TEST REPORT

Product	:	WiFi module
Trade mark	:	N/A
Model/Type reference	:	ESP-01E
Serial Number	:	N/A
Report Number	:	EED32K00216301
FCC ID	:	2AHMR-ESP01E
Date of Issue	:	Nov. 07, 2018
Test Standards	:	47 CFR Part 15Subpart C
Test result	:	PASS

Prepared for:

Shenzhen Ai-Thinker Technology Co., Ltd.
6/F, Block C2, Huafeng Industrial Park, Hangcheng Road,
Baoan district, Shenzhen, China

Prepared by:

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Tested By: Tom chen (Test Project)

Compiled by: Kevin Ian (Project Engineer)

Reviewed by: Kevin yang (Reviewer)

Approved by: Sheek Luo (Lab supervisor)

Date: Nov. 07, 2018

Check No.: 3320276355

2 Version

Version No.	Date	Description
00	Nov. 07, 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	PASS
6dB Occupied Bandwidth	47 CFR Part 15 Subpart C Section 15.247 (a)(2)	ANSI C63.10-2013	PASS
Power Spectral Density	47 CFR Part 15 Subpart C Section 15.247 (e)	ANSI C63.10-2013	PASS
Band-edge for RF Conducted Emissions	47 CFR Part 15 Subpart C Section 15.247(d)	ANSI C63.10-2013	PASS
RF Conducted Spurious Emissions	47 CFR Part 15 Subpart C Section 15.247(d)	ANSI C63.10-2013	PASS
Radiated Spurious Emissions	47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS

Remark:

Test according to ANSI C63.4-2014 & ANSI C63.10-2013.

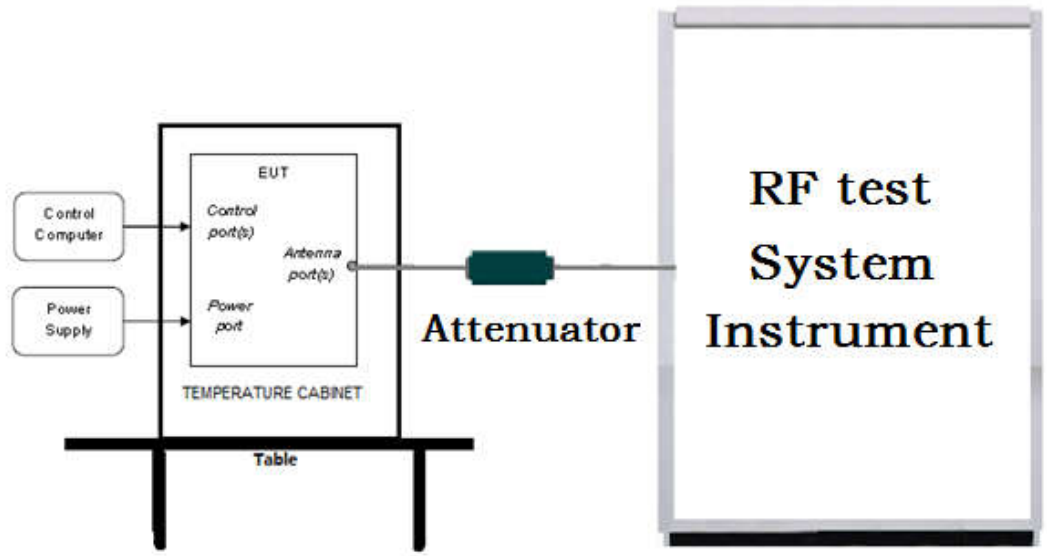
The tested sample(s) and the sample information are provided by the client.

4 Content

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:

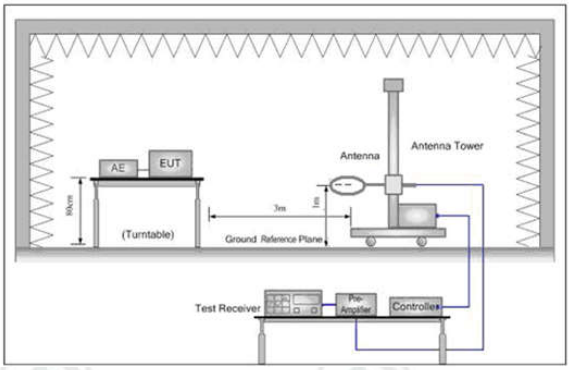


Figure 1. Below 30MHz

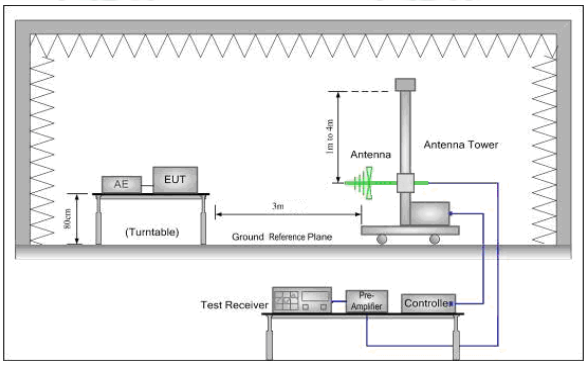


Figure 2. 30MHz to 1GHz

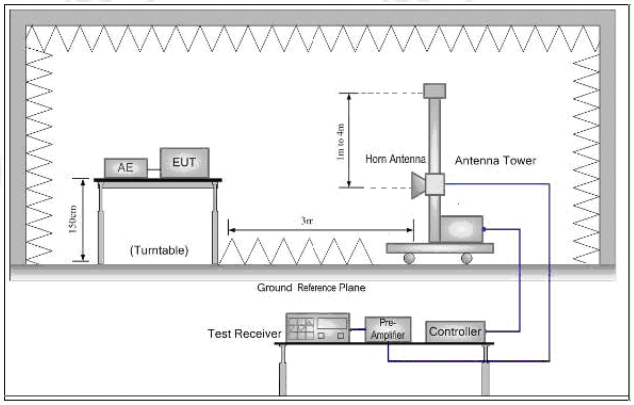
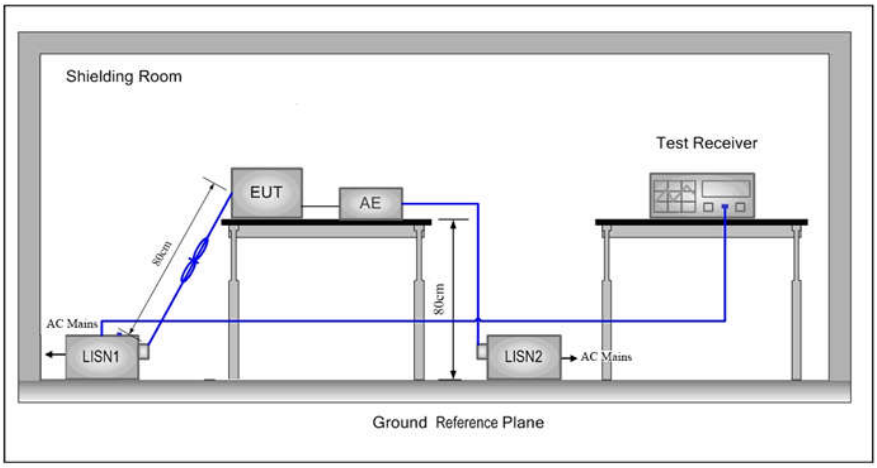


Figure 3. Above 1GHz

5.1.3 For Conducted Emissions test setup

Conducted Emissions setup



5.2 Test Environment

Operating Environment:	
Temperature:	22°C
Humidity:	62% 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:	The EUT transmitted the continuous signal at the specific channel(s).			

Test mode:

Pre-scan under all rate at lowest channel 1

Mode	**802.11b**			
Data Rate	**1Mbps**	**2Mbps**	**5.5Mbps**	**11Mbps**
Power(dBm)	15.51	15.47	15.78	15.89

Mode	**802.11g**							
Data Rate	**6Mbps**	**9Mbps**	**12Mbps**	**18Mbps**	**24Mbps**	**36Mbps**	**48Mbps**	**54Mbps**
Power(dBm)	15.36	15.34	15.22	15.10	15.06	15.00	14.98	14.89

Mode	**802.11n (HT20)**							
Data Rate	**6.5Mbps**	**13Mbps**	**19.5Mbps**	**26Mbps**	**39Mbps**	**52Mbps**	**58.5Mbps**	**65Mbps**
Power(dBm)	14.04	14.01	13.97	13.81	13.74	13.87	13.64	13.61

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:	WiFi module
Model No.(EUT):	ESP-01E
Trade Mark:	N/A
EUT Supports Radios application:	WiFi 802.11b/g/n(HT20): 2412MHz to 2462MHz
Power Supply:	DC 3.3V
Sample Received Date:	Aug. 09, 2018
Sample tested Date:	Aug. 09, 2018 to Nov. 07, 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:	Spring antenna
Antenna Gain:	2.78dBi
Test Voltage:	DC 3.3V

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
Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China
Telephone: +86 (0) 755 33683668 Fax:+86 (0) 755 33683385
No tests were sub-contracted.
FCC Designation No.: CN1164

6.6 Test Facility

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

CNAS-Lab Code: L1910

Centre Testing International Group Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories. .

A2LA-Lab Cert. No. 3061.01

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

FCC-Designation No.: CN1164

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 American association for Centre Testing International Group Co., Ltd. EMC laboratory accreditation Designation No.: CN1164

IC-Registration No.: 7408A

The 3m Alternate Test Site of Centre Testing International Group Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 7408A.

IC-Registration No.: 7408B

The 10m Alternate Test Site of Centre Testing International Group Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 7408B.

NEMKO-Aut. No.: ELA503

Centre Testing International Group Co., Ltd. has been assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA-10.

VCCI

The Radiation 3 &10 meters site of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-4096.

Main Ports Conducted Interference Measurement of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-4563.

Telecommunication Ports Conducted Disturbance Measurement of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-2146.

The Radiation 3 meters site of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-758

6.7 Deviation from Standards

None.

6.8 Abnormalities from Standard Conditions

None.

6.9 Other Information Requested by the Customer

None.

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

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9×10^{-8}
2	RF power, conducted	0.46dB (30MHz-1GHz)
		0.55dB (1GHz-18GHz)
3	Radiated Spurious emission test	4.3dB (30MHz-1GHz)
		4.5dB (1GHz-12.75GHz)
4	Conduction emission	3.5dB (9kHz to 150kHz)
		3.1dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	3.8%
7	DC power voltages	0.026%

7 Equipment List

RF test system					
Equipment	**Manufacturer**	**Model 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	MY54426035	03-13-2018	03-12-2019
PC-1	Lenovo	R4960d	---	03-13-2018	03-12-2019
BT&WI-FI Automatic control	R&S	OSP120	101374	03-13-2018	03-12-2019
RF control unit	JS Tonscend	JS0806-2	15860006	03-13-2018	03-12-2019
RF control unit	JS Tonscend	JS0806-1	15860004	03-13-2018	03-12-2019
RF control unit	JS Tonscend	JS0806-4	158060007	03-13-2018	03-12-2019
BT&WI-FI Automatic test software	JS Tonscend	JS1120-2	---	03-13-2018	03-12-2019

Conducted disturbance Test					
Equipment	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
Receiver	R&S	ESCI	100435	05-25-2018	05-24-2019
Temperature/ Humidity Indicator	Defu	TH128	/	07-02-2018	07-01-2019
Communication test set	Agilent	E5515C	GB47050534	03-16-2018	03-15-2019
Communication test set	R&S	CMW500	152394	03-16-2018	03-15-2019
LISN	R&S	ENV216	100098	05-10-2018	05-10-2019
LISN	schwarzbeck	NNLK8121	8121-529	05-10-2018	05-10-2019
Voltage Probe	R&S	ESH2-Z3 0299.7810.56	100042	06-13-2017	06-11-2020
Current Probe	R&S	EZ-17 816.2063.03	100106	05-30-2018	05-29-2019
ISN	TESEQ	ISN T800	30297	02-06-2018	02-05-2019

3M Semi/full-anechoic Chamber					
Equipment	**Manufacturer**	**Model No.**	**Serial Number**	**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	9163-401	04-26-2018	04-25-2019
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-618	07-30-2018	07-29-2019
Microwave Preamplifier	Agilent	8449B	3008A02425	08-22-2017	08-21-2018
Microwave Preamplifier	Agilent	8449B	3008A02425	08-21-2018	08-20-2019
Microwave Preamplifier	Tonscend	EMC051845SE	980380	01-19-2018	01-18-2019
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-1869	04-25-2018	04-23-2021
Double ridge horn antenna	A.H.SYSTEMS	SAS-574	6042	06-05-2018	06-04-2021
Pre-amplifier	A.H.SYSTEMS	PAP-1840-60	6041	06-05-2018	06-04-2021
Loop Antenna	ETS	6502	00071730	06-22-2017	06-21-2019
Spectrum Analyzer	R&S	FSP40	100416	05-11-2018	05-10-2019
Receiver	R&S	ESCI	100435	05-25-2018	05-24-2019
Multi device Controller	maturo	NCD/070/10711112	---	01-10-2018	01-09-2019
LISN	schwarzbeck	NNBM8125	81251547	05-11-2018	05-10-2019
LISN	schwarzbeck	NNBM8125	81251548	05-11-2018	05-10-2019
Signal Generator	Agilent	E4438C	MY45095744	03-13-2018	03-12-2019
Signal Generator	Keysight	E8257D	MY53401106	03-13-2018	03-12-2019
Temperature/ Humidity Indicator	TAYLOR	1451	1905	05-02-2018	05-01-2019
Communication test set	Agilent	E5515C	GB47050534	03-16-2018	03-15-2019
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
Communication test set	R&S	CMW500	104466	02-05-2018	02-04-2019
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
band rejection filter	Sinoscite	FL5CX01CA09CL12-0395-001	---	01-10-2018	01-09-2019
band rejection filter	Sinoscite	FL5CX01CA08CL12-0393-001	---	01-10-2018	01-09-2019
band rejection filter	Sinoscite	FL5CX02CA04CL12-0396-002	---	01-10-2018	01-09-2019
band rejection filter	Sinoscite	FL5CX02CA03CL12-0394-001	---	01-10-2018	01-09-2019

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 Unlicensed Wireless Devices

Test Results List:

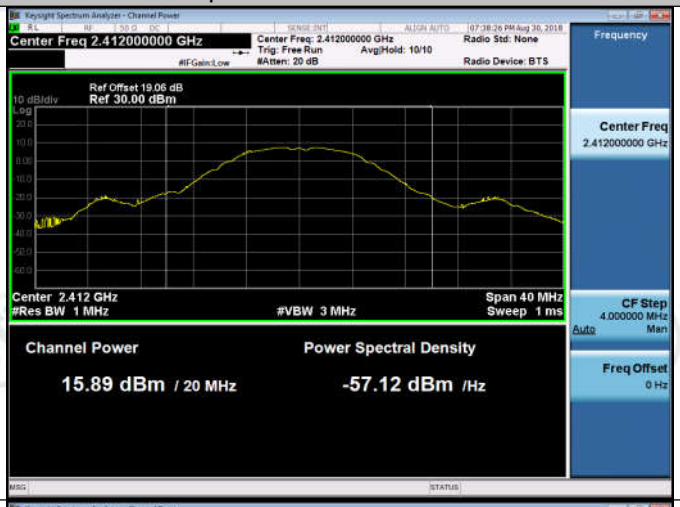
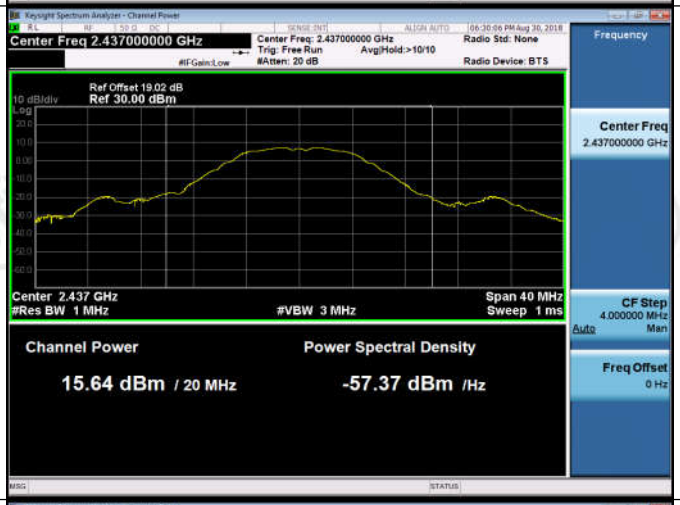
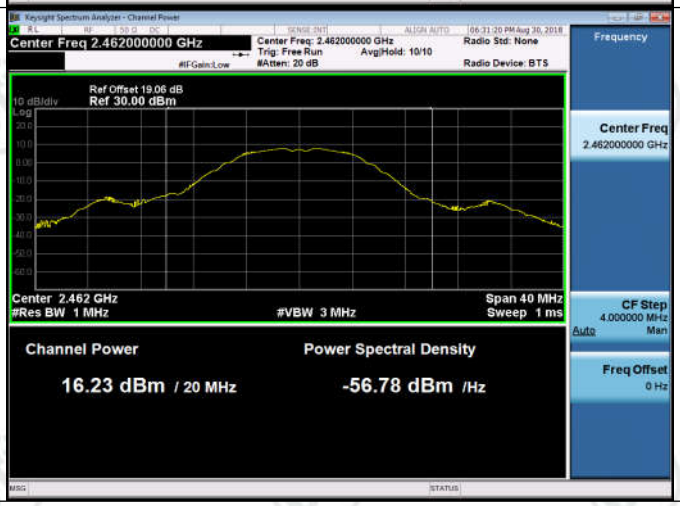
Test Requirement	Test method	Test item	Verdict	Note
Part15C Section 15.247 (b)(3)	ANSI C63.10	Conducted Peak Output Power	PASS	Appendix A)
Part15C Section 15.247 (a)(2)	ANSI C63.10	6dB Occupied Bandwidth	PASS	Appendix B)
Part15C Section 15.247(d)	ANSI C63.10	Band-edge for RF Conducted Emissions	PASS	Appendix C)
Part15C Section 15.247(d)	ANSI C63.10	RF Conducted Spurious Emissions	PASS	Appendix D)
Part15C Section 15.247 (e)	ANSI C63.10	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)

