Shenzhen Global Test Service Co.,Ltd.
No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

FCC PART 15 SUBPART C TEST REPORT

FCC PART 15.247

Report Reference No......:	**GTSR19010008-WLAN01**
FCC ID..... **:**	**2AL6K-R8188NU3**
Compiled by (position+printed name+signature)..:	File administrators Jimmy Wang
Supervised by (position+printed name+signature)..:	Test Engineer Aaron Tan
Approved by (position+printed name+signature)..:	Manager Jason Hu
Date of issue.....:	Jan.12, 2019

Representative Laboratory Name .:	**Shenzhen Global Test Service Co.,Ltd.**
Address.....:	No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong, China
Applicant's name.....:	**Shenzhen Bilian Electronic Co.,Ltd.**
Address .....:	Building B1,Zhongxing Industrial Zone,Juling,Jutang Community, Guanlan street,Longhua New District, Shenzhen, Guangdong, P.R.China
Test specification .....**:**	
Standard .....:	**FCC Part 15.247**
TRF Originator.....:	Shenzhen Global Test Service Co.,Ltd.
Master TRF.....:	Dated 2014-12

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Test item description .....:	IEEE 802.11b/g/n 1T1R USB WiFi Module
Trade Mark .....:	LB-LINK
Manufacturer .....:	**Shenzhen Bilian Electronic Co.,Ltd.**
Model/Type reference.....:	**BL-R8188NU3**
Listed Models .....:	/
Modulation Type .....:	IEEE 802.11b/802.11g/802.11n
Operation Frequency.....:	From 2412 - 2462MHz
Hardware Version .....:	V0.1
Software Version .....:	V33
Rating .....:	DC 5V from USB port
Result.....:	**PASS**

T E S T R E P O R T

Test Report No. :	GTSR19010008-WLAN01	Jan. 12, 2019 Date of issue

Equipment under Test	:	IEEE 802.11b/g/n 1T1R USB WiFi Module
Model /Type	:	BL-R8188NU3
Listed Models	:	/
Applicant	:	Shenzhen Bilian Electronic Co.,Ltd.
Address	:	Building B1,Zhongxing Industrial Zone,Juling,Jutang Community, Guanlan street,Longhua New District, Shenzhen, Guangdong, P.R.China
Manufacturer	:	Shenzhen Bilian Electronic Co.,Ltd.
Address	:	Building B1,Zhongxing Industrial Zone,Juling,Jutang Community, Guanlan street,Longhua New 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 V05: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247
KDB 662911 D01 Multiple Transmitter Output v02r01: Emissions Testing of Transmitters with Multiple Outputs in the Same Band

2 . SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	Jan. 4, 2019
Testing commenced on	:	Jan. 4, 2019
Testing concluded on	:	Jan. 14, 2019

2.2. Product Description

Name of EUT	IEEE 802.11b/g/n 1T1R USB WiFi Module
Trade Mark:	/
Model Number	BL-R8188NU3
Listed Models	/
Power Supply	DC 5V from USB port
WLAN	Supported 802.11b/802.11g/802.11n
Modulation Type	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 802.11b:2412-2462MHz IEEE 802.11g:2412-2462MHz IEEE 802.11n HT20:2412-2462MHz IEEE 802.11n HT40:2422-2452MHz
Antenna gain	1.31 dbi
Antenna Type	External antenna

2.3. Equipment Under Test

Power supply system utilised

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

DC 5V

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

This is a wifi Module.

2.5. EUT operation mode

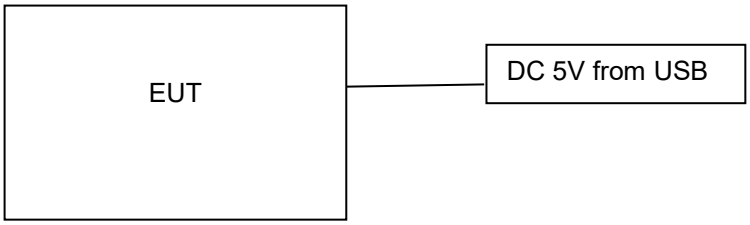
The application provider specific test software(Realtek MPtool) to control sample in continuous TX and RX (Duty Cycle >98%) for testing meet KDB558074 test requirement.

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. Special Accessories

Manufacturer	Description	Model	Serial Number	Certificate
TOSHIBA	Tablet PC	Satellite S40Dt-A	D26T	DOC

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

This submittal(s) (test report) is intended for **FCC ID: 2AL6K- R8188NU3** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.9. 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.
No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

3.2. Test Facility

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

FCC-Registration No.: 165725

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.

A2LA-Lab Cert. No.: 4758.01

Shenzhen Global Test Service Co.,Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

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.

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 HT40	☒ Lowest ☒ Middle ☒ Highest	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Middle ☒ Highest	☒	☐	☐	☐	complies
§15.247(a)(2)	Spectrum bandwidth – 6 dB bandwidth	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Middle ☒ Highest	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Middle ☒ Highest	☒ ☒	☐	☐	☐	complies
§15.247(b)(1)	Maximum output power	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Middle ☒ Highest	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Middle ☒ Highest	☒ ☒ ☒	☐	☐	☐	complies
§15.247(d)	Band edge compliance conducted	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Highest	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Highest	☒ ☒	☐	☐	☐	complies
§15.205	Band edge compliance radiated	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Highest	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Highest	☒	☐	☐	☐	complies
§15.247(d)	TX spurious emissions conducted	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Middle ☒ Highest	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Middle ☒ Highest	☒ ☒	☐	☐	☐	complies
§15.247(d)	TX spurious emissions radiated	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Middle ☒ Highest	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ 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
	11n(40MHz)/OFDM	13.5Mbps	3/6/9
Band Edge	11b/DSSS	1 Mbps	1/11
	11g/OFDM	6 Mbps	1/11
	11n(20MHz)/OFDM	6.5Mbps	1/11
	11n(40MHz)/OFDM	13.5Mbps	3/9

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

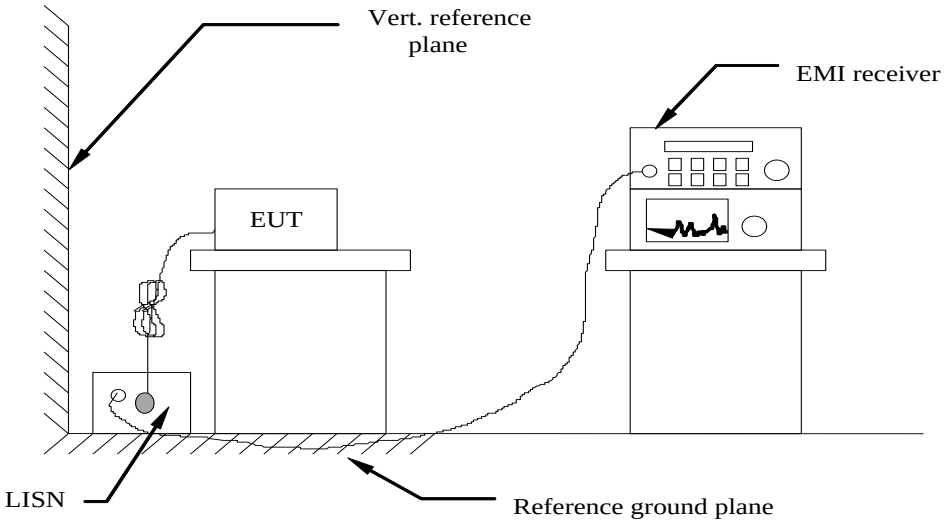
Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.08	2018/09/20	2019/09/19
LISN	R&S	ESH2-Z5	893606/008	2018/09/20	2019/09/19
Bilog Antenna	Schwarzbeck	VULB9163	976	2016/09/20	2019/09/19
EMI Test Receiver	R&S	ESCI7	101102	2018/09/20	2019/09/19
Spectrum Analyzer	Agilent	N9020A	MY48010425	2018/09/20	2019/09/19
Spectrum Analyzer	R&S	FSP40	100019	2018/06/05	2019/06/04
Controller	EM Electronics	Controller EM 1000	N/A	N/A	N/A
Horn Antenna	Schwarzbeck	BBHA 9120D	01622	2016/09/20	2019/09/19
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2016/09/20	2019/09/19
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	971	2016/09/20	2019/09/19
Amplifier	Schwarzbeck	BBV 9743	#202	2018/09/20	2019/09/19
Amplifier	EMCI	EMC051845B	980355	2018/09/20	2019/09/19
Temperature/Humidity Meter	Gangxing	CTH-608	02	2018/09/20	2019/09/19
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	KL142031	2018/09/20	2019/09/19
High-Pass Filter	K&L	41H10-1375/U12750-O/O	KL142032	2018/09/20	2019/09/19
RF Cable(below 1GHz)	HUBER+SUHNER	RG214	RE01	2018/09/20	2019/09/19
RF Cable(above 1GHz)	HUBER+SUHNER	RG214	RE02	2018/09/20	2019/09/19
Data acquisition card	Agilent	U2531A	TW53323507	2018/09/20	2019/09/19
Power Sensor	Agilent	U2021XA	MY5365004	2018/09/20	2019/09/19
EMI Test Software	R&S	ES-K1	V1.7.1	2018/09/20	2019/09/19
EMI Test Software	JS Tonscend	JS32-RE	2.0.1.5	2018/09/20	2019/09/19

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

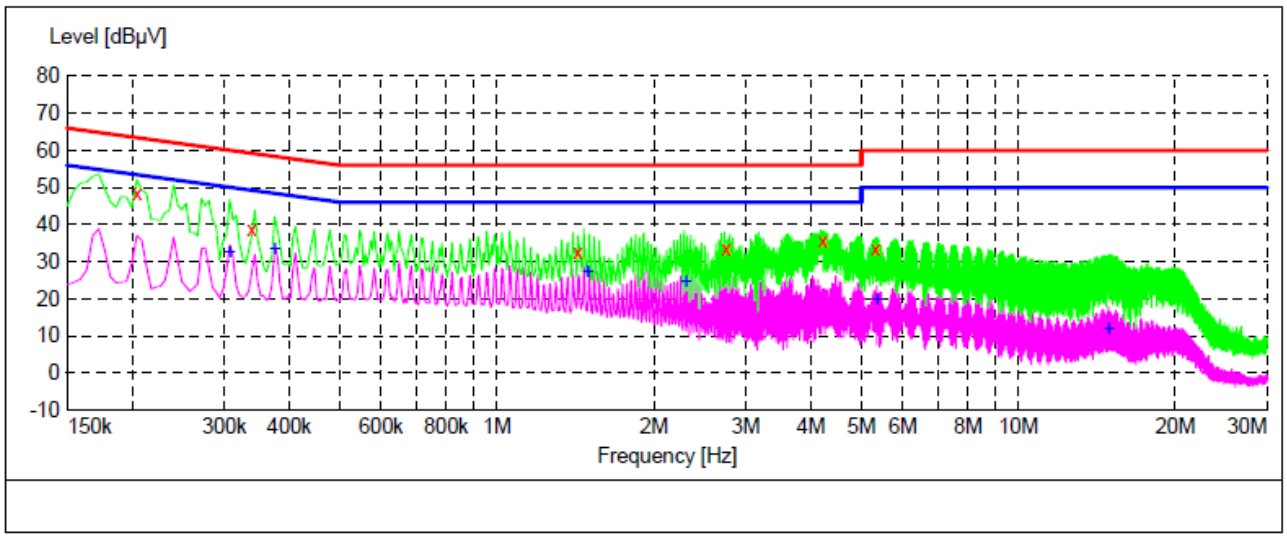
For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following：

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 802.11b/802.11g/802.11n HT20/802.11n HT40 mode in AC 120V/60Hz and AC 240V/50Hz, Pre-test AC conducted emission at power from AC mains mode and at charge from PC mode, recorded worst case..

