



Test Certificate

A sample of the following product received on October 19, 2010 and tested on August 29 and September 1 and 6 and October 28, 2011 complied with the requirements of

- EN 300 328 V1.7.1 “Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive”

given the measurement uncertainties detailed in Elliott report R85918.

Summit Data Communications Model SDC-WB40NBT

Mark E Hill
Staff Engineer

Summit Data Communications

Printed Name



Testing Cert #2016.01

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Fremont, CA. 94538-2435

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Radio Test Report

EN 300 328 V1.7.1

*ElectroMagnetic Compatibility and Radio spectrum Matters
(ERM); Wideband Transmission Systems;
Data transmission equipment operating in the 2,4 GHz ISM
band and using spread spectrum modulation techniques;*

Model: SDC-WB40NBT

COMPANY: Summit Data Communications
526 South Main St. Suite 805
Akron, OH 44311

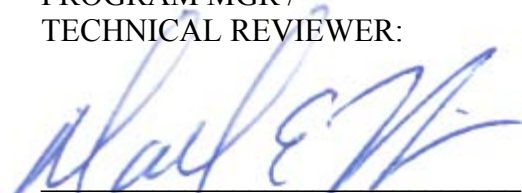
TEST SITE(S): Elliott Laboratories
41039 Boyce Road.
Fremont, CA. 94538-2435

REPORT DATE: March 2, 2012

FINAL TEST DATES: August 29 and September 1 and 6 and October
28, 2011

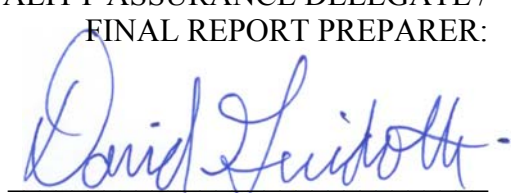
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REVISION HISTORY

Rev#	Date	Comments	Modified By
-	3-2-2012	First release	

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SCOPE

The European Committee for Electrotechnical Standardization (CENELEC) and the European Telecommunications Standards Institute (ETSI) publish standards regarding ElectroMagnetic Compatibility and Radio spectrum Matters for radio-communications devices.

Tests have been performed on the Summit Data Communications model SDC-WB40NBT, pursuant to the relevant requirements of the following harmonized EN standard(s) covering essential requirements under article 3.2 of the R&TTE Directive:

- EN 300 328 V1.7.1 “Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband Transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using spread spectrum modulation techniques”

OBJECTIVE

The objective of the manufacturer is to comply with the harmonized standards identified in the previous section. In the case of most equipment, this document requires testing to other EN specifications. In order to demonstrate compliance, the manufacturer or a contracted laboratory makes measurements and takes the necessary steps to ensure that the equipment complies with the appropriate technical standards.

STATEMENT OF COMPLIANCE

The tested sample of Summit Data Communications model SDC-WB40NBT complied with the requirements of:

EN 300 328 V1.7.1

Although all measurements were below the specification limit, one or more measurements were below the limit by a margin less than the measurement uncertainty. It is not therefore possible to state that the tested sample complied with the requirements based upon a 95% level of confidence. However, where a confidence level of less than 95% is acceptable, the device is considered to be in compliance with the requirements.

The test results recorded herein are based on a single type test of Summit Data Communications model SDC-WB40NBT and therefore apply only to the tested sample. The sample was selected and prepared by Ron Seide of Summit Data Communications.

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.

DEVIATIONS FROM THE STANDARDS

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

TEST RESULTS**EN 300 328 V1.7.1 – Digital Modulation**

Section	Description	Measured	Limit	Result
4.3.1.2	Average Effective Radiated Power (over normal and extreme conditions)	802.11b: 19.3 dBm 802.11g: 15.3 dBm 802.11n20: 12.7 dBm	100mw (20dBm)	Complies
4.3.2	Peak Power Density ¹	802.11b: 8.9 dBm/MHz 802.11g: 4.5 dBm/MHz 802.11n20: 1.5 dBm/MHz	10 dBm/1MHz	Complies
4.3.3	Frequency Range (over normal and extreme conditions)	802.11b: 2403.80 - 2403.25 MHz 802.11g: 2403.03 - 2481.07 MHz 802.11n20: 2402.88- 2481.35 MHz	2400 MHz – 2483.5 MHz	Complies
4.3.4	Number of hopping channels	-	Not applicable to digital modulation transmitters	-
4.3.4	Channel separation	-		
4.3.4	Maximum time of occupancy	-		
4.3.5	Medium Access Protocol	Uses 802.11 protocol		Complies
4.3.6	Transmit Mode Spurious Emissions (conducted)	All emissions more than 10dB below limit	EN 300 328 v1.4.1 Tables 2 and 3	Complies
4.3.6	Transmit Mode Spurious Emissions (radiated)	All emissions more than 10dB below limit	EN 300 328 v1.4.1 Tables 2 and 3	Complies
4.3.7	Stand-By/Receive Mode Spurious Emissions (conducted)	All emissions more than 10dB below limit	EN 300 328 v1.4.1 Tables 4 and 5	Complies
4.3.7	Stand-By/Receive Mode Spurious Emissions (radiated)	-52.0dBm @ 1584.690MHz (-5.0dB)	EN 300 328 v1.4.1 Tables 4 and 5	Complies
Note – For results for the Bluetooth or 5GHz WiFi operation, please refer to Elliott reports R86062 and R86059, respectively.				

EXTREME CONDITIONS

Voltage extremes used during testing were 3.0VDC to 3.6VDC and are based on the manufacturer declared values for extremes.

Temperature extremes used during testing were those for unrestricted use, -20°C to +55°C.

¹ Does not apply to systems that use frequency hopping modulation.

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 (based on a coverage factor (k=2) and were calculated in accordance with NAMAS document NIS 81 and M3003.

Measurement Type	Measurement Unit	Frequency Range	Expanded Uncertainty
RF frequency	Hz	25 to 7000 MHz	1.7×10^{-7}
RF power, conducted	dBm	25 to 7000 MHz	± 0.52 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
Transmitter switch off time	Seconds	-	0.1 sec

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

The Summit Data Communications model SDC-WB40NBT is an 802.11abgn 1x1 with Bluetooth 2.1 module.

The sample was received on October 19, 2010 and tested on August 29 and September 1 and 6 and October 28, 2011. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Summit	SDC-WB40NBT	802.11abgn 1x1 with BT	Prototype	TWG-SDCWB40NBT

PERFORMANCE ASSESSMENT

The primary function of the model SDC-WB40NBT is to provide 802.11abgn and Bluetooth connectivity to a host device. All other characteristics of the product tested are detailed in the remainder of this report.

OTHER EUT DETAILS

The EUT supports 20MHz operation only.

The EUT supports the following antennas:

Monopole Antenna - 2.4 and 5GHz bands - Huber+Suhner, SOA 2459/360/5/0/V_C, 3dBi (2.4GHz), 6.5dBi (5GHz)

Dipole Antenna #1 - 2.4 and 5GHz bands - Larsen, R380.500.314, 1.6dBi (2.4GHz), 5dBi (5GHz)

Dipole Antenna #2 - 2.4 GHz only - Cisco Air-Ant 4941 2dBi(2.4GHz)

Magnetic Dipole - 2.4GHz and 5GHz bands – Ethertronics, 2.5dBi (2.4GHz), 5dBi (5GHz)

ENCLOSURE

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

MODIFICATIONS

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

SUPPORT EQUIPMENT

Company	Model	Description	Serial Number	FCC ID
Lenovo	Inspiron 1545	Laptop Computer (Note 1)	953R2K1	DoC
GME	GFP181U-A330	AC/DC Adapter (Note 2)	1005-000194	-
-	-	Battery Pack (Note 3)	-	-

Note 1 - Used to configure the EUT and then disconnected prior to testing

Note 2 – Used for RF antenna port measurements

Note 3 – Used for radiated spurious emissions tests

EUT INTERFACE PORTS

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

Port	Connected To	Description	Cable(s)	
			Shielded or Unshielded	Length(m)
AC/DC Adapter – DC out	WB40	2wire	Unshielded	1.5m
Battery Pack	WB40	2wire	Unshielded	0.1m

EUT OPERATION

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

EMISSIONS TESTING**GENERAL INFORMATION**

Antenna port measurements were taken at the Elliott Laboratories test site located at 41039 Boyce Road, Fremont, CA 94538-2435.

Final radiated spurious emissions measurements were taken at the Elliott Laboratories Anechoic Chambers and/or Open Area Test Site(s) listed below. The sites conform to the requirements of ANSI C63.4: 2003 *American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz* and CISPR 16-1-4:2007 - *Specification for radio disturbance and immunity measuring apparatus and methods Part 1-4: Radio disturbance and immunity measuring apparatus Ancillary equipment Radiated disturbances*. They are registered with the VCCI and are on file with the FCC and industry Canada.

Site	Registration Numbers			Location
	VCCI	FCC	Canada	
Chamber 3	R-1683 C-1795	769238	IC 2845B-3	41039 Boyce Road Fremont, CA 94538-2435
Chamber 4	R-1684 C-1796	211948	IC 2845B-4	
Chamber 5	R-1685 C-1797	211948	IC 2845B-5	

In the case of Open Area Test Sites, ambient levels are at least 6 dB below the specification limits with the exception of predictable local TV, radio, and mobile communications traffic.

Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions measurements are performed with the EUT's rf input/output connected to the input of a spectrum analyzer. When required an attenuator or dc block is placed between the EUT and the spectrum analyzer.

RADIATED EMISSIONS CONSIDERATIONS

CISPR has determined that radiated measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an Open Area Test Site or anechoic chamber, as defined in CISPR 16-1-4 and Annex A of EN 300 328 / EN 301 893 / EN 300 440-1. The test site is maintained free of conductive objects within the CISPR defined elliptical area.

EMISSIONS MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1-1 is used for radiated emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 7000 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.

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.

Measurement bandwidths for the test instruments are set in accordance with the requirements of the standards referenced in this document.

INSTRUMENT CONTROL COMPUTER

Software control is used to convert the receiver measurements to the field strength at an antenna, 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 exported in a graphic and/or tabular format, as appropriate.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer runs automated data collection programs that 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 EUT antenna port or receiving antenna and the test receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

ANTENNAS

A combination of biconical, log periodic or bi-log antennas are used to cover the range from 25 MHz to 1000 MHz. Broadband antennas or tuned dipole antennas are used over the entire 25 to 1000 MHz frequency range as the reference antenna for substitution measurements.

Above 1000 MHz, a dual-ridge guide horn antenna or octave horn antenna are used as reference and measurement antennas.

The antenna calibration factors are included in site factors that are programmed into the test receivers and instrument control software when measuring the radiated field strength.

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.

The test height above ground for non-body worn devices shall be 150 centimeters. Floor mounted equipment will 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.

RADIO STANDARD TEST PROCEDURES**OUTPUT POWER**

Output power is measured using an average sensor head. If the device is operating with a duty cycle during the measurement the measurement time is set to exceed the on/off duty cycle and the measured value is then corrected by adding a factor of $10 \log(1/\text{duty cycle})$ to the measured value.

Power measurements as required by EN 300 328 are measured using a wideband power meter. Duty cycle is measured using either a diode detector as detailed in EN 300 328 section 5.7.2.2 or with a spectrum analyzer in zero-span mod with resolution and video bandwidths set to their maximum values and sweep time set to the lowest value that accurately captures the duty cycle period.

Power density is initially measured as a peak bandwidth (RBW=VBW=1MHz). If the power density is within 3dB of the limit it is re-measured via the IF output of the spectrum analyzer using an average sensor.

Power measurements made directly on the rf power port are, when appropriate, converted to an EIRP by adding the gain of the highest gain antenna that can be used with the device under test, as specified by the manufacturer.

FREQUENCY RANGE (EN 300 328, 2.4 GHz Band)

Frequency range is measured in accordance with EN 300 328 section 5.7.4.. Typically a bandwidth of 100kHz is used and the lower and upper frequencies at which the transmitted signal exceeds the spurious emission limit, adjusted for the measurement bandwidth, define the frequency range.

CONDUCTED SPURIOUS EMISSIONS

Conducted emissions are measured at the output of the device using a RF cable and attenuator if required. Initial scans are made using a peak detector (RBW=VBW) and using scan rates to ensure that the EUT transmits before the sweep moves out of each resolution bandwidth (for transmit mode).

RADIATED SPURIOUS EMISSIONS

Radiated emissions measurements are performed in two phases. A preliminary scan of emissions is conducted in either an anechoic chamber or on an OATS during which all significant EUT frequencies are identified with the system in a nominal configuration.

At least two scans are performed across the complete frequency range of interest and at each operating frequency identified in the reference standard. One or more of these is with the antenna polarized vertically while the one or more of these is with the antenna polarized horizontally. Initial scans are made using a peak detector (RBW=VBW) and using scan rates to ensure that the EUT transmits before the sweep moves out of each resolution bandwidth (for transmit mode).

During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit. The limit is a field strength limit derived from the ERP limit specified in the standard(s).

All signals within 10dB of this calculated limit are re-measured on an OATS or Semi-anechoic chamber. The field strength is recorded and the EUT is then replaced with a substitution antenna of known gain (typically a dipole antenna or a double-ridged horn antenna). The erp of the substitution antenna is measured and used to calculate the erp of the EUT as outlined in section C3 of EN 300 328 and EN 301 893.

