TEST REPORT

Product Name	:	WIFI module
Trade mark	:	GSD
Model/Type reference	:	W7LM1110, W7LM1110A
Serial Number	:	N/A
Report Number	:	EED32I00297001
FCC ID	:	2AC23-W7LM1110
Date of Issue	:	Dec. 19, 2016
Test Standards	:	47 CFR Part 15 Subpart C (2015)
Test result	:	PASS

Prepared for:

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Prepared by:

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Date:	Dec. 19, 2016		Check No.: 2457512532

CENTRE TESTING INTERNATIONAL GROUP CO.,LTD. Report Seal

2 Version

Version No.	Date	Description
00	Dec. 19, 2016	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 D01v03r05	PASS
6dB Occupied Bandwidth	47 CFR Part 15 Subpart C Section 15.247 (a)(2)	ANSI C63.10-2013/ KDB 558074 D01v03r05	PASS
Power Spectral Density	47 CFR Part 15 Subpart C Section 15.247 (e)	ANSI C63.10-2013/ KDB 558074 D01v03r05	PASS
Band-edge for RF Conducted Emissions	47 CFR Part 15 Subpart C Section 15.247(d)	ANSI C63.10-2013/ KDB 558074 D01v03r05	PASS
RF Conducted Spurious Emissions	47 CFR Part 15 Subpart C Section 15.247(d)	ANSI C63.10-2013/ KDB 558074 D01v03r05	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 and the sample information are provided by the client.

Model No.: W7LM1110, W7LM1110A

Only the model W7LM1110 was tested, since the modules ontology,Antenna type and Antenna gain are all the same, only the Antenna size is different.

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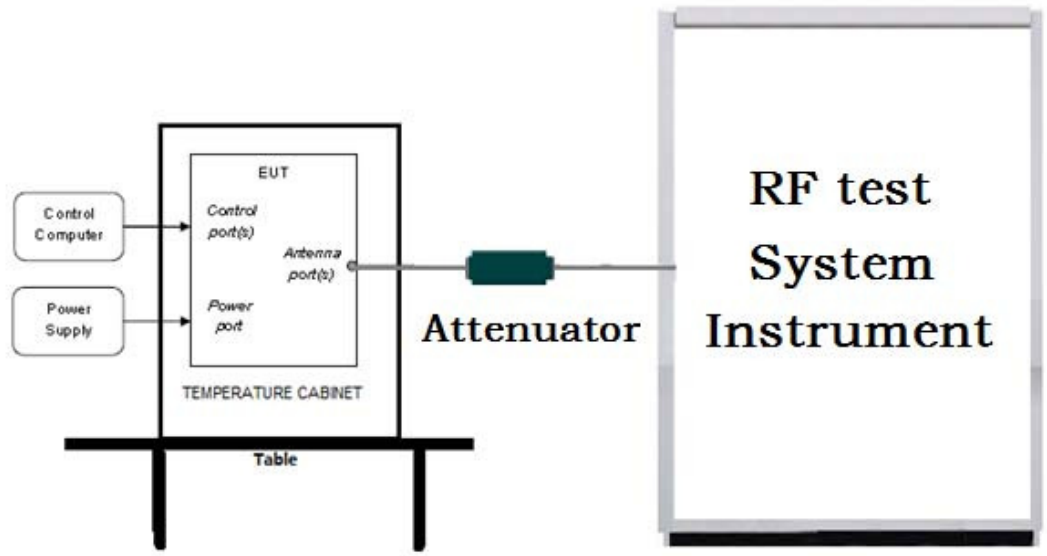
5 Test Requirement

5.1 Test setup

5.1.1 For Conducted test setup



5.1.2 For Radiated Emissions test setup

Radiated Emissions setup:

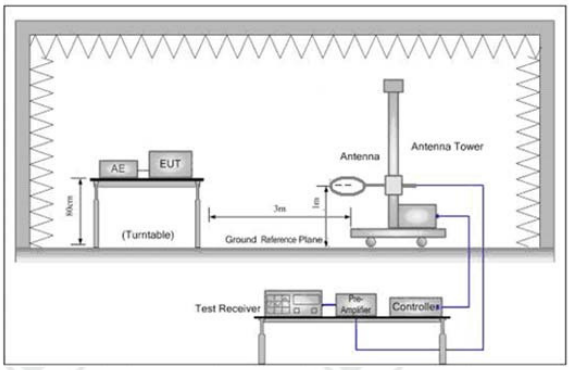


Figure 1. Below 30MHz

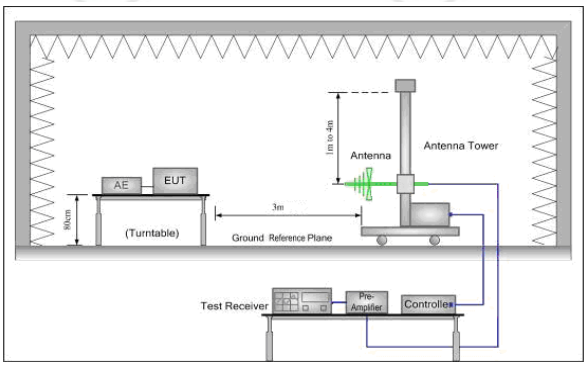


Figure 2. 30MHz to 1GHz

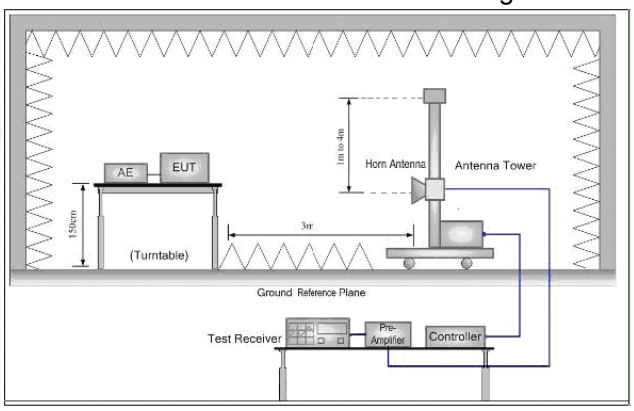
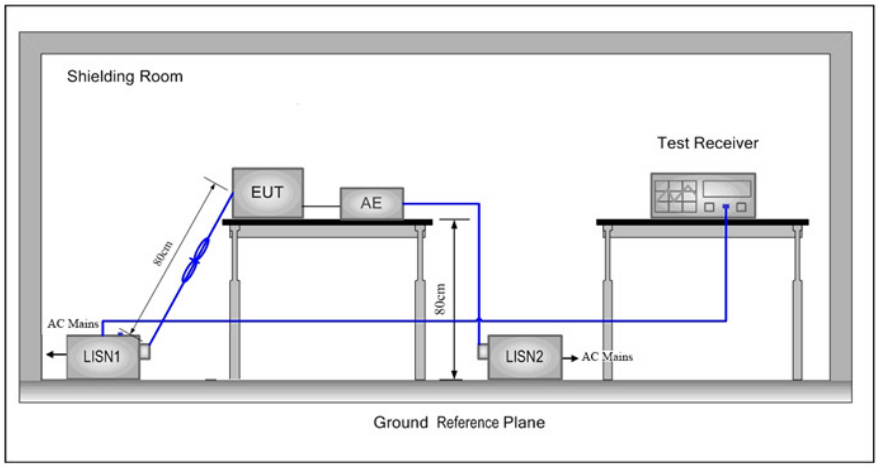


Figure 3. Above 1GHz

5.1.3 For Conducted Emissions test setup

Conducted Emissions setup



5.2 Test Environment

Operating Environment:	
Temperature:	22°C
Humidity:	53% RH
Atmospheric Pressure:	1010mbar

5.3 Test Condition

Test channel:

Test Mode	Tx	RF Channel		
		Low(L)	Middle(M)	High(H)
802.11b/g/n(HT20)	2412MHz ~2462 MHz	Channel 1	Channel 6	Channel11
		2412MHz	2437MHz	2462MHz
802.11n(HT40)	2422MHz ~2452 MHz	Channel 1	Channel 4	Channel7
		2422MHz	2437MHz	2452MHz
Transmitting mode:	The EUT transmitted the continuous modulation test 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)	20.25	20.31	20.34	20.38

Mode	802.11g							
Data Rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
Power(dBm)	22.64	22.61	22.60	22.57	22.54	22.53	22.50	22.41

Mode	802.11n (HT20)							
Data Rate	6.5Mbps	13Mbps	19.5Mbps	26Mbps	39Mbps	52Mbps	58.5Mbps	65Mbps
Power(dBm)	20.63	20.61	20.59	20.55	20.53	20.50	20.47	20.34
Mode	802.11n (HT40)							
Data Rate	13.5Mbps	27Mbps	40.5Mbps	54Mbps	81Mbps	108Mbps	121.5Mbps	135Mbps
Power(dBm)	20.78	20.74	20.71	20.70	20.66	20.64	20.61	20.55

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); 13.5Mbps of rate is the worst case of 802.11n(HT40).

6 General Information

6.1 Client Information

Applicant:	Hui Zhou Gaoshengda Technology Co., LTD
Address of Applicant:	NO.75 Zhongkai Development Area, Huizhou, Guangdong, China
Manufacturer:	Hui Zhou Gaoshengda Technology Co., LTD
Address of Manufacturer:	NO.75 Zhongkai Development Area, Huizhou, Guangdong, China

6.2 General Description of EUT

Product Name:	WIFI module
Model No.(EUT):	W7LM1110, W7LM1110A
Trade Mark:	GSD
EUT Supports Radios application:	WiFi b/g/n(HT20/HT40): 2412-2462MHz
Power Supply:	DC 5V
Sample Received Date:	Nov. 18, 2016
Sample tested Date:	Nov. 18, 2016 to Dec. 19, 2016

6.3 Product Specification subjective to this standard

Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422MHz to 2452MHz
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels IEEE 802.11n HT40: 7 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 and HT40): OFDM (64QAM, 16QAM, QPSK,BPSK)
Test Power Grade:	19(manufacturer declare)
Test Software of EUT:	MT7601USB.exe(manufacturer declare)
Antenna Type and Gain:	PIFA Antenna
Antenna Gain:	3dBi
Test Voltage:	AC 120V/60Hz, AC 240V/50Hz

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		

Operation Frequency each of channel(802.11n HT40)					
Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2422MHz	4	2437MHz	7	2452MHz
2	2427MHz	5	2442MHz		
3	2432MHz	6	2447MHz		

6.4 Description of Support Units

The EUT has been tested with associated equipment below.

Associated equipment name		Manufacture	S/N	Model	Supplied by
AE1	Laptop	Lenovo	EB22995690	E46L	CTI
AE2	Mouse	L.Selectron	E0703009435HVKF	OP-200	CTI
AE3	PC	DELL	JMNBGZX	OPTIPLEX330	CTI
AE4	Monitor	EIZO	2160033 TA	S1703	CTI
AE5	Keyboard	Lenovo	60203893	LXH-EKB-10YA	CTI
AE6	Mouse	HP	674316-001	SM-2022	CTI

6.5 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd.

Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China 518101

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

No tests were sub-contracted.

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-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.

IC-Registration No.: 7408A-2

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-2 .

IC-Registration No.: 7408B-1

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-1.

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	0.31dB (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	04-01-2016	03-31-2017
Spectrum Analyzer	Keysight	N9010A	MY54510339	04-01-2016	03-31-2017
Signal Generator	Keysight	N5182B	MY53051549	04-01-2016	03-31-2017
High-pass filter	Sinoscite	FL3CX03WG18 NM12-0398-002	---	01-12-2016	01-11-2017
High-pass filter	MICRO-TRONICS	SPA-F-63029-4	---	01-12-2016	01-11-2017
DC Power	Keysight	E3642A	MY54436035	04-01-2016	03-31-2017
PC-1	Lenovo	R4960d	---	04-01-2016	03-31-2017
power meter & power sensor	R&S	OSP120	101374	04-01-2016	03-31-2017
RF control unit	JS Tonscend	JS0806-2	158060006	04-01-2016	03-31-2017
BT&WI-FI Automatic test software	JS Tonscend	JS1120-2	---	04-01-2016	03-31-2017

Conducted disturbance Test					
Equipment	**Manufacturer**	**Mode No.**	**Serial Number**	**Cal. date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
Receiver	R&S	ESCI	100009	06-16-2016	06-15-2017
Temperature/ Humidity Indicator	TAYLOR	1451	1905	04-27-2016	04-26-2017
LISN	R&S	ENV216	100098	06-16-2016	06-15-2017
LISN	schwarzbeck	NNLK8121	8121-529	06-16-2016	06-15-2017
Voltage Probe	R&S	ESH2-Z3	--	07-09-2014	07-07-2017
Current Probe	R&S	EZ17	100106	06-16-2016	06-15-2017
ISN	TESEQ GmbH	ISN T800	30297	01-29-2015	01-27-2017

3M Semi/full-anechoic Chamber					
Equipment	**Manufacturer**	**Mode No.**	**Serial Number**	**Cal. date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
3M Chamber & Accessory Equipment	TDK	SAC-3	---	06-05-2016	06-05-2019
TRILOG Broadband Antenna	SCHWARZBECK	VULB9163	9163-484	05-23-2016	05-22-2017
Microwave Preamplifier	Agilent	8449B	3008A02425	02-04-2016	02-03-2017
Horn Antenna	ETS-LINDGREN	3117	00057410	06-30-2015	06-28-2018
Horn Antenna	A.H.SYSTEMS	SAS-574	374	06-30-2015	06-28-2018
Loop Antenna	ETS	6502	00071730	07-30-2015	07-28-2017
Spectrum Analyzer	R&S	FSP40	100416	06-16-2016	06-15-2017
Receiver	R&S	ESCI	100435	06-16-2016	06-15-2017
Multi device Controller	maturo	NCD/070/10711112	---	01-12-2016	01-11-2017
LISN	schwarzbeck	NNBM8125	81251547	06-16-2016	06-15-2017
LISN	schwarzbeck	NNBM8125	81251548	06-16-2016	06-15-2017
Signal Generator	Agilent	E4438C	MY45095744	04-01-2016	03-31-2017
Signal Generator	Keysight	E8257D	MY53401106	04-01-2016	03-31-2017
Temperature/ Humidity Indicator	TAYLOR	1451	1905	04-27-2016	04-26-2017
Cable line	Fulai(7M)	SF106	5219/6A	01-12-2016	01-11-2017
Cable line	Fulai(6M)	SF106	5220/6A	01-12-2016	01-11-2017
Cable line	Fulai(3M)	SF106	5216/6A	01-12-2016	01-11-2017
Cable line	Fulai(3M)	SF106	5217/6A	01-12-2016	01-11-2017
High-pass filter	Sinoscite	FL3CX03WG18NM12-0398-002	---	01-12-2016	01-11-2017
High-pass filter	MICRO-TRONICS	SPA-F-63029-4	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX01CA09CL12-0395-001	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX01CA08CL12-0393-001	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX02CA04CL12-0396-002	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX02CA03CL12-0394-001	---	01-12-2016	01-11-2017

8 Radio Technical Requirements Specification

Reference documents for testing:

No.	Identity	Document Title
1	FCC Part15C (2015)	Subpart C-Intentional Radiators
2	ANSI C63.10-2013	American National Standard for Testing Unlicesed Wireless Devices
3	KDB 558074 D01 v03r05	DTS Meas Guidance

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

Test Procedure

1. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Measure the conducted output power and record the results in the test report.

Result Table

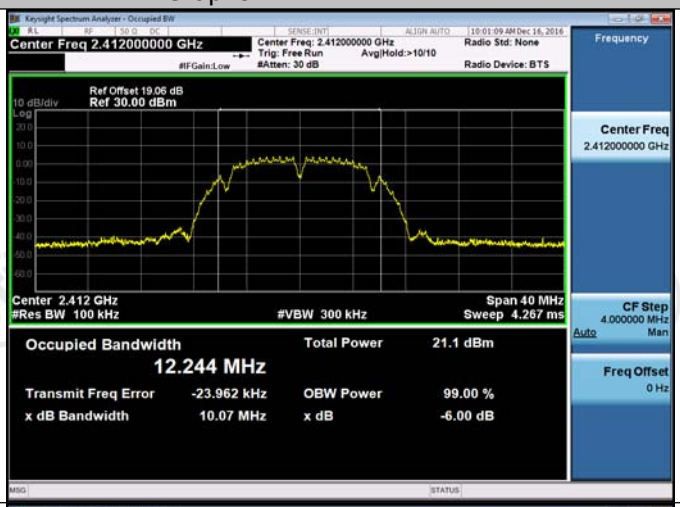
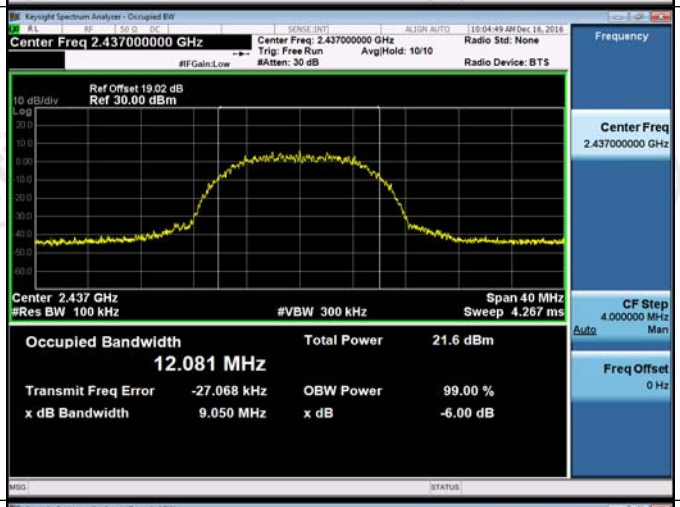
Mode	Channel	Conducted Peak Output Power [dBm]	Verdict
11B	LCH	20.38	PASS
11B	MCH	20.05	PASS
11B	HCH	20.35	PASS
11G	LCH	22.64	PASS
11G	MCH	22.74	PASS
11G	HCH	23.15	PASS
11N20SISO	LCH	20.63	PASS
11N20SISO	MCH	21.15	PASS
11N20SISO	HCH	21.55	PASS
11N40SISO	LCH	20.78	PASS
11N40SISO	MCH	21.64	PASS
11N40SISO	HCH	21.74	PASS

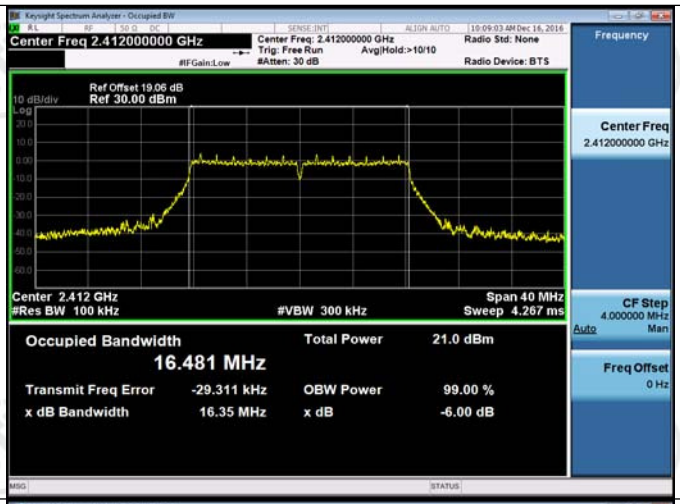
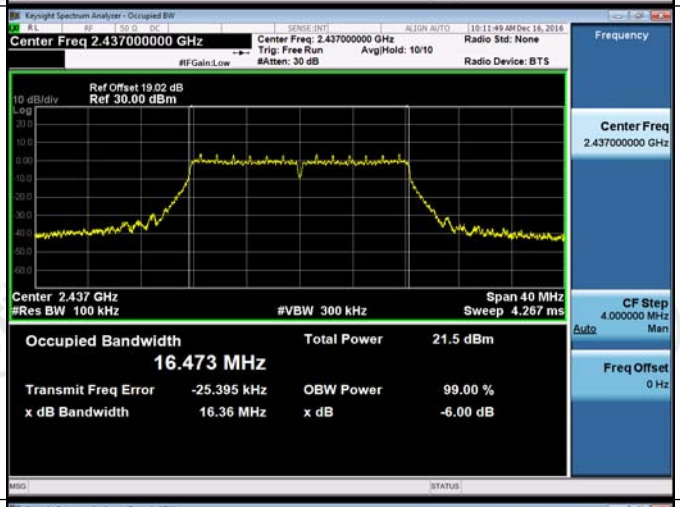
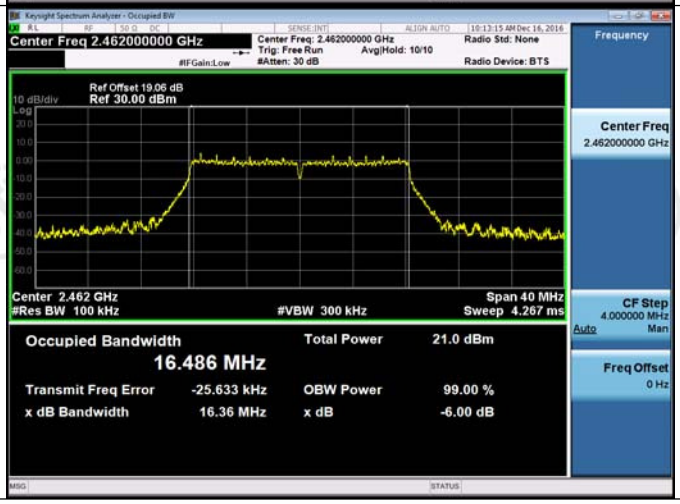
Appendix B): 6dB Occupied Bandwidth

