FCC Part 15C Test Report

FCC ID: 2AGQ7WMSP02

Product Name:	**WMSP02**
Trademark:	
Model Name :	**WMSP02** **WMSP01**
Prepared For : Address :	**Beijing Winner Microelectronics Co., Ltd.** 7th floor, Zhixing Building, No.3 Shangyuancun, Haidian District, Beijing, P.R.China
Prepared By : Address :	**Shenzhen BCTC Technology Co., Ltd.** No.101,Yousong Road,Longhua New District, Shenzhen,China
Test Date:	**Nov. 23 - Nov. 30, 2015**
Date of Report :	**Nov. 30, 2015**
Report No.:	**BCTC-151114104**

TEST RESULT CERTIFICATION

Applicant's name..... : Beijing Winner Microelectronics Co., Ltd.

Address..... : 7th floor, Zhixing Building, No.3 Shangyuancun, Haidian District, Beijing, P.R.China

Manufacture's Name..... : Beijing Winner Microelectronics Co., Ltd.

Address..... : 7th floor, Zhixing Building, No.3 Shangyuancun, Haidian District, Beijing, P.R.China

Product description

Product name.....: WMSP02

Model and/or type reference : WMSP02

Serial Model.....: WMSP01

Standards..... : FCC Part15.247

Test procedure ..... ANSI C63.10-2013

This device described above has been tested by BCTC, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Testing Engineer **:** Eric Yang

(Eric Yang)

Technical Manager **:** Sophie Lee

(Sophia Lee)

Authorized Signatory **:** Casey Wang

SHENZHEN BCTC TECHNOLOGY CO., LTD. APPROVED

(Casey Wang)

Table of Contents

Page

Table of Contents

Page

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.247) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.247 (a)(2)	6dB Bandwidth	PASS	
15.247 (b)	Peak Output Power	PASS	
15.247 (c)	Radiated Spurious Emission	PASS	
15.247 (d)	Power Spectral Density	PASS	
15.205	Band Edge Emission	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

(1)” N/A” denotes test is not applicable in this Test Report

1.1 TEST FACILITY

Shenzhen BCTC Technology Co., Ltd.
Add. : No.101,Yousong Road,Longhua New District, Shenzhen,China
FCC Registered No.: 187086

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y ± U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95** %。

No.	Item	Uncertainty
1	Conducted Emission Test	±1.38dB
2	RF power,conducted	±0.16dB
3	Spurious emissions,conducted	±0.21dB
4	All emissions,radiated(<1G)	±4.68dB
5	All emissions,radiated(>1G)	±4.89dB
6	Temperature	±0.5°C
7	Humidity	±2%

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

<table>
<tr><td>Equipment</td><td>WMSP02</td></tr>
<tr><td>Trade Name</td><td></td></tr>
<tr><td>Model Name</td><td>WMSP02</td></tr>
<tr><td>Serial Model</td><td>WMSP01</td></tr>
<tr><td>Model Difference</td><td>All the model are the same circuit and RF module,except model names.</td></tr>
<tr><td>Product Description</td><td>The EUT is a WMSP02
<table>
<tr><td>Operation Frequency:</td><td>802.11b/g:2412~2462 MHz</td></tr>
<tr><td>Modulation Type:</td><td>DSSS, OFDM, DBPSK, DQPSK, CCK, QAM16/64</td></tr>
<tr><td>Bit Rate of Transmitter</td><td>802.11b:11/5.5/2/1 Mbps
802.11g:54/48/36/24/18/12/9/6Mbps</td></tr>
<tr><td>Number Of Channel</td><td>11 CH, Please see Note 2.</td></tr>
<tr><td>Antenna Designation:</td><td>Please see Note 3.</td></tr>
<tr><td>Output Power(Conducted,AV):</td><td>802.11b: 12.65dBm (Max.)
802.11g: 10.72 dBm (Max.)</td></tr>
<tr><td>Antenna Gain (dBi)</td><td>1.0dbi</td></tr>
</table>
Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.</td></tr>
<tr><td>Channel List</td><td>Please refer to the Note 2.</td></tr>
<tr><td>Adapter</td><td>N/A</td></tr>
<tr><td>Battery</td><td>N/A</td></tr>
</table>

Note:

1. For a more detailed features description, please refer to the manufacturer’s specifications or the User's Manual.

2.

Channel List for 802.11b/g							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	04	2427	07	2442	10	2457
02	2417	05	2432	08	2447	11	2462
03	2422	06	2437	09	2452		

3.

Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
A	N/A	N/A	PCB Antenna	N/A	1.0	Wifi Antenna

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	802.11b CH1/ CH6/ CH11
Mode 2	802.11g CH1/ CH6/ CH11
Mode 3	Link Mode

For Conducted Emission	
Final Test Mode	Description
Mode 3	Link Mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11b CH1/ CH6/ CH11
Mode 2	802.11g CH1/ CH6/ CH11

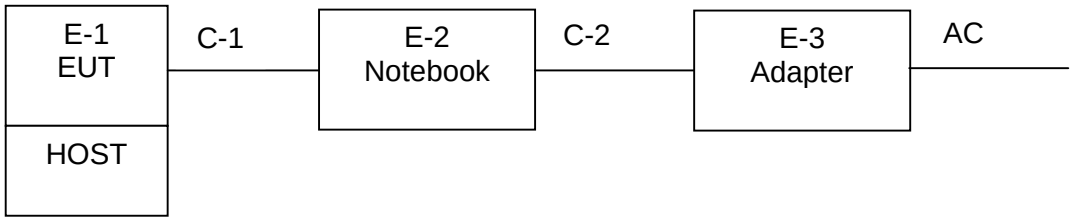
Note:

(1) The measurements are performed at the highest, middle, lowest available channels.

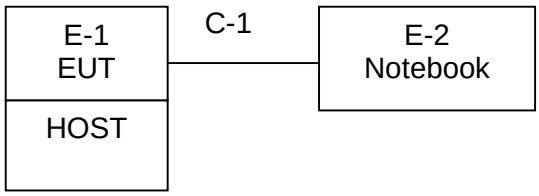
(2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission Test



Radiated Spurious Emission Test



2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	WMSP02	Winner Micro	WMSP02	N/A	EUT
	HOST	N/A	JP0005	N/A	
E-2	Notebook	N/A	X550C	N/A	
E-3	Adapter	N/A	AD887520	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C1	NO	NO	1.0M	
C2	NO	NO	1.5M	

Note:

(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4407B	MY45109572	2015.08.25	2016.08.24	1 year
2	Test Receiver	R&S	ESPI	101396	2015.08.25	2016.08.24	1 year
3	Bilog Antenna	SCHWARZBECK	VULB9160	VULB9160-3369	2015.08.25	2016.08.24	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2015.06.07	2016.06.06	1 year
5	Spectrum Analyzer	ADVANTEST	R3132	150900201	2015.06.07	2016.06.06	1 year
6	Horn Antenna	SCHWARZBECK	9120D	9120D-1275	2015.08.25	2016.08.24	1 year
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2015.07.06	2016.07.05	1 year
8	Amplifier	SCHWARZBECK	BBV9718	9718-270	2015.08.25	2016.08.24	1 year
9	Amplifier	SCHWARZBECK	BBV9743	9743-119	2015.08.25	2016.08.24	1 year
10	Loop Antenna	ARA	PLA-1030/B	1029	2015.06.08	2016.06.07	1 year
11	Power Meter	R&S	NRVS	100696	2015.07.06	2016.07.05	1 year
12	Power Sensor	R&S	URV5-Z4	0395.1619.05	2015.07.06	2016.07.05	1 year
13	RF cables	R&S	N/A	N/A	2015.07.06	2016.07.05	1 year

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Test Receiver	R&S	ESCI	101421	2015.08.25	2016.08.24	1 year
2	LISN	SCHWARZBECK	NSLK8127	812779	2015.08.25	2016.08.24	1 year
3	LISN	EMCO	Feb-16	42990	2015.08.24	2016.08.23	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2015.06.07	2016.06.06	1 year
5	Passive Voltage Probe	R&S	ESH2-Z3	100196	2015.06.07	2016.06.06	1 year

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	73.00	60.00	56.00	46.00	CISPR
5.0 -30.0	73.00	60.00	60.00	50.00	CISPR

0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	73.00	60.00	56.00	46.00	FCC
5.0 -30.0	73.00	60.00	60.00	50.00	FCC

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

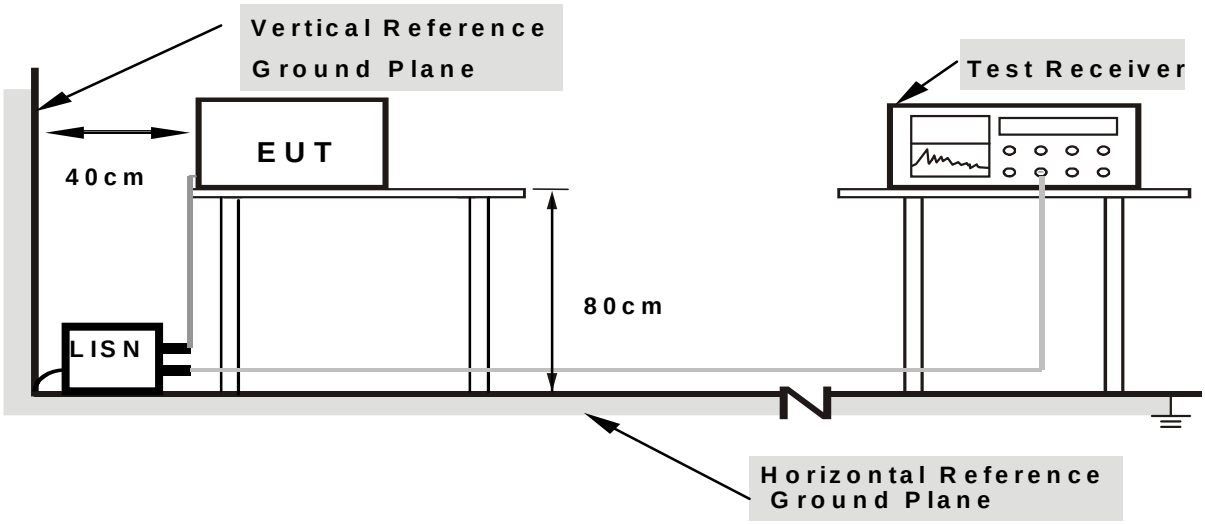
3.1.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

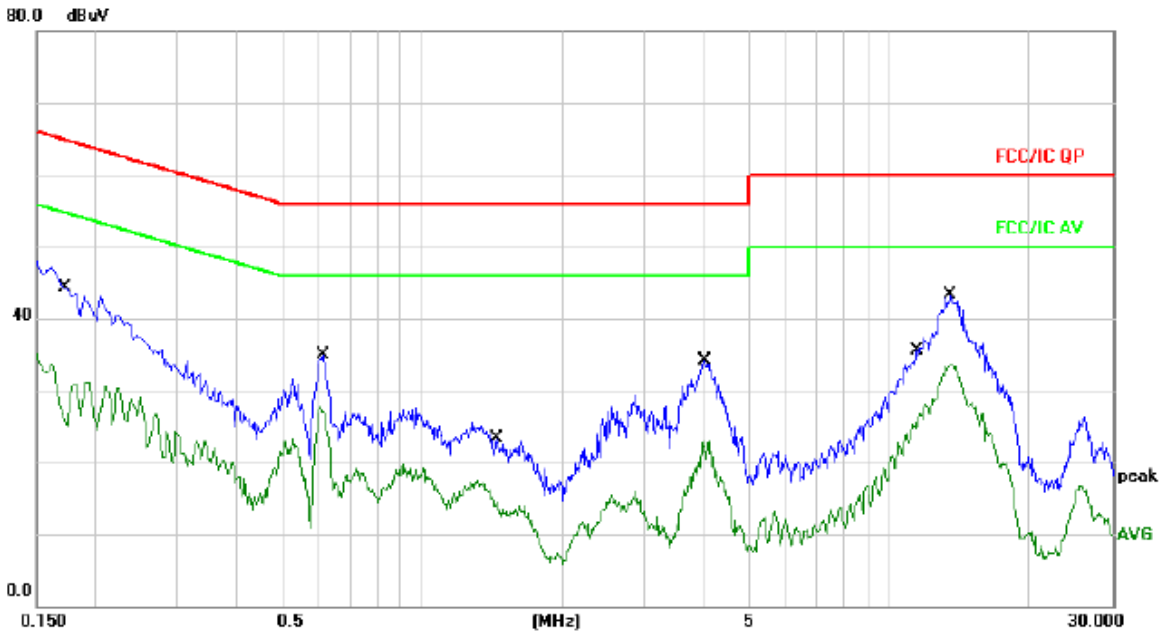
We pretest AC 120V and AC 240V, the worst voltage was AC 120V and the data recording in the report.

3.1.6 TEST RESULTS

EUT：	WMSP02	Model Name. ：	WMSP02
Temperature：	26℃	Relative Humidity：	54%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	AC120V/60Hz from laptop adapter	Test Mode：	Link Mode

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Detector Type
0.1749	33.87	10.06	43.93	64.72	-20.79	QP
0.1749	21.00	10.06	31.06	54.72	-23.66	AVG
0.6140	24.82	10.13	34.95	56.00	-21.05	QP
0.6140	8.98	10.13	19.11	46.00	-26.89	AVG
1.4460	13.18	10.17	23.35	56.00	-32.65	QP
1.4460	3.77	10.17	13.94	46.00	-32.06	AVG
4.0380	24.00	10.16	34.16	56.00	-21.84	QP
4.0380	7.99	10.16	18.15	46.00	-27.85	AVG
11.4980	25.47	10.13	35.60	60.00	-24.40	QP
11.4980	16.04	10.13	26.17	50.00	-23.83	AVG
13.5140	33.17	10.14	43.31	60.00	-16.69	QP
13.5140	21.77	10.14	31.91	50.00	-18.09	AVG

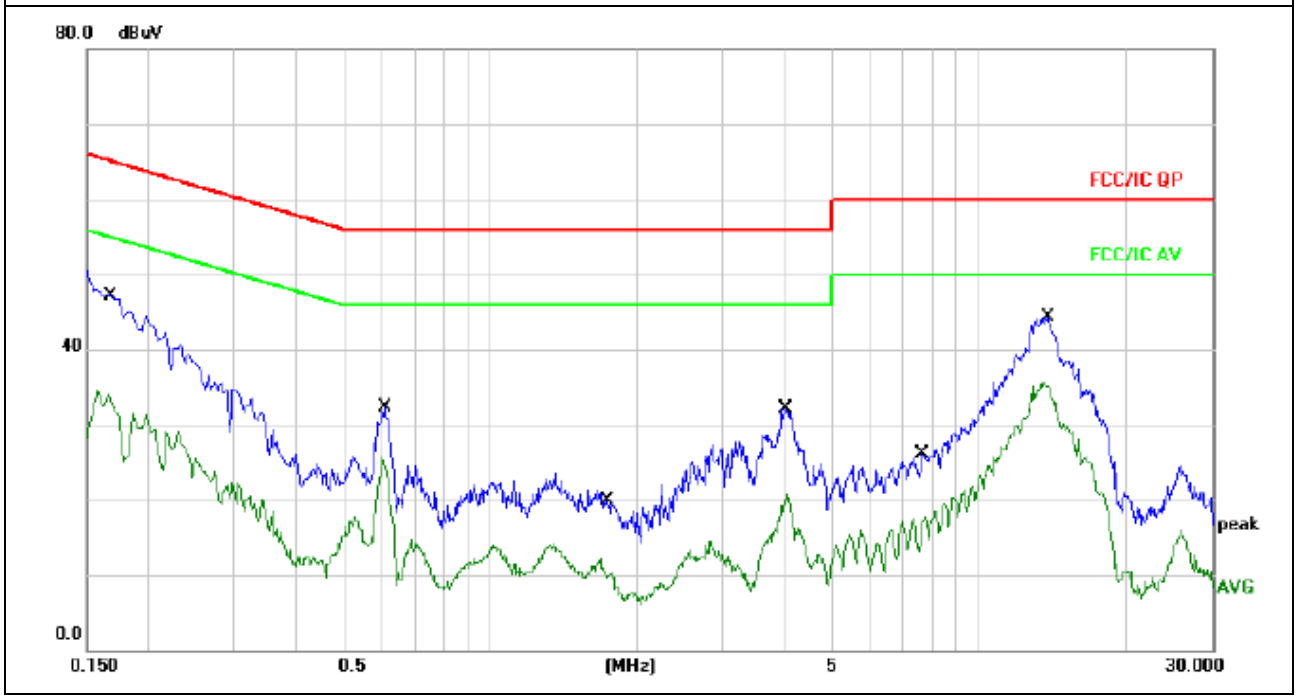
Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



