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 15.247

Report Reference No. ..... :	**GTSR17050097-01**
FCC ID. ..... :	**2AL6K-R8192RD3**
Compiled by (position+printed name+signature) . :	File administrators Jimmy Wang
Supervised by (position+printed name+signature) . :	Test Engineer Peter Xiao
Approved by (position+printed name+signature) . :	Manager Sam Wang
Date of issue ..... :	Jun. 05, 2017
Representative Laboratory Name. :	**Shenzhen Global Test Service Co.,Ltd.**
Address ..... :	1F, Building No. 13A, Zhonghaixin Science and Technology City, No.12,6 Road, Ganli Industrial Park, Buji Street, Longgang District, Shenzhen, Guangdong
Applicant's name ..... :	**ShenZhen BiLian Electronic Co.,Ltd.**
Address ..... :	Building B1,Zhongxing Industrial Zone,Juling,Jutang Community, Guanlan street,LongHua district, Shenzhen,Guangdong,P.R.China
Test specification ..... **:**	
Standard..... :	**FCC Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz**
TRF Originator ..... :	Shenzhen Global Test Service Co.,Ltd.
Master TRF ..... :	Dated 2014-12

Test item description ..... :	300Mbps WIRELESS USB ADAPTER
Trade Mark..... :	/
Manufacturer ..... :	**ShenZhen BiLian Electronic Co.,Ltd.**
Model/Type reference ..... :	BL-R8192RD3
Listed Models ..... :	/
Operation Frequency ..... :	From 2412MHz to 2462MHz
Hardware Version ..... :	94V-0
Software Version..... :	V1.1
Rating..... :	USB 5V From PC
Result ..... :	**PASS**

T E S T R E P O R T

Test Report No. :	**GTSR17050097-01**	Jun. 05, 2017 Date of issue

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

Test Result:	**PASS**

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

Contents

1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.
ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices
KDB558074 D01 V04: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

2. SUMMARY

2.1. General Remarks

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

2.2. Product Description

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

2.3. Equipment Under Test

Power supply system utilised

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

USB 5V From PC

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

This is a 300Mbps WIRELESS USB ADAPTER.

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

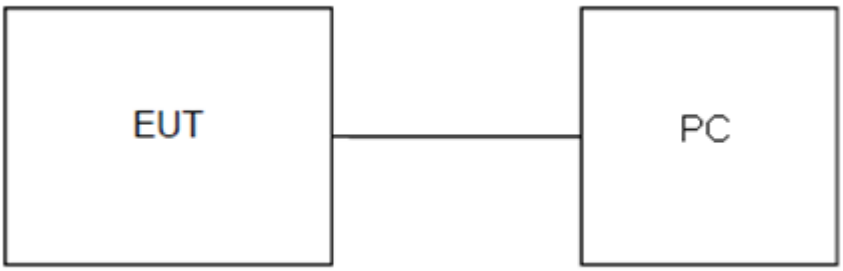
2.5. EUT operation mode

The application provider specific test software to control sample in continuous TX and RX (Duty Cycle >98%) for testing meet KDB558074 test requirement.

IEEE 802.11b/g/n: Thirteen channels are provided to the EUT.

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432		
6	2437		
7	2442		

2.6. Block Diagram of Test Setup



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

This submittal(s) (test report) is intended for **FCC ID: 2AL6K-R8192RD3** filing to comply with Section 15.247 of the FCC Part 15, Subpart C 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
§15.247(b)(4)	Antenna gain	802.11b	☒ Lowest ☒ Middle ☒ Highest	802.11b	☒ Lowest ☒ Middle ☒ Highest	☒	☐	☐	☐	complies
§15.247(e)	Power spectral density	802.11b 802.11g 802.11n HT20 802.11n HT20 Mimo mode	☒ Lowest ☒ Middle ☒ Highest	802.11b 802.11g 802.11n HT20 802.11n HT20 Mimo mode	☒ Lowest ☒ Middle ☒ Highest	☒	☐	☐	☐	complies
§15.247(a)(2)	Spectrum bandwidth – 6 dB bandwidth	802.11b 802.11g 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	802.11b 802.11g 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	☒ ☒	☐	☐	☐	complies
§15.247(b)(1)	Maximum output power	802.11b 802.11g 802.11n HT20 802.11n HT20 Mimo mode	☒ Lowest ☒ Middle ☒ Highest	802.11b 802.11g 802.11n HT20 802.11n HT20 Mimo mode	☒ Lowest ☒ Middle ☒ Highest	☒ ☒ ☒	☐	☐	☐	complies
§15.247(d)	Band edge compliance conducted	802.11b 802.11g 802.11n HT20	☒ Lowest ☒ Highest	802.11b 802.11g 802.11n HT20	☒ Lowest ☒ Highest	☒ ☒	☐	☐	☐	complies
§15.205	Band edge compliance radiated	802.11b 802.11g 802.11n HT20 802.11n HT20 Mimo mode	☒ Lowest ☒ Highest	802.11b 802.11g 802.11n HT20 802.11n HT20 Mimo mode	☒ Lowest ☒ Highest	☒	☐	☐	☐	complies
§15.247(d)	TX spurious emissions conducted	802.11b 802.11g 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	802.11b 802.11g 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	☒ ☒	☐	☐	☐	complies
§15.247(d)	TX spurious emissions radiated	802.11b 802.11g 802.11n HT20 802.11n HT20 Mimo mode	☒ Lowest ☒ Middle ☒ Highest	802.11b 802.11g 802.11n HT20 802.11n HT20 Mimo mode	☒ Lowest ☒ Middle ☒ Highest	☒	☐	☐	☐	complies
§15.109	RX spurious emissions radiated	-/-	-/-	-/-	-/-	☐	☐	☒	☐	complies
§15.209(a)	TX spurious Emissions radiated < 30 MHz	802.11b	-/-	802.11b	-/-	☒	☐	☐	☐	complies
§15.107(a) §15.207	Conducted Emissions < 30 MHz	802.11b	-/-	802.11b	-/-	☒	☐	☐	☐	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 Spurious RF conducted emission Radiated Emission 9kHz~1GHz& Radiated Emission 1GHz~10th Harmonic	11b/DSSS	1 Mbps	1/6/11
	11g/OFDM	6 Mbps	1/6/11
	11n(20MHz)/OFDM	6.5Mbps	1/6/11
Band Edge	11b/DSSS	1 Mbps	1/11
	11g/OFDM	6 Mbps	1/11
	11n(20MHz)/OFDM	6.5Mbps	1/11

3.5. Statement of the measurement uncertainty

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

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

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

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

3.6. Equipments Used during the Test

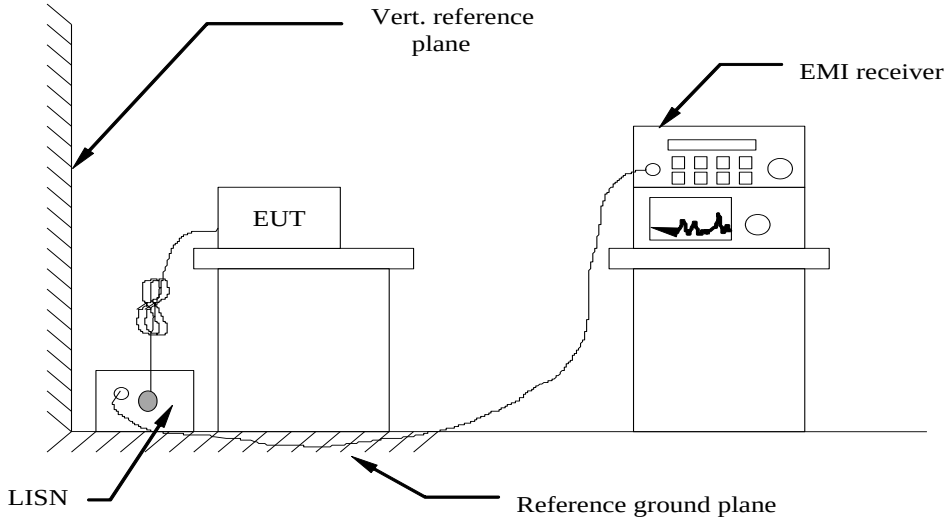
Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.08	2017/05/28	2018/05/27
LISN	R&S	ESH2-Z5	893606/008	2017/05/27	2018/05/26
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2017/06/02	2018/06/01
EMI Test Receiver	R&S	ESCI	101102	2016/06/26	2017/06/25
Spectrum Analyzer	Agilent	N9020A	MY48010425	2016/06/17	2017/06/16
Controller	EM Electronics	Controller EM 1000	N/A	2016/06/17	2017/06/16
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2017/05/19	2018/05/18
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2017/05/19	2018/05/18
Amplifier	Agilent	8349B	3008A02306	2017/05/19	2018/05/18
Amplifier	Agilent	8447D	2944A10176	2017/05/19	2018/05/18
Temperature/Humidity Meter	Gangxing	CTH-608	02	2017/05/19	2018/05/18
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	N/A	2017/05/19	2018/05/18
High-Pass Filter	K&L	41H10-1375/U12750-O/O	N/A	2017/05/19	2018/05/18
Data acquisition card	Agilent	U2531A	TW53323507	2017/05/20	2018/05/19
Power Sensor	Agilent	U2021XA	MY5365004	2017/05/20	2018/05/19
Power Sensor	Agilent	U2021XA	MY5334008	2017/05/20	2018/05/19
RF Cable	HUBER+SUHNER	RG214	N/A	2017/05/20	2018/05/19

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 USB 5V from PC, the PC received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5 All support equipments received AC power from a second LISN, if any.
6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT.The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

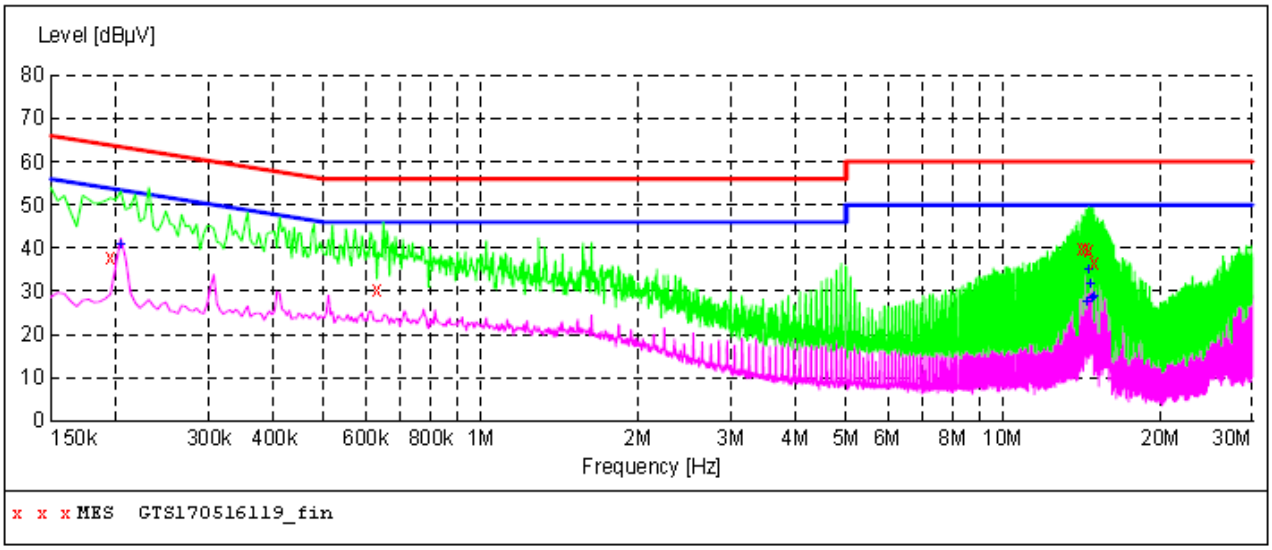
For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

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

TEST RESULTS

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

Power supply:	USB 5V From PC	Polarization	L



MEASUREMENT RESULT: "GTS170516119_fin"

5/16/2017 2:49PM

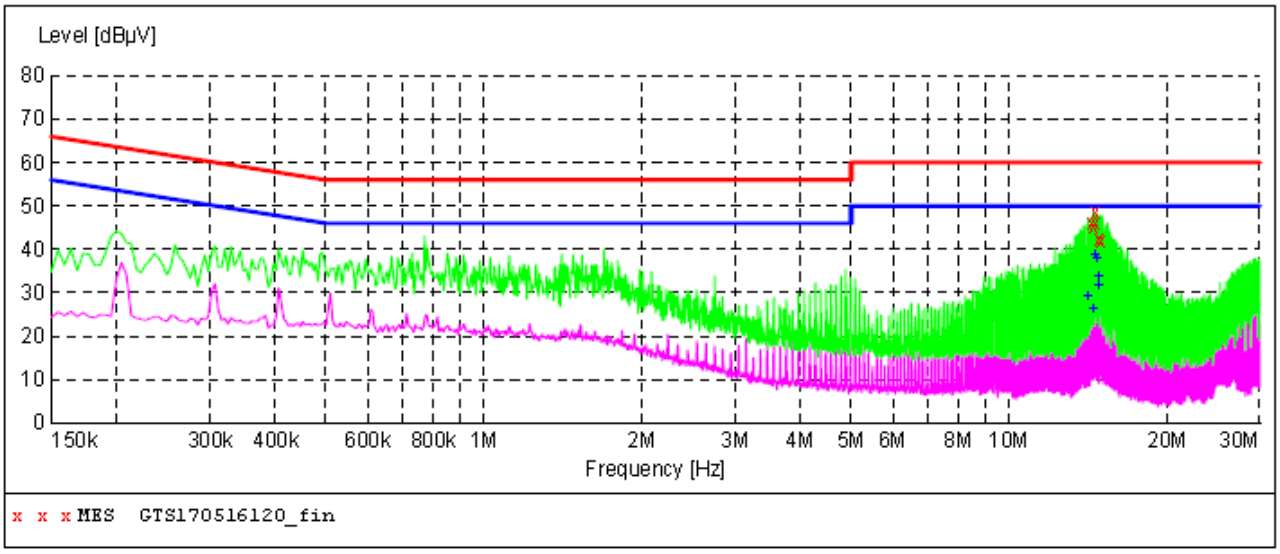
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.195000	37.80	10.0	64	26.0	QP	L1	GND
0.631500	30.40	9.7	56	25.6	QP	L1	GND
14.149500	39.90	8.3	60	20.1	QP	L1	GND
14.370000	39.90	8.3	60	20.1	QP	L1	GND
14.554500	39.60	8.2	60	20.4	QP	L1	GND
14.950500	36.50	8.2	60	23.5	QP	L1	GND

