

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C REQUIREMENT**

OF

Smart Console

Model No.: iSS50

FCC ID: EMOISS50

Trademark: iHome

Report No.: ED160706002E

Issue Date: August 03, 2016

Prepared for

**SDI Technologies Inc.
1299, Main Street, Rahway, NJ 07065, U.S.A.**

Prepared by

**EMTEK(Dongguan) Co., Ltd.
No.281, Guantai Road, Nancheng District,
Dongguan, Guangdong, China
TEL: 86-769-22807078
FAX: 86-769-22807079**

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EMTEK(Dongguan) Co., Ltd.**

VERIFICATION OF COMPLIANCE

Applicant:	SDI Technologies Inc. 1299, Main Street, Rahway, NJ 07065, U.S.A.
Manufacturer:	SDI Technologies Inc. 1299, Main Street, Rahway, NJ 07065, U.S.A.
Factory:	BCD China Electronics Manufacturing (Shenzhen) Ltd 3/F&5/F, Bldg B2, Xin An No. 3 Industrial Park, Hang Cheng Industrial Zone, Qian Jin Road, Xi Xiang, Bao An District, Shenzhen, Guangdong, China 518126
Product Description:	Smart Console
Model Number:	iSS50

We hereby certify that:

The above equipment was tested by EMTEK(Dongguan) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10-2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.247(2016).

Date of Test : July 25, 2016 to August 02, 2016

Yolanda Liang

Prepared by : Yolanda Liang/Editor

Alan He

Reviewer : Alan He/Supervisor

Sam Lv

Approved & Authorized Signer : Sam Lv/Manager

Modified Information

Version	Summary	Revision Date	Report No.
Ver.1.0	Original Report	/	ED160706002E

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APPENDIX I (PHOTOS OF EUT)(4 PAGES)

1. General Information

1.1 Product Description

Characteristics	Description
Product Name	Smart Console
Model number	iSS50
Power Supply	AC 120V, 60Hz, USB DC5V
Modulation	802.11b: DSSS(DBPSK/DQPSK/CCK) 802.11g/n: OFDM(BPSK/QPSK/16QAM/64QAM)
Operating Frequency Range	2412-2462MHz for 802.11b/g/n(HT20) 2422-2452MHz for 802.11n(HT40)
Number of Channels	11 for 20MHz bandwidth; 7 for 40MHz bandwidth
Transmit Power Max	802.11b: 14.54dBm 802.11g: 12.20dBm 802.11n(HT20): 11.12dBm 802.11n(HT40): 10.05dBm
Antenna Type	Internal antenna
Antenna Gain	5.12dBi

Note: for more details, please refer to the User's manual of the EUT.

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.

2.3.2 Radiated Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. Emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013.

2.4 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

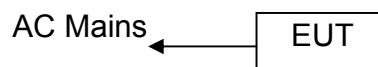


Table 2-1 Equipment Used in Tested System

Item	Equipment	Trademark	Model No.	FCC ID	Note
1.	Smart Console	iHome	iSS50	EMOISS50	EUT
2	AC adapter	N/A	LY04-001	N/A	Support EUT
3	PC	DELL	OPTIRLEX 760	N/A	Support EUT

Note:

- (1) Unless otherwise denoted as EUT in 『Remark』 column, device(s) used in tested system is a support equipment.

3. Description of Test Modes

The EUT has been tested under its typical operating condition.

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

The FCC application works with the Manufacturing WI-FI firmware only. Flash this firmware using flashprog.sh utility. The manufacturing firmware is present in wmsdk_bundle-x.y.z/wifi-firmware directory.

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.

Those data rates (802.11b: 1 Mbps; 802.11g: 6 Mbps; 802.11n (HT20): MCS0; 802.11n (HT40): MCS8) were used for all test.

The data of the worst mode are recorded in the following pages and the others data rates do not exceed the limits.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Frequency and Channel list for 802.11 b/g/n (HT20):

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

Frequency and Channel list for 802.11 n (HT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	5	2432	8	2447
4	2427	6	2437	9	2452
		7	2442		

Test Frequency and Channel for 802.11 b/g/n (HT20):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	6	2437	11	2462

Test Frequency and channel for 802.11 n (HT40):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	6	2437	9	2452

The output power setting of EUT is set in the factory and followed the max. peak level in below

802.11b	14
802.11g	12
802.11n(HT20)	11
802.11n(HT40)	10

Operated Mode for Worst Duty cycle:

Test Signal Duty Cycle(x)	Average correction factor(db)
802.11b-100%	0
802.11g-100%	0
802.11n(HT20)-100%	0
802.11n(HT40) -100%	0

4. Summary of Test Results

FCC Rules	Description Of Test	Result
§15.247(a)(2)	6dB bandwidth	Pass
§15.247(b)(3)	Max Peak output Power test	Pass
§15.247(e)	Power density	Pass
§15.247(d)	Band edge test	Pass
§15.207	AC Power Conducted Emission	Pass
§15.247(d), §15.209	Radiated Emission	Pass
§15.247(d)	Antenna Port Emission	Pass
§15.247(b)&§15.203	Antenna Application	Pass

5. Test Facility

Site Description

EMC Lab : Registered on FCC, June 18, 2014
The Certificate Number is 247565.

Registered on Industry Canada, February 19, 2014
The Certificate Number is 9444A

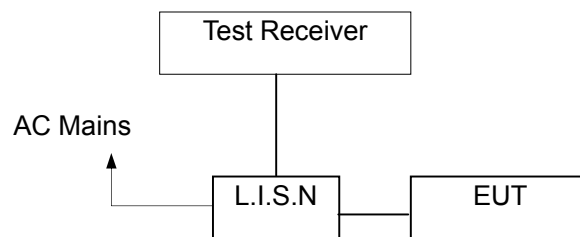
Name of Firm : EMTEK(Dongguan) Co., Ltd.
Site Location : No.281, Guantai Road, Nancheng District,
Dongguan, Guangdong, China

6. Conducted Emissions Test

6.1 Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

6.2 Test SET-UP (Block Diagram of Configuration)



6.3 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Last Cal.	Due date
Test Receiver	Rohde & Schwarz	ESCS30	100018	03/16/2016	03/15/2017
L.I.S.N	Rohde & Schwarz	ENV216	100017	03/16/2016	03/15/2017
RF Switching Unit	CDS	RSU-M2	38401	03/16/2016	03/15/2017
Coaxial Cable	CDS	79254	46107086	03/16/2016	03/15/2017

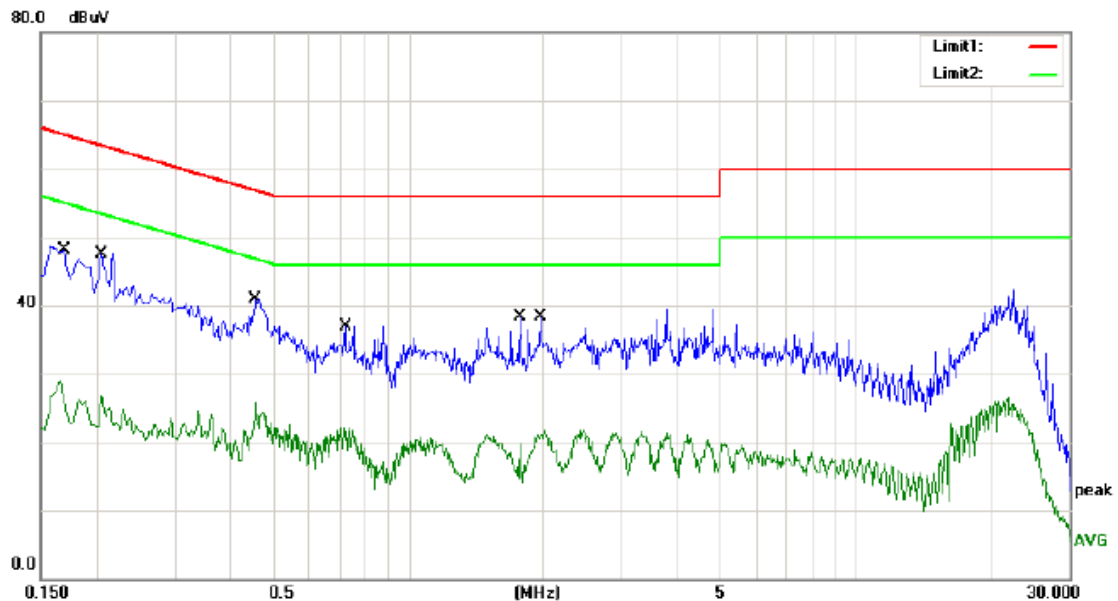
6.4 Conducted Emission Limit

Conducted Emission Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

6.5 Measurement Result

Please refer to the following pages.



Site site #1

Phase: L1

Temperature: 24

Limit: (CE)FCC PART 15 class B

Power: AC 120V/60Hz

Humidity: 55 %

Mode: Wi-Fi Link mode

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1660	47.85	0.00	47.85	65.16	-17.31	QP	
2		0.1660	28.81	0.00	28.81	55.16	-26.35	AVG	
3	*	0.2060	47.52	0.00	47.52	63.37	-15.85	QP	
4		0.2060	26.70	0.00	26.70	53.37	-26.67	AVG	
5		0.4540	40.89	0.00	40.89	56.80	-15.91	QP	
6		0.4540	25.65	0.00	25.65	46.80	-21.15	AVG	
7		0.7180	36.98	0.00	36.98	56.00	-19.02	QP	
8		0.7180	22.09	0.00	22.09	46.00	-23.91	AVG	
9		1.7740	38.27	0.00	38.27	56.00	-17.73	QP	
10		1.7740	19.64	0.00	19.64	46.00	-26.36	AVG	
11		1.9700	38.30	0.00	38.30	56.00	-17.70	QP	
12		1.9700	21.69	0.00	21.69	46.00	-24.31	AVG	

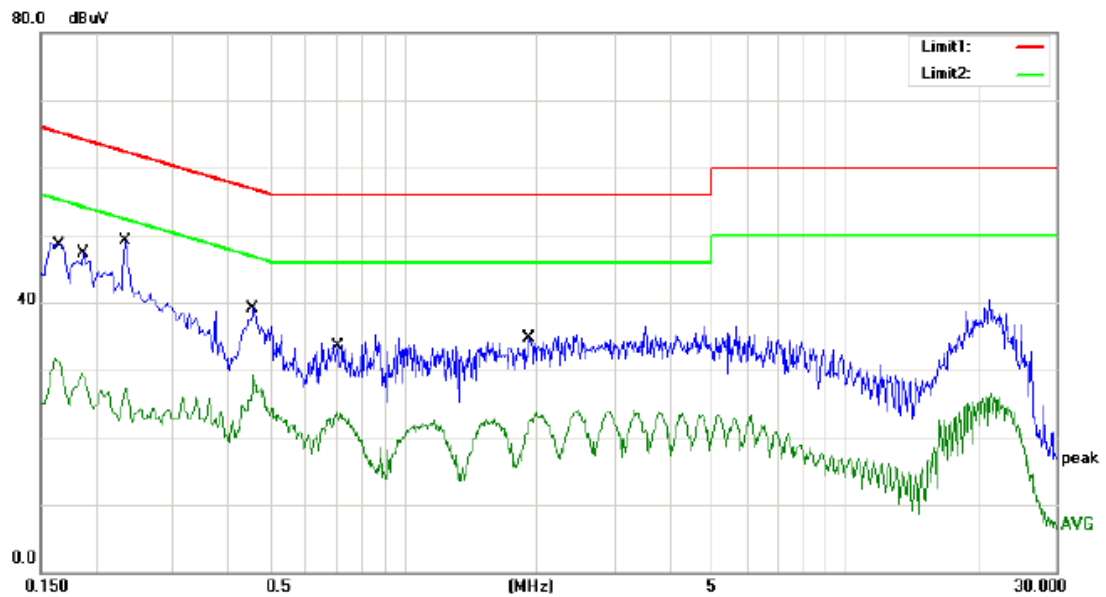
*:Maximum data

x:Over limit

!:over margin

Comment: Factor build in receiver.

Operator:



Site site #1

Phase: **N**

Temperature: 24

Limit: (CE)FCC PART 15 class B

Power: AC 120V/60Hz

Humidity: 55 %

Mode: WI-FI Link mode

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1620	48.54	0.00	48.54	65.36	-16.82	QP	
2		0.1620	31.61	0.00	31.61	55.36	-23.75	AVG	
3		0.1860	47.31	0.00	47.31	64.21	-16.90	QP	
4		0.1860	29.50	0.00	29.50	54.21	-24.71	AVG	
5	*	0.2340	49.00	0.00	49.00	62.31	-13.31	QP	
6		0.2340	27.32	0.00	27.32	52.31	-24.99	AVG	
7		0.4540	39.12	0.00	39.12	56.80	-17.68	QP	
8		0.4540	29.34	0.00	29.34	46.80	-17.46	AVG	
9		0.7020	33.65	0.00	33.65	56.00	-22.35	QP	
10		0.7020	23.61	0.00	23.61	46.00	-22.39	AVG	
11		1.9380	34.44	0.00	34.44	56.00	-21.56	QP	
12		1.9380	23.27	0.00	23.27	46.00	-22.73	AVG	

*:Maximum data

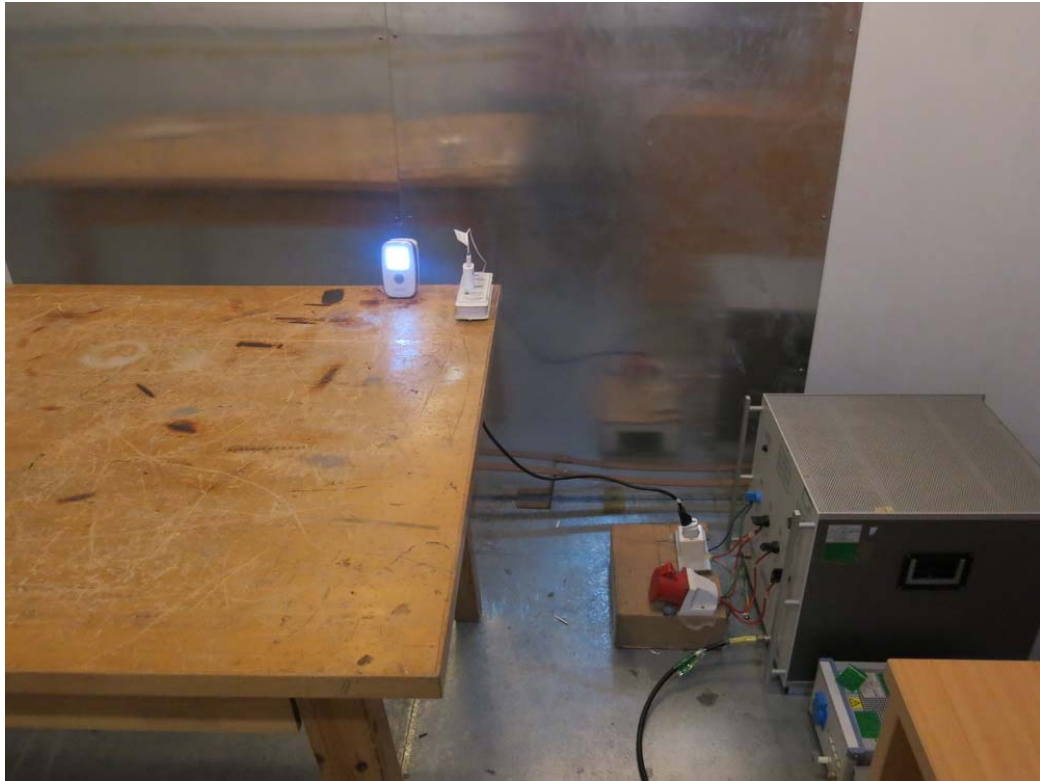
x:Over limit

!:over margin

Comment: Factor build in receiver.

Operator:

6.6 Conducted Measurement Photos:



7. Radiated Emission Test

7.1 Measurement Procedure

1. The testing follows the guidelines in Spurious Radiated Emissions of ANSI C63.10-2013.
2. Below 1000MHz, The EUT was placed on a turn table which is 0.8m above ground plane. And above 1000MHz, The EUT was placed on a Styrofoam table which is 1.5m above ground plane.
3. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (From 1m to 4m) and turntable (from 0 degree to 360 degree) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Final measurement (Above 1GHz): The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The EMI Receiver set to peak and average mode and a resolution bandwidth of 1MHz. The measurement will be performed in horizontal and vertical polarization of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 degree to 360 degree in order to have the antenna inside the cone of radiation.
7. Test Procedure of measurement (For Above 1GHz):
 - 1) Monitor the frequency range at horizontal polarization and move the antenna over all sides of the EUT(if necessary move the EUT to another orthogonal axis).
 - 2) Change the antenna polarization and repeat 1) with vertical polarization.
 - 3) Make a hardcopy of the spectrum.
 - 4) Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
 - 5) Change the analyser mode to Clear/ Write and found the cone of emission.
 - 6) Rotate and move the EUT, so that the measuring distance can be enlarged to 3m and the antenna will be still inside the cone of emission.
 - 7) Measure the level of the detected frequency with the correct resolution bandwidth, with the antenna polarization and azimuth and the peak and average detector, which causes the maximum emission.
 - 8) Repeat steps 1) to 7) for the next antenna spot if the EUT is larger than the antenna beamwidth.

Use the following spectrum analyzer settings:

When spectrum scanned from 30MHz to 1GHz setting resolution bandwidth 120KHz and video bandwidth 300KHz:

EMI Test Receiver	Setting
Attenuation	Auto
RB	120KHz
VB	300KHz
Detector	QP
Trace	Max hold

When spectrum scanned above 1GHz setting resolution bandwidth 1MHz, video bandwidth 3MHz:

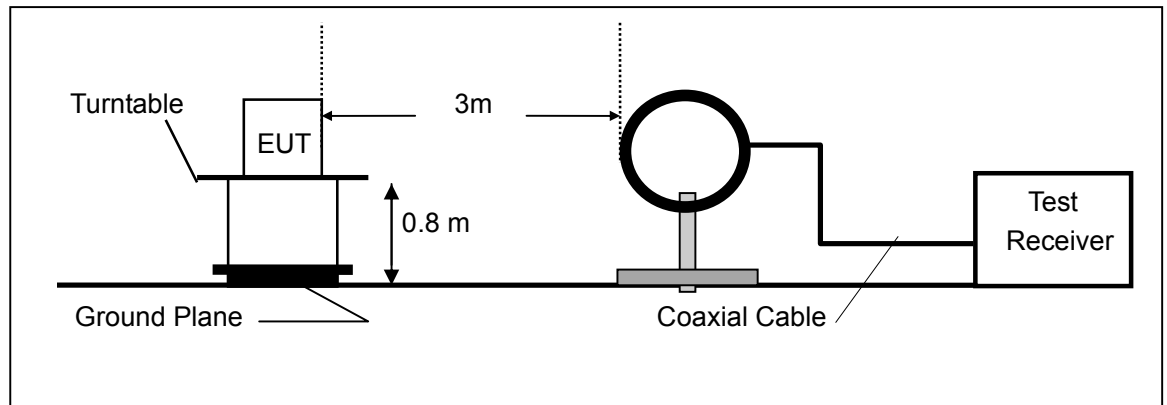
EMI Test Receiver	Setting
Attenuation	Auto
RB	1MHz
VB	3MHz
Detector	Peak
Trace	Max hold

When spectrum scanned above 1GHz setting resolution bandwidth 1MHz, video bandwidth 10Hz:

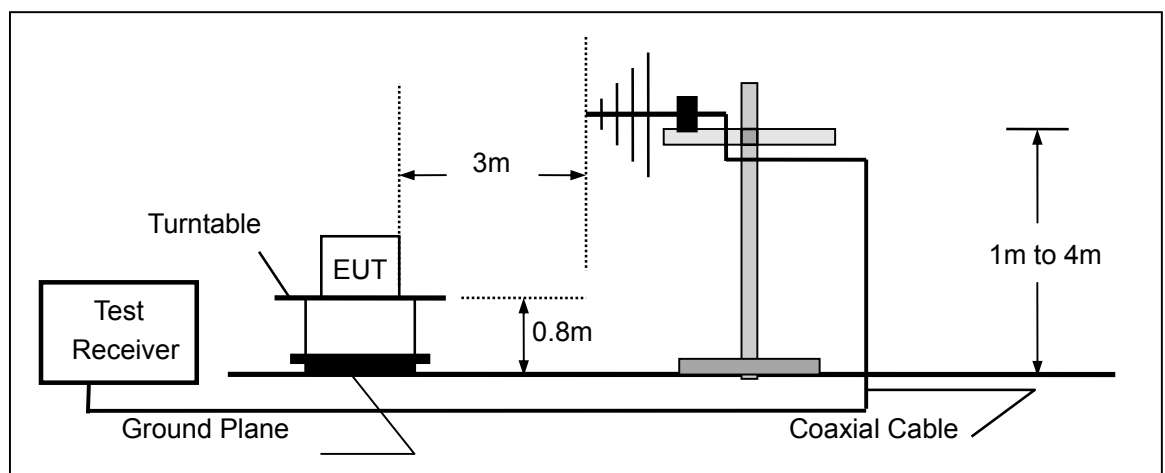
EMI Test Receiver	Setting
Attenuation	Auto
RB	1MHz
VB	10Hz
Detector	AVG
Trace	Max hold

