TEST REPORT

Product	:	ESP-12S
Trade mark	:	N/A
Model/Type reference	:	ESP-12S
Serial Number	:	N/A
Report Number	:	EED32K00061601
FCC ID	:	2AHMRESP12S
Date of Issue	:	Apr. 08, 2018
Test Standards	:	47 CFR Part 15 Subpart C
Test result	:	PASS

Prepared for:

Shenzhen Ai-Thinker Technology co., LTD.
6/F, Block C2, Huafeng Industrial Park, Hangcheng Road,
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Prepared by:

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Tested By:	Tom chen (Test Project)	Compiled by:	Kevin lan (Project Engineer)
Reviewed by:	Kevin yang (Reviewer)	Approved by:	Sheek Luo (Lab supervisor)
Date:	Apr. 08, 2018		Check No.:2392184354

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2 Version

Version No.	Date	Description
00	Apr. 08, 2018	Original

3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15 Subpart C Section 15.203/15.247 (c)	ANSI C63.10-2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013	PASS
Conducted Peak Output Power	47 CFR Part 15 Subpart C Section 15.247 (b)(3)	ANSI C63.10-2013/ KDB 558074 D01v04	PASS
6dB Occupied Bandwidth	47 CFR Part 15 Subpart C Section 15.247 (a)(2)	ANSI C63.10-2013/ KDB 558074 D01v04	PASS
Power Spectral Density	47 CFR Part 15 Subpart C Section 15.247 (e)	ANSI C63.10-2013/ KDB 558074 D01v04	PASS
Band-edge for RF Conducted Emissions	47 CFR Part 15 Subpart C Section 15.247(d)	ANSI C63.10-2013/ KDB 558074 D01v04	PASS
RF Conducted Spurious Emissions	47 CFR Part 15 Subpart C Section 15.247(d)	ANSI C63.10-2013/ KDB 558074 D01v04	PASS
Radiated Spurious Emissions	47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2013 KDB 558074 D01v04	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2013 KDB 558074 D01v04	PASS

Remark:
Test according to ANSI C63.4-2014 & ANSI C63.10-2013.
The tested samples and the sample information are provided by the client.

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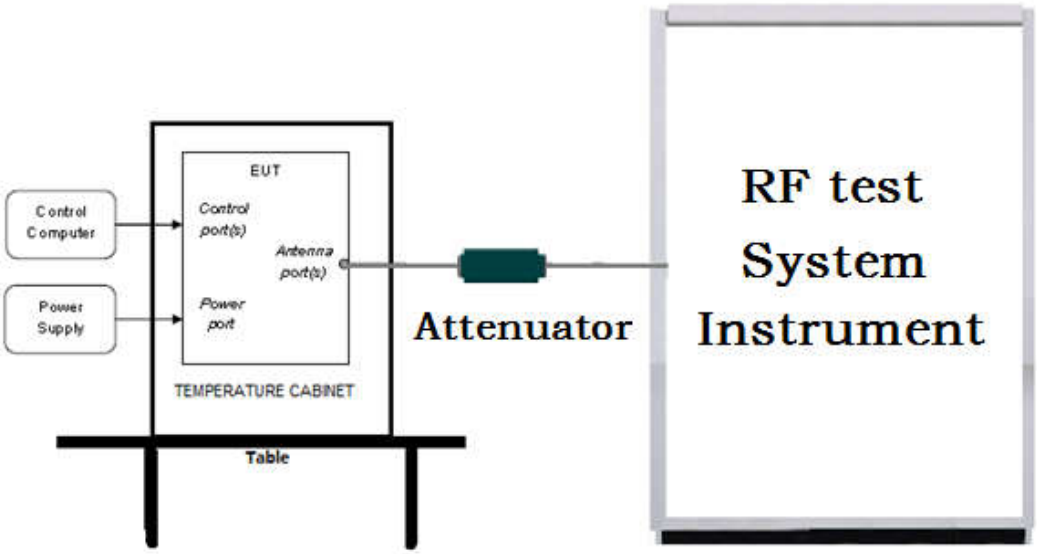
5 Test Requirement

5.1 Test setup

5.1.1 For Conducted test setup



5.1.2 For Radiated Emissions test setup

Radiated Emissions setup:

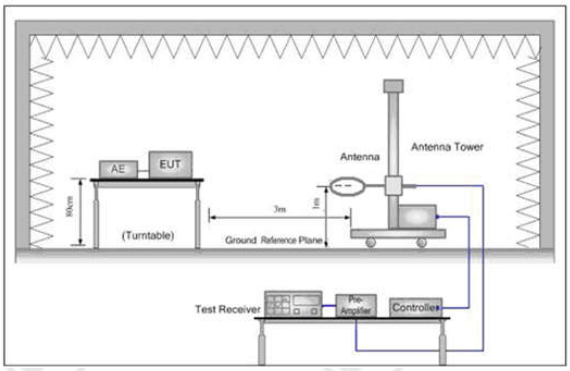


Figure 1. Below 30MHz

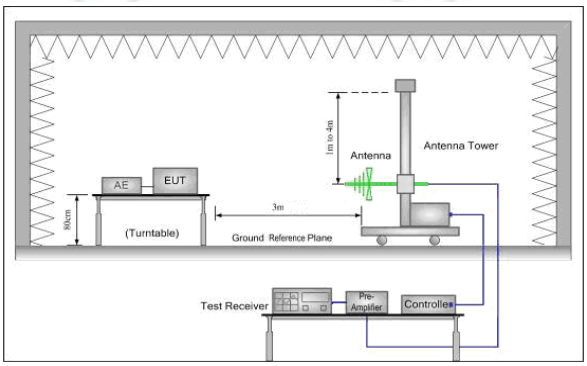


Figure 2. 30MHz to 1GHz

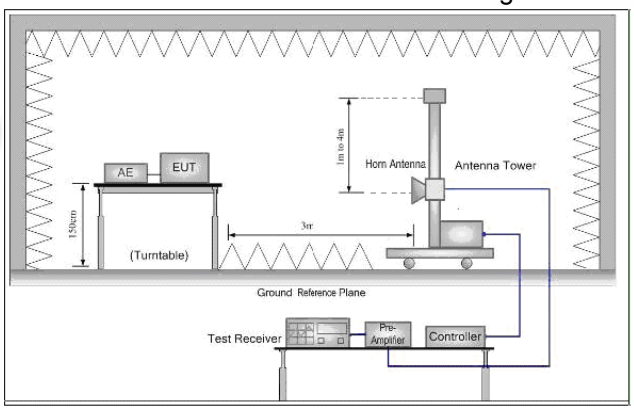
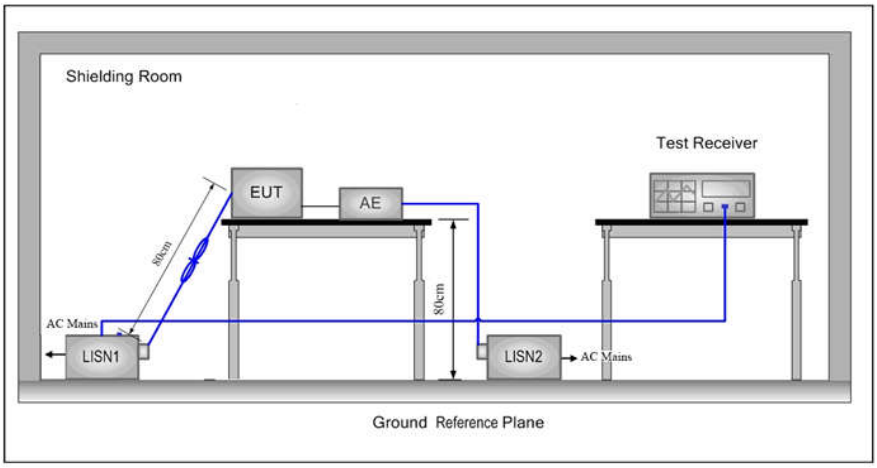


Figure 3. Above 1GHz

5.1.3 For Conducted Emissions test setup

Conducted Emissions setup



5.2 Test Environment

Operating Environment:	
Temperature:	26.6 °C
Humidity:	42 % RH
Atmospheric Pressure:	1010mbar

5.3 Test Condition

Test channel:

Test Mode	Tx/Rx	RF Channel		
		Low(L)	Middle(M)	High(H)
802.11b/g/n(HT20)	2412MHz ~2462 MHz	Channel 1	Channel 6	Channel11
		2412MHz	2437MHz	2462MHz
Transmitting mode:	Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.			

Test mode:

Pre-scan under all rate at lowest channel 1

Mode	**802.11b**			
Data Rate	**1Mbps**	**2Mbps**	**5.5Mbps**	**11Mbps**
Power(dBm)	13.35	13.56	13.87	14.06

Mode	**802.11g**							
Data Rate	**6Mbps**	**9Mbps**	**12Mbps**	**18Mbps**	**24Mbps**	**36Mbps**	**48Mbps**	**54Mbps**
Power(dBm)	13.63	13.25	13.01	12.98	12.84	12.77	12.85	12.54

Mode	**802.11n (HT20)**							
Data Rate	**6.5Mbps**	**13Mbps**	**19.5Mbps**	**26Mbps**	**39Mbps**	**52Mbps**	**58.5Mbps**	**65Mbps**
Power(dBm)	13.70	13.52	13.21	13.34	13.45	12.95	13.21	12.98

Through Pre-scan, 11Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20).

6 General Information

6.1 Client Information

Applicant:	Shenzhen Ai-Thinker Technology co., LTD.
Address of Applicant:	6/F, Block C2, Huafeng Industrial Park, Hangcheng Road, Baoan district, Shenzhen, China
Manufacturer:	Shenzhen Ai-Thinker Technology co., LTD.
Address of Manufacturer:	6/F, Block C2, Huafeng Industrial Park, Hangcheng Road, Baoan district, Shenzhen, China
Factory:	Shenzhen Ai-Thinker Technology co., LTD.
Address of Factory:	6/F, Block C2, Huafeng Industrial Park, Hangcheng Road, Baoan district, Shenzhen, China

6.2 General Description of EUT

Product Name:	ESP-12S
Model No.(EUT):	ESP-12S
Trade Mark:	N/A
EUT Supports Radios application:	Wi-Fi: 802.11 b/g/n(20M) , 2412MHz-2462MHz
Power Supply:	DC 3.3V
Sample Received Date:	Mar. 22, 2018
Sample tested Date:	Mar. 22, 2018 to Apr. 02, 2018

6.3 Product Specification subjective to this standard

Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels
Channel Separation:	5MHz
Type of Modulation:	IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE for 802.11g :OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n(HT20) : OFDM (64QAM, 16QAM, QPSK,BPSK)
Test Power Grade:	N/A
Test Software of EUT:	ESP Series Modules FCC & CE Test Tool V2.2.3.exe (manufacturer declare)
Antenna Type and Gain:	Type: PCB Antenna; Gain: 3dBi
Test Voltage:	DC 3.3V and AC 120V/60Hz

Operation Frequency each of channel(802.11b/g/n HT20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

6.4 Description of Support Units

The EUT has been tested independently

6.5 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd.

Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China518101

Telephone: +86 (0) 755 3368 3668 Fax:+86 (0) 755 3368 3385

No tests were sub-contracted.

FCC Designation No.: CN1164

FCC-Registration No.: 886427

Centre Testing International Group 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 886427.

6.6 Deviation from Standards

None.

6.7 Abnormalities from Standard Conditions

None.

6.8 Other Information Requested by the Customer

None.

6.9 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9×10^{-8}
2	RF power, conducted	0.31dB (30MHz-1GHz)
		0.57dB (1GHz-18GHz)
3	Radiated Spurious emission test	4.5dB (30MHz-1GHz)
		4.8dB (1GHz-12.75GHz)
4	Conduction emission	3.6dB (9kHz to 150kHz)
		3.2dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	2.8%
7	DC power voltages	0.025%

7 Equipment List

RF test system					
Equipment	**Manufacturer**	**Mode No.**	**Serial Number**	**Cal. Date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
Signal Generator	Keysight	E8257D	MY53401106	03-13-2018	03-12-2019
Spectrum Analyzer	Keysight	N9010A	MY54510339	03-13-2018	03-12-2019
Signal Generator	Keysight	N5182B	MY53051549	03-13-2018	03-12-2019
High-pass filter	Sinoscite	FL3CX03WG18NM12-0398-002	---	01-10-2018	01-09-2019
High-pass filter	MICRO-TRONICS	SPA-F-63029-4	---	01-10-2018	01-09-2019
DC Power	Keysight	E3642A	MY54436035	03-13-2018	03-12-2019
power meter & power sensor	R&S	OSP120	101374	03-13-2018	03-12-2019
RF control unit	JS Tonscend	JS0806-2	2015860006	03-13-2018	03-12-2019
BT&WI-FI Automatic test software	JS Tonscend	JSTS1120-2	---	03-13-2018	03-12-2019

3M Full-anechoic Chamber - Radio-frequency electromagnetic field Immunity Test					
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Cal. date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
3M Chamber & Accessory Equipment	TDK	SAC-3	---	06-04-2016	06-03-2019
TRILOG Broadband Antenna	SCHWARZBECK	VULB9163	9163-617	03-29-2018	03-28-2019
Preamplifier	JS Tonscend	EMC051845 SE	980380	01-19-2018	01-18-2019
Horn Antenna	ETS-LINDGREN	3117	00057410	06-30-2015	06-28-2018
Loop Antenna	ETS	6502	00071730	06-22-2017	06-21-2019
Spectrum Analyzer	R&S	FSP40	100416	06-13-2017	06-12-2018
Receiver	R&S	ESCI	100435	06-14-2017	06-13-2018
Multi device Controller	maturo	NCD/070/107 11112	---	01-10-2018	01-09-2019
Signal Generator	Keysight	E8257D	MY53401106	03-13-2018	03-12-2019
Temperature/ Humidity Indicator	TAYLOR	1451	1905	05-08-2017	05-07-2018
Cable line	Fulai(7M)	SF106	5219/6A	01-10-2018	01-09-2019
Cable line	Fulai(6M)	SF106	5220/6A	01-10-2018	01-09-2019
Cable line	Fulai(3M)	SF106	5216/6A	01-10-2018	01-09-2019
Cable line	Fulai(3M)	SF106	5217/6A	01-10-2018	01-09-2019
High-pass filter	Sinoscite	FL3CX03WG 18NM12-0398-002	---	01-10-2018	01-09-2019

Conducted disturbance Test					
Equipment	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
Receiver	R&S	ESCI	100009	06-14-2017	06-13-2018
Temperature/ Humidity Indicator	TAYLOR	1451	1905	05-08-2017	05-07-2018
LISN	schwarzbeck	NNLK8121	8121-529	06-13-2017	06-12-2018

8 Radio Technical Requirements Specification

Reference documents for testing:

No.	Identity	Document Title
1	FCC Part15C	Subpart C-Intentional Radiators
2	ANSI C63.10-2013	American National Standard for Testing Unlicesed Wireless Devices

Test Results List:

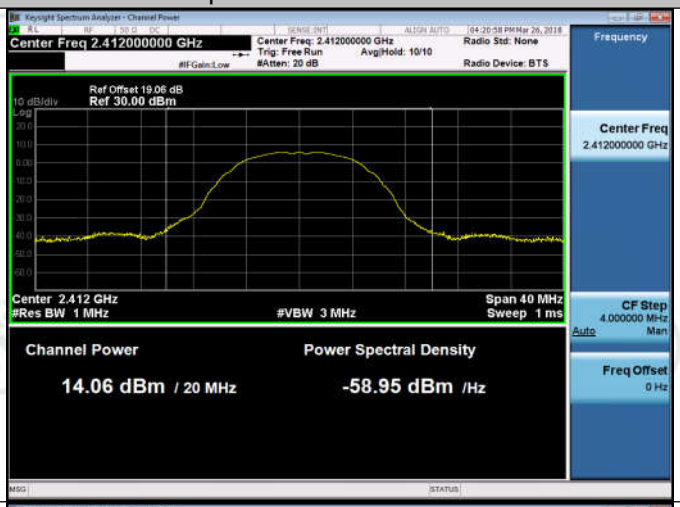
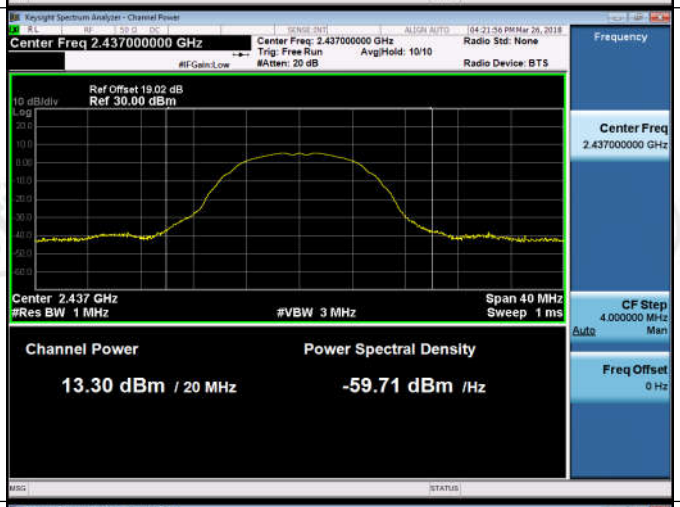
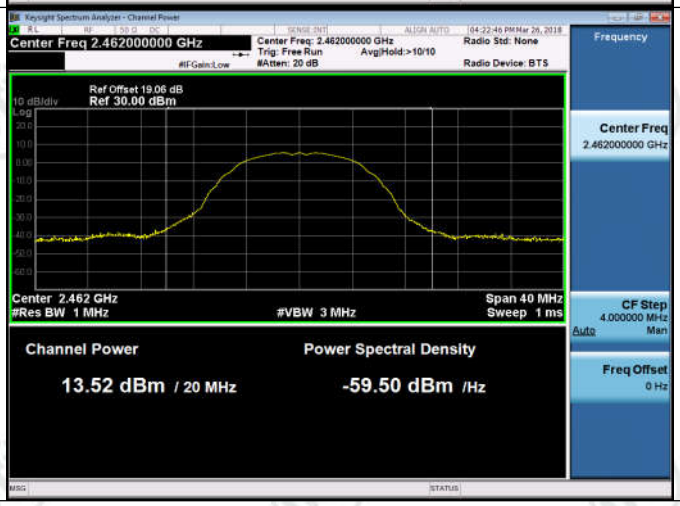
Test Requirement	Test method	Test item	Verdict	Note
Part15C Section 15.247 (b)(3)	ANSI C63.10/ KDB 558074	Conducted Peak Output Power	PASS	Appendix A)
Part15C Section 15.247 (a)(2)	ANSI C63.10/ KDB 558074	6dB Occupied Bandwidth	PASS	Appendix B)
Part15C Section 15.247(d)	ANSI C63.10/ KDB 558074	Band-edge for RF Conducted Emissions	PASS	Appendix C)
Part15C Section 15.247(d)	ANSI C63.10/ KDB 558074	RF Conducted Spurious Emissions	PASS	Appendix D)
Part15C Section 15.247 (e)	ANSI C63.10/ KDB 558074	Power Spectral Density	PASS	Appendix E)
Part15C Section 15.203/15.247 (c)	ANSI C63.10	Antenna Requirement	PASS	Appendix F)
Part15C Section 15.207	ANSI C63.10	AC Power Line Conducted Emission	PASS	Appendix G)
Part15C Section 15.205/15.209	ANSI C63.10	Restricted bands around fundamental frequency (Radiated Emission)	PASS	Appendix H)
Part15C Section 15.205/15.209	ANSI C63.10	Radiated Spurious Emissions	PASS	Appendix I)

