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Emissions
Test Report

EUT Name: Wireless Residential Gateway

Model No.: 5268AC

CFR 47 Part 15.407 2013 and RSS 210: 2010

Prepared for:

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Revisions

Revision No.	Date MM/DD/YYYY	Reason for Change	Author
0	05/23/2014	Original Document	N/A

Note: Latest revision report will replace all previous reports.

Statement of Compliance

Manufacturer:	Pace Americas 310 Providence Mine Road, Ste. 200 Nevada City, CA 95959 (530) 274-5440
Requester / Applicant:	Mark Rieger
Name of Equipment:	Wireless Residential Gateway
Model No.	5268AC
Type of Equipment:	Intentional Radiator
Application of Regulations:	CFR 47 Part 15.407 2013 and RSS 210: 2010
Test Dates:	April 10, 2014 to April 24, 2014

Guidance Documents:

Emissions: ANSI C63.10-2009, KDB 789033 D01 General UNII Test Procedure v01r03

Test Methods:

Emissions: ANSI C63.10-2009, KDB 789033 D01 General UNII Test Procedure v01r03

The electromagnetic compatibility test and documented data described in this report has been performed and recorded by TUV Rheinland, in accordance with the standards and procedures listed herein. As the responsible authorized agent of the EMC laboratory, I hereby declare that the equipment described above has been shown to be compliant with the EMC requirements of the stated regulations and standards based on these results. If any special accessories and/or modifications were required for compliance, they are listed in the Executive Summary of this report.

This report must not be used to claim product endorsement by A2LA or any agency of the U.S. Government. This report contains data that are not covered by A2LA accreditation. This report shall not be reproduced except in full, without the written authorization of TUV Rheinland of North America.

Jeremy Luong	05/23/2014	Conan Boyle	05/23/2014
Test Engineer	Date	Laboratory Signature	Date

Testing Cert #3331.02 **US5254** **2932M-1**

INDUSTRY CANADA

1 Executive Summary

1.1 Scope

This report is intended to document the status of conformance with the requirements of the CFR 47 Part 15.407 2013 and RSS 210: 2010 based on the results of testing performed on April 10, 2014 to April 24, 2014 on the Wireless Residential Gateway Model 5268AC manufactured by Pace Americas This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout its life cycle. All documentation will be included as a supplement.

1.2 Purpose

Testing was performed to evaluate the EMC performance of the EUT in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report.

This report will document the result for operating frequency band 5250 MHz to 5350 MHz.

1.3 Summary of Test Results

Table 1: Summary of Test Results

Test	Test Method ANSI C63.4:2003/ ANSI C63.10:2009	Test Limit	Measured Value	Result
Spurious Emission in Transmitted Mode	CFR47 15.209, CFR47 15.407 (b) RSS-GEN Sect.7.2.3, RSS 210 Sect. A.9.2	Class B	- 4.19 dB (Margin)	**Complied**
Restricted Bands of Operation	CFR47 15.205, RSS 210 Sect.2.6	Class B		**Complied**
AC Power Conducted Emission	CFR47 15.207, RSS-GEN Sect.7.2.2	Class B	- 14.27 dB (Margin)	**Complied**
Occupied Bandwidth	CFR47 15.407 (a), RSS GEN Sect.4.4.1	Na	26dB BW: 22.591MHz 99% BW: 16.775MHz	**Complied**
Maximum Output Power	CFR47 15.407 (a), RSS 210 Sect. A.9.2	21.92 dBm	20.97dBm	**Complied**
Peak Power Spectral Density	CFR47 15.407 (a), RSS 210 Sect. A.9.2	8.92 dBm/MHz	8.848 dBm/MHz	**Complied**
Peak Excursion Ratio	CFR47 15.407 (a)(6)	< 13 dB	- 4.39 dB (margin)	**Complied**
Conducted Emission – Antenna Port	CFR47 15.407 (b), RSS 210 Sect.6.2.2	< -27 dBm/MHz	Note 2	**Complied**
Frequency Stability	CFR47 15.407 (g), RSS GEN Sect. 4.7.	±20 ppm	8.98 ppm	**Complied**
RF Exposure - General Population	CFR47 15.247 (i), 2.1091	1.0 mW/cm^2	0.2416 mW/cm2	**Complied**

Note: 1. Test limit was accounted for the maximum directional gain antenna.
2. Meet restricted band emission requirements.
3. This report will document band 5250 MHz to 5350 MHz with band-crossing signals.

1.4 Special Accessories

No special accessories were necessary in order to achieve compliance.

1.5 Equipment Modifications

None

2 Laboratory Information

2.1 Accreditations & Endorsements

2.1.1 US Federal Communications Commission

TUV Rheinland of North America at 1279 Quarry Ln, Pleasanton, CA 94566 is recognized by the commission for performing testing services for the general public on a fee basis. These laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (US5254). The laboratory scope of accreditation includes: Title 47 CFR Parts 15, 18, and 90. The accreditation is updated every 3 years.

2.1.2 A2LA

TUV Rheinland of North America is accredited by the National Voluntary Laboratory Accreditation Program, which is administered under the auspices of the National Institute of Standards and Technology. The laboratory has been assessed and accredited in accordance with ISO Guide 17025:2005 and ISO 9002 (Lab Code 3331.02). The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

2.1.3 Canada – Industry Canada

TUV Rheinland of North America at the 1279 Quarry Ln, Pleasanton, CA 94566 address is accredited by Industry Canada for performing testing services for the general public on a fee basis. This laboratory test facilities have been fully described in reports submitted to and accepted by Industry Canada (File Number 2932M). This reference number is the indication to the Industry Canada Certification Officers that the site meets the requirements of RSS 212, Issue 1 (Provisional). The accreditation is updated every 3 years.

2.1.4 Japan – VCCI

The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) is a group that consists of Information Technology Equipment (ITE) manufacturers and EMC test laboratories. The purpose of the Council is to take voluntary control measures against electromagnetic interference from Information Technology Equipment, and thereby contribute to the development of a socially beneficial and responsible state of affairs in the realm of Information Technology Equipment in Japan. TUV Rheinland of North America at 1279 Quarry Ln, Pleasanton, CA 94566 has been assessed and approved in accordance with the Regulations for Voluntary Control Measures.

VCCI Registration No. for Pleasanton: A-0031

VCCI Registration No. for Santa Clara: A-0032

2.1.5 **Acceptance by Mutual Recognition Arrangement**

The United States has an established agreement with specific countries under the Asia Pacific Laboratory Accreditation Corporation (APLAC) Mutual Recognition Arrangement. Under this agreement, all TUV Rheinland at 1279 Quarry Ln, Pleasanton, CA 94566 test results and test reports within the scope of the laboratory A2LA accreditation will be accepted by each member country.

2.2 Test Facilities

All of the test facilities are located at 1279 Quarry Lane, Pleasanton, California 94566, USA. The 2305 Mission College, Santa Clara, 95054, USA location is considered a Pleasanton annex.

2.2.1 **Emission Test Facility**

The Semi-Anechoic chamber and AC Line Conducted measurement facility used to collect the radiated and conducted data has been constructed in accordance with ANSI C63.7:1992. The site has been measured in accordance with and verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4-2009, at a test distance of 3 and 5 meters. The site is listed with the FCC and accredited by A2LA (Lab Code 3331.02). The 3/5-meter semi-anechoic chamber used to collect the radiated data has been verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4-2009, at a test distance of 3 meter and 5 meters. A report detailing this site can be obtained from TUV Rheinland of North America.

2.2.2 **Immunity Test Facility**

ESD, EFT, Surge, PQF: These tests are performed in an environmentally controlled room with a 3.7 m x 4.8 m x 3.175 mm thick aluminum floor connected to PE ground.

For ESD testing, tabletop equipment is placed on an insulated mat with a surface resistivity of 10^9 Ohms/square on a 1.6 m x 0.8 m x 0.8 m high non-conductive table with a 3.175 mm aluminum top (Horizontal Coupling Plane). The HCP is connected to the main ground plane via a low impedance ground strap through two 470-kΩ resistors. The Vertical Coupling Plane consists of an aluminum plate 50 cm x 50 cm x 3.175 mm thick. The VCP is connected to the main ground plane via a low impedance ground strap through two 470-kΩ resistors.

For EFT, Surge, PQF, the HCP and VCP are removed.

RF Field Immunity testing is performed in a 7.3m x 4.3m x 4.1m anechoic chamber.

RF Conducted and Magnetic Field Immunity testing is performed on a 4.8m x 3.7m x 3.175mm thick aluminum ground plane.

All test areas allow a minimum distance of 1 meter from the EUT to walls or conducting objects.

2.3 Measurement Uncertainty

Two types of measurement uncertainty are expressed in this report, per *ISO Guide To The Expression Of Uncertainty In Measurement*, 1st Edition, 1995.

The Combined Standard Uncertainty is the standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities; it is equal to the positive square root of the sum of the variances or co-variances of these other quantities, weighted according to how the measurement result varies with changes in these quantities. The term *standard uncertainty* is the result of a measurement expressed as a standard deviation.

2.3.1 **Sample Calculation – radiated & conducted emissions**

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

Field Strength (dBμV/m) = RAW - AMP + CBL + ACF

Where: RAW = Measured level before correction (dBμV)

AMP = Amplifier Gain (dB)

CBL = Cable Loss (dB)

ACF = Antenna Correction Factor (dB/m)

$$\mu V/m = 10^{\frac{dB\mu V/m}{20}}$$

Sample radiated emissions calculation @ 30 MHz

Measurement +Antenna Factor–Amplifier Gain+Cable loss=Radiated Emissions (dBuV/m)

25 dBuV/m + 17.5 dB – 20 dB + 1.0 dB = 23.5 dBuV/m

2.3.2 **Measurement Uncertainty**

Per CISPR 16-4-2	**U_{lab}**	**U_{cispr}**
Radiated Disturbance @ 10 meters		
30 – 1,000 MHz	2.25 dB	4.51 dB
Radiated Disturbance @ 3 meters		
30 – 1,000 MHz	2.26 dB	4.52 dB
1 – 6 GHz	2.12 dB	4.25 dB
6 – 40 GHz	2.47 dB	4.93 dB
Conducted Disturbance @ Mains Terminals		
150 kHz – 30 MHz	1.09 dB	2.18 dB
Disturbance Power		
30 MHz – 300 MHz	3.92 dB	4.3 dB

Voltech PM6000A

The estimated combined standard uncertainty for harmonic current and flicker measurements is ± 5.0%.	Per CISPR 16-4-2 Methods

Measurement Uncertainty Immunity

The estimated combined standard uncertainty for ESD immunity measurements is ± 8.2%.	Per IEC 61000-4-2
The estimated combined standard uncertainty for radiated immunity measurements is ± 4.10 dB.	Per IEC 61000-4-3
The estimated combined standard uncertainty for conducted immunity measurements with CDN is ± 3.66 dB	Per IEC 61000-4-6
The estimated combined standard uncertainty for power frequency magnetic field immunity is ± 2.9%.	Per IEC 61000-4-8

Thermo KeyTek EMC Pro

The estimated combined standard uncertainty for EFT fast transient immunity measurements is ± 2.6%.
The estimated combined standard uncertainty for surge immunity measurements is ± 2.6%.
The estimated combined standard uncertainty for voltage variation and interruption measurements is ± 1.74%.

Measurement Uncertainty – Radio Testing

The estimated combined standard uncertainty for frequency error measurements is ± 3.88 Hz
The estimated combined standard uncertainty for carrier power measurements is ± 1.59 dB.
The estimated combined standard uncertainty for adjacent channel power measurements is ± 1.47 dB.
The estimated combined standard uncertainty for modulation frequency response measurements is ± 0.46 dB.
The estimated combined standard uncertainty for transmitter conducted emission measurements is ± 4.01 dB

The expanded uncertainty at a level of 95% confidence is obtained by multiplying the combined standard uncertainty by a coverage factor of 2. Compliance criteria are not based on measurement uncertainty.

2.4 Calibration Traceability

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Standard 17025:2005.

3 Product Information

3.1 Product Description

Pace Americas 5268AC is a residential gateway that provides an 802.11 a/b/g/n/ac Wi-Fi access point and ethernet switch function for connecting personal computers and other in-home networked devices to the service provider's network. The 5168AC features:

- Bonded ADSL2+/VDSL2
- Gigabit Ethernet WAN
- HomePNA 3.1 coax port
- 4 Gigabit Ethernet LAN ports
- 5GHZ 802.11n 4x4 MIMO Wi-Fi
- 2.4GHZ 802.11n 2x2 MIMO Wi-Fi
- 2 FXS (VoIP) Lines
- USB Host Port

3.2 Equipment Configuration

A description of the equipment configuration is given in the Test Plan Section. The EUT was tested as called for in the test standard and was configured and operated in a manner consistent with its intended use. The EUT was connected to rated power and allowed to reach intended operating conditions. The placement of the EUT system components was guided by the test standard and selected to represent typical installation conditions.

In the case of an EUT that can operate in more than one configuration, preliminary testing was performed to determine the configuration that produced maximum radiation.

The final configuration was selected to produce the worst case radiation for emissions testing and to place the EUT in the most susceptible state for immunity testing.

3.3 Operating Mode

A description of the operation mode is given in the Test Plan Section. In the case of an EUT that can operate in more than one state, preliminary testing was performed to determine the operating mode that produced maximum radiation.

The final operating mode was selected to produce the worst case radiation for emissions testing and to place the EUT in the most susceptible state for immunity testing.

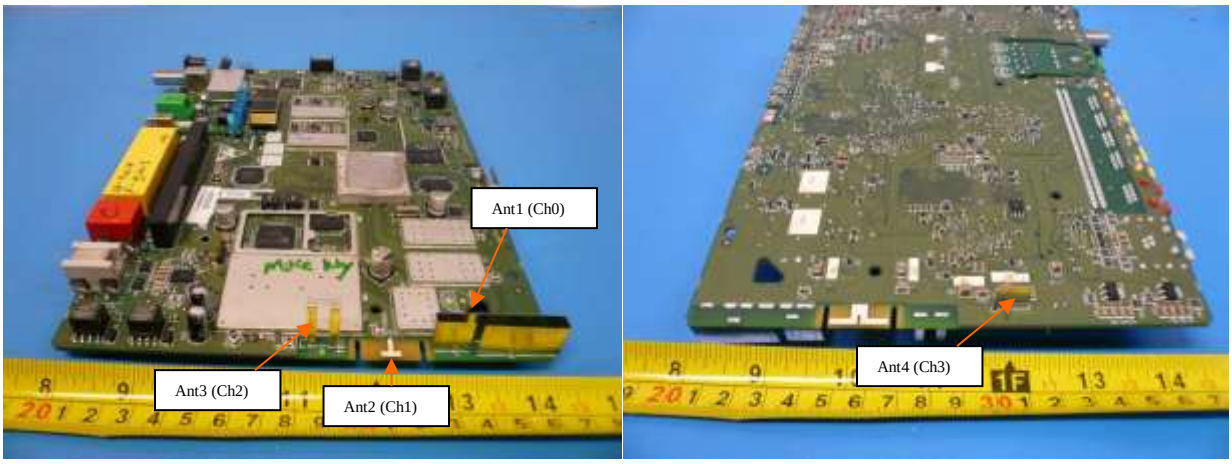
3.4 Unique Antenna Connector

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of CFR47 Parts 15.211, 15.213, 15.217, 15.219, or 15.221.

3.4.1 **Results**

The Wireless Residential Gateway has 4 internal fixed antennas. All antennas are integrated on the PCB. There is no external antenna connection available.

Antenna	Peak Gain (dBi)
1	1.95
2	2.27
3	1.83
4	2.03
Total Directional gain is +8.08 dBi.	



4 Emissions

Testing was performed in accordance with CFR 47 Part 15.407: 2013 and RSS 210 Annex 9: 2010. These test methods are listed under the laboratory's A2LA Scope of Accreditation. This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices. Procedures described in section 8 of the standard were used.

4.1 Output Power Requirements

The maximum output power requirement is the maximum equivalent isotropic radiated power deLinering at the transmitting antenna under specified conditions of measurements in the presence of modulation.

The maximum output power and harmonics shall not exceed CFR47 Part 15.407 (a):2012 and RSS 210 A9.2: 2010.

The maximum transmitted powers are

Band 5150-5250 MHz:50 mW or 4 dBm + 10Log B.

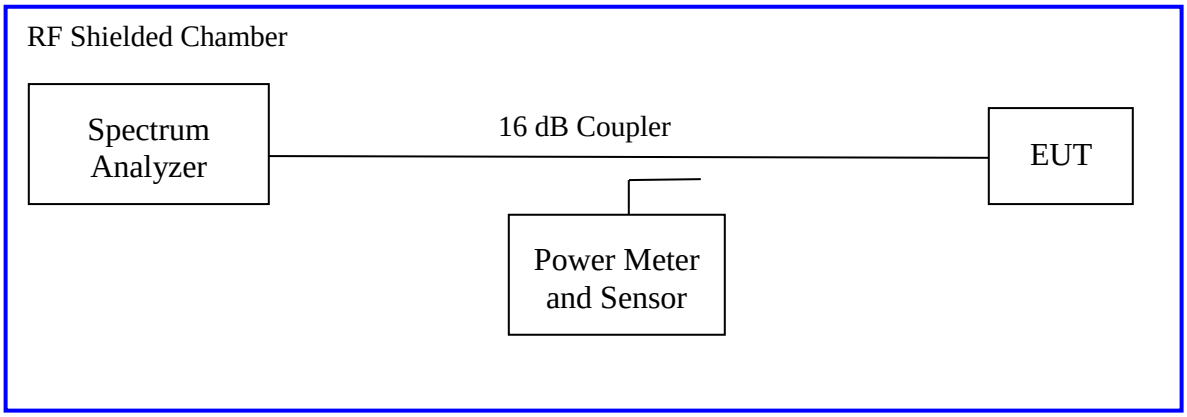
Band 5250-5350 MHz, 5470-5725 MHz:250 mW or 11 dBm + 10Log B.

Band 5725-5825 MHz:1 W or 17 dBm + 10Log B. Where B is 26 dB Bandwidth.

4.1.1 **Test Method**

The ANSI C63.10-2009 Section 6.10.3.1 conducted method was used to measure the channel power output. The preliminary investigation was performed at different data rate/ chain to determine the highest power output for each mode. The worst findings were conducted on 3 channels in each mode on the sample, S/N 121404000111, per CFR47 Part 15.407(a): 2012 and RSS 210 A.9.2; 5230 MHz to 5350 MHz. The worst mode results indicated below.

Test Setup:



Method SA-2 of "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices" applies since the EUT continuously transmit with duty cycle less 100%.

The duty cycle, CF = 10Log(1/duty cycle), was applied.

Each chain was measured individually and applied the measure-and-sum approach per KDB66291. All chains will be on at all time and beam performing. Per CFR47 Part 15.407 (a) (1), the limit is reduced for every dBi gain exceeding 6 dBi. The adjusted limit is 21.92 dBm for UNII2c since the total directional gain is 8.08 dBi.

4.1.2 **Results**

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 2: RF Output Power at the Antenna Port – Test Results

Test Conditions: Conducted Measurement				**Test Date:** April 21, 2014				
Antenna Type: Integrated				**Power Setting:** See test plan				
Directional Antenna Gain: + 8.08 dBi				**Signal State:** Modulated.				
Ambient Temp.: 23 °C				**Relative Humidity:**34%				
802.11a, 4x4								
Operating Channel	**Limit [dBm]**	**Ch0 [dBm]**	**Ch1 [dBm]**	**Ch2 [dBm]**	**Ch3 [dBm]**	**CF [dB]**	**Total Power [dBm]**	**Margin [dB]**
5260	21.92	13.53	13.92	13.15	13.24	0.04	19.53	-2.38
5300	21.92	13.57	14.16	13.36	13.97	0.04	19.84	-2.08
5320	21.92	13.68	14.64	14.01	13.92	0.04	20.14	-1.78
Note: The highest output power was observed at 802.11a, 6Mbps, 4 Data Streams at 99% duty cycle. Power Setting was 16 dBm.								
802.11n HT20, 4x4								
Operating Channel	**Limit [dBm]**	**Ch0 [dBm]**	**Ch1 [dBm]**	**Ch2 [dBm]**	**Ch3 [dBm]**	**CF [dB]**	**Total Power [dBm]**	**Margin [dB]**
5260	21.92	13.16	13.83	13.29	13.19	0.09	19.48	-2.43
5300	21.92	13.07	14.52	13.95	13.72	0.09	19.95	-1.97
5320	21.92	13.66	14.80	14.20	14.05	0.09	20.30	-1.62
Note: The highest output power was observed at MCS0, 4 Data Streams at 98% duty cycle. Power Setting was 16 dBm.								

802.11n HT40, 4x4								
Operating Channel	**Limit [dBm]**	**Ch0 [dBm]**	**Ch1 [dBm]**	**Ch2 [dBm]**	**Ch3 [dBm]**	**CF [dB]**	**Total Power [dBm]**	**Margin [dB]**
5270	21.92	13.33	14.56	13.65	13.75	0.18	20.05	-1.87
5310	21.92	11.83	12.63	12.01	12.27	0.18	18.39	-3.52
Note: The highest output power was observed at MCS0, 4 Data Streams at 96% duty cycle. Power Setting was 16 dBm at 5270 MHz and 14 dBm at 5310 MHz.								
802.11ac VHT20, 4x4								
Operating Channel	**Limit [dBm]**	**Ch0 [dBm]**	**Ch1 [dBm]**	**Ch2 [dBm]**	**Ch3 [dBm]**	**CF [dB]**	**Total Power [dBm]**	**Margin [dB]**
5260	21.92	13.40	14.14	13.36	13.12	0.09	19.63	-2.29
5300	21.92	13.37	14.59	13.99	13.90	0.09	20.09	-1.83
5320	21.92	13.18	14.86	14.18	14.07	0.09	20.22	-1.70
Note: The highest output power was observed at MCS0, 4 Data Streams at 98% duty cycle. Power Setting was 16 dBm.								
802.11ac VHT40 Mode, 4x4								
Operating Channel	**Limit [dBm]**	**Ch0 [dBm]**	**Ch1 [dBm]**	**Ch2 [dBm]**	**Ch3 [dBm]**	**CF [dB]**	**Total Power [dBm]**	**Margin [dB]**
5270	21.92	13.32	14.05	13.95	13.68	0.13	19.91	-2.01
5310	21.92	12.39	13.86	13.20	13.03	0.13	19.30	-2.62
Note: The highest output power was observed at MCS0, 4 Data Streams at 97% duty cycle. Power Setting was 16 dBm at 5270 MHz and 14 dBm at 5310 MHz.								
802.11ac VHT80 Mode, 4x4								
Operating Channel	**Limit [dBm]**	**Ch0 [dBm]**	**Ch1 [dBm]**	**Ch2 [dBm]**	**Ch3 [dBm]**	**CF [dB]**	**Total Power [dBm]**	**Margin [dB]**
5290	21.92	13.96	15.28	14.67	14.54	0.32	20.97	-0.95
Note: The highest output power was observed at MCS0, 4 Data Streams at 93% duty cycle. Power Setting was 16 dBm.								

Table 3: Average Output Power at the Antenna Port – Reference Only

Test Conditions: Conducted Measurement				**Test Date:** April 21, 2014				
Antenna Type: Integrated				**Power Setting:** See test plan				
Directional Antenna Gain: + 8.08 dBi				**Signal State:** Modulated.				
Ambient Temp.: 23 °C				**Relative Humidity:**34%				
802.11a, 4x4								
Operating Channel	**Limit [dBm]**	**Ch0 [dBm]**	**Ch1 [dBm]**	**Ch2 [dBm]**	**Ch3 [dBm]**	**CF [dB]**	**Total Power [dBm]**	**Margin [dB]**
5260	N/A	15.52	15.86	15.12	15.17	0.04	21.49	N/A
5300	N/A	15.28	15.84	15.84	15.75	0.04	21.75	N/A
5320	N/A	15.25	16.20	15.63	15.50	0.04	21.72	N/A
Note: The highest output power was observed at 802.11a, 6Mbps, 4 Data Streams at 99% duty cycle. Power Setting was 16 dBm.								
802.11n HT20, 4x4								
Operating Channel	**Limit [dBm]**	**Ch0 [dBm]**	**Ch1 [dBm]**	**Ch2 [dBm]**	**Ch3 [dBm]**	**CF [dB]**	**Total Power [dBm]**	**Margin [dB]**
5260	N/A	15.13	15.87	15.23	15.17	0.09	21.47	N/A
5300	N/A	14.84	16.29	16.29	15.48	0.09	21.88	N/A
5320	N/A	15.29	16.48	15.78	15.67	0.09	21.93	N/A
Note: The highest output power was observed at MCS0, 4 Data Streams at 98% duty cycle. Power Setting was 16 dBm.								
802.11n HT40, 4x4								
Operating Channel	**Limit [dBm]**	**Ch0 [dBm]**	**Ch1 [dBm]**	**Ch2 [dBm]**	**Ch3 [dBm]**	**CF [dB]**	**Total Power [dBm]**	**Margin [dB]**
5270	N/A	15.37	16.55	15.58	15.65	0.18	22.01	N/A
5310	N/A	13.57	14.36	14.36	13.88	0.18	20.25	N/A
Note: The highest output power was observed at MCS0, 4 Data Streams at 96% duty cycle. Power Setting was 16 dBm at 5270 MHz and 14 dBm at 5310 MHz.								

802.11ac VHT20, 4x4								
Operating Channel	**Limit [dBm]**	**Ch0 [dBm]**	**Ch1 [dBm]**	**Ch2 [dBm]**	**Ch3 [dBm]**	**CF [dB]**	**Total Power [dBm]**	**Margin [dB]**
5260	N/A	15.39	16.15	15.31	15.13	0.09	21.62	N/A
5300	N/A	15.17	16.33	16.33	15.62	0.09	22.00	N/A
5320	N/A	15.14	16.50	15.77	15.70	0.09	21.91	N/A
Note: The highest output power was observed at MCS0, 4 Data Streams at 98% duty cycle. Power Setting was 16 dBm.								
802.11ac VHT40, 4x4								
Operating Channel	**Limit [dBm]**	**Ch0 [dBm]**	**Ch1 [dBm]**	**Ch2 [dBm]**	**Ch3 [dBm]**	**CF [dB]**	**Total Power [dBm]**	**Margin [dB]**
5270	N/A	15.24	15.94	15.78	15.48	0.13	21.77	N/A
5310	N/A	14.12	15.53	15.53	14.64	0.13	21.15	N/A
Note: The highest output power was observed at MCS0, 4 Data Streams at 97% duty cycle. Power Setting was 16 dBm at 5270 MHz and 14 dBm at 5310 MHz.								
802.11ac VHT80, 4x4								
Operating Channel	**Limit [dBm]**	**Ch0 [dBm]**	**Ch1 [dBm]**	**Ch2 [dBm]**	**Ch3 [dBm]**	**CF [dB]**	**Total Power [dBm]**	**Margin [dB]**
5290	N/A	15.84	17.09	16.42	16.26	0.32	22.76	N/A
Note: The highest output power was observed at MCS0, 4 Data Streams at 93% duty cycle. Power Setting was 16 dBm.								

Figure 1: Maximum Conducted Output Power-5260MHz-11a-6Mbps-Ch0

Figure 2: Maximum Conducted Output Power-5260MHz-11a-6Mbps-Ch1

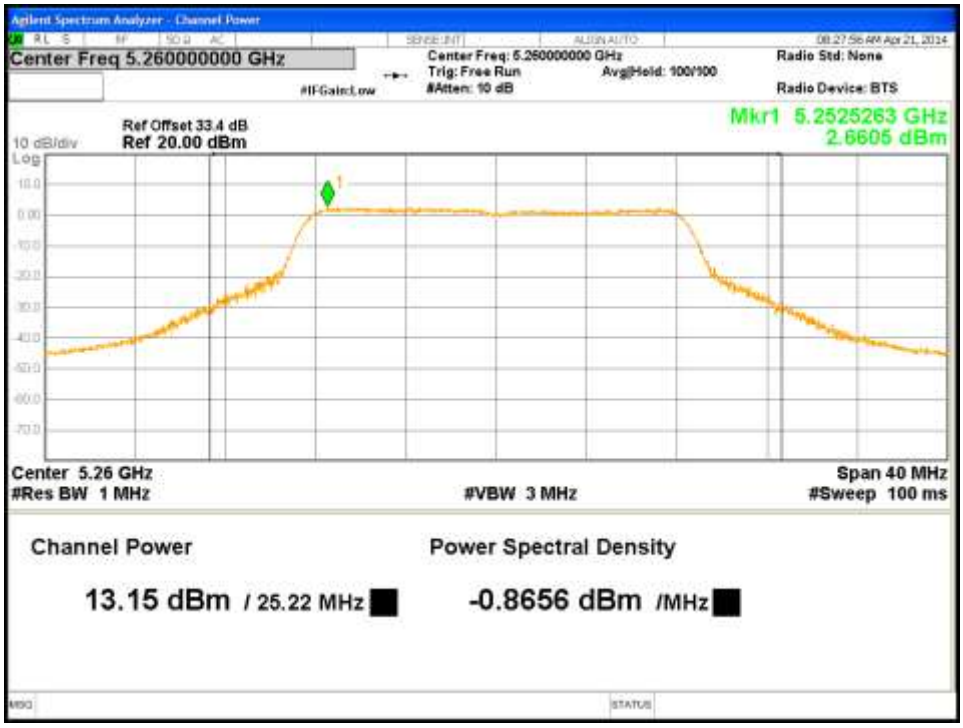


Figure 3: Maximum Conducted Output Power-5260MHz-11a-6Mbps-Ch2

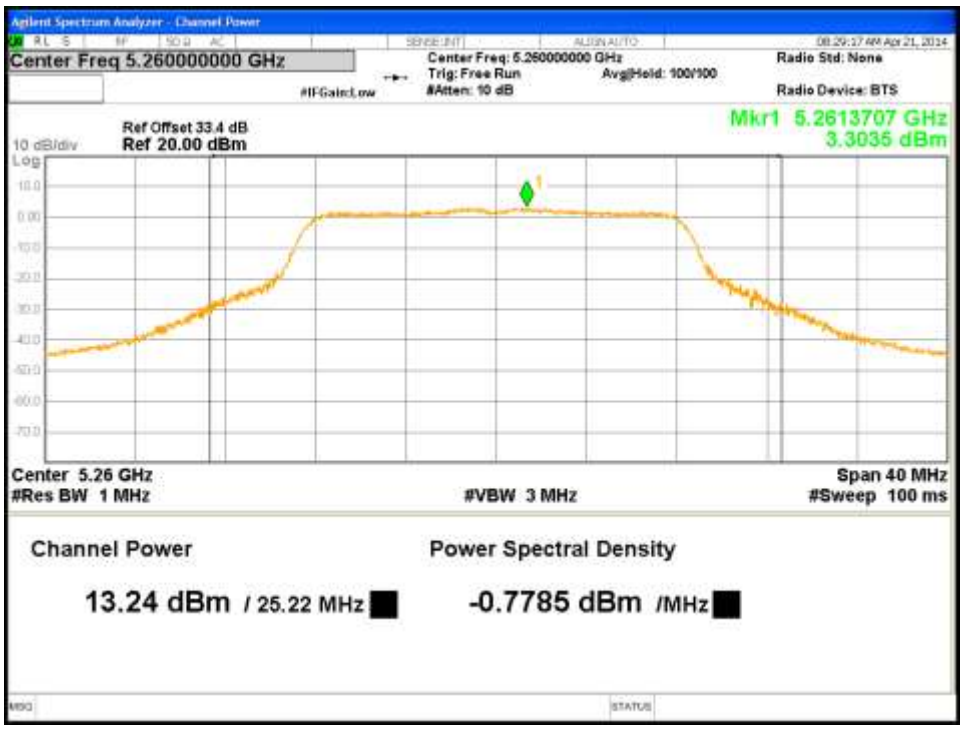


Figure 4: Maximum Conducted Output Power-5260MHz-11a-6Mbps-Ch3

Figure 5: Maximum Conducted Output Power-5300MHz-11a-6Mbps-Ch0

Figure 6: Maximum Conducted Output Power-5300MHz-11a-6Mbps-Ch1

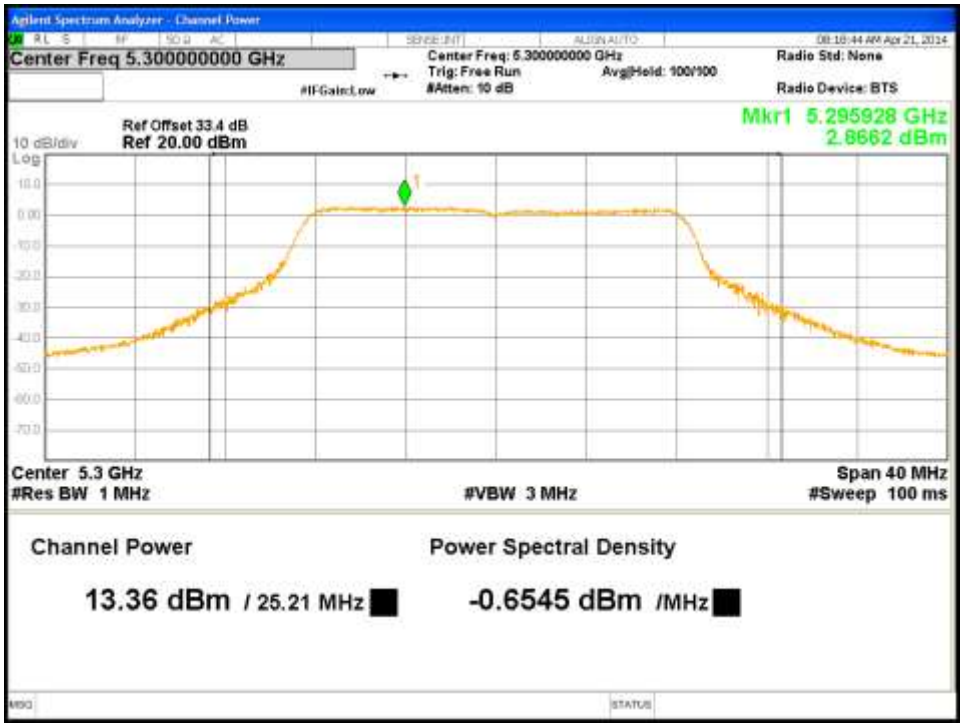


Figure 7: Maximum Conducted Output Power-5300MHz-11a-6Mbps-Ch2

Figure 8: Maximum Conducted Output Power-5300MHz-11a-6Mbps-Ch3

Figure 9: Maximum Conducted Output Power-5320MHz-11a-6Mbps-Ch0

Figure 10: Maximum Conducted Output Power-5320MHz-11a-6Mbps-Ch1

Figure 11: Maximum Conducted Output Power-5320MHz-11a-6Mbps-Ch2

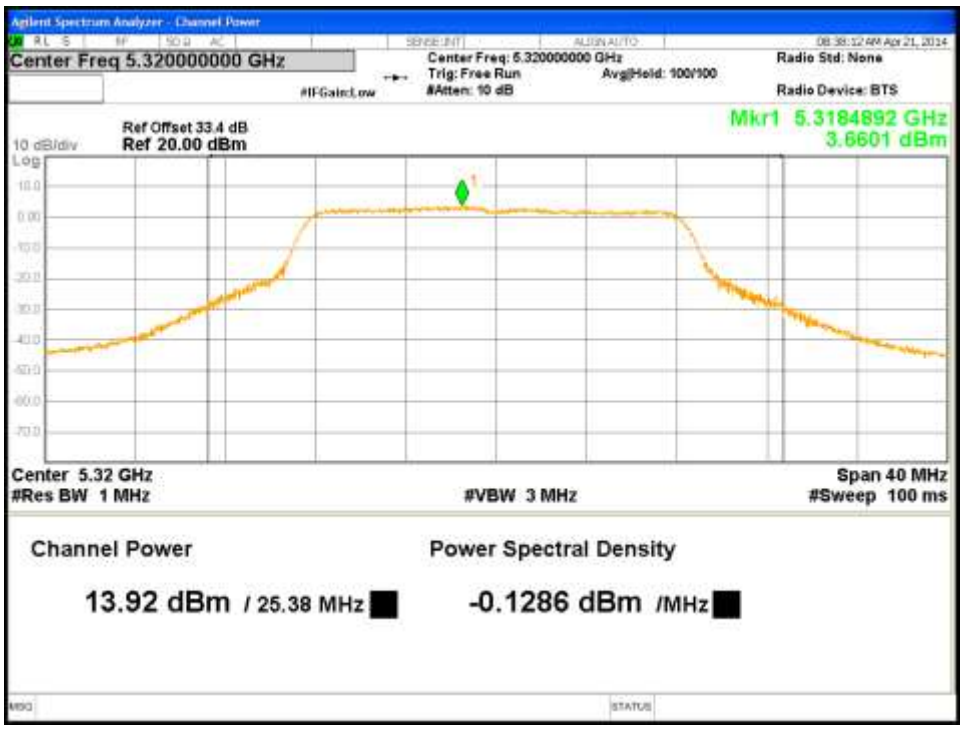


Figure 12: Maximum Conducted Output Power-5320MHz-11a-6Mbps-Ch3

Figure 13: Maximum Conducted Output Power-5260MHz-HT20-MCS0-Ch0

Figure 14: Maximum Conducted Output Power-5260MHz-HT20-MCS0-Ch1

Figure 15: Maximum Conducted Output Power-5260MHz-HT20-MCS0-Ch2

Figure 16: Maximum Conducted Output Power-5260MHz-HT20-MCS0-Ch3

Figure 17: Maximum Conducted Output Power-5300MHz-HT20-MCS0-Ch0

Figure 18: Maximum Conducted Output Power-5300MHz-HT20-MCS0-Ch1

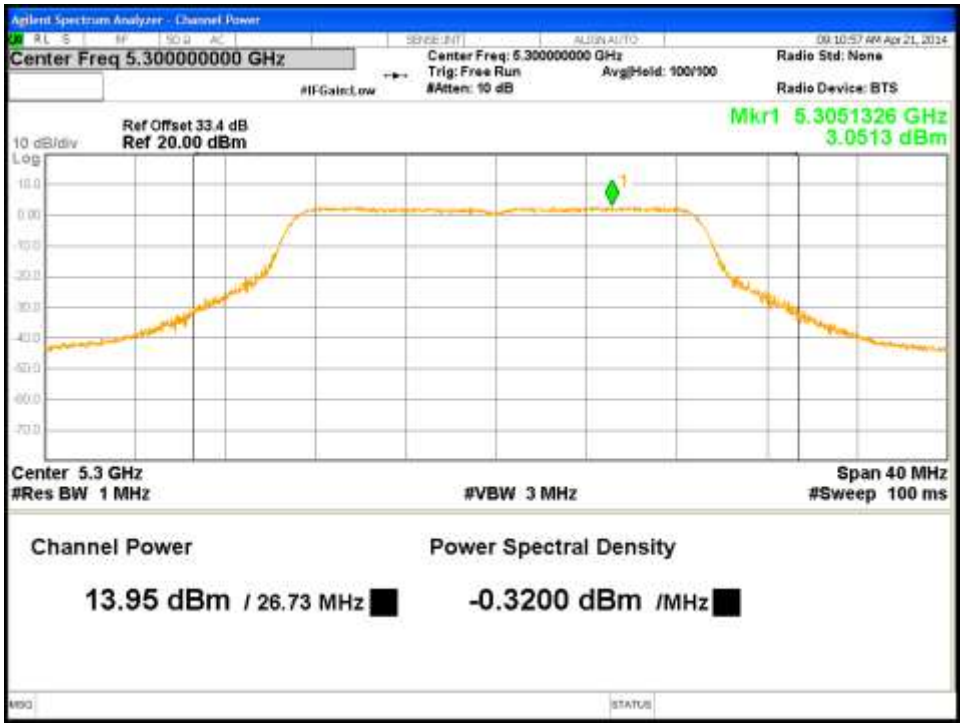


Figure 19: Maximum Conducted Output Power-5300MHz-HT20-MCS0-Ch2

Figure 20: Maximum Conducted Output Power-5300MHz-HT20-MCS0-Ch3

Figure 21: Maximum Conducted Output Power-5320MHz-HT20-MCS0-Ch0

Figure 22: Maximum Conducted Output Power-5320MHz-HT20-MCS0-Ch1

Figure 23: Maximum Conducted Output Power-5320MHz-HT20-MCS0-Ch2

Figure 24: Maximum Conducted Output Power-5320MHz-HT20-MCS0-Ch3

Figure 25: Maximum Conducted Output Power-5270MHz-HT40-MCS0-Ch0

Figure 26: Maximum Conducted Output Power-5270MHz-HT40-MCS0-Ch1

Figure 27: Maximum Conducted Output Power-5270MHz-HT40-MCS0-Ch2

Figure 28: Maximum Conducted Output Power-5270MHz-HT40-MCS0-Ch3

Figure 29: Maximum Conducted Output Power-5310MHz-HT40-MCS0-Ch0

Figure 30: Maximum Conducted Output Power-5310MHz-HT40-MCS0-Ch1

Figure 31: Maximum Conducted Output Power-5310MHz-HT40-MCS0-Ch2

Figure 32: Maximum Conducted Output Power-5310MHz-HT40-MCS0-Ch3

Figure 33: Maximum Conducted Output Power-5260MHz-VHT20-MCS0-Ch0

Figure 34: Maximum Conducted Output Power-5260MHz-VHT20-MCS0-Ch1

Figure 35: Maximum Conducted Output Power-5260MHz-VHT20-MCS0-Ch2

Figure 36: Maximum Conducted Output Power-5260MHz-VHT20-MCS0-Ch3

Figure 37: Maximum Conducted Output Power-5300MHz-VHT20-MCS0-Ch0

Figure 38: Maximum Conducted Output Power-5300MHz-VHT20-MCS0-Ch1

Figure 39: Maximum Conducted Output Power-5300MHz-VHT20-MCS0-Ch2

Figure 40: Maximum Conducted Output Power-5300MHz-VHT20-MCS0-Ch3

Figure 41: Maximum Conducted Output Power-5320MHz-VHT20-MCS0-Ch0

Figure 42: Maximum Conducted Output Power-5320MHz-VHT20-MCS0-Ch1

Figure 43: Maximum Conducted Output Power-5320MHz-VHT20-MCS0-Ch2

Figure 44: Maximum Conducted Output Power-5320MHz-VHT20-MCS0-Ch3

Figure 45: Maximum Conducted Output Power-5270MHz-VHT40-MCS0-Ch0

Figure 46: Maximum Conducted Output Power-5270MHz-VHT40-MCS0-Ch1

Figure 47: Maximum Conducted Output Power-5270MHz-VHT40-MCS0-Ch2

Figure 48: Maximum Conducted Output Power-5270MHz-VHT40-MCS0-Ch3

Figure 49: Maximum Conducted Output Power-5310MHz-VHT40-MCS0-Ch0

Figure 50: Maximum Conducted Output Power-5310MHz-VHT40-MCS0-Ch1

Figure 51: Maximum Conducted Output Power-5310MHz-VHT40-MCS0-Ch2

Figure 52: Maximum Conducted Output Power-5310MHz-VHT40-MCS0-Ch3

Figure 53: Maximum Conducted Output Power-5290MHz-VHT80-MCS0-Ch0

Figure 54: Maximum Conducted Output Power-5290MHz-VHT80-MCS0-Ch1

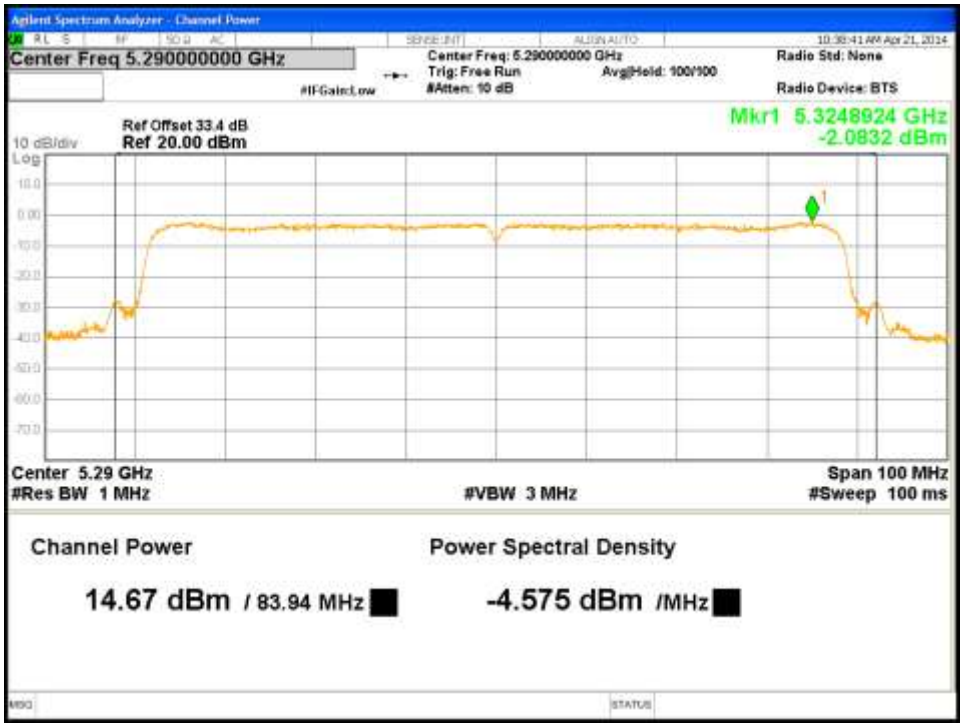


Figure 55: Maximum Conducted Output Power-5290MHz-VHT80-MCS0-Ch2

Figure 56: Maximum Conducted Output Power-5290MHz-VHT80-MCS0-Ch3

4.2 Occupied Bandwidth

The occupied bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency.

