FCC TEST REPORT

For

Epiphan Systems Inc

HDMI media encoder

Model No.: WEBCASTER X2, AV STUDIO ENCODER

Prepared For	:	Epiphan Systems Inc
Address	:	400 March Road Suite 510, Ottawa, K2K 3H4 Canada

Prepared By	:	Shenzhen Anbotek Compliance Laboratory Limited
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Report Number	:	R0217060041W4
Date of Test	:	Jun. 08~Jul. 10, 2017
Date of Report	:	Jul. 10, 2017

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TEST REPORT

Applicant	:	Epiphan Systems Inc
Manufacturer	:	Ugoos Industrial Co., Ltd
Product Name	:	HDMI media encoder
Model No.	:	WEBCASTER X2, AV STUDIO ENCODER
Trade Mark	:	N.A.
Rating(s)	:	Input DC 5V, 3A (via Adapter Input 100-240V~, 50/60HZ, 0.8A, Output DC 5V, 3A)
Test Standard(s)	**:**	**FCC Part15 Subpart E 2016, Paragraph 15.407**
Test Method(s)	**:**	**ANSI C63.10: 2013, KDB 789033 D02 General UNII Test Procedures New Rules v01r04**

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart E requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Test : : Jun. 08~Jul. 10, 2017

Prepared by : : Winkey Wang

(Tested Engineer / Winkey Wang)

Reviewer : : Amy Ding

(Project Manager / Amy Ding)

Approved & Authorized Signer : : Tom Chen

(Manager / Tom Chen)

1. General Information

1.1. Client Information

Applicant	:	Epiphan Systems Inc
Address	:	400 March Road Suite 510, Ottawa, K2K 3H4 Canada
Manufacturer	:	Ugoos Industrial Co., Ltd
Address	:	12th Floor, Building B, Bao'an Square, Sun'gang Road, Luohu, Shenzhen, China

1.2. Description of Device (EUT)

Product Name	:	HDMI media encoder	
Model No.	:	WEBCASTER X2, AV STUDIO ENCODER (Note: All samples are the same except the model number, housing and mic, so we prepare "WEBCASTER X2" for test only.)	
Trade Mark	:	N.A	
Test Power Supply	:	AC 120V, 60Hz for adapter/AC 240V, 60Hz for adapter	
Product Description	:	Operation Frequency:	BT 4.0+EDR: 2402-2480MHz WIFI 2.4G: 2412-2462MHz / 2422-2452MHz WIFI 5G: 5180MHz~5240MHz / 5190MHz~5230MHz/ 5210MHz
		Number of Channel:	BT 4.0+EDR: 40 Channels for BT 4.0(BLE) 79 Channels for BT EDR WIFI 2.4G: 11 Channels for 802.11b/ g/ n(HT20) 7 Channels for 802.11n(HT40) WIFI 5G: 4 Channels for 802.11a 4 Channels for 802.11n(HT20) 4 Channels for 802.11ac(HT20) 2 Channels for 802.11n(HT40) 2 Channels for 802.11ac(HT40) 1 Channels for 802.11ac(HT80)
		Modulation Type:	GFSK with BT 4.0 GFSK, π/4DQPSK, 8DPSK with BT EDR OFDM with BPSK/QPSK/16QAM/64QAM for 802.11a/b/g/n; OFDM with BPSK/QPSK/16QAM/64QAM/ 256QAM for 802.11ac
		Antenna Type:	Rod Antenna
		Antenna Gain(Peak):	5 dBi
Remark: 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.			

2)This report is for WIFI 5G

1.3. Auxiliary Equipment Used During Test

Adapter	:	Manufacturer: Shenzhen Rongweixin Technology Co., Ltd. M/N: R241-05030001 Input: 100-240V~50/60Hz 0.8A Output: AC 120V/60HZ, 3000mA Remark: The adapter was provided by customer.

1.4. Description of Test Modes

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Mode	Test channel	Frequency (MHz)
OFDM(802.11a/n20/ac20)	CH 36	5180MHz
	CH 40	5200MHz
	CH 48	5240MHz
OFDM(802.11n40/ac40)	CH 38	5190MHz
	CH 46	5230MHz
OFDM(802.11ac80)	CH 42	5210MHz

Note:
1. The measurements are performed at the highest, middle, lowest available channels.
2. The EUT has been tested as an independent unit. And Continual Transmitting in maximum power.
3. For the relevant Conducted Measurement, the temporary antenna connector is used during the measurement. Antenna Connector Impedance: 50Ω, Cable Loss: 1.0 dB
4. The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is more than 98%

1.5. List of channels

802.11a/n20/ac20

Channel	Freq. (MHz)	Channel	Freq. (MHz)
36	5180	44	5220
40	5200	48	5240

802.11n40/ac40

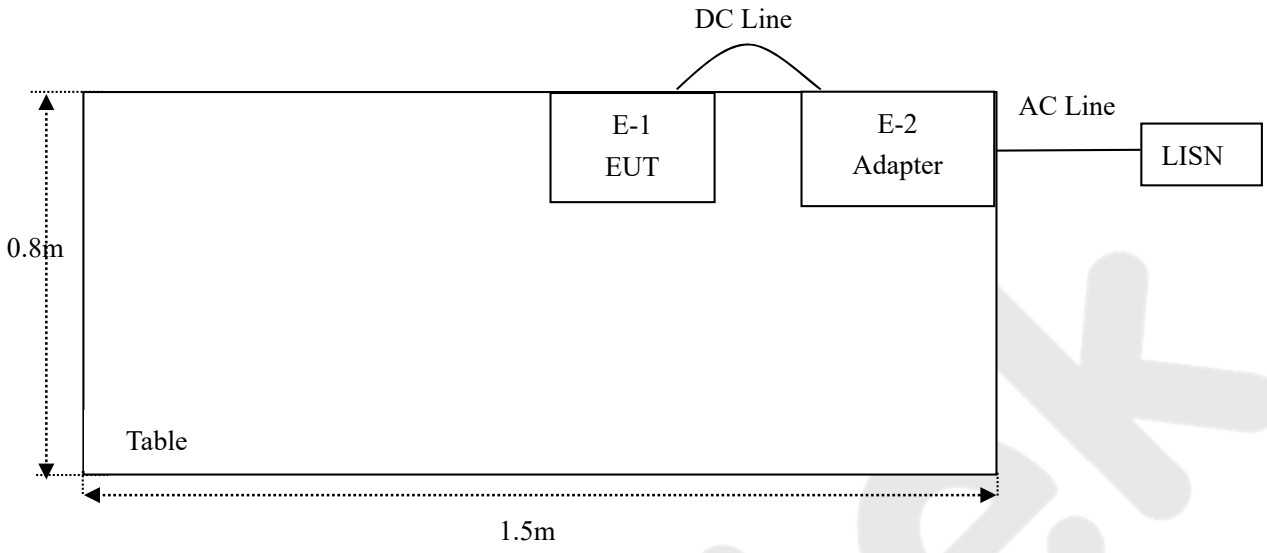
Channel	Freq. (MHz)	Channel	Freq. (MHz)
38	5190	46	5230

802.11ac80

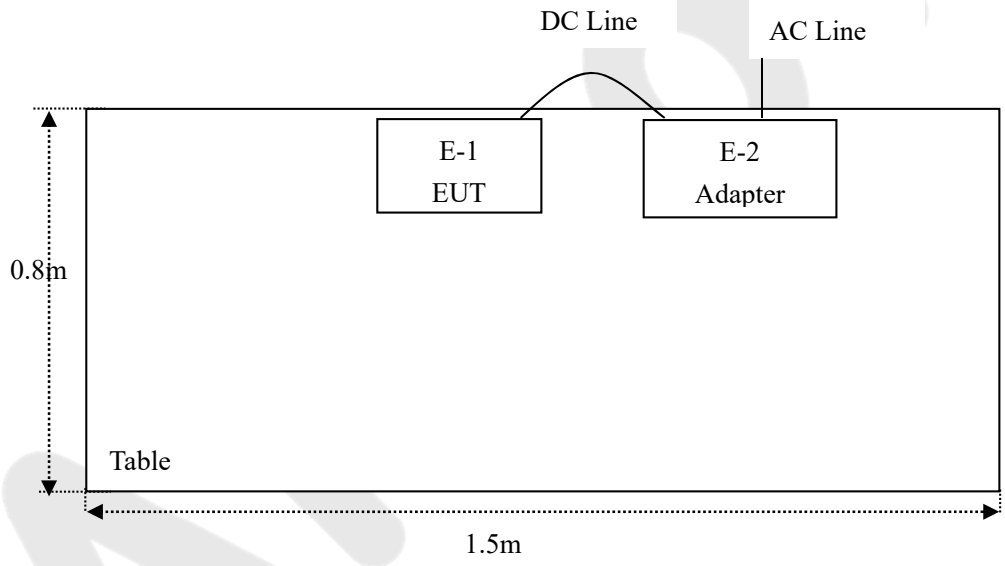
Channel	Freq. (MHz)
42	5210

1.6. Description Of Test Setup

CE



RE



1.7. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	May 27, 2017	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	May 27, 2017	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	May 27, 2017	1 Year
4.	Spectrum Analysis	Agilent	E4407B	US39390582	May 27, 2017	1 Year
5.	Preamplifier	SKET Electronic	BK1G18G30 D	KD17503	May 27, 2017	1 Year
6.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	May 27, 2017	1 Year
7.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	May 31, 2017	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	May 31, 2017	1 Year
9.	Loop Antenna	Schwarzbeck	HFH2-Z2	100047	Apr. 03, 2017	1 Year
10.	Pre-amplifier	SONOMA	310N	186860	May 27, 2017	1 Year
11.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
12.	Power Sensor	DAER	RPR3006W	15I00041SN045	May 27, 2017	1 Year
13.	Power Sensor	DAER	RPR3006W	15I00041SN046	May 27, 2017	1 Year
14.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	May 27, 2017	1 Year
15.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	May 27, 2017	1 Year
16.	Signal Generator	Agilent	E4421B	MY41000743	May 27, 2017	1 Year
17.	DC Power supply	IVYTECH	IV6003	1601D6030007	May 26, 2017	1 Year
18.	TEMP&HUMI PROGRAMMABLE CHAMBER	Sertep	ZJ-HWHS80B	ZJ-17042804	Mar. 03, 2017	1 Year

1.8. Measurement Uncertainty

Radiation Uncertainty	:	Ur = 4.1 dB (Horizontal)
		Ur = 4.3 dB (Vertical)
Conduction Uncertainty	:	Uc = 3.4dB

1.9. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 752021

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registed and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 752021, July 06, 2016.

ISED-Registration No.: 8058A-1

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A-1, June 13, 2016.

Test Location

All Emissions tests were performed at

Shenzhen Anbotek Compliance Laboratory Limited. at 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China

2. Summary of Test Results

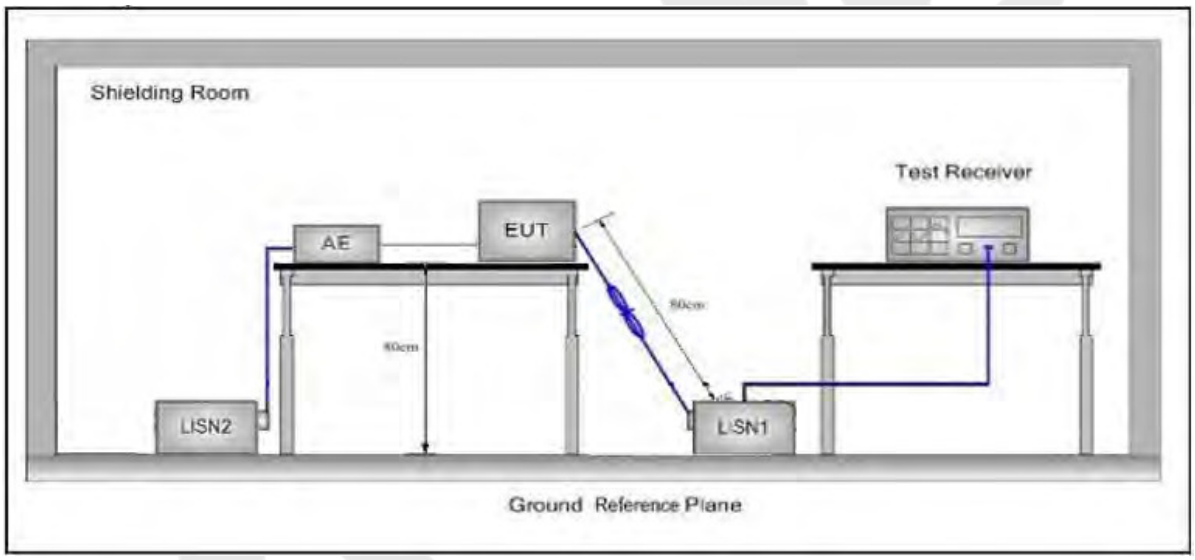
Standard	Test Type	Result
15.207 & 15.407	Conducted Emission	PASS
15.205/15.209	Spurious Emission	PASS
15.407(b)	Band Edge	PASS
15.407(a)(5)	Occupy Bandwidth	PASS
15.407(a)(1)(3)	Maximum Conducted Output Power	PASS
15.407(a)(1)(3)	Peak Power Spectral Density	PASS
15.203/15.407g	Antenna Requirement	PASS

3. Conducted Emission Test

3.1. Test Standard and Limit

Test Standard	FCC Part15 Section 15.207&15.407		
Test Limit	Frequency	Maximum RF Line Voltage (dBuV)	
		Quasi-peak Level	Average Level
	150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
	500kHz~5MHz	56	46
	5MHz~30MHz	60	50
Remark: (1) *Decreasing linearly with logarithm of the frequency. (2) The lower limit shall apply at the transition frequency.			

3.2. Test Setup



3.3. Test Procedure

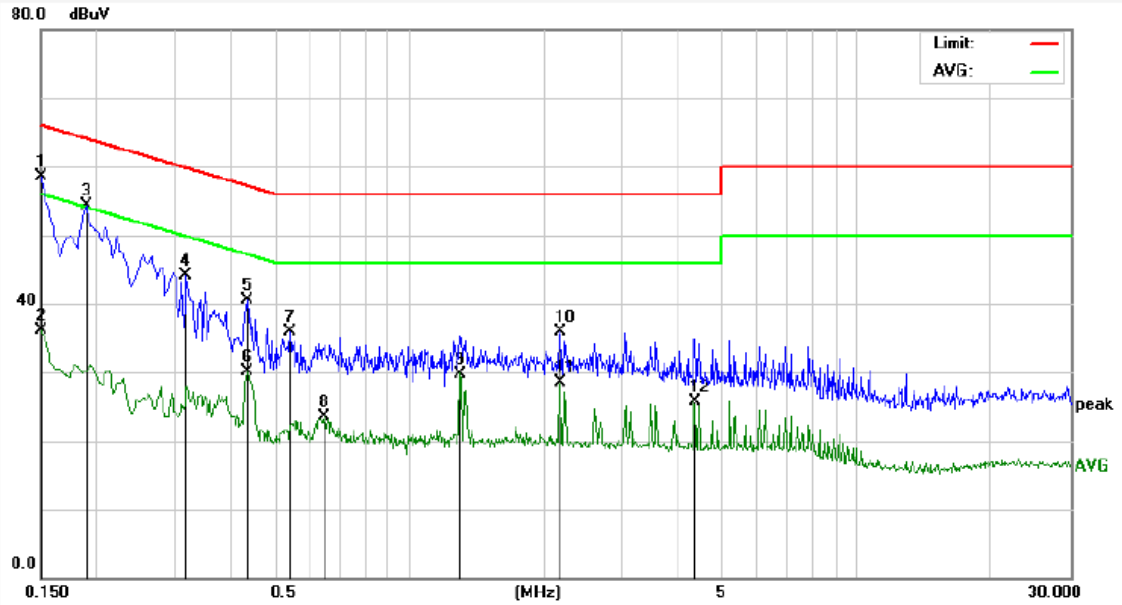
The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.10-2013 on Conducted Emission Measurement.
The bandwidth of test receiver (ESCI) set at 9kHz.
The frequency range from 150kHz to 30MHz is checked.

3.4. Test Data

Please to see the following pages

Conducted Emission Test Data

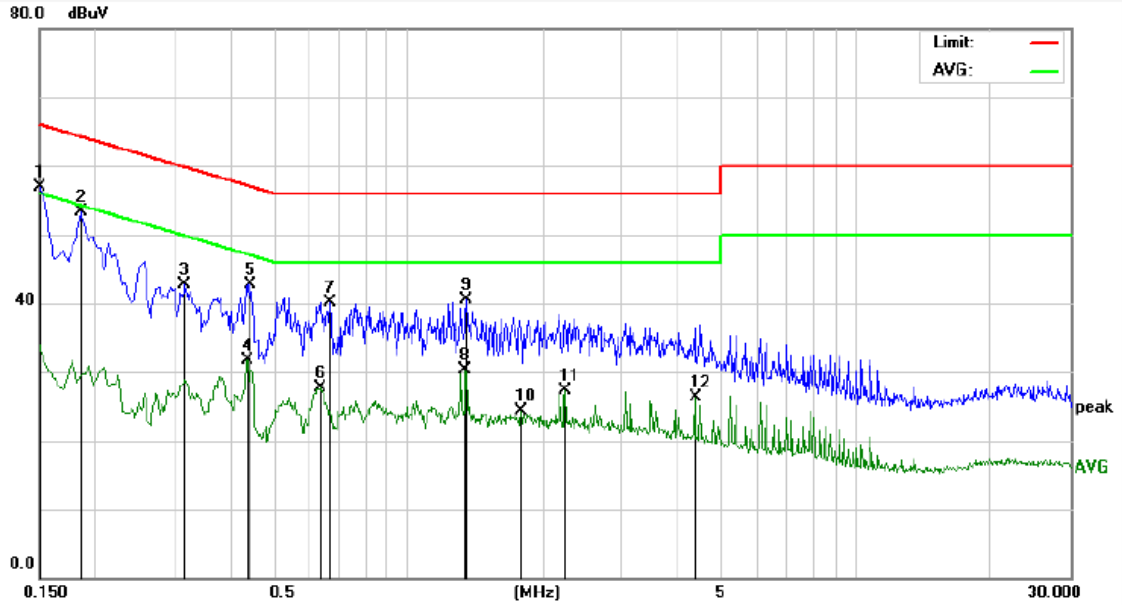
Test Site: 1# Shielded Room
Operating Condition: Keeping TX mode
Test Specification: AC 120V, 60Hz for adapter
Comment: Live Line
Tem.:25℃ Hum.:50%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1500	38.69	19.90	58.59	65.99	-7.40	QP	
2	0.1500	16.16	19.90	36.06	55.99	-19.93	AVG	
3	0.1900	34.46	19.90	54.36	64.03	-9.67	QP	
4	0.3180	24.24	19.90	44.14	59.76	-15.62	QP	
5	0.4340	20.58	19.95	40.53	57.18	-16.65	QP	
6	0.4340	10.20	19.95	30.15	47.18	-17.03	AVG	
7	0.5420	15.92	19.99	35.91	56.00	-20.09	QP	
8	0.6460	3.39	20.02	23.41	46.00	-22.59	AVG	
9	1.2980	9.67	20.13	29.80	46.00	-16.20	AVG	
10	2.1780	15.73	20.14	35.87	56.00	-20.13	QP	
11	2.1780	8.38	20.14	28.52	46.00	-17.48	AVG	
12	4.3340	5.46	20.19	25.65	46.00	-20.35	AVG	

Conducted Emission Test Data

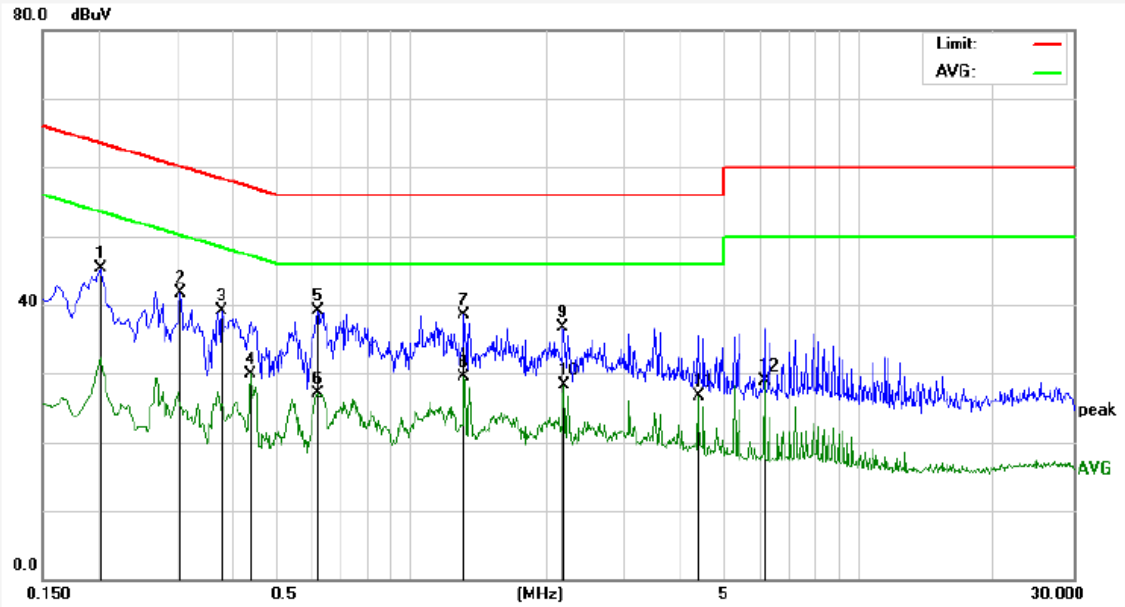
Test Site: 1# Shielded Room
Operating Condition: Keeping TX mode
Test Specification: AC 120V, 60Hz for adapter
Comment: Neutral Line
Tem.:25℃ Hum.:50%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1500	36.96	19.90	56.86	65.99	-9.13	QP	
2	0.1860	33.48	19.90	53.38	64.21	-10.83	QP	
3	0.3180	22.80	19.90	42.70	59.76	-17.06	QP	
4	0.4380	11.80	19.95	31.75	47.10	-15.35	AVG	
5	0.4460	22.69	19.96	42.65	56.95	-14.30	QP	
6	0.6380	7.71	20.02	27.73	46.00	-18.27	AVG	
7	0.6700	20.12	20.03	40.15	56.00	-15.85	QP	
8	1.3420	10.23	20.13	30.36	46.00	-15.64	AVG	
9	1.3460	20.30	20.13	40.43	56.00	-15.57	QP	
10	1.7900	4.13	20.14	24.27	46.00	-21.73	AVG	
11	2.2380	7.25	20.14	27.39	46.00	-18.61	AVG	
12	4.3659	6.13	20.19	26.32	46.00	-19.68	AVG	

