



Test Certificate

A sample of the following product received on October 19, 2010 and tested on October 31 and November 11, 2011 and January 4, 2012 complied with the requirements of

- EN 301 893 V1.5.1 "Broadband Radio Access Networks (BRAN); 5 GHz high performance RLAN; Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive"

given the measurement uncertainties detailed in Elliott report R86059.

Summit Data Communications

Model SDC-WB40NBT

Mark E Hill
Staff Engineer

Summit Data Communications

Printed Name



Testing Cert #2016.01

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Radio Test Report

EN 301 893 V1.5.1

*ElectroMagnetic Compatibility and Radio spectrum Matters
(ERM); Broadband Radio Access Networks (BRAN); 5 GHz
high performance RLAN*

Model: SDC-WB40NBT

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

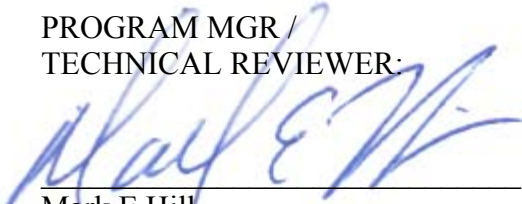
TEST SITE(S): Elliott Laboratories
41039 Boyce Road.
Fremont, CA. 94538-2435

REPORT DATE: March 2, 2012

FINAL TEST DATES: October 31 and November 11, 2011 and January
4, 2012

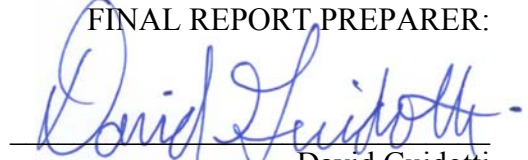
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REVISION HISTORY

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 301 893 V1.5.1 “Broadband Radio Access Networks (BRAN); 5 GHz high performance RLAN; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive”

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 301 893 V1.5.1

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 301 893 V1.5.1**

Section	Description	Channel	Measured Value	Limit	Result
4.2.2	Centre Frequencies	5180MHz 5320MHz 5500MHz 5700MHz	14.5ppm	+/- 20ppm	Complies
Mode: 802.11a					
4.3.2	Nominal Channel Bandwidth and Occupied Channel Bandwidth	5180MHz 5320MHz 5500MHz 5700MHz	16.4 – 19.0 MHz	80-100% of the nominal channel bandwidth	Complies
4.4.2.1	RF output power and power density at the highest power level (5150-5350 MHz)	5180MHz	19.2 dBm	23.0 dBm	Complies
		5320MHz	9.6 dBm/MHz	10 dBm/MHz	Complies
	RF output power and power density at the highest power level (5470-5725MHz)	5500MHz	19.6 dBm	23.0 dBm	Complies
		5700MHz	9.2 dBm/MHz	10 dBm/MHz	Complies
4.4.2.2	RF output power at the lowest power level of the TPC range	5180MHz 5320MHz 5180MHz 5320MHz	Device complies with 802.11h protocol		
4.5.2	Transmitter In-Band Spurious Emissions	5180MHz 5320MHz 5500MHz 5700MHz	complied with the mask	Figure 2 Spectral mask	Complies
Mode: 802.11n20					
4.3.2	Nominal Channel Bandwidth and Occupied Channel Bandwidth	5180MHz 5320MHz 5500MHz 5700MHz	17.7 – 18.2 MHz	80-100% of the nominal channel bandwidth	Complies
4.4.2.1	RF output power and power density at the highest power level (5150-5350 MHz)	5180MHz	19.6 dBm	23.0 dBm	Complies
		5320MHz	9.6 dBm/MHz	10 dBm/MHz	Complies
	RF output power and power density at the highest power level (5470-5725MHz)	5500MHz	19.4 dBm	23.0 dBm	Complies
		5700MHz	8.7 dBm/MHz	10 dBm/MHz	Complies
4.4.2.2	RF output power at the lowest power level of the TPC range	5180MHz 5320MHz 5180MHz 5320MHz	Device complies with 802.11h protocol		
4.5.2	Transmitter In-Band Spurious Emissions	5180MHz 5320MHz 5500MHz 5700MHz	complied with the mask	Figure 2 Spectral mask	Complies

Section	Description	Channel	Measured Value	Limit	Result
Spurious Emissions - Worst-case value for all modes					
4.5.1.2	Transmitter Out-Of Band Conducted Spurious Emissions	5180MHz 5320MHz	-31.8dBm @ 11395.13 MHz (-1.8dB)	Table 4	Complies
	Transmitter Out-Of Band Radiated Spurious Emissions	5500MHz 5700MHz	All emissions more than 10dB below limit	Table 4	Complies
4.6	Receiver Conducted Spurious Emissions	5180MHz 5320MHz	-60.1dBm @ 3799.930 MHz (-13.1dB)	25 – 1000 MHz: -57dBm 1 – 26.5 GHz: -47dBm	Complies
	Receiver Radiated Spurious Emissions	5500MHz 5700MHz	-53.7dBm @ 1582.3MHz (-6.7dB)		Complies
Other Requirements					
4.7.2	DFS operational modes	-	Slave Device	Master and/or Slave Device	Complies
4.7.2.1.2 4.7.2.2.2 4.7.2.3.2 4.7.2.4.2	Requirements related to DFS	These requirements have been assessed separately and are covered under the scope of Elliott test report R86362.			
4.7.2.5.2	Uniform Spreading – use of available spectrum and probability of channel selection.				
4.8.2	Medium Access Protocol	-	The system uses the 802.11 protocol to facilitate spectrum sharing.	A medium access protocol shall be implemented by the equipment and shall be active under all circumstances.	Complies
4.9.2	User Access Restrictions	-	The manufacturer attests to the fact that the DFS controls are not accessible and cannot be disabled/alterd by the end user.	DFS controls (hardware or software) related to radar detection shall not be accessible to the user so that the DFS functions can neither be disabled nor altered.	Complies
Note – Although the measurement is below the specification limit, it is below the limit by a margin less than the measurement uncertainty. Note – For results for the Bluetooth or 2GHz WiFi operation, please refer to Elliott reports R86062 and R85918, 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.

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 October 31 and November 11, 2011 and January 4, 2012. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Summit	SDC-WB40NBT	802.11abgn 1x with BT	Prototype	TWG-SDCW40NBT

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 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.

CARRIER FREQUENCIES

If the device can operate in an un-modulated mode then the carrier frequency is measured in that mode, otherwise the carrier frequency is calculated using the $(f1 + f2)/2$ method, where f1 and f2 are the -10dB points.

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).

When devices being evaluated against the requirements of EN 301 893 have emissions close to the limit are tested using Video Averaging¹, with video gating used where the transmit duty cycle is less than 1.

¹ When using video averaging the span is set to ensure the analyzer bin size does not exceed one half the measurement bandwidth.

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). Where applicable, final measurements may be made with video averaging enabled.

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.

DFS – THRESHOLD, CHANNEL CLOSING TRANSMISSION TIME AND CHANNEL MOVE TIME

The threshold level for DFS radar detection is determined by using the test methods outlined in section 5.3.7 of EN 301 893 (section 5.3.6 of EN 302 502). Typically the unit under test is configured to report when it detects a burst of radar rather than to change channel on detecting radar to expedite these measurements.

Channel clearing and closing times are measured by applying a radar burst with the device configured to change channel and by observing the original channel for transmissions.

DFS CHANNEL AVAILABILITY CHECK TIME

The channel availability check time is determined by using the test methods outlined in section 5.3.7 of EN 301 893 (section 5.3.6 of EN 302 502). Radar bursts are applied during the EUT boot sequence to verify that a check for radar on the selected channel is performed for at least 60 seconds prior to commencing transmissions on that channel.

UNIFORM LOADING

The channel loading, where appropriate (i.e. when channel selection is not determined under control of the network), is determined by re-booting the EUT multiple times and recording the channel initially selected. The number of times each channel is selected is divided by the total number of times the device was re-booted to calculate the utilization. This is compared to the theoretical loading of $1/n$, where n is the total number of channels available.

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, 30 - 18,000 MHz, 31-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	785	5/18/2012
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	8/9/2012
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/22/2012
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1681	9/8/2012
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	4/6/2012
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2251	10/11/2012
Com-Power Corp.	Preamplifier, 30-1000 MHz	PA-103A	2359	2/15/2012

Environmental Stability, 12-Nov-11

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Rohde & Schwarz	Power Meter, Dual Channel	NRVD	1071	5/26/2012
Rohde & Schwarz	Attenuator, 20 dB, 10W, DC-18 GHz	20dB, 10W, Type N	1795	5/25/2012
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	1/26/2012
Thermotron	Temp Chamber (w/ F4 Watlow Controller)	S1.2	2170	7/8/2012

Radio Antenna Port (Power and Spurious Emissions), 04-Jan-12

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	1/26/2012

Appendix B Test Data

T84432 Pages 20 - 60



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 301 893

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: 10/31/2011	Config. Used: 1
Test Engineer: J. Caizzi, Jack Liu, R. Varelas	Config Change: None
Test Location: FT5	EUT Voltage: 3.3 VDC

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:	22.5 °C
Rel. Humidity:	42 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
2	Spurious Emissions Transmit Mode, 30 - 26,000 MHz	EN 301 893	Pass	All emissions more than 10dB below limit
4	Spurious Emissions Receive/Stand-By Mode, 30 - 26,000 MHz	EN 301 893	Pass	-53.7dBm @ 1582.3MHz (-6.7dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

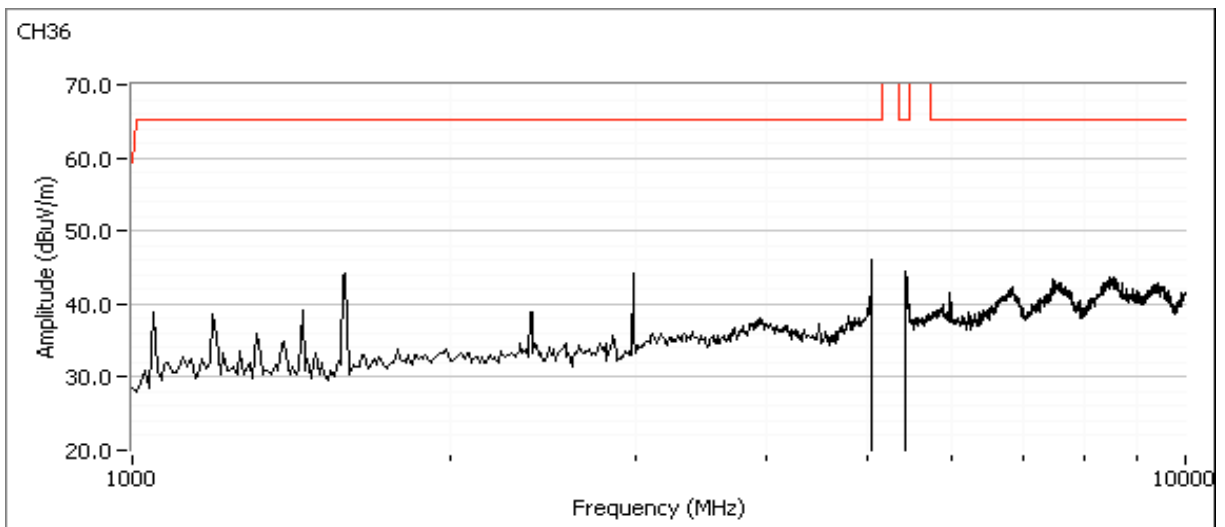
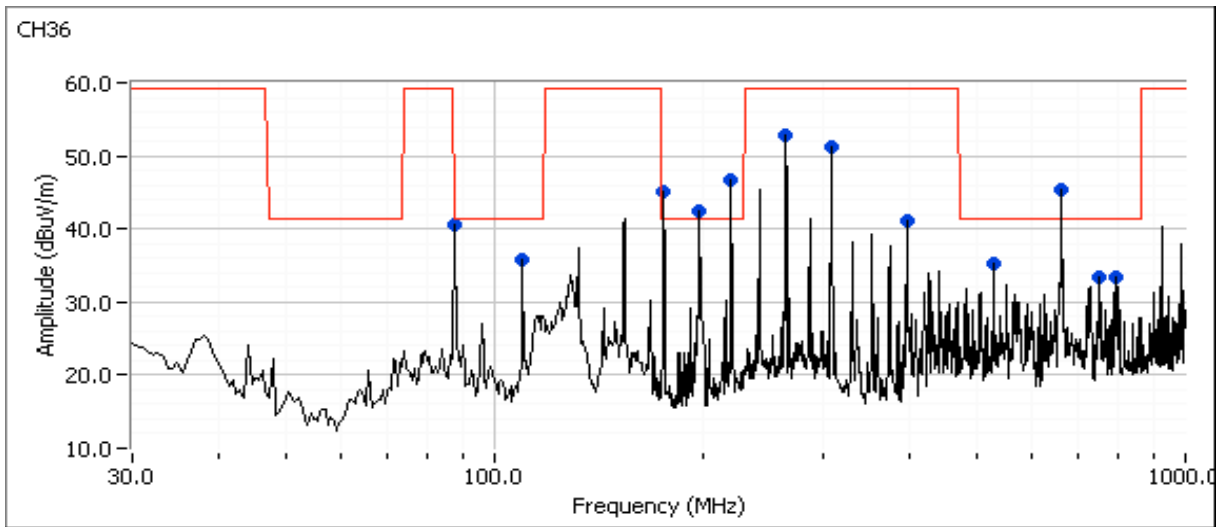
Deviations From The Standard

No deviations were made from the requirements of the standard.

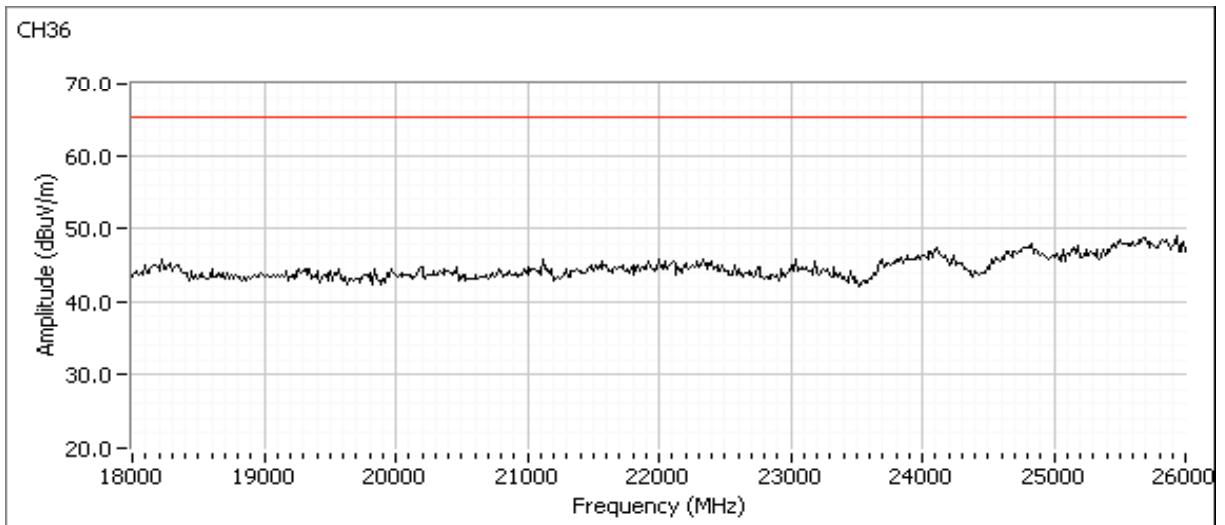
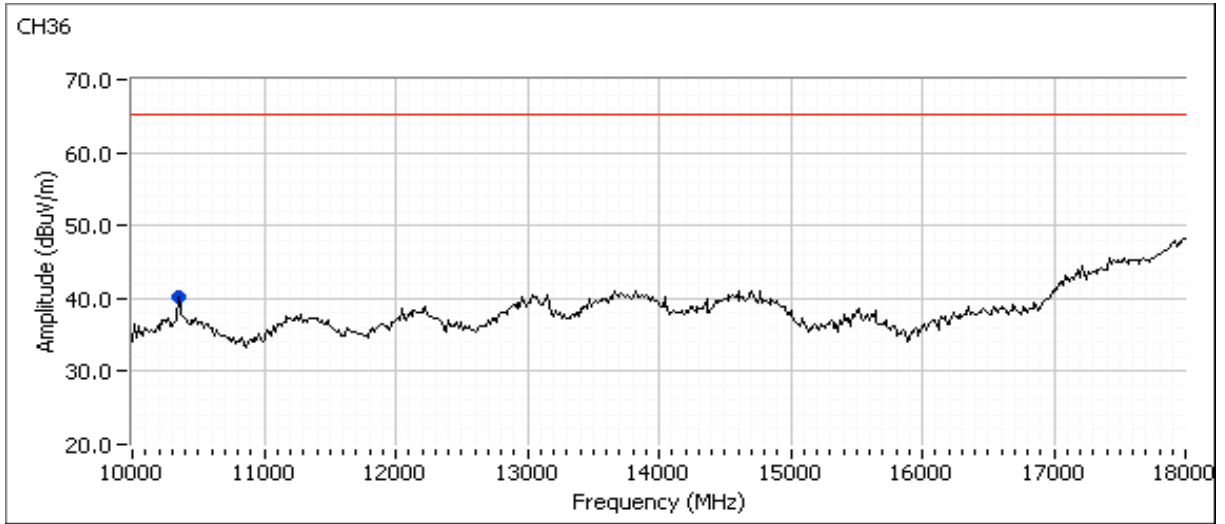
Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

