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# **FCC REPORT**

**Application No:** SZEM1405002719RF **Applicant:** RM ACQUISITION. LLC

Manufacturer/ Factory: ELECTRONICS TECHNOLOGY (DONG GUAN)COMPANY

"<sup>y.</sup> LIMITED

Product Name: GPS

Model No.(EUT): TND525

Add Model No.: TND530, RVND5535

**FCC ID:** A4C-10006A

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

**Date of Receipt:** 2014-06-10

**Date of Test:** 2014-06-18 to 2014-07-02

**Date of Issue:** 2014-07-15

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

Remark:

Model No.: TND525, TND530, RVND5535

Only the Model TND525 was tested, since the electrical circuit design, layout, components used and internal wiring were identical for all above models. Only the Item number is different.



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# 4 General Information

### 4.1 Client Information

Applicant:	RM ACQUISITION. LLC
Address of Applicant:	9855 Woods Dr., Skokie, IL 60077
Manufacturer:	ELECTRONICS TECHNOLOGY (DONG GUAN)COMPANY LIMITED
Address of Manufacturer:	No. 161, Xin Min Road, Tong Luo Wei Industrial Zone, Jin Xia, Chang An Town, Dong Guan City, Guang Dong Province, China
Factory:	ELECTRONICS TECHNOLOGY (DONG GUAN)COMPANY LIMITED
Address of Factory	No. 161, Xin Min Road, Tong Luo Wei Industrial Zone, Jin Xia, Chang An Town, Dong Guan City, Guang Dong Province, China

# 4.2 General Description of EUT

Product Name:	GPS
Model No.:	TND525, TND530, RVND5535
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)
EUT Function:	GPS/GPRS Locator
Sample Type:	Fixed production
Test Power Grade:	1(manufacturer declare)
Test Software of EUT:	WinCEUniTest (manufacturer declare )
Modulation Type:	DSSS
Antenna Type and Gain:	Type : Integral antenna Gain : 0dBi
Vehicular adapter:	Model:BY0502000
	Input: DC 12-24V == 2.5A Output: DC 5V == 2.0A
Power Supply:	Mode:Y14DBIAA1 Type:Lithium polymer battery DC 3.7V 950mAh (Li-ion Rechargeable Battery)
USB cable:	100cm (Unshielded)
DC cable:	152cm (Unshielded)



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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:	24.0 °C
Humidity:	52 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Transmitting mode:	The EUT transmitted the continuous modulation test signal at the specific channel(s).
AC charge + Transmitting mode:	The EUT transmitted the continuous modulation test signal at the specific channel(s) and AC charge it.
Vehicular charge+ Transmitting mode:	The EUT transmitted the continuous modulation test signal at the specific channel(s) and Vehicular charge it.

# 4.4 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.
10.1	0 1 1 000	N//A
AC Adapter	Supply by SGS	N/A
Earphone	Supply by SGS	N/A
SD card	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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# 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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# 4.10Equipment 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:

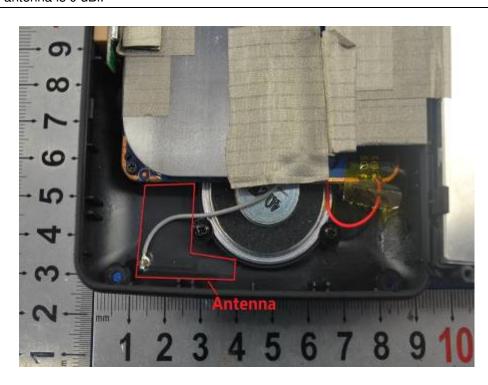
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit 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 0 dBi.





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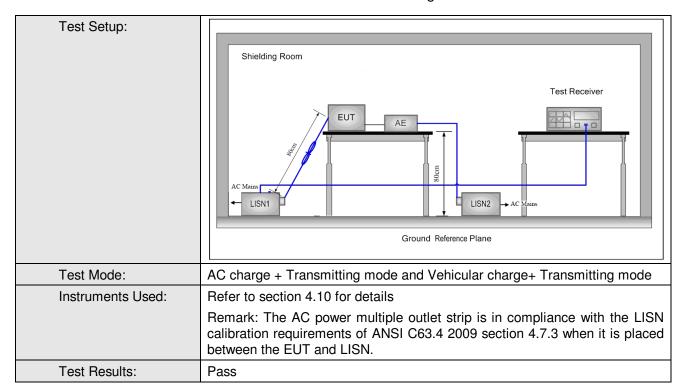
### 5.2 Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207			
Test Method:	ANSI C63.10: 2009			
Test Frequency Range:	150kHz to 30MHz			
Limit:	Fraguenov rango (MUZ)	Limit (dBuV)		
	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:	The mains terminal disturb	oance voltage test was	conducted in a shie	lded
	room.  2) The EUT was connected to Impedance Stabilization linear impedance. The power connected to a second reference plane in the second reference plane.  3) The tabletop EUT was place ground reference plane. Was placed on the horizon of the EUT shall be 0.4 movertical ground reference preference plane. The LISN unit under test and bonder mounted on top of the ground between the closest points the EUT and associated experience plane. In order to find the maximum equipment and all of the in ANSI C63.10: 2009 on contract the second reference plane.	Network) which proving ver cables of all other of LISN 2, which was same way as the LISC cket outlet strip was outlet strip was outlet strip was outled the rate of the ced upon a non-metallical ground reference plant a vertical ground reference plane was bonded to the outlet a ground reference und reference plane. To sof the LISN 1 and the quipment was at least outlet a ground the relation of the cables must be outlet and the puipment was at least outlet a ground the relation of the cables must be outlet and the puipment was at least outlet a cables must be outlet a cables must be outlet a cables must be outlet and the cables must be outlet and the cables must be outlet and the cables are cables must be outlet and the cables are cables must be outlet and the cables are cables are cables and the cables are cables are cables and the cables are cable	des a 50Ω/50μH + units of the EUT were bonded to the gro SN 1 for the unit be used to connect multing of the LISN was to table 0.8m above to grarrangement, the ane, ference plane. The re and reference plane. The horizontal ground om the boundary of the plane for LISNs his distance was EUT. All other units 0.8 m from the LISN ve positions of the changed according	e bund being ltiple is not the EUT lear the of 2.



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#### **Measurement Data**

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

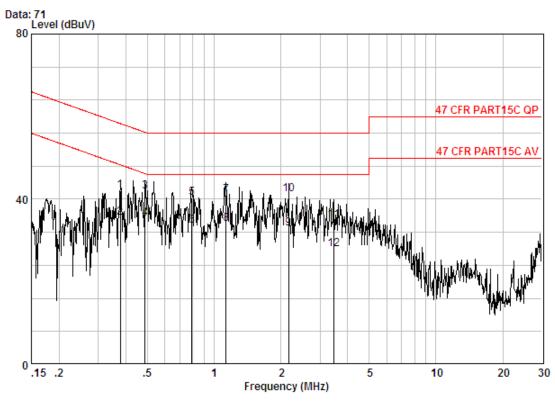
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.



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#### Live Line:



Site : Shielding Room

Condition : 47 CFR PART15C QP CE LINE

Job No. : 2719RF

Mode : AC charge +TX mode

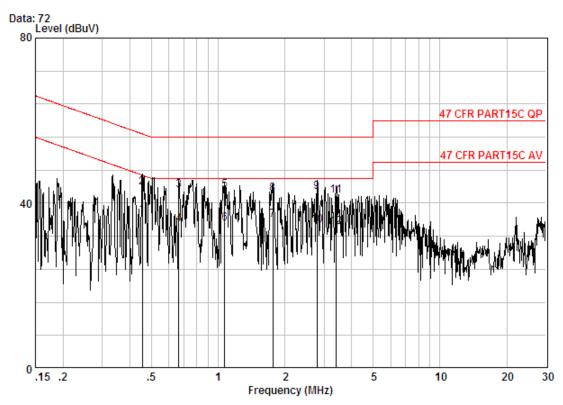
		Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
		MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1		0.37711	0.01	9.78	32.35	42.14	58.34	-16.21	QP
2		0.37711	0.01	9.78	25.74	35.53	48.34	-12.81	Average
3		0.48890	0.01	9.80	32.03	41.84	56.19	-14.35	QP
4	@	0.48890	0.01	9.80	25.52	35.33	46.19	-10.86	Average
5		0.79180	0.02	9.80	30.44	40.26	56.00	-15.74	QP
6		0.79180	0.02	9.80	23.83	33.65	46.00	-12.35	Average
7		1.129	0.02	9.80	31.26	41.08	56.00	-14.92	QP
8		1.129	0.02	9.80	24.18	34.00	46.00	-12.00	Average
9		2.167	0.02	9.81	23.08	32.91	46.00	-13.09	Average
10		2.167	0.02	9.81	31.43	41.26	56.00	-14.74	QP
11		3.454	0.02	9.86	25.03	34.91	56.00	-21.09	QP
12		3.454	0.02	9.86	17.98	27.86	46.00	-18.14	Average



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#### Neutral Line:



Site : Shielding Room

Condition : 47 CFR PART15C QP CE NEUTRAL

Job No. : 2719RF

Mode : AC charge +TX mode

		Freq	Cable	LISN Factor	Read Level	Level	Limit	Over	Demark
		1104	2000	140001	Dever	Dever	Dinc	DIMI	remark
		MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	@	0.45395	0.01	9.80	27.34	37.15	46.80	-9.65	Average
2		0.45395	0.01	9.80	33.90	43.71	56.80	-13.09	QP
3		0.66478	0.02	9.80	33.39	43.21	56.00	-12.79	QP
4		0.66478	0.02	9.80	25.14	34.96	46.00	-11.04	Average
5		1.071	0.02	9.80	33.28	43.10	56.00	-12.90	QP
6	@	1.071	0.02	9.80	25.38	35.20	46.00	-10.80	Average
7	@	1.762	0.02	9.80	26.17	35.99	46.00	-10.01	Average
8		1.762	0.02	9.80	32.39	42.21	56.00	-13.79	QP
9		2.794	0.02	9.84	32.90	42.75	56.00	-13.25	QP
10		2.794	0.02	9.84	24.74	34.60	46.00	-11.40	Average
11		3.399	0.02	9.86	31.94	41.81	56.00	-14.19	QP
12		3.399	0.02	9.86	24.35	34.23	46.00	-11.77	Average

#### Notes:

- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 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				
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 under all rate at lowest channel 1

Mode	802.11b							
Data Rate	1Mbps	2Mbps	5.5Mbps	11Mbps				
	23.19	23.01	22.89	22.56				
Mode	802.11g							
Data Rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
	24.47	24.17	23.96	23.72	23.55	23.27	23.09	22.89
Mode	802.11n(HT20)							
Data Rate	6.5Mbps	13Mbps	19.5Mbps	26Mbps	39Mbps	52Mbps	58.5Mbps	65Mbps
	21.28	21.08	20.96	20.78	20.64	20.47	20.34	20.21

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);





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#### **Measurement Data**

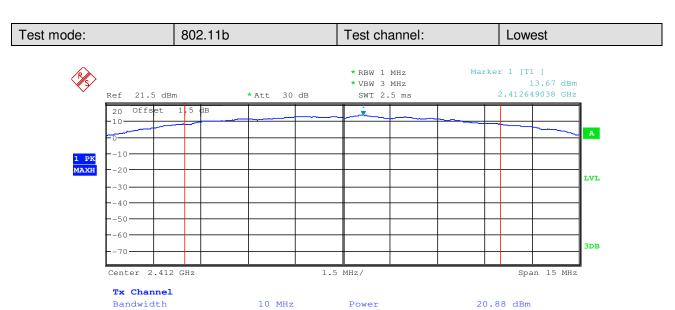
802.11b mode					
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result		
Lowest	20.88	30.00	Pass		
Middle	22.43	30.00	Pass		
Highest	23.19	30.00	Pass		
	802.11g mo	de			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result		
Lowest	23.18	30.00	Pass		
Middle	23.80	30.00	Pass		
Highest	24.47	30.00	Pass		
	802.11n(HT20)	mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result		
Lowest	20.23	30.00	Pass		
Middle	20.70	30.00	Pass		
Highest	21.28	30.00	Pass		

