



# FCC 47 CFR PART 15 SUBPART E & INDUSTRY CANADA RSS-210

for

Screeneo

Model: HDP1590, HDP1690

Brand: PHILIPS

Test Report Number:

C140310Z02-T

Issued Date: May 5, 2014

Issued for

SAGEMCOM SAS

250 Route de l' Empereur - 92848 RUEIL MALMAISON  
CEDEX- FRANCE

Issued by:

Compliance Certification Services (Shenzhen) Inc.

No.10-1 Mingkeda Logistics park, No.18, Huanguan South Rd.,  
Guan Lan Town, Baoan District, Shenzhen, China

TEL: 86-755-28055000

FAX: 86-755-28055221



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## Revision History

Rev.	Issue No.	Revisions	Effect Page	Revised By
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## 1. TEST CERTIFICATION

<b>Product</b>	Screeneo
<b>Model</b>	HDP1590, HDP1690
<b>Brand</b>	PHILIPS
<b>Tested</b>	March 10~April 28, 2014
<b>Applicant</b>	<b>SAGEMCOM SAS</b> 250 Route de l' Empereur - 92848 RUEIL MALMAISON CEDEX- FRANCE
<b>Manufacturer</b>	<b>SAGEMCOM DOCUMENTS SAS</b> 250 Route de l' Empereur - 92848 RUEIL MALMAISON CEDEX- FRANCE

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart E & Industry Canada RSS-210 Issue 8 December, 2010	No non-compliance noted

### We hereby certify that:

Compliance Certification Services Inc. tested the above equipment. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in **ANSI C63.4: 2009** and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.407 and Industry Canada RSS-210 Issue 8.

The TEST RESULTS of this report relate only to the tested sample identified in this report.

*Approved by:*

**Sunday Hu**  
Supervisor of EMC Dept.  
Compliance Certification Service Inc.

*Reviewed by:*

**Ruby Zhang**  
Supervisor of Report Dept.  
Compliance Certification Service Inc.



## 2. EUT DESCRIPTION

<b>Product</b>	Screeneo
<b>Model Number</b>	HDP1590, HDP1690
<b>Brand</b>	PHILIPS
<b>Model Discrepancy</b>	1. HDP1590 is a typical model for full functions which is embedded with Wi-Fi 2.4G/5G and Bluetooth modules; 2. HDP1690 is a upgraded version based on HDP1590,The same HW,Mechanical and Radio modules design as HDP1590 ,except that Light engine changed from 500 Lum to 800 Lum and Fan changed the manufacturer.
<b>Serial Number</b>	C140310Z02-T
<b>Received Date</b>	March 10, 2014
<b>Power Supply</b>	AC100-240V,50/60Hz,150mA
<b>Frequency Range</b>	UNII Band I: IEEE 802.11a, 802.11n HT20 : 5180MHz ~ 5240MHz; IEEE 802.11n HT40 : 5190MHz ~ 5230MHz UNII Band II IEEE 802.11a, 802.11n HT20 : 5260MHz ~ 5320MHz IEEE 802.11n HT40 : 5270MHz ~ 5310MHz UNII Band III IEEE 802.11a, 802.11n HT20 : 5500MHz ~ 5700MHz IEEE 802.11n HT40 : 5510MHz ~ 5670MHz UNII Band IV IEEE 802.11a, 802.11n HT20 : 5745MHz ~ 5805MHz IEEE 802.11n HT40 : 5755MHz ~ 5795MHz
<b>Transmit Power</b>	UNII Band I: IEEE 802.11a mode: 11.88dBm (Antenna 0) IEEE 802.11a mode: 12.39dBm (Antenna 1) IEEE 802.11n HT 20 MHz mode: 15.17dBm (Combine with Antenna 0 and Antenna 1) IEEE 802.11n HT 40 MHz mode: 14.65dBm (Combine with Antenna 0 and Antenna 1) UNII Band II IEEE 802.11a mode: 13.71dBm (Antenna 0) IEEE 802.11a mode: 13.86dBm (Antenna 1) IEEE 802.11n HT 20 MHz mode: 16.46dBm (Combine with Antenna 0 and Antenna 1) IEEE 802.11n HT 40 MHz mode: 16.18dBm (Combine with Antenna 0 and Antenna 1) UNII Band III IEEE 802.11a mode: 13.32dBm (Antenna 0) IEEE 802.11a mode: 13.63dBm (Antenna 1) IEEE 802.11n HT 20 MHz mode: 16.50dBm (Combine with Antenna 0 and Antenna 1) IEEE 802.11n HT 40 MHz mode: 15.47dBm (Combine with Antenna 0 and Antenna 1) UNII Band IV IEEE 802.11a mode: 13.99dBm (Antenna 0) IEEE 802.11a mode: 12.83dBm (Antenna 1) IEEE 802.11n HT 20 MHz mode: 16.41dBm (Combine with Antenna 0 and Antenna 1) IEEE 802.11n HT 40 MHz mode: 15.81dBm (Combine with Antenna 0 and Antenna 1)
<b>Modulation Technique</b>	OFDM (QPSK, BPSK, 16-QAM, 64-QAM)



<b>Transmit Data Rate</b>	IEEE 802.11a mode: 54, 48, 36, 24, 18, 12, 9, 6 Mbps IEEE 802.11n HT 20 MHz: OFDM (6.5, 7.2, 13, 14.4, 14.44, 19.5, 21.7, 26, 28.89, 28.9, 39, 43.3, 43.33 52, 57.78, 57.8, 58.5, 65.0, 72.2, 78, 86.67, 104, 115.56, 117, 130, 144.44 Mbps) IEEE 802.11n HT 40 MHz: OFDM (13.5, 15, 27, 30, 40.5, 45, 54, 60, 81, 90, 108, 120, 121.5, 135, 150, 162, 180, 216, 240, 243, 270, 300 Mbps)
<b>Number of Channels</b>	UNII Band I: IEEE 802.11a, 802.11n HT20 : 4 Channels IEEE 802.11n HT40 : 2 Channels UNII Band II IEEE 802.11a, 802.11n HT20 : 4 Channels IEEE 802.11n HT40 : 2 Channels UNII Band III IEEE 802.11a, 802.11n HT20 : 8 Channels IEEE 802.11n HT40 : 3 Channels UNII Band IV IEEE 802.11a, 802.11n HT20 : 4 Channels IEEE 802.11n HT40 : 2 Channels
<b>Antenna Specification</b>	Embedded Type Antenna with 1.5dBi gain (Max)
<b>Channels Spacing</b>	IEEE 802.11a, 802.11n HT20 : 20MHz IEEE 802.11n HT40: 40MHz,
<b>Temperature Range</b>	5°C ~ 35°C
<b>Hardware Version</b>	Motherboard: 8446C V6.0 Driver board: 8631C V5.0 power board: NER-SPM00-290A-J,Ver A8
<b>Software Version</b>	V1.18_2014_04_10

**Note:** 1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.

**Operation Frequency:**

UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII)		
CHANNEL	MHz	Remark
36	5180	passive scanning
38	5190	passive scanning
40	5200	passive scanning
44	5220	passive scanning
46	5230	passive scanning
48	5240	passive scanning
52	5260	passive scanning
54	5270	passive scanning
56	5280	passive scanning
60	5300	passive scanning
62	5310	passive scanning
64	5320	passive scanning
100	5500	passive scanning
102	5510	passive scanning
104	5520	passive scanning
108	5540	passive scanning
110	5550	passive scanning
112	5560	passive scanning
116	5580	passive scanning
132	5660	passive scanning
134	5670	passive scanning
136	5680	passive scanning
140	5700	passive scanning
149	5745	passive scanning
151	5755	passive scanning
153	5765	passive scanning
157	5785	passive scanning
159	5795	passive scanning
161	5805	passive scanning

*Remark: The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.*



### 3. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4: 2009 Radiated testing was performed at an antenna to EUT distance 3 meters.

The tests documented in this report were performed in accordance with ANSI C63.4: 2009 and FCC CFR 47 Part 15.207, 15.209 and 15.407, RSS-GEN Issue 2, and RSS-210 Issue 8.

Radio testing was performed according to KDB DA 02-2138、KDB 789033 D01、KDB 905462 D05;

#### 3.1 EUT CONFIGURATION

The EUT configuration for testing is installed for RF field strength measurement to meet the Commissions requirement, and is operated in a manner intended to generate the maximum emission in a continuous normal application.

#### 3.2 EUT EXERCISE

The EUT is operated in the engineering mode to fix the TX frequency for the purposes of measurement.

According to its specifications, the EUT must comply with the requirements of Section 15.407 under the FCC Rules Part 15 Subpart E.

#### 3.3 GENERAL TEST PROCEDURES

##### Conducted Emissions

The EUT is placed on the turntable, which is positioned at 0.8 m above the ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4, the conducted emission from the EUT is measured in the frequency range between 0.15 MHz and 30MHz, using the CISPR Quasi-Peak detector mode.

##### Radiated Emissions

The EUT is placed on the turntable, which is 0.8 m above the ground plane. The turntable is then rotated for 360 degrees to determine the proper orientation for the maximum emission level. The EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission level. And, each emission is to be maximized by changing the horizontal and vertical polarization of the receiving antenna. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4: 2003.



### 3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41	322 - 335.4		

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.



### 3.5 DESCRIPTION OF TEST MODES

The EUT is a 2x2 configuration spatial MIMO (2TX & 2RX) without beam forming function. The 2x2 configuration is implemented with two outside TX & RX Antennas (Antenna 0 and Antenna 1).

Software used to control the EUT for staying in continuous transmitting mode was programmed.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz, which worst case was in normal link mode only.

#### UNII Band I:

##### **IEEE 802.11a for 5180 ~ 5240MHz:**

Channel Low (5180MHz), Channel Mid (5220MHz) and Channel High (5240MHz) with 6Mbps data rate were chosen for full testing.

##### **IEEE 802.11n HT 20 MHz for 5180 ~ 5240MHz:**

Channel Low (5180MHz), Channel Mid (5220MHz) and Channel High (5240MHz) with 13Mbps data rate were chosen for full testing.

##### **IEEE 802.11n HT 40 MHz Channel for 5190 ~ 5230MHz:**

Channel Low (5190MHz) and Channel High (5230MHz) with 27Mbps data rate were chosen for full testing.

#### UNII Band II:

##### **IEEE 802.11a for 5260 ~ 5320MHz:**

Channel Low (5260MHz), Channel Mid (5280MHz) and Channel High (5320MHz) with 6Mbps data rate were chosen for full testing.

##### **IEEE 802.11n HT 20 MHz for 5260 ~ 5320MHz:**

Channel Low (5260MHz), Channel Mid (5280MHz) and Channel High (5320MHz) with 13Mbps data rate were chosen for full testing.

##### **IEEE 802.11n HT 40 MHz for 5270 ~ 5310MHz:**

Channel Low (5270MHz) and Channel High (5310MHz) with 27Mbps data rate were chosen for full testing.



## **UNII Band III:**

### **IEEE 802.11a for 5500 ~ 5700MHz:**

Channel Low (5500MHz), Channel Mid (5580MHz) and Channel High (5700MHz) with 6Mbps data rate were chosen for full testing.

### **IEEE 802.11n HT 20 MHz for 5500 ~ 5700MHz:**

Channel Low (5500MHz), Channel Mid (5580MHz) and Channel High (5700MHz) with 13Mbps data rate were chosen for full testing.

### **IEEE 802.11n HT 40 MHz for 5510 ~ 5670MHz:**

Channel Low (5510MHz), Channel Mid (5550MHz) and Channel High (5670MHz) with 27Mbps data rate were chosen for full testing.

## **UNII Band IV:**

### **IEEE 802.11a for 5745 ~ 5805MHz:**

Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5805MHz) with 6Mbps data rate were chosen for full testing.

### **IEEE 802.11n HT 20 MHz for 5745 ~ 5805MHz:**

Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5805MHz) with 13Mbps data rate were chosen for full testing.

### **IEEE 802.11n HT 40 MHz for 5755 ~ 5795MHz:**

Channel Low (5755MHz) and Channel High (5795MHz) with 27Mbps data rate were chosen for full testing.



## 4. SETUP OF EQUIPMENT UNDER TEST

### 4.1 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Equipment	Model No.	Serial No.	FCC ID	Brand	Data Cable	Power Cord
1	PC	Dcsmif	805CV2X	DoC	DELL	Unshielded, 1.50m (VGA Cable) Unshielded, 1.50m (HDMI Cable)	Unshielded, 1.80m
2	Keyboard	SK-8115	CN-0DJ313-71616 -82P-0YTB	DoC	DELL	Unshielded, 1.50m	N/A
3	Mouse	MS111-P	J1101ANN	DoC	DELL	Unshielded, 1.45m	N/A
4	Modem	Modem1414	9013592	DoC	ACEEX	Unshielded, 1.20m	Unshielded, 2.00m
5	Printer	P310B	DLRE217030	DoC	EPSON	Unshielded, 1.20m	Unshielded, 2.00m
6	Headset	ST908	N/A	DoC	SENIC	Unshielded, 2.20m	N/A
7	DVD 1#	DV-410V-G	HKKD010577CN	DoC	PIONEER	Unshielded, 1.50m (HDMI Cable)	Unshielded, 2.00m
8	DVD 2#	DV-410V-G	HKKD010577CN	DoC	PIONEER	Unshielded, 1.50m (HDMI Cable)	Unshielded, 2.00m
9	USB 2.0 1#	RD1000	B9DJ4K1	DoC	DELL	Unshielded, 0.50m	N/A
10	USB 2.0 2#	RD1000	C9DJ4K1	DoC	DELL	Unshielded, 0.50m	N/A
11	USB 2.0 3#	RD1000	59DJ4K1	DoC	DELL	Unshielded, 0.50m	N/A
12	Speaker 1#	MF4105	N/A	DoC	CREATIVE	Unshielded, 2.00m	N/A
13	Speaker 2#	MF4105	N/A	DoC	CREATIVE	Unshielded, 2.00m	N/A
14	Speaker 3#	N/A	N/A	DoC	N/A	Unshielded, 2.00m	N/A
15	SD Card	N/A	N/A	DoC	Kingston	N/A	N/A
16	Wireless Router	TL-WR740N	12714462932	DoC	TP-LINK	Unshielded 1.50m	N/A

**Note:**

Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

### 4.2 CONFIGURATION OF SYSTEM UNDER TEST

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.



## 5. FACILITIES AND ACCREDITATIONS

### 5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at  
**No.10-1 Mingkeda Logistics park, No.18, Huanguan South Rd., Guan Lan Town,  
Baoan District, Shenzhen, China**

The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22.

### 5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

### 5.3 ACCREDITATIONS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

<b>USA</b>	<b>A2LA</b>
<b>China</b>	<b>CNAS</b>

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

<b>USA</b>	<b>FCC</b>
<b>Japan</b>	<b>VCCI(C-3478, R-3135, T-652, G-624)</b>
<b>Canada</b>	<b>INDUSTRY CANADA</b>
<b>Taiwan</b>	<b>BSMI</b>

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.ccsrf.com>



## 5.4 LABORATORY ACCREDITATIONS AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by American Association for Laboratory Accreditation Program for the specific scope accreditation under Lab Code: 0824-01 to perform Electromagnetic Interference tests according to FCC Part 15 and CISPR 22 requirements. In addition, the test facilities are listed with Industry Canada, Certification and Engineering Bureau, IC 2324G-1 for 3M Semi Anechoic Chamber A, 2324G-2 for 3M Semi Anechoic Chamber B.

## 5.5 MEASUREMENT UNCERTAINTY

Parameter	Uncertainty
RF frequency	+/- 1 * 10 <sup>-5</sup>
RF power conducted	+/- 1,5 dB
RF power radiated	+/- 6 dB
Spurious emissions, conducted	+/- 3 dB
Spurious emissions, radiated	+/- 6 dB
Humidity	+/- 5 %
Temperature	+/- 1°C
Time	+/-10 %

*Remark: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.*



## 6. APPLICABLE RULES

### **RSS-210 §2 General Certification Requirements and Specifications**

#### **RSS-210 §2.1 RSS-Gen Compliance**

In addition to RSS-210, the requirements in RSS-Gen, *General Requirements and Information for the Certification of Radio Apparatus*, must be met.

#### **RSS-210 §2.2 Emissions Falling Within Restricted Frequency Bands**

Category I licence-exempt equipment is required to comply with the provisions in RSS-Gen with respect to emissions falling within restricted frequency bands. These restricted frequency bands are listed in RSS-Gen.

#### **RSS-210 §2.3 Receivers**

Category I equipment receivers for use with transmitters subject to RSS-210 must comply with the applicable requirements set out in RSS-Gen and be certified under RSS-210. Category II equipment receivers for use with transmitters subject to RSS-210 are exempt from certification, but are subject to compliance with RSS-Gen and RSS-310.

#### **RSS-210 §2.5 General Field Strength Limits**

RSS-Gen includes the general field strength limits of unwanted emissions, where applicable, for transmitters and receivers operating in accordance with the provisions specified in this standard. Unwanted emissions of transmitters and receivers are permitted to fall within the restricted bands listed in RSS-Gen, and including the TV bands, but fundamental emissions are prohibited in the restricted bands.

#### **RSS-210 §2.5.1 Transmitters with Wanted Emissions that are Within the General Field Strength Limits**

Whether or not their operation is addressed by published RSS standards, transmitters whose wanted and unwanted emissions are within the general field strength limits shown in RSS-Gen, they may operate in any of the frequency bands, other than the restricted bands listed in RSS-Gen and including the TV bands, and shall be certified under RSS-210. Under no conditions may the level of any unwanted emissions exceed the level of the fundamental emission.

**Note:** Devices operating below 490 kHz in which all emissions are at least 40 dB below the limit listed in RSS-Gen (*General Field Strength Limits for Transmitters at Frequencies below 30 MHz*) are Category II devices and are subject to RSS-310.



## RSS-210 §2.7 Tables

### **RSS-210 §Annex 8: Frequency Hopping and Digital Modulation Systems Operating in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz Bands**

This section applies to systems that employ frequency hopping (FH) and digital modulation technology in the 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz bands. Systems in these bands may employ frequency hopping, digital modulation and or a combination (hybrid) of both techniques.

A frequency hopping system that synchronizes with another or several other systems (to avoid frequency collision among them) via off-air sensing or via connecting cables is not hopping randomly and therefore is not in compliance with RSS-210.