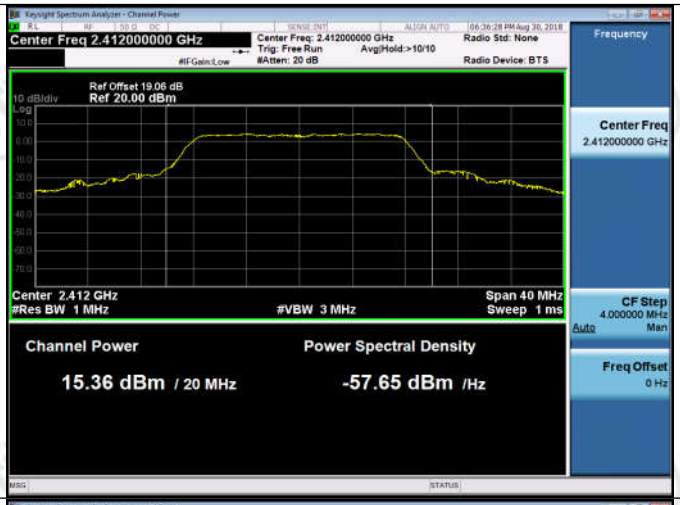
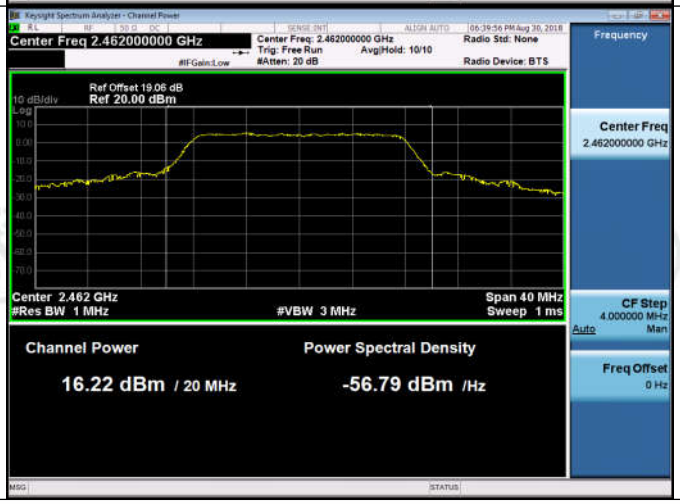
Appendix A): Conducted Peak Output Power

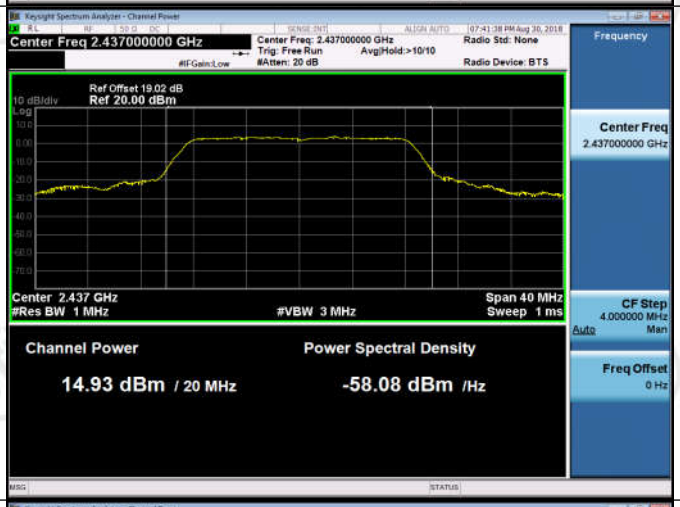
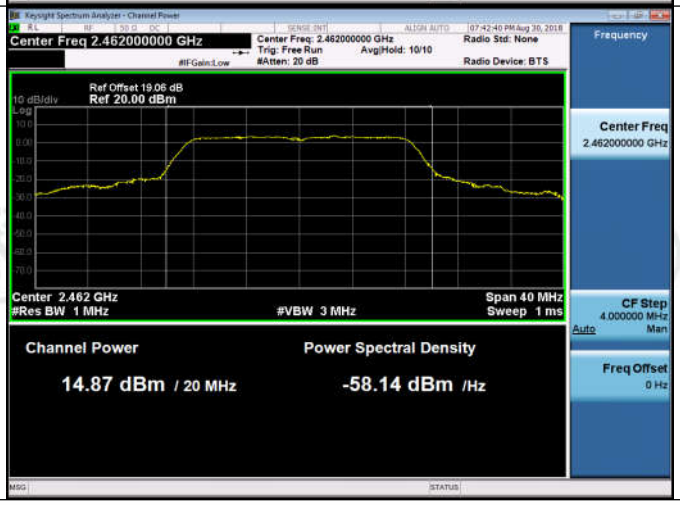
Result Table

Mode	Channel	Conducted Peak Output Power [dBm]	Verdict
11B	LCH	15.89	PASS
11B	MCH	15.64	PASS
11B	HCH	16.23	PASS
11G	LCH	15.36	PASS
11G	MCH	15.42	PASS
11G	HCH	16.22	PASS
11N20SISO	LCH	14.04	PASS
11N20SISO	MCH	14.93	PASS
11N20SISO	HCH	14.87	PASS

Test Graph

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

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

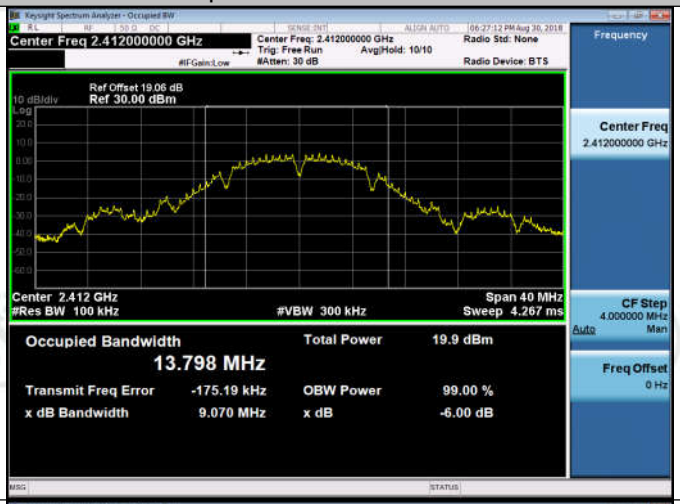
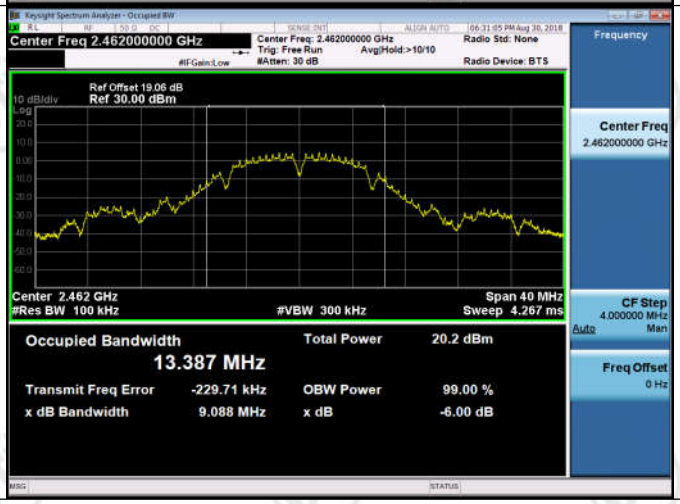
11N20SISO/LCH			
11N20SISO/MCH			
11N20SISO/HCH			

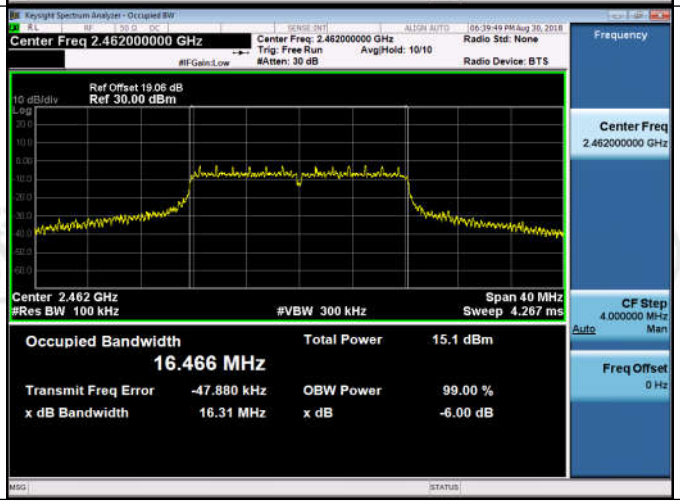
Appendix B): 6dB Occupied Bandwidth

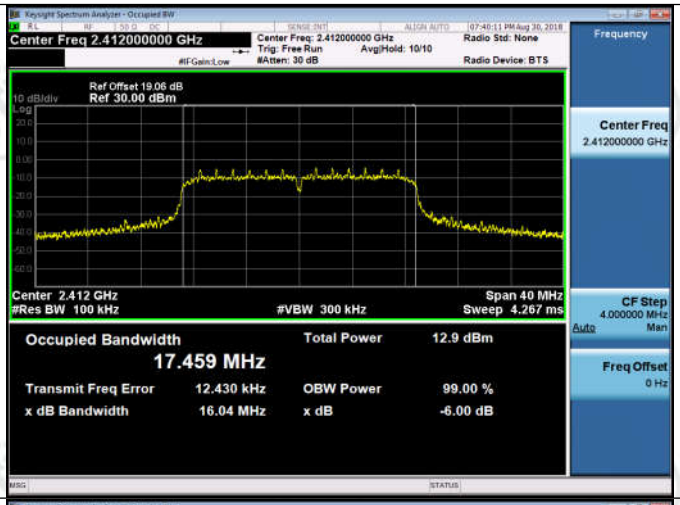
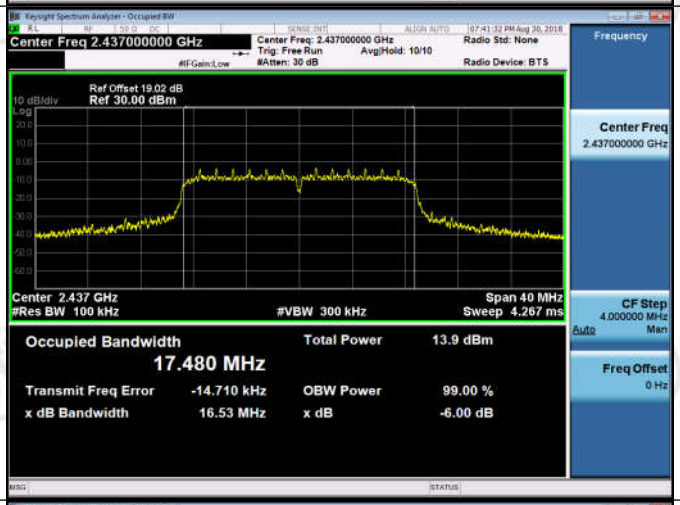
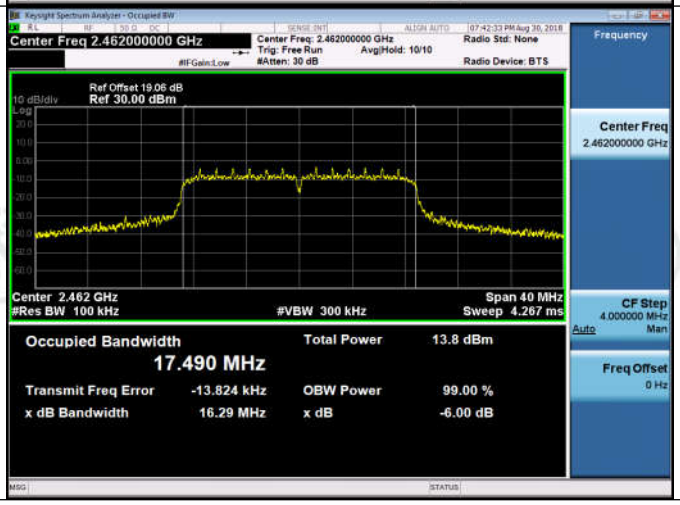
Result Table

Mode	Channel	6dB Bandwidth [MHz]	99% OBW [MHz]	Verdict
11B	LCH	9.070	13.798	PASS
11B	MCH	9.101	13.488	PASS
11B	HCH	9.088	13.387	PASS
11G	LCH	16.29	16.452	PASS
11G	MCH	16.07	16.466	PASS
11G	HCH	16.31	16.466	PASS
11N20SISO	LCH	16.04	17.459	PASS
11N20SISO	MCH	16.53	17.480	PASS
11N20SISO	HCH	16.29	17.490	PASS

Test Graph

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

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

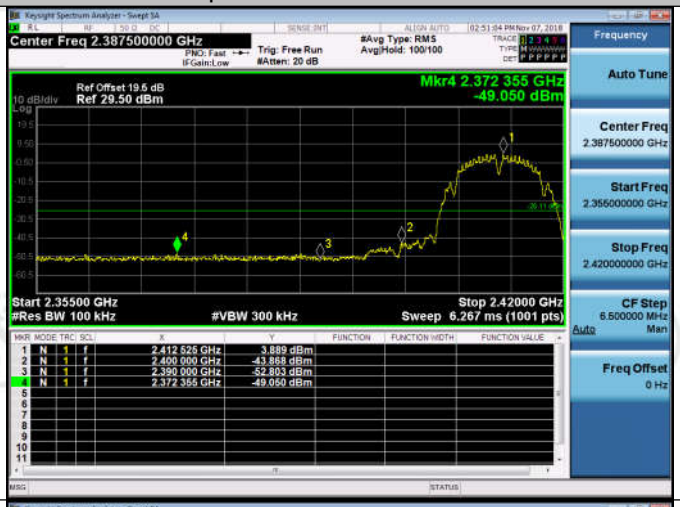
11N20SISO/LCH			
11N20SISO/MCH			
11N20SISO/HCH			

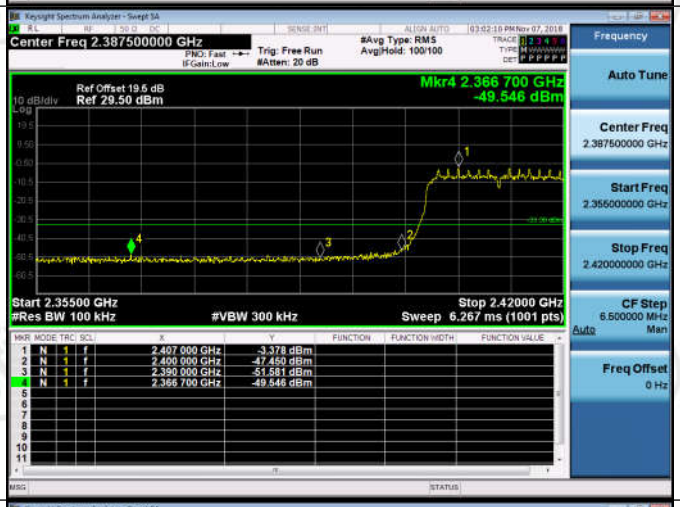
Appendix C): Band-edge for RF Conducted Emissions

Result Table

Mode	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
11B	LCH	3.889	-49.050	-26.11	PASS
11B	HCH	3.305	-48.741	-26.70	PASS
11G	LCH	-3.362	-49.357	-33.36	PASS
11G	HCH	-1.765	-46.861	-31.77	PASS
11N20SISO	LCH	-3.378	-49.546	-33.38	PASS
11N20SISO	HCH	-1.970	-48.722	-31.97	PASS

Test Graph

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

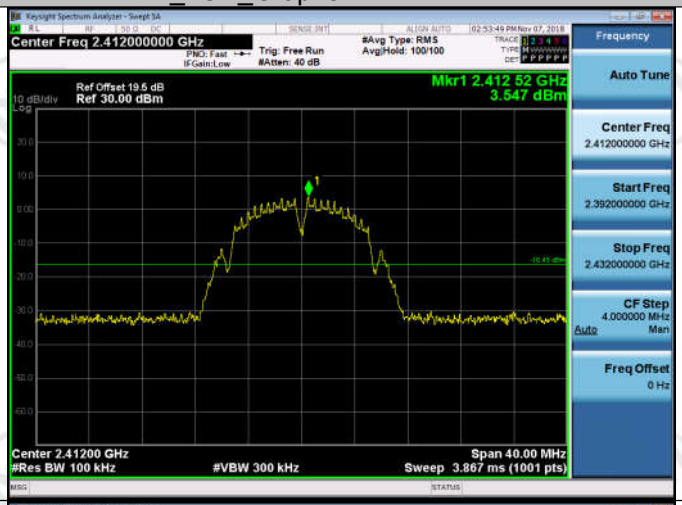
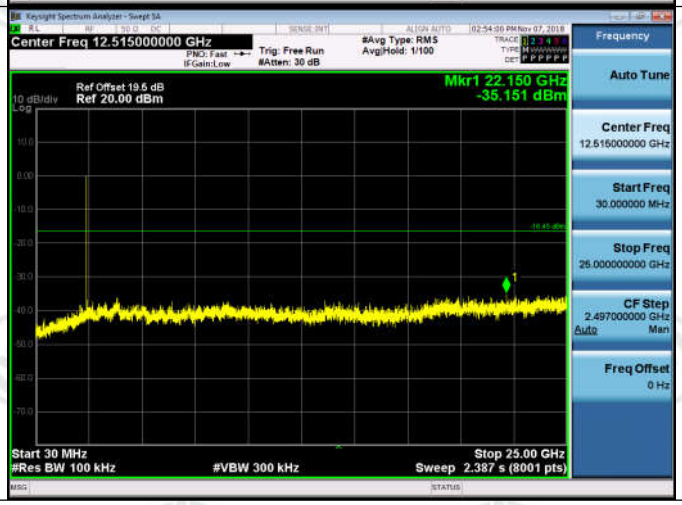
11G/HCH		
11N20SISO/LCH		
11N20SISO/HCH		

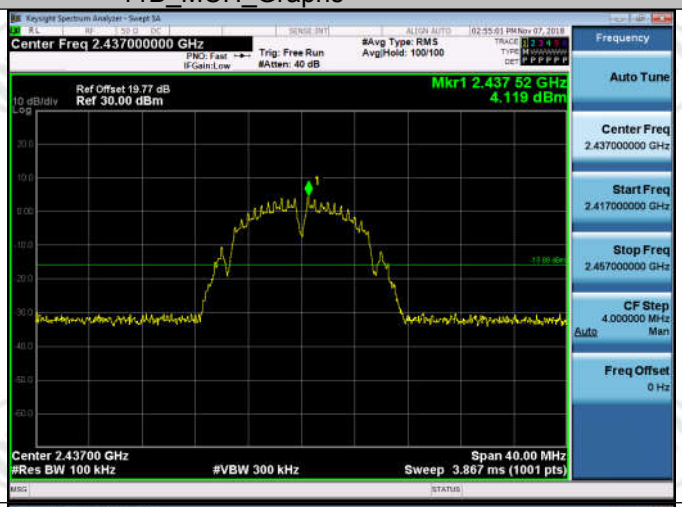
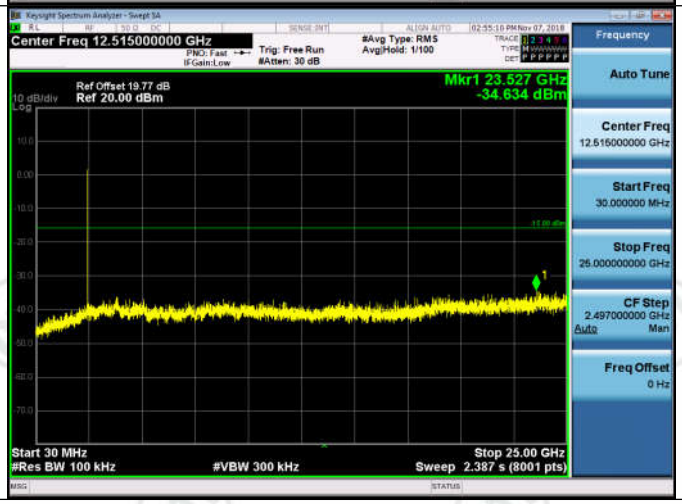
Appendix D): RF Conducted Spurious Emissions

