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.....:	**GTSR16020030-5.8WLAN**
FCC ID. ..... :	**2AHMXDOOGEEP1**
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 .....:	Mar. 21, 2016
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 DOOGEE TONG WEI Tech Co.,Ltd.**
Address .....:	The Forth and Fifth floor of the western Room 412,plant 405, Sangda estate, Zhehua Road, Huaqiang North street, Futian Dis. Shenzhen
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

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Test item description ..... :	Smart projector
Trade Mark.....:	DOOGEE
Manufacturer .....:	**Shenzhen DOOGEE TONG WEI Tech Co.,Ltd.**
Model/Type reference .....:	DOOGEE P1
Listed Models .....:	/
Operation Frequency.....:	From 5180MHz to 5240MHz/From 5745MHz to 5825MHz
Hardware Version .....:	L8-MAIN-PCB-V1.3
Software Version.....:	M806-V54
Rating.....:	Input:AC100-240V,50/60Hz,0.5A Output:DC5V,2A
Result.....:	**PASS**

T E S T R E P O R T

Test Report No. :	**GTSR16020030-5.8WLAN**	Mar. 21, 2016 Date of issue

Equipment under Test	:	Smart projector
Model /Type	:	DOOGEE P1
Listed Models	:	/
Applicant	:	**Shenzhen DOOGEE TONG WEI Tech Co.,Ltd.**
Address	:	The Forth and Fifth floor of the western Room 412,plant 405, Sangda estate, Zhehua Road, Huaqiang North street, Futian Dis. Shenzhen
Manufacturer	:	**Shenzhen DOOGEE TONG WEI Tech Co.,Ltd.**
Address	:	The Forth and Fifth floor of the western Room 412,plant 405, Sangda estate, Zhehua Road, Huaqiang North street, Futian Dis. Shenzhen

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.

Contents

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	:	Mar. 01, 2016
Testing commenced on	:	Mar. 01, 2016
Testing concluded on	:	Mar. 21, 2016

2.2. Product Description

Name of EUT	Smart projector
Model Number	DOOGEEP1
Listed Models	/
FCC ID	2AHMXDOOGEEP1
Power Supply	DC 5V or Battery DC 3.8V
Adapter information:	Model: ASSA41i-050200 Input: 100-240V～50/60Hz 0.5A Output:DC 5.0V 2.0A
Supported type:	802.11a/802.11b/802.11g/802.11n HT20
Operation bandwidth:	20MHz
Modulation:	802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK) 802.11b: DSSS(CCK,DQPSK,DBPSK) 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK)
Operation frequency:	802.11a: 5180MHz—5240MHz/5745MHz—5825MHz 802.11b:2412-2462MHz 802.11g:2412-2462MHz 802.11n HT20:2412-2462MHz/5180MHz—5240MHz/5745MHz—5825MHz
Antenna Type	Internal Antenna

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)		

DC 3.8V

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

This is a Smart projector.

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

2.5. EUT operation mode

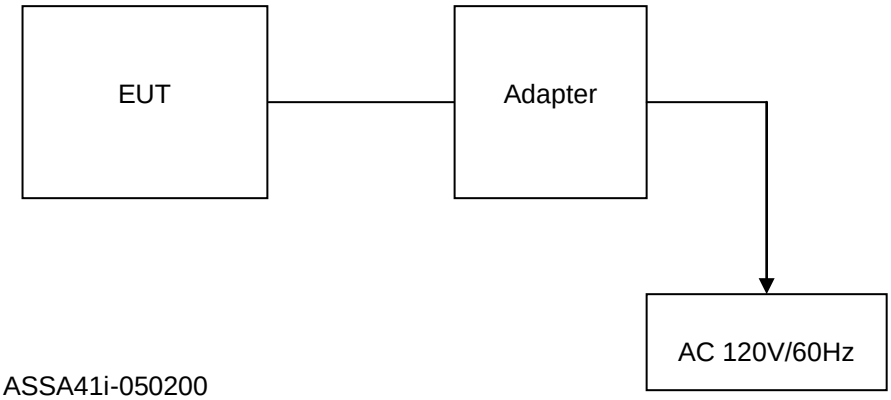
The application provider specific test software to control sample in continuous TX and RX.

IEEE 802.11a/n:

UNII-1		UNII-1		UNII-1	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	**5180**	38	5190	42	5210
40	**5200**	46	5230		
44	5220				
48	**5240**				

UNII-3		UNII-3		UNII-3	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	**5745**	151	5755	155	5775
153	5765	159	5795		
157	**5785**				
161	5805				
165	**5825**				

2.6. Block Diagram of Test Setup



Adapter:

Model: ASSA41i-050200
Input: 100-240V～50/60Hz 0.5A
Output: 5.0V DC 2A
Power Cable: 120cm
◇ Shielded ◆ Unshielded

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

This submittal(s) (test report) is intended for **FCC ID: 2AHMXDOOGEEP1** 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.

2.9. NOTE

Function	Test Standards	Reference Report
WLAN-2.4	FCC Part 15 Subpart C	GTSR16020030-2.4WLAN
WLAN-5.8	FCC Part 15 Subpart E	GTSR16020030-5.8WLAN
EMF	FCC Per 47 CFR 2.1093(d)	GTSR16020030-MPE

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	☒ Lowest ☒ Middle ☒ Highest	802.11a	☒ Lowest ☒ Middle ☒ Highest	☒	☐	☐	☐	complies
§15.407(a)	Power spectral density	802.11a 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	802.11a 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	☒	☐	☐	☐	complies
§15.407(a)	Spectrum bandwidth – 26 dB bandwidth	802.11a 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	802.11a 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	☒ ☒	☐	☐	☐	complies
§15.407(e)	Spectrum bandwidth – 6 dB bandwidth	802.11a 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	802.11a 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	☒ ☒	☐	☐	☐	complies
§15.407(a)	Maximum output power	802.11a 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	802.11a 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	☒ ☒ ☒	☐	☐	☐	complies
§15.407(b)	Band edge compliance conducted	802.11a 802.11n HT20	☒ Lowest ☒ Highest	802.11a 802.11n HT20	☒ Lowest ☒ Highest	☒ ☒	☐	☐	☐	complies
§15.407(b)	Band edge compliance radiated	802.11a 802.11n HT20	☒ Lowest ☒ Highest	8802.11a 802.11n HT20	☒ Lowest ☒ Highest	☒	☐	☐	☐	complies
§15.407(a)	TX spurious emissions conducted	802.11a 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	802.11a 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	☒ ☒	☐	☐	☐	complies
§15.407(a)	TX spurious emissions radiated	802.11a 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	802.11a	☒ Lowest ☒ Middle ☒ Highest	☒	☐	☐	☐	complies
§15.407(g)	Frequency Stability	802.11a 802.11n HT20	☒ Lowest ☒ Highest	802.11a	☒ Lowest	☒	☐	☐	☐	complies
§15.109	RX spurious emissions radiated	-/-	-/-	-/-	-/-	☒	☐	☐	☐	complies
§15.209(a)	TX spurious Emissions radiated < 30 MHz	802.11a	-/-	802.11a	-/-	☒	☐	☐	☐	complies
§15.107(a) §15.207	Conducted Emissions < 30 MHz	802.11a	-/-	802.11a	-/-	☒	☐	☐	☐	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	36/40/44
	11n/OFDM	6.5 Mbps	149/157/165
Band Edge	11a/ OFDM	1 Mbps	36/40/44
	11n/OFDM	6 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

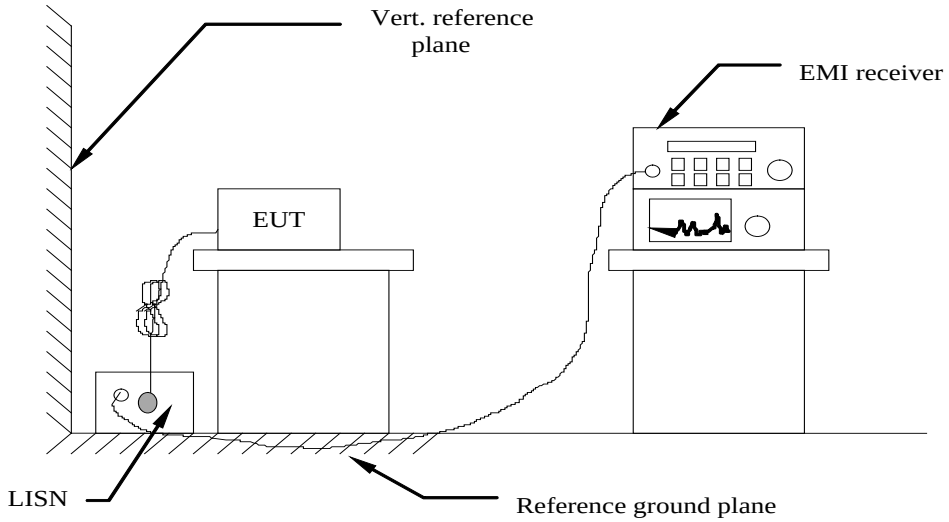
Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.08	2015/05/28	2016/05/27
LISN	R&S	ESH2-Z5	893606/008	2015/05/27	2016/05/26
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2015/06/02	2016/06/01
EMI Test Receiver	R&S	ESCI	101102	2015/06/26	2016/06/25
Spectrum Analyzer	Agilent	N9020A	MY48010425	2015/06/17	2016/06/16
Spectrum Analyzer	R&S	FSP40	1164.4391.32	2015/06/17	2016/06/16
Controller	EM Electronics	Controller EM 1000	N/A	2015/05/21	2016/05/20
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2015/05/19	2016/05/18
Double Ridged Horn Antenna	Rohde&Schwarz	HF907	100265	2015/05/19	2016/05/18
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2015/05/19	2016/05/18
Amplifier	Agilent	8349B	3008A02306	2015/05/19	2016/05/18
Amplifier	Agilent	8447D	2944A10176	2015/05/19	2016/05/18
Amplifer	A.H.	PAM-1840VH	562	2015/05/19	2016/05/18
Temperature/Humidity Meter	Gangxing	CTH-608	02	2015/05/20	2016/05/19
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	N/A	2015/05/20	2016/05/19
High-Pass Filter	K&L	41H10-1375/U12750-O/O	N/A	2015/05/20	2016/05/19
Data acquisition card	Agilent	U2531A	TW53323507	2015/05/20	2016/05/19
Power Sensor	Agilent	U2021XA	MY5365004	2015/05/20	2016/05/19
RF Cable	HUBER+SUHNER	RG214	N/A	2015/05/20	2016/05/19

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 DC5V power from PC, the adapter of 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

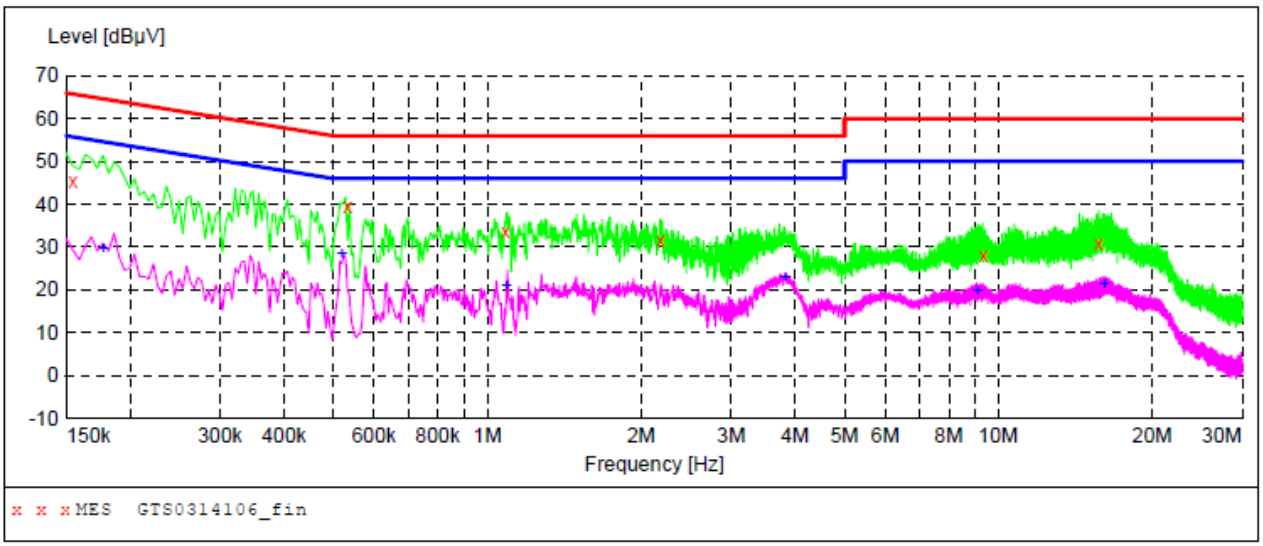
For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

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 tested three positions in AC 120V/60Hz and AC 240V/60Hz, the worst case was recorded .

