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......:	**GTSR17020073-02**
FCC ID..... **:**	**2ALGI-CC-001**
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.....:	Apr. 18, 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.....:	**Nanjing Mythware Information Technology Co.,Ltd.**
Address .....:	Level 13, Unit 3,Zijin Entrepreneur R&D Centre, No.89 Shengli Road, Jiangning District, Nanjing, 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 .....:	Mythware Classroom Cloud AP
Trade Mark .....:	Mythware
Manufacturer .....:	**Nanjing Yansheng Electronics Co.,Ltd.**
Model/Type reference.....:	CC-001
Listed Models .....:	CCE-6010X,CCU-6010X,CCHE-6010X,CCHU-6010X,CCW-6010X
Operation Frequency.....:	From 5180MHz to 5240MHz/ 5745MHz to 5825MHz
Hardware Version .....:	AP_MB_REV_C1
Software Version .....:	V1.0
Rating .....:	Input: AC 100-240V~50/60Hz 1.5A
Result.....:	**PASS**

T E S T R E P O R T

Test Report No. :	**GTSR17020073-02**	Apr. 18, 2017 Date of issue

Equipment under Test	:	Mythware Classroom Cloud AP
Model /Type	:	CC-001
Listed Models	:	CCE-6010X,CCU-6010X,CCHE-6010X,CCHU-6010X,CCW-6010X
Applicant	:	**Nanjing Mythware Information Technology Co.,Ltd.**
Address	:	Level 13, Unit 3,Zijin Entrepreneur R&D Centre, No.89 Shengli Road, Jiangning District, Nanjing, China
Manufacturer	:	**Nanjing Yansheng Electronics Co.,Ltd.**
Address	:	No.9 Gaohu Road, Jiangning District, Nanjing, 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.

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	:	Feb. 28, 2017
Testing commenced on	:	Feb. 28, 2017
Testing concluded on	:	Apr. 18, 2017

2.2. Product Description

Name of EUT	Mythware Classroom Cloud AP
Trade Mark	Mythware
Model Number	CC-001
Listed Models	CCE-6010X,CCU-6010X,CCHE-6010X,CCHU-6010X,CCW-6010X
FCC ID	2ALGI-CC-001
Power Supply	DC 12V PoE Port Power Supply(802.3at Standard)
Power Supply	Model:SK05T-1200300U Input: AC 100-240V~50/60Hz 1.5A Output:DC 12V 3A
Supported type:	802.11b/802.11g/802.11n HT20/802.11n HT40 /802.11ac/802.11n
WLAN	Supported 802.11ac/802.11b/802.11g/802.11n HT20/802.11n HT40
Modulation Type	IEEE 802.11ac: 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) IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK,BPSK)
Operation frequency	IEEE 802.11ac:5180MHz-5240MHz/5745MHz-5825MHz IEEE 802.11b:2412-2462MHz IEEE 802.11g:2412-2462MHz IEEE 802.11n HT20:2412-2462MHz/5180MHz-5240MHz/5745MHz-5825MHz IEEE 802.11n HT40:2422-2452MHz
Antenna Type	Internal Antenna
Antenna gain	1.06dBi
Remark: The products are identical in interior structure, electrical circuits and components, just model names and antenna numbers are different.	

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 12V From Adapter AC 120V/60Hz

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

This is a Mythware Classroom Cloud AP.

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

2.5. EUT operation mode

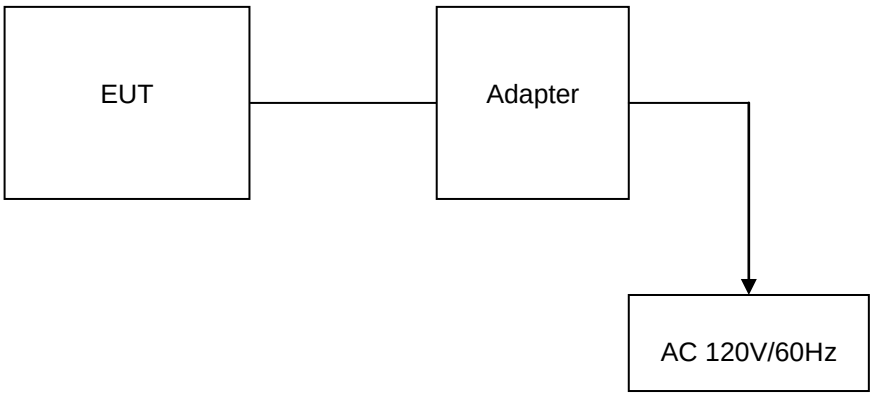
The application provider specific test software to control sample in continuous TX and RX.

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

UNII-1	
Channel	Frequency (MHz)
36	**5180**
40	**5200**
44	5220
48	**5240**

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: 2ALGI-CC-001** 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	802.11ac	☒ Lowest ☒ Middle ☒ Highest	802.11ac	☒ Lowest ☒ Middle ☒ Highest	☒	☐	☐	☐	complies
§15.407(a)	Power spectral density	802.11ac 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	802.11ac 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	☒	☐	☐	☐	complies
§15.407(a)	Spectrum bandwidth – 26 dB bandwidth	802.11ac 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	802.11ac 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	☒ ☒	☐	☐	☐	complies
§15.407(e)	Spectrum bandwidth – 6 dB bandwidth	802.11ac 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	802.11ac 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	☒ ☒	☐	☐	☐	complies
§15.407(a)	Maximum output power	802.11ac 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	802.11ac 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	☒ ☒ ☒	☐	☐	☐	complies
§15.407(b)	Band edge compliance conducted	802.11ac 802.11n HT20	☒ Lowest ☒ Highest	802.11ac 802.11n HT20	☒ Lowest ☒ Highest	☒ ☒	☐	☐	☐	complies
§15.407(b)	Band edge compliance radiated	802.11ac 802.11n HT20	☒ Lowest ☒ Highest	8802.11ac	☒ Lowest ☒ Highest	☒	☐	☐	☐	complies
§15.407(a)	TX spurious emissions conducted	-/-	-/-	-/-	-/-	☐	☐	☒	☐	complies
§15.407(a)	TX spurious emissions radiated	802.11ac 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	802.11ac	☒ Lowest ☒ Middle ☒ Highest	☒	☐	☐	☐	complies
§15.407(g)	Frequency Stability	802.11ac 802.11n HT20	☒ Lowest ☒ Highest	802.11ac	☒ Lowest	☒	☐	☐	☐	complies
§15.109	RX spurious emissions radiated	-/-	-/-	-/-	-/-	☐	☐	☒	☐	complies
§15.209(a)	TX spurious Emissions radiated < 30 MHz	802.11ac 802.11n HT20	-/-	802.11ac	-/-	☒	☐	☐	☐	complies
§15.107(a) §15.207	Conducted Emissions < 30 MHz	802.11ac 802.11n HT20	-/-	802.11ac	-/-	☒	☐	☐	☐	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	11ac/OFDM	6 Mbps	36/40/44
	11n/OFDM	6.5 Mbps	149/157/165
Band Edge	11ac/OFDM	6 Mbps	36/40/44
	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

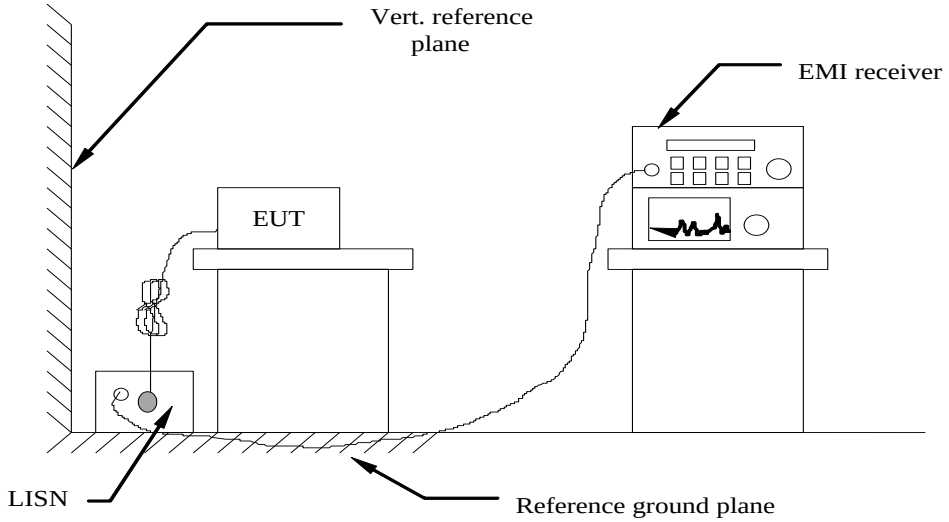
Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.08	2016/05/28	2017/05/27
LISN	R&S	ESH2-Z5	893606/008	2016/05/27	2017/05/26
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2016/06/02	2017/06/01
EMI Test Receiver	R&S	ESCI	101102	2016/06/26	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	2016/05/21	2017/05/20
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2016/05/19	2017/05/18
Double Ridged Horn Antenna	Rohde&Schwarz	HF907	100265	2016/05/19	2017/05/18
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2016/05/19	2017/05/18
Amplifier	Agilent	8349B	3008A02306	2016/05/19	2017/05/18
Amplifier	Agilent	8447D	2944A10176	2016/05/19	2017/05/18
Amplifer	A.H.	PAM-1840VH	562	2016/05/19	2017/05/18
Temperature/Humidity Meter	Gangxing	CTH-608	02	2016/05/20	2017/05/19
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	N/A	2016/05/20	2017/05/19
High-Pass Filter	K&L	41H10-1375/U12750-O/O	N/A	2016/05/20	2017/05/19
Data acquisition card	Agilent	U2531A	TW53323507	2016/05/20	2017/05/19
Power Sensor	Agilent	U2021XA	MY5365004	2016/05/20	2017/05/19
RF Cable	HUBER+SUHNER	RG214	N/A	2016/05/20	2017/05/19

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 DC 5V power from adapter, the adapter received AC120V/60Hz and AC 240V/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

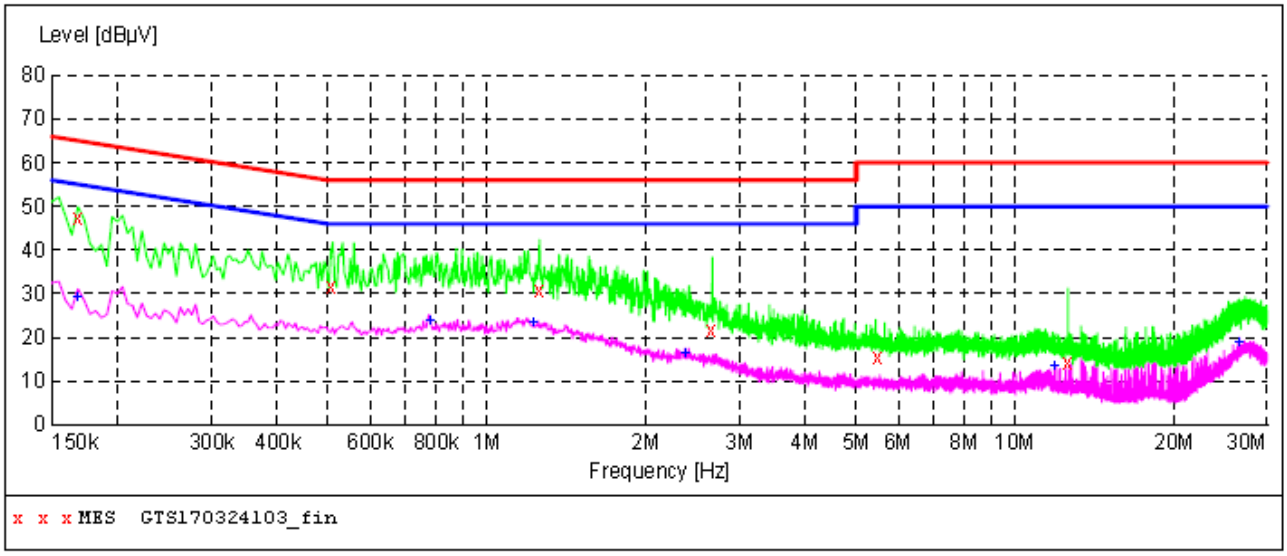
For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following：

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 802.11ac/802.11n HT20 mode in AC 120V/60Hz and 240V/60Hz, the worst case was recorded .

Power supply:	DC 12V from Adapter AC 120V/60Hz	Polarization	L



MEASUREMENT RESULT: "GTS170324103_fin"

3/24/2017 3:56PM

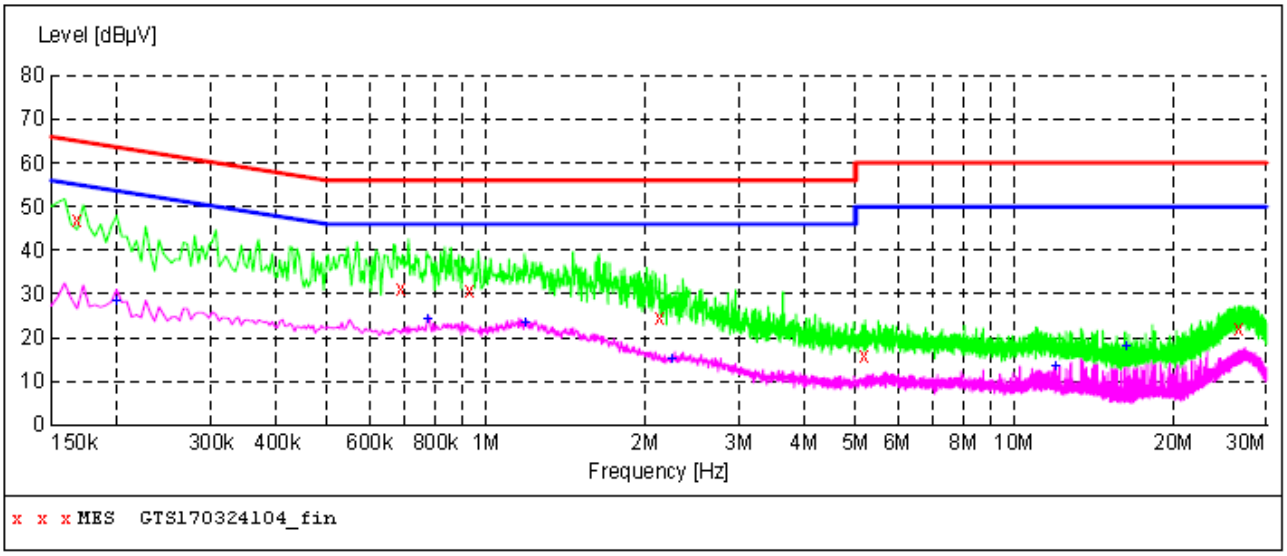
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.168000	47.30	10.0	65	17.8	QP	L1	GND
0.505500	31.80	9.8	56	24.2	QP	L1	GND
1.252500	30.80	9.6	56	25.2	QP	L1	GND
2.661000	21.70	9.5	56	34.3	QP	L1	GND
5.478000	15.50	9.3	60	44.5	QP	L1	GND
12.570000	14.40	8.5	60	45.6	QP	L1	GND

MEASUREMENT RESULT: "GTS170324103_fin2"