MEASUREMENT RESULT: "GTS170516119_fin2"

5/16/2017 2:49PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.204000	40.60	10.0	53	12.8	AV	L1	GND
14.455500	27.40	8.3	50	22.6	AV	L1	GND
14.568000	34.90	8.2	50	15.1	AV	L1	GND
14.671500	31.60	8.2	50	18.4	AV	L1	GND
14.775000	28.20	8.2	50	21.8	AV	L1	GND
14.874000	28.70	8.2	50	21.3	AV	L1	GND

Power supply:	USB 5V From PC	Polarization	N



MEASUREMENT RESULT: "GTS170516120_fin"

5/16/2017 2:53PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
14.347500	46.10	8.3	60	13.9	QP	N	GND
14.446500	45.40	8.3	60	14.6	QP	N	GND
14.559000	46.30	8.2	60	13.7	QP	N	GND
14.658000	48.80	8.2	60	11.2	QP	N	GND
14.842500	42.30	8.2	60	17.7	QP	N	GND
14.941500	41.90	8.2	60	18.1	QP	N	GND

MEASUREMENT RESULT: "GTS170516120_fin2"

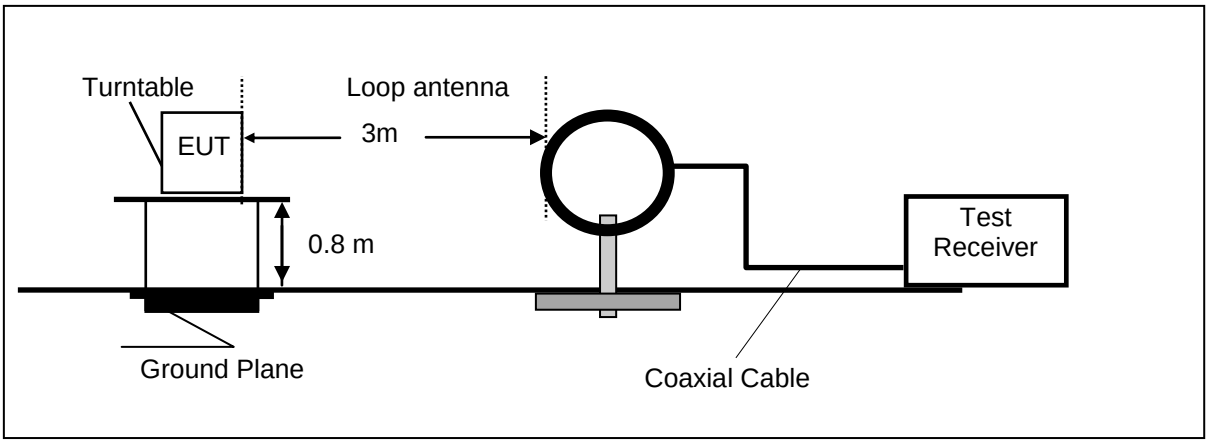
5/16/2017 2:53PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
14.131500	29.30	8.3	50	20.7	AV	N	GND
14.433000	26.10	8.3	50	23.9	AV	N	GND
14.550000	38.60	8.2	50	11.4	AV	N	GND
14.649000	37.70	8.2	50	12.3	AV	N	GND
14.752500	33.80	8.2	50	16.2	AV	N	GND
14.856000	31.70	8.2	50	18.3	AV	N	GND

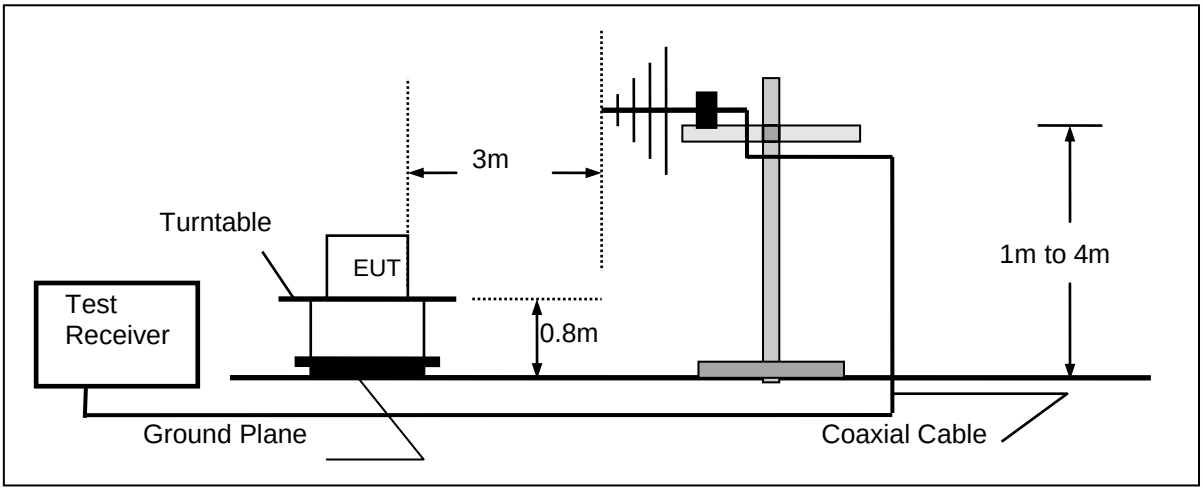
4.2. Radiated Emission

TEST CONFIGURATION

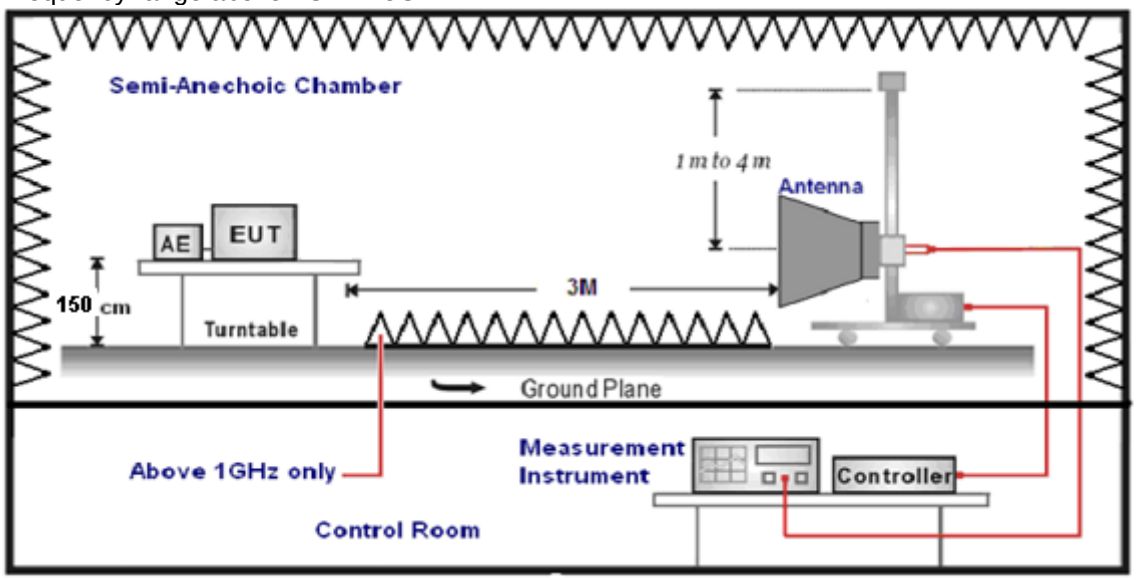
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



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 frequency range 1GHz – 25GHz.
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. Radiated emission test frequency band from 9KHz to 25GHz.
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

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the100kHz bandwidth within the band that contains the highest level of desired power.

The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos.

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

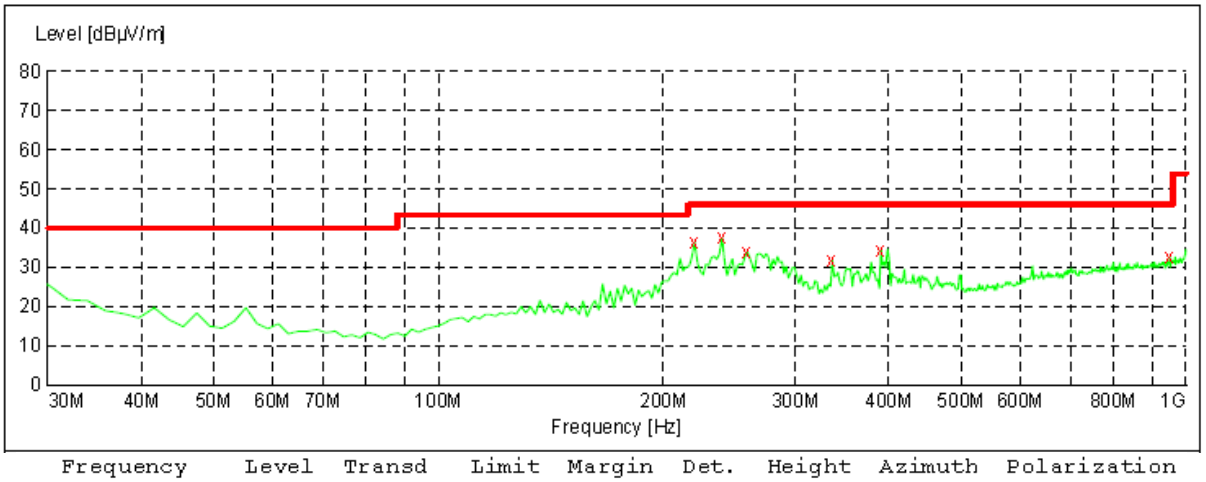
Remark: We tested at 802.11b/802.11g/802.11n HT20 mode at the antenna single transmitting mode and 802.11n HT20 at the Mimo mode, recored the worst data at the antenna single transmitting mode.
Test site: Shenzhen CTL Testing Technology Co., Ltd.

For 9 KHz-30MHz

Frequency (MHz)	Corrected Reading (dBuV/m)@3m	FCC Limit (dBuV/m) @3m	Margin (dB)	Detector	Result
0.32	46.24	97.50	51.26	QP	PASS
1.86	45.75	69.54	23.79	QP	PASS
15.28	45.39	69.54	24.15	QP	PASS
24.17	45.77	69.54	23.77	QP	PASS

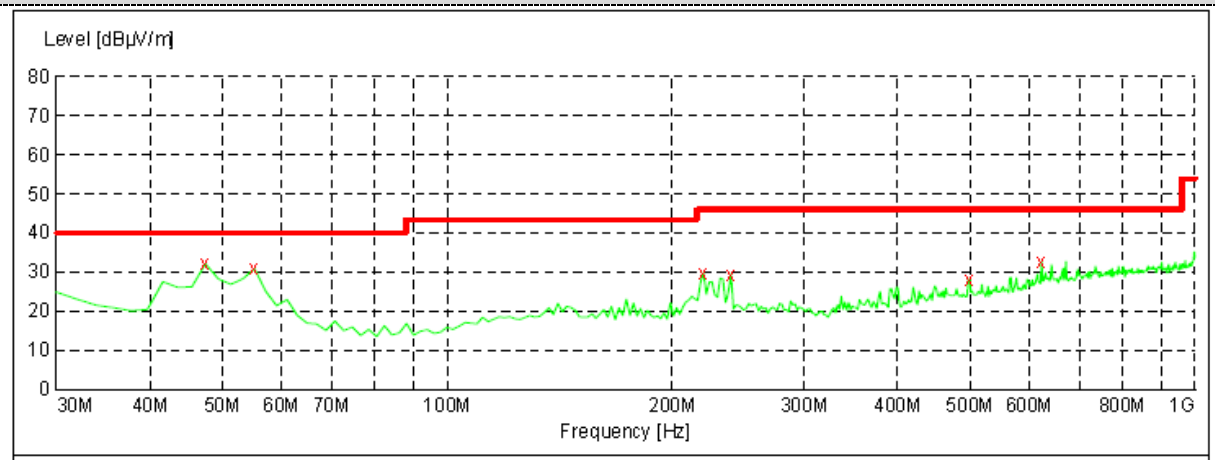
For 30MHz-1GHz

Horizontal



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
220.120000	36.40	13.9	46.0	9.6	PK	100	325.0	HORIZONTAL
239.520000	37.50	13.7	46.0	8.5	PK	100	157.0	HORIZONTAL
258.920000	34.00	14.6	46.0	12.0	PK	100	227.0	HORIZONTAL
336.520000	31.70	16.3	46.0	14.3	PK	200	115.0	HORIZONTAL
390.840000	34.40	17.8	46.0	11.6	PK	200	46.0	HORIZONTAL
951.500000	32.60	26.5	46.0	13.4	PK	200	236.0	HORIZONTAL