7.2 Test SET-UP (Block Diagram of Configuration)

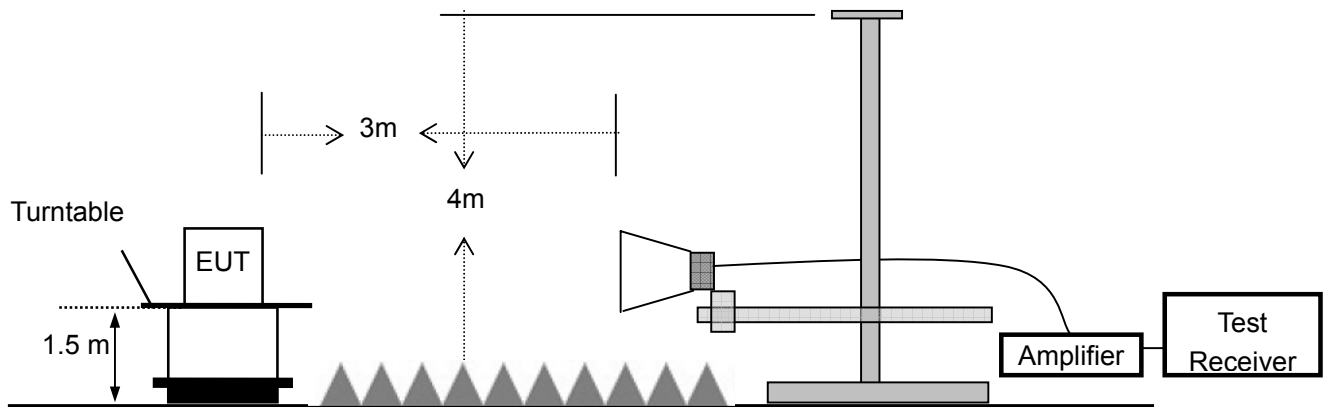
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



7.3 Measurement Equipment Used

Item	Equipment	Manufacturer	Model No.	Serial No.	Characteristics	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	1166.5950.03	9KHz-3GHz	06/24/2016	1 Year
2.	Loop Antenna	Schwarzbeck	FMZB 1519	012	9 KHz -30MHz	06/24/2016	1 Year
3.	Bilog Antenna	Schwarzbeck	VULB9163	000141	25MHz-2GHz	06/24/2016	1 Year
4.	Power Amplifier	CDS	RSU-M352	818	1MHz-1GHz	06/24/2016	1 Year
5.	Power Amplifier	HP	8447F	OPT H64	1GHz-26.5GHz	06/24/2016	1 Year
6.	Color Monitor	SUNSP0	SP-140A	N/A	--	06/24/2016	1 Year
7.	Single Line Filter	JIANLI	XL-3	N/A	--	06/24/2016	1 Year
8.	Single Phase Power Line Filter	JIANLI	DL-2X100B	N/A	--	06/24/2016	1 Year
9.	3 Phase Power Line Filter	JIANLI	DL-4X100B	N/A	--	06/24/2016	1 Year
10.	DC Power Filter	JIANLI	DL-2X50B	N/A	--	06/24/2016	1 Year
11.	Cable	Schwarzbeck	PLF-100	549489	9KHz-3GHz	06/24/2016	1 Year
12.	Cable	Rosenberger	CIL02	A0783566	9KHz-3GHz	06/24/2016	1 Year
13.	Cable	Rosenberger	RG 233/U	525178	9KHz-3GHz	06/24/2016	1 Year
14.	Signal Analyzer	Rohde & Schwarz	FSV30	103040	9KHz-40GHz	06/24/2016	1 Year
15.	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1272	1GHz-18GHz	06/24/2016	1 Year
16.	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	18GHz -26.5GHz	06/24/2016	1 Year
17.	Power Amplifier	LUNAR EM	LNA1G18-40	J10100000081	1GHz-26.5GHz	06/24/2016	1 Year
18.	Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	06/24/2016	1 Year
19.	Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	06/24/2016	1 Year
20.	Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	06/24/2016	1 Year

7.4 Radiated Emission Limit

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table 15.209(a):

Frequencies (MHz)	Field Strength (micровolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

15.205 Restricted bands of operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)

Remark 1. Emission level in dBuV/m=20 log (uV/m)

- : 2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of § 15.205, and the emissions located in restricted bands also comply with 15.209 limit.

7.5 Measurement Result

Below 30MHz:

All the modulation modes were tested the data of the test mode are recorded in the following pages.

Operation Mode:	TX Mode	Test Date :	August 02, 2016
Frequency Range:	9KHz~30MHz	Temperature :	28°C
Test Result:	PASS	Humidity :	60 %
Measured Distance:	3m	Test By:	WOLF

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)
--	--	--	--	--

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

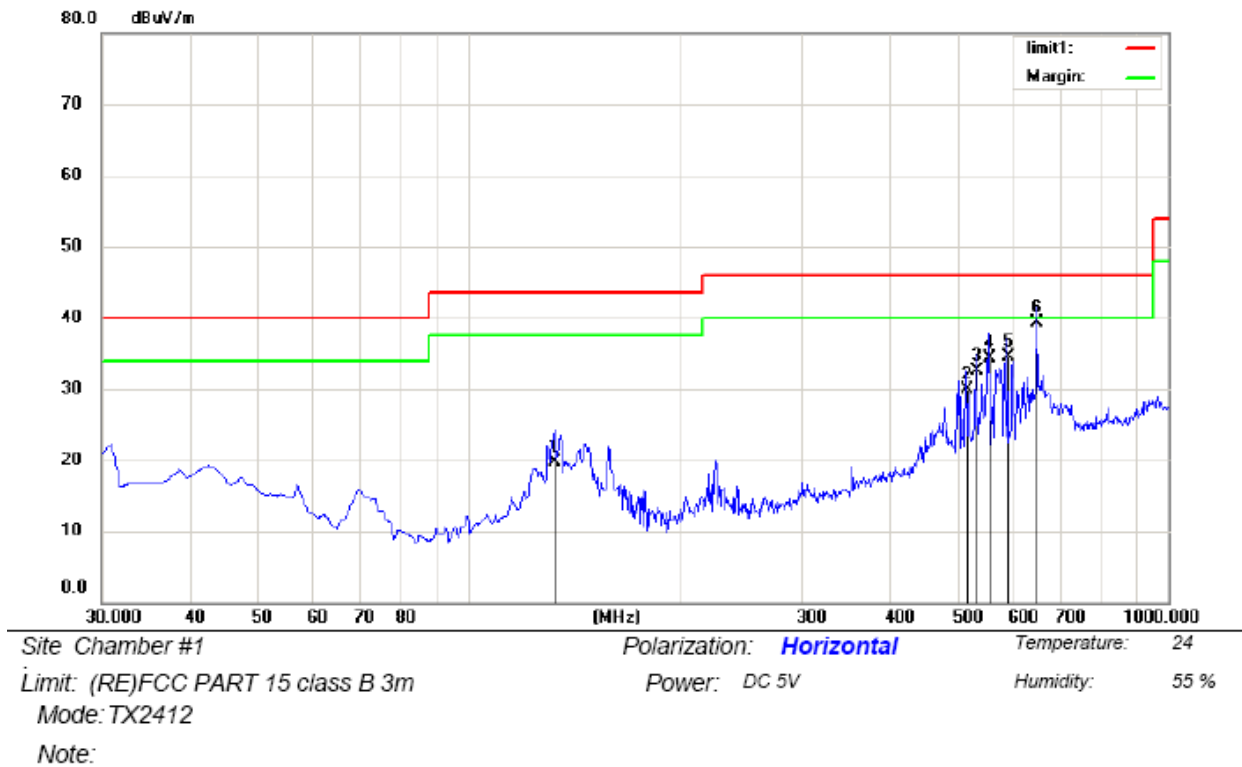
Distance extrapolation factor = $40 \log(\text{Specific distance} / \text{test distance})$ (dB);

Limit line = Specific limits(dBuV) + distance extrapolation factor.

Below 1000MHz:

All the modulation modes were tested the data of the worst mode (TX 802.11b) are recorded in the following pages and the others modulation methods do not exceed the limits.

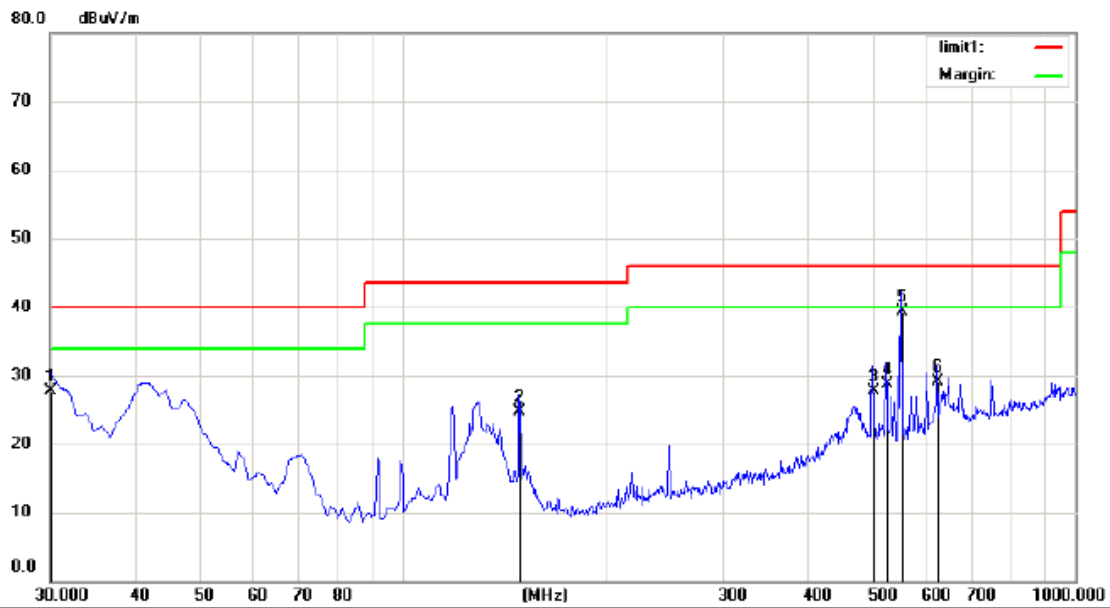
Please refer to the following test plots:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		132.8200	37.25	-17.58	19.67	43.50	-23.83	QP		
2		514.0300	40.15	-10.19	29.96	46.00	-16.04	QP		
3		530.5200	42.16	-9.66	32.50	46.00	-13.50	QP		
4		554.7700	43.26	-8.89	34.37	46.00	-11.63	QP		
5		589.6900	42.98	-8.38	34.60	46.00	-11.40	QP		
6	*	648.8600	47.10	-7.80	39.30	46.00	-6.70	QP		

*:Maximum data x:Over limit !:over margin

Operator:



Site: Chamber #1

Polarization: **Vertical**

Temperature: 24

Limit: (RE)FCC PART 15 class B 3m

Power: DC 5V

Humidity: 55 %

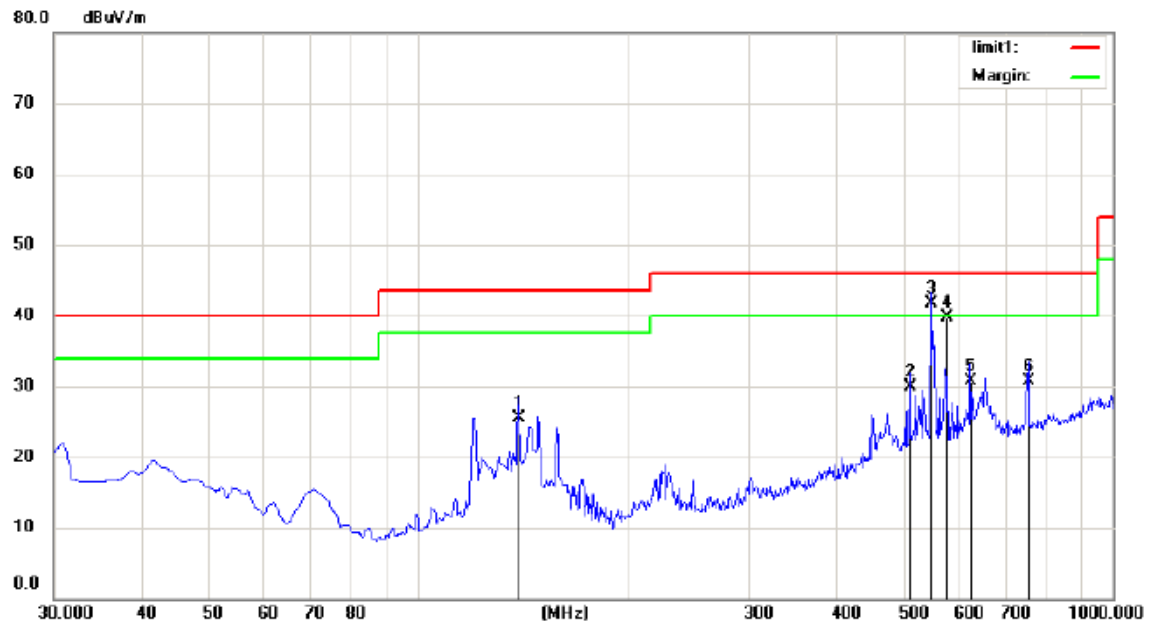
Mode: TX2412

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		30.0000	42.50	-14.83	27.67	40.00	-12.33	QP		
2		149.3100	43.17	-18.56	24.61	43.50	-18.89	QP		
3		499.4800	38.26	-10.50	27.76	46.00	-18.24	QP		
4		523.7300	38.59	-9.97	28.62	46.00	-17.38	QP		
5	*	551.8600	48.50	-9.29	39.21	46.00	-6.79	QP		
6		624.6100	37.14	-8.08	29.06	46.00	-16.94	QP		

*:Maximum data x:Over limit !:over margin

Operator:



Site: Chamber #1

Polarization: Horizontal

Temperature: 24

Limit: (RE)FCC PART 15 class B 3m

Power: DC 5V

Humidity: 55 %

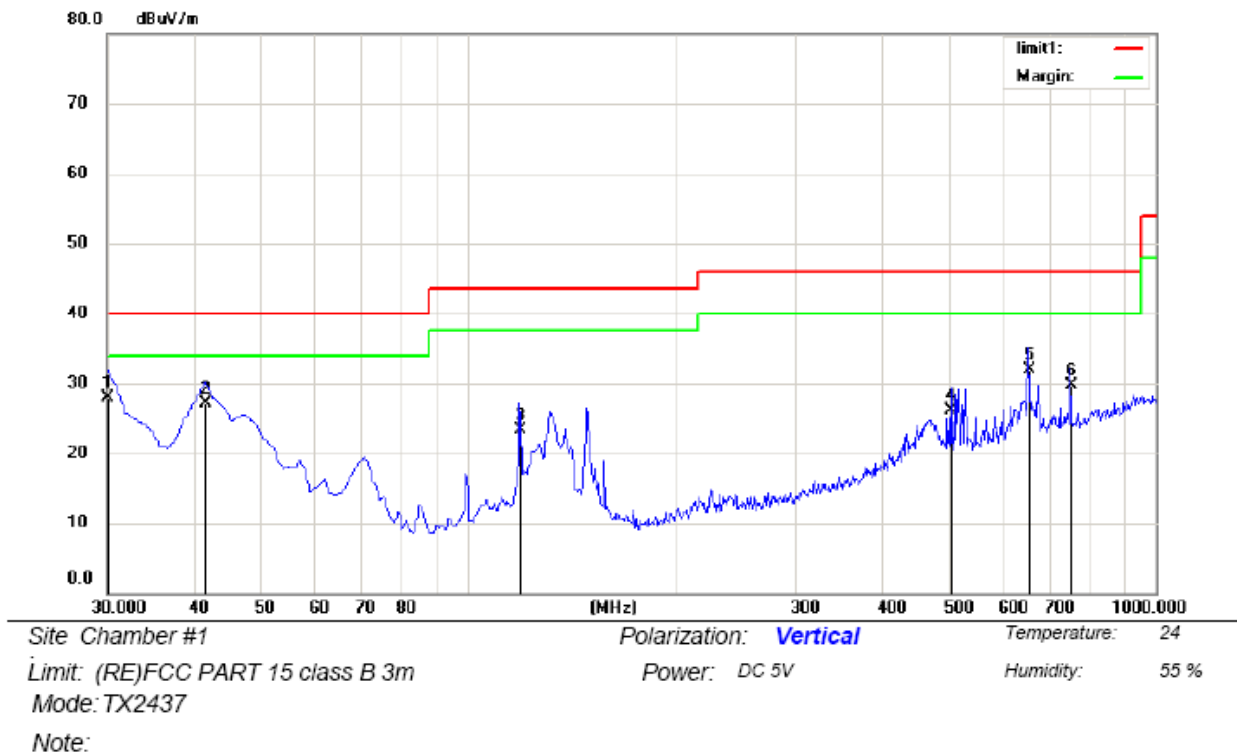
Mode: TX2437

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		139.6100	43.66	-18.15	25.51	43.50	-17.99	QP		
2		511.1200	40.15	-10.25	29.90	46.00	-16.10	QP		
3	*	548.9500	50.70	-8.98	41.72	46.00	-4.28	QP		
4		575.1400	48.30	-8.60	39.70	46.00	-6.30	QP		
5		623.6400	38.77	-8.09	30.68	46.00	-15.32	QP		
6		756.5300	36.25	-5.62	30.63	46.00	-15.37	QP		

*:Maximum data x:Over limit !:over margin

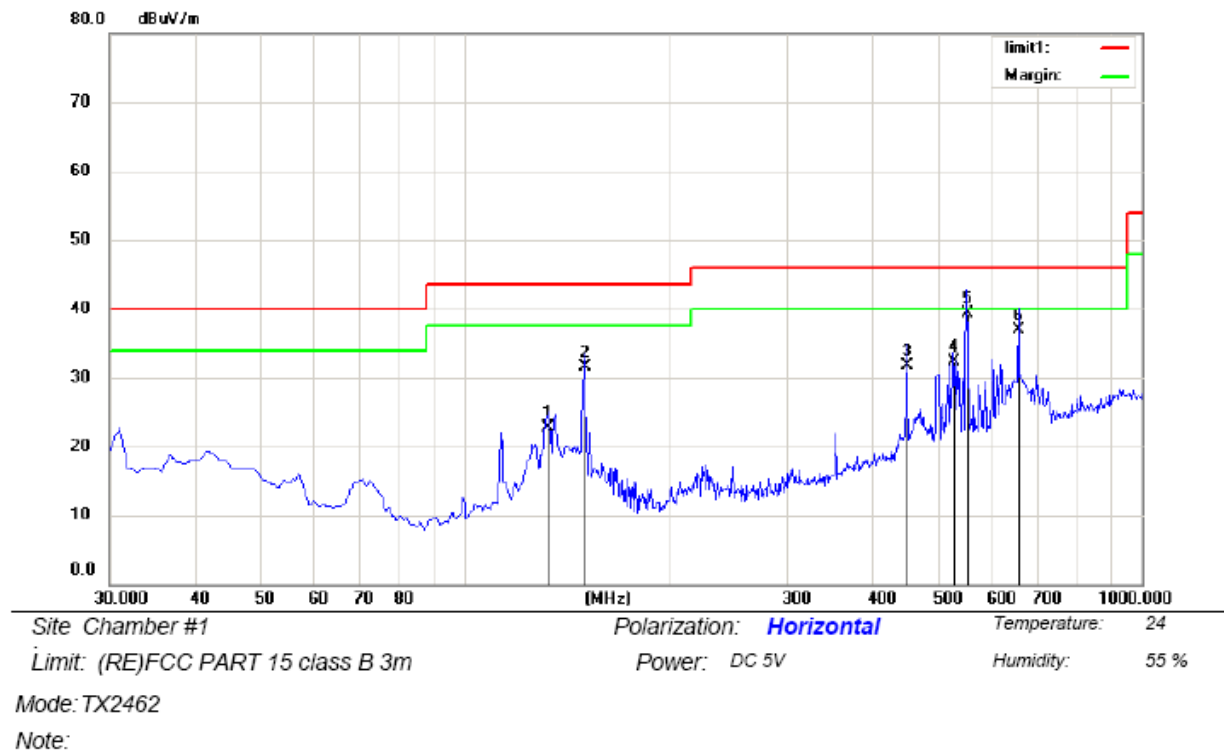
Operator:



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree	Comment
1	*	30.0000	42.65	-14.83	27.82	40.00	-12.18	QP		
2		41.6400	40.15	-13.11	27.04	40.00	-12.96	QP		
3		119.2400	41.33	-18.04	23.29	43.50	-20.21	QP		
4		504.3300	36.50	-10.40	26.10	46.00	-19.90	QP		
5		652.7400	39.80	-7.82	31.98	46.00	-14.02	QP		
6		752.6500	35.60	-5.89	29.71	46.00	-16.29	QP		

*:Maximum data x:Over limit !:over margin

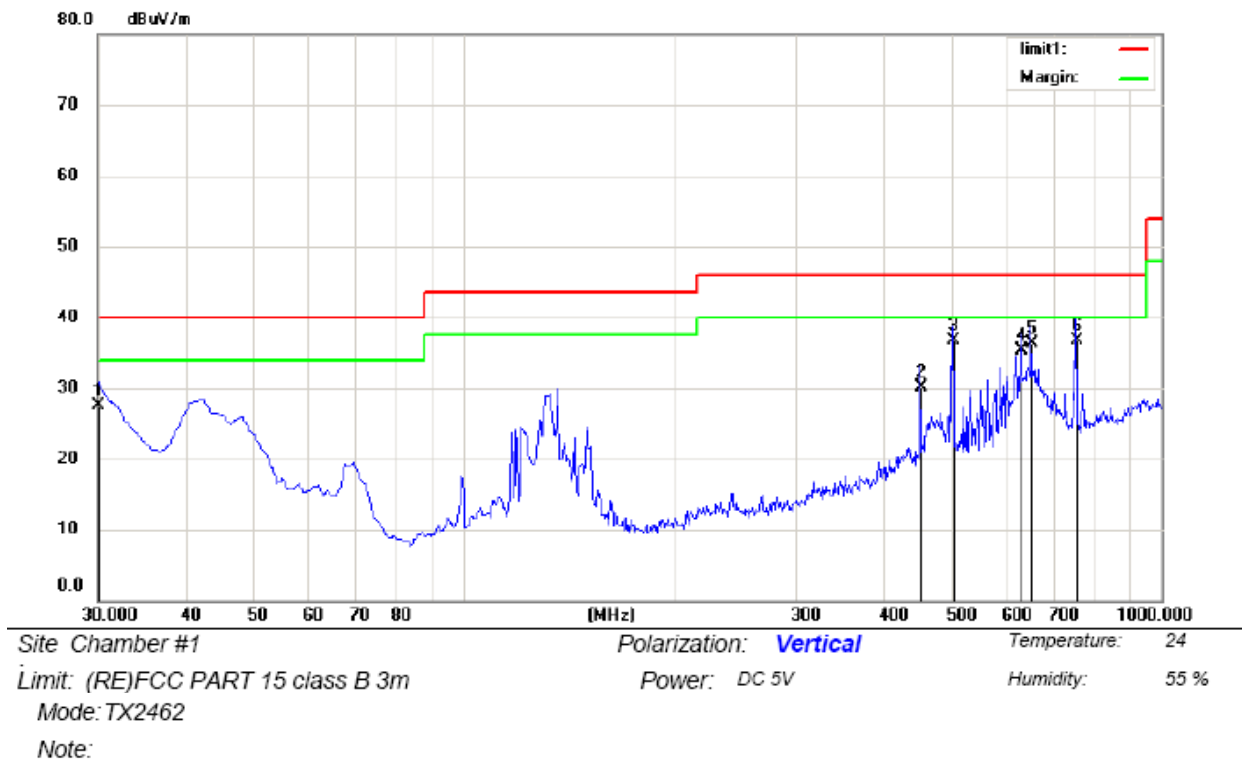
Operator:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		132.8200	40.30	-17.58	22.72	43.50	-20.78	QP		
2		150.2800	50.10	-18.62	31.48	43.50	-12.02	QP		
3		450.9800	43.17	-11.52	31.65	46.00	-14.35	QP		
4		526.6400	42.10	-9.81	32.29	46.00	-13.71	QP		
5	*	551.8600	48.25	-8.92	39.33	46.00	-6.67	QP		
6		656.6200	44.52	-7.71	36.81	46.00	-9.19	QP		

*:Maximum data x:Over limit !:over margin

Operator:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		30.0000	42.33	-14.83	27.50	40.00	-12.50	QP		
2		451.9500	41.52	-11.49	30.03	46.00	-15.97	QP		
3		502.3900	47.10	-10.43	36.67	46.00	-9.33	QP		
4		630.4300	43.26	-8.02	35.24	46.00	-10.76	QP		
5		650.8000	44.12	-7.83	36.29	46.00	-9.71	QP		
6	*	753.6200	42.65	-5.89	36.76	46.00	-9.24	QP		

*:Maximum data x:Over limit !:over margin

Operator:

Above 1GHz:

Operation Mode: 802.11b Lowest Test Date : July 26, 2016

Freq. (MHz)	Ant.Pol H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4824	V	68.75	48.72	74	54	-5.25	-5.28
7236	V	67.15	47.56	74	54	-6.85	-6.44
9648	V	66.23	46.25	74	54	-7.77	-7.75
12060	V	65.08	45.13	74	54	-8.92	-8.87
14472	V	64.48	44.08	74	54	-9.52	-9.92
16884	V	63.25	43.29	74	54	-10.75	-10.71
4824	H	67.46	47.49	74	54	-6.54	-6.51
7236	H	66.08	46.25	74	54	-7.92	-7.75
9648	H	65.13	45.13	74	54	-8.87	-8.87
12060	H	64.28	44.08	74	54	-9.72	-9.92
14472	H	63.72	43.29	74	54	-10.28	-10.71
16884	H	62.75	42.17	74	54	-11.25	-11.83

Operation Mode: 802.11b Middle Test Date : July 26, 2016

Freq. (MHz)	Ant.Pol H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4874	V	67.46	47.42	74	54	-6.54	-6.58
7311	V	66.28	46.28	74	54	-7.72	-7.72
9688	V	65.13	45.15	74	54	-8.87	-8.85
12185	V	64.85	44.95	74	54	-9.15	-9.05
14622	V	63.17	43.08	74	54	-10.83	-10.92
17059	V	62.85	42.19	74	54	-11.15	-11.81
4874	H	68.42	46.85	74	54	-5.58	-7.15
7311	H	67.13	45.25	74	54	-6.87	-8.75
9688	H	66.85	44.13	74	54	-7.15	-9.87
12185	H	65.08	43.28	74	54	-8.92	-10.72
14622	H	64.13	42.95	74	54	-9.87	-11.05
17059	H	63.92	41.28	74	54	-10.08	-12.72

Operation Mode: 802.11b Highest

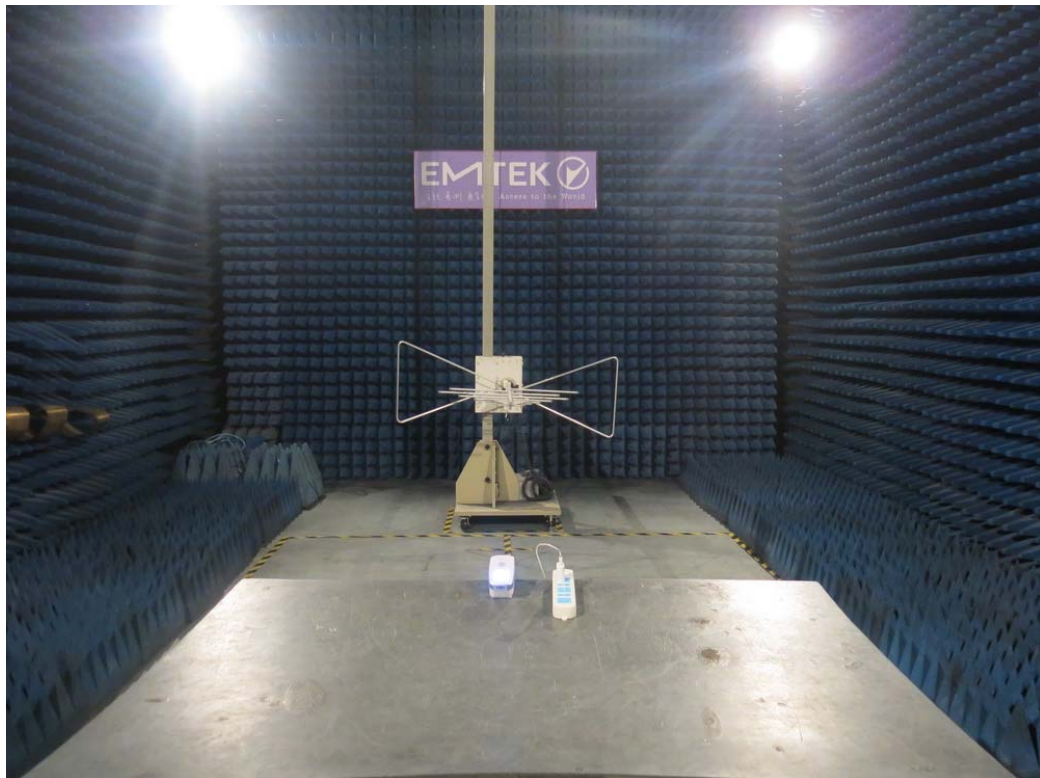
Test Date : July 26, 2016

Freq. (MHz)	Ant.Pol H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4924	V	68.15	46.72	74	54	-5.85	-7.28
7386	V	67.28	45.82	74	54	-6.72	-8.18
9848	V	66.25	44.13	74	54	-7.75	-9.87
12310	V	65.13	43.28	74	54	-8.87	-10.72
14772	V	64.28	42.19	74	54	-9.72	-11.81
17234	V	63.17	41.08	74	54	-10.83	-12.92
4924	H	67.16	45.13	74	54	-6.84	-8.87
7386	H	66.08	44.85	74	54	-7.92	-9.15
9848	H	65.13	43.62	74	54	-8.87	-10.38
12310	H	64.28	42.17	74	54	-9.72	-11.83
14772	H	63.72	41.08	74	54	-10.28	-12.92
17234	H	62.75	40.39	74	54	-11.25	-13.61

Other harmonics emissions are lower than 20dB below the allowable limit.

- Note:**
- (1) All Readings are Peak Value and AV.
 - (2) Emission Level= Reading Level+ Probe Factor +Cable Loss.
 - (3) The average measurement was not performed when the peak measured data under the limit of average detection.
 - (4) Measuring frequencies from 1GHz to 25GHz

7.6 Radiated Measurement Photos:



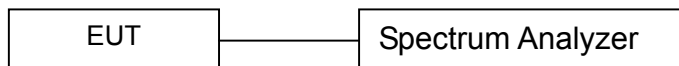
8. 6dB Bandwidth Test

8.1 Measurement Procedure

The EUT was operating in IEEE 802.11b, 802.11g, 802.11n(HT20), 802.11n(HT40) mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.

1. Set resolution bandwidth (RBW) = 100 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ 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 frequency) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

8.2 Test SET-UP (Block Diagram of Configuration)



8.3 Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Characteristics	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	10Hz-30GHz	06/24/2016	06/23/2017
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	06/24/2016	06/23/2017
Antenna Connector	ARTHUR-YANG	2244-N1TG1	N/A	10Hz-30GHz	06/24/2016	06/23/2017

Remark: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

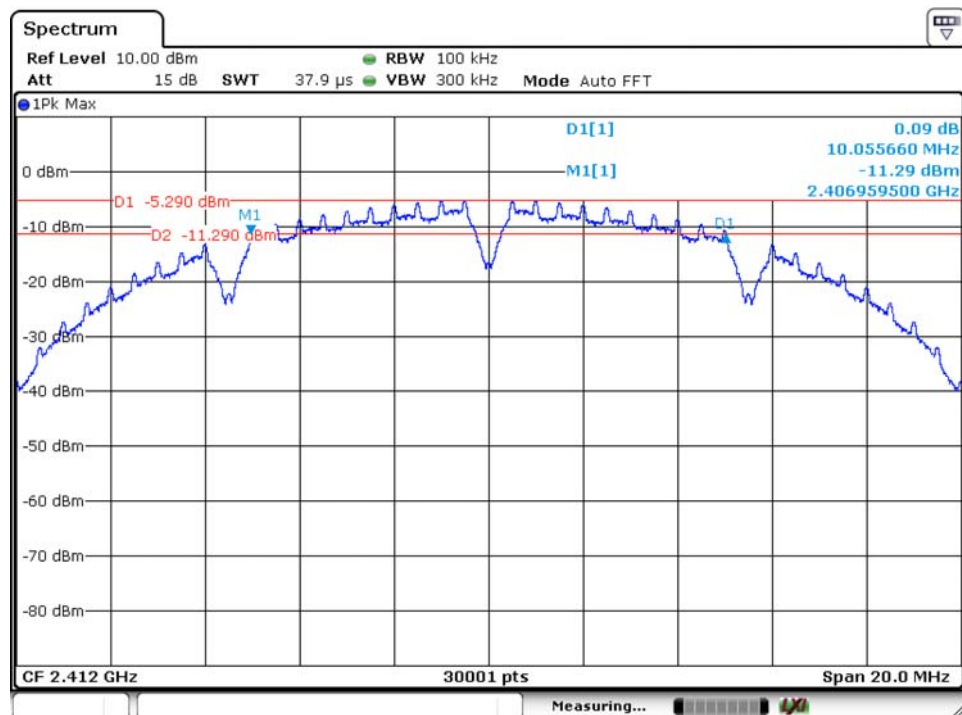
8.4 Measurement Results

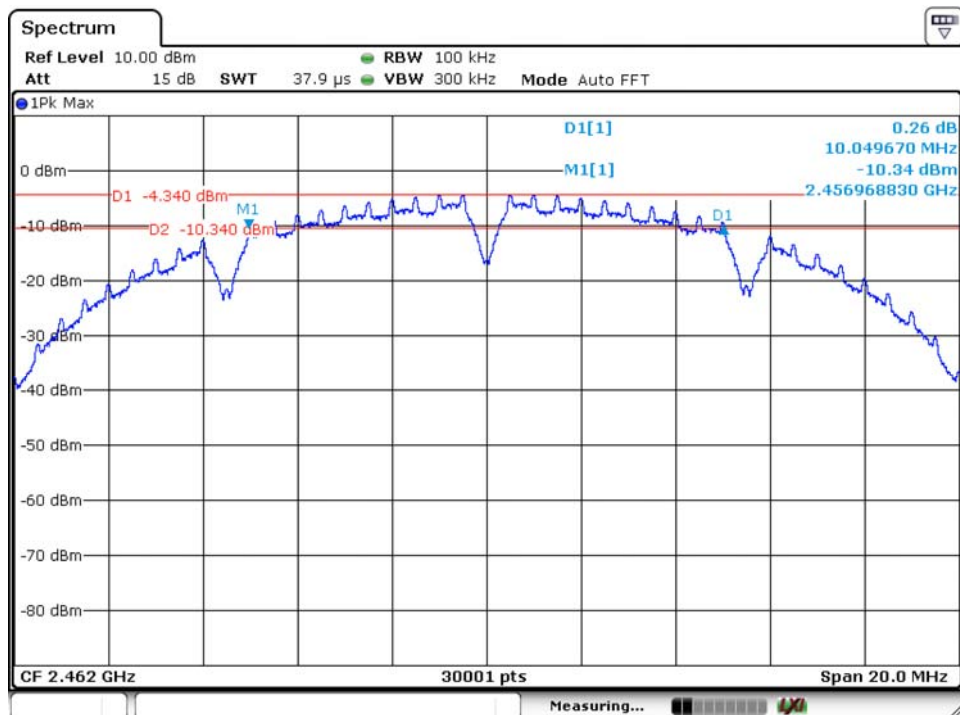
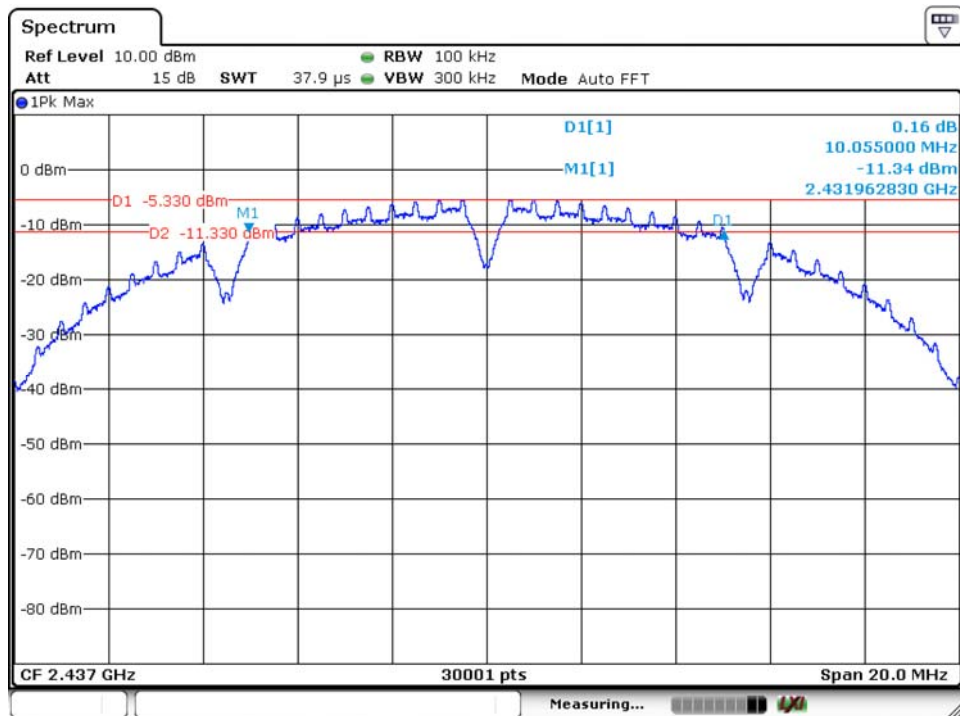
6 Bandwidth Test Data Chart:

Refer to attached data chart.

