FCC Radio Test Report

Product Name:	**Wireless USB Adapter**
Trademark:	N/A
FCC ID:	YWTWF7610U5B
Model Name :	GWF-5B06
Prepared For : Address :	**Shenzhen Ogemray Technology Co., Ltd.** 3/F,No.9 Bldg.Minxing Industrial Park.Minkang Rd. Minzhi St. Baoan District.Shenzhen, China
Prepared By : Address :	**DongGuan Precise Testing Service Co., Ltd.** Building D, Baoding Technology Park, Guangming Road 2, Guangming Community, Dongcheng District, Dongguan, Guangdong, China
Test Date:	**Sept. 03 - Sept. 15, 2015**
Date of Report :	**Sept. 16, 2015**
Report No.:	**PT1509018003F-2**

VERIFICATION OF COMPLIANCE

Applicant's name ..... :	**Shenzhen Ogemray Technology Co., Ltd.**
Address ..... :	3/F,No.9 Bldg.Minxing Industrial Park.Minkang Rd. Minzhi St. Baoan District.Shenzhen, China
Manufacture's Name ..... :	**Shenzhen Ogemray Technology Co., Ltd.**
Address ..... :	3/F,No.9 Bldg.Minxing Industrial Park.Minkang Rd. Minzhi St. Baoan District.Shenzhen, China

Product description

Product name :	Wireless USB Adapter
Trademark:	N/A
Model Name:	GWF-5B06
Test procedure	FCC Part15.407
Standards	ANSI C63.10:2013

This device described above has been tested by PTS, 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.

This report shall not be reproduced except in full, without the written approval of PTS, this document may be altered or revised by PTS, personal only, and shall be noted in the revision of the document.

Test Result..... : **Pass**

Testing Engineer : Juan Zeng
(Juan Zeng)

Technical Manager : Tom. zhang
(Tom Zhang)

Authorized Signatory : Chris Du
(Chris Du)

Table of Contents

Page

Table of Contents

Page

Table of Contents

Page

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.407) , Subpart E			
Standard Section	Test Item	Judgment	Remark
§15.407(a)	Maximum Conducted Output Power	PASS	
§15.407(a)	Power Spectral Density	PASS	
§15.407(a)	26dB Bandwidth	PASS	
§15.407(a)	99% Occupied Bandwidth	PASS	
§15.407(a)	Peak Excursion	PASS	
§15.407(b)	Radiated Emissions	PASS	
§15.407(b)	Band edge Emissions	PASS	
§15.205	Emissions at Restricted Band	PASS	
§15.407(g)	Frequency Stability	PASS	
§15.207(a)	Line Conducted Emissions	PASS	
§15.203	Antenna Requirements	PASS	
§2.1093	RF Exposure	PASS	

NOTE:

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

1.1 TEST FACILITY

FCC Registration No.: 371540, IC Registration No.: 12191A-1

Dongguan Precise Testing Service Co., Ltd.

Add.: Building D,Baoding Technology Park,Guangming Road2,Dongcheng District, Dongguan, Guangdong, China

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 colspan="2">Wireless USB Adapter</td></tr>
<tr><td>Trade Name</td><td colspan="2">N/A</td></tr>
<tr><td>Model Name</td><td colspan="2">GWF-5B06</td></tr>
<tr><td>Product Description</td><td colspan="2">The EUT is a Wireless USB Adapter
<table>
<tr><td>Operation Frequency:</td><td>5150~5250MHz</td></tr>
<tr><td>Modulation Type:</td><td>802.11n: OFDM (64QAM, 16QAM,QPSK,BPSK)
802.11a: OFDM (64QAM, 16QAM,QPSK,BPSK)
802.11ac: OFDM (64QAM, 16QAM,QPSK,BPSK)</td></tr>
<tr><td>Bit Rate of Transmitter:</td><td>802.11n-HT20: 6.5-65 Mbps
802.11n-HT40:13.5-135 Mbps
802.11a: 6-54Mbps
802.11ac: MCS0~MCS9</td></tr>
<tr><td>Number Of Channel:</td><td>For 20MHz bandwidth: 4 Channels
For 40MHz bandwidth: 2 Channels
For 80MHz bandwidth: 1 Channels</td></tr>
<tr><td>Antenna Designation:</td><td>Please see Note 3.</td></tr>
<tr><td>Antenna Gain (dBi)</td><td>2.8 dBi</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 colspan="2">Please refer to the Note 2.</td></tr>
<tr><td>Power supply:</td><td colspan="2">DC 5.0V, 210+/-30mA</td></tr>
<tr><td>Connecting I/O Port(s)</td><td colspan="2">Please refer to the User's Manual</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 802.11n(HT20)/802.11a/802.11ac(20MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	40	5200	44	5220	48	5240

