

## **EMC Test Report**

### **Application for FCC Grant of Equipment Authorization Canada Certification**

### **Innovation, Science and Economic Development Canada RSS-Gen Issue 4 / RSS 247 Issue 1 FCC Part 15, Subpart E**

### **Model: BGW210-700 ARRIS DSL Wireless Residential Gateway**

FCC ID: PGRBGW210

APPLICANT: Arris  
310 Providence Mine Road  
Nevada City, CA 95959

TEST SITE(S): National Technical Systems - Silicon Valley  
41039 Boyce Road.  
Fremont, CA. 94538-2435

IC SITE REGISTRATION #: 2845B-4 and 2845B-7

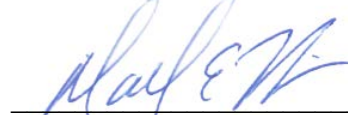
REPORT DATE: November 10, 2016

REISSUE DATE: November 18, 2016

FINAL TEST DATES: September 14, 15, 16, 19, 20, 21 and 30 and  
October 3, 4, 5 and 12, 2016

TOTAL NUMBER OF PAGES: 142

PROGRAM MGR /  
TECHNICAL REVIEWER:



Mark E Hill  
Staff Engineer

QUALITY ASSURANCE DELEGATE /  
FINAL REPORT PREPARER:



David Guidotti  
Senior Technical Writer



National Technical Systems - Silicon Valley is accredited by the A2LA, certificate number 0214.26, to perform the test(s) listed in this report, except where noted otherwise. This report and the information contained herein represent the results of testing test articles identified and selected by the client performed to specifications and/or procedures selected by the client. National Technical Systems (NTS) makes no representations, expressed or implied, that such testing is adequate (or inadequate) to demonstrate efficiency, performance, reliability, or any other characteristic of the articles being tested, or similar products. This report should not be relied upon as an endorsement or certification by NTS of the equipment tested, nor does it represent any statement whatsoever as to its merchantability or fitness of the test article, or similar products, for a particular purpose. This report shall not be reproduced except in full

**REVISION HISTORY**

Rev#	Date	Comments	Modified By
-	November 10, 2016	First release	
1.0	November 14, 2016	Updated company name to Arris	MEH
2.0	November 18, 2016	Added reference to ANSI C63 to scope. Clarified 2.4GHz beamforming. Corrected calculation error for VBW for measurements with duty cycle >98%. Added frequency stability results and associated test equipment. Clarified the use of a filter for spurious emissions. Clarified antenna gain values used.	MEH

## TABLE OF CONTENTS

<b>REVISION HISTORY .....</b>	<b>2</b>
<b>TABLE OF CONTENTS .....</b>	<b>3</b>
<b>SCOPE.....</b>	<b>4</b>
<b>OBJECTIVE .....</b>	<b>4</b>
<b>STATEMENT OF COMPLIANCE.....</b>	<b>5</b>
<b>DEVIATIONS FROM THE STANDARDS.....</b>	<b>5</b>
<b>TEST RESULTS SUMMARY .....</b>	<b>6</b>
UNII / LELAN DEVICES .....	6
MEASUREMENT UNCERTAINTIES.....	9
<b>EQUIPMENT UNDER TEST (EUT) DETAILS.....</b>	<b>10</b>
GENERAL.....	10
OTHER EUT DETAILS.....	10
ANTENNA SYSTEM .....	10
ENCLOSURE.....	10
MODIFICATIONS.....	10
SUPPORT EQUIPMENT.....	11
EUT INTERFACE PORTS .....	11
EUT OPERATION .....	11
<b>TEST SITE.....</b>	<b>12</b>
GENERAL INFORMATION.....	12
CONDUCTED EMISSIONS CONSIDERATIONS .....	12
RADIATED EMISSIONS CONSIDERATIONS .....	12
<b>MEASUREMENT INSTRUMENTATION .....</b>	<b>13</b>
RECEIVER SYSTEM .....	13
INSTRUMENT CONTROL COMPUTER .....	13
LINE IMPEDANCE STABILIZATION NETWORK (LISN).....	13
FILTERS/ATTENUATORS .....	14
ANTENNAS.....	14
ANTENNA MAST AND EQUIPMENT TURNABLE.....	14
INSTRUMENT CALIBRATION.....	14
<b>TEST PROCEDURES .....</b>	<b>15</b>
EUT AND CABLE PLACEMENT .....	15
CONDUCTED EMISSIONS.....	15
RADIATED EMISSIONS.....	15
CONDUCTED EMISSIONS FROM ANTENNA PORT .....	19
BANDWIDTH MEASUREMENTS .....	19
SPECIFICATION LIMITS AND SAMPLE CALCULATIONS.....	20
CONDUCTED EMISSIONS SPECIFICATION LIMITS: FCC 15.207; FCC 15.107(A), RSS GEN .....	20
GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS .....	21
RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS.....	21
FCC 15.407 (A) OUTPUT POWER LIMITS .....	22
OUTPUT POWER LIMITS –LELAN DEVICES.....	22
SPURIOUS EMISSIONS LIMITS –UNII AND LELAN DEVICES .....	22
SAMPLE CALCULATIONS - CONDUCTED EMISSIONS .....	23
SAMPLE CALCULATIONS - RADIATED EMISSIONS.....	23
SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION.....	24
<b>APPENDIX A TEST EQUIPMENT CALIBRATION DATA .....</b>	<b>25</b>
<b>APPENDIX B TEST DATA .....</b>	<b>29</b>
<b>END OF REPORT .....</b>	<b>142</b>

## **SCOPE**

An electromagnetic emissions test has been performed on the Arris model BGW210-700 ARRIS DSL Wireless Residential Gateway, pursuant to the following rules:

FCC Part 15, Subpart E requirements for UNII Devices

Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in the following reference standards and as outlined in National Technical Systems - Silicon Valley test procedures:

ANSI C63.10-2013

FCC General UNII Test Procedures KDB789033

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

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

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

## **OBJECTIVE**

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

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

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

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

**STATEMENT OF COMPLIANCE**

The tested sample of Arris model BGW210-700 ARRIS DSL Wireless Residential Gateway complied with the requirements of the following regulations:

FCC Part 15, Subpart E requirements for UNII Devices

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

The test results recorded herein are based on a single type test of Arris model BGW210-700 ARRIS DSL Wireless Residential Gateway and therefore apply only to the tested sample. The sample was selected and prepared by Mark Rieger of Arris

**DEVIATIONS FROM THE STANDARDS**

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

## TEST RESULTS SUMMARY

### UNII / LELAN DEVICES

#### OPERATION IN THE 5.15 – 5.25 GHZ BAND – ACCESS POINTS

FCC Rule Part		Description	Measured Value / Comments	Limit / Requirement	Result
15.407 (a) (1) (ii)		Output Power (Non-Beamforming)	a: 26.7dBm (468.7 mW) n20: 26.7dBm (467.9 mW) n40: 26.6dBm (458.7 mW) ac80: 19.6dBm (90.4 mW)	30 dBm EIRP <= 4W	Complies
15.407 (a) (1) (ii)		Output Power (Beamforming)	n20: 26.7dBm (467.9 mW) n40: 26.6dBm (458.7 mW) ac80: 17.6dBm (57.0 mW)	30 dBm EIRP unlimited	Complies
15.407 (a) (1) (ii)		Power Spectral Density (Non-Beamforming)	a: 16.1dBm/MHz n20: 15.4dBm/MHz n40: 12.4dBm/MHz ac80: 3.0dBm/MHz	17 dBm/MHz	Complies
15.407 (a) (1) (ii)		Power Spectral Density (Beamforming)	n20: 15.4dBm/MHz n40: 12.4dBm/MHz ac80: 1.1dBm/MHz	17 dBm/MHz	Complies
15.407 (a) (1) (i)		EIRP 30° Above Horizon	N/A – EUT is indoor use only	21 dBm (125 mW)	N/A
15.407(b) (1) / 15.209		Spurious Emissions	53.4 dBμV/m @ 5149.7 MHz (-0.6 dB)	Refer to the limits section (p21) for restricted bands, all others -27 dBm/MHz EIRP	Complies

**OPERATION IN THE 5.725 – 5.85 GHZ BAND**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(e)	-	6dB Bandwidth	a: 16.4 MHz n20: 17.6 MHz n40: 36.4 MHz ac80: 75.2 MHz	<= 500 kHz	Complies
15.407(a) (3)	-	Output Power (Non-Beamforming)	a: 26.3dBm (426.2 mW) n20: 26.1dBm (407.6 mW) n40: 26.2dBm (412.3 mW) ac80: 26.2dBm (417.1 mW)	30 dBm (1 W) EIRP <= 4W	Complies
15.407(a) (3)	-	Output Power (Beamforming)	n20: 26.1dBm (407.6 mW) n40: 26.2dBm (412.3 mW) ac80: 26.2dBm (417.1 mW)	30 dBm (1 W) EIRP <= 4W	Complies
15.407(a) (3)	-	Power Spectral Density (Beamforming and non-Beamforming)	a: 15.7dBm/MHz n20: 15.2dBm/MHz n40: 11.9dBm/MHz ac80: 9.5dBm/MHz	30 dBm / 500 kHz	Complies
15.407(b) (4) (i) / 15.209	-	Spurious Emissions	64.4 dBuV/m @ 5930.0 MHz (-3.9 dB)	Refer to the limits section (p21) for restricted bands, all others 15.407(b)(4)(i)	Complies

**REQUIREMENTS FOR ALL U-NII/LELAN BANDS**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.407	-	Modulation	Systems uses OFDM / DSSS techniques	Digital modulation is required	Complies
15.31 (m)	-	Channel Selection	Emissions tested at outermost and middle channels in each band	Device was tested on the top, bottom and center channels in each band	N/A
15.407 (c)	-	Operation in the absence of information to transmit	Operation is discontinued in the absence of information	Device shall automatically discontinue operation in the absence of information to transmit	Complies
15.407 (g)	-	Frequency Stability	Frequency stability is better than 10 ppm.	Signal shall remain within the allocated band	Complies
15.407 (h1)	-	Transmit Power Control	TCP mechanism is discussed in the Operational Description	The U-NII device shall have the capability to operate with a mean EIRP value lower than 24dBm (250mW)	Complies
15.407 (h2)	RSS-247 6.3	Dynamic frequency Selection (device with radar detection)	Device does not operate in either 5470 – 5725 or 5250 – 5350 MHz bands.		N/A

**GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS**

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	Antennas are internal to the device	Unique or integral antenna required	Complies
15.407 (b) (6)	RSS-Gen Table 3	AC Conducted Emissions	44.8 dB $\mu$ V @ 0.151 MHz (-21.1 dB)	Refer to page 20	Complies
15.247 (i) 15.407 (f)	-	RF Exposure Requirements	Refer to MPE calculations in separate exhibit	Refer to OET 65, FCC Part 1 and RSS 102	Complies

**MEASUREMENT UNCERTAINTIES**

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

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

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

The Arris model BGW210-700 ARRIS DSL Wireless Residential Gateway is a uDSL Wireless Residential Gateway that is designed to connect to a PSTN Telecommunications network supporting a bonded VDSL2 connection. The electrical rating of the EUT is 12 Volts, 3 Amps DC. It is supplied by an external AC/DC power supply.

The sample was received on September 14, 2016 and tested on September 14, 15, 16, 19, 20, 21 and 30 and October 3, 4, 5 and 12, 2016. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
ARRIS	BGW210-700	uDSL Wireless Residential Gateway	184795205922976	PGRBGW210

**OTHER EUT DETAILS**

2.4GHz radio – 802.11bgn (20/40MHz)

Only transmits in 3Tx mode, supports 1 to 3 spatial streams

Beamforming is supported for 11n 20 and 40MHz operation

5GHz radio – 802.11abgn/ac (20/40/80MHz)

Only transmits in 4Tx mode, supports 1 to 4 spatial streams

Beamforming supported for 11n/ac 20, 40, 80MHz operation

Simultaneous transmission of 2.4 and 5GHz supported.

**ANTENNA SYSTEM**

2.4GHz – three stamped metal antennas. Two are mounted on the interior of the enclosure and one is mounted directly to the motherboard. Peak Gains: 3.11dBi, 3.665dBi, 3.653dBi.

5GHz – four stamped metal antennas. One is mounted on the interior of the enclosure and three are mounted directly to the motherboard.

**ENCLOSURE**

The EUT enclosure measures approximately 25cm by 20cm by 6cm. It is primarily constructed of uncoated plastic.

**MODIFICATIONS**

No modifications were made to the EUT during the time the product was at NTS Silicon Valley.

**SUPPORT EQUIPMENT**

The following equipment was used as support equipment for testing:

Company	Model	Description	Serial Number	FCC ID
	-	None	-	-

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

Company	Model	Description	Serial Number	FCC ID
Dell	Latitude 1311	Laptop	-	-

**EUT INTERFACE PORTS**

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Ethernet 1	Laptop	RJ45	Unshielded	10.0
Ethernet 2,3,4	Unterminated	RJ45	Unshielded	2.0
USB 1,2	Unterminated	USB	Shielded	2.0
Broadband	Unterminated	RJ11	Unshielded	2.0
Phone Lines 1&2	Unterminated	RJ11	Unshielded	2.0
DC In	Power Supply DC out	2-wire	Unshielded	1.0
Power Supply AC in	AC mains	2-wire	Unshielded	1.5

**EUT OPERATION**

During testing, the EUT was configured to continuously transmit at the maximum output power. Channel, data rate, and mode is detailed in the test results.

For radiated beamforming testing, the EUT was configured to establish a connection with a remote client located behind the measurement antenna and data was streamed from the EUT to the client.

Note, antenna port measurements for beamforming operation were performed using the test mode commands since the rf spectrum emissions are identical to non-beamforming transmissions.

## TEST SITE

### GENERAL INFORMATION

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

Site	Designation / Registration Numbers		Location
	FCC	Canada	
Chamber 4	US0027	2845B-4	41039 Boyce Road Fremont, CA 94538-2435
Chamber 7	US0027	2845B-7	

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

### CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.10. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

### RADIATED EMISSIONS CONSIDERATIONS

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

## **MEASUREMENT INSTRUMENTATION**

### **RECEIVER SYSTEM**

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

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

### **INSTRUMENT CONTROL COMPUTER**

Software is used to view and convert receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers. The software used for radiated and conducted emissions measurements is NTS EMI Test Software (rev 2.10)

### **LINE IMPEDANCE STABILIZATION NETWORK (LISN)**

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

**FILTERS/ATTENUATORS**

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

**ANTENNAS**

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

**ANTENNA MAST AND EQUIPMENT TURNTABLE**

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

ANSI C63.10 specifies that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor as specified in ANSI C63.4. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

**INSTRUMENT CALIBRATION**

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

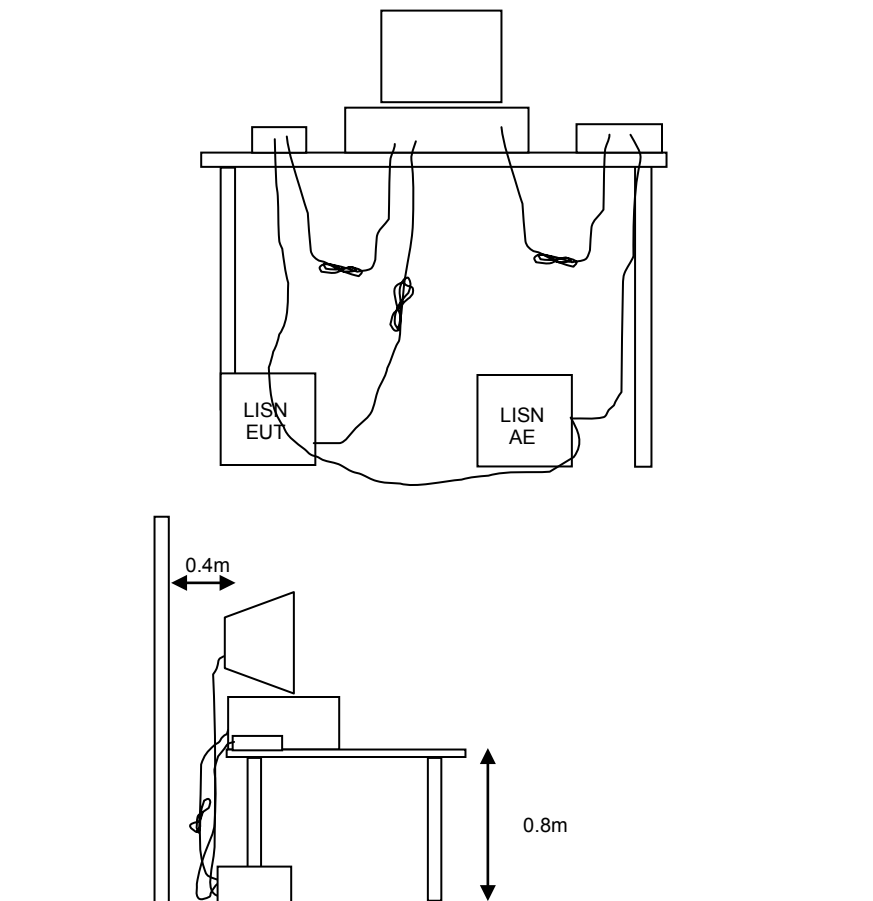
## TEST PROCEDURES

### EUT AND CABLE PLACEMENT

The regulations require that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.10, and the worst-case orientation is used for final measurements.

### CONDUCTED EMISSIONS

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



**Figure 1 Typical Conducted Emissions Test Configuration**

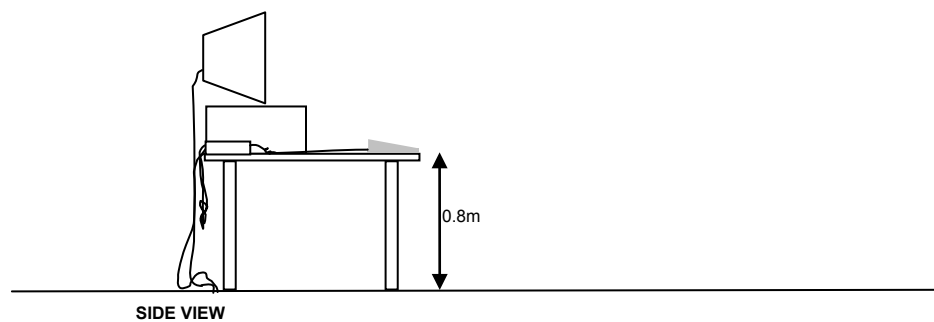
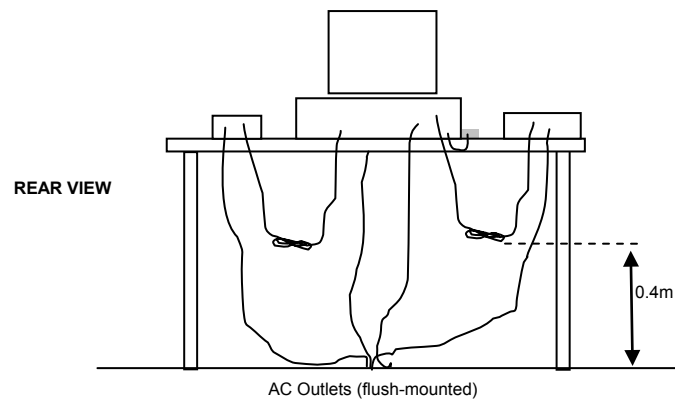
**RADIATED EMISSIONS**

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

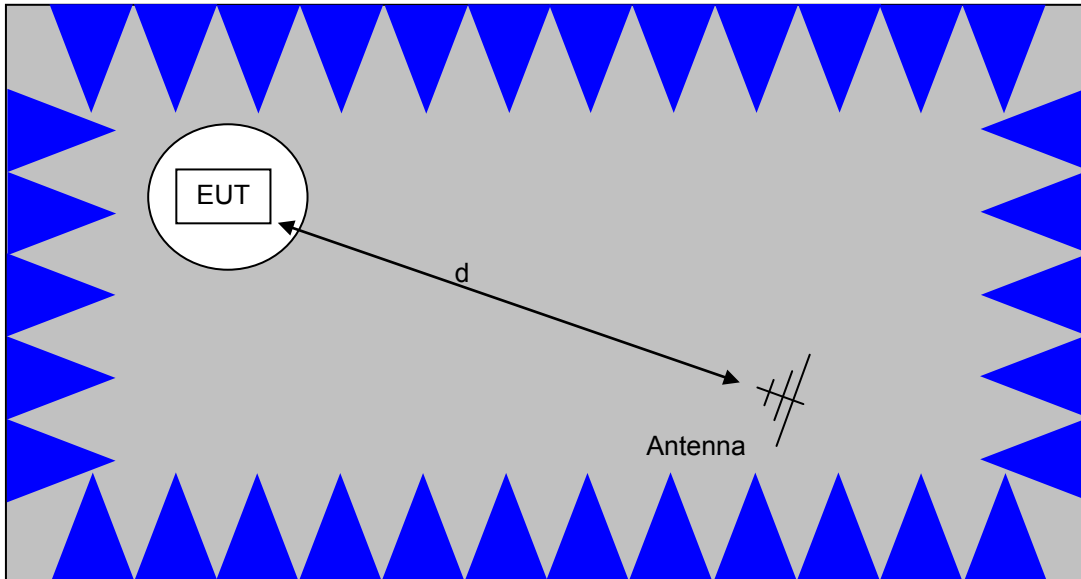
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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

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

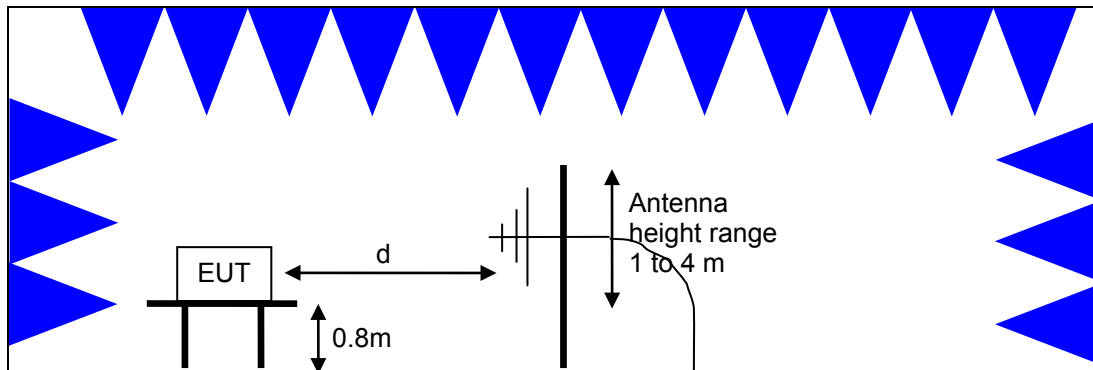


Typical Test Configuration for Radiated Field Strength Measurements



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

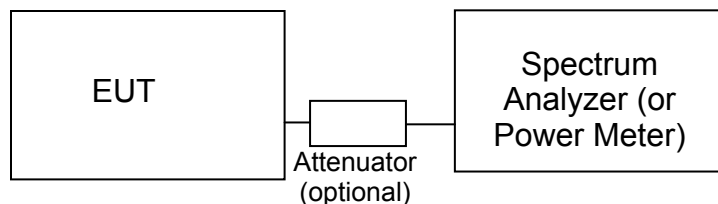
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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

**CONDUCTED EMISSIONS FROM ANTENNA PORT**

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

**Test Configuration for Antenna Port Measurements**

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

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

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

**BANDWIDTH MEASUREMENTS**

The 6dB, 20dB, 26dB and/or 99% signal bandwidth are measured using the bandwidths recommended by ANSI C63.10 and RSS GEN.

**SPECIFICATION LIMITS AND SAMPLE CALCULATIONS**

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

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

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

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

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

### GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands<sup>1</sup>.

Frequency Range (MHz)	Limit (uV/m)	Limit (dBuV/m @ 3m)
0.009-0.490	2400/F <sub>KHz</sub> @ 300m	67.6-20*log <sub>10</sub> (F <sub>KHz</sub> ) @ 300m
0.490-1.705	24000/F <sub>KHz</sub> @ 30m	87.6-20*log <sub>10</sub> (F <sub>KHz</sub> ) @ 30m
1.705 to 30	30 @ 30m	29.5 @ 30m
30 to 88	100 @ 3m	40 @ 3m
88 to 216	150 @ 3m	43.5 @ 3m
216 to 960	200 @ 3m	46.0 @ 3m
Above 960	500 @ 3m	54.0 @ 3m

### RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from receivers as detailed in FCC Part 15.109 and RSS GEN Table 2. Note that receivers operating outside of the frequency range 30 MHz – 960 MHz are exempt from the requirements of 15.109 and receivers that are not stand-alone are exempt from the ISED Canada requirements per RSS-GEN.

Frequency Range (MHz)	Limit (uV/m @ 3m)	Limit (dBuV/m @ 3m)
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

<sup>1</sup> The restricted bands are detailed in FCC 15.205 and RSS-Gen Table 6

### FCC 15.407 (a) OUTPUT POWER LIMITS

The table below shows the limits for output power and output power density. For the 5250-5350 and 5470-5725 MHz bands, where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

Operating Frequency (MHz)	Output Power	Power Spectral Density
5150 – 5250	1Watt (30 dBm)	17 dBm/MHz
5250 – 5350 and 5470-5725	250 mW (24 dBm)	11 dBm/MHz
5725 – 5825	1 Watt (30 dBm)	30 dBm/500kHz

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

### OUTPUT POWER LIMITS –LELAN DEVICES

The table below shows the limits for output power and output power density defined by RSS 247. Where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

Operating Frequency (MHz)	Output Power	Power Spectral Density
5150 – 5250	200mW (23 dBm) eirp	10 dBm/MHz eirp
5250 – 5350 and 5470 - 5725	250 mW (24 dBm) <sup>2</sup> 1W (30dBm) eirp	11 dBm/MHz
5725 – 5825	1 Watt (30 dBm) 4W eirp	30 dBm/500kHz

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

### SPURIOUS EMISSIONS LIMITS –UNII and LELAN DEVICES

The spurious emissions limits for signals below 1GHz are the FCC/RSS-Gen general limits. For emissions above 1GHz, signals in restricted bands are subject to the FCC/RSS-Gen general limits. All other signals have a limit of –27dBm/MHz, which is field strength of 68.3dBuV/m/MHz at a distance of 3m. For devices operating in the 5725-5850 MHz bands under the LELAN/UNII rules, the limit within 10MHz of the allocated band is increased to –17dBm/MHz.

<sup>2</sup> If EIRP exceeds 500mW the device must employ TPC

**SAMPLE CALCULATIONS - CONDUCTED EMISSIONS**

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

$$R_r - S = M$$

where:

$R_r$  = Receiver Reading in dBuV

$S$  = Specification Limit in dBuV

$M$  = Margin to Specification in +/- dB

**SAMPLE CALCULATIONS - RADIATED EMISSIONS**

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

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

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

where:

$F_d$  = Distance Factor in dB

$D_m$  = Measurement Distance in meters

$D_s$  = Specification Distance in meters

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

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

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

$R_r$  = Receiver Reading in dBuV/m

$F_d$  = Distance Factor in dB

$R_c$  = Corrected Reading in dBuV/m

$L_s$  = Specification Limit in dBuV/m

$M$  = Margin in dB Relative to Spec

**SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION**

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

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

where P is the eirp (Watts)

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

## Appendix A Test Equipment Calibration Data

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Calibrated</u>	<u>Cal Due</u>
<b>Radiated Emissions, Band Edge Wifi, 14-Sep-16</b>					
NTS	NTS EMI Software (rev 2.10)	N/A	0		N/A
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	12/19/2015	12/19/2016
EMCO	Antenna, Horn, 1-18 GHz	3115	2733	11/18/2014	11/18/2016
<b>Radiated Emissions, 1 - 12 GHz, 15-Sep-16</b>					
NTS	NTS EMI Software (rev 2.10)	N/A	0		N/A
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	1/21/2016	1/21/2017
Hewlett Packard	Spectrum Analyzer (SA40)	8564E (84125C)	1148	10/17/2015	10/17/2016
Rohde & Schwarz	Red 30 Hz -40 GHz				
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	12/19/2015	12/19/2016
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	6/29/2016	6/29/2017
EMCO	Antenna, Horn, 1-18 GHz	3115	2733	11/18/2014	11/18/2016
<b>Radiated Emissions, 1000 - 25,000 MHz, 16-Sep-16</b>					
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	1/21/2016	1/21/2017
HP / Miteq	SA40 Head (Red)	TTA1840-45-5P-HG-S	1145	8/24/2016	8/24/2017
Hewlett Packard	Spectrum Analyzer (SA40)	8564E (84125C)	1148	10/17/2015	10/17/2016
Micro-Tronics	Red 30 Hz -40 GHz				
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	6/29/2016	6/29/2017
A. H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	8/28/2014	8/28/2017
EMCO	Antenna, Horn, 1-18 GHz	3115	2733	11/18/2014	11/18/2016
<b>Radiated Emissions, 1 - 18 GHz, 19-Sep-16</b>					
NTS	NTS EMI Software (rev 2.10)	N/A	0		N/A
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	1/21/2016	1/21/2017
Hewlett Packard	Spectrum Analyzer (SA40)	8564E (84125C)	1148	10/17/2015	10/17/2016
Micro-Tronics	Red 30 Hz -40 GHz				
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	6/29/2016	6/29/2017
EMCO	Antenna, Horn, 1-18 GHz	3115	2733	11/18/2014	11/18/2016
<b>Radio Antenna Port (Power and Spurious Emissions), 19-Sep-16</b>					
NTS	NTS EMI Software (rev 2.10)	N/A	0		N/A
Agilent Technologies	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HX,	E4446A	2139	6/24/2016	6/24/2017
<b>Radio Antenna Port (Power and Spurious Emissions), 20-Sep-16</b>					
NTS	NTS EMI Software (rev 2.10)	N/A	0		N/A
Agilent Technologies	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HX,	E4446A	2139	6/24/2016	6/24/2017



<b>Manufacturer</b>	<b>Description</b>	<b>Model</b>	<b>Asset #</b>	<b>Calibrated</b>	<b>Cal Due</b>
<b>Radio Antenna Port (Power and Spurious Emissions), 21-Sep-16</b>					
NTS	NTS EMI Software (rev 2.10)	N/A	0		N/A
Agilent Technologies	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	6/24/2016	6/24/2017
<b>Radiated Emissions, 1 - 6 GHz, 28-Sep-16</b>					
NTS	NTS EMI Software (rev 2.10)	N/A	0		N/A
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/30/2016	6/30/2018
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	6/29/2016	6/29/2017
<b>Radiated Spurious Emissions, 1,000 - 40,000 MHz, 30-Sep-16</b>					
NTS	NTS EMI Software (rev 2.10)	N/A	0		N/A
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	10/12/2015	10/12/2016
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/30/2016	6/30/2018
Hewlett Packard	Spectrum Analyzer (SA40) Blue 9 kHz - 40 GHz	8564E (84125C)	1393	3/28/2016	3/28/2017
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	6/29/2016	6/29/2017
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2251	9/19/2016	9/19/2017
<b>Radiated Emissions, 1,000 - 40,000 MHz, 30-Sep-16</b>					
NTS	NTS EMI Software (rev 2.10)	N/A	0		N/A
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	2240	9/20/2016	9/20/2017
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	10/12/2015	10/12/2016
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/30/2016	6/30/2018
Hewlett Packard	Spectrum Analyzer (SA40) Blue 9 kHz - 40 GHz	8564E (84125C)	1393	3/28/2016	3/28/2017
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	6/29/2016	6/29/2017
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2251	9/19/2016	9/19/2017
<b>Radiated Emissions, 1,000 - 40,000 MHz, 03-Oct-16</b>					
NTS	NTS EMI Software (rev 2.10)	N/A	0		N/A
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	2240	9/20/2016	9/20/2017
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	10/12/2015	10/12/2016
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/30/2016	6/30/2018
Hewlett Packard	Spectrum Analyzer (SA40) Blue 9 kHz - 40 GHz	8564E (84125C)	1393	3/28/2016	3/28/2017
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	6/29/2016	6/29/2017
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2251	9/19/2016	9/19/2017
Hewlett Packard	High Pass filter, 8.2 GHz	P/N 84300-80039	1152	6/28/2016	6/28/2017
HP / Miteq	SA40 Head (Blue)	TTA1840-45-5P-HG-S	1620	3/8/2016	3/8/2017
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1682	5/9/2016	5/9/2017



<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Calibrated</u>	<u>Cal Due</u>
A. H. Systems	Red System Horn, 18-40GHz	SAS-574, p/n: 2581	2161	7/16/2015	7/16/2017
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	2240	9/20/2016	9/20/2017
<b>Radiated Emissions, 1,000 - 18,000 MHz, 04-Oct-16</b>					
NTS	NTS EMI Software (rev 2.10)	N/A	0		N/A
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	10/12/2015	11/12/2016
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/30/2016	6/30/2018
Hewlett Packard	High Pass filter, 8.2 GHz	P/N 84300-80039	1152	6/28/2016	6/28/2017
Hewlett Packard	Spectrum Analyzer (SA40) Blue 9 kHz - 40 GHz	8564E (84125C)	1393	3/28/2016	3/28/2017
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1682	5/9/2016	5/9/2017
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	6/29/2016	6/29/2017
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	2240	9/20/2016	9/20/2017
<b>Radiated Emissions, 30 - 1,000 MHz, 04-Oct-16</b>					
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	12/19/2015	12/19/2016
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	2197	9/9/2015	9/9/2017
Com-Power	Preamplifier, 30-1000 MHz	PA-103	2465	9/16/2016	9/16/2017
<b>Radiated Emissions, 1000 - 40,000 MHz, 04-Oct-16</b>					
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	10/12/2015	11/12/2016
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/30/2016	6/30/2018
Hewlett Packard	High Pass filter, 8.2 GHz	P/N 84300-80039	1152	6/28/2016	6/28/2017
Hewlett Packard	Spectrum Analyzer (SA40) Blue 9 kHz - 40 GHz	8564E (84125C)	1393	3/28/2016	3/28/2017
HP / Miteq	SA40 Head (Blue)	TTA1840-45-5P-HG-S	1620	3/8/2016	3/8/2017
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1682	5/9/2016	5/9/2017
A. H. Systems	Red System Horn, 18-40GHz	SAS-574, p/n: 2581	2161	7/16/2015	7/16/2017
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2238	9/19/2016	9/19/2017
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2251	9/19/2016	9/19/2017
<b>Conducted Emissions - AC Power Ports, 05-Oct-16</b>					
NTS	NTS EMI Software (rev 2.10)	N/A	0		N/A
EMCO	LISN, 10 kHz-100 MHz	3825/2	1292	8/1/2016	8/1/2017
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	12/19/2015	12/19/2016
Com-Power	Comb Gen, Cond, 50-250/250-500 kHz	CG-510	1551	3/4/2016	3/4/2017
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1594	8/31/2016	8/31/2017



<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Calibrated</u>	<u>Cal Due</u>
<b>Radio Antenna Port (Power and Spurious Emissions), 12-Oct-16</b>					
NTS	NTS UNII Power Software (rev 3.8)	N/A	0		N/A
NTS	NTS Capture Analyzer Software (rev 3.8)	N/A	0		N/A
Agilent Technologies	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	6/24/2016	6/24/2017
<b>Radio Antenna Port (Frequency Stability), 26-Oct-16</b>					
NTS	NTS Capture Analyzer Software (rev 3.8)	N/A	0		N/A
Rohde & Schwarz	Signal Analyzer 20 Hz - 26.5 GHz	FSQ26	2327	17-Jun-16	17-Jun-17
Honeywell	Chart Recorder	DR45AT-1000-00-001-0 (Trueline)	2406	17-Nov-15	17-Nov-16
Envirotronics	Temperature/Humidity chamber	SH16C	3195		N/A

## **Appendix B Test Data**

T102846 Pages 30 – 141

Client:	Arris	Job Number:	JD102271
Product	BGW210-700	T-Log Number:	T102846
System Configuration:	-	Project Manager:	Irene Rademacher
Contact:	Mark Rieger	Project Coordinator:	-
Emissions Standard(s):	FCC 15.B, 15.247, 15.407	Class:	B
Immunity Standard(s):	-	Environment:	-

## EMC Test Data

For The

**Arris**

Product

BGW210-700

Date of Last Test: 11/4/2016

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## FCC Part 15 Frequency Stability

### Test Specific Details

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

### General Test Configuration

All measurements are made with the EUT's rf port connected to the measurement instrument via an attenuator. All amplitude measurements are adjusted to account for the attenuation between EUT and measuring instrument. For frequency stability measurements the EUT was placed inside an environmental chamber.