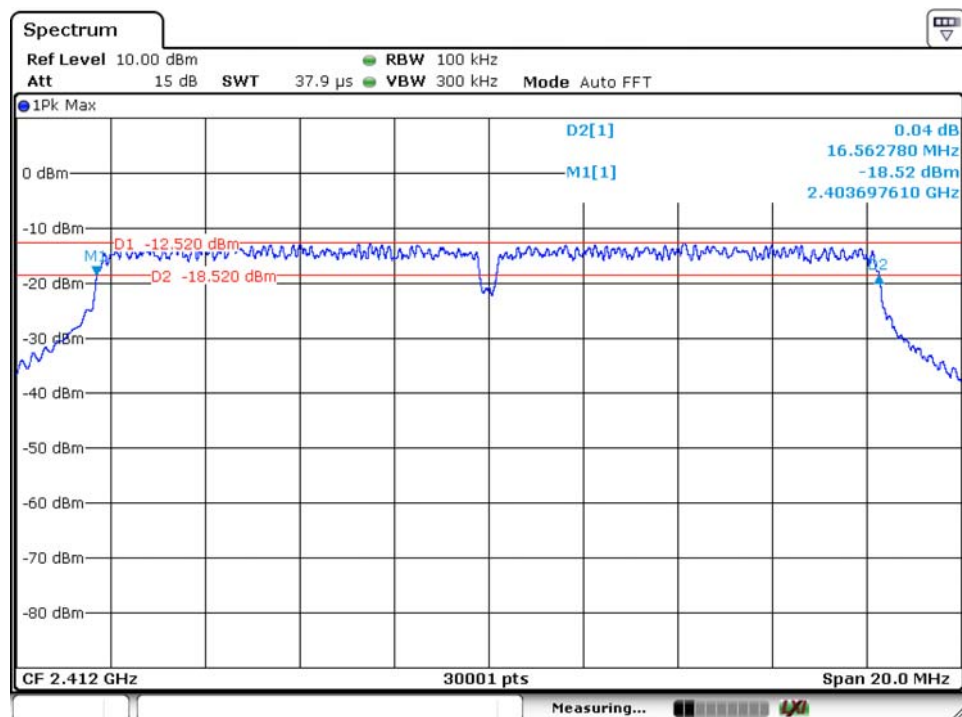
Spectrum Detector:	PK	Test Date :	July 26, 2016
Test By:	Andy	Temperature :	28°C
Test Result:	PASS	Humidity :	60%

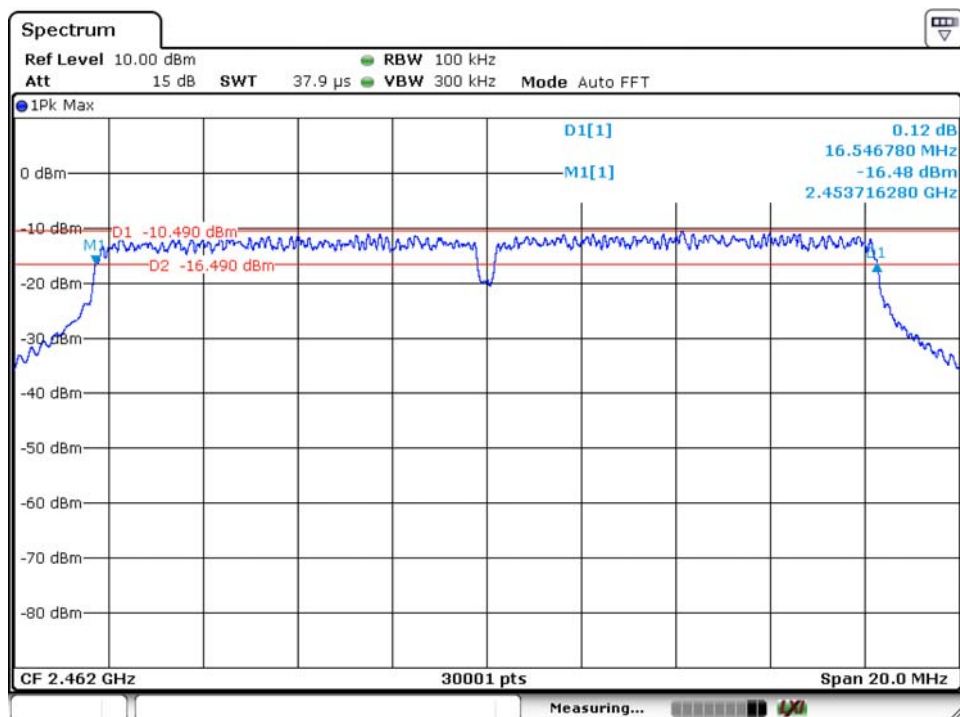
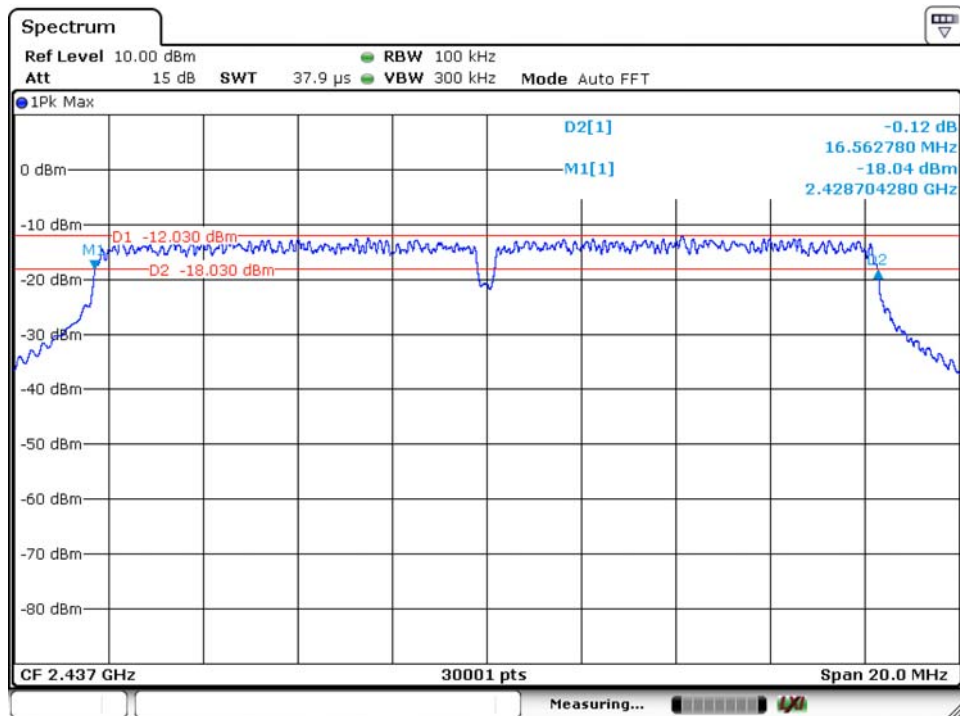
IEEE 802.11b			
Channel frequency (MHz)	Measurement level (KHz)	Required Limit (KHz)	Result
2412	10056	>500	Pass
2437	10055	>500	
2462	10050	>500	



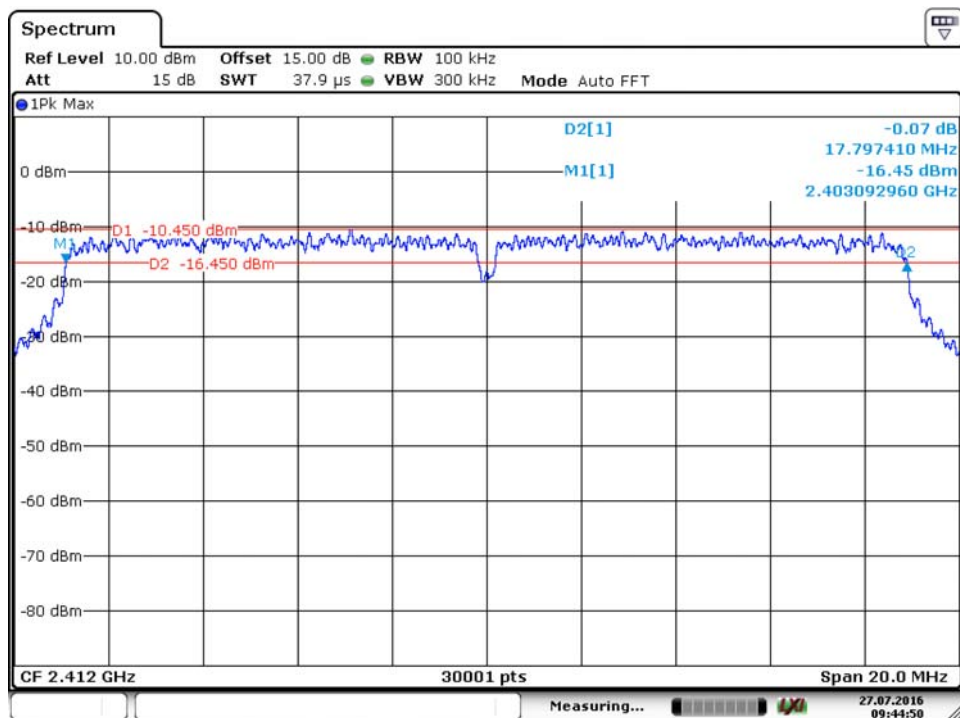


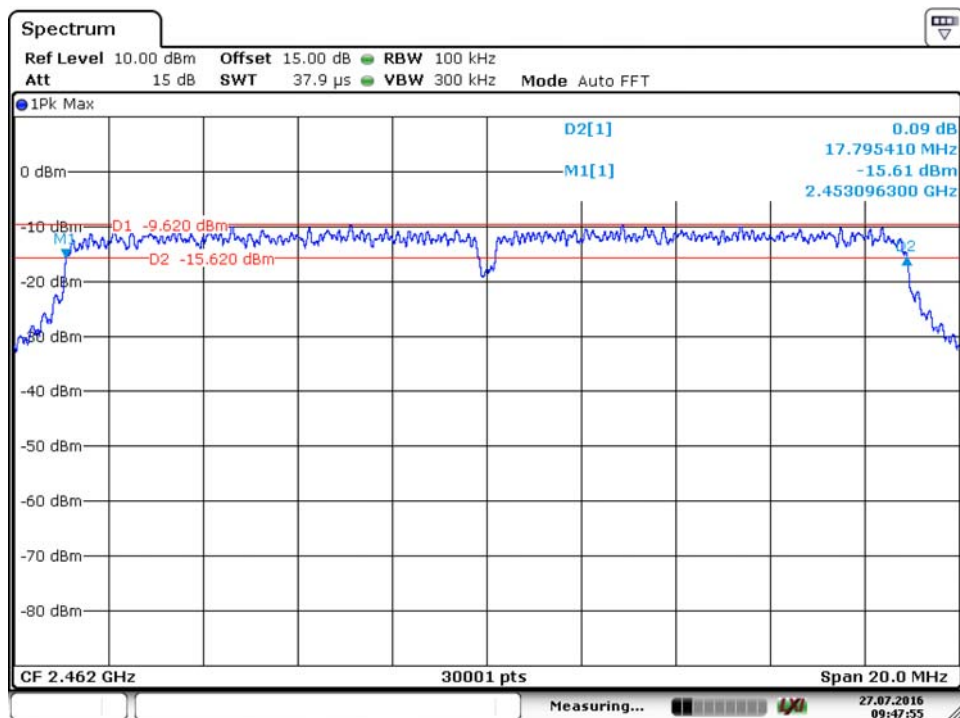
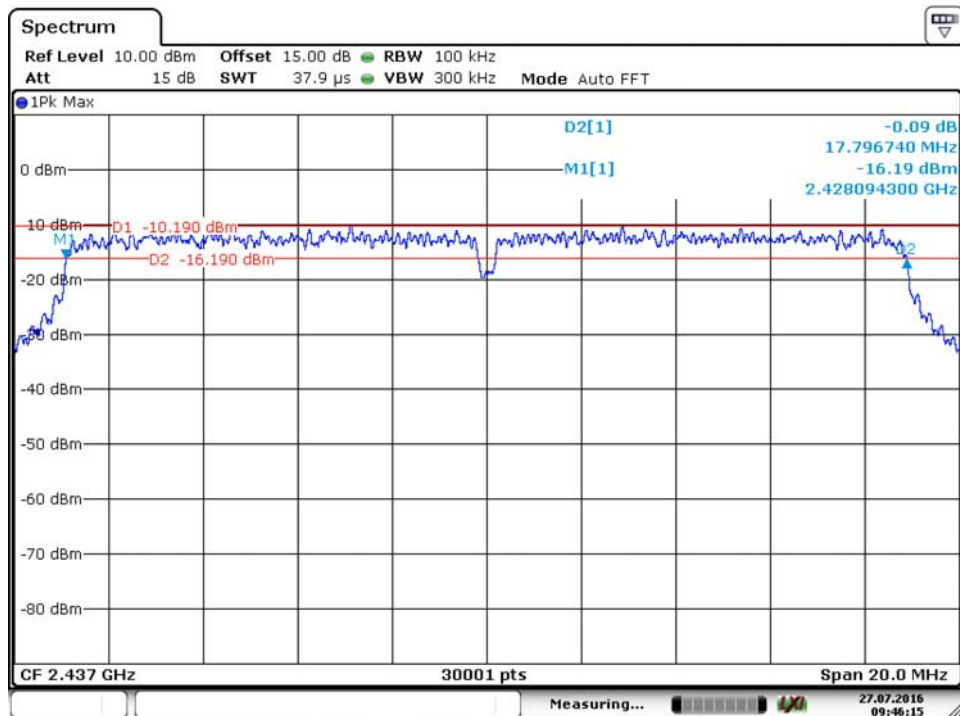
IEEE 802.11g			
Channel frequency (MHz)	Measurement level (KHz)	Required Limit (KHz)	Result
2412	16563	>500	Pass
2437	16563	>500	
2462	16547	>500	



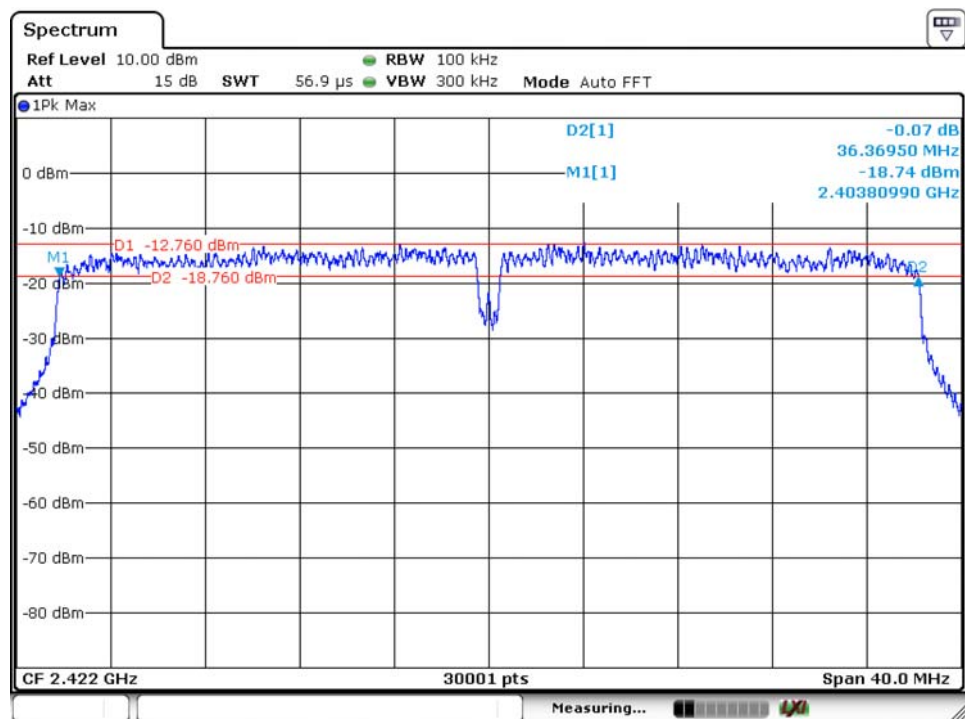


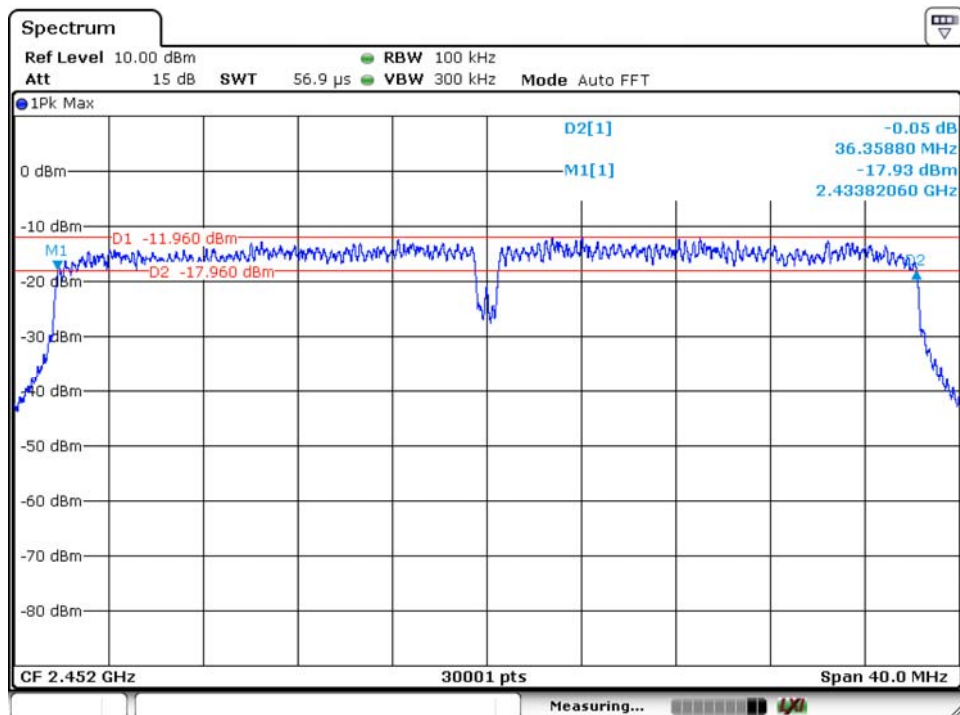
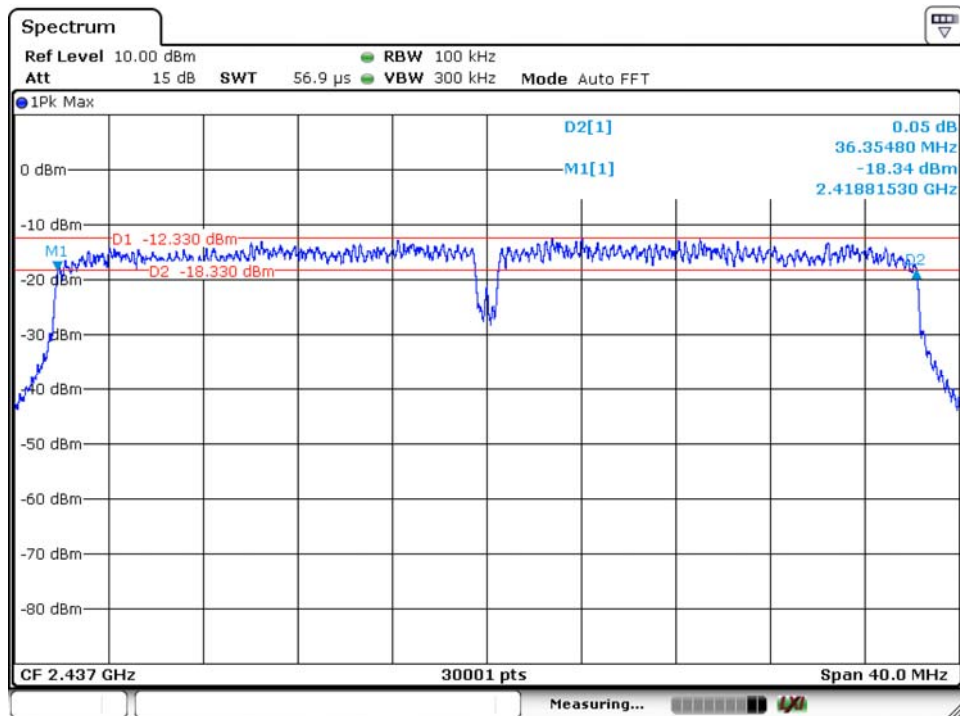
IEEE 802.11n(HT20)			
Channel frequency (MHz)	Measurement level (KHz)	Required Limit (KHz)	Result
2412	17797	>500	Pass
2437	17797	>500	
2462	17795	>500	





IEEE 802.11n(HT40)			
Channel frequency (MHz)	Measurement level (KHz)	Required Limit (KHz)	Result
2422	36370	>500	Pass
2437	36355	>500	
2452	36359	>500	



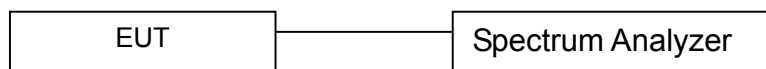


9. Maximum Peak Output Power Test

9.1 Measurement Procedure

- Check the calibration of the measuring instrument(SA) using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- The center frequency of the spectrum analyzer is set to the fundamental frequency and using proper RBW and VBW setting.

9.2 Test SET-UP (Block Diagram of Configuration)



9.3 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Characteristics	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	10Hz-30GHz	06/24/2016	06/23/2017
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	06/24/2016	06/23/2017
Antenna Connector	ARTHUR-YANG	2244-N1TG1	N/A	10Hz-30GHz	06/24/2016	06/23/2017

Remark: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

9.4 Peak Power output limit

The maximum peak power shall be less 1Watt.

9.5 Measurement Results

Spectrum Detector:	PK	Test Date :	July 26, 2016
Test By:	Andy	Temperature :	28°C
Test Result:	PASS	Humidity :	60%

Test Channel	Peak Output Power (dBm)				Limit(dBm)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	13.20	11.56	10.25	9.25	30	Pass
Middle	13.32	12.06	11.03	9.65		
Highest	14.54	12.20	11.12	10.05		

10. Band Edge Test

10.1 Measurement Procedure

For Conducted Test

1. The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100KHz. The video bandwidth is set to 300KHz.
2. The spectrum from 30MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

EMI Test Receiver	Setting
Attenuation	Auto
RBW	100KHz
VBW	300KHz
Detector	Peak
Trace	Max hold

For Radiated emission Test

The EUT was placed on a styrofoam table which is 1.5m above ground plane.