3/24/2017 3:56PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.168000	29.20	10.0	55	25.9	AV	L1	GND
0.780000	23.90	9.7	46	22.1	AV	L1	GND
1.225500	23.40	9.6	46	22.6	AV	L1	GND
2.373000	16.40	9.5	46	29.6	AV	L1	GND
11.890500	13.20	8.6	50	36.8	AV	L1	GND
26.610000	18.90	7.0	50	31.1	AV	L1	GND

Power supply:	DC 12V from Adapter AC 120V/60Hz	Polarization	N



MEASUREMENT RESULT: "GTS170324104_fin"

3/24/2017 4:00PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.168000	46.80	10.0	65	18.3	QP	N	GND
0.690000	31.20	9.7	56	24.8	QP	N	GND
0.933000	30.90	9.6	56	25.1	QP	N	GND
2.134500	24.70	9.5	56	31.3	QP	N	GND
5.199000	16.00	9.3	60	44.0	QP	N	GND
26.605500	22.10	7.0	60	37.9	QP	N	GND

MEASUREMENT RESULT: "GTS170324104_fin2"

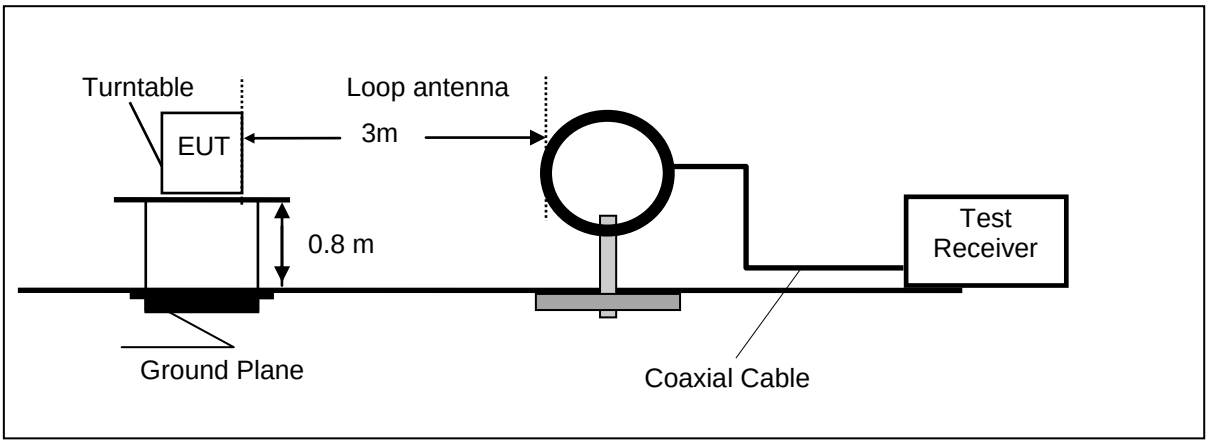
3/24/2017 4:00PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.199500	28.40	10.0	54	25.2	AV	N	GND
0.775500	24.20	9.7	46	21.8	AV	N	GND
1.189500	23.40	9.6	46	22.6	AV	N	GND
2.242500	15.00	9.5	46	31.0	AV	N	GND
11.953500	13.30	8.6	50	36.7	AV	N	GND
16.228500	18.10	7.9	50	31.9	AV	N	GND

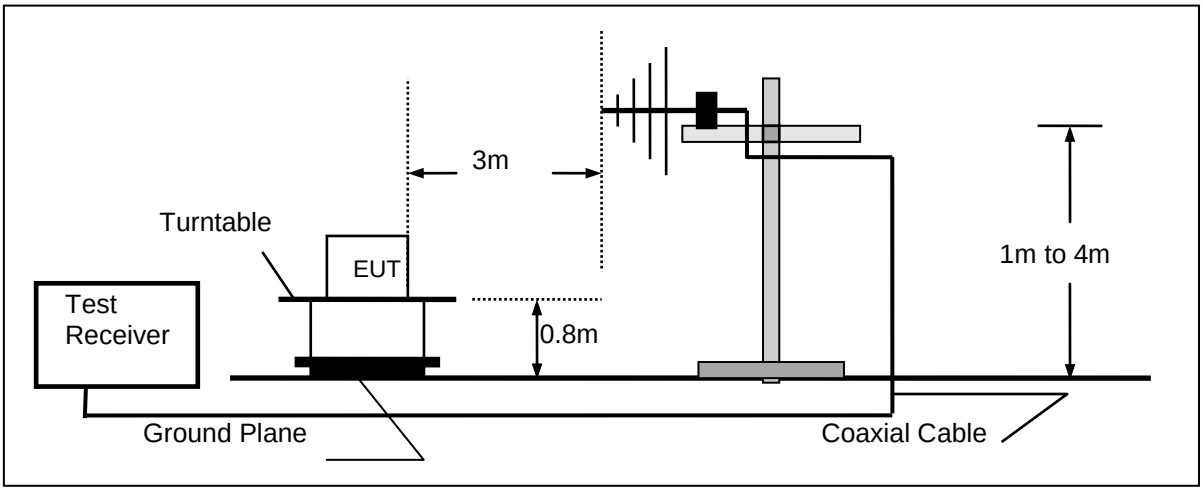
4.2. Radiated Emission

TEST CONFIGURATION

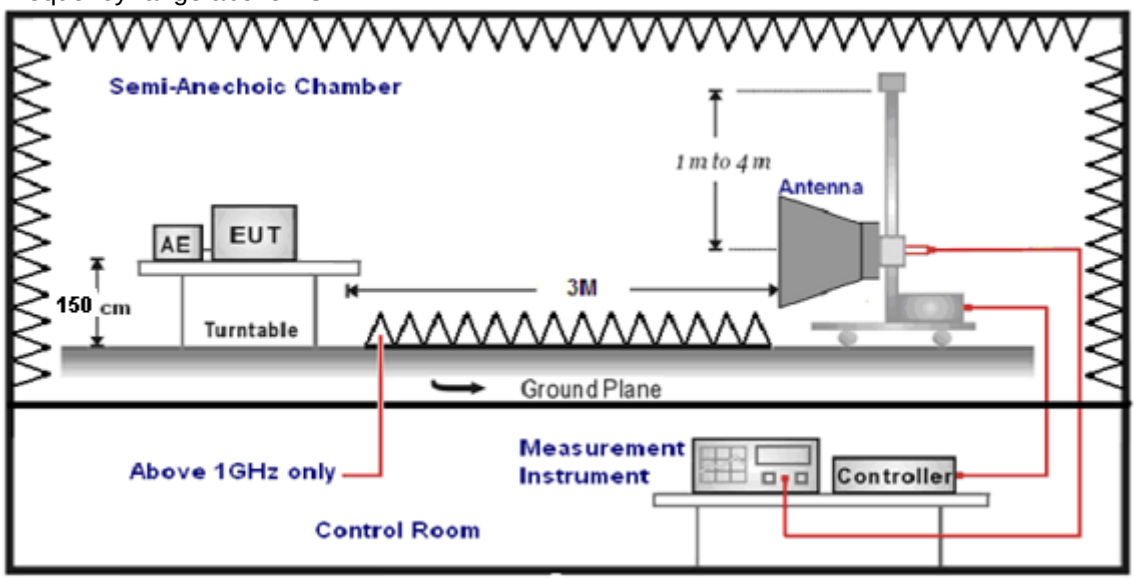
Frequency range 9 KHz – 30MHz



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

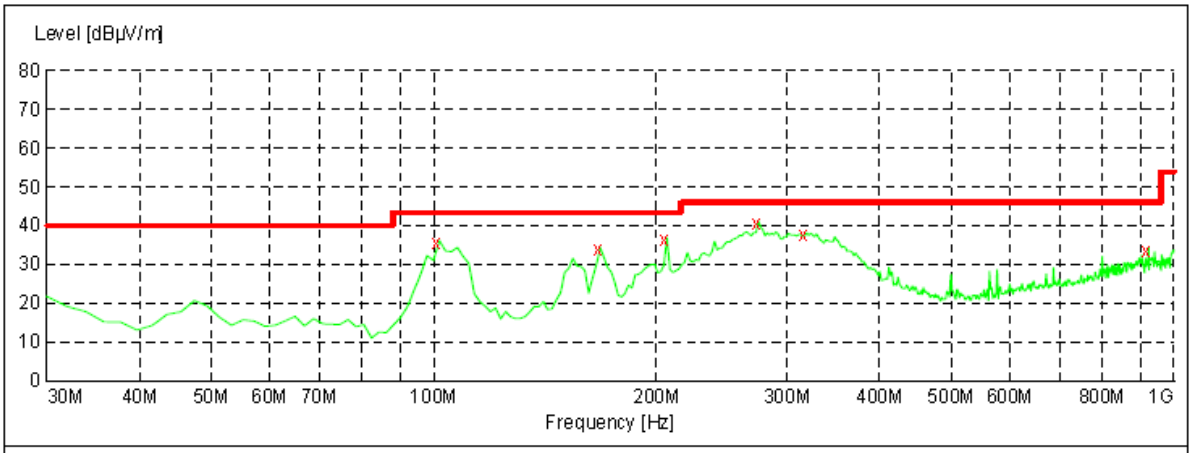
Remark: We tested at 802.11ac/802.11n HT20 mode at the antenna single transmitting mode and the Mimo mode in AC 120V/60Hz and AC 240V/60Hz, and recored the worst data at the Mimo mode of the 802.11ac Mode.
Test site: Shenzhen CTL Testing Technology Co., Ltd.

For 9 KHz-30MHz

Frequency (MHz)	Corrected Reading (dBuV/m)@3m	FCC Limit (dBuV/m) @3m	Margin (dB)	Detector	Result
0.28	52.64	98.66	46.02	QP	PASS
1.54	43.71	63.85	20.14	QP	PASS
12.87	45.26	69.54	24.28	QP	PASS
26.41	40.92	69.54	28.62	QP	PASS

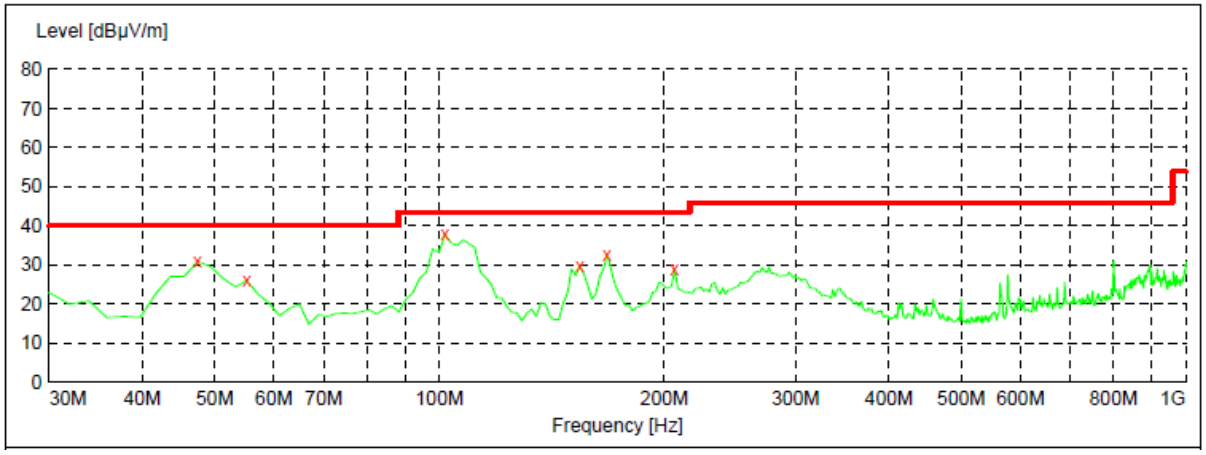
For 30MHz-1GHz

Horizontal



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
101.780000	36.40	11.6	43.5	7.1	PK	100	244.0	HORIZONTAL
167.740000	33.80	13.4	43.5	8.7	PK	100	128.0	HORIZONTAL
206.540000	37.20	14.1	43.5	6.3	PK	100	168.0	HORIZONTAL
274.440000	41.60	15.1	46.0	4.4	PK	100	85.0	HORIZONTAL
319.060000	38.50	15.7	46.0	7.5	PK	300	203.0	HORIZONTAL
924.340000	34.50	26.2	46.0	11.5	PK	300	117.0	HORIZONTAL

Vertical



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	31.60	8.7	40.0	8.4	PK	100	176.0	VERTICAL
55.220000	26.80	8.0	40.0	13.2	PK	100	69.0	VERTICAL
101.780000	38.60	11.6	43.5	4.9	PK	100	134.0	VERTICAL
154.160000	30.50	13.7	43.5	13.0	PK	300	213.0	VERTICAL
167.740000	33.40	13.4	43.5	10.1	PK	300	131.0	VERTICAL
206.540000	29.70	14.1	43.5	13.8	PK	300	256.0	VERTICAL

For 1GHz to 40GHz

802.11ac 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	32.53	38.55	33.64	11.24	48.68	74.00	25.32	Peak	Horizontal
1	10360	20.26	38.55	33.64	11.24	36.41	54.00	17.59	AV	Horizontal
2	15540	34.53	36.49	36.53	13.72	48.21	74.00	25.79	Peak	Horizontal
2	15540	24.16	36.49	36.53	13.72	37.84	54.00	16.16	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	29.58	38.55	33.64	11.24	45.73	74.00	28.27	Peak	Vertical
1	10360	18.11	38.55	33.64	11.24	34.26	54.00	19.74	AV	Vertical
2	15540	32.84	36.49	36.53	13.72	46.52	74.00	27.48	Peak	Vertical
2	15540	20.21	36.49	36.53	13.72	33.89	54.00	20.11	AV	Vertical

802.11ac 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	32.93	38.57	33.66	11.36	49.38	74.00	24.62	Peak	Horizontal
1	10400	20.76	38.57	33.66	11.36	37.21	54.00	16.79	AV	Horizontal
2	15600	34.74	36.51	36.55	13.91	48.61	74.00	25.39	Peak	Horizontal
2	15600	24.58	36.51	36.55	13.91	38.45	54.00	15.55	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	32.06	38.57	33.66	11.36	48.51	74.00	25.49	Peak	Vertical
1	10400	20.02	38.57	33.66	11.36	36.47	54.00	17.53	AV	Vertical
2	15600	32.45	36.51	36.55	13.91	46.32	74.00	27.68	Peak	Vertical
2	15600	23.94	36.51	36.55	13.91	37.81	54.00	16.19	AV	Vertical

802.11ac 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	32.85	38.56	33.70	11.41	49.12	74.00	24.88	Peak	Horizontal
1	10480	21.21	38.56	33.70	11.41	37.48	54.00	16.52	AV	Horizontal
2	15720	34.69	36.54	36.57	13.98	48.64	74.00	25.36	Peak	Horizontal
2	15720	24.64	36.54	36.57	13.98	38.59	54.00	15.41	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	31.98	38.56	33.70	11.41	48.25	74.00	25.75	Peak	Vertical
1	10480	22.28	38.56	33.70	11.41	38.55	54.00	15.45	AV	Vertical
2	15720	35.79	36.54	36.57	13.98	49.74	74.00	24.26	Peak	Vertical
2	15720	23.52	36.54	36.57	13.98	37.47	54.00	16.53	AV	Vertical