Vertical



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	32.10	8.7	40.0	7.9	PK	100	175.0	VERTICAL
55.220000	30.80	8.0	40.0	9.2	PK	100	298.0	VERTICAL
220.120000	29.80	13.9	46.0	16.2	PK	100	59.0	VERTICAL
239.520000	29.50	13.7	46.0	16.5	PK	300	113.0	VERTICAL
499.480000	28.20	20.2	46.0	17.8	PK	300	259.0	VERTICAL
623.640000	32.70	22.3	46.0	13.3	PK	300	233.0	VERTICAL

For 1GHz to 25GHz

802.11b Mode (above 1GHz)

Frequency(MHz):				2412			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4824	45.41	PK	74	28.59	1.00	105	43.31	31.60	7.00	36.5	2.10
1	4824	36.28	AV	54	17.72	1.00	105	34.18	31.60	7.00	36.5	2.10
2	7236	46.28	PK	74	27.72	1.00	312	35.35	37.33	8.90	35.3	10.93
2	7236	37.12	AV	54	16.88	1.00	312	26.19	37.33	8.90	35.3	10.93

Frequency(MHz):				2412			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4824	47.23	PK	74	26.77	1.00	274	45.13	31.60	7.00	36.50	2.10
1	4824	36.17	AV	54	17.83	1.00	274	34.07	31.60	7.00	36.50	2.10
2	7236	45.86	PK	74	28.14	1.00	156	34.93	37.33	8.90	35.30	10.93
2	7236	36.14	AV	54	17.86	1.00	156	25.21	37.33	8.90	35.30	10.93

Frequency(MHz):				2437			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	45.69	PK	74.00	28.31	1.00	122	43.57	31.02	7.60	36.5	2.12
1	4874.00	37.22	AV	54.00	16.78	1.00	122	35.10	31.02	7.60	36.5	2.12
2	7311.00	46.28	PK	74.00	27.72	1.00	255	35.20	37.28	8.60	34.8	11.08
2	7311.00	36.47	AV	54.00	17.53	1.00	255	25.39	37.28	8.60	34.8	11.08

Frequency(MHz):				2437			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	46.31	PK	74.00	27.69	1.00	244	44.19	31.02	7.60	36.5	2.12
1	4874.00	36.27	AV	54.00	17.73	1.00	244	34.15	31.02	7.60	36.5	2.12
2	7311.00	47.58	PK	74.00	26.42	1.00	198	36.50	37.28	8.60	34.8	11.08
2	7311.00	35.28	AV	54.00	18.72	1.00	198	24.20	37.28	8.60	34.8	11.08

Frequency(MHz):				2462			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4924.00	47.32	PK	74.00	26.68	1.00	303	44.12	31.58	7.82	36.2	3.20
1	4924.00	36.55	AV	54.00	17.45	1.00	303	33.35	31.58	7.82	36.2	3.20
2	7386.00	46.39	PK	74.00	27.61	1.00	165	34.45	38.51	8.73	35.3	11.94
2	7386.00	36.41	AV	54.00	17.59	1.00	165	24.47	38.51	8.73	35.3	11.94

Frequency(MHz):				2462			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4924.00	47.59	PK	74.00	26.41	1.00	177	44.39	31.58	7.82	36.2	3.20
1	4924.00	36.84	AV	54.00	17.16	1.00	177	33.64	31.58	7.82	36.2	3.20
2	7386.00	46.94	PK	74.00	27.06	1.00	114	35.00	38.51	8.73	35.3	11.94
2	7386.00	37.22	AV	54.00	16.78	1.00	114	25.28	38.51	8.73	35.3	11.94

802.11g Mode (above 1GHz)

Frequency(MHz):				2412			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4824	47.34	PK	74	26.66	1.00	285	45.24	31.6	7.00	36.5	2.10
1	4824	35.08	AV	54	18.92	1.00	285	32.98	31.6	7.00	36.5	2.10
2	7236	46.61	PK	74	27.39	1.00	316	35.68	37.33	8.90	35.3	10.93
2	7236	36.57	AV	54	17.43	1.00	316	25.64	37.33	8.90	35.3	10.93

Frequency(MHz):				2412			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4824	47.56	PK	74	26.44	1.00	89	45.46	31.60	7.00	36.50	2.10
1	4824	37.25	AV	54	16.75	1.00	89	35.15	31.60	7.00	36.50	2.10
2	7236	46.39	PK	74	27.61	1.00	265	35.46	37.33	8.90	35.30	10.93
2	7236	37.84	AV	54	16.16	1.00	265	26.91	37.33	8.90	35.30	10.93

Frequency(MHz):				2437			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	47.65	PK	74.00	26.35	1.00	178	45.53	31.02	7.60	36.5	2.12
1	4874.00	37.49	AV	54.00	16.51	1.00	178	35.37	31.02	7.60	36.5	2.12
2	7311.00	46.18	PK	74.00	27.82	1.00	133	35.10	37.28	8.60	34.8	11.08
2	7311.00	37.49	AV	54.00	16.51	1.00	133	26.41	37.28	8.60	34.8	11.08

Frequency(MHz):				2437			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	47.62	PK	74.00	26.38	1.00	159	45.50	31.02	7.60	36.5	2.12
1	4874.00	36.82	AV	54.00	17.18	1.00	159	34.70	31.02	7.60	36.5	2.12
2	7311.00	46.73	PK	74.00	27.27	1.00	347	35.65	37.28	8.60	34.8	11.08
2	7311.00	35.99	AV	54.00	18.01	1.00	347	24.91	37.28	8.60	34.8	11.08

Frequency(MHz):				2462			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4924.00	46.87	PK	74.00	27.13	1.00	145	43.67	31.58	7.82	36.2	3.20
1	4924.00	36.92	AV	54.00	17.08	1.00	145	33.72	31.58	7.82	36.2	3.20
2	7386.00	47.85	PK	74.00	26.15	1.00	278	35.91	38.51	8.73	35.3	11.94
2	7386.00	37.64	AV	54.00	16.36	1.00	278	25.70	38.51	8.73	35.3	11.94

Frequency(MHz):				2462			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4924.00	48.28	PK	74.00	25.72	1.00	74	45.08	31.58	7.82	36.2	3.20
1	4924.00	39.62	AV	54.00	14.38	1.00	74	36.42	31.58	7.82	36.2	3.20
2	7386.00	47.06	PK	74.00	26.94	1.00	163	35.12	38.51	8.73	35.3	11.94
2	7386.00	38.54	AV	54.00	15.46	1.00	163	26.60	38.51	8.73	35.3	11.94

802.11n HT20 Mode (above 1GHz)

Frequency(MHz):				2412			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4824	47.88	PK	74	26.12	1.00	311	45.78	31.6	7.00	36.5	2.10
1	4824	37.56	AV	54	16.44	1.00	311	35.46	31.6	7.00	36.5	2.10
2	7236	48.21	PK	74	25.79	1.00	298	37.28	37.33	8.90	35.3	10.93
2	7236	36.49	AV	54	17.51	1.00	298	25.56	37.33	8.90	35.3	10.93

Frequency(MHz):				2412			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4824	47.89	PK	74	26.11	1.00	217	45.79	31.60	7.00	36.50	2.10
1	4824	36.55	AV	54	17.45	1.00	217	34.45	31.60	7.00	36.50	2.10
2	7236	48.26	PK	74	25.74	1.00	161	37.33	37.33	8.90	35.30	10.93
2	7236	37.57	AV	54	16.43	1.00	161	26.64	37.33	8.90	35.30	10.93

Frequency(MHz):				2437			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	46.99	PK	74.00	27.01	1.00	244	44.87	31.02	7.60	36.5	2.12
1	4874.00	37.52	AV	54.00	16.48	1.00	244	35.40	31.02	7.60	36.5	2.12
2	7311.00	48.41	PK	74.00	25.59	1.00	185	37.33	37.28	8.60	34.8	11.08
2	7311.00	36.87	AV	54.00	17.13	1.00	185	25.79	37.28	8.60	34.8	11.08

Frequency(MHz):				2437			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	47.58	PK	74.00	26.42	1.00	126	45.46	31.02	7.60	36.5	2.12
1	4874.00	38.03	AV	54.00	15.97	1.00	126	35.91	31.02	7.60	36.5	2.12
2	7311.00	48.23	PK	74.00	25.77	1.00	329	37.15	37.28	8.60	34.8	11.08
2	7311.00	37.28	AV	54.00	16.72	1.00	329	26.20	37.28	8.60	34.8	11.08

Frequency(MHz):				2462			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4924.00	48.67	PK	74.00	25.33	1.00	62	45.47	31.58	7.82	36.2	3.20
1	4924.00	37.34	AV	54.00	16.66	1.00	62	34.14	31.58	7.82	36.2	3.20
2	7386.00	46.92	PK	74.00	27.08	1.00	186	34.98	38.51	8.73	35.3	11.94
2	7386.00	37.44	AV	54.00	16.56	1.00	186	25.50	38.51	8.73	35.3	11.94

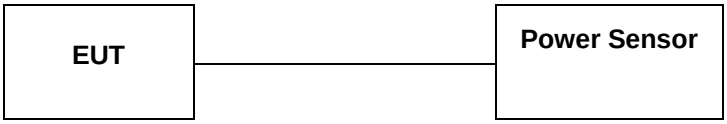
Frequency(MHz):				2462			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4924.00	47.66	PK	74.00	26.34	1.00	264	44.46	31.58	7.82	36.2	3.20
1	4924.00	38.08	AV	54.00	15.92	1.00	264	34.88	31.58	7.82	36.2	3.20
2	7386.00	47.92	PK	74.00	26.08	1.00	105	35.98	35.51	8.73	35.3	11.94
2	7386.00	37.75	AV	54.00	16.25	1.00	105	25.81	38.51	8.73	35.3	11.94

REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.

4.3. Maximum Peak Output Power

TEST CONFIGURATION



TEST PROCEDURE

According to KDB558074 D01 DTS Measurement Guidance Section 9.1 Maximum peak conducted output power,9.1.2. and Average conducted output power, 9.2.3.1.

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

The maximum Average conducted output power may be measured using a wideband RF power meter with a thermocouple derector or equivalent. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

LIMIT

The Maximum Peak Output Power Measurement is 30dBm.

TEST RESULTS

Antenna 1

Type	Channel	Output power PK (dBm)	Output power AV (dBm)	Limit (dBm)	Result
802.11b	01	10.54	7.64	30.00	Pass
	06	10.32	7.45		
	11	10.63	7.68		
802.11g	01	10.14	7.02	30.00	Pass
	06	10.27	7.07		
	11	10.52	7.16		
802.11n(HT20)	01	9.42	4.78	30.00	Pass
	06	9.17	4.73		
	11	9.24	4.82		

Antenna 2

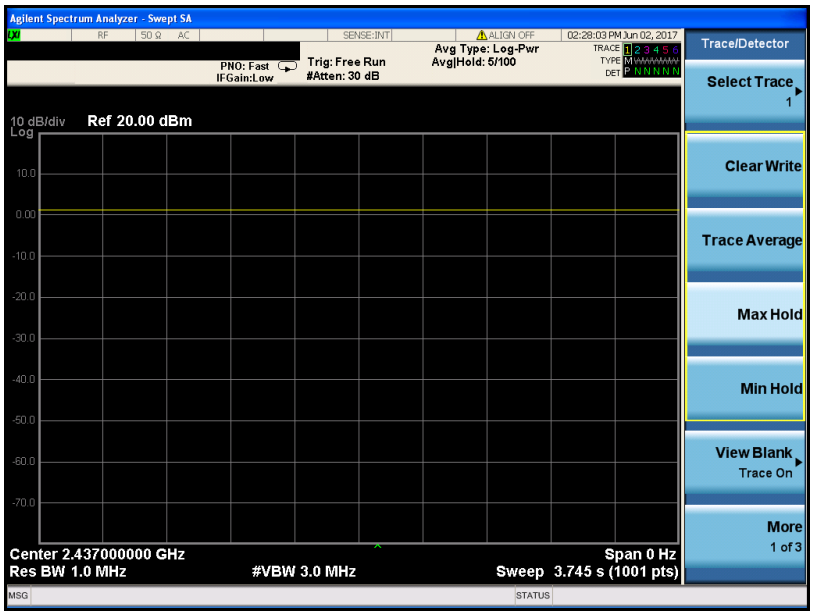
Type	Channel	Output power PK (dBm)	Output power AV (dBm)	Limit (dBm)	Result
802.11b	01	10.47	7.58	30.00	Pass
	06	10.68	7.74		
	11	10.51	7.62		
802.11g	01	10.49	7.45	30.00	Pass
	06	10.37	7.52		
	11	10.28	7.31		
802.11n(HT20)	01	9.63	4.85	30.00	Pass
	06	9.55	4.64		
	11	9.47	4.71		

MIMO*2

Type	Channel	Peak Output power ANT1 (dBm)	Peak Output power ANT2 (dBm)	Peak Output power Total (dBm)	Limit (dBm)	Result
802.11n(HT20)	01	9.42	9.63	12.54	30	Pass
	06	9.17	9.55	12.37		
	11	9.24	9.47	12.37		

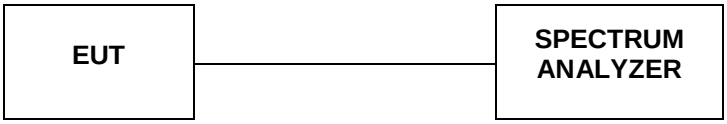
Note: 1.The test results including the cable lose.