EUT：	WMSP02	Model Name. ：	WMSP02
Temperature：	26℃	Relative Humidity：	54%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	AC120V/60Hz from laptop adapter	Test Mode：	Link Mode

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1700	36.75	10.06	46.81	64.96	-18.15	QP
0.1700	22.30	10.06	32.36	54.96	-22.60	AVG
0.6100	22.20	10.13	32.33	56.00	-23.67	QP
0.6100	13.89	10.13	24.02	46.00	-21.98	AVG
1.7420	9.72	10.18	19.90	56.00	-36.10	QP
1.7420	-0.25	10.18	9.93	46.00	-36.07	AVG
4.0220	21.95	10.16	32.11	56.00	-23.89	QP
4.0220	4.31	10.16	14.47	46.00	-31.53	AVG
7.6700	16.10	10.10	26.20	60.00	-33.80	QP
7.6700	8.50	10.10	18.60	50.00	-31.40	AVG
13.8460	34.19	10.14	44.33	60.00	-15.67	QP
13.8460	20.86	10.14	31.00	50.00	-19.00	AVG

Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / *10Hz* for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 25GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 and 1.5 meters above the ground at a 3 meter semi-chamber test. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m; above 1GHz, the height was 1.5m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

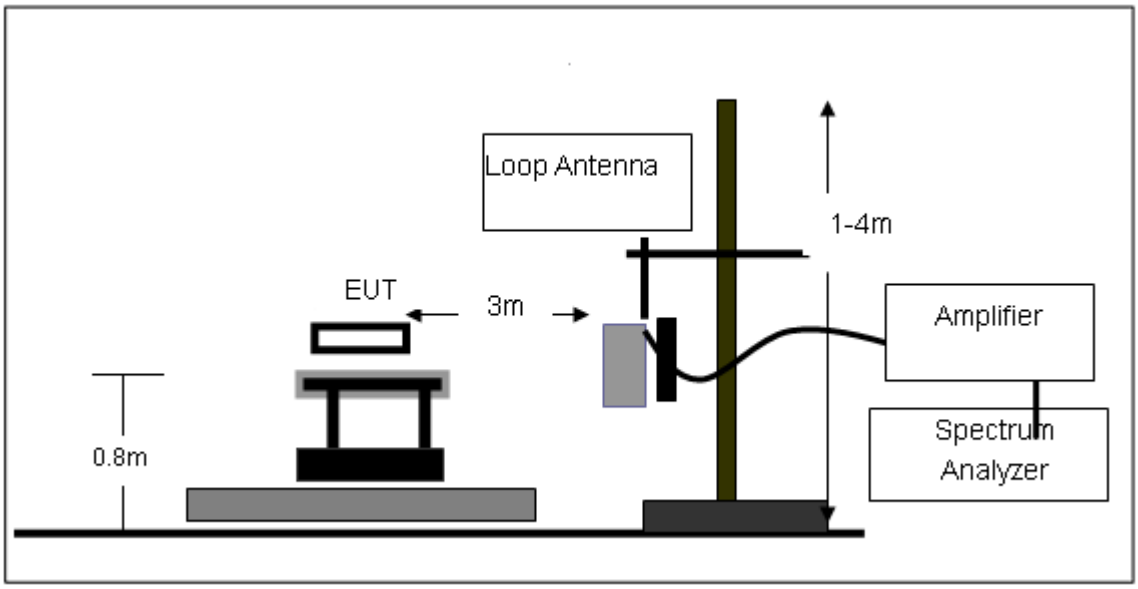
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported
The frequency range from 30MHz to 10th harmonic (25GHz) are checked. and no any emissions were found from 18GHz to 25 GHz, So the radiated emissions from 18GHz to 25GHz were not record.

3.2.3 DEVIATION FROM TEST STANDARD

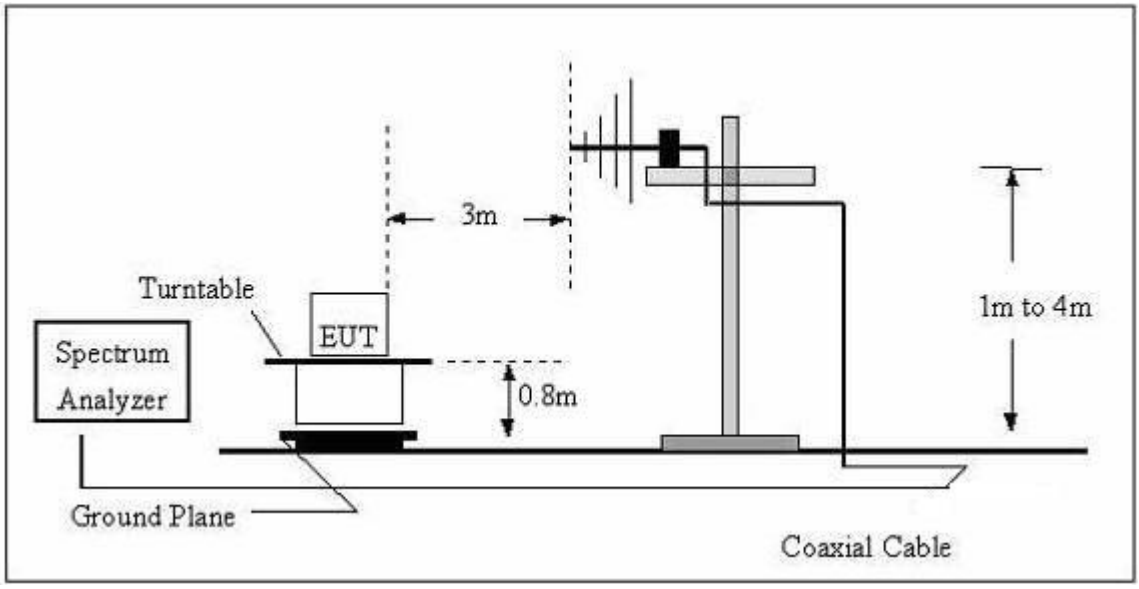
No deviation

3.2.4 TEST SETUP

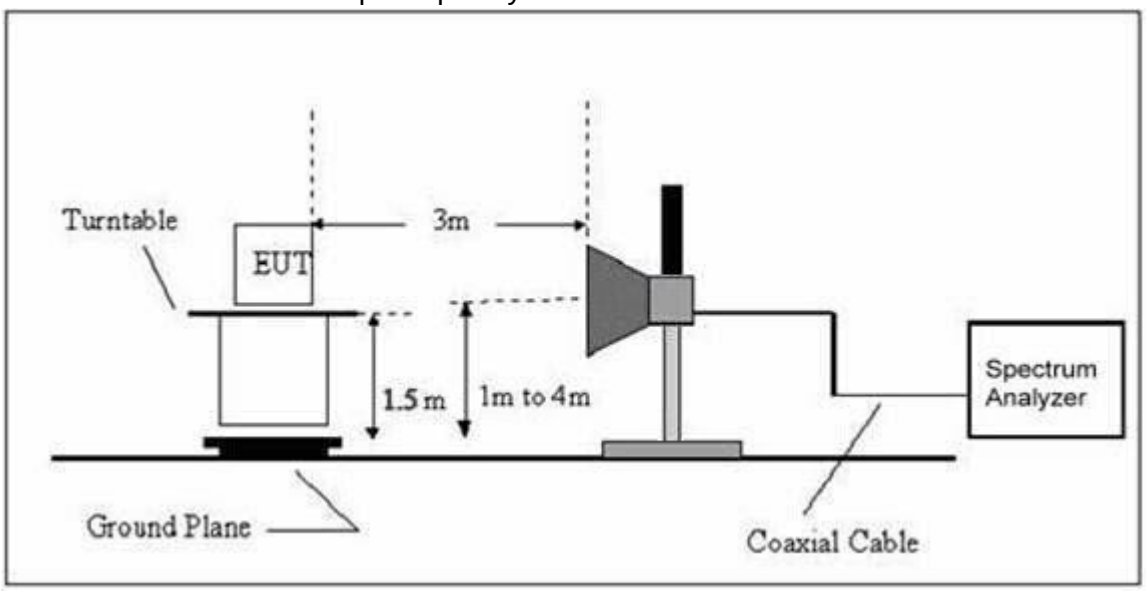
（A）Radiated Emission Test-Up Frequency Below 30MHz



（B）Radiated Emission Test-Up Frequency 30MHz~1GHz



（C）Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)

EUT：	WMSP02	Model Name. ：	WMSP02
Temperature：	20℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	AC120V/60Hz
Test Mode ：	TX	Polarization :	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

NOTE:

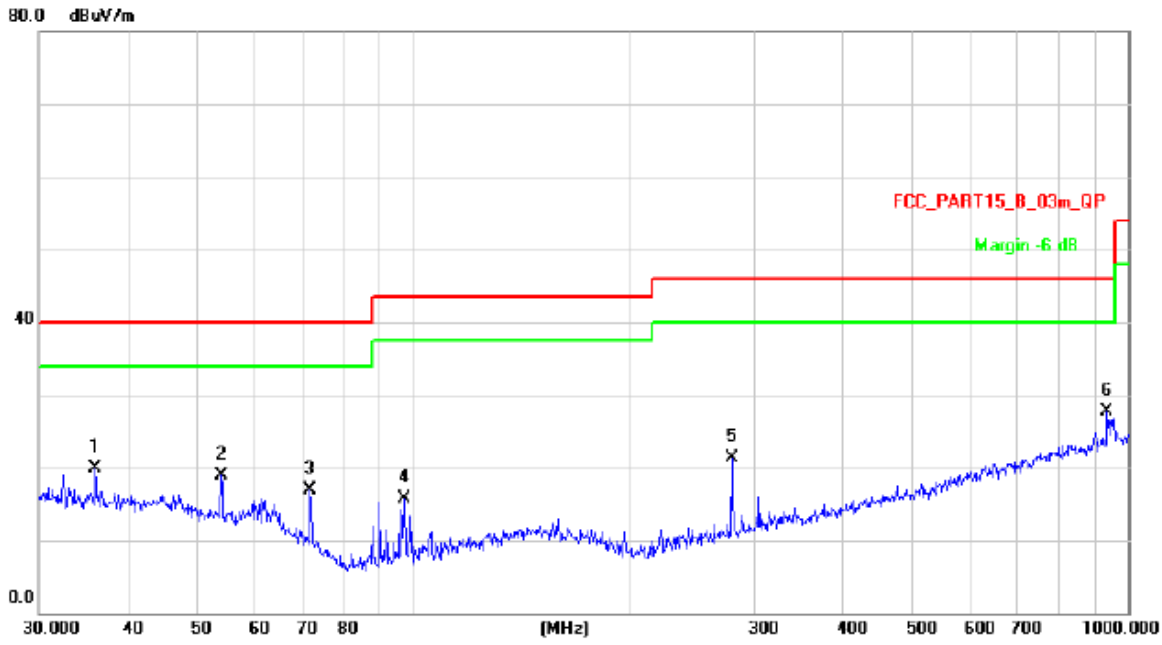
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)

EUT：	WMSP02	Model Name ：	WMSP02
Temperature：	26℃	Relative Humidity：	54%
Pressure：	1010 hPa	Polarization：	Horizontal
Test Voltage ：	DC5V from laptop		
Test Mode ：	Link Mode		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
35.8746	28.52	-8.58	19.94	40.00	-20.06	QP
53.8818	29.88	-10.93	18.95	40.00	-21.05	QP
71.8320	32.02	-15.19	16.83	40.00	-23.17	QP
97.1148	32.41	-16.79	15.62	43.50	-27.88	QP
279.0436	34.39	-13.13	21.26	46.00	-24.74	QP
935.5463	28.39	-0.78	27.61	46.00	-18.39	QP

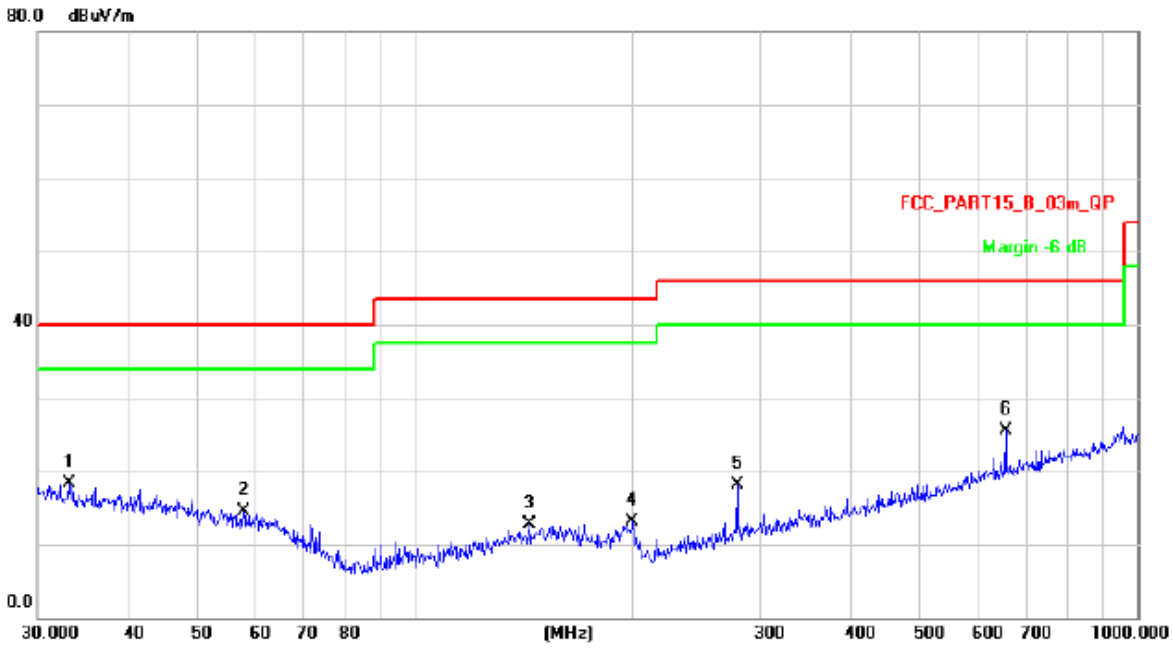
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
All interfaces was connected, and BT TX mode was link.