Channel List for 802.11n(HT40)/802.11ac(40MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	46	5230	--	--	--	--

Channel List for /802.11ac(80MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
42	5210	--	--	--	--	--	--

3.

Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
A	N/A	N/A	PCB Antenna	N/A	2.8	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	802.11n-HT20 CH36/ CH40/ CH48
Mode 2	802.11-HT40 CH38/ CH46
Mode 3	802.11a CH36/ CH40/ CH48
Mode 4	802.11ac(20MHz) CH36/ CH40/ CH48
Mode 5	802.11ac(40MHz) CH38/ CH46
Mode 6	802.11ac(80MHz) CH42
Mode 7	Link Mode

For Conducted Emission	
Final Test Mode	Description
Mode 7	Link Mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11n-HT20 CH36/ CH40/ CH48
Mode 2	802.11-HT40 CH38/ CH46
Mode 3	802.11a CH36/ CH40/ CH48
Mode 4	802.11ac(20MHz) CH36/ CH40/ CH48
Mode 5	802.11ac(40MHz) CH38/ CH46
Mode 6	802.11ac(80MHz) CH42
Mode 7	Link Mode

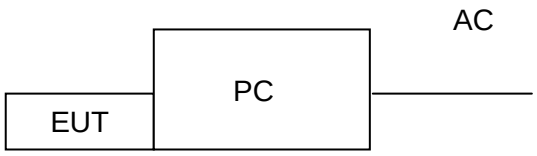
Note:

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

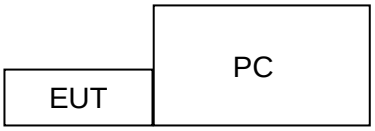
(2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported

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
PC	PC	Sony	GWF-5B06	N/A	
EUT	Wireless USB Adapter	N/A	GWF-5B06	N/A	

Item	Shielded Type	Ferrite Core	Length	Note

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

FOR RADIATED EMISSION TEST (BELOW 1GHZ)

Name of Equipment	Manufacturer	Model	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 4, 2015	July 3, 2016
Trilog Broadband Antenna (25M-1GHz)	SCHWARZBECK	VULB9160	9160-3355	July 4, 2015	July 3, 2016
Signal Amplifier	SCHWARZBECK	BBV 9475	9745-0013	July 4, 2015	July 3, 2016
RF Cable	SCHWARZBECK	AK9515E	96221	July 4, 2015	July 3, 2016
3m Anechoic Chamber	CHENGYU	966	PTS-001	June 6, 2015	June 5, 2016
MULTI-DEVICE Positioning Controller	Max-Full	MF-7802	MF780208339	N/A	N/A
Active loop antenna (9K-30MHz)	Schwarzbeck	FMZB1519	1519-038	June 6, 2015	June 5, 2016
Spectrum analyzer	Agilent	E4407B	MY46185649	June 6, 2015	June 5, 2016

FOR RADIATED EMISSION TEST (1GHZ ABOVE)

Name of Equipment	Manufacturer	Model	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 4, 2015	July 3, 2016
Horn Antenna (1G-18GHz)	SCHWARZBECK	BBHA9120D	9120D-1246	July 11, 2015	July 10, 2016
Spectrum Analyzer	Agilent	E4411B	MY4511453	July 4, 2015	July 3, 2016
Signal Amplifier	SCHWARZBECK	BBV 9718	9718-269	July 7, 2015	July 6, 2016
RF Cable	SCHWARZBECK	AK9515H	96220	July 8, 2015	July 7, 2016
3m Anechoic Chamber	CHENGYU	966	PTS-001	June 6, 2015	June 5, 2016
MULTI-DEVICE Positioning Controller	Max-Full	MF-7802	MF780208339	N/A	N/A

Horn Ant (18G-40GHz)	Schwarzbeck	BBHA 9170	9170-181	June 6, 2015	June 5, 2016

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA and NIM/CHINA
2. N/A = No Calibration Request.