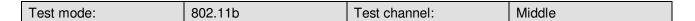


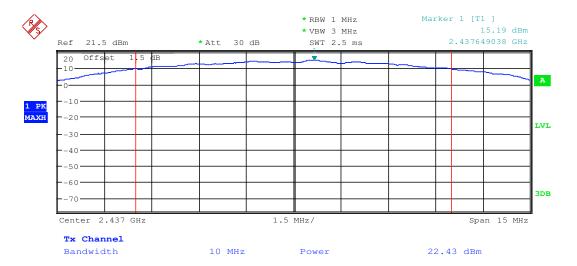
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### Test plot as follows:









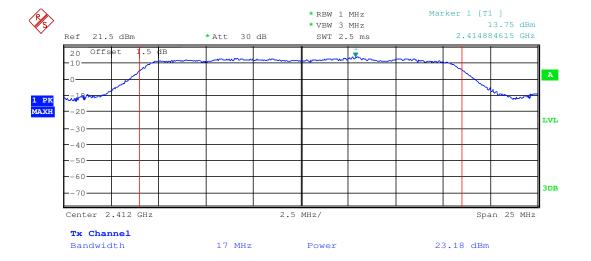
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Test mode: 802.11b Test channel: Highest



Test mode: 802.11g Test channel: Lowest

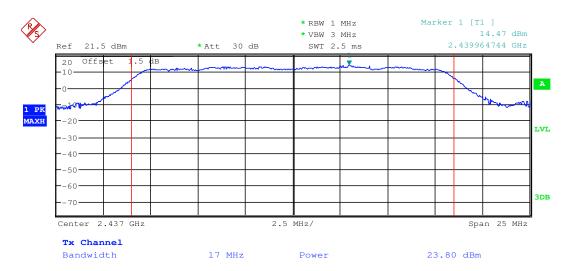




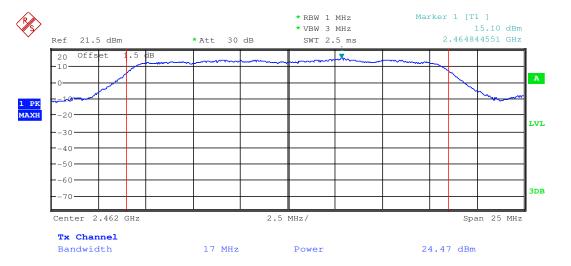
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Test mode: 802.11g Test channel: Middle



Test mode: 802.11g Test channel: Highest

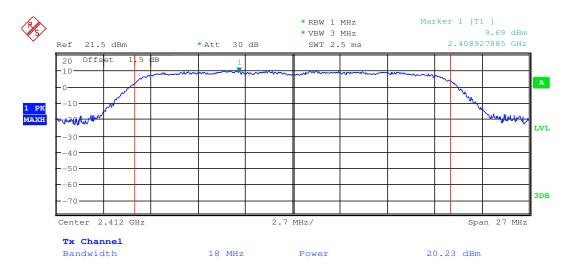




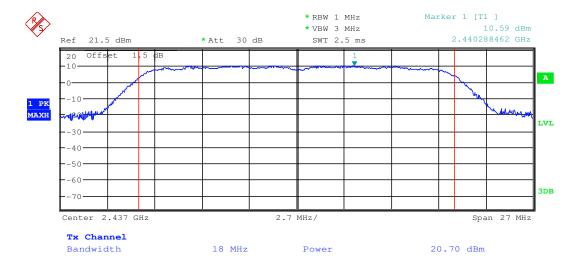
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Test mode: 802.11 n(HT20) Test channel: Lowest



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

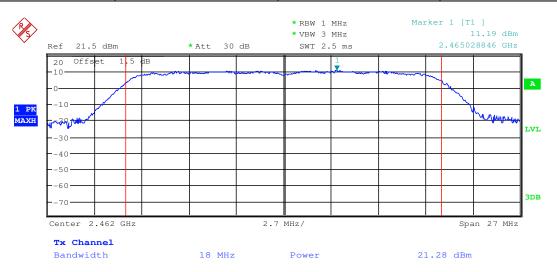




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Test mode: 802.11 n(HT20) Test channel: Highest

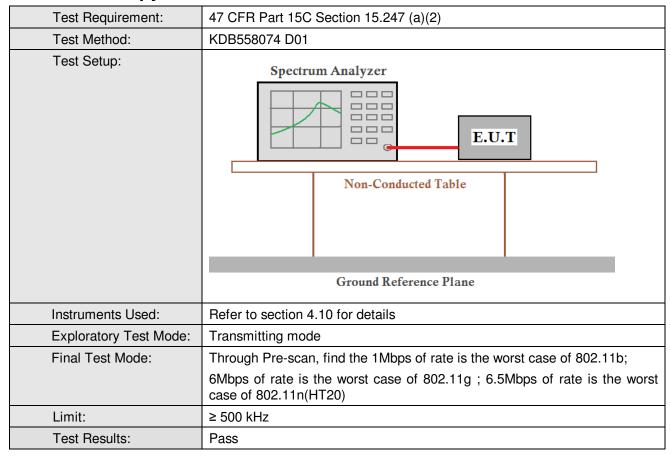




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# 5.4 6dB Occupy Bandwidth





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#### **Measurement Data**

802.11b mode						
Test channel	6dB Occupy Bandwidth (MHz)	Limit (kHz)	Result			
Lowest	9.230769231	≥500	Pass			
Middle	9.278846154	≥500	Pass			
Highest	9.038461538	≥500	Pass			
	802.11g mode					
Test channel	6dB Occupy Bandwidth (MHz)	Limit (kHz)	Result			
Lowest	16.466346154	≥500	Pass			
Middle	16.586538462	≥500	Pass			
Highest	Highest 16.442307692		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			

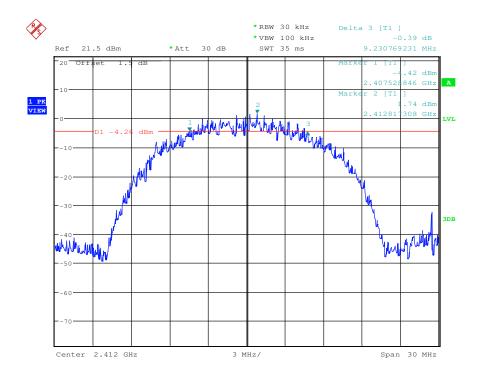


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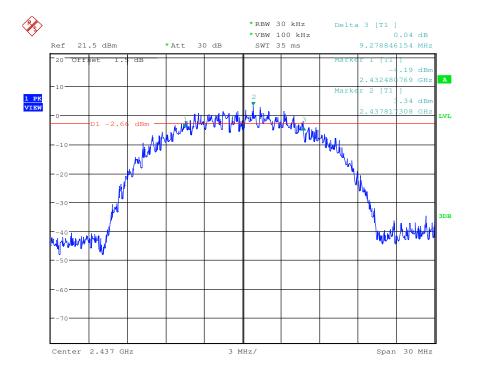
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### Test plot as follows:

Test mode: 802.11b Test channel: Lowest



Test mode: 802.11b Test channel: Middle

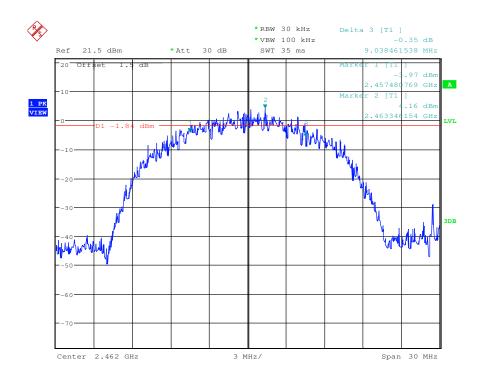




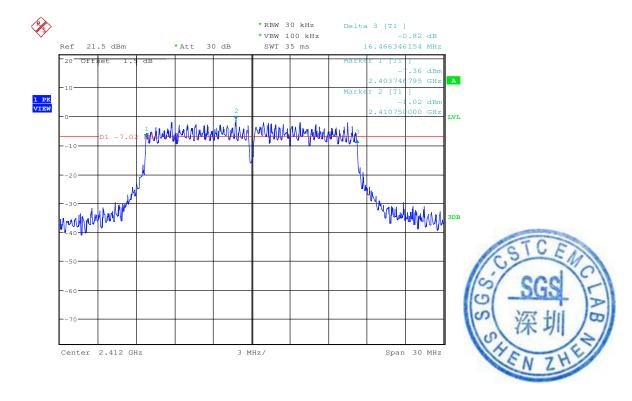
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Test mode: 802.11b Test channel: Highest



Test mode: 802.11g Test channel: Lowest

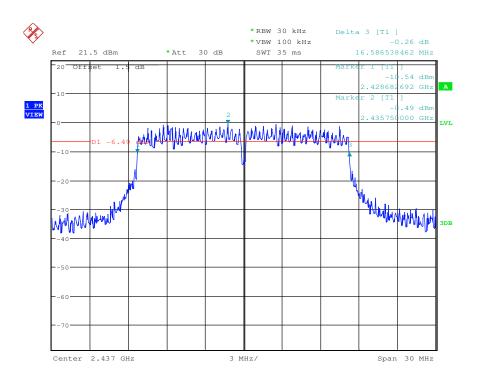




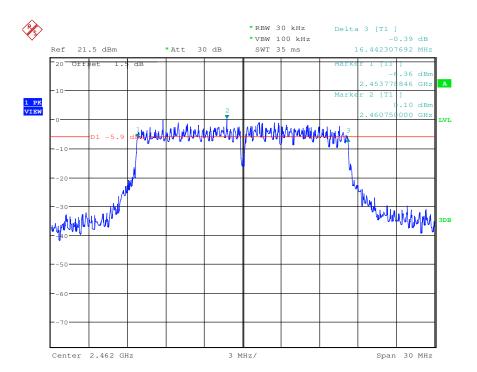
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Test mode: 802.11g Test channel: Middle



Test mode: 802.11g Test channel: Highest

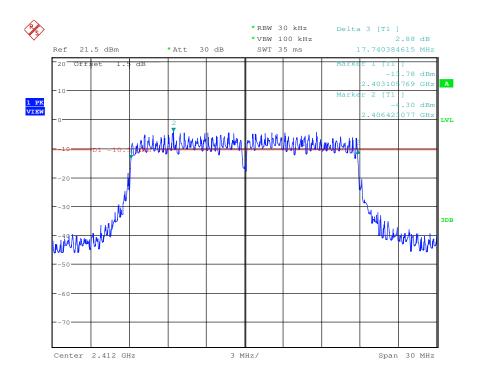




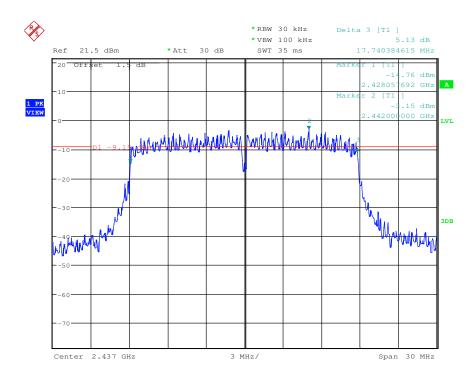
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Test mode: 802.11n(HT20) Test channel: Lowest



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

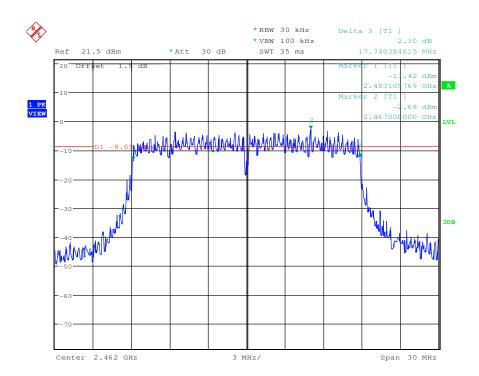




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Test mode: 802.11n(HT20) Test channel: Highest





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# 5.5 Power Spectral Density

Test Requirement:	47 CFR Part 15C Section 15.247 (e)				
Test Method:	KDB558074 D01				
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	-6.75	≤8.00	Pass			
Middle	-5.02	≤8.00	Pass			
Highest	-5.19	≤8.00	Pass			
	802.11g mode					
Test channel	Power Spectral Density (dBm)	Limit (dBm)	Result			
Lowest	-11.93	≤8.00	Pass			
Middle	-11.22	≤8.00	Pass			
Highest	-10.57	≤8.00	Pass			
	802.11n(HT20) mode					
Test channel	Power Spectral Density (dBm)	Limit (dBm)	Result			
Lowest	-14.78	≤8.00	Pass			
Middle	-13.67	≤8.00	Pass			
Highest	-14.06	≤8.00	Pass			