Conducted Emission Test Data

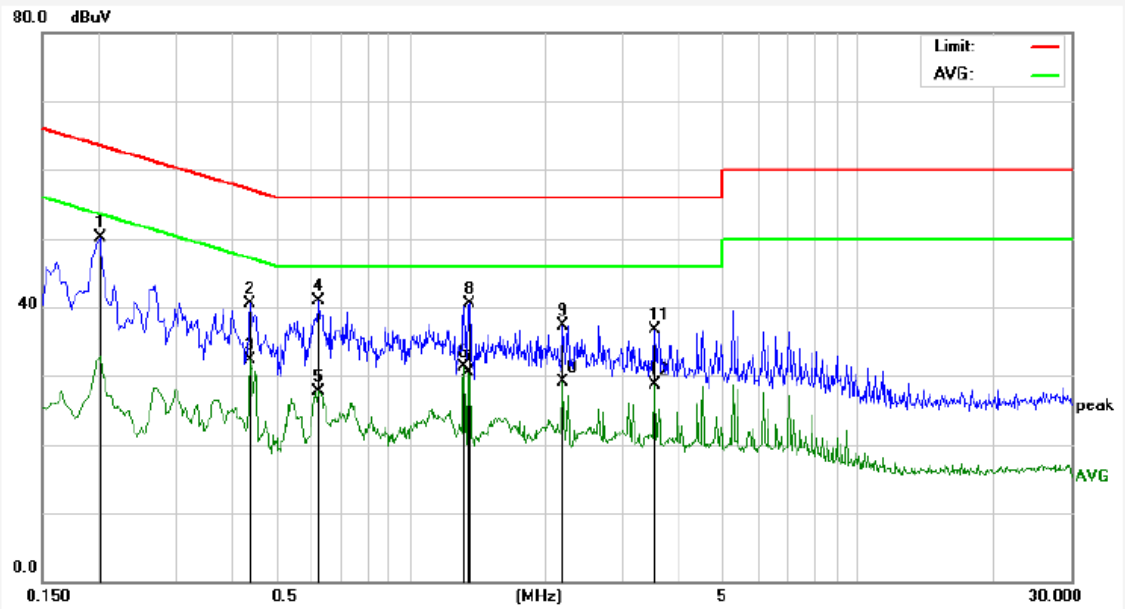
Test Site: 1# Shielded Room
Operating Condition: Keeping TX mode
Test Specification: AC 240V, 60Hz for adapter
Comment: Live Line
Tem.:25℃ Hum.:50%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.2020	25.34	19.90	45.24	63.52	-18.28	QP	
2	0.3060	21.77	19.89	41.66	60.08	-18.42	QP	
3	0.3780	19.18	19.93	39.11	58.32	-19.21	QP	
4	0.4380	9.99	19.95	29.94	47.10	-17.16	AVG	
5	0.6180	19.09	20.02	39.11	56.00	-16.89	QP	
6	0.6180	7.11	20.02	27.13	46.00	-18.87	AVG	
7	1.3140	18.42	20.13	38.55	56.00	-17.45	QP	
8	1.3140	9.34	20.13	29.47	46.00	-16.53	AVG	
9	2.1860	16.61	20.14	36.75	56.00	-19.25	QP	
10	2.1900	8.14	20.14	28.28	46.00	-17.72	AVG	
11	4.3820	6.60	20.19	26.79	46.00	-19.21	AVG	
12	6.1340	8.62	20.24	28.86	50.00	-21.14	AVG	

Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: Keeping TX mode
Test Specification: AC 240V, 60Hz for adapter
Comment: Neutral Line
Tem.:25℃ Hum.:50%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.2020	30.14	19.90	50.04	63.52	-13.48	QP	
2	0.4380	20.61	19.95	40.56	57.10	-16.54	QP	
3	0.4380	12.29	19.95	32.24	47.10	-14.86	AVG	
4	0.6260	20.82	20.02	40.84	56.00	-15.16	QP	
5	0.6260	7.70	20.02	27.72	46.00	-18.28	AVG	
6	1.3180	11.18	20.13	31.31	46.00	-14.69	AVG	
7	1.3500	10.45	20.13	30.58	46.00	-15.42	AVG	
8	1.3540	20.41	20.13	40.54	56.00	-15.46	QP	
9	2.1940	17.26	20.14	37.40	56.00	-18.60	QP	
10	2.1940	8.96	20.14	29.10	46.00	-16.90	AVG	
11	3.5140	16.62	20.17	36.79	56.00	-19.21	QP	
12	3.5140	8.47	20.17	28.64	46.00	-17.36	AVG	

4. Radiation Spurious Emission and Band Edge

4.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.209, 15.205 and 15.407				
Test Limit	Frequency (MHz)	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz~0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz~88MHz	100	40.0	Quasi-peak	3
	88MHz~216MHz	150	43.5	Quasi-peak	3
	216MHz~960MHz	200	46.0	Quasi-peak	3
	960MHz~1000MHz	500	54.0	Quasi-peak	3
	Above 1000MHz	500	54.0	Average	3
		-	68.2	Peak	3

Remark:

(1)The lower limit shall apply at the transition frequency.

(2) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

(3) Above 1GHz limit: E[dBμV/m] = EIRP[dBm] + 95.2=68.2 dBuV/m, for EIPR[dBm]=-27dBm.

4.2. Test Setup

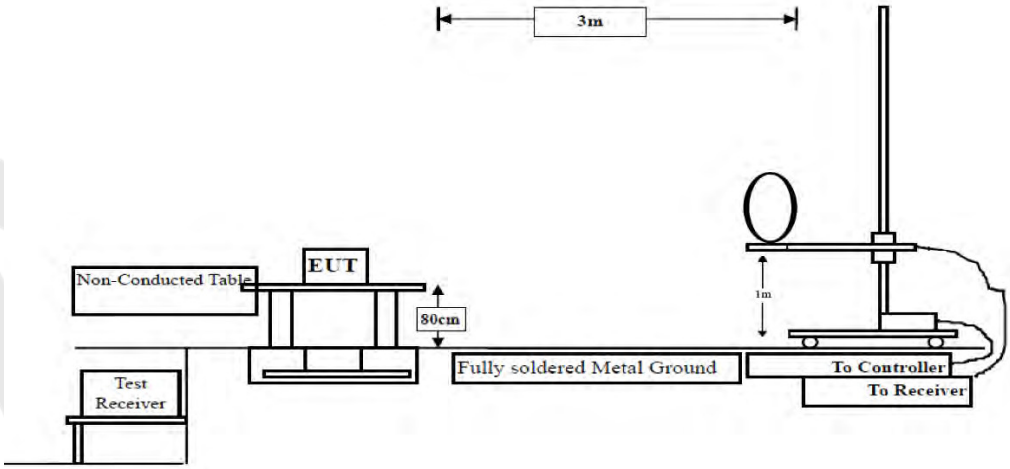


Figure 1. Below 30MHz

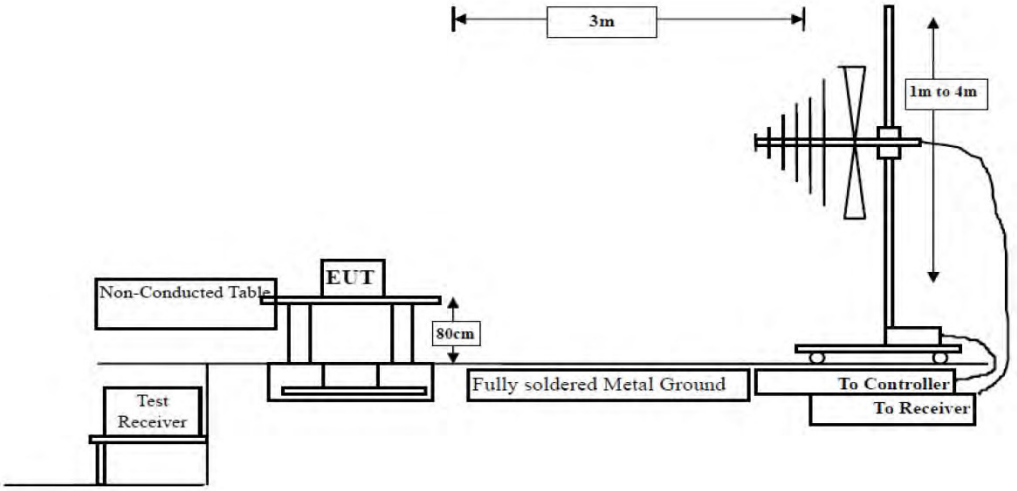


Figure 2. 30MHz to 1GHz

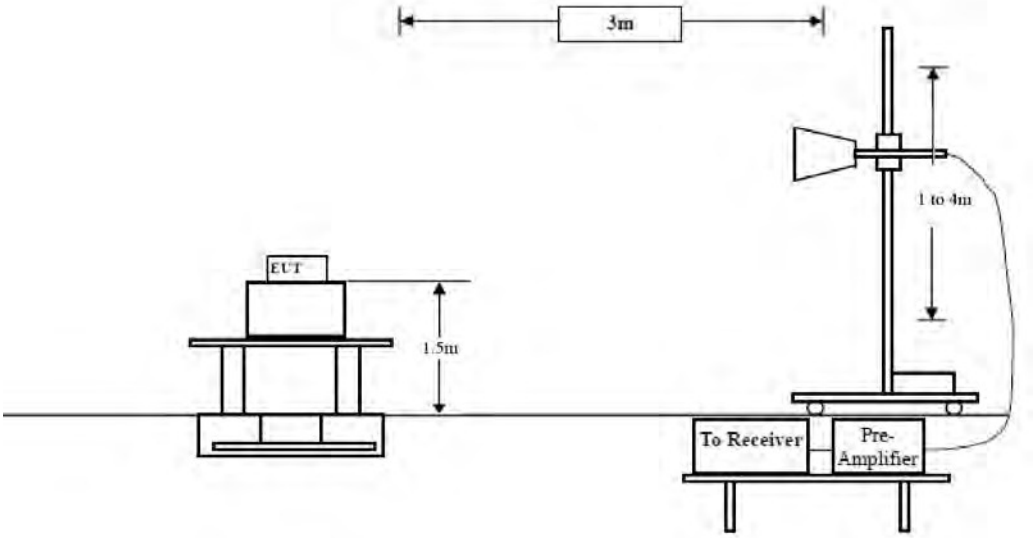


Figure 3. Above 1 GHz

4.3. Test Procedure

For below 1GHz: The EUT is placed on a turntable, which is 0.8m above the ground plane.
For above 1GHz: The EUT is placed on a turntable, which is 1.5m above the ground plane.
The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Rotated the EUT through three orthogonal axes to determine the maximum emissions, both horizontal and vertical polarization of the antenna are set on test. The EUT is tested in 9*6*6 Chamber. The device is evaluated in xyz orientation.

For 9kHz to 150kHz, Set the spectrum analyzer as:
RBW = 200Hz, VBW =1kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 150kHz to 30MHz, Set the spectrum analyzer as:
RBW = 9KHz, VBW =30kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 30MHz to 1000MHz, Set the spectrum analyzer as:
RBW = 100kHz, VBW =300kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.
.
For above 1GHz, Set the spectrum analyzer as:
RBW =1MHz, VBW =1MHz, Detector= Peak, Trace mode= Max hold, Sweep- auto couple.
RBW =1MHz, VBW =10Hz, Detector= Average, Trace mode= Max hold, Sweep- auto couple.

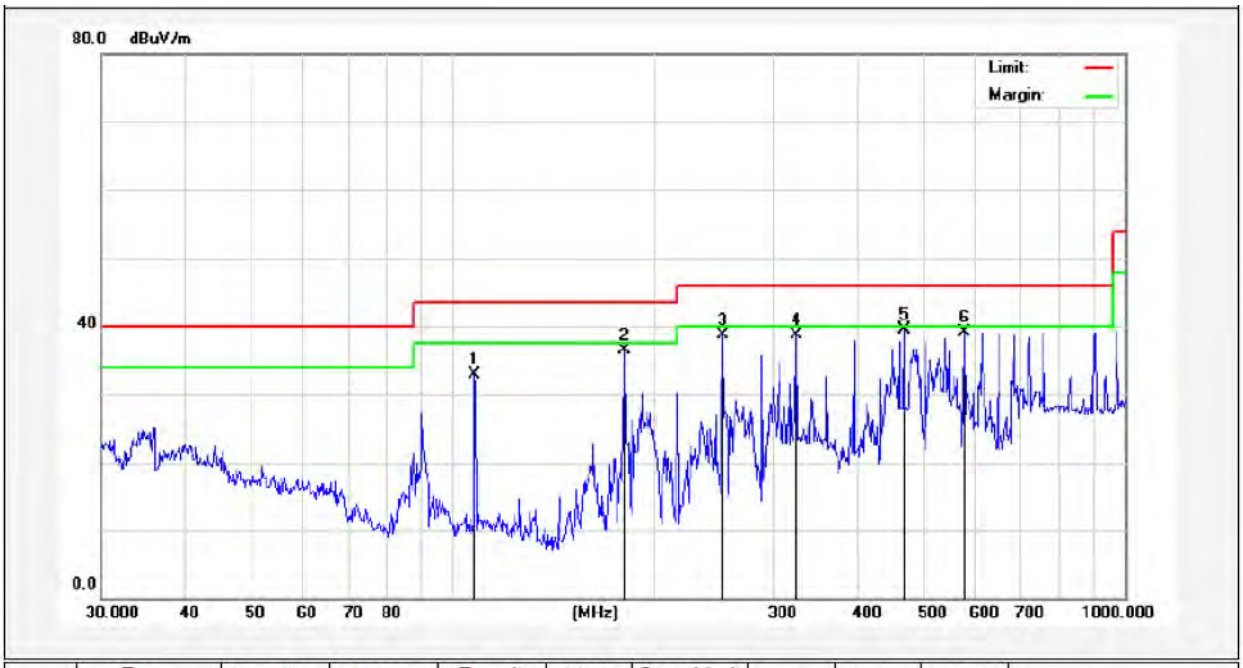
4.4. Test Data

PASS

The test results of 9kHz-30MHz and above 18000MHz are attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Test Results (30~1000MHz)

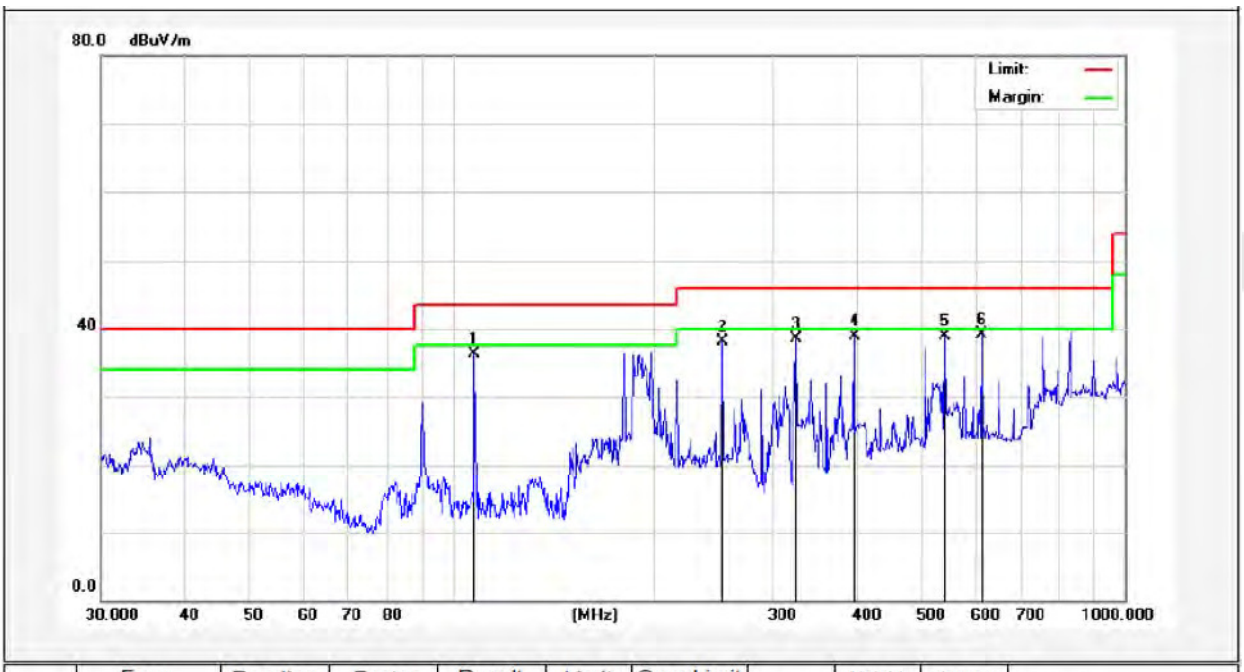
Job No.:	0217060041W	Temp.(°C)/Hum.(%RH):	24.3°C/55%RH
Standard:	FCC PART 15C	Power Source:	AC 120V/60Hz
Test Mode:	TX Mode	Polarization:	Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	107.8876	48.57	-15.66	32.91	43.50	-10.59	peak			
2	180.0165	53.35	-16.85	36.50	43.50	-7.00	peak			
3	252.0627	52.77	-14.03	38.74	46.00	-7.26	peak			
4	324.4560	52.77	-14.04	38.73	46.00	-7.27	peak			
5	468.8761	51.26	-11.85	39.41	46.00	-6.59	peak			
6	576.6443	48.77	-9.64	39.13	46.00	-6.87	peak			

Test Results (30~1000MHz)

Job No.:	0217060041W	Temp.(°C)/Hum.(%RH):	24.3°C/55%RH
Standard:	FCC PART 15C	Power Source:	AC 120V/60Hz
Test Mode:	TX Mode	Polarization:	Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	107.8876	57.01	-20.66	36.35	43.50	-7.15	peak			
2	252.0627	56.76	-18.64	38.12	46.00	-7.88	peak			
3	324.4560	53.52	-15.04	38.48	46.00	-7.52	peak			
4	396.2412	51.85	-12.94	38.91	46.00	-7.09	peak			
5	539.4773	49.91	-11.07	38.84	46.00	-7.16	peak			
6	612.0642	49.92	-10.91	39.01	46.00	-6.99	peak			

Test Results (Above 1000MHz)

Test mode:	IEEE 802.11a	Test channel:	Low CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10360.00	42.32	31.98	17.08	33.91	57.47	68.20	-10.73	V
15540.00	35.02	32.65	20.03	34.85	52.85	68.20	-15.35	V
10360.00	37.65	31.98	17.08	33.91	52.80	68.20	-15.40	H
15540.00	35.78	32.65	20.03	34.85	53.61	68.20	-14.59	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10360.00	31.32	31.98	17.08	33.91	46.47	54.00	-7.53	V
15540.00	28.35	32.65	20.03	34.85	46.18	54.00	-7.82	V
10360.00	28.31	31.98	17.08	33.91	43.46	54.00	-10.54	H
15540.00	27.36	32.65	20.03	34.85	45.19	54.00	-8.81	H

Test mode:	IEEE 802.11a	Test channel:	Mid CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10400.00	40.06	32.44	17.18	33.91	55.77	68.20	-12.43	V
15600.00	36.45	32.78	20.12	34.86	54.49	68.20	-13.71	V
10400.00	38.53	32.44	17.18	33.91	54.24	68.20	-13.96	H
15600.00	35.96	32.78	20.12	34.86	54.00	68.20	-14.20	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10400.00	30.02	32.44	17.18	33.91	45.73	54.00	-8.27	V
15600.00	28.36	32.78	20.12	34.86	46.40	54.00	-7.60	V
10400.00	30.01	32.44	17.18	33.91	45.72	54.00	-8.28	H
15600.00	29.34	32.78	20.12	34.86	47.38	54.00	-6.62	H

Test mode:	IEEE 802.11a	Test channel:	High CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10480.00	40.06	32.59	18.02	33.92	56.75	68.20	-11.45	V
15720.00	39.25	32.87	20.15	34.88	57.39	68.20	-10.81	V
10480.00	41.32	32.59	18.02	33.92	58.01	68.20	-10.19	H
15720.00	40.21	32.87	20.15	34.88	58.35	68.20	-9.85	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10480.00	30.21	32.59	18.02	33.92	46.90	54.00	-7.10	V
15720.00	30.11	32.87	20.15	34.88	48.25	54.00	-5.75	V
10480.00	29.65	32.59	18.02	33.92	46.34	54.00	-7.66	H
15720.00	29.35	32.87	20.15	34.88	47.49	54.00	-6.51	H

Test mode:	IEEE 802.11n(HT20)	Test channel:	Low CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10360.00	39.81	31.98	17.08	33.91	54.96	68.20	-13.24	V
15540.00	36.21	32.65	20.03	34.85	54.04	68.20	-14.16	V
10360.00	37.15	31.98	17.08	33.91	52.30	68.20	-15.90	H
15540.00	36.25	32.65	20.03	34.85	54.08	68.20	-14.12	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10360.00	31.12	31.98	17.08	33.91	46.27	54.00	-7.73	V
15540.00	28.32	32.65	20.03	34.85	46.15	54.00	-7.85	V
10360.00	30.57	31.98	17.08	33.91	45.72	54.00	-8.28	H
15540.00	28.35	32.65	20.03	34.85	46.18	54.00	-7.82	H

Test mode:	IEEE 802.11n(HT20)	Test channel:	Mid CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10400.00	40.35	32.44	17.18	33.91	56.06	68.20	-12.14	V
15600.00	39.12	32.78	20.12	34.86	57.16	68.20	-11.04	V
10400.00	38.35	32.44	17.18	33.91	54.06	68.20	-14.14	H
15600.00	36.12	32.78	20.12	34.86	54.16	68.20	-14.04	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10400.00	29.13	32.44	17.18	33.91	44.84	54.00	-9.16	V
15600.00	27.32	32.78	20.12	34.86	45.36	54.00	-8.64	V
10400.00	29.03	32.44	17.18	33.91	44.74	54.00	-9.26	H
15600.00	28.36	32.78	20.12	34.86	46.40	54.00	-7.60	H

Test mode:	IEEE 802.11n(HT20)	Test channel:	High CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10480.00	41.21	32.59	18.02	33.92	57.90	68.20	-10.30	V
15720.00	38.35	32.87	20.15	34.88	56.49	68.20	-11.71	V
10480.00	36.23	32.59	18.02	33.92	52.92	68.20	-15.28	H
15720.00	38.13	32.87	20.15	34.88	56.27	68.20	-11.93	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10480.00	31.25	32.59	18.02	33.92	47.94	54.00	-6.06	V
15720.00	32.41	32.87	20.15	34.88	50.55	54.00	-3.45	V
10480.00	29.32	32.59	18.02	33.92	46.01	54.00	-7.99	H
15720.00	28.74	32.87	20.15	34.88	46.88	54.00	-7.12	H

Test mode:	IEEE 802.11n(ac20)	Test channel:	Low CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10360.00	41.87	31.98	17.08	33.91	57.02	68.20	-11.18	V
15540.00	35.23	32.65	20.03	34.85	53.06	68.20	-15.14	V
10360.00	38.46	31.98	17.08	33.91	53.61	68.20	-14.59	H
15540.00	35.05	32.65	20.03	34.85	52.88	68.20	-15.32	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10360.00	32.16	31.98	17.08	33.91	47.31	54.00	-6.69	V
15540.00	29.34	32.65	20.03	34.85	47.17	54.00	-6.83	V
10360.00	30.25	31.98	17.08	33.91	45.40	54.00	-8.60	H
15540.00	27.22	32.65	20.03	34.85	45.05	54.00	-8.95	H