The measurement procedure at the band edges was simplified by performing the measurement in just one plot. Both, the in-band-emission and the unwanted emission were encompassed by the span. After trace stabilization, the maximum peak was determined by a peak detector and the value was marked by an appropriate limit line. The second limit line, which is 20dB below the first, marks the limit for the emissions in the unrestricted band. A maximum-peak-detector marks the highest emission in the unrestricted band next to the band edge.

The measurements were performed at the lower end of the 2.4GHz band.

Use the following spectrum analyzer settings:

For Restricted Band, When spectrum scanned above 1GHz setting resolution bandwidth 1MHz, video bandwidth 3MHz:

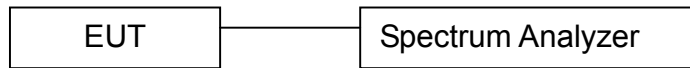
EMI Test Receiver	Setting
Attenuation	Auto
RBW	1MHz
VBW	3MHz
Detector	Peak
Trace	Max hold

For Non-Restricted Band, When spectrum scanned above 1GHz setting resolution bandwidth 100KHz, video bandwidth 300KHz:

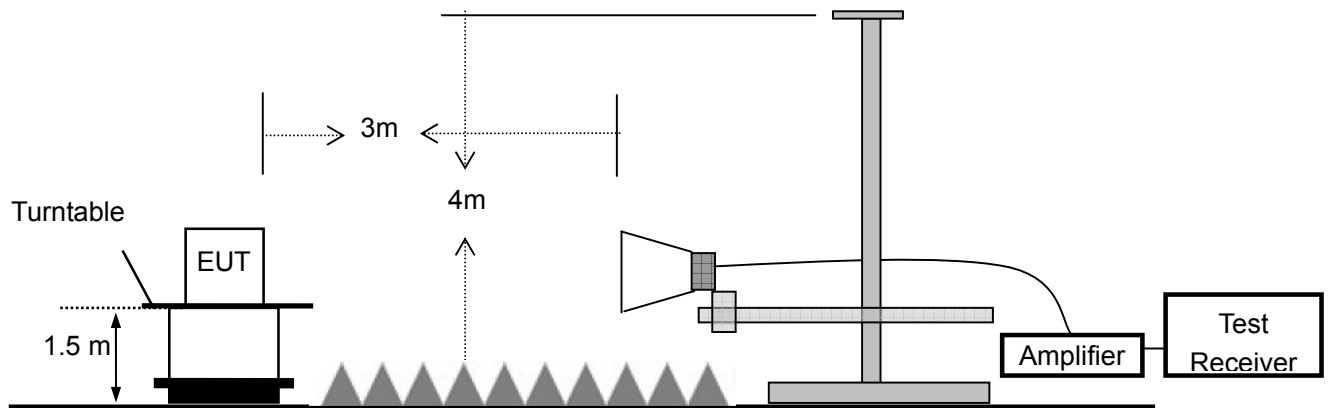
EMI Test Receiver	Setting
Attenuation	Auto
RBW	100KHz
VBW	300KHz
Detector	Peak
Trace	Max hold

10.2 Test SET-UP (Block Diagram of Configuration)

For Conducted Test



For Radiated emission Test



10.3 Measurement Equipment Used:

For Conducted Test

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Characteristics	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	10Hz-30GHz	06/24/2016	06/23/2017
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	06/24/2016	06/23/2017
Antenna Connector	ARTHUR-YANG	2244-N1TG1	N/A	10Hz-30GHz	06/24/2016	06/23/2017

Remark: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

For Radiated emission Test

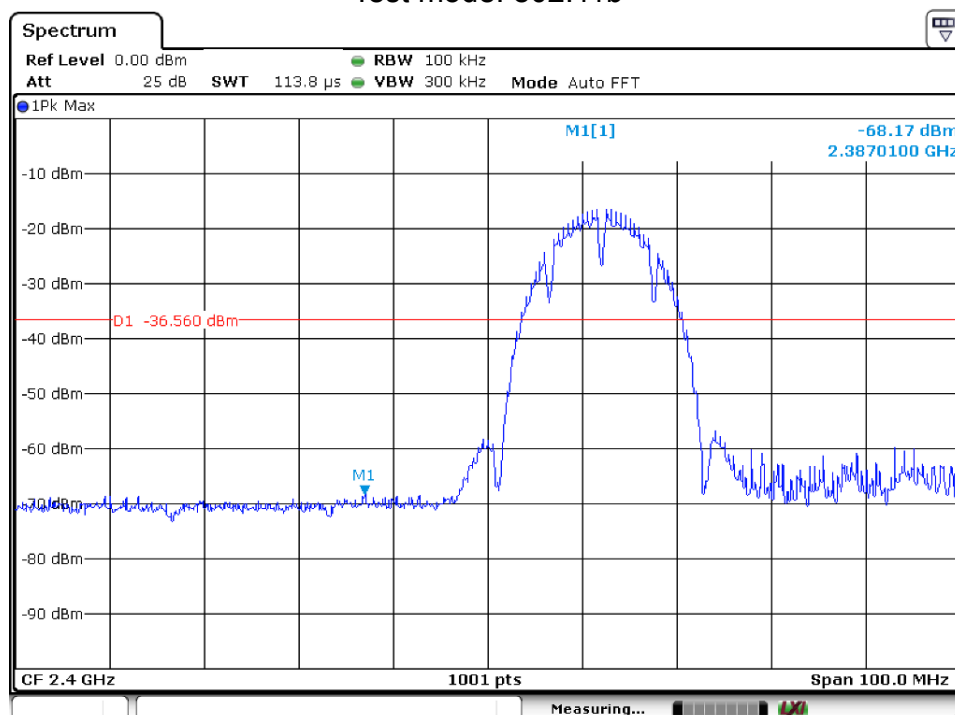
Item	Equipment	Manufacturer	Model No.	Serial No.	Characteristics	Last Cal.	Cal. Interval
1	Signal Analyzer	Rohde & Schwarz	FSV30	103040	9KHz-40GHz	06/24/2016	1 Year
2	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1272	1GHz-18GHz	06/24/2016	1 Year
3	Power Amplifier	LUNAR EM	LNA1G18-40	J10100000081	1GHz-26.5GHz	06/24/2016	1 Year
4	Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	06/24/2016	1 Year
5	Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	06/24/2016	1 Year
6	Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	06/24/2016	1Year

10.4 Measurement Results

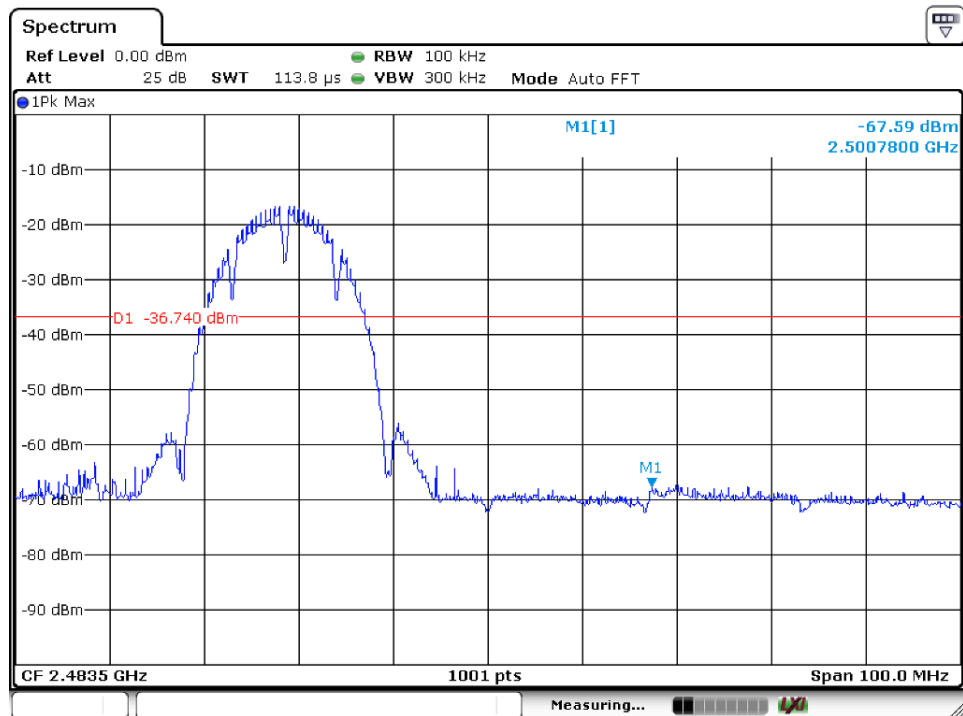
1. Conducted Test

Please refer to the following pages.

Test mode: 802.11b

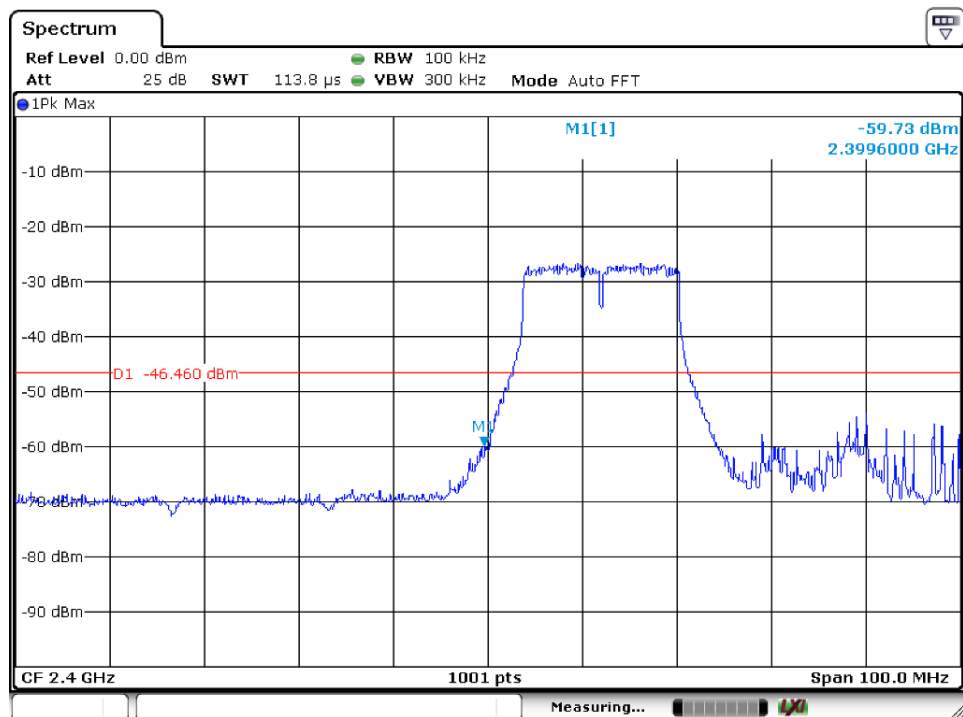


Lowest Channel

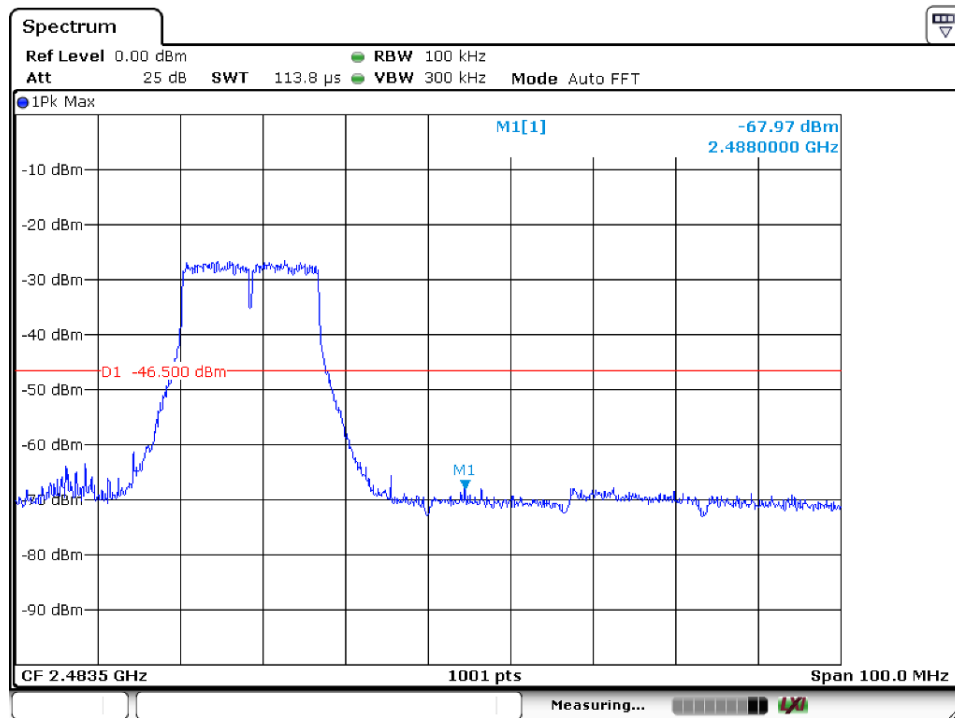


Highest Channel

Test mode: 802.11g

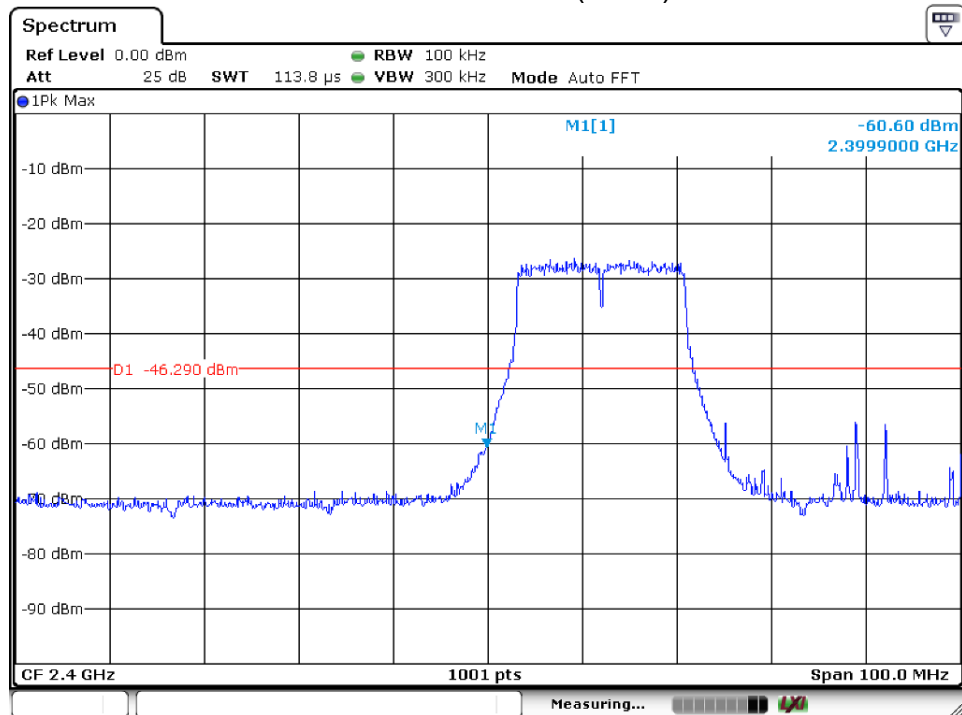


Lowest Channel

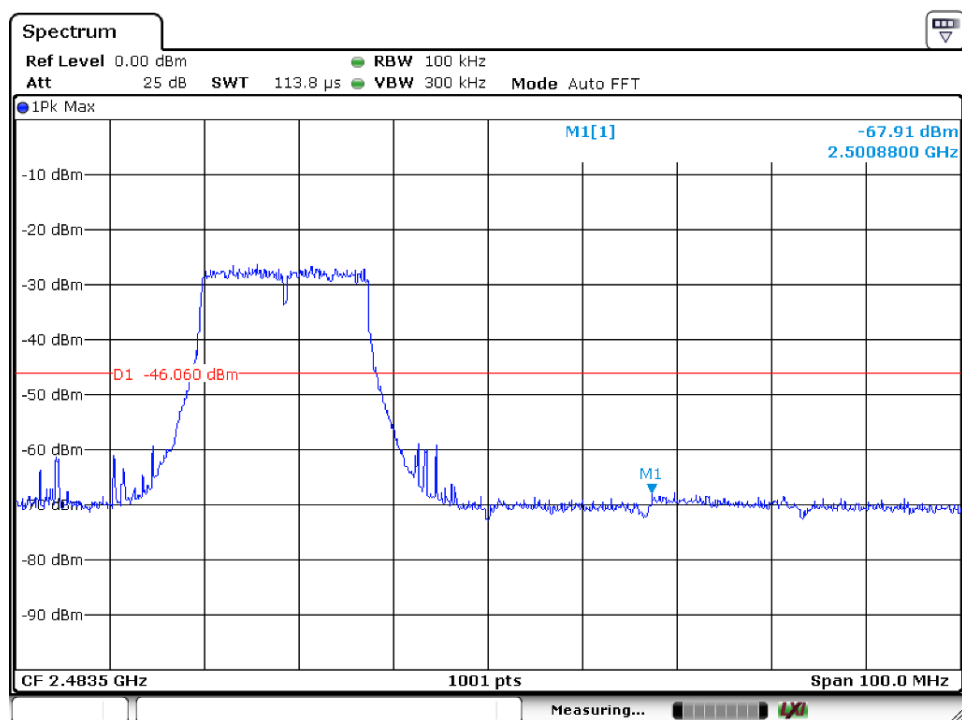


Highest Channel

Test mode: 802.11n(HT20)

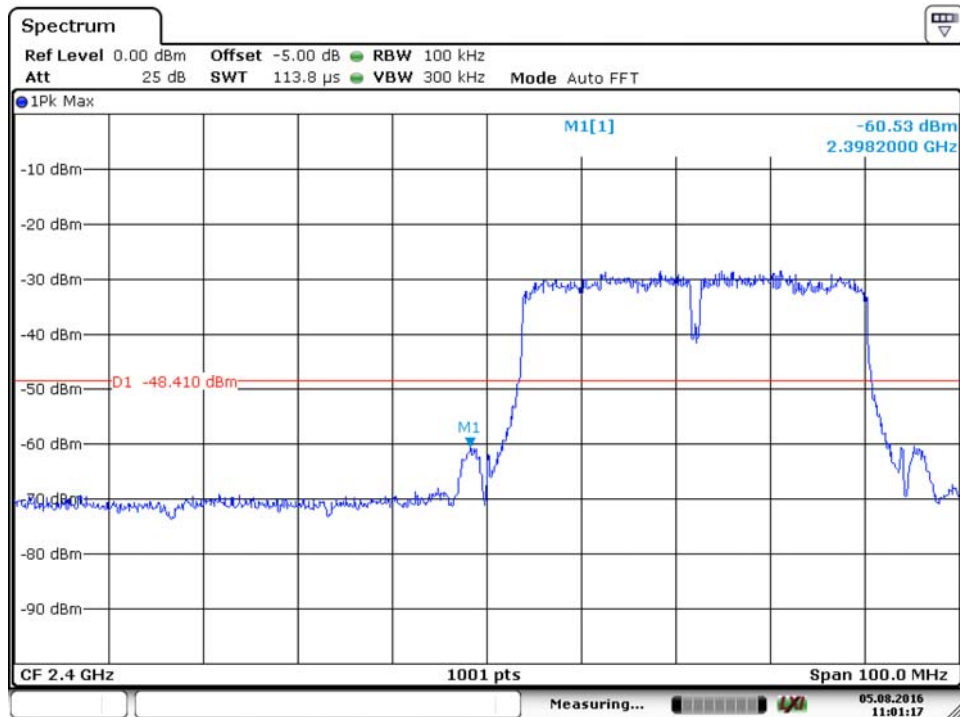


Lowest Channel

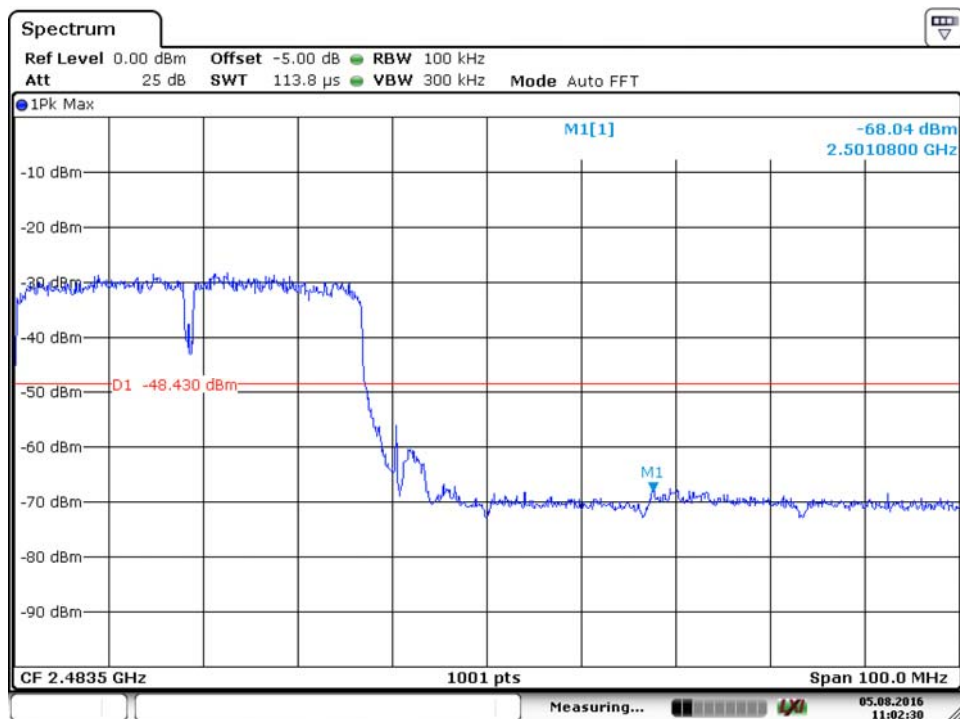


Highest Channel

Test mode: 802.11n(HT40)