SAMPLE CALCULATIONS**SAMPLE CALCULATIONS - CONDUCTED SPURIOUS EMISSIONS**

Measurements are compared directly to the conducted emissions specification limit (decibel form). The calculation is as follows:

$$R_r - S = M$$

where:

$$\begin{aligned} R_r &= \text{Measured value in dBm} \\ S &= \text{Specification Limit in dBm} \\ M &= \text{Margin to Specification in +/- dB} \end{aligned}$$

SAMPLE CALCULATIONS - RADIATED SPURIOUS EMISSIONS

Receiver readings are compared directly to a converted specification limit (decibel form). The conversion uses the effective radiated power limit specified in the standard to calculate the expected field strength in free space using the following formula:

$$E = \frac{\sqrt{30 P G}}{d}$$

where:

$$\begin{aligned} E &= \text{Field Strength in V/m} \\ P &= \text{Power in Watts} \\ G &= \text{Gain of antenna in numeric gain}^2 \\ D &= \text{distance in meters} \end{aligned}$$

The field strength limit is then converted to decibel form (dBuV/m) and the margin of a given emission peak relative to the limit is calculated as follows:

$$M = R_c - L_s$$

where:

$$\begin{aligned} R_c &= \text{Corrected Receiver Reading in dBuV/m} \\ L_s &= \text{Calculated specification Limit in dBuV/m} \\ M &= \text{Margin in dB Relative to Spec} \end{aligned}$$

When substitution measurements are required (all signals with less than 6dB of margin relative the field strength limit) the margin of the emissions relative to the effective radiated power limit is calculated from:

$$P_s - S = M$$

where:

$$\begin{aligned} P_s &= \text{effective radiated power determined from antenna} \\ &\quad \text{substitution (dBm)} \\ S &= \text{Specification Limit in dBm} \\ M &= \text{Margin to Specification in +/- dB} \end{aligned}$$

² Although the gain relative to a dipole should be used for limits expressed as an erp, the isotropic gain is used as this produces a more conservative limit.

Appendix A Test Equipment Calibration Data**Radiated Emissions, 25 - 12,750 MHz, 30-Aug-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 (SA40-Red)	3115	1142	8/2/2012
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	8/15/2012
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	11/2/2011
Hewlett Packard	Preamplifier, 100 kHz - 1.3 GHz	8447D OPT 010	1826	5/17/2012
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	2197	12/29/2011

Radio Antenna Port (Power and Spurious Emissions), 01-Sep-11

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1422	12/1/2011
Rohde & Schwarz	Power Sensor 100 uW - 10 Watts	NRV-Z53	1555	2/2/2012
Rohde & Schwarz	Attenuator, 20 dB , 50 ohm, 10W, DC-18 GHz	20dB, 10W, Type N	1556	2/2/2012
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HX,)	E4446A	2139	1/26/2012
Thermotron	Temp Chamber (w/ F4 Watlow Controller)	S1.2	2170	7/8/2012

Radiated Emissions, 1000 - 12,750 MHz, 27-Oct-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	8/15/2012

Radiated Emissions, 25 - 12,750 MHz, 29-Oct-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	786	12/11/2011
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	8/2/2012
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	8/15/2012
Rohde & Schwarz	Power Sensor 100 uW - 2 Watts use with 20dB attenuator sn:100059 only	NRV-Z32	1423	9/1/2012
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	11/15/2011
Rohde & Schwarz	Power Meter, Dual Channel	NRVD	1539	9/9/2012
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1548	6/24/2012
Hewlett Packard	Preamplifier, 100 kHz - 1.3 GHz	8447D OPT 010	1826	5/17/2012
Agilent	MXG Analog Signal Generator	N5181A	2146	1/26/2012
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	2197	12/29/2011

Appendix B Test Data

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EMC Test Data

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
		Account Manager:	Christine Krebill
Contact:	Ron Seide		-
Emissions Standard(s):	EN 300 328, EN 301 893, AS/NZS 4268	Class:	-
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Summit Data Communications

Model

SDC-WB40

Date of Last Test: 2/27/2012

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

Radiated Spurious Emissions, EN 300 328-1 (WiFi Operation)

Test Specific Details

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

Date of Test: 8/29/2011	Config. Used: 1
Test Engineer: Rafael Varelas	Config Change: None
Test Location: FT Chamber #4	EUT Voltage: 3.3Vdc

General Test Configuration

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

The measurement antenna was located 3 meters from the EUT.

Ambient Conditions:

Temperature:	20.7 °C
Rel. Humidity:	39 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
2	Spurious Emissions Transmit Mode, 25 - 12,750 MHz	EN 300 328	Pass	All emissions were more than 10dB below the limit

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

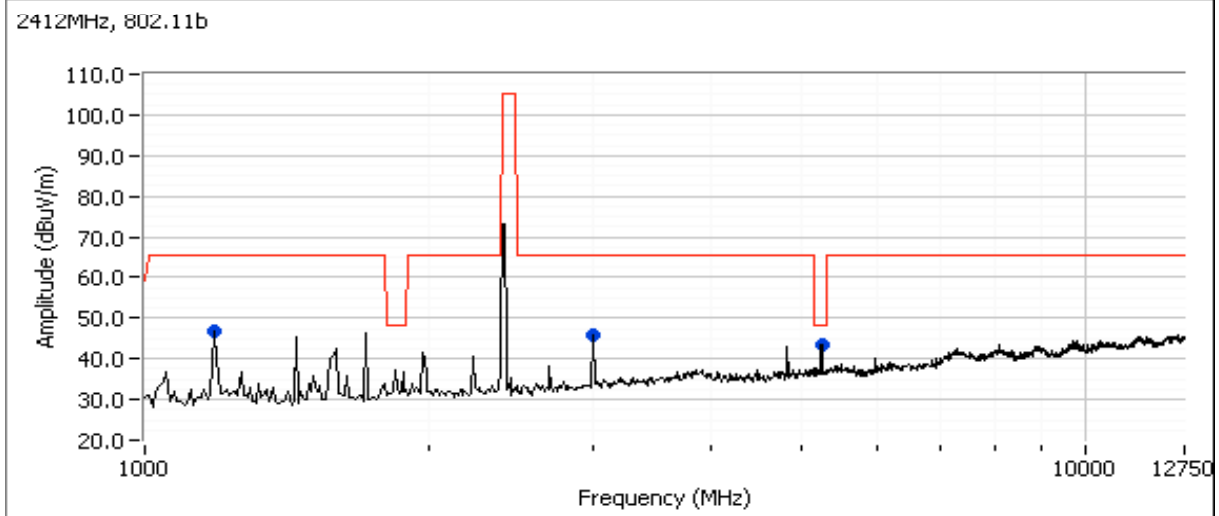
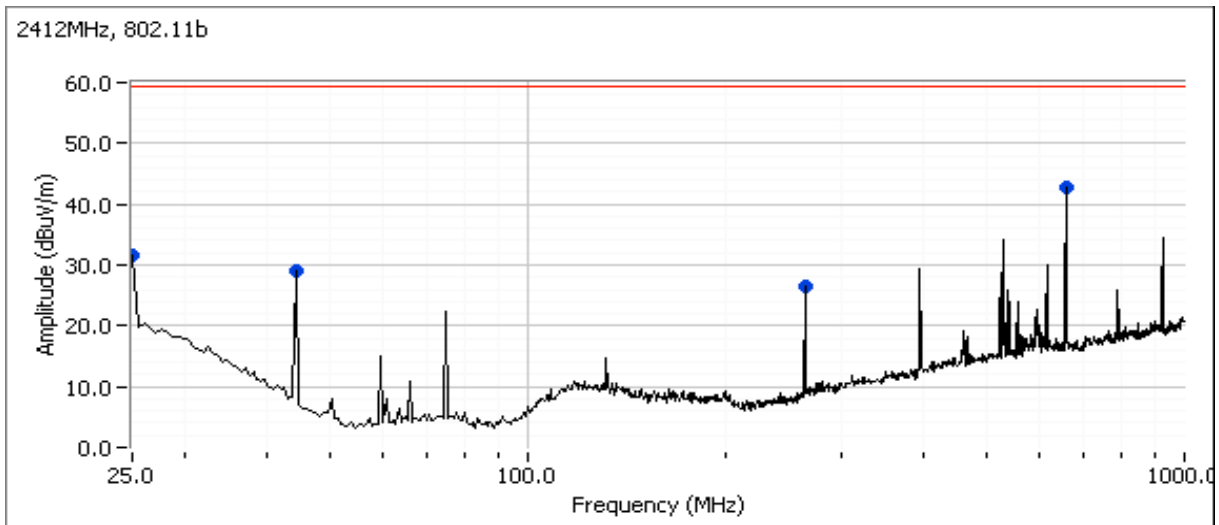
No deviations were made from the requirements of the standard.

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

Run #1: Radiated Spurious Emissions, Transmit Mode, 25 - 12750 MHz

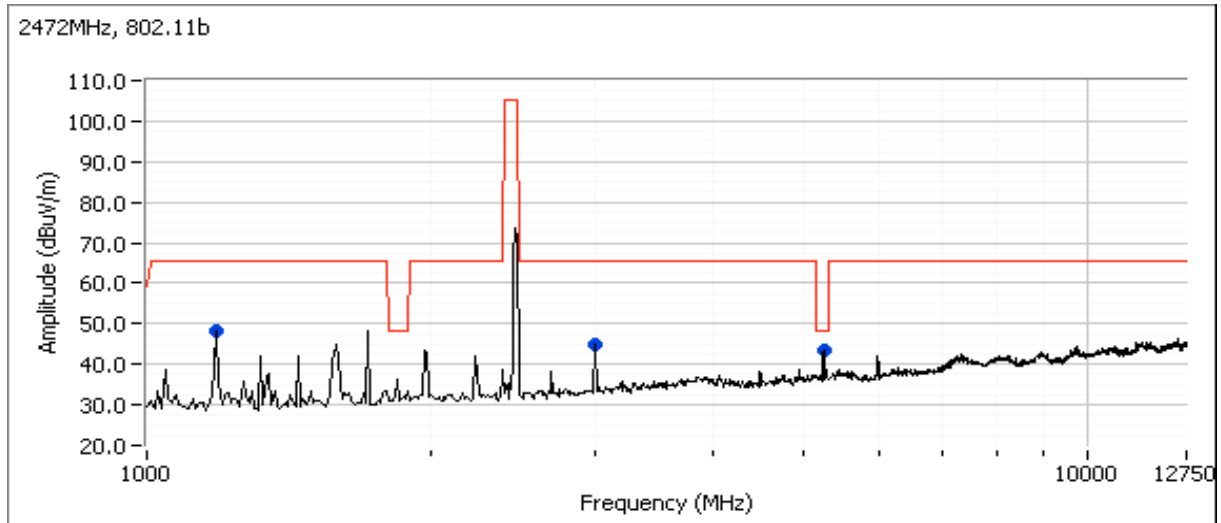
Measurements made at 3m

Graph - Channel: 2412 MHz, Mode: 802.11b

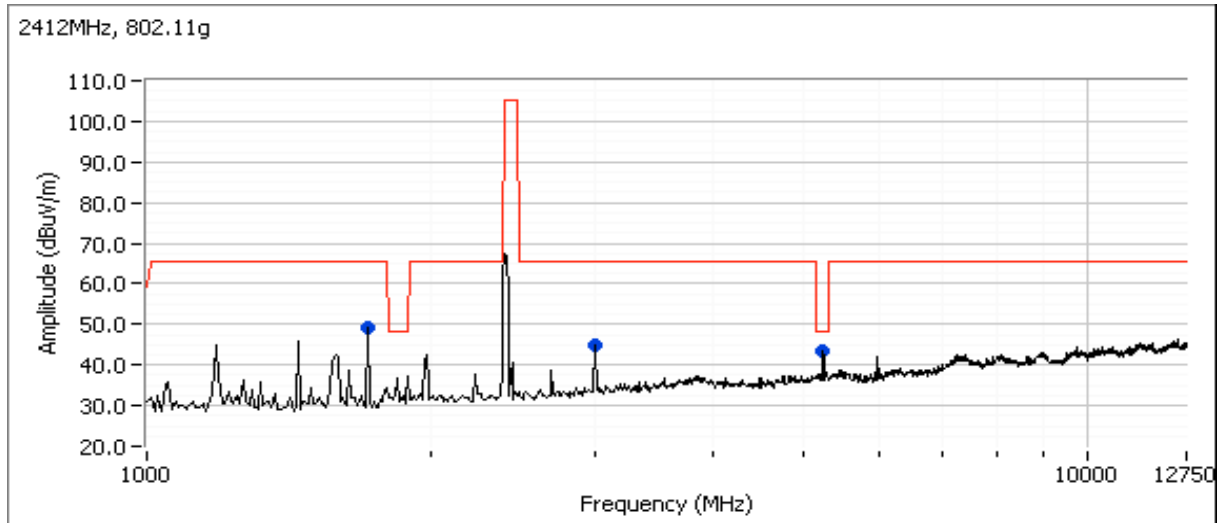


Client: Summit Data Communications	Job Number: J78403
Model: SDC-WB40	T-Log Number: T84432
Contact: Ron Seide	Account Manager: Christine Krebill
Standard: EN 300 328, EN 301 893, AS/NZS 4268	Class: N/A

