Shenzhen Global Test Service Co.,Ltd.
1F, Building No. 13A, Zhonghaixin Science and Technology City, No.12,6 Road, Ganli Industrial Park, Buji Street, Longgang District, Shenzhen, Guangdong

FCC PART 15 SUBPART C TEST REPORT

FCC PART 15.407

Report Reference No......:	**GTSR17050097-02**
FCC ID..... :	**2AL6K-R8192RD3**
Compiled by (position+printed name+signature)..:	File administrators Jimmy Wang
Supervised by (position+printed name+signature)..:	Test Engineer Peter Xiao
Approved by (position+printed name+signature)..:	Manager Sam Wang
Date of issue.....:	Jun. 05, 2017
Representative Laboratory Name .:	**Shenzhen Global Test Service Co.,Ltd.**
Address .....:	1F, Building No. 13A, Zhonghaixin Science and Technology City, No.12,6 Road, Ganli Industrial Park, Buji Street, Longgang District, Shenzhen, Guangdong
Applicant's name.....:	**ShenZhen BiLian Electronic Co.,Ltd.**
Address .....:	Building B1,Zhongxing Industrial Zone,Juling,Jutang Community, Guanlan street,LongHua district, Shenzhen,Guangdong,P.R.China
Test specification .....**:**	
Standard .....:	**FCC Part 15.407: UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE DEVICES**
TRF Originator.....:	Shenzhen Global Test Service Co.,Ltd.
Master TRF.....:	Dated 2014-12

Test item description .....:	300Mbps WIRELESS USB ADAPTER
Trade Mark .....:	/
Manufacturer .....:	**ShenZhen BiLian Electronic Co.,Ltd.**
Model/Type reference.....:	BL-R8192RD3
Listed Models .....:	/
Operation Frequency.....:	From 5745MHz to 5825MHz
Hardware Version .....:	94V-0
Software Version .....:	V1.1
Rating .....:	USB 5V From PC
Result.....:	**PASS**

T E S T R E P O R T

Test Report No. :	**GTSR17050097-02**	Jun. 05, 2017 Date of issue

Equipment under Test	:	300Mbps WIRELESS USB ADAPTER
Model /Type	:	BL-R8192RD3
Listed Models	:	/
Applicant	:	**ShenZhen BiLian Electronic Co.,Ltd.**
Address	:	Building B1,Zhongxing Industrial Zone,Juling,Jutang Community, Guanlan street,LongHua district, Shenzhen,Guangdong,P.R.China
Manufacturer	:	**ShenZhen BiLian Electronic Co.,Ltd.**
Address	:	Building B1,Zhongxing Industrial Zone,Juling,Jutang Community, Guanlan street,LongHua district, Shenzhen,Guangdong,P.R.China

Test Result:	**PASS**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.407: UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE DEVICES.
ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices
KDB 789033 D02: GUIDELINES FOR COMPLIANCE TESTING OF UNLICENSED NATIONAL INFORAMTION INFRASTRUCTURE (U-NII) DEVICES PART 15, SUBPART E

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	May. 05, 2017
Testing commenced on	:	May. 05, 2017
Testing concluded on	:	Jun. 05, 2017

2.2. Product Description

Name of EUT	300Mbps WIRELESS USB ADAPTER
Trade Mark	/
Model Number	BL-R8192RD3
Listed Models	/
FCC ID	2AL6K-R8192RD3
Power Supply	USB 5V From PC
WLAN	Supported 802.11a HT20/802.11b/802.11g/802.11n HT20
Modulation Type	IEEE 802.11a HT20: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK)
Operation frequency	IEEE 802.11a HT20: 5745MHz-5825MHz IEEE 802.11b: 2412-2462MHz IEEE 802.11g: 2412-2462MHz IEEE 802.11n HT20: 2412-2462MHz/5745MHz-5825MHz
Antenna Type	Internal Antenna
Antenna gain	1.13dBi

2.3. Equipment Under Test

Power supply system utilised

Power supply voltage	:	○	230V / 50 Hz	○	120V / 60Hz
		○	12 V DC	○	24 V DC
		●	Other (specified in blank below)		

USB 5V From PC

2.4. Short description of the Equipment under Test (EUT)

This is a 300Mbps WIRELESS USB ADAPTER.

For more details, refer to the user's manual of the EUT.

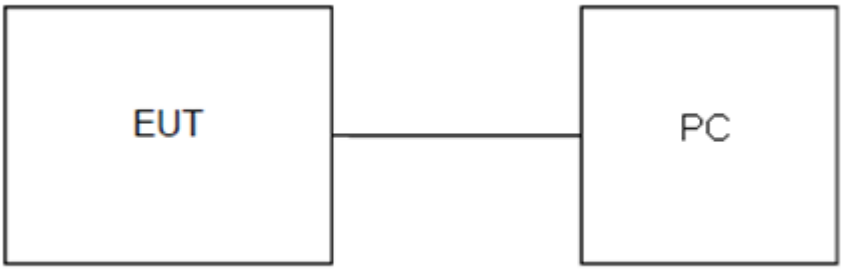
2.5. EUT operation mode

The application provider specific test software to control sample in continuous TX and RX.

IEEE 802.11a(20MHz)/IEEE 802.11n(20MHz):

UNII-3	
Channel	Frequency (MHz)
149	**5745**
153	5765
157	**5785**
161	5805
165	**5825**

2.6. Block Diagram of Test Setup



2.7. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: 2AL6K-R8192RD3** filing to comply with Section 15.407 of the FCC Part 15, Subpart E Rules.

2.8. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen Global Test Service Co.,Ltd.
1F, Building No. 13A, Zhonghaixin Science and Technology City, No.12,6 Road, Ganli Industrial Park, Buji Street, Longgang District, Shenzhen, Guangdong

Shenzhen CTL Testing Technology Co.,Ltd.
1/F.-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, Guangdong, China

3.2. Test Facility

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

FCC-Registration No.: 964637

Shenzhen Global Test Service Co.,Ltd EMC Laboratory has been registered 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 964637, Jul 24, 2015.

CNAS-Lab Code: L8169

Shenzhen Global Test Service Co.,Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories. Date of Registration: Dec. 11, 2015. Valid time is until Dec. 10, 2018.

FCC-Registration No.: 970318

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered 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 970318, December 19, 2013.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4. Test Description

Test Specification clause	Test case	Test Mode	Test Channel	Recorded In Report		Pass	Fail	NA	NP	Remark
§15.203	Antenna gain	802.11a HT20	☒ Lowest ☒ Middle ☒ Highest	802.11a HT20	☒ Lowest ☒ Middle ☒ Highest	☒	☐	☐	☐	complies
§15.407(a)	Power spectral density	802.11a HT20 802.11n HT20 802.11n HT20 Mimo mode	☒ Lowest ☒ Middle ☒ Highest	802.11a HT20 802.11n HT20 802.11n HT20 Mimo mode	☒ Lowest ☒ Middle ☒ Highest	☒	☐	☐	☐	complies
§15.407(a)	Spectrum bandwidth – 26 dB bandwidth	-/-	-/-	-/-	-/-	☐	☐	☒	☐	complies
§15.407(e)	Spectrum bandwidth – 6 dB bandwidth	802.11a HT20 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	802.11a HT20 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	☒ ☒	☐	☐	☐	complies
§15.407(a)	Maximum output power	802.11a HT20 802.11n HT20 802.11n HT20 Mimo mode	☒ Lowest ☒ Middle ☒ Highest	802.11a HT20 802.11n HT20 802.11n HT20 Mimo mode	☒ Lowest ☒ Middle ☒ Highest	☒ ☒ ☒	☐	☐	☐	complies
§15.407(b)	Band edge compliance conducted	802.11a HT20 802.11n HT20	☒ Lowest ☒ Highest	802.11a HT20 802.11n HT20	☒ Lowest ☒ Highest	☒ ☒	☐	☐	☐	complies
§15.407(b)	Band edge compliance radiated	802.11a HT20 802.11n HT20 802.11n HT20 Mimo mode	☒ Lowest ☒ Highest	8802.11a HT20	☒ Lowest ☒ Highest	☒	☐	☐	☐	complies
§15.407(a)	TX spurious emissions conducted	-/-	-/-	-/-	-/-	☐	☐	☒	☐	complies
§15.407(a)	TX spurious emissions radiated	802.11a HT20 802.11n HT20 802.11n HT20 Mimo mode	☒ Lowest ☒ Middle ☒ Highest	802.11a HT20	☒ Lowest ☒ Middle ☒ Highest	☒	☐	☐	☐	complies
§15.407(g)	Frequency Stability	802.11a HT20	☒ Lowest ☒ Highest	802.11a HT20	☒ Lowest	☒	☐	☐	☐	complies
§15.109	RX spurious emissions radiated	-/-	-/-	-/-	-/-	☐	☐	☒	☐	complies
§15.209(a)	TX spurious Emissions radiated < 30 MHz	802.11a HT20 802.11n HT20	-/-	802.11a HT20	-/-	☒	☐	☐	☐	complies
§15.107(a) §15.207	Conducted Emissions < 30 MHz	802.11a HT20 802.11n HT20	-/-	802.11a HT20	-/-	☒	☐	☐	☐	complies

Remark:
1. The measurement uncertainty is not included in the test result.
2. NA = Not Applicable; NP = Not Performed

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Channel
Maximum Peak Conducted Output Power Power Spectral Density 6dB Bandwidth 26dB Bandwidth Spurious RF conducted emission Radiated Emission 9kHz~1GHz& Radiated Emission 1GHz~10th Harmonic	11a/OFDM	6 Mbps	149/157/165
	11n/OFDM	6.5 Mbps	149/157/165
Band Edge	11a/OFDM	6 Mbps	149/157/165
	11n/OFDM	6.5 Mbps	149/157/165

3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Global Test Service Co.,Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen GTS laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10 dB	(1)
Radiated Emission	1~18GHz	4.32 dB	(1)
Radiated Emission	18-40GHz	5.54 dB	(1)
Conducted Disturbance	0.15~30MHz	3.12 dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.6. Equipments Used during the Test

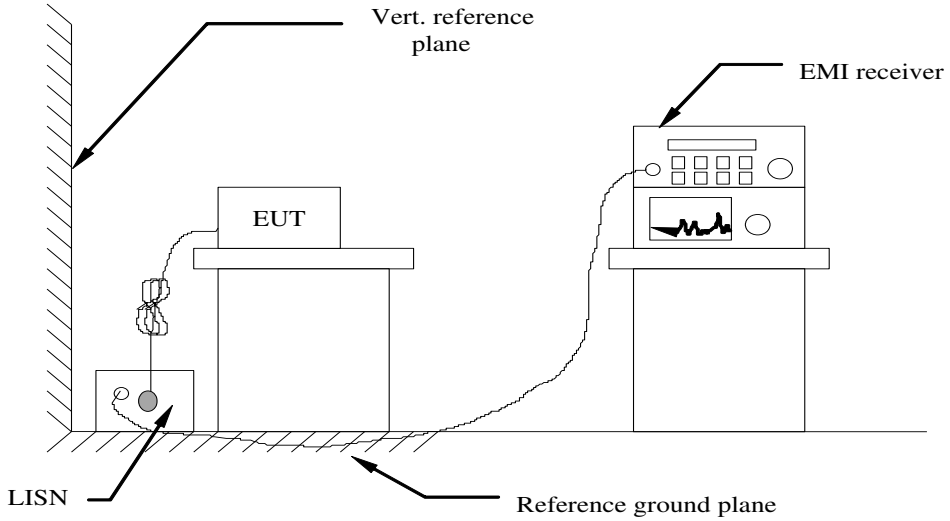
Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.08	2017/05/28	2018/05/27
LISN	R&S	ESH2-Z5	893606/008	2017/05/27	2018/05/26
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2017/06/02	2018/06/01
EMI Test Receiver	R&S	ESCI	101102	2016/06/26	2017/06/25
Spectrum Analyzer	Agilent	N9020A	MY48010425	2016/06/17	2017/06/16
Spectrum Analyzer	R&S	FSP40	1164.4391.32	2016/06/17	2017/06/16
Controller	EM Electronics	Controller EM 1000	N/A	2017/05/19	2018/05/18
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2017/05/19	2018/05/18
Double Ridged Horn Antenna	Rohde&Schwarz	HF907	100265	2017/05/19	2018/05/18
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2017/05/19	2018/05/18
Amplifier	Agilent	8349B	3008A02306	2017/05/19	2018/05/18
Amplifier	Agilent	8447D	2944A10176	2017/05/19	2018/05/18
Amplifer	A.H.	PAM-1840VH	562	2017/05/19	2018/05/18
Temperature/Humidity Meter	Gangxing	CTH-608	02	2017/05/20	2018/05/19
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	N/A	2017/05/20	2018/05/19
High-Pass Filter	K&L	41H10-1375/U12750-O/O	N/A	2017/05/20	2018/05/19
Data acquisition card	Agilent	U2531A	TW53323507	2017/05/20	2018/05/19
Power Sensor	Agilent	U2021XA	MY5365004	2017/05/19	2018/05/18
RF Cable	HUBER+SUHNER	RG214	N/A	2017/05/19	2018/05/18

Note: The Cal.Interval was one year.