Ambient Conditions:                      Temperature:            22 °C  
    Rel. Humidity:            47 %

Run #	Test Performed	Limit	Pass / Fail
1	Frequency Stability	Stays in band	Pass

### 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.

Date of Test: 10/26/2016  
 Test Engineer: Mehran Birgani  
 Test Location: Lab 3

Config. Used: Conducted  
 Config Change: None  
 EUT Voltage: 120V/60Hz

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Run #1: Frequency Stability

Nominal Frequency: 5200 MHz

## Frequency Stability Over Temperature

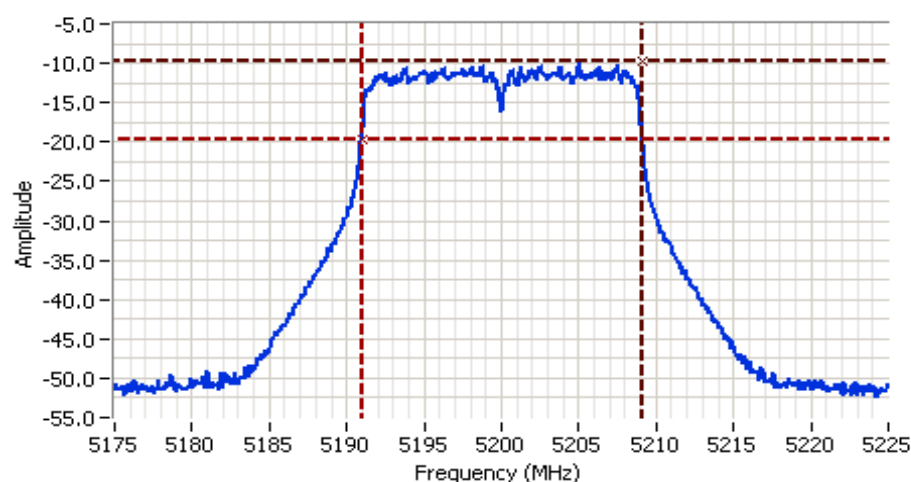
The EUT was soaked at each temperature for a minimum of 30 minutes prior to starting the transmitter and making the measurements to ensure the EUT and chamber had stabilized at that temperature.

Temperature	Frequency Measured	Drift	
(Celsius)	(MHz)	(Hz)	(ppm)
0	5200.0401	40100	7.7
20	5200.0000	0	0.0
50	5200.0000	0	0.0
Worst case:		40100	7.7

## Frequency Stability Over Input Voltage

Nominal Voltage is 120Vac.

Voltage	Frequency Measured	Drift	
(DC)	(MHz)	(Hz)	(ppm)
102.00	5200.000000	0	0.0
138.00	5200.000000	0	0.0
Worst case:		0	0.0



### Analyzer Settings

Rohde&Schwarz,FSQ  
 CF: 5200.000 MHz  
 SPAN: 50.000 MHz  
 RB: 200 kHz  
 VB: 1.000 MHz  
 Detector: POS  
 Attn: 35 DB  
 RL Offset: 0.0 DB  
 Sweep Time: 1.0s  
 Ref Lvl: 8.0 DBM

### Comments

Frequency Stability  
 0 °C; 120V  
 Cal CF: 5200.0401 MHz

Cursor 1	5209.0545	-9.7	
Cursor 2	5191.0256	-19.7	

Delta Freq. 18.029  
 Delta Amplitude 10.0

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Power vs. Data Rate

In normal operating modes the card uses power settings stored on EEPROM to set the output power. For a given nominal output power the actual transmit power normally is reduced as the data rate increases, therefore testing was performed at the data rate in the mode with highest power to determine compliance with the requirements.

The following power measurements were made using a GATED average power meter and with the device configured in a continuous transmit mode on Chain 1 at the various data rates in each mode to verify the highest power mode:

### Sample Notes

Sample S/N: 184795026016480

Driver (5GHz): -

Date of Test: 9/27/2016

Test Engineer: Mark Hill

Test Location: FT Lab#4

### 5GHz Radio

Mode	Data Rate	Power (dBm)	Power setting
802.11a	6	<b>21.9</b>	23.0
	9	21.9	
	12	21.8	
	18	21.8	
	24	21.7	
	36	21.7	
	48	21.6	
	54	21.6	
802.11n/ac 20MHz	6.5	21.9	23.0
	13	21.9	
	19.5	21.9	
	26	21.9	
	39	21.9	
	52	21.9	
	58.5	21.9	
	65	21.9	
	78	21.9	

<<-11ac mode only

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

Mode	Data Rate	Power (dBm)	Power setting
802.11n/ac 40MHz	13.5	<b>21.8</b>	23.0
	27	21.8	
	40.5	21.8	
	54	21.8	
	81	21.8	
	108	21.8	
	121.5	21.8	
	135	21.8	
	162	21.6	
	180	21.5	
802.11ac 80MHz	29.3	<b>22.0</b>	23.0
	58.5	22.0	
	87.8	22.0	
	117	22.0	
	175.5	22.0	
	234	22.0	
	266.3	22.0	
	292.5	22.0	
	351	22.0	
	390	21.8	

<<-11ac mode only  
<<-11ac mode only

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Duty Cycle

### Sample Notes

Sample S/N: 184795026016480

Driver (5GHz): -

Date of Test: 9/27/2016

Test Engineer: Mark Hill

Test Location: FT Lab#4

Duty cycle measurements performed on the worse case data rate for power.

Notes: Measurements taken with maximum RBW/VBW settings allowed.

### 5GHz Radio - nonTxBF - using test mode

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	6Mbs	0.89	Yes	0.558	0.51	1.01	1792
n20	MSC0	0.99	Yes	4.96	0	0	10
n40	MCS0	0.97	Yes	2.408	0.11	0.22	415
ac80	VHT0	0.96	Yes	1.139	0.19	0.37	878

\* Correction factor when using RMS/Power averaging -  $10 \cdot \log(1/x)$

\*\* Correction factor when using linear voltage average -  $20 \cdot \log(1/x)$

T = Minimum transmission duration

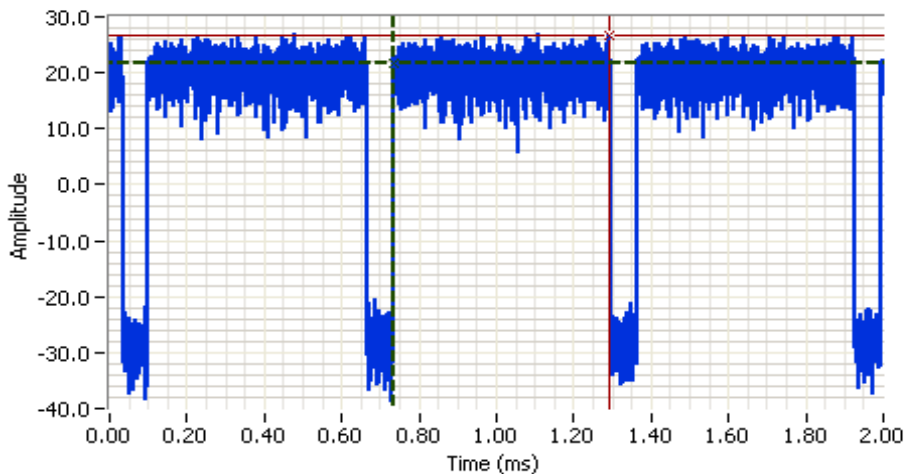
**NTS**

WE ENGINEER SUCCESS

## EMC Test Data

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

Mode: 11a

**Analyzer Settings**

Agilent Technologies, E4446A  
CF: 5200.000 MHz  
SPAN: 0.000 MHz  
RB: 8.000 MHz  
VB: 8.000 MHz  
Detector: POS  
Attn: 40 DB  
RL Offset: 11.7 DB  
Sweep Time: 2.0ms  
Ref Lvl: 36.7 DBM

**Comments**

11a - 6Mb/s  
Tx on = 0.558ms

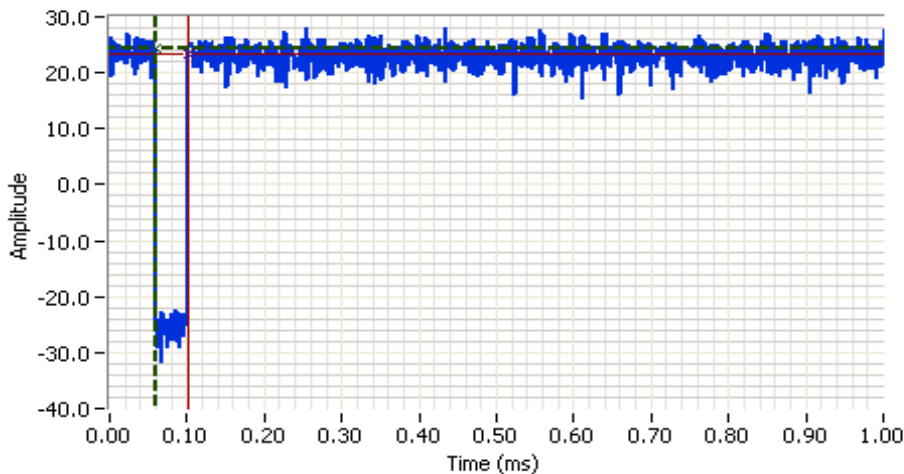
Cursor 1	0.7328	21.8	
Cursor 2	1.2909	26.6	

Delta Time (ms)	0.558
Delta Amplitude	4.7



Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

Mode: n/ac 20MHz (non-TxBF)

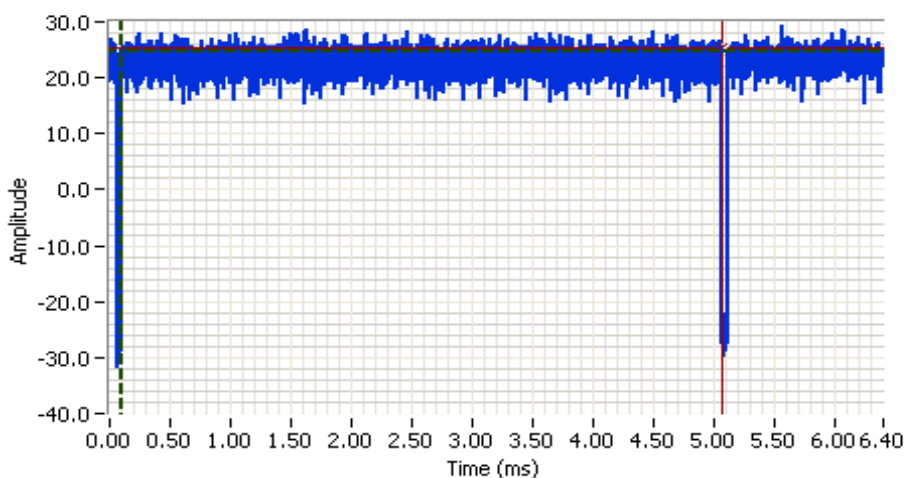


## Analyzer Settings

Agilent Technologies, E4446A  
 CF: 5200.000 MHz  
 SPAN: 0.000 MHz  
 RB: 8.000 MHz  
 VB: 8.000 MHz  
 Detector: POS  
 Attn: 40 DB  
 RL Offset: 11.7 DB  
 Sweep Time: 6.4ms  
 Ref Lvl: 36.7 DBM

## Comments

n20 - MSC0  
 Tx on = 4.960ms  
 Tx off = 0.042ms



## Analyzer Settings

Agilent Technologies, E4446A  
 CF: 5200.000 MHz  
 SPAN: 0.000 MHz  
 RB: 8.000 MHz  
 VB: 8.000 MHz  
 Detector: POS  
 Attn: 40 DB  
 RL Offset: 11.7 DB  
 Sweep Time: 6.4ms  
 Ref Lvl: 36.7 DBM

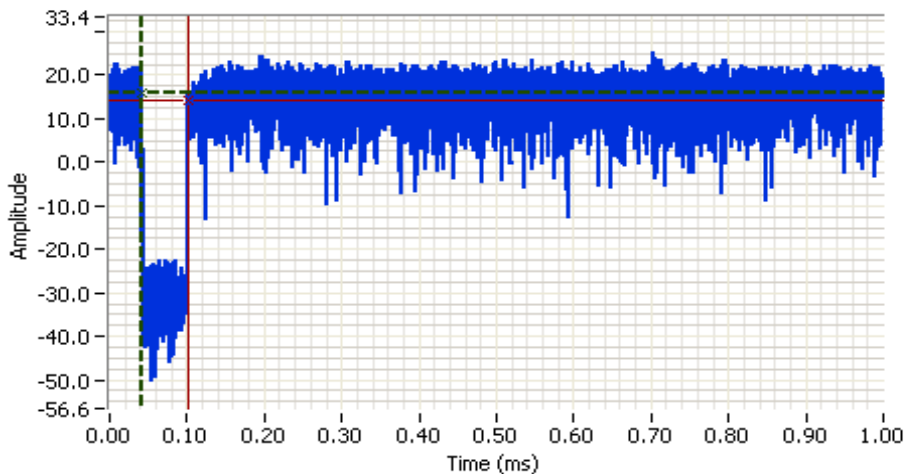
## Comments

n20 - MSC0  
 Tx on = 4.960ms



Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

Mode: n/ac 40MHz (non-TxBF)



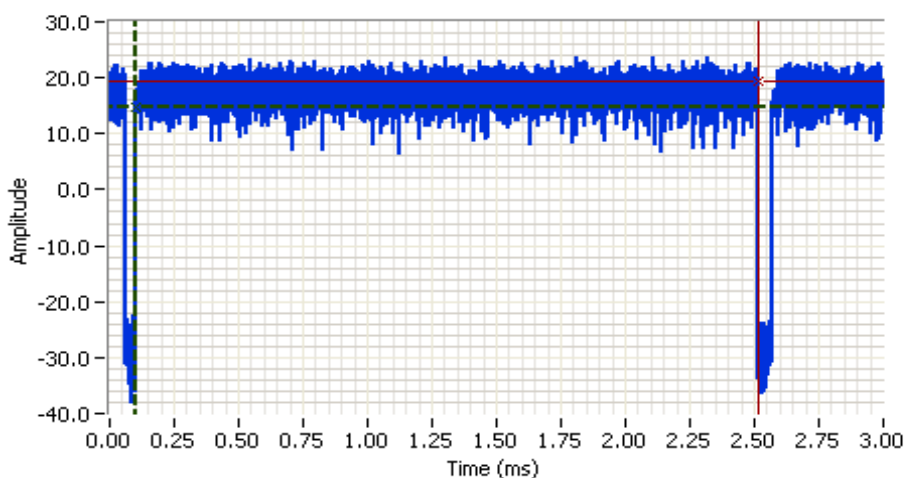
## Analyzer Settings

Agilent Technologies, E4446A  
 CF: 5190.000 MHz  
 SPAN: 0.000 MHz  
 RB: 8.000 MHz  
 VB: 8.000 MHz  
 Detector: POS  
 Attn: 40 DB  
 RL Offset: 11.7 DB  
 Sweep Time: 1.0ms  
 Ref Lvl: 36.7 DBM

## Comments

n40 - MSC0  
 Tx off = 0.062ms

Cursor 1	0.0404	15.9		Delta Time (ms)	0.062
Cursor 2	0.1019	14.1		Delta Amplitude	1.8



## Analyzer Settings

Agilent Technologies, E4446A  
 CF: 5190.000 MHz  
 SPAN: 0.000 MHz  
 RB: 8.000 MHz  
 VB: 8.000 MHz  
 Detector: POS  
 Attn: 40 DB  
 RL Offset: 11.7 DB  
 Sweep Time: 3.0ms  
 Ref Lvl: 36.7 DBM

## Comments

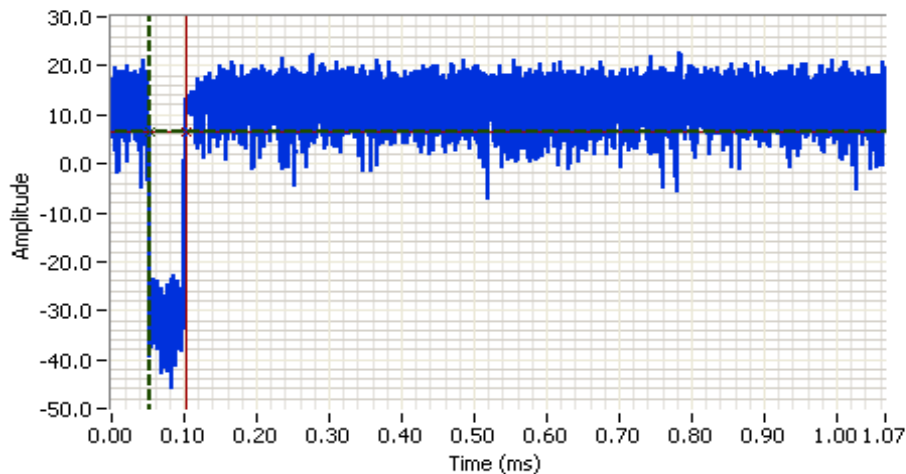
n40 - MSC0  
 Tx on = 2.408ms

Cursor 1	0.1050	14.6		Delta Time (ms)	2.408
Cursor 2	2.5128	19.3		Delta Amplitude	4.7



Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

Mode: ac 80MHz (non-TxBF)

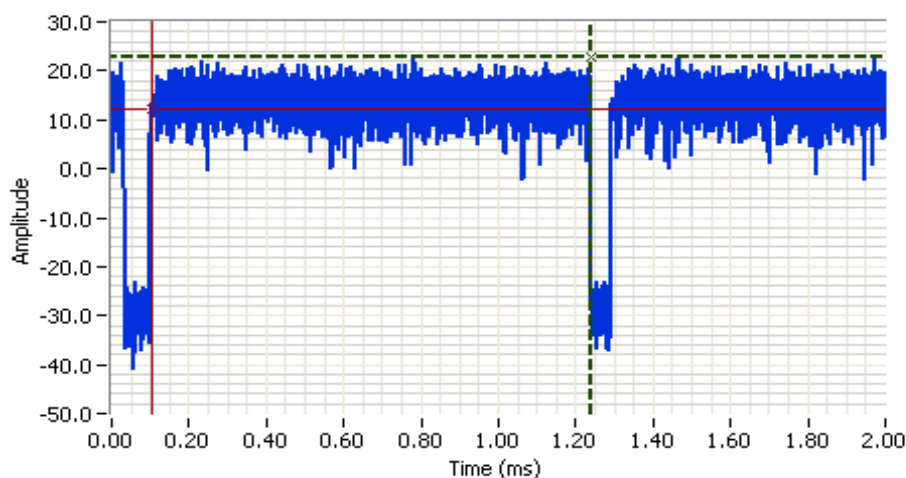


## Analyzer Settings

Agilent Technologies, E4446A  
 CF: 5210.000 MHz  
 SPAN: 0.000 MHz  
 RB: 8.000 MHz  
 VB: 8.000 MHz  
 Detector: POS  
 Attn: 40 DB  
 RL Offset: 11.7 DB  
 Sweep Time: 1.1ms  
 Ref Lvl: 36.7 DBM

## Comments

ac80 -VHT0  
 Tx off = 0.050ms



## Analyzer Settings

Agilent Technologies, E4446A  
 CF: 5210.000 MHz  
 SPAN: 0.000 MHz  
 RB: 8.000 MHz  
 VB: 8.000 MHz  
 Detector: POS  
 Attn: 40 DB  
 RL Offset: 11.7 DB  
 Sweep Time: 2.0ms  
 Ref Lvl: 36.7 DBM

## Comments

ac80 -VHT0  
 Tx on = 1.139ms



Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## RSS-247 and FCC 15.407 (UNII) Radiated Spurious Emissions

### Test Specific Details

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

### General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.  
 For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

### Ambient Conditions:

Temperature: 21.9 °C  
 Rel. Humidity: 52 %

### Summary of Results

Run #	Mode	Channel	Target Power	Passing Power Setting	Test Performed	Limit	Result / Margin
20MHz Bandwidth Modes							
1	a	36 - 5180MHz	-	20	Restricted Band Edge at 5150 MHz	15.209	53.2 dBµV/m @ 5148.4 MHz (-0.8 dB)
	a	40 - 5200MHz	-	23	Restricted Band Edge at 5150 MHz	15.209	49.6 dBµV/m @ 5150.0 MHz (-4.4 dB)
4	a	149 - 5745MHz	-	23	Band Edge 5725 MHz	15E	Pass, refer to plot
	a	165 - 5825MHz	-	23	Band Edge 5850MHz	15E	Pass, refer to plot
5	n20	36 - 5180MHz	-	21	Restricted Band Edge at 5150 MHz	15.209	53.1 dBµV/m @ 5149.9 MHz (-0.9 dB)
8	n20	149 - 5745MHz	-	23	Band Edge 5725 MHz	15E	Pass, refer to plot
	n20	165 - 5825MHz	-	23	Band Edge 5850MHz	15E	Pass, refer to plot

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

Run #	Mode	Channel	Target Power	Passing Power Setting	Test Performed	Limit	Result / Margin
40MHz Bandwidth Modes							
9	n40	38 - 5190MHz	-	15	Restricted Band Edge at 5150 MHz	15.209	53.4 dBµV/m @ 5149.8 MHz (-0.6 dB)
	n40	46 - 5230MHz	-	23	Restricted Band Edge at 5150 MHz	15.209	48.7 dBµV/m @ 5150.0 MHz (-5.3 dB)
12	n40	151 - 5755MHz	-	23	Band Edge 5725 MHz	15E	Pass, refer to plot
	n40	159 - 5795MHz	-	23	Band Edge 5850MHz	15E	Pass, refer to plot
80MHz Bandwidth Modes							
13	ac80	42 - 5210MHz	-	15	Restricted Band Edge at 5150 MHz	15.209	53.2 dBµV/m @ 5138.2 MHz (-0.8 dB)
16	ac80	155 - 5775MHz	-	23	Band Edge 5725 MHz	15E	Pass, refer to plot.
	ac80	155 - 5775MHz	-	23	Band Edge 5850MHz	15E	Pass, refer to plot.

## 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.

## Procedure Comments:

Measurements performed in accordance with FCC KDB 789033

Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time

Unless otherwise stated/noted, emission has duty cycle  $\geq 98\%$  and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold 50 traces. (method VB of KDB 789033)

Additional channels were assessed for bandedge compliance when the adjacent outer channel was more than 3dB below the center channel target power.

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	6Mbs	0.89	Yes	0.558	0.51	1.01	1792
n20	MSC0	0.99	Yes	4.96	0	0	10
n40	MCS0	0.97	Yes	2.408	0.11	0.22	415
ac80	VHT0	0.96	Yes	1.139	0.19	0.37	878

## Sample Notes

Sample S/N: 184795206016480

Driver:

Antenna: 4x4 internal

## Measurement Specific Notes:

Note 1:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector). Per KDB 789033 2) c) (i), compliance can be demonstrated by meeting the average and peak limits of 15.209, as an alternative.
Note 3:	Emission has constant duty cycle < 98%, average measurement performed: RBW=1MHz, VBW>1/T but not less than 10Hz, peak detector, linear averaging, auto sweep, max hold 50*1/DC traces (method VB of KDB 789033)
Note 5:	Plots of the average and peak bandedge do not account for any duty cycle correction. Refer to the tabular results for final measurements.

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Run #1: Radiated Bandedge Measurements, 5150-5250MHz

Date of Test: 9/29/2016  
 Test Engineer: Rafael Varelas  
 Test Location: Fremont CH #7

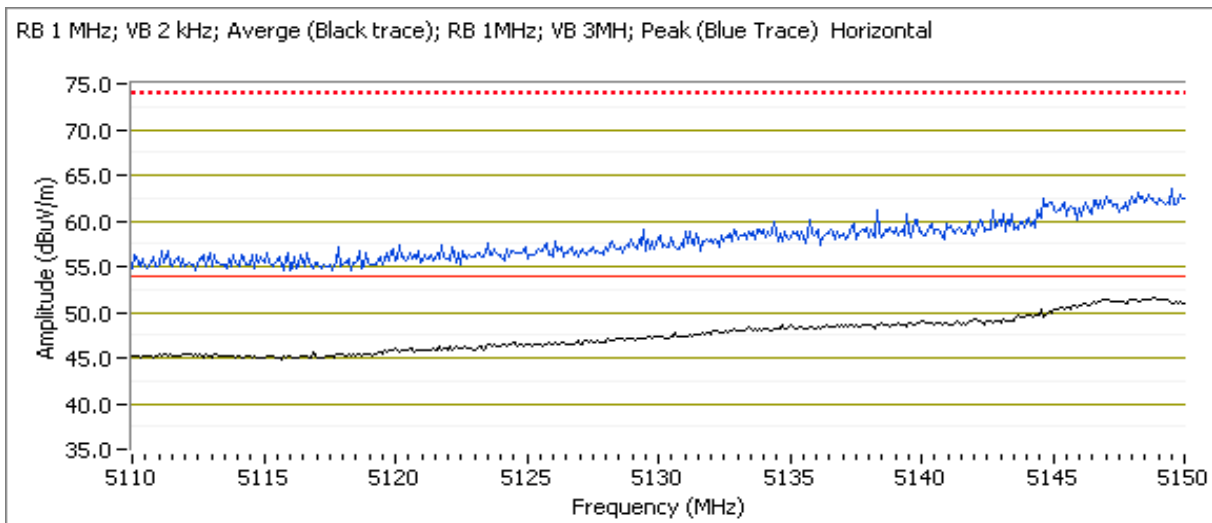
Config. Used: 1  
 Config Change: None  
 EUT Voltage: 120V/60Hz

Channel: 36 - 5180 MHz  
 Tx Chain: 4Tx  
 Mode: a  
 Data Rate: 6 Mbs

EUT Orientation: Flat  
 Power setting: 20

### 5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5148.380	53.2	H	54.0	-0.8	Avg	139	1.6	POS; RB 1 MHz; VB: 2 kHz
5149.310	65.4	H	74.0	-8.6	PK	139	1.6	POS; RB 1 MHz; VB: 3 MHz
5149.400	46.4	V	54.0	-7.6	Avg	166	1.7	POS; RB 1 MHz; VB: 2 kHz
5145.470	59.0	V	74.0	-15.0	PK	166	1.7	POS; RB 1 MHz; VB: 3 MHz



Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

Channel: 36 - 5180 MHz

Tx Chain: 4Tx

Mode: a

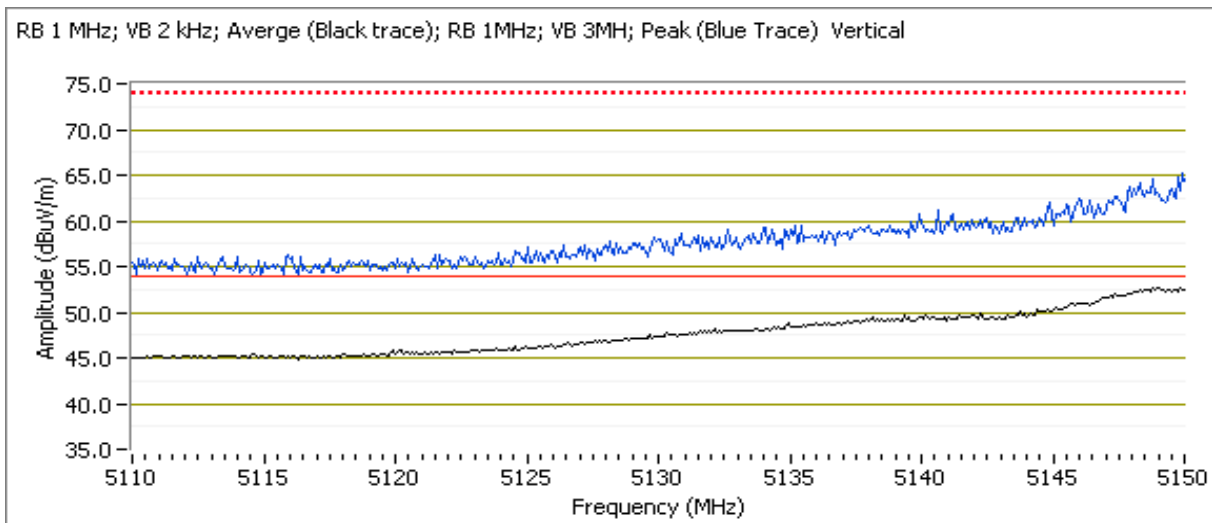
Data Rate: 6 Mbs

EUT Orientation: Upright

Power setting: 20

## 5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.400	50.9	H	54.0	-3.1	Avg	78	2.0	POS; RB 1 MHz; VB: 2 kHz
5149.880	64.9	H	74.0	-9.1	PK	78	2.0	POS; RB 1 MHz; VB: 3 MHz
5148.980	52.6	V	54.0	-1.4	Avg	360	1.9	POS; RB 1 MHz; VB: 2 kHz
5148.380	65.3	V	74.0	-8.7	PK	360	1.9	POS; RB 1 MHz; VB: 3 MHz



Based on the above results, all testing was performed with the EUT flat with the measurement antenna in a horizontal polarization orientation