Power supply:	DC 5V from Adapter	Polarization	L



MEASUREMENT RESULT: "GTS0314106_fin"

3/14/2016 11:42AM

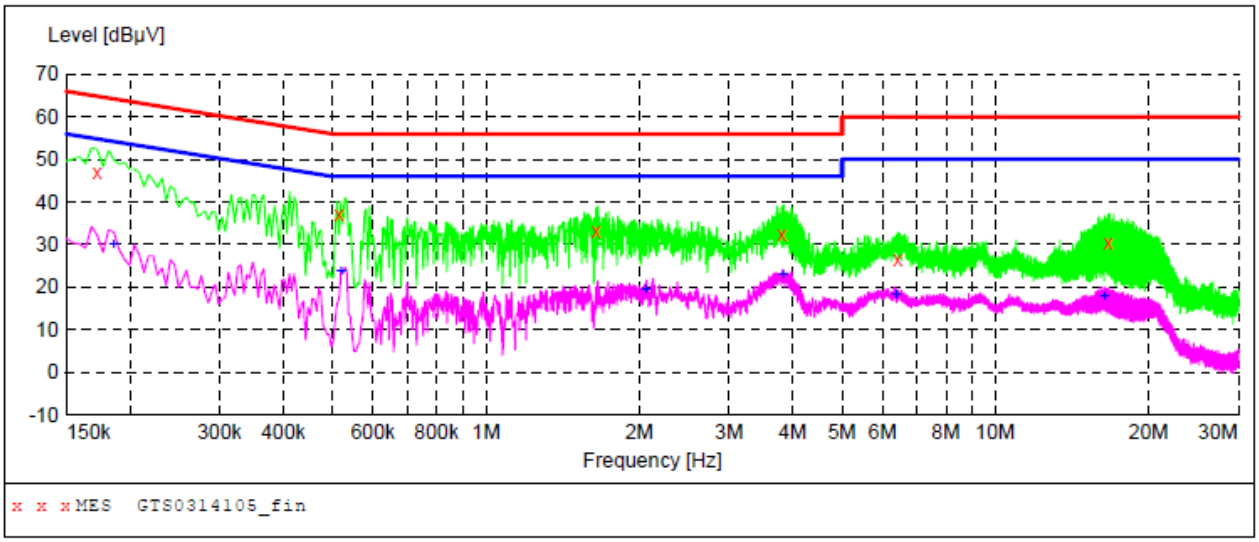
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.154500	45.20	10.1	66	20.6	QP	L1	GND
0.532500	39.40	9.8	56	16.6	QP	L1	GND
1.086000	33.70	9.6	56	22.3	QP	L1	GND
2.179500	31.60	9.5	56	24.4	QP	L1	GND
9.352500	28.00	8.9	60	32.0	QP	L1	GND
15.715500	30.70	8.0	60	29.3	QP	L1	GND

MEASUREMENT RESULT: "GTS0314106_fin2"

3/14/2016 11:42AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.177000	29.50	10.0	55	25.1	AV	L1	GND
0.519000	28.30	9.8	46	17.7	AV	L1	GND
1.090500	20.80	9.6	46	25.2	AV	L1	GND
3.822000	23.10	9.4	46	22.9	AV	L1	GND
9.078000	19.80	9.0	50	30.2	AV	L1	GND
16.089000	21.30	7.9	50	28.7	AV	L1	GND

Power supply:	DC 5V from Adapter	Polarization	N



MEASUREMENT RESULT: "GTS0314105_fin"

3/14/2016 11:39AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.172500	46.80	10.0	65	18.0	QP	N	GND
0.514500	37.00	9.8	56	19.0	QP	N	GND
1.644000	33.00	9.5	56	23.0	QP	N	GND
3.808500	32.50	9.4	56	23.5	QP	N	GND
6.436500	26.60	9.2	60	33.4	QP	N	GND
16.656000	30.30	7.8	60	29.7	QP	N	GND

MEASUREMENT RESULT: "GTS0314105_fin2"

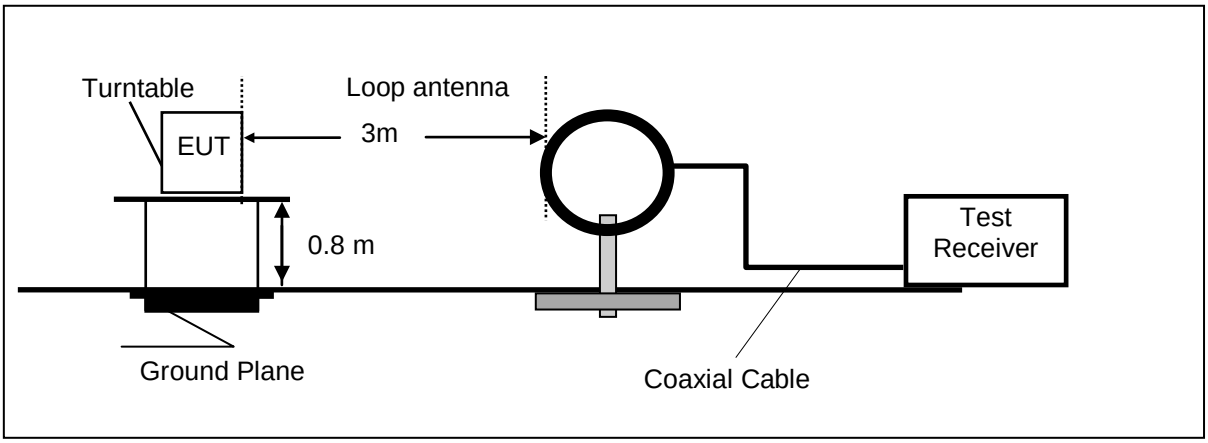
3/14/2016 11:39AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.186000	30.00	10.0	54	24.2	AV	N	GND
0.519000	23.90	9.8	46	22.1	AV	N	GND
2.058000	19.50	9.5	46	26.5	AV	N	GND
3.831000	22.90	9.4	46	23.1	AV	N	GND
6.382500	18.10	9.2	50	31.9	AV	N	GND
16.341000	17.70	7.8	50	32.3	AV	N	GND