#### **RSS-210 §A8.1 Frequency Hopping Systems**

Frequency hopping systems are spread spectrum systems in which the carrier is modulated with coded information in a conventional manner causing a conventional spreading of the RF energy about the carrier frequency. The frequency of the carrier is not fixed but changes at fixed intervals under the direction of a coded sequence.

Frequency hopping systems are not required to employ all available hopping frequencies during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream.

Incorporation of intelligence into a frequency hopping system that enables it to recognize other users of the band and to avoid occupied frequencies is permitted, provided that the frequency hopping system does it individually, and independently chooses or adapts its hopset. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

The following applies to frequency hopping systems in each of the three bands.

(a) The bandwidth of a frequency hopping channel is the 20 dB emission bandwidth, measured with the hopping stopped. The system RF bandwidth is equal to the channel bandwidth multiplied by the number of channels in the hopset. The hopset shall be such that the near term distribution of frequencies appears random, with sequential hops randomly distributed in both direction and magnitude of change in the hopset while the long term distribution appears evenly distributed.



(b) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 0.125 W. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

(d) Frequency hopping systems operating in the 2400-2483.5 MHz band shall use at least 15 hopping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Transmissions on particular hopping frequencies may be avoided or suppressed provided that a minimum of 15 hopping channels are used.

#### **RSS-210 §A8.2 Digital Modulation Systems**

These include systems employing digital modulation techniques resulting in spectral characteristics similar to direct sequence systems. The following applies to all three bands.

#### **RSS-210 §A8.4 Transmitter Output Power and e.i.r.p. Requirements**

(4) For systems employing digital modulation techniques operating in the 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz bands, the maximum peak conducted power shall not exceed 1 W. Except as provided in Section A8.4(5), the e.i.r.p. shall not exceed 4 W.

As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power (see RSS-Gen)

(5) Point-to-point systems in the bands 2400-2483.5 MHz and 5725-5850 MHz are permitted to have an e.i.r.p. higher than 4 W, provided that the higher e.i.r.p. is achieved by employing higher gain directional antennas and not higher transmitter output powers. Point-to-multipoint systems, omni-directional applications and multiple co-located transmitters transmitting the same information are prohibited from exceeding 4 W e.i.r.p. However, remote stations of point-to-multipoint systems shall be allowed to operate at greater than 4 W e.i.r.p, under the same conditions as for point-to-point systems.

**Note:** “Fixed, point-to-point operation”, excludes point-to-multipoint systems, omnidirectional applications and multiple co-located transmitters transmitting the same information.



## **RSS-210 §A8.5 Out-of-band Emissions**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required.

## **RSS-Gen §2 General Information**

### **RSS-Gen §2.1.2 Category II Equipment**

Category II equipment comprises radio devices where a standard has been prescribed but for which a TAC is not required, that is, equipment certification by Industry Canada or a Certification Body (CB) is not required (certification exempt), pursuant to subsection 4(3) of the Radiocommunication Act. The manufacturer or importer shall nevertheless ensure that the standards are complied with. A test report shall be available on request and the device shall be properly labelled.

### **RSS-Gen §2.2 Receivers**

Receivers that are used for radiocommunication other than broadcasting are defined as Category I equipment or Category II equipment, subject to compliance with applicable Industry Canada standards.

Receivers shall be capable of operation only with transmitters for which RSSs are published. Receivers are classified as described in sections 2.2.1 and 2.2.2.

### **RSS-Gen §2.2.1 Category I Equipment Receivers**

A receiver is classified as Category I equipment if it meets one of the following conditions:

- (a) a stand-alone receiver (see Note 1, below), which operates on any frequency in the band 30-960 MHz, and is used for the reception of signals in that frequency band from a transmitter classified as Category I equipment;
- (b) a Citizen's Band (CB) receiver (26.96-27.410 MHz);
- (c) a scanner receiver.

**Note 1:** A *stand-alone receiver* is defined as any receiver that is not permanently combined together with a transmitter in a single case (transceiver), in which it functions as the receiver component of the transceiver.

Receivers classified as Category I equipment shall comply with the limits for receiver spurious emissions set out in RSS-Gen; however, equipment certification is granted under the applicable RSS standard along with the associated transmitter classified as Category I equipment. Scanner receivers are covered under their own specific RSS.

### **RSS-Gen §2.2.2 Category II Equipment Receivers**

A receiver is classified as Category II equipment if it does not meet any of the conditions of Section 2.2.1.

Category II receivers shall comply with the applicable testing, labelling and user manual requirements in RSS-310.



## **RSS-Gen §5.6 Exposure of Humans to RF Fields**

Category I and Category II equipment shall comply with the applicable requirements of RSS-102.

## **RSS-Gen §6 Receiver Spurious Emission Standard**

Receivers shall comply with the limits of spurious emissions set out in this section, measured over the frequency range determined in accordance with Section 4.10.

### **RSS-Gen §6.1 Radiated Limits**

Radiated spurious emission measurements shall be performed with the receiver antenna connected to the receiver antenna terminals.

Spurious emissions from receivers shall not exceed the radiated limits shown in the table below:

### **RSS-Gen Table 2 - Spurious Emission Limits for Receivers**

Frequency (MHz)	Field Strength microvolts/m at 3 metres
30-88	100
88-216	150
216-960	200
Above 960	500

\*Measurements for compliance with limits in the above table may be performed at distances other than 3 metres, in accordance with Section 7.2.7.

**RSS- Gen Table 3: Restricted Frequency Bands <sup>(Note)</sup>**

MHz	MHz	MHz	MHz	GHz
0.090-0.110	8.37625-8.38675	--	1718.8-1722.2	9.0-9.2
--	8.41425-8.41475	156.52475-156.52525	2200-2300	9.3-9.5
2.1735-2.1905	12.29-12.293	156.7-156.9	2310-2390	10.6-12.7
3.020-3.026	12.51975-12.52025	--	--	13.25-13.4
4.125-4.128	12.57675-12.57725	--	2655-2900	14.47-14.5
4.17725-4.17775	13.36-13.41	240-285	3260-3267	15.35-16.2
4.20725-4.20775	16.42-16.423	322-335.4	3332-3339	17.7-21.4
5.677-5.683	16.69475-16.69525	399.9-410	3345.8-3358	22.01-23.12
6.215-6.218	16.80425-16.80475	608-614	3500-4400	23.6-24.0
6.26775-6.26825	25.5-25.67	960-1427	4500-5150	31.2-31.8
6.31175-6.31225	37.5-38.25	1435-1626.5	5350-5460	36.43-36.5
8.291-8.294	73-74.6; 74.8-75.2	1645.5-1646.5	7250-7750	Above 38.6
8.362-8.366	108-138	1660-1710	8025-8500	

**Note:** Certain frequency bands listed in Table 2 and above 38.6 GHz are designated for low-power licence-exempt applications. These frequency bands and the requirements that apply to the devices are set out in this Standard as well as RSS-310.

**RSS- Gen Table 5: General Field Strength Limits for Transmitters at Frequencies Above 30 MHz**

Frequency (MHz)	Field Strength (microvolt/m at 3 metres)
30-88	100
88-216	150
216-960	200
Above 960	500

**Note:** Transmitting devices are not permitted in Table 1 bands or, unless stated otherwise, in TV bands(54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz and 614-806 MHz).

**RSS- Gen Table 6: General Field Strength Limits for Transmitters at Frequencies Below 30 MHz (Transmit)**

Frequency (fundamental or spurious)	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/377F (F in Hz)	300
490-1.705 kHz	24,000/F (F in kHz)	24,000/377F (F in kHz)	30
1.705-30 MHz	30	N/A	30

**Note:** The emission limits for the bands 9-90 kHz and 110-490 kHz are based on measurements employing an average detector.



## **RSS-Gen §7.1.2 Transmitter Antenna**

A transmitter can only be sold or operated with antennas with which it was approved. Transmitter may be approved with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest gain antenna of each combination of transmitter and antenna type for which approval is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type having equal or lesser gain as an antenna that had been successfully tested with the transmitter, will also be considered approved with the transmitter, and may be used and marketed with the transmitter. For Category I transmitters, the manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.

When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer.

For transmitters of RF output power of 10 milliwatts or less, only the portion of the antenna gain that is in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power to demonstrate compliance with the radiated power limits specified in the applicable standard. For transmitters of output power greater than 10 milliwatts, the total antenna gain shall be added to the measured RF output power to demonstrate compliance to the specified radiated power limits. User manuals for transmitters shall display the following notice in a conspicuous location:

*Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.*

The above notice may be affixed to the device instead of displayed in the user manual.

User manuals for transmitters equipped with detachable antennas shall also contain the following notice in a conspicuous location:

*This radio transmitter (identify the device by certification number, or model number if Category II) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.*

Immediately following the above notice, the manufacturer shall provide a list of all antenna types approved for use with the transmitter, indicating the maximum permissible antenna gain (in dBi) and required impedance for each.

**RSS-Gen §7.2.4 Transmitter and Receiver AC Power Lines Conducted Emission Limits**

Except when the requirements applicable to a given device state otherwise, for any radio apparatus equipped to operate from the public utility AC power supply, either directly or indirectly (such as with a battery charger), the radio frequency voltage of emissions conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in the table below. The more stringent limit applies at the frequency range boundaries. The conducted emissions shall be measured with a 50 ohm/50 microhenry line impedance stabilization network (LISN).

**RSS-Gen Table 4 – AC Power Line Conducted Emission Limits**

Frequency Range (MHz)	Conducted limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

\*Decreases with the logarithm of the frequency.



## 7. FCC PART 15 REQUIREMENTS & RSS 210 REQUIREMENTS

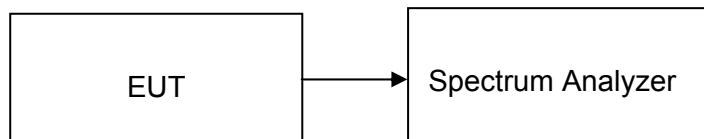
### 7.1 99% BANDWIDTH

#### 7.1.1 MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	Agilent	E4446A	US44300399	03/01/2014	03/01/2015

**Remark:** Each piece of equipment is scheduled for calibration once a year.

#### 7.1.2 TEST CONFIGURATION



#### 7.1.3 TEST PROCEDURE

The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold.



### 7.1.4 TEST RESULTS

Test mode: IEEE 802.11a mode / 5180 ~ 5240MHz

Channel	Frequency (MHz)	Bandwidth(MHz)	
		Antenna 0	Antenna 1
Low	5180	16.6066	16.5920
Mid	5220	16.5459	16.4929
High	5240	16.5051	16.5304

Test mode: IEEE 802.11a mode / 5260 ~ 5320MHz

Channel	Frequency (MHz)	Bandwidth(MHz)	
		Antenna 0	Antenna 1
Low	5260	16.5006	16.4866
Mid	5280	16.5037	16.5335
High	5320	16.5013	16.5250

Test mode: IEEE 802.11a mode / 5500 ~ 5700MHz

Channel	Frequency (MHz)	Bandwidth(MHz)	
		Antenna 0	Antenna 1
Low	5500	16.4915	16.4696
Mid	5580	16.4899	16.4419
High	5700	16.5697	16.4644

Test mode: IEEE 802.11a mode / 5745 ~ 5805MHz

Channel	Frequency (MHz)	Bandwidth(MHz)	
		Antenna 0	Antenna 1
Low	5745	16.5575	16.4447
Mid	5785	16.5741	16.4512
High	5805	16.6801	16.4855

**Test mode: IEEE 802.11n HT 20 MHz mode / 5180 ~ 5240MHz**

Channel	Frequency (MHz)	Bandwidth(MHz)	
		Antenna 0	Antenna 1
Low	5180	17.5185	17.5610
Mid	5220	17.5106	17.5435
High	5240	17.5009	17.5415

**Test mode: IEEE 802.11n HT 20 MHz mode / 5260 ~ 5320MHz**

Channel	Frequency (MHz)	Bandwidth(MHz)	
		Antenna 0	Antenna 1
Low	5260	17.5278	17.5080
Mid	5280	17.5134	17.5094
High	5320	17.4904	17.5442

**Test mode: IEEE 802.11n HT 20 MHz mode / 5500 ~ 5700MHz**

Channel	Frequency (MHz)	Bandwidth(MHz)	
		Antenna 0	Antenna 1
Low	5500	17.4801	17.4865
Mid	5580	17.5133	17.4843
High	5700	17.4883	17.5083

**Test mode: IEEE 802.11n HT 20 MHz mode / 5745 ~ 5805MHz**

Channel	Frequency (MHz)	Bandwidth(MHz)	
		Antenna 0	Antenna 1
Low	5745	17.6140	17.4785
Mid	5785	17.5684	17.5228
High	5805	17.6397	17.5405

**Test mode: IEEE 802.11n HT 40 MHz mode / 5190 ~ 5230MHz**

Channel	Frequency (MHz)	Bandwidth(MHz)	
		Antenna 0	Antenna 1
Low	5190	36.2198	36.1969
High	5230	36.2015	36.1834

**Test mode: IEEE 802.11n HT 40 MHz mode / 5270 ~ 5310MHz**

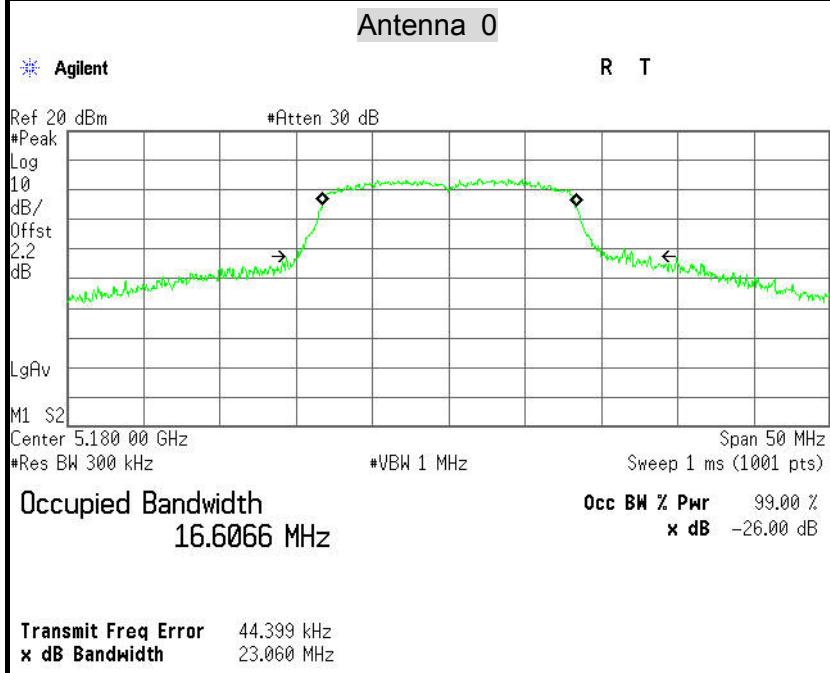
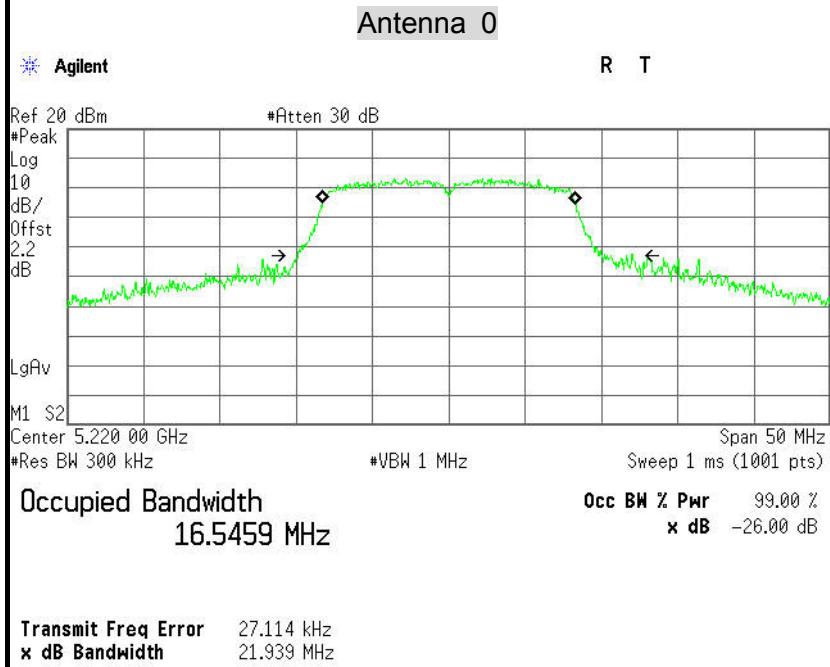
Channel	Frequency (MHz)	Bandwidth(MHz)	
		Antenna 0	Antenna 1
Low	5270	36.1988	36.1885
High	5310	36.2320	36.1765