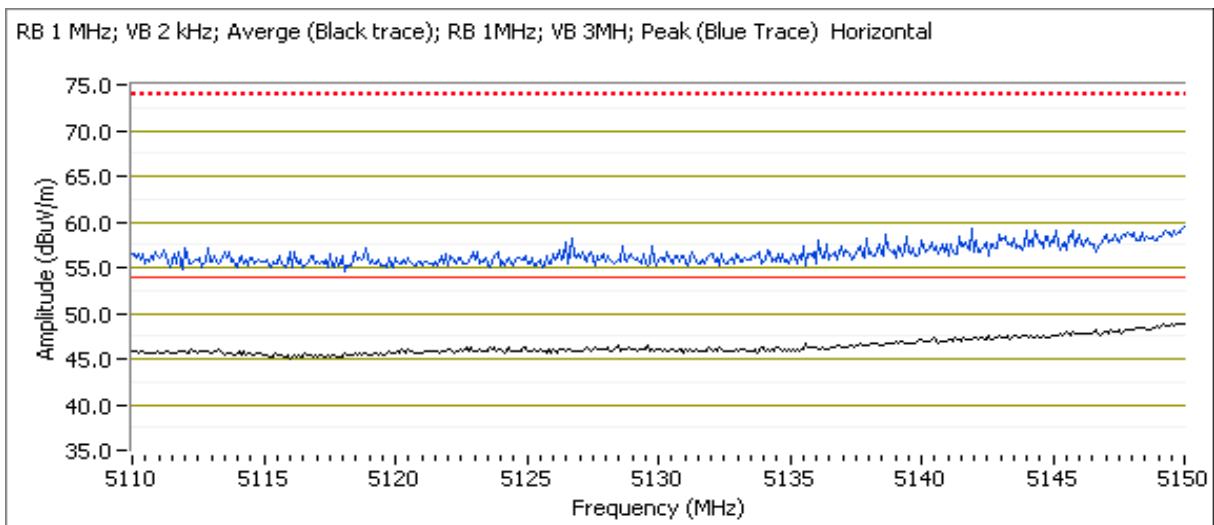
Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

Channel: 40 - 5200 MHz  
 Tx Chain: 4Tx  
 Mode: a  
 Data Rate: 6 Mbs

EUT Orientation: Flat  
 Power setting: 23

## 5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.970	49.6	H	54.0	-4.4	Avg	56	1.6	POS; RB 1 MHz; VB: 2 kHz
5149.970	60.5	H	74.0	-13.5	PK	56	1.6	POS; RB 1 MHz; VB: 3 MHz



Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

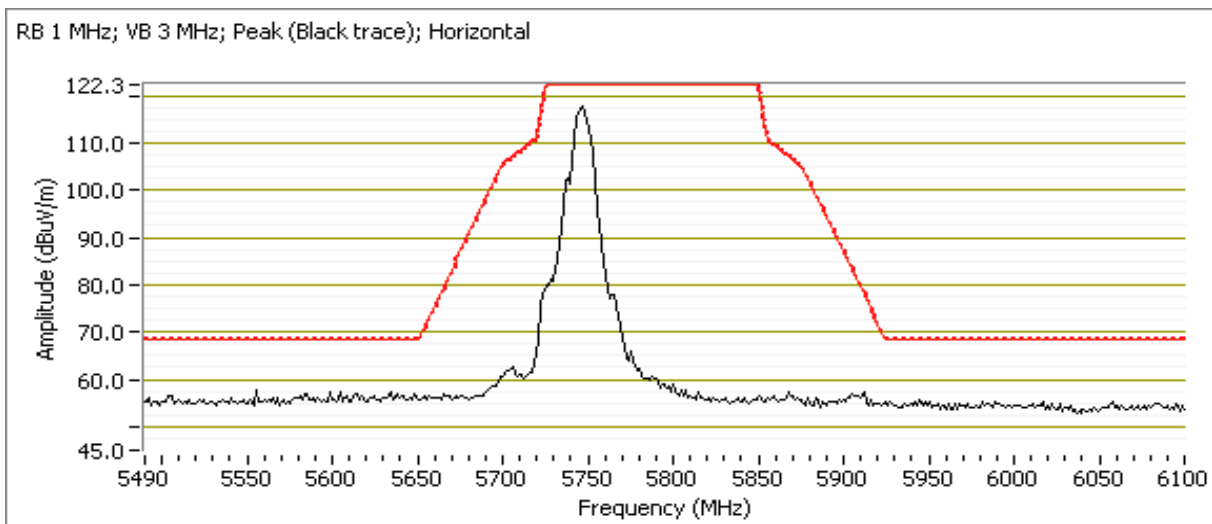
## Run #4: Radiated Bandedge Measurements, 5725-5850MHz

Date of Test: 9/29/2016  
 Test Engineer: Rafael Varelas  
 Test Location: Fremont CH #7

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

Channel: 149 - 5745MHz  
 Tx Chain: 4Tx  
 Mode: a  
 Data Rate: 6 Mbs

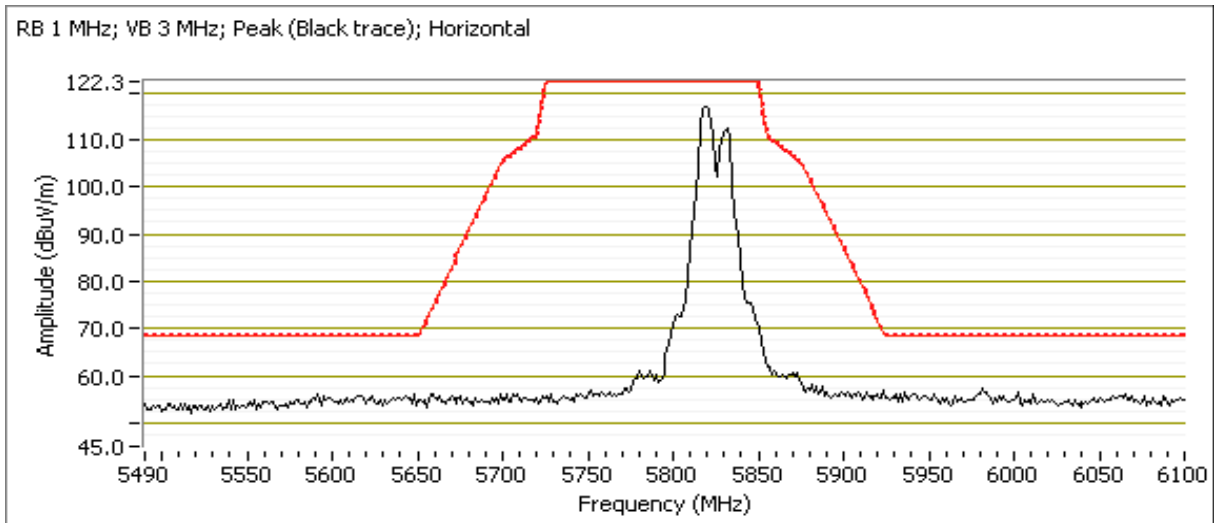
EUT Orientation: Flat  
 Power setting: 23



Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

Channel: 165 - 5825MHz  
 Tx Chain: 4Tx  
 Mode: a  
 Data Rate: 6 Mbs

EUT Orientation: Flat  
 Power setting: 23



Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Run #5: Radiated Bandedge Measurements, 5150-5250MHz

Date of Test: 9/29/2016  
 Test Engineer: Rafael Varelas  
 Test Location: Fremont CH #7

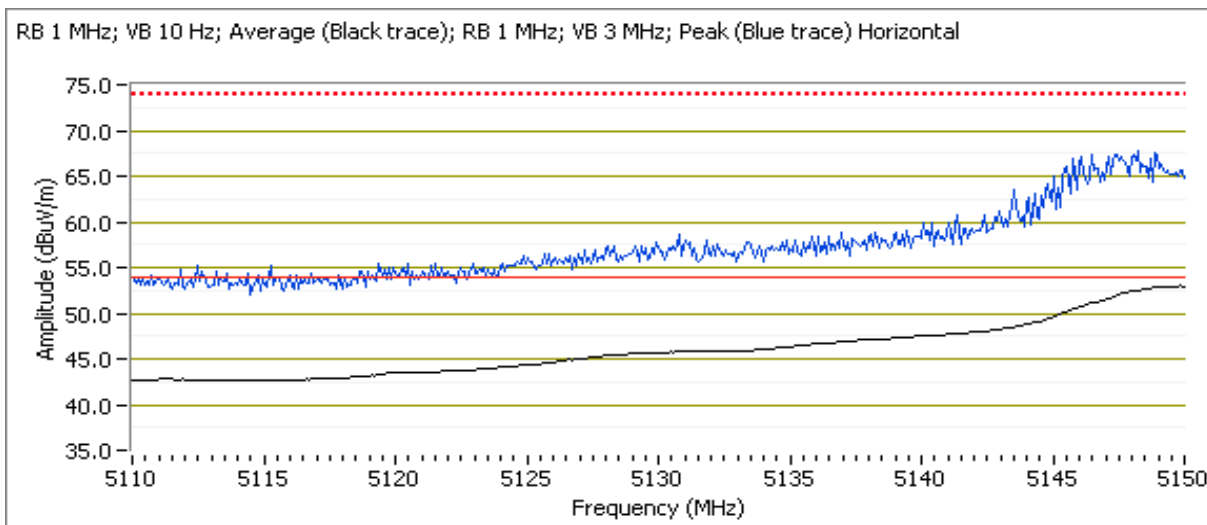
Config. Used: 1  
 Config Change: None  
 EUT Voltage: 120V/60Hz

Channel: 36 - 5180 MHz  
 Tx Chain: 4Tx  
 Mode: n20  
 Data Rate: MCS0

EUT Orientation: Flat  
 Power setting: 21

### 5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.930	53.1	H	54.0	-0.9	AVG	360	1.6	POS; RB 1 MHz; VB: 10 Hz
5147.960	68.2	H	74.0	-5.8	PK	360	1.6	POS; RB 1 MHz; VB: 3 MHz



Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

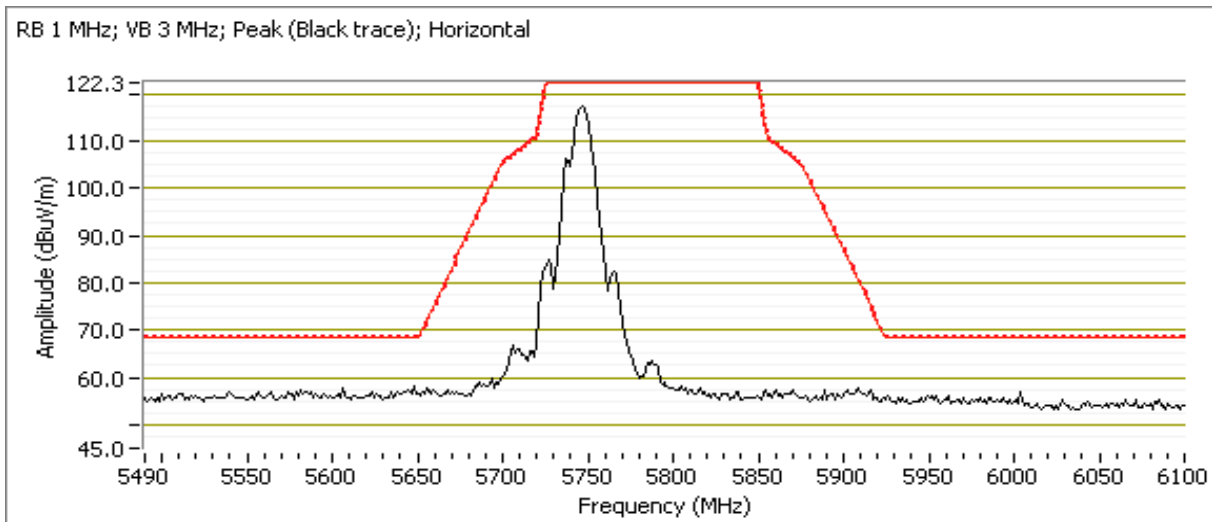
## Run #8: Radiated Bandedge Measurements, 5725-5850MHz

Date of Test: 9/29/2016  
 Test Engineer: Rafael Varelas  
 Test Location: Fremont CH #7

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

Channel: 149 - 5745MHz  
 Tx Chain: 4Tx  
 Mode: n20  
 Data Rate: MCS0

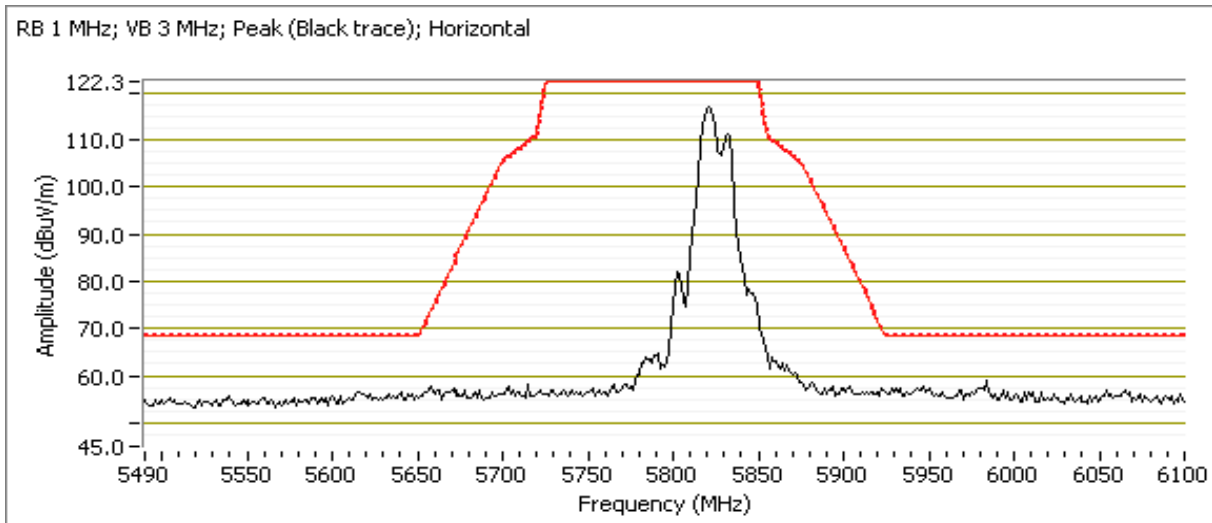
EUT Orientation: Flat  
 Power setting: 23



Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

Channel: 165 - 5825MHz  
 Tx Chain: 4Tx  
 Mode: n20  
 Data Rate: MCS0

EUT Orientation: Flat  
 Power setting: 23



Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Run #9: Radiated Bandedge Measurements, 5150-5250MHz

Date of Test: 9/29/2016  
 Test Engineer: Rafael Varelas  
 Test Location: Fremont CH #7

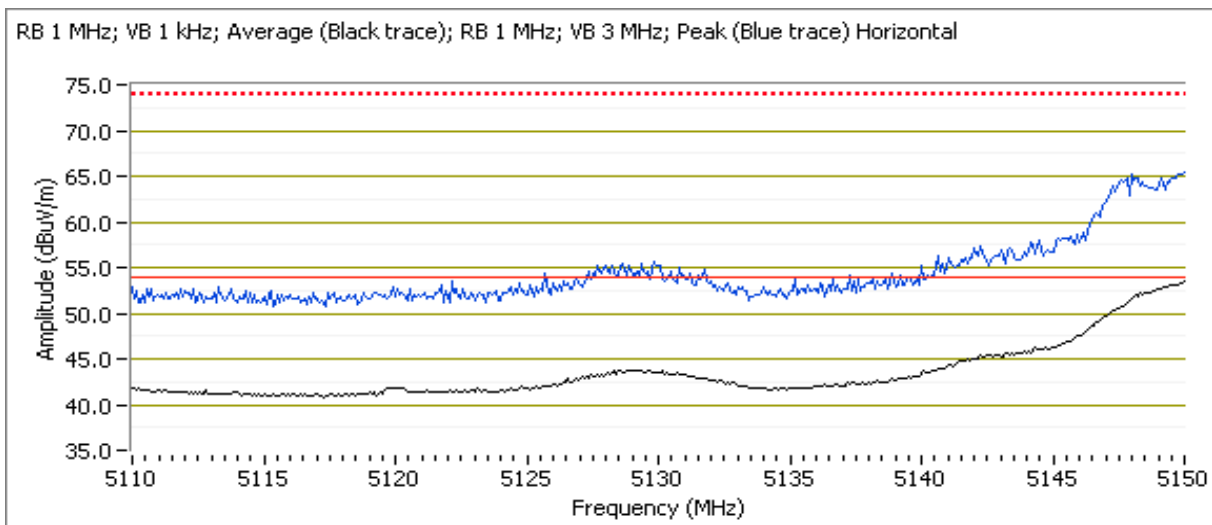
Config. Used: 1  
 Config Change: None  
 EUT Voltage: 120V/60Hz

Channel: 38 - 5190 MHz  
 Tx Chain: 4Tx  
 Mode: n40  
 Data Rate: MCS0

EUT Orientation: Flat  
 Power setting: 15

### 5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.820	53.4	H	54.0	-0.6	Avg	167	1.7	POS; RB 1 MHz; VB: 1 kHz
5149.560	66.3	H	74.0	-7.7	PK	167	1.7	POS; RB 1 MHz; VB: 3 MHz



**NTS**

WE ENGINEER SUCCESS

## EMC Test Data

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

Channel: 46 - 5230 MHz

EUT Orientation: Flat

Tx Chain: 4Tx

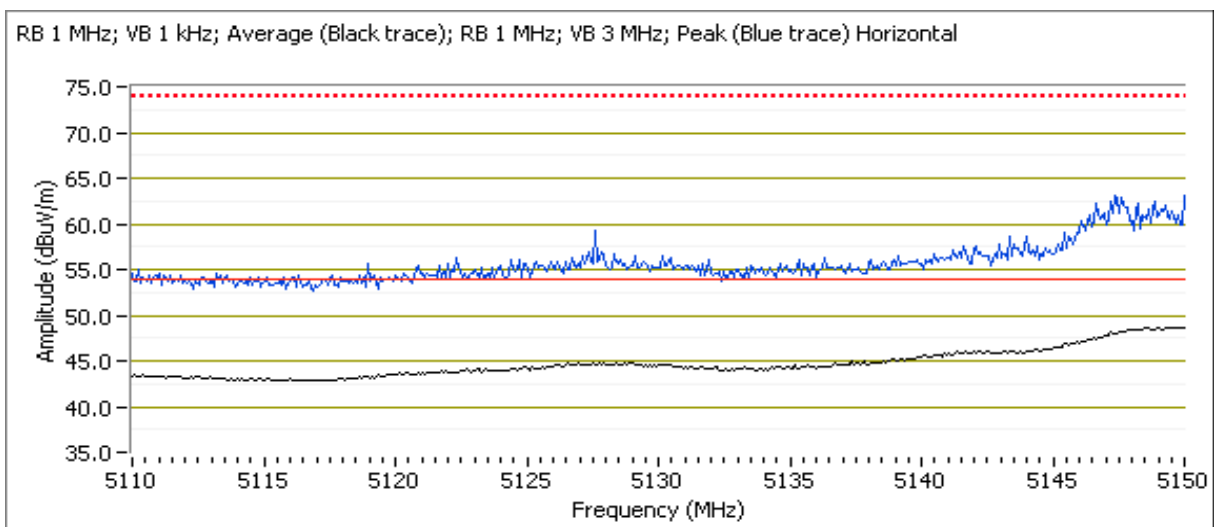
Power setting: 23

Mode: n40

Data Rate: MCS0

### 5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.970	48.7	H	54.0	-5.3	Avg	152	2.0	POS; RB 1 MHz; VB: 1 kHz
5147.040	62.8	H	74.0	-11.2	PK	152	2.0	POS; RB 1 MHz; VB: 3 MHz



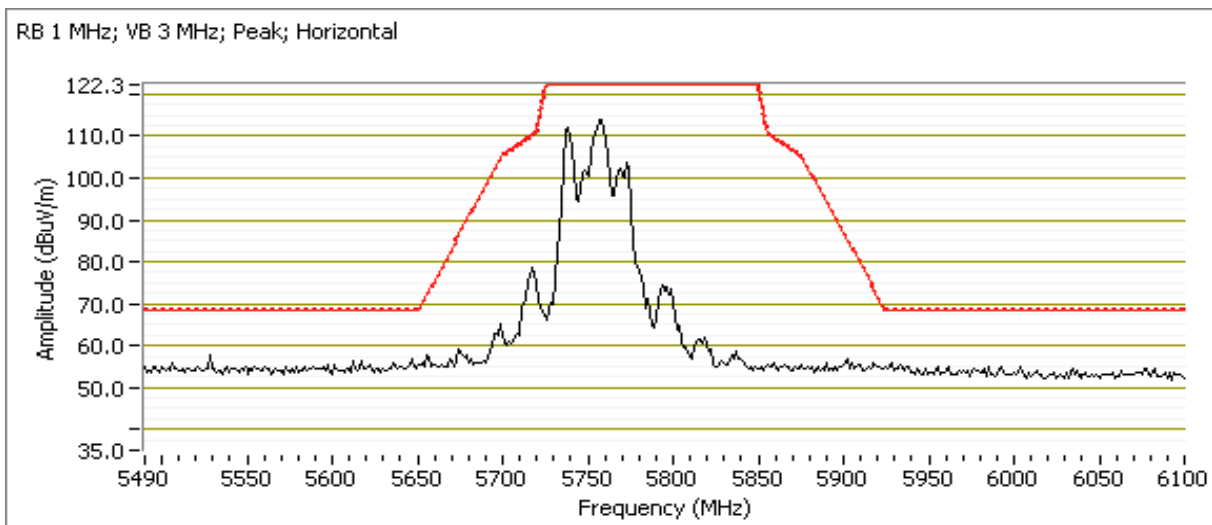
Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Run #12: Radiated Bandedge Measurements, 5725-5850MHz

Date of Test: 9/29/2016  
 Test Engineer: Rafael Varelas  
 Test Location: Fremont CH #7

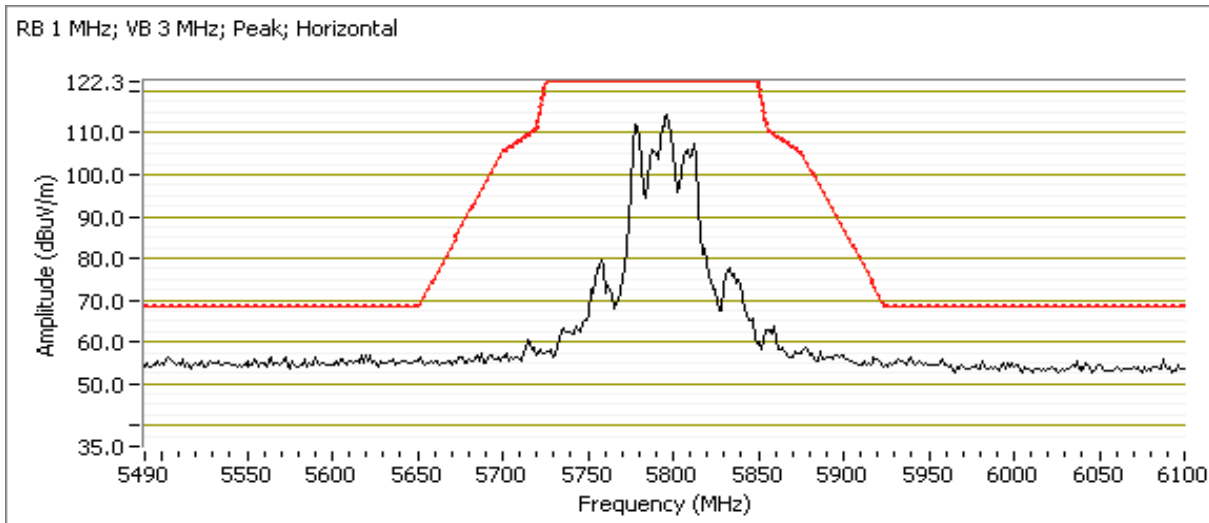
Config. Used: 1  
 Config Change: None  
 EUT Voltage: 120V/60Hz

Channel: 151 - 5755MHz  
 Tx Chain: 4Tx  
 Mode: n40  
 Data Rate: MCS0



Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

Channel: 159 - 5795MHz  
 Tx Chain: 4Tx  
 Mode: n40  
 Data Rate: MCS0



Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Run #13: Radiated Bandedge Measurements, 5150-5250MHz

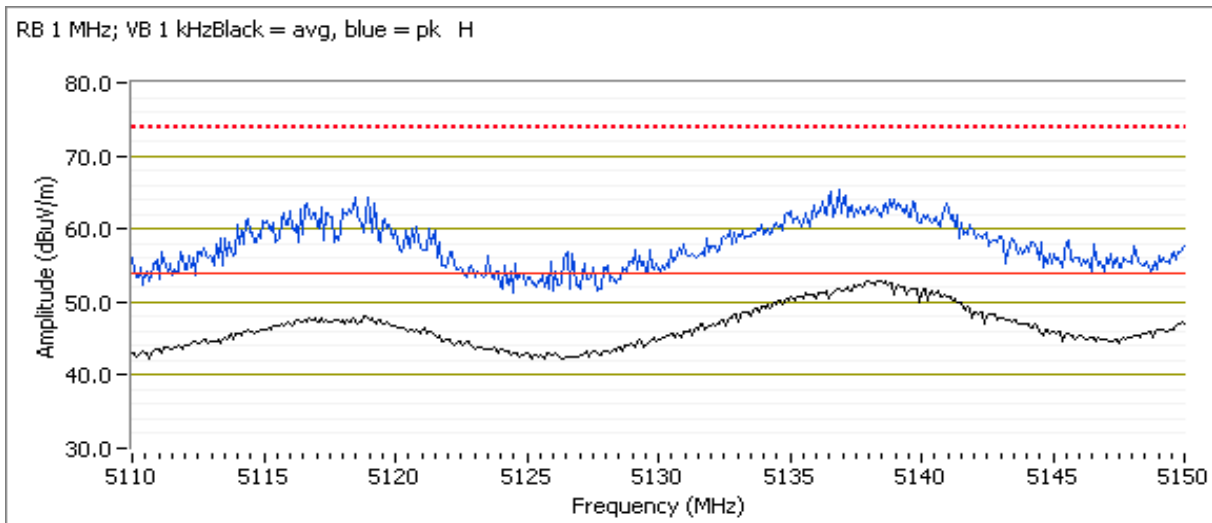
Date of Test: 9/30/2016 0:00  
 Test Engineer: John Caizzi & Kevin Wen  
 Test Location: Chamber 7

Config. Used: 1  
 Config Change: none  
 EUT Voltage: 120V / 60Hz

Channel: 42 - 5210MHz  
 Tx Chain: 4Tx  
 Mode: ac80  
 Data Rate: MCS0  
 EUT Orientation: Flat  
 Power setting: 15

### 5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5138.220	53.2	H	54.0	-0.8	Avg	8	1.39	RB 1 MHz, VB 1 kHz, note 3.
5117.370	65.1	H	74.0	-8.9	PK	8	1.39	



Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

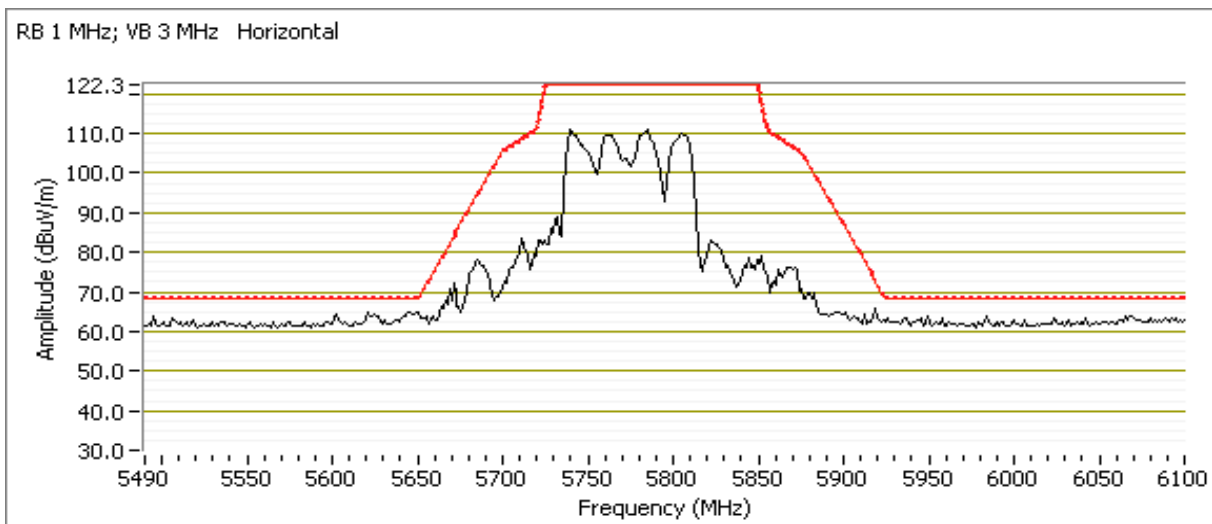
## Run #16: Radiated Bandedge Measurements, 5725-5850MHz

Date of Test: 9/30/2016 0:00  
 Test Engineer: John Caizzi & Kevin Wen  
 Test Location: Chamber 7

Config. Used: 1  
 Config Change: none  
 EUT Voltage: 120V / 60Hz

Channel: 155 - 5775MHz  
 Tx Chain: 4Tx  
 Mode: ac80  
 Data Rate: MCS0

EUT Orientation: Flat  
 Power setting: 23



Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## RSS-247 and FCC 15.407 (UNII) Radiated Spurious Emissions

### Test Specific Details

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

### General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.  
 For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

### Ambient Conditions:

Temperature: 22.6 °C  
 Rel. Humidity: 37 %

### Summary of Results

Run #	Mode	Channel	Target Power	Passing Power Setting	Test Performed	Limit	Result / Margin
<b>20MHz Bandwidth Modes</b>							
5	n20	36 - 5180MHz	23	19	Restricted Band Edge at 5150 MHz	15.209	53.4 dBµV/m @ 5149.7 MHz (-0.6 dB)
	n20	40 - 5200MHz	23	23	Restricted Band Edge at 5150 MHz	15.209	52.5 dBµV/m @ 5148.1 MHz (-1.5 dB)
8	n20	149 - 5745MHz	23	23	Band Edge 5725 MHz	15E	Pass, refer to plots
	n20	165 - 5825MHz	23	23	Band Edge 5850MHz	15E	Pass, refer to plots
<b>40MHz Bandwidth Modes</b>							
9	n40	38 - 5190MHz	23	17	Restricted Band Edge at 5150 MHz	15.209	53.1 dBµV/m @ 5150.0 MHz (-0.9 dB)
9	n40	46 - 5230MHz	23	23	Restricted Band Edge at 5150 MHz	15.209	48.8 dBµV/m @ 5147.4 MHz (-5.2 dB)
12	n40	151 - 5755MHz	23	23	Band Edge 5725 MHz	15E	Pass, refer to plots
	n40	159 - 5795MHz	23	23	Band Edge 5850MHz	15E	Pass, refer to plots

**NTS**

WE ENGINEER SUCCESS

## EMC Test Data

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

Run #	Mode	Channel	Target Power	Passing Power Setting	Test Performed	Limit	Result / Margin
80MHz Bandwith Modes							
13	ac80	42 - 5210MHz	23	13	Restricted Band Edge at 5150 MHz	15.209	53.1 dBµV/m @ 5149.2 MHz (-0.9 dB)
16	ac80	155 - 5775MHz	23	23	Band Edge 5725 MHz	15E	64.1 dBµV/m @ 5648.0 MHz (-4.2 dB)
	ac80	155 - 5775MHz	23	23	Band Edge 5850MHz	15E	64.4 dBµV/m @ 5930.0 MHz (-3.9 dB)

Beamforming supported for 11n/11ac modes

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		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.

## Procedure Comments:

Measurements performed in accordance with FCC KDB 789033

Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time

Unless otherwise stated/noted, emission has duty cycle  $\geq 98\%$  and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold 50 traces. (method VB of KDB 789033)

Additional channels were assessed for bandedge compliance when the adjacent outer channel was more than 3dB below the center channel target power.

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11n20	MCS0	83%	NO	4.17	0.79	1.58	240
11n40	MCS0	34%	NO	1.71	4.67	9.33	586
ac80	VHT0	17%	NO	0.84	7.75	15.49	1190

## Sample Notes

Sample S/N: 184795206016480

Driver: -

Antenna: 4x4 internal

## Measurement Specific Notes:

Note 1:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB $\geq$ 3MHz, peak detector). Per KDB 789033 2) c) (i), compliance can be demonstrated by meeting the average and peak limits of 15.209, as an alternative.
Note 2:	Emission has a duty cycle $\geq 98\%$ , average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces (method AD of KDB 789033)
Note 3:	Emission has non constant duty cycle $< 98\%$ , average measurement performed: RBW=1MHz, VBW $> 1/T$ , peak detector, linear average mode, sweep time auto, max hold. Max hold for $50 \cdot (1/DC)$ traces
Note 5:	Plots of the average and peak bandedge do not account for any duty cycle correction. Refer to the tabular results for final measurements.