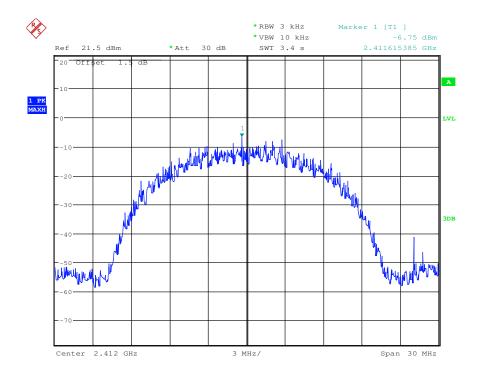


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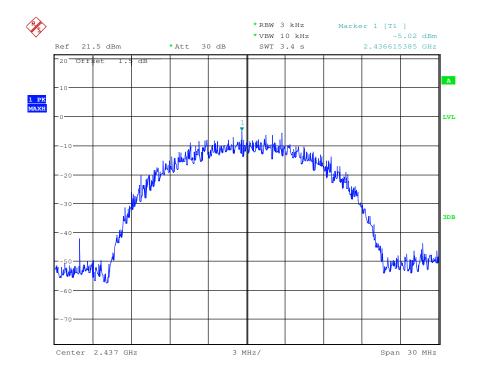
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### Test plot as follows:

Test mode: 802.11b Test channel: Lowest



Test mode: 802.11b Test channel: Middle

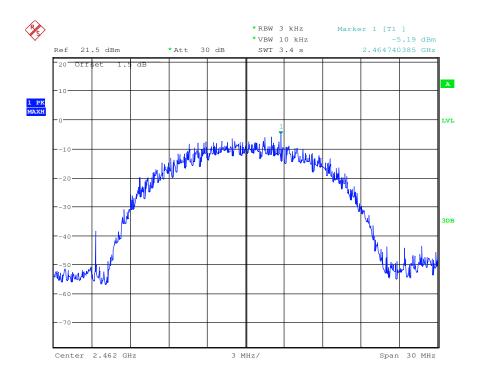




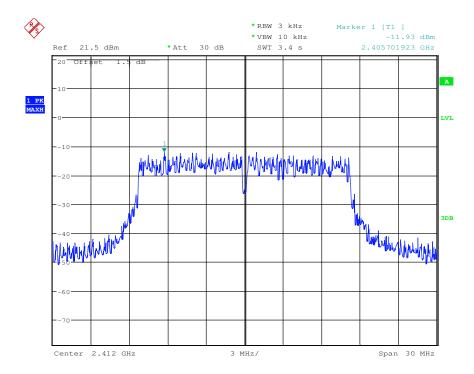
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Test mode: 802.11b Test channel: Highest





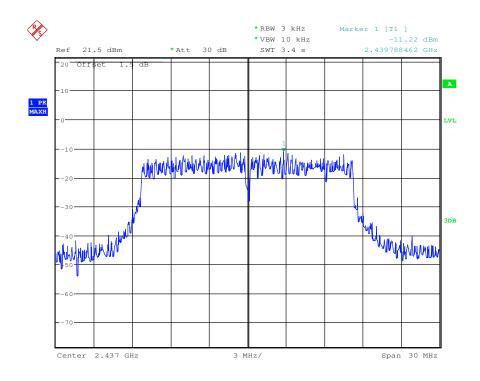




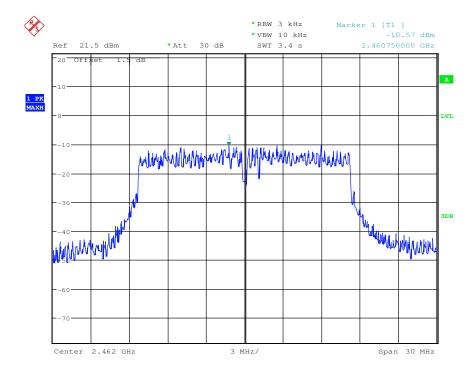
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Test mode: 802.11g Test channel: Middle



Test mode: 802.11g Test channel: Highest

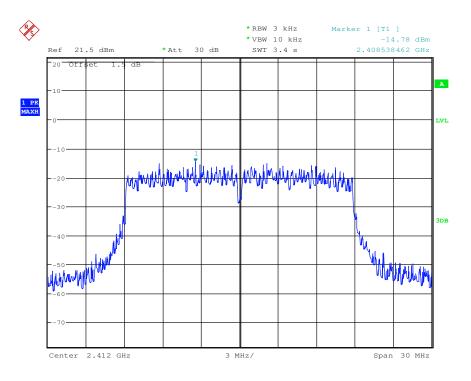




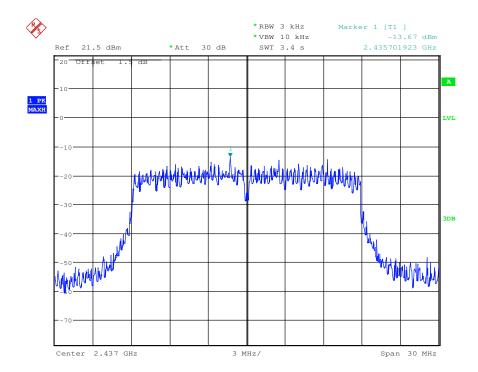
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Test mode: 802.11n(HT20) Test channel: Lowest



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

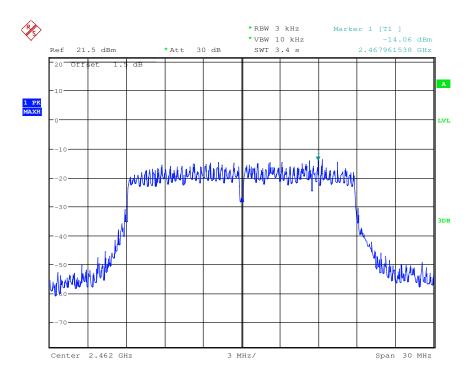




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Test mode: 802.11n(HT20) Test channel: Highest







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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					
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					

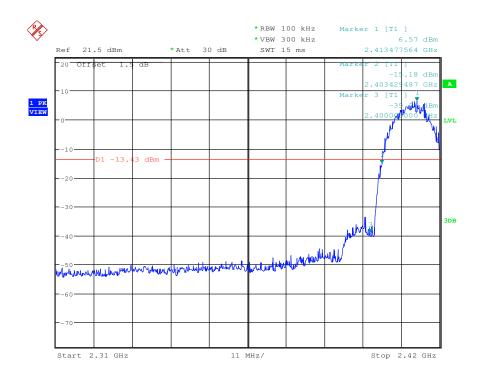


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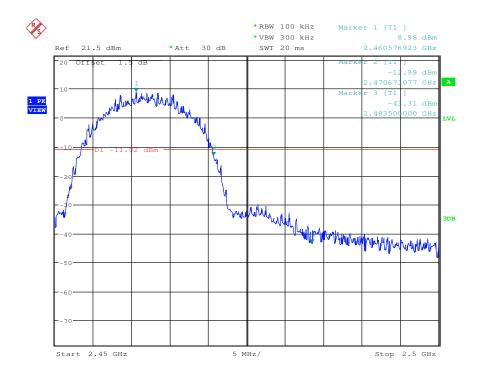
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## Test plot as follows:

Test mode: 802.11b Test channel: Lowest



Test mode: 802.11b Test channel: Highest

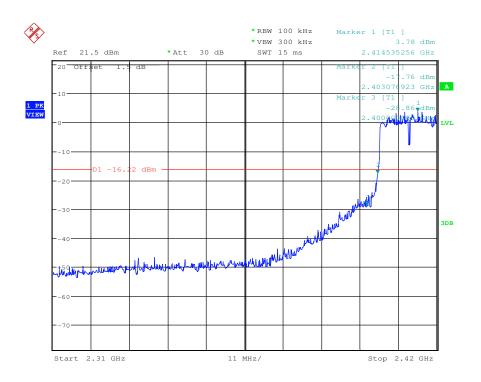




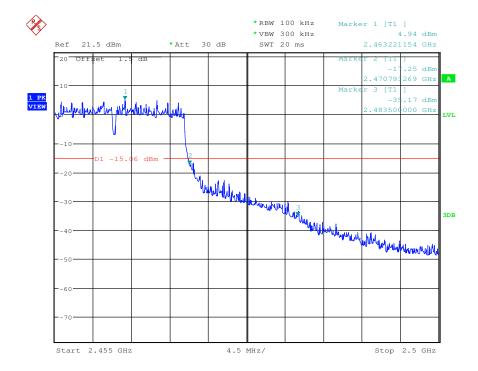
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Test mode: 802.11g Test channel: Lowest



Test mode: 802.11g Test channel: Highest

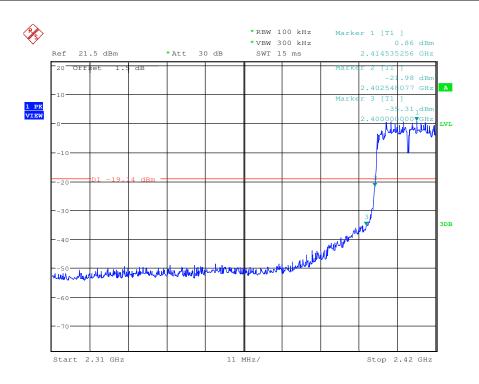




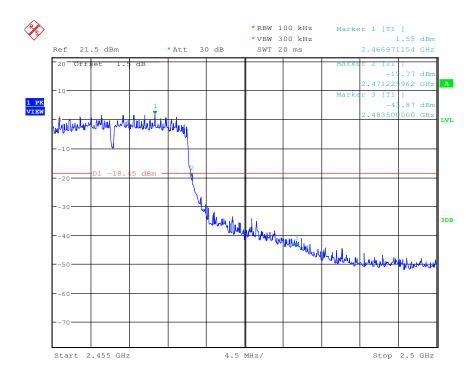
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Test mode: 802.11n(HT20) Test channel: Lowest



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





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# 5.7 RF Conducted Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	KDB558074 D01
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;
i iliai Test Mode.	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

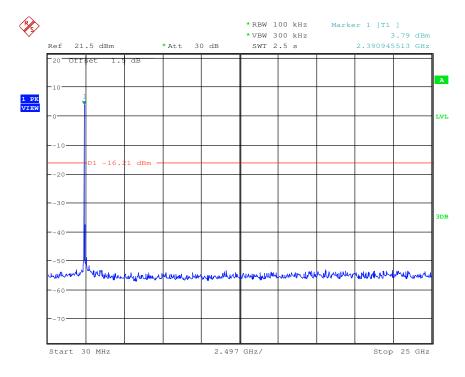


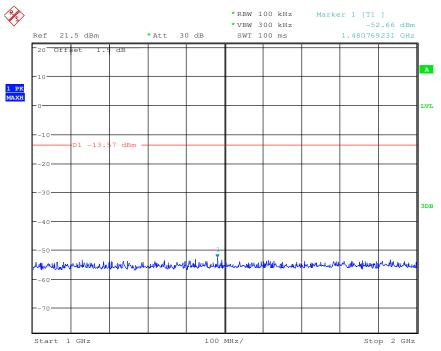
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#### Test plot as follows:

Test mode: 802.11b Test channel: Lowest

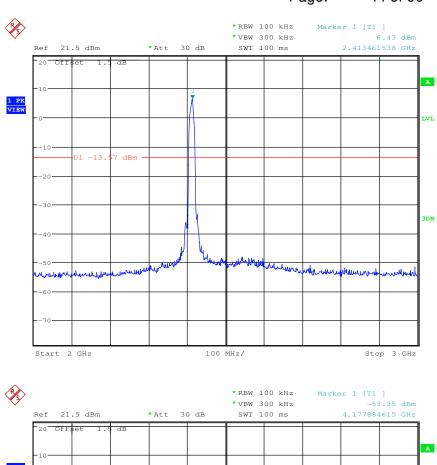


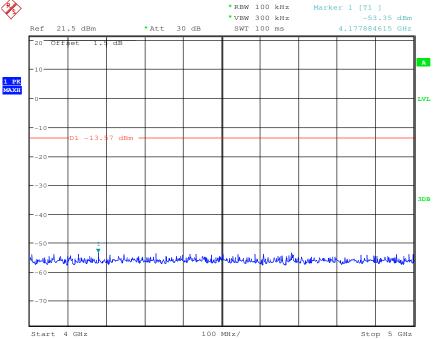




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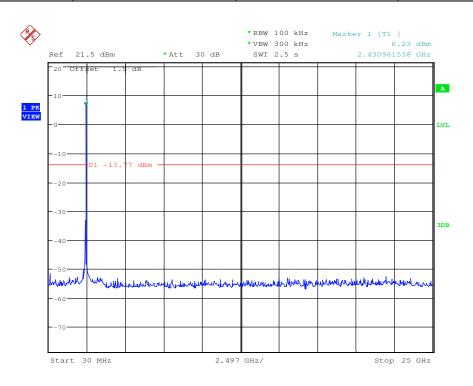


