

**SGS-CSTC Standards  
Technical Services  
(Shanghai)Co., Ltd.**

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Report No.: SHEM110700097301  
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## **TEST REPORT**

**Application No. :** SHEM110700097301

**Applicant:** Panasonic Mobile Communications CO., LTD.

**FCC ID:** UCE211044A

**Fundamental Frequency :** 2.4GHz ISM Band

**Equipment Under Test (EUT):**

Name: WCDMA Digital Mobile Phone

Model No.: EB-4052

Serial number: D26B729N3351233

**Standards:** FCC PART 15 SUBPART C, Section 15.247

**Date of Receipt:** Jul. 28, 2011

**Date of Test:** Aug. 03, 2011 to Oct 10, 2011

**Date of Issue:** Oct 12, 2011

**Test Result :** **PASS \***

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



Jim Xu

E&E Section Head



Zenger Zhang

E&E Project Engineer

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## 2 Test Summary

The customer requested FCC tests for a 2.4GHz transmitter.

Test	Test Requirement	Test Procedure	Result
AC Power Line Conducted Emission	FCC PART 15 Section 15.207(a)	ANSI C63.4,2003	PASS
Peak Output Power	FCC PART 15 Section 15.247(b)(3),(4)(c)	KDB 558074	PASS
6dB Bandwidth	FCC PART 15 Section 15.247(a)(2)	KDB 558074	PASS
Radiated Emission Band Edge	FCC PART 15 Section 15.247(d)	ANSI C63.4,2003 KDB 558074	PASS
Conducted Spurious Emission	FCC PART 15 Section 15.247(d)	KDB 558074	PASS
Radiated Spurious Emission	FCC PART 15 Section 15.247(d)&15.209	ANSI C63.4,2003 KDB 558074	PASS
Peak Power Density	FCC PART 15 Section 15.247(e)	ANSI C63.10,2009	PASS
Antenna Requirement	FCC PART 15 Section 15.203	N/A	PASS

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## **4 General Information**

### **4.1 Client Information**

Applicant : Panasonic Mobile Communications CO.,LTD.  
Applicant Address: 600 Saedo-cho,Tsuzuki-ku,Yokohama;224-8539,Japan  
Manufacturer: Shanghai Sunrise Simcom Limited  
Manufacturer Address: No.888 shengli RD. Qingpu district, SHANGHAI, China

### **4.2 Details of E.U.T.**

Name: WCDMA Digital Mobile Phone  
Model No.: EB-4052  
AC Adaptor (with USB cable): Model: P01(UHA)  
(Input :110-240V~ 50/60 Hz, 0.14A, Output : 5.0 VDC, 1.0A)  
(Cable Length:1.34m)  
Frequency Band : 2.4GHz ISM Band  
Spread Spectrum: IEEE 802.11b:DSSS  
IEEE 802.11g :OFDM  
IEEE 802.11n\_20MHz :OFDM  
Battery: Model: P25  
S/N:Unknown  
3.7V 1200mAh  
Hardware Version: V2.2  
Software Version: ponyo-ginger-dcm-07-0033  
M7630A-ABBQMAZM-4.1.30T V0.25  
Bluetooth support: V 2.1 (EDR)  
WiFi support: 802.11 b/g/n

### **4.3 Description of Support Units**

None

### **4.4 Test Location**

Tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.  
No.588 West Jindu Road, Songjiang District, Shanghai, China. 201612.

Tel: +86 21 6191 5666 Fax: +86 21 6191 5655

No tests were sub-contracted.

#### **4.5 Test Software and program for test mode**

Setup transmitting mode by the software “android” and “test\_tool” these were supplied by the client.

#### **4.6 Other Information Requested by the Customer**

None.

#### **4.7 Test Facility**

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

- CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. 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. Date of expiry: 2014-07-26.

- FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683, Expiry Date: 2012-03-17.

- Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A. Expiry Date: 2011-09-29.

- VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-3172 and C-3514 respectively. Date of Registration: 2009-11-30.

Date of Expiry: 2012-03-17.

## 5 Test Results

### 5.1 Test Instruments

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due date
1	EMI test receiver	Rohde & Schwarz	ESU40	100109	2011-6-4	2012-6-3
2	Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-679	2011-6-4	2012-6-3
3	Horn Antenna	Rohde & Schwarz	HF906	100284	2011-3-12	2012-3-10
4	ANTENNA	SCHWARZBECK	VULB9168	9168-313	2011-6-4	2012-6-3
5	Ultra broadband antenna	Rohde & Schwarz	HL562	100227	2010-10-9	2011-10-8
6	Atmosphere pressure meter	Shanghai ZhongXuan Electronic Co;Ltd	BY-2003P	--	2010-10-15	2011-10-14
7	CLAMP METER	FLUKE	316	86080010	2011-04-22	2012-04-20
8	Thermo-Hygrometer	ZHICHEN	ZC1-2	01050033	2010-10-15	2011-10-14
9	High-low temperature cabinet	Shanghai YuanZhen	GW2050	--	2011-6-17	2012-6-16
10	DC power	KIKUSUI	PMC35-3	NF100260	2011-1-16	2012-1-15
11	Tunable Notch Filter	Wainwright instruments GmbH	WRCT1800.0/2000.0-0.2/40-5SSK	11	2011-1-26	2012-1-25
12	Tunable Notch Filter	Wainwright instruments GmbH	WRCT800.0/88.0-0.2/40-5SSK	9	2011-1-26	2012-1-25
13	High pass Filter	FSCW	HP 12/2800-5AA2	19A45-02	2011-4-8	2012-4-7
14	Low nosie amplifier	TESEQ	LNA6900	70133	2011-7-6	2012-7-5
15	EMI test receiver	Rohde & Schwarz	ESCS30	100086	2011-06-04	2012-06-03
16	Line impedance stabilization network	SCHWARZBECK	NSLK8127	8127-490	2011-05-07	2012-05-06

## **5.2 E.U.T. Operation**

Input voltage: Input :100-240V~ 50-60 Hz, 0.14A, Output : DC 5.0 VDC, 1.0A

Operating Environment:

Temperature:	25.0 °C
Humidity:	45 % RH
Atmospheric Pressure:	1010 mbar

EUT Operation:

The EUT has been tested under operating condition.

Test program was used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

802.11 b mode:Channel low (2412MHz) mid(2437MHz) high(2462MHz) with the worst case 1Mbps date rate was report for radiated spurious emission.

802.11 g mode:Channel low (2412MHz) mid(2437MHz) high(2462MHz) with the worst case 6Mbps date rate was report for radiated spurious emission.

802.11 n mode:Channel low (2412MHz) mid(2437MHz) high(2462MHz) with the worst case MCS0\_GI800ns date rate was report for radiated spurious emission.

## **5.3 Test Procedure & Measurement Data**

### **5.3.1 Antenna Requirement**

**Test Requirement:** FCC Part15 15.203

**Measurement Distance:** 3m (Semi-Anechoic Chamber)

**Requirements:** An intentional radiator shall be designed to ensure that no antenna other than 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 shall be considered sufficient to comply with the provisions of this section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219 or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

**FCC Rules  
(Section15.203)**

Described how the EUT complies with the requirement that either its antenna is permanently attached, or that it employs a unique antenna connector, for every antenna proposed for use with the EUT.

The exception in those cases where EUT must be professionally installed. In order to demonstrate that professional installation is required, the following 3 points must be addressed:

- The application (or intended use) of the EUT
- The installation requirements of the EUT
- The method by which the EUT will be marketed

**Conclusion**

The directional gains of antenna used for transmitting is -2.37 dBi, The RF transmitter uses an integrated antenna without connector.

### **5.3.2 Conducted Emission Test**

**Test Requirement:** FCC Part15 15.207

**Test date:** Aug. 10, 2011

**Standard Applicable** According to section 15.207, frequency 150KHz to 30MHz shall not exceed the limit table as below.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

#### **EUT Setup**

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4-2003.
2. EUT is charged with adapter plug-in LISN.
3. The LISN was connected with 120V AC/60Hz power source.

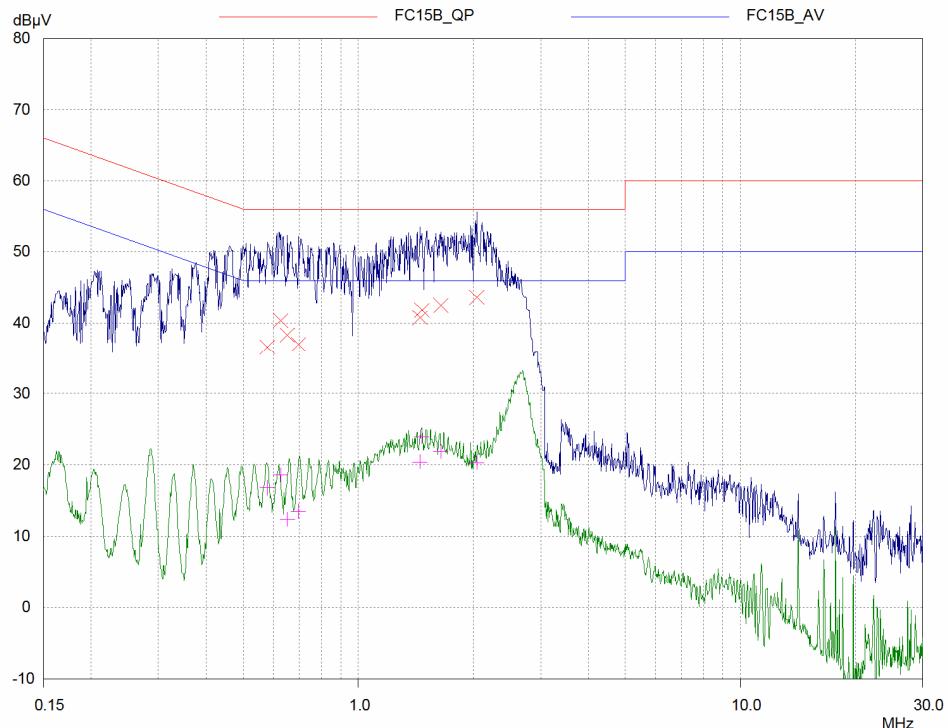
#### **Measurement Result**

Operation mode: Normal Link Mode

Note: All test modes have been tested.

Below is the worst case in 802.11g mode.

**L line:**

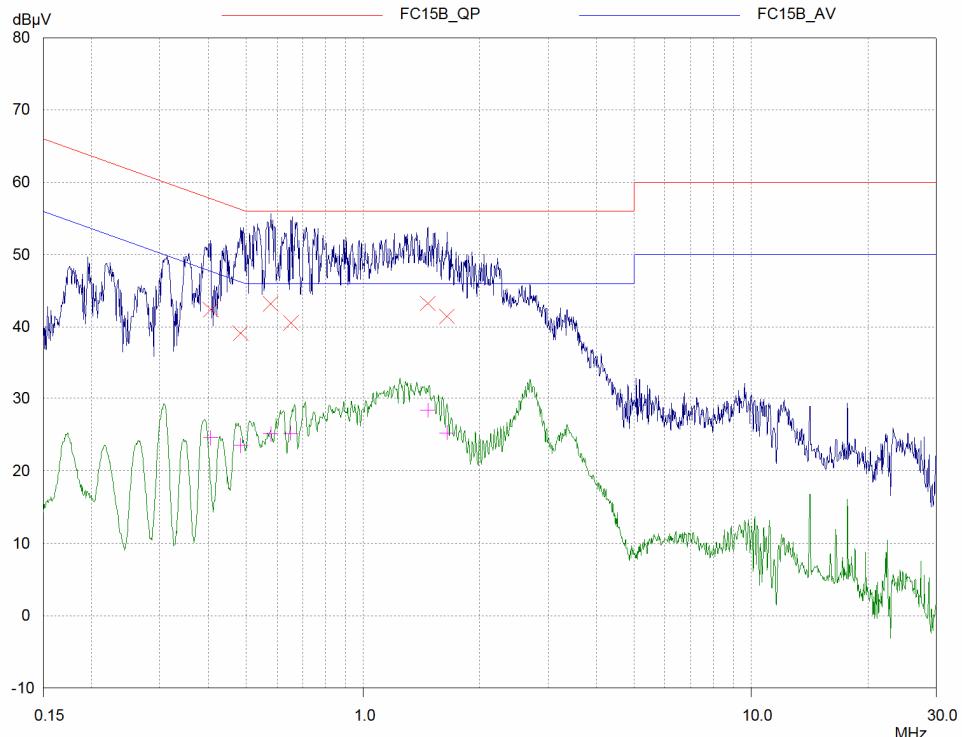


**Final Measurement Results**

Frequency MHz	QP Level dB $\mu$ V	QP Limit dB $\mu$ V	QP Dev dB
0.57821	36.58	56.00	19.42
0.62626	40.38	56.00	15.62
0.65177	38.32	56.00	17.68
0.69754	36.98	56.00	19.02
1.44823	40.74	56.00	15.26
1.46568	41.84	56.00	14.16
1.64557	42.48	56.00	13.52
2.04145	43.60	56.00	12.40

Frequency MHz	AV Level dB $\mu$ V	AV Limit dB $\mu$ V	AV Dev dB
0.57821	16.73	46.00	29.27
0.62626	18.57	46.00	27.43
0.65177	12.34	46.00	33.66
0.69754	13.43	46.00	32.57
1.44823	20.36	46.00	25.64
1.46568	23.90	46.00	22.10
1.64557	21.84	46.00	24.16
2.04145	20.30	46.00	25.70

**N Line:**



**Final Measurement Results**

Frequency MHz	QP Level dB $\mu$ V	QP Limit dB $\mu$ V	QP Delta dB
0.4053	42.42	57.74	15.32
0.48313	39.16	56.29	17.13
0.57821	43.24	56.00	12.76
0.65177	40.58	56.00	15.42
1.46568	43.28	56.00	12.72
1.64557	41.52	56.00	14.48

Frequency MHz	AV Level dB $\mu$ V	AV Limit dB $\mu$ V	AV Delta dB
0.4053	24.59	47.74	23.15
0.48313	23.53	46.29	22.76
0.57821	25.10	46.00	20.90
0.65177	25.22	46.00	20.78
1.46568	28.43	46.00	17.57
1.64557	25.29	46.00	20.71

### **5.3.3 Peak Output Power Measurement**

<b>Test Requirement:</b>	FCC Part 15 15.247(a)(2),(b)
<b>Test date</b>	Aug 11, 2011
<b>Standard Applicable:</b>	<p>According to section 15.247(a)(2),(b)</p> <p>(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.</p> <p>(4) 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.</p> <p>(c) Operation with directional antenna gains greater than 6 dBi.</p> <p>(1) Fixed point-to-point operation:</p> <p>(i) Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.</p> <p>(ii) Systems operating in the 5725-5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power.</p>
<b>Measuremet Produc</b>	<ol style="list-style-type: none"><li>1. Place the EUT on the table and set it in transmitting mode.</li><li>2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum.</li><li>3. Set the occur band to the entire emission bandwidth of the signal.</li><li>4. Record the max.channel power reading</li><li>5. Repeat above procedures until all the frequency measured were complete.</li></ol>

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**Measurement Result:**

The test was performed with 802.11b, the data was shown the worst case 802.11b 1Mbps.

CH	Frequency (MHz)	Reading Peak Power(dBm)	Cable Loss (dB)	Output Peak Power (dBm)	Limit (dBm)	Result
LOW	2412	12.81	1.3	14.11	30	PASS
MID	2437	13.32	1.3	14.62	30	PASS
HIGH	2462	14.26	1.3	15.56	30	PASS

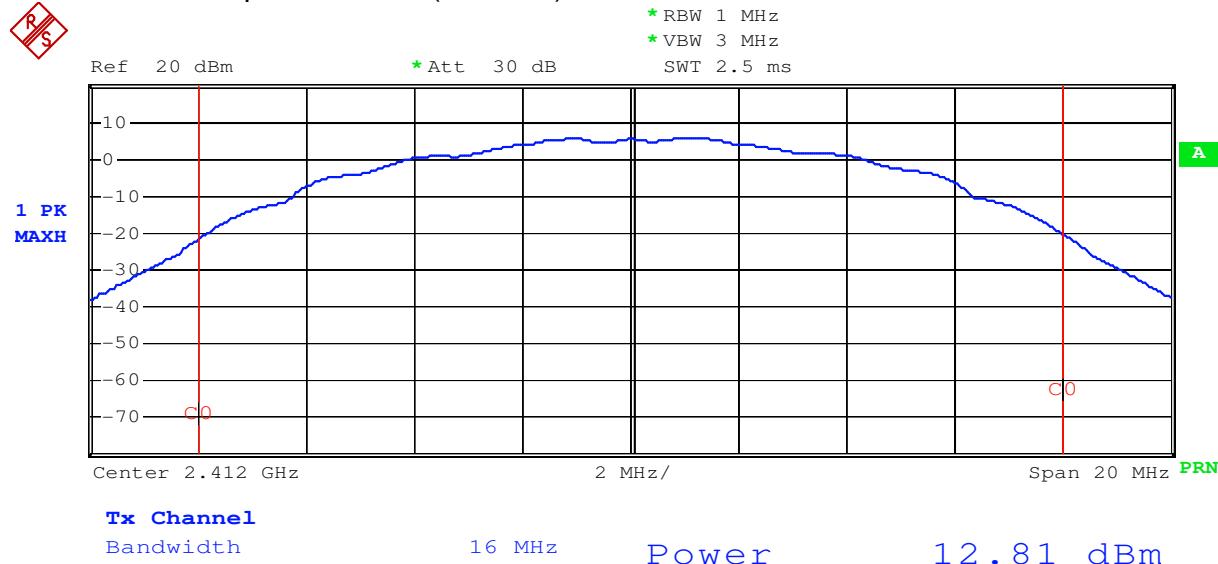
The test was performed with 802.11g, the data was shown the worst case 802.11g 6Mbps.

CH	Frequency (MHz)	Reading Peak Power(dBm)	Cable Loss (dB)	Output Peak Power (dBm)	Limit (dBm)	Result
LOW	2412	18.36	1.3	19.66	30	PASS
MID	2437	19.05	1.3	20.35	30	PASS
HIGH	2462	19.82	1.3	21.12	30	PASS

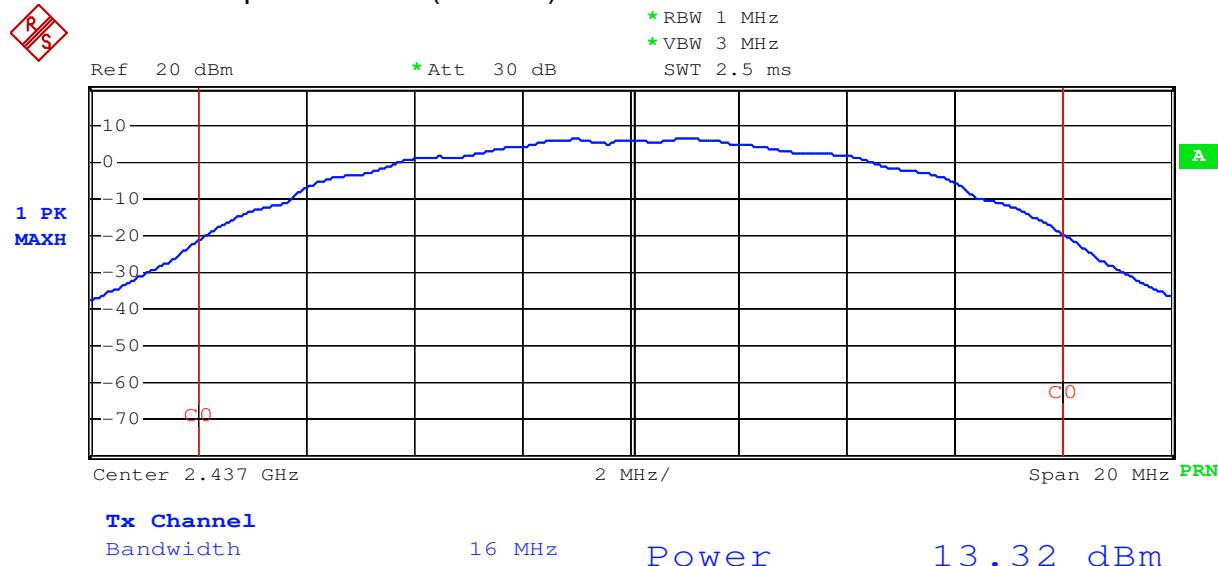
The test was performed with 802.11n\_20MHz, the data was shown the worst case 802.11n 6.5Mbps.

CH	Frequency (MHz)	Reading Peak Power(dBm)	Cable Loss (dB)	Output Power (dBm)	Limit (dBm)	Result
LOW	2412	18.35	1.3	19.65	30	PASS
MID	2437	18.86	1.3	20.16	30	PASS
HIGH	2462	19.86	1.3	21.16	30	PASS

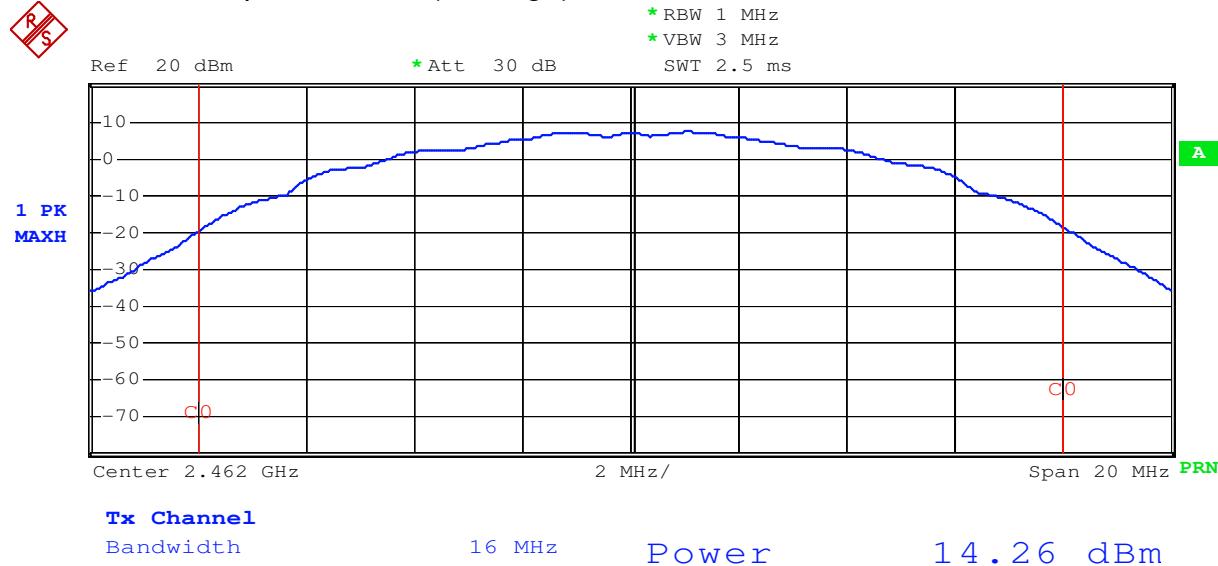
Peak Power Output Data Plot(CH Low)802.11b



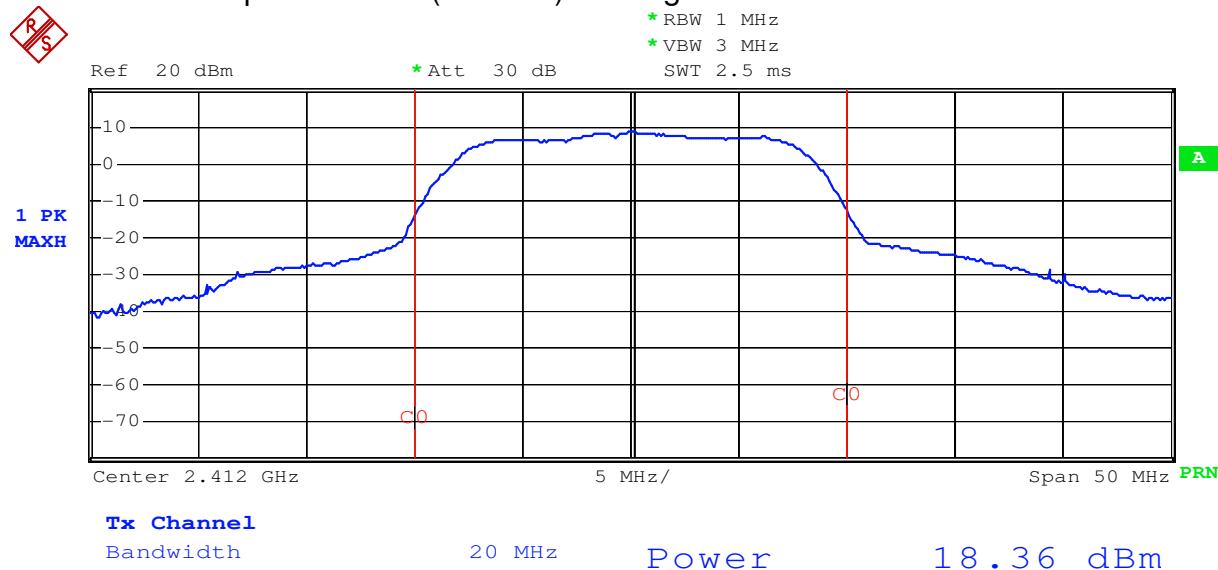
Peak Power Output Data Plot(CH Mid)802.11b



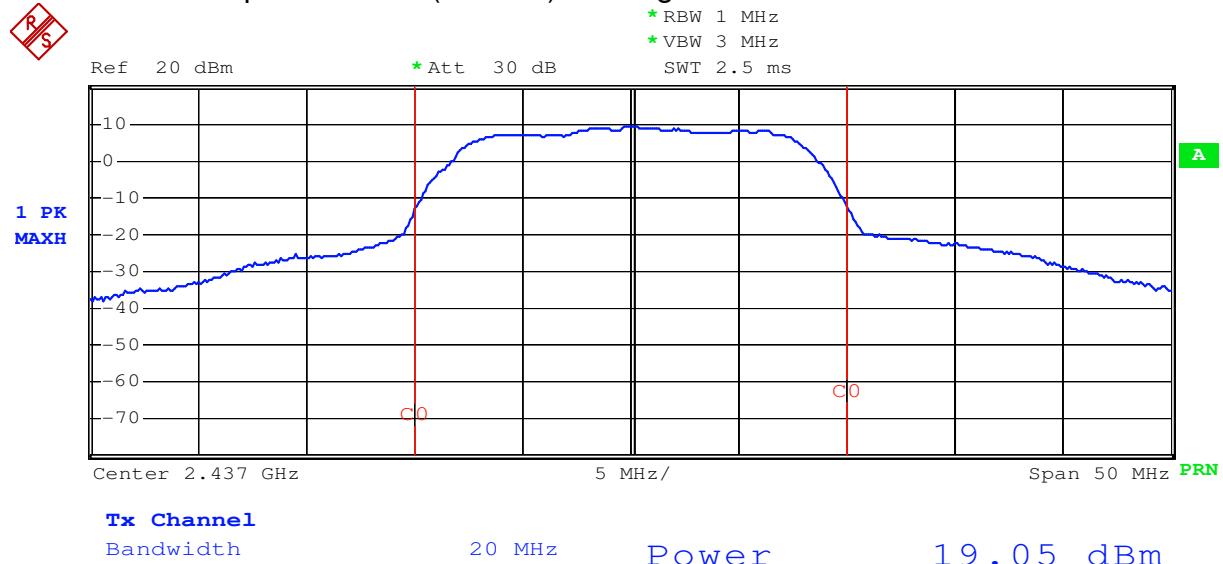
**Peak Power Output Data Plot(CH High)802.11b**



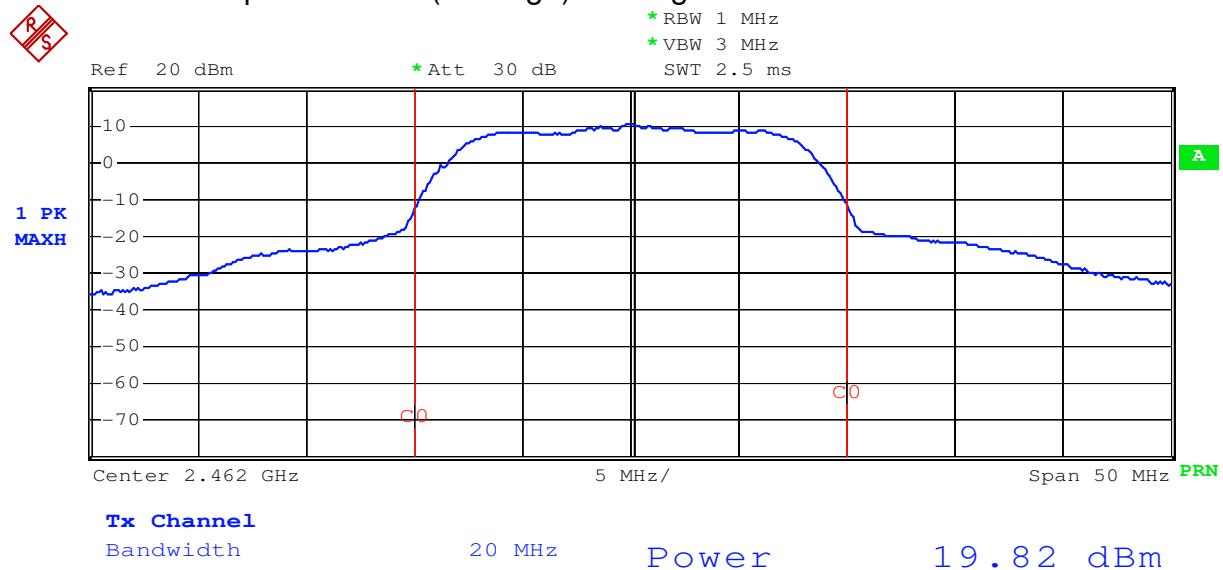
**Peak Power Output Data Plot(CH Low)802.11g**



**Peak Power Output Data Plot(CH Mid)802.11g**



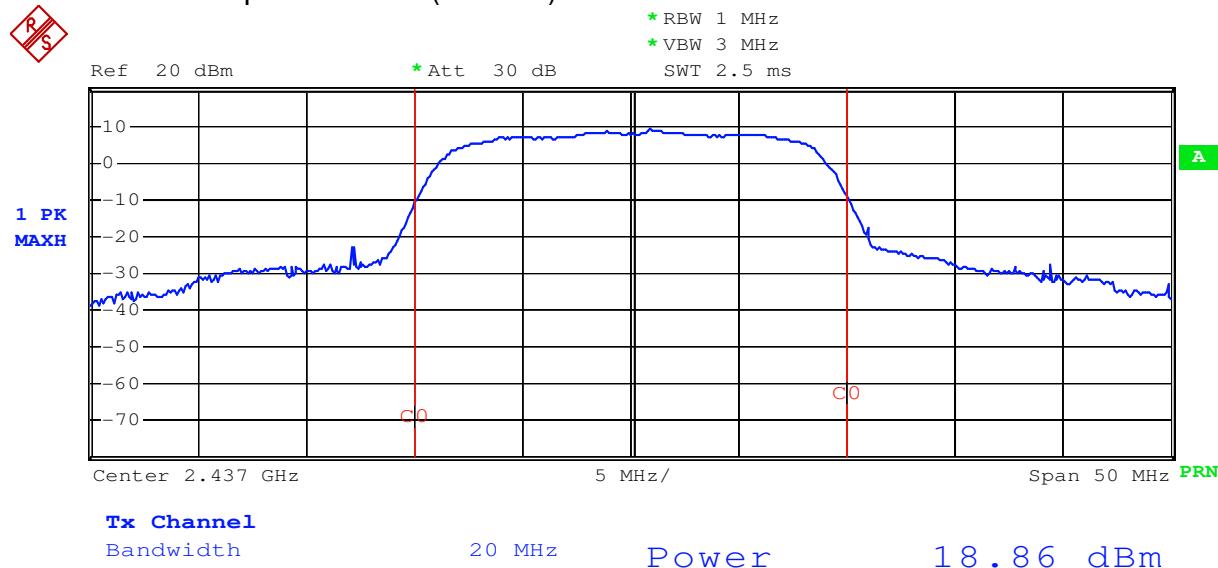
**Peak Power Output Data Plot(CH High)802.11g**



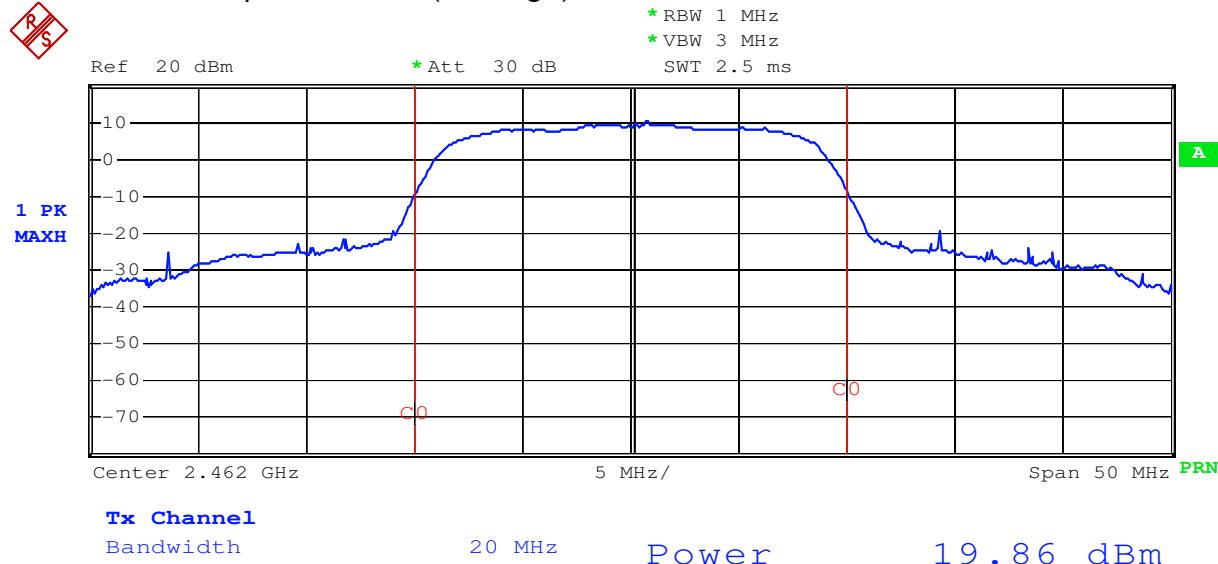
Peak Power Output Data Plot(CH Low)802.11n



Peak Power Output Data Plot(CH Mid)802.11n



Peak Power Output Data Plot(CH High)802.11n



### 5.3.4 6dB Bandwidth

<b>Test Requirement:</b>	FCC Part15 247(a)(2)
<b>Test date:</b>	Aug 11, Sep 22, and Sep 26, 2011
<b>Standard Applicable:</b>	According to section 15.247(a)(2), Systems using digital modulation techniques may operate in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands. The minimum 6dB bandwidth shall be at least 500KHz.
<b>Measurement Procedure:</b>	<ol style="list-style-type: none"> <li>1. Place the EUT on the table and set it in transmitting mode.</li> <li>2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.</li> <li>3. Set the spectrum analyzer as RBW=100KHz, VBW =3* RBW, Span=30/ 50MHz, Sweep=auto</li> <li>4. Mark the peak frequency and -6dB (upper and lower) frequency.</li> <li>5. Repeat above procedures until all frequency measured were complete.</li> </ol>

#### Measurement Result:

The test was performed with 802.11b, the data was shown the worst case 802.11b 1Mbps.

CH	Frequency (MHz)	Bandwidth (MHz)	Limit Bandwidth (KHz)	Result
LOW	2412	8.0	500	PASS
MID	2437	8.0	500	PASS
HIGH	2462	8.0	500	PASS

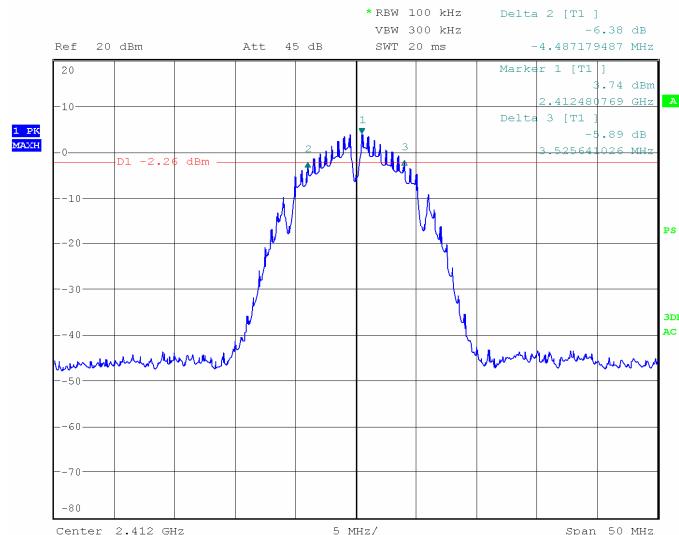
The test was performed with 802.11g, the data was shown the worst case 802.11g 6Mbps.

CH	Frequency (MHz)	Bandwidth (MHz)	Limit Bandwidth (KHz)	Result
LOW	2412	15.1	500	PASS
MID	2437	15.1	500	PASS
HIGH	2462	15.2	500	PASS

The test was performed with 802.11n\_20MHz, the data was shown the worst case 802.11n 6.5Mbps.

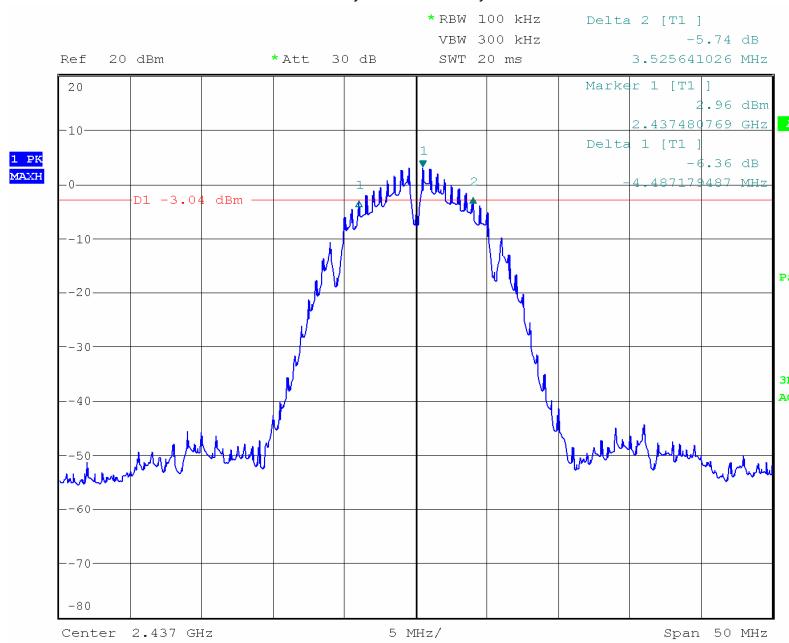
CH	Frequency (MHz)	Bandwidth (MHz)	Limit Bandwidth (KHz)	Result
LOW	2412	15.9	500	PASS
MID	2437	16.0	500	PASS
HIGH	2462	16.0	500	PASS

**6dB Band Width Test Data CH-Low,802.11b,1M mode**



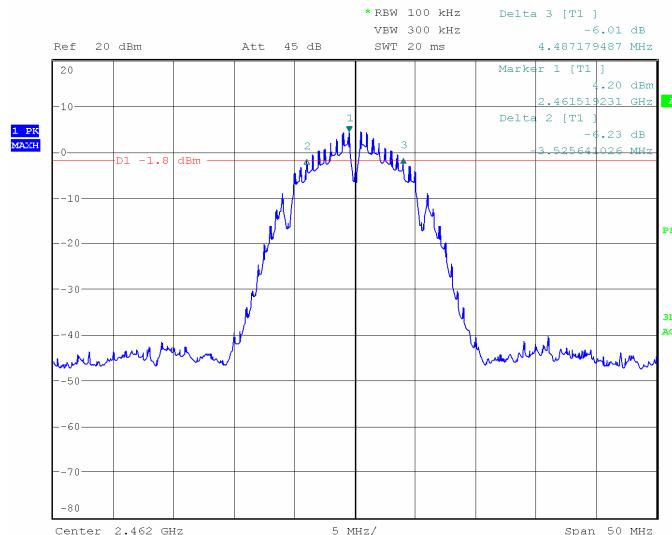
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**6dB Band Width Test Data CH-Mid,802.11b,1M mode**



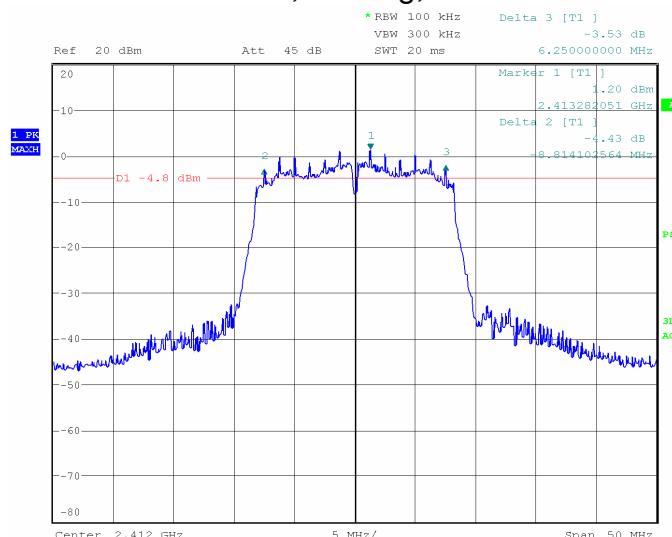
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**6dB Band Width Test Data CH-High,802.11b,1M mode**



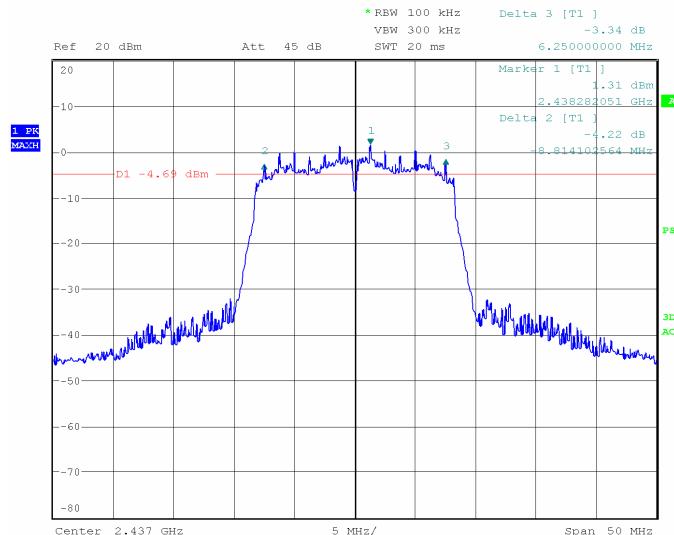
Date: 26.SEP.2011 20:47:23

**6dB Band Width Test Data CH-Low,802.11g,6M mode**



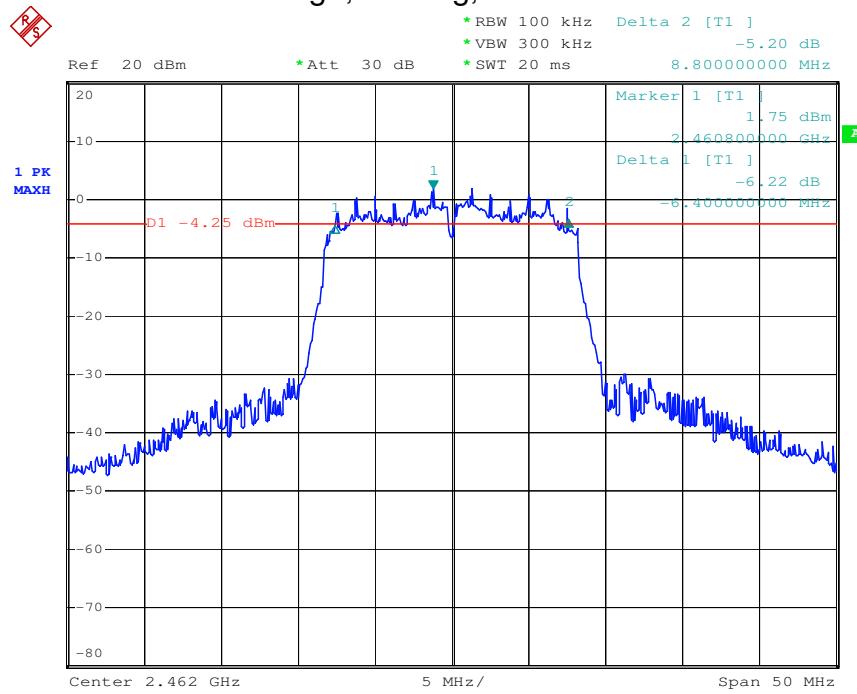
Date: 26.SEP.2011 20:53:47

**6dB Band Width Test Data CH-Mid,802.11g,6M mode**



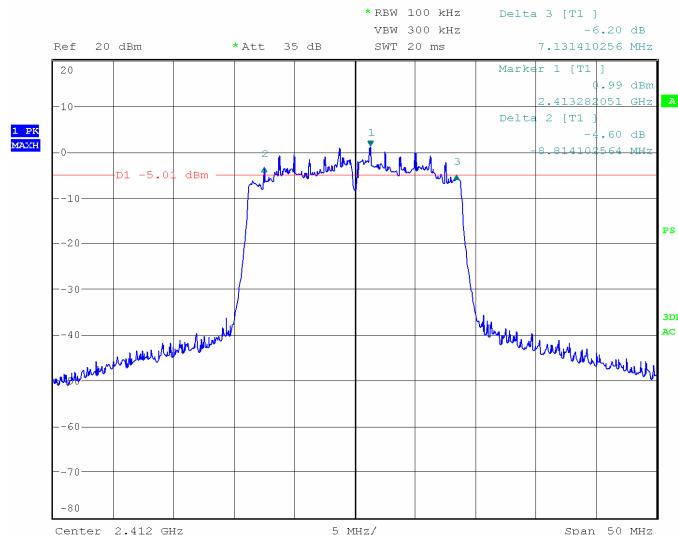
Date: 26.SEP.2011 20:55:29

**6dB Band Width Test Data CH-High,802.11g,6M mode**



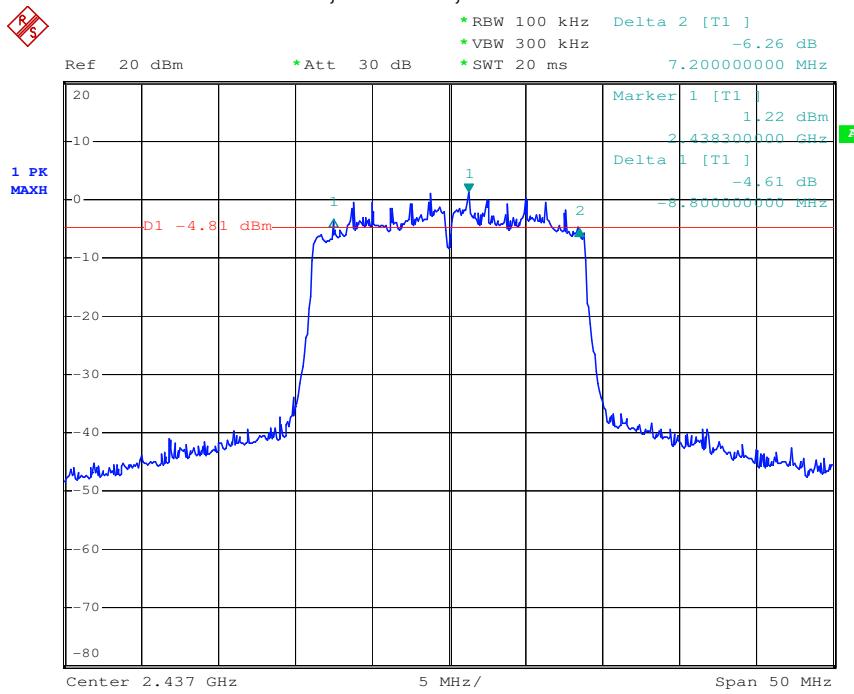
Date: 22.SEP.2011 16:27:56

**6dB Band Width Test Data CH-Low,802.11n,6.5M mode**



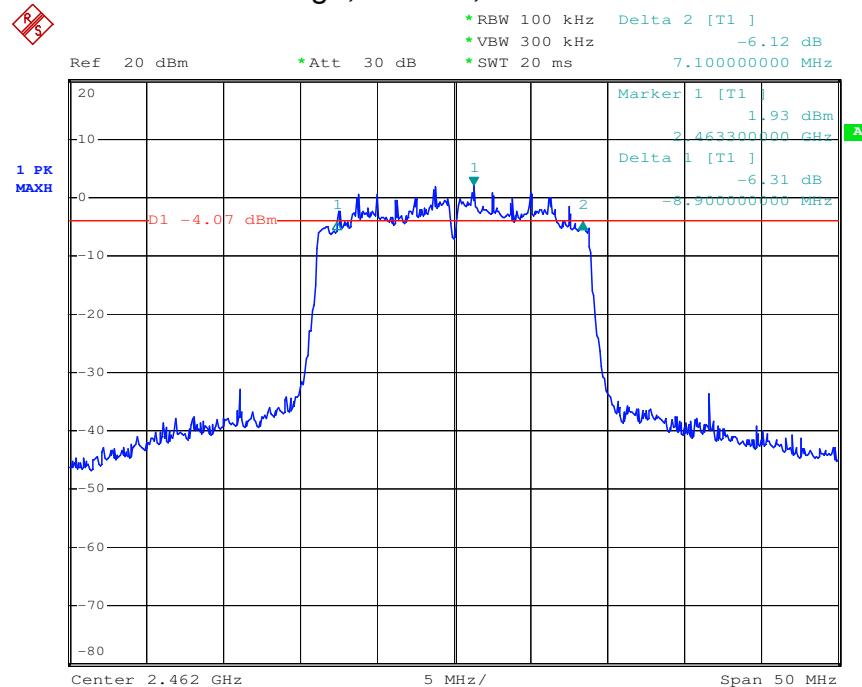
Date: 26.SEP.2011 21:06:05

**6dB Band Width Test Data CH-Mid,802.11n,6.5M mode**



Date: 22.SEP.2011 16:30:43

6dB Band Width Test Data CH-High,802.11n,6.5M mode

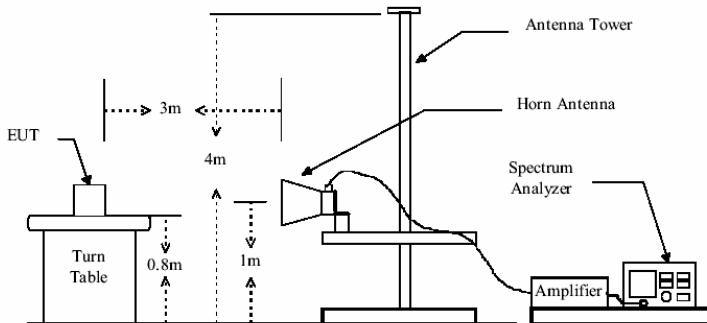


Date: 22.SEP.2011 16:35:35

### 5.3.5 Radiated Emission Band Edge

<b>Test Requirement:</b>	FCC Part15 247(c)
<b>Test date:</b>	Aug 11, 2011
<b>Standard Applicable:</b>	According to section 15.247(c),in any 100KHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in section 15.205(a), must also comply with the radiated emission limits specified in 15.209(a).
<b>Measurement Procedure:</b>	<p>The EUT was setup according to ANSI 63.4,2003 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47 CFR 15.247 requirements. The EUT is placed on a turn table which is 0.8 m above ground. The turn table is rotated 360 degrees to determine to the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C 63.4:2003 on radiated measurement.</p> <p>Spectrum analyzer parameters setting as shown below:</p> <ul style="list-style-type: none"> <li>(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO</li> <li>(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO</li> </ul>