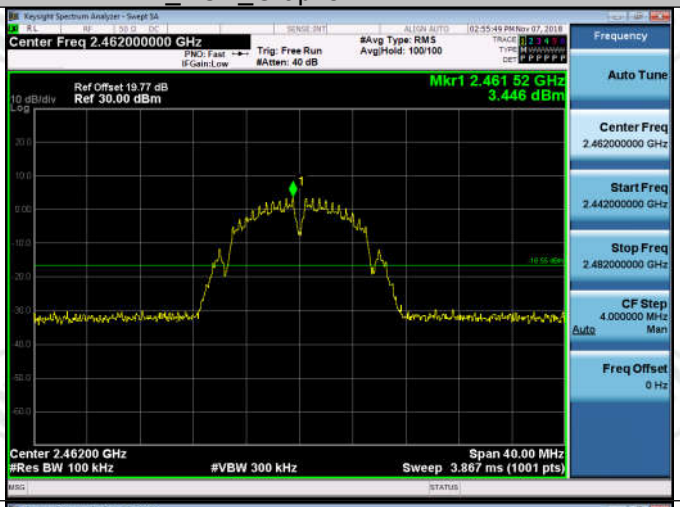
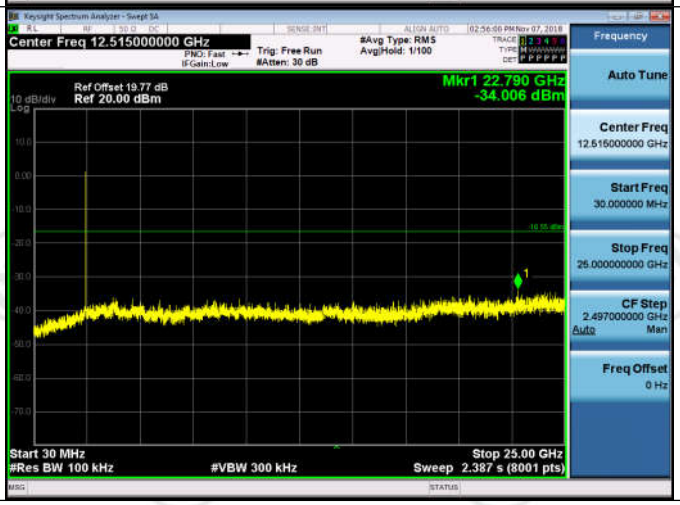
Result Table

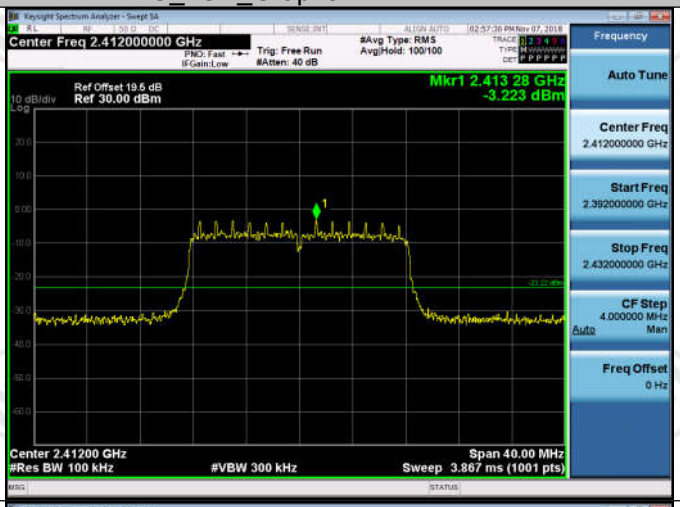
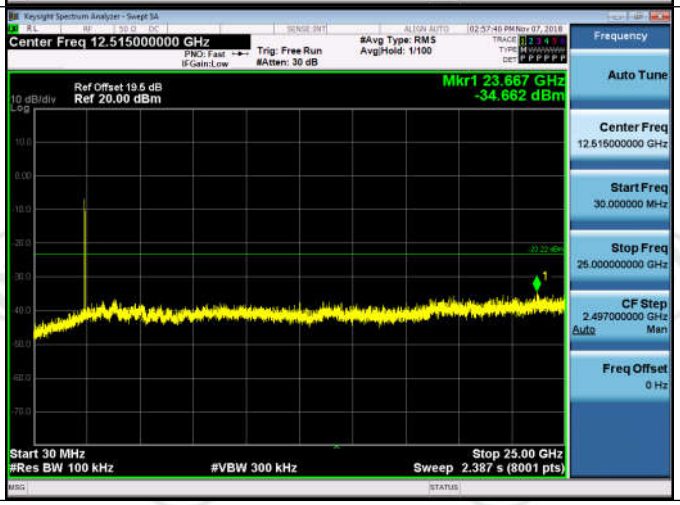
Mode	Channel	Pref [dBm]	Puw[dBm]	Verdict
11B	LCH	3.547	<Limit	PASS
11B	MCH	4.119	<Limit	PASS
11B	HCH	3.446	<Limit	PASS
11G	LCH	-3.223	<Limit	PASS
11G	MCH	-2.711	<Limit	PASS
11G	HCH	-1.458	<Limit	PASS
11N20SISO	LCH	-3.493	<Limit	PASS
11N20SISO	MCH	-2.992	<Limit	PASS
11N20SISO	HCH	-2.109	<Limit	PASS

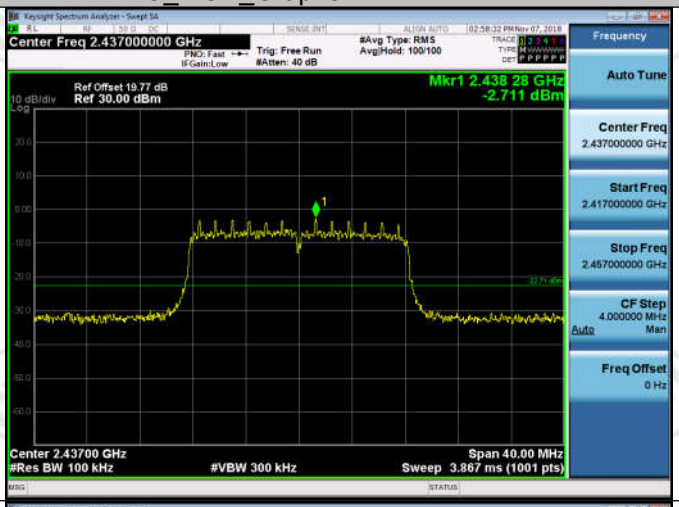
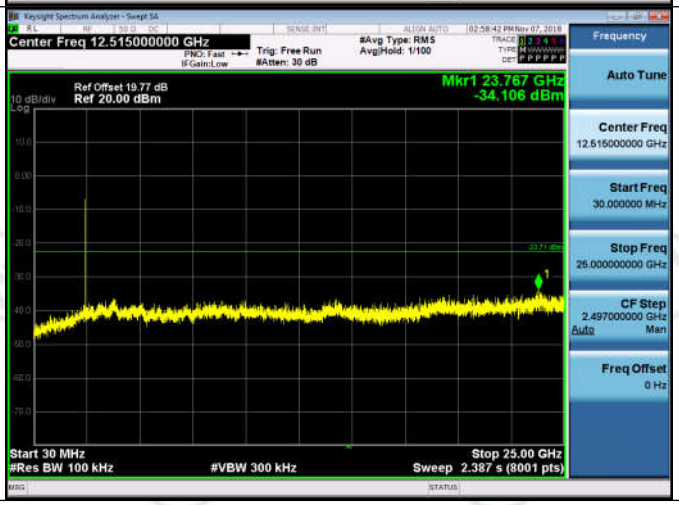
Test Graph

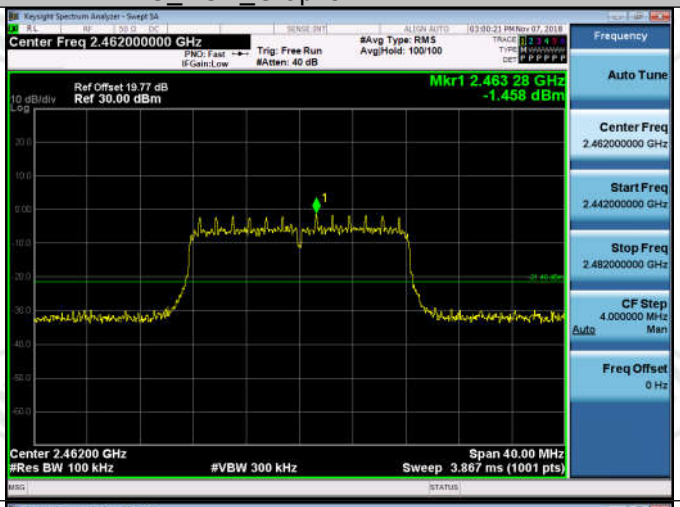
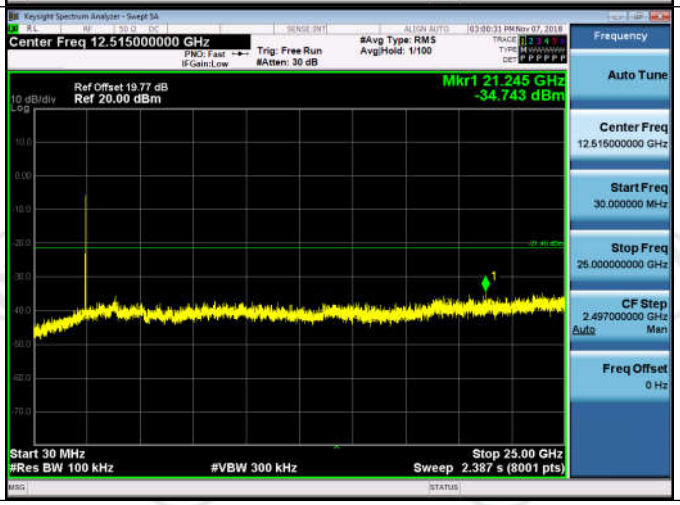
11B_LCH_Graphs		
Pref/11B/LCH		
Puw/11B/LCH		

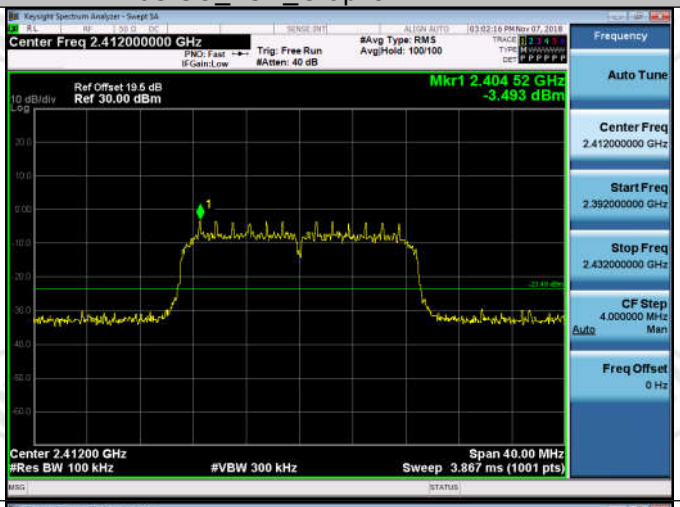
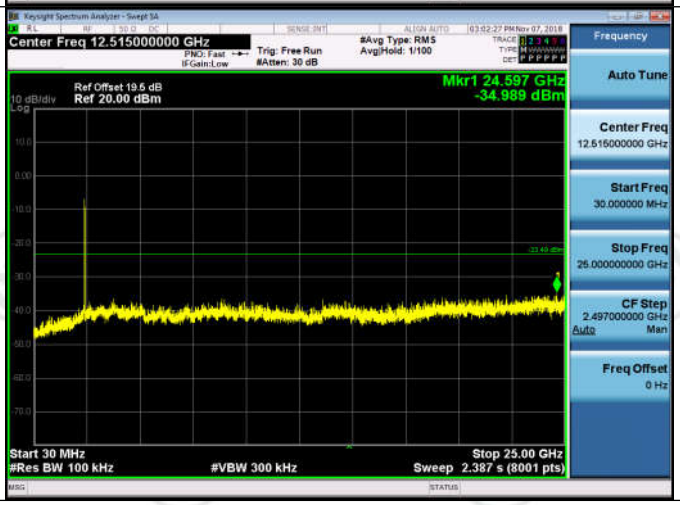
11B_MCH_Graphs		
Pref/11B/MCH		
Puw/11B/MCH		

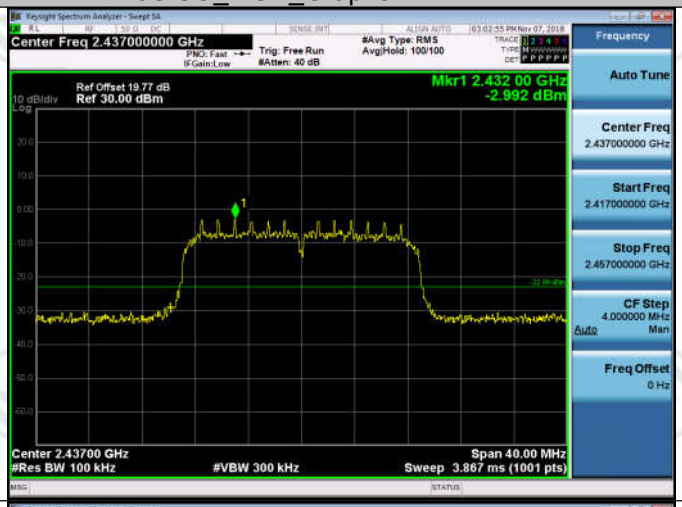
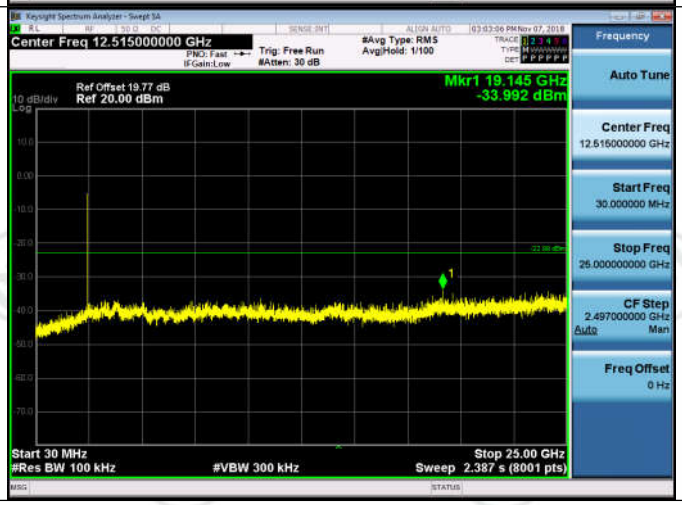
11B_HCH_Graphs			
Pref/11B/HCH			
Puw/11B/HCH			

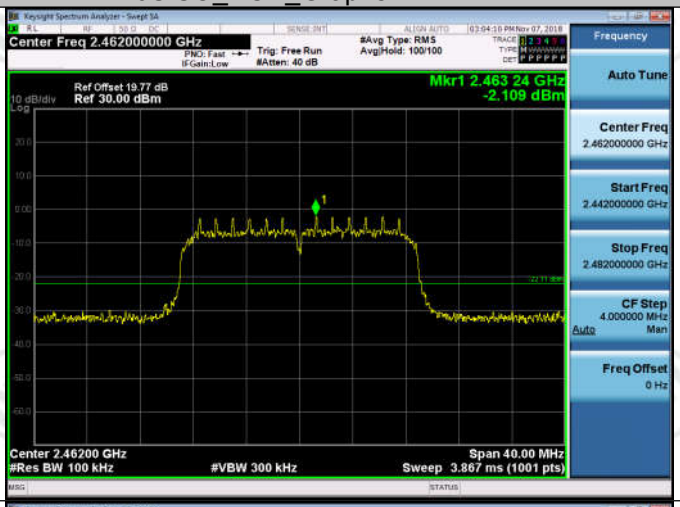
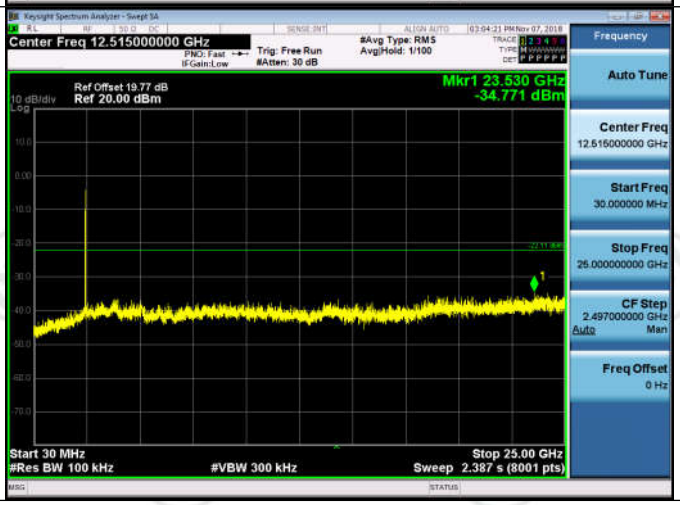
11G_LCH_Graphs			
Pref/11G/LCH			
Puw/11G/LCH			

