

# FCC TEST REPORT

for

Borqs BeiJing Ltd.

6" Tablet Remote

Model Number: XR6

FCC ID: 2ABDK-XR6

IC: 12695A-XR6

Prepared for : Borqs BeiJing Ltd.  
Address : Tower A, Building B23, Universal Business Park, No. 10  
Jiuxianqiao Road, Chaoyang District Beijing, 100015 China

Prepared by : Keyway Testing Technology Co., Ltd.  
Address : Building 1, Baishun Industrial Zone, Zhangmutou Town,  
Dongguan, Guangdong, China

Tel: 86-769-8718 2258


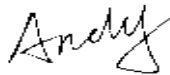

Fax: 86-769-8718 1058

Report No. : 15KWE012375F  
Date of Test : Jan. 15~25, 2015  
Date of Report : Jan. 27, 2015

## TABLE OF CONTENTS

Test Report Declaration	Page
1. TEST SUMMARY .....	4
2. GENERAL PRODUCT INFORMATION.....	5
2.1. Product Function .....	5
2.2. Description of Device (EUT) .....	5
2.3. Product Version.....	6
2.4. Independent Operation Modes .....	6
2.5. TEST SITES.....	6
2.6. List of Test and Measurement Instruments.....	7
3. TEST SET-UP AND OPERATION MODES .....	8
3.1. Principle of Configuration Selection .....	8
3.2. Block Diagram of Test Set-up.....	8
3.3. Test Operation Mode and Test Software .....	8
3.4. Special Accessories and Auxiliary Equipment .....	8
3.5. Countermeasures to Achieve EMC Compliance .....	8
4. EMISSION TEST RESULTS .....	9
4.1. Conducted Emission at the Mains Terminals Test .....	9
4.2. Radiated Emission Test.....	12
5. BAND EDGE COMPLIANCE TEST .....	19
5.1. Limits.....	19
5.2. Test setup .....	19
5.3. Test Data .....	19
6. 26DB AND 99% BANDWIDTH TEST.....	20
6.1. Measurement Procedure .....	20
7. OUTPUT POWER TEST.....	24
7.1. Limits.....	24
7.2. Test setup .....	24
7.3. Test result .....	24
8. PEAK POWER SPECTRAL DENSITY TEST.....	26
8.1. Limits.....	26
8.2. Test setup .....	26
8.3. Test data .....	26
9. FREQUENCY STABILITY.....	31
9.1. Measurement procedure .....	31
9.2. Test setup .....	31
9.3. Limit .....	31
9.4. Test data .....	31
10. ANTENNA REQUIREMENTS .....	33
10.1. Limits.....	33
10.2. Result.....	33
11. PHOTOGRAPHS OF TEST SET-UP .....	34
12. PHOTOGRAPHS OF THE EUT .....	36

## Keyway Testing Technology Co., Ltd.

<b>Applicant:</b>	Borqs BeiJing Ltd.		
<b>Address:</b>	Tower A, Building B23, Universal Business Park, No. 10 Jiuxianqiao Road, Chaoyang District Beijing, 100015 China		
<b>Manufacturer:</b>	Borqs BeiJing Ltd.		
<b>Address:</b>	Tower A, Building B23, Universal Business Park, No. 10 Jiuxianqiao Road, Chaoyang District Beijing, 100015 China		
<b>E.U.T:</b>	6" Tablet Remote		
<b>Model Number:</b>	XR6		
<b>Trade Name:</b>	VIZIO	<b>Serial No.:</b>	-----
<b>Date of Receipt:</b>	Jan. 14, 2015	<b>Date of Test:</b>	Jan. 15~25, 2015
<b>Test Specification:</b>	FCC Part 15, Subpart 15.407: Oct. 1, 2014 ANSI C63.10:2013 RSS-210 Issue 8 December 2010 RSS-Gen Issue 4 November 2014		
<b>Test Result:</b>	The equipment under test was found to be compliance with the requirements of the standards applied.		
	<b>Issue Date: Jan. 27, 2015</b>		
Tested by:	Reviewed by:	Approved by:	
			
_____ Daisy Chen / Engineer	_____ Andy Gao / Supervisor	_____ Jade Yang / Supervisor	
<b>Other Aspects:</b>	None.		
<i>Abbreviations: OK/P=passed    fail/F=failed    n.a/N=not applicable    E.U.T=equipment under tested</i>			
<i>This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Keyway Testing Technology Co., Ltd.</i>			

## 1.TEST SUMMARY

Test Items	Test Requirement	Result
Conducted Emissions	15.207 RSS-GEN, Section 7.2.2	PASS
Radiated Emissions	15.407(b), 15.209 RSS-210, A9.2, A9.4	PASS
26dB bandwidth and 99%dB Bandwidth	15.407 (a) RSS-210, A9.2, A9.4	PASS
Power density	15.407 (a) RSS-210, A9.2	PASS
Maximum Peak Output Power	15.407 (a) RSS-210, A9.2	PASS
Emissions from out of band	15.407 (b) RSS-210, A9.2	PASS
Frequency Stability	15.407 (g)	PASS
Antenna Requirement	15.203	PASS

## 2.GENERAL PRODUCT INFORMATION

### 2.1. Product Function

Refer to Technical Construction Form and User Manual.

### 2.2. Description of Device (EUT)

Product Name:	6" Tablet Remote
Model No.:	XR6
Operation Frequency:	WIFI:2412MHz~2462MHz (802.11b/802.11g/802.11n(H20)) 2422MHz~2452MHz (802.11n(H40)) WIFI:5180-5240 MHz; (5G 802.11a/n(HT20)) 5190-5230 MHz; (802.11n(HT40)) BT: 2402MHz~2480MHz
Channel numbers:	WIFI:11 for 802.11b/802.11g/802.11n(H20) ,7 for 802.11n(H40) BT: 79 Channels 7channels for 5G 802.11a/n(HT20) 8channels 5G for 802.11n(HT40)
Modulation technology:	WIFI: Direct Sequence Spread Spectrum (DSSS) for (IEEE 802.11b) Orthogonal Frequency Division Multiplexing(OFDM) for (IEEE 802.11g/802.11n) BT: GFSK
Data speed (IEEE 802.11b):	1Mbps, 2Mbps, 5.5Mbps, 11Mbps
Data speed (IEEE 802.11g):	6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps,54Mbps
Data speed (IEEE 802.11n):	Up to 150Mbps
Antenna Type:	Internal
Antenna gain:	1.0dBi for WIFI 1.0dBi for BT
Power supply:	DC 3.7V form battery DC 5V from adapter
Adapter	Manufacturer: AQUIL STAR PRECISION INDUSTRIAL(SHENZHEN)CO., LTD M/N: ASUC41a-050120 I/P:AC 100~240V 50/60Hz 0.2A O/P:DC 5V 1.2A

## 2.3. Product Version

Product SW version	BORQS_VIZIO_141204_1213 40
Product HW version	DVT1
Radio SW version	80-WL007-1 Rev. D
Radio HW version	WCN3680B Rev. D
Test SW Version	TV1.0
RF power setting in TEST SW	2.4G:11b 15 dBm;11g 14 dBm;11n(HT20) 13 dBm; 11n(HT40) 11 dBm 5G:11n 12 dBm; 11a 14 dBm BT:0dBm

Note: SW means software, HW means hardware.

## 2.4. Independent Operation Modes

The basic operation modes are:

These is Digital Transmission system (DTS) and have modulation OFDM, DSSS, DBPSK, DQPSK, CCK, 16QAM, 64QAM. According exploratory test, EUT will have maximum output power in those data rate (802.11a/n: MCS0), so those data rate were used for all test. The equipment enables high-speed access without wires to network assets. This adapter uses the IEEE 802.11 protocol to enable wireless communications between the host and Wireless router.

For 802.11a/n(HT20):

- 1.lowest channel : 5180MHz (Channel 36)
- 2.middle channel : 5200MHz (Channel 40)
3. highest channel : 5240MHz (Channel 48)

For 802.11n(HT40):

4. For lowest channel : 5190MHz (Channel 38)
5. highest channel : 5230MHz (Channel 46)

Note: for conducted emission test, we pretest all mode, the worst mode was 802.11a channel 36.

for radiated emissions test, we pretest all mode, the worst mode was 802.11a.

The worst mode's data was recording and show in the test report.

## 2.5. TEST SITES

### 2.5.1. Test Facilities

Lab Qualifications : Certificated by Industry Canada  
Registration No.: 9868A  
Date of registration: December 8, 2011

Certificated by FCC, USA  
Registration No.: 370994  
Date of registration: February 21, 2012

Certificated by CNAS China  
Registration No.: CNAS L5783  
Date of registration: August 8, 2012

## 2.6. List of Test and Measurement Instruments

### 2.6.1. For conducted emission at the mains terminals test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCI	101156	Apr. 27,14	Apr. 27,15
Artificial Mains Network	Rohde&Schwarz	ENV216	101315	Apr. 27,14	Apr. 27,15
Artificial Mains Network (AUX)	Rohde&Schwarz	ENV216	101314	Apr. 27,14	Apr. 27,15
RF Cable	FUJIKURA	3D-2W	944 Cable	Apr. 27,14	Apr. 27,15