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2013.
2 Support equipment, if needed, was placed as per ANSI C63.10-2013
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013
4 The EUT received USB 5V from PC, the PC received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5 All support equipments received AC power from a second LISN, if any.
6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT.The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

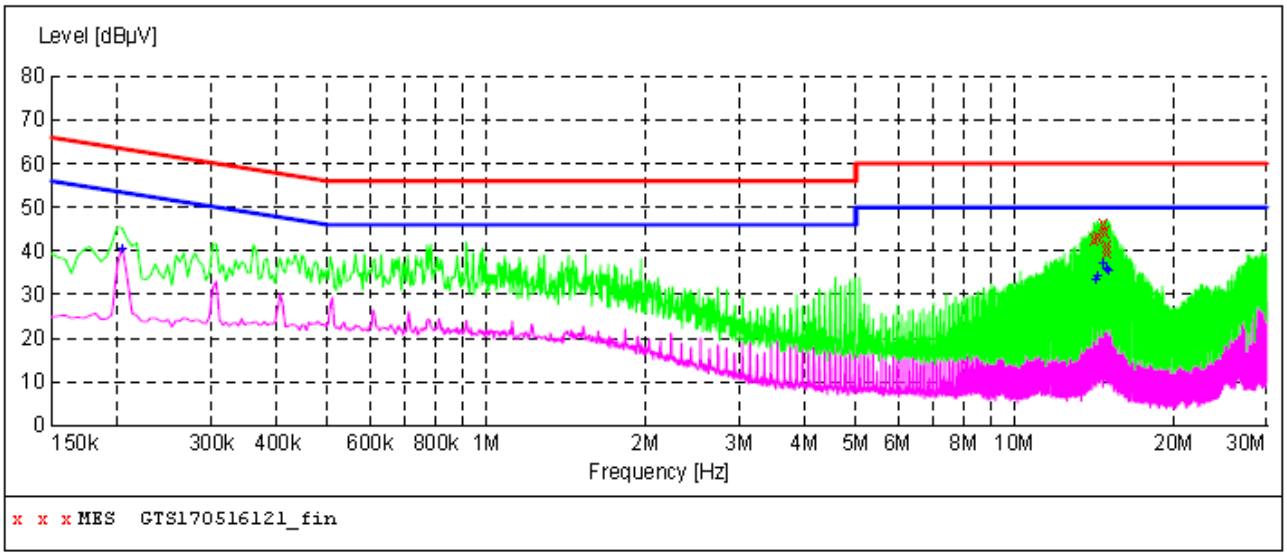
For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the frequency.		

TEST RESULTS

Remark: We measured Conducted Emission at 802.11a HT20/802.11n HT20 mode, the worst case was recorded .

Power supply:	USB 5V From PC	Polarization	L



MEASUREMENT RESULT: "GTS170516121_fin"

5/16/2017 3:01PM

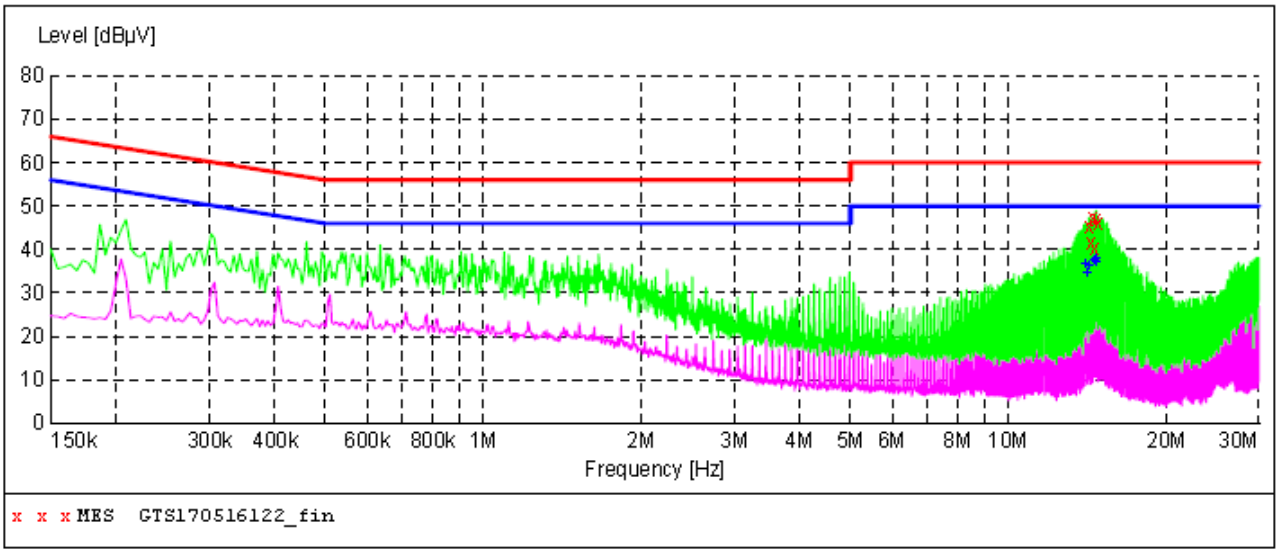
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
14.122500	42.90	8.3	60	17.1	QP	L1	GND
14.325000	43.40	8.3	60	16.6	QP	L1	GND
14.734500	46.30	8.2	60	13.7	QP	L1	GND
14.833500	44.60	8.2	60	15.4	QP	L1	GND
14.923500	41.10	8.2	60	18.9	QP	L1	GND
15.027000	39.80	8.2	60	20.2	QP	L1	GND

MEASUREMENT RESULT: "GTS170516121_fin2"

5/16/2017 3:01PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.204000	40.50	10.0	53	12.9	AV	L1	GND
14.221500	33.40	8.3	50	16.6	AV	L1	GND
14.329500	34.10	8.3	50	15.9	AV	L1	GND
14.631000	37.00	8.2	50	13.0	AV	L1	GND
14.937000	35.90	8.2	50	14.1	AV	L1	GND
15.040500	35.30	8.2	50	14.7	AV	L1	GND

Power supply:	USB 5V From PC	Polarization	N



MEASUREMENT RESULT: "GTS170516122_fin"

5/16/2017 3:04PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
14.221500	45.30	8.3	60	14.7	QP	N	GND
14.410500	41.50	8.3	60	18.5	QP	N	GND
14.527500	47.30	8.2	60	12.7	QP	N	GND
14.613000	40.20	8.2	60	19.8	QP	N	GND
14.730000	46.90	8.2	60	13.1	QP	N	GND
14.833500	46.20	8.2	60	13.8	QP	N	GND

MEASUREMENT RESULT: "GTS170516122_fin2"

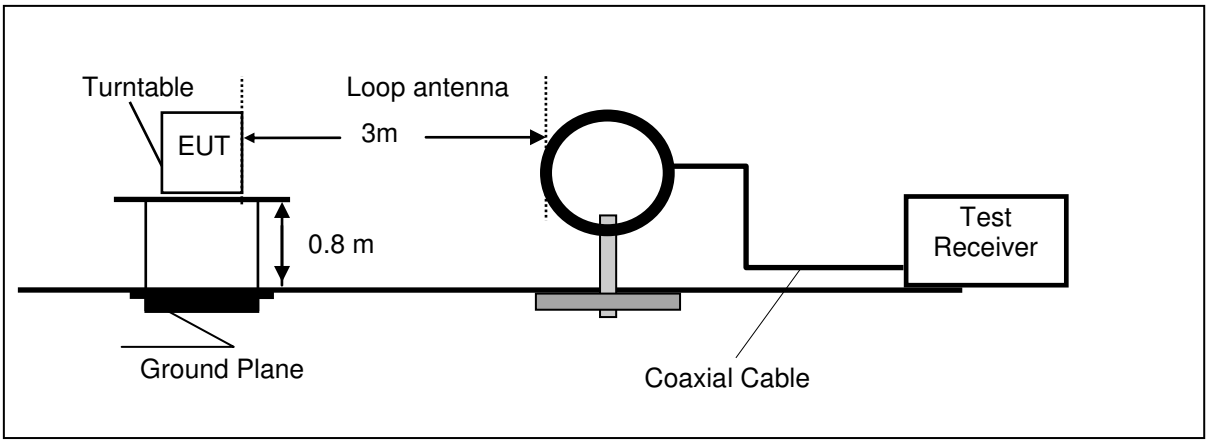
5/16/2017 3:04PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
14.019000	36.40	8.3	50	13.6	AV	N	GND
14.122500	34.50	8.3	50	15.5	AV	N	GND
14.221500	36.10	8.3	50	13.9	AV	N	GND
14.527500	37.40	8.2	50	12.6	AV	N	GND
14.626500	37.00	8.2	50	13.0	AV	N	GND
14.730000	37.70	8.2	50	12.3	AV	N	GND

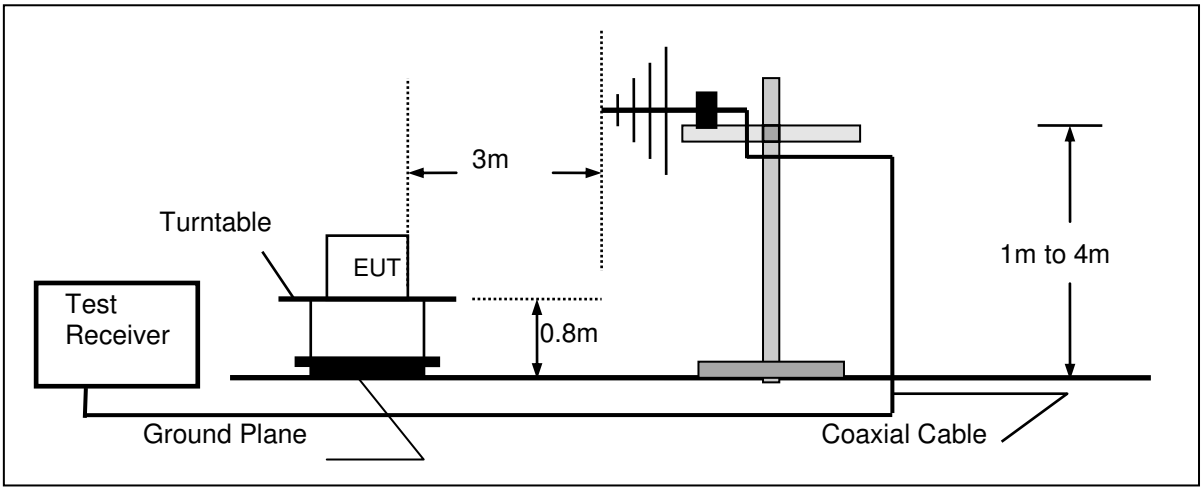
4.2. Radiated Emission

TEST CONFIGURATION

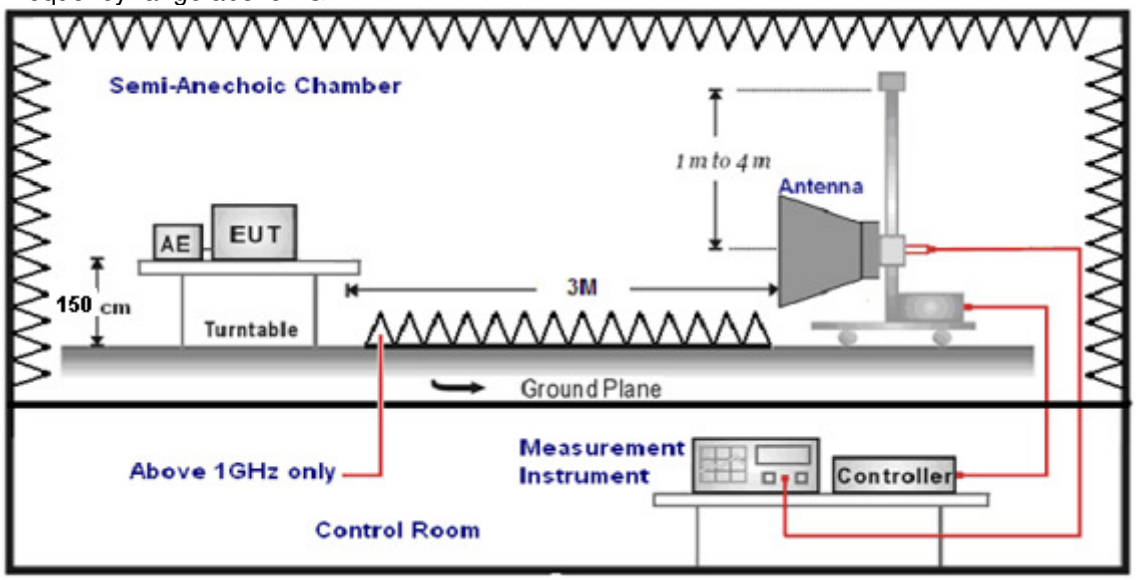
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz



TEST PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 9 KHz –1GHz;the EUT was placed on a turn table which is 1.5m above ground plane when testing above 1GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. The EUT minimum operation frequency was 24MHz and maximum operation frequency was 5825MHz.so radiated emission test frequency band from 9KHz to 40GHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Ultra-Broadband Antenna	3
1GHz-18GHz	Double Ridged Horn Antenna	3
18GHz-25GHz	Horn Anternna	1

7. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz,Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz,Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

Transd=AF +CL-AG

RADIATION LIMIT

According to §15.407 (b): Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits

Frequency (MHz)	EIRP Limit (dBm)	Equivalent Field Strength at 3m (dBμV/m)
5150-5250	-27	68.3
5250-5350	-27	68.3
5470-5725	-27	68.3
5725-5850	-27 (beyond 10MHz of the bandedge)	68.3
	-17 (within 10 MHz of band edge)	78.3

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST RESULTS

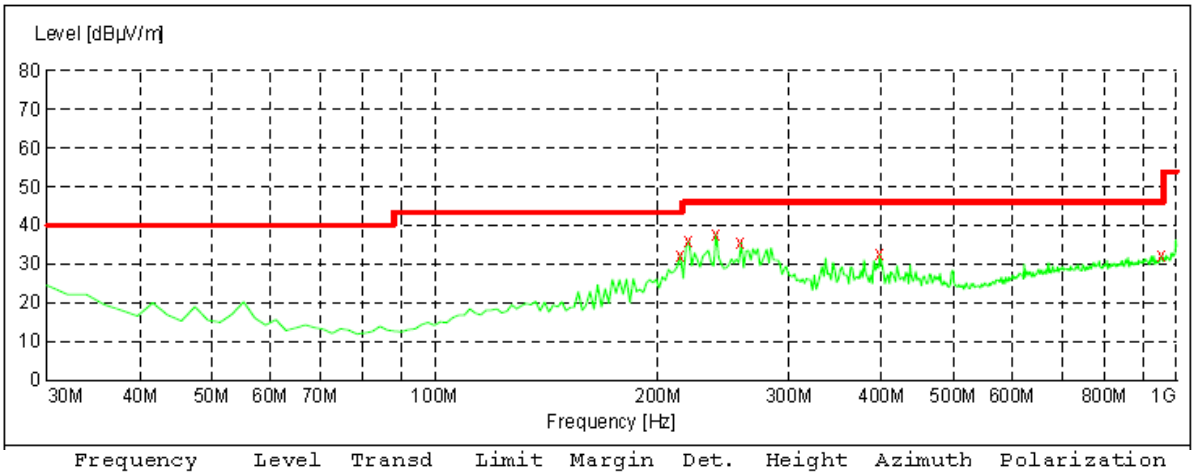
Remark: We tested at 802.11a HT20/802.11n HT20 mode at the antenna single transmitting mode and 802.11n HT20 at the Mimo mode, recored the worst data at 802.11a HT20 mode at the antenna single transmitting mode.
Test site: Shenzhen CTL Testing Technology Co., Ltd.