Graph - Channel: 2472 MHz, Mode: 802.11b

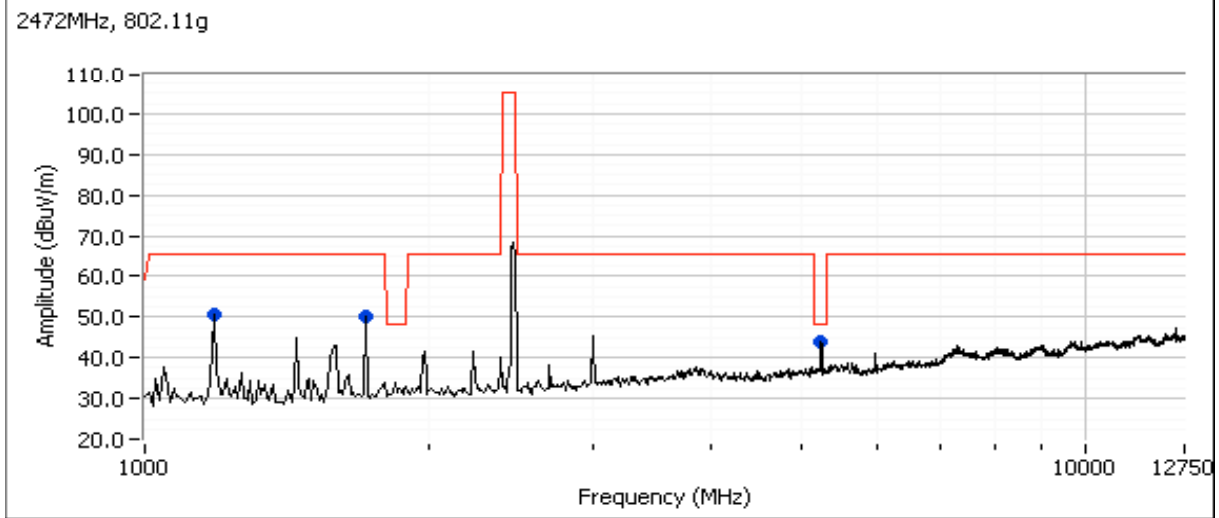
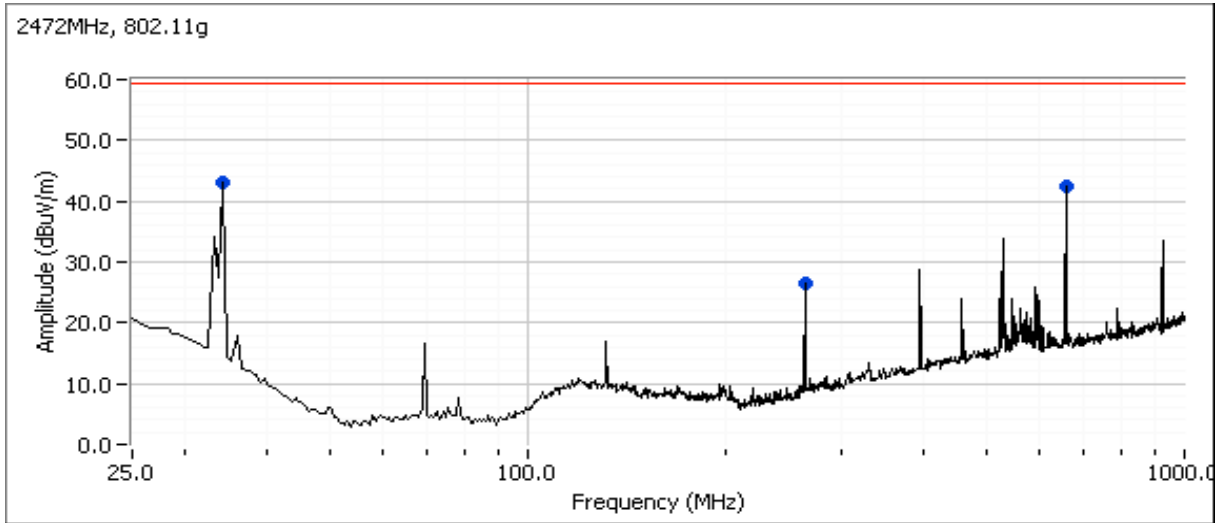


Graph - Channel: 2412 MHz, Mode: 802.11g



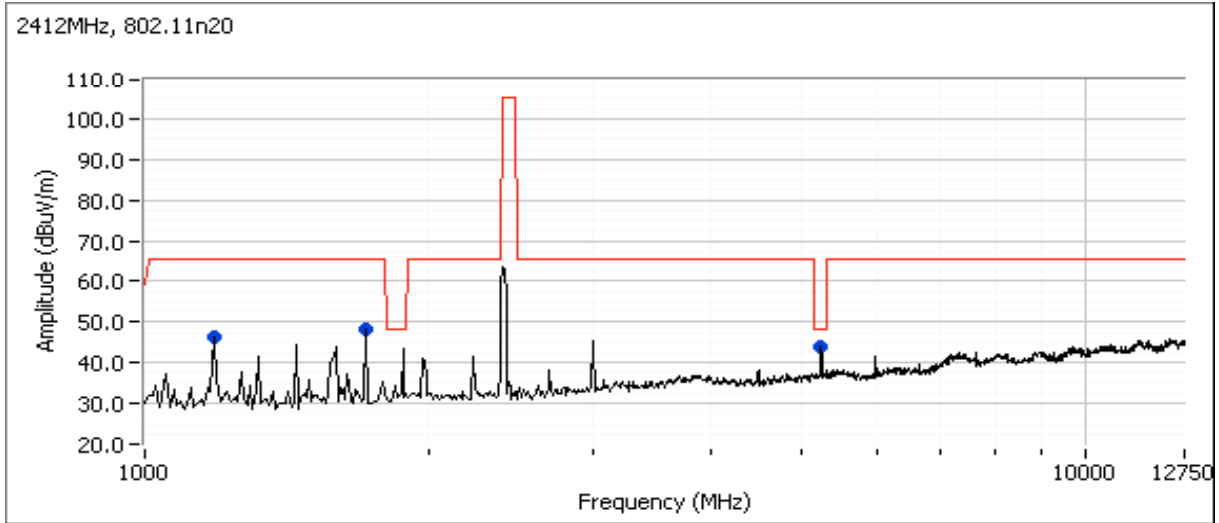
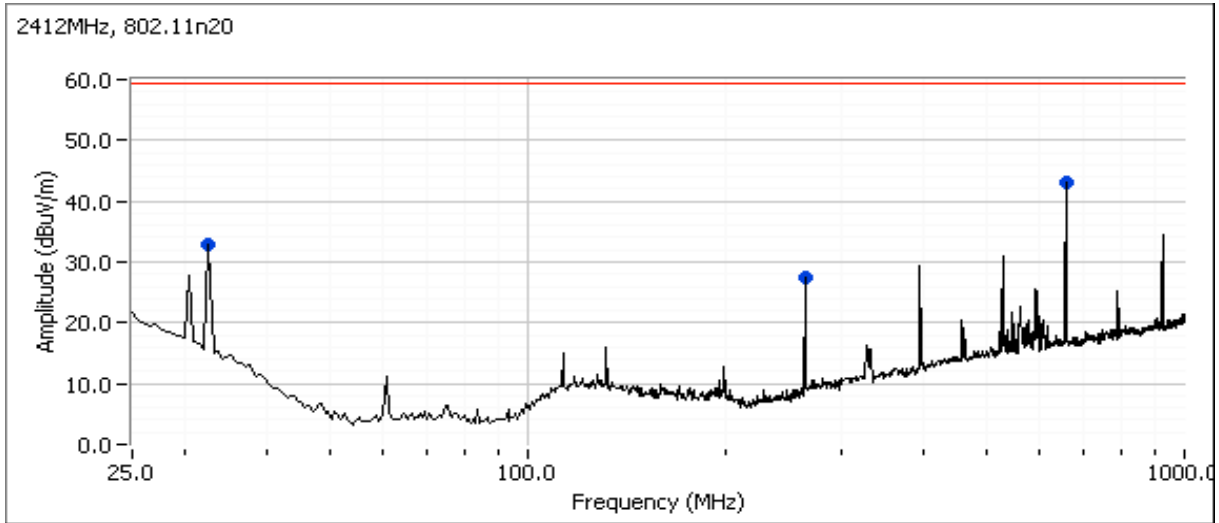
Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

Graph - Channel: 2472 MHz, Mode: 802.11g



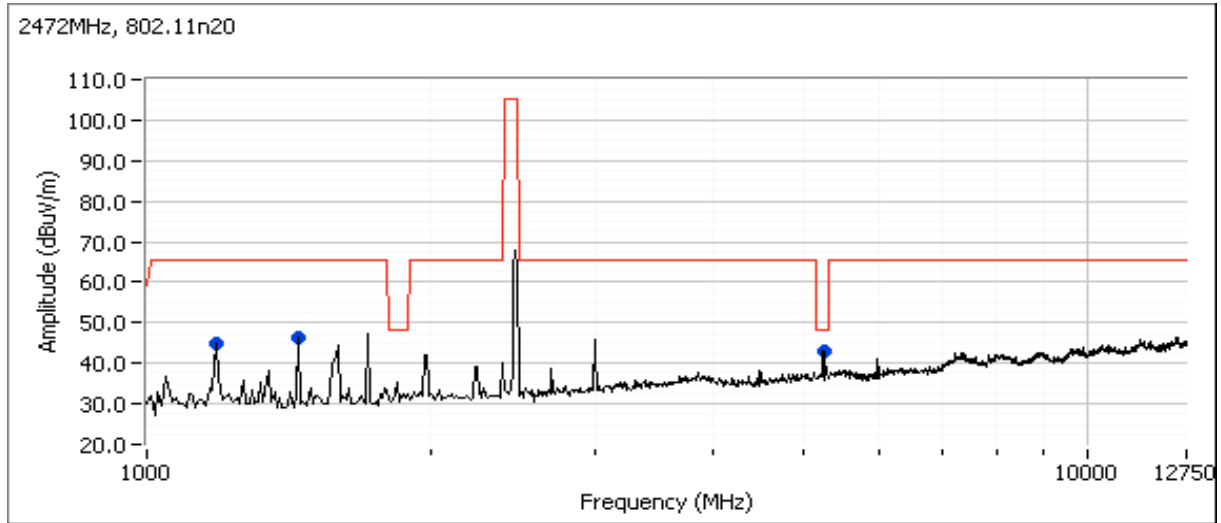
Client: Summit Data Communications	Job Number: J78403
Model: SDC-WB40	T-Log Number: T84432
Contact: Ron Seide	Account Manager: Christine Krebill
Standard: EN 300 328, EN 301 893, AS/NZS 4268	Class: N/A

Graph - Channel: 2412 MHz, Mode: 802.11n20



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

Graph - Channel: 2472 MHz, Mode: 802.11n20



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

Results Table - All channels

Frequency MHz	Level dB μ V/m	Pol v/h	EN 300 328 ^{Note 1}		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments	Channel and mode
			Limit	Margin					
25.000	31.7	V	59.3	-27.6	Peak	360	1.0		1,b
44.289	29.0	V	59.3	-30.3	Peak	360	1.0		1,b
264.178	26.5	H	59.3	-32.8	Peak	218	2.5		1,b
660.521	42.8	H	59.3	-16.5	Peak	197	2.0		1,b
1188.990	46.9	H	65.3	-18.4	Peak	356	1.0		1,b
2994.490	45.7	H	65.3	-19.6	Peak	350	1.0		1,b
5240.010	43.6	V	48.3	-4.7	Peak	75	1.6	Support equipment	1,b
1191.550	48.1	H	65.3	-17.2	Peak	203	2.2		13,b
2994.490	45.1	V	65.3	-20.2	Peak	223	1.0		13,b
5241.930	43.6	V	48.3	-4.7	Peak	238	1.0	Support equipment	13,b
1717.460	49.4	H	65.3	-15.9	Peak	193	1.3		1,g
2994.400	44.7	V	65.3	-20.6	Peak	231	1.0		1,g
5237.560	43.4	V	48.3	-4.9	Peak	102	1.3	Support equipment	1,g
34.369	43.2	V	59.3	-16.1	Peak	360	1.0		13,g
264.178	26.5	H	59.3	-32.8	Peak	265	2.0		13,g
660.521	42.5	H	59.3	-16.8	Peak	214	2.5		13,g
1186.320	50.4	H	65.3	-14.9	Peak	221	1.0		13,g
1717.350	50.3	H	65.3	-15.0	Peak	210	1.3		13,g
5241.940	44.1	V	48.3	-4.2	Peak	99	1.3	Support equipment	13,g
32.715	32.9	H	59.3	-26.4	Peak	360	1.5		1, n20
264.178	27.3	H	59.3	-32.0	Peak	206	2.0		1, n20
660.521	43.0	H	59.3	-16.3	Peak	202	2.0		1, n20
1187.810	46.2	H	65.3	-19.1	Peak	352	1.0		1, n20
1717.350	48.3	H	65.3	-17.0	Peak	2	1.6		1, n20
5239.920	43.8	V	48.3	-4.5	Peak	230	1.0	Support equipment	1, n20
1182.690	45.1	V	65.3	-20.2	Peak	240	1.6		13,n20
1453.230	46.4	H	65.3	-18.9	Peak	234	1.6		13,n20
5245.020	43.1	V	48.3	-5.2	Peak	101	1.3	Support equipment	13,n20

Note 1: The field strength limit in the tables above was calculated from the erp/eirp limit detailed in the standard using the free space propagation equation: $E = \sqrt{(30PG)/d}$. This limit is conservative - it does not consider the presence of the ground plane and, for erp limits, the dipole gain (2.2dBi) has not been included. The erp or eirp for all signals with less than 10dB of margin relative to this field strength limit is determined using substitution measurements.

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

Run #2: Radiated Spurious Emissions, Transmit Mode: Final Field Strength and Substitution Measurements

No radio related emissions within 10dB of the limit, no substitutions performed.

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

Radiated Spurious Emissions, EN 300 328-1 (WiFi Operation)

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: 10/28/2011
 Test Engineer: R Varelas / M. Birgani
 Test Location: FT Chamber #4

Config. Used: 1
 Config Change: None
 EUT Voltage: 3.3Vdc

General Test Configuration

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

The measurement antenna was located 3 meters from the EUT.