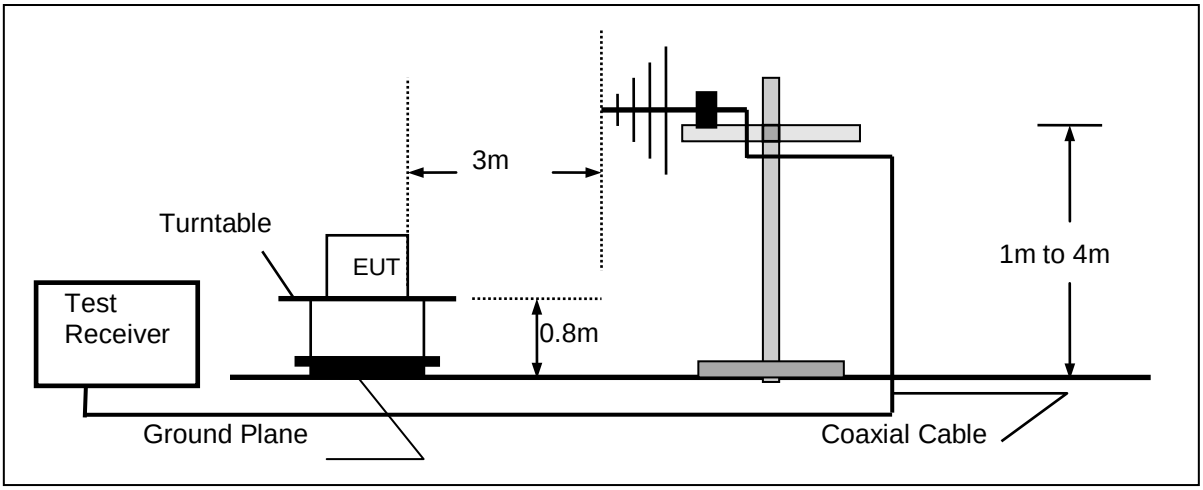
4.2. Radiated Emission

TEST CONFIGURATION

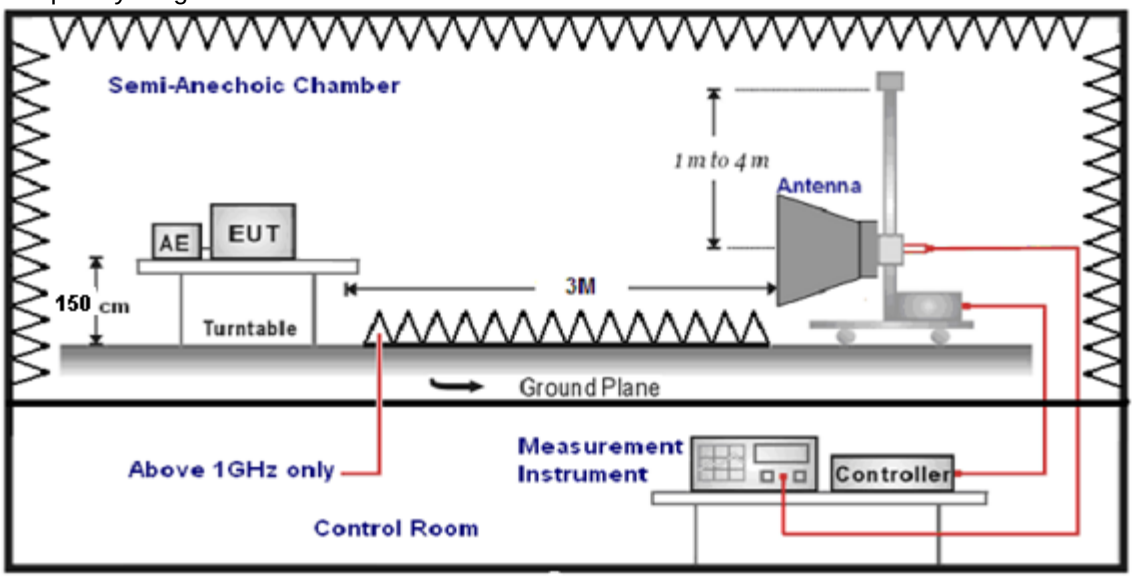
Frequency range 9 KHz – 30MHz



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

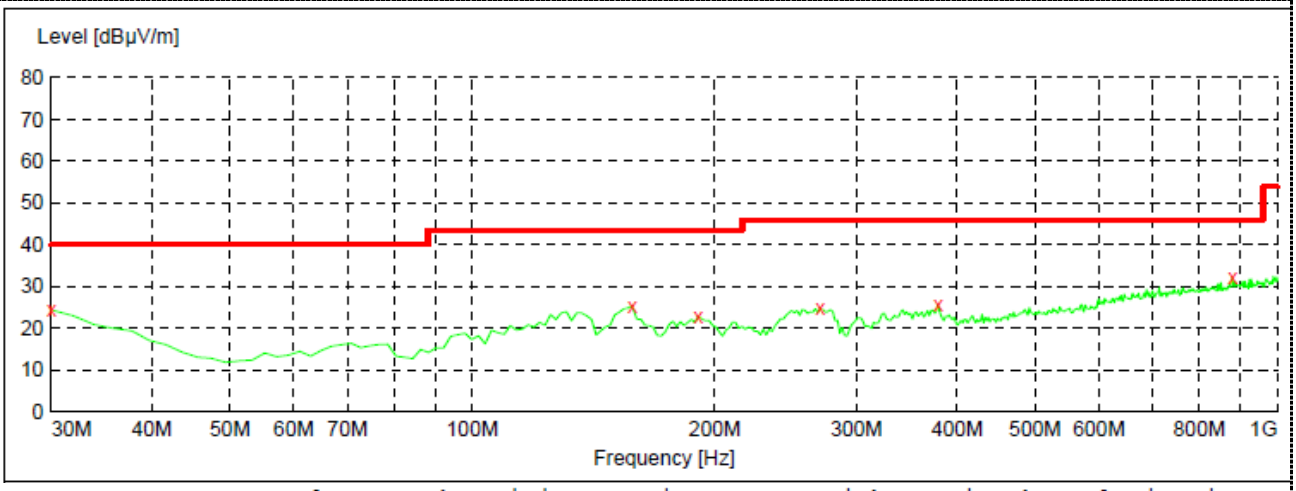
Remark: We tested three positions in AC 120V/60Hz and AC 240V/60Hz, the worst case was recorded.
Test site: Shenzhen CTL Testing Technology Co., Ltd

For 9 KHz-30MHz

Frequency (MHz)	Corrected Reading (dBuV/m)@3m	FCC Limit (dBuV/m) @3m	Margin (dB)	Detector	Result
0.36	46.28	96.48	50.20	QP	PASS
1.65	35.30	63.25	27.95	QP	PASS
20.51	43.25	69.54	26.29	QP	PASS
25.77	38.64	69.54	30.90	QP	PASS

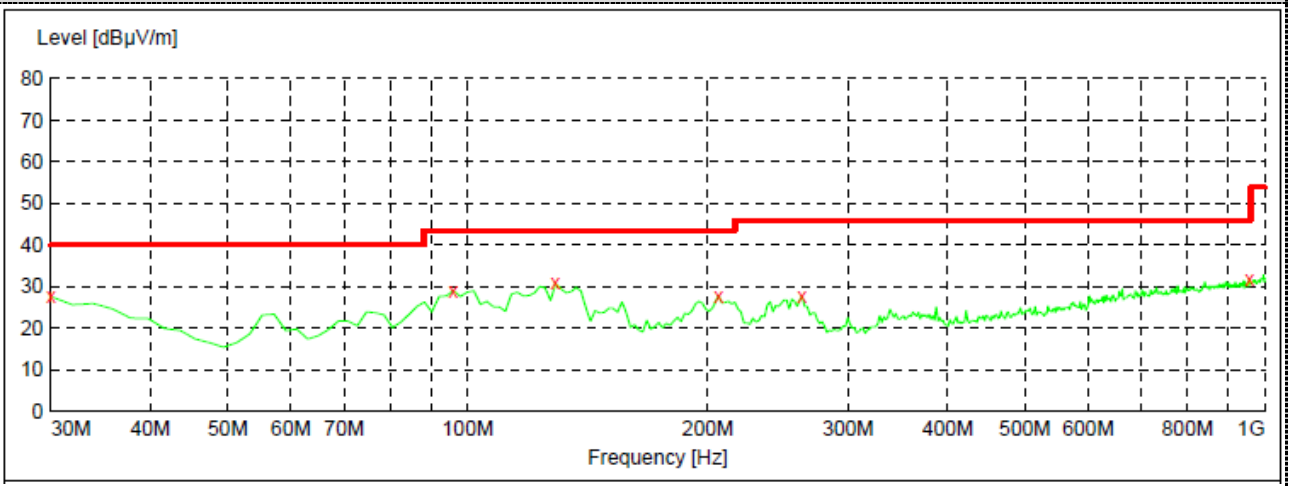
For 30MHz-1GHz

Horizontal



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	24.40	20.8	40.0	15.6	---	100.0	247.00	HORIZONTAL
158.040000	25.40	13.7	43.5	18.1	---	100.0	89.00	HORIZONTAL
191.020000	22.80	13.2	43.5	20.7	---	100.0	207.00	HORIZONTAL
270.560000	24.70	15.0	46.0	21.3	---	100.0	154.00	HORIZONTAL
379.200000	25.60	17.6	46.0	20.4	---	100.0	166.00	HORIZONTAL
879.720000	32.10	25.5	46.0	13.9	---	100.0	126.00	HORIZONTAL

Vertical



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	27.60	20.8	40.0	12.4	---	100.0	156.00	VERTICAL
95.960000	29.00	10.2	43.5	14.5	---	100.0	120.00	VERTICAL
128.940000	30.80	14.5	43.5	12.7	---	100.0	96.00	VERTICAL
206.540000	27.80	14.1	43.5	15.7	---	100.0	169.00	VERTICAL
262.800000	27.60	14.8	46.0	18.4	---	100.0	204.00	VERTICAL
957.320000	31.80	26.6	46.0	14.2	---	100.0	240.00	VERTICAL

For 1GHz to 40GHz

802.11a Mode_Channel 36 _5180 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	10360	36.97	38.55	33.64	11.24	53.12	74.00	20.88	Peak	Horizontal
1	15540	28.41	36.49	36.53	13.72	42.09	54.00	11.91	AV	Horizontal
2	10360	38.92	38.55	33.64	11.24	55.07	74.00	18.93	Peak	Horizontal
2	15540	29.87	36.49	36.53	13.72	43.55	54.00	10.45	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	10360	35.49	38.55	33.64	11.24	51.64	74.00	22.36	Peak	Vertical
1	15540	26.29	36.49	36.53	13.72	39.97	54.00	14.03	AV	Vertical
2	10360	37.23	38.55	33.64	11.24	53.38	74.00	20.62	Peak	Vertical
2	15540	27.38	36.49	36.53	13.72	41.06	54.00	12.94	AV	Vertical

802.11a Mode_Channel 40 _ 5200 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	10400	40.49	38.55	33.64	11.36	56.76	74.00	17.24	Peak	Horizontal
1	15600	32.02	36.49	36.53	13.91	45.89	54.00	8.11	AV	Horizontal
2	10400	42.97	38.55	33.64	11.36	59.24	74.00	14.76	Peak	Horizontal
2	15600	32.85	36.49	36.53	13.91	46.72	54.00	7.28	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	10400	38.17	38.55	33.64	11.36	54.44	74.00	19.56	Peak	Vertical
1	15600	29.51	36.49	36.53	13.91	43.38	54.00	10.62	AV	Vertical
2	10400	40.34	38.55	33.64	11.36	56.61	74.00	17.39	Peak	Vertical
2	15600	30.92	36.49	36.53	13.91	44.79	54.00	9.21	AV	Vertical

802.11a Mode_ Channel 48_ 5240 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	10480	38.07	38.55	33.64	11.41	54.39	74.00	19.61	Peak	Horizontal
1	15720	28.41	36.49	36.53	13.98	42.35	54.00	11.65	AV	Horizontal
2	10480	40.29	38.55	33.64	11.41	56.61	74.00	17.39	Peak	Horizontal
2	15720	30.23	36.49	36.53	13.98	44.17	54.00	9.83	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	10480	36.11	38.55	33.64	11.41	52.43	74.00	21.57	Peak	Vertical
1	15720	27.72	36.49	36.53	13.98	41.66	54.00	12.34	AV	Vertical
2	10480	37.65	38.55	33.64	11.41	53.97	74.00	20.03	Peak	Vertical
2	15720	27.45	36.49	36.53	13.98	41.39	54.00	12.61	AV	Vertical

802.11a 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	39.51	38.46	33.92	11.59	55.64	74.00	18.36	Peak	Horizontal
1	17235	23.87	43.11	37.11	13.94	43.81	54.00	10.19	AV	Horizontal
2	11490	41.55	38.46	33.92	11.59	57.68	74.00	16.32	Peak	Horizontal
2	17235	24.32	43.11	37.11	13.94	44.26	54.00	9.74	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	36.81	38.46	33.92	11.59	52.94	74.00	21.06	Peak	Vertical
1	17235	21.23	43.11	37.11	13.94	41.17	54.00	12.83	AV	Vertical
2	11490	38.81	38.46	33.92	11.59	54.94	74.00	19.06	Peak	Vertical
2	17235	22.29	43.11	37.11	13.94	42.23	54.00	11.77	AV	Vertical

802.11a 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	41.17	38.46	33.92	11.66	57.37	74.00	16.63	Peak	Horizontal
1	17355	26.04	43.11	37.11	14.02	46.06	54.00	7.94	AV	Horizontal
2	11570	46.03	38.46	33.92	11.66	62.23	74.00	11.77	Peak	Horizontal
2	17355	29.64	43.11	37.11	14.02	49.66	54.00	4.34	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	38.78	38.46	33.92	11.66	54.98	74.00	19.02	Peak	Vertical
1	17355	23.23	43.11	37.11	14.02	43.25	54.00	10.75	AV	Vertical
2	11570	42.92	38.46	33.92	11.66	59.12	74.00	14.88	Peak	Vertical
2	17355	24.74	43.11	37.11	14.02	44.76	54.00	9.24	AV	Vertical

802.11a 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	41.08	38.46	33.92	11.71	57.33	74.00	8.25	Peak	Horizontal
1	17475	25.57	43.11	37.11	14.18	45.75	54.00	13.86	AV	Horizontal
2	11650	43.89	38.46	33.92	11.71	60.14	74.00	5.22	Peak	Horizontal
2	17475	28.60	43.11	37.11	14.18	48.78	54.00	8.25	AV	Horizontal