For 9 KHz-30MHz

Frequency (MHz)	Corrected Reading (dBuV/m)@3m	FCC Limit (dBuV/m) @3m	Margin (dB)	Detector	Result
0.24	49.65	100.00	50.35	QP	PASS
5.16	47.31	69.54	22.23	QP	PASS
20.31	47.58	69.54	21.96	QP	PASS
26.78	46.82	69.54	22.72	QP	PASS

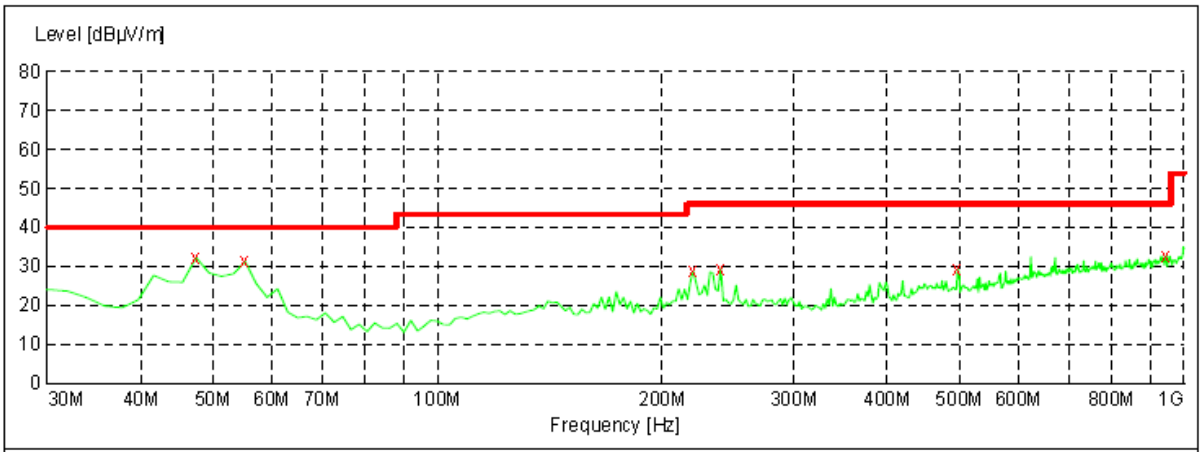
For 30MHz-1GHz

Horizontal



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
214.300000	32.40	14.0	43.5	11.1	PK	100	317.0	HORIZONTAL
220.120000	36.00	13.9	46.0	10.0	PK	100	274.0	HORIZONTAL
239.520000	37.80	13.7	46.0	8.2	PK	100	113.0	HORIZONTAL
258.920000	35.60	14.6	46.0	10.4	PK	300	285.0	HORIZONTAL
398.600000	32.70	17.9	46.0	13.3	PK	300	96.0	HORIZONTAL
955.380000	32.10	26.6	46.0	13.9	PK	300	159.0	HORIZONTAL

Vertical



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	32.20	8.7	40.0	7.8	PK	100	185.0	VERTICAL
55.220000	31.20	8.0	40.0	8.8	PK	100	322.0	VERTICAL
220.120000	28.80	13.9	46.0	17.2	PK	100	117.0	VERTICAL
239.520000	29.50	13.7	46.0	16.5	PK	200	254.0	VERTICAL
497.540000	29.20	20.2	46.0	16.8	PK	200	211.0	VERTICAL
947.620000	32.70	26.5	46.0	13.3	PK	200	166.0	VERTICAL

For 1GHz to 40GHz

802.11a HT20 Mode_Channel 149_ 5745 MHz

Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
1	11490	30.46	38.46	33.92	11.59	46.59	74.00	27.41	Peak	Horizontal
1	11490	21.01	38.46	33.92	11.59	37.14	54.00	16.86	AV	Horizontal
2	17235	27.38	43.11	37.11	13.94	47.32	74.00	26.68	Peak	Horizontal
2	17235	18.50	43.11	37.11	13.94	38.44	54.00	15.56	AV]	Horizontal

Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
1	11490	31.08	38.46	33.92	11.59	47.21	74.00	26.79	Peak	Vertical
1	11490	20.82	38.46	33.92	11.59	36.95	54.00	17.05	AV	Vertical
2	17235	28.18	43.11	37.11	13.94	48.12	74.00	25.88	Peak	Vertical
2	17235	17.62	43.11	37.11	13.94	37.56	54.00	16.44	AV	Vertical

802.11a HT20 Mode_Channel 157_5785 MHz

Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
1	11570	31.80	38.53	33.86	11.66	48.13	74.00	25.87	Peak	Horizontal
1	11570	21.16	38.53	33.86	11.66	37.49	54.00	16.51	AV	Horizontal
2	17355	28.99	43.20	37.15	14.02	49.06	74.00	24.94	Peak	Horizontal
2	17355	17.65	43.20	37.15	14.02	37.72	54.00	16.28	AV	Horizontal

Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
1	11570	31.33	38.53	33.86	11.66	47.66	74.00	26.34	Peak	Vertical
1	11570	20.16	38.53	33.86	11.66	36.49	54.00	17.51	AV	Vertical
2	17355	28.68	43.20	37.15	14.02	48.75	74.00	25.25	Peak	Vertical
2	17355	18.21	43.20	37.15	14.02	38.28	54.00	15.72	AV	Vertical

802.11a HT20 Mode_Channel 165_5825 MHz

Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
1	11650	32.01	38.56	33.84	11.71	48.44	74.00	25.56	Peak	Horizontal
1	11650	21.18	38.56	33.84	11.71	37.61	54.00	16.39	AV	Horizontal
2	17475	28.55	43.23	37.17	14.18	48.79	74.00	25.21	Peak	Horizontal
2	17475	16.58	43.23	37.17	14.18	36.82	54.00	17.18	AV	Horizontal

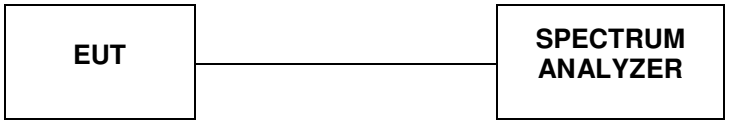
Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
1	11650	31.02	38.56	33.84	11.71	47.45	74.00	26.55	Peak	Vertical
1	11650	20.45	38.56	33.84	11.71	36.88	54.00	17.12	AV	Vertical
2	17475	27.79	43.23	37.17	14.18	48.03	74.00	25.97	Peak	Vertical
2	17475	16.97	43.23	37.17	14.18	37.21	54.00	16.79	AV	Vertical

REMARKS:

1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. The other emission levels were very low against the limit.
3. The average measurement was not performed when the peak measured data under the limit of average detection.
4. Detector AV is setting spectrum/receiver. RBW=1MHz/VBW=10Hz/Sweep time=Auto/Detector=Peak;

4.3. Duty Cycle

TEST CONFIGURATION



TEST PROCEDURE

According to KDB789033 D02 General UNII Test Procedures New Rules v01 B Duty Cycle (x), Transmission Duration (T):

a. A diode detector and an oscilloscope that together have sufficiently short response time to permit accurate measurements of the on and off times of the transmitted signal
b. The zero-span mode on a spectrum analyzer or EMI receiver, if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW ≥ EBW if possible; otherwise, set RBW to the largest available value. Set VBW ≥ RBW. Set detector = peak or average. The zerospan measurement method shall not be used unless both RBW and VBW are > 50/T, where T is defined in section II.B.1.a), and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T ≤ 16.7 microseconds.)

TEST RESULTS

Antenna 1

802.11a HT20 Test Mode

Channel	Frequency (MHz)	Duty Cycle	Duty factor (dB)
149	5745	0.895	0.482
157	5785	0.917	0.376
165	5825	0.896	0.477

802.11n HT20 Test Mode

Channel	Frequency (MHz)	Duty Cycle	Duty factor (dB)
149	5745	0.905	0.434
157	5785	0.904	0.438
165	5825	0.906	0.429

Antenna 2

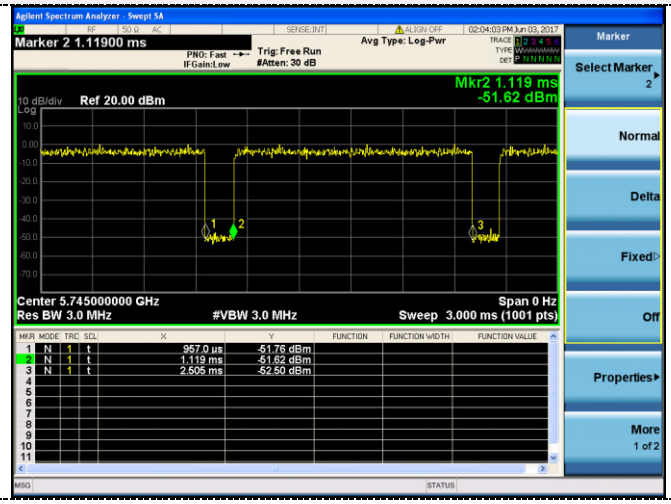
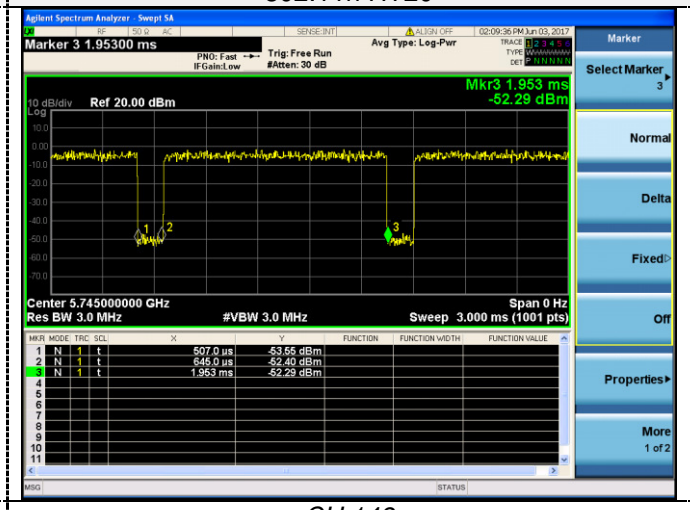
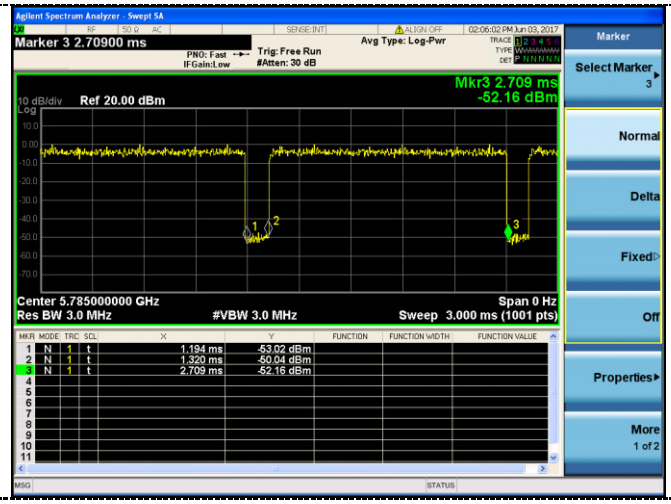
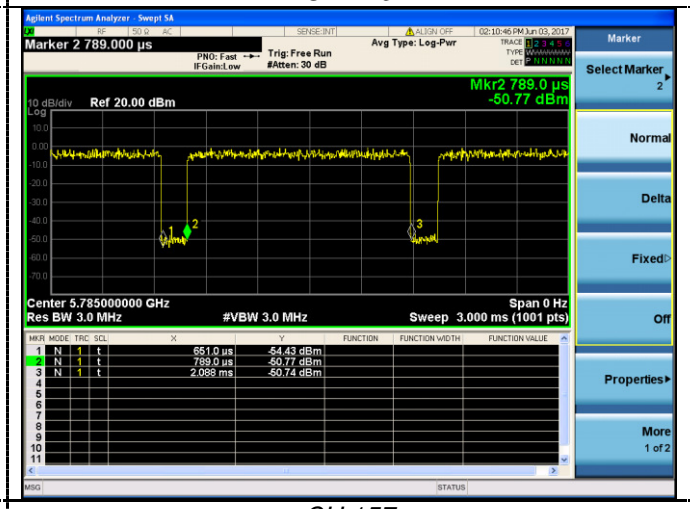
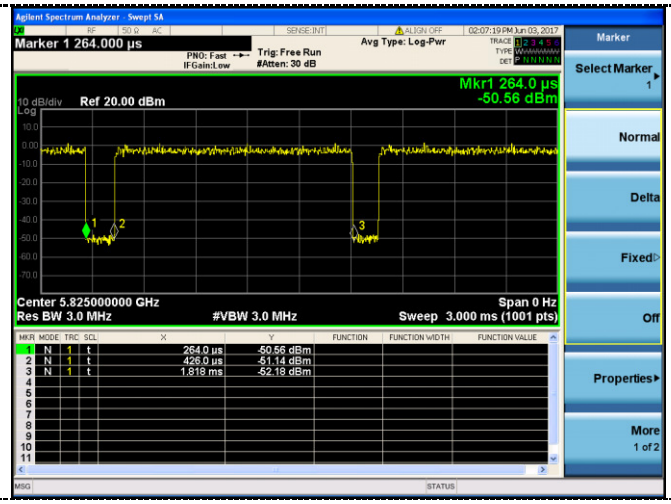
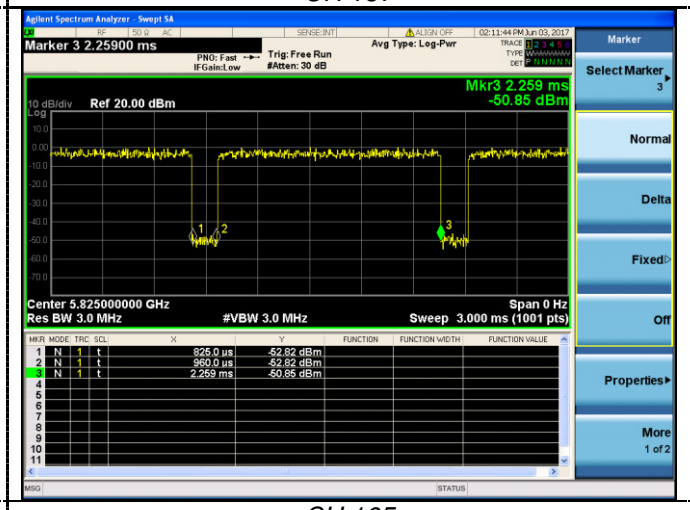
802.11a HT20 Test Mode