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Run #5: Radiated Bandedge Measurements, 5150-5250MHz

Date of Test: 9/28/2016  
 Test Engineer: Rafael Varelas  
 Test Location: Fremont CH #7

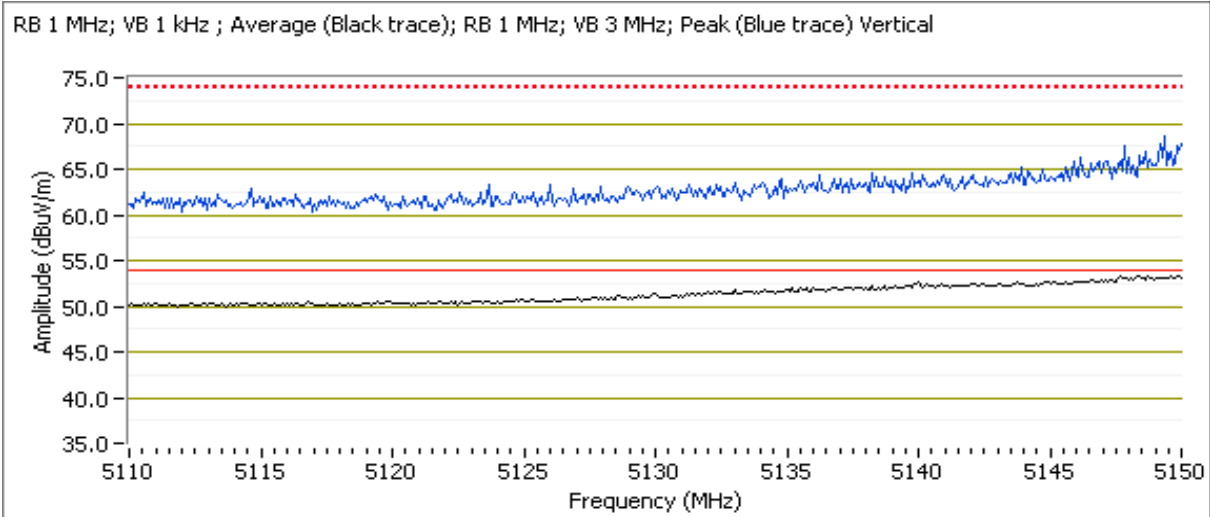
Config. Used: 2  
 Config Change: None  
 EUT Voltage: 120V/60Hz

Channel: 36 - 5180 MHz  
 Tx Chain: 4Tx  
 Mode: n20  
 Data Rate: MCS0

EUT Orientation: Upright  
 Power setting: 19

### 5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5148.680	50.7	H	54.0	-3.3	Avg	236	1.7	POS; RB 1 MHz; VB: 1 kHz
5147.480	65.2	H	74.0	-8.8	PK	236	1.7	POS; RB 1 MHz; VB: 3 MHz
5148.560	53.3	V	54.0	-0.7	Avg	360	1.4	POS; RB 1 MHz; VB: 1 kHz
5149.520	66.8	V	74.0	-7.2	PK	360	1.4	POS; RB 1 MHz; VB: 3 MHz



Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

Channel: 36 - 5180 MHz

EUT Orientation: Flat

Tx Chain: 4Tx

Power setting: 19

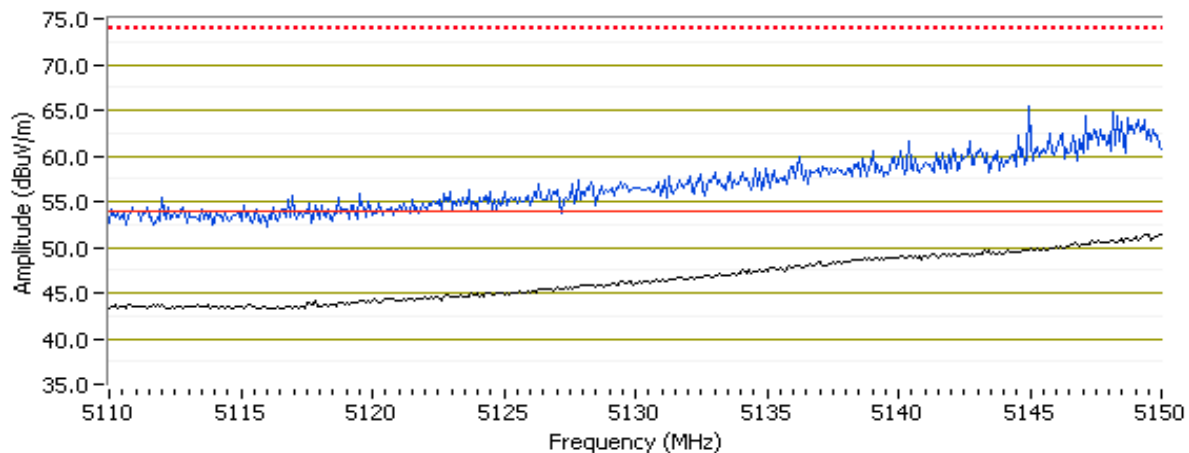
Mode: n20

Data Rate: MCS0

## 5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.680	53.4	H	54.0	-0.6	Avg	360	1.5	POS; RB 1 MHz; VB: 1 kHz
5148.200	46.8	V	54.0	-7.2	Avg	0	1.4	POS; RB 1 MHz; VB: 1 kHz
5146.790	65.1	H	74.0	-8.9	PK	360	1.5	POS; RB 1 MHz; VB: 3 MHz
5148.560	60.8	V	74.0	-13.2	PK	0	1.4	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 1 kHz ; Average (Black trace); RB 1 MHz; VB 3 MHz; Peak (Blue trace) Horizontal



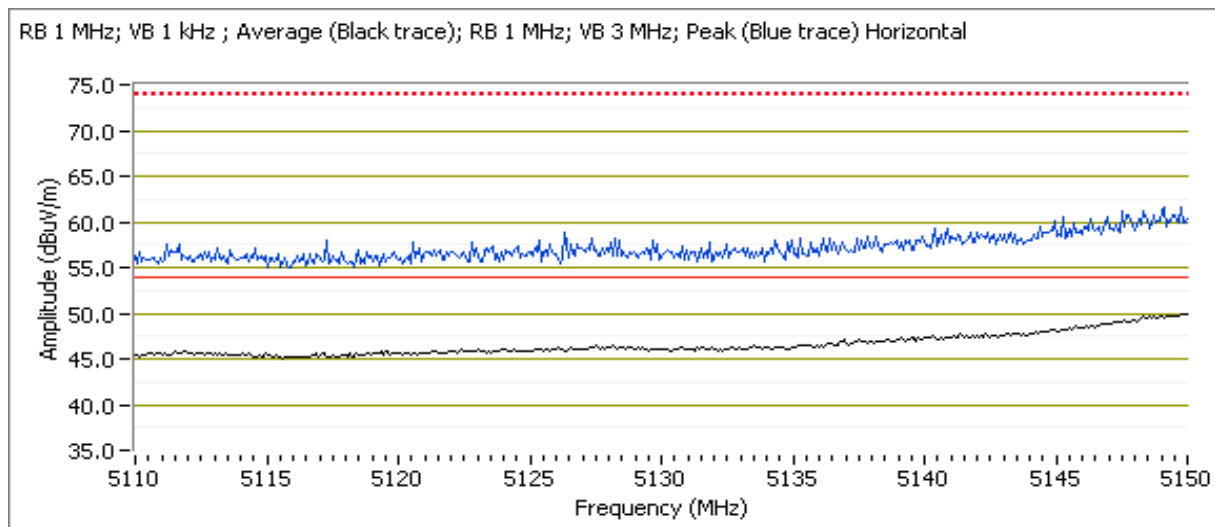
Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

Channel: 40 - 5200 MHz  
 Tx Chain: 4Tx  
 Mode: n20  
 Data Rate: MCS0

EUT Orientation: Flat  
 Power setting: 23

## 5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5148.080	52.5	H	54.0	-1.5	Avg	360	1.5	POS; RB 1 MHz; VB: 1 kHz
5149.520	63.6	H	74.0	-10.4	PK	360	1.5	POS; RB 1 MHz; VB: 3 MHz



Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

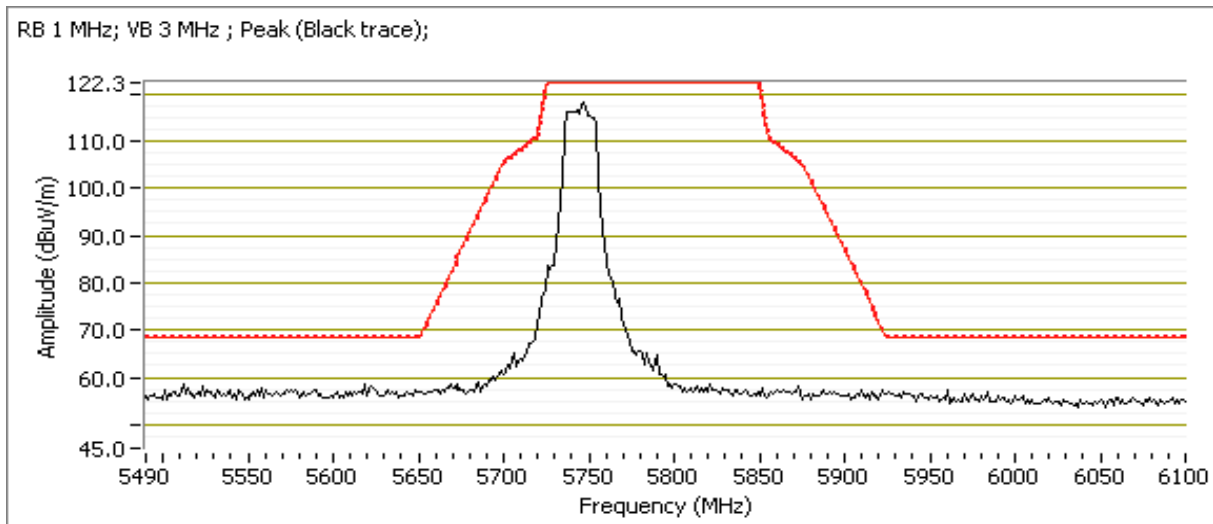
## Run #8: Radiated Bandedge Measurements, 5725-5850MHz

Date of Test: 9/28/2016  
 Test Engineer: Rafael Varelas  
 Test Location: Fremont CH #7

Config. Used: 2  
 Config Change: None  
 EUT Voltage: 120V/60Hz

Channel: 149 - 5745MHz  
 Tx Chain: 4Tx  
 Mode: n20  
 Data Rate: MCS0

EUT Orientation: Flat  
 Power setting: 23

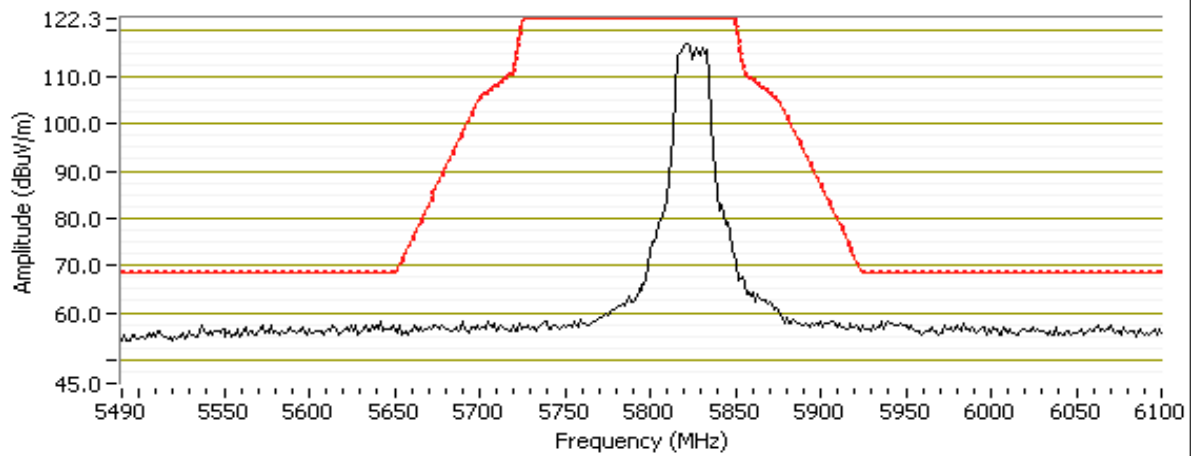


Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

Channel: 165 - 5825MHz  
 Tx Chain: 4Tx  
 Mode: n20  
 Data Rate: MCS0

EUT Orientation: Flat  
 Power setting: 23

RB 1 MHz; VB 3 MHz ; Peak (Black trace);



Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Run #9: Radiated Bandedge Measurements, 5150-5250MHz

Date of Test: 9/28/2016  
 Test Engineer: Rafael Varelas  
 Test Location: Fremont CH #7

Config. Used: 2  
 Config Change: None  
 EUT Voltage: 120V/60Hz

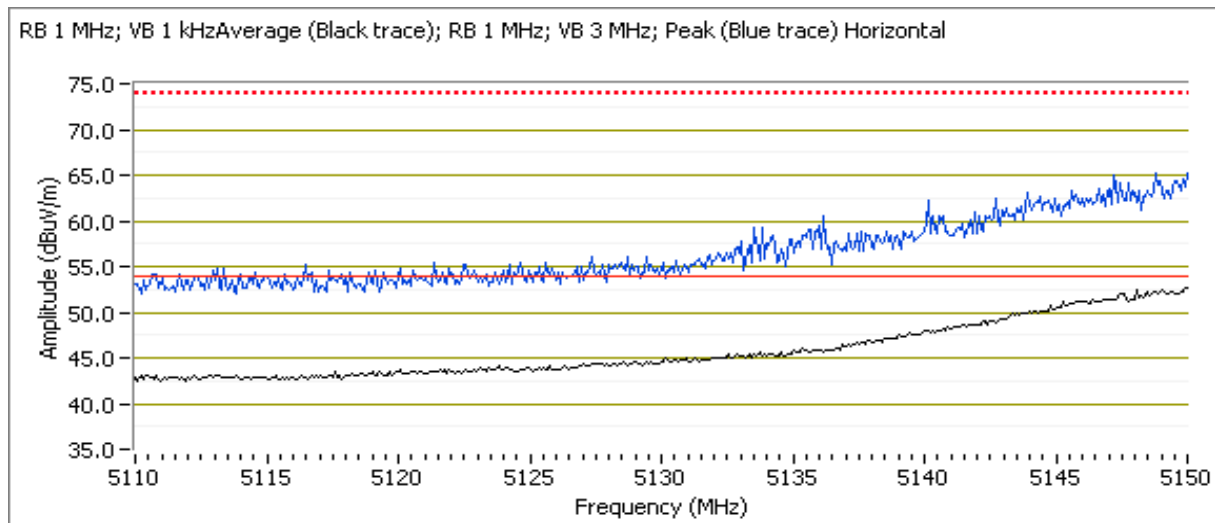
Channel: 38 - 5190 MHz  
 Tx Chain: 4Tx  
 Mode: n40  
 Data Rate: MCS0

EUT Orientation: Flat  
 Power setting: 17

### 5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5150.000	53.1	H	54.0	-0.9	Avg	360	1.4	POS; RB 1 MHz; VB: 1 kHz
5149.640	65.4	H	74.0	-8.6	PK	360	1.4	POS; RB 1 MHz; VB: 3 MHz
5149.840	48.0	V	54.0	-6.0	Avg	360	1.0	POS; RB 1 MHz; VB: 1 kHz
5148.480	63.3	V	74.0	-10.7	PK	360	1.0	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 1 kHz Average (Black trace); RB 1 MHz; VB 3 MHz; Peak (Blue trace) Horizontal



Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

Channel: 46 - 5230 MHz

EUT Orientation: Flat

Tx Chain: 4Tx

Power setting: 23

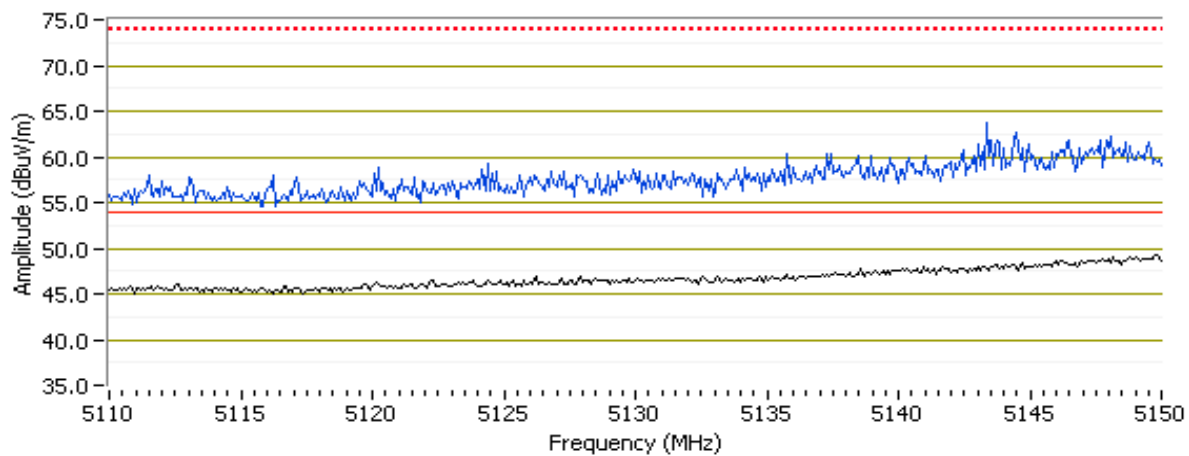
Mode: n40

Data Rate: MCS0

## 5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5147.440	48.8	H	54.0	-5.2	Avg	140	1.6	POS; RB 1 MHz; VB: 1 kHz
5148.800	62.6	H	74.0	-11.4	PK	140	1.6	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 1 kHz; Average (Black trace); RB 1 MHz; VB 3 MHz; Peak (Blue trace) Horizontal



Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

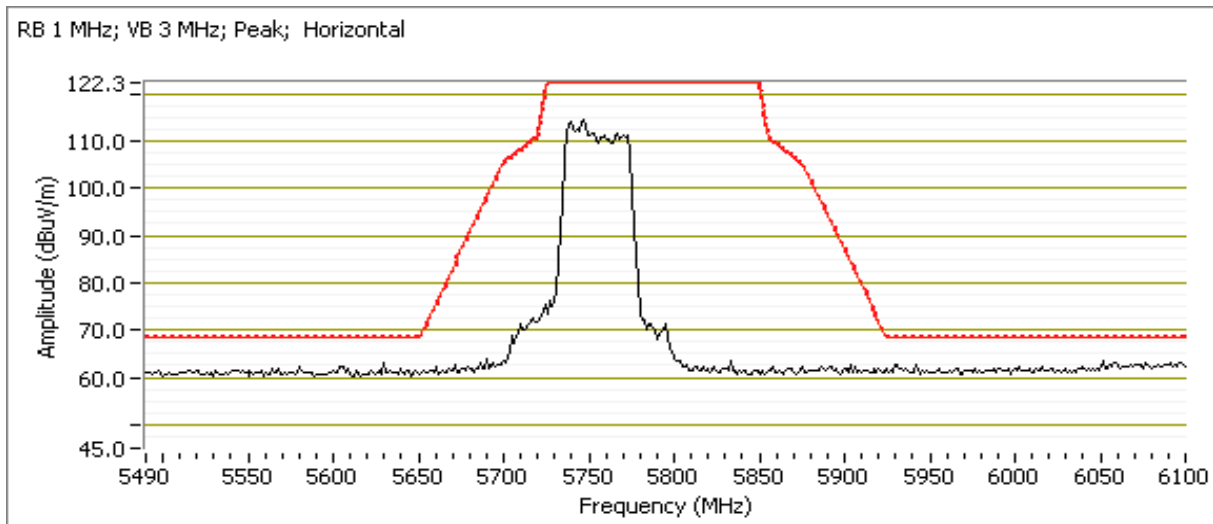
## Run #12: Radiated Bandedge Measurements, 5725-5850MHz

Date of Test: 9/29/2019 0:00  
 Test Engineer: Mark Hill  
 Test Location: FT #7

Config. Used: 2  
 Config Change: -  
 EUT Voltage: 120V/60Hz

Channel: 151 - 5755MHz  
 Tx Chain: 4Tx  
 Mode: n40  
 Data Rate: MSC0

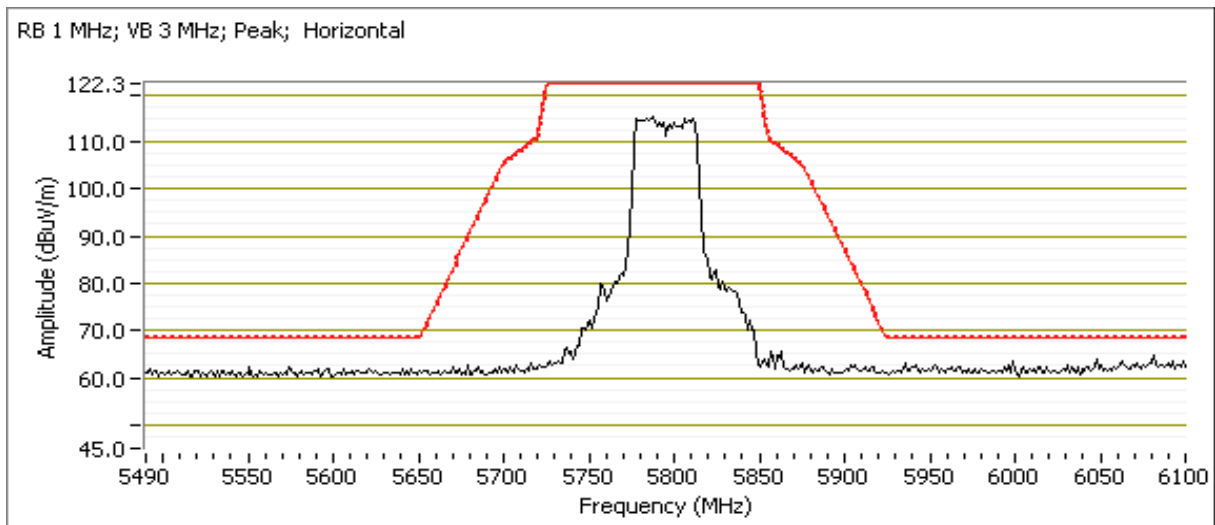
EUT Orientation: Flat  
 Power setting: 23



Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

Channel: 159 - 5795MHz  
 Tx Chain: 4Tx  
 Mode: n40  
 Data Rate: MCS0

EUT Orientation: Flat  
 Power setting: 23



Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Run #13: Radiated Bandedge Measurements, 5150-5250MHz

Date of Test: 9/29/2019 0:00  
 Test Engineer: Mark Hill  
 Test Location: FT #7

Config. Used: 2  
 Config Change: -  
 EUT Voltage: 120V/60MHz

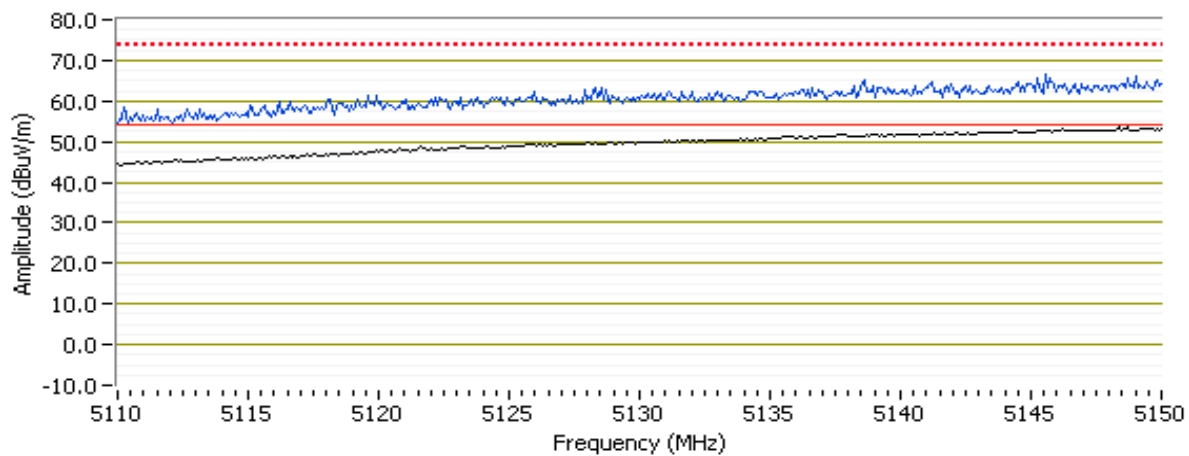
Channel: 42 - 5210MHz  
 Tx Chain: 4Tx  
 Mode: ac80  
 Data Rate: VHT0

EUT Orientation: Flat  
 Power setting: 13

### 5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.220	53.1	H	54.0	-0.9	Avg	360	1.2	POS; RB 1 MHz; VB: 3 kHz, note 3
5148.980	66.5	H	74.0	-7.5	PK	360	1.2	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 3 kHz; Average (Black trace); RB 1MHz; VB 3MHz; Peak (Blue Trace) Horizontal



Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Run #16: Radiated Bandedge Measurements, 5725-5850MHz

Date of Test: 9/29/2019 0:00

Test Engineer: Mark Hill

Test Location: FT #7

Config. Used: 2

Config Change: -

EUT Voltage: 120V/60Hz

Channel: 155 - 5775MHz

Tx Chain: 4Tx

Mode: ac80

Data Rate: VHT0

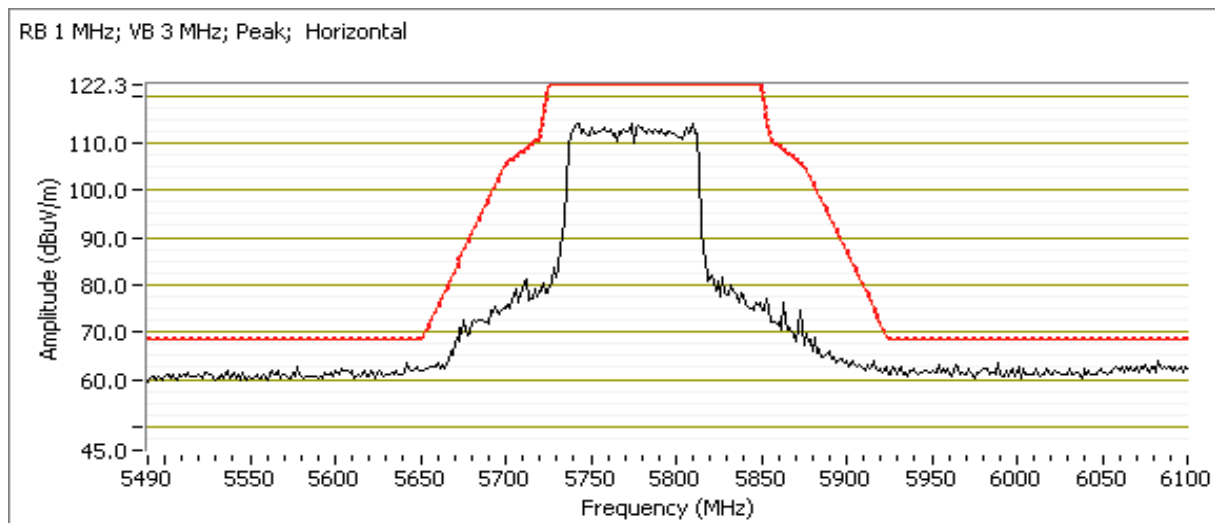
### 5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5648.010	64.1	H	68.3	-4.2	PK	149	1.8	POS; RB 1 MHz; VB: 3 MHz

### 5850 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5929.970	64.4	H	68.3	-3.9	PK	149	1.8	POS; RB 1 MHz; VB: 3 MHz

RB 1 MHz; VB 3 MHz; Peak; Horizontal



Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## RSS-247 and FCC 15.407 (UNII) Radiated Spurious Emissions

### Test Specific Details

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

Date of Test: 9/30/2016, 10/3/2016, 10/4/2016  
 Test Engineer: John Caizzi, Kevin Wen & Rafael V.  
 Test Location: Chamber #7

Config. Used: 1  
 Config Change: none  
 EUT Voltage: 120V/60Hz

### General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.  
 For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

### Ambient Conditions:

Temperature: 23.8 °C  
 Rel. Humidity: 46 %

### Summary of Results

Run #	Mode	Channel	Target Power	Passing Power Setting	Test Performed	Limit	Result / Margin
Scans on "center" channel in all four OFDM modes to determine the worst case mode.							
1	a	40 - 5200MHz	23	23	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	49.0 dBµV/m @ 5440.2 MHz (-5.0 dB)
	n20	40 - 5200MHz		23			refer to test run
	n40	38 - 5190MHz		23			refer to test run
	ac80	42 - 5210MHz		23			refer to test run
Measurements on low and high channels in worst-case OFDM mode.							
2	a	36 - 5180MHz	23	23	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	50.1 dBµV/m @ 5428.7 MHz (-3.9 dB)
	a	48 - 5240MHz		23			49.8 dBµV/m @ 5397.2 MHz (-4.2 dB)

# EMC Test Data

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

Run #	Mode	Channel	Target Power	Passing Power Setting	Test Performed	Limit	Result / Margin
Scans on "center" channel in all four OFDM modes to determine the worst case mode.							
7	a	157 - 5785MHz	23	23	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	47.3 dBµV/m @ 11575.3 MHz (-6.7 dB)
	n20	157 - 5785MHz		23			refer to test run
	n40	159 - 5795MHz		23			refer to test run
	ac80	155 - 5755MHz		23			refer to test run
Measurements on low and high channels in worst-case OFDM mode.							
8	a	149 - 5745MHz	23	23	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	48.0 dBµV/m @ 11492.1 MHz (-6.0 dB)
	a	165- 5825MHz	23	23			49.8 dBµV/m @ 11646.5 MHz (-4.2 dB)

Note: All testing performed in nonTxBF operation.

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		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.