Duty cycle used in all test items: 100%



4.4. Power Spectral Density

TEST CONFIGURATION



TEST PROCEDURE

According to KDB 558074 D01 Method PKPSD (peak PSD) This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance, and is optional if the maximum conducted (average) output power was used to demonstrate compliance.

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ 3 RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

LIMIT

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST RESULTS

Antenna 1

Type	Channel	Power Spectral Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
802.11b	01	-23.768	8.00	Pass
	06	-23.611		
	11	-23.029		
802.11g	01	-27.624	8.00	Pass
	06	-26.995		
	11	-26.490		
802.11n(HT20)	01	-27.151	8.00	Pass
	06	-26.620		
	11	-26.292		

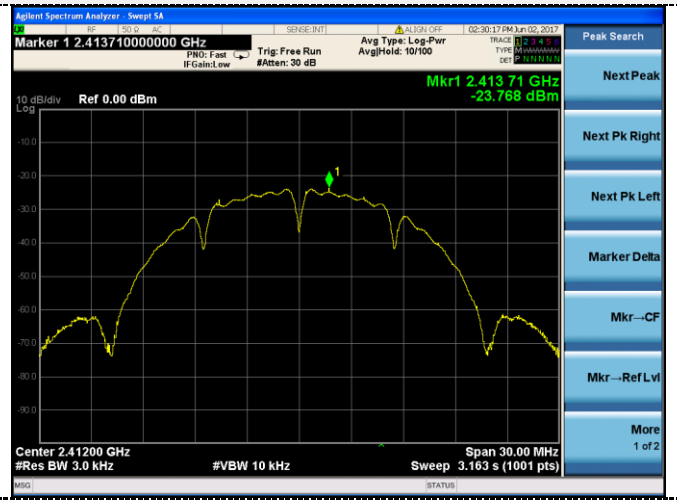
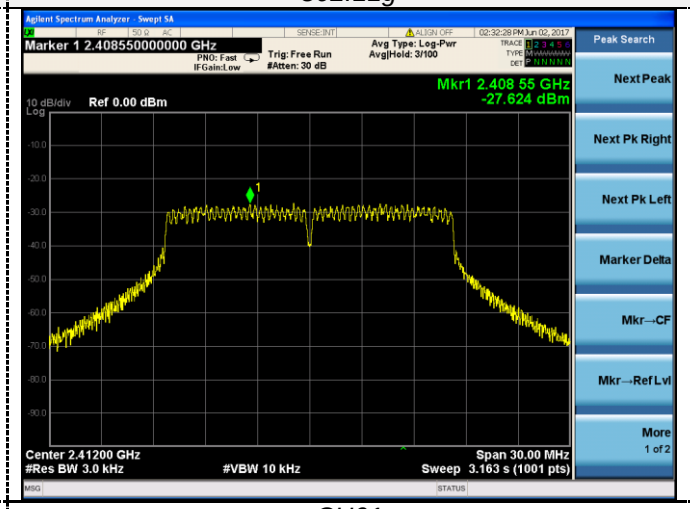
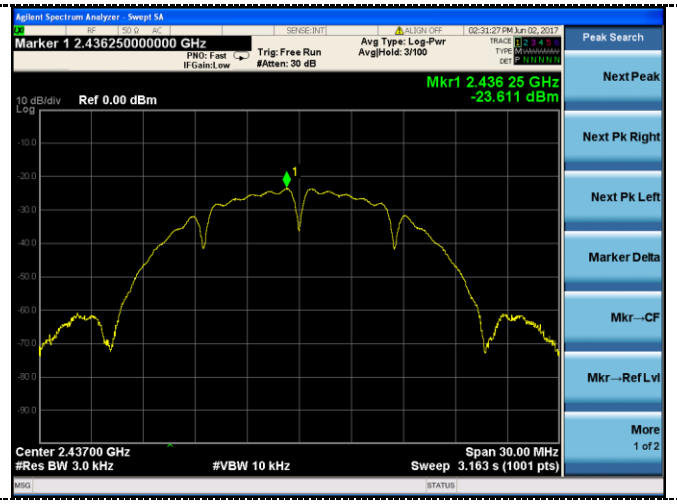
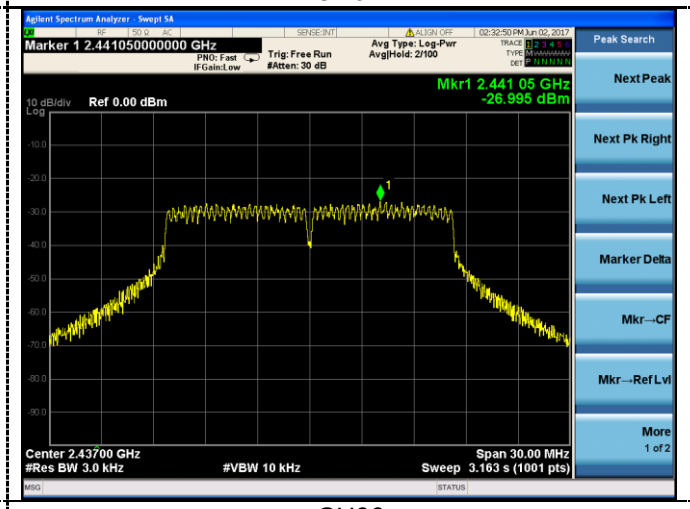
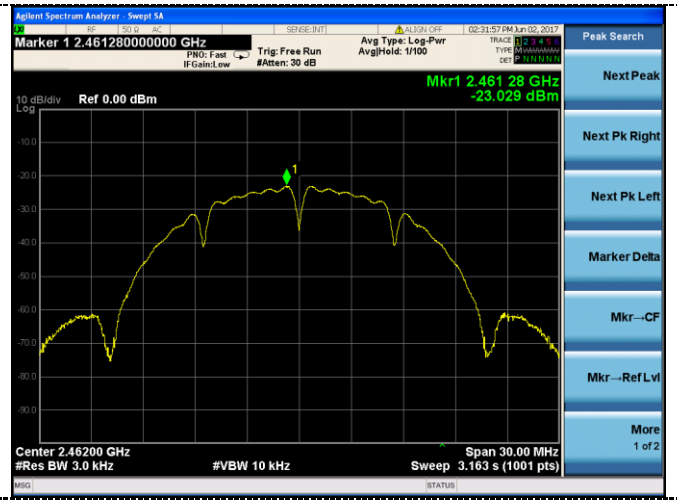
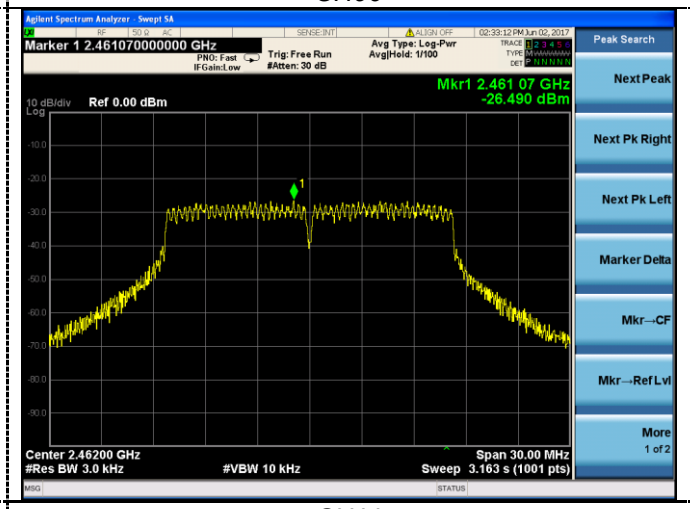
Antenna 2

Type	Channel	Power Spectral Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
802.11b	01	-23.153	8.00	Pass
	06	-23.340		
	11	-22.744		
802.11g	01	-27.148	8.00	Pass
	06	-26.596		
	11	-26.282		
802.11n(HT20)	01	-27.135	8.00	Pass
	06	-26.939		
	11	-26.098		

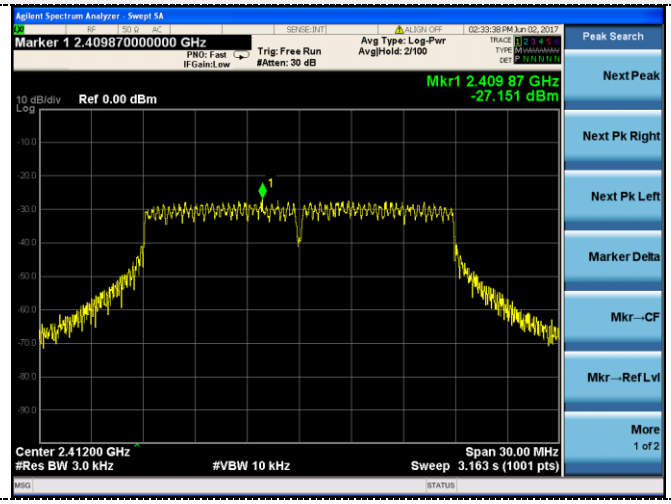
MIMO*2

Type	Channel	Power Spectral Density ANT1 (dBm/3KHz)	Power Spectral Density ANT2 (dBm/3KHz)	Power Spectral Density Total (dBm/3KHz)	Limit (dBm/ 3KHz)	Result
802.11n(HT20)	01	-27.151	-27.135	-24.13	8.00	Pass
	06	-26.620	-26.939	-23.77		
	11	-26.292	-26.098	-23.18		