Power supply:	AC 120V/60Hz(adapter)	Polarization	L



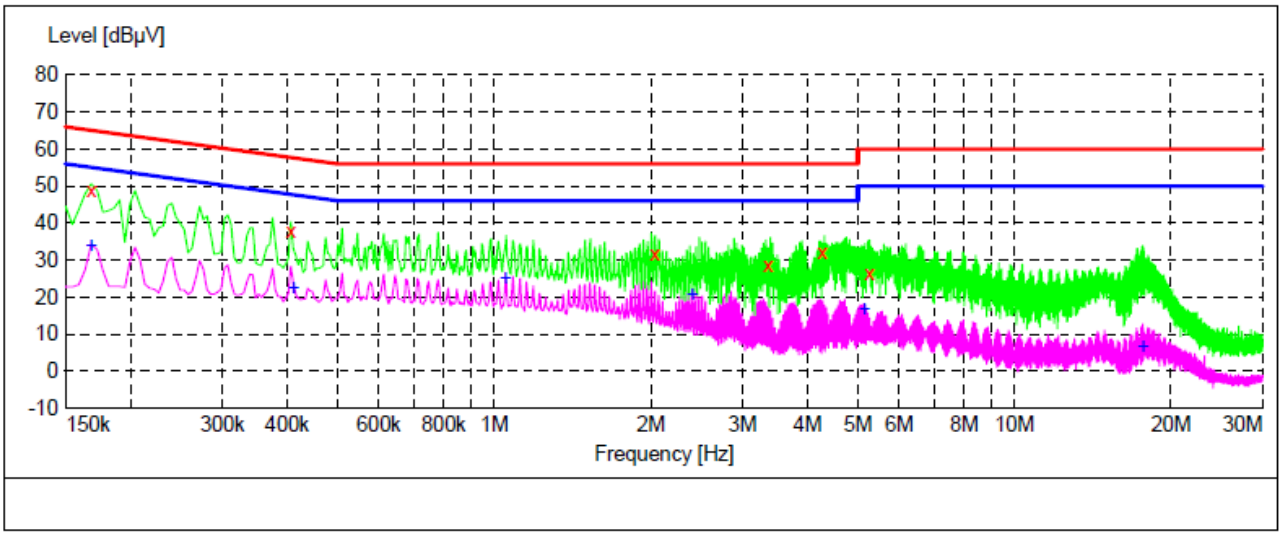
MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.204000	48.40	10.0	63	15.0	QP	L1	GND
0.339000	38.70	9.9	59	20.5	QP	L1	GND
1.428000	32.40	9.6	56	23.6	QP	L1	GND
2.751000	33.50	9.5	56	22.5	QP	L1	GND
4.222500	35.50	9.4	56	20.5	QP	L1	GND
5.325000	33.60	9.3	60	26.4	QP	L1	GND

MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.307500	32.50	9.9	50	17.5	AV	L1	GND
0.375000	33.30	9.8	48	15.1	AV	L1	GND
1.495500	27.20	9.6	46	18.8	AV	L1	GND
2.310000	24.90	9.5	46	21.1	AV	L1	GND
5.361000	20.00	9.3	50	30.0	AV	L1	GND
14.919000	11.80	8.2	50	38.2	AV	L1	GND

Power supply:	AC 120V/60Hz(adapter)	Polarization	N



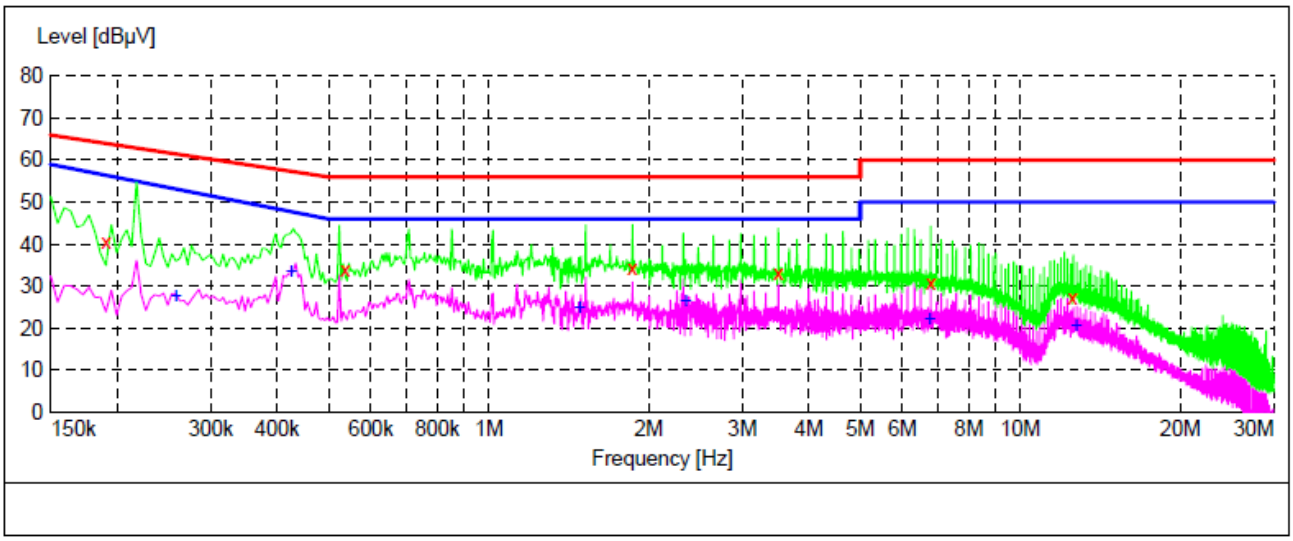
MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.168000	48.80	10.0	65	16.3	QP	N	GND
0.406500	37.80	9.8	58	19.9	QP	N	GND
2.035500	31.60	9.5	56	24.4	QP	N	GND
3.358500	28.50	9.4	56	27.5	QP	N	GND
4.272000	32.10	9.4	56	23.9	QP	N	GND
5.257500	26.60	9.3	60	33.4	QP	N	GND

MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.168000	34.00	10.0	55	21.1	AV	N	GND
0.411000	22.50	9.8	48	25.1	AV	N	GND
1.050000	25.10	9.6	46	20.9	AV	N	GND
2.404500	20.70	9.5	46	25.3	AV	N	GND
5.149500	16.60	9.3	50	33.4	AV	N	GND
17.664000	6.80	8.7	50	43.2	AV	N	GND

Power supply:	AC 240V/50Hz(adapter)	Polarization	L



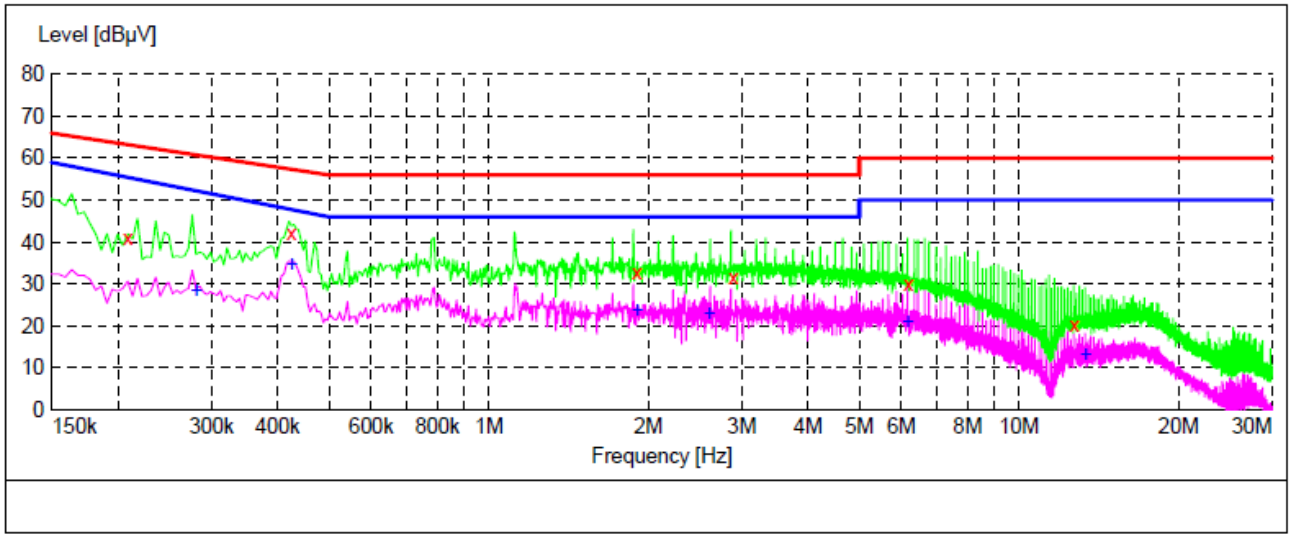
MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.190500	40.50	10.0	64	23.5	QP	L1	GND
0.537000	33.90	9.8	56	22.1	QP	L1	GND
1.860000	34.30	9.5	56	21.7	QP	L1	GND
3.507000	33.20	9.4	56	22.8	QP	L1	GND
6.796500	30.70	9.1	60	29.3	QP	L1	GND
12.543000	27.40	8.5	60	32.6	QP	L1	GND

MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.258000	27.70	9.9	53	25.4	AV	L1	GND
0.424500	33.60	9.8	48	14.2	AV	L1	GND
1.482000	24.90	9.6	46	21.1	AV	L1	GND
2.346000	26.40	9.5	46	19.6	AV	L1	GND
6.756000	22.20	9.1	50	27.8	AV	L1	GND
12.723000	20.50	8.5	50	29.5	AV	L1	GND

Power supply:	AC 240V/50Hz(adapter)	Polarization	N



MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.208500	41.10	10.0	63	22.2	QP	N	GND
0.424500	42.20	9.8	57	15.2	QP	N	GND
1.900500	32.90	9.5	56	23.1	QP	N	GND
2.895000	31.70	9.5	56	24.3	QP	N	GND
6.193500	30.00	9.2	60	30.0	QP	N	GND
12.714000	20.10	8.5	60	39.9	QP	N	GND

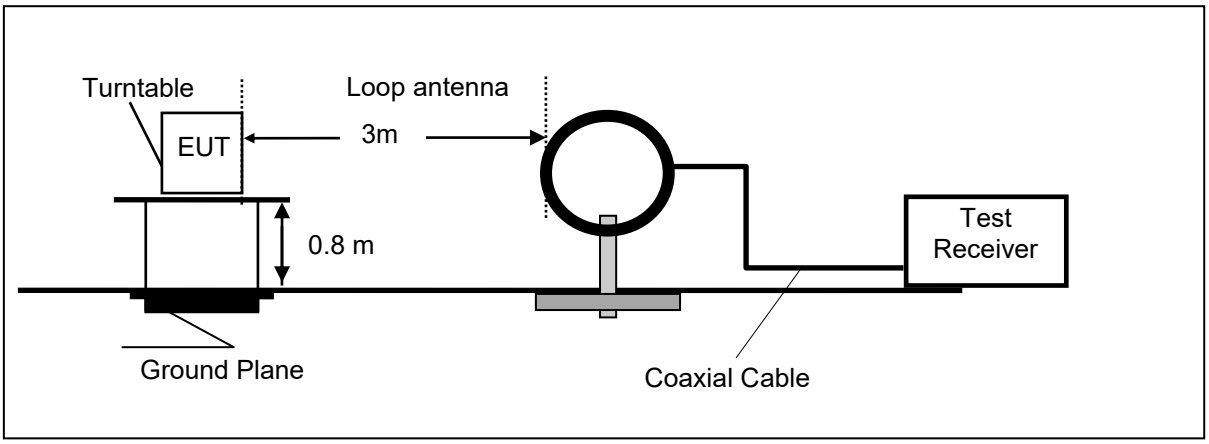
MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.280500	28.50	9.9	52	23.7	AV	N	GND
0.424500	34.90	9.8	48	12.9	AV	N	GND
1.905000	23.80	9.5	46	22.2	AV	N	GND
2.602500	23.20	9.5	46	22.8	AV	N	GND
6.166500	20.90	9.2	50	29.1	AV	N	GND
13.353000	13.40	8.4	50	36.6	AV	N	GND

