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......:	**GTSR16060030-2.4WLAN**
FCC ID..... :	**2AIS5-ARKJ01**
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. 24, 2016
Test 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.....:	**Beijing Palo Alto Tech Co.,Ltd.**
Address .....:	T3-A-31,Wangjing Soho, Chaoyang District, Beijing, 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 .....:	CoolGlass
Trade Mark .....:	/
Manufacturer .....:	**Beijing Palo Alto Tech Co.,Ltd.**
Model/Type reference.....:	ARKJ01
Listed Models .....:	/
Operation Frequency.....:	From 2412MHz to 2462MHz
Hardware Version .....:	PD_M200_S3132E_V1.0
Software Version .....:	BP-A-V2.0
Rating .....:	DC 3.8V
Result.....:	**PASS**

T E S T R E P O R T

Test Report No. :	**GTSR16060030-2.4WLAN**	Jun. 24, 2016 Date of issue

Equipment under Test	:	CoolGlass
Model /Type	:	ARKJ01
Listed Models	:	/
Applicant	:	**Beijing Palo Alto Tech Co.,Ltd.**
Address	:	T3-A-31,Wangjing Soho, Chaoyang District, Beijing, China
Manufacturer	:	**Beijing Palo Alto Tech Co.,Ltd.**
Address	:	T3-A-31,Wangjing Soho, Chaoyang District, Beijing, China

Test Result:	**PASS**

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 V03r05: 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	:	Jun. 12, 2016
Testing commenced on	:	Jun. 12, 2016
Testing concluded on	:	Jun. 24, 2016

2.2. Product Description

Name of EUT	CoolGlass
Model Number	ARKJ01
Listed Models	/
FCC ID	2AIS5-ARKJ01
Power Supply	Battery DC 3.8V
Supported type:	802.11a/802.11ac/802.11b/802.11g/802.11n HT20/BLE
Modulation:	802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK) 802.11ac: OFDM(64QAM, 16QAM, QPSK, BPSK) 802.11b: DSSS(CCK,DQPSK,DBPSK) 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK) Bluetooth Lower Energy: GFSK
Operation frequency:	802.11a:5180MHz – 5240MHz/5745MHz – 5825MHz 802.11ac:5180MHz – 5240MHz/5745MHz – 5825MHz 802.11b:2412 – 2462MHz 802.11g:2412 – 2462MHz 802.11n HT20:2412 – 2462MHz BLE: 2402 – 2480 MHz
Antenna Type	Internal Antenna and maximum antenna gain is 0dBi

2.3. Equipment Under Test

Power supply system utilised

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

DC 3.80V/DC5.0V adapter from AC 120V/60Hz or from USB to PC

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

This is a CoolGlass.

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

2.5. EUT operation mode

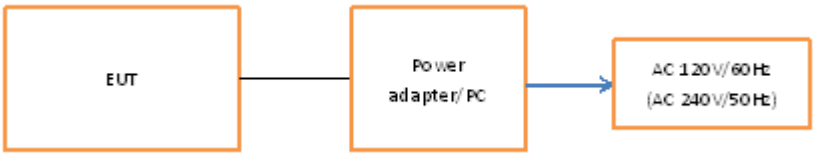
The application provider specific test software to control sample in continuous TX and RX (Duty Cycle >98%)

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: 2AIS5-ARKJ01** 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.

2.9. NOTE

	Test Standards	Reference Report
Bluetooth-BLE	FCC Part 15 Subpart C	GTSR16060030-BLE
WLAN-2.4	FCC Part 15 Subpart C	GTSR16060030-2.4WLAN
WLAN-5.8	FCC Part 15 Subpart E	GTSR16060030-5.8WLAN
RF Exposure	FCC Per 47 CFR 2.1093(d)	GTSR16060030-MPE

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Test Site 1: 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

Test Site 2: 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. Summary of Test Results

FCC Part § 15.247			
FCC Rules	Description of Test	Results	Test Site
§15.247(b)	Maximum Conducted Output Power	PASS	Site 1
§15.247(e)	Power Spectral Density	PASS	Site 1
§15.247(a)(2)	6dB Bandwidth	PASS	Site 1
§15.247(d)	Conducted Spurious Emissions	PASS	Site 1
§15.209, §15.247(d)	Radiated Spurious Emissions	PASS	Site 2
§15.205	Emissions at Restricted Band	PASS	Site 2
§15.207(a)	Conducted Emissions	PASS	Site 1
§15.203	Antenna Requirements	PASS	Site 2

3.5. 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	☒ Lowest ☒ Middle ☒ Highest	802.11b 802.11g 802.11n HT20	☒ Lowest ☒ Middle ☒ Highest	☒	☐	☐	☐	complies
§15.247(a)(1)	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	☒ Lowest ☒ Middle ☒ Highest	802.11b 802.11g 802.11n HT20	☒ 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	☒ Lowest ☒ Highest	802.11b 802.11g 802.11n HT20	☒ 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	☒ Lowest ☒ Middle ☒ Highest	802.11b 802.11g 802.11n HT20	☒ 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 HT20/OFDM	6.5Mbps	1/6/11
Band Edge	11b/DSSS	1 Mbps	1/11
	11g/OFDM	6 Mbps	1/11
	11n HT20/OFDM	6.5Mbps	1/11

3.6. 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.

3.7. Equipments Used during the Test

Test Site 1

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
Spectrum Analyzer	Agilent	N9020A	MY48010425	2016/06/17	2017/06/16
LISN	R&S	ENV216	3560.6550.08	2016/05/28	2017/05/27
LISN	R&S	ESH2-Z5	893606/008	2016/05/27	2017/05/26
EMI Test Receiver	R&S	ESCI	101102	2015/06/26	2016/06/25
EMC Test Software	R&S	ES-K1	N/A	N/A	N/A
RF Cable	H&S	N/A	N/A	2015/06/26	2016/06/25

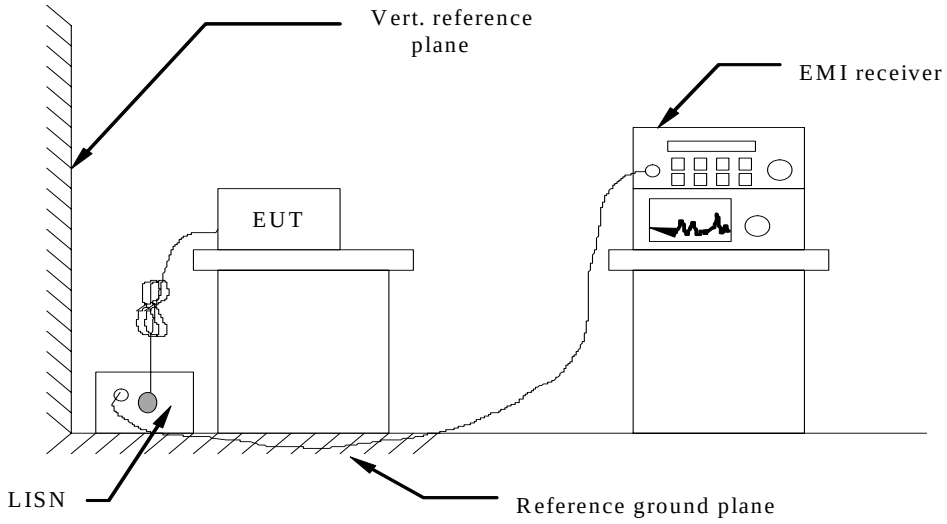
Test Site 2

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2016/06/02	2019/06/01
Controller	EM Electronics	Controller EM 1000	N/A	N/A	N/A
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2016/05/19	2019/05/18
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170219	2016/05/19	2019/05/18
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2016/05/19	2019/05/18
EMC Test Software	R&S	ES-K1	N/A	N/A	N/A
Amplifier	Agilent	8349B	3008A02306	2016/05/19	2017/05/18
Amplifier	Agilent	8447D	2944A10176	2016/05/19	2017/05/18
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	N/A	2016/05/20	2017/05/19
High-Pass Filter	K&L	41H10-1375/U12750-O/O	N/A	2016/05/20	2017/05/19
Data acquisition card	Agilent	U2531A	TW53323507	2016/05/20	2017/05/19
Power Sensor	Agilent	U2021XA	MY5365004	2016/05/20	2017/05/19
RF Cable	H&S	RG214	N/A	2016/05/20	2017/05/19
EMI Test Receiver	R&S	ESCI	103710	2016/05/20	2017/05/19
Spectrum Analyzer	Agilent	N9020A	MY49100067	2016/05/20	2017/05/19