Run #1: Radiated Spurious Emissions, Transmit Mode, 30 - 26,000 MHz
 Measurements made at 3m

Channel 36: 5180 MHz, 802.11a

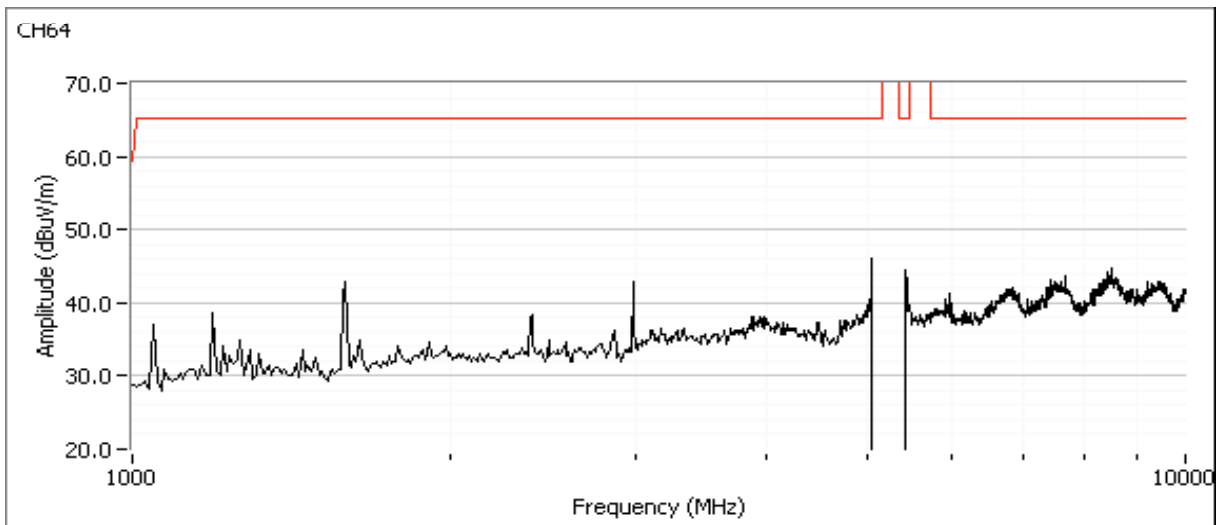
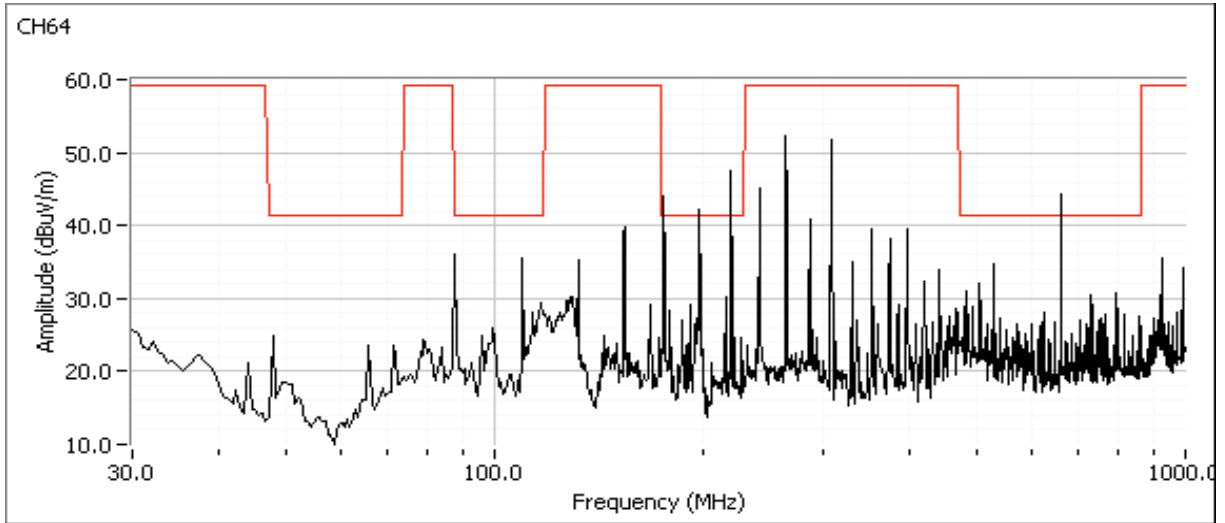


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

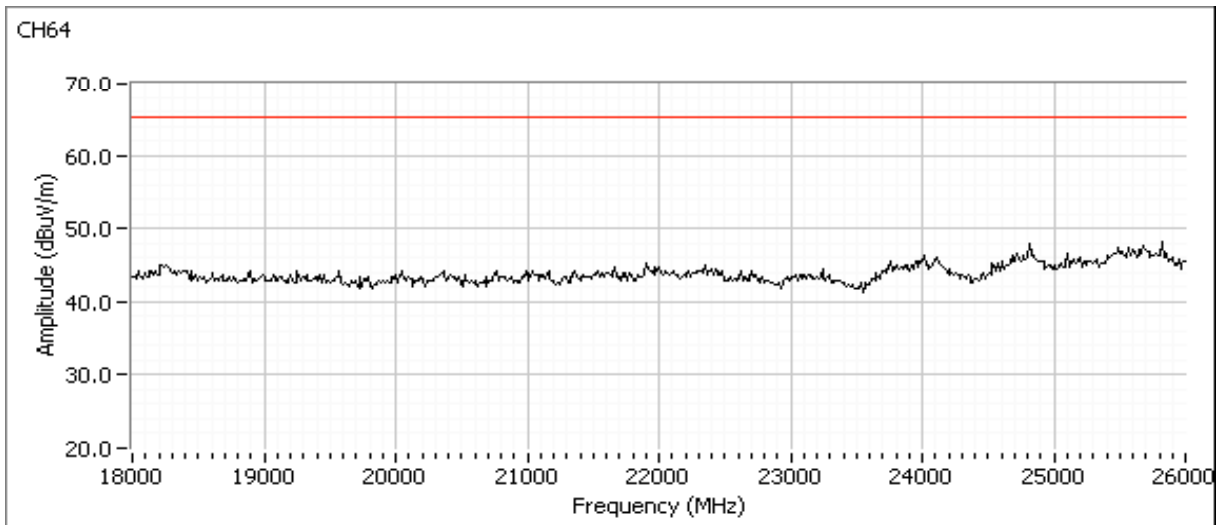
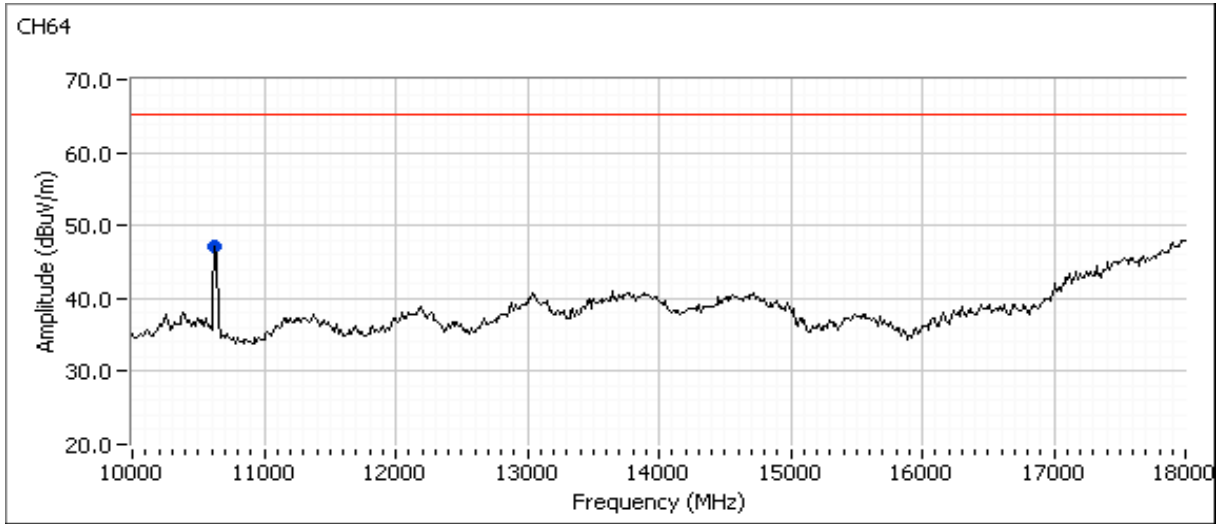


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

Channel 64: 5320 MHz, 802.11a

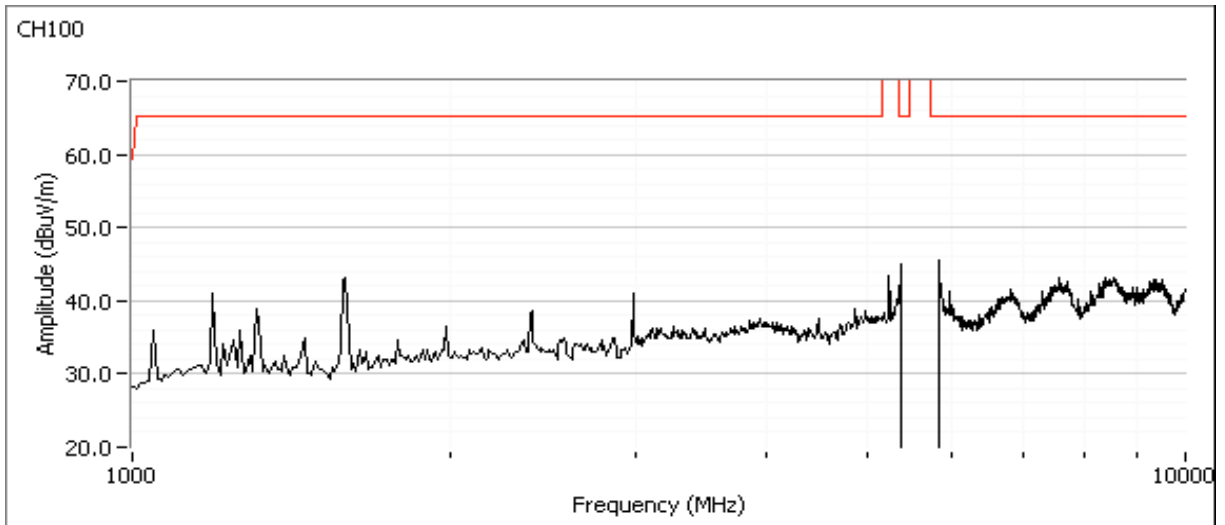
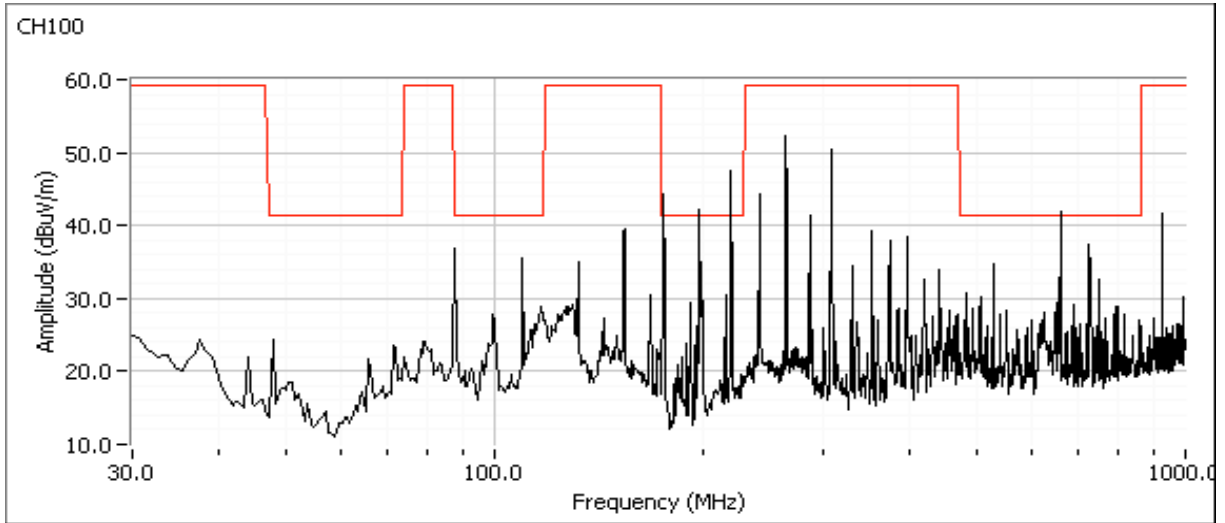


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

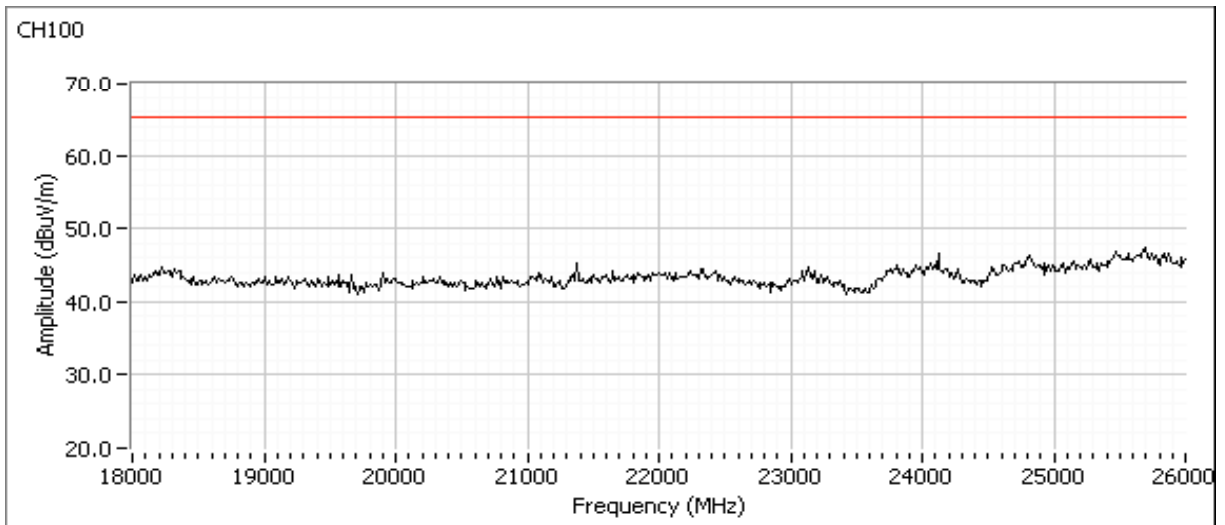
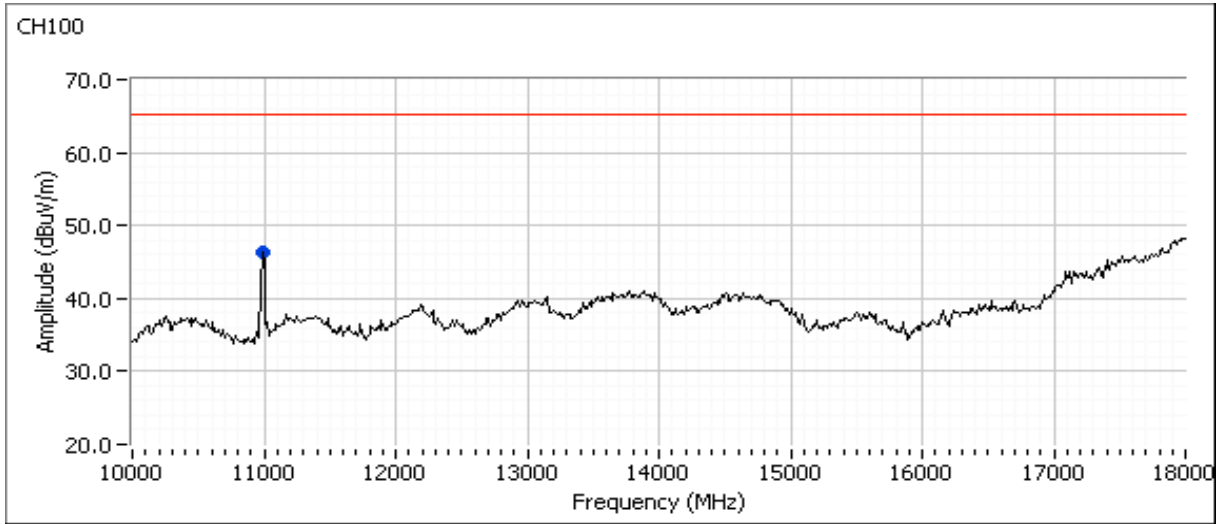