## Procedure Comments:

Measurements performed in accordance with FCC KDB 789033

Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time

Unless otherwise stated/noted, emission has duty cycle  $\geq 98\%$  and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold 50 traces. (method VB of KDB 789033)

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	6Mbs	0.89	Yes	0.558	0.51	1.01	1792
n20	MSC0	0.99	Yes	4.96	0	0	10
n40	MCS0	0.97	Yes	2.408	0.11	0.22	415
ac80	VHT0	0.96	Yes	1.139	0.19	0.37	878

## Sample Notes

Sample S/N: 184795206016480

Driver: -

Antenna: 4x4 internal

## Measurement Specific Notes:

Note 1:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB $\geq$ 3MHz, peak detector). Per KDB 789033 2) c) (i), compliance can be demonstrated by meeting the average and peak limits of 15.209, as an alternative.
Note 2:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 3:	Emission has constant duty cycle $< 98\%$ , average measurement performed: RBW=1MHz, VBW $>1/T$ but not less than 10Hz, peak detector, linear averaging, auto sweep, max hold 50*1/DC traces (method VB of KDB 789033)

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

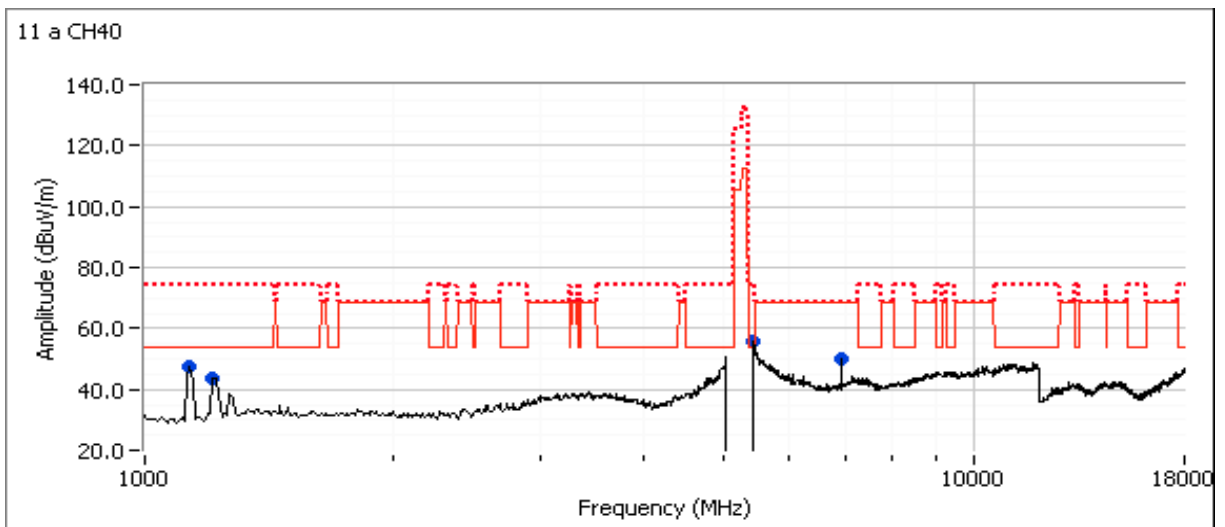
## Run #1, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5150-5250 MHz Band

Date of Test: 9/30/2016, 10/3/16  
 Test Engineer: John Caizzi, Kevin Wen & Rafael V.  
 Test Location: Chamber 7

Config. Used: 1  
 Config Change: none  
 EUT Voltage: 120V/60Hz

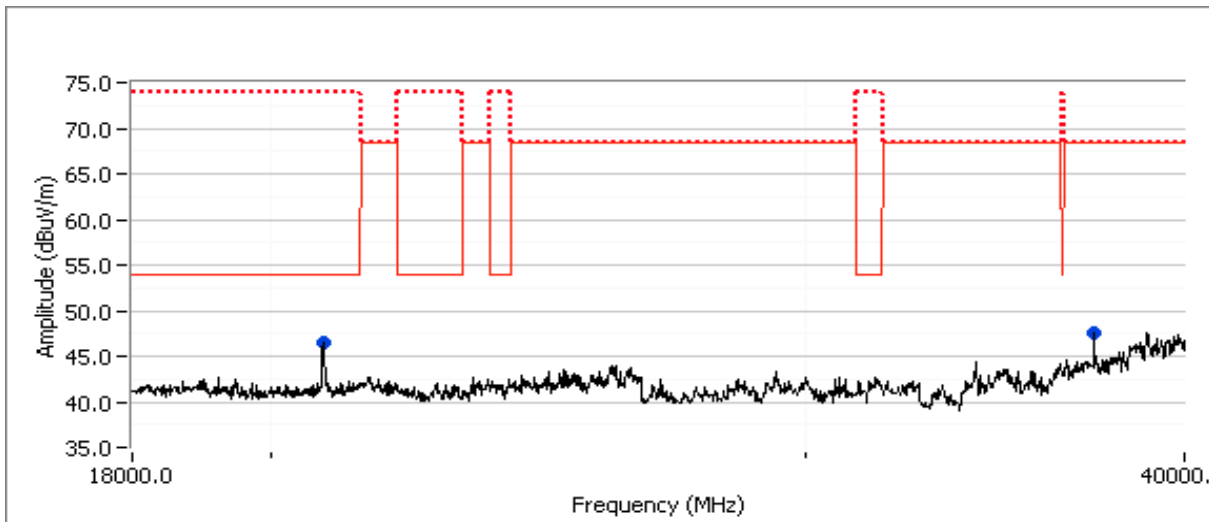
### Run #1a: Center Channel

Channel: 40 Mode: a  
 Tx Chain: 4Tx Data Rate: 6Mbps



Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Run #1a: Center Channel



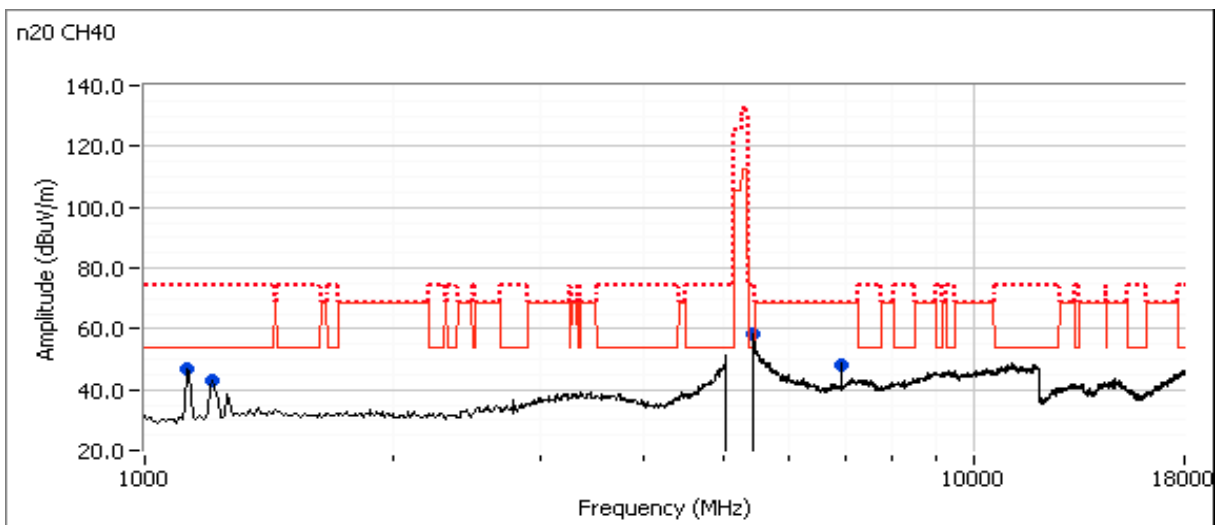
Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5440.160	49.0	H	54.0	-5.0	Avg	159	1.25	RB 1 MHz, VB 2 kHz, notes 3& 4.
5443.090	59.9	H	74.0	-14.1	PK	159	1.25	
1208.930	42.0	H	54.0	-12.0	AVG	23	1.09	not radio related
1200.760	49.2	H	74.0	-24.8	PK	23	1.09	not radio related
6933.320	53.1	H	68.3	-15.2	PK	200	1.70	not radio related
1129.200	44.2	H	54.0	-9.8	AVG	158	1.00	not radio related
1129.360	51.7	H	74.0	-22.3	PK	158	1.00	not radio related
20806.200	41.5	V	54.0	-12.5	AVG	46	1.76	RB 1 MHz;VB 3 kHz;Peak
20805.130	53.5	V	74.0	-20.5	PK	46	1.76	RB 1 MHz;VB 3 MHz;Peak
37331.770	56.8	V	68.3	-11.5	PK	57	2.02	RB 1 MHz;VB 3 MHz;Pk, noise floor

Note 4: Measured without bandstop filter with R&S analyzer. Signal is artifact of using filter.

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Run #1b: Center Channel

Channel: 40 Mode: n20  
 Tx Chain: 4Tx Data Rate: MCS0



Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5365.950	50.8	H	54.0	-3.2	AVG	360	1.3	POS; RB 1 MHz; VB: 10 Hz, note 4
5359.700	63.8	H	74.0	-10.2	PK	360	1.3	POS; RB 1 MHz; VB: 3 MHz, note 4
1125.000	47.1	H	54.0	-6.9	Peak	0	1.0	measured in run #1a
1208.330	43.2	V	54.0	-10.8	Peak	62	1.0	measured in run #1a
6940.000	48.2	H	68.3	-20.1	Peak	192	2.0	measured in run #1a

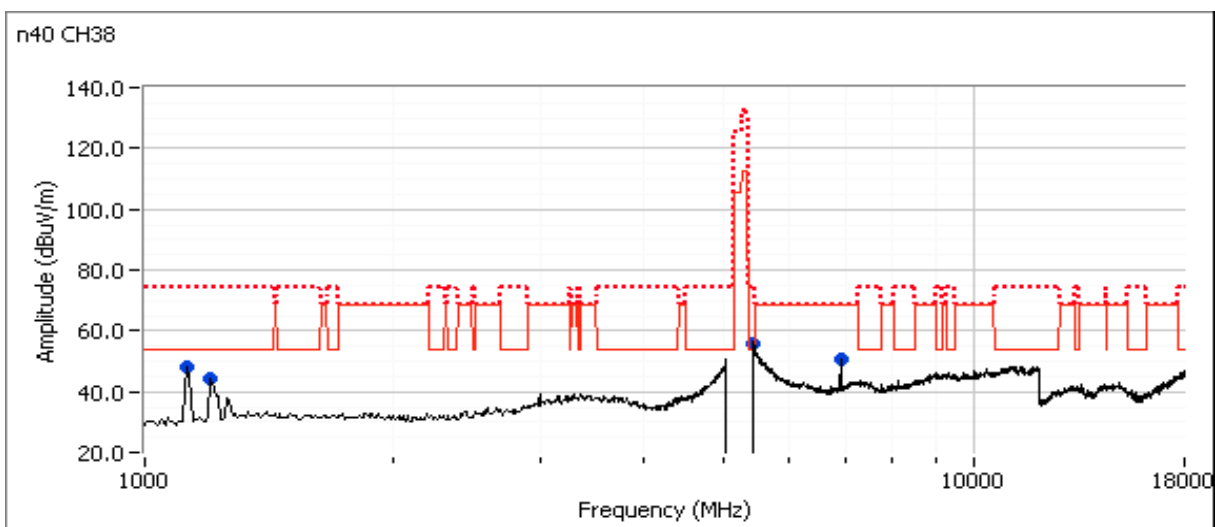
Note: Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range

Note 4: Measured without bandstop filter with R&S analyzer. Signal is artifact of using filter.

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Run #1c: Center Channel

Channel: 38                      Mode: n40  
 Tx Chain: 4Tx                Data Rate: MCS0



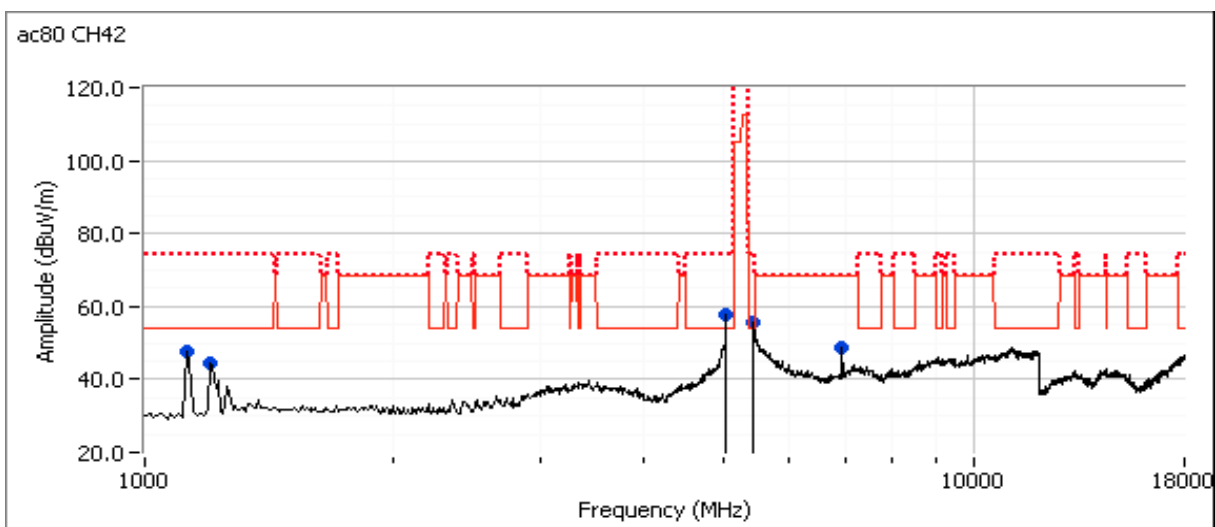
Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.880	48.2	H	54.0	-5.8	Avg	360	1.3	POS; RB 1 MHz; VB: 1 kHz, note 4
5361.380	58.9	H	74.0	-15.1	PK	360	1.3	POS; RB 1 MHz; VB: 3 MHz, note 4
1125.000	47.8	H	54.0	-6.2	Peak	239	1.5	measured in run #1a
1200.000	44.0	H	54.0	-10.0	Peak	12	1.0	measured in run #1a
6920.000	50.6	H	68.3	-17.7	Peak	202	1.5	measured in run #1a

Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range
Note 4:	Measured without bandstop filter with R&S analyzer. Signal is artifact of using filter.

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Run #1d: Center Channel

Channel: 42                      Mode: ac80  
Tx Chain: 4Tx                  Data Rate: MCS0



Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5352.480	40.3	H	54.0	-13.7	Avg	86	1.5	POS; RB 1 MHz; VB: 1 kHz, note 4
5353.750	52.2	H	74.0	-21.8	PK	86	1.5	POS; RB 1 MHz; VB: 3 MHz, note 4
1125.000	47.4	H	54.0	-6.6	Peak	259	1.5	measured in run #1a
1200.000	44.3	H	54.0	-9.7	Peak	12	1.0	measured in run #1a
6950.000	48.8	H	68.3	-19.5	Peak	193	2.0	measured in run #1a

Note: Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range

Note 4: Measured without bandstop filter with R&S analyzer. Signal is artifact of using filter.

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

Run #2: Radiated Spurious Emissions, 1,000 - 40000 MHz. Operating Mode: Worse case from Run #1

Date of Test: 10/3/2016, 10/4/2016

Config. Used: 1

Test Engineer: Rafael V.

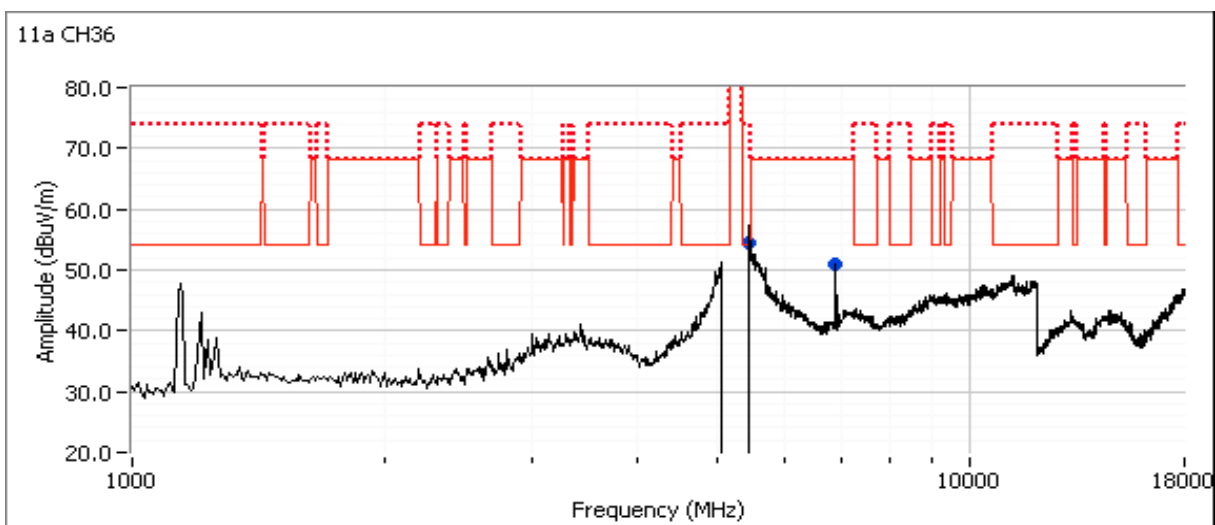
Config Change: none

Test Location: Chamber # 7

EUT Voltage: 120V/60Hz

Run #2a: Low Channel

Channel: 36 Mode: 11a  
Tx Chain: 4Tx Data Rate: 6Mbps



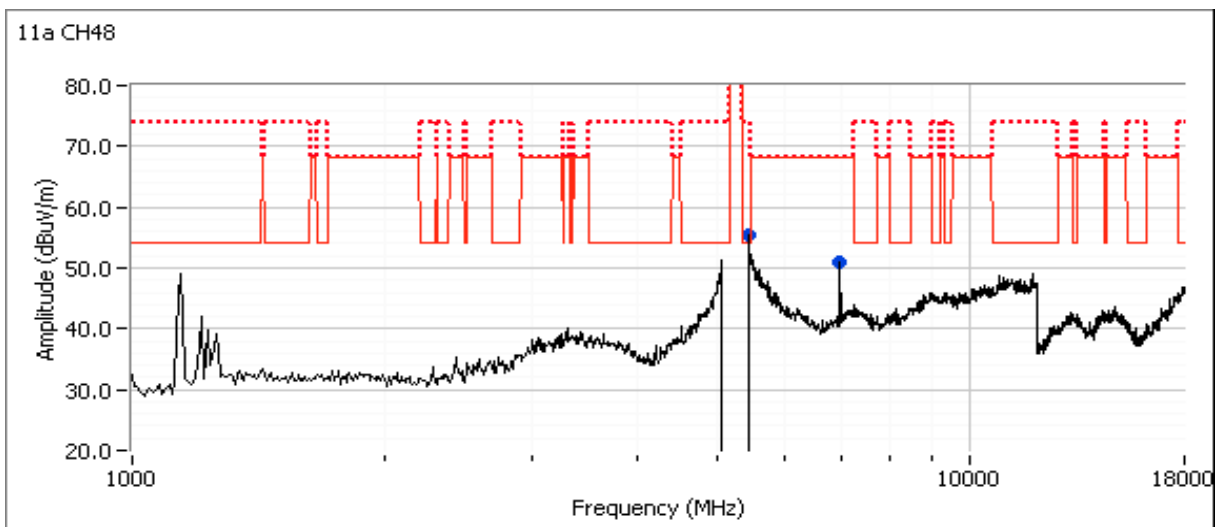
Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5428.700	50.1	H	54.0	-3.9	Avg	360	1.7	POS; RB 1 MHz; VB: 2 kHz, note 4
5375.570	61.1	H	74.0	-12.9	PK	360	1.7	POS; RB 1 MHz; VB: 3 MHz, note 4
6906.480	54.7	H	68.3	-13.6	PK	210	1.7	RB 1 MHz;VB 3 MHz;Peak

Note 4: Measured without bandstop filter with R&S analyzer. Signal is artifact of using filter.

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Run #2b: High Channel

Channel: 48      Mode: 11a  
 Tx Chain: 4Tx      Data Rate: 6Mbps



Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5397.170	49.8	H	54.0	-4.2	Avg	149	1.6	POS; RB 1 MHz; VB: 2 kHz, note 4
5402.020	60.5	H	74.0	-13.5	PK	149	1.6	POS; RB 1 MHz; VB: 3 MHz, note 4
6986.600	55.5	H	68.3	-12.8	PK	198	1.7	RB 1 MHz;VB 3 MHz;Peak

Note 4: Measured without bandstop filter with R&S analyzer. Signal is artifact of using filter.

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Run #7, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5725-5850 MHz Band

Date of Test: 10/3/2016

Config. Used: 1

Test Engineer: Mark Hill

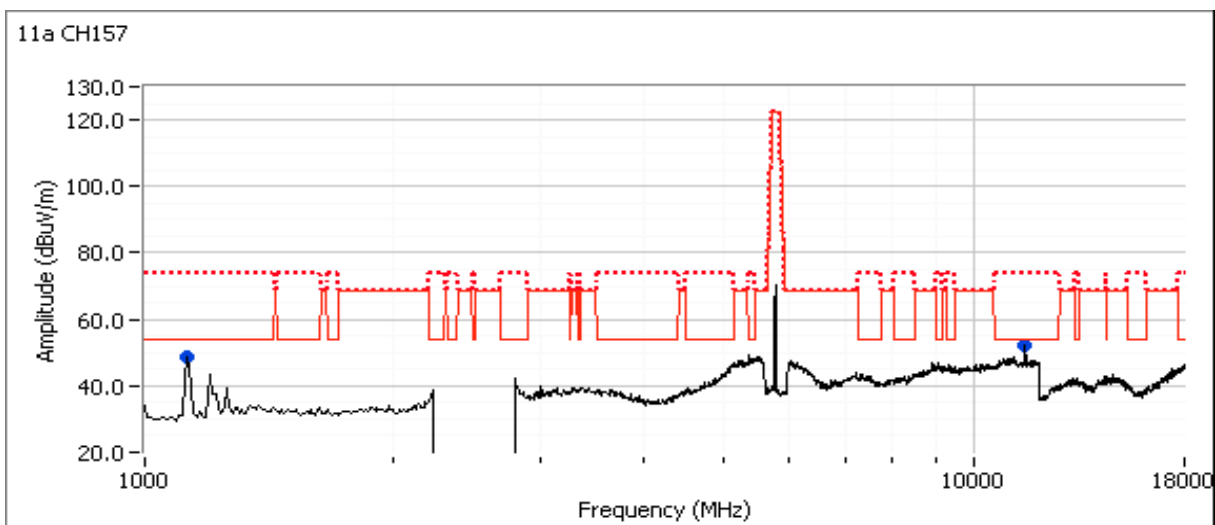
Config Change: -

Test Location: FT #7

EUT Voltage: 120V/60Hz

### Run #7a: Center Channel

Channel: 157  
 Tx Chain: 4Tx  
 Mode: a  
 Data Rate: 6Mbps



Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11575.280	47.3	V	54.0	-6.7	Avg	184	2.4	RB 1 MHz;VB 3 kHz;Peak, note 3
11571.200	60.0	V	74.0	-14.0	PK	184	2.4	RB 1 MHz;VB 3 MHz;Peak
1125.000	48.4	H	54.0	-5.6	Peak	76	1.6	measured in run #1a

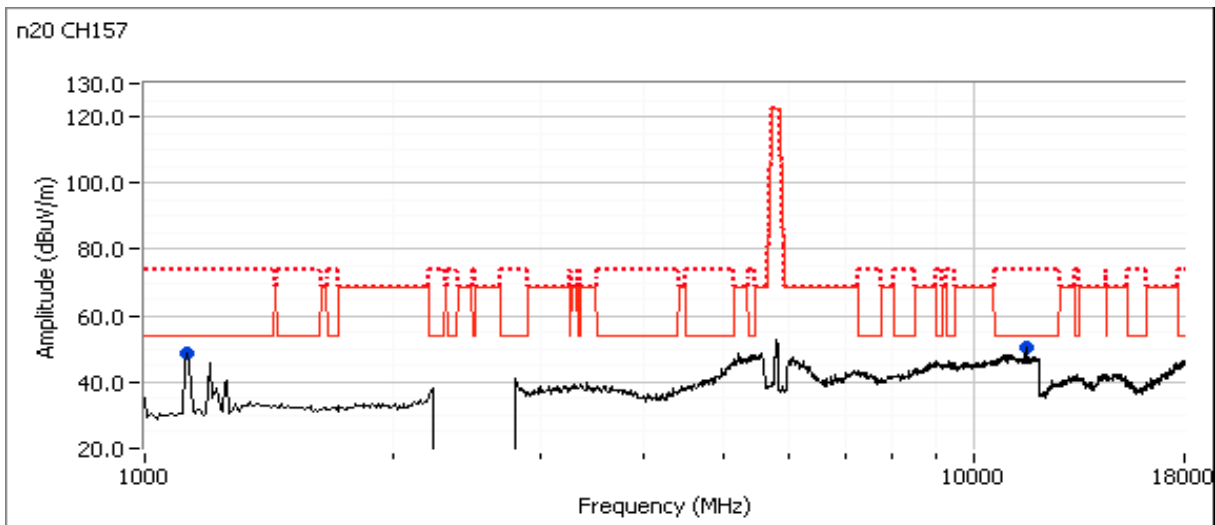
Note: Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range

Note: A 2.4GHz band reject filter was incorrectly selected in the measurement software. The testing was performed using a 5GHz band reject filter. As shown on measurements on the low and high channel (shown further below), there are no significant emissions in the 2.4GHz filter's rejection band.

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Run #7b: Center Channel

Channel: 157 Mode: n20  
 Tx Chain: 4Tx Data Rate: MSC0



Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11573.710	47.3	V	54.0	-6.7	AVG	185	2.3	RB 1 MHz;VB 10 Hz;Peak
11574.390	60.1	V	74.0	-13.9	PK	185	2.3	RB 1 MHz;VB 3 MHz;Peak
1125.000	49.1	H	54.0	-4.9	Peak	218	1.0	measured in run #1a

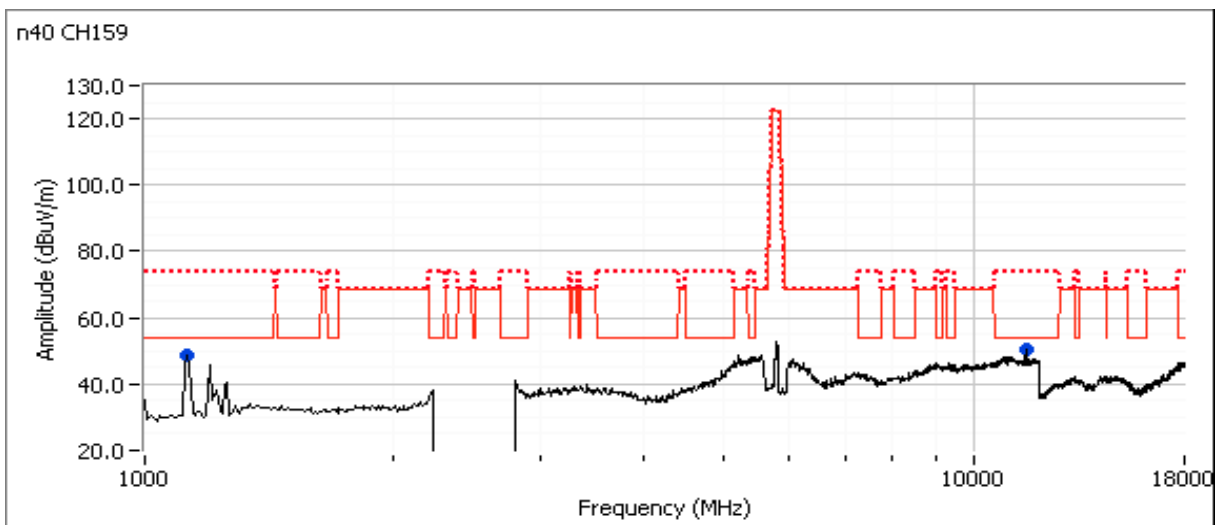
Note: Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range

Note: A 2.4GHz band reject filter was incorrectly selected in the measurement software. The testing was performed using a 5GHz band reject filter. As shown on measurements on the low and high channel (shown further below), there are no significant emissions in the 2.4GHz filter's rejection band.

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Run #7c: Center Channel

Channel: 159      Mode: n40  
 Tx Chain: 4Tx      Data Rate: MCS0



Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11589.610	45.6	V	54.0	-8.4	Avg	168	2.3	RB 1 MHz;VB 1 kHz;Peak, note 3
11589.600	57.5	V	74.0	-16.5	PK	168	2.3	RB 1 MHz;VB 3 MHz;Peak
1125.000	48.6	H	54.0	-5.4	Peak	285	1.6	measured in run #1a

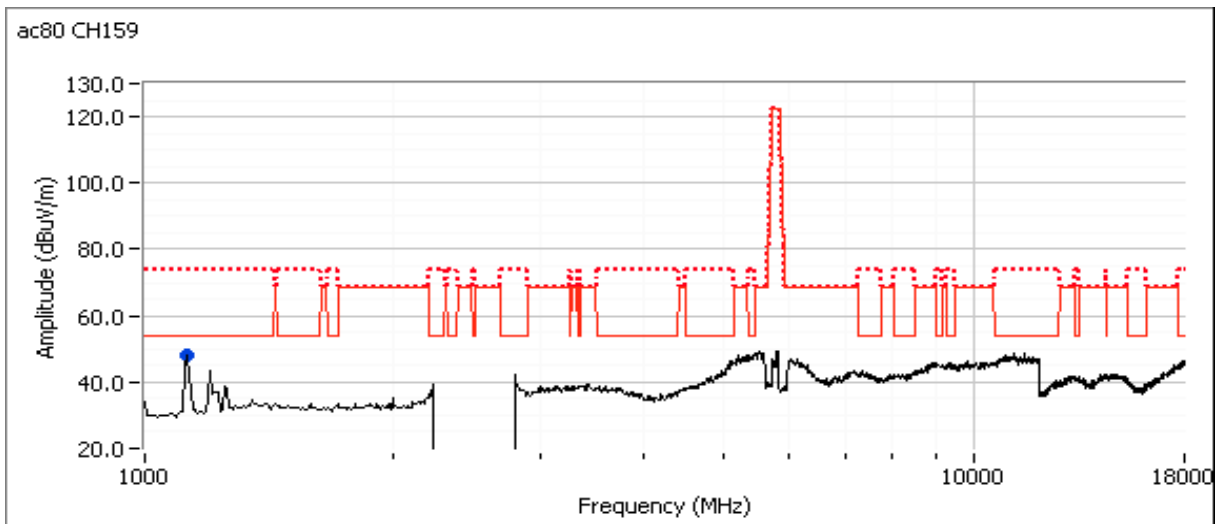
Note: Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range

Note: A 2.4GHz band reject filter was incorrectly selected in the measurement software. The testing was performed using a 5GHz band reject filter. As shown on measurements on the low and high channel (shown further below), there are no significant emissions in the 2.4GHz filter's rejection band.

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Run #7d: Center Channel

Channel: 155      Mode: ac80  
 Tx Chain: 4Tx      Data Rate: VHT0



Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1125.000	48.1	H	54.0	-5.9	Peak	290	1.6	measured in run #1a

Note: Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range

Note: A 2.4GHz band reject filter was incorrectly selected in the measurement software. The testing was performed using a 5GHz band reject filter. As shown on measurements on the low and high channel (shown further below), there are no significant emissions in the 2.4GHz filter's rejection band.

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

Run #8: Radiated Spurious Emissions, 1,000 - 40000 MHz. Operating Mode: Worse case from Run #7

Date of Test: 10/4/2016

Config. Used: 1

Test Engineer: John Caizzi, Kevin Wen

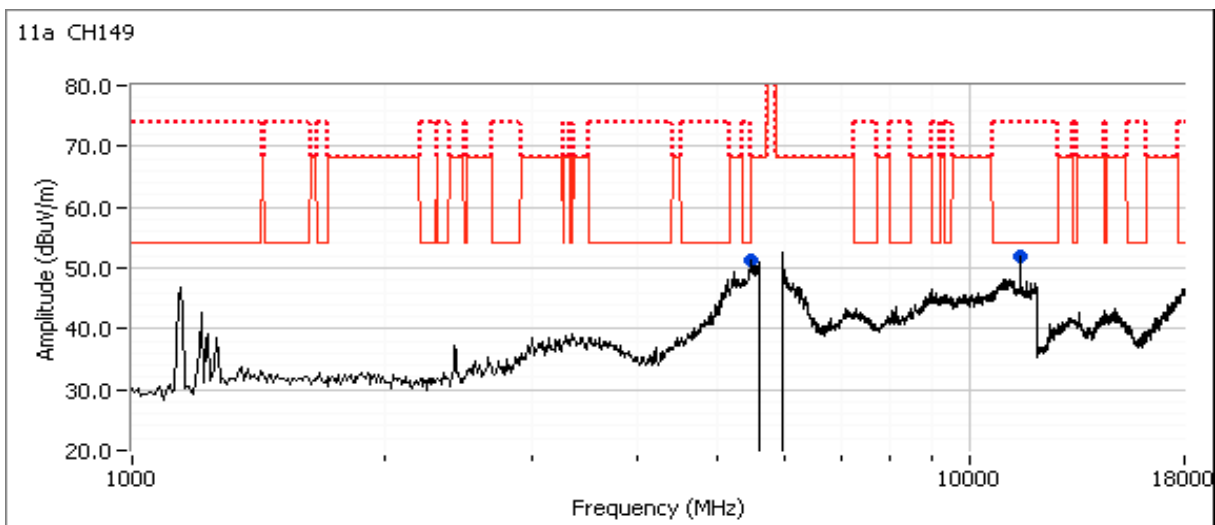
Config Change: None

Test Location: Fremont CH #7

EUT Voltage: 120V/60Hz

Run #8a: Low Channel

Channel: 149 Mode: 11a  
 Tx Chain: 4Tx Data Rate: 6Mbps

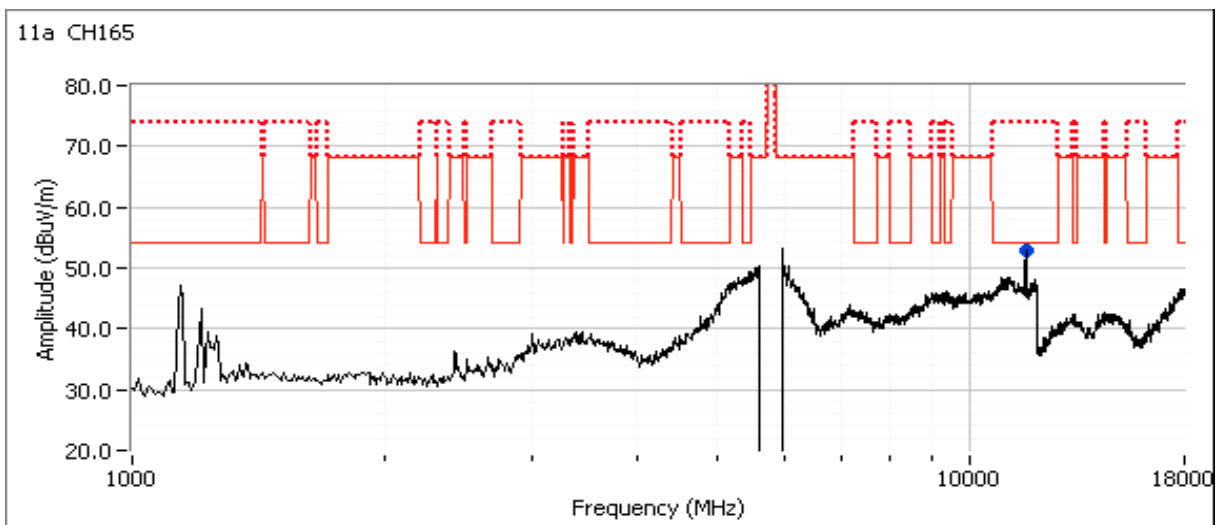


Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11492.100	48.0	V	54.0	-6.0	Avg	122	2.3	RB 1 MHz, VB 3 kHz; note 3
11491.900	59.5	V	74.0	-14.5	PK	122	2.3	RB 1 MHz, VB 3 MHz

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Run #8b: High Channel

Channel: 165      Mode: 11a  
 Tx Chain: 4Tx      Data Rate: 6Mbps



Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11646.530	49.8	V	54.0	-4.2	Avg	314	1.1	RB 1 MHz, VB 3 kHz; note 3
11647.570	61.6	V	74.0	-12.4	PK	314	1.1	RB 1 MHz, VB 3 MHz

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## FCC 15.407(UNII) Antenna Port Measurements Power, PSD, Bandwidth and Spurious Emissions