Test mode:	IEEE 802.11n(ac20)	Test channel:	Mid CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10400.00	40.73	32.44	17.18	33.91	56.44	68.20	-11.76	V
15600.00	37.41	32.78	20.12	34.86	55.45	68.20	-12.75	V
10400.00	39.22	32.44	17.18	33.91	54.93	68.20	-13.27	H
15600.00	36.10	32.78	20.12	34.86	54.14	68.20	-14.06	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10400.00	30.35	32.44	17.18	33.91	46.06	54.00	-7.94	V
15600.00	27.49	32.78	20.12	34.86	45.53	54.00	-8.47	V
10400.00	29.42	32.44	17.18	33.91	45.13	54.00	-8.87	H
15600.00	27.15	32.78	20.12	34.86	45.19	54.00	-8.81	H

Test mode:	IEEE 802.11n(ac20)	Test channel:	High CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10480.00	40.34	32.59	18.02	33.92	57.03	68.20	-11.17	V
15720.00	38.56	32.87	20.15	34.88	56.70	68.20	-11.50	V
10480.00	39.22	32.59	18.02	33.92	55.91	68.20	-12.29	H
15720.00	37.25	32.87	20.15	34.88	55.39	68.20	-12.81	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10480.00	30.17	32.59	18.02	33.92	46.86	54.00	-7.14	V
15720.00	28.14	32.87	20.15	34.88	46.28	54.00	-7.72	V
10480.00	28.85	32.59	18.02	33.92	45.54	54.00	-8.46	H
15720.00	27.42	32.87	20.15	34.88	45.56	54.00	-8.44	H

Test mode:	IEEE 802.11n(HT40)	Test channel:	Low CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10380.00	37.76	31.98	17.08	33.91	52.91	68.20	-15.29	V
15570.00	35.87	32.65	20.03	34.85	53.70	68.20	-14.50	V
10380.00	37.63	31.98	17.08	33.91	52.78	68.20	-15.42	H
15570.00	35.74	32.65	20.03	34.85	53.57	68.20	-14.63	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10380.00	30.11	31.98	17.08	33.91	45.26	54.00	-8.74	V
15570.00	28.83	32.65	20.03	34.85	46.66	54.00	-7.34	V
10380.00	30.11	31.98	17.08	33.91	45.26	54.00	-8.74	H
15570.00	27.34	32.65	20.03	34.85	45.17	54.00	-8.83	H

Test mode:	IEEE 802.11n(HT40)	Test channel:	High CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10460.00	42.25	32.59	18.02	33.92	58.94	68.20	-9.26	V
15690.00	39.12	32.87	20.15	34.88	57.26	68.20	-10.94	V
10460.00	37.41	32.59	18.02	33.92	54.10	68.20	-14.10	H
15690.00	38.53	32.87	20.15	34.88	56.67	68.20	-11.53	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10460.00	32.13	32.59	18.02	33.92	48.82	54.00	-5.18	V
15690.00	32.71	32.87	20.15	34.88	50.85	54.00	-3.15	V
10460.00	29.59	32.59	18.02	33.92	46.28	54.00	-7.72	H
15690.00	28.36	32.87	20.15	34.88	46.50	54.00	-7.50	H

Test mode:	IEEE 802.11ac(HT40)	Test channel:	Low CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10380.00	37.48	31.98	17.08	33.91	52.63	68.20	-15.57	V
15570.00	35.27	32.65	20.03	34.85	53.10	68.20	-15.10	V
10380.00	37.21	31.98	17.08	33.91	52.36	68.20	-15.84	H
15570.00	35.53	32.65	20.03	34.85	53.36	68.20	-14.84	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10380.00	31.24	31.98	17.08	33.91	46.39	54.00	-7.61	V
15570.00	28.35	32.65	20.03	34.85	46.18	54.00	-7.82	V
10380.00	30.34	31.98	17.08	33.91	45.49	54.00	-8.51	H
15570.00	27.69	32.65	20.03	34.85	45.52	54.00	-8.48	H

Test mode:	IEEE 802.11ac(HT40)	Test channel:	High CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10460.00	41.78	32.59	18.02	33.92	58.47	68.20	-9.73	V
15690.00	38.47	32.87	20.15	34.88	56.61	68.20	-11.59	V
10460.00	39.27	32.59	18.02	33.92	55.96	68.20	-12.24	H
15690.00	37.42	32.87	20.15	34.88	55.56	68.20	-12.64	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10460.00	31.78	32.59	18.02	33.92	48.47	54.00	-5.53	V
15690.00	28.89	32.87	20.15	34.88	47.03	54.00	-6.97	V
10460.00	30.27	32.59	18.02	33.92	46.96	54.00	-7.04	H
15690.00	28.35	32.78	20.12	34.86	46.39	54.00	-7.61	H

Test mode:	IEEE 802.11ac(HT80)	Test channel:	

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10420.00	41.29	32.44	17.18	33.91	57.00	68.20	-11.20	V
15630.00	36.49	32.78	20.12	34.86	54.53	68.20	-13.67	V
10420.00	38.73	32.44	17.18	33.91	54.44	68.20	-13.76	H
15630.00	35.47	32.78	20.12	34.86	53.51	68.20	-14.69	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
10420.00	30.19	32.44	17.18	33.91	45.90	54.00	-8.10	V
15630.00	28.25	32.78	20.12	34.86	46.29	54.00	-7.71	V
10420.00	30.04	32.44	17.18	33.91	45.75	54.00	-8.25	H
15630.00	27.93	32.78	20.12	34.86	45.97	54.00	-8.03	H

Note:

1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

Radiated Band Edge:

Test Mode: 802.11a								
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
5150.00	41.35	28.65	13.58	31.04	52.54	68.20	-15.66	H
5350.00	42.32	29.16	14.68	31.96	54.20	68.20	-14.00	H
5150.00	42.31	28.65	13.58	31.04	53.50	68.20	-14.70	V
5350.00	43.25	29.16	14.68	31.96	55.13	68.20	-13.07	V
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
5150.00	34.72	28.65	13.58	31.04	45.91	54.00	-8.09	H
5350.00	35.48	29.16	14.68	31.96	47.36	54.00	-6.64	H
5150.00	35.14	28.65	13.58	31.04	46.33	54.00	-7.67	V
5350.00	36.21	29.16	14.68	31.96	48.09	54.00	-5.91	V

Test Mode: 802.11n20								
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
5150.00	41.67	28.65	13.58	31.04	52.86	68.20	-15.34	H
5350.00	42.15	29.16	14.68	31.96	54.03	68.20	-14.17	H
5150.00	42.35	28.65	13.58	31.04	53.54	68.20	-14.66	V
5350.00	43.07	29.16	14.68	31.96	54.95	68.20	-13.25	V
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
5150.00	34.25	28.65	13.58	31.04	45.44	54.00	-8.56	H
5350.00	35.78	29.16	14.68	31.96	47.66	54.00	-6.34	H
5150.00	34.74	28.65	13.58	31.04	45.93	54.00	-8.07	V
5350.00	36.05	29.16	14.68	31.96	47.93	54.00	-6.07	V

Test Mode: 802.11ac20								
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
5150.00	41.29	28.65	13.58	31.04	52.48	68.20	-15.72	H
5350.00	42.64	29.16	14.68	31.96	54.52	68.20	-13.68	H
5150.00	43.31	28.65	13.58	31.04	54.50	68.20	-13.70	V
5350.00	42.77	29.16	14.68	31.96	54.65	68.20	-13.55	V
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
5150.00	33.78	28.65	13.58	31.04	44.97	54.00	-9.03	H
5350.00	34.64	29.16	14.68	31.96	46.52	54.00	-7.48	H
5150.00	34.12	28.65	13.58	31.04	45.31	54.00	-8.69	V
5350.00	35.44	29.16	14.68	31.96	47.32	54.00	-6.68	V

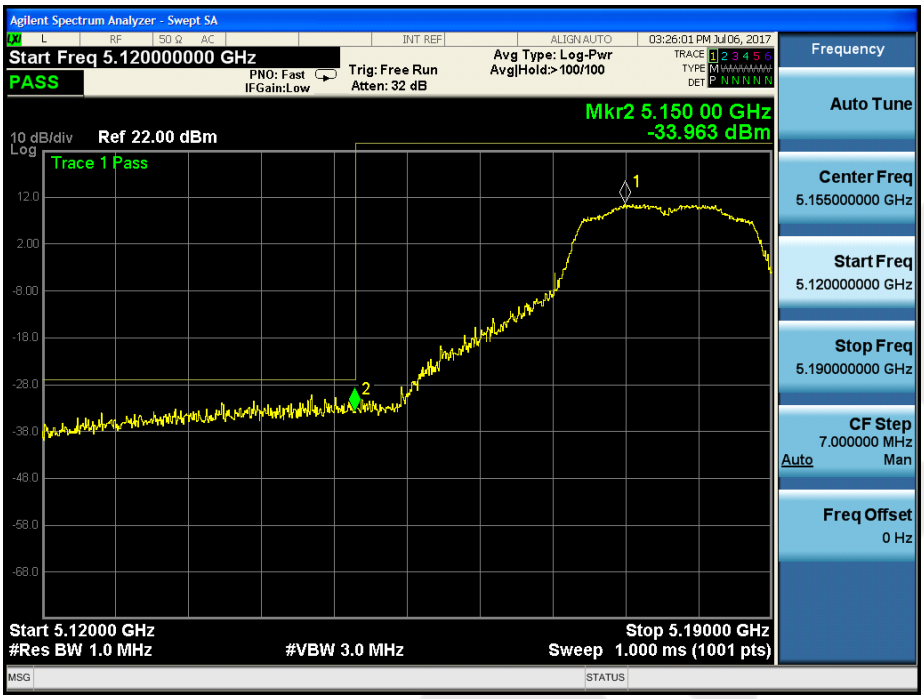
Test Mode: 802.11n40								
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
5150.00	41.47	28.65	13.58	31.04	52.66	68.20	-15.54	H
5350.00	42.61	29.16	14.68	31.96	54.49	68.20	-13.71	H
5150.00	41.77	28.65	13.58	31.04	52.96	68.20	-15.24	V
5350.00	43.81	29.16	14.68	31.96	55.69	68.20	-12.51	V
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
5150.00	33.53	28.65	13.58	31.04	44.72	54.00	-9.28	H
5350.00	34.25	29.16	14.68	31.96	46.13	54.00	-7.87	H
5150.00	33.78	28.65	13.58	31.04	44.97	54.00	-9.03	V
5350.00	35.13	29.16	14.68	31.96	47.01	54.00	-6.99	V

Test Mode: 802.11ac40								
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
5150.00	41.25	28.65	13.58	31.04	52.44	68.20	-15.76	H
5350.00	42.37	29.16	14.68	31.96	54.25	68.20	-13.95	H
5150.00	41.54	28.65	13.58	31.04	52.73	68.20	-15.47	V
5350.00	43.41	29.16	14.68	31.96	55.29	68.20	-12.91	V
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
5150.00	33.47	28.65	13.58	31.04	44.66	54.00	-9.34	H
5350.00	34.61	29.16	14.68	31.96	46.49	54.00	-7.51	H
5150.00	33.62	28.65	13.58	31.04	44.81	54.00	-9.19	V
5350.00	35.01	29.16	14.68	31.96	46.89	54.00	-7.11	V

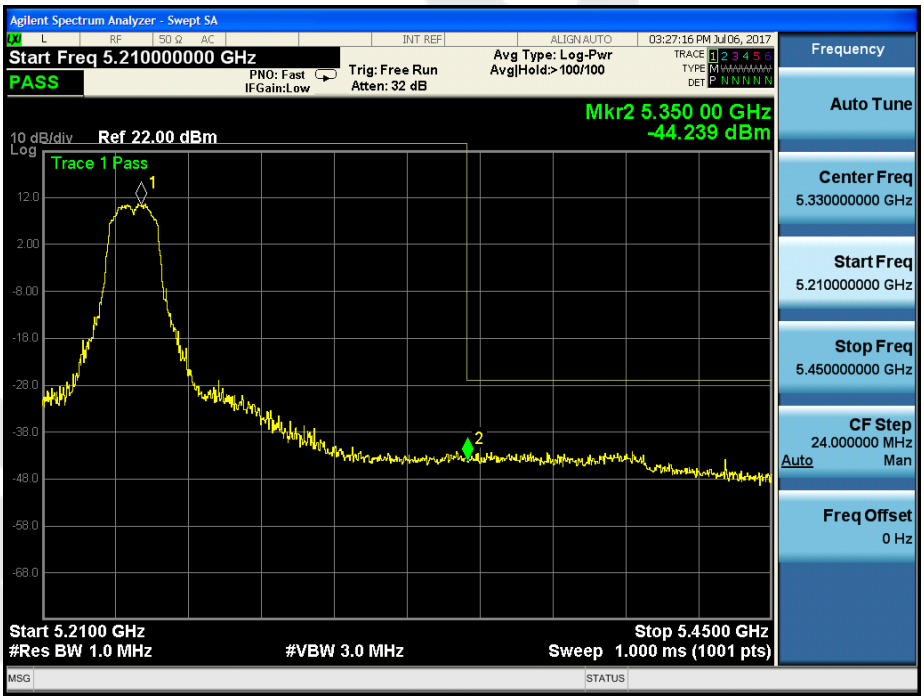
Test Mode: 802.11ac80								
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
5150.00	41.63	28.65	13.58	31.04	52.82	68.20	-15.38	H
5350.00	42.49	29.16	14.68	31.96	54.37	68.20	-13.83	H
5150.00	41.21	28.65	13.58	31.04	52.40	68.20	-15.80	V
5350.00	43.82	29.16	14.68	31.96	55.70	68.20	-12.50	V
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
5150.00	33.65	28.65	13.58	31.04	44.84	54.00	-9.16	H
5350.00	34.45	29.16	14.68	31.96	46.33	54.00	-7.67	H
5150.00	33.72	28.65	13.58	31.04	44.91	54.00	-9.09	V
5350.00	35.31	29.16	14.68	31.96	47.19	54.00	-6.81	V

For conducted test:

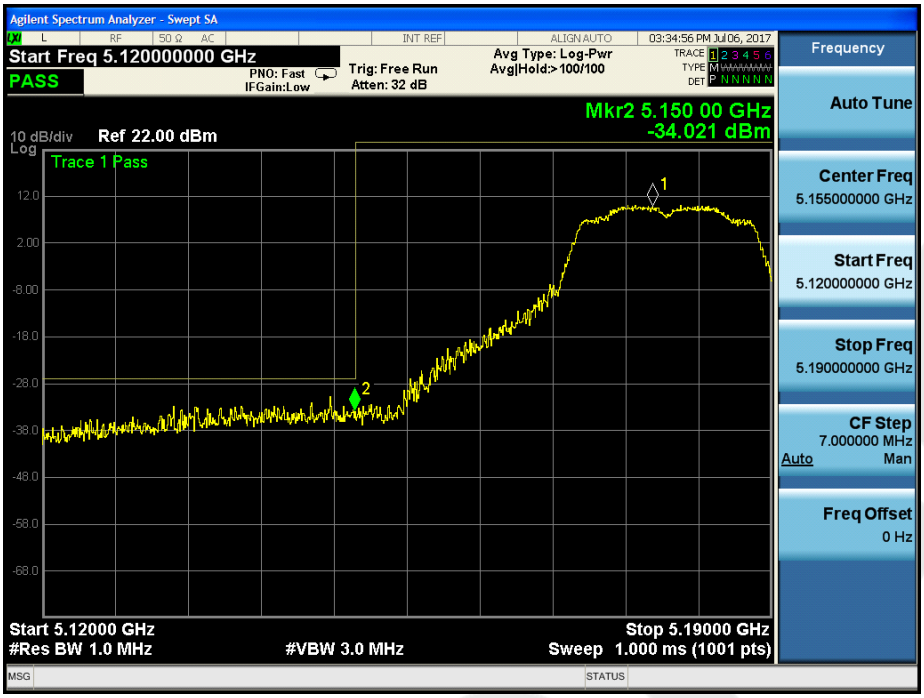
802.11a: Band Edge, Left Side



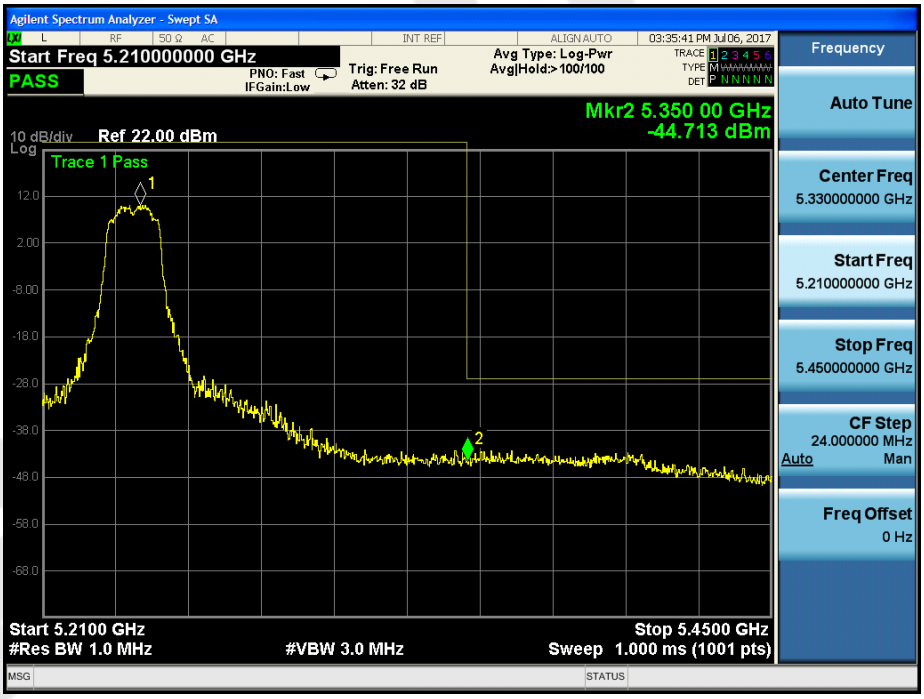
802.11a: Band Edge, Right Side



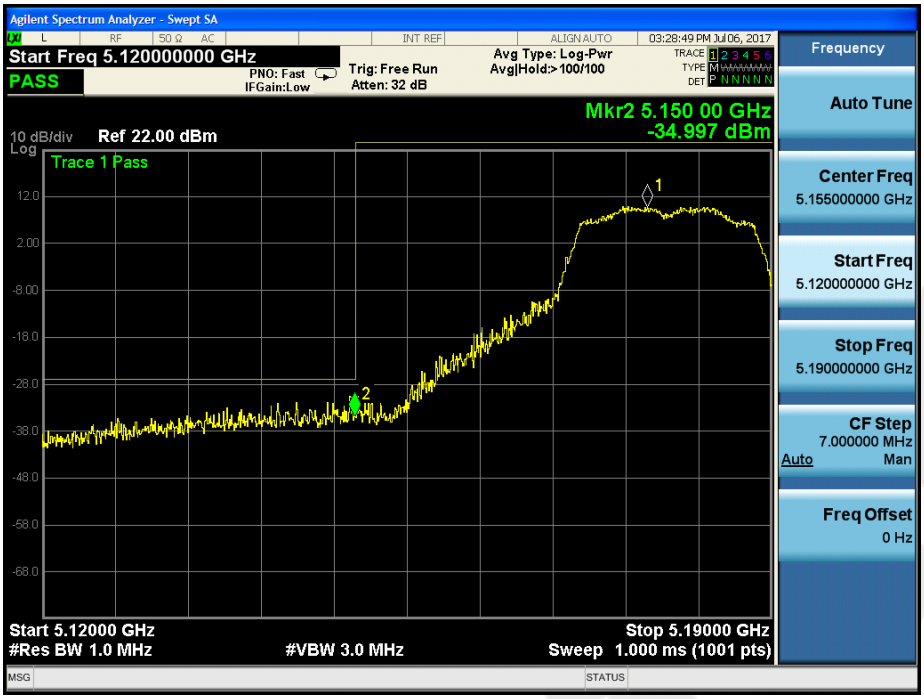
802.11n(20): Band Edge, Left Side



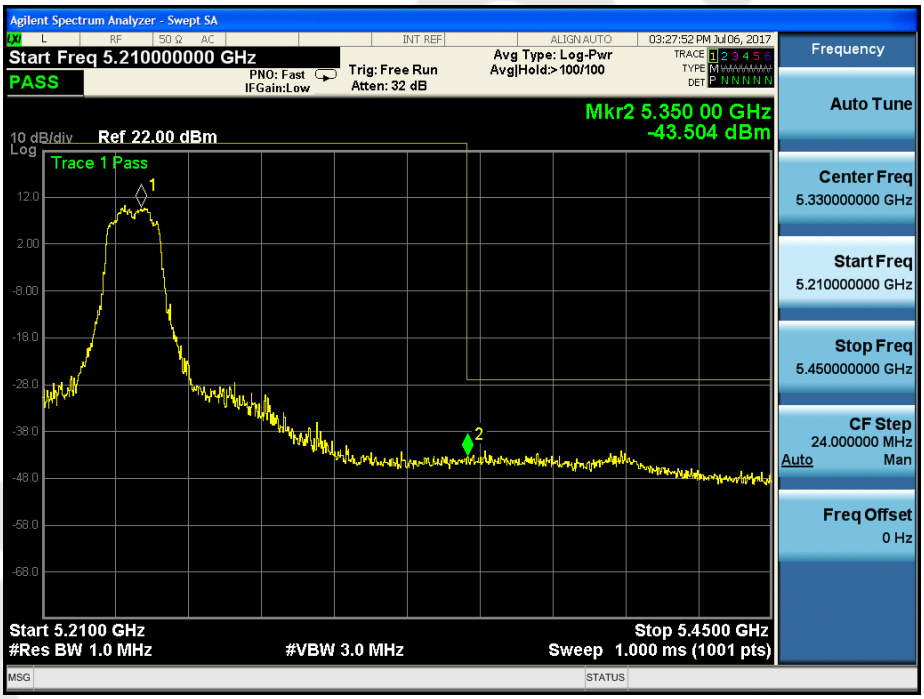
802.11n(20): Band Edge, Right Side



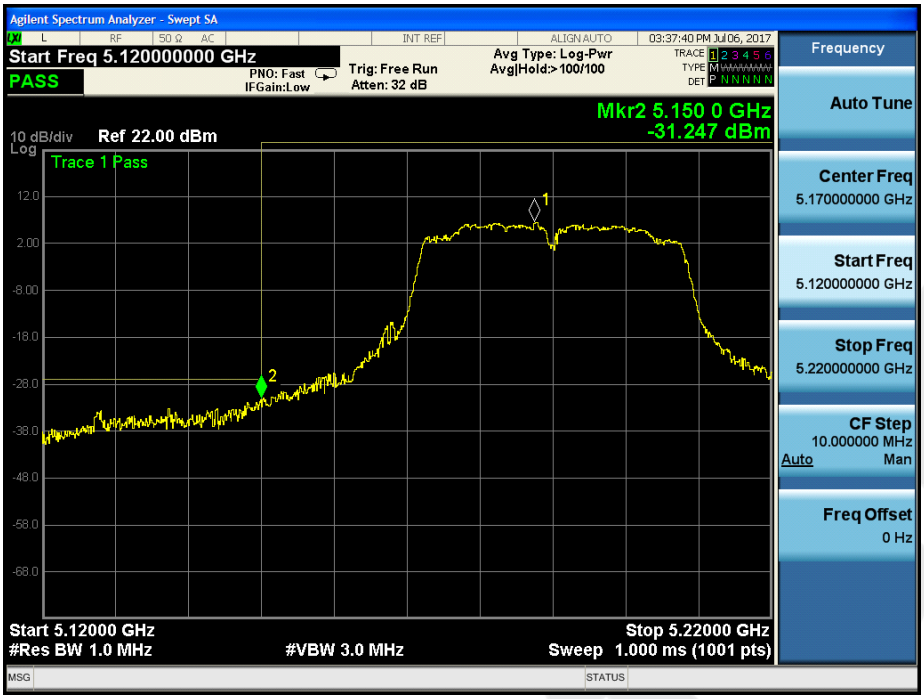
802.11ac(20): Band Edge, Left Side



802.11ac(20): Band Edge, Right Side

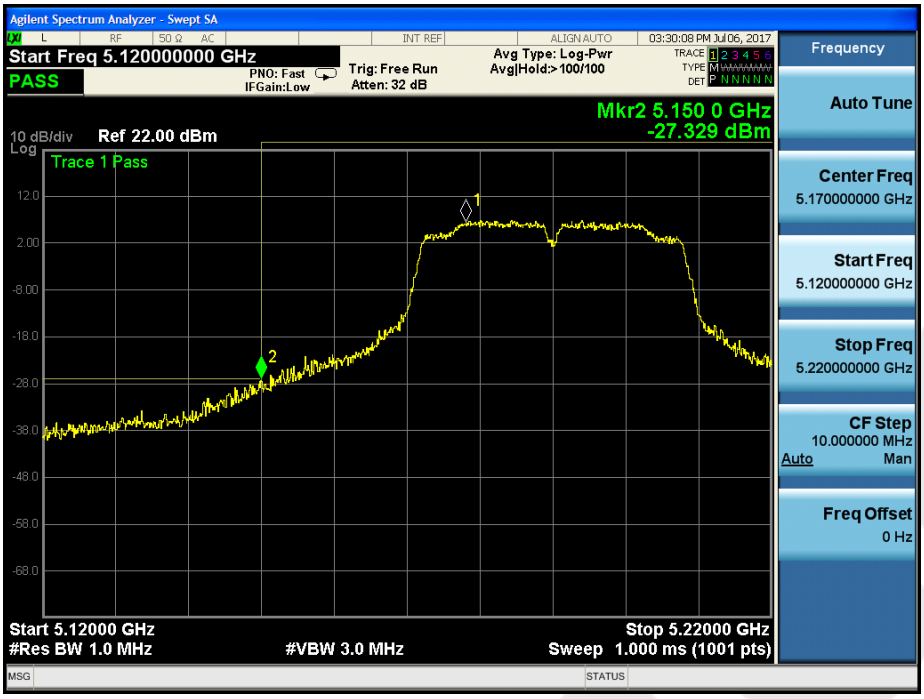


802.11n(40): Band Edge, Left Side

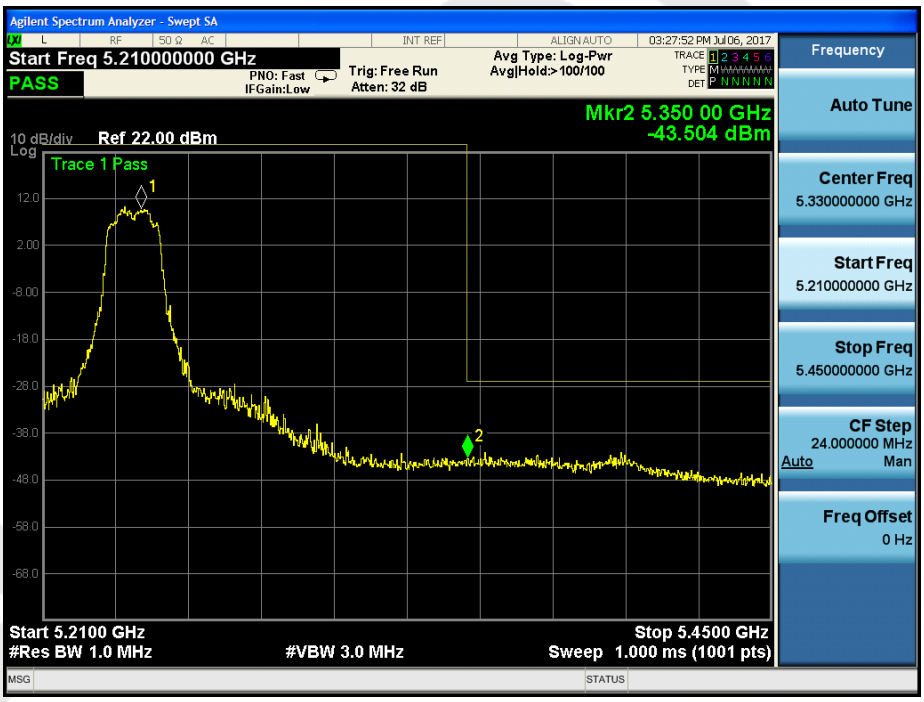


802.11n(40): Band Edge, Right Side

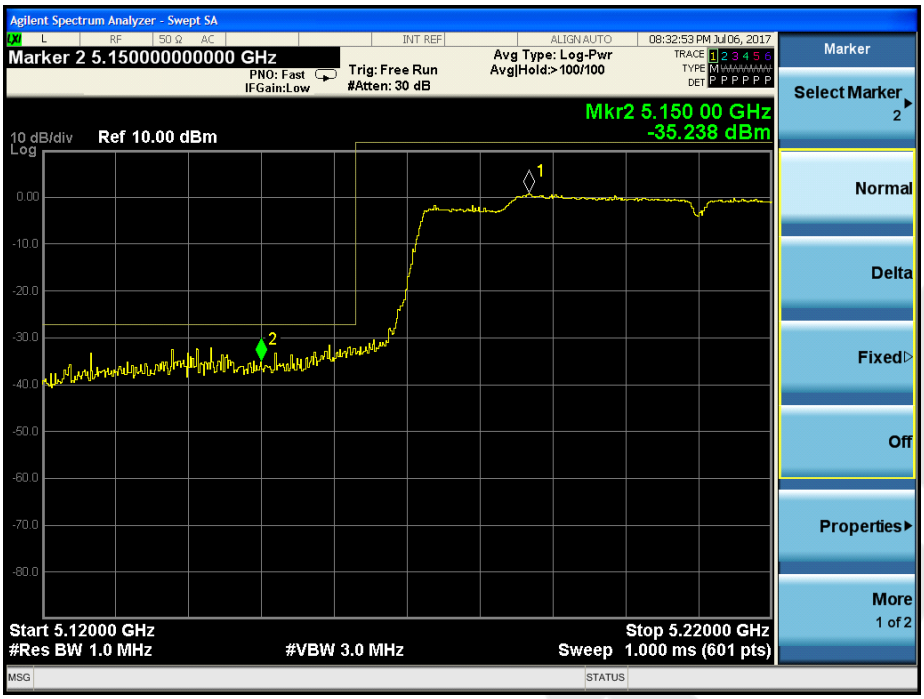
802.11ac(40): Band Edge, Left Side



802.11ac(40): Band Edge, Right Side



802.11ac(80): Band Edge, Left Side



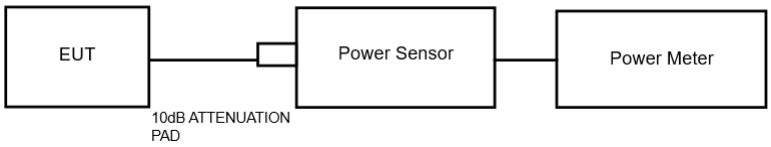
802.11ac(80): Band Edge, Right Side

5. Maximum Peak Output Power Test

5.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.407 (a)(1) (3)
Test Limit	24dBm

5.2. Test Setup



5.3. Test Procedure

1. The Transmitter output (antenna port) was connected to the power meter.
2. Turn on the EUT and power meter and then record the power value.
3. Repeat above procedures on all channels needed to be tested.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

5.4. Test Data

Test Item	:	Max. peak output power	Test Mode	:	CH Low ~ CH High
Test Voltage	:	AC 120V/60Hz	Temperature	:	24°C
Test Result	:	PASS	Humidity	:	55%RH

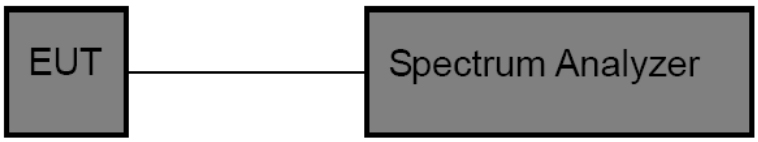
Mode	Channel Frequency (MHz)	Peak Power output (dBm)	Limit (dBm)	Results
802.11a	5180	17.62	24.00	PASS
	5200	17.81	24.00	PASS
	5240	17.40	24.00	PASS
802.11n20	5180	17.23	24.00	PASS
	5200	16.58	24.00	PASS
	5240	17.19	24.00	PASS
802.11ac20	5180	16.54	24.00	PASS
	5200	16.82	24.00	PASS
	5240	17.35	24.00	PASS
802.11n40	5190	16.35	24.00	PASS
	5230	16.27	24.00	PASS
802.11ac40	5190	15.85	24.00	PASS
	5230	15.49	24.00	PASS
802.11ac80	5210	15.42	24.00	PASS

6. Occupy Bandwidth Test

6.1. Test Standard

Test Standard	FCC Part15 C Section 15.407 (a)(5)

6.2. Test Setup



6.3. Test Procedure

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

3. Set the spectrum analyzer as:

26 dB &99%bandwidth

RBW = approximately 1% of the emission bandwidth;
Set the VBW＞RBW;
Detector= Peak
Trace mode= Max hold.
Sweep- auto couple.

6 dB bandwidth

RBW = 100kHz;
Set the video bandwidth (VBW) ≥ 3 RBW;
Detector= Peak
Trace mode= Max hold.
Sweep- auto couple.

4. Measure the maximum width of the emission that is 26dB /6dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer.

5. Repeat until all the rest channels are investigated.

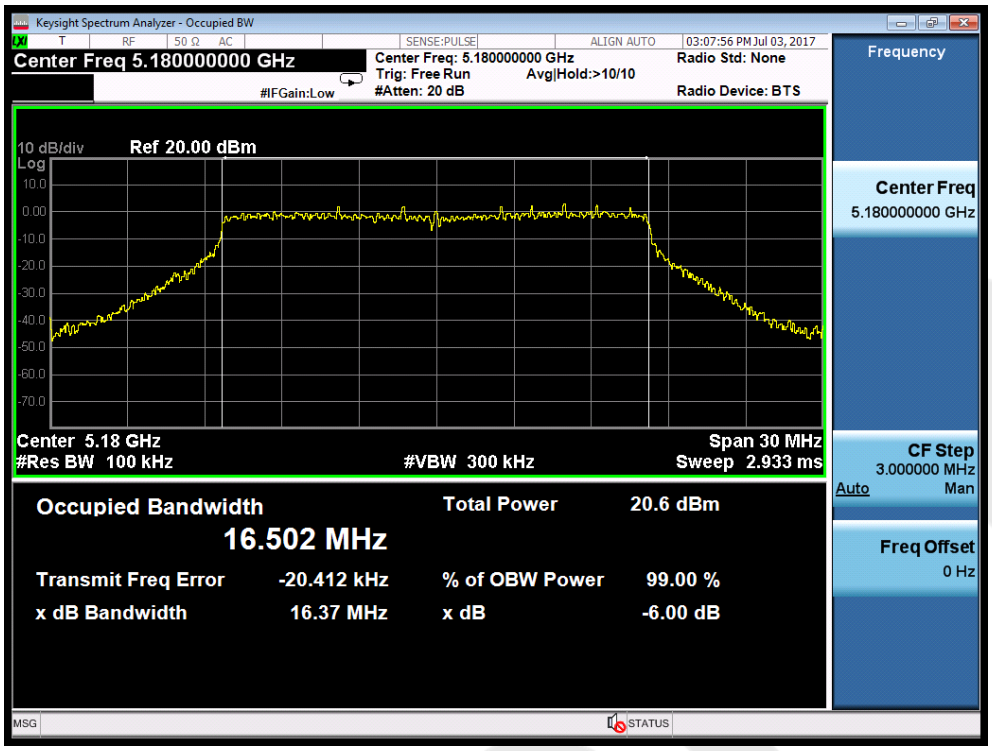
6.4. Test Data

Test Item	:	6dB &26dB BW	Test Mode	:	CH Low ~ CH High
Test Voltage	:	AC 120V/60Hz	Temperature	:	24℃
Test Result	:	PASS	Humidity	:	55%RH

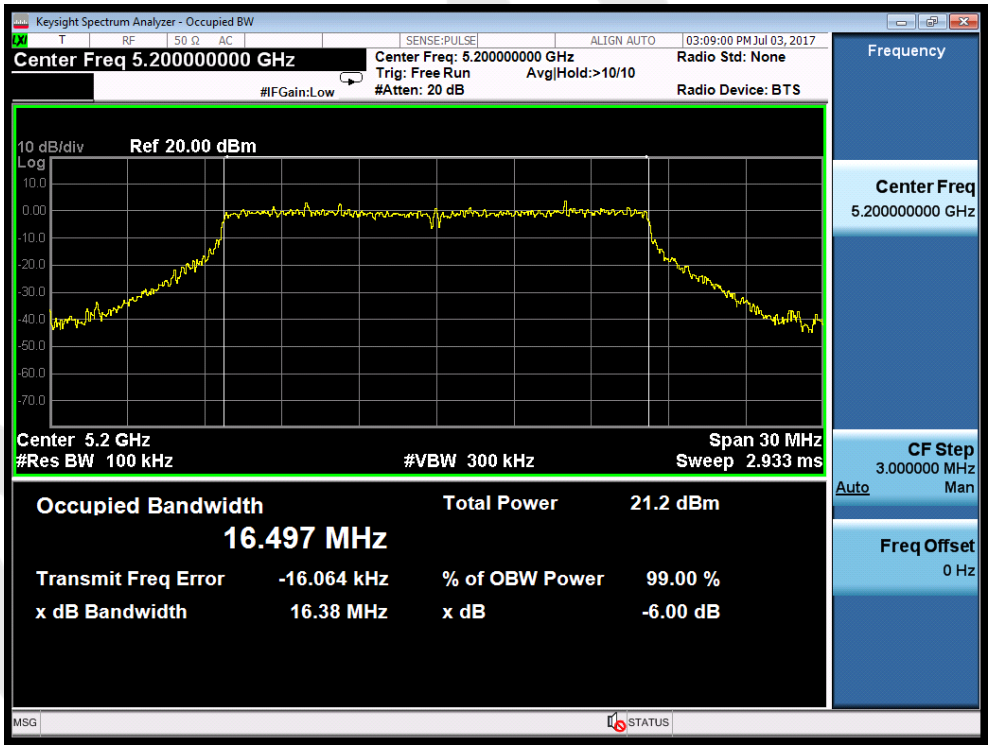
Mode	Channel Frequency (MHz)	6dB BW(MHz)	Limit	Results
802.11a	5180	16.37	>0.5MHz	PASS
	5200	16.38		PASS
	5240	16.36		PASS
802.11n20	5180	17.32		PASS
	5200	17.07		PASS
	5240	17.60		PASS
802.11ac20	5180	16.37		PASS
	5200	16.38		PASS
	5240	16.36		PASS
802.11n40	5190	35.13		PASS
	5230	35.18		PASS
802.11ac40	5190	35.13		PASS
	5230	35.15		PASS
802.11ac80	5210	75.42		PASS

Mode	Channel Frequency (MHz)	26dB BW(MHz)	99% Bandwidth (MHz)
802.11a	5180	25.79	17.004
	5200	25.22	16.732
	5240	23.97	16.566
802.11n20	5180	26.44	18.051
	5200	26.20	17.949
	5240	25.68	17.868
802.11ac20	5180	24.25	17.766
	5200	23.94	17.733
	5240	23.93	17.712
802.11n40	5190	46.13	36.260
	5230	45.82	36.268
802.11ac40	5190	45.46	36.261
	5230	45.68	36.246
802.11ac80	5210	81.93	75.613