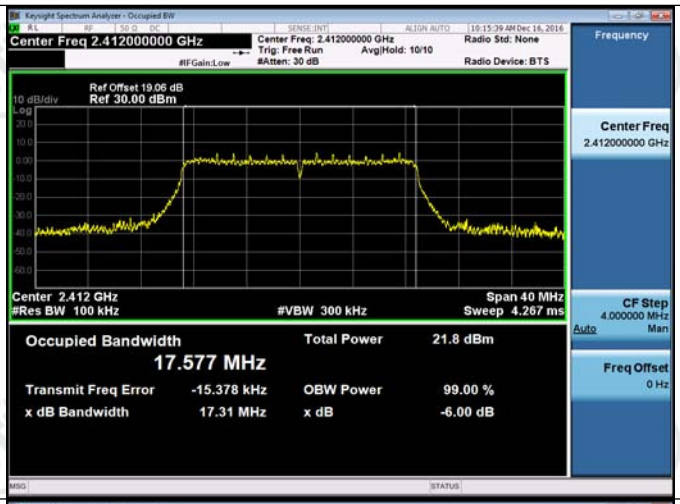
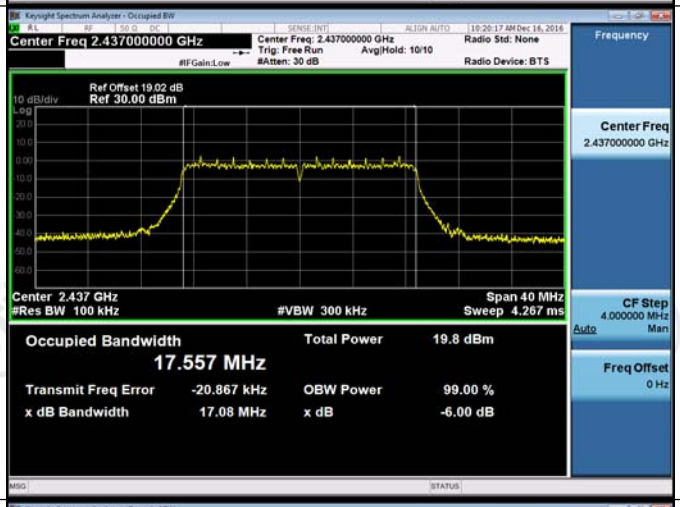
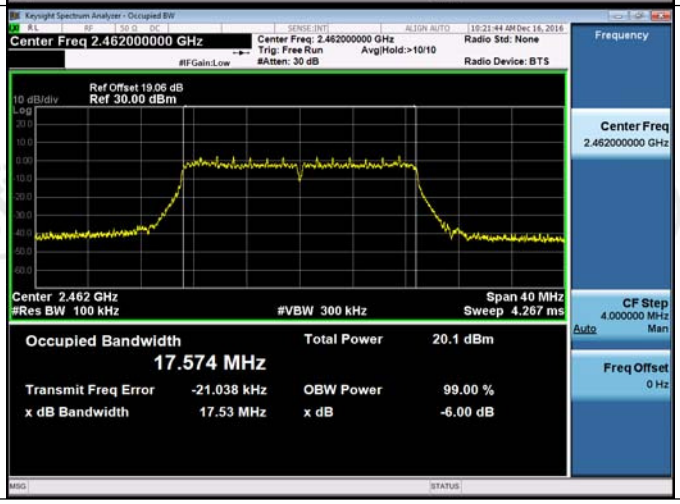
Result Table

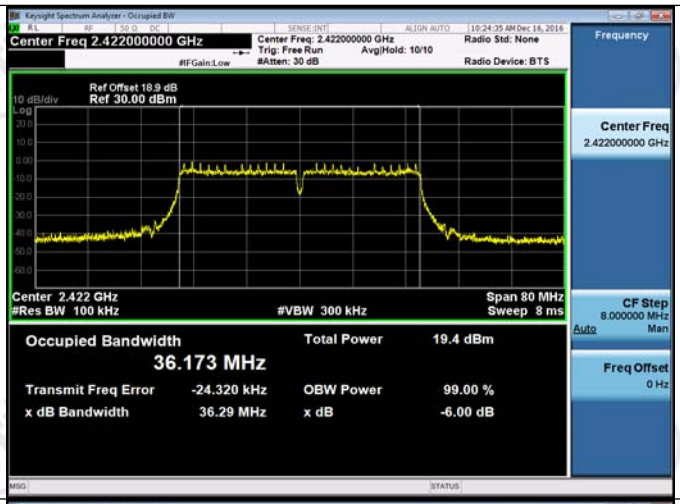
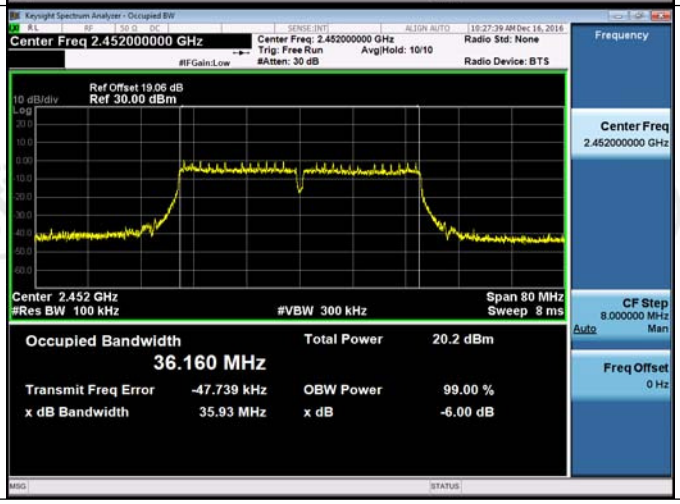
Mode	Channel	6dB Bandwidth [MHz]	99% OBW [MHz]	Verdict	Remark
11B	LCH	10.07	12.244	PASS	Peak detector
11B	MCH	9.050	12.081	PASS	
11B	HCH	9.032	12.117	PASS	
11G	LCH	16.35	16.481	PASS	
11G	MCH	16.36	16.473	PASS	
11G	HCH	16.36	16.486	PASS	
11N20SISO	LCH	17.31	17.577	PASS	
11N20SISO	MCH	17.08	17.557	PASS	
11N20SISO	HCH	17.53	17.574	PASS	
11N40SISO	LCH	36.29	36.173	PASS	
11N40SISO	MCH	36.29	36.144	PASS	
11N40SISO	HCH	35.93	36.160	PASS	

Test Graph

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

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

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

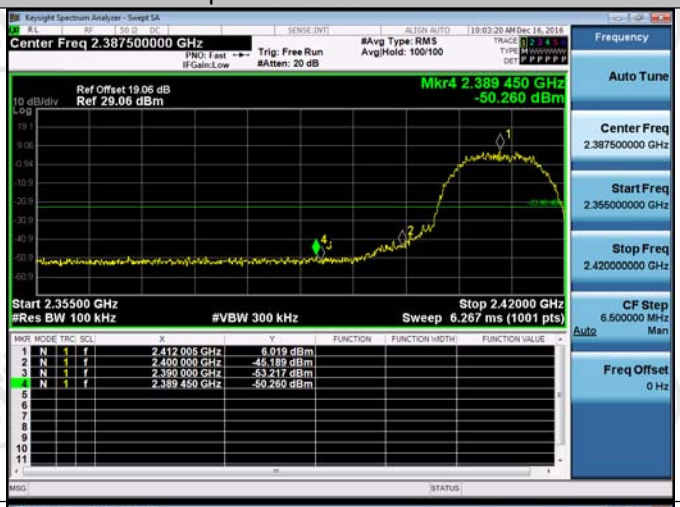
11N40SISO/LCH			
11N40SISO/MCH			
11N40SISO/HCH			

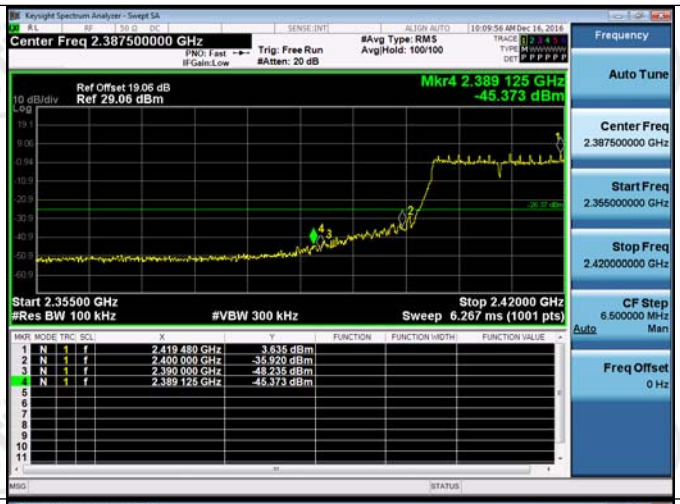
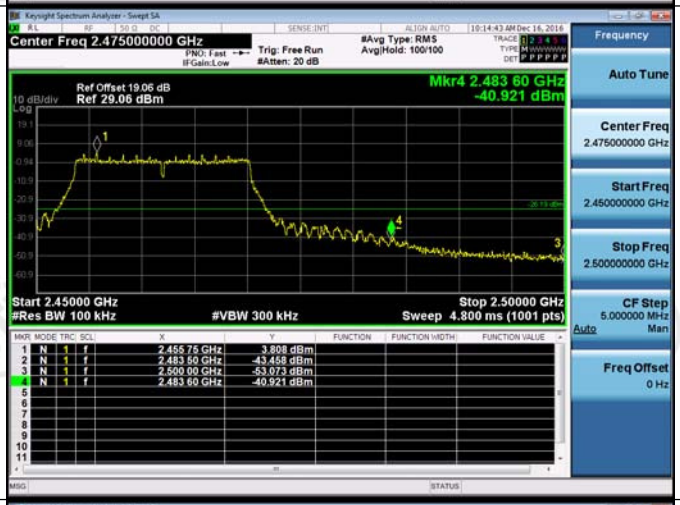
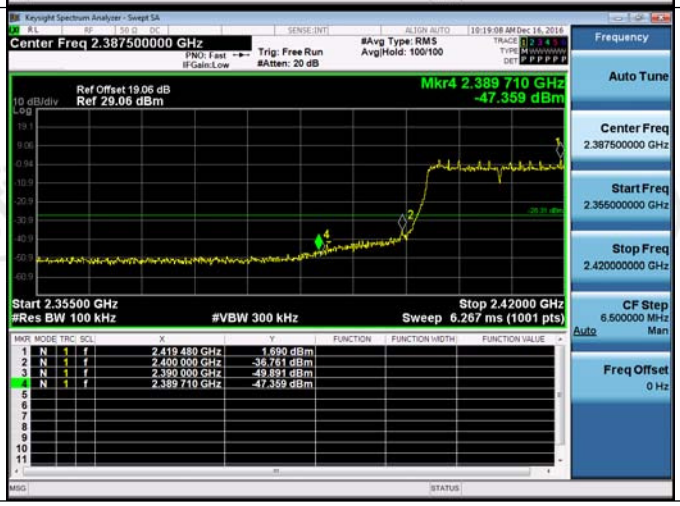
Appendix C): Band-edge for RF Conducted Emissions

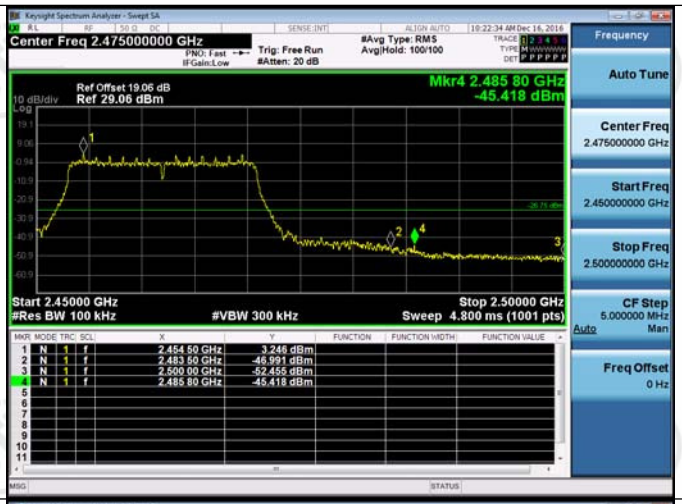
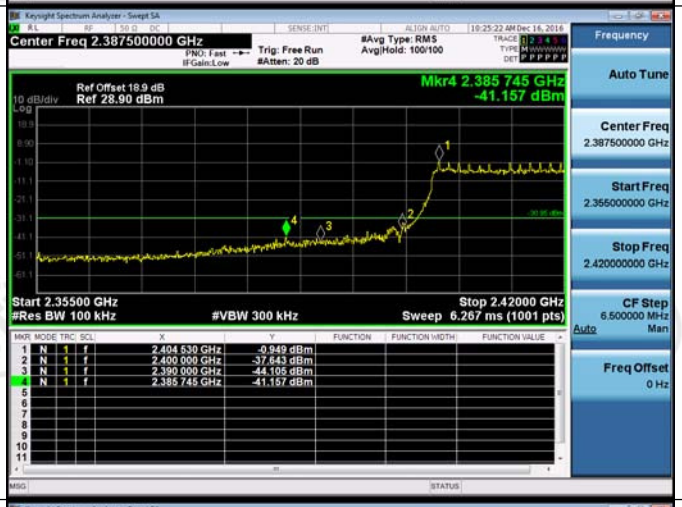
Result Table

Mode	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
11B	LCH	6.019	-50.260	-23.98	PASS
11B	HCH	5.443	-50.439	-24.56	PASS
11G	LCH	3.635	-45.373	-26.37	PASS
11G	HCH	3.808	-40.921	-26.19	PASS
11N20SISO	LCH	1.690	-47.359	-28.31	PASS
11N20SISO	HCH	3.246	-45.418	-26.75	PASS
11N40SISO	LCH	-0.949	-41.157	-30.95	PASS
11N40SISO	HCH	-0.921	-44.333	-30.92	PASS

Test Graph

Graphs		
11B/LCH		
11B/HCH		

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

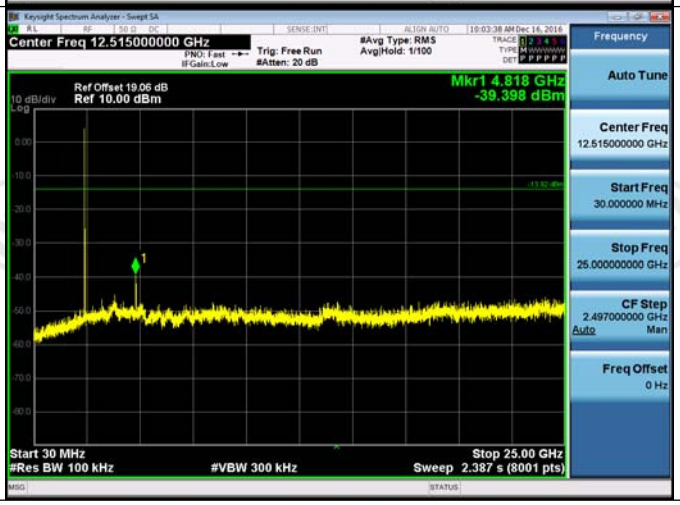
11N20SISO/HCH			
11N40SISO/LCH			
11N40SISO/HCH			

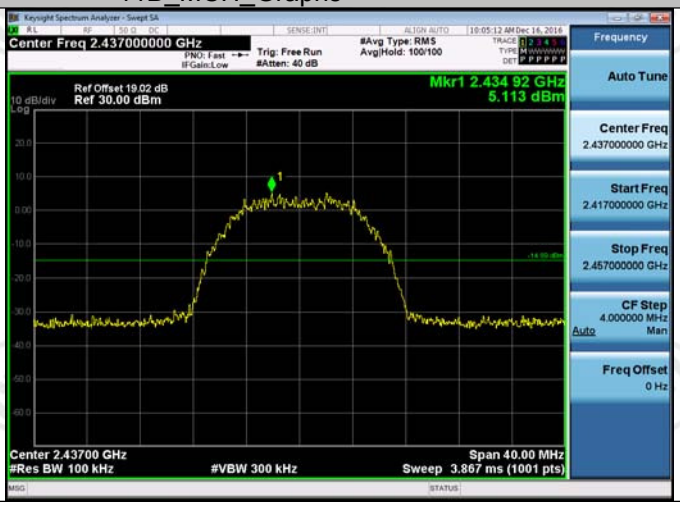
Appendix D): RF Conducted Spurious Emissions

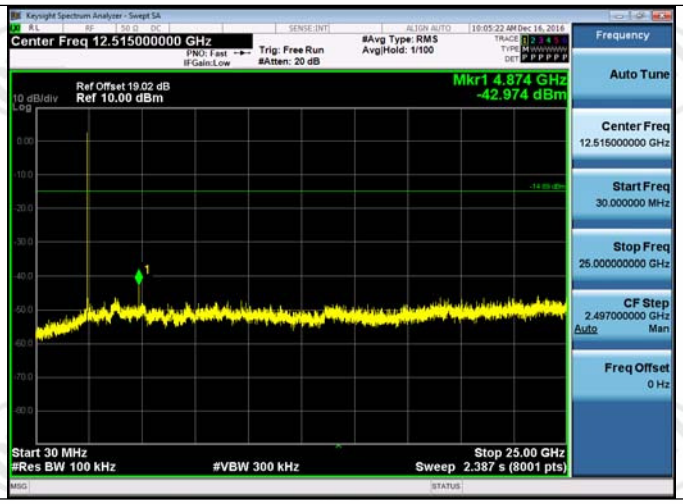
Result Table

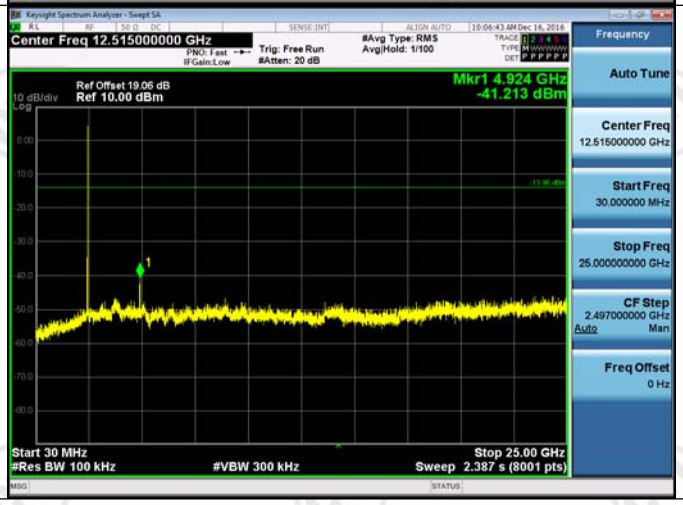
Mode	Channel	Pref [dBm]	Puw[dBm]	Verdict
11B	LCH	6.08	<Limit	PASS
11B	MCH	5.113	<Limit	PASS
11B	HCH	6.037	<Limit	PASS
11G	LCH	3.289	<Limit	PASS
11G	MCH	4.011	<Limit	PASS
11G	HCH	3.737	<Limit	PASS
11N20SISO	LCH	1.451	<Limit	PASS
11N20SISO	MCH	2.034	<Limit	PASS
11N20SISO	HCH	3.023	<Limit	PASS
11N40SISO	LCH	-0.595	<Limit	PASS
11N40SISO	MCH	0.19	<Limit	PASS
11N40SISO	HCH	0.34	<Limit	PASS