FOR CONDUCTED EMISSION TEST:

Name of Equipment	Manufacturer	Model	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 4, 2015	July 3, 2016
Signal analyzer	Agilent	N9020A	MY51550378	July 8, 2015	July 7, 2016
Artificial Mains Network	Narda	L2-16B	000WX31025	July 8, 2015	July 7, 2016
Artificial Mains Network (AUX)	Narda	L2-16B	000WX31026	July 8, 2015	July 7, 2016
RF Cable	SCHWARZBECK	AK9515E	96222	July 4, 2015	July 3, 2016
Shielded Room	CHENGYU	843	PTS-002	June 6, 2015	June 5, 2016

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA and NIM/CHINA

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

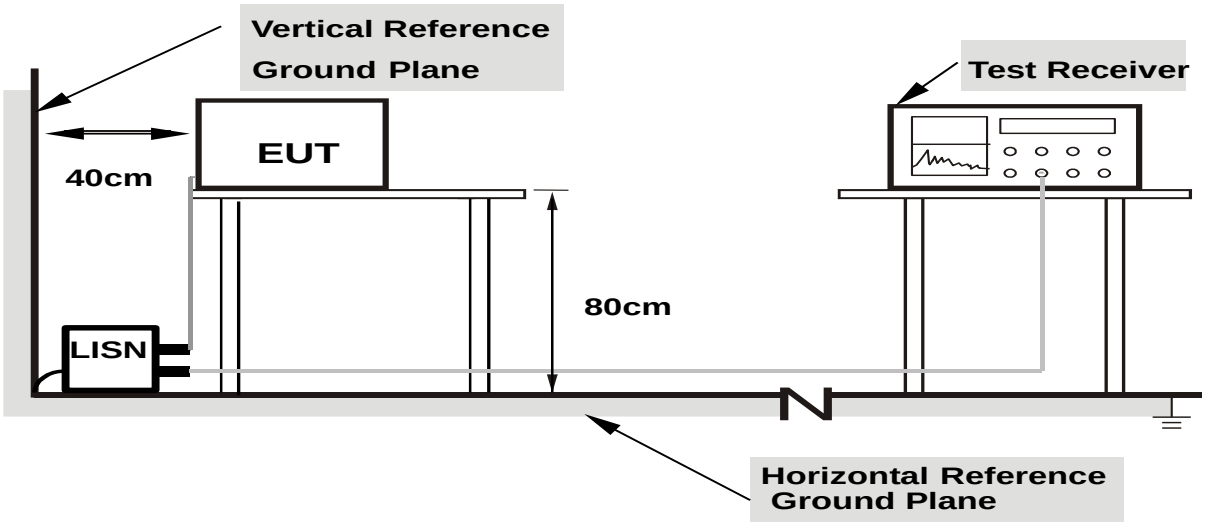
3.1.2 TEST PROCEDURE