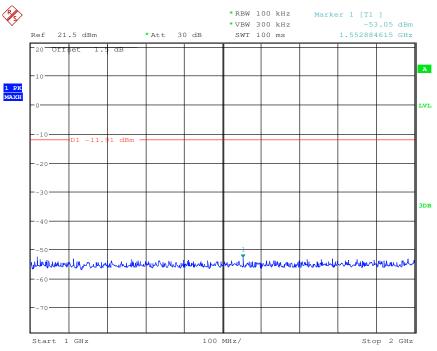


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Test mode: 802.11b Test channel: Middle

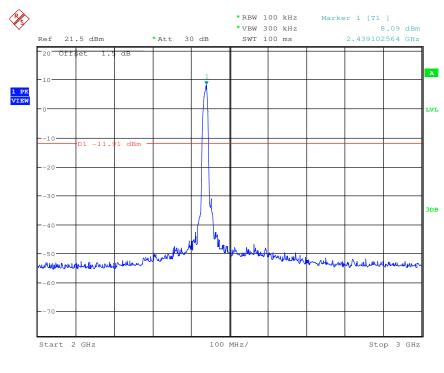


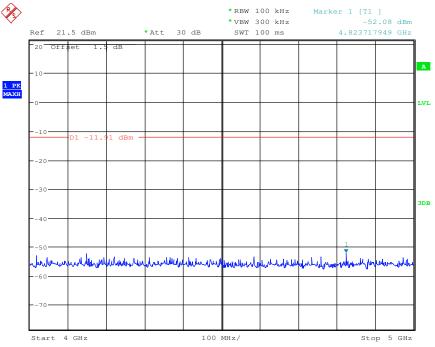




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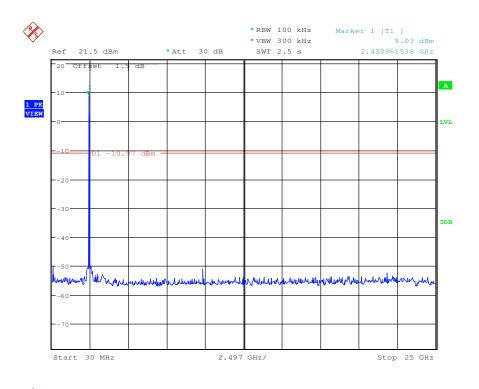


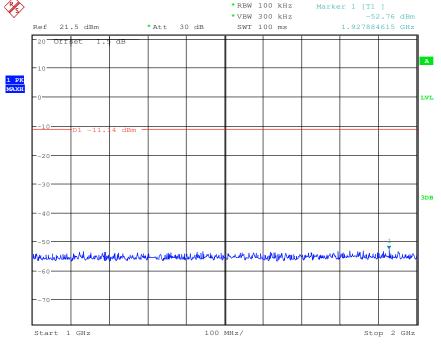


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Test mode: 802.11b Test channel: Highest



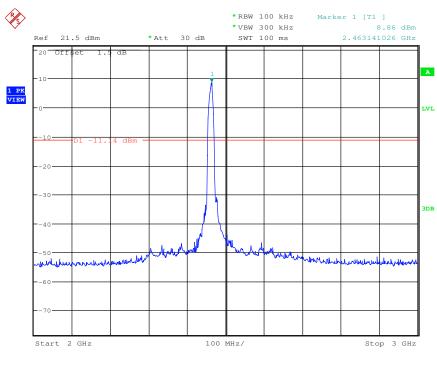


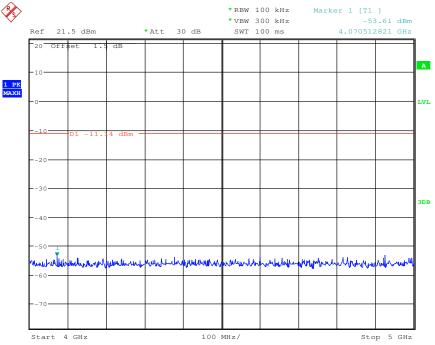




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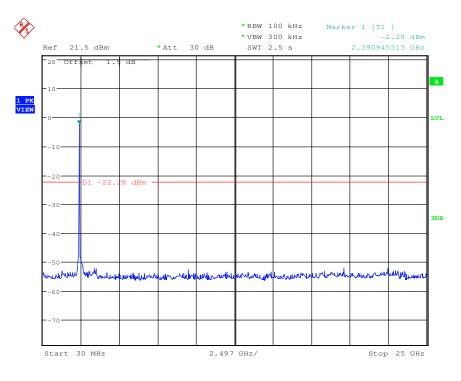


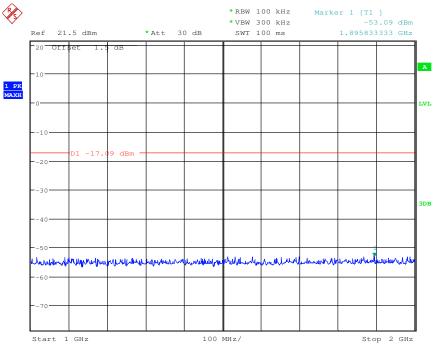


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Test mode: 802.11g Test channel: Lowest

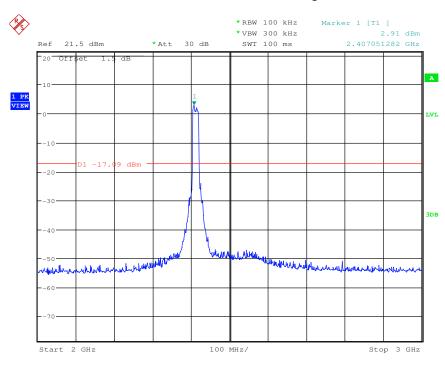


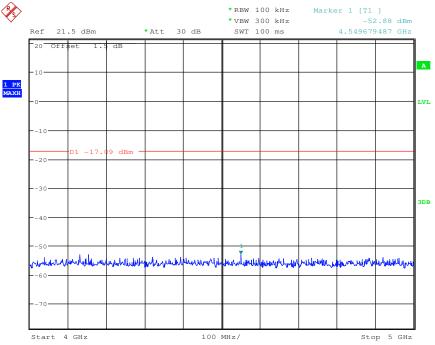




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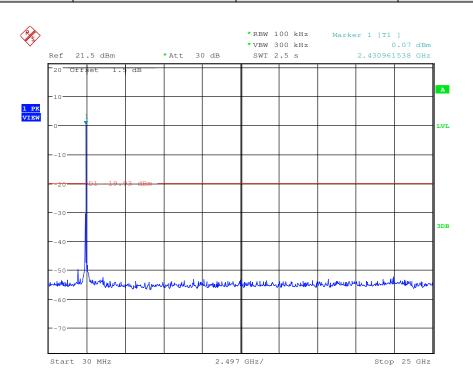


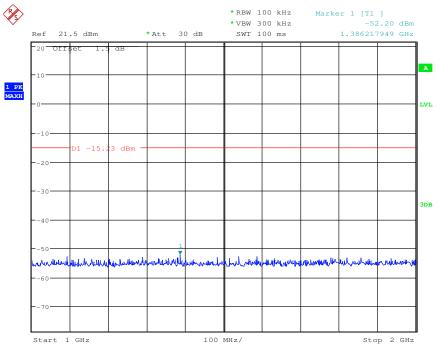


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Test mode: 802.11g Test channel: Middle

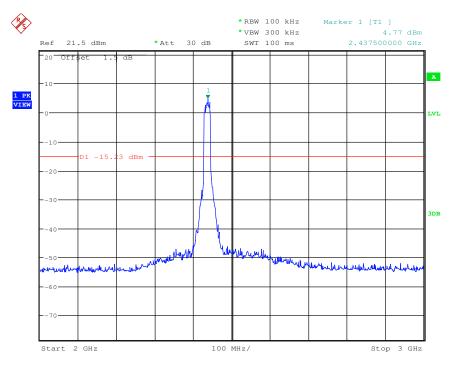


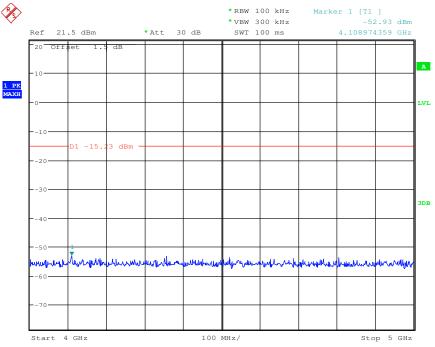




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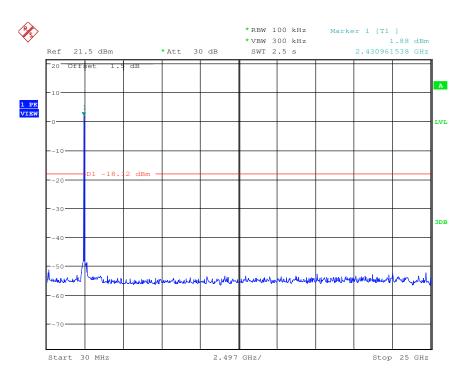


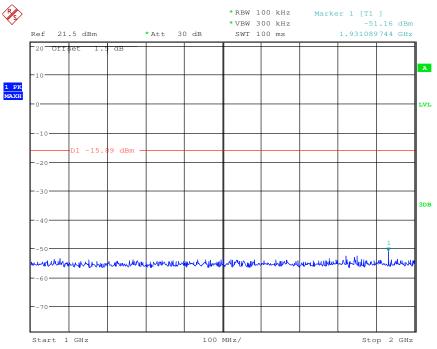


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Test mode: 802.11g Test channel: Highest

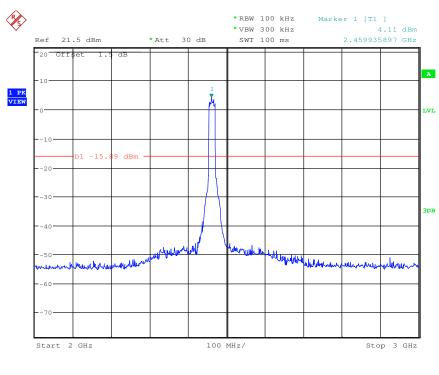


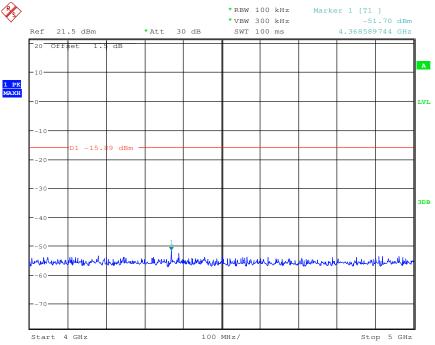




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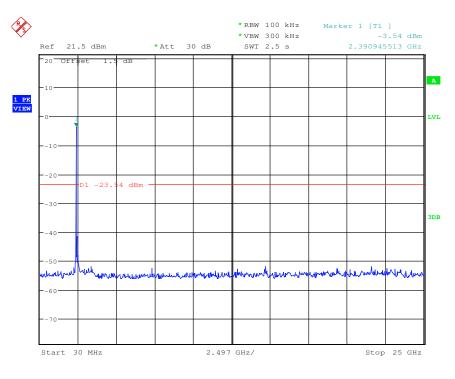


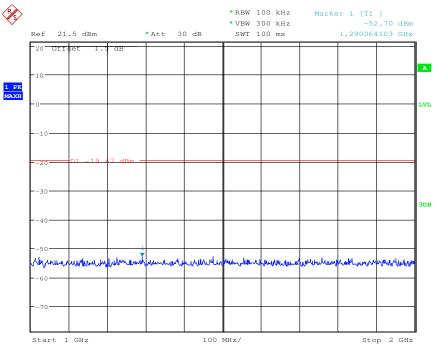


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Test mode: 802.11n(HT20) Test channel: Lowest