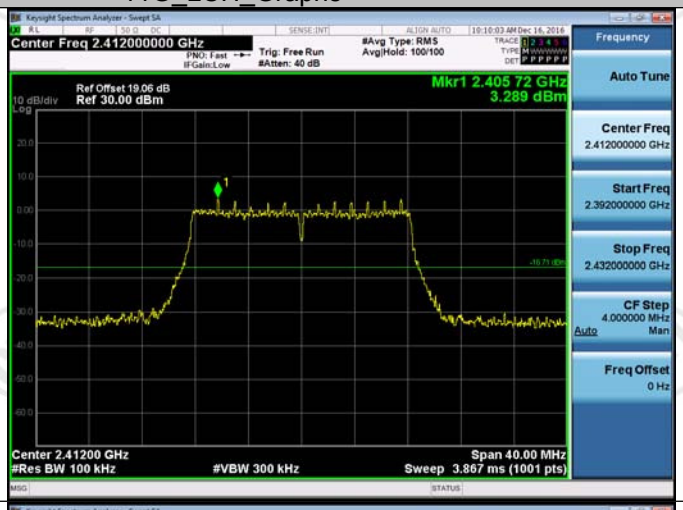
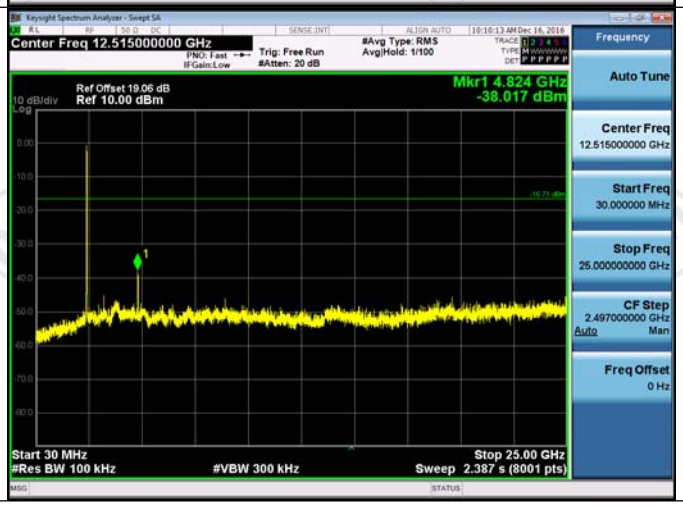
Test Graph

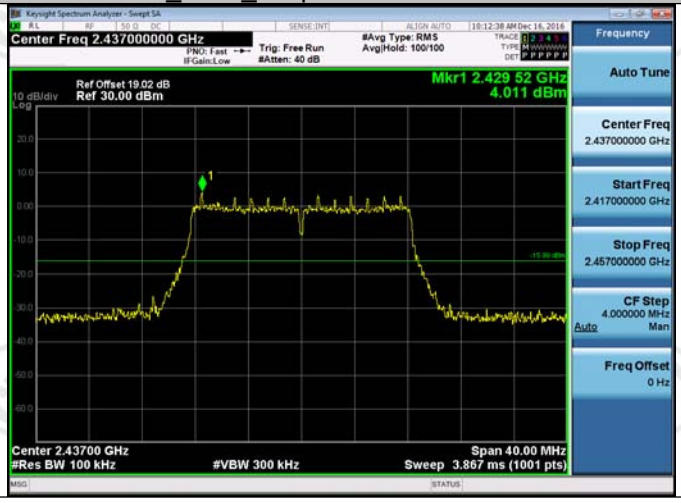
11B_LCH_Graphs	
Pref/11B/LCH	
Puw/11B/LCH	

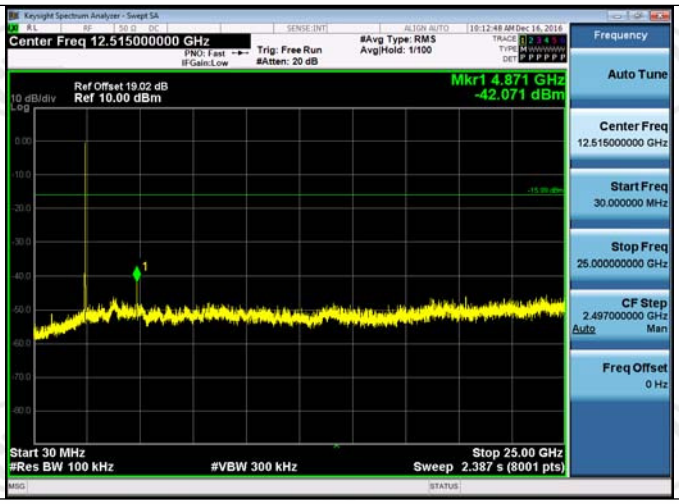
11B_MCH_Graphs	
Pref/11B/MCH	

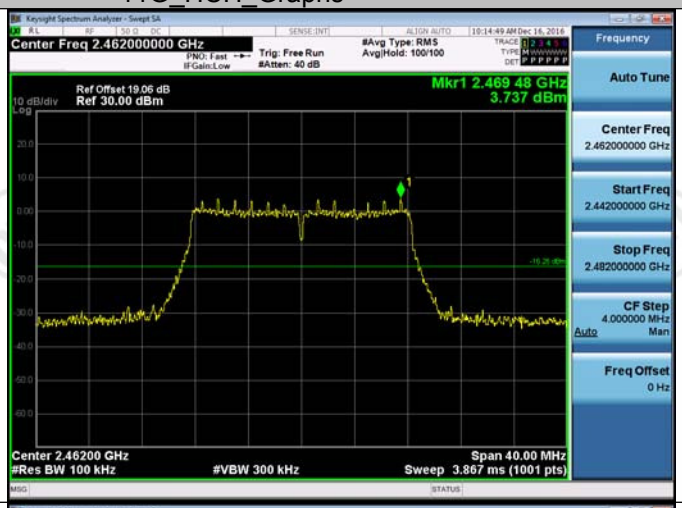
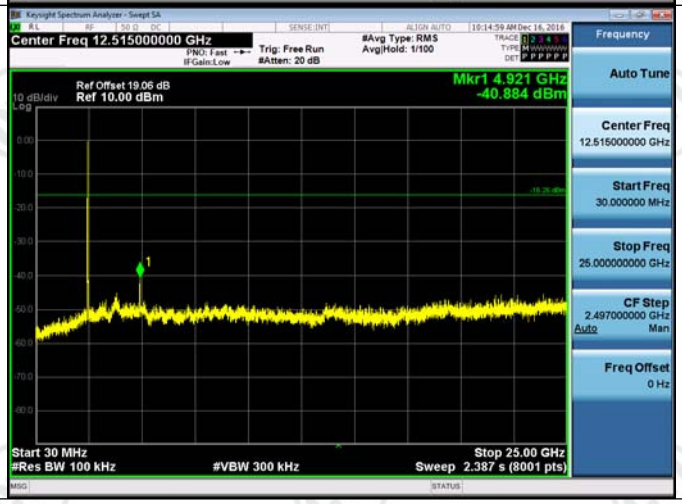
Puw/11B/MCH	

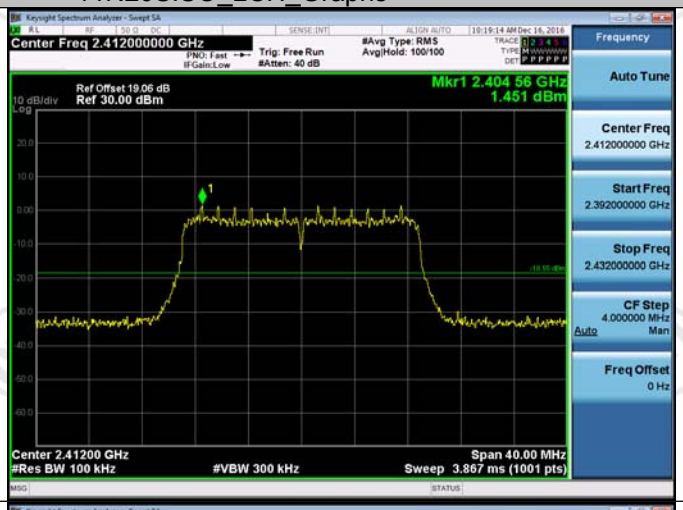
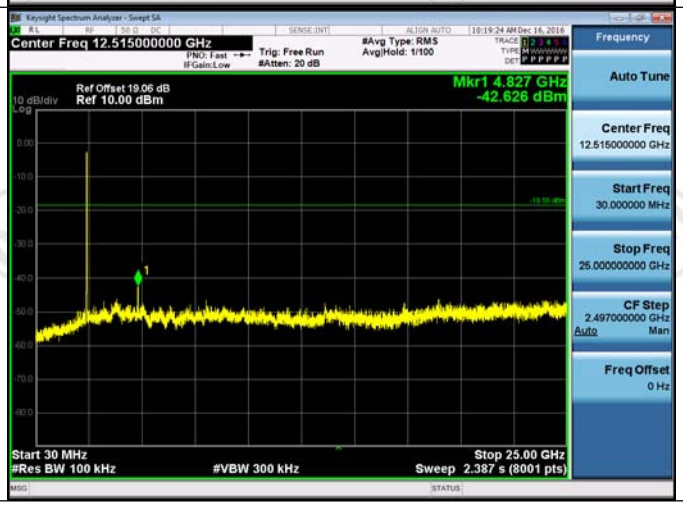
11B_HCH_Graphs	
Pref/11B/HCH	
Puw/11B/HCH	

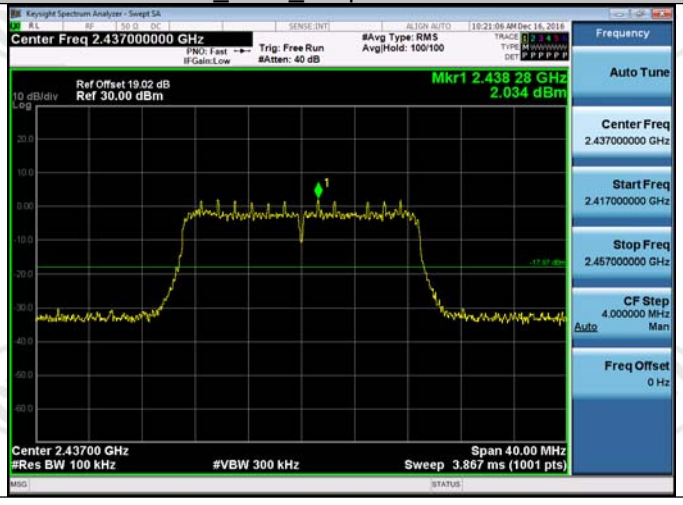
11G_LCH_Graphs		
Pref/11G/LCH		
Puw/11G/LCH		

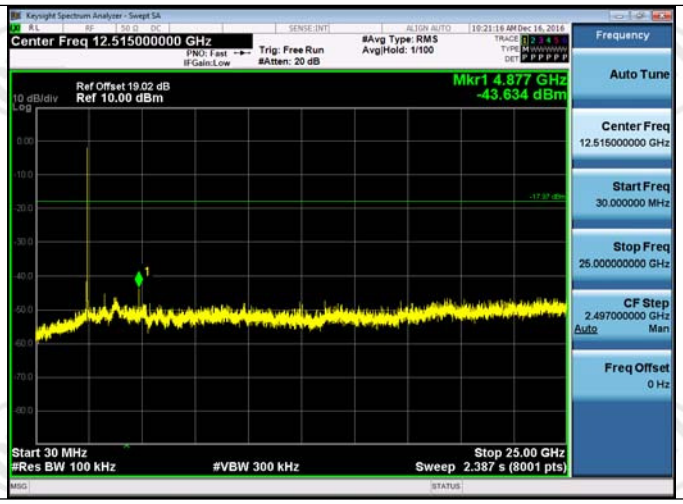
11G_MCH_Graphs		
Pref/11G/MCH		

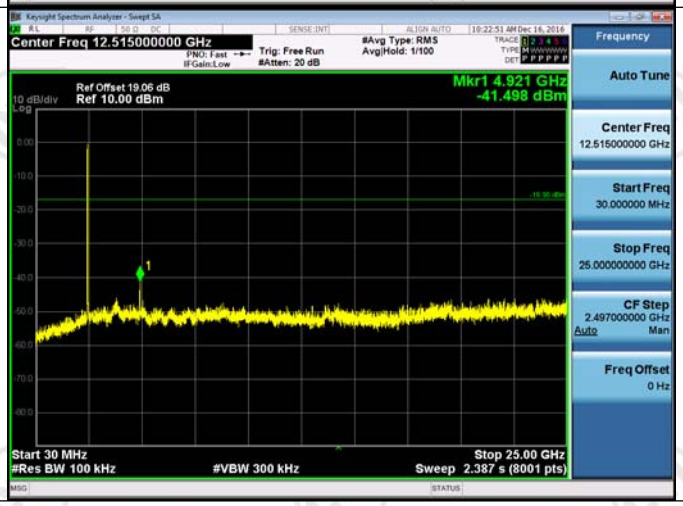
Puw/11G/MCH	

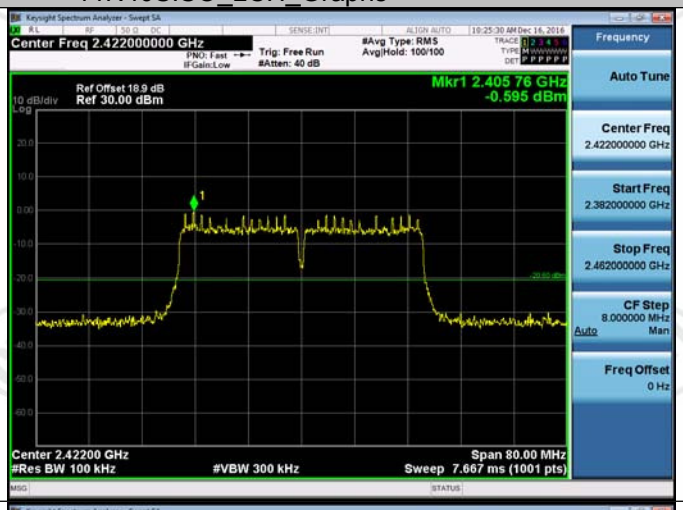
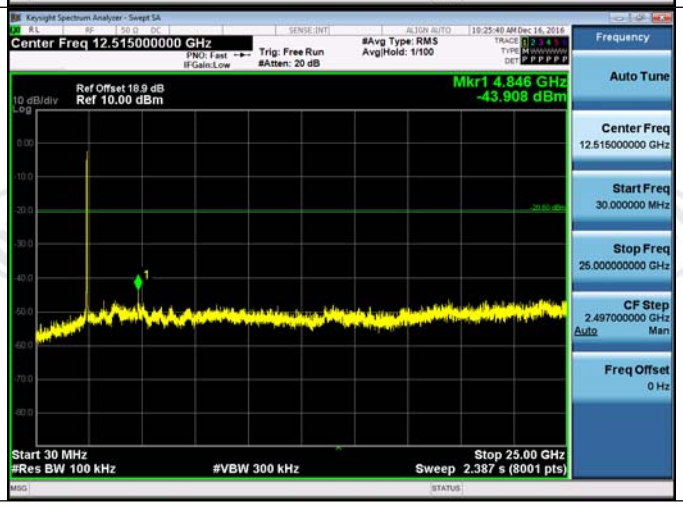
11G_HCH_Graphs	
Pref/11G/HCH	
Puw/11G/HCH	

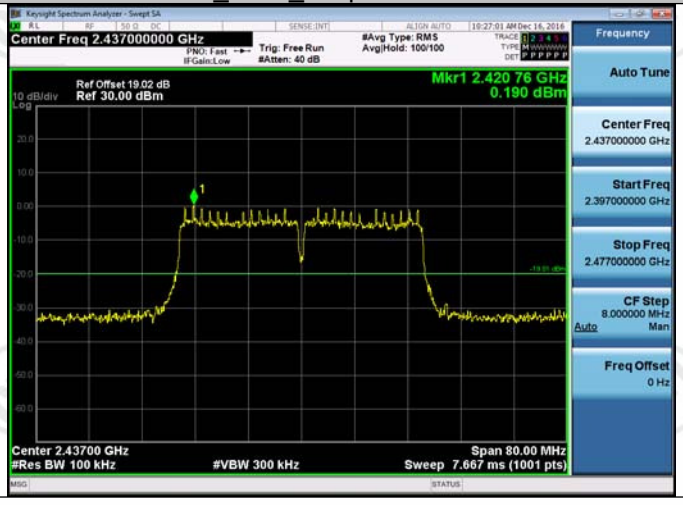
11N20SISO_LCH_Graphs		
Pref/11N20SISO/LCH		
/11N20SISO/LCH		

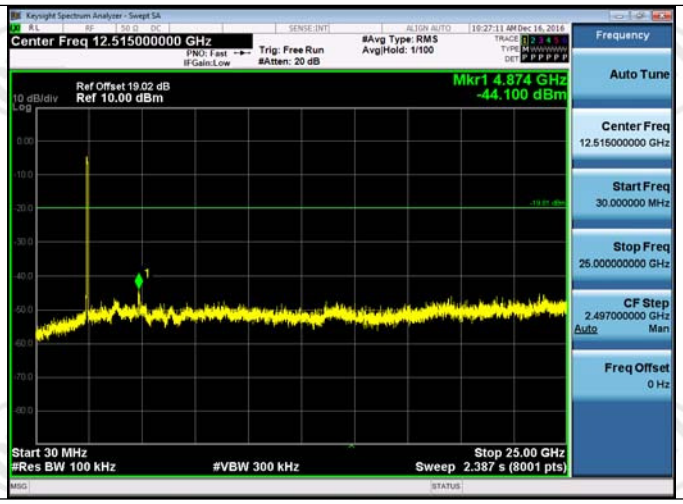
11N20SISO_MCH_Graphs		
Pref/11N20SISO/MCH		

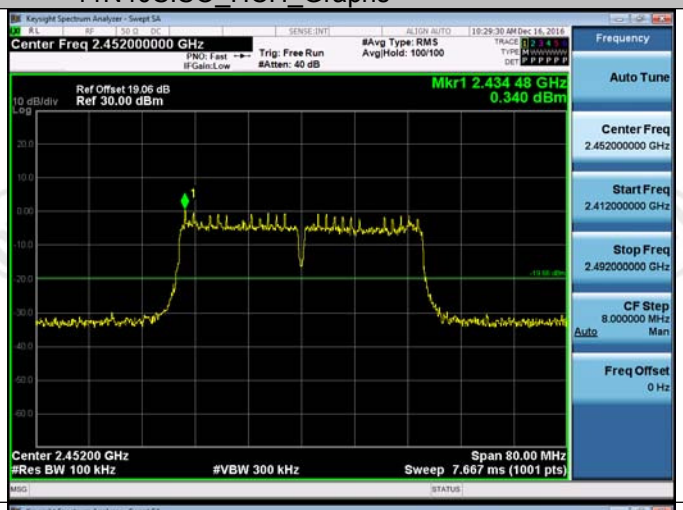
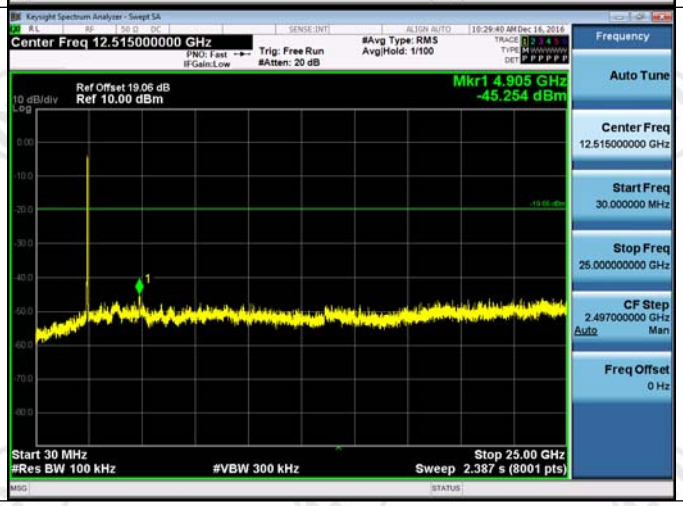
Puw/11N20SISO/MCH	

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

11N40SISO_LCH_Graphs		
Pref/11N40SISO/LCH		
Puw/11N40SISO/LCH		

11N40SISO_MCH_Graphs		
Pref/11N40SISO/MCH		

Puw/11N40SISO/MCH	

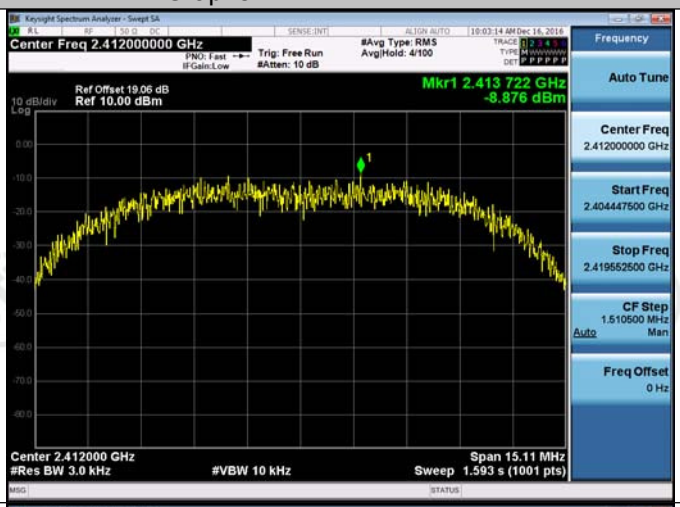
11N40SISO_HCH_Graphs	
Pref/11N40SISO/HCH	
Puw/11N40SISO/HCH	