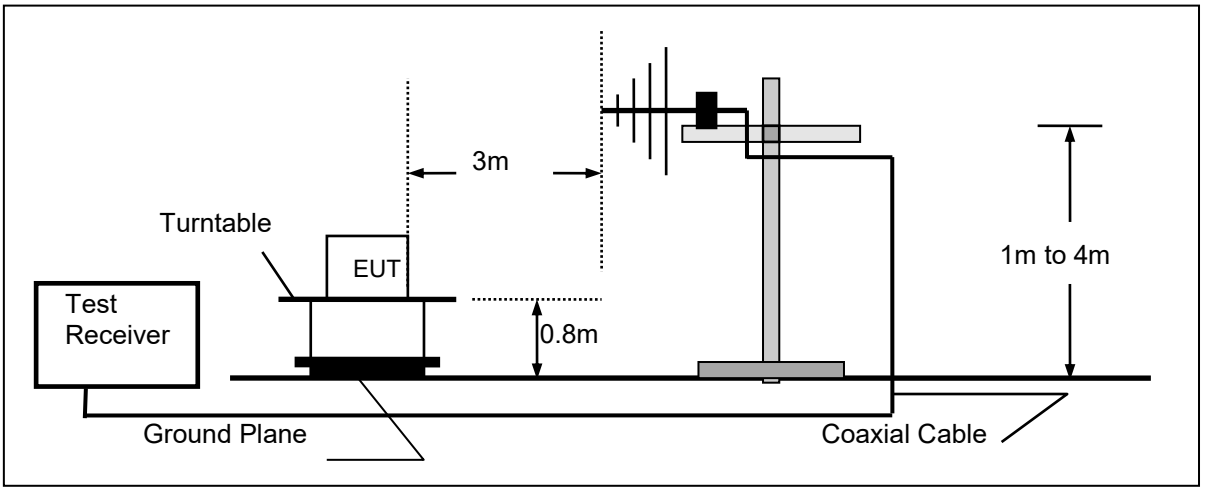
4.2. Radiated Emission

TEST CONFIGURATION

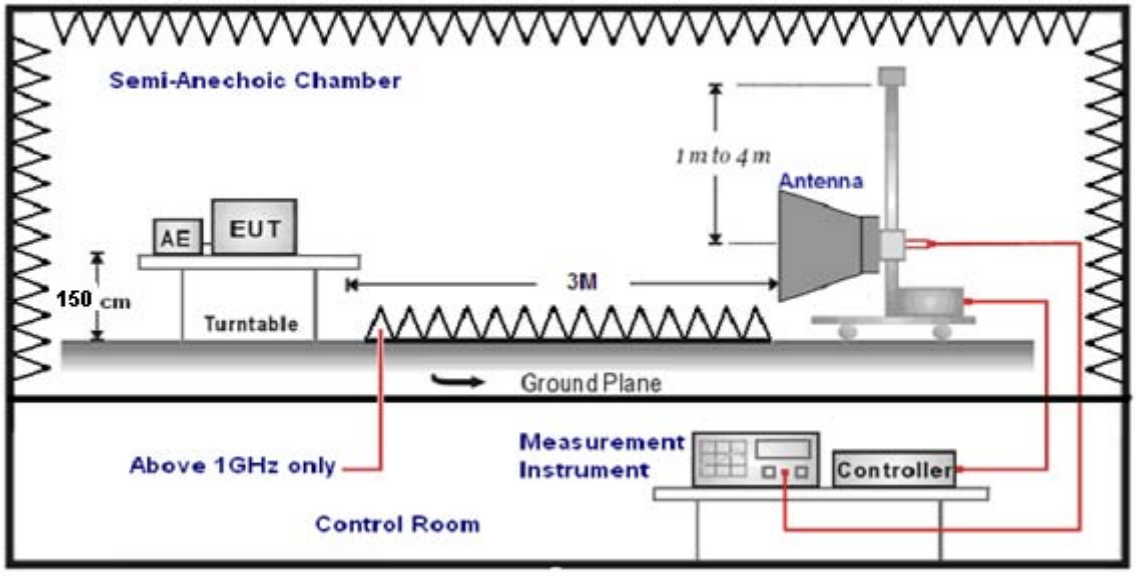
Frequency range 9 KHz – 30MHz



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 HT20/802.11n HT40 mode at the antenna single transmitting mode and 802.11n HT20/802.11n HT40 at the Mimo mode in AC 120V/60Hz, and recored the worst data at the antenna single transmitting mode.

For 9 KHz-30MHz

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	P
--	--	--	--	P

Note:

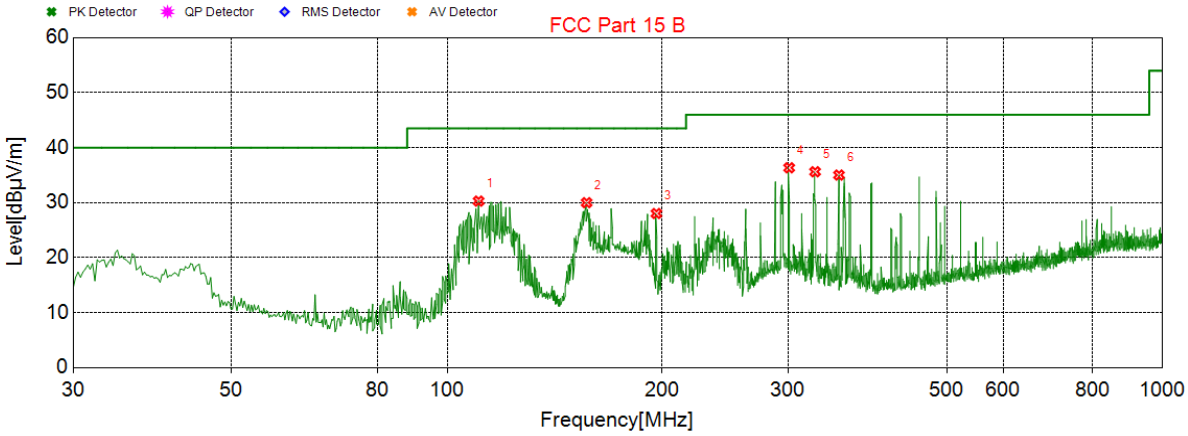
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor =40 log (specific distance/test distance)(dB);

Limit line = specific limits(dBuv) + distance extrapolation factor.

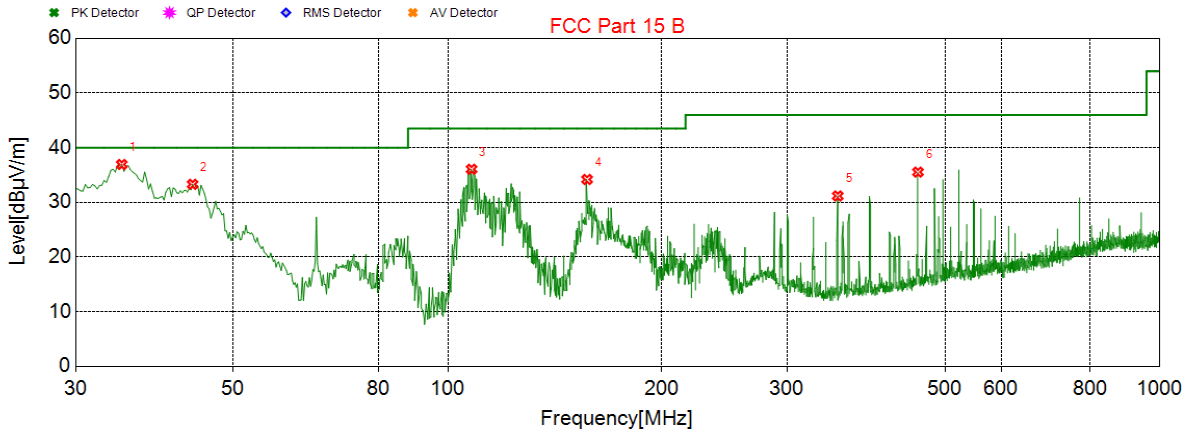
For 30MHz-1GHz

Horizontal



NO.	Freq. [MHz]	Reading [dBµV/m]	Result Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle[°]	Polarity
1	110.753	47.41	30.29	-17.12	43.50	13.21	100	352	Horizontal
2	156.828	49.43	30.01	-19.42	43.50	13.49	100	248	Horizontal
3	196.355	44.85	28.04	-16.81	43.50	15.46	100	235	Horizontal
4	301.115	50.47	36.35	-14.12	46.00	9.65	100	105	Horizontal
5	327.305	49.05	35.63	-13.42	46.00	10.37	100	92	Horizontal
6	353.495	47.90	35.03	-12.87	46.00	10.97	100	79	Horizontal

Vertical



NO.	Freq. [MHz]	Reading [dBµV/m]	Result Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle[°]	Polarity
1	34.850	54.04	36.94	-17.10	40.00	3.06	100	217	Vertical
2	43.823	48.35	33.31	-15.04	40.00	6.69	100	165	Vertical
3	108.085	53.05	36.07	-16.98	43.50	7.43	100	9	Vertical
4	157.070	53.60	34.2	-19.40	43.50	9.30	100	204	Vertical
5	353.495	44.05	31.18	-12.87	46.00	14.82	100	165	Vertical
6	458.255	46.15	35.54	-10.61	46.00	10.46	100	308	Vertical

Note:

1. Pre-scan all modes and recorded the worst case results in this report (IEEE 802.11n HT20 mode (Middle Channel, Combined Antenna Chain1 and Antenna Chain2)).
2. Emission level (dBuV/m) = Meter Reading+ antenna Factor+ cable loss- preamp factor
3. Margin value = Emission level-Limits

For 1GHz to 25GHz

802.11b

Polar (H/V)	Frequency	Meter Reading	Antenna Factor	Cable loss	Preamp factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
802.11b-2412MHz									
V	4824	33.85	30.28	7.01	26.63	44.51	74	-27.78	Pk
H	4824	35.84	30.28	7.01	26.63	46.5	74	-28.98	PK
V	7236	28.41	36.59	8.91	24.98	48.93	74	-26.35	Pk
H	7236	29.68	36.59	8.91	24.98	50.2	74	-27.03	PK
802.11b-2437MHz									
V	4874	36.14	30.36	7.62	26.63	47.49	74	-27.53	Pk
H	4874	37.59	30.36	7.62	26.63	48.94	74	-28.37	PK
V	7311	26.94	36.61	8.84	24.98	47.41	74	-26.15	Pk
H	7311	28.53	36.61	8.84	24.98	49	74	-25.67	PK
802.11b-2462MHz									
V	4924	37.45	30.43	7.94	26.63	49.19	74	-26.02	Pk
H	4924	39.68	30.43	7.94	26.63	51.42	74	-27.00	PK
V	7386	27.55	36.78	8.45	24.98	47.8	74	-25.79	Pk
H	7386	29.81	36.78	8.45	24.98	50.06	74	-27.17	PK

802.11b

Polar (H/V)	Frequency	Meter Reading	Antenna Factor	Cable loss	Preamp factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
802.11g-2412MHz									
V	4824	33.96	30.28	7.01	26.63	44.62	74	-29.8	Pk
H	4824	34.29	30.28	7.01	26.63	44.95	74	-30.65	PK
V	7236	30.14	36.59	8.91	24.98	50.66	74	-25.44	Pk
H	7236	31.08	36.59	8.91	24.98	51.6	74	-28	PK
802.11g-2437MHz									
V	4874	35.29	30.36	7.62	26.63	46.64	74	-28.53	Pk
H	4874	36.48	30.36	7.62	26.63	47.83	74	-29.44	PK
V	7311	28.14	36.61	8.84	24.98	48.61	74	-26.94	Pk
H	7311	29.73	36.61	8.84	24.98	50.2	74	-27.12	PK
802.11g-2462MHz									
V	4924	36.85	30.43	7.94	26.63	48.59	74	-26.79	Pk
H	4924	34.29	30.43	7.94	26.63	46.03	74	-29.08	PK
V	7386	25.52	36.78	8.45	24.98	45.77	74	-28.33	Pk
H	7386	26.19	36.78	8.45	24.98	46.44	74	-28.57	PK

802.11n HT20

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
802.11n20-2412MHz									
V	4824	32.85	30.28	7.01	26.63	43.51	74	-31.38	Pk
H	4824	34.33	30.28	7.01	26.63	44.99	74	-30.86	PK
V	7236	28.15	36.59	8.91	24.98	48.67	74	-25.89	Pk
H	7236	29.68	36.59	8.91	24.98	50.2	74	-27.16	PK
802.11n20-2437MHz									
V	4874	34.28	30.36	7.62	26.63	45.63	74	-28.37	Pk
H	4874	35.47	30.36	7.62	26.63	46.82	74	-27.18	PK
V	7311	27.64	36.61	8.84	24.98	48.11	74	-25.89	Pk
H	7311	29.54	36.61	8.84	24.98	50.01	74	-27.67	PK
802.11n20-2462MHz									
V	4924	34.15	30.43	7.94	26.63	45.89	74	-28.08	Pk
H	4924	36.28	30.43	7.94	26.63	48.02	74	-28.99	PK
V	7386	27.16	36.78	8.45	24.98	47.41	74	-27.9	Pk
H	7386	28.34	36.78	8.45	24.98	48.59	74	-25.41	PK

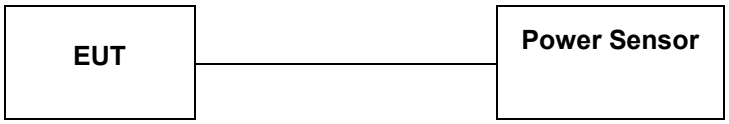
802.11n HT40

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
802.11n40-2422MHz									
V	4844	30.12	30.18	7.06	26.63	40.73	74	-33.77	Pk
H	4844	32.22	30.18	7.06	26.63	42.83	74	-33.38	PK
V	7266	25.34	36.61	9.02	24.98	45.99	74	-29.17	Pk
H	7266	27.63	36.61	9.02	24.98	48.28	74	-28.11	PK
802.11n40-2437MHz									
V	4874	28.65	30.36	7.62	26.63	40	74	-32.5	Pk
H	4874	30.45	30.36	7.62	26.63	41.8	74	-32.97	PK
V	7311	24.68	36.61	8.84	24.98	45.15	74	-30.95	Pk
H	7311	26.69	36.61	8.84	24.98	47.16	74	-30.18	PK
802.11n40-2452MHz									
V	4904	31.22	30.31	8.06	26.63	42.96	74	-31	Pk
H	4904	33.45	30.31	8.06	26.63	45.19	74	-32.97	PK
V	7356	20.76	36.56	8.45	24.98	40.79	74	-32.11	Pk
H	7356	21.12	36.56	8.45	24.98	41.15	74	-30.69	PK

Note:
1). Measuring frequencies from 9 KHz - 10th harmonic or 26.5GHz (which is less), No emission found between lowest internal used/generated frequency to 30MHz.
2). Radiated emissions measured in frequency range from 9k~10th harmonic or 26.5GHz (which is less) were made with an instrument using Peak detector mode.
3). Data of measurement within this frequency range shown “---” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4). Worst case data at 1Mbps at IEEE 802.11b; 6Mbps at IEEE 802.11g; 6.5Mbps at IEEE 802.11n HT20; 13.5Mbps at IEEE 802.11n HT40