### Test Specific Details

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

### Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5150 - 5250MHz	15.407(a) (1) (ii)	Pass	a: 26.7dBm (468.7 mW) n20: 26.7dBm (467.9 mW) n40: 26.6dBm (458.7 mW) ac80: 19.6dBm (90.4 mW)
1	PSD, 5150 - 5250MHz	15.407(a) (1) (ii)	Pass	a: 16.1dBm/MHz n20: 15.4dBm/MHz n40: 12.4dBm/MHz ac80: 3.0dBm/MHz
1	99% Bandwidth	RSS-247 (Information only)	N/A	a: 17.2 MHz n20: 18.4 MHz n40: 37.0 MHz ac80: 75.1 MHz

### General Test Configuration

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

### Ambient Conditions:

Temperature: 23.9 °C  
Rel. Humidity: 41.2 %

### 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: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Procedure Comments:

Measurements performed in accordance with FCC KDB 789033 D01

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	6Mbps	0.89	Yes	0.558	0.51	1.01	1792
n20	MSC0	0.99	Yes	4.96	0	0	202
n40	MCS0	0.97	Yes	2.408	0.11	0.22	415
ac80	VHT0	0.96	Yes	1.139	0.19	0.37	878

## Sample Notes

Sample S/N: 184795206016480

Driver: -



## EMC Test Data

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

### Run #1: Bandwidth, Output Power and Power Spectral Density - MIMO Systems

Date of Test: 10/6/2016, 10/10/2016  
 Test Engineer: John Caizzi, Rafael Varelas  
 Test Location: Fremont Lab 4A

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

Note 1:	Duty Cycle $\geq 98\%$ . Output power measured using a spectrum analyzer (see plots below). RBW=1MHz, VB=3 MHz, Span > OBW, # of points in sweep $\geq 2 \times \text{span}/\text{RBW}$ , auto sweep, RMS detector, power averaging on (transmitted signal was continuous, duty cycle $\geq 98\%$ ) and power integration over the OBW (method SA-1 of ANSI C63.10).
Note 2:	Constant Duty Cycle < 98%. Output power measured using a spectrum analyzer (see plots below). RBW=1MHz, VB=3 MHz, Span > OBW, # of points in sweep $\geq 2 \times \text{span}/\text{RBW}$ , RMS detector, trace average 100 traces, power averaging on and power integration over the OBW. The measurements were adjusted by correcting for duty cycle. This is based on $10\log(1/x)$ , where x is the duty cycle. (method SA-2 of ANSI C63.10)
Note 3:	Measured using the same analyzer settings used for output power.
Note 5:	99% Bandwidth measured in accordance with C63.10 - RB between 1-5 % of OBW and $\text{VB} \geq 3 \times \text{RB}$ , Span between 1.5 and 5 times OBW.
Note 6:	For MIMO systems the total output power and total PSD are calculated from the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals are non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## Antenna Gain Information

Freq	Antenna Gain (dBi) / Chain				BF	MultiChain Legacy	CDD	Sectorized / Xpol	Dir G (PWR)	Dir G (PSD)
	1	2	3	4						
5150-5250	Refer to antenna spec in operational description				No	Yes	Yes	No	0.90	6.50
5250-5350					No	Yes	Yes	No	0.90	6.90
5470-5725					No	Yes	Yes	No	1.10	7.10
5725-5825					No	Yes	Yes	No	0.80	6.50

## For devices that support CDD modes

Min # of spatial streams: 1  
 Max # of spatial streams: 4

Notes:	BF = beamforming mode supported, Multichain Legacy = 802.11 legacy data rates supported for multichain transmissions, CDD = Cyclic Delay Diversity (or Cyclic Shift Diversity) modes supported, Sectorized / Xpol = antennas are sectorized or cross polarized.
Notes:	Dir G (PWR) = total gain (Gant + Array Gain) for power calculations; GA (PSD) = total gain for PSD calculations based on FCC KDB 662911. Depending on the modes supported, the Array Gain value for power could be different from the PSD value.
Notes:	Array gain for power taken from antenna spec in operational description. As the device operates using CDD, the Dir G (PWR) used the "Uncorrelated" value provided; PSD used the "Correlated". This is per KDB 662911 F(2)f).
Notes:	For systems with Beamforming and CDD, choose one the following options: Option 1: Delays are optimized for beamforming, rather than being selected from cyclic delay table of 802.11; Array gains calculated based on beamforming criteria. Option 2: Antennas are paired for beamforming, and the pairs are configured to use the cyclic delay diversity of 802.11; the array gain associated with beamforming with 2 antennas (3dB), and the array gain associated with CDD with two antennas (3dB for PSD and 0 dB for power)

FCC UNII-1 Limits		Pwr	PSD
	Outdoor AP	30	17
X	Indoor AP	30	17
	Station (e.g. Client)	24	11
	Outdoor AP (>30° Elv.)	21	-

# EMC Test Data

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## MIMO Device - 5150-5250 MHz Band - FCC

Mode: 11a

Max EIRP (mW): 576.62697

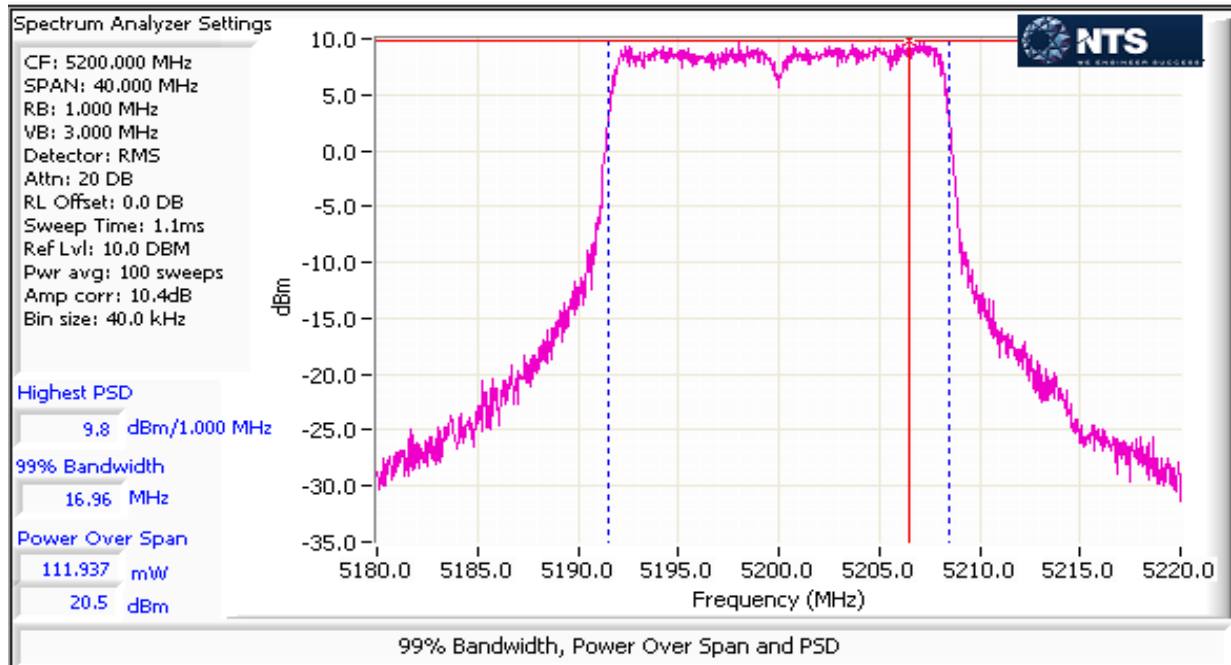
Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power <sup>2</sup> dBm	Total Power <sup>6</sup> mW   dBm		FCC Limit dBm	Max Power (W)	Result
5180	1	20		89	17.5	279.3	24.5	30.0	0.469	Pass
	3				18.0					
	4				18.3					
	2				17.9					
5200	1	23		89	19.8	468.7	26.7	30.0		Pass
	3				20.5					
	4				20.2					
	2				20.2					
5240	1	23		89	19.6	432.6	26.4	30.0	Pass	
	3				20.2					
	4				20.0					
	2				19.5					

## 5150-5250 PSD - FCC

Mode: 11a

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD <sup>3</sup> dBm/MHz	Total PSD <sup>6</sup> mW/MHz	dBm/MHz	FCC Limit dBm/MHz	Result
5180	1	20		89	6.9	24.3	13.9	16.5	Pass
	3				7.5				
	4				7.7				
	2				7.2				
5200	1	23		89	9.0	40.9	16.1	16.5	Pass
	3				9.8				
	4				9.5				
	2				10.0				
5240	1	23		89	8.8	36.9	15.7	16.5	Pass
	3				9.6				
	4				9.3				
	2				8.8				

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A



# EMC Test Data

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## MIMO Device - 5150-5250 MHz Band - FCC

Mode: n20

Max EIRP (mW): 575.64276

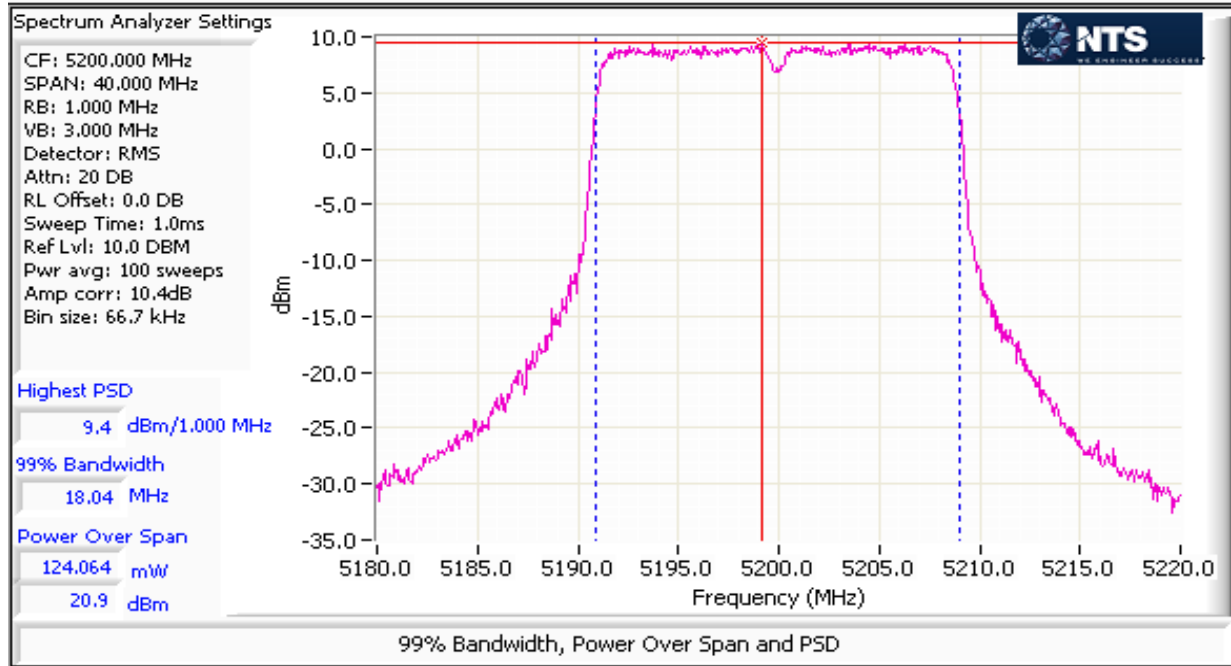
Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power <sup>1</sup> dBm	Total Power <sup>6</sup> mW   dBm		FCC Limit dBm	Max Power (W)	Result
5180	1	21		99	18.5	314.7	25.0	30.0	0.468	Pass
	3				19.1					
	4				19.2					
	2				19.0					
5200	1	23		99	20.3	467.9	26.7	30.0		Pass
	3				20.8					
	4				20.9					
	2				20.7					
5240	1	23		99	19.8	440.5	26.4	30.0	Pass	
	3				20.9					
	4				20.6					
	2				20.3					

## 5150-5250 PSD - FCC

Mode: n20

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD <sup>3</sup> dBm/MHz	Total PSD <sup>6</sup> mW/MHz	dBm/MHz	FCC Limit dBm/MHz	Result
5180	1	21		99	7.3	22.6	13.5	16.5	Pass
	3				7.6				
	4				7.7				
	2				7.5				
5200	1	23		99	9.0	33.7	15.3	16.5	Pass
	3				9.3				
	4				9.4				
	2				9.3				
5240	1	23		99	8.8	34.8	15.4	16.5	Pass
	3				9.7				
	4				9.7				
	2				9.3				

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A



# EMC Test Data

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## MIMO Device - 5150-5250 MHz Band - FCC

Mode: n40

Max EIRP (mW): 564.32429

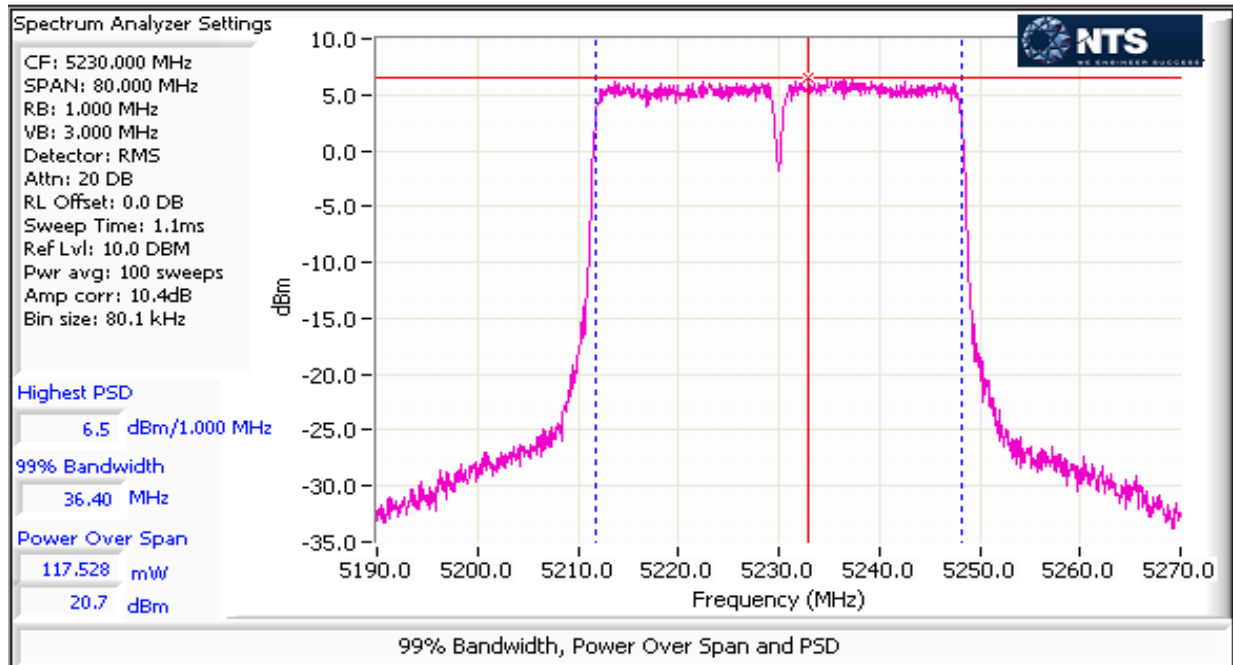
Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power <sup>2</sup> dBm	Total Power <sup>6</sup> mW	Total Power <sup>6</sup> dBm	FCC Limit dBm	Max Power (W)	Result
5190	1	15		97	13.4	91.8	19.6	30.0	0.459	Pass
	3				13.6					
	4				13.3					
	2				13.6					
5230	1	23		97	19.9	458.7	26.6	30.0	0.459	Pass
	3				20.7					
	4				20.5					
	2				20.7					

## 5150-5250 PSD - FCC

Mode: n40

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD <sup>3</sup> dBm/MHz	Total PSD <sup>6</sup> mW/MHz	Total PSD <sup>6</sup> dBm/MHz	FCC Limit dBm/MHz	Result
5190	1	15		97	-0.7	3.6	5.6	16.5	Pass
	3				-0.3				
	4				-0.8				
	2				-0.4				
5230	1	23		97	5.7	17.5	12.4	16.5	Pass
	3				6.4				
	4				6.5				
	2				6.5				

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A



# EMC Test Data

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## MIMO Device - 5150-5250 MHz Band - FCC

Mode: ac80

Max EIRP (mW): 111.2163

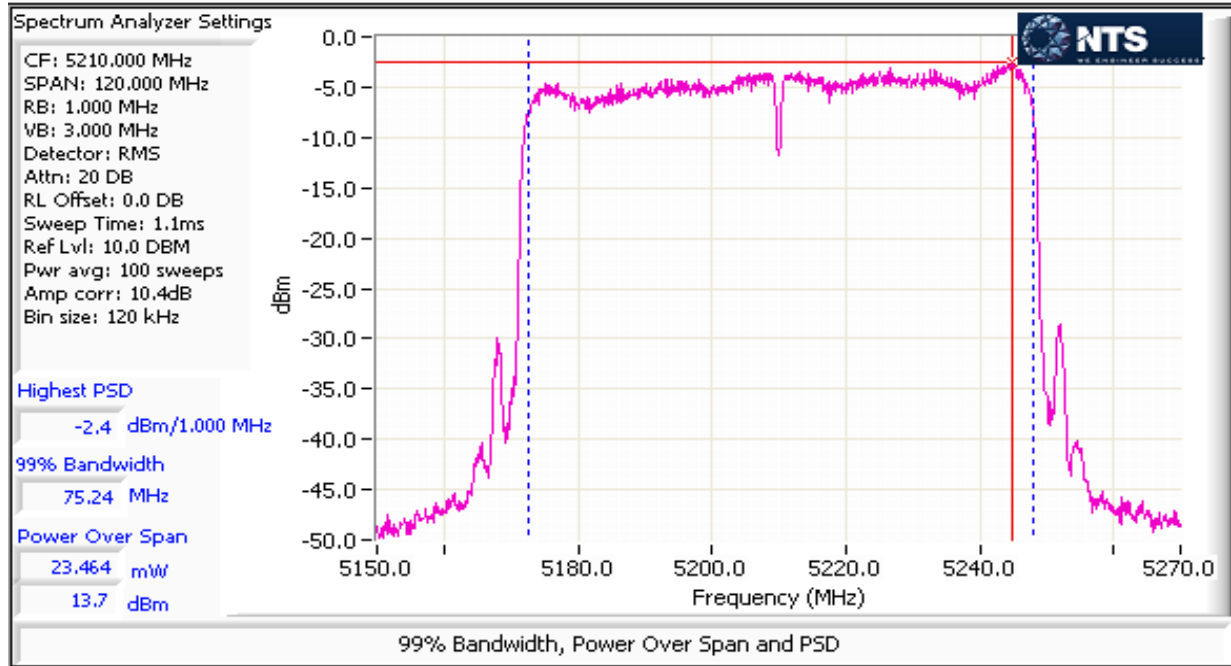
Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power <sup>2</sup> dBm	Total Power <sup>6</sup> mW	Total Power <sup>6</sup> dBm	FCC Limit dBm	Max Power (W)	Result
5210	1	15		96	13.2	90.4	19.6	30.0	0.090	Pass
	3				13.6					
	4				12.9					
	2				13.7					

## 5150-5250 PSD - FCC

Mode: ac80

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD <sup>3</sup> dBm/MHz	Total PSD <sup>6</sup> mW/MHz	Total PSD <sup>6</sup> dBm/MHz	FCC Limit dBm/MHz	Result
5210	1	15		96	-3.6	2.0	3.0	16.5	Pass
	3				-2.7				
	4				-3.9				
	2				-2.4				

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A



Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## FCC 15.407(UNII)

### Antenna Port Measurements

#### Power, PSD, Bandwidth and Spurious Emissions

#### Test Specific Details

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

#### Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5150 - 5250MHz	15.407(a) (1) (ii)	Pass	n20: 26.7dBm (467.9 mW) n40: 26.6dBm (458.7 mW) ac80: 17.6dBm (57.0 mW)
1	PSD, 5150 - 5250MHz	15.407(a) (1) (ii)	Pass	n20: 15.4dBm/MHz n40: 12.4dBm/MHz ac80: 1.1dBm/MHz
1	99% Bandwidth	RSS-247 (Information only)	N/A	n20: 18.3 MHz n40: 37.0 MHz ac80: 75.2 MHz

#### General Test Configuration

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

#### Ambient Conditions:

Temperature: 22.6 °C  
 Rel. Humidity: 43.7 %

#### 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.



## EMC Test Data

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

### Procedure Comments:

Measurements performed in accordance with FCC KDB 789033 D01

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
n20	MSC0	0.99	Yes	4.96	0	0	202
n40	MCS0	0.97	Yes	2.408	0.11	0.22	415
ac80	VHT0	0.96	Yes	1.139	0.19	0.37	878

Note - antenna port measurements for TxBF performed using non-TxBF test mode that yields higher duty cycle than the radiated TxBF configuration

### Sample Notes

Sample S/N: 184795206016480

Driver:

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## Run #1: Bandwidth, Output Power and Power Spectral Density - MIMO Systems

Date of Test: 10/11/2016 0:00  
Test Engineer: Rafael Varelas  
Test Location: Fremont Lab 4A

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

Note 1:	Duty Cycle $\geq 98\%$ . Output power measured using a spectrum analyzer (see plots below). RBW=1MHz, VB=3 MHz, Span > OBW, # of points in sweep $\geq 2 \times \text{span}/\text{RBW}$ , auto sweep, RMS detector, power averaging on (transmitted signal was continuous, duty cycle $\geq 98\%$ ) and power integration over the OBW (method SA-1 of ANSI C63.10).
Note 2:	Constant Duty Cycle < 98%. Output power measured using a spectrum analyzer (see plots below). RBW=1MHz, VB=3 MHz, Span > OBW, # of points in sweep $\geq 2 \times \text{span}/\text{RBW}$ , RMS detector, trace average 100 traces, power averaging on and power integration over the OBW. The measurements were adjusted by correcting for duty cycle. This is based on $10\log(1/x)$ , where x is the duty cycle. (method SA-2 of ANSI C63.10)
Note 3:	Measured using the same analyzer settings used for output power.
Note 5:	99% Bandwidth measured in accordance with C63.10 - RB between 1-5 % of OBW and VB $\geq 3 \times \text{RB}$ , Span between 1.5 and 5 times OBW.
Note 6:	For MIMO systems the total output power and total PSD are calculated from the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals are non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## Antenna Gain Information

Freq	Antenna Gain (dBi) / Chain				BF	MultiChain Legacy	CDD	Sectorized / Xpol	Dir G (PWR)	Dir G (PSD)
	1	2	3	4						
5150-5250	Refer to antenna spec in operational description				Yes	Yes	Yes	No	6.50	6.50
5250-5350					Yes	Yes	Yes	No	6.90	6.90
5470-5725					Yes	Yes	Yes	No	7.10	7.10
5725-5825					Yes	Yes	Yes	No	6.50	6.50

## For devices that support CDD modes

Min # of spatial streams: 1  
 Max # of spatial streams: 4

Notes:	BF = beamforming mode supported, Multichain Legacy = 802.11 legacy data rates supported for multichain transmissions, CDD = Cyclic Delay Diversity (or Cyclic Shift Diversity) modes supported, Sectorized / Xpol = antennas are sectorized or cross polarized.
Notes:	Dir G (PWR) = total gain (Gant + Array Gain) for power calculations; GA (PSD) = total gain for PSD calculations based on FCC KDB 662911. Depending on the modes supported, the Array Gain value for power could be different from the PSD value.
Notes:	Array gain for power taken from antenna spec in operational description. As the device operates using beamforming the Dir G (PWR) and Dir G (PSD) used the "Correlated" value provided. This is per KDB 662911 F)2)d).
Notes:	For systems with Beamforming and CDD, choose one the following options: Option 1: Delays are optimized for beamforming, rather than being selected from cyclic delay table of 802.11; Array gains calculated based on beamforming criteria. Option 2: Antennas are paired for beamforming, and the pairs are configured to use the cyclic delay diversity of 802.11; the array gain associated with beamforming with 2 antennas (3dB), and the array gain associated with CDD with two antennas (3dB for PSD and 0 dB for power)

FCC UNII-1 Limits		Pwr	PSD
	Outdoor AP	30	17
X	Indoor AP	30	17
	Station (e.g. Client)	24	11
	Outdoor AP (>30° Elv.)	21	-

# EMC Test Data

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## MIMO Device - 5150-5250 MHz Band - FCC

Mode: n20

Max EIRP (mW): 2090.0325

Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power <sup>1</sup> dBm	Total Power <sup>6</sup> mW   dBm		FCC Limit dBm	Max Power (W)	Result
5180	1	19		99	16.7	204.3	23.1	29.5	0.468	Pass
	3				17.0					
	4				17.4					
	2				17.2					
5200	1	23		99	20.3	467.9	26.7	29.5		Pass
	3				20.8					
	4				20.9					
	2				20.7					
5240	1	23		99	19.8	440.5	26.4	29.5	Pass	
	3				20.9					
	4				20.6					
	2				20.3					

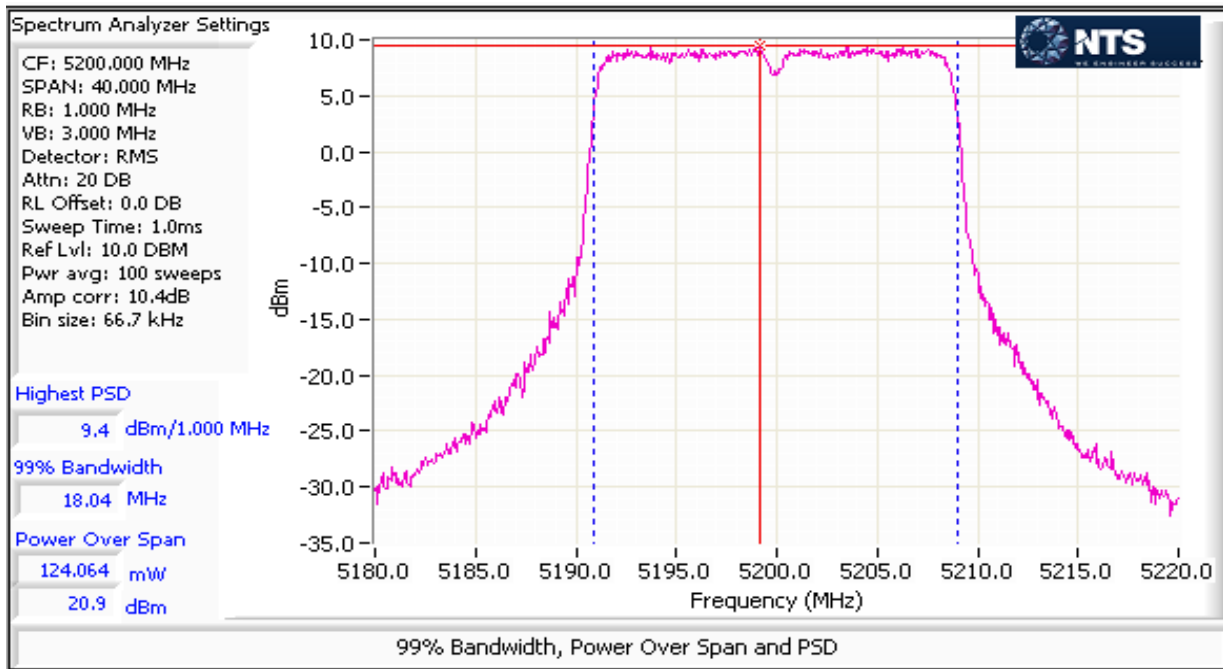
## 5150-5250 PSD - FCC

Mode: n20

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD <sup>3</sup> dBm/MHz	Total PSD <sup>6</sup> mW/MHz	dBm/MHz	FCC Limit dBm/MHz	Result
5180	1	19		99	5.8	16.4	12.1	16.5	Pass
	3				6.2				
	4				6.3				
	2				6.2				
5200	1	23		99	9.0	33.7	15.3	16.5	Pass
	3				9.3				
	4				9.4				
	2				9.3				
5240	1	23		99	8.8	34.8	15.4	16.5	Pass
	3				9.7				
	4				9.7				
	2				9.3				

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## MIMO Device - 5150-5250 MHz Band



Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## MIMO Device - 5150-5250 MHz Band - FCC

Mode: n40

Max EIRP (mW): 2048.9376

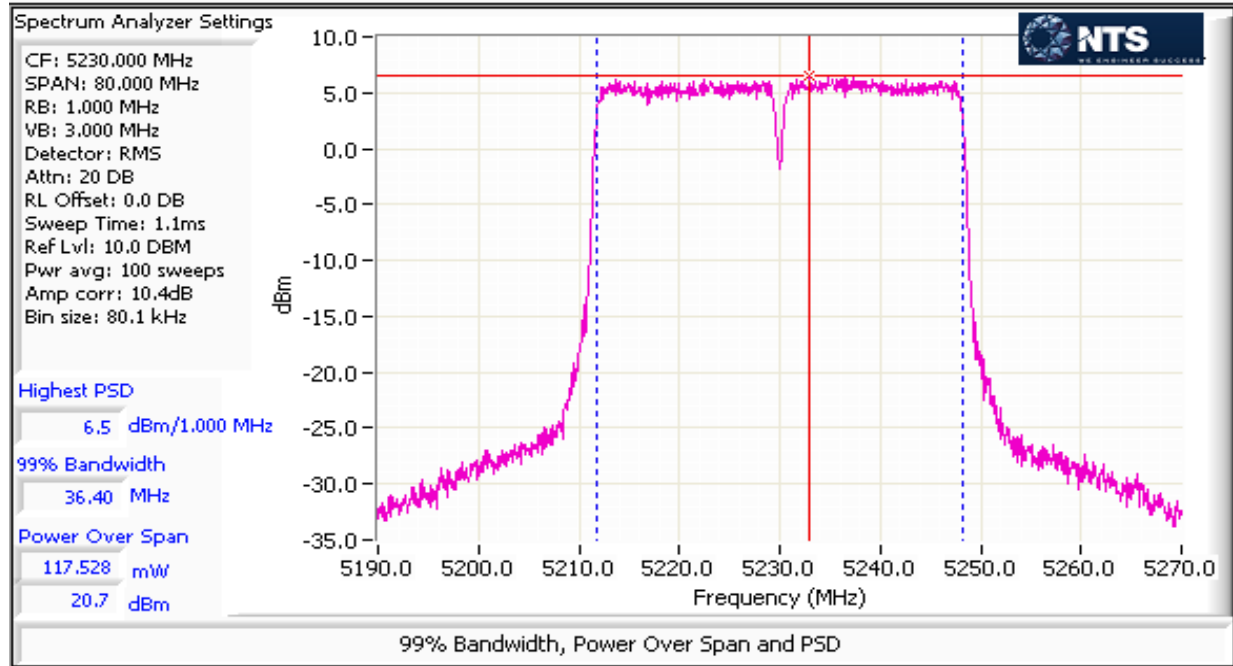
Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power <sup>2</sup> dBm	Total Power <sup>6</sup> mW	Total Power <sup>6</sup> dBm	FCC Limit dBm	Max Power (W)	Result
5190	1	17		97	15.2	137.6	21.4	29.5	0.459	Pass
	3				15.0					
	4				15.7					
	2				15.0					
5230	1	23		97	19.9	458.7	26.6	29.5	0.459	Pass
	3				20.7					
	4				20.5					
	2				20.7					

## 5150-5250 PSD - FCC

Mode: n40

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD <sup>3</sup> dBm/MHz	Total PSD <sup>6</sup> mW/MHz	Total PSD <sup>6</sup> dBm/MHz	FCC Limit dBm/MHz	Result
5190	1	17		97	1.5	5.8	7.6	16.5	Pass
	3				1.0				
	4				1.8				
	2				1.6				
5230	1	23		97	5.7	17.5	12.4	16.5	Pass
	3				6.4				
	4				6.5				
	2				6.5				

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A



Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## MIMO Device - 5150-5250 MHz Band - FCC

Mode: ac80

Max EIRP (mW): 254.60965

Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power <sup>2</sup> dBm	Total Power <sup>6</sup> mW	dBm	FCC Limit dBm	Max Power (W)	Result
5210	1	13		96	11.0	57.0	17.6	29.5	0.057	Pass
	3				11.8					
	4				11.2					
	2				11.4					

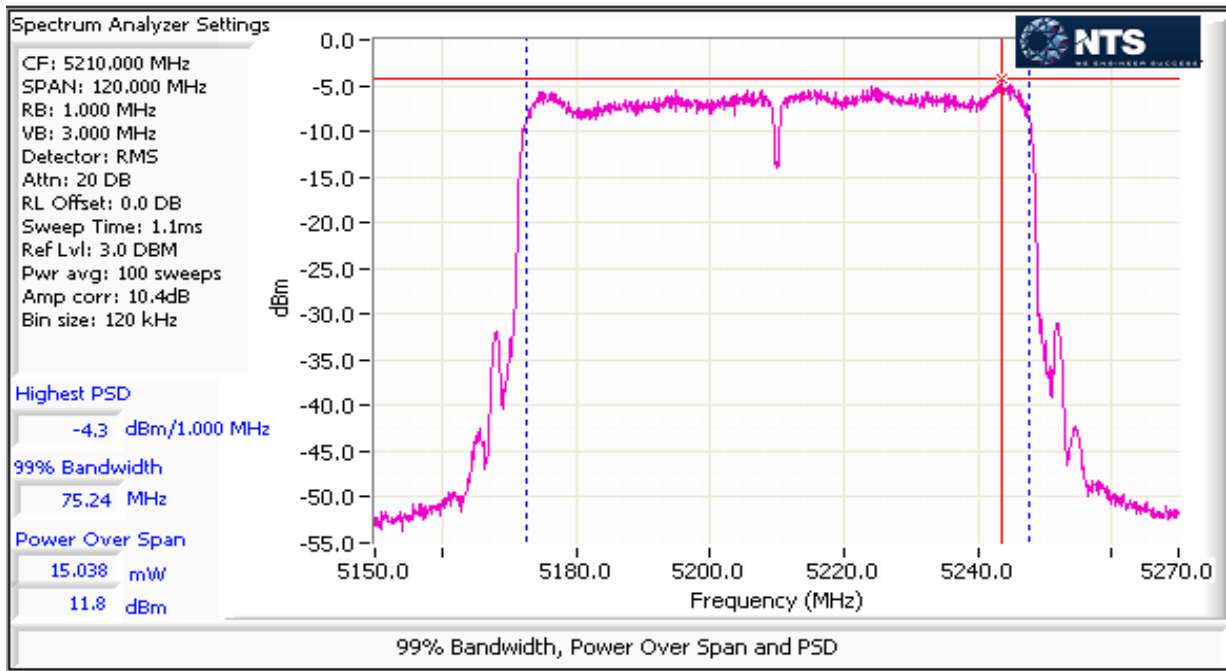
## 5150-5250 PSD - FCC

Mode: ac80

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD <sup>3</sup> dBm/MHz	Total PSD <sup>6</sup> mW/MHz	dBm/MHz	FCC Limit dBm/MHz	Result
5210	1	13		96	-5.8	1.3	1.1	16.5	Pass
	3				-4.3				
	4				-5.5				
	2				-5.0				

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## MIMO Device - 5150-5250 MHz Band



Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## FCC 15.407(UNII) Antenna Port Measurements Power, PSD, Bandwidth and Spurious Emissions

### Test Specific Details

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

### Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5725 - 5850MHz	15.407(a) (3)	Pass	a: 26.3dBm (426.2 mW) n20: 26.1dBm (407.6 mW) n40: 26.2dBm (412.3 mW) ac80: 26.2dBm (417.1 mW)
1	PSD, 5725 - 5850MHz	15.407(a) (3)	Pass	a: 15.7dBm/MHz n20: 15.2dBm/MHz n40: 11.9dBm/MHz ac80: 9.5dBm/MHz
1	99% Bandwidth	RSS-GEN (Information only)	N/A	a: 16.96 MHz n20: 18.08 MHz n40: 36.4 MHz ac80: 75.24 MHz
2	6dB BW	15.407 (e)	N/A	a: 16.4 MHz n20: 17.6 MHz n40: 36.4 MHz ac80: 75.2 MHz

### General Test Configuration

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

### Ambient Conditions:

Temperature: 22.7 °C  
Rel. Humidity: 38 %

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		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.

