

Report No.: SZEM131000568301

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# **FCC REPORT**

**Application No:** SZEM1310005683RF

Applicant: Shenzhen Neostra Technology Co.,Ltd.

Manufacturer: Shenzhen Neostra Technology Co.,Ltd.

Factory: Shenzhen Neostra Technology Co.,Ltd.

Product Name: MID

Model No.(EUT): MA975Q9(WIFI)

FCC ID: FCK1404

Standards: 47 CFR Part 15, Subpart C (2013)

**Date of Receipt:** 2013-10-23

**Date of Test:** 2013-11-13 to 2014-05-15

**Date of Issue:** 2014-05-27

Test Result: PASS \*

. \* In the configuration tested, the EUT complied with the standards specified above.

#### Authorized Signature:



Jack Zhang EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.



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# 2 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 2009	PASS
AC Power Line Conducted Emission	47 CFR Part 15, Subpart C Section 15.207	ANSI C63.10 2009	PASS
Conducted Peak Output Power	47 CFR Part 15, Subpart C Section 15.247 (b)(3)	KDB558074 D01 v03r01	PASS
6dB Occupied Bandwidth	47 CFR Part 15, Subpart C Section 15.247 (a)(2)	KDB558074 D01 v03r01	PASS
Power Spectral Density	47 CFR Part 15, Subpart C Section 15.247 (e)	KDB558074 D01 v03r01	PASS
Band-edge for RF Conducted Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	KDB558074 D01 v03r01	PASS
RF Conducted Spurious Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	KDB558074 D01 v03r01	PASS
Radiated Spurious Emissions	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 2009	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 2009	PASS



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## 4 General Information

#### 4.1 Client Information

Applicant:	Shenzhen Neostra Technology Co.,Ltd.
Address of Applicant:	Build 7, Huai De Cui Hai Industrial Park, Fu Yong Town, Bao'an District, Shenzhen, China.
Manufacturer:	Shenzhen Neostra Technology Co.,Ltd.
Address of Manufacturer:	Build 7, Huai De Cui Hai Industrial Park, Fu Yong Town, Bao'an District, Shenzhen, China.
Factory:	Shenzhen Neostra Technology Co.,Ltd.
Address of Factory:	Build 7, Huai De Cui Hai Industrial Park, Fu Yong Town, Bao'an District, Shenzhen, China.

# 4.2 General Description of EUT

Product Name:	MID
Model No.:	MA975Q9(WIFI)
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)
Sample Type:	Portable production
Antenna Type and Gain:	Type: Integral
	Gain: 2.5dBi
USB Cable:	80cm(Shielded , two core)
AC adapter:	MODEL: KNC015D-050250U
	INPUT: AC 100-240V 50/60Hz 0.5A
	OUTPUT: DC 5.0V 2.5A
Battery:	DC 3.7V 8200mAh (Li-ion rechargeable battery)
Test Voltage:	AC 120V 60Hz
	DC 3.7V battery fully charged

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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		

#### Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

#### For 802.11b/g/n (HT20):

Channel	Frequency
The Lowest channel	2412MHz
The Middle channel	2437MHz
The Highest channel	2462MHz





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#### 4.3 Test Environment and Mode

Operating Environment:	
Temperature:	23.0 °C
Humidity:	45 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Charge + Transmitting mode:	Keep the EUT charging and transmitting with modulation
Transmitting mode:	Keep the EUT transmitting with modulation

# 4.4 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.
Earphone	Supply by SGS	N/A

#### 4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch E&E Lab,

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

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# SGS

#### SGS-CSTC Standards Technical Services Ltd.

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# 4.6 Test Facility

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

#### CNAS (No. CNAS L2929)

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

#### VCCI

The 3m Semi-anechoic chamber, Full-anechoic Chamber and Shielded Room (7.5m x 4.0m x 3.0m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2197, G-416, T-1153 and C-2383 respectively.

#### FCC – Registration No.: 556682

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen 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 No.: 556682.

#### • Industry Canada (IC)

Two 3m Semi-anechoic chambers of SGS-CSTC Standards Technical Services Co., Ltd. have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1 & 4620C-2.

#### 4.7 Deviation from Standards

None.

#### 4.8 Abnormalities from Standard Conditions

None.

# 4.9 Other Information Requested by the Customer

None.



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# 4.10 Equipment List

	Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Due date (yyyy-mm-dd)	
1	Shielding Room	ZhongYu Electron	GB-88	SEL0042	2015-06-10	
2	LISN	Rohde & Schwarz	ENV216	SEL0152	2014-10-24	
3	LISN	ETS-LINDGREN	3816/2	SEL0021	2015-05-16	
4	8 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN- T8-02	SEL0162	2014-11-10	
5	4 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN- T4-02	SEL0163	2014-11-10	
6	2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN- T2-02	SEL0164	2014-11-10	
7	EMI Test Receiver	Rohde & Schwarz	ESCI	SEL0022	2015-05-16	
8	Coaxial Cable	SGS	N/A	SEL0025	2015-05-29	
9	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2014-10-24	
10	Humidity/ Temperature Indicator	Shanhai Qixiang	ZJ1-2B	SEL0103	2014-10-24	
11	Barometer	Chang Chun	DYM3	SEL0088	2015-05-16	



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	RE in Chamber				
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Due date (yyyy-mm-dd)
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	2015-06-10
2	EMI Test Receiver	Rohde & Schwarz	ESIB26	SEL0023	2015-05-16
3	EMI Test software	AUDIX	E3	SEL0050	N/A
4	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEL0015	2014-10-24
5	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEL0006	2014-10-24
6	Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEL0076	2014-10-24
7	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEL0053	2015-05-16
8	Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEL0168	2014-10-24
9	Coaxial cable	SGS	N/A	SEL0027	2015-05-29
10	Coaxial cable	SGS	N/A	SEL0189	2015-05-29
11	Coaxial cable	SGS	N/A	SEL0121	2015-05-29
12	Coaxial cable	SGS	N/A	SEL0178	2015-05-29
13	Band filter	Amindeon	82346	SEL0094	2015-05-16
14	Barometer	Chang Chun	DYM3	SEL0088	2015-05-16
15	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2014-10-24
16	Humidity/ Temperature Indicator	Shanhai Qixiang	ZJ1-2B	SEL0103	2014-10-24
17	Signal Generator (10M-27GHz)	Rohde & Schwarz	SMR27	SEL0067	2015-05-16
18	Signal Generator	Rohde & Schwarz	SMY01	SEL0155	2014-10-24
19	Loop Antenna	Beijing Daze	ZN30401	SEL0203	2015-06-04



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	RF connected test				
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Due date (yyyy-mm-dd)
1	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2014-10-24
2	Humidity/ Temperature Indicator	HYGRO	ZJ1-2B	SEL0033	2014-10-24
3	Spectrum Analyzer	Rohde & Schwarz	FSP	SEL0154	2014-10-24
4	Coaxial cable	SGS	N/A	SEL0178	2015-05-29
5	Coaxial cable	SGS	N/A	SEL0179	2015-05-29
6	Barometer	ChangChun	DYM3	SEL0088	2015-05-16
7	Signal Generator	Rohde & Schwarz	SML03	SEL0068	2015-05-16
8	Band filter	amideon	82346	SEL0094	2015-05-16
9	POWER METER	R&S	NRVS	SEL0144	2014-10-24
10	Attenuator	Beijin feihang taida	TST-2-6dB	SEL0205	2015-05-16
11	Power Divider(splitter)	Agilent Technologies	11636B	SEL0130	2014-10-24

Note: The calibration interval is one year, all the instruments are valid.



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## 5 Test results and Measurement Data

# 5.1 Antenna Requirement

Standard requirement: 47 CFR Part 15C Section 15.203 /247(c)

15.203 requirement:

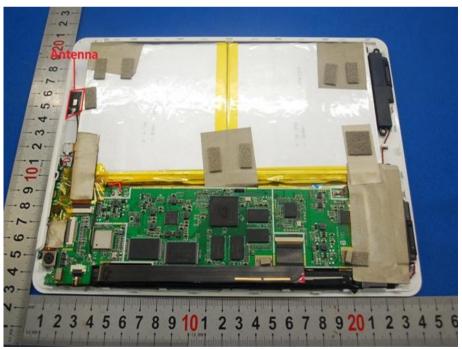
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit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

15.247(b) (4) requirement:

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

#### **EUT Antenna:**

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 2.5dBi.





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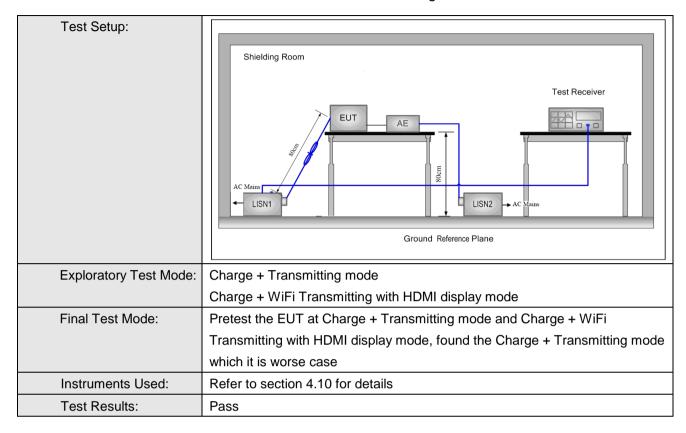
#### 5.2 Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.2	207		
Test Method:	ANSI C63.10: 2009			
Test Frequency Range:	150kHz to 30MHz			
Limit:	5 (MIL)	Limit (d	lBuV)	
	Frequency range (MHz)	Quasi-peak	Average	
	0.15-0.5	66 to 56*	56 to 46*	
	0.5-5	56	46	
	5-30	60	50	
	* Decreases with the logarithm	n of the frequency.		
Test Procedure:	<ol> <li>The mains terminal disturt room.</li> <li>The EUT was connected to Impedance Stabilization Not impedance. The power call connected to a second LIS plane in the same way as it multiple socket outlet strip single LISN provided the ration of the tabletop EUT was placed ground reference plane. An placed on the horizontal ground reference plane. An vertical ground reference preference plane. The LISN unit under test and bonded mounted on top of the ground the EUT and associated extends the EUT and associated extends and all of the in ANSI C63.10: 2009 on corr</li> </ol>	o AC power source throetwork) which provides oles of all other units of the LISN 1 for the unit to was used to connect mating of the LISN was noted upon a non-metallice and for floor-standing are cound reference plane, the a vertical ground reference of the unit of the	bugh a LISN 1 (Line a 50Ω/50μH + 5Ω line the EUT were do not the ground reference of the the ground reference of the the exceeded. The transperse of the tr	near ence to a ne was ear ne he



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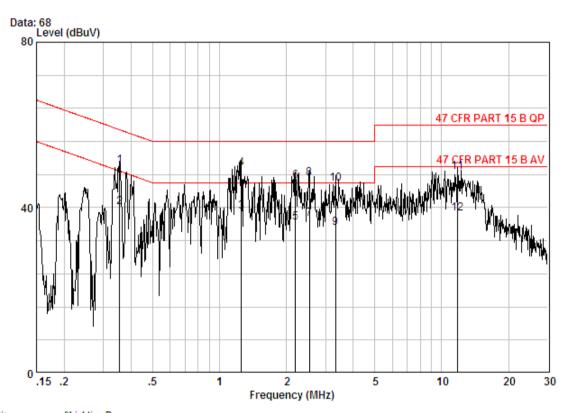
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#### **Measurement Data**

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:



Site : Shielding Room

Condition : 47 CFR PART 15 B QP CE LINE

Job No. : 5683RF Test mode : Charge + TX

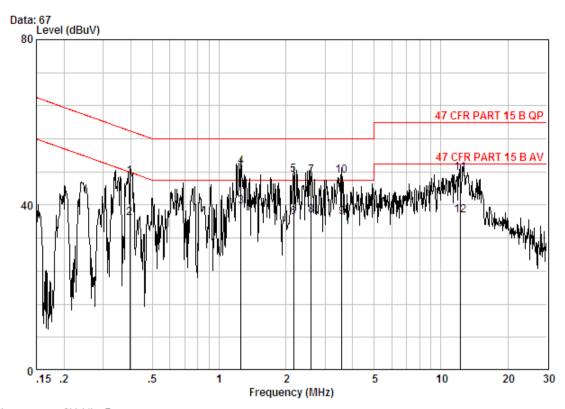
	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.35576	0.01	9.76	40.42	50.19	58.83	-8.64	QP
2	0.35576	0.01	9.76	30.26	40.03	48.83	-8.80	Average
3	1.255	0.02	9.80	29.25	39.07	46.00	-6.93	Average
4 @	1.255	0.02	9.80	39.71	49.53	56.00	-6.47	QP
5	2.201	0.02	9.81	26.58	36.41	46.00	-9.59	Average
6	2.201	0.02	9.81	36.67	46.50	56.00	-9.50	QP
7	2.540	0.02	9.83	27.45	37.30	46.00	-8.70	Average
8	2.540	0.02	9.83	37.16	47.01	56.00	-8.99	QP
9	3.328	0.02	9.86	25.31	35.18	46.00	-10.82	Average
10	3.328	0.02	9.86	35.85	45.73	56.00	-10.27	QP
11	11.745	0.01	9.98	38.71	48.70	60.00	-11.30	QP
12	11.745	0.01	9.98	28.69	38.68	50.00	-11.32	Average



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#### **Neutral Line:**



Site : Shielding Room

Condition : 47 CFR PART 15 B QP CE NEUTRAL

Job No. : 5683RF Test mode : Charge + TX

		Cable	LISN	Read		Limit	Over	
	Fr	eq Loss	Factor	Level	Level	Line	Limit	Remark
	M	Hz dB	dB	dBuV	dBuV	dBuV	dB	
1	0.395	53 0.01	9.79	37.01	46.81	57.95	-11.14	QP
2	0.395	53 0.01	9.79	27.06	36.86	47.95	-11.08	Average
3	0 1.2	55 0.02	9.80	29.81	39.63	46.00	-6.37	Average
4	1.2	55 0.02	9.80	39.34	49.16	56.00	-6.84	QP
5	2.1	67 0.02	9.81	37.45	47.28	56.00	-8.72	QP
6	2.1	67 0.02	9.81	27.21	37.04	46.00	-8.96	Average
7	2.5	94 0.02	9.83	37.27	47.12	56.00	-8.88	QP
8	2.5	94 0.02	9.83	27.65	37.50	46.00	-8.50	Average
9	3.5	65 0.02	9.86	27.11	36.99	46.00	-9.01	Average
10	3.5	65 0.02	9.86	37.21	47.09	56.00	-8.91	QP
11	12.1	88 0.01	10.00	37.67	47.69	60.00	-12.31	QP
12	12.1	88 0.01	10.00	27.56	37.57	50.00	-12.43	Average

#### Notes:

1. The following Quasi-Peak and Average measurements were performed on the EU

2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.