### 2.6.2. For radiated emission test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCI	101156	Apr. 27,14	Apr. 27,15
System Simulator	Agilent	E5515C	GB43130245	Apr. 27,14	Apr. 27,15
Power Splitter	Weinschel	1506A	NW425	Apr. 27,14	Apr. 27,15
Bilog Antenna	ETS-LINDGREEN	3142D	135452	Apr. 27,14	Apr. 27,15
Spectrum Analyzer	Agilent	E4411B	MY4511304	Apr. 27,14	Apr. 27,15
Spectrum Analyzer	R&S	FSV40	132.1.3008K39 -100967	Apr. 27,14	Apr. 27,15
3m Semi-anechoic Chamber	ETS-LINDGREEN	966	KW01	Apr. 27,14	Apr. 27,15
Signal Amplifier	SONOMA	310	187016	Apr. 27,14	Apr. 27,15
Signal Amplifier	Agilent	8449B	3008A00251	Apr. 27,14	Apr. 27,15
RF Cable	IMRO	IMRO-400	966 Cable 1#	N/A	N/A
MULTI-DEVICE Controller	ETS-LINDGREEN	2090	126913	N/A	N/A
Horn Antenna	DAZE	ZN30701	11003	Apr. 27,14	Apr. 27,15
Horn Antenna	SCHWARZBECK	BBHA9170	9170-068	Apr. 27,14	Apr. 27,15
Spectrum Analyzer	Agilent	8593E	3911A04271	Apr. 27,14	Apr. 27,15
Spectrum Analyzer	Agilent	E4408B	MY44211125	Apr. 27,14	Apr. 27,15
Signal Amplifier	DAZE	ZN3380C	11001	Apr. 27,14	Apr. 27,15
High Pass filter	Micro	HPM50111	324216	Apr. 27,14	Apr. 27,15
Filter	COM-MW	ZBSF-C836.5-25-X	KW032	Apr. 27,14	Apr. 27,15
Filter	COM-MW	ZBSF-C1747.5-75-X2	KW035	Apr. 27,14	Apr. 27,15
Filter	COM-MW	ZBSF-C1880-60-X2	KW037	Apr. 27,14	Apr. 27,15
DC Power Supply	LongWei	PS-305D	010964729	Apr. 27,14	Apr. 27,15
Constant temperature and humidity box	GF	GTH-800-40-1P	MAA9906-005	Apr. 27,14	Apr. 27,15
Universal radio communication tester	Rohde&Schwarz	CMU200	3215420	Apr. 27,14	Apr. 27,15
Splitter	Agilent	11636B	0025164	Apr. 27,14	Apr. 27,15

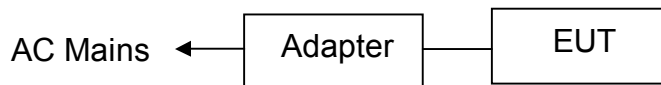
### 3. TEST SET-UP AND OPERATION MODES

#### 3.1. Principle of Configuration Selection

**Emission:** The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

#### 3.2. Block Diagram of Test Set-up

System Diagram of Connections between EUT and Simulators



*(EUT: 6" Tablet Remote)*

#### 3.3. Test Operation Mode and Test Software

None.

#### 3.4. Special Accessories and Auxiliary Equipment

None.

#### 3.5. Countermeasures to Achieve EMC Compliance

None.



## 4. EMISSION TEST RESULTS

### 4.1. Conducted Emission at the Mains Terminals Test

#### 4.1.1. Limit 15.207 limits

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

#### 4.1.2. Test Setup

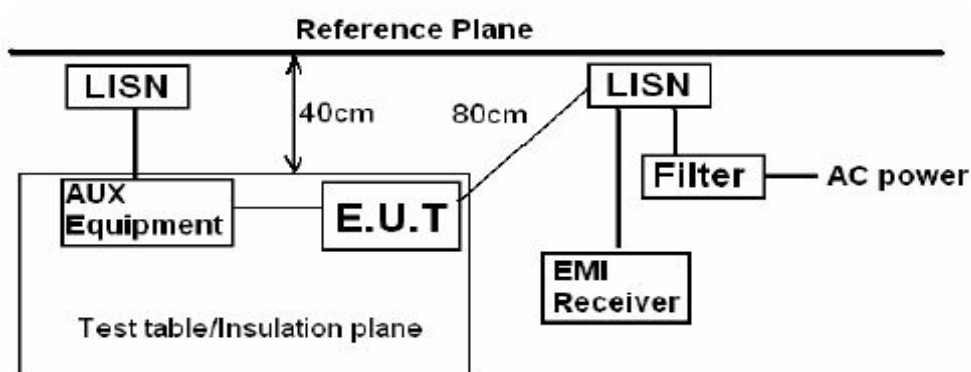
The EUT was put on a wooden table which was 0.8 m high above the ground and connected to the AC mains through the Artificial Mains Network (AMN). Where the mains cable supplied by the manufacture was longer than 0.8 m, the excess was folded back and forth parallel to the cable at the centre so as to form a bundle no longer than 0.4 m.

The EUT was kept 0.4 m from any other earthed conducting surface. Both sides of AC line were checked to find out the maximum conducted emission levels according to the test procedure during the conducted emission test.

The frequency range from 150 kHz to 30 MHz was investigated.

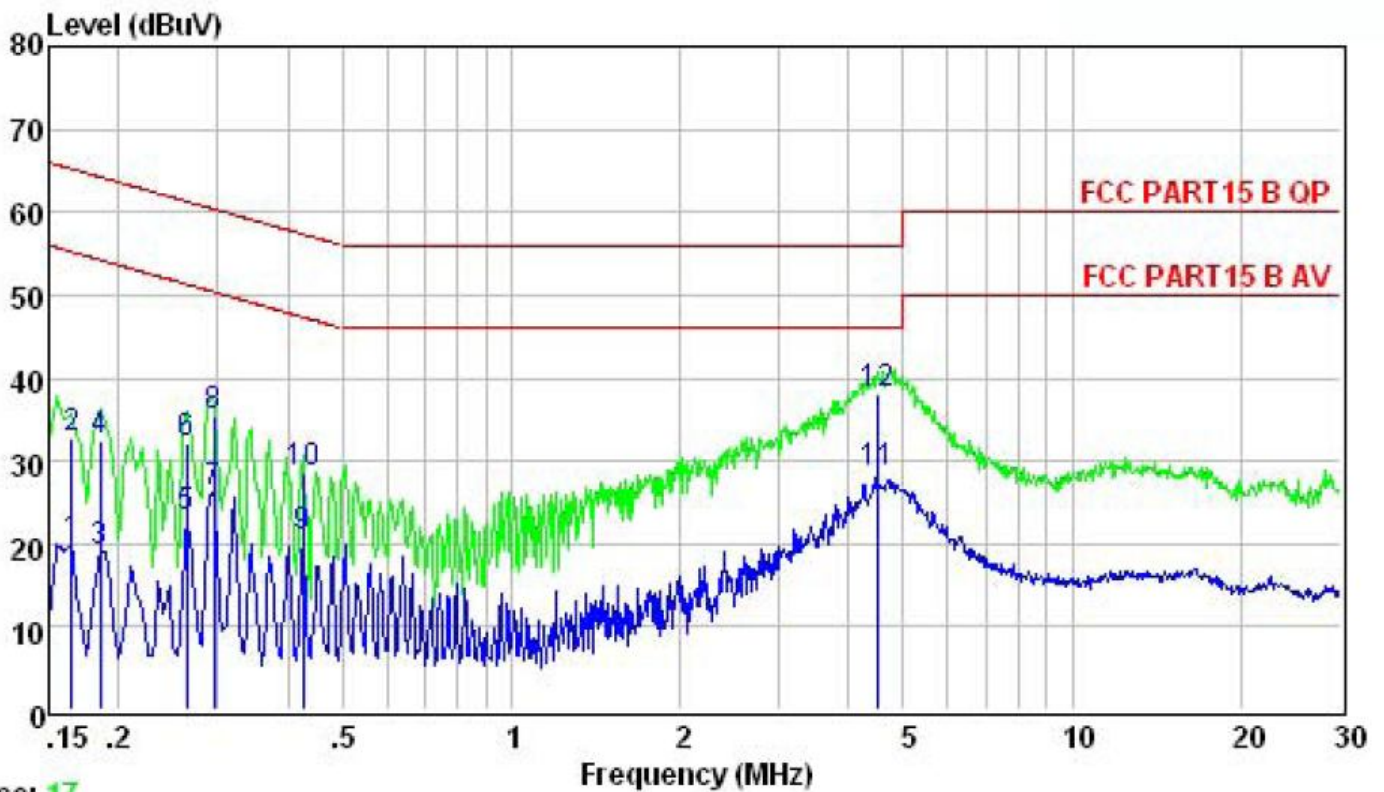
The bandwidth of the test receiver was set at 9 kHz.

Pretest for all mode, The test data of the worst case condition(s) was reported on the following page.



*Remark:*  
 E.U.T: Equipment Under Test  
 LISN: Line Impedance Stabilization Network  
 Test table height=0.8m