Channel	Frequency (MHz)	Duty Cycle	Duty factor (dB)
149	5745	0.908	0.419
157	5785	0.904	0.438
165	5825	0.901	0.453

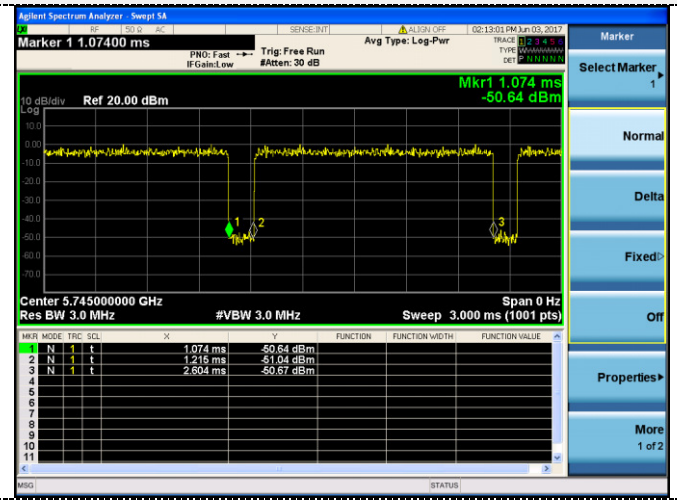
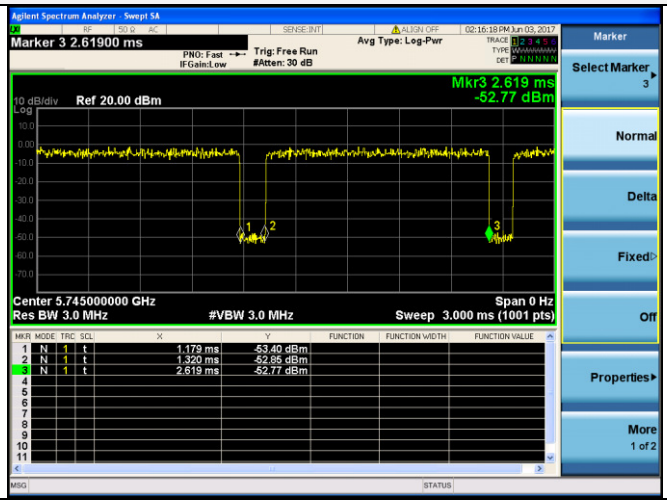
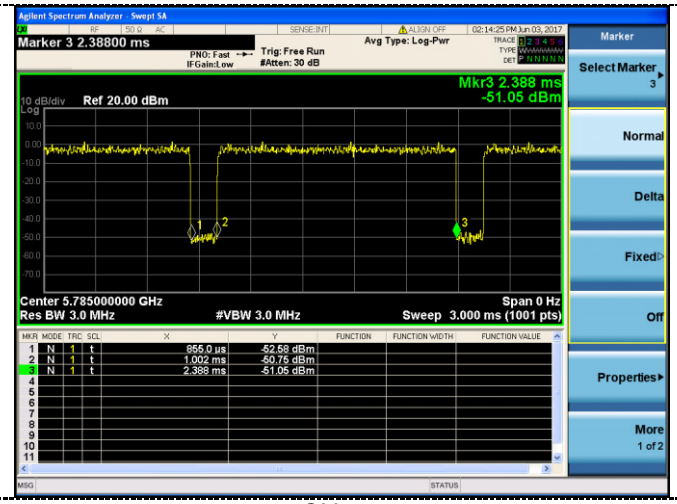
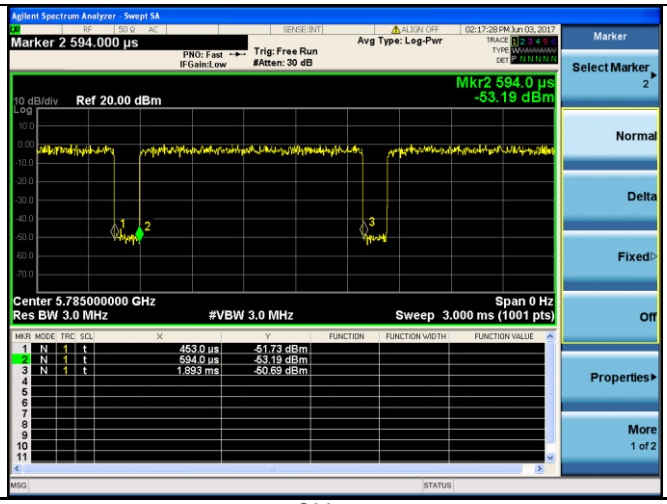
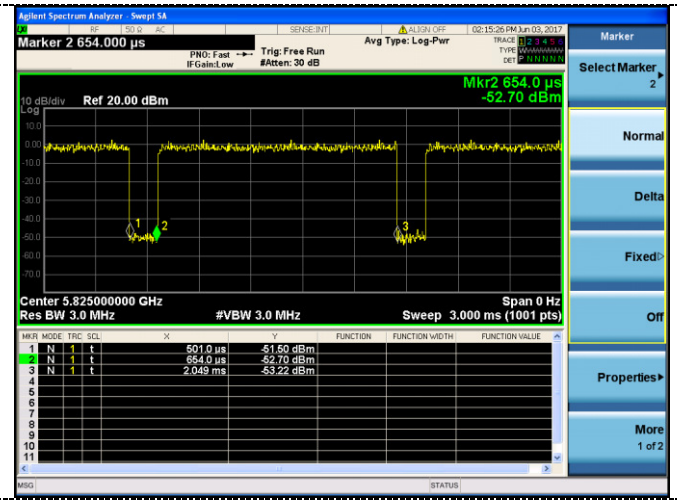
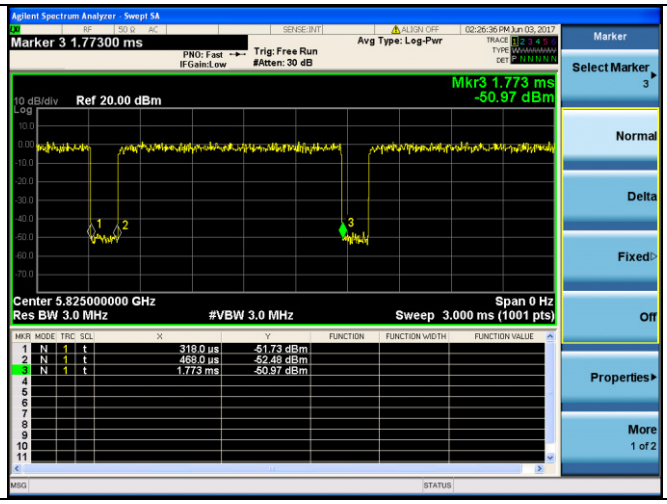
802.11n HT20 Test Mode

Channel	Frequency (MHz)	Duty Cycle	Duty factor (dB)
149	5745	0.902	0.448
157	5785	0.902	0.448
165	5825	0.897	0.472

Antenna 1

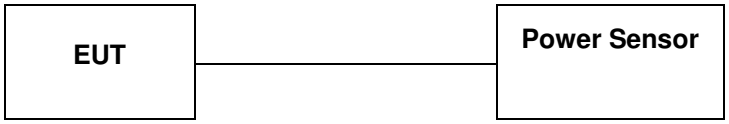
802.11a HT20	802.11n HT20
	
CH 149	*CH 149*
	
CH 157	*CH 157*
	
CH 165	*CH 165*

Antenna 2

802.11a HT20	802.11n HT20
	
CH 149	*CH 149*
	
CH 157	*CH 157*
	
CH 165	*CH 165*

4.4. Maximum Average Output Power

TEST CONFIGURATION



TEST PROCEDURE

According to KDB789033 D02 General UNII Test Procedures New Rules v01 Section E3 Measurement using a Power Meter (PM):

a. Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied
   1. The EUT is configured to transmit continuously or to transmit with a constant duty cycle
   2. At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.
   3. The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.

b. If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in section II.B

c. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.

Adjust the measurement in dBm by adding 10 log(1/x) where x is the duty cycle (e.g., 10 log(1/0.25) if the duty cycle is 25 percent).

LIMIT

According to §15.407(a): The maximum output power should be not exceed follow:

Frequency Range (MHz)	Limit
5150-5250	Fixed:1 Watt (30dBm) Mobile and portable: 250mW (24dBm)
5250-5350	250mW (24dBm)
5470-5725	250mW (24dBm)
5725-5850	1 Watt (30dBm)
Note: The maximum e.i.r.p at anyelevation angle above 30 degrees as measured from the horizon must not exceed 125mW(21dBm)	

TEST RESULTS

Antenna 1

802.11a HT20 Test Mode

Channel	Frequency (MHz)	Output Power PK (dBm)	Output Power AV (dBm)	Duty factor (dB)	Output Power AV+ Duty factor (dBm)	Limits (dBm)	Verdict
149	5745	7.41	4.52	0.482	5.002	30.00	PASS
157	5785	8.11	5.12	0.376	5.496	30.00	PASS
165	5825	7.47	4.68	0.477	5.157	30.00	PASS

802.11n HT20 Test Mode

Channel	Frequency (MHz)	Output Power PK (dBm)	Output Power AV (dBm)	Duty factor (dB)	Output Power AV+ Duty factor (dBm)	Limits (dBm)	Verdict
149	5745	6.10	3.35	0.434	3.784	30.00	PASS
157	5785	6.21	3.41	0.438	3.848	30.00	PASS
165	5825	6.79	3.28	0.429	3.709	30.00	PASS

Antenna 2

802.11a HT20 Test Mode

Channel	Frequency (MHz)	Output Power PK (dBm)	Output Power AV (dBm)	Duty factor (dB)	Output Power AV+ Duty factor (dBm)	Limits (dBm)	Verdict
149	5745	7.56	4.69	0.419	5.109	30.00	PASS
157	5785	8.13	5.35	0.438	5.788	30.00	PASS
165	5825	7.74	4.66	0.453	5.113	30.00	PASS

802.11n HT20 Test Mode

Channel	Frequency (MHz)	Output Power PK (dBm)	Output Power AV (dBm)	Duty factor (dB)	Output Power AV+ Duty factor (dBm)	Limits (dBm)	Verdict
149	5745	6.68	3.17	0.448	3.618	30.00	PASS
157	5785	6.59	3.06	0.448	3.508	30.00	PASS
165	5825	6.77	3.29	0.472	3.762	30.00	PASS

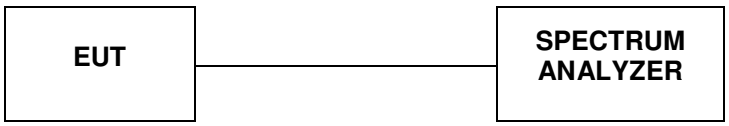
MIMO*2

Type	Channel	Output Power PK ANT1	Output Power PK ANT2	Output Power PK (dBm)	Limit (dBm)	Result
802.11n HT20	149	6.10	6.68	9.41	30.00	Pass
	157	6.21	6.59	9.41		
	165	6.79	6.77	9.79		

Type	Channel	Output Power AV + Duty factor (dBm) ANT1	Output Power AV + Duty factor (dBm) ANT2	Output Power AV + Duty factor Total (dBm)	Limit (dBm)	Result
802.11n HT20	149	3.784	3.618	6.71	30.00	Pass
	157	3.848	3.508	6.69		
	165	3.709	3.762	6.75		

4.5. Power Spectral Density

TEST CONFIGURATION



TEST PROCEDURE

According to KDB 789033 D02 General UNII Test Procedures New Rules v01 F: The rules requires "maximum power spectral density" measurements where the intent is to measure the maximum value of the time average of the power spectral density measured during a period of continuous transmission

a. Create an average power spectrum for the EUT operating mode being tested by following the instructions in section II.E.2. for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, "Compute power…". (This procedure is required even if the maximum conducted output power measurement was performed using a power meter, method PM.)
b. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
c. Make the following adjustments to the peak value of the spectrum, if applicable:
   1. If Method SA-2 or SA-2 Alternative was used, add 10 log(1/x), where x is the duty cycle, to the peak of the spectrum.
   2.) If Method SA-3 Alternative was used and the linear mode was used in step II.E.2.g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.
d. The result is the Maximum PSD over 1 MHz reference bandwidth.
e. 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). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 KHz bandwidth, the following adjustments to the procedures apply:
   1. Set RBW ≥ 1/T, where T is defined in section II.B.I.a).
   2. Set VBW ≥ 3 RBW.
   3. If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
   4. If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10log(1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
   5. Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

   Note: As a practical matter, it is recommended to use reduced RBW of 100 KHz for the sections 5.c) and 5.d) above, since RBW=100 KHz is available on nearly all spectrum analyzers.
f. Adjust the measurement in dBm by adding 10 log(1/x) where x is the duty cycle (e.g., 10 log(1/0.25) if the duty cycle is 25 percent).