The 99% bandwidth is the bandwidth in which 99% of the transmitted power occupied.

The 26 dB bandwidth is defined the bandwidth of 26 dBr from highest transmitted level of the fundamental frequency.

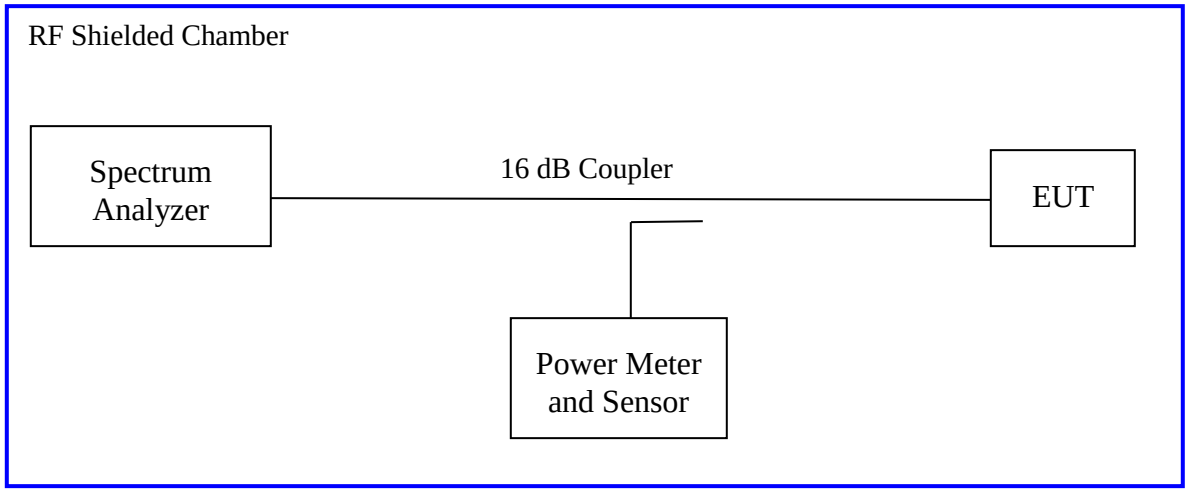
There is no restriction limits for the bandwidth. The 26 dB bandwidth was used to determine the limit for maximum conducted output power per CFR47 Part 15.407(a).

To obtain the tighter limit,

4.2.1 **Test Method**

The conducted method was used to measure the occupied bandwidth. The measurement was performed with modulation per CFR47 15.407(a) 2012 and RSS Gen Sect. 4.4.1:2010. The preliminary investigation was performed to find the narrowest 26 dB bandwidth for each operational mode at different data rates. This worst finding was performed on 3 channels in each operating frequency range; 5250 MHz to 5350 MHz on the sample, S/N 121404000111. The results indicated below.

Test Setup:



4.2.2 **Results**

These occupied bandwidth measurements were taken for references only.

Table 4: Occupied Bandwidth – Test Results

Test Conditions: Conducted Measurement				**Test Date:** April 8, 2014				
Antenna Type: Integrated				**Power Setting:** See test plan				
Directional Antenna Gain: + 8.08 dBi				**Signal State:** Modulated.				
Ambient Temp.: 23 °C				**Relative Humidity:**33%				
Bandwidth (MHz) for 802.11a								
Freq. (MHz)	**99% Bandwidth (MHz)**				**26 dB Bandwidth (MHz)**			
	Ch0	**Ch1**	**Ch2**	**Ch3**	**Ch0**	**Ch1**	**Ch2**	**Ch3**
5260	17.004	16.975	16.986	16.769	23.495	23.068	22.825	22.642
5300	16.927	17.028	16.952	16.775	22.933	23.461	22.765	22.591
5320	16.923	17.059	16.941	16.789	22.911	23.451	22.652	22.734
Note: The bandwidth was measured at 6 Mbps for 802.11a mode.								
Bandwidth (MHz) for 802.11n HT20								
Freq. (MHz)	**99% Bandwidth (MHz)**				**26 dB Bandwidth (MHz)**			
	Ch0	**Ch1**	**Ch2**	**Ch3**	**Ch0**	**Ch1**	**Ch2**	**Ch3**
5260	18.247	18.259	18.245	18.249	24.510	24.589	24.366	24.092
5300	18.243	18.256	18.241	18.263	24.587	24.568	24.310	23.987
5320	18.247	18.242	18.226	18.264	24.545	24.501	24.361	24.103
Note: The bandwidth was measured at 6.5 Mbps for 802.11n HT20 mode.								
Bandwidth (MHz) for 802.11n HT40								
Freq. (MHz)	**99% Bandwidth (MHz)**				**26 dB Bandwidth (MHz)**			
	Ch0	**Ch1**	**Ch2**	**Ch3**	**Ch0**	**Ch1**	**Ch2**	**Ch3**
5270	36.539	36.502	36.523	36.645	42.674	42.465	45.551	43.660
5310	36.504	36.459	36.497	36.557	42.605	42.402	42.638	43.037
Note: The bandwidth was measured at 13.5 Mbps for 802.11n HT40 mode.								

Bandwidth (MHz) for 802.11ac VHT20								
Freq. (MHz)	99% Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Ch0	Ch1	Ch2	Ch3	Ch0	Ch1	Ch2	Ch3
5260	18.299	18.241	18.314	18.227	24.355	24.540	24.449	24.002
5300	18.301	18.241	18.299	18.252	24.248	24.391	24.397	23.989
5320	18.305	18.228	18.296	18.248	24.348	24.396	24.448	24.083
Note: The bandwidth was measured for 802.11ac VHT20 mode at MCS0.								
Bandwidth (MHz) for 802.11ac VHT40								
Freq. (MHz)	99% Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Ch0	Ch1	Ch2	Ch3	Ch0	Ch1	Ch2	Ch3
5270	36.538	36.654	36.570	36.676	42.624	42.947	42.886	43.363
5310	36.514	36.597	36.545	36.628	42.660	42.854	42.943	43.143
Note: The bandwidth was measured for 802.11ac VHT40 mode at MCS0.								
Bandwidth (MHz) for 802.11ac VHT80								
Freq. (MHz)	99% Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Ch0	Ch1	Ch2	Ch3	Ch0	Ch1	Ch2	Ch3
5290	75.454	75.398	75.525	75.489	85.202	84.383	86.133	86.406
Note: The bandwidth was measured for 802.11ac VHT80 mode at MCS0.								