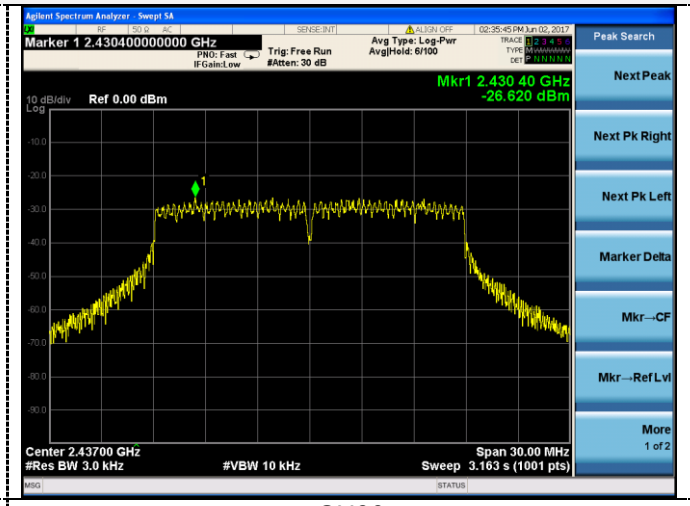
Antenna 1

802.11b	802.11g
	
CH01	CH01
	
CH06	CH06
	
CH11	CH11

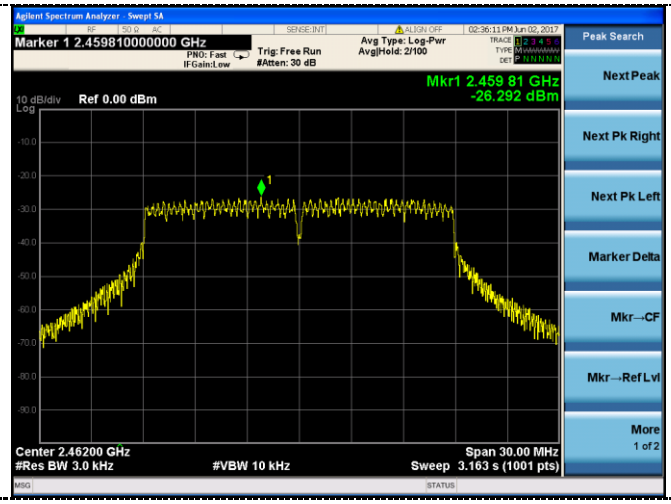
802.11 nHT20



CH01

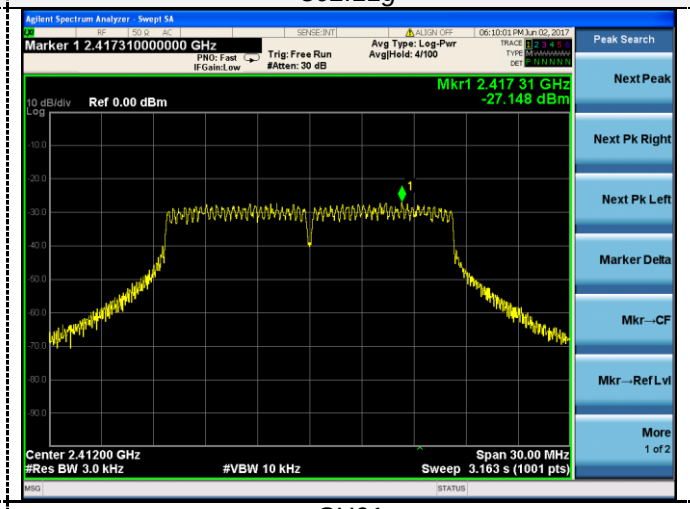
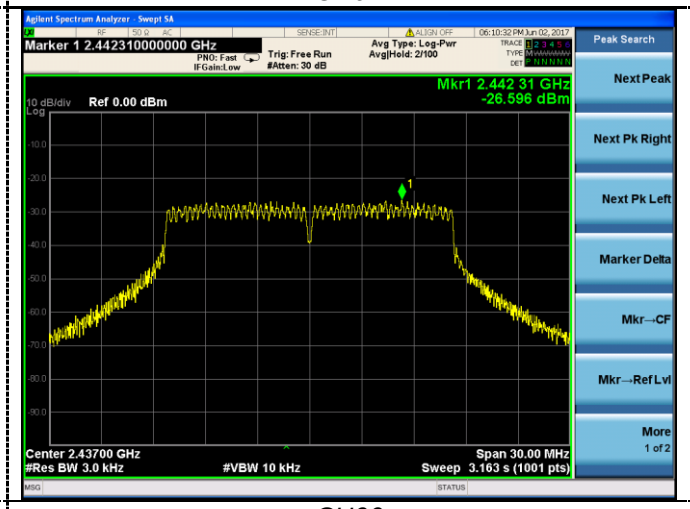
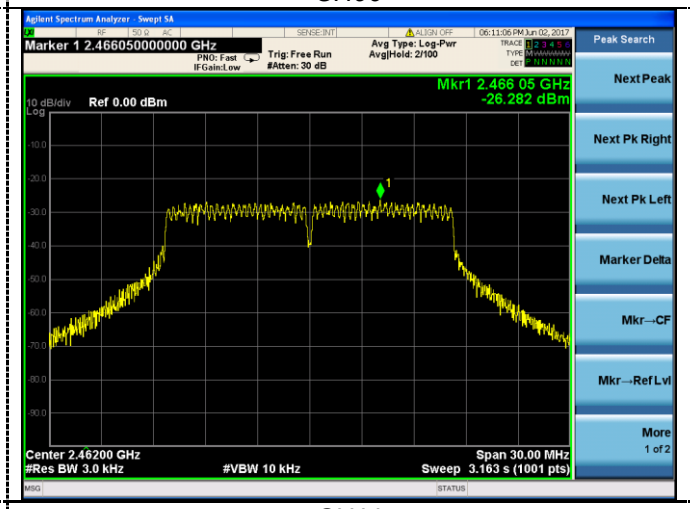


CH06

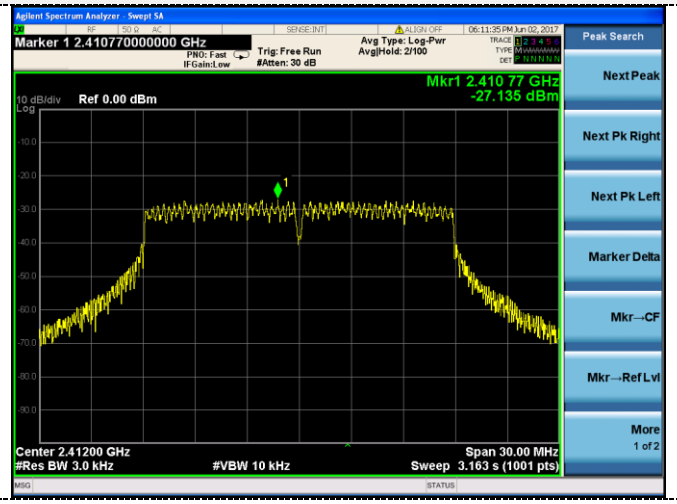


CH11

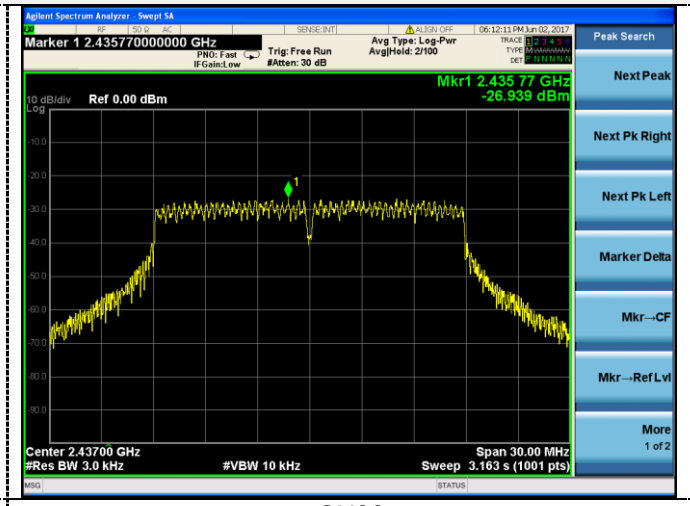
Antenna 2

802.11b	802.11g
	
CH01	CH01
	
CH06	CH06
	
CH11	CH11

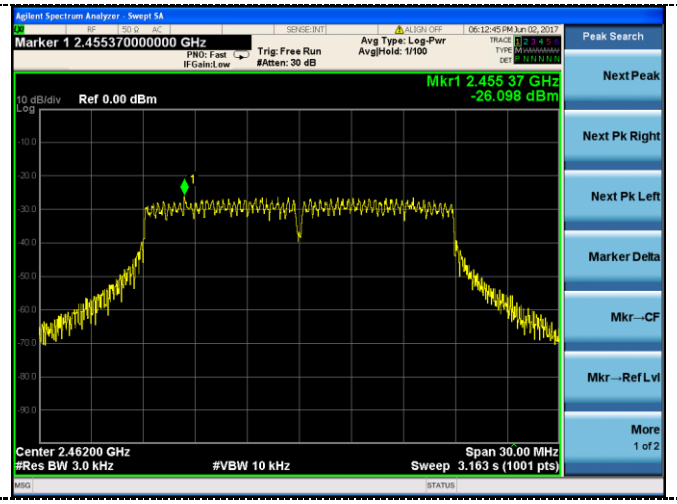
802.11 nHT20



CH01



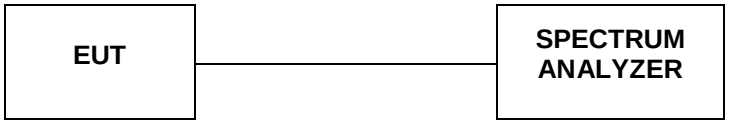
CH06



CH11

4.5. 6dB Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW=100 KHz and VBW=300KHz.
The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.
According to KDB558074 D01 for one of the following procedures may be used to determine the modulated DTS device signal bandwidth.
1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. 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.

LIMIT

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz

TEST RESULTS

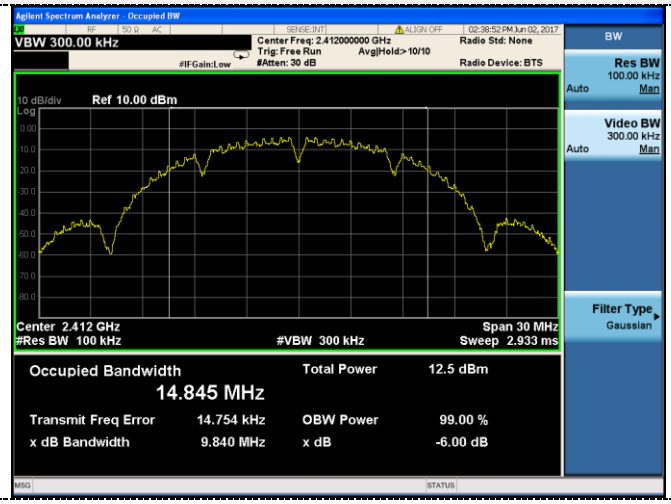
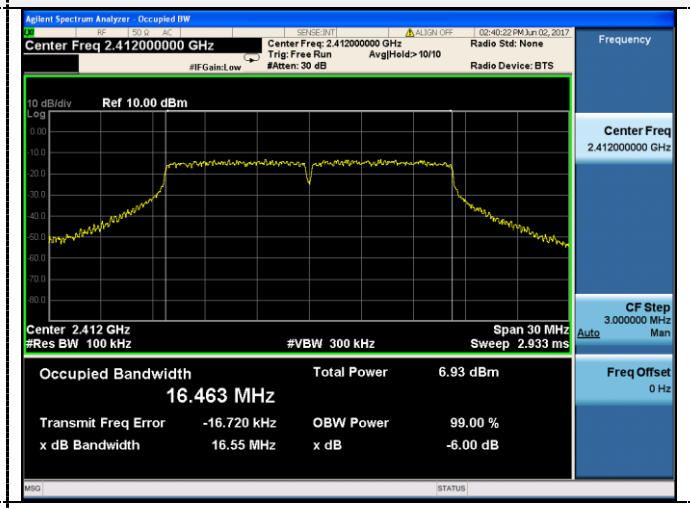
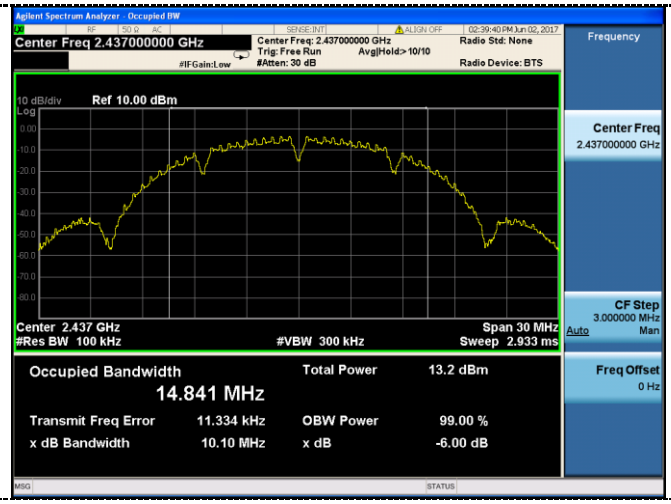
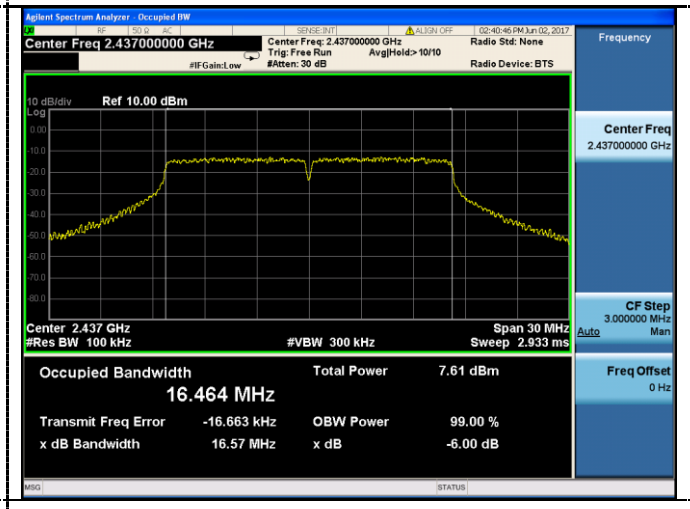
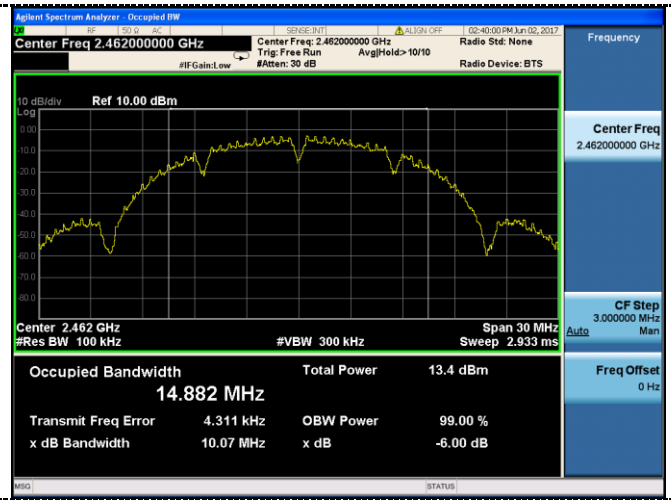
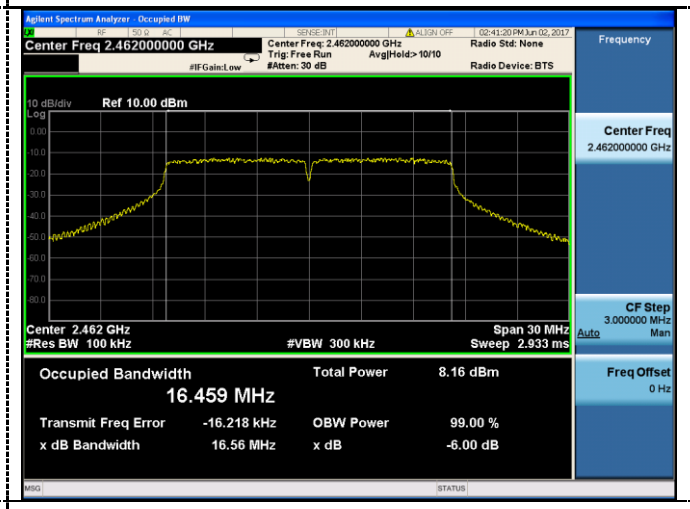
Antenna 1