LIMIT

According to §15.407(a): The maximum output power should be not exceed follow:

Frequency Range (MHz)	Limit
5150-5250	Other then Mobile and portable:17dBm/MHz Mobile and portable:11dBm/MHz
5250-5350	11dBm/MHz
5470-5725	11dBm/MHz
5725-5850	30dBm/500kHz

TEST RESULTS

Antenna 1

802.11a HT20 Test Mode

Channel	Frequency (MHz)	Report PSD (dBm/100KHz)	Duty factor (dB)	RBW factor (dB)	Report PSD+ Duty factor+ RBW factor (dBm/500kHz)	Limits (dBm/500kHz)	Verdict
149	5745	-16.68	0.482	6.99	-9.208	30	PASS
157	5785	-15.17	0.376	6.99	-7.804	30	PASS
165	5825	-13.81	0.477	6.99	-6.343	30	PASS

802.11n HT20 Test Mode

Channel	Frequency (MHz)	Report PSD (dBm/100KHz)	Duty factor (dB)	RBW factor (dB)	Report PSD+ Duty factor+ RBW factor (dBm/500kHz)	Limits (dBm/500kHz)	Verdict
149	5745	-16.41	0.434	6.99	-8.986	30	PASS
157	5785	-15.09	0.438	6.99	-7.662	30	PASS
165	5825	-14.23	0.429	6.99	-6.811	30	PASS

Antenna 2

802.11a Test Mode

Channel	Frequency (MHz)	Report PSD (dBm/100KHz)	Duty factor (dB)	RBW factor (dB)	Report PSD+ Duty factor+ RBW factor (dBm/500kHz)	Limits (dBm/500kHz)	Verdict
149	5745	-17.20	0.419	6.99	-9.791	30	PASS
157	5785	-16.50	0.438	6.99	-9.072	30	PASS
165	5825	-15.20	0.453	6.99	-7.757	30	PASS

802.11n HT20 Test Mode

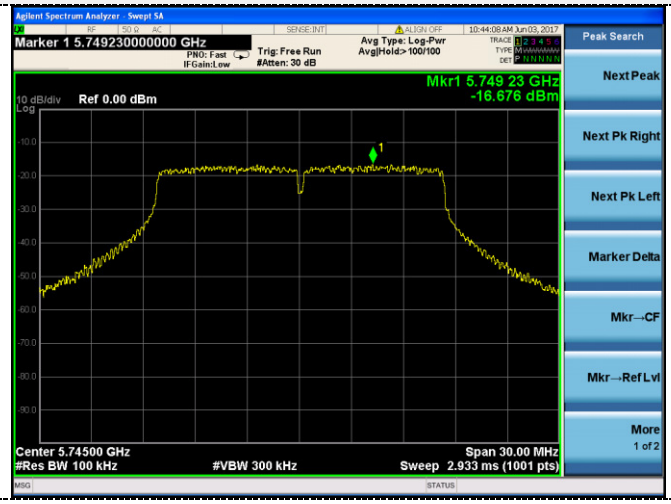
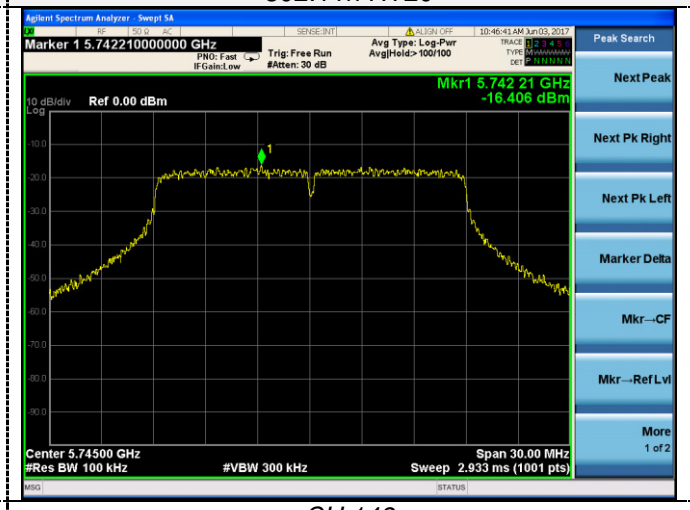
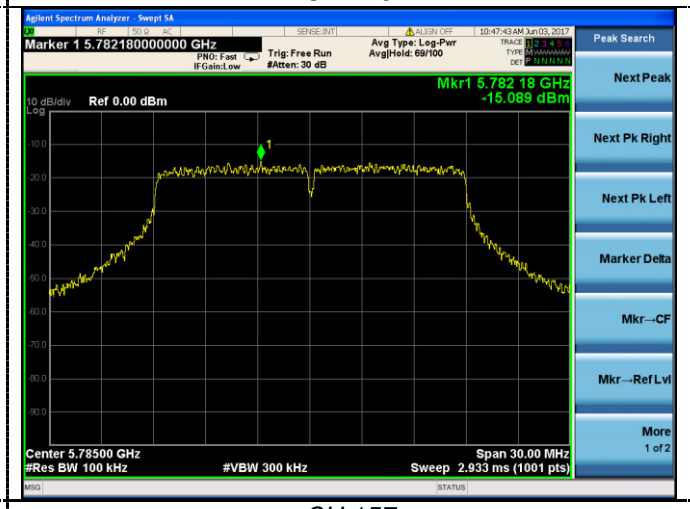
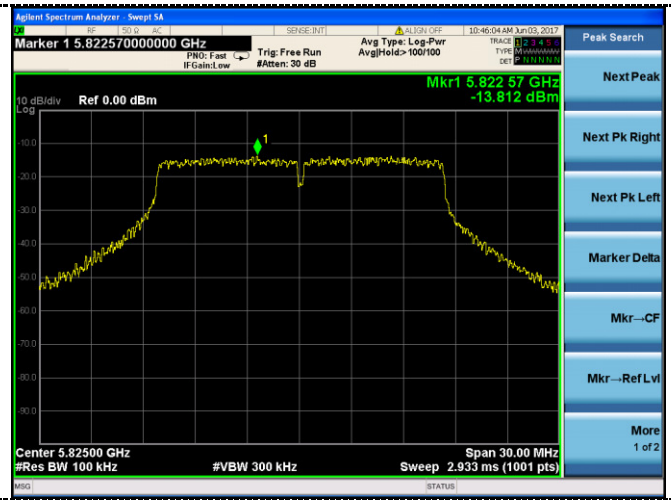
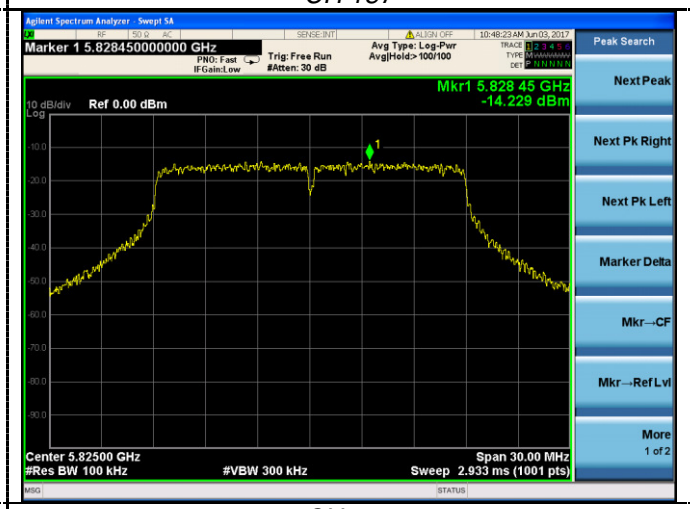
Channel	Frequency (MHz)	Report PSD (dBm/100KHz)	Duty factor (dB)	RBW factor (dB)	Report PSD+ Duty factor+ RBW factor (dBm/500kHz)	Limits (dBm/500kHz)	Verdict
149	5745	-16.82	0.448	6.99	-9.382	30	PASS
157	5785	-15.99	0.448	6.99	-8.552	30	PASS
165	5825	-14.97	0.472	6.99	-7.508	30	PASS

MIMO*2

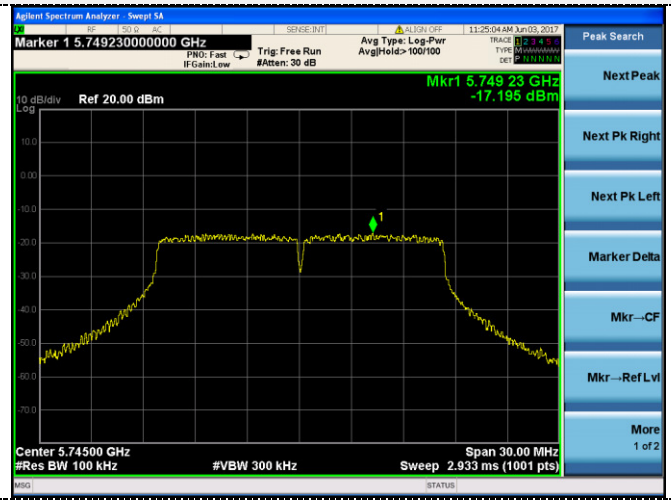
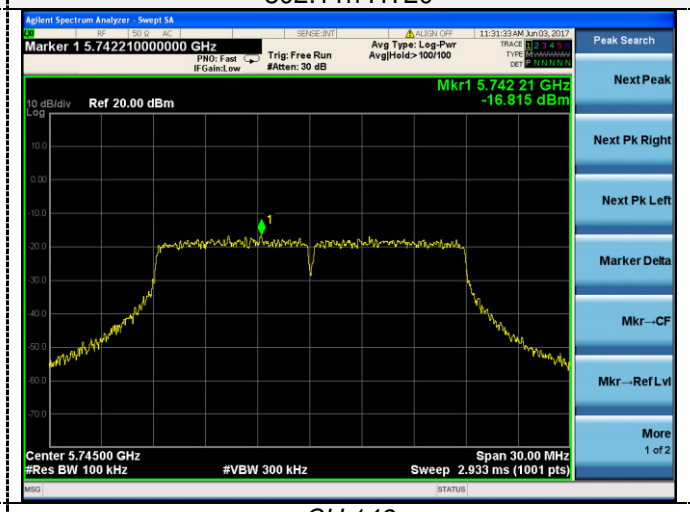
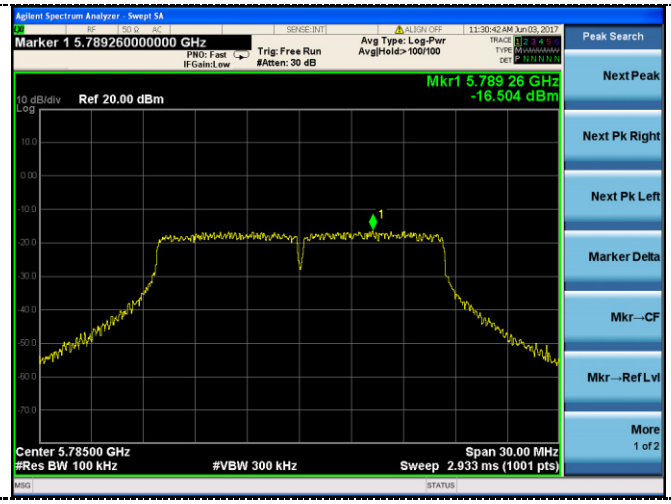
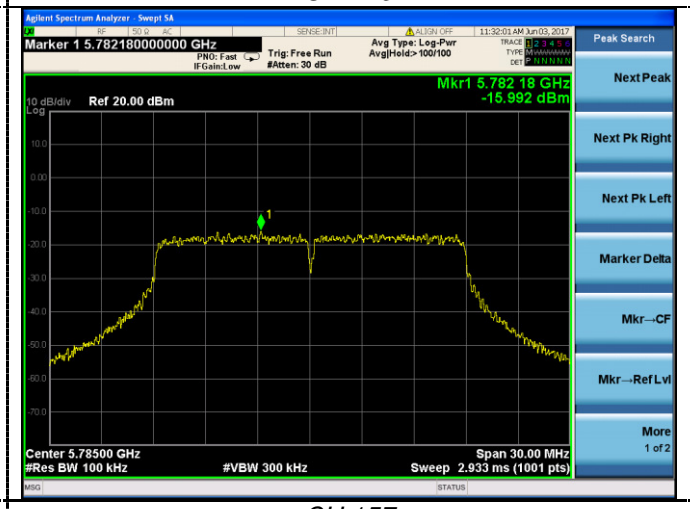
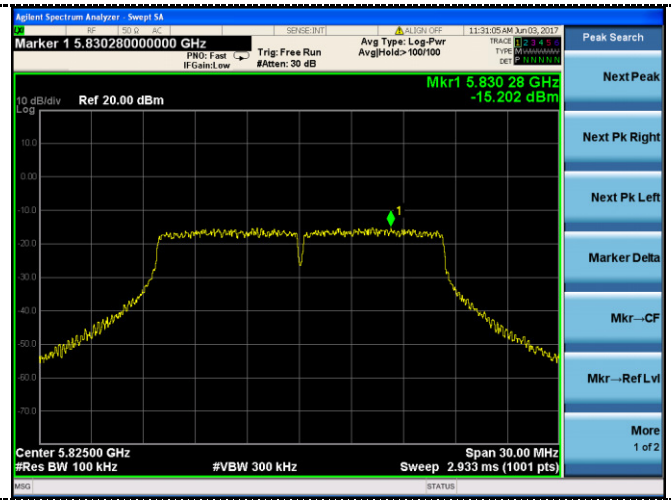
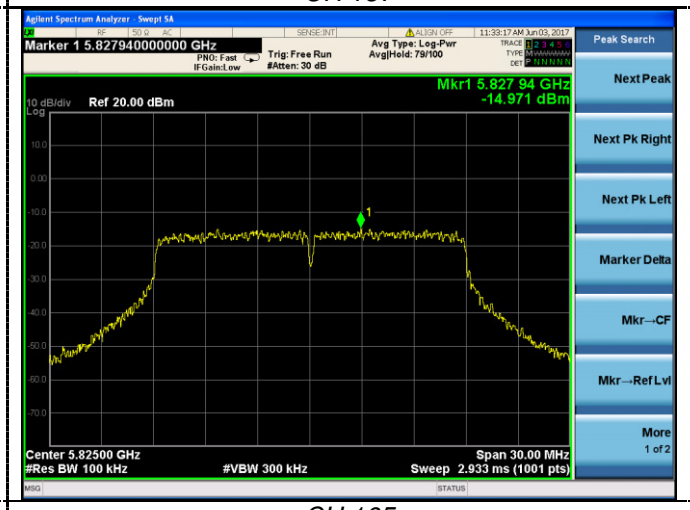
Type	Channel	Report PSD+Duty factor+RBW factor(500kHz) ANT1 (dBm/1MHz)	Report PSD+Duty factor+RBW factor(500kHz) ANT2 (dBm/1MHz)	Report PSD+Duty factor+RBW factor(500kHz) Total (dBm/1MHz)	Limit (dBm/500kHz)	Result
802.11n HT20	149	-8.986	-9.382	-6.17	30.00	Pass
	157	-7.662	-8.552	-5.07		
	165	-6.811	-7.508	-4.14		