## Procedure Comments:

Measurements performed in accordance with FCC KDB 789033 D01

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	6Mbps	0.89	Yes	0.558	0.51	1.01	1792
n20	MSC0	0.99	Yes	4.96	0	0	202
n40	MCS0	0.97	Yes	2.408	0.11	0.22	415
ac80	VHT0	0.96	Yes	1.139	0.19	0.37	878

## Sample Notes

Sample S/N: 184795206016480

Driver: -



## EMC Test Data

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

### Run #1: Bandwidth, Output Power and Power Spectral Density - MIMO Systems

Date of Test: 10/7/2016, 10/10/2016

Config. Used: 1

Test Engineer: Kevin Wen, Rafael Varelas

Config Change: None

Test Location: Fremont Lab 4A

EUT Voltage: 120V/60Hz

Note 1:	Duty Cycle $\geq 98\%$ . Output power measured using a spectrum analyzer (see plots below). RBW=1MHz, VB=3 MHz, Span > OBW, # of points in sweep $\geq 2 \times \text{span}/\text{RBW}$ , auto sweep, RMS detector, power averaging on (transmitted signal was continuous, duty cycle $\geq 98\%$ ) and power integration over the OBW (method SA-1 of ANSI C63.10).
Note 2:	Constant Duty Cycle < 98%. Output power measured using a spectrum analyzer (see plots below). RBW=1MHz, VB=3 MHz, Span > OBW, # of points in sweep $\geq 2 \times \text{span}/\text{RBW}$ , RMS detector, trace average 100 traces, power averaging on and power integration over the OBW. The measurements were adjusted by correcting for duty cycle. This is based on $10\log(1/x)$ , where x is the duty cycle. (method SA-2 of ANSI C63.10)
Note 3:	Measured using the same analyzer settings used for output power.
Note 4:	99% Bandwidth measured in accordance with C63.10 - RB between 1-5 % of OBW and VB $\geq 3 \times \text{RB}$ , Span between 1.5 and 5 times OBW.
Note 5:	For MIMO systems the total output power and total PSD are calculated from the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals on the non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## Antenna Gain Information

Freq	Antenna Gain (dBi) / Chain				BF	MultiChain Legacy	CDD	Sectorized / Xpol	Dir G (PWR)	Dir G (PSD)
	1	2	3	4						
5150-5250	Refer to antenna spec in operational description				No	Yes	Yes	No	0.90	6.50
5250-5350					No	Yes	Yes	No	0.90	6.90
5470-5725					No	Yes	Yes	No	1.10	7.10
5725-5825					No	Yes	Yes	No	1.10	7.10

## For devices that support CDD modes

Min # of spatial streams: 1  
 Max # of spatial streams: 4

Notes:	BF = beamforming mode supported, Multichain Legacy = 802.11 legacy data rates supported for multichain transmissions, CDD = Cyclic Delay Diversity (or Cyclic Shift Diversity) modes supported, Sectorized / Xpol = antennas are sectorized or cross polarized.
Notes:	Dir G (PWR) = total gain (Gant + Array Gain) for power calculations; GA (PSD) = total gain for PSD calculations based on FCC KDB 662911. Depending on the modes supported, the Array Gain value for power could be different from the PSD value.
Notes:	Array gain for power taken from antenna spec in operational description. As the device operates using CDD, the Dir G (PWR) used the "Uncorrelated" value provided; PSD used the "Correlated". This is per KDB 662911 F)2)f).
Notes:	For systems with Beamforming and CDD, choose one the following options: Option 1: Delays are optimized for beamforming, rather than being selected from cyclic delay table of 802.11; Array gains calculated based on beamforming criteria. Option 2: Antennas are paired for beamforming, and the pairs are configured to use the cyclic delay diversity of 802.11; the array gain associated with beamforming with 2 antennas (3dB), and the array gain associated with CDD with two antennas (3dB for PSD and 0 dB for power)

# EMC Test Data

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## MIMO Device - 5725-5850 MHz Band - FCC/IC

Mode: 11a

Max EIRP (mW): 549.1

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power dBm	Total Power <sup>1</sup>		Limit dBm	Max Power (W)	Result
					mW	dBm				
5745	1	23	16.96	89	19.7	426.2	26.3	30.0	0.426	Pass
	3				20.3					
	4				18.7					
	2				20.2					
5785	1	23	16.96	89	19.3	423.7	26.3	30.0		Pass
	3				20.4					
	4				18.9					
	2				20.2					
5825	1	23	16.96	89	19.3	383.1	25.8	30.0	Pass	
	3				19.6					
	4				18.4					
	2				19.8					

## 5725-5850 PSD - FCC/IC

Mode: 11a

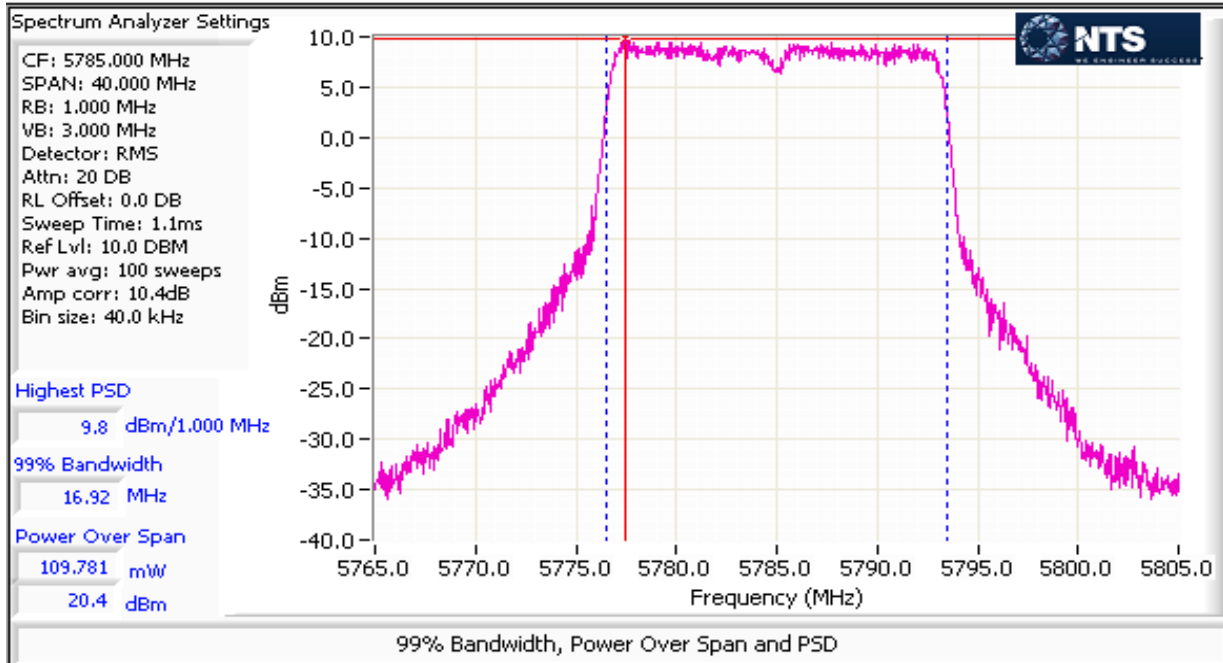
Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD <sup>1</sup> mW/MHz	dBm/MHz	FCC Limit dBm/500kHz	IC Limit	Result
5745	1	23		89	9.2	37.2	15.7	28.9	28.9	Pass
	3				9.6					
	4				8.0					
	2				9.7					
5785	1	23		89	8.7	35.8	15.5	28.9	28.9	Pass
	3				9.8					
	4				7.9					
	2				9.4					
5825	1	23		89	9.0	34.0	15.3	28.9	28.9	Pass
	3				9.2					
	4				7.7					
	2				9.1					

**NTS**

WE ENGINEER SUCCESS

## EMC Test Data

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A



# EMC Test Data

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## MIMO Device - 5725-5850 MHz Band - FCC/IC

Mode: n20

Max EIRP (mW): 525.1

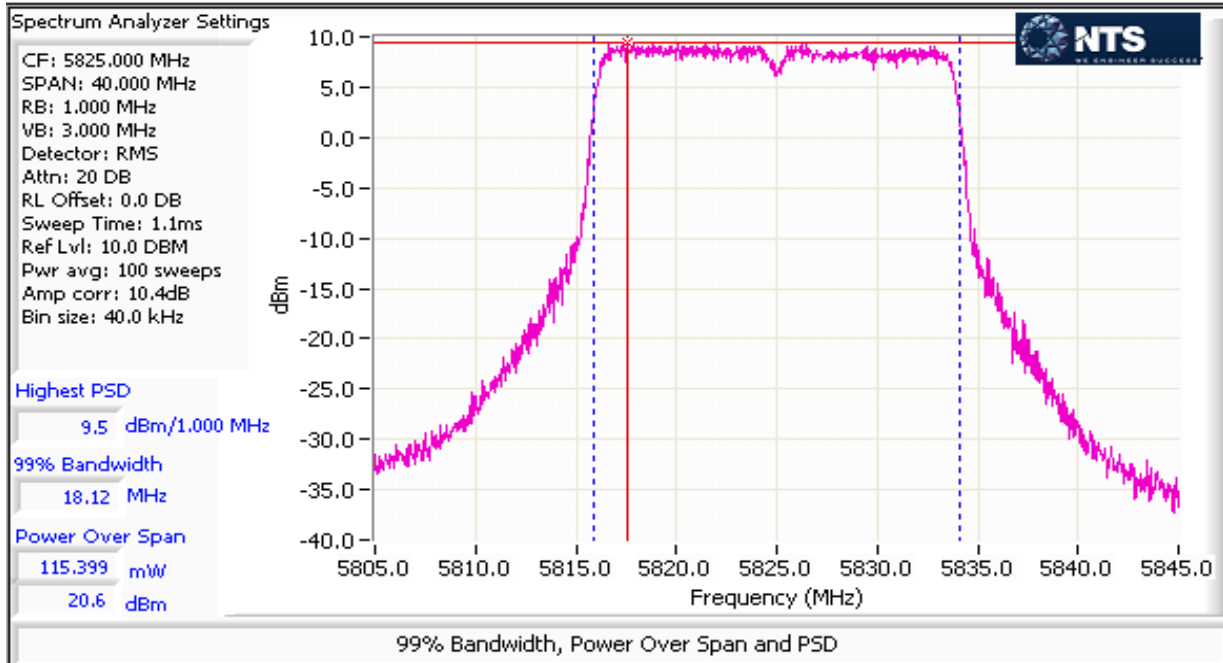
Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power dBm	Total Power <sup>1</sup>		FCC Limit dBm	Max Power (W)	Result
5745	1	23	18.08	99	20.0	407.6	26.1	30.0	0.408	Pass
	3				20.5					
	4				19.2					
	2				20.5					
5785	1	23	18.08	99	19.9	406.8	26.1	30.0		Pass
	3				20.5					
	4				19.0					
	2				20.7					
5825	1	23	18.08	99	19.9	393.8	26.0	30.0		Pass
	3				20.6					
	4				19.1					
	2				20.0					

## 5725-5850 PSD - FCC/IC

Mode: n20

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD <sup>1</sup> mW/MHz	dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5745	1	23		99	9.5	33.0	15.2	28.9	28.9	Pass
	3				9.4					
	4				8.1					
	2				9.5					
5785	1	23		99	8.8	31.6	15.0	28.9	28.9	Pass
	3				9.5					
	4				7.8					
	2				9.6					
5825	1	23		99	9.7	33.0	15.2	28.9	28.9	Pass
	3				9.5					
	4				8.1					
	2				9.2					

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A



## EMC Test Data

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

### MIMO Device - 5725-5850 MHz Band - FCC/IC

Mode: n40

Max EIRP (mW): 531.1

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power dBm	Total Power <sup>1</sup>		FCC Limit dBm	Max Power (W)	Result
						mW	dBm			
5755	1	23	36.4	97	19.8	412.3	26.2	30.0	0.412	Pass
	3				20.3					
	4				19.3					
	2				20.5					
5795	1	23	36.4	97	19.8	404.2	26.1	30.0		Pass
	3				20.1					
	4				19.4					
	2				20.3					

### MIMO Device 5725-5850 PSD - FCC/IC

Mode: n40

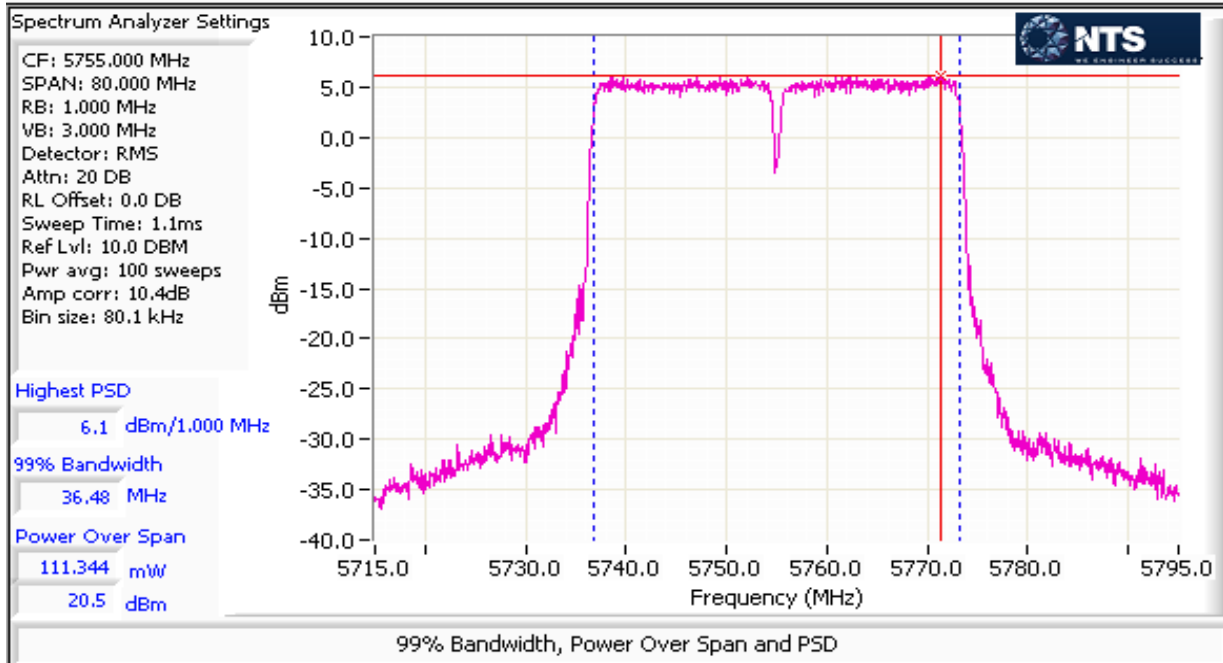
Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD <sup>1</sup> mW/MHz	dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5755	1	23		97	5.7	15.5	11.9	28.9	28.9	Pass
	3				6.0					
	4				5.1					
	2				6.1					
5795	1	23		97	5.9	15.6	11.9	28.9	28.9	Pass
	3				6.0					
	4				5.2					
	2				6.0					

**NTS**

WE ENGINEER SUCCESS

## EMC Test Data

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A



Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## MIMO Device - 5725-5850 MHz Band - FCC/IC

Mode: ac80

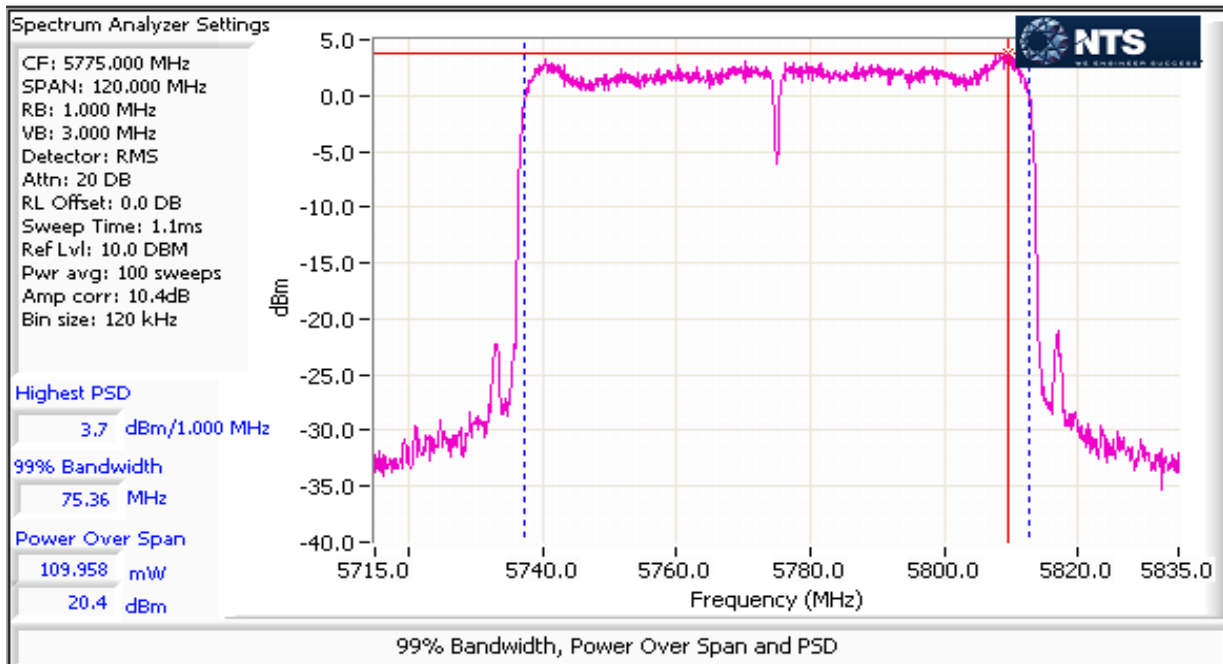
Max EIRP (mW): 537.3

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power dBm	Total Power <sup>1</sup> mW	dBm	FCC Limit dBm	Max Power (W)	Result
5775	1	23	75.24	96	20.1	417.1	26.2	30.0	0.417	Pass
	3				20.3					
	4				19.1					
	2				20.4					

## MIMO Device 5725-5850 PSD - FCC/IC

Mode: ac80

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD <sup>1</sup> mW/MHz	dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5775	1	23		96	3.4	9.0	9.5	28.9	28.9	Pass
	3				3.7					
	4				2.4					
	2				3.7					



Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## Run #3: Signal Bandwidth

Mode:

11a

Power Setting	Frequency (MHz)	Bandwidth (MHz) 6dB	RBW Setting (MHz) 6dB
23	5745	16.376	0.1
23	5785	16.376	0.1
23	5825	16.376	0.1

Mode:

n20

Power Setting	Frequency (MHz)	Bandwidth (MHz) 6dB	RBW Setting (MHz) 6dB
23	5745	17.618	0.1
23	5785	17.578	0.1
23	5825	17.618	0.1

Mode:

n40

Power Setting	Frequency (MHz)	Bandwidth (MHz) 6dB	RBW Setting (MHz) 6dB
23	5755	36.276	0.1
23	5795	36.276	0.1

Mode:

ac80

Power Setting	Frequency (MHz)	Bandwidth (MHz) 6dB	RBW Setting (MHz) 6dB
23	5775	75.195	0.1

Note 1: DTS BW: RBW=100kHz, VBW ≥ 3\*RBW, peak detector, max hold, auto sweep time, Span 2-5 times measured BW.

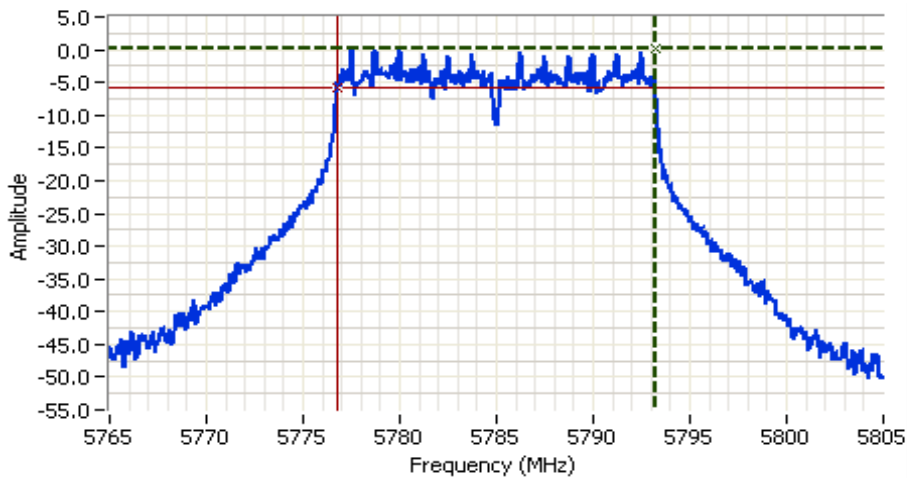
Note 2: Measurements performed on chain 1

**NTS**

WE ENGINEER SUCCESS

## EMC Test Data

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A



### Analyzer Settings

Agilent Technologies, E4446A  
CF: 5785.000 MHz  
SPAN: 40.000 MHz  
RB: 100 kHz  
VB: 300 kHz  
Detector: POS  
Attn: 20 DB  
RL Offset: 0.0 DB  
Sweep Time: 3.9ms  
Ref Lvl: 3.0 DBM

### Comments

6dB BW: 16.376 MHz

Cursor 1	5793.1882	0.1	
Cursor 2	5776.8118	-5.9	

Delta Freq. 16.376

Delta Amplitude 6.0

**NTS**

WE ENGINEER SUCCESS

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## RSS-247 (LELAN) and FCC 15.407(UNII) Antenna Port Measurements Power, PSD, Bandwidth and Spurious Emissions

### Test Specific Details

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

### Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5725 - 5850MHz	15.407(a) (3)	Pass	n20: 26.1dBm (407.6 mW) n40: 26.2dBm (412.3 mW) ac80: 26.2dBm (417.1 mW)
1	PSD, 5725 - 5850MHz	15.407(a) (3)	Pass	n20: 15.2dBm/MHz n40: 11.9dBm/MHz ac80: 9.5dBm/MHz
1	99% Bandwidth	RSS-GEN (Information only)	N/A	n20: 18.1 MHz n40: 36.4 MHz ac80: 75.2 MHz
2	6dB BW	15.407 (e)	N/A	Unchanged from non-Tx BF operation

### General Test Configuration

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

### Ambient Conditions:

Temperature: 22.9 °C  
Rel. Humidity: 40 %

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	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.

## Procedure Comments:

Measurements performed in accordance with FCC KDB 789033 D01

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	6Mbs	0.89	Yes	0.558	0.51	1.01	1792
n20	MSC0	0.99	Yes	4.96	0	0	202
n40	MCS0	0.97	Yes	2.408	0.11	0.22	415
ac80	VHT0	0.96	Yes	1.139	0.19	0.37	878

## Sample Notes

Sample S/N: 184795206016480

Driver: -

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Run #1: Bandwidth, Output Power and Power Spectral Density - MIMO Systems

Date of Test: 10/12/2016 0:00

Config. Used: 1

Test Engineer: Kevin Wen

Config Change: None

Test Location: Fremont Lab 4A

EUT Voltage: 120V/60Hz

Note 1:	Duty Cycle $\geq 98\%$ . Output power measured using a spectrum analyzer (see plots below). RBW=1MHz, VB=3 MHz, Span > OBW, # of points in sweep $\geq 2 \times \text{span}/\text{RBW}$ , auto sweep, RMS detector, power averaging on (transmitted signal was continuous, duty cycle $\geq 98\%$ ) and power integration over the OBW (method SA-1 of ANSI C63.10).
Note 2:	Constant Duty Cycle < 98%. Output power measured using a spectrum analyzer (see plots below). RBW=1MHz, VB=3 MHz, Span > OBW, # of points in sweep $\geq 2 \times \text{span}/\text{RBW}$ , RMS detector, trace average 100 traces, power averaging on and power integration over the OBW. The measurements were adjusted by correcting for duty cycle. This is based on $10\log(1/x)$ , where x is the duty cycle. (method SA-2 of ANSI C63.10)
Note 3:	Measured using the same analyzer settings used for output power.
Note 4:	99% Bandwidth measured in accordance with C63.10 - RB between 1-5 % of OBW and VB $\geq 3 \times \text{RB}$ , Span between 1.5 and 5 times OBW.
Note 5:	For MIMO systems the total output power and total PSD are calculated from the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals on the non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.

## Antenna Gain Information

Freq	Antenna Gain (dBi) / Chain				BF	MultiChain Legacy	CDD	Sectorized / Xpol	Dir G (PWR)	Dir G (PSD)
	1	2	3	4						
5150-5250	Refer to antenna spec in operational description				Yes	Yes	Yes	No	6.50	6.50
5250-5350					Yes	Yes	Yes	No	6.90	6.90
5470-5725					Yes	Yes	Yes	No	7.10	7.10
5725-5825					Yes	Yes	Yes	No	7.10	7.10

## For devices that support CDD modes

Min # of spatial streams: 1

Max # of spatial streams: 4

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

Notes:	BF = beamforming mode supported, Multichain Legacy = 802.11 legacy data rates supported for multichain transmissions, CDD = Cyclic Delay Diversity (or Cyclic Shift Diversity) modes supported, Sectorized / Xpol = antennas are sectorized or cross polarized.
Notes:	Dir G (PWR) = total gain (Gant + Array Gain) for power calculations; GA (PSD) = total gain for PSD calculations based on FCC KDB 662911. Depending on the modes supported, the Array Gain value for power could be different from the PSD value.
Notes:	Array gain for power taken from antenna spec in operational description. As the device operates using beamforming the Dir G (PWR) and Dir G (PSD) used the "Correlated" value provided. This is per KDB 662911 F)2)d).
Notes:	For systems with Beamforming and CDD, choose one the following options: Option 1: Delays are optimized for beamforming, rather than being selected from cyclic delay table of 802.11; Array gains calculated based on beamforming criteria. Option 2: Antennas are paired for beamforming, and the pairs are configured to use the cyclic delay diversity of 802.11; the array gain associated with beamforming with 2 antennas (3dB), and the array gain associated with CDD with two antennas (3dB for PSD and 0 dB for power)

## EMC Test Data

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

### MIMO Device - 5725-5850 MHz Band - FCC/IC

Mode: n20

Max EIRP (mW): 2090.4

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power dBm	Total Power <sup>1</sup>		FCC Limit dBm	Max Power (W)	Result
5745	1	23	18.08	99	20.0	407.6	26.1	28.9	0.408	Pass
	3				20.5					
	4				19.2					
	2				20.5					
5785	1	23	18.08	99	19.9	406.8	26.1	28.9		Pass
	3				20.5					
	4				19.0					
	2				20.7					
5825	1	23	18.08	99	19.9	393.8	26.0	28.9	Pass	
	3				20.6					
	4				19.1					
	2				20.0					

### 5250-5350 PSD - FCC/IC

Mode: n20

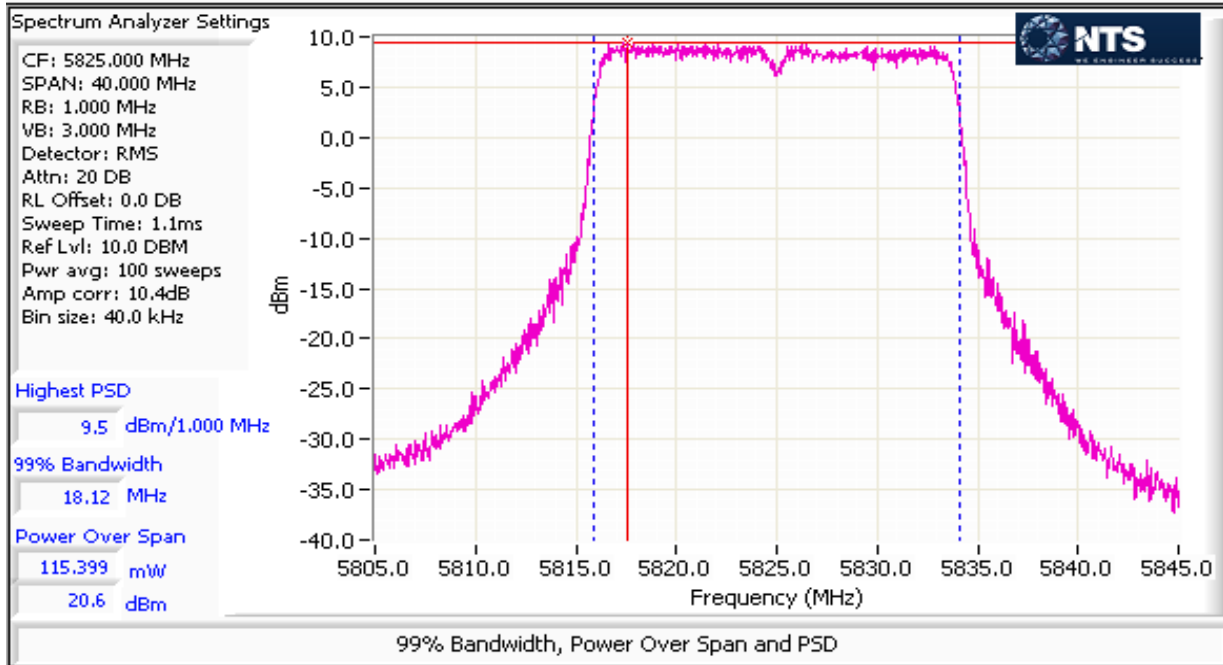
Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD <sup>1</sup> mW/MHz	dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5745	1	23		99	9.5	33.0	15.2	28.9	28.9	Pass
	3				9.4					
	4				8.1					
	2				9.5					
5785	1	23		99	8.8	31.6	15.0	28.9	28.9	Pass
	3				9.5					
	4				7.8					
	2				9.6					
5825	1	23		99	9.7	33.0	15.2	28.9	28.9	Pass
	3				9.5					
	4				8.1					
	2				9.2					

**NTS**

WE ENGINEER SUCCESS

## EMC Test Data

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A



Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## MIMO Device - 5725-5850 MHz Band - FCC/IC