Type	Channel	6dB Bandwidth (MHz)	Limit (KHz)	Result
802.11b	01	9.84	≥500	Pass
	06	10.10		
	11	10.07		
802.11g	01	16.55	≥500	Pass
	06	16.57		
	11	16.56		
802.11nHT20	01	17.75	≥500	Pass
	06	17.67		
	11	17.72		

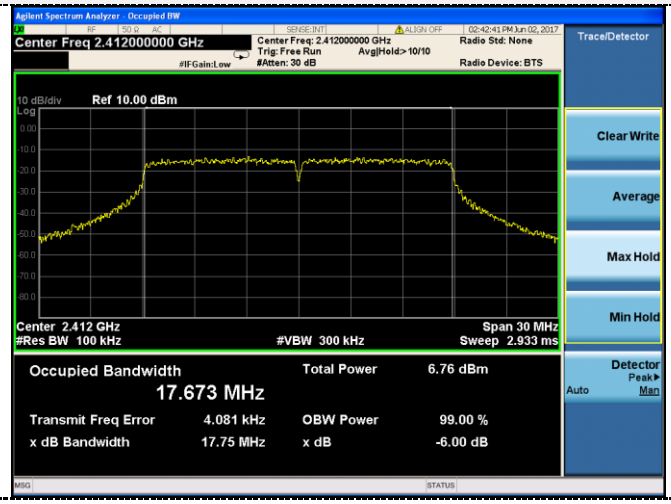
Antenna 2

Type	Channel	6dB Bandwidth (MHz)	Limit (KHz)	Result
802.11b	01	9.98	≥500	Pass
	06	9.76		
	11	9.82		
802.11g	01	16.50	≥500	Pass
	06	16.52		
	11	16.52		
802.11nHT20	01	17.73	≥500	Pass
	06	17.71		
	11	17.74		

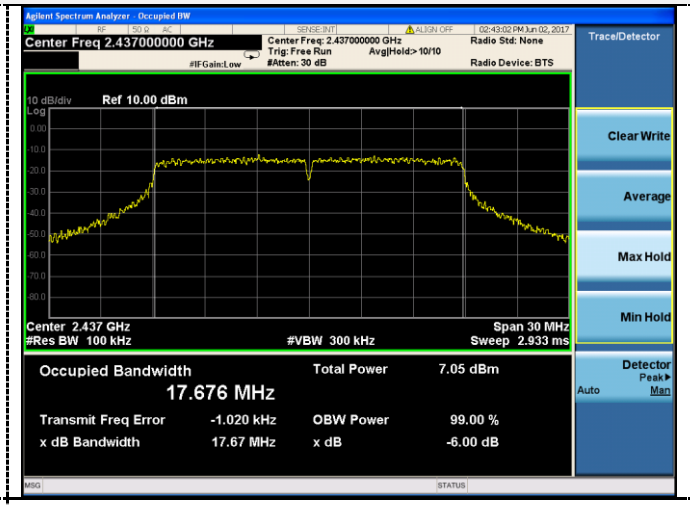
Antenna 1

802.11b	802.11g
	
CH01	CH01
	
CH06	CH06
	
CH11	CH11

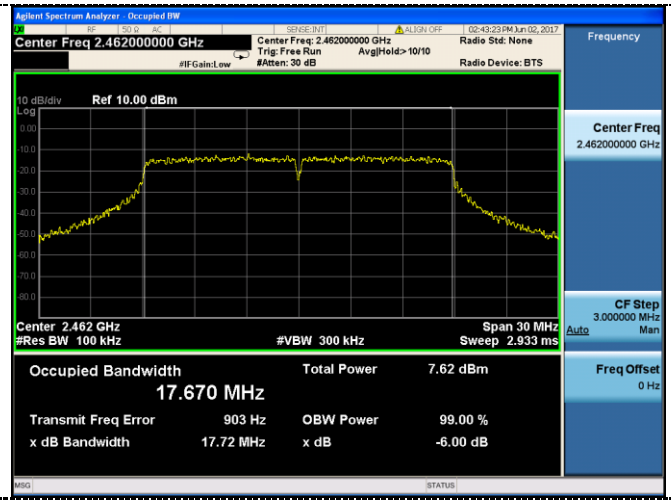
802.11n HT20



CH01

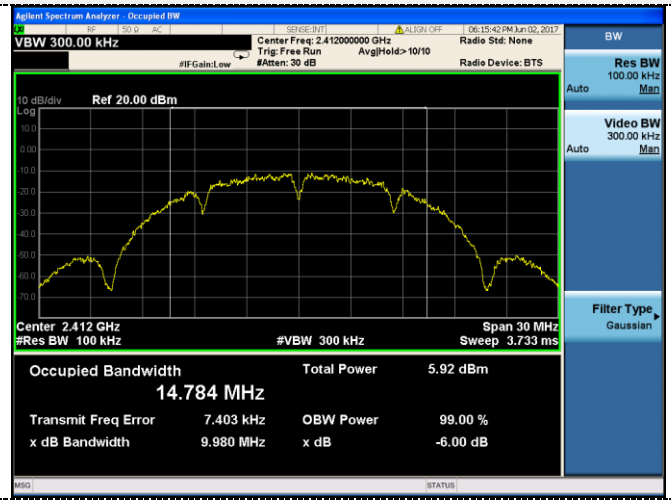
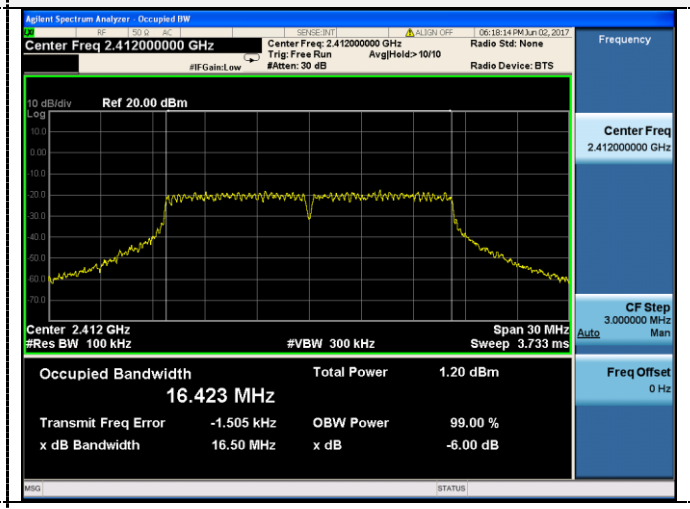
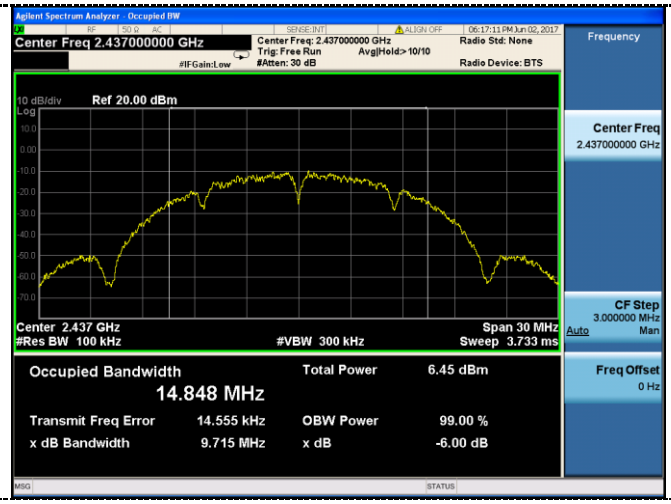
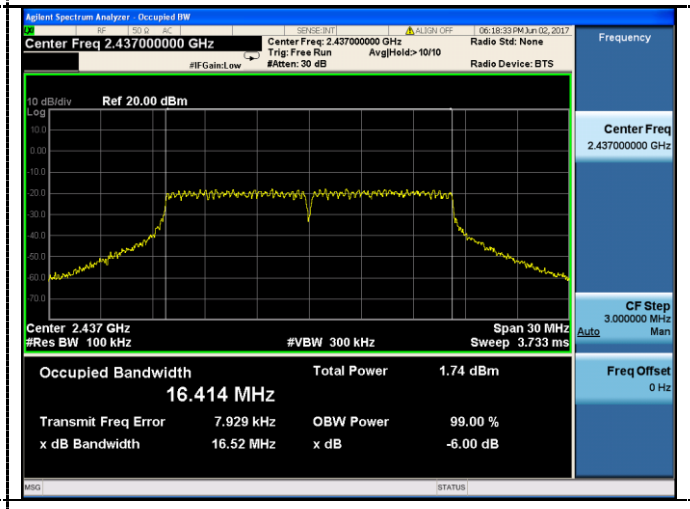
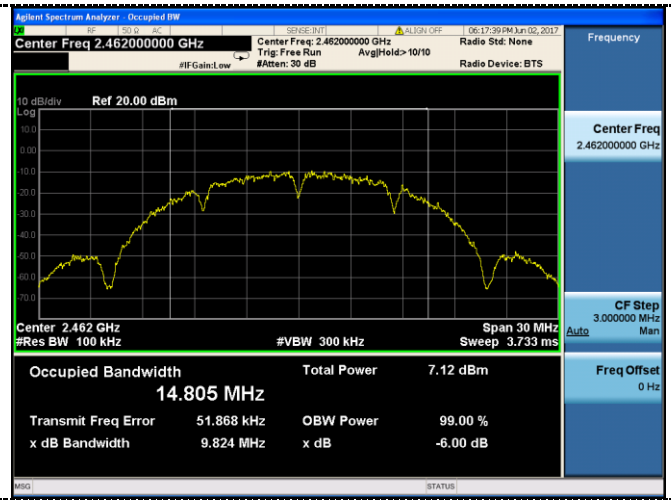
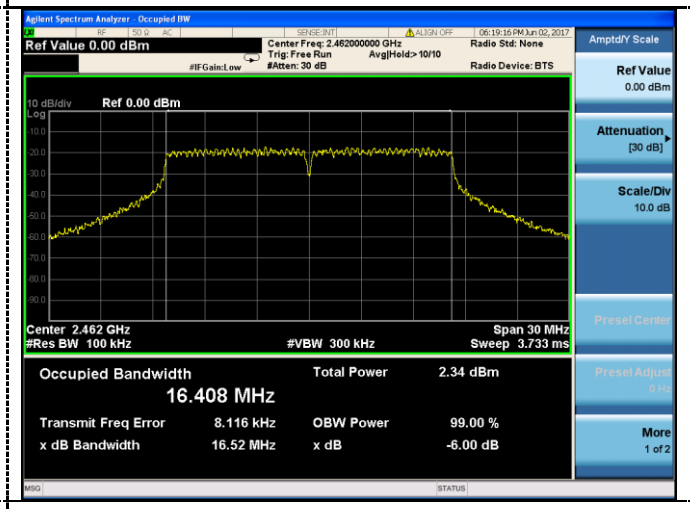


CH06

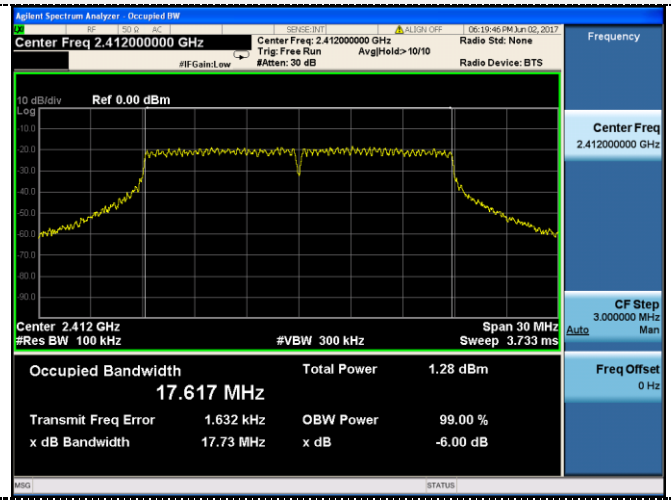


CH11

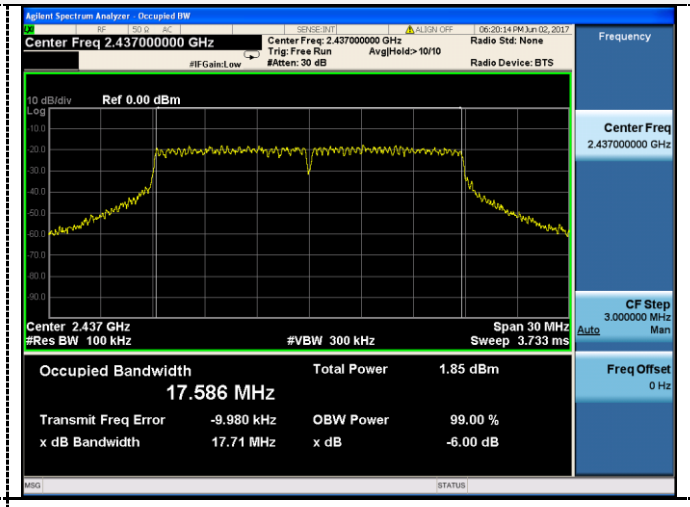
Antenna 2

802.11b	802.11g
	
CH01	CH01
	
CH06	CH06
	
CH11	CH11

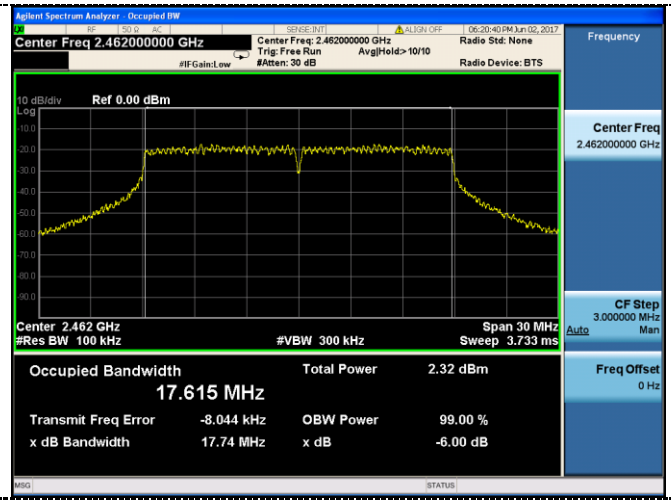
802.11n HT20



CH01



CH06



CH11

4.6. Band Edge Compliance of RF Emission

TEST REQUIREMENT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

TEST PROCEDURE

According to KDB 558074 D01 for Antenna-port conducted measurement. Antenna-port conducted measurements may also be used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case spurious emissions is required.