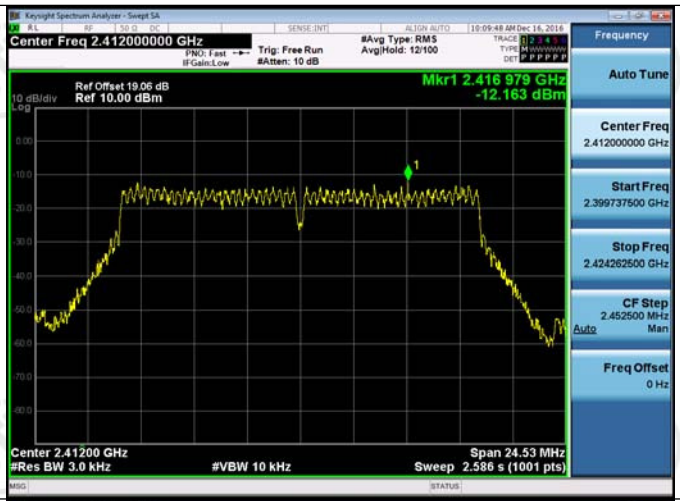
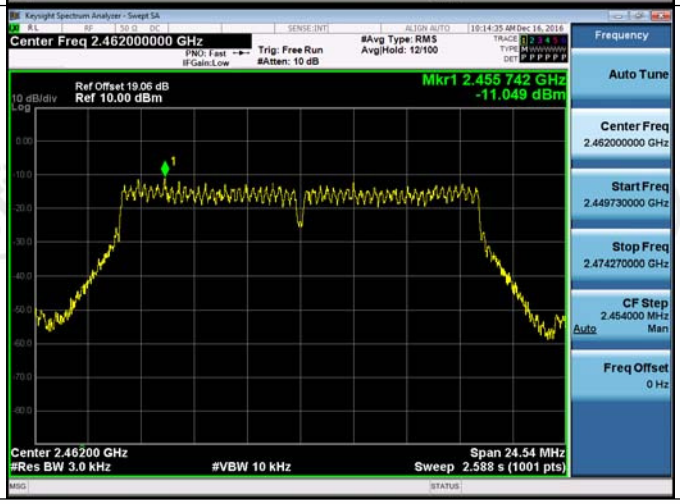
Appendix E): Power Spectral Density

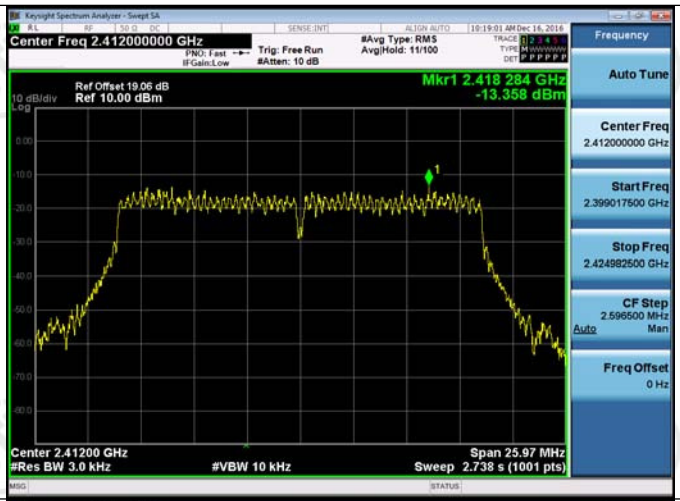
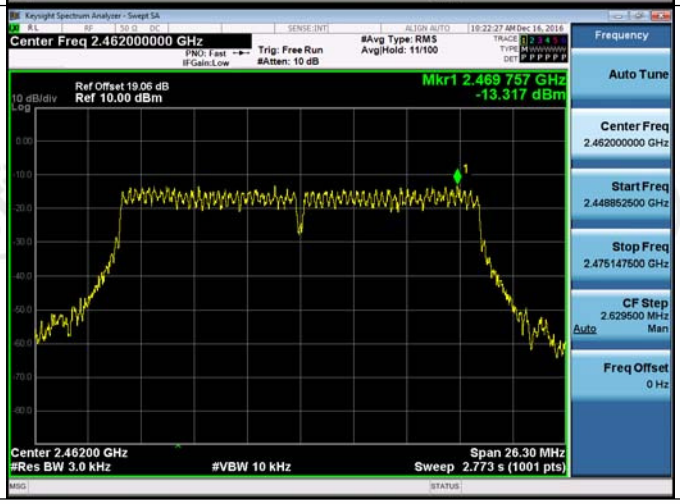
Result Table

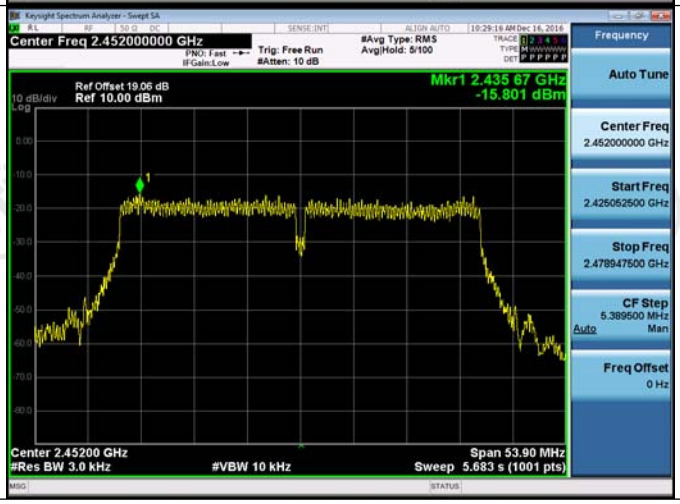
Mode	Channel	Power Spectral Density[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
11B	LCH	-8.876	8	PASS
11B	MCH	-9.118	8	PASS
11B	HCH	-8.852	8	PASS
11G	LCH	-12.163	8	PASS
11G	MCH	-12.131	8	PASS
11G	HCH	-11.049	8	PASS
11N20SISO	LCH	-13.358	8	PASS
11N20SISO	MCH	-13.421	8	PASS
11N20SISO	HCH	-13.317	8	PASS
11N40SISO	LCH	-16.665	8	PASS
11N40SISO	MCH	-14.836	8	PASS
11N40SISO	HCH	-15.801	8	PASS

Test Graph

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

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

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

11N40SISO/LCH			
11N40SISO/MCH			
11N40SISO/HCH			

Appendix F): Antenna Requirement

15.203 requirement:

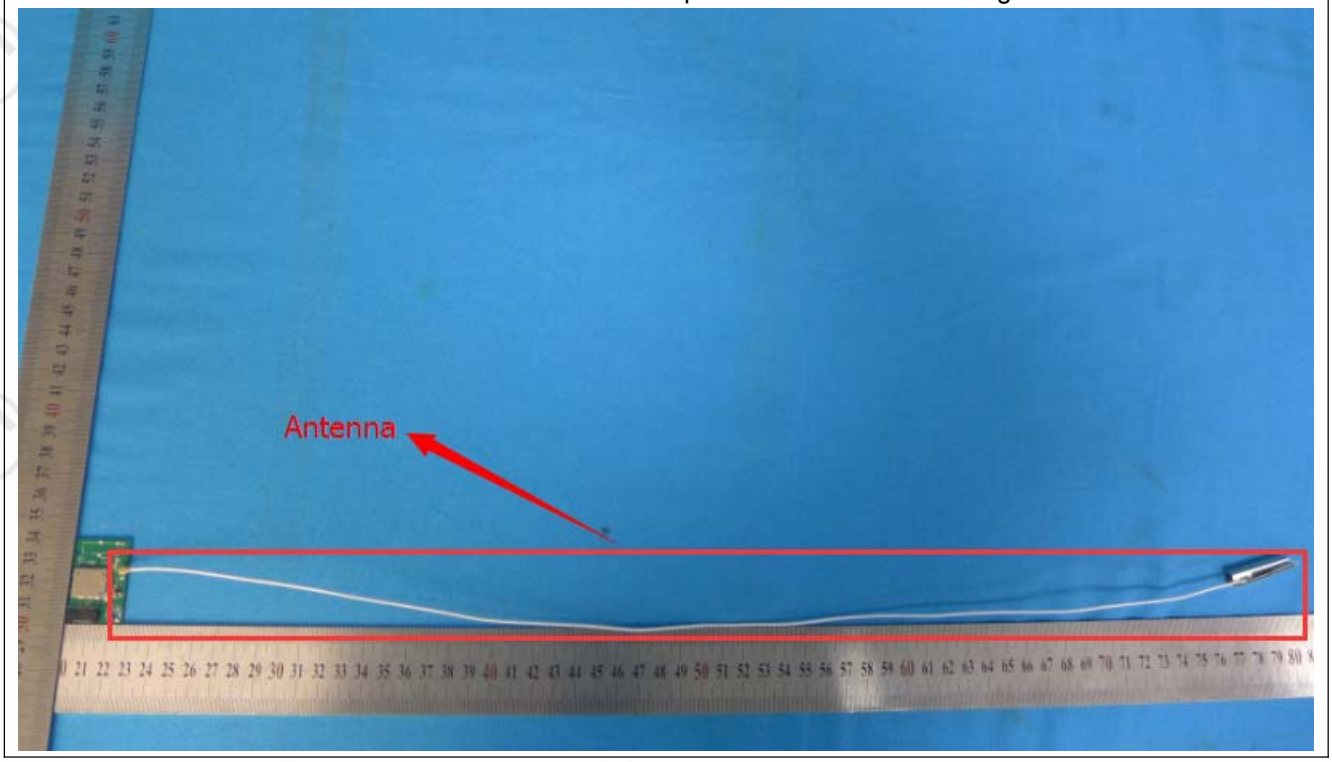
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit 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 PIFA Antenna and no consideration of replacement. The best case gain of the antenna is 3Bi.



Appendix G): AC Power Line Conducted Emission

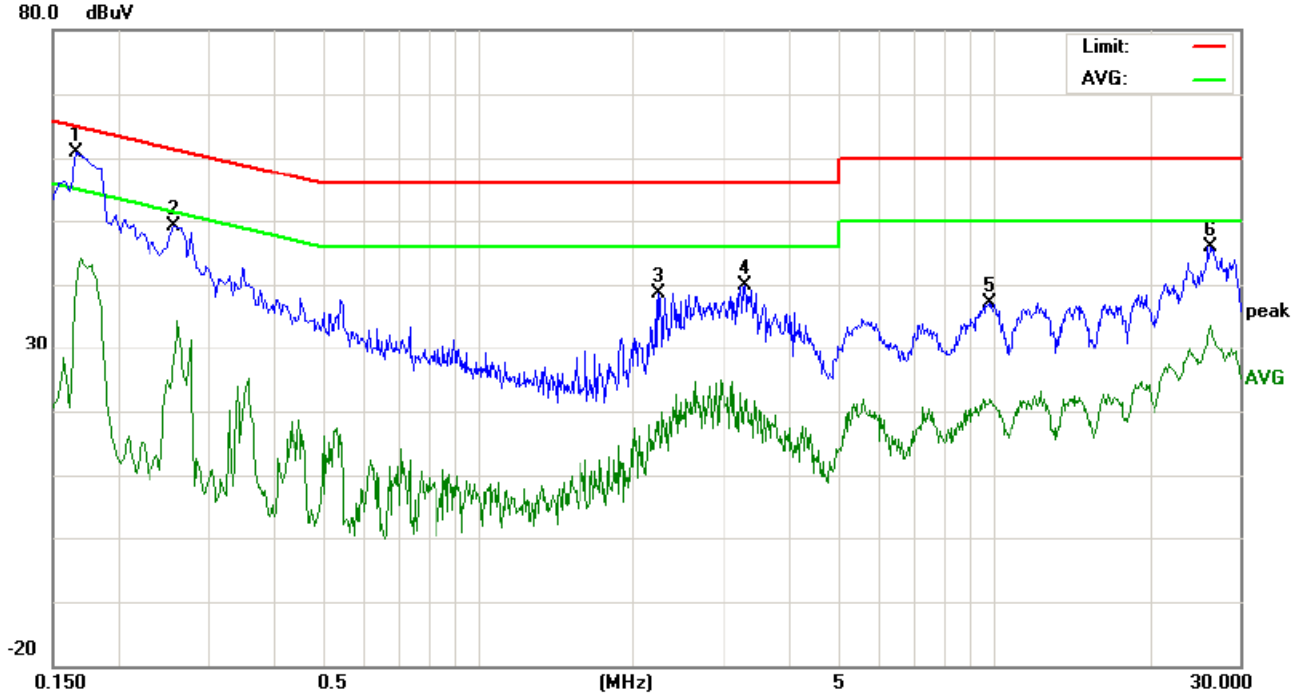
<table>
<tr><td>Test Procedure:</td><td>Test frequency range :150KHz-30MHz
1)The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance.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

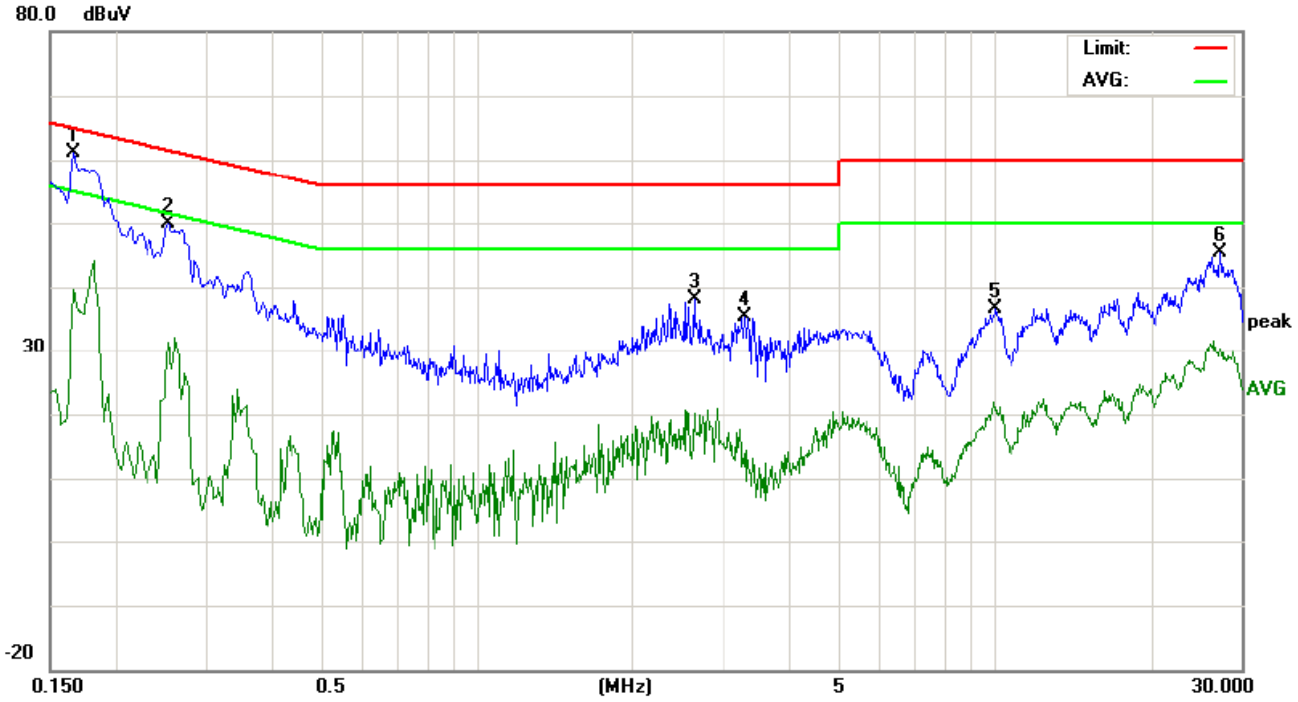
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

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	0.1660	51.14	47.95	25.18	9.80	60.94	57.75	34.98	65.15	55.15	-7.40	-20.17	P	
2	0.2580	39.36		18.08	9.80	49.16		27.88	61.49	51.49	-12.33	-23.61	P	
3	2.2420	28.75		8.42	10.00	38.75		18.42	56.00	46.00	-17.25	-27.58	P	
4	3.2980	29.99		11.73	10.00	39.99		21.73	56.00	46.00	-16.01	-24.27	P	
5	9.7700	27.00		11.42	10.00	37.00		21.42	60.00	50.00	-23.00	-28.58	P	
6	26.3700	36.17		23.84	9.80	45.97		33.64	60.00	50.00	-14.03	-16.36	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	0.1660	51.28	43.00	16.70	9.80	61.08	52.80	26.50	65.15	55.15	-12.35	-28.65	P	
2	0.2540	40.00		21.59	9.80	49.80		31.39	61.62	51.62	-11.82	-20.23	P	
3	2.6300	28.19		10.23	10.00	38.19		20.23	56.00	46.00	-17.81	-25.77	P	
4	3.3060	25.41		3.91	10.00	35.41		13.91	56.00	46.00	-20.59	-32.09	P	
5	10.0380	26.53		11.01	10.00	36.53		21.01	60.00	50.00	-23.47	-28.99	P	
6	27.3700	35.69		20.52	9.80	45.49		30.32	60.00	50.00	-14.51	-19.68	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.