EUT：	WMSP02	Model Name ：	WMSP02
Temperature：	26℃	Relative Humidity：	54%
Pressure：	1010 hPa	Polarization：	Vertical
Test Voltage ：	DC5V from laptop		
Test Mode ：	Link Mode		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
33.0950	26.73	-8.39	18.34	40.00	-21.66	QP
57.7962	25.83	-11.34	14.49	40.00	-25.51	QP
143.8295	25.81	-13.18	12.63	43.50	-30.87	QP
199.9856	29.21	-16.20	13.01	43.50	-30.49	QP
279.0436	31.24	-13.13	18.11	46.00	-27.89	QP
656.5300	30.57	-4.99	25.58	46.00	-20.42	QP

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
All interfaces was connected, and BT TX mode was link.

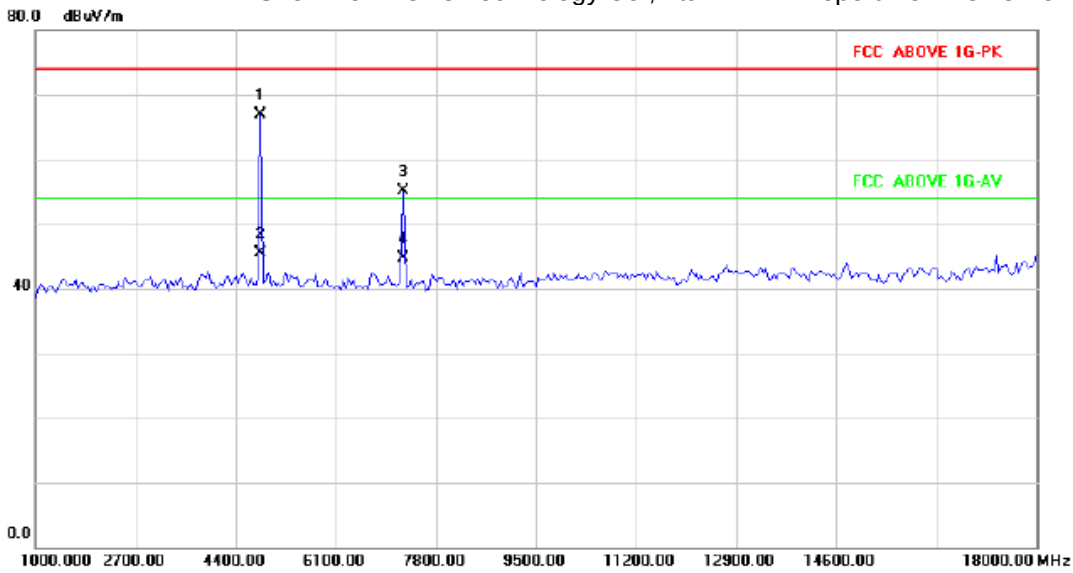


3.2.8 TEST RESULTS (ABOVE 1000 MHZ)

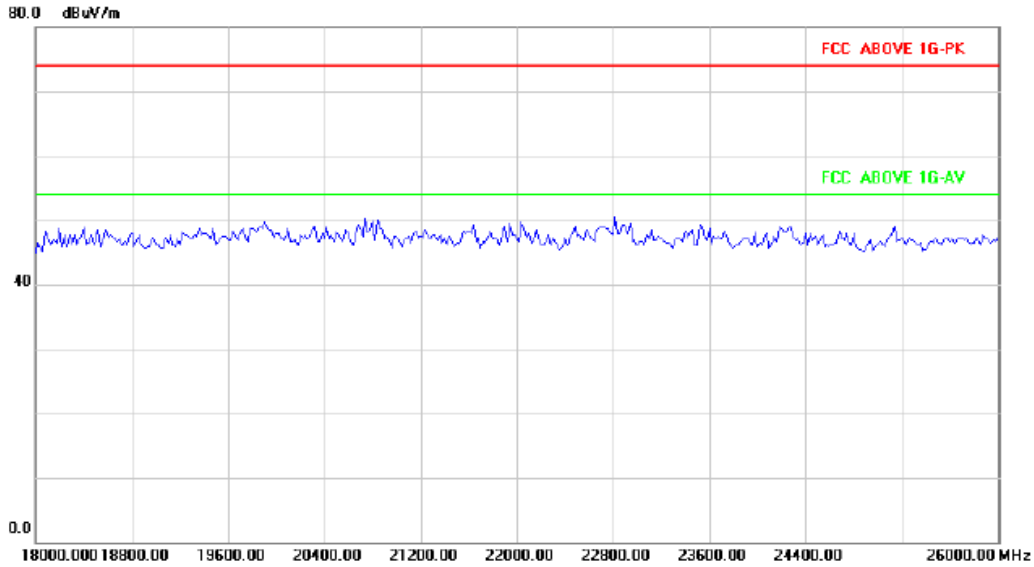
802.11b

Normal Voltage

operation frequency:2412 Horizontal

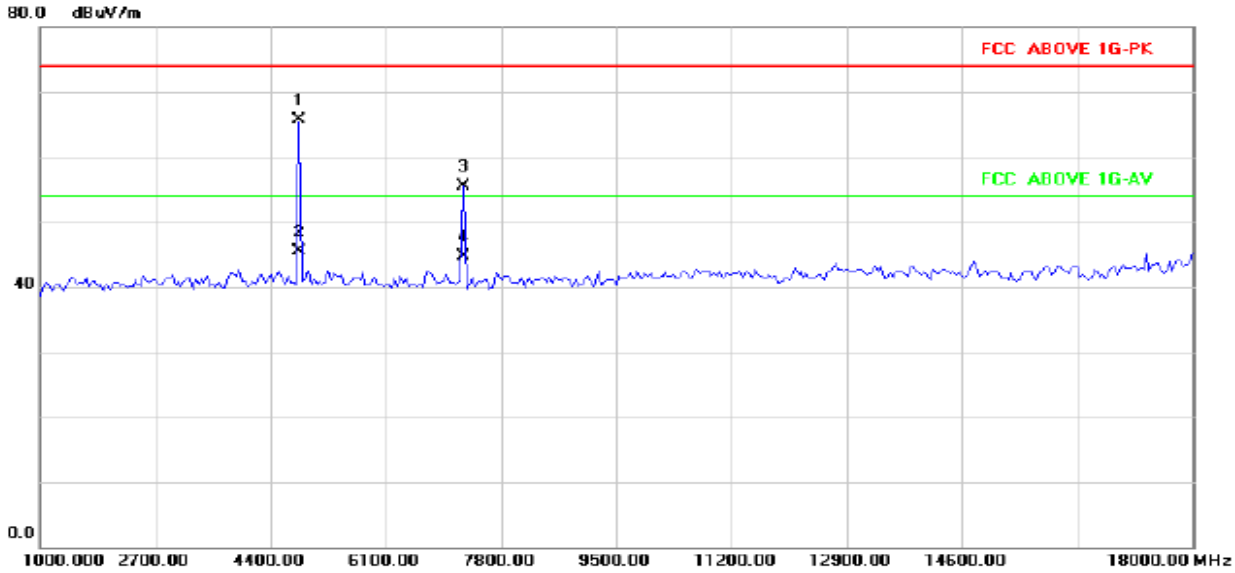


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4824.000	47.54	19.36	66.90	74.00	-7.10	peak			
2		4824.000	26.19	19.36	45.55	54.00	-8.45	AVG			
3		7236.000	37.92	17.17	55.09	74.00	-18.91	peak			
4		7236.000	27.48	17.17	44.65	54.00	-9.35	AVG			

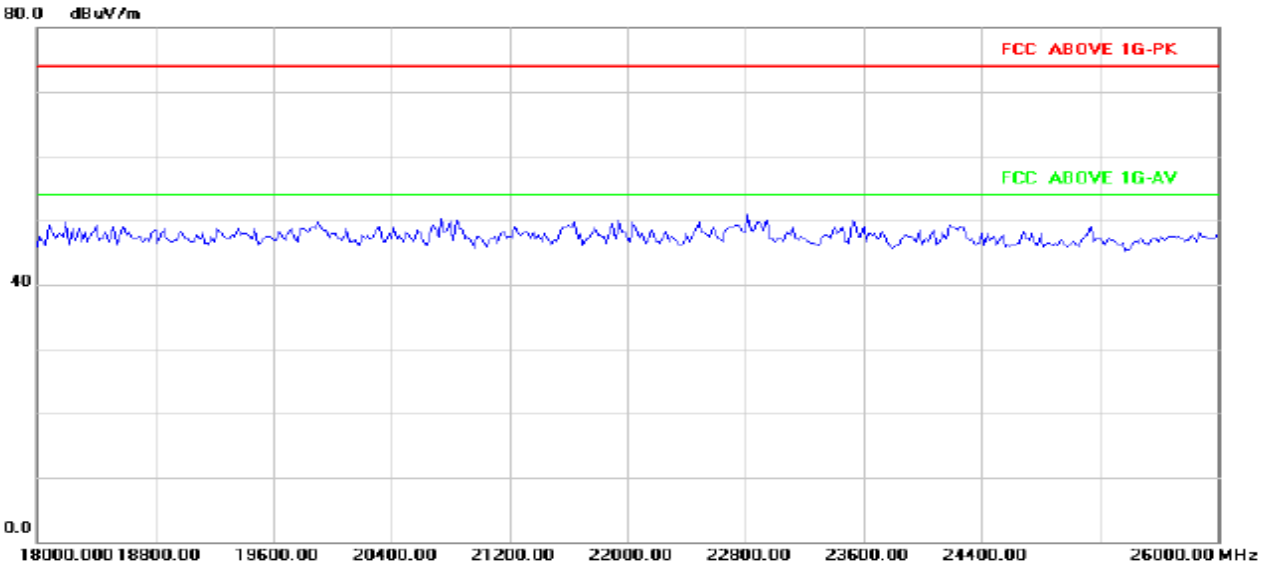


The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4824.000	46.28	19.36	65.64	74.00	-8.36	peak			
2		4824.000	26.19	19.36	45.55	54.00	-8.45	AVG			
3		7236.000	38.38	17.17	55.55	74.00	-18.45	peak			
4		7236.000	27.48	17.17	44.65	54.00	-9.35	AVG			