802.11ac 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	32.56	38.46	33.92	11.59	48.69	74.00	25.31	Peak	Horizontal
1	11490	22.95	38.46	33.92	11.59	39.08	54.00	14.92	AV	Horizontal
2	17235	29.21	43.11	37.11	13.94	49.15	74.00	24.85	Peak	Horizontal
2	17235	18.72	43.11	37.11	13.94	38.66	54.00	15.34	AV[J]	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	33.47	38.46	33.92	11.59	49.60	74.00	24.40	Peak	Vertical
1	11490	21.15	38.46	33.92	11.59	37.28	54.00	16.72	AV	Vertical
2	17235	28.29	43.11	37.11	13.94	48.23	74.00	25.77	Peak	Vertical
2	17235	18.58	43.11	37.11	13.94	38.52	54.00	15.48	AV	Vertical

802.11ac 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	31.58	38.53	33.86	11.66	47.91	74.00	26.09	Peak	Horizontal
1	11570	22.31	38.53	33.86	11.66	38.64	54.00	15.36	AV	Horizontal
2	17355	28.60	43.20	37.15	14.02	48.67	74.00	25.33	Peak	Horizontal
2	17355	19.14	43.20	37.15	14.02	39.21	54.00	14.79	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	32.03	38.53	33.86	11.66	48.36	74.00	25.64	Peak	Vertical
1	11570	21.56	38.53	33.86	11.66	37.89	54.00	16.11	AV	Vertical
2	17355	28.15	43.20	37.15	14.02	48.22	74.00	25.78	Peak	Vertical
2	17355	18.58	43.20	37.15	14.02	38.65	54.00	15.35	AV	Vertical

802.11ac 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	31.90	38.56	33.84	11.71	48.33	74.00	25.67	Peak	Horizontal
1	11650	21.26	38.56	33.84	11.71	37.69	54.00	16.31	AV	Horizontal
2	17475	29.72	43.23	37.17	14.18	49.96	74.00	24.04	Peak	Horizontal
2	17475	19.37	43.23	37.17	14.18	39.61	54.00	14.39	AV	Horizontal

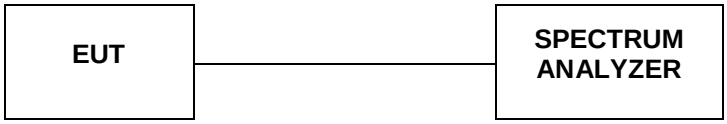
Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
1	11650	33.23	38.56	33.84	11.71	49.66	74.00	24.34	Peak	Vertical
1	11650	21.98	38.56	33.84	11.71	38.41	54.00	15.59	AV	Vertical
2	17475	28.15	43.23	37.17	14.18	48.39	74.00	25.61	Peak	Vertical
2	17475	18.20	43.23	37.17	14.18	38.44	54.00	15.56	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

802.11ac Test Mode

Channel	Frequency (MHz)	Duty Cycle	Duty factor (dB)
36	5180	0.981	0.083
40	5200	0.982	0.079
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	0.980	0.088
48	5240	0.987	0.057

802.11ac Test Mode

Channel	Frequency (MHz)	Duty Cycle	Duty factor (dB)
149	5745	0.845	0.732
157	5785	0.856	0.675
165	5825	0.841	0.752

802.11n HT20 Test Mode

Channel	Frequency (MHz)	Duty Cycle	Duty factor (dB)
149	5745	0.855	0.681
157	5785	0.844	0.752
165	5825	0.844	0.752

Antenna 2

802.11ac Test Mode

Channel	Frequency (MHz)	Duty Cycle	Duty factor (dB)
36	5180	0.980	0.088
40	5200	0.980	0.088
48	5240	0.978	0.097

802.11n HT20 Test Mode

Channel	Frequency (MHz)	Duty Cycle	Duty factor (dB)
36	5180	0.984	0.070
40	5200	0.986	0.061
48	5240	0.982	0.079

802.11ac Test Mode

Channel	Frequency (MHz)	Duty Cycle	Duty factor (dB)
149	5745	0.842	0.767
157	5785	0.832	0.799
165	5825	0.842	0.767

802.11n HT20 Test Mode

Channel	Frequency (MHz)	Duty Cycle	Duty factor (dB)
149	5745	0.845	0.731
157	5785	0.849	0.711
165	5825	0.836	0.778

Antenna 3

802.11ac Test Mode

Channel	Frequency (MHz)	Duty Cycle	Duty factor (dB)
36	5180	0.981	0.083
40	5200	0.979	0.092
48	5240	0.979	0.092

802.11n HT20 Test Mode

Channel	Frequency (MHz)	Duty Cycle	Duty factor (dB)
36	5180	0.982	0.079
40	5200	0.979	0.092
48	5240	0.982	0.079

802.11ac Test Mode

Channel	Frequency (MHz)	Duty Cycle	Duty factor (dB)
149	5745	0.842	0.767
157	5785	0.837	0.773
165	5825	0.837	0.773

802.11n HT20 Test Mode

Channel	Frequency (MHz)	Duty Cycle	Duty factor (dB)
149	5745	0.854	0.685
157	5785	0.836	0.778
165	5825	0.840	0.757

Antenna 4

802.11ac Test Mode

Channel	Frequency (MHz)	Duty Cycle	Duty factor (dB)
36	5180	0.983	0.075
40	5200	0.981	0.083
48	5240	0.981	0.083

802.11n HT20 Test Mode

Channel	Frequency (MHz)	Duty Cycle	Duty factor (dB)
36	5180	0.982	0.079
40	5200	0.987	0.057
48	5240	0.978	0.097

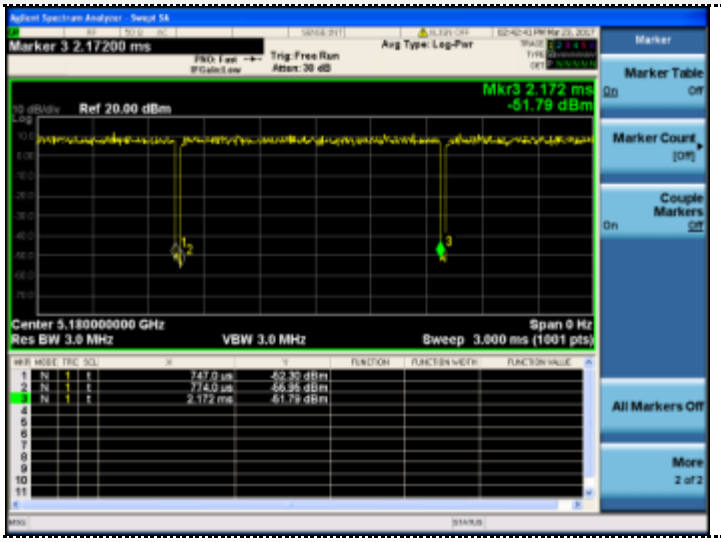
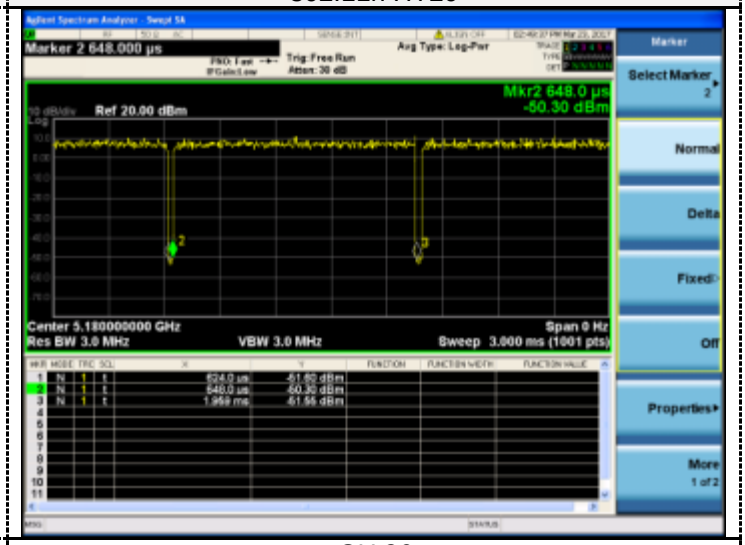
802.11ac Test Mode

Channel	Frequency (MHz)	Duty Cycle	Duty factor (dB)
149	5745	0.835	0.783
157	5785	0.841	0.752
165	5825	0.832	0.799

802.11n HT20 Test Mode

Channel	Frequency (MHz)	Duty Cycle	Duty factor (dB)
149	5745	0.835	0.783
157	5785	0.839	0.762
165	5825	0.846	0.726

Antenna 1

802.11ac	802.11n HT20
	
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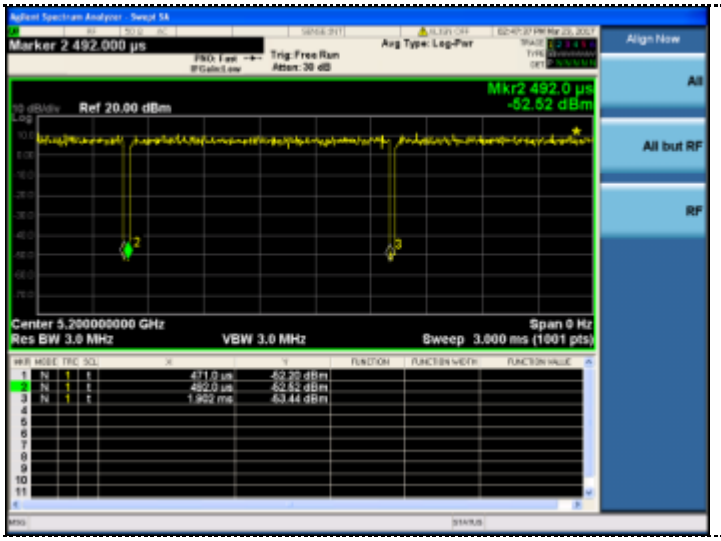	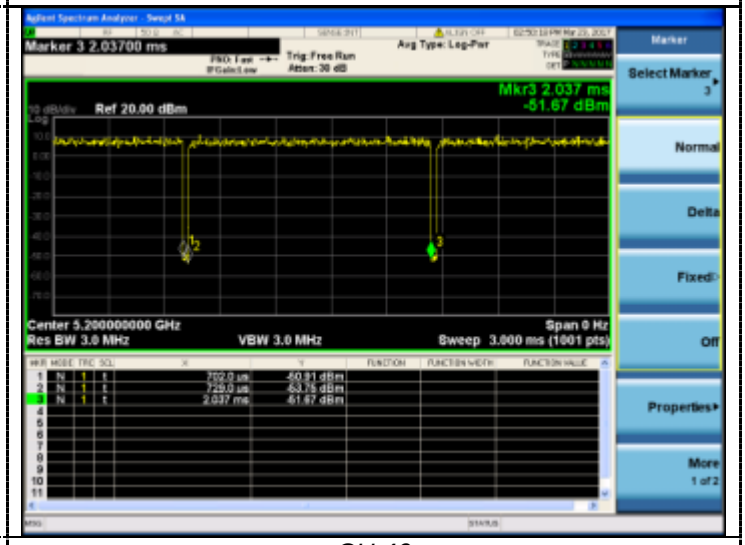
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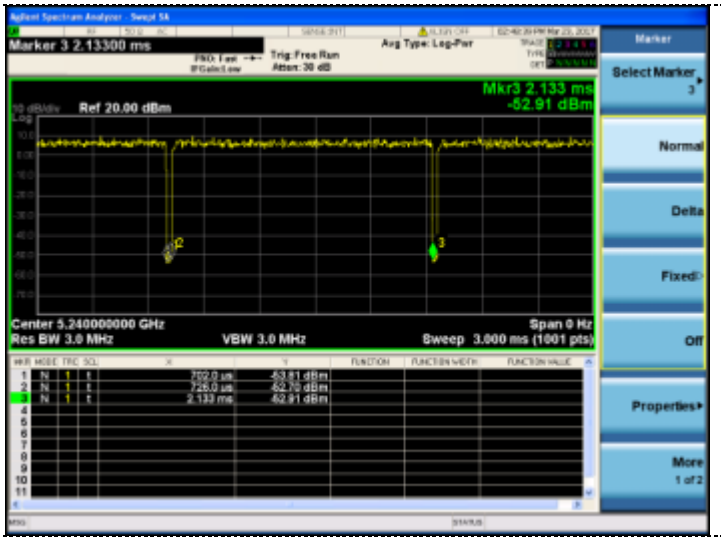
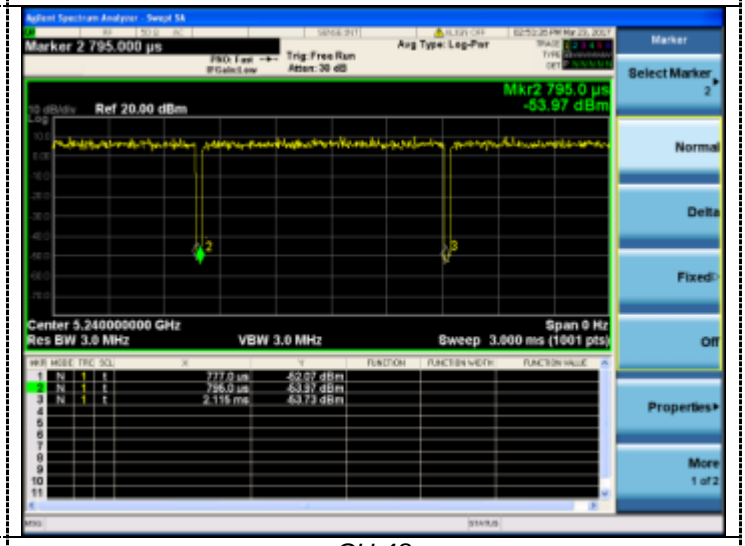
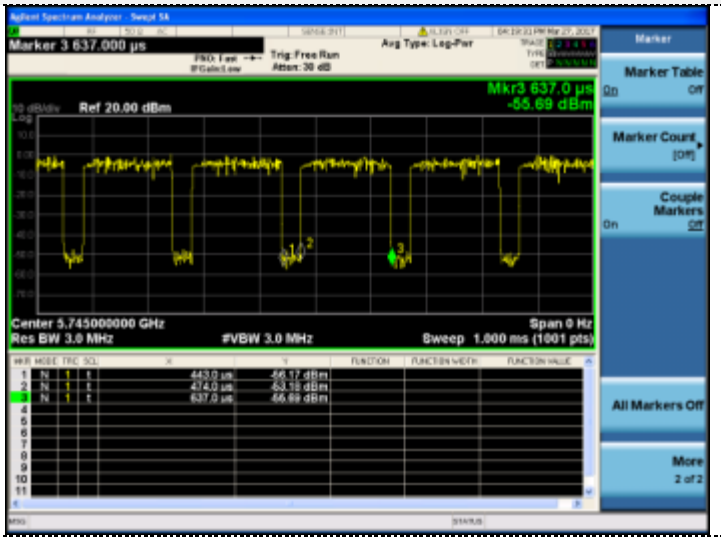
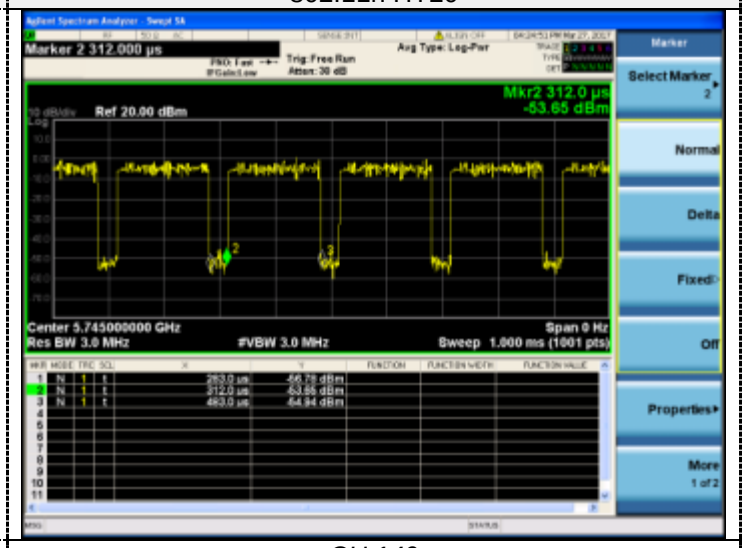
	