3. AC 120V and 240V are tested and found the worst case is 120V, So only the 120V data were shown in the above.

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:

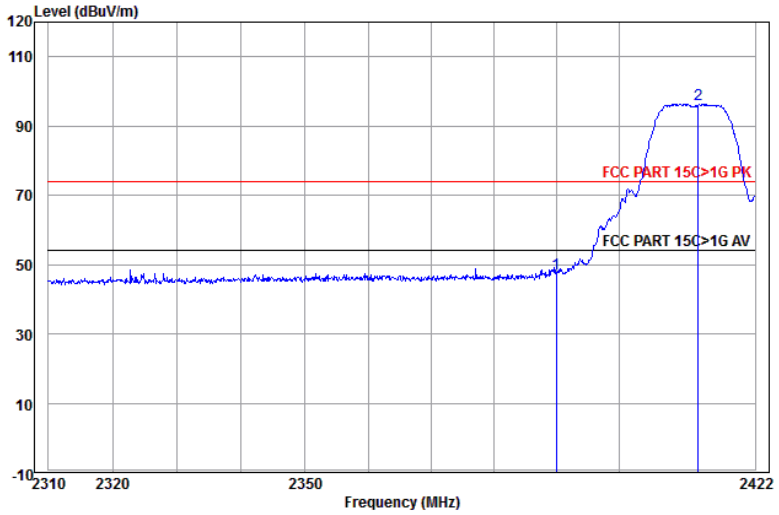
g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).
h. Test the EUT in the lowest channel , the Highest channel
i. The radiation measurements are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

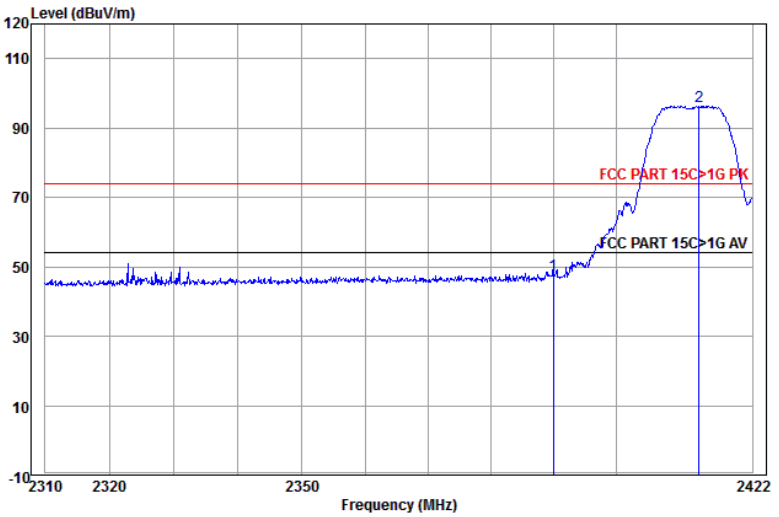
Test plot as follows:

Worse case mode:	802.11b (11Mbps)		
Frequency: 2390.0MHz	Test channel: Lowest	Polarization: Horizontal	Remark: Peak



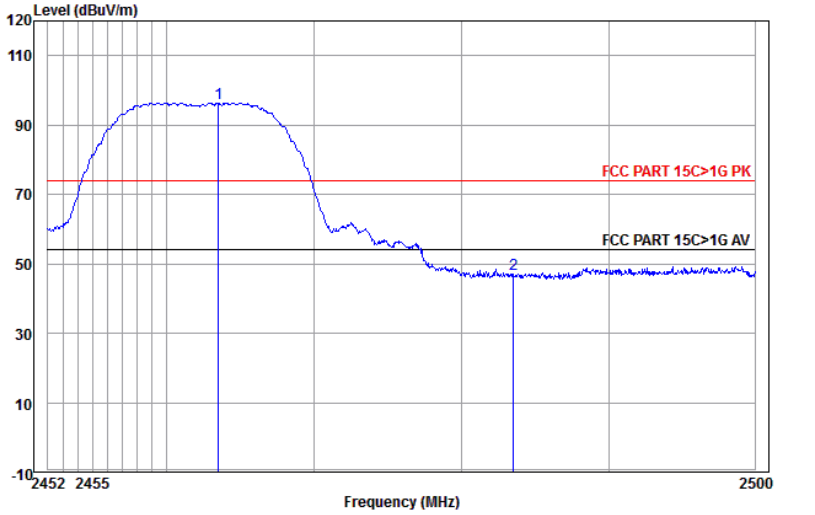
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	4.28	34.39	45.05	47.47	74.00	-26.53	Horizontal	
2 pp	2412.844	32.58	4.34	34.39	93.72	96.25	74.00	22.25	Horizontal	

Worse case mode:	802.11b (11Mbps)		
Frequency: 2390.0MHz	Test channel: Lowest	Polarization: Vertical	Remark: Peak



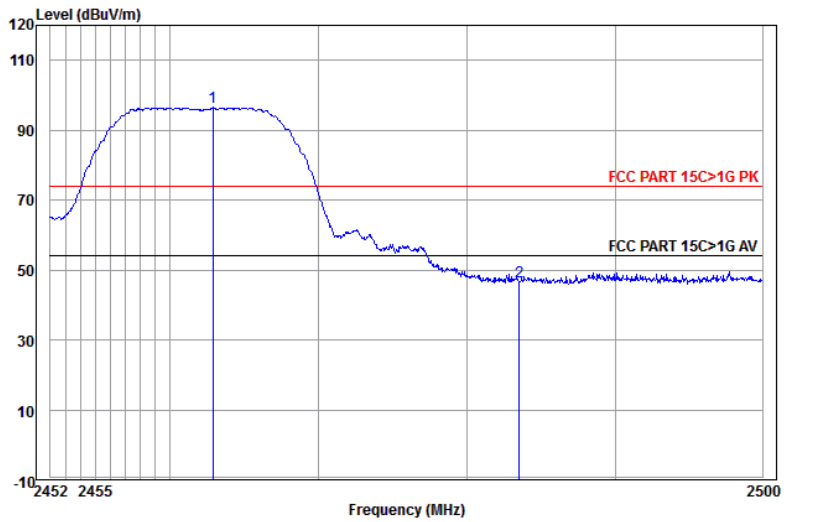
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	4.28	34.39	45.44	47.86	74.00	-26.14	Vertical	
2 pp	2413.415	32.58	4.34	34.39	93.68	96.21	74.00	22.21	Vertical	

Worse case mode:	802.11b (11Mbps)		
Frequency: 2483.5MHz	Test channel: Highest	Polarization: Horizontal	Remark: Peak



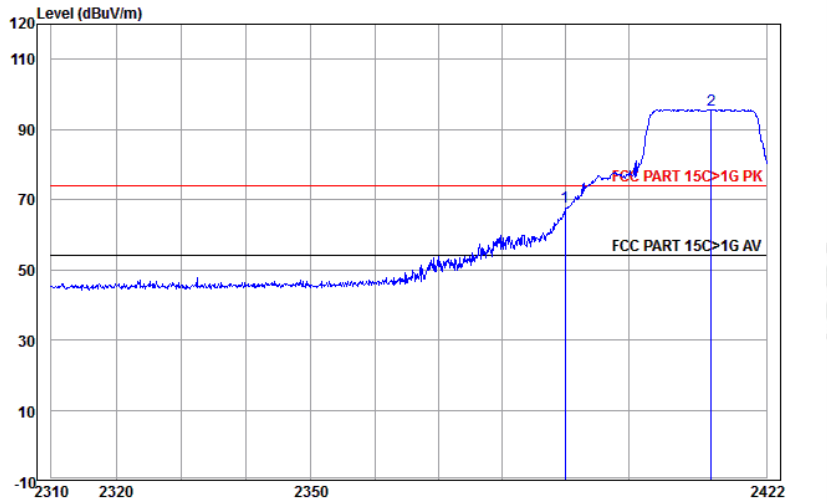
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2463.483	32.68	4.46	34.40	93.51	96.25	74.00	22.25	Horizontal	
2	2483.500	32.71	4.51	34.41	44.22	47.03	74.00	-26.97	Horizontal	

Worse case mode:	802.11b (11Mbps)		
Frequency: 2483.5MHz	Test channel: Highest	Polarization: Vertical	Remark: Peak



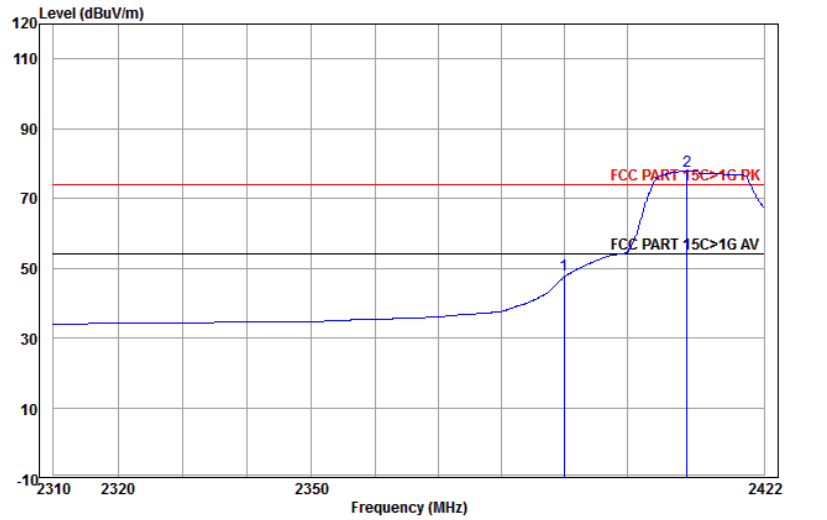
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2462.862	32.68	4.46	34.40	93.71	96.45	74.00	22.45	Vertical	
2	2483.500	32.71	4.51	34.41	44.04	46.85	74.00	-27.15	Vertical	

Worse case mode:	802.11g (6Mbps)		
Frequency: 2390.0MHz	Test channel: Lowest	Polarization: Horizontal	Remark: Peak



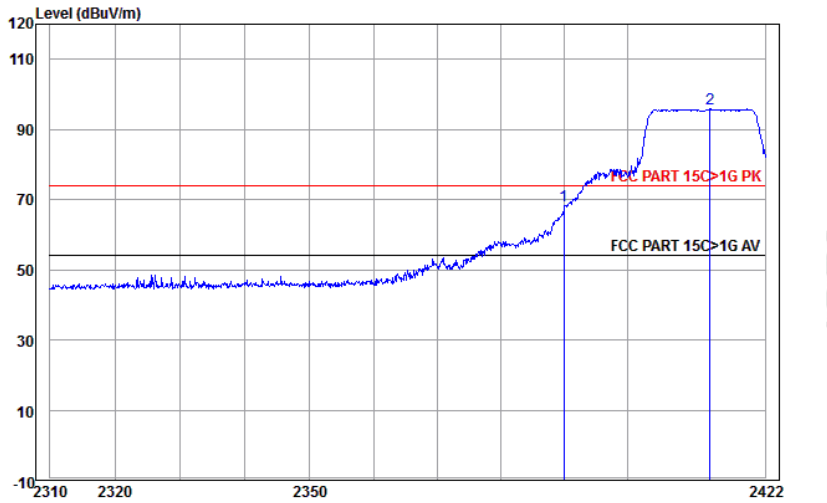
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	4.28	34.39	65.34	67.76	74.00	-6.24	Horizontal	
2 pp	2413.186	32.58	4.34	34.39	93.18	95.71	74.00	21.71	Horizontal	

Worse case mode:	802.11g (6Mbps)		
Frequency: 2390.0MHz	Test channel: Lowest	Polarization: Horizontal	Remark: Average



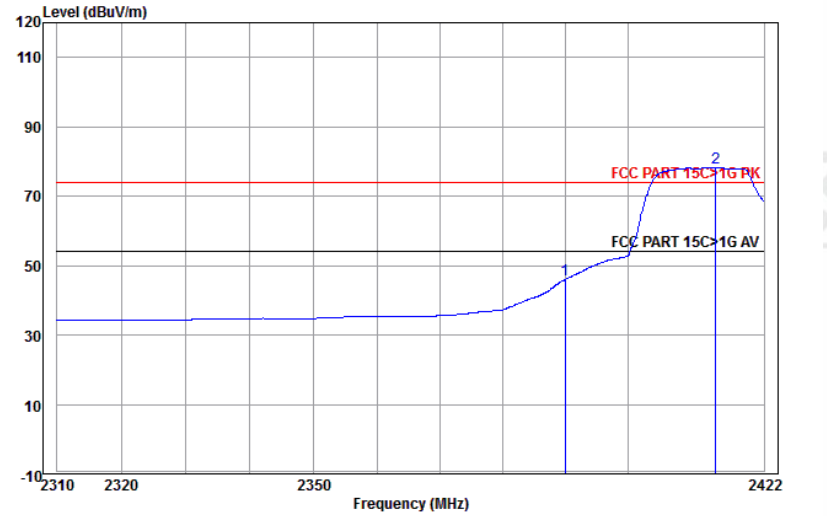
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	4.28	34.39	45.68	48.10	54.00	-5.90	Horizontal	Average
2 pp	2409.647	32.57	4.33	34.39	75.40	77.91	54.00	23.91	Horizontal	Average

Worse case mode:	802.11g (6Mbps)		
Frequency: 2390.0MHz	Test channel: Lowest	Polarization: Vertical	Remark: Peak



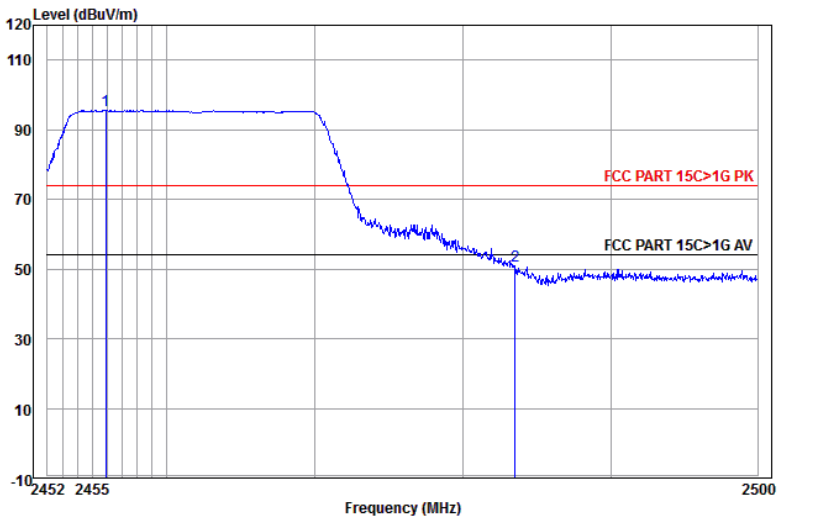
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	4.28	34.39	65.89	68.31	74.00	-5.69	Vertical	
2 pp	2413.186	32.58	4.34	34.39	93.22	95.75	74.00	21.75	Vertical	

Worse case mode:	802.11g (6Mbps)		
Frequency: 2390.0MHz	Test channel: Lowest	Polarization: Vertical	Remark: Average



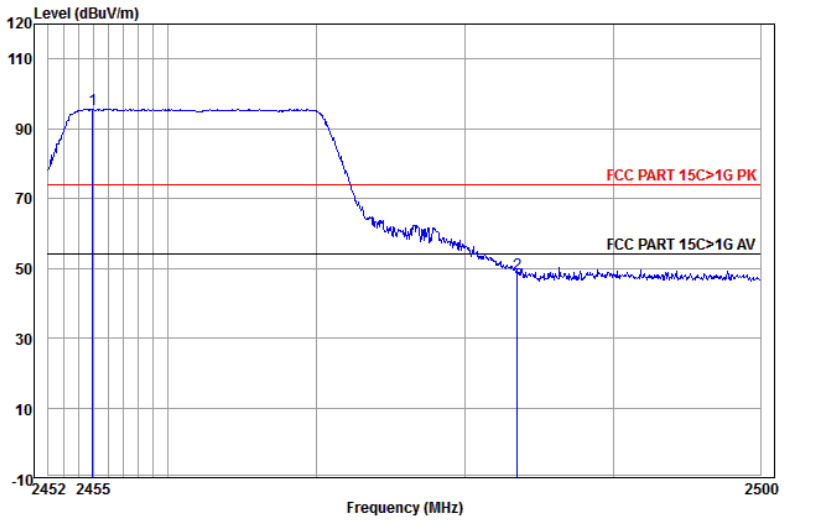
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	4.28	34.39	43.68	46.10	54.00	-7.90	Vertical	Average
2 pp	2414.215	32.58	4.34	34.39	75.61	78.14	54.00	24.14	Vertical	Average

Worse case mode:	802.11g (6Mbps)		
Frequency: 2483.5MHz	Test channel: Highest	Polarization: Horizontal	Remark: Peak



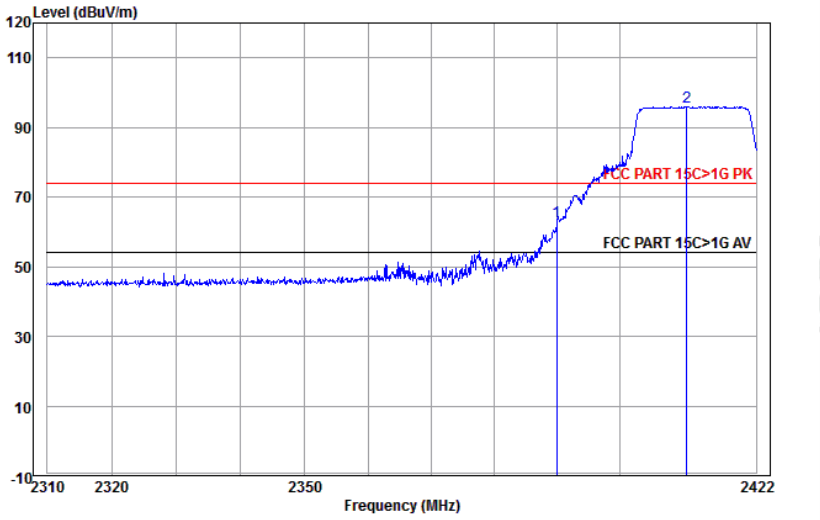
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2455.901	32.66	4.44	34.40	92.92	95.62	74.00	21.62	Horizontal	
2	2483.500	32.71	4.51	34.41	48.01	50.82	74.00	-23.18	Horizontal	

Worse case mode:	802.11g (6Mbps)		
Frequency: 2483.5MHz	Test channel: Highest	Polarization: Vertical	Remark: Peak



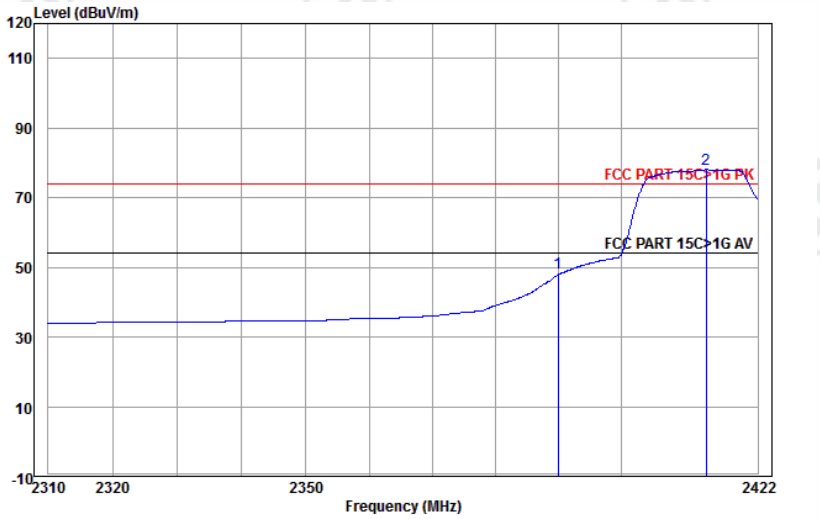
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2454.949	32.66	4.44	34.40	92.97	95.67	74.00	21.67	Vertical	
2	2483.500	32.71	4.51	34.41	45.75	48.56	74.00	-25.44	Vertical	

Worse case mode:	802.11n(HT20) (6.5Mbps)		
Frequency: 2390.0MHz	Test channel: Lowest	Polarization: Horizontal	Remark: Peak



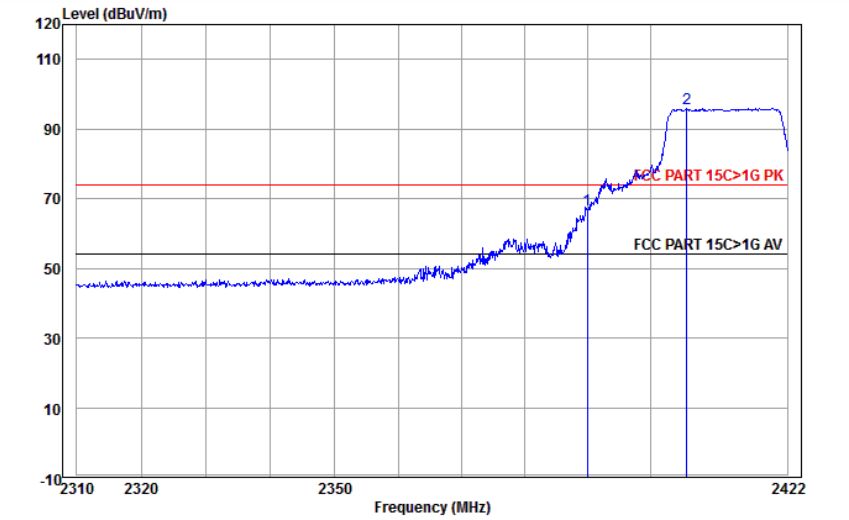
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	4.28	34.39	60.42	62.84	74.00	-11.16	Horizontal	
2 pp	2410.788	32.58	4.33	34.39	93.41	95.93	74.00	21.93	Horizontal	

Worse case mode:	802.11n(HT20) (6.5Mbps)		
Frequency: 2390.0MHz	Test channel: Lowest	Polarization: Horizontal	Remark: Average



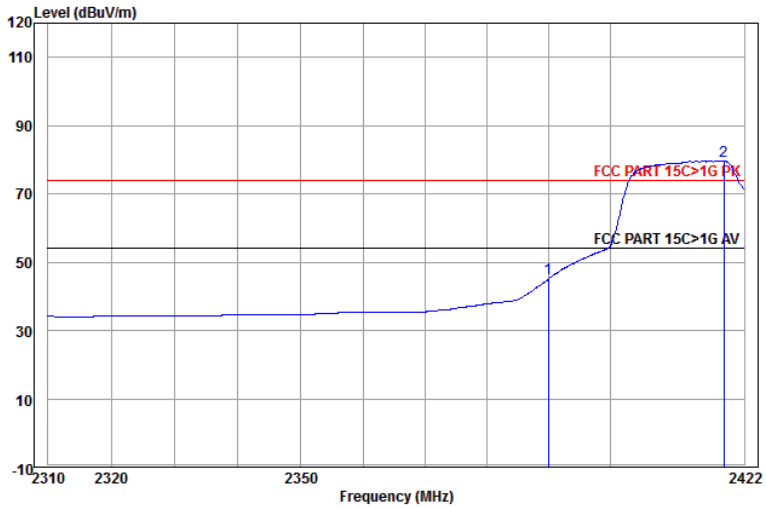
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	4.28	34.39	45.90	48.32	54.00	-5.68	Horizontal	Average
2 pp	2413.643	32.58	4.34	34.39	75.51	78.04	54.00	24.04	Horizontal	Average