Ambient Conditions: Temperature: 18-23 °C
 Rel. Humidity: 30-40 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
2	Spurious Emissions Receive/Stand-By Mode 25 - 12,750 MHz	EN 300 328	Pass	-52.0dB/m @ 1584.69MHz (-5.0dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

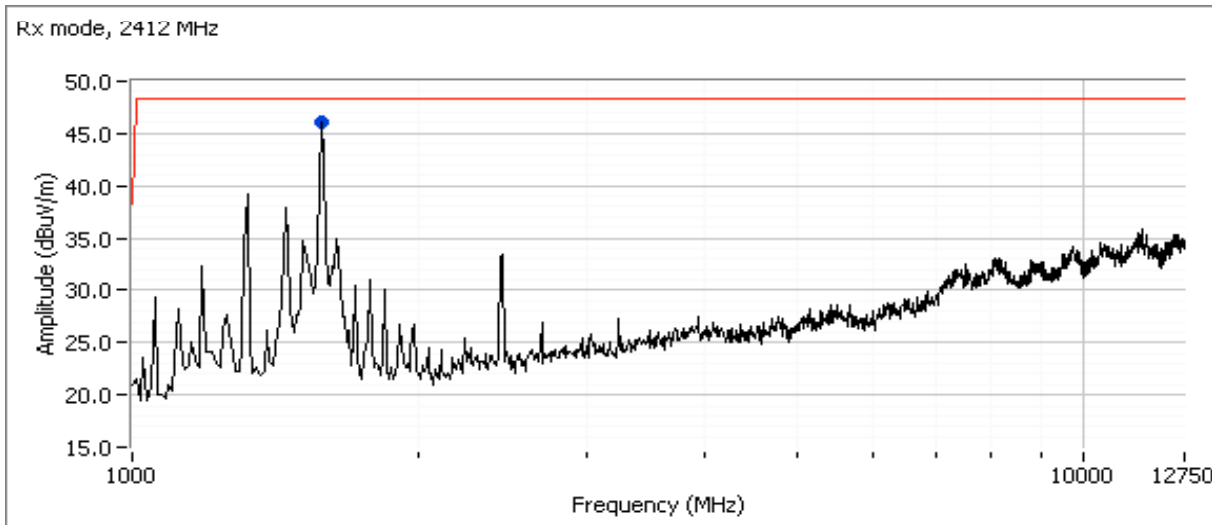
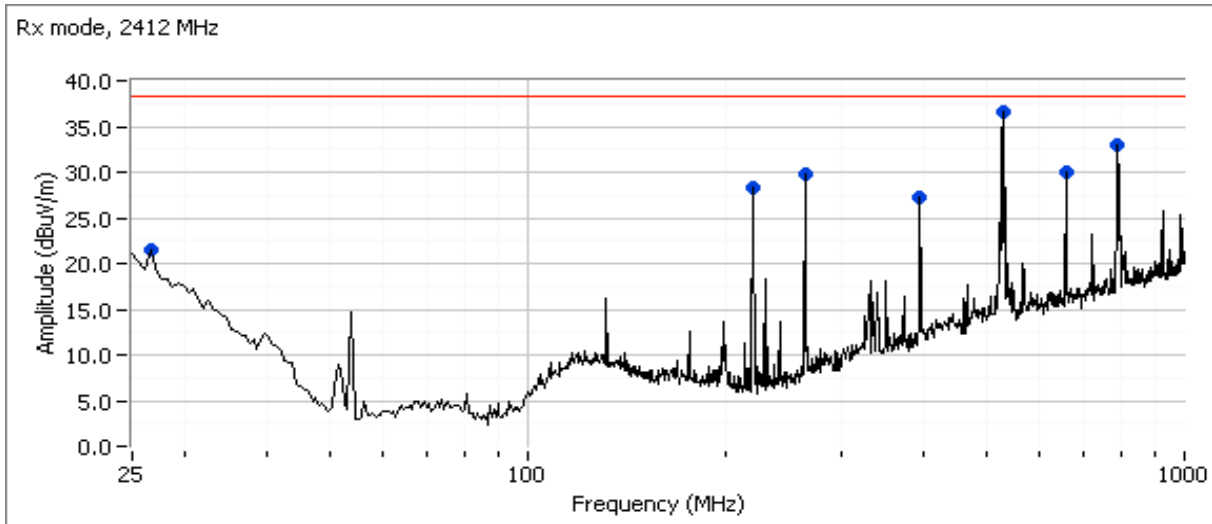
Deviations From The Standard

No deviations were made from the requirements of the standard.

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
30 - 12750 MHz	3	3	0.0

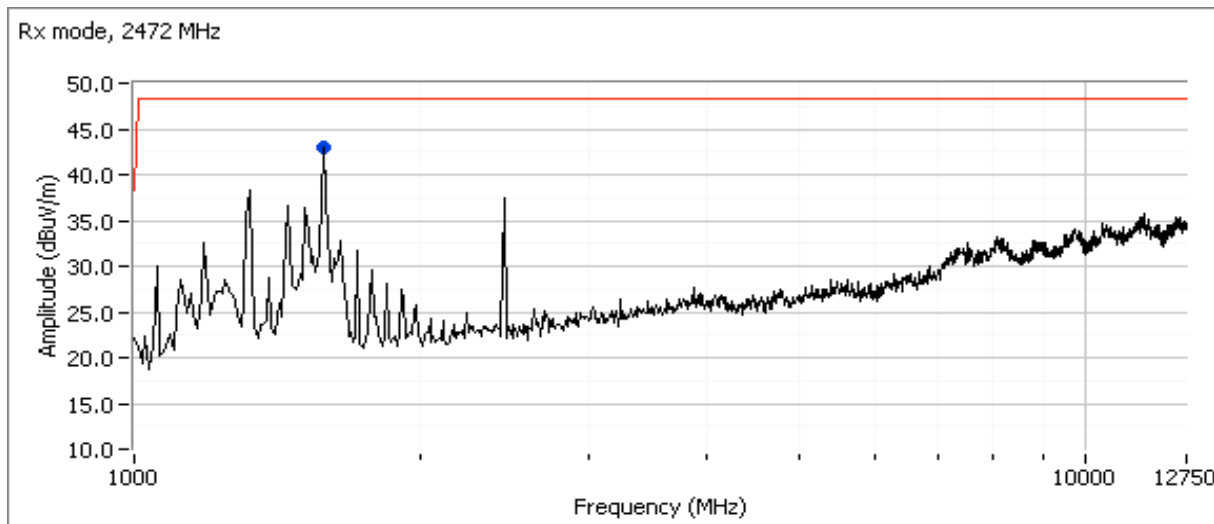
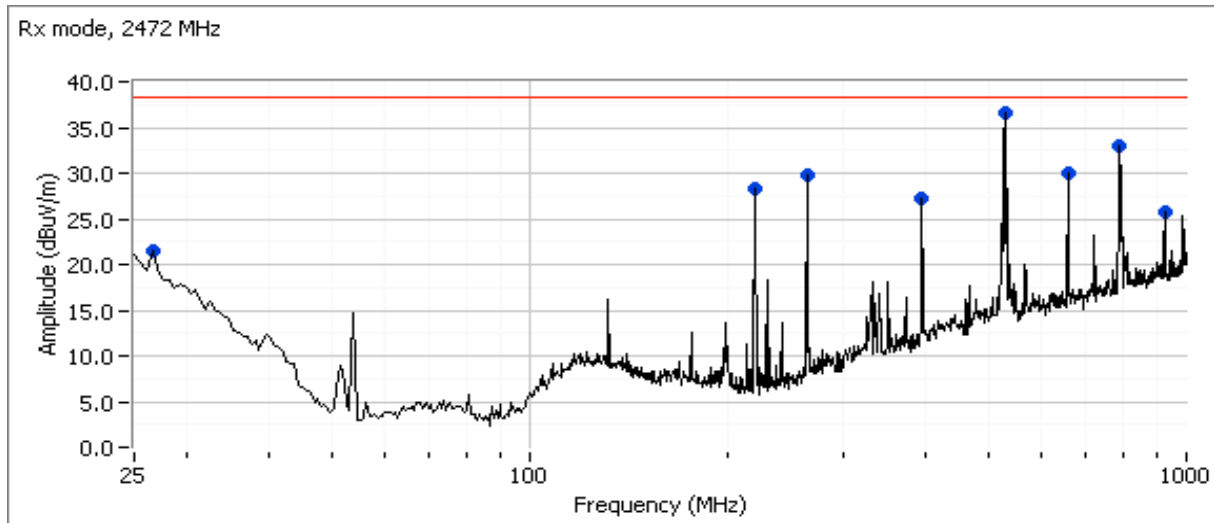
Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

Run #1: Radiated Spurious Emissions, Receive Mode, 25 - 12750 MHz
 Graph - low channel at 2412 MHz



Client: Summit Data Communications	Job Number: J78403
Model: SDC-WB40	T-Log Number: T84432
Contact: Ron Seide	Account Manager: Christine Krebill
Standard: EN 300 328, EN 301 893, AS/NZS 4268	Class: N/A

Graph - high channel at 2472 MHz





EMC Test Data

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

Results Table - All channels

Frequency MHz	Level dB μ V/m	Pol v/h	EN 300 328 ^{Note 1}		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments	Channel Frequency
			Limit	Margin					
26.653	21.4	V	38.3	-16.9	Peak	275	1.5		1
220.090	28.4	H	38.3	-9.9	Peak	223	1.0		1
264.178	29.7	H	38.3	-8.6	Peak	266	1.0		1
792.385	33.0	H	38.3	-5.3	Peak	42	1.5		1
660.521	30.1	V	38.3	-8.2	Peak	299	1.5		1
528.657	36.7	H	38.3	-1.6	Peak	28	1.5		1
395.391	27.2	H	38.3	-11.1	Peak	245	1.5		1
1579.080	46.9	H	48.3	-1.4	PK	139	1.3	RB 1 MHz;VB 3 MHz;Pk	1
26.653	21.6	V	38.3	-16.7	Peak	277	1.0		13
220.090	28.1	H	38.3	-10.2	Peak	220	1.0		13
264.178	29.5	H	38.3	-8.8	Peak	266	1.0		13
792.385	33.1	H	38.3	-5.2	Peak	45	1.5		13
660.520	29.8	V	38.3	-8.5	Peak	300	1.0		13
528.660	36.2	H	38.3	-2.1	Peak	25	1.5		13
395.390	27.0	H	38.3	-11.3	Peak	250	1.5		13
925.650	25.6	H	38.3	-12.7	Peak	160	1.5		13
1584.690	47.9	H	48.3	-0.4	PK	145	1.0	RB 1 MHz;VB 3 MHz;Pk	13

Note 1: The field strength limit in the tables above was calculated from the erp/eirp limit detailed in the standard using the free space propagation equation: $E = \sqrt{(30PG)/d}$. This limit is conservative - it does not consider the presence of the ground plane and, for erp limits, the dipole gain (2.2dBi) has not been included. The erp or eirp for all signals with less than 10dB of margin relative to this field strength limit is determined using substitution measurements.

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

Run #2: Radiated Spurious Emissions, Receive Mode: Final Field Strength and Substitution Measurements

Frequency MHz	Level dB μ V/m	Pol v/h	EN 300 328 ^{Note 1}		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments	Channel Frequency
			Limit	Margin					
220.090	28.4	H	38.3	-9.9	Peak	223	1.0		1
264.178	29.7	H	38.3	-8.6	Peak	266	1.0		1
528.657	36.7	H	38.3	-1.6	Peak	28	1.5		1
660.521	30.1	V	38.3	-8.2	Peak	299	1.5		1
792.385	33.1	H	38.3	-5.2	Peak	45	1.5		13
792.385	33.0	H	38.3	-5.3	Peak	42	1.5		1
1584.690	47.9	H	48.3	-0.4	PK	145	1.0	RB 1 MHz;VB 3 MHz;Pk	13

Horizontal

Frequency MHz	Substitution measurements			Site Factor ⁴	EUT measurements			eirp Limit dBm	erp Limit dBm	Margin dB
	Pin ¹	Gain ²	FS ³		FS ⁵	eirp (dBm)	erp (dBm)			
220.090	-11.1	6.4	90.7	95.4	28.4	-67.0	-69.2		-57.0	-12.2
264.178	-11.2	5.8	90.3	95.7	29.7	-66.0	-68.2		-57.0	-11.2
528.657	-11.8	6.2	92.2	97.8	36.7	-61.1	-63.3		-57.0	-6.3
792.385	-12.1	7.4	90.5	95.2	33.1	-62.1	-64.3		-57.0	-7.3
1584.690	-13.2	8.6	93.1	97.7	47.9	-49.8	-52.0		-47.0	-5.0

Vertical

Frequency MHz	Substitution measurements			Site Factor ⁴	EUT measurements			eirp Limit dBm	erp Limit dBm	Margin dB
	Pin ¹	Gain ²	FS ³		FS ⁵	eirp (dBm)	erp (dBm)			
660.521	-12.0	7.2	89.7	94.5	30.1	-64.4	-66.6		-57.0	-9.6

- Note 1: Pin is the input power (dBm) to the substitution antenna
- Note 2: Gain is the gain (dBi) for the substitution antenna. A dipole has a nominal gain of 2.2dBi, however the dipole balun loss may reduce the gain of the substitution dipole used.
- Note 3: FS is the field strength (dBuV/m) measured from the substitution antenna, maximized for receive antenna height and transmit antenna azimuth.
- Note 4: Site Factor - this is the site factor to convert from a field strength in dBuV/m to an eirp in dBm.
- Note 5: EUT field strength as measured during initial run.

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

**Radio Performance Test - EN 300 328 and AS/NZS 4268
RF Port Measurements**

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: 9/1/2011 & 9/6/11
 Test Engineer: M. Birgani / R. Varelas
 Test Location: FT Lab #4

Config. Used: 1
 Config Change: none
 EUT Voltage: 3.3 V

General Test Configuration

The EUT's rf port was connected to the measurement instrument's rf port, via an attenuator or dc-block if necessary.