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

Channel 100: 5500 MHz, 802.11a

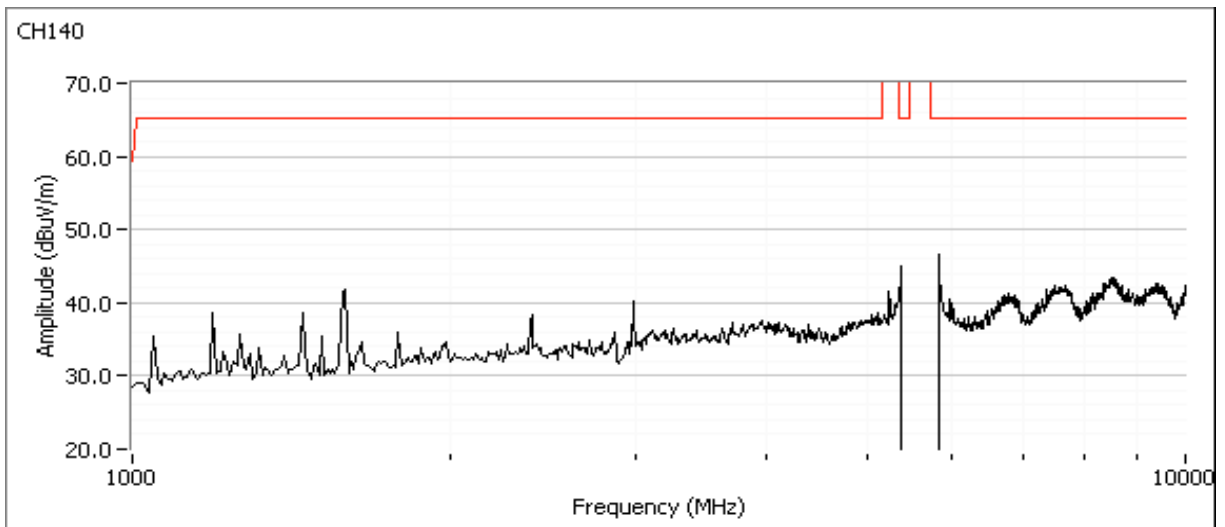
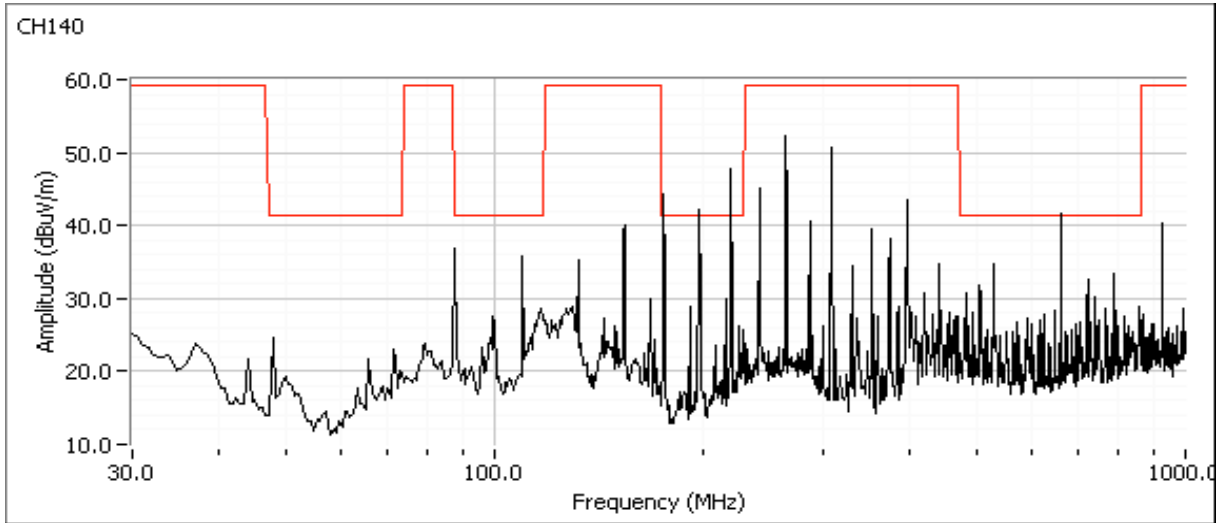


Client: Summit Data Communications	Job Number: J78403
Model: SDC-WB40	T-Log Number: T84432
Contact: Ron Seide	Account Manager: Christine Krebill
Standard: EN 300 328, EN 301 893, AS/NZS 4268	Class: N/A

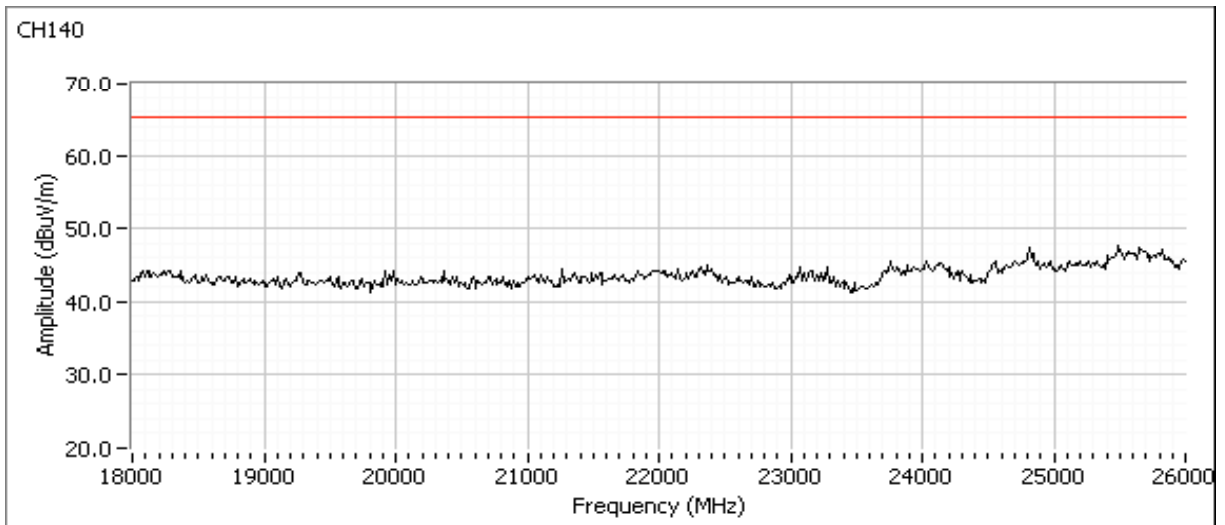
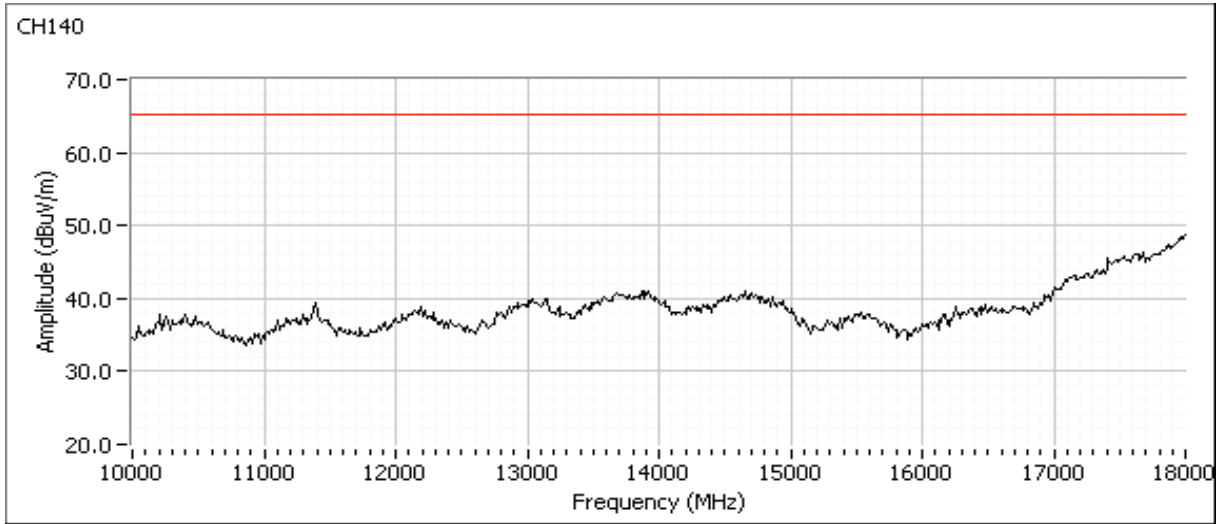


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

Channel 140: 5700 MHz, 802.11a



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

Results Table - All channels

Frequency MHz	Level dB μ V/m	Pol v/h	EN 301 893 ^{Note 1}		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments	Channel and mode
			Limit	Margin					
220.461	46.7	V	41.3	5.4	Peak	52	1.5		All / a
660.521	45.5	H	41.3	4.2	Peak	152	1.0		All / a
176.092	45.0	H	41.3	3.7	Peak	102	1.5		All / a
198.277	42.4	H	41.3	1.1	Peak	127	1.0		All / a
87.896	40.6	H	41.3	-0.7	Peak	186	2.0		All / a
110.080	35.7	V	41.3	-5.6	Peak	337	1.0		All / a
528.657	35.2	H	41.3	-6.1	Peak	152	1.5		All / a
264.289	52.9	H	59.3	-6.4	Peak	92	1.0		All / a
751.703	33.4	H	41.3	-7.9	Peak	141	1.0		All / a
793.788	33.4	H	41.3	-7.9	Peak	204	1.0		All / a
307.014	51.3	H	59.3	-8.0	Peak	77	1.0		All / a
395.391	41.0	H	59.3	-18.3	Peak	109	1.0		All / a
10346.67	40.1	V	65.3	-25.2	Peak	278	1.3	CH36	36 / a
10626.67	47.2	V	65.3	-18.1	Peak	175	1.3	CH64	64 / a
10986.67	46.4	H	65.3	-18.9	Peak	189	1.6	CH100	100 / a

- 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.
- Note 2:** Based on the similarity between 802.11a & 802.11n20 modes, only 802.11a was tested.
- Note 3:** By running scans with the EUT module powered up but the Tx off, it was determined that none of the emissions below 1 GHz were coming from the radio.

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

Measurements made at 3m

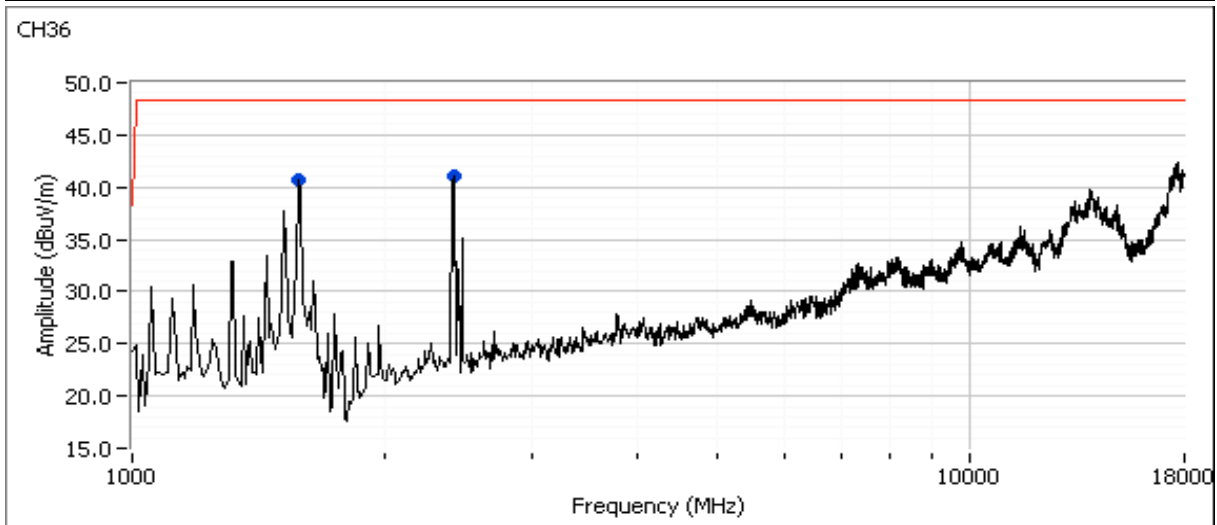
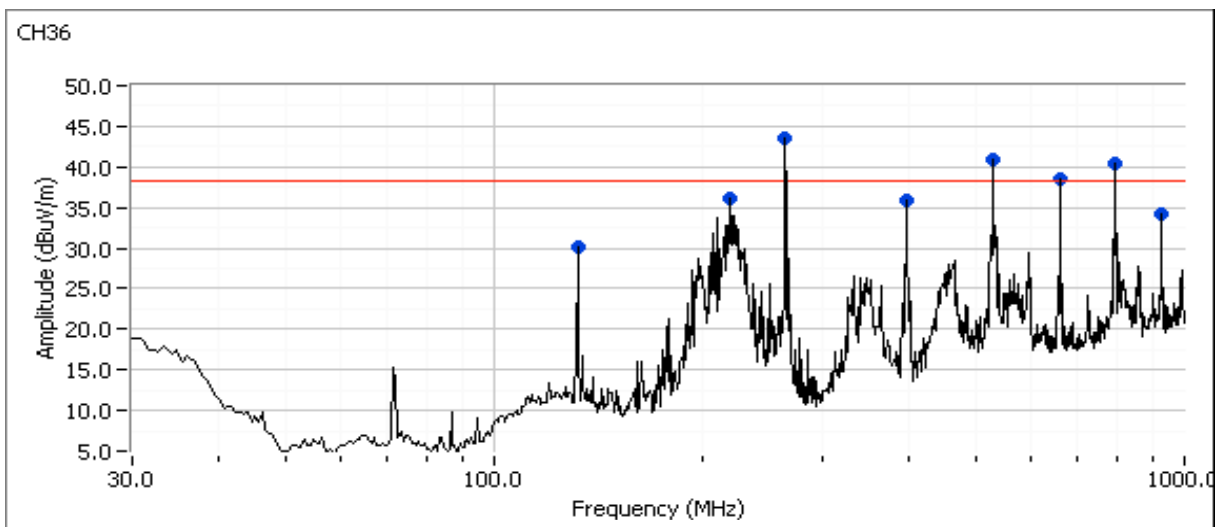
Frequency MHz	Level dB μ V/m	Pol v/h	EN 301 893 ^{Note 1}		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments	Channel and mode
			Limit	Margin					
11000.940	53.4	H	65.3	-11.9	Pk	176	1.38	RBW = 1 MHz = VBW	100 / a
10638.800	51.0	H	65.3	-14.3	Pk	172	1.18	RBW = 1 MHz = VBW	64 / a
10364.740	51.4	H	65.3	-13.9	Pk	360	1.00	RBW = 1 MHz = VBW	36 / a

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

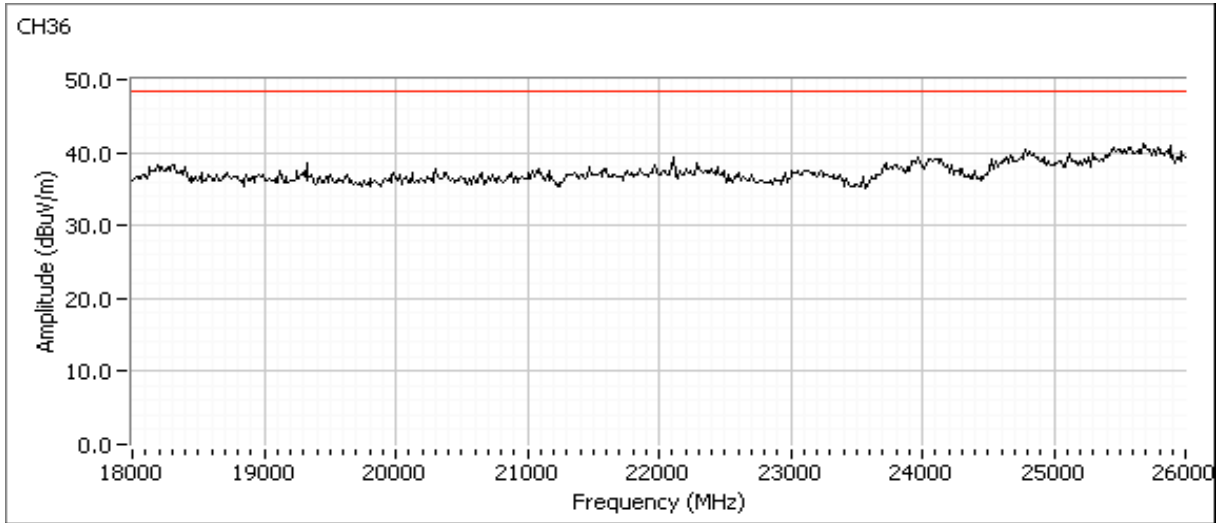
Client: Summit Data Communications	Job Number: J78403
Model: SDC-WB40	T-Log Number: T84432
Contact: Ron Seide	Account Manager: Christine Krebill
Standard: EN 300 328, EN 301 893, AS/NZS 4268	Class: N/A