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

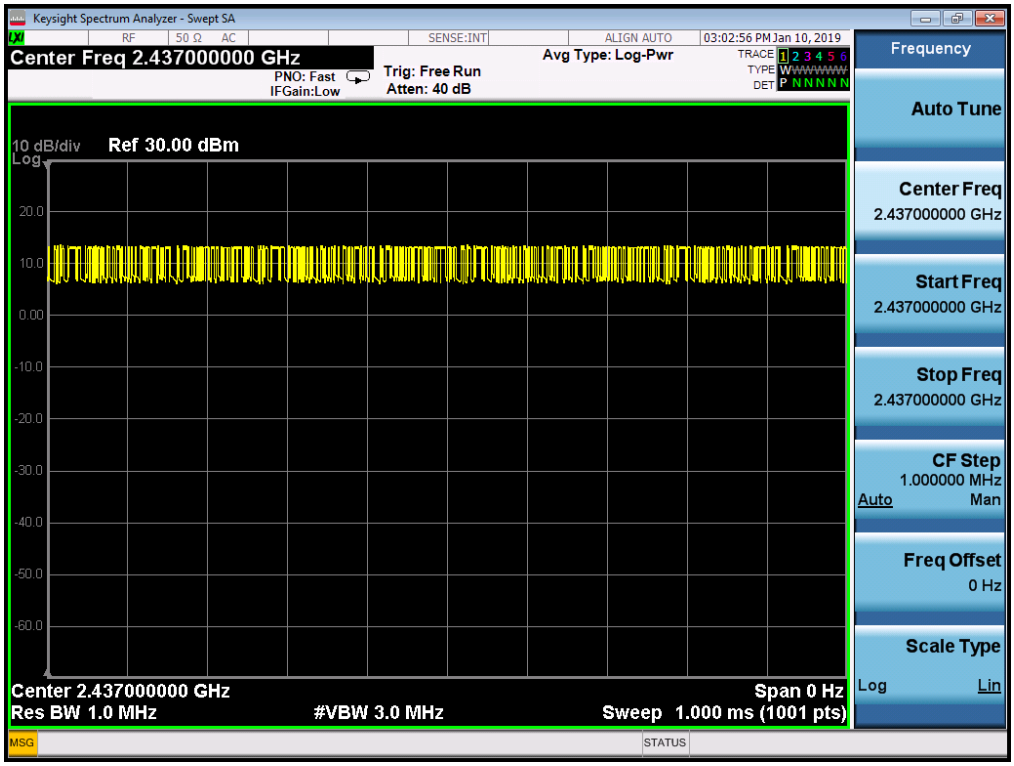
The Maximum Peak Output Power Measurement is 30dBm.

TEST RESULTS

Type	Channel	Output power PK (dBm)	Limit (dBm)	Result
802.11b	01	15.86	30.00	Pass
	06	15.78		
	11	15.74		
802.11g	01	14.57	30.00	Pass
	06	14.38		
	11	14.36		
802.11n(HT20)	01	13.58	30.00	Pass
	06	13.51		
	11	13.47		
802.11n(HT40)	03	12.43	30.00	Pass
	06	12.51		
	09	12.48		

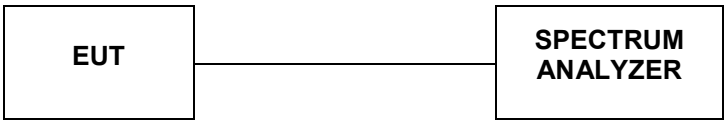
Note:
1) Measured output power at difference data rate for each mode and recorded worst case for each mode.
2). Test results including cable loss;
3) Worst case data at 1Mbps at IEEE 802.11b; 6Mbps at IEEE 802.11g; 6.5Mbps at IEEE 802.11n HT20; 13.5Mbps at IEEE 802.11n HT40;

802.11b


Keysight Spectrum Analyzer - Swept SA
RF
50 Ω
AC
SENSE:INT
ALIGN AUTO
03:02:56 PM Jan 10, 2019
Center Freq 2.437000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 40 dB
Avg Type: Log-Pwr
TRACE 1 2 3 4 5 6
TYPE W W W W W W
DET P N N N N N
10 dB/div
Log
Ref 30.00 dBm
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
Center 2.437000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 1.000 ms (1001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
2.437000000 GHz
Start Freq
2.437000000 GHz
Stop Freq
2.437000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

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

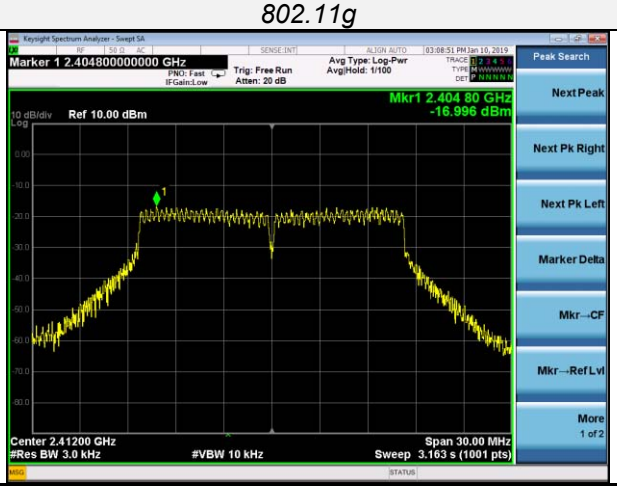
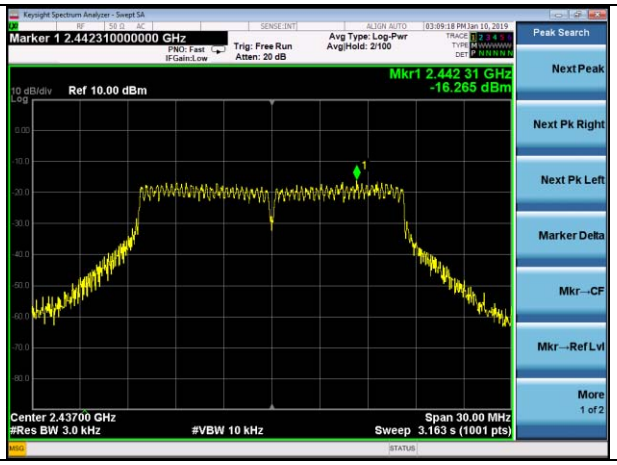
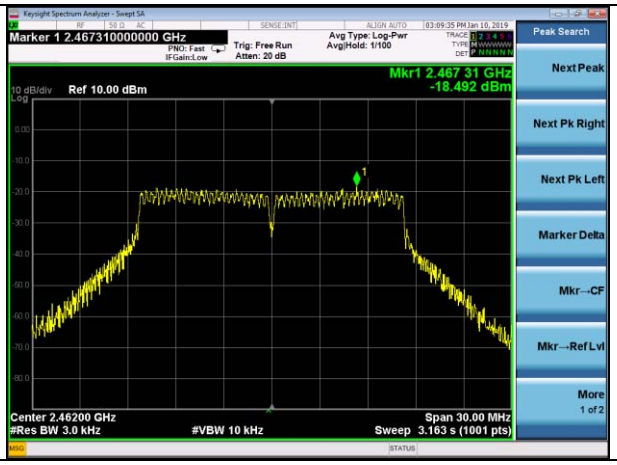
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

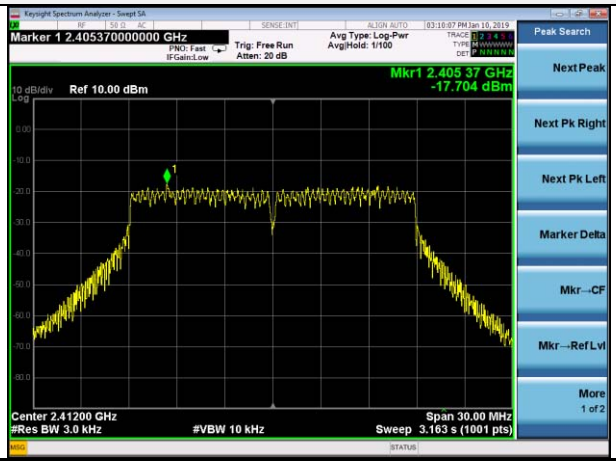
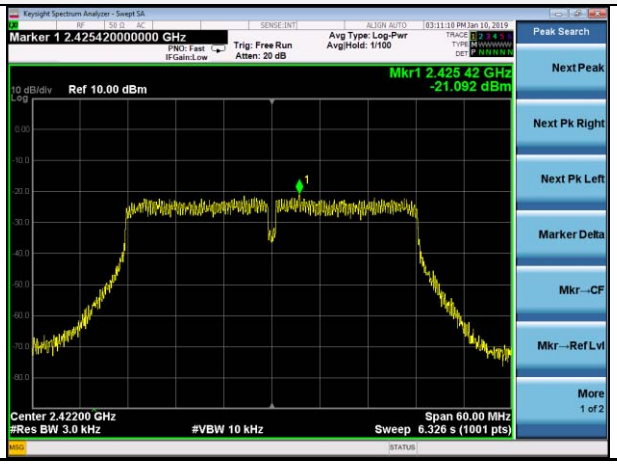
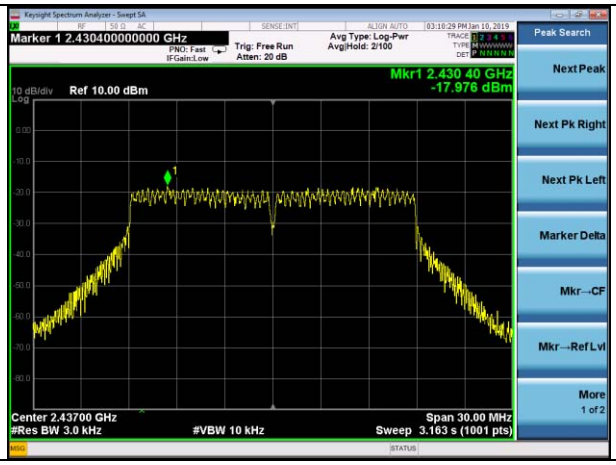
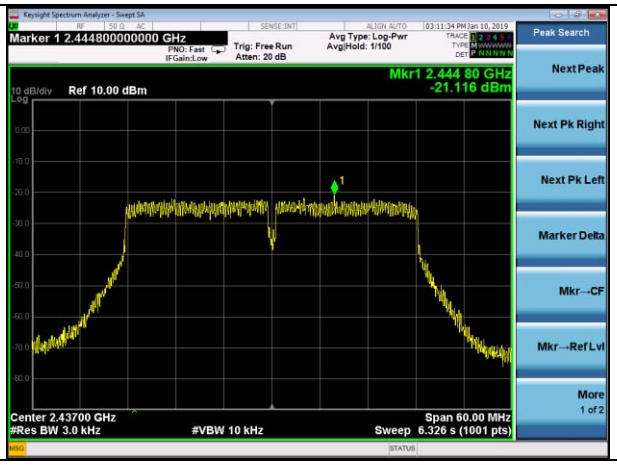
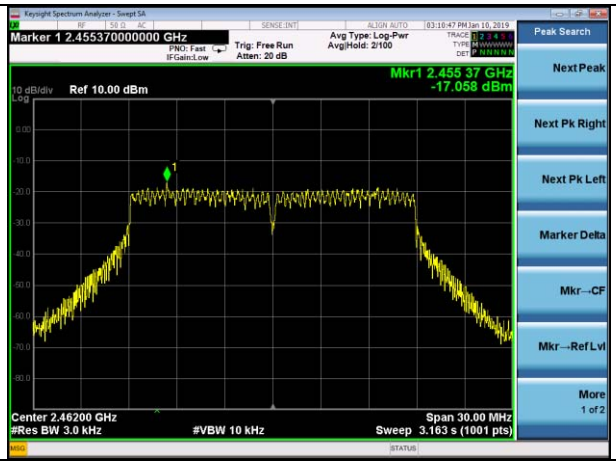
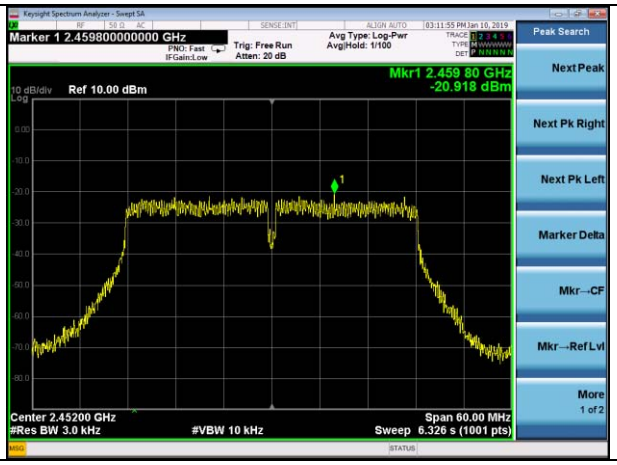
TEST RESULTS

Type	Channel	Power Spectral Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
802.11b	01	-14.425	8.00	Pass
	06	-14.538		
	11	-15.186		
802.11g	01	-16.996	8.00	Pass
	06	-16.265		
	11	-18.492		
802.11n(HT20)	01	-17.704	8.00	Pass
	06	-17.976		
	11	-17.058		
802.11n(HT40)	03	-21.092	8.00	Pass
	06	-21.116		
	09	-20.918		

Note:

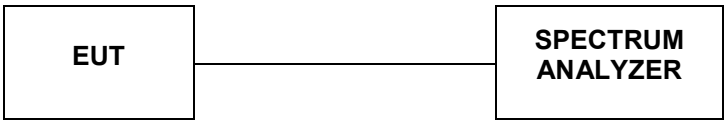
1). Measured peak power spectrum density at difference data rate for each mode and recorded worst case for each mode.
2). Test results including cable loss;
3). Worst case data at 1Mbps at IEEE 802.11b; 6Mbps at IEEE 802.11g; 6.5Mbps at IEEE 802.11n HT20; 13.5Mbps at IEEE 802.11n HT40;
4.) Please refer to following plots;

802.11b	802.11g
	
CH01	CH01
	
CH06	CH06
	
CH11	CH11

802.11 nHT20	802.11nHT40
	
CH01	CH03
	
CH06	CH06
	
CH11	CH09

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.