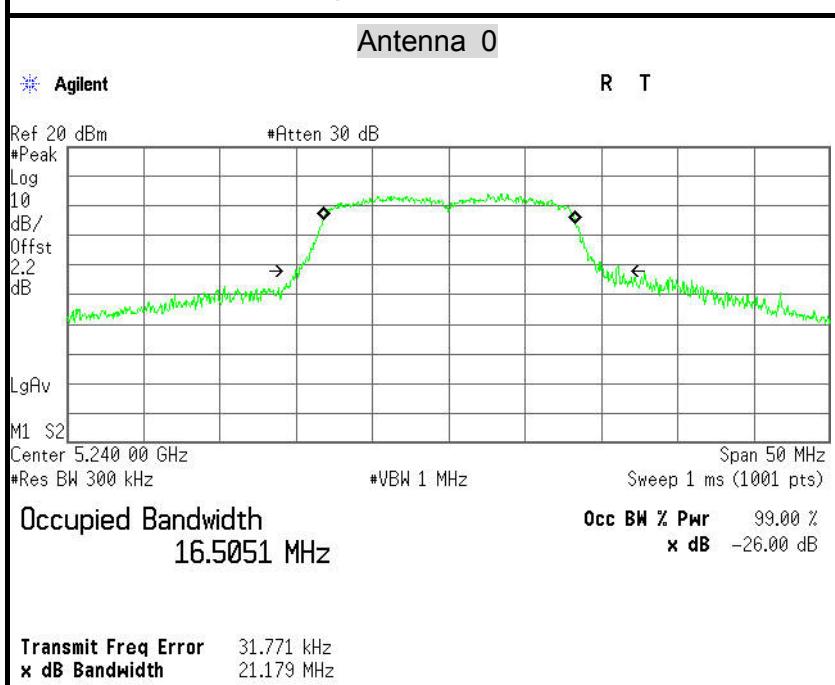
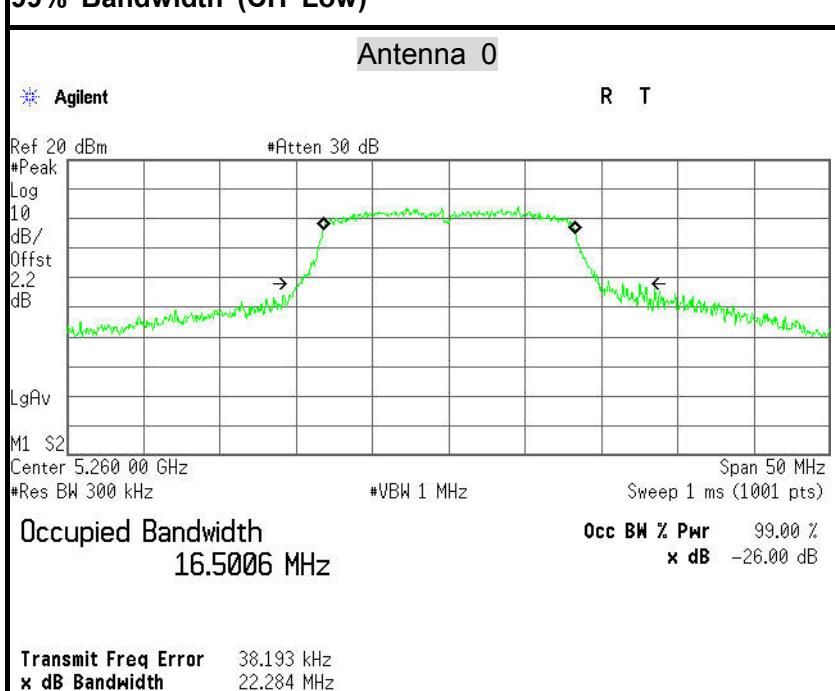
**Test mode: IEEE 802.11n HT 40 MHz mode / 5510 ~ 5670MHz**

Channel	Frequency (MHz)	Bandwidth(MHz)	
		Antenna 0	Antenna 1
Low	5510	36.1762	36.1583
Mid	5550	36.1932	36.2099
High	5670	36.1858	36.1416

**Test mode: IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz**

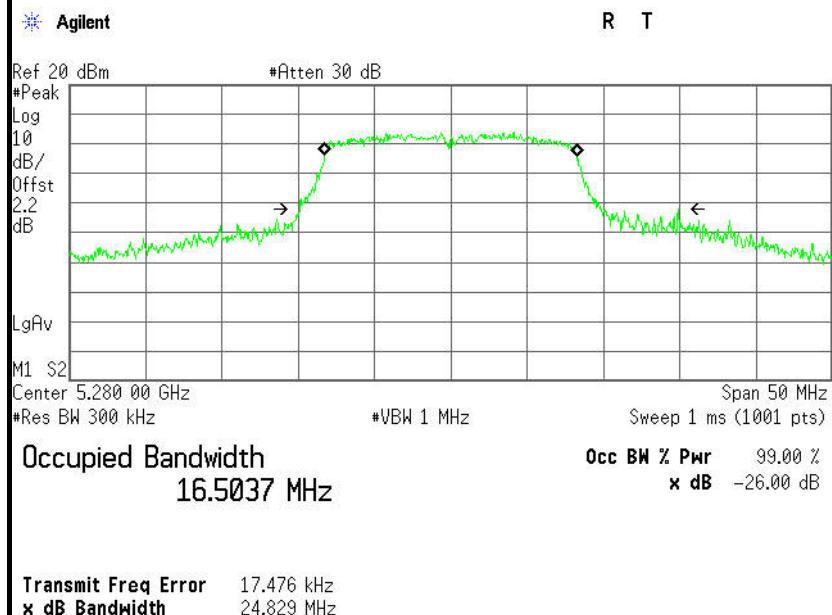
Channel	Frequency (MHz)	Bandwidth(MHz)	
		Antenna 0	Antenna 1
Low	5755	36.2494	36.1988
High	5795	36.3401	36.1942

Test Plot**IEEE 802.11a mode / 5180 ~ 5240MHz****99% Bandwidth (CH Low)****99% Bandwidth (CH Mid)**

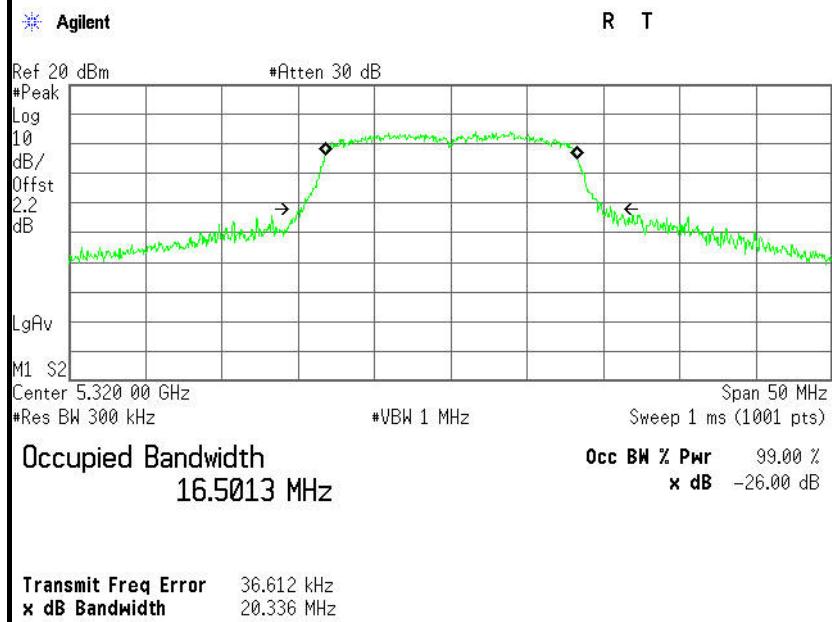
**99% Bandwidth (CH High)****99% Bandwidth (CH Low)**

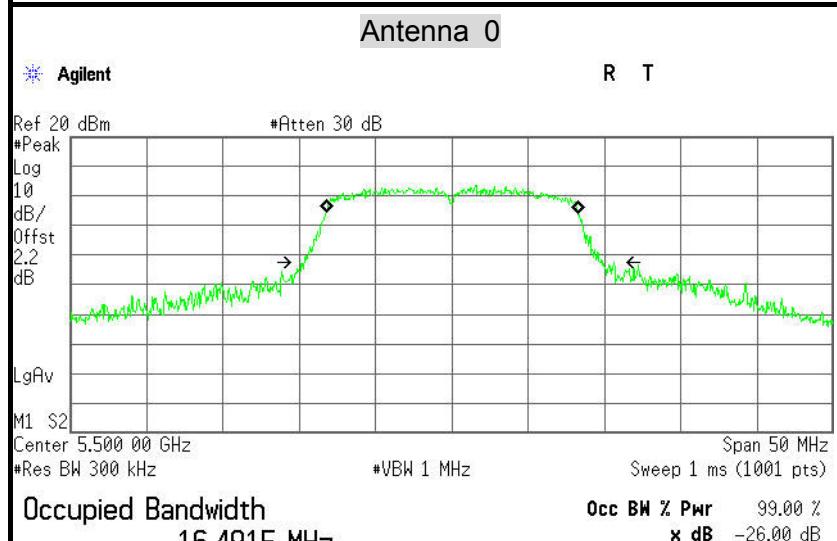
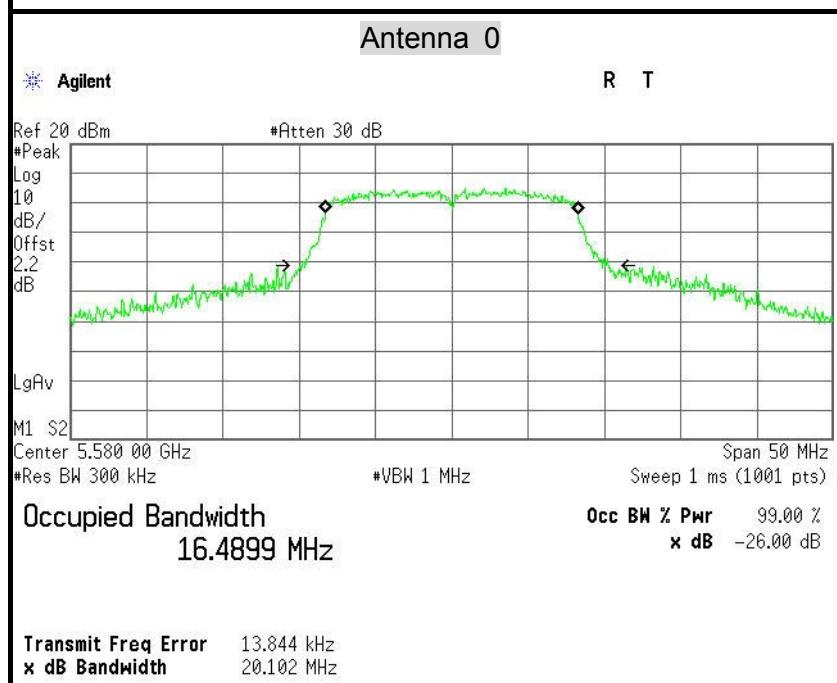
**99% Bandwidth (CH Mid)**

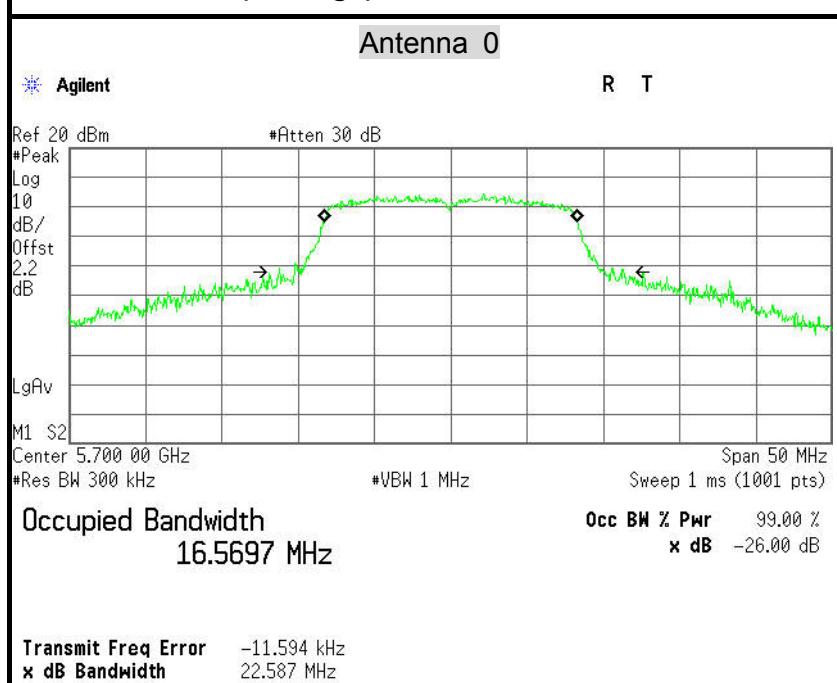
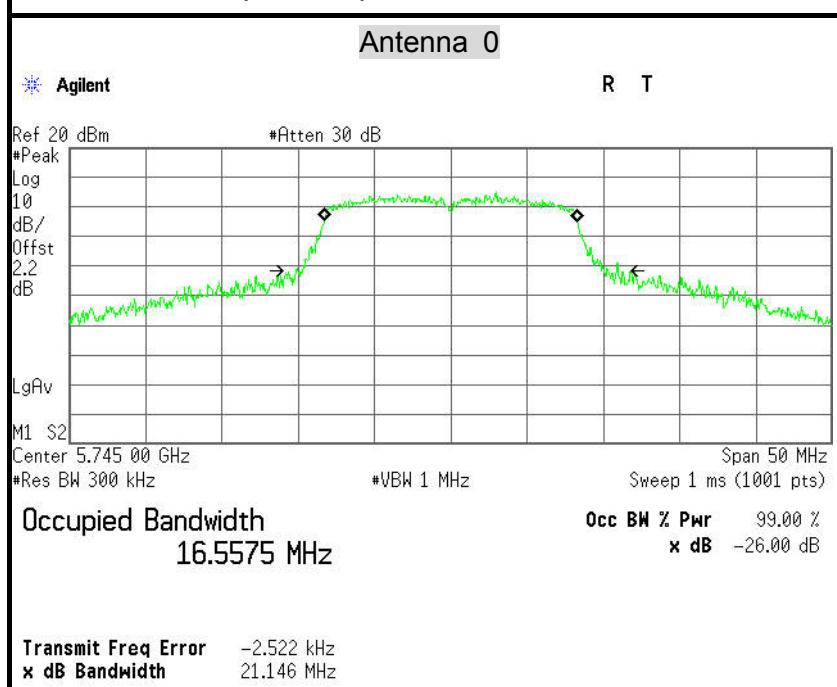
Antenna 0

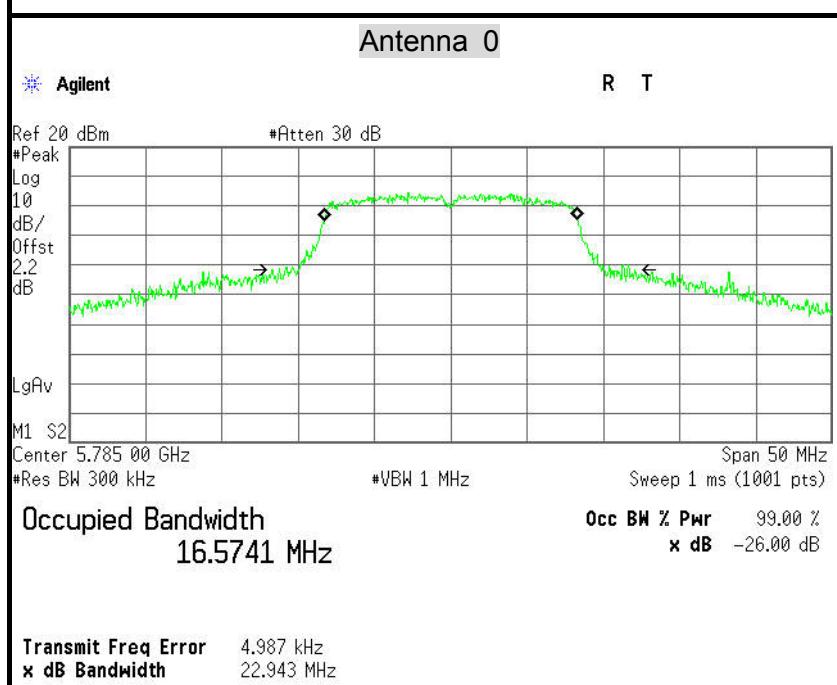
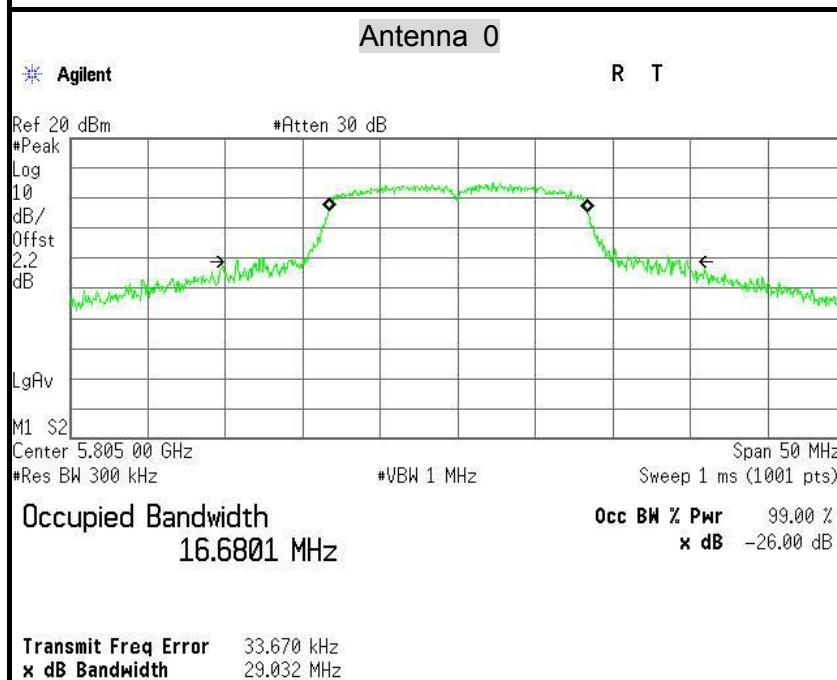
**99% Bandwidth (CH High)**

