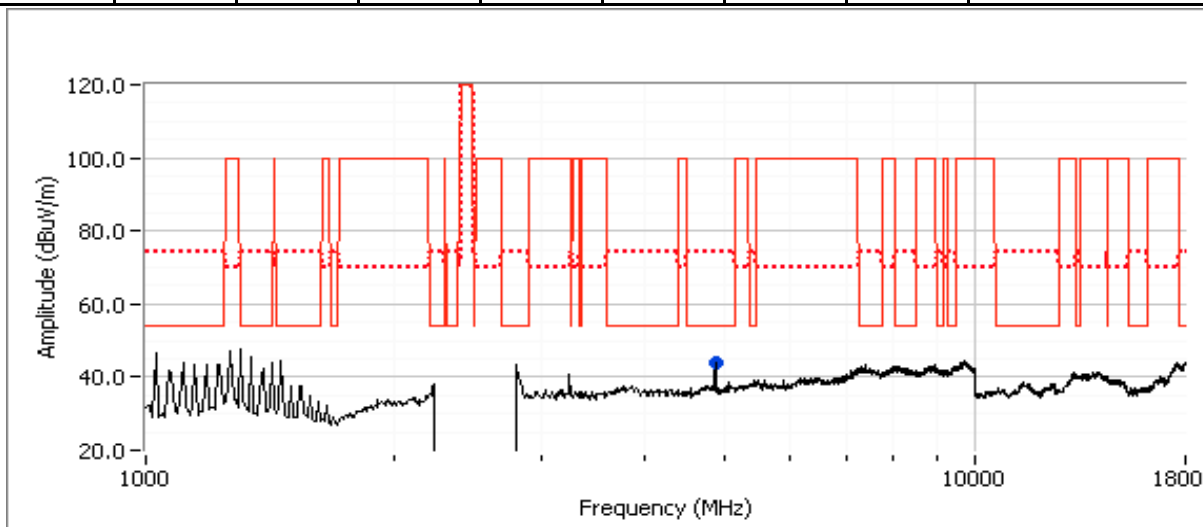
- Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.
- Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.
- Note 3: No significant signals found between 18-26GHz

Client:	Summit Data Communications	Job Number:	J83780
Model:	PH30AG	T-Log Number:	T83840
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	FCC 15.247/15.E	Class:	N/A

Run #2b: Center Channel @ 2437 MHz

Fundamental emission level @ 3m in 100kHz RBW:		dB μ V/m
Limit for emissions outside of restricted bands:	-20 dB μ V/m	Limit is -20dBc (Peak power measurement)
Limit for emissions outside of restricted bands:	-30 dB μ V/m	Limit is -30dBc (UNII power measurement)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4876.030	38.9	V	54.0	-15.1	AVG	269	1.3	RB 1 MHz;VB 10 Hz;Pk
4875.880	51.1	V	74.0	-22.9	PK	269	1.3	RB 1 MHz;VB 3 MHz;Pk



Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.
Note 3:	No significant signals found between 18-26GHz

Client:	Summit Data Communications	Job Number:	J83780
Model:	PH30AG	T-Log Number:	T83840
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	FCC 15.247/15.E	Class:	N/A