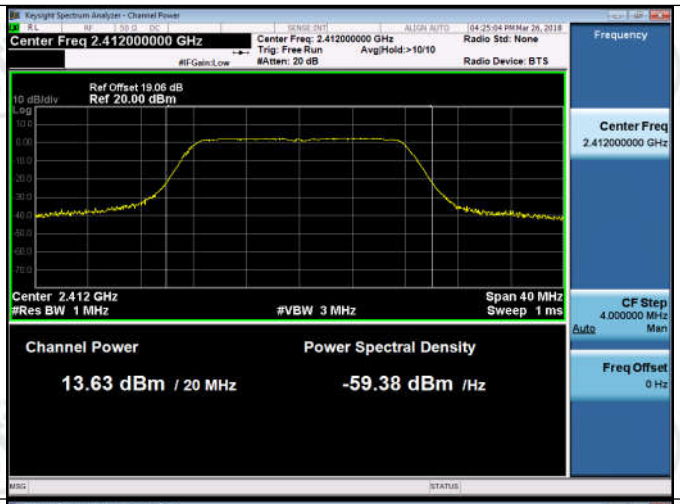
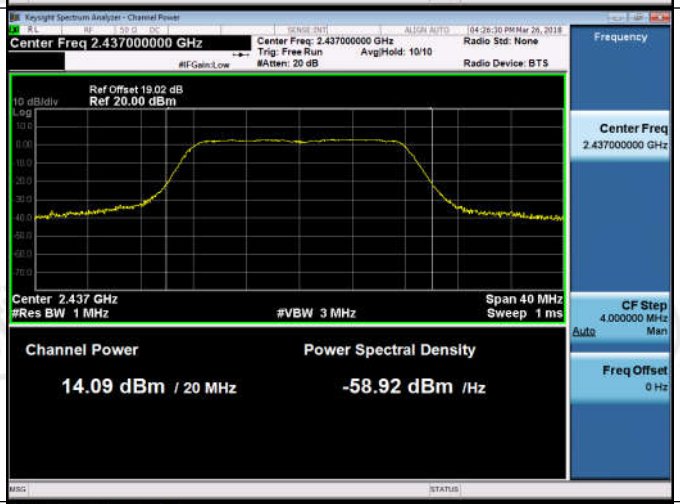
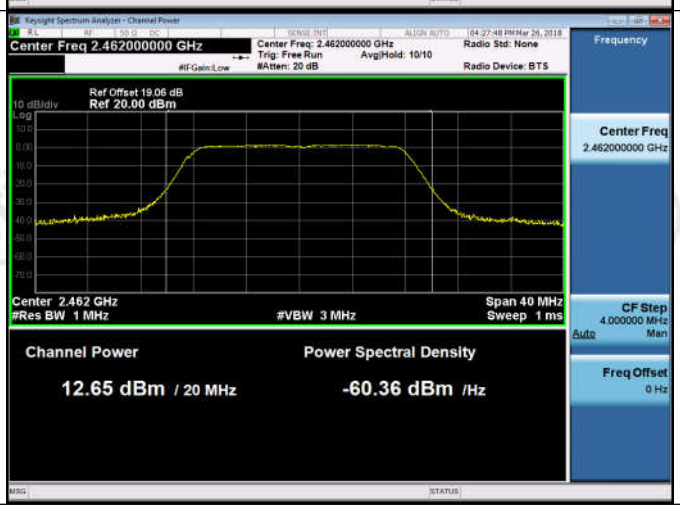
Appendix A): Conducted Peak Output Power

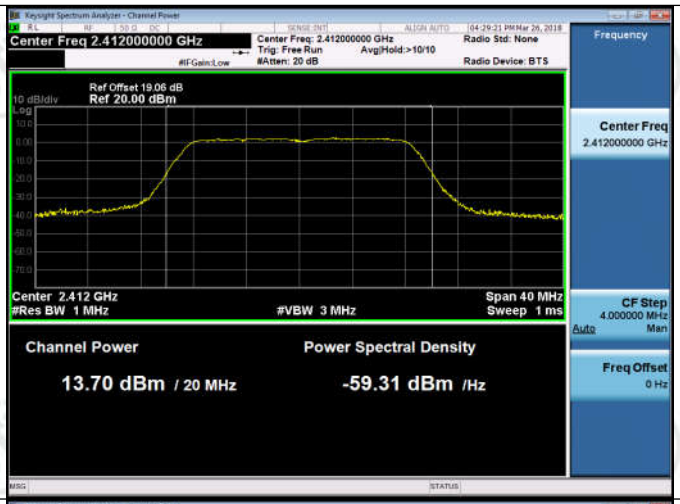
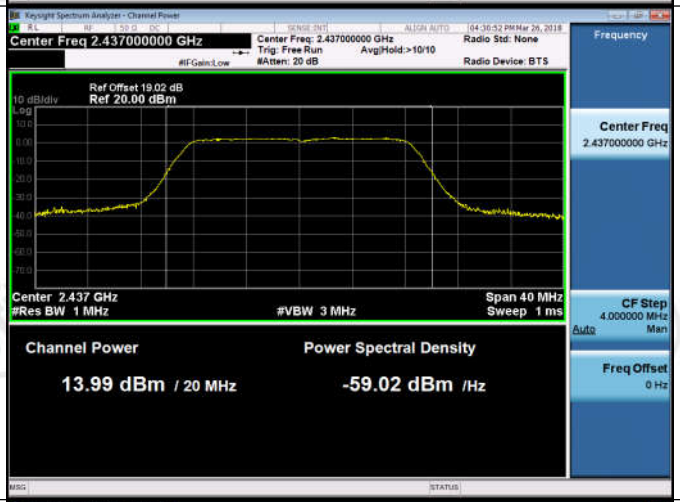
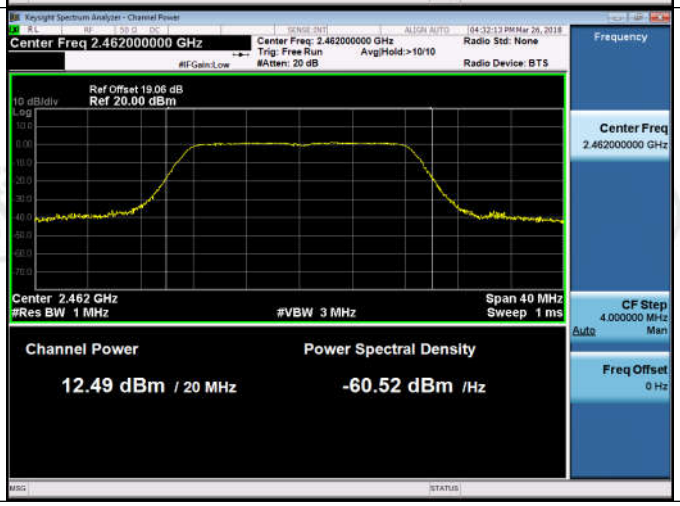
Result Table

Mode	Channel	Conducted Peak Output Power [dBm]	Verdict
11B	LCH	14.06	PASS
11B	MCH	13.3	PASS
11B	HCH	13.52	PASS
11G	LCH	13.63	PASS
11G	MCH	14.09	PASS
11G	HCH	12.65	PASS
11N20SISO	LCH	13.7	PASS
11N20SISO	MCH	13.99	PASS
11N20SISO	HCH	12.49	PASS

Test Graph

Graphs			
11B/LCH			
11B/MCH			
11B/HCH			

11G/LCH			
11G/MCH			
11G/HCH			

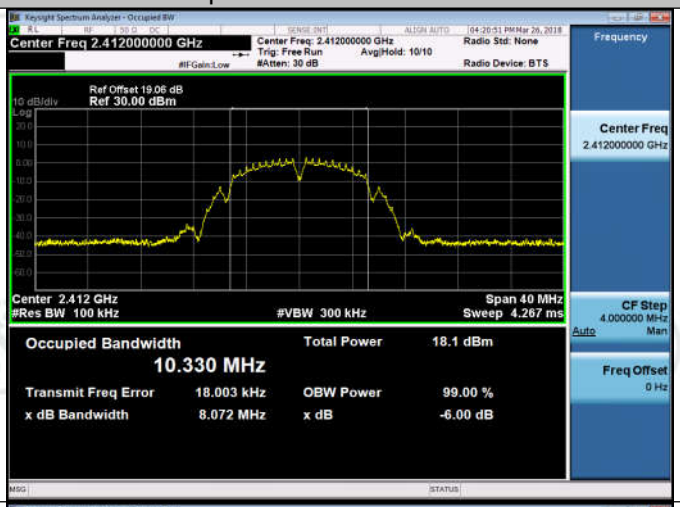
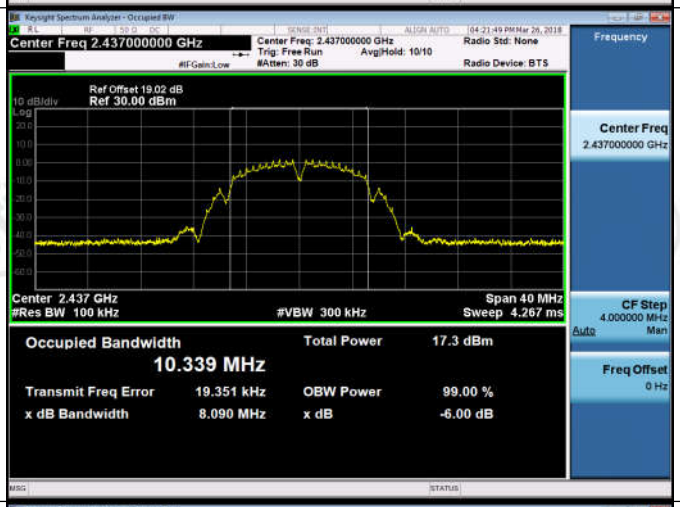
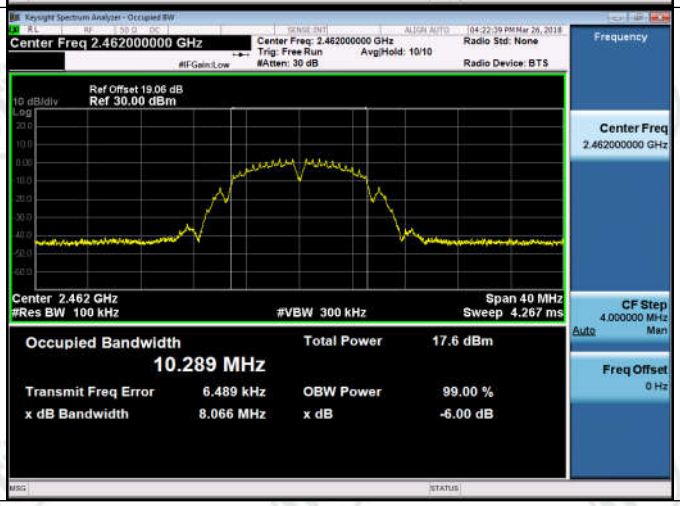
11N20SISO/LCH			
11N20SISO/MCH			
11N20SISO/HCH			

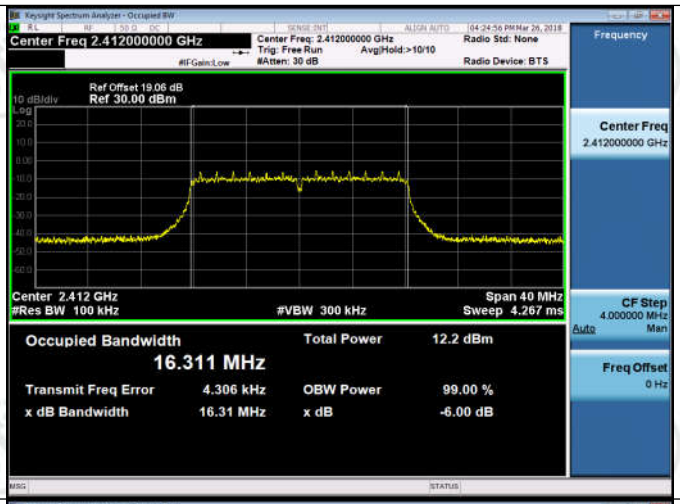
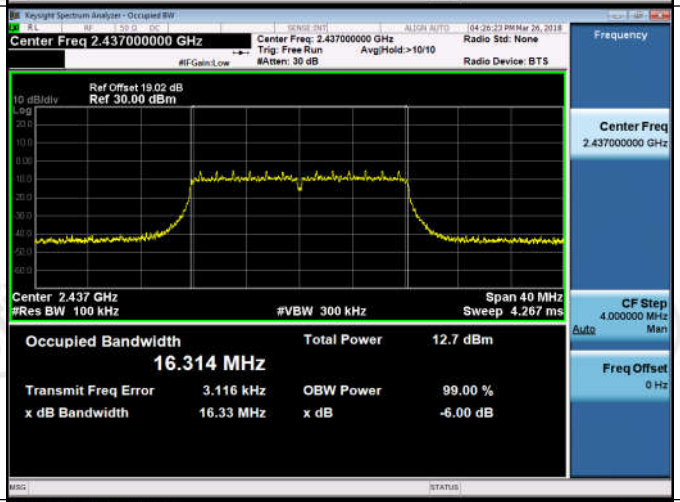
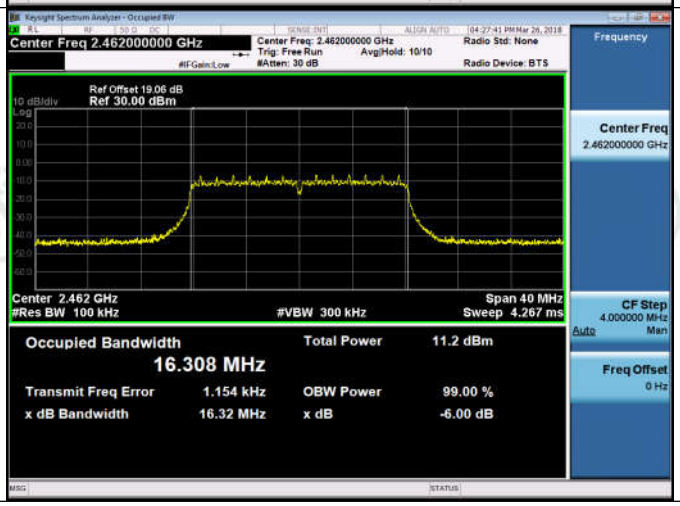
Appendix B): 6dB Occupied Bandwidth

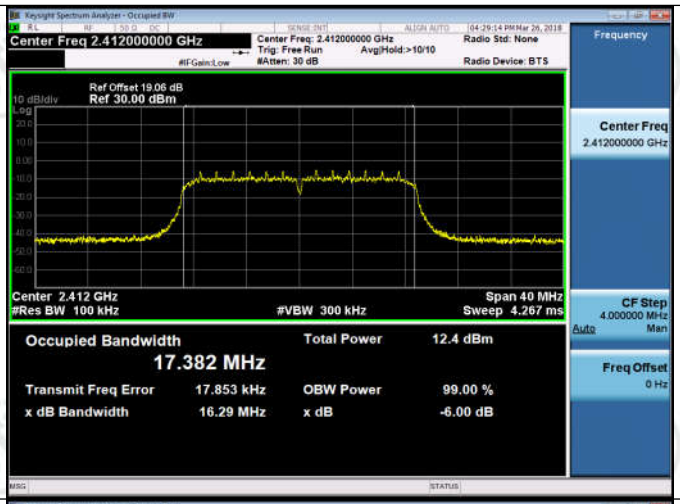
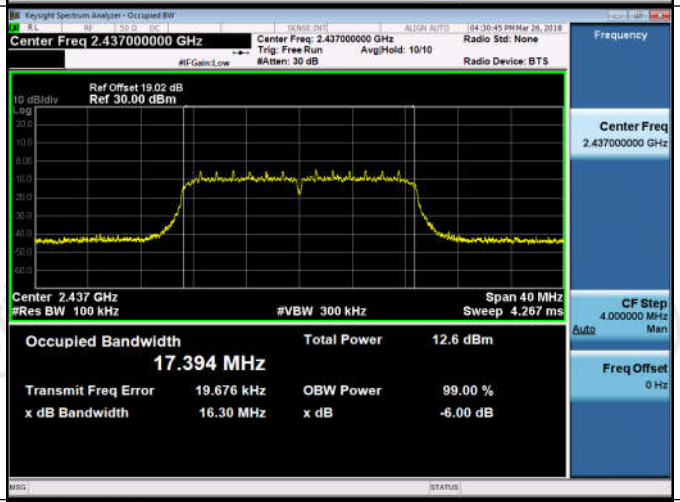
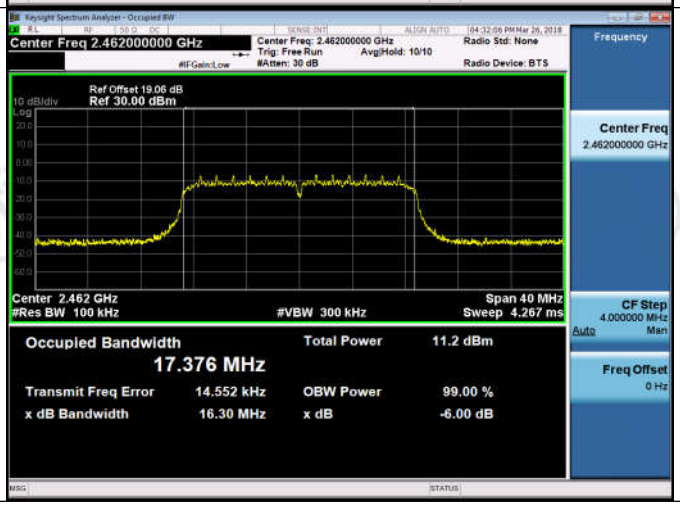
Result Table

Mode	Channel	6dB Bandwidth [MHz]	99% OBW [MHz]	Verdict	Remark
11B	LCH	8.072	10.330	PASS	Peak detector
11B	MCH	8.090	10.339	PASS	
11B	HCH	8.066	10.289	PASS	
11G	LCH	16.31	16.311	PASS	
11G	MCH	16.33	16.314	PASS	
11G	HCH	16.32	16.308	PASS	
11N20SISO	LCH	16.29	17.382	PASS	
11N20SISO	MCH	16.30	17.394	PASS	
11N20SISO	HCH	16.30	17.376	PASS	

Test Graph

Graphs			
11B/LCH			
11B/MCH			
11B/HCH			

11G/LCH			
11G/MCH			
11G/HCH			

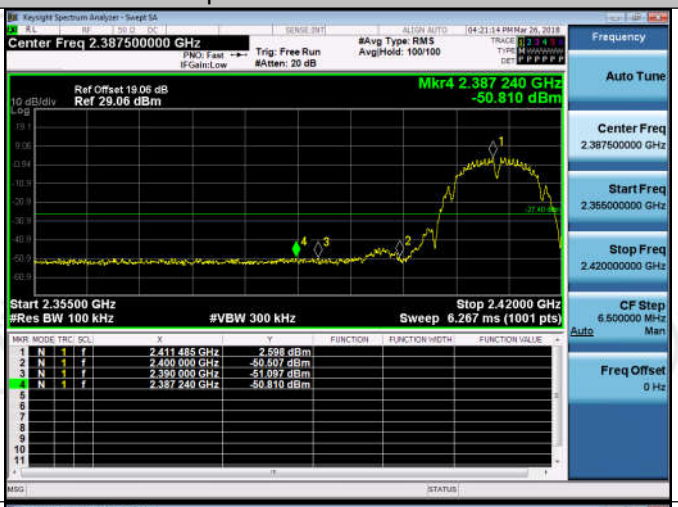
11N20SISO/LCH			
11N20SISO/MCH			
11N20SISO/HCH			