Note:
1. For 802.11a HT20 mode at finial test to get the worst-case emission at 6Mbps.
2. For 802.11n HT20 mode at finial test to get the worst-case emission at 6.5Mbps.
3. The test results including the cable lose.

Antenna 1

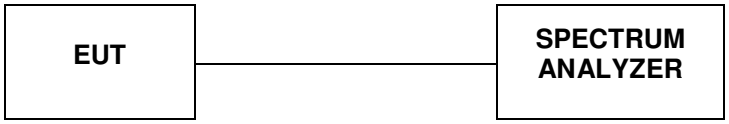
802.11a HT20	802.11n HT20
	
CH 149	*CH 149*
	
CH 157	*CH 157*
	
CH 165	*CH 165*

Antenna 2

802.11a HT20	802.11n HT20
	
CH 149	*CH 149*
	
CH 157	*CH 157*
	
CH 165	*CH 165*

4.6. 6dB Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

According to KDB789033 D02 General UNII Test Procedures New Rules v01 for one of the following procedures may be used for section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

a. Set RBW = 100 kHz.
b. Set the video bandwidth (VBW) ≥ 3 × RBW
c. Detector = Peak.
d. Trace mode = max hold.
e. Sweep = auto couple.
f. Allow the trace to stabilize
g. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

LIMIT

For Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz

TEST RESULTS

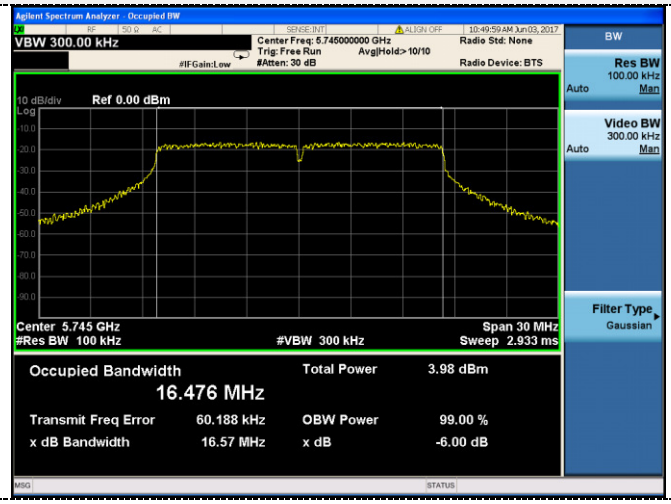
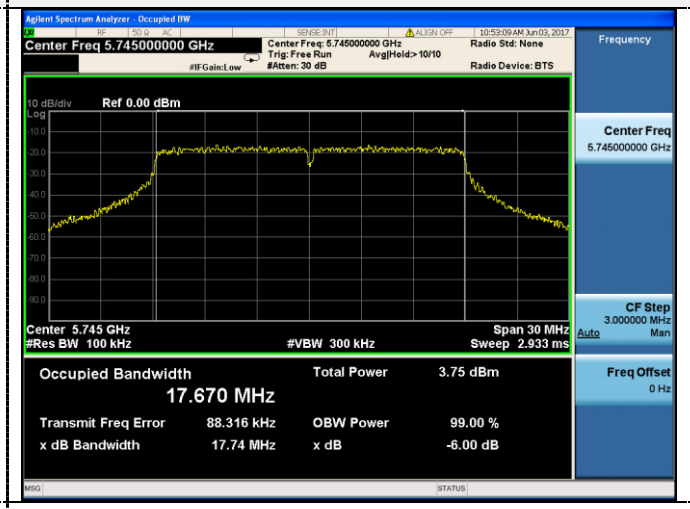
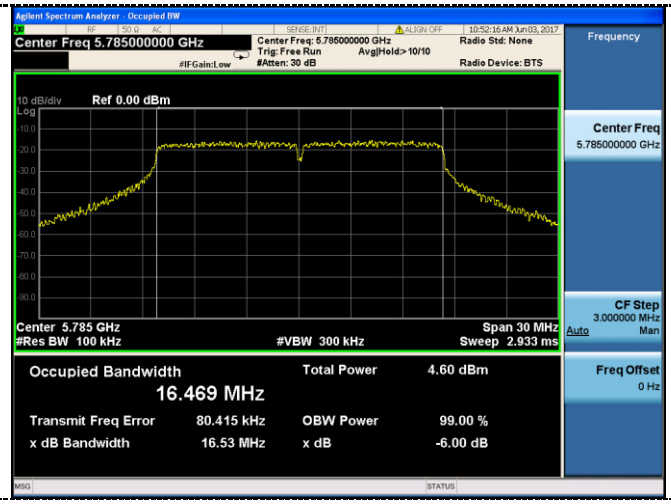
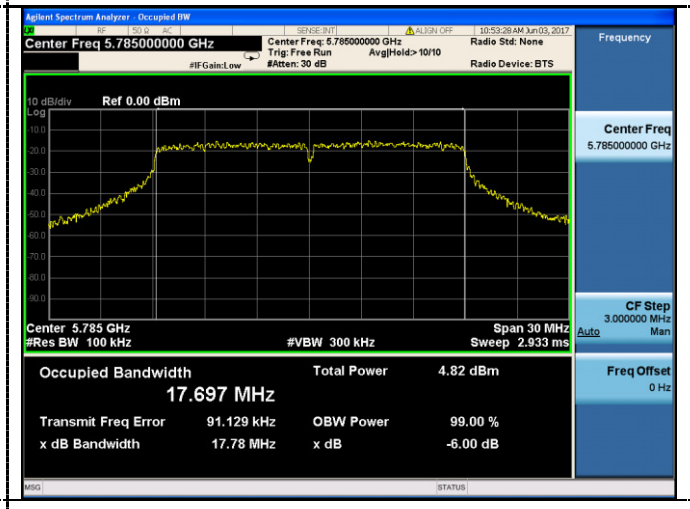
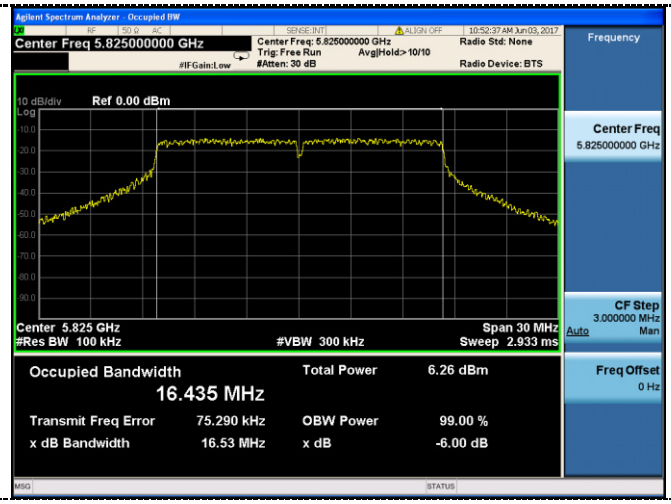
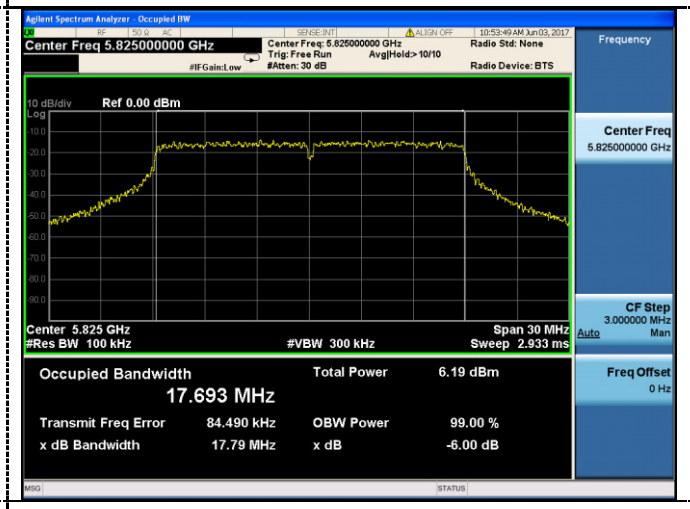
Antenna 1

Type	Channel	6dB Bandwidth (MHz)	Limit (KHz)	Result
802.11a HT20	149	16.57	≥500	Pass
	157	16.53		
	165	16.53		
802.11n HT20	149	17.74	≥500	Pass
	157	17.78		
	165	17.79		