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# 5.3 Conducted Peak Output Power

Test Requirement:	47 CFR Part 15C Section 15.247 (b)(3)			
Test Method:	KDB558074 D01 v03r01			
Test Setup:	Spectrum Analyzer  E.U.T  Non-Conducted Table  Ground Reference Plane			
	Remark:  Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.			
Test Instruments:	Refer to section 4.10 for details			
Exploratory Test Mode:	Transmitting mode			
Final Test Mode:	Through Pre-scan, find the 1Mbps 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).			
Limit:	30dBm			
Test Results:	Pass			

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Pre-scan und	Pre-scan under all rate at lowest channel 1							
Mode		802	.11b			_		
Data Rate	1Mbps	2Mbps	5.5Mbps	11Mbps				
Power (dBm)	19.39	19.35	19.30	19.27				
Mode				802	2.11g			
Data Rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
Power (dBm)	20.24	20.21	20.15	20.12	20.10	20.07	20.05	20.01
Mode				802.11	n(HT20)			
Data Rate	6.5Mbps	13Mbps	19.5Mbps	26Mbps	39Mbps	52Mbps	58.5Mbps	65Mbps
Power (dBm)	19.36	19.32	19.27	19.25	19.21	19.18	19.13	19.09

Through Pre-scan, 1Mbps 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).

#### **Measurement Data**

802.11b mode							
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result				
Lowest	19.39	30.00	Pass				
Middle	19.01	30.00	Pass				
Highest	18.56	30.00	Pass				
802.11g mode							
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result				
Lowest	20.24	30.00	Pass				
Middle	19.77	30.00	Pass				
Highest	19.60	30.00	Pass				
	802.11n(HT20)mode						
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result				
Lowest	19.36	30.00	Pass				
Middle	19.12	30.00	Pass				
Highest	18.68	30.00	Pass				

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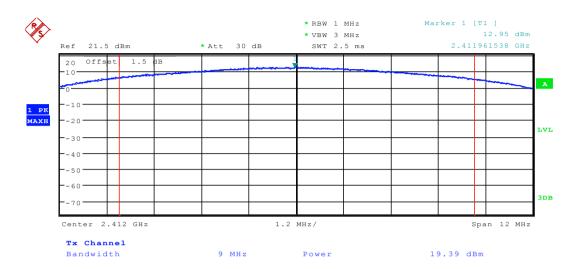


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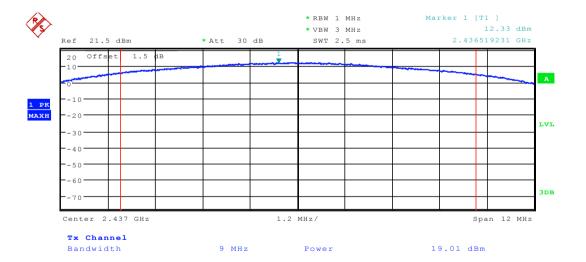
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Test plot as follows:

Test mode: 802.11b Test channel: Lowest



Test mode: 802.11b Test channel: Middle
---



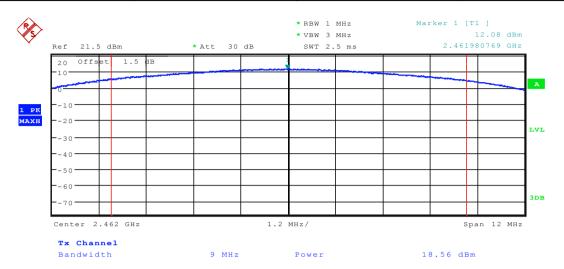
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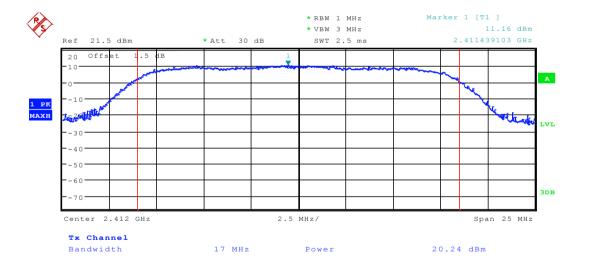
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Test mode: 802.11b Test channel: Highest



Test mode: 802.11g Test channel: Lowest



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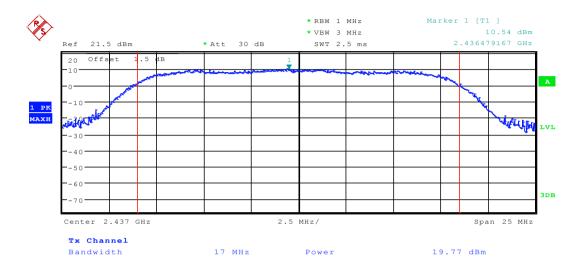
Tx Channel
Bandwidth

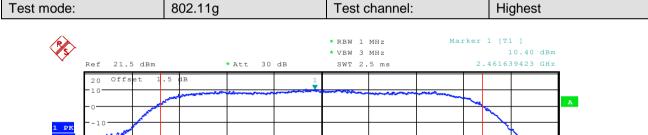
#### SGS-CSTC Standards Technical Services Ltd.

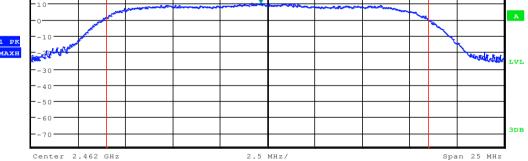
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Test mode: 802.11g Test channel: Middle







Power

19.60 dBm

17 MHz

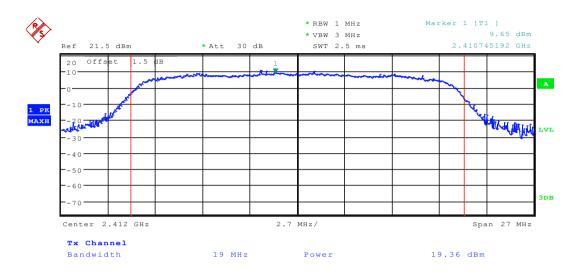
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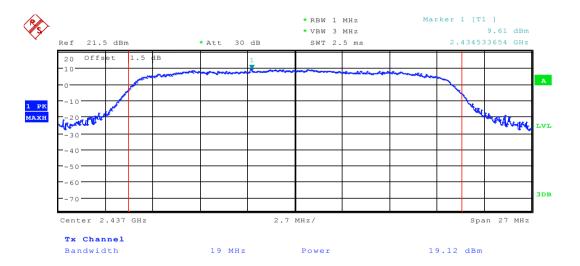
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Test mode: 802.11n(HT20) Test channel: Lowest



l est mode:   802.11n(HT20)   Test channel:   Middle	Test mode:	802.11n(HT20)	Test channel:	Middle
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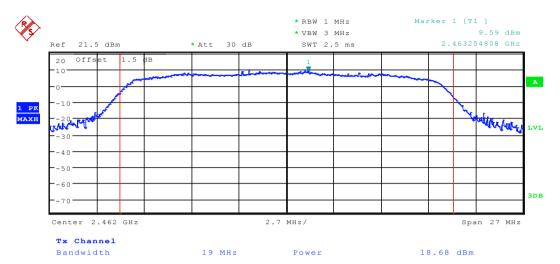
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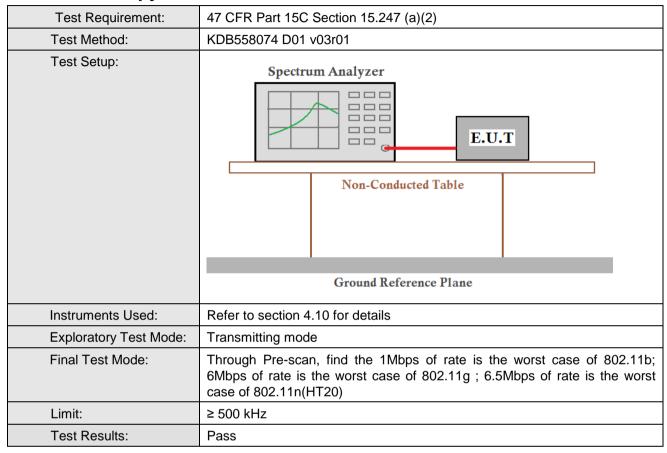




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# 5.4 6dB Occupy Bandwidth



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#### **Measurement Data**

802.11b mode								
Test channel	6dB Occupy Bandwidth (MHz)	Limit (kHz)	Result					
Lowest	7.596153846	≥500	Pass					
Middle	7.307692308	≥500	Pass					
Highest	7.644230769	≥500	Pass					
	802.11g mode							
Test channel	6dB Occupy Bandwidth (MHz)	Limit (kHz)	Result					
Lowest	16.490384615	≥500	Pass					
Middle	16.490384615	≥500	Pass					
Highest	16.442307692	≥500	Pass					
	802.11n(HT20) mode							
Test channel	6dB Occupy Bandwidth (MHz)	Limit (kHz)	Result					
Lowest	17.740384615	≥500	Pass					
Middle	17.740384615	≥500	Pass					
Highest	17.740384615	≥500	Pass					

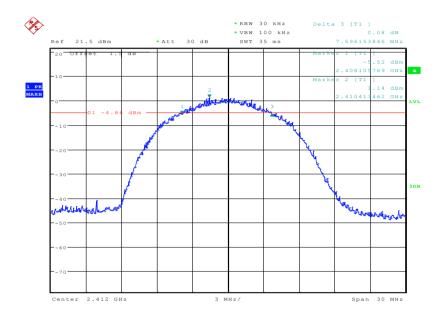


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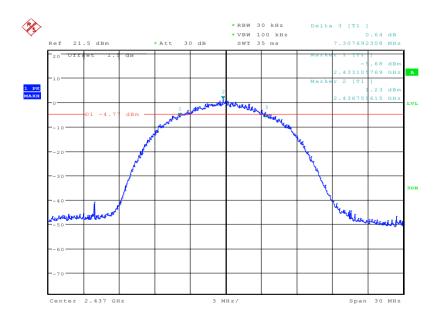
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Test plot as follows:

Test mode: 802.11b Test channel: Lowest



Test mode: 802.11b Test channel: Middle



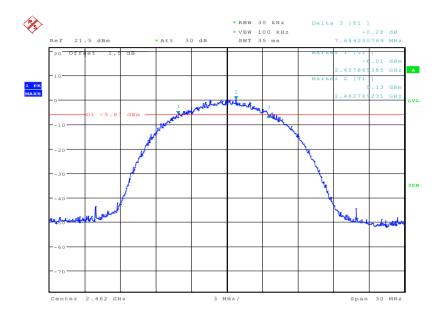


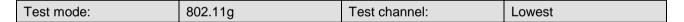


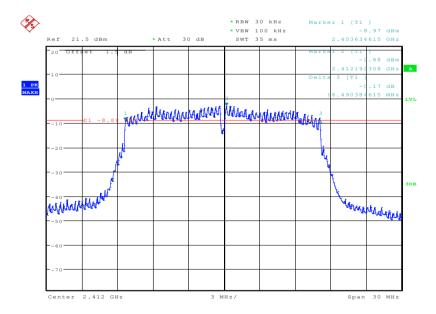
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Test mode: 802.11b Test channel: Highest







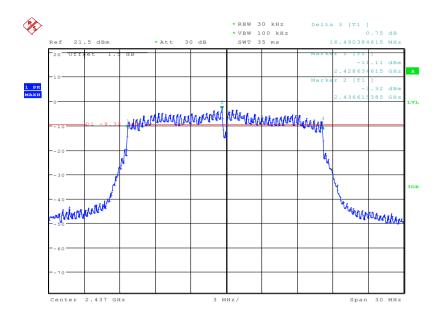
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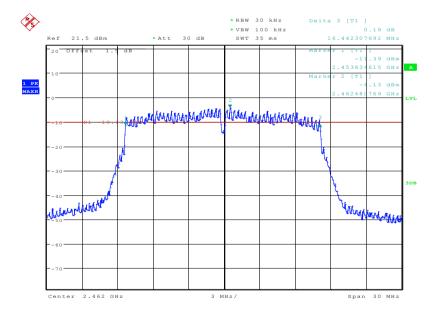
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Test mode: 802.11g Test channel: Middle







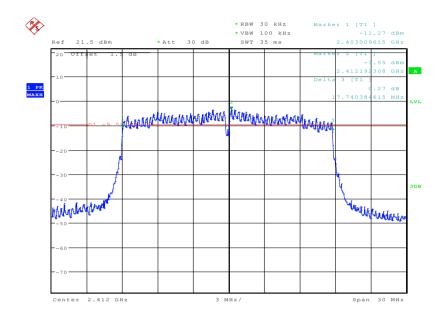
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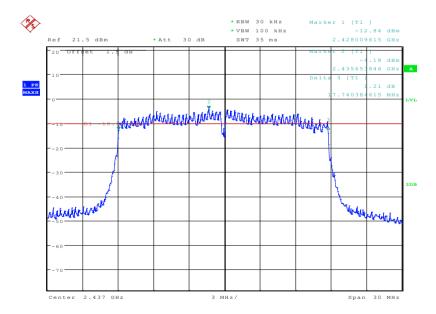
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Test mode: 802.11n(HT20) Test channel: Lowest