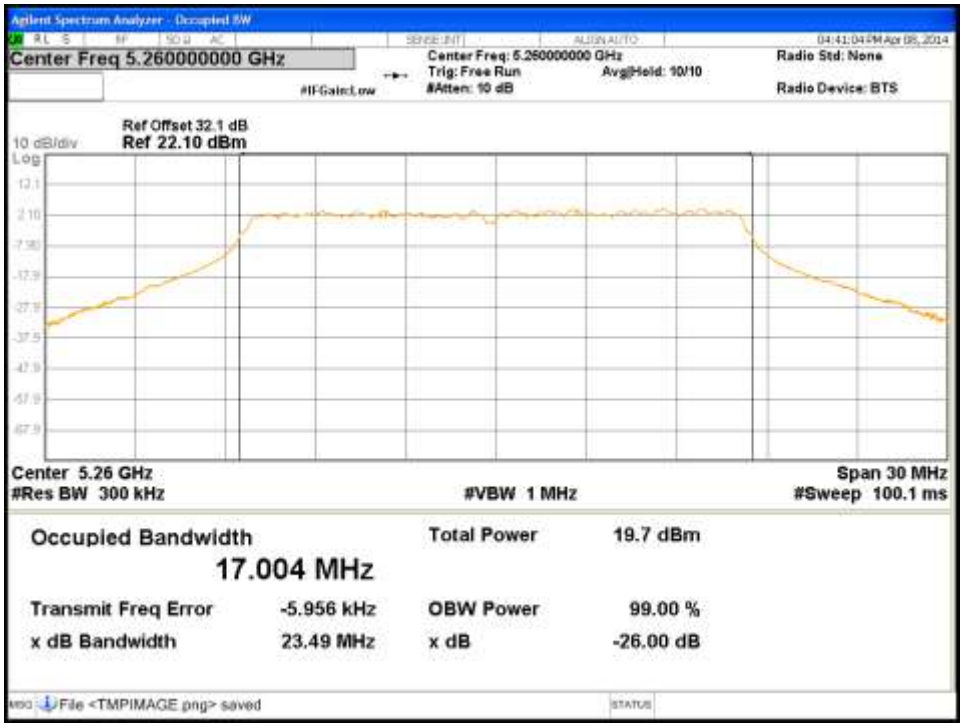


Figure 57: Occupied Bandwidth-5260MHz-11a-6Mbps-Ch0

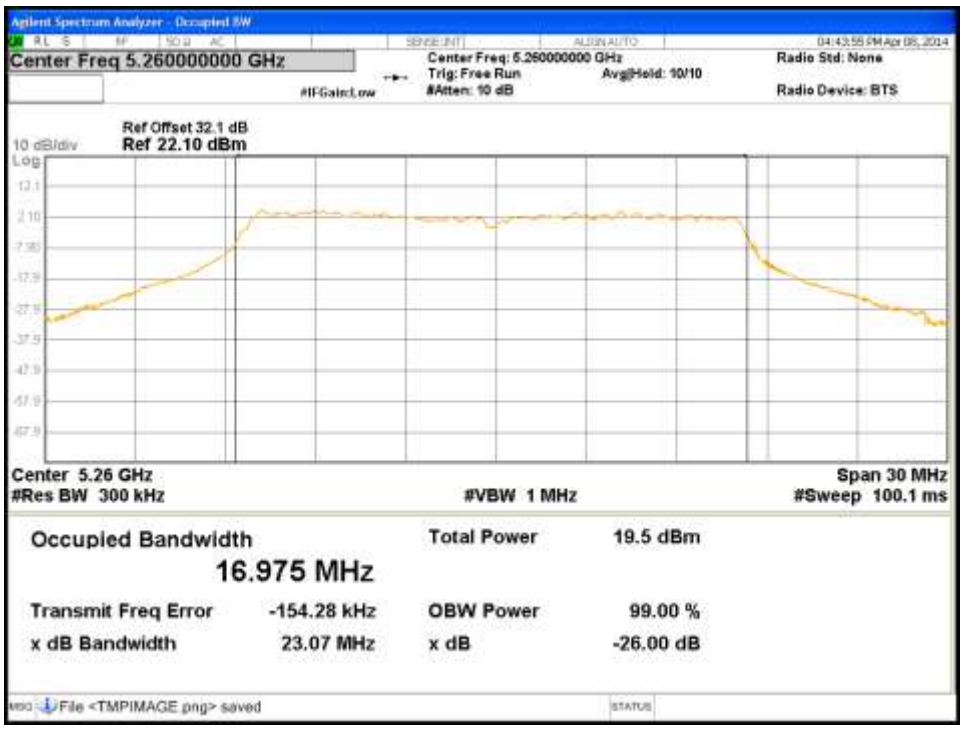


Figure 58: Occupied Bandwidth-5260MHz-11a-6Mbps-Ch1

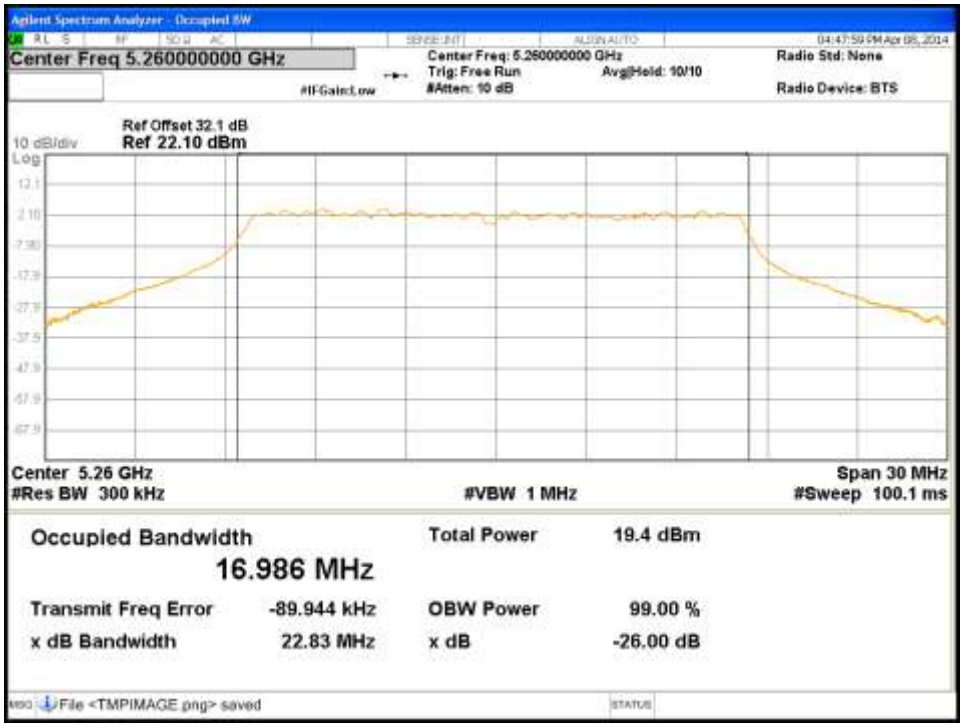


Figure 59: Occupied Bandwidth-5260MHz-11a-6Mbps-Ch2

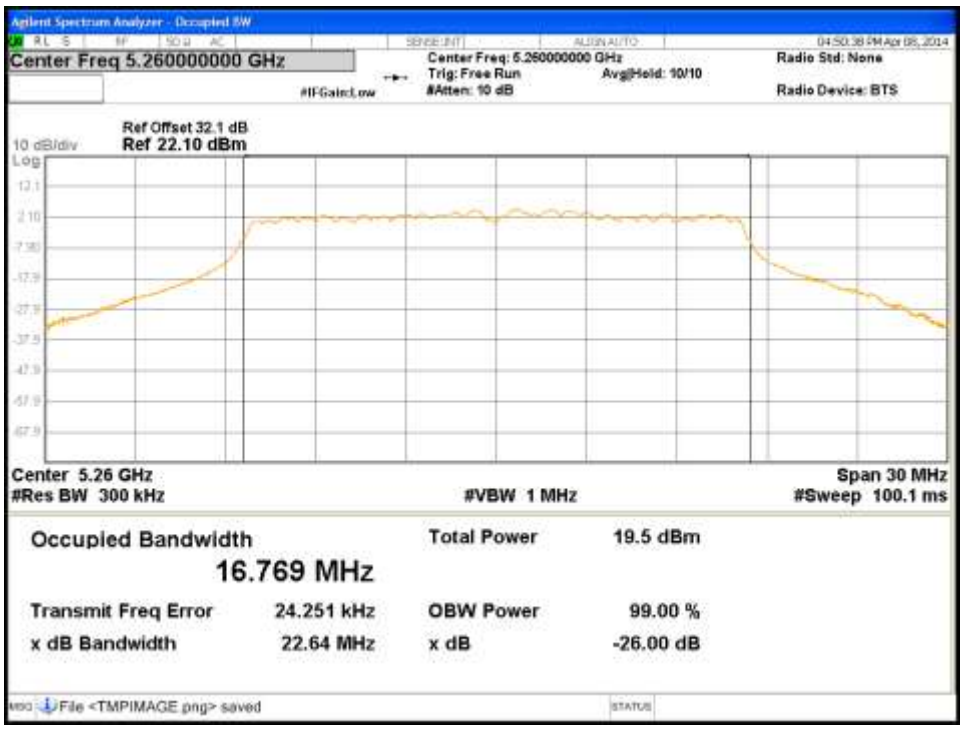


Figure 60: Occupied Bandwidth-5260MHz-11a-6Mbps-Ch3

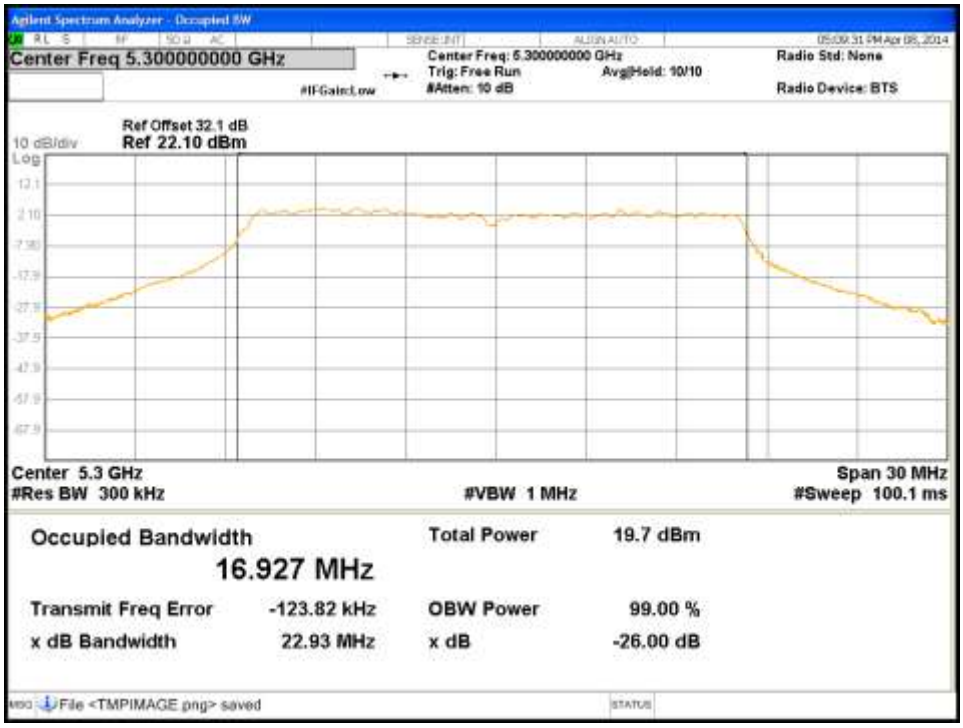


Figure 61: Occupied Bandwidth-5300MHz-11a-6Mbps-Ch0

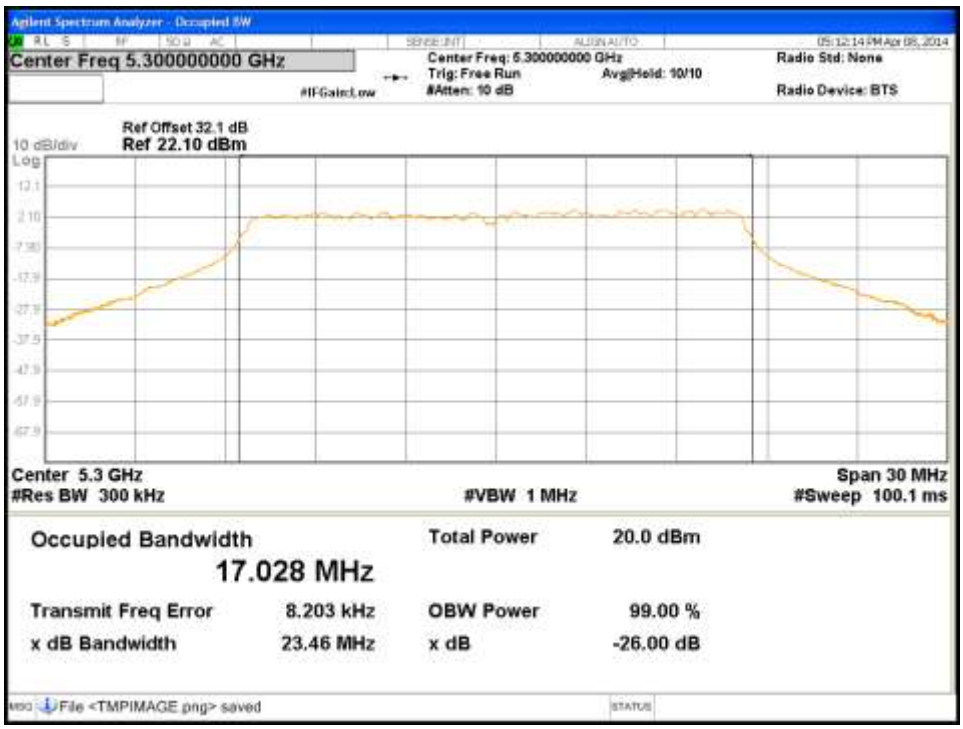


Figure 62: Occupied Bandwidth-5300MHz-11a-6Mbps-Ch1

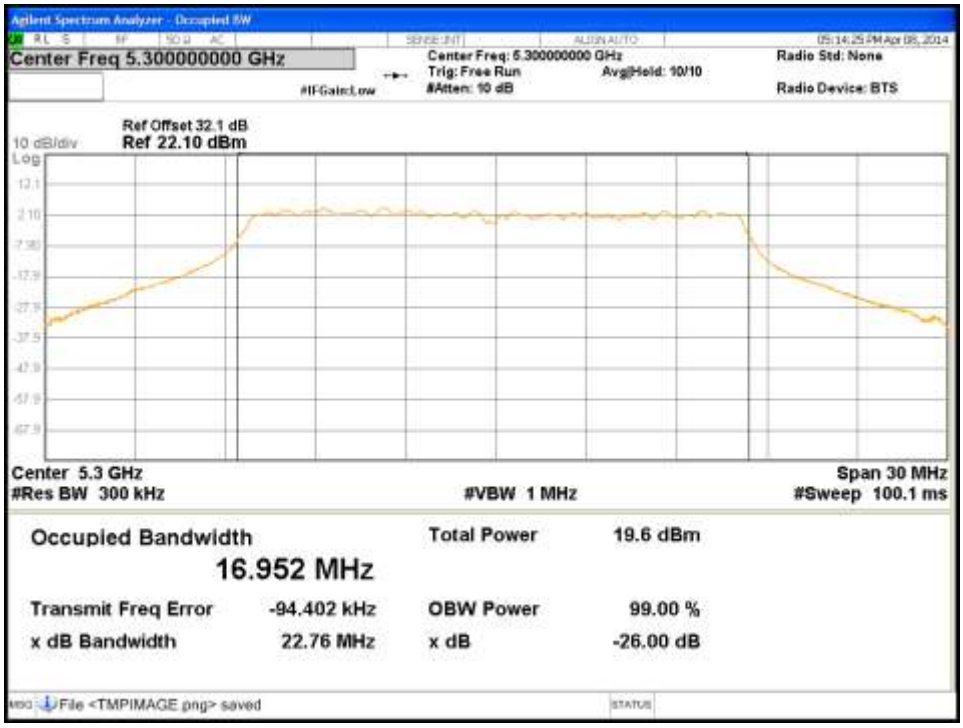


Figure 63: Occupied Bandwidth-5300MHz-11a-6Mbps-Ch2

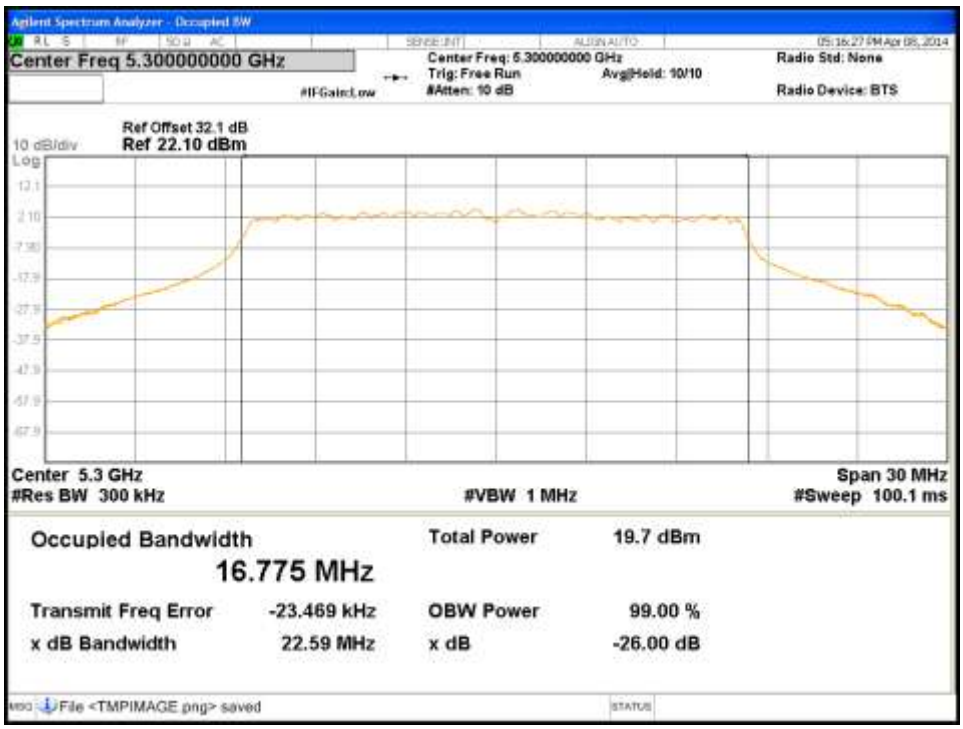


Figure 64: Occupied Bandwidth-5300MHz-11a-6Mbps-Ch3

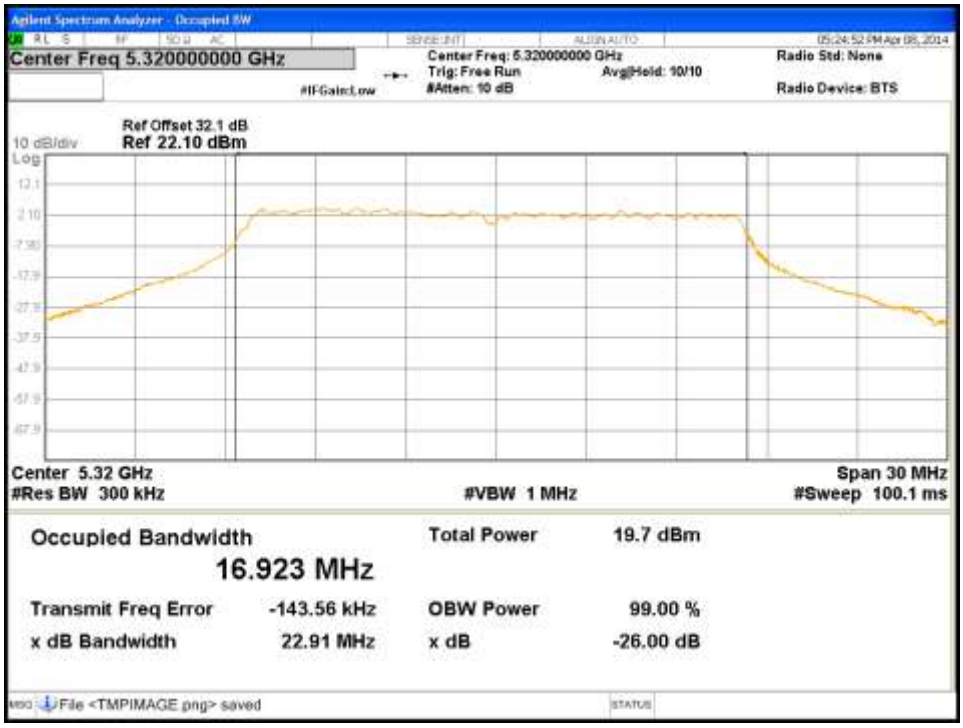


Figure 65: Occupied Bandwidth-5320MHz-11a-6Mbps-Ch0

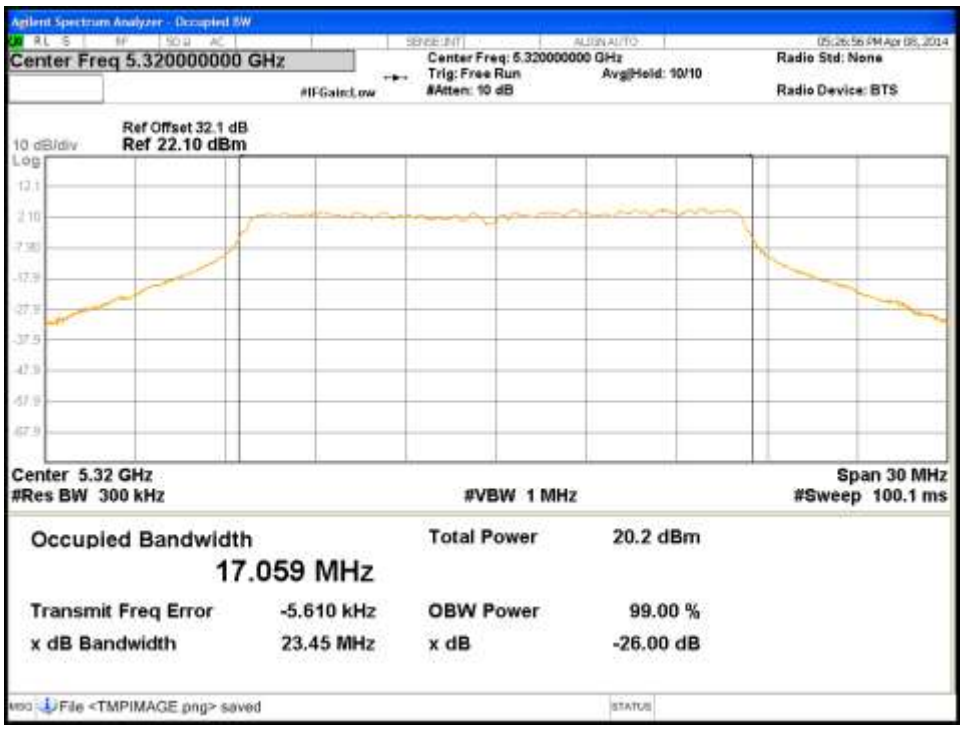


Figure 66: Occupied Bandwidth-5320MHz-11a-6Mbps-Ch1

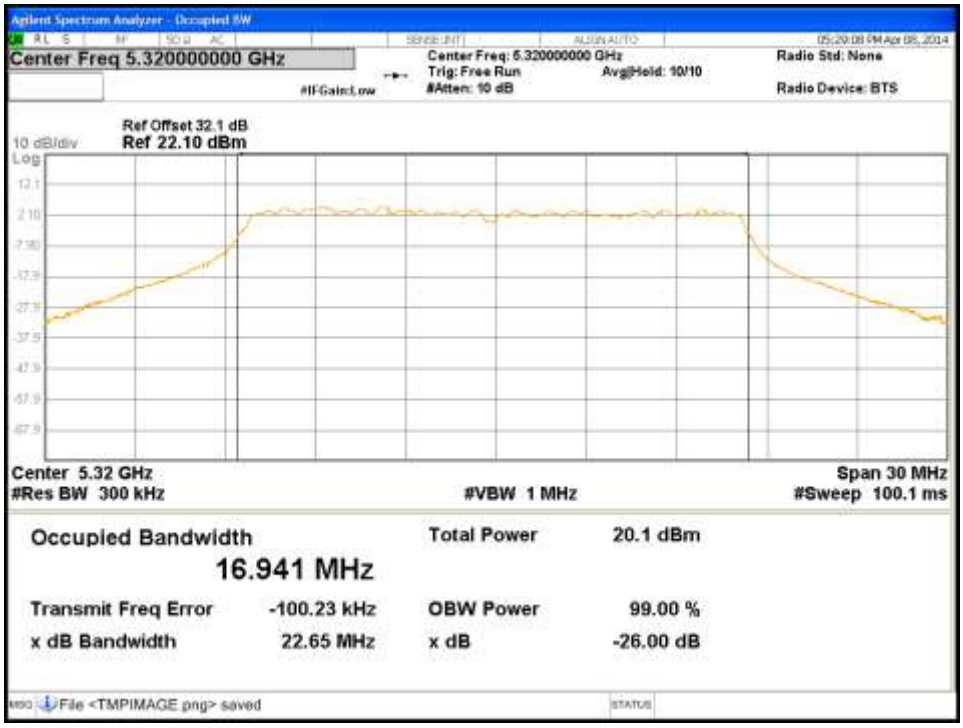


Figure 67: Occupied Bandwidth-5320MHz-11a-6Mbps-Ch2

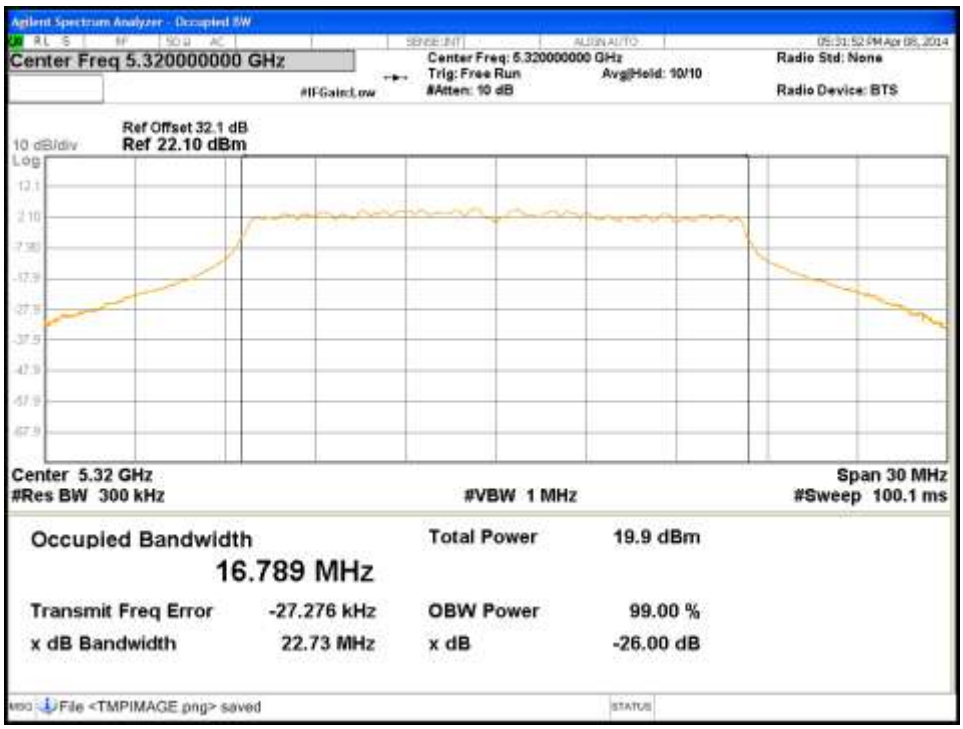


Figure 68: Occupied Bandwidth-5320MHz-11a-6Mbps-Ch3

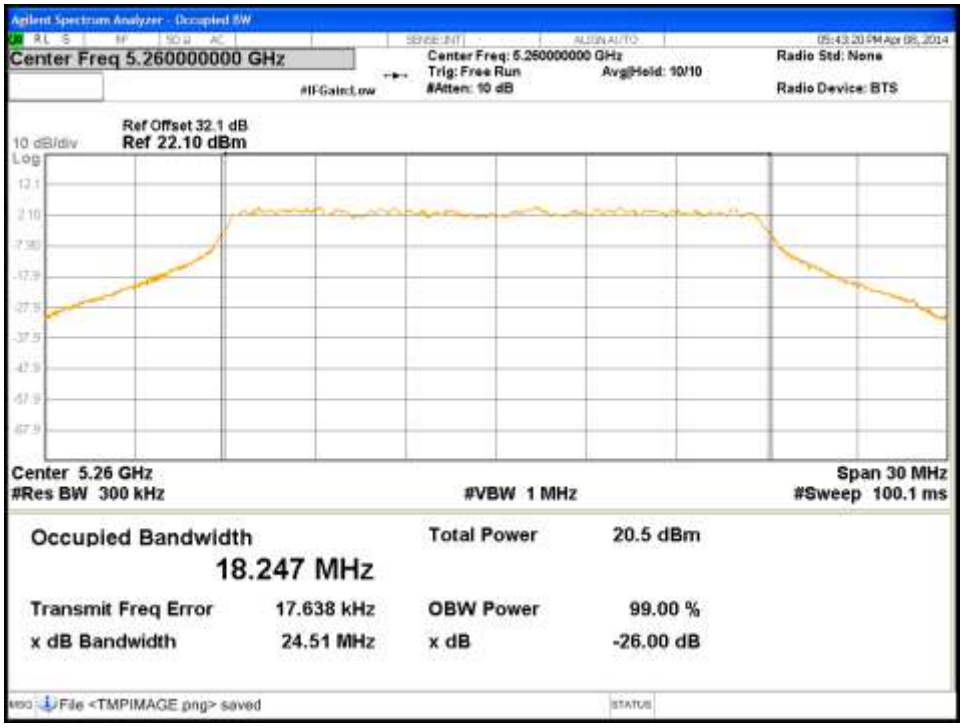


Figure 69: Occupied Bandwidth-5260MHz-HT20-MCS0-Ch0

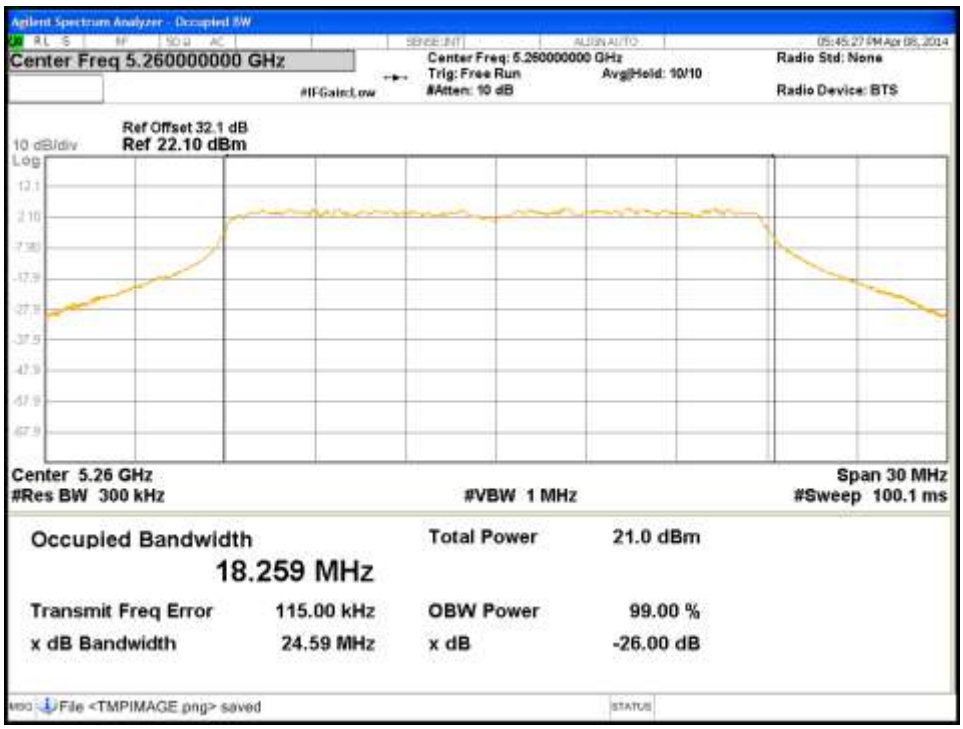


Figure 70: Occupied Bandwidth-5260MHz-HT20-MCS0-Ch1

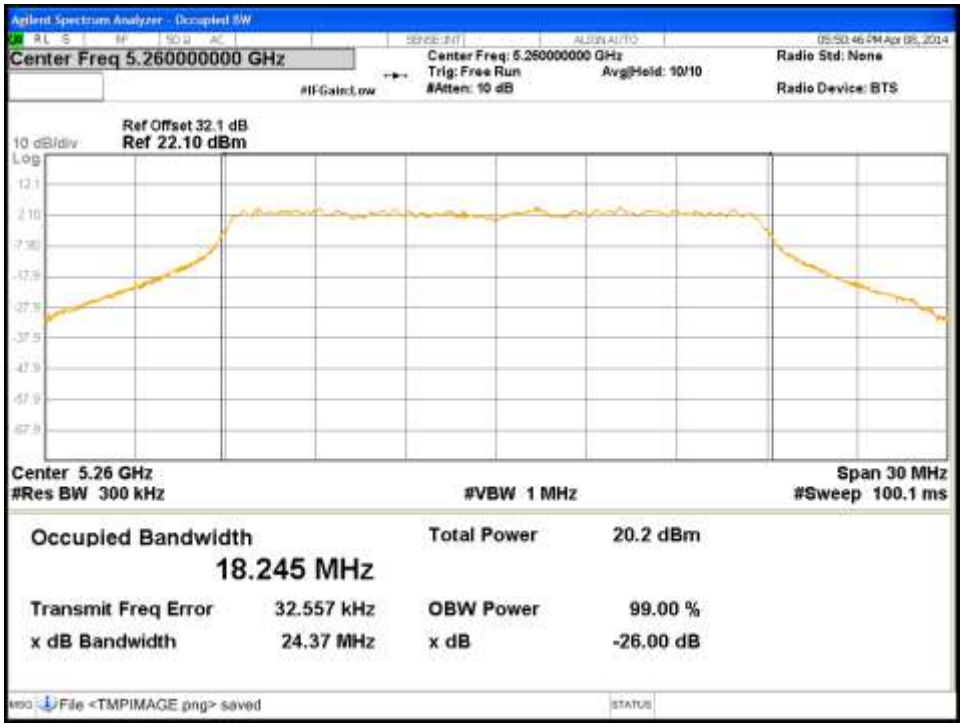


Figure 71: Occupied Bandwidth-5260MHz-HT20-MCS0-Ch2

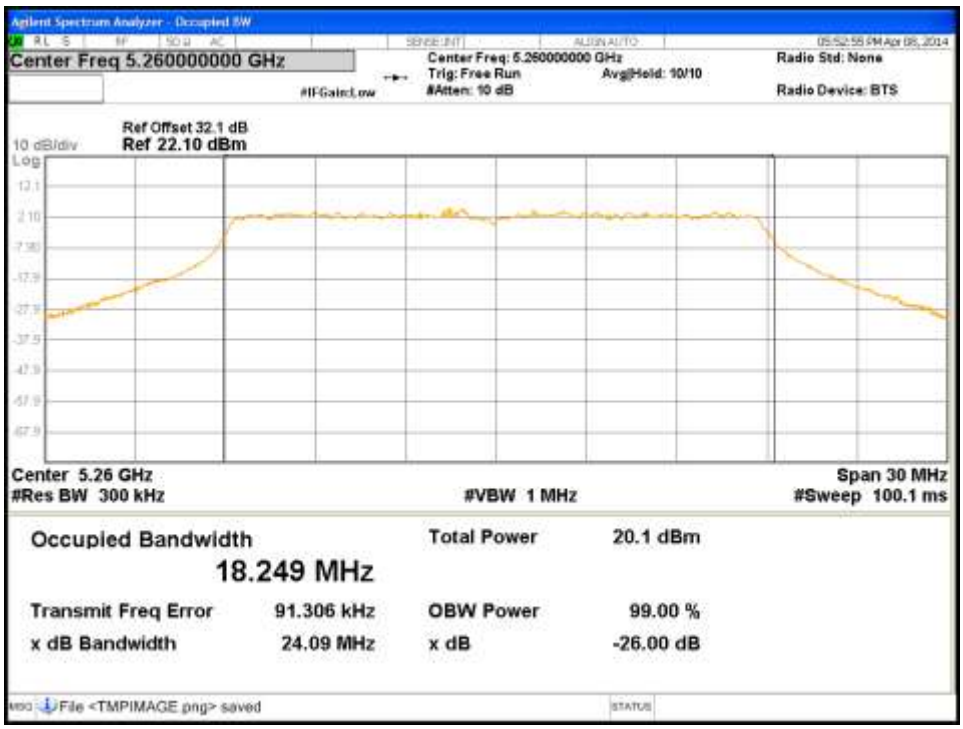


Figure 72: Occupied Bandwidth-5260MHz-HT20-MCS0-Ch3

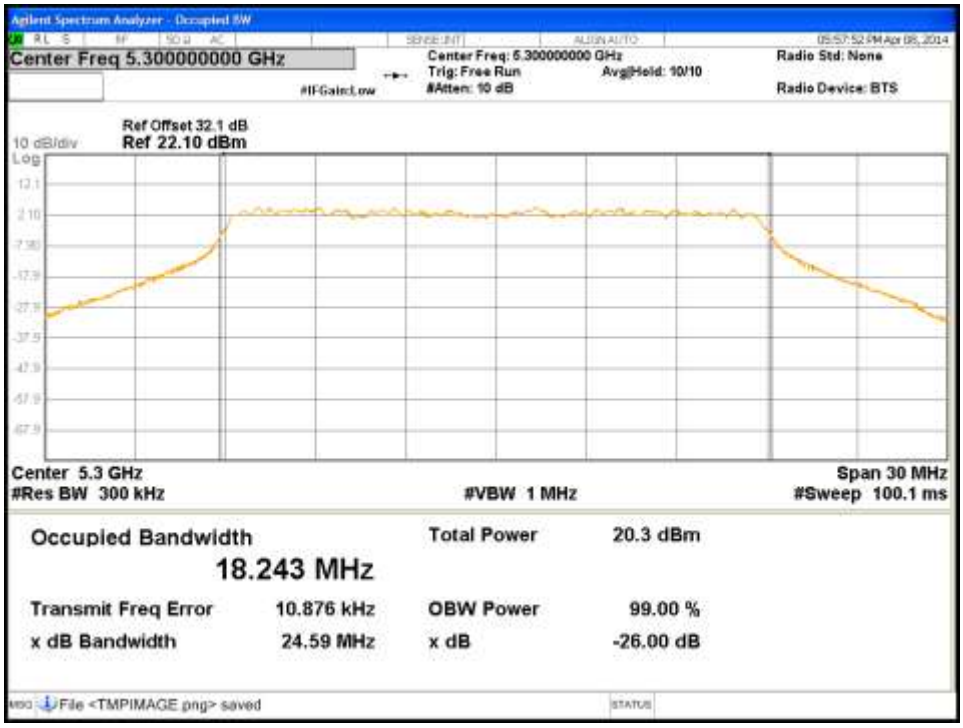


Figure 73: Occupied Bandwidth-5300MHz-HT20-MCS0-Ch0

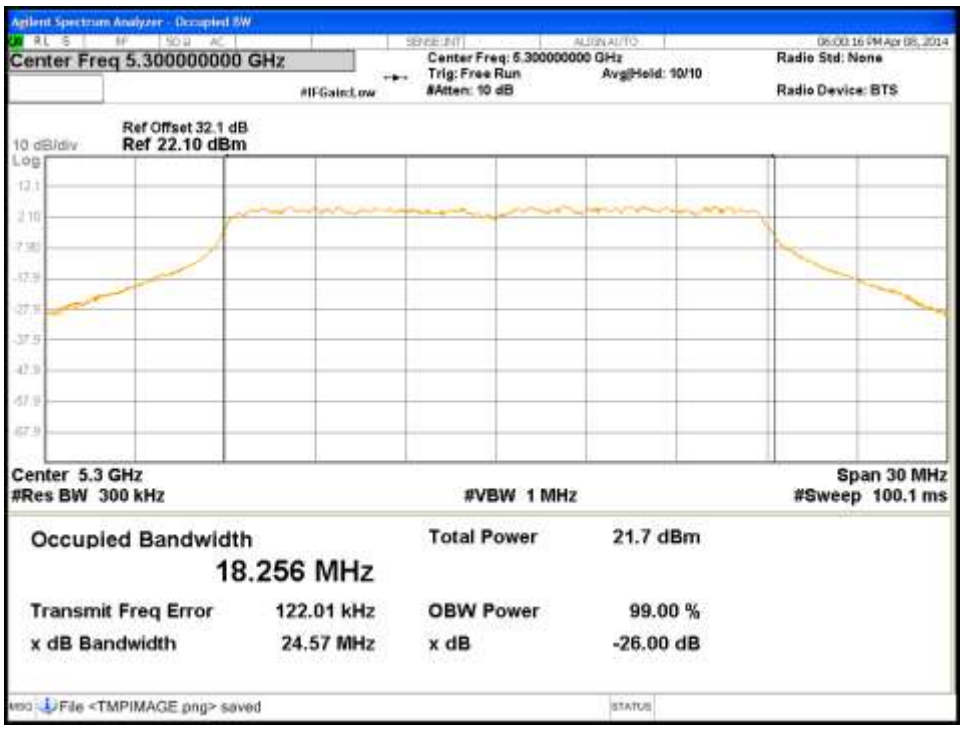


Figure 74: Occupied Bandwidth-5300MHz-HT20-MCS0-Ch1

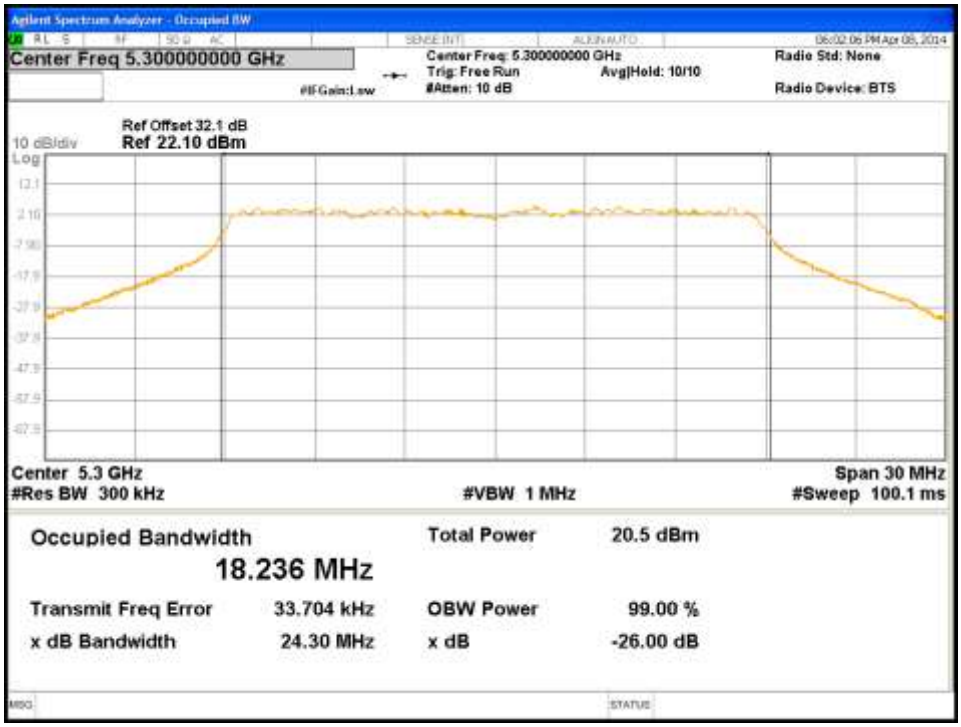


Figure 75: Occupied Bandwidth-5300MHz-HT20-MCS0-Ch2

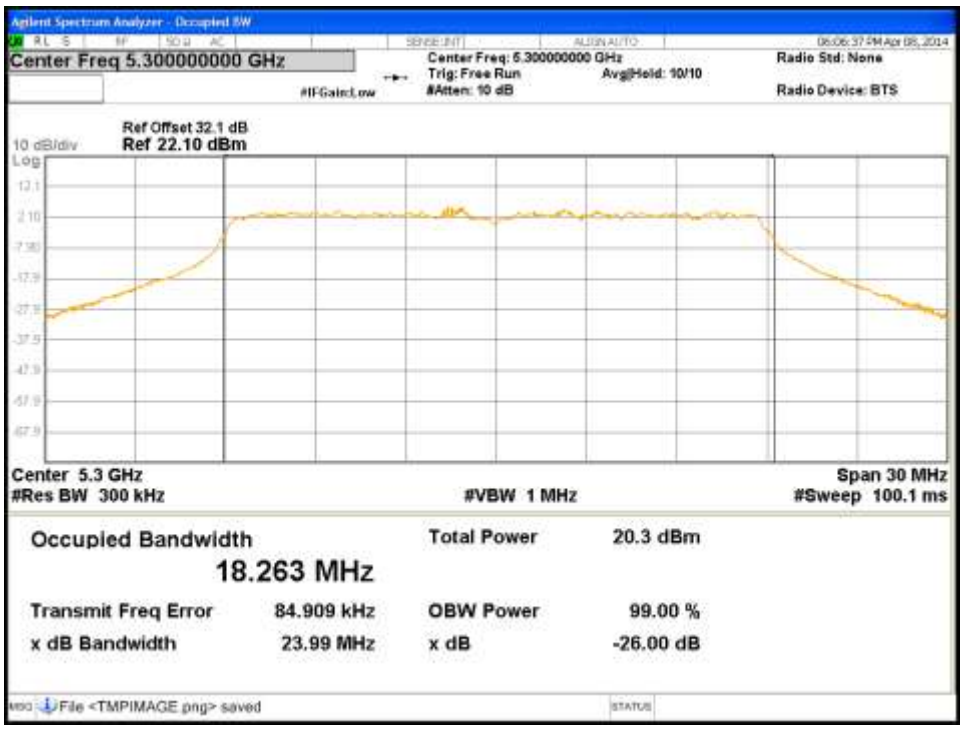


Figure 76: Occupied Bandwidth-5300MHz-HT20-MCS0-Ch3

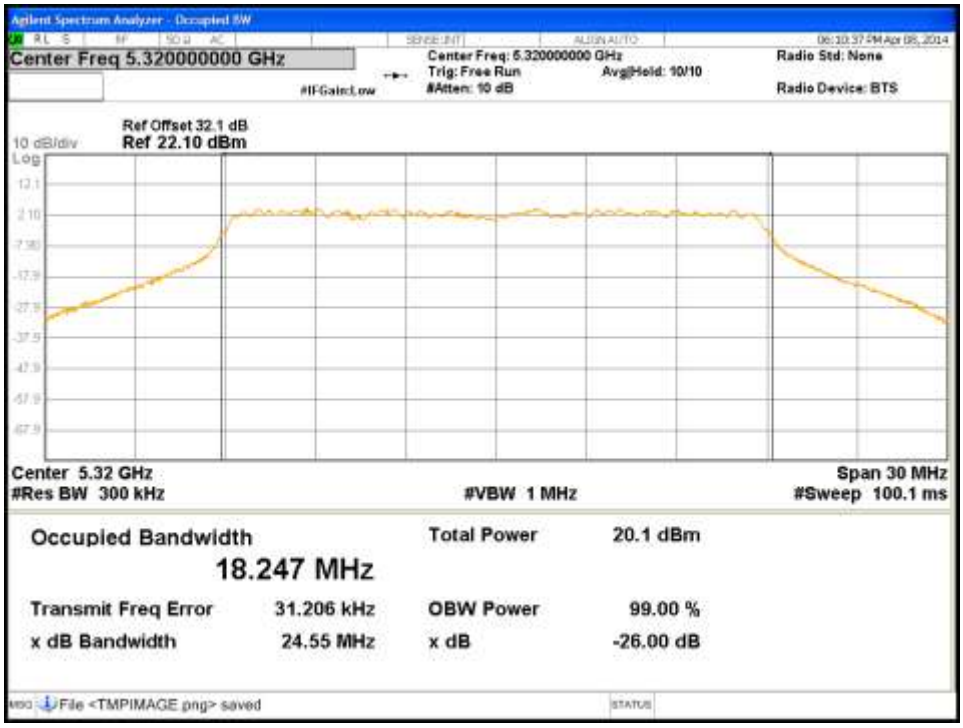


Figure 77: Occupied Bandwidth-5320MHz-HT20-MCS0-Ch0

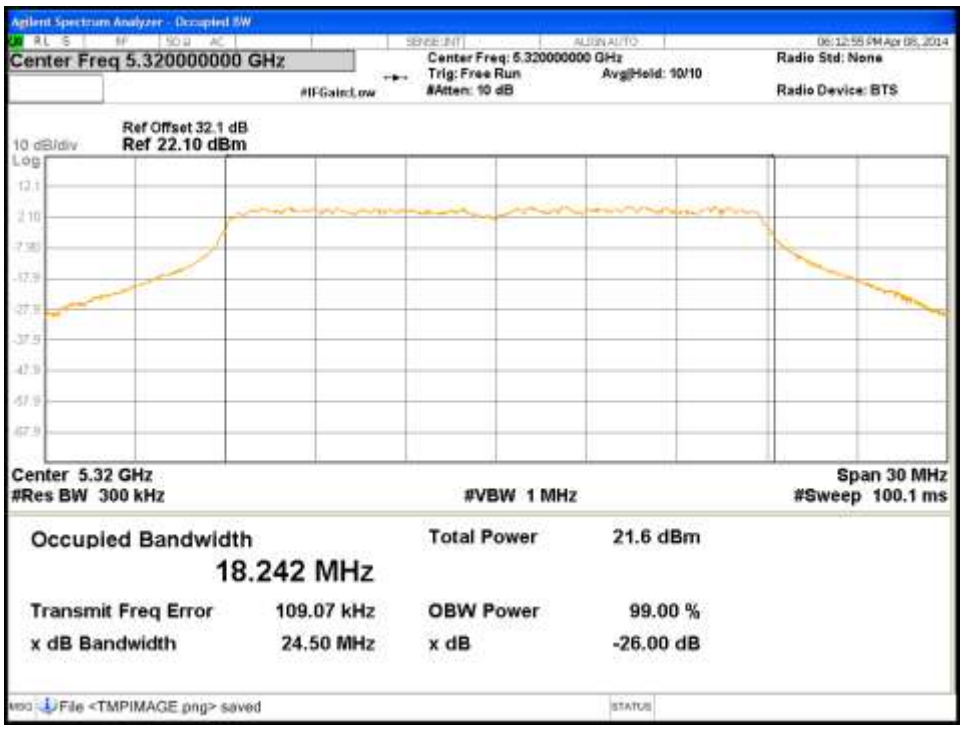


Figure 78: Occupied Bandwidth-5320MHz-HT20-MCS0-Ch1

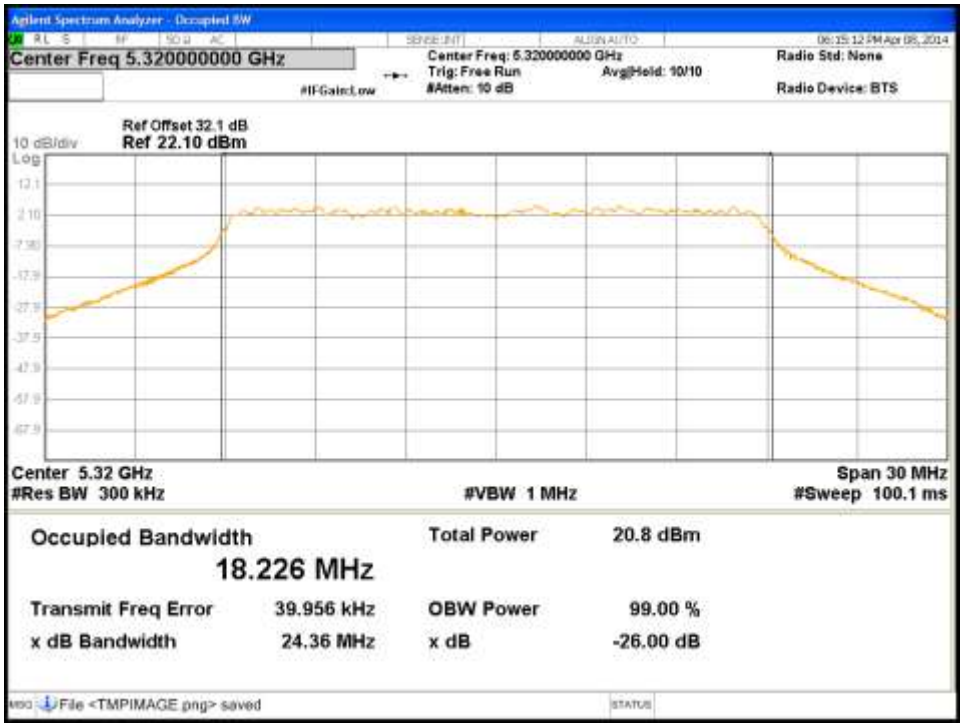


Figure 79: Occupied Bandwidth-5320MHz-HT20-MCS0-Ch2

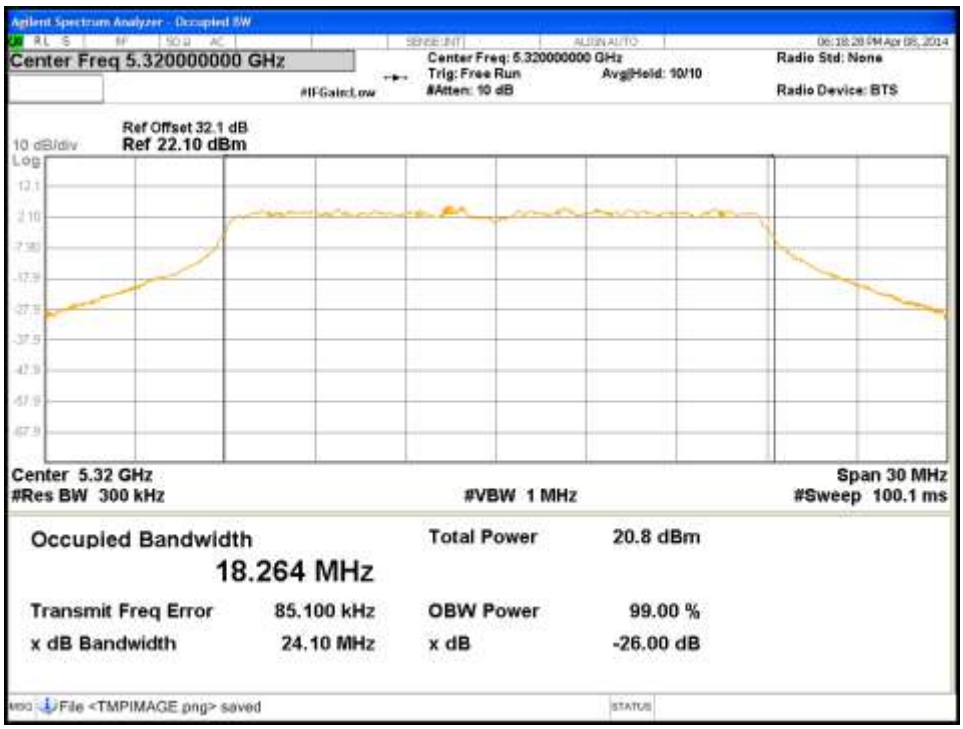


Figure 80: Occupied Bandwidth-5320MHz-HT20-MCS0-Ch3

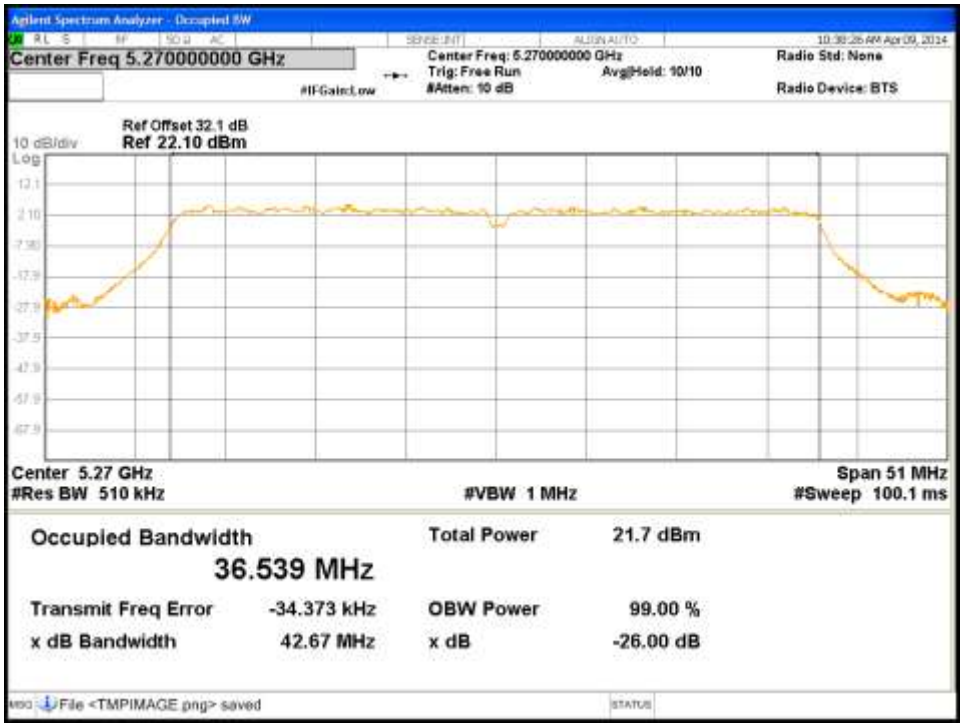


Figure 81: Occupied Bandwidth-5270MHz-HT40-MCS0-Ch0

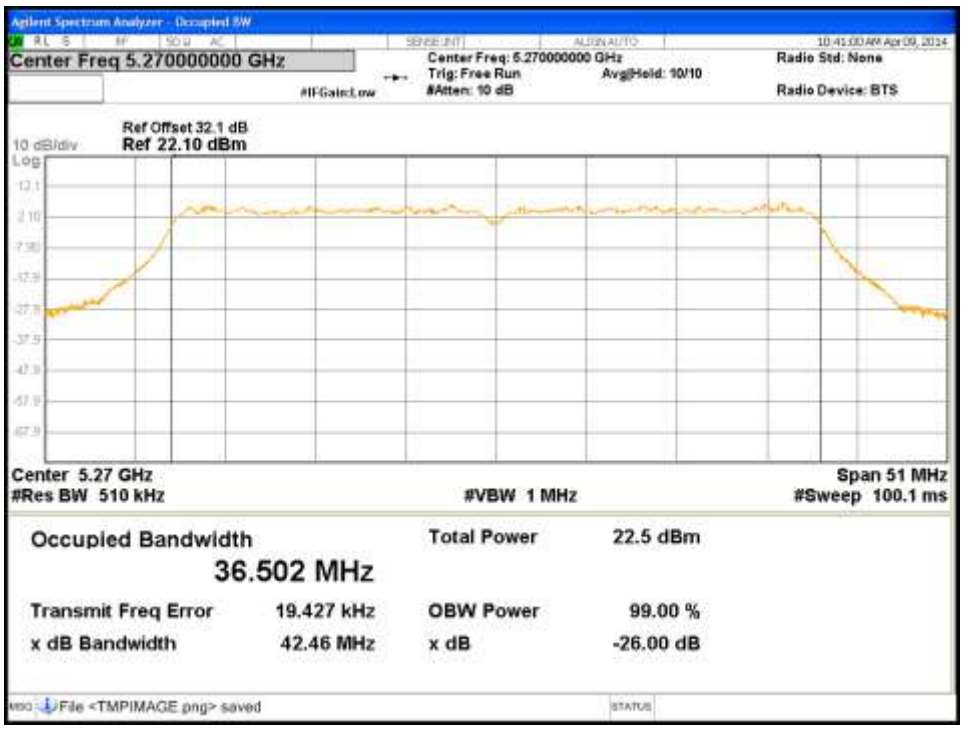


Figure 82: Occupied Bandwidth-5270MHz-HT40-MCS0-Ch1

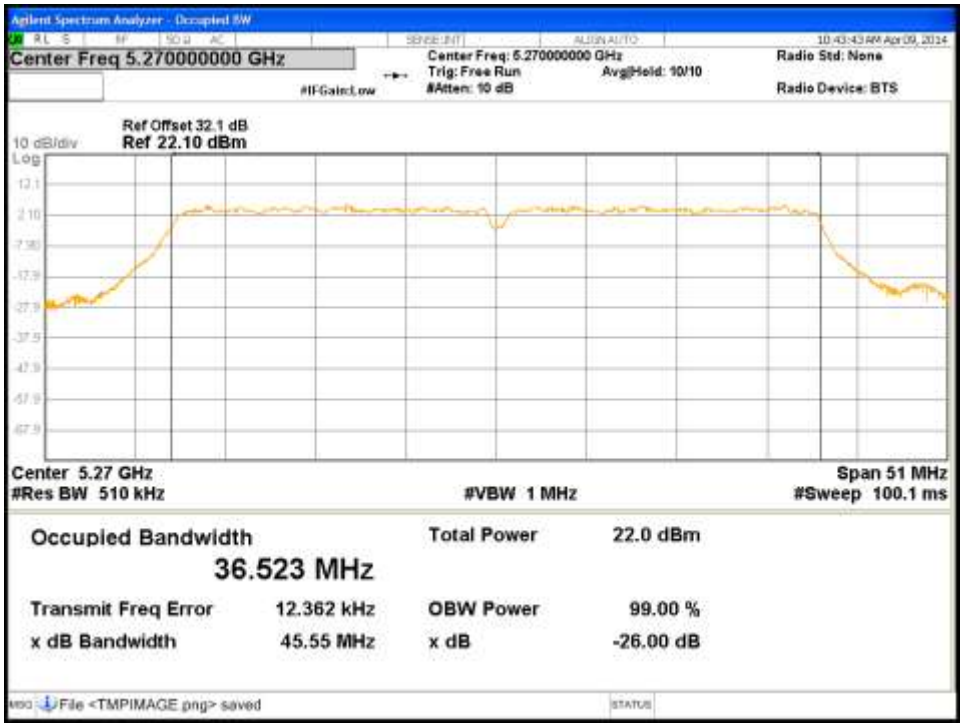


Figure 83: Occupied Bandwidth-5270MHz-HT40-MCS0-Ch2

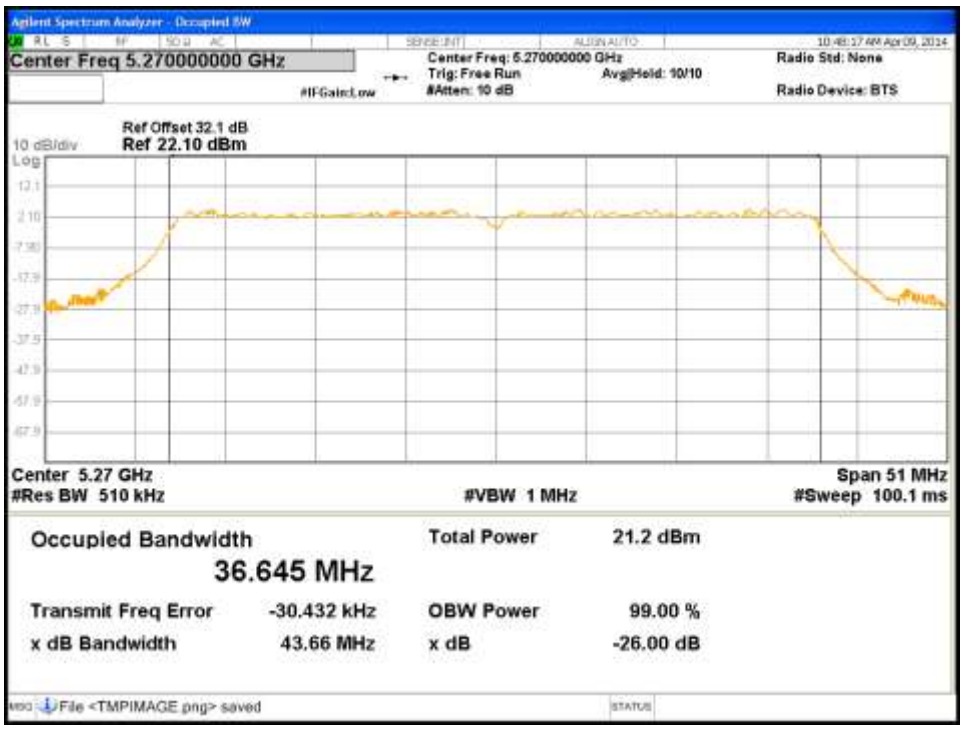


Figure 84: Occupied Bandwidth-5270MHz-HT40-MCS0-Ch3

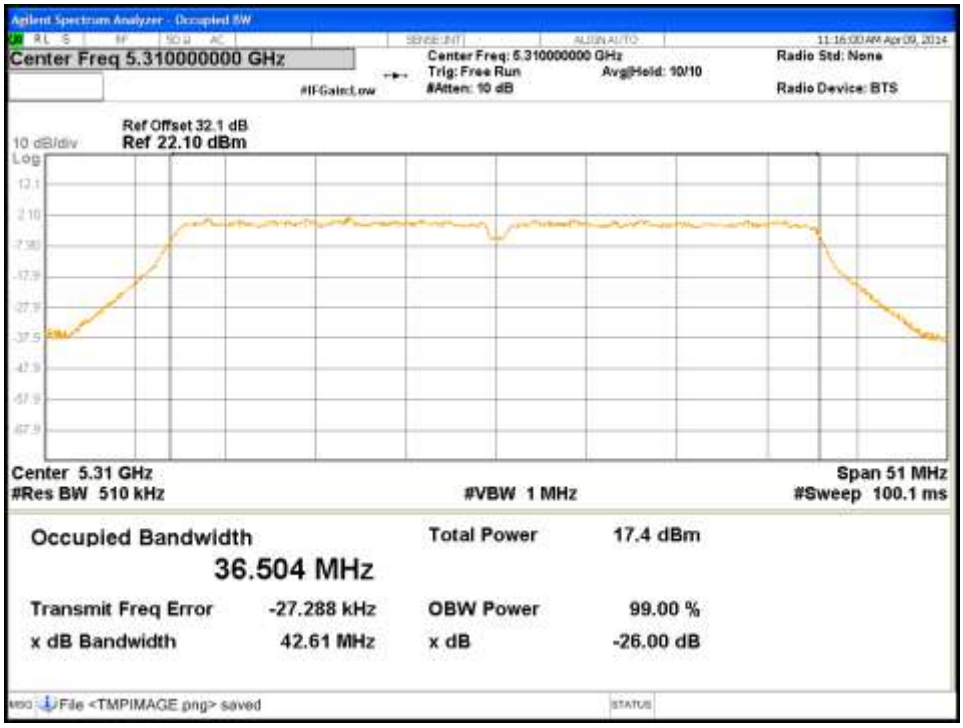


Figure 85: Occupied Bandwidth-5310MHz-HT40-MCS0-Ch0