#### Radiated Emission Test Set-up Frequency Over 1GHz



The field strength is calculated by adding the Antenna Factor, Preamplifier Factor & Cable Factor. 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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**Remark:** Factor= Antenna Factor+Cable Factor- Preamplifier Factor

**Measurement Result:**

**CH Low 802.11b Mode 1M**

**Horizontal, Peak Detector:**

Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2400	36.65	-10.04	26.61	74.00	47.39

**Horizontal, AV Detector:**

Frequency (MHz)	AV Reading (dBuV)	Factor (dB/m)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
2400	28.71	-10.04	18.67	54.00	35.33

**Vertical, Peak Detector:**

Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2400	39.25	-10.04	29.21	74.00	44.79

**Vertical, AV Detector:**

Frequency (MHz)	AV Reading (dBuV)	Factor (dB/m)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
2400	33.08	-10.04	23.04	54.00	30.96

**CH High 802.11b Mode 1M**

**Horizontal, Peak Detector:**

Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2483.5	41.43	-10.24	31.19	74.00	42.81

**Horizontal, AV Detector:**

Frequency (MHz)	AV Reading (dBuV)	Factor (dB/m)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
2483.50	33.31	-10.24	23.07	54.00	30.93

**Vertical, Peak Detector:**

Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2483.5	39.33	-10.24	29.09	74.00	44.91

**Vertical, AV Detector:**

Frequency (MHz)	AV Reading (dBuV)	Factor (dB/m)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
2483.5	32.25	-10.24	22.01	54.00	31.99

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**CH Low 802.11g Mode 6M**

**Horizontal, Peak Detector:**

Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2400.0	56.13	-10.04	46.09	74	27.91

**Horizontal, AV Detector:**

Frequency (MHz)	AV Reading (dBuV)	Factor (dB/m)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
2400.0	46.97	-10.04	36.93	54	17.07

**Vertical, Peak Detector:**

Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2400.0	57.00	-10.04	46.96	74	27.04

**Vertical, AV Detector:**

Frequency (MHz)	AV Reading (dBuV)	Factor (dB/m)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
2400.0	48.40	-10.04	38.36	54	15.64

**CH High 802.11g Mode 6M**

**Horizontal, Peak Detector:**

Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2483.5	50.87	-10.24	40.63	74	33.37

**Horizontal, AV Detector:**

Frequency (MHz)	AV Reading (dBuV)	Factor (dB/m)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
2483.50	41.13	-10.24	30.89	54	23.11

**Vertical, Peak Detector:**

Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2483.5	58.03	-10.24	47.79	74	26.21

**Vertical, AV Detector:**

Frequency (MHz)	AV Reading (dBuV)	Factor (dB/m)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
2483.5	50.14	-10.24	40.17	54	13.83

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**CH Low 802.11n\_20MHz Mode 6.5M**

**Horizontal, Peak Detector:**

Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2400.0	58.94	-10.04	48.90	74.00	25.1

**Horizontal, AV Detector:**

Frequency (MHz)	AV Reading (dBuV)	Factor (dB/m)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
2400.0	44.57	-10.04	34.53	54	19.47

**Vertical, Peak Detector:**

Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2400.0	54.70	-10.04	44.66	74	29.34

**Vertical, AV Detector:**

Frequency (MHz)	AV Reading (dBuV)	Factor (dB/m)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
2400.0	49.13	-10.04	39.09	54	14.91

**CH High 802.11n\_20MHz Mode 6.5M**

**Horizontal, Peak Detector:**

Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2483.5	46.4	-10.24	36.16	74	37.84

**Horizontal, AV Detector:**

Frequency (MHz)	AV Reading (dBuV)	Factor (dB/m)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
2483.50	39.08	-10.24	28.84	54	25.16

**Vertical, Peak Detector:**

Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2483.5	55.14	-10.24	44.90	74	29.1

**Vertical, AV Detector:**

Frequency (MHz)	AV Reading (dBuV)	Factor (dB/m)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
2483.5	52.78	-10.24	42.54	54	11.46

### **5.3.6                   Conducted Spurious Emission Test**

**Test Requirement:**                   FCC Part15 247(c)

**Test date:**                           Aug 12, 2011

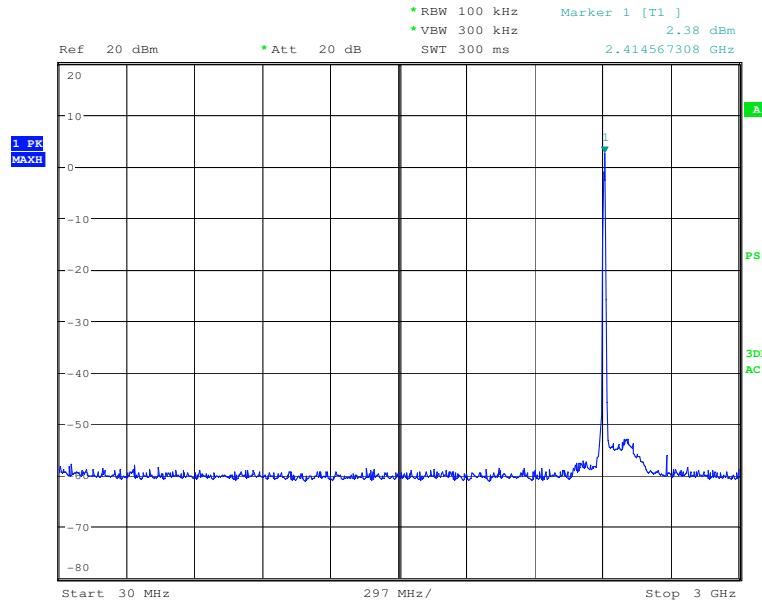
**Standard Applicable:**                   According to section 15.247(c),in any 100KHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating,the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power,In addition,radiated emissions which fall in the restricted bands,as defined in section 15.205(a),must also comply with the radiated emission limits specified in 15.209(a).

**Measurement Procedure:**

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW=100KHz VBW=300KHz, Sweep = auto
6. Repeat above procedures until all frequency measured were complete.

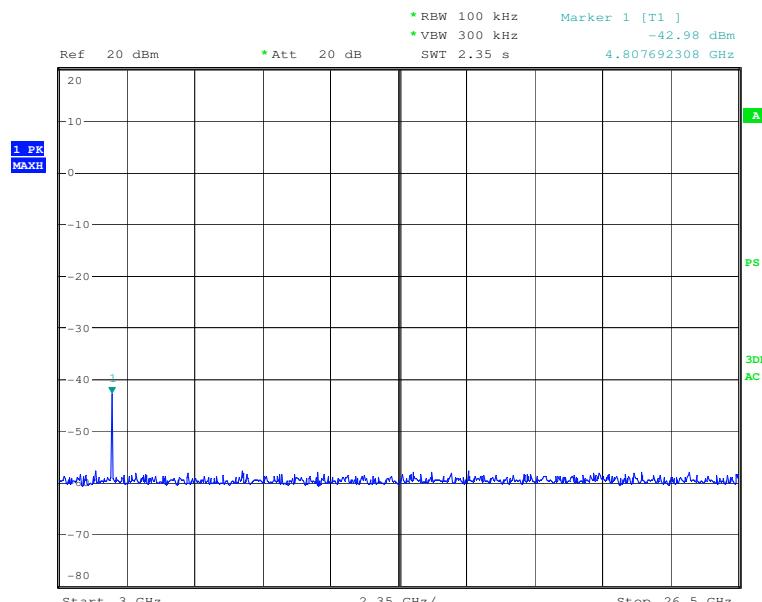
## Measurement Result:

Conducted spurious Emission Measurement Result (802.11b)1M  
CH Low 30MHz-3GHz



Date: 12.AUG.2011 09:33:23

CH Low 3GHz-26.5GHz



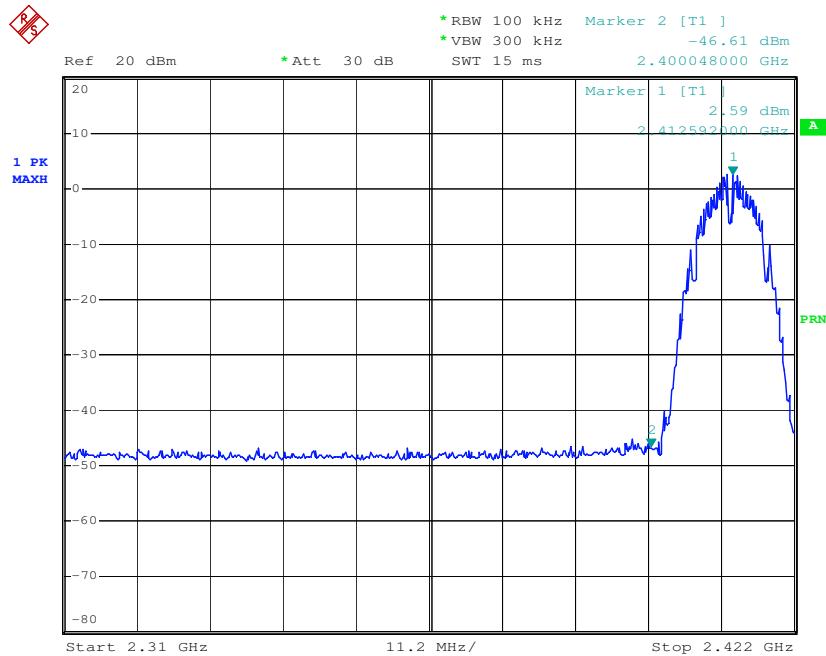
Date: 12.AUG.2011 09:34:39

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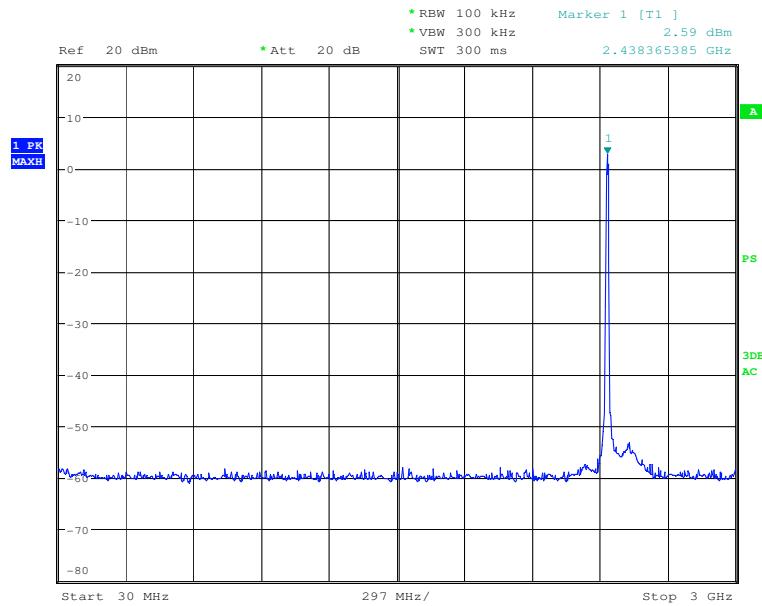
Report No.: SHEMA110700097301  
Page: 31 of 127

**Band Edge (Conducted Mode)**



Date: 11.AUG.2011 16:15:06

**Ch Mid 30MHz-3GHz**

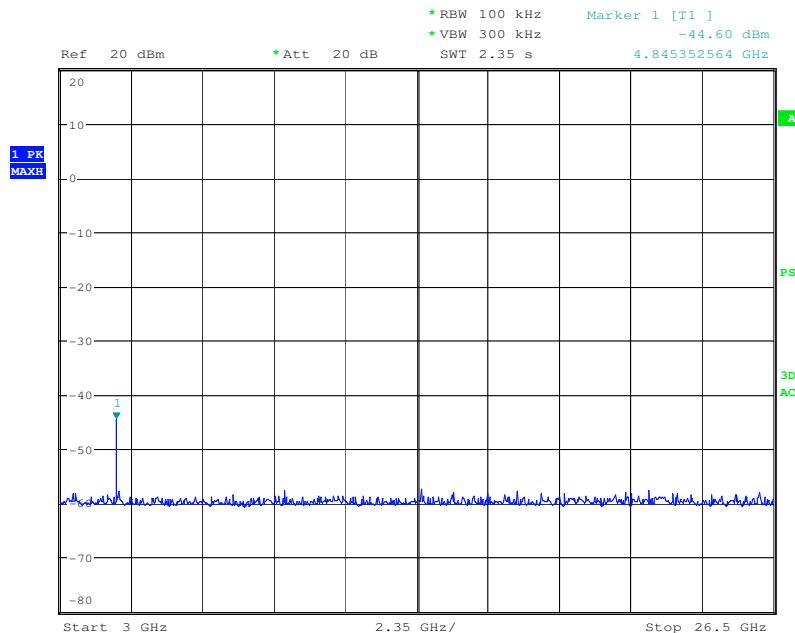


Date: 12.AUG.2011 10:02:52

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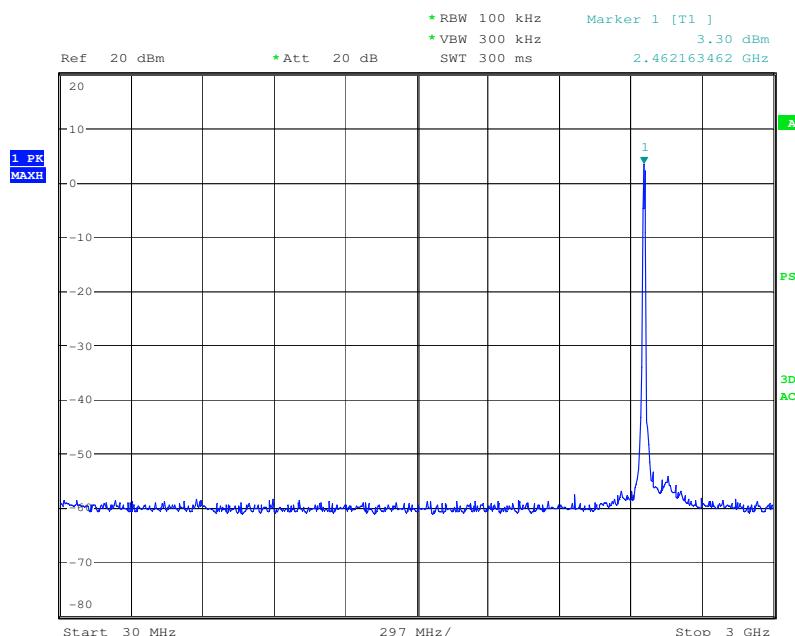
Report No.: SHEM110700097301  
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**Ch Mid 3GHz-26.5GHz**



Date: 12.AUG.2011 10:03:57

**Ch High 30MHz-3GHz**



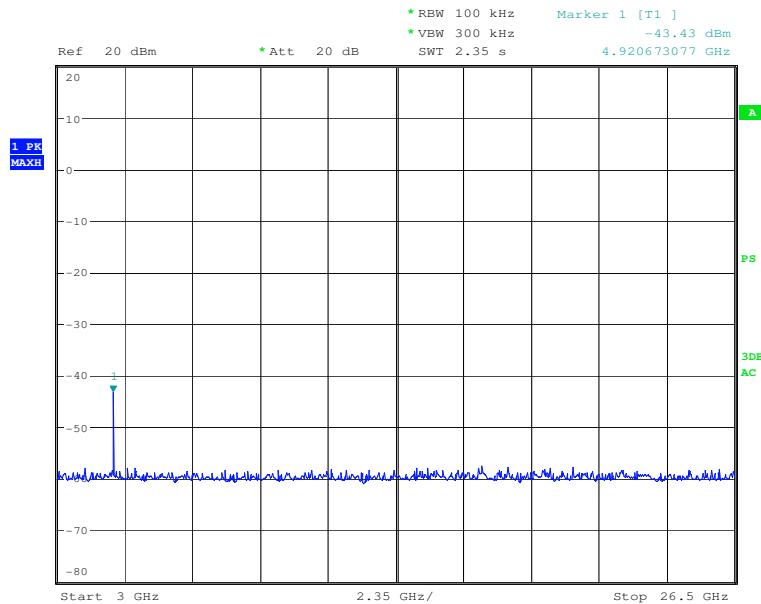
Date: 12.AUG.2011 10:07:10

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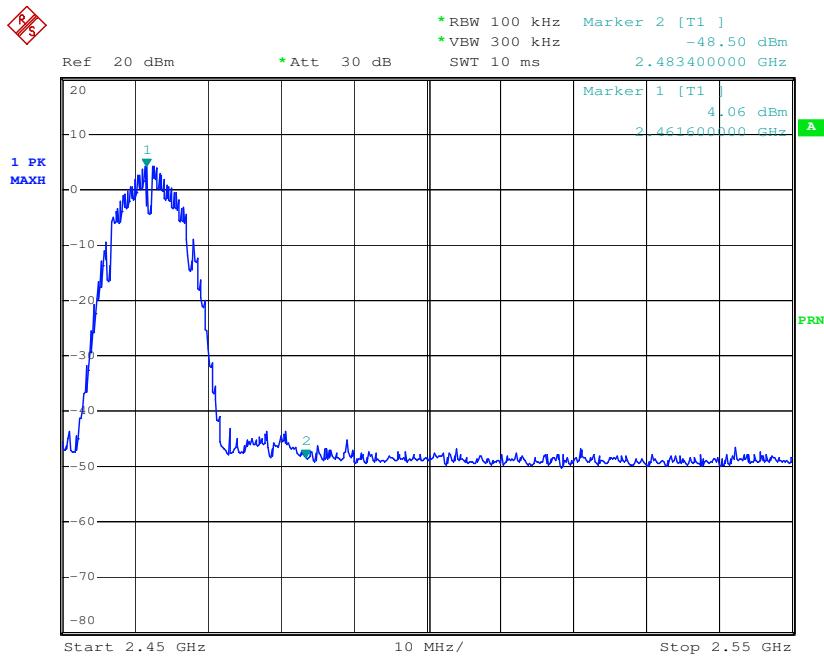
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Ch High 3GHz-26.5GHz



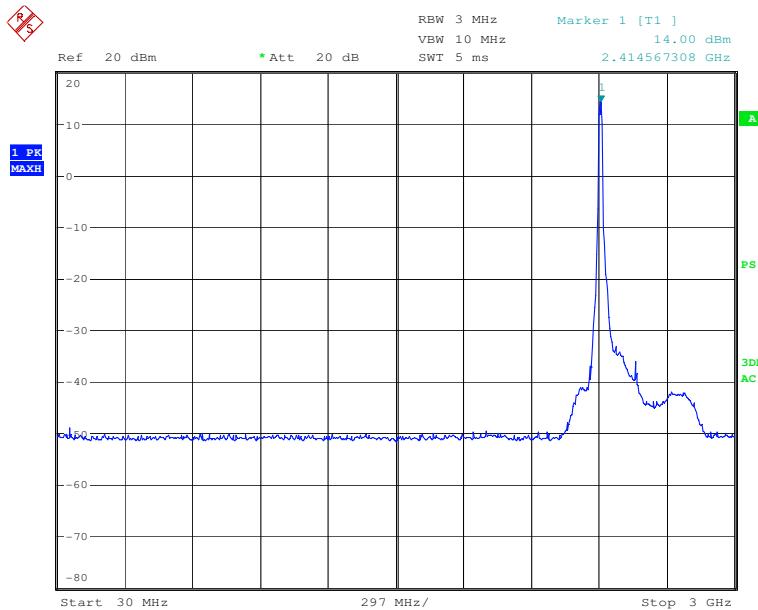
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Band Edge (Conducted Mode)



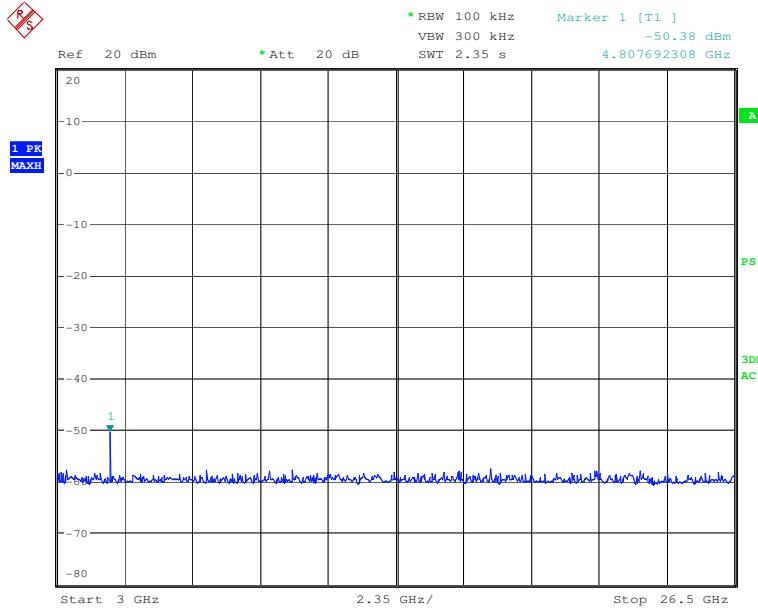
Date: 11.AUG.2011 16:17:53

**Conducted Spurious Emission Measurement Result(802.11g),6M**  
Ch Low 30MHz-3GHz



Date: 13.AUG.2011 10:05:47

Ch Low 3GH-26.5GHz

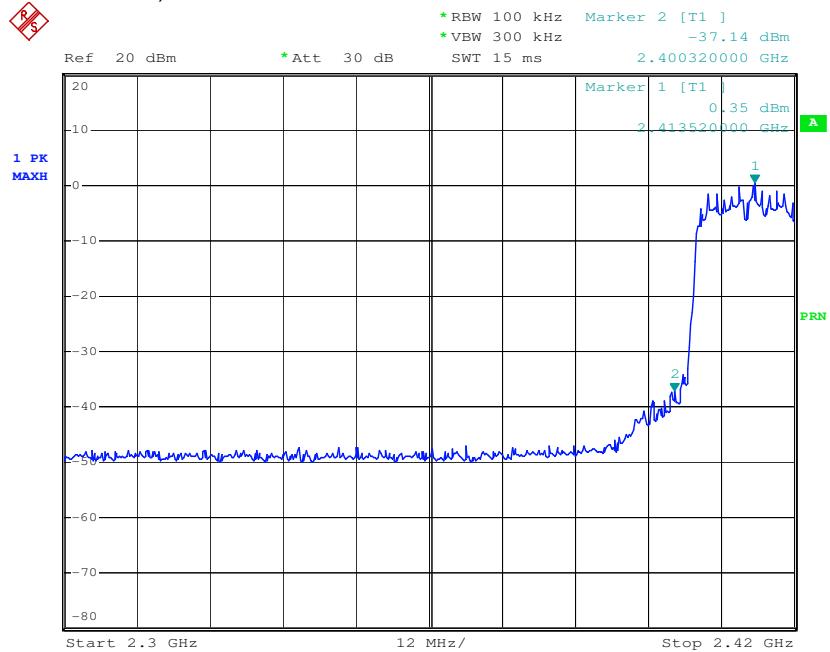


Date: 13.AUG.2011 10:09:04

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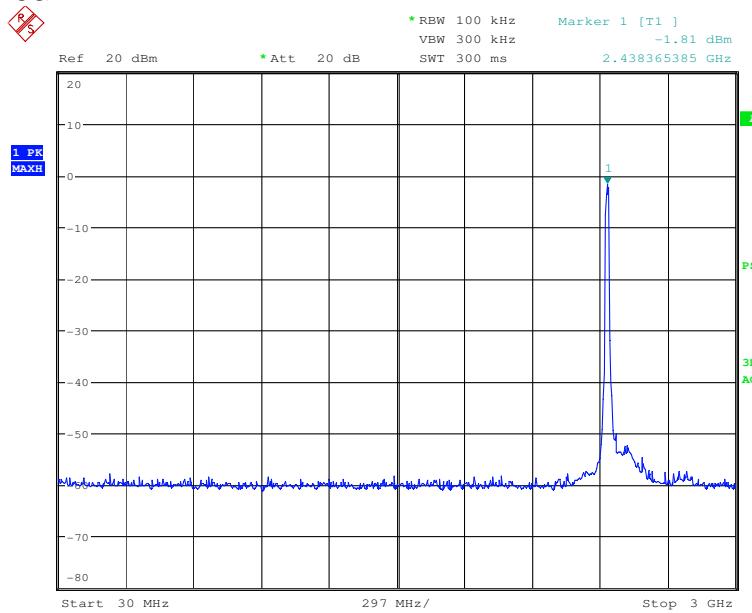
Report No.: SHEM110700097301  
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Band Edge (Conducted Mode)



Date: 11.AUG.2011 16:24:13

Ch Mid 30MHz-3GHz

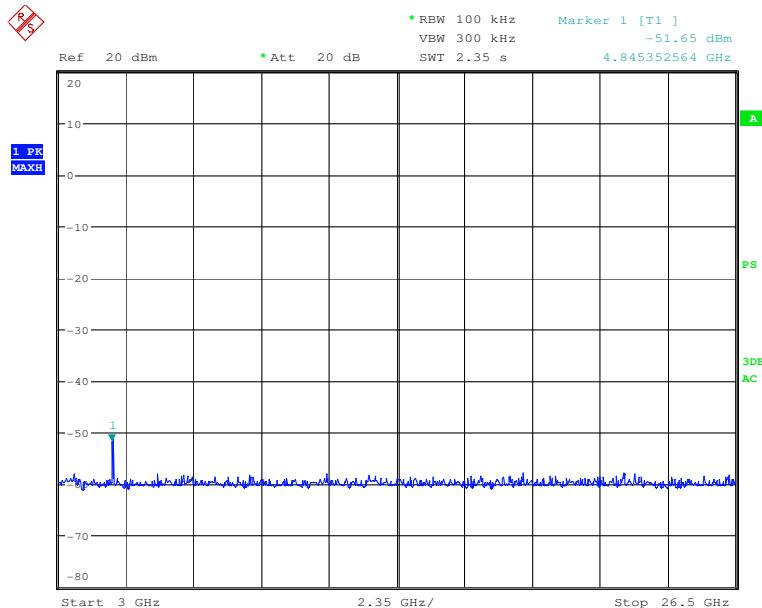


Date: 13.AUG.2011 10:15:01

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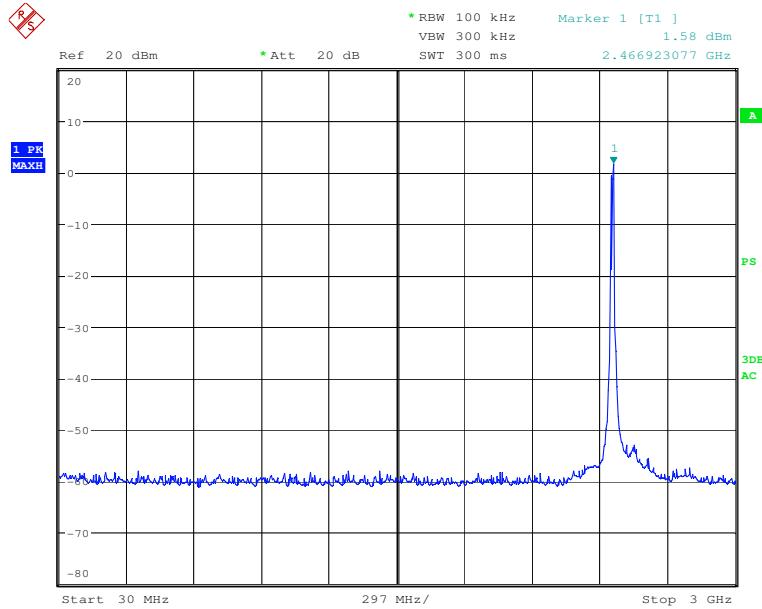
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Ch Mid 3GHz-26.5GHz



Date: 13.AUG.2011 10:15:46

Ch High 30MHz-3GHz

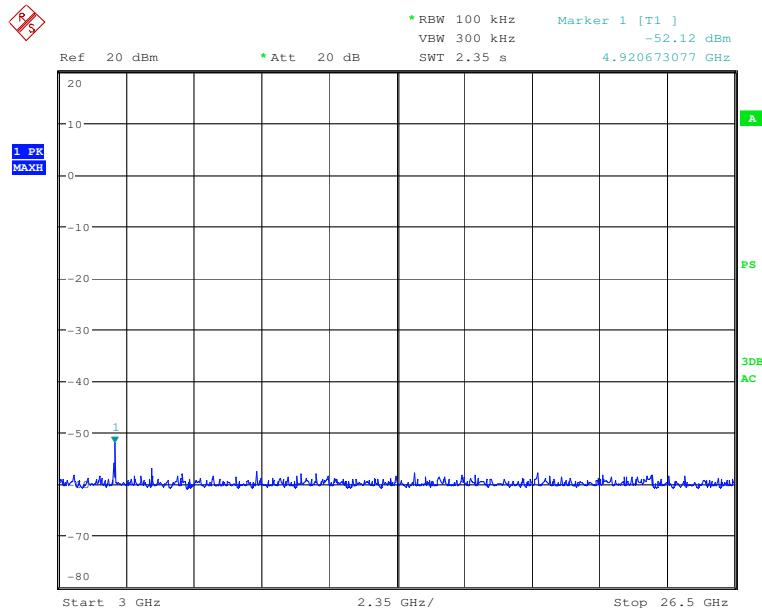


Date: 13.AUG.2011 10:12:58

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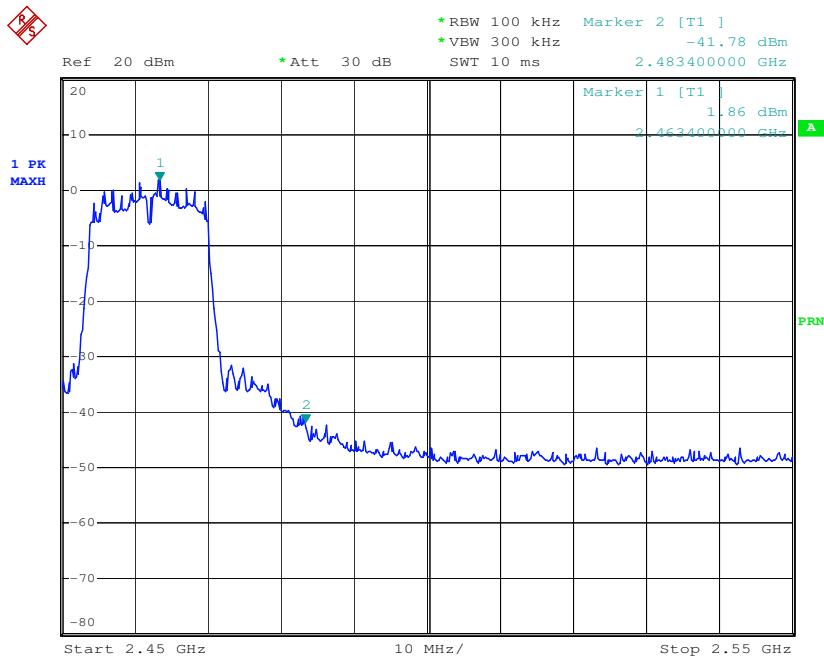
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Ch High 3GHz-26.5GHz



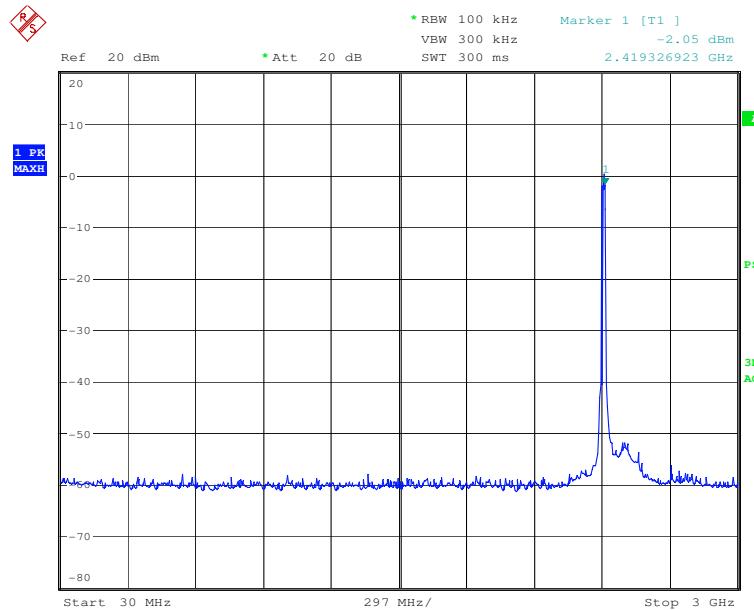
Date: 13.AUG.2011 10:13:54

Band Edge (Conducted Mode)



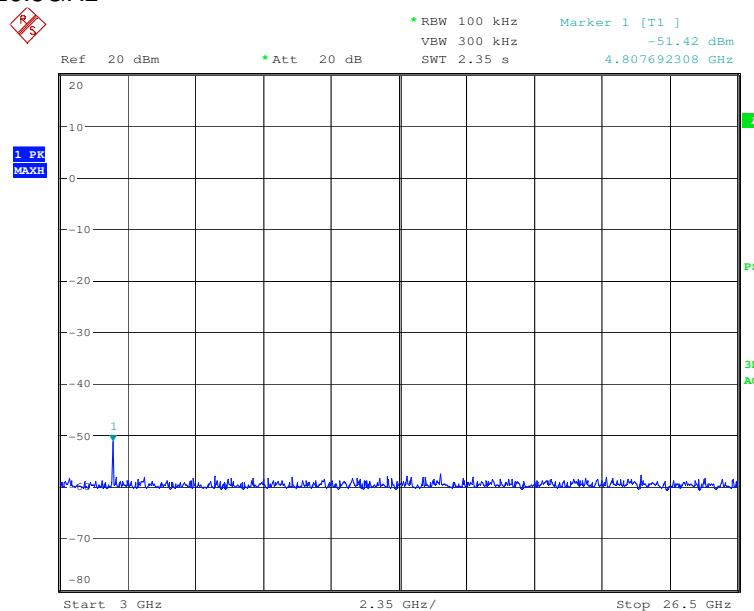
Date: 11.AUG.2011 16:21:12

**Conducted Spurious Emission Measurement Result(802.11n\_20MHz),6.5M**  
Ch Low 30MHz-3GHz



Date: 13.AUG.2011 10:24:57

**Ch Low 3GHz-26.5GHz**

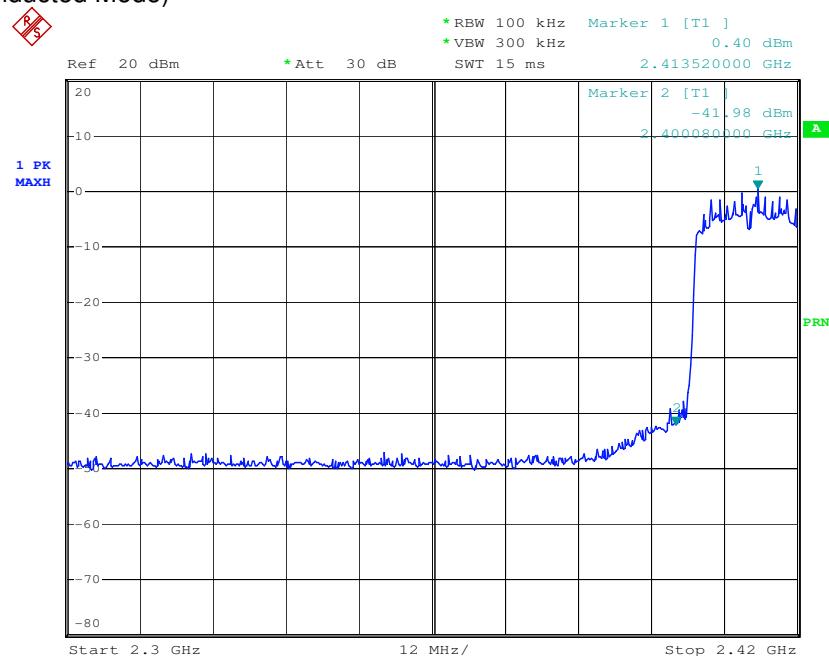


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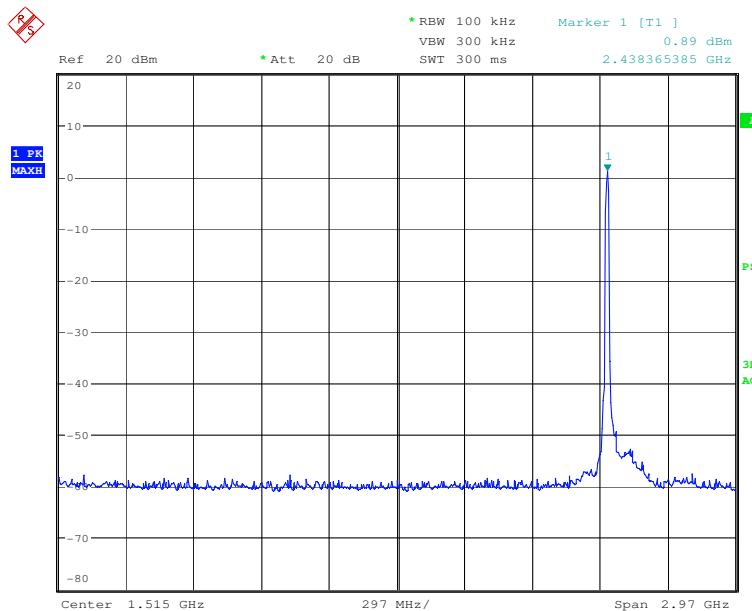
Report No.: SHEM110700097301  
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**Band Edge (Conducted Mode)**



Date: 11.AUG.2011 16:26:30

**Ch Mid 30MHz-3GHz**

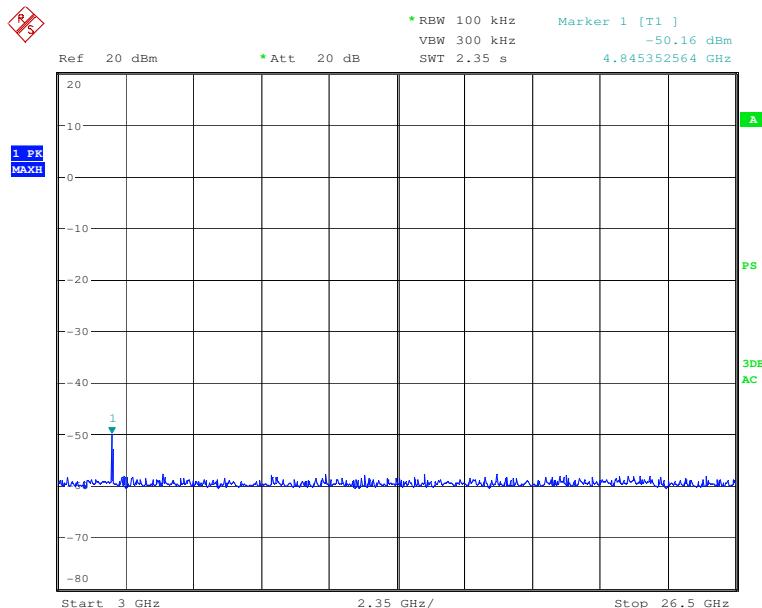


Date: 13.AUG.2011 10:22:42

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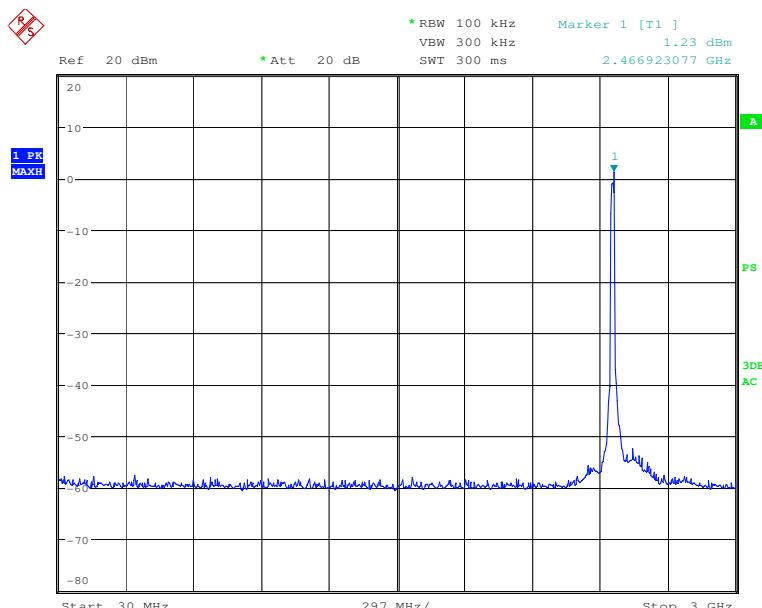
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Ch Mid 3GHz-26.5GHz



Date: 13.AUG.2011 10:23:49

Ch High 30MHz-3GHz

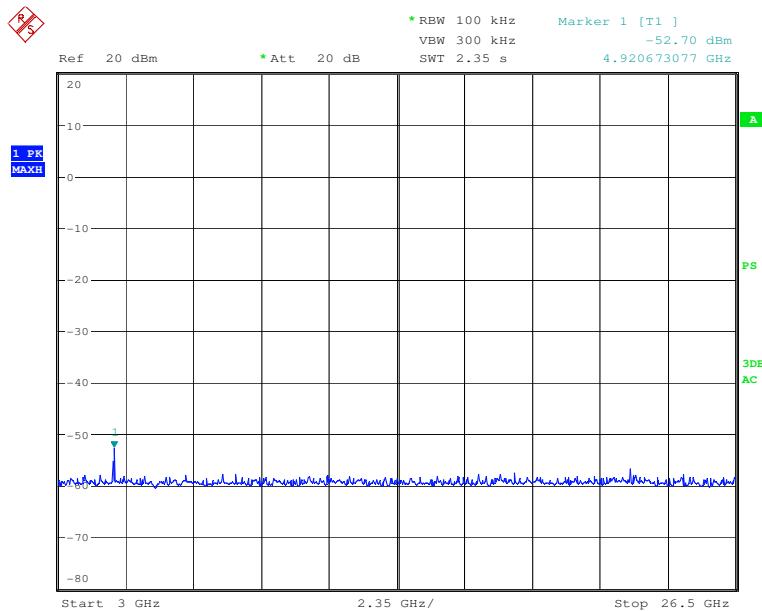


Date: 13.AUG.2011 10:19:53

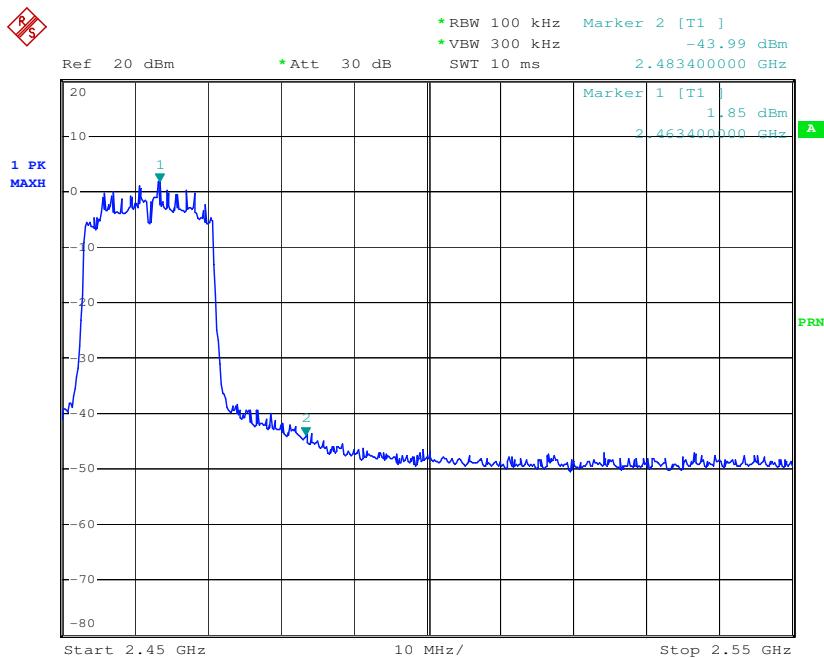
**SGS-CSTC Standards  
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Ch High 3GHz-26.5GHz



Band Edge (Conducted Mode)



### 5.3.7 Spurious Radiated Emission Test

**Test Requirement:** FCC Part15 247(c)

**Test date:** Sep 23, 2011 to Sep 28, 2011

**Standard Applicable:** According to section 15.247(c),all other emissions outside these bands shall not exceed the general radiated emission limits specified in section15.209(a).And according to section 15.33(a)(1),for an intentional radiator operates below 10GHz,the frequency range of measurements:to the tenth harmonic of the highest fundamental frequency or to 40GHz,which is lower.