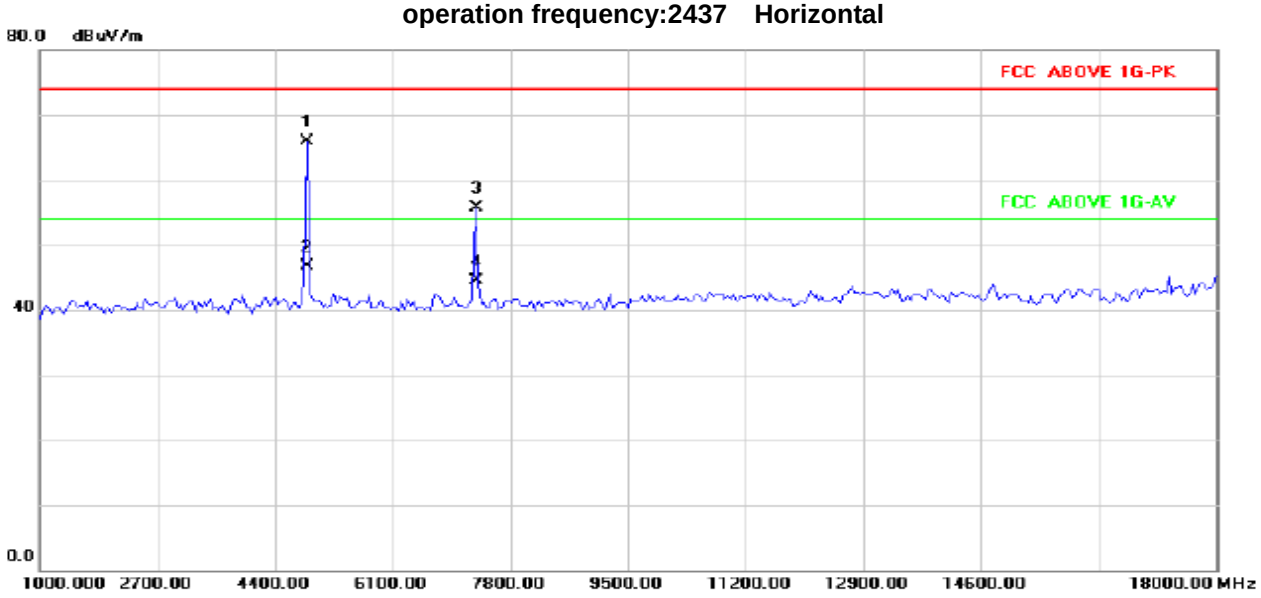


The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

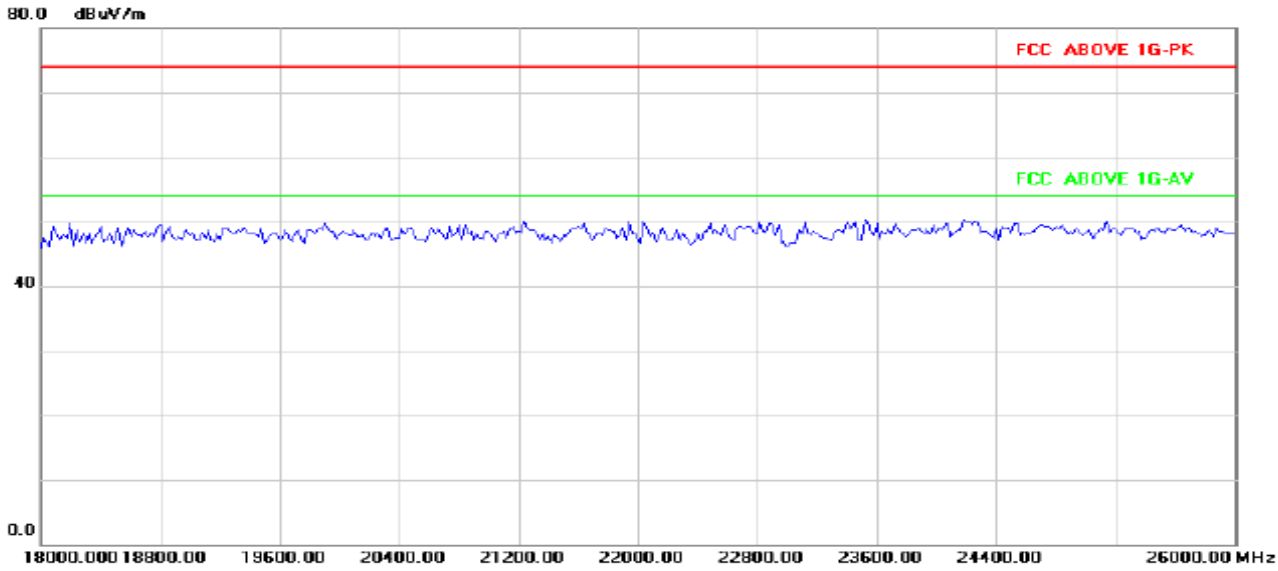
802.11b

Normal Voltage

operation frequency:2437 Horizontal

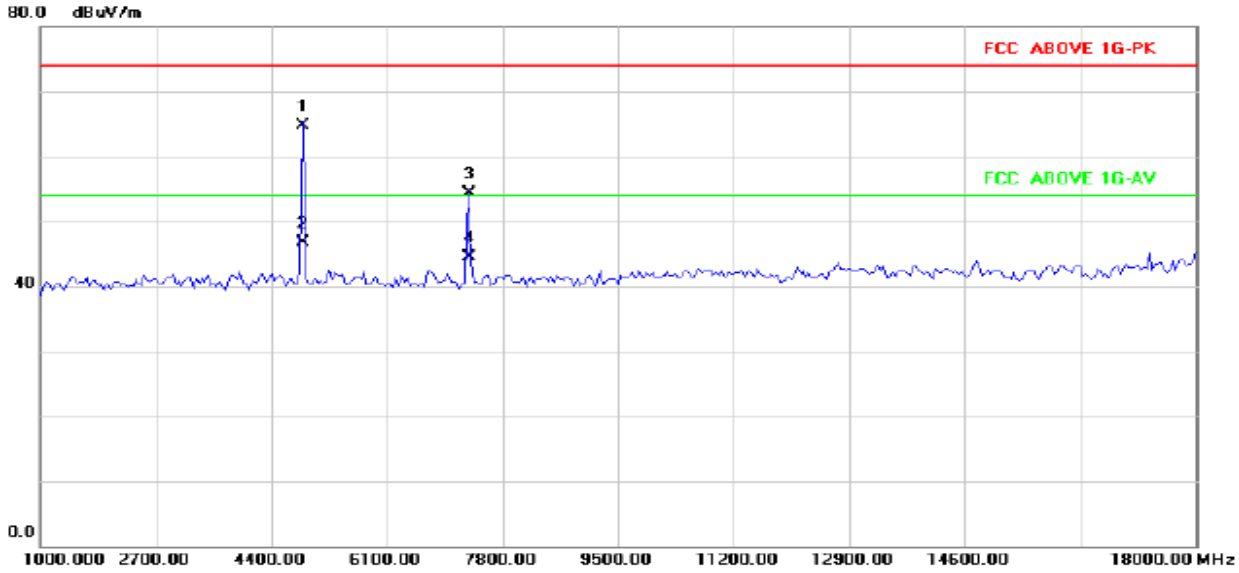


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		4874.000	46.42	19.42	65.84	74.00	-8.16	peak			
2	*	4874.000	27.36	19.42	46.78	54.00	-7.22	AVG			
3		7311.000	38.49	17.19	55.68	74.00	-18.32	peak			
4		7311.000	27.33	17.19	44.52	54.00	-9.48	AVG			

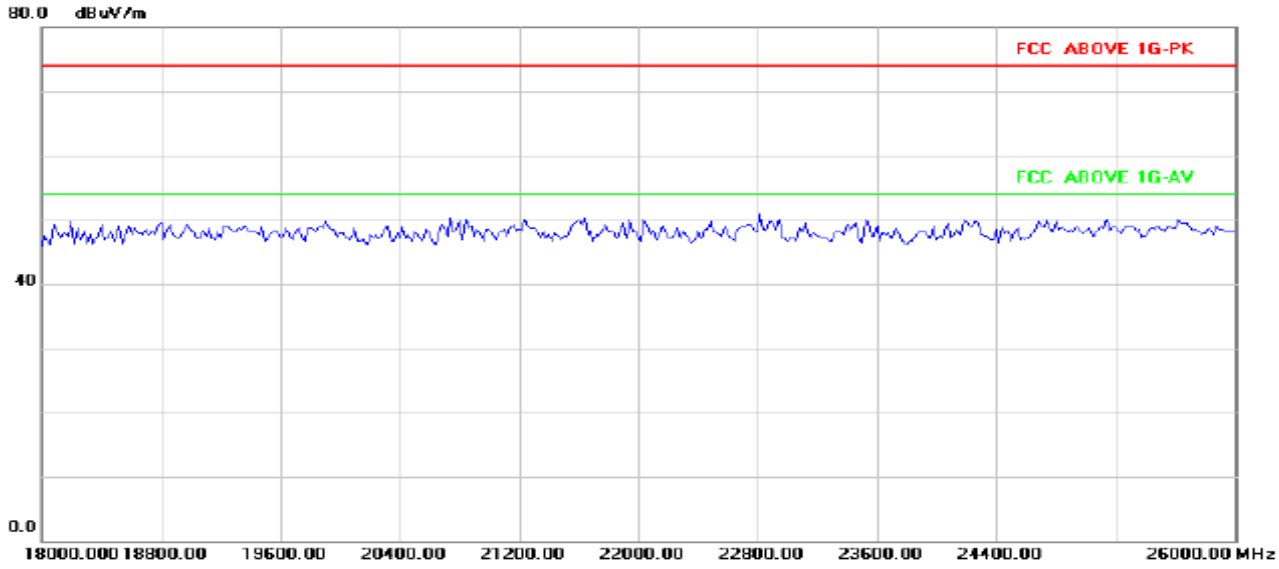


The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		4874.000	45.36	19.42	64.78	74.00	-9.22	peak			
2	*	4874.000	27.36	19.42	46.78	54.00	-7.22	AVG			
3		7311.000	37.06	17.19	54.25	74.00	-19.75	peak			
4		7311.000	27.33	17.19	44.52	54.00	-9.48	AVG			

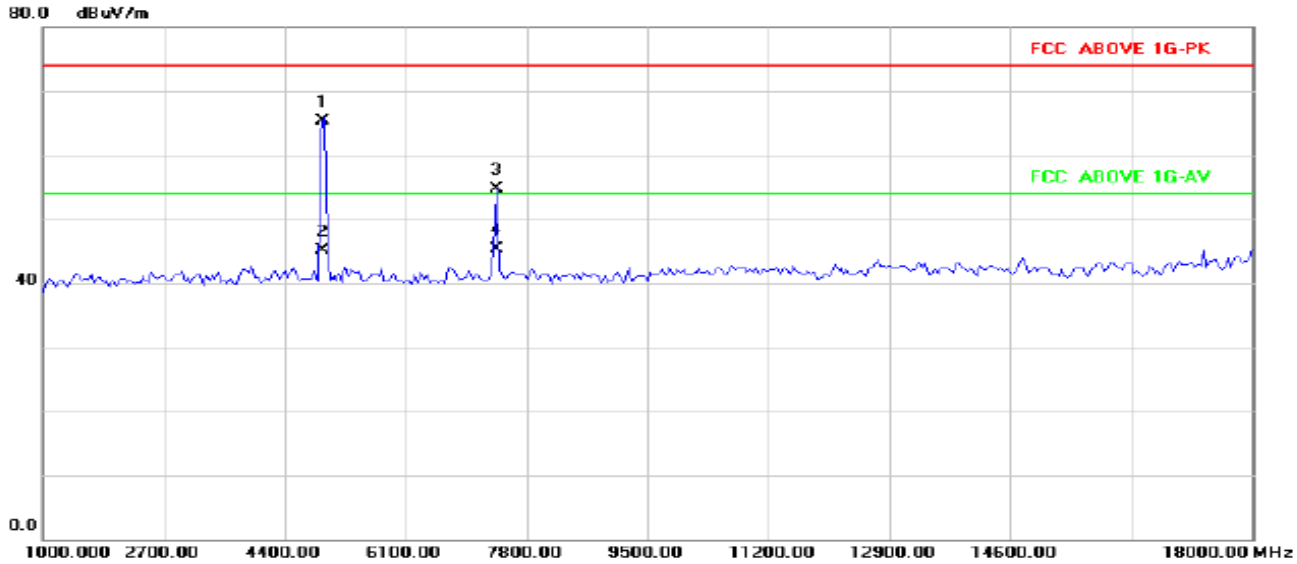


The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

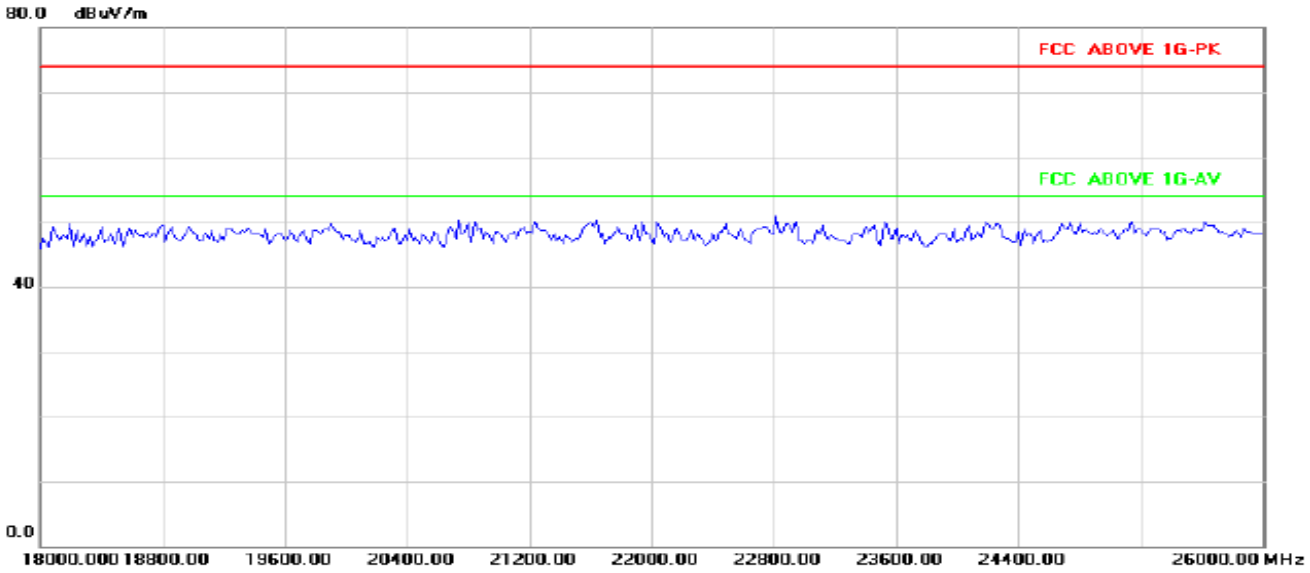
802.11b

Normal Voltage

operation frequency:2462 Horizontal

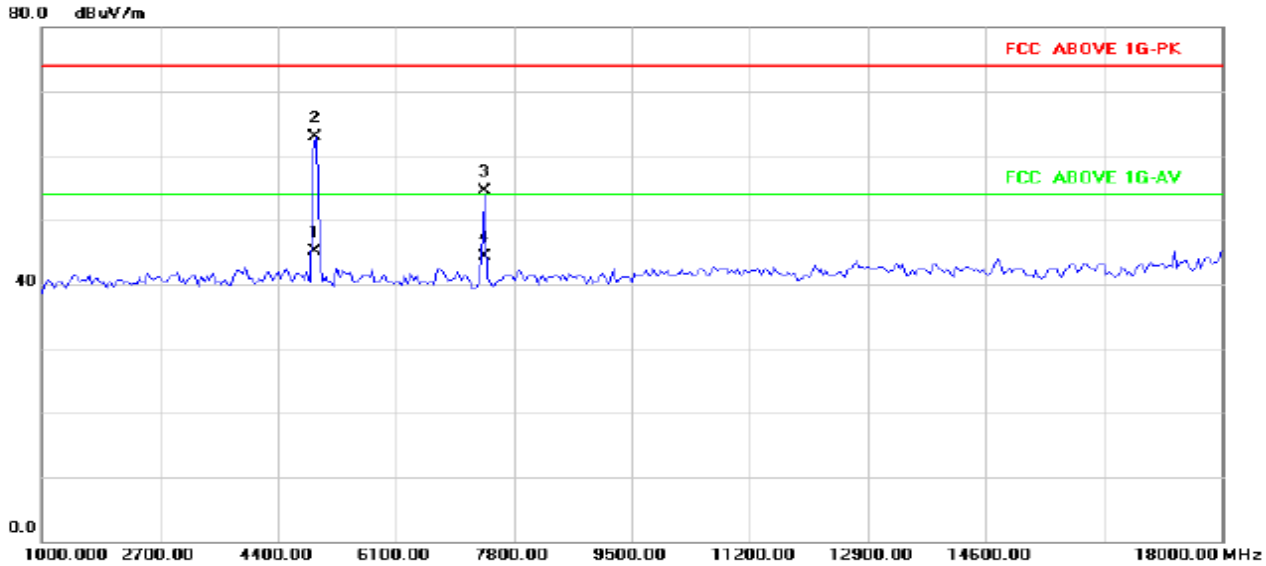


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4924.000	45.86	19.47	65.33	74.00	-8.67	peak			
2		4924.000	25.65	19.47	45.12	54.00	-8.88	AVG			
3		7386.000	37.45	17.22	54.67	74.00	-19.33	peak			
4		7386.000	28.05	17.22	45.27	54.00	-8.73	AVG			

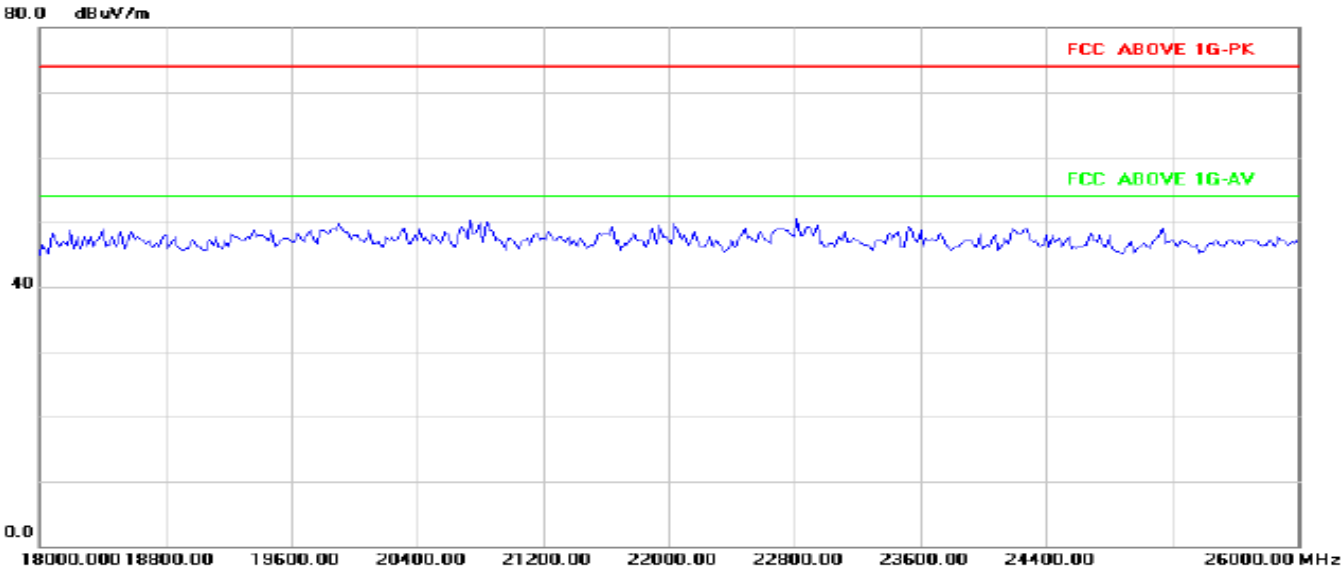


The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

operation frequency:2412 Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4924.000	25.65	19.47	45.12	54.00	-8.88	AVG			
2		4924.500	43.50	19.47	62.97	74.00	-11.03	peak			
3		7386.000	37.33	17.22	54.55	74.00	-19.45	peak			
4		7386.000	27.05	17.22	44.27	54.00	-9.73	AVG			



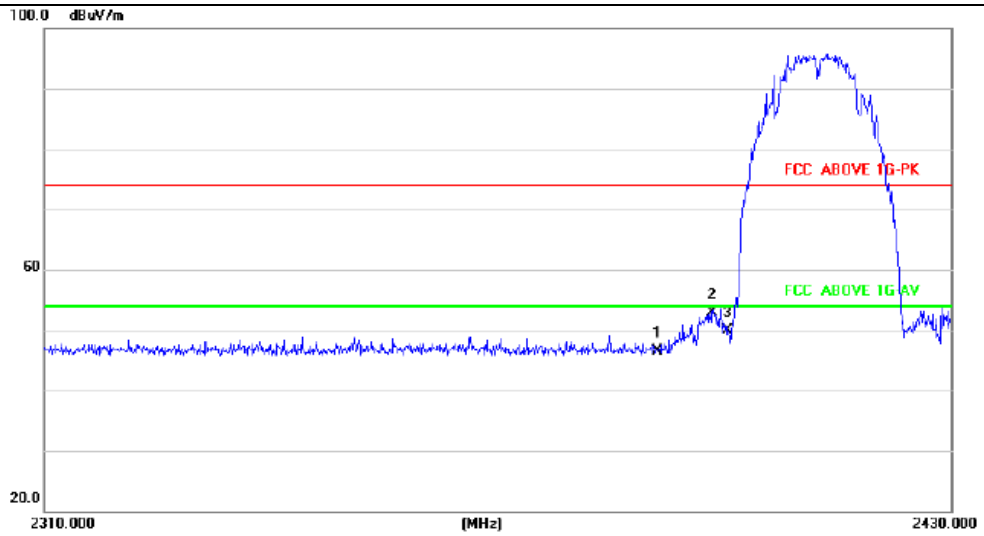
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Note:"802.11b" mode is the worst mode.