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2013.
2 Support equipment, if needed, was placed as per ANSI C63.10-2013
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013
4 The EUT received DC5V power, the adapter received AC120V/60Hz (AC 240V/50Hz) or DC 5.0V form USB to PC adapter 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：

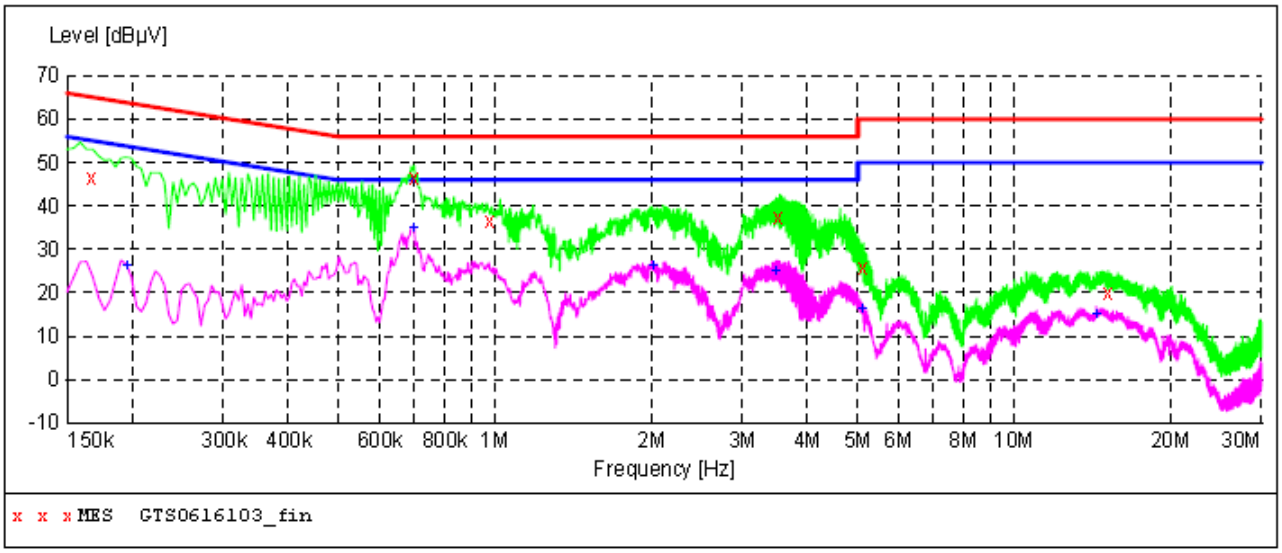
Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the frequency.		

TEST RESULTS

Remark:

1. We tested at AC power adapter charging and USB from PC charging mode, also at voltage AC 120V/60Hz and AC 240V/50Hz, recorded worst case.
2. We tested at WLAN Link mode for AC conducted emission

Power supply:	DC 5V from Adapter AC 120V/60Hz	Polarization	L



MEASUREMENT RESULT: "GTS0616103_fin"

6/16/2016 10:11AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.168000	46.50	10.0	65	18.6	QP	L1	GND
0.699000	46.30	9.7	56	9.7	QP	L1	GND
0.978000	36.50	9.6	56	19.5	QP	L1	GND
3.511500	37.50	9.4	56	18.5	QP	L1	GND
5.113500	25.70	9.3	60	34.3	QP	L1	GND
15.184500	19.90	8.1	60	40.1	QP	L1	GND

MEASUREMENT RESULT: "GTS0616103_fin2"

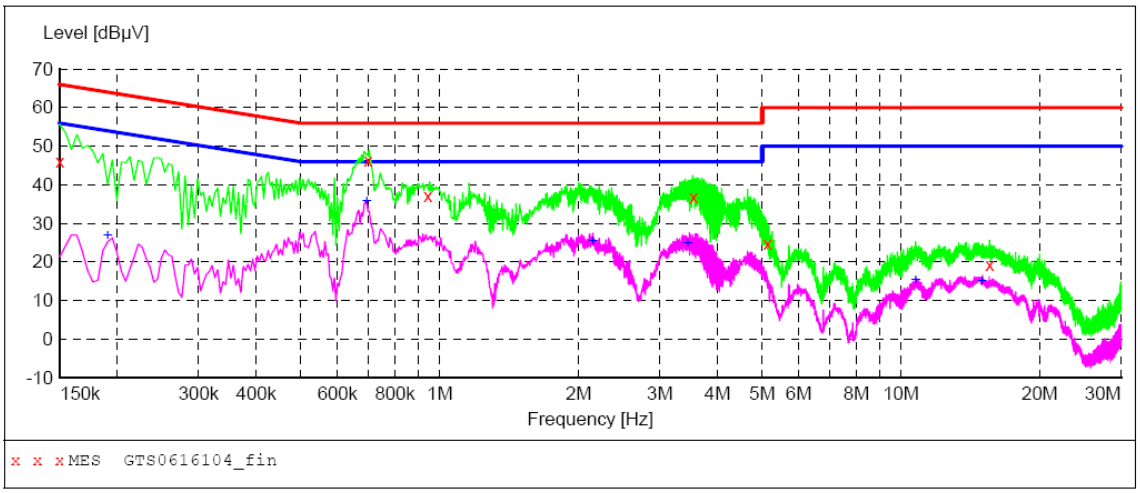
6/16/2016 10:11AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.195000	26.30	10.0	54	27.5	AV	L1	GND
0.699000	34.70	9.7	46	11.3	AV	L1	GND
2.013000	26.00	9.5	46	20.0	AV	L1	GND
3.480000	24.80	9.4	46	21.2	AV	L1	GND
5.086500	16.40	9.3	50	33.6	AV	L1	GND
14.428500	15.00	8.3	50	35.0	AV	L1	GND

Power supply:	DC 5V from Adapter AC 120V/60Hz	Polarization	N

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "GTS0616104_fin"

6/16/2016 10:14AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	45.90	10.1	66	20.1	QP	N	GND
0.699000	46.20	9.7	56	9.8	QP	N	GND
0.942000	37.20	9.6	56	18.8	QP	N	GND
3.552000	36.90	9.4	56	19.1	QP	N	GND
5.136000	24.80	9.3	60	35.2	QP	N	GND
15.567000	19.40	8.0	60	40.6	QP	N	GND

MEASUREMENT RESULT: "GTS0616104_fin2"

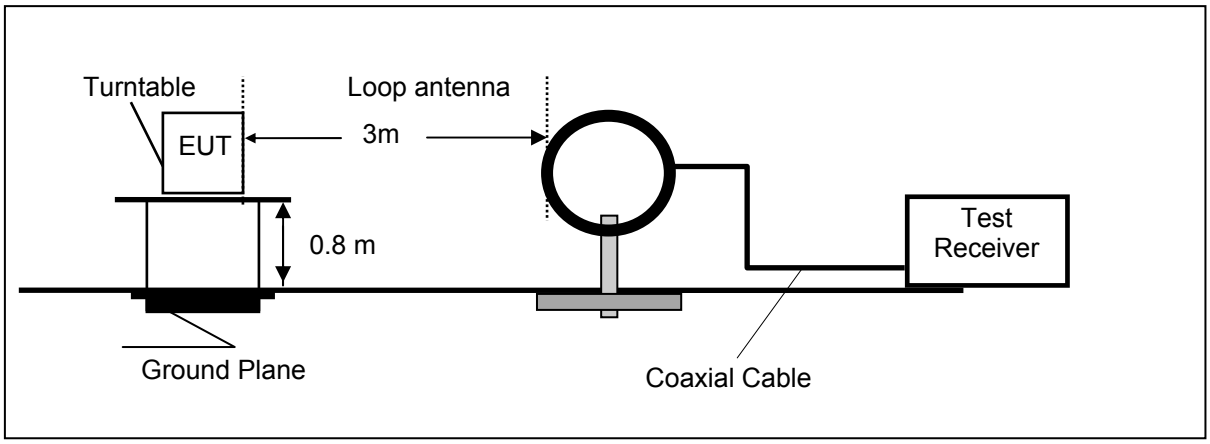
6/16/2016 10:14AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.190500	26.80	10.0	54	27.2	AV	N	GND
0.694500	35.60	9.7	46	10.4	AV	N	GND
2.148000	25.40	9.5	46	20.6	AV	N	GND
3.448500	24.70	9.4	46	21.3	AV	N	GND
10.761000	15.30	8.8	50	34.7	AV	N	GND
14.991000	15.10	8.2	50	34.9	AV	N	GND