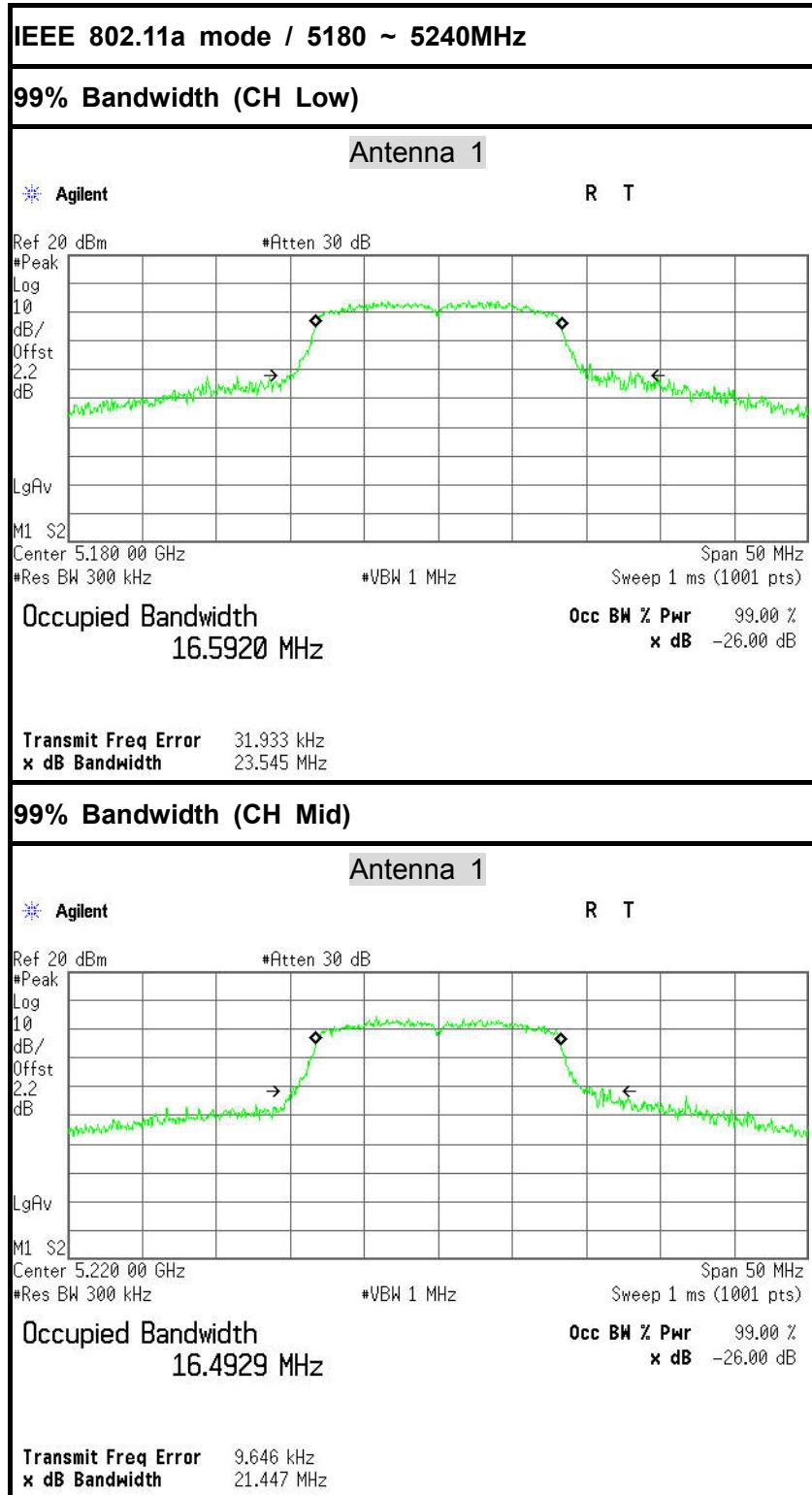
Antenna 0

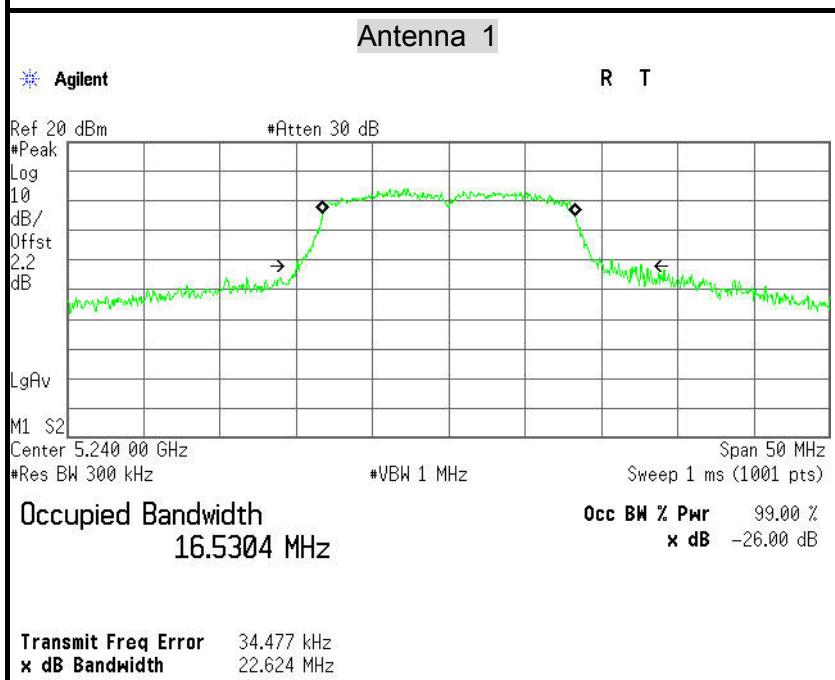
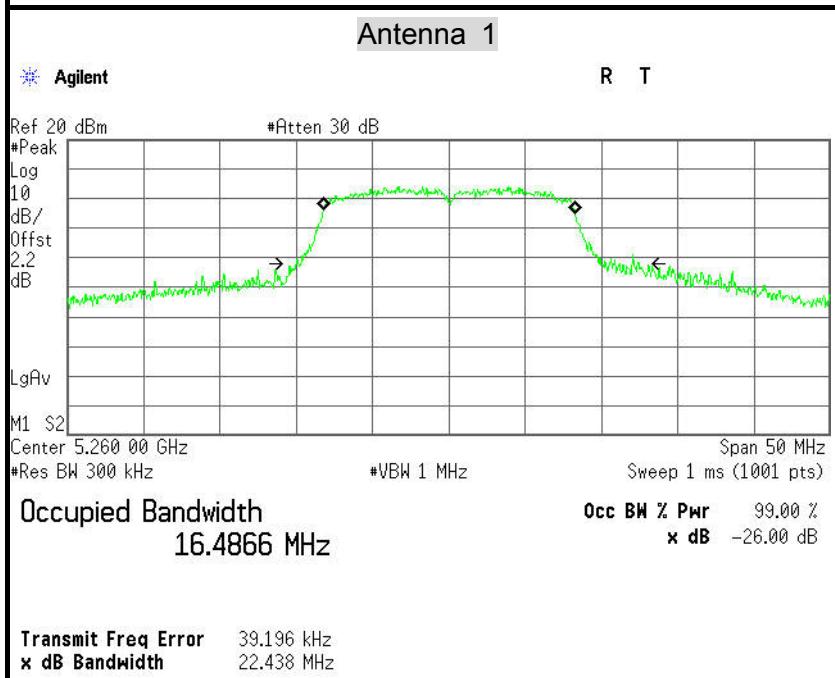


**IEEE 802.11a mode / 5500 ~ 5700MHz****99% Bandwidth (CH Low)****99% Bandwidth (CH Mid)**

**99% Bandwidth (CH High)****IEEE 802.11a mode / 5745 ~ 5805MHz****99% Bandwidth (CH Low)**

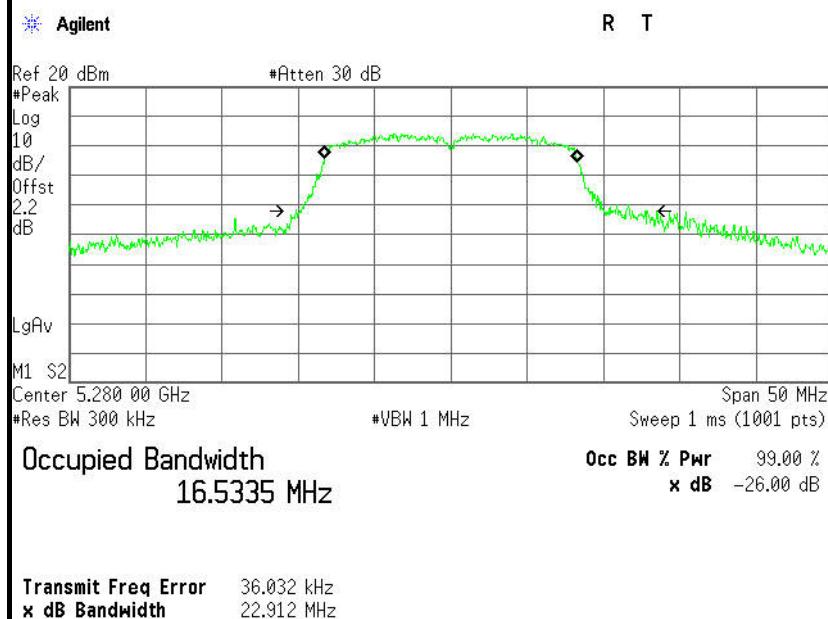
**99% Bandwidth (CH Mid)****99% Bandwidth (CH High)**



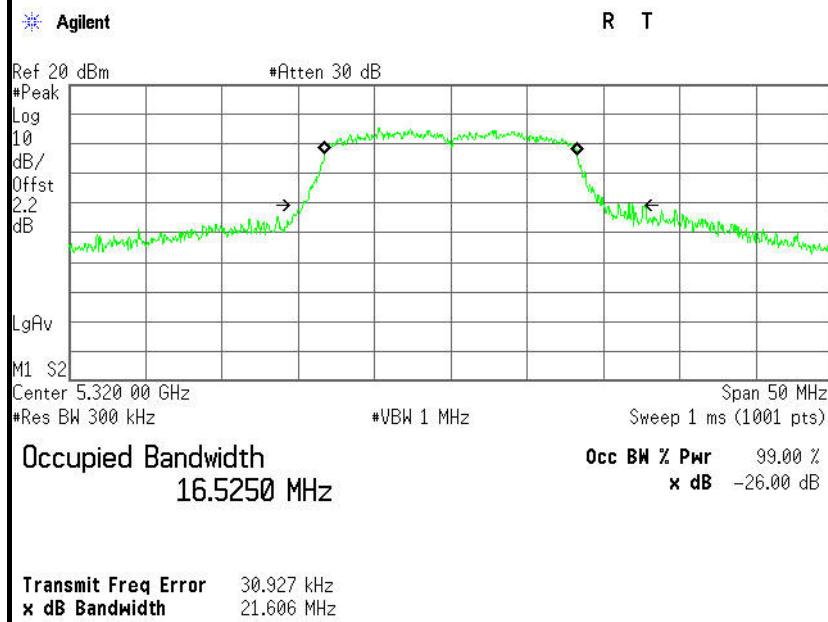
**99% Bandwidth (CH High)****IEEE 802.11a mode / 5260 ~ 5320MHz****99% Bandwidth (CH Low)**

**99% Bandwidth (CH Mid)**

Antenna 1

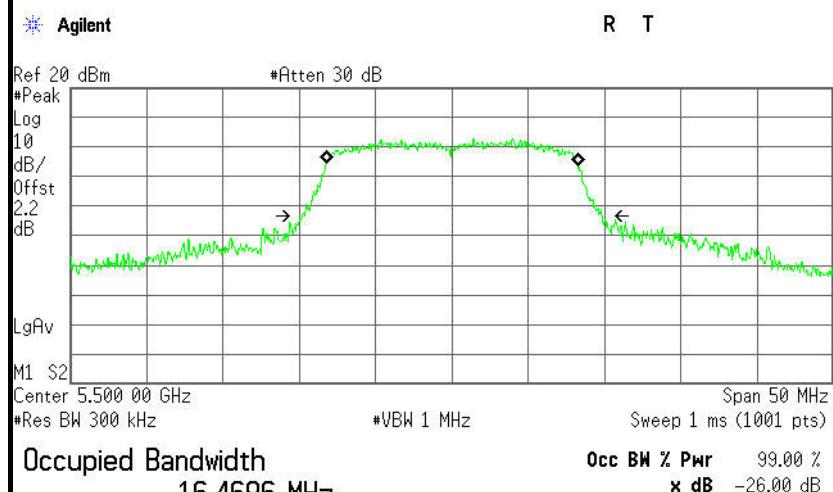
**99% Bandwidth (CH High)**

Antenna 1



**IEEE 802.11a mode / 5500 ~ 5700MHz****99% Bandwidth (CH Low)**

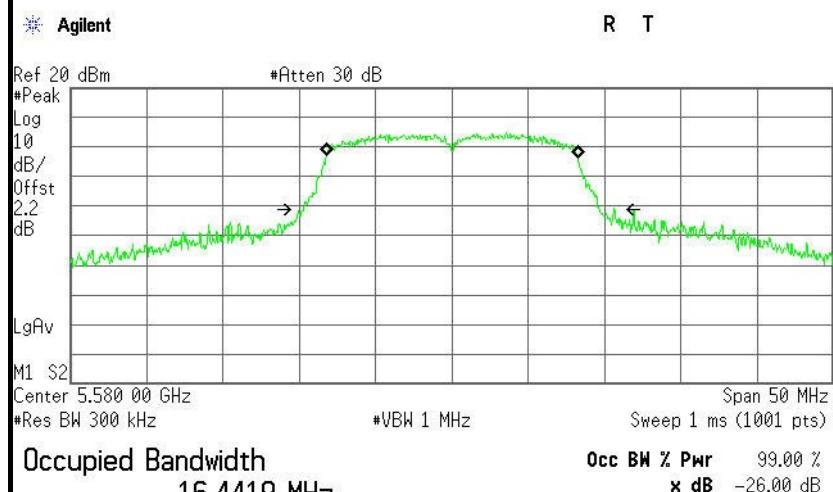
Antenna 1



Transmit Freq Error 23.905 kHz  
x dB Bandwidth 19.636 MHz

**99% Bandwidth (CH Mid)**

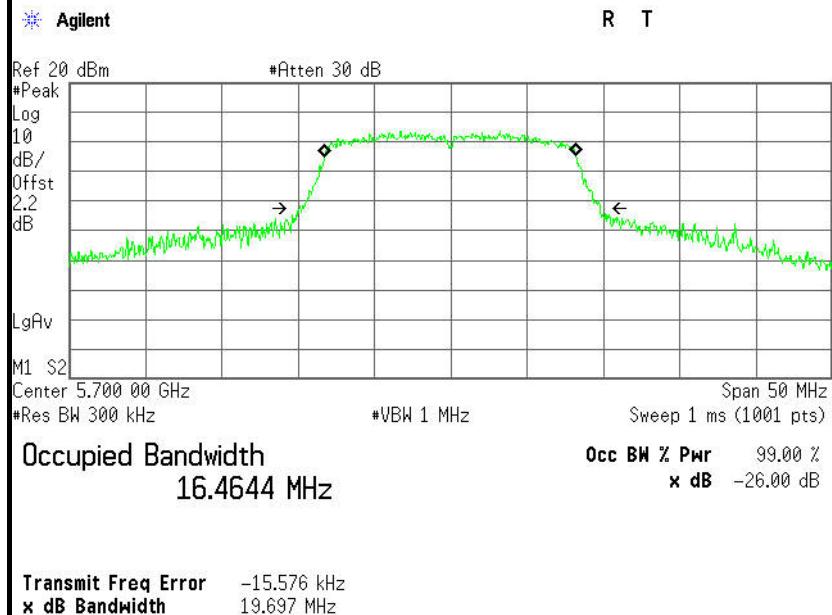
Antenna 1

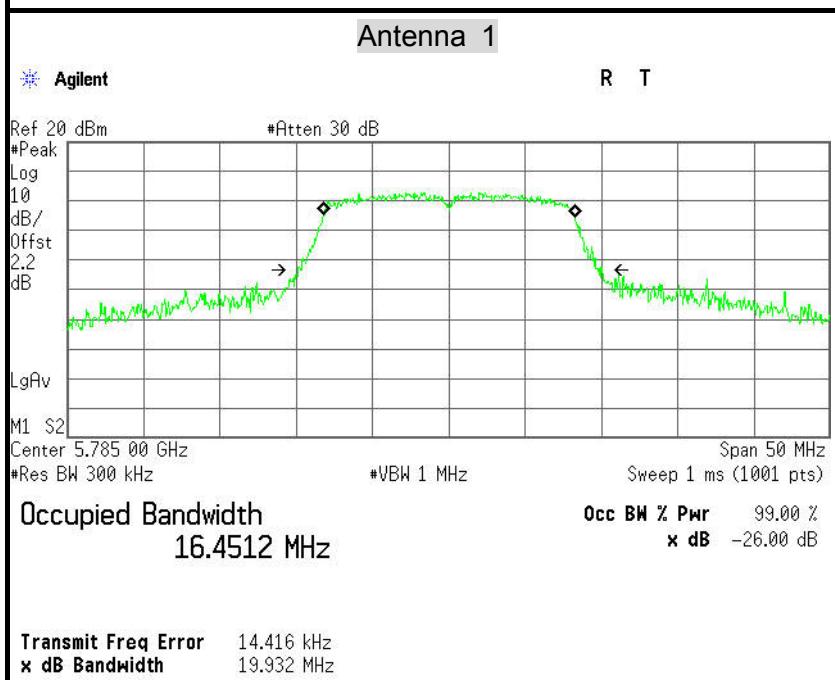
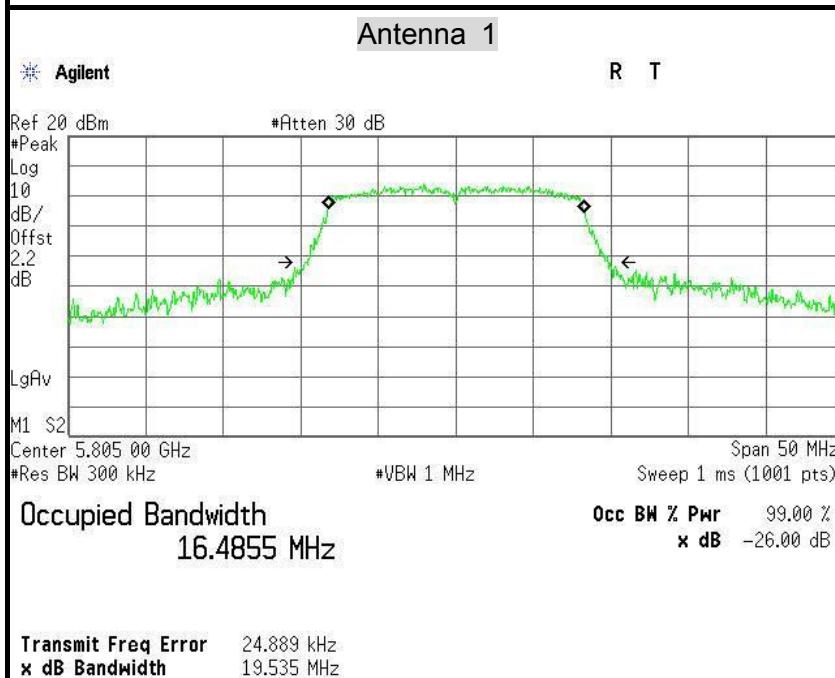