Run #3: Radiated Spurious Emissions, Receive Mode, 30 - 26,000 MHz
 Measurements made at 3m

Graph - low channel at 5180 MHz

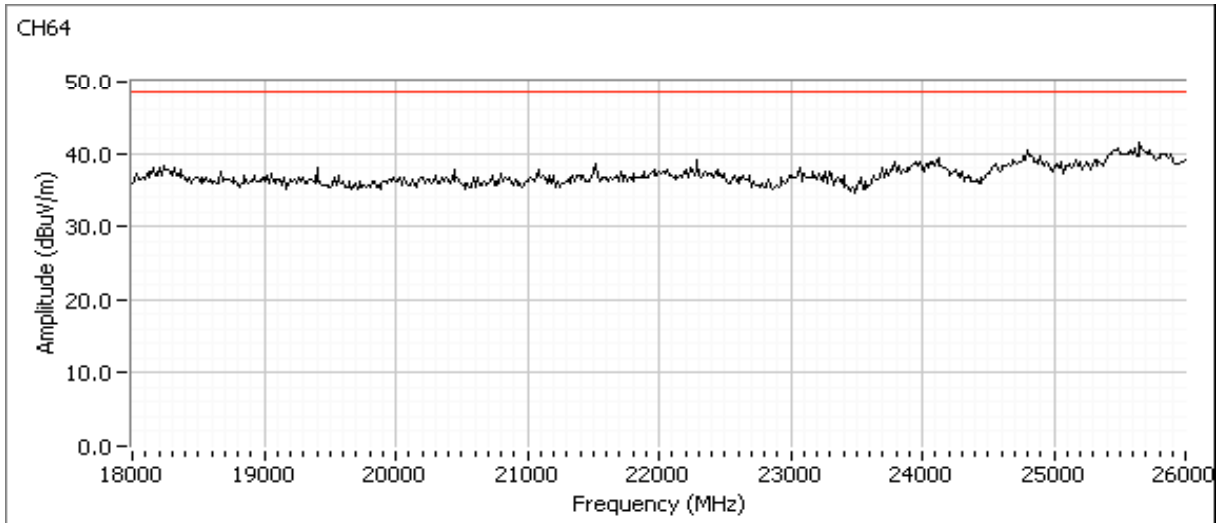
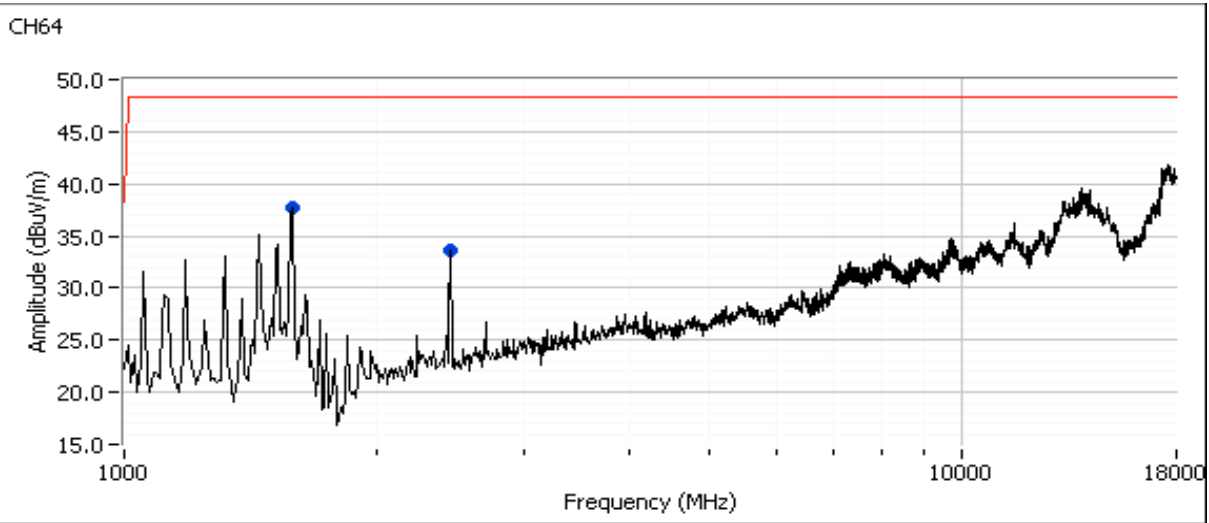


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A



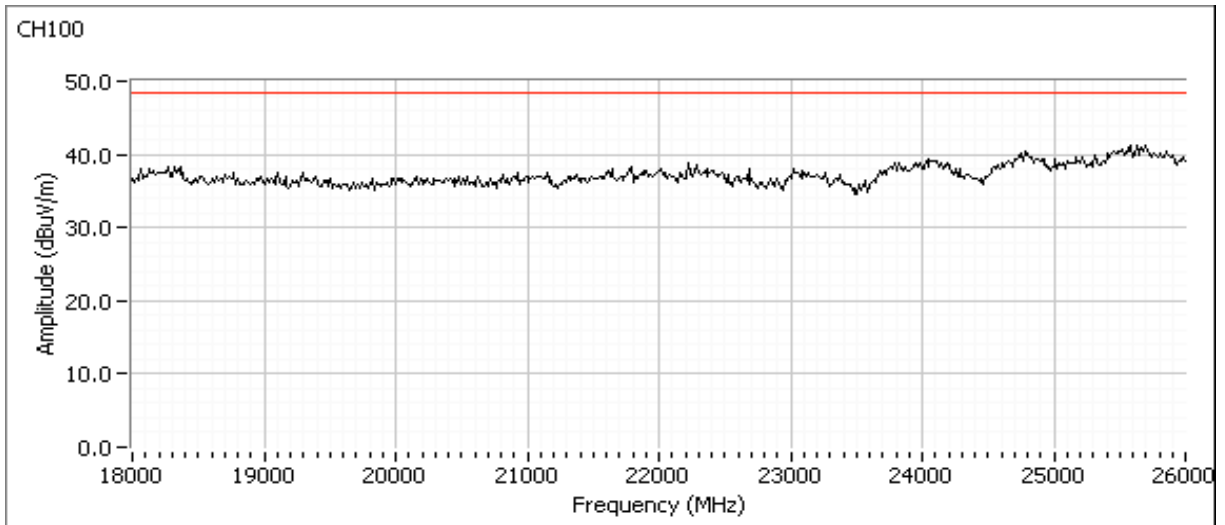
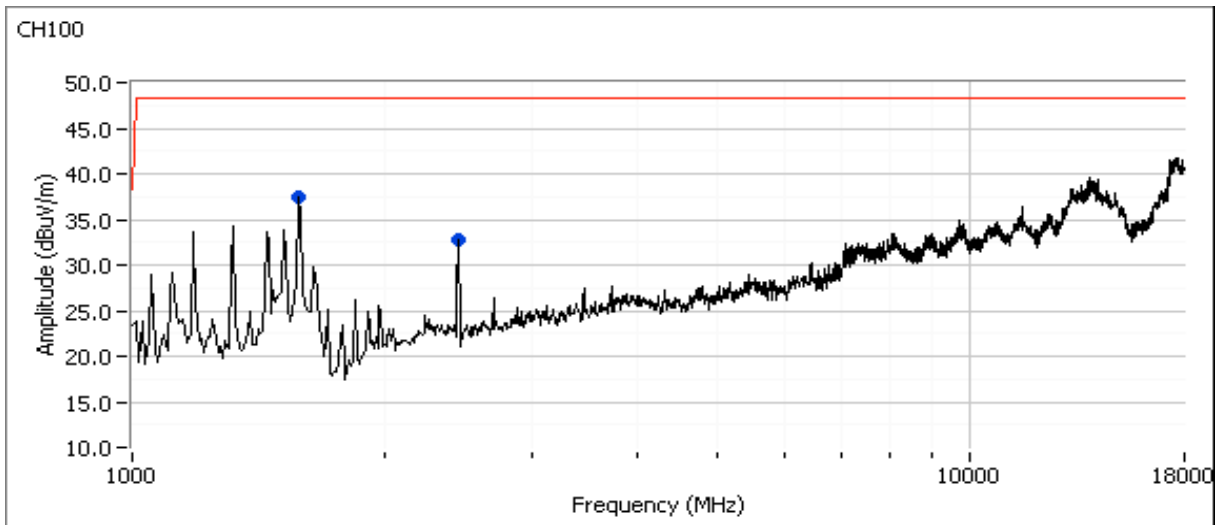
Client: Summit Data Communications	Job Number: J78403
Model: SDC-WB40	T-Log Number: T84432
Contact: Ron Seide	Account Manager: Christine Krebill
Standard: EN 300 328, EN 301 893, AS/NZS 4268	Class: N/A

Graph - high channel at 5320 MHz



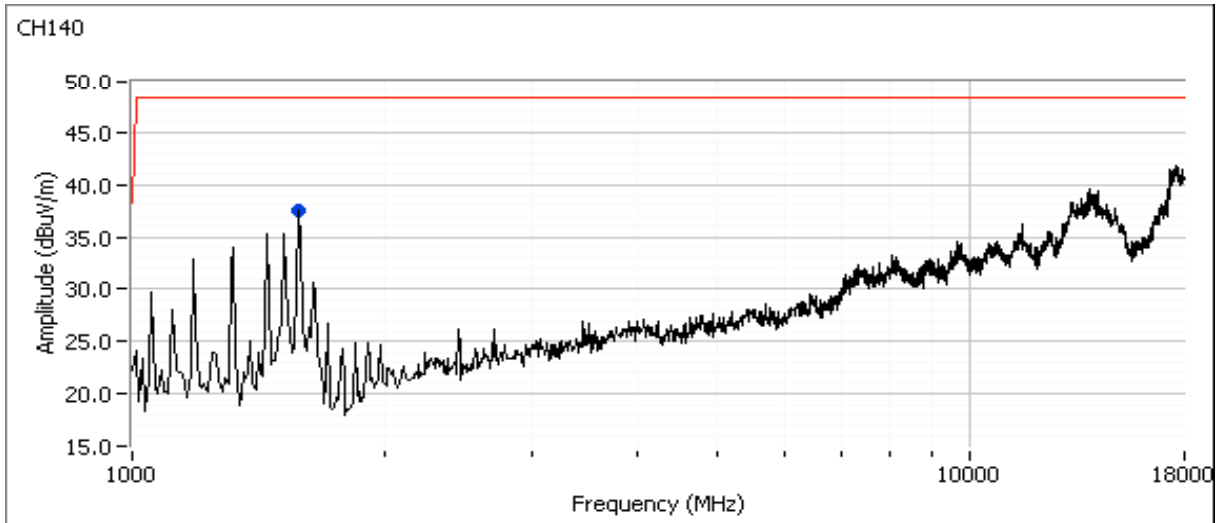
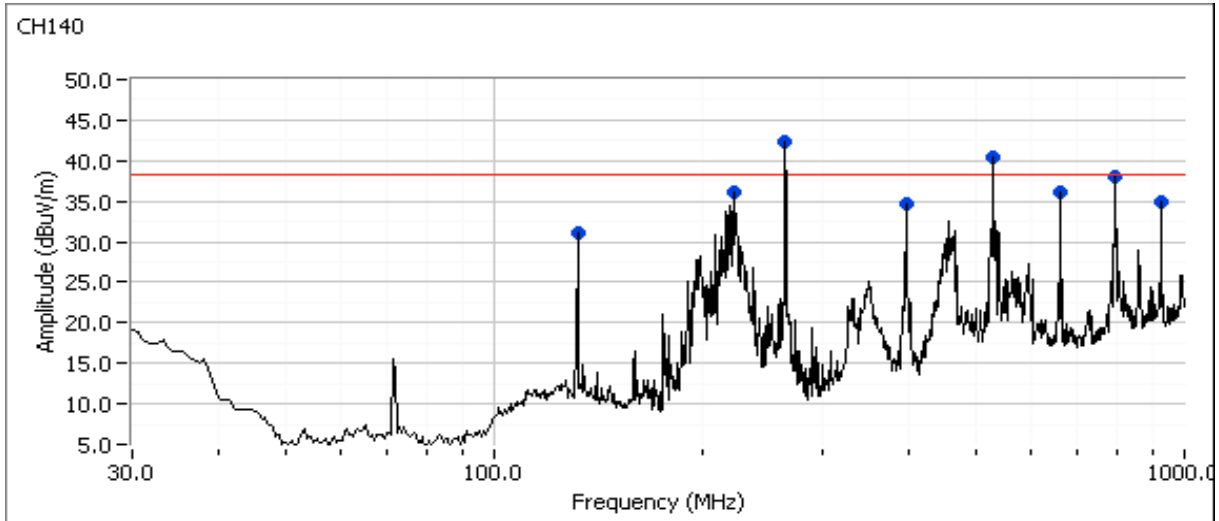
Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

Graph - low channel at 5500 MHz

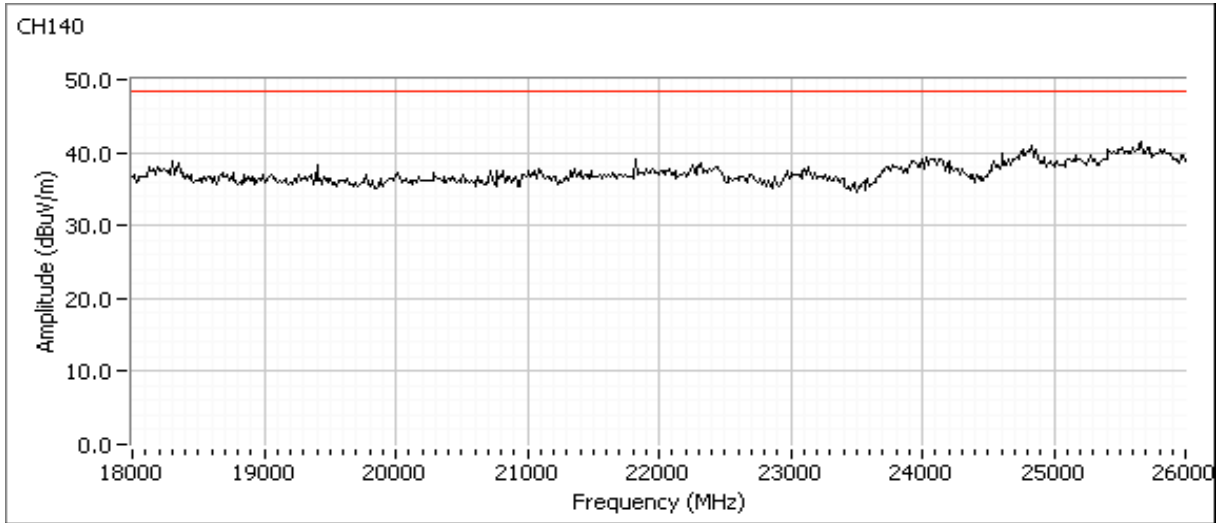


Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

Graph - high channel at 5700 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
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 301 893 ^{Note 1}		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments	Channel Frequency
			Limit	Margin					
132.095	30.1	H	38.3	-8.2	Peak	349	1.5		36
220.174	36.2	H	38.3	-2.1	Peak	324	1.0		36
264.209	43.5	H	38.3	5.2	Peak	334	2.5		36
396.304	35.8	H	38.3	-2.5	Peak	143	1.5		36
528.254	40.9	H	38.3	2.6	Peak	174	1.0		36
660.492	38.5	H	38.3	0.2	Peak	172	2.0		36
792.709	40.5	H	38.3	2.2	Peak	102	1.0		36
924.698	34.2	H	38.3	-4.1	Peak	270	4.0		36
1584.310	43.1	V	48.3	-5.2	PK	224	1.0	RB 1 MHz;VB 3 MHz;Pk	36
2419.520	32.4	H	48.3	-15.9	PK	47	1.0	RB 1 MHz;VB 3 MHz;Pk	36
1583.700	42.5	H	48.3	-5.8	PK	129	1.0	RB 1 MHz;VB 3 MHz;Pk	64
2458.470	33.7	V	48.3	-14.6	Peak	133	1.0		64
1582.260	46.2	V	48.3	-2.1	PK	159	1.0	RB 1 MHz;VB 3 MHz;Pk	100
2449.610	32.7	H	48.3	-15.6	Peak	17	1.0		100
132.102	31.2	H	38.3	-7.1	Peak	314	1.5		140
222.885	36.1	H	38.3	-2.2	Peak	345	4.0		140
264.202	42.4	H	38.3	4.1	Peak	146	2.0		140
396.304	34.7	H	38.3	-3.6	Peak	359	2.0		140
528.411	40.5	H	38.3	2.2	Peak	17	1.0		140
660.511	36.2	H	38.3	-2.1	Peak	206	2.0		140
792.611	38.1	H	38.3	-0.2	Peak	17	1.5		140
924.698	34.9	H	38.3	-3.4	Peak	254	3.0		140
1585.010	42.4	V	48.3	-5.9	PK	58	1.0	RB 1 MHz;VB 3 MHz;Pk	140

- 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.
- Note 3: By running scans with the EUT module powered up but the Rx off, it was determined that none of the emissions below 1 GHz were coming from the radio.