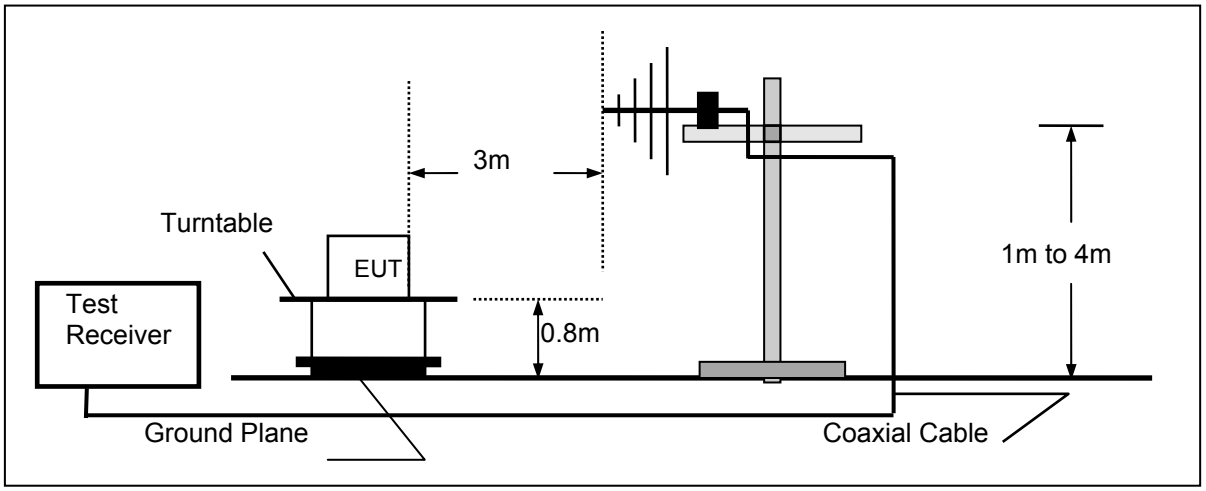
4.2. Radiated Emission

TEST CONFIGURATION

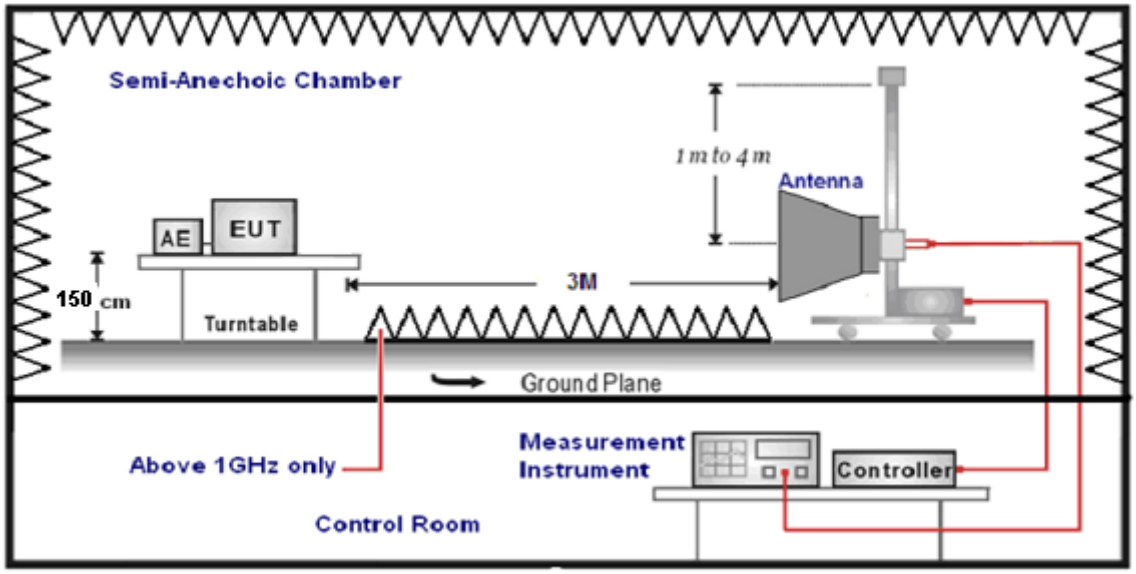
Frequency range 9 KHz – 30MHz



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. The EUT minimum operation frequency was 32.768KHz and maximum operation frequency was 2480MHz.so radiated emission test frequency band from 9KHz to 25GHz.

a) 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

b) 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

More procudre as follows;

1) Sequence of testing 9 kHz to 30 MHz

Setup:
--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
--- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.
--- If the EUT is a floor standing device, it is placed on the ground.
--- Auxiliary equipment and cables were positioned to simulate normal operation conditions.
--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
--- The measurement distance is 3 meter.
--- The EUT was set into operation.

Premeasurement:
--- The turntable rotates from 0° to 315° using 45° steps.
--- The antenna height is 1.0 meter.
--- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:
--- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).
--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QP detector.
--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

2) Sequence of testing 30 MHz to 1 GHz

Setup:
--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
--- Auxiliary equipment and cables were positioned to simulate normal operation conditions
--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
--- The measurement distance is 3 meter.
--- The EUT was set into operation.

Premeasurement:
--- The turntable rotates from 0° to 315° using 45° steps.
--- The antenna is polarized vertical and horizontal.
--- The antenna height changes from 1 to 4 meter.
--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:
--- The final measurement will be performed with minimum the six highest peaks.
--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter.
--- The final measurement will be done with QP detector with an EMI receiver.
--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

3) Sequence of testing 1 GHz to 18 GHz

Setup:
--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
--- Auxiliary equipment and cables were positioned to simulate normal operation conditions
--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
--- The measurement distance is 3 meter.
--- The EUT was set into operation.

Premeasurement:
--- The turntable rotates from 0° to 315° using 45° steps.
--- The antenna is polarized vertical and horizontal.
--- The antenna height scan range is 1 meter to 2.5 meter.
--- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:
--- The final measurement will be performed with minimum the six highest peaks.
--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.
--- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.
--- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

4) Sequence of testing above 18 GHz

Setup:
--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
--- Auxiliary equipment and cables were positioned to simulate normal operation conditions
--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
--- The measurement distance is 1 meter.
--- The EUT was set into operation.

Premeasurement:
--- The antenna is moved spherical over the EUT in different polarizations of the antenna.
Final measurement:
--- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.
--- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

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	

For example

Frequency (MHz)	FS (dBμV/m)	RA (dBμV/m)	AF (dB)	CL (dB)	AG (dB)	Transd (dB)
300.00	40	58.1	12.2	1.6	31.90	-18.1

Transd=AF +CL-AG

RADIATION LIMIT

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.
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)

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	300	20log(2400/F(KHz))+80	2400/F(KHz)
0.49-1.705	30	20log(24000/F(KHz))+40	24000/F(KHz)
1.705-30	30	20log(30)+40	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