**Measurement Procedure:**

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.

Test instrumentation resolution bandwidth 120 kHz and Quasi-Peak detector applies (30 MHz - 1000 MHz). 1MHz resolution bandwidth and Peak detector apply (1000 MHz – 12.75GHz )

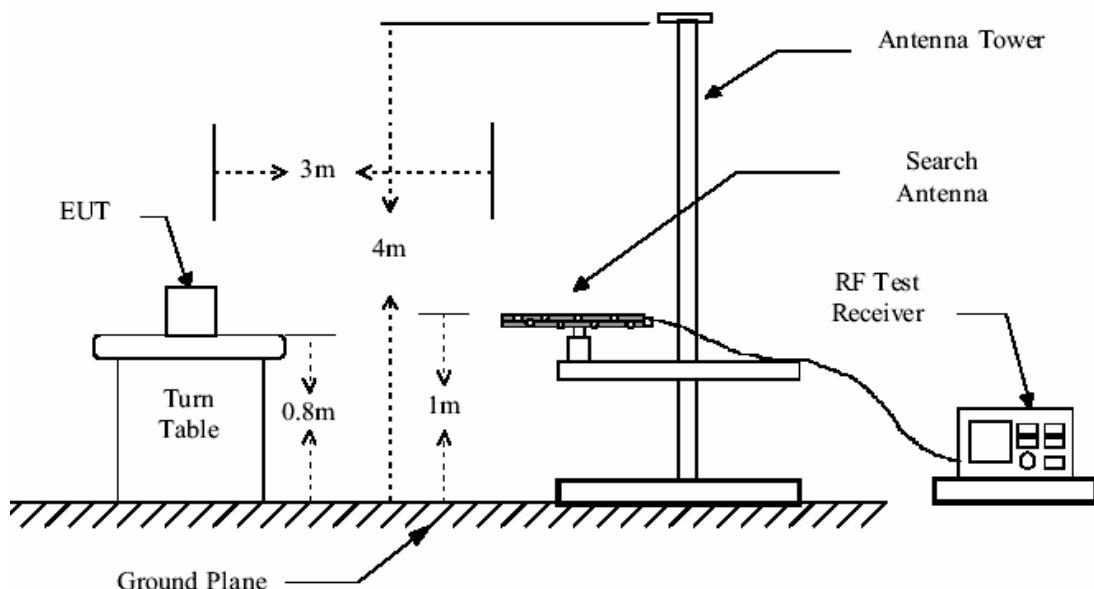
Above 1GHz

- (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
- (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO.

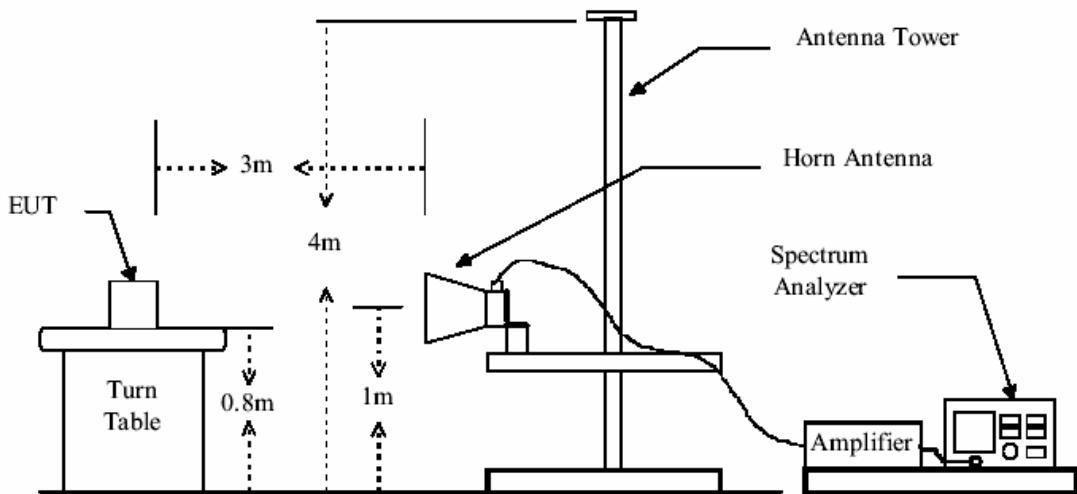
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until all frequency measured were complete.

**Radiated Test Set-up:**

Radiated Emission Test Set-up, Frequency Below 1000MHz

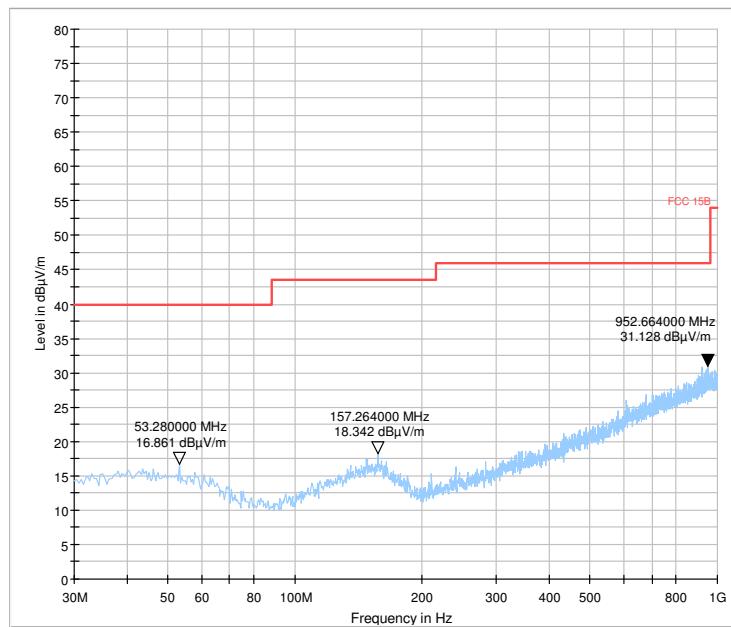


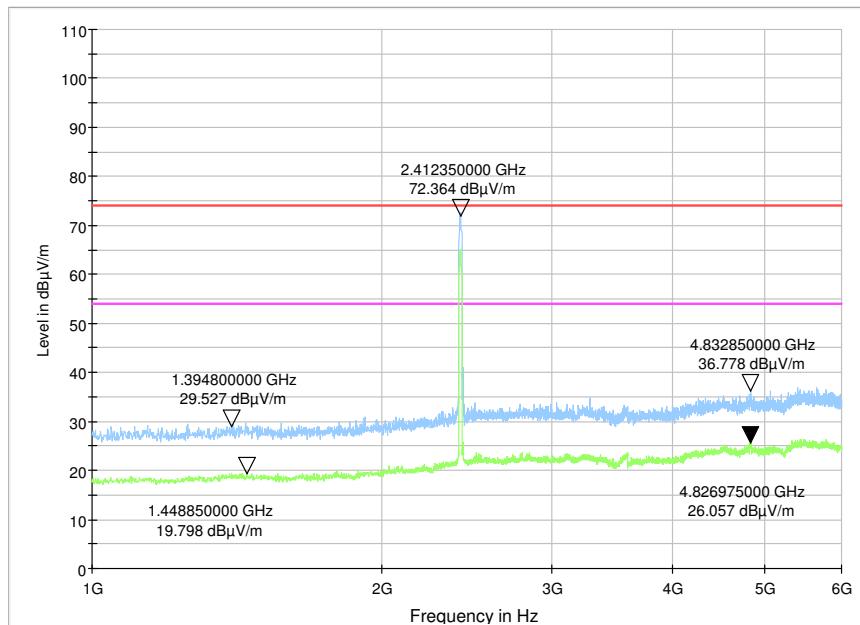
Radiated Emission Test Set-up Frequency Over 1GHz.



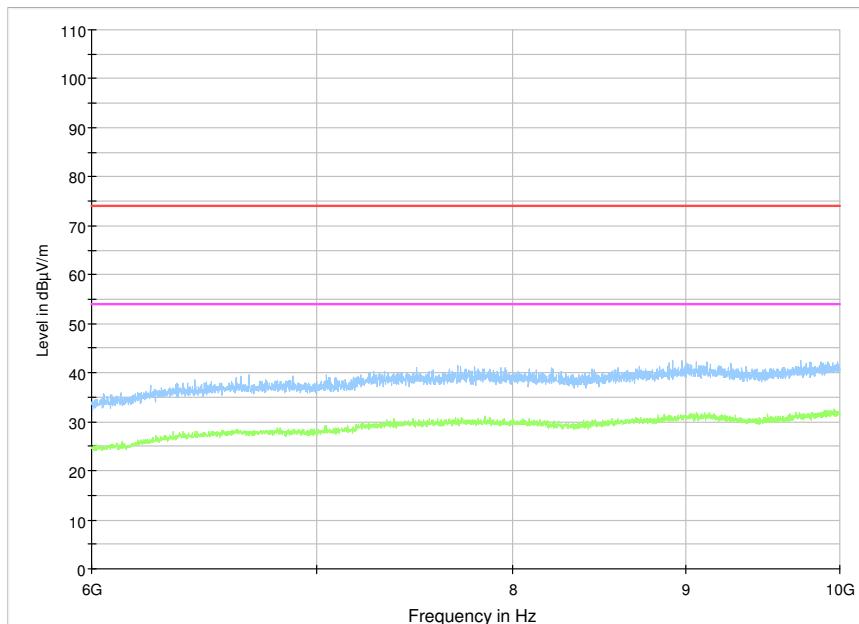
**Operation Mode: 802.11b TX CH Low 1M**

Vertical



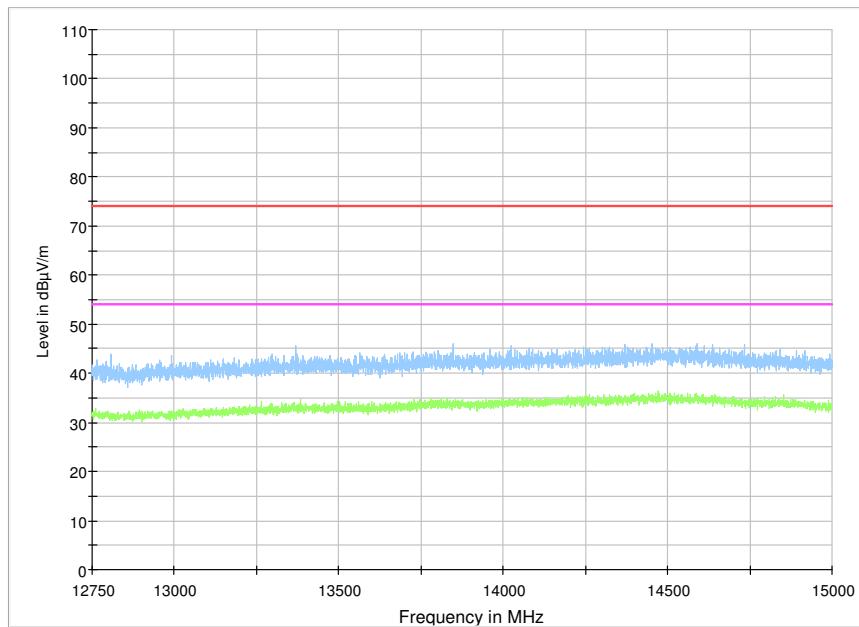
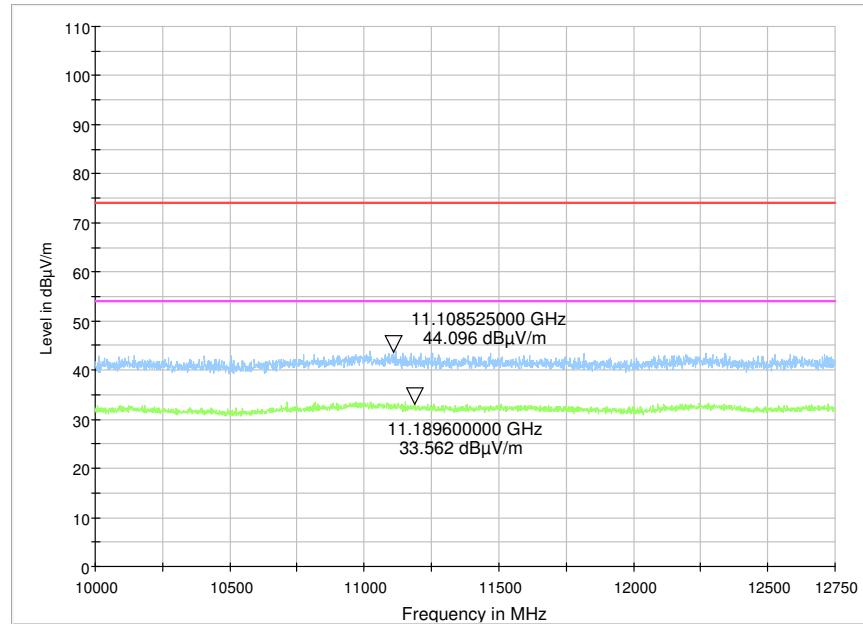


**Note: 2412.35MHz is the EUT WiFi working frequency.**



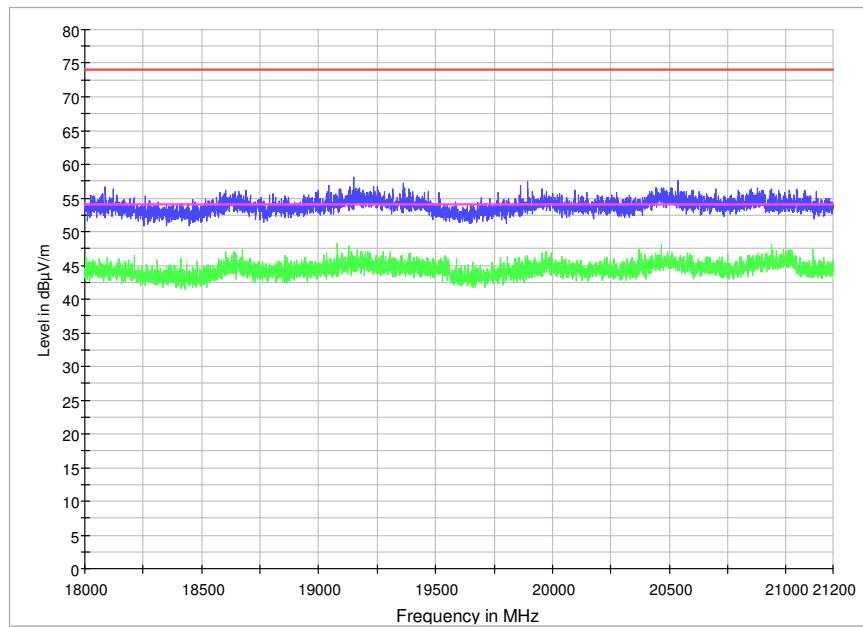
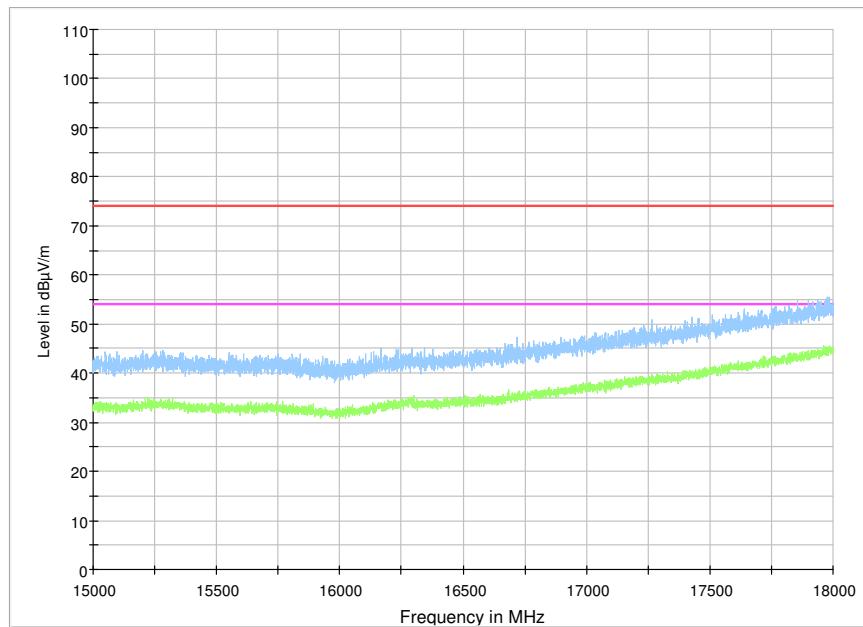
**SGS-CSTC Standards  
Technical Services  
(Shanghai)Co., Ltd.**

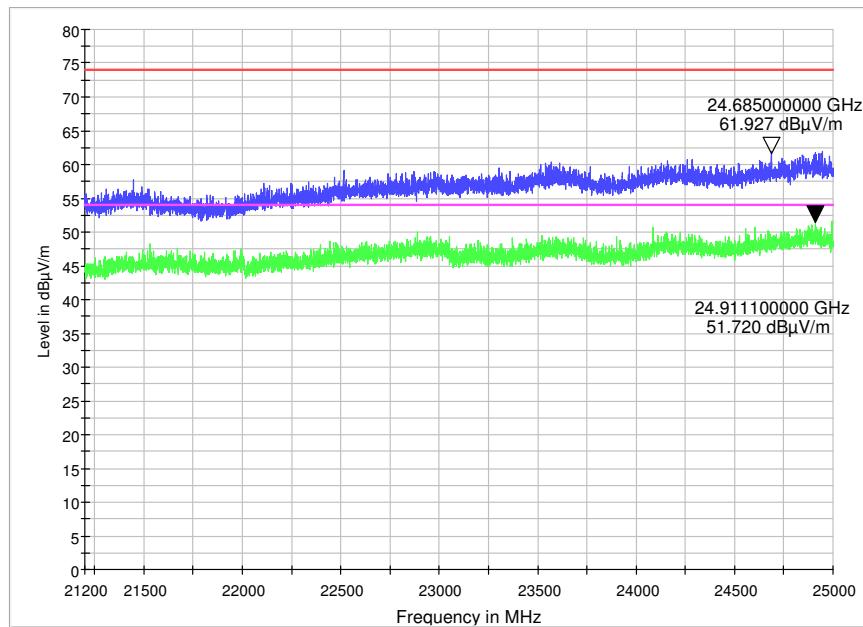
Report No.: SLEM110700097301  
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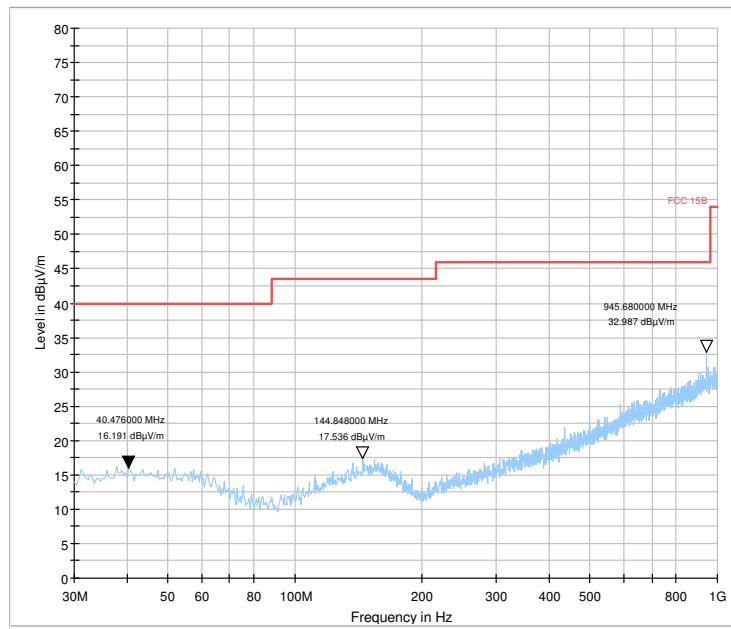
**SGS-CSTC Standards  
Technical Services  
(Shanghai)Co., Ltd.**

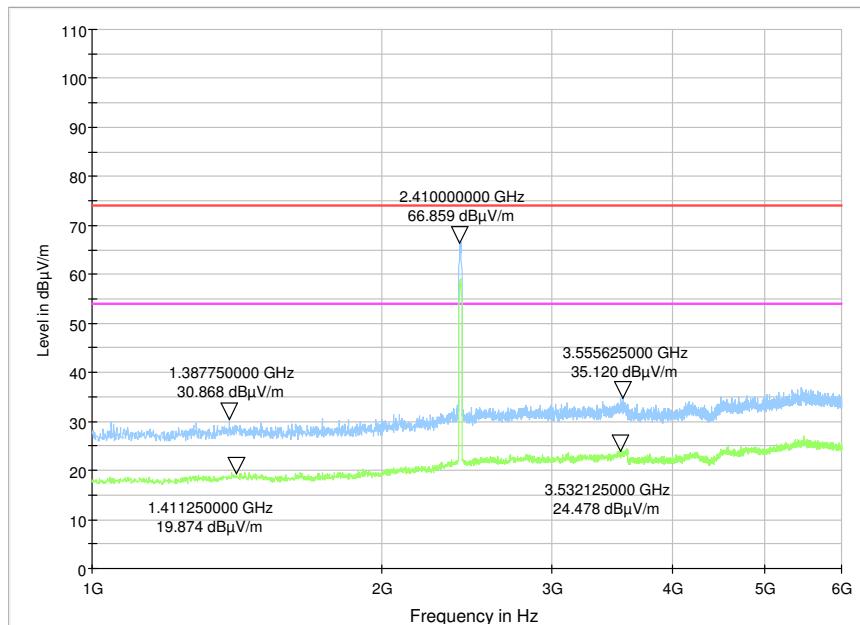
Report No.: SHEM110700097301  
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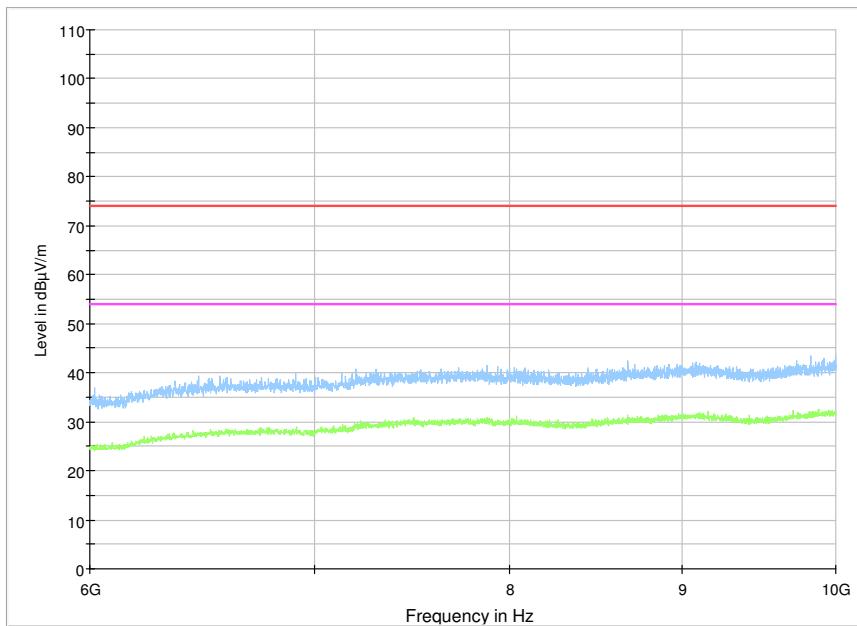


Horizontal



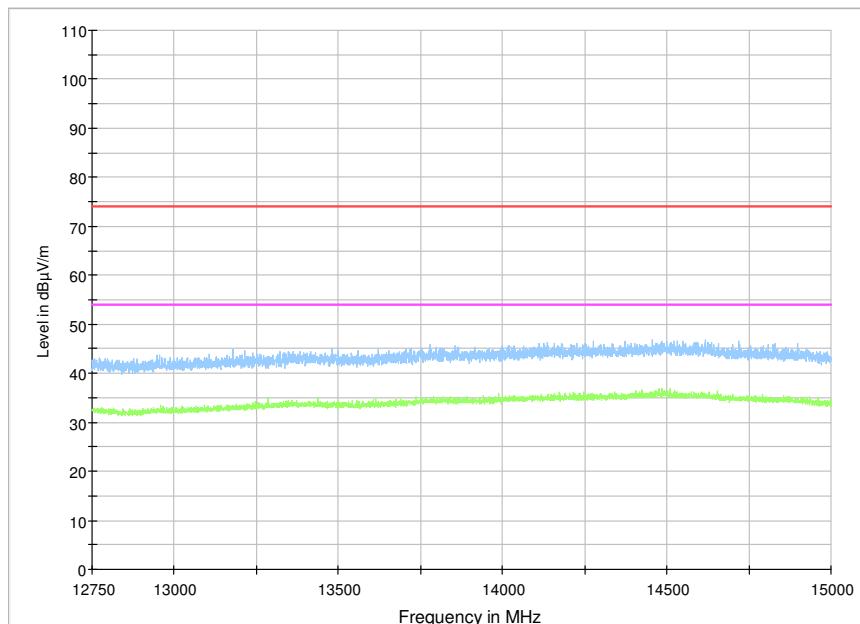
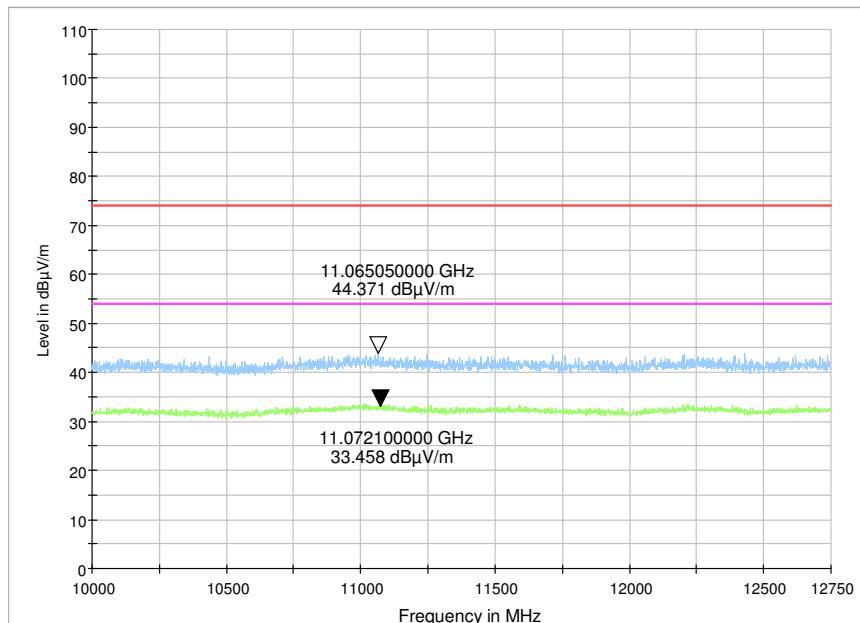


**Note: 2410.00MHz is the EUT WiFi working frequency.**



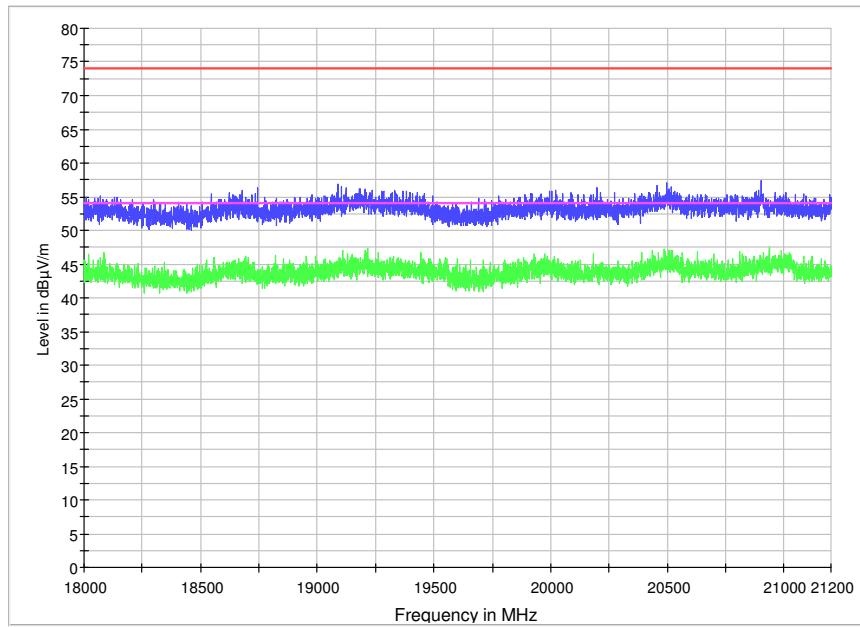
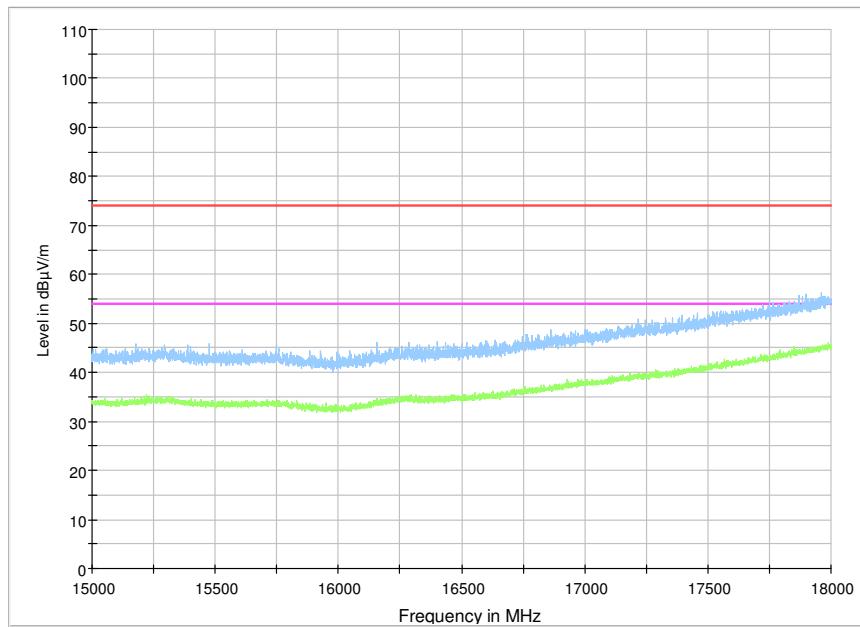
**SGS-CSTC Standards  
Technical Services  
(Shanghai)Co., Ltd.**

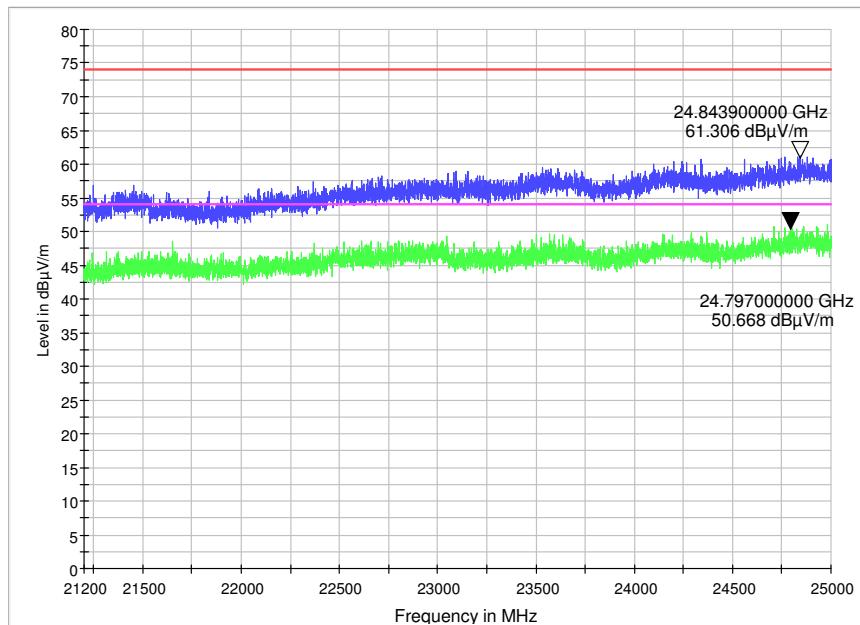
Report No.: SHEM110700097301  
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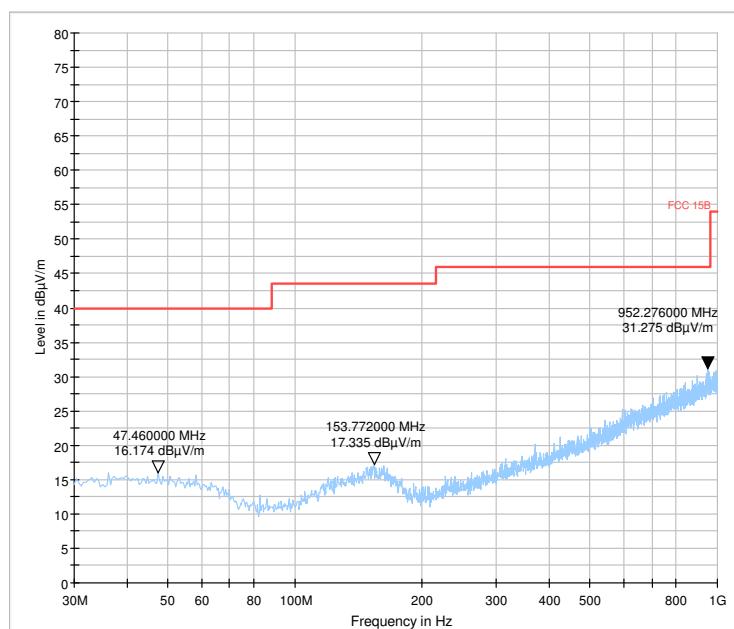
**SGS-CSTC Standards  
Technical Services  
(Shanghai)Co., Ltd.**

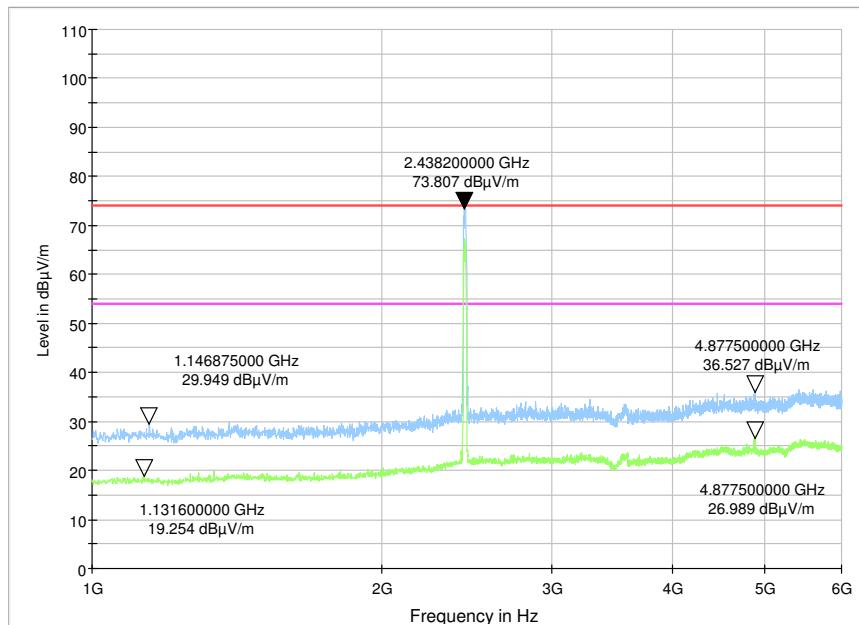
Report No.: SHEM110700097301  
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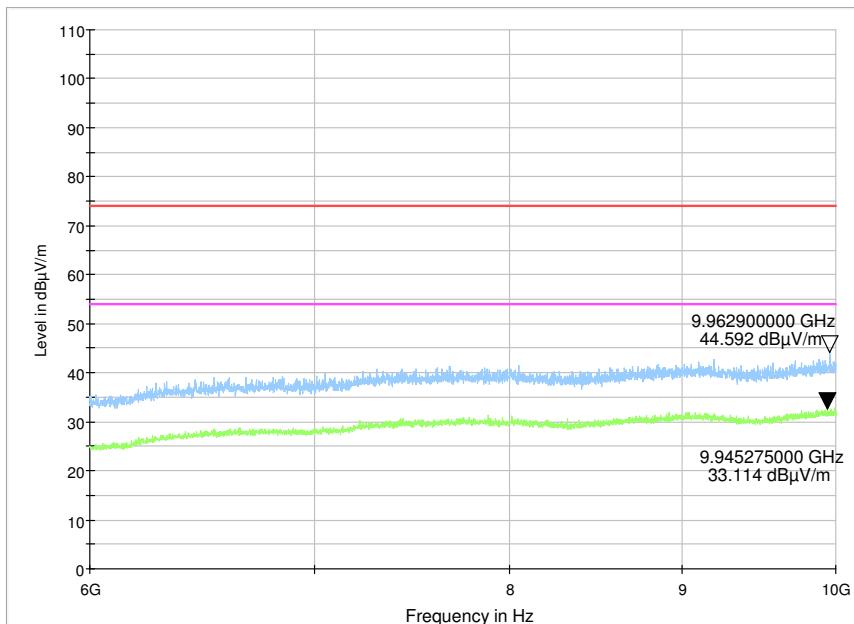


**Operation Mode: 802.11b TX CH Mid 1M**  
Vertical



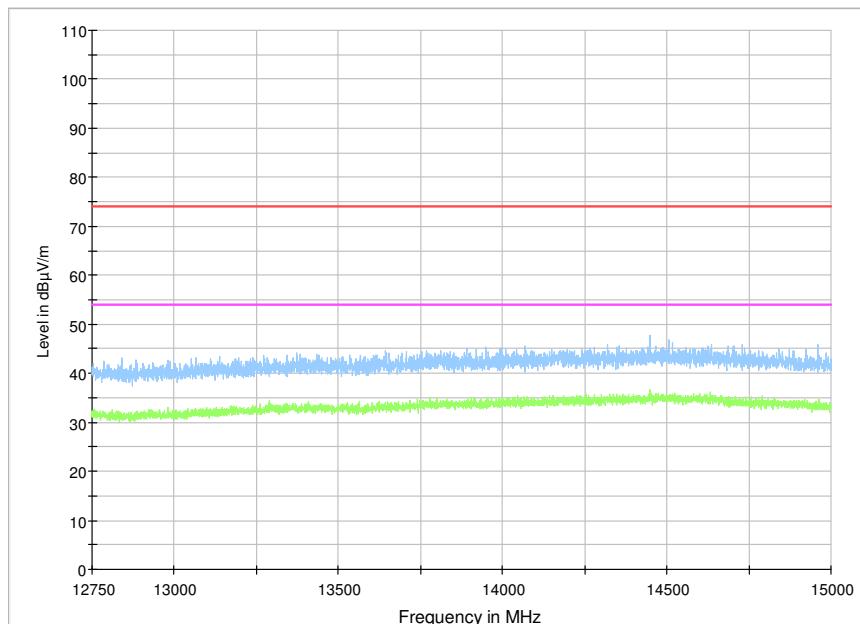
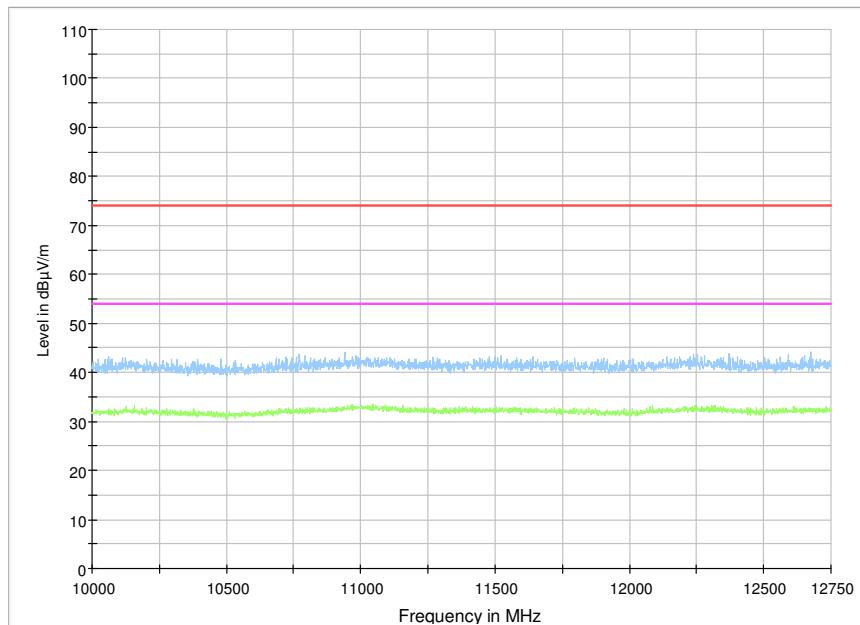


**Note: 2438.20MHz is the EUT WiFi working frequency.**



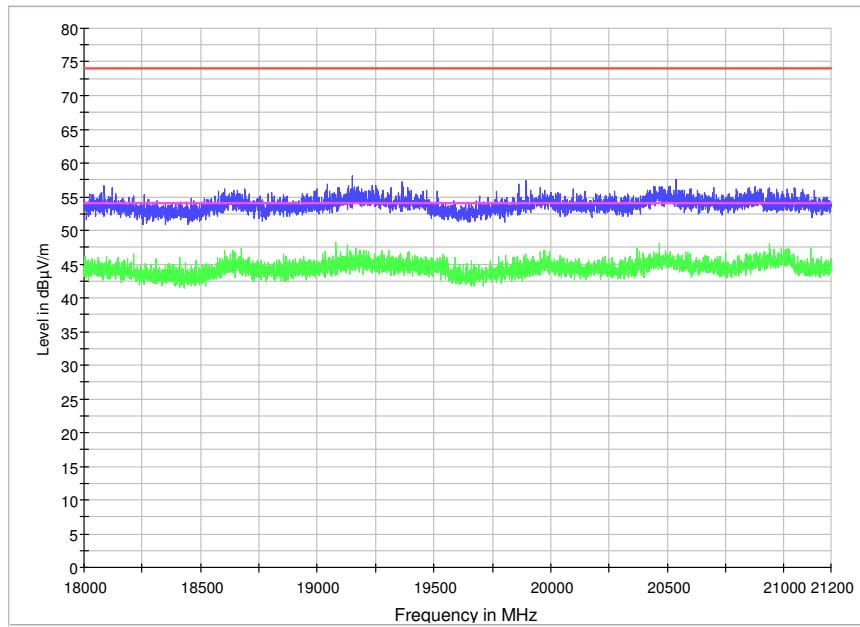
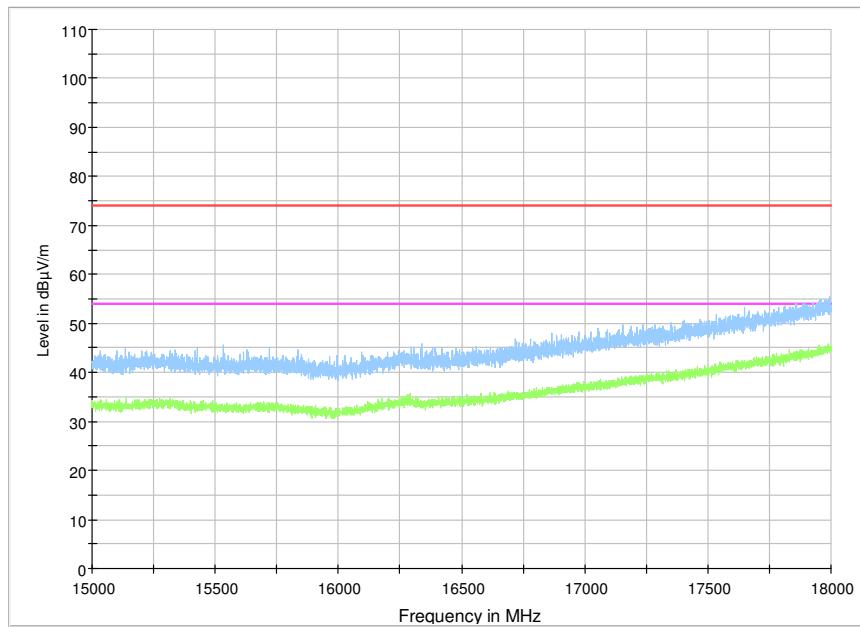
**SGS-CSTC Standards  
Technical Services  
(Shanghai)Co., Ltd.**