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, for Radiated emissions restricted band RBW=1MHz, VBW=3MHz for peak detector and RBW=1MHz, VBW=10Hz for average detector.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.
6. Measure the conducted output power (in dBm) using the detector specified by the appropriate regulatory agency (see 12.2.2, 12.2.3, and 12.2.4 for guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).
7. Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see 12.2.5 for guidance on determining the applicable antenna gain)
8. Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤ 30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).
9. For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW).
10. Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:
    $E = EIRP – 20\log D + 104.8$

where:
E = electric field strength in dBμV/m,
EIRP = equivalent isotropic radiated power in dBm
D = specified measurement distance in meters.

11. Since the out-of-band characteristics of the EUT transmit antenna will often be unknown, the use of a conservative antenna gain value is necessary. Thus, when determining the EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater. However, for devices that operate in multiple frequency bands while using the same transmit antenna, the highest gain of the antenna within the operating band nearest in frequency to the restricted band emission being measured may be used in lieu of the overall highest gain when the emission is at a frequency that is within 20 percent of the nearest band edge frequency, but in no case shall a value less than 2 dBi be used.
12. Compare the resultant electric field strength level to the applicable regulatory limit.
13. Perform radiated spurious emission test dures until all measured frequencies were complete.

LIMIT

Below -20dB of the highest emission level in operating band.
Radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a).

TEST RESULTS

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

4.6.1 For Radiated Bandedge Measurement

802.11b

Frequency(MHz):			**2412**			**Polarity:**			**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
2390.00	49.28	PK	74.00	24.72	1.00	118	54.59	27.49	3.32	36.12	-5.31
2390.00	37.63	AV	54.00	16.37	1.00	118	42.94	27.49	3.32	36.12	-5.31
Frequency(MHz):			**2412**			**Polarity:**			**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
2390.00	48.54	PK	74.00	25.46	1.00	251	53.85	27.49	3.32	36.12	-5.31
2390.00	36.92	AV	54.00	17.08	1.00	251	42.23	27.49	3.32	36.12	-5.31
Frequency(MHz):			**2462**			**Polarity:**			**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
2483.50	47.12	PK	74.00	26.88	1.00	169	52.84	27.45	3.38	36.55	-5.72
2483.50	37.54	AV	54.00	16.46	1.00	169	43.26	27.45	3.38	36.55	-5.72
Frequency(MHz):			**2462**			**Polarity:**			**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
2483.50	48.20	PK	74.00	25.80	1.00	342	53.92	27.45	3.38	36.55	-5.72
2483.50	36.53	AV	54.00	17.47	1.00	342	42.25	27.45	3.38	36.55	-5.72

802.11g

Frequency(MHz):			**2412**			**Polarity:**			**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
2390.00	47.68	PK	74.00	26.32	1.00	145	52.99	27.49	3.32	36.12	-5.31
2390.00	37.16	AV	54.00	16.84	1.00	145	42.47	27.49	3.32	36.12	-5.31
Frequency(MHz):			**2412**			**Polarity:**			**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
2390.00	47.46	PK	74.00	26.54	1.00	155	52.77	27.49	3.32	36.12	-5.31
2390.00	36.58	AV	54.00	17.42	1.00	155	41.89	27.49	3.32	36.12	-5.31
Frequency(MHz):			**2462**			**Polarity:**			**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
2483.50	48.89	PK	74.00	25.11	1.00	104	54.61	27.45	3.38	36.55	-5.72
2483.50	37.41	AV	54.00	16.59	1.00	104	43.13	27.45	3.38	36.55	-5.72
Frequency(MHz):			**2462**			**Polarity:**			**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
2483.50	48.55	PK	74.00	25.45	1.00	213	54.27	27.45	3.38	36.55	-5.72
2483.50	36.81	AV	54.00	17.19	1.00	213	42.53	27.45	3.38	36.55	-5.72

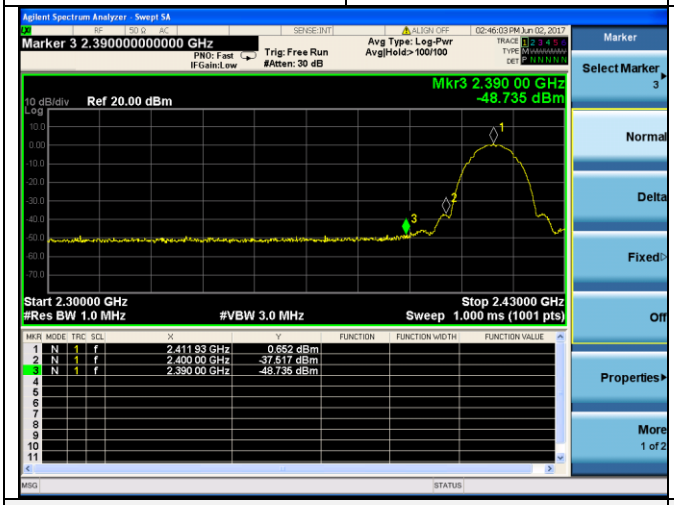
802.11n HT20

Frequency(MHz):			2412			Polarity:			HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
2390.00	47.33	PK	74.00	26.67	1.00	235	52.64	27.49	3.32	36.12	-5.31
2390.00	38.12	AV	54.00	15.88	1.00	235	43.43	27.49	3.32	36.12	-5.31
Frequency(MHz):			**2412**			**Polarity:**			**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
2390.00	48.68	PK	74.00	25.32	1.00	227	53.99	27.49	3.32	36.12	-5.31
2390.00	37.44	AV	54.00	16.56	1.00	227	42.75	27.49	3.32	36.12	-5.31
Frequency(MHz):			**2462**			**Polarity:**			**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
2483.50	47.29	PK	74.00	26.71	1.00	178	53.01	27.45	3.38	36.55	-5.72
2483.50	36.94	AV	54.00	17.06	1.00	178	42.66	27.45	3.38	36.55	-5.72
Frequency(MHz):			**2462**			**Polarity:**			**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
2483.50	48.65	PK	74.00	25.35	1.00	311	54.37	27.45	3.38	36.55	-5.72
2483.50	36.48	AV	54.00	17.52	1.00	311	42.20	27.45	3.38	36.55	-5.72

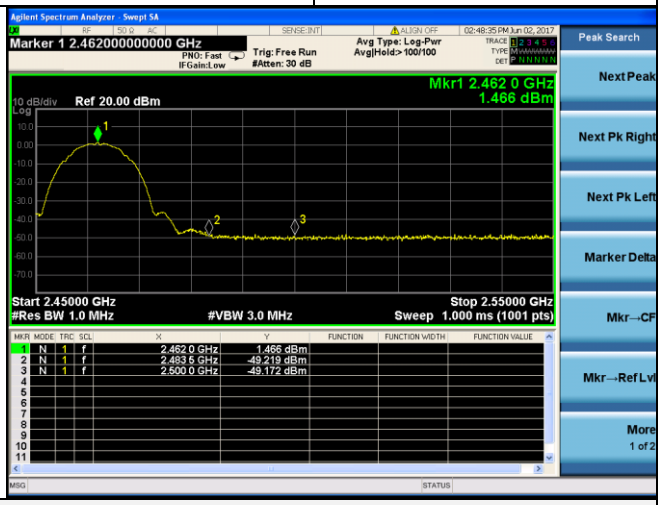
4.6.2 For Conducted Bandedge Measurement

Antenna 1

802.11b			
Frequency (MHz)	**Delta Peak to Band emission (dBc)**	**Limit (dBc)**	**Verdict**
2400.00	-38.17	-20	PASS
2483.50	-50.69	-20	PASS

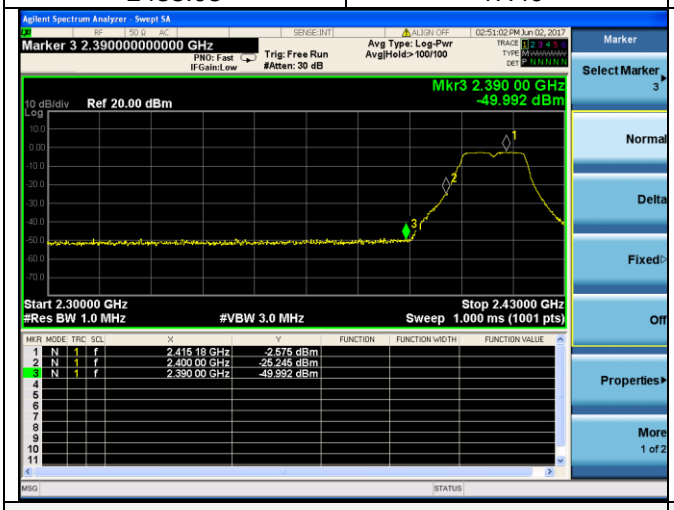


2412

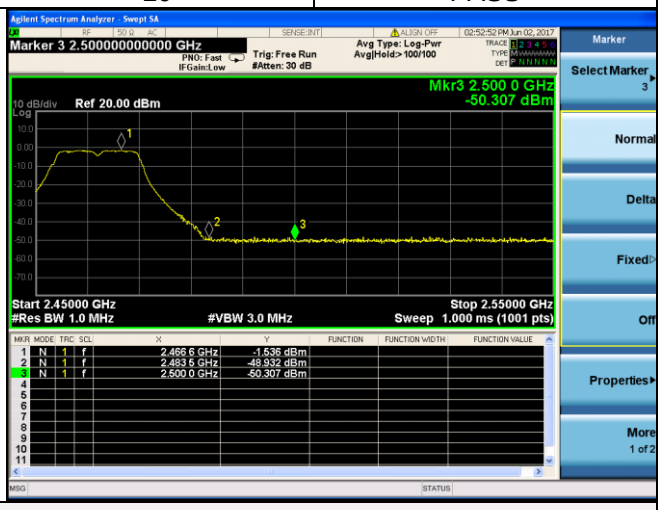


2462

802.11g			
Frequency (MHz)	Delta Peak to Band emission (dBc)	Limit (dBc)	Verdict
2400.00	-22.67	-20	PASS
2483.05	-47.40	-20	PASS

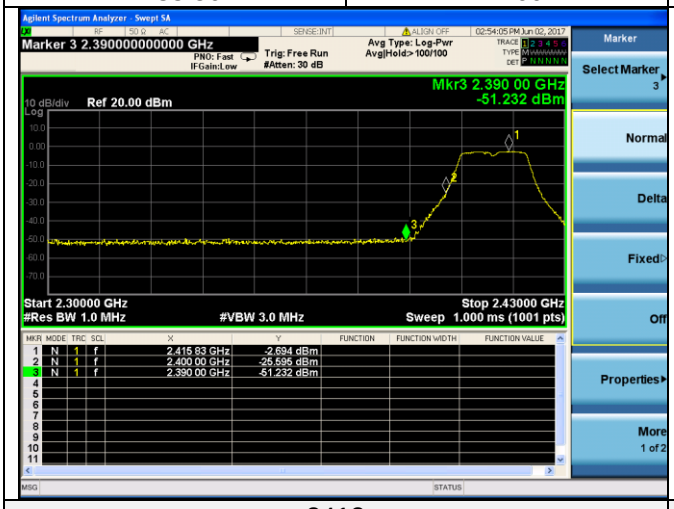


2412

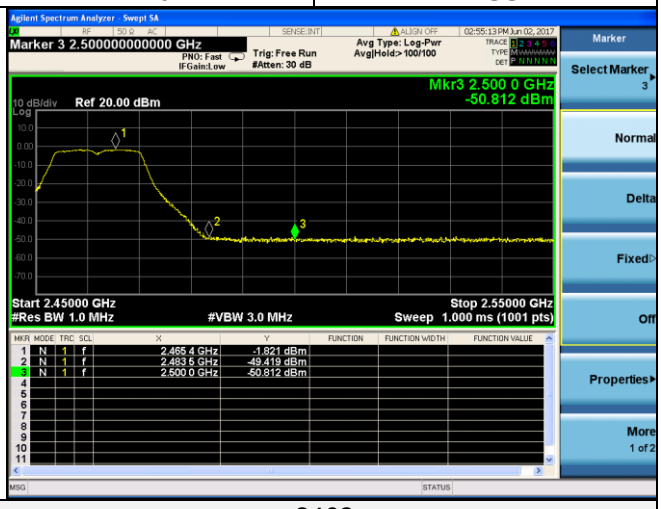


2462

802.11n HT20			
Frequency (MHz)	Delta Peak to Band emission (dBc)	Limit (dBc)	Verdict
2400.00	-22.90	-20	PASS
2483.50	-47.60	-20	PASS