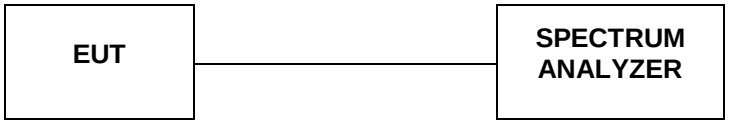
Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
1	11650	37.09	38.55	33.64	11.71	53.34	74.00	20.66	Peak	Vertical
1	17475	21.84	36.49	36.53	14.18	42.02	54.00	11.98	AV	Vertical
2	11650	39.16	38.55	33.64	11.71	55.41	74.00	18.59	Peak	Vertical
2	17475	24.08	36.49	36.53	14.18	44.26	54.00	9.74	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

For UNII-1 Band

802.11a Test Mode

Channel	Frequency (MHz)	Duty Cycle	Duty factor (dB)
36	5180	0.983	0.075
40	5200	0.983	0.075
48	5240	0.983	0.075

802.11n HT20 Test Mode

Channel	Frequency (MHz)	Duty Cycle	Duty factor (dB)
36	5180	0.982	0.079
40	5200	0.978	0.097
48	5240	0.986	0.061

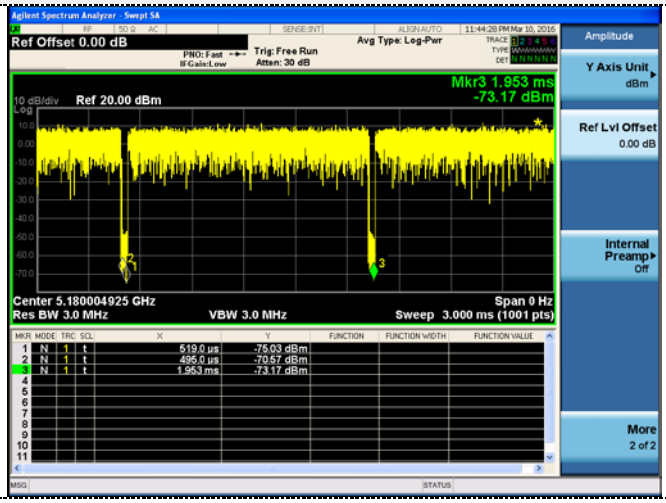
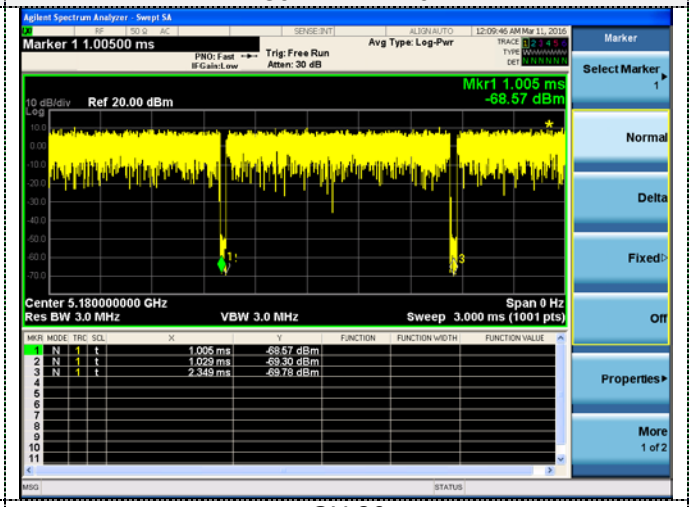
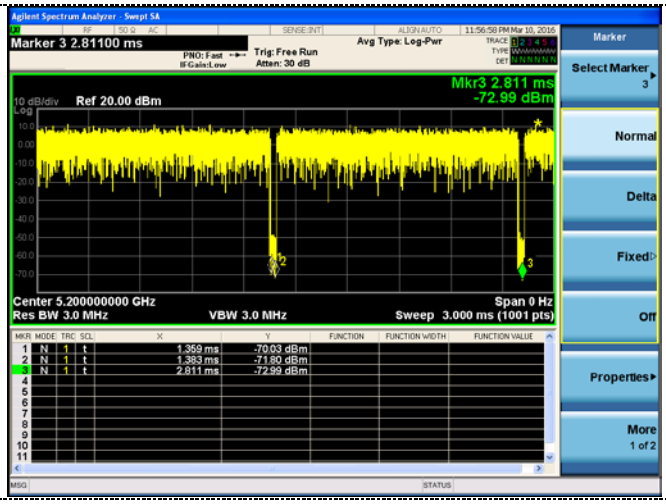
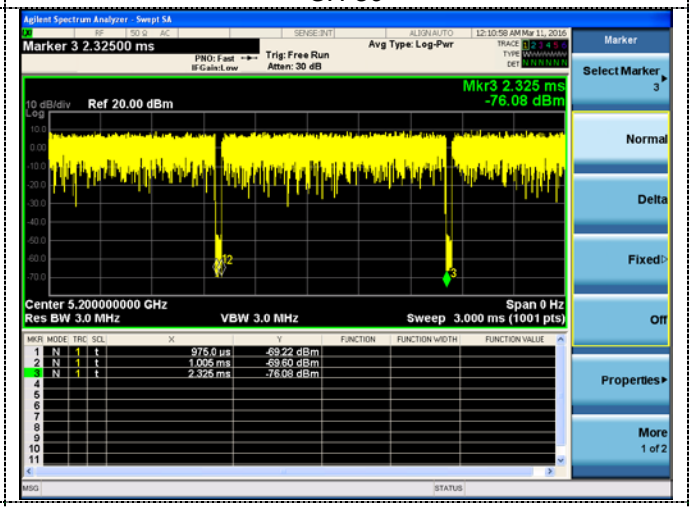
For UNII-3 Band

802.11a Test Mode

Channel	Frequency (MHz)	Duty Cycle	Duty factor (dB)
149	5745	0.986	0.061
157	5785	0.984	0.070
165	5825	0.989	0.048

802.11n HT20 Test Mode

Channel	Frequency (MHz)	Duty Cycle	Duty factor (dB)
149	5745	0.983	0.075
157	5785	0.988	0.052
165	5825	0.989	0.048

802.11a	802.11n HT20
	
CH 36	CH 36
	
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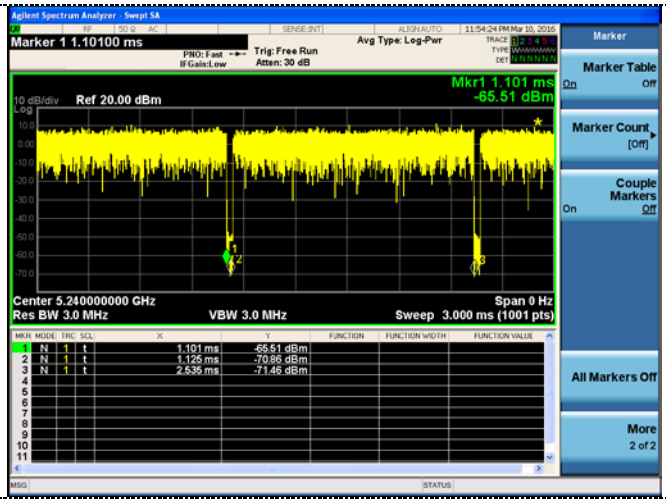
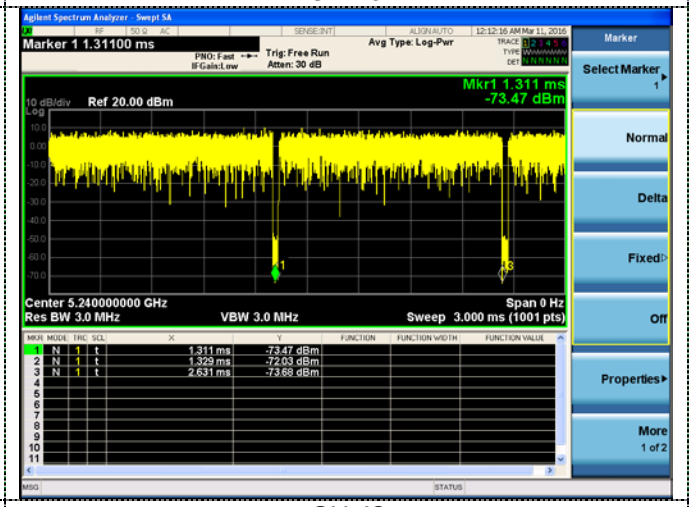
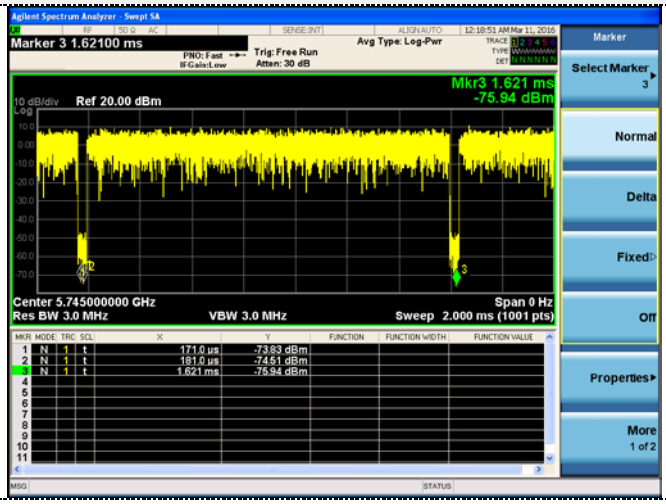
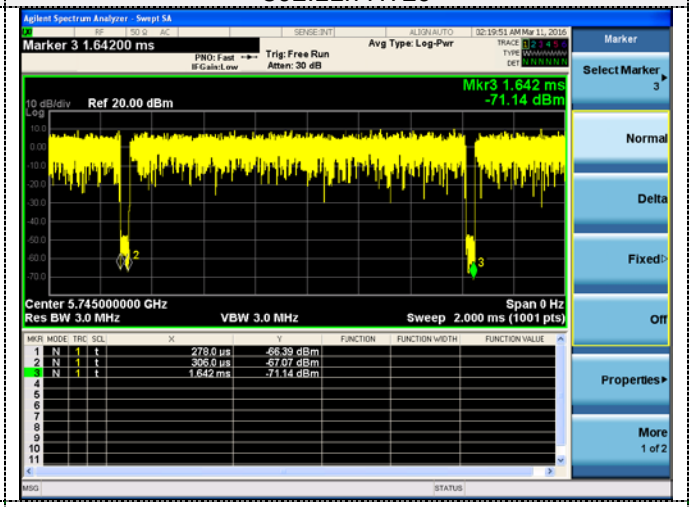
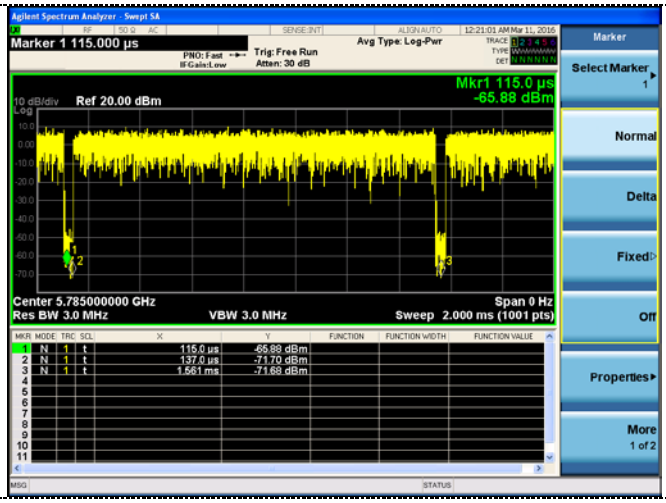
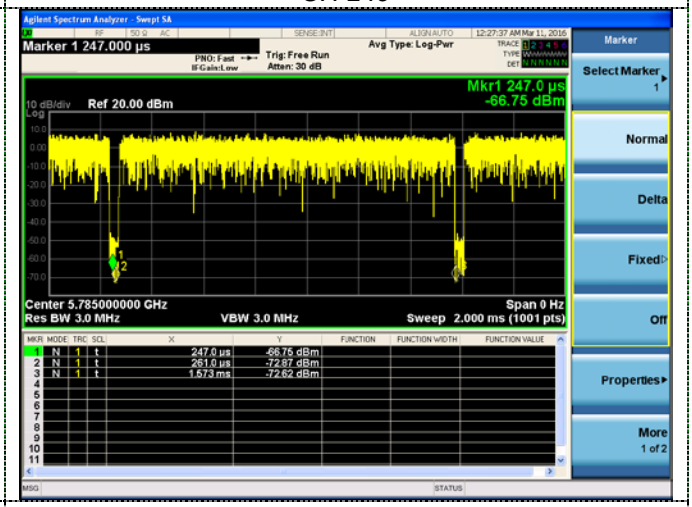
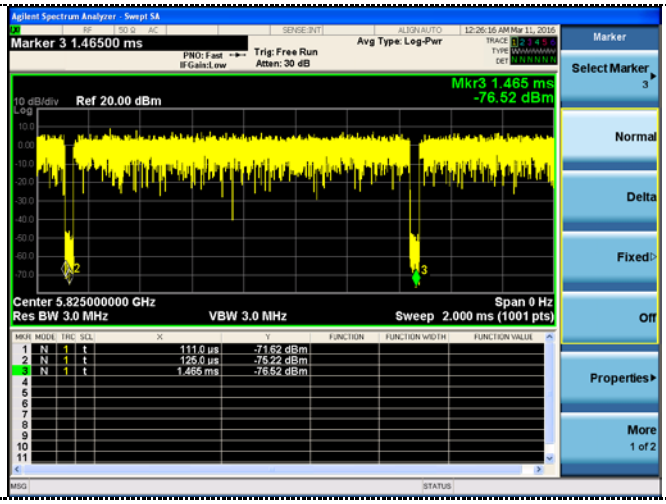
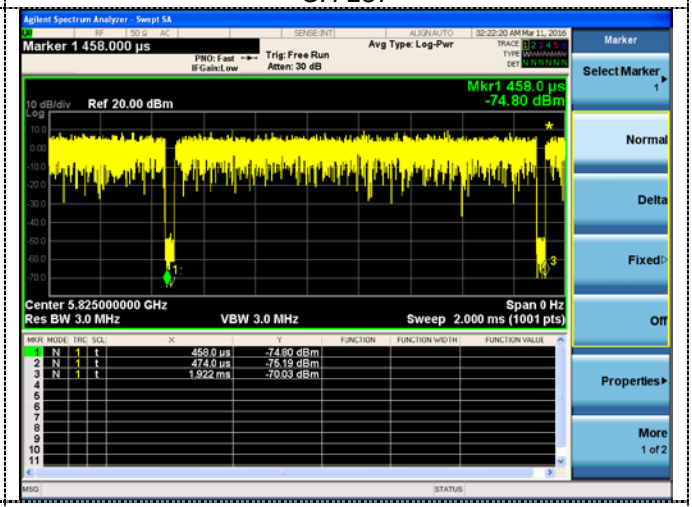
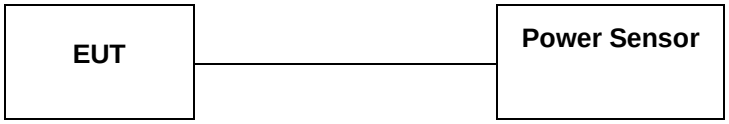
	