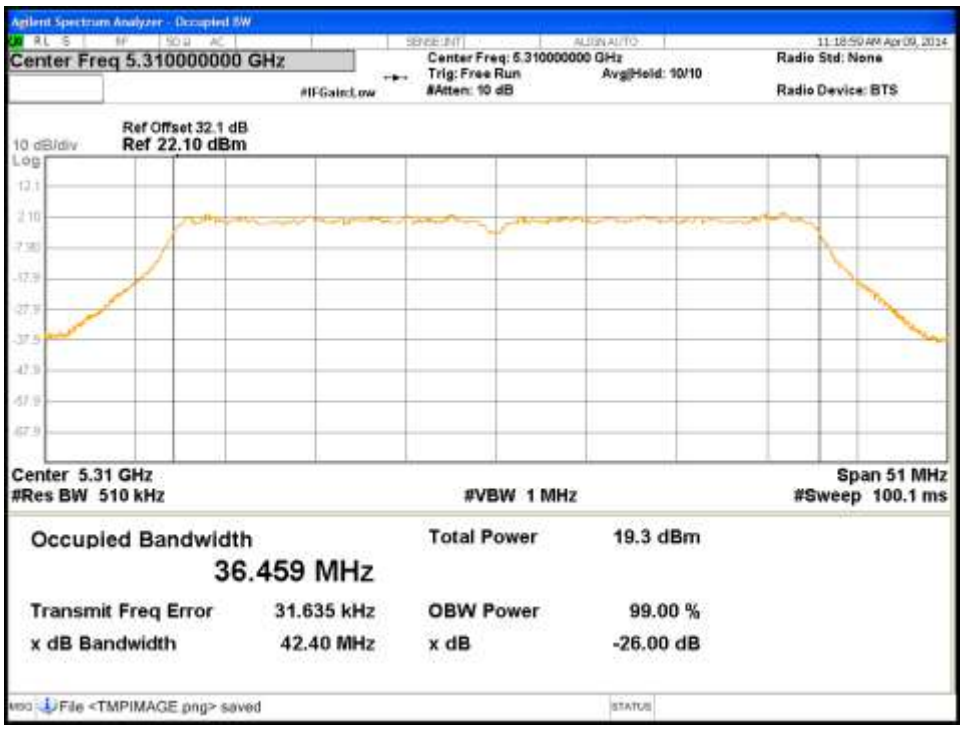


Figure 86: Occupied Bandwidth-5310MHz-HT40-MCS0-Ch1

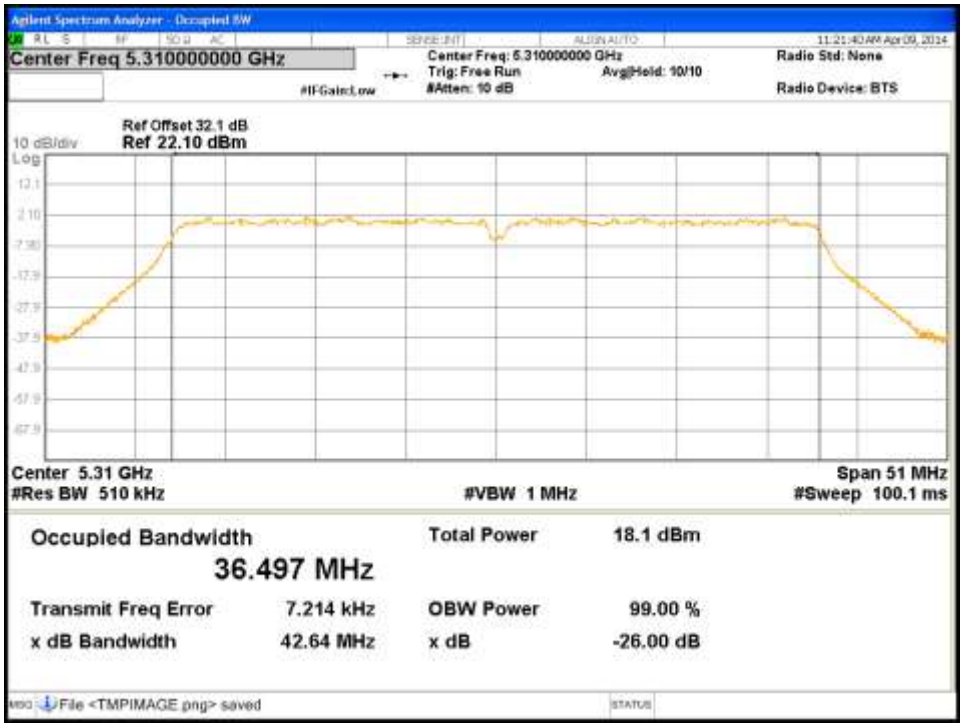


Figure 87: Occupied Bandwidth-5310MHz-HT40-MCS0-Ch2

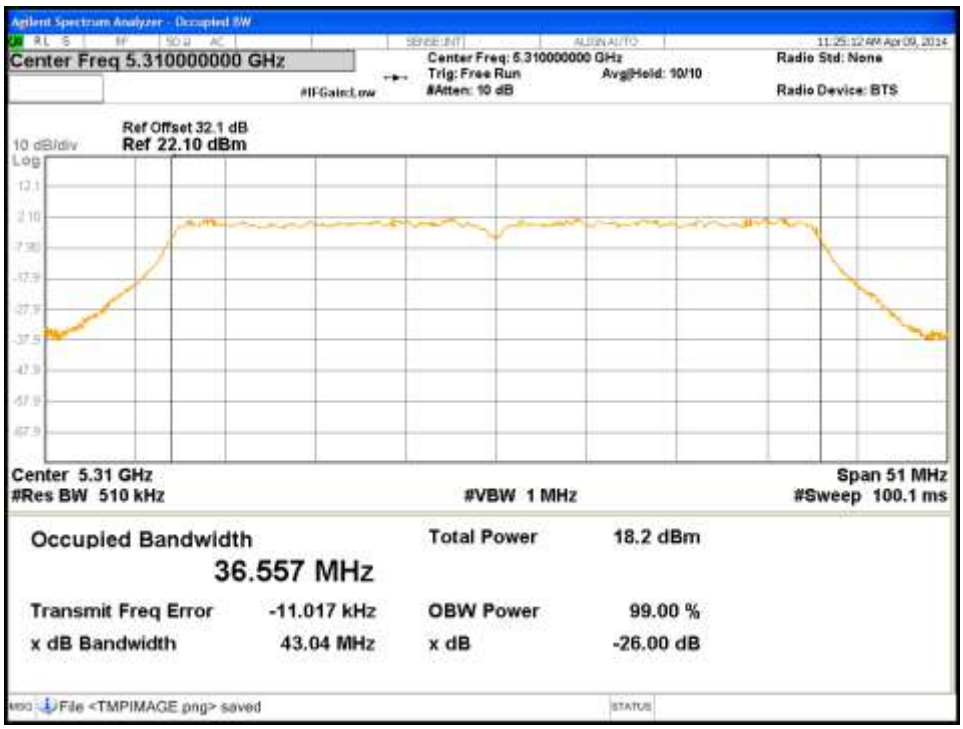


Figure 88: Occupied Bandwidth-5310MHz-HT40-MCS0-Ch3

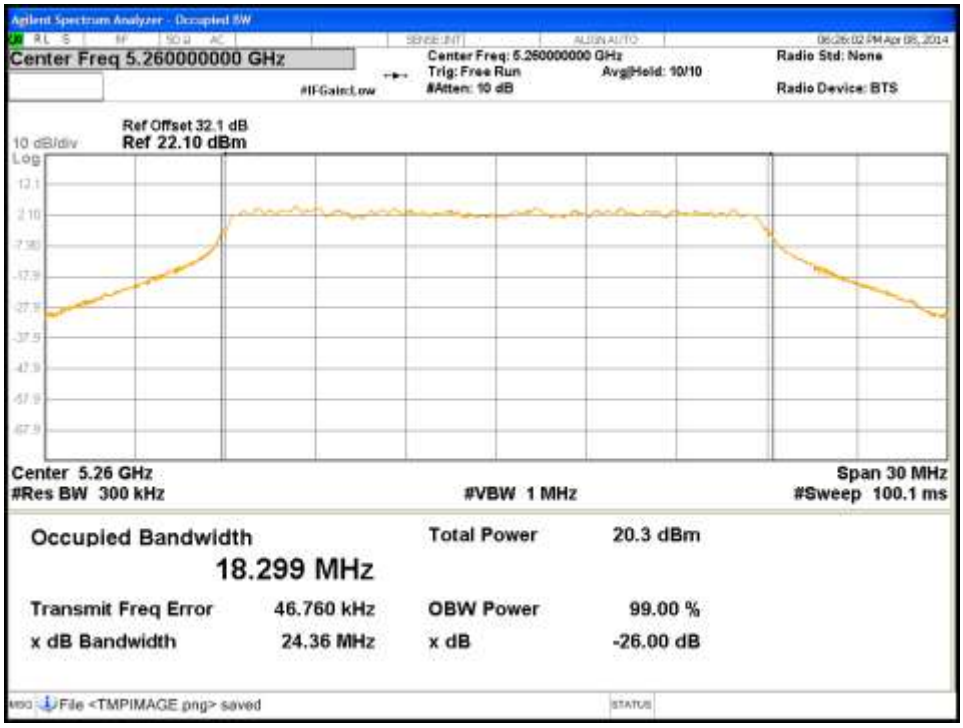


Figure 89: Occupied Bandwidth-5260MHz-VHT20-MCS0-Ch0

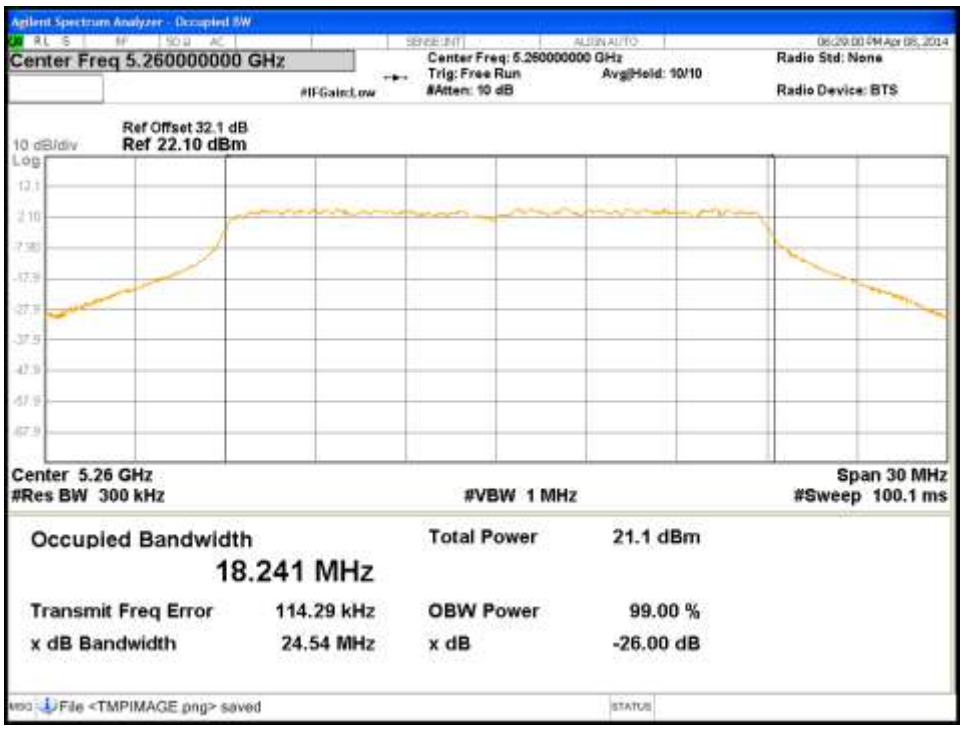


Figure 90: Occupied Bandwidth-5260MHz-VHT20-MCS0-Ch1

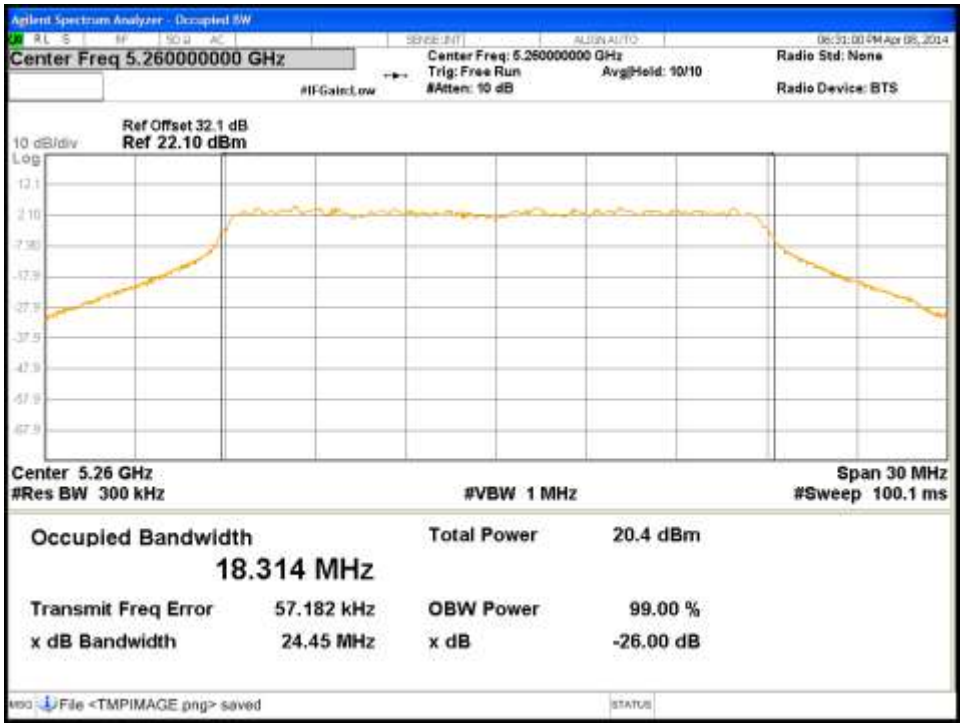


Figure 91: Occupied Bandwidth-5260MHz-VHT20-MCS0-Ch2

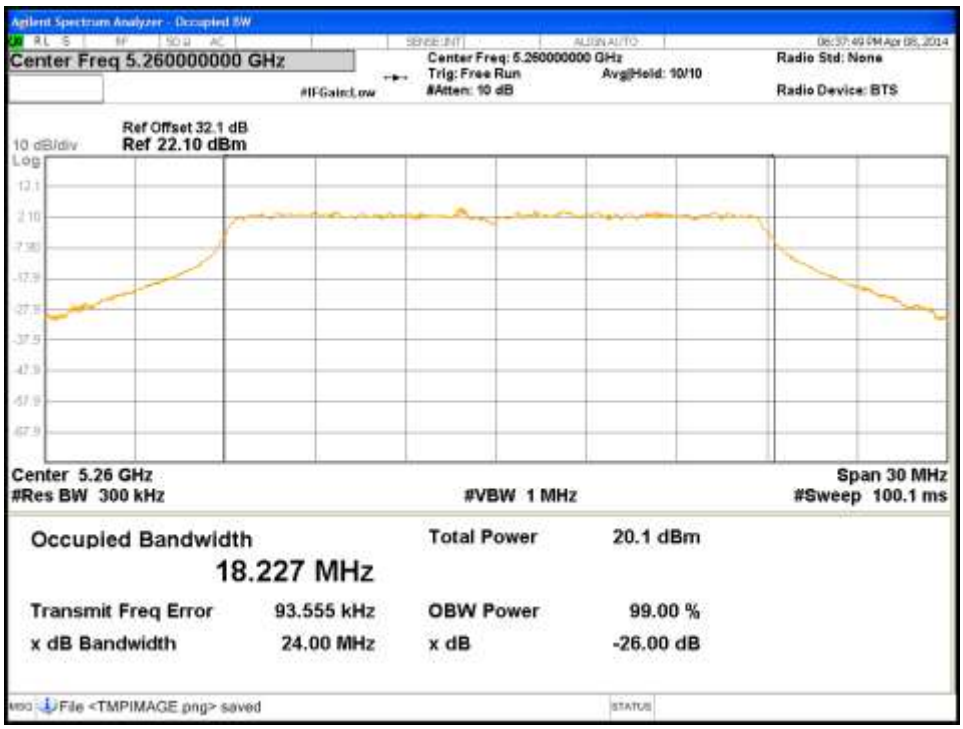


Figure 92: Occupied Bandwidth-5260MHz-VHT20-MCS0-Ch3

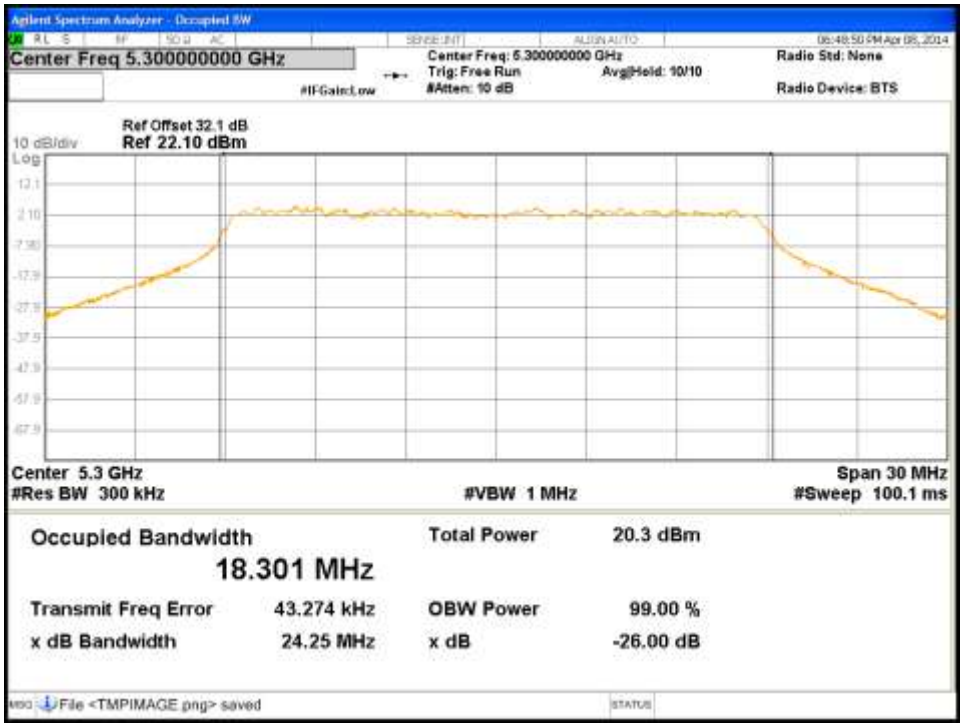


Figure 93: Occupied Bandwidth-5300MHz-VHT20-MCS0-Ch0

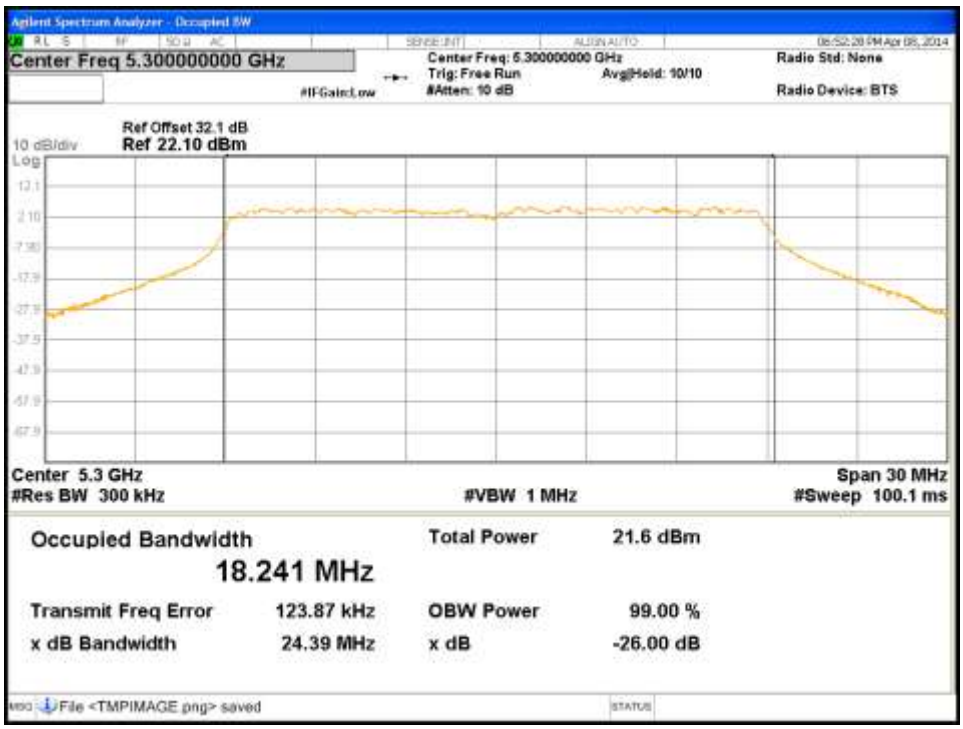


Figure 94: Occupied Bandwidth-5300MHz-VHT20-MCS0-Ch1

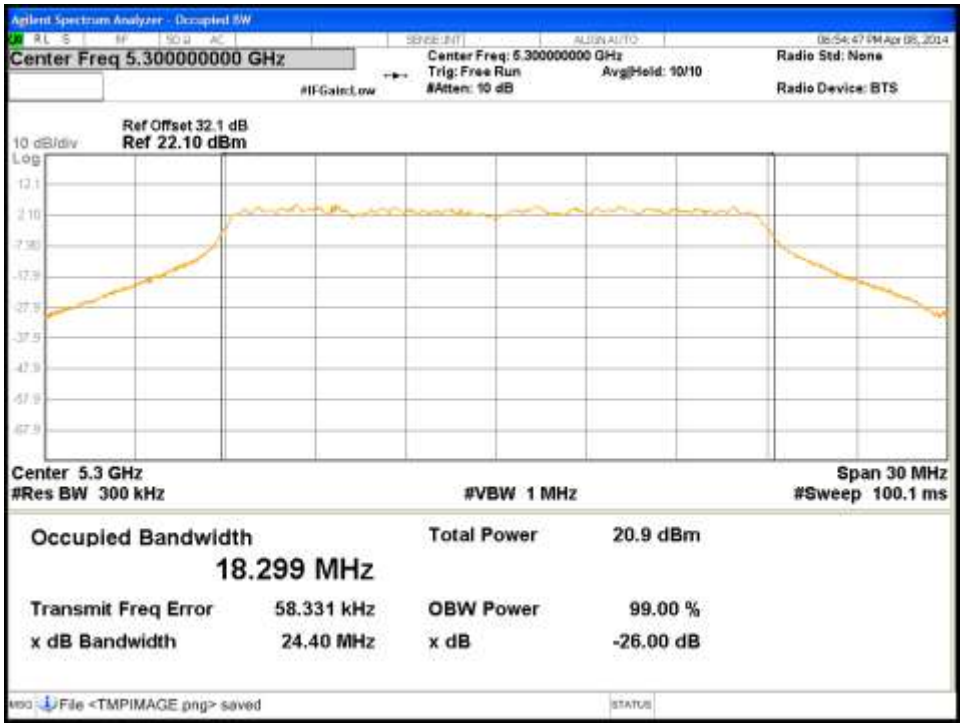


Figure 95: Occupied Bandwidth-5300MHz-VHT20-MCS0-Ch2

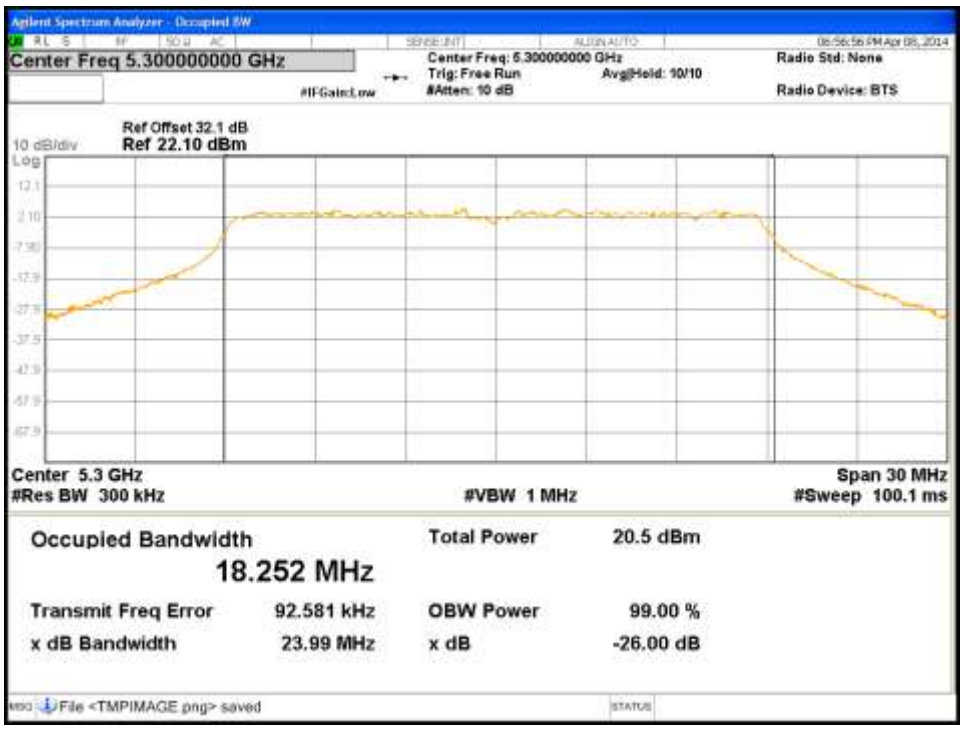


Figure 96: Occupied Bandwidth-5300MHz-VHT20-MCS0-Ch3

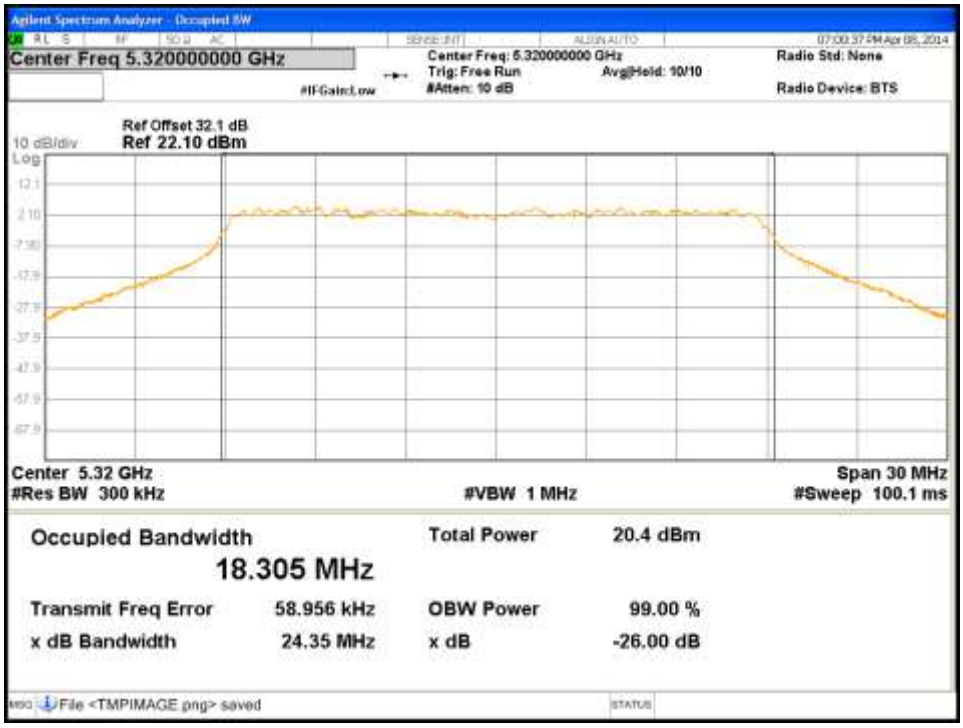


Figure 97: Occupied Bandwidth-5320MHz-VHT20-MCS0-Ch0

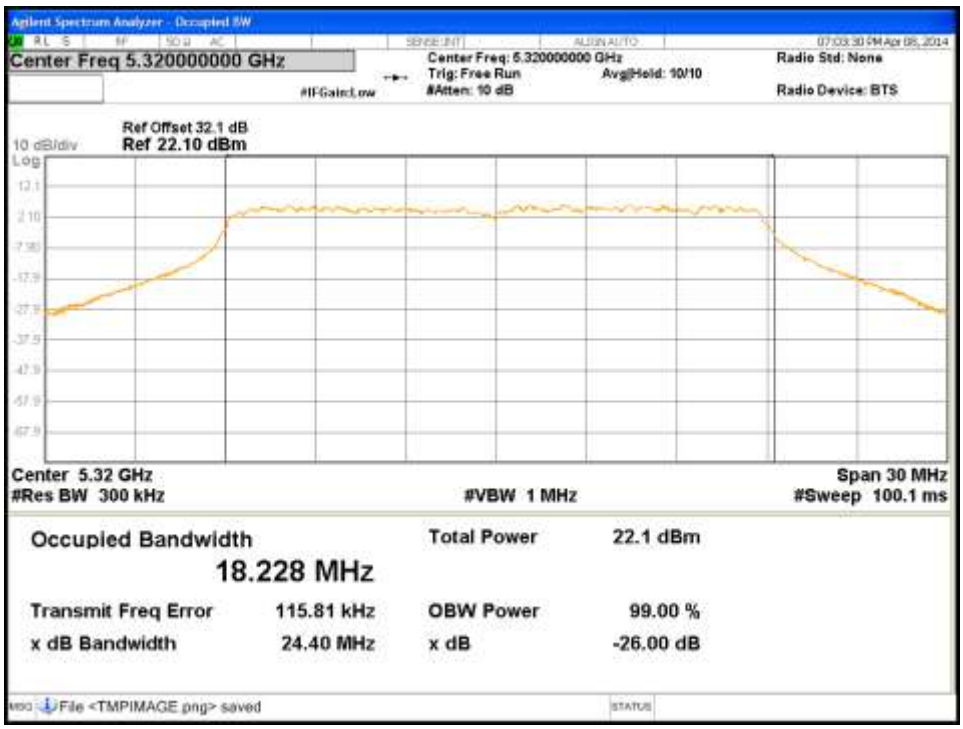


Figure 98: Occupied Bandwidth-5320MHz-VHT20-MCS0-Ch1

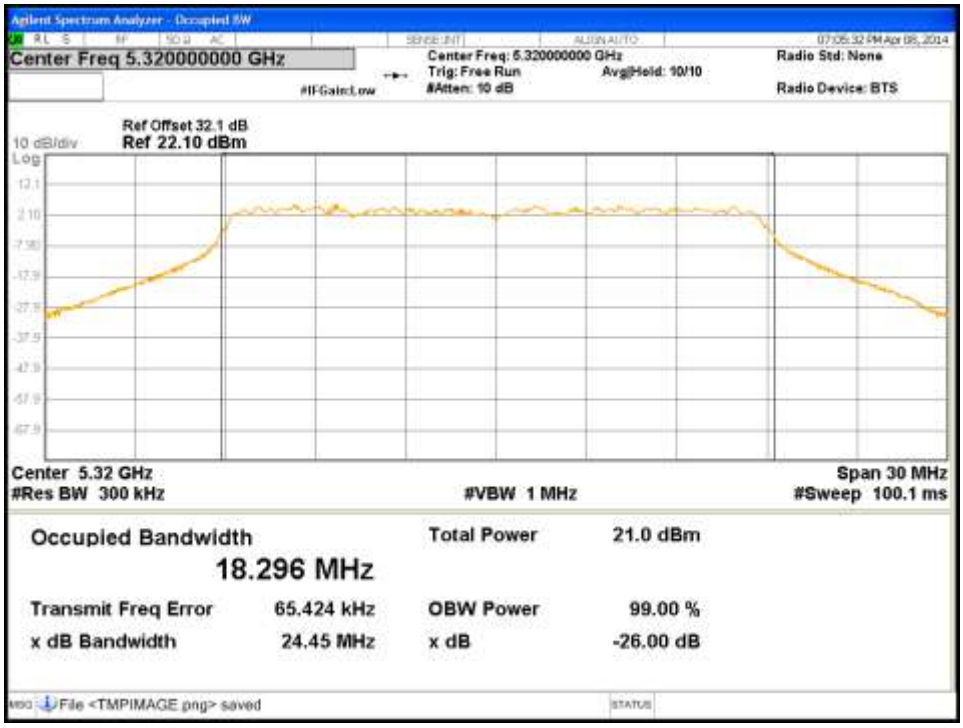


Figure 99: Occupied Bandwidth-5320MHz-VHT20-MCS0-Ch2

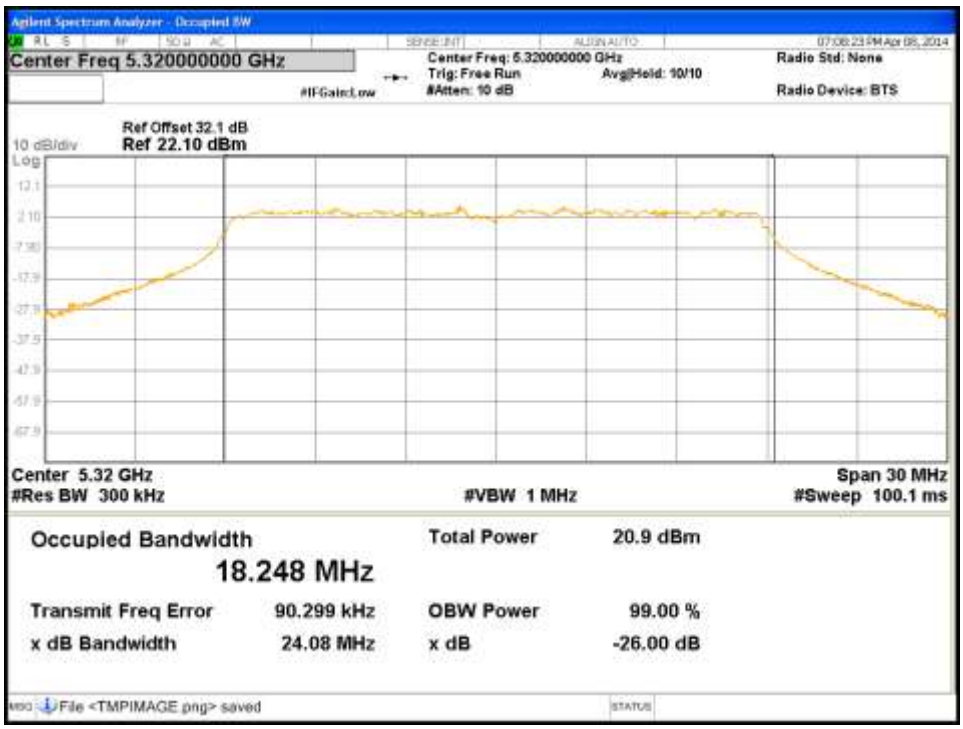


Figure 100: Occupied Bandwidth-5320MHz-VHT20-MCS0-Ch3

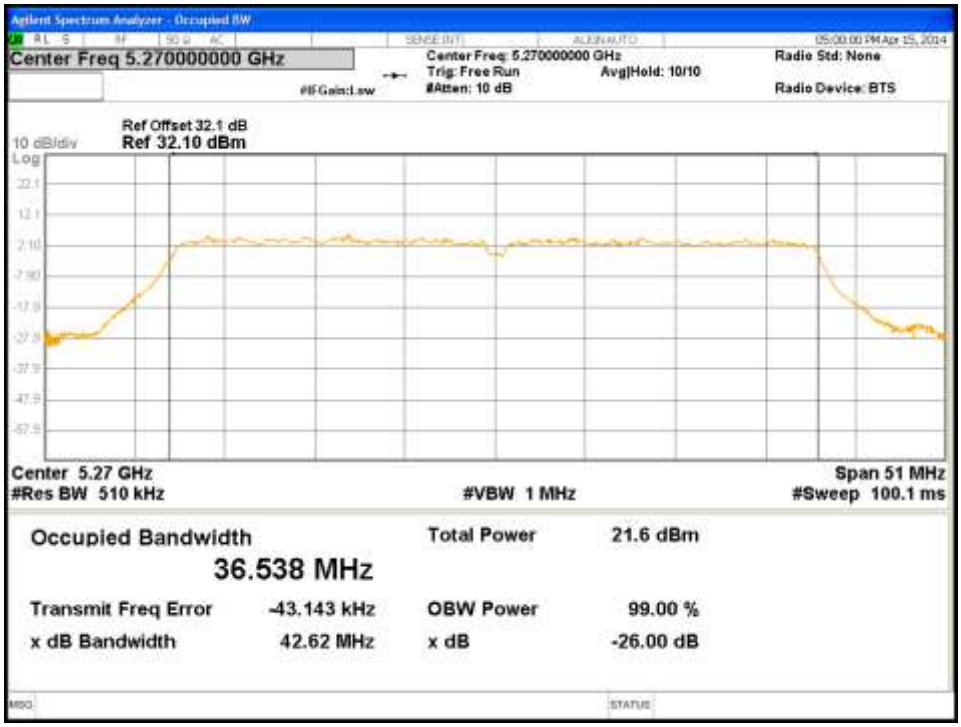


Figure 101: Occupied Bandwidth-5270MHz-VHT40-MCS0-Ch0

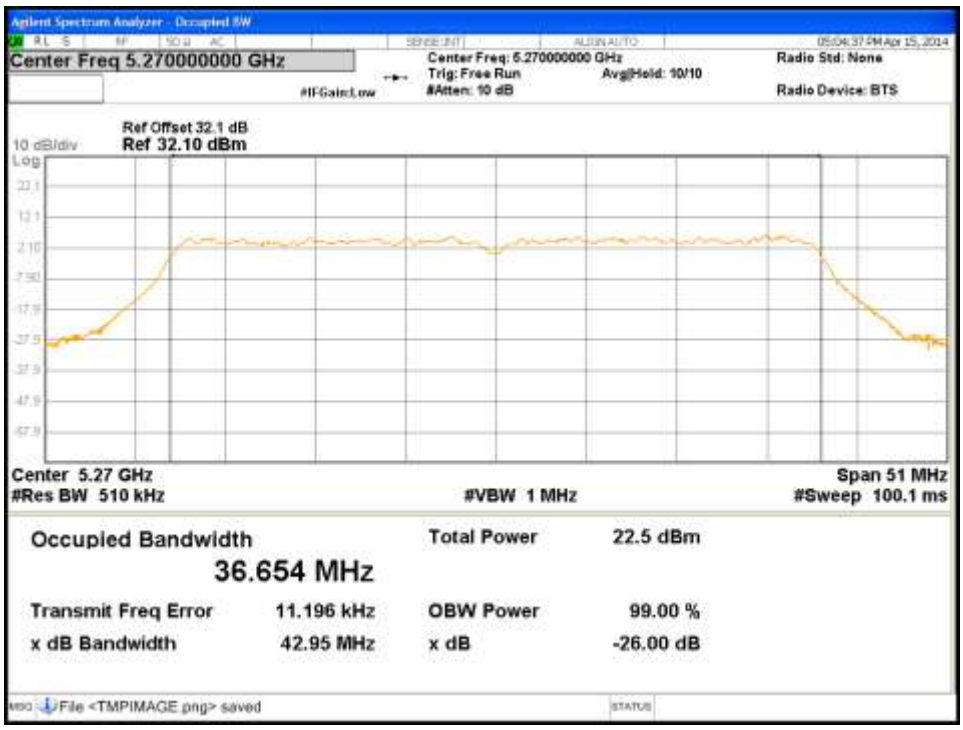


Figure 102: Occupied Bandwidth-5270MHz-VHT40-MCS0-Ch1

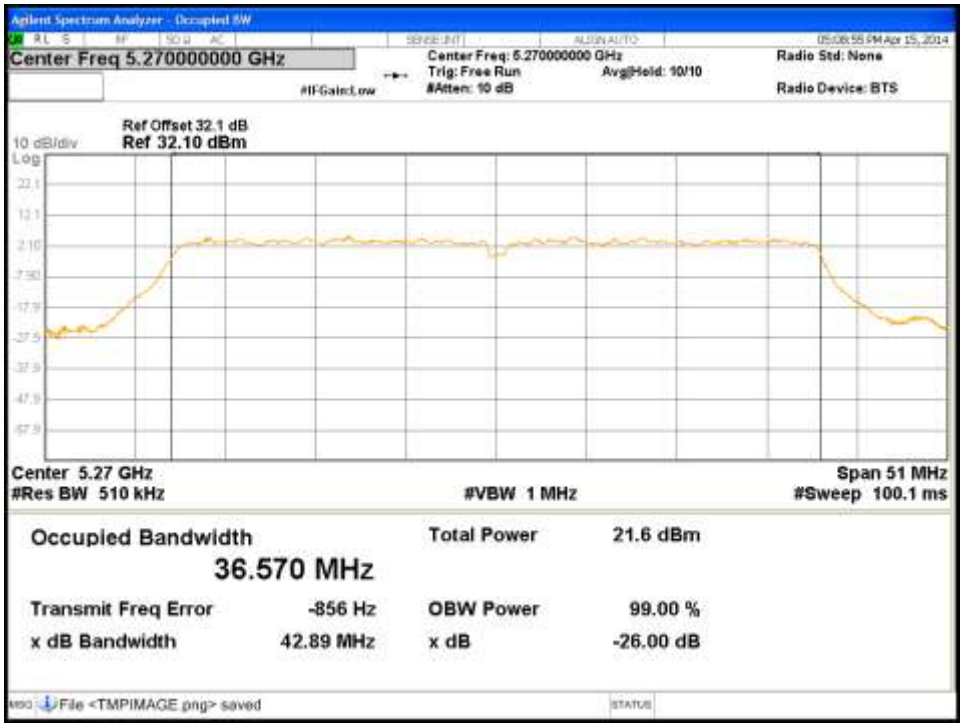


Figure 103: Occupied Bandwidth-5270MHz-VHT40-MCS0-Ch2

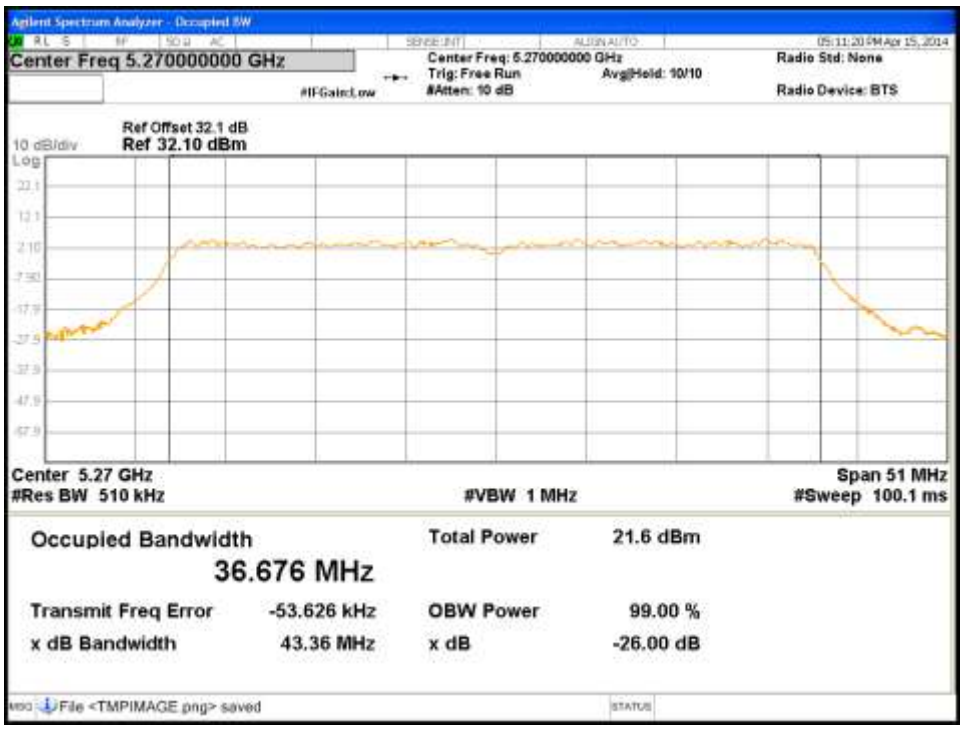


Figure 104: Occupied Bandwidth-5270MHz-VHT40-MCS0-Ch3

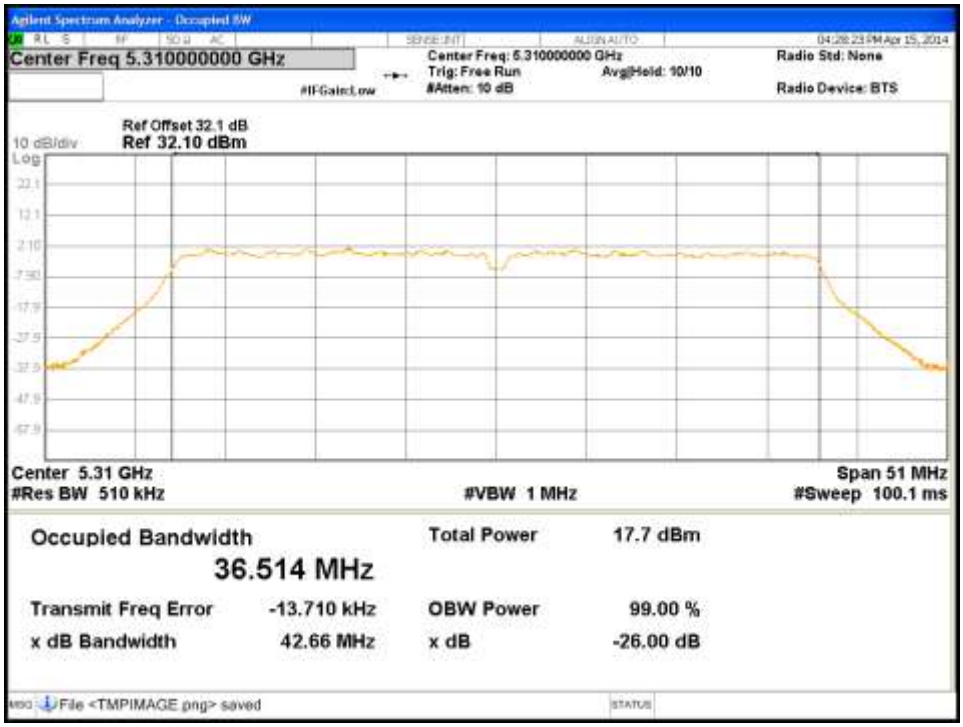


Figure 105: Occupied Bandwidth-5310MHz-VHT40-MCS0-Ch0

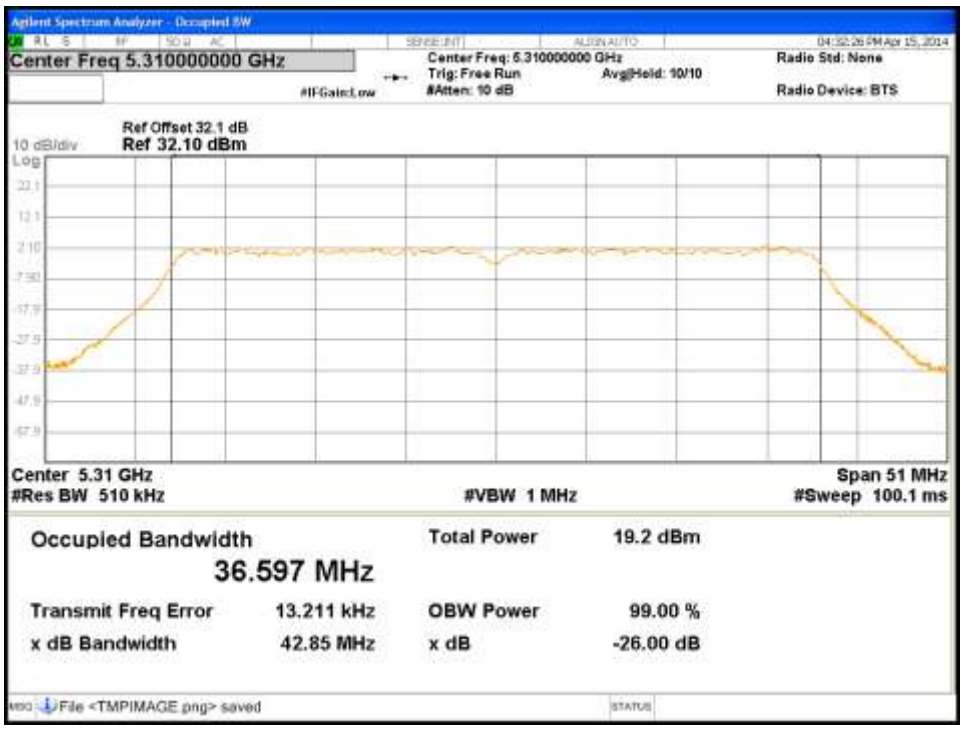


Figure 106: Occupied Bandwidth-5310MHz-VHT40-MCS0-Ch1

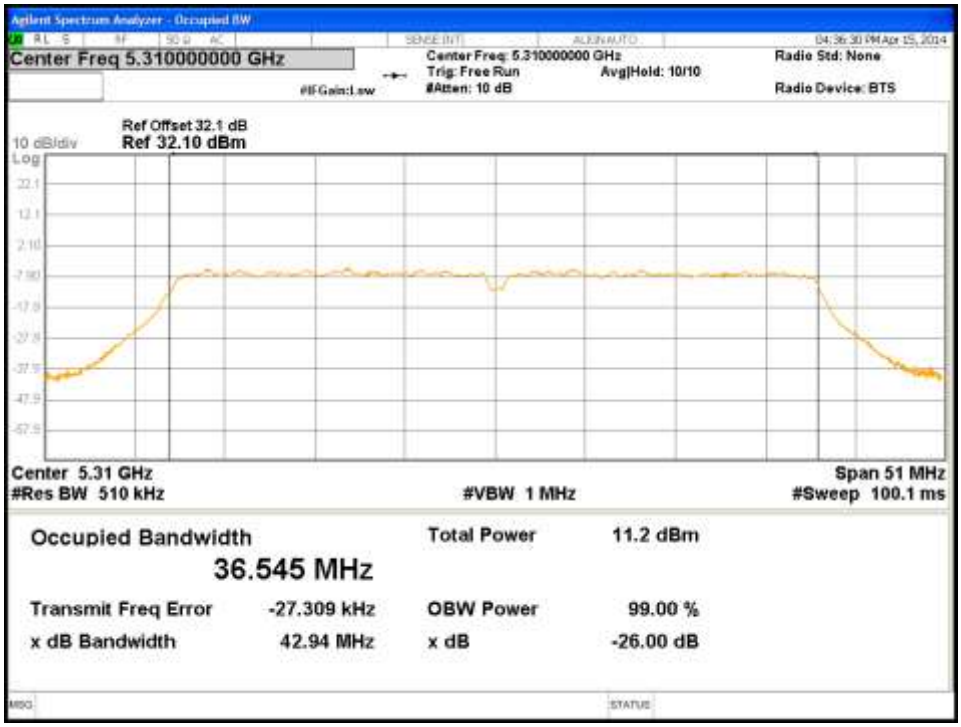


Figure 107: Occupied Bandwidth-5310MHz-VHT40-MCS0-Ch2

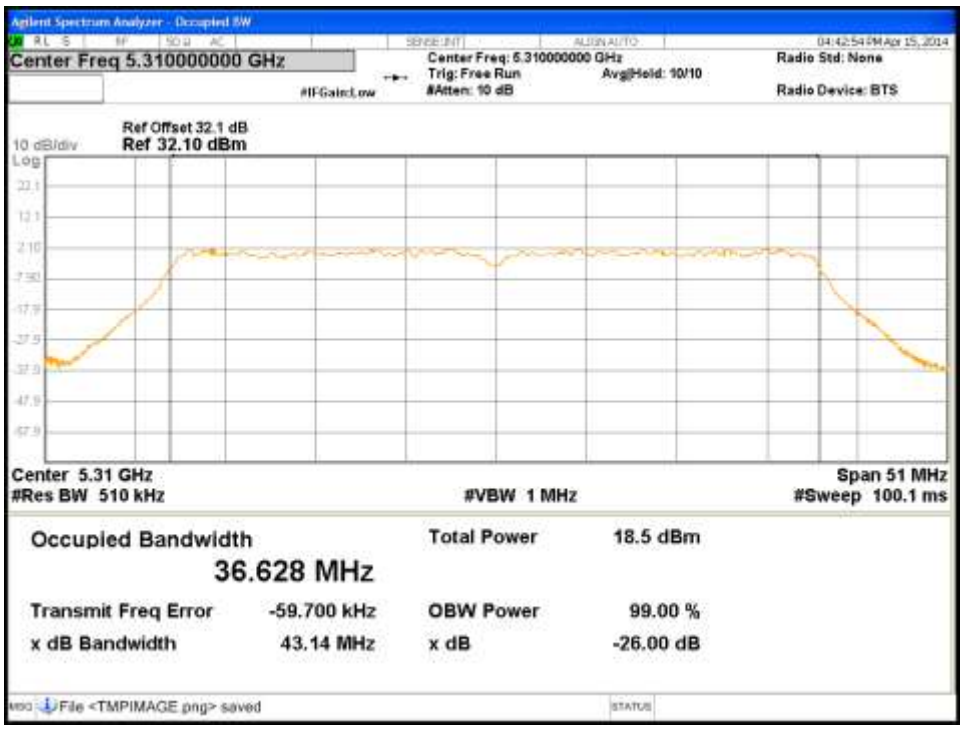


Figure 108: Occupied Bandwidth-5310MHz-VHT40-MCS0-Ch3

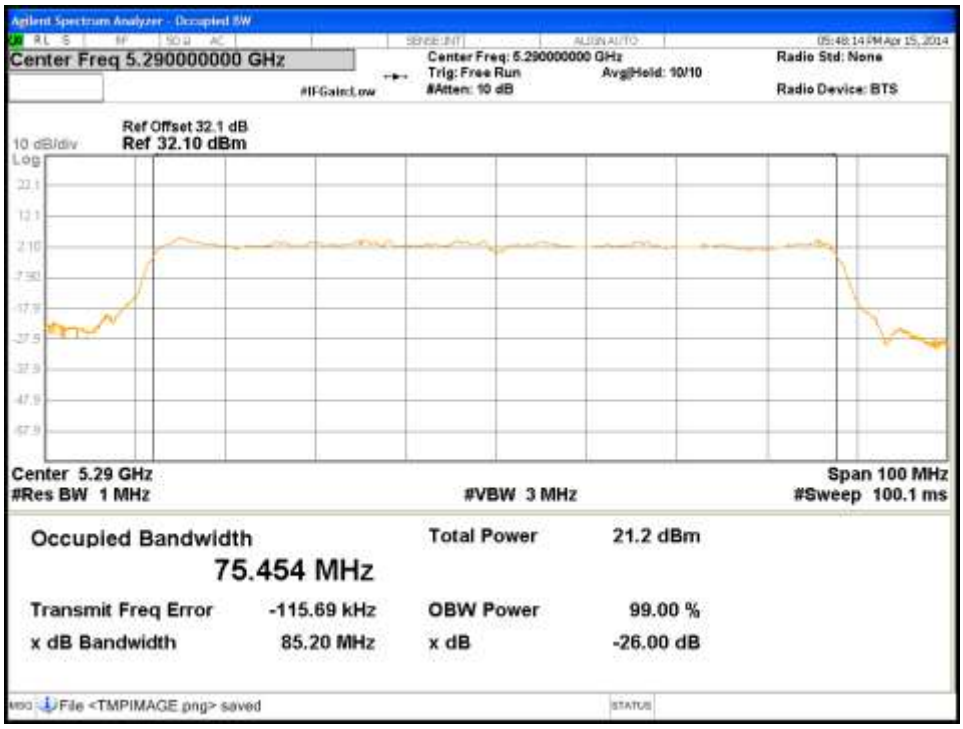


Figure 109: Occupied Bandwidth-5290MHz-VHT80-MCS0-Ch0

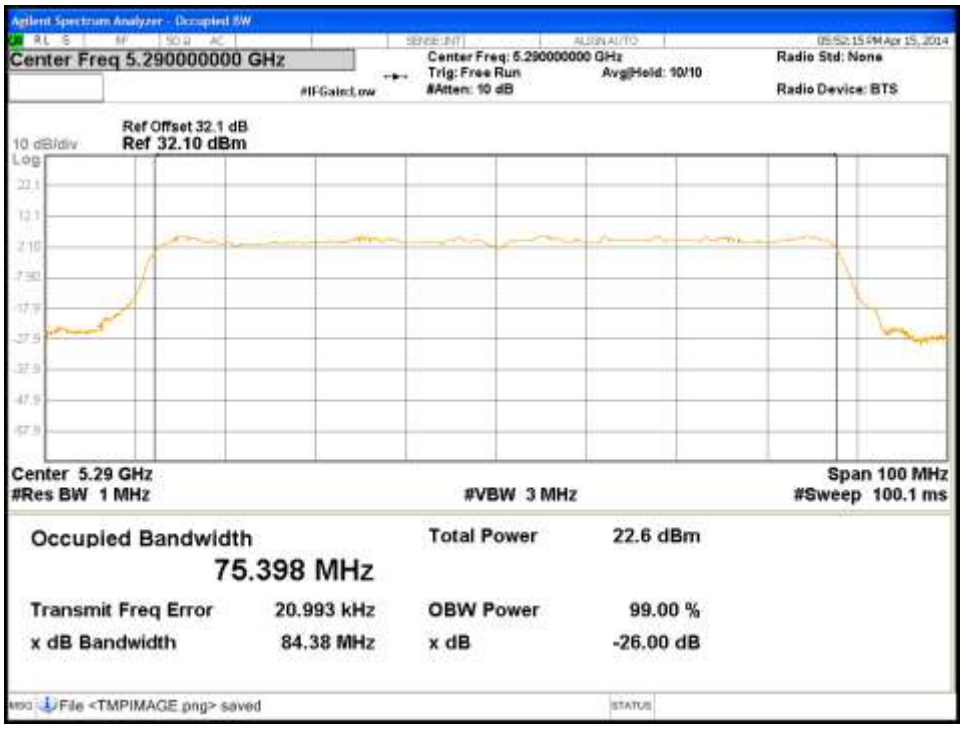


Figure 110: Occupied Bandwidth-5290MHz-VHT80-MCS0-Ch1

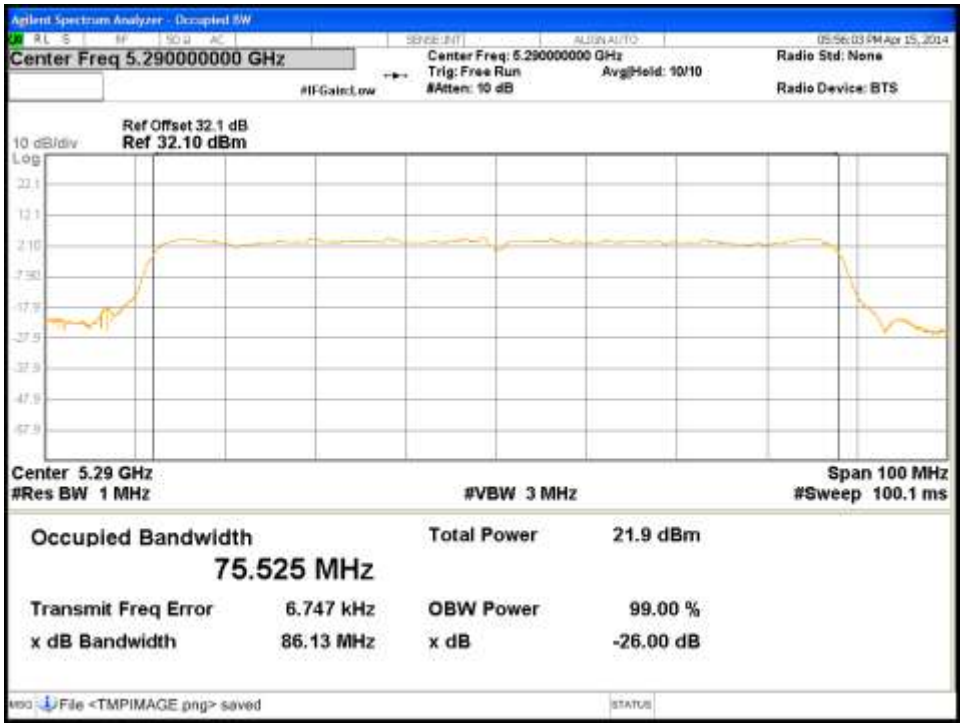


Figure 111: Occupied Bandwidth-5290MHz-VHT80-MCS0-Ch2

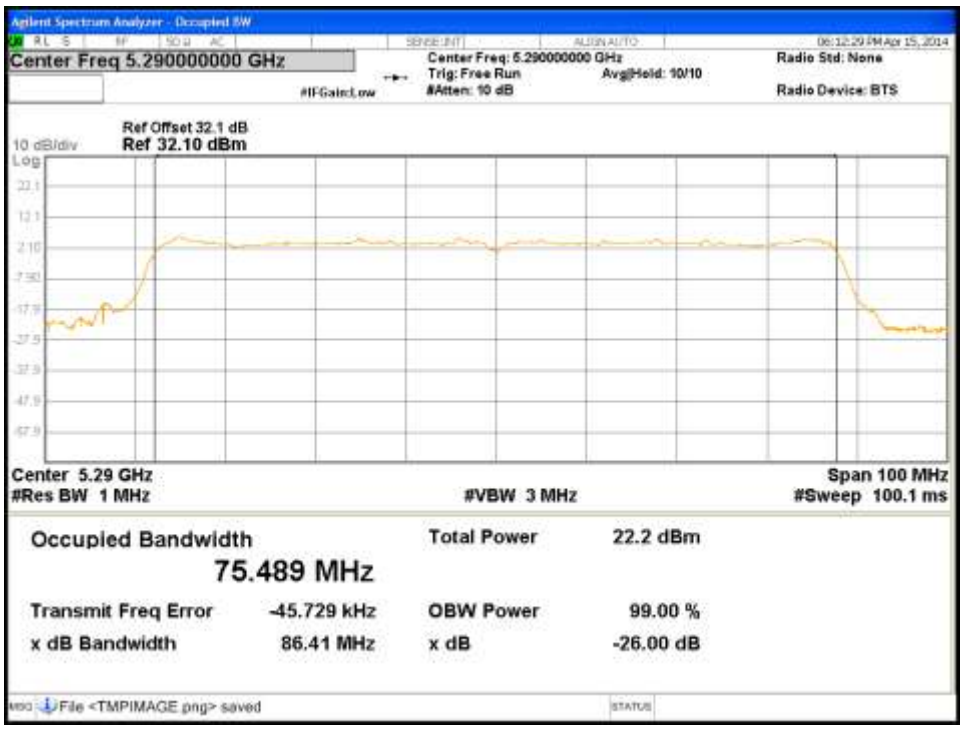


Figure 112: Occupied Bandwidth-5290MHz-VHT80-MCS0-Ch3

4.3 Peak Excursion

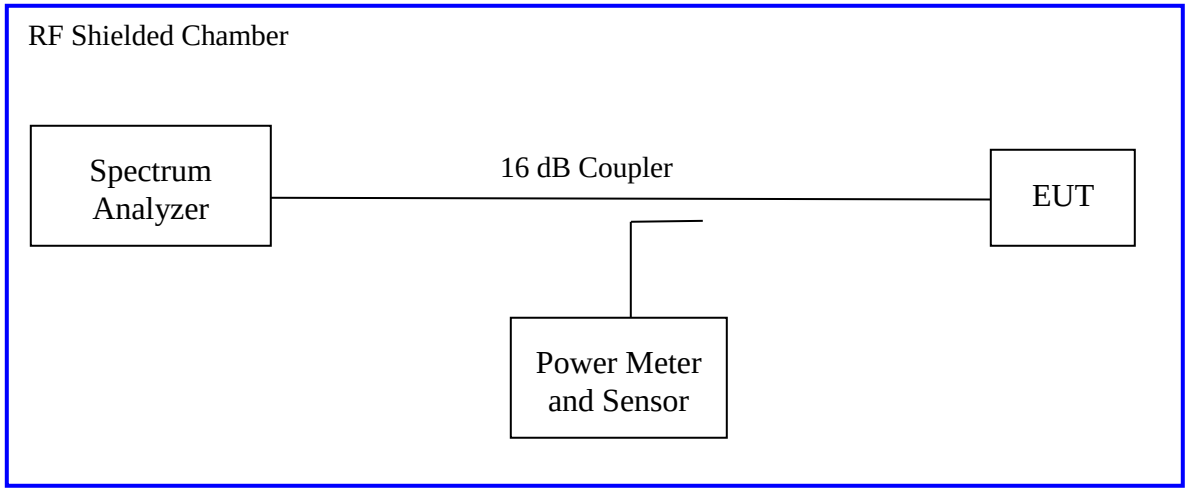