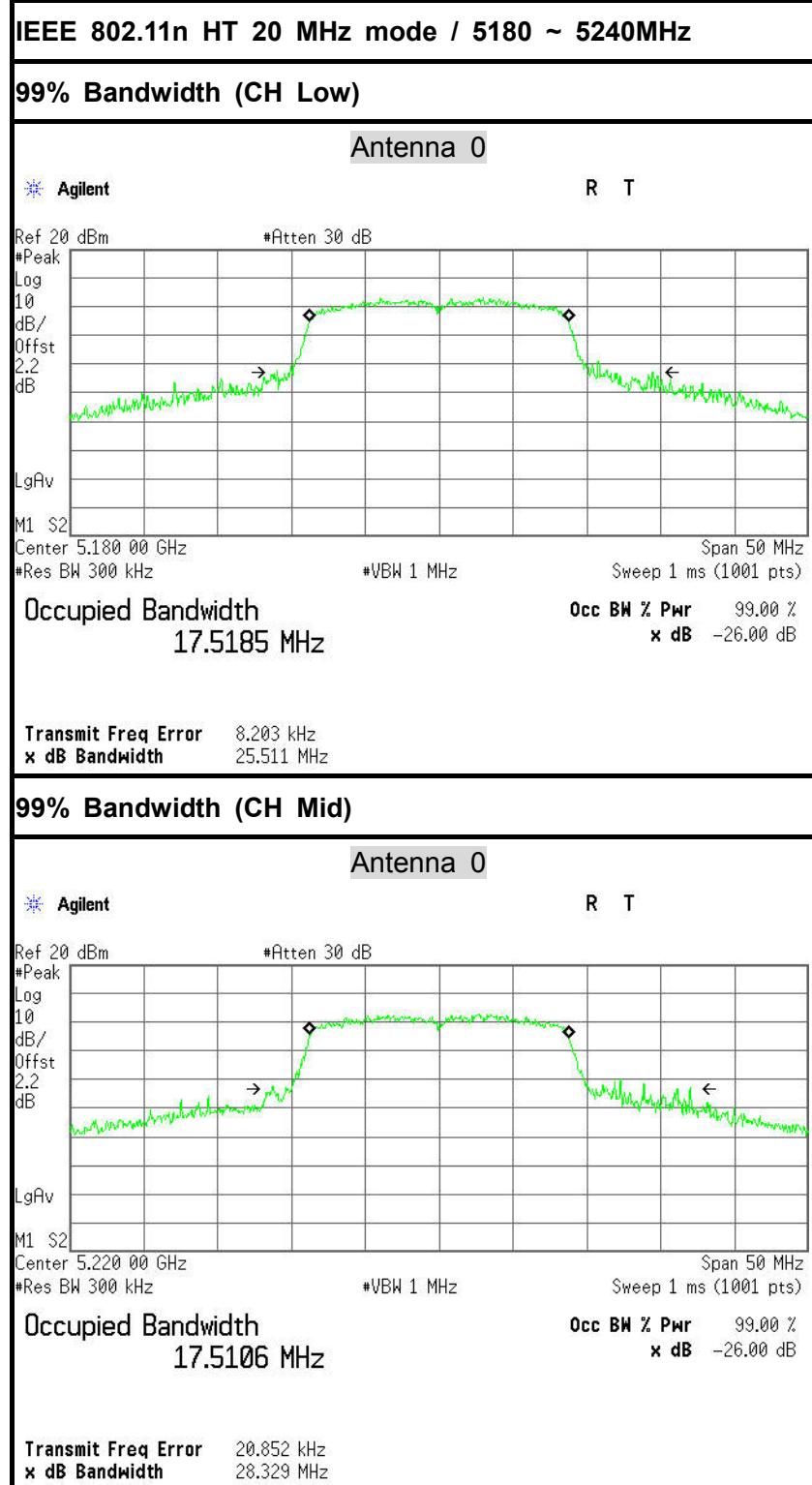
Transmit Freq Error 9.725 kHz  
x dB Bandwidth 20.369 MHz

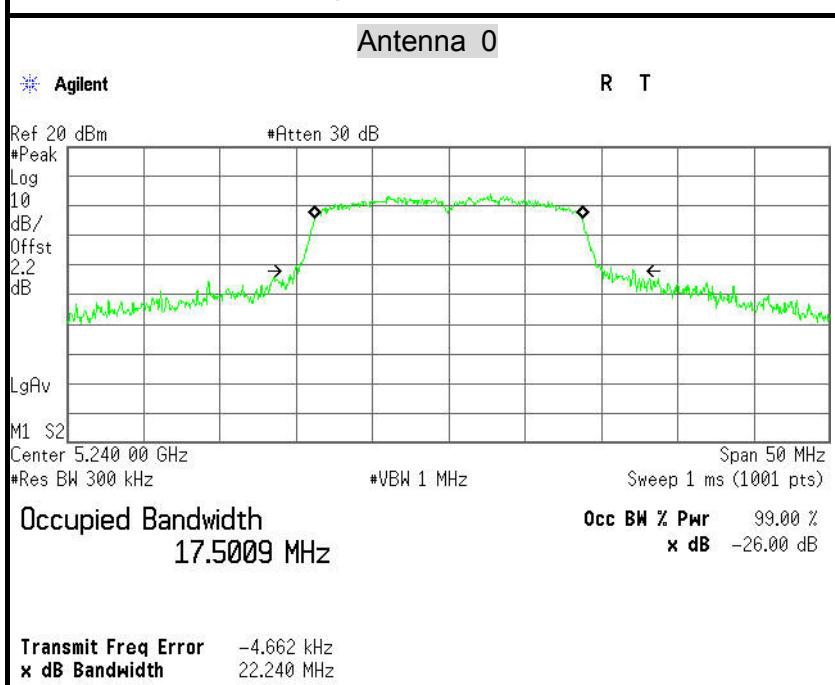
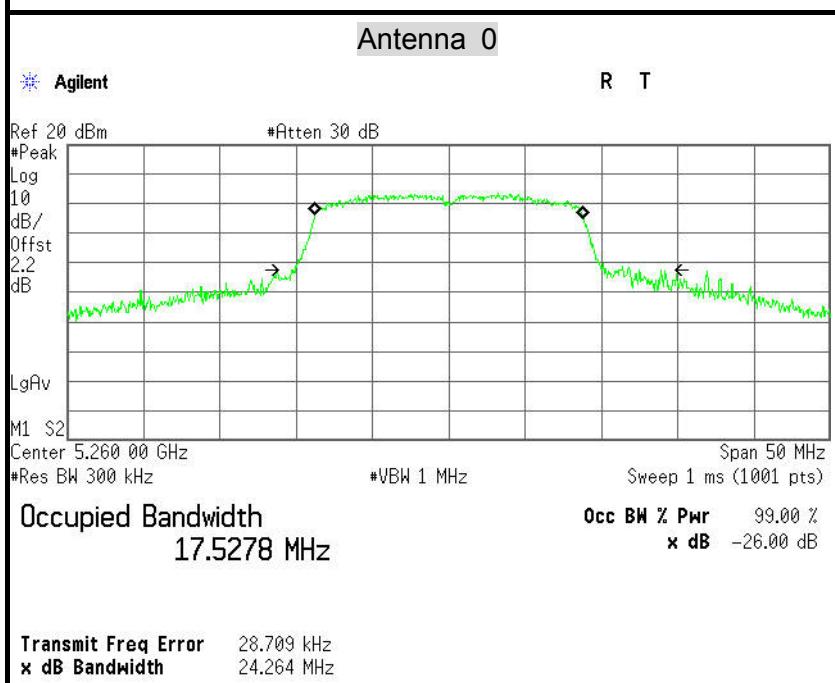
**99% Bandwidth (CH High)**

Antenna 1



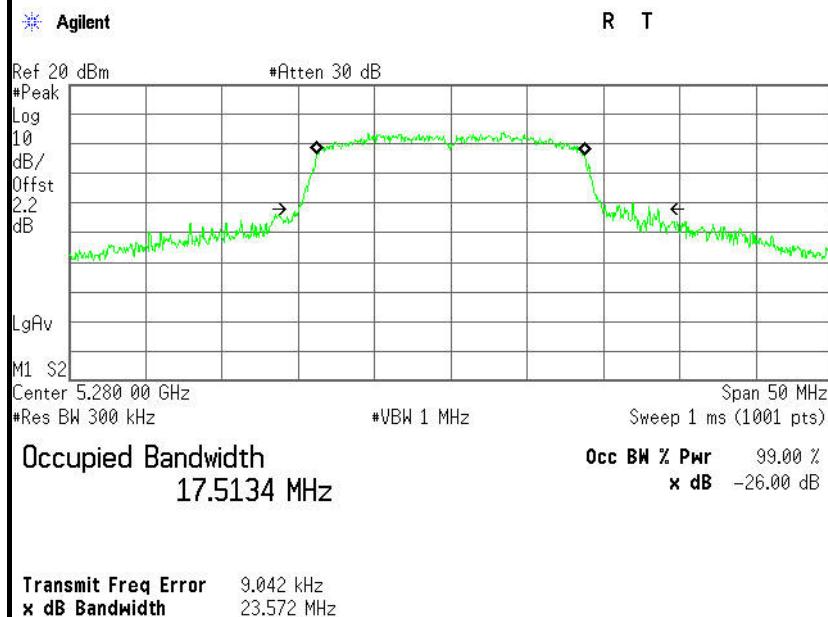
**99% Bandwidth (CH Mid)****99% Bandwidth (CH High)**



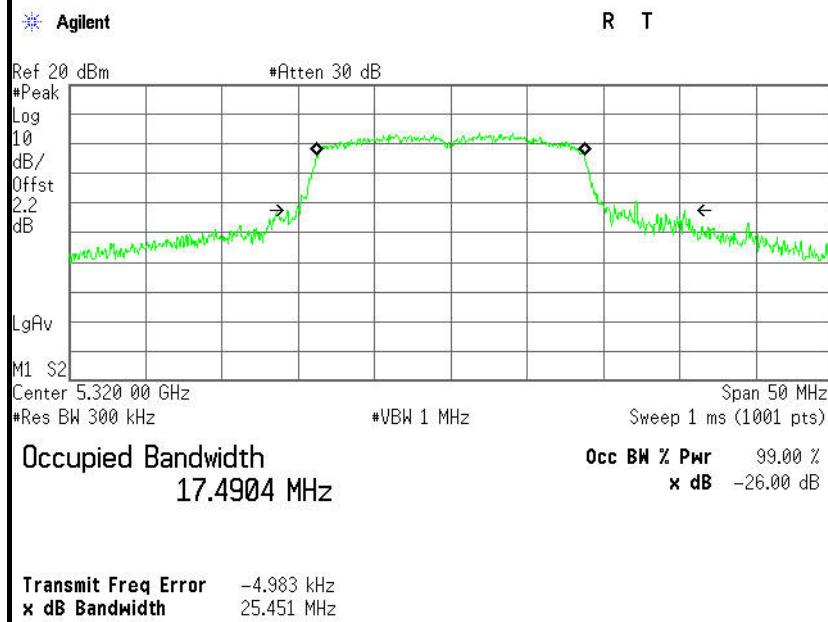
**99% Bandwidth (CH High)****IEEE 802.11n HT 20 MHz mode / 5260 ~ 5320MHz****99% Bandwidth (CH Low)**

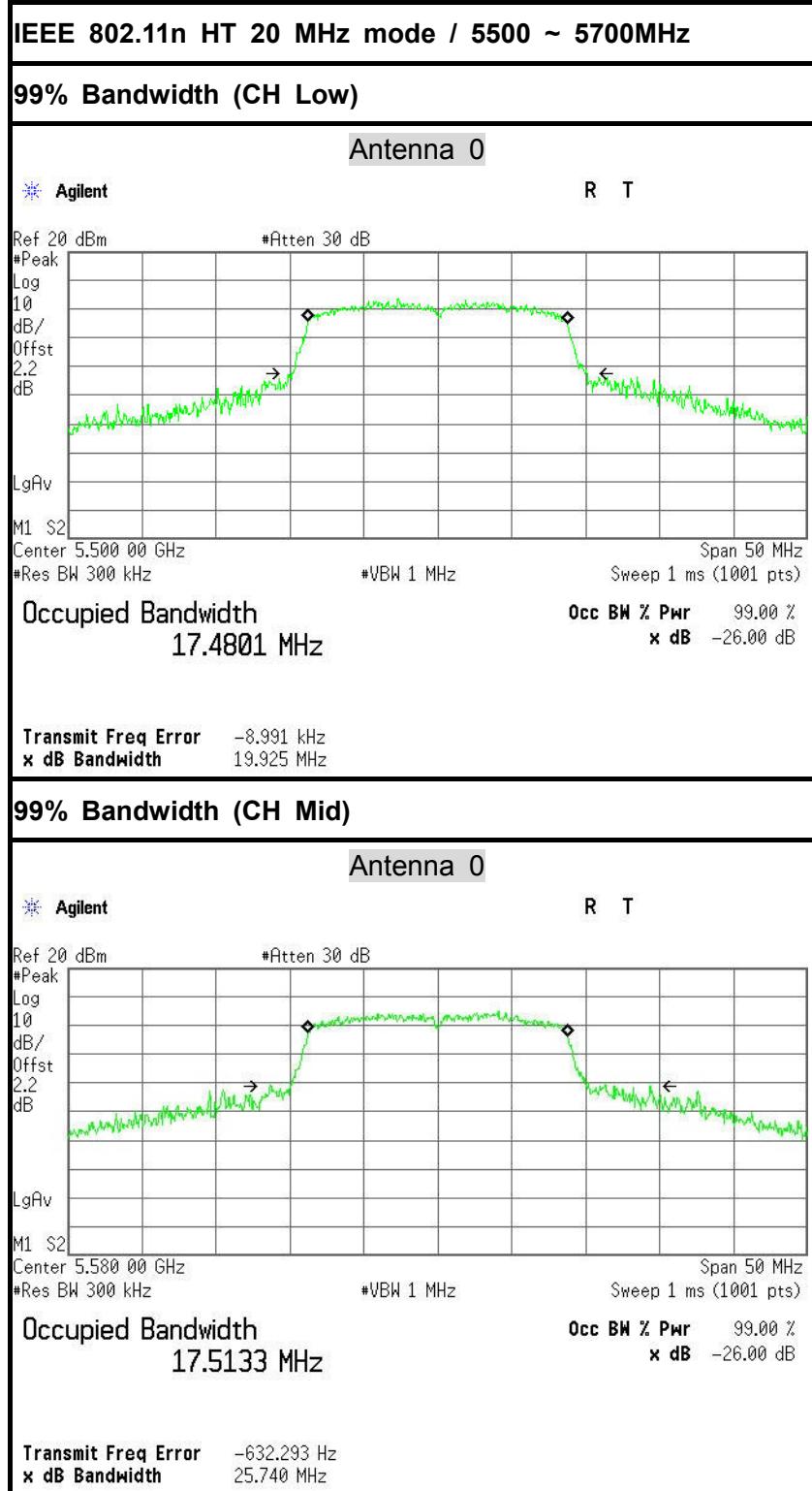
**99% Bandwidth (CH Mid)**

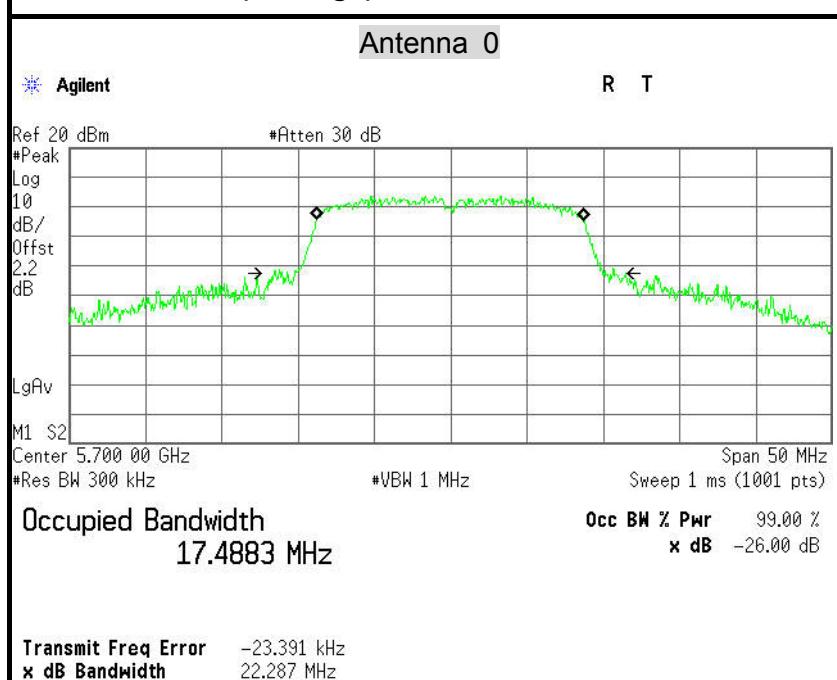
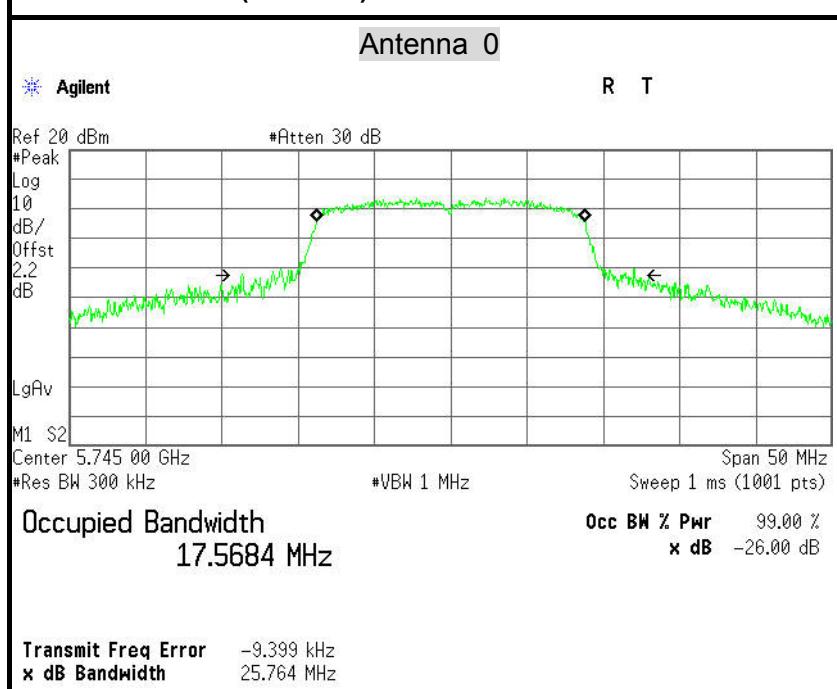
Antenna 0