CH 48	CH 48

802.11a	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

For UNII-1 Band

802.11a 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
36	5180	14.26	10.74	0.075	10.815	24.00	PASS
40	5200	13.82	10.57	0.075	10.645	24.00	PASS
48	5240	13.54	10.20	0.075	10.275	24.00	PASS

802.11nHT20 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
36	5180	13.95	10.09	0.079	10.169	24.00	PASS
40	5200	13.84	10.02	0.097	10.117	24.00	PASS
48	5240	13.02	9.78	0.061	9.841	24.00	PASS

For UNII-3 Band

802.11a Test Mode

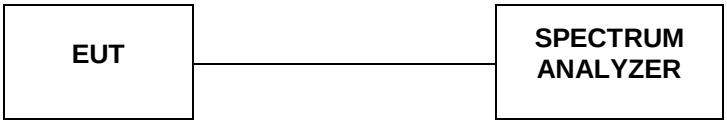
Channel	Frequency (MHz)	Output Power PK (dBm)	Output Power AV (dBm)	Duty factor (dB)	Output Power AV+ Duty factor (dBm)	Limits (dBm)	Verdict
149	5745	14.73	11.46	0.061	11.521	30.00	PASS
157	5785	14.52	11.28	0.070	11.350	30.00	PASS
165	5825	14.83	11.47	0.048	11.518	30.00	PASS

802.11nHT20 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	14.17	10.46	0.075	10.535	30.00	PASS
157	5785	13.89	10.27	0.052	10.322	30.00	PASS
165	5825	13.02	9.84	0.048	9.888	30.00	PASS

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

For UNII-1 Band

802.11a Test Mode

Channel	Frequency (MHz)	Report PSD (dBm/1MHz)	Duty factor (dB)	RBW factor (dB)	Report PSD+ Duty factor+ RBW factor (dBm/1MHz)	Limits (dBm/1MHz)	Verdict
36	5180	7.110	0.075	0.00	7.185	11	PASS
40	5200	6.885	0.075	0.00	6.960	11	PASS
48	5240	5.252	0.075	0.00	5.327	11	PASS

802.11n HT20 Test Mode

Channel	Frequency (MHz)	Report PSD (dBm/1MHz)	Duty factor (dB)	RBW factor (dB)	Report PSD+ Duty factor+ RBW factor (dBm/1MHz)	Limits (dBm/1MHz)	Verdict
36	5180	5.396	0.079	0.00	5.475	11	PASS
40	5200	5.714	0.097	0.00	5.811	11	PASS
48	5240	5.017	0.061	0.00	5.078	11	PASS

For UNII-3 Band

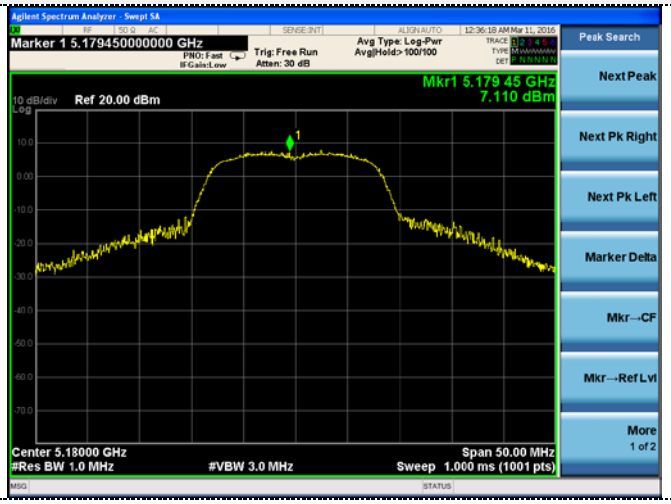
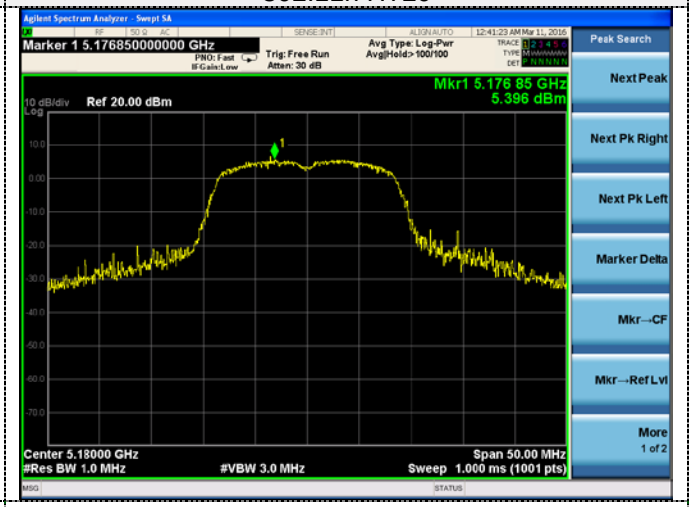
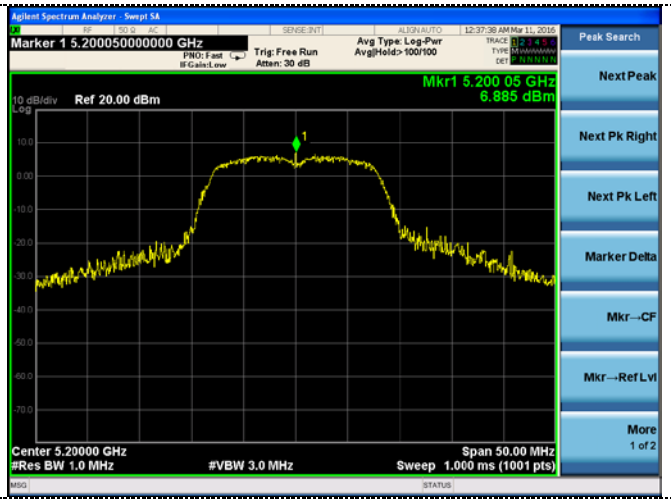
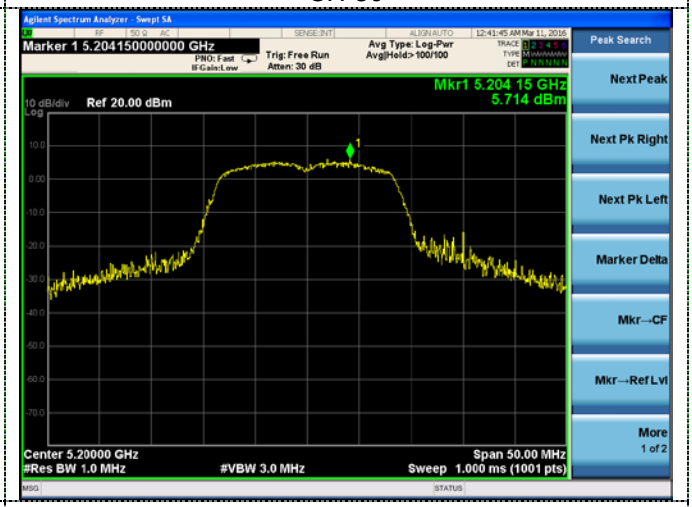
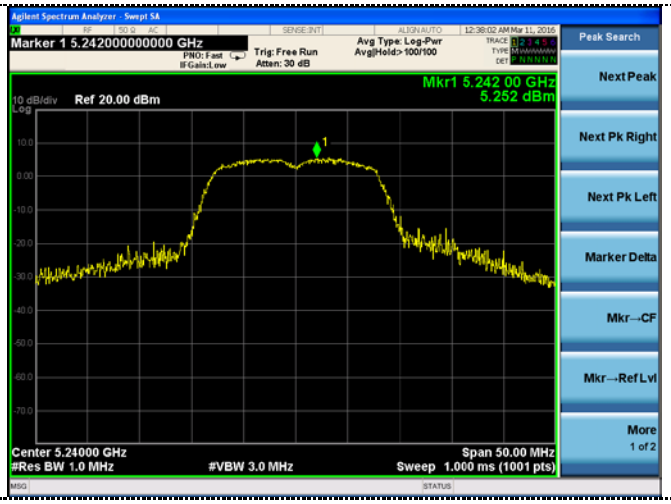
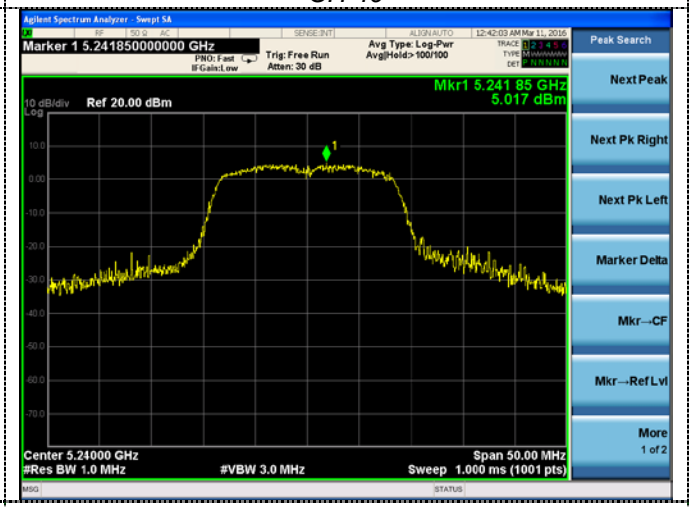
802.11a Test Mode