CH 48	*CH 48*

802.11ac	802.11n HT20
	
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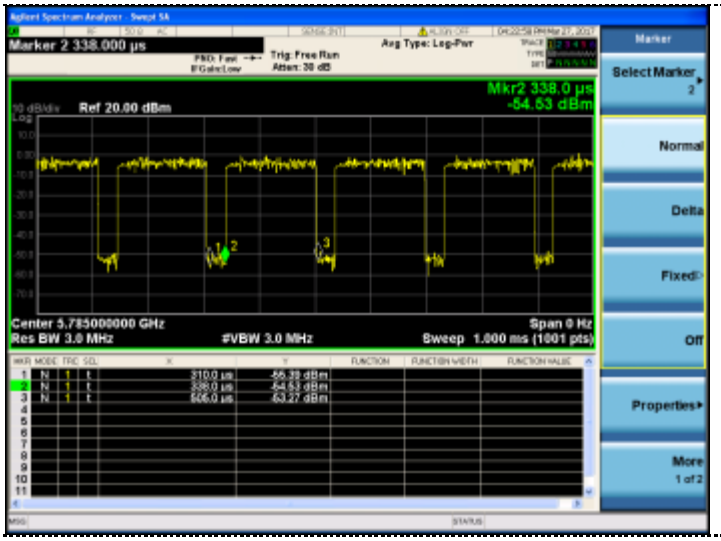	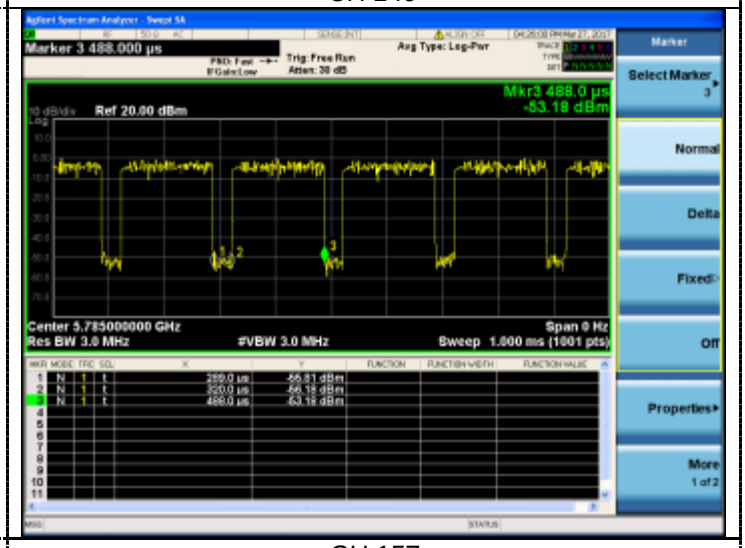
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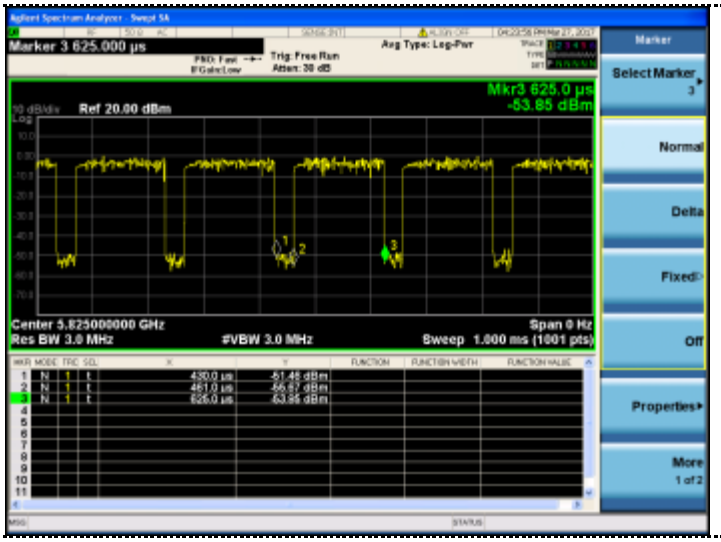
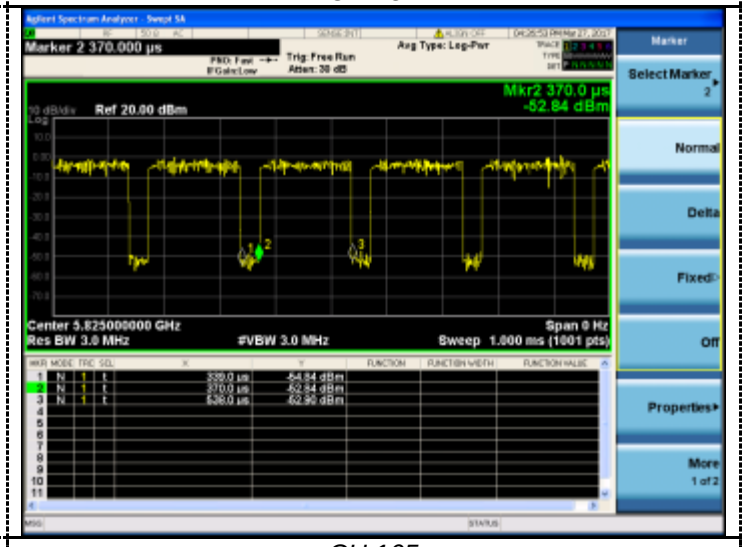
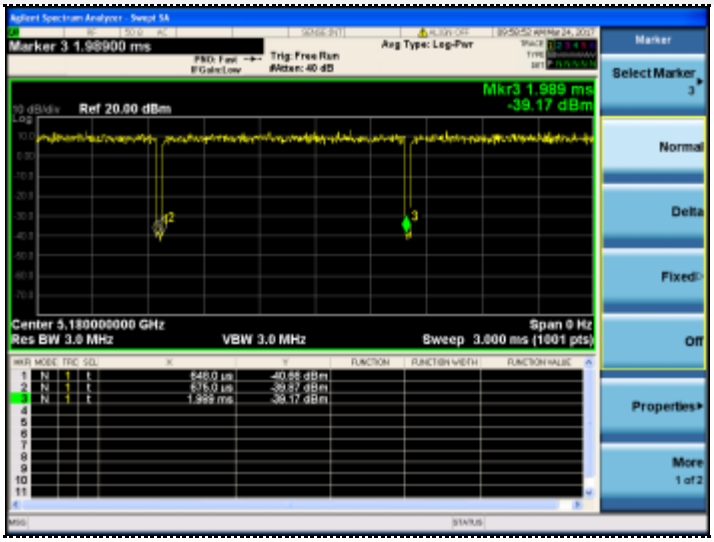
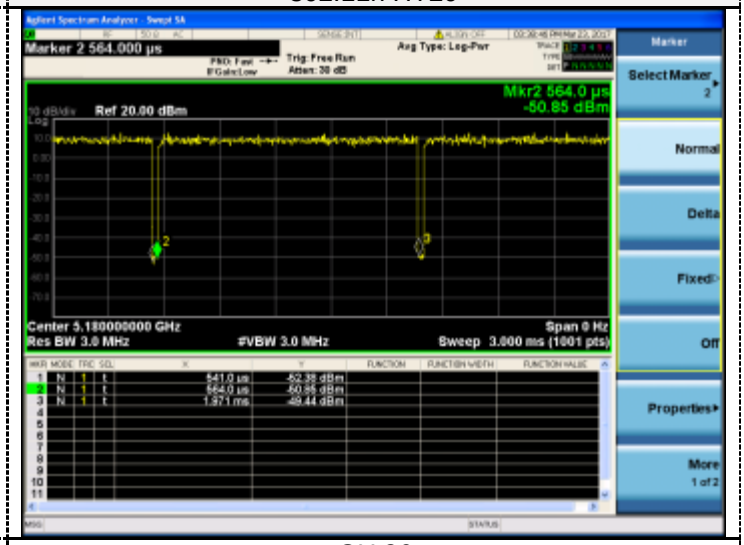
	
CH 165	*CH 165*

Antenna 2

802.11ac	802.11n HT20
	
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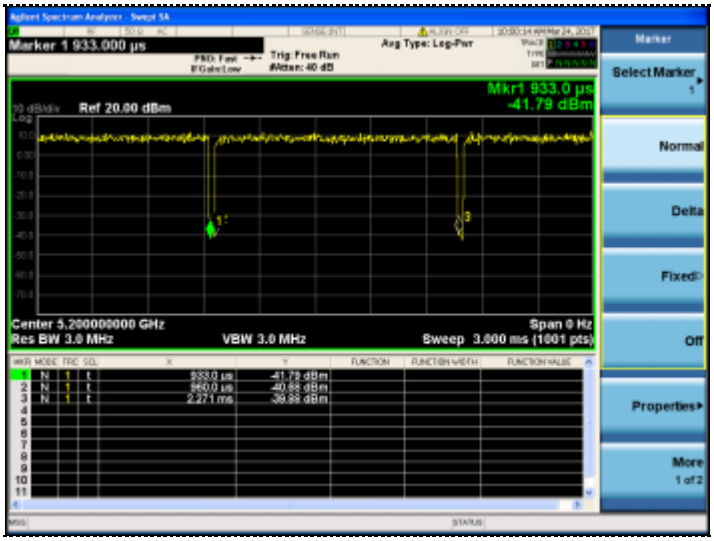	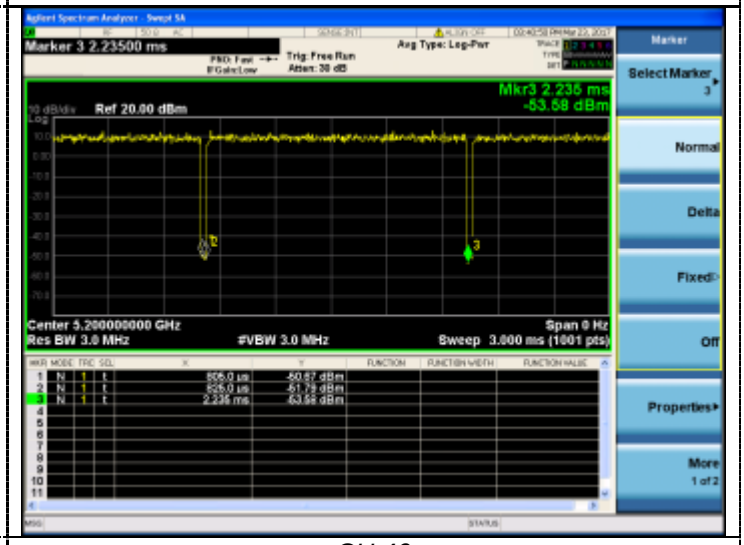
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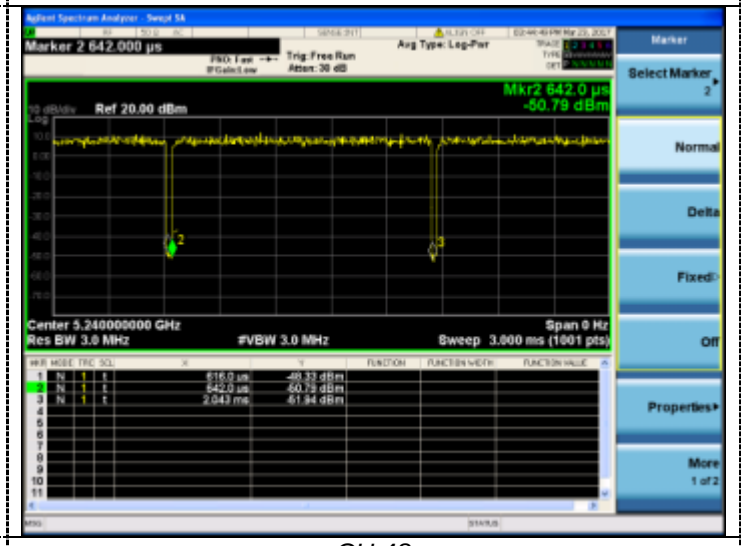
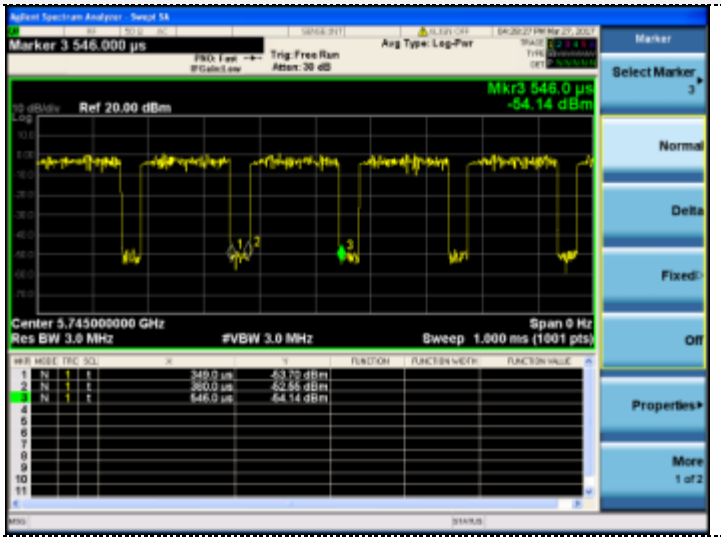
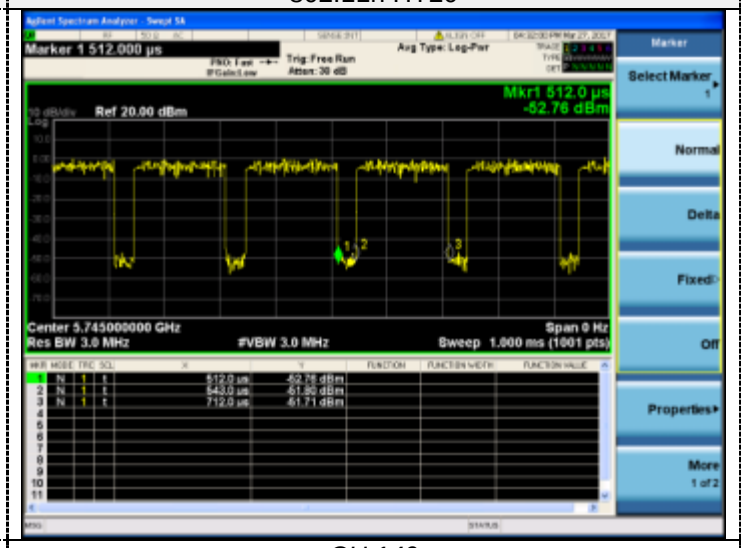
	