Band Radiated

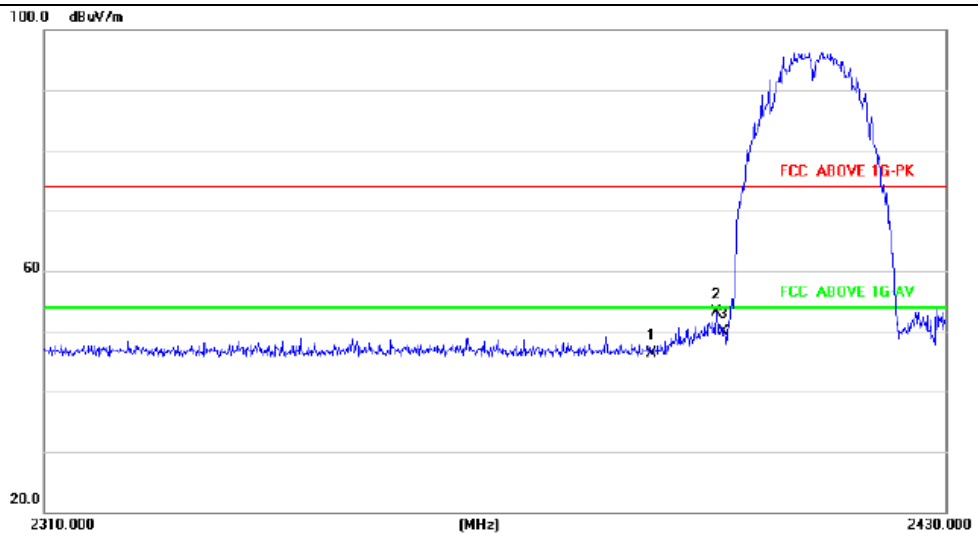
802.11b

Horizontal 2412



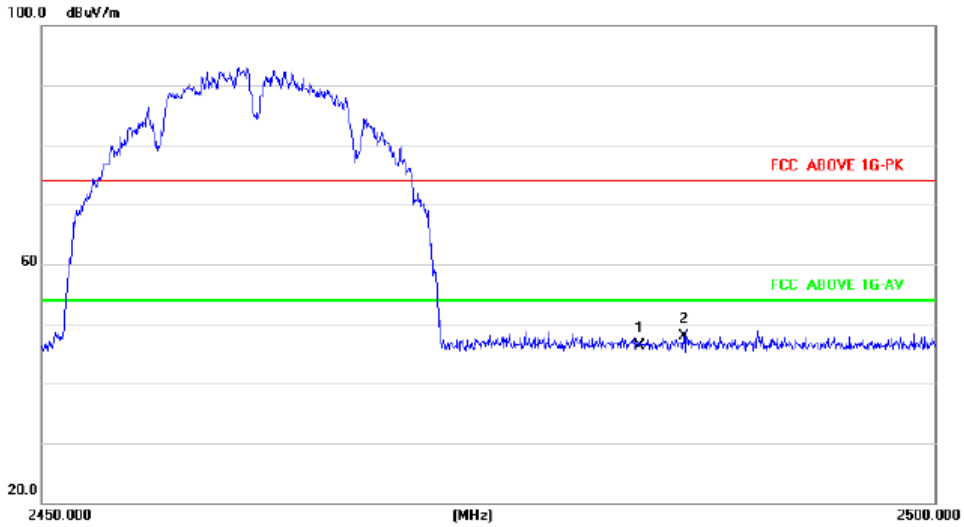
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2390.640	32.74	13.83	46.57	74.00	-27.43	peak			
2	*	2397.960	39.13	13.85	52.98	74.00	-21.02	peak			
3		2400.000	36.14	13.85	49.99	74.00	-24.01	peak			

Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2390.280	32.52	13.83	46.35	74.00	-27.65	peak			
2	*	2399.040	39.17	13.85	53.02	74.00	-20.98	peak			
3		2400.000	36.14	13.85	49.99	74.00	-24.01	peak			

Horizontal 2462



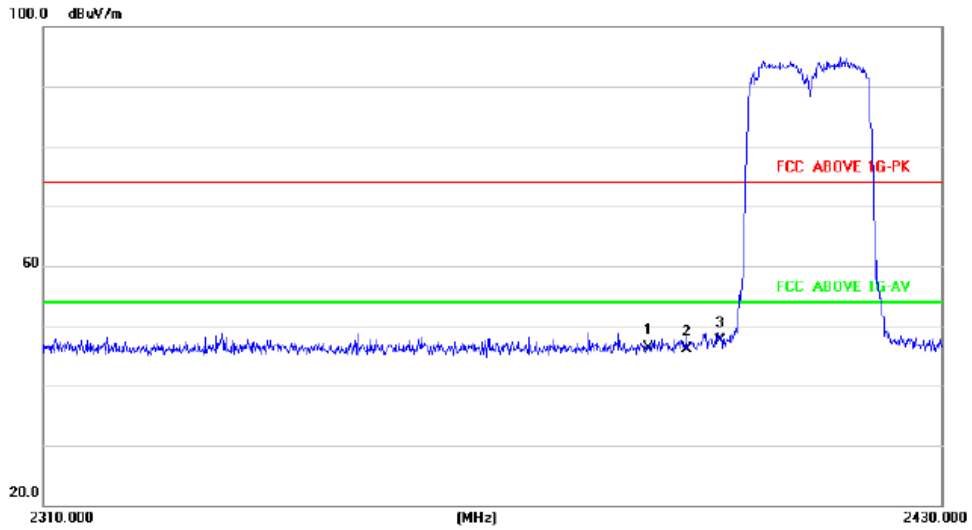
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2483.350	32.24	14.02	46.26	74.00	-27.74	peak			
2	*	2485.850	33.91	14.02	47.93	74.00	-26.07	peak			

Vertical

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2483.550	32.47	14.02	46.49	74.00	-27.51	peak			
2	*	2487.800	32.82	14.04	46.86	74.00	-27.14	peak			

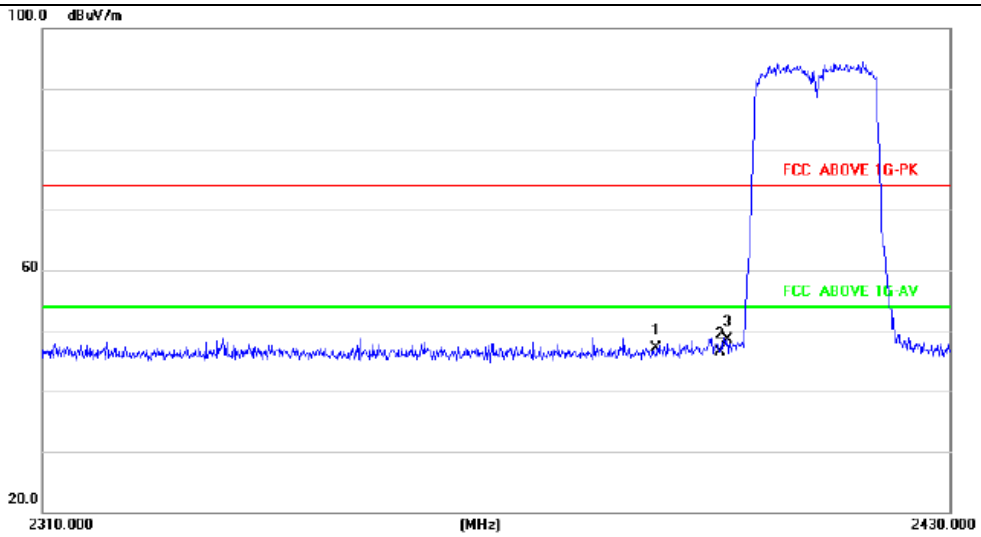
802.11g

Horizontal 2412



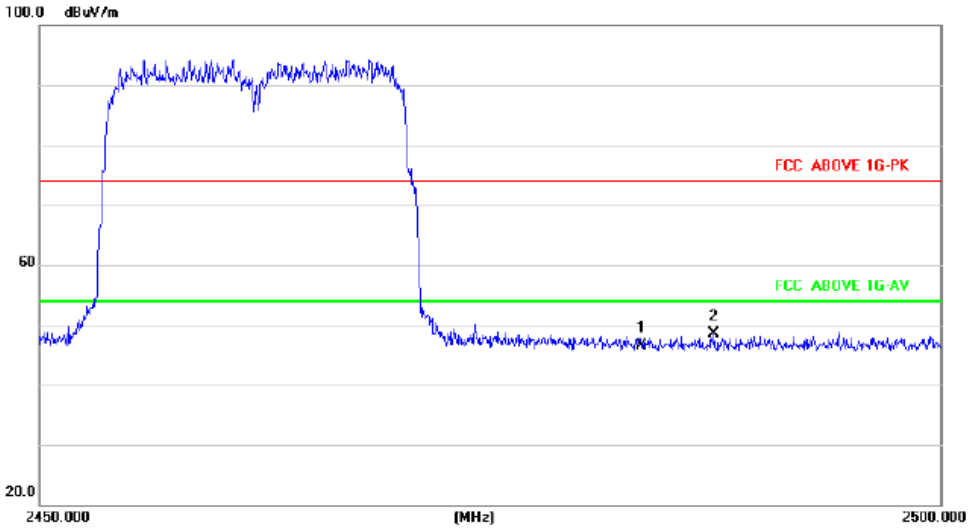
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2390.160	32.50	13.83	46.33	74.00	-27.67	peak			
2		2395.200	32.29	13.85	46.14	74.00	-27.86	peak			
3	*	2400.000	33.66	13.85	47.51	74.00	-26.49	peak			

Vertical



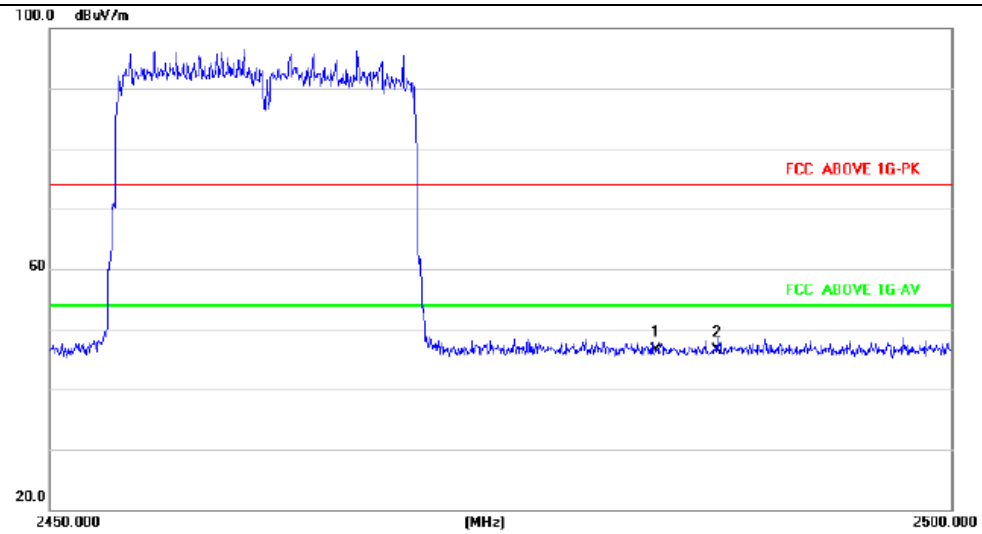
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2390.640	33.19	13.83	47.02	74.00	-26.98	peak			
2		2399.040	32.70	13.85	46.55	74.00	-27.45	peak			
3	*	2400.120	34.68	13.85	48.53	74.00	-25.47	peak			

Horizontal 2462



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2483.350	32.49	14.02	46.51	74.00	-27.49	peak			
2	*	2487.400	34.54	14.04	48.58	74.00	-25.42	peak			

Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2483.550	32.42	14.02	46.44	74.00	-27.56	peak			
2	*	2487.000	32.41	14.04	46.45	74.00	-27.55	peak			

If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

4. POWER SPECTRAL DENSITY TEST

4.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

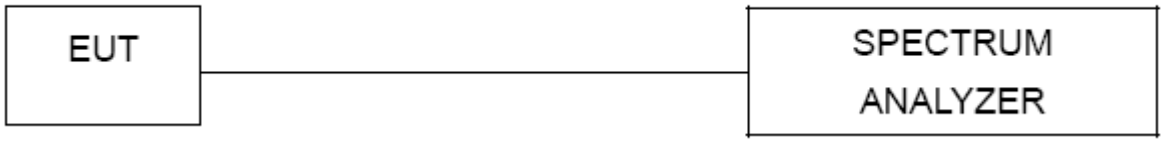
4.1.1 TEST PROCEDURE

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW ≥ 3 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

4.1.2 DEVIATION FROM STANDARD

No deviation.