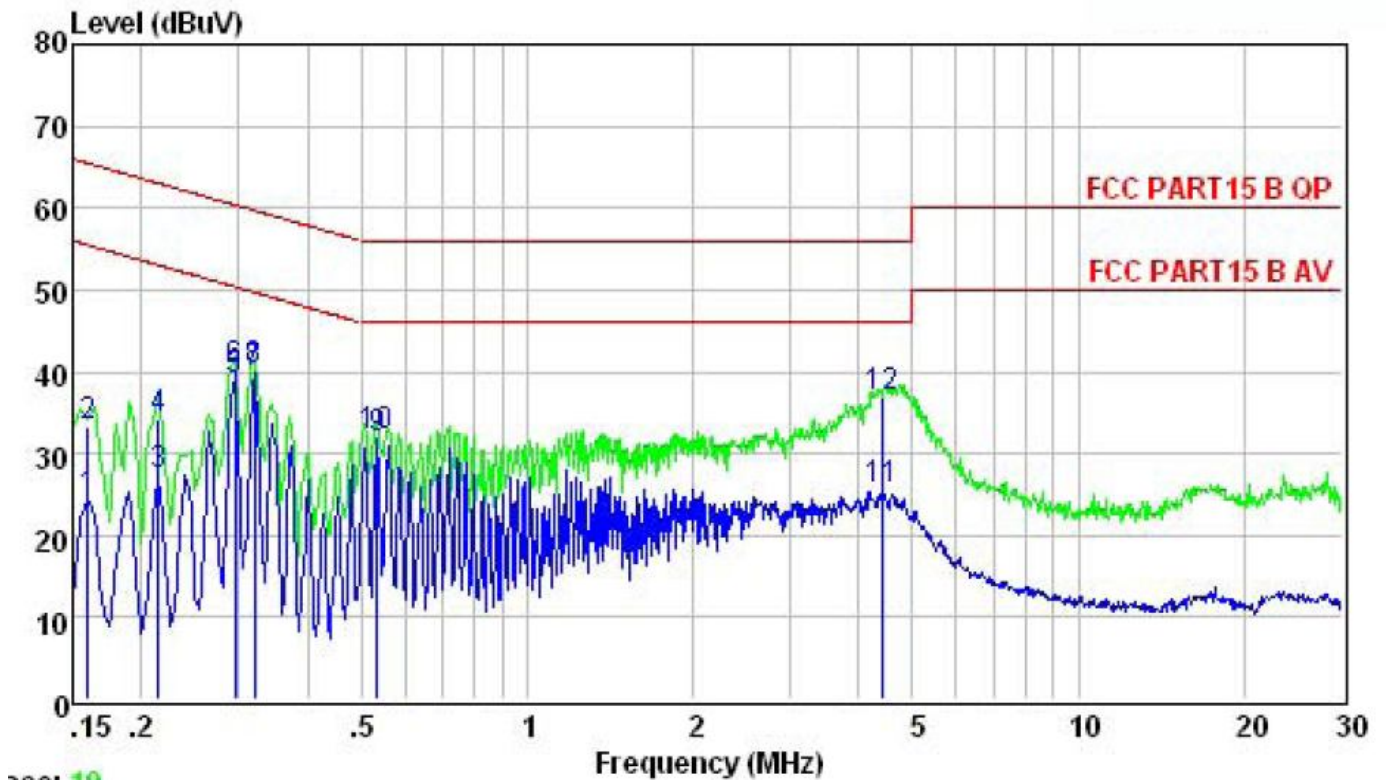
Line



ca: 17

	Freq	Level	Limit	Over	Remark
	MHz	dBuV	dBuV	dB	
1	0.165	19.94	55.21	-35.27	Average
2	0.165	32.58	65.21	-32.63	QP
3	0.185	19.02	54.24	-35.22	Average
4	0.185	32.56	64.24	-31.68	QP
5	0.264	23.09	51.29	-28.20	Average
6	0.264	32.14	61.29	-29.15	QP
7	0.296	26.08	50.37	-24.29	Average
8	0.296	35.28	60.37	-25.09	QP
9	0.426	20.87	47.33	-26.46	Average
10	0.426	28.52	57.33	-28.81	QP
11	4.478	28.45	46.00	-17.55	Average
12	4.478	37.99	56.00	-18.01	QP

Neutral



	Freq	Level	Limit	Over	Remark
	MHz	dBuV	dBuV	dB	
1	0.160	24.50	55.47	-30.97	Average
2	0.160	33.33	65.47	-32.14	QP
3	0.215	27.23	53.01	-25.78	Average
4	0.215	34.12	63.01	-28.89	QP
5	0.296	39.02	50.37	-11.35	Average
6	0.296	40.18	60.37	-20.19	QP
7	0.320	39.97	49.71	-9.74	Average
8	0.320	40.28	59.71	-19.43	QP
9	0.535	31.69	46.00	-14.31	Average
10	0.535	32.15	56.00	-23.85	QP
11	4.407	25.58	46.00	-20.42	Average
12	4.407	36.98	56.00	-19.02	QP

## 4.2. Radiated Emission Test

### 4.2.1. Limit 15.209 limits

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V}/\text{m}$	$\text{dB}(\mu\text{V})/\text{m}$
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

### 4.2.2. Restricted bands of operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

### 4.2.3. Test setup

The EUT was placed on a turn table which was 0.8 m (above 1GHz, the table was 1.5m) above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.

The EUT was tested in the Chamber Site. It was pre-scanned with a Peak detector from the spectrum, and all the final readings from the test receiver were measured with the Quasi-Peak detector.

The bandwidth of the EMI test receiver is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's VBW is set at 3MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure above 1GHz, Both PK and AV measure, PK detector is used.

The frequency range from 30MHz to 10<sup>th</sup> harmonic (25GHz) are checked. and no any emissions were found from 18GHz to 25 GHz, So the radiated emissions from 18GHz to 25GHz were not record.

Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.

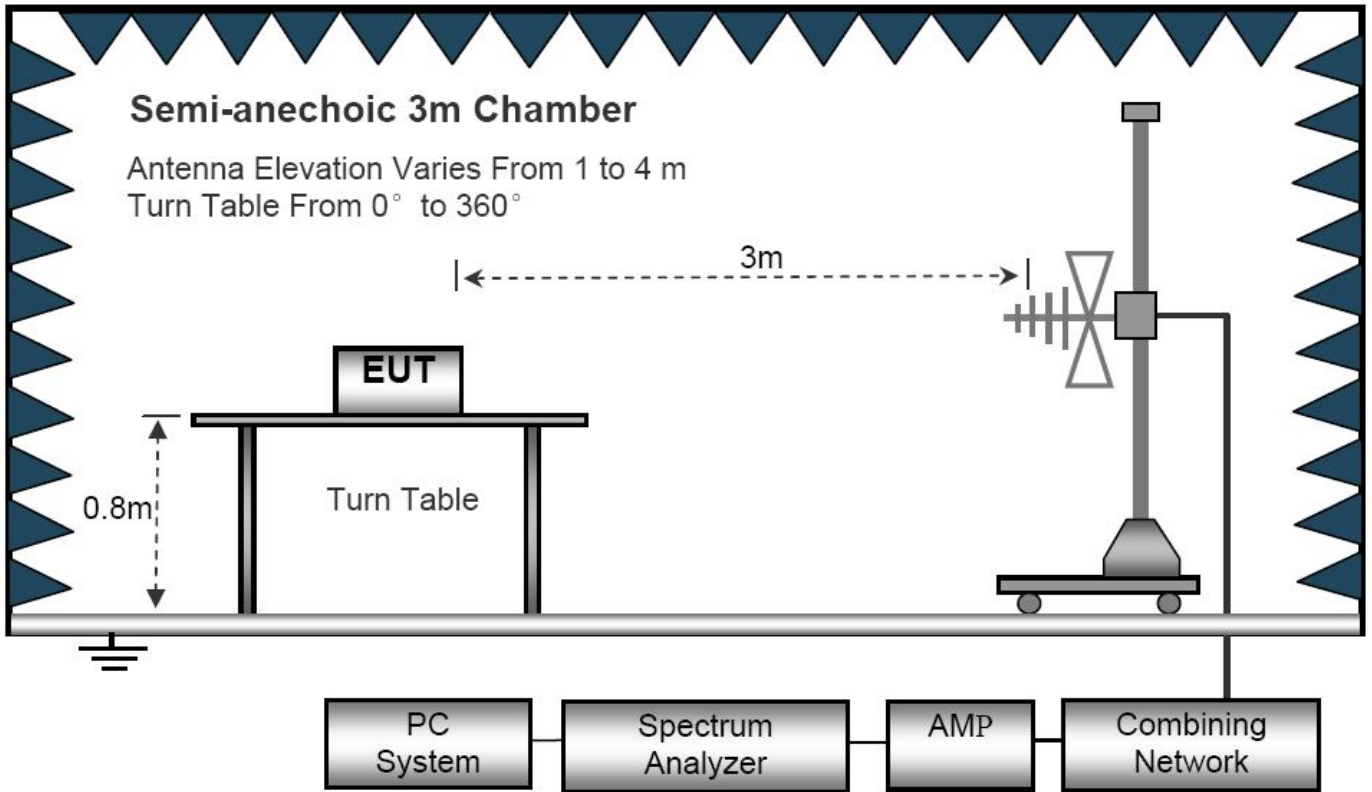
2. Measurement Uncertainty:  $\pm 3.2$  dB at a level of confidence of 95%.

3. For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.

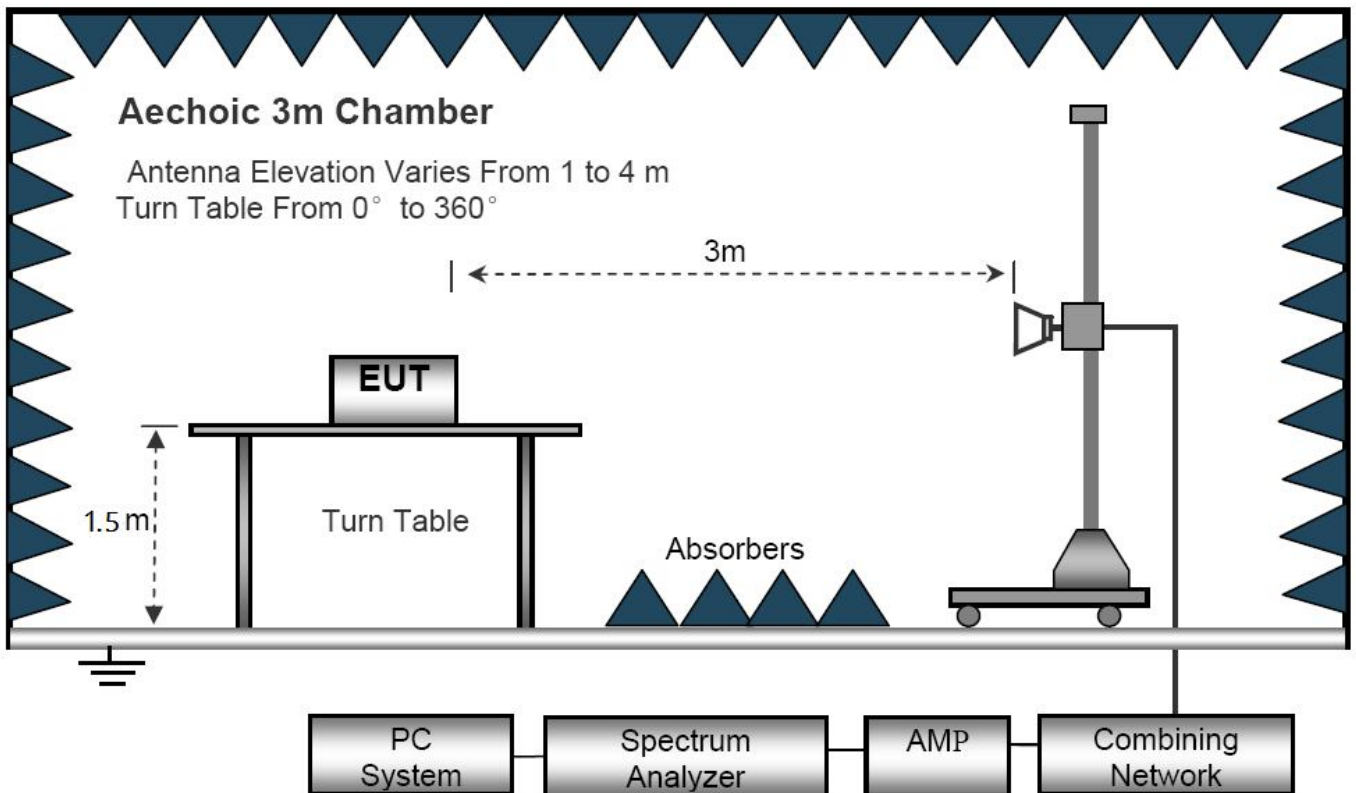
4. For emissions below 1GHz, pretest for all mode, The test data of the worst case condition(s) was reported on the following pages.