CH 48	*CH 48*

802.11ac	802.11n HT20
	
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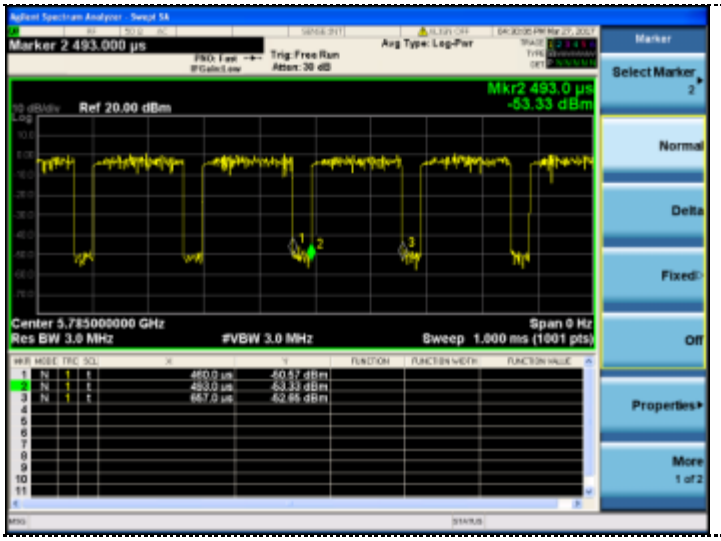
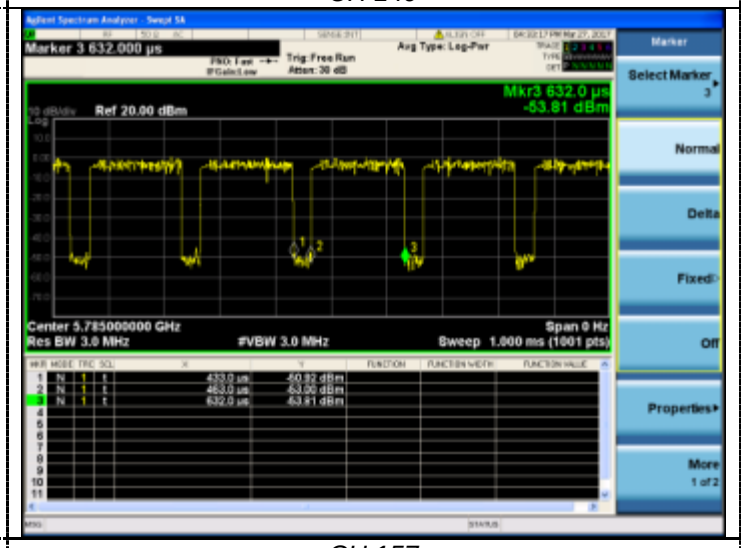
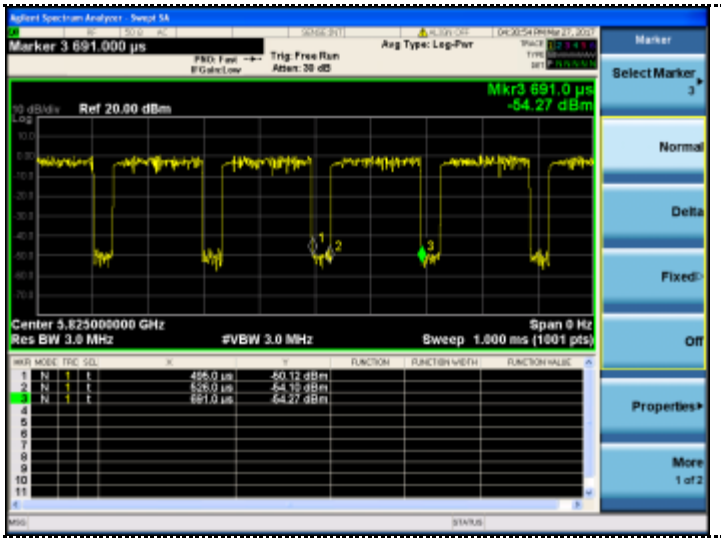
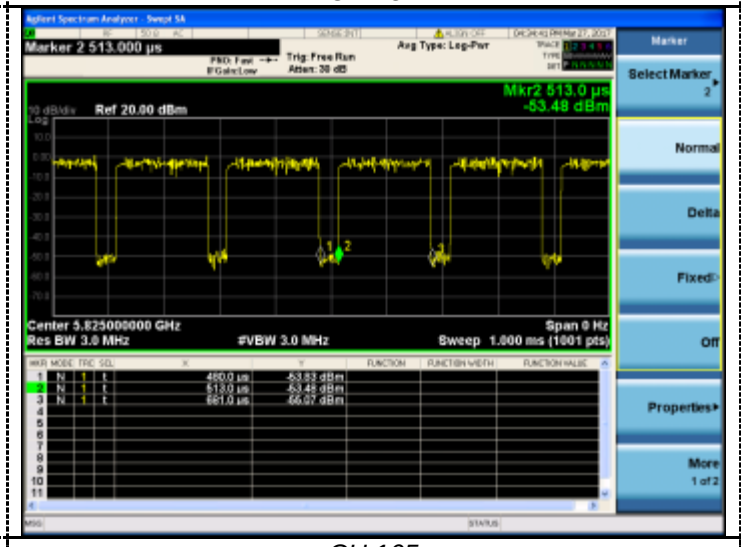
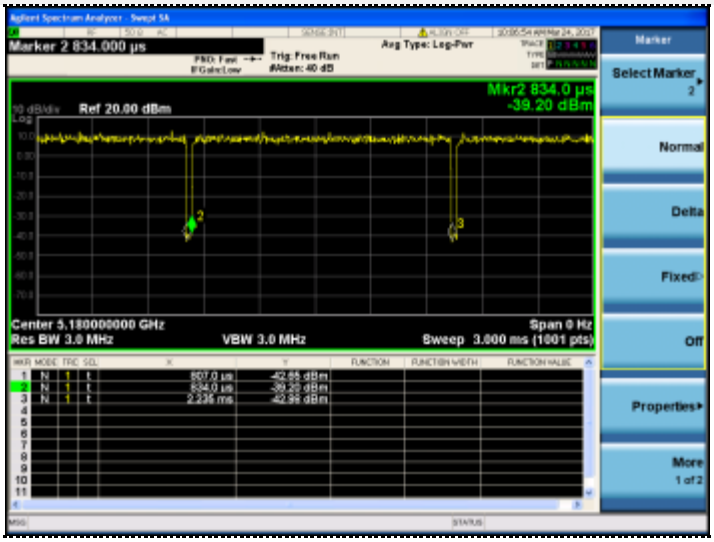
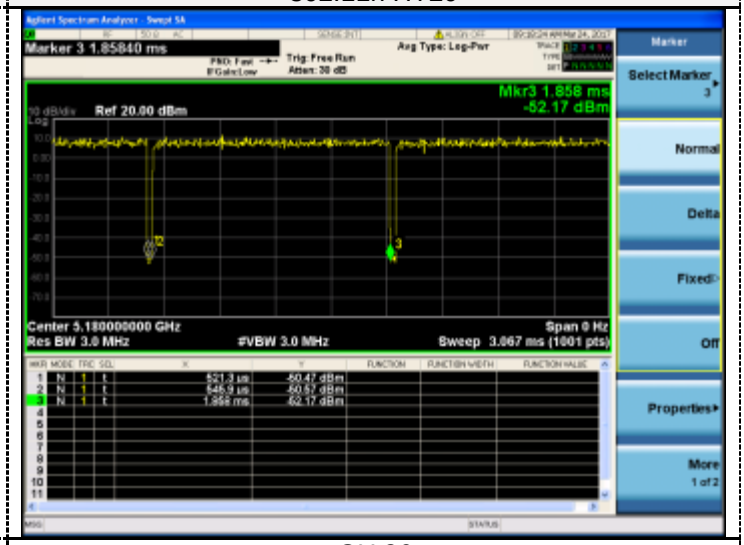
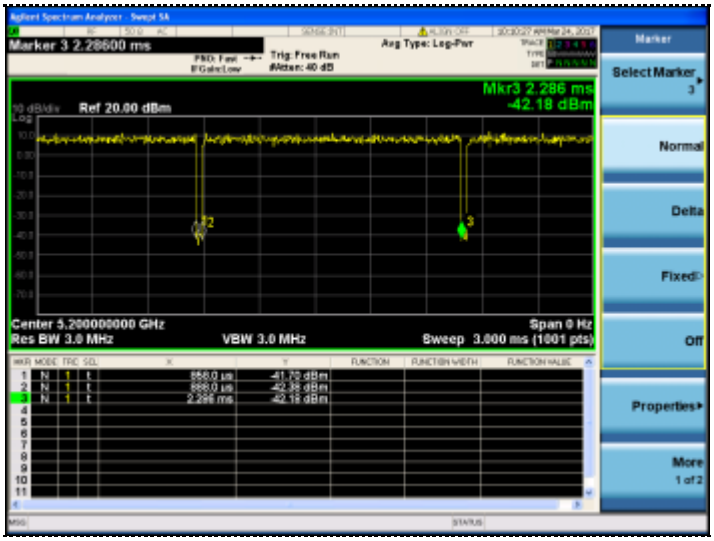
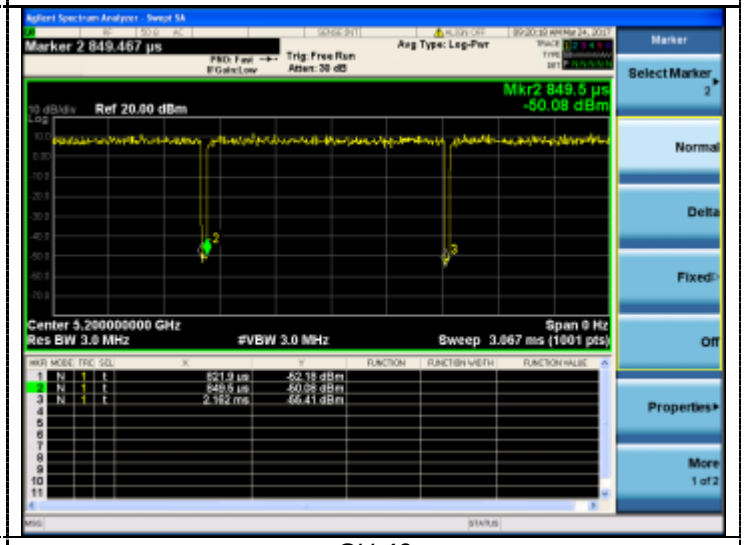
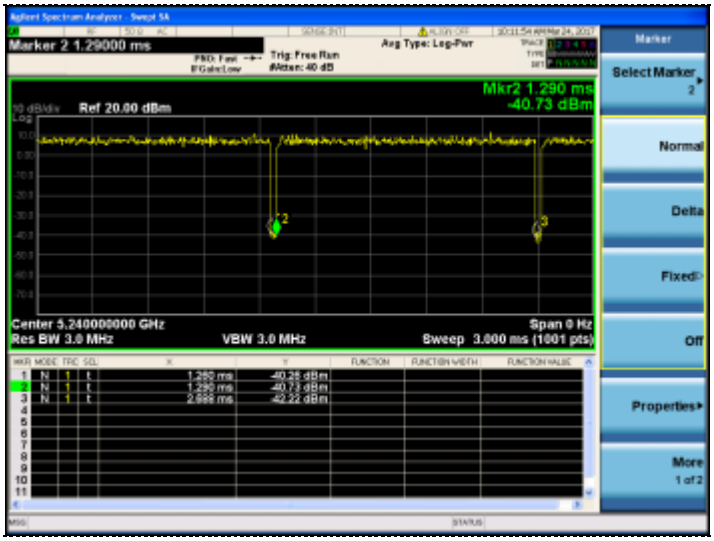
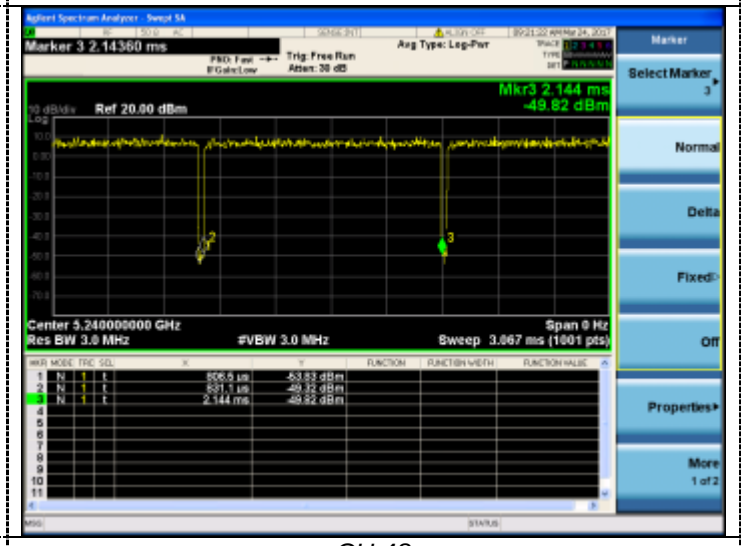