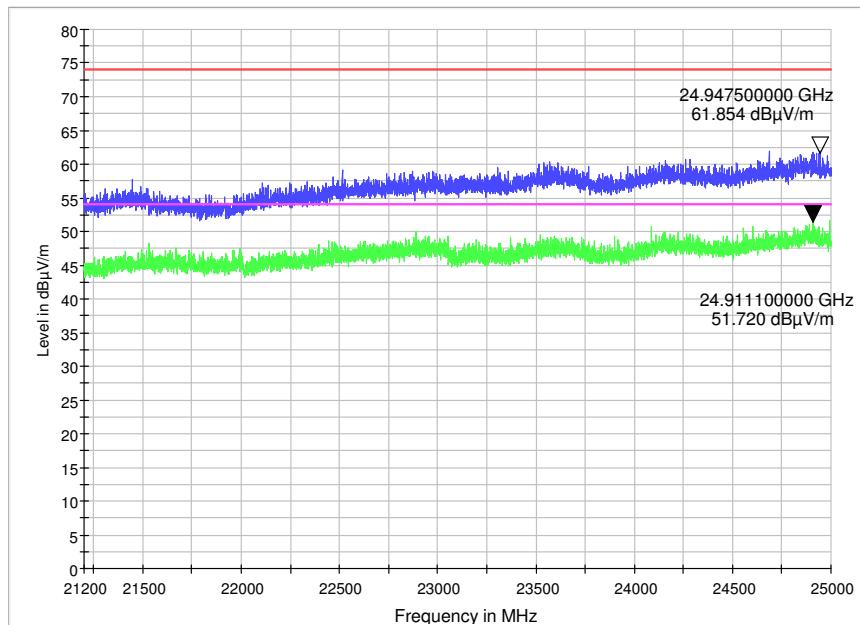
Report No.: SHEM110700097301  
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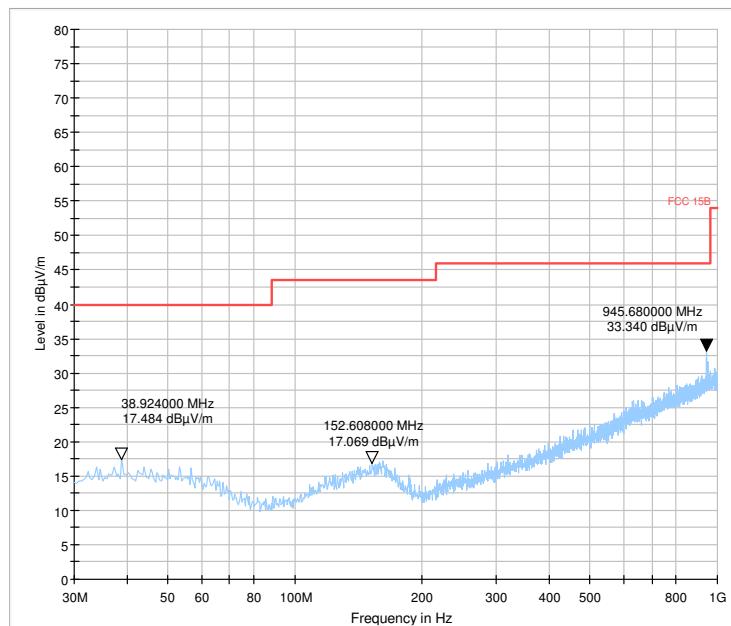
**SGS-CSTC Standards  
Technical Services  
(Shanghai)Co., Ltd.**

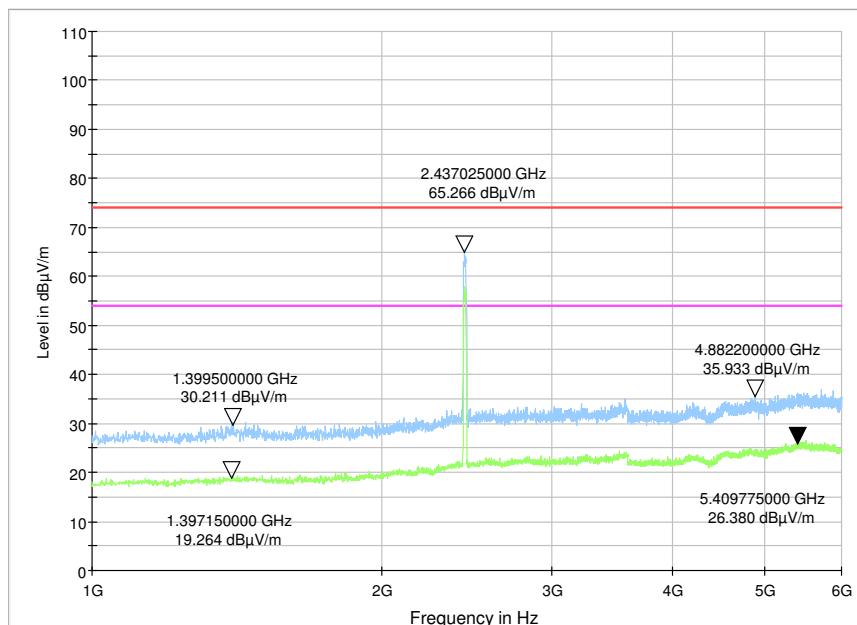
Report No.: SHEM110700097301  
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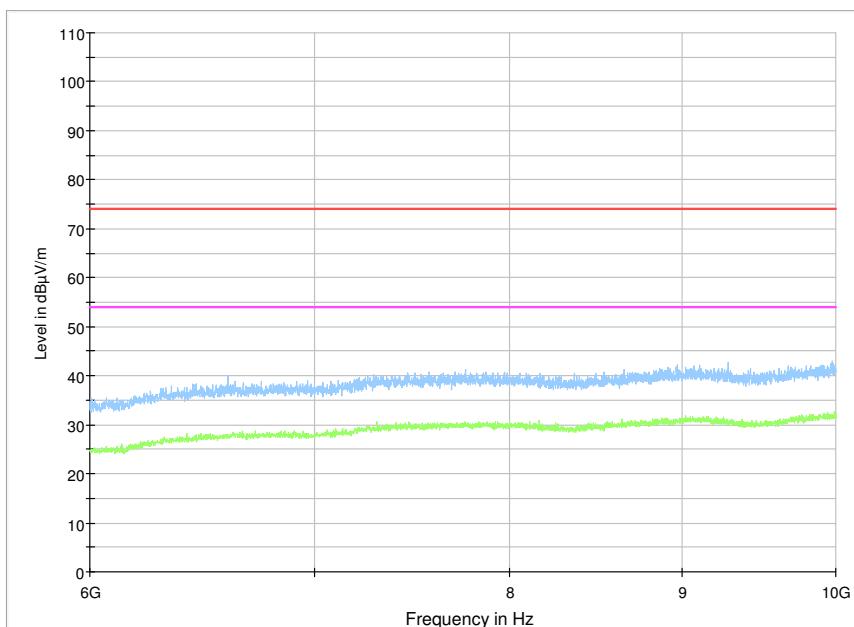


Horizontal



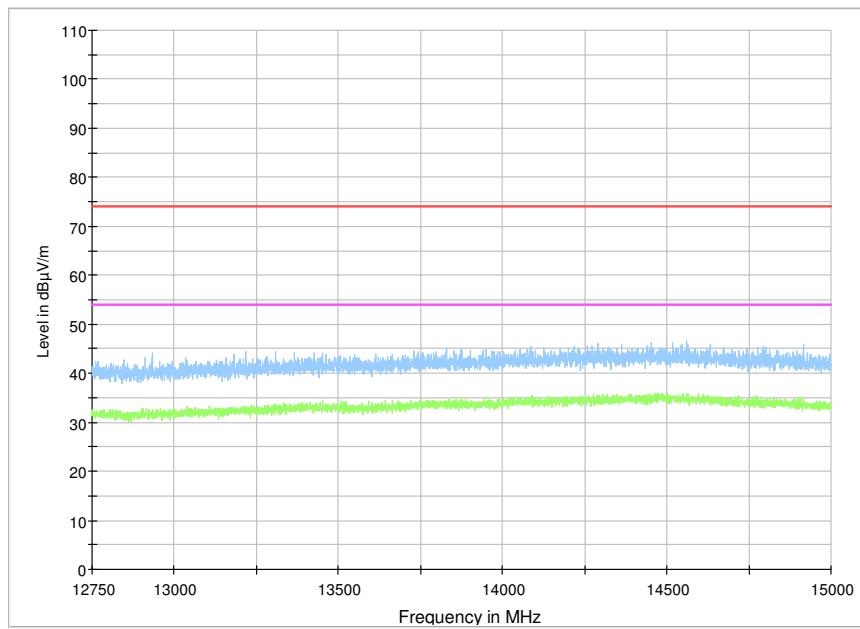
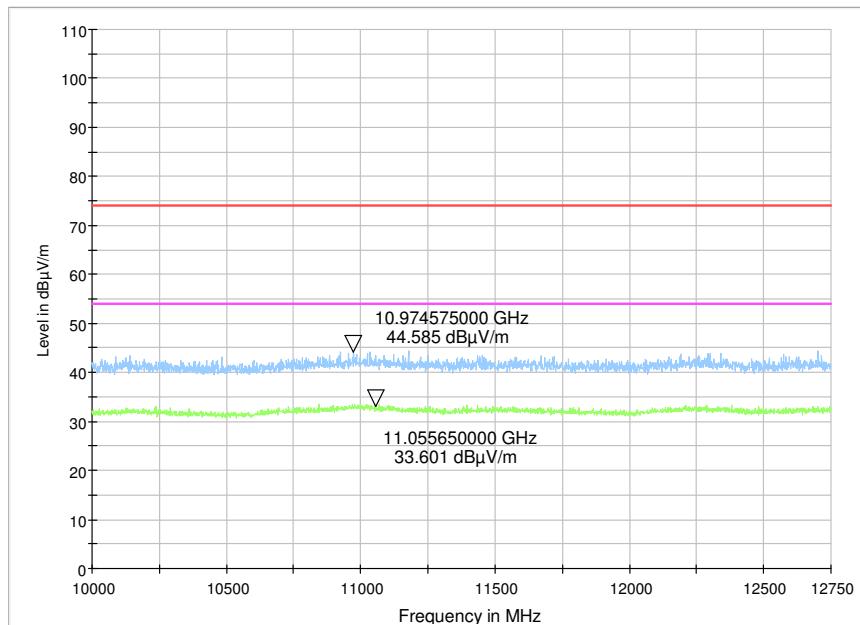


**Note: 2437.03MHz is the EUT WiFi working frequency.**



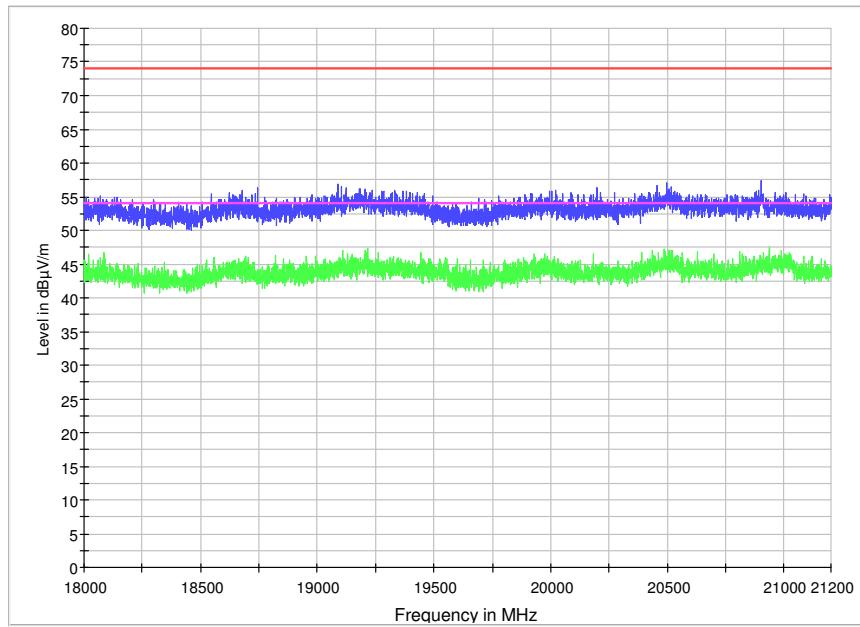
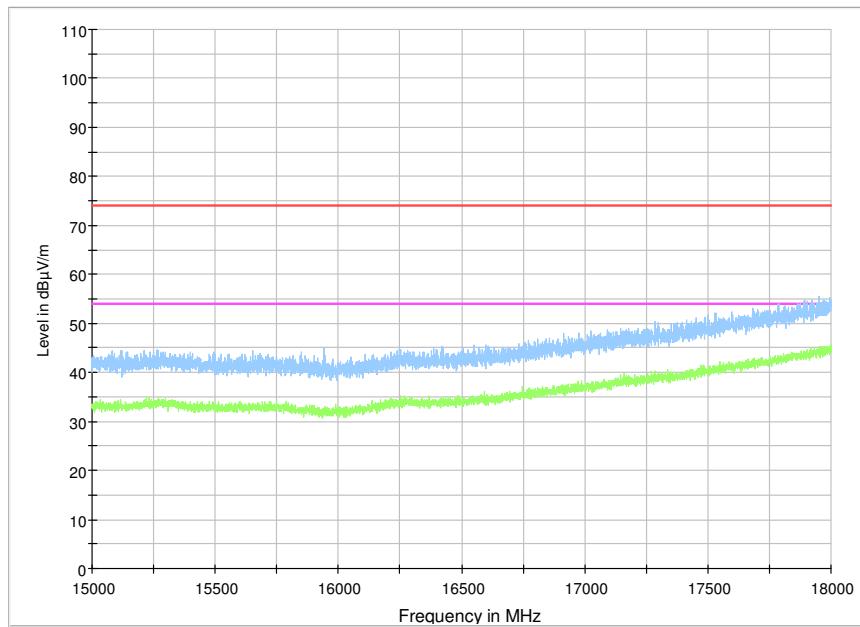
**SGS-CSTC Standards  
Technical Services  
(Shanghai)Co., Ltd.**

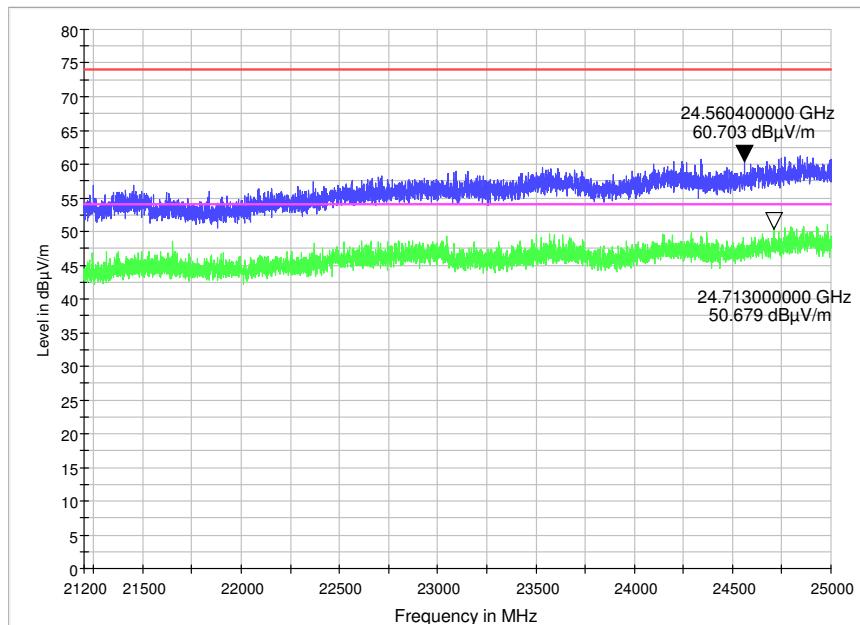
Report No.: SHEM110700097301  
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**SGS-CSTC Standards  
Technical Services  
(Shanghai)Co., Ltd.**

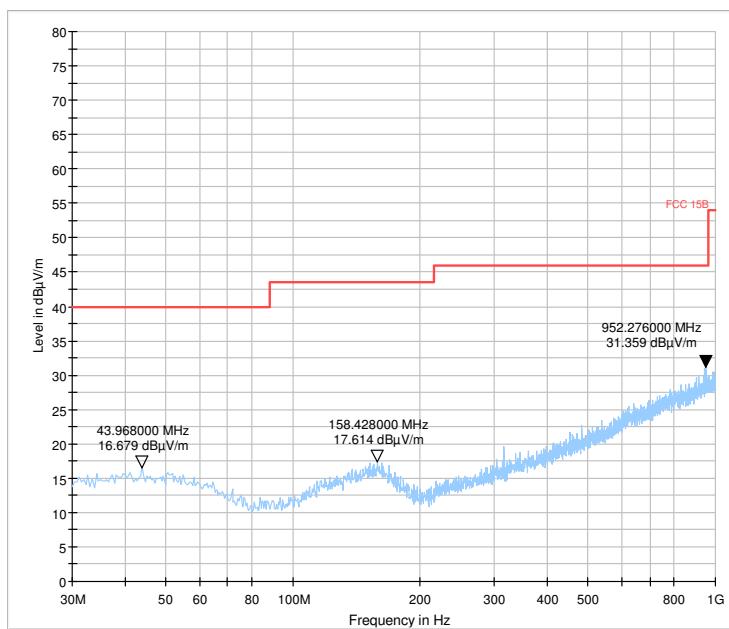
Report No.: SHEM110700097301  
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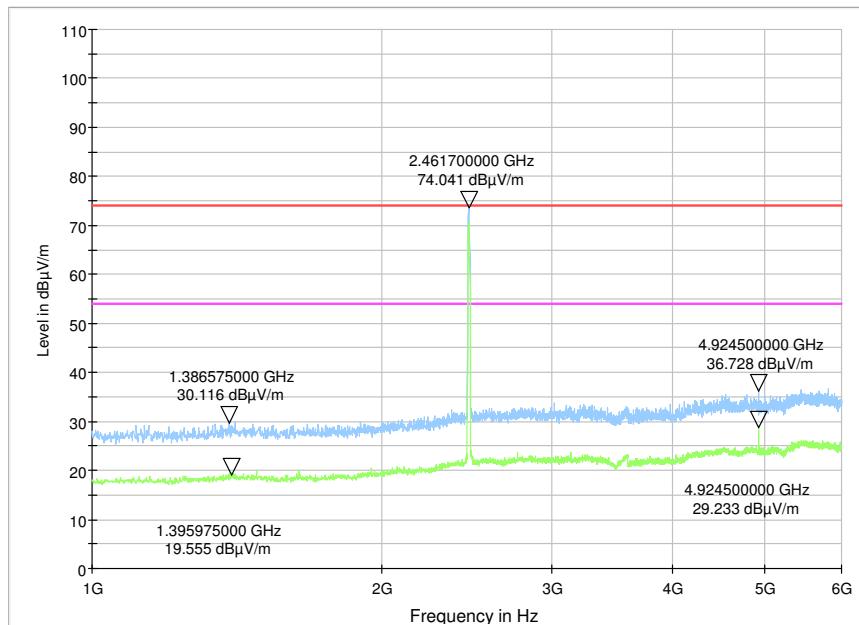




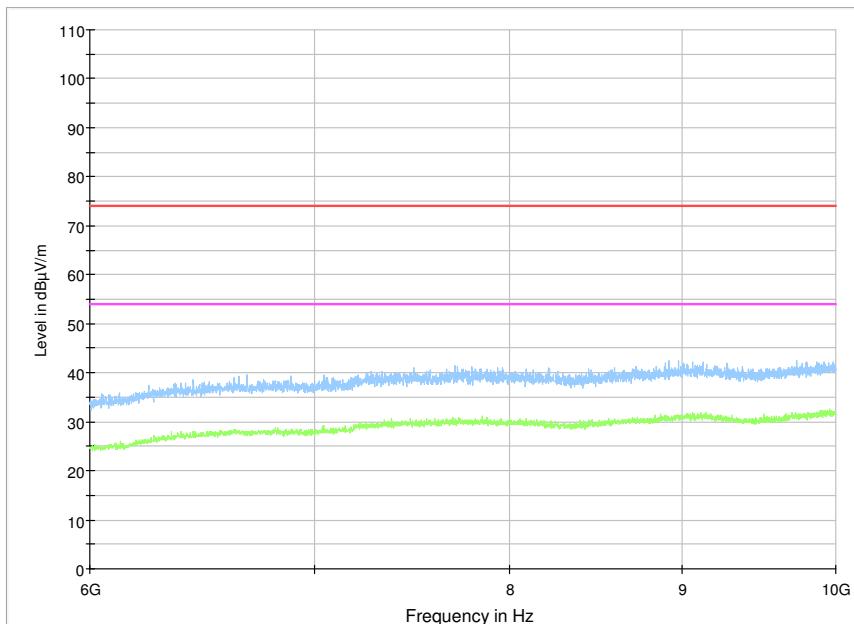
**Operation Mode: 802.11b TX CH High 1M**

Vertical



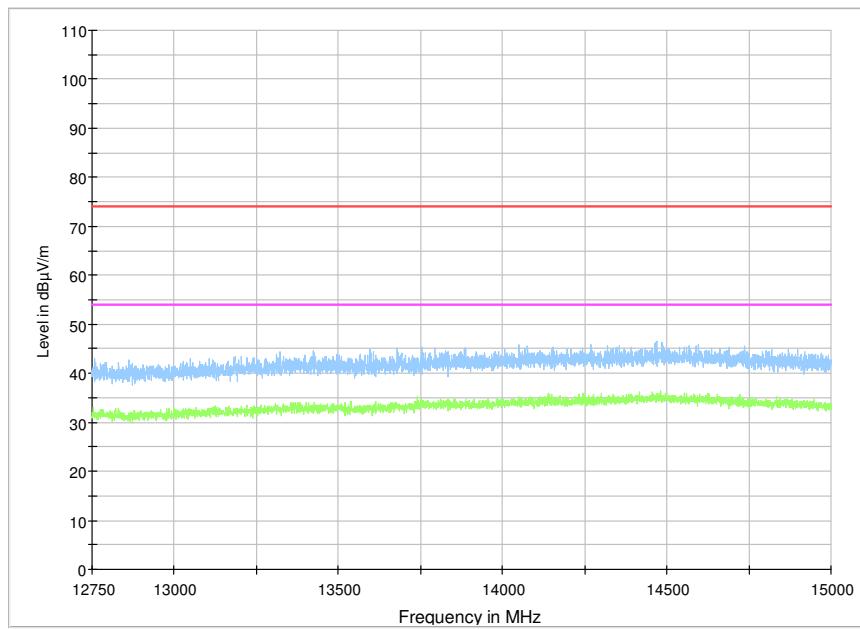
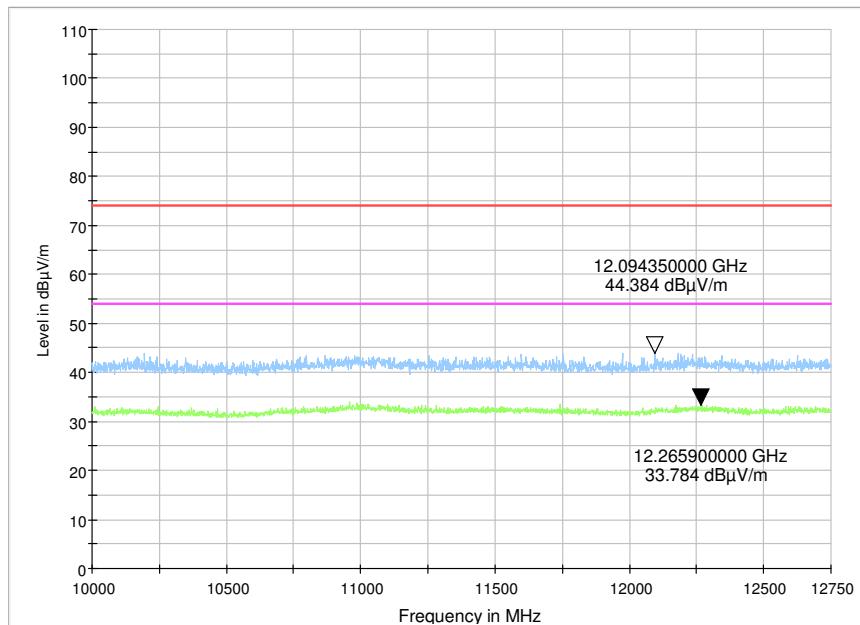


**Note: 2461.70MHz is the EUT WiFi working frequency.**



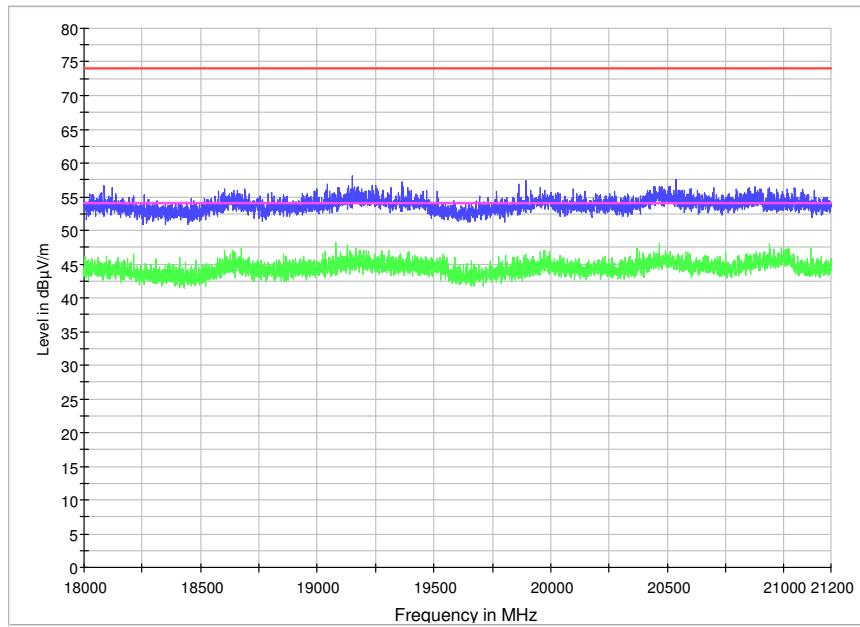
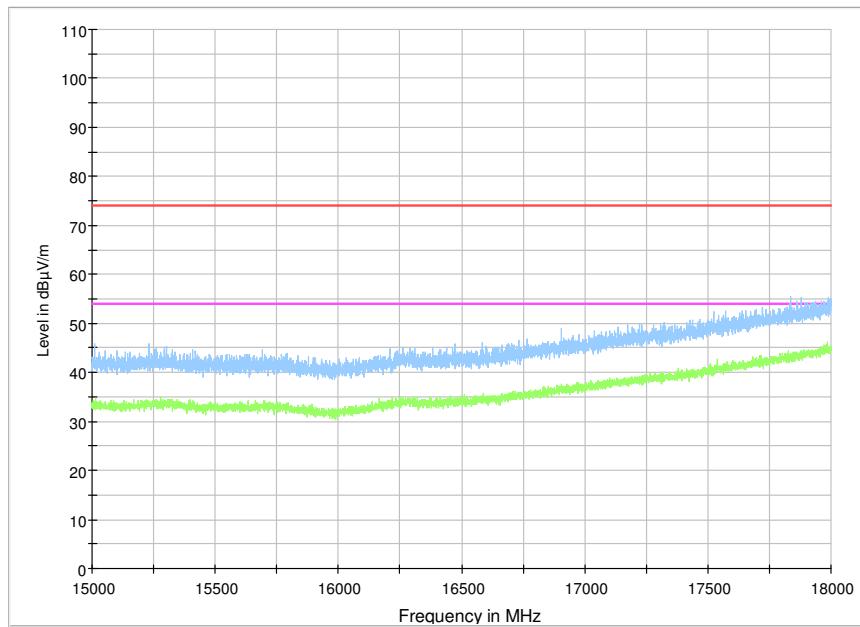
**SGS-CSTC Standards  
Technical Services  
(Shanghai)Co., Ltd.**

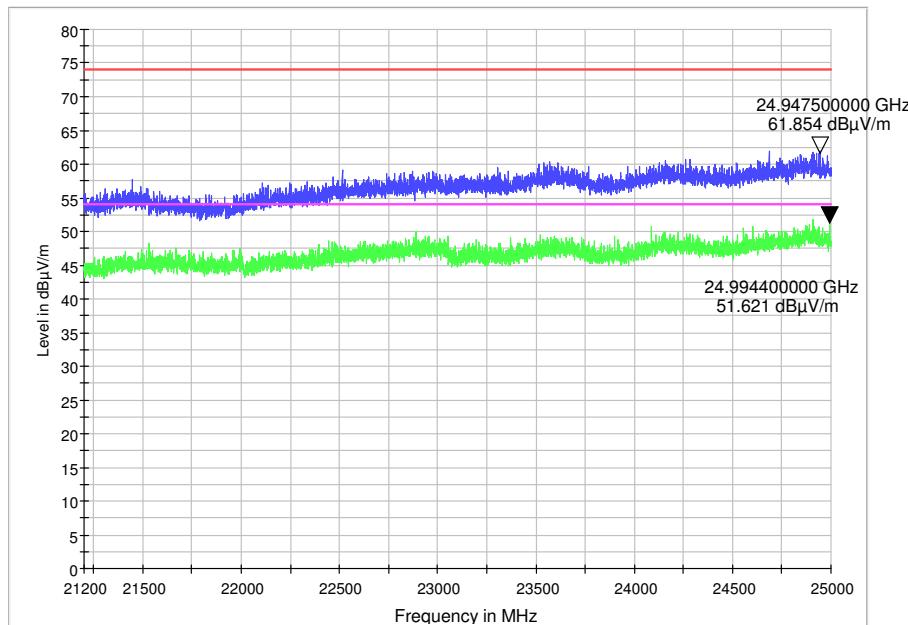
Report No.: SHEM110700097301  
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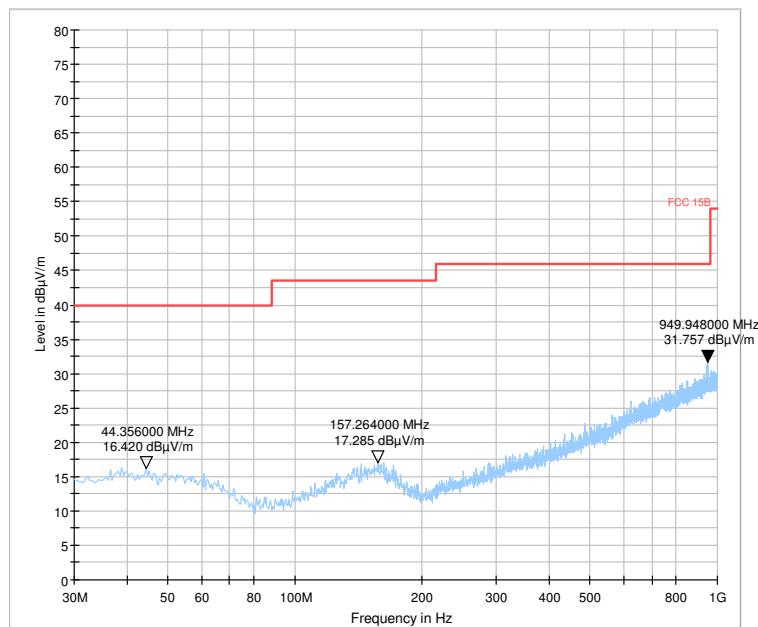
**SGS-CSTC Standards  
Technical Services  
(Shanghai)Co., Ltd.**

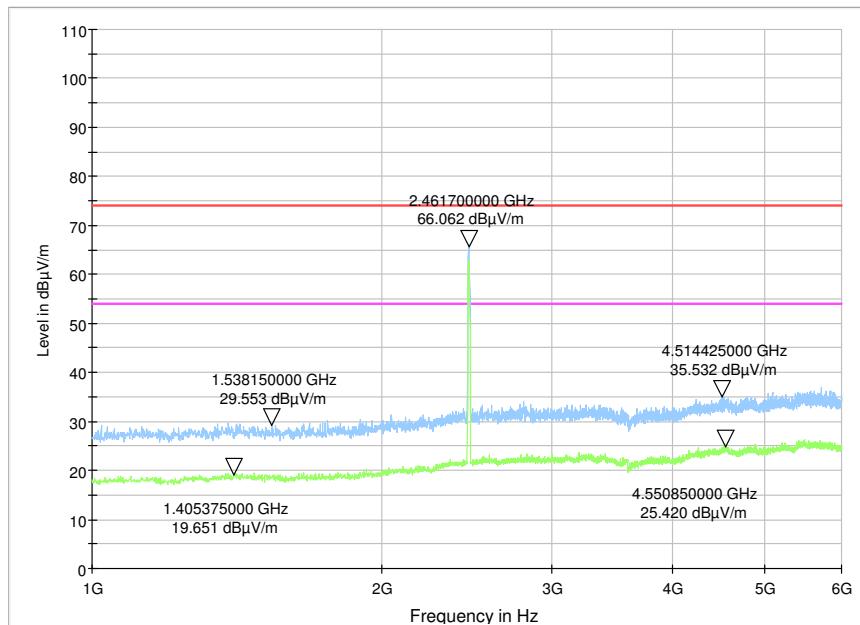
Report No.: SHEM110700097301  
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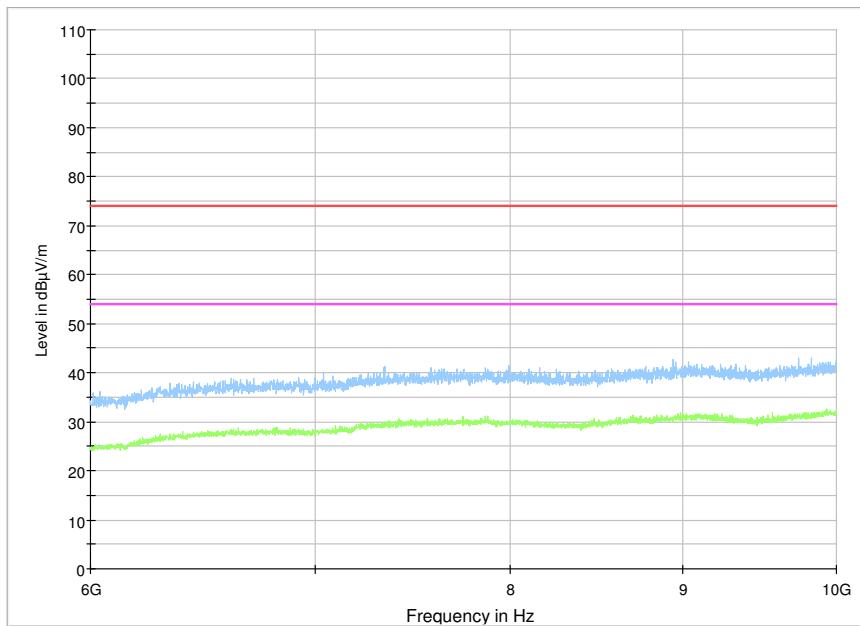


**Horizontal**



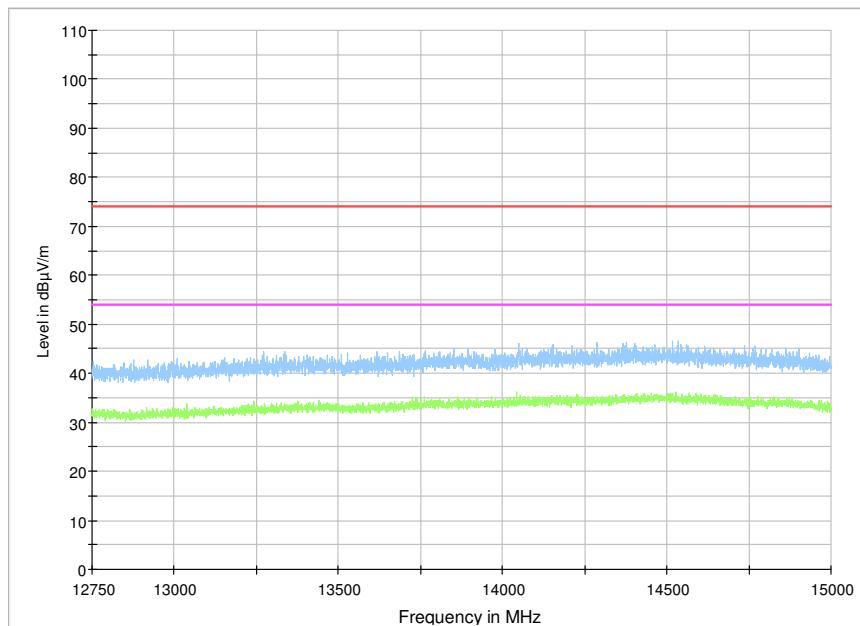
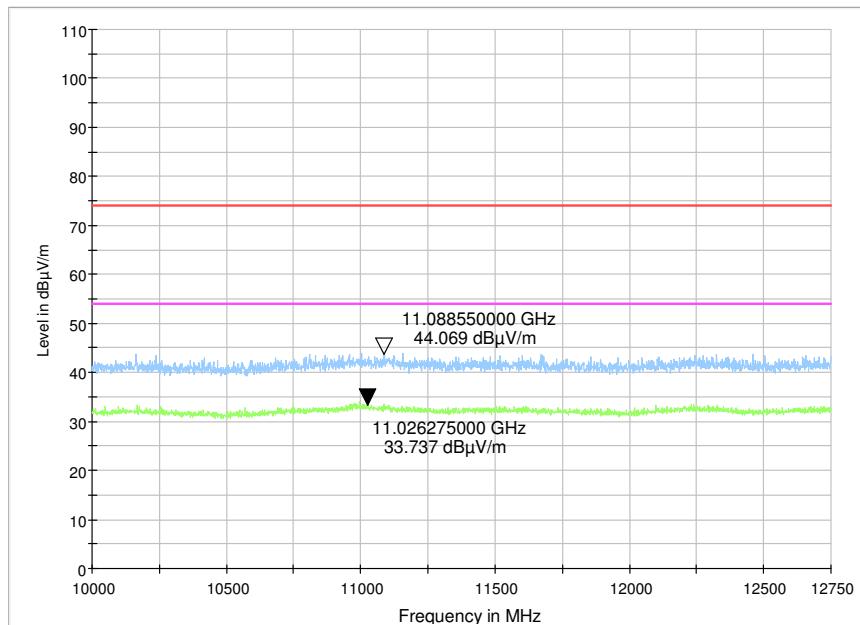


**Note: 2461.70MHz is the EUT WiFi working frequency.**



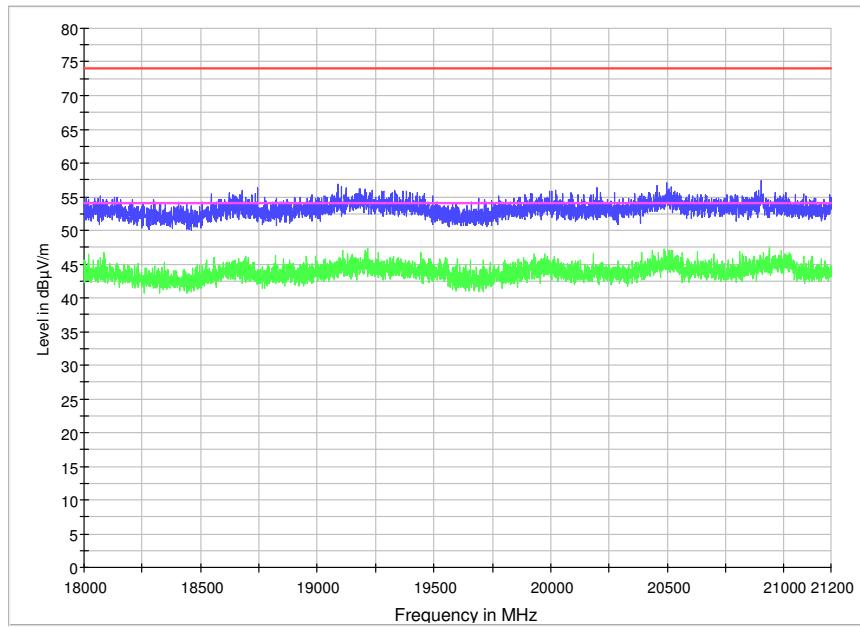
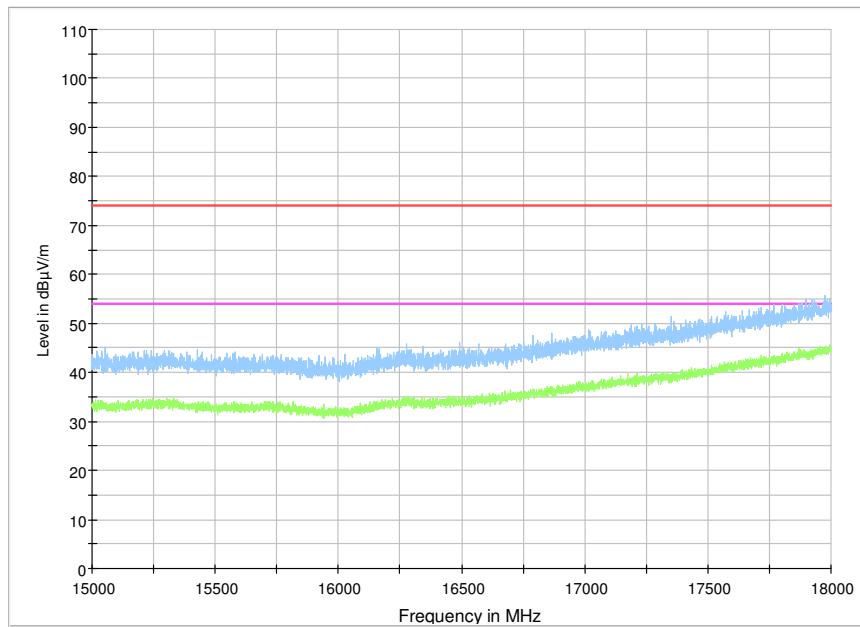
**SGS-CSTC Standards  
Technical Services  
(Shanghai)Co., Ltd.**

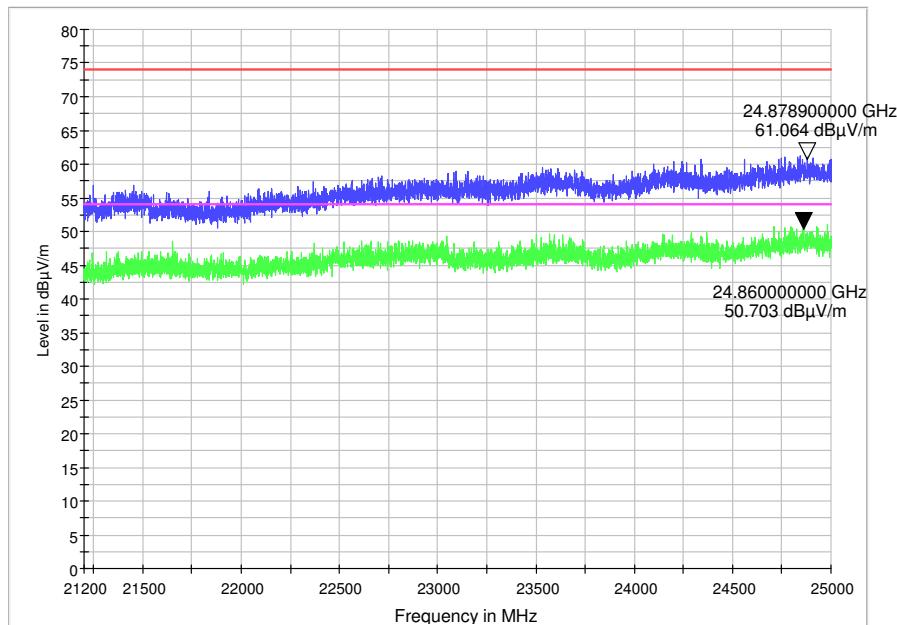
Report No.: SHEM110700097301  
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**SGS-CSTC Standards  
Technical Services  
(Shanghai)Co., Ltd.**

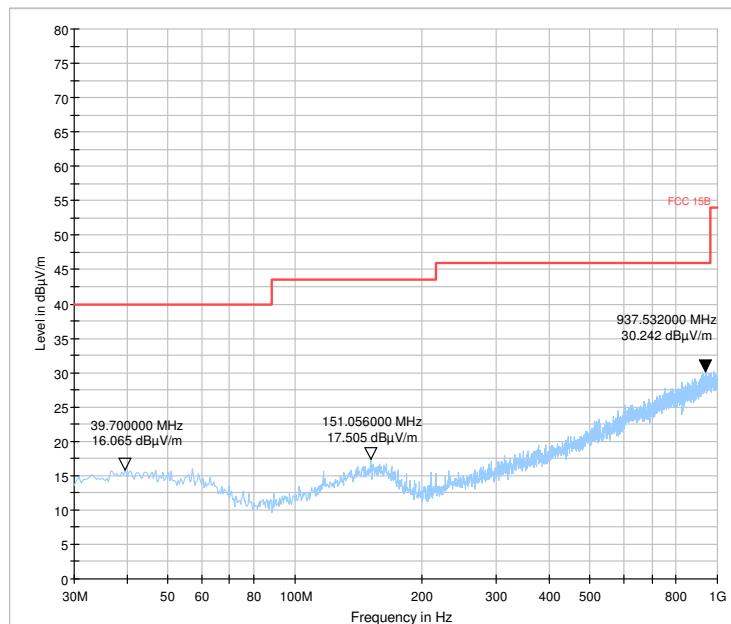
Report No.: SHEM110700097301  
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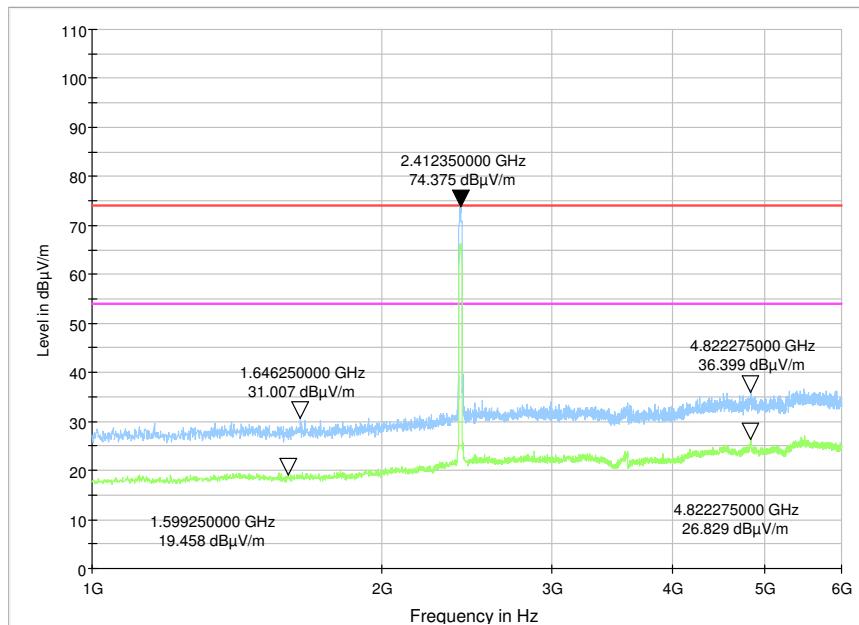