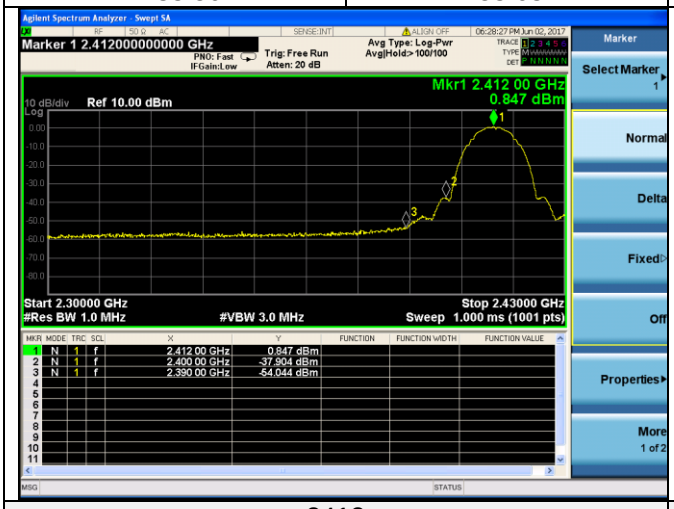
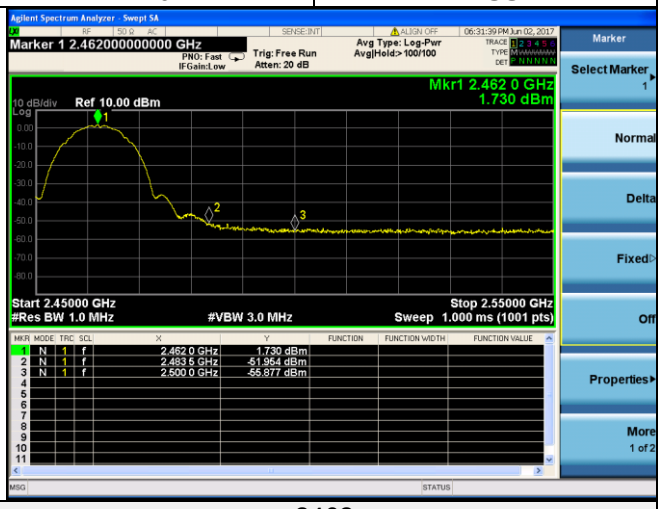


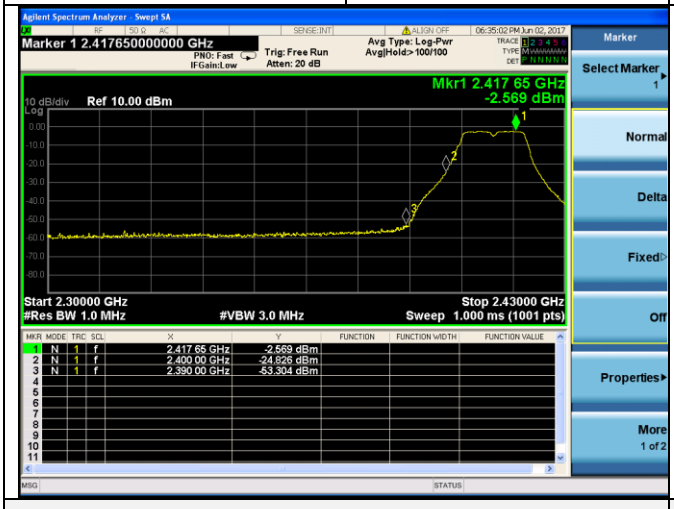
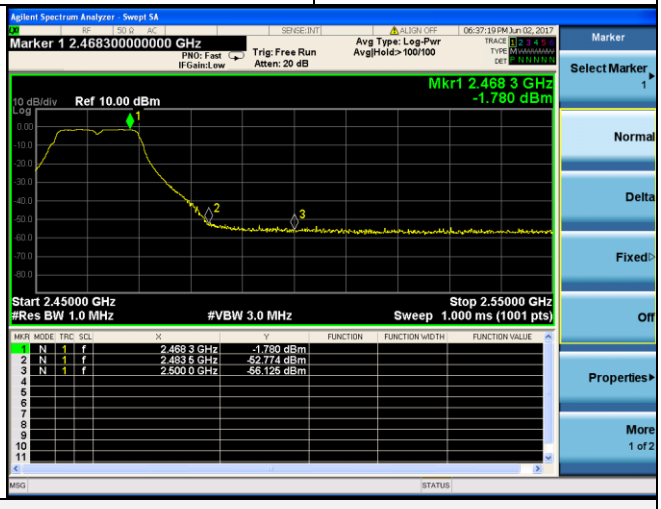
2412

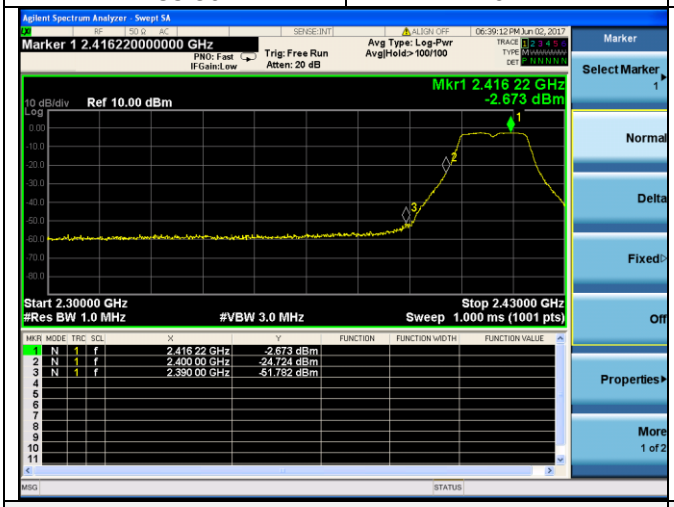


2462

Antenna 2

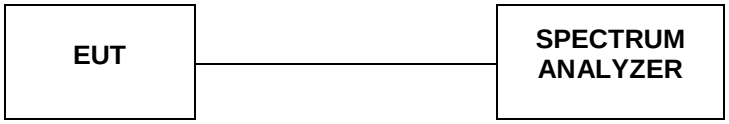
802.11b			
Frequency (MHz)	**Delta Peak to Band emission (dBc)**	**Limit (dBc)**	**Verdict**
2400.00	-38.75	-20	PASS
2483.50	-53.68	-20	PASS
			
2412		2462	

802.11g			
Frequency (MHz)	**Delta Peak to Band emission (dBc)**	**Limit (dBc)**	**Verdict**
2400.00	-22.26	-20	PASS
2483.05	-50.99	-20	PASS
			
2412		**2462**	

802.11n HT20			
Frequency (MHz)	**Delta Peak to Band emission (dBc)**	**Limit (dBc)**	**Verdict**
2400.00	-22.05	-20	PASS
2483.50	-49.71	-20	PASS
			
2412		2462	

4.7. Spurious RF Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2013, For 9KHz-150kHz, Set RBW=1kHz and VBW= 3KHz;For 150KHz-10MHz, Set RBW=10kHz and VBW= 30KHz:For 10MHz-25GHz ,Set RBW=100kHz and VBW= 300KHz in order to measure the peak field strength, and mwasure frequeny range from 9KHz to 25GHz.

LIMIT

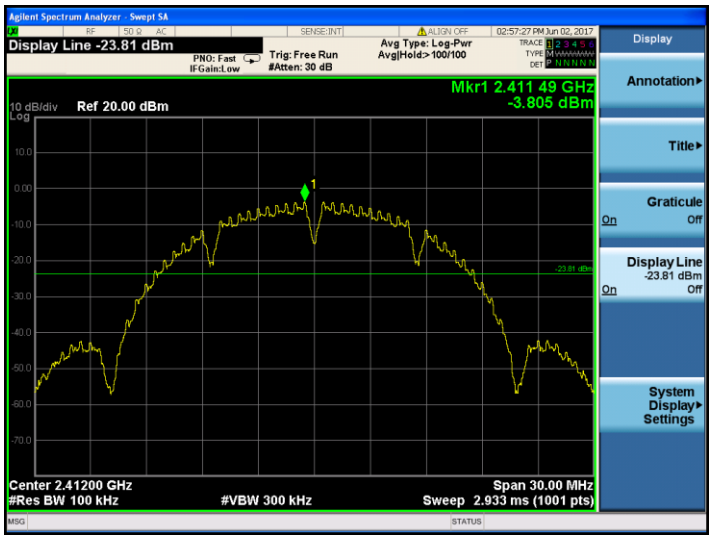
1. Below -20dB of the highest emission level in operating band.
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.
3.For below 30MHz,For 9KHz-150kHz,150K-10MHz,We use the RBW 1KHz,10KHz, So the limit need to calculated by “10lg(BW1/BW2)“. for example For9KHz-150kHz,RBW 1KHz, The Limit= the highest emission level-20-10log(100/1)= the highest emission level-40.

TEST RESULTS

Remark: The measurement frequency range is from 9KHz to the 10^{th} harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandege measurement data.

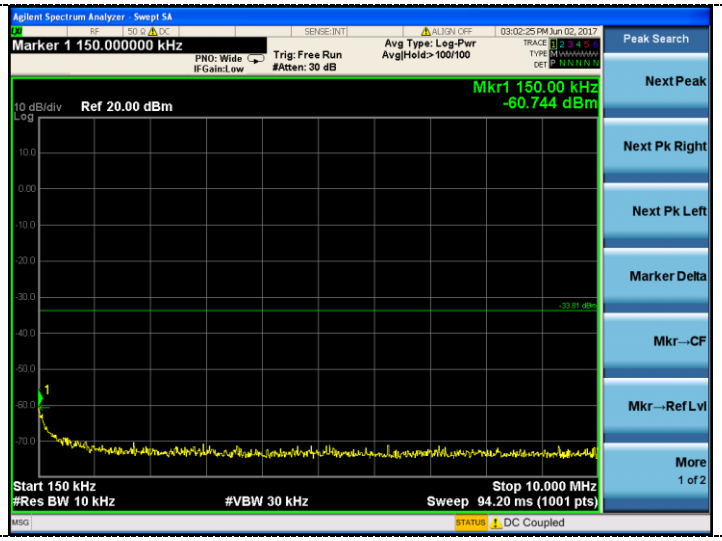
Antenna 1

Test Mode:	802.11b	Test channel :	01



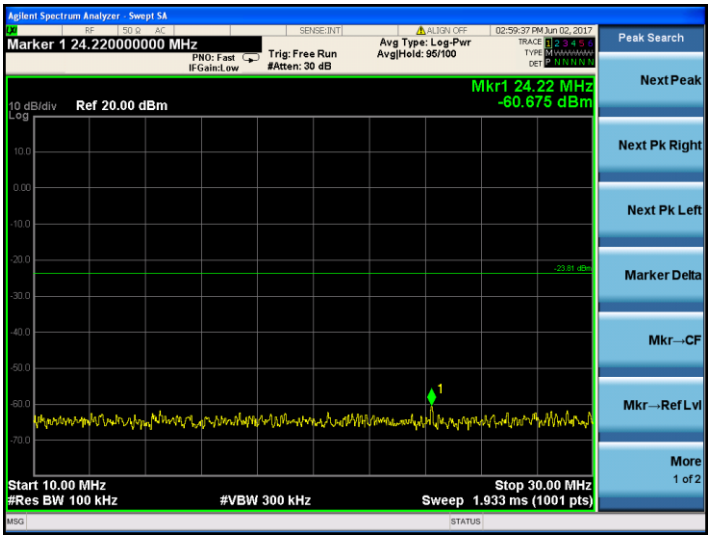
Channel 01

9KHz~150KHz

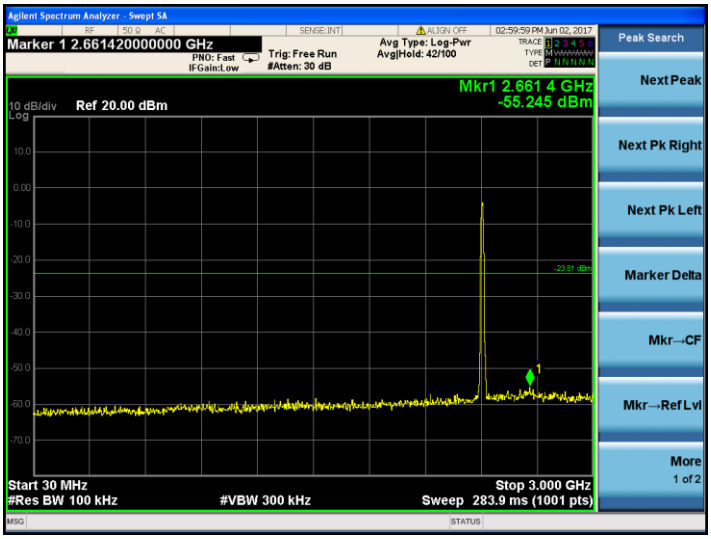


150KHz ~10MHz

Test Mode:	802.11b	Test channel :	01



10MHz ~30MHz



30MHz ~3GHz

3GHz~25GHz