5. For Both PK and AV value above 1GHz, PK detector is used.

**Below 1GHz**

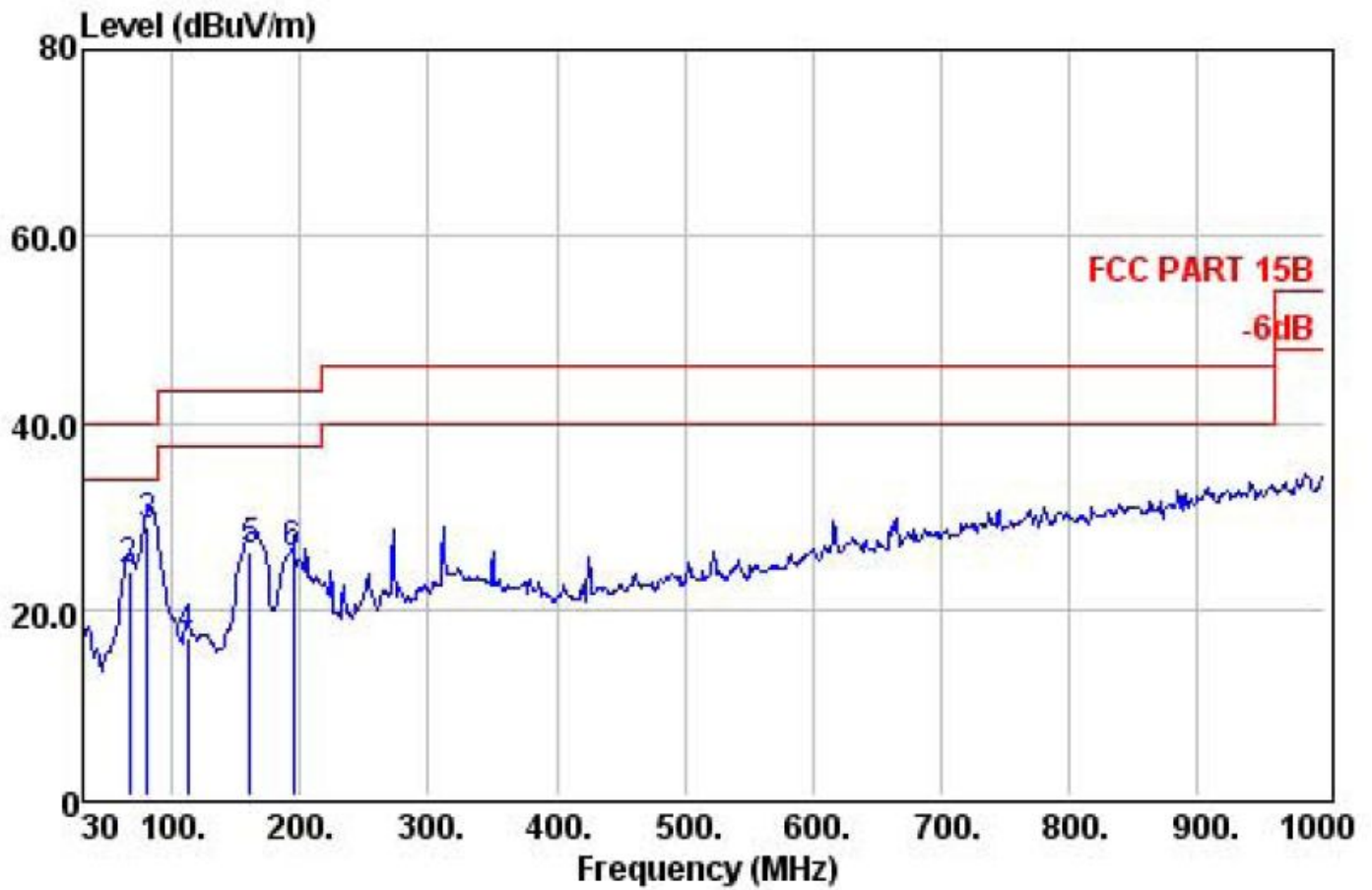


**Above 1GHz**



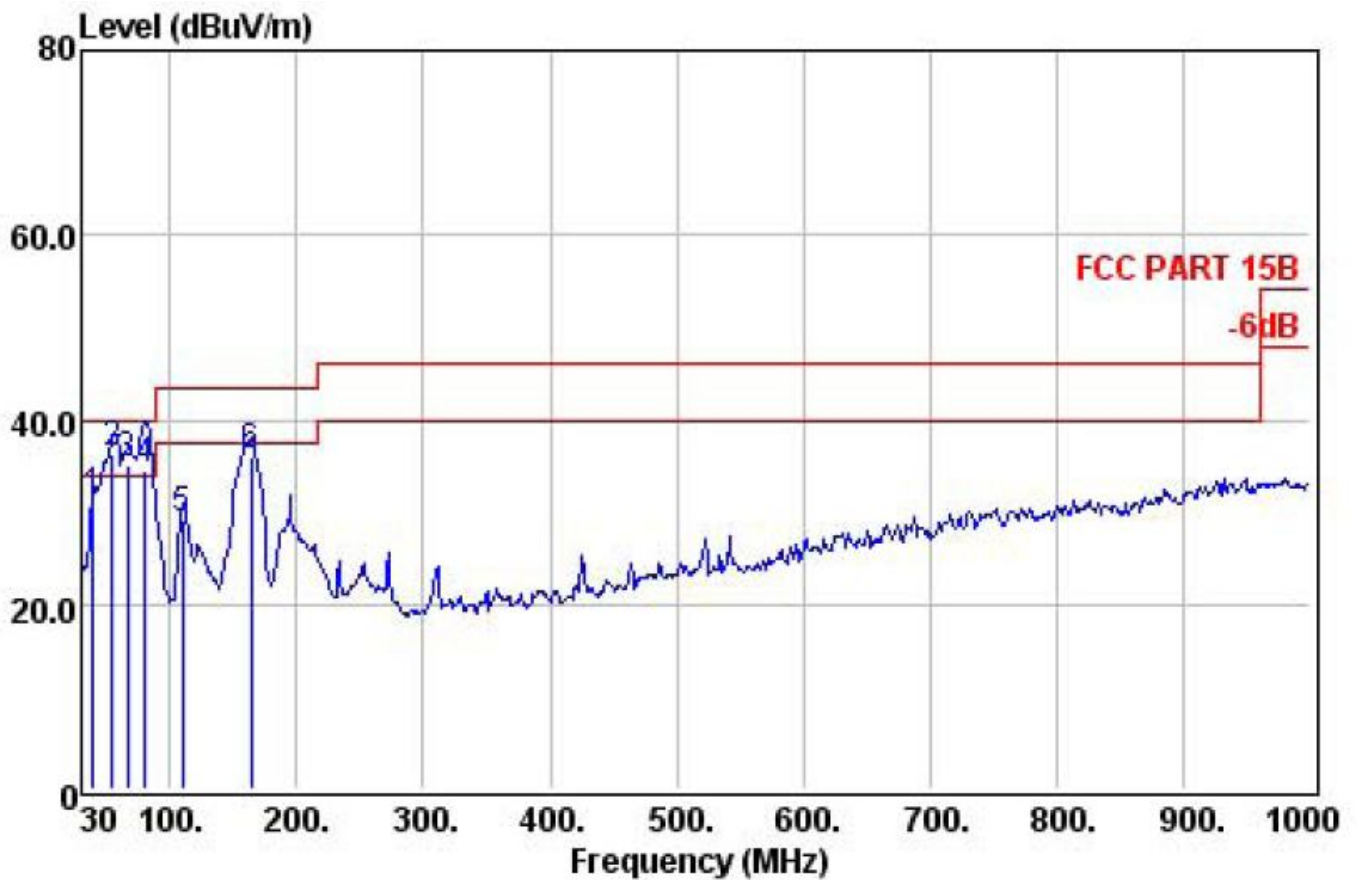


Below 1GHz  
Horizontal



	Preamp	Read	CableAntenna	Limit	Over				
	Freq	Factor	Level	Loss	Factor	Level	Line	Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	30.00	31.41	30.40	0.56	18.80	18.35	40.00	-21.65	QP
2	66.86	31.31	47.20	0.85	7.44	24.18	40.00	-15.82	QP
3	80.44	31.34	51.28	0.85	8.05	28.84	40.00	-11.16	QP
4	112.45	31.29	38.16	1.03	9.10	17.00	43.50	-26.50	QP
5	160.95	31.22	46.89	1.30	9.29	26.26	43.50	-17.24	QP
6	194.90	31.11	44.93	1.46	10.54	25.82	43.50	-17.68	QP

Vertical



	Preamp	Read	CableAntenna		Limit	Over				
	Freq	Factor	Level	Loss	Factor	Level	Line	Limit		
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB		
1	39.70	31.37	48.86	0.56	13.08	31.13	40.00	-8.87	QP	
2	!	54.25	31.37	58.75	0.75	8.16	36.29	40.00	-3.71	QP
3	!	66.86	31.31	58.14	0.85	7.44	35.12	40.00	-4.88	QP
4	!	80.44	31.34	56.90	0.85	8.05	34.46	40.00	-5.54	QP
5		109.54	31.31	50.02	1.03	9.31	29.05	43.50	-14.45	QP
6		163.86	31.21	56.31	1.30	9.55	35.95	43.50	-7.55	QP



Above 1GHz  
802.11a TX Channel 36  
Horizontal

	Freq	Preamp Factor	Read Level	CableAntenna Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	5879.00	27.69	18.15	15.93	34.93	41.32	74.00	-32.68	Peak
2	7239.00	27.95	16.73	16.61	37.30	42.69	74.00	-31.31	Peak
3	9007.00	28.40	17.33	16.88	37.40	43.21	74.00	-30.79	Peak
4	10360.00	28.84	14.29	17.04	38.99	41.48	74.00	-32.52	Peak
5	11846.00	28.98	14.28	17.34	39.56	42.20	74.00	-31.80	Peak
6	13189.00	29.24	11.53	18.42	41.57	42.28	74.00	-31.72	Peak