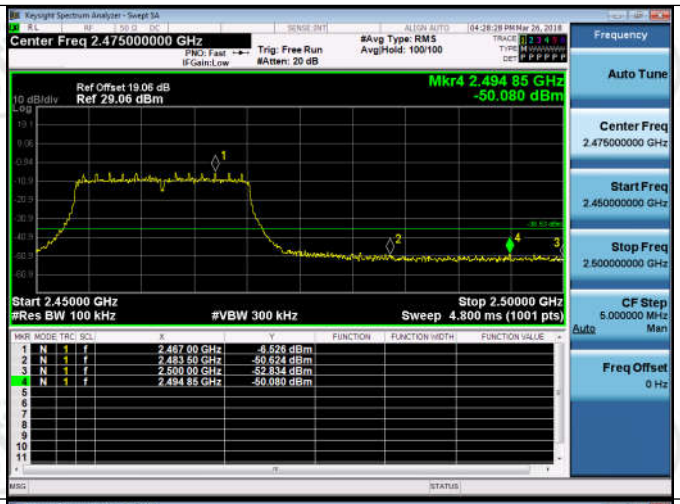
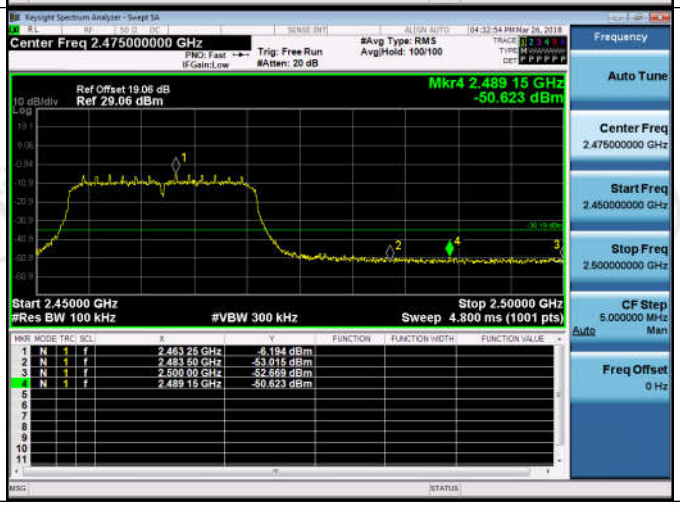
Appendix C): Band-edge for RF Conducted Emissions

Result Table

Mode	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
11B	LCH	2.598	-50.810	-27.4	PASS
11B	HCH	2.472	-50.504	-27.53	PASS
11G	LCH	-5.214	-49.601	-35.21	PASS
11G	HCH	-6.526	-50.080	-36.53	PASS
11N20SISO	LCH	-5.108	-50.828	-35.11	PASS
11N20SISO	HCH	-6.194	-50.623	-36.19	PASS

Test Graph

Graphs			
11B/LCH			
11B/HCH			
11G/LCH			

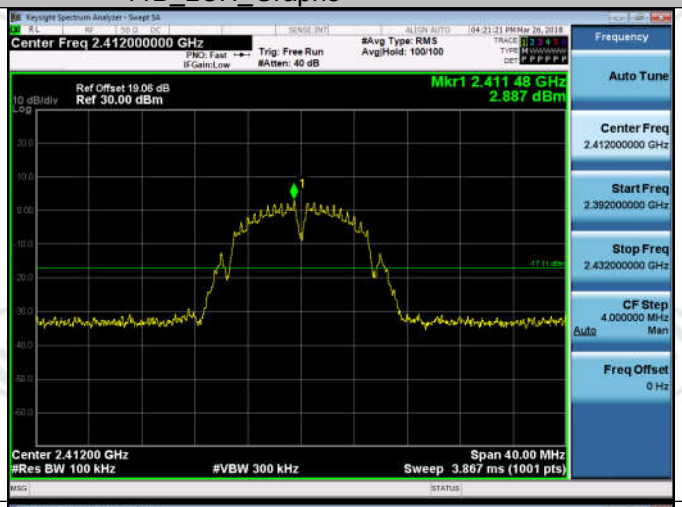
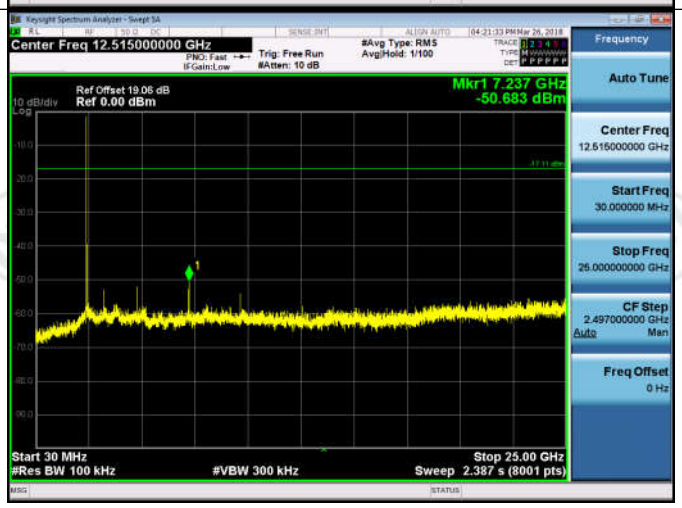
11G/HCH			
11N20SISO/LCH			
11N20SISO/HCH			

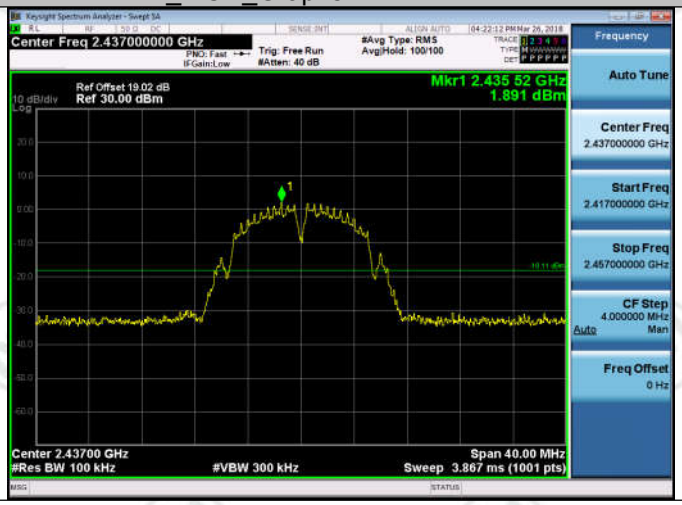
Appendix D): RF Conducted Spurious Emissions

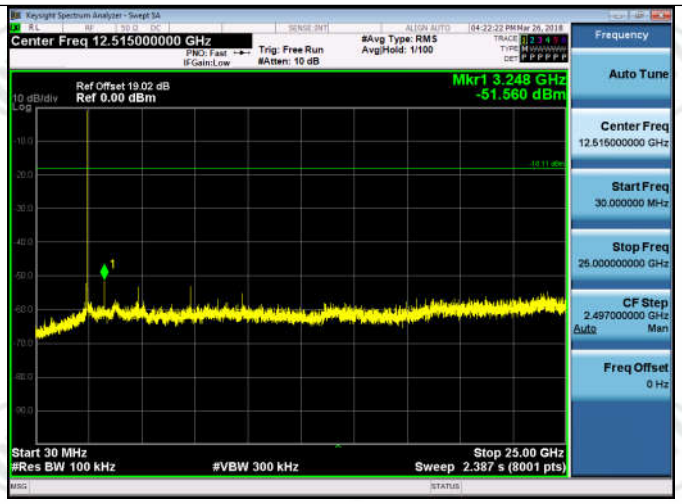
Result Table

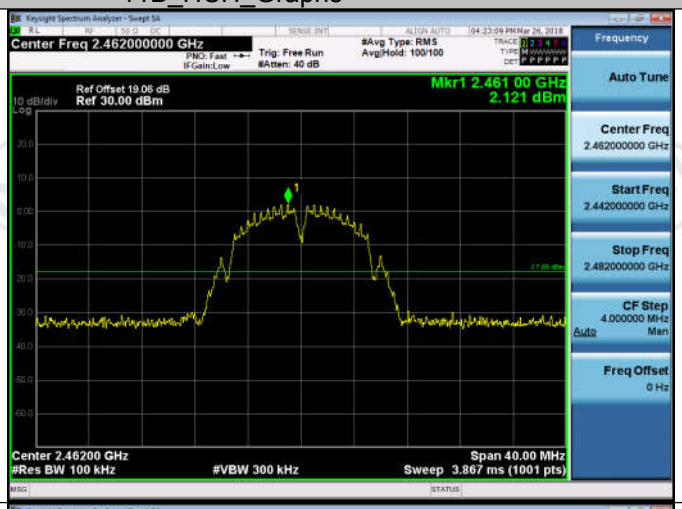
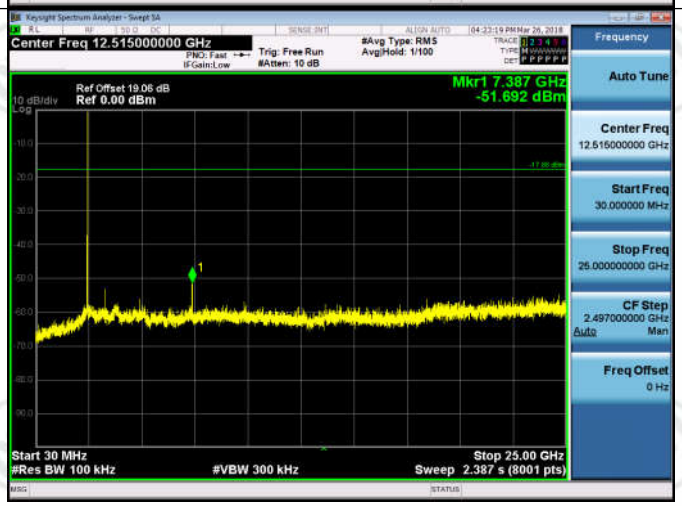
Mode	Channel	Pref [dBm]	Puw[dBm]	Verdict
11B	LCH	2.887	<Limit	PASS
11B	MCH	1.891	<Limit	PASS
11B	HCH	2.121	<Limit	PASS
11G	LCH	-5.144	<Limit	PASS
11G	MCH	-5.021	<Limit	PASS
11G	HCH	-6.178	<Limit	PASS
11N20SISO	LCH	-5.315	<Limit	PASS
11N20SISO	MCH	-4.867	<Limit	PASS
11N20SISO	HCH	-6.335	<Limit	PASS

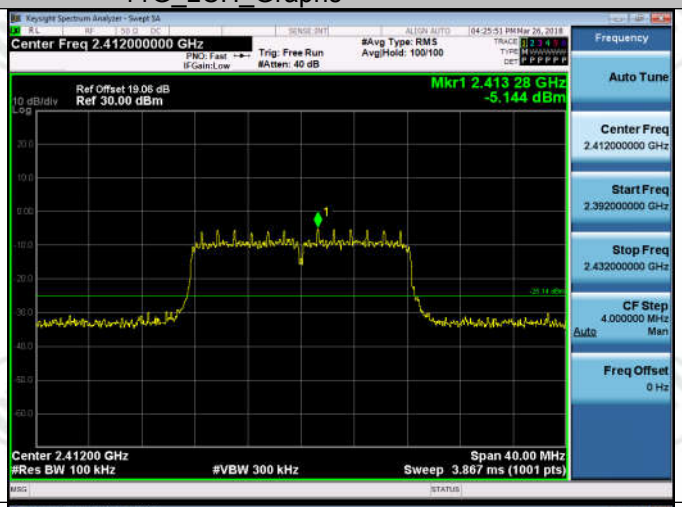
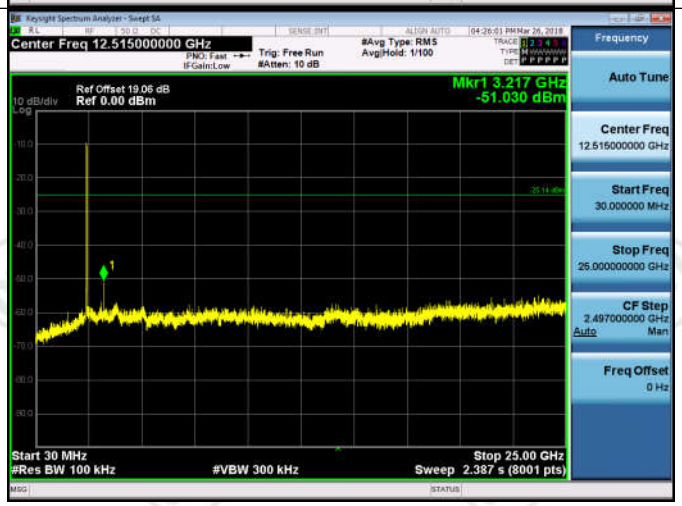
Test Graph

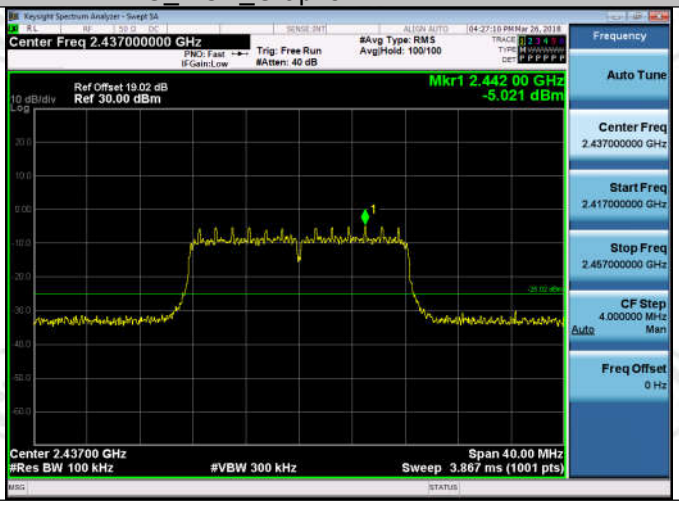
11B_LCH_Graphs	
Pref/11B/LCH	
Puw/11B/LCH	

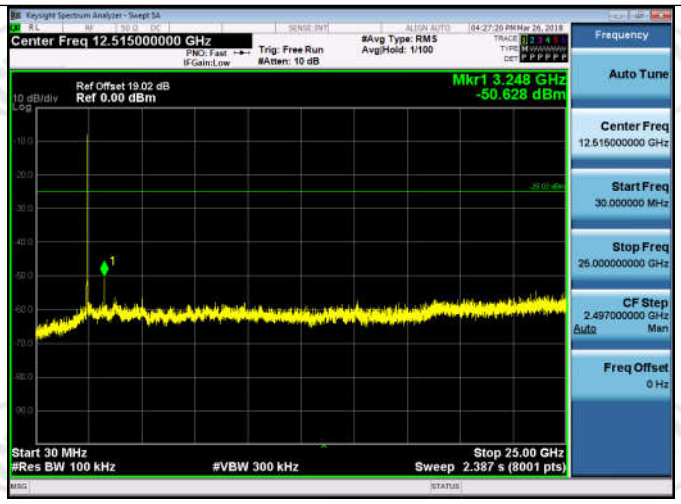
11B_MCH_Graphs	
Pref/11B/MCH	

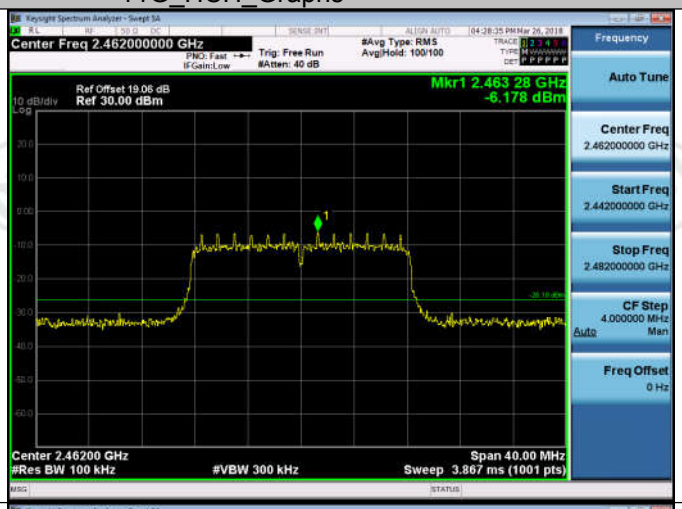
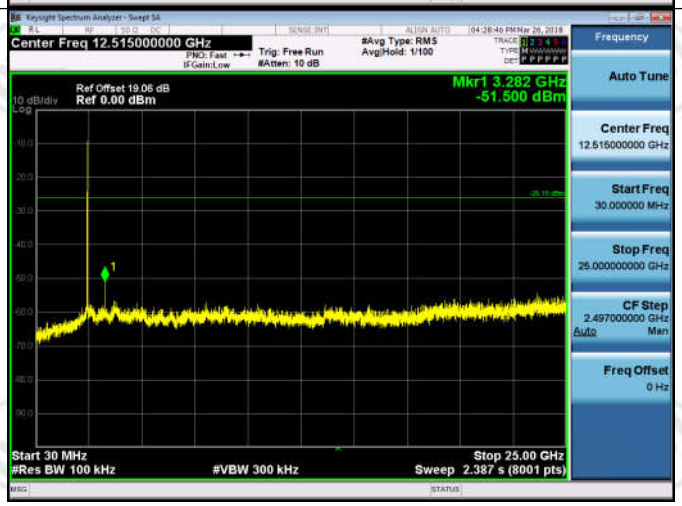
Puw/11B/MCH	

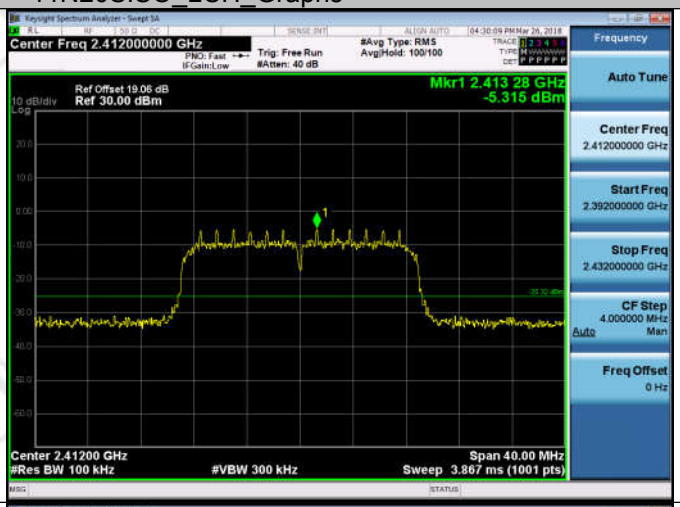
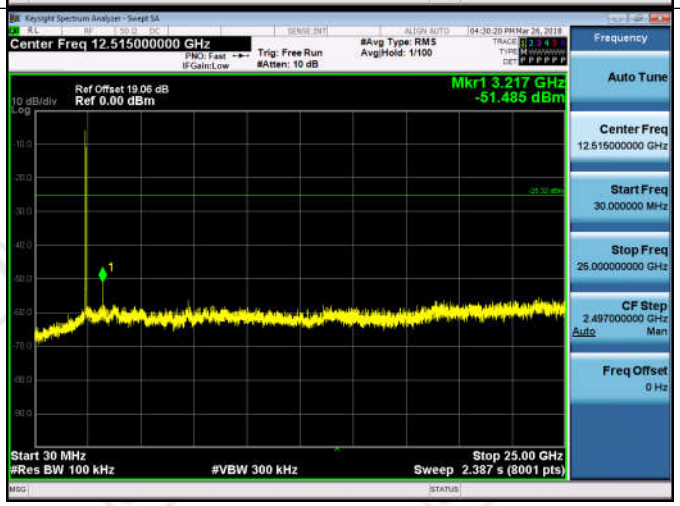
11B_HCH_Graphs	
Pref/11B/HCH	
Puw/11B/HCH	