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

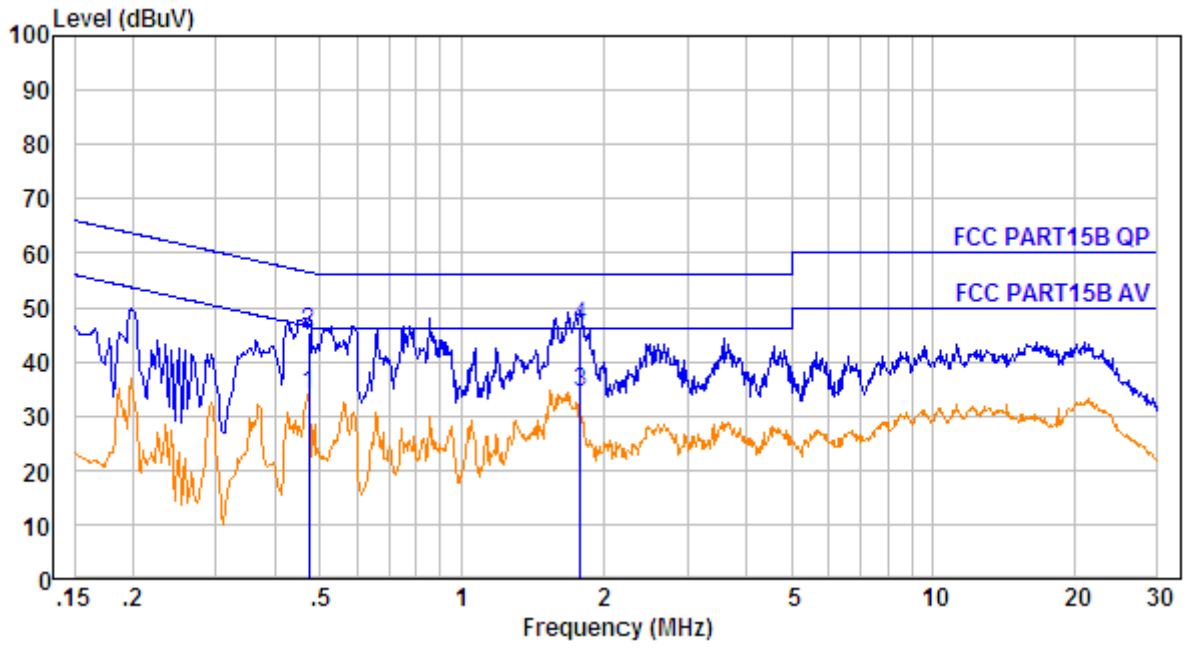
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

3.1.6 TEST RESULTS

EUT：	Wireless USB Adapter	Model Name. ：	GWF-5B06
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	AC120V/60Hz	Test Mode：	Mode 7

No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBuV	Emission Level dBuV	Limit dBuV	Over Limit dB	Remark
1.	0.474	10.64	0.60	22.79	34.03	46.45	-12.42	Average
2.	0.474	10.64	0.60	34.11	45.35	56.45	-11.10	QP
3.	1.790	10.69	0.60	22.99	34.28	46.00	-11.72	Average
4.	1.790	10.69	0.60	35.27	46.56	56.00	-9.44	QP

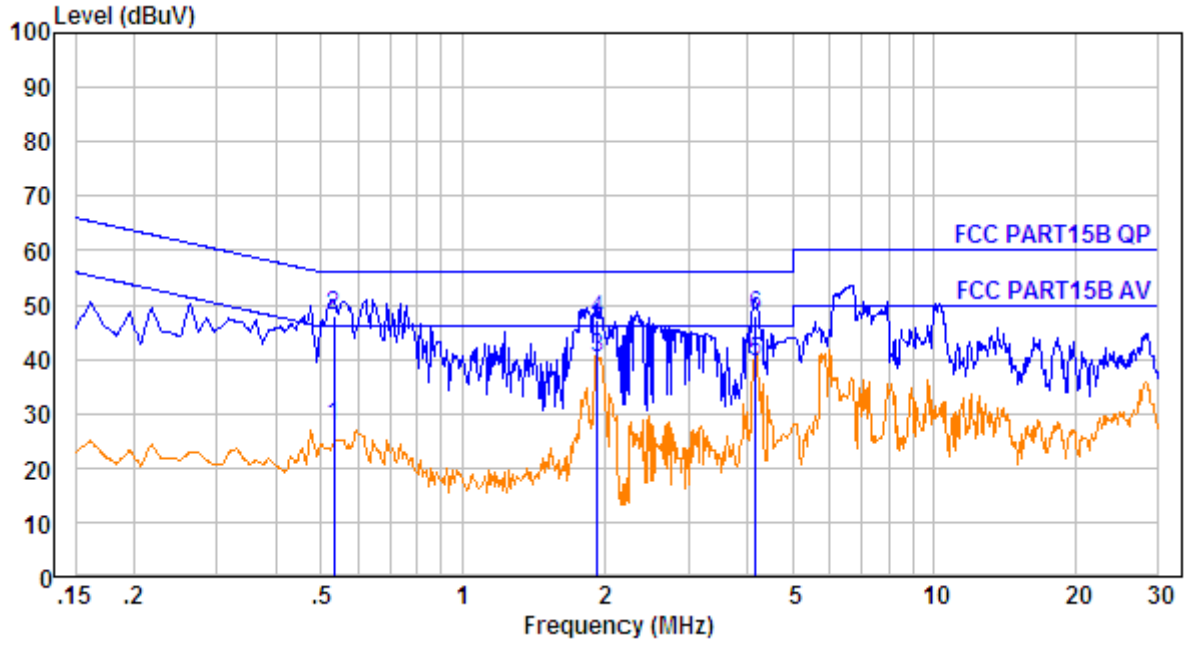
Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