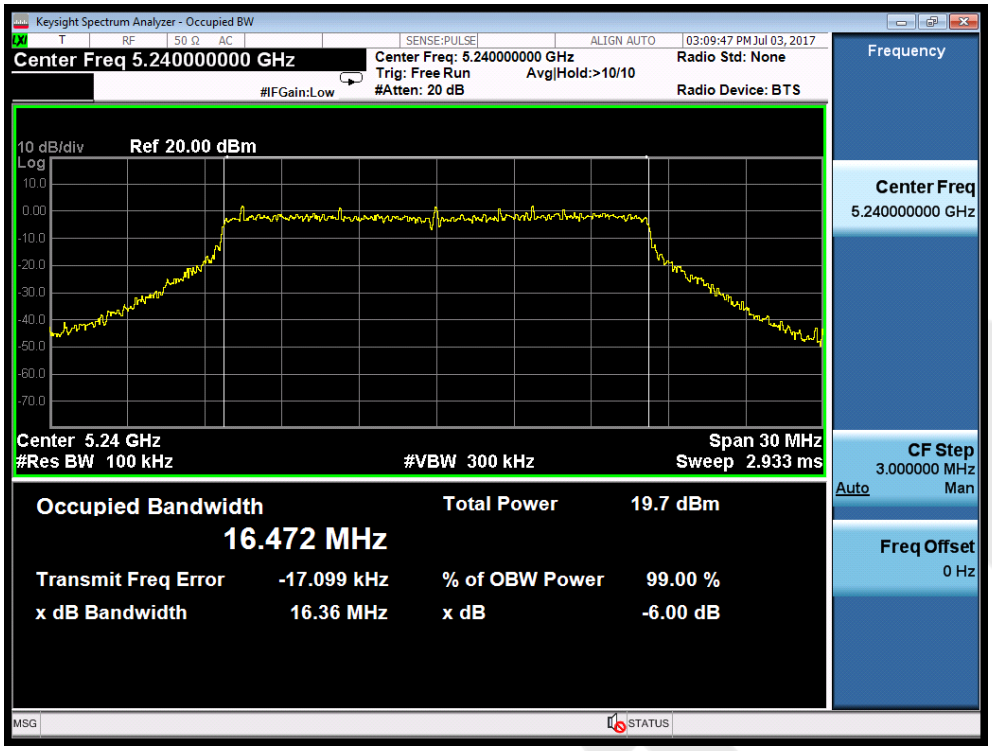
6dB Bandwidth



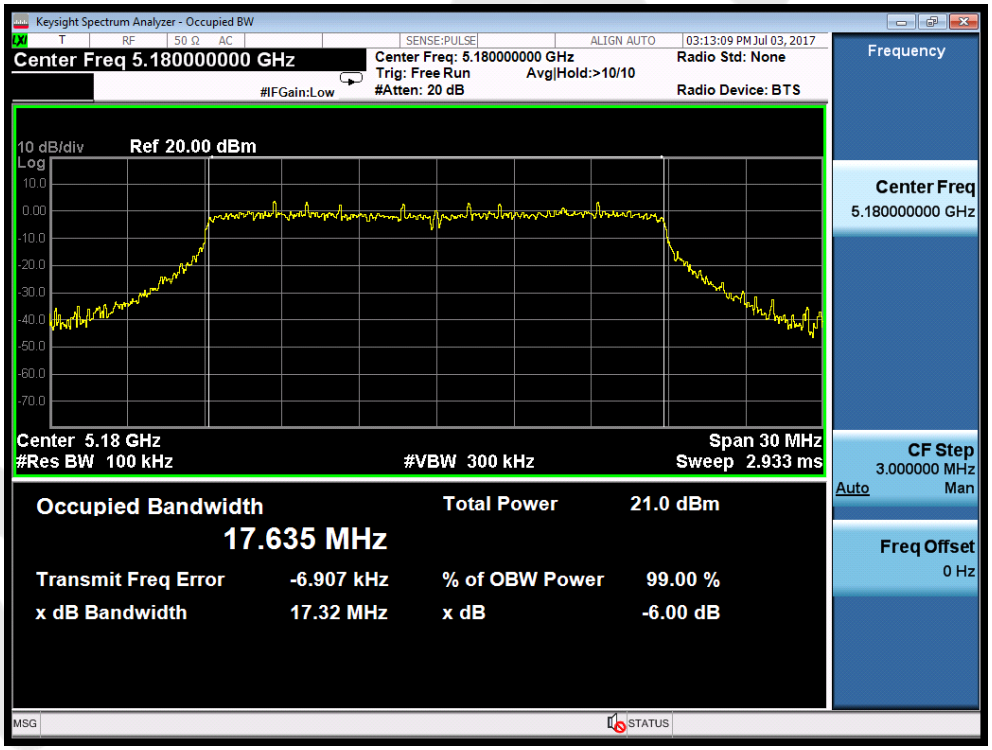
Test Mode: 802.11a--Low



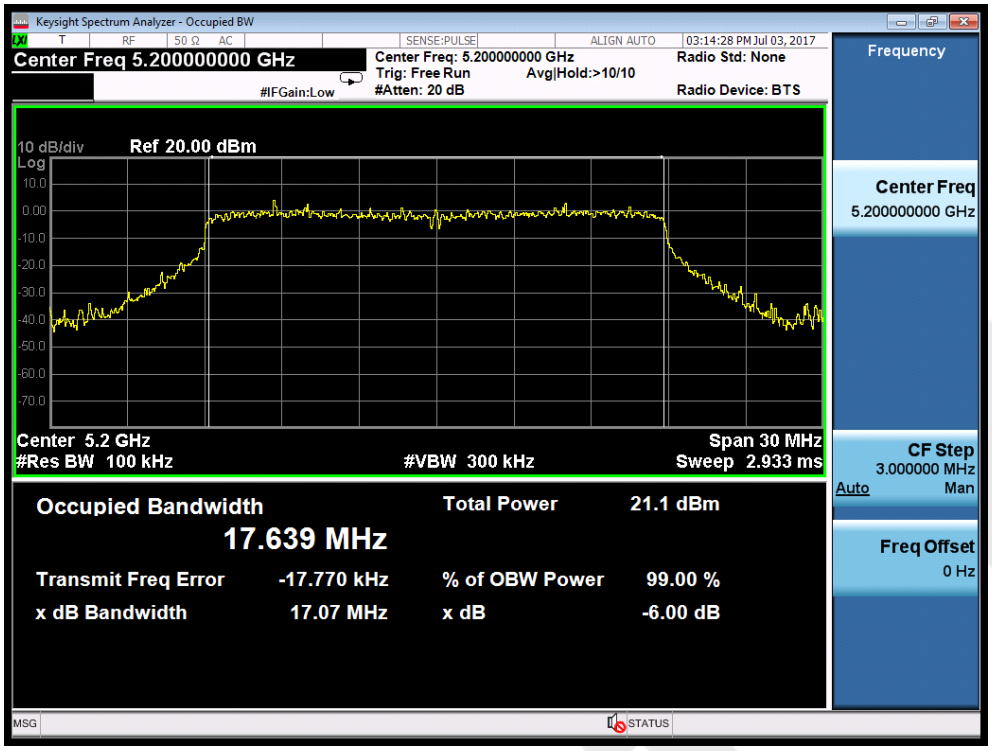
Test Mode: 802.11a---Middle



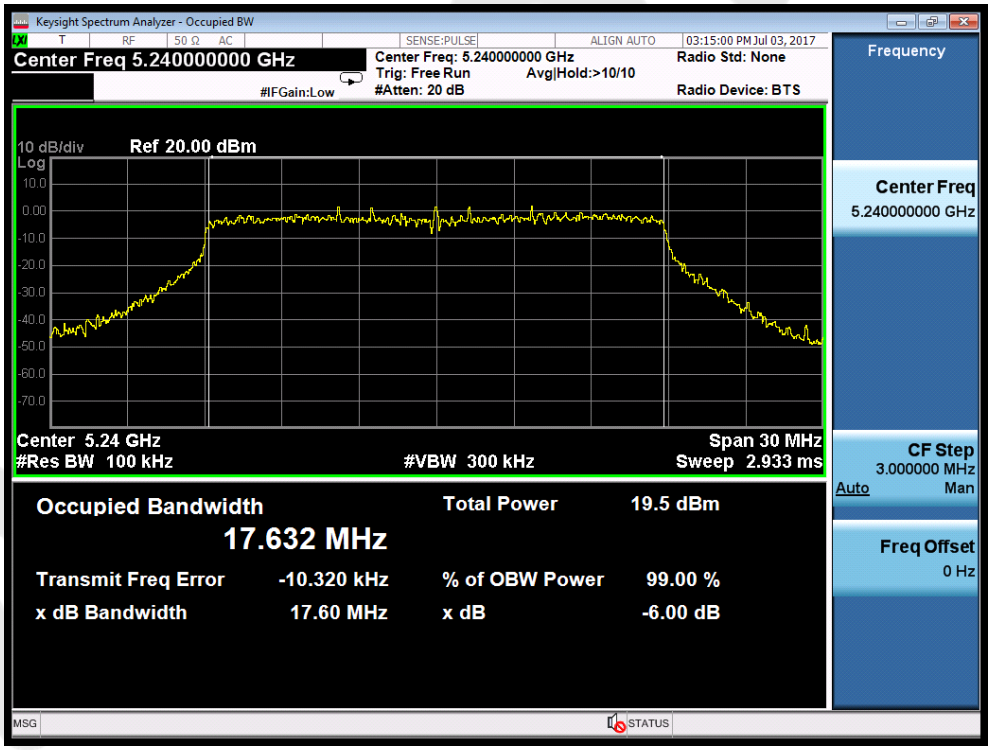
Test Mode: 802.11a---High



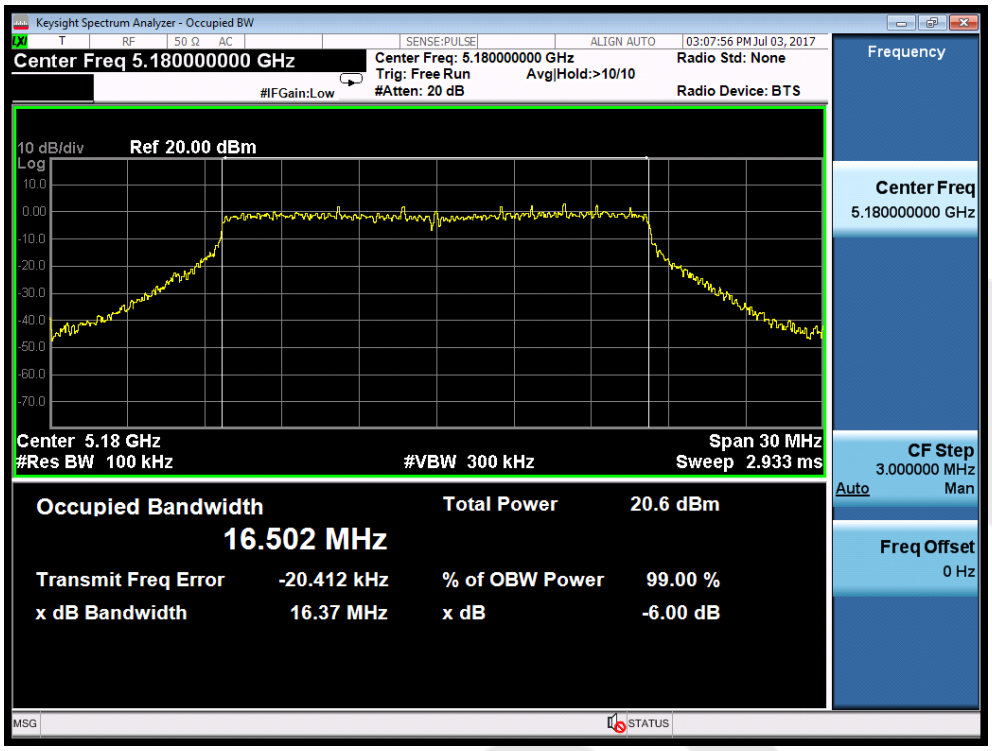
Test Mode: 802.11n20---Low



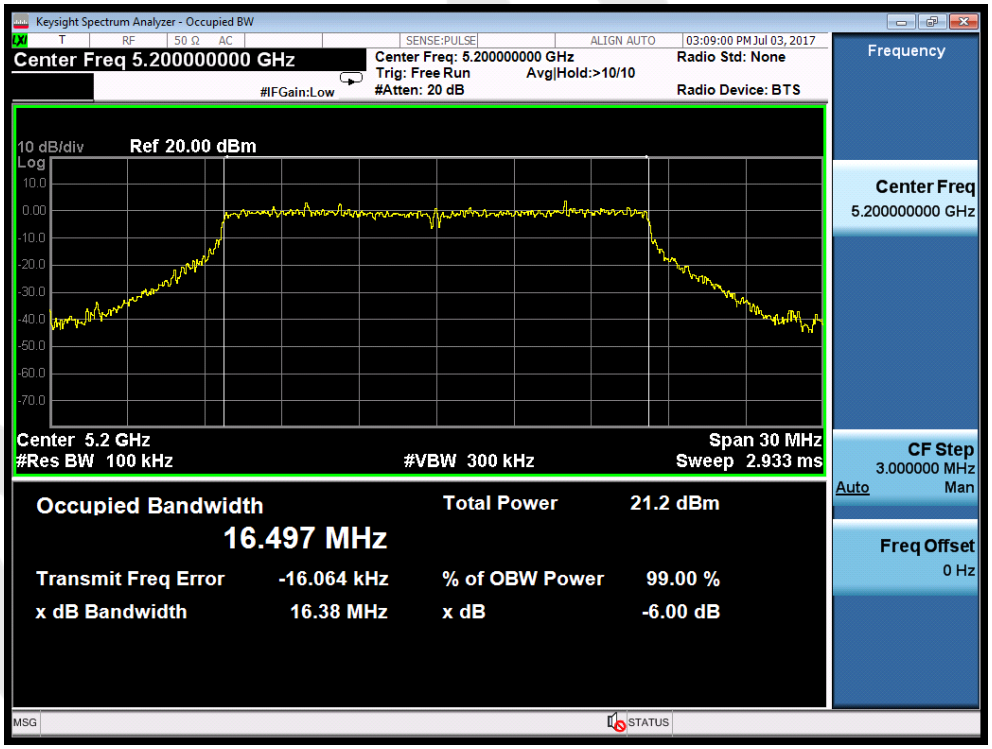
Test Mode: 802.11n20---Middle



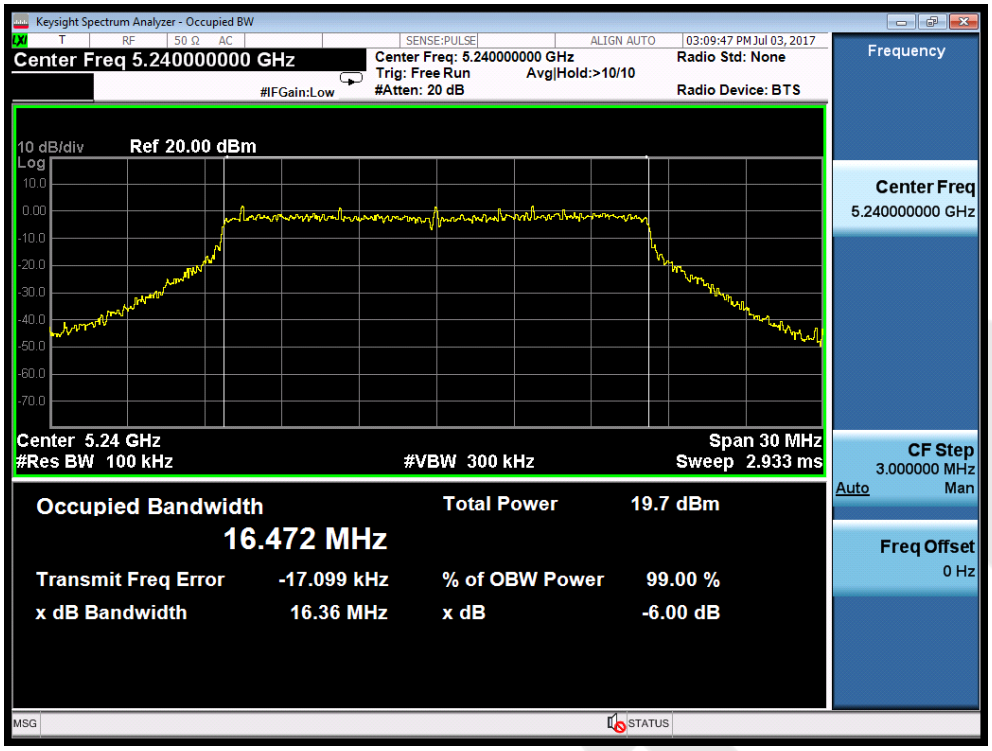
Test Mode: 802.11n20---High



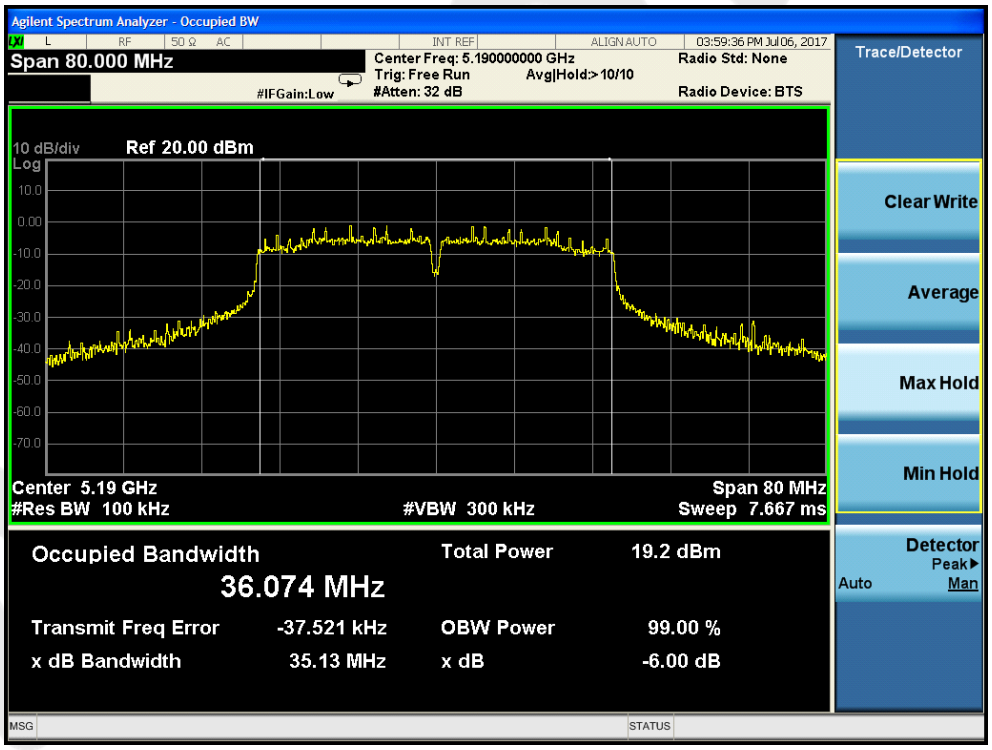
Test Mode: 802.11ac20--Low



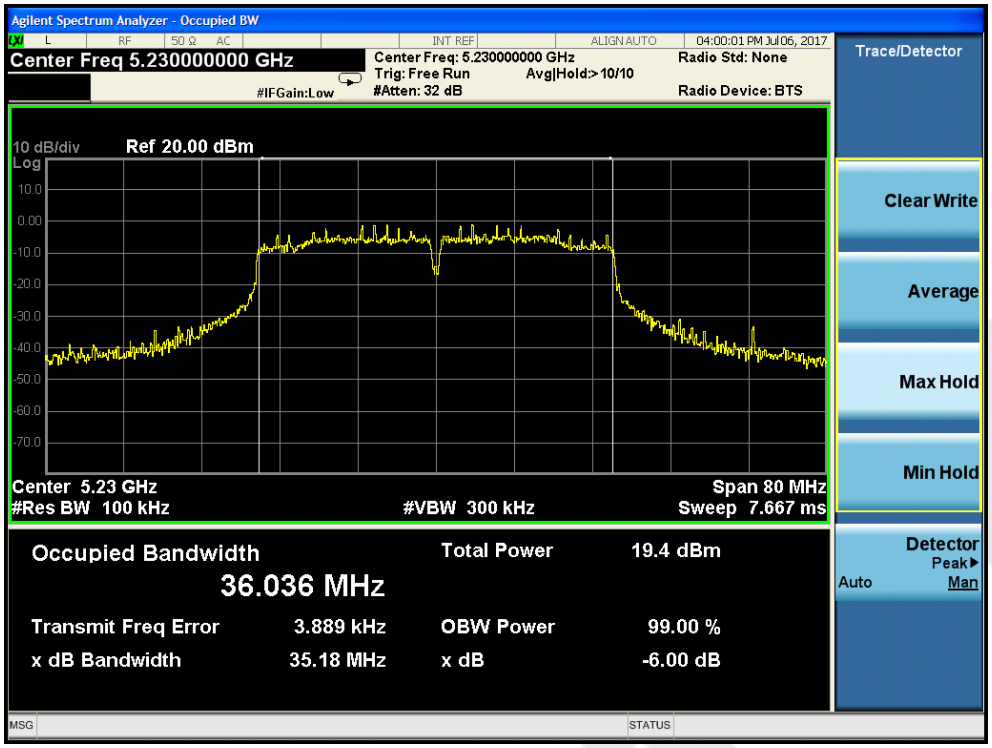
Test Mode: 802.11ac20---Middle



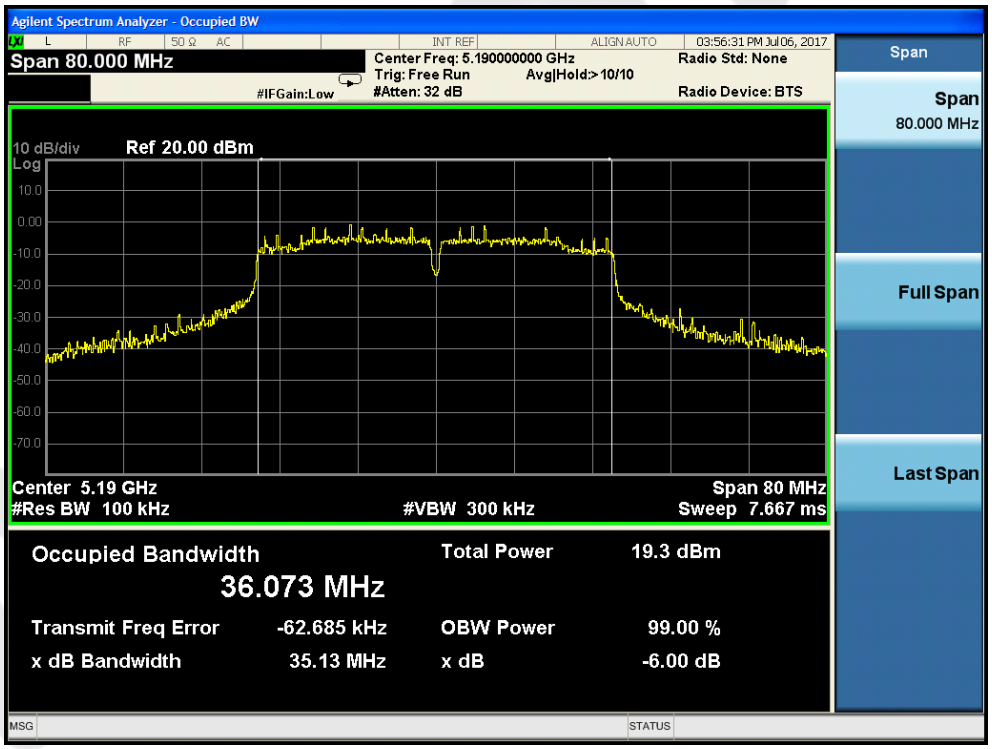
Test Mode: 802.11ac20---High



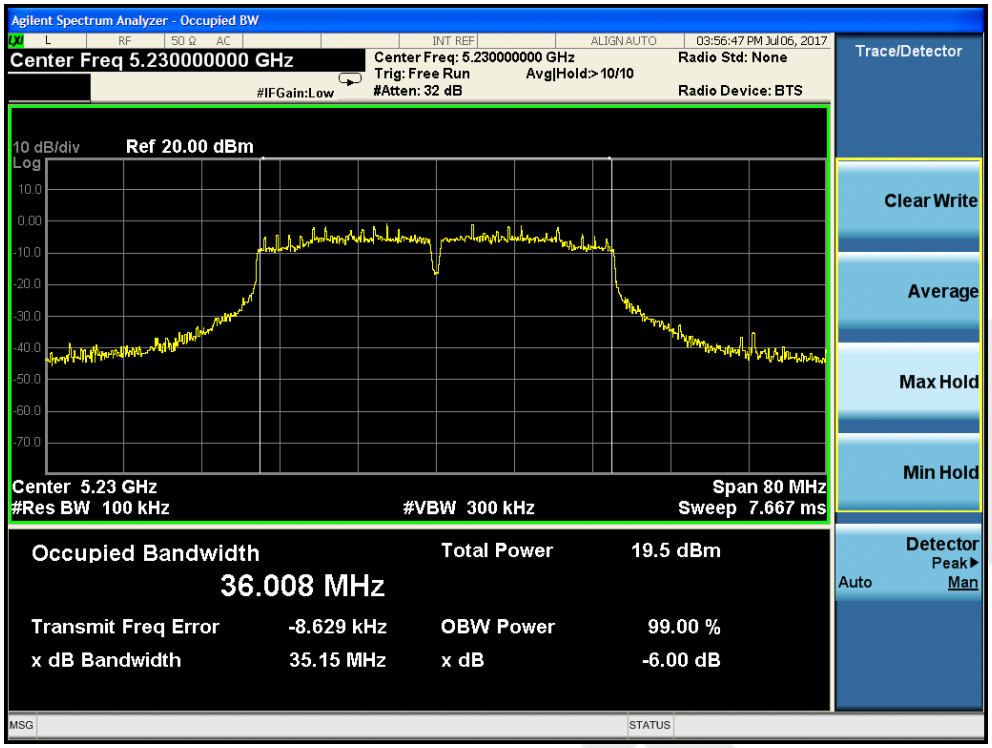
Test Mode: 802.11n40---Low



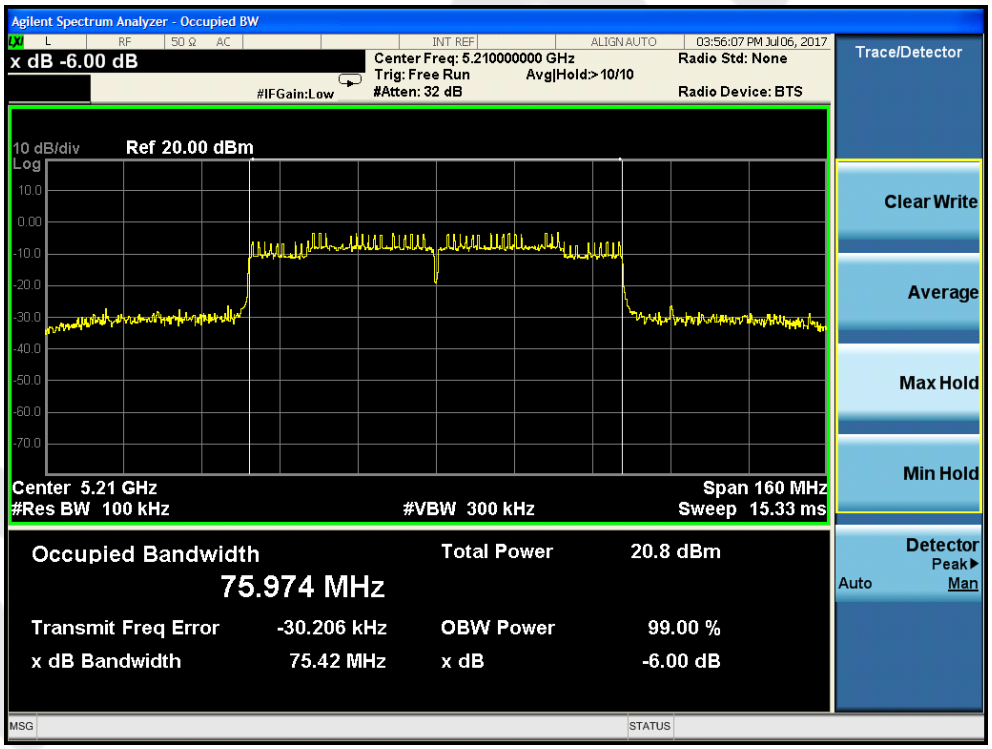
Test Mode: 802.11n40---High



Test Mode: 802.11ac40---Low

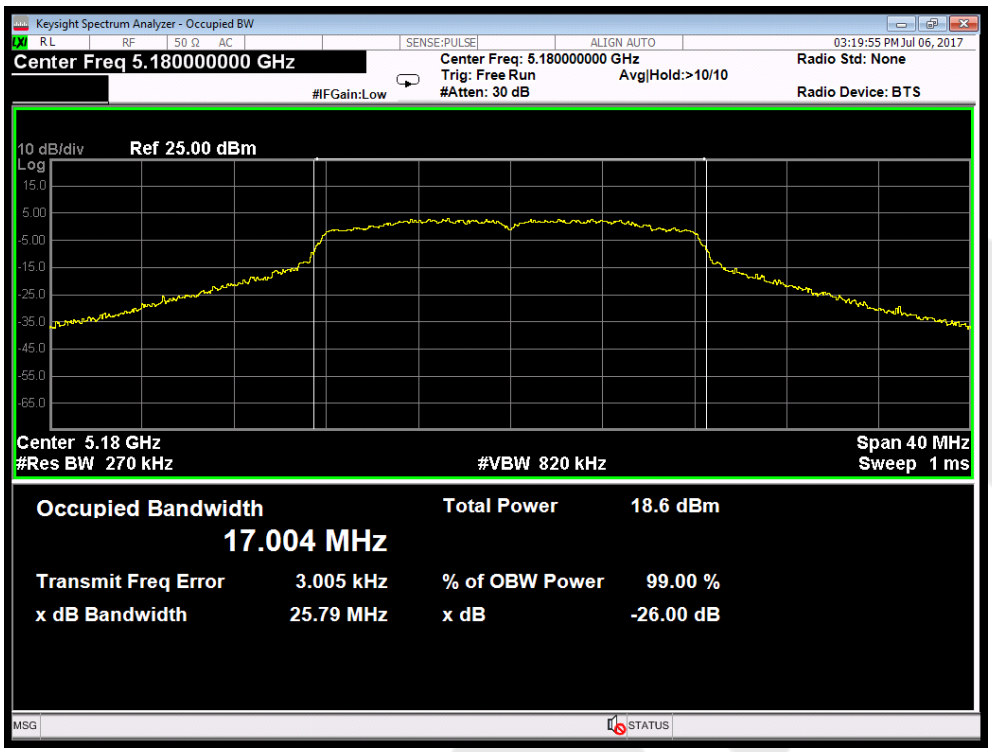


Test Mode: 802.11ac40---High

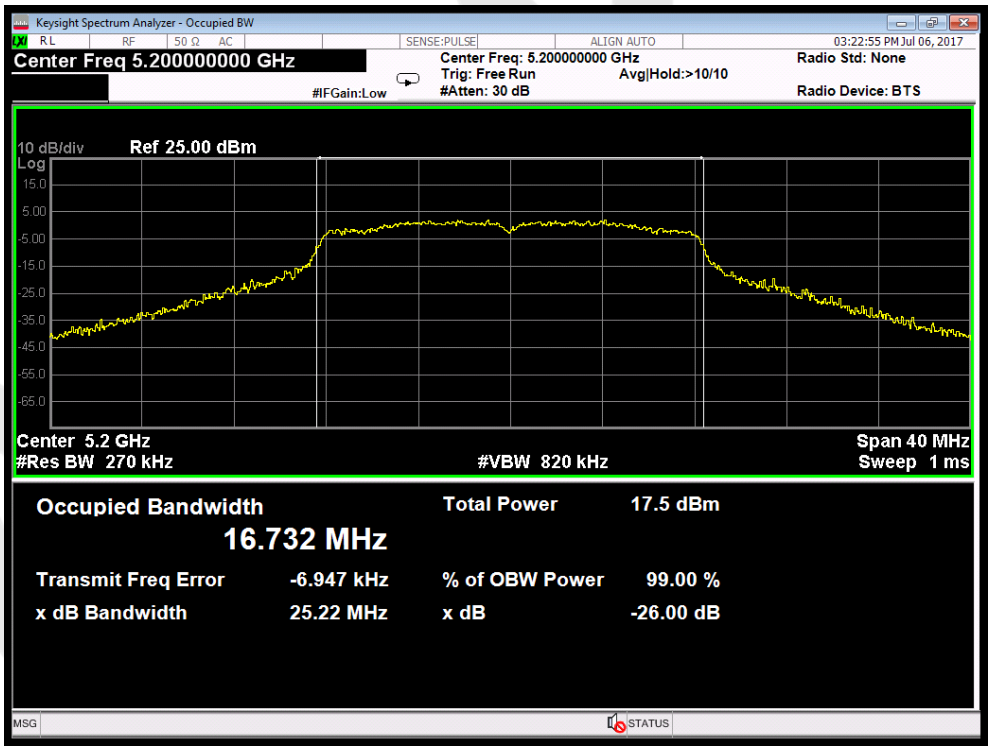


Test Mode: 802.11ac80

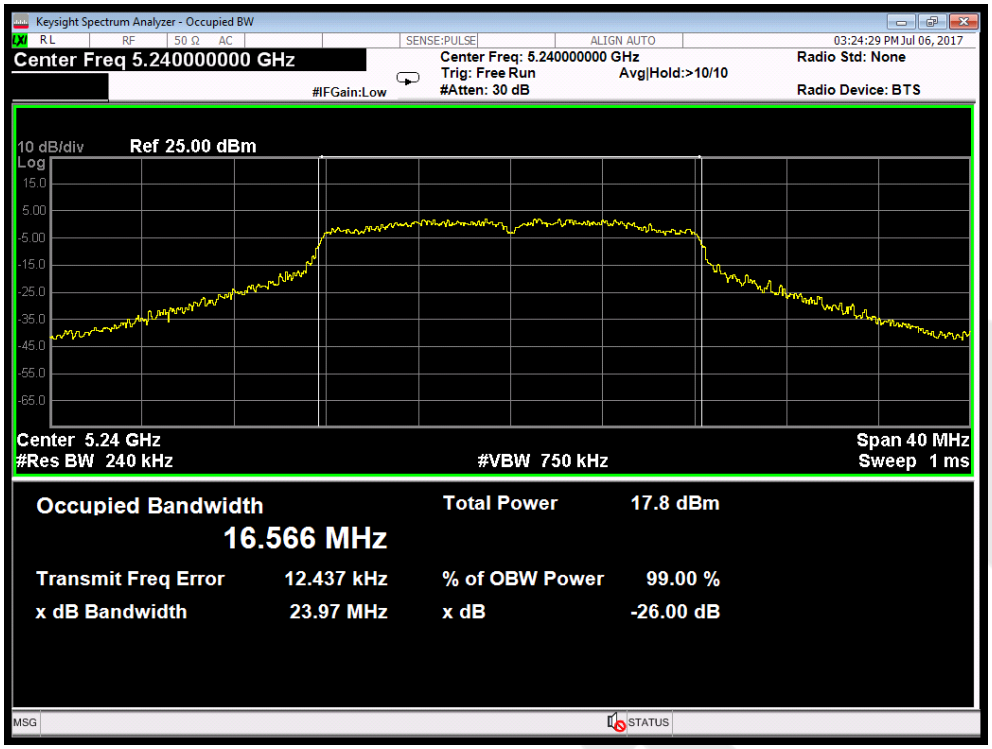
26dB &99% Bandwidth



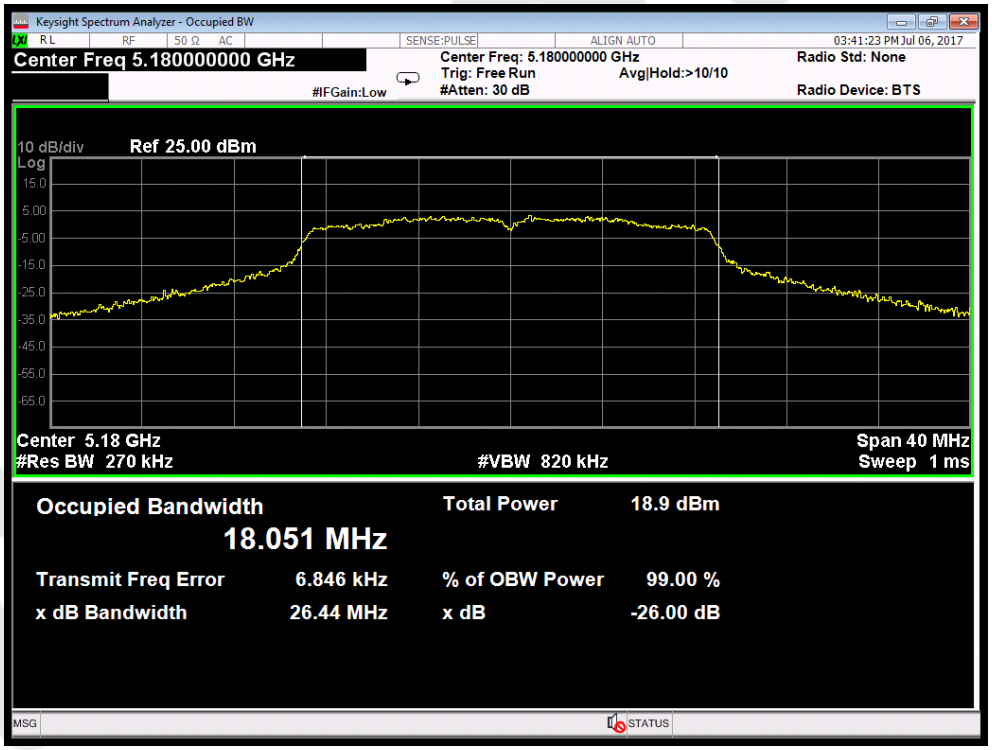
Test Mode: 802.11a--Low



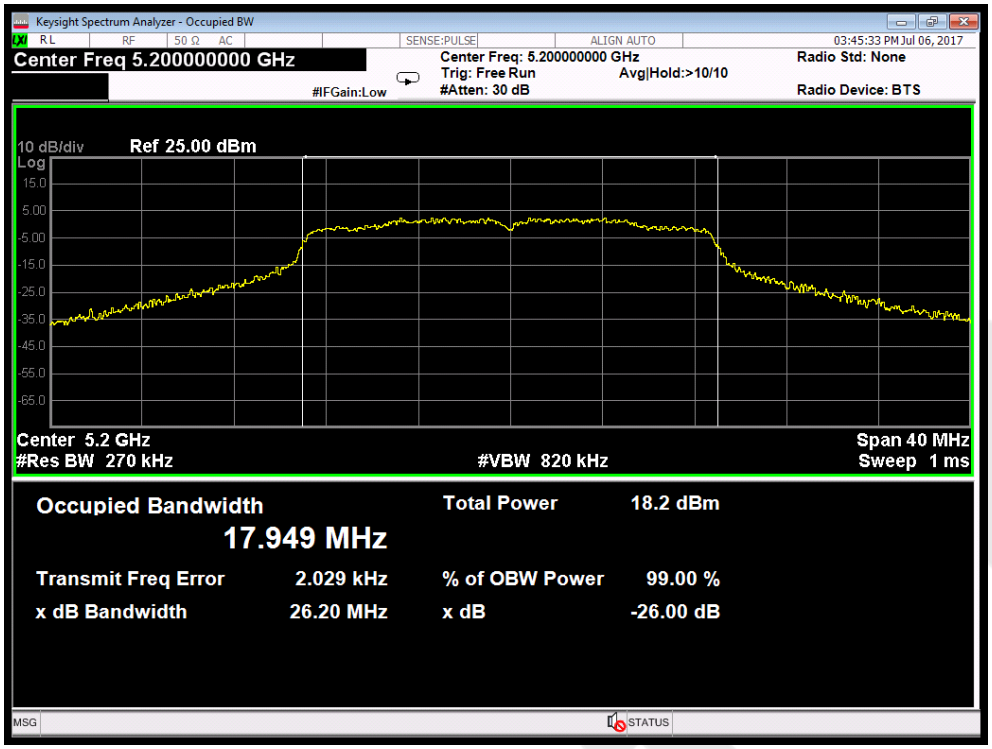
Test Mode: 802.11a---Middle



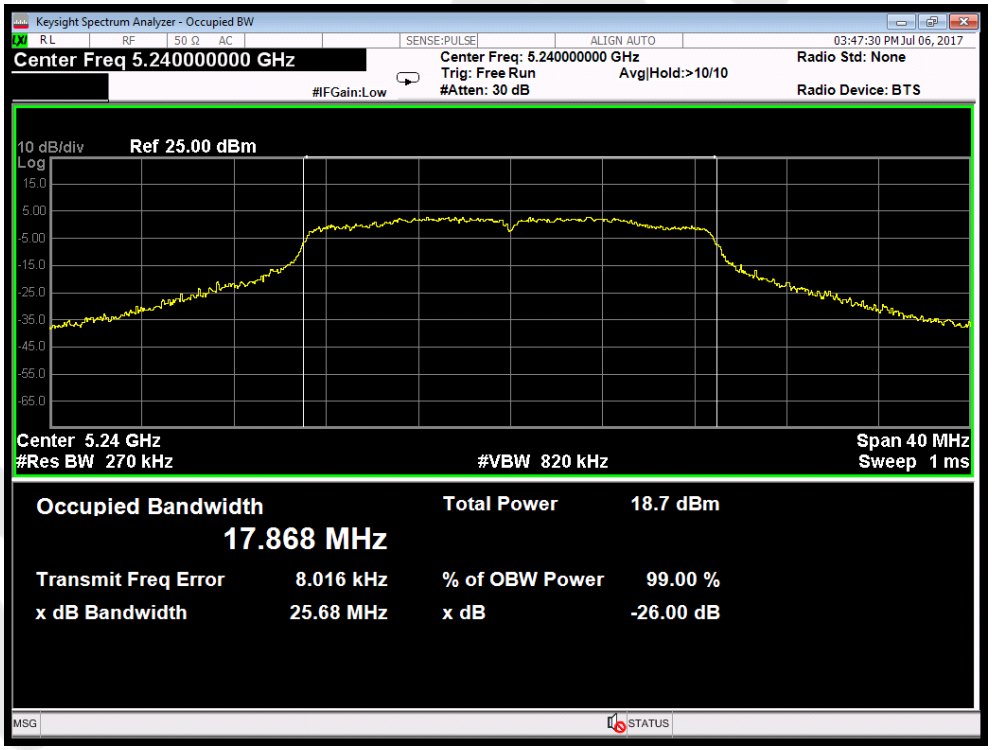
Test Mode: 802.11a---High



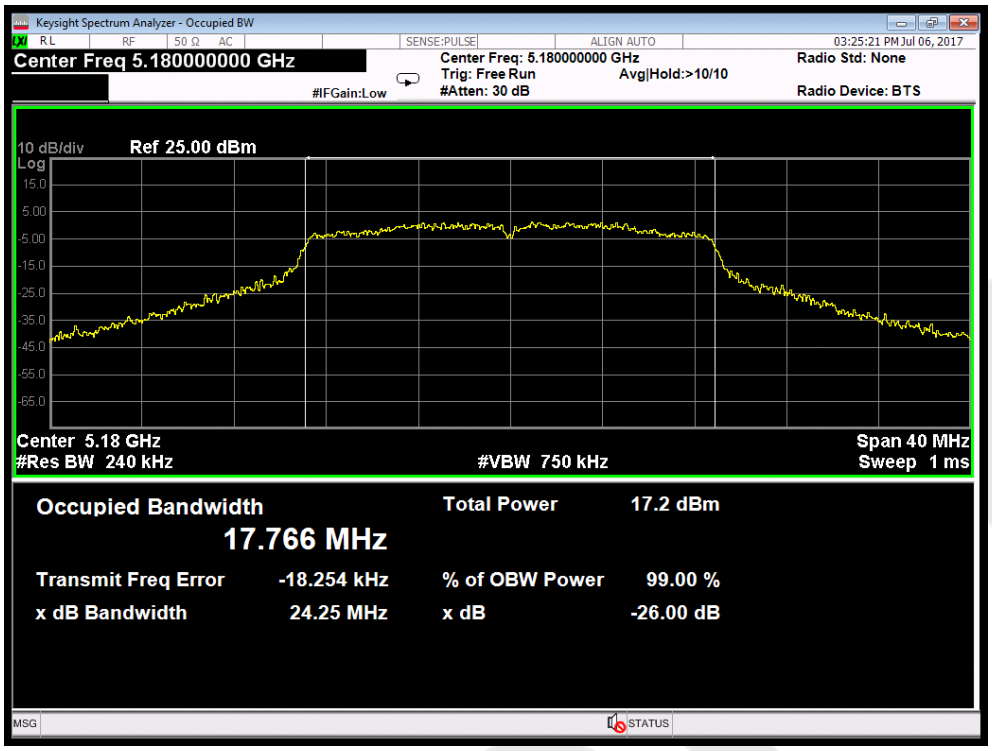
Test Mode: 802.11n20---Low



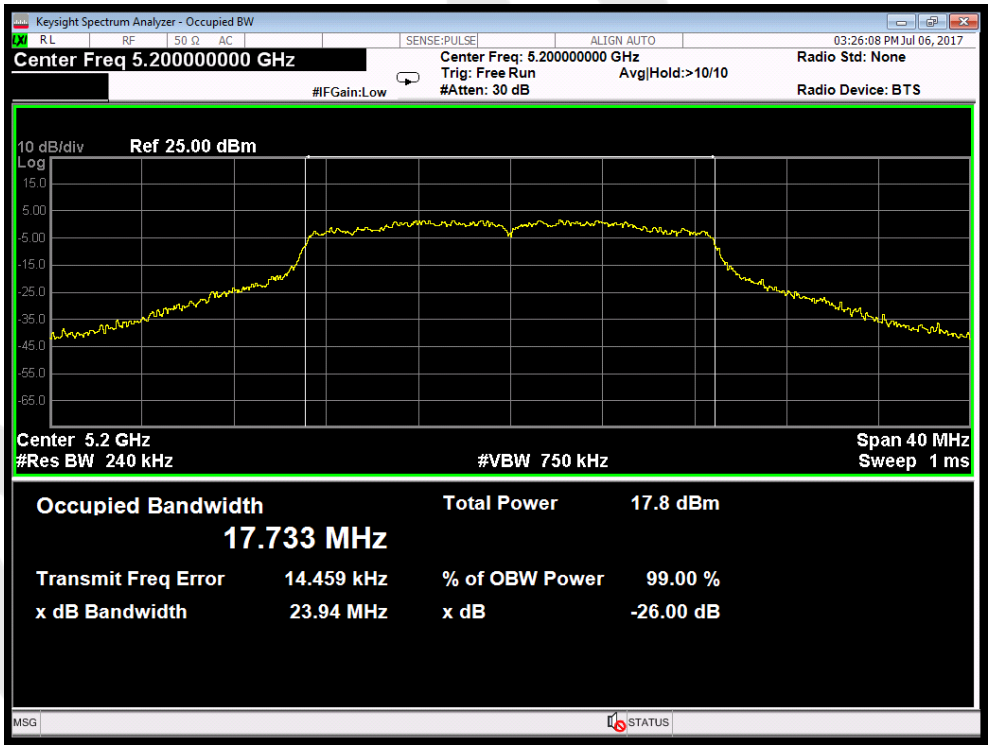