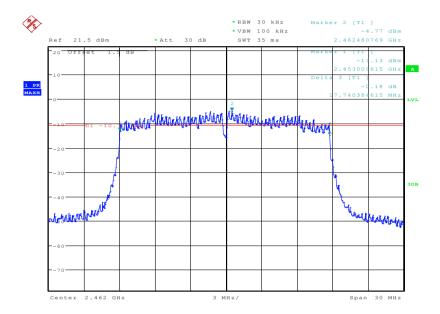
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Test mode: 802.11n(HT20) Test channel: Highest



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# 5.5 Power Spectral Density

Test Requirement:	47 CFR Part 15C Section 15.247 (e)			
Test Method:	KDB558074 D01 v03r01			
Test Setup:	Spectrum Analyzer  E.U.T  Non-Conducted Table  Ground Reference Plane			
	Remark:			
	Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.			
Test Instruments:	Refer to section 4.10 for details			
Exploratory Test Mode:	Transmitting mode			
Final Test Mode:	Through Pre-scan, find the 1Mbps 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)			
Limit:	≤8.00dBm			
Test Results:	Pass			

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#### **Measurement Data**

802.11b mode								
Test channel	Power Spectral Density (dBm)	Limit (dBm)	Result					
Lowest	-9.09	≤8.00	Pass					
Middle	-10.05	≤8.00	Pass					
Highest	-11.38	≤8.00	Pass					
	802.11g mode							
Test channel	Power Spectral Density (dBm)	Limit (dBm)	Result					
Lowest	-13.67	≤8.00	Pass					
Middle	-14.11	≤8.00	Pass					
Highest	-15.16	≤8.00	Pass					
	802.11n(HT20) mode							
Test channel	Power Spectral Density (dBm)	Limit (dBm)	Result					
Lowest	-15.03	≤8.00	Pass					
Middle	-16.01	≤8.00	Pass					
Highest	-16.46	≤8.00	Pass					

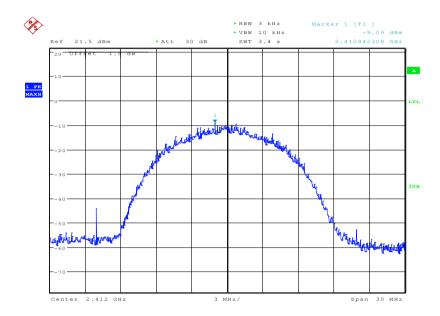


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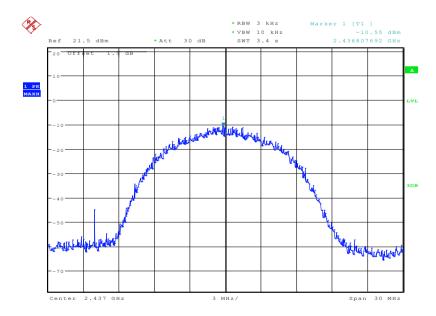
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Test plot as follows:

Test mode: 802.11b Test channel: Lowest







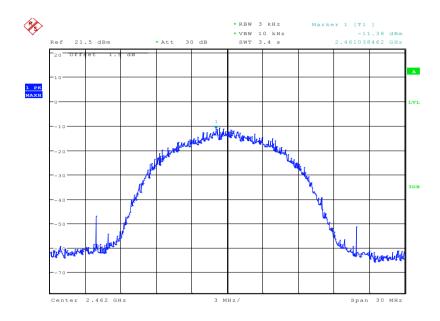
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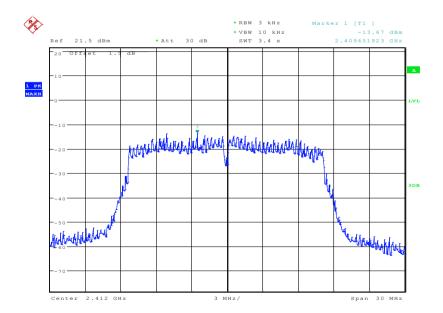
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Test mode: 802.11b Test channel: Highest



Test mode: 802.11g Test channel: Lowest



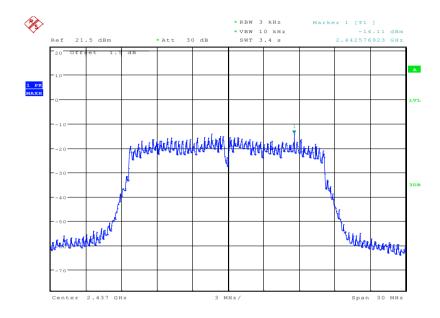
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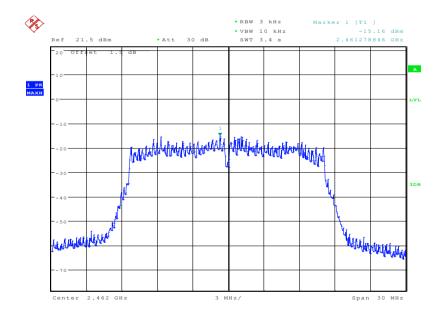
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Test mode: 802.11g Test channel: Middle







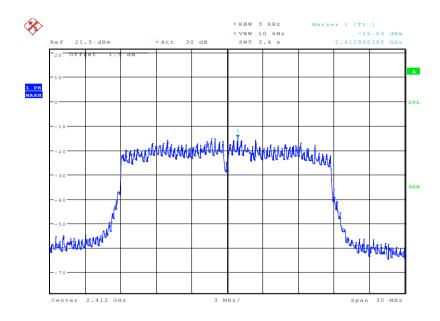
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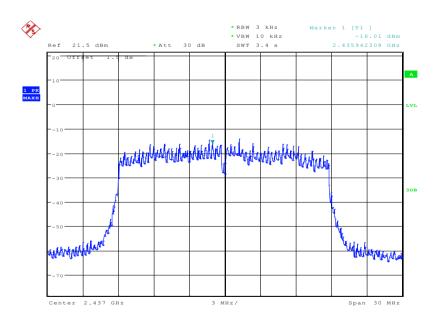
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Test mode: 802.11n(HT20) Test channel: Lowest



Test mode: 802.11n(HT20) Test channel: Middle



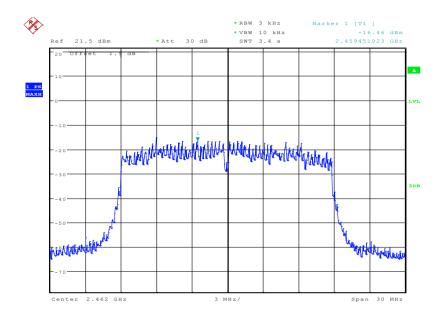




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Test mode: 802.11n(HT20) Test channel: Highest



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# 5.6 Band-edge for RF Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	KDB558074 D01 v03r01
Test Setup:	Spectrum Analyzer  E.U.T  Non-Conducted Table  Ground Reference Plane  Remark:  Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.
Exploratory Test Mode:	Transmitting mode
Final Test Mode:	Through Pre-scan, find the 1Mbps 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).
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread
	spectrum intentional radiator is operating, the radio frequency power that is
	produced by the intentional radiator shall be at least 20 dB below that in the
	100 kHz bandwidth within the band that contains the highest level of the
	desired power, based on either an RF conducted or a radiated measurement.
Instruments Used:	Refer to section 4.10 for details
Test Results:	Pass

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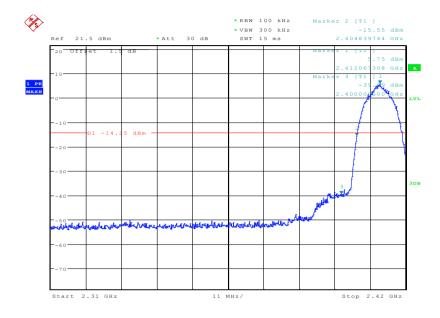


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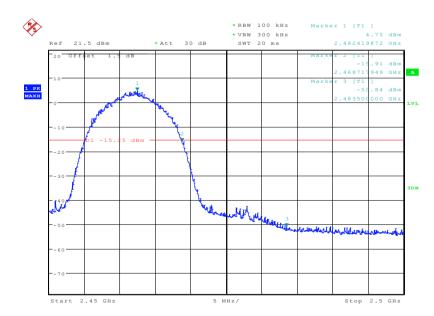
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# Test plot as follows:

Test mode: 802.11b Test channel: Lowest



Test mode: 802.11b Test channel: Highest



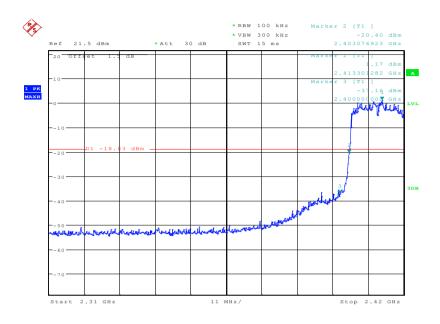
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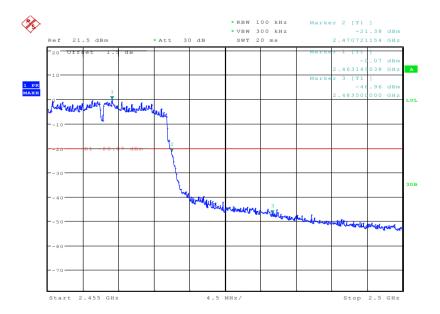
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Test mode: 802.11g Test channel: Lowest







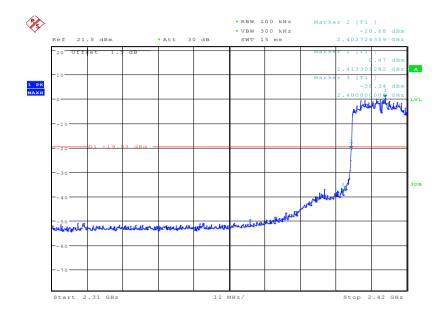
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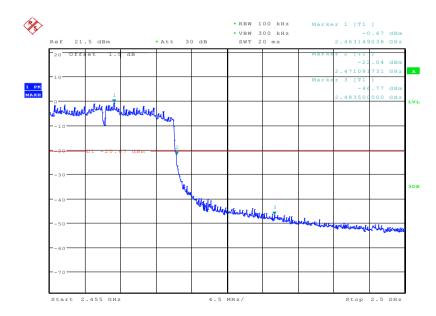
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Test mode: 802.11n(HT20) Test channel: Lowest







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# 5.7 RF Conducted Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	KDB558074 D01 v03r01
Test Setup:	Spectrum Analyzer  E.U.T  Non-Conducted Table  Ground Reference Plane  Remark:
Exploratory Test Mode:	Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.  Transmitting mode
Final Test Mode:	Through Pre-scan, find the 1Mbps 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).
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread
	spectrum intentional radiator is operating, the radio frequency power that is
	produced by the intentional radiator shall be at least 20 dB below that in the
	100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Instruments Used:	Refer to section 4.10 for details
Test Results:	Pass

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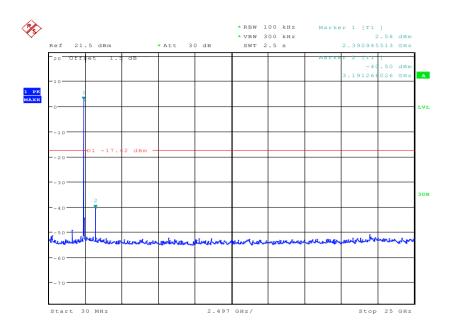


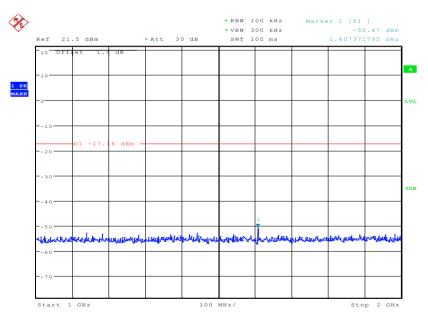
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# Test plot as follows:

Test mode: 802.11b Test channel: Lowest



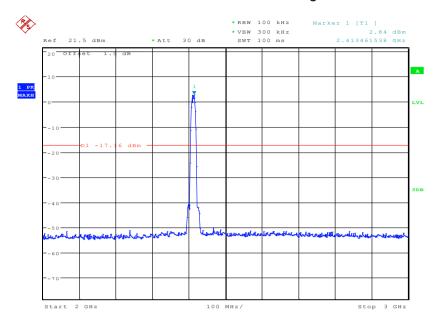


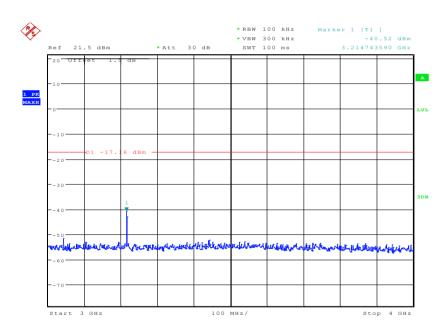
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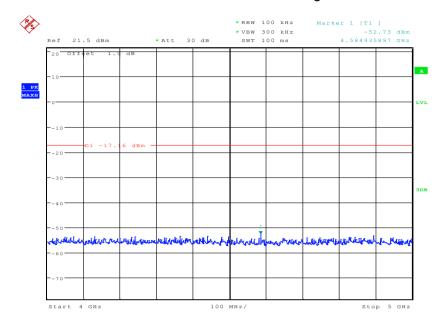


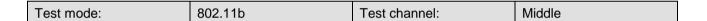
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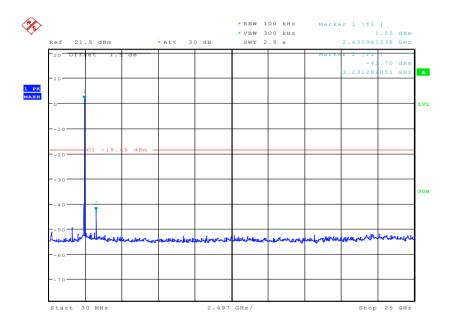