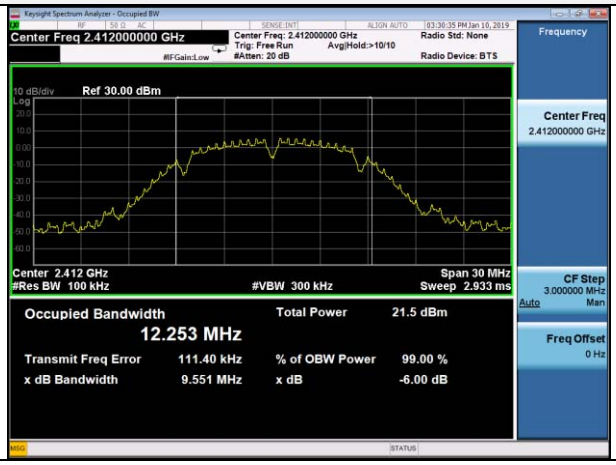
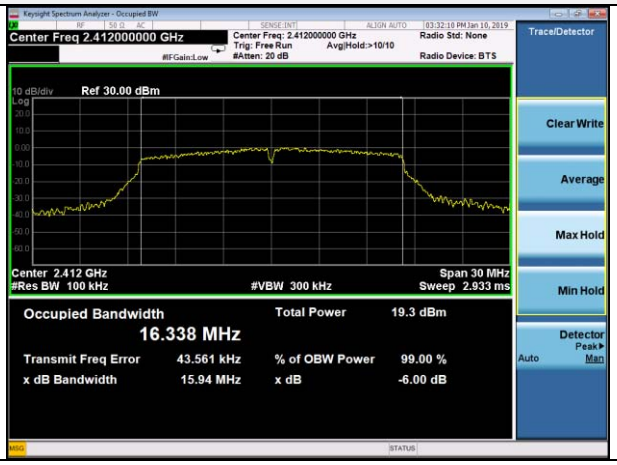
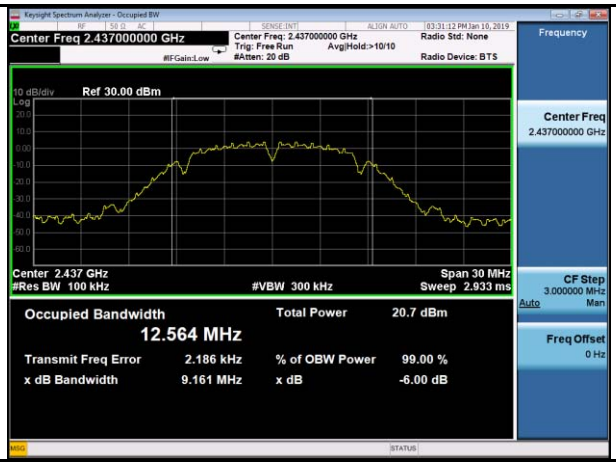
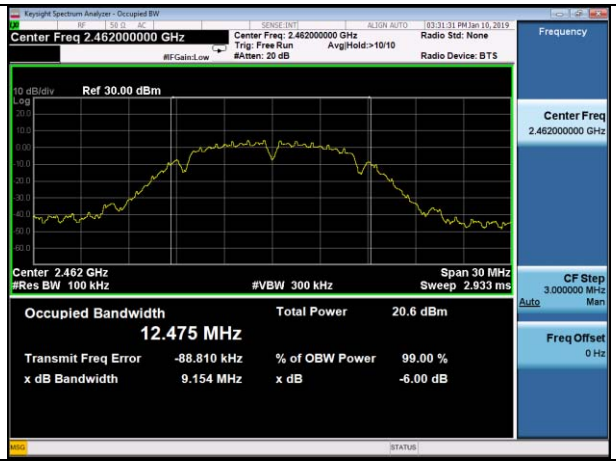
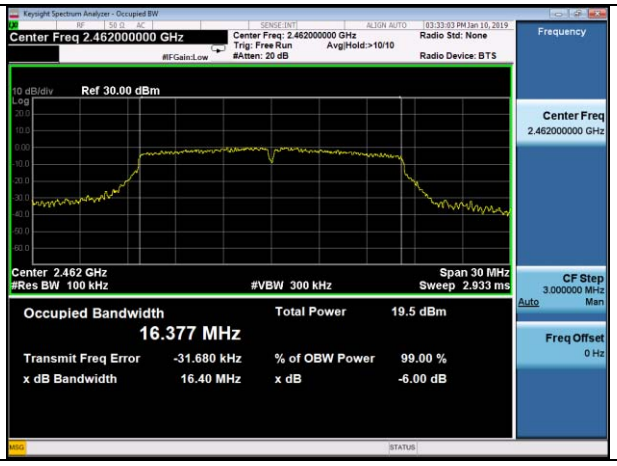
LIMIT

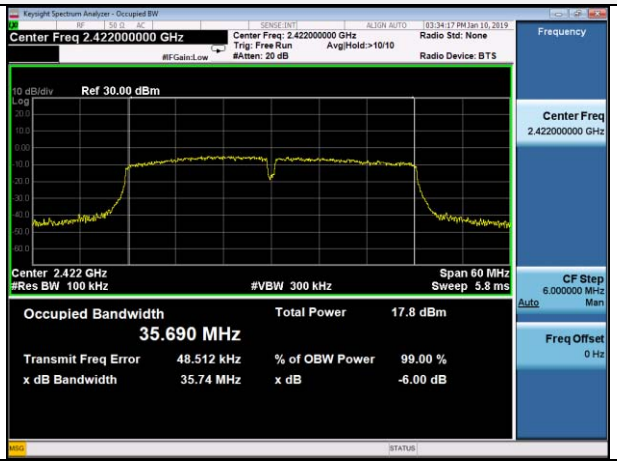
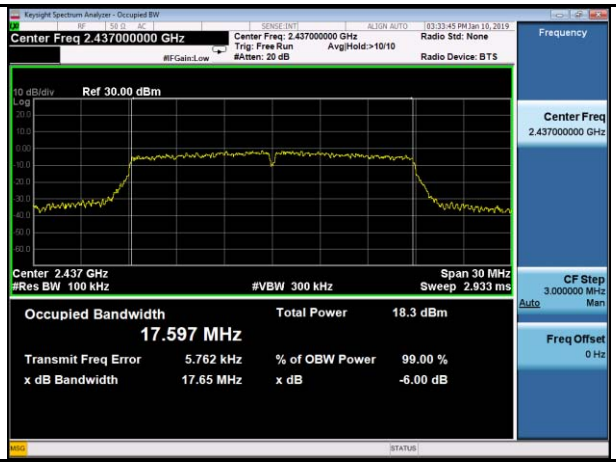
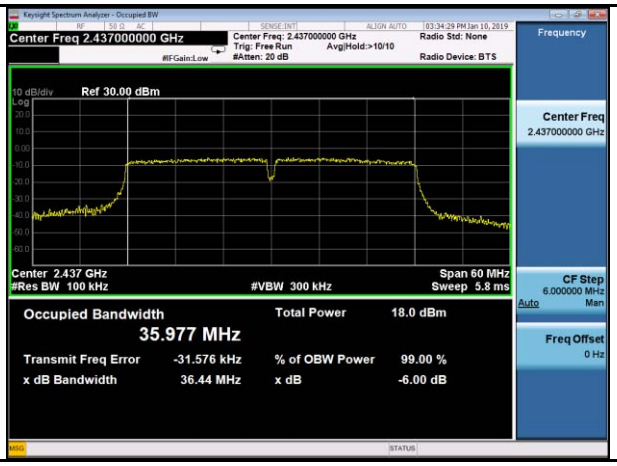
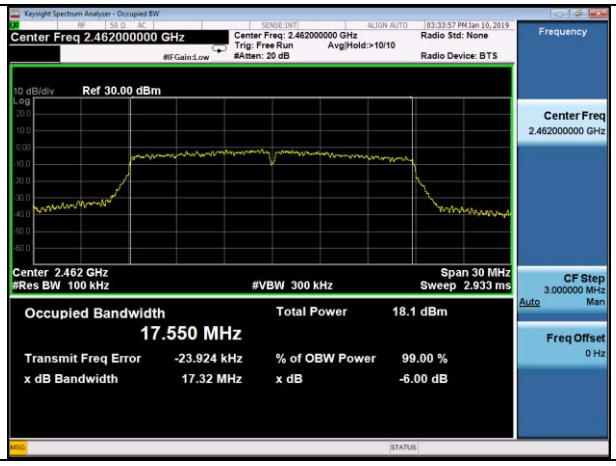
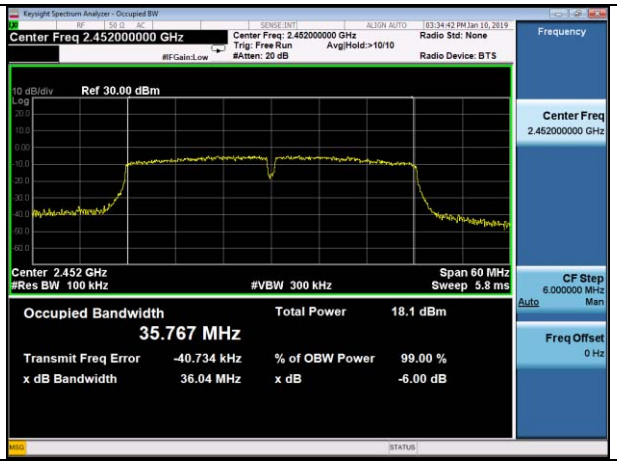
For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz

TEST RESULTS

Type	Channel	6dB Bandwidth (MHz)	Limit (KHz)	Result
802.11b	01	9.551	≥500	Pass
	06	9.161		
	11	9.154		
802.11g	01	15.94	≥500	Pass
	06	16.43		
	11	16.40		
802.11nHT20	01	16.69	≥500	Pass
	06	17.65		
	11	17.32		
802.11nHT40	03	35.74	≥500	Pass
	06	36.44		
	09	36.04		

Note:
1). Measured 6dB Bandwidth at difference data rate for each mode and recorded worst case for each mode.
2). Test results including cable loss;
3). Worst case data at 1Mbps at IEEE 802.11b; 6Mbps at IEEE 802.11g; 6.5Mbps at IEEE 802.11n HT20; 13.5Mbps at IEEE 802.11n HT40;

802.11b	*802.11g*
	
CH01	*CH01*
	
CH06	*CH06*
	
CH11	*CH11*

802.11n HT20	*802.11n HT40*
	
CH01	*CH03*
	
CH06	*CH06*
	
CH11	*CH09*

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 internal 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 HT20/802.11n HT40 mode at the antenna single transmitting mode and 802.11n HT20/802.11n HT40 at the Mimo mode, and recored the worst data at the antenna single transmitting mode.