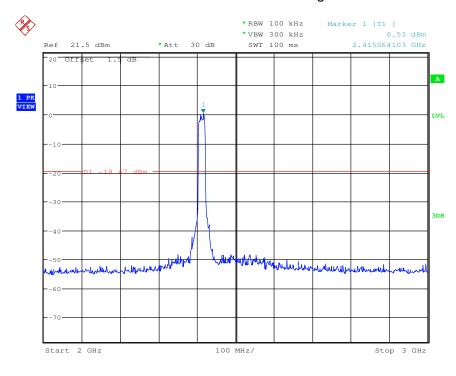


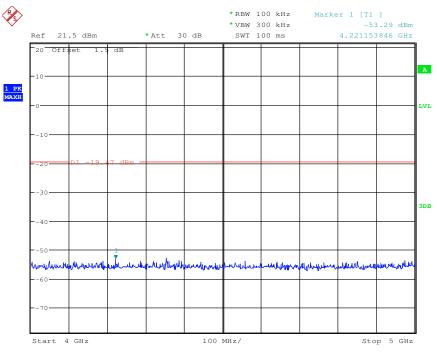
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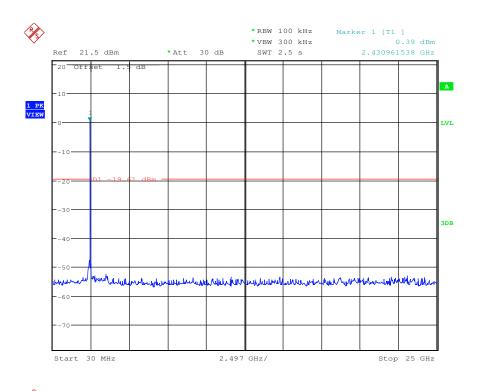


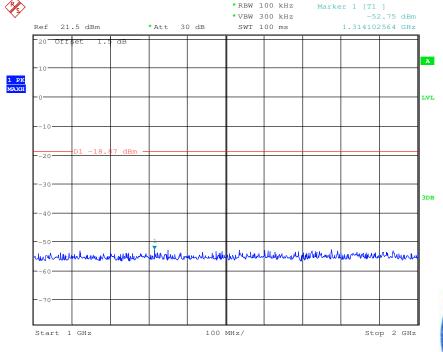


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Test mode: 802.11n(HT20) Test channel: Middle





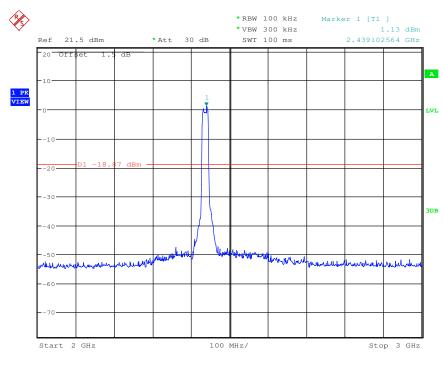


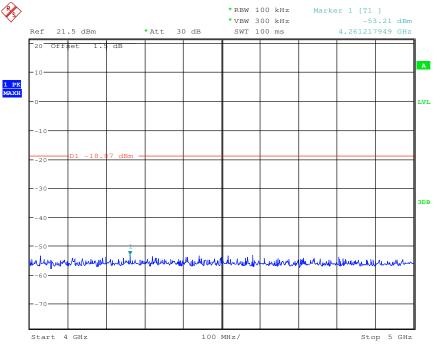
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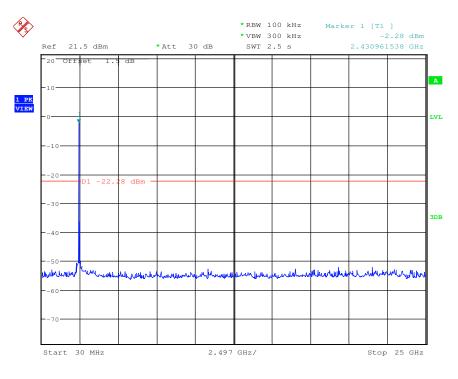


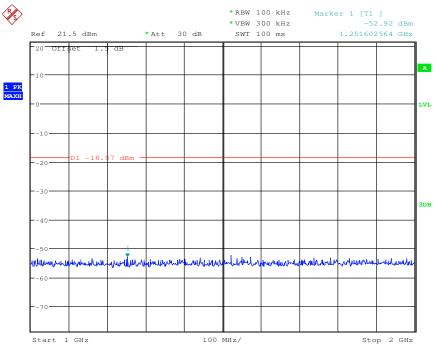


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Test mode: 802.11n(HT20) Test channel: Highest

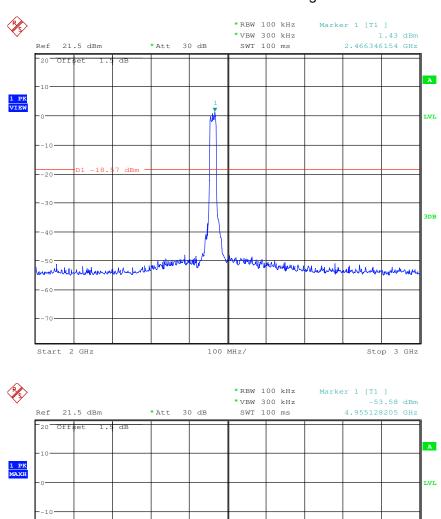


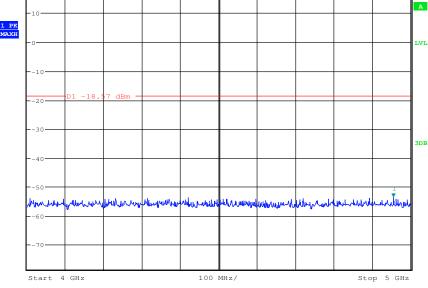




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#### Remark:

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

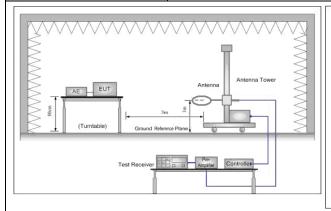
Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205									
Test Method:	ANSI C63.10 2009									
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)									
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark					
	0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak					
	0.009MHz-0.090MHz	Average	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									
	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.									



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#### Test Setup:



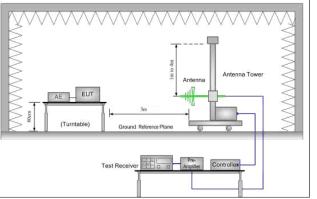


Figure 1. Below 30MHz

Figure 2. 30MHz to 1GHz

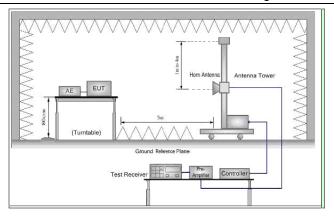


Figure 3. Above 1 GHz

#### 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. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting mode, AC charge + Transmitting mode and Vehicular charge+ 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) ;
	Only the worst case is recorded in the report.
Instruments Used:	Refer to section 4.10 for details
Test Results:	Pass

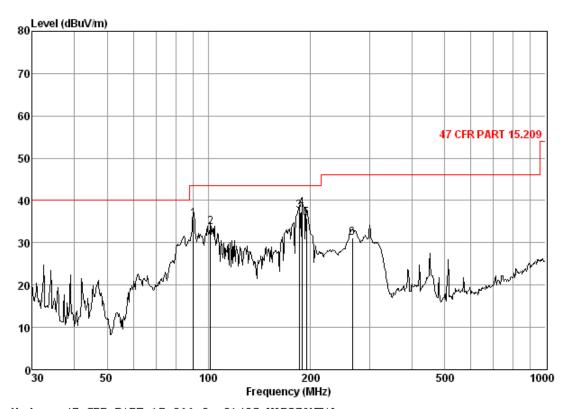


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#### 5.8.1 Radiated emission below 1GHz

30MHz~1GHz (QP)		
Test mode:	AC charge + Transmitting mode	Horizontal



Condition: 47 CFR PART 15.209 3m 3142C HORIZONTAL

Job No.

: 2719RF : AC cahrge + TX mode Mode

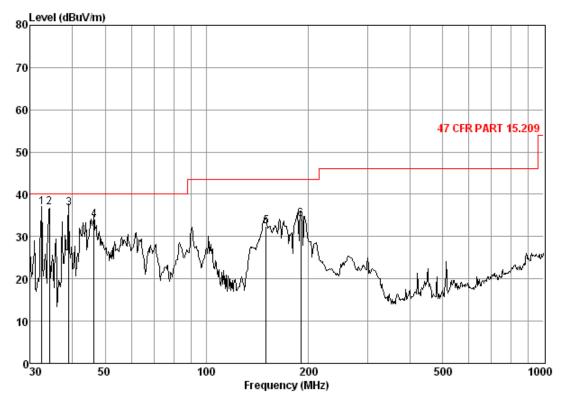
	Freq			Preamp Factor		Level	Limit Line	Over Limit
	MHz	dB	_dB/m	dB	dBuV	$\overline{\text{dBuV/m}}$	$\overline{\text{dBuV/m}}$	dB
1 2 3 4 5 6	89. 99 101. 29 185. 79 189. 07 195. 14 266. 61	1.10 1.20 1.38 1.38 1.39 1.75	6.10 6.82 6.71 6.77 7.10 9.20	27. 21 27. 19 26. 75 26. 74 26. 71 26. 49	56.12 56.73	35. 69 33. 75 37. 46 38. 14 35. 86 31. 22	43.50 43.50 43.50	-7.81 -9.75 -6.04 -5.36 -7.64 -14.78



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Test mode: AC charge + Transmitting mode Vertical



Condition: 47 CFR PART 15.209 3m 3142C VERTICAL

Job No. : 2719RF

Mode : AC cahrge + TX mode

ioac	_	CableA		Preamp	Read		Limit	Over
	Freq	Loss	ractor	Factor	Level	Level	Line	Limit
_	MHz	d₿	dB/m	d₿	dBu√	dBuV/m	dBuV/m	d₿
1	32.41	0.60	16.10	27.35	47.55	36.90	40.00	-3.10
2	34.13	0.60	14.69	27.34	49.00	36.95	40.00	-3.05
3	38. 97	0.60	11.47	27.32	52.00	36.75	40.00	-3.25
4	46.34	0.73	8.32	27.30	52.27	34.02	40.00	-5.98
5	150.01	1.32	9.30	26.91	48.77	32.48	43.50	-11.02
6	190.41	1.39	6.80	26.73	52.60	34.06	43.50	-9.44



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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
2927.691	5.01	33.28	40.24	45.88	43.93	74	-30.07	Vertical
3903.444	6.33	33.70	40.97	45.59	44.65	74	-29.35	Vertical
4824.000	7.45	34.68	41.64	46.26	46.75	74	-27.25	Vertical
7236.000	8.76	35.90	39.85	43.80	48.61	74	-25.39	Vertical
9648.000	9.69	37.36	37.76	41.79	51.08	74	-22.92	Vertical
11663.190	11.04	38.56	38.13	40.96	52.43	74	-21.57	Vertical
2927.691	5.01	33.28	40.24	45.87	43.92	74	-30.08	Horizontal
3943.392	6.38	33.74	41.00	44.95	44.07	74	-29.93	Horizontal
4824.000	7.45	34.68	41.64	45.57	46.06	74	-27.94	Horizontal
7236.000	8.76	35.90	39.85	43.89	48.70	74	-25.30	Horizontal
9648.000	9.69	37.36	37.76	41.46	50.75	74	-23.25	Horizontal
11722.720	11.08	38.62	38.16	40.77	52.31	74	-21.69	Horizontal