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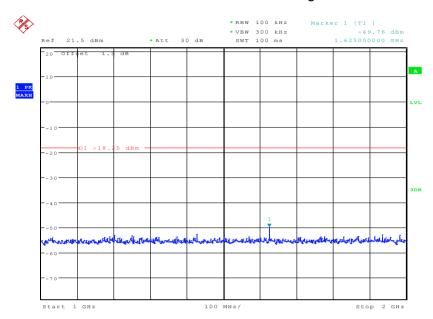


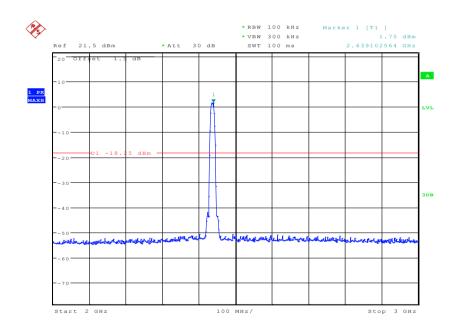
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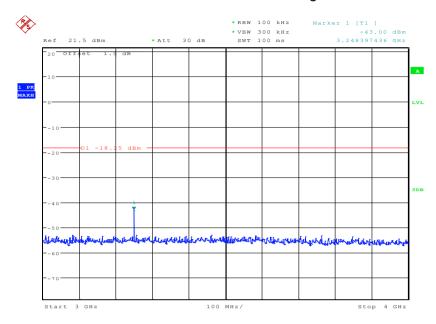


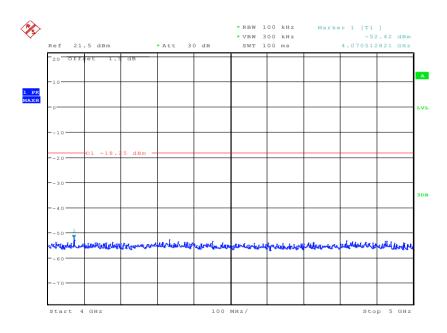
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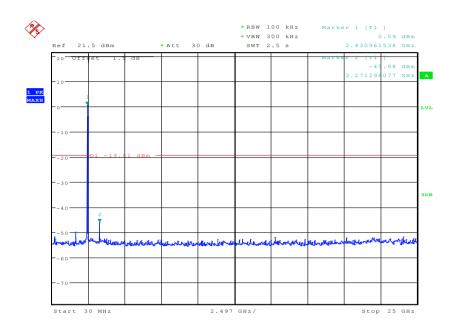
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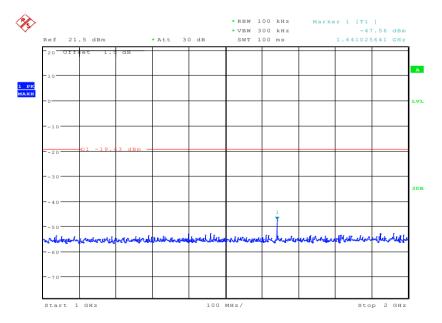


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Test mode: 802.11b Test channel: Highest



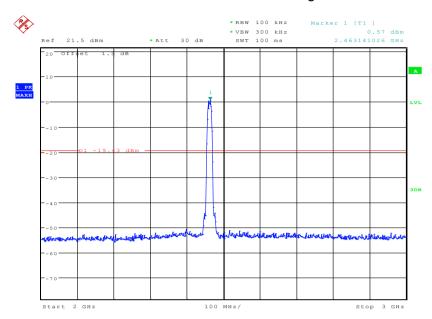


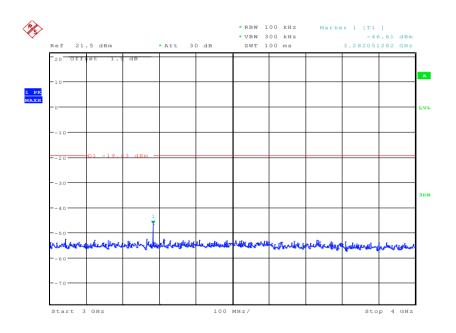
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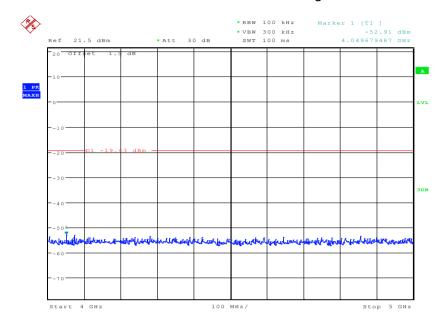


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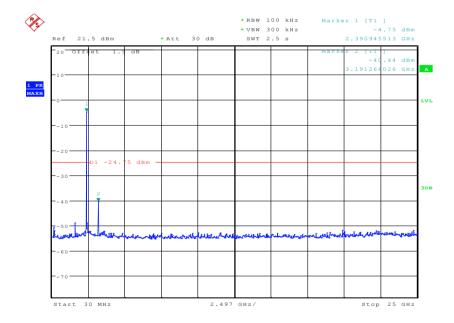


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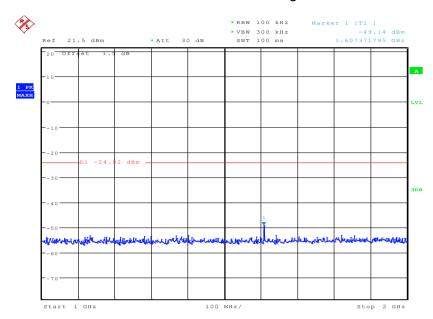


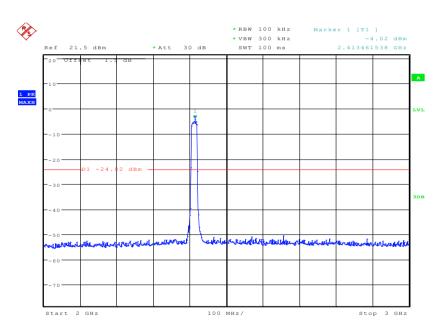
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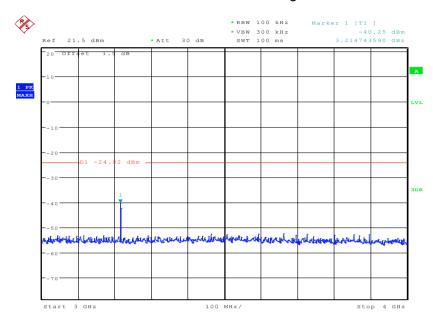


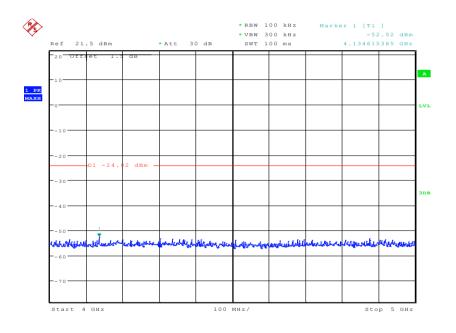
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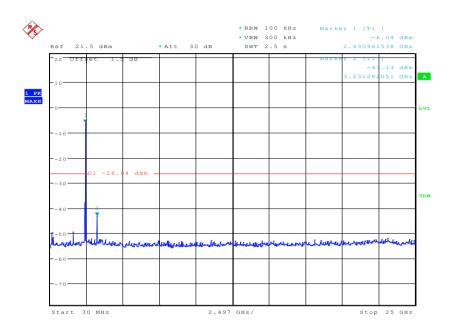
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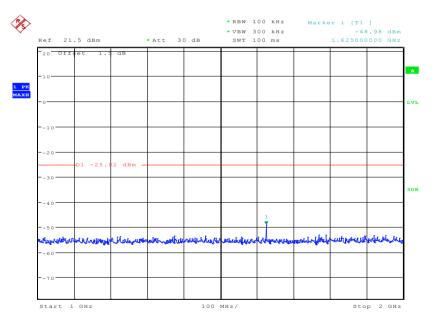


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Test mode: 802.11g Test channel: Middle



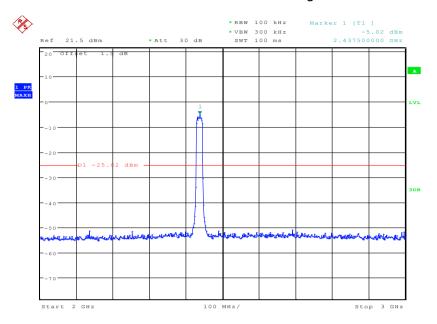


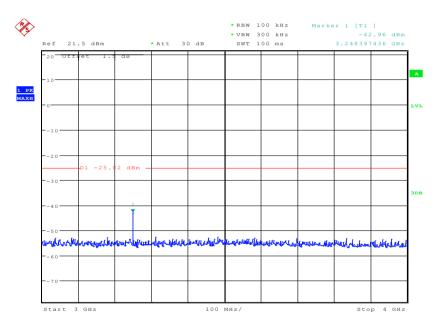
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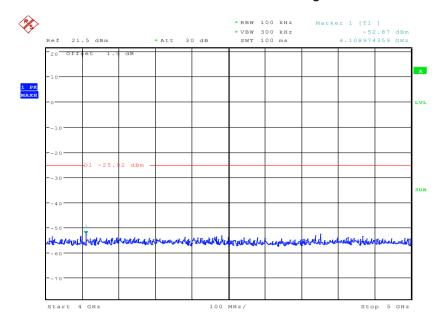


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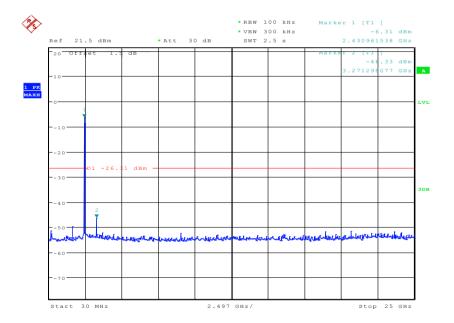


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Test mode:	802.11g	Test channel:	Highest

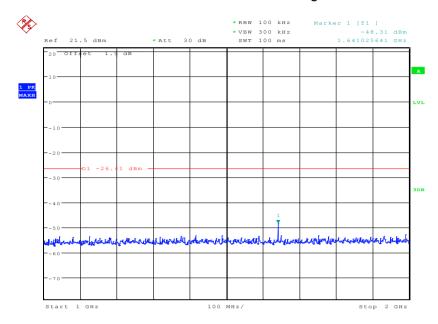


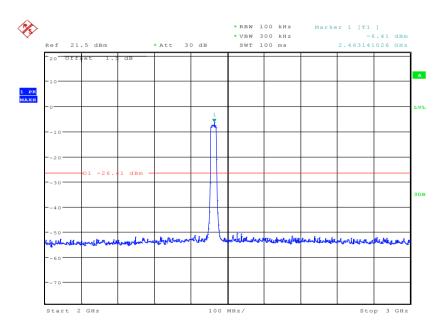
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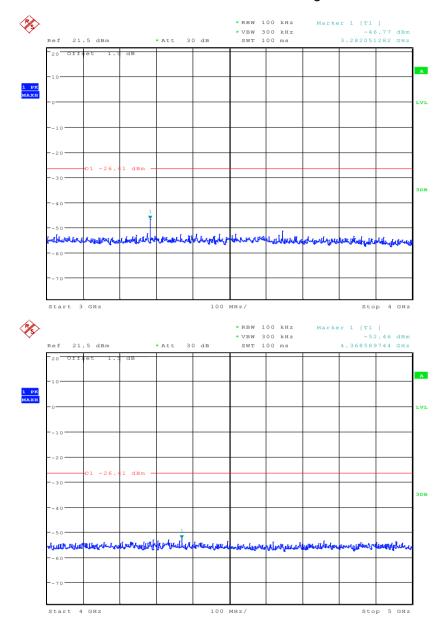


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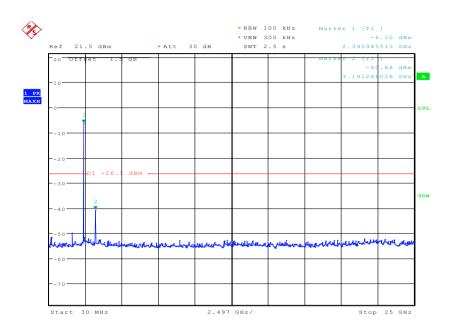
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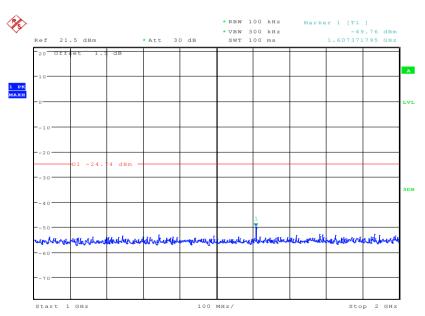


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Test mode: 802.11n(HT20) Test channel: Lowest



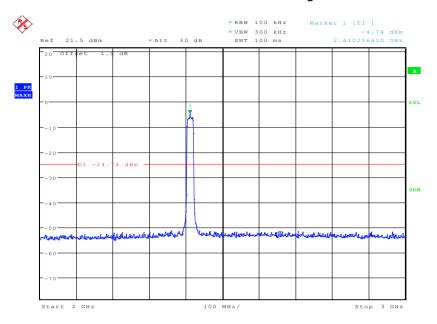


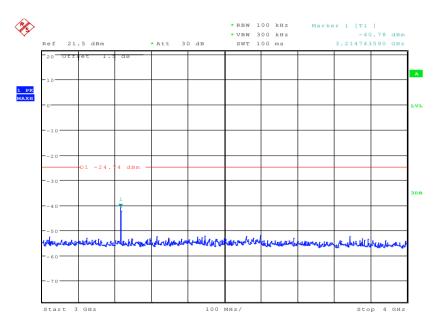
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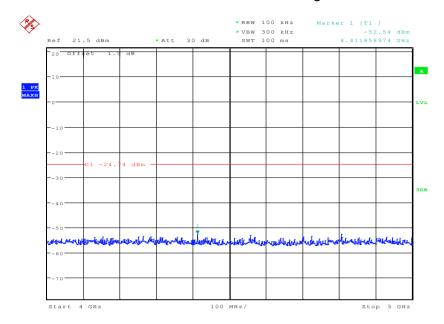