4.6.1 For Radiated Bandedge Measurement

IEEE 802.11b								
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Ground Reflection Factor (dB)	Covert Radiated E Level At 3m (dBuV/m)	Detector	Limit (dBuV/m)	Over limit dB	Verdict
2310	-41.351	1.31	0	55.189	Peak	74	-18.811	PASS
2310	-52.777	1.31	0	43.763	AV	54	-10.237	PASS
2390	-40.641	1.31	0	55.899	Peak	74	-18.101	PASS
2390	-52.558	1.31	0	43.982	AV	54	-10.018	PASS
2483.5	-39.301	1.31	0	57.239	Peak	74	-16.761	PASS
2483.5	-50.774	1.31	0	45.766	AV	54	-8.234	PASS
2500	-40.308	1.31	0	56.232	Peak	74	-17.768	PASS
2500	-52.726	1.31	0	43.814	AV	54	-10.186	PASS

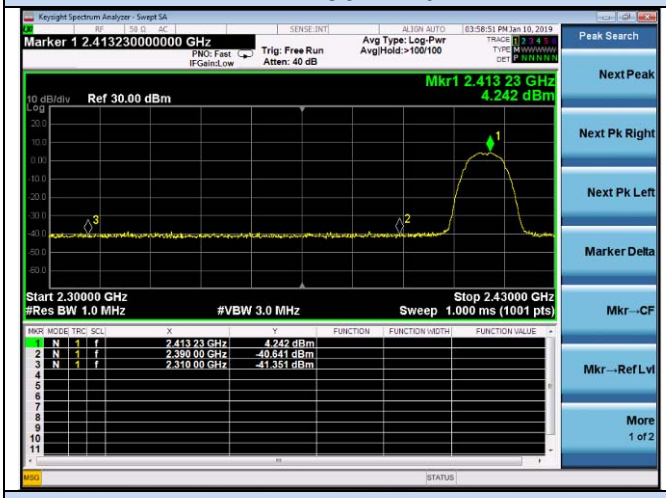
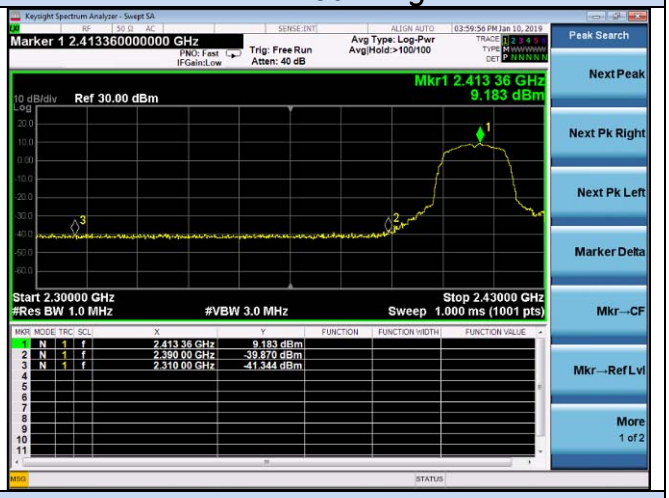
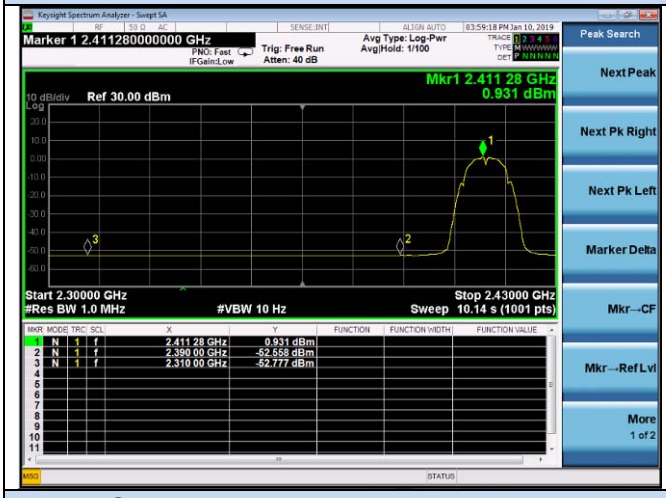
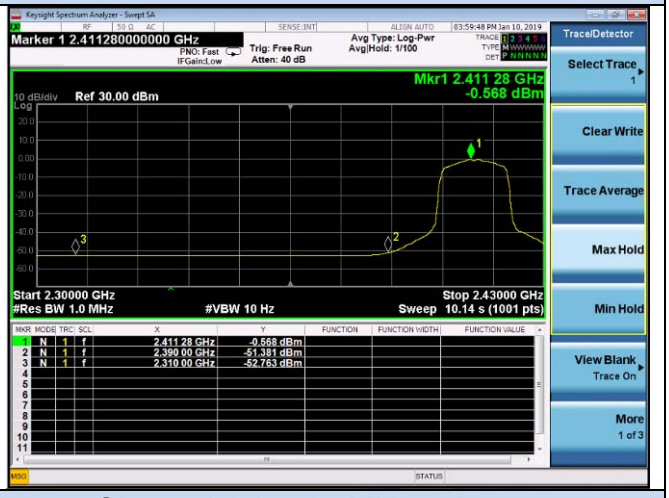
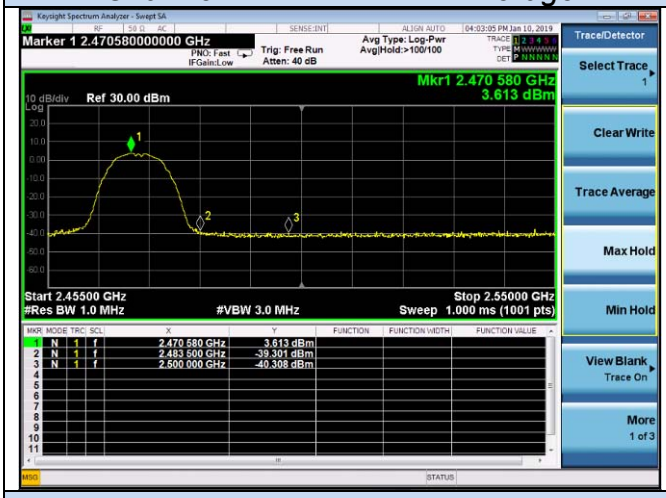
IEEE 802.11g								
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Ground Reflection Factor (dB)	Covert Radiated E Level At 3m (dBuV/m)	Detector	Limit (dBuV/m)	Over limit dB	Verdict
2310	-41.344	1.31	0	55.196	Peak	74	-18.804	PASS
2310	-51.381	1.31	0	45.159	AV	54	-8.841	PASS
2390	-39.87	1.31	0	56.67	Peak	74	-17.33	PASS
2390	-52.763	1.31	0	43.777	AV	54	-10.223	PASS
2483.5	-34.662	1.31	0	61.878	Peak	74	-12.122	PASS
2483.5	-45.625	1.31	0	50.915	AV	54	-3.085	PASS
2500	-42.775	1.31	0	53.765	Peak	74	-20.235	PASS
2500	-52.663	1.31	0	43.877	AV	54	-10.123	PASS

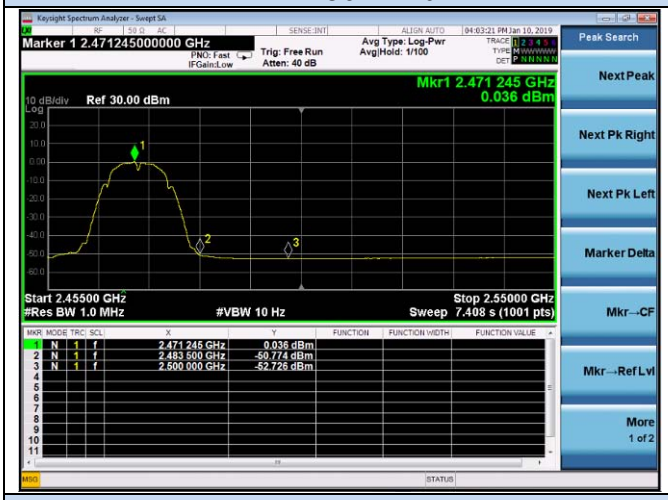
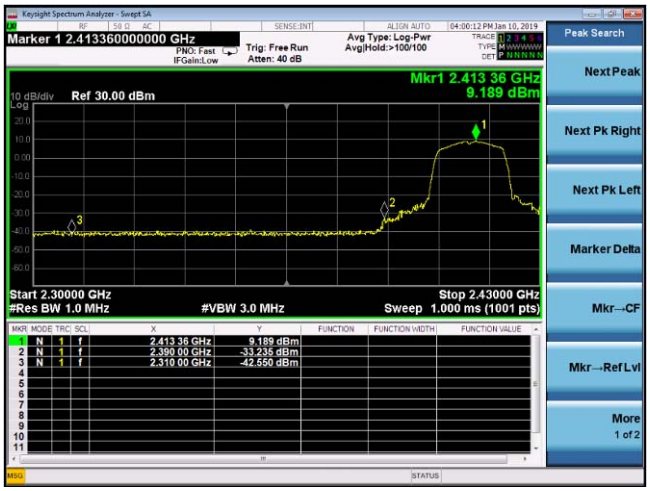
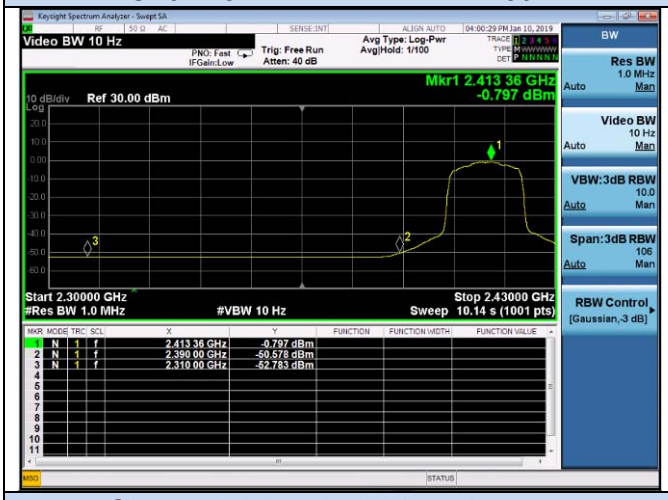
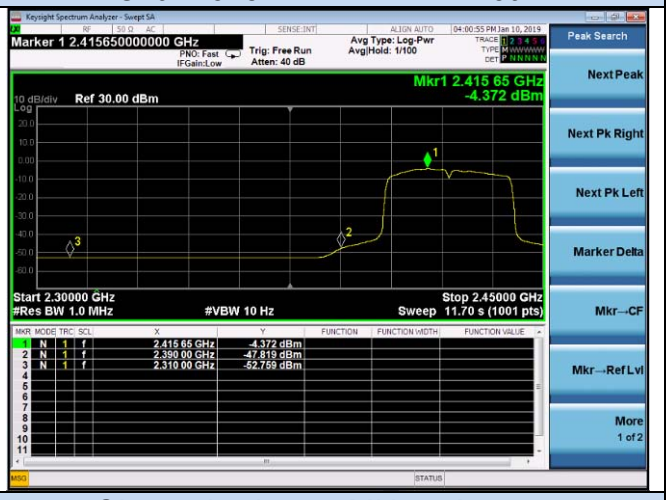
IEEE 802.11n20								
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Ground Reflection Factor (dB)	Covert Radiated E Level At 3m (dBuV/m)	Detector	Limit (dBuV/m)	Over limit dB	Verdict
2310	-42.55	1.31	0	53.99	Peak	74	-20.01	PASS
2310	-52.783	1.31	0	43.757	AV	54	-10.243	PASS
2390	-32.235	1.31	0	64.305	Peak	74	-9.695	PASS
2390	-50.578	1.31	0	45.962	AV	54	-8.038	PASS
2483.5	-35.967	1.31	0	60.573	Peak	74	-13.427	PASS
2483.5	-49.281	1.31	0	47.259	AV	54	-6.741	PASS
2500	-42.477	1.31	0	54.063	Peak	74	-19.937	PASS
2500	-52.736	1.31	0	43.804	AV	54	-10.196	PASS