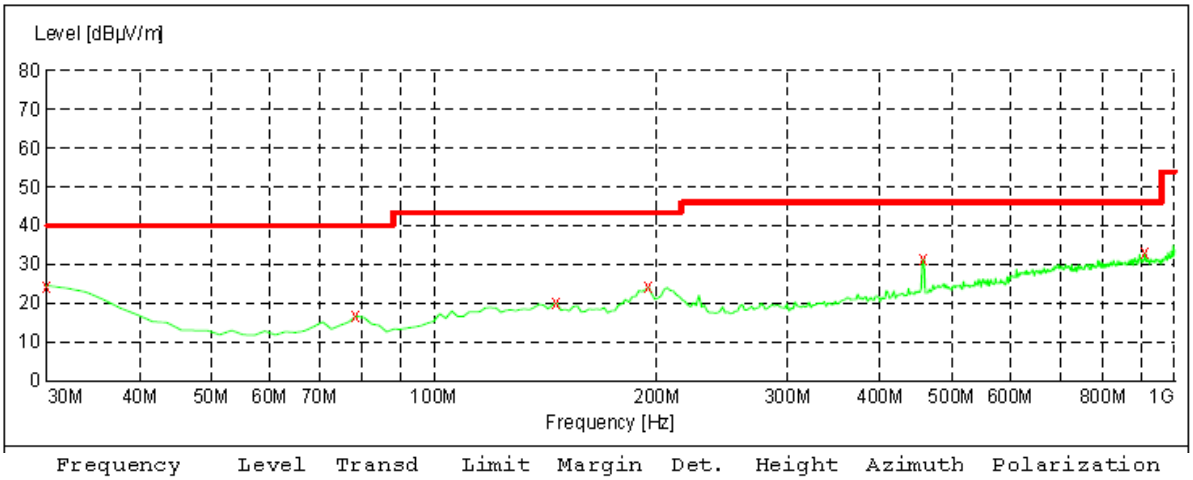
Remark: 1. We tested three positions and recorded worst case.
2. We tested WLAN IEEE 802.11b Link mode for below 1G;
3. Over Limit = Emission level - Limit value
4. "---" states emission level at least lower than limit 20dB, so without recorded any values;
5. The radiated measurement are performed the each channel (low/mid/high), the datum recorded below is the worst case for all test channels.
6. *We tested both battery powered and powered by adapter charging mode at three orientate ons, recorded worst case at powered by adapter charging mode.*

For 9 KHz-30MHz

Frequency (MHz)	Corrected Reading (dBuV/m)@3m	FCC Limit (dBuV/m) @3m	Margin (dB)	Detector	Result
0.36	50.27	96.48	46.21	QP	PASS
1.65	43.69	63.25	19.56	QP	PASS
20.51	44.85	69.54	24.69	QP	PASS
25.77	44.24	69.54	25.30	QP	PASS

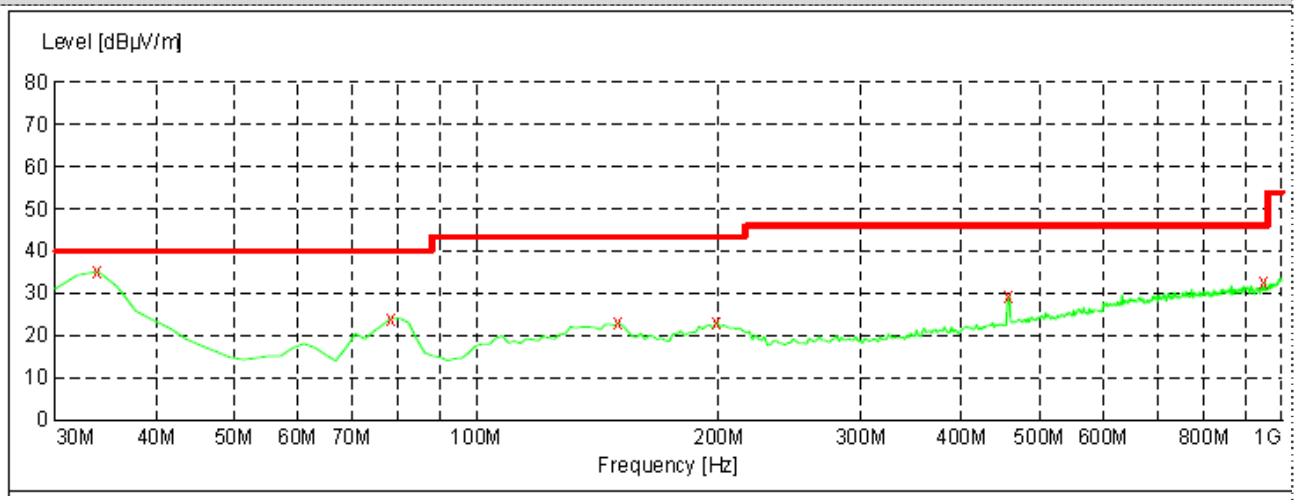
For 30MHz-1GHz

Horizontal



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	24.50	20.8	40.0	15.5	PK	100	98.0	HORIZONTAL
78.500000	16.60	8.4	40.0	23.4	PK	100	132.0	HORIZONTAL
146.400000	20.00	14.0	43.5	23.5	PK	100	158.0	HORIZONTAL
194.900000	24.10	13.2	43.5	19.4	PK	300	197.0	HORIZONTAL
458.740000	31.30	19.4	46.0	14.7	PK	300	223.0	HORIZONTAL
912.700000	33.00	26.1	46.0	13.0	PK	300	268.0	HORIZONTAL

Vertical



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
33.880000	35.10	17.7	40.0	4.9	PK	100	102.0	VERTICAL
78.500000	24.00	8.4	40.0	16.0	PK	100	138.0	VERTICAL
150.280000	22.90	13.8	43.5	20.6	PK	100	189.0	VERTICAL
198.780000	23.20	13.9	43.5	20.3	PK	300	225.0	VERTICAL
458.740000	29.40	19.4	46.0	16.6	PK	300	267.0	VERTICAL
953.440000	32.50	26.6	46.0	13.5	PK	300	337.0	VERTICAL

For 1GHz to 25GHz

IEEE 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	55.32	PK	74	18.68	1.00	144	53.22	31.6	7.00	36.5	2.10
1	4824	41.20	AV	54	12.80	1.00	144	39.10	31.6	7.00	36.5	2.10
2	7236	53.63	PK	74	20.37	1.00	205	42.70	37.33	8.90	35.3	10.93
2	7236	41.27	AV	54	12.73	1.00	205	30.34	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	57.34	PK	74	16.66	1.00	132	55.24	31.60	7.00	36.50	2.10
1	4824	43.28	AV	54	10.72	1.00	132	41.18	31.60	7.00	36.50	2.10
2	7236	53.22	PK	74	20.78	1.00	226	42.29	37.33	8.90	35.30	10.93
2	7236	43.69	AV	54	10.31	1.00	226	32.76	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	59.87	PK	74.00	14.13	1.00	89	57.75	31.02	7.60	36.5	2.12
1	4874.00	41.62	AV	54.00	12.38	1.00	89	39.50	31.02	7.60	36.5	2.12
2	7311.00	57.34	PK	74.00	16.66	1.00	156	46.26	37.28	8.60	34.8	11.08
2	7311.00	42.26	AV	54.00	11.74	1.00	156	31.18	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	60.28	PK	74.00	13.72	1.00	169	58.16	31.02	7.60	36.5	2.12
1	4874.00	43.33	AV	54.00	10.67	1.00	169	41.21	31.02	7.60	36.5	2.12
2	7311.00	55.66	PK	74.00	18.34	1.00	265	44.58	37.28	8.60	34.8	11.08
2	7311.00	43.29	AV	54.00	10.71	1.00	265	32.21	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	61.34	PK	74.00	12.66	1.00	174	58.14	31.58	7.82	36.2	3.20
1	4924.00	42.36	AV	54.00	11.64	1.00	174	39.16	31.58	7.82	36.2	3.20
2	7386.00	57.29	PK	74.00	16.71	1.00	229	45.35	38.51	8.73	35.3	11.94
2	7386.00	41.38	AV	54.00	12.62	1.00	229	29.44	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	59.38	PK	74.00	14.62	1.00	144	56.18	31.58	7.82	36.2	3.20
1	4924.00	42.17	AV	54.00	11.83	1.00	144	38.97	31.58	7.82	36.2	3.20
2	7386.00	55.27	PK	74.00	18.73	1.00	235	43.33	38.51	8.73	35.3	11.94
2	7386.00	43.31	AV	54.00	10.69	1.00	235	31.37	38.51	8.73	35.3	11.94