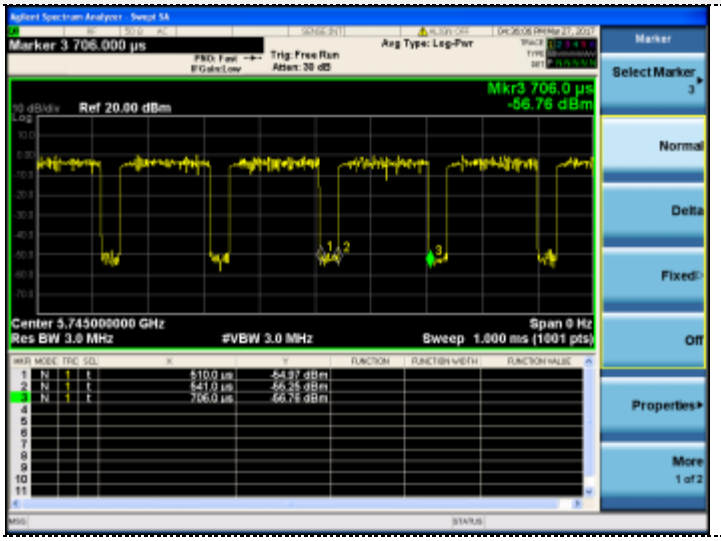
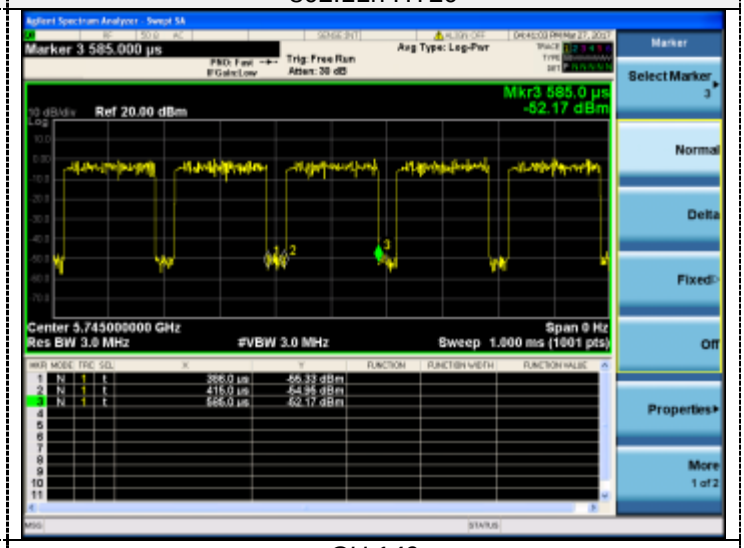
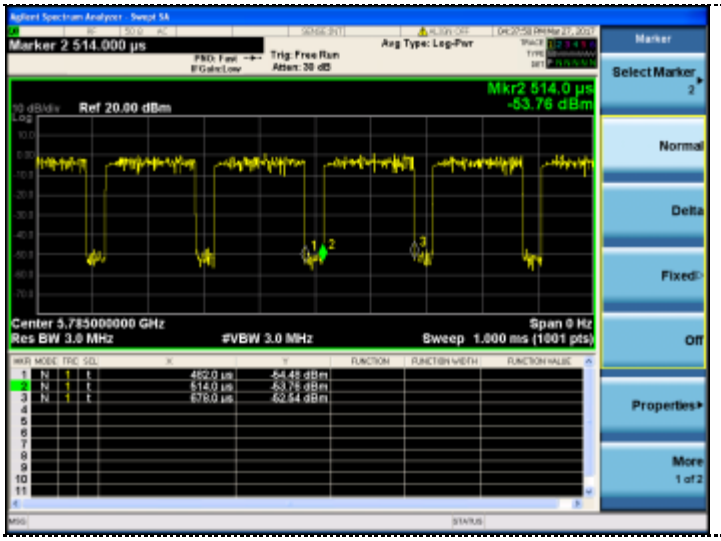
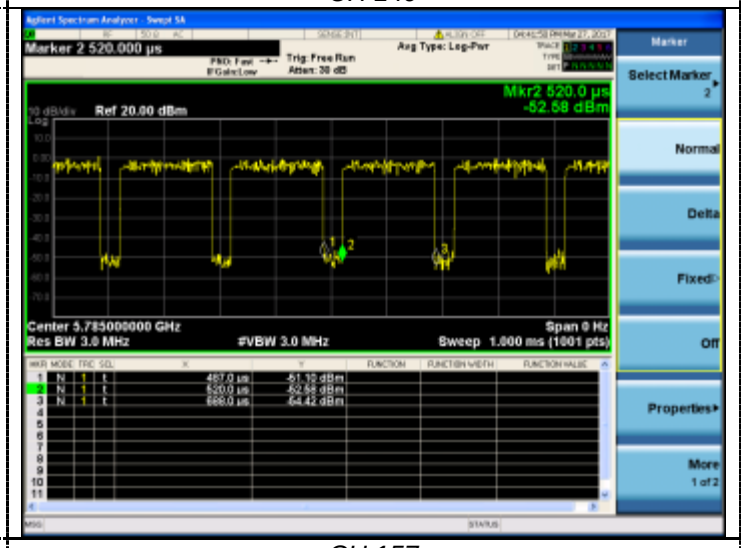
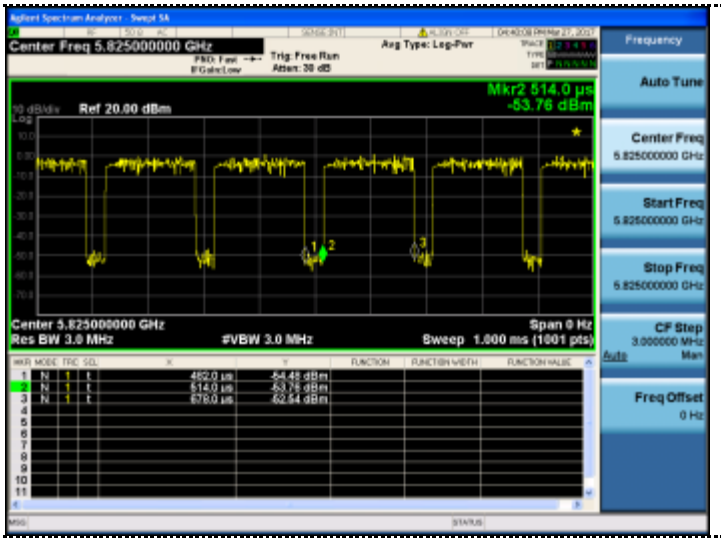
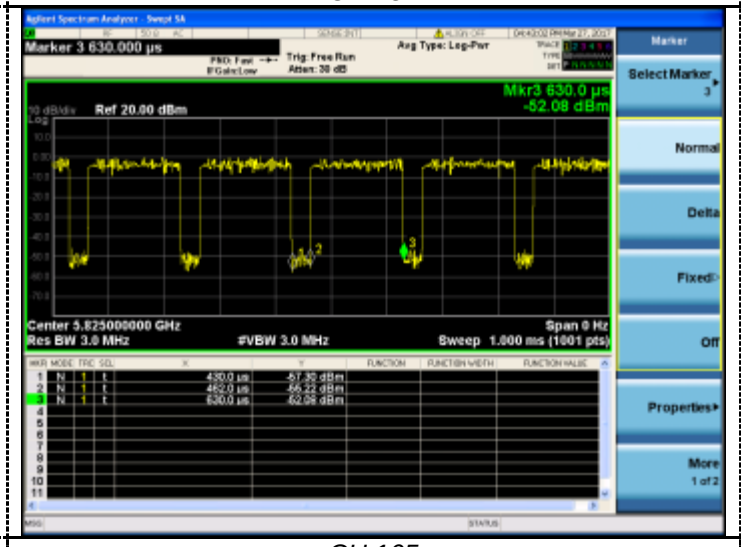
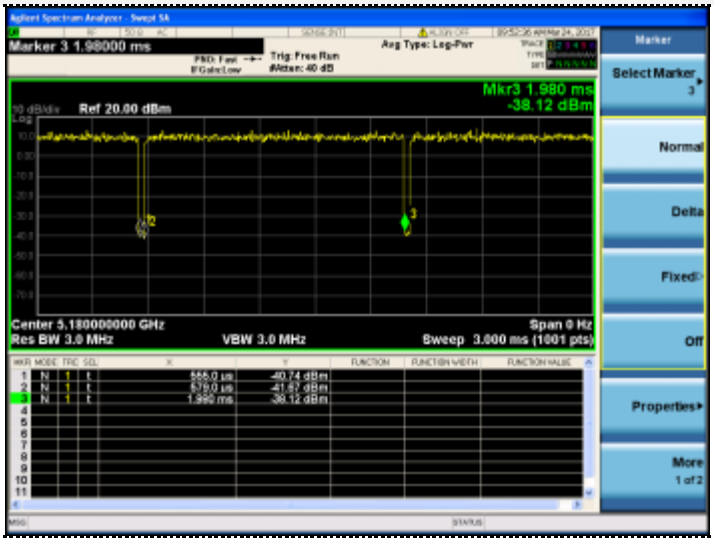
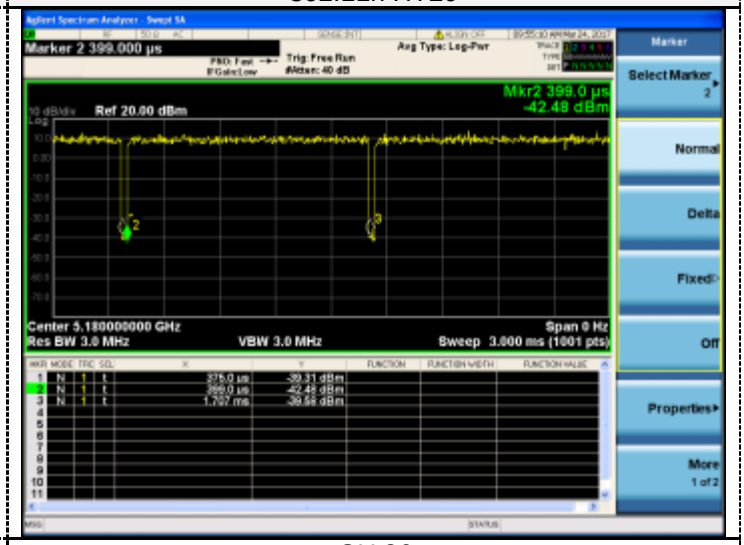
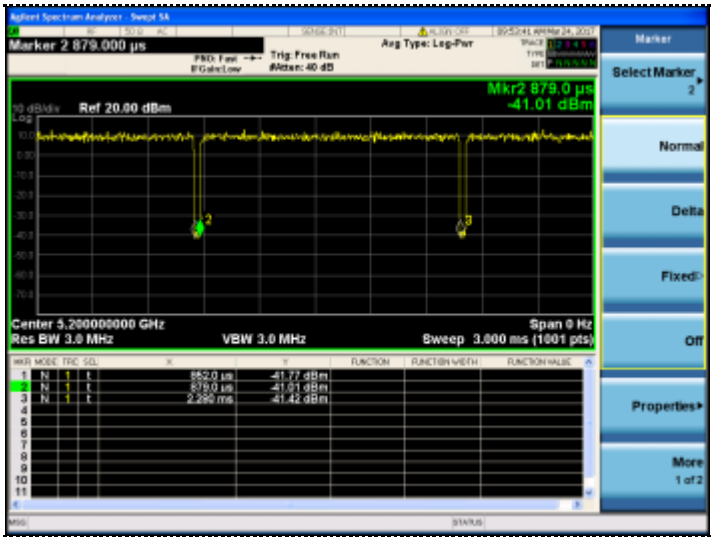
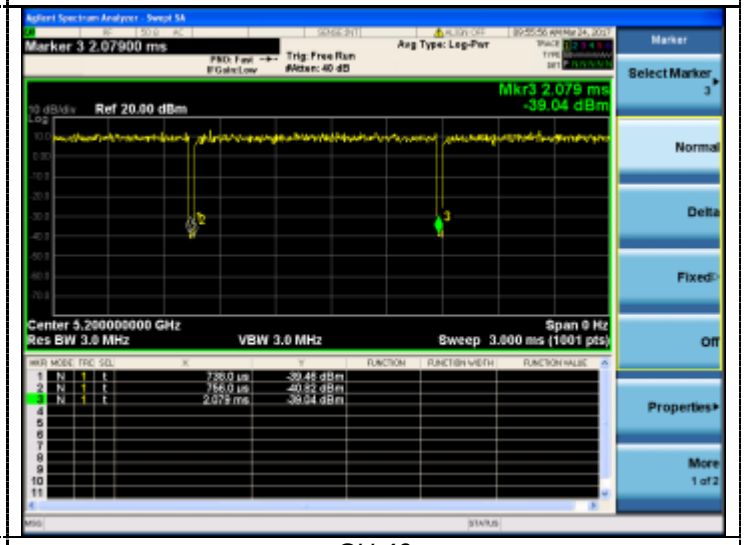
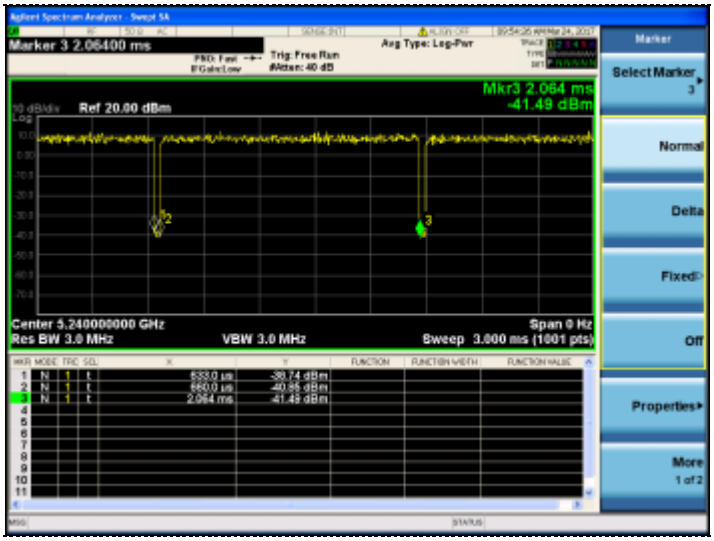
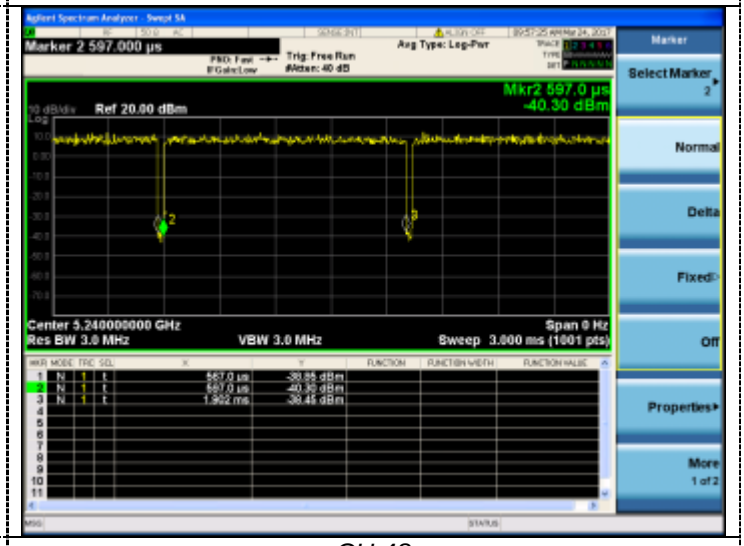
	