Summary of Results

Run #	Test Performed	Limit	Result	Value / Margin
1	Power spectral density at normal conditions	EN 300 328 10dBm/MHz (10mW/MHz) eirp	Pass	802.11b: 8.9 dBm/MHz 802.11g: 4.5 dBm/MHz 802.11n20: 1.5 dBm/MHz
2	Output Power over extreme conditions	EN 300 328, 20dBm (100mW) eirp	Pass	802.11b: 19.3 dBm 802.11g: 15.3 dBm 802.11n20: 12.7 dBm
2	Frequency Range over extreme conditions	EN 300 328 2400 - 2483.5 MHz	Pass	802.11b: 2403.80 - 2403.25 MHz 802.11g: 2403.03 - 2481.07 MHz 802.11n20: 2402.88- 2481.35 MHz
2	Frequency Range over extreme conditions	AS/NZS 4268 2400 - 2483.5 MHz	Pass	802.11b: 2405.64 - 2478.22 MHz 802.11g: 2403.44 - 2480.60 MHz 802.11n20: 2402.98-2481.12 MHz
3	Transmitter spurious emissions, 30MHz - 12,750MHz (rf port)	EN 300 328	Pass	All emissions below the Tx limit
3	Receiver spurious emissions, 30MHz - 12,750MHz (rf port)	EN 300 328	Pass	All emissions below the Rx limit

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	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.

Normal and Extreme Operating Conditions:

Test Notes

Voltage extremes (nominal/normal voltage defined as 3.3 V):

X	Voltage extremes for DC-powered equipment +/-10% of nominal
---	---

Temperature extremes:

X	-20°C to +55°C (Limits for unrestricted use taken from EN 300 328 / EN 300 220)
	0°C to +35°C (Limits for indoor use taken from EN 300 328 / EN 300 220)
	-10°C to +55°C (taken from AS/NZS 4268)
	Manufacturer declared values: ??°C to ??°C

Ambient (Normal) Conditions: Temperature: 20 °C
 Rel. Humidity: 32 %

Run #1: Power Measurements - Spread spectrum (Digital Modulation)

Initial measurements made on the center channel to determine the data rate with the highest output power. All final measurements made with device operating at the highest power level.

8021.11b

Rate	Setting	Pmeas	Duty Cycle	Pout
1	Default	15.4	1	15.4
2	Default	15.4	1	15.4
5.5	Default	15.4	1	15.4
11	Default	15.1	1	15.1

8021.11g

Rate	Setting	Pmeas	Duty Cycle	Pout
6	Default	11.4	1	11.4
9	Default	11.7	1	11.7
12	Default	11.7	1	11.7
18	Default	11.3	1	11.3
24	Default	11.3	1	11.3
36	Default	11.1	1	11.1
48	Default	10.6	1	10.6
54	Default	8.6	1	8.6

Setting: software power setting of EUT
 Pmeas: Measured output power (average)
 Duty Cycle: Duty cycle of transmissions (1 = 100%)

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
		Account Manager:	Christine Krebill
Contact:	Ron Seide		
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

Run #1: Power Measurements - Spread spectrum (Digital Modulation)

Cable Loss: 0.6 dB Attenuator: 10.0 dB Total Loss: 17.5 dB
 Cable Loss: 0.8 dB Combiner: 6.1 dB

Notes for power and power spectral density measurements

- Note 1: Average Power measured using a wideband, calibrated RF power meter with a thermocouple detector (or an equivalent thereof).
- Note 2: PSD measured using a thermocouple detector (or an equivalent thereof) connected to the IF output of the spectrum analyzer, with the analyzer set to RMS Avg detector with RB=VB= 1MHz for digital modulation and RB=VB= 100kHz for FHSS.
- Note 3: Gain is the maximum gain of the antenna assembly that can be used with the EUT at this power level.
- Note 4: Duty Cycle - the duty cycle of the transmitter during the power measurement [time on / (time off + time on)]. Measured using diode detector and oscilloscope or directly from the analyzer.
- Note 5: EIRP levels are the measured levels corrected for duty cycle [10log(duty cycle)] and EUT antenna gain. For MIMO modes the total power is the aggregated eirp for each transmit chain.

Average Power¹ under normal and extreme operating conditions

Power Setting	Channel / Mode	Average Power (dBm) ¹ For Operating Condition					Max Antenna Gain ³	Duty Cycle ⁴	Max Average Power (EIRP) ⁵	Maximum permitted EIRP (dBm)
		Normal 20°C	Extreme -20°C		Extreme 55°C					
			3.3 V	3.0 V	3.6 V	3.0 V				
Default	#1b	14.9	14.3	14.3	15.3	15.3	3.0	1.0	18.3	20.0
Default	#6b	15.4	14.9	14.9	15.0	15.0	3.0	1.0	18.4	20.0
Default	#13b	16.3	16.2	16.3	16.3	16.3	3.0	1.0	19.3	20.0
Default	#1g	10.7	9.6	9.6	10.9	10.9	3.0	1.0	13.9	20.0
Default	#6g	11.4	11.0	11.0	11.1	11.1	3.0	1.0	14.4	20.0
Default	#13g	12.1	12.3	12.3	12.3	12.3	3.0	1.0	15.3	20.0
Default	#1n20	7.9	5.5	5.5	8.0	8.1	3.0	1.0	11.1	20.0
Default	#6n20	8.6	7.1	7.1	8.5	8.5	3.0	1.0	11.6	20.0
Default	#13n20	9.7	8.6	8.6	9.5	9.7	3.0	1.0	12.7	20.0

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

Power spectral Density² (normal operating conditions)

Power Setting	Channel	Frequency	PSD ² dBm	Gain ³ dBi	Duty Cycle ⁴	EIRP ⁵ PSD	PSD	
		MHz					Limit	Margin
Default	#1b	2412.805	4.9	3.0	1.0	7.9	10.0	-2.1
Default	#6b	2436.122	4.6	3.0	1.0	7.6	10.0	-2.4
Default	#13b	2471.141	5.9	3.0	1.0	8.9	10.0	-1.1
Default	#1g	2413.233	-0.6	3.0	1.0	2.4	10.0	-7.6
Default	#6g	2438.082	0.8	3.0	1.0	3.8	10.0	-6.2
Default	#13g	2470.337	1.5	3.0	1.0	4.5	10.0	-5.5
Default	#1n20	2413.282	-3.8	3.0	1.0	-0.8	10.0	-10.8
Default	#6n20	2438.090	-2.2	3.0	1.0	0.8	10.0	-9.2
Default	#13n20	2473.020	-1.5	3.0	1.0	1.5	10.0	-8.5

Run #2: Frequency Range Under Normal and Extreme Conditions - EN 300 328

	Mode	Antenna Gain	Power Setting	Measured Frequency (MHz) For Operating Condition					Low F _L High F _H	Result
				Normal 20°C 3.3 V	Extreme		55°C			
					-20°C 3.0 V	3.6 V	3.0 V	3.6 V		
F _L (MHz)	b	3.0	Default	2403.87	2403.80	2403.90	2404.000	2404.030	2403.80	PASS
F _H (MHz)	b	3.0	Default	2480.12	2480.18	2480.25	2480.07	2479.91	2480.25	PASS
F _L (MHz)	g	3.0	Default	2403.25	2403.03	2403.07	2403.41	2403.20	2403.03	PASS
F _H (MHz)	g	3.0	Default	2480.63	2481.07	2481.07	2480.94	2480.96	2481.07	PASS
F _L (MHz)	n20	3.0	Default	2402.88	2402.93	2402.90	2402.88	2402.99	2402.88	PASS
F _H (MHz)	n20	3.0	Default	2481.17	2481.35	2481.32	2481.15	2481.17	2481.35	PASS

FL and Fh are the lowest and highest frequencies above the spurious emission limit of -30dBm/100kHz eirp for the operating mode (data rate and modulation) that produced the widest frequency range.
If the device meets the frequency range requirements at the highest power setting and with the highest gain antenna then no further tests are required. If it does not then tests are made for each power setting using the highest gain that can be used with each power setting.

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

802.11b



software rev: [Z:\XN Bandedge.exe\EN 300 328 Frequency Range test rev 3.6.v12/31/1903

EUT Frequency

2412.00

Max EUT Antenna

Gain (dBi)

3.0

Analyzer Settings

Band 1

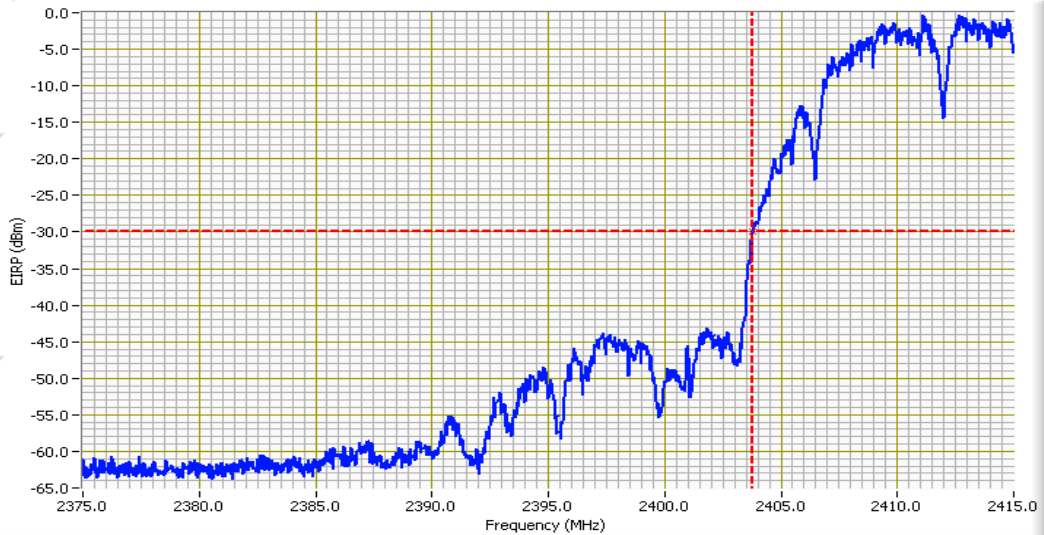
CF: 2385.000 MHz
SPAN: 20.000 MHz
RB: 100 kHz
VB: 100 kHz
Detector: Sample
Attn: 20 DB
RL Offset: 0.0 DB
Sweep Time: 7.6ms
Ref Lvl: 0.4 DBM
Vavg: 50

Analyzer Settings

Band 2

CF: 2405.000 MHz
SPAN: 20.000 MHz
RB: 100 kHz
VB: 100 kHz
Detector: Sample
Attn: 20 DB
RL Offset: 0.0 DB
Sweep Time: 7.6ms
Ref Lvl: 0.4 DBM
Vavg: 50

Data includes an offset of 17.60dB to account for the external attenuation between rf port and analyzer plus an offset for the maximum EUT antenna gain of 3.00dBi



FI 2403.80 -30.00

EN 300 328, 802.11b, -20C 3.6V



software rev: [Z:\XN Bandedge.exe\EN 300 328 Frequency Range test rev 3.6.v12/31/1903

EUT Frequency

2472.00

Max EUT Antenna

Gain (dBi)

3.0

Analyzer Settings

Band 1

CF: 2477.500 MHz
SPAN: 15.000 MHz
RB: 100 kHz
VB: 100 kHz
Detector: Sample
Attn: 20 DB
RL Offset: 0.0 DB
Sweep Time: 5.7ms
Ref Lvl: 0.4 DBM
Vavg: 50

Analyzer Settings

Band 2

CF: 2492.500 MHz
SPAN: 15.000 MHz
RB: 100 kHz
VB: 100 kHz
Detector: Sample
Attn: 20 DB
RL Offset: 0.0 DB
Sweep Time: 5.7ms
Ref Lvl: 0.4 DBM
Vavg: 50

Data includes an offset of 17.60dB to account for the external attenuation between rf port and analyzer plus an offset for the maximum EUT antenna gain of 3.00dBi



Fh 2480.25 -30.00

EN 300 328, 802.11b, -20C 3.6V

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

802.11g



Software rev: Z:\K\N Bandedge.exe\EN 300 328 Frequency Range test rev 3.6.w12/31/1903

EUT Frequency

2412.00

Max EUT Antenna Gain (dBi)

3.0

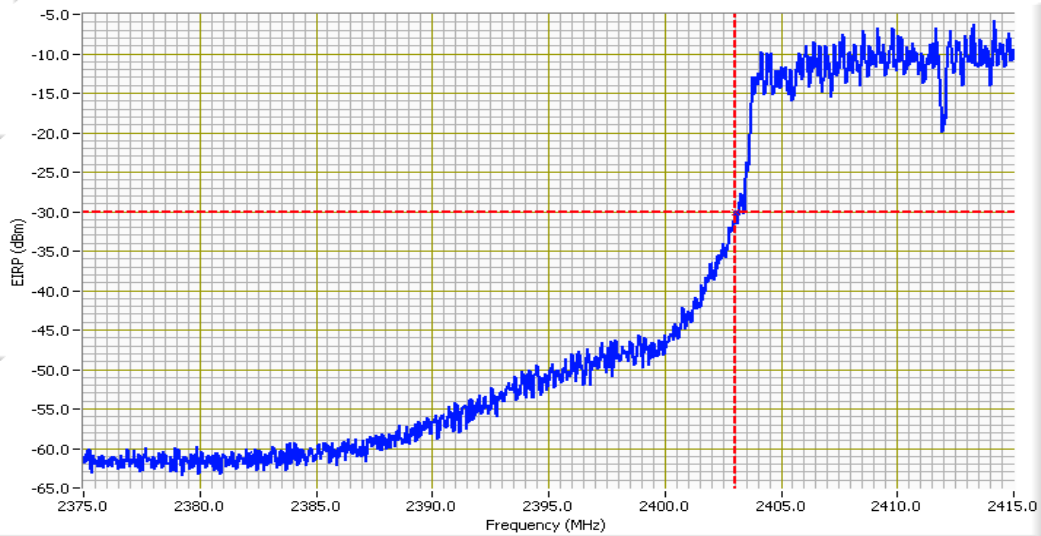
Analyzer Settings Band 1

CF: 2385.000 MHz
SPAN: 20.000 MHz
RB: 100 kHz
VB: 100 kHz
Detector: Sample
Attn: 20 dB
RL Offset: 0.0 dB
Sweep Time: 7.6ms
Ref Lvl: 0.4 DBM
Vavg: 50