Run #2c: High Channel @ 2462 MHz

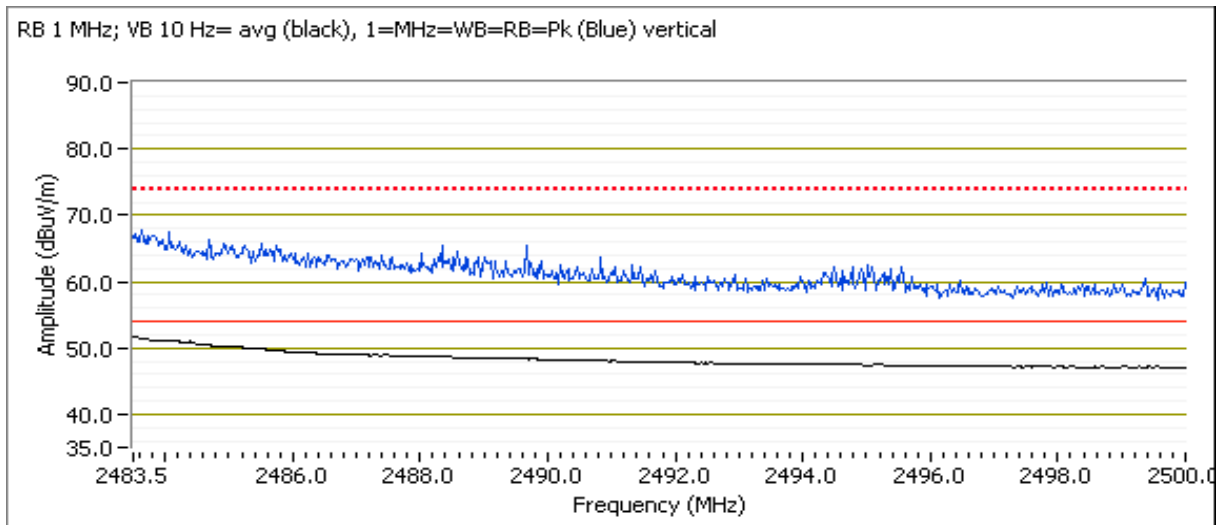
Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2455.570	101.5	V	-	-	AVG	102	1.1	RB 1 MHz;VB 10 Hz;Pk
2455.800	110.2	V	-	-	PK	102	1.1	RB 1 MHz;VB 3 MHz;Pk
2457.100	101.4	V	-	-	PK	102	1.1	RB 100 kHz;VB 100 kHz;Pk
2459.830	91.4	H	-	-	AVG	123	1.0	RB 1 MHz;VB 10 Hz;Pk
2458.400	100.1	H	-	-	PK	123	1.0	RB 1 MHz;VB 3 MHz;Pk
2458.400	90.9	H	-	-	PK	123	1.0	RB 100 kHz;VB 100 kHz;Pk

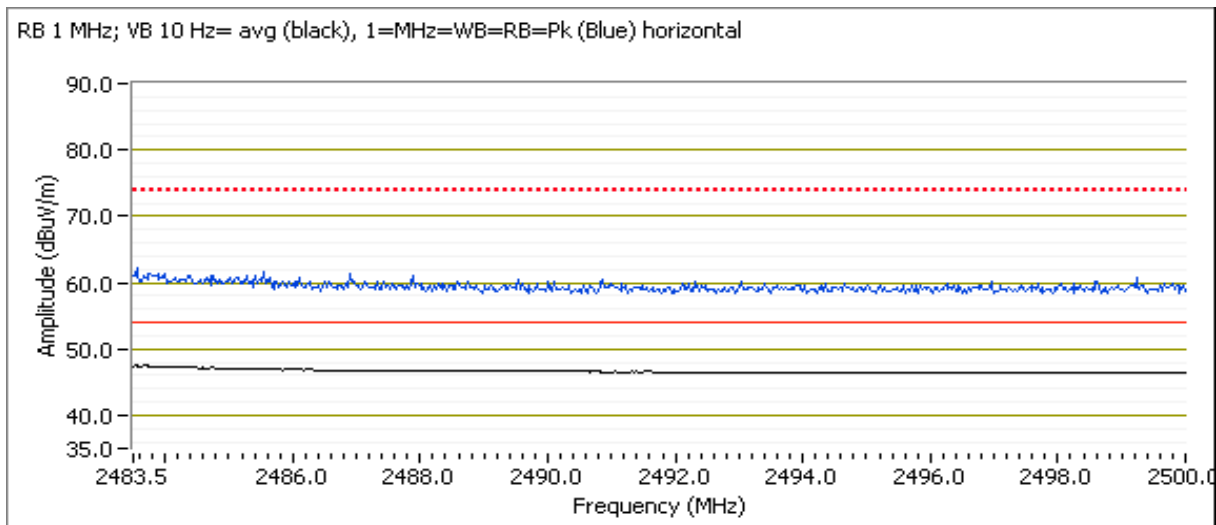
Fundamental emission level @ 3m in 100kHz RBW:	101.4	dB μ V/m	
Limit for emissions outside of restricted bands:	81.4	dB μ V/m	Limit is -20dBc (Peak power measurement)
Limit for emissions outside of restricted bands:	71.4	dB μ V/m	Limit is -30dBc (UNII power measurement)

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2483.500	53.9	V	54.0	-0.1	AVG	102	1.1	RB 1 MHz;VB 10 Hz;Pk
2484.080	66.5	V	74.0	-7.5	PK	102	1.1	RB 1 MHz;VB 3 MHz;Pk
2484.080	49.2	H	54.0	-4.8	AVG	123	1.0	RB 1 MHz;VB 10 Hz;Pk
2487.050	60.4	H	74.0	-13.6	PK	123	1.0	RB 1 MHz;VB 3 MHz;Pk