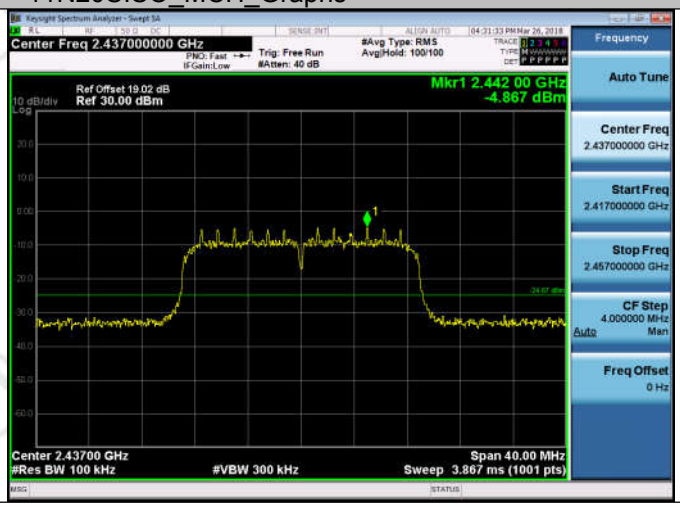
11G_LCH_Graphs	
Pref/11G/LCH	
Puw/11G/LCH	

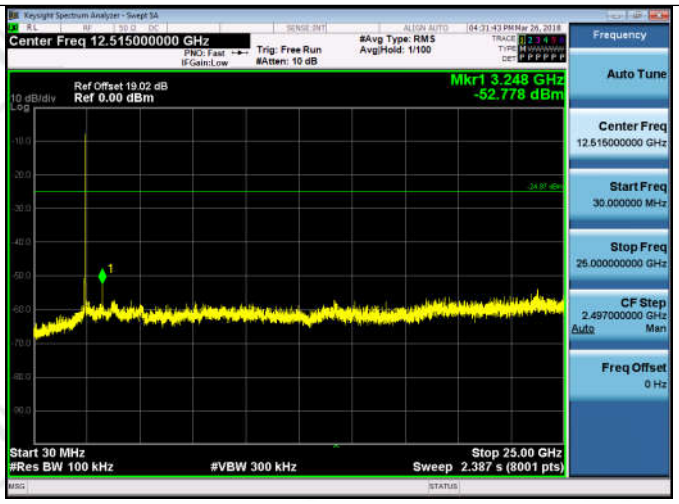
11G_MCH_Graphs	
Pref/11G/MCH	

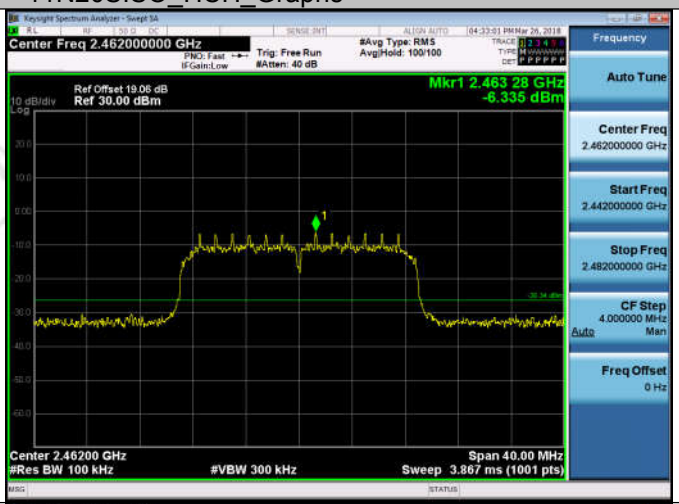
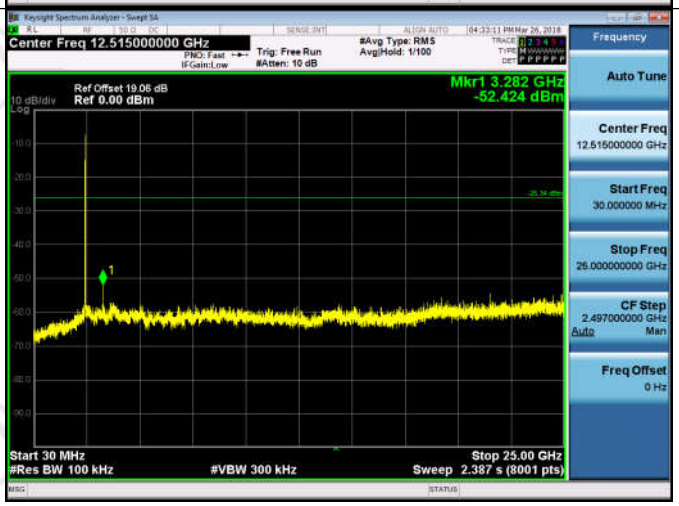
Puw/11G/MCH	

11G_HCH_Graphs	
Pref/11G/HCH	
Puw/11G/HCH	

11N20SISO_LCH_Graphs		
Pref/11N20SISO/LCH		
/11N20SISO/LCH		

11N20SISO_MCH_Graphs		
Pref/11N20SISO/MCH		

Puw/11N20SISO/MCH	

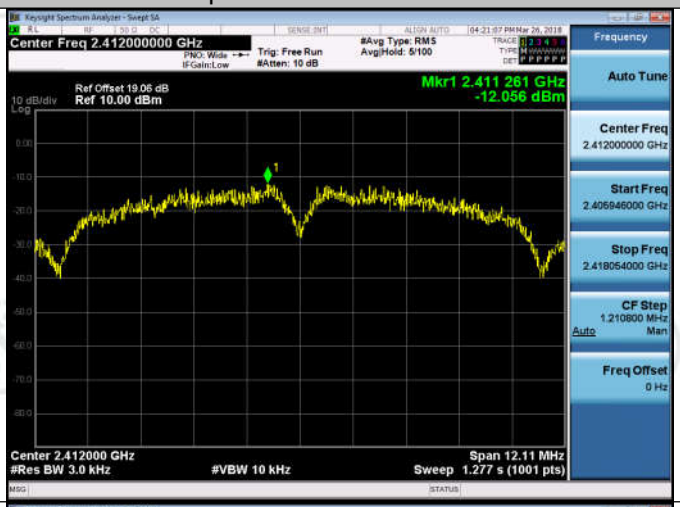
11N20SISO_HCH_Graphs	
Pref/11N20SISO/HCH	
Puw/11N20SISO/HCH	

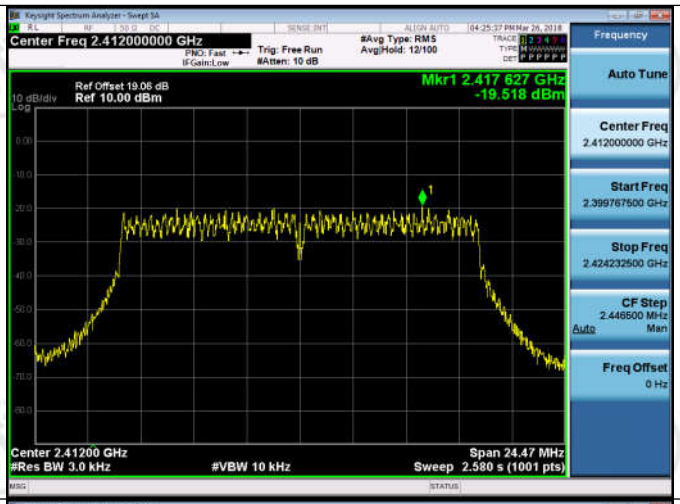
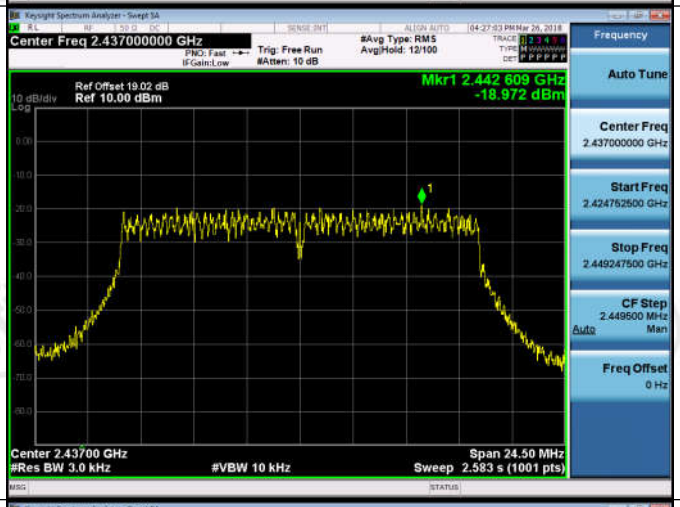
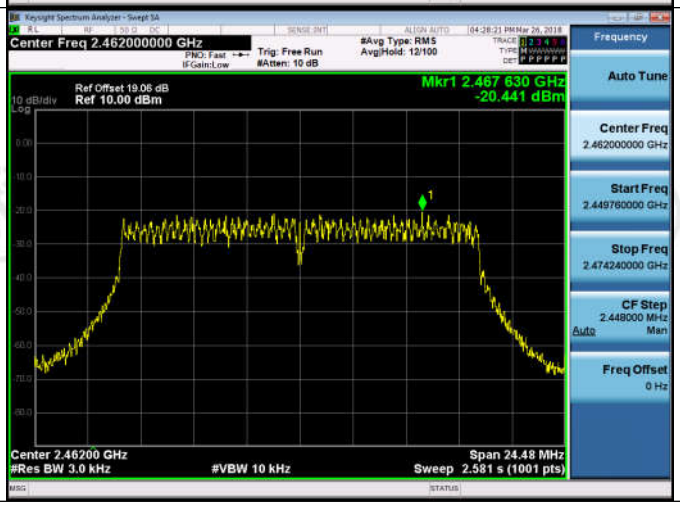
Appendix E): Power Spectral Density

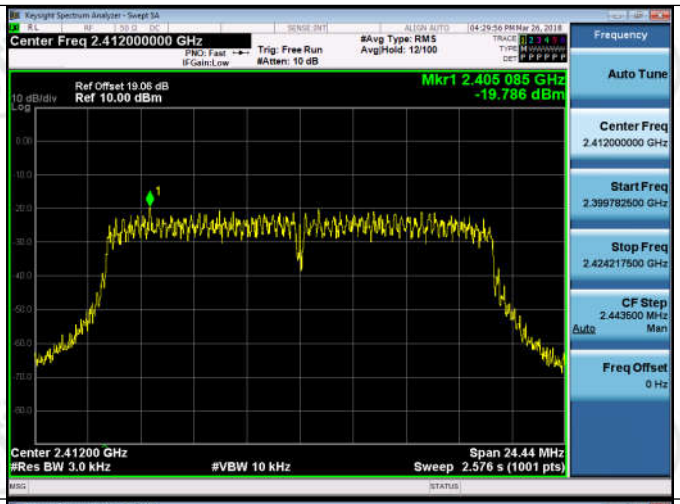
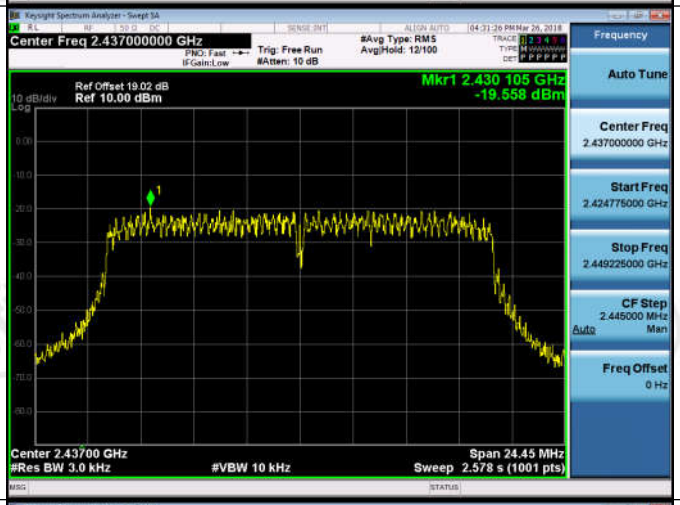
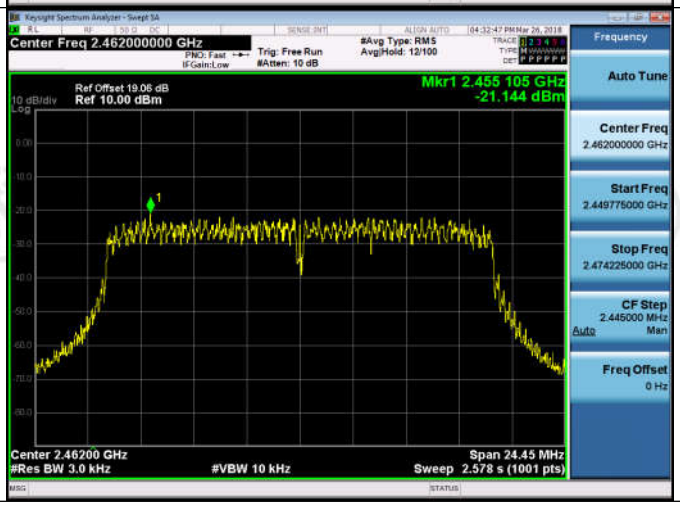
Result Table

Mode	Channel	Power Spectral Density [[dBm/3kHz]	Limit [dBm/3kHz]	Verdict
11B	LCH	-12.056	8	PASS
11B	MCH	-12.243	8	PASS
11B	HCH	-13.158	8	PASS
11G	LCH	-19.518	8	PASS
11G	MCH	-18.972	8	PASS
11G	HCH	-20.441	8	PASS
11N20SISO	LCH	-19.786	8	PASS
11N20SISO	MCH	-19.558	8	PASS
11N20SISO	HCH	-21.144	8	PASS

Test Graph

Graphs			
11B/LCH			
11B/MCH			
11B/HCH			

11G/LCH			
11G/MCH			
11G/HCH			

11N20SISO/LCH			
11N20SISO/MCH			
11N20SISO/HCH			

Appendix F): Antenna Requirement

15.203 requirement:

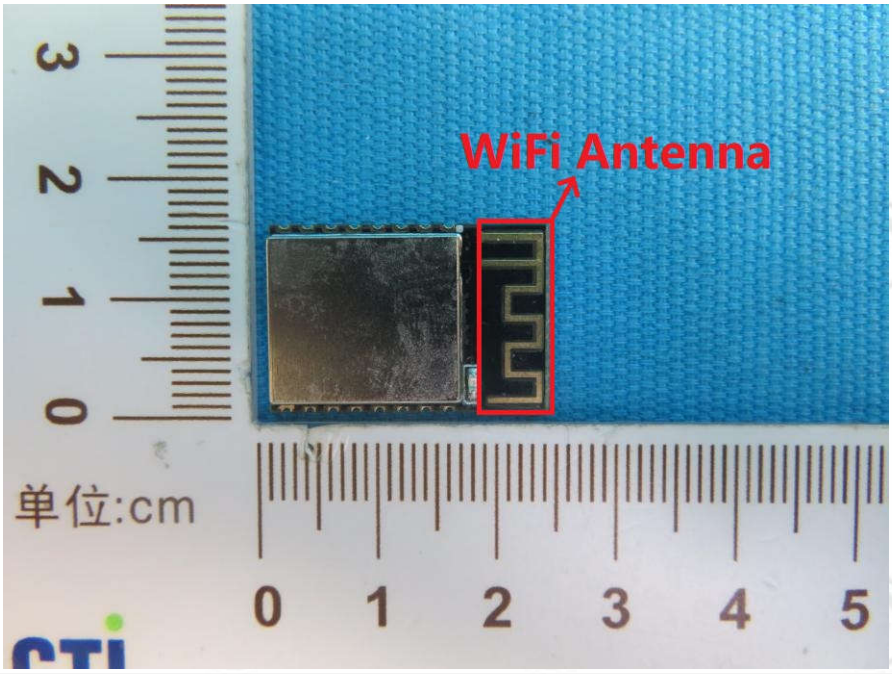
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:	

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 3dBi.



Appendix G): AC Power Line Conducted Emission

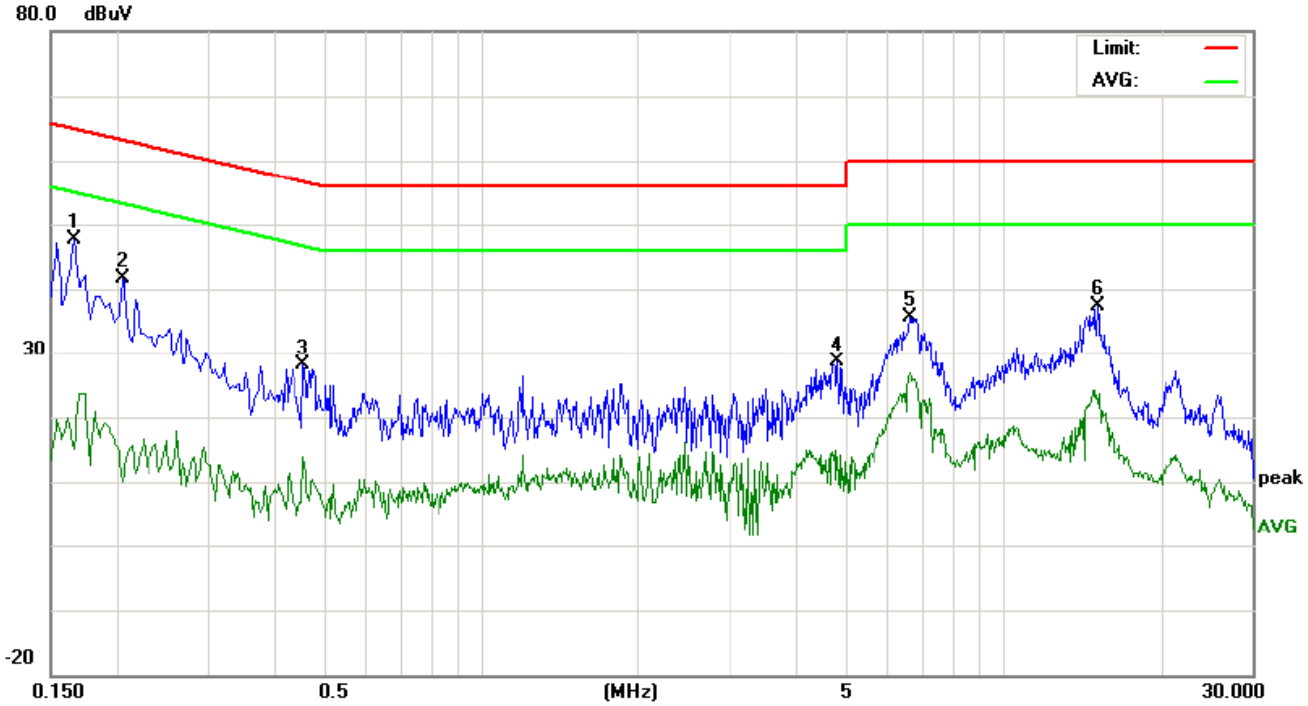
<table>
<tr><td>Test Procedure:</td><td>Test frequency range :150KHz-30MHz
1)The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3)The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBμV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
</table>
* The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.
NOTE : The lower limit is applicable at the transition frequency</td></tr>
</table>

Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

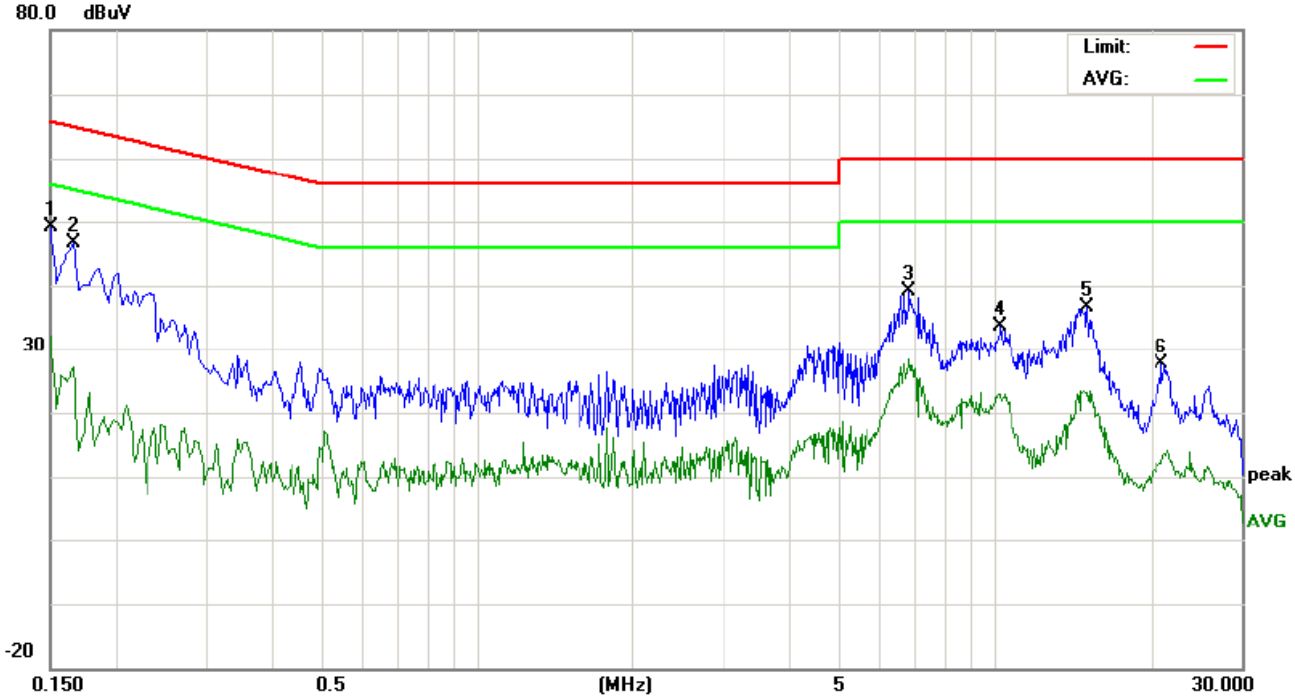
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Live line:



No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)			
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F	Comment
1	0.1660	37.98	31.99	11.81	9.75	47.73	41.74	21.56	65.15	55.15	-23.41	-33.59	P	
2	0.2060	31.95	26.97	8.20	9.71	41.66	36.68	17.91	63.36	53.36	-26.68	-35.45	P	
3	0.4580	18.29	11.27	-0.54	9.73	28.02	21.00	9.19	56.73	46.73	-35.73	-37.54	P	
4	4.8020	18.92	10.41	0.21	9.63	28.55	20.04	9.84	56.00	46.00	-35.96	-36.16	P	
5	6.6300	25.92	21.02	13.75	9.62	35.54	30.64	23.37	60.00	50.00	-29.36	-26.63	P	
6	15.1660	27.34	16.86	6.47	10.01	37.35	26.87	16.48	60.00	50.00	-33.13	-33.52	P	

Neutral line:



No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)			
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F	Comment
1	0.1501	39.39	34.62	13.67	9.76	49.15	44.38	23.43	65.99	55.99	-21.61	-32.56	P	
2	0.1660	36.83	31.73	11.79	9.75	46.58	41.48	21.54	65.15	55.15	-23.67	-33.61	P	
3	6.8619	29.50	21.98	14.14	9.62	39.12	31.60	23.76	60.00	50.00	-28.40	-26.24	P	
4	10.2379	23.91	17.48	11.13	9.80	33.71	27.28	20.93	60.00	50.00	-32.72	-29.07	P	
5	15.1299	26.59	17.77	6.50	10.01	36.60	27.78	16.51	60.00	50.00	-32.22	-33.49	P	
6	21.0900	17.43	9.20	2.11	10.09	27.52	19.29	12.20	60.00	50.00	-40.71	-37.80	P	

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

Appendix H): Restricted bands around fundamental frequency (Radiated)

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Test Procedure:

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel

Above 1GHz test procedure as below:

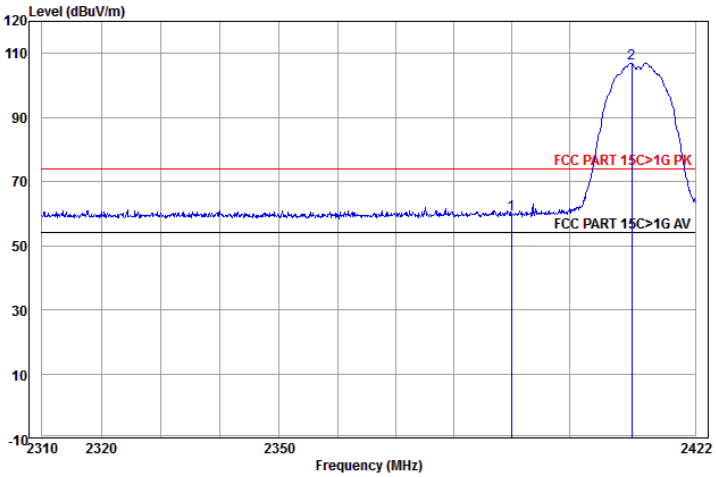
g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).
h. Test the EUT in the lowest channel , the Highest channel
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.
j. Repeat above procedures until all frequencies measured was complete.

Limit:

Frequency	Limit (dBμV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
	74.0	Peak Value

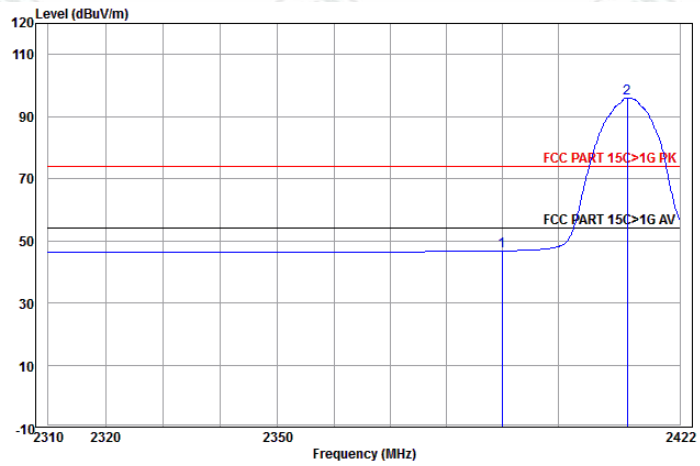
Test plot as follows:

Worse case mode:	802.11b (11Mbps)		
Frequency: 2412MHz	Test channel: Lowest	Polarization: Horizontal	Remark: Peak



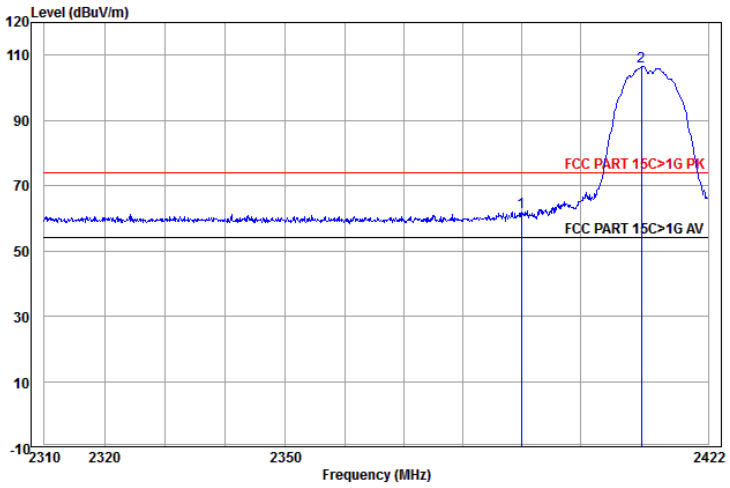
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	3.07	24.26	59.86	74.00	-14.14	Horizontal	
2 pp	2410.902	32.58	3.08	71.18	106.84	74.00	32.84	Horizontal	

Worse case mode:	802.11b (11Mbps)		
Frequency: 2412MHz	Test channel: Lowest	Polarization: Horizontal	Remark: Average



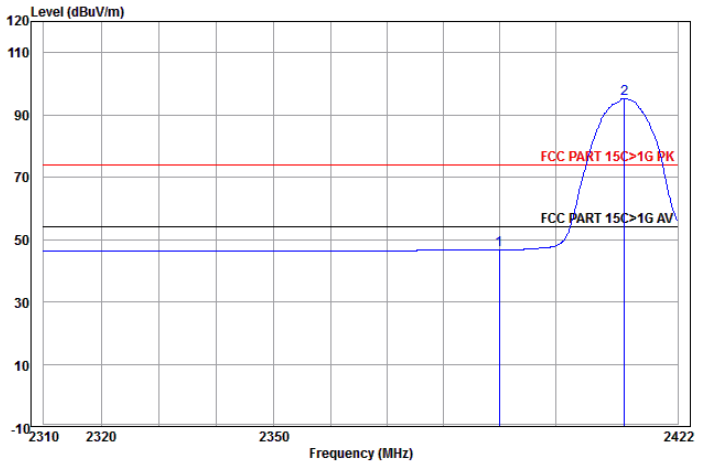
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	3.07	11.14	46.74	54.00	-7.26	Horizontal	Average
2 pp	2412.501	32.58	3.08	60.39	96.05	54.00	42.05	Horizontal	Average

Worse case mode:	802.11b (11Mbps)		
Frequency: 2412MHz	Test channel: Lowest	Polarization: Vertical	Remark: Peak



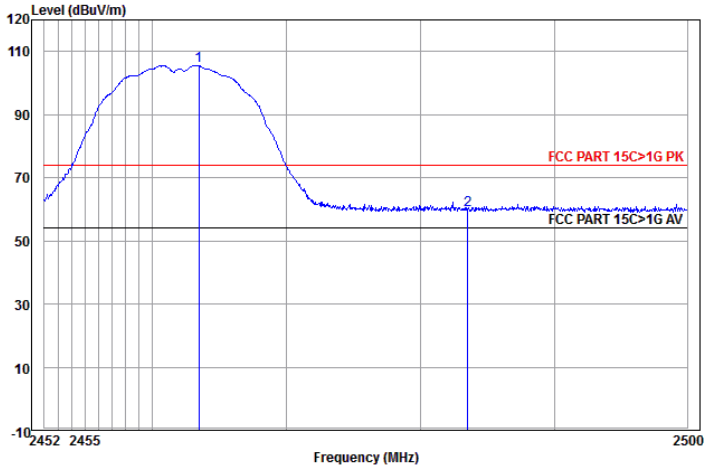
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	3.07	26.28	61.88	74.00	-12.12	Vertical	
2 pp	2410.560	32.57	3.08	70.89	106.54	74.00	32.54	Vertical	

Worse case mode:	802.11b (11Mbps)		
Frequency: 2412MHz	Test channel: Lowest	Polarization: Vertical	Remark: Average



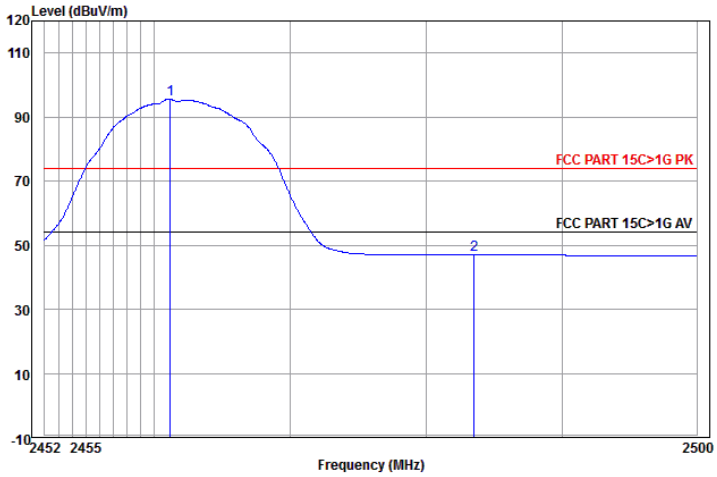
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	3.07	11.19	46.79	54.00	-7.21	Vertical	Average
2 pp	2412.387	32.58	3.08	59.61	95.27	54.00	41.27	Vertical	Average

Worse case mode:	802.11b (11Mbps)		
Frequency: 2462MHz	Test channel: Highest	Polarization: Horizontal	Remark: Peak



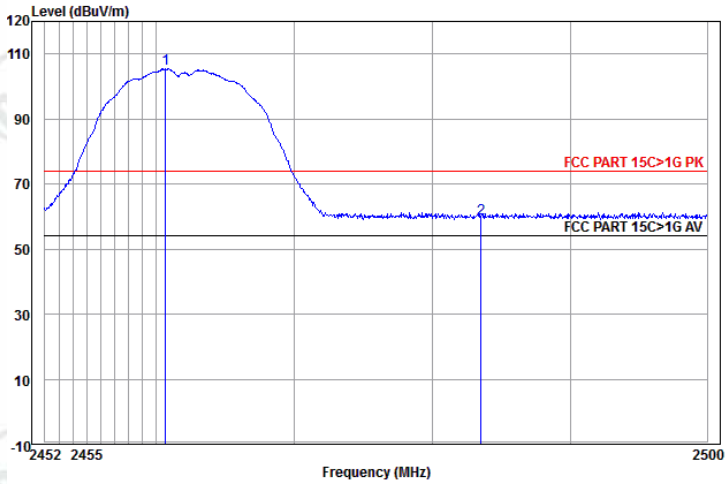
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2463.435	32.68	3.11	69.67	105.46	74.00	31.46	Horizontal	
2	2483.500	32.71	3.12	24.05	59.88	74.00	-14.12	Horizontal	

Worse case mode:	802.11b (11Mbps)		
Frequency: 2462MHz	Test channel: Highest	Polarization: Horizontal	Remark: Average



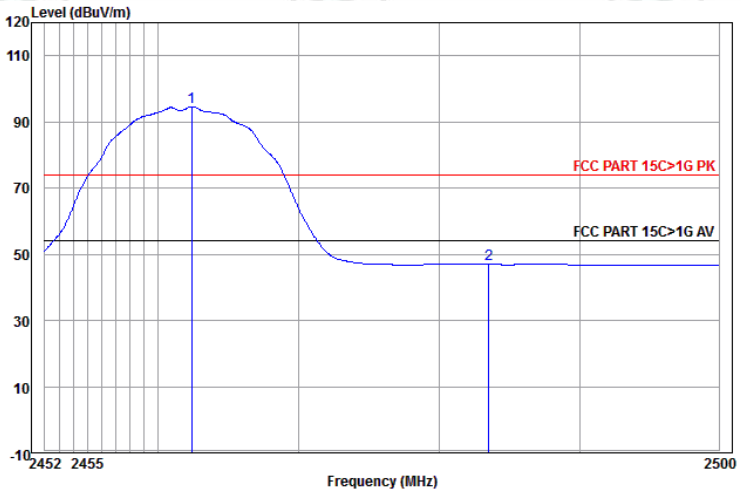
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2461.192	32.67	3.11	59.85	95.63	54.00	41.63	Horizontal	Average
2	2483.500	32.71	3.12	11.12	46.95	54.00	-7.05	Horizontal	Average

Worse case mode:	802.11b (11Mbps)		
Frequency: 2462MHz	Test channel: Highest	Polarization: Vertical	Remark: Peak



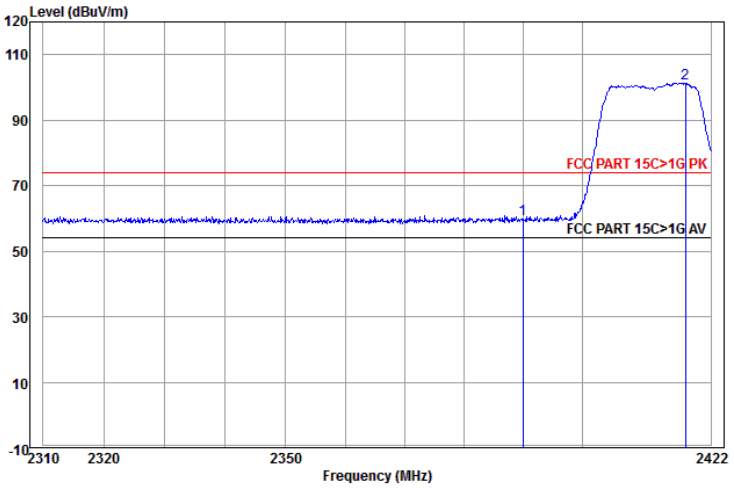
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2460.667	32.67	3.11	69.53	105.31	74.00	31.31	Vertical	
2	2483.500	32.71	3.12	23.75	59.58	74.00	-14.42	Vertical	

Worse case mode:	802.11b (11Mbps)		
Frequency: 2462MHz	Test channel: Highest	Polarization: Vertical	Remark: Average



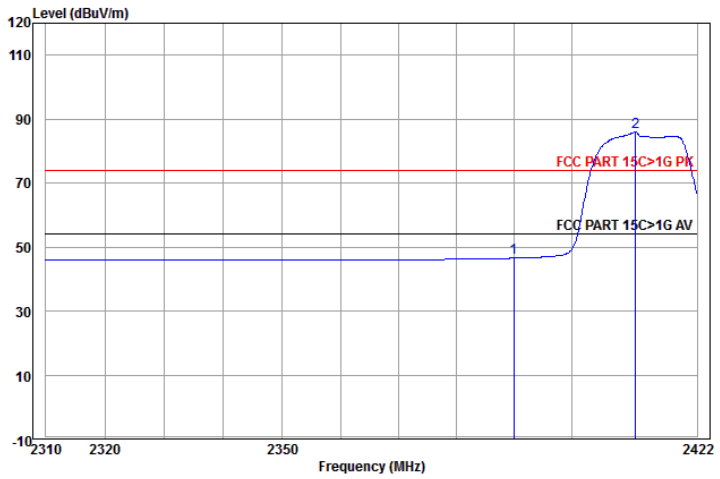
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2462.385	32.67	3.11	58.76	94.54	54.00	40.54	Vertical	Average
2	2483.500	32.71	3.12	11.07	46.90	54.00	-7.10	Vertical	Average

Worse case mode:	802.11g (6Mbps)		
Frequency: 2412MHz	Test channel: Lowest	Polarization: Horizontal	Remark: Peak



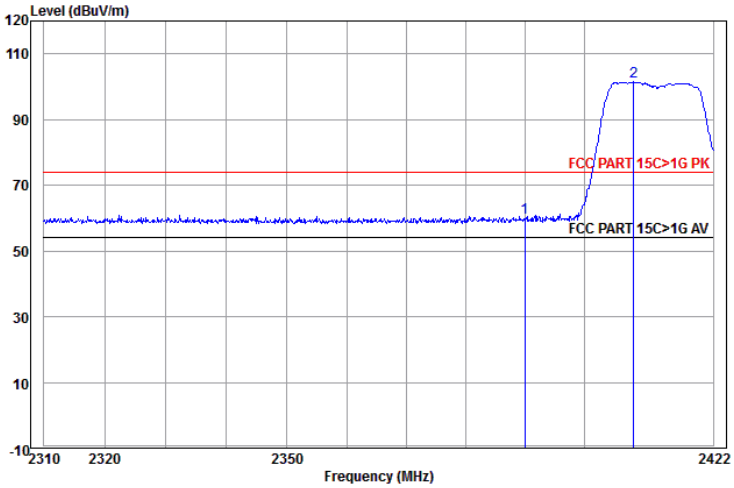
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	3.07	24.03	59.63	74.00	-14.37	Horizontal	
2 pp	2417.646	32.59	3.08	65.53	101.20	74.00	27.20	Horizontal	

Worse case mode:	802.11g (6Mbps)		
Frequency: 2412MHz	Test channel: Lowest	Polarization: Horizontal	Remark: Average