Lowest Channel



Highest Channel

2. Radiated emission Test

Spectrum Detector: PK/AV Test Date : July 26, 2016
Test By: Andy Temperature : 28 °C
Humidity : 65 %

IEEE 802.11b							
Frequency (MHz)	Antenna polarization	Emission (dBuV/m)		Band edge Limit (dBuV/m)		Margin (dB)	
	(H/V)	PK	AV	PK	AV	PK	AV
2400	H	64.15	45.38	74	54	-9.85	-8.62
2400	V	60.2	39.15	74	54	-13.8	-14.85
2483.5	H	64.82	46.38	74	54	-9.18	-7.62
2483.5	V	59.7	39.18	74	54	-14.3	-14.82

IEEE 802.11g							
Frequency (MHz)	Antenna polarization	Emission (dBuV/m)		Band edge Limit (dBuV/m)		Margin (dB)	
	(H/V)	PK	AV	PK	AV	PK	AV
2400	H	65.15	45.15	74	54	-8.85	-8.85
2400	V	60.84	40.82	74	54	-13.16	-13.18
2483.5	H	64.71	46.35	74	54	-9.29	-7.65
2483.5	V	61.3	39.75	74	54	-12.7	-14.25

IEEE 802.11n(HT20)							
Frequency (MHz)	Antenna polarization	Emission (dBuV/m)		Band edge Limit (dBuV/m)		Margin (dB)	
	(H/V)	PK	AV	PK	AV	PK	AV
2400	H	65.18	45.36	74	54	-8.82	-8.64
2400	V	60.35	40.28	74	54	-13.65	-13.72
2483.5	H	64.72	46.15	74	54	-9.28	-7.85
2483.5	V	60.1	40.85	74	54	-13.9	-13.15

IEEE 802.11n(HT40)							
Frequency (MHz)	Antenna polarization	Emission (dBuV/m)		Band edge Limit (dBuV/m)		Margin (dB)	
	(H/V)	PK	AV	PK	AV	PK	AV
2400	H	63.15	46.35	74	54	-10.85	-7.65
2400	V	56.35	40.18	74	54	-17.65	-13.82
2483.5	H	64.17	45.2	74	54	-9.83	-8.8
2483.5	V	60.85	39.57	74	54	-13.15	-14.43

11. Power Density

11.1 Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Characteristics	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	10Hz-30GHz	06/24/2016	06/23/2017
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	06/24/2016	06/23/2017
Antenna Connector	ARTHUR-YANG	2244-N1TG1	N/A	10Hz-30GHz	06/24/2016	06/23/2017

Remark: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

11.2 Measuring Instruments and Setting

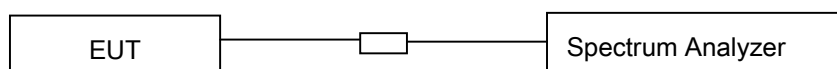
The following table is the setting of spectrum analyzer.

Spectrum analyzer	Setting
Attenuation	Auto
Span Frequency	Set the span to 1.5 times the DTS bandwidth.
RB	3kHz
VB	10KHz
Detector	Peak
Trace	Max hold
Sweep Time	Automatic

11.3 Test Procedures

- The transmitter output (antenna port) was connected to the spectrum analyzer.
- Set analyzer center frequency to DTS channel center frequency.
- Set the analyzer span to a minimum of 1.5 times the DTS bandwidth.
- Set the RBW ≥ 3 kHz. Set the VBW $\geq 3 \times$ RBW.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level.

11.4 Block Diagram of Test Setup



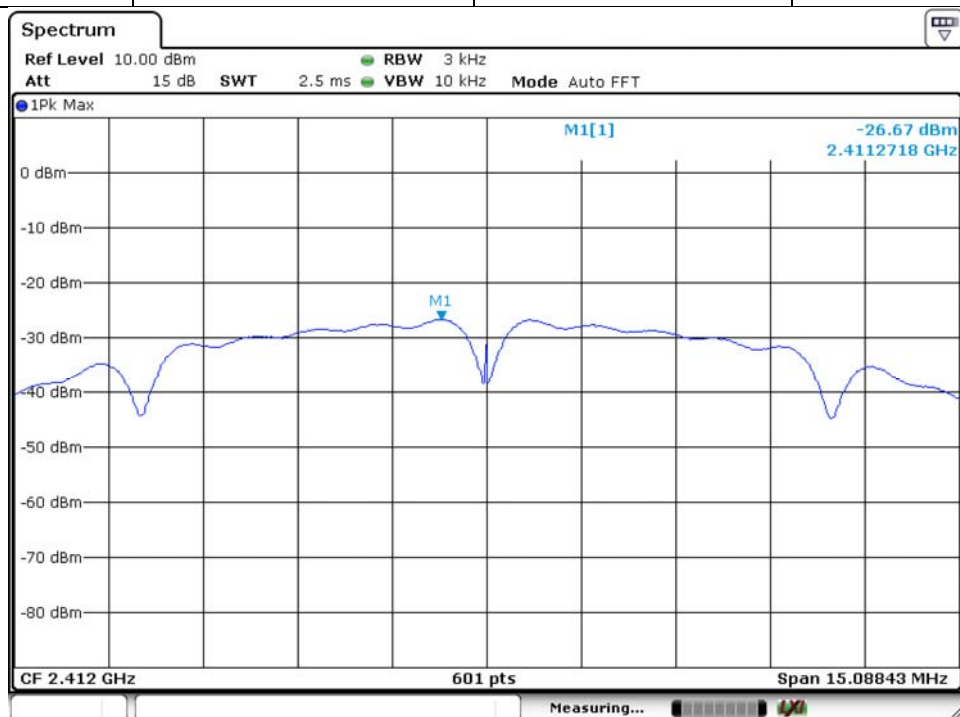
11.5 Limit

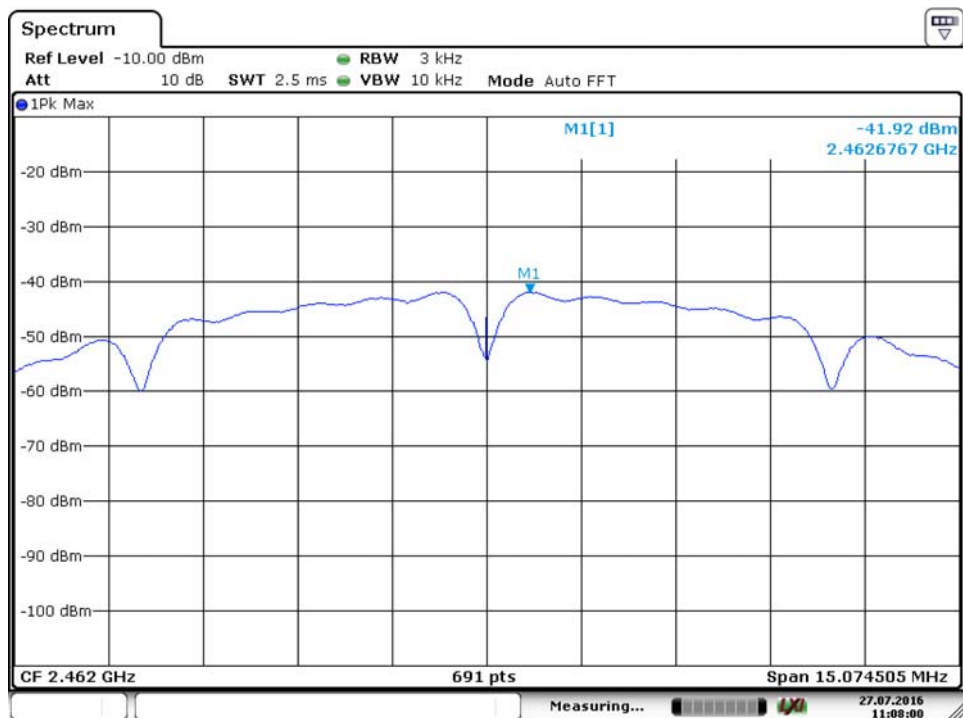
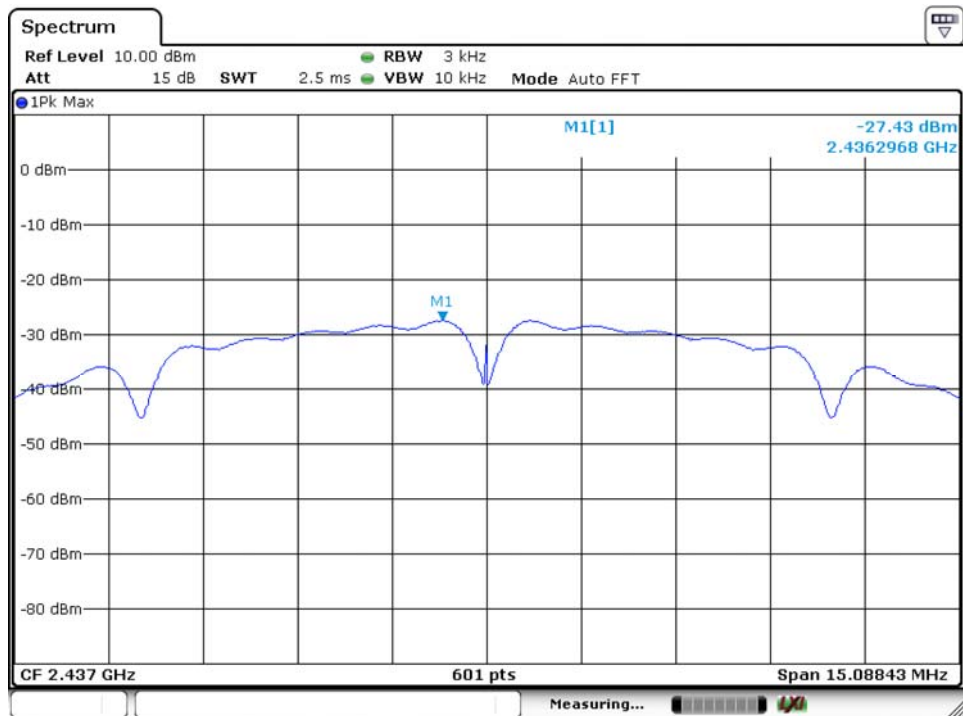
The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3 kHz bandwidth.

11.6 Test Result

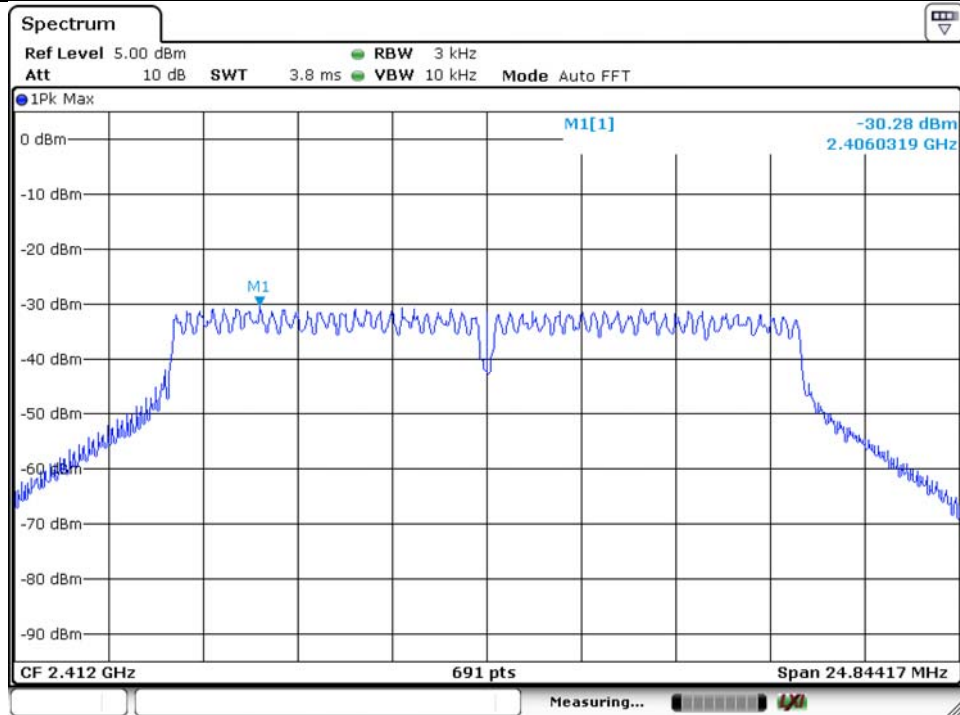
Spectrum Detector:	PK	Test Date :	July 26, 2016
Test By:	Andy	Temperature :	28°C
Test Mode:	802.11b	Humidity :	60%

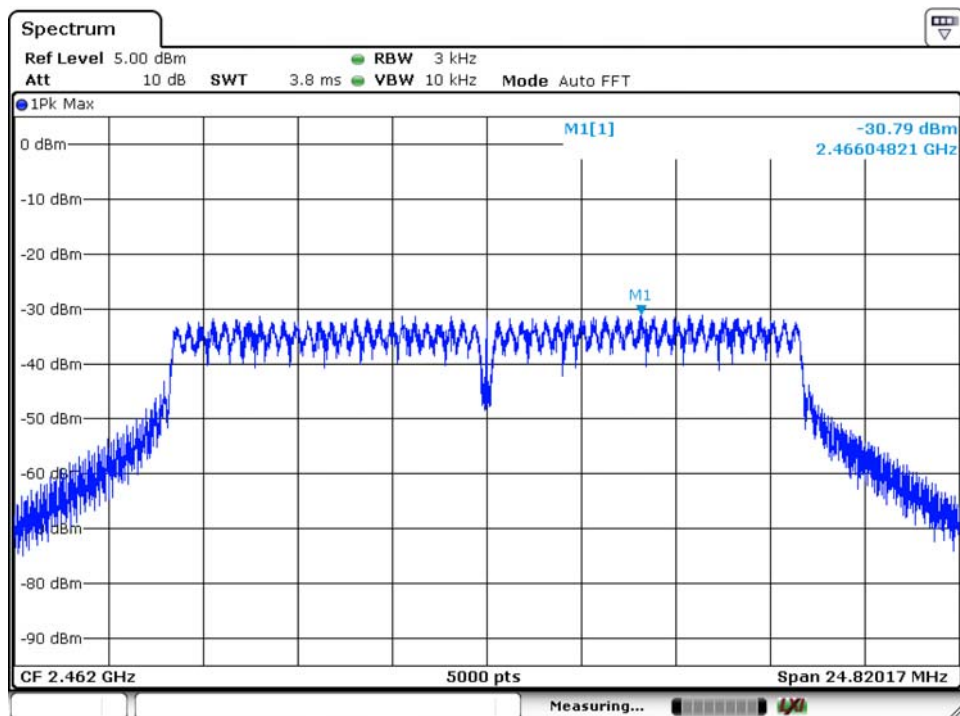
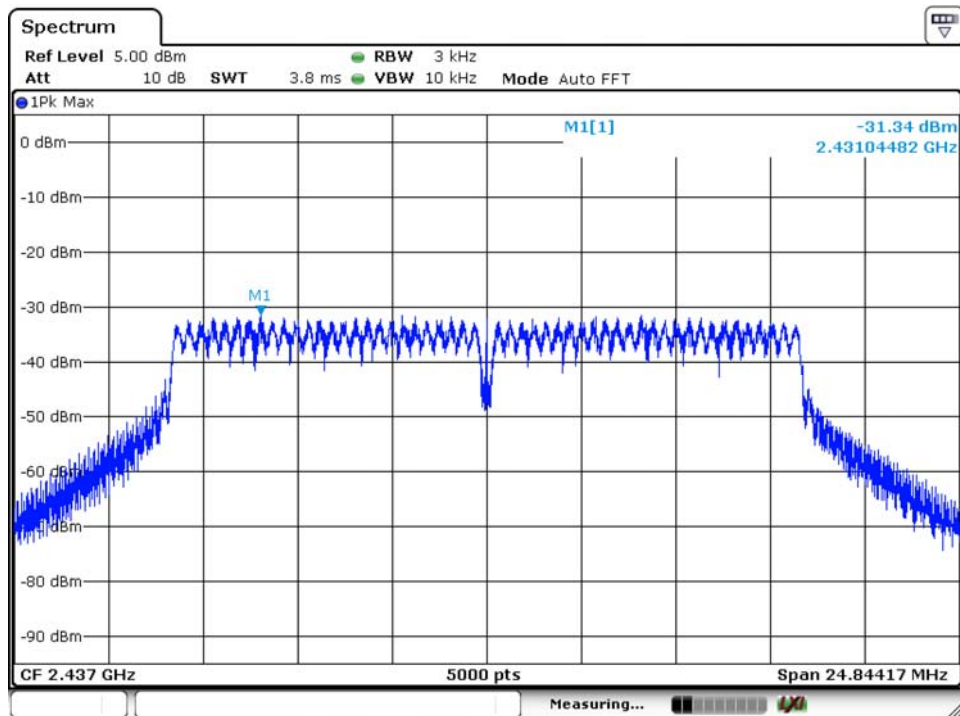
IEEE 802.11b			
Channel frequency (MHz)	Measurement level (dBm/3KHz)	Limit(dBm/3KHz)	Result
2412	-26.67	8	Pass
2437	-27.43		
2462	-41.92		