Worse case mode:	802.11n(HT20) (6.5Mbps)		
Frequency: 2390.0MHz	Test channel: Lowest	Polarization: Vertical	Remark: Peak



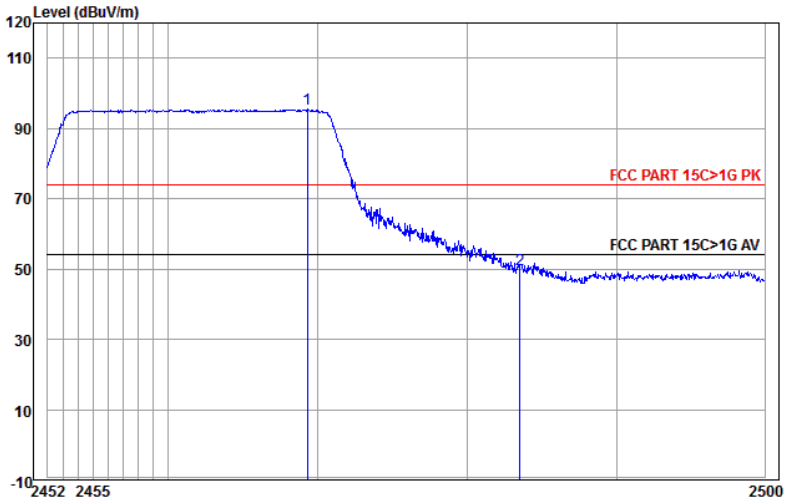
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	4.28	34.39	64.31	66.73	74.00	-7.27	Vertical	
2 pp	2405.885	32.57	4.32	34.39	93.32	95.82	74.00	21.82	Vertical	

Worse case mode:	802.11n(HT20) (6.5Mbps)		
Frequency: 2390.0MHz	Test channel: Lowest	Polarization: Vertical	Remark: Average



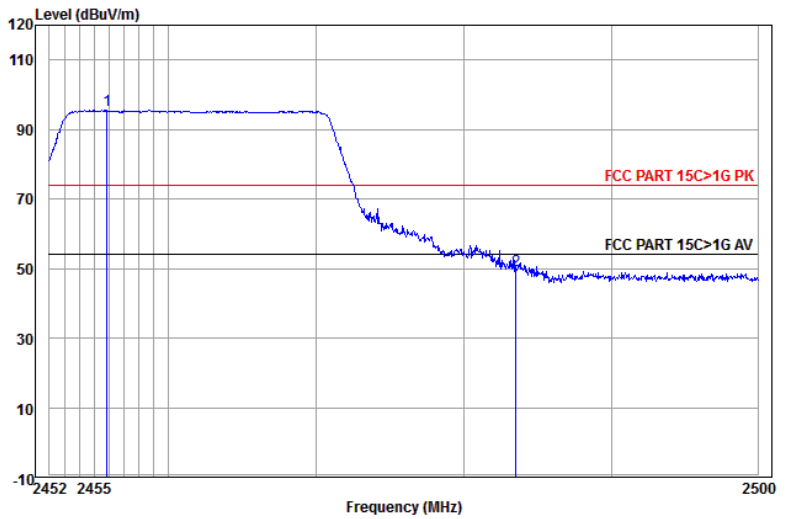
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	4.28	34.39	42.95	45.37	54.00	-8.63	Vertical	Average
2 pp	2418.677	32.59	4.35	34.39	77.15	79.70	54.00	25.70	Vertical	Average

Worse case mode:	802.11n(HT20) (6.5Mbps)		
Frequency: 2483.5MHz	Test channel: Highest	Polarization: Horizontal	Remark: Peak



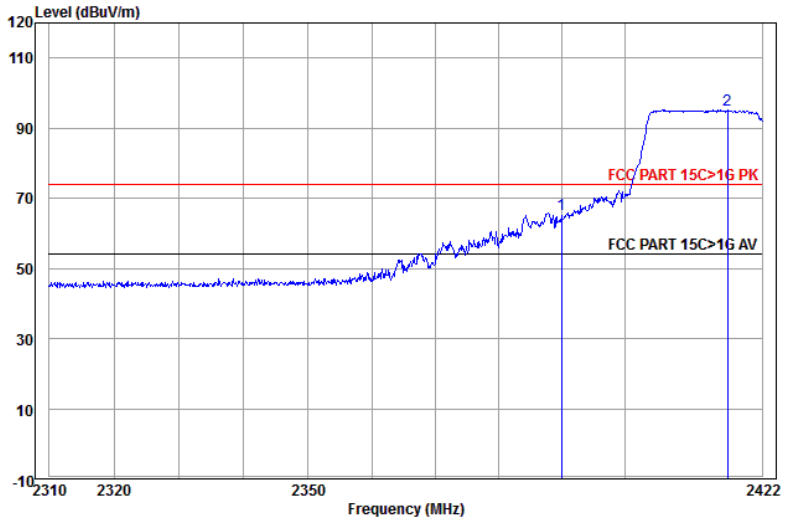
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2469.269	32.69	4.47	34.40	92.63	95.39	74.00	21.39	Horizontal	
2	2483.500	32.71	4.51	34.41	46.89	49.70	74.00	-24.30	Horizontal	

Worse case mode:	802.11n(HT20) (6.5Mbps)		
Frequency: 2483.5MHz	Test channel: Highest	Polarization: Vertical	Remark: Peak



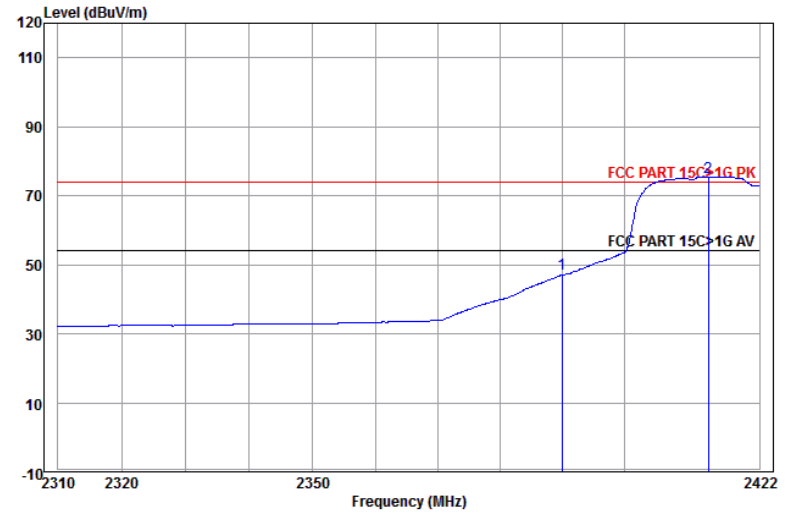
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2455.854	32.66	4.44	34.40	92.82	95.52	74.00	21.52	Vertical	
2	2483.500	32.71	4.51	34.41	46.53	49.34	74.00	-24.66	Vertical	

Worse case mode:	802.11n(HT40) (13.5Mbps)		
Frequency: 2390.0MHz	Test channel: Lowest	Polarization: Horizontal	Remark: Peak



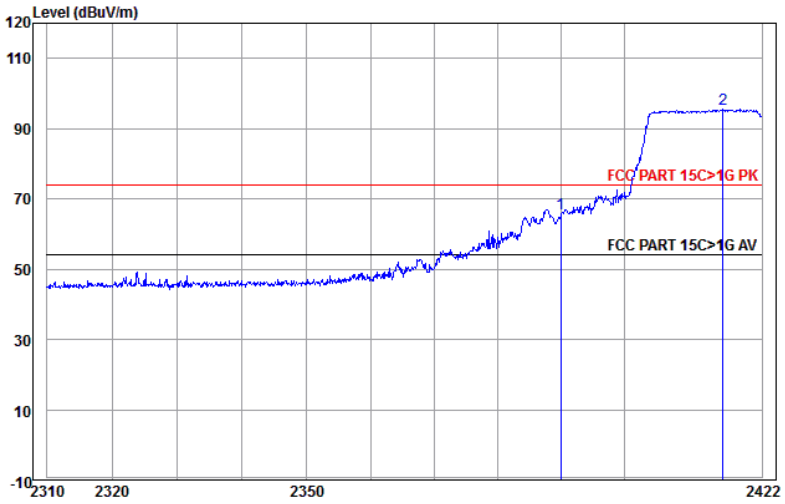
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	4.28	34.39	62.93	65.35	74.00	-8.65	Horizontal	
2 pp	2416.502	32.59	4.35	34.39	92.59	95.14	74.00	21.14	Horizontal	

Worse case mode:	802.11n(HT40) (13.5Mbps)		
Frequency: 2390.0MHz	Test channel: Lowest	Polarization: Horizontal	Remark: Average



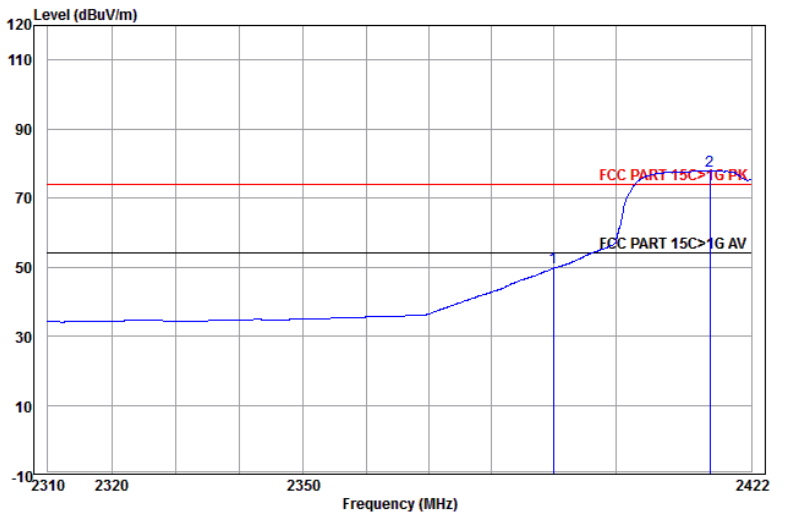
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	4.28	34.39	44.86	47.28	54.00	-6.72	Horizontal	Average
2 pp	2413.643	32.58	4.34	34.39	72.88	75.41	54.00	21.41	Horizontal	Average

Worse case mode:	802.11n(HT40) (13.5Mbps)		
Frequency: 2390.0MHz	Test channel: Lowest	Polarization: Vertical	Remark: Peak



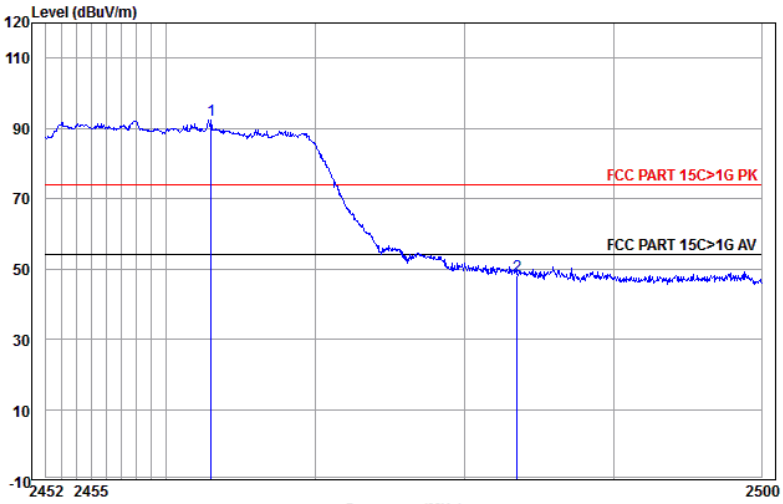
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	4.28	34.39	63.42	65.84	74.00	-8.16	Vertical	
2 pp	2415.816	32.59	4.34	34.39	92.90	95.44	74.00	21.44	Vertical	

Worse case mode:	802.11n(HT40) (13.5Mbps)		
Frequency: 2390.0MHz	Test channel: Lowest	Polarization: Vertical	Remark: Average



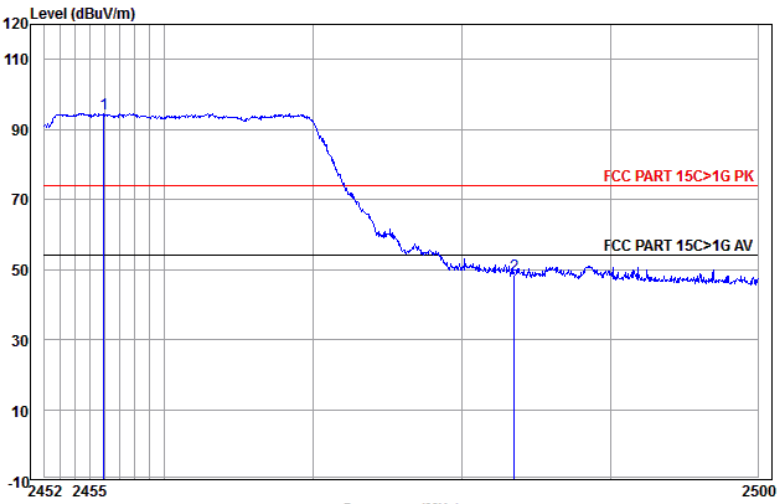
	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	4.28	34.39	47.39	49.81	54.00	-4.19	Vertical	Average
2 pp	2415.244	32.58	4.34	34.39	75.33	77.86	54.00	23.86	Vertical	Average

Worse case mode:	802.11n(HT40) (13.5Mbps)		
Frequency: 2483.5MHz	Test channel:Highest	Polarization: Horizontal	Remark: Peak



	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2463.005	32.68	4.46	34.40	89.64	92.38	74.00	18.38	Horizontal	
2	2483.500	32.71	4.51	34.41	45.19	48.00	74.00	-26.00	Horizontal	

Worse case mode:	802.11n(HT40) (13.5Mbps)		
Frequency: 2483.5MHz	Test channel:Highest	Polarization: Vertical	Remark: Peak



	Freq	Ant Factor	Cable Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1 pp	2455.949	32.66	4.44	34.40	91.80	94.50	74.00	20.50	Vertical	
2	2483.500	32.71	4.51	34.41	45.74	48.55	74.00	-25.45	Vertical	

Note:

1) Through Pre-scan transmitting mode with all kind of modulation and data rate, and 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) ; 13.5Mbps of rate is the worst case of 802.11n(HT40),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:

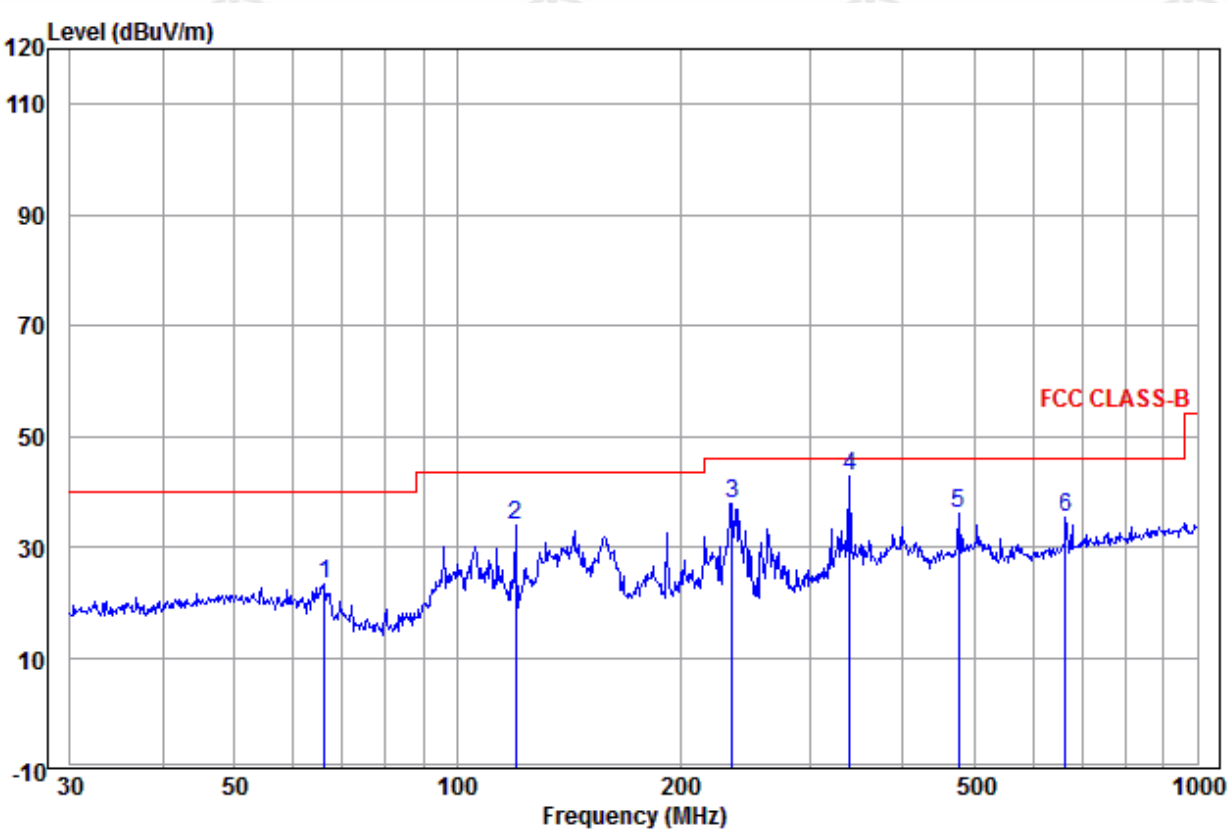
Frequency	Field strength (microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz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

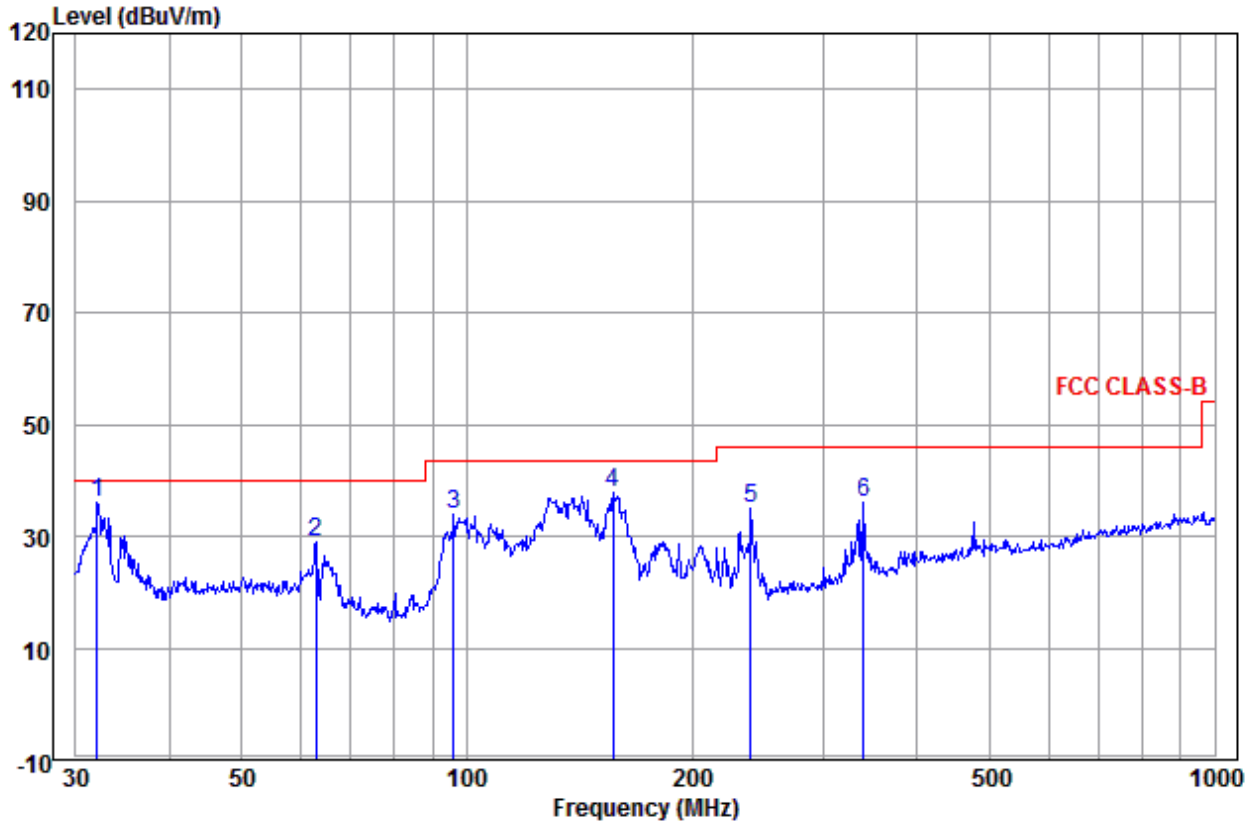
Radiated Emission below 1GHz

30MHz~1GHz (QP)		
Test mode:	Transmitting	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	66.266	11.61	1.44	10.27	23.32	40.00	-16.68	Horizontal	
2	119.856	11.64	1.57	20.64	33.85	43.50	-9.65	Horizontal	
3	234.991	12.18	2.31	23.36	37.85	46.00	-8.15	Horizontal	
4 pp	339.589	14.55	2.65	25.74	42.94	46.00	-3.06	Horizontal	
5	475.499	17.78	3.06	15.06	35.90	46.00	-10.10	Horizontal	
6	663.473	19.90	3.66	11.82	35.38	46.00	-10.62	Horizontal	