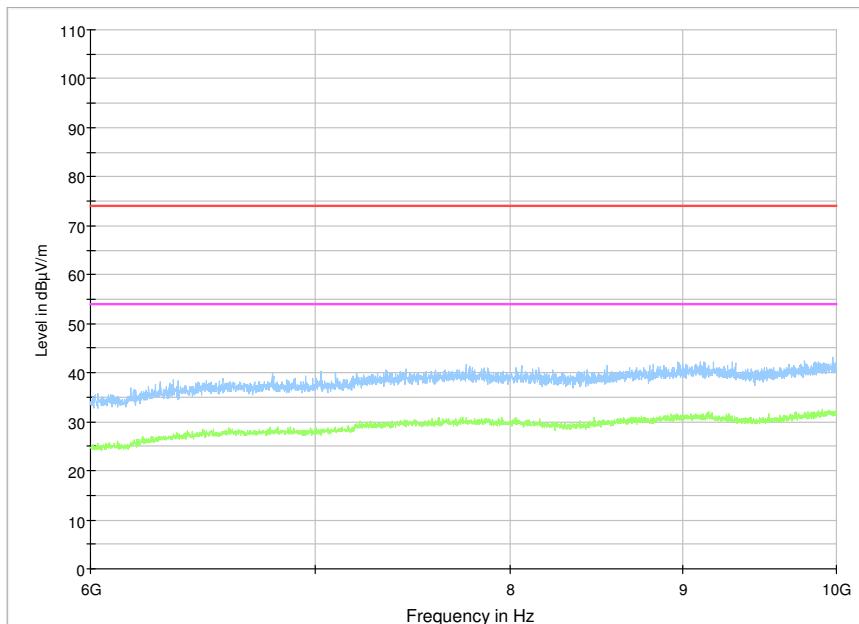
**Operation Mode: 802.11g TX CH Low 6M**

Vertical



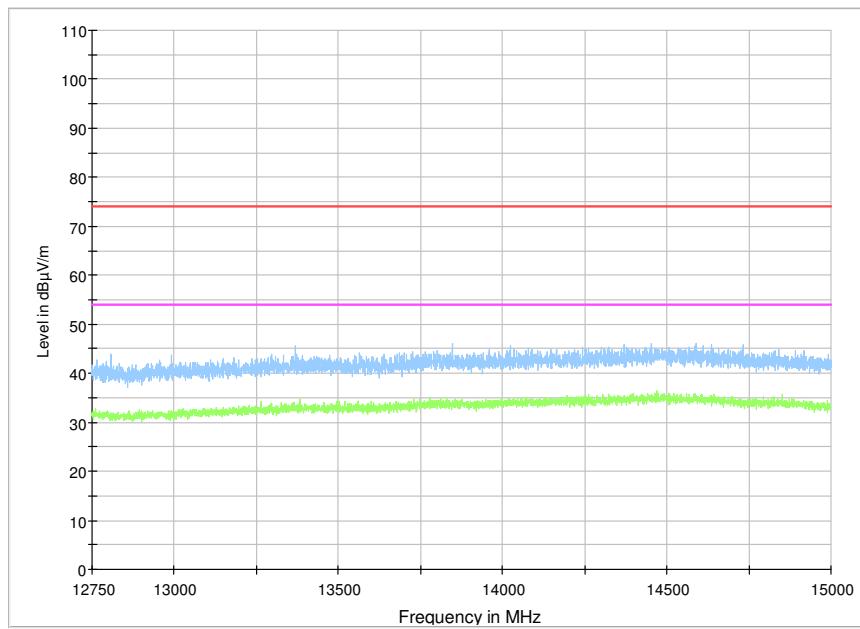
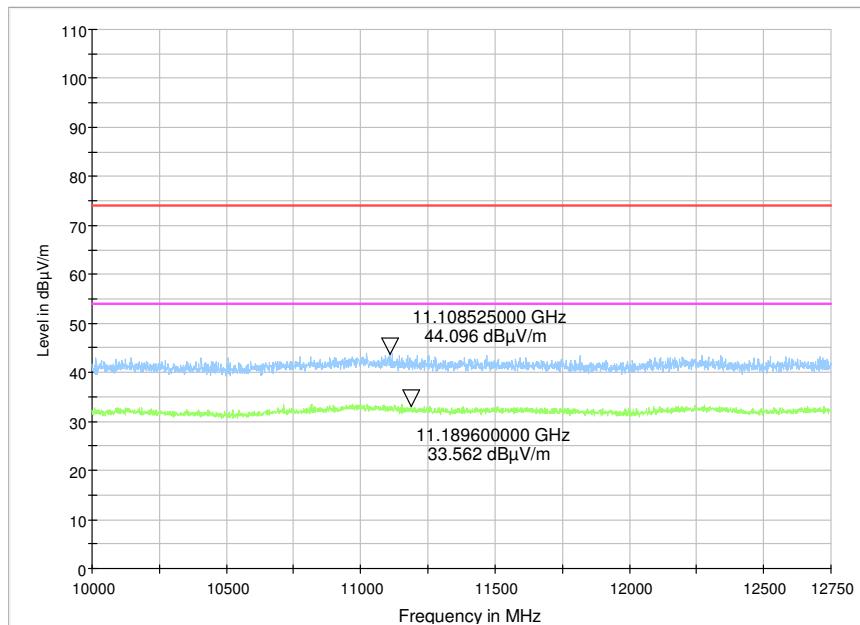


**Note: 2412.35MHz is the EUT WiFi working frequency.**



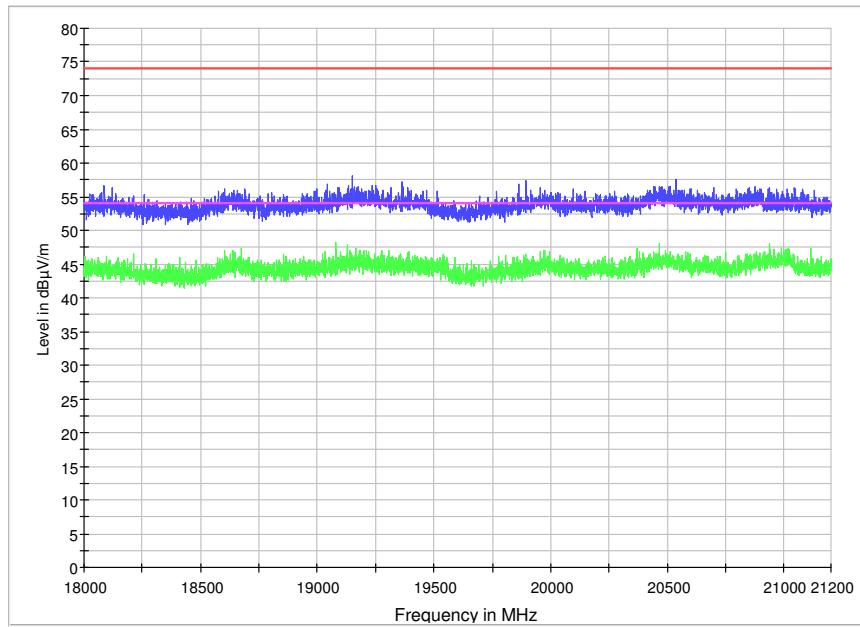
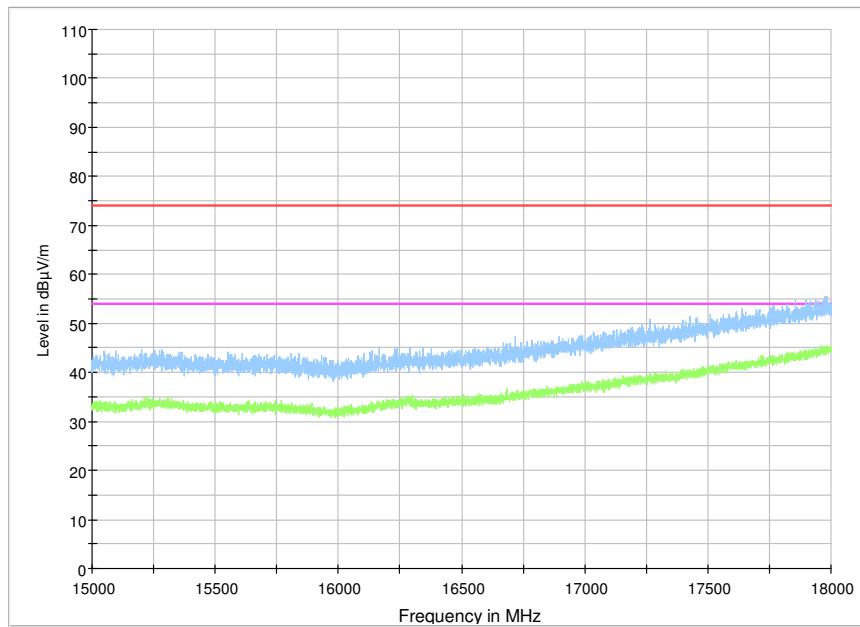
**SGS-CSTC Standards  
Technical Services  
(Shanghai)Co., Ltd.**

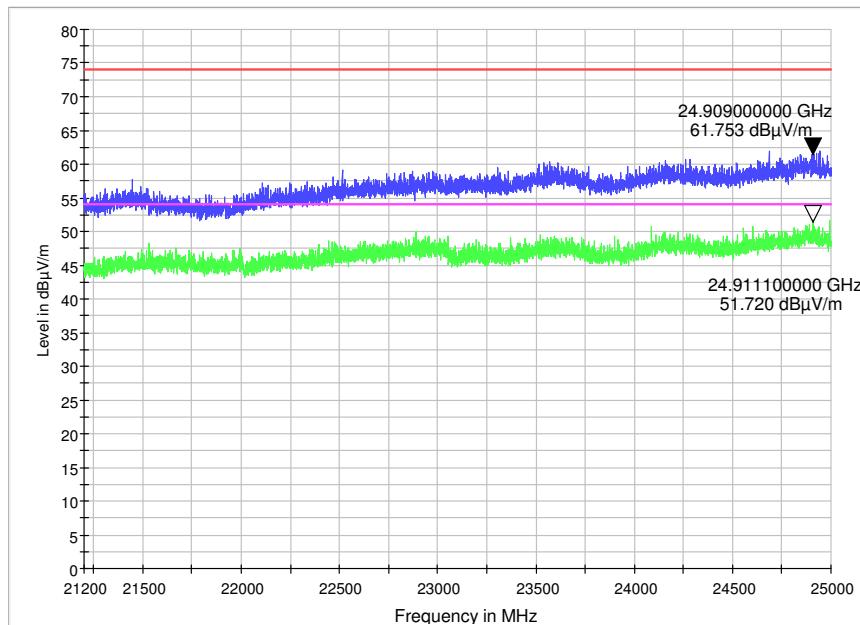
Report No.: SHEM110700097301  
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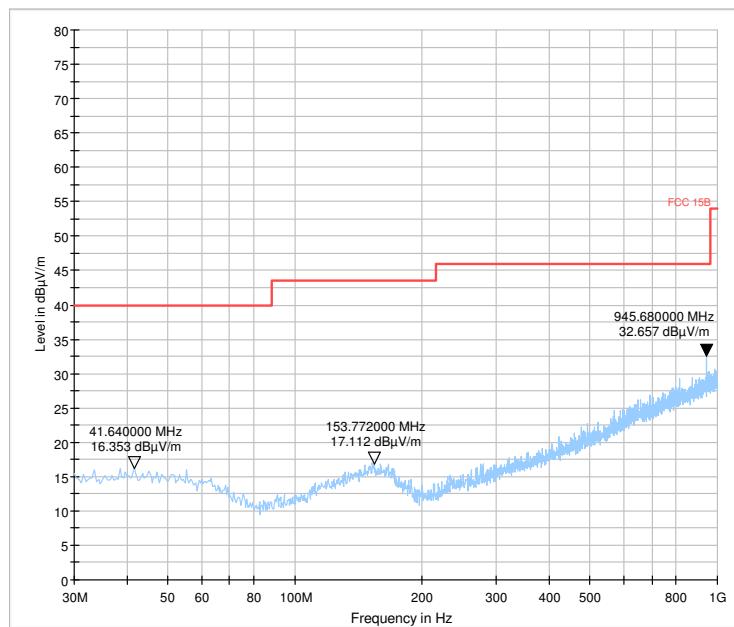
**SGS-CSTC Standards  
Technical Services  
(Shanghai)Co., Ltd.**

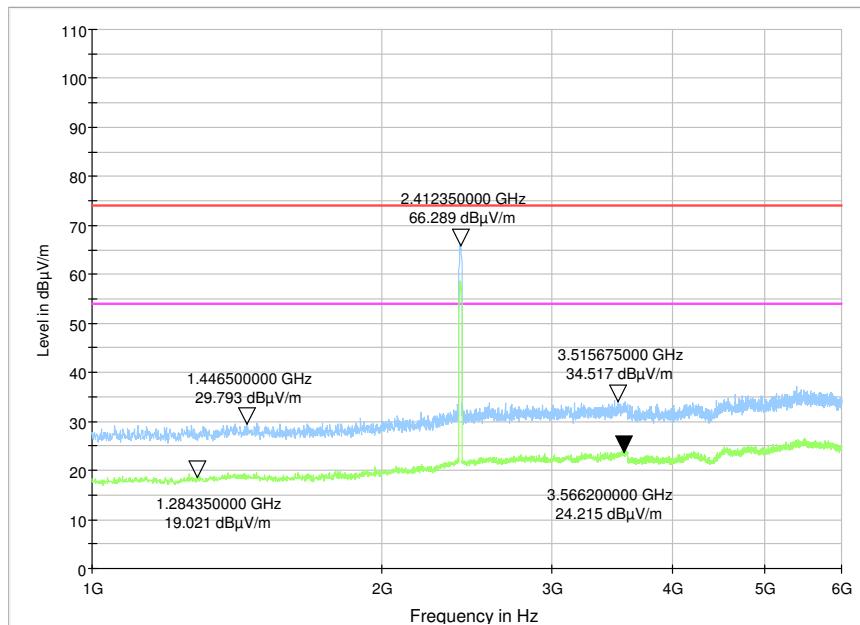
Report No.: SHEM110700097301  
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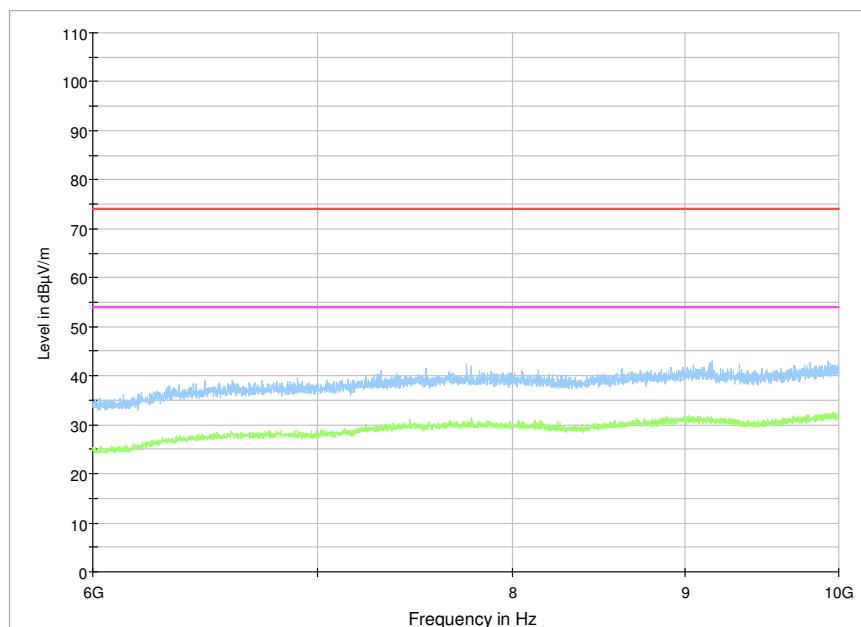


**Horizontal**



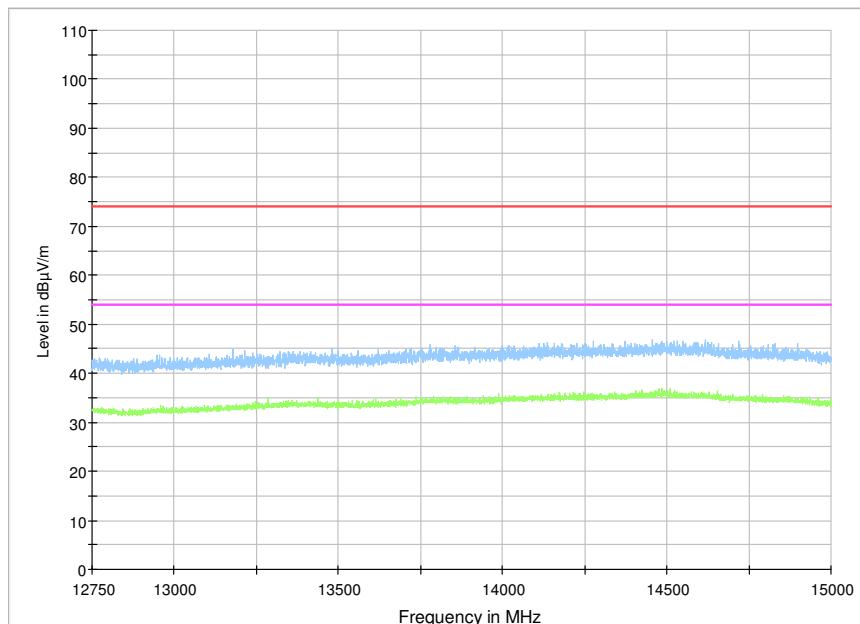
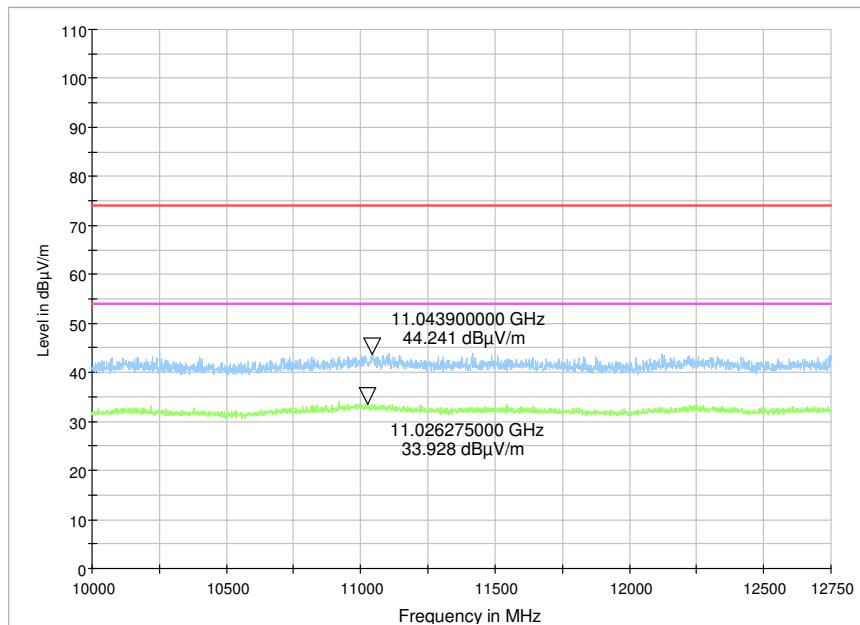


**Note: 2412.35MHz is the EUT WiFi working frequency.**



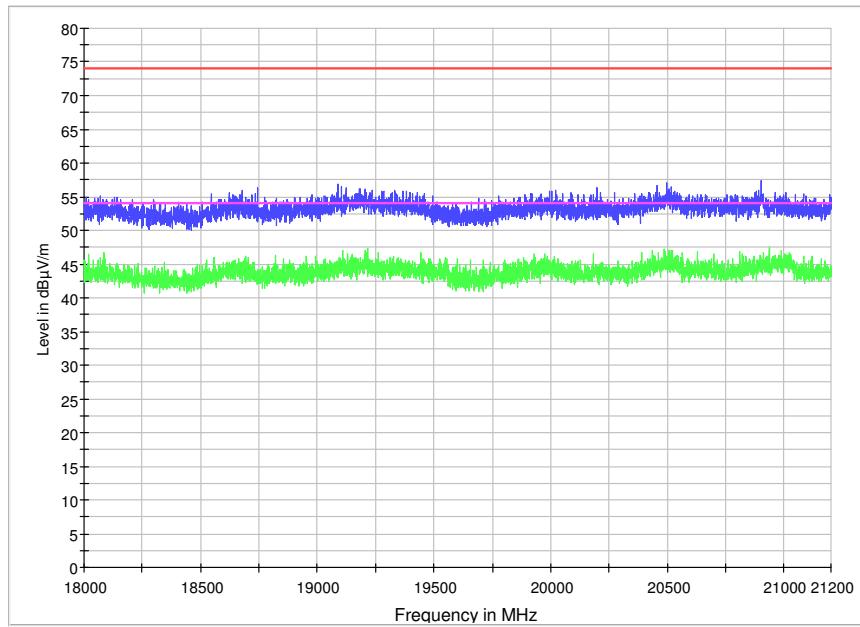
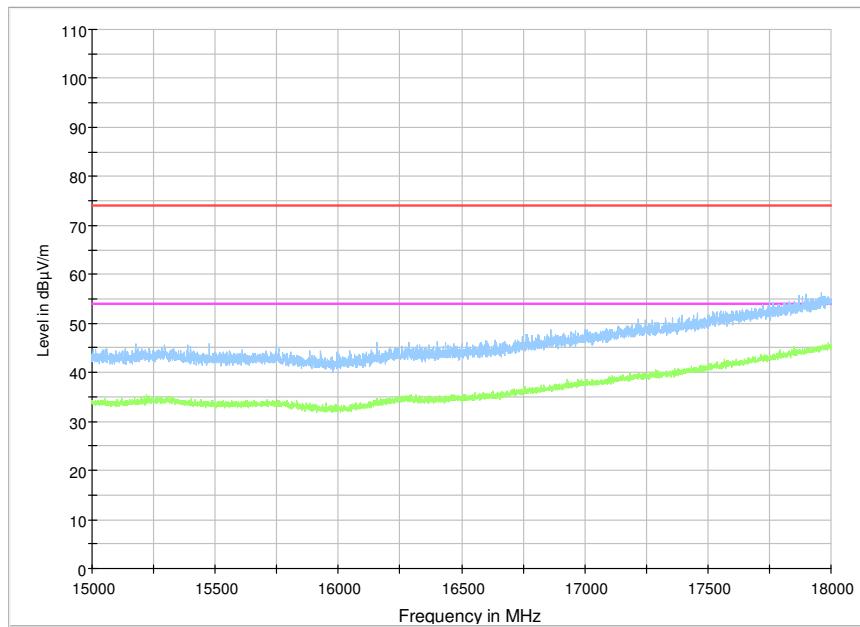
**SGS-CSTC Standards  
Technical Services  
(Shanghai)Co., Ltd.**

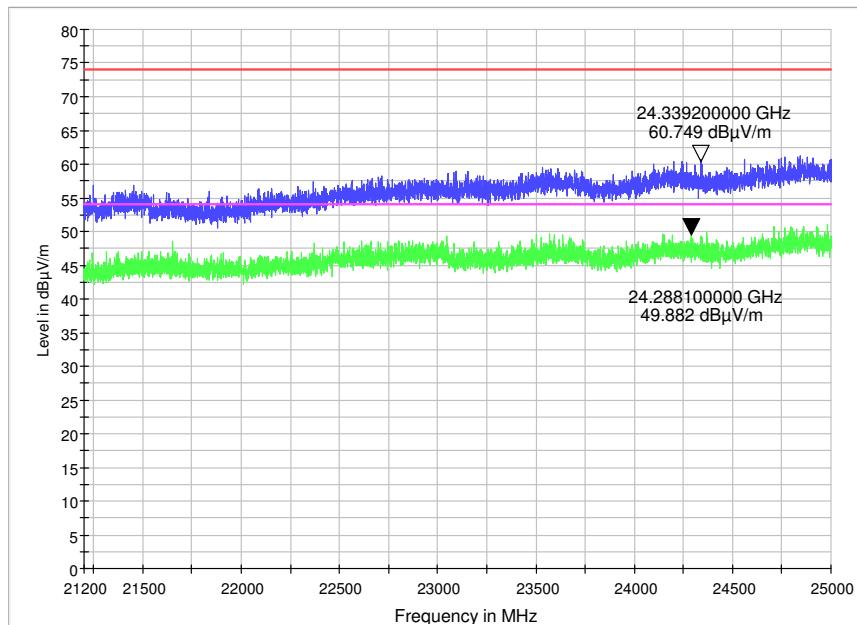
Report No.: SHEM110700097301  
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Technical Services  
(Shanghai)Co., Ltd.**

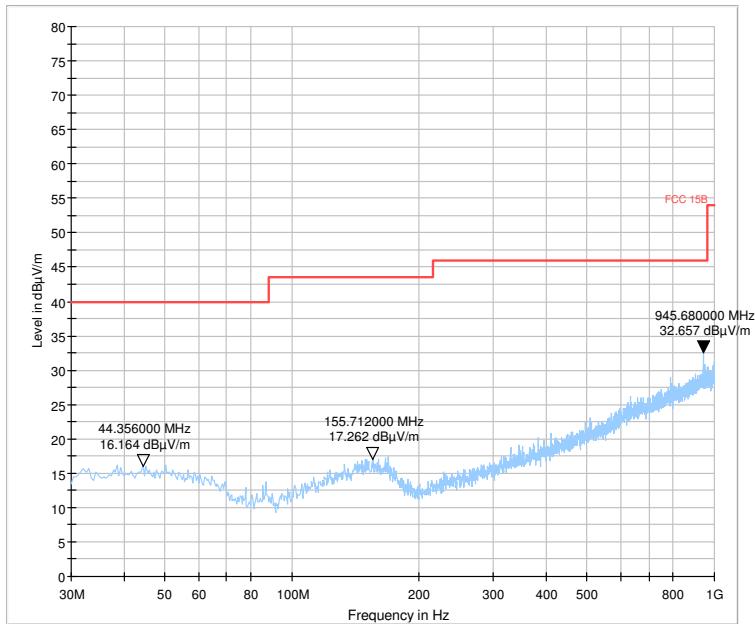
Report No.: SHEM110700097301  
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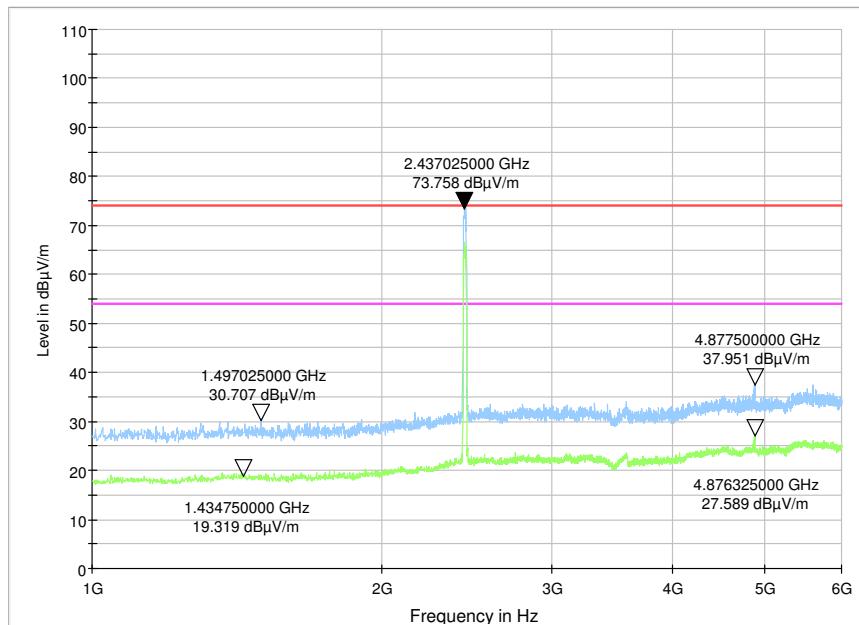




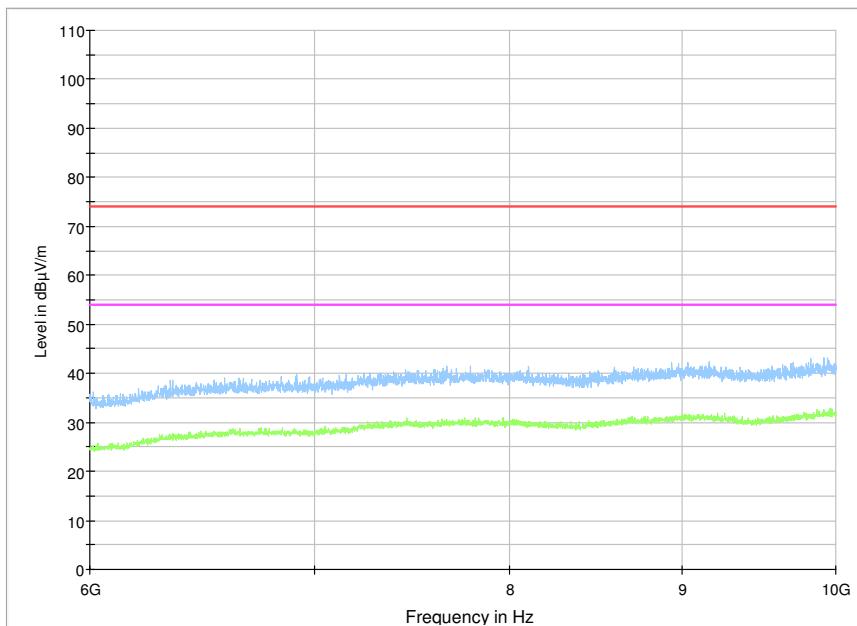
**Operation Mode: 802.11g TX CH Mid 6M**

Vertical



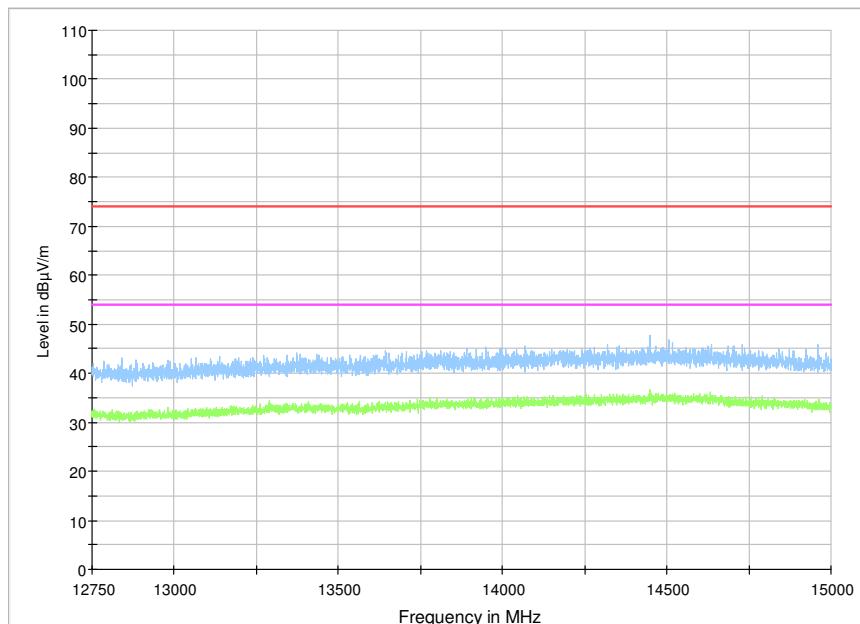
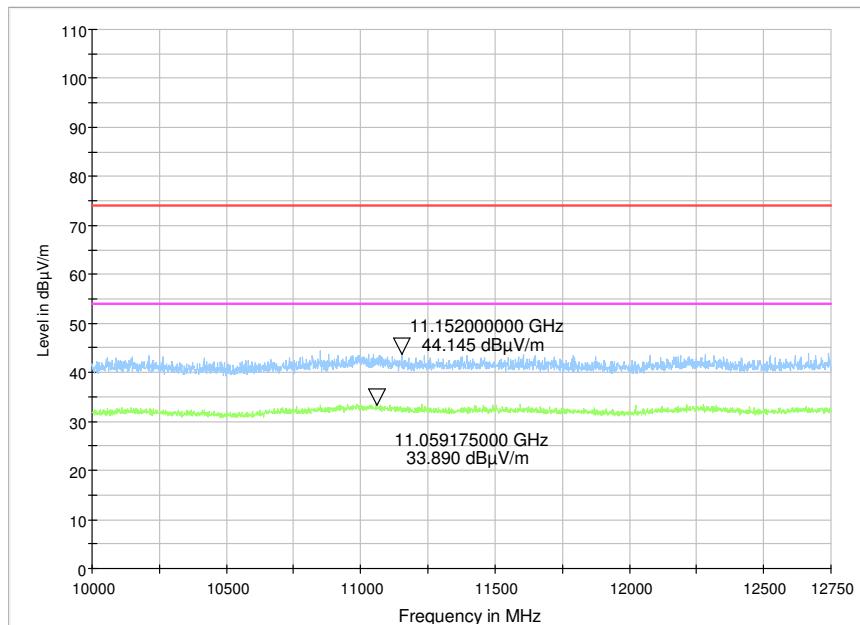


Note: 2437.03MHz is the EUT WiFi working frequency.



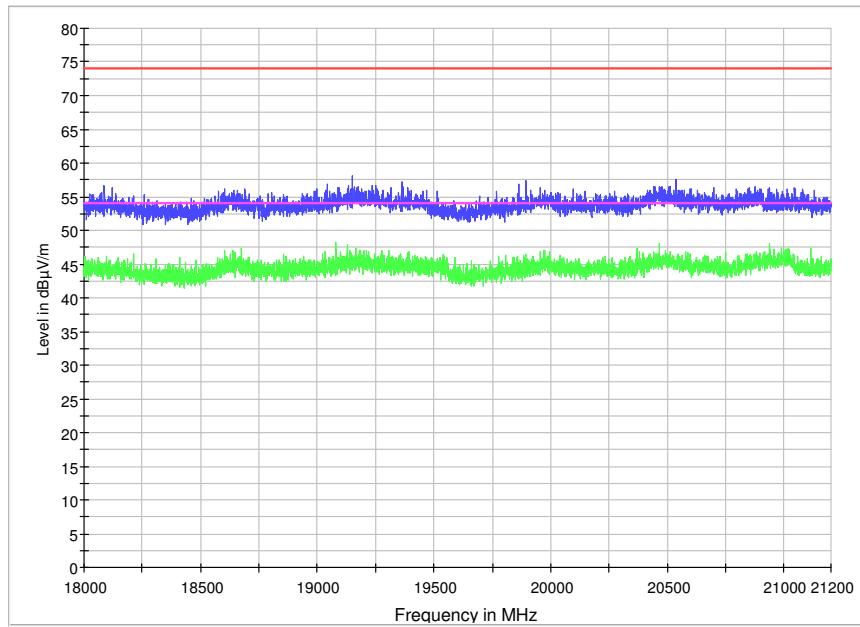
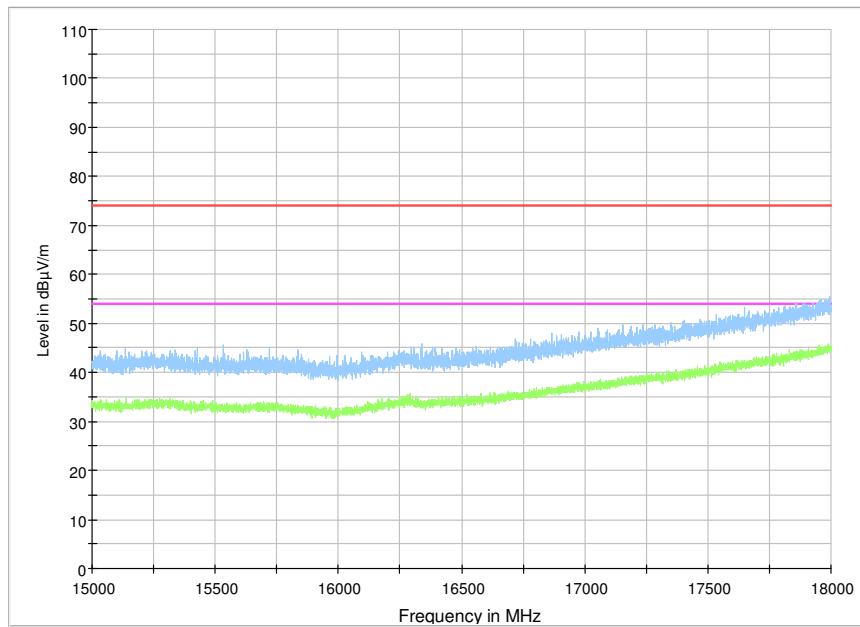
**SGS-CSTC Standards  
Technical Services  
(Shanghai)Co., Ltd.**

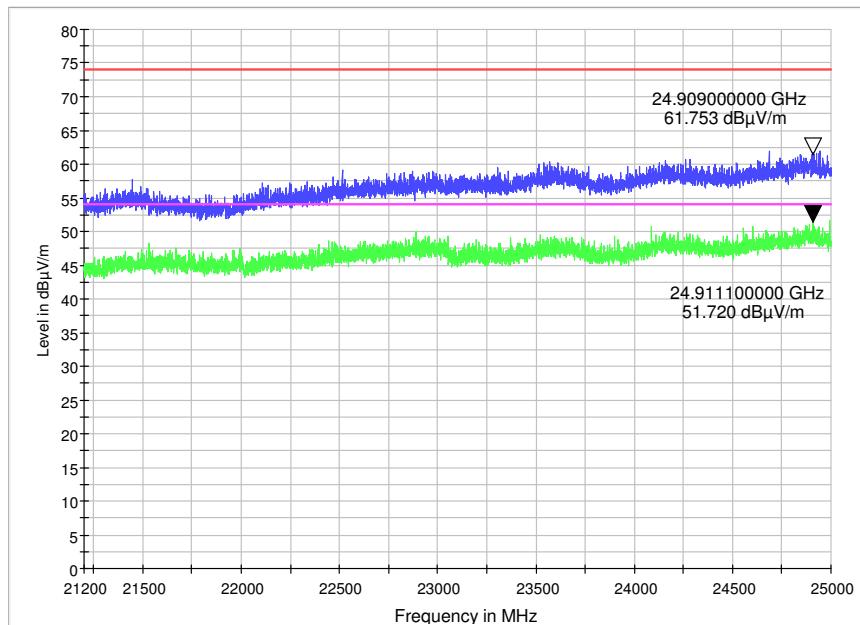
Report No.: SHEM110700097301  
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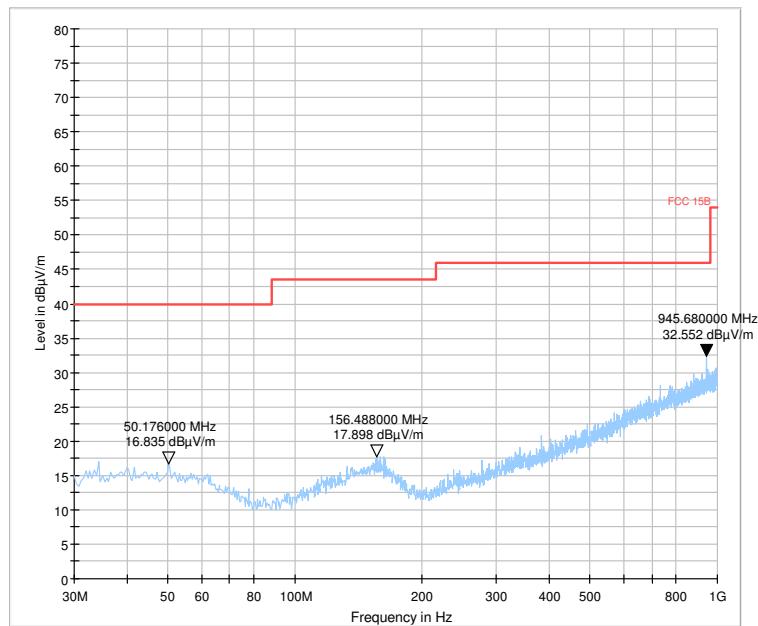
**SGS-CSTC Standards  
Technical Services  
(Shanghai)Co., Ltd.**

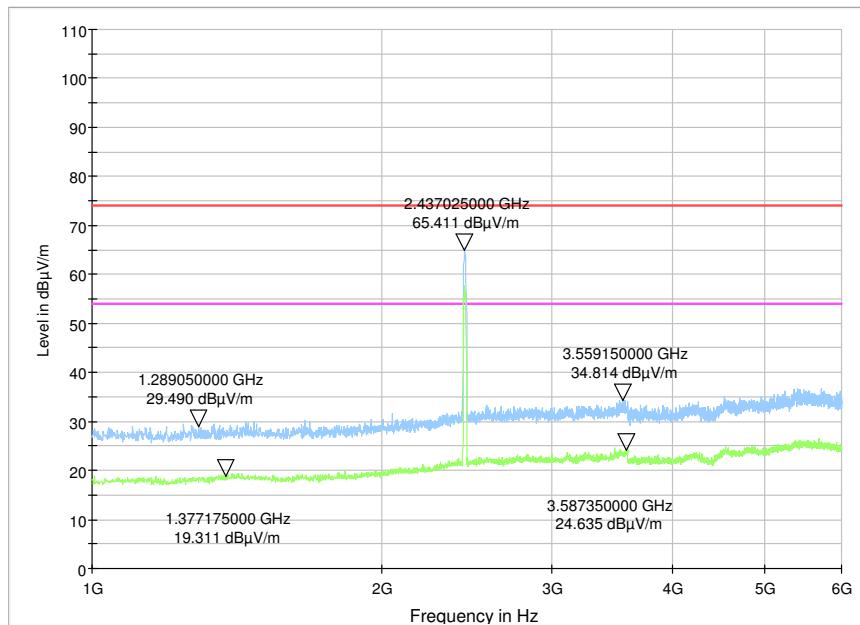
Report No.: SHEM110700097301  
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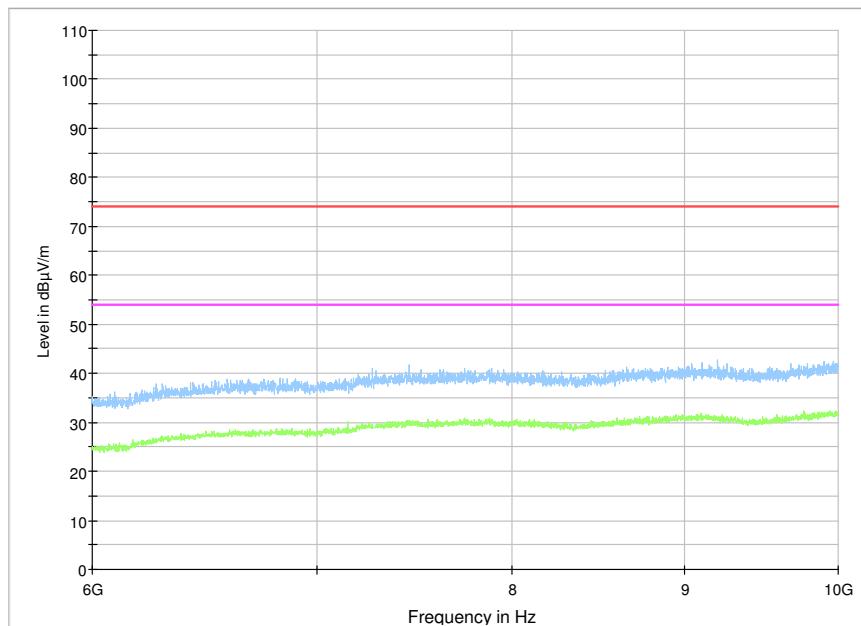


**Horizontal**



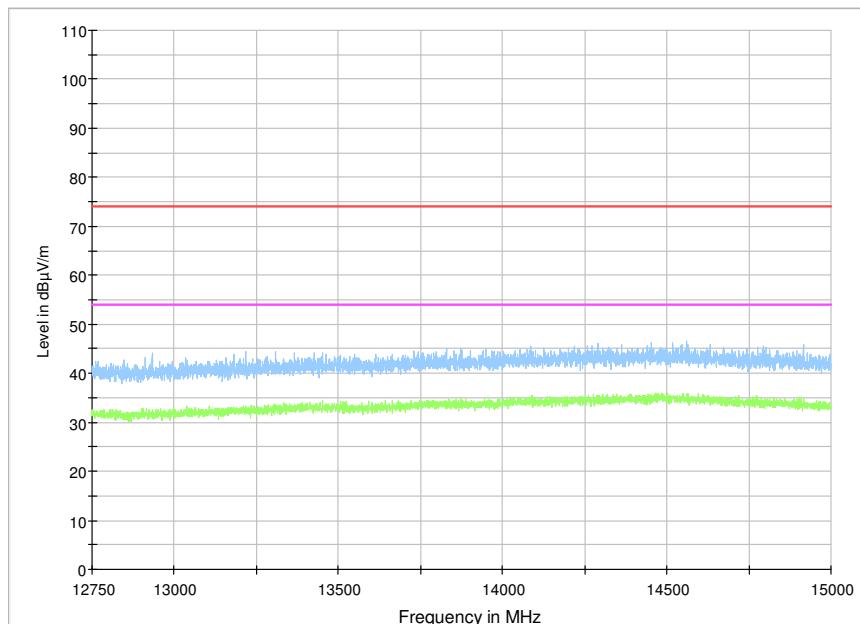
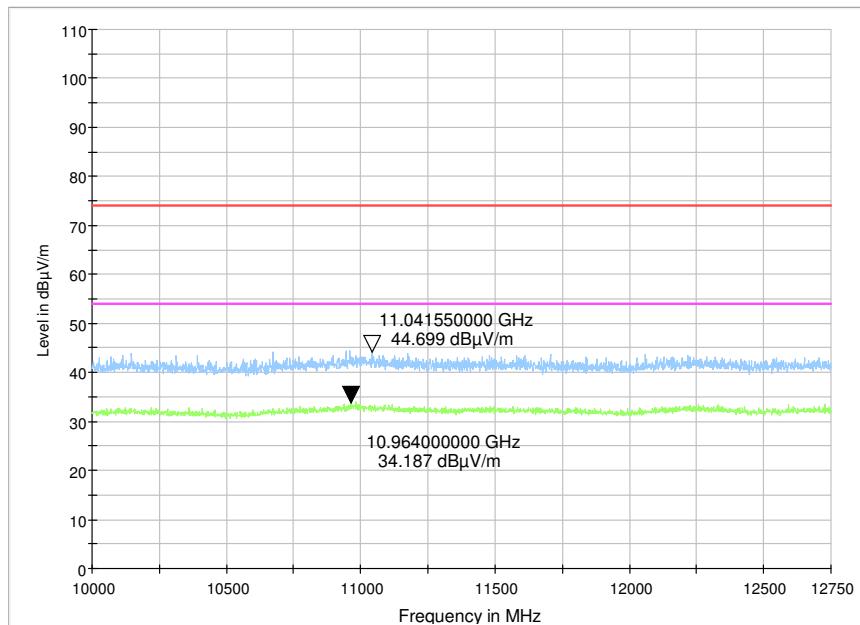