CH 157	*CH 157*
	
CH 165	*CH 165*

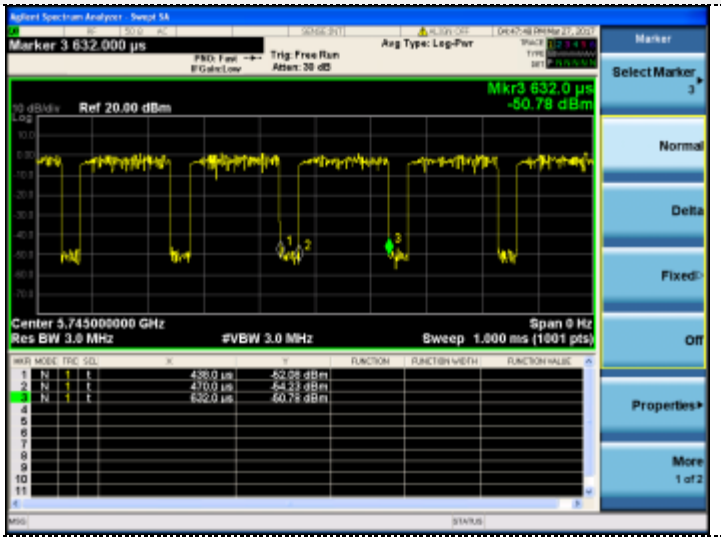
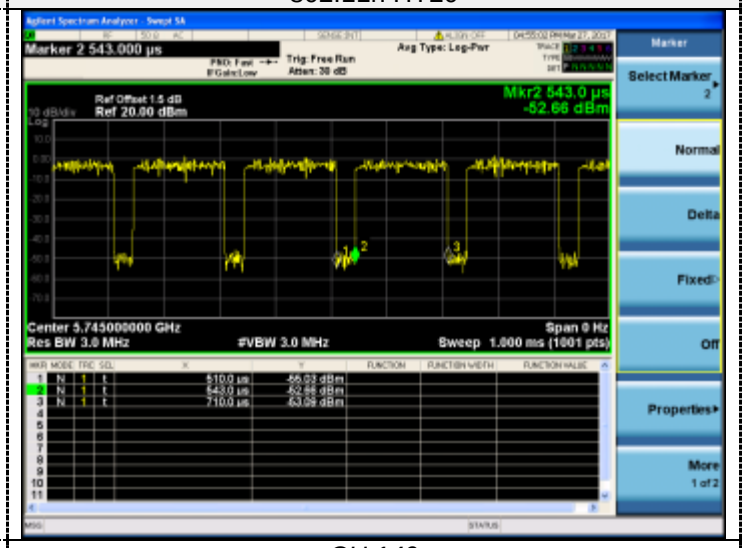
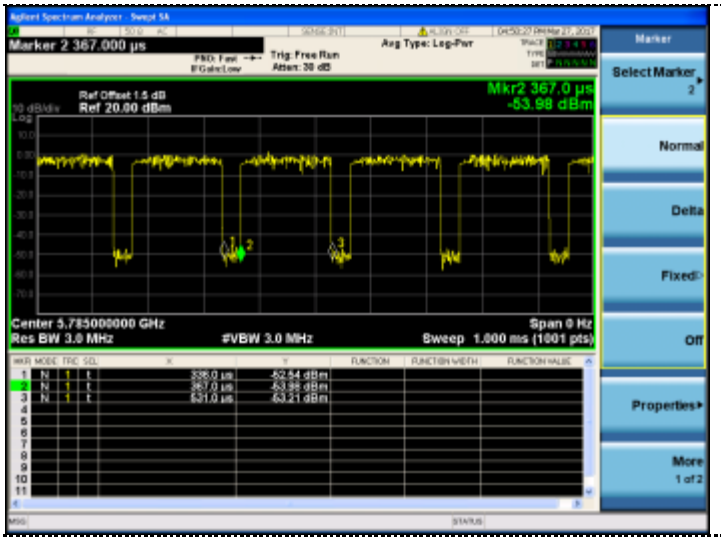
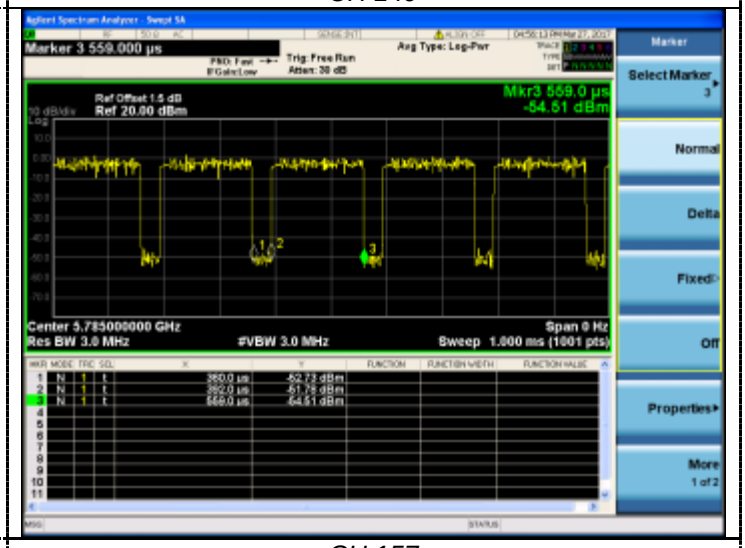
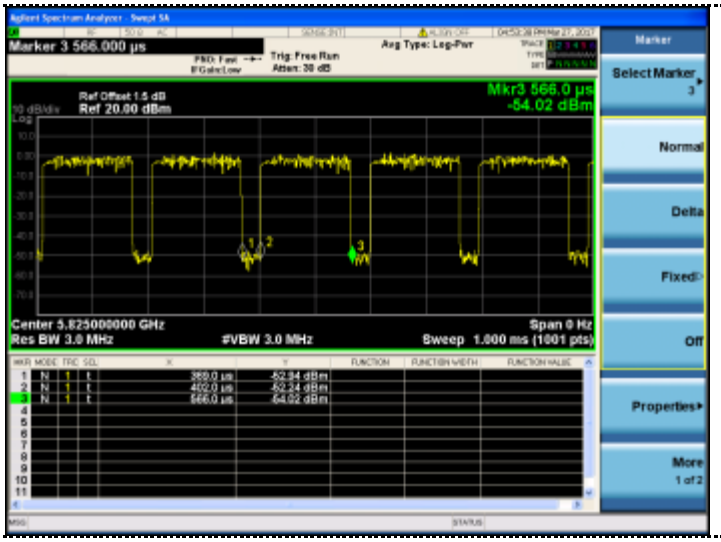
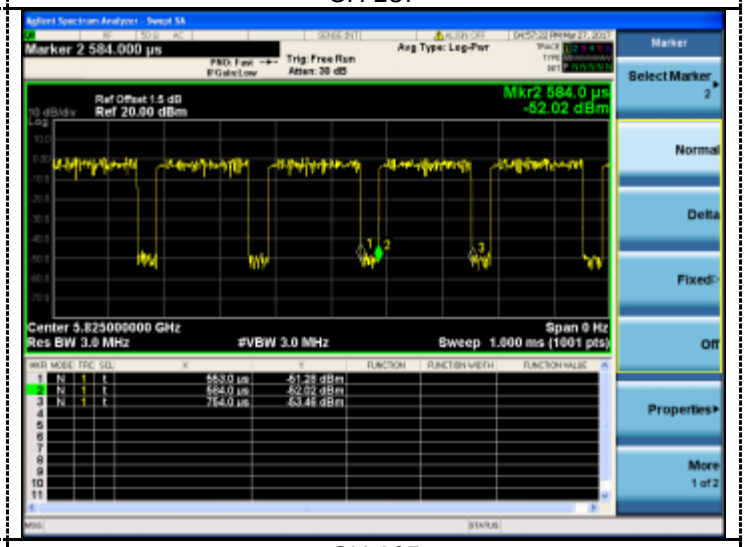
Antenna 3

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

802.11ac	802.11n HT20
	
CH 149	CH 149
	
CH 157	CH 157
	
CH 165	CH 165

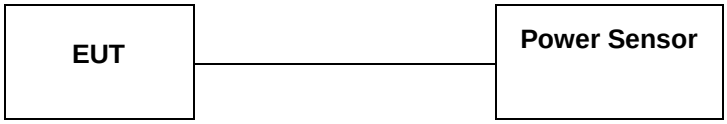
Antenna 4

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

802.11ac	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

802.11ac 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	14.49	11.61	0.083	11.693	24.00	PASS
40	5200	14.62	11.33	0.079	11.409	24.00	PASS
48	5240	13.54	10.75	0.075	10.825	24.00	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
36	5180	14.57	11.71	0.079	11.789	24.00	PASS
40	5200	14.58	11.65	0.088	11.738	24.00	PASS
48	5240	13.42	10.74	0.057	10.797	24.00	PASS

802.11ac 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	4.22	0.732	4.952	30.00	PASS
157	5785	6.79	3.12	0.675	3.795	30.00	PASS
165	5825	6.13	3.57	0.752	4.322	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	8.31	5.45	0.681	6.131	30.00	PASS
157	5785	7.20	4.61	0.752	5.362	30.00	PASS
165	5825	7.70	4.27	0.752	5.022	30.00	PASS

Antenna 2

802.11ac 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	15.39	12.22	0.088	12.308	24.00	PASS
40	5200	15.24	12.54	0.088	12.628	24.00	PASS
48	5240	15.14	12.78	0.097	12.877	24.00	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
36	5180	15.20	12.65	0.070	12.720	24.00	PASS
40	5200	15.20	12.57	0.061	12.631	24.00	PASS
48	5240	14.16	11.84	0.079	11.919	24.00	PASS

802.11ac 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	7.75	4.66	0.767	5.427	30.00	PASS
157	5785	7.81	4.78	0.799	5.579	30.00	PASS
165	5825	7.55	4.32	0.767	5.087	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	7.48	4.29	0.731	5.021	30.00	PASS
157	5785	8.03	4.85	0.711	5.561	30.00	PASS
165	5825	7.47	4.18	0.778	4.958	30.00	PASS

Antenna 3

802.11ac 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	15.21	12.16	0.083	12.243	24.00	PASS
40	5200	15.99	12.75	0.092	12.842	24.00	PASS
48	5240	14.45	11.44	0.092	11.532	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	15.08	12.89	0.079	12.969	24.00	PASS
40	5200	15.52	12.46	0.092	12.552	24.00	PASS
48	5240	14.32	11.71	0.079	11.789	24.00	PASS

802.11ac 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	7.94	4.12	0.767	4.887	30.00	PASS
157	5785	8.05	4.85	0.773	5.623	30.00	PASS
165	5825	7.86	4.01	0.773	4.783	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	7.25	4.11	0.685	4.795	30.00	PASS
157	5785	7.83	4.24	0.778	5.018	30.00	PASS
165	5825	7.17	4.59	0.757	5.347	30.00	PASS

Antenna 4

802.11ac 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	14.42	11.54	0.075	11.615	24.00	PASS
40	5200	14.69	11.12	0.083	11.203	24.00	PASS
48	5240	15.74	12.76	0.083	12.843	24.00	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
36	5180	14.99	11.08	0.079	11.159	24.00	PASS
40	5200	14.86	11.95	0.057	12.007	24.00	PASS
48	5240	14.03	11.45	0.097	11.547	24.00	PASS

802.11ac 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	7.05	4.45	0.783	5.233	30.00	PASS
157	5785	6.89	3.37	0.752	4.122	30.00	PASS
165	5825	6.72	3.81	0.799	4.609	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	6.95	3.47	0.783	4.253	30.00	PASS
157	5785	7.11	4.61	0.762	5.372	30.00	PASS
165	5825	6.84	3.34	0.726	4.066	30.00	PASS

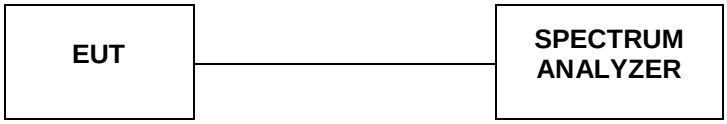
MIMO*4

Type	Channel	Output Power AV + Duty factor (dBm) ANT1	Output Power AV + Duty factor (dBm) ANT2	Output Power AV + Duty factor (dBm) ANT3	Output Power AV + Duty factor (dBm) ANT4	Output Power AV + Duty factor Total (dBm)	Limit (dBm)	Result
802.11ac	36	11.693	12.308	12.243	11.615	18.00	24.00	Pass
	40	11.409	12.628	12.842	11.203	18.10		
	48	10.825	12.877	11.532	12.843	18.13		
802.11n HT20	36	11.789	12.720	12.969	11.159	18.24	24.00	Pass
	40	11.738	12.631	12.552	12.007	18.27		
	48	10.797	11.919	11.789	11.547	17.55		

Type	Channel	Output Power AV + Duty factor (dBm) ANT1	Output Power AV + Duty factor (dBm) ANT2	Output Power AV + Duty factor (dBm) ANT3	Output Power AV + Duty factor (dBm) ANT4	Output Power AV + Duty factor Total (dBm)	Limit (dBm)	Result
802.11ac	149	4.952	5.427	4.887	5.233	11.15	30.00	Pass
	157	3.795	5.579	5.623	4.122	10.88		
	165	4.322	5.087	4.783	4.609	10.73		
802.11n HT20	149	6.131	5.021	4.795	4.253	11.13	30.00	Pass
	157	5.362	5.561	5.018	5.372	11.35		
	165	5.022	4.958	5.347	4.066	10.89		

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

802.11ac 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	3.34	0.083	0.00	3.423	11	PASS
40	5200	2.71	0.079	0.00	2.789	11	PASS
48	5240	2.02	0.075	0.00	2.095	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	3.16	0.079	0.00	3.239	11	PASS
40	5200	2.93	0.088	0.00	3.018	11	PASS
48	5240	1.70	0.057	0.00	1.757	11	PASS

802.11ac 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	-15.46	0.732	6.99	-7.738	30	PASS
157	5785	-15.20	0.675	6.99	-7.535	30	PASS
165	5825	-14.67	0.752	6.99	-6.928	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	-15.26	0.681	6.99	-7.589	30	PASS
157	5785	-15.85	0.752	6.99	-8.108	30	PASS
165	5825	-14.72	0.752	6.99	-6.978	30	PASS

Antenna 2

802.11ac 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	4.35	0.088	0.00	4.438	11	PASS
40	5200	3.92	0.088	0.00	4.008	11	PASS
48	5240	2.89	0.097	0.00	2.987	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	4.11	0.070	0.00	4.180	11	PASS
40	5200	4.03	0.061	0.00	4.091	11	PASS
48	5240	2.87	0.079	0.00	2.949	11	PASS

802.11ac 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	-14.33	0.767	6.99	-6.573	30	PASS
157	5785	-14.11	0.799	6.99	-6.321	30	PASS
165	5825	-13.84	0.767	6.99	-6.083	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	-14.51	0.731	6.99	-6.789	30	PASS
157	5785	-13.98	0.711	6.99	-6.279	30	PASS
165	5825	-13.23	0.778	6.99	-5.462	30	PASS

Antenna 3

802.11ac 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	3.96	0.083	0.00	4.043	11	PASS
40	5200	3.67	0.092	0.00	3.762	11	PASS
48	5240	2.72	0.092	0.00	2.812	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	3.63	0.079	0.00	3.709	11	PASS
40	5200	3.46	0.092	0.00	3.552	11	PASS
48	5240	2.21	0.079	0.00	2.289	11	PASS

802.11ac 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	-15.13	0.767	6.99	-7.373	30	PASS
157	5785	-14.93	0.773	6.99	-7.167	30	PASS
165	5825	-14.29	0.773	6.99	-6.527	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	-14.38	0.685	6.99	-6.705	30	PASS
157	5785	-14.91	0.778	6.99	-7.142	30	PASS
165	5825	-14.34	0.757	6.99	-6.593	30	PASS

Antenna 4

802.11ac 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	4.88	0.075	0.00	4.955	11	PASS
40	5200	4.66	0.083	0.00	4.743	11	PASS
48	5240	3.55	0.083	0.00	3.633	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	4.84	0.079	0.00	4.919	11	PASS
40	5200	4.40	0.057	0.00	4.457	11	PASS
48	5240	3.44	0.097	0.00	3.537	11	PASS

802.11ac 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	-14.09	0.783	6.99	-6.317	30	PASS
157	5785	-13.79	0.752	6.99	-6.048	30	PASS
165	5825	-13.20	0.799	6.99	-5.411	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	-14.16	0.783	6.99	-6.387	30	PASS
157	5785	-14.30	0.762	6.99	-6.548	30	PASS
165	5825	-13.36	0.726	6.99	-5.644	30	PASS