11G_MCH_Graphs			
Pref/11G/MCH			
Puw/11G/MCH			

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

11N20SISO_LCH_Graphs			
Pref/11N20 SISO/LCH			
Puw/11N20 SISO/LCH			

11N20SISO_MCH_Graphs			
Pref/11N20 SISO/MCH			
Puw/11N20 SISO/MCH			

11N20SISO_HCH_Graphs			
Pref/11N20 SISO/HCH			
Puw/11N20 SISO/HCH			

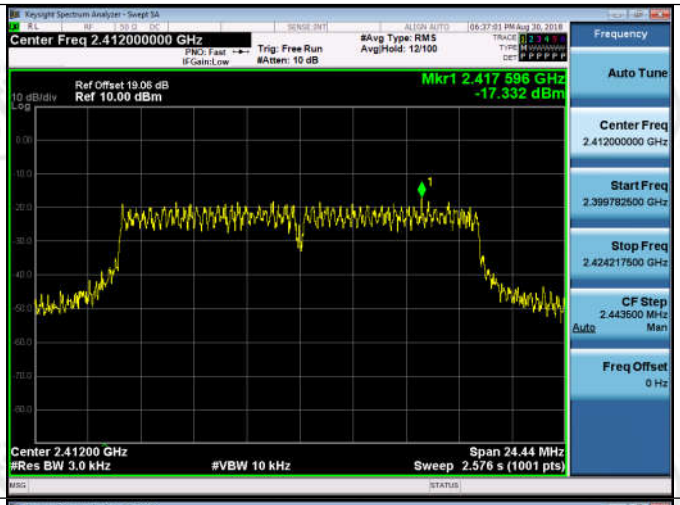
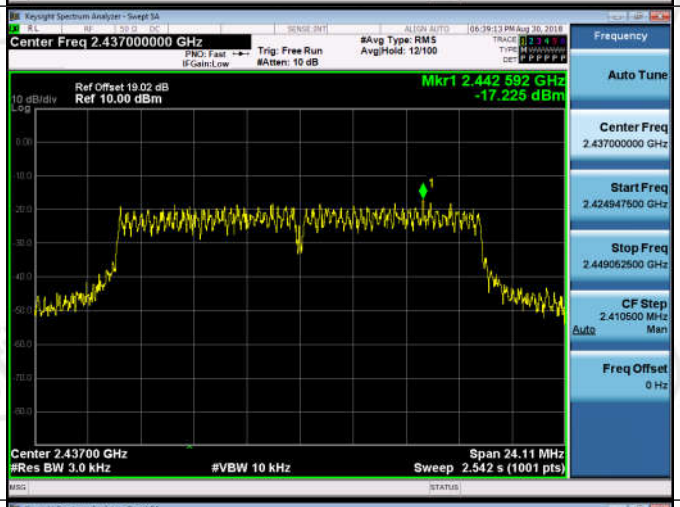
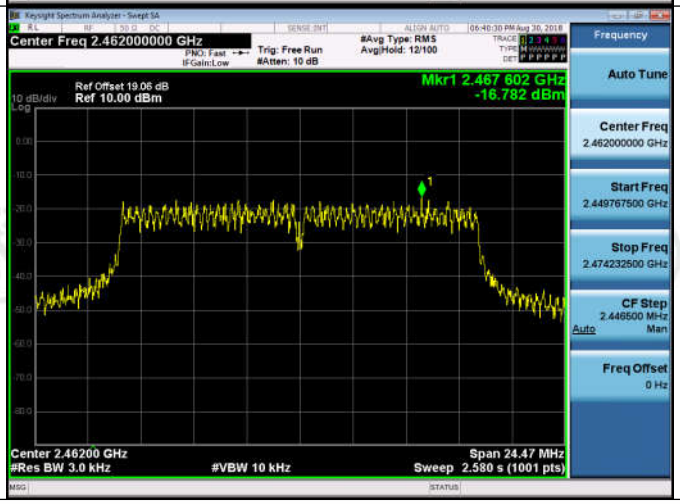
Appendix E): Power Spectral Density

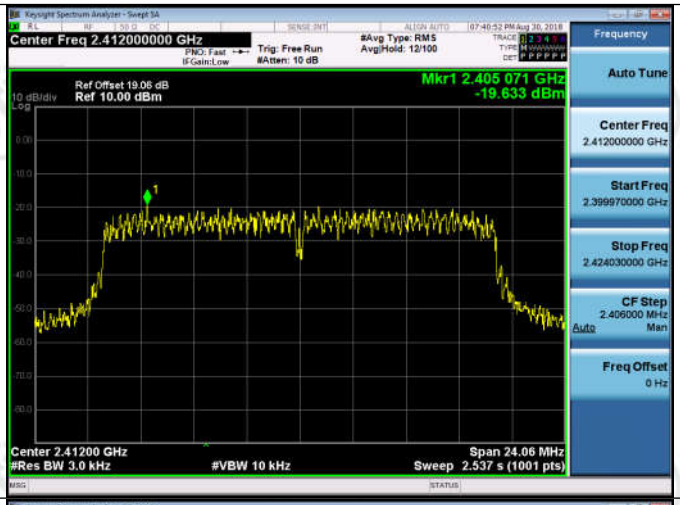
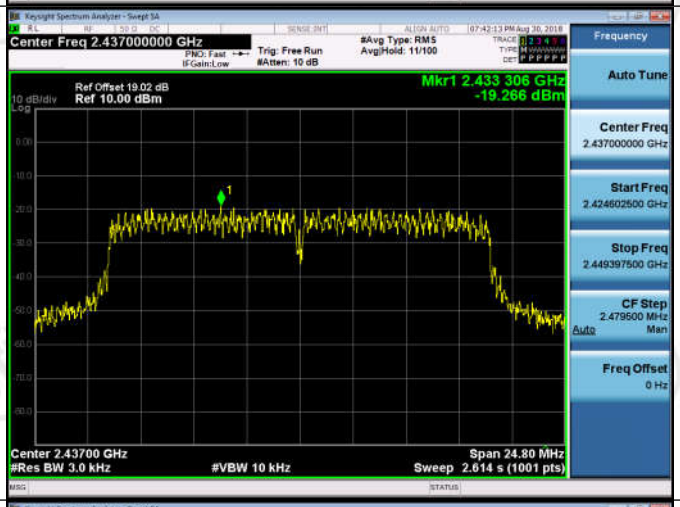
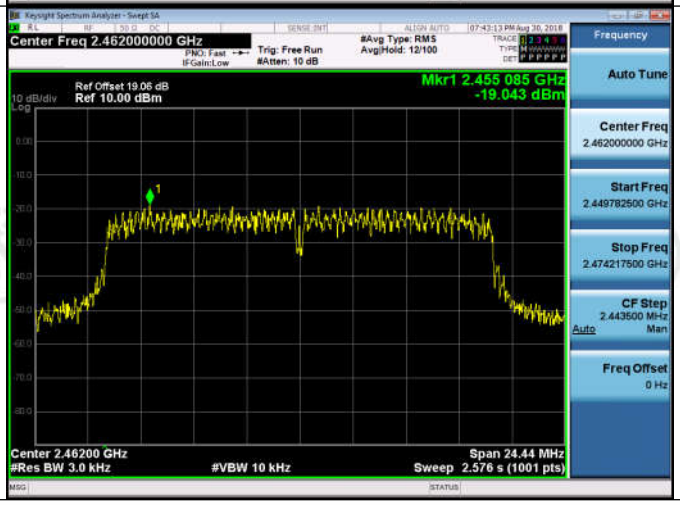
Result Table

Mode	Channel	Power Spectral Density [dBm/3kHz]	Limit[dBm/3kHz]	Verdict
11B	LCH	-11.185	8	PASS
11B	MCH	-10.114	8	PASS
11B	HCH	-10.584	8	PASS
11G	LCH	-17.332	8	PASS
11G	MCH	-17.225	8	PASS
11G	HCH	-16.782	8	PASS
11N20SISO	LCH	-19.633	8	PASS
11N20SISO	MCH	-19.266	8	PASS
11N20SISO	HCH	-19.043	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:

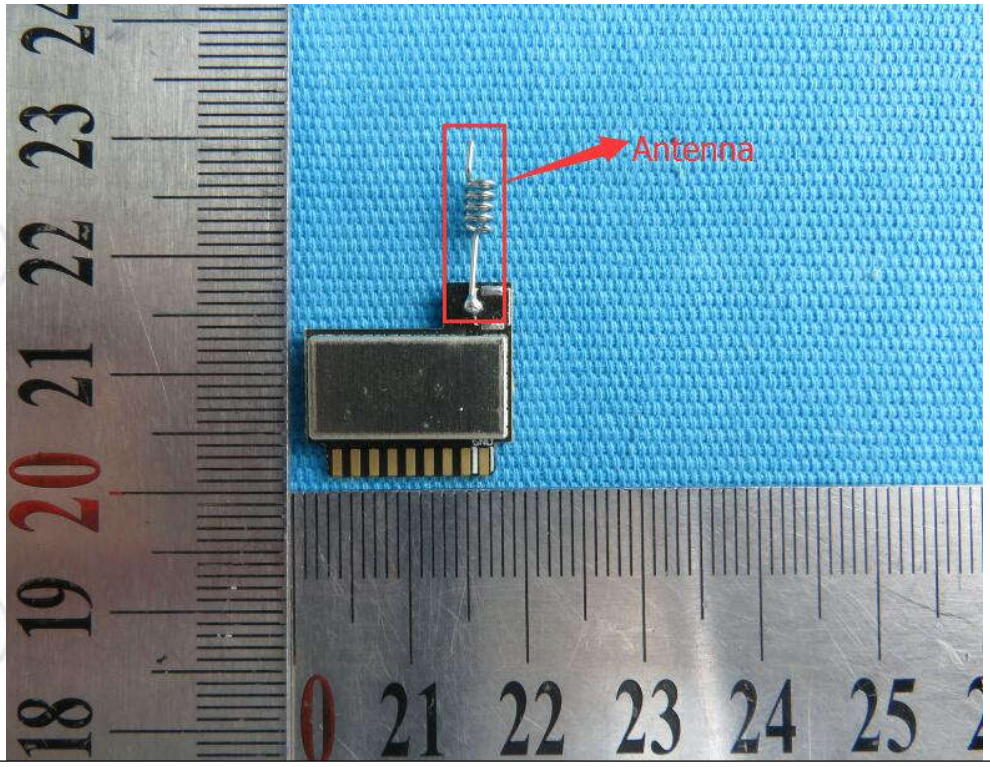
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit 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 Spring antenna and no consideration of replacement. The best case gain of the antenna is 2.78dBi.



Appendix G): AC Power Line Conducted Emission

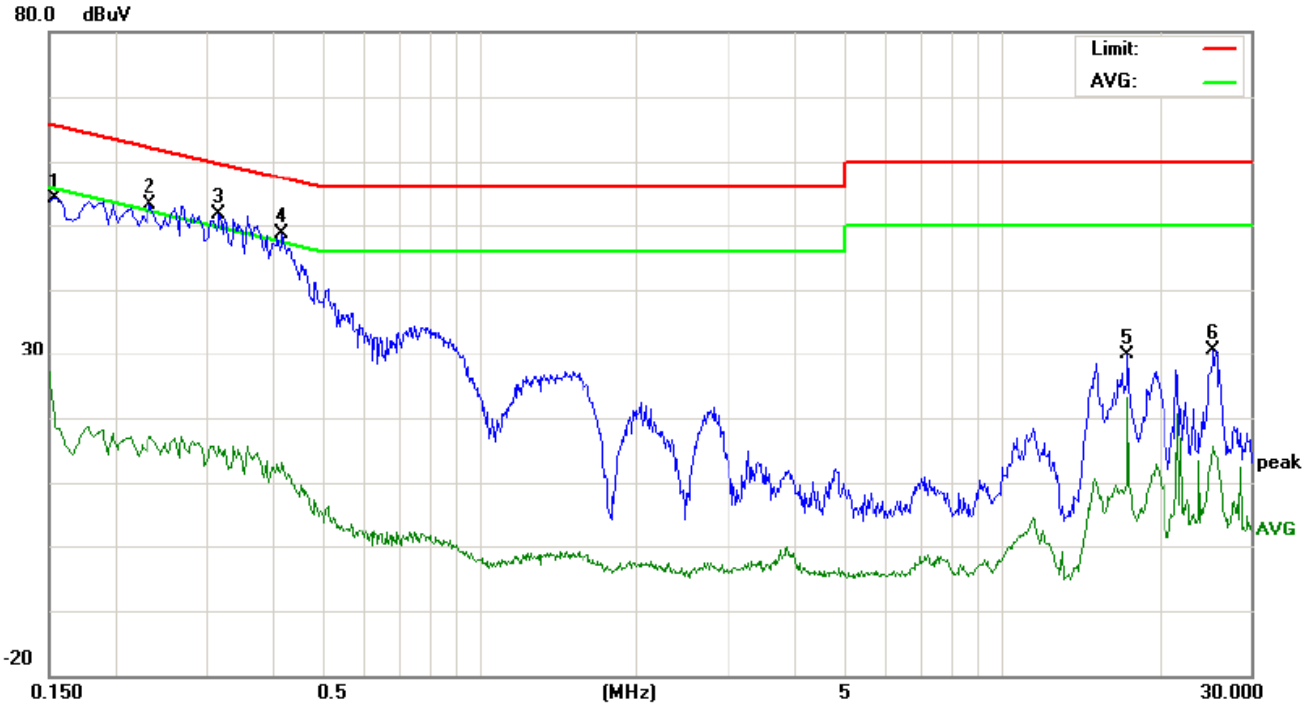
<table>
<tr><td>Test Procedure:</td><td>Test frequency range :150KHz-30MHz
1)The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. 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><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBμV)</th></tr>
<tr><th>Quasi-peak</th><th>Average</th></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.

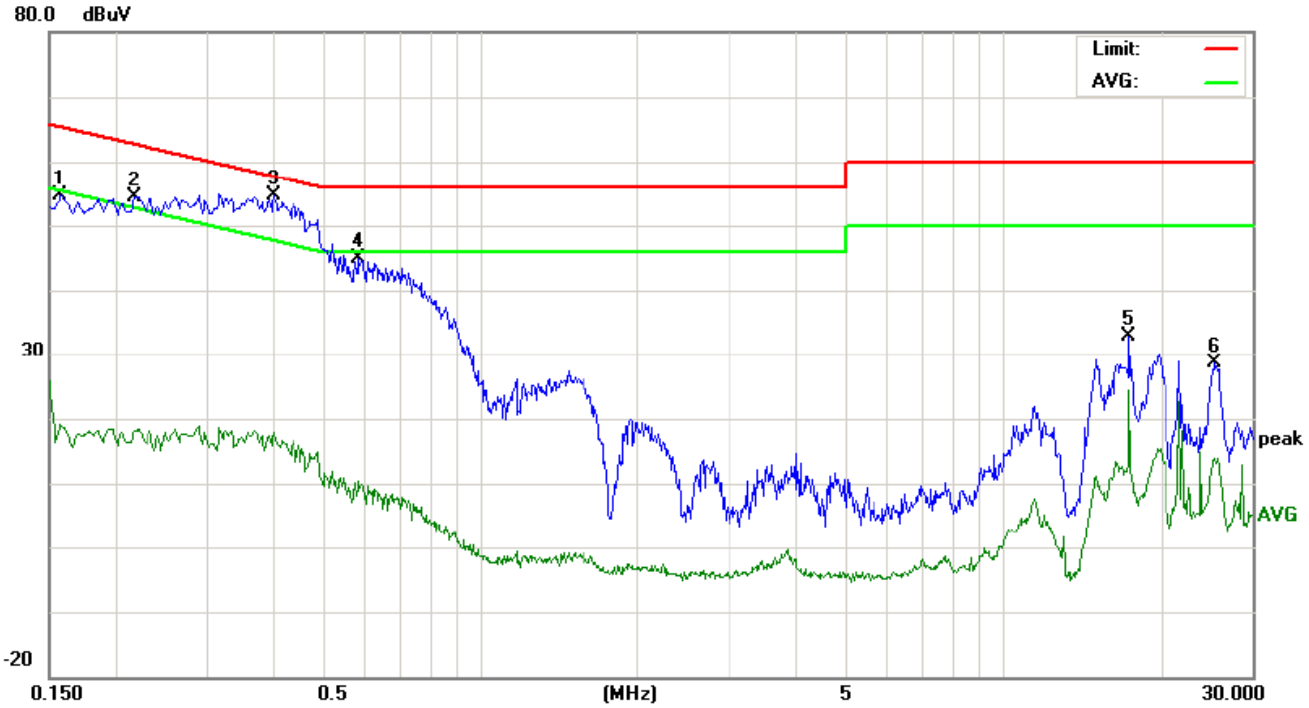
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

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	0.1539	44.28	37.74	6.91	9.76	54.04	47.50	16.67	65.78	55.78	-18.28	-39.11	P	
2	0.2340	43.29	36.29	5.50	9.73	53.02	46.02	15.23	62.30	52.30	-16.28	-37.07	P	
3	0.3180	41.83	34.61	4.05	9.77	51.60	44.38	13.82	59.76	49.76	-15.38	-35.94	P	
4	0.4180	38.87	30.92	0.78	9.74	48.61	40.66	10.52	57.49	47.49	-16.83	-36.97	P	
5	17.4380	19.81	12.33	0.66	10.03	29.84	22.36	10.69	60.00	50.00	-37.64	-39.31	P	
6	25.5540	20.52	12.25	3.49	10.19	30.71	22.44	13.68	60.00	50.00	-37.56	-36.32	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	0.1580	44.96	37.58	9.28	9.76	54.72	47.34	19.04	65.56	55.56	-18.22	-36.52	P	
2	0.2180	44.65	37.14	8.41	9.72	54.37	46.86	18.13	62.89	52.89	-16.03	-34.76	P	
3	0.4020	44.86	37.47	8.11	9.75	54.61	47.22	17.86	57.81	47.81	-10.59	-29.95	P	
4	0.5860	35.21	28.15	0.57	9.74	44.95	37.89	10.31	56.00	46.00	-18.11	-35.69	P	
5	17.4220	22.78	15.44	14.22	10.03	32.81	25.47	24.25	60.00	50.00	-34.53	-25.75	P	
6	25.4820	18.35	11.26	3.63	10.19	28.54	21.45	13.82	60.00	50.00	-38.55	-36.18	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:

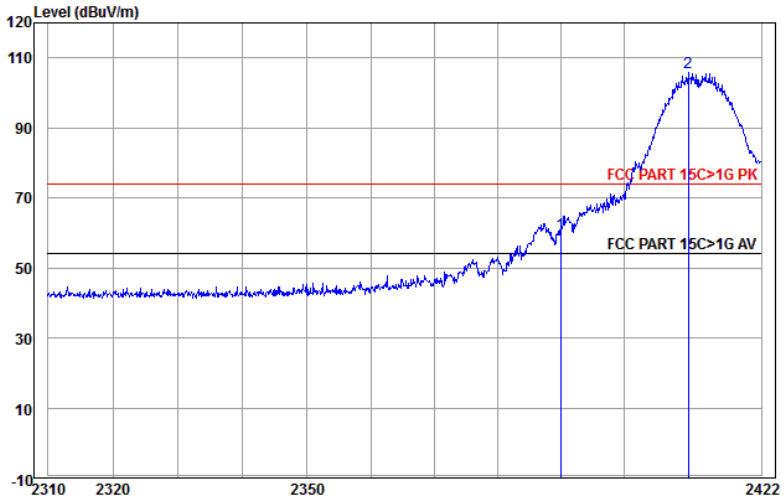
g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).
h. Test the EUT in the lowest channel , the Highest channel
i. The radiation measurements are 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