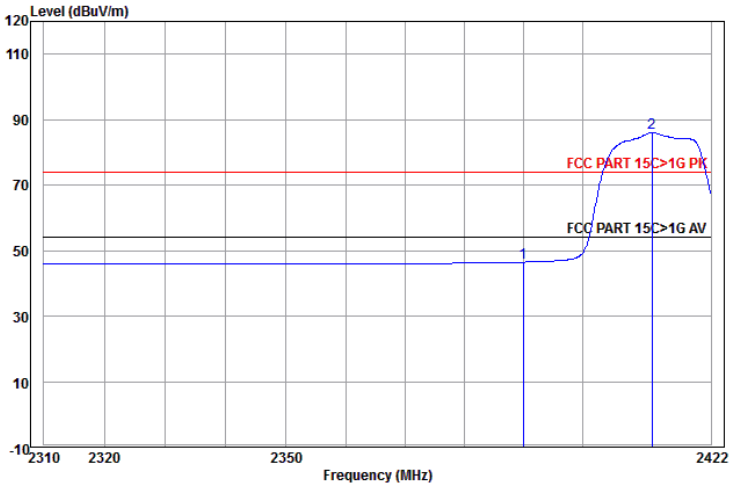
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	3.07	10.94	46.54	54.00	-7.46	Horizontal	Average
2 pp	2411.245	32.58	3.08	50.35	86.01	54.00	32.01	Horizontal	Average

Worse case mode:	802.11g (6Mbps)		
Frequency: 2412MHz	Test channel: Lowest	Polarization: Vertical	Remark: Peak



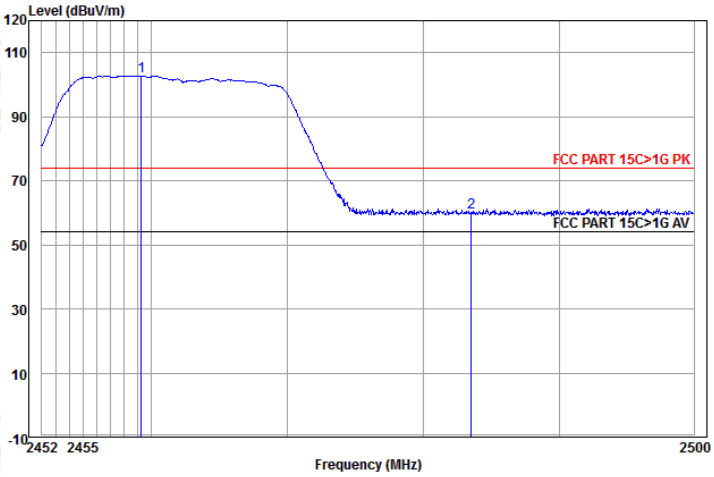
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	3.07	24.38	59.98	74.00	-14.02	Vertical	
2 pp	2408.392	32.57	3.08	65.80	101.45	74.00	27.45	Vertical	

Worse case mode:	802.11g (6Mbps)		
Frequency: 2412MHz	Test channel: Lowest	Polarization: Vertical	Remark: Average



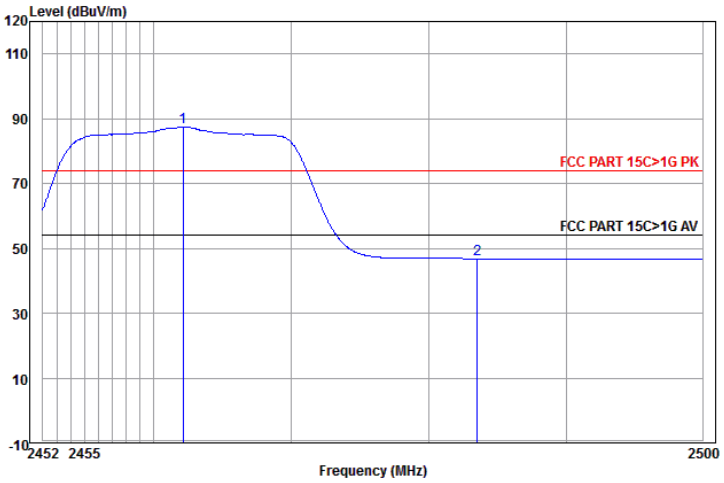
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	3.07	10.90	46.50	54.00	-7.50	Vertical	Average
2 pp	2411.930	32.58	3.08	50.26	85.92	54.00	31.92	Vertical	Average

Worse case mode:	802.11g (6Mbps)		
Frequency: 2462MHz	Test channel: Highest	Polarization: Horizontal	Remark: Peak



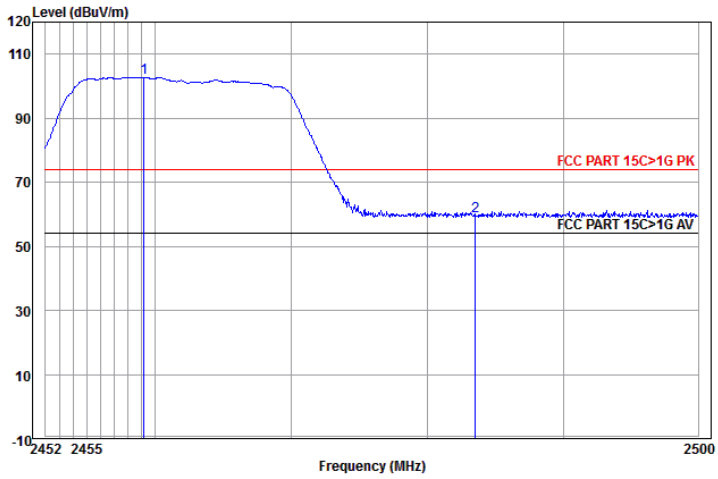
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2459.284	32.67	3.11	67.02	102.80	74.00	28.80	Horizontal	
2	2483.500	32.71	3.12	24.35	60.18	74.00	-13.82	Horizontal	

Worse case mode:	802.11g (6Mbps)		
Frequency: 2462MHz	Test channel: Highest	Polarization: Horizontal	Remark: Average



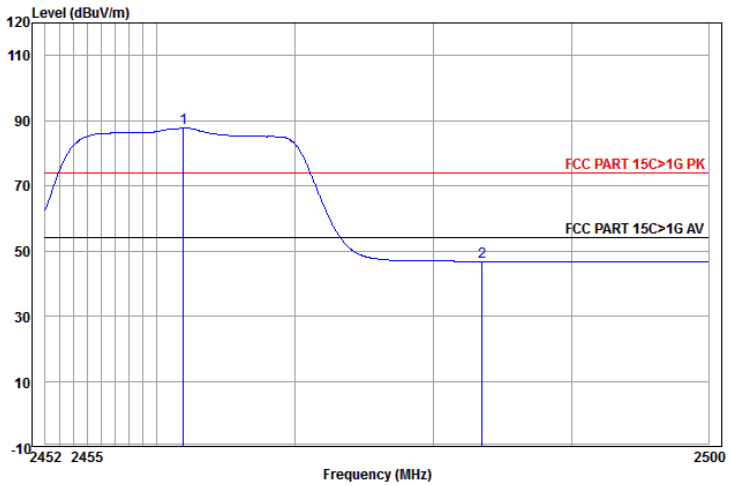
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2462.146	32.67	3.11	51.70	87.48	54.00	33.48	Horizontal	Average
2	2483.500	32.71	3.12	10.93	46.76	54.00	-7.24	Horizontal	Average

Worse case mode:	802.11g (6Mbps)		
Frequency: 2462MHz	Test channel: Highest	Polarization: Vertical	Remark: Peak



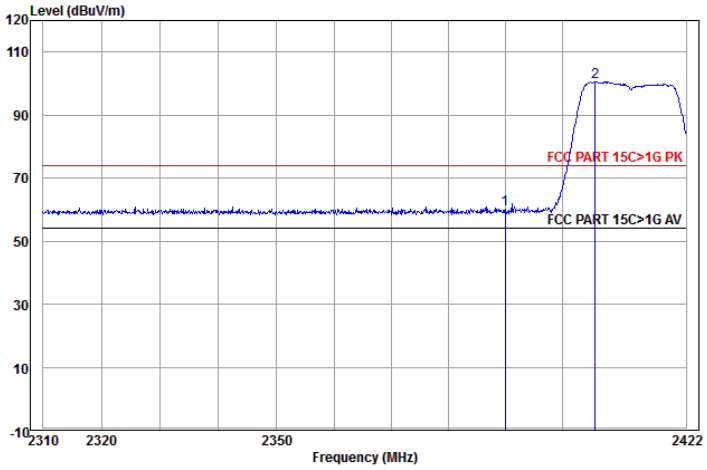
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2459.188	32.67	3.11	67.03	102.81	74.00	28.81	Vertical	
2	2483.500	32.71	3.12	23.47	59.30	74.00	-14.70	Vertical	

Worse case mode:	802.11g (6Mbps)		
Frequency: 2462MHz	Test channel: Highest	Polarization: Vertical	Remark: Average



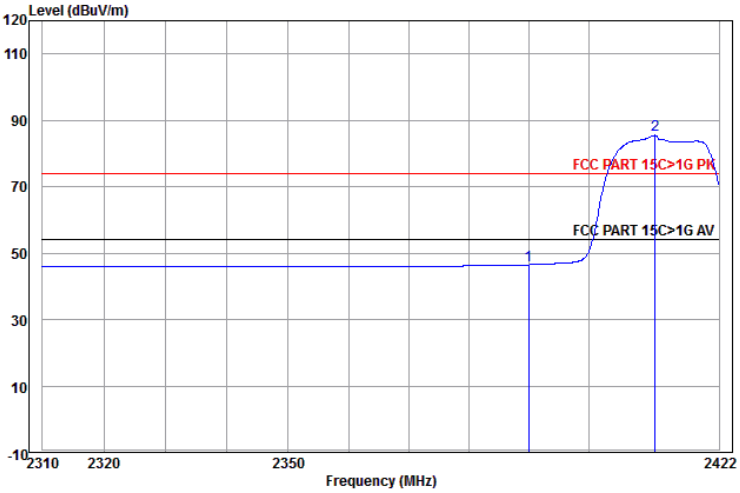
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2461.907	32.67	3.11	51.94	87.72	54.00	33.72	Vertical	Average
2	2483.500	32.71	3.12	10.97	46.80	54.00	-7.20	Vertical	Average

Worse case mode:	802.11n(HT20) (6.5Mbps)		
Frequency: 2412MHz	Test channel: Lowest	Polarization: Horizontal	Remark: Peak



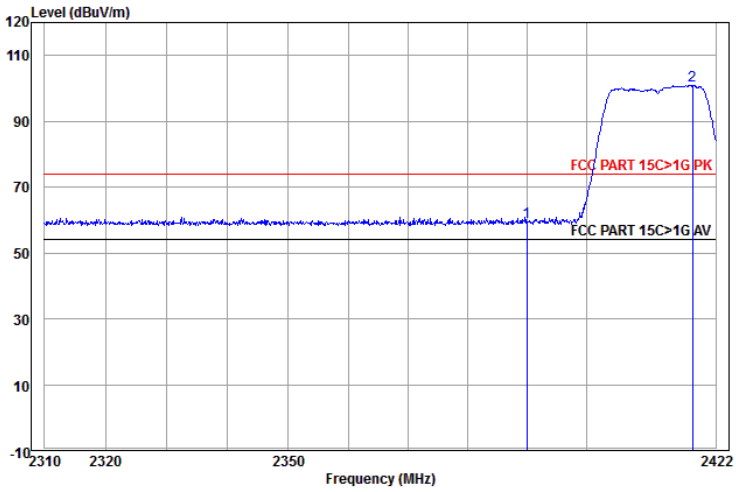
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	3.07	24.42	60.02	74.00	-13.98	Horizontal	
2 pp	2405.885	32.57	3.08	64.95	100.60	74.00	26.60	Horizontal	

Worse case mode:	802.11n(HT20) (6.5Mbps)		
Frequency: 2412MHz	Test channel: Lowest	Polarization: Horizontal	Remark: Average



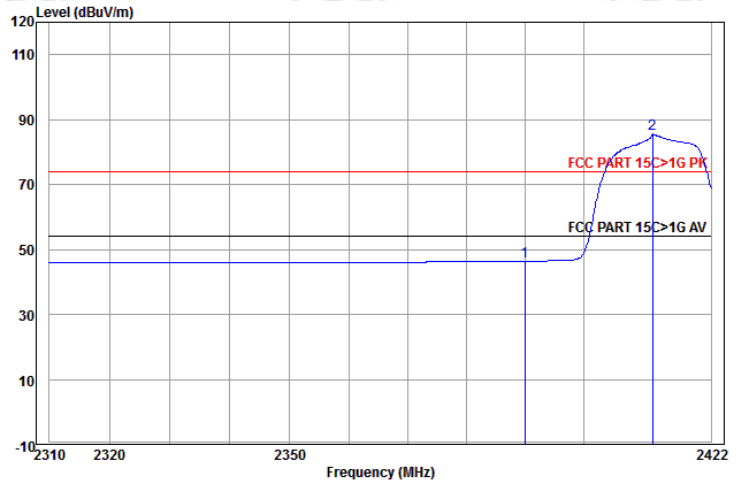
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	3.07	10.89	46.49	54.00	-7.51	Horizontal	Average
2 pp	2411.245	32.58	3.08	49.84	85.50	54.00	31.50	Horizontal	Average

Worse case mode:	802.11n(HT20) (6.5Mbps)		
Frequency: 2412MHz	Test channel: Lowest	Polarization: Vertical	Remark: Peak



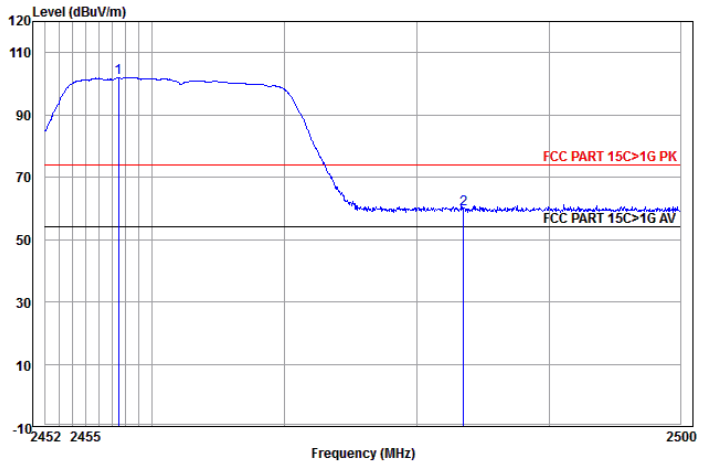
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	3.07	23.71	59.31	74.00	-14.69	Vertical	
2 pp	2418.104	32.59	3.08	65.12	100.79	74.00	26.79	Vertical	

Worse case mode:	802.11n(HT20) (6.5Mbps)		
Frequency: 2412MHz	Test channel: Lowest	Polarization: Vertical	Remark: Average



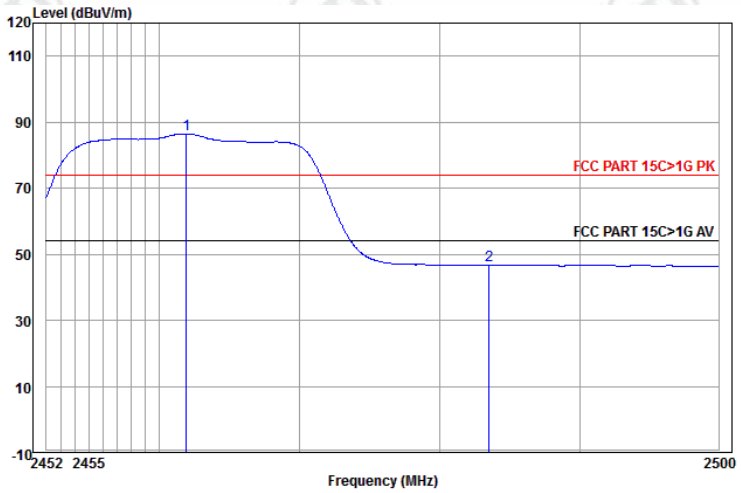
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	3.07	10.83	46.43	54.00	-7.57	Vertical	Average
2 pp	2411.930	32.58	3.08	49.81	85.47	54.00	31.47	Vertical	Average

Worse case mode:	802.11n(HT20) (6.5Mbps)		
Frequency: 2462MHz	Test channel: Highest	Polarization: Horizontal	Remark: Peak



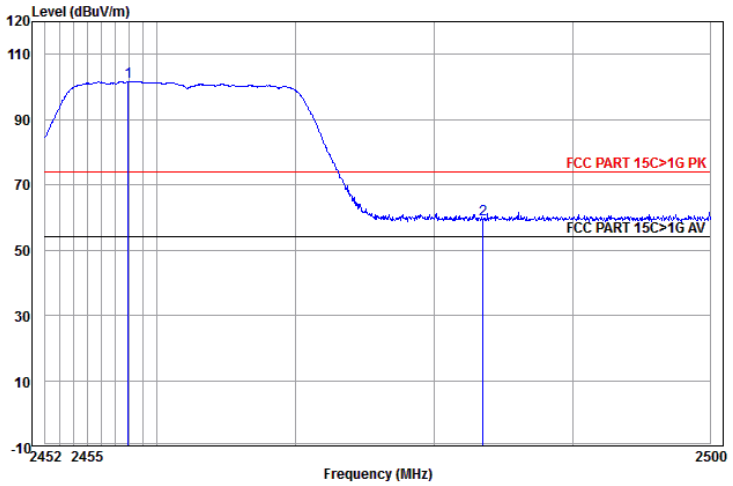
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2457.473	32.67	3.10	66.19	101.96	74.00	27.96	Horizontal	
2	2483.500	32.71	3.12	24.00	59.83	74.00	-14.17	Horizontal	

Worse case mode:	802.11n(HT20) (6.5Mbps)		
Frequency: 2462MHz	Test channel: Highest	Polarization: Horizontal	Remark:Average



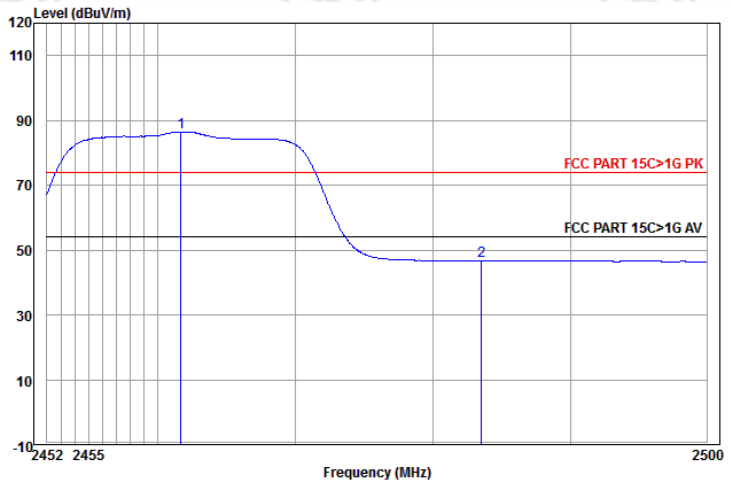
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2461.907	32.67	3.11	50.56	86.34	54.00	32.34	Horizontal	Average
2	2483.500	32.71	3.12	10.78	46.61	54.00	-7.39	Horizontal	Average

Worse case mode:	802.11n(HT20) (6.5Mbps)		
Frequency: 2462MHz	Test channel: Highest	Polarization: Vertical	Remark: Peak



	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2457.949	32.67	3.10	65.88	101.65	74.00	27.65	Vertical	
2	2483.500	32.71	3.12	23.58	59.41	74.00	-14.59	Vertical	

Worse case mode:	802.11n(HT20) (6.5Mbps)		
Frequency: 2462MHz	Test channel: Highest	Polarization: Vertical	Remark: Average



	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2461.669	32.67	3.11	50.71	86.49	54.00	32.49	Vertical	Average
2	2483.500	32.71	3.12	10.80	46.63	54.00	-7.37	Vertical	Average

Note:

1) Through Pre-scan transmitting mode and charge+transmitter mode with all kind of modulation and data rate, found the 11Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20), and then Only the worst case is recorded in the report.