EUT：	Wireless USB Adapter	Model Name. ：	GWF-5B06
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	AC120V/60Hz	Test Mode：	Mode 7

No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBuV	Emission Level dBuV	Limit dBuV	Over Limit dB	Remark
1.	0.532	10.65	0.60	16.28	27.53	46.00	-18.47	Average
2.	0.532	10.65	0.60	36.80	48.05	56.00	-7.95	QP
3.	1.939	10.70	0.60	28.79	40.09	46.00	-5.91	Average
4.	1.939	10.70	0.60	35.87	47.17	56.00	-8.83	QP
5.	4.158	10.73	0.60	28.32	39.65	46.00	-6.35	Average
6.	4.158	10.73	0.60	36.80	48.13	56.00	-7.87	QP

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 A (dBuV/m) (at 3M)		Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80	60	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 1GHz. 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 meters above the ground at a 3 meter open area test site. 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; 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:

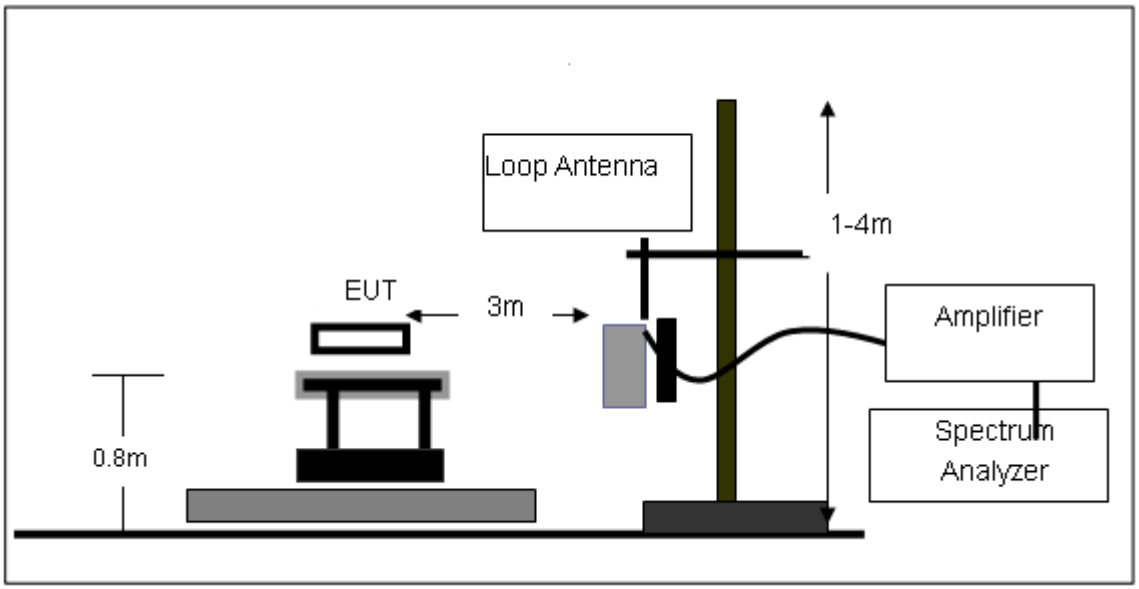
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