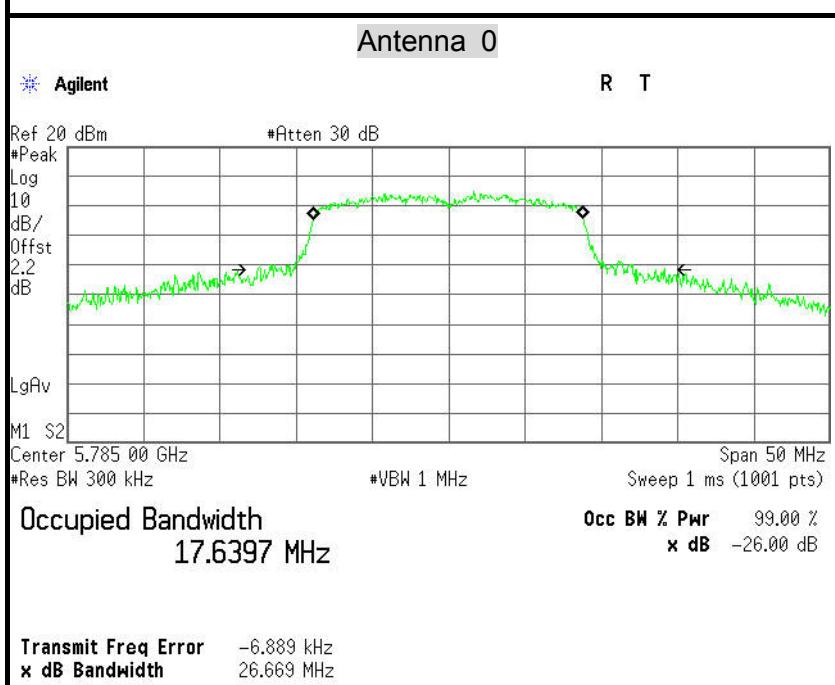
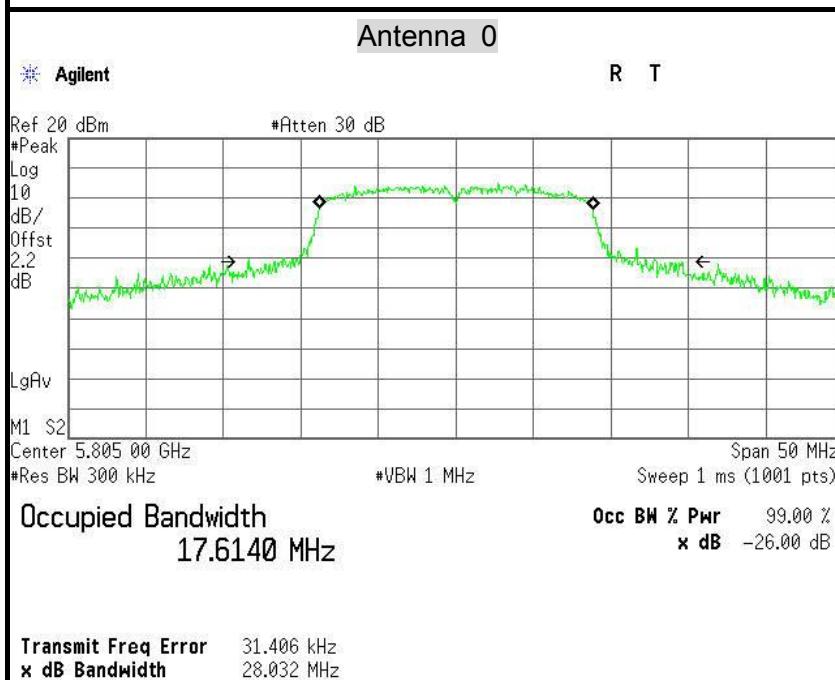
**99% Bandwidth (CH High)**

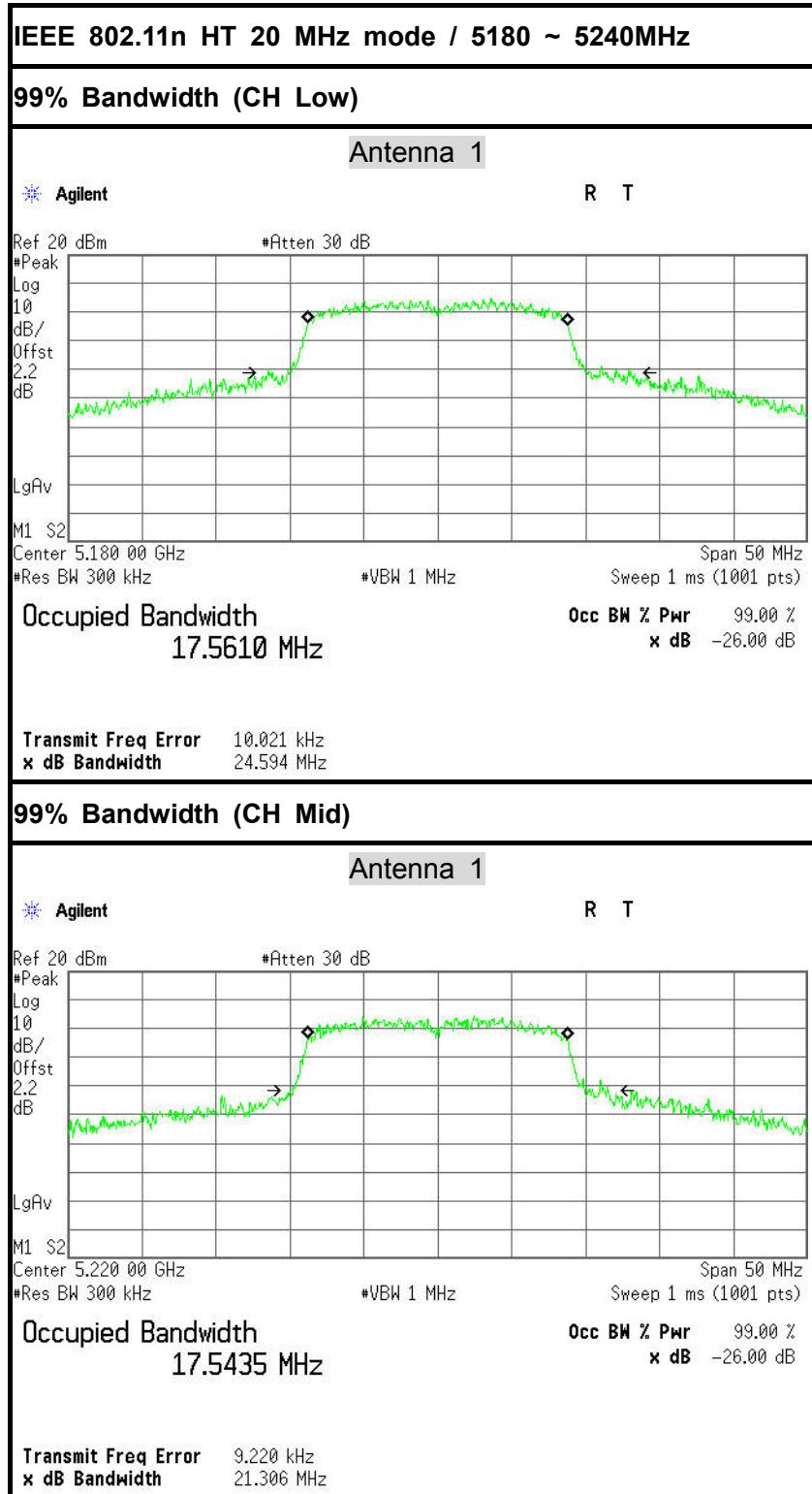
Antenna 0

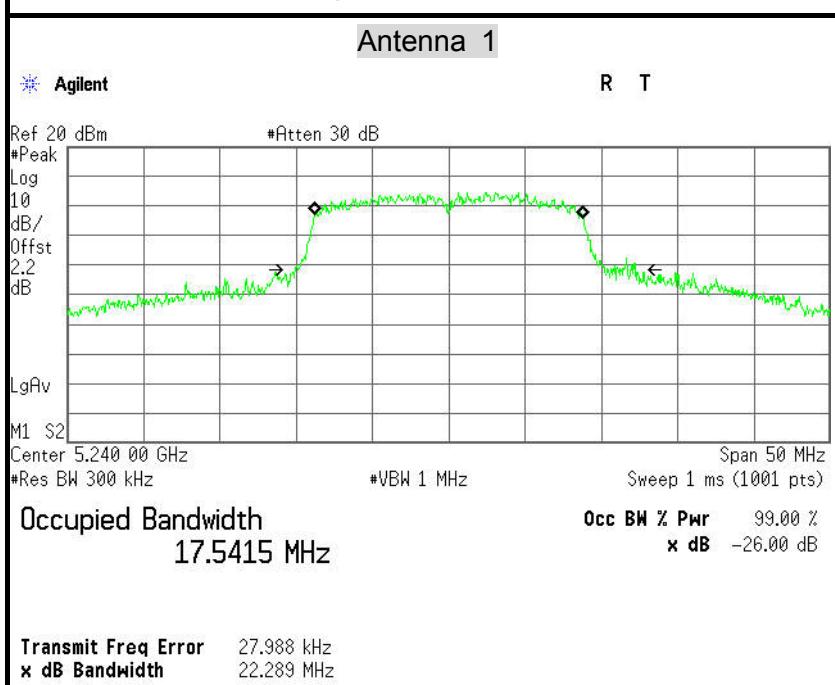
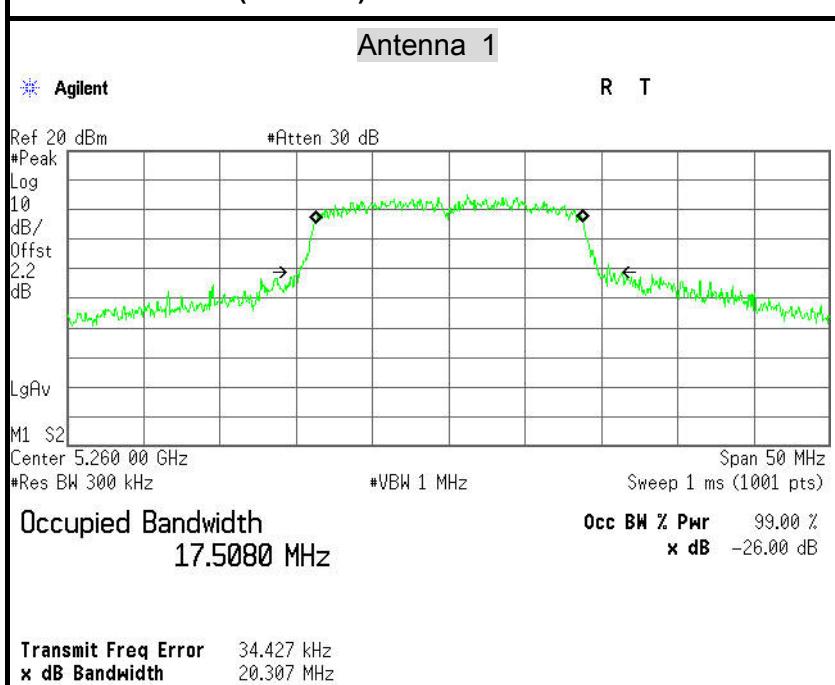




**99% Bandwidth (CH High)****IEEE 802.11n HT 20 MHz mode / 5745 ~ 5805MHz****99% Bandwidth (CH Low)**

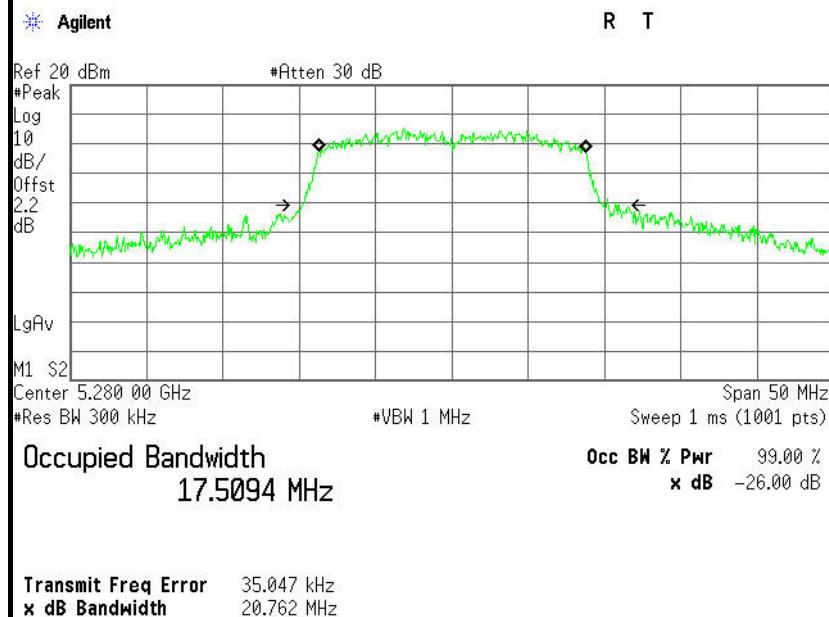
**99% Bandwidth (CH Mid)****99% Bandwidth (CH High)**



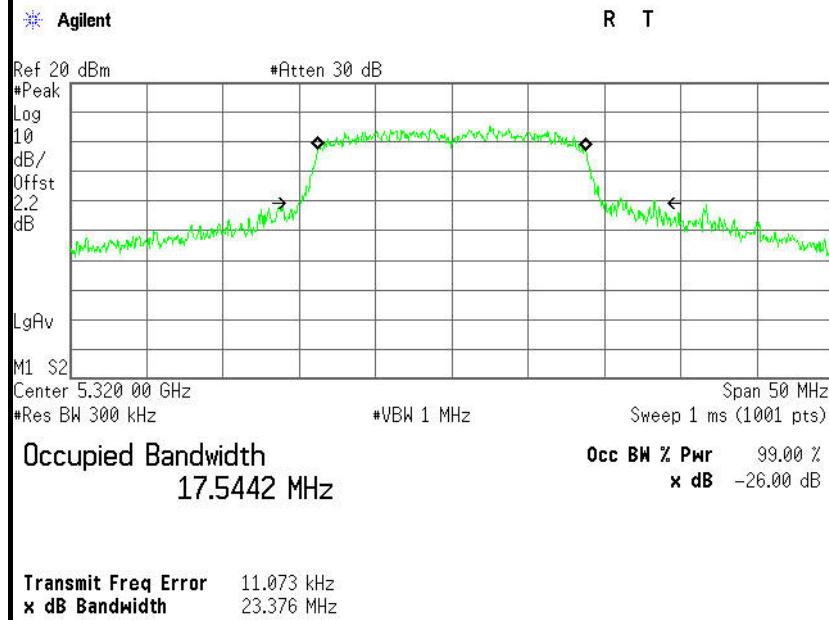
**99% Bandwidth (CH High)****99% Bandwidth (CH Low)**