4.1.3 TEST SETUP



4.1.4 EUT OPERATION CONDITIONS

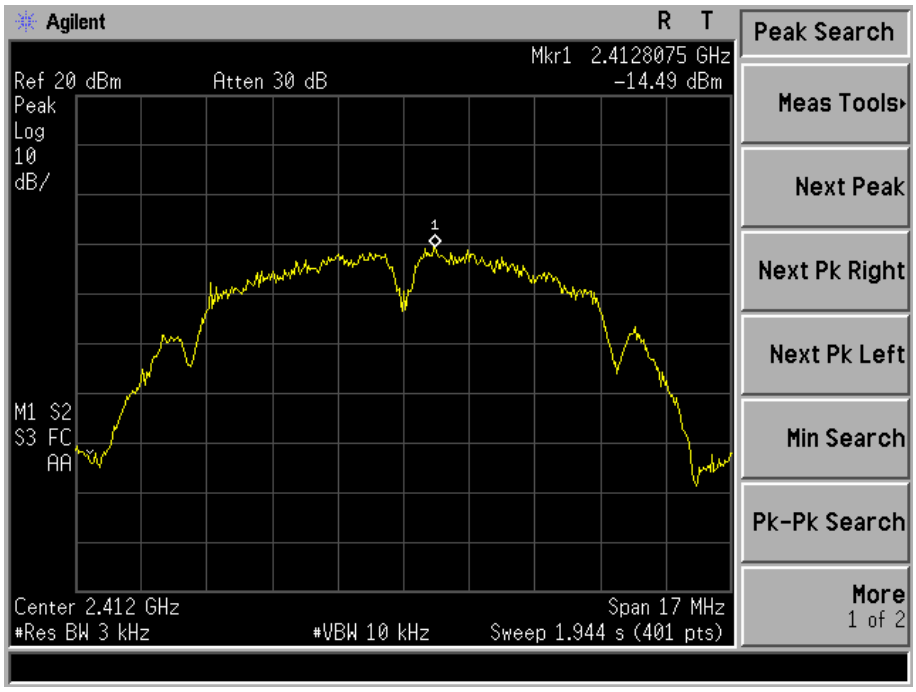
The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

4.1.5 TEST RESULTS

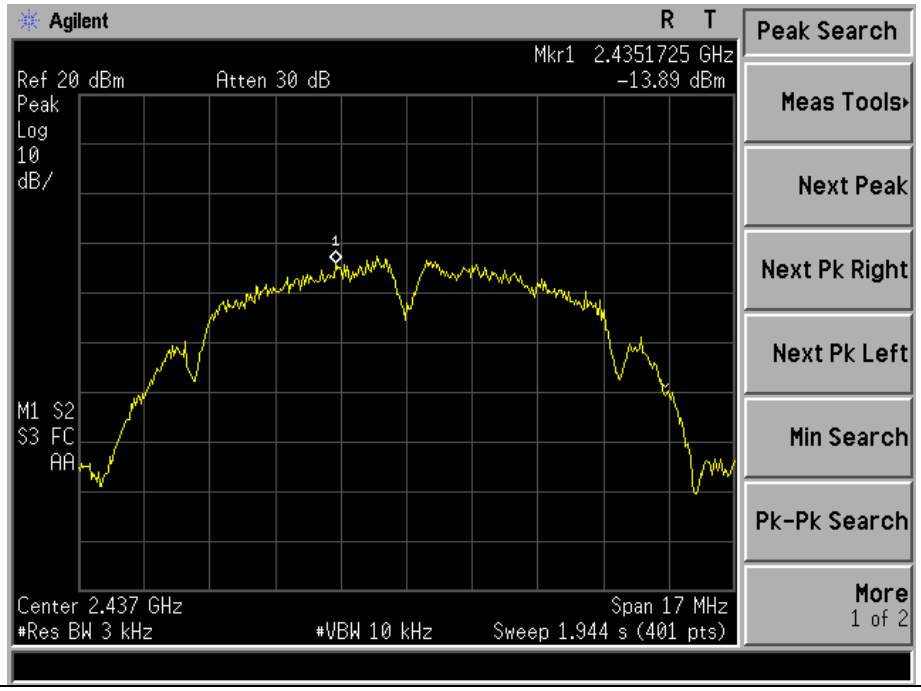
EUT：	WMSP02	Model Name ：	WMSP02
Temperature：	25℃	Relative Humidity：	54%
Pressure：	1015 hPa	Test Voltage ：	DC5V from laptop
Test Mode ：	TX b Mode /CH01, CH06, CH11		

Frequency	Power Density (dBm)	Limit (dBm)	Result
2412 MHz	-14.49	8	PASS
2437 MHz	-13.89	8	PASS
2462 MHz	-15.27	8	PASS

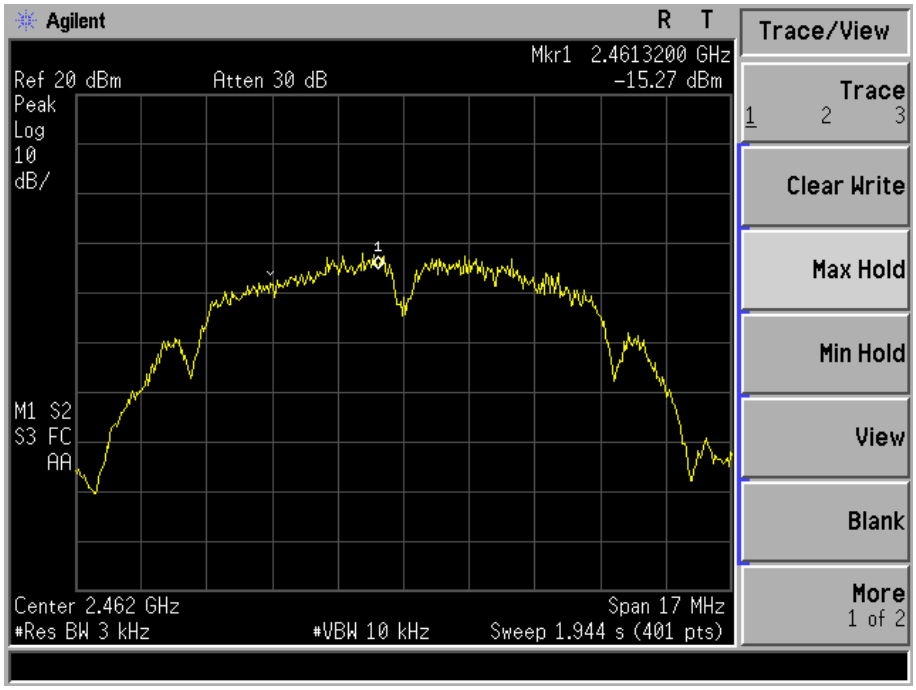
TX CH01



TX CH06



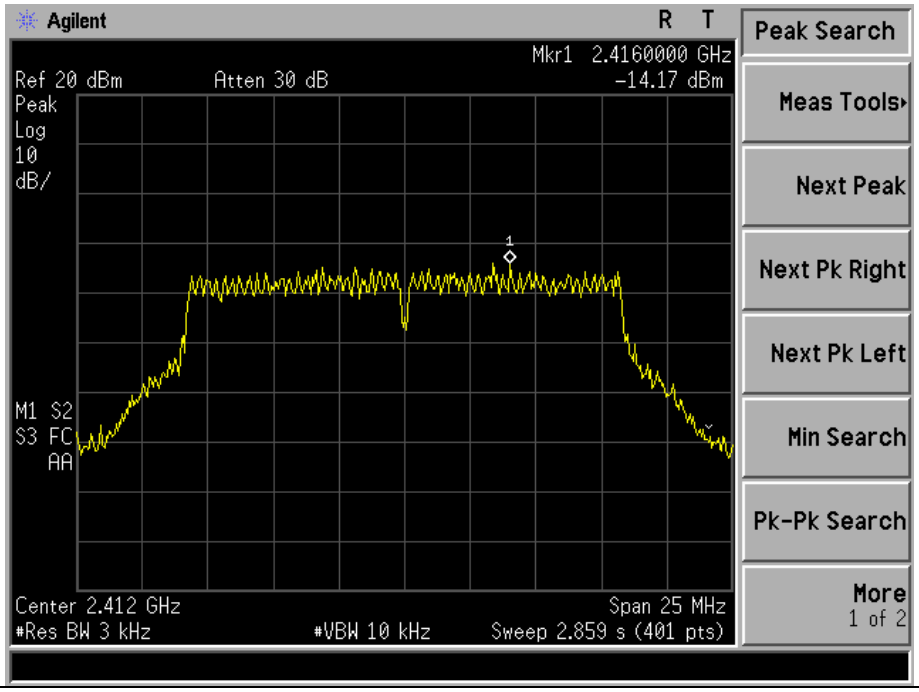
TX CH11



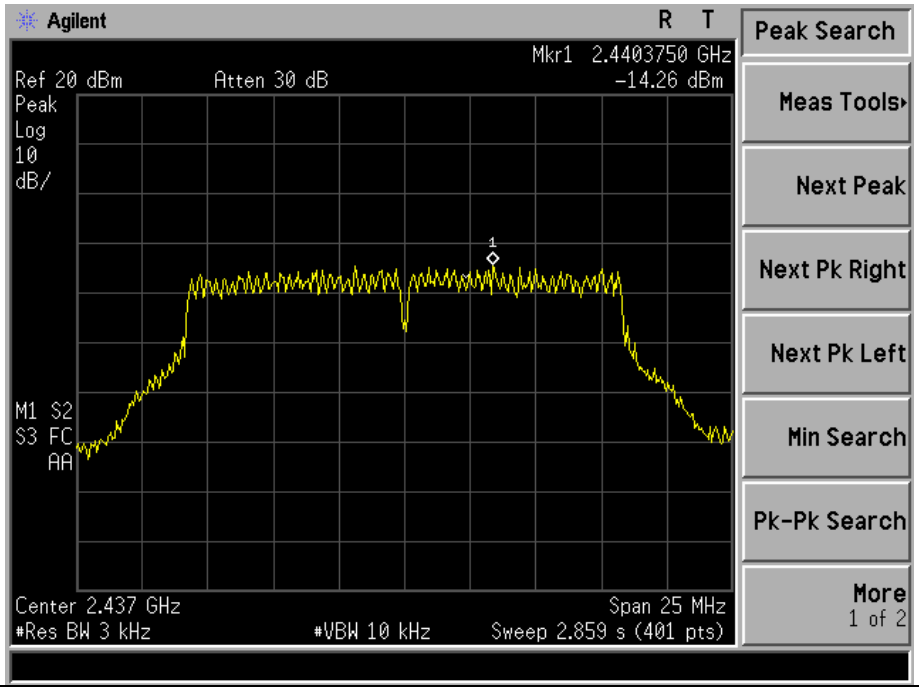
EUT：	WMSP02	Model Name ：	WMSP02
Temperature：	25℃	Relative Humidity：	54%
Pressure：	1015 hPa	Test Voltage ：	DC5V from laptop
Test Mode ：	TX g Mode /CH01, CH06, CH11		

Frequency	Power Density (dBm)	Limit (dBm)	Result
2412 MHz	-14.17	8	PASS
2437 MHz	-14.26	8	PASS
2462 MHz	-15.08	8	PASS

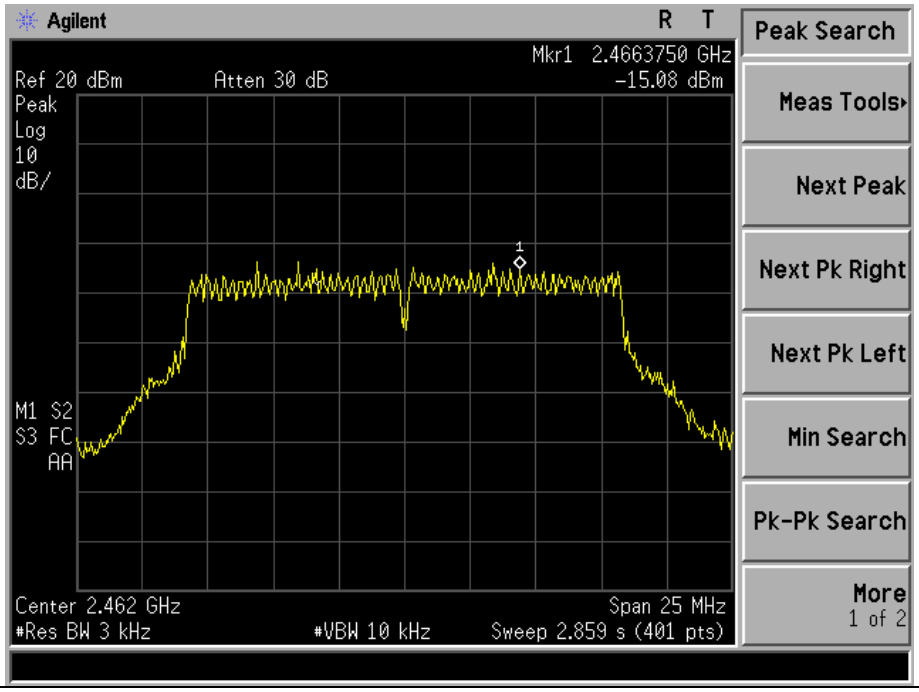
TX CH01



TX CH06



TX CH11



5. BANDWIDTH TEST

5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	>= 500KHz (6dB bandwidth)	2400-2483.5	PASS

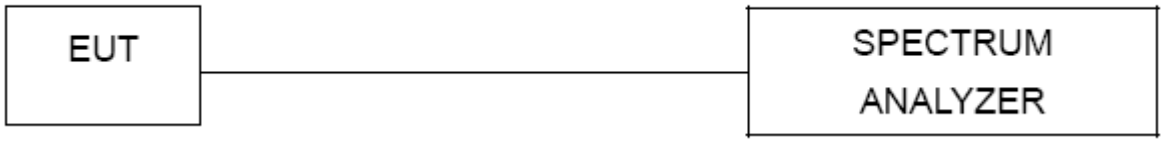
5.1.1 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 1-5% or DTS BW, not to exceed 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

5.1.2 DEVIATION FROM STANDARD

No deviation.