According to the CFR47 Part 15.407 (a)(6), the ratio of the peak excursion of the modulation envelope(measured suing a peak hold function) to the maximum conducted output power shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

4.3.1 **Test Method**

The ANSI C63.10-2009 Section 6.10.4 conducted method was used to measure the peak excursion.

The measurement was performed with modulation per CFR47 Part 15.407 (a) (6). This test was conducted on 3 channels in each operating mode in frequency range 5250 MHz to 5350 MHz with band crossing channel on the test sample, S/N 121404000111. The worst sample result indicated below.

Test Setup:



4.3.2 **Results**

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 5: Peak Excursion – Test Results

Test Conditions: Conducted Measurement				**Test Date:** April 8, 2014			
Antenna Type: Integrated				**Power Setting:** See test plan			
Directional Antenna Gain: + 8.08 dBi				**Signal State:** Modulated.			
Ambient Temp.: 23 °C				**Relative Humidity:**33%			
802.11a Mode							
Freq. [MHz]	**Limit [dB]**	**Peak Excursion [dB]**				**Max. Excursion [dB]**	**Margin [dB]**
		0	**1**	**2**	**3**		
5260	13.0	-6.76	-6.04	-7.57	-7.40	-7.57	-5.43
5300	13.0	-6.32	-6.71	-7.53	-6.70	-7.53	-5.47
5320	13.0	-6.07	-6.52	-7.48	-7.36	-7.48	-5.52
Note: The peak excursion was observed at 802.11a 6 Mbps per Data Stream.							
802.11n (HT20) Mode							
Freq. [MHz]	**Limit [dB]**	**Peak Excursion [dB]**				**Max. Excursion [dB]**	**Margin [dB]**
		0	**1**	**2**	**3**		
5260	13.0	-7.31	-7.59	-6.85	-7.02	-7.59	-5.41
5300	13.0	-7.09	-7.80	-7.35	-7.68	-7.80	-5.21
5320	13.0	-7.00	-7.78	-6.87	-7.62	-7.78	-5.22
Note: The peak excursion was observed at 802.11n HT20 MCS0.							
802.11n (HT40) Mode							
Freq. [MHz]	**Limit [dB]**	**Peak Excursion [dB]**				**Max. Excursion [dB]**	**Margin [dB]**
		0	**1**	**2**	**3**		
5270	-13.00	-7.39	-7.61	-7.63	-7.65	-7.65	-5.35
5310	-13.00	-8.19	-8.61	-8.08	-7.94	-8.61	-4.39
Note: The peak excursion was observed at 802.11n HT40 MCS0.							

802.11ac (VHT20) Mode							
Freq. [MHz]	Limit [dB]	Peak Excursion [dB]				Max. Excursion [dB]	Margin [dB]
		0	1	2	3		
5260	-13.00	-7.72	-7.50	-7.36	-6.90	-7.72	-5.29
5300	-13.00	-7.07	-7.40	-7.30	-8.03	-8.03	-4.97
5320	-13.00	-7.01	-7.73	-7.51	-7.21	-7.73	-5.27
Note: The peak excursion was observed at 802.11ac VHT20 MCS0.							
802.11ac (VHT40) Mode							
Freq. [MHz]	Limit [dB]	Peak Excursion [dB]				Max. Excursion [dB]	Margin [dB]
		0	1	2	3		
5270	-13.00	-7.66	-7.78	-8.15	-7.66	-8.15	-4.85
5310	-13.00	-8.08	-8.09	-7.71	-7.82	-8.09	-4.91
Note: The peak excursion was observed at 802.11ac VHT40 MCS0.							
802.11ac (VHT80) Mode							
Freq. [MHz]	Limit [dB]	Peak Excursion [dB]				Max. Excursion [dB]	Margin [dB]
		0	1	2	3		
5290	-13.00	-7.64	-7.52	-7.43	-8.31	-8.31	-4.69
Note: The peak excursion was observed at 802.11ac VHT80 MCS0.							