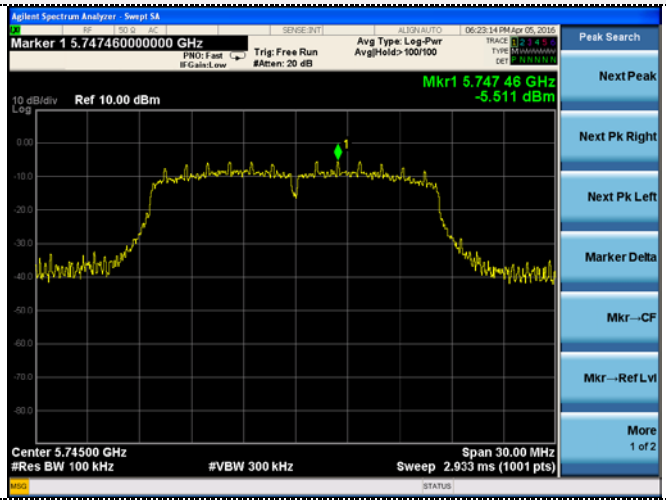
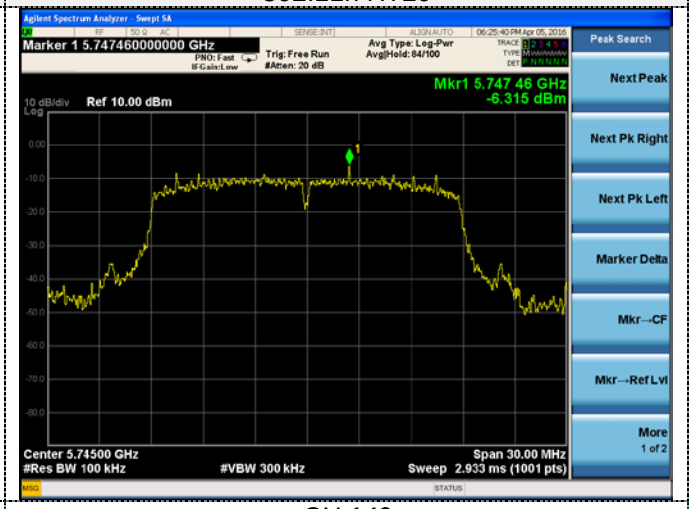
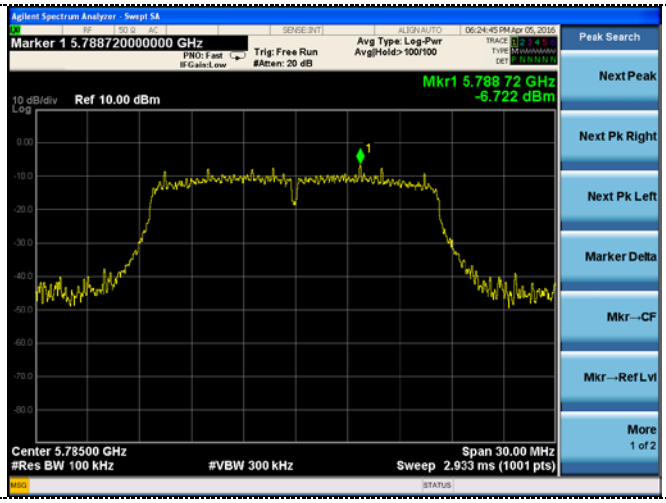
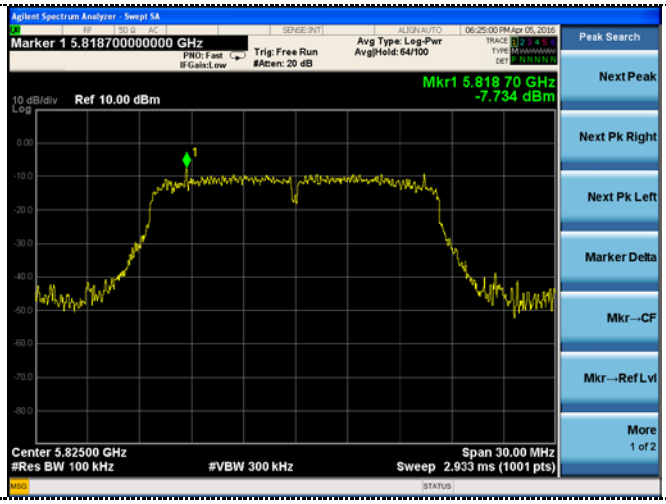
Channel	Frequency (MHz)	Report PSD (dBm/100KHz)	Duty factor (dB)	RBW factor (dB)	Report PSD+ Duty factor+ RBW factor (dBm/500kHz)	Limits (dBm/500kHz)	Verdict
149	5745	-5.511	0.061	6.99	1.540	30	PASS
157	5785	-6.722	0.070	6.99	0.338	30	PASS
165	5825	-7.734	0.048	6.99	-0.696	30	PASS

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	-6.315	0.075	6.99	0.750	30	PASS
157	5785	-8.130	0.052	6.99	-1.088	30	PASS
165	5825	-7.550	0.048	6.99	-0.512	30	PASS

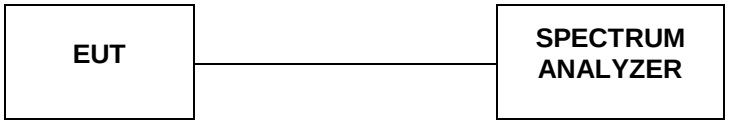
Note:
1. For 802.11a mode at finial test to get the worst-case emission at 6Mbps.
2. For 802.11n HT20 mode at finial test to get the worst-case emission at 6.5Mbps.
3. The test results including the cable lose.

802.11a	802.11n HT20
	
CH 36	*CH 36*
	
CH 40	*CH 40*
	
CH 48	*CH 48*

802.11a	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.

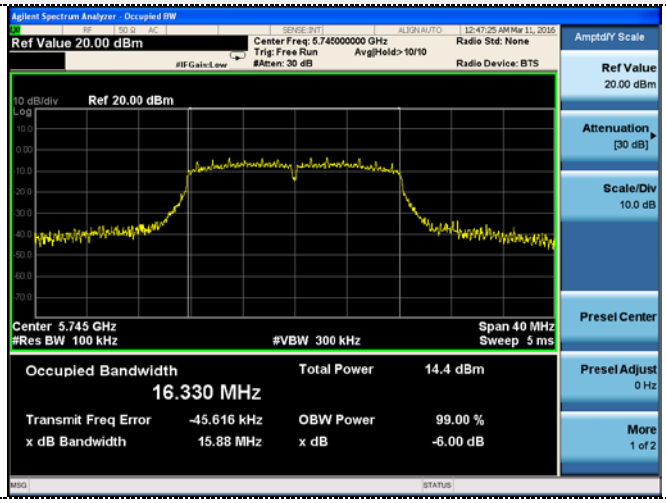
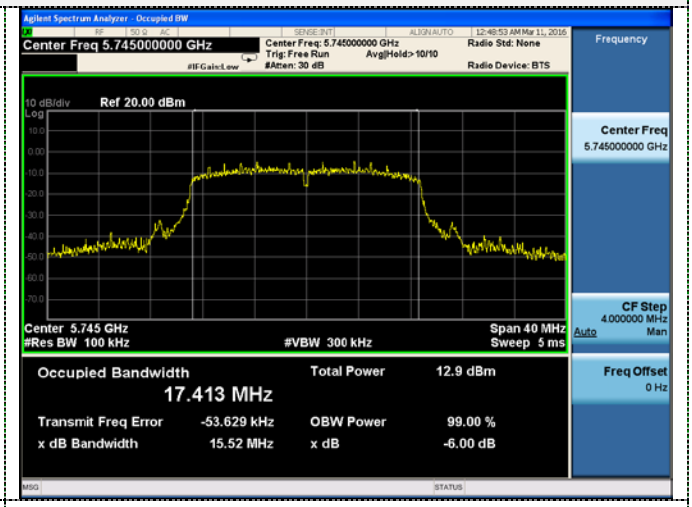
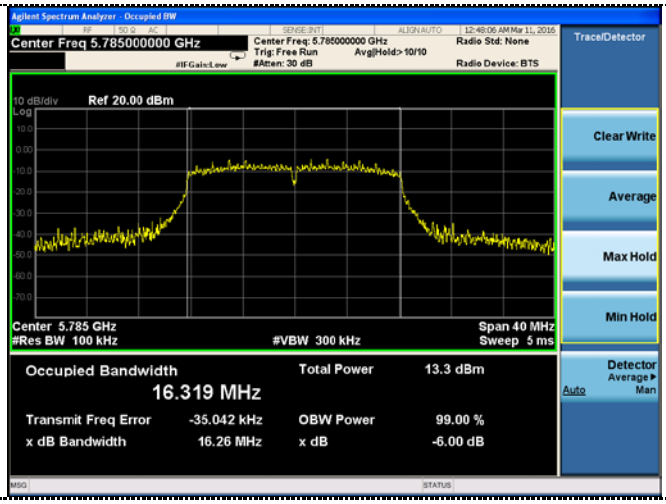
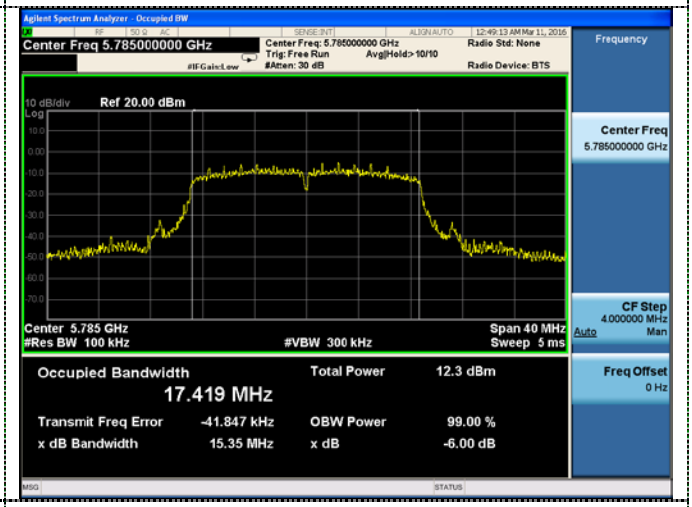
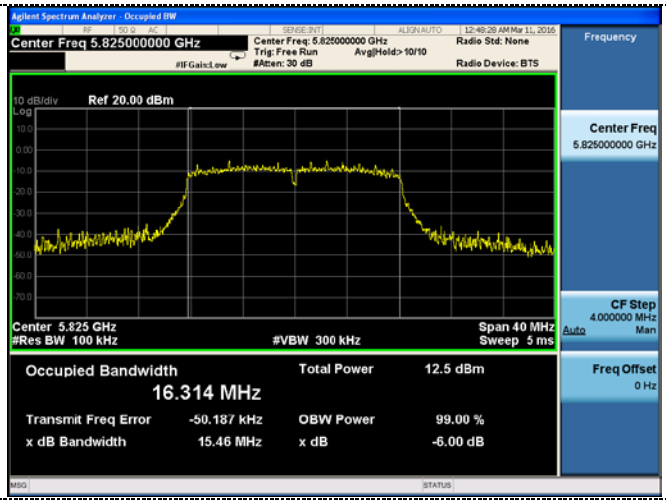
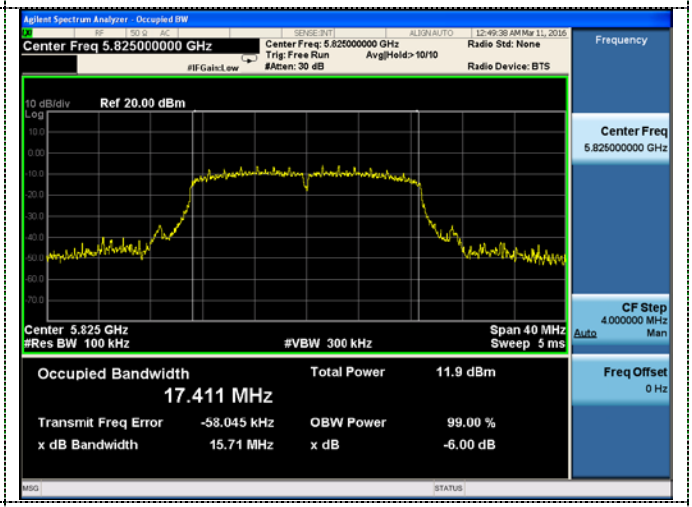
Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