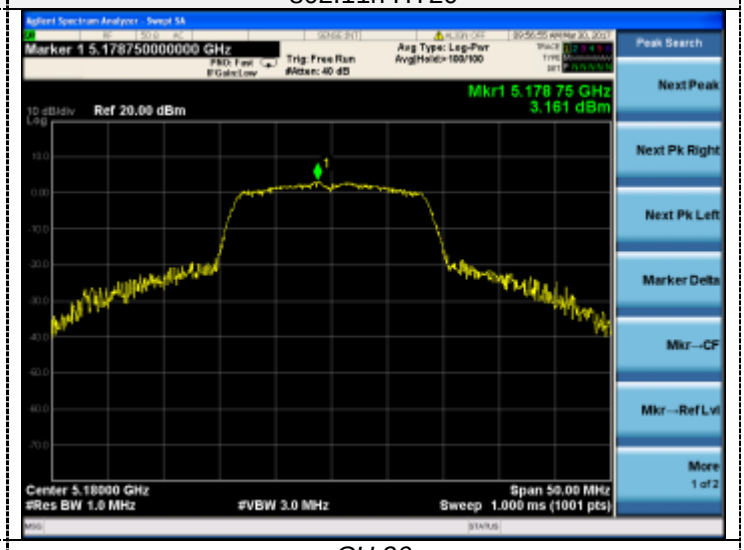
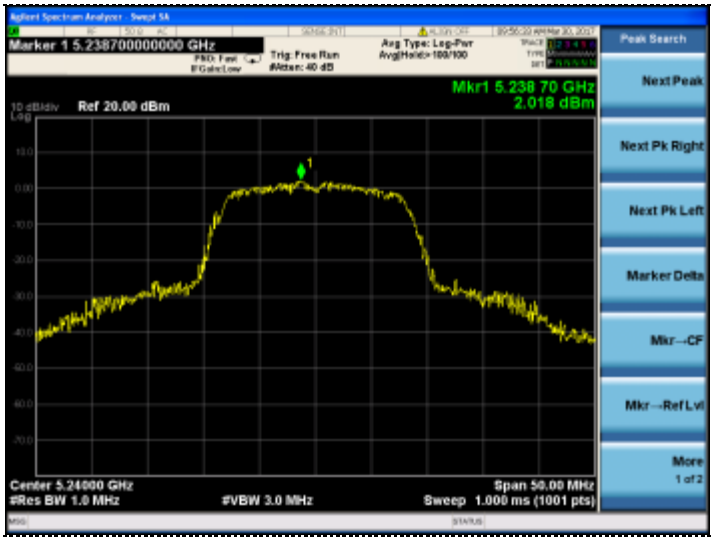
MIMO*4

Type	Channel	Report PSD+Duty factor+RBW factor(dBm/1MHz) ANT1 (dBm/1MHz)	Report PSD+Duty factor+RBW factor(dBm/1MHz) ANT2 (dBm/1MHz)	Report PSD+Duty factor+RBW factor(dBm/1MHz) ANT3 (dBm/1MHz)	Report PSD+Duty factor+RBW factor(dBm/1MHz) ANT4 (dBm/1MHz)	Report PSD+Duty factor+RBW factor(dBm/1MHz) Total (dBm/1MHz)	Limits(dBm/1MHz)	Result
802.11ac	36	3.423	4.438	4.043	4.955	10.27	11.00	Pass
	40	2.789	4.008	3.762	4.743	9.90		
	48	2.095	2.987	2.812	3.633	8.94		
802.11n HT20	36	3.239	4.180	3.709	4.919	10.08	11.00	Pass
	40	3.018	4.091	3.552	4.457	9.83		
	48	1.757	2.949	2.289	3.537	8.71		

Type	Channel	Report PSD+Duty factor+RBW factor(500 kHz) ANT1 (dBm/1MHz)	Report PSD+Duty factor+RBW factor(500 kHz) ANT2 (dBm/1MHz)	Report PSD+Duty factor+RBW factor(500 kHz) ANT3 (dBm/1MHz)	Report PSD+Duty factor+RBW factor(500 kHz) ANT4 (dBm/1MHz)	Report PSD+Duty factor+RBW factor(500kHz) Total (dBm/1MHz)	Limit (dBm/500 kHz)	Result
802.11ac	149	-7.738	-6.573	-7.373	-6.317	-0.94	30.00	Pass
	157	-7.535	-6.321	-7.167	-6.048	-0.71		
	165	-6.928	-6.083	-6.527	-5.411	-0.18		
802.11n HT20	149	-7.589	-6.789	-6.705	-6.387	-0.82	30.00	Pass
	157	-8.108	-6.279	-7.142	-6.548	-0.94		
	165	-6.978	-5.462	-6.593	-5.644	-0.10		

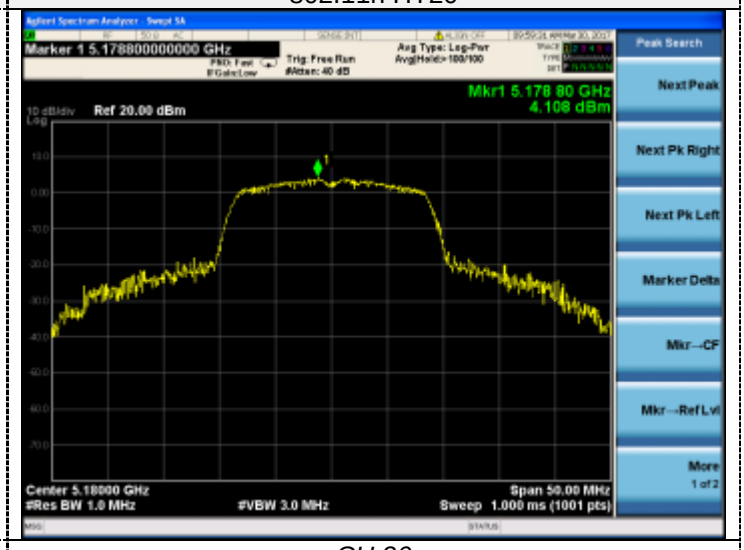
Note:
1. For 802.11ac mode at finial test to get the worst-case emission at 6Mbps.
2. For 802.11n HT20 mode at finial test to get the worst-case emission at 6.5Mbps.
3. The test results including the cable lose.

Antenna 1

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

802.11ac	802.11n HT20
	
CH 149	CH 149
	
CH 157	CH 157
	
CH 165	CH 165

Antenna 2

802.11ac	802.11n HT20
	
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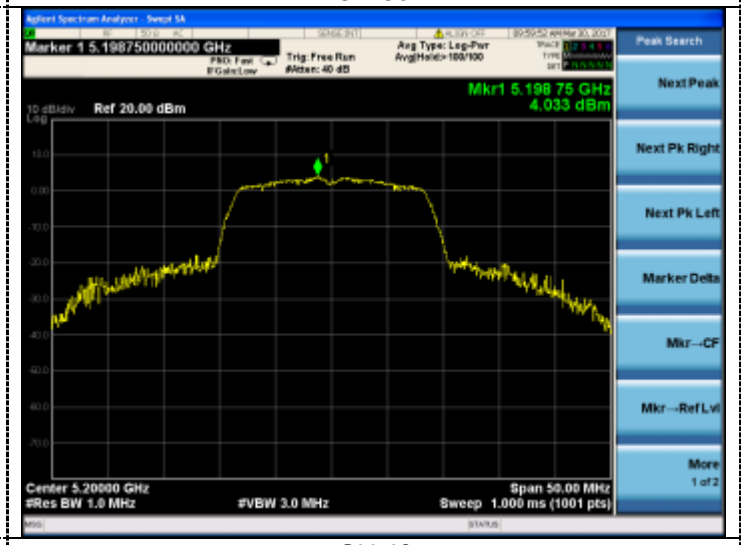
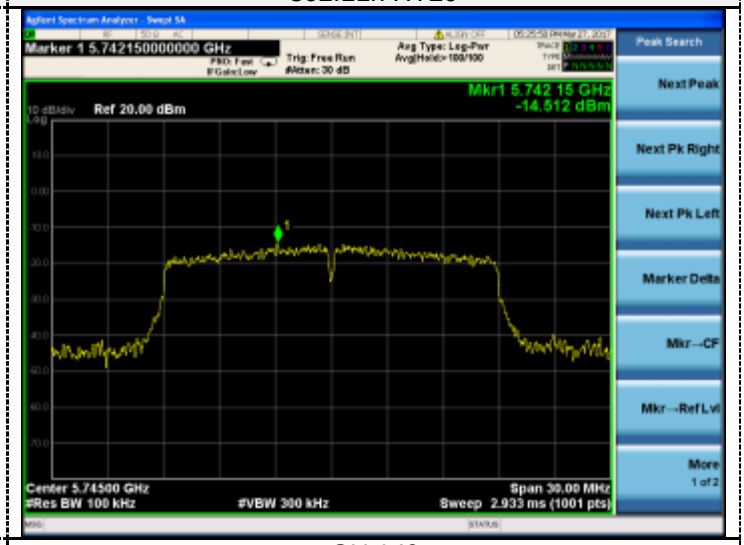
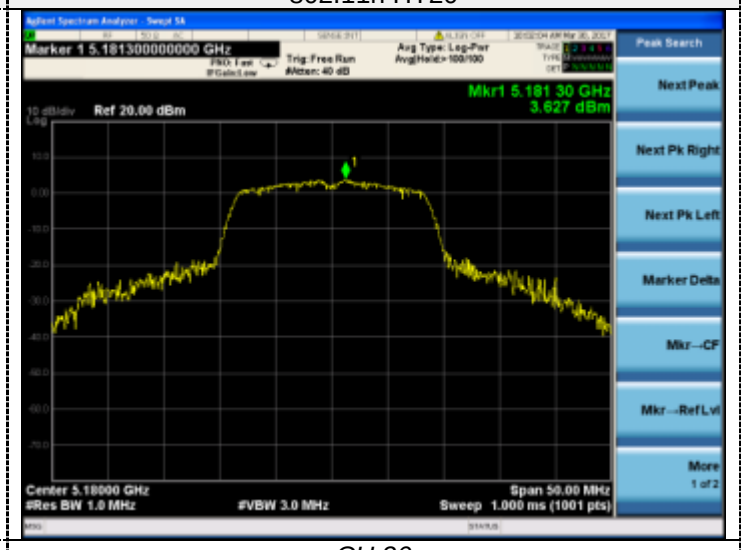
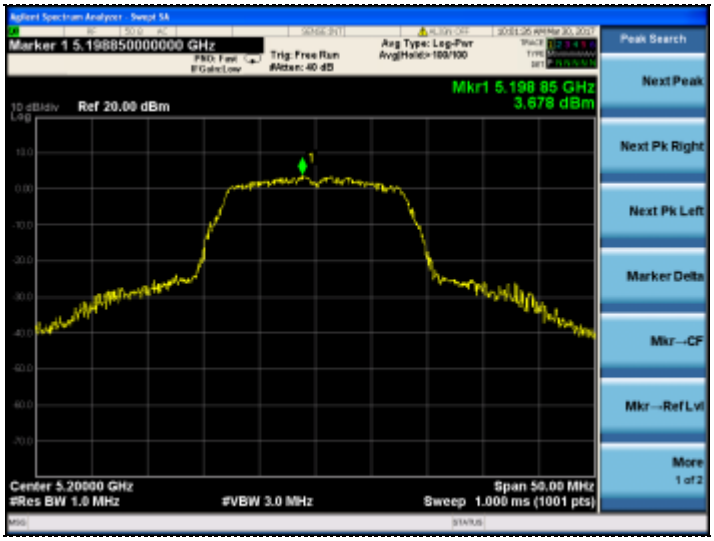
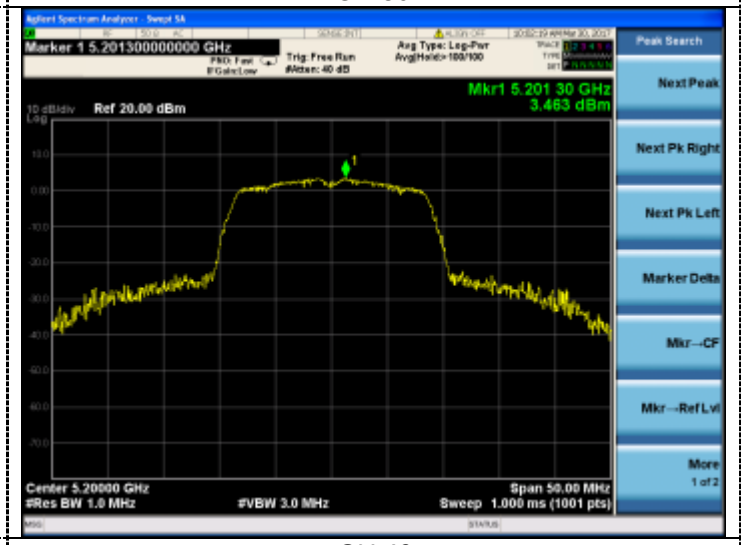
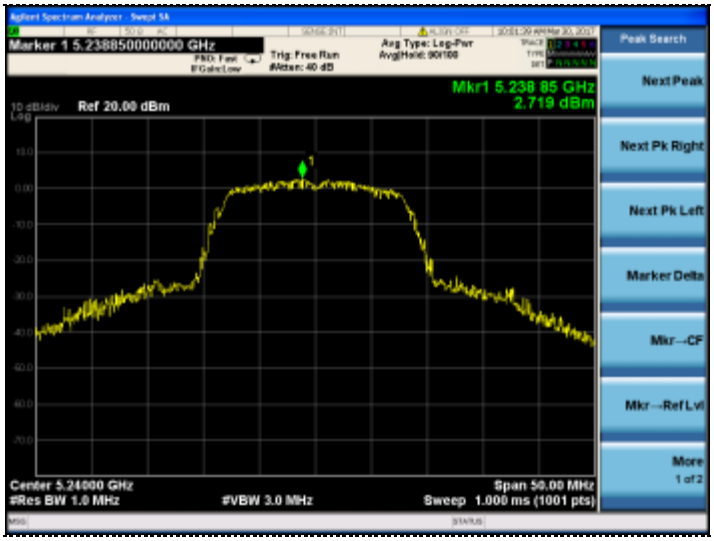
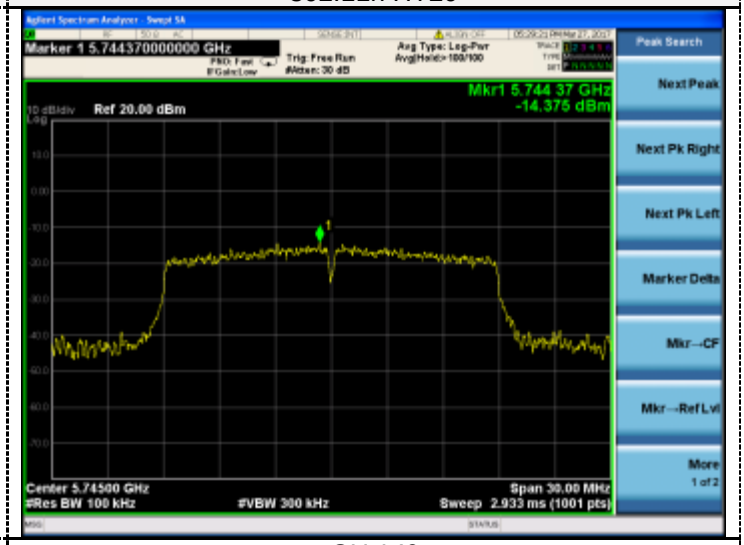
	
CH 40	*CH 40*
	
CH 48	*CH 48*

802.11ac	802.11n HT20
	
CH 149	CH 149
	
CH 157	CH 157
	
CH 165	CH 165

Antenna 3

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

802.11ac	802.11n HT20
	
CH 149	CH 149
	
CH 157	CH 157
	
CH 165	CH 165