Figure 113: Peak Excursion-5260MHz-11a-6Mbps-Ch0

Figure 114: Peak Excursion-5260MHz-11a-6Mbps-Ch1

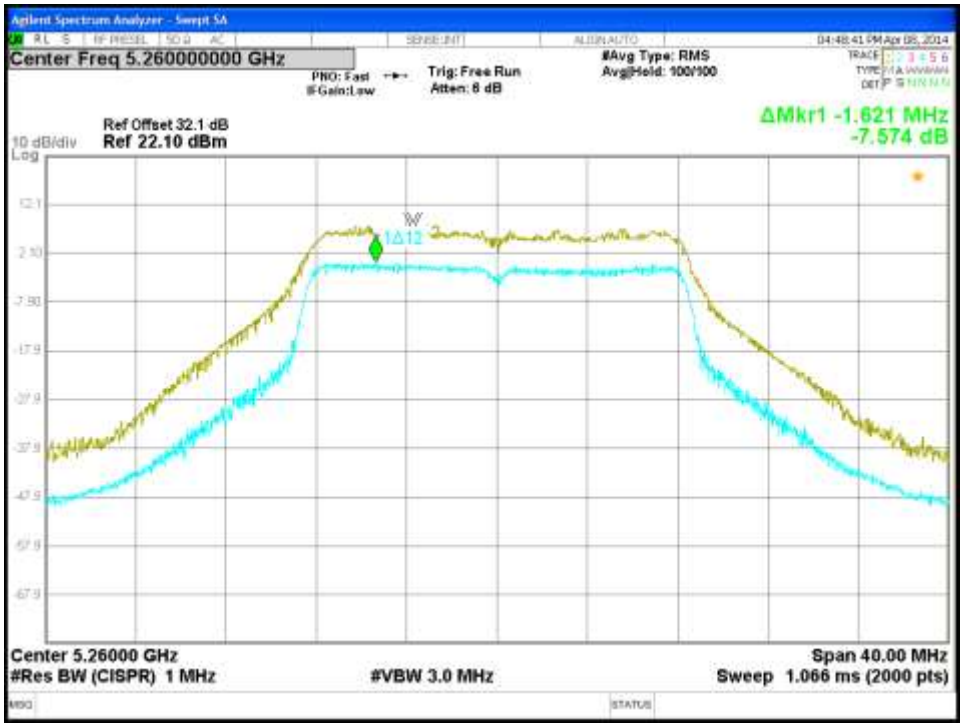


Figure 115: Peak Excursion-5260MHz-11a-6Mbps-Ch2

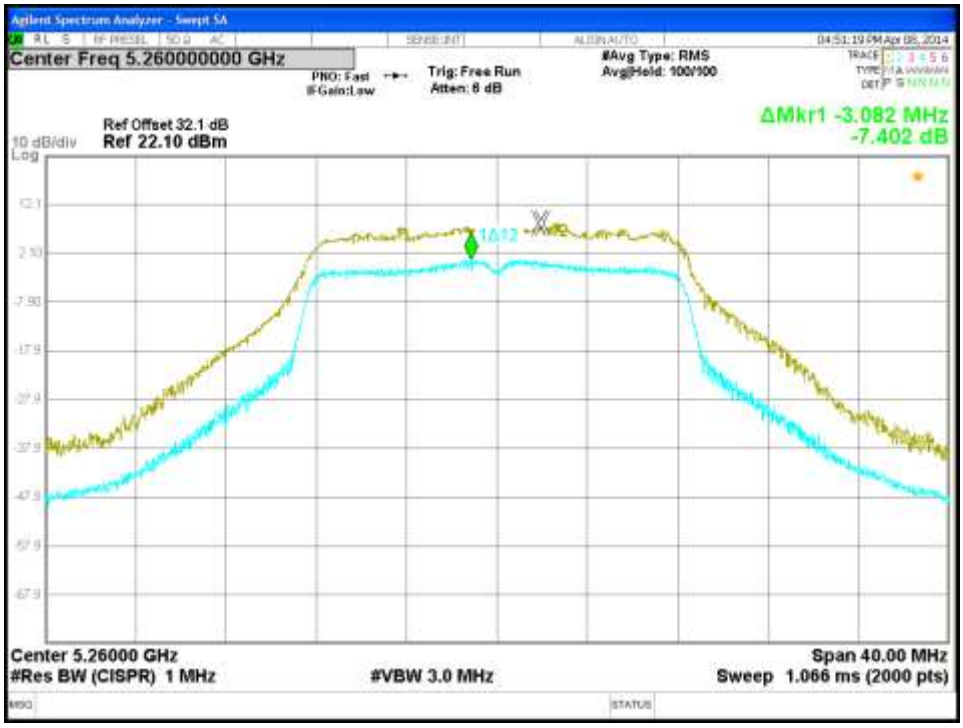


Figure 116: Peak Excursion-5260MHz-11a-6Mbps-Ch3

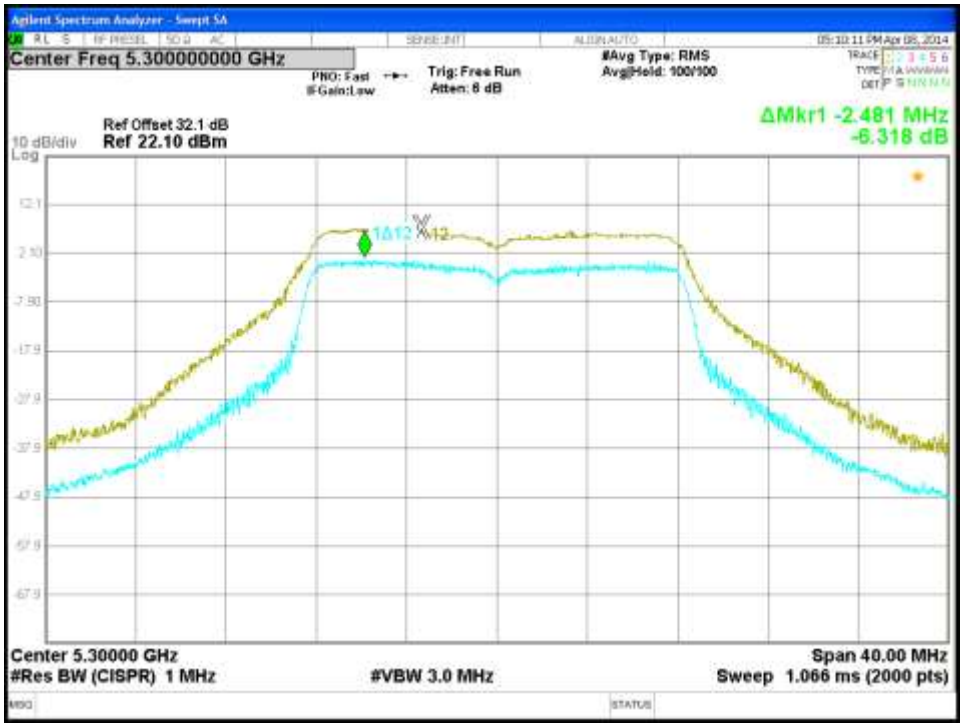


Figure 117: Peak Excursion-5300MHz-11a-6Mbps-Ch0

Figure 118: Peak Excursion-5300MHz-11a-6Mbps-Ch1

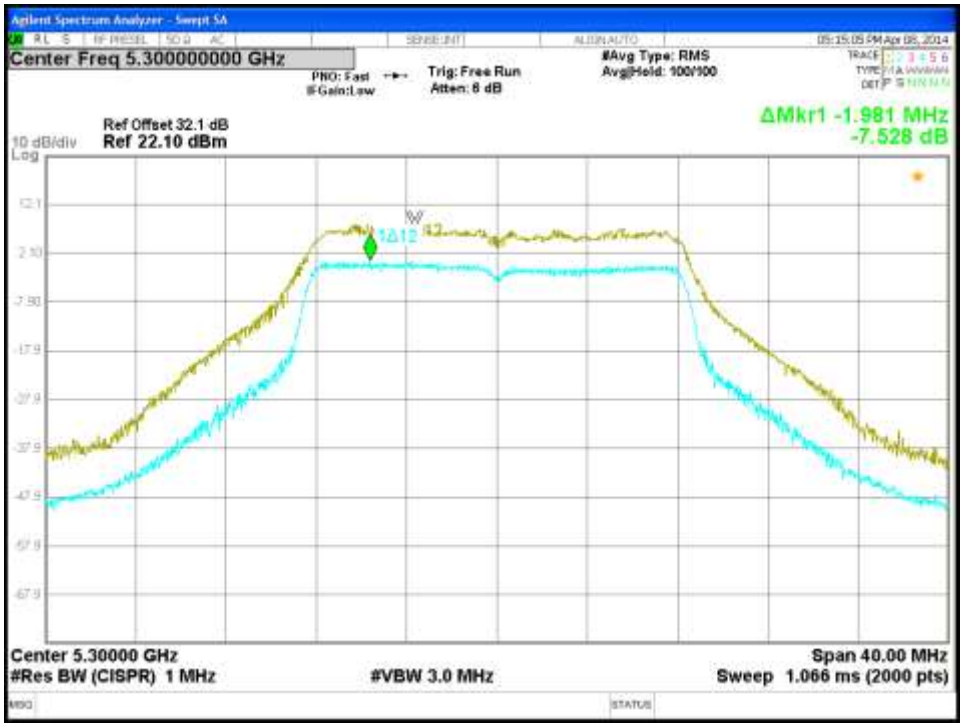


Figure 119: Peak Excursion-5300MHz-11a-6Mbps-Ch2

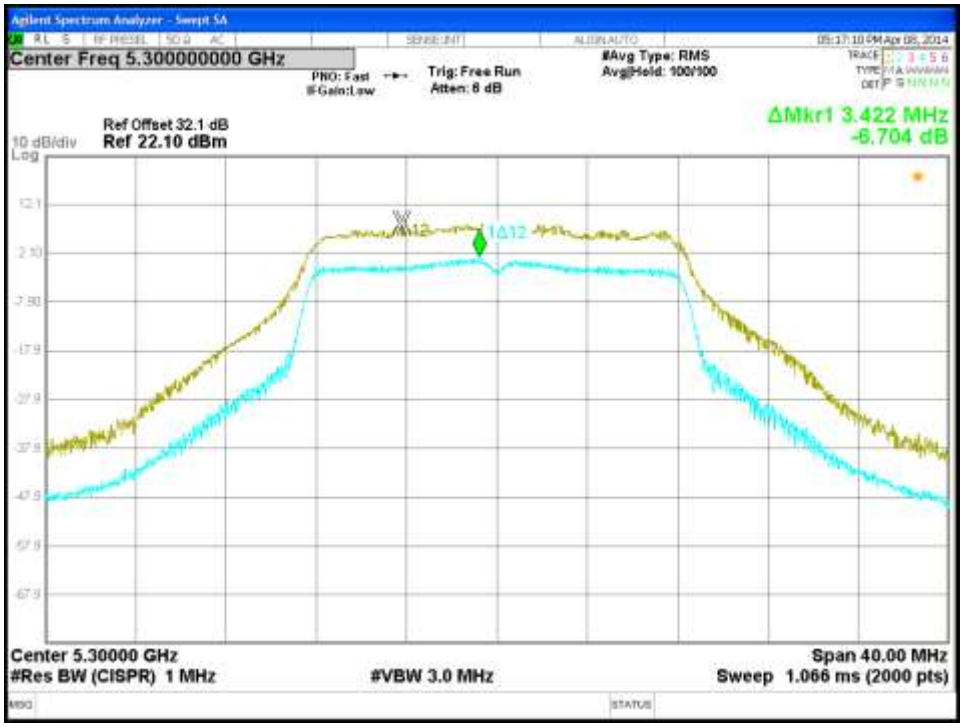


Figure 120: Peak Excursion-5300MHz-11a-6Mbps-Ch3

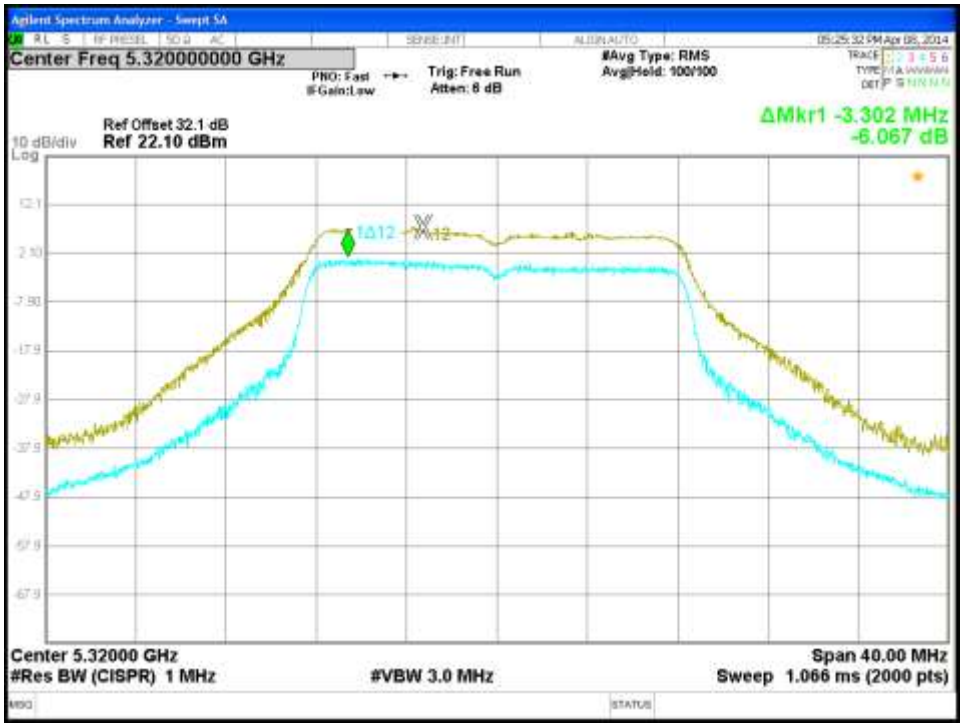


Figure 121: Peak Excursion-5320MHz-11a-6Mbps-Ch0

Figure 122: Peak Excursion-5320MHz-11a-6Mbps-Ch1

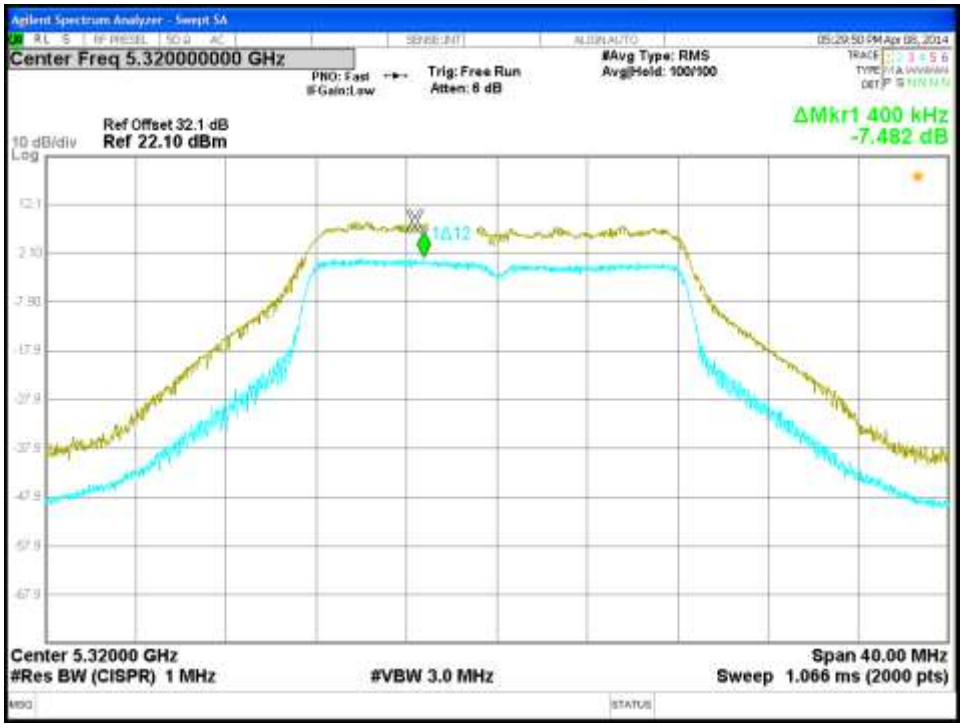


Figure 123: Peak Excursion-5320MHz-11a-6Mbps-Ch2

Figure 124: Peak Excursion-5320MHz-11a-6Mbps-Ch3

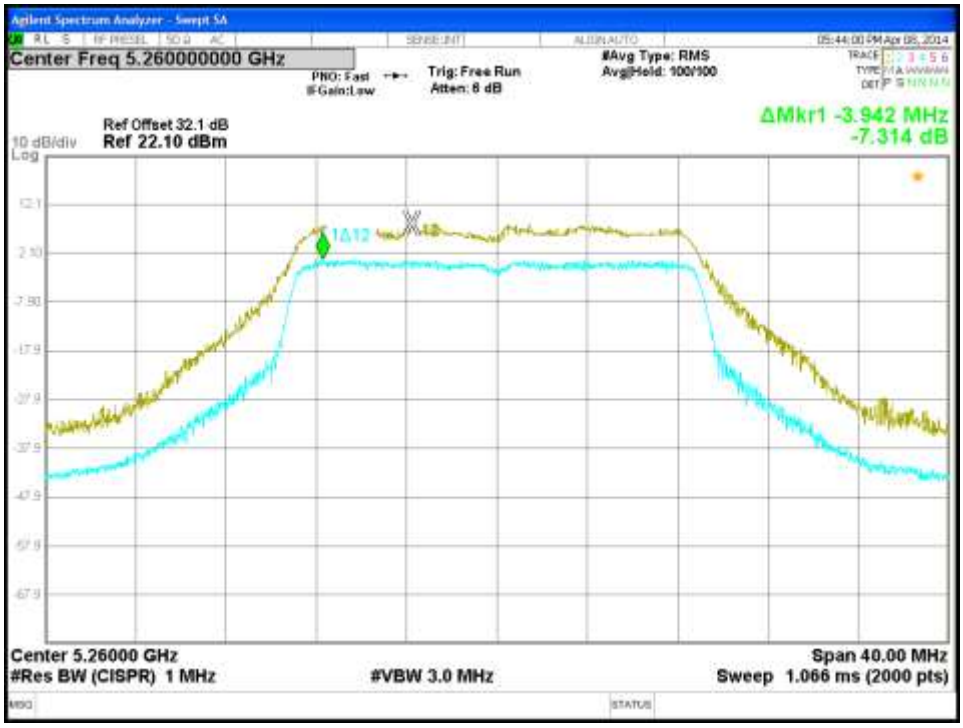


Figure 125: Peak Excursion-5260MHz-HT20-MCS0-Ch0

Figure 126: Peak Excursion-5260MHz-HT20-MCS0-Ch1

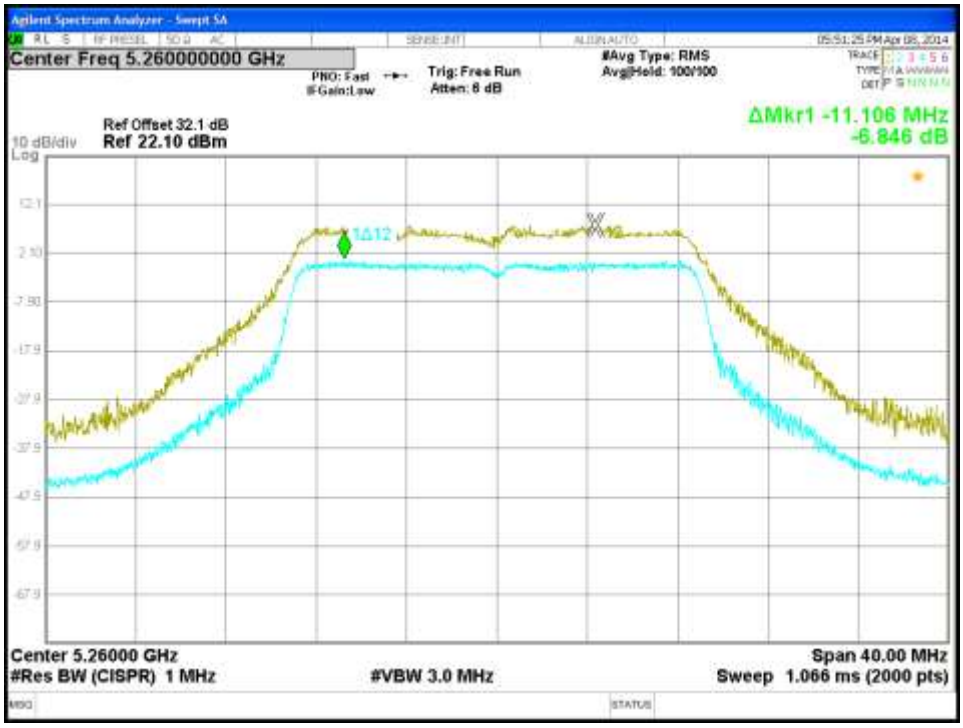


Figure 127: Peak Excursion-5260MHz-HT20-MCS0-Ch2

Figure 128: Peak Excursion-5260MHz-HT20-MCS0-Ch3

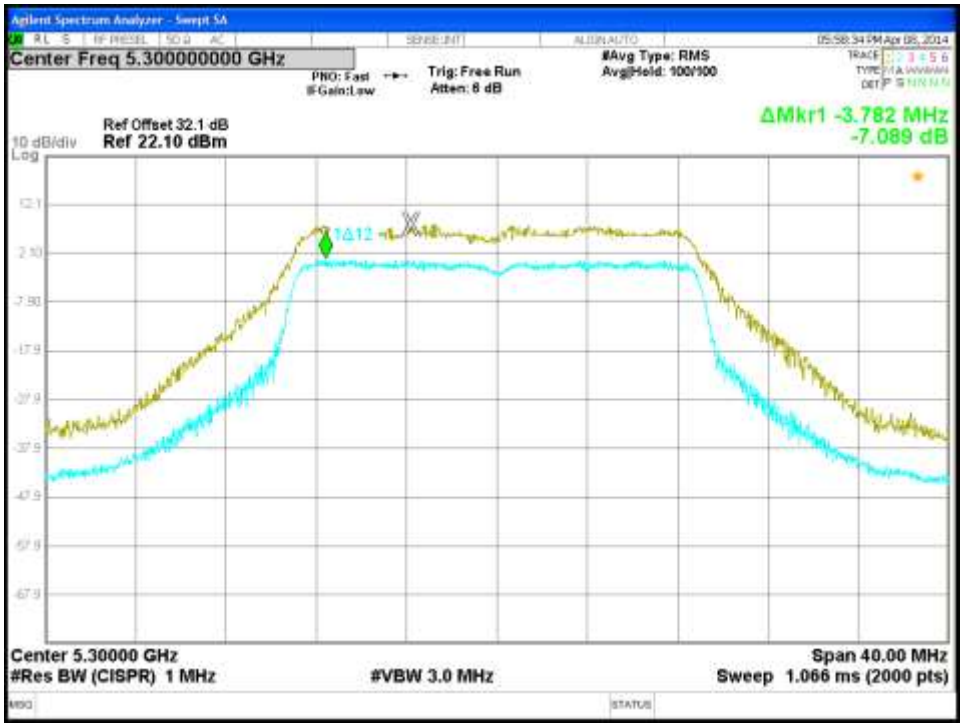


Figure 129: Peak Excursion-5300MHz-HT20-MCS0-Ch0

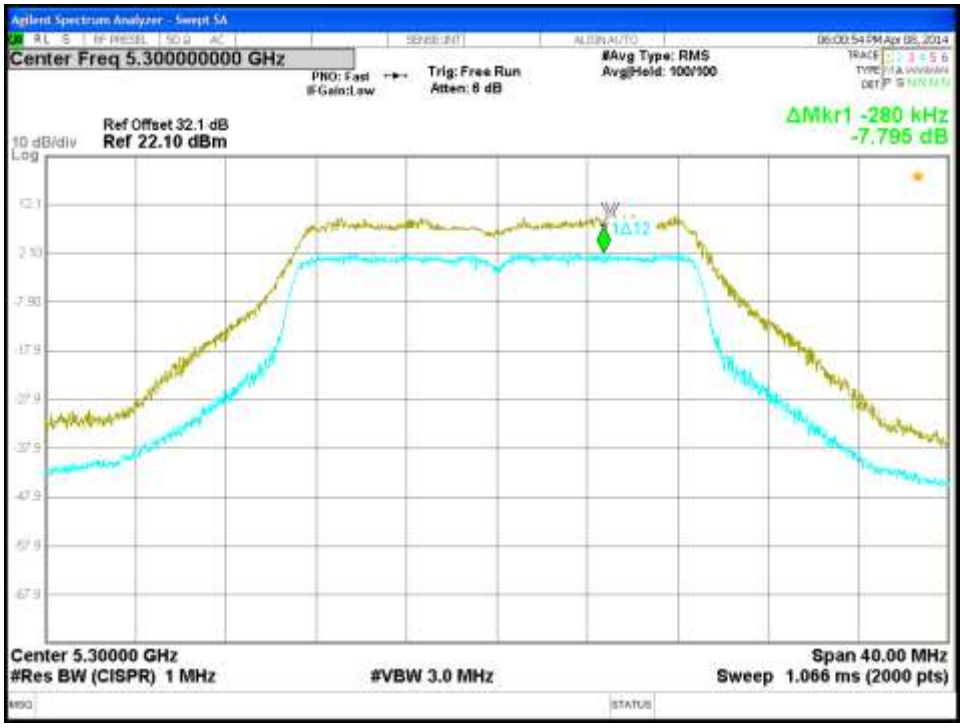


Figure 130: Peak Excursion-5300MHz-HT20-MCS0-Ch1

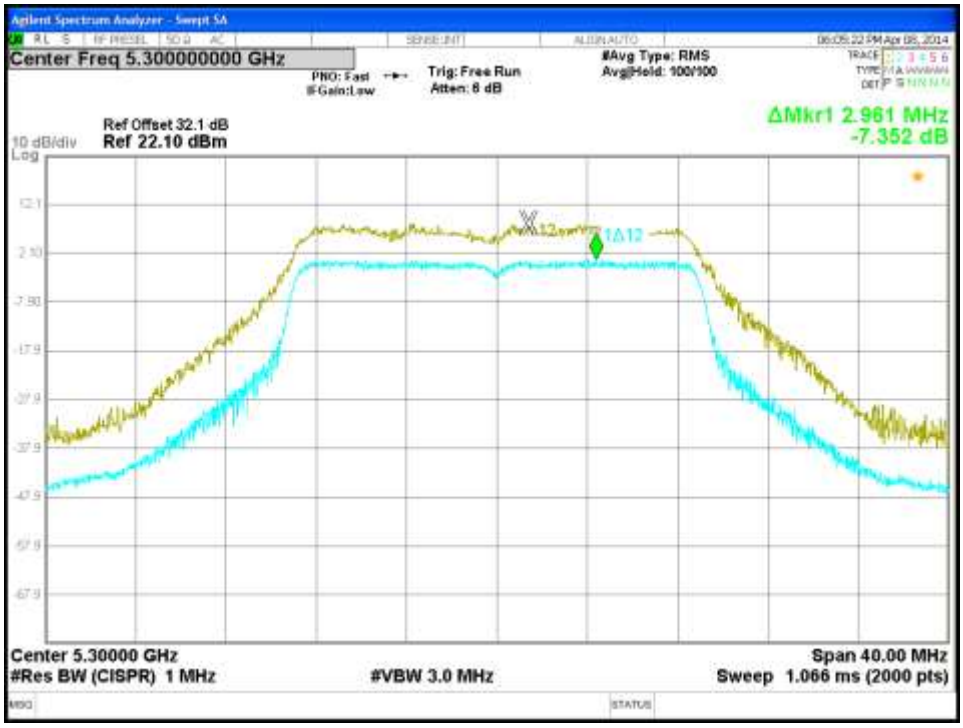


Figure 131: Peak Excursion-5300MHz-HT20-MCS0-Ch2

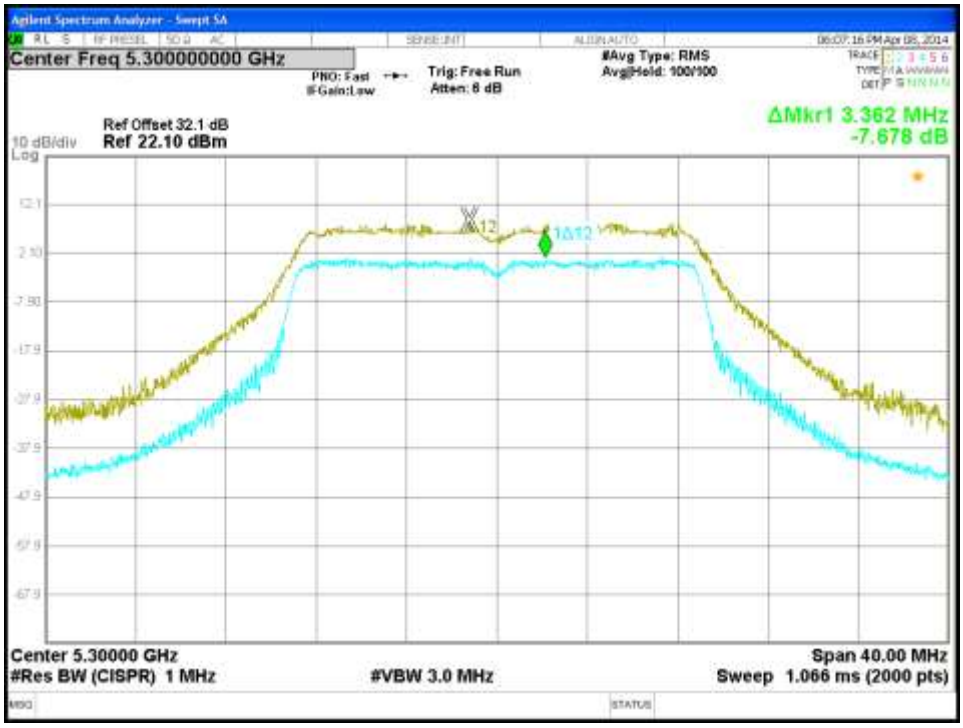


Figure 132: Peak Excursion-5300MHz-HT20-MCS0-Ch3

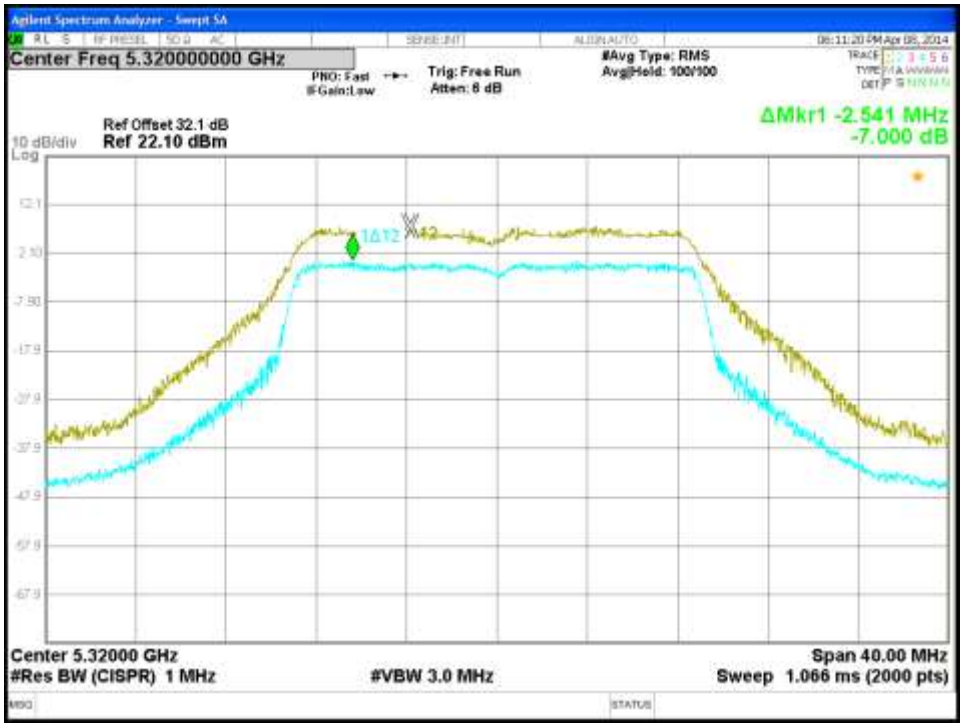


Figure 133: Peak Excursion-5320MHz-HT20-MCS0-Ch0

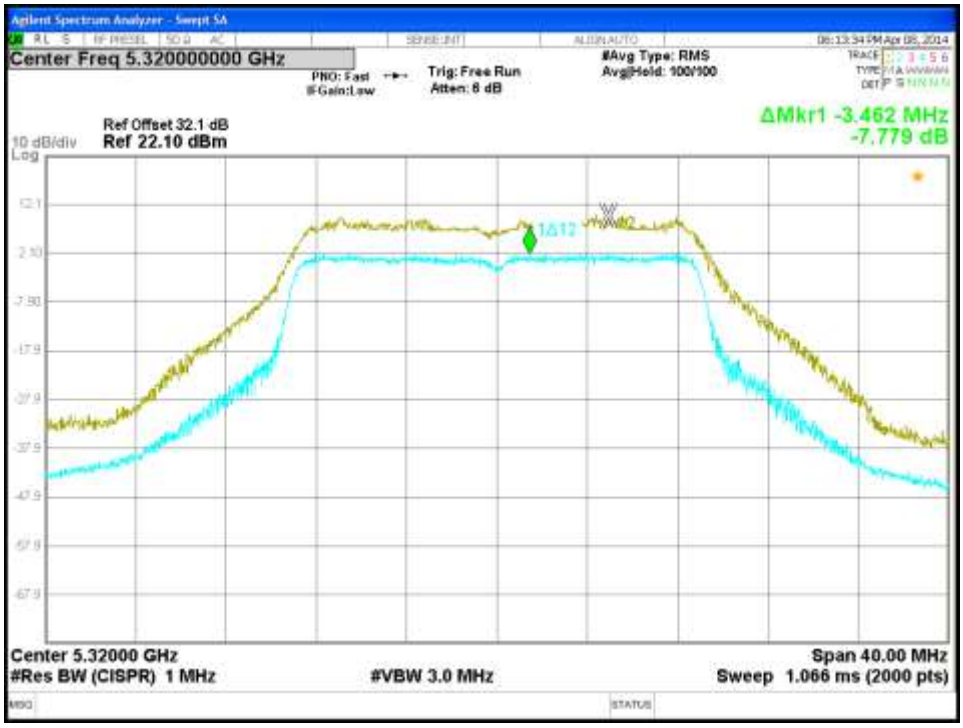


Figure 134: Peak Excursion-5320MHz-HT20-MCS0-Ch1

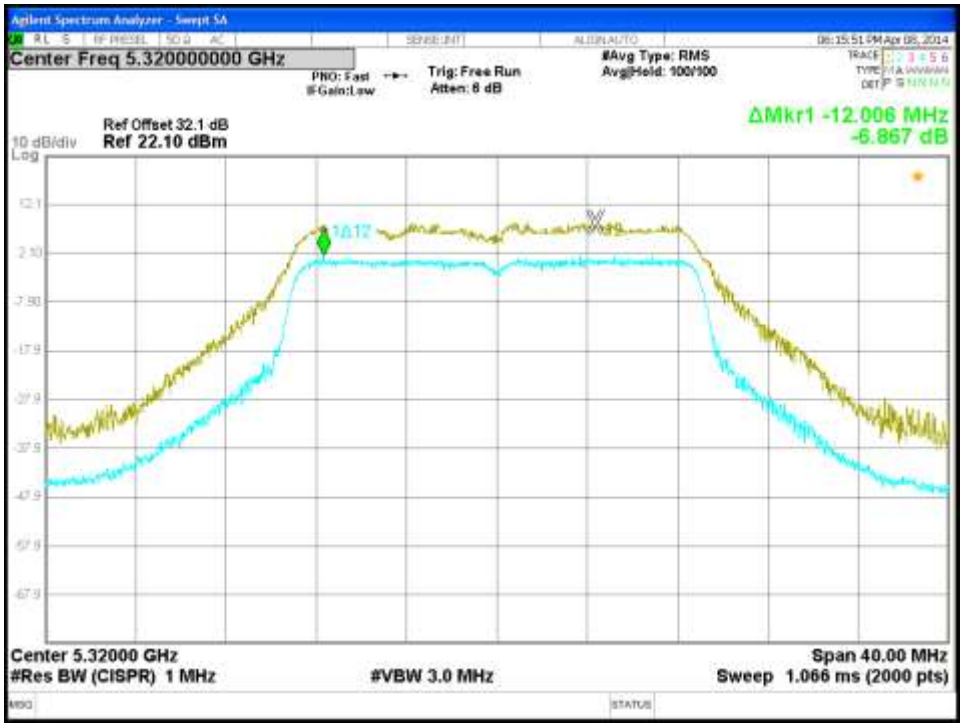


Figure 135: Peak Excursion-5320MHz-HT20-MCS0-Ch2

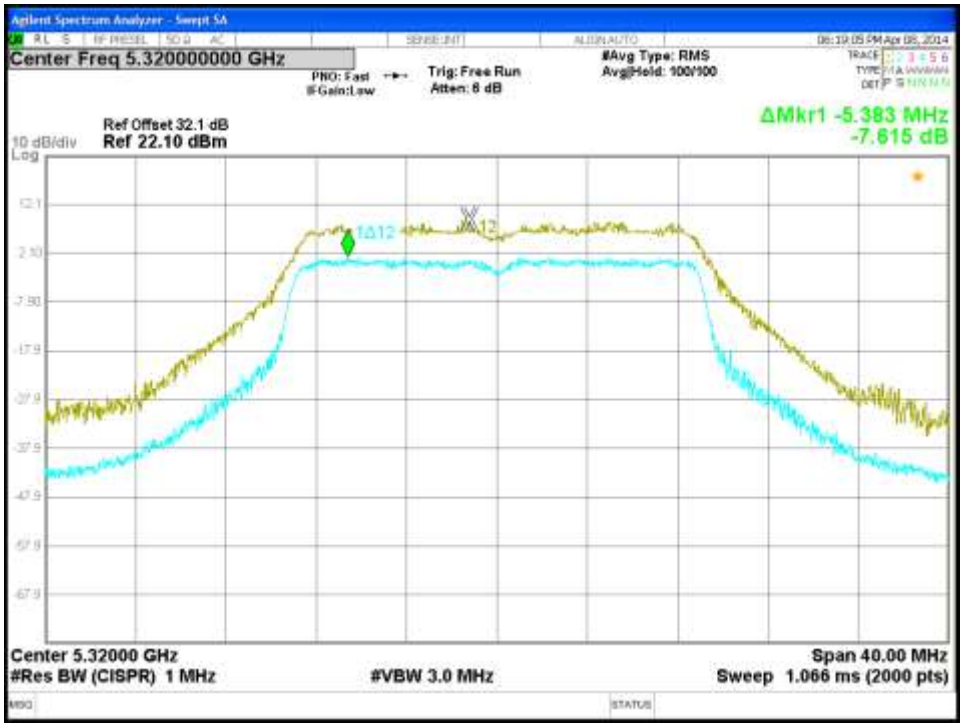


Figure 136: Peak Excursion-5320MHz-HT20-MCS0-Ch3

Figure 137: Peak Excursion-5270MHz-HT40-MCS0-Ch0

Figure 138: Peak Excursion-5270MHz-HT40-MCS0-Ch1

Figure 139: Peak Excursion-5270MHz-HT40-MCS0-Ch2

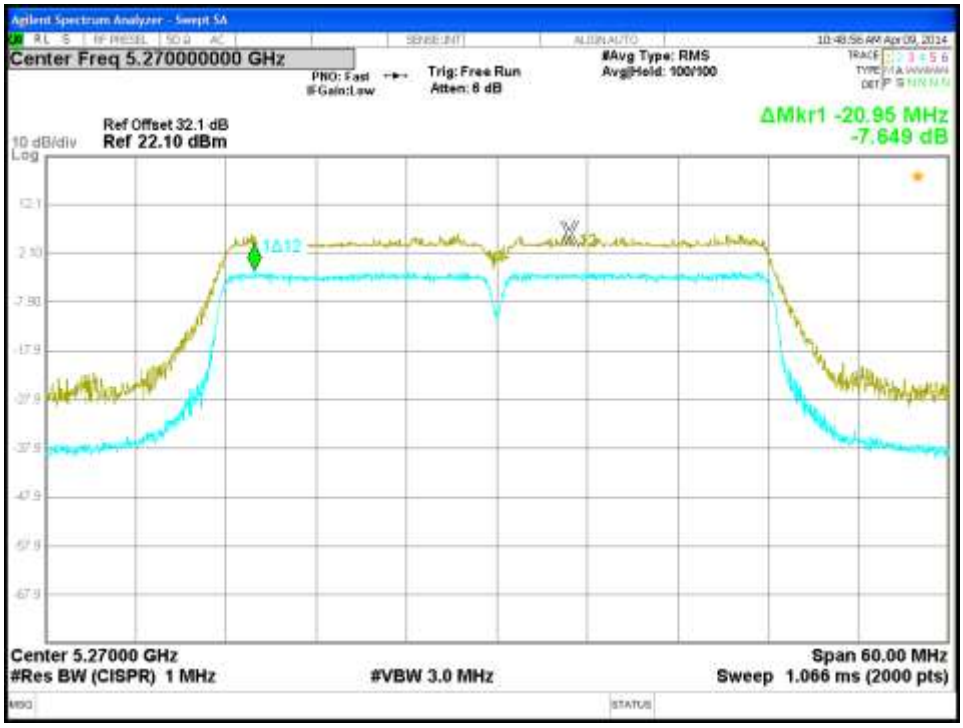


Figure 140: Peak Excursion-5270MHz-HT40-MCS0-Ch3

Figure 141: Peak Excursion-5310MHz-HT40-MCS0-Ch0

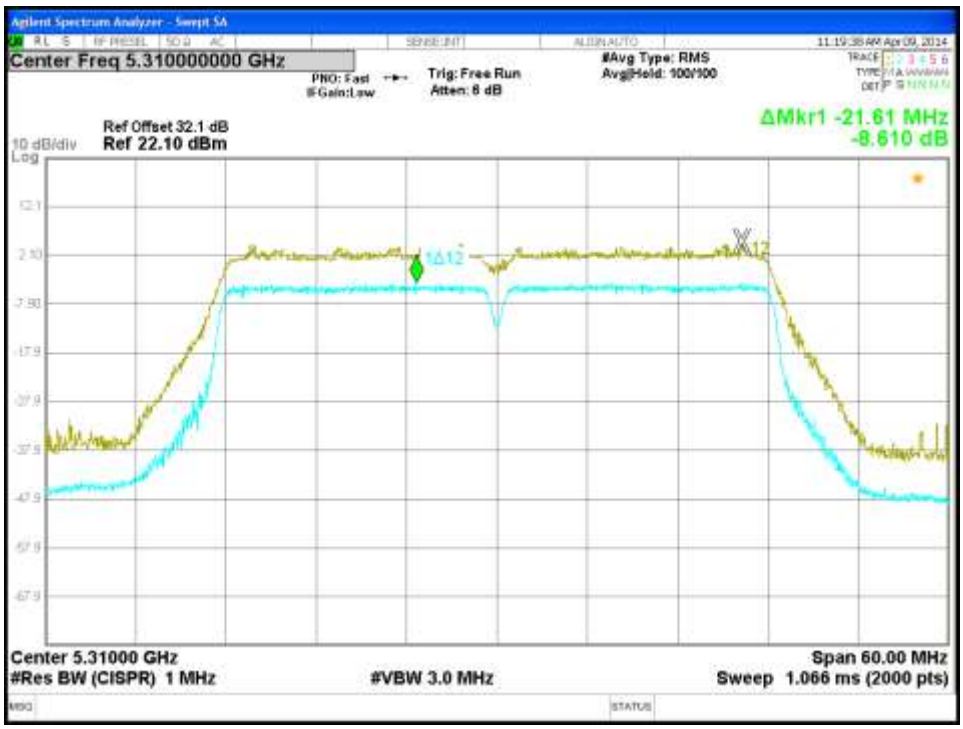


Figure 142: Peak Excursion-5310MHz-HT40-MCS0-Ch1

Figure 143: Peak Excursion-5310MHz-HT40-MCS0-Ch2

Figure 144: Peak Excursion-5310MHz-HT40-MCS0-Ch3

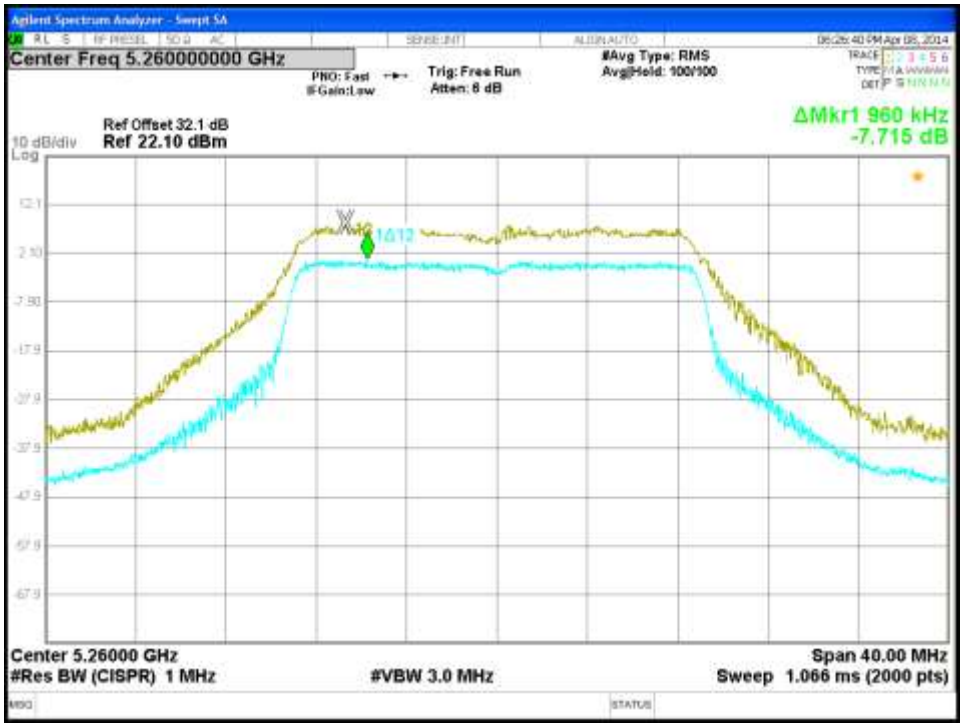


Figure 145: Peak Excursion-5260MHz-VHT20-MCS0-Ch0

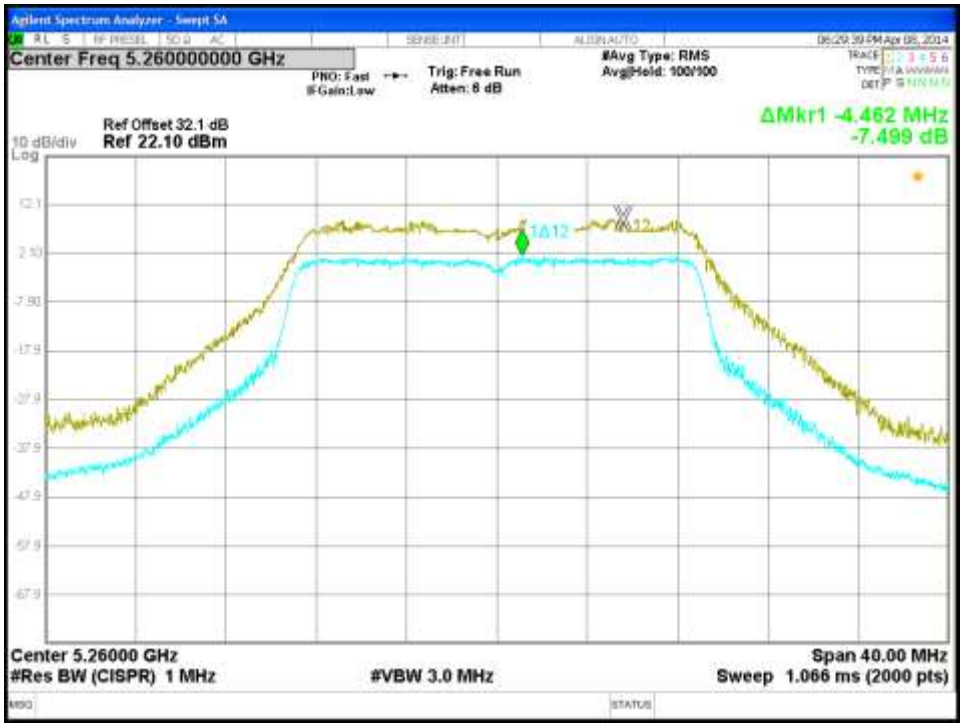


Figure 146: Peak Excursion-5260MHz-VHT20-MCS0-Ch1

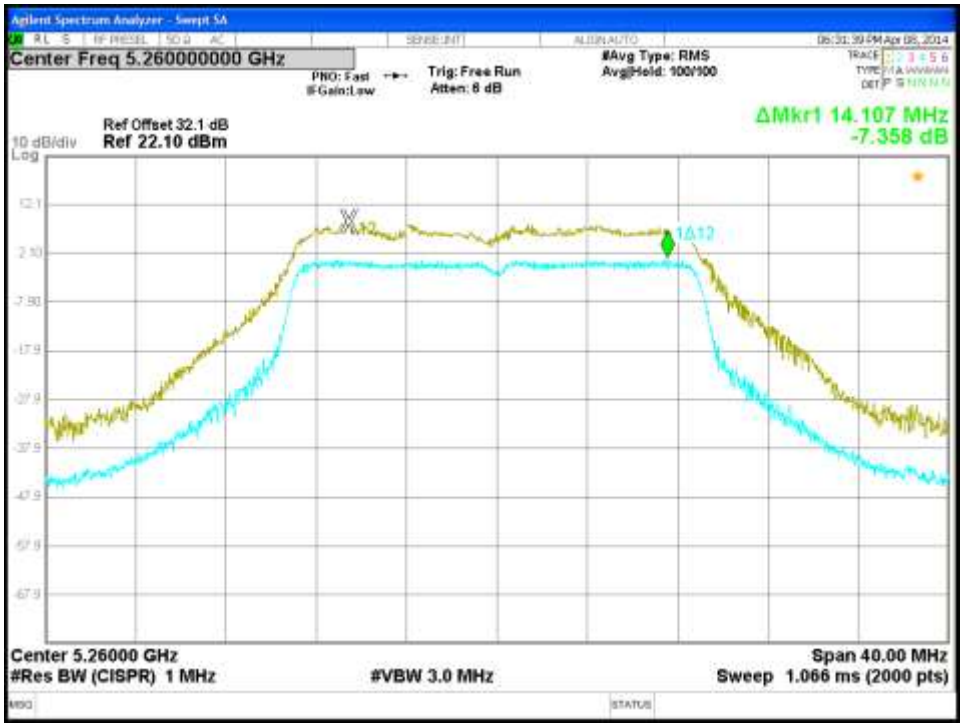


Figure 147: Peak Excursion-5260MHz-VHT20-MCS0-Ch2

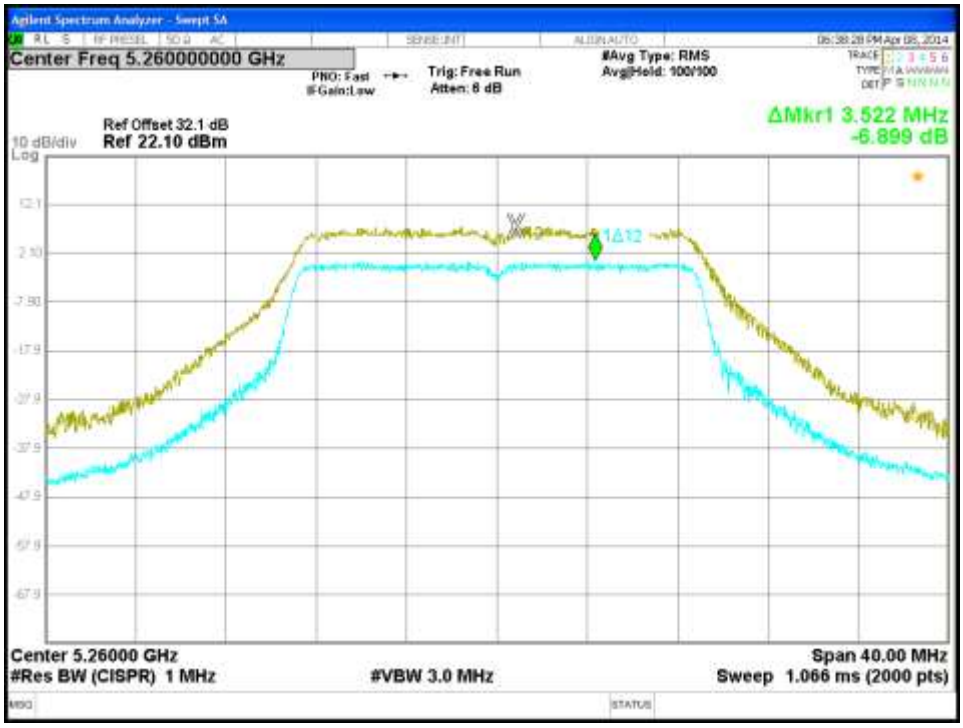


Figure 148: Peak Excursion-5260MHz-VHT20-MCS0-Ch3

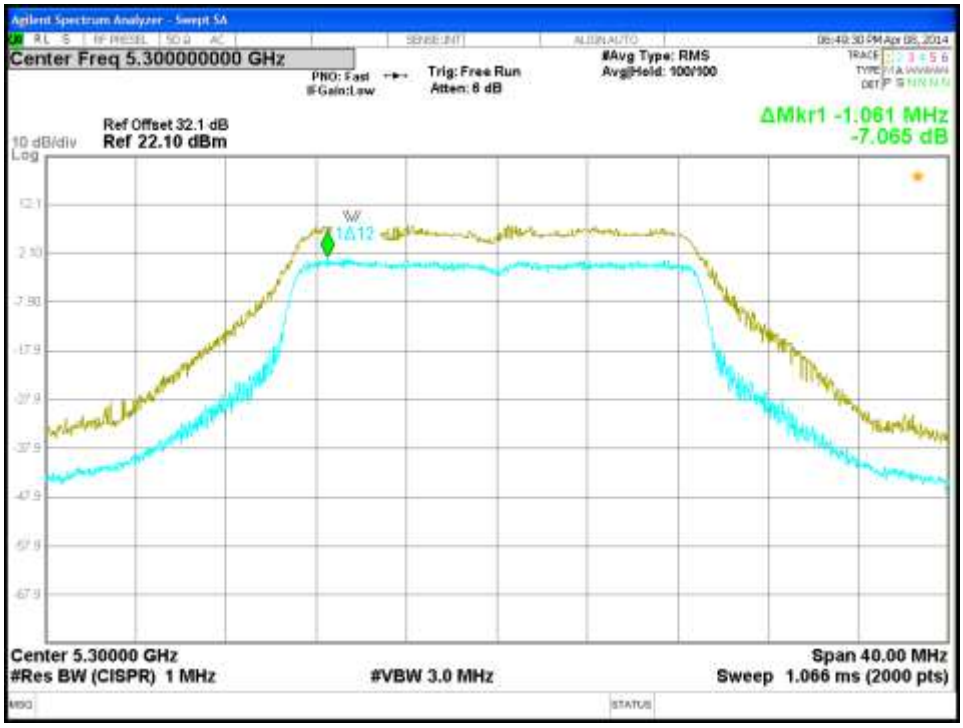


Figure 149: Peak Excursion-5300MHz-VHT20-MCS0-Ch0

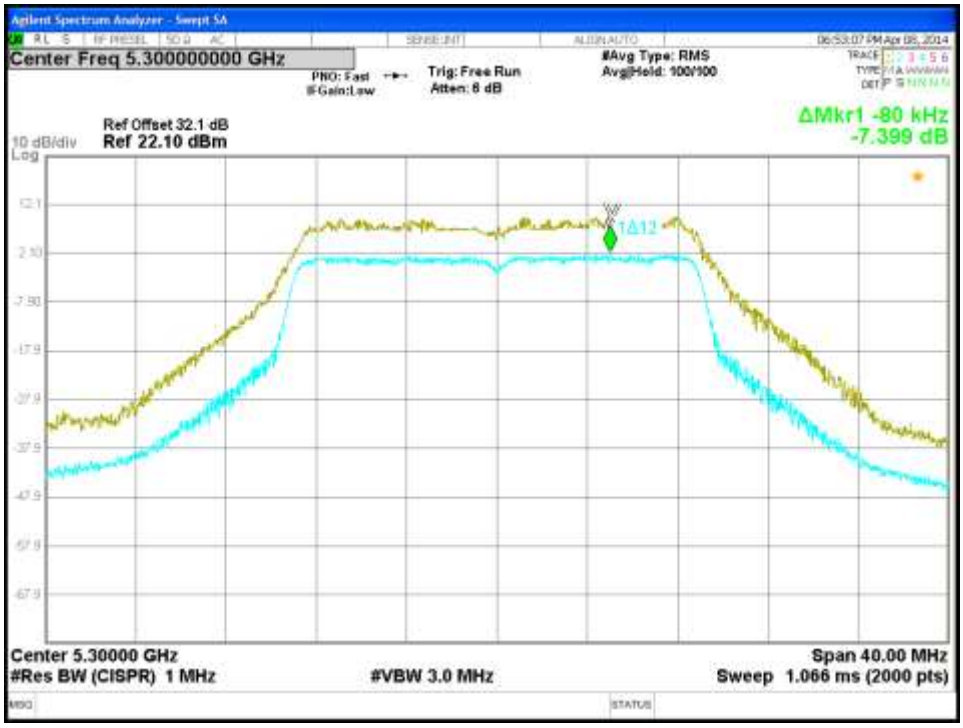


Figure 150: Peak Excursion-5300MHz-VHT20-MCS0-Ch1

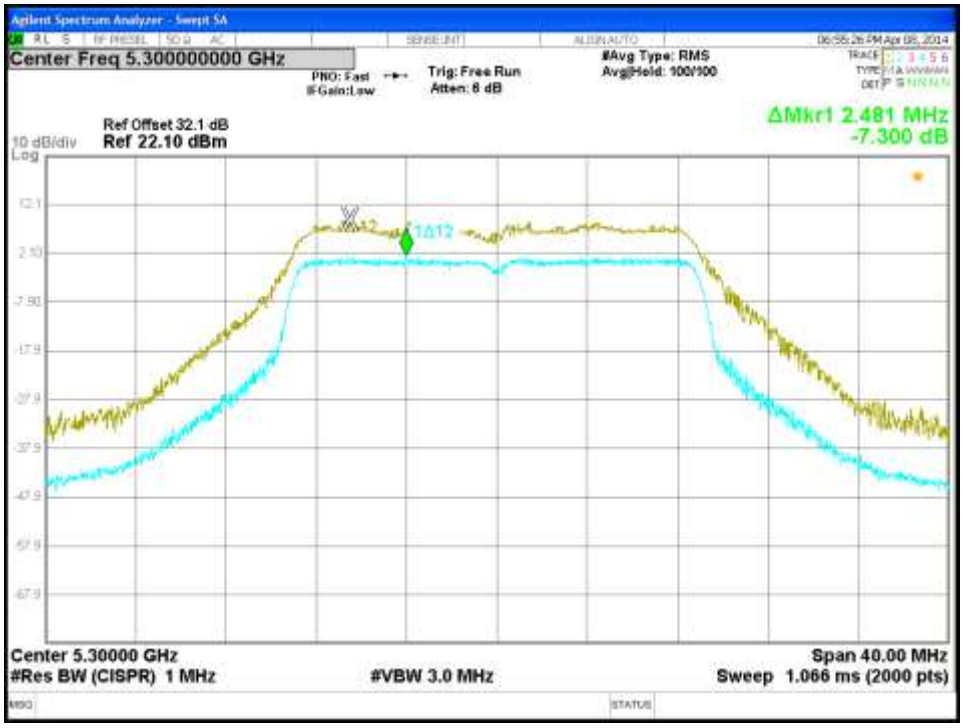


Figure 151: Peak Excursion-5300MHz-VHT20-MCS0-Ch2

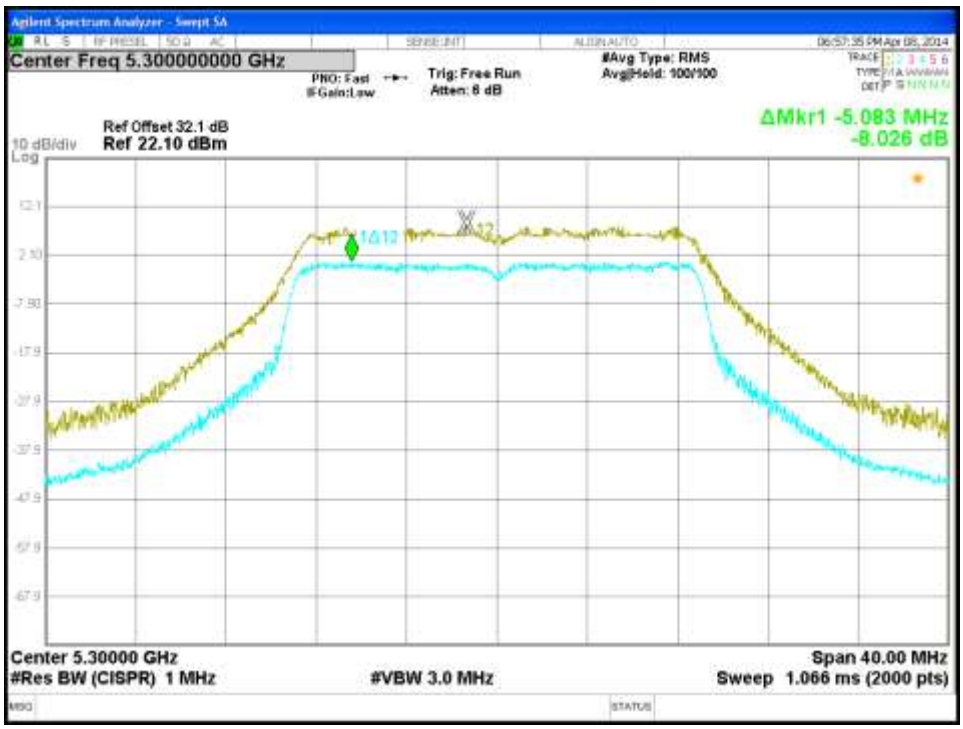


Figure 152: Peak Excursion-5300MHz-VHT20-MCS0-Ch3

Figure 153: Peak Excursion-5320MHz-VHT20-MCS0-Ch0

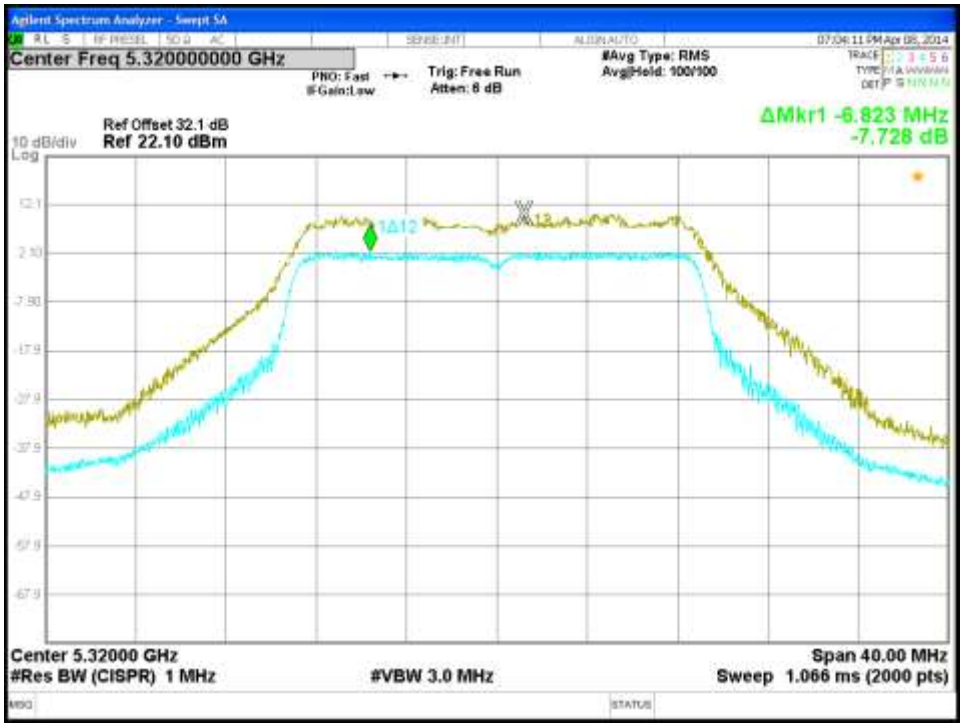


Figure 154: Peak Excursion-5320MHz-VHT20-MCS0-Ch1

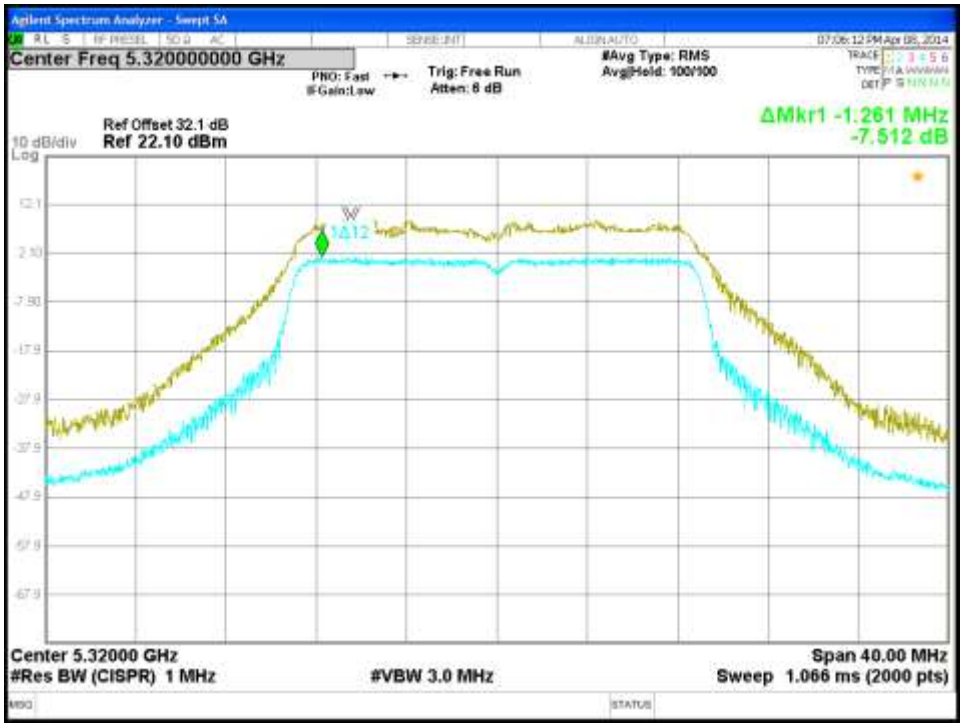


Figure 155: Peak Excursion-5320MHz-VHT20-MCS0-Ch2

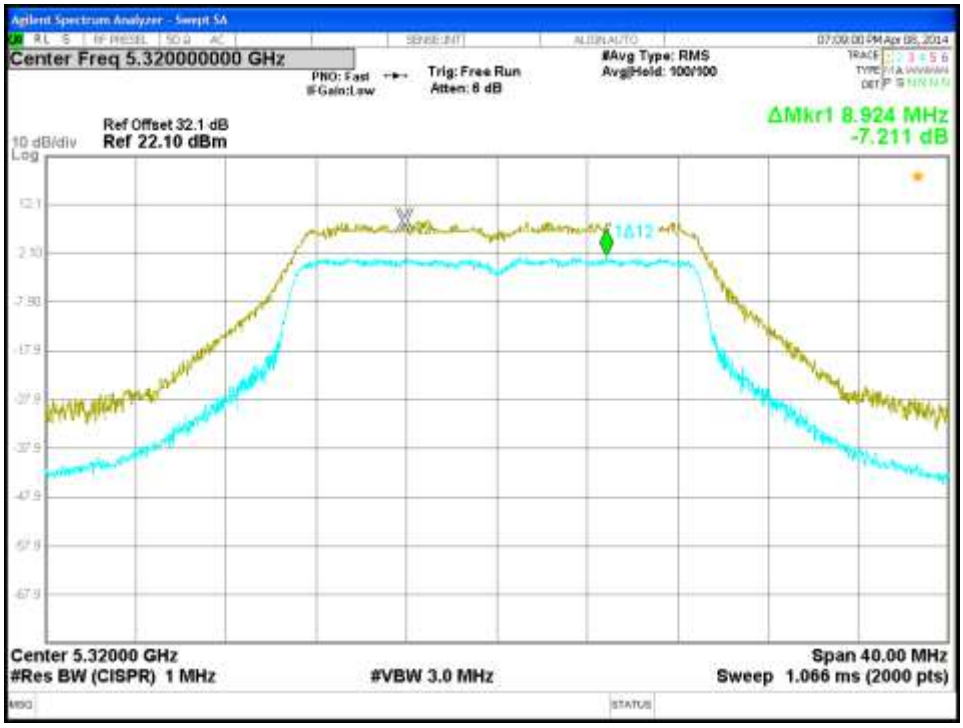


Figure 156: Peak Excursion-5320MHz-VHT20-MCS0-Ch3

Figure 157: Peak Excursion-5270MHz-VHT40-MCS0-Ch0

Figure 158: Peak Excursion-5270MHz-VHT40-MCS0-Ch1

Figure 159: Peak Excursion-5270MHz-VHT40-MCS0-Ch2

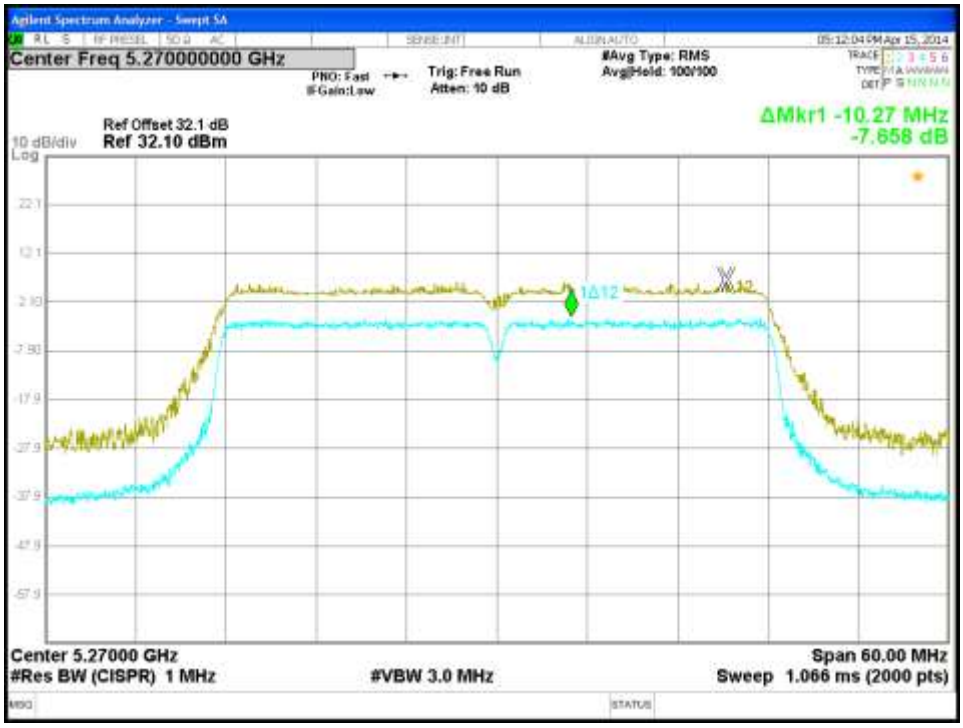