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 pp	32.067	12.89	1.04	22.08	36.01	40.00	-3.99	Vertical	
2	62.871	12.77	1.44	14.79	29.00	40.00	-11.00	Vertical	
3	96.099	12.44	1.58	20.06	34.08	43.50	-9.42	Vertical	
4	157.007	10.00	1.68	26.14	37.82	43.50	-5.68	Vertical	
5	239.987	12.25	2.32	20.51	35.08	46.00	-10.92	Vertical	
6	339.589	14.55	2.65	18.76	35.96	46.00	-10.04	Vertical	

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
1135.731	30.07	2.44	35.03	46.30	43.78	74.00	-30.22	Pass	Horizontal
1439.090	30.75	2.77	34.73	46.12	44.91	74.00	-29.09	Pass	Horizontal
4824.000	34.73	5.10	34.35	44.49	49.97	74.00	-24.03	Pass	Horizontal
5660.469	35.64	6.67	34.30	41.87	49.88	74.00	-24.12	Pass	Horizontal
7236.000	36.42	6.69	34.90	38.74	46.95	74.00	-27.05	Pass	Horizontal
9648.000	37.93	7.70	35.07	39.03	49.59	74.00	-24.41	Pass	Horizontal
1319.777	30.50	2.65	34.84	45.40	43.71	74.00	-30.29	Pass	Vertical
3634.910	33.07	5.50	34.57	43.61	47.61	74.00	-26.39	Pass	Vertical
4824.000	34.73	5.10	34.35	45.21	50.69	74.00	-23.31	Pass	Vertical
6017.064	35.91	7.41	34.31	40.82	49.83	74.00	-24.17	Pass	Vertical
7236.000	36.42	6.69	34.90	38.81	47.02	74.00	-26.98	Pass	Vertical
9648.000	37.93	7.70	35.07	38.54	49.10	74.00	-24.90	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
1093.183	29.96	2.38	35.08	46.31	43.57	74.00	-30.43	Pass	Horizontal
3757.208	32.97	5.48	34.58	43.69	47.56	74.00	-26.44	Pass	Horizontal
4874.000	34.84	5.09	34.33	44.98	50.58	74.00	-23.42	Pass	Horizontal
5956.109	35.87	7.33	34.30	42.07	50.97	74.00	-23.03	Pass	Horizontal
7311.000	36.43	6.76	34.90	40.99	49.28	74.00	-24.72	Pass	Horizontal
9748.000	38.03	7.61	35.05	38.90	49.49	74.00	-24.51	Pass	Horizontal
1195.049	30.21	2.51	34.97	47.18	44.93	74.00	-29.07	Pass	Vertical
1319.777	30.50	2.65	34.84	49.36	47.67	74.00	-26.33	Pass	Vertical
4874.000	34.84	5.09	34.33	45.32	50.92	74.00	-23.08	Pass	Vertical
5910.798	35.83	7.23	34.30	42.07	50.83	74.00	-23.17	Pass	Vertical
7311.000	36.43	6.76	34.90	39.21	47.50	74.00	-26.50	Pass	Vertical
9748.000	38.03	7.61	35.05	38.54	49.13	74.00	-24.87	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
1195.049	30.21	2.51	34.97	47.41	45.16	74.00	-28.84	Pass	Horizontal
3993.903	32.80	5.44	34.60	43.50	47.14	74.00	-26.86	Pass	Horizontal
4924.000	34.94	5.07	34.32	45.05	50.74	74.00	-23.26	Pass	Horizontal
6203.700	36.01	7.22	34.43	41.74	50.54	74.00	-23.46	Pass	Horizontal
7386.000	36.44	6.83	34.90	39.22	47.59	74.00	-26.41	Pass	Horizontal
9848.000	38.14	7.53	35.03	38.60	49.24	74.00	-24.76	Pass	Horizontal
1079.357	29.92	2.37	35.10	48.84	46.03	74.00	-27.97	Pass	Vertical
1364.182	30.60	2.69	34.80	46.95	45.44	74.00	-28.56	Pass	Vertical
3700.260	33.02	5.49	34.57	45.80	49.74	74.00	-24.26	Pass	Vertical
4924.000	34.94	5.07	34.32	44.99	50.68	74.00	-23.32	Pass	Vertical
7386.000	36.44	6.83	34.90	41.24	49.61	74.00	-24.39	Pass	Vertical
9848.000	38.14	7.53	35.03	37.73	48.37	74.00	-25.63	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
1110.008	30.00	2.41	35.06	45.67	43.02	74.00	-30.98	Pass	Horizontal
1319.777	30.50	2.65	34.84	49.04	47.35	74.00	-26.65	Pass	Horizontal
4824.000	34.73	5.10	34.35	44.22	49.70	74.00	-24.30	Pass	Horizontal
6379.864	36.10	7.05	34.54	41.60	50.21	74.00	-23.79	Pass	Horizontal
7236.000	36.42	6.69	34.90	41.09	49.30	74.00	-24.70	Pass	Horizontal
9648.000	37.93	7.70	35.07	38.75	49.31	74.00	-24.69	Pass	Horizontal
1182.943	30.18	2.50	34.98	45.66	43.36	74.00	-30.64	Pass	Vertical
1668.044	31.18	2.98	34.54	47.36	46.98	74.00	-27.02	Pass	Vertical
4824.000	34.73	5.10	34.35	43.84	49.32	74.00	-24.68	Pass	Vertical
5747.586	35.71	6.87	34.30	42.64	50.92	74.00	-23.08	Pass	Vertical
7236.000	36.42	6.69	34.90	40.38	48.59	74.00	-25.41	Pass	Vertical
9648.000	37.93	7.70	35.07	38.70	49.26	74.00	-24.74	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
1121.367	30.03	2.42	35.05	46.44	43.84	74.00	-30.16	Pass	Horizontal
1319.777	30.50	2.65	34.84	49.52	47.83	74.00	-26.17	Pass	Horizontal
4874.000	34.84	5.09	34.33	44.56	50.16	74.00	-23.84	Pass	Horizontal
6363.645	36.09	7.06	34.53	41.78	50.40	74.00	-23.60	Pass	Horizontal
7311.000	36.43	6.76	34.90	41.09	49.38	74.00	-24.62	Pass	Horizontal
9748.000	38.03	7.61	35.05	37.91	48.50	74.00	-25.50	Pass	Horizontal
1087.632	29.94	2.38	35.09	46.06	43.29	74.00	-30.71	Pass	Vertical
1374.639	30.62	2.71	34.79	45.68	44.22	74.00	-29.78	Pass	Vertical
1668.044	31.18	2.98	34.54	47.59	47.21	74.00	-26.79	Pass	Vertical
4874.000	34.84	5.09	34.33	42.12	47.72	74.00	-26.28	Pass	Vertical
7311.000	36.43	6.76	34.90	40.13	48.42	74.00	-25.58	Pass	Vertical
9748.000	38.03	7.61	35.05	38.82	49.41	74.00	-24.59	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
1319.777	30.50	2.65	34.84	49.71	48.02	74.00	-25.98	Pass	Horizontal
1537.557	30.94	2.86	34.64	49.18	48.34	74.00	-25.66	Pass	Horizontal
4924.000	34.94	5.07	34.32	44.52	50.21	74.00	-23.79	Pass	Horizontal
5910.798	35.83	7.23	34.30	41.52	50.28	74.00	-23.72	Pass	Horizontal
7386.000	36.44	6.83	34.90	40.18	48.55	74.00	-25.45	Pass	Horizontal
9848.000	38.14	7.53	35.03	40.31	50.95	74.00	-23.05	Pass	Horizontal
1090.404	29.95	2.38	35.09	46.31	43.55	74.00	-30.45	Pass	Vertical
1340.089	30.54	2.67	34.82	46.67	45.06	74.00	-28.94	Pass	Vertical
1663.803	31.17	2.97	34.54	46.54	46.14	74.00	-27.86	Pass	Vertical
4946.072	34.99	5.06	34.31	42.01	47.75	74.00	-26.25	Pass	Vertical
7386.000	36.44	6.83	34.90	41.07	49.44	74.00	-24.56	Pass	Vertical
9848.000	38.14	7.53	35.03	39.74	50.38	74.00	-23.62	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
1319.777	30.50	2.65	34.84	49.15	47.46	74.00	-26.54	Pass	Horizontal
1553.293	30.97	2.88	34.63	47.88	47.10	74.00	-26.90	Pass	Horizontal
4824.000	34.73	5.10	34.35	42.30	47.78	74.00	-26.22	Pass	Horizontal
5836.044	35.78	7.07	34.30	40.59	49.14	74.00	-24.86	Pass	Horizontal
7236.000	36.42	6.69	34.90	38.93	47.14	74.00	-26.86	Pass	Horizontal
9648.000	37.93	7.70	35.07	40.43	50.99	74.00	-23.01	Pass	Horizontal
1159.096	30.13	2.47	35.01	46.41	44.00	74.00	-30.00	Pass	Vertical
1461.238	30.79	2.79	34.71	45.50	44.37	74.00	-29.63	Pass	Vertical
4824.000	34.73	5.10	34.35	43.20	48.68	74.00	-25.32	Pass	Vertical
5971.290	35.88	7.37	34.30	41.40	50.35	74.00	-23.65	Pass	Vertical
7236.000	36.42	6.69	34.90	40.22	48.43	74.00	-25.57	Pass	Vertical
9648.000	37.93	7.70	35.07	38.99	49.55	74.00	-24.45	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
1162.051	30.13	2.47	35.00	46.10	43.70	74.00	-30.30	Pass	Horizontal
1319.777	30.50	2.65	34.84	49.93	48.24	74.00	-25.76	Pass	Horizontal
4874.000	34.84	5.09	34.33	44.63	50.23	74.00	-23.77	Pass	Horizontal
5956.109	35.87	7.33	34.30	41.24	50.14	74.00	-23.86	Pass	Horizontal
7311.000	36.43	6.76	34.90	41.01	49.30	74.00	-24.70	Pass	Horizontal
9748.000	38.03	7.61	35.05	38.86	49.45	74.00	-24.55	Pass	Horizontal
1201.149	30.23	2.52	34.96	45.71	43.50	74.00	-30.50	Pass	Vertical
1605.554	31.07	2.92	34.59	44.23	43.63	74.00	-30.37	Pass	Vertical
4874.000	34.84	5.09	34.33	42.54	48.14	74.00	-25.86	Pass	Vertical
6001.768	35.90	7.43	34.30	41.09	50.12	74.00	-23.88	Pass	Vertical
7311.000	36.43	6.76	34.90	40.64	48.93	74.00	-25.07	Pass	Vertical
9748.000	38.03	7.61	35.05	40.04	50.63	74.00	-23.37	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
1195.049	30.21	2.51	34.97	46.14	43.89	74.00	-30.11	Pass	Horizontal
1439.090	30.75	2.77	34.73	46.47	45.26	74.00	-28.74	Pass	Horizontal
4924.000	34.94	5.07	34.32	43.22	48.91	74.00	-25.09	Pass	Horizontal
5762.235	35.72	6.90	34.30	41.31	49.63	74.00	-24.37	Pass	Horizontal
7386.000	36.44	6.83	34.90	40.30	48.67	74.00	-25.33	Pass	Horizontal
9848.000	38.14	7.53	35.03	39.98	50.62	74.00	-23.38	Pass	Horizontal
1185.958	30.19	2.50	34.98	46.87	44.58	74.00	-29.42	Pass	Vertical
1668.044	31.18	2.98	34.54	46.32	45.94	74.00	-28.06	Pass	Vertical
4924.000	34.94	5.07	34.32	44.36	50.05	74.00	-23.95	Pass	Vertical
5956.109	35.87	7.33	34.30	41.55	50.45	74.00	-23.55	Pass	Vertical
7386.000	36.44	6.83	34.90	40.86	49.23	74.00	-24.77	Pass	Vertical
9848.000	38.14	7.53	35.03	39.84	50.48	74.00	-23.52	Pass	Vertical

Test mode: 802.11n(HT40)(13.5Mbps)	Test Frequency: 2422MHz	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
1127.091	30.05	2.43	35.04	46.54	43.98	74.00	-30.02	Pass	Horizontal
1553.293	30.97	2.88	34.63	47.02	46.24	74.00	-27.76	Pass	Horizontal
4844.000	34.77	5.10	34.34	40.78	46.31	74.00	-27.69	Pass	Horizontal
5940.967	35.86	7.30	34.30	41.50	50.36	74.00	-23.64	Pass	Horizontal
7266.000	36.43	6.72	34.90	40.36	48.61	74.00	-25.39	Pass	Horizontal
9688.000	37.97	7.66	35.06	38.55	49.12	74.00	-24.88	Pass	Horizontal
1093.183	29.96	2.38	35.08	47.07	44.33	74.00	-29.67	Pass	Vertical
1350.362	30.57	2.68	34.81	45.65	44.09	74.00	-29.91	Pass	Vertical
4844.000	34.77	5.10	34.34	41.30	46.83	74.00	-27.17	Pass	Vertical
5776.922	35.73	6.93	34.30	41.55	49.91	74.00	-24.09	Pass	Vertical
7266.000	36.43	6.72	34.90	40.11	48.36	74.00	-25.64	Pass	Vertical
9688.000	37.97	7.66	35.06	39.65	50.22	74.00	-23.78	Pass	Vertical

Test mode: 802.11n(HT40)(13.5Mbps)				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
1138.626	30.07	2.44	35.03	45.89	43.37	74.00	-30.63	Pass	Horizontal
1319.777	30.50	2.65	34.84	47.42	45.73	74.00	-28.27	Pass	Horizontal
4874.000	34.84	5.09	34.33	45.00	50.60	74.00	-23.40	Pass	Horizontal
6315.233	36.07	7.11	34.50	42.24	50.92	74.00	-23.08	Pass	Horizontal
7311.000	36.43	6.76	34.90	40.72	49.01	74.00	-24.99	Pass	Horizontal
9748.000	38.03	7.61	35.05	39.90	50.49	74.00	-23.51	Pass	Horizontal
1198.095	30.22	2.51	34.97	45.96	43.72	74.00	-30.28	Pass	Vertical
1668.044	31.18	2.98	34.54	47.30	46.92	74.00	-27.08	Pass	Vertical
4874.000	34.84	5.09	34.33	43.03	48.63	74.00	-25.37	Pass	Vertical
5732.974	35.70	6.83	34.30	41.93	50.16	74.00	-23.84	Pass	Vertical
7311.000	36.43	6.76	34.90	40.43	48.72	74.00	-25.28	Pass	Vertical
9748.000	38.03	7.61	35.05	39.25	49.84	74.00	-24.16	Pass	Vertical

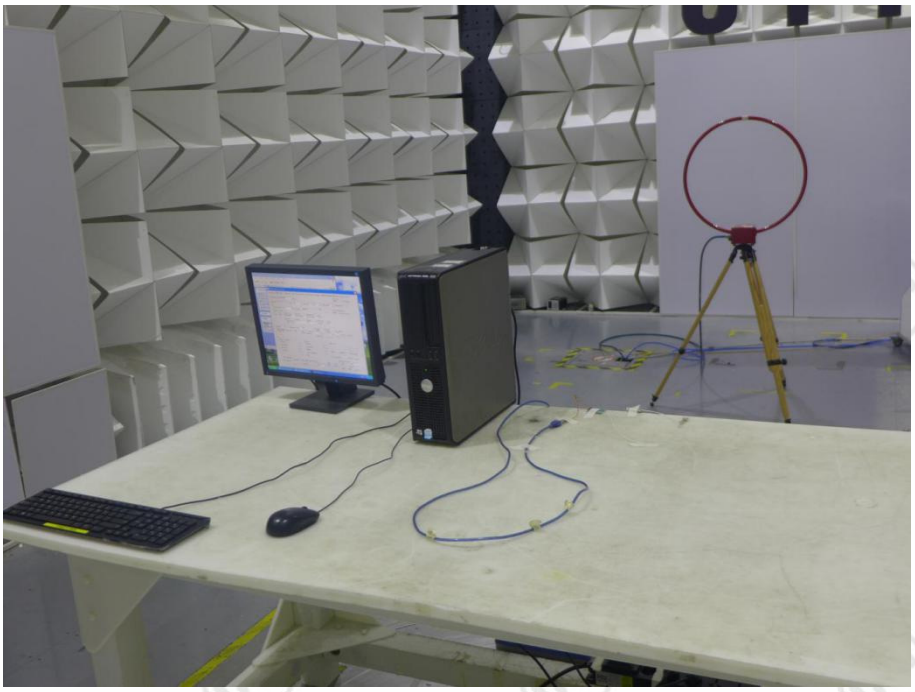
Test mode: 802.11n(HT40)(13.5Mbps)				Test Frequency: 2452MHz			Remark: Peak		
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Final test level (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1127.091	30.05	2.43	35.04	46.94	44.38	74.00	-29.62	Pass	Horizontal
1319.777	30.50	2.65	34.84	47.99	46.30	74.00	-27.70	Pass	Horizontal
4904.000	34.90	5.07	34.33	42.51	48.15	74.00	-25.85	Pass	Horizontal
5925.863	35.85	7.27	34.30	41.36	50.18	74.00	-23.82	Pass	Horizontal
7356.000	36.44	6.80	34.90	40.34	48.68	74.00	-25.32	Pass	Horizontal
9808.000	38.10	7.56	35.04	38.92	49.54	74.00	-24.46	Pass	Horizontal
1176.935	30.17	2.49	34.99	45.71	43.38	74.00	-30.62	Pass	Vertical
1659.574	31.16	2.97	34.54	46.83	46.42	74.00	-27.58	Pass	Vertical
4904.000	34.90	5.07	34.33	43.11	48.75	74.00	-25.25	Pass	Vertical
5895.771	35.82	7.20	34.30	41.68	50.40	74.00	-23.60	Pass	Vertical
7356.000	36.44	6.80	34.90	40.24	48.58	74.00	-25.42	Pass	Vertical
9808.000	38.10	7.56	35.04	39.10	49.72	74.00	-24.28	Pass	Vertical

Note:
1) Through Pre-scan transmitter mode with all kind of modulation and data rate, find the 11Mbps of rate is the worst case of 802.11b; 6Mbpsof rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40),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

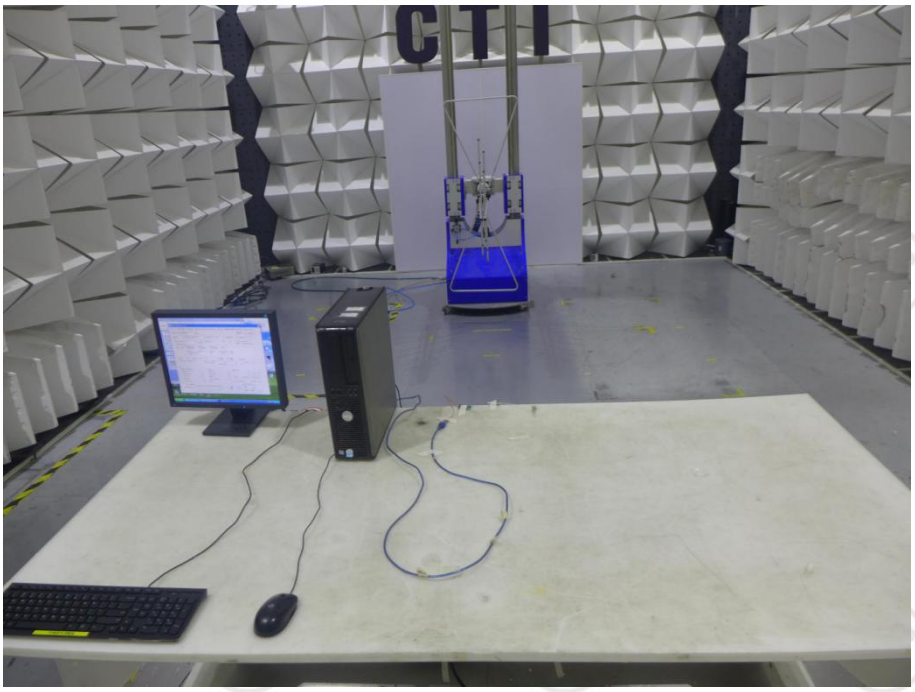
displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
4) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak values are measured.