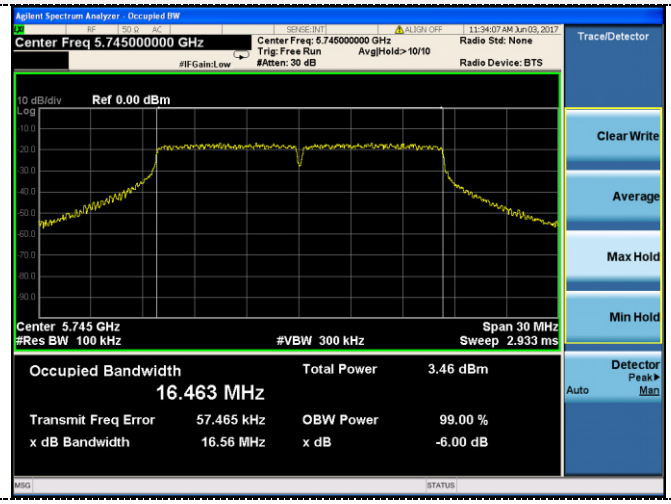
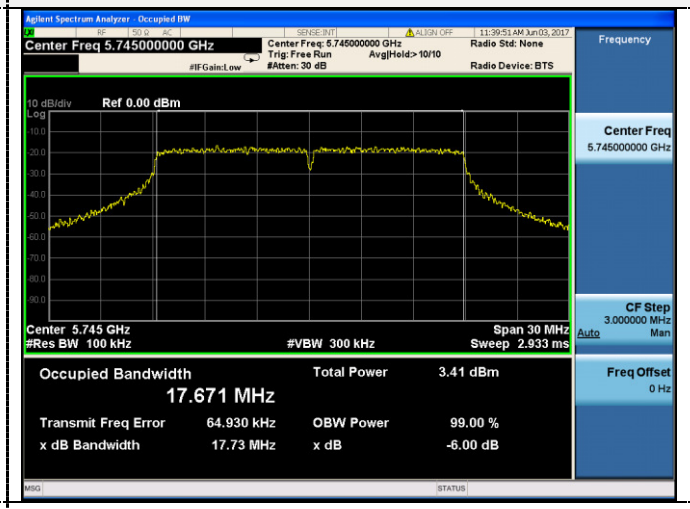
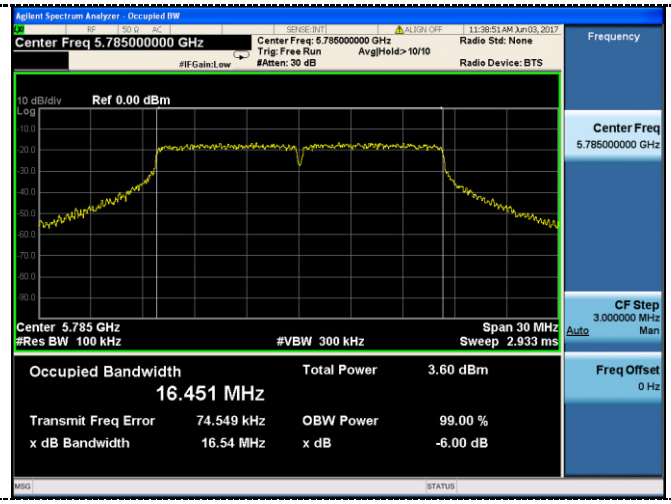
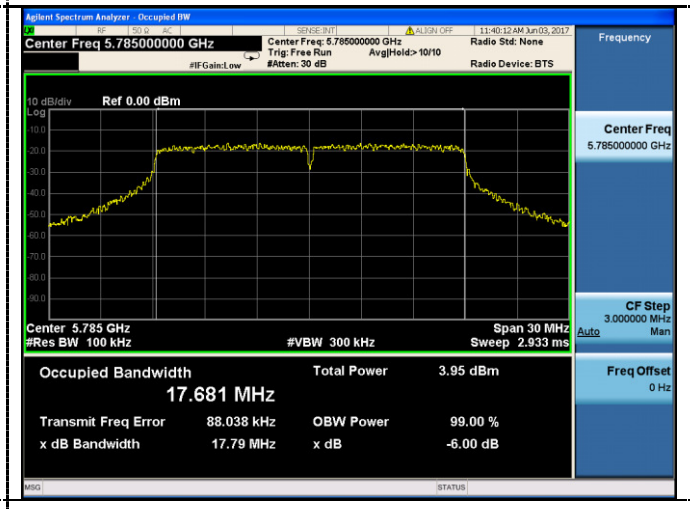
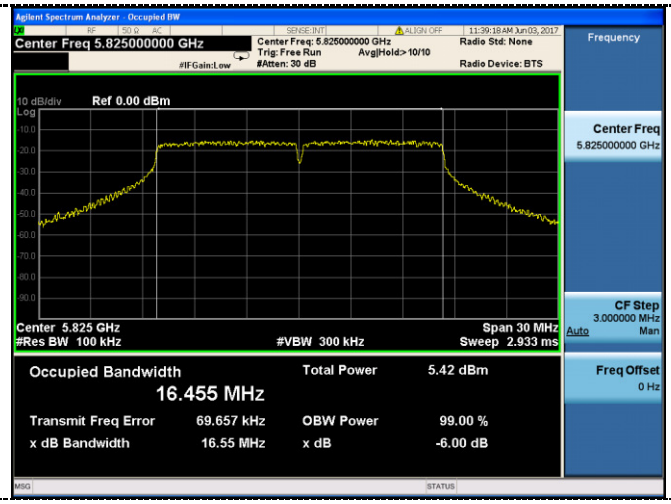
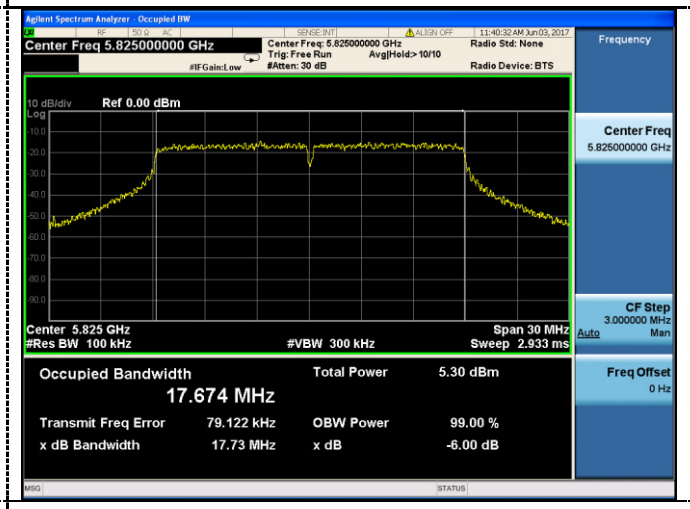
Antenna 2

Type	Channel	6dB Bandwidth (MHz)	Limit (KHz)	Result
802.11a HT20	149	16.56	≥500	Pass
	157	16.54		
	165	16.55		
802.11n HT20	149	17.73	≥500	Pass
	157	17.79		
	165	17.73		

Antenna 1

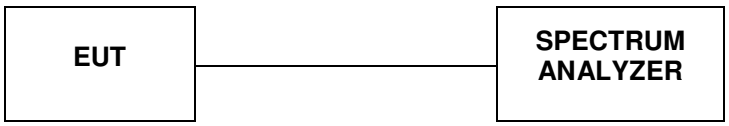
802.11a HT20	802.11n HT20
	
CH149	*CH149*
	
CH157	*CH157*
	
CH165	*CH165*

Antenna 2

802.11a HT20	802.11n HT20
	
CH149	*CH149*
	
CH157	*CH157*
	
CH165	*CH165*

4.7. 26dBc Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

According to KDB789033 D02 General UNII Test Procedures New Rules v01 for one of the following procedures may be used for Emission Bandwidth (EBW) measurement:

a. Set RBW = 300 kHz (approximately 1% of the emission bandwidth).
b. Set the video bandwidth (VBW) = 1000 KHz (VBW > RBW)
c. Detector = Peak.
d. Trace mode = max hold.
e. Sweep = auto couple.
f. Allow the trace to stabilize
g. Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

LIMIT

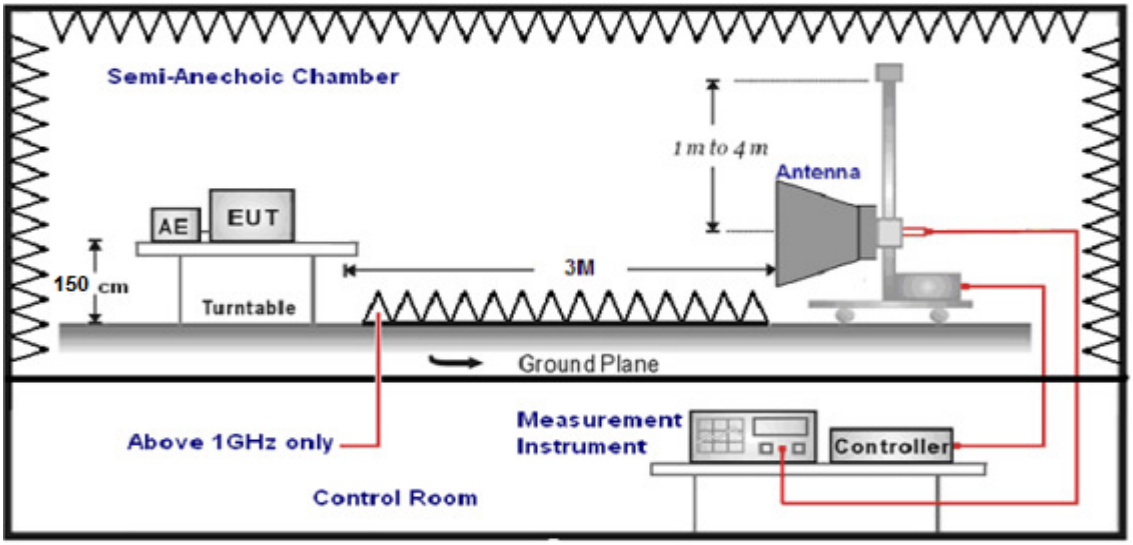
No Limits for 26dBc Bandwith

TEST RESULTS

The test is not applicable to the EUT.

4.8. Band Edge Compliance

TEST CONFIGURATION



LIMIT

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

According to §15.407 (b):
For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
For transmitters operating in the 5.725-5.85 GHz band:
All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Frequency (MHz)		EIRP Limit (dBm)	Equivalent Field Strength at 3m (dBμV/m)
5150-5250		-27	68.3
5250-5350		-27	68.3
5470-5725		-27	68.3
5725-5850	Below 5650	-27	68.3
	5650-5700	-27~10	68.3~105.3
	5700-5720	10~15.6	105.3~110.9
	5720-5725	15.6~27	110.9~68.3
	5725-5850	27	122.3
	5850-5855	27~15.6	122.3~110.9
	5855-5875	15.6~10	110.9~105.3
	5875-5925	10~-27	105.3~68.3
	Above 5925	-27	68.3

TEST PROCEDURE

1. The EUT was placed on a turn table which is 1.5m above 1GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed..
5. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
1GHz-18GHz	Double Ridged Horn Antenna	3

6. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
1GHz-18GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

TEST RESULTS

Remark: We tested at 802.11a HT20/802.11n HT20 mode at the antenna single transmitting mode and at 802.11n HT20 mode at Mimo mode, recored the worst data at 802.11a HT20 mode at the antenna single transmitting mode.

Test site: Shenzhen CTL Testing Technology Co., Ltd.

For Radiated Bandedge Measurement

802.11 a HT20/ Channel 149 :5745 MHz									
Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
5725.00	33.41	35.69	29.13	8.65	48.62	122.3	73.68	Peak	Horizontal
5725.00	21.98	35.69	29.13	8.65	37.19	---	---	AV	Horizontal
5745.00	75.30	35.70	29.14	8.69	90.55	---	---	Peak	Horizontal
5745.00	74.39	35.70	29.14	8.69	89.64	---	---	AV	Horizontal
5725.00	34.42	35.69	29.13	8.65	49.63	122.3	72.67	Peak	Vertical
5725.00	23.06	35.69	29.13	8.65	38.27	---	---	AV	Vertical
5745.00	76.22	35.70	29.14	8.69	91.47	---	---	Peak	Vertical
5745.00	74.31	35.70	29.14	8.69	89.56	---	---	AV	Vertical

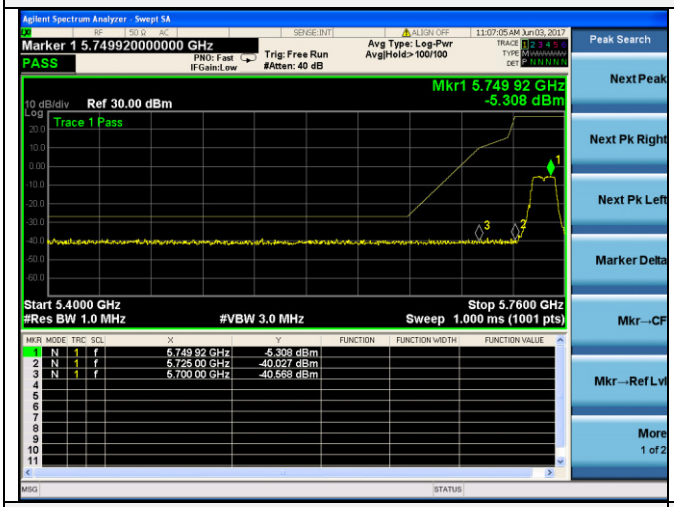
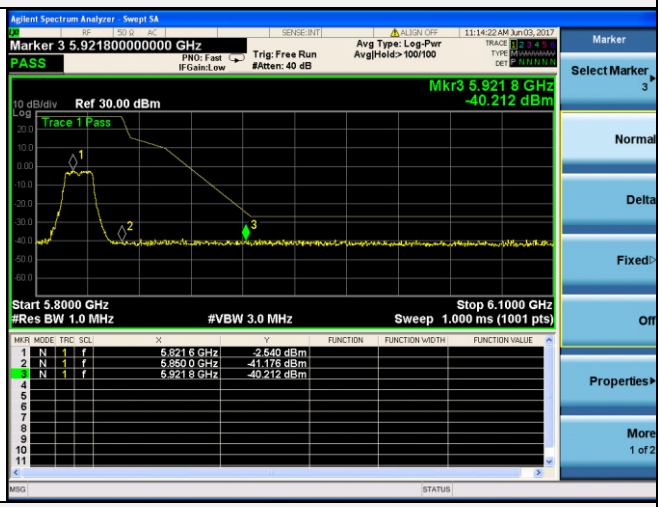
802.11 a HT20/ Channel 165 :5825 MHz									
Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
5825.00	76.01	35.82	29.16	8.77	91.44	---	---	Peak	Horizontal
5825.00	74.26	35.82	29.16	8.77	89.69	---	---	AV	Horizontal
5850.00	31.88	35.85	29.18	8.80	47.35	122.3	74.95	Peak	Horizontal
5850.00	20.97	35.85	29.18	8.80	36.44	---	---	AV	Horizontal
5825.00	75.15	35.82	29.16	8.77	90.58	---	---	Peak	Vertical
5825.00	73.26	35.82	29.16	8.77	88.69	---	---	AV	Vertical
5850.00	34.20	35.85	29.18	8.80	49.67	122.3	72.63	Peak	Vertical
5850.00	22.72	35.85	29.18	8.80	38.19	---	---	AV	Vertical