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: Radiated Spurious Emissions, Receive Mode: Final Field Strength and Substitution Measurements
 Measurements made at 3m

Frequency MHz	Level dB μ V/m	Pol v/h	EN 301 893 ^{Note 1} Limit Margin		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments	Channel Frequency
1582.260	46.2	V	48.3	-2.1	PK	159	1.0	RB 1 MHz;VB 3 MHz;Pk	100

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)			
1582.260	-15.1	8.4	91.0	97.7	46.2	-51.5	-53.7		-47.0	-6.7

- 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
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

Radio Performance Test - EN 301 893 V1.5.1 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: 11/11/2011 and 1/4/2012
 Test Engineer: R. Varelas, M. Birgani
 Test Location: FT Lab #4

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

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	Pass / Fail	Result / Margin
1	Power spectral density at normal conditions (5150-5350 MHz)	EN 301 893 (4.4.2.1) 10dBm/MHz	Pass	802.11a: 9.6 dBm/MHz 802.11n 20: 9.6 dBm/MHz
1	Power spectral density at normal conditions (5470-5725 MHz)	EN 301 893 (4.4.2.1) 17dBm/MHz	Pass	802.11a: 9.2 dBm/MHz 802.11n 20: 8.7 dBm/MHz
1	Output Power over extreme conditions (5150-5350 MHz) Highest Power setting	EN 301 893 (4.4.2.1) 23dBm eirp	Pass	802.11a: 19.2 dBm 802.11n 20: 19.6 dBm
1	Output Power over extreme conditions (5470-5725 MHz) Highest Power setting	EN 301 893 (4.4.2.1) 30dBm eirp	Pass	802.11a: 19.6 dBm 802.11n 20: 19.4 dBm
2	Center Frequency	EN 301 893 (4.2) 20ppm	Pass	Error = 14.5 ppm
3	Nominal Channel Bandwidth and Occupied Channel Bandwidth	EN 301 893 (4.3)	Pass	802.11a: 19.0 MHz 802.11n 20: 18.2 MHz
4	Uniform Spreading	EN 301 893 (4.7.2.6) (60%)	N/A	EUT is a client device without ad-hoc operation
5	Transmitter unwanted emissions within the 5GHz RLAN bands (Mask)	EN 301 893 (4.5.2)	Pass	Complies with mask
6	Transmitter unwanted emissions outside the 5GHz RLAN bands	EN 301 893 (4.5.1)	Pass	-31.8dBm @ 11395.13 MHz
7	Receiver Spurious Emissions	EN 301 893 (4.6)	Pass	-60.1dBm @ 3799.930 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

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

For the Nominal Channel Bandwidth/Occupied Channel Bandwidth requirement of section 4.3, testing was performed using a 99% bandwidth measurement. This is consistent with the released version of EN 301 893 v1.6.1.

Normal and Extreme Operating Conditions:

Extreme operating conditions are defined as the extremes of the intended operating voltage and temperature range specified by the manufacturer. As guidance, the following extreme conditions detailed in EN 300 328 v1.6.1 may be used:

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)
---	---

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.

Rate	Setting	Pmeas	Duty Cycle	Pout
6	Default	15.3	1	15.3
9	Default	14.3	1	14.3
12	Default	14.2	1	14.2
18	Default	14.2	1	14.2
24	Default	13.9	1	13.9
36	Default	13.6	1	13.6
48	Default	13.3	1	13.3
54	Default	10.7	1	10.7

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
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

Run #1: RF Output Power, Transmit Power Control (TPC) and power density (Section 4.4)

To Analyzer:

Cable ID(s): EL540 Coupler ID: 2033 Total Loss: 11.9 dB

To Meter:

Cable ID(s): EL540 Coupler ID: 2033 Total Loss: 1.7 dB

Run #1a: Transmit Power Control (TPC) (Section 4.4.1.2)

Does the device support TPC: Yes

Description of TPC operation:

Supports 802.11h

Note: If the device does not support TPC, then the limits for power in the 5250-5350 and 5470-5725 MHz band are reduced by 3dB

Note - Client (aka Slave) devices with an output power exceeding 23dBm or power density exceeding 10dBm/MHz are required to have radar detection capabilities.

Run #1b: RF output power and power density at the highest power level (Section 4.4.2.1)

Single-chain or single-transmitter operation

Note 1:	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 positive peak detector with RB= VB = 1MHz.
Note 2:	PSD measured using a spectrum analyzer with RB=VB=1MHz and rms average detector, 60 second sweep time, max hold.
Note 3:	Gain is the maximum gain of the antenna assembly that can be used with the EUT at this power level for each individual chain.
Note 4:	Duty Cycle - the duty cycle of the transmitter during the power measurement [time on /(time off + time on)]
Note 5:	EIRP levels are the measured levels corrected for duty cycle [10log(1/duty cycle)] and EUT antenna gain.

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 Density under normal operating conditions

Channel MHz	Frequency MHz	PSD ² dBm	Gain ³ dBi	Duty Cycle ⁴	EIRP ⁵ PSD	PSD ⁶	
						Limit	Margin
802.11a							
5180	5181.065	2.6	6.5	1.0	9.1	10.0	-0.9
5320	5321.035	3.1	6.5	1.0	9.6	10.0	-0.4
5500	5500.990	2.7	6.5	1.0	9.2	10.0	-0.8
5700	5701.040	-3.4	6.5	1.0	3.1	10.0	-6.9
802.11n20							
5180	5180.975	3.1	6.5	1.0	9.6	10.0	-0.4
5320	5321.080	3.0	6.5	1.0	9.5	10.0	-0.5
5500	5501.115	2.2	6.5	1.0	8.7	10.0	-1.3
5700	5701.115	0.2	6.5	1.0	6.7	10.0	-3.3

Highest Average Power under normal and extreme operating conditions

Power Setting	Channel (MHz)	Average Power (dBm) ¹ For Operating Condition					Max Antenna Gain ³	Duty Cycle ⁴	Max Average Power (EIRP) ⁵	Maximum permitted EIRP
		Normal		Extreme						
		20°C 3.3 V	-20°C 3.0 V	-20°C 3.6 V	55°C 3.0 V	55°C 3.6 V				
802.11a										
-	5180	12.3	11.9	11.9	10.4	10.4	6.5	1.0	18.8	23.0
-	5320	12.7	12.7	12.7	9.7	9.7	6.5	1.0	19.2	23.0
-	5500	12.8	13.1	13.1	11.2	11.2	6.5	1.0	19.6	23.0
-	5700	6.7	6.8	6.8	6.1	6.1	6.5	1.0	13.3	23.0
802.11n20										
-	5180	13.1	12.5	12.5	11.2	11.2	6.5	1.0	19.6	23.0
-	5320	13.0	12.4	12.4	9.5	9.5	6.5	1.0	19.5	23.0
-	5500	12.8	12.9	12.9	10.8	10.8	6.5	1.0	19.4	23.0
-	5700	10.3	10.6	10.6	10.0	10.0	6.5	1.0	17.1	23.0

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 #2: Center Frequencies (Section 4.2)

Frequency error was measured on the modulated carrier. The operating frequency was calculated by dividing the sum of the frequencies for the upper and lower -10dBc points on the modulated signal by 2 (RB= 10kHz VB= 3MHz).

Channel Frequency (MHz)	Measured Frequency (MHz) For Operating Condition					Maximum Frequency Error (kHz)	Maximum Frequency Error (ppm)
	Normal	Extreme					
	20°C 3.3 V	0°C		50°C			
		3.0 V	3.6 V	3.0 V	3.6 V		
5180.00	5180.030	5180.060	5180.075	5180.030	5180.045	75.000	14.5
5320.00	5319.985	5320.045	5320.045	5320.045	5320.015	45.000	8.5
5500.00	5500.015	5500.075	5499.925	5500.030	5500.015	75.000	13.6
5700.00	5699.985	5700.060	5700.060	5700.015	5700.030	60.000	10.5
						Worst case error (ppm):	14.5

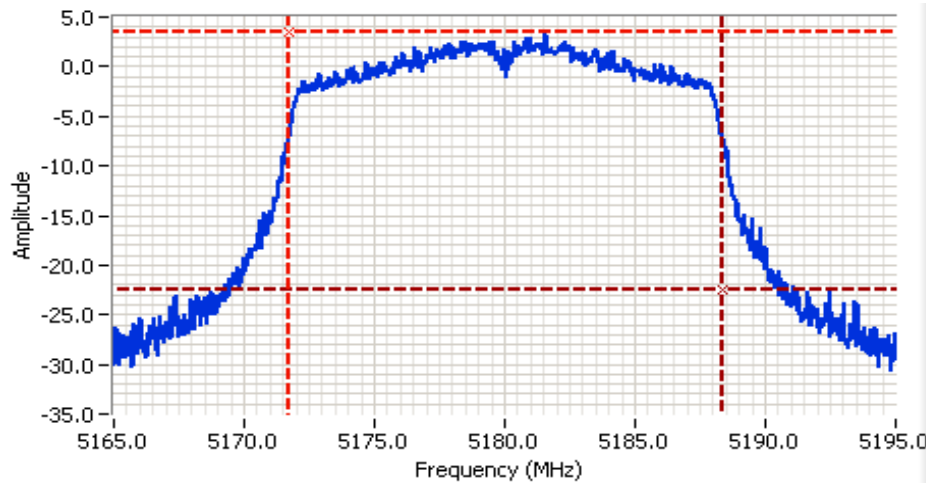
Client:	Summit Data Communications	Job Number:	J78403
Model:	SDC-WB40	T-Log Number:	T84432
Contact:	Ron Seide	Account Manager:	Christine Krebill
Standard:	EN 300 328, EN 301 893, AS/NZS 4268	Class:	N/A

Run #2: Frequency Range Under Normal and Extreme Conditions - 5150-5350MHz and 5470-5725MHz - AS/NZS 4268

	Mode	Antenna Gain	Power Setting	Measured Frequency (MHz) For Operating Condition					Low F _L High F _H	Result
				Normal	Extreme		55°C			
				20°C 3.3 V	-20°C 3.0 V	3.6 V	3.0 V	3.6 V		
5150-5350 MHz										
F _L (MHz)	a	6.5	Default	5171.810	5171.780	5171.750	5171.690	5171.720	5171.690	PASS
F _H (MHz)	a	6.5	Default	5328.250	5328.430	5328.430	5328.370	5328.370	5328.430	PASS
F _L (MHz)	n20	6.5	Default	5171.030	5171.150	5171.150	5171.090	5171.060	5171.030	PASS
F _H (MHz)	n20	6.5	Default	5329.030	5329.030	5329.060	5329.000	5328.970	5329.060	PASS
5470-5725 MHz										
F _L (MHz)	a	6.5	Default	5491.660	5491.420	5491.390	5491.510	5491.480	5491.390	PASS
F _H (MHz)	a	6.5	Default	5708.130	5708.370	5708.340	5708.340	5708.340	5708.370	PASS
F _L (MHz)	n20	6.5	Default	5490.430	5490.940	5490.940	5490.940	5490.970	5490.430	PASS
F _H (MHz)	n20	6.5	Default	5708.790	5709.030	5709.000	5709.000	5709.000	5709.030	PASS



FL 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

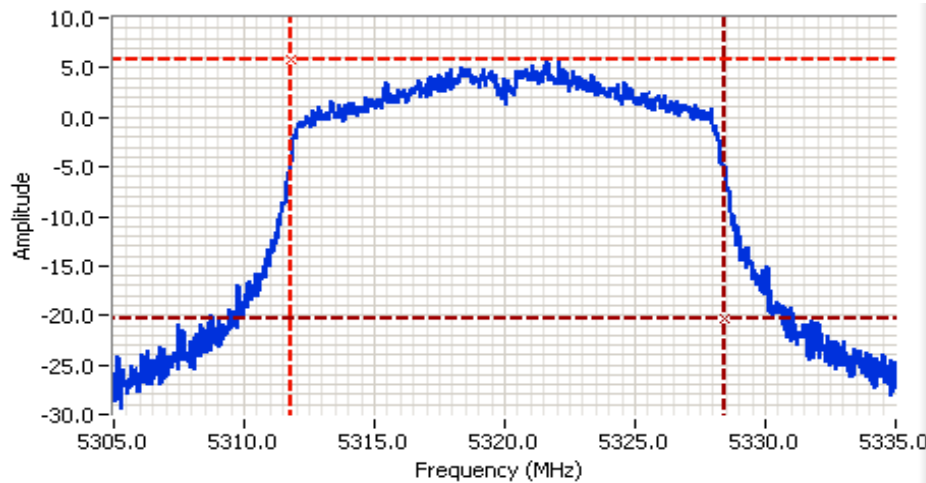


Analyzer Settings
 Agilent Technologies, E4446A
 CF: 5180.000 MHz
 SPAN: 30.000 MHz
 RB: 300 kHz
 VB: 1.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 1.0s
 Ref Lvl: 10.5 DBM

Comments
 99% BW: 16.680 MHz
 802.11a, 55C, 3.0V
 FL: 5171.690 MHz



Cursor 1 5171.6900 3.55 
 Cursor 2 5188.3700 -22.45 

Delta Freq. 16.680
 Delta Amplitude 26.00



Analyzer Settings
 Agilent Technologies, E4446A
 CF: 5320.000 MHz
 SPAN: 30.000 MHz
 RB: 300 kHz
 VB: 1.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 1.0s
 Ref Lvl: 8.5 DBM

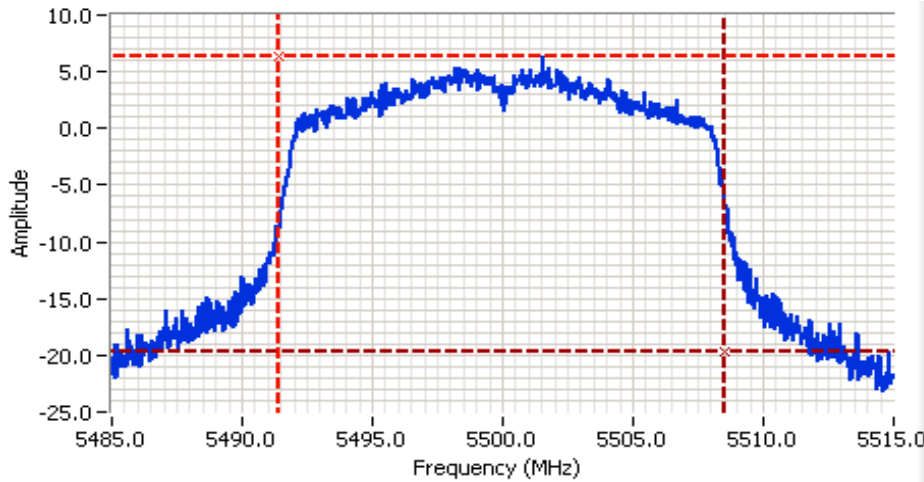
Comments
 99% BW: 16.620 MHz
 802.11a, -20C, 3.6V
 FH: 5328.430 MHz

Cursor 1 5311.8100 5.76 
 Cursor 2 5328.4300 -20.24 

Delta Freq. 16.620
 Delta Amplitude 26.00



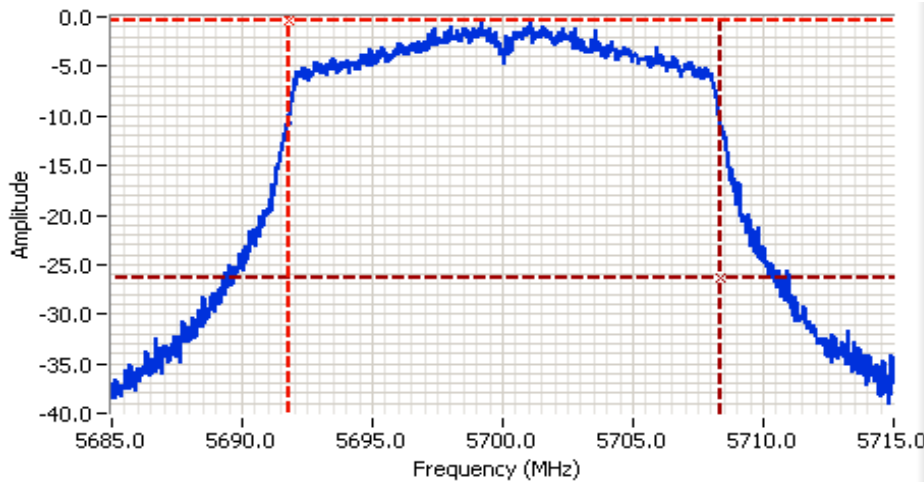
Client: Summit Data Communications	Job Number: J78403
Model: SDC-WB40	T-Log Number: T84432
Contact: Ron Seide	Account Manager: Christine Krebill
Standard: EN 300 328, EN 301 893, AS/NZS 4268	Class: N/A



Analyzer Settings
 Agilent Technologies, E4446A
 CF: 5500.000 MHz
 SPAN: 30.000 MHz
 RB: 300 kHz
 VB: 1.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 1.0s
 Ref Lvl: 8.5 DBM

Comments
 99% BW: 17.160 MHz
 802.11a, -20C, 3.6V
 FL: 5491.390 MHz

Cursor 1 5491.3900 6.33  Delta Freq. 17.160
 Cursor 2 5508.5500 -19.67  Delta Amplitude 26.00



Analyzer Settings
 Agilent Technologies, E4446A
 CF: 5700.000 MHz
 SPAN: 30.000 MHz
 RB: 300 kHz
 VB: 1.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 1.0s
 Ref Lvl: 0.5 DBM

Comments
 99% BW: 16.590 MHz
 802.11a, -20C, 3.0V
 FH: 5708.370 MHz

Cursor 1 5691.7800 -0.39  Delta Freq. 16.590
 Cursor 2 5708.3700 -26.39  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: Nominal Channel Bandwidth and Occupied Channel Bandwidth (Section 4.3)

The occupied channel bandwidth measurement is performed on the lowest and highest frequencies in each band for every declared nominal bandwidth within each band (5150 - 5350 MHz and/or 5470 - 5725 MHz). Measurements are made under normal conditions only.