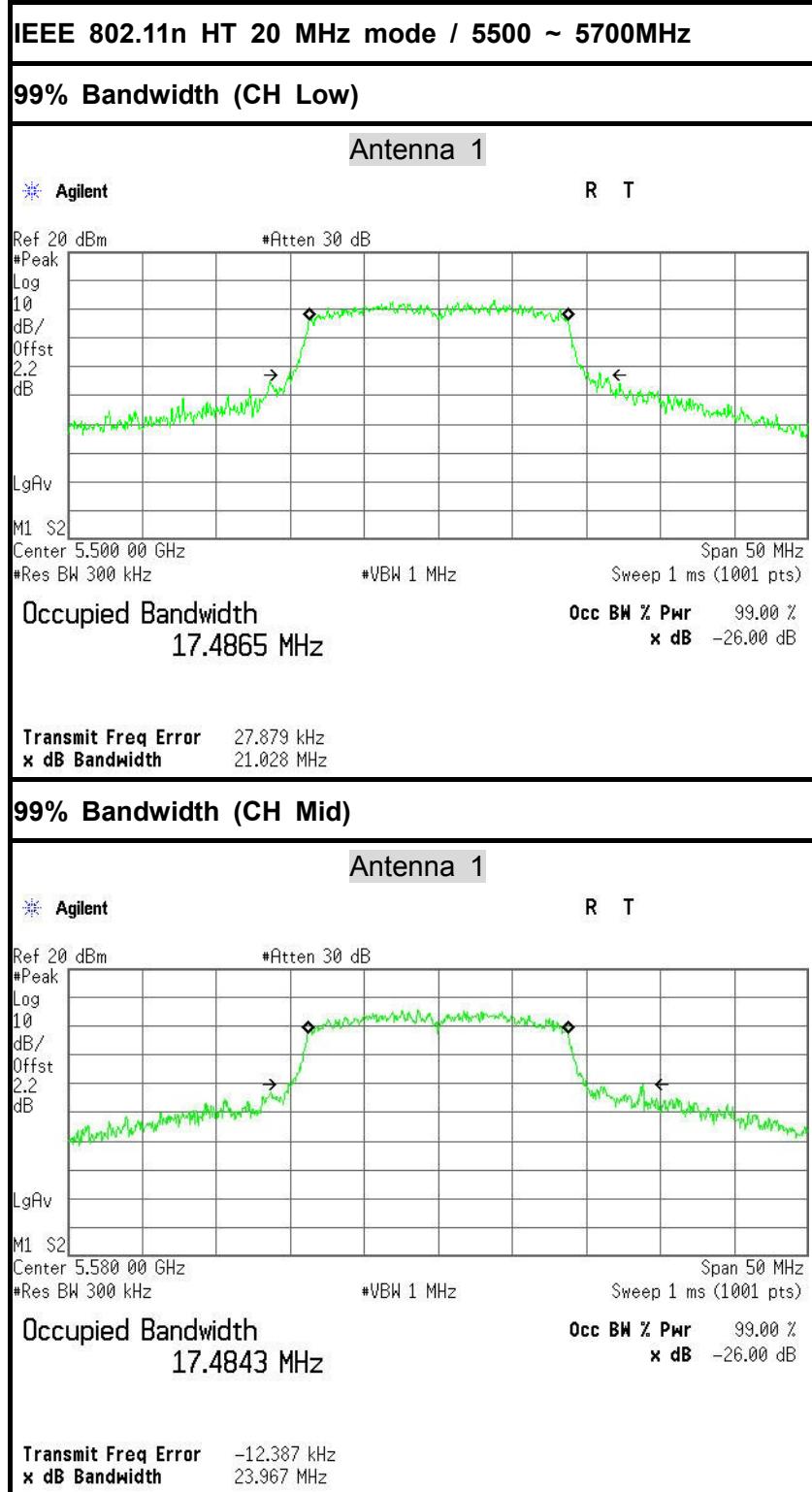
**99% Bandwidth (CH Mid)**

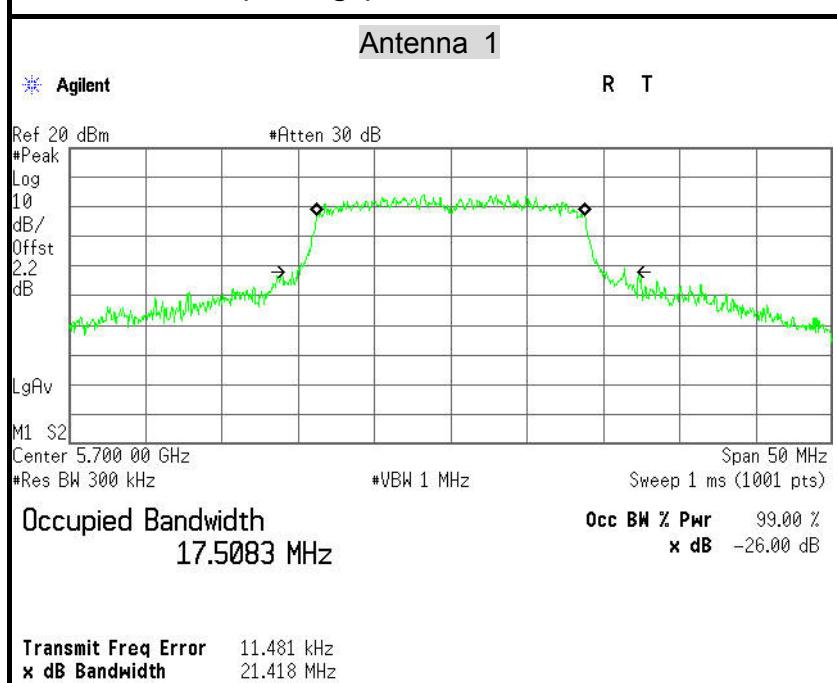
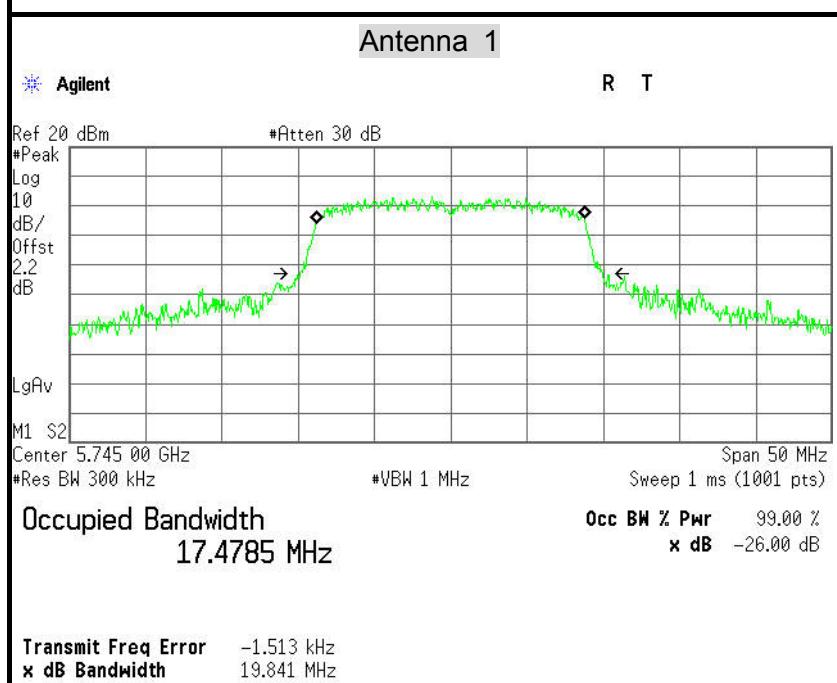
Antenna 1

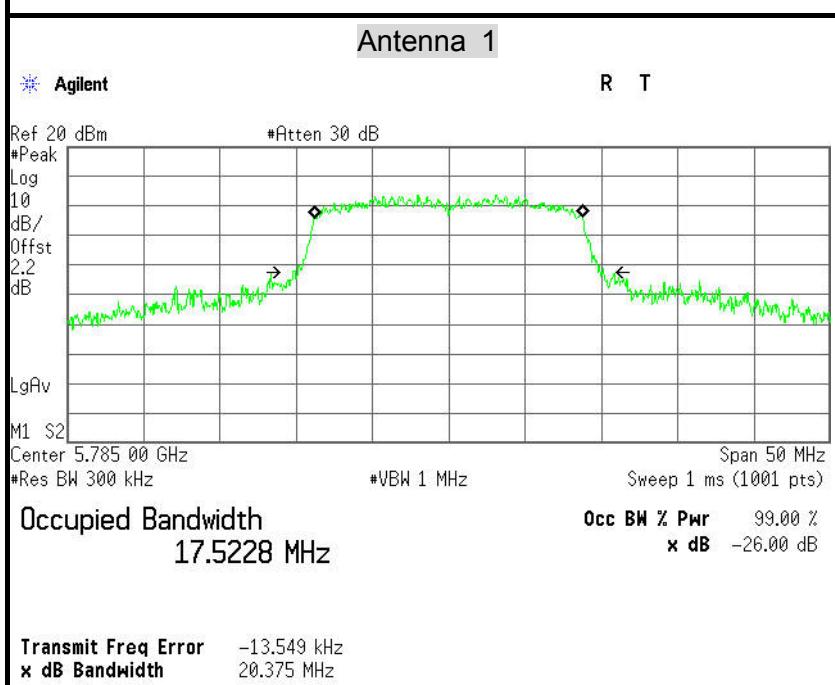
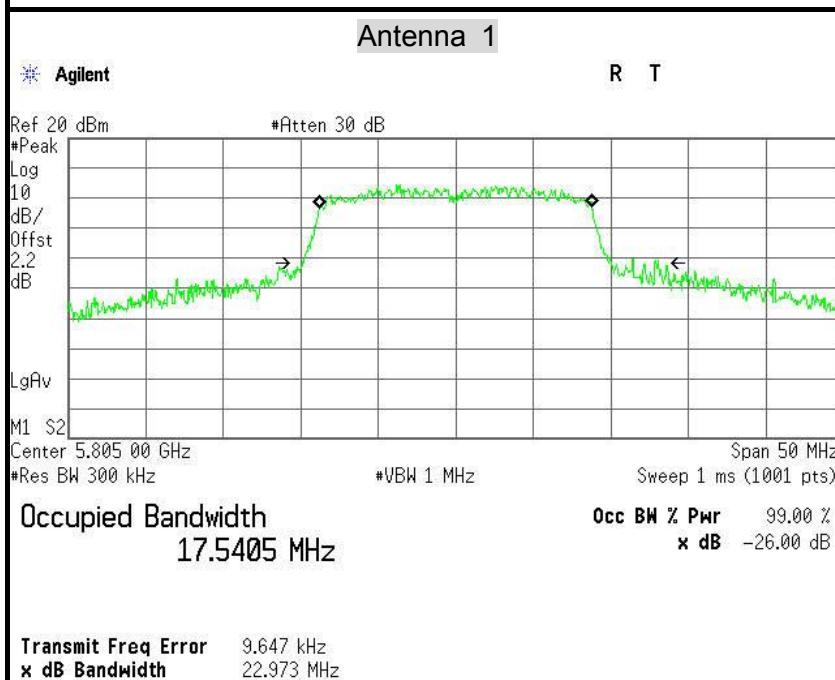
**99% Bandwidth (CH High)**

Antenna 1



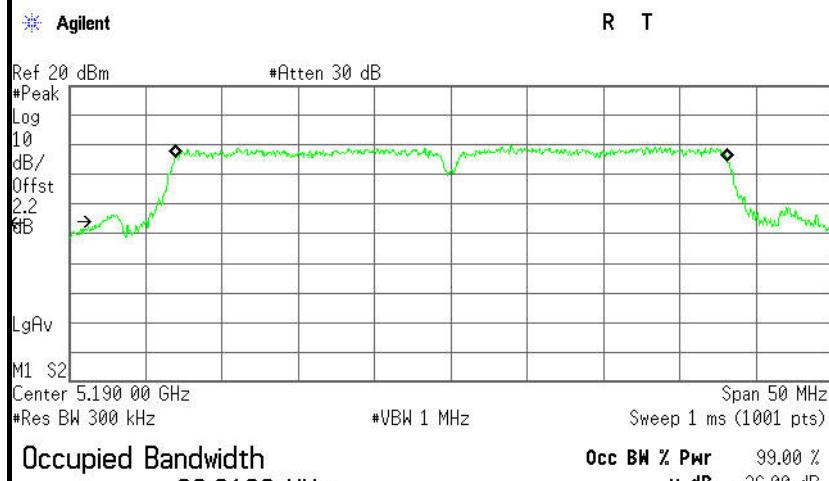


**99% Bandwidth (CH High)****99% Bandwidth (CH Low)**

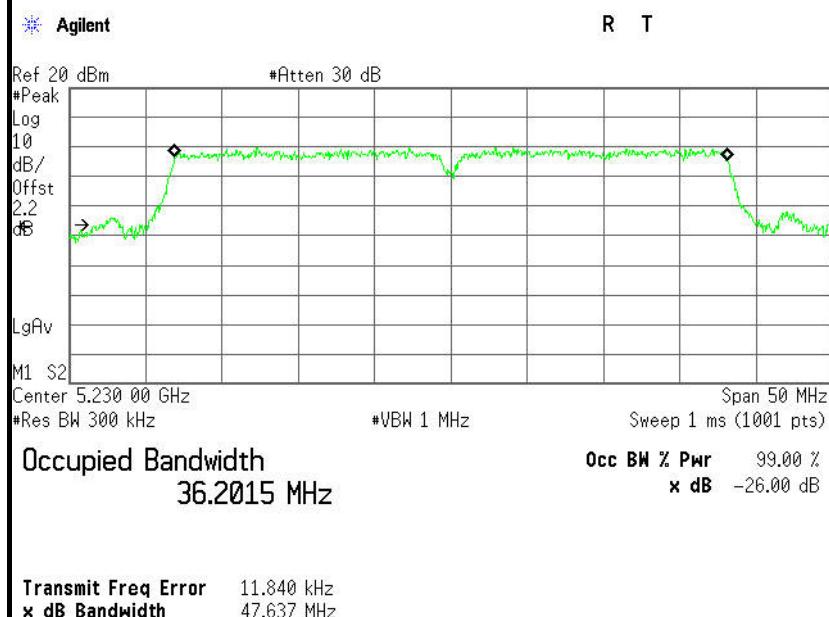
**99% Bandwidth (CH Mid)****99% Bandwidth (CH High)**

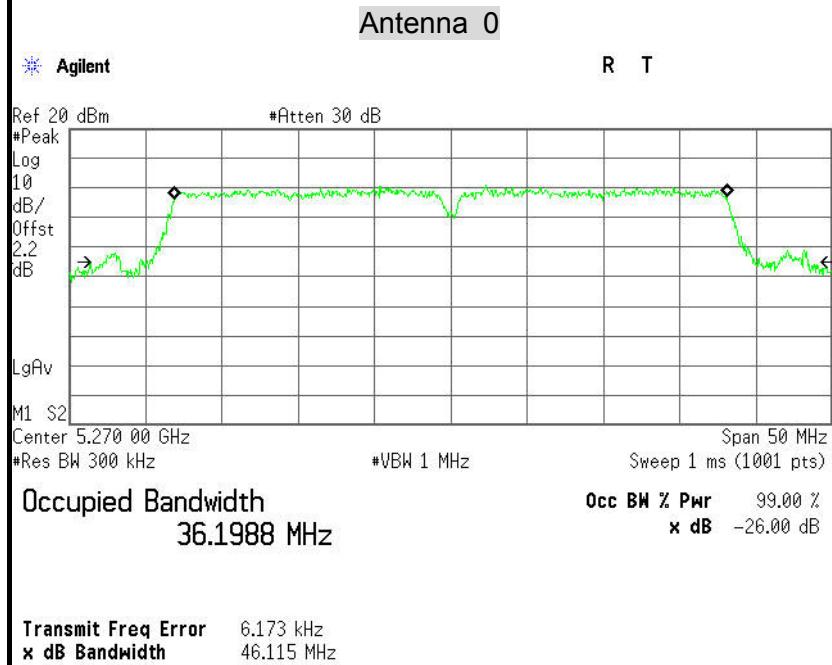
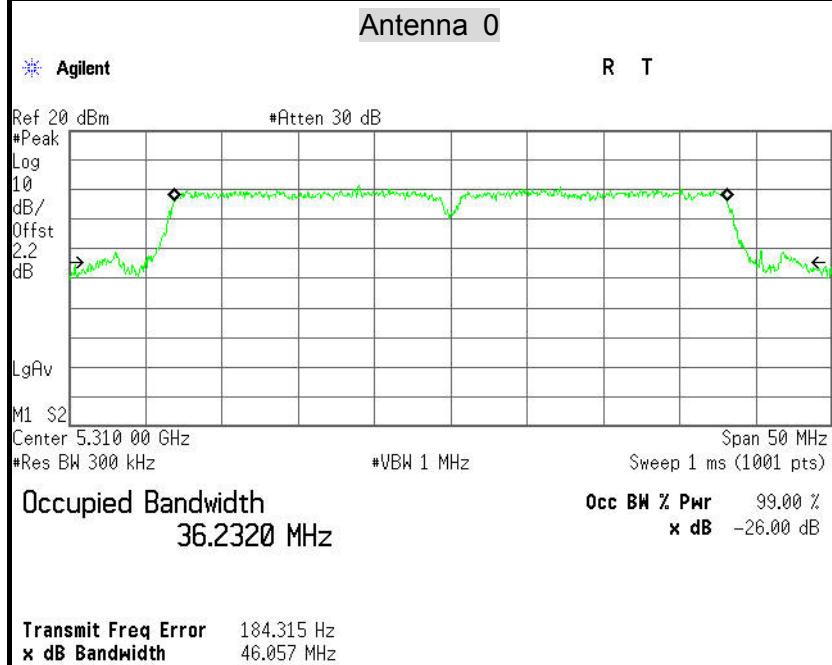
**IEEE 802.11n HT 40 MHz mode / 5190 ~ 5230MHz****99% Bandwidth (CH Low)**