Test mode:	802	.11b	Test ch	annel:	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
2868.674	4.95	33.21	40.20	45.89	43.85	74	-30.15	Vertical
3893.520	6.31	33.68	40.95	45.55	44.59	74	-29.41	Vertical
4874.000	7.48	34.59	41.68	45.62	46.01	74	-27.99	Vertical
7311.000	8.85	35.92	39.79	44.20	49.18	74	-24.82	Vertical
9748.000	9.74	37.46	37.68	41.10	50.62	74	-23.38	Vertical
11812.580	11.15	38.71	38.20	41.12	52.78	74	-21.22	Vertical
2832.394	4.92	33.17	40.17	44.41	42.33	74	-31.67	Horizontal
3893.520	6.31	33.68	40.95	45.42	44.46	74	-29.54	Horizontal
4874.000	7.48	34.59	41.68	45.87	46.26	74	-27.74	Horizontal
7311.000	8.85	35.92	39.79	43.93	48.91	74	-25.09	Horizontal
9748.000	9.74	37.46	37.68	40.86	50.38	74	-23.62	Horizontal
11574.460	10.98	38.47	38.10	40.91	52.26	74	-21.74	Horizontal



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Test mode:	802	.11b	Test cha	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
2935.153	5.01	33.31	40.26	45.33	43.39	74	-30.61	Vertical
3913.393	6.33	33.70	40.97	45.76	44.82	74	-29.18	Vertical
4924.000	7.51	34.51	41.72	45.99	46.29	74	-27.71	Vertical
7386.000	8.94	35.96	39.72	43.22	48.40	74	-25.60	Vertical
9848.000	9.78	37.54	37.58	40.52	50.26	74	-23.74	Vertical
11574.460	10.98	38.47	38.10	41.21	52.56	74	-21.44	Vertical
2950.135	5.02	33.33	40.27	45.22	43.30	74	-30.70	Horizontal
3943.392	6.38	33.74	41.00	45.15	44.27	74	-29.73	Horizontal
4924.000	7.51	34.51	41.72	46.58	46.88	74	-27.12	Horizontal
7386.000	8.94	35.96	39.72	43.74	48.92	74	-25.08	Horizontal
9848.000	9.78	37.54	37.58	40.82	50.56	74	-23.44	Horizontal
11692.920	11.07	38.59	38.15	41.26	52.77	74	-21.23	Horizontal

Test mode:	802	.11g	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
2927.691	5.01	33.28	40.24	45.60	43.65	74	-30.35	Vertical
3933.367	6.38	33.74	40.98	45.02	44.16	74	-29.84	Vertical
4824.000	7.45	34.68	41.64	45.92	46.41	74	-27.59	Vertical
7236.000	8.76	35.90	39.85	43.33	48.14	74	-25.86	Vertical
9648.000	9.69	37.36	37.76	41.60	50.89	74	-23.11	Vertical
12024.960	11.30	38.93	38.28	40.49	52.44	74	-21.56	Vertical
3049.394	5.12	33.38	40.34	45.43	43.59	74	-30.41	Horizontal
3943.392	6.38	33.74	41.00	45.75	44.87	74	-29.13	Horizontal
4824.000	7.45	34.68	41.64	45.37	45.86	74	-28.14	Horizontal
7236.000	8.76	35.90	39.85	44.17	48.98	74	-25.02	Horizontal
9648.000	9.69	37.36	37.76	41.26	50.55	74	-23.45	Horizontal
11872.880	11.20	38.78	38.22	41.08	52.84	74	-21.16	Horizontal



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Test mode:	802	.11g	Test ch	annel:	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
2920.248	5.00	33.28	40.24	44.26	42.30	74	-31.70	Vertical
3933.367	6.38	33.74	40.98	44.52	43.66	74	-30.34	Vertical
4874.000	7.48	34.59	41.68	45.51	45.90	74	-28.10	Vertical
7311.000	8.85	35.92	39.79	43.86	48.84	74	-25.16	Vertical
9748.000	9.74	37.46	37.68	41.45	50.97	74	-23.03	Vertical
11574.460	10.98	38.47	38.10	41.00	52.35	74	-21.65	Vertical
2854.107	4.95	33.19	40.20	44.79	42.73	74	-31.27	Horizontal
3893.520	6.31	33.68	40.95	45.77	44.81	74	-29.19	Horizontal
4874.000	7.48	34.59	41.68	46.00	46.39	74	-27.61	Horizontal
7311.000	8.85	35.92	39.79	43.34	48.32	74	-25.68	Horizontal
9748.000	9.74	37.46	37.68	41.33	50.85	74	-23.15	Horizontal
11399.030	10.85	38.42	38.02	41.63	52.88	74	-21.12	Horizontal

Test mode: 802.11g		Test channel:		Highest Rema		:	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
2957.654	5.02	33.33	40.27	45.34	43.42	74	-30.58	Vertical
3953.443	6.41	33.76	41.00	44.86	44.03	74	-29.97	Vertical
4924.000	7.51	34.51	41.72	45.52	45.82	74	-28.18	Vertical
7386.000	8.94	35.96	39.72	43.72	48.90	74	-25.10	Vertical
9848.000	9.78	37.54	37.58	40.51	50.25	74	-23.75	Vertical
11663.190	11.04	38.56	38.13	41.37	52.84	74	-21.16	Vertical
2920.248	5.00	33.28	40.24	45.52	43.56	74	-30.44	Horizontal
3963.520	6.41	33.76	41.01	44.88	44.04	74	-29.96	Horizontal
4924.000	7.51	34.51	41.72	45.80	46.10	74	-27.90	Horizontal
7386.000	8.94	35.96	39.72	43.08	48.26	74	-25.74	Horizontal
9848.000	9.78	37.54	37.58	41.02	50.76	74	-23.24	Horizontal
11752.600	11.11	38.66	38.17	40.63	52.23	74	-21.77	Horizontal



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Test mode: 802.11 no		.11 n(HT20)	Test channel:		Lowest Remar		:	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
2942.635	5.01	33.31	40.26	45.62	43.68	74	-30.32	Vertical
3933.367	6.38	33.74	40.98	44.64	43.78	74	-30.22	Vertical
4824.000	7.45	34.68	41.64	45.60	46.09	74	-27.91	Vertical
7236.000	8.76	35.90	39.85	44.16	48.97	74	-25.03	Vertical
9648.000	9.69	37.36	37.76	41.55	50.84	74	-23.16	Vertical
11545.040	10.95	38.43	38.09	41.17	52.46	74	-21.54	Vertical
2854.107	4.95	33.19	40.20	45.46	43.40	74	-30.60	Horizontal
3933.367	6.38	33.74	40.98	44.76	43.90	74	-30.10	Horizontal
4824.000	7.45	34.68	41.64	45.12	45.61	74	-28.39	Horizontal
7236.000	8.76	35.90	39.85	44.00	48.81	74	-25.19	Horizontal
9648.000	9.69	37.36	37.76	40.87	50.16	74	-23.84	Horizontal
11663.190	11.04	38.56	38.13	40.89	52.36	74	-21.64	Horizontal

Test mode: 802.11 r		.11 n(HT20)	Test channel:		Middle Rem		:	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
2825.193	4.92	33.14	40.17	45.23	43.12	74	-30.88	Vertical
3933.367	6.38	33.74	40.98	44.99	44.13	74	-29.87	Vertical
4874.000	7.48	34.59	41.68	45.11	45.50	74	-28.50	Vertical
7311.000	8.85	35.92	39.79	43.49	48.47	74	-25.53	Vertical
9748.000	9.74	37.46	37.68	40.81	50.33	74	-23.67	Vertical
11722.720	11.08	38.62	38.16	40.78	52.32	74	-21.68	Vertical
2912.824	5.00	33.28	40.24	44.87	42.91	74	-31.09	Horizontal
3933.367	6.38	33.74	40.98	45.57	44.71	74	-29.29	Horizontal
4874.000	7.48	34.59	41.68	45.11	45.50	74	-28.50	Horizontal
7311.000	8.85	35.92	39.79	43.33	48.31	74	-25.69	Horizontal
9748.000	9.74	37.46	37.68	41.31	50.83	74	-23.17	Horizontal
11812.580	11.15	38.71	38.20	40.63	52.29	74	-21.71	Horizontal



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Test mode: 802.11 n(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
2980.327	5.05	33.35	40.28	45.25	43.37	74	-30.63	Vertical
3933.367	6.38	33.74	40.98	44.99	44.13	74	-29.87	Vertical
4924.000	7.51	34.51	41.72	45.90	46.20	74	-27.80	Vertical
7386.000	8.94	35.96	39.72	43.31	48.49	74	-25.51	Vertical
9848.000	9.78	37.54	37.58	40.73	50.47	74	-23.53	Vertical
11370.050	10.84	38.43	38.02	40.98	52.23	74	-21.77	Vertical
2950.135	5.02	33.33	40.27	45.03	43.11	74	-30.89	Horizontal
3933.367	6.38	33.74	40.98	45.57	44.71	74	-29.29	Horizontal
4924.000	7.51	34.51	41.72	46.18	46.48	74	-27.52	Horizontal
7386.000	8.94	35.96	39.72	43.03	48.21	74	-25.79	Horizontal
9848.000	9.78	37.54	37.58	41.16	50.90	74	-23.10	Horizontal
11752.600	11.11	38.66	38.17	40.82	52.42	74	-21.58	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.



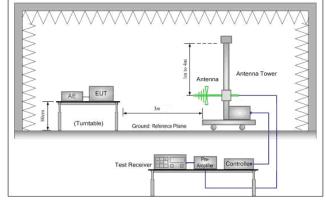
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## 5.9 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205						
Test Method:	ANSI C63.10 2009						
Test Site:	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:							





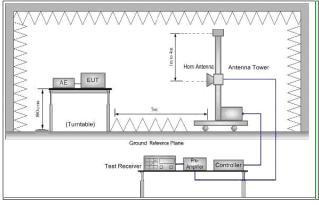


Figure 1. 30MHz to 1GHz

Figure 2. Above 1 GHz



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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. Repeat above procedures until all frequencies measured was complete.  Exploratory Test Mode:  Transmitting 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);  Only the worst case is recorded in the report.  Refer to section 4.10 for details		
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. Repeat above procedures until all frequencies measured was complete.  Exploratory Test Mode:  Transmitting 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);  Only the worst case is recorded in the report.	Test Procedure:	the ground at a 3 meter semi-anechoic camber. The table was rotated
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. Repeat above procedures until all frequencies measured was complete.  Exploratory Test Mode:  Transmitting mode  Exploratory 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);  Only the worst case is recorded in the report.		antenna, which was mounted on the top of a variable-height antenna
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. Repeat above procedures until all frequencies measured was complete.  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);  Only the worst case is recorded in the report.  Refer to section 4.10 for details		ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make
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. Repeat above procedures until all frequencies measured was complete.  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);  Only the worst case is recorded in the report.  Instruments Used: Refer to section 4.10 for details		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
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. Repeat above procedures until all frequencies measured was complete.  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);  Only the worst case is recorded in the report.  Instruments Used: Refer to section 4.10 for details		
h. Repeat above procedures until all frequencies measured was complete.  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);  Only the worst case is recorded in the report.  Instruments Used: Refer to section 4.10 for details		transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for
complete.  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);  Only the worst case is recorded in the report.  Instruments Used: Refer to section 4.10 for details		g. Test the EUT in the lowest channel, the Highest channel
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);  Only the worst case is recorded in the report.  Instruments Used:  Refer to section 4.10 for details		· · · · · · · · · · · · · · · · · · ·
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	Exploratory Test Mode:	Transmitting mode
case of 802.11n(HT20); Only the worst case is recorded in the report.  Instruments Used: Refer to section 4.10 for details	Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b;
Instruments Used: Refer to section 4.10 for details		
		Only the worst case is recorded in the report.
Test Results: Pass	Instruments Used:	Refer to section 4.10 for details
	Test Results:	Pass

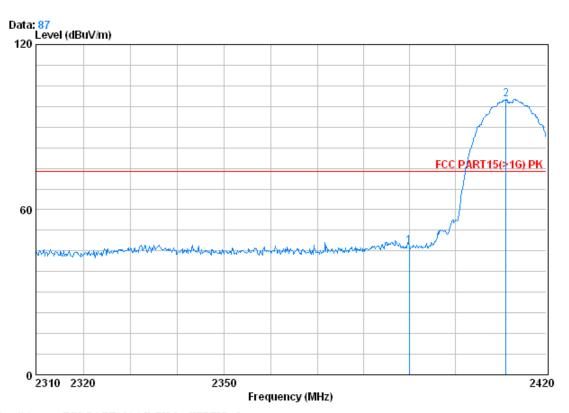


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## Test plot as follows:

Worse case mode: 802.11b Test channel: Lowest Remark: Peak Vertical



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

Job No. : 2719RF Mode : 2412 B

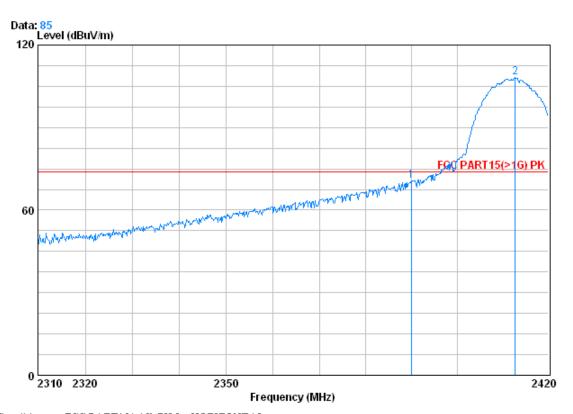
		Freq		Antenna Factor	•			Limit Line	Over Limit
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1		2390.000	2.98	32.51	39.85	50.96	46.60	74.00	-27.40
2 :	X	2411.090	2.99	32.54	39.86	104.39	100.06	74.00	26.06



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Worse case mode: 802.11b Test channel: Lowest Remark: Peak Horizontal



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

Job No. : 2719RF Mode : 2412 B

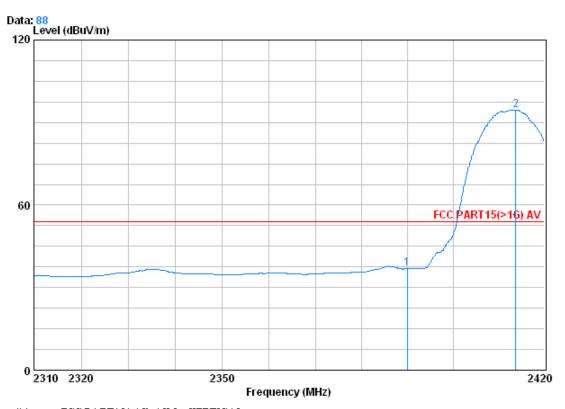
	Freq			Preamp Rea Factor Leve			Limit Line		
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 2 0	2389.970 2412.740						74.00 74.00		



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Worse case mode: 802.11b Test channel: Lowest Remark: Average Vertical



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

Job No. : 2719RF Mode : 2412 B

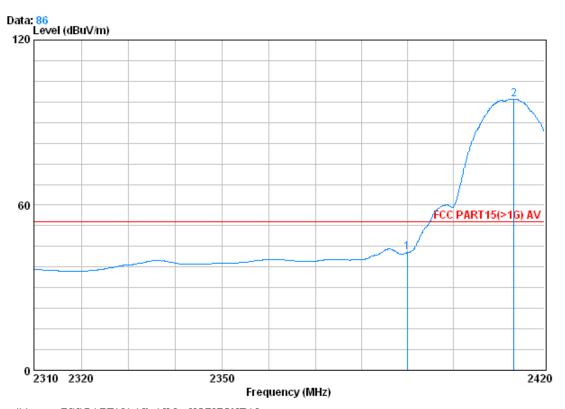
. 2 12.	Freq			Preamp Factor			Limit Line	
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 2 @	2390.000	2.98	32.51	39.85	41.33	36.98	54.00	-17.02



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



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

Job No. : 2719RF Mode : 2412 B

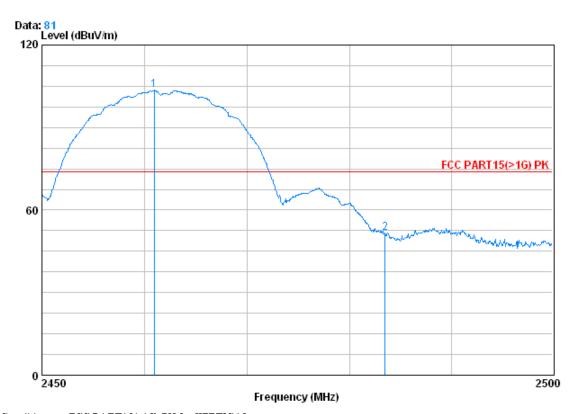
		Cablei	Antenna	Preamp	Read		Limit	Over
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2390.000	2.98	32.51	39.85	47.17	42.81	54.00	-11.19
2 0	2413.290	2.99	32.54	39.86	102.82	98.49	54.00	44.49



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Worse case mode: 802.11b Test channel: Highest Remark: Peak Vertical



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

Job No. : 2719RF Mode : 2462 B

	Freq		Antenna Factor	•			Limit Line	Over Limit	
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 0	2460.900 2483.500								

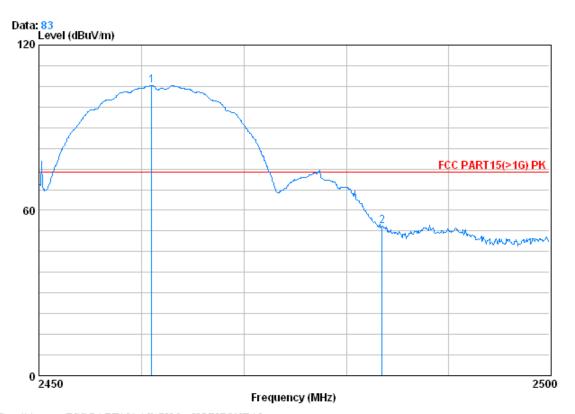




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Worse case mode: 802.11b Test channel: Highest Remark: Peak Horizontal



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

Job No. : 2719RF Mode : 2462 B

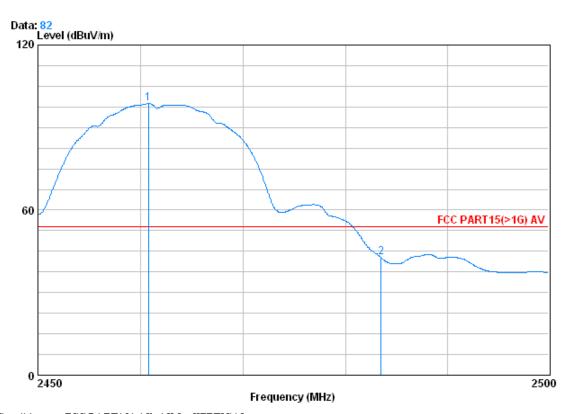
	Freq		Antenna Factor	•				Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 0 2	2460.950 2483.500							31.36 -19.70



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Worse case mode: 802.11b Test channel: Highest Remark: Average Vertical



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

Job No. : 2719RF Mode : 2462 B

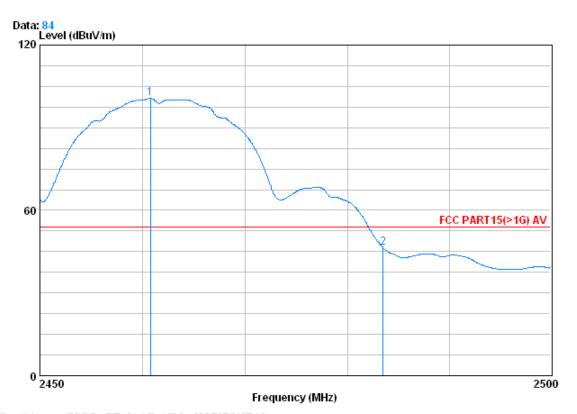
		Freq		Antenna Factor	•			Limit Level Line	
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	0	2460.750	3.02	32.64	39.91	102.98	98.74	54.00	44.74
2		2483.500	3.03	32.67	39.92	47.03	42.81	54.00	-11.19



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Worse case mode: 802.11b Test channel: Highest Remark: Average Horizontal



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

Job No. : 2719RF Mode : 2462 B

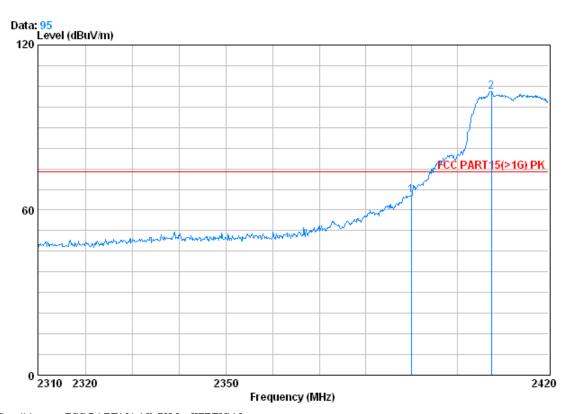
	. 2-02 D	Freq			•	Read Level		Limit Line	Over Limit
	-	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 @ 2		2460.750 2483.500						54.00 54.00	



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Worse case mode: 802.11g Test channel: Lowest Remark: Peak Vertical



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

Job No. : 2719RF Mode : 2412 G

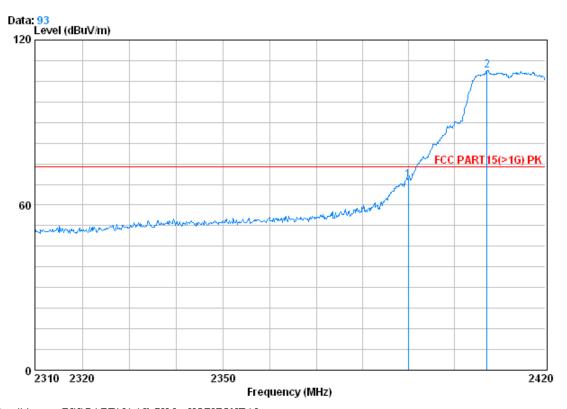
	Freq		Antenna Factor	-			Limit Line		
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 2 X	2390.000 2407.460						74.00 74.00		



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Worse case mode: 802.11g Test channel: Lowest Remark: Peak Horizontal



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

Job No. : 2719RF Mode : 2412 G

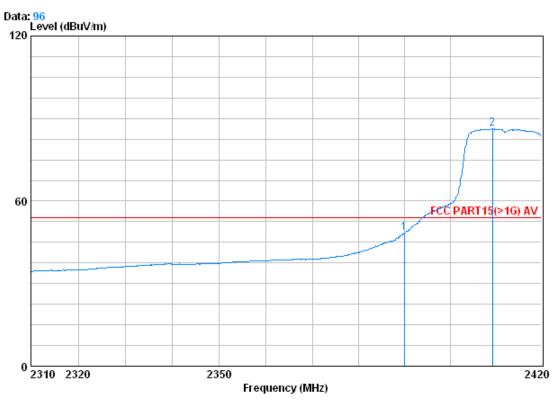
			Cable	Antenna	Preamp	Read		Limit	Over
		Freq	Loss	Factor	Factor	Level	Level	Line	Limit
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1		2390.000	2.98	32.51	39.85	73.22	68.86	74.00	-5.14
2	0	2407.130	2.99	32.54	39.86	113.19	108.86	74.00	34.86



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Worse case mode: 802.11g Test channel: Lowest Remark: Average Vertical



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

Job No. : 2719RF Mode : 2412 G

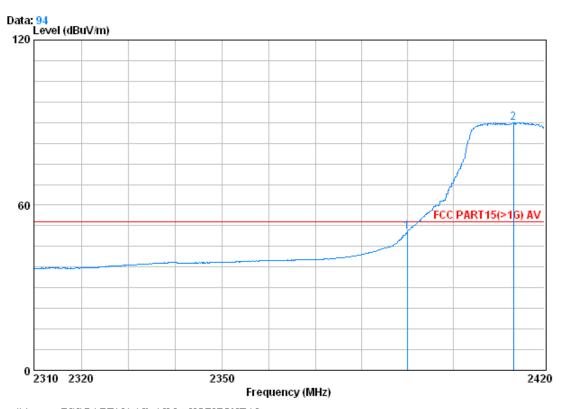
			CableAntenna		Preamp Read			Limit	Over
		Freq	Loss	Factor	Factor	Level	Level	Line	Limit
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
				,			,	,	
1		2390.000	2.98	32.51	39.85	52.68	48.32	54.00	-5.68
_	_								
2	Ø	2409.220	2.99	32.54	39.86	90.51	86.19	54.00	32.19



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Worse case mode: 802.11g Test channel: Lowest Remark: Average Horizontal