Vertical

	Freq	Preamp Factor	Read Level	CableAntenna Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	5913.00	27.69	17.74	16.15	35.01	41.21	74.00	-32.79	Peak
2	7783.00	28.06	15.15	16.64	36.83	40.56	74.00	-33.44	Peak
3	10360.00	28.84	13.78	17.04	38.99	40.97	74.00	-33.03	Peak
4	12390.00	29.08	12.67	17.70	39.48	40.77	74.00	-33.23	Peak
5	14226.00	29.43	10.82	19.51	42.20	43.10	74.00	-30.90	Peak
6	15467.00	29.62	12.54	20.29	38.41	41.62	74.00	-32.38	Peak

802.11a TX Channel 40  
Horizontal

	Freq	Preamp Factor	Read Level	CableAntenna Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	5879.00	27.69	16.20	15.93	34.93	39.37	74.00	-34.63	Peak
2	7562.00	28.01	15.46	16.63	37.27	41.35	74.00	-32.65	Peak
3	8888.00	28.36	13.47	16.85	37.26	39.22	74.00	-34.78	Peak
4	10400.00	28.84	13.34	17.04	39.04	40.58	74.00	-33.42	Peak
5	11285.00	28.93	13.19	17.22	39.73	41.21	74.00	-32.79	Peak
6	12849.00	29.17	9.68	18.09	40.34	38.94	74.00	-35.06	Peak

## Vertical

	Freq	Preamp Factor	Read Level	CableAntenna Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	8038.00	28.11	14.09	16.66	36.43	39.07	74.00	-34.93	Peak
2	10400.00	28.84	14.77	17.04	39.04	42.01	74.00	-31.99	Peak
3	11336.00	28.93	13.20	17.23	39.77	41.27	74.00	-32.73	Peak
4	13631.00	29.33	7.09	18.94	43.13	39.83	74.00	-34.17	Peak
5	15212.00	29.58	14.75	20.13	38.46	43.76	74.00	-30.24	Peak
6	16691.00	29.98	8.77	21.11	43.86	43.76	74.00	-30.24	Peak

## 802.11a TX Channel 48

## Horizontal

	Freq	Preamp Factor	Read Level	CableAntenna Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	5726.00	27.67	18.68	15.05	34.59	40.65	74.00	-33.35	Peak
2	7205.00	27.94	15.85	16.61	37.28	41.80	74.00	-32.20	Peak
3	10480.00	28.85	15.26	17.06	39.17	42.64	74.00	-31.36	Peak
4	11387.00	28.94	13.39	17.24	39.81	41.50	74.00	-32.50	Peak
5	13274.00	29.25	10.33	18.52	41.97	41.57	74.00	-32.43	Peak
6	14617.00	29.49	13.73	19.76	40.11	44.11	74.00	-29.89	Peak

## Vertical

	Freq	Preamp Factor	Read Level	CableAntenna Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	6219.00	27.74	16.26	16.60	35.50	40.62	74.00	-33.38	Peak
2	7868.00	28.07	15.92	16.65	36.67	41.17	74.00	-32.83	Peak
3	10480.00	28.85	14.65	17.06	39.17	42.03	74.00	-31.97	Peak
4	11659.00	28.97	15.94	17.30	39.74	44.01	74.00	-29.99	Peak
5	12764.00	29.15	12.46	18.02	40.14	41.47	74.00	-32.53	Peak
6	13903.00	29.38	11.55	19.24	43.40	44.81	74.00	-29.19	Peak

## 5. BAND EDGE COMPLIANCE TEST

### 5.1. Limits

Band 5.15-5.25GHz:

FCC: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.

IC: Emissions outside the band 5150-5250 MHz shall not exceed -27 dBm/MHz e.i.r.p.

Band 5.725-5.825GHz:

FCC: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz.

IC: For the band 5725-5825 MHz, emissions within the frequency range from the band edges to 10 MHz above or below the band edges shall not exceed -17 dBm/MHz e.i.r.p. For frequencies more than 10 MHz above or below the band edges, emissions shall not exceed -27 dBm/MHz.

### 5.2. Test setup

Test method: FCC KDB 789033 G)& Parts 15.407(b)(4) & 15.209(a)

Same as Clause 4.2.

### 5.3. Test Data

Please see data as below:

Note: we pretest horizontal and vertical, the worst was horizontal and show in the report.

Modulation	Test Frequency (MHz)	Max Level (dBμV/m)	EIRP[dBm]	Limit[dBm]	Result
802.11a	5180	42.29	-52.91	-27.00	Pass
	5240	41.97	-53.23	-27.00	Pass
802.11n(HT20)	5180	42.34	-52.86	-27.00	Pass
	5240	42.31	-52.89	-27.00	Pass
802.11n(HT40)	5190	42.51	-52.69	-27.00	Pass
	5230	41.87	-53.33	-27.00	Pass

Remark: 1. According to KDB 789033 D02 section H) d) (iii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:  $EIRP[dBm] = E[dBμV/m] - 95.2$

## 6. 26DB AND 99% BANDWIDTH TEST

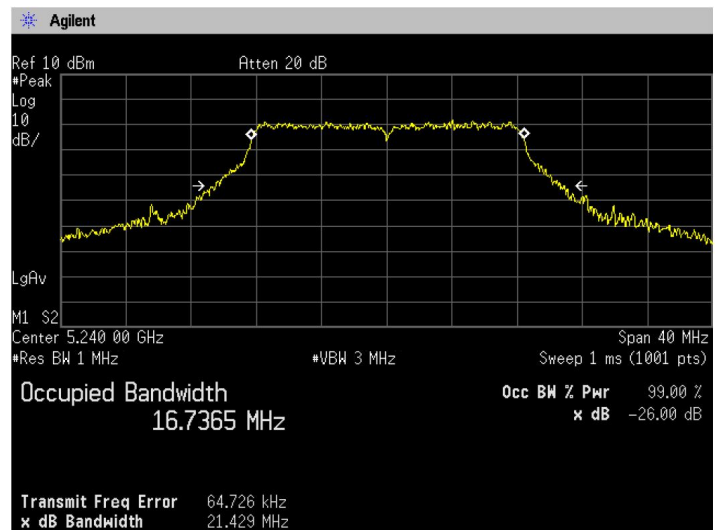
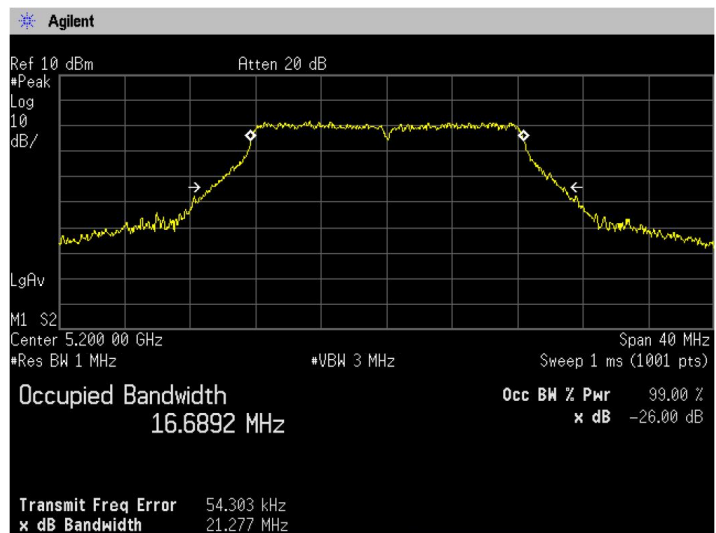
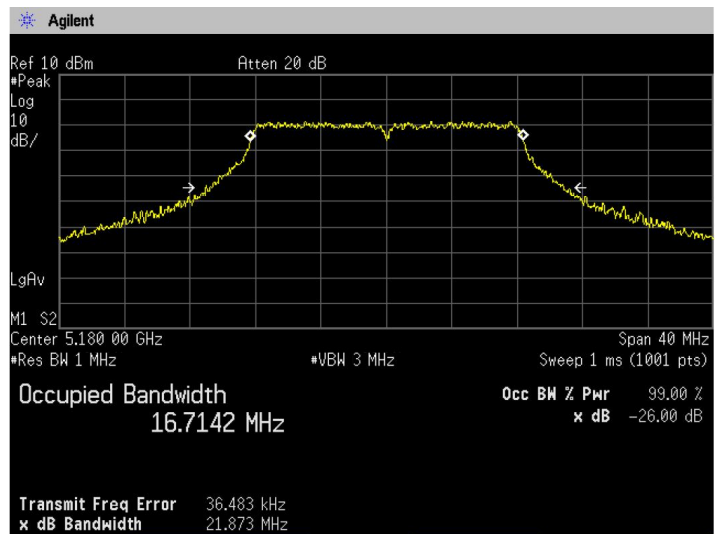
### 6.1. Measurement Procedure

The bandwidth at 26 dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum power control level, as defined in KDB 789033, at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26 dB bandwidth.