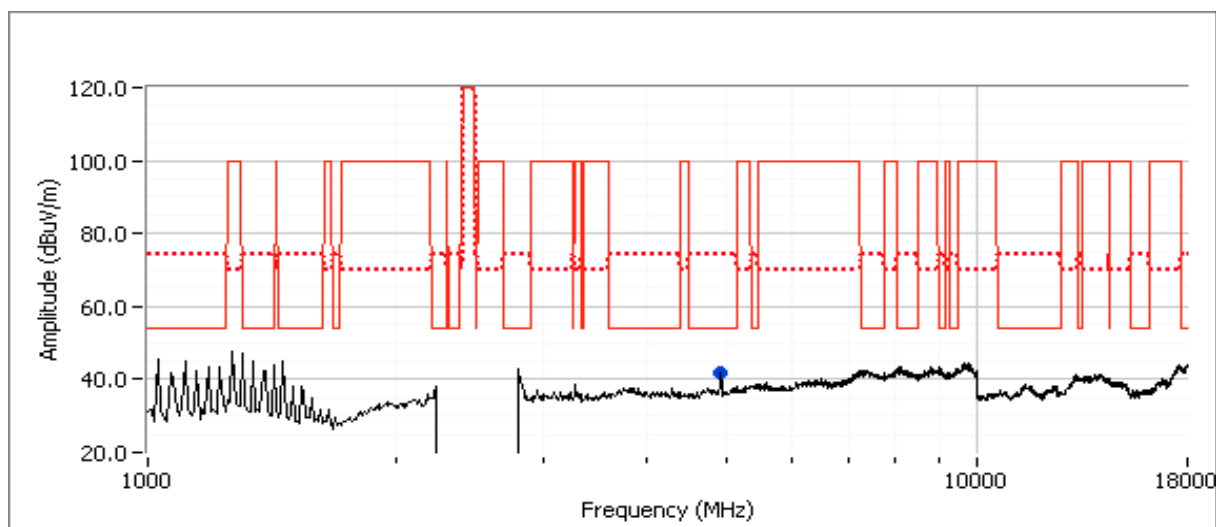


Client:	Summit Data Communications	Job Number:	J83780
Model:	PH30AG	T-Log Number:	T83840
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	FCC 15.247/15.E	Class:	N/A



Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
4929.970	36.6	V	54.0	-17.4	AVG	328	1.3	RB 1 MHz;VB 10 Hz;Pk
4930.900	48.6	V	74.0	-25.4	PK	328	1.3	RB 1 MHz;VB 3 MHz;Pk



Client:	Summit Data Communications	Job Number:	J83780
Model:	PH30AG	T-Log Number:	T83840
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	FCC 15.247/15.E	Class:	N/A

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.
Note 3:	No significant signals found between 18-26GHz



Client:	Summit Data Communications	Job Number:	J83780
Model:	PH30AG	T-Log Number:	T83840
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	FCC 15.247/15.E	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions

Test Specific Details

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 20.1 °C
Rel. Humidity: 38 %

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

Run #	Mode	Channel	Power Setting	Antenna	Test Performed	Limit	Result / Margin
1a	802.11a	low	Max	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	47.0dBµV/m @ 5420.1MHz (-7.0dB)
1b	802.11a	center	Max	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	49.8dBµV/m @ 5380.8MHz (-4.2dB)
1c	802.11a	high	Max	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	49.7dBµV/m @ 5411.2MHz (-4.3dB)

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: No spurious emissions were detected below 1 GHz
802.11a was tested at 6Mbps. This was the highest output power data rate.

Client:	Summit Data Communications	Job Number:	J83780
Model:	PH30AG	T-Log Number:	T83840
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	FCC 15.247/15.E	Class:	N/A