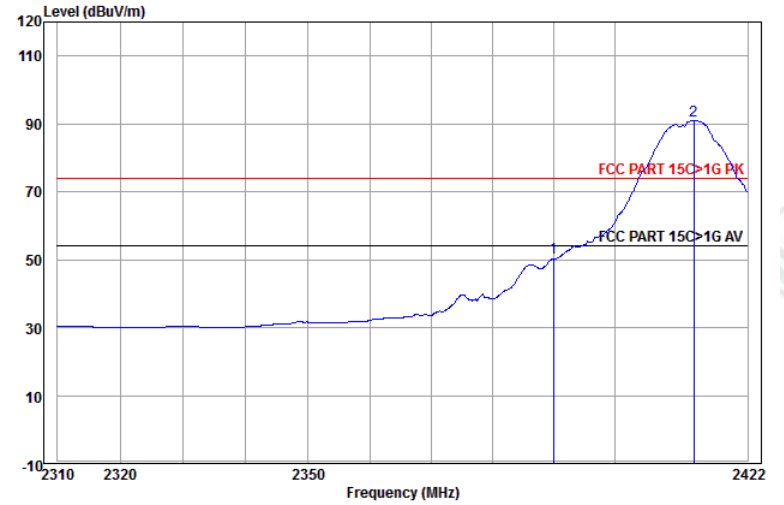
Test plot as follows:

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



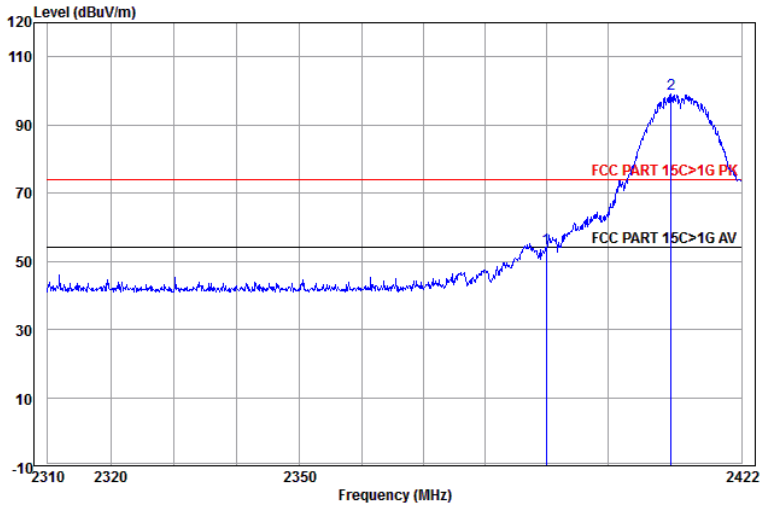
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	27.64	3.07	29.21	59.92	74.00	-14.08	Horizontal	
2 pp	2410.332	27.62	3.08	75.09	105.79	74.00	31.79	Horizontal	

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



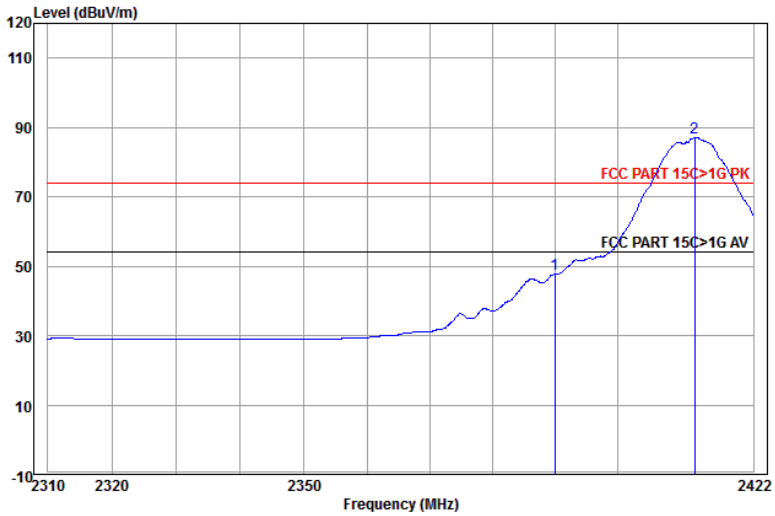
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	27.64	3.07	19.73	50.44	54.00	-3.56	Horizontal	Average
2 pp	2413.072	27.61	3.08	60.26	90.95	54.00	36.95	Horizontal	Average

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



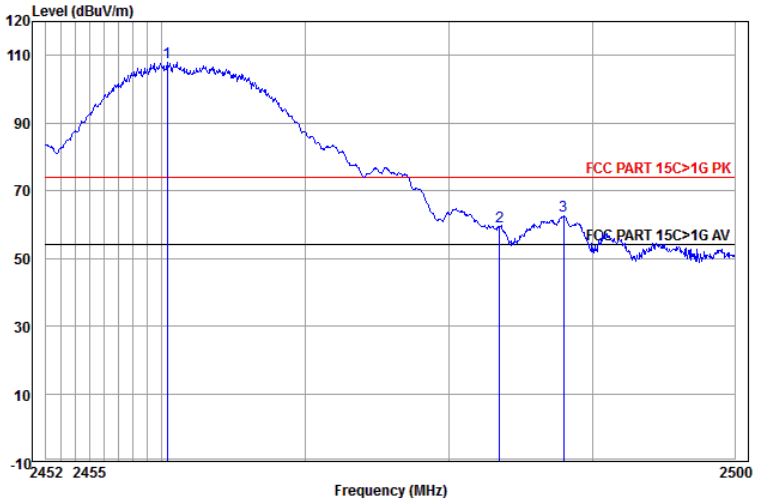
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	27.64	3.07	23.21	53.92	74.00	-20.08	Vertical	
2 pp	2410.446	27.62	3.08	68.53	99.23	74.00	25.23	Vertical	

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



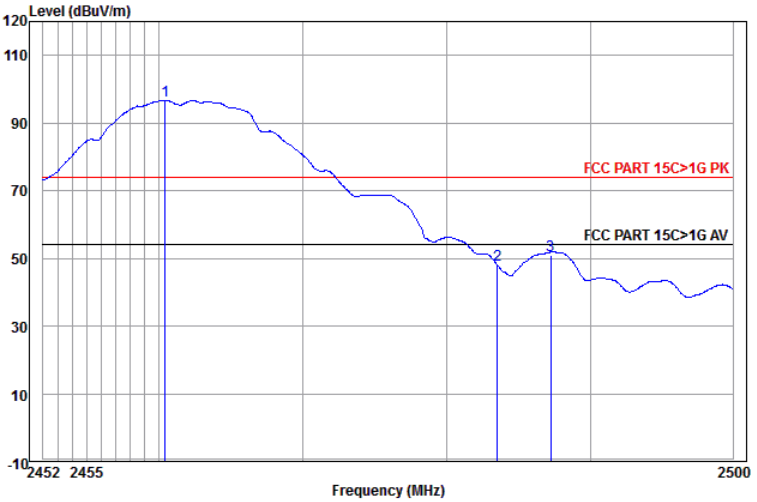
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	27.64	3.07	16.99	47.70	54.00	-6.30	Vertical	Average
2 pp	2412.501	27.61	3.08	56.31	87.00	54.00	33.00	Vertical	Average

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



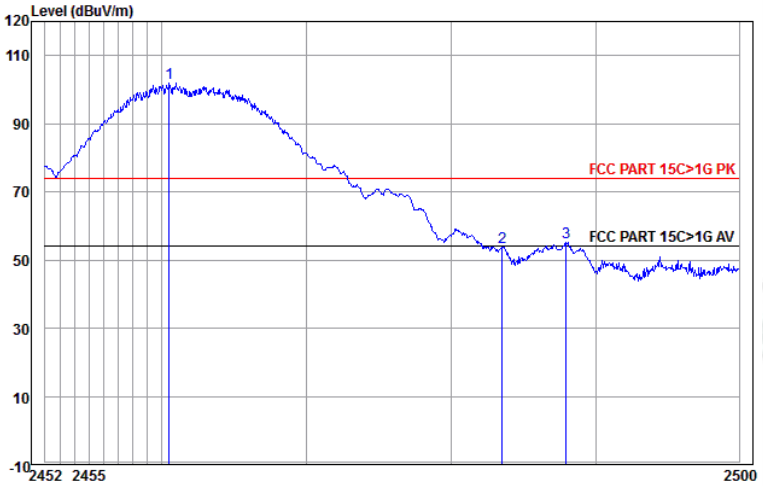
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2460.381	27.60	3.11	77.35	108.06	74.00	34.06	Horizontal	
2	2483.500	27.59	3.12	28.68	59.39	74.00	-14.61	Horizontal	
3	2488.009	27.58	3.12	31.83	62.53	74.00	-11.47	Horizontal	

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



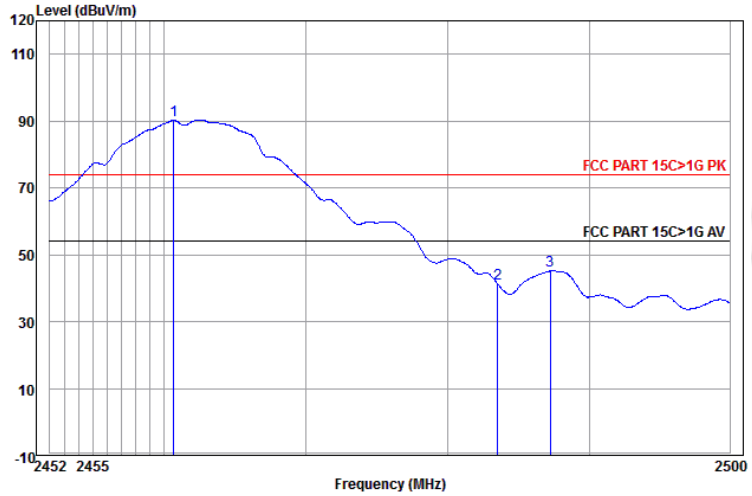
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2460.428	27.60	3.11	66.00	96.71	54.00	42.71	Horizontal	Average
2	2483.500	27.59	3.12	17.44	48.15	54.00	-5.85	Horizontal	Average
3	2487.238	27.59	3.12	20.17	50.88	54.00	-3.12	Horizontal	Average

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



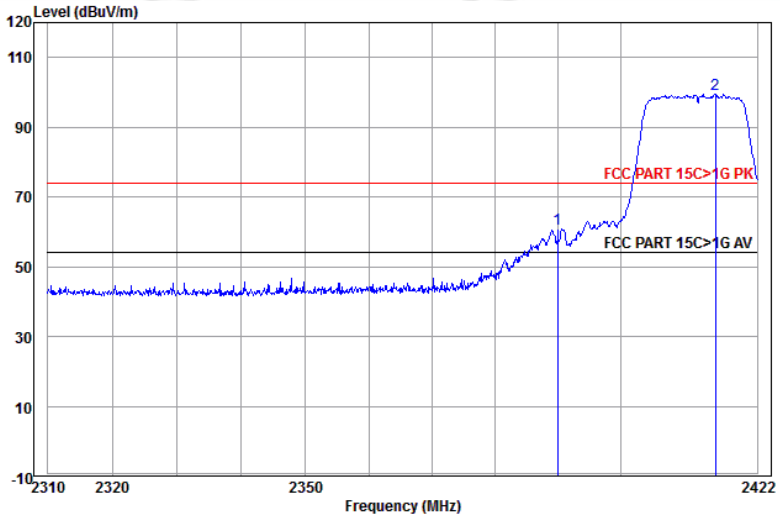
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	pp 2460.524	27.60	3.11	71.16	101.87	74.00	27.87	Vertical	
2	2483.500	27.59	3.12	22.92	53.63	74.00	-20.37	Vertical	
3	2487.961	27.58	3.12	24.42	55.12	74.00	-18.88	Vertical	

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



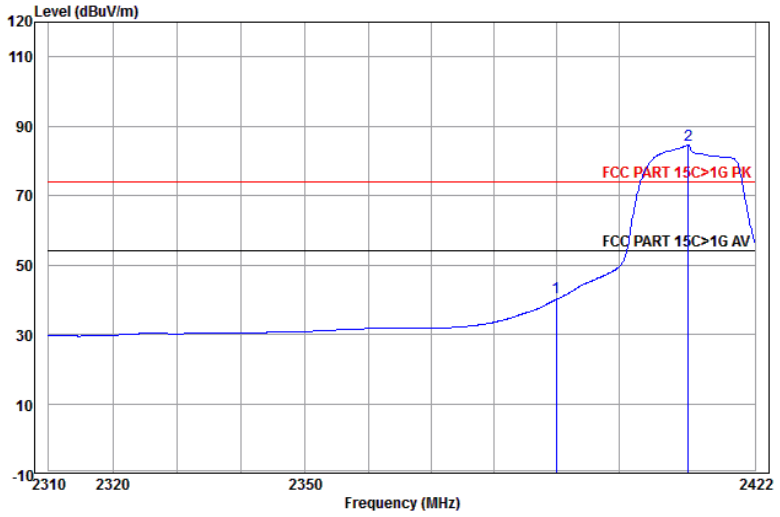
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	pp 2460.667	27.60	3.11	59.60	90.31	54.00	36.31	Vertical	Average
2	2483.500	27.59	3.12	10.76	41.47	54.00	-12.53	Vertical	Average
3	2487.238	27.59	3.12	14.45	45.16	54.00	-8.84	Vertical	Average

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



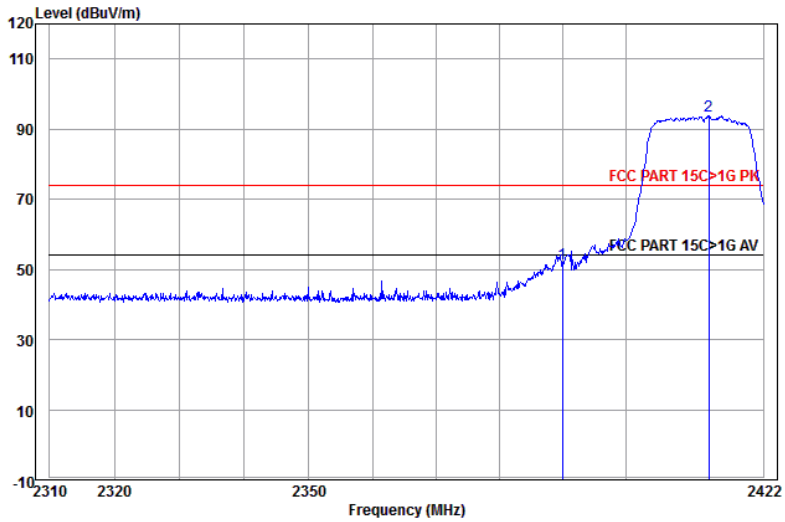
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	27.64	3.07	30.03	60.74	74.00	-13.26	Horizontal	
2 pp	2415.244	27.61	3.08	68.77	99.46	74.00	25.46	Horizontal	

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



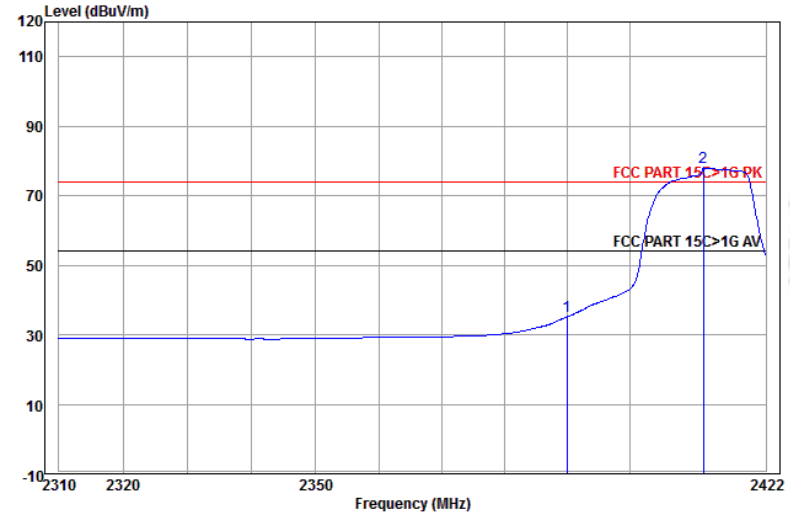
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	27.64	3.07	9.96	40.67	54.00	-13.33	Horizontal	Average
2 pp	2411.245	27.62	3.08	53.99	84.69	54.00	30.69	Horizontal	Average

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



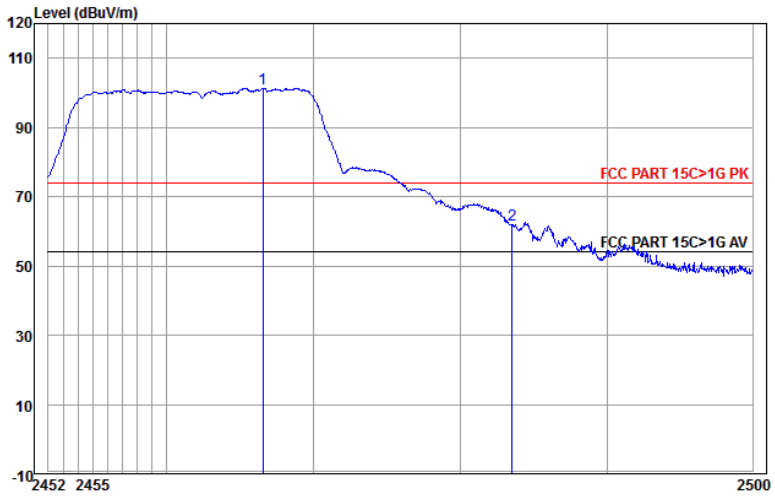
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	27.64	3.07	20.95	51.66	74.00	-22.34	Vertical	
2 pp	2413.301	27.61	3.08	63.05	93.74	74.00	19.74	Vertical	

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



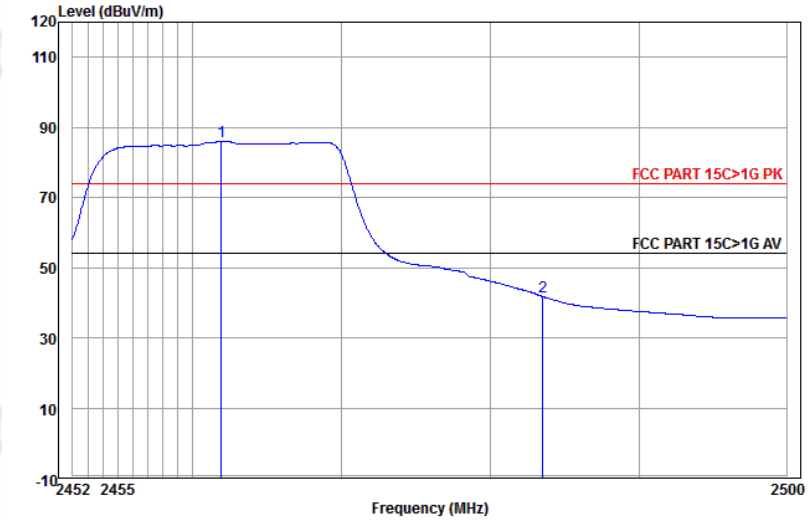
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	27.64	3.07	4.63	35.34	54.00	-18.66	Vertical	Average
2 pp	2411.930	27.62	3.08	47.37	78.07	54.00	24.07	Vertical	Average