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

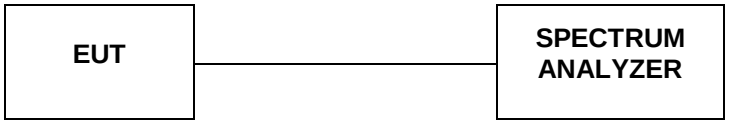
TEST RESULTS

Type	Channel	6dB Bandwidth (MHz)	Limit (KHz)	Result
802.11a	149	15.88	≥500	Pass
	157	16.26		
	165	15.46		
802.11nHT20	149	15.52	≥500	Pass
	157	15.35		
	165	15.71		

802.11a	*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%.

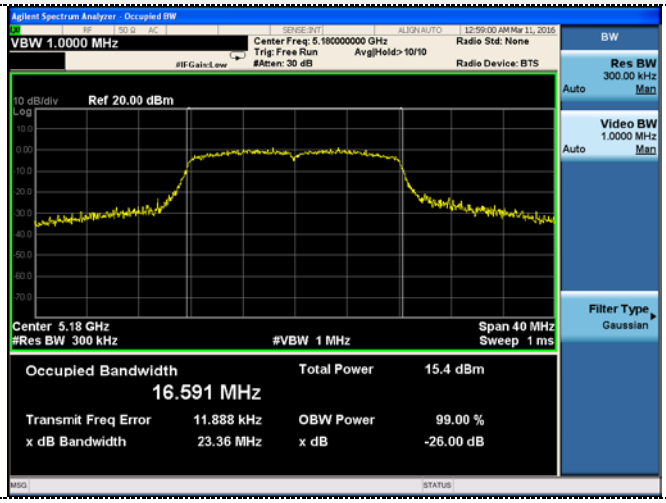
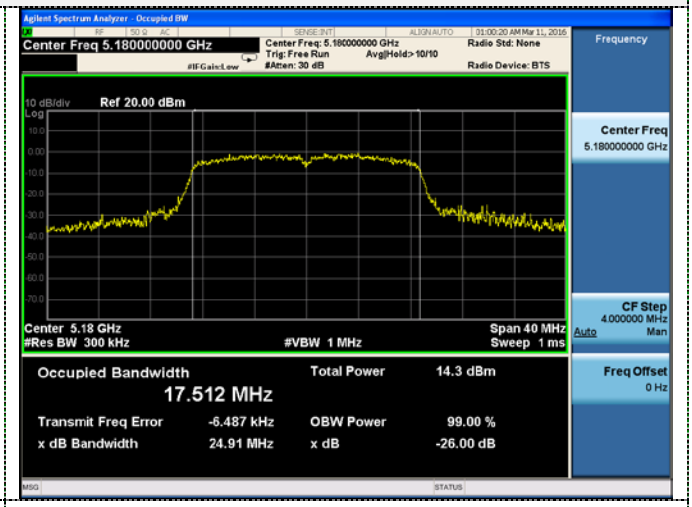
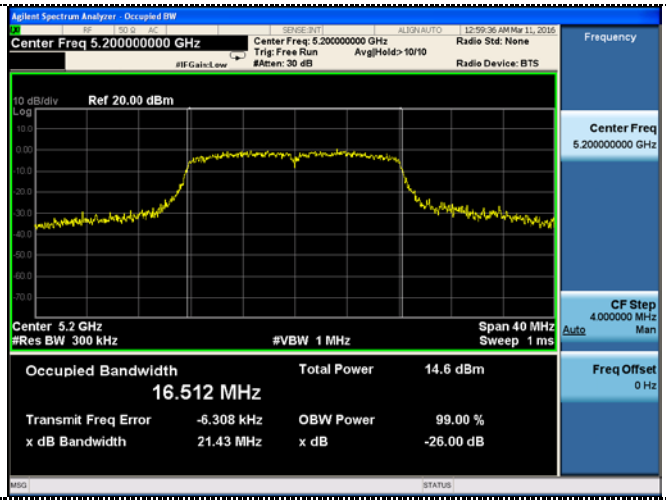
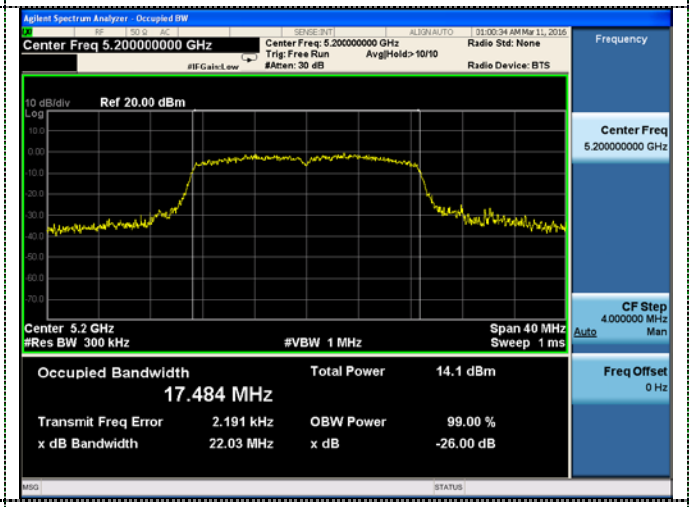
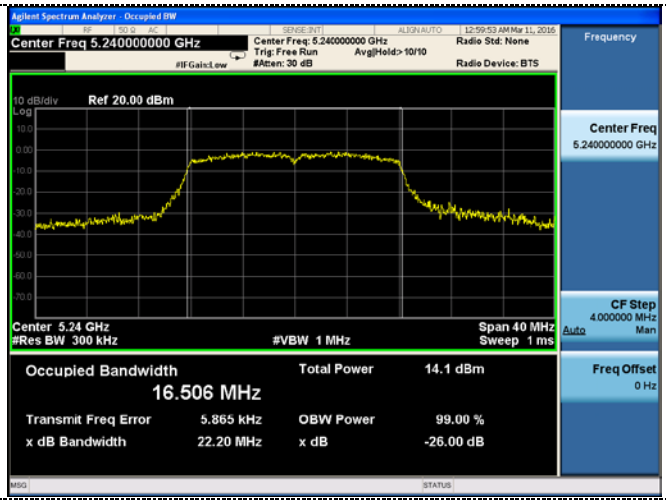
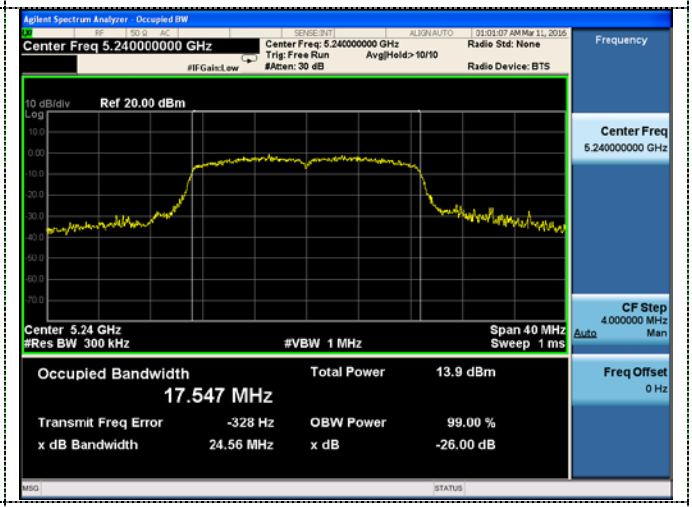
Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