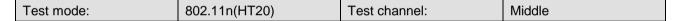
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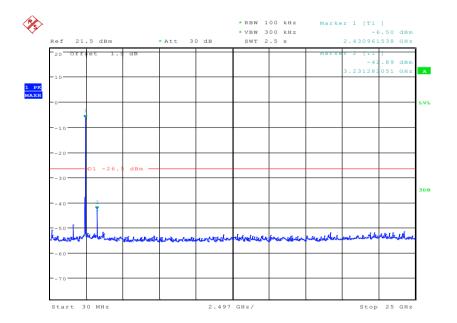


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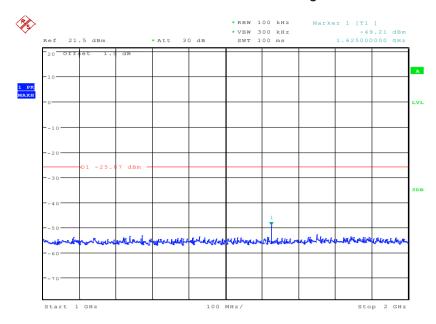


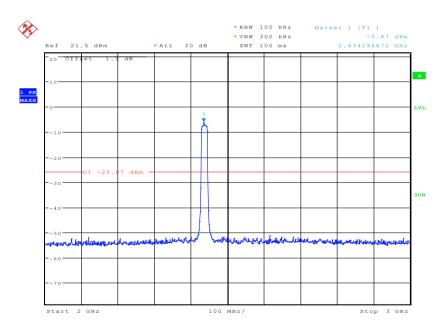
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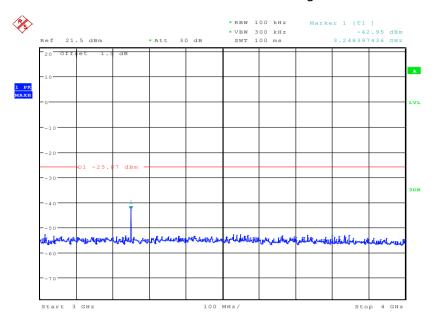


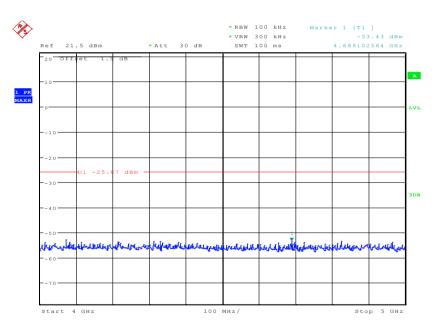
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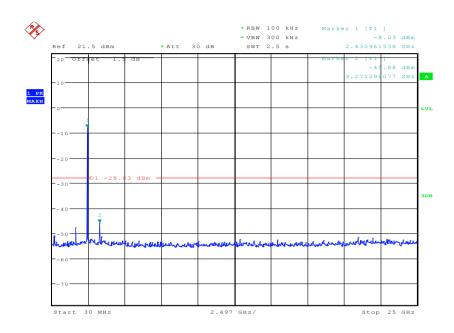
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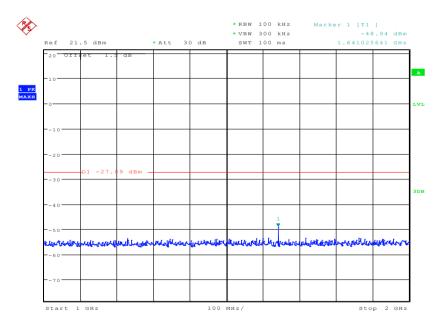


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Test mode: 802.11n(HT20) Test channel: Highest



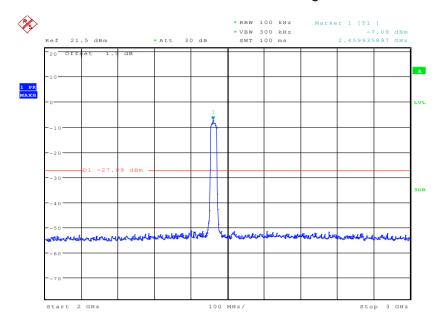


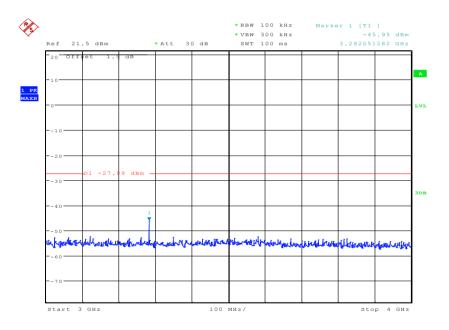
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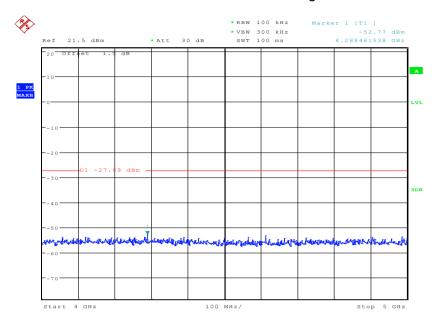


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#### Remark:

Pretest 9kHz to 25GHz, find the highest point when testing, so only the worst data were shown in the test report.

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# 5.8 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205									
Test Method:	ANSI C63.10 2009									
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)									
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	100 kHz	300kHz	Quasi-peak					
	Above 1GHz	Peak	1MHz	3MHz	Peak					
	Above IGHZ	Peak	1MHz	10Hz	Average					
Limit:	Frequency	Field strength (microvolt/meter)	Limit (dBuV/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 emission level radiated by the device.										



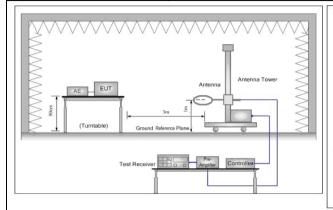
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#### Test Setup:



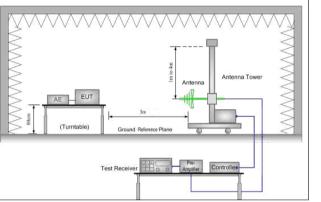


Figure 1. Below 30MHz

Figure 2. 30MHz to 1GHz

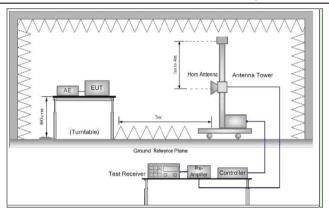


Figure 3. Above 1 GHz

#### Test Procedure:

- 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 table 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

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	method as specified and then reported in a data sheet.
	g. Test the EUT in the lowest channel ,the middle channel ,the Highest channel
	h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
	i. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Charge + Transmitting mode, Transmitting mode, Charge + WiFi Transmitting with HDMI display mode and WiFi Transmitting with HDMI display mode
Final Test Mode:	Pretest the EUT at Charge + Transmitting mode, Transmitting mode, Charge + WiFi Transmitting with HDMI display mode and WiFi Transmitting with HDMI display mode, found the Charge + Transmitting mode which it is the worst case.
	Through Pre-scan, find the 1Mbps 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); Only the worst case is recorded in the report.
Instruments Used:	Refer to section 4.10 for details
Test Results:	Pass

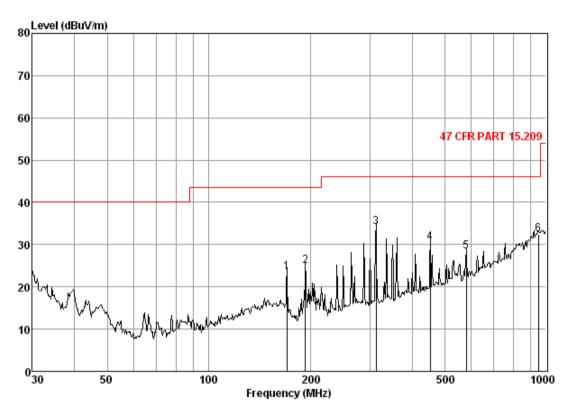


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#### 5.8.1 Radiated emission below 1GHz

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



Condition: 47 CFR PART 15.209 3m 3142C VERTICAL

Job No. : 5683RF Mode : Charge+Tx

040	Freq	CableA		Preamp Factor			Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	$\overline{\text{dBuV/m}}$	$\overline{\text{dBuV/m}}$	<del>d</del> B
1 2 3 4 5 6	170. 19 193. 09 313. 28 452. 72 578. 67 948. 76	1.35 1.39 1.94 2.42 2.68 3.65		26. 82 26. 73 26. 50 27. 46 27. 57 26. 54	39. 95 43. 27 48. 86 42. 70 38. 12 33. 86	23. 48 24. 90 34. 18 30. 58 28. 33 32. 37	43.50 46.00 46.00 46.00	-20.02 -18.60 -11.82 -15.42 -17.67 -13.63

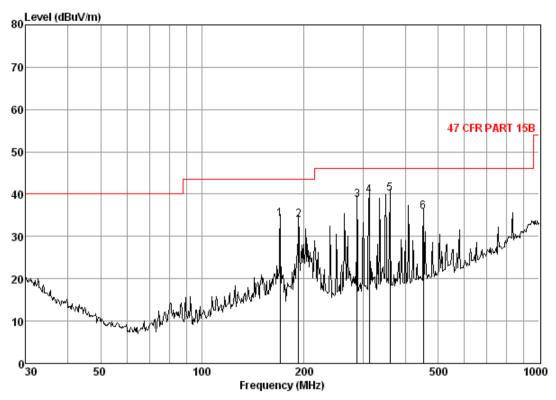
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Test mode: Charge + Transmitting mode	Horizontal
---------------------------------------	------------



Condition: 47 CFR PART 15B 3m 3142C HORIZONTAL

Job No. : 5683RF Mode : Charge+Tx

ouc	Fred	CableA		Preamp Factor	Read Level		Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBu∀	dBuV/m	dBuV/m	d₿
1	170.19	1.35	9.00	26.82	50.67	34.20	43.50	-9.30
2	193.09	1.39	6.97	26.73	52.38	34.01	43.50	-9.49
3	287.99	1.85	9. 27	26.43	53.99	38.68	46.00	-7.32
4	313.28	1.94	9.88	26.50	54.31	39.63	46.00	-6.37
5	360.45	2.09	10.40	26.87	54.46	40.08	46.00	-5.92
6	452.72	2.42	12.92	27.46	47.89	35.77	46.00	-10.23

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#### 5.8.2 Transmitter emission above 1GHz

Test mode:	802	.11b	Test ch	annel:	Lowest	Remark		Peak
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
3033.908	5.12	33.39	40.33	48.18	46.36	74	-27.64	Vertical
3834.506	6.23	33.61	40.91	47.80	46.73	74	-27.27	Vertical
4824.000	7.45	34.68	41.64	49.33	49.82	74	-24.18	Vertical
7236.000	8.76	35.90	39.85	46.21	51.02	74	-22.98	Vertical
9648.000	9.69	37.36	37.76	43.05	52.34	74	-21.66	Vertical
11842.690	11.17	38.74	38.21	41.61	53.31	74	-20.69	Vertical
2942.635	5.01	33.31	40.26	46.59	44.65	74	-29.35	Horizontal
3786.010	6.16	33.55	40.88	47.80	46.63	74	-27.37	Horizontal
4824.000	7.45	34.68	41.64	48.72	49.21	74	-24.79	Horizontal
7236.000	8.76	35.90	39.85	46.62	51.43	74	-22.57	Horizontal
9648.000	9.69	37.36	37.76	43.62	52.91	74	-21.09	Horizontal
11842.690	11.17	38.74	38.21	40.65	52.35	74	-21.65	Horizontal

Test mode:	802	02.11b Test channel: Middle Remark:		:	Peak			
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
3026.195	5.09	33.39	40.33	45.38	43.53	74	-30.47	Vertical
3844.279	6.26	33.61	40.93	46.79	45.73	74	-28.27	Vertical
4874.000	7.48	34.59	41.68	50.49	50.88	74	-23.12	Vertical
7311.000	8.85	35.92	39.79	47.09	52.07	74	-21.93	Vertical
9748.000	9.74	37.46	37.68	42.06	51.58	74	-22.42	Vertical
12117.140	11.33	39.02	38.32	39.51	51.54	74	-22.46	Vertical
2980.327	5.05	33.35	40.28	47.25	45.37	74	-28.63	Horizontal
3738.129	6.11	33.49	40.84	46.56	45.32	74	-28.68	Horizontal
4874.000	7.48	34.59	41.68	48.69	49.08	74	-24.92	Horizontal
7311.000	8.85	35.92	39.79	47.95	52.93	74	-21.07	Horizontal
9748.000	9.74	37.46	37.68	42.61	52.13	74	-21.87	Horizontal
11752.600	11.11	38.66	38.17	40.72	52.32	74	-21.68	Horizontal

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Test mode:	802	.11b	Test ch	annel:	Highest	Remark	:	Peak
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2890.665	4.98	33.24	40.23	45.80	43.79	74	-30.21	Vertical
3834.506	6.23	33.61	40.91	46.28	45.21	74	-28.79	Vertical
4924.000	7.51	34.51	41.72	48.88	49.18	74	-24.82	Vertical
7386.000	8.94	35.96	39.72	45.97	51.15	74	-22.85	Vertical
9848.000	9.78	37.54	37.58	43.23	52.97	74	-21.03	Vertical
11963.890	11.26	38.87	38.26	40.77	52.64	74	-21.36	Vertical
2995.538	5.05	33.38	40.30	46.05	44.18	74	-29.82	Horizontal
3766.785	6.13	33.53	40.87	47.24	46.03	74	-27.97	Horizontal
4924.000	7.51	34.51	41.72	49.38	49.68	74	-24.32	Horizontal
7386.000	8.94	35.96	39.72	46.09	51.27	74	-22.73	Horizontal
9848.000	9.78	37.54	37.58	43.15	52.89	74	-21.11	Horizontal
12148.020	11.35	39.06	38.34	41.18	53.25	74	-20.75	Horizontal