The measurement is made using the spectrum analyzer to measure the 99% bandwidth of the modulated signal. The analyzer is configured with RB=100kHz, VB=300kHz, peak detector and max hold, with the span set to twice the nominal bandwidth.

Channel frequency MHz	Mode	Nominal Bandwidth MHz	Occupied Channel Bandwidth		Result
			Measured (MHz)	Limit (MHz)	
5180	802.11a	20.00	19.0	16 - 20	Pass
5320	802.11a	20.00	17.7	16 - 20	Pass
5500	802.11a	20.00	18.1	16 - 20	Pass
5700	802.11a	20.00	16.4	16 - 20	Pass
5180	802.11n	20.00	18.2	16 - 20	Pass
5320	802.11n	20.00	17.9	16 - 20	Pass
5500	802.11n	20.00	17.8	16 - 20	Pass
5700	802.11n	20.00	17.7	16 - 20	Pass

Run #4: Uniform Spreading (Section 4.7.2.6)

The uniform spreading mechanism is not applicable to a client device that does not support ad-hoc operation, the spreading mechanism is achieved by the master device.

Run #5: Transmitter unwanted emissions within the 5GHz RLAN Bands (Section 4.5.2)

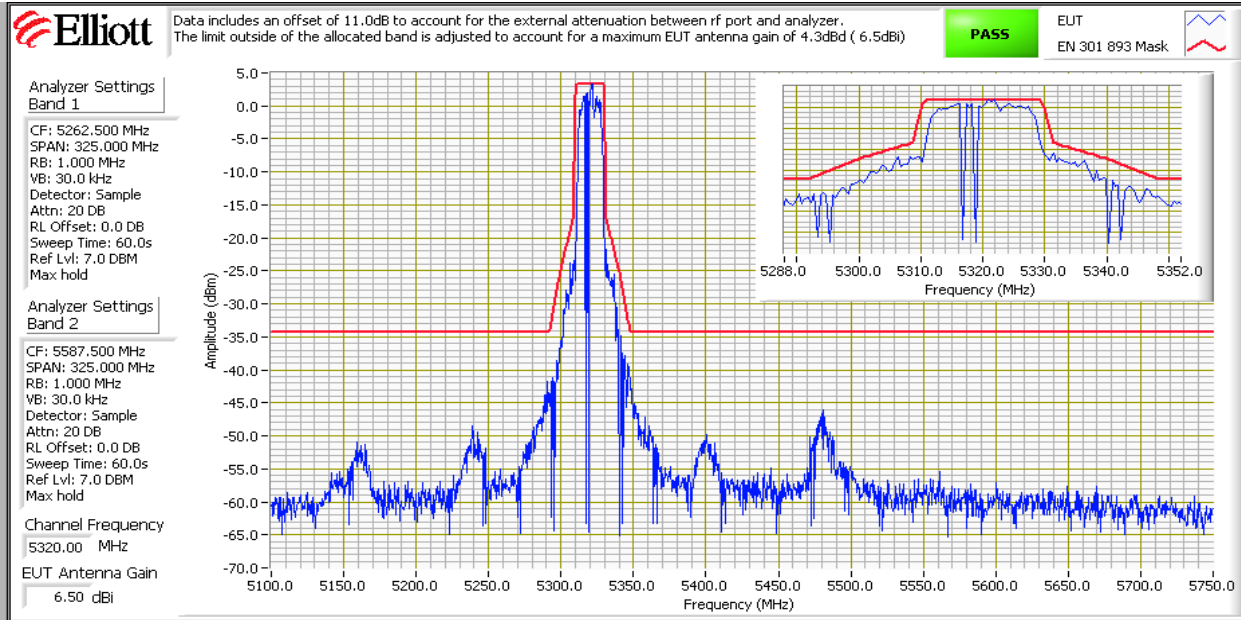
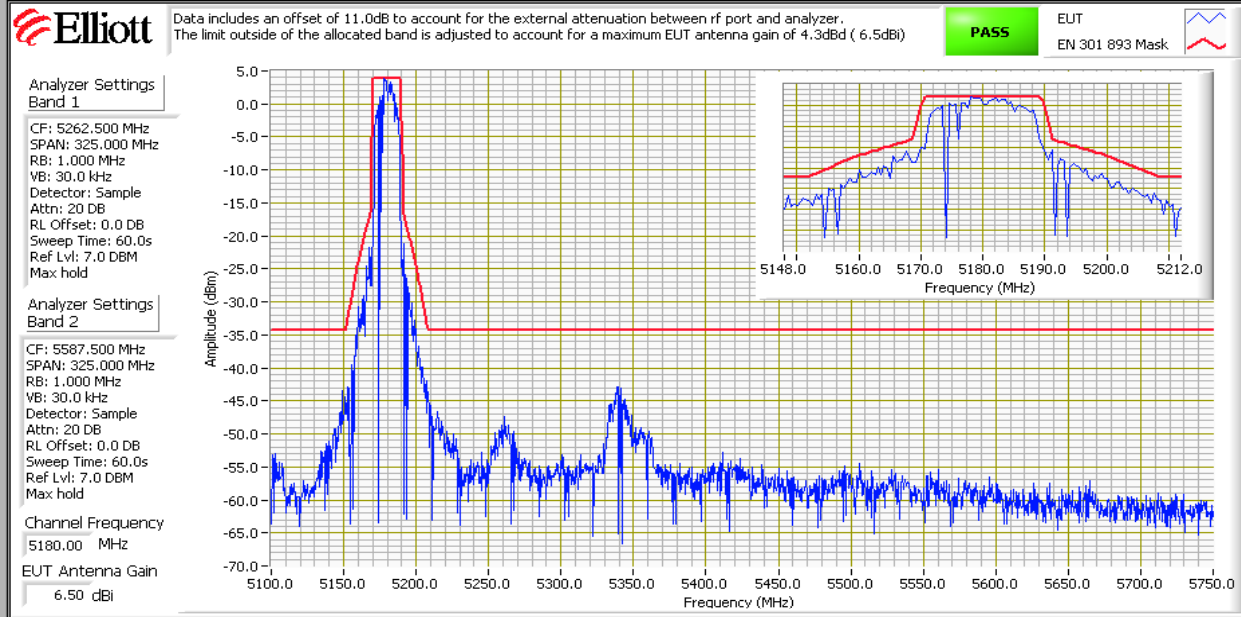
Summary

Mode	Channel (MHz)	Result	
		Chain A	Chain B
802.11a	5180	Pass	
802.11a	5320	Pass	
802.11a	5500	Pass	
802.11a	5700	Pass	

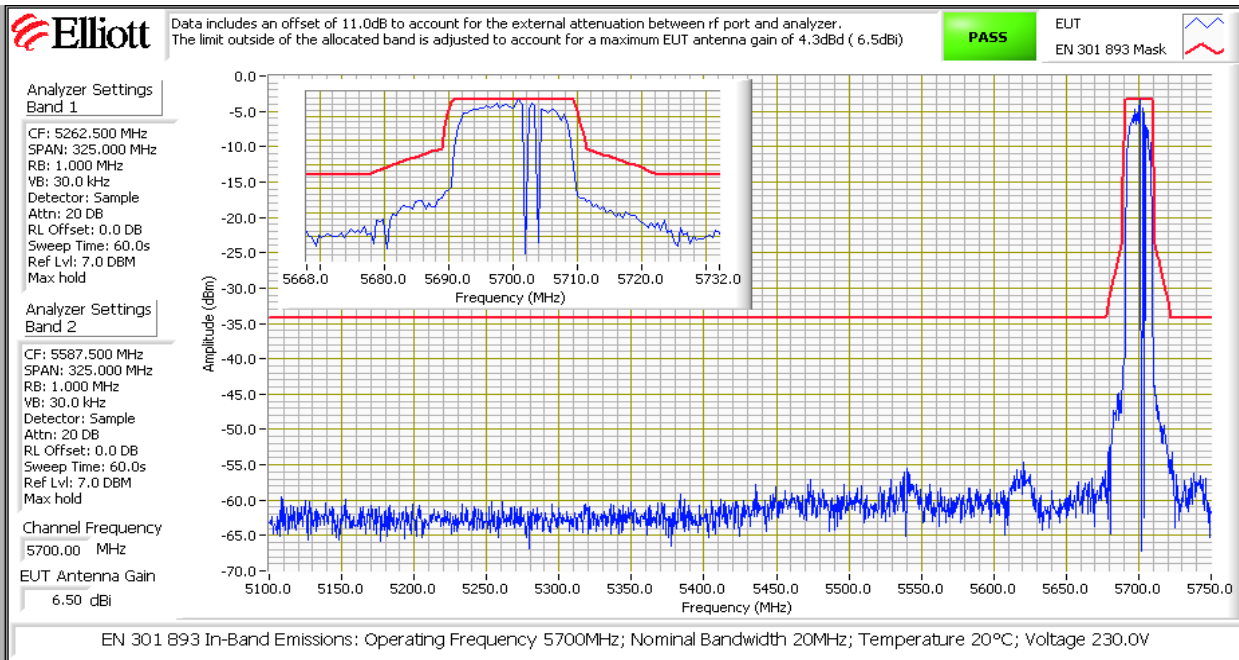
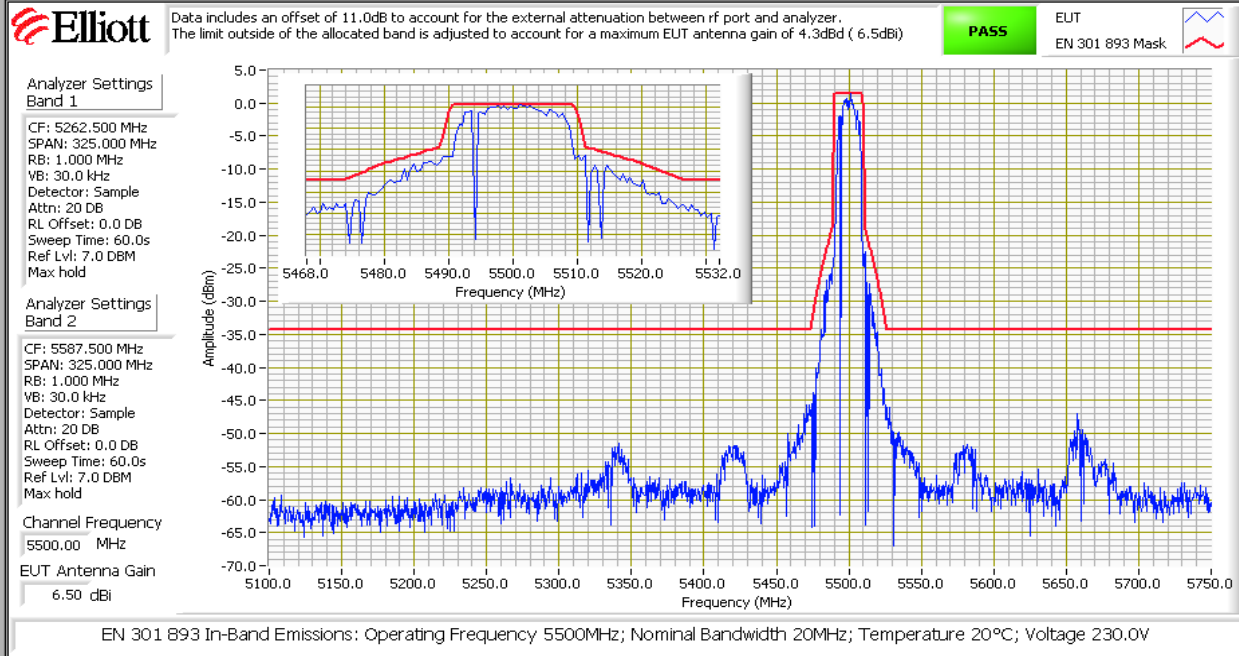
Mode	Channel (MHz)	Result	
		Chain A	Chain B
802.11n20	5180	Pass	
802.11n20	5320	Pass	
802.11n20	5500	Pass	
802.11n20	5700	Pass	

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

802.11a

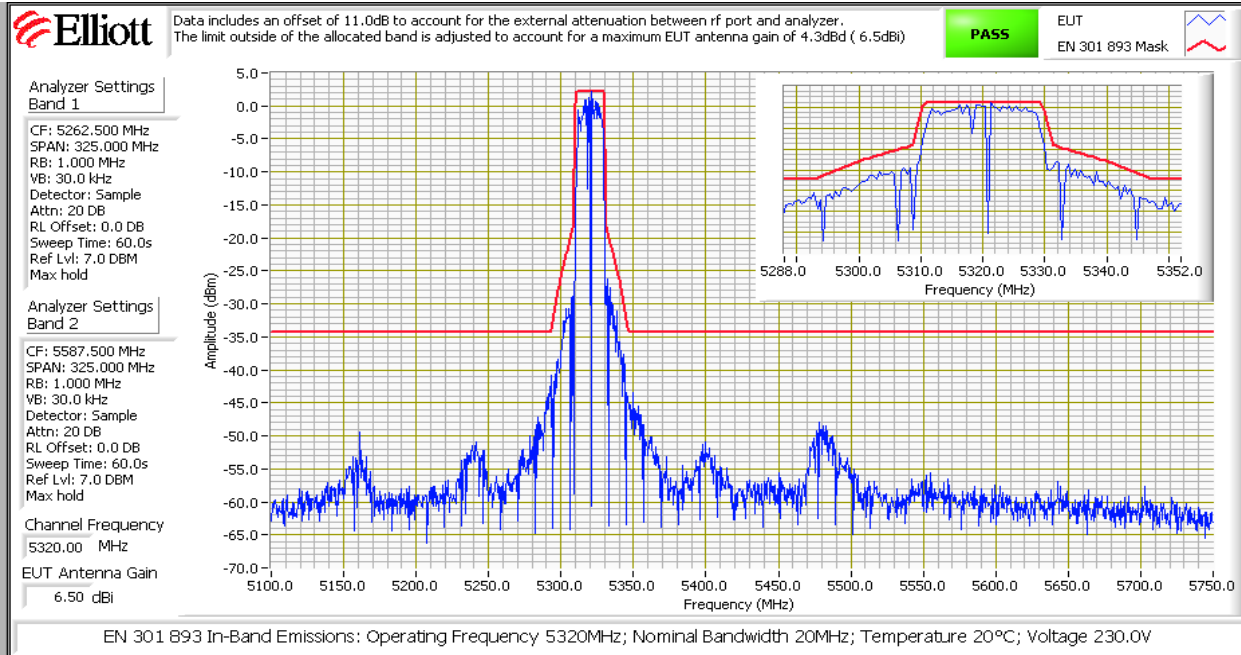
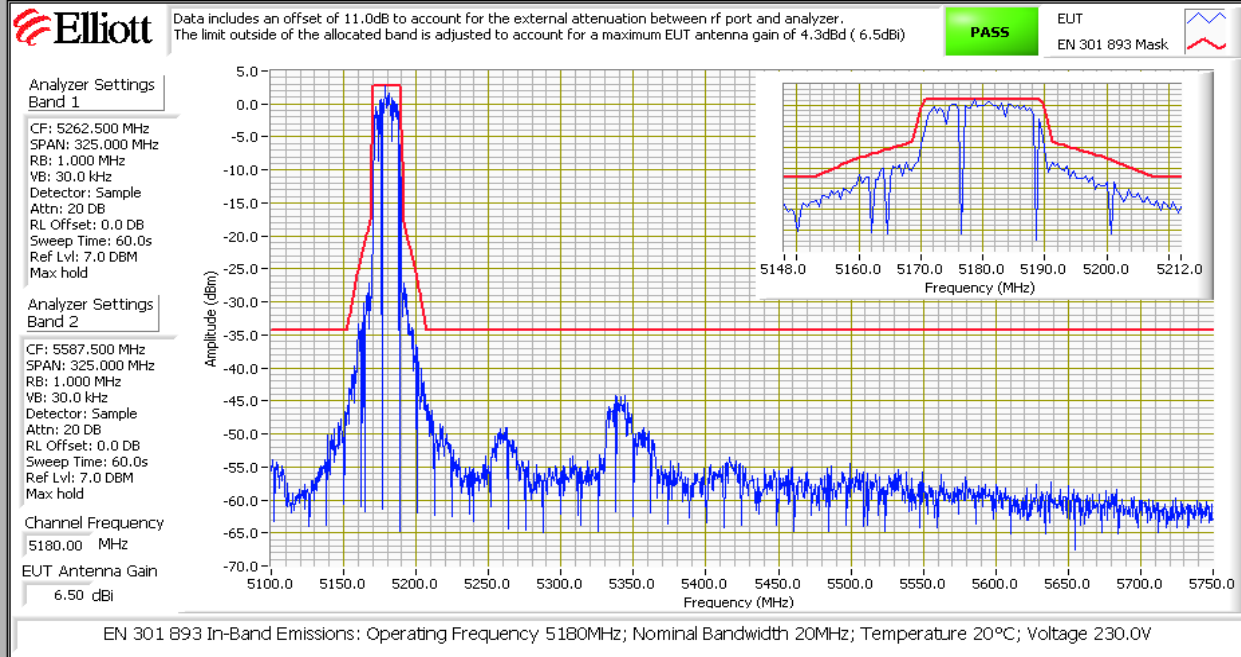