5.1.3 TEST SETUP



5.1.4 EUT OPERATION CONDITIONS

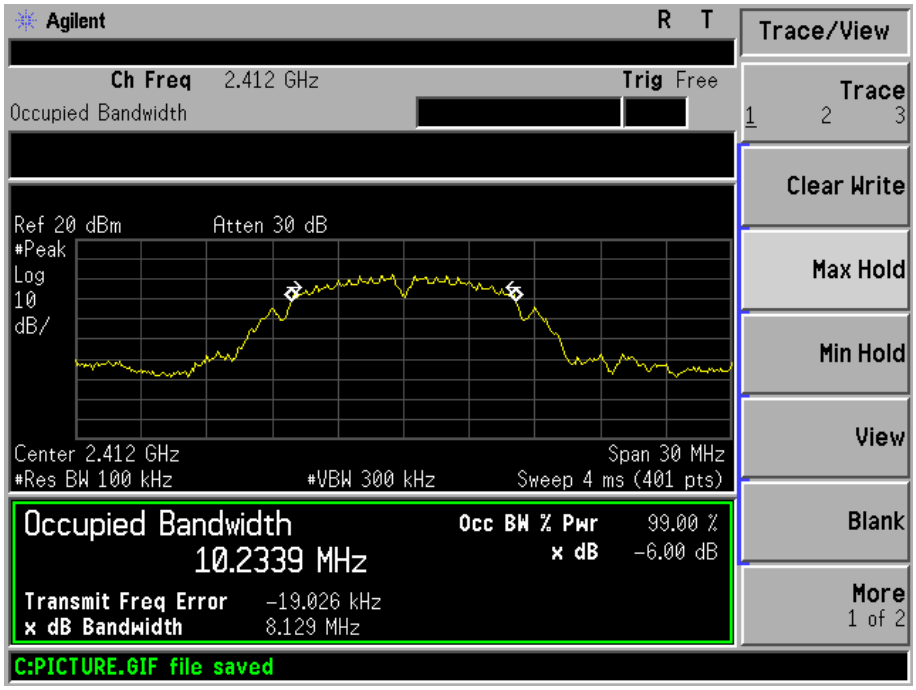
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.1.5 TEST RESULTS

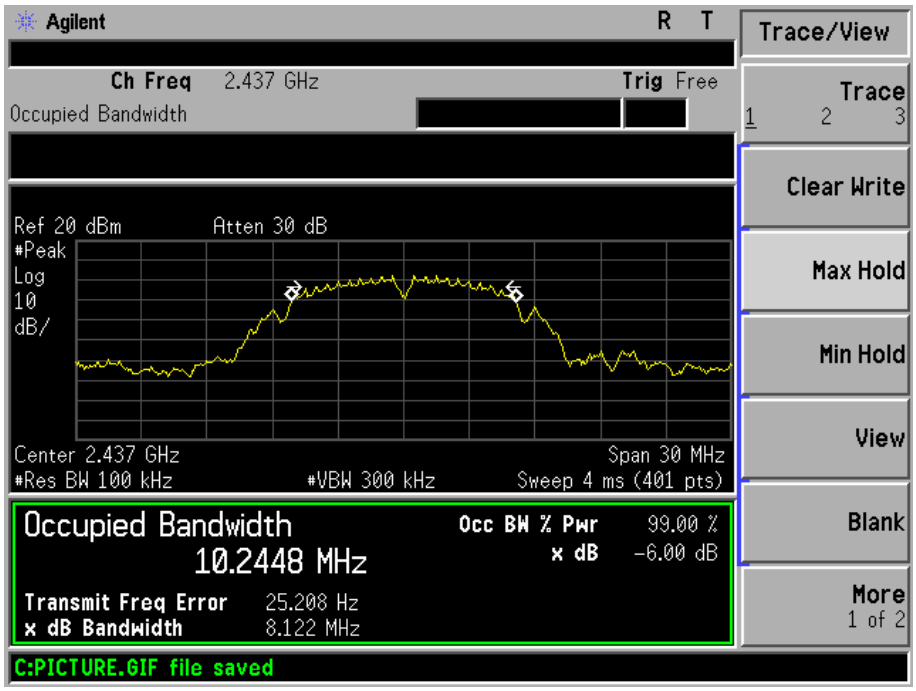
EUT：	WMSP02	Model Name ：	WMSP02
Temperature：	25℃	Relative Humidity：	54%
Pressure：	1012 hPa	Test Voltage ：	DC5V from laptop
Test Mode ：	TX b Mode /CH01, CH06, CH11		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	8.129	500	Pass
Middle	2437	8.122	500	Pass
High	2462	8.098	500	Pass

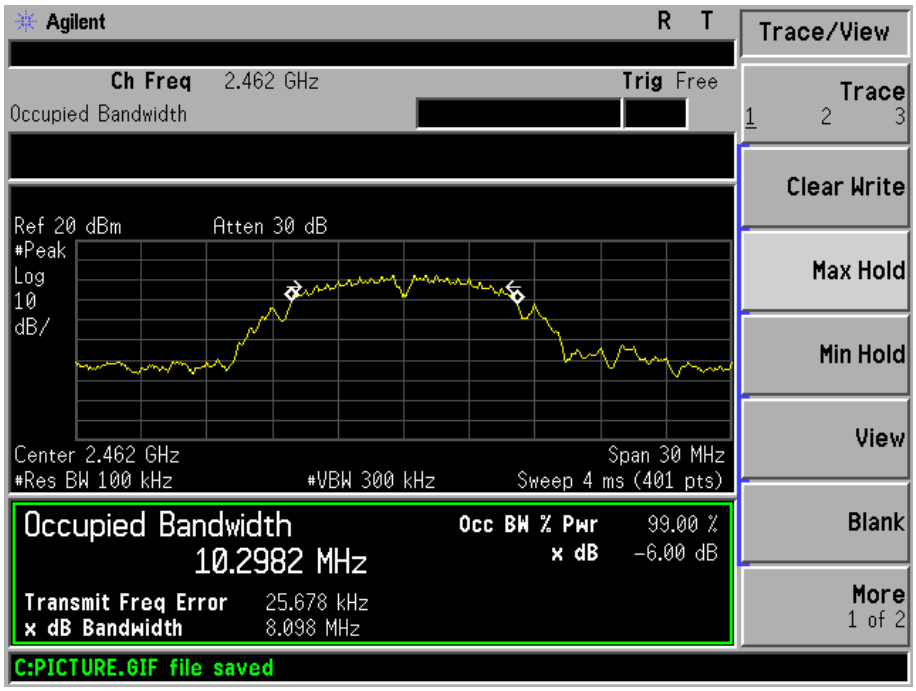
TX CH 01



TX CH 06



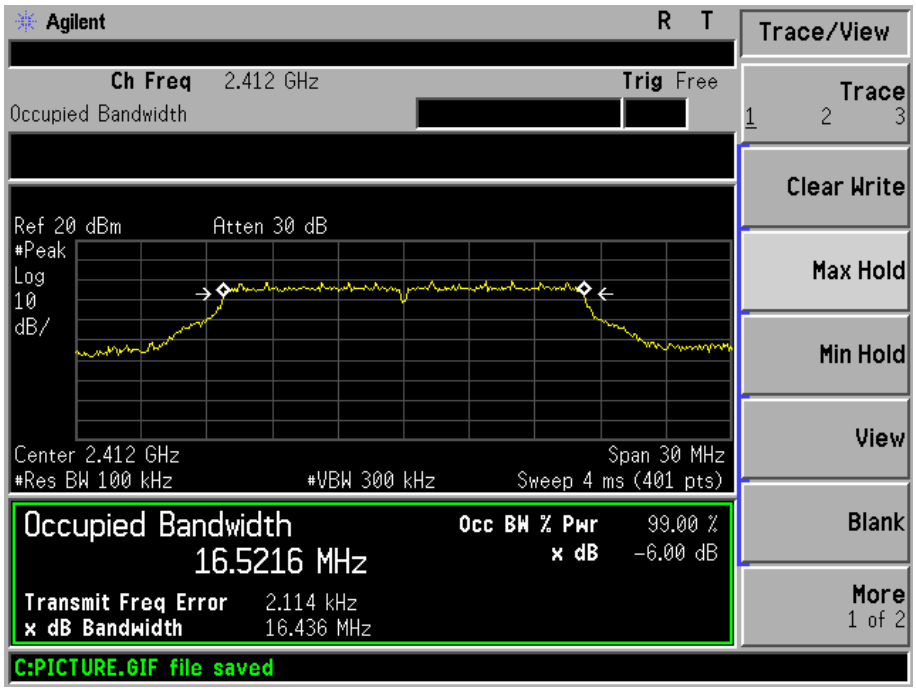
TX CH 11



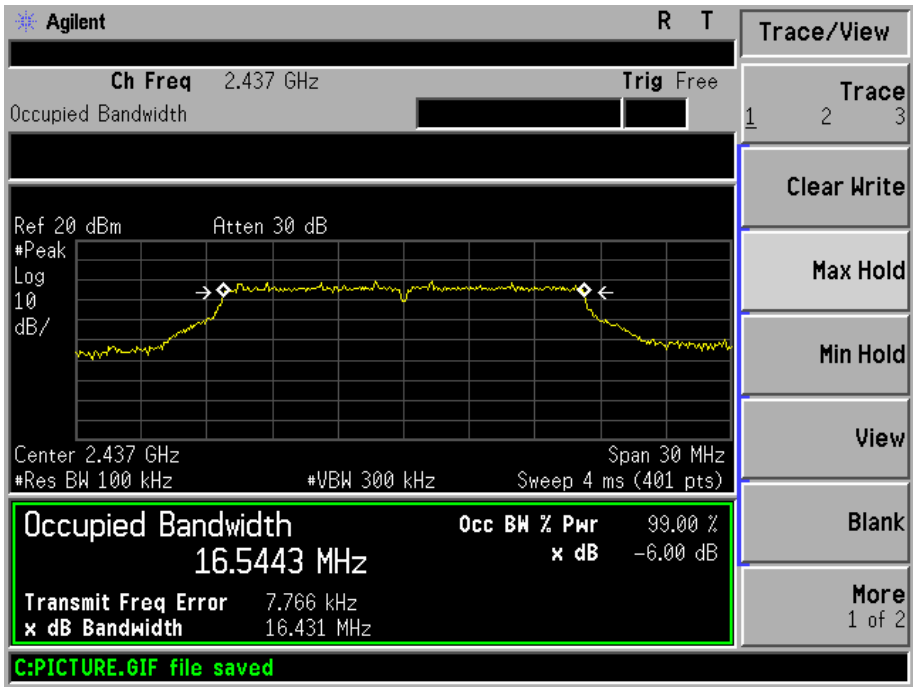
EUT：	WMSP02	Model Name ：	WMSP02
Temperature：	25℃	Relative Humidity：	54%
Pressure：	1012 hPa	Test Voltage ：	DC5V from laptop
Test Mode ：	TX g Mode /CH01, CH06, CH11		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.436	500	Pass
Middle	2437	16.431	500	Pass
High	2462	16.424	500	Pass

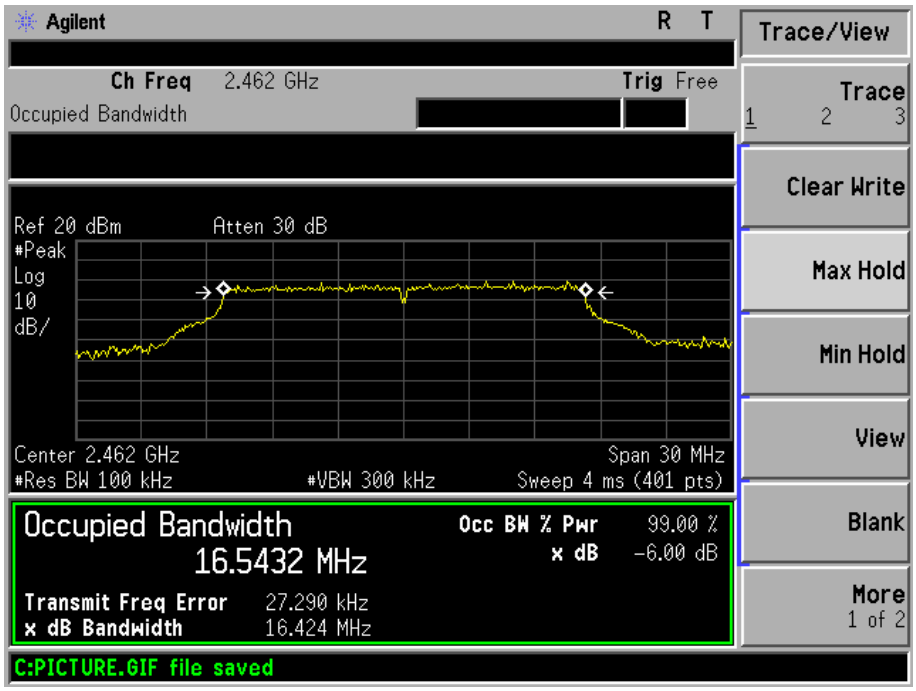
TX CH 01



TX CH 06



TX CH 11



6. PEAK OUTPUT POWER TEST

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

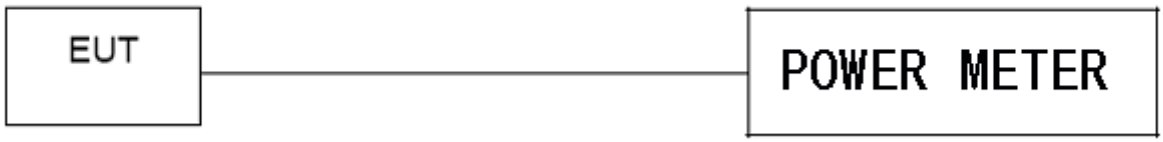
6.1.1 TEST PROCEDURE

a. The EUT was directly connected to the Power meter

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.1.5 TEST RESULTS

EUT：	WMSP02	Model Name ：	WMSP02
Temperature：	25℃	Relative Humidity：	54%
Pressure：	1012 hPa	Test Voltage ：	DC5V from laptop
Test Mode ：	TX b/g		

TX 802.11b Mode				
Test Channe	Frequency	Maximum Conducted Output Power(PK)	Maximum Conducted Output Power(AV)	LIMIT
	(MHz)	(dBm)	(dBm)	dBm
CH01	2412	13.72	12.65	30
CH06	2437	13.66	12.52	30
CH11	2462	13.54	12.35	30
TX 802.11g Mode				
CH01	2412	11.85	10.72	30
CH06	2437	11.63	10.45	30
CH11	2462	11.44	10.22	30

7. 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE

APPLICABLE STANDARD

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

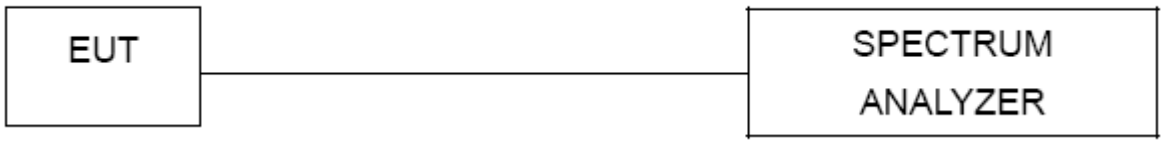
TEST PROCEDURE

a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
c) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
d) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
e) Repeat above procedures until all measured frequencies were complete.

7.1 DEVIATION FROM STANDARD

No deviation.