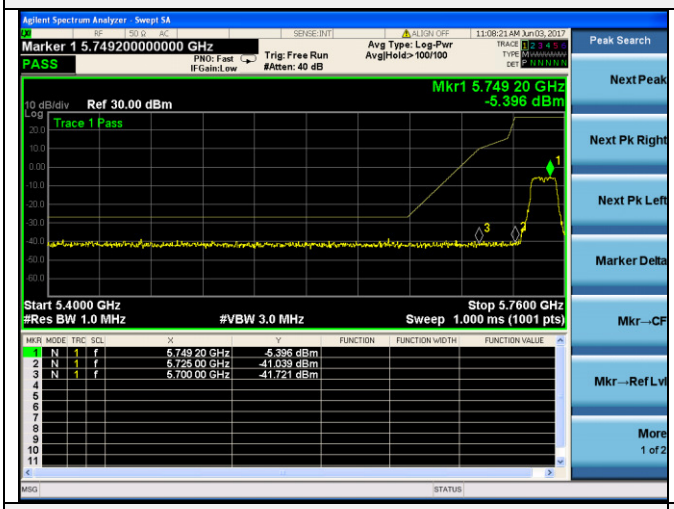
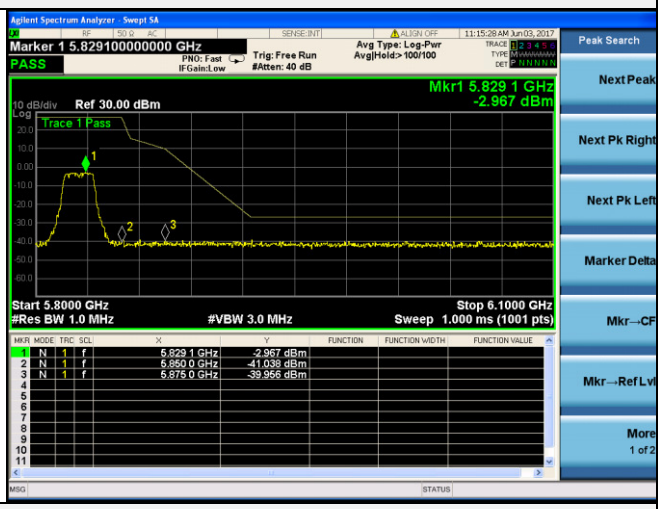
REMARKS:

1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. The other emission levels were very low against the limit.
3. The average measurement was not performed when the peak measured data under the limit of average detection.
4. Detector AV is setting spectrum/receiver. RBW=1MHz/VBW=10Hz/Sweep time=Auto/Detector=Peak;

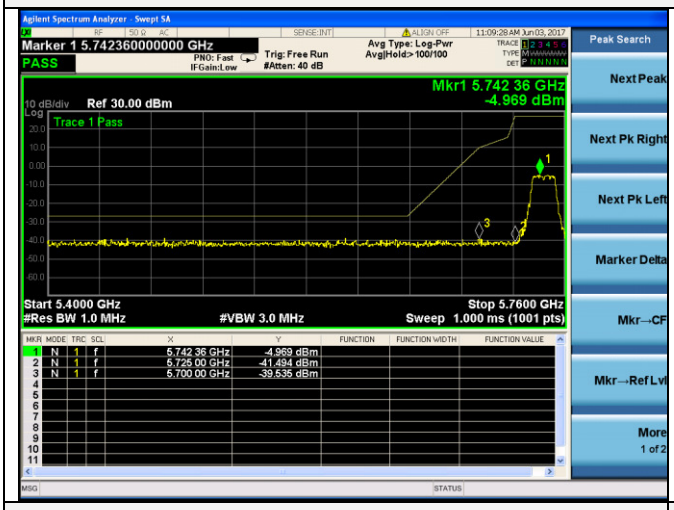
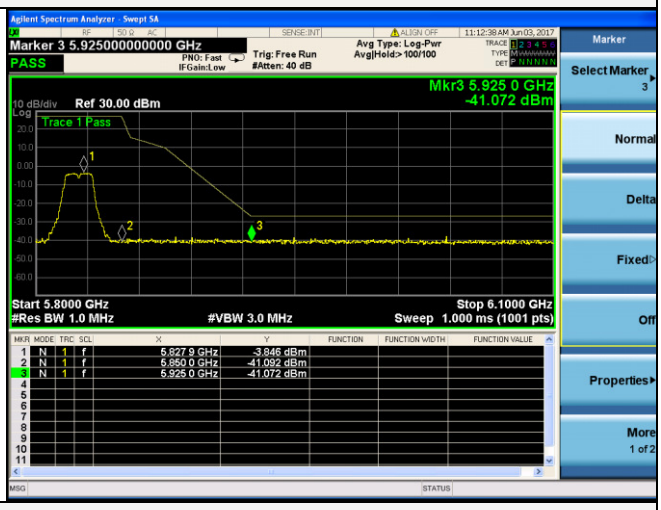
For Conducted Bandedge Measurement

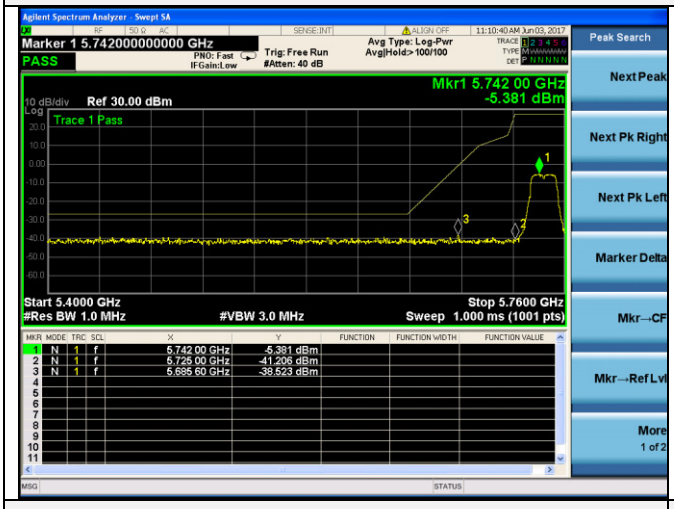
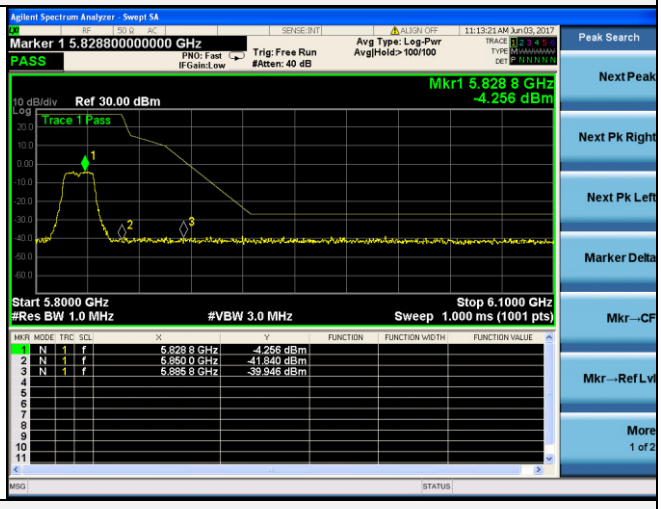
Antenna 1

802.11a HT20	
	
5745	5825

802.11n HT20	
	
5745	5825

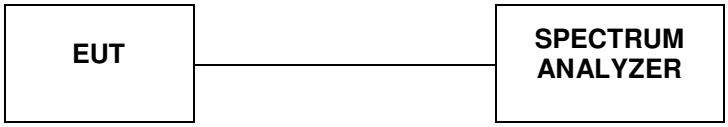
Antenna 2

802.11a HT20	
	
5745	5825

802.11n HT20	
	
5745	5825

4.9. Frequency Stability

TEST CONFIGURATION



TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port
b. Spectrum setting as follows:
RBW=10KHz
VBW=30KHz
Span= Entire absence of modulation emissionsbandwidth
Sweep Time= Auto
Attenuation= Auto
c. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value.

LIMIT

Frequency Range (MHz)	Limit
5150-5250	Specifiedin the user's manual
5250-5350	
5470-5725	
5725-5850	

TEST RESULTS

Antenna 1

802.11 a HT20/ Channel 149: 5745MHz

Voltage. Frequency Stability

Voltage (V)	Measurement Frequency (MHz)
5.75	5745.000024
5.00	5745.000026
4.25	5745.000030
Maximum Deviation (MHz)	0.000030
Maximum Deviation (ppm)	0.0052

Temperature. Frequency Stability

Temperature (℃)	Measurement Frequency (MHz)
-10	5745.000030
5	5745.000027
15	5745.000034
25	5745.000037
35	5745.000031
45	5745.000028
55	5745.000030
Maximum Deviation (MHz)	0.000037
Maximum Deviation (ppm)	0.0064

Antenna 2

802.11 a HT20/ Channel 149: 5745MHz

Voltage. Frequency Stability

Voltage (V)	Measurement Frequency (MHz)
5.7	5745.000033
5.0	5745.000029
4.2	5745.000035
Maximum Deviation (MHz)	0.000035
Maximum Deviation (ppm)	0.0061

Temperature. Frequency Stability

Temperature (℃)	Measurement Frequency (MHz)
-10	5745.000031
5	5745.000030
15	5745.000034
25	5745.000039
35	5745.000035
45	5745.000037
55	5745.000029
Maximum Deviation (MHz)	0.000039
Maximum Deviation (ppm)	0.0068

4.10. Antenna Requirement

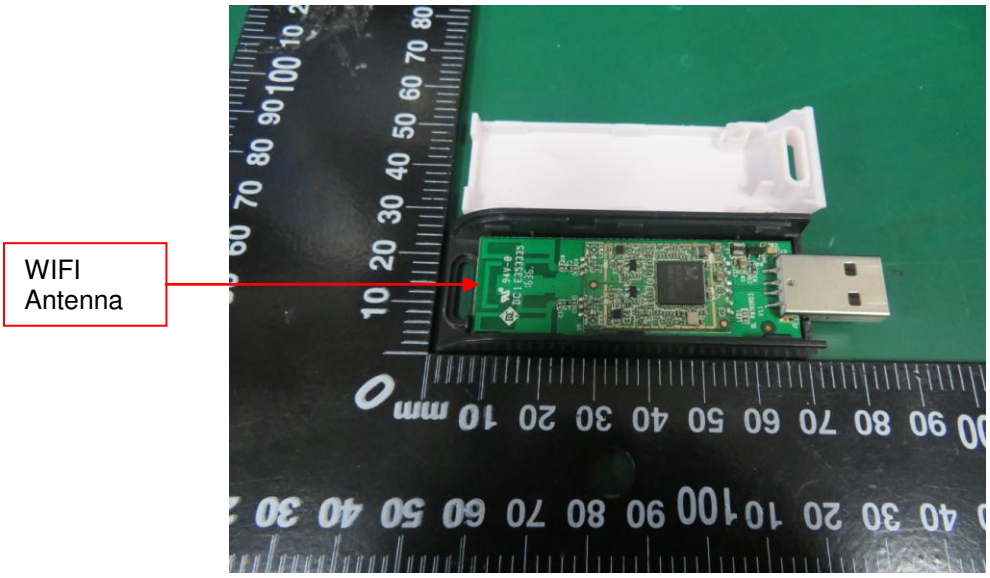
Standard Applicable

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.

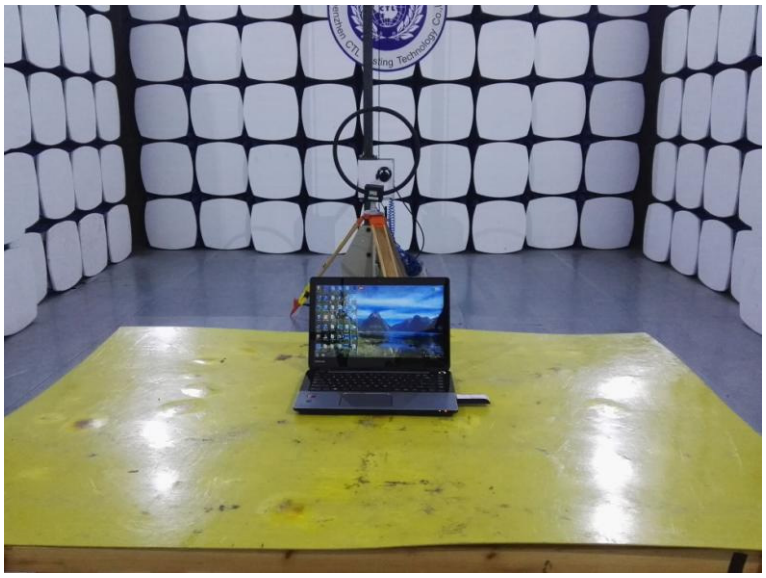
And according to FCC 47 CFR Section 15.407 (a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

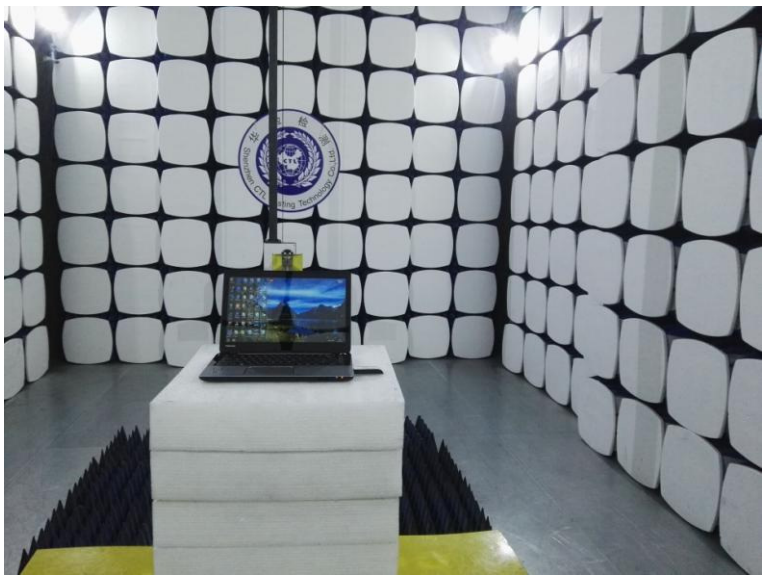
Antenna Information

The antenna is layout on PCB board, The directional gains of antenna used for transmitting is 1.13dBi.



5. Test Setup Photos of the EUT





6. External and Internal Photos of the EUT

Reference to the test report No. GTSR17050097-01.

.....End of Report.....