Client: Summit Data Communications	Job Number: J78403
Model: SDC-WB40	T-Log Number: T84432
Contact: Ron Seide	Account Manager: Christine Krebill
Standard: EN 300 328, EN 301 893, AS/NZS 4268	Class: N/A



Client: Summit Data Communications	Job Number: J78403
Model: SDC-WB40	T-Log Number: T84432
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



Data includes an offset of 11.0dB to account for the external attenuation between rf port and analyzer.
The limit outside of the allocated band is adjusted to account for a maximum EUT antenna gain of 4.3dBd (6.5dBi)

PASS EUT
EN 301 893 Mask

Analyzer Settings Band 1

CF: 5262.500 MHz
SPAN: 325.000 MHz
RB: 1.000 MHz
VB: 30.0 kHz
Detector: Sample
Attn: 20 DB
RL Offset: 0.0 DB
Sweep Time: 60.0s
Ref Lvl: 7.0 DBM
Max hold

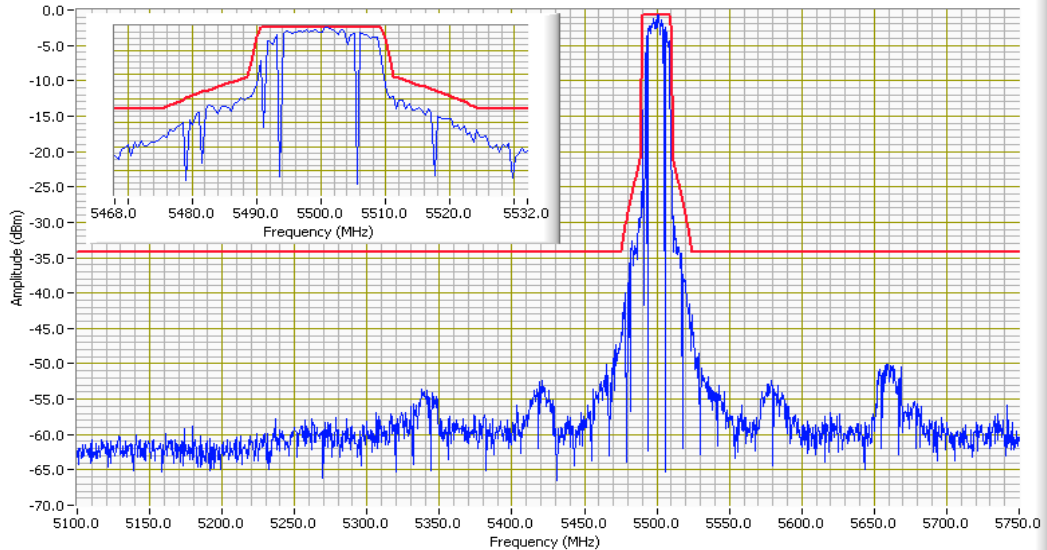
Analyzer Settings Band 2

CF: 5587.500 MHz
SPAN: 325.000 MHz
RB: 1.000 MHz
VB: 30.0 kHz
Detector: Sample
Attn: 20 DB
RL Offset: 0.0 DB
Sweep Time: 60.0s
Ref Lvl: 7.0 DBM
Max hold

Channel Frequency

5500.00 MHz

EUT Antenna Gain
6.50 dBi



EN 301 893 In-Band Emissions: Operating Frequency 5500MHz; Nominal Bandwidth 20MHz; Temperature 20°C; Voltage 230.0V



Data includes an offset of 11.0dB to account for the external attenuation between rf port and analyzer.
The limit outside of the allocated band is adjusted to account for a maximum EUT antenna gain of 4.3dBd (6.5dBi)

PASS EUT
EN 301 893 Mask

Analyzer Settings Band 1

CF: 5262.500 MHz
SPAN: 325.000 MHz
RB: 1.000 MHz
VB: 30.0 kHz
Detector: Sample
Attn: 20 DB
RL Offset: 0.0 DB
Sweep Time: 60.0s
Ref Lvl: 7.0 DBM
Max hold

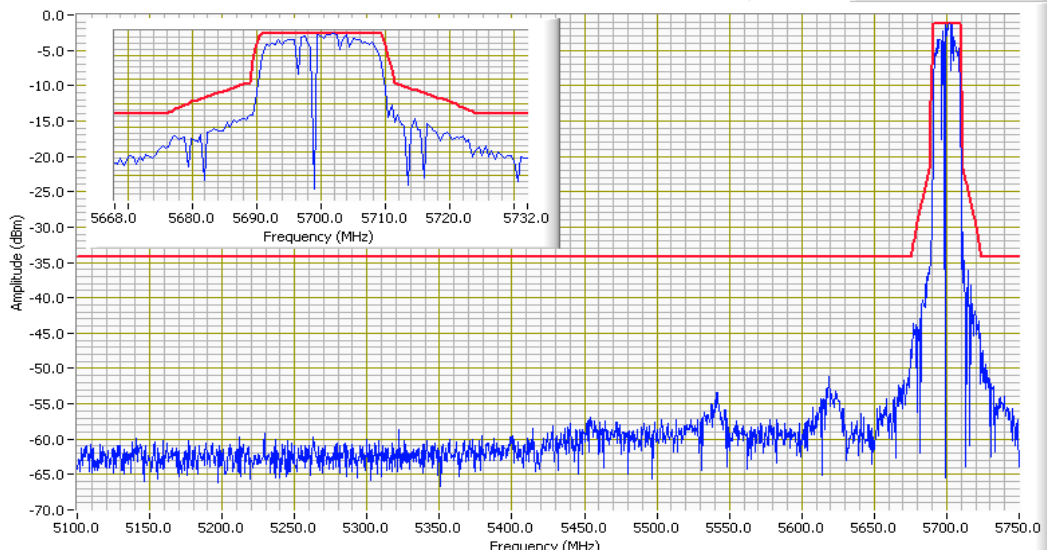
Analyzer Settings Band 2

CF: 5587.500 MHz
SPAN: 325.000 MHz
RB: 1.000 MHz
VB: 30.0 kHz
Detector: Sample
Attn: 20 DB
RL Offset: 0.0 DB
Sweep Time: 60.0s
Ref Lvl: 7.0 DBM
Max hold

Channel Frequency

5700.00 MHz

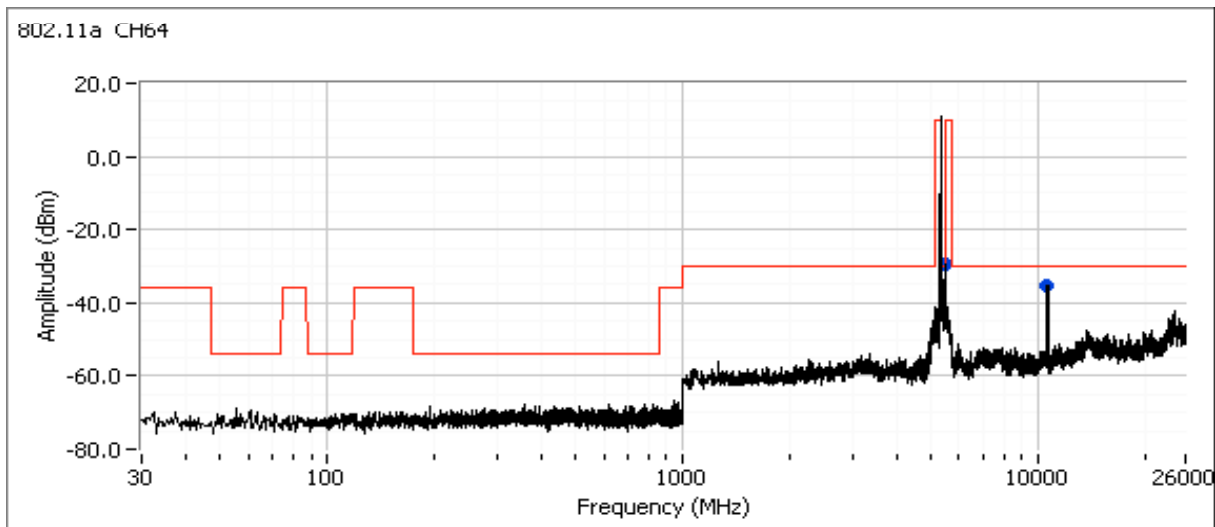
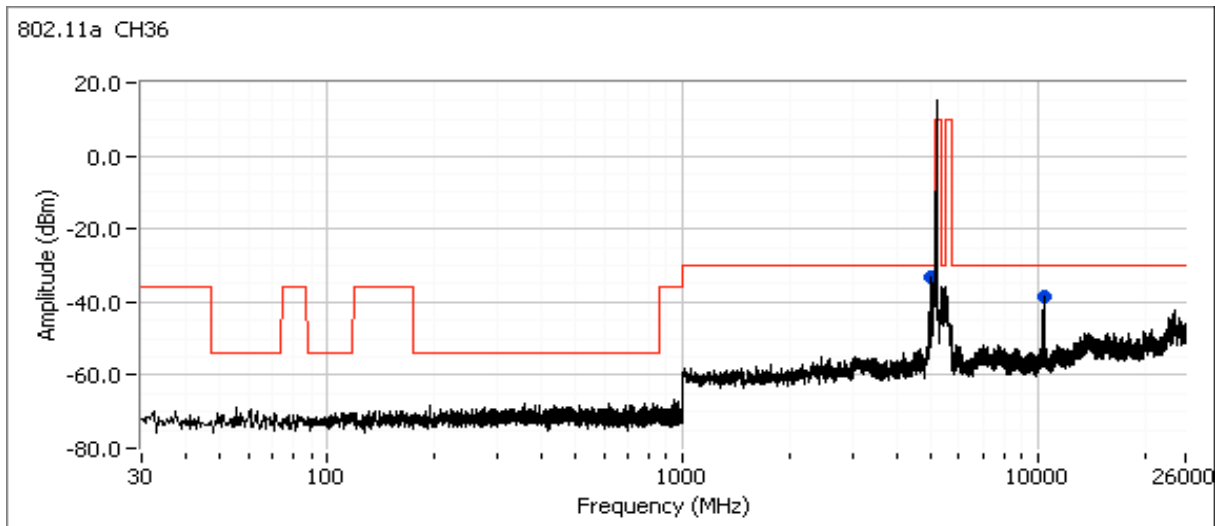
EUT Antenna Gain
6.50 dBi



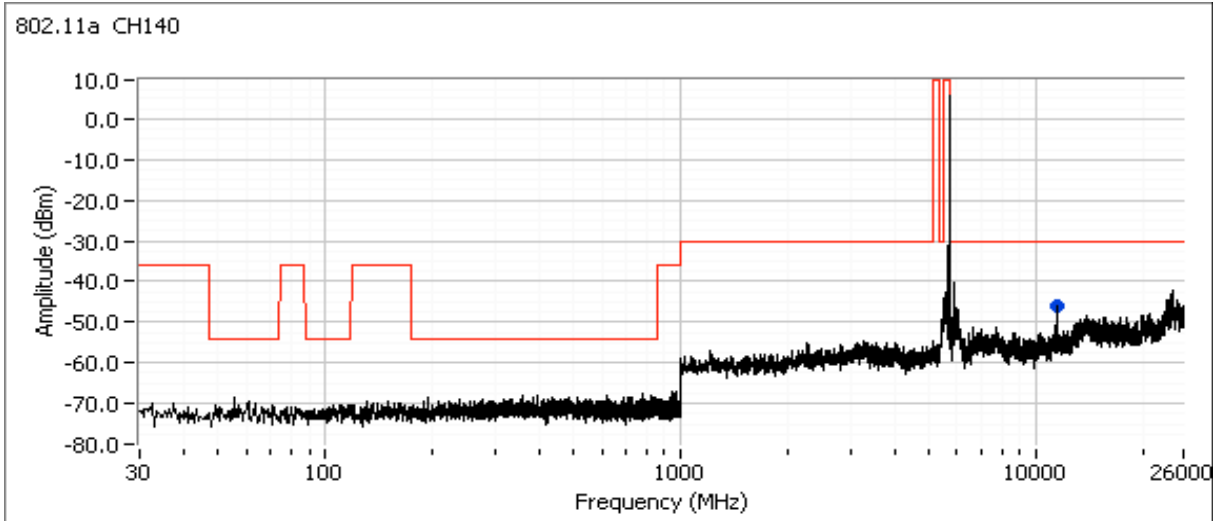
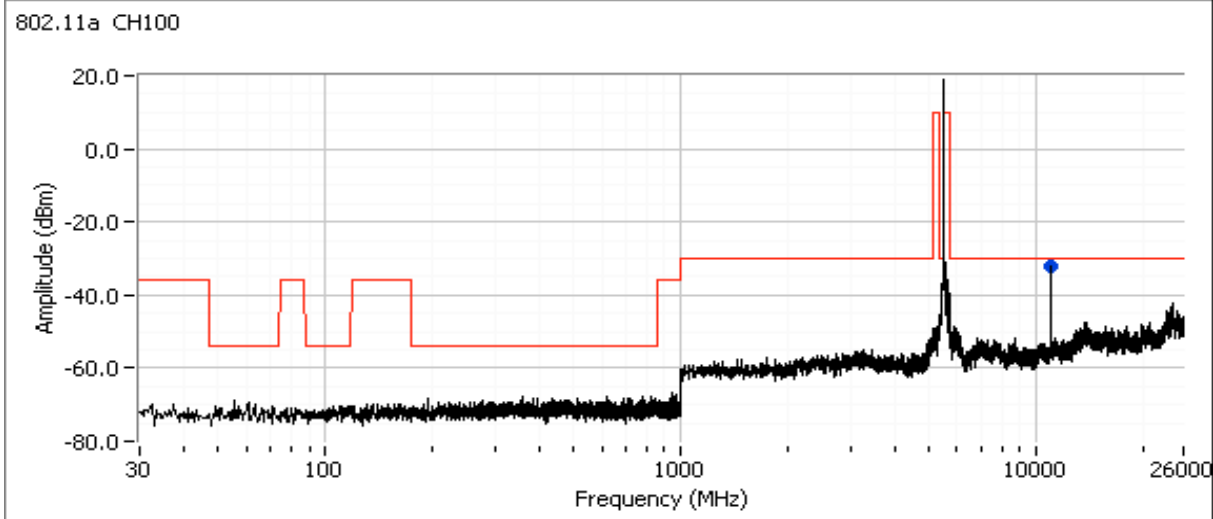
EN 301 893 In-Band Emissions: Operating Frequency 5700MHz; Nominal Bandwidth 20MHz; Temperature 20°C; Voltage 230.0V