Mode: n40

Max EIRP (mW): 2114.5

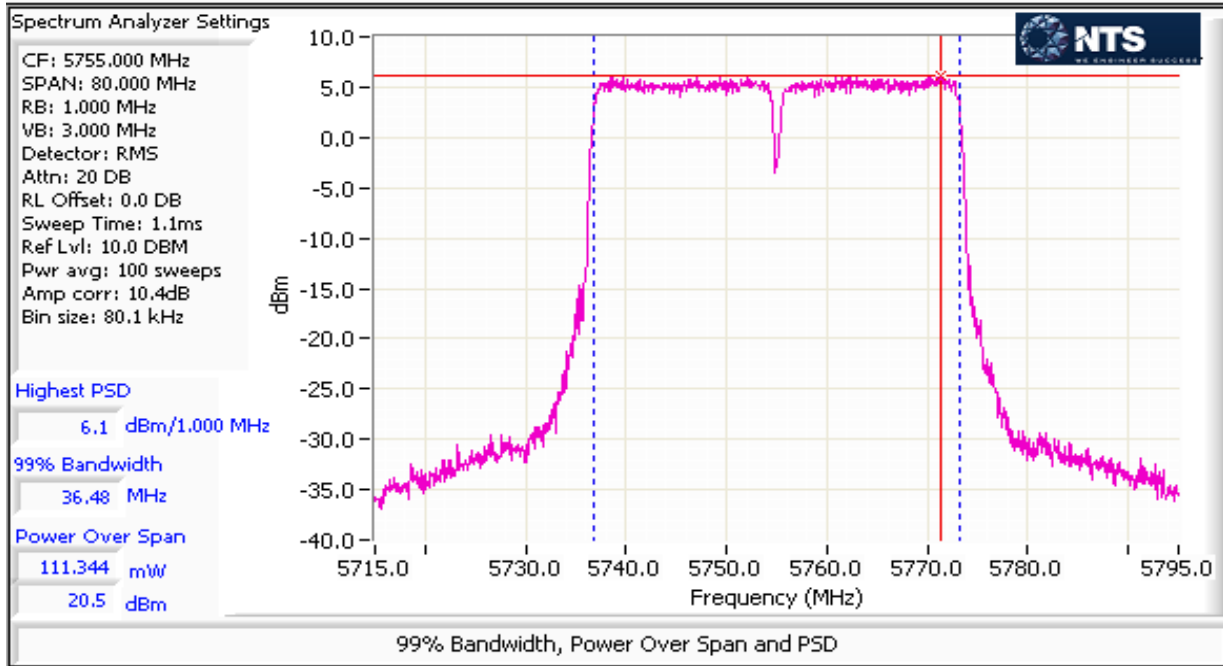
Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power dBm	Total Power <sup>1</sup>		FCC Limit dBm	Max Power (W)	Result
5755	1	23	36.4	97	19.8	412.3	26.2	28.9	0.412	Pass
	3				20.3					
	4				19.3					
	2				20.5					
5795	1	23	36.4	97	19.8	404.2	26.1	28.9		Pass
	3				20.1					
	4				19.4					
	2				20.3					

## MIMO Device 5250-5350 PSD - FCC/IC

Mode: n40

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD <sup>1</sup> mW/MHz	dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5755	1	23		97	5.7	15.5	11.9	28.9	28.9	Pass
	3				6.0					
	4				5.1					
	2				6.1					
5795	1	23		97	5.9	15.6	11.9	28.9	28.9	Pass
	3				6.0					
	4				5.2					
	2				6.0					

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A



Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## MIMO Device - 5725-5850 MHz Band - FCC/IC

Mode: ac80

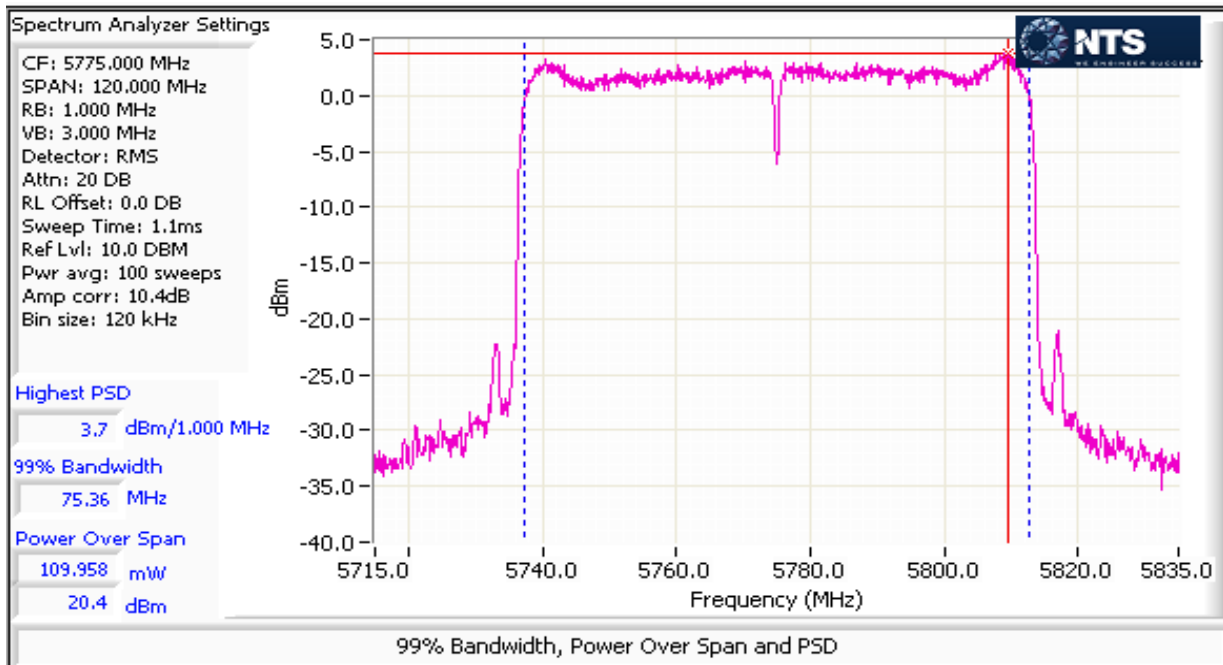
Max EIRP (mW): 2139.1

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power dBm	Total Power <sup>1</sup> mW	dBm	FCC Limit dBm	Max Power (W)	Result
5775	1	23	75.24	96	20.1	417.1	26.2	28.9	0.417	Pass
	3				20.3					
	4				19.1					
	2				20.4					

## MIMO Device 5250-5350 PSD - FCC/IC

Mode: ac80

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD <sup>1</sup> mW/MHz	dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5775	1	23		96	3.4	9.0	9.5	28.9	28.9	Pass
	3				3.7					
	4				2.4					
	2				3.7					



Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## RSS-247, FCC 15.247, FCC 15.407 Radiated Spurious Emissions

### Test Specific Details

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

Date of Test: 10/4/2016  
 Test Engineer: Rafael Varelas  
 Test Location: Fremont CH 7

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

### General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.  
 For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

### Ambient Conditions:

Temperature: 21.8 °C  
 Rel. Humidity: 43 %

### Summary of Results

Run #	Mode	Channel	Target Power	Passing Power Setting	Test Performed	Limit	Result / Margin
Simultaneous Tx operation							
1	b	6	25.5	25.5	Radiated Emissions, 30 - 1000MHz	FCC 15.209 / 15.247 / 15 E	31.5 dBµV/m @ 361.09 MHz (-14.5 dB)
	a	40	23	23	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15.247 / 15 E	51.9 dBµV/m @ 7312.1 MHz (-2.1 dB)
2	b	6	25.5	25.5	Radiated Emissions, 30 - 1000MHz	FCC 15.209 / 15.247 / 15 E	31.7 dBµV/m @ 361.09 MHz (-14.3 dB)
	a	157	23	23	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15.247 / 15 E	52.9 dBµV/m @ 7311.9 MHz (-1.1 dB)

### 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:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

## Procedure Comments:

Measurements performed in accordance with FCC KDB 789033

Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time

Unless otherwise stated/noted, emission has duty cycle  $\geq 98\%$  and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold 50 traces. (method VB of KDB 789033)

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11b	1Mbps	1.00	Yes	12.43	0	0	80
11a	6Mbps	0.89	Yes	0.558	0.51	1.01	1792

## Sample Notes

Sample S/N: 184795206016480

Driver: -

Antenna: 3x3, 4x4 internal

## Measurement Specific Notes:

Note 1:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB $\geq$ 3MHz, peak detector). Per KDB 789033 2) c) (i), compliance can be demonstrated by meeting the average and peak limits of 15.209, as an alternative.
Note 2:	Emission has constant duty cycle < 98%, average measurement performed: RBW=1MHz, VBW>1/T but not less than 10Hz, peak detector, linear averaging, auto sweep,max hold 50*1/DC traces (method VB of KDB 789033)

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Run #1, Radiated Spurious Emissions

Date of Test: 10/4/2016

Test Engineer: Rafael Varelas

Test Location: Fremont CH 7

Config. Used: 1

Config Change: None

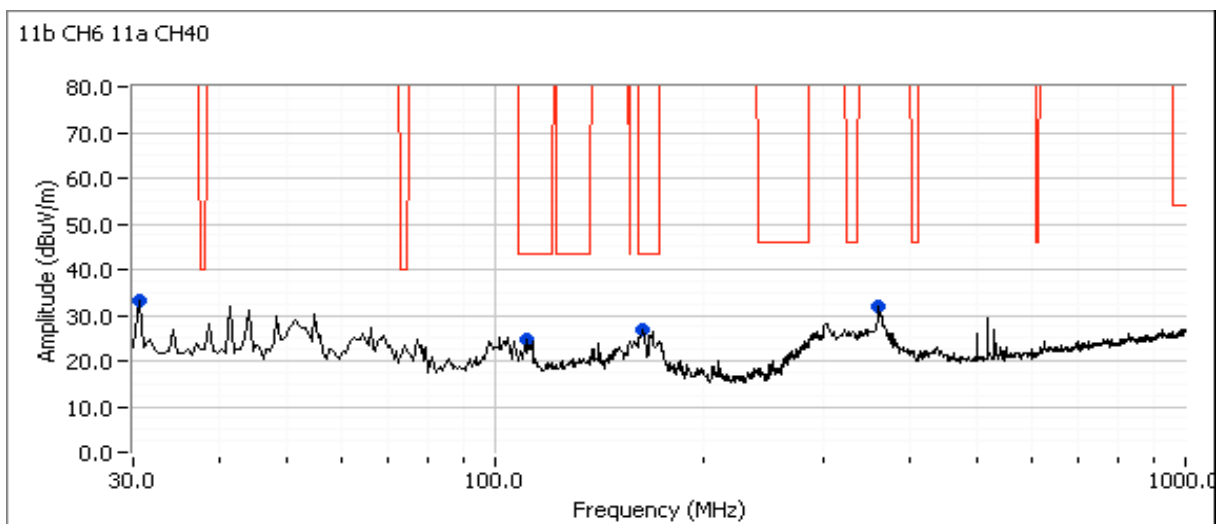
EUT Voltage: 120V/60Hz

Channel: 6 Mode: 11b  
Tx Chain: 3Tx Data Rate: 1Mbps

Channel: 40 Mode: 11a  
Tx Chain: 4Tx Data Rate: 6Mbps

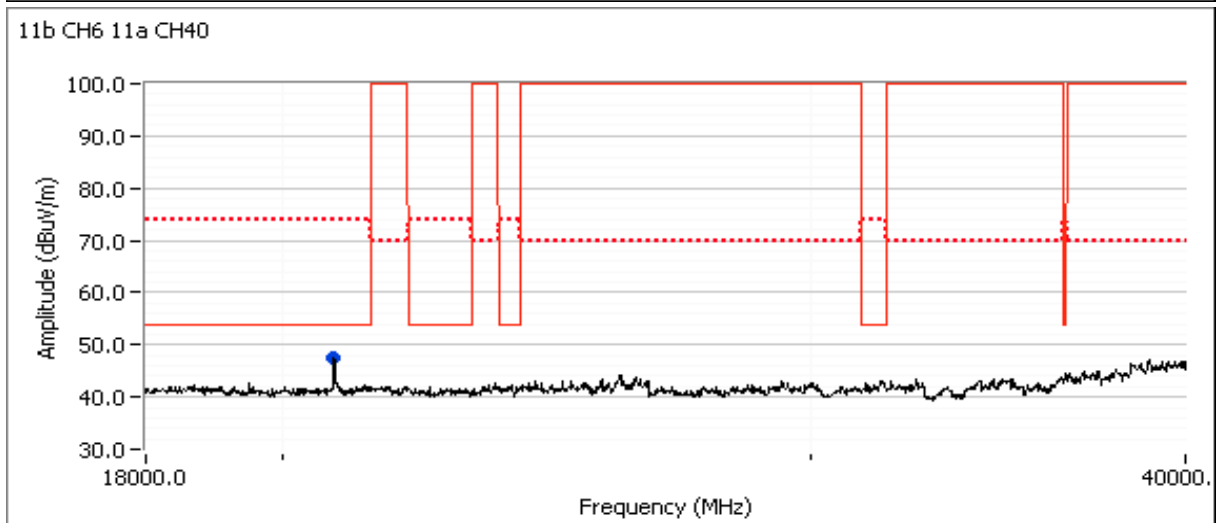
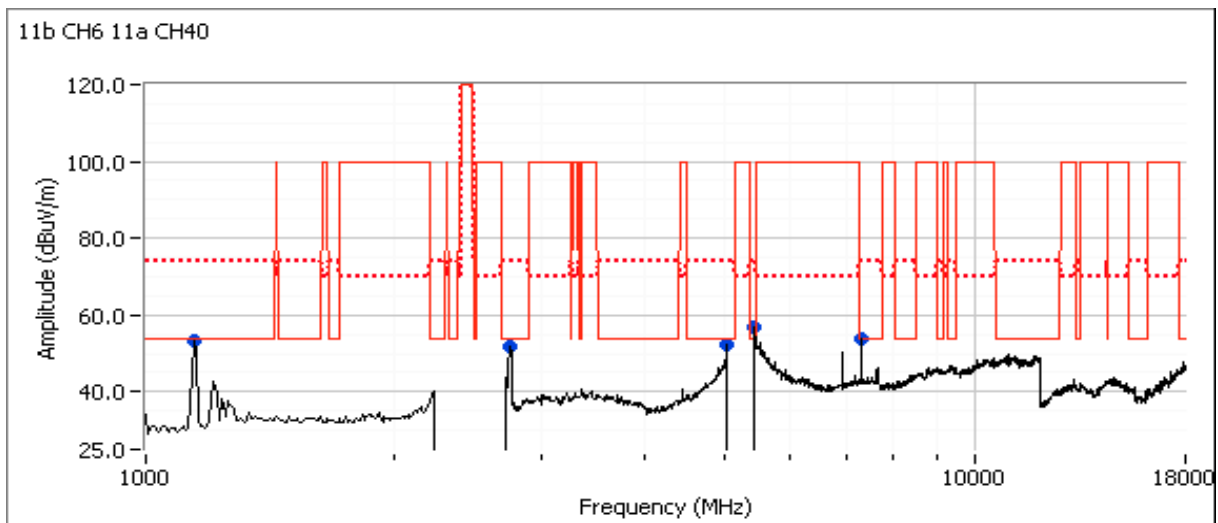
## Run #1a: 30-1000MHz

Frequency	Level	Pol	15.209 / 15.247 / 15E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
361.087	31.5	H	46.0	-14.5	QP	239	1.0	Restricted limit used
31.481	18.2	V	40.0	-21.8	QP	325	1.0	Restricted limit used
111.641	18.9	V	43.5	-24.6	QP	167	1.1	QP (1.00s)
165.483	24.7	V	43.5	-18.8	QP	141	0.9	QP (1.00s)



Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

Run #1b: 1000-40000MHz



# EMC Test Data

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7312.120	51.9	H	54.0	-2.1	Avg	341	1.0	RB 1 MHz;VB 3 kHz;Peak
7310.170	58.1	H	74.0	-15.9	PK	341	1.0	RB 1 MHz;VB 3 MHz;Peak
5149.200	49.4	H	54.0	-4.6	Avg	121	1.7	POS; RB 1 MHz; VB: 2 kHz, note 3
5149.920	60.9	H	74.0	-13.1	PK	121	1.7	POS; RB 1 MHz; VB: 3 MHz, note 3
5433.250	49.4	H	54.0	-4.6	Avg	356	1.5	POS; RB 1 MHz; VB: 2 kHz, note 4
5426.190	60.6	H	74.0	-13.4	PK	356	1.5	POS; RB 1 MHz; VB: 3 MHz, note 4
20800.100	44.6	V	54.0	-9.4	Avg	113	1.9	RB 1 MHz;VB 3 kHz;Peak
20799.530	54.0	V	74.0	-20.0	PK	113	1.9	RB 1 MHz;VB 3 MHz;Peak
2768.700	43.1	H	54.0	-10.9	Avg	136	1.3	POS; RB 1 MHz; VB: 2 kHz, note 4
2768.940	53.9	H	74.0	-20.1	PK	136	1.3	POS; RB 1 MHz; VB: 3 MHz, note 4
1142.090	53.2	H	54.0	-0.8	Peak	124	1.0	Non-radio related signal

Note 3: Measured with bandstop filters with R&S analyzer. Signal is artifact of using filter.

Note 4: Measured with bandstop filters with R&S analyzer.

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

## Run #2, Radiated Spurious Emissions

Date of Test: 10/4/2016

Test Engineer: Rafael Varelas

Test Location: Fremont CH 7

Config. Used: 1

Config Change: None

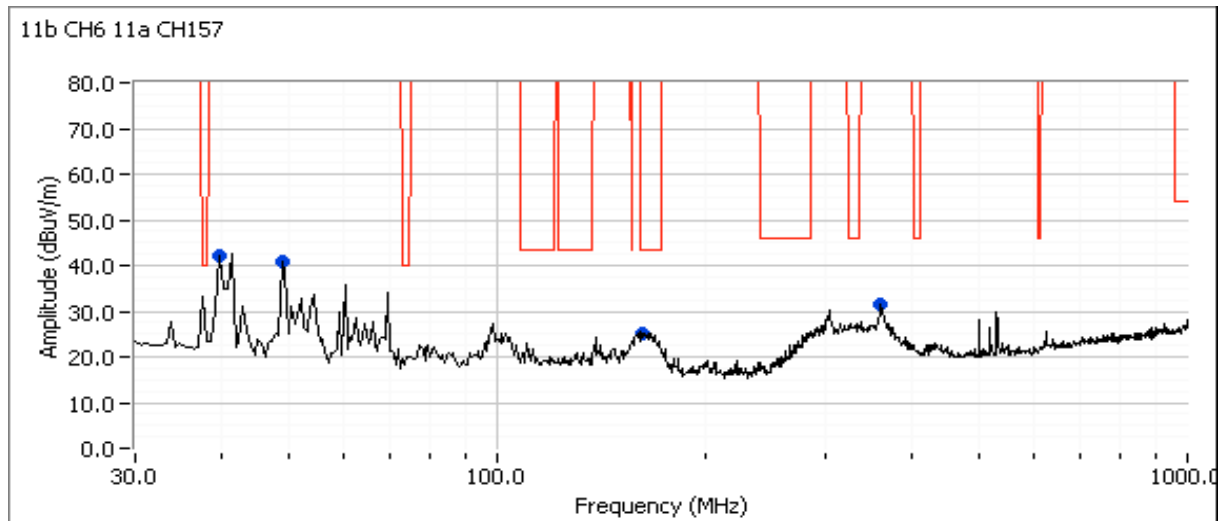
EUT Voltage: 120V/60Hz

Channel: 6 Mode: 11b  
Tx Chain: 3Tx Data Rate: 1Mbps

Channel: 157 Mode: 11a  
Tx Chain: 4Tx Data Rate: 6Mbps

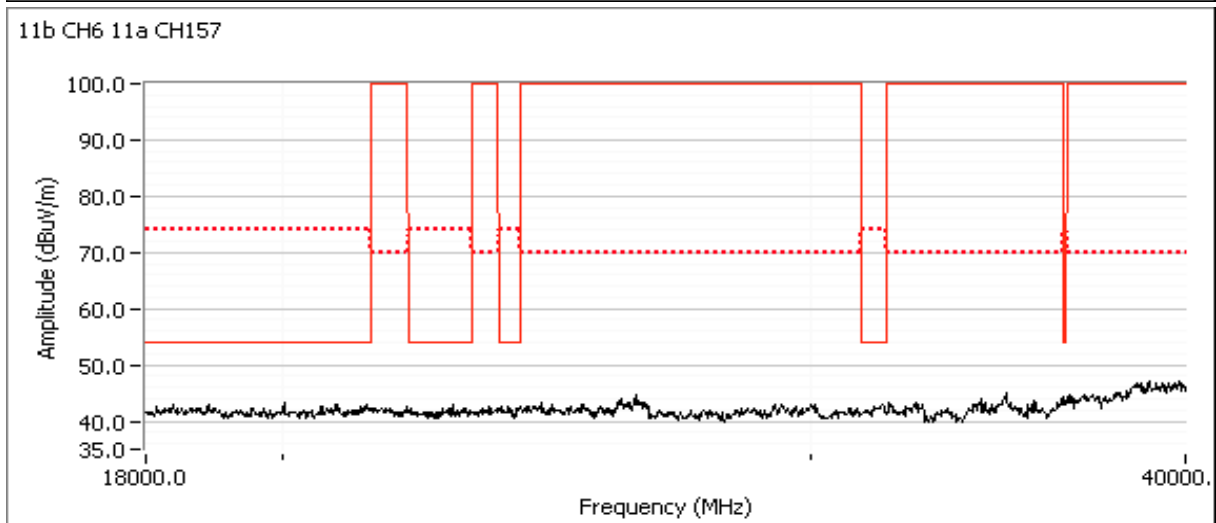
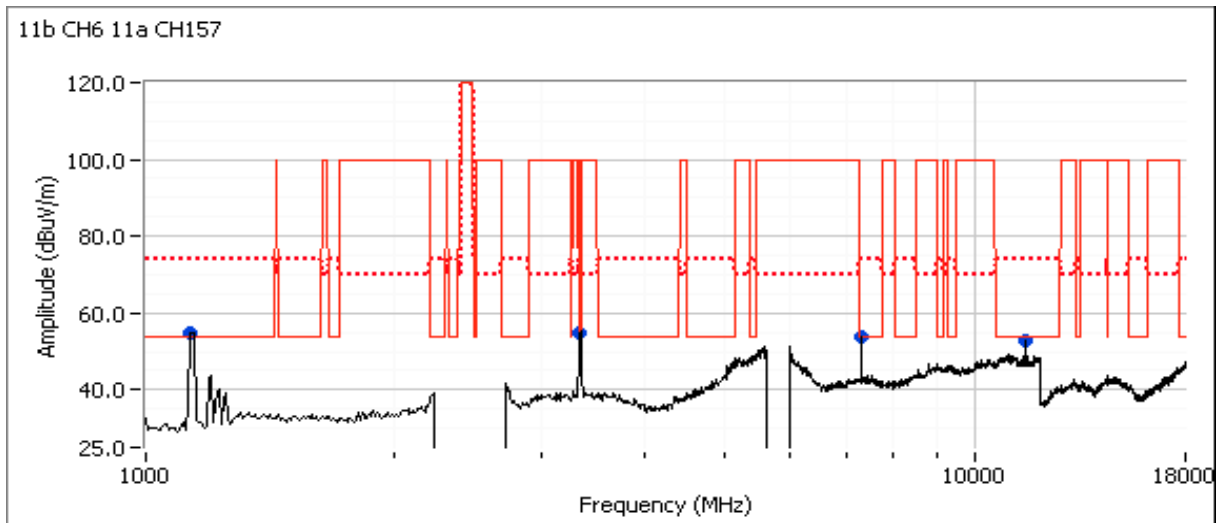
## Run #1a: 30-1000MHz

Frequency	Level	Pol	15.209 / 15.247 / 15E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
361.093	31.7	H	46.0	-14.3	QP	238	1.0	Restricted limit used
39.677	18.7	V	40.0	-21.3	QP	91	1.0	Restricted limit used
162.551	21.7	V	43.5	-21.8	QP	113	1.0	QP (1.00s)
47.798	23.4	V	40.0	-16.6	QP	292	1.0	Restricted limit used



Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: N/A

Run #1b: 1000-40000MHz



## EMC Test Data

Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	N/A

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7311.940	52.9	H	54.0	-1.1	Avg	342	1.1	RB 1 MHz;VB 3 kHz;Peak
7312.030	58.9	H	74.0	-15.1	PK	342	1.1	RB 1 MHz;VB 3 MHz;Peak
3338.610	51.4	V	54.0	-2.6	Avg	340	1.5	RB 1 MHz;VB 3 kHz;Peak
3338.620	62.0	V	74.0	-12.0	PK	340	1.5	RB 1 MHz;VB 3 MHz;Peak
3341.610	62.8	V	68.3	-5.5	PK	340	1.5	RB 1 MHz;VB 3 MHz;Peak
11571.730	48.1	V	54.0	-5.9	Avg	290	1.4	RB 1 MHz;VB 3 kHz;Peak
11572.400	59.5	V	74.0	-14.5	PK	290	1.4	RB 1 MHz;VB 3 MHz;Peak
1139.430								Non-radio related signal

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: B

## Conducted Emissions

(NTS Silicon Valley, Fremont Facility, Semi-Anechoic Chamber)

### 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: 10/5/2016  
 Test Engineer: Kevin Wen  
 Test Location: Fremont Chamber #4

Config. Used: 1  
 Config Change: -  
 EUT Voltage: 120V/60Hz

### General Test Configuration

For tabletop equipment, the EUT was located on a table inside the semi-anechoic chamber, 40 cm from a vertical coupling plane and 80 cm from the LISN. Remote support equipment was located outside of the semi-anechoic chamber. Any cables running to remote support equipment were routed through metal conduit and when possible passed through a ferrite clamp upon exiting the chamber.

Ambient Conditions: Temperature: 25 °C  
 Rel. Humidity: 40 %

### Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power, 120V/60Hz	15.207	Pass	44.8 dBµV @ 0.151 MHz (-21.1 dB)

### 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.

### Sample Notes

Sample S/N: 184795206016480

Driver: -

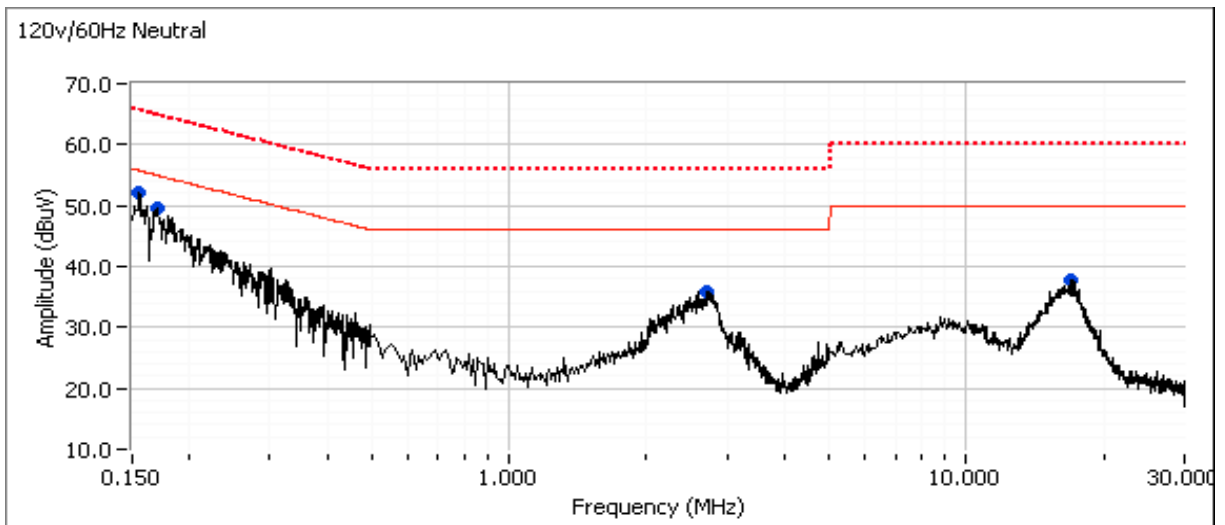
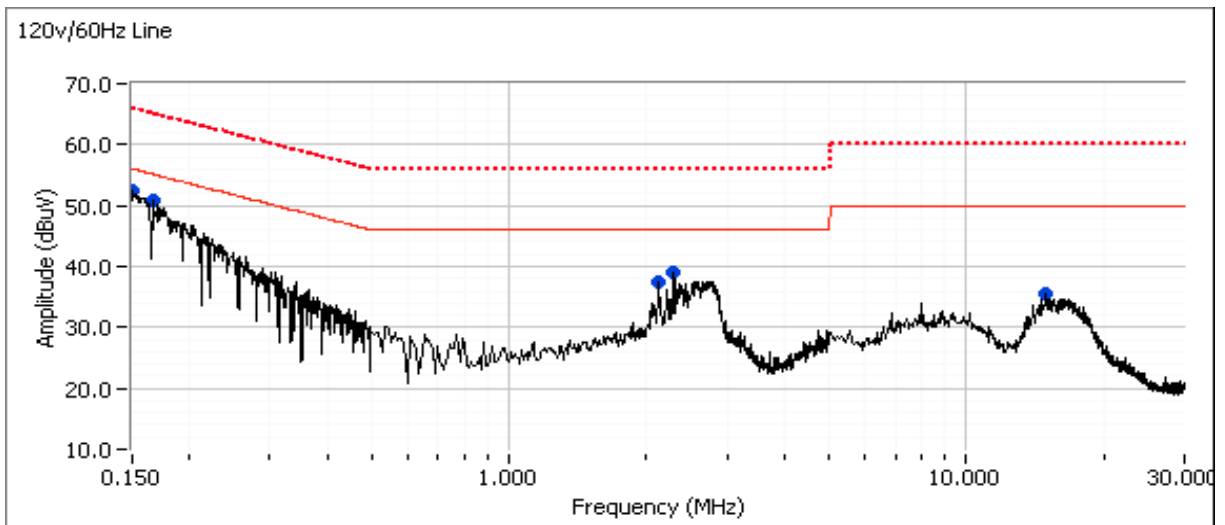
Antenna: 4x4 internal

Channel: 6 Mode: b Power setting = 25.5  
 Tx Chain: 3Tx Data Rate: 1Mbps

Channel: 157 Mode: a Power setting = 23  
 Tx Chain: 4Tx Data Rate: 6Mbps

Client: Arris	Job Number: JD102271
Model: BGW210-700	T-Log Number: T102846
Contact: Mark Rieger	Project Manager: Irene Rademacher
Standard: FCC 15.B, 15.247, 15.407	Project Coordinator: -
	Class: B

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz



Client:	Arris	Job Number:	JD102271
Model:	BGW210-700	T-Log Number:	T102846
Contact:	Mark Rieger	Project Manager:	Irene Rademacher
Standard:	FCC 15.B, 15.247, 15.407	Project Coordinator:	-
		Class:	B

## Preliminary peak readings captured during pre-scan (peak readings vs. average limit)

Frequency MHz	Level dB $\mu$ V	AC Line	FCC 15.207		Detector QP/Ave	Comments
			Limit	Margin		
0.167	50.9	Line 1	55.1	-4.2	Peak	
0.150	52.3	Line 1	56.0	-3.7	Peak	
2.123	37.5	Line 1	46.0	-8.5	Peak	
2.295	39.0	Line 1	46.0	-7.0	Peak	
14.970	35.6	Line 1	50.0	-14.4	Peak	
0.156	52.2	Neutral	55.7	-3.5	Peak	
0.170	49.6	Neutral	54.9	-5.3	Peak	
2.718	36.0	Neutral	46.0	-10.0	Peak	
16.874	37.9	Neutral	50.0	-12.1	Peak	

## Final quasi-peak and average readings

Frequency MHz	Level dB $\mu$ V	AC Line	FCC 15.207		Detector QP/Ave	Comments
			Limit	Margin		
0.151	44.8	Line 1	65.9	-21.1	QP	QP (1.00s)
0.156	44.3	Neutral	65.7	-21.4	QP	QP (1.00s)
0.167	42.8	Line 1	65.1	-22.3	QP	QP (1.00s)
2.711	22.0	Neutral	46.0	-24.0	AVG	AVG (0.10s)
2.289	21.3	Line 1	46.0	-24.7	AVG	AVG (0.10s)
16.859	24.8	Neutral	50.0	-25.2	AVG	AVG (0.10s)
2.124	20.7	Line 1	46.0	-25.3	AVG	AVG (0.10s)
14.940	24.3	Line 1	50.0	-25.7	AVG	AVG (0.10s)
0.170	39.3	Neutral	65.0	-25.7	QP	QP (1.00s)
2.711	30.1	Neutral	56.0	-25.9	QP	QP (1.00s)
2.289	29.1	Line 1	56.0	-26.9	QP	QP (1.00s)
16.859	32.2	Neutral	60.0	-27.8	QP	QP (1.00s)
2.124	27.5	Line 1	56.0	-28.5	QP	QP (1.00s)
14.940	29.9	Line 1	60.0	-30.1	QP	QP (1.00s)
0.151	25.3	Line 1	55.9	-30.6	AVG	AVG (0.10s)
0.167	23.8	Line 1	55.1	-31.3	AVG	AVG (0.10s)
0.156	23.1	Neutral	55.7	-32.6	AVG	AVG (0.10s)
0.170	21.2	Neutral	55.0	-33.8	AVG	AVG (0.10s)

### ***End of Report***

This page is intentionally blank and marks the last page of this test report.