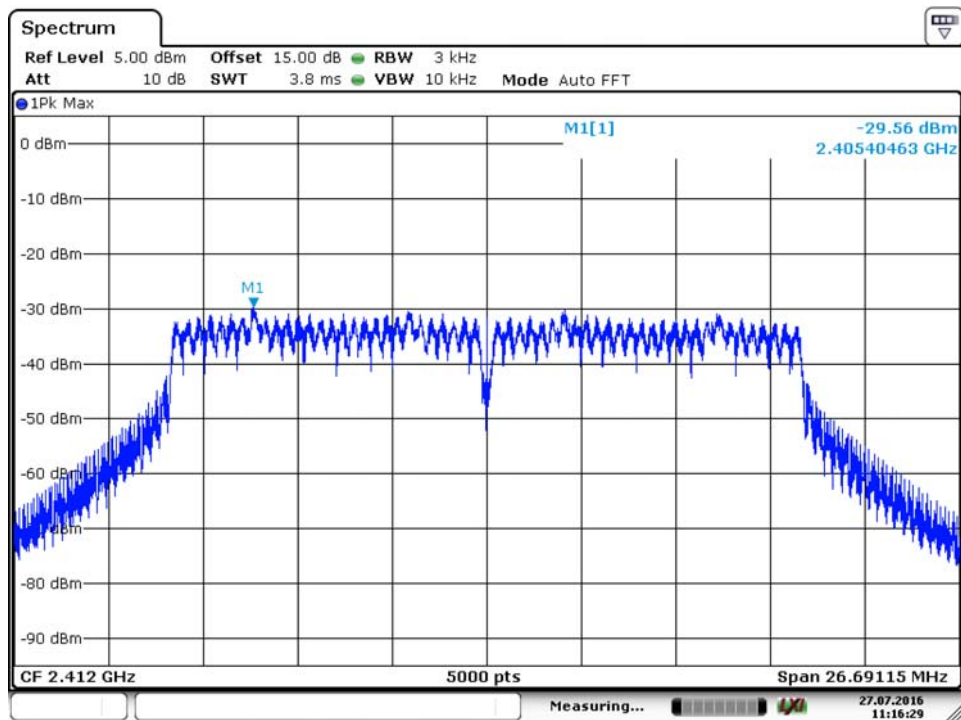


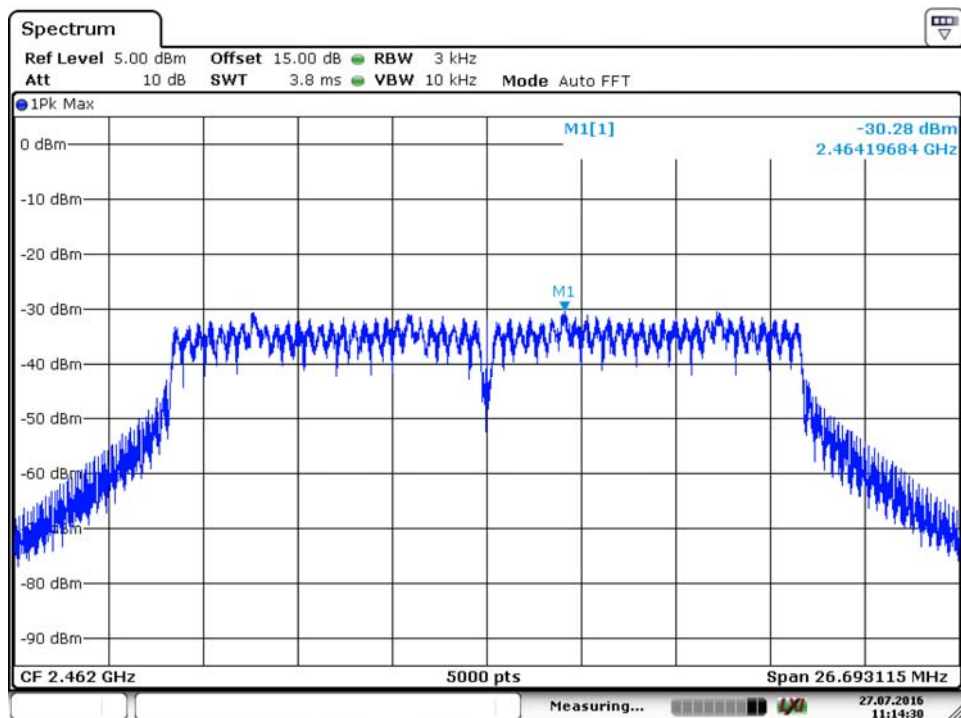
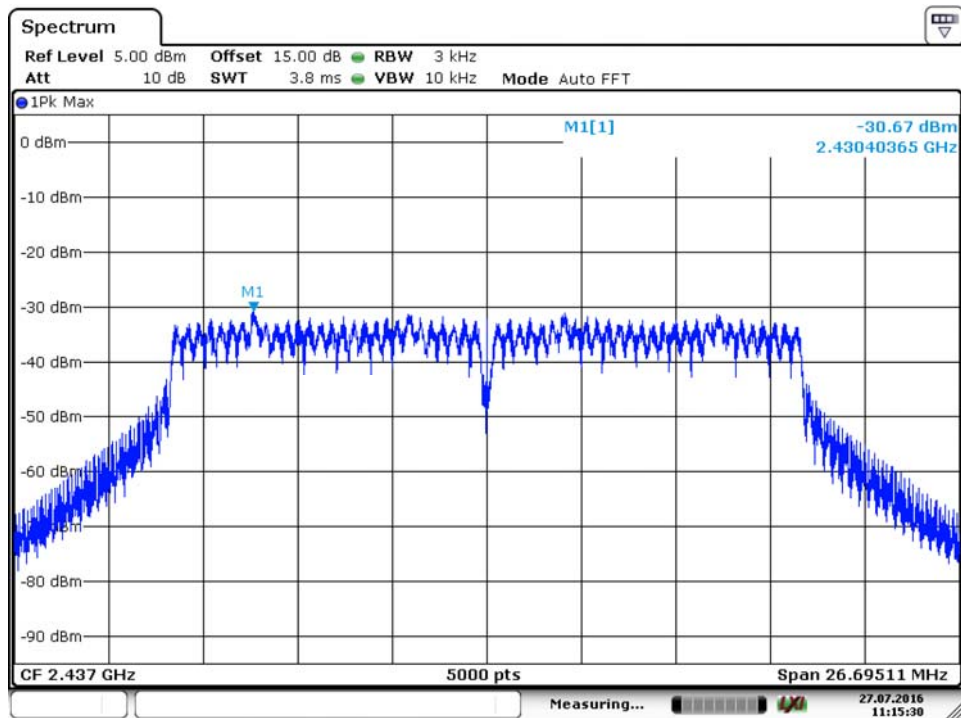
IEEE 802.11g			
Channel frequency (MHz)	Measurement level (dBm/3KHz)	Limit(dBm/3KHz)	Result
2412	-30.28	8	Pass
2437	-31.34		
2462	-30.79		



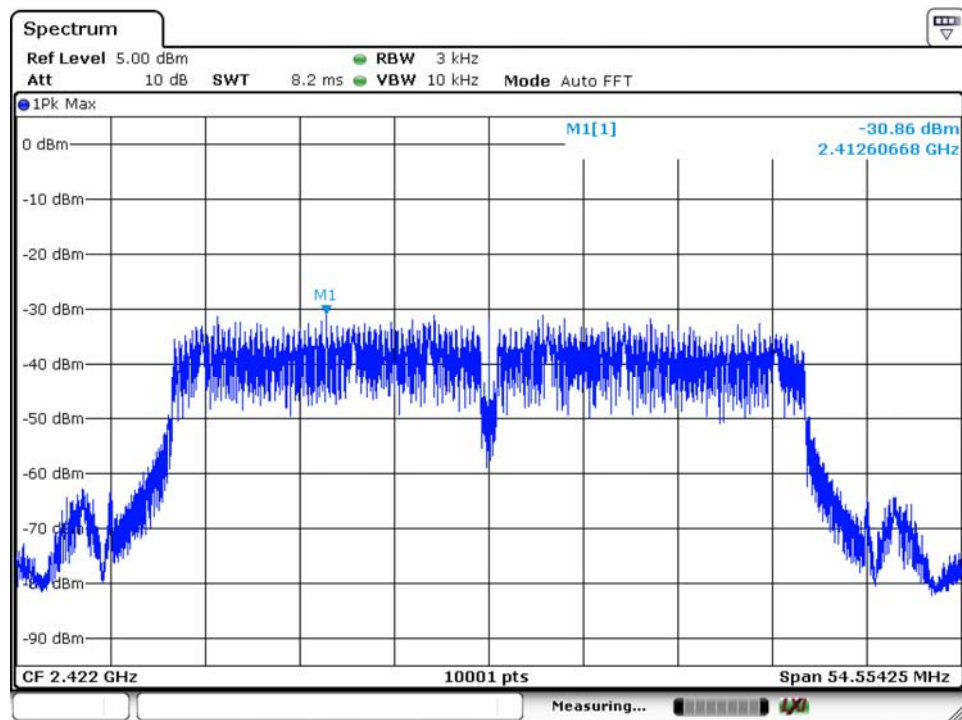


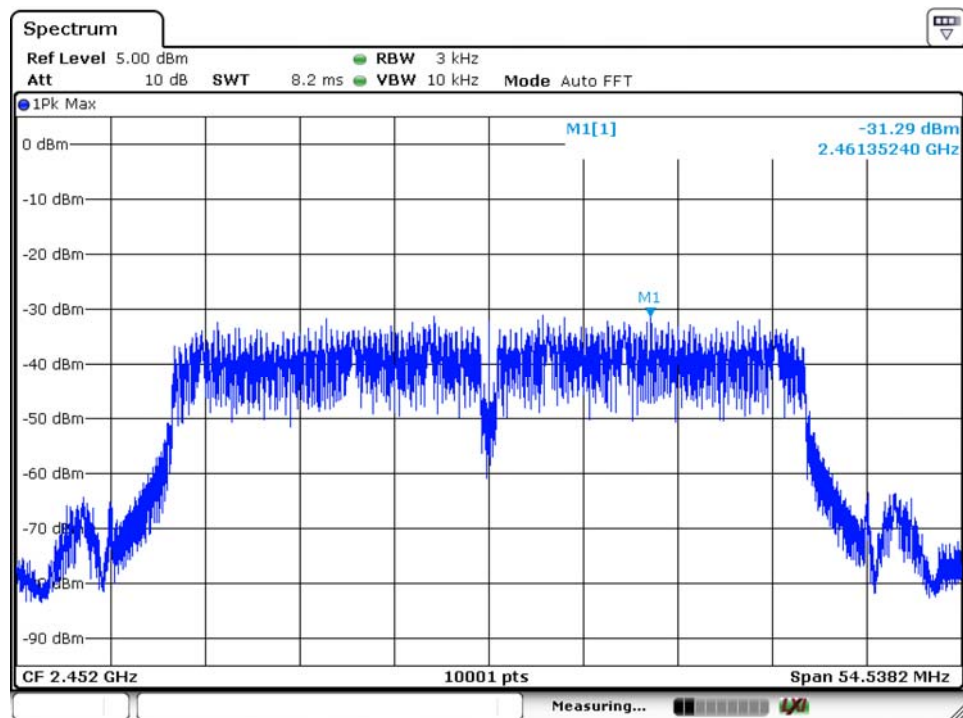
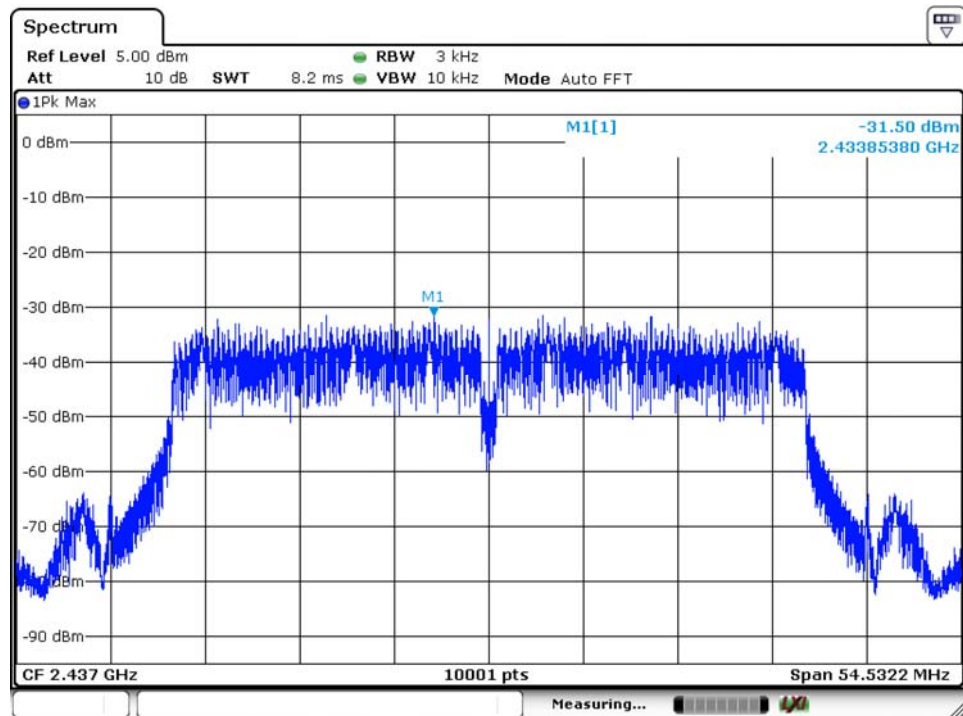
IEEE 802.11n(HT20)			
Channel frequency (MHz)	Measurement level (dBm/3KHz)	Limit(dBm/3KHz)	Result
2412	-29.56	8	Pass
2437	-30.67		
2462	-30.28		





IEEE 802.11n(HT40)			
Channel frequency (MHz)	Measurement level (dBm/3KHz)	Limit(dBm/3KHz)	Result
2422	-30.86	8	Pass
2437	-31.50		
2452	-31.29		





12. Antenna Port Emission

12.1 Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Characteristics	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	10Hz-30GHz	06/24/2016	06/23/2017
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	06/24/2016	06/23/2017
Antenna Connector	ARTHUR-YANG	2244-N1TG1	N/A	10Hz-30GHz	06/24/2016	06/23/2017

Remark: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

12.2 Measuring Instruments and Setting

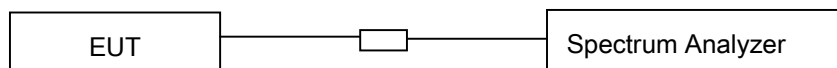
The following table is the setting of spectrum analyzer.

Spectrum analyzer	Setting
Attenuation	Auto
RB	100kHz
VB	300kHz
Detector	Peak
Trace	Max hold

12.3 Test Procedures

The conducted spurious emissions were measured conducted using a spectrum analyzer at low, Middle, and high channels, the limit was determined by attenuation 20dB of the RF peak power output.

12.4 Block Diagram of Test setup

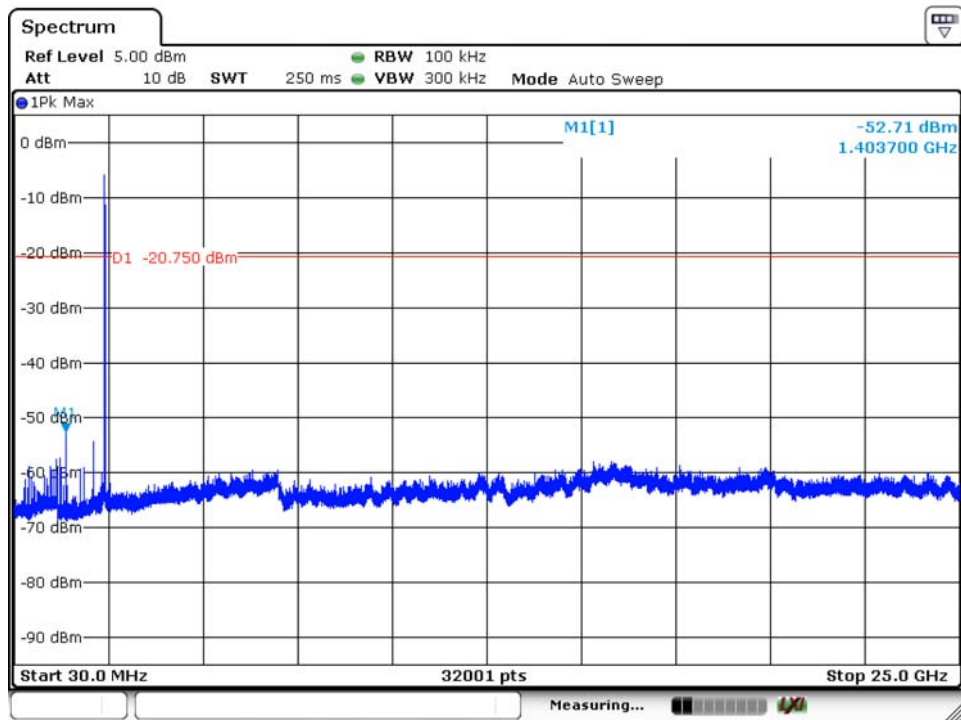


12.5 Test Result

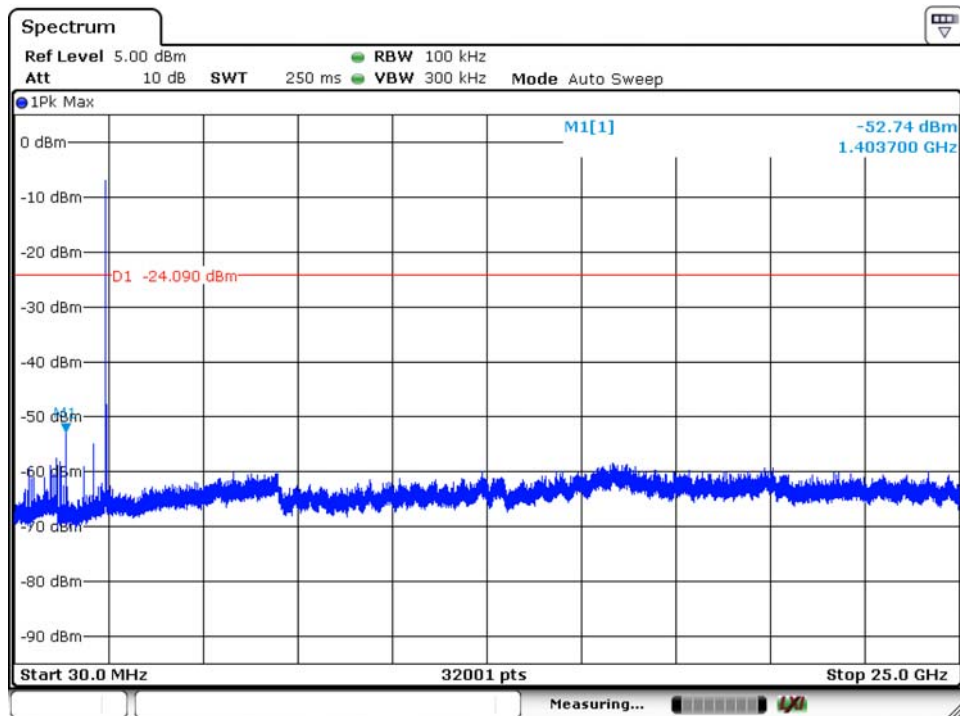
PASS.

Please refer to following pages.