IEEE 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	61.57	PK	74	12.43	1.00	59	59.47	31.6	7.00	36.5	2.10
1	4824	44.46	AV	54	9.54	1.00	59	42.36	31.6	7.00	36.5	2.10
2	7236	54.47	PK	74	19.53	1.00	169	43.54	37.33	8.90	35.3	10.93
2	7236	41.03	AV	54	12.97	1.00	169	30.10	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	61.67	PK	74	12.33	1.00	118	59.57	31.60	7.00	36.50	2.10
1	4824	42.38	AV	54	11.62	1.00	118	40.28	31.60	7.00	36.50	2.10
2	7236	55.69	PK	74	18.31	1.00	186	44.76	37.33	8.90	35.30	10.93
2	7236	42.31	AV	54	11.69	1.00	186	31.38	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	60.46	PK	74.00	13.54	1.00	144	58.36	31.02	7.60	36.5	2.12
1	4874.00	42.78	AV	54.00	11.22	1.00	144	40.66	31.02	7.60	36.5	2.12
2	7311.00	55.49	PK	74.00	18.51	1.00	231	44.41	37.28	8.60	34.8	11.08
2	7311.00	43.27	AV	54.00	10.73	1.00	231	32.19	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	60.68	PK	74.00	13.32	1.00	138	58.56	31.02	7.60	36.5	2.12
1	4874.00	43.25	AV	54.00	10.75	1.00	138	41.13	31.02	7.60	36.5	2.12
2	7311.00	57.84	PK	74.00	16.16	1.00	276	46.76	37.28	8.60	34.8	11.08
2	7311.00	41.86	AV	54.00	12.14	1.00	276	30.78	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	61.33	PK	74.00	12.67	1.00	103	58.13	31.58	7.82	36.2	3.20
1	4924.00	43.16	AV	54.00	10.84	1.00	103	39.96	31.58	7.82	36.2	3.20
2	7386.00	55.69	PK	74.00	18.31	1.00	255	43.75	38.51	8.73	35.3	11.94
2	7386.00	41.66	AV	54.00	12.34	1.00	255	29.72	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	61.82	PK	74.00	12.18	1.00	119	58.62	31.58	7.82	36.2	3.20
1	4924.00	42.97	AV	54.00	11.03	1.00	119	39.77	31.58	7.82	36.2	3.20
2	7386.00	56.83	PK	74.00	17.17	1.00	220	44.89	38.51	8.73	35.3	11.94
2	7386.00	42.75	AV	54.00	11.25	1.00	220	30.81	38.51	8.73	35.3	11.94

IEEE 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	59.68	PK	74	14.32	1.00	78	57.58	31.6	7.00	36.5	2.10
1	4824	42.35	AV	54	11.65	1.00	78	40.25	31.6	7.00	36.5	2.10
2	7236	57.39	PK	74	16.61	1.00	188	46.46	37.33	8.90	35.3	10.93
2	7236	42.71	AV	54	11.29	1.00	188	31.78	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	61.08	PK	74	12.92	1.00	136	58.98	31.60	7.00	36.50	2.10
1	4824	43.25	AV	54	10.75	1.00	136	41.15	31.60	7.00	36.50	2.10
2	7236	55.63	PK	74	18.37	1.00	291	44.70	37.33	8.90	35.30	10.93
2	7236	42.38	AV	54	11.62	1.00	291	31.45	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	58.38	PK	74.00	15.62	1.00	131	56.26	31.02	7.60	36.5	2.12
1	4874.00	41.73	AV	54.00	12.27	1.00	131	39.61	31.02	7.60	36.5	2.12
2	7311.00	55.39	PK	74.00	18.61	1.00	199	44.31	37.28	8.60	34.8	11.08
2	7311.00	43.33	AV	54.00	10.67	1.00	199	32.25	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	61.53	PK	74.00	12.47	1.00	122	59.41	31.02	7.60	36.5	2.12
1	4874.00	44.26	AV	54.00	9.74	1.00	122	42.14	31.02	7.60	36.5	2.12
2	7311.00	55.74	PK	74.00	18.26	1.00	202	44.66	37.28	8.60	34.8	11.08
2	7311.00	41.69	AV	54.00	12.31	1.00	202	30.61	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	59.67	PK	74.00	14.33	1.00	154	56.47	31.58	7.82	36.2	3.20
1	4924.00	42.77	AV	54.00	11.23	1.00	154	39.57	31.58	7.82	36.2	3.20
2	7386.00	56.76	PK	74.00	17.24	1.00	237	44.82	38.51	8.73	35.3	11.94
2	7386.00	43.24	AV	54.00	10.76	1.00	237	31.30	38.51	8.73	35.3	11.94

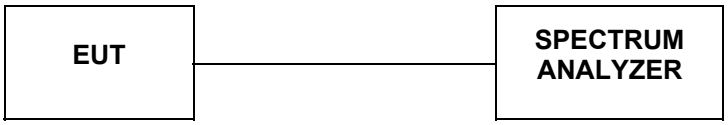
Frequency(MHz):				2462			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4924.00	60.11	PK	74.00	13.89	1.00	101	56.91	31.58	7.82	36.2	3.20
1	4924.00	42.57	AV	54.00	11.43	1.00	101	39.37	31.58	7.82	36.2	3.20
2	7386.00	56.77	PK	74.00	17.23	1.00	262	44.83	38.51	8.73	35.3	11.94
2	7386.00	43.64	AV	54.00	10.36	1.00	262	31.70	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. Duty Cycle

TEST CONFIGURATION



LIMIT

None, For reporting purposes only.

The Maximum Peak Output Power Measurement is 30dBm.
Preferably, all measurements of maximum conducted (average) output power will be performed with the EUT transmitting continuously (i.e., with a duty cycle of greater than or equal to 98%).
When continuous transmission cannot be achieved and sweep triggering/signal gating cannot be implemented, alternate procedures are provided that can be used to measure the average power; however, they will require an additional measurement of the transmitter duty cycle. Within this guidance document, the duty cycle refers to the fraction of time over which the transmitter is on and is transmitting at its maximum power control level. The duty cycle is considered to be constant if variations are less than ± 2 percent, otherwise the duty cycle is considered to be non-constant.

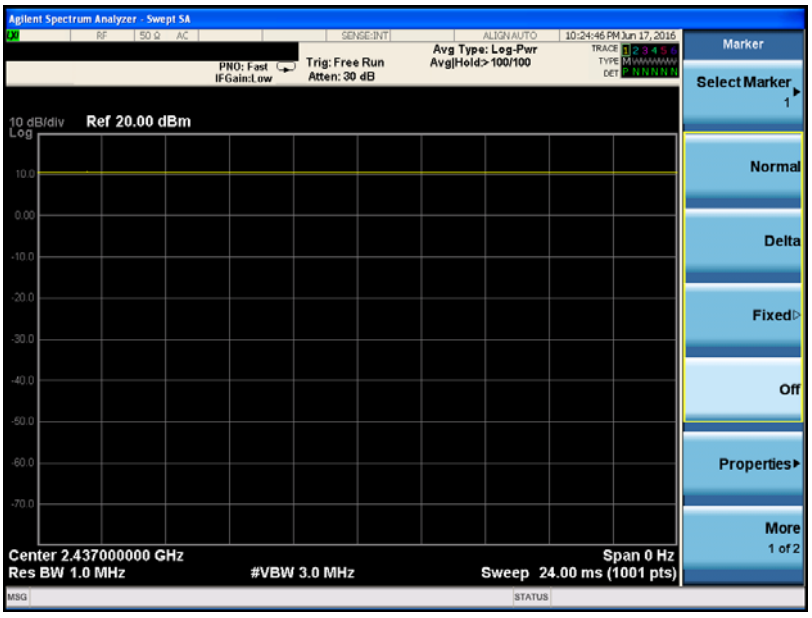
TEST PROCEDURE

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

TEST RESULTS

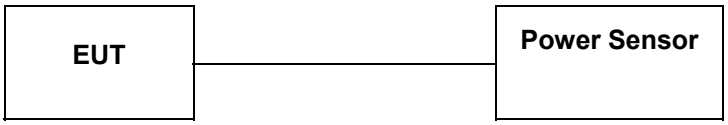
The Manufacturer provide specific software to control sample work at 100% continuous transmit;

Please see following one of Duty Cycle test plots.



4.4. Maximum Peak Output Power

TEST CONFIGURATION



TEST PROCEDURE

According to KDB558074 D01 DTS Measurement Guidance Section 9.1 Maximum peak conducted output power,9.1.1. 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.

LIMIT

The Maximum Peak Output Power Measurement is 30dBm.