7.2 TEST SETUP



7.3 EUT OPERATION CONDITIONS

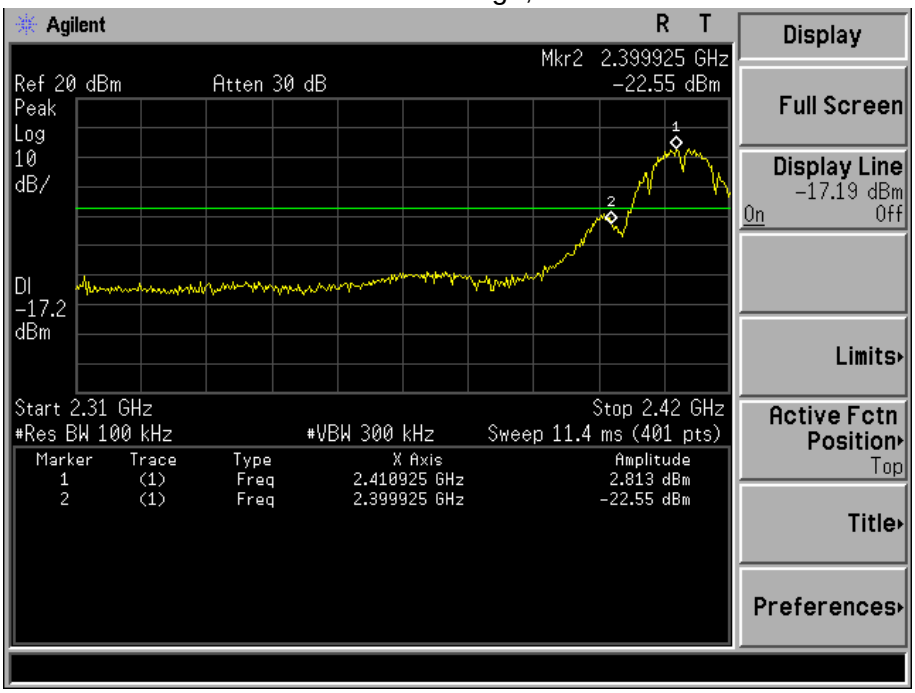
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

7.4 TEST RESULTS

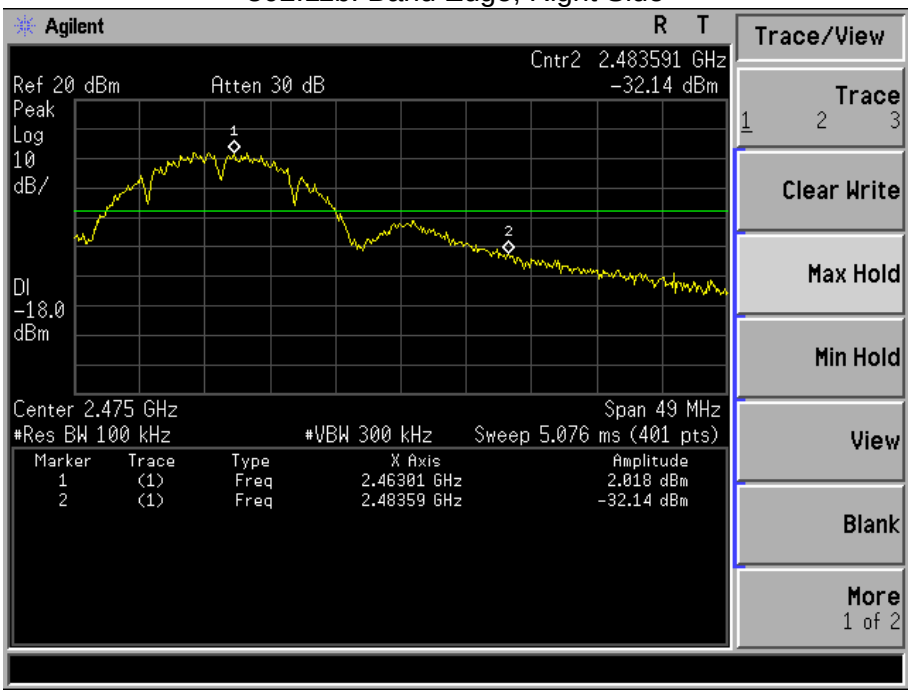
EUT：	WMSP02	Model Name ：	WMSP02
Temperature：	25℃	Relative Humidity：	54%
Pressure：	1012 hPa	Test Voltage ：	DC5V from laptop

Frequency Band	Delta Peak to band emission (dBc)	＞Limit (dBc)	Result
802.11b mode			
Left-band	25.36	20	Pass
Right-band	34.16	20	Pass
802.11g mode			
Left-band	32.27	20	Pass
Right-band	41.48	20	Pass

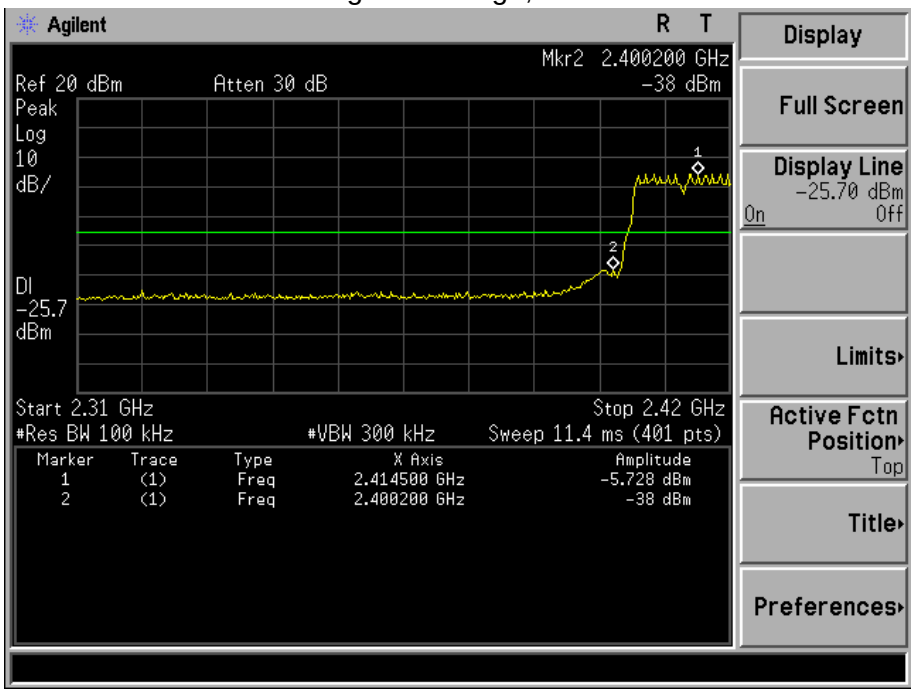
802.11b: Band Edge, Left Side



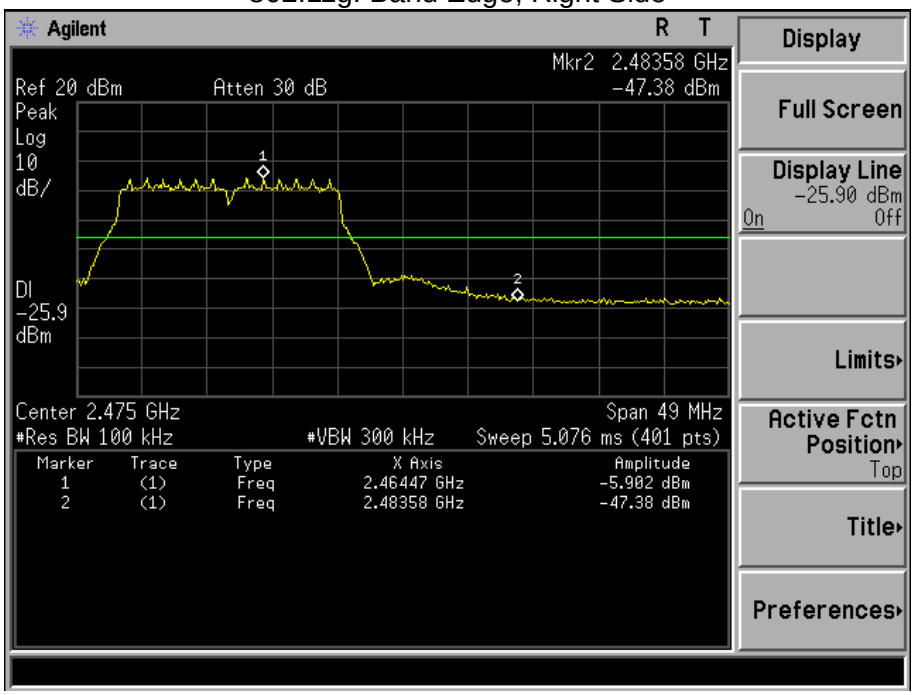
802.11b: Band Edge, Right Side



802.11g: Band Edge, Left Side



802.11g: Band Edge, Right Side



8. DUTY CYCLE OF TEST SIGNAL

8.1 STANDARD REQUIREMENT

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle.

All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

8.2 FORMULA:

Duty Cycle = Ton / (Ton+Toff)

Measurement Procedure:

1. Set span = Zero
2. RBW = 8MHz
3. VBW = 8MHz,
4. Detector = Peak

Duty Cycle:

	Duty Cycle	Duty Fator (dB)
802.11b	1	0
802.11g	1	0

9. ANTENNA REQUIREMENT

9.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

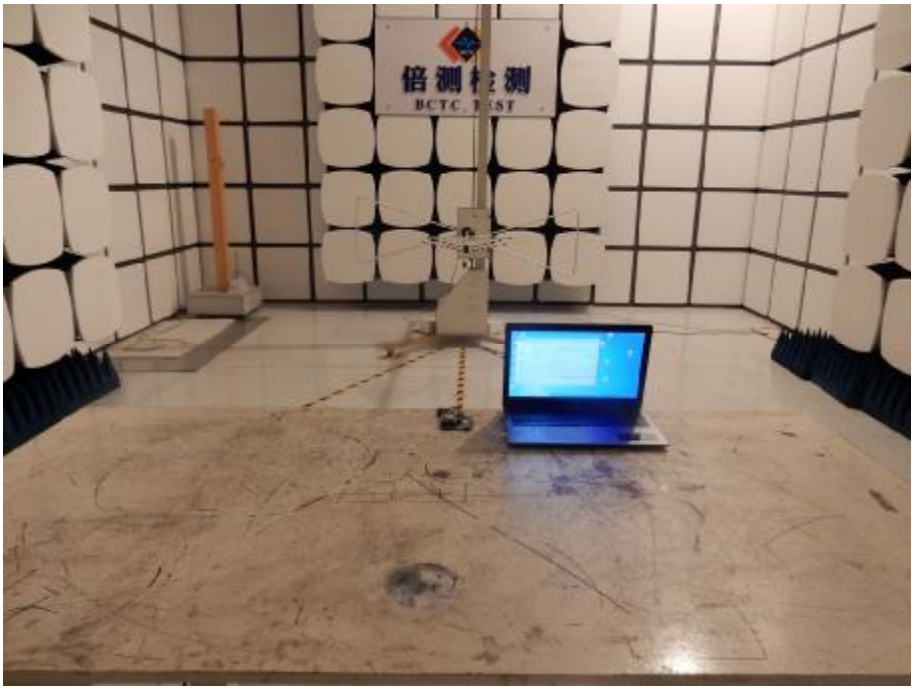
9.2 EUT ANTENNA

The EUT antenna is Integrated(PCB) antenna. It comply with the standard requirement.

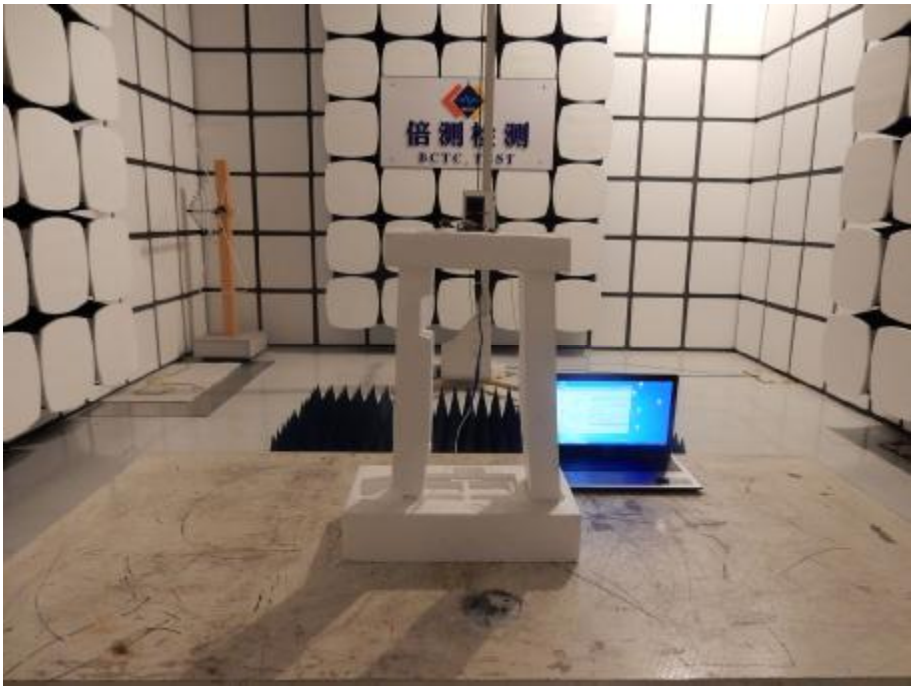
10. EUT TEST PHOTO

Conducted Measurement Photos

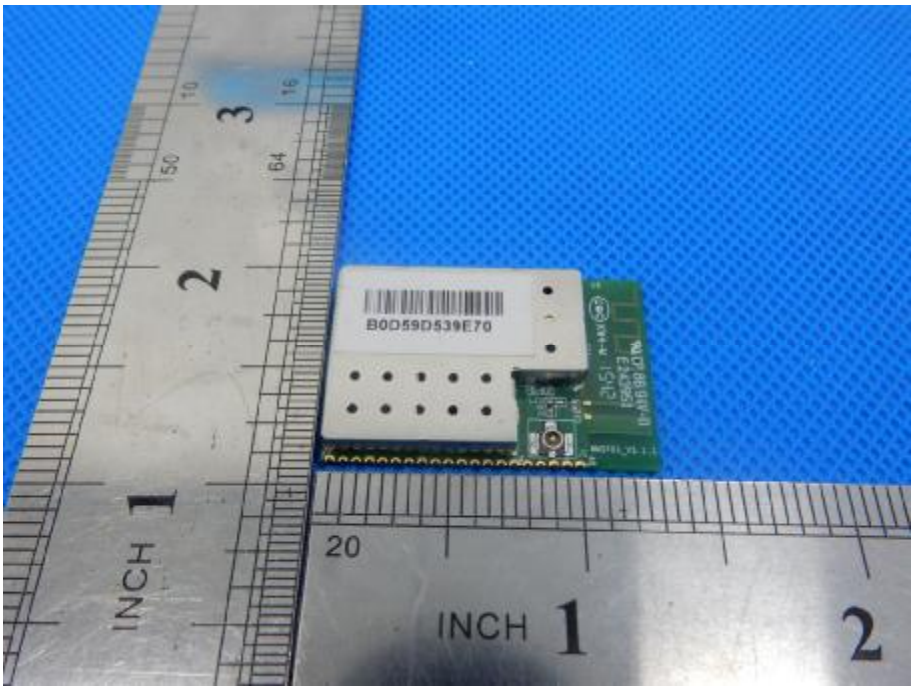
Radiated Measurement Photos

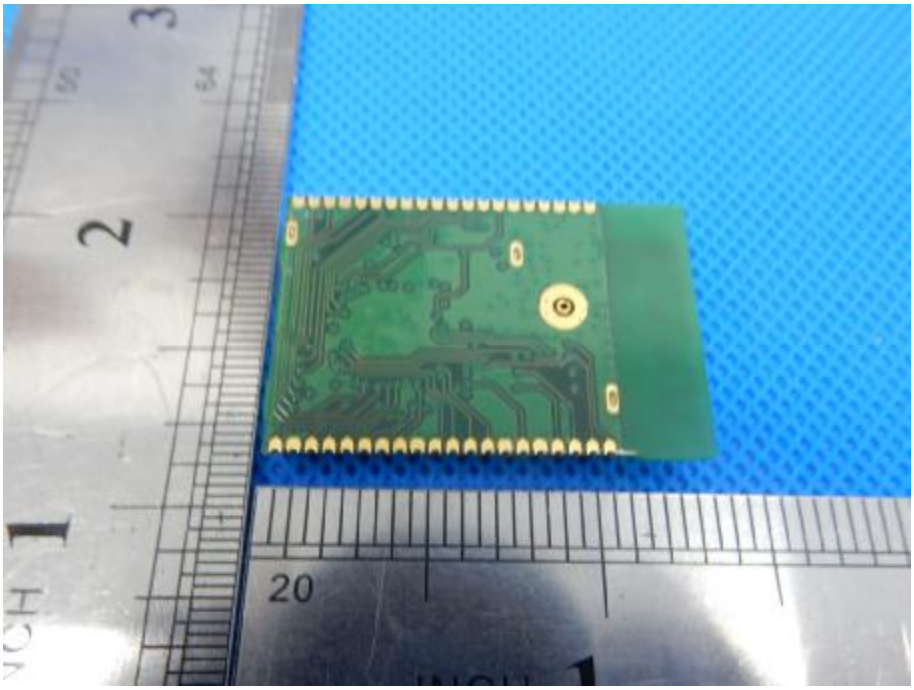


Radiated Measurement Photos



11. EUT PHOTO





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