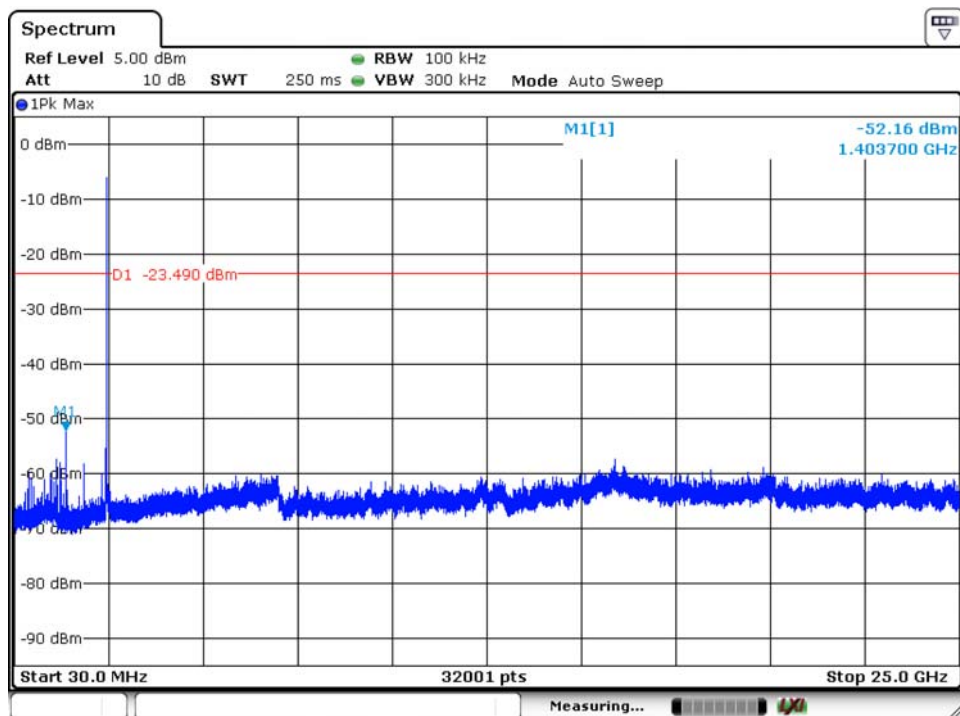
Test Mode: 802.11b



Lowest Channel

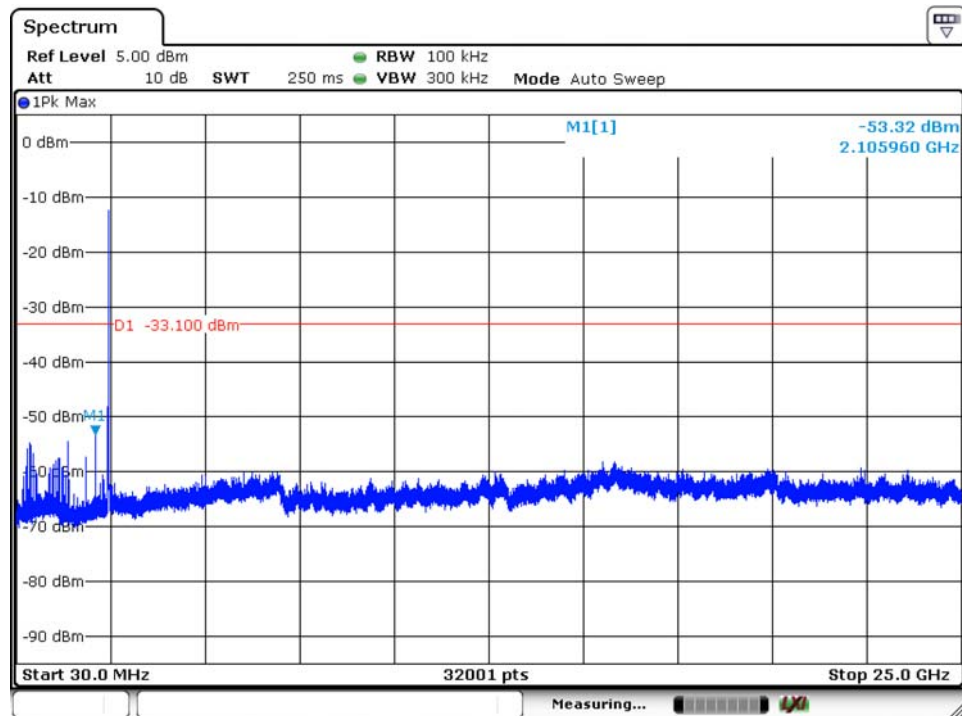


Middel Channel

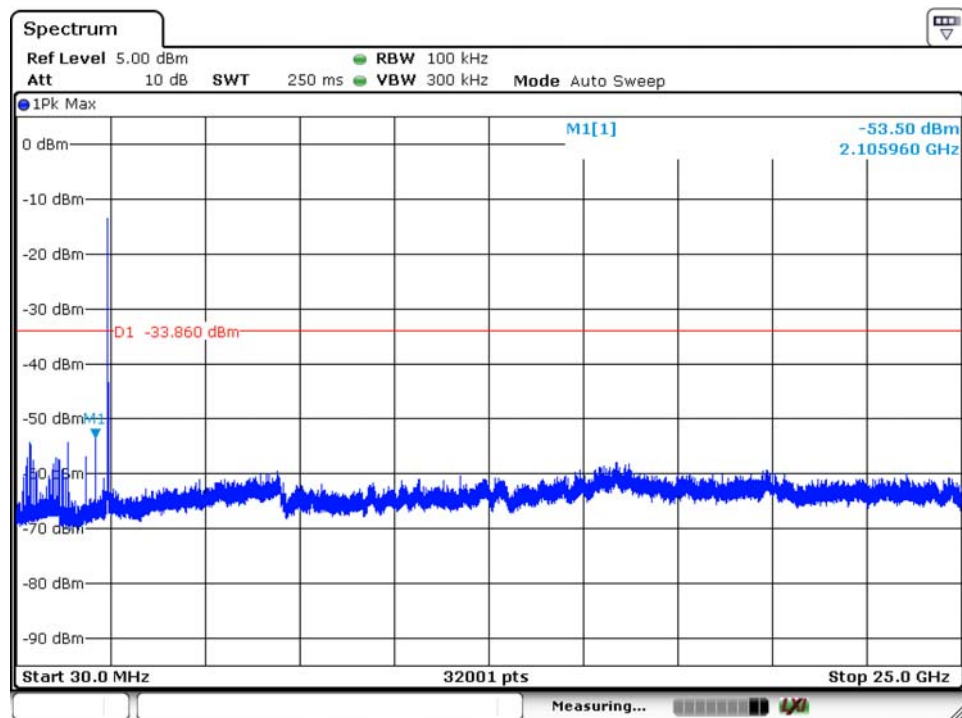


Highest Channel

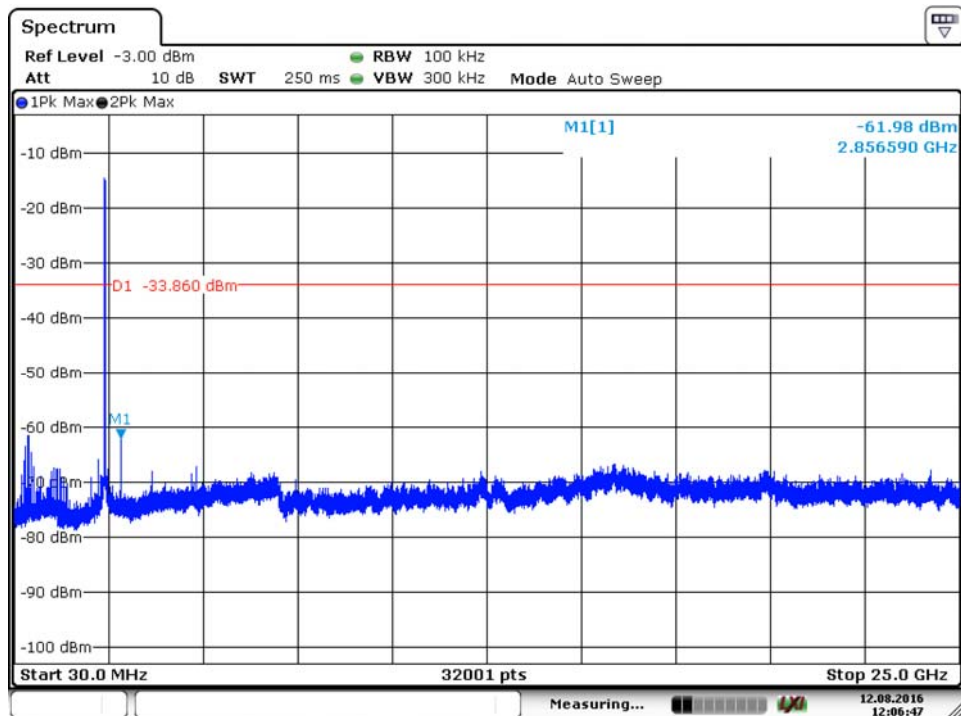
Test Mode: 802.11g



Lowest Channel

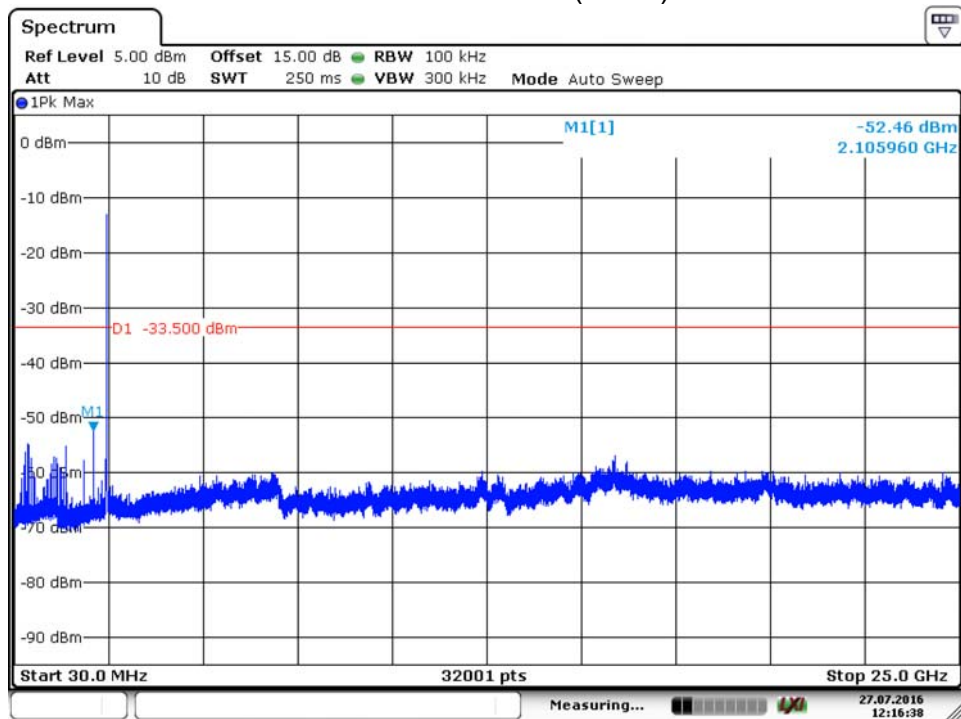


Middle Channel

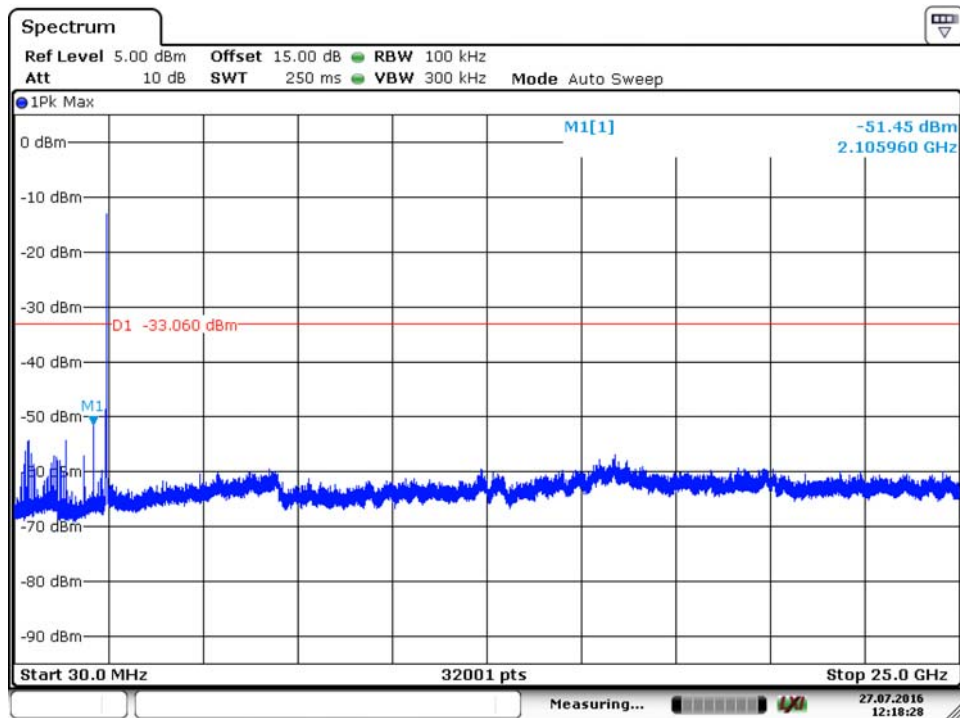


Highest Channel

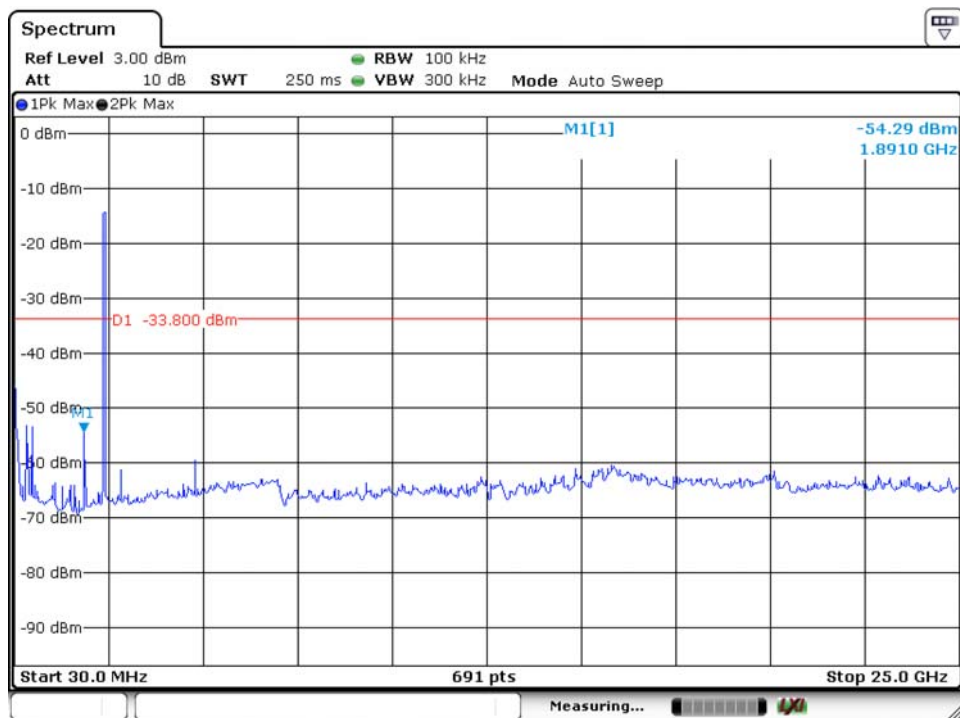
Test Mode: 802.11n(HT20)



Lowest Channel

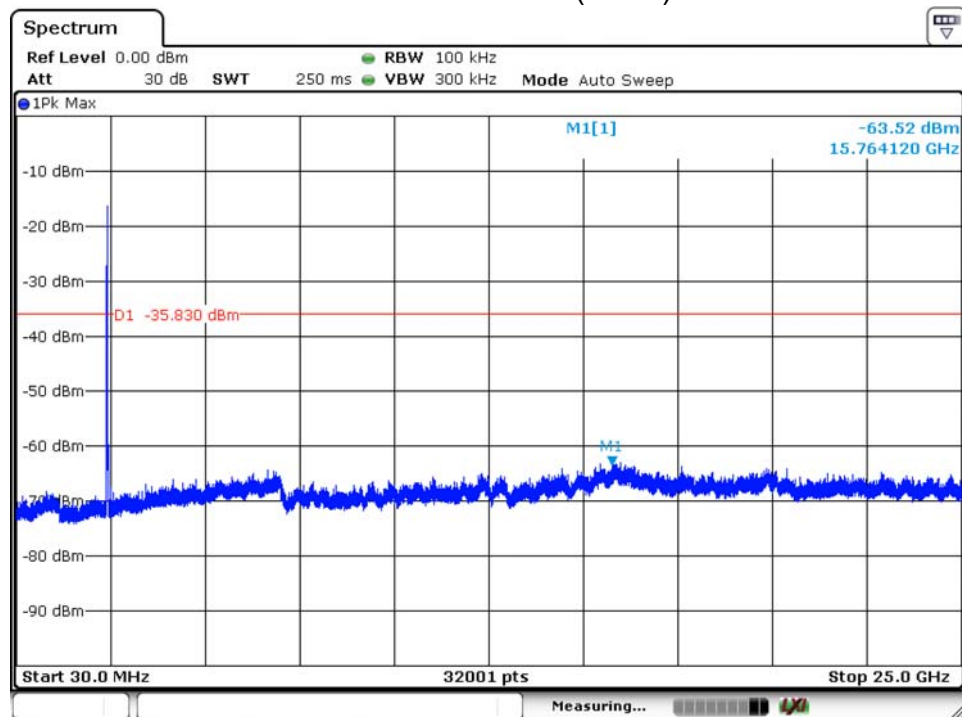


Middle Channel

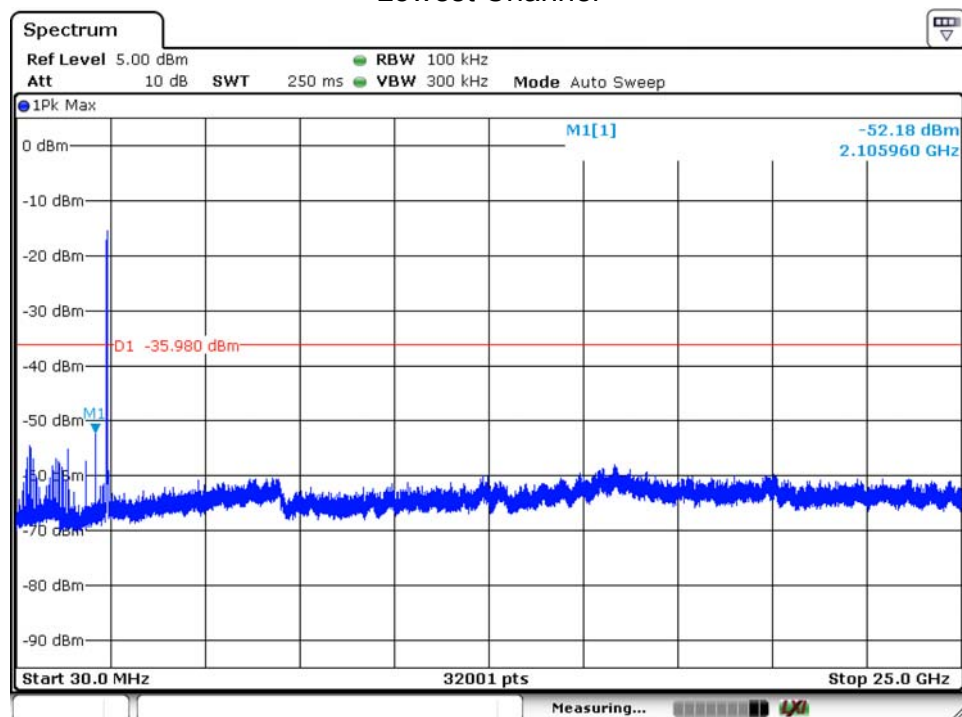


Highest Channel

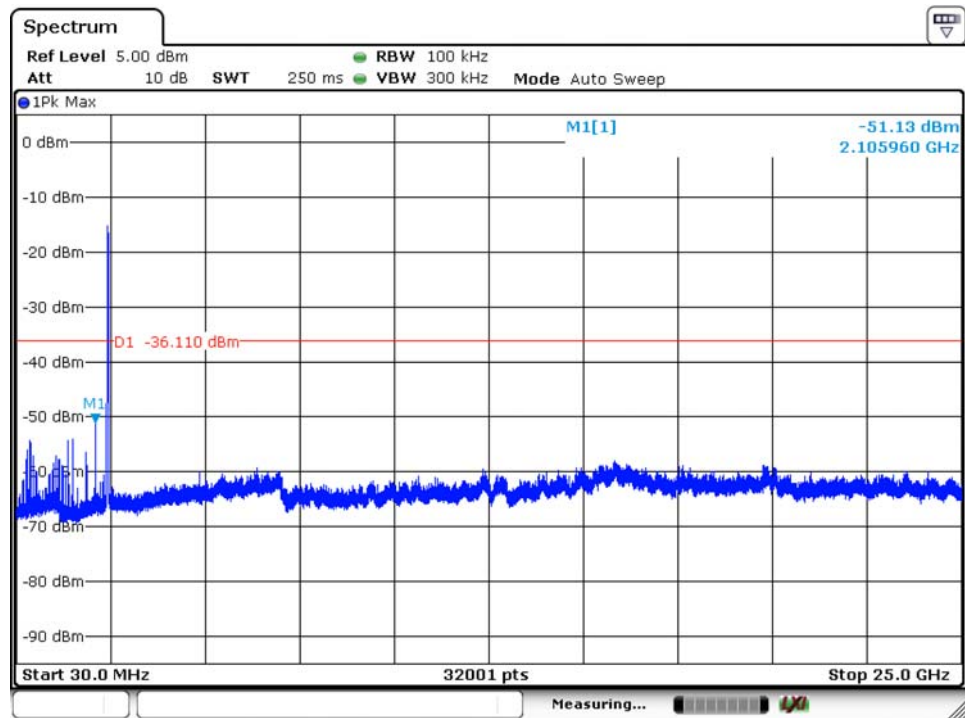
Test Mode: 802.11n(HT40)



Lowest Channel



Middle Channel



Highest Channel

13. Antenna Application

13.1 Antenna Requirement

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 (b), 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.

13.2 Result

The EUT'S antenna is an internal PCB antenna. The antenna's gain is 5.12 dBi and meets the requirement.

APPENDIX I (PHOTOS OF EUT)