Analyzer Settings Band 2

CF: 2405.000 MHz
SPAN: 20.000 MHz
RB: 100 kHz
VB: 100 kHz
Detector: Sample
Attn: 20 dB
RL Offset: 0.0 dB
Sweep Time: 7.6ms
Ref Lvl: 0.4 DBM
Vavg: 50

Data includes an offset of 17.60dB to account for the external attenuation between rf port and analyzer plus an offset for the maximum EUT antenna gain of 3.00dBi



H 2403.03 -30.00

EN 300 328, 802.11g, -20 C 3.0V



Software rev: Z:\K\N Bandedge.exe\EN 300 328 Frequency Range test rev 3.6.w12/31/1903

EUT Frequency

2472.00

Max EUT Antenna Gain (dBi)

3.0

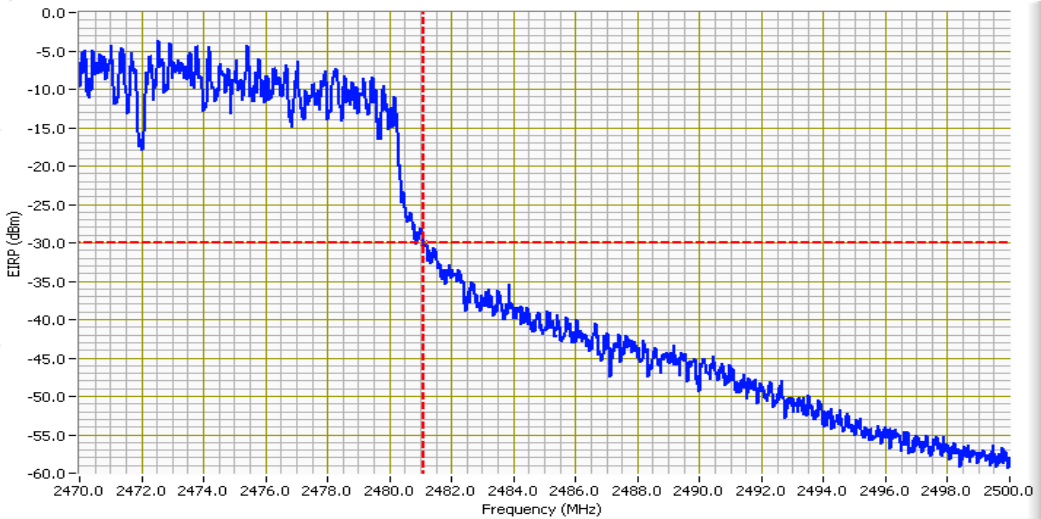
Analyzer Settings Band 1

CF: 2477.500 MHz
SPAN: 15.000 MHz
RB: 100 kHz
VB: 100 kHz
Detector: Sample
Attn: 20 dB
RL Offset: 0.0 dB
Sweep Time: 5.7ms
Ref Lvl: 0.4 DBM
Vavg: 50

Analyzer Settings Band 2

CF: 2492.500 MHz
SPAN: 15.000 MHz
RB: 100 kHz
VB: 100 kHz
Detector: Sample
Attn: 20 dB
RL Offset: 0.0 dB
Sweep Time: 5.7ms
Ref Lvl: 0.4 DBM
Vavg: 50

Data includes an offset of 17.60dB to account for the external attenuation between rf port and analyzer plus an offset for the maximum EUT antenna gain of 3.00dBi

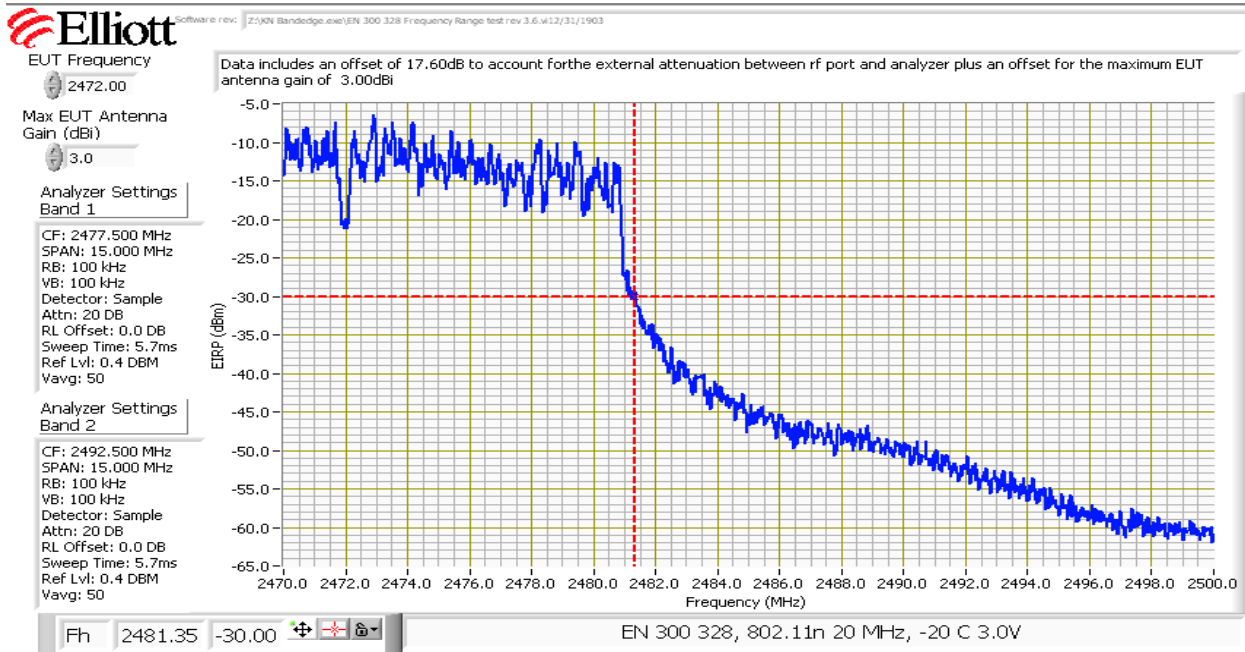
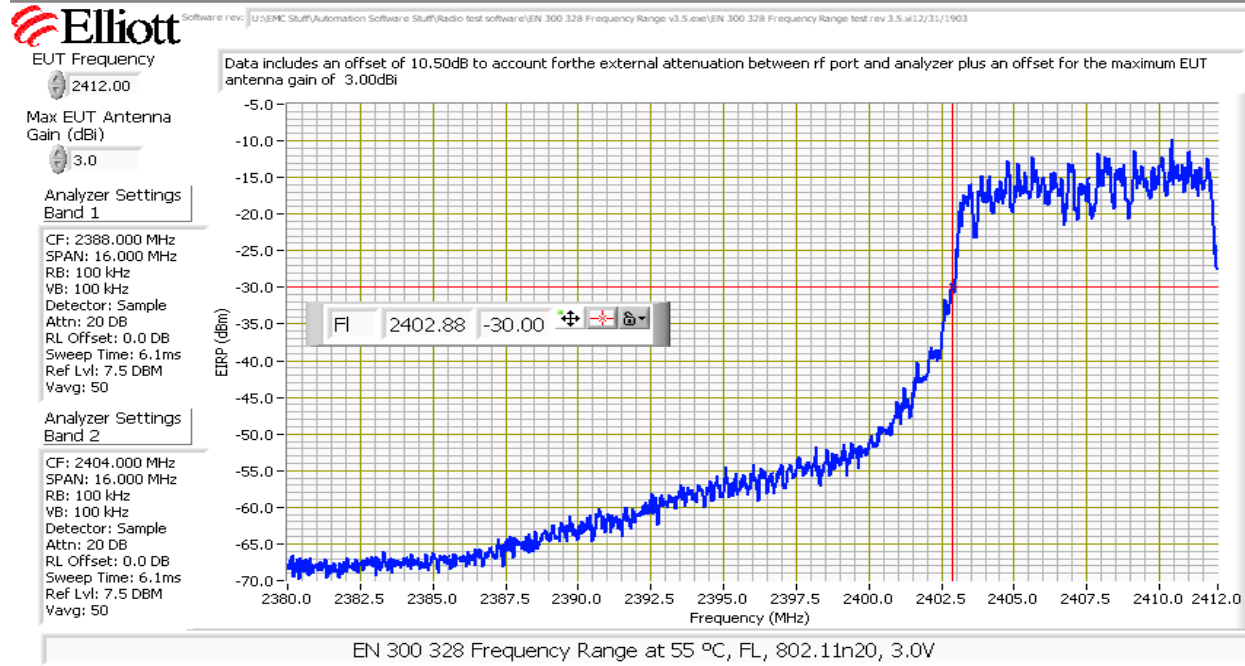


Fh 2481.07 -30.00

EN 300 328, 802.11g, -20C 3.6V

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

802.11n20



Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

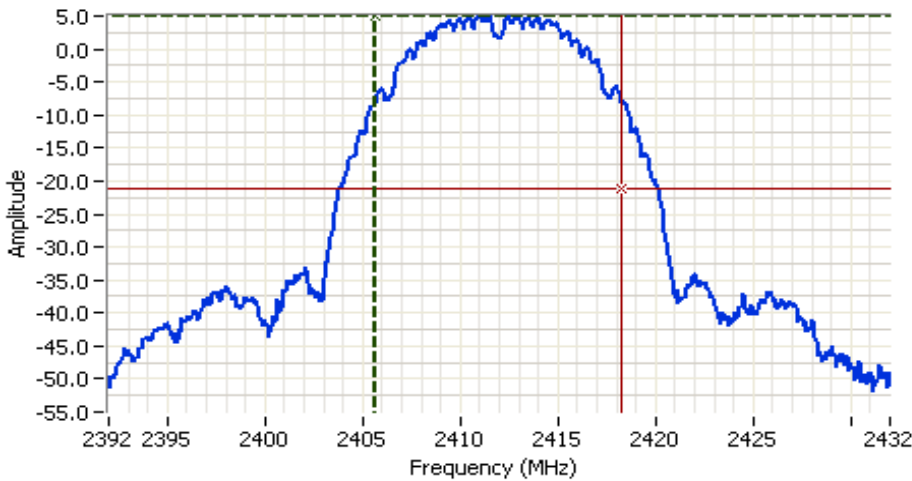
Run #2: Frequency Range Under Normal and Extreme Conditions - 2400 - 2483.5MHz, AZ/NZS 4268

	Mode	Antenna Gain	Power Setting	Measured Frequency (MHz) For Operating Condition					Low F_L High F_H	Result
				Normal 20°C 3.3 V	Extreme		55°C			
					-20°C 3.0 V	3.6 V	3.0 V	3.6 V		
F_L (MHz)	b	3.0	Default	2405.644	2405.720	2405.720	2405.711	2405.711	2405.644	PASS
F_H (MHz)	b	3.0	Default	2478.156	2478.160	2478.160	2478.223	2478.223	2478.223	PASS
F_L (MHz)	g	3.0	Default	2403.514	2403.480	2403.480	2403.448	2403.448	2403.448	PASS
F_H (MHz)	g	3.0	Default	2480.552	2480.520	2480.600	2463.381	2480.552	2480.600	PASS
F_L (MHz)	n20	3.0	Default	2403.048	2403.040	2403.040	2402.982	2402.982	2402.982	PASS
F_H (MHz)	n20	3.0	Default	2481.085	2481.120	2481.080	2481.110	2481.110	2481.120	PASS

F_L and F_H are the frequencies that define the upper and lower limits of the 99% signal bandwidth. F_L is taken from the 99% bandwidth plot for the lowest operating frequency and F_H from the 99% bandwidth plot for the highest operating frequency.