Test Mode: 802.11n20---Middle



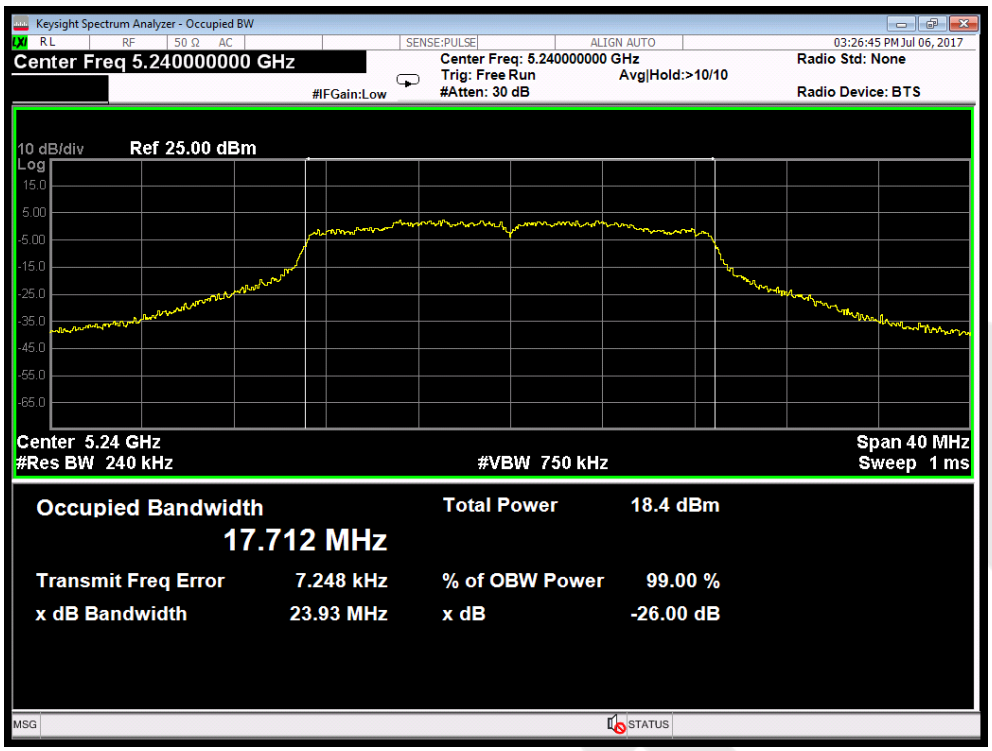
Test Mode: 802.11n20---High



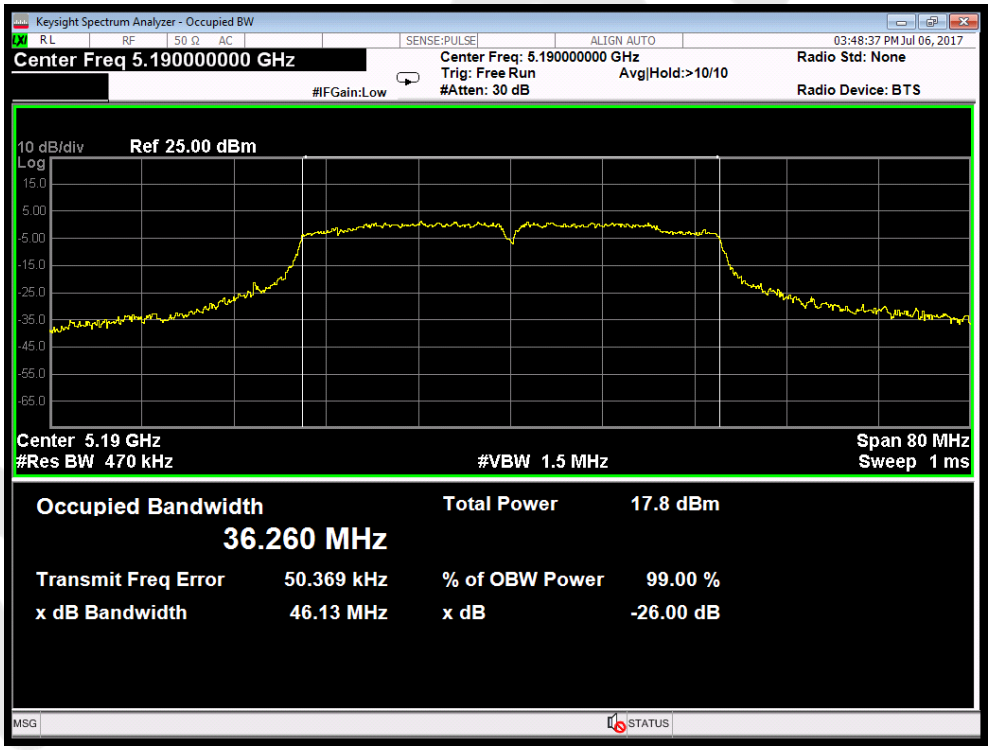
Test Mode: 802.11ac20--Low



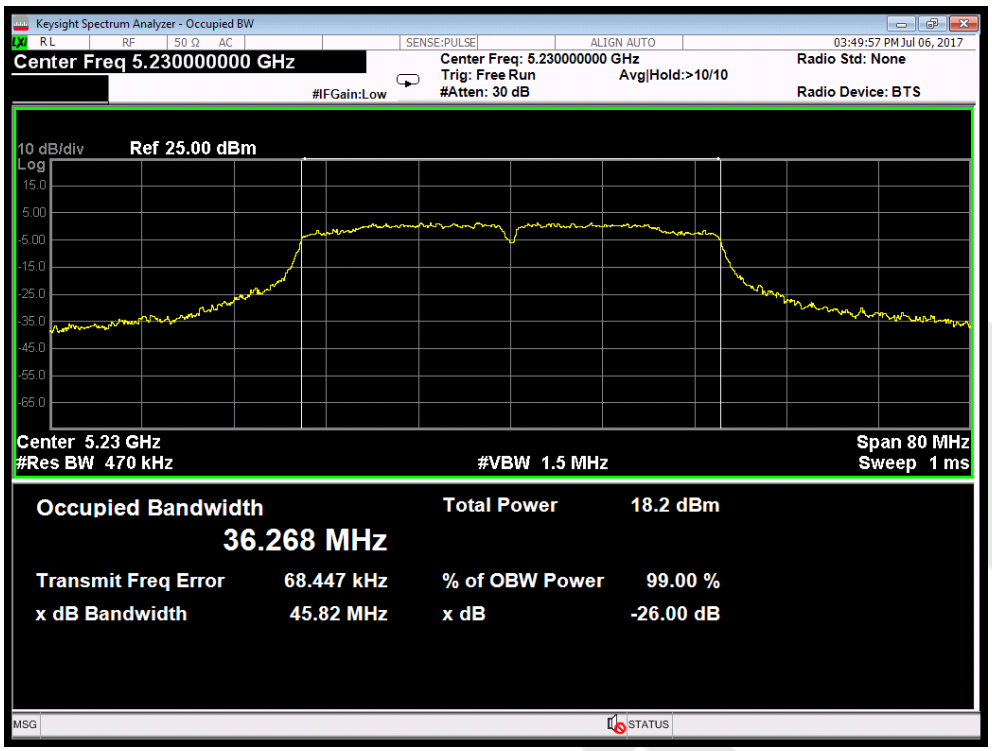
Test Mode: 802.11ac20---Middle



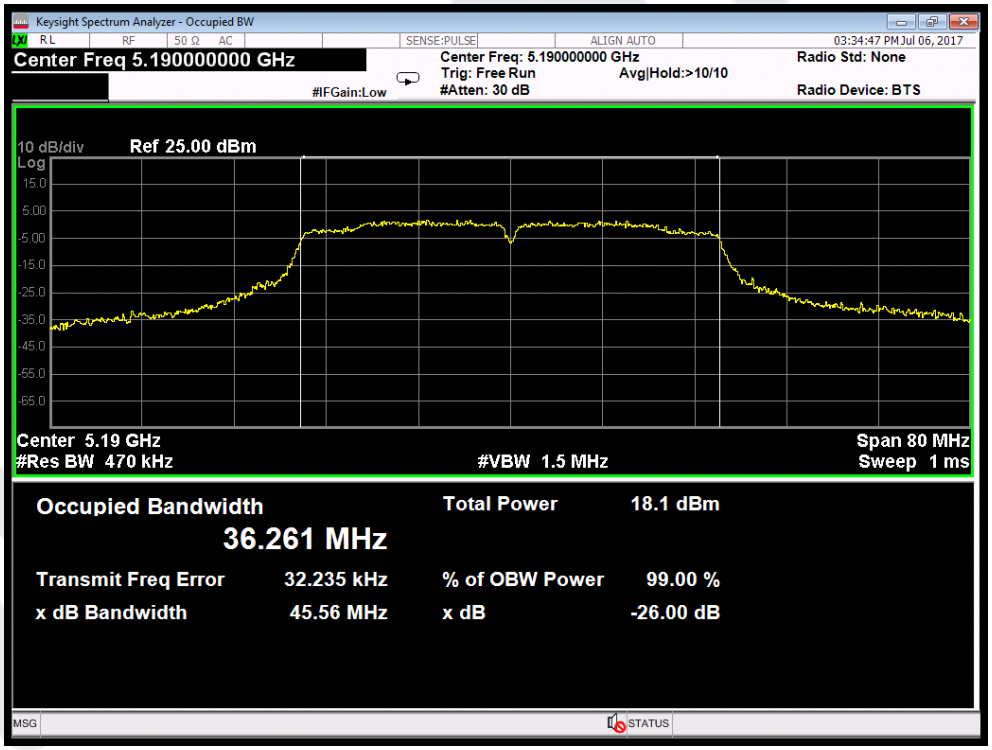
Test Mode: 802.11ac20---High



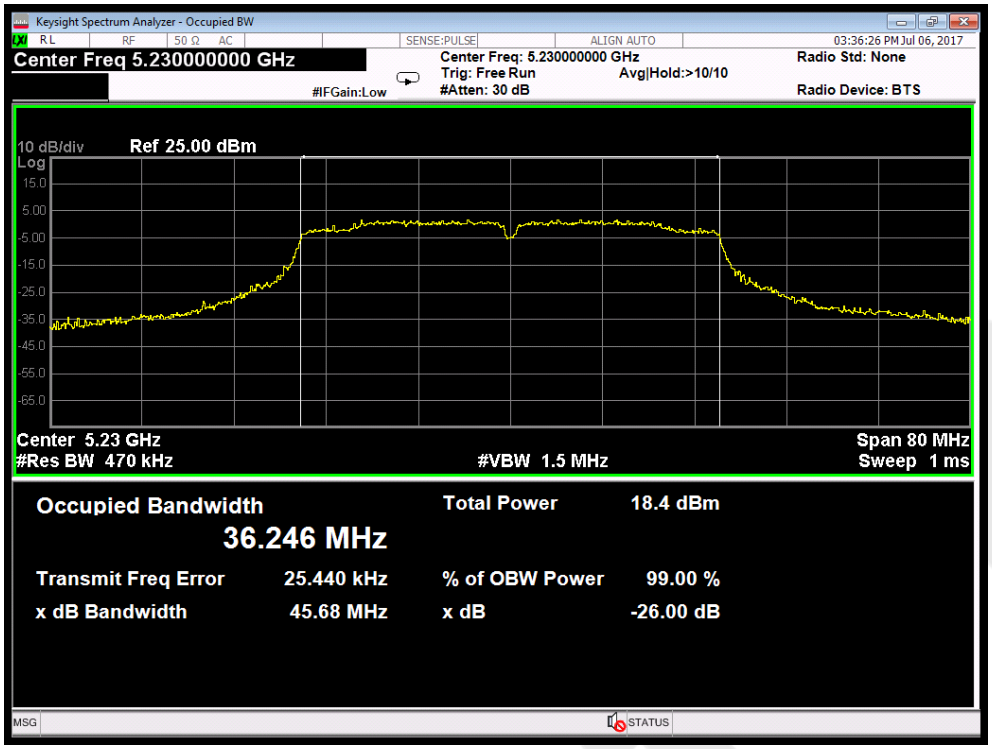
Test Mode: 802.11n40---Low



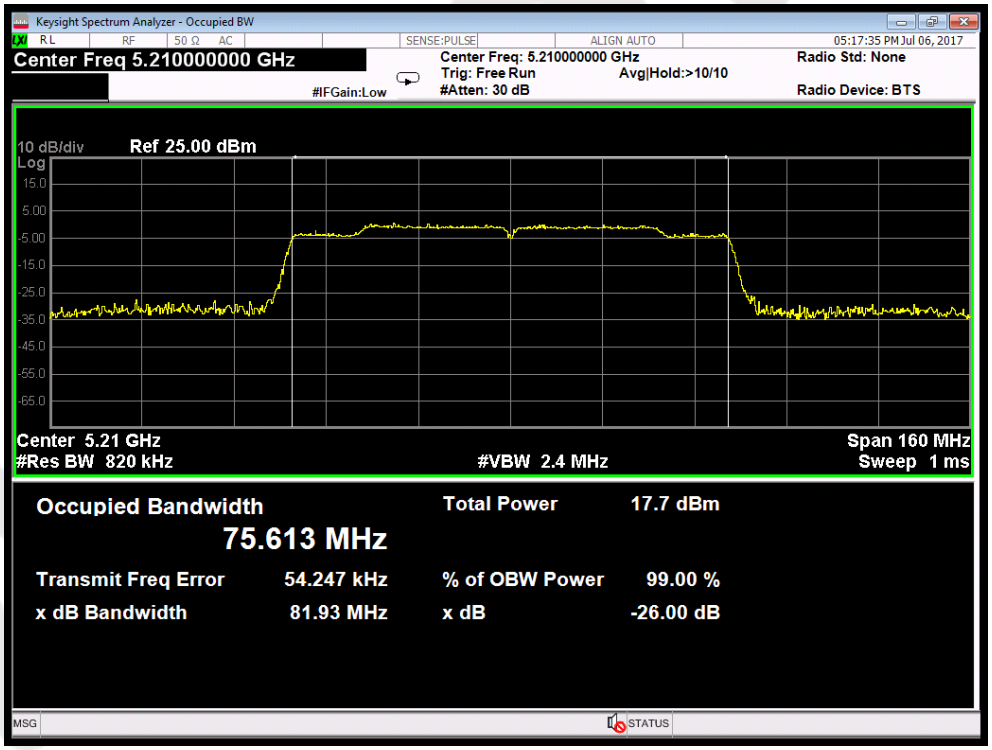
Test Mode: 802.11n40---High



Test Mode: 802.11ac40---Low



Test Mode: 802.11ac40---High



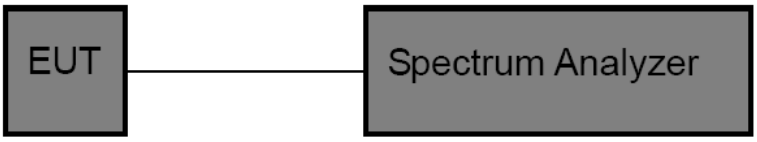
Test Mode: 802.11ac80

7. Power Spectral Density Test

7.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.407 (a) (1) (2) (3)
Test Limit	11dBm

7.2. Test Setup



7.3. Test Procedure

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, "provided that the measured power is integrated over the full reference bandwidth" to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz).

1. The EUT is directly connected to the spectrum analyzer;
2. Set RBW =1MHz;
3. Set VBW ≥ 3 RBW=3MHz;
3. Set the span to encompass the entire emissions bandwidth (EBW) of the signal;
5. Detector=RMS;
6. Sweep time= auto couple;
7. Trace mode=max. hold;

7.4. Test Data

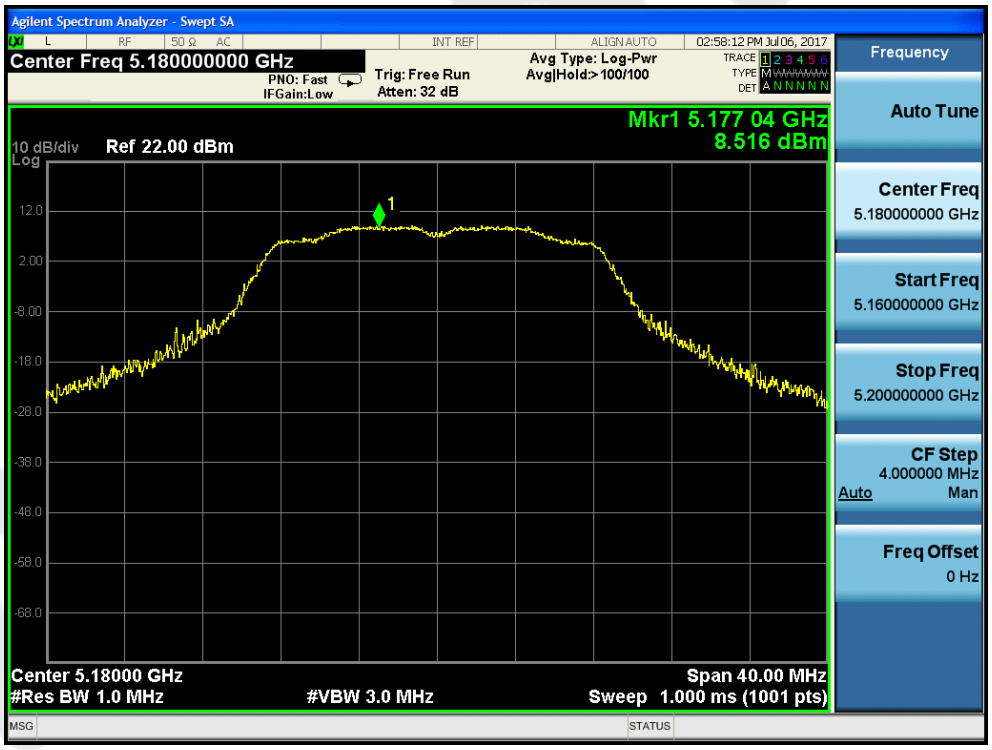
Test Item	:	Power Spectral Density	Test Mode	:	CH Low ~ CH High
Test Voltage	:	AC 120V/60HZ	Temperature	:	24℃
Test Result	:	PASS	Humidity	:	55%RH