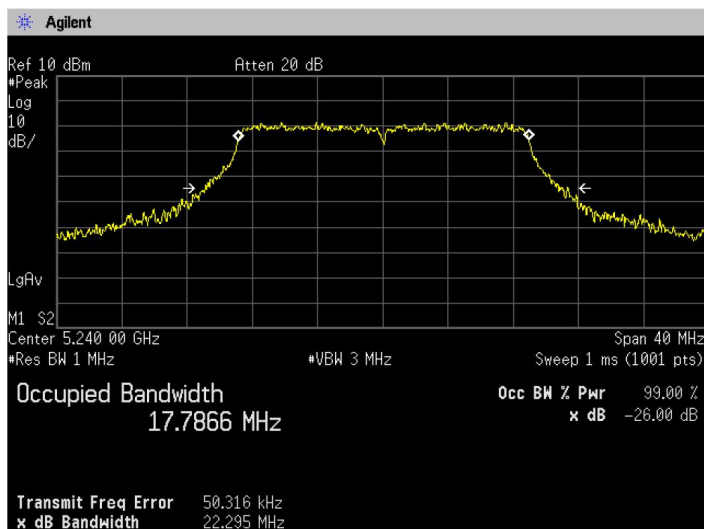
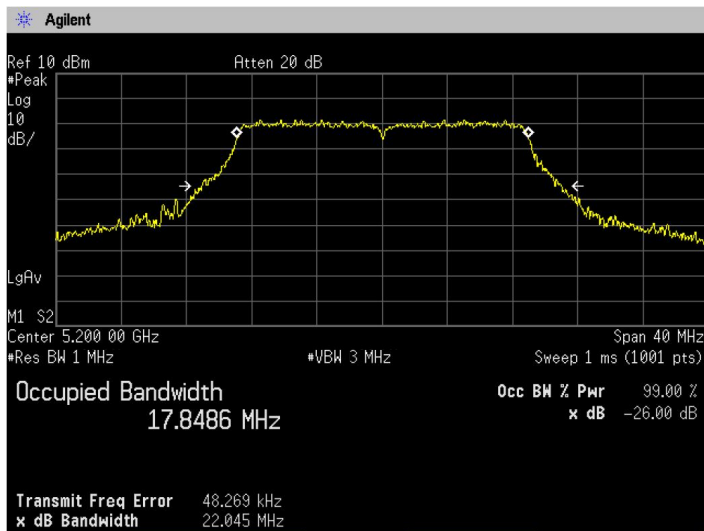
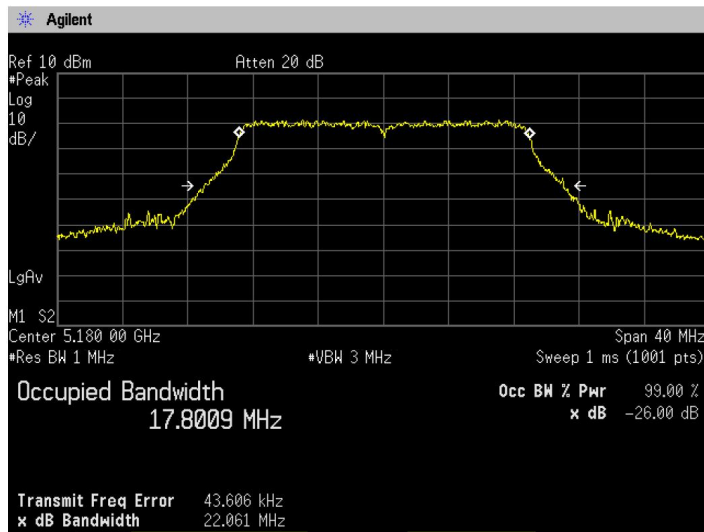
The 26 dB bandwidth is used to determine the conducted power limits.

	<b>Channel number</b>	<b>Frequency (MHz)</b>	<b>26dB Bandwidth (MHz)</b>	<b>99% Bandwidth (MHz)</b>
802.11a	36	5180	21.873	16.714
	40	5200	21.277	16.689
	48	5240	21.429	16.737
802.11n (HT20)	36	5180	22.061	17.801
	40	5200	22.045	17.849
	48	5240	22.295	17.787
802.11n (HT40)	38	5190	42.612	36.105
	46	5230	42.809	36.153

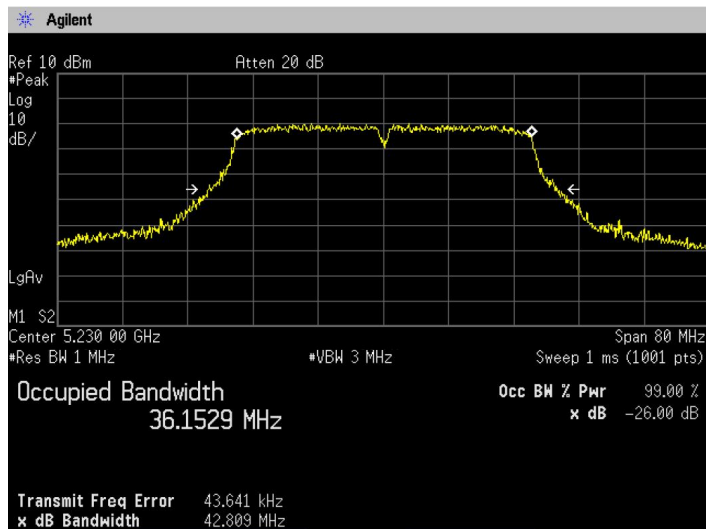
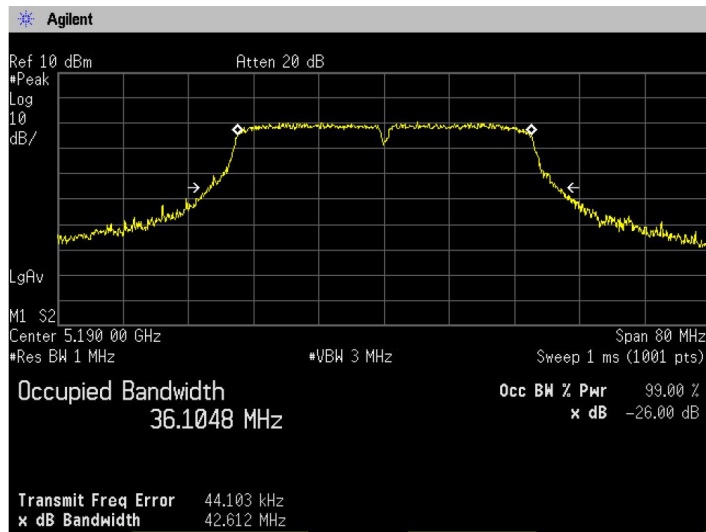
802.11a



802.11n (HT20)



802.11n (HT40)



## 7. OUTPUT POWER TEST

### 7.1. Limits

Band 5.15-5.25GHz:

FCC: The maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or  $4 \text{ dBm} + 10 \log B$ , where B is the -26dB emission bandwidth in MHz.

IC: The maximum e.i.r.p. shall not exceed 200 mW or  $10 + 10 \log B$  dBm, whichever power is less. B is the 99% emission bandwidth in MHz.

Band 5.725-5.825GHz:

FCC: the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1 W or  $17 \text{ dBm} + 10 \log B$ , where B is the -26dB emission bandwidth in MHz.

IC: The maximum conducted output power shall not exceed 1.0 W or  $17 + 10 \log_{10} B$ , dBm, whichever power is less.

### 7.2. Test setup

1. The maximum average conducted output power can be measured using Method PM-G (Measurement using a gated RF average power meter):
2. Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.
  - a. The Transmitter output (antenna port) was connected to the power meter.
  - b. Turn on the EUT and power meter and then record the power value.
  - c. Repeat above procedures on all channels needed to be tested.

### 7.3. Test result



## For FCC

	Frequency (MHz)	Output Power (dBm)	26dB Bandwidth (MHz)	FCC Limit (dBm)	Result
802.11a	5180	14.28	21.873	17.0	Pass
	5200	14.22	21.277	17.0	Pass
	5240	14.26	21.429	17.0	Pass
802.11n (HT20)	5180	13.25	22.061	17.0	Pass
	5200	13.09	22.045	17.0	Pass
	5240	13.05	22.295	17.0	Pass
802.11n (HT40)	5190	12.31	42.612	17.0	Pass
	5230	12.18	42.809	17.0	Pass

For 5.15~5.25GHz, the limit=50 mW or 4 dBm+10log B, whichever power is less

## For IC

	Frequency (MHz)	Output Power (dBm)	Antenna Gain dB	EIRP Power (dBm)	99% Bandwidth (MHz)	IC Limit (dBm)	Result
802.11a	5180	14.28	1.0	15.28	16.714	22.2	Pass
	5200	14.22	1.0	15.22	16.689	22.2	Pass
	5240	14.26	1.0	15.26	16.737	22.2	Pass
802.11n (HT20)	5180	13.25	1.0	14.25	17.801	22.1	Pass
	5200	13.09	1.0	14.09	17.849	22.1	Pass
	5240	13.05	1.0	14.05	17.787	22.1	Pass
802.11n (HT40)	5190	12.31	1.0	13.31	36.105	23.0	Pass
	5230	12.18	1.0	13.18	36.153	23.0	Pass

For 5.15~5.25GHz, the limit=200 mW or 10 +10logB dBm, whichever power is less

EIRP=output power+antenna gain

## 8. PEAK POWER SPECTRAL DENSITY TEST

### 8.1. Limits

Band 5.15-5.25GHz:

FCC: the peak power spectral density shall not exceed 4 dBm in any 1MHz band.

IC: The power spectral density shall not exceed 10dBm in any 1 MHz band.

Band 5.725-5.825GHz:

FCC: the peak power spectral density shall not exceed 17 dBm in any 1MHz band.

IC: the peak power spectral density shall not exceed 17 dBm in any 1MHz band.

### 8.2. Test setup

Methods refer to FCC KDB 789033

- 1) Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, "Compute power...".
- 2) Use the peak search function on the instrument to find the peak of the spectrum.
- 3) The result is the PPSD.
- 4) The above procedures make use of 1 MHz resolution bandwidth to satisfy the 1 MHz measurement bandwidth specified in the 15.407(a)(5). That rule section also permits use of resolution bandwidths less than 1 MHz "provided that the measured power is integrated to show the total power over the measurement bandwidth" (i.e., 1 MHz). If measurements are performed using a reduced resolution bandwidth and integrated over 1 MHz bandwidth