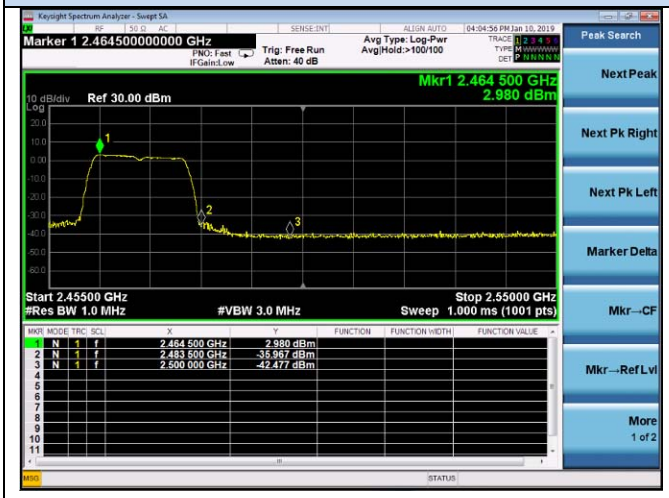
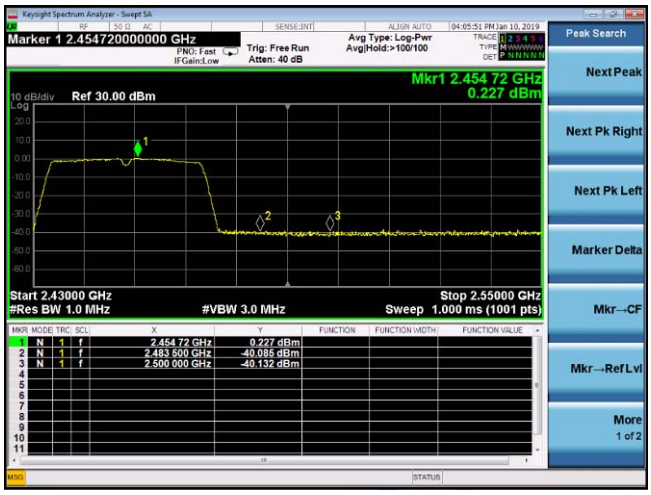
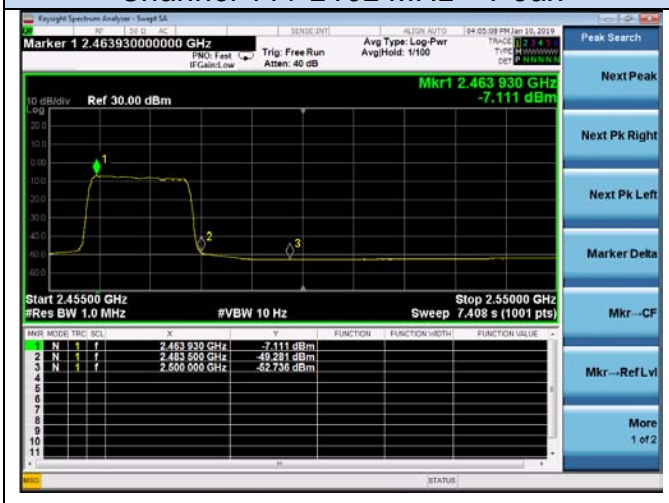
IEEE 802.11n40								
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Ground Reflection Factor (dB)	Covert Radiated E Level At 3m (dBuV/m)	Detector	Limit (dBuV/m)	Over limit dB	Verdict
2310	-40.164	1.31	0	56.376	Peak	74	-17.624	PASS
2310	-52.759	1.31	0	43.781	AV	54	-10.219	PASS
2390	-35.012	1.31	0	61.528	Peak	74	-12.472	PASS
2390	-47.819	1.31	0	48.721	AV	54	-5.279	PASS
2483.5	-40.085	1.31	0	56.455	Peak	74	-17.545	PASS
2483.5	-51.952	1.31	0	44.588	AV	54	-9.412	PASS
2500	-40.132	1.31	0	56.408	Peak	74	-17.592	PASS
2500	-51.962	1.31	0	44.578	AV	54	-9.422	PASS

Remark:

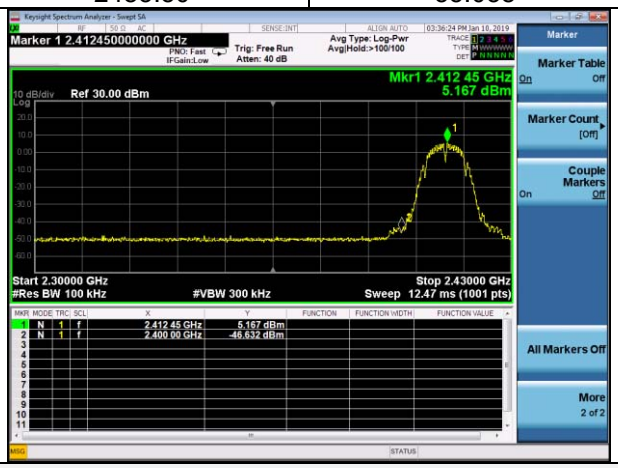
1. *Measured Band-edge measurements for radiated emissions at difference data rate for each mode and recorded worst case for each mode.*
2. *Test results including cable loss;*
3. *Worst case data at 1Mbps at IEEE 802.11b; 6Mbps at IEEE 802.11g; 6.5Mbps at IEEE 802.11n HT20; 13.5Mbps at IEEE 802.11n HT40;*
4. *"---"means that the fundamental frequency not for 15.209 limits requirement.*
5. *No need measure Average values if Peak values meets Average limits;*
6. ** means maximum values of frequency band 2310 – 2390 MHz, 2483.5 – 2500 MHz;*
7. *Covert Radiated E Level At 3m = Conducted average power + Directional Gain + 104.77-20*log(3);*
8. *Please refer to following plots;*

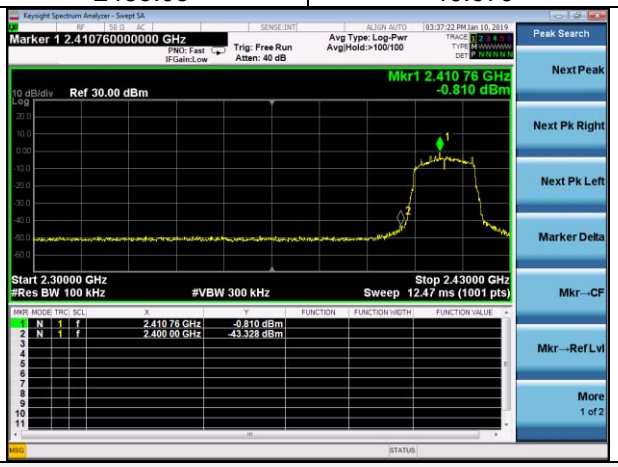
Band-edge measurements for radiated emissions	
IEEE 802.11b	*IEEE 802.11g*
	
Channel 1 / 2412 MHz – Peak	*Channel 1 / 2412 MHz – Peak*
	
Channel 1 / 2412 MHz – Average	*Channel 1 / 2412 MHz – Average*
	
Channel 11 / 2462 MHz – Peak	*Channel 11 / 2462 MHz – Peak*

Band-edge measurements for radiated emissions	
Antenna 1	
IEEE 802.11b	*IEEE 802.11g*
	
Channel 11 / 2462 MHz – Average	*Channel 11 / 2462 MHz – Average*
IEEE 802.11n HT20	*IEEE 802.11n HT40*
	
Channel 1 / 2412 MHz – Peak	*Channel 3 / 2422 MHz – Peak*
	
Channel 1 / 2412 MHz – Average	*Channel 3 / 2422 MHz – Average*

Band-edge measurements for radiated emissions	
IEEE 802.11n HT20	*IEEE 802.11n HT40*
	
Channel 11 / 2462 MHz – Peak	*Channel 9 / 2452 MHz – Peak*
	
Channel 11 / 2462 MHz – Average	*Channel 9 / 2452 MHz – Average*

4.6.2 For Conducted Bandedge Measurement

802.11b			
Frequency (MHz)	**Delta Peak to Band emission (dBc)**	**Limit (dBc)**	**Verdict**
2400.00	51.8	-20	PASS
2483.50	55.038	-20	PASS
			
2412		2462	

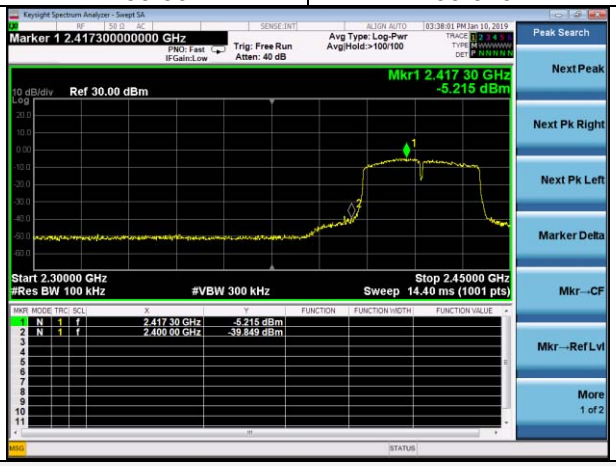
802.11g			
Frequency (MHz)	**Delta Peak to Band emission (dBc)**	**Limit (dBc)**	**Verdict**
2400.00	42.518	-20	PASS
2483.05	46.679	-20	PASS
			
2412		**2462**	

802.11n HT20			
Frequency (MHz)	Delta Peak to Band emission (dBc)	Limit (dBc)	Verdict
2400.00	37.989	-20	PASS
2483.50	46.215	-20	PASS

2412

2462

802.11n HT40			
Frequency (MHz)	Delta Peak to Band emission (dBc)	Limit (dBc)	Verdict
2400.00	34.634	-20	PASS
2483.50	39.349	-20	PASS

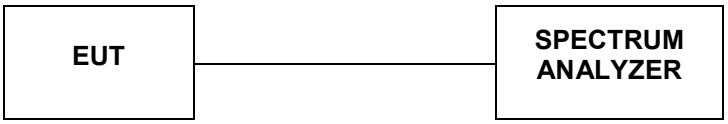


2422

2452

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

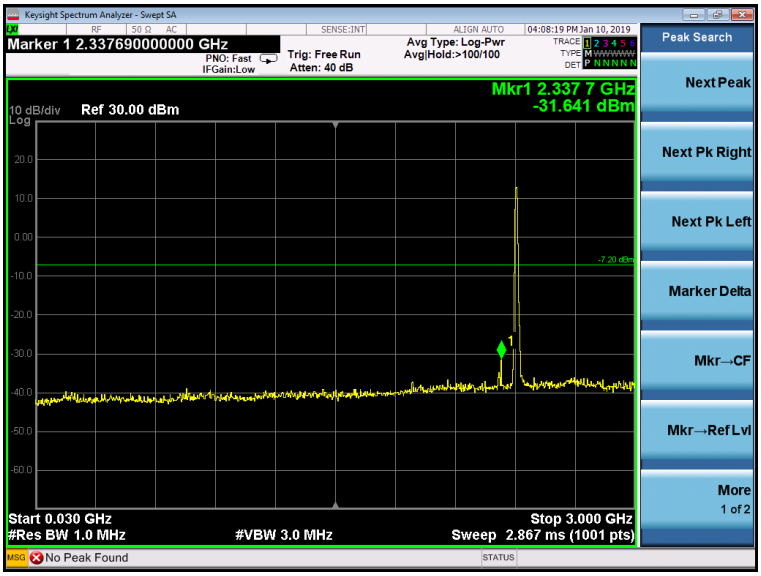
1. Below -20dB of the highest emission level in operating band.
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.
3.For below 30MHz,For 9KHz-150kHz,150K-10MHz,We use the RBW 1KHz,10KHz, So the limit need to calculated by “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.and record the worst data in the report.