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading - Correct Factor

Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor

Appendix I): Radiated Spurious Emissions

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Test Procedure:

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter)..
h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.
j. Repeat above procedures until all frequencies measured was complete.

Limit:

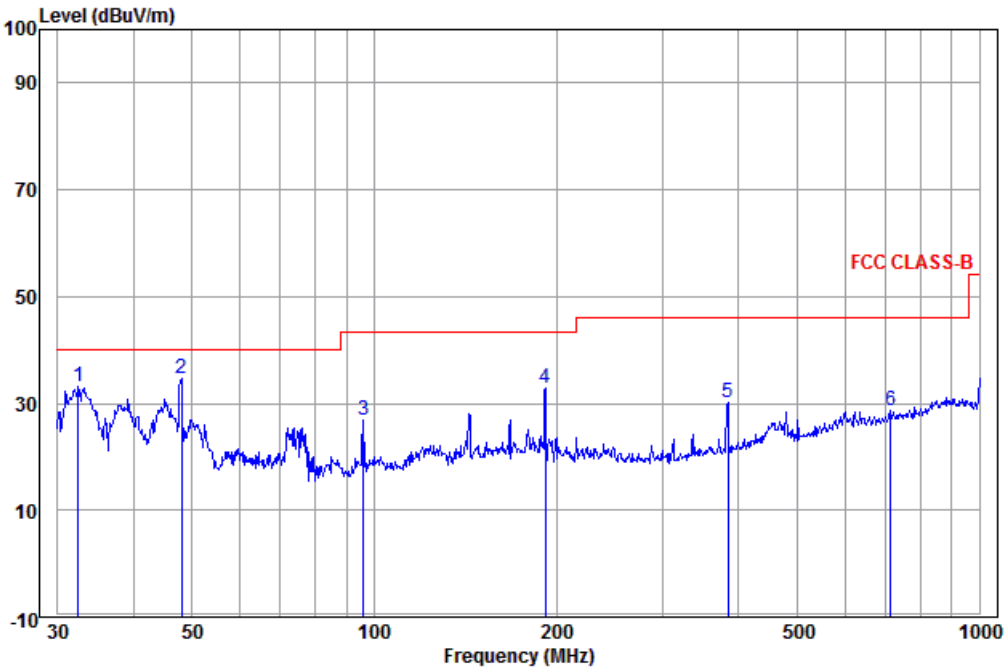
Frequency	Field strength (microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Radiated Spurious Emissions test Data:

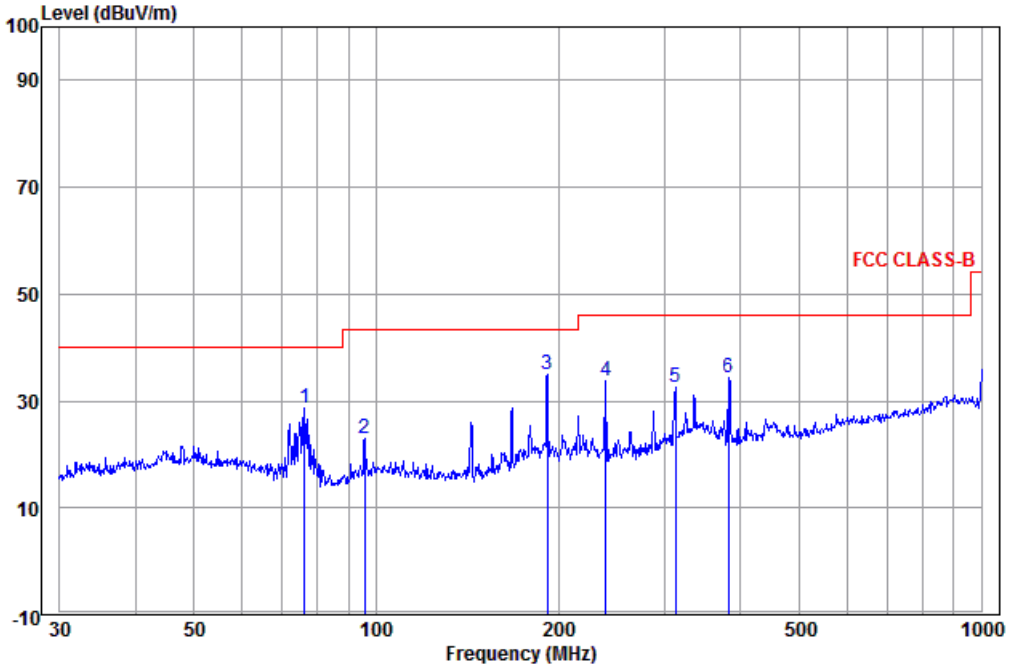
Radiated Emission below 1GHz

30MHz~1GHz (QP)		
Test mode:	Transmitting	Vertical



	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	32.406	12.41	0.08	20.75	33.24	40.00	-6.76	Vertical	QP
2 pp	47.994	14.45	0.10	20.01	34.56	40.00	-5.44	Vertical	QP
3	96.099	11.90	0.52	14.47	26.89	43.50	-16.61	Vertical	QP
4	191.745	11.10	1.03	20.63	32.76	43.50	-10.74	Vertical	QP
5	383.932	14.95	1.32	13.88	30.15	46.00	-15.85	Vertical	QP
6	714.173	19.22	2.16	7.33	28.71	46.00	-17.29	Vertical	QP

Test mode:	Transmitting	Horizontal



	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	76.244	9.25	0.36	18.92	28.53	40.00	-11.47	Horizontal	QP
2	95.762	11.84	0.51	10.62	22.97	43.50	-20.53	Horizontal	QP
3 pp	191.745	11.10	1.03	22.72	34.85	43.50	-8.65	Horizontal	QP
4	239.987	12.40	1.30	19.99	33.69	46.00	-12.31	Horizontal	QP
5	312.179	13.66	1.13	17.72	32.51	46.00	-13.49	Horizontal	QP
6	382.588	14.93	1.32	18.17	34.42	46.00	-11.58	Horizontal	QP

Transmitter Emission above 1GHz

Test mode: 802.11b(11Mbps)	Test Frequency: 2412MHz	Remark: Peak

Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Final test level (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1254.268	30.35	1.94	44.31	47.57	35.55	74.00	-38.45	Pass	Horizontal
1561.221	30.99	2.36	43.93	47.75	37.17	74.00	-36.83	Pass	Horizontal
4824.000	34.73	6.02	44.60	47.43	43.58	74.00	-30.42	Pass	Horizontal
6047.776	35.93	7.43	44.51	48.55	47.40	74.00	-26.60	Pass	Horizontal
7236.000	36.42	6.94	44.80	46.65	45.21	74.00	-28.79	Pass	Horizontal
9648.000	37.93	7.01	45.57	40.14	39.51	74.00	-34.49	Pass	Horizontal
1309.737	30.48	2.03	44.23	48.18	36.46	74.00	-37.54	Pass	Vertical
1529.749	30.93	2.33	43.96	48.14	37.44	74.00	-36.56	Pass	Vertical
4288.958	33.52	4.87	44.60	49.42	43.21	74.00	-30.79	Pass	Vertical
4824.000	34.73	6.02	44.60	47.64	43.79	74.00	-30.21	Pass	Vertical
7236.000	36.42	6.94	44.80	45.70	44.26	74.00	-29.74	Pass	Vertical
9648.000	37.93	7.01	45.57	40.82	40.19	74.00	-33.81	Pass	Vertical

Test mode: 802.11b(11Mbps)	Test Frequency: 2437MHz	Remark: Peak

Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Final test level (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1299.773	30.46	2.01	44.25	47.82	36.04	74.00	-37.96	Pass	Horizontal
1809.605	31.41	2.65	43.67	48.32	38.71	74.00	-35.29	Pass	Horizontal
4874.000	34.84	6.12	44.60	47.65	44.01	74.00	-29.99	Pass	Horizontal
6078.644	35.94	7.42	44.51	49.10	47.95	74.00	-26.05	Pass	Horizontal
7311.000	36.43	6.86	44.86	47.37	45.80	74.00	-28.20	Pass	Horizontal
9748.000	38.03	7.10	45.55	41.57	41.15	74.00	-32.85	Pass	Horizontal
1176.935	30.17	1.82	44.42	48.33	35.90	74.00	-38.10	Pass	Vertical
1565.200	30.99	2.37	43.92	47.96	37.40	74.00	-36.60	Pass	Vertical
4874.000	34.84	6.12	44.60	48.04	44.40	74.00	-29.60	Pass	Vertical
6078.644	35.94	7.42	44.51	48.43	47.28	74.00	-26.72	Pass	Vertical
7311.000	36.43	6.86	44.86	47.93	46.36	74.00	-27.64	Pass	Vertical
9748.000	38.03	7.10	45.55	42.60	42.18	74.00	-31.82	Pass	Vertical

Test mode: 802.11b(11Mbps)			Test Frequency: 2462MHz			Remark: Peak			
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Final test level (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1222.743	30.28	1.90	44.35	47.59	35.42	74.00	-38.58	Pass	Horizontal
4159.927	33.20	4.57	44.60	48.36	41.53	74.00	-32.47	Pass	Horizontal
4924.000	34.94	6.22	44.60	47.16	43.72	74.00	-30.28	Pass	Horizontal
5791.646	35.74	7.23	44.52	48.61	47.06	74.00	-26.94	Pass	Horizontal
7386.000	36.44	6.78	44.92	46.26	44.56	74.00	-29.44	Pass	Horizontal
9834.406	38.13	7.18	45.53	40.17	39.95	74.00	-34.05	Pass	Horizontal
1165.013	30.14	1.80	44.44	48.49	35.99	74.00	-38.01	Pass	Vertical
1406.496	30.68	2.16	44.11	48.22	36.95	74.00	-37.05	Pass	Vertical
4924.000	34.94	6.22	44.60	49.00	45.56	74.00	-28.44	Pass	Vertical
6094.137	35.95	7.41	44.51	48.58	47.43	74.00	-26.57	Pass	Vertical
7386.000	36.44	6.78	44.92	47.41	45.71	74.00	-28.29	Pass	Vertical
9848.000	38.14	7.19	45.53	40.02	39.82	74.00	-34.18	Pass	Vertical

Test mode: 802.11g(6Mbps)			Test Frequency: 2412MHz			Remark: Peak			
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Final test level (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1402.920	30.68	2.16	44.11	48.52	37.25	74.00	-36.75	Pass	Horizontal
1764.123	31.34	2.60	43.72	47.83	38.05	74.00	-35.95	Pass	Horizontal
4824.000	34.73	6.02	44.60	48.22	44.37	74.00	-29.63	Pass	Horizontal
6047.776	35.93	7.43	44.51	48.71	47.56	74.00	-26.44	Pass	Horizontal
7236.000	36.42	6.94	44.80	45.60	44.16	74.00	-29.84	Pass	Horizontal
9648.000	37.93	7.01	45.57	40.41	39.78	74.00	-34.22	Pass	Horizontal
1192.011	30.21	1.85	44.40	48.56	36.22	74.00	-37.78	Pass	Vertical
1593.340	31.04	2.40	43.89	47.65	37.20	74.00	-36.80	Pass	Vertical
4824.000	34.73	6.02	44.60	47.72	43.87	74.00	-30.13	Pass	Vertical
6094.137	35.95	7.41	44.51	48.50	47.35	74.00	-26.65	Pass	Vertical
7236.000	36.42	6.94	44.80	45.28	43.84	74.00	-30.16	Pass	Vertical
9648.000	37.93	7.01	45.57	43.12	42.49	74.00	-31.51	Pass	Vertical

Test mode: 802.11g(6Mbps)			Test Frequency: 2437MHz			Remark: Peak			
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Final test level (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1179.935	30.18	1.83	44.41	48.52	36.12	74.00	-37.88	Pass	Horizontal
1549.344	30.96	2.35	43.94	47.80	37.17	74.00	-36.83	Pass	Horizontal
4874.000	34.84	6.12	44.60	47.95	44.31	74.00	-29.69	Pass	Horizontal
5490.177	35.51	6.92	44.55	49.31	47.19	74.00	-26.81	Pass	Horizontal
7311.000	36.43	6.86	44.86	46.81	45.24	74.00	-28.76	Pass	Horizontal
9748.000	38.03	7.10	45.55	41.57	41.15	74.00	-32.85	Pass	Horizontal
1378.143	30.63	2.13	44.14	48.30	36.92	74.00	-37.08	Pass	Vertical
2013.795	31.73	2.85	43.52	47.27	38.33	74.00	-35.67	Pass	Vertical
4874.000	34.84	6.12	44.60	48.51	44.87	74.00	-29.13	Pass	Vertical
6125.242	35.97	7.41	44.51	48.65	47.52	74.00	-26.48	Pass	Vertical
7311.000	36.43	6.86	44.86	47.90	46.33	74.00	-27.67	Pass	Vertical
9748.000	38.03	7.10	45.55	41.63	41.21	74.00	-32.79	Pass	Vertical

Test mode: 802.11g(6Mbps)			Test Frequency: 2462MHz			Remark: Peak			
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Final test level (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1210.356	30.25	1.88	44.37	48.25	36.01	74.00	-37.99	Pass	Horizontal
1805.005	31.40	2.64	43.68	48.37	38.73	74.00	-35.27	Pass	Horizontal
4924.000	34.94	6.22	44.60	46.52	43.08	74.00	-30.92	Pass	Horizontal
6094.137	35.95	7.41	44.51	47.76	46.61	74.00	-27.39	Pass	Horizontal
7386.000	36.44	6.78	44.92	45.52	43.82	74.00	-30.18	Pass	Horizontal
9848.000	38.14	7.19	45.53	40.44	40.24	74.00	-33.76	Pass	Horizontal
1313.075	30.49	2.03	44.23	48.06	36.35	74.00	-37.65	Pass	Vertical
1553.293	30.97	2.35	43.94	48.02	37.40	74.00	-36.60	Pass	Vertical
4924.000	34.94	6.22	44.60	46.32	42.88	74.00	-31.12	Pass	Vertical
5791.646	35.74	7.23	44.52	48.48	46.93	74.00	-27.07	Pass	Vertical
7386.000	36.44	6.78	44.92	45.89	44.19	74.00	-29.81	Pass	Vertical
9848.000	38.14	7.19	45.53	40.21	40.01	74.00	-33.99	Pass	Vertical

Test mode: 802.11n(HT20)(6.5Mbps)	Test Frequency: 2412MHz	Remark: Peak

Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Final test level (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1273.572	30.40	1.97	44.28	47.67	35.76	74.00	-38.24	Pass	Horizontal
1573.189	31.01	2.38	43.92	47.83	37.30	74.00	-36.70	Pass	Horizontal
4824.000	34.73	6.02	44.60	48.21	44.36	74.00	-29.64	Pass	Horizontal
6094.137	35.95	7.41	44.51	48.58	47.43	74.00	-26.57	Pass	Horizontal
7236.000	36.42	6.94	44.80	46.67	45.23	74.00	-28.77	Pass	Horizontal
9648.000	37.93	7.01	45.57	41.34	40.71	74.00	-33.29	Pass	Horizontal
1367.659	30.60	2.11	44.16	48.48	37.03	74.00	-36.97	Pass	Vertical
1823.477	31.43	2.66	43.66	48.57	39.00	74.00	-35.00	Pass	Vertical
4824.000	34.73	6.02	44.60	47.29	43.44	74.00	-30.56	Pass	Vertical
6078.644	35.94	7.42	44.51	48.33	47.18	74.00	-26.82	Pass	Vertical
7236.000	36.42	6.94	44.80	46.46	45.02	74.00	-28.98	Pass	Vertical
9648.000	37.93	7.01	45.57	41.29	40.66	74.00	-33.34	Pass	Vertical

Test mode: 802.11n(HT20)(6.5Mbps)	Test Frequency: 2437MHz	Remark: Peak

Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Final test level (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1185.958	30.19	1.84	44.40	48.38	36.01	74.00	-37.99	Pass	Horizontal
1510.402	30.89	2.30	43.99	49.07	38.27	74.00	-35.73	Pass	Horizontal
4874.000	34.84	6.12	44.60	47.41	43.77	74.00	-30.23	Pass	Horizontal
6109.670	35.96	7.41	44.51	48.83	47.69	74.00	-26.31	Pass	Horizontal
7311.000	36.43	6.86	44.86	47.07	45.50	74.00	-28.50	Pass	Horizontal
9748.000	38.03	7.10	45.55	42.28	41.86	74.00	-32.14	Pass	Horizontal
1267.104	30.38	1.96	44.29	47.71	35.76	74.00	-38.24	Pass	Vertical
1617.862	31.09	2.43	43.87	47.98	37.63	74.00	-36.37	Pass	Vertical
4874.000	34.84	6.12	44.60	48.82	45.18	74.00	-28.82	Pass	Vertical
5791.646	35.74	7.23	44.52	48.14	46.59	74.00	-27.41	Pass	Vertical
7311.000	36.43	6.86	44.86	47.13	45.56	74.00	-28.44	Pass	Vertical
9748.000	38.03	7.10	45.55	39.71	39.29	74.00	-34.71	Pass	Vertical

Test mode: 802.11n(HT20)(6.5Mbps)	Test Frequency: 2462MHz	Remark: Peak

Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Final test level (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1170.959	30.16	1.81	44.43	48.54	36.08	74.00	-37.92	Pass	Horizontal
1525.860	30.92	2.32	43.97	48.25	37.52	74.00	-36.48	Pass	Horizontal
4924.000	34.94	6.22	44.60	45.54	42.10	74.00	-31.90	Pass	Horizontal
6063.190	35.93	7.42	44.51	47.89	46.73	74.00	-27.27	Pass	Horizontal
7386.000	36.44	6.78	44.92	45.15	43.45	74.00	-30.55	Pass	Horizontal
9848.000	38.14	7.19	45.53	40.71	40.51	74.00	-33.49	Pass	Horizontal
1392.247	30.65	2.14	44.13	48.62	37.28	74.00	-36.72	Pass	Vertical
1823.477	31.43	2.66	43.66	49.04	39.47	74.00	-34.53	Pass	Vertical
4924.000	34.94	6.22	44.60	48.26	44.82	74.00	-29.18	Pass	Vertical
6078.644	35.94	7.42	44.51	49.19	48.04	74.00	-25.96	Pass	Vertical
7386.000	36.44	6.78	44.92	47.62	45.92	74.00	-28.08	Pass	Vertical
9848.000	38.14	7.19	45.53	41.12	40.92	74.00	-33.08	Pass	Vertical

Note:

1) Through Pre-scan transmitting mode with all kind of modulation and data rate,

found the 11Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20), and then Only the worst case is recorded in the report.