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



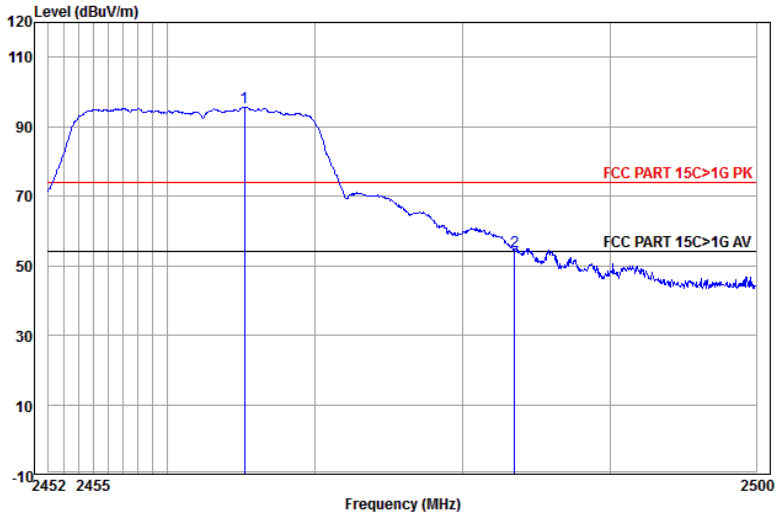
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2466.542	27.59	3.11	70.70	101.40	74.00	27.40	Horizontal	
2	2483.500	27.59	3.12	31.21	61.92	74.00	-12.08	Horizontal	

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



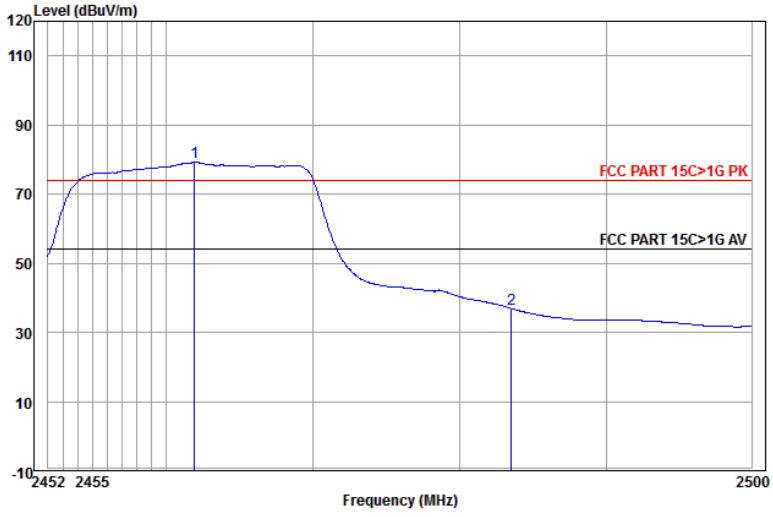
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2461.907	27.60	3.11	55.31	86.02	54.00	32.02	Horizontal	Average
2	2483.500	27.59	3.12	11.05	41.76	54.00	-12.24	Horizontal	Average

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



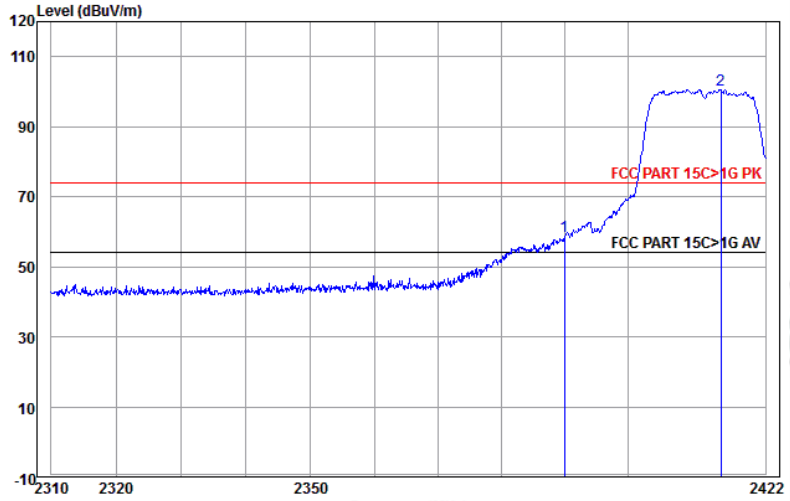
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2465.203	27.59	3.11	64.91	95.61	74.00	21.61	Vertical	
2	2483.500	27.59	3.12	23.32	54.03	74.00	-19.97	Vertical	

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



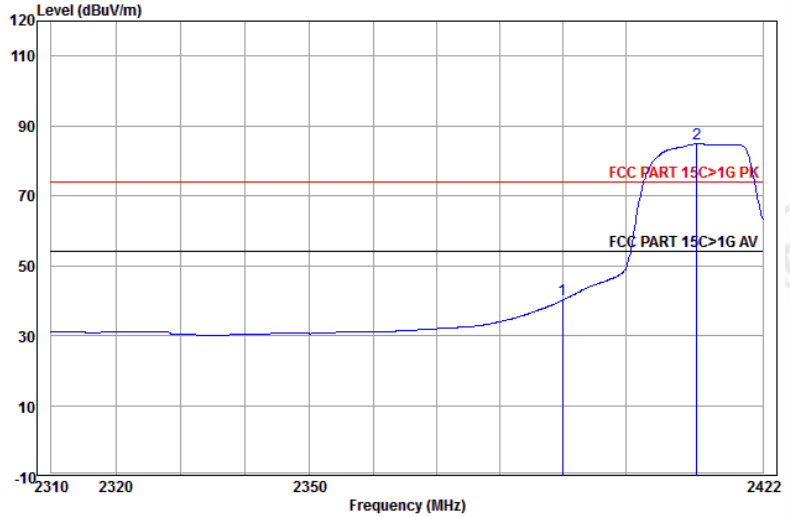
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2461.907	27.60	3.11	48.49	79.20	54.00	25.20	Vertical	Average
2	2483.500	27.59	3.12	6.21	36.92	54.00	-17.08	Vertical	Average

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



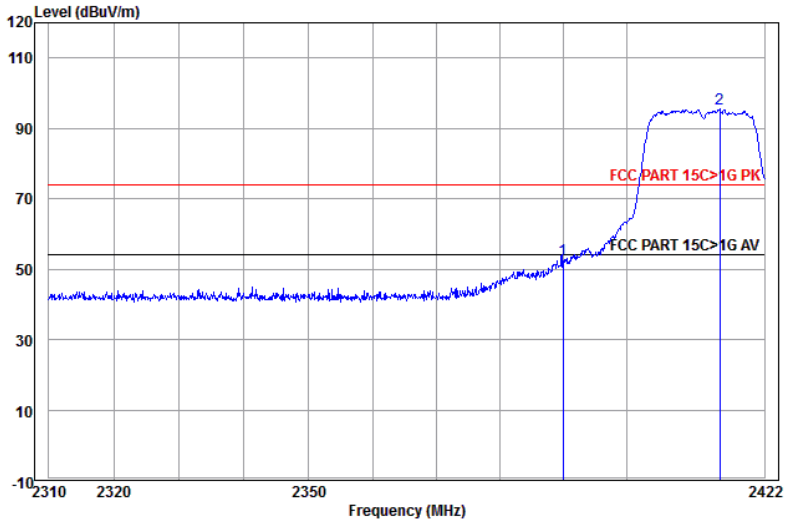
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	27.64	3.07	28.07	58.78	74.00	-15.22	Horizontal	
2 pp	2414.901	27.61	3.08	69.97	100.66	74.00	26.66	Horizontal	

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



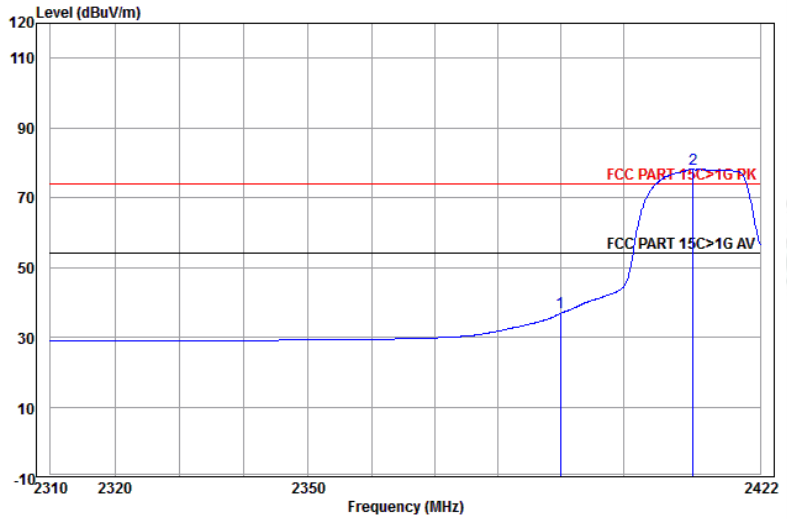
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	27.64	3.07	9.60	40.31	54.00	-13.69	Horizontal	Average
2 pp	2411.359	27.62	3.08	54.18	84.88	54.00	30.88	Horizontal	Average

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



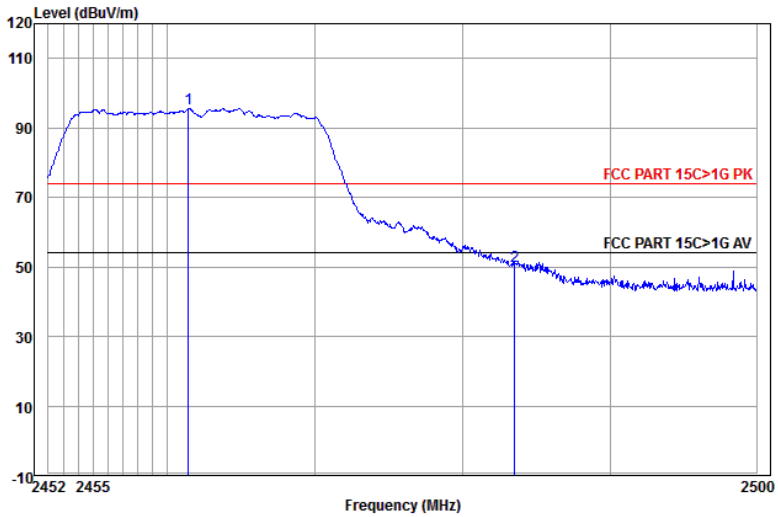
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	27.64	3.07	22.03	52.74	74.00	-21.26	Vertical	
2 pp	2414.901	27.61	3.08	64.76	95.45	74.00	21.45	Vertical	

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



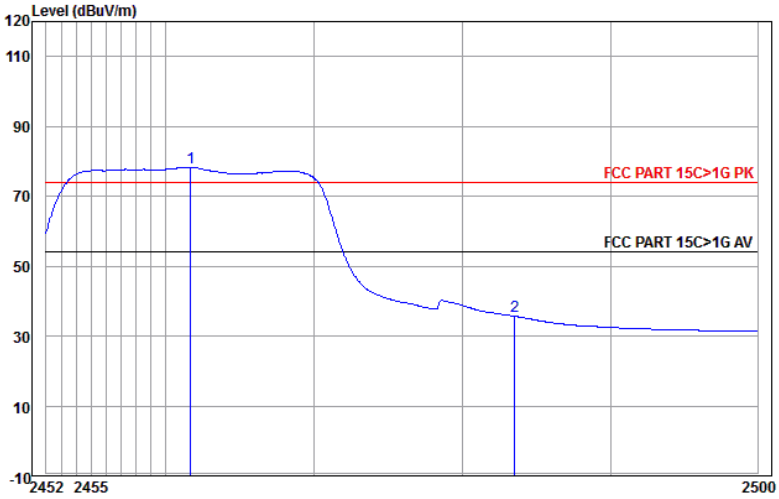
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	27.64	3.07	6.23	36.94	54.00	-17.06	Vertical	Average
2 pp	2411.245	27.62	3.08	47.62	78.32	54.00	24.32	Vertical	Average

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



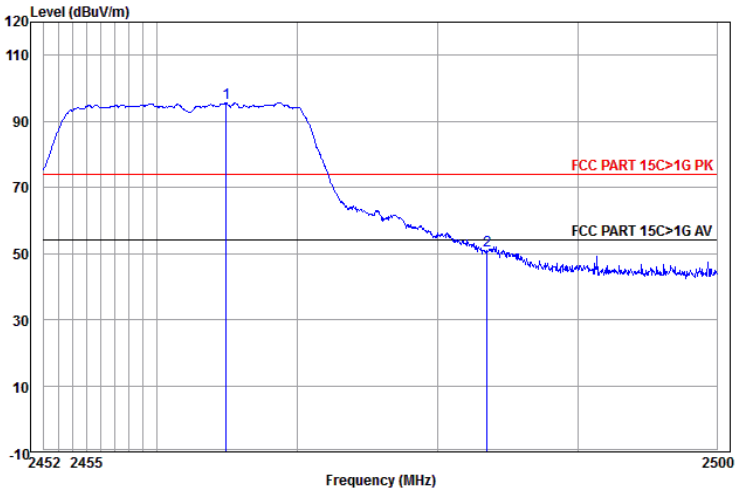
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2461.430	27.60	3.11	64.84	95.55	74.00	21.55	Horizontal	
2	2483.500	27.59	3.12	19.47	50.18	74.00	-23.82	Horizontal	

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



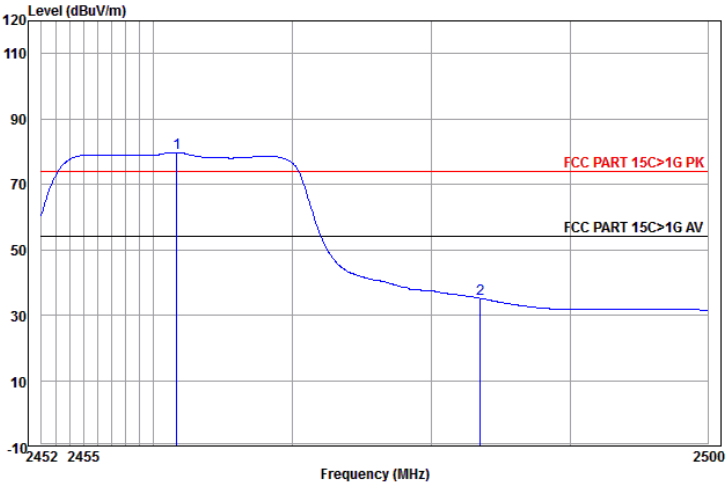
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2461.669	27.60	3.11	47.63	78.34	54.00	24.34	Horizontal	Average
2	2483.500	27.59	3.12	4.98	35.69	54.00	-18.31	Horizontal	Average

Worse case mode:	802.11n(HT20) (6.5Mbps)		
	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	2464.916	27.59	3.11	64.90	95.60	74.00	21.60	Vertical	
2	2483.500	27.59	3.12	20.31	51.02	74.00	-22.98	Vertical	

Worse case mode:	802.11n(HT20) (6.5Mbps)		
	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	27.60	3.11	49.03	79.74	54.00	25.74	Vertical	Average
2	2483.500	27.59	3.12	4.45	35.16	54.00	-18.84	Vertical	Average

Note:

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

Test mode: 802.11 b(11Mbps)Transmitting

NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity
1	161.1702	7.96	1.48	-31.98	49.09	26.55	43.50	16.95	Pass	Horizontal
2	199.7840	10.88	1.67	-31.94	51.54	32.15	43.50	11.35	Pass	Horizontal
3	290.2060	13.00	2.03	-31.87	45.79	28.95	46.00	17.05	Pass	Horizontal
4	399.2559	15.38	2.38	-31.76	42.16	28.16	46.00	17.84	Pass	Horizontal
5	597.3695	18.95	2.94	-31.97	40.18	30.10	46.00	15.90	Pass	Horizontal
6	839.1418	21.37	3.50	-31.90	35.14	28.11	46.00	17.89	Pass	Horizontal
7	161.3643	7.98	1.48	-31.98	48.71	26.19	43.50	17.31	Pass	Vertical
8	199.7840	10.88	1.67	-31.94	47.95	28.56	43.50	14.94	Pass	Vertical
9	290.4001	13.01	2.03	-31.88	46.05	29.21	46.00	16.79	Pass	Vertical
10	354.6269	14.40	2.25	-31.86	41.69	26.48	46.00	19.52	Pass	Vertical
11	597.9516	18.96	2.95	-31.98	41.76	31.69	46.00	14.31	Pass	Vertical
12	799.5579	20.90	3.39	-32.03	35.92	28.18	46.00	17.82	Pass	Vertical

Test mode: 802.11 g(6Mbps) Transmitting

NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity
1	199.7840	10.88	1.67	-31.94	44.63	25.24	43.50	18.26	Pass	Horizontal
2	290.4001	13.01	2.03	-31.88	46.22	29.38	46.00	16.62	Pass	Horizontal
3	322.4165	13.69	2.13	-31.81	41.62	25.63	46.00	20.37	Pass	Horizontal
4	399.8380	15.40	2.38	-31.76	40.48	26.50	46.00	19.50	Pass	Horizontal
5	598.5337	18.97	2.95	-31.98	44.29	34.23	46.00	11.77	Pass	Horizontal
6	786.9454	20.76	3.36	-31.99	34.31	26.44	46.00	19.56	Pass	Horizontal
7	48.8218	13.20	0.79	-32.12	40.46	22.33	40.00	17.67	Pass	Vertical
8	199.0078	10.81	1.66	-31.94	44.68	25.21	43.50	18.29	Pass	Vertical
9	290.2060	13.00	2.03	-31.87	46.50	29.66	46.00	16.34	Pass	Vertical
10	399.4499	15.39	2.38	-31.77	39.71	25.71	46.00	20.29	Pass	Vertical
11	598.7277	18.97	2.95	-31.98	42.09	32.03	46.00	13.97	Pass	Vertical
12	798.1996	20.88	3.39	-32.02	35.01	27.26	46.00	18.74	Pass	Vertical

Test mode: 802.11 n(HT20)(6.5Mbps)

NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity
1	208.9038	11.13	1.71	-31.94	44.69	25.59	43.50	17.91	Pass	Horizontal
2	290.4001	13.01	2.03	-31.88	45.16	28.32	46.00	17.68	Pass	Horizontal
3	354.6269	14.40	2.25	-31.86	40.51	25.30	46.00	20.70	Pass	Horizontal
4	398.0916	15.36	2.37	-31.77	39.18	25.14	46.00	20.86	Pass	Horizontal
5	599.3099	18.99	2.96	-31.99	40.37	30.33	46.00	15.67	Pass	Horizontal
6	796.6473	20.86	3.38	-32.01	34.73	26.96	46.00	19.04	Pass	Horizontal
7	48.8218	13.20	0.79	-32.12	40.44	22.31	40.00	17.69	Pass	Vertical
8	199.2018	10.82	1.67	-31.94	51.15	31.70	43.50	11.80	Pass	Vertical
9	290.4001	13.01	2.03	-31.88	45.43	28.59	46.00	17.41	Pass	Vertical
10	355.0150	14.41	2.25	-31.85	40.07	24.88	46.00	21.12	Pass	Vertical
11	399.2559	15.38	2.38	-31.76	41.05	27.05	46.00	18.95	Pass	Vertical
12	599.8920	19.00	2.96	-31.99	41.76	31.73	46.00	14.27	Pass	Vertical

Transmitter Emission above 1GHz

Mode:				802.11b(11Mbps) Transmitting			Channel: 2412				
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity	Remark
1	3215.4966	33.29	4.59	-36.74	46.88	48.02	74.00	25.98	Pass	H	Peak
2	4824.0000	34.50	4.61	-36.11	59.38	62.38	74.00	11.62	Pass	H	Peak
3	4824.0000	34.50	4.61	-36.11	43.38	46.38	54.00	7.62	Pass	H	Average
4	5743.9244	35.39	4.95	-36.13	43.90	48.11	74.00	25.89	Pass	H	Peak
5	7236.0000	36.34	5.79	-36.44	41.10	46.79	74.00	27.21	Pass	H	Peak
6	8153.3903	36.46	6.42	-36.45	43.69	50.12	74.00	23.88	Pass	H	Peak
7	9648.0000	37.66	6.72	-36.92	44.91	52.37	74.00	21.63	Pass	H	Peak
8	9648.0000	37.66	6.72	-36.91	30.27	37.74	54.00	16.26	Pass	H	Average
9	2645.1290	32.63	4.09	-36.65	48.09	48.16	74.00	25.84	Pass	V	Peak
10	4824.0000	34.50	4.61	-36.11	57.99	60.99	74.00	13.01	Pass	V	Peak
11	4824.0000	34.50	4.61	-36.11	43.10	46.10	54.00	7.90	Pass	V	Average
12	5715.6466	35.35	4.99	-36.12	44.09	48.31	74.00	25.69	Pass	V	Peak
13	7236.0000	36.34	5.79	-36.44	40.77	46.46	74.00	27.54	Pass	V	Peak
14	8287.9538	36.52	6.13	-36.58	44.08	50.15	74.00	23.85	Pass	V	Peak
15	9648.0000	37.66	6.72	-36.92	45.06	52.52	74.00	21.48	Pass	V	Peak
16	9648.0000	37.66	6.72	-36.91	30.48	37.95	54.00	16.05	Pass	V	Average

Mode:				802.11b(11Mbps) Transmitting			Channel: 2437				
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity	Remark
1	3248.6499	33.30	4.46	-36.82	46.36	47.30	74.00	26.70	Pass	H	Peak
2	4874.0000	34.50	4.78	-36.09	54.93	58.12	74.00	15.88	Pass	H	Peak
3	4874.0000	34.50	4.78	-36.09	41.84	45.03	54.00	8.97	Pass	H	Average
4	6575.6826	35.93	5.44	-36.19	42.10	47.28	74.00	26.72	Pass	H	Peak
5	7311.0000	36.41	5.85	-36.31	41.44	47.39	74.00	26.61	Pass	H	Peak
6	7694.1194	36.52	6.25	-36.39	43.03	49.41	74.00	24.59	Pass	H	Peak
7	9748.0000	37.70	6.77	-36.79	43.01	50.69	74.00	23.31	Pass	H	Peak
8	1593.3187	29.02	3.06	-36.99	49.97	45.06	74.00	28.94	Pass	V	Peak
9	3575.3075	33.46	4.39	-36.51	45.11	46.45	74.00	27.55	Pass	V	Peak
10	4874.0000	34.50	4.78	-36.09	58.69	61.88	74.00	12.12	Pass	V	Peak
11	4874.0000	34.50	4.78	-36.09	42.56	45.75	54.00	8.25	Pass	V	Average
12	6436.2436	35.89	5.46	-36.28	42.23	47.30	74.00	26.70	Pass	V	Peak
13	7311.0000	36.41	5.85	-36.31	39.31	45.26	74.00	28.74	Pass	V	Peak
14	9748.0000	37.70	6.77	-36.79	43.19	50.87	74.00	23.13	Pass	V	Peak

Mode:				802.11b(11Mbps) Transmitting			Channel: 2462				
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity	Remark
1	3192.0942	33.28	4.64	-36.74	46.17	47.35	74.00	26.65	Pass	H	Peak
2	4614.7615	34.50	4.99	-36.31	43.50	46.68	74.00	27.32	Pass	H	Peak
3	4924.0000	34.50	4.85	-36.17	53.03	56.21	74.00	17.79	Pass	H	Peak
4	4924.0000	34.50	4.85	-36.17	39.52	42.70	54.00	11.30	Pass	H	Average
5	6333.8584	35.87	5.46	-36.17	44.27	49.43	74.00	24.57	Pass	H	Peak
6	7386.0000	36.49	5.85	-36.34	39.68	45.68	74.00	28.32	Pass	H	Peak
7	9848.0000	37.74	6.83	-36.93	42.41	50.05	74.00	23.95	Pass	H	Peak
8	3186.2436	33.27	4.63	-36.76	48.13	49.27	74.00	24.73	Pass	V	Peak
9	4924.0000	34.50	4.85	-36.17	56.30	59.48	74.00	14.52	Pass	V	Peak
10	4924.0000	34.50	4.85	-36.17	37.73	40.91	54.00	13.09	Pass	V	Average
11	5989.6490	35.78	5.34	-36.29	43.02	47.85	74.00	26.15	Pass	V	Peak
12	7386.0000	36.49	5.85	-36.34	40.46	46.46	74.00	27.54	Pass	V	Peak
13	8406.9157	36.56	6.34	-36.28	43.74	50.36	74.00	23.64	Pass	V	Peak
14	9848.0000	37.74	6.83	-36.93	42.54	50.18	74.00	23.82	Pass	V	Peak

Mode:				802.11 g(6Mbps) Transmitting			Channel: 2412				
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity	Remark
1	3216.4716	33.29	4.58	-36.73	47.29	48.43	74.00	25.57	Pass	H	Peak
2	4824.0000	34.50	4.61	-36.11	59.82	62.82	74.00	11.18	Pass	H	Peak
3	4824.0000	34.50	4.61	-36.11	45.27	48.27	54.00	5.73	Pass	H	Average
4	6375.7876	35.88	5.38	-36.24	43.71	48.73	74.00	25.27	Pass	H	Peak
5	7236.0000	36.34	5.79	-36.44	41.95	47.64	74.00	26.36	Pass	H	Peak
6	8527.8278	36.66	6.40	-36.38	43.64	50.32	74.00	23.68	Pass	H	Peak
7	9648.0000	37.66	6.72	-36.92	42.50	49.96	74.00	24.04	Pass	H	Peak
8	3185.2685	33.27	4.63	-36.77	49.68	50.81	74.00	23.19	Pass	V	Peak
9	4824.0000	34.50	4.61	-36.11	52.52	55.52	74.00	18.48	Pass	V	Peak
10	4824.0000	34.50	4.61	-36.11	34.78	37.78	54.00	16.22	Pass	V	Average
11	5893.1143	35.63	5.06	-36.21	43.43	47.91	74.00	26.09	Pass	V	Peak
12	7236.0000	36.34	5.79	-36.44	40.80	46.49	74.00	27.51	Pass	V	Peak
13	7681.4431	36.53	6.22	-36.46	43.80	50.09	74.00	23.91	Pass	V	Peak
14	9648.0000	37.66	6.72	-36.92	42.32	49.78	74.00	24.22	Pass	V	Peak

Mode:				802.11 g(6Mbps) Transmitting			Channel: 2437				
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity	Remark
1	3195.0195	33.28	4.64	-36.72	45.36	46.56	74.00	27.44	Pass	H	Peak
2	4874.0000	34.50	4.78	-36.09	57.41	60.60	74.00	13.40	Pass	H	Peak
3	4874.0000	34.50	4.78	-36.09	42.91	46.10	54.00	7.90	Pass	H	Average
4	6324.1074	35.86	5.46	-36.18	43.41	48.55	74.00	25.45	Pass	H	Peak
5	7311.0000	36.41	5.85	-36.31	40.35	46.30	74.00	27.70	Pass	H	Peak
6	8389.3639	36.56	6.30	-36.36	44.13	50.63	74.00	23.37	Pass	H	Peak
7	9748.0000	37.70	6.77	-36.79	42.14	49.82	74.00	24.18	Pass	H	Peak
8	3188.1938	33.28	4.63	-36.76	49.01	50.16	74.00	23.84	Pass	V	Peak
9	4874.0000	34.50	4.78	-36.09	54.65	57.84	74.00	16.16	Pass	V	Peak
10	4874.0000	34.50	4.78	-36.09	32.37	35.56	54.00	18.44	Pass	V	Average
11	5650.3150	35.24	4.97	-36.02	43.73	47.92	74.00	26.08	Pass	V	Peak
12	7311.0000	36.41	5.85	-36.31	41.14	47.09	74.00	26.91	Pass	V	Peak
13	8442.0192	36.58	6.39	-36.40	43.65	50.22	74.00	23.78	Pass	V	Peak
14	9748.0000	37.70	6.77	-36.79	42.57	50.25	74.00	23.75	Pass	V	Peak

Mode:				802.11 g(6Mbps) Transmitting			Channel: 2462				
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity	Remark
1	3282.7783	33.31	4.54	-36.80	46.97	48.02	74.00	25.98	Pass	H	Peak
2	4924.0000	34.50	4.85	-36.17	59.30	62.48	74.00	11.52	Pass	H	Peak
3	4924.0000	34.50	4.85	-36.17	44.38	47.56	54.00	6.44	Pass	H	Average
4	5769.2769	35.43	4.96	-36.09	43.40	47.70	74.00	26.30	Pass	H	Peak
5	7386.0000	36.49	5.85	-36.34	40.54	46.54	74.00	27.46	Pass	H	Peak
6	7709.7210	36.52	6.26	-36.40	43.11	49.49	74.00	24.51	Pass	H	Peak
7	9848.0000	37.74	6.83	-36.93	40.95	48.59	74.00	25.41	Pass	H	Peak
8	3322.7573	33.33	4.55	-36.75	46.90	48.03	74.00	25.97	Pass	V	Peak
9	4924.0000	34.50	4.85	-36.17	51.16	54.34	74.00	19.66	Pass	V	Peak
10	4924.0000	34.50	4.85	-36.17	37.42	40.60	54.00	13.40	Pass	V	Average
11	5977.9478	35.76	5.33	-36.24	43.60	48.45	74.00	25.55	Pass	V	Peak
12	7386.0000	36.49	5.85	-36.34	39.94	45.94	74.00	28.06	Pass	V	Peak
13	8415.6916	36.57	6.35	-36.31	44.06	50.67	74.00	23.33	Pass	V	Peak
14	9848.0000	37.74	6.83	-36.93	43.30	50.94	74.00	23.06	Pass	V	Peak

Mode:				802.11 n(HT20)(6.5Mbps) Transmitting					Channel: 2412		
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity	Remark
1	3216.4716	33.29	4.58	-36.73	46.98	48.12	74.00	25.88	Pass	H	Peak
2	4824.0000	34.50	4.61	-36.11	56.76	59.76	74.00	14.24	Pass	H	Peak
3	4824.0000	34.50	4.61	-36.11	39.79	42.79	54.00	11.21	Pass	H	Average
4	6170.0420	35.83	5.24	-36.24	43.10	47.93	74.00	26.07	Pass	H	Peak
5	7236.0000	36.34	5.79	-36.44	41.08	46.77	74.00	27.23	Pass	H	Peak
6	9064.1314	37.69	6.47	-36.53	43.23	50.86	74.00	23.14	Pass	H	Peak
7	9648.0000	37.66	6.72	-36.92	42.61	50.07	74.00	23.93	Pass	H	Peak
8	1993.3987	31.66	3.46	-36.75	51.01	49.38	74.00	24.62	Pass	H	Peak
9	3195.9946	33.28	4.64	-36.71	46.35	47.56	74.00	26.44	Pass	V	Peak
10	4824.0000	34.50	4.61	-36.11	51.33	54.33	74.00	19.67	Pass	V	Peak
11	4824.0000	34.50	4.61	-36.11	38.88	41.88	54.00	12.12	Pass	V	Average
12	6385.5386	35.88	5.35	-36.28	43.15	48.10	74.00	25.90	Pass	V	Peak
14	7236.0000	36.34	5.79	-36.44	40.70	46.39	74.00	27.61	Pass	V	Peak
15	9648.0000	37.66	6.72	-36.92	42.14	49.60	74.00	24.40	Pass	V	Peak

Mode:				802.11 n(HT20)(6.5Mbps) Transmitting					Channel: 2437		
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity	Remark
1	3249.6250	33.30	4.45	-36.82	46.82	47.75	74.00	26.25	Pass	H	Peak
2	4874.0000	34.50	4.78	-36.09	56.29	59.48	74.00	14.52	Pass	H	Peak
3	4874.0000	34.50	4.78	-36.09	43.58	46.77	54.00	7.23	Pass	H	Average
4	6367.9868	35.87	5.41	-36.21	44.06	49.13	74.00	24.87	Pass	H	Peak
5	7311.0000	36.41	5.85	-36.31	41.11	47.06	74.00	26.94	Pass	H	Peak
6	8420.5671	36.57	6.36	-36.33	43.97	50.57	74.00	23.43	Pass	H	Peak
7	9748.0000	37.70	6.77	-36.79	41.95	49.63	74.00	24.37	Pass	H	Peak
8	3197.9448	33.28	4.65	-36.71	46.46	47.68	74.00	26.32	Pass	V	Peak
9	4874.0000	34.50	4.78	-36.09	53.80	56.99	74.00	17.01	Pass	V	Peak
10	4874.0000	34.50	4.78	-36.09	39.78	42.97	54.00	11.03	Pass	V	Average
11	6393.3393	35.88	5.33	-36.31	43.85	48.75	74.00	25.25	Pass	V	Peak
12	7311.0000	36.41	5.85	-36.31	40.74	46.69	74.00	27.31	Pass	V	Peak
13	8418.6169	36.57	6.36	-36.33	43.65	50.25	74.00	23.75	Pass	V	Peak
14	9748.0000	37.70	6.77	-36.79	42.84	50.52	74.00	23.48	Pass	V	Peak

Mode:				802.11 n(HT20)(6.5Mbps) Transmitting					Channel: 2462		
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity	Remark
1	3282.7783	33.31	4.54	-36.80	46.80	47.85	74.00	26.15	Pass	H	Peak
2	4924.0000	34.50	4.85	-36.17	58.00	61.18	74.00	12.82	Pass	H	Peak
3	4924.0000	34.50	4.85	-36.17	44.53	47.71	54.00	6.29	Pass	H	Average
4	7268.0018	36.37	5.81	-36.37	44.12	49.93	74.00	24.07	Pass	H	Peak
5	7386.0000	36.49	5.85	-36.34	40.65	46.65	74.00	27.35	Pass	H	Peak
6	8418.6169	36.57	6.36	-36.33	44.28	50.88	74.00	23.12	Pass	H	Peak
7	9848.0000	37.74	6.83	-36.93	41.53	49.17	74.00	24.83	Pass	H	Peak
8	2669.9340	32.67	4.10	-36.68	48.76	48.85	74.00	25.15	Pass	V	Peak
9	4924.0000	34.50	4.85	-36.17	51.62	54.80	74.00	19.20	Pass	V	Peak
10	4924.0000	34.50	4.85	-36.17	31.76	34.94	54.00	19.06	Pass	V	Average
11	7026.1776	36.13	5.69	-36.17	43.42	49.07	74.00	24.93	Pass	V	Peak
12	7386.0000	36.49	5.85	-36.34	40.51	46.51	74.00	27.49	Pass	V	Peak
13	8520.0270	36.64	6.42	-36.39	44.08	50.75	74.00	23.25	Pass	V	Peak
14	9848.0000	37.74	6.83	-36.93	41.90	49.54	74.00	24.46	Pass	V	Peak

Note:

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

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

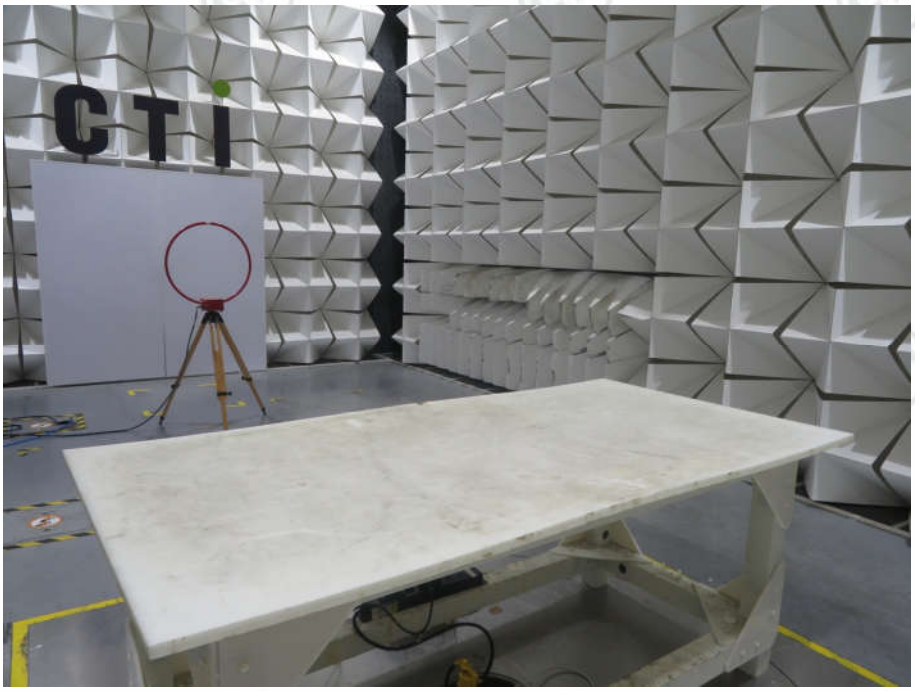
Final Test Level =Receiver Reading - Correct Factor