**Note: 2437.03MHz is the EUT WiFi working frequency.**



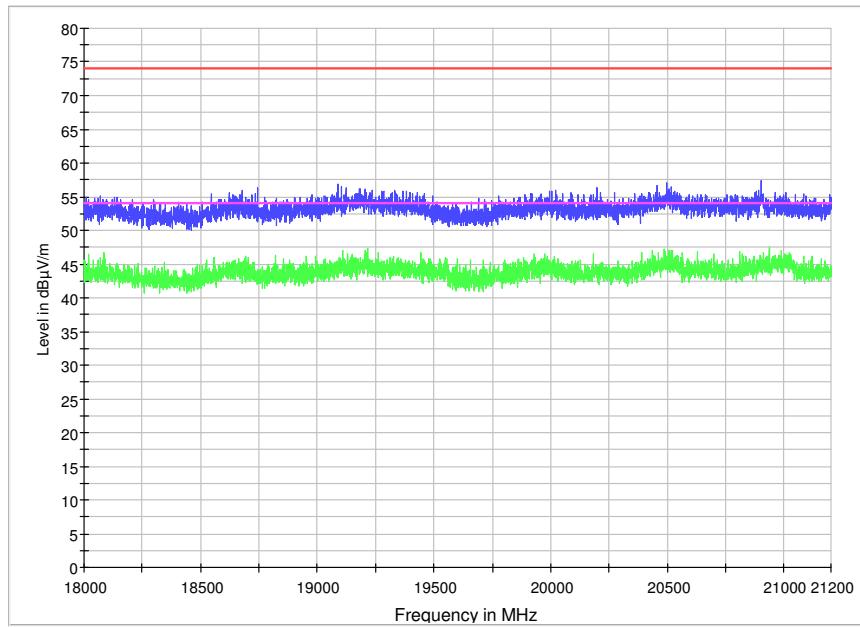
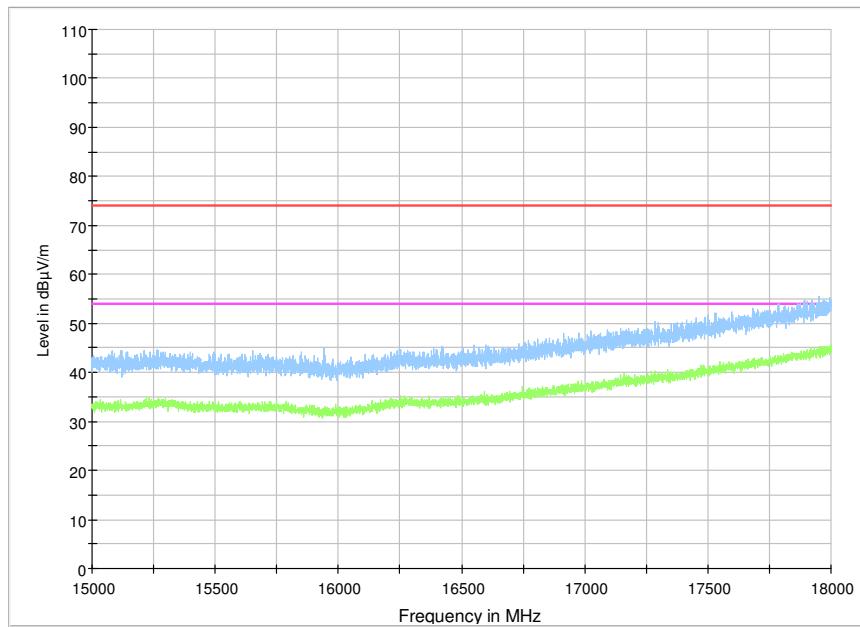
**SGS-CSTC Standards  
Technical Services  
(Shanghai)Co., Ltd.**

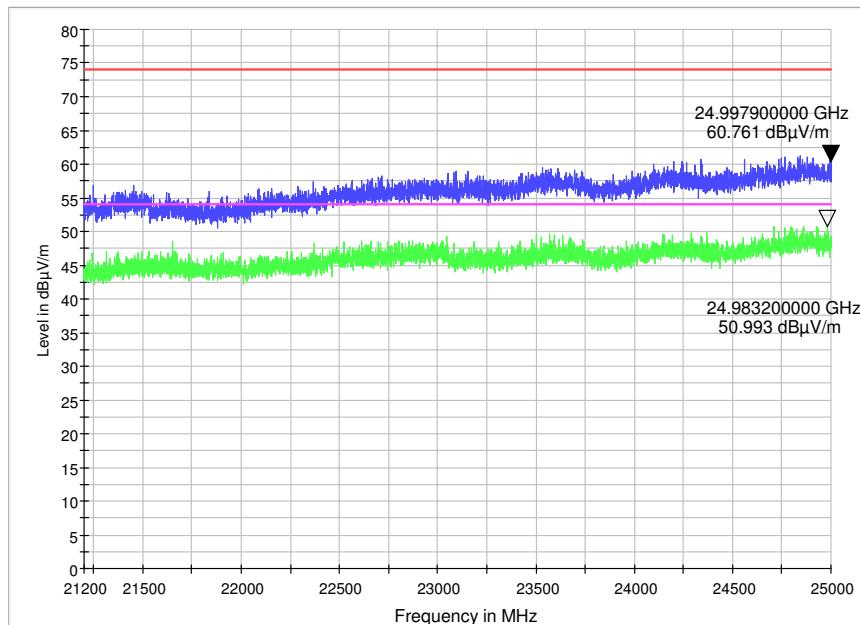
Report No.: SHEM110700097301  
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**SGS-CSTC Standards  
Technical Services  
(Shanghai)Co., Ltd.**

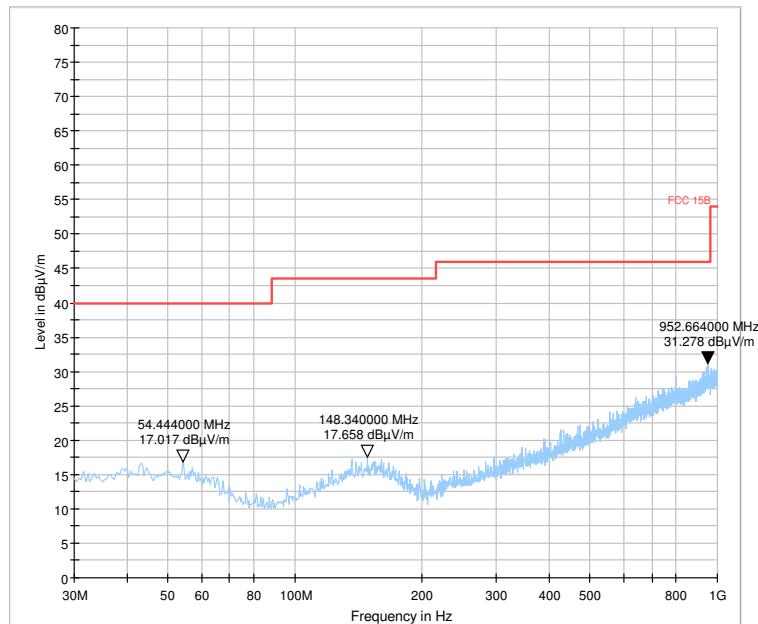
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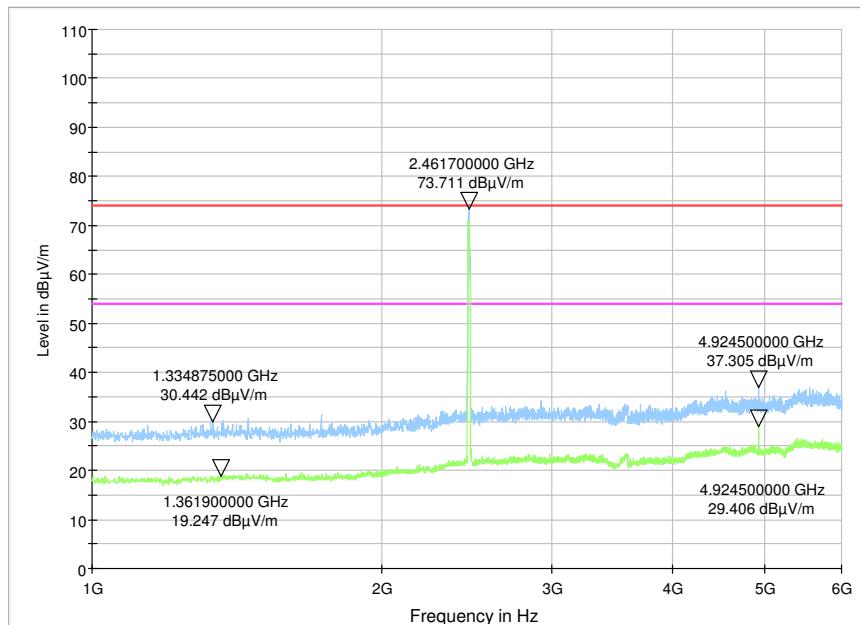




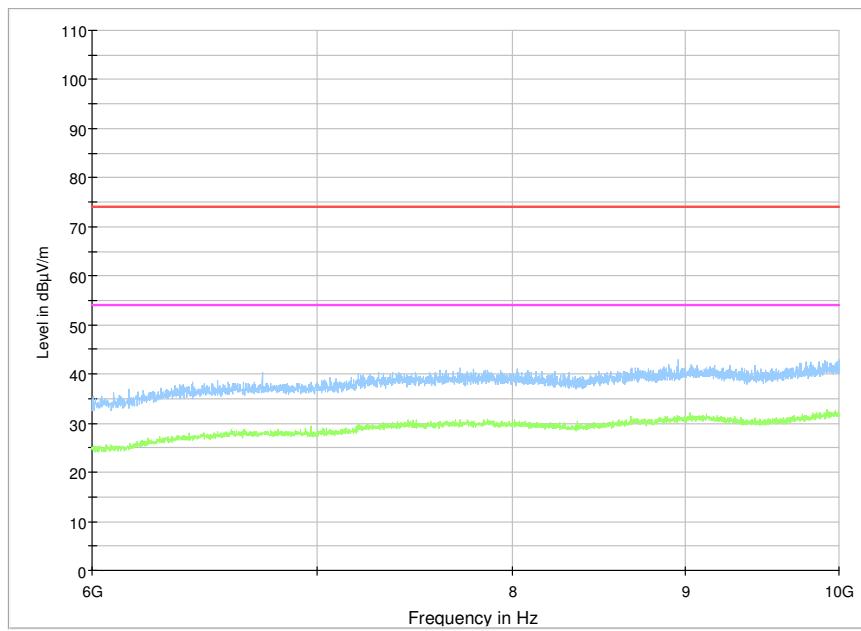
**Operation Mode: 802.11g TX CH High 6M**

Vertical



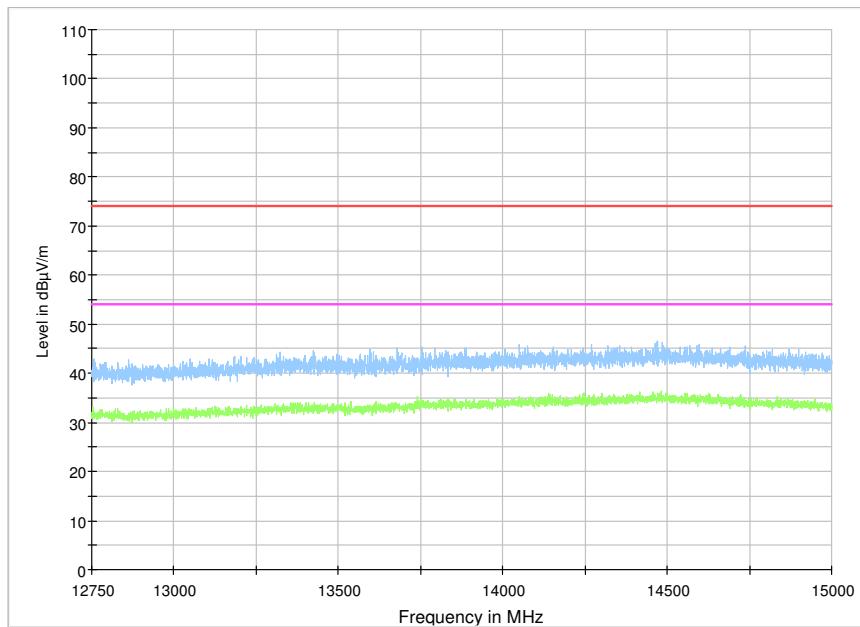
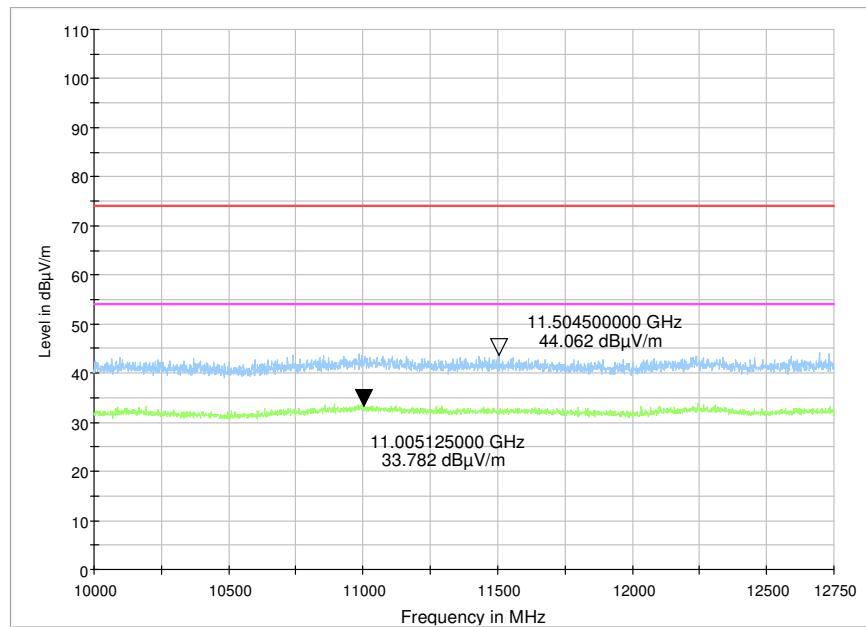


**Note: 2461.70MHz is the EUT WiFi working frequency.**



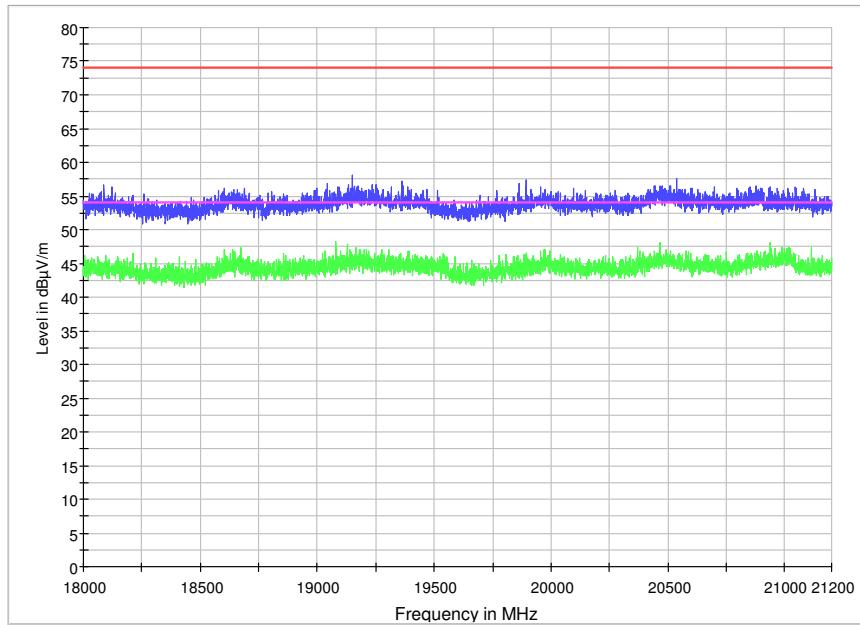
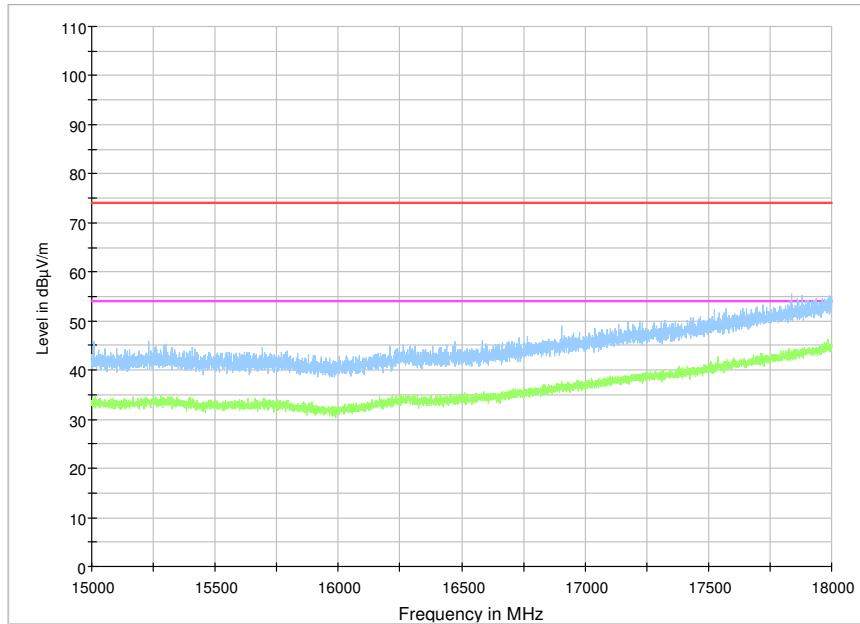
**SGS-CSTC Standards  
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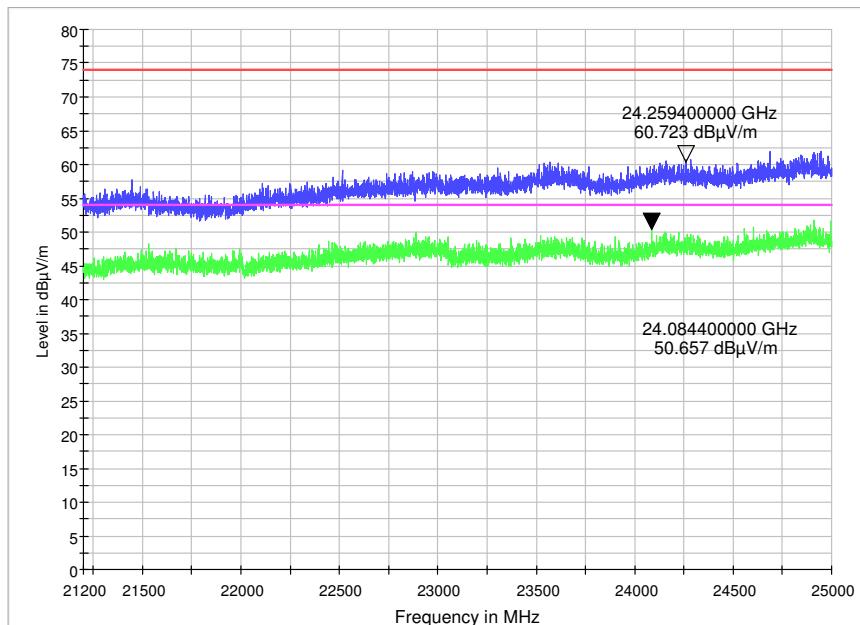
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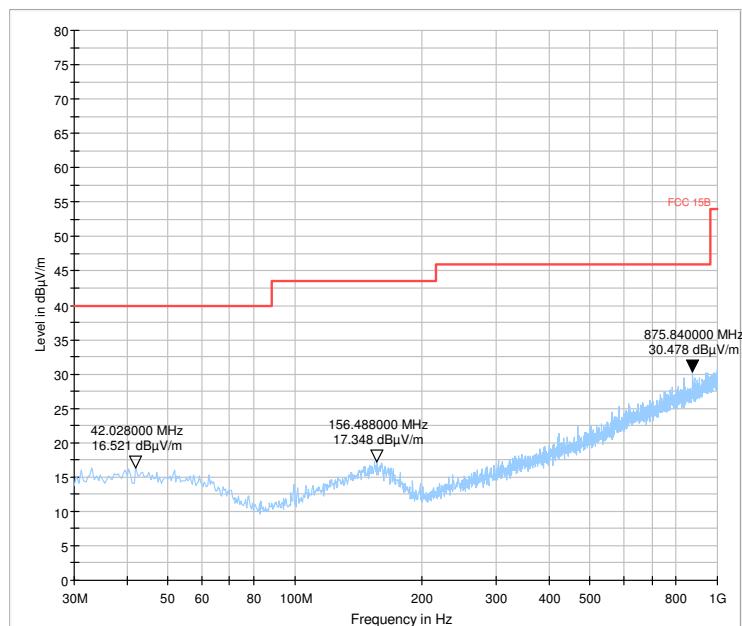
**SGS-CSTC Standards  
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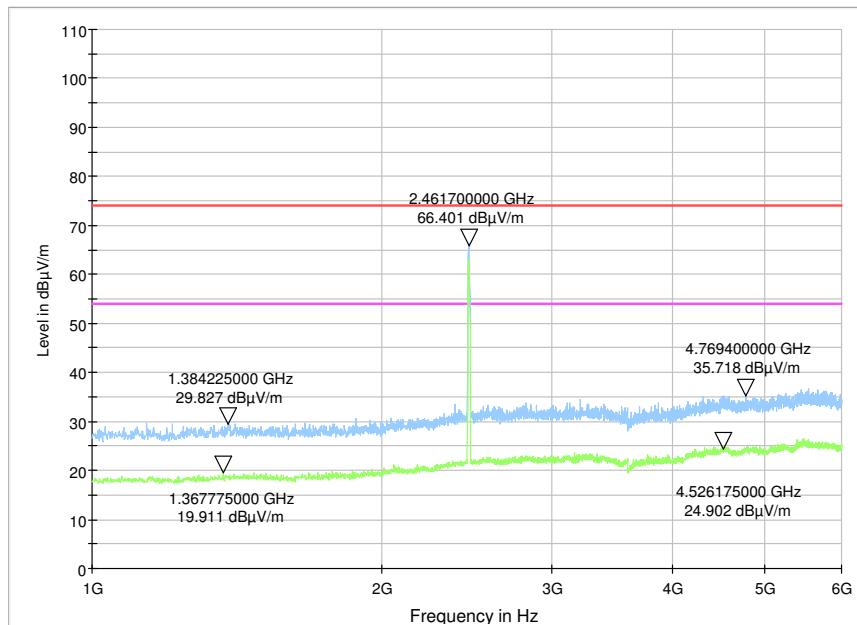
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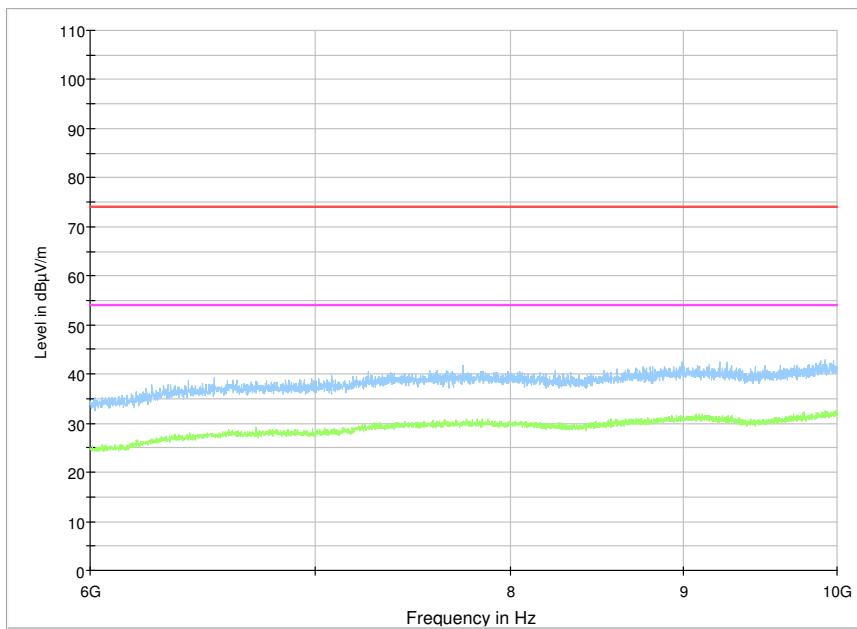


**Horizontal**



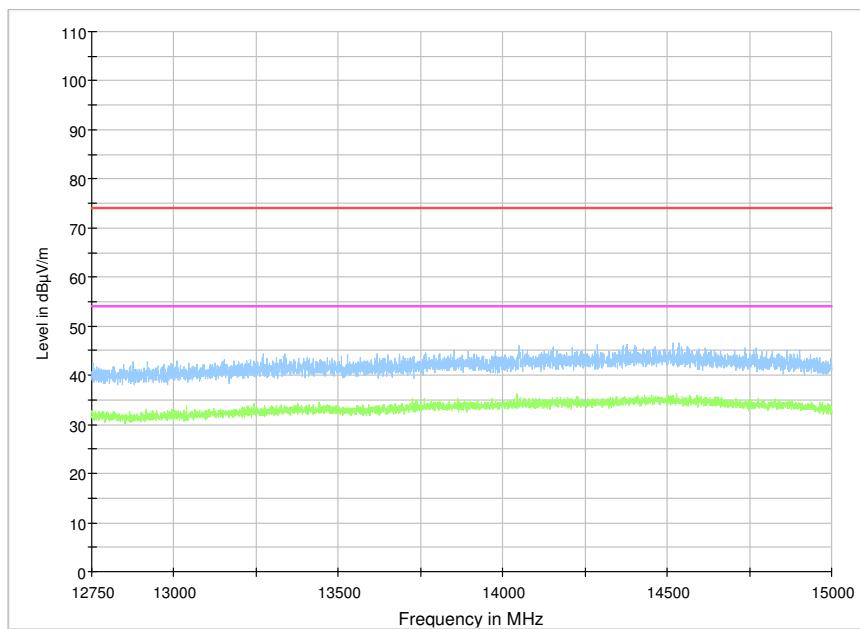
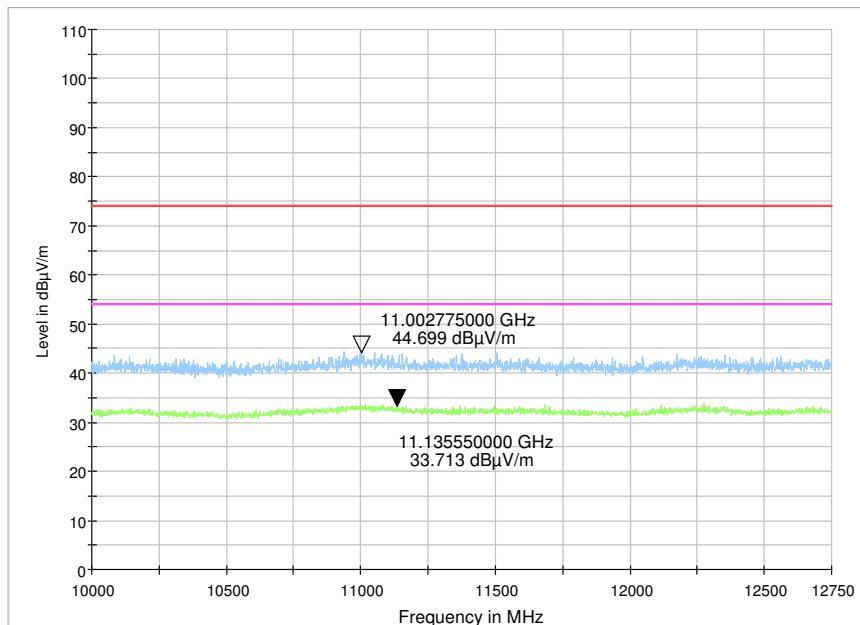


**Note: 2461.70MHz is the EUT WiFi working frequency.**



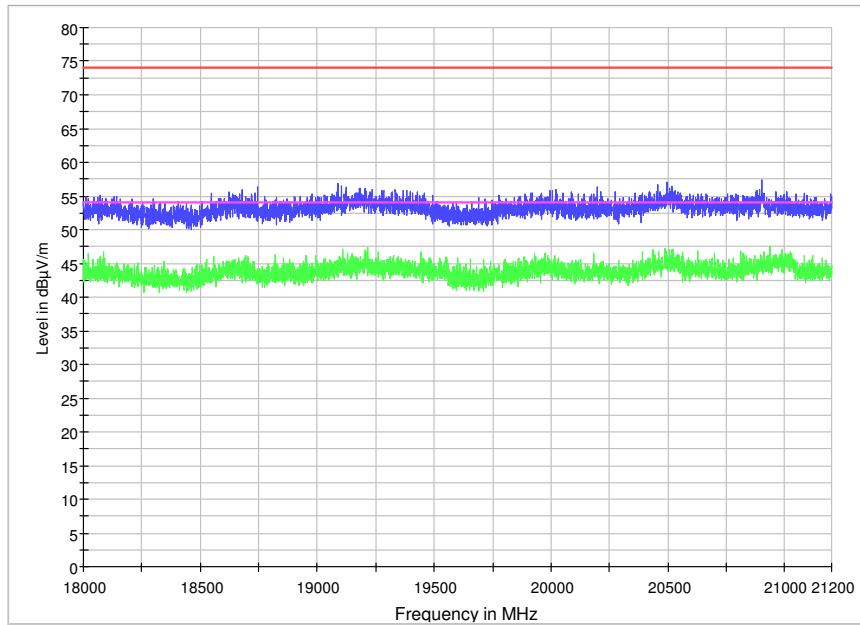
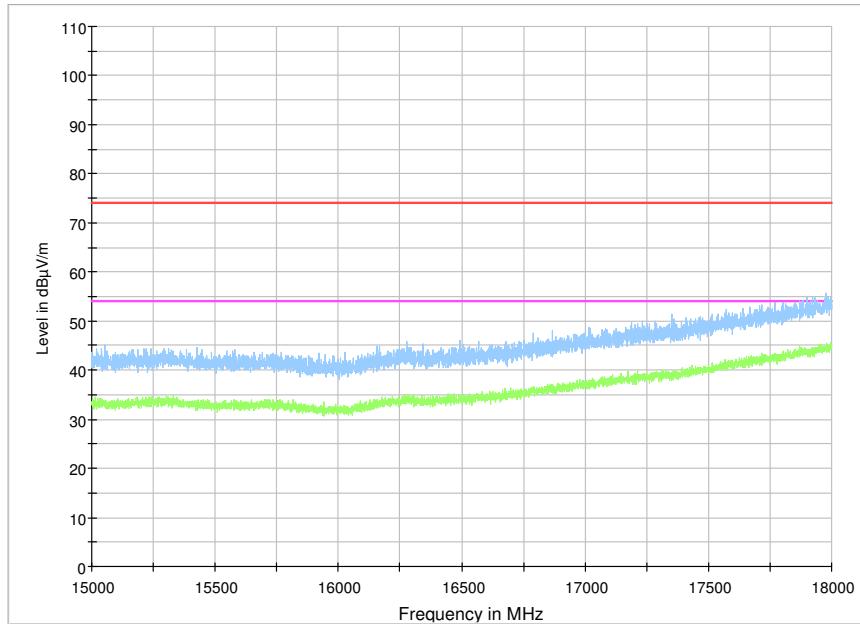
**SGS-CSTC Standards  
Technical Services  
(Shanghai)Co., Ltd.**

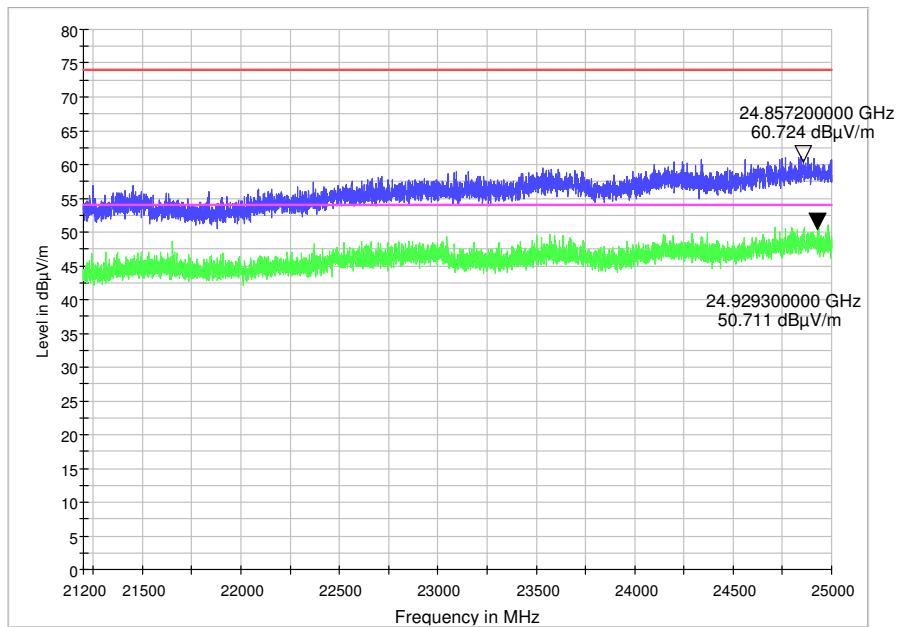
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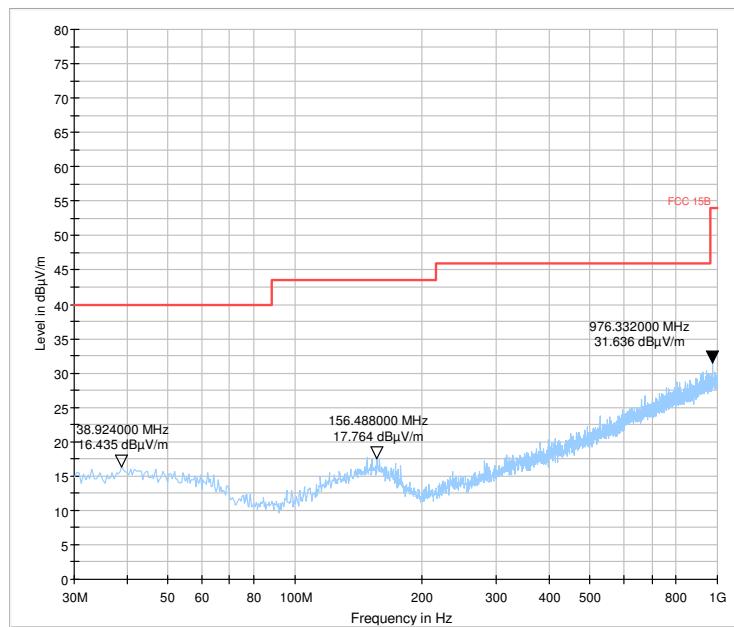
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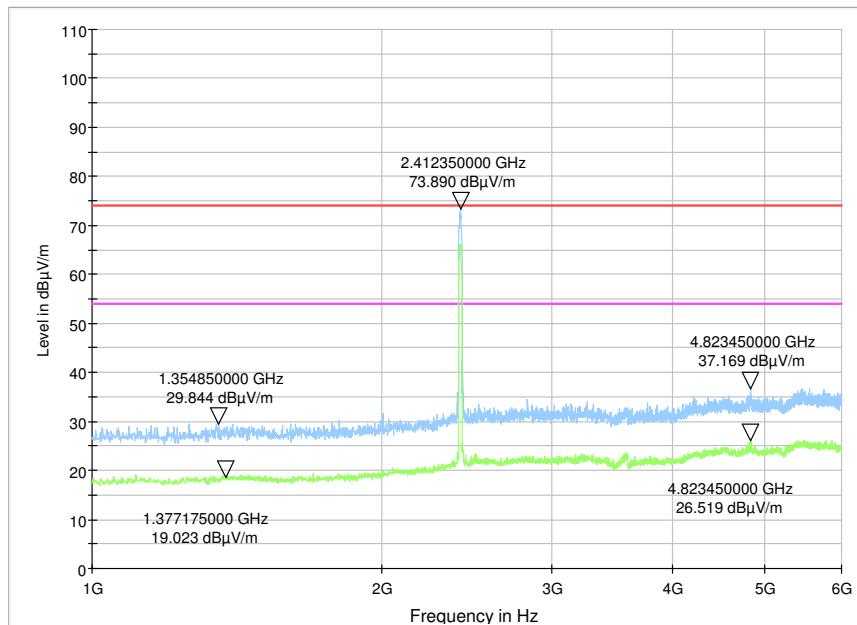




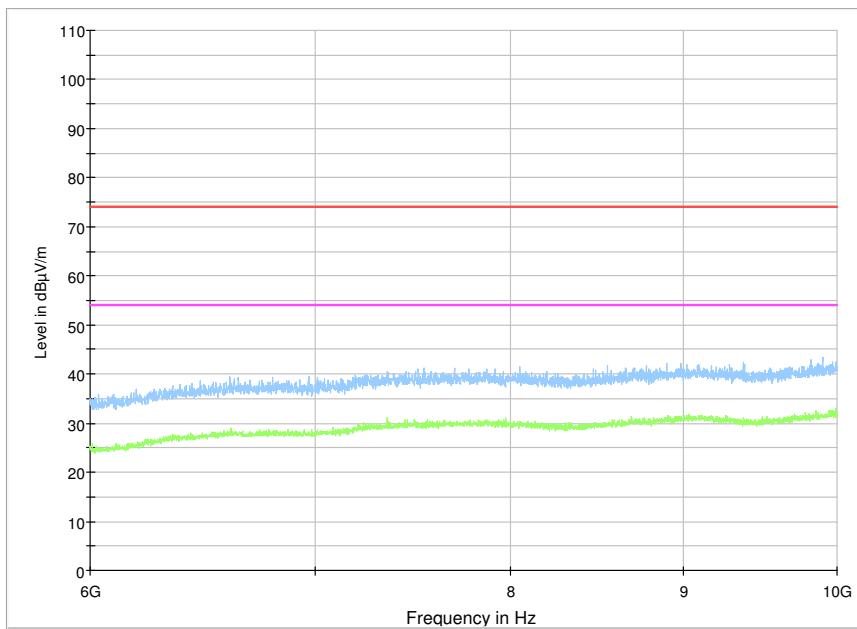
**Operation Mode: 802.11n TX CH Low 6.5M**

Vertical



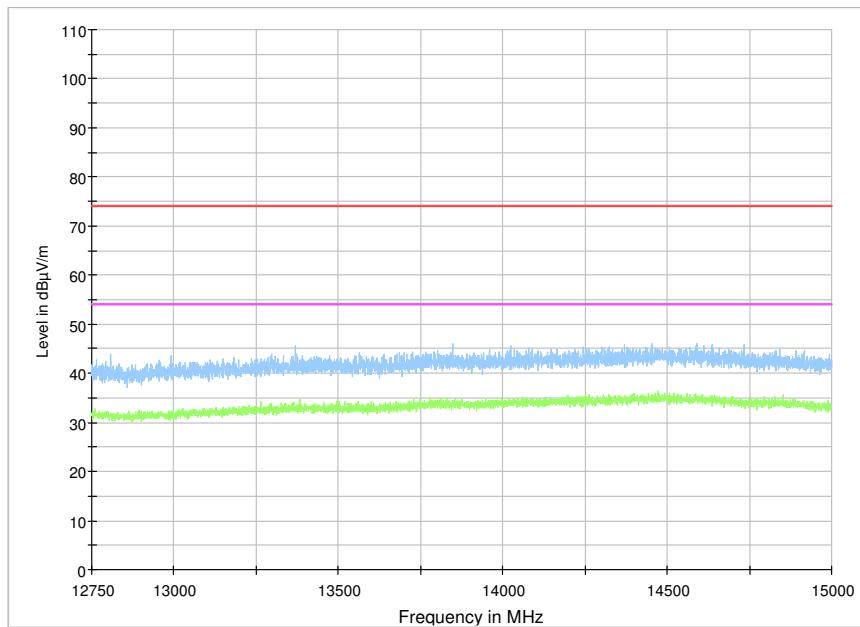
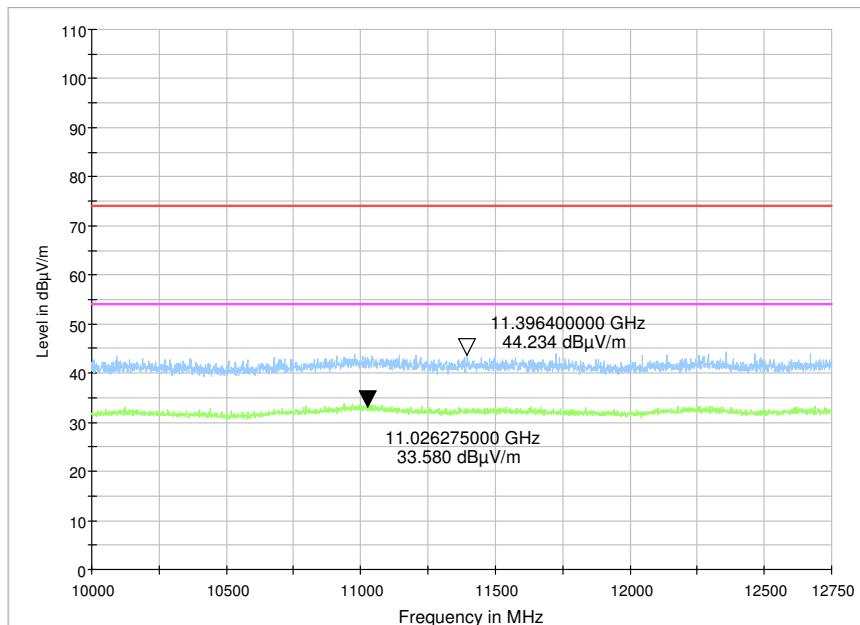