Client: Summit Data Communications	Job Number: J78403
Model: SDC-WB40	T-Log Number: T84432
Contact: Ron Seide	Account Manager: Christine Krebill
Standard: EN 300 328, EN 301 893, AS/NZS 4268	Class: N/A

802.11b



Analyzer Settings

Agilent Technologies, E4446A
CF: 2412.000 MHz
SPAN: 40.000 MHz
RB: 510 kHz
VB: 1.500 MHz
Detector: POS
Attn: 20 DB
RL Offset: 10.5 DB
Sweep Time: 1.0ms
Ref Lvl: 15.0 DBM

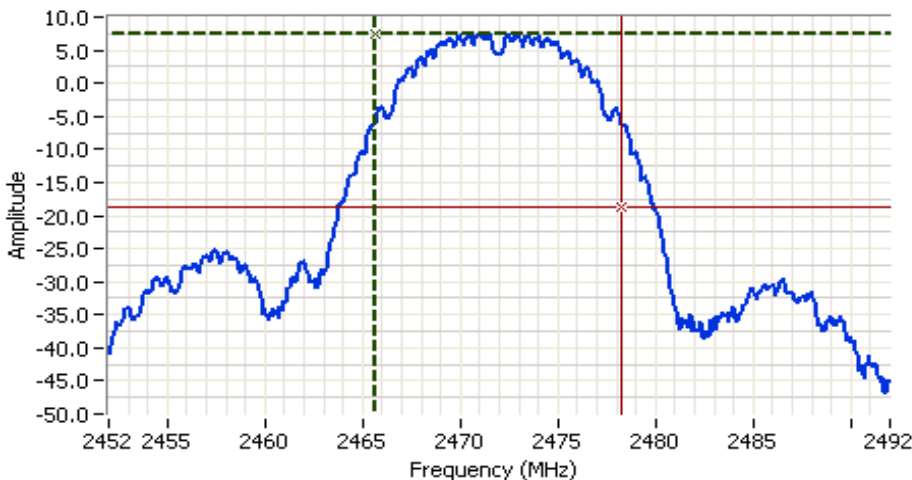
Comments

Frequency Range at 20 °C
FL, 802.11b, 3.3V

Cursor 1	2405.6439	4.89	
Cursor 2	2418.2895	-21.11	

Delta Freq. 12.646

Delta Amplitude 26.00



Analyzer Settings

Agilent Technologies, E4446A
CF: 2472.000 MHz
SPAN: 40.000 MHz
RB: 510 kHz
VB: 1.500 MHz
Detector: POS
Attn: 20 DB
RL Offset: 10.5 DB
Sweep Time: 1.0ms
Ref Lvl: 15.0 DBM

Comments

Frequency Range at 55 °C
FH, 802.11b, 3.0V

Cursor 1	2465.6439	7.39	
Cursor 2	2478.2230	-18.61	

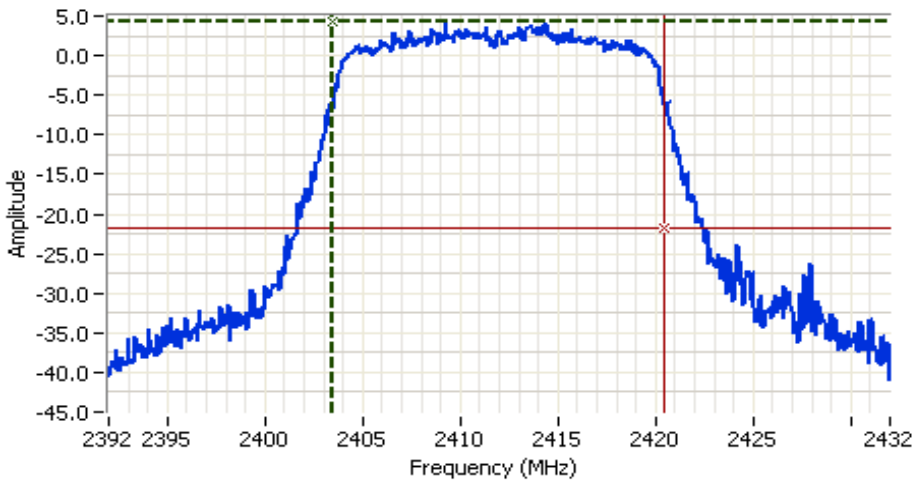
Delta Freq. 12.579

Delta Amplitude 26.00



Client: Summit Data Communications	Job Number: J78403
Model: SDC-WB40	T-Log Number: T84432
Contact: Ron Seide	Account Manager: Christine Krebill
Standard: EN 300 328, EN 301 893, AS/NZS 4268	Class: N/A

802.11g

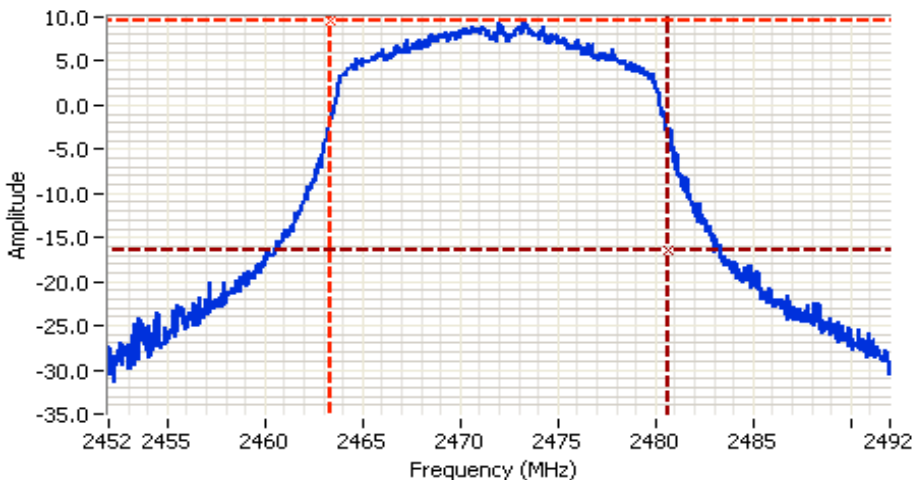


Analyzer Settings
 Agilent Technologies, E4446A
 CF: 2412.000 MHz
 SPAN: 40.000 MHz
 RB: 510 kHz
 VB: 1.500 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 10.5 DB
 Sweep Time: 1.0ms
 Ref Lvl: 10.0 DBM

Comments
 Frequency Range at 55 °C
 FL, 802.11g, 3.0V

Cursor 1 2403.4476 4.23
 Cursor 2 2420.4859 -21.77

Delta Freq. 17.038
 Delta Amplitude 26.00



Analyzer Settings
 Agilent Technologies, E4446A
 CF: 2472.000 MHz
 SPAN: 40.000 MHz
 RB: 510 kHz
 VB: 1.500 MHz
 Detector: POS
 Attn: 20 DB
 RL Offset: 17.1 DB
 Sweep Time: 1.1ms
 Ref Lvl: 17.5 DBM

Comments
 802.11g
 FH: 2480.600 MHz
 -20C, 3.6 V

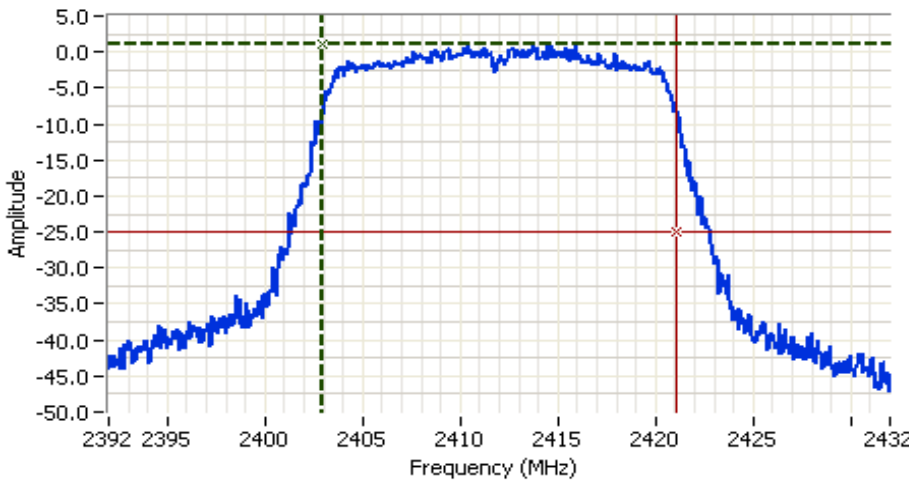
Cursor 1 2463.3200 9.48
 Cursor 2 2480.6000 -16.52

Delta Freq. 17.280
 Delta Amplitude 26.00



Client: Summit Data Communications	Job Number: J78403
Model: SDC-WB40	T-Log Number: T84432
Contact: Ron Seide	Account Manager: Christine Krebill
Standard: EN 300 328, EN 301 893, AS/NZS 4268	Class: N/A

802.11n20



Analyzer Settings

Agilent Technologies, E4446A
CF: 2412.000 MHz
SPAN: 40.000 MHz
RB: 510 kHz
VB: 1.500 MHz
Detector: POS
Attn: 10 DB
RL Offset: 10.5 DB
Sweep Time: 1.0ms
Ref Lvl: 10.0 DBM

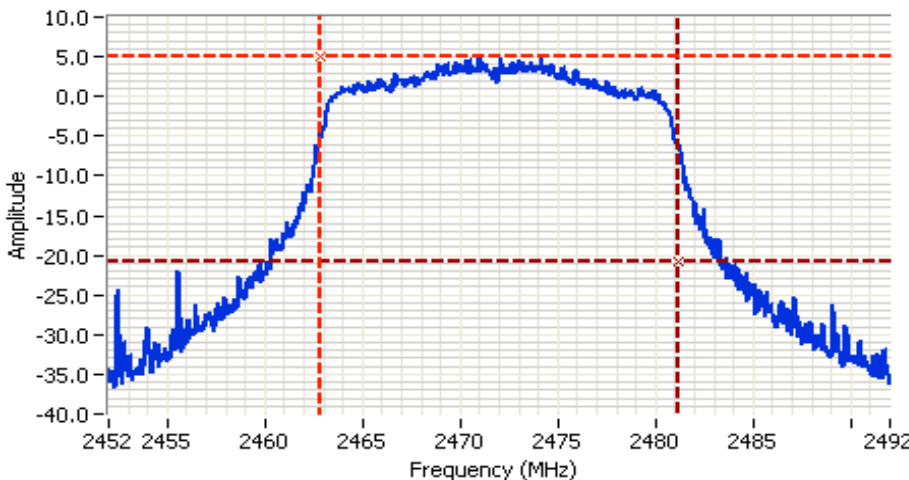
Comments

Frequency Range at 55 °C
FL, 802.11n20, 3.6V

Cursor 1	2402.9817	1.08	
Cursor 2	2421.0183	-24.92	

Delta Freq. 18.037

Delta Amplitude 26.00



Analyzer Settings

Agilent Technologies, E4446A
CF: 2472.000 MHz
SPAN: 40.000 MHz
RB: 510 kHz
VB: 1.500 MHz
Detector: POS
Attn: 20 DB
RL Offset: 17.1 DB
Sweep Time: 1.1ms
Ref Lvl: 17.5 DBM

Comments

802.11n 20MHz
FH: 2481.120 MHz
-20C, 3.0 V

Cursor 1	2462.8000	5.12	
Cursor 2	2481.1200	-20.88	

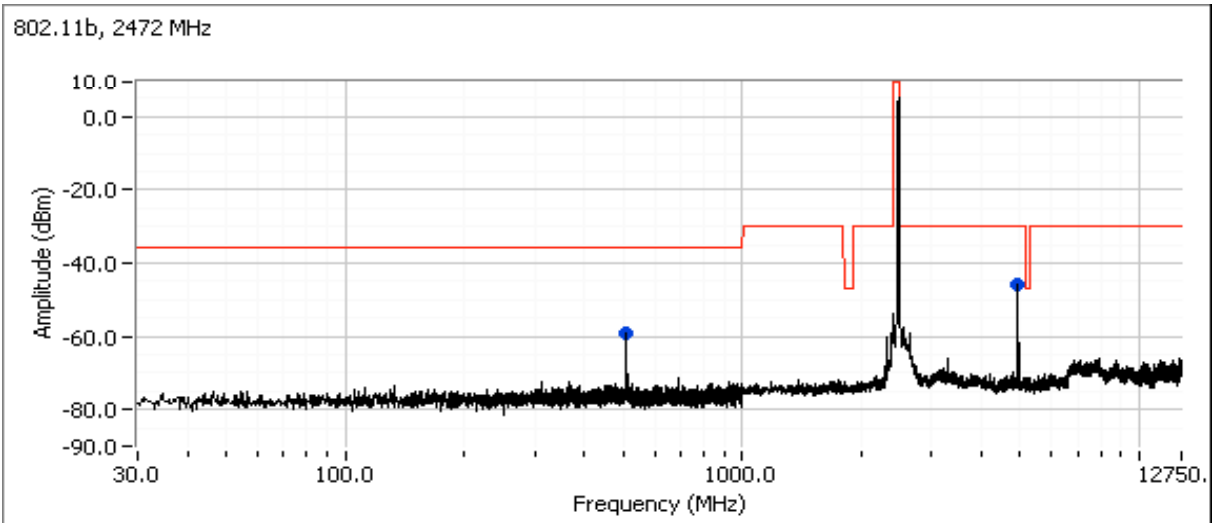
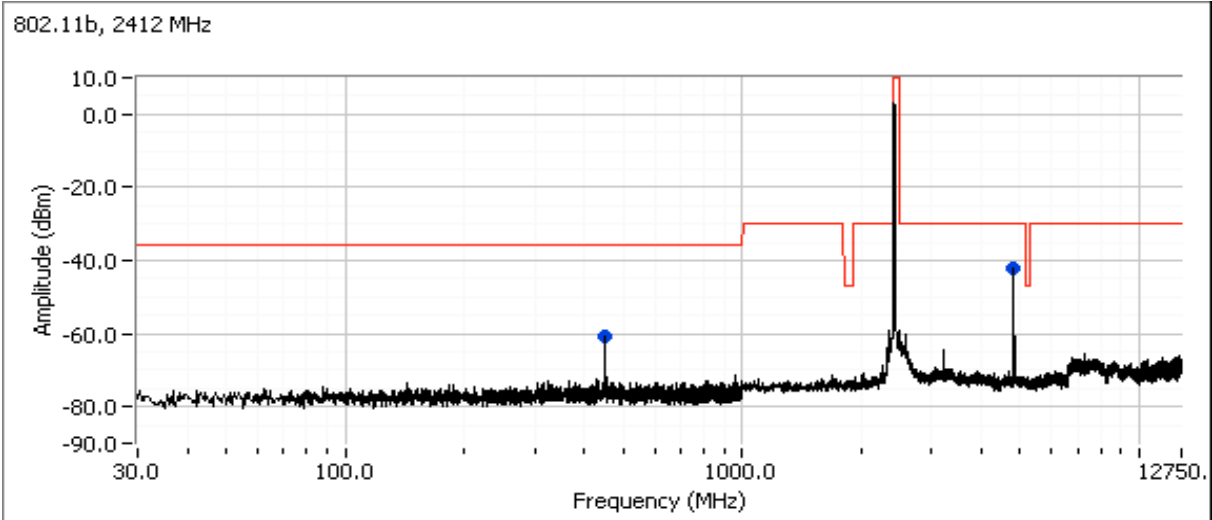
Delta Freq. 18.320