### 8.3. Test data

Test data as below

For FCC

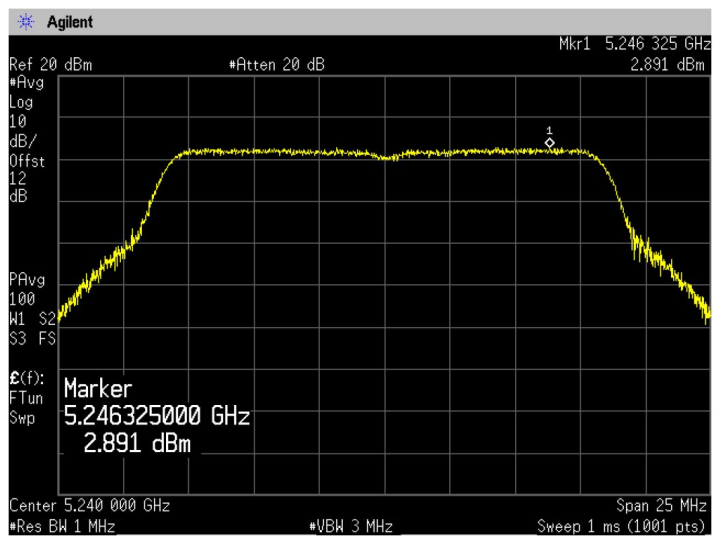
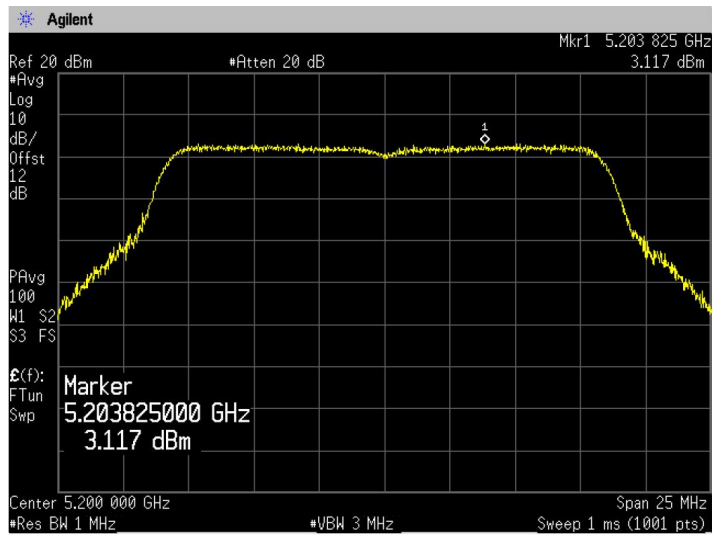
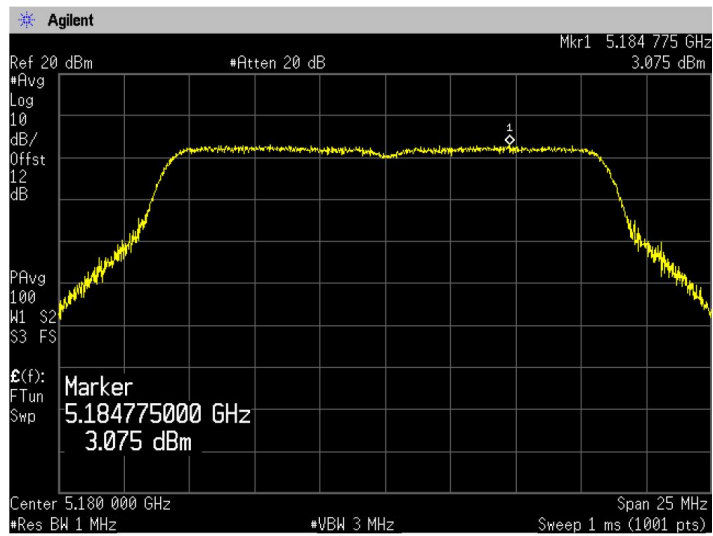
	Frequency (MHz)	Output Power(dBm)	FCC Limit (dBm)	Result
802.11a	5180	2.82	4.0	Pass
	5200	2.47	4.0	Pass
	5240	2.35	4.0	Pass
802.11n (HT20)	5180	2.11	4.0	Pass
	5200	3.21	4.0	Pass
	5240	2.09	4.0	Pass
802.11n (HT40)	5190	0.20	4.0	Pass
	5230	0.19	4.0	Pass

For IC

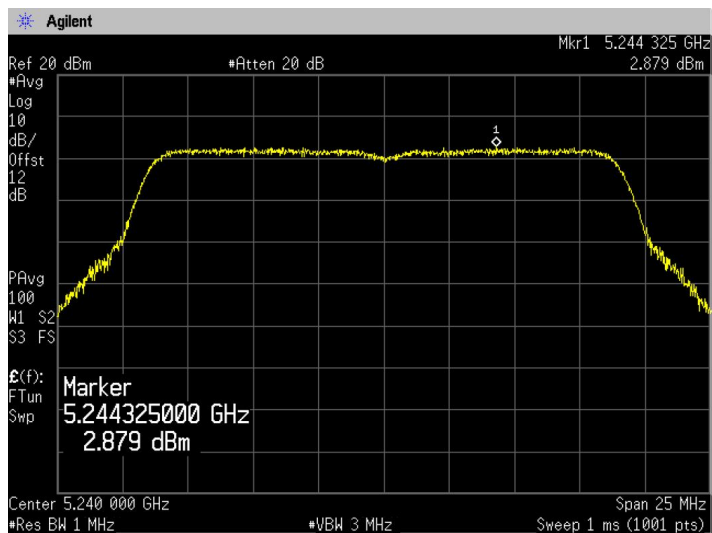
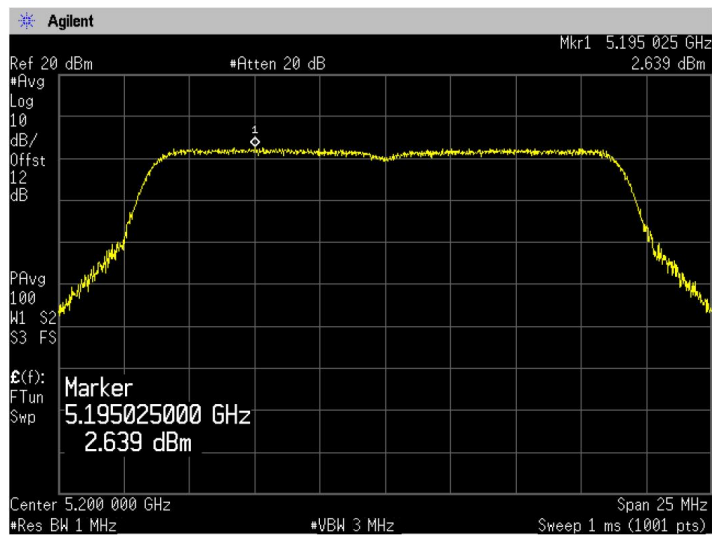
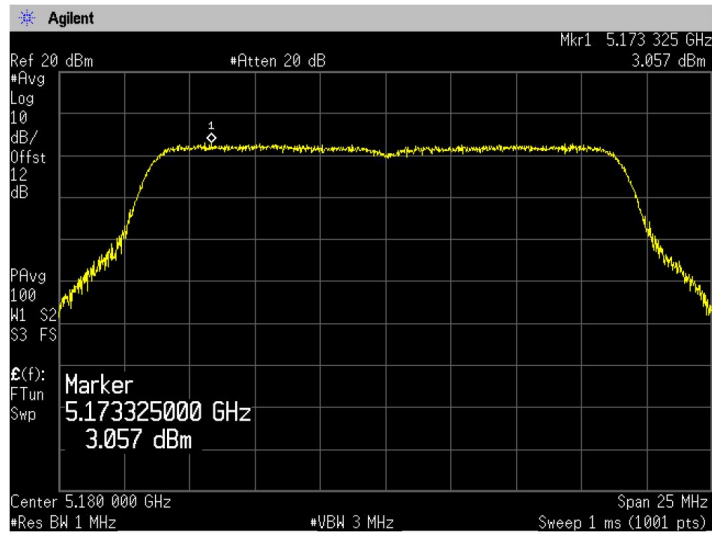
	Frequency (MHz)	Output Power (dBm)	Antenna Gain dB	EIRP Power (dBm)	IC Limit (dBm)	Result
802.11a	5180	2.82	1.0	6.12	10.0	Pass
	5200	2.47	1.0	5.77	10.0	Pass
	5240	2.35	1.0	5.65	10.0	Pass
802.11n (HT20)	5180	2.11	1.0	5.41	10.0	Pass
	5200	3.21	1.0	6.51	10.0	Pass
	5240	2.09	1.0	5.39	10.0	Pass
802.11n (HT40)	5190	0.20	1.0	3.50	10.0	Pass
	5230	0.19	1.0	3.49	10.0	Pass

EIRP=output power+ antenna gain

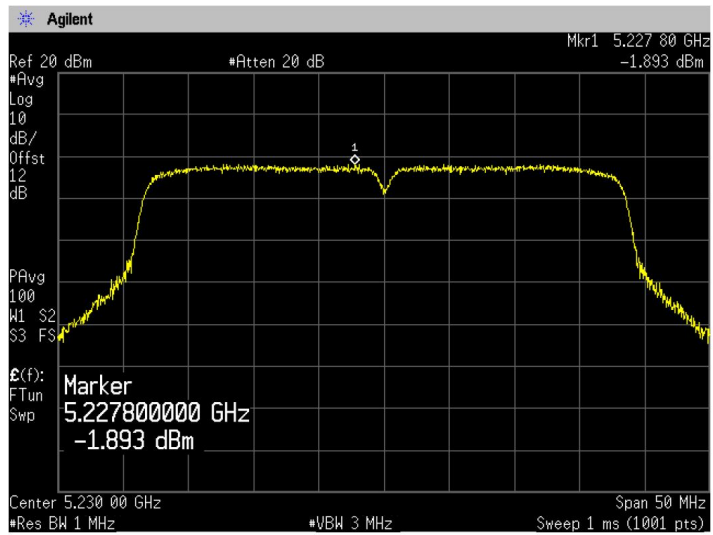
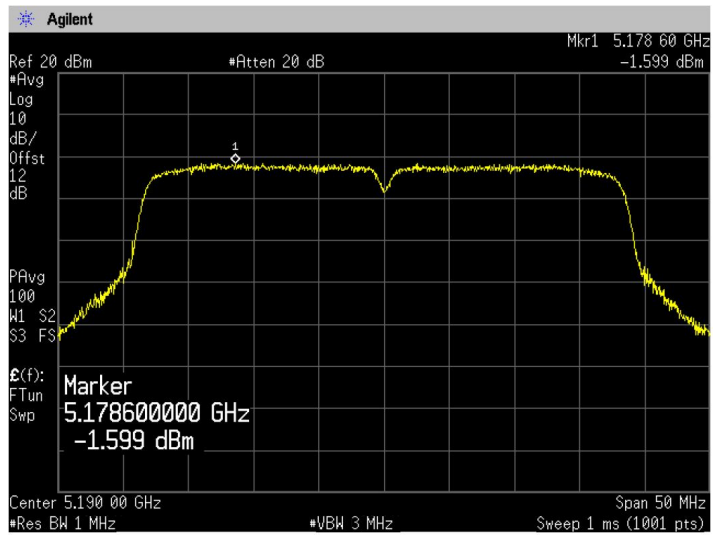
802.11a



802.11n (HT20)



802.11n (HT40)



## 9. FREQUENCY STABILITY

### 9.1. Measurement procedure

[FCC 15.407(g)]

The EUT was placed of an inside of an constant temperature chamber as the temperature in the chamber was varied between -30°C and +60°C. The temperature was incremented by 10°C intervals and the unit was allowed to stabilize at each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channels center frequency was recorded.