**Note: 2412.35MHz is the EUT WiFi working frequency.**



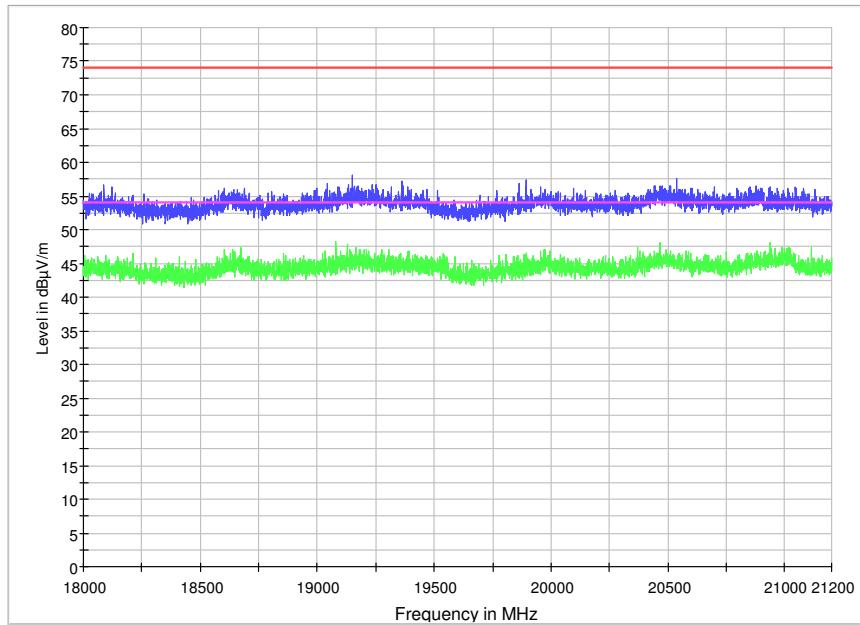
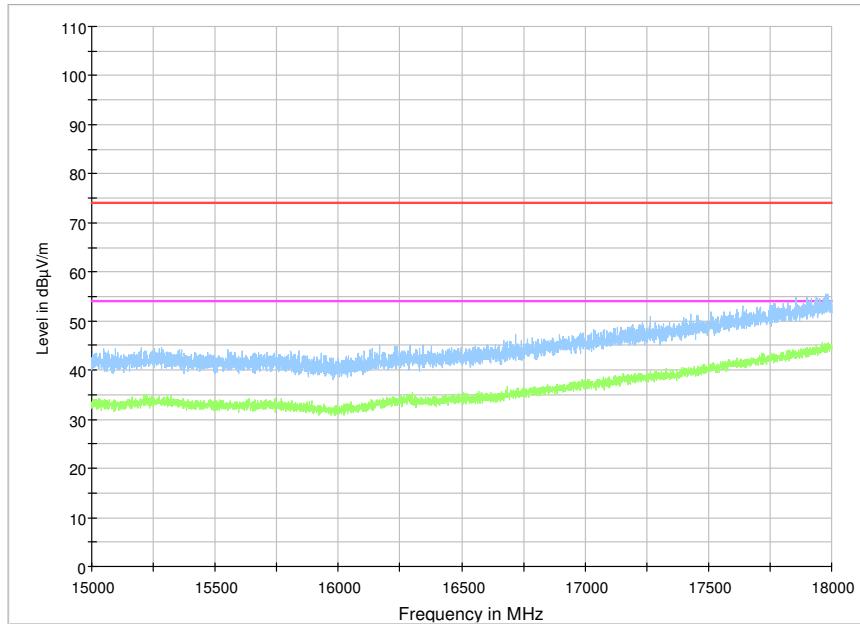
**SGS-CSTC Standards  
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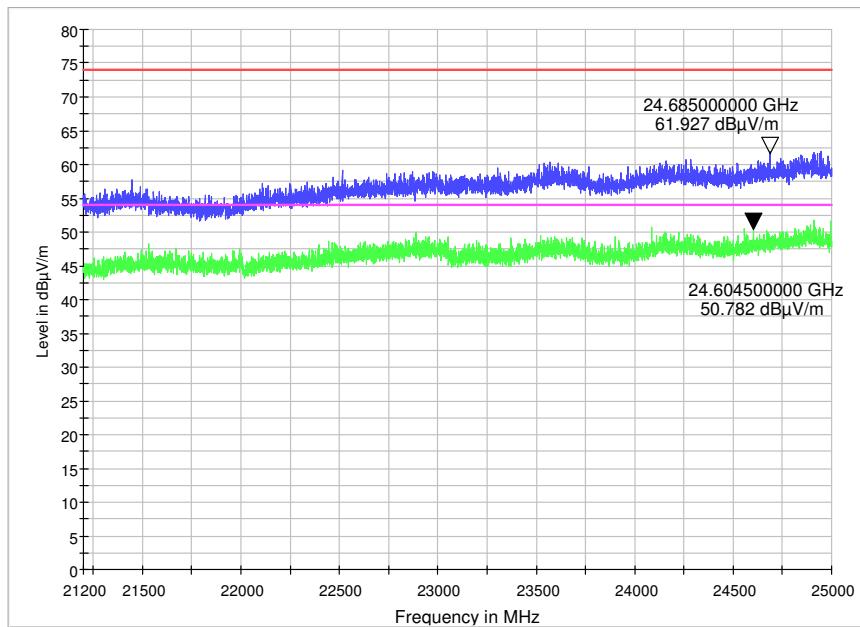
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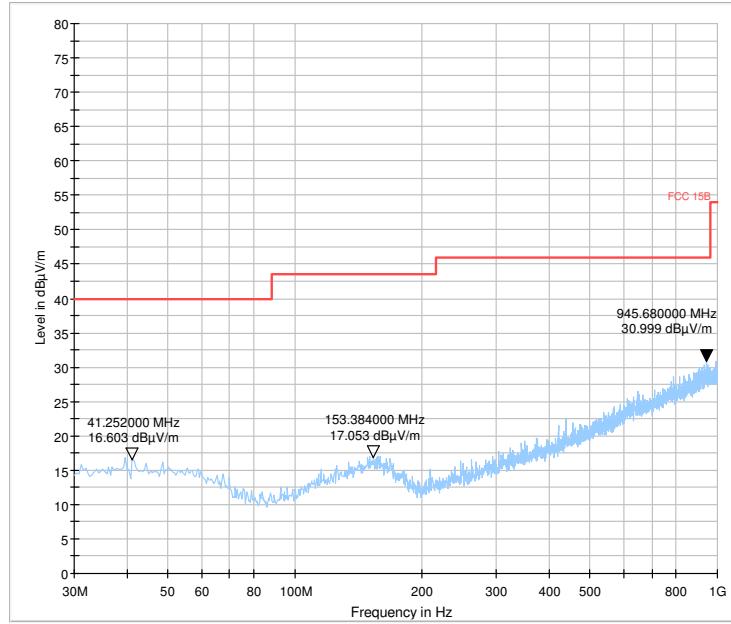
**SGS-CSTC Standards  
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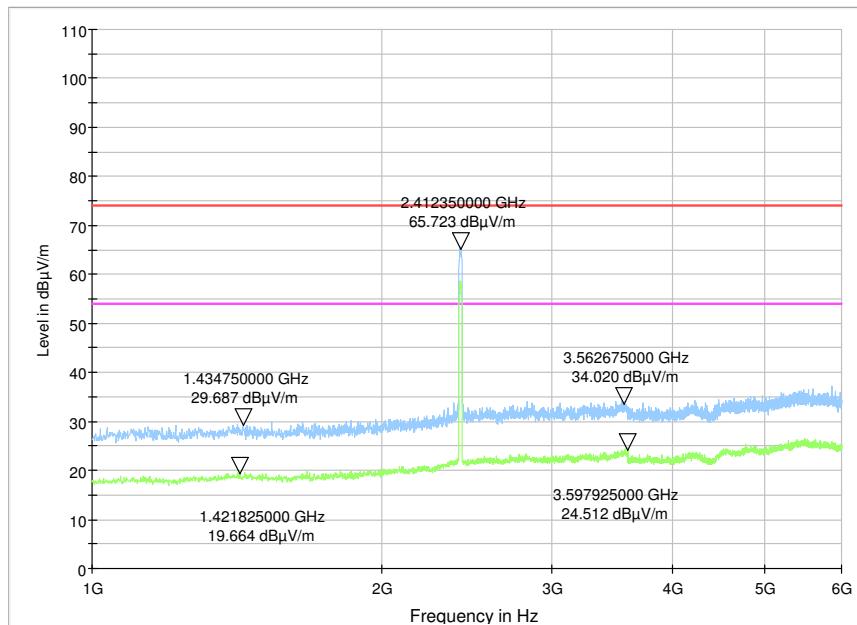
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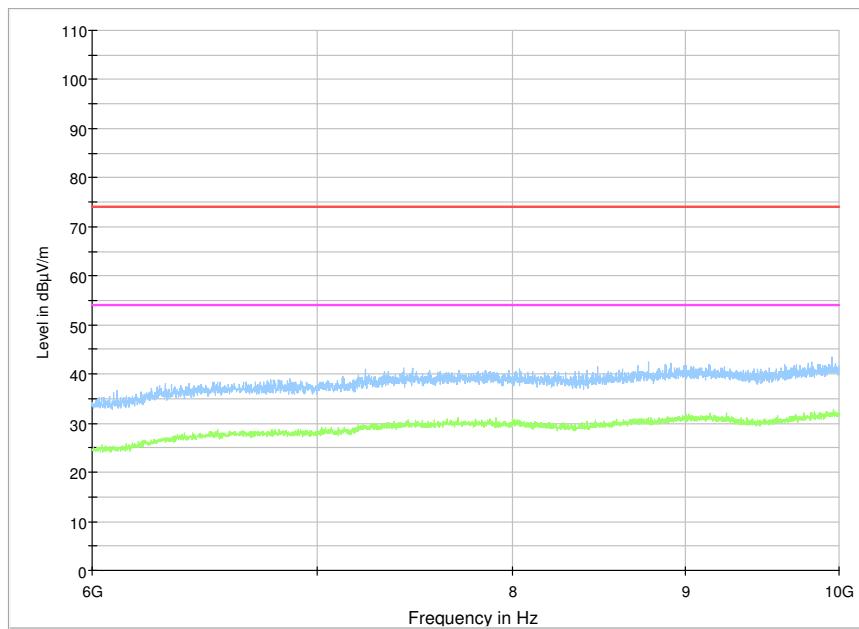


**Horizontal**



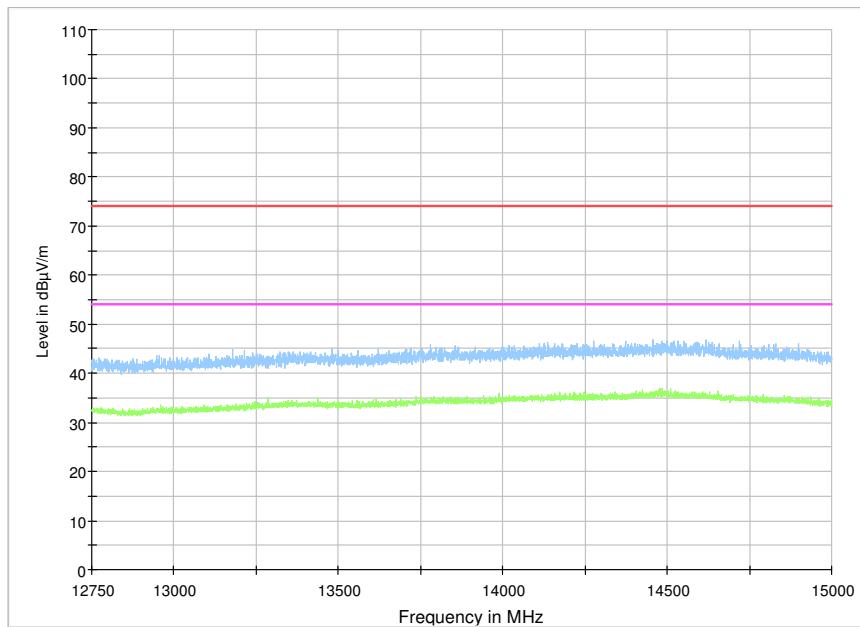
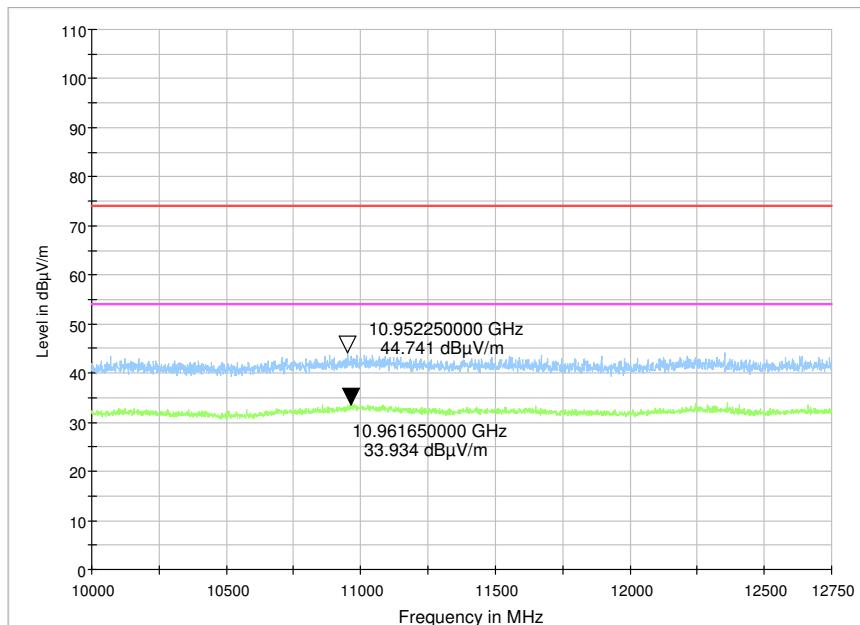


**Note: 2412.35MHz is the EUT WiFi working frequency.**



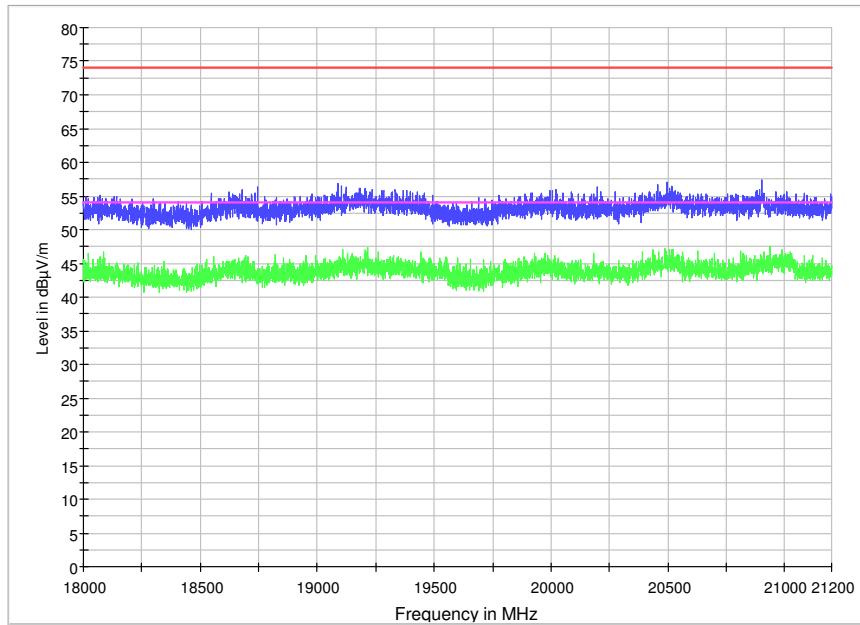
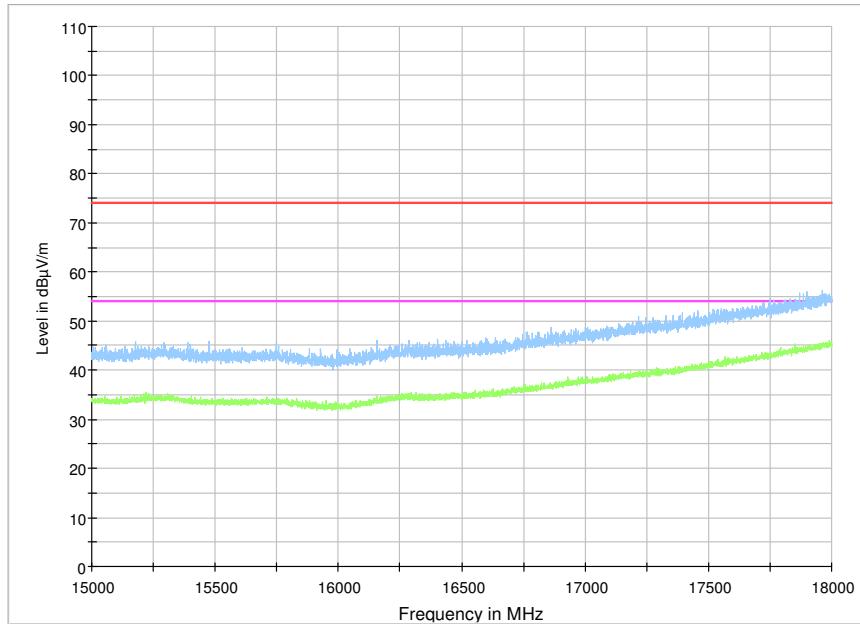
**SGS-CSTC Standards  
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(Shanghai)Co., Ltd.**

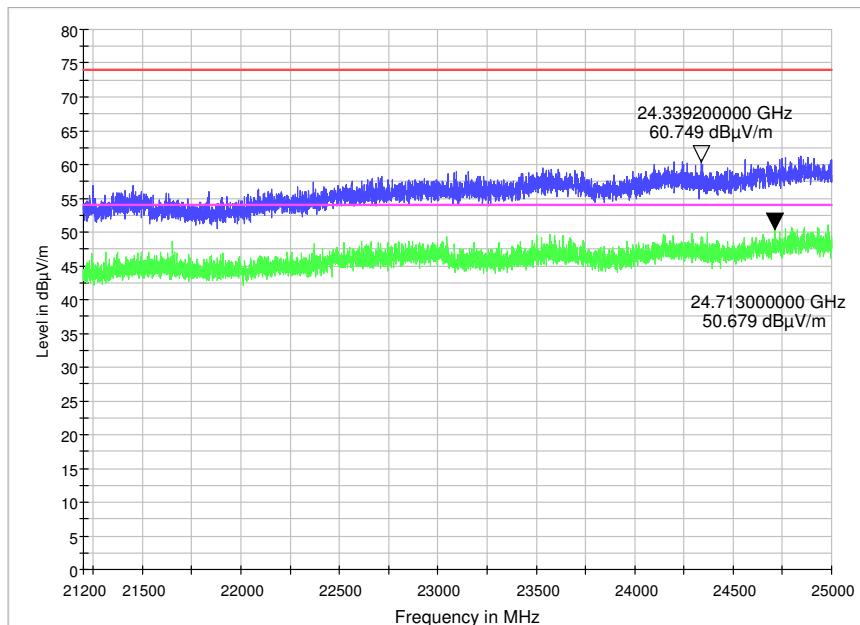
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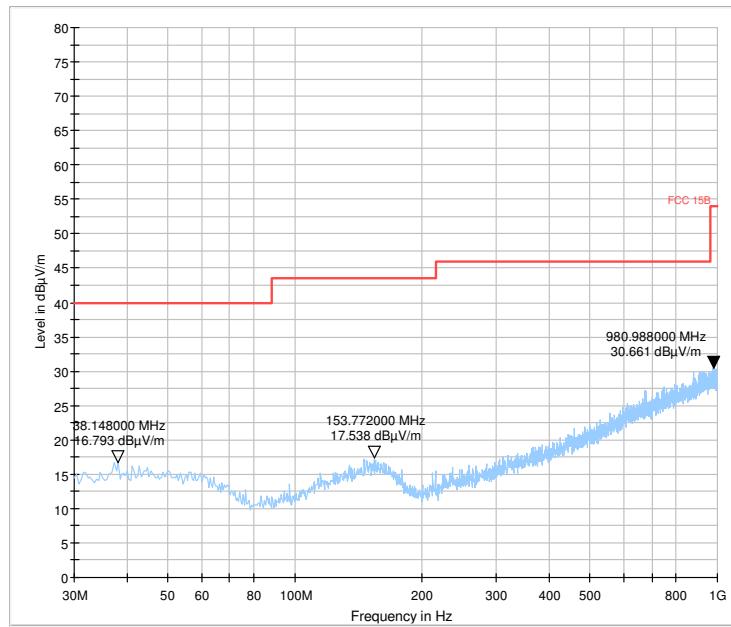
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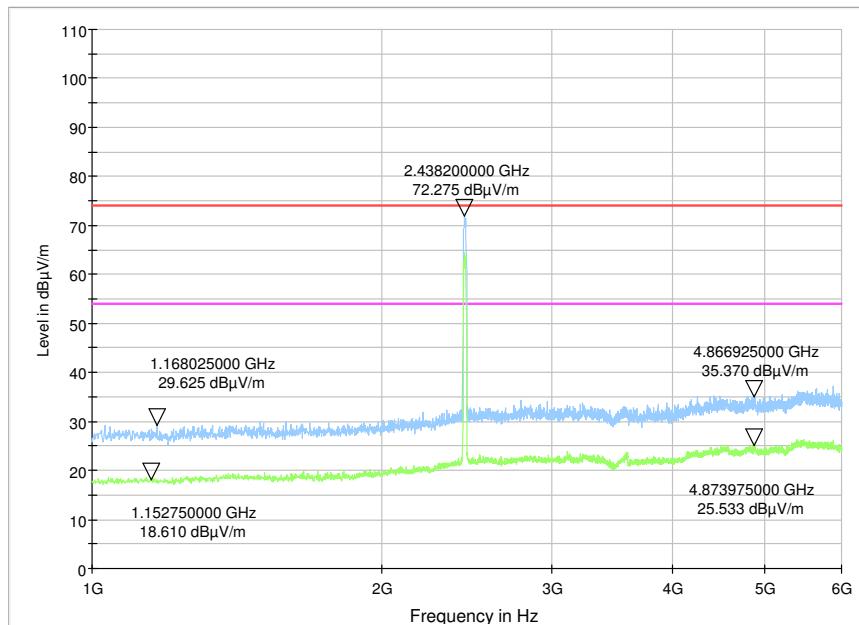




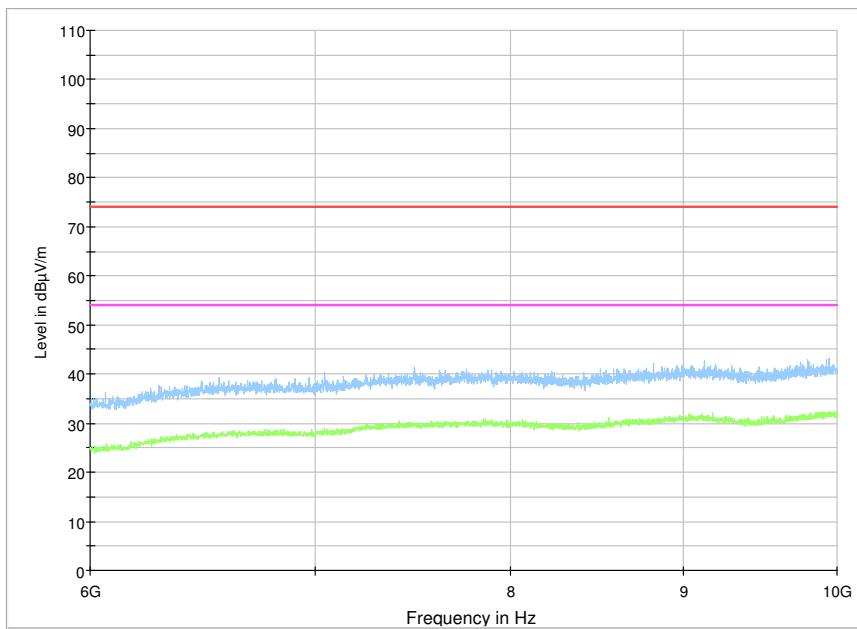
**Operation Mode: 802.11n TX CH Mid 6.5M**

Vertical



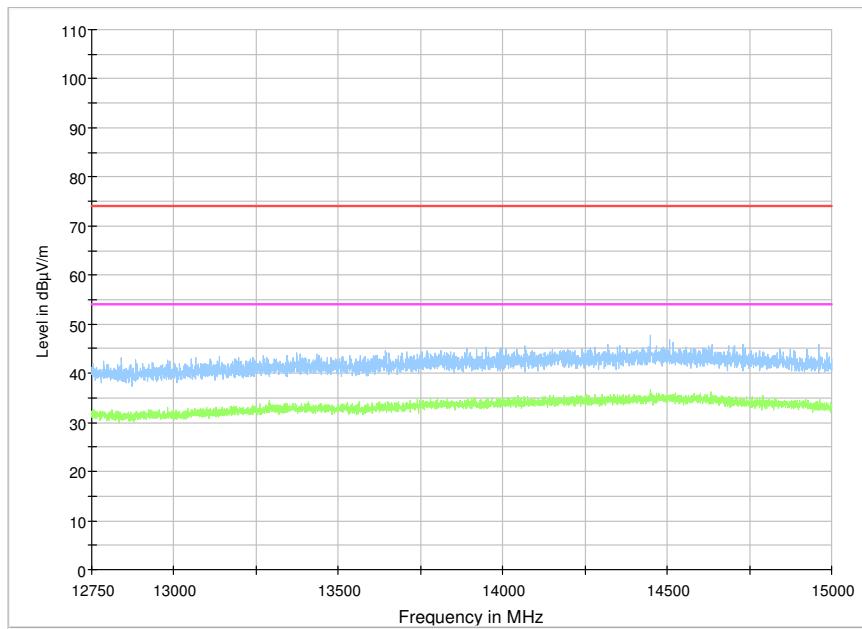
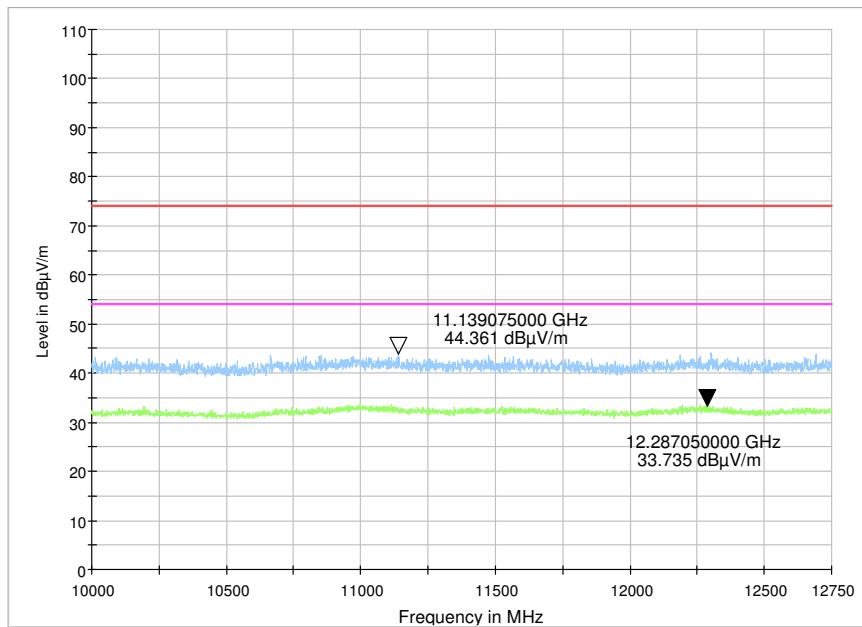


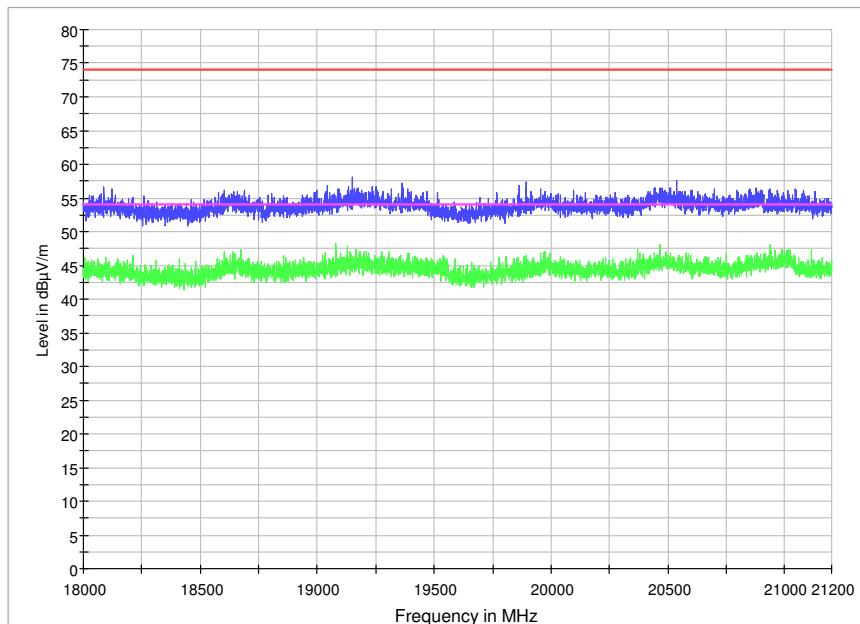
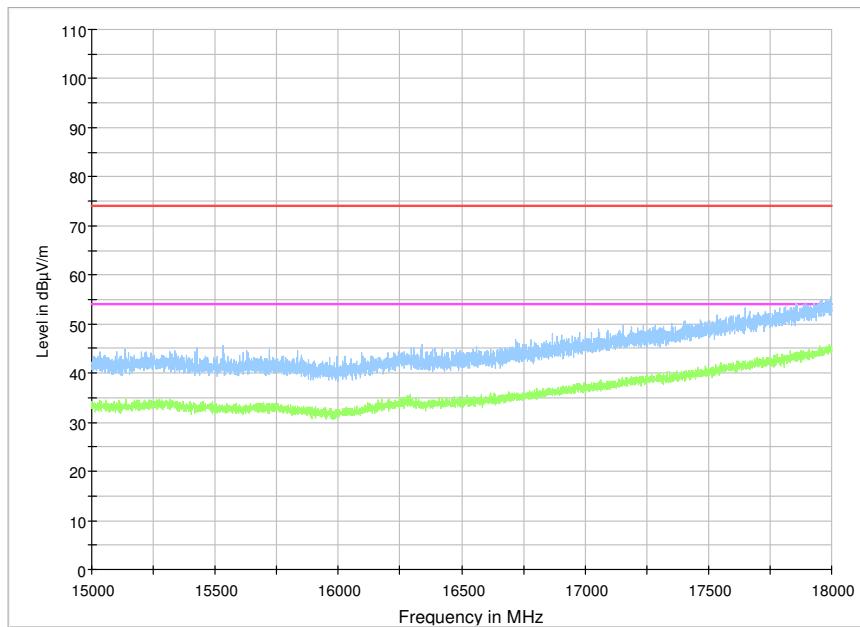
**Note: 2438.20MHz is the EUT WiFi working frequency.**

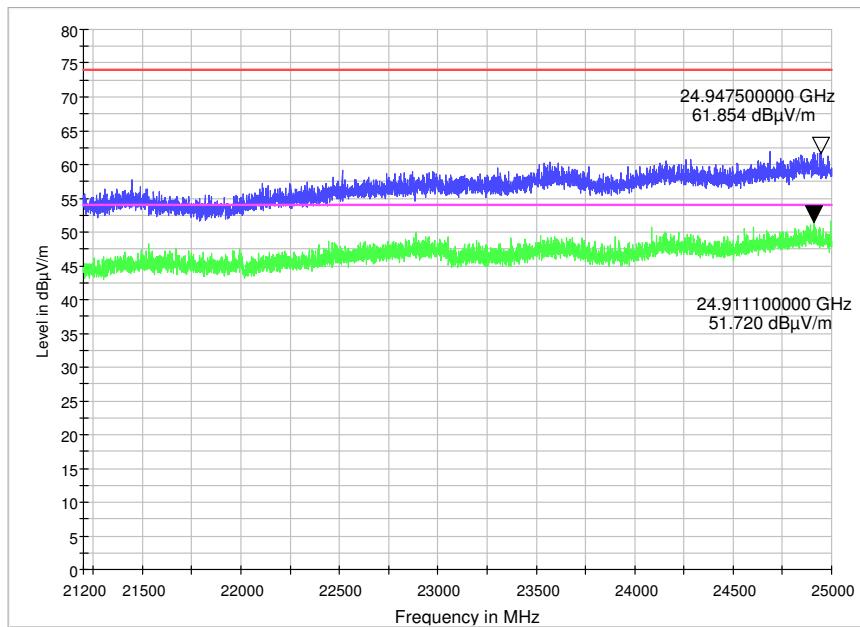


**SGS-CSTC Standards  
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(Shanghai)Co., Ltd.**

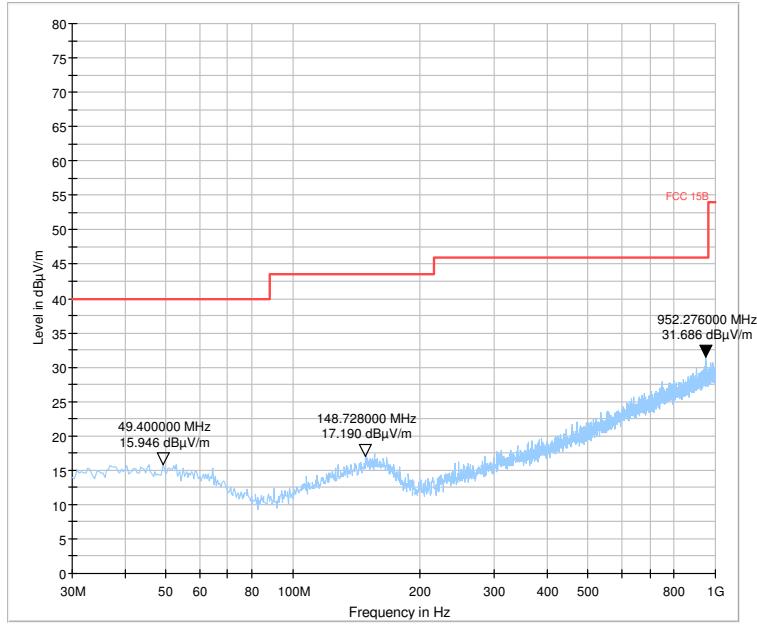
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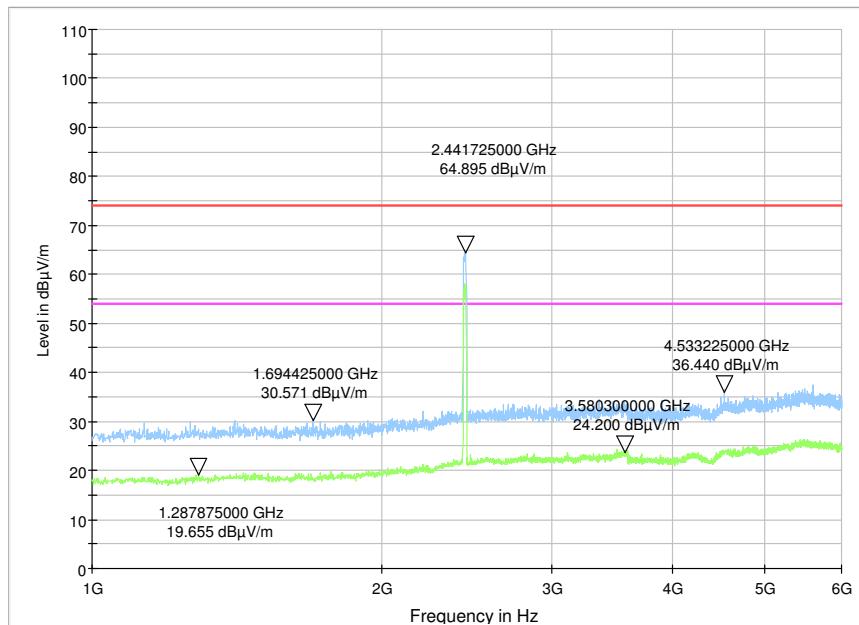




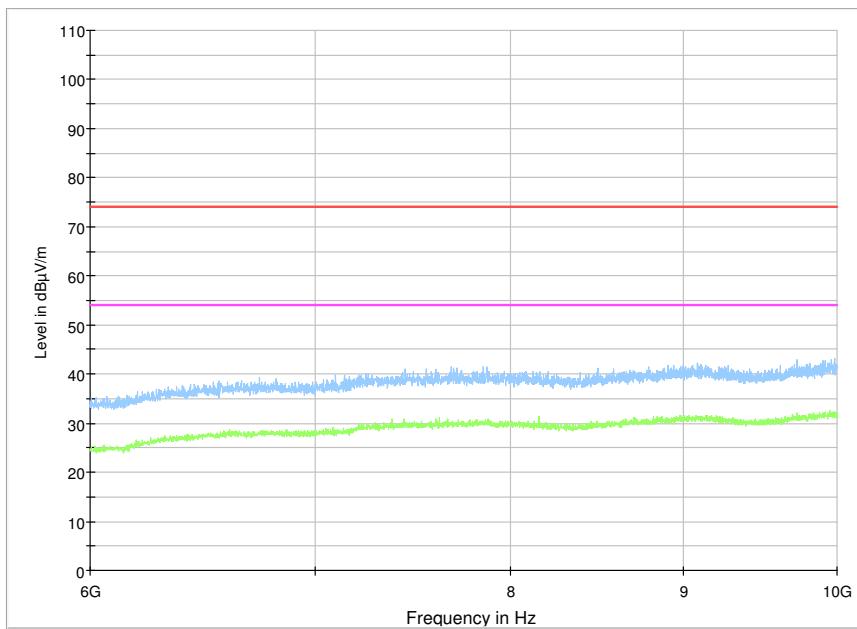


**Horizontal**



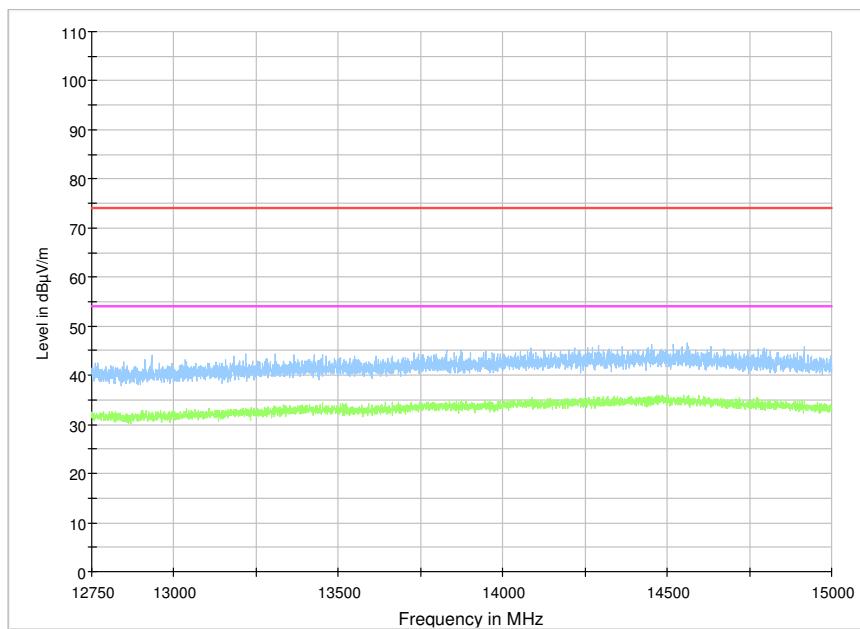
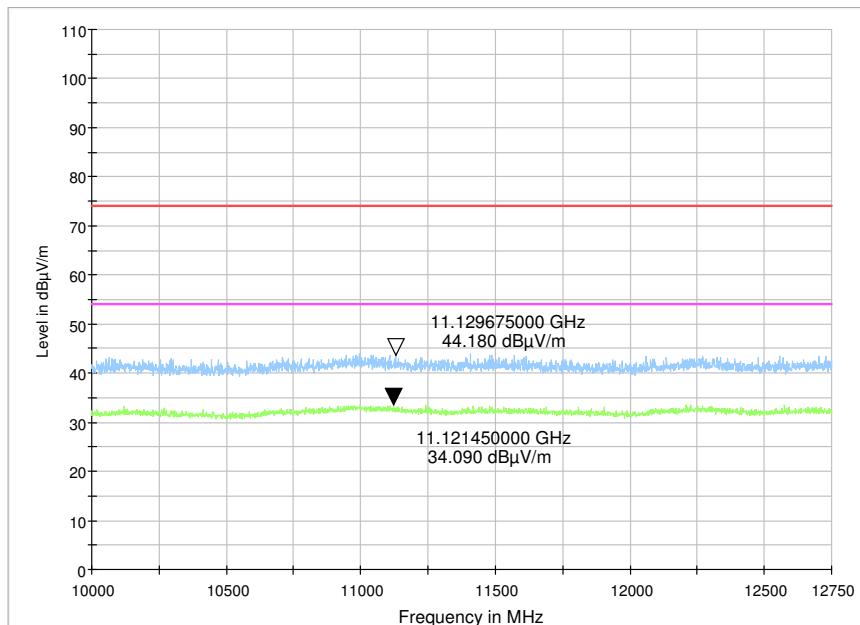


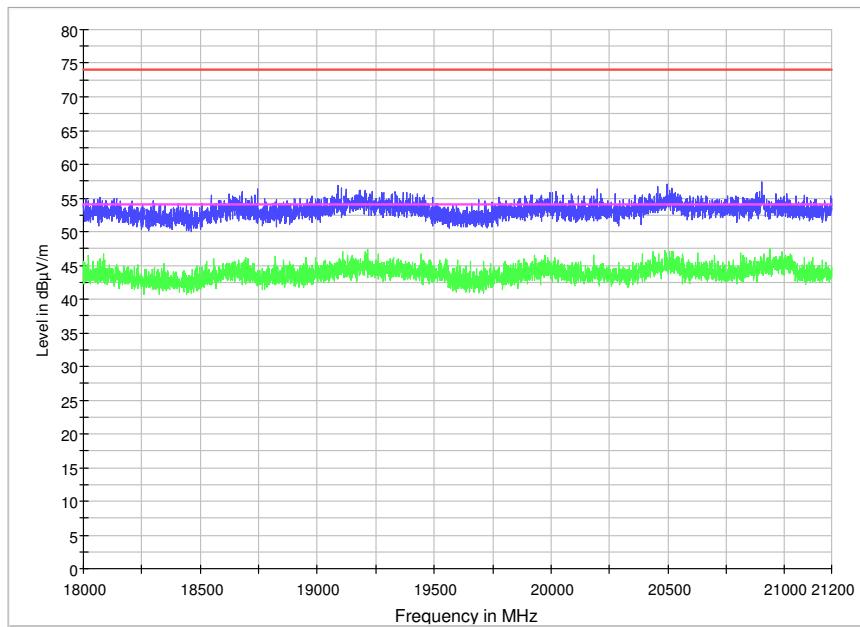
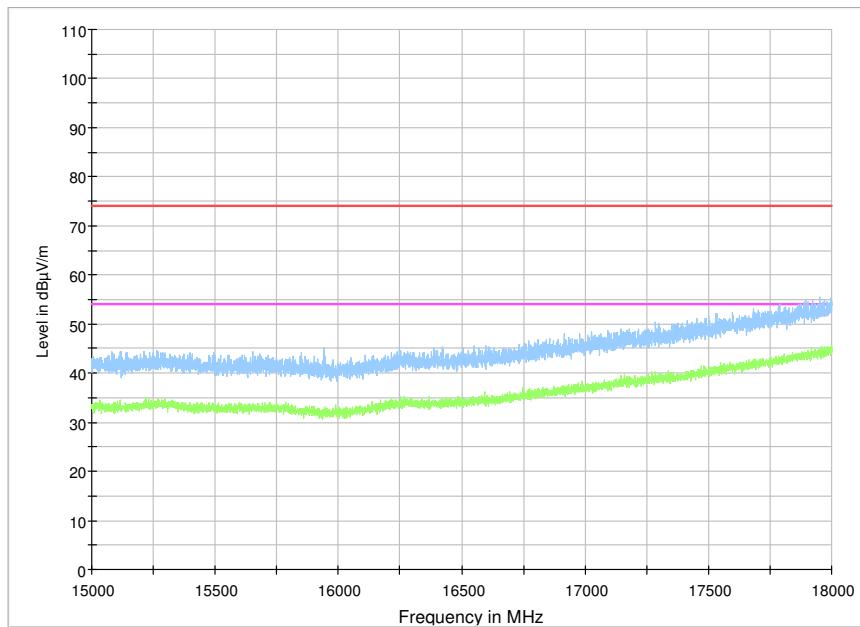
**Note: 2441.73MHz is the EUT WiFi working frequency.**

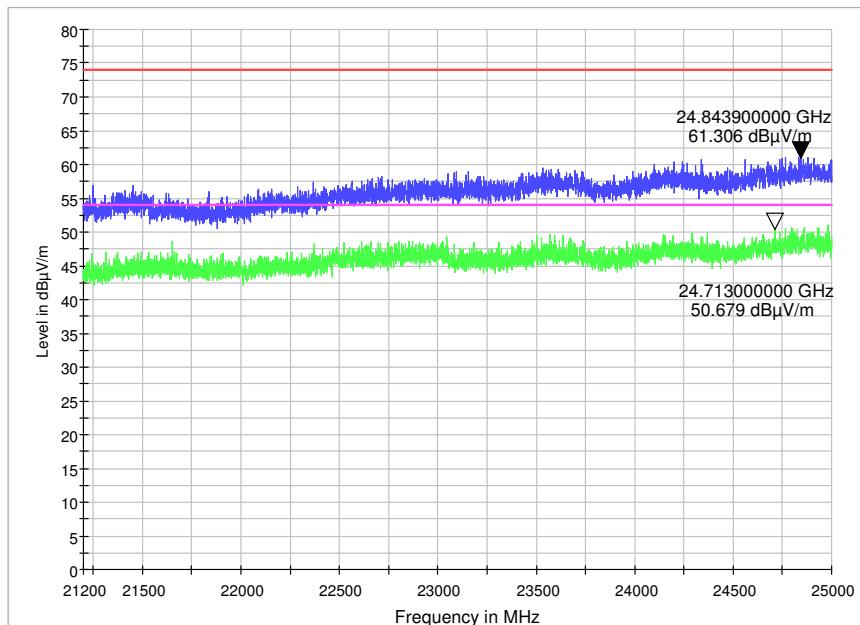


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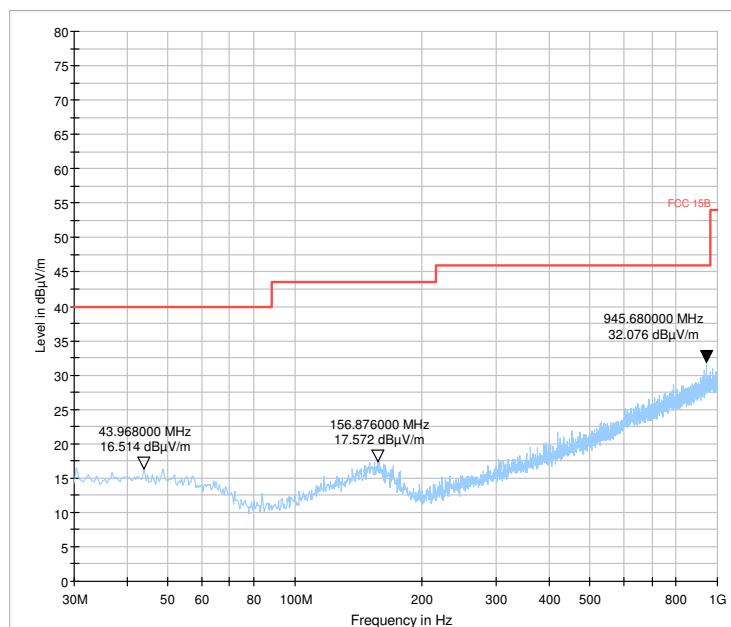


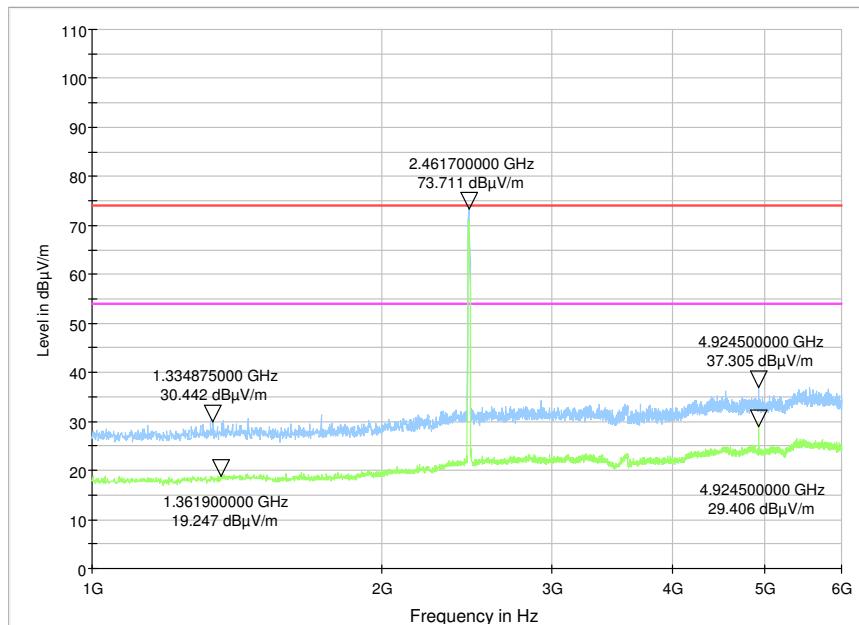




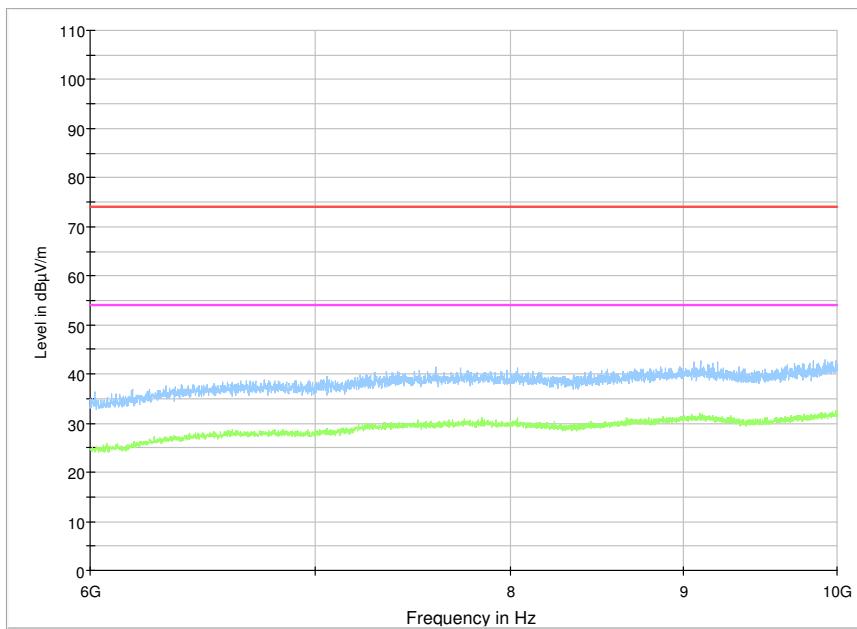
**Operation Mode: 802.11n TX CH High 6.5M**