PHOTOGRAPHS OF TEST SETUP

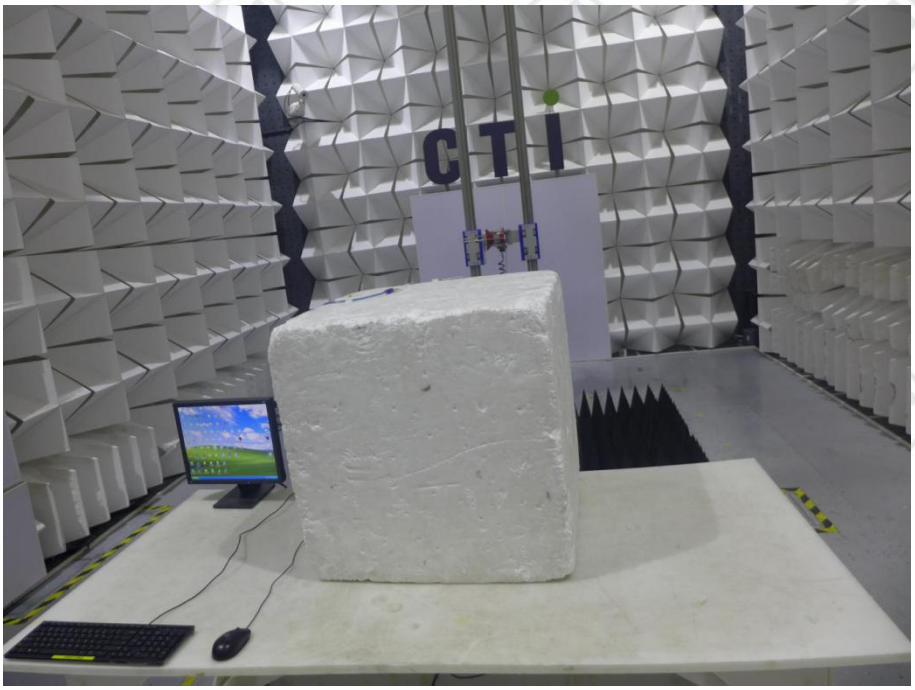
Test Model No.: W7LM1110



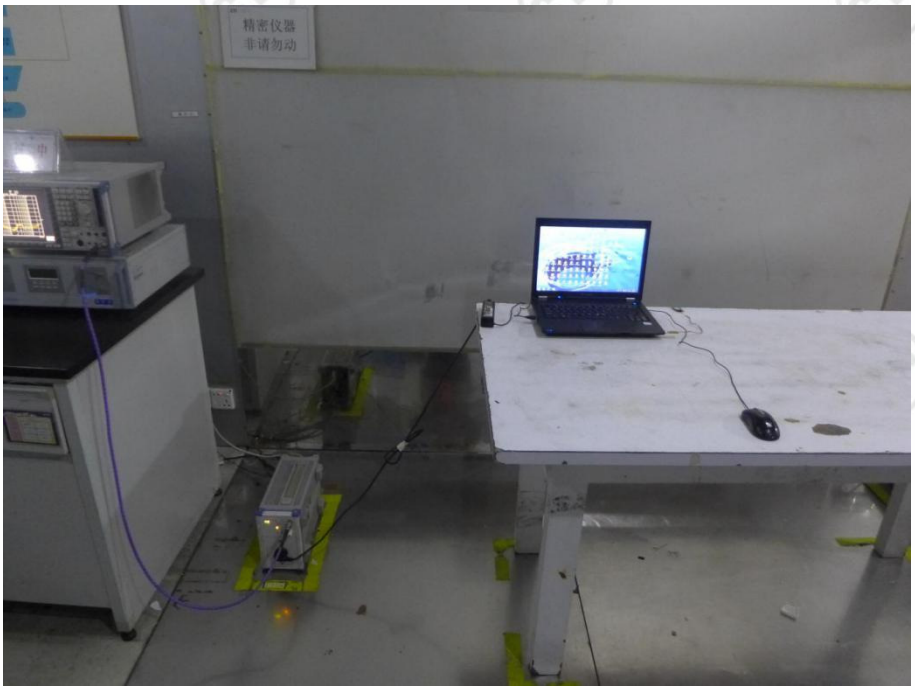
Radiated spurious emission Test Setup-1(Below 30MHz)



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



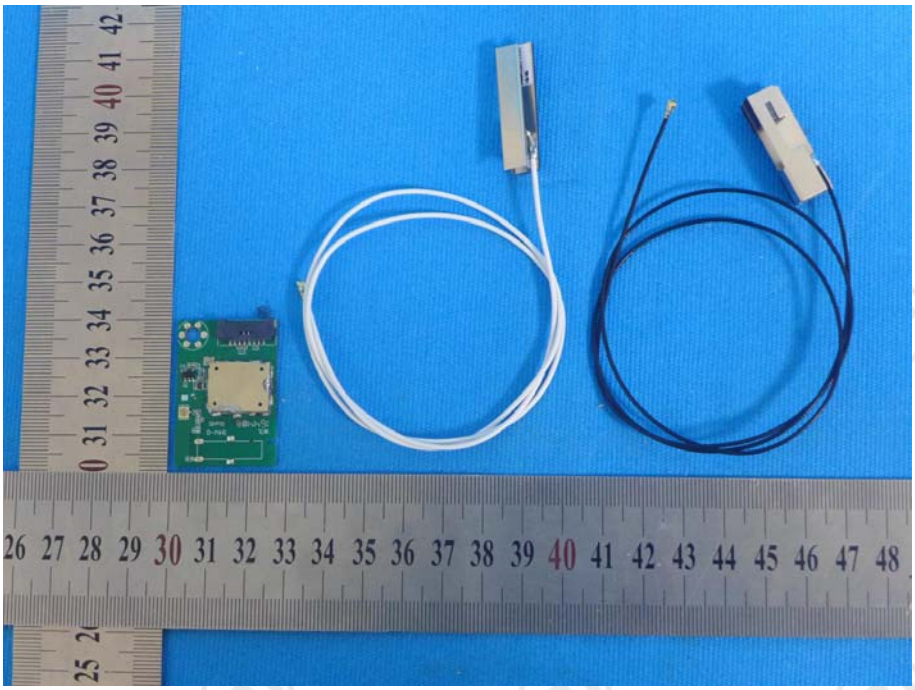
Radiated spurious emission Test Setup-3(Above 1GHz)



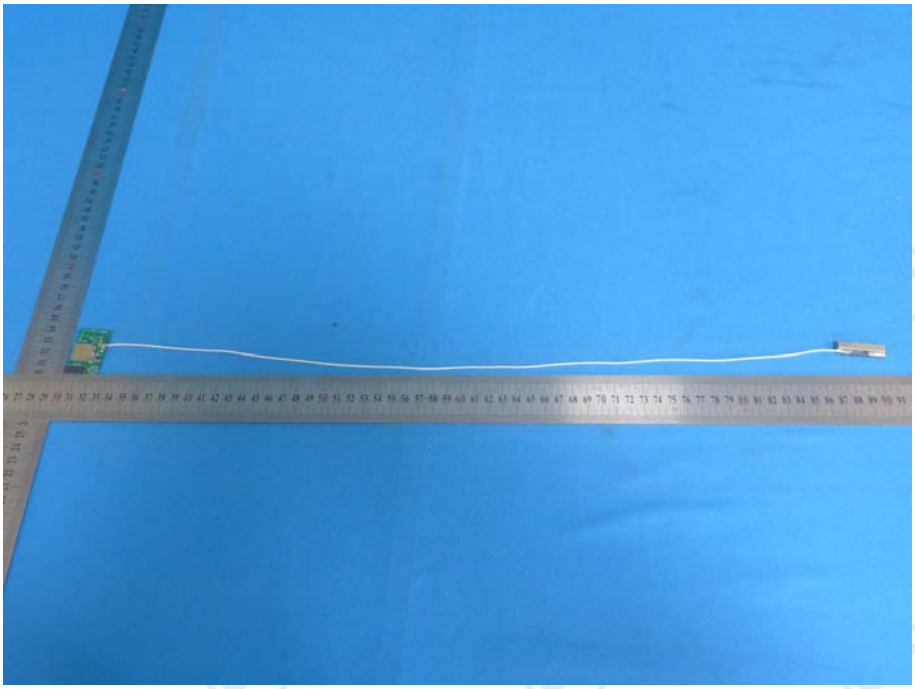
Conducted Emissions Test Setup

PHOTOGRAPHS OF EUT Constructional Details

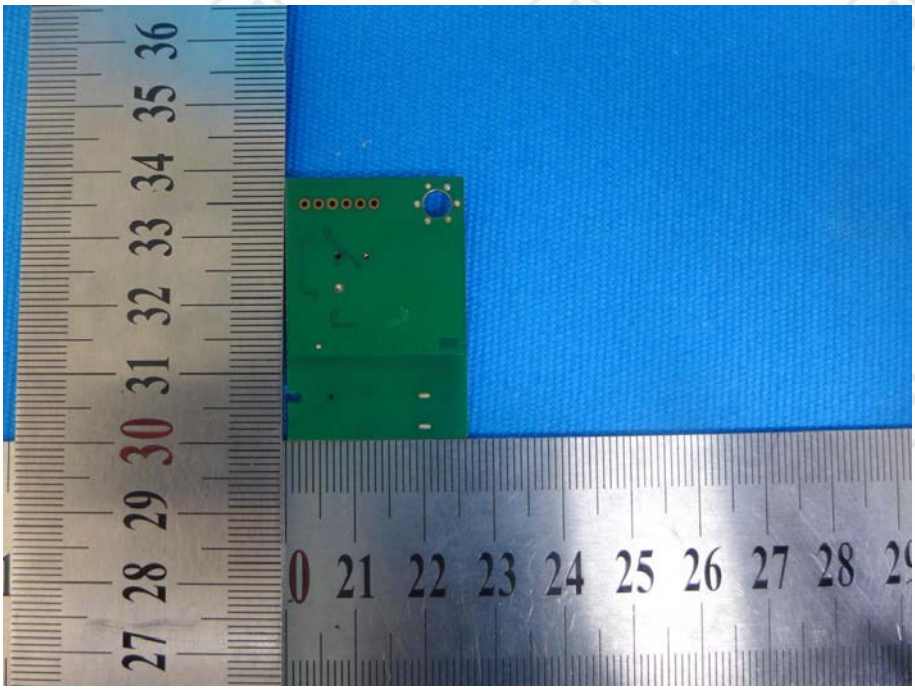
Test Model No.: W7LM1110



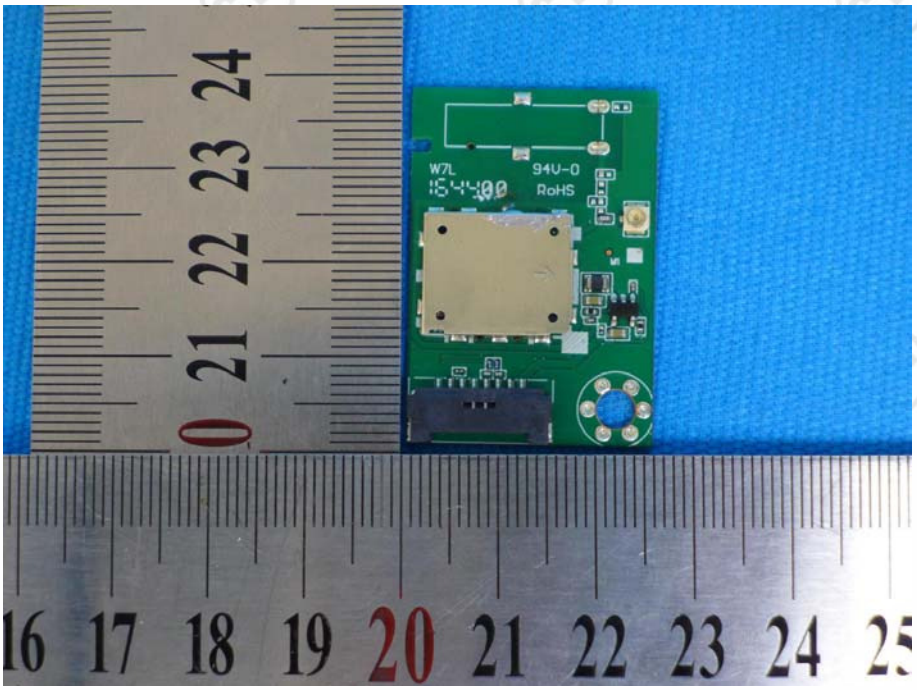
View of Product-1



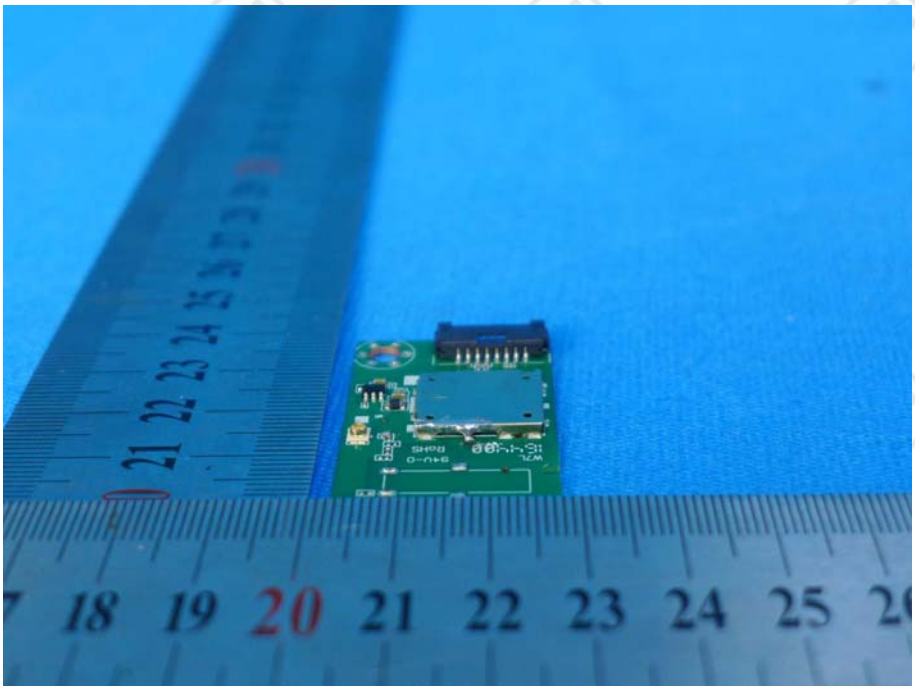
View of Product-2



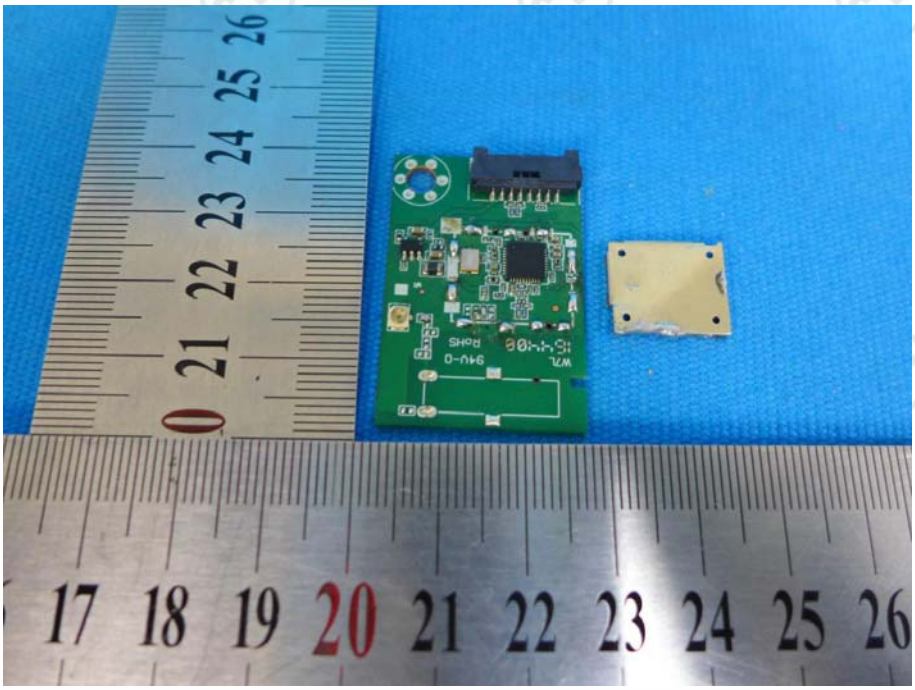
View of Product-3



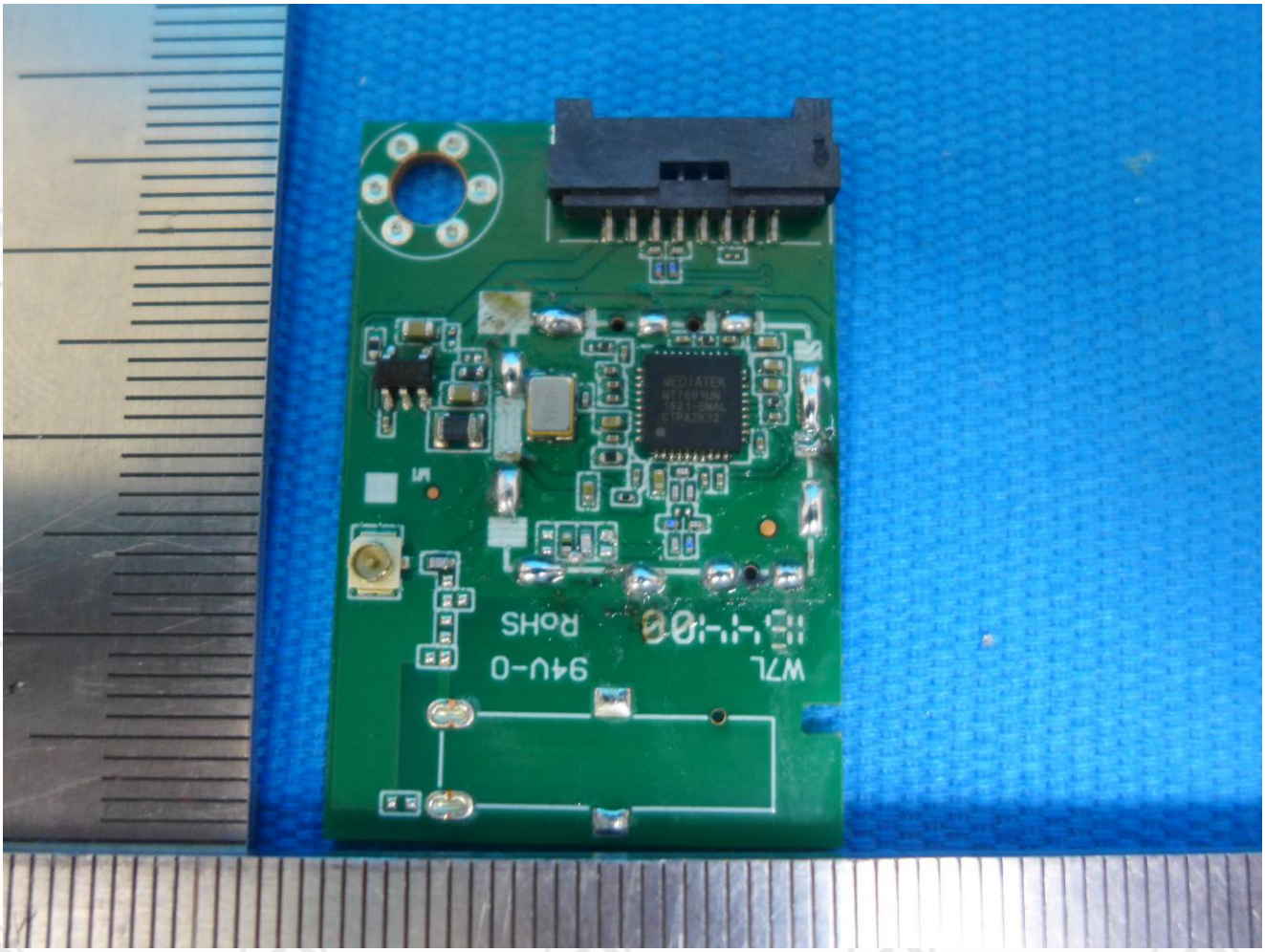
View of Product-4



View of Product-5



View of Product-6



View of Product-7

*** End of Report ***