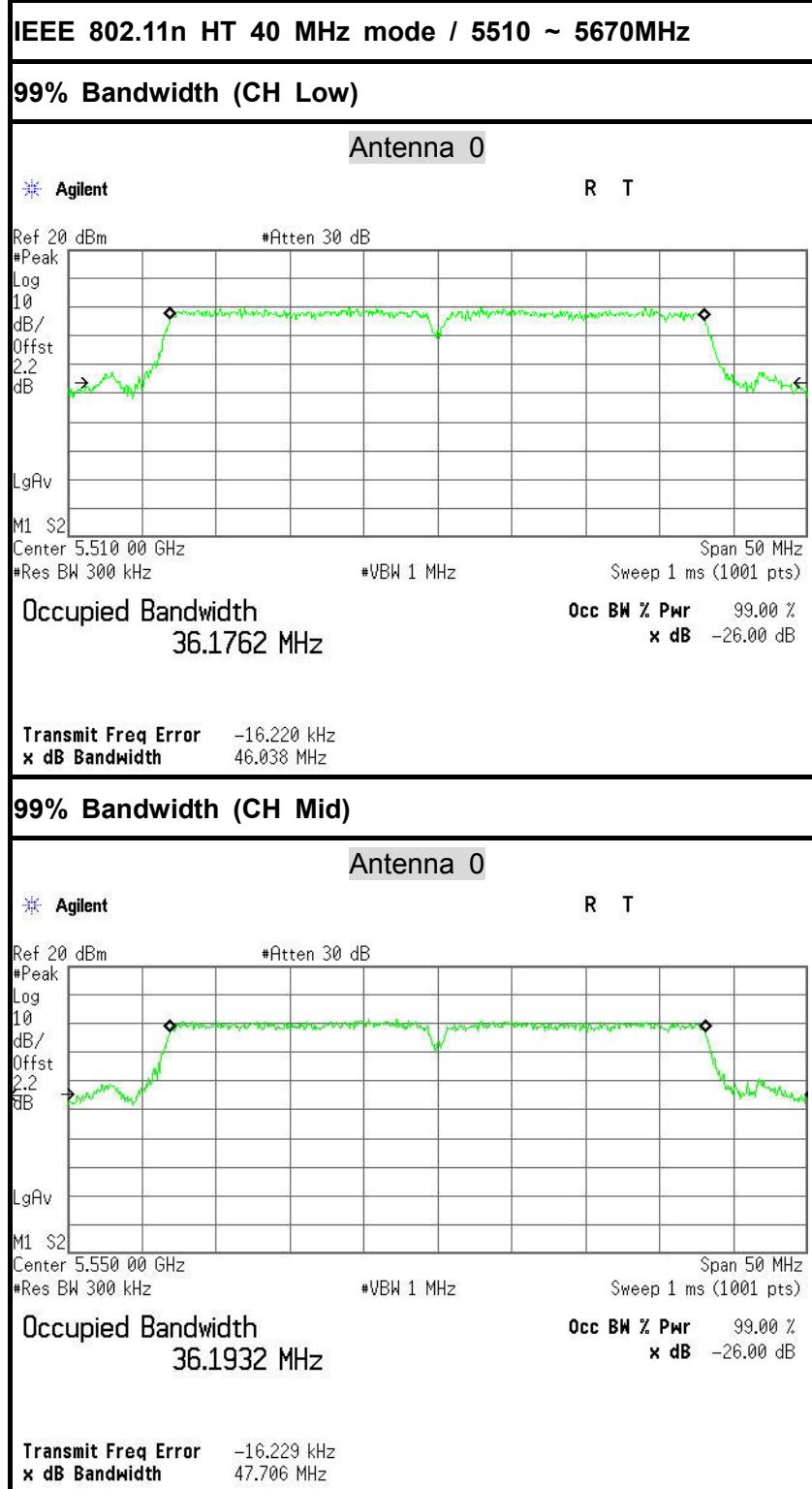
Antenna 0

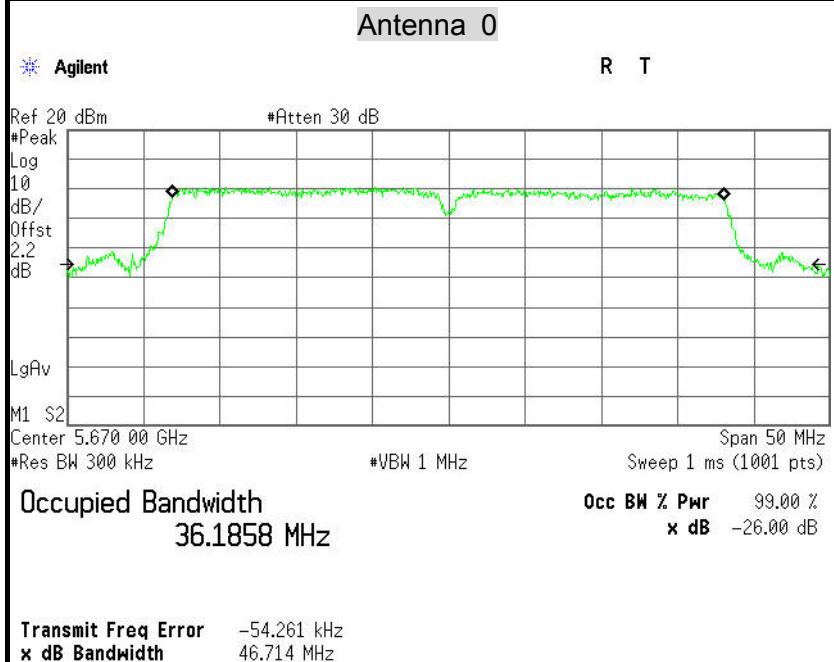
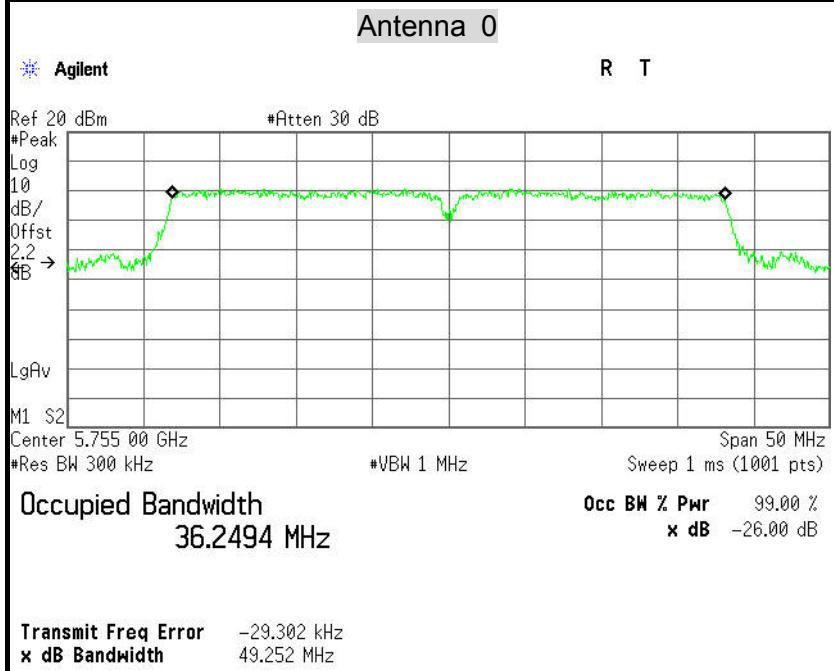
**99% Bandwidth (CH High)**

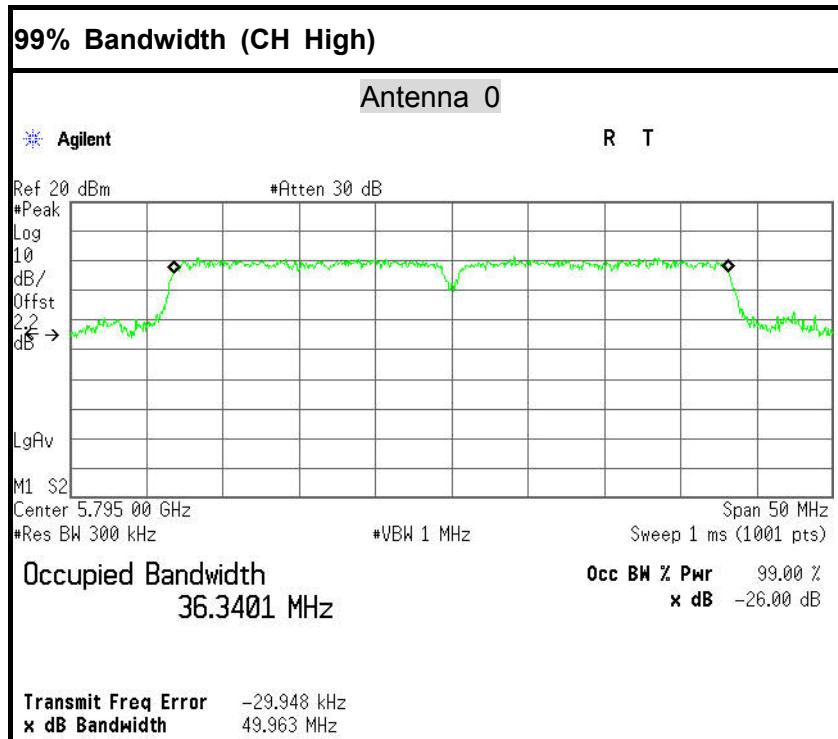
Antenna 0

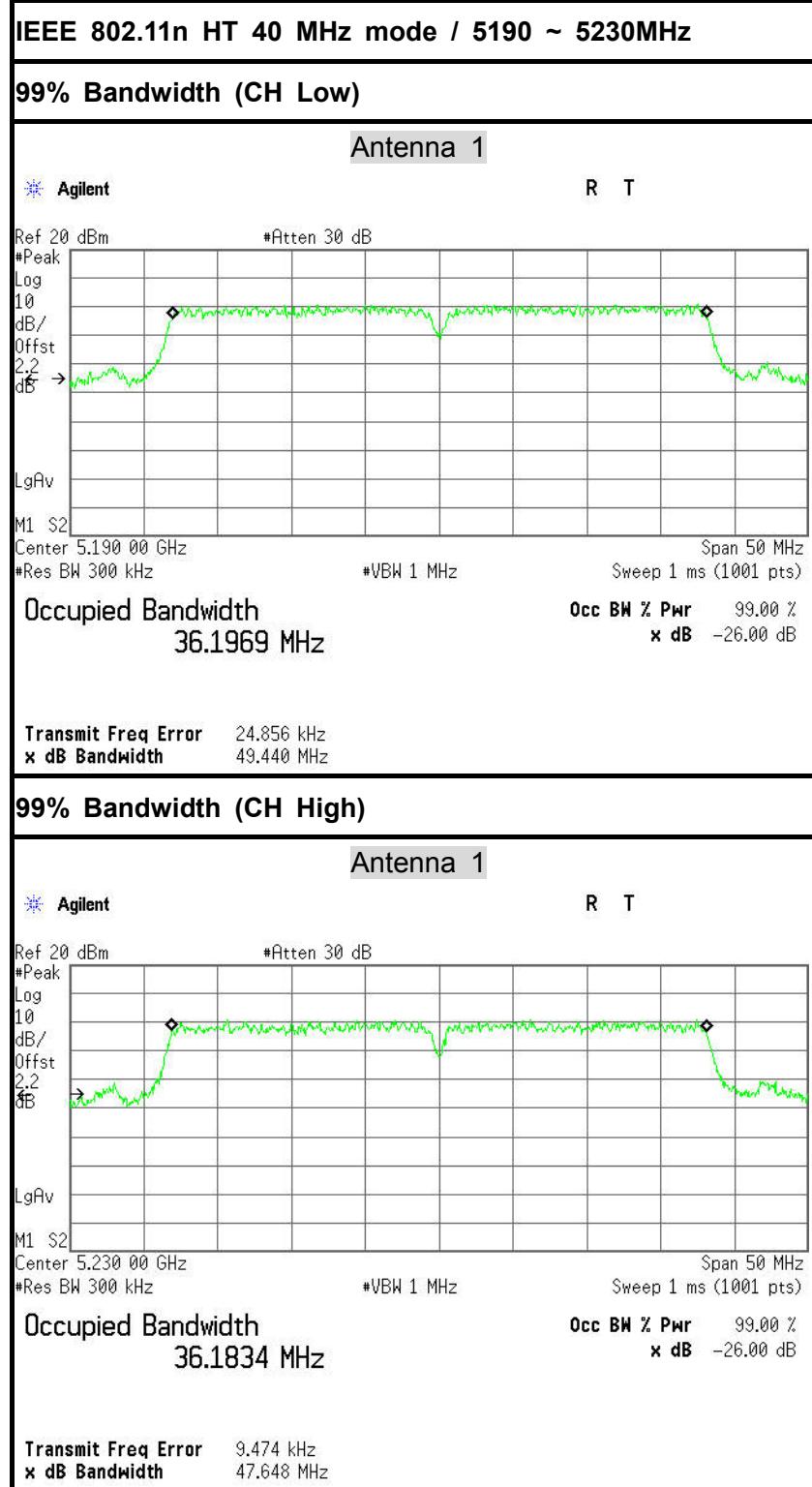


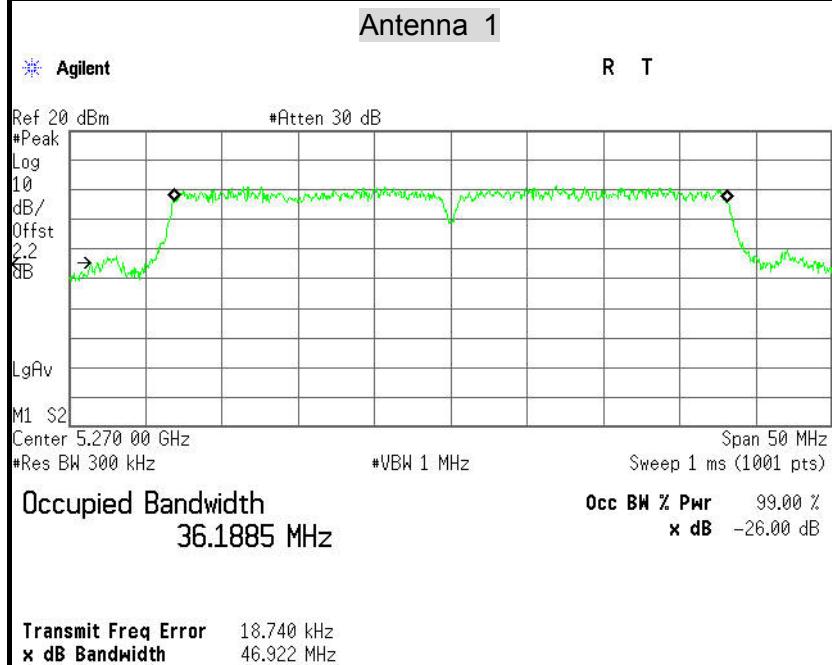
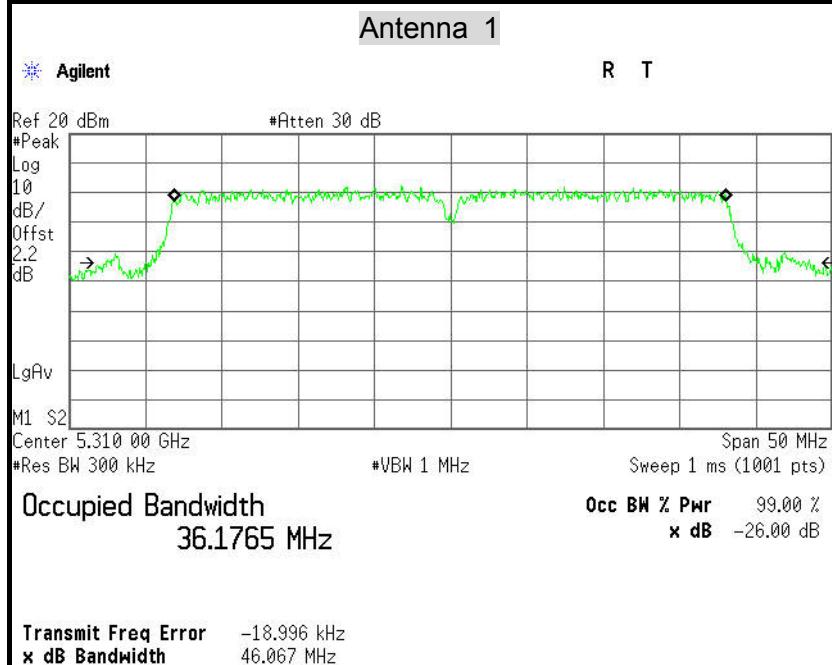
**IEEE 802.11n HT 40 MHz mode / 5270 ~ 5310MHz****99% Bandwidth (CH Low)****99% Bandwidth (CH High)**

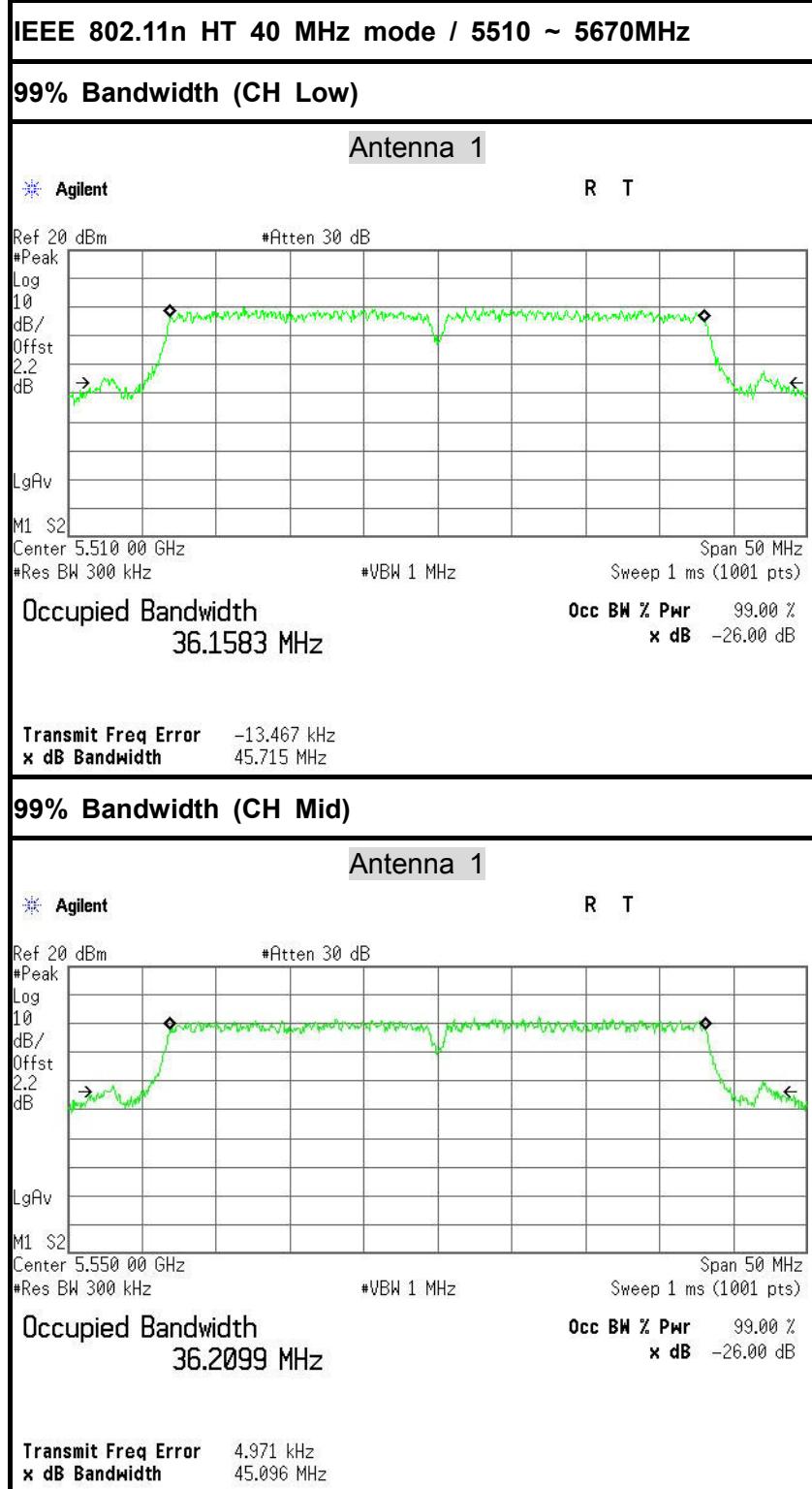


**99% Bandwidth (CH High)****IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz****99% Bandwidth (CH Low)**



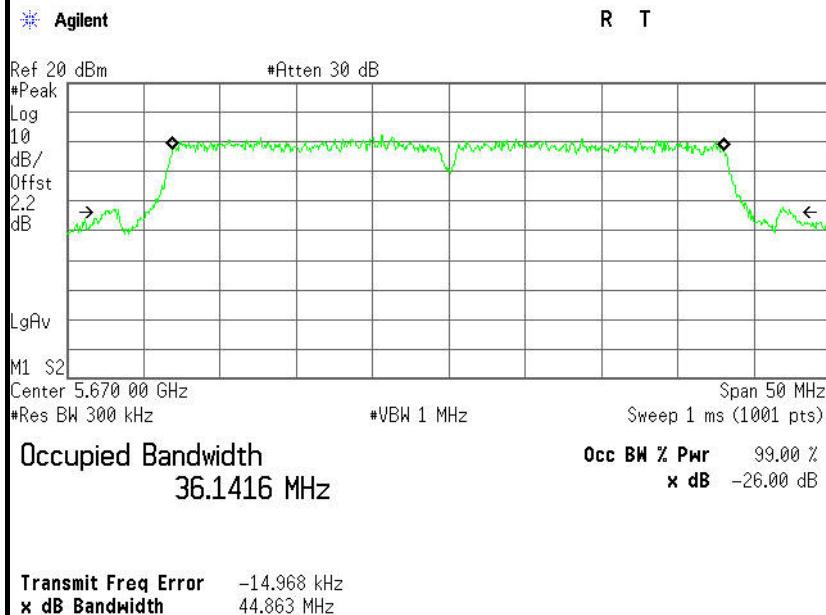


**IEEE 802.11n HT 40 MHz mode / 5190 ~ 5310MHz****99% Bandwidth (CH Low)****99% Bandwidth (CH High)**



**99% Bandwidth (CH High)**

Antenna 1

**IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz****99% Bandwidth (CH Low)**

Antenna 1