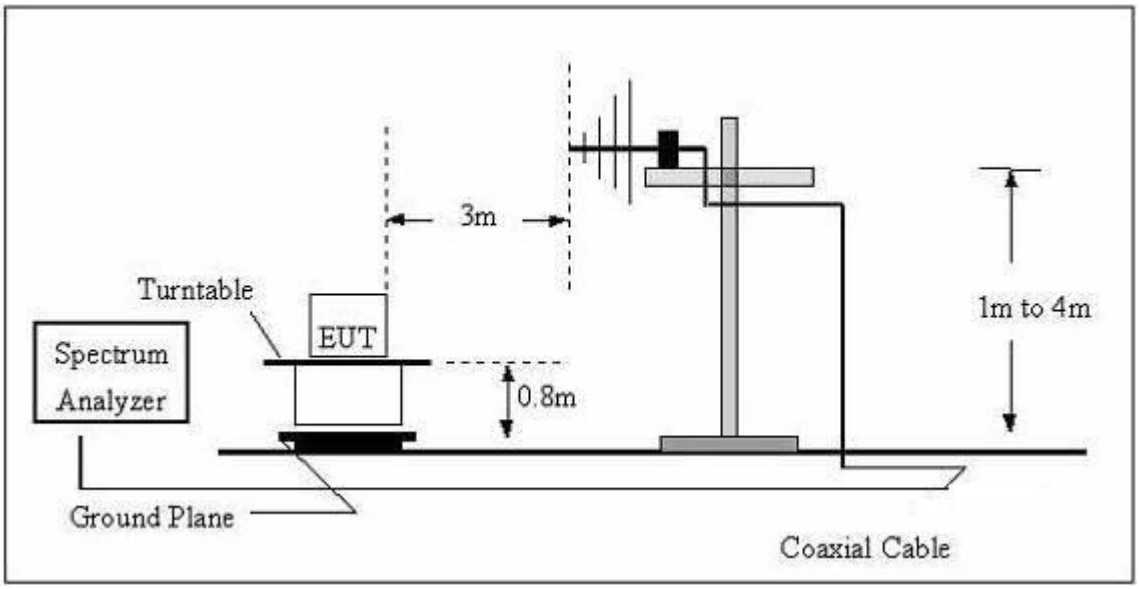
No deviation

3.2.4 TEST SETUP

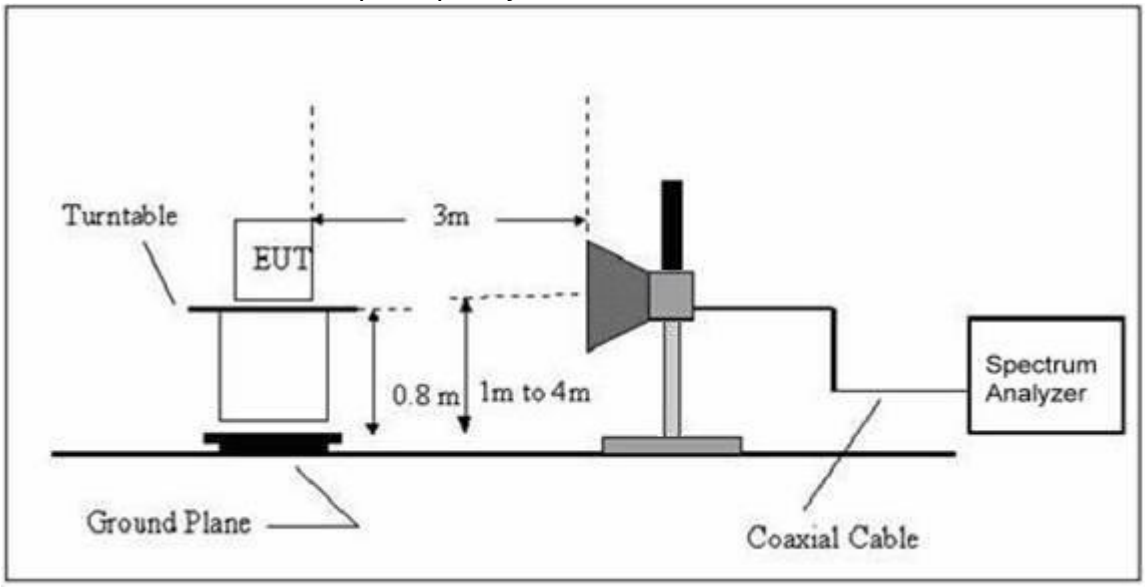
（A）Radiated Emission Test-Up Frequency Below 30MHz



（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：	Wireless USB Adapter	Model Name. ：	GWF-5B06
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX	Polarization :	--