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

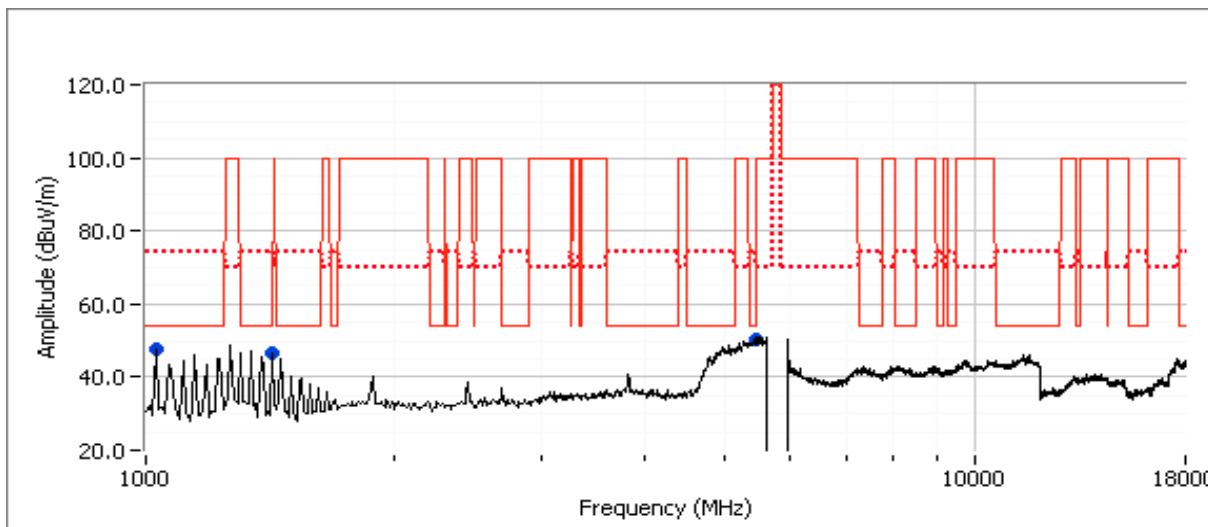
Date of Test: 7/20/2011
 Test Engineer: Rafael Varelas
 Test Location: FT Chamber #4

Run #1a: Low Channel @ 5745 MHz

Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5420.070	47.0	V	54.0	-7.0	AVG	0	1.0	RB 1 MHz;VB 10 Hz;Pk
5419.430	57.9	V	74.0	-16.1	PK	0	1.0	RB 1 MHz;VB 3 MHz;Pk
1423.430	45.7	H	54.0	-8.3	AVG	237	1.0	RB 1 MHz;VB 10 Hz;Pk
1423.340	48.7	H	74.0	-25.3	PK	237	1.0	RB 1 MHz;VB 3 MHz;Pk
1033.480	46.9	V	54.0	-7.1	AVG	150	1.0	RB 1 MHz;VB 10 Hz;Pk
1033.360	49.0	V	74.0	-25.0	PK	150	1.0	RB 1 MHz;VB 3 MHz;Pk

- Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
- Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.
- Note 3: No significant signals found between 18-40GHz



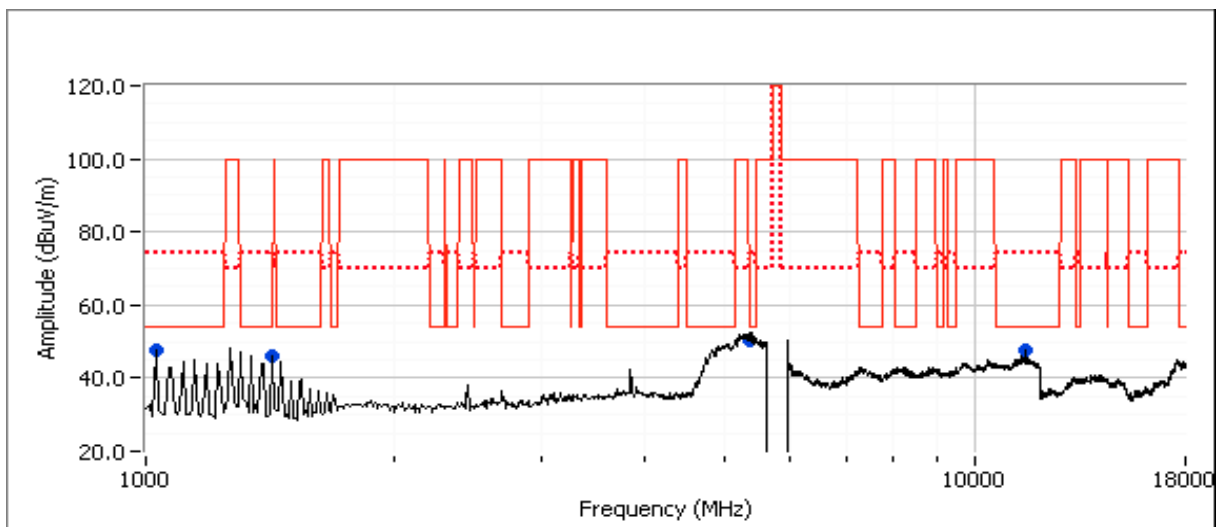
Client:	Summit Data Communications	Job Number:	J83780
Model:	PH30AG	T-Log Number:	T83840
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	FCC 15.247/15.E	Class:	N/A