### 9.2. Test setup

Methods refer to FCC KDB 789033

The EUT was set to operate with following conditions.

- 5.2GHz Band

The test mode of EUT is as follows.

- Tx mode

### 9.3. Limit

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified.

### 9.4. Test data

Test Conditions			Frequency Deviation	
Band	Power(Vdc)	Temperature(°C)	Frequency Error(Hz)	ppm
802.11a 5200.00MHz	3.7	-30	41	0.0079
	3.7	-20	43	0.0083
	3.7	-10	38	0.0073
	3.7	0	39	0.0075
	3.7	10	25	0.0048
	3.7	20	42	0.0081
	3.7	30	37	0.0071
	3.7	40	43	0.0083
	3.7	50	26	0.0050
	4.25	25	25	0.0048
	3.70	25	27	0.0052
	3.40	25	31	0.0060
802.11n (HT20) 5200.00MHz	3.7	-30	39	0.0075
	3.7	-20	36	0.0069
	3.7	-10	31	0.0060
	3.7	0	25	0.0048
	3.7	10	42	0.0081
	3.7	20	25	0.0048
	3.7	30	30	0.0058
	3.7	40	33	0.0063
	3.7	50	31	0.0060
	4.25	25	27	0.0052
	3.70	25	25	0.0048
	3.40	25	28	0.0054
802.11n (HT40) 5230.00MHz	3.7	-30	72	0.0138
	3.7	-20	67	0.0128
	3.7	-10	54	0.0103
	3.7	0	46	0.0088
	3.7	10	54	0.0103
	3.7	20	64	0.0122
	3.7	30	23	0.0044
	3.7	40	46	0.0088
	3.7	50	35	0.0067
	4.25	25	37	0.0071
	3.70	25	23	0.0044
	3.40	25	17	0.0033

Note: Measurement Uncertainty: ±20Hz.



## **10. ANTENNA REQUIREMENTS**

### **10.1. Limits**

For intentional device, according to FCC 47 CFR Section 15.203, 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### **10.2. Result**

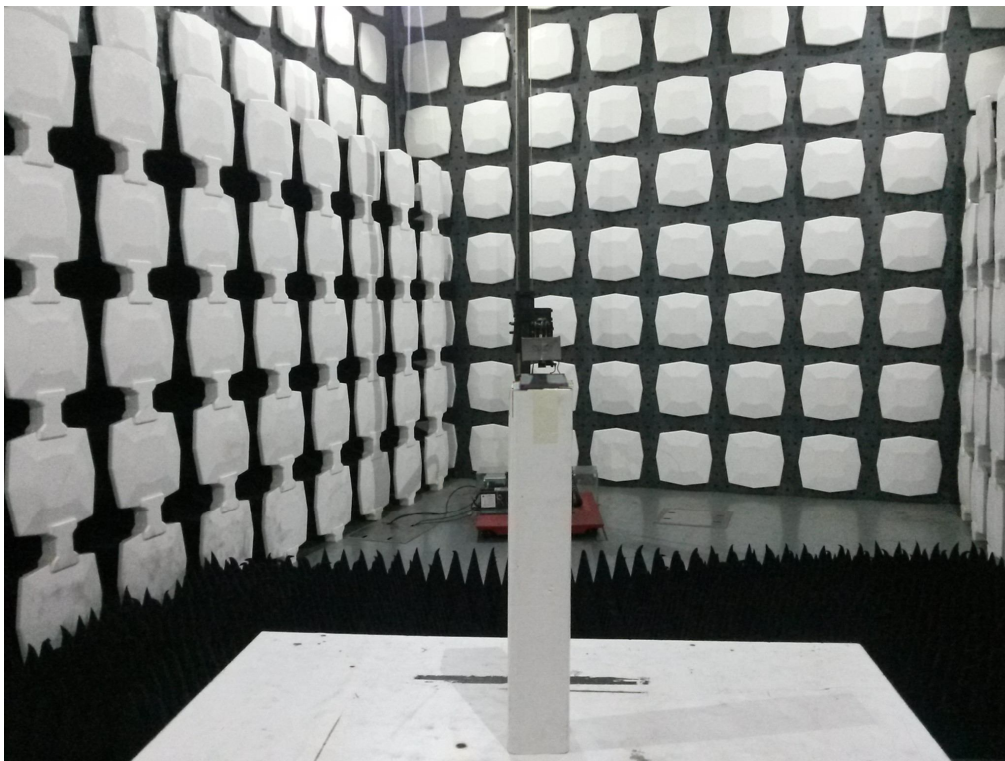
The antennas used for this product are permanent attached antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 1.0dBi.

## 11. PHOTOGRAPHS OF TEST SET-UP

Conducted Emission



Radiated Emission Test

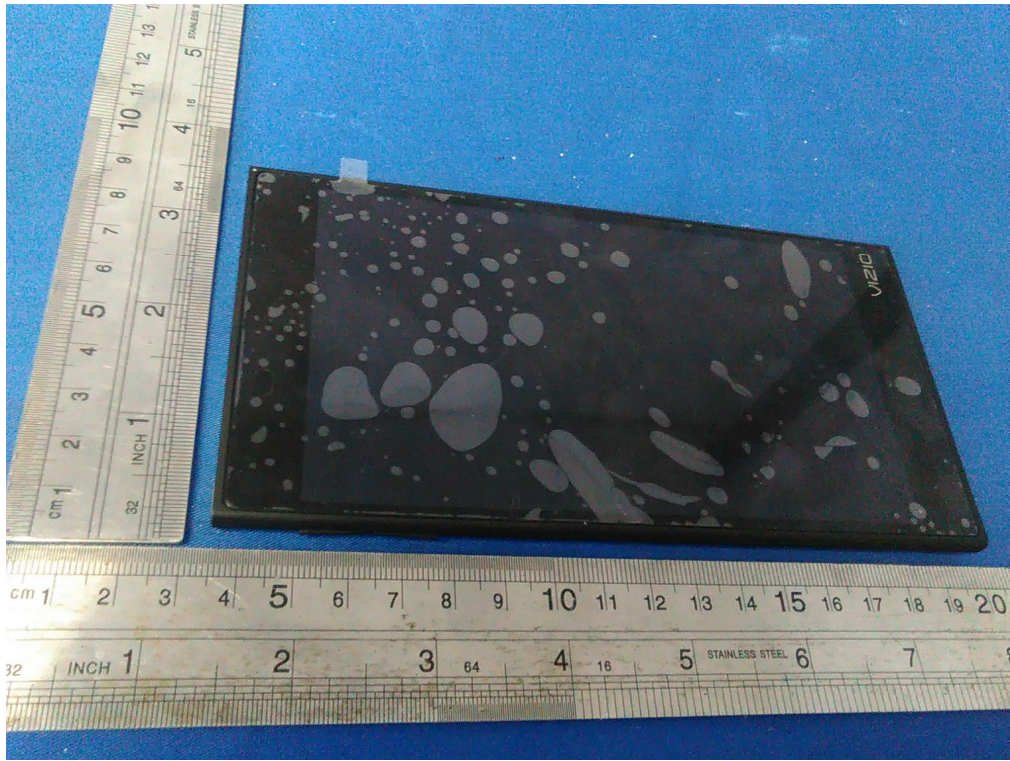


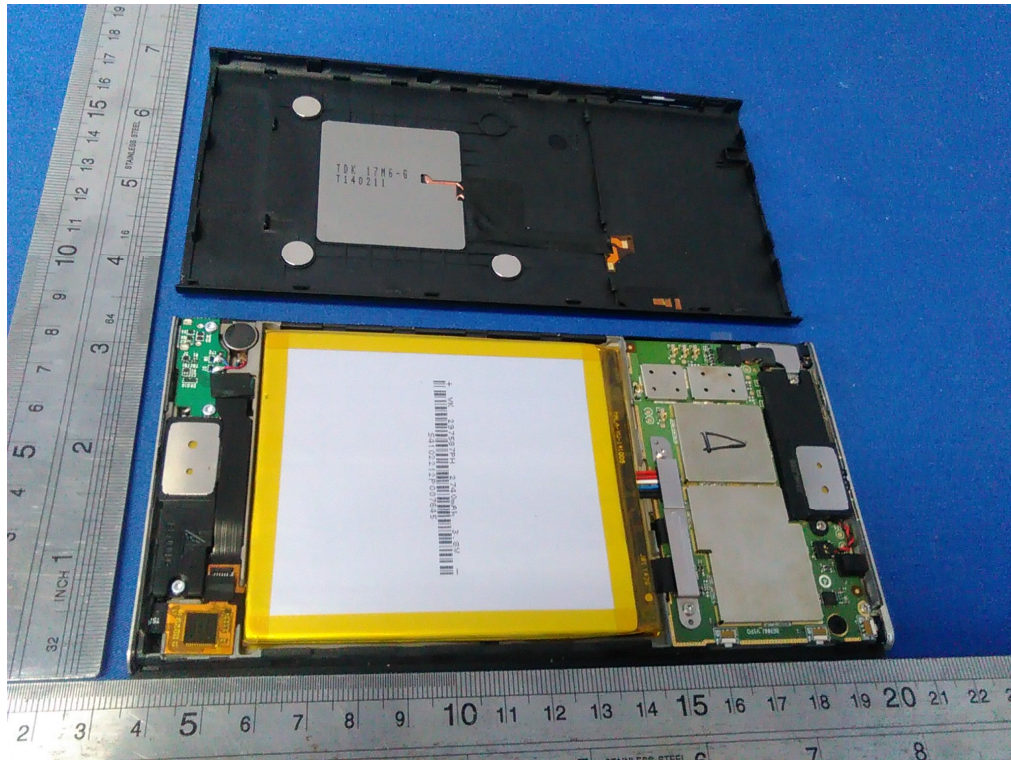


## 12. PHOTOGRAPHS OF THE EUT









-----END-----