Delta Amplitude 26.00

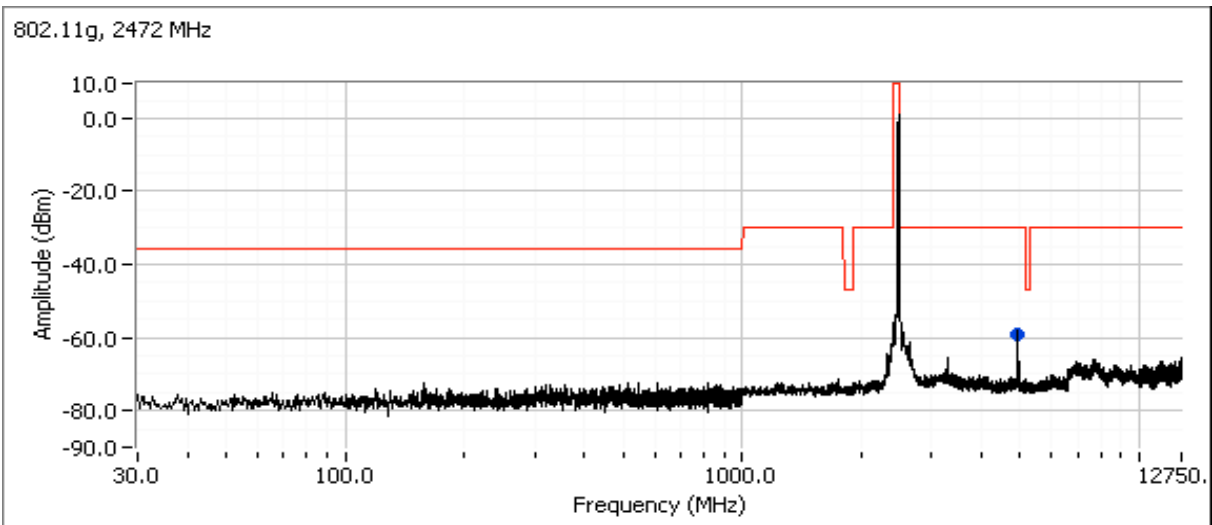
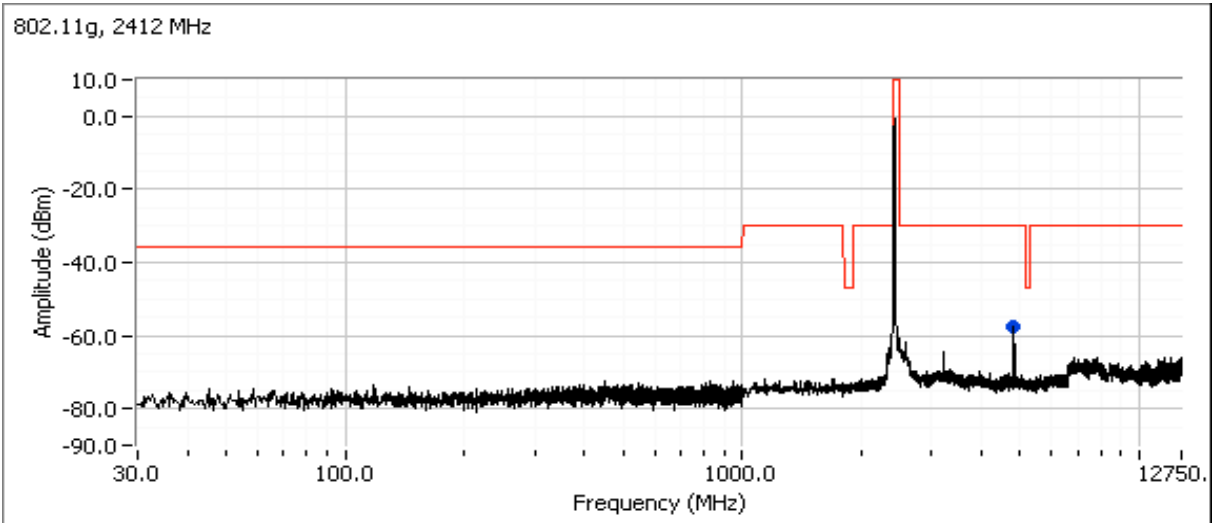


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

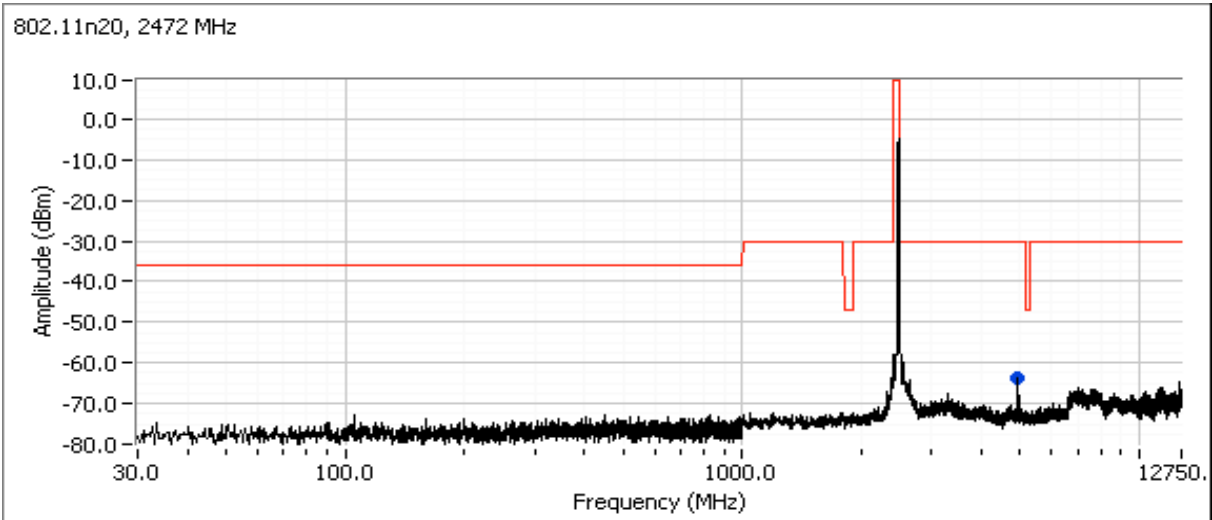
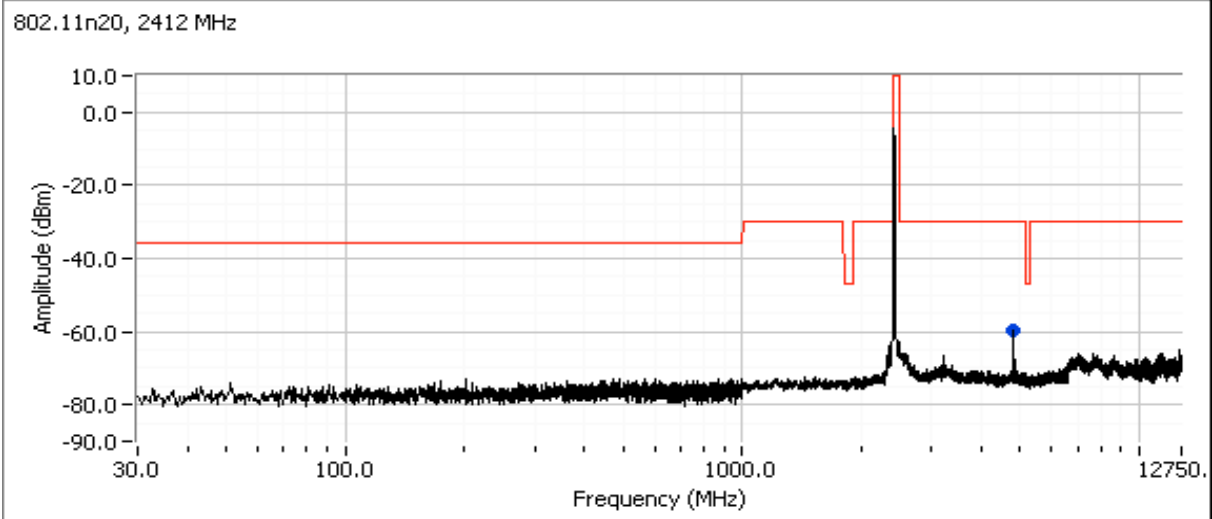
Run #3: Antenna Port Conducted Spurious Emissions, Transmit Mode, 30 - 12750 MHz



Client: Summit Data Communications	Job Number: J78403
Model: SDC-WB40	T-Log Number: T84432
Contact: Ron Seide	Account Manager: Christine Krebill
Standard: EN 300 328, EN 301 893, AS/NZS 4268	Class: N/A



Client: Summit Data Communications	Job Number: J78403
Model: SDC-WB40	T-Log Number: T84432
	Account Manager: Christine Krebill
Contact: Ron Seide	
Standard: EN 300 328, EN 301 893, AS/NZS 4268	Class: N/A

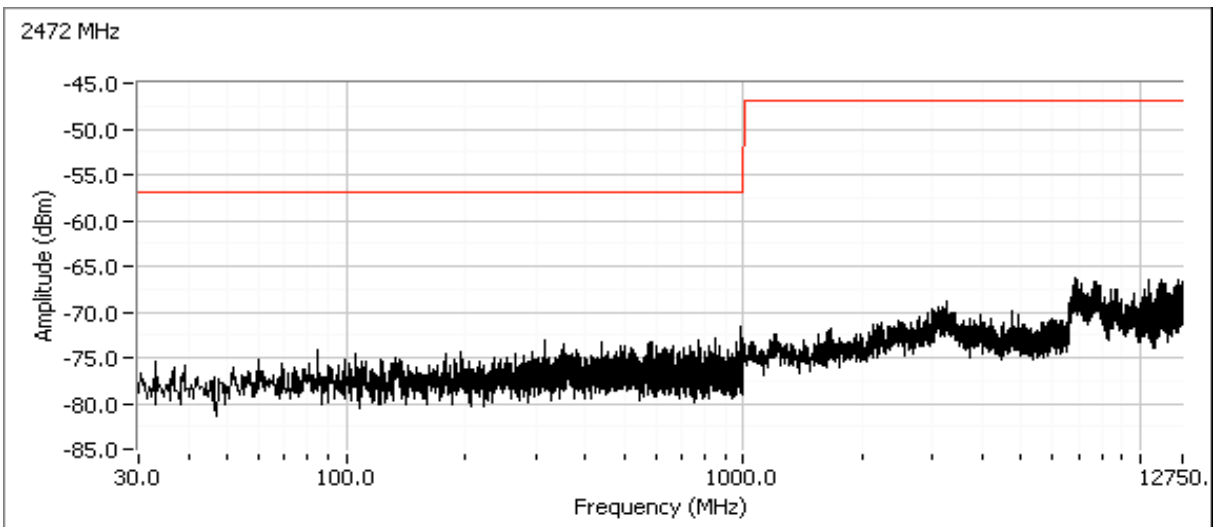
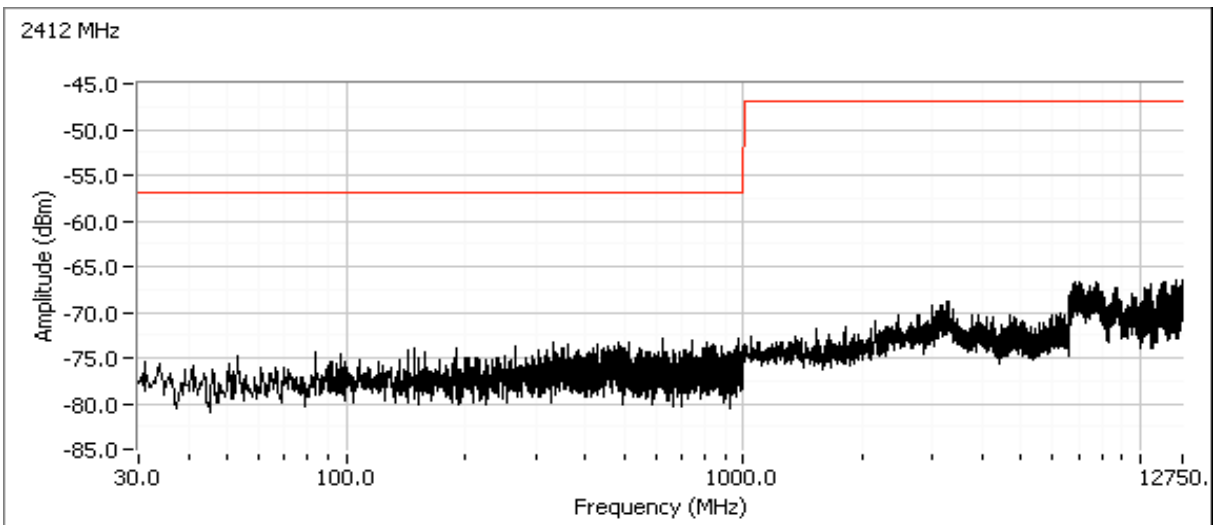


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

Frequency MHz	Level dBm	Port	EN 300 328		Detector	Channel	Mode	Comments
			Limit	Margin				
4946.320	-63.6	RF Port	-30.0	-33.6	Peak	13	n20	
4823.270	-59.6	RF Port	-30.0	-29.6	Peak	1	n20	
451.120	-60.6	RF Port	-36.0	-24.6	Peak	1	b	
4823.270	-41.9	RF Port	-30.0	-11.9	Peak	1	b	
511.280	-59.2	RF Port	-36.0	-23.2	Peak	13	b	
4943.310	-46.1	RF Port	-30.0	-16.1	Peak	13	b	
4943.310	-59.2	RF Port	-30.0	-29.2	Peak	13	g	
4823.270	-57.6	RF Port	-30.0	-27.6	Peak	1	g	

Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

Run #4: Antenna Port Conducted Spurious Emissions, Receive Mode, 30 - 12,750 MHz



End of Report

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