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

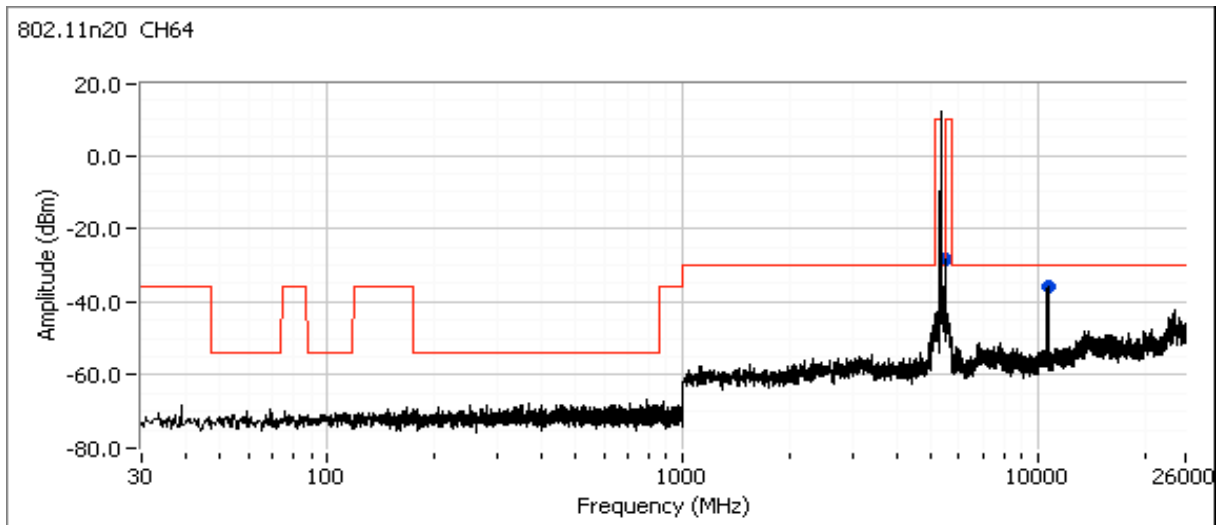
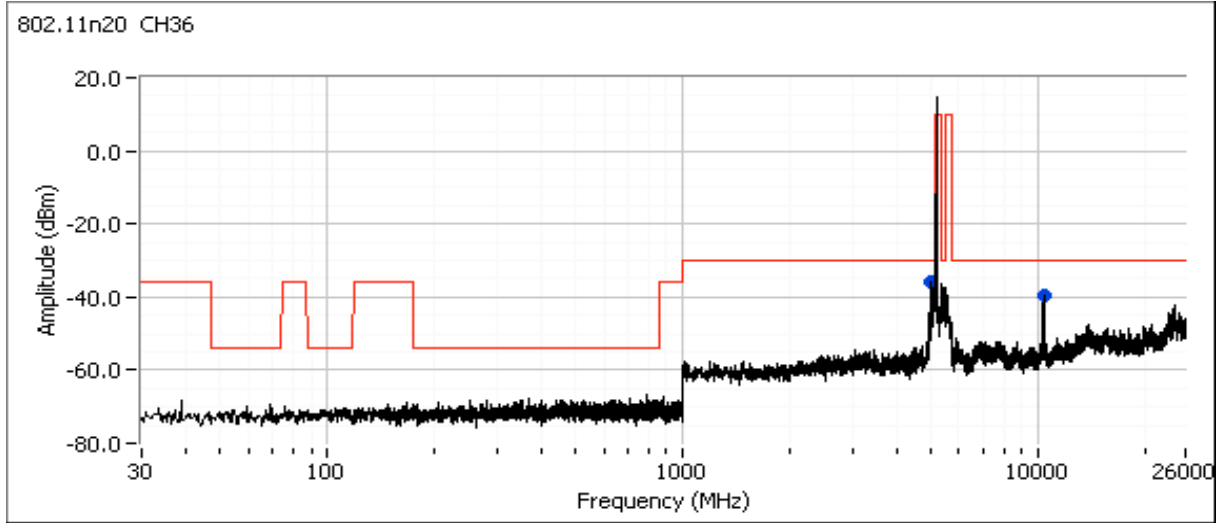
Run #6: Transmitter unwanted emissions outside the 5 GHz RLAN bands (section 4.5.1)
 Transmit Mode, 30 - 26,500 MHz



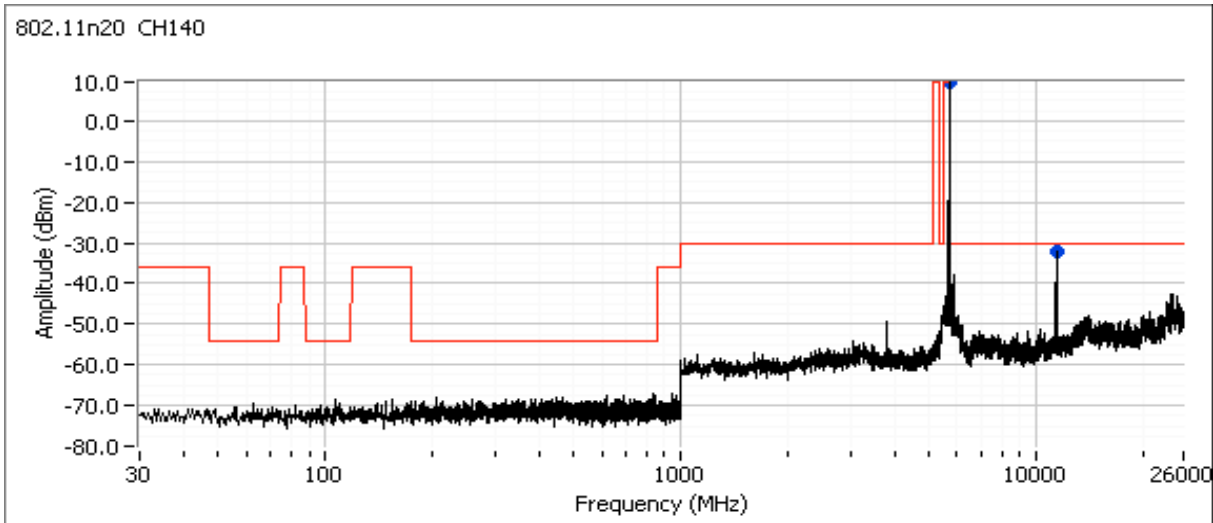
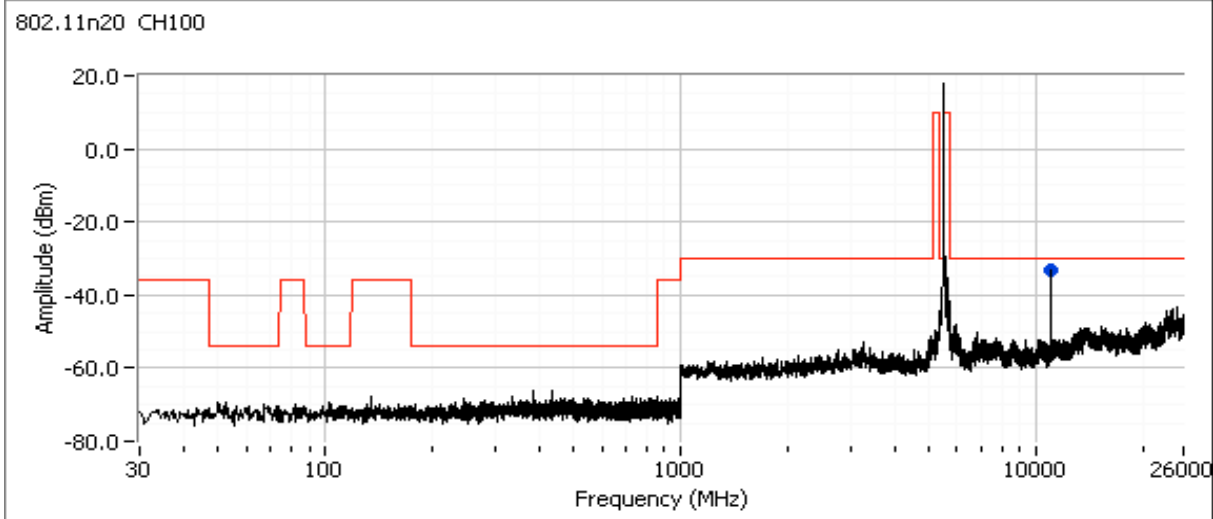
Client: Summit Data Communications	Job Number: J78403
Model: SDC-WB40	T-Log Number: T84432
Contact: Ron Seide	Account Manager: Christine Krebill
Standard: EN 300 328, EN 301 893, AS/NZS 4268	Class: N/A



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





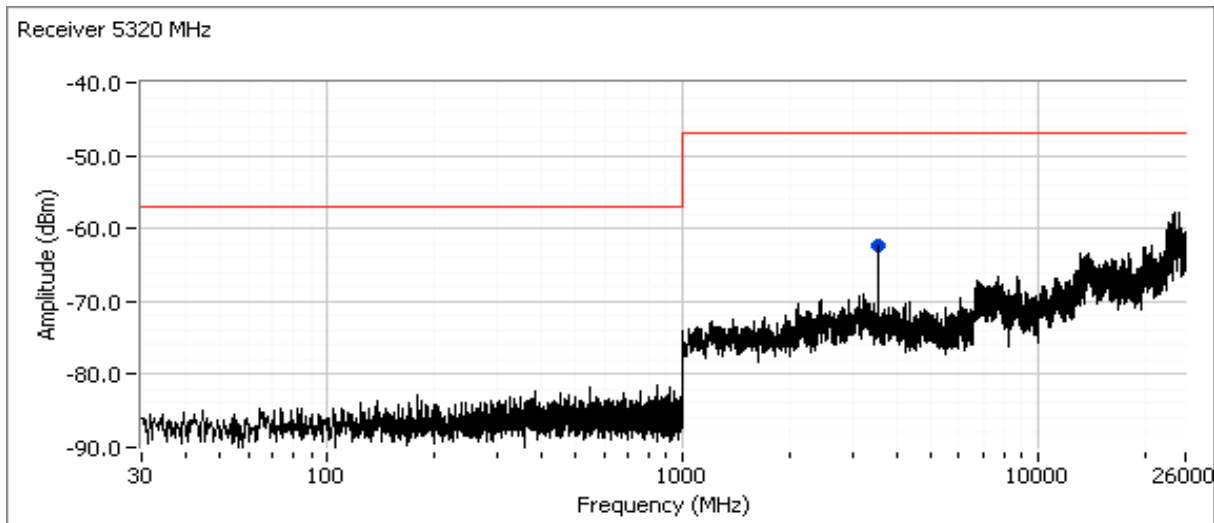
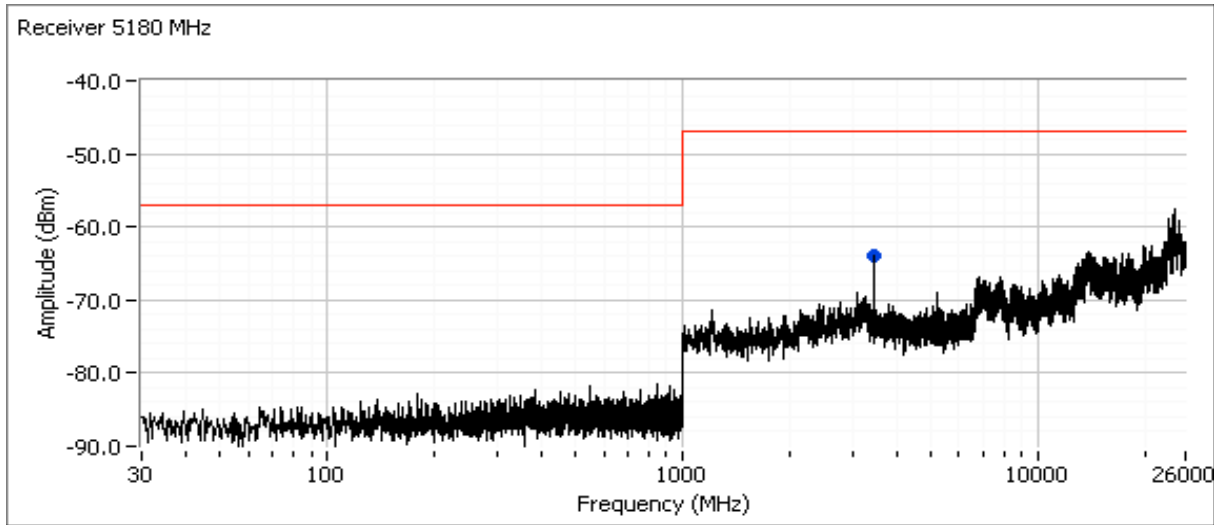
EMC Test Data

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

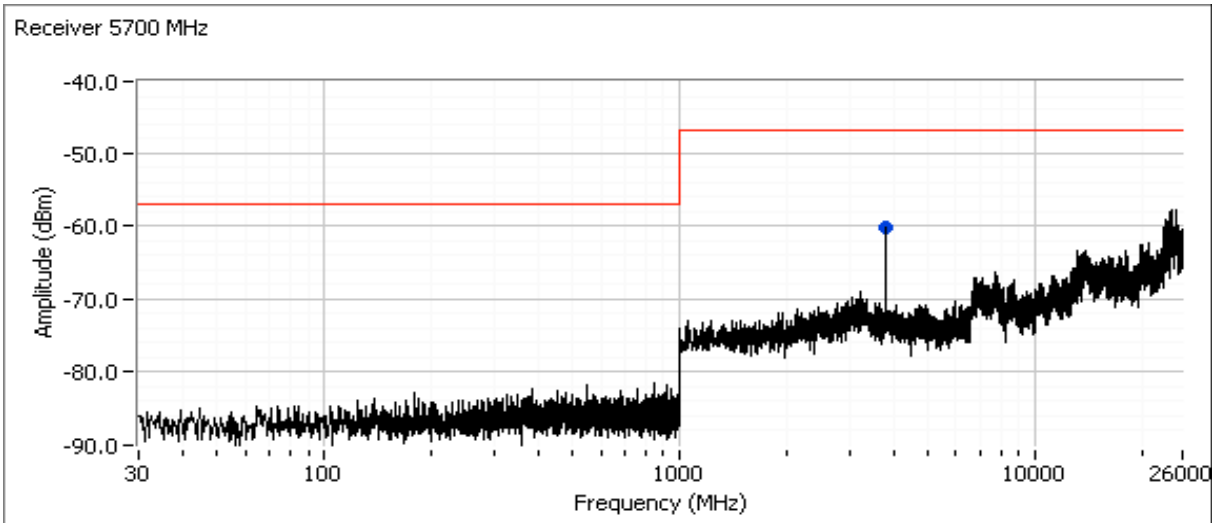
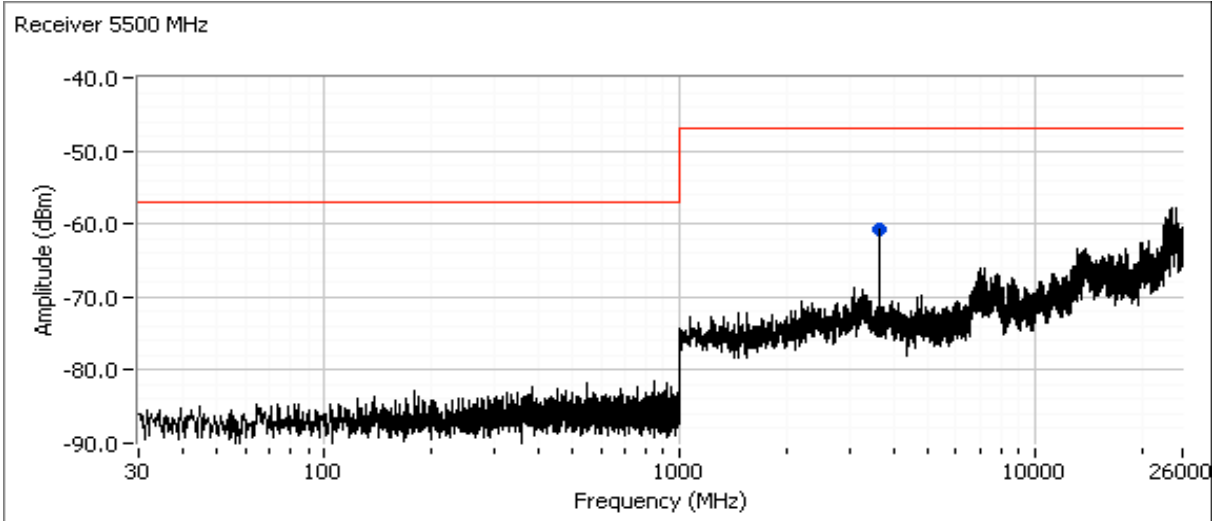
Frequency MHz	Level dBm	Port	EN 301 893		Detector	Channel	Mode	Comments
			Limit	Margin				
11395.13	-31.8	RF Port	-30.0	-1.8	Peak	140	n20	
11005.67	-33.1	RF Port	-30.0	-3.1	Peak	100	n20	
5018.34	-36.0	RF Port	-30.0	-6.0	Peak	36	n20	
10357.45	-39.8	RF Port	-30.0	-9.8	Peak	36	n20	
5483.49	-28.2	RF Port	10.0	-38.2	Peak	64	n20	
10642.88	-36.0	RF Port	-30.0	-6.0	Peak	64	n20	
5018.34	-33.1	RF Port	-30.0	-3.1	Peak	36	a	
10360.12	-38.3	RF Port	-30.0	-8.3	Peak	36	a	
5486.50	-29.6	RF Port	10.0	-39.6	Peak	64	a	
10640.21	-35.4	RF Port	-30.0	-5.4	Peak	64	a	
11003.00	-32.1	RF Port	-30.0	-2.1	Peak	100	a	
11397.80	-46.0	RF Port	-30.0	-16.0	Peak	140	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

Run #7: Receiver Spurious Emissions (Section 4.6)
 Receive Mode, 30 - 26,500 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



Frequency MHz	Level dBm	Port	EN 301 893		Detector	Channel	Mode	Comments
			Limit	Margin				
3454.820	-64.0	RF Port	-47.0	-17.0	Peak	36		
3547.850	-62.4	RF Port	-47.0	-15.4	Peak	64		
3667.890	-60.7	RF Port	-47.0	-13.7	Peak	100		
3799.930	-60.1	RF Port	-47.0	-13.1	Peak	140		

End of Report

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