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading - Correct Factor

Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor

3) Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

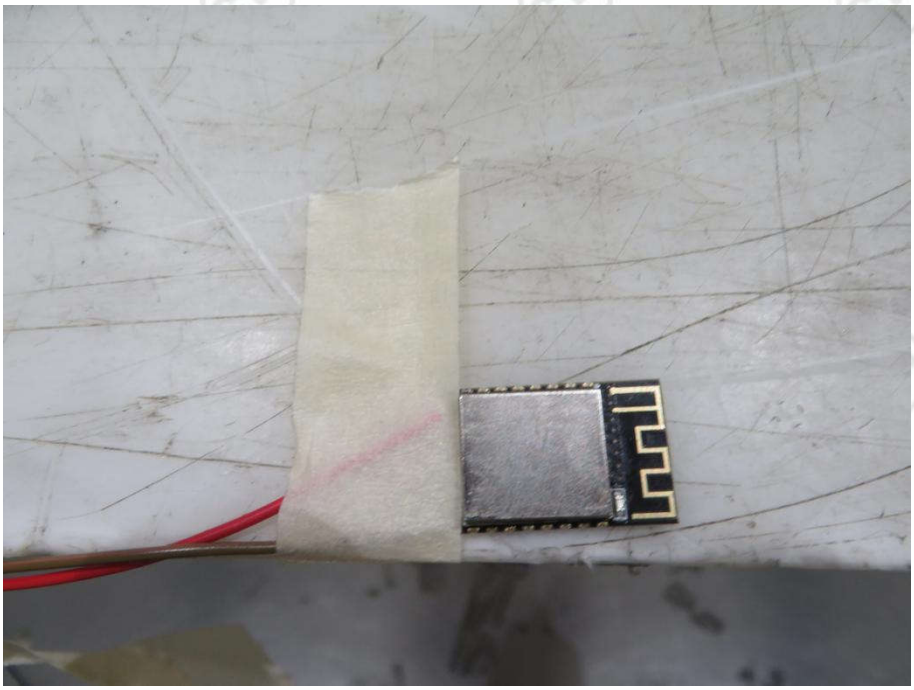
PHOTOGRAPHS OF TEST SETUP

Test Model No.: ESP-12S

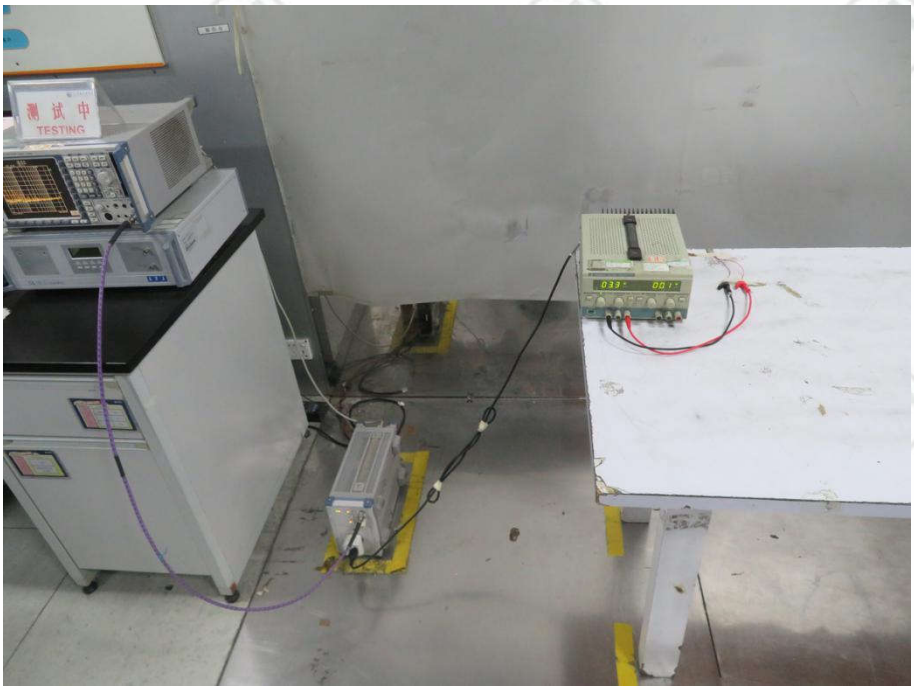
Radiated spurious emission Test Setup-1(30MHz-1GHz)

Radiated spurious emission Test Setup-2(Above 1GHz)

Radiated spurious emission Test Setup-3(Below 30MHz)



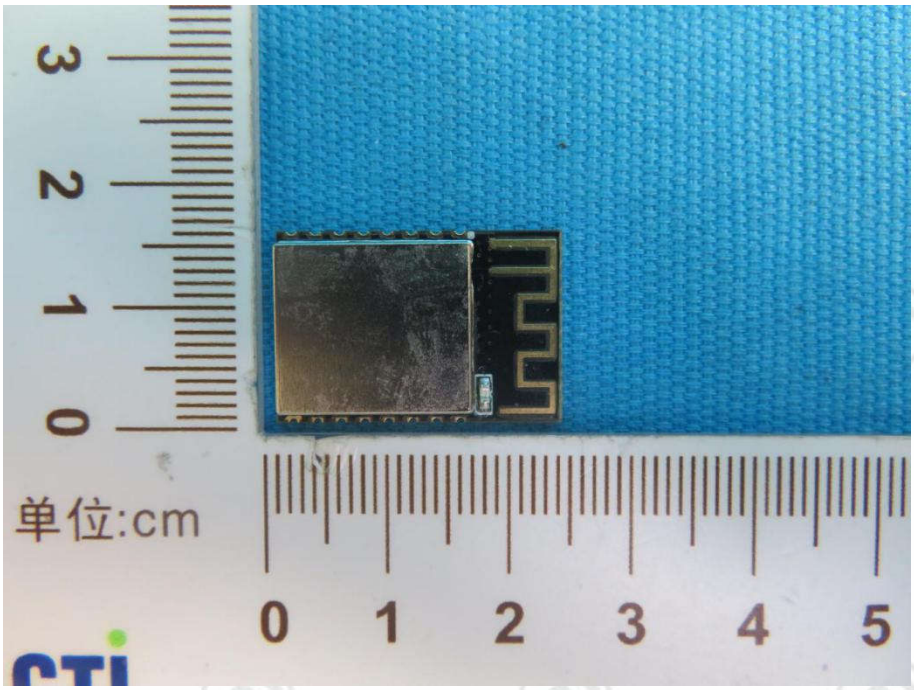
Radiated spurious emission Test Setup for close-up



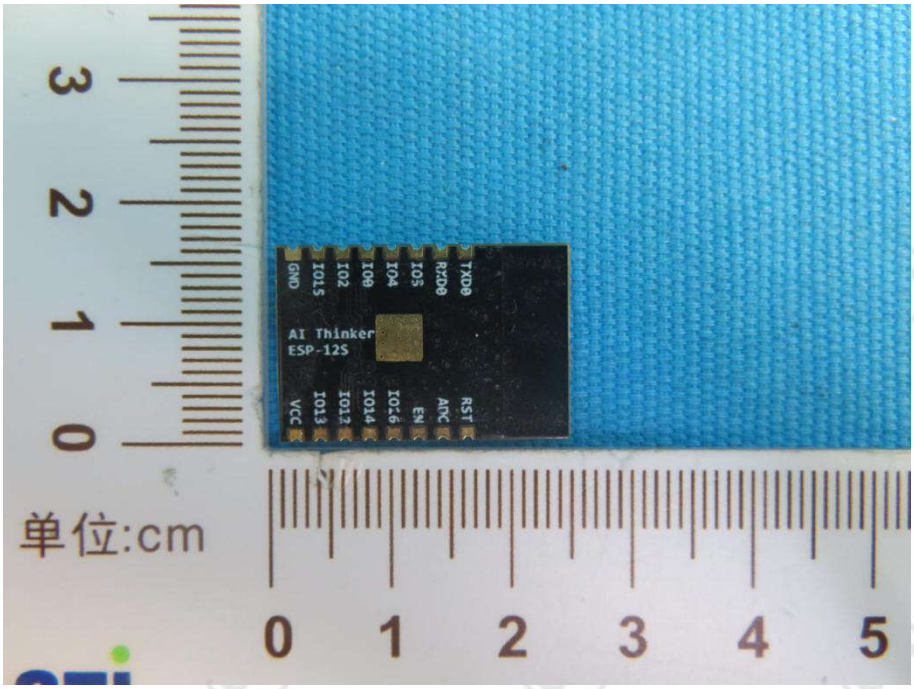
Conducted Emissions Test Setup

PHOTOGRAPHS OF EUT Constructional Details

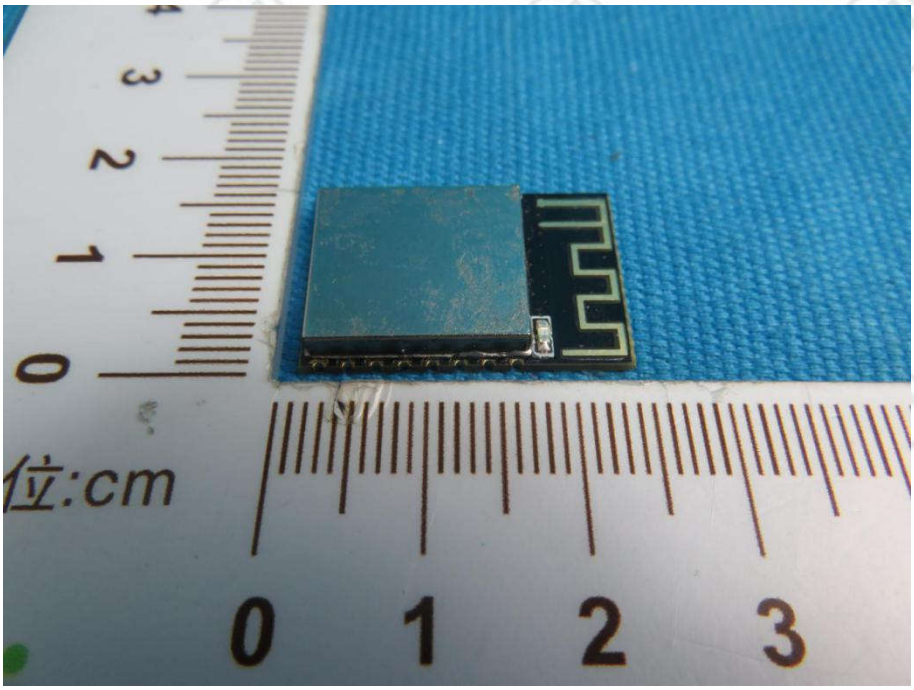
Test model No.: ESP-12S



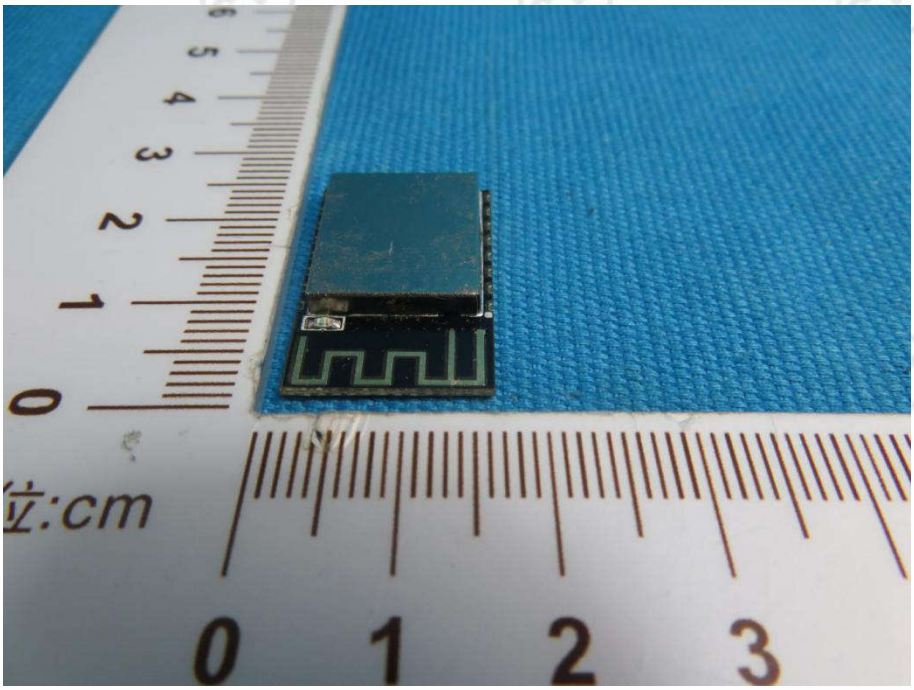
View of Product-1



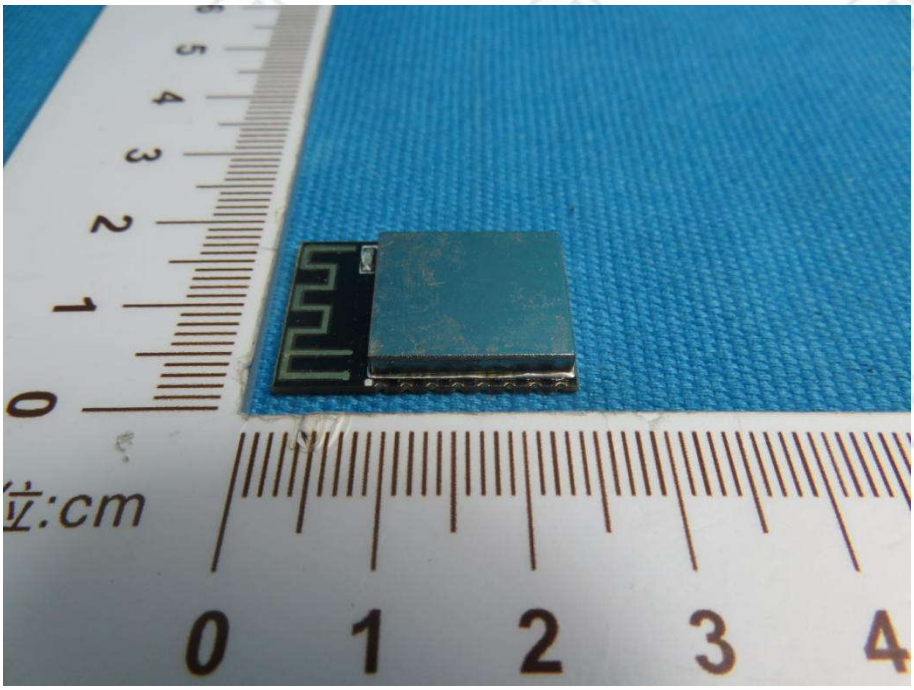
View of Product-2



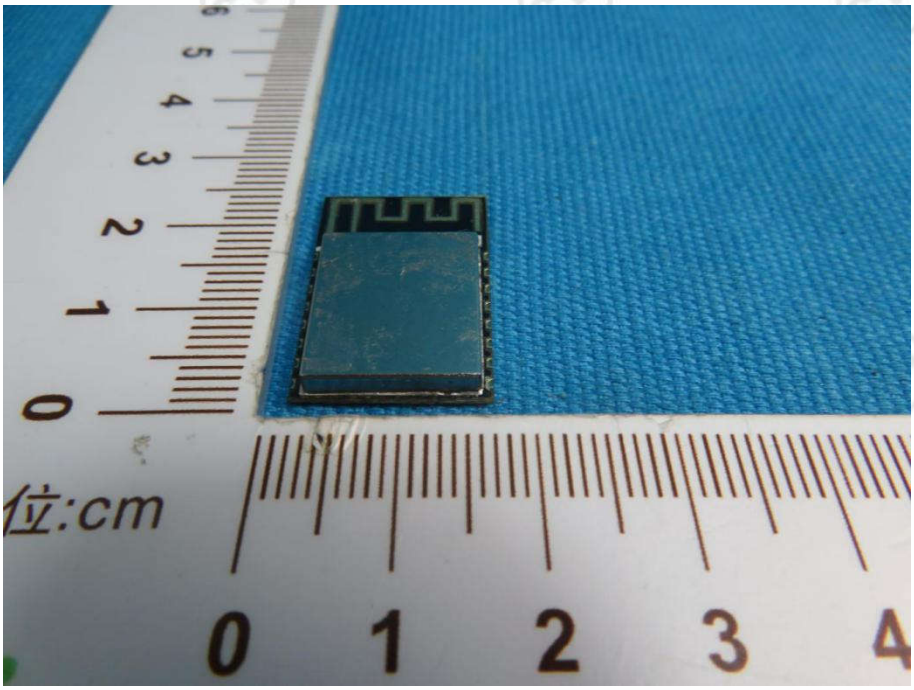
View of Product-3



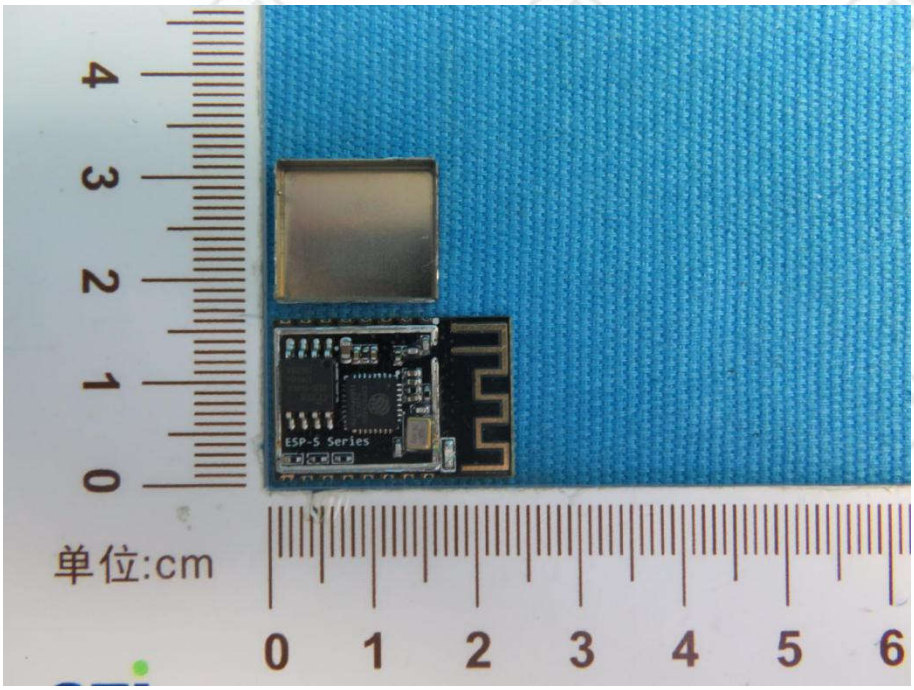
View of Product-4



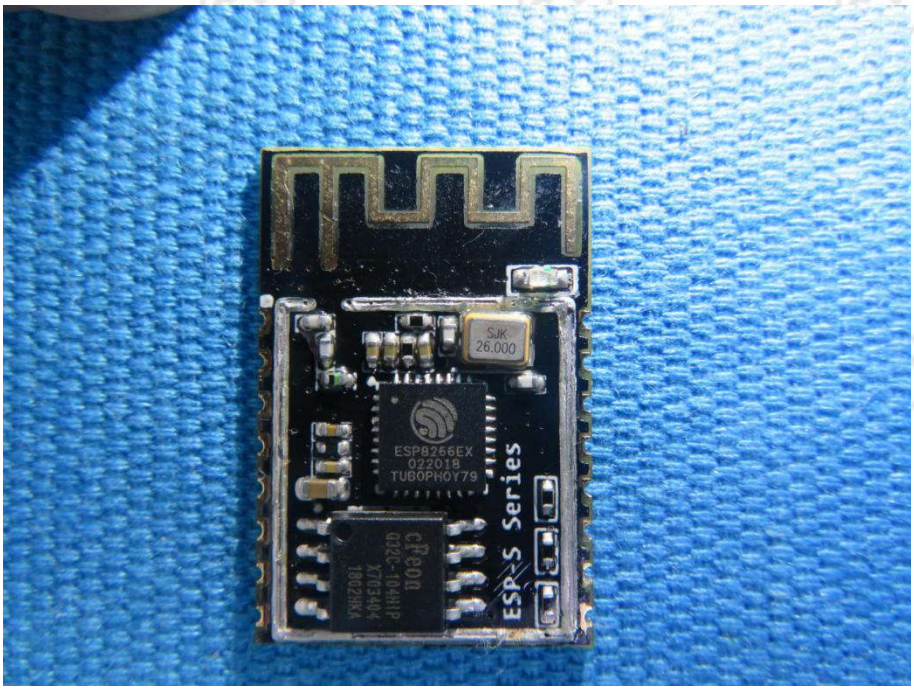
View of Product-5



View of Product-6



View of Product-7



View of Product-8

*** End of Report ***

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