Run #1b: Center Channel @ 5785 MHz

Spurious Emissions

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5380.750	49.8	V	54.0	-4.2	AVG	272	1.0	RB 1 MHz;VB 10 Hz;Pk
5376.810	61.0	V	74.0	-13.0	PK	272	1.0	RB 1 MHz;VB 3 MHz;Pk
11570.180	44.5	V	54.0	-9.5	AVG	22	1.1	RB 1 MHz;VB 10 Hz;Pk
11569.130	55.6	V	74.0	-18.4	PK	22	1.1	RB 1 MHz;VB 3 MHz;Pk
1033.430	46.7	V	54.0	-7.3	AVG	147	1.0	RB 1 MHz;VB 10 Hz;Pk
1033.450	48.8	V	74.0	-25.2	PK	147	1.0	RB 1 MHz;VB 3 MHz;Pk
1423.340	45.4	H	54.0	-8.6	AVG	243	0.9	RB 1 MHz;VB 10 Hz;Pk
1423.580	48.8	H	74.0	-25.2	PK	243	0.9	RB 1 MHz;VB 3 MHz;Pk

- Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
- Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.
- Note 3: No significant signals found between 18-40GHz



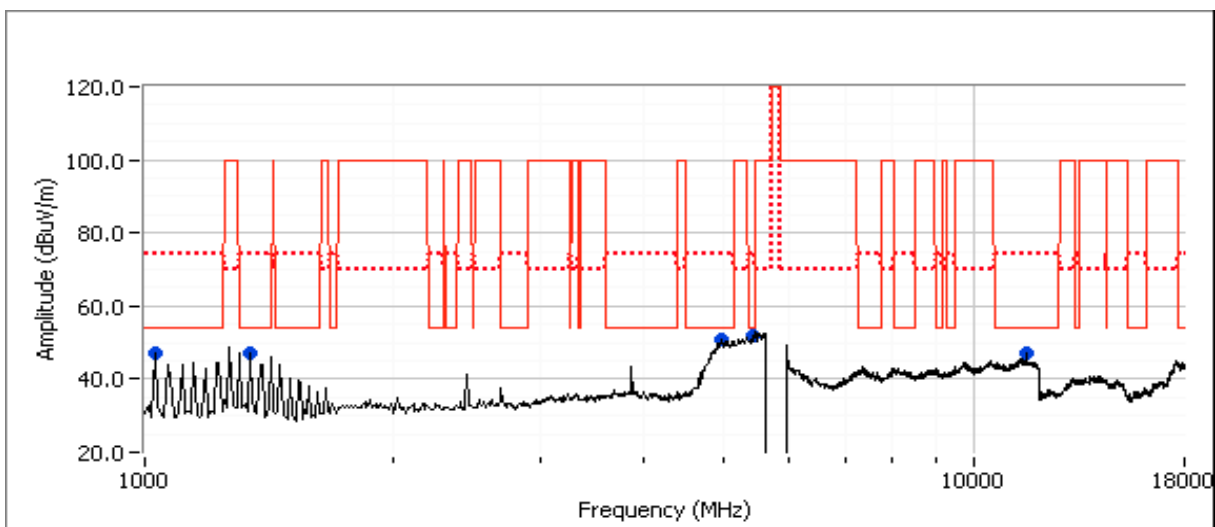
Client:	Summit Data Communications	Job Number:	J83780
Model:	PH30AG	T-Log Number:	T83840
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	FCC 15.247/15.E	Class:	N/A

Run #1c: High Channel @ 5805 MHz

Spurious Emissions

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5411.160	49.7	V	54.0	-4.3	AVG	3	1.1	RB 1 MHz;VB 10 Hz;Pk
5411.530	60.8	V	74.0	-13.2	PK	3	1.1	RB 1 MHz;VB 3 MHz;Pk
4966.560	48.6	V	54.0	-5.4	AVG	23	1.0	RB 1 MHz;VB 10 Hz;Pk
4973.310	60.1	V	74.0	-13.9	PK	23	1.0	RB 1 MHz;VB 3 MHz;Pk
1033.490	47.2	V	54.0	-6.8	AVG	153	1.0	RB 1 MHz;VB 10 Hz;Pk
1033.470	49.3	V	74.0	-24.7	PK	153	1.0	RB 1 MHz;VB 3 MHz;Pk
1345.440	47.5	H	54.0	-6.5	AVG	244	1.0	RB 1 MHz;VB 10 Hz;Pk
1345.440	49.4	H	74.0	-24.6	PK	244	1.0	RB 1 MHz;VB 3 MHz;Pk
11610.380	45.0	V	54.0	-9.0	AVG	323	1.7	RB 1 MHz;VB 10 Hz;Pk
11609.850	56.5	V	74.0	-17.5	PK	323	1.7	RB 1 MHz;VB 3 MHz;Pk

- Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
- Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.
- Note 3: No significant signals found between 18-40GHz



End of Report

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