Mode	Channel Frequency (MHz)	Final Power Spectral Density (dBm)	Limit	Results
802.11a	5180	8.837	11dBm	PASS
	5200	7.770		PASS
	5240	8.530		PASS
802.11n20	5180	8.516		PASS
	5200	8.222		PASS
	5240	6.654		PASS
802.11ac20	5180	8.804		PASS
	5200	7.898		PASS
	5240	8.476		PASS
802.11n40	5190	7.700		PASS
	5230	8.099		PASS
802.11ac40	5190	5.064		PASS
	5230	5.654		PASS
802.11ac80	5190	2.832		PASS

Test Mode: 802.11a--Low

Test Mode: 802.11a---Middle

Test Mode: 802.11a---High



Test Mode: 802.11n20---Low

Test Mode: 802.11n20---Middle

Test Mode: 802.11n20---High

Test Mode: 802.11ac20--Low

Test Mode: 802.11ac20---Middle

Test Mode: 802.11ac20---High

Test Mode: 802.11n40---Low

Test Mode: 802.11n40---High

Test Mode: 802.11ac40---Low

Test Mode: 802.11ac40---High

Test Mode: 802.11ac80

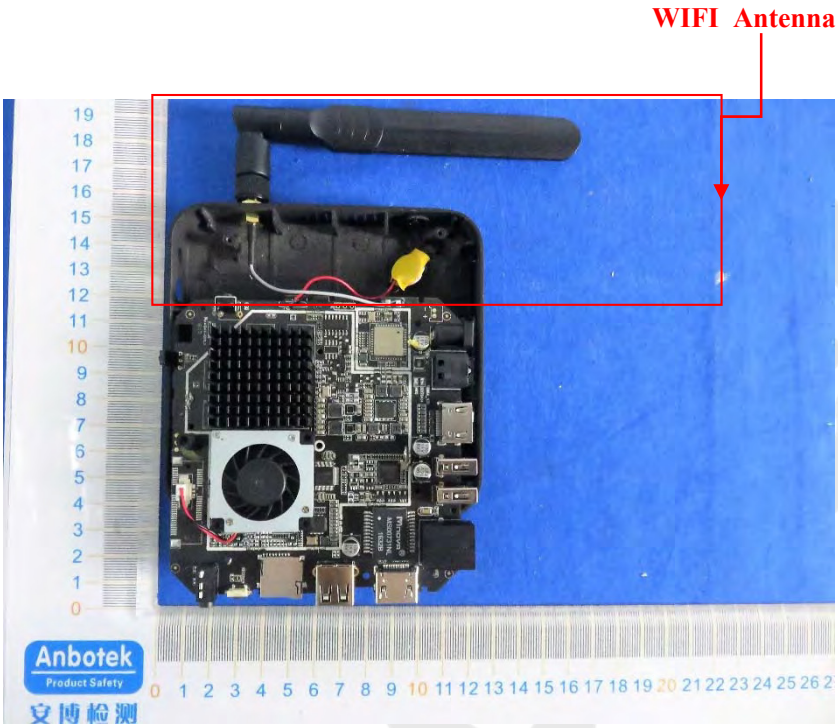
8. Antenna Requirement

8.1. Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203 /15.407
Requirement	1) 15.203 requirement: 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, 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. 2) 15.407 requirement: 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 §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

8.2. Antenna Connected Construction

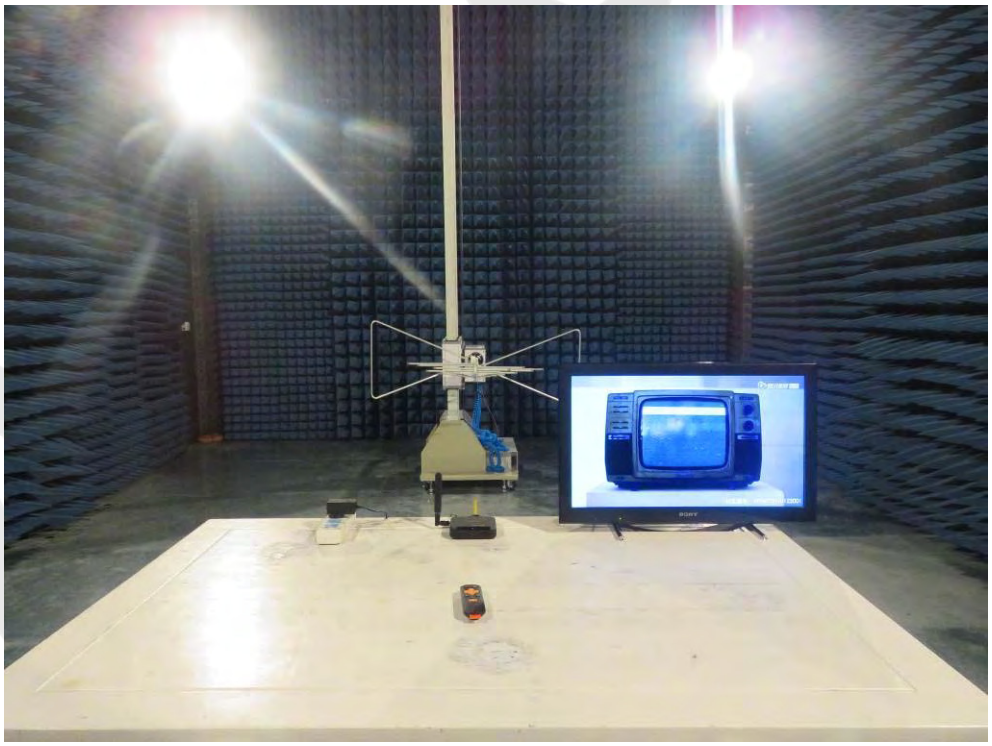
The WIFI antenna is a rod antenna which permanently attached, and the best case gain of the antenna is 5dBi. It complies with the standard requirement.