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

Job No. : 2719RF Mode : 2412 G

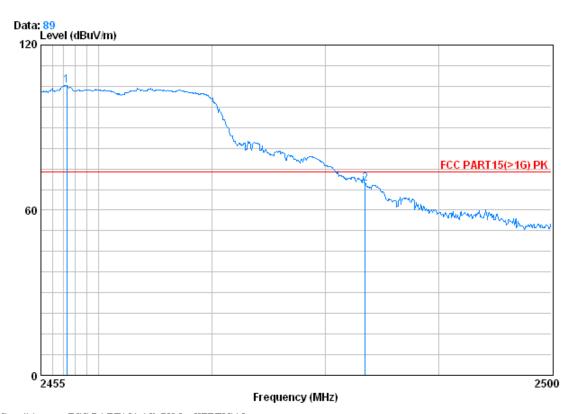
			Cable	Antenna	Preamp	Read		Limit	Over
		Freq	Loss	Factor	Factor	Level	Level	Line	Limit
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1		2389.970	2.98	32.51	39.85	54.86	50.50	54.00	-3.50
2	0	2413.180	2.99	32.54	39.86	94.21	89.88	54.00	35.88



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



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

Job No. : 2719RF Mode : 2462 G

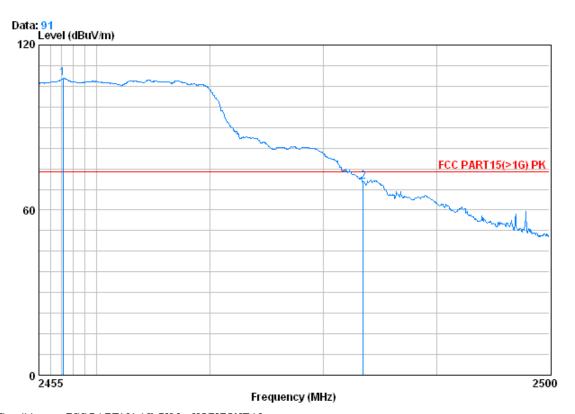
		Freq	CableAntenna Preamp Freq Loss Factor Factor						Limit Line	Over Limit	
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	0	2457.250 2483.500						74.00 74.00			



Report No.: SZEM140500271901

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Worse case mode: 802.11g Test channel: Highest Remark: Peak Horizontal



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

Job No. : 2719RF Mode : 2462 G

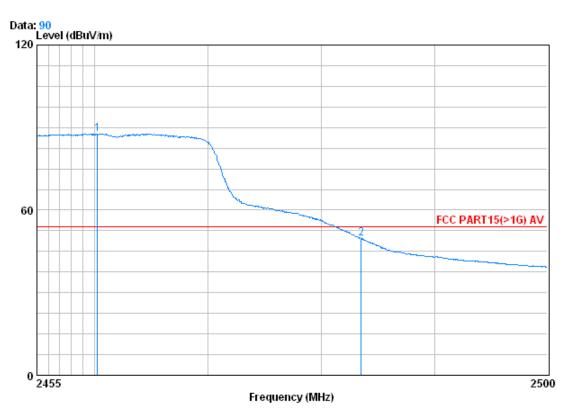
		Freq		Antenna Factor	•			Limit Line	Over Limit	
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	0	2457.115 2483.485								



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Worse case mode: 802.11g Test channel: Highest Remark: Average Vertical



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

Job No. : 2719RF Mode : 2462 G

	. 2 102 0	Freq			Preamp Factor			Limit Line	Over Limit
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 0	!	2460.310						54.00	
2		2483.500	3.03	32.67	39.92	53.83	49.61	54.00	-4.39

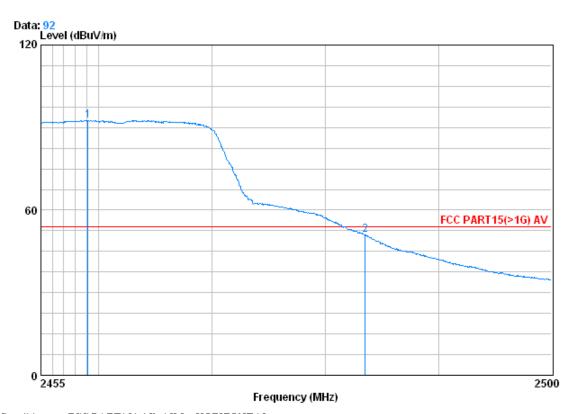




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Worse case mode: 802.11g Test channel: Highest Remark: Average Horizontal



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

Job No. : 2719RF Mode : 2462 G

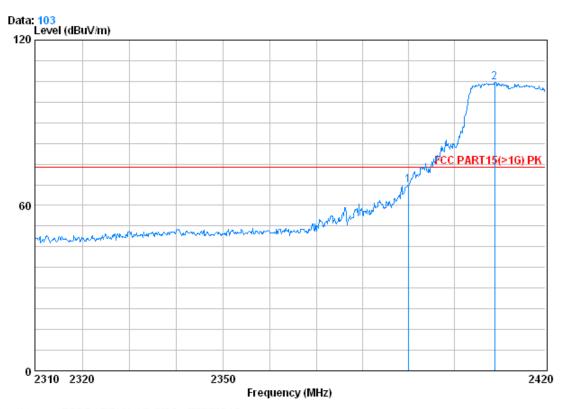
		Freq			Preamp Factor			Limit Line	Over Limit
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	0	2459.095 2483.485						54.00 54.00	



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



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

Job No. : 2719RF Mode : 2412 N

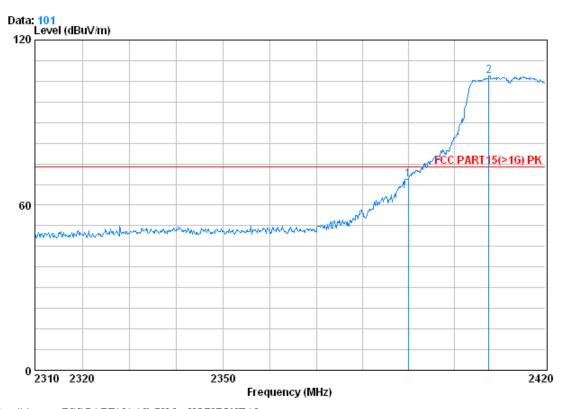
			CableAntenna P		Preamp	Read		Over	
		Freq	Loss	Factor	Factor	Level	Level	Line	Limit
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
								,	
1		2390.000	2.98	32.51	39.85	71.67	67.32	74.00	-6.68
_									
2	0	2408.890	2.99	32.54	39.86	108.94	104.61	74.00	30.61



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



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

Job No. : 2719RF Mode : 2412 N

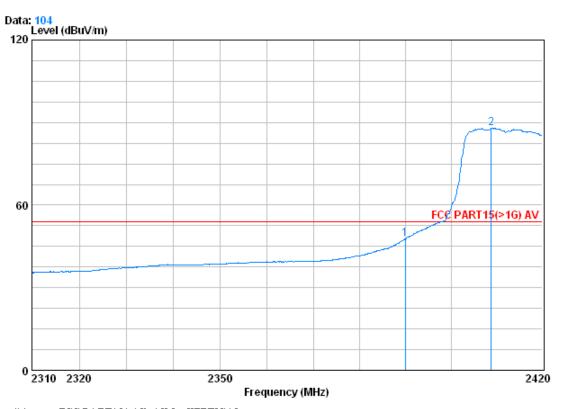
			Cablei	lntenna	Preamp	Read		Limit	Over
		Freq	Loss	Factor	Factor	Level	Level	Line	Limit
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1		2390.000	2.98	32.51	39.85	73.83	69.47	74.00	-4.53
2	0	2407.570	2.99	32.54	39.86	111.36	107.03	74.00	33.03



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Worse case mode: | 802.11 n(HT20) | Test channel: | Lowest | Remark: | Average | Vertical



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

Job No. : 2719RF Mode : 2412 N

			CableÀntenna P		Preamp	o Read I		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	52.20	47.84	54.00	-6.16
2	0	2408.780	2.99	32.54	39.86	92.23	87.90	54.00	33.90



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



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

Job No. : 2719RF Mode : 2412 N

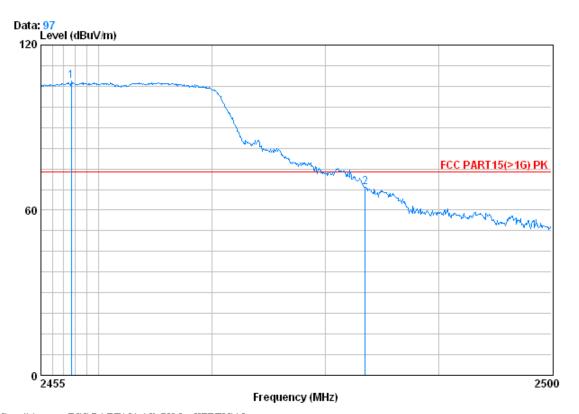
	. ==	Freq			Preamp Factor			Limit Line	
		MHz	dB	dB/m	dB	dBuV	dBuV/m	$\overline{\text{dBuV/m}}$	dB
1 2 (	<u>a</u>	2390.000 2413.620			39.85 39.86				



Report No.: SZEM140500271901

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



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

Job No. : 2719RF Mode : 2462 N

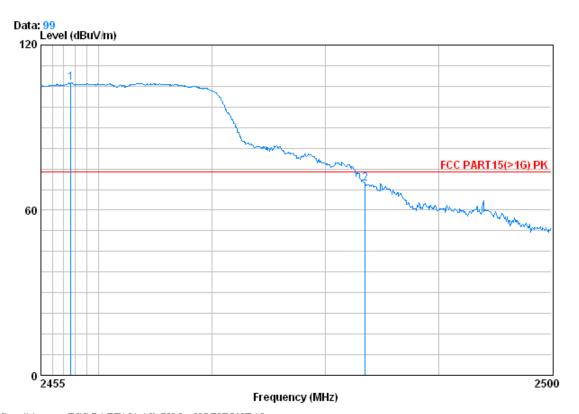
	Freq	CableAntenna Preamp Freq Loss Factor Factor		-			Limit Line	Over Limit	
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 0 2	2457.655 2483.500						74.00 74.00		



Report No.: SZEM140500271901

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



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

Job No. : 2719RF Mode : 2462 N

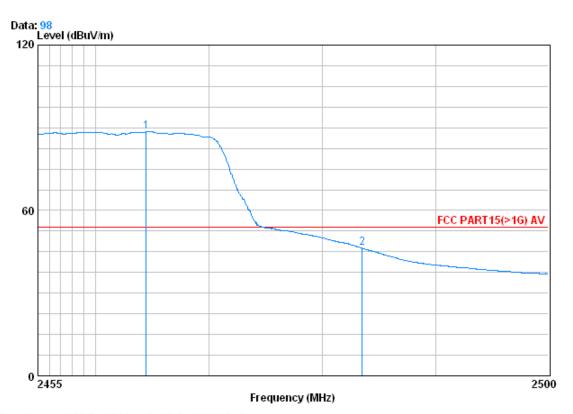
	CableAntenna Pream Freq Loss Factor Factor						Limit Line	Over Limit	
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 0 2	2457.610 2483.500						74.00 74.00		



Report No.: SZEM140500271901

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Worse case mode: | 802.11 n(HT20) | Test channel: | Highest | Remark: | Average | Vertical



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

Job No. : 2719RF Mode : 2462 N

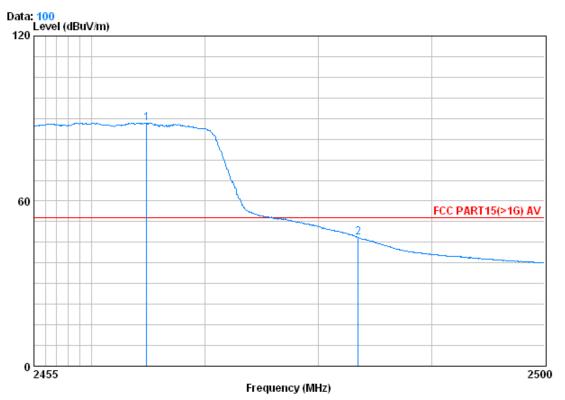
·10 ·40	. 2-102 11	Freq			Preamp Factor			Limit Line	
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	——dB
1 0		2464.495 2483.500							



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



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

Job No. : 2719RF Mode : 2462 N

	. 2-102 11	Freq			Preamp Factor			Limit Line	Over Limit
		MHz	dB	dB/m	dB	dBuV	dBuV/m	$\overline{\text{dBuV/m}}$	dB
1 0		2464.855	3.02	32.64	39.91	92.67	88.43	54.00	34.43
2		2483.500	3.03	32.67	39.92	51.03	46.81	54.00	-7.19

#### 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