Test Mode:	802.11b	Test channel :	01

Channel 01

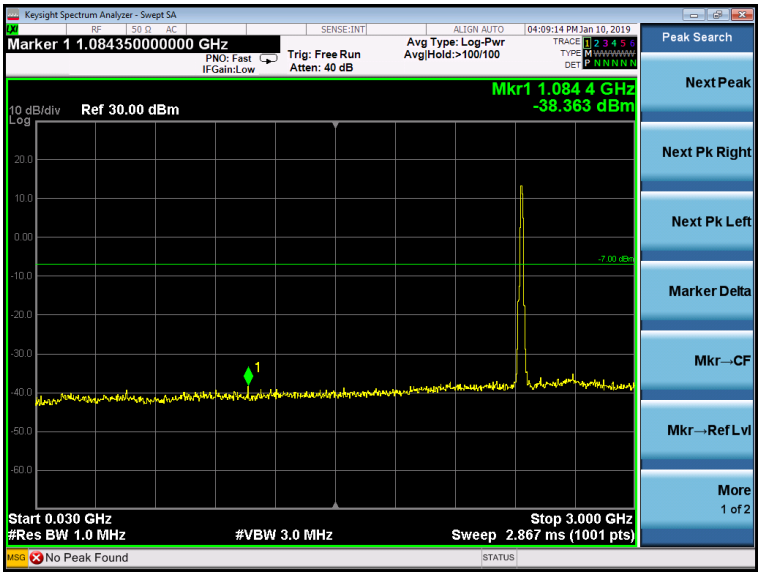


30MHz ~3GHz

3GHz~25GHz

Test Mode:	802.11b	Test channel :	06

Channel 06

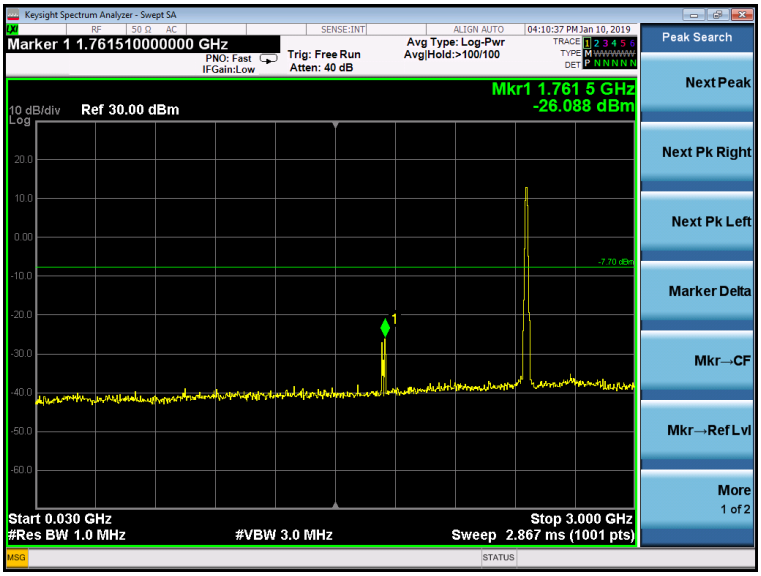


30MHz ~3GHz

3GHz~25GHz

Test Mode:	802.11b	Test channel :	11

Channel 11



30MHz ~3GHz

3GHz~25GHz

4.8. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

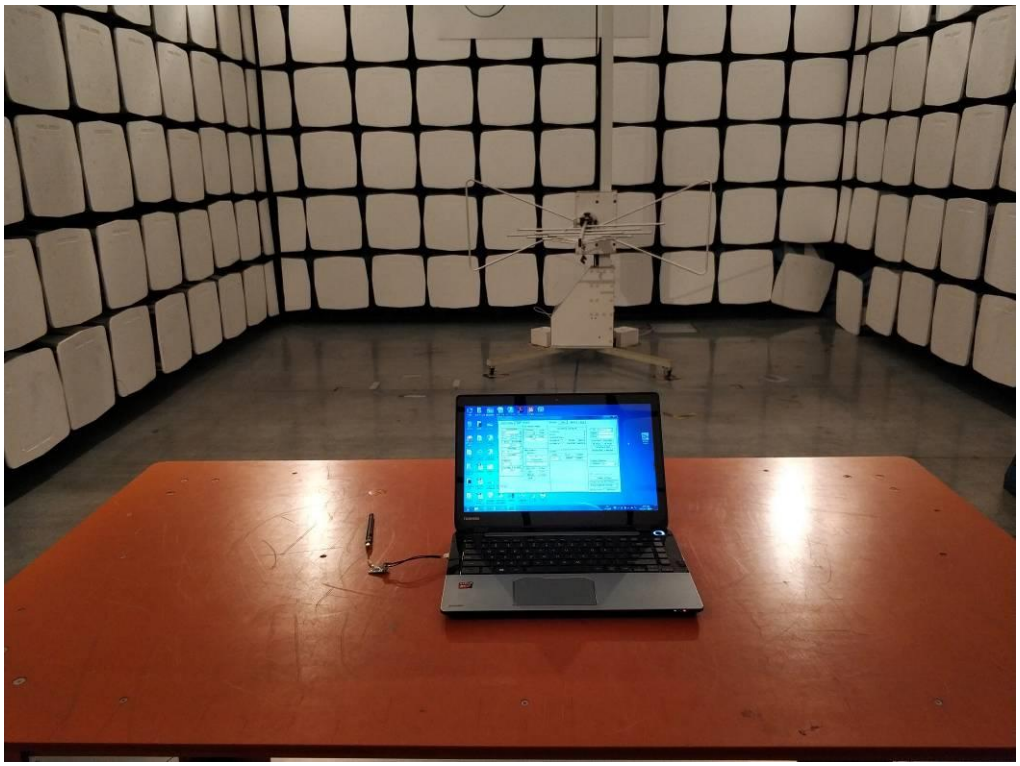
And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

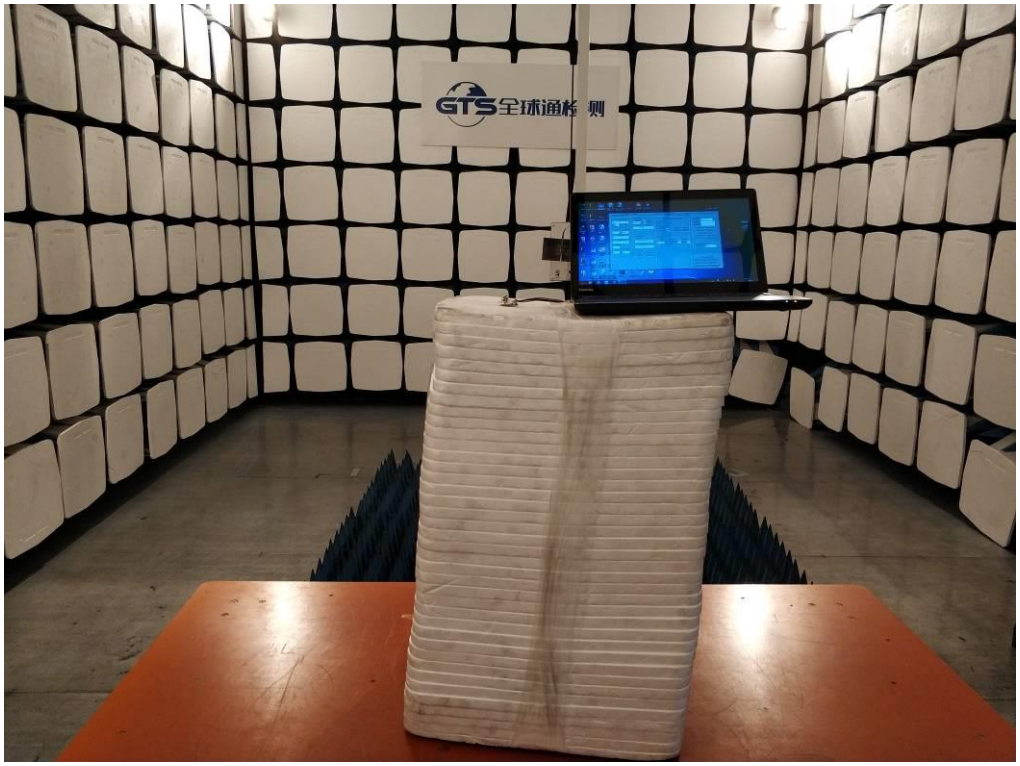
Test Result

The antenna used for this product is internal Antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 1.31dBi .

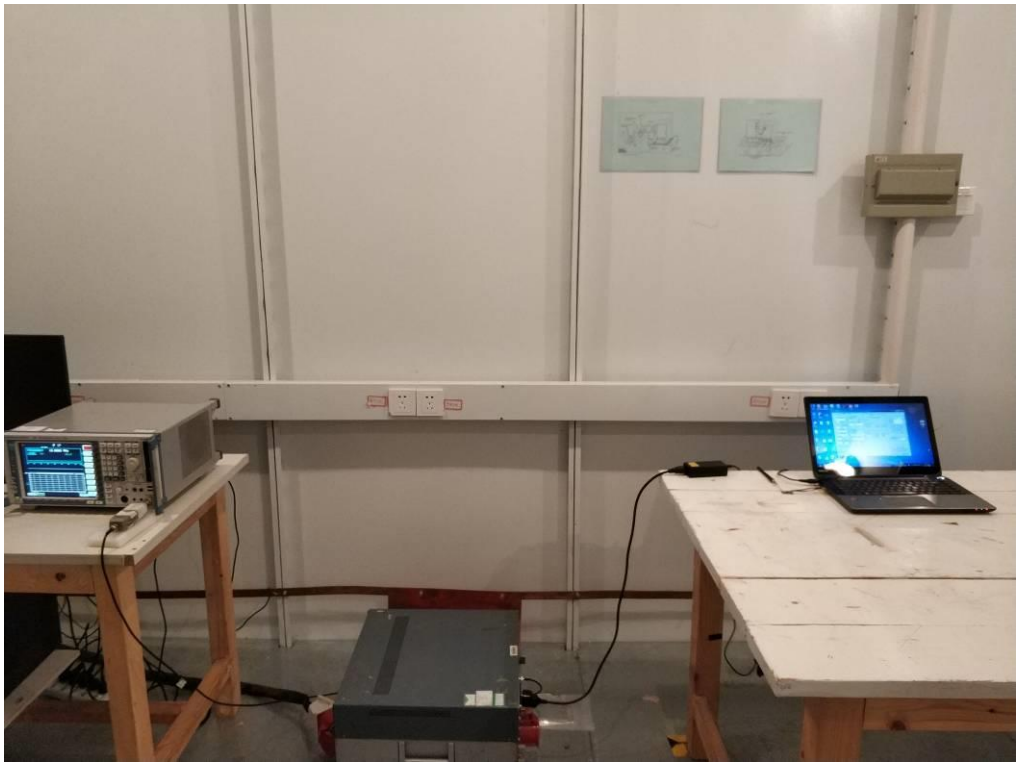
5. Test Setup Photos of the EUT

Radiated Emission Test

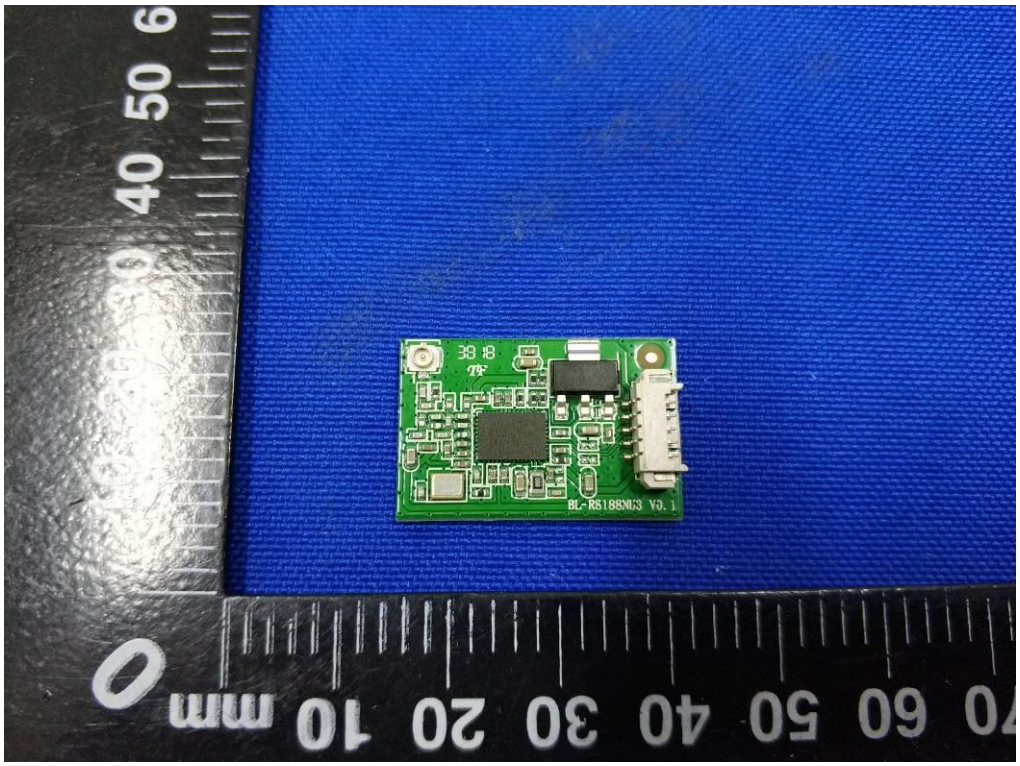


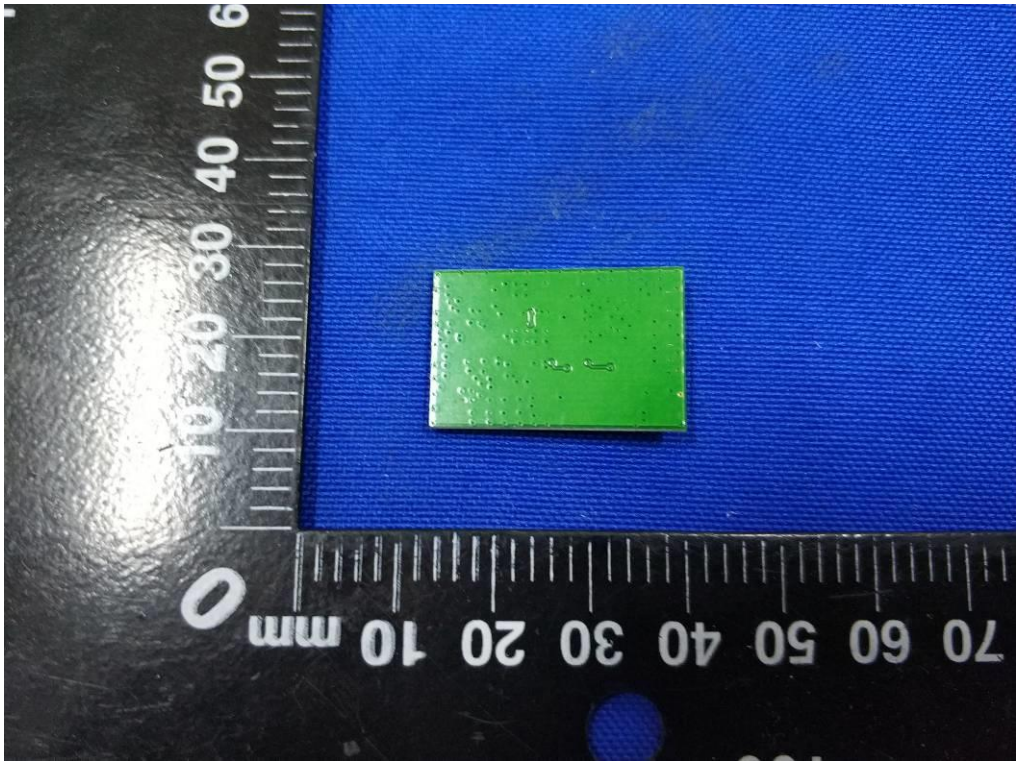


Conducted Emission



6. External and Internal Photos of the EUT





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