LIMIT

No Limits for 26dBc Bandwith

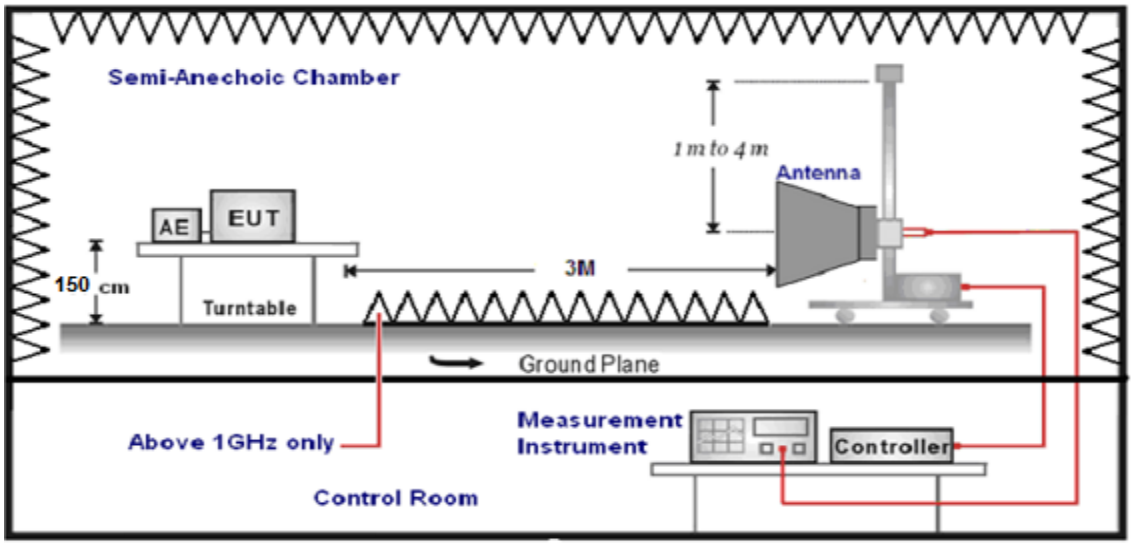
TEST RESULTS

Type	Channel	26dB Bandwidth (MHz)	Limit (KHz)	Result
802.11a	36	23.36	---	Pass
	40	21.43		
	48	22.20		
802.11nHT20	36	24.91	---	Pass
	40	22.03		
	48	24.56		

802.11a	*802.11n HT20*
	
CH36	*CH36*
	
CH40	*CH40*
	
CH48	*CH48*

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): 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

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 measured at both 802.11 a and 802.11 n HT20 mode, recorded worst case at 802.11 a mode;

For UNII-1 Band

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
5150.00	36.32	35.58	29.04	8.28	51.14	68.30	17.16	Peak	Horizontal
5150.00	27.21	35.58	29.04	8.28	42.03	54.00	11.97	AV	Horizontal
5174.60	84.06	35.55	29.04	8.28	98.85	---	---	Peak	Horizontal
5175.00	75.17	35.55	29.04	8.28	89.96	---	---	AV	Horizontal
5150.00	34.89	35.58	29.04	8.28	49.71	68.30	18.59	Peak	Vertical
5150.00	25.84	35.58	29.04	8.28	40.66	54.00	13.34	AV	Vertical
5177.90	77.46	35.55	29.04	8.28	92.25	---	---	Peak	Vertical
5177.55	68.98	35.55	29.04	8.28	83.77	---	---	AV	Vertical
5237.46	82.66	35.51	29.05	8.32	97.44	---	---	Peak	Horizontal
5238.65	74.13	35.51	29.05	8.32	88.91	---	---	AV	Horizontal
5350.00	35.30	35.42	29.06	8.39	50.05	68.30	18.25	Peak	Horizontal
5350.00	26.44	35.42	29.06	8.39	41.19	54.00	12.81	AV	Horizontal
5243.26	79.26	35.51	29.05	8.32	94.04	---	---	Peak	Vertical
4242.30	71.90	35.51	29.05	8.32	86.68	---	---	AV	Vertical
5350.00	34.07	35.42	29.06	8.39	48.82	68.30	19.48	Peak	Vertical
5350.00	25.31	35.42	29.06	8.39	40.06	54.00	13.94	AV	Vertical

For UNII-3 Band

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	40.21	35.69	29.13	8.65	55.42	78.30	22.88	Peak	Horizontal
5725.00	30.76	35.69	29.13	8.65	45.97	68.30	22.33	AV	Horizontal
5740.12	82.58	35.69	29.14	8.69	97.82	---	---	Peak	Horizontal
5743.35	73.54	35.69	29.14	8.69	88.78	---	---	AV	Horizontal
5725.00	36.42	35.69	29.13	8.65	51.63	78.30	26.67	Peak	Vertical
5725.00	26.85	35.69	29.13	8.65	42.06	68.30	26.24	AV	Vertical
5737.95	78.22	35.69	29.14	8.69	93.46	---	---	Peak	Vertical
5751.50	66.00	35.69	29.14	8.69	81.24	---	---	AV	Vertical
5826.92	83.35	35.82	29.16	8.77	98.78	---	---	Peak	Horizontal
5828.41	73.99	35.82	29.16	8.77	89.42	---	---	AV	Horizontal
5850.00	36.90	35.85	29.16	8.77	52.36	78.30	15.94	Peak	Horizontal
5850.00	27.53	35.85	29.16	8.77	42.99	68.30	11.01	AV	Horizontal
5820.43	73.29	35.82	29.16	8.77	88.72	---	---	Peak	Vertical
5819.09	64.22	35.82	29.16	8.77	79.65	---	---	AV[1]	Vertical
5850.00	34.67	35.85	29.16	8.77	50.13	78.30	18.17	Peak	Vertical
5850.00	27.06	35.85	29.16	8.77	42.52	68.30	11.48	AV[1]	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

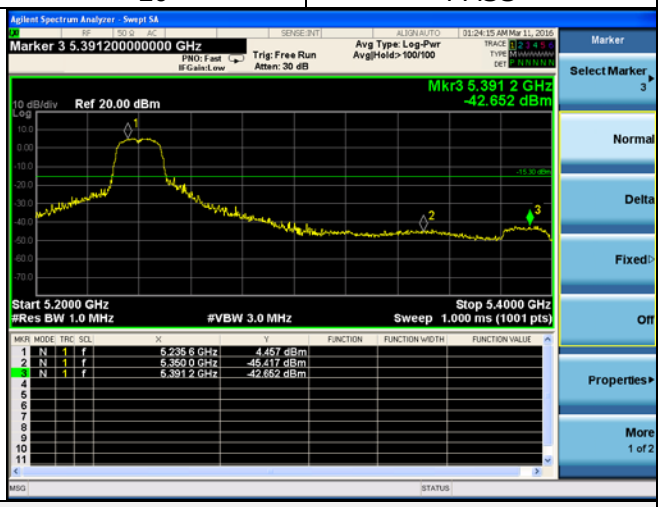
802.11a			
Frequency (MHz)	**Delta Peak to Band emission (dBc)**	**Limit (dBc)**	**Verdict**
5150.00	-39.31	-20	PASS
5350.00	-50.28	-20	PASS

5180

5240

802.11n HT20			
Frequency (MHz)	Delta Peak to Band emission (dBc)	Limit (dBc)	Verdict
5150.00	-39.27	-20	PASS
5350.00	-49.87	-20	PASS

5180



5240

802.11a			
Frequency (MHz)	Delta Peak to Band emission (dBc)	Limit (dBc)	Verdict
5725.00	-31.67	-20	PASS
5850.00	-36.36	-20	PASS

5745

5825

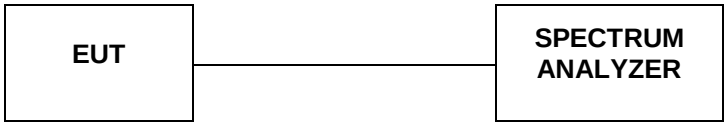
802.11n HT20			
Frequency (MHz)	Delta Peak to Band emission (dBc)	Limit (dBc)	Verdict
5725.00	-32.94	-20	PASS
5850.00	-40.63	-20	PASS

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

For UNII-1 Band

Voltage. Frequency Stability

Voltage (V)	Measurement Frequency (MHz)
4.2	5180.0000
3.8	5180.0000
3.4	5180.0000
Maximum Deviation (MHz)	0.0000
Maximum Deviation (ppm)	0.0000

Temperature. Frequency Stability

Temperature (℃)	Measurement Frequency (MHz)
-10	5180.0000
5	5180.0000
15	5180.0000
25	5180.0000
35	5180.0000
45	5180.0000
55	5180.0000
Maximum Deviation (MHz)	0.0000
Maximum Deviation (ppm)	0.0000

For UNII-3 Band

Voltage. Frequency Stability

Voltage (V)	Measurement Frequency (MHz)
4.2	5745.0000
3.8	5745.0000
3.4	5745.0000
Maximum Deviation (MHz)	0.0000
Maximum Deviation (ppm)	0.0000

Temperature. Frequency Stability

Temperature (℃)	Measurement Frequency (MHz)
-10	5745.0000
5	5745.0000
15	5745.0000
25	5745.0000
35	5745.0000
45	5745.0000
55	5745.0000
Maximum Deviation (MHz)	0.0000
Maximum Deviation (ppm)	0.0000

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.

Refer to statement below for compliance.

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Measurement

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module.For normal WLAN devices, the IEEE 802.11a mode is used.

Measurement parameters

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	1MHz
Video bandwidth:	3MHz
Trace-Mode:	Max hold

Limits

Antenna Gain	6 dBi

Results

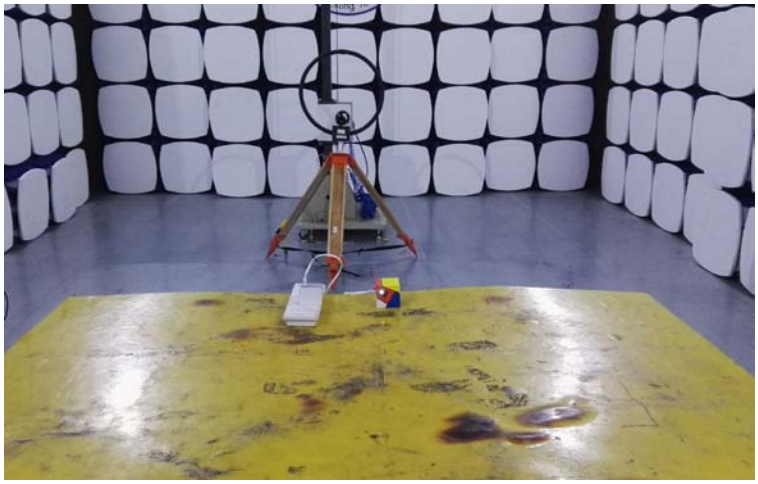
For UNII-1 Band

T_{nom}	V_{nom}	Lowest Channel 5180 MHz	Middle Channel 5200 MHz	Highest Channel 5240 MHz
Conducted power [dBm] Measured with IEEE 802.11a		10.83	10.68	10.29
Radiated power [dBm] Measured with IEEE 802.11a		12.66	12.33	11.71
Gain [dBi] Calculated		1.83	1.65	1.42
Measurement uncertainty		± 0.6 dB (cond.) / ± 2.56 dB (rad.)		

For UNII-3 Band

T_{nom}	V_{nom}	Lowest Channel 5745 MHz	Middle Channel 5785 MHz	Highest Channel 5825 MHz
Conducted power [dBm] Measured with IEEE 802.11a		11.56	11.37	11.56
Radiated power [dBm] Measured with IEEE 802.11a		13.28	12.93	12.88
Gain [dBi] Calculated		1.72	1.56	1.32
Measurement uncertainty		± 0.6 dB (cond.) / ±4.32 dB (rad.)		

5. Test Setup Photos of the EUT



6. External and Internal Photos of the EUT

Reference to the test report No. GTSR16020030-2.4WLAN.

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