Test mode: 802		.11g Test cha		annel: Lowest		Remark		Peak
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2950.135	5.02	33.33	40.27	45.81	43.89	74	-30.11	Vertical
3719.146	6.08	33.47	40.83	47.34	46.06	74	-27.94	Vertical
4824.000	7.45	34.68	41.64	49.53	50.02	74	-23.98	Vertical
7236.000	8.76	35.90	39.85	46.68	51.49	74	-22.51	Vertical
9648.000	9.69	37.36	37.76	43.15	52.44	74	-21.56	Vertical
12178.980	11.36	39.09	38.35	40.36	52.46	74	-21.54	Vertical
2980.327	5.05	33.35	40.28	45.62	43.74	74	-30.26	Horizontal
3953.443	6.41	33.76	41.00	46.75	45.92	74	-28.08	Horizontal
4824.000	7.45	34.68	41.64	48.84	49.33	74	-24.67	Horizontal
7236.000	8.76	35.90	39.85	45.87	50.68	74	-23.32	Horizontal
9648.000	9.69	37.36	37.76	43.04	52.33	74	-21.67	Horizontal
12272.340	11.40	39.18	38.39	40.31	52.50	74	-21.50	Horizontal

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Test mode: 802.11g		.11g	Test channel:		Middle	Remark	:	Peak
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2890.665	4.98	33.24	40.23	45.90	43.89	74	-30.11	Vertical
3815.033	6.21	33.59	40.90	46.27	45.17	74	-28.83	Vertical
4874.000	7.48	34.59	41.68	48.21	48.60	74	-25.40	Vertical
7311.000	8.85	35.92	39.79	46.53	51.51	74	-22.49	Vertical
9748.000	9.74	37.46	37.68	42.29	51.81	74	-22.19	Vertical
12178.980	11.36	39.09	38.35	40.26	52.36	74	-21.64	Vertical
3018.502	5.09	33.39	40.31	46.74	44.91	74	-29.09	Horizontal
3795.660	6.18	33.55	40.88	47.17	46.02	74	-27.98	Horizontal
4874.000	7.48	34.59	41.68	48.24	48.63	74	-25.37	Horizontal
7311.000	8.85	35.92	39.79	45.23	50.21	74	-23.79	Horizontal
9748.000	9.74	37.46	37.68	42.19	51.71	74	-22.29	Horizontal
12366.420	11.43	39.28	38.43	39.85	52.13	74	-21.87	Horizontal

Test mode: 802.		.11g	Test channel:		Highest	Remark	:	Peak
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2920.248	5.00	33.28	40.24	46.76	44.80	74	-29.20	Vertical
3805.334	6.18	33.57	40.90	47.17	46.02	74	-27.98	Vertical
4924.000	7.51	34.51	41.72	50.13	50.43	74	-23.57	Vertical
7386.000	8.94	35.96	39.72	47.27	52.45	74	-21.55	Vertical
9848.000	9.78	37.54	37.58	42.05	51.79	74	-22.21	Vertical
11963.890	11.26	38.87	38.26	41.11	52.98	74	-21.02	Vertical
2987.923	5.05	33.38	40.30	45.20	43.33	74	-30.67	Horizontal
3933.367	6.38	33.74	40.98	46.75	45.89	74	-28.11	Horizontal
4924.000	7.51	34.51	41.72	48.73	49.03	74	-24.97	Horizontal
7386.000	8.94	35.96	39.72	46.07	51.25	74	-22.75	Horizontal
9848.000	9.78	37.54	37.58	42.17	51.91	74	-22.09	Horizontal
12241.140	11.38	39.14	38.38	40.94	53.08	74	-20.92	Horizontal

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Test mode:	802	.11n(HT20)	Test ch	annel:	Lowest	Remark	:	Peak
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2810.846	4.91	33.14	40.16	46.24	44.13	74	-29.87	Vertical
3913.393	6.33	33.70	40.97	46.91	45.97	74	-28.03	Vertical
4824.000	7.45	34.68	41.64	50.36	50.85	74	-23.15	Vertical
7236.000	8.76	35.90	39.85	46.96	51.77	74	-22.23	Vertical
9648.000	9.69	37.36	37.76	42.08	51.37	74	-22.63	Vertical
12366.420	11.43	39.28	38.43	40.56	52.84	74	-21.16	Vertical
2846.851	4.94	33.19	40.19	47.65	45.59	74	-28.41	Horizontal
3834.506	6.23	33.61	40.91	46.00	44.93	74	-29.07	Horizontal
4824.000	7.45	34.68	41.64	48.86	49.35	74	-24.65	Horizontal
7236.000	8.76	35.90	39.85	46.27	51.08	74	-22.92	Horizontal
9648.000	9.69	37.36	37.76	43.22	52.51	74	-21.49	Horizontal
12272.340	11.40	39.18	38.39	40.92	53.11	74	-20.89	Horizontal

Test mode:		802.	11n(HT20)	Test ch	annel:	Middle	Remark		Peak
Frequency (MHz)	Cab Los (dB	SS	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	nit Line BuV/m)	Over Limit (dB)	Polarization
3010.828	5.0	7	33.40	40.31	46.16	44.32	74	-29.68	Vertical
3824.757	6.2	1	33.59	40.91	46.86	45.75	74	-28.25	Vertical
4874.000	7.4	8	34.59	41.68	48.07	48.46	74	-25.54	Vertical
7311.000	8.8	5	35.92	39.79	46.30	51.28	74	-22.72	Vertical
9748.000	9.7	4	37.46	37.68	42.07	51.59	74	-22.41	Vertical
12303.620	11.4	41	39.21	38.40	41.09	53.31	74	-20.69	Vertical
2912.824	5.0	0	33.28	40.24	46.37	44.41	74	-29.59	Horizontal
3738.129	6.1	1	33.49	40.84	46.69	45.45	74	-28.55	Horizontal
4874.000	7.4	8	34.59	41.68	49.58	49.97	74	-24.03	Horizontal
7311.000	8.8	5	35.92	39.79	46.39	51.37	74	-22.63	Horizontal
9748.000	9.7	4	37.46	37.68	42.10	51.62	74	-22.38	Horizontal
11842.690	11.1	17	38.74	38.21	40.92	52.62	74	-21.38	Horizontal



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Test mode:	80	2.11n(HT20)	Test ch	annel:	Highest	Remark	:	Peak
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2950.135	5.02	33.33	40.27	46.71	44.79	74	-29.21	Vertical
3834.506	6.23	33.61	40.91	47.17	46.10	74	-27.90	Vertical
4924.000	7.51	34.51	41.72	48.78	49.08	74	-24.92	Vertical
7386.000	8.94	35.96	39.72	46.85	52.03	74	-21.97	Vertical
9848.000	9.78	37.54	37.58	42.99	52.73	74	-21.27	Vertical
11963.890	11.26	38.87	38.26	41.53	53.40	74	-20.60	Vertical
2935.153	5.01	33.31	40.26	47.09	45.15	74	-28.85	Horizontal
3824.757	6.21	33.59	40.91	46.50	45.39	74	-28.61	Horizontal
4924.000	7.51	34.51	41.72	48.92	49.22	74	-24.78	Horizontal
7386.000	8.94	35.96	39.72	45.30	50.48	74	-23.52	Horizontal
9848.000	9.78	37.54	37.58	41.67	51.41	74	-22.59	Horizontal
11812.580	11.15	38.71	38.20	40.71	52.37	74	-21.63	Horizontal

#### Remark:

- 1) 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 + Antenna Factor + Cable Factor Preamplifier Factor
- 2) 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.
- 3)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 measurements were shown in the report.

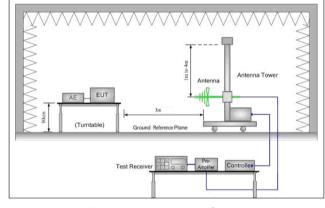


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# 5.9 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section 15	47 CFR Part 15C Section 15.209 and 15.205								
Test Method:	ANSI C63.10 2009	ANSI C63.10 2009								
Test Site:	Measurement Distance: 3m	Measurement Distance: 3m (Semi-Anechoic Chamber)								
Limit:	Frequency	Limit (dBuV/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							
	Above IGHZ	74.0	Peak Value							
Test Setup:										



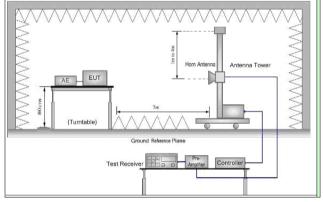


Figure 1. 30MHz to 1GHz

Figure 2. Above 1 GHz





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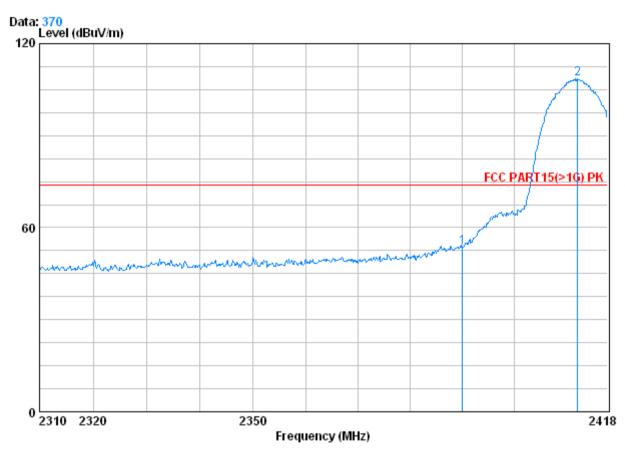
Test Procedure:	a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
	b. The EUT was set 3 meters away from the interference-receiving antenna, which was 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 table 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
	g. Test the EUT in the lowest channel, the Highest channel
	h. 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.
	<ul> <li>Repeat above procedures until all frequencies measured was complete.</li> </ul>
Exploratory Test Mode:	Charge + Transmitting mode, Transmitting mode, Charge + WiFi Transmitting with HDMI display mode and WiFi Transmitting with HDMI display mode
Final Test Mode:	Pretest the EUT at Charge + Transmitting mode, Transmitting mode, Charge + WiFi Transmitting with HDMI display mode and WiFi Transmitting with HDMI display mode, found the Charge + Transmitting mode which it is the worst case.
	Through Pre-scan, find the 1Mbps 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); Only the worst case is recorded in the report.
Instruments Used:	Refer to section 4.10 for details
Test Results:	Pass



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#### Test plot as follows:



Condition : FCC PART15(>1G) PK 3m VERTICAL

Job No. : 5683RF

Mode : 2412 Bandedge B

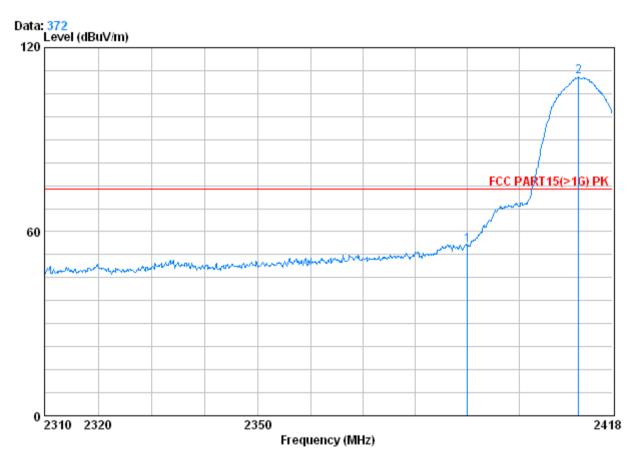
loge	: 2412 Bandedge B			Preamp	Read		Limit	Over
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2390.000	2.98	32.51	39.85	57.95	53.60	74.00	-20.40
2 0	2412.168	2.99	32.54	39.86	112.76	108.44	74.00	34.44



Report No.: SZEM131000568301

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Test mode:	802.11b	Tost channel:	Lowest	Remark:	Dook	Horizontal
rest mode.	002.110	Test channel:	Lowest	remark.	Peak	Horizontal



Condition : FCC PART15(>1G) PK 3m HORIZONTAL

Job No. : 5683RF

Mode : 2412 Bandedge B

1046	Freq			Preamp Factor			Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 2 0	2390.000 2411.412							-18.56 36.43

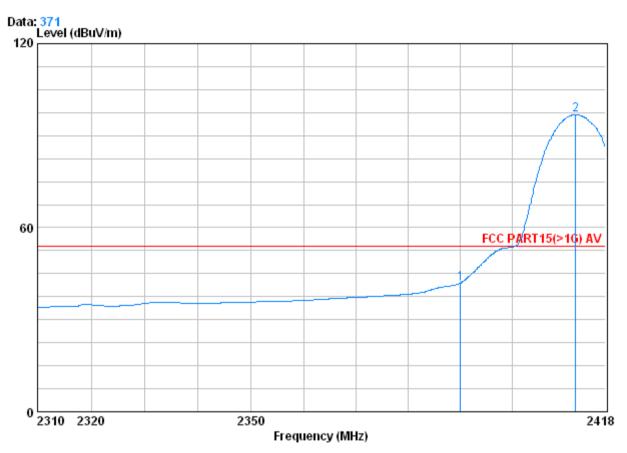
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Test mode: 802.11b	Test channel:	Lowest	Remark:	Average	Vertical
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Condition : FCC PART15(>1G) AV 3m VERTICAL

Job No. : 5683RF

Mode : 2412 Bandedge B

	Freq			•		Read Level Level		
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2390.000	2.98	32.51	39.85	46.37	42.02	54.00	-11.98
2 0	2412.168	2.99	32.54	39.86	101.23	96.90	54.00	42.90