Vertical



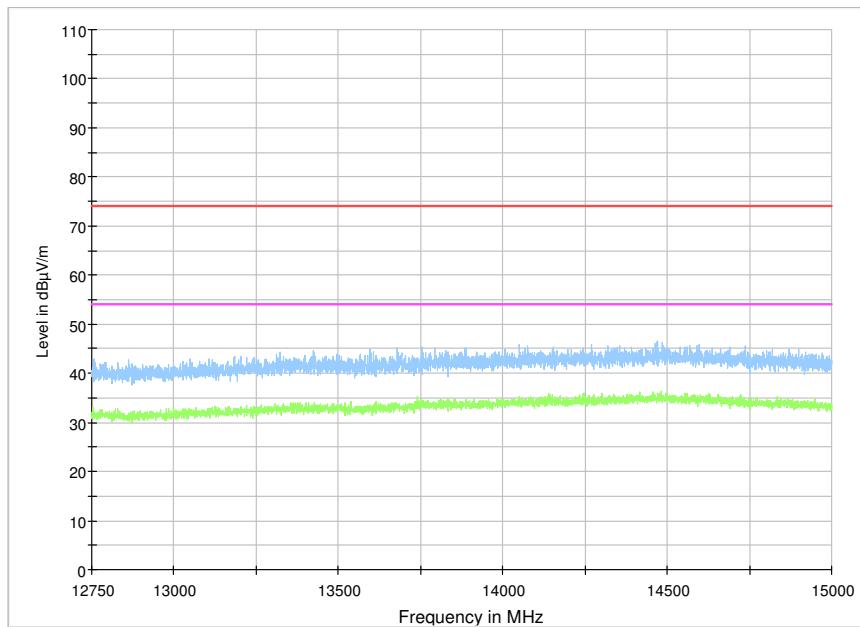
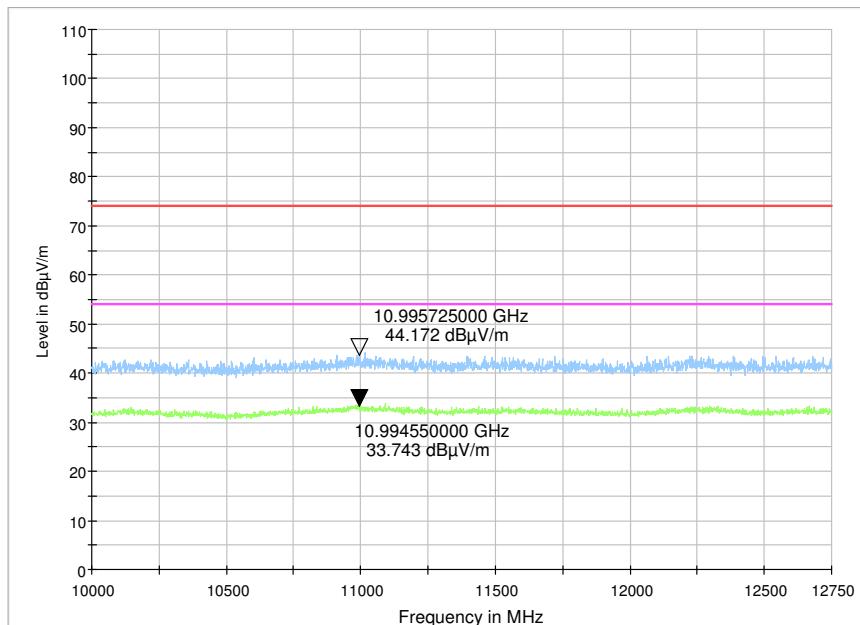


**Note: 2461.70MHz is the EUT WiFi working frequency.**



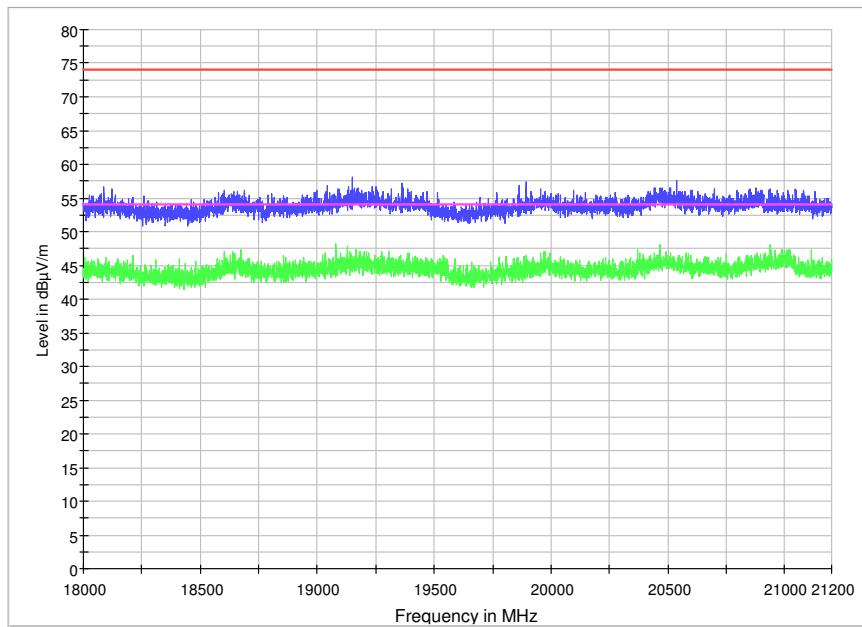
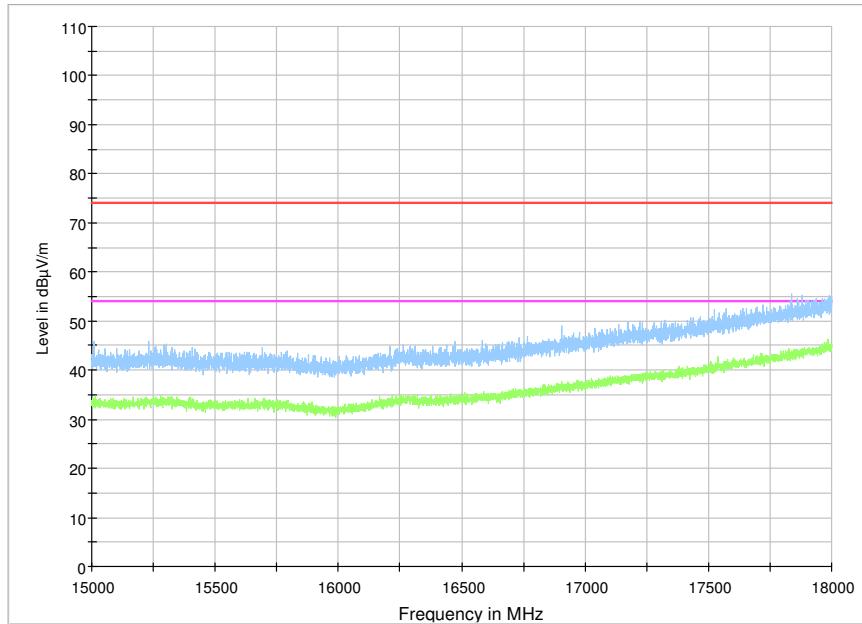
**SGS-CSTC Standards  
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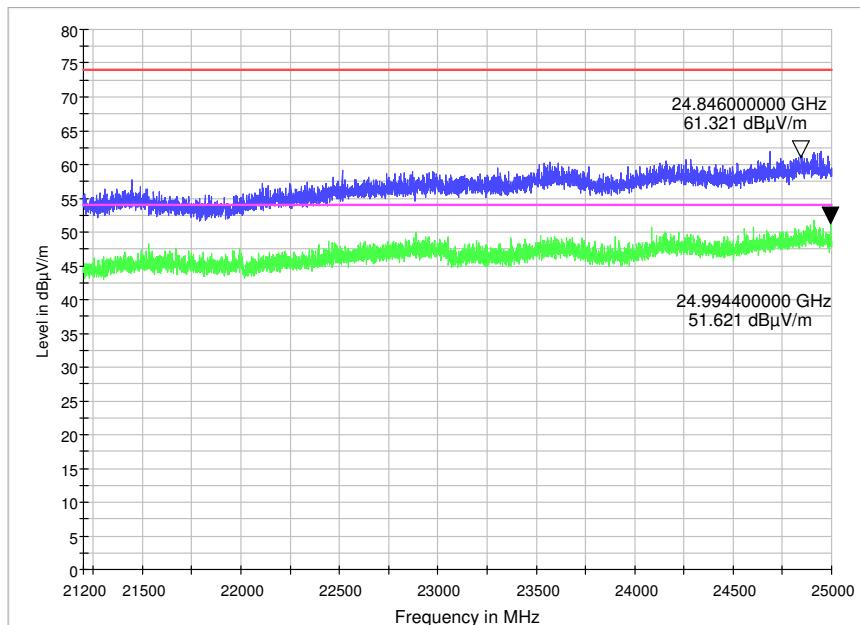
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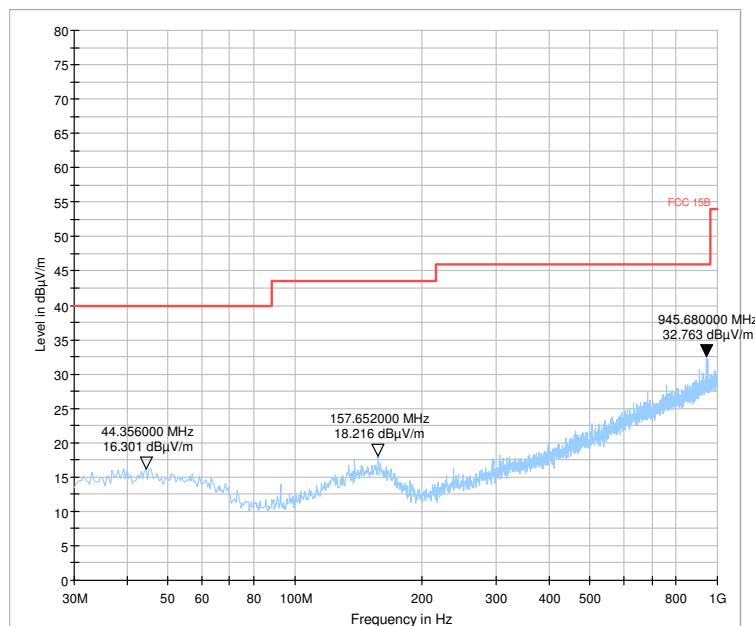
**SGS-CSTC Standards  
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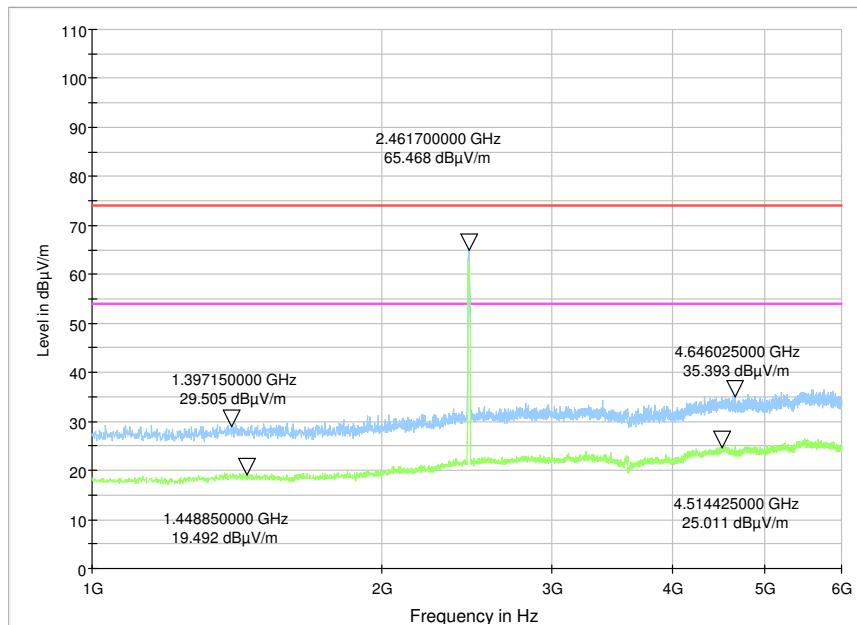
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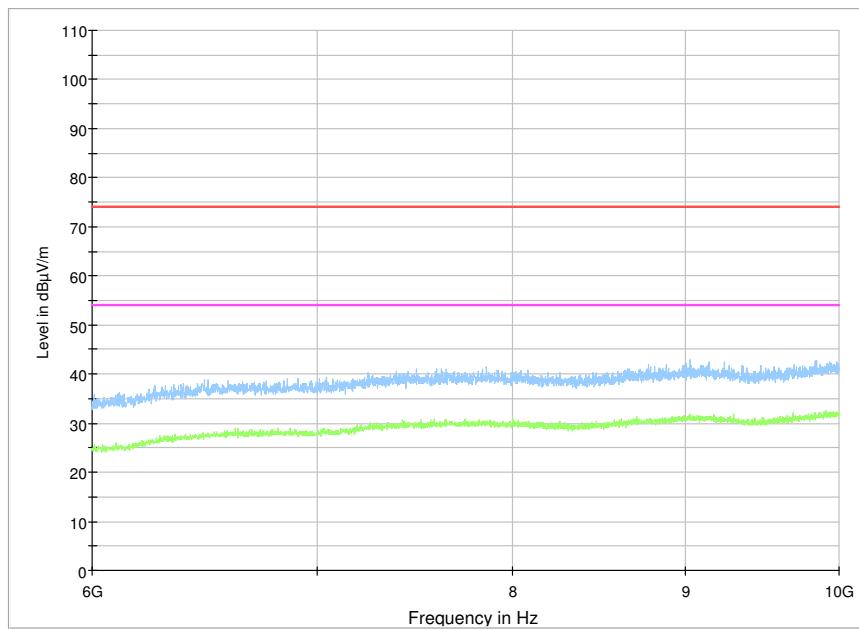


**Horizontal**



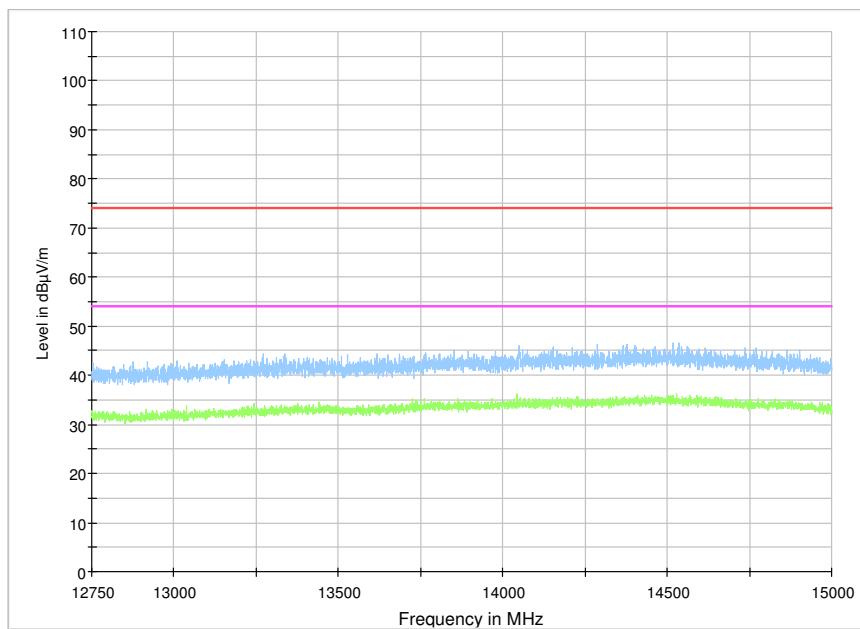
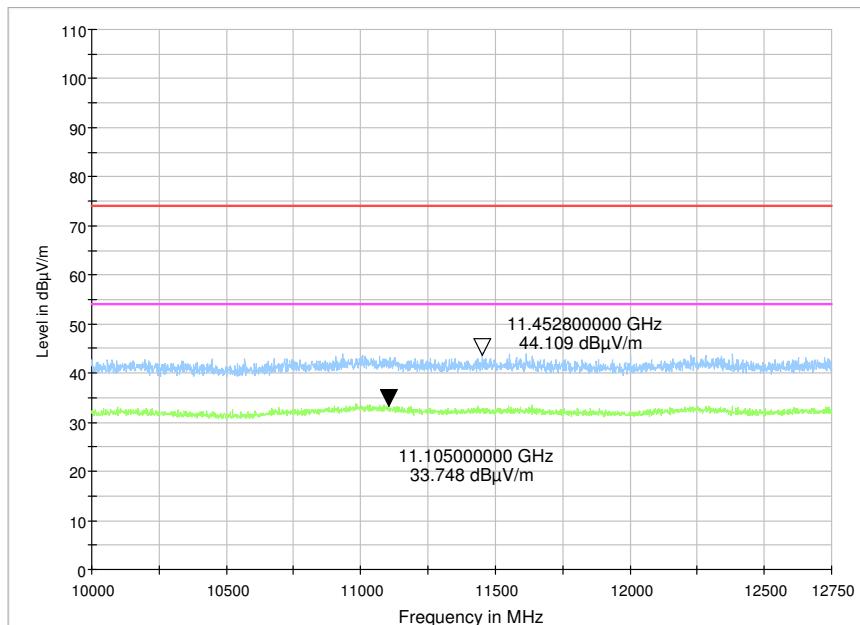


**Note: 2461.70MHz is the EUT WiFi working frequency.**



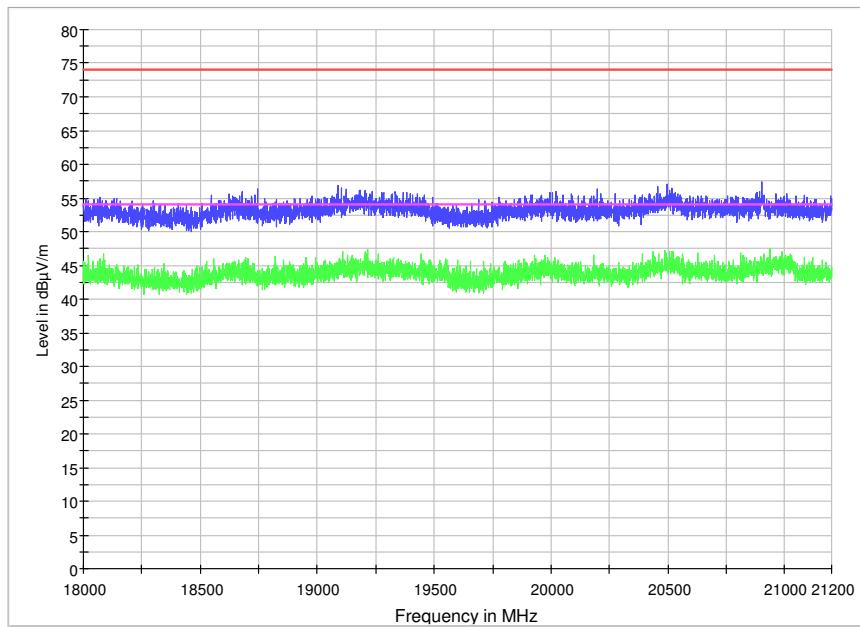
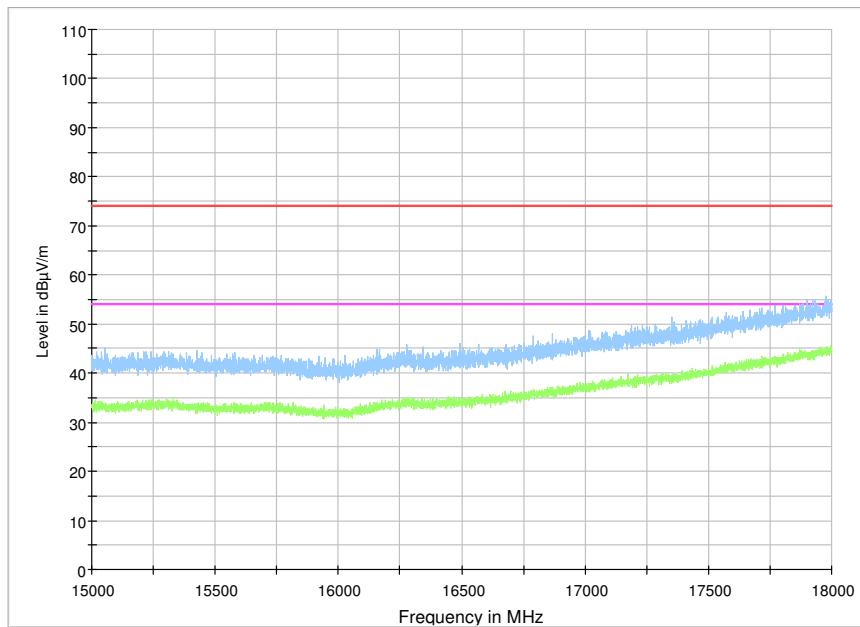
**SGS-CSTC Standards  
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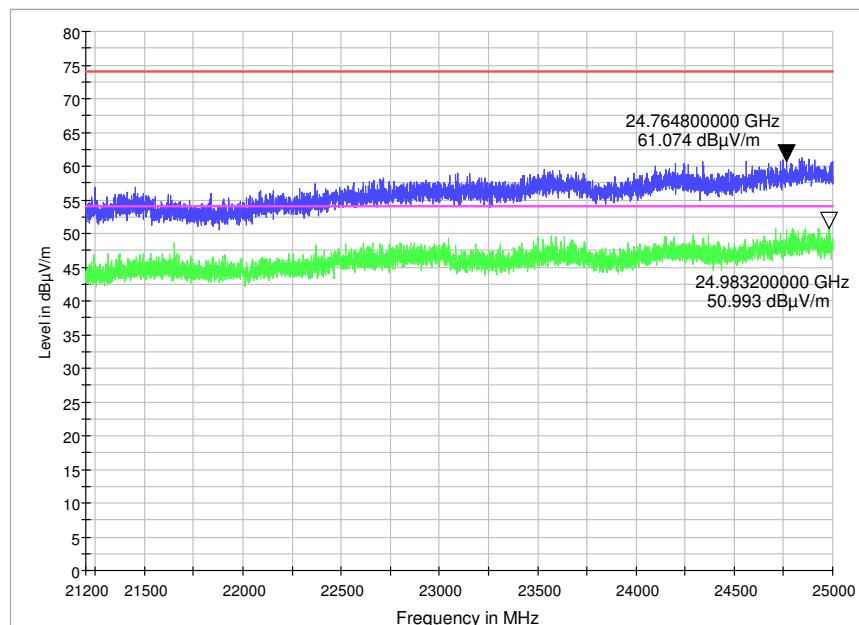
Report No.: SHEM110700097301  
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**30MHz~1GHz Max value in all modes and all channels Spurious Emissions**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
54.44	14.1	1.44	24.53	26.16	17.17	40.00	Vertical
157.26	16.5	2.40	24.31	23.75	18.34	43.50	Vertical
945.68	21.9	3.40	24.04	31.40	32.66	46.00	Vertical
38.92	14.1	1.44	24.50	26.44	17.48	40.00	Horizontal
157.65	16.5	2.40	24.31	23.63	18.22	43.50	Horizontal
945.68	21.9	3.40	24.04	32.08	33.34	46.00	Horizontal

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

Final Test Level = Receiver Reading + Antenna Factor + Cable loss - Preamplifier Factor.

**Test Result: Pass**

**Operation Mode: 802.11b TX CH Low 1M**

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

**Peak Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
1394.8	31.0	6.7	1.7	43.4	33.53	29.53	74	Vertical
4832.9	35.8	8.3	1.2	43.1	34.58	36.78	74	Vertical
11108.5	37.7	9.6	7.0	43.3	33.1	44.10	74	Vertical
24685.0 (note3)	41.3	11.2	8.6	47.6	48.43	61.93	74	Vertical
1387.8	31.0	6.7	1.7	43.4	34.87	30.87	74	Horizontal
3555.6	35.8	8.3	1.2	43.1	32.92	35.12	74	Horizontal
11065.1	37.7	9.6	7.0	43.3	33.37	44.37	74	Horizontal
24843.9 (note3)	41.3	11.2	8.6	47.6	47.81	61.31	74	Horizontal

**Average Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
1448.9	31.0	6.7	1.7	43.4	23.8	19.80	54	Vertical
4827.0	35.8	8.3	1.2	43.1	23.86	26.06	54	Vertical
11189.6	37.7	9.6	7.0	43.3	22.56	33.56	54	Vertical
24911.1 (note3)	41.3	11.2	8.6	47.6	38.22	51.72	54	Vertical
1411.3	31.0	6.7	1.7	43.4	23.87	19.87	54	Horizontal
3532.1	35.8	8.3	1.2	43.1	22.28	24.48	54	Horizontal
11072.1	37.7	9.6	7.0	43.3	22.46	33.46	54	Horizontal
24797.0 (note3)	41.3	11.2	8.6	47.6	37.17	50.67	54	Horizontal

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

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor + Filter + Preamplifier Factor.

2. The emission level of 5th to 10th harmonic is greater than 18dB from the limit.

3. The measurement was demonstrating the highest peak and average system noise floor values.

**SGS-CSTC Standards  
Technical Services  
(Shanghai)Co., Ltd.**

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**Operation Mode:802.11b TX CH Mid 1M**

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
1146.9	31.6	6.7	1.8	43.5	33.35	29.95	74	Vertical
4877.5	35.7	8.4	0.9	43.1	34.63	36.53	74	Vertical
9962.9	37.9	9.7	7.2	43.0	32.79	44.59	74	Vertical
24947.5 (note3)	41.3	11.2	8.6	47.6	48.35	61.85	74	Vertical
1399.5	31.6	6.7	1.8	43.5	33.61	30.21	74	Horizontal
4882.2	35.7	8.4	0.9	43.1	34.03	35.93	74	Horizontal
10974.6	37.9	9.7	7.2	43.0	32.79	44.59	74	Horizontal
24560.4 (note3)	41.3	11.2	8.6	47.6	47.20	60.70	74	Horizontal

**Average Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
1131.6	31.6	6.7	1.8	43.5	22.65	19.25	54	Vertical
4877.5	35.7	8.4	0.9	43.1	25.09	26.99	54	Vertical
9945.28	37.9	9.7	7.2	43.0	22.21	33.11	54	Vertical
24911.1 (note3)	41.3	11.2	8.6	47.6	38.22	51.72	54	Vertical
1397.2	31.6	6.7	1.8	43.5	22.66	19.26	54	Horizontal
5409.8	35.7	8.4	0.9	43.1	24.48	26.38	54	Horizontal
11055.7	37.9	9.7	7.2	43.0	21.80	33.60	54	Horizontal
24713.0 (note3)	41.3	11.2	8.6	47.6	37.18	50.68	54	Horizontal

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

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor + Filter + Preamplifier Factor.

2. The emission level of 5<sup>th</sup> to 10th harmonic is greater than 18dB from the limit.

3. The measurement was demonstrating the highest peak and average system noise floor values.

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**Operation Mode:802.11b TX CH High 1M**

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

**Peak Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
1386.6	31.5	6.8	2.3	43.7	33.22	30.12	74	Vertical
4924.5	35.6	8.4	0.5	43.1	35.33	36.73	74	Vertical
12094.4	38.0	9.8	7.3	42.7	31.98	44.38	74	Vertical
24947.5 (note3)	41.3	11.2	8.6	47.6	48.35	61.85	74	Vertical
1538.2	31.5	6.8	2.3	43.7	32.65	29.55	74	Horizontal
4514.4	35.6	8.4	0.5	43.1	34.13	35.53	74	Horizontal
11088.6	38.0	9.8	7.3	42.7	31.67	44.07	74	Horizontal
24878.9 (note3)	41.3	11.2	8.6	47.6	47.56	61.06	74	Horizontal

**Average Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
1396.0	31.5	6.8	2.3	43.7	22.66	19.56	54	Vertical
4924.5	35.6	8.4	0.5	43.1	27.83	29.23	54	Vertical
12265.9	38.0	9.8	7.3	42.7	21.38	33.78	54	Vertical
24994.4 (note3)	41.3	11.2	8.6	47.6	38.12	51.62	54	Vertical
1405.4	31.5	6.8	2.3	43.7	22.75	19.65	54	Horizontal
4550.9	35.6	8.4	0.5	43.1	24.02	25.42	54	Horizontal
11026.3	38.0	9.8	7.3	42.7	21.34	33.74	54	Horizontal
24860.0 (note3)	41.3	11.2	8.6	47.6	37.20	50.70	54	Horizontal

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

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor + Filter + Preamplifier Factor.

2. The emission level of 5<sup>th</sup> to 10<sup>th</sup> harmonic is greater than 18dB from the limit.

3. The measurement was demonstrating the highest peak and average system noise floor values.

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**Operation Mode:802.11g TX CH Low 6M**

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

**Peak Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
1646.3	31.0	6.7	1.7	43.4	35.01	31.01	74	Vertical
4882.2	35.8	8.3	1.2	43.1	34.20	36.40	74	Vertical
11108.5	37.7	9.6	7.0	43.3	33.10	44.10	74	Vertical
24909.0 (note3)	41.3	11.2	8.6	47.6	48.25	61.75	74	Vertical
1446.5	31.0	6.7	1.7	43.4	33.79	29.79	74	Horizontal
3515.7	35.8	8.3	1.2	43.1	32.32	34.52	74	Horizontal
11043.9	37.7	9.6	7.0	43.3	33.24	44.24	74	Horizontal
24339.2 (note3)	41.3	11.2	8.6	47.6	47.25	60.75	74	Horizontal

**Average Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
1599.3	31.0	6.7	1.7	43.4	23.46	19.46	54	Vertical
4822.3	35.8	8.3	1.2	43.1	24.63	26.83	54	Vertical
11189.6	37.7	9.6	7.0	43.3	22.56	33.56	54	Vertical
24911.1 (note3)	41.3	11.2	8.6	47.6	38.22	51.72	54	Vertical
1284.4	31.0	6.7	1.7	43.4	23.02	19.02	54	Horizontal
3566.2	35.8	8.3	1.2	43.1	22.01	24.21	54	Horizontal
11026.3	37.7	9.6	7.0	43.3	22.93	33.93	54	Horizontal
24288.1 (note3)	41.3	11.2	8.6	47.6	36.38	49.88	54	Horizontal

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

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor + Filter + Preamplifier Factor.

2. The emission level of 5<sup>th</sup> to 10<sup>th</sup> harmonic is greater than 18dB from the limit.

3. The measurement was demonstrating the highest peak and average system noise floor values.

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**Operation Mode:802.11g TX CH Mid 6M**

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

**Peak Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
1497.0	31.6	6.7	1.8	43.5	34.11	30.71	74	Vertical
4877.5	35.7	8.4	0.9	43.1	36.05	37.95	74	Vertical
11152.0	37.9	9.7	7.2	43.0	32.34	44.14	74	Vertical
24909.0 (note3)	41.3	11.2	8.6	47.6	48.25	61.75	74	Vertical
1289.1	31.6	6.7	1.8	43.5	32.89	29.49	74	Horizontal
3559.2	35.7	8.4	0.9	43.1	32.91	34.81	74	Horizontal
11041.6	37.9	9.7	7.2	43.0	32.90	44.70	74	Horizontal
24997.9 (note3)	41.3	11.2	8.6	47.6	47.26	60.76	74	Horizontal

**Average Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
1434.8	31.6	6.7	1.8	43.5	22.72	19.32	54	Vertical
4876.3	35.7	8.4	0.9	43.1	25.69	27.59	54	Vertical
11059.2	37.9	9.7	7.2	43.0	22.09	33.89	54	Vertical
24911.1 (note3)	41.3	11.2	8.6	47.6	38.22	51.72	54	Vertical
1377.2	31.6	6.7	1.8	43.5	22.71	19.31	54	Horizontal
3587.4	35.7	8.4	0.9	43.1	22.74	24.64	54	Horizontal
10964.0	37.9	9.7	7.2	43.0	22.39	34.19	54	Horizontal
24983.2 (note3)	41.3	11.2	8.6	47.6	37.49	50.99	54	Horizontal

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

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor + Filter + Preamplifier Factor.

2. The emission level of 5<sup>th</sup> to 10<sup>th</sup> harmonic is greater than 18dB from the limit.

3. The measurement was demonstrating the highest peak and average system noise floor values.

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**Operation Mode:802.11g TX CH High 6M**

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

**Peak Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
1334.9	31.5	6.8	2.3	43.7	33.54	30.44	74	Vertical
4924.5	35.6	8.4	0.5	43.1	35.91	37.31	74	Vertical
11504.5	38.0	9.8	7.3	42.7	31.66	44.06	74	Vertical
24259.4 (note3)	41.3	11.2	8.6	47.6	47.22	60.72	74	Vertical
1384.2	31.5	6.8	2.3	43.7	32.93	29.83	74	Horizontal
4769.4	35.6	8.4	0.5	43.1	34.32	35.72	74	Horizontal
11002.8	38.0	9.8	7.3	42.7	32.30	44.70	74	Horizontal
24857.2 (note3)	41.3	11.2	8.6	47.6	47.22	60.72	74	Horizontal

**Average Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
1361.9	31.5	6.8	2.3	43.7	22.35	19.25	54	Vertical
4924.5	35.6	8.4	0.5	43.1	28.01	29.41	54	Vertical
11005.1	38.0	9.8	7.3	42.7	21.38	33.78	54	Vertical
24084.4 (note3)	41.3	11.2	8.6	47.6	37.16	50.66	54	Vertical
1367.8	31.5	6.8	2.3	43.7	23.01	19.91	54	Horizontal
4526.2	35.6	8.4	0.5	43.1	23.50	24.90	54	Horizontal
11135.6	38.0	9.8	7.3	42.7	21.32	33.72	54	Horizontal
24929.3 (note3)	41.3	11.2	8.6	47.6	37.21	50.71	54	Horizontal

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

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor + Filter + Preamplifier Factor.

2. The emission level of 5<sup>th</sup> to 10<sup>th</sup> harmonic is greater than 18dB from the limit.

3. The measurement was demonstrating the highest peak and average system noise floor values.

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**Operation Mode:802.11n TX CH Low 6.5M**

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

**Peak Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
1354.9	31.0	6.7	1.7	43.4	33.84	29.84	74	Vertical
4823.5	35.8	8.3	1.2	43.1	34.97	37.17	74	Vertical
11396.4	37.7	9.6	7.0	43.3	33.23	44.23	74	Vertical
24685.0 (note3)	41.3	11.2	8.6	47.6	48.43	61.93	74	Vertical
1434.8	31.0	6.7	1.7	43.4	33.69	29.69	74	Horizontal
3562.7	35.8	8.3	1.2	43.1	31.82	34.02	74	Horizontal
10952.2	37.7	9.6	7.0	43.3	33.74	44.74	74	Horizontal
24339.2 (note3)	41.3	11.2	8.6	47.6	47.25	60.75	74	Horizontal

**Average Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
1377.2	31.0	6.7	1.7	43.4	23.02	19.02	54	Vertical
4823.5	35.8	8.3	1.2	43.1	24.32	26.52	54	Vertical
11026.3	37.7	9.6	7.0	43.3	22.58	33.58	54	Vertical
24604.5 (note3)	41.3	11.2	8.6	47.6	37.28	50.78	54	Vertical
1421.8	31.0	6.7	1.7	43.4	23.66	19.66	54	Horizontal
3597.9	35.8	8.3	1.2	43.1	22.31	24.51	54	Horizontal
10961.7	37.7	9.6	7.0	43.3	22.93	33.93	54	Horizontal
24713.0 (note3)	41.3	11.2	8.6	47.6	37.18	50.68	54	Horizontal

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

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor + Filter + Preamplifier Factor.

2. The emission level of 5th to 10th harmonic is greater than 18dB from the limit.

3. The measurement was demonstrating the highest peak and average system noise floor values.

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**Operation Mode:802.11n TX CH Mid 6.5M**

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

**Peak Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
1168.0	31.6	6.7	1.8	43.5	33.03	29.63	74	Vertical
4866.9	35.7	8.4	0.9	43.1	33.47	35.37	74	Vertical
11139.1	37.9	9.7	7.2	43.0	32.56	44.36	74	Vertical
24947.5 (note3)	41.3	11.2	8.6	47.6	48.35	61.85	74	Vertical
1694.4	31.6	6.7	1.8	43.5	33.97	30.57	74	Horizontal
4533.2	35.7	8.4	0.9	43.1	34.54	36.44	74	Horizontal
11129.7	37.9	9.7	7.2	43.0	32.38	44.18	74	Horizontal
24843.9 (note3)	41.3	11.2	8.6	47.6	47.81	61.31	74	Horizontal

**Average Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
1152.7	31.6	6.7	1.8	43.5	22.01	18.61	54	Vertical
4874.0	35.7	8.4	0.9	43.1	23.63	25.53	54	Vertical
12287.1	37.9	9.7	7.2	43.0	21.94	33.74	54	Vertical
24911.1 (note3)	41.3	11.2	8.6	47.6	38.22	51.72	54	Vertical
1287.9	31.6	6.7	1.8	43.5	23.06	19.66	54	Horizontal
3580.3	35.7	8.4	0.9	43.1	22.30	24.20	54	Horizontal
11121.5	37.9	9.7	7.2	43.0	22.29	34.09	54	Horizontal
24713.0 (note3)	41.3	11.2	8.6	47.6	37.18	50.68	54	Horizontal

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

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor + Filter - Preamplifier Factor.

2. The emission level of 5<sup>th</sup> to 10<sup>th</sup> harmonic is greater than 18dB from the limit.

3. The measurement was demonstrating the highest peak and average system noise floor values.

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**Operation Mode:802.11n TX CH High 6.5M**

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

**Peak Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
1334.9	31.5	6.8	2.3	43.7	33.54	30.44	74	Vertical
4924.5	35.6	8.4	0.5	43.1	35.91	37.31	74	Vertical
10995.7	38.0	9.8	7.3	42.7	31.77	44.17	74	Vertical
24846.0 (note3)	41.3	11.2	8.6	47.6	47.82	61.32	74	Vertical
1397.2	31.5	6.8	2.3	43.7	32.61	29.51	74	Horizontal
4646.0	35.6	8.4	0.5	43.1	33.99	35.39	74	Horizontal
11452.8	38.0	9.8	7.3	42.7	31.71	44.11	74	Horizontal
24764.8 (note3)	41.3	11.2	8.6	47.6	47.57	61.07	74	Horizontal

**Average Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
1361.9	31.5	6.8	2.3	43.7	22.38	19.25	54	Vertical
4924.5	35.6	8.4	0.5	43.1	28.01	29.41	54	Vertical
10994.6	38.0	9.8	7.3	42.7	21.34	33.74	54	Vertical
24994.4 (note3)	41.3	11.2	8.6	47.6	38.12	51.62	54	Vertical
1448.9	31.5	6.8	2.3	43.7	22.59	19.49	54	Horizontal
4514.4	35.6	8.4	0.5	43.1	23.61	25.01	54	Horizontal
11105.0	38.0	9.8	7.3	42.7	21.35	33.75	54	Horizontal
24983.2 (note3)	41.3	11.2	8.6	47.6	37.49	50.99	54	Horizontal

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

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor + Filter + Preamplifier Factor.

2. The emission level of 5th to 10th harmonic is greater than 18dB from the limit.

3. The measurement was demonstrating the highest peak and average system noise floor values.

### **5.3.8 Peak Power Spectral Density**

**Test Requirement:** FCC Part15 247(e)

**Test date:** Oct 10, 2011

**Standard Applicable:** According to section 15.247(e), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dB in any 3KHz band during any time in terval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph(b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

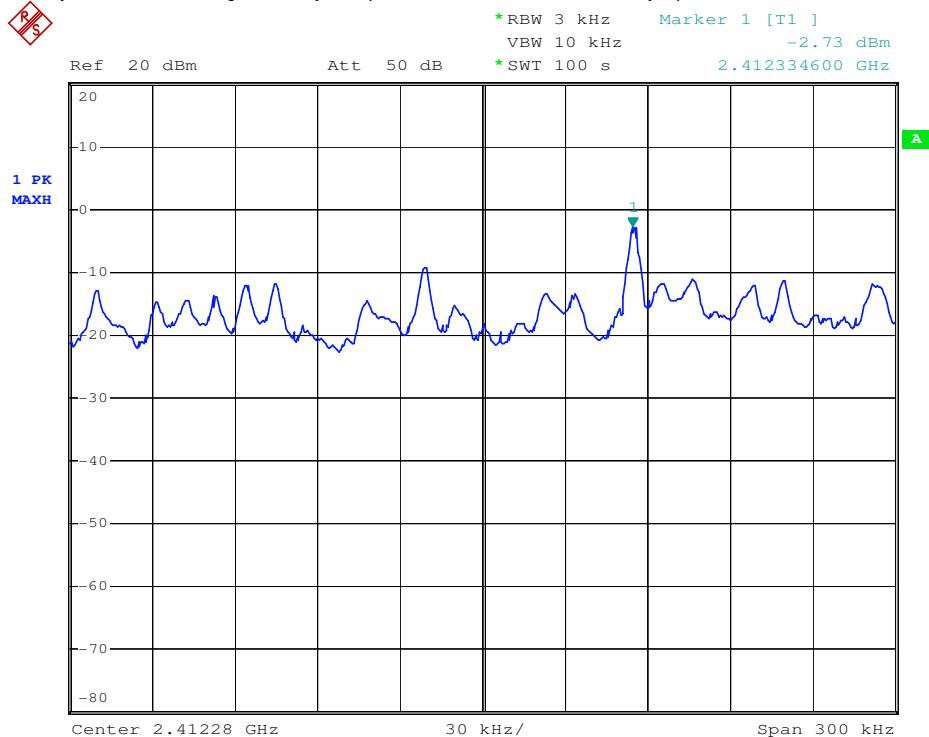
**Measurement Procedure:** The EUT was tested according to ANSI C63.10-2009 section 6.11.2.3.

#### **Measurement Result:**

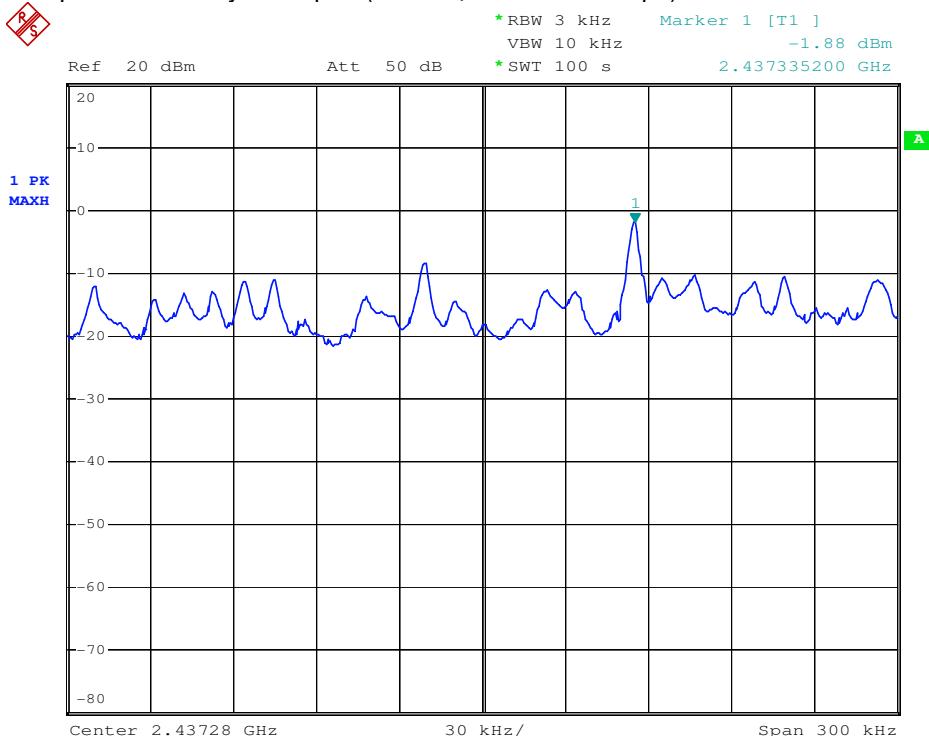
Channel	Data rate (Mbps)	Frequency (MHz)	Reading (dBm)	Cable Loss (dB)	RF Power Density (dBm)	Limit (dBm)	Result
LOW	1	2412.28	-2.73	0.5	-2.23	8	PASS
MID	1	2437.28	-1.88	0.5	-1.38	8	PASS
HIGH	1	2462.28	-1.68	0.5	-1.18	8	PASS

Note: All supported modulation schemes were tested on top, middle and bottom channels to determine the worse case configuration. The worse case values recorded are shown in the table above.

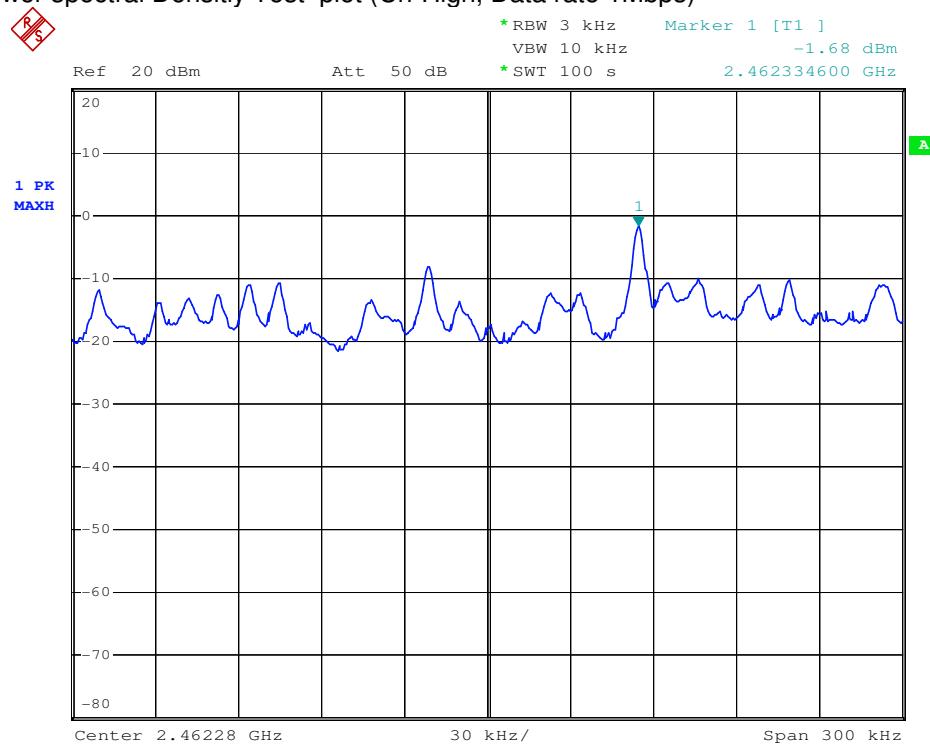
802.11b Power spectral Density Test plot (Ch-Low, Data rate 1Mbps)



802.11b Power spectral Density Test plot (Ch-Mid, Data rate 1Mbps)



802.11b Power spectral Density Test plot (Ch-High, Data rate 1Mbps)



**End of Report**