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

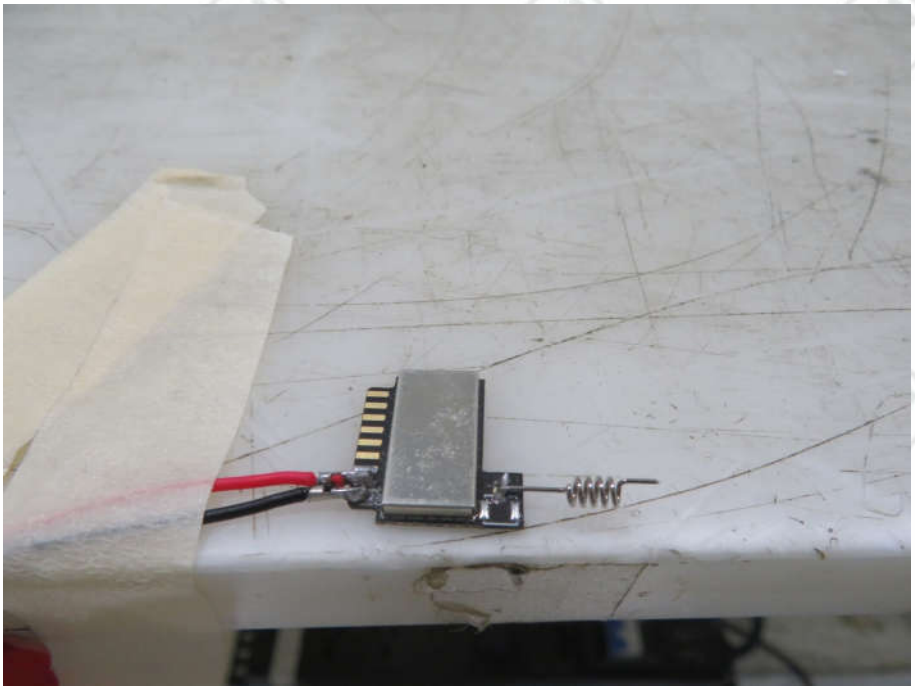
Test Model No.: ESP-01E



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

Radiated spurious emission Test Setup-2(30MHz-1GHz)

Radiated spurious emission Test Setup-3(Above 1GHz)

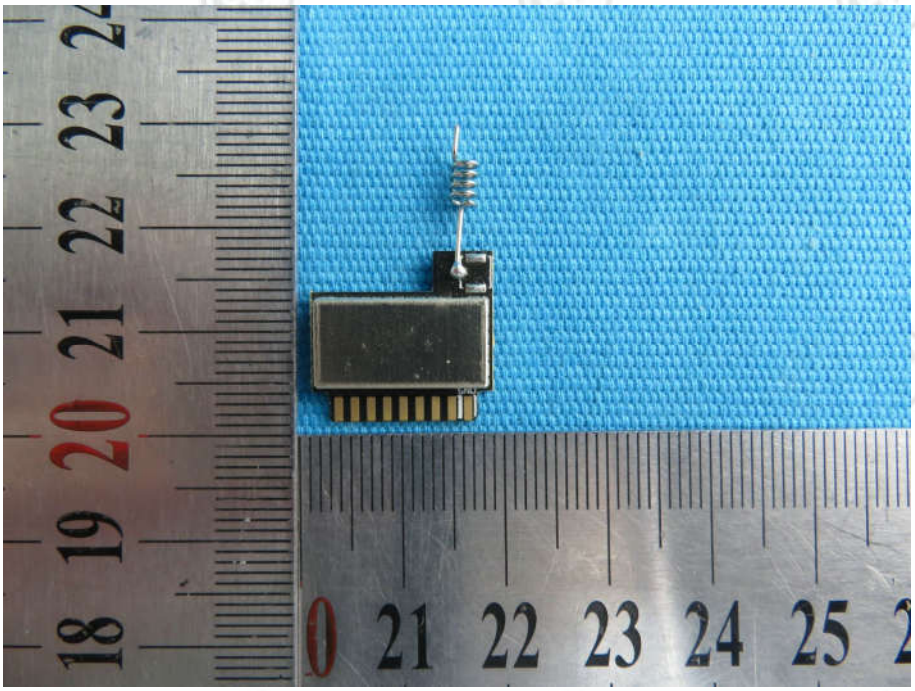


Radiated spurious emission Test Setup-4(Close-up)

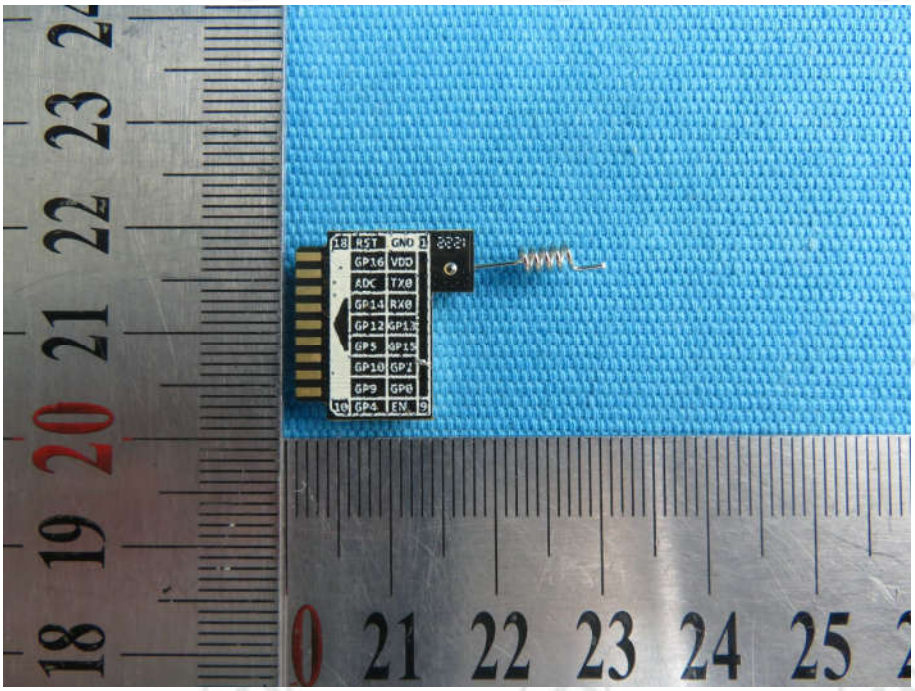
Conducted Emissions Test Setup

PHOTOGRAPHS OF EUT Constructional Details

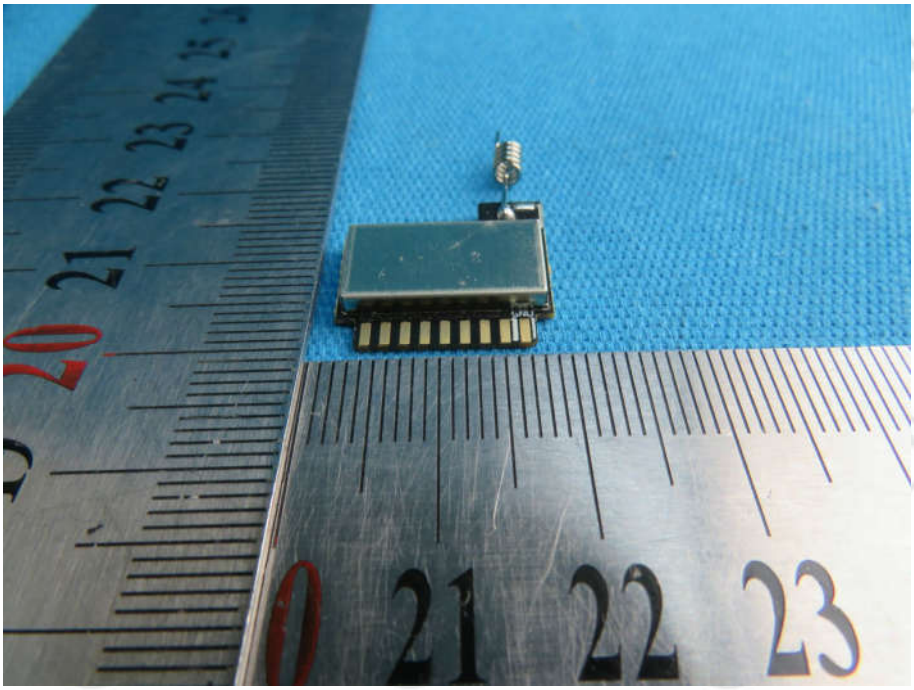
Test model No.: ESP-01E



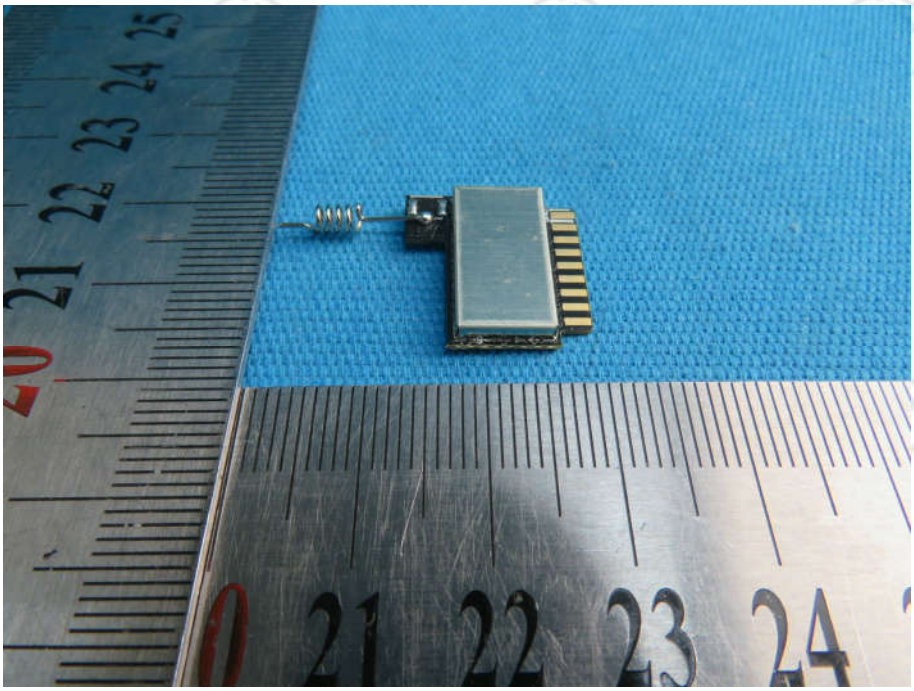
View of Product-1



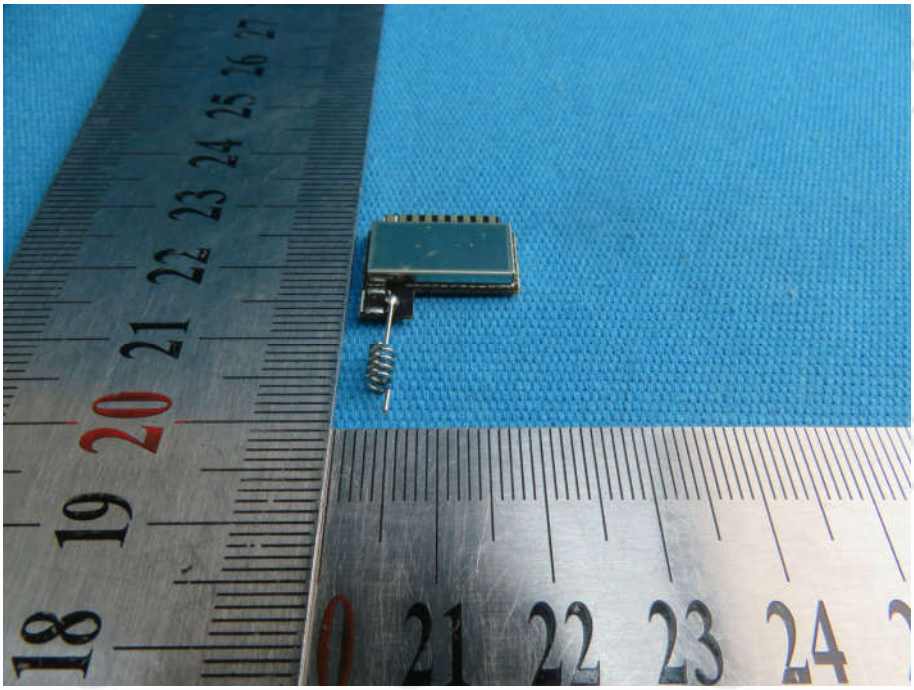
View of Product-2



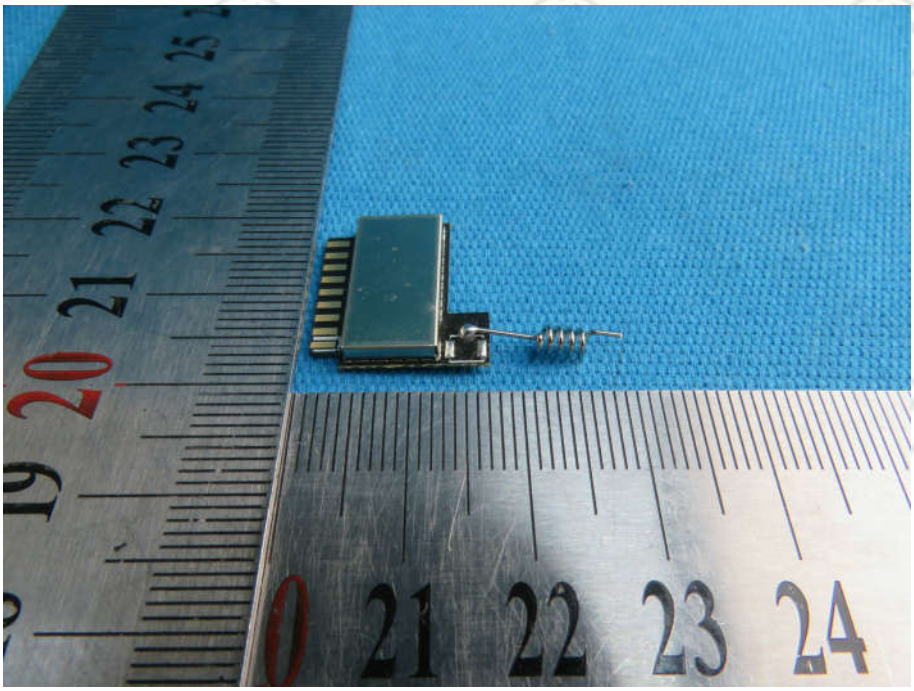
View of Product-3



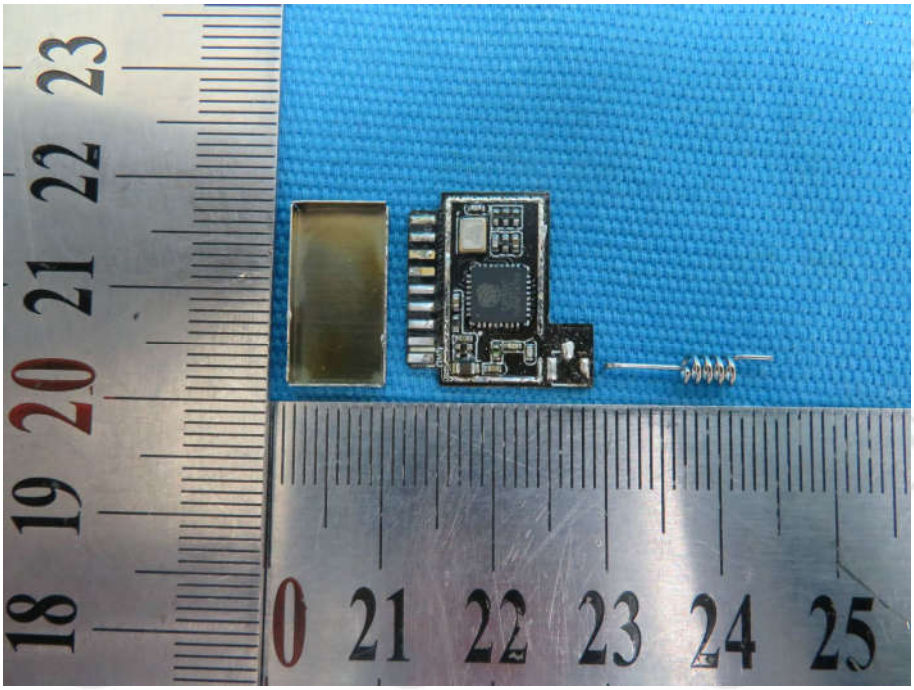
View of Product-4



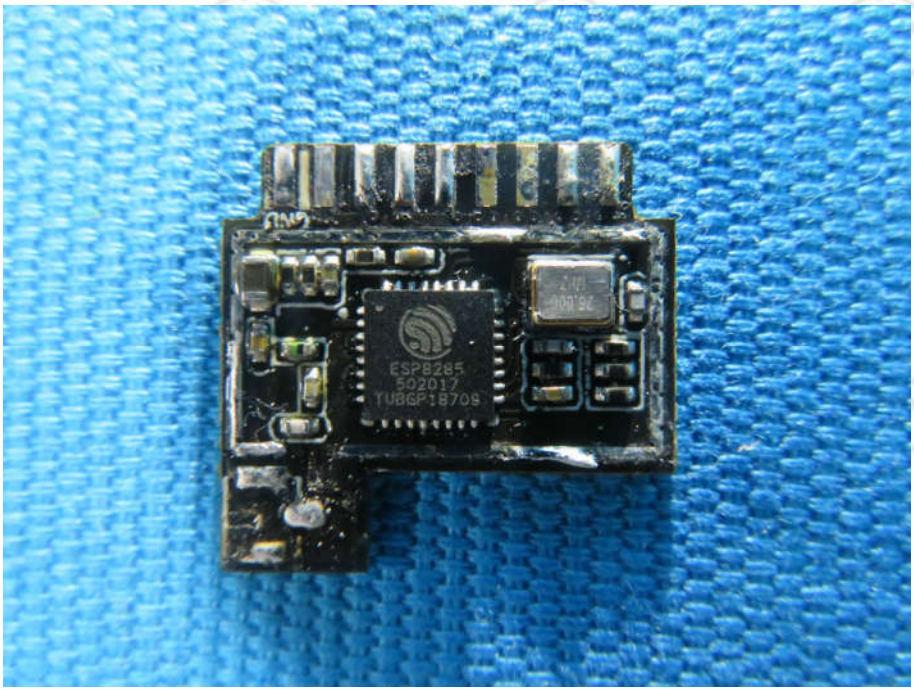
View of Product-5



View of Product-6



View of Product-7



View of Product-8

*** End of Report ***

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