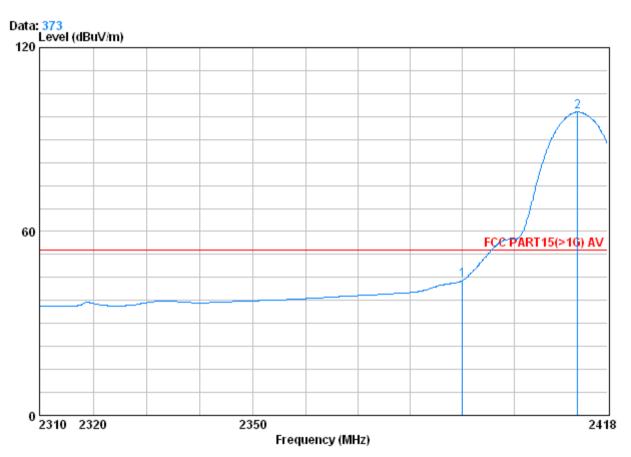
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Test mode:	802.11b	Test channel:	Lowest	Remark:	Average	Horizontal



Condition : FCC PART15(>1G) AV 3m HORIZONTAL

Job No. : 5683RF

Mode : 2412 Bandedge B

.040	Freq			•			Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	$\overline{\text{dBuV/m}}$	dB
1 2 @	2390.000 2412.168						54.00 54.00	

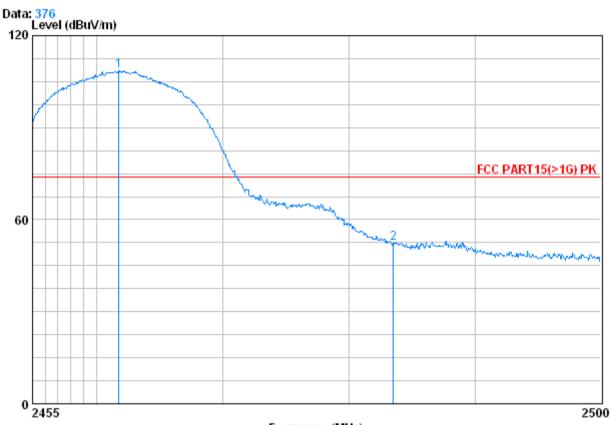
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Test mode:	802.11b	Test channel:	Highest	Remark:	Peak	Vertical	ı
	002.1.0	1 001 0110111011	9	1 (011101111		* O. t.Oa.	



Frequency (MHz)

Condition : FCC PART15(>1G) PK 3m VERTICAL

Job No. : 5683RF

Mode : 2462 Bandedge B

	Freq			Preamp Factor			Limit Line	
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 @ 2	2461.795 2483.500			39.91 39.92				34.63 -21.81

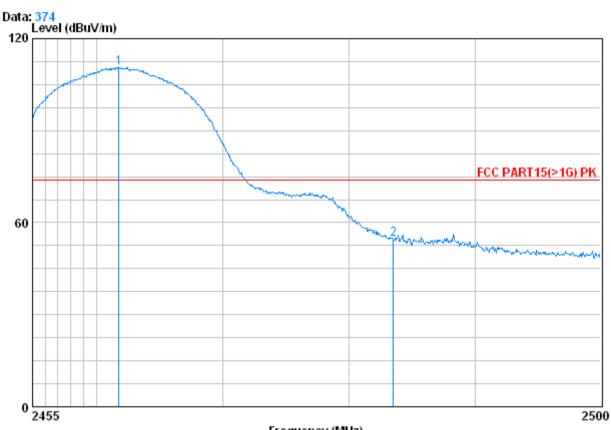
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Report No.: SZEM131000568301

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Test mode: 802.11b Test channel: Highest Remark: Per	Peak Horizontal
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Frequency (MHz)

Condition : FCC PART15(>1G) PK 3m HORIZONTAL

Job No. : 5683RF

Mode : 2462 Bandedge B

	Freq			-				Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 0	2461.795	3.02	32.64	39.91	114.84	110.59	74.00	36.59
2	2483.500	3.03	32.67	39.92	58.75	54.53	74.00	-19.47

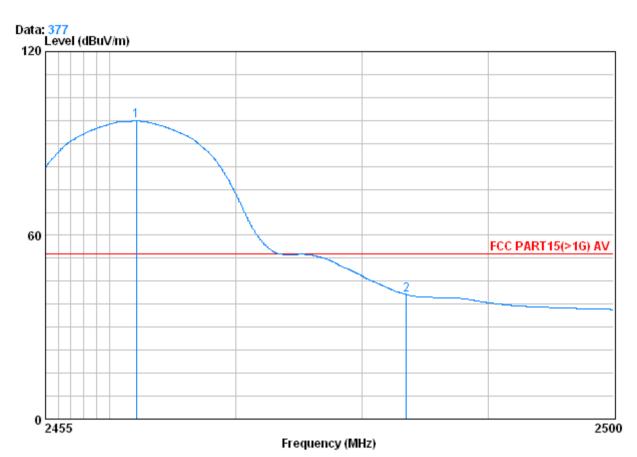
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	Test mode:	802.11b	Test channel:	Highest	Remark:	Average	Vertical	l
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Condition : FCC PART15(>1G) AV 3m VERTICAL

Job No. : 5683RF

Mode : 2462 Bandedge B

	Freq			Preamp Factor			Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 0	2462.155	3.02	32.64	39.91	101.61	97.36	54.00	43.36
2	2483.500	3.03	32.67	39.92	44.92	40.70	54.00	-13.30

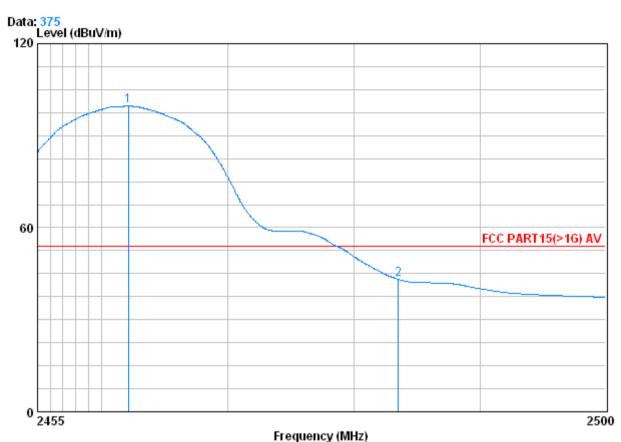
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	Test mode:	802.11b	Test channel:	Highest	Remark:	Average	Horizontal
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Condition : FCC PART15(>1G) AV 3m HORIZONTAL

Job No. : 5683RF

Mode : 2462 Bandedge B

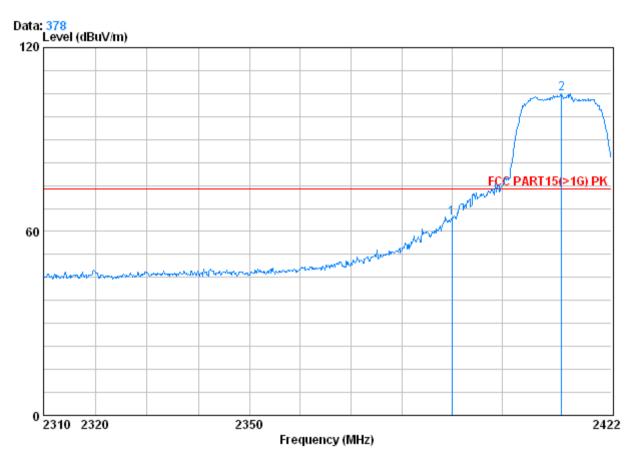
	Freq			Preamp Factor				
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 0 2	2462.155 2483.500							45.66 -10.83



Report No.: SZEM131000568301

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Test mode:   802.11g   Test channel:   Lowest   Remark:   Peak   Vertical
---



Condition : FCC PART15(>1G) PK 3m VERTICAL

Job No. : 5683RF

Mode : 2412 Bandedge G

	Freq			Preamp Factor			Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 2 @	2390.000 2411.920						74.00 74.00	



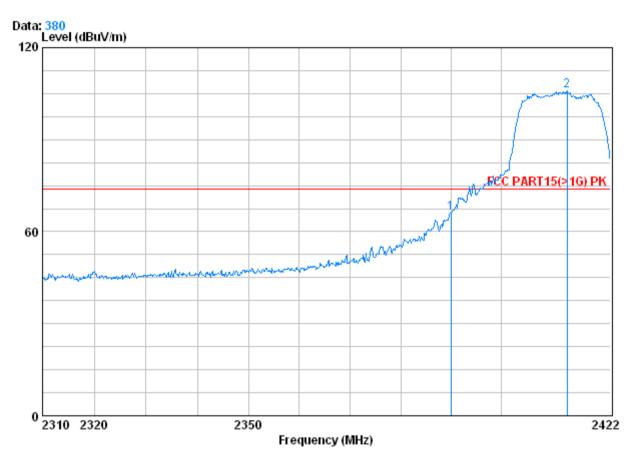
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	000 44					
Test mode:	802.11g	Test channel:	Lowest	Remark:	Peak	Horizontal



Condition : FCC PART15(>1G) PK 3m HORIZONTAL

Job No. : 5683RF

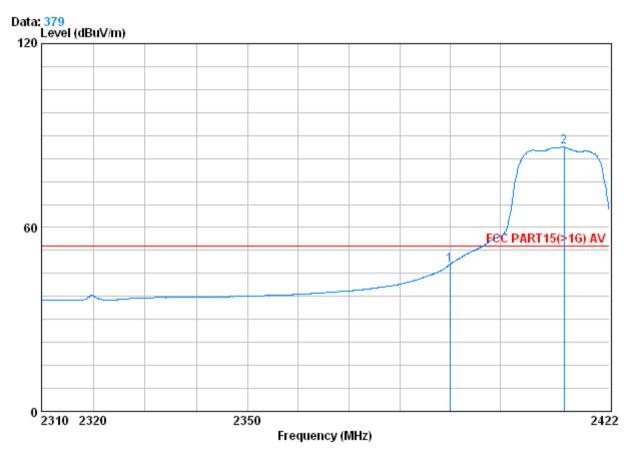
Mode : 2412 Bandedge G

	Freq			Preamp Factor			Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 2 @	2390.000 2413.264						74.00 74.00	



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Condition : FCC PART15(>1G) AV 3m VERTICAL

Job No. : 5683RF

Mode : 2412 Bandedge G

1046	Freq			Preamp Factor	Read Level		Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 2 @	2390.000 2412.816			39.85 39.86				-6.24 32.23

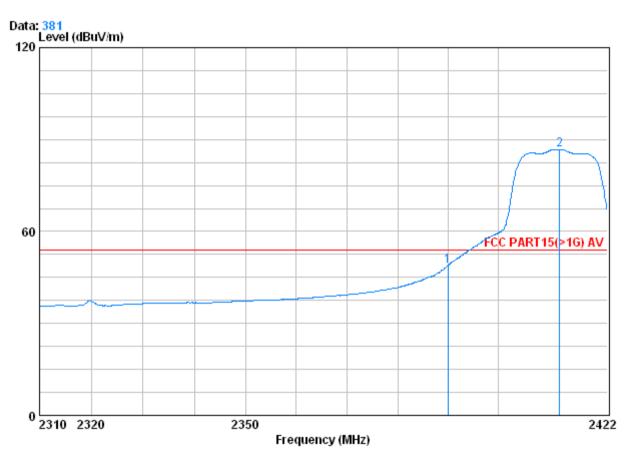
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Ī	Test mode:	802.11g	Test channel:	Lowest	Remark:	Average	Horizontal



Condition : FCC PART15(>1G) AV 3m HORIZONTAL

Job No. : 5683RF

Mode : 2412 Bandedge G

.040	Freq			Preamp Factor			Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	$\overline{\text{dBuV/m}}$	dB
1 2 @	2390.000 2412.368			39.85 39.86				

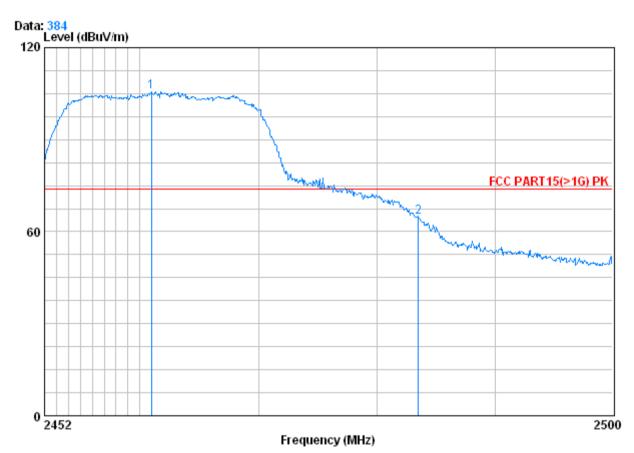
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Test mode:	802.11g	Test channel:	Highest	Remark:	Peak	Vertical



Condition : FCC PART15(>1G) PK 3m VERTICAL

Job No. : 5683RF

Mode : 2462 Bandedge G

	Freq			Preamp Factor			Limit Line	
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 0 2	2460.976 2483.500						74.00 74.00	

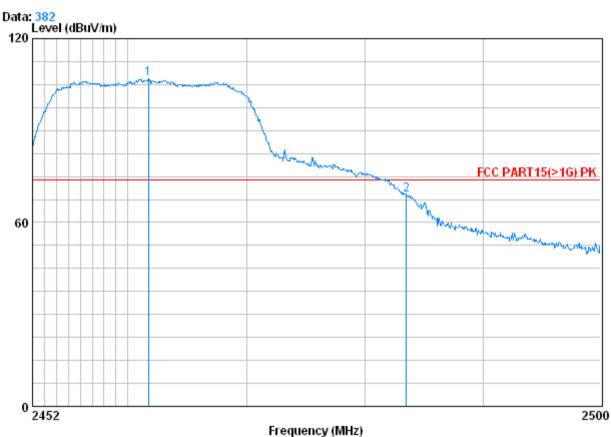
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Test mode:	802.11a	Test channel:	Highest	Remark:	Peak	Horizontal