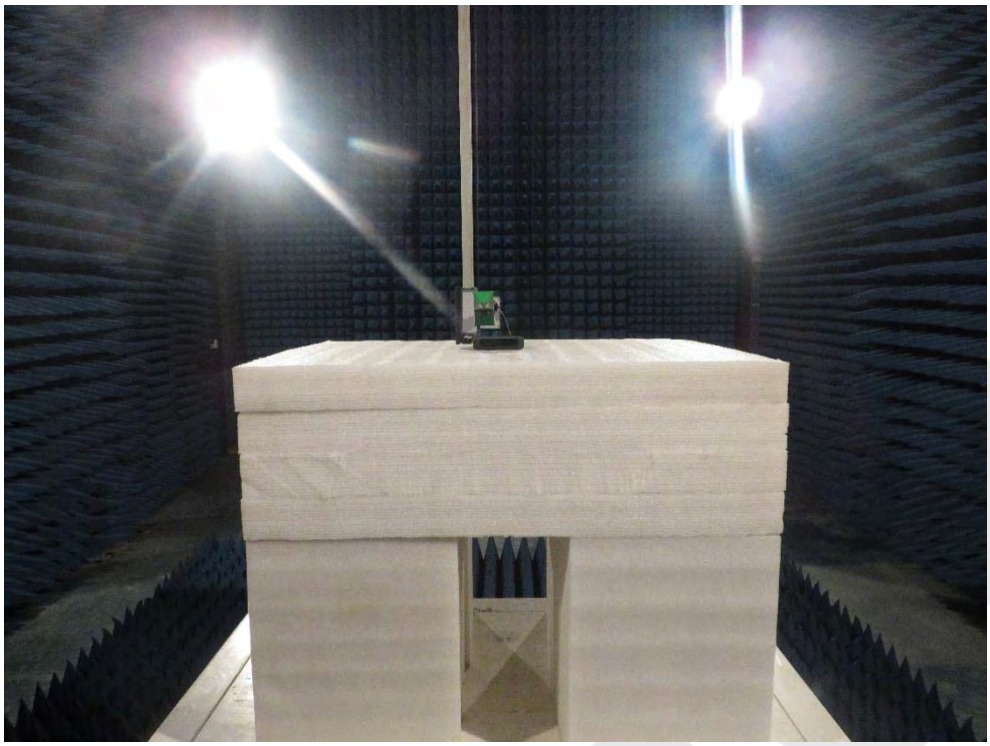


APPENDIX I -- TEST SETUP PHOTOGRAPH

Photo of Conducted Emission Measurement

Photo of Radiation Emission Test



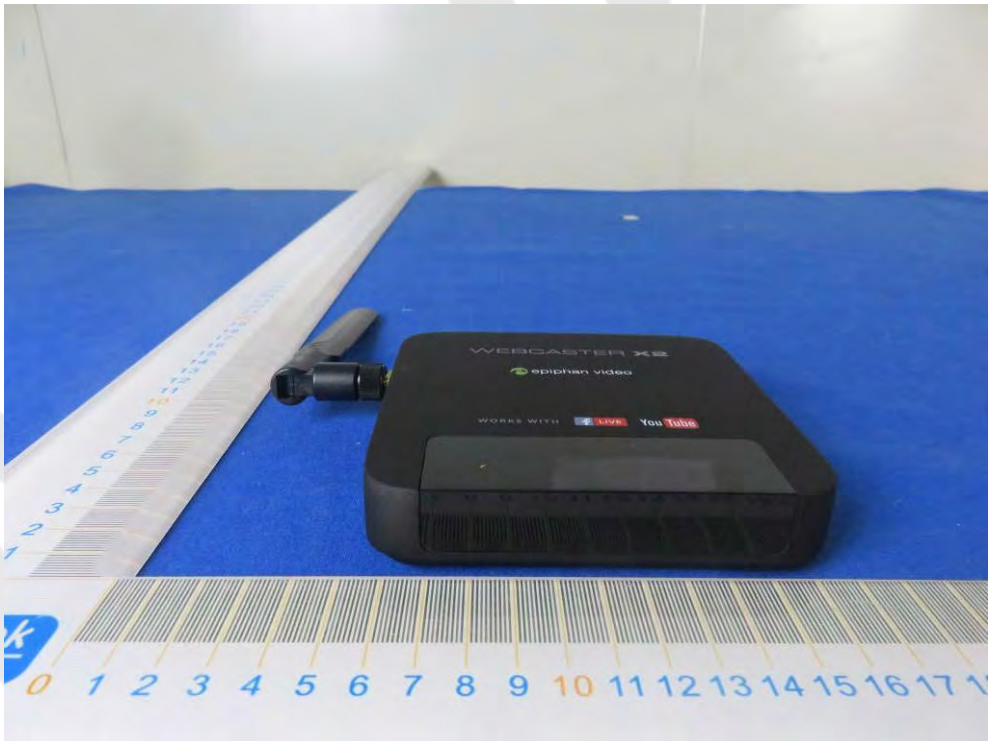


APPENDIX II -- EXTERNAL PHOTOGRAPH

Anbotek
Product Safety
安博检测

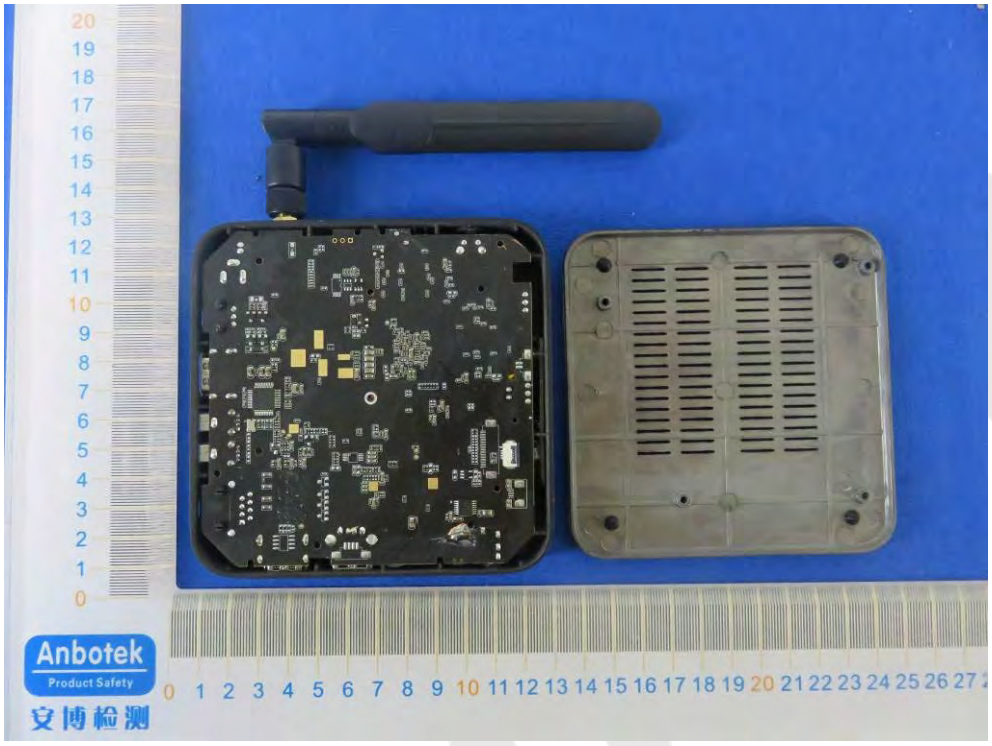
AV
RECOVERY
TF
USB
HDMI IN

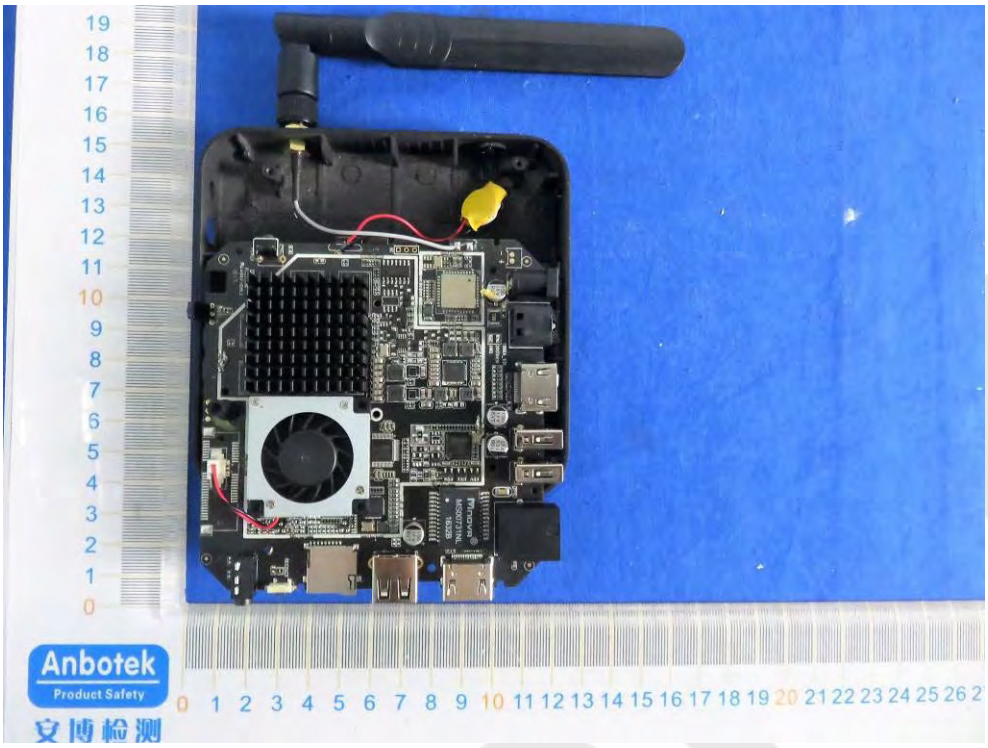
WEBCASTER X2


WEBCASTER X2
epiphan video
WORKS WITH
Live
YouTube

LAN
USB
HDMI OUT
OPTICAL
DC

APPENDIX III -- INTERNAL PHOTOGRAPH

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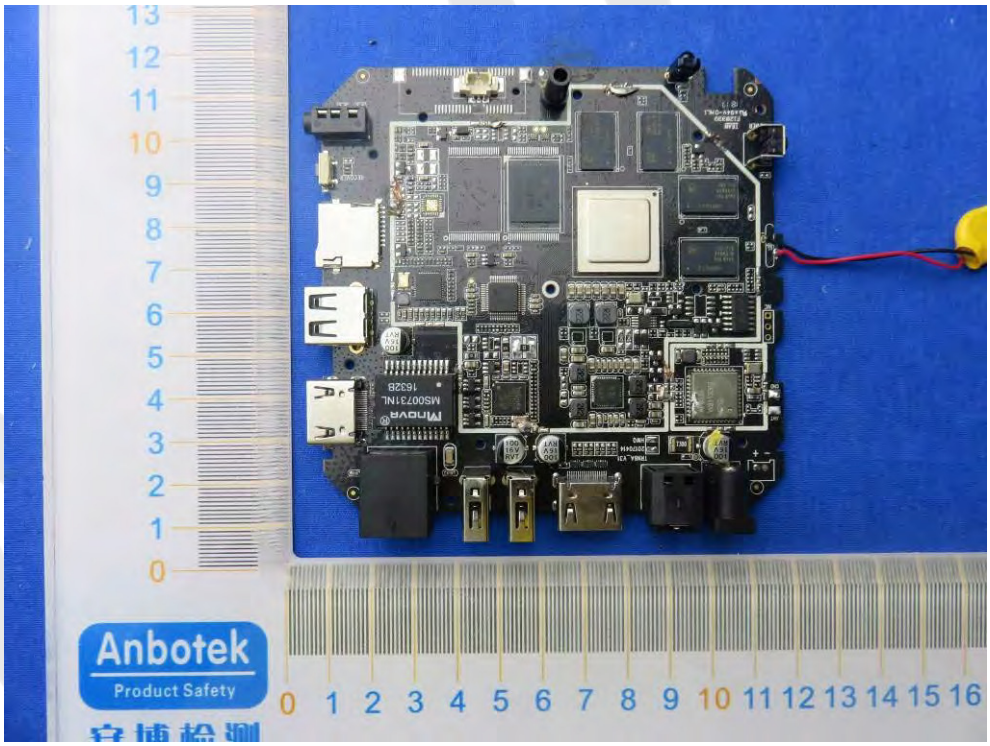
Product Safety
安博检测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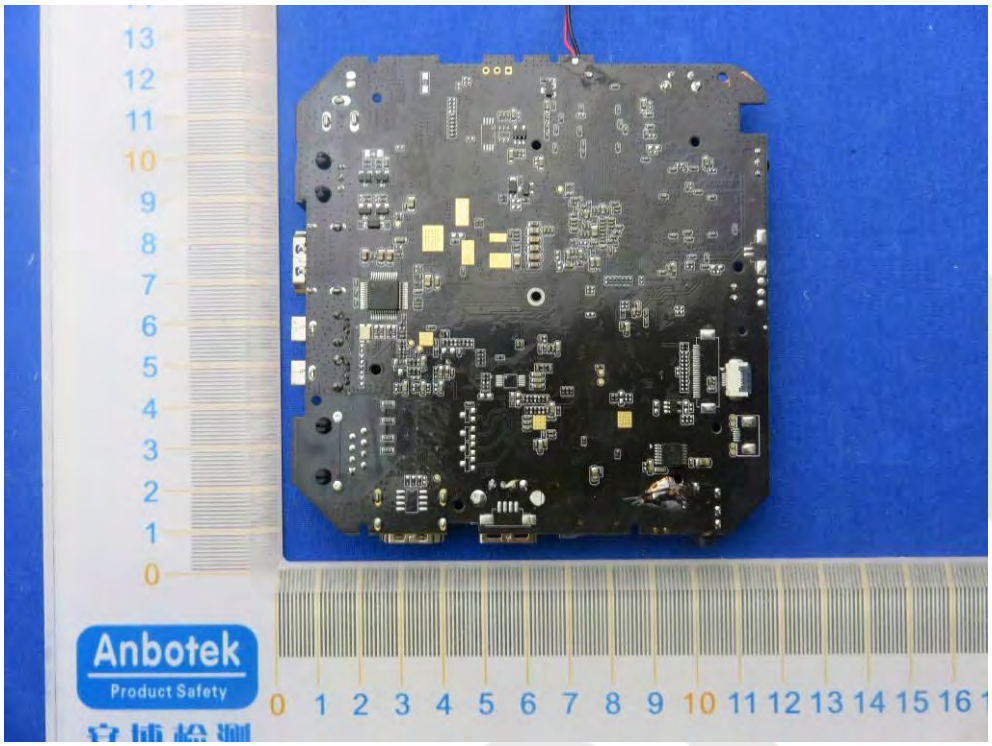
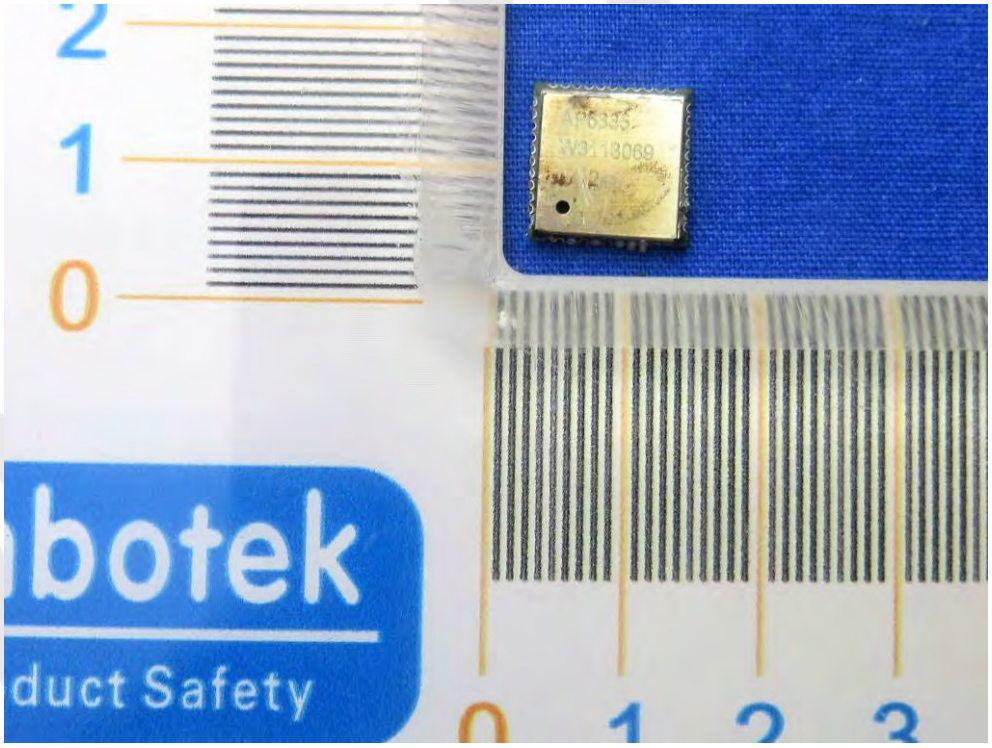
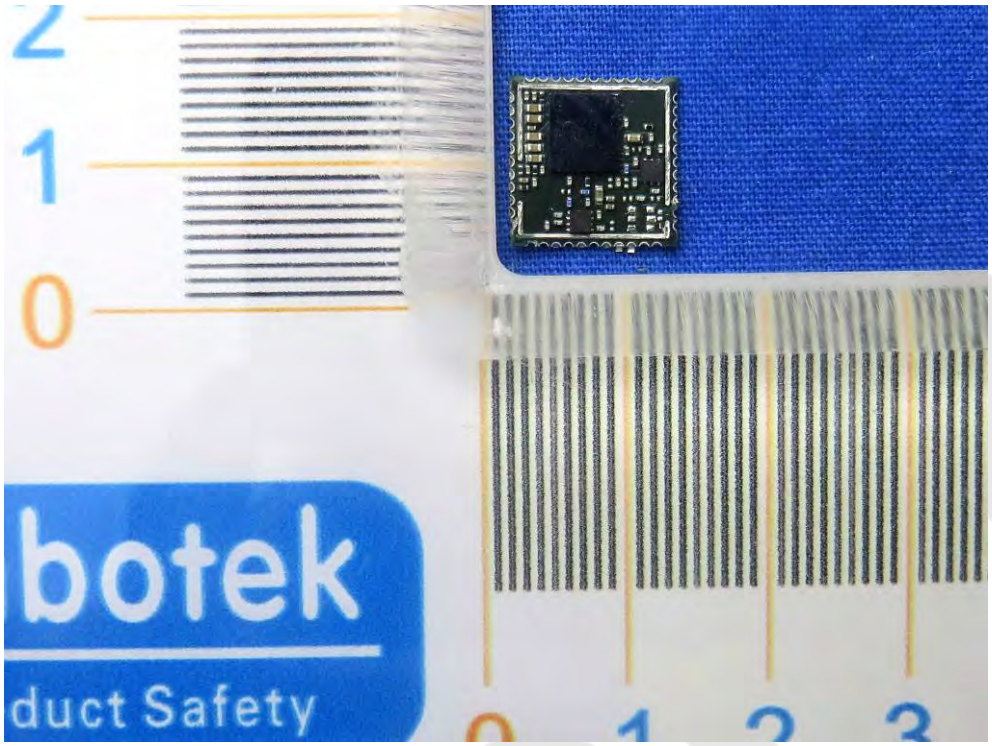
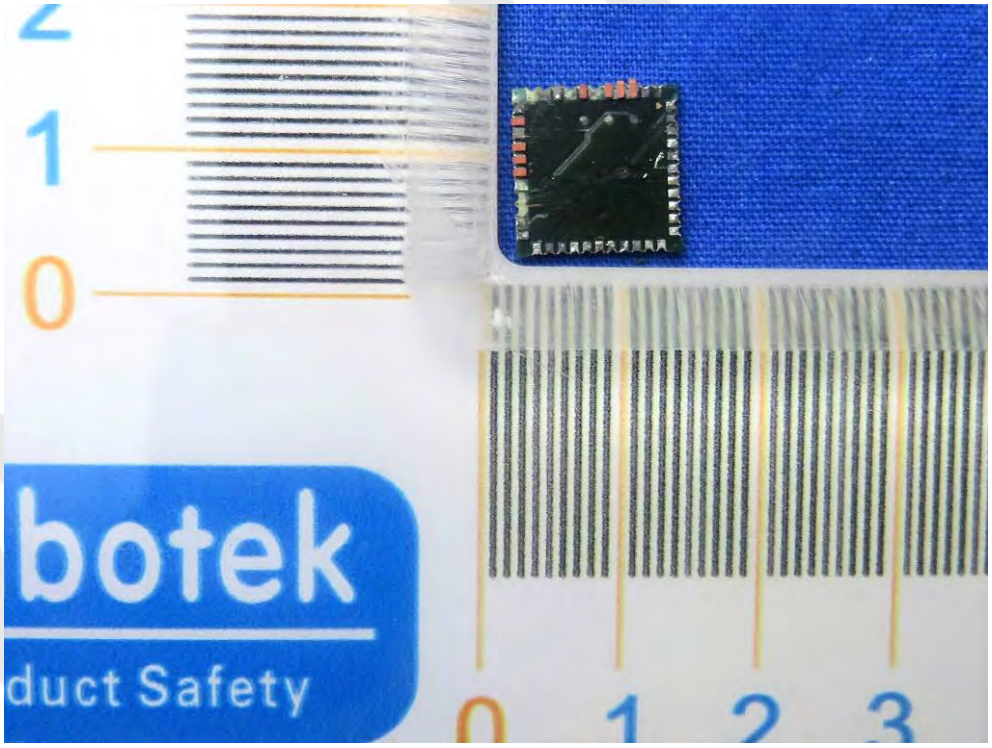
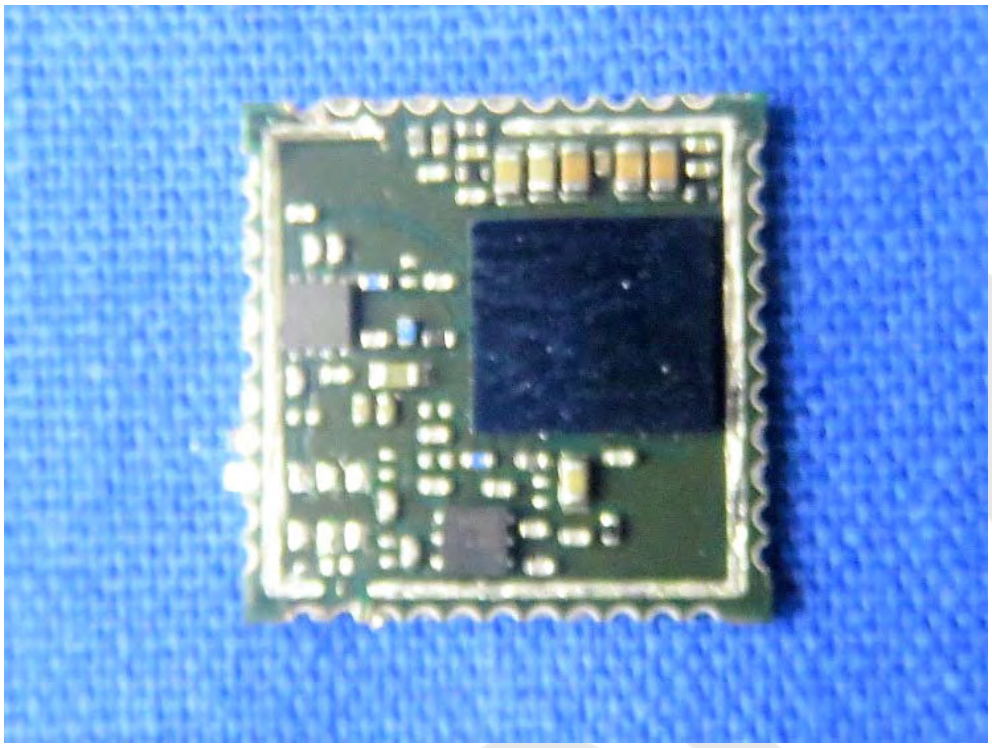
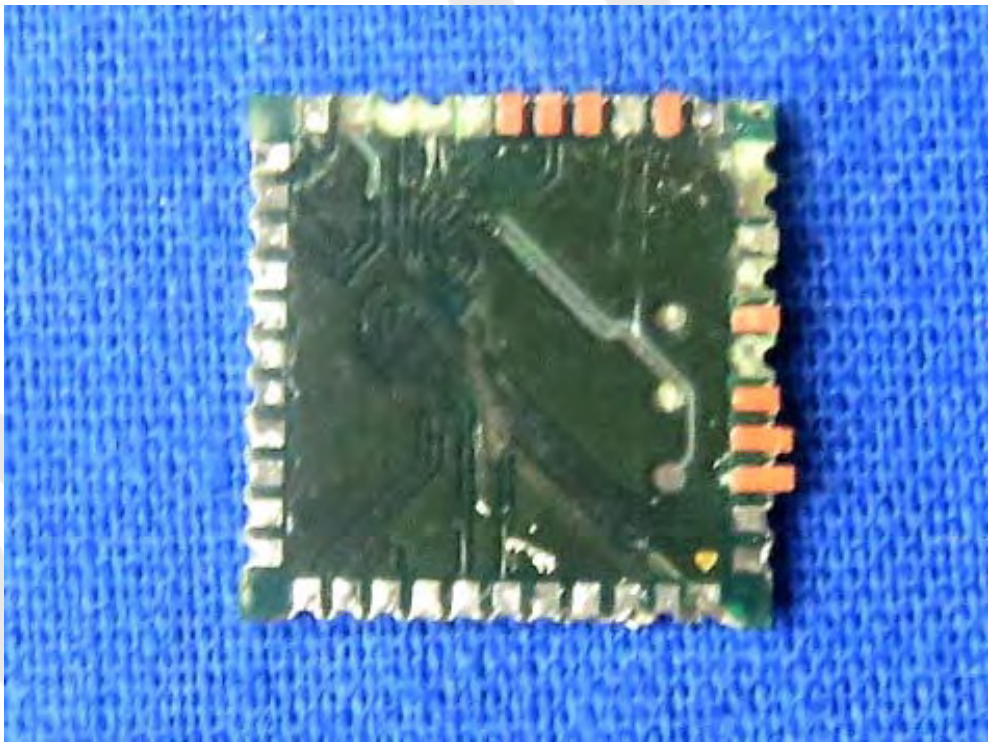
Product Safety


Anbotek
Product Safety


AP6335-
W3113069
botek
duct Safety


botek
duct Safety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duct Safety