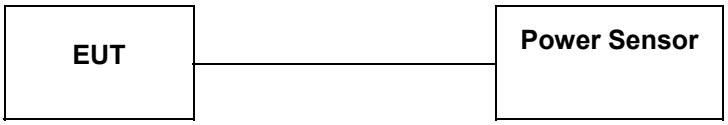
TEST RESULTS

Test Mode	Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Limits (dBm)	Verdict
IEEE 802.11 b	1	2412	10.71	30	PASS
	6	2437	10.26		
	11	2462	10.03		
IEEE 802.11 g	1	2412	10.48	30	PASS
	6	2437	10.07		
	11	2462	9.89		
IEEE 802.11 n HT20	1	2412	9.34	30	PASS
	6	2437	9.59		
	11	2462	9.02		

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

4.5. Maximum Average Output Power

TEST CONFIGURATION



TEST PROCEDURE

According to KDB558074 D01 DTS Measurement Guidance Section 9.2.3.1 Method AVGPM (Measurement using an RF average power meter).

a) As an alternative to spectrum analyzer or EMI receiver measurements, measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied.
   1) The EUT is configured to transmit continuously, or to transmit with a constant duty factor.
   2) At all times when the EUT is transmitting, it shall be transmitting at its maximum power control level.
   3) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
b) If the transmitter does not transmit continuously, measure the duty cycle (x) of the transmitter output signal as described in Section 6.0.
c) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
d) Adjust the measurement in dBm by adding 10log (1/x), where x is the duty cycle to the measurement result.

LIMIT

None, For reporting purposes only.

TEST RESULTS

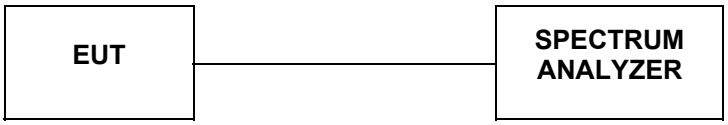
Test Mode	Channel	Frequency (MHz)	Measured Output Average Power (dBm)	Limits (dBm)	Verdict
IEEE 802.11 b	1	2412	7.28	30	PASS
	6	2437	7.12		
	11	2462	7.45		
IEEE 802.11 g	1	2412	7.43	30	PASS
	6	2437	7.27		
	11	2462	7.29		
IEEE 802.11 n HT20	1	2412	4.93	30	PASS
	6	2437	5.12		
	11	2462	5.33		

Remark:

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

4.6. Power Spectral Density

TEST CONFIGURATION



TEST PROCEDURE

According to KDB 558074 D01 V03 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

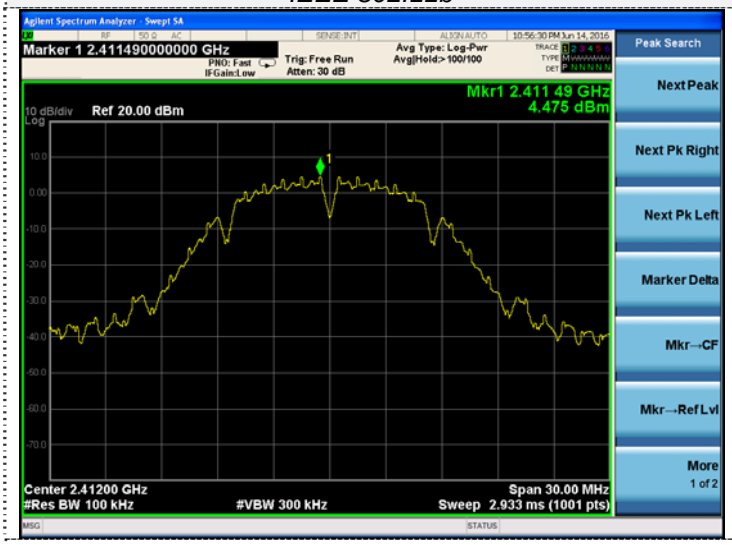
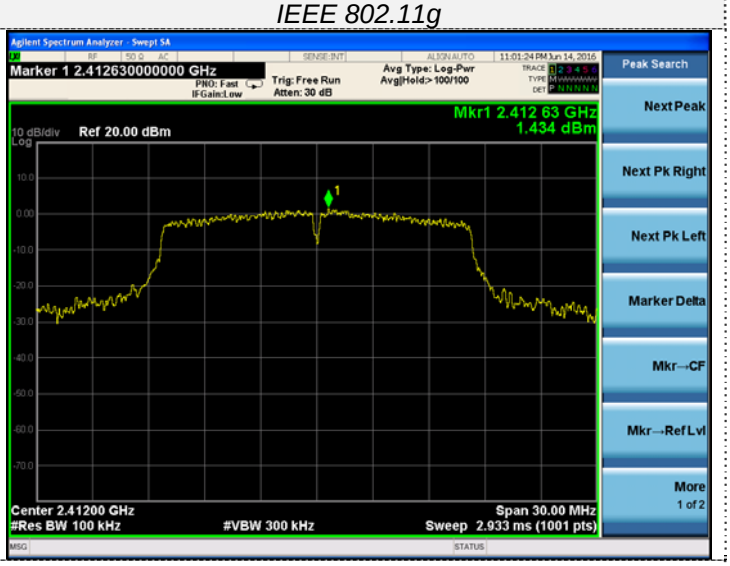
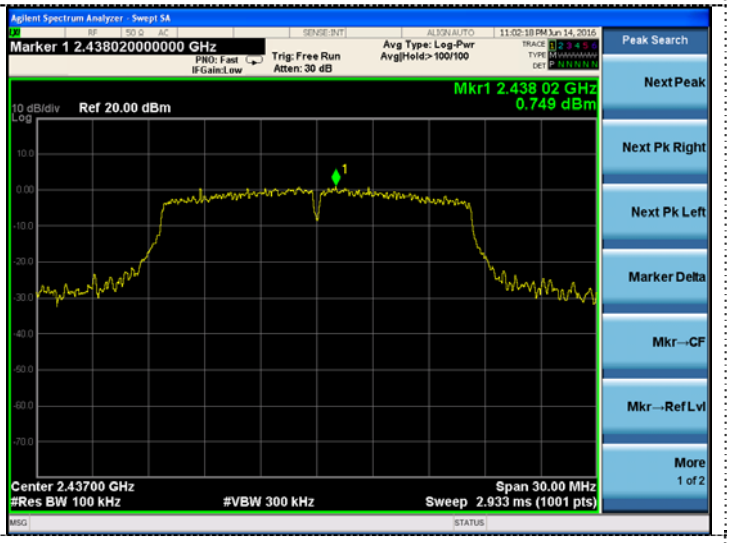
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

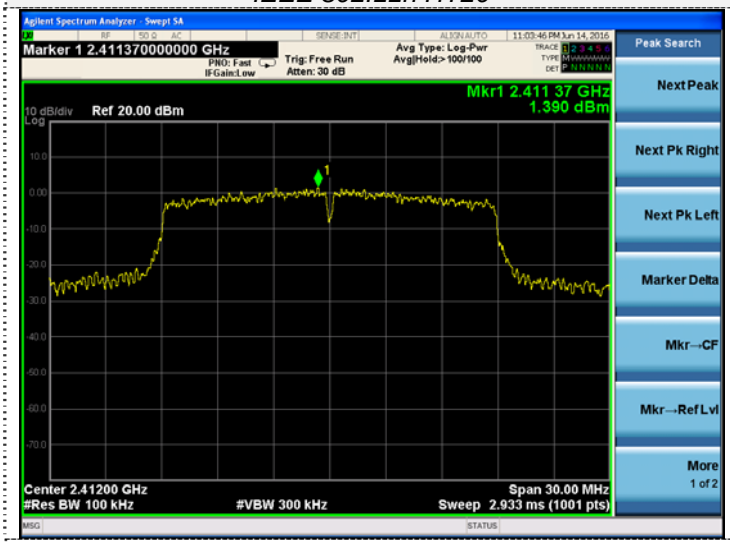
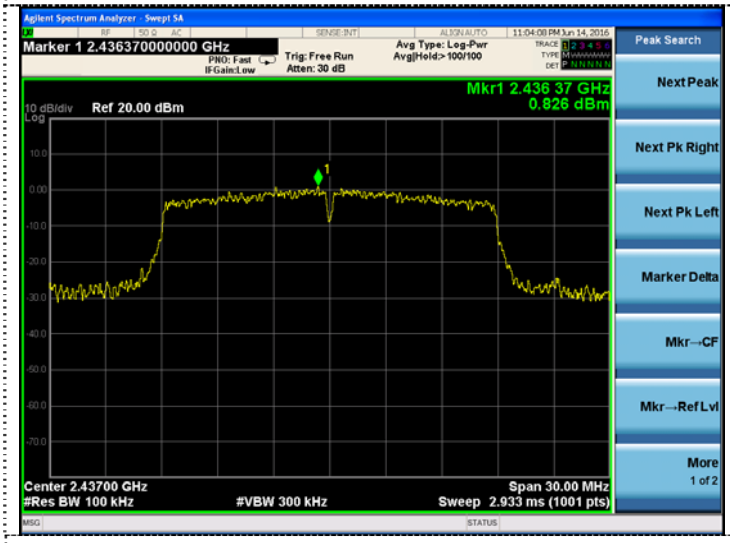
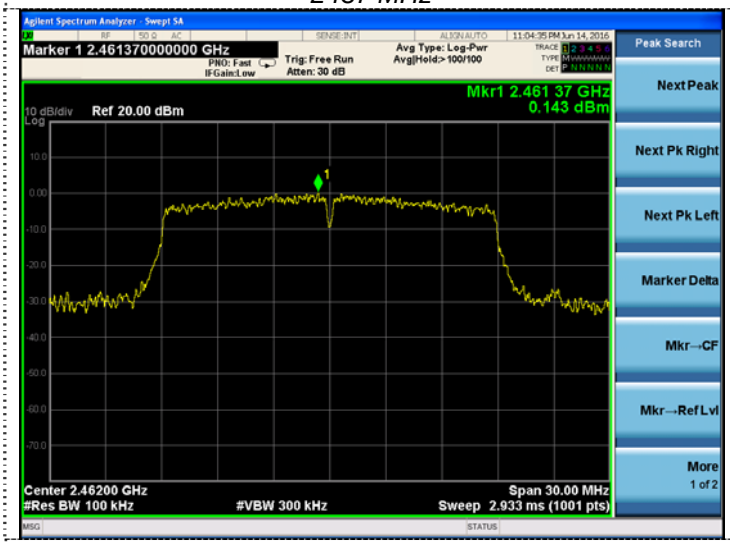
TEST RESULTS