: FCC PART15(>1G) PK 3m HORIZONTAL Condition

Job No. : 5683RF

Mode : 2462 Bandedge G

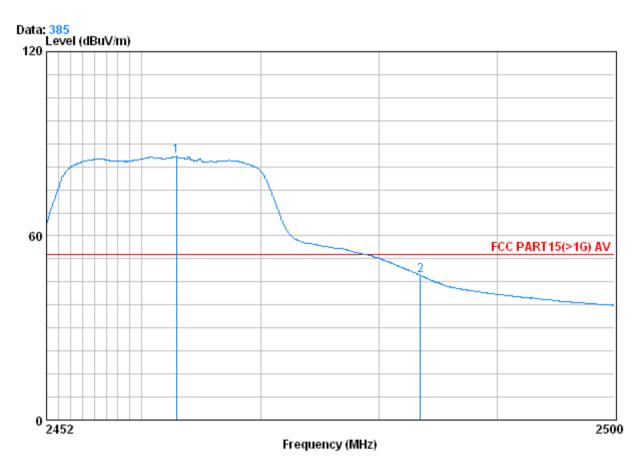
	Freq			•	Read Level		Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 @ 2	2461.744 2483.500						74.00 74.00	



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Test mode:   802.11q   Test channel:   Highest   Remark:   Average	Average	Remark: Ave	Highest	Test channel:	802.11g	Test mode:
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Condition : FCC PART15(>1G) AV 3m VERTICAL

Job No. : 5683RF

Mode : 2462 Bandedge G

	Freq			Preamp Factor			Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 0	2462.896						54.00	
2	2483.500	3.03	32.67	39.92	51.40	47.18	54.00	-6.82

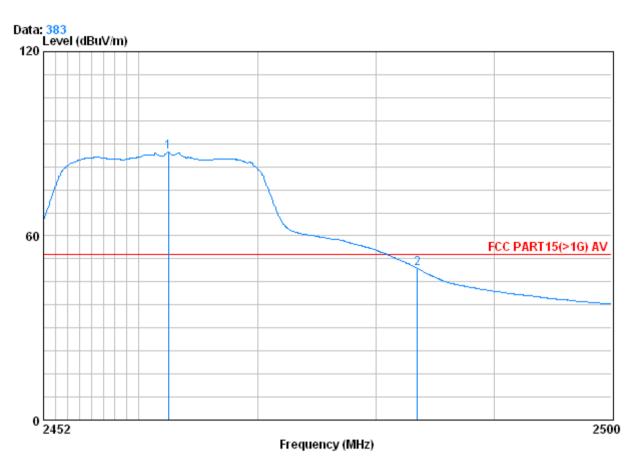
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Test mode:	802.11g	Test channel:	Highest	Remark:	Average	Horizontal



Condition : FCC PART15(>1G) AV 3m HORIZONTAL

Job No. : 5683RF

Mode : 2462 Bandedge G

	Freq			itenna Preamp 'actor Factor					
	MHz	dB	dB/m	dB	dBuV	dBuV/m	$\overline{\mathtt{dBuV/m}}$	dB	
1 0	2462.464	3.02	32.64	39.91	91.55	87.30	54.00	33.30	
2	2483.500	3.03	32.67	39.92	53.65	49.43	54.00	-4.57	

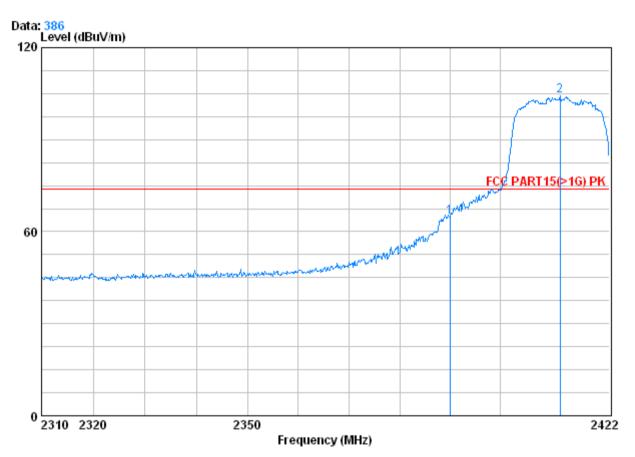
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Test mode:	802.11n(HT20)	Test channel:	Lowest	Remark:	Peak	Vertical



Condition : FCC PART15(>1G) PK 3m VERTICAL

Job No. : 5683RF

Mode : 2412 Bandedge N

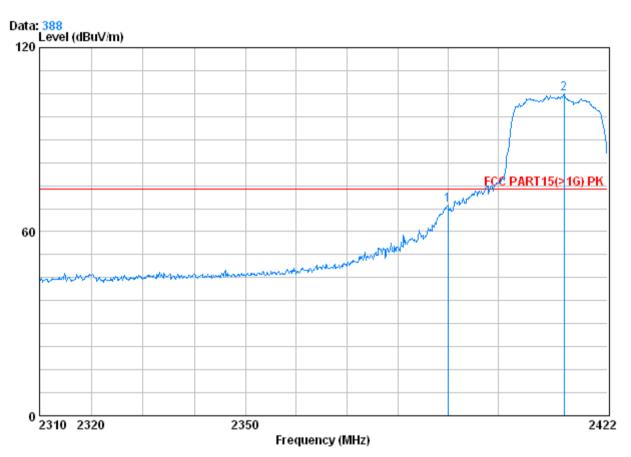
	Freq			Preamp Factor			Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 2 X	2390.000 2412.032						74.00 74.00	



Report No.: SZEM131000568301

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Test mode:   802.11n(HT20)   Test channel:   Lowest   Remark:   Peak   Hori
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Condition : FCC PART15(>1G) PK 3m HORIZONTAL

Job No. : 5683RF

Mode : 2412 Bandedge N

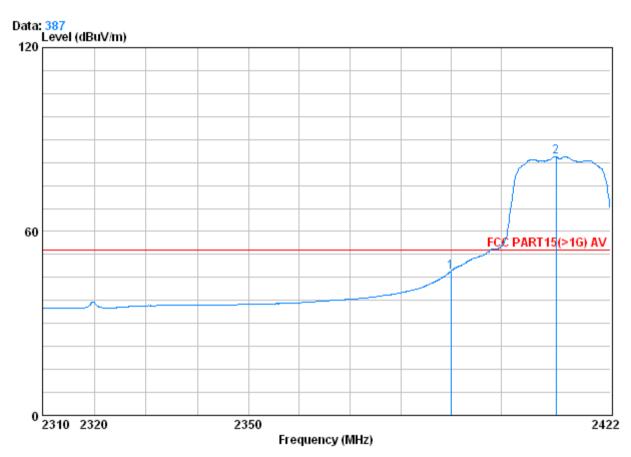
	Fre					Read Level Level			
	мн	z dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2390.00	0 2.98	32.51	39.85	73.11	68.76	74.00	-5.24	
2 8	9 2413.26	4 2.99	32.54	39.86	109.17	104.85	74.00	30.85	



Report No.: SZEM131000568301

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Test mode:   802.11n(HT20)   Test channel:   Lowest   Remark:   Average   Vertical
--



Condition : FCC PART15(>1G) AV 3m VERTICAL

Job No. : 5683RF

Mode : 2412 Bandedge N

1040	Freq			Preamp Factor	Read Level		Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	$\overline{\mathtt{dBuV/m}}$	dB
1 2 X	2390.000 2411.024			39.85 39.86				



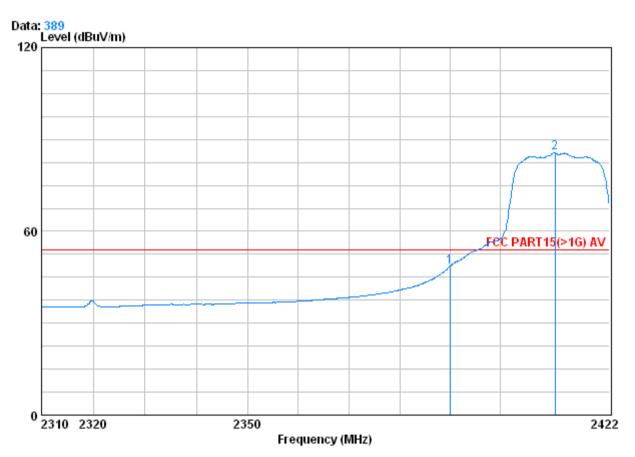
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Test mode:	802.11n(HT20)	Test channel:	Lowest	Remark:	Average	Horizontal



Condition : FCC PART15(>1G) AV 3m HORIZONTAL

Job No. : 5683RF

Mode : 2412 Bandedge N

	Freq			Preamp Factor			Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	——dB
1 2 0	2390.000 2411.024			39.85 39.86				

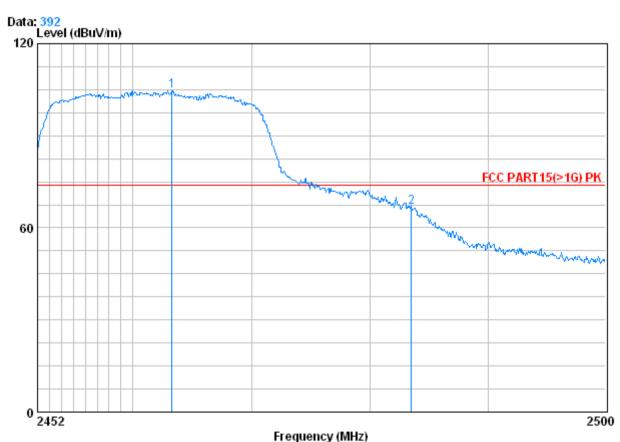
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Ī	Test mode:	802.11n(HT20)	Test channel:	Highest	Remark:	Peak	Vertical



Condition : FCC PART15(>1G) PK 3m VERTICAL

Job No. : 5683RF

Mode : 2462 Bandedge N

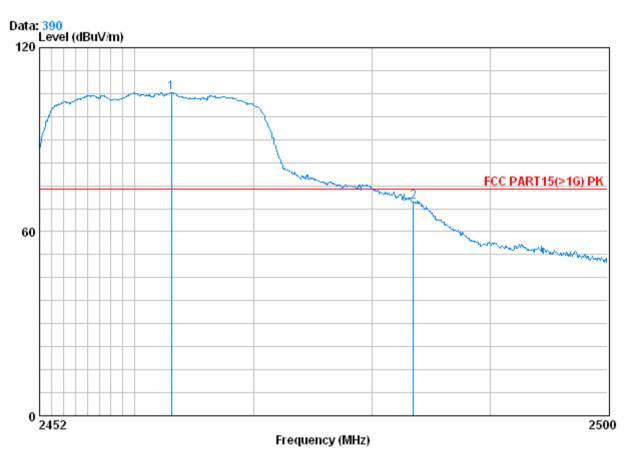
	Freq			-			Limit Line	
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 X 2	2463.280 2483.500						74.00 74.00	



Report No.: SZEM131000568301

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Test mode:	802.11n(HT20)	Test channel:	Highest	Remark:	Peak	Horizontal



Condition: FCC PART15(>1G) PK 3m HORIZONTAL

Job No. : 5683RF

Mode : 2462 Bandedge N

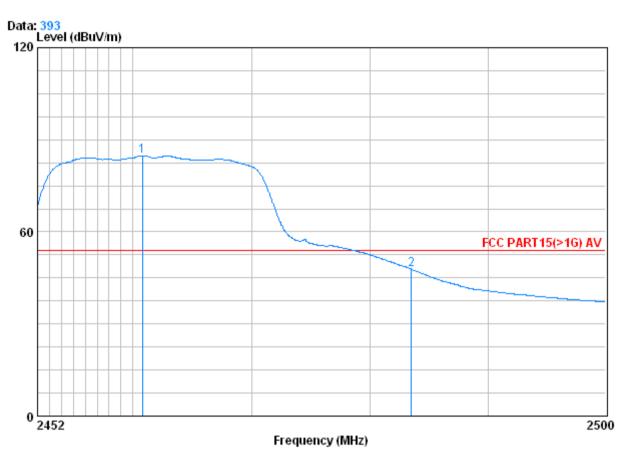
	Freq			•			Limit Line		
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 0	2463.088	3.02	32.64	39.91	109.67	105.42	74.00	31.42	
2	2483.500	3.03	32.67	39.92	73.76	69.54	74.00	-4.46	



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ſ	Test mode:	802.11n(HT20)	Test channel:	Highest	Remark:	Average	Vertical



Condition : FCC PART15(>1G) AV 3m VERTICAL

Job No. : 5683RF

Mode : 2462 Bandedge N

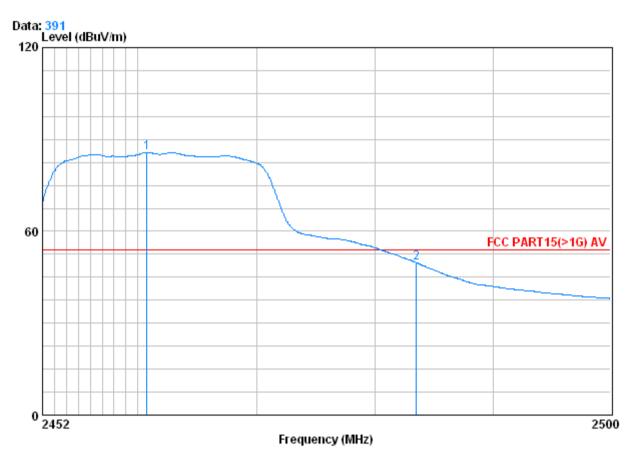
	Freq			Preamp Factor			Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 0 2	2460.784 2483.500						54.00 54.00	



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Test mode: 802.11n(HT20)   Test channel:   Highest   Remark:   Average	11n(HT20) Test channel: Highest Remark: Ave	ige Horizontal
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Condition : FCC PART15(>1G) AV 3m HORIZONTAL

Job No. : 5683RF

Mode : 2462 Bandedge N

	Freq			Preamp Factor			Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 0 2	2460.736 2483.500			39.91 39.92				

#### Note:

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 + Antenna Factor + Cable Factor - Preamplifier Factor

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