Figure 160: Peak Excursion-5270MHz-VHT40-MCS0-Ch3

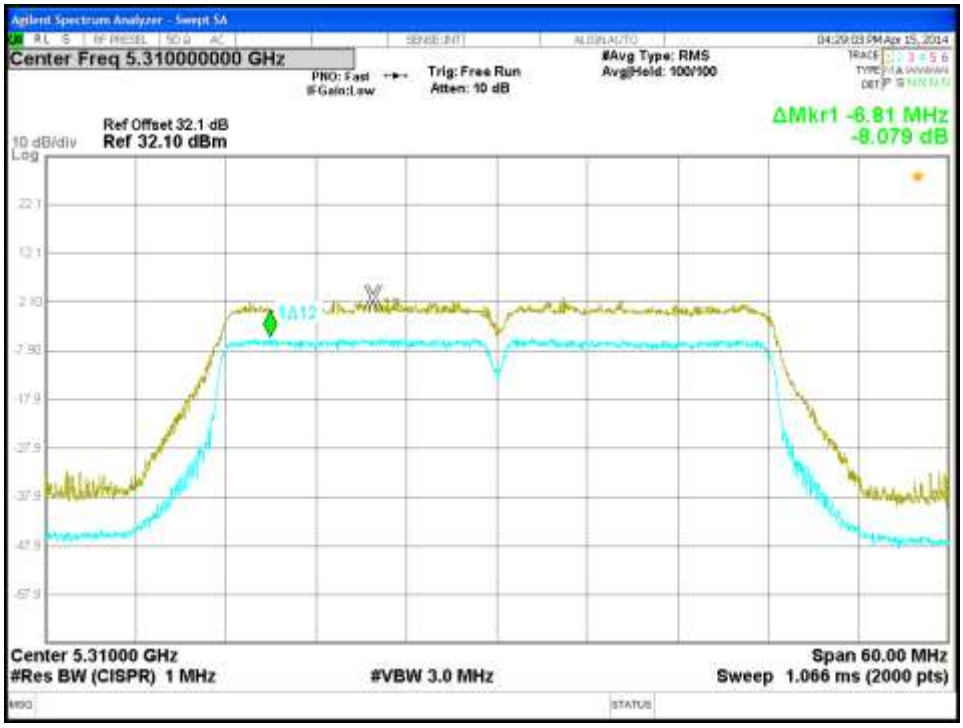


Figure 161: Peak Excursion-5310MHz-VHT40-MCS0-Ch0

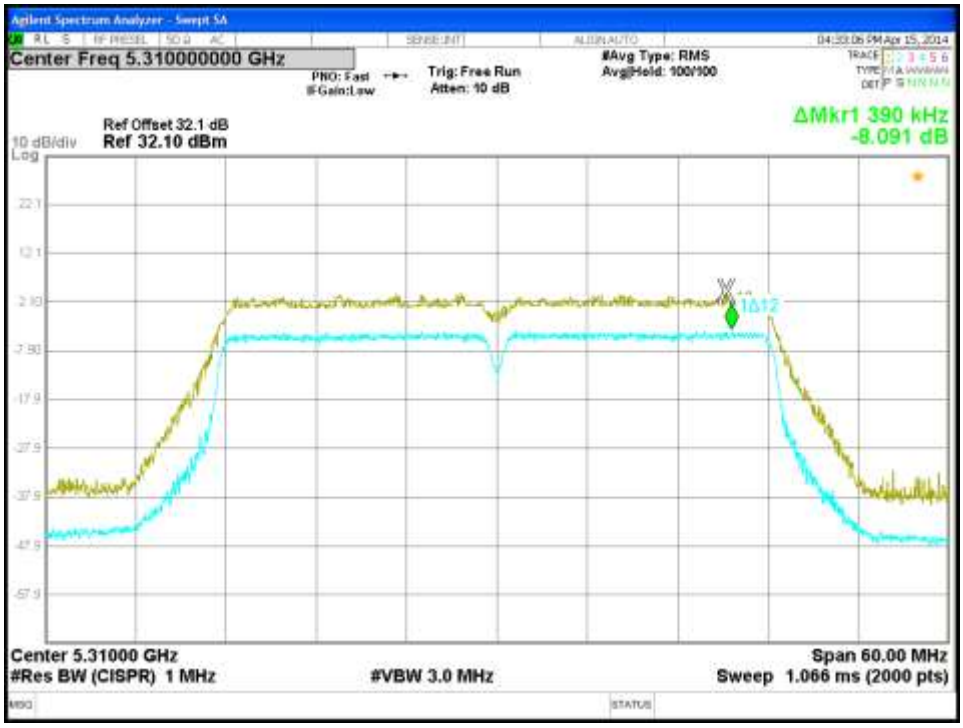


Figure 162: Peak Excursion-5310MHz-VHT40-MCS0-Ch1

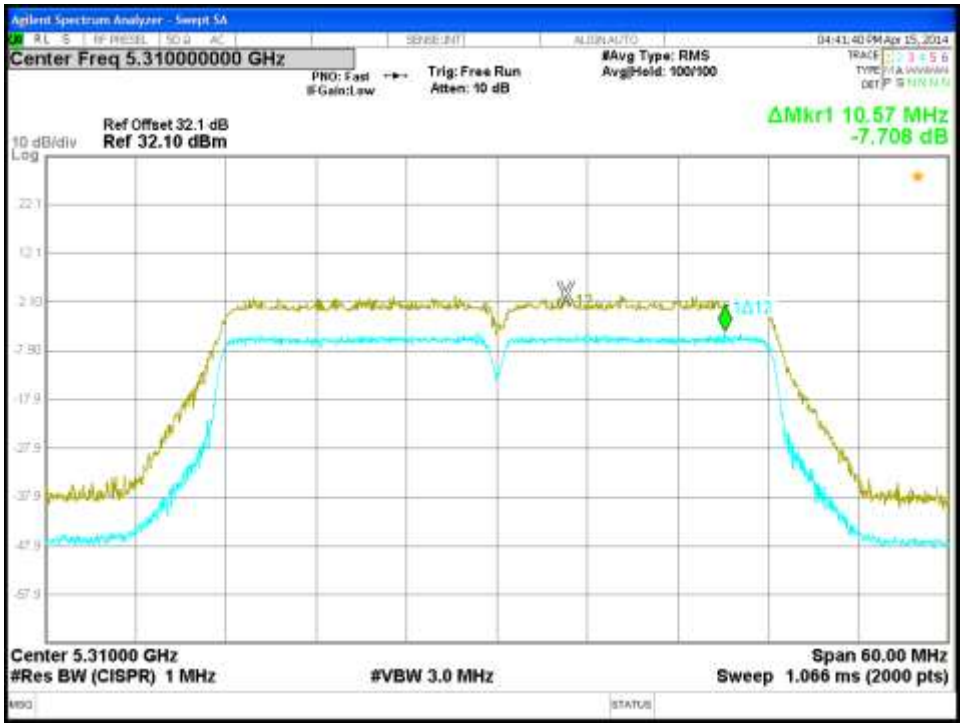


Figure 163: Peak Excursion-5310MHz-VHT40-MCS0-Ch2

Figure 164: Peak Excursion-5310MHz-VHT40-MCS0-Ch3

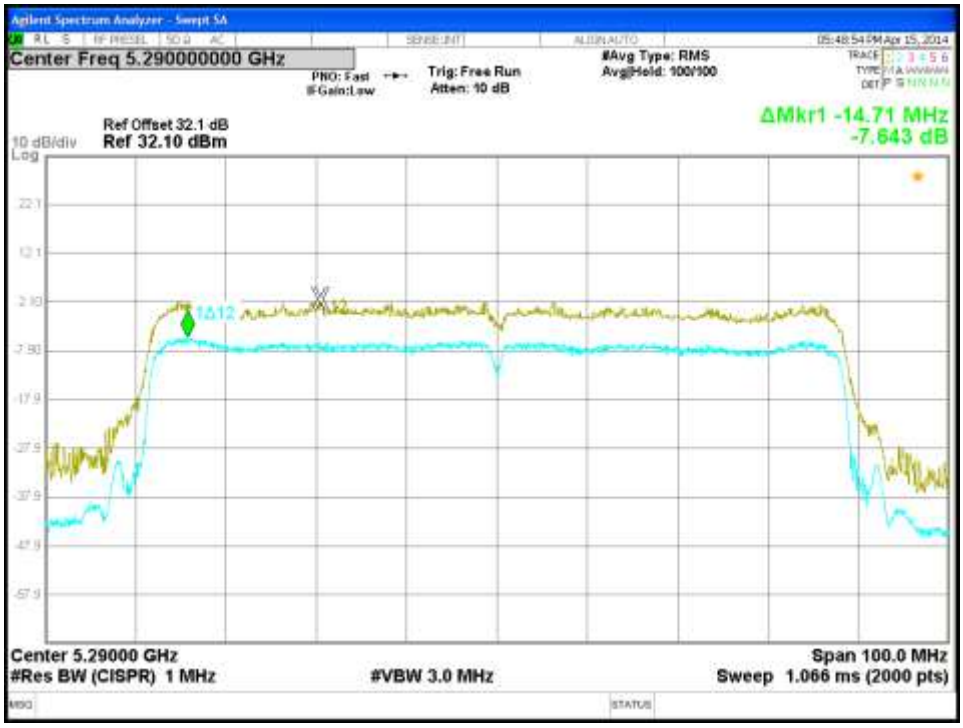


Figure 165: Peak Excursion-5290MHz-VHT80-MCS0-Ch0

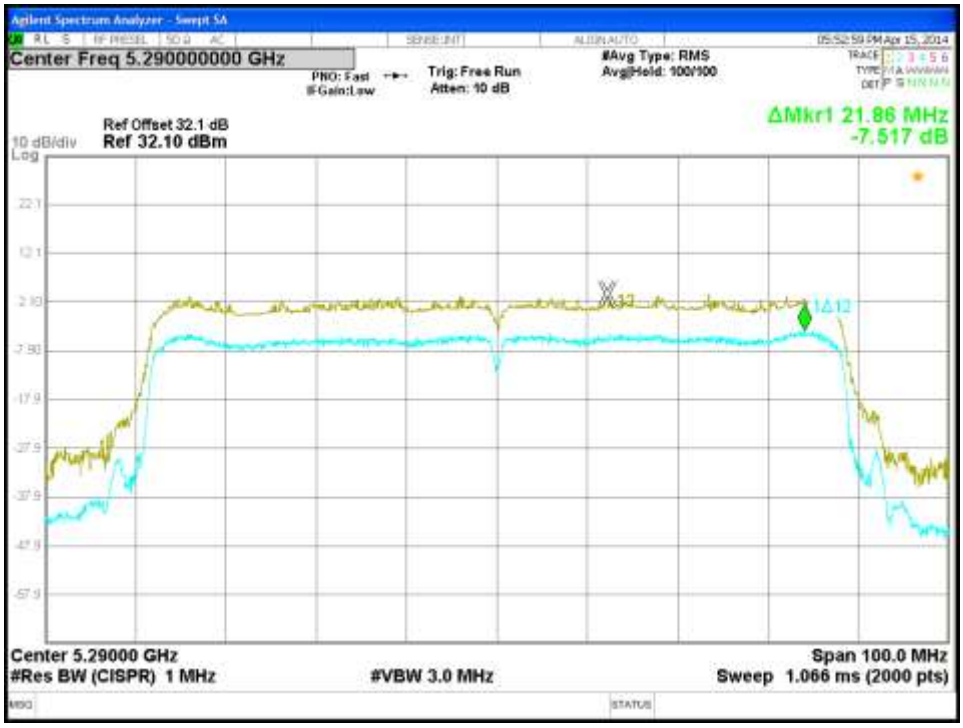


Figure 166: Peak Excursion-5290MHz-VHT80-MCS0-Ch1

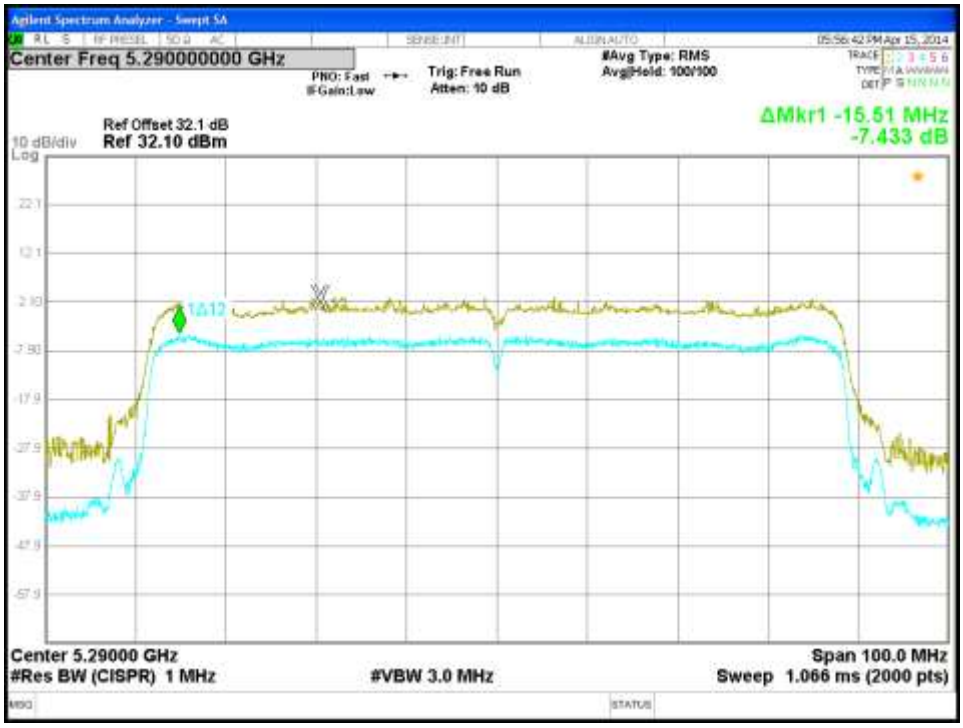


Figure 167: Peak Excursion-5290MHz-VHT80-MCS0-Ch2

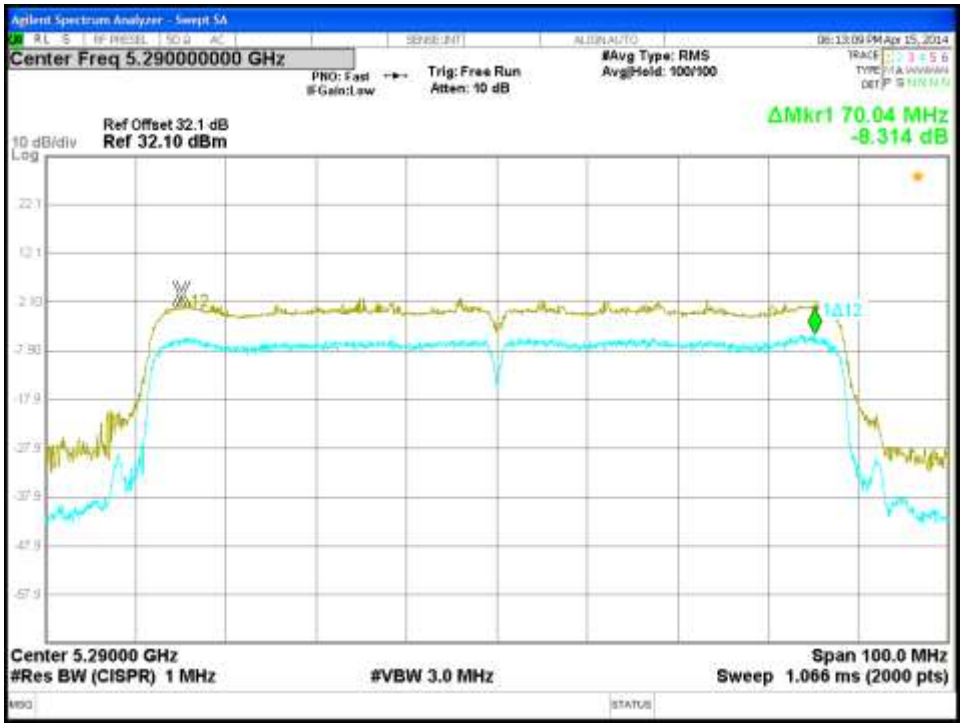


Figure 168: Peak Excursion-5290MHz-VHT80-MCS0-Ch3

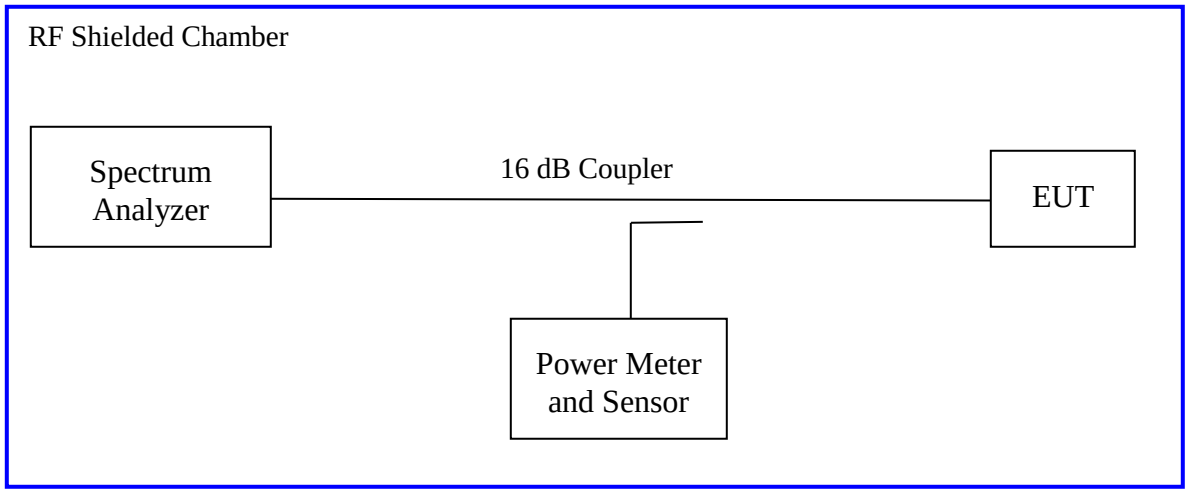
4.4 Power Spectral Density

According to the CFR47 Part 15.407 (a) and RSS 210 (A9.2), the spectral power density output of the antenna port shall be less than 11 dBm in any 1 MHz band during any time interval of continuous transmission.

4.4.1 **Test Method**

The conducted method was used to measure the power spectral density per ANSI C63.10-2009 Section 6.11.2. The measurement was performed with modulation per CFR47 Part 15.407 (a) and RSS 210 (A9.2). The pre-evaluation was performed to find the worst modes. The worst findings were conducted on 3 channels in frequency range of 5250 MHz to 5350 MHz for the test sample, S/N 121404000111. The result indicated below.

Test Setup:



KDB 789033 D01 v01r03 Section F, Method SA-2 was applies since the EUT continuously transmit with duty cycle less 100%. The duty cycle, CF = 10Log(1/duty cycle), was applied.

Amplitude bins of all chains were sum together to determine the highest power spectral density per KDB 662911.

The total directional gain would be 8.08 dBi. The limit is reduced for every dBi gain exceeding 6 dBi. The limit would be 8.92 dBm.

4.4.2 **Results**

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 6: Power Spectral Density – Test Results

Test Conditions: Conducted Measurement		**Test Date:** April 21, 2014	
Antenna Type: Integrated		**Power Setting:** See test plan	
Directional Antenna Gain: + 8.08 dBi		**Signal State:** Modulated.	
Ambient Temp.: 23 °C		**Relative Humidity:**33%	
Power Spectral Density			
802.11a Mode			
Freq. (MHz)	**Total PSD [dBm]**	**Limit [dBm]**	**Margin [dB]**
5260	8.228	8.92	-0.69
5300	8.543	8.92	-0.38
5320	8.848	8.92	-0.07
Note: The highest power spectral density was observed at 802.11a 6Mbps per data stream.			
802.11n (HT20) Mode			
Freq. (MHz)	**Total PSD [dBm]**	**Limit [dBm]**	**Margin [dB]**
5260	8.832	8.92	-0.09
5300	8.429	8.92	-0.49
5320	8.661	8.92	-0.26
Note: The highest power spectral density was observed at 802.11n HT20 MCS0 per data stream.			

802.11n (HT40) Mode			
Freq. (MHz)	**Total PSD [dBm]**	**Limit [dBm]**	**Margin [dB]**
5270	5.363	8.92	-3.56
5310	3.548	8.92	-5.37
Note: The highest peak output power was observed at 802.11n HT40 MCS0 per data stream.			

802.11ac (VHT20) Mode			
Freq. (MHz)	**Total PSD [dBm]**	**Limit [dBm]**	**Margin [dB]**
5260	7.961	8.92	-0.96
5300	8.473	8.92	-0.45
5320	8.559	8.92	-0.36
Note: The highest power spectral density was observed at 802.11ac VHT20 MCS0 per data stream.			

802.11ac (VHT40) Mode			
Freq. (MHz)	**Total PSD [dBm]**	**Limit [dBm]**	**Margin [dB]**
5270	5.177	8.92	-3.74
5310	4.600	8.92	-4.32
Note: The highest peak output power was observed at 802.11ac VHT40 MCS0 per data stream.			

802.11ac (VHT80) Mode			
Freq. (MHz)	**Total PSD [dBm]**	**Limit [dBm]**	**Margin [dB]**
5290	3.595	8.92	-5.33
Note: The highest peak output power was observed at 802.11ac VHT80 MCS0 per data stream.			