Test Mode	Channel	Frequency (MHz)	Measured Peak Power Spectral Density (dBm/100KHz)	Limits (dBm/3KHz)	Verdict
IEEE 802.11 b	1	2412	4.47	8	PASS
	6	2437	5.21		
	11	2462	5.44		
IEEE 802.11 g	1	2412	1.43	8	PASS
	6	2437	0.74		
	11	2462	0.02		
IEEE 802.11 n HT20	1	2412	1.39	8	PASS
	6	2437	0.82		
	11	2462	0.14		

Remark:
1. *Measured output power at difference data rate for each mode and recorded woest case for each mode.*
2. *Test results including cable loss;*
3. *Worst case data at 1Mbps at IEEE 802.11 b; 6Mbps at IEEE 802.11 g; 6.5Mbps at IEEE 802.11 n HT20;*
4. *please refer to following plots;*

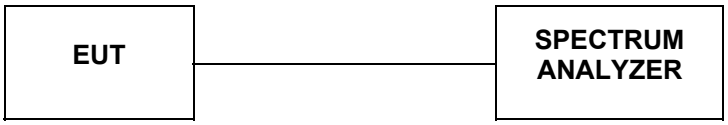
Peak Power Spectral Density

IEEE 802.11b	*IEEE 802.11g*
	
2412 MHz	*2412 MHz*
	
2437 MHz	*2437 MHz*
	
2462 MHz	*2462 MHz*

Peak Power Spectral Density	
IEEE 802.11n HT20	
	
2412 MHz	
	
2437 MHz	
	
2462 MHz	

4.7. 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

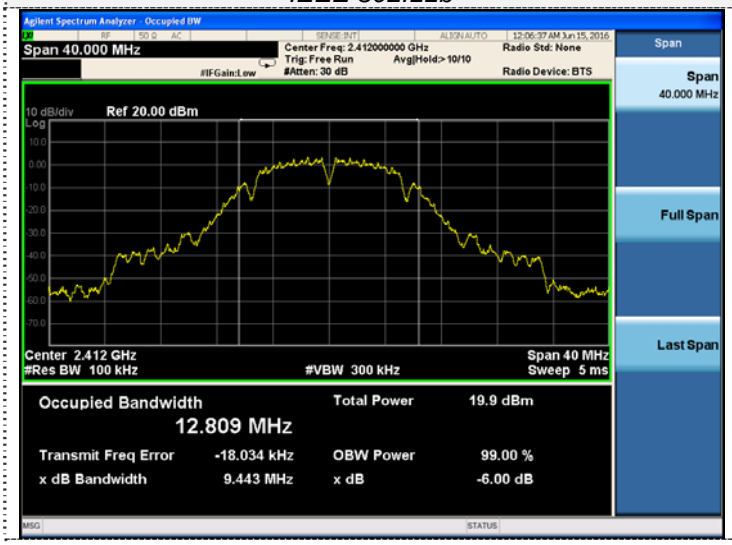
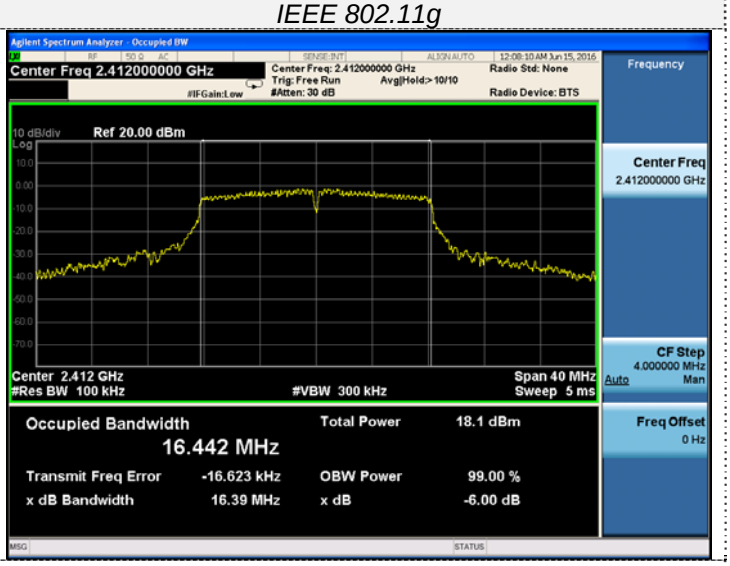
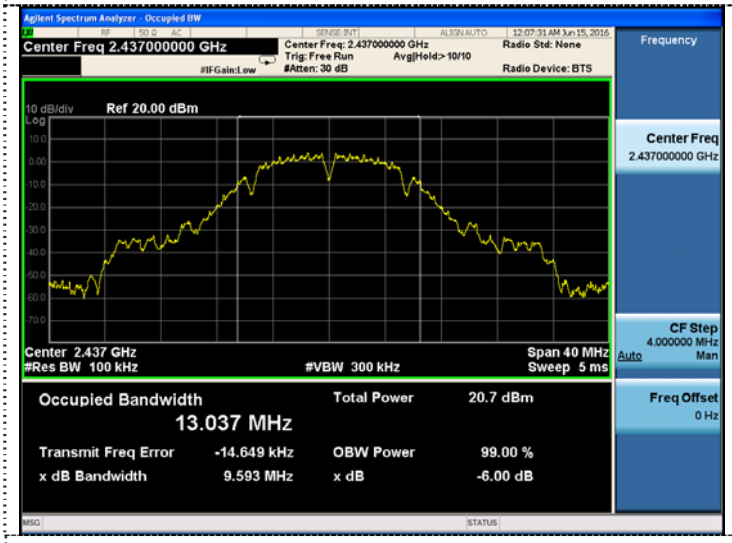
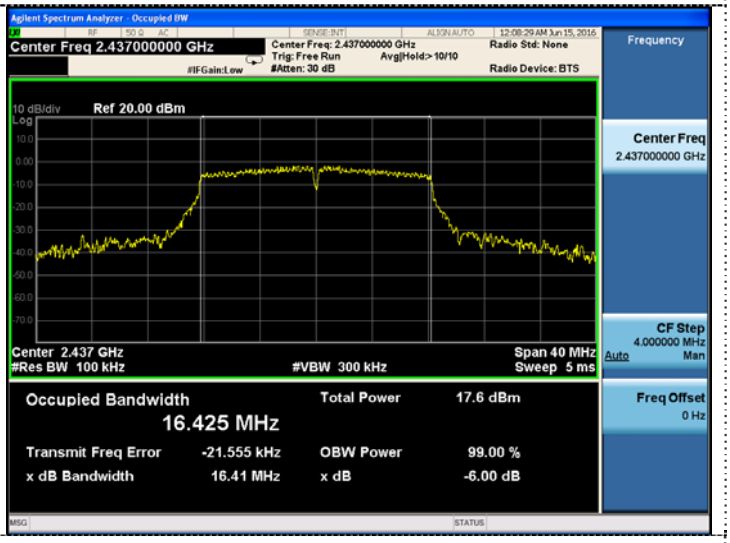
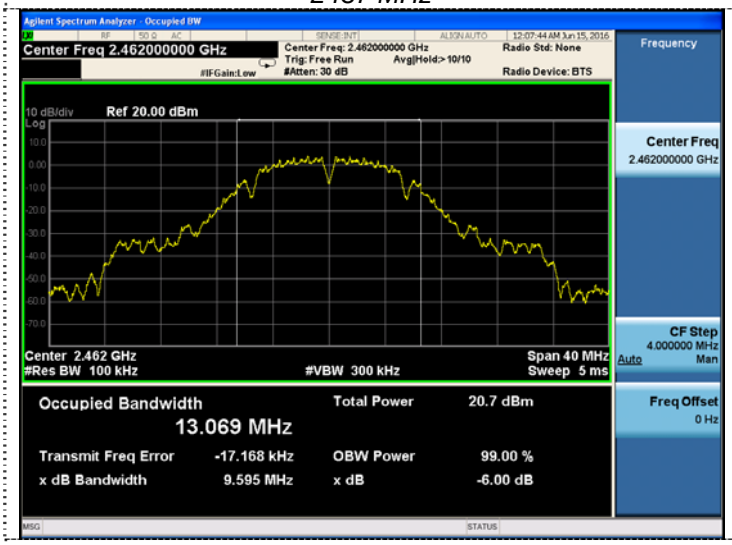
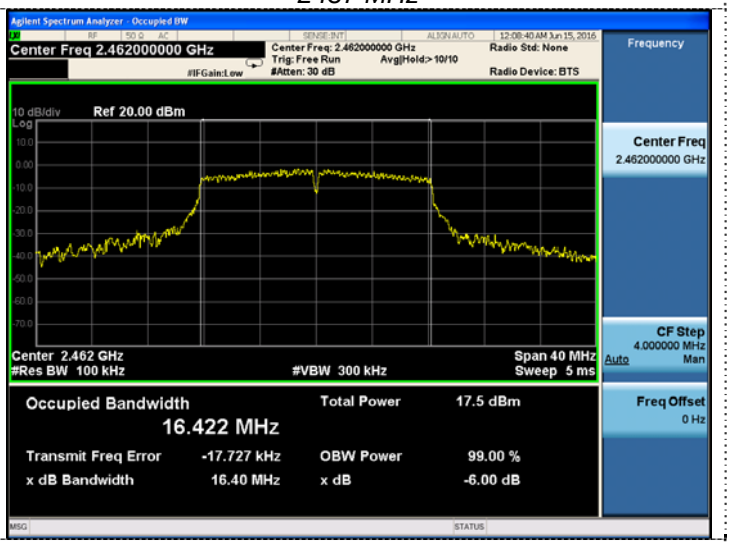
For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz

TEST RESULTS

Test Mode	Channel	Frequency (MHz)	Measured 6 dB Bandwidth (MHz)	Limits (MHz)	Verdict
IEEE 802.11 b	1	2412	9.443	≥0.5000	PASS
	6	2437	9.593		
	11	2462	9.595		
IEEE 802.11 g	1	2412	16.390	≥0.5000	PASS
	6	2437	16.410		
	11	2462	16.400		
IEEE 802.11 n HT20	1	2412	17.600	≥0.5000	PASS
	6	2437	17.600		
	11	2462	17.600		

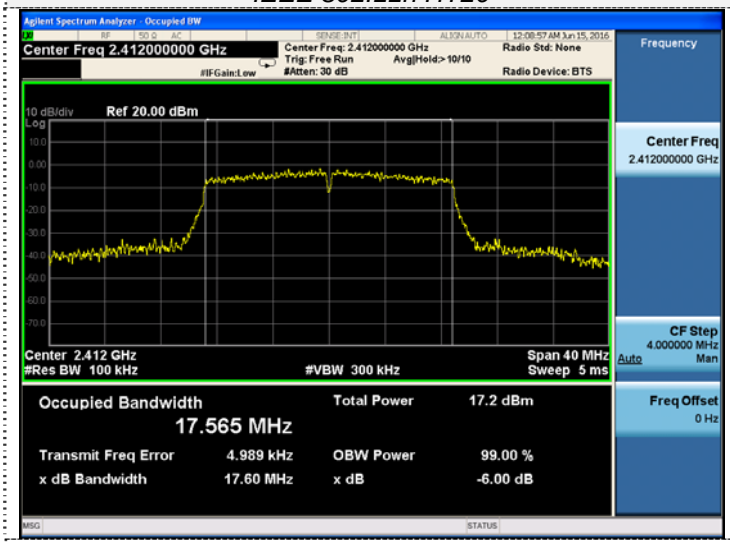
Remark:
1. *Measured output power at difference data rate for each mode and recorded woest case for each mode.*
2. *Test results including cable loss;*
3. *Worst case data at 1Mbps at IEEE 802.11 b; 6Mbps at IEEE 802.11 g; 6.5Mbps at IEEE 802.11 n HT20;*
4. *please refer to following plots;*

DTS Bandwidth (6 dB Bandwidth)

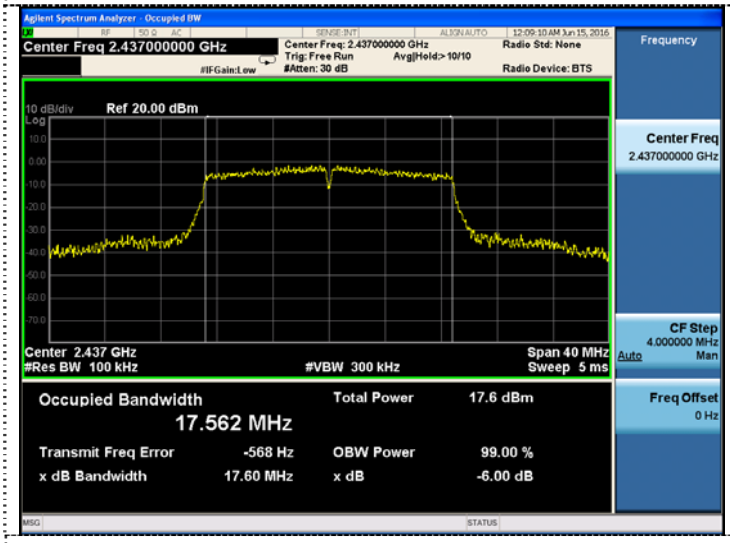
IEEE 802.11b	*IEEE 802.11g*
	
2412 MHz	*2412 MHz*
	
2437 MHz	*2437 MHz*
	
2462 MHz	*2462 MHz*

DTS Bandwidth (6 dB Bandwidth)

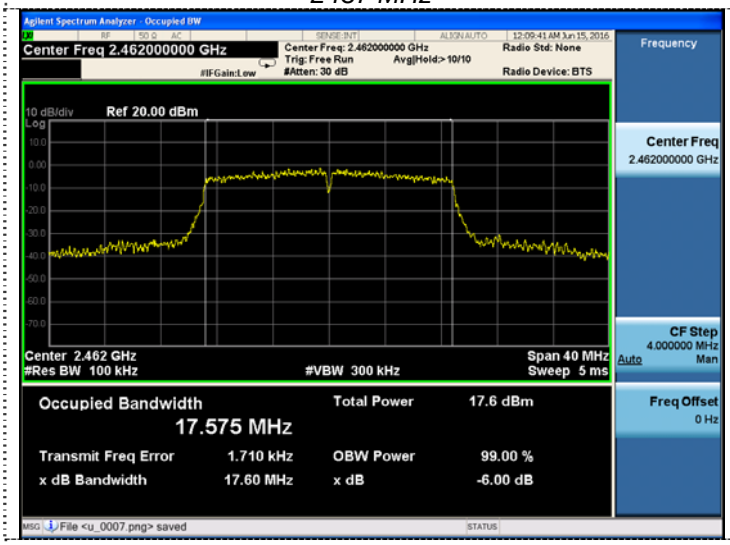
IEEE 802.11n HT20



2412 MHz



2437 MHz



2462 MHz