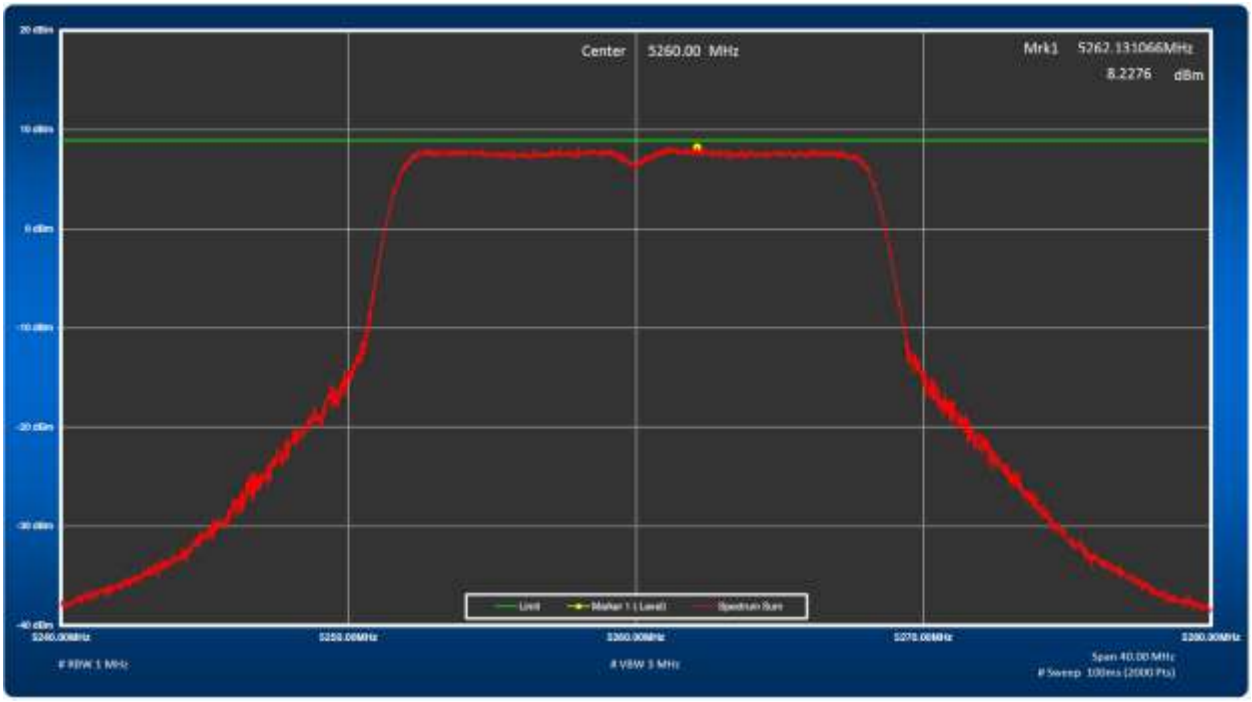


Figure 169: Total Sum of Power Spectral Density, 5260 MHz at 802.11a, 6 Mbps

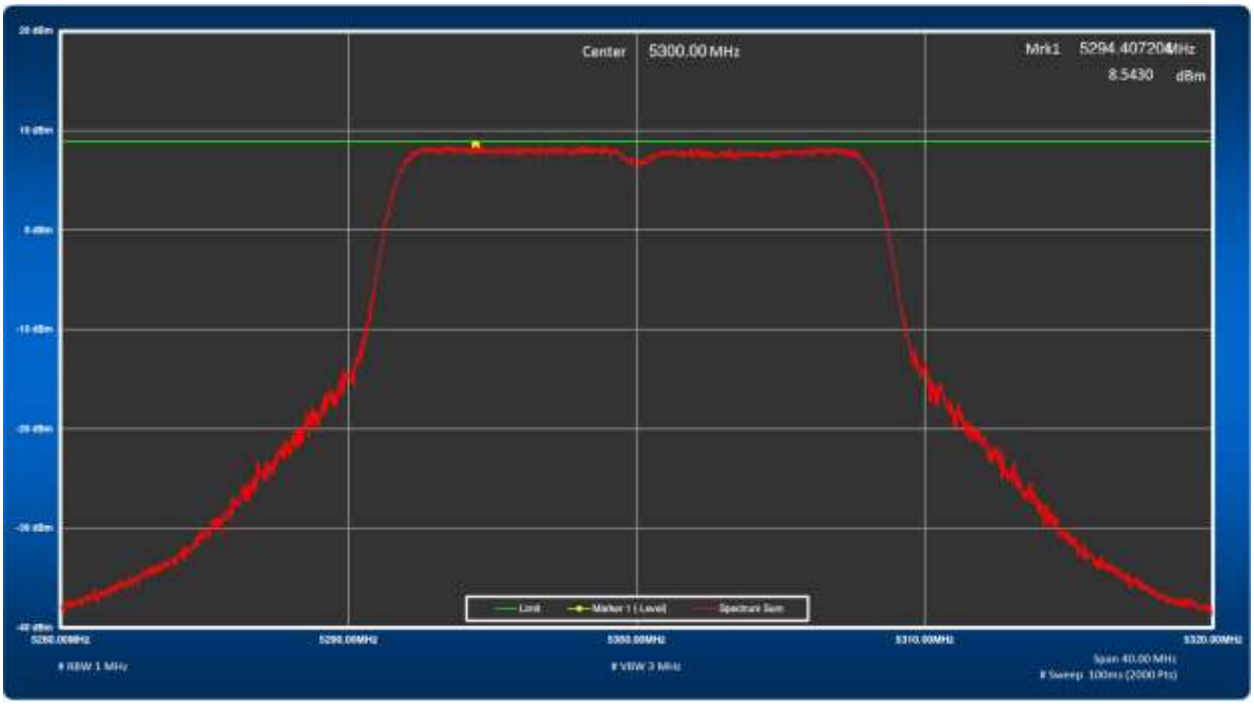


Figure 170: Total Sum of Power Spectral Density, 5300 MHz at 802.11a, 6 Mbps

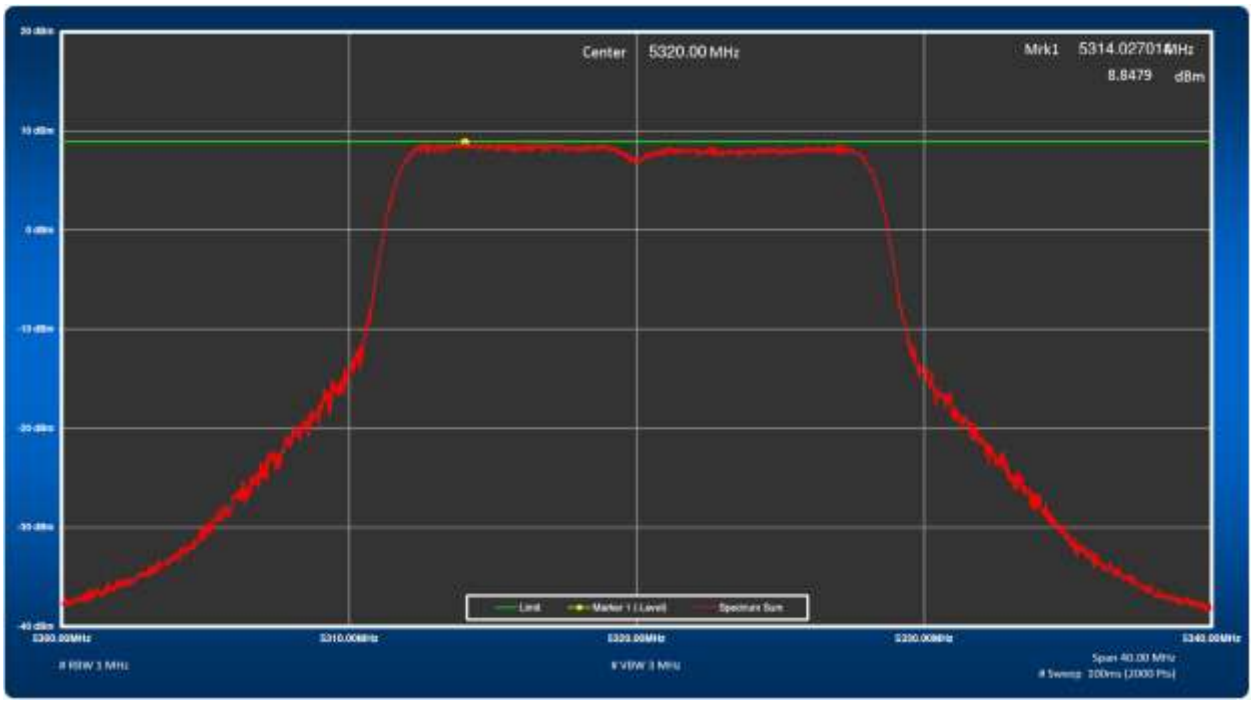


Figure 171: Total Sum of Power Spectral Density, 5320 MHz at 802.11a, 6 Mbps

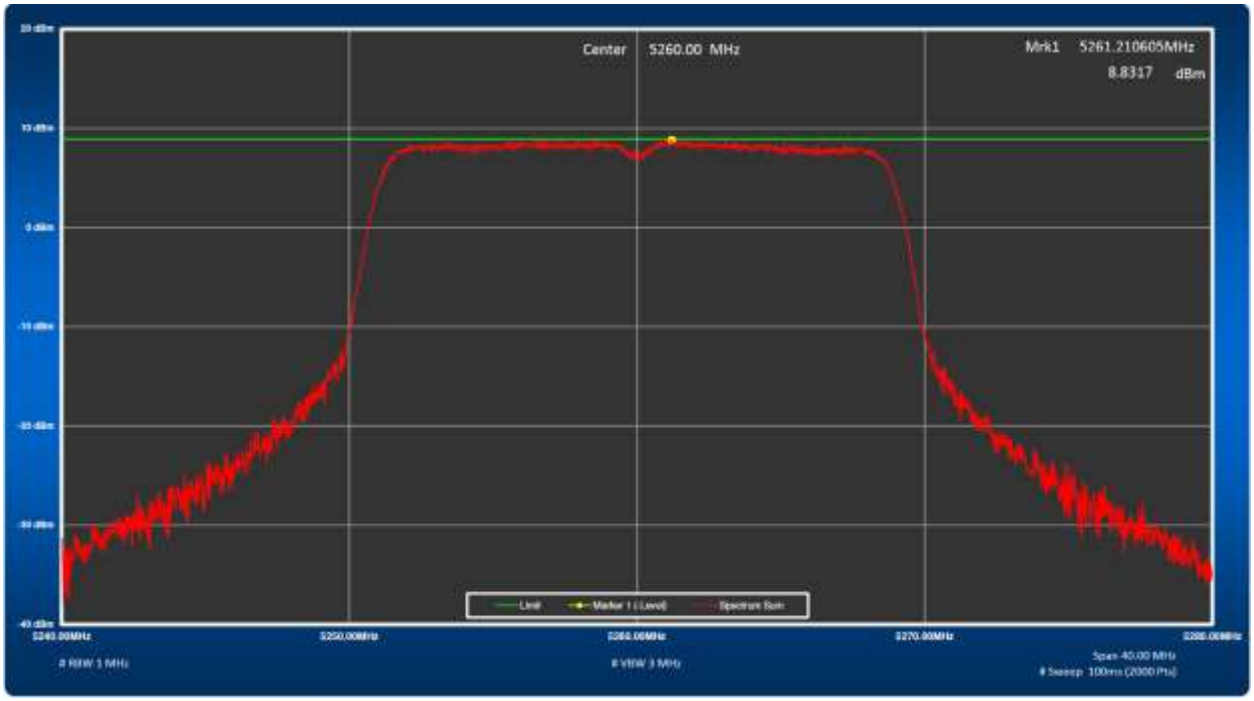


Figure 172: Total Sum of Power Spectral Density, 5260 MHz at 802.11n HT20 MCS0

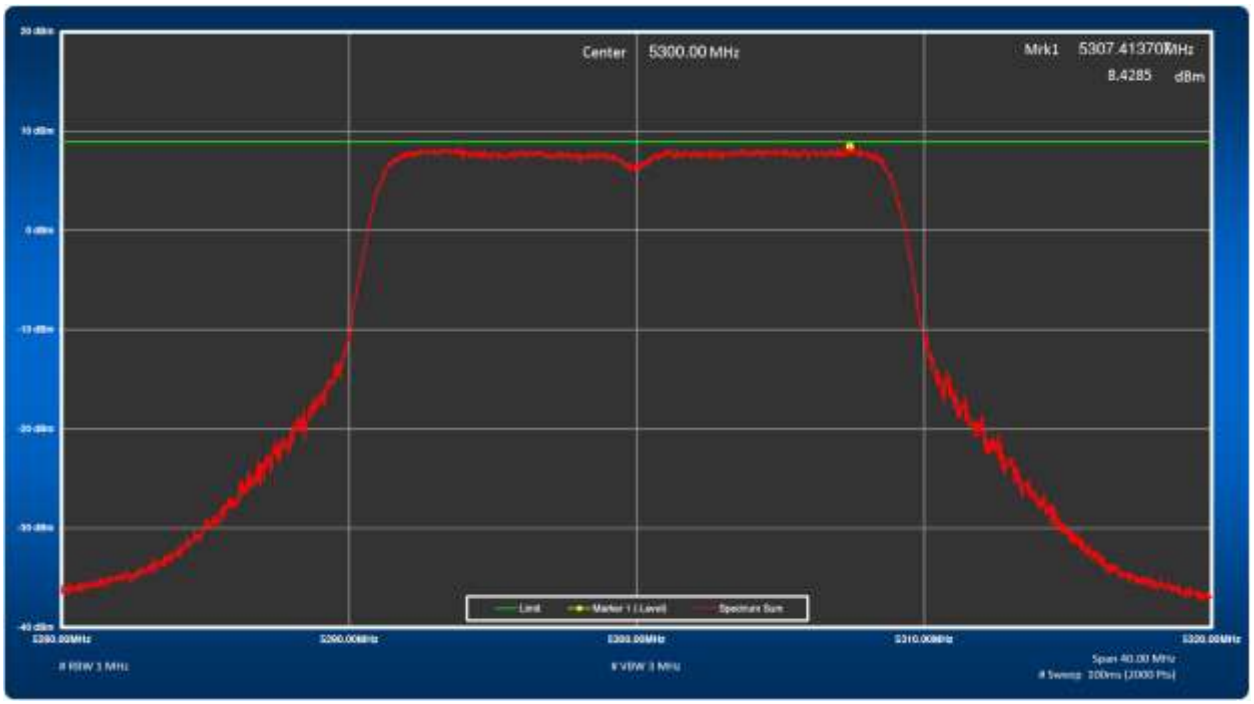


Figure 173: Total Sum of Power Spectral Density, 5300 MHz at 802.11n HT20 MCS0

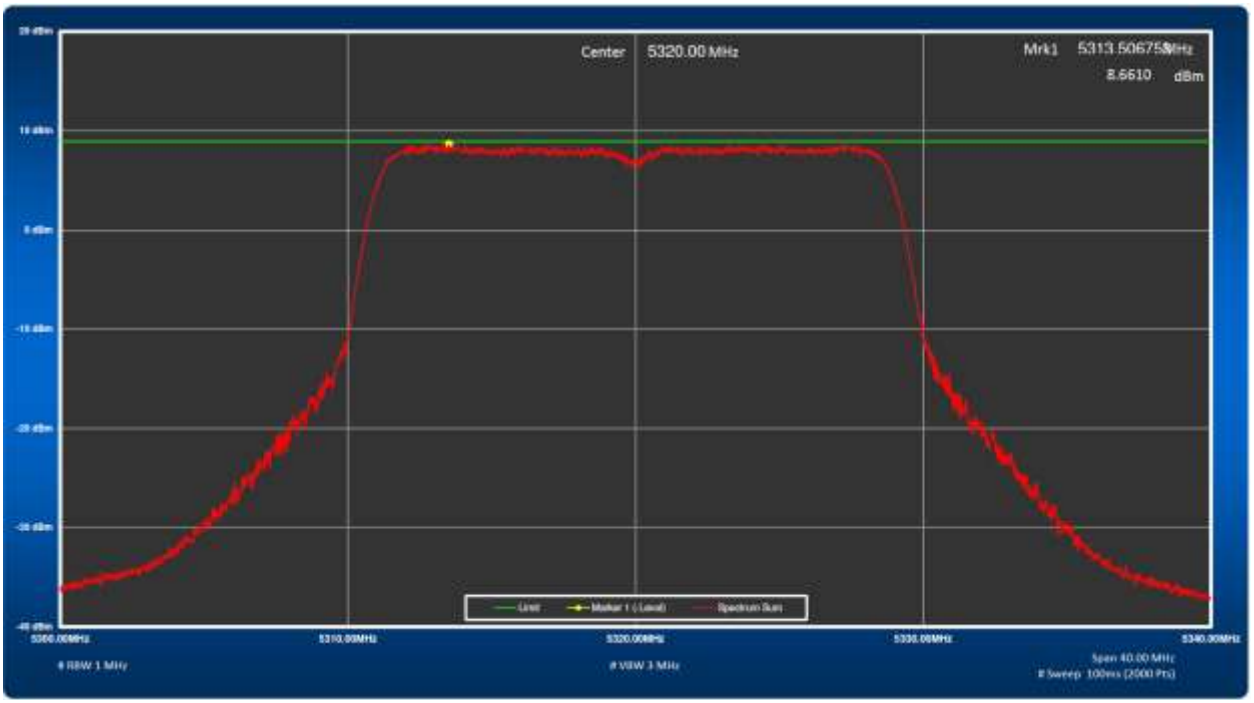


Figure 174: Total Sum of Power Spectral Density, 5320 MHz at 802.11n HT20 MCS0

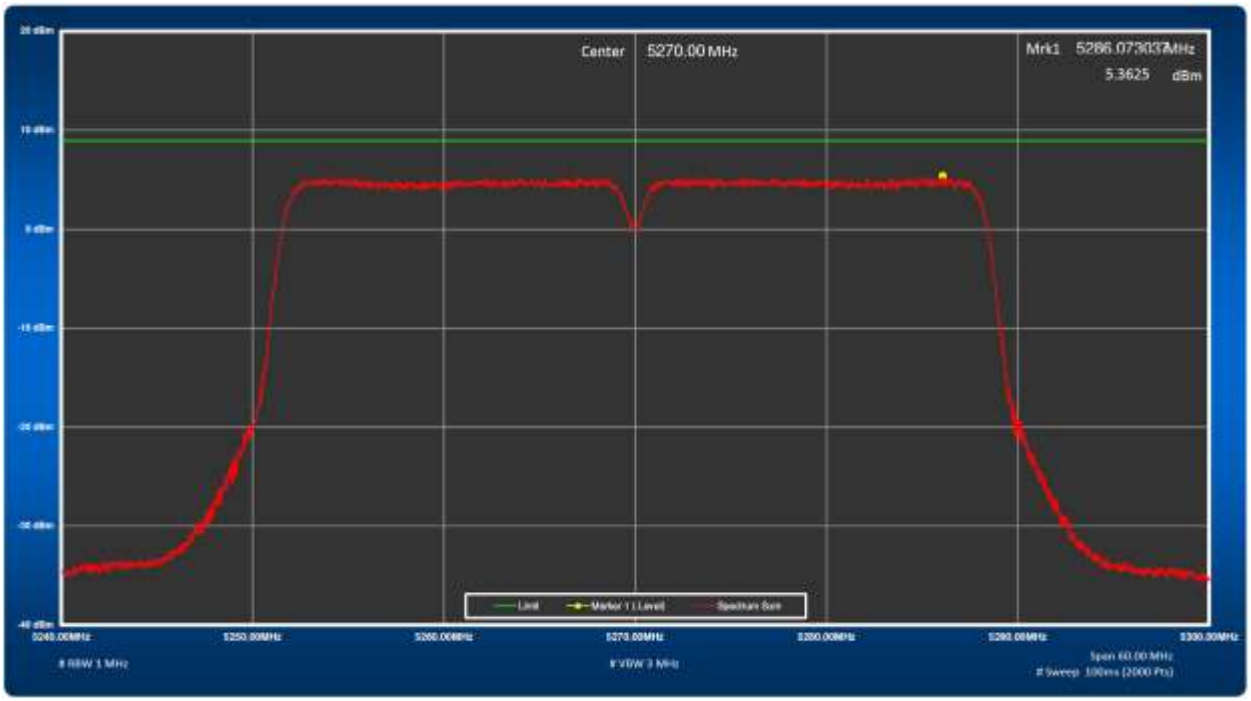


Figure 175: Total Sum of Power Spectral Density, 5270 MHz at 802.11n HT40 MCS0

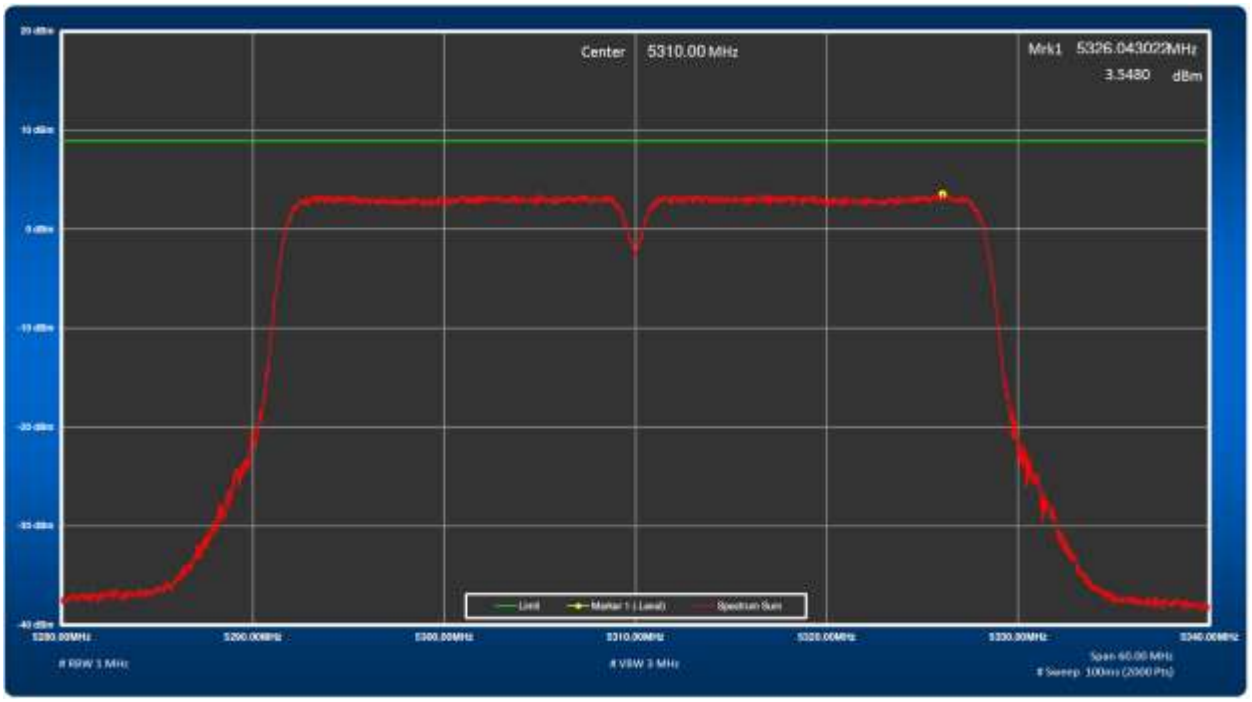


Figure 176: Total Sum of Power Spectral Density, 5310 MHz at 802.11n HT40 MCS0

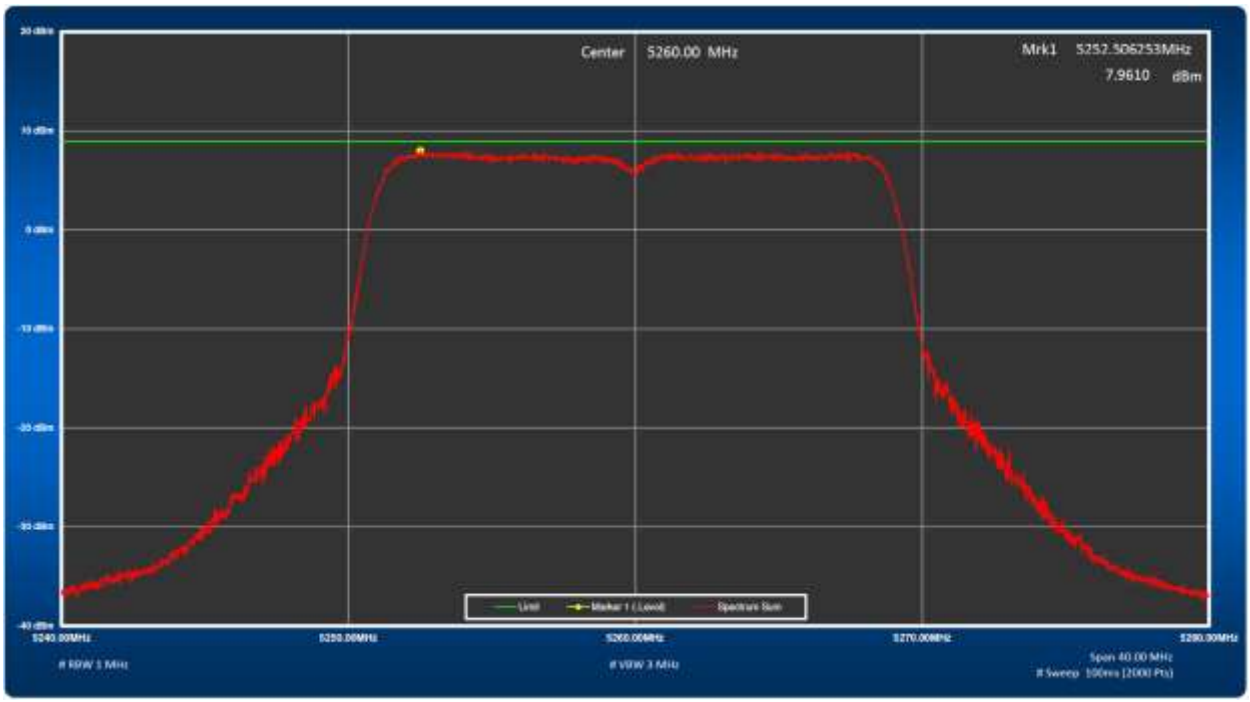


Figure 177: Total Sum of Power Spectral Density, 5260 MHz at 802.11ac VHT20 MCS0

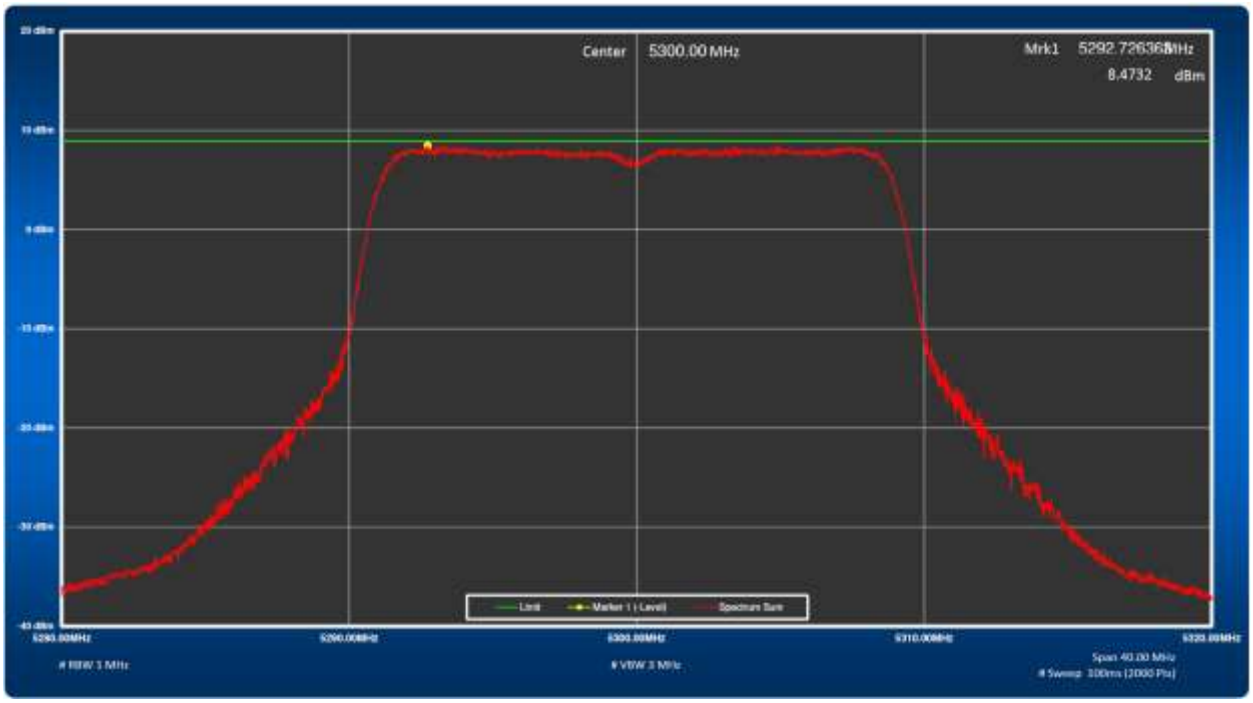


Figure 178: Total Sum of Power Spectral Density, 5300 MHz at 802.11ac VHT20 MCS0

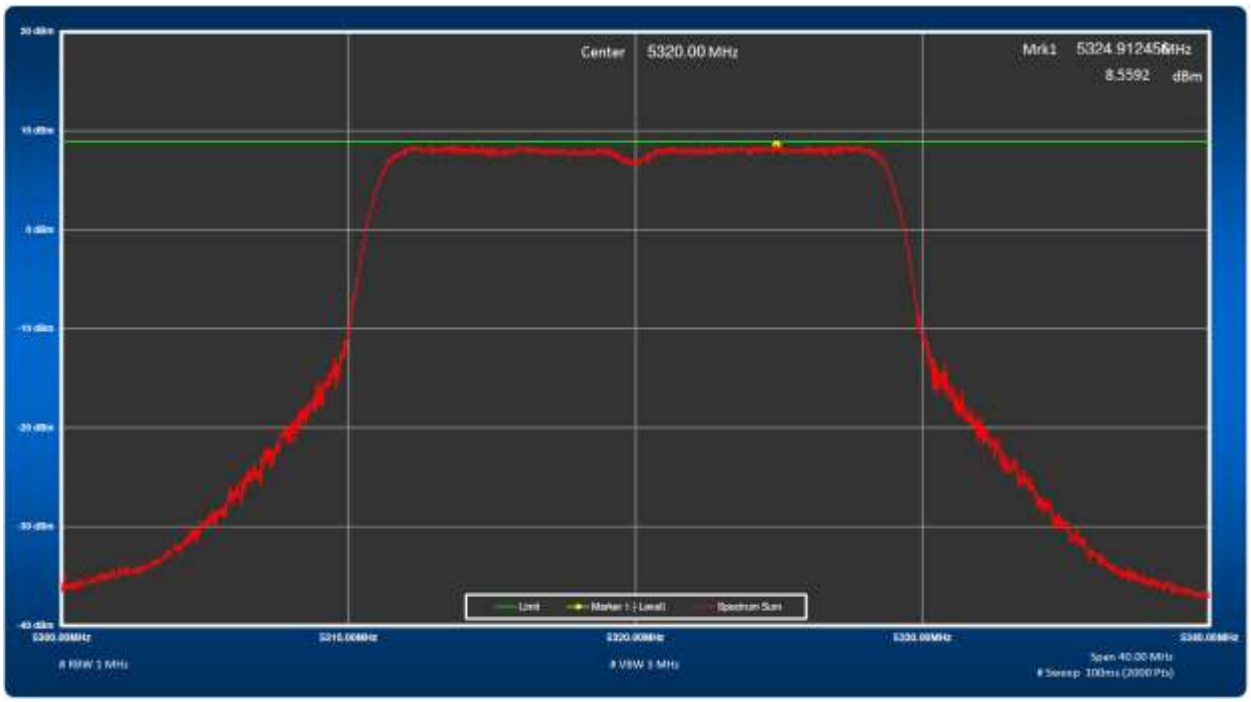


Figure 179: Total Sum of Power Spectral Density, 5320 MHz at 802.11ac VHT20 MCS0

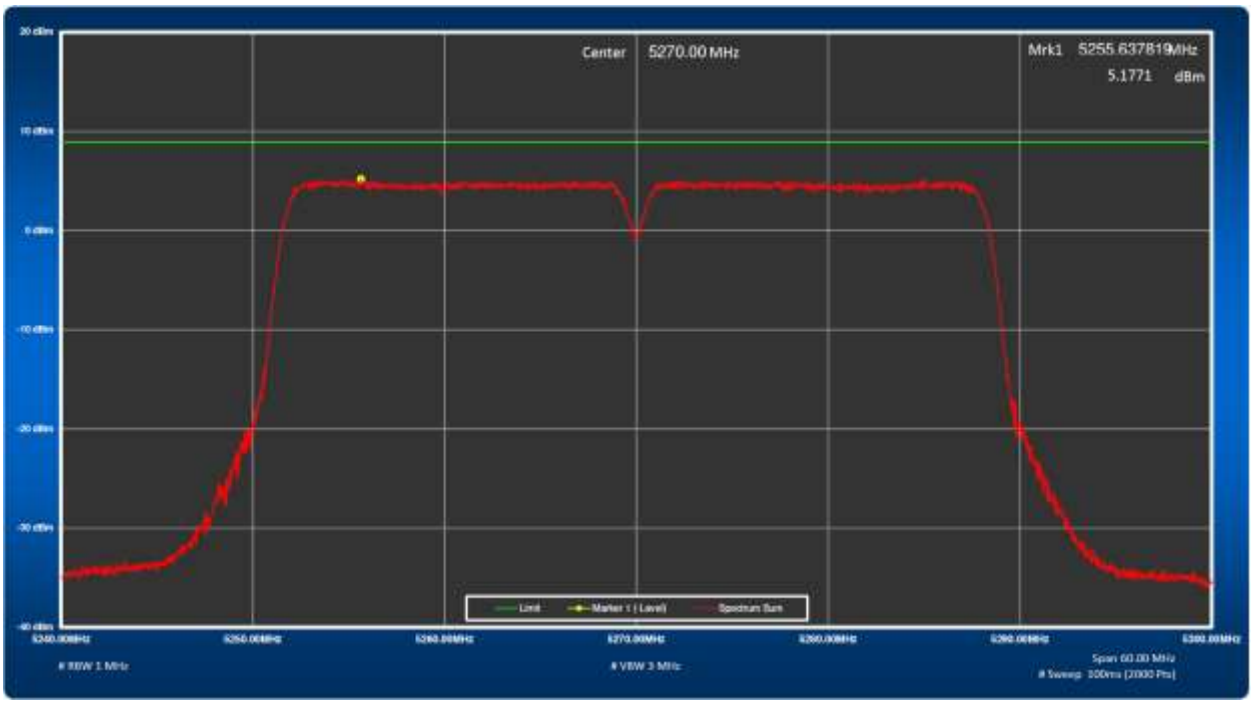


Figure 180: Total Sum of Power Spectral Density, 5270 MHz at 802.11ac VHT40 MCS0

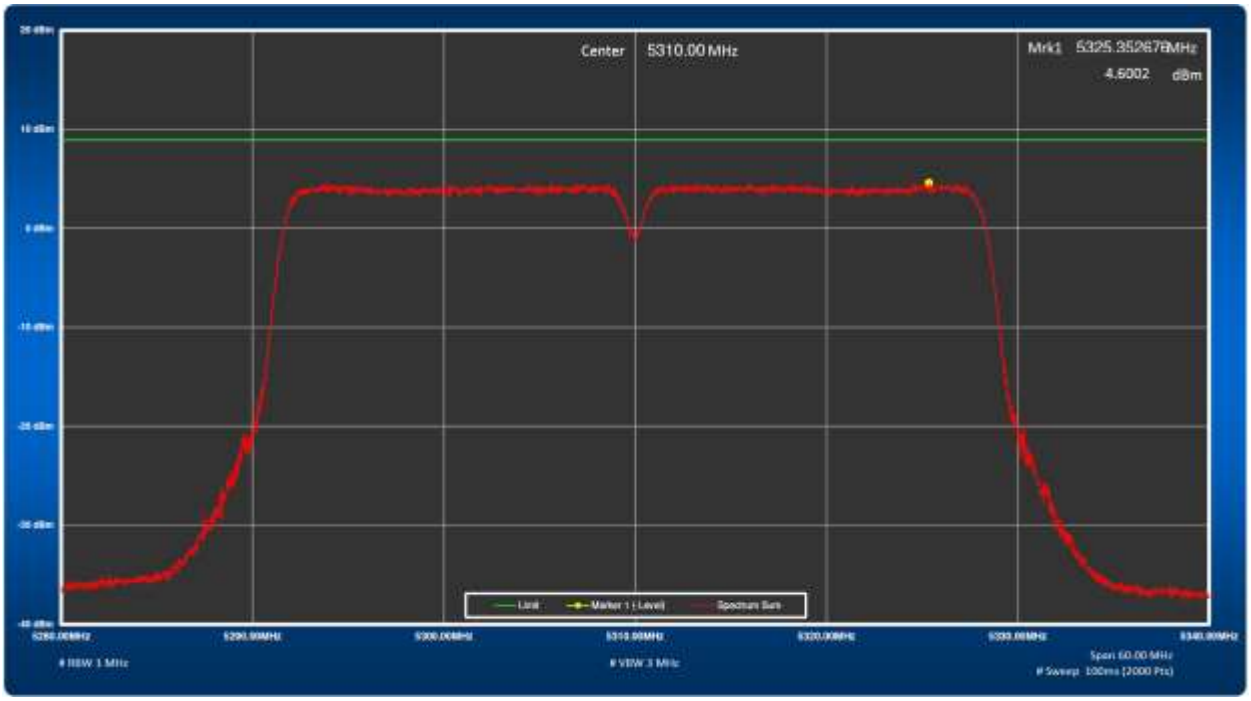


Figure 181: Total Sum of Power Spectral Density, 5310 MHz at 802.11ac VHT40 MCS0

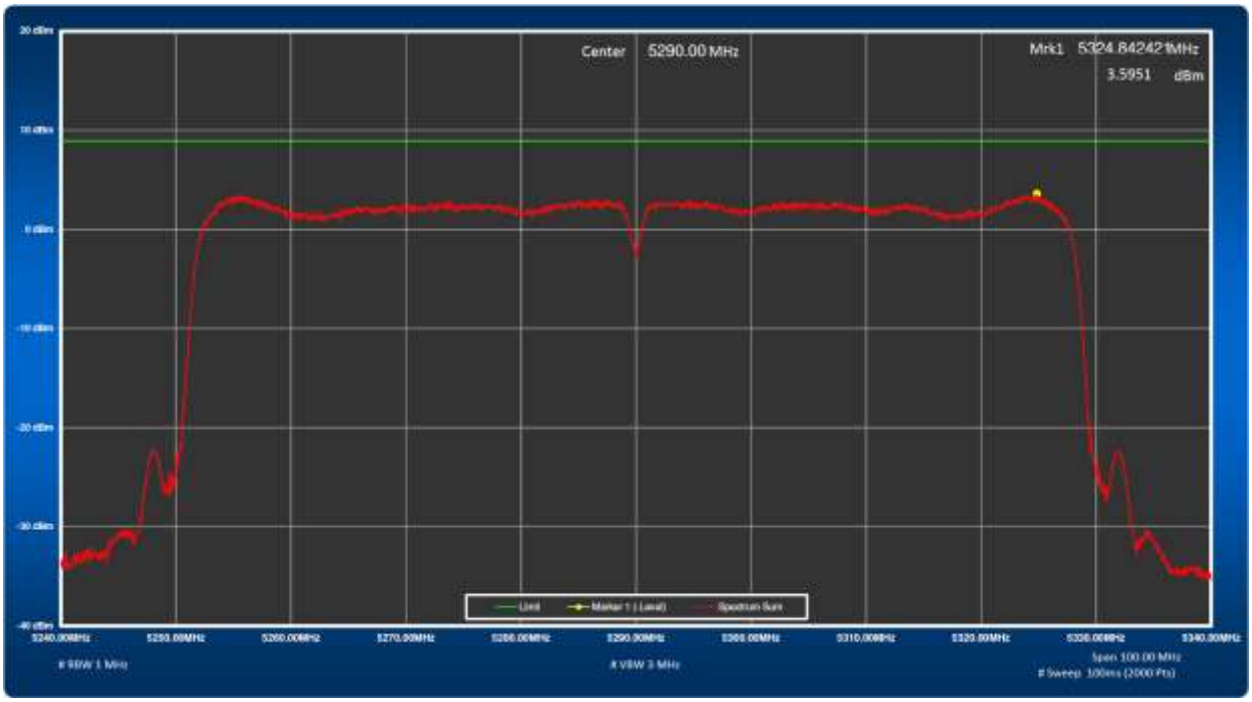


Figure 182: Total Sum of Power Spectral Density, 5290 MHz at 802.11ac VHT80 MCS0