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

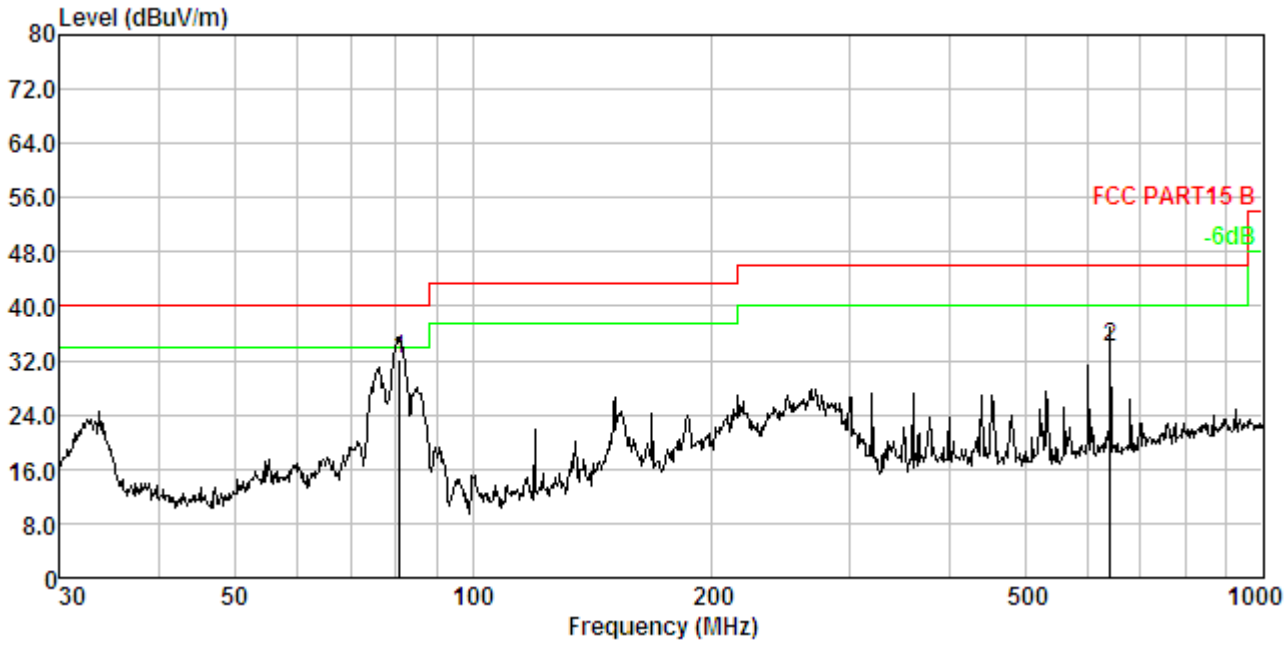
NOTE:

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：	Wireless USB Adapter	Model Name ：	GWF-5B06
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	Mode 1		

Test plot for Horizontal:

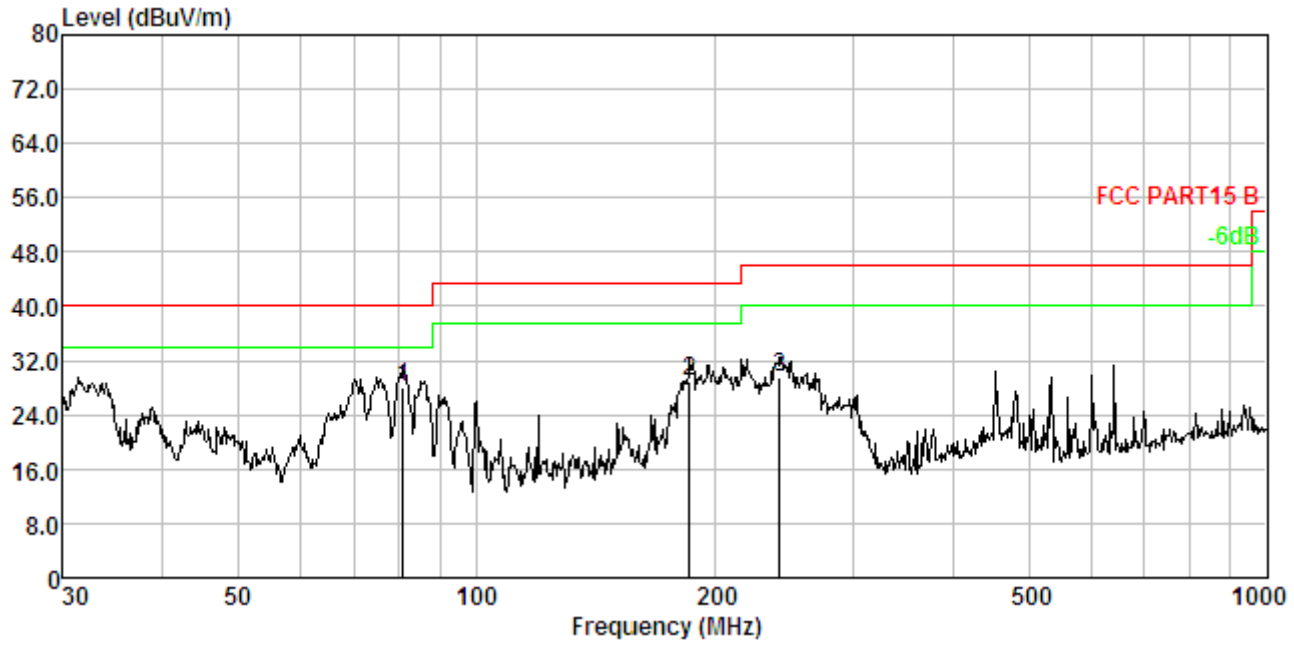


No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	80.927	1.95	8.75	51.94	30.32	32.32	40.00	-7.68	QP
2.	640.611	3.83	19.45	41.56	31.04	33.80	46.00	-12.20	QP

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level

Test plot for Vertical:



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	80.927	1.95	8.75	47.52	30.32	27.90	40.00	-12.10	QP
2.	185.788	2.71	11.66	45.26	30.60	29.03	43.50	-14.47	QP
3.	241.676	2.94	11.75	45.47	30.70	29.46	46.00	-16.54	QP

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level

3.2.8 TEST RESULTS (ABOVE 1000 MHZ)

802.11a

Normal Voltage

Polar (H/V)	Frequency (GHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5180							
V	15.55	60.20	-3.75	56.45	74.00	-17.55	Pk
V	15.55	43.29	-3.75	39.54	54.00	-14.46	AV
H	15.55	61.67	-3.75	57.92	74.00	-16.08	Pk
H	15.55	45.60	-3.75	41.85	54.00	-12.15	AV
Remark: Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level							

802.11a

Normal Voltage

Polar (H/V)	Frequency (GHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5200							
V	15.65	60.60	-3.77	56.83	74.00	-17.17	Pk
V	15.65	42.99	-3.77	39.22	54.00	-14.78	AV
H	15.65	61.51	-3.77	57.74	74.00	-16.26	Pk
H	15.65	45.23	-3.77	41.46	54.00	-12.54	AV
Remark: Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level							

802.11a

Normal Voltage

Polar (H/V)	Frequency (GHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5240							
V	15.73	60.05	-3.78	56.27	74.00	-17.73	Pk
V	15.73	43.27	-3.78	39.49	54.00	-14.51	AV
H	15.73	61.34	-3.78	57.56	74.00	-16.44	Pk
H	15.73	45.20	-3.78	41.42	54.00	-12.58	AV
Remark: Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level							

802.11n(20MHz)

Normal Voltage

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(GHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:5180							
V	15.55	60.49	-3.75	56.74	74.00	-17.26	Pk
V	15.55	42.86	-3.75	39.11	54.00	-14.89	AV
H	15.55	61.40	-3.75	57.65	74.00	-16.35	Pk
H	15.55	44.17	-3.75	40.42	54.00	-13.58	AV

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level

802.11n(20MHz)

Normal Voltage

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(GHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:5200							
V	15.65	60.21	-3.77	56.44	74.00	-17.56	Pk
V	15.65	43.69	-3.77	39.92	54.00	-14.08	AV
H	15.65	61.12	-3.77	57.35	74.00	-16.65	Pk
H	15.65	44.05	-3.77	40.28	54.00	-13.72	AV

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level

802.11n(20MHz)

Normal Voltage

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(GHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:5240							
V	15.73	60.14	-3.78	56.36	74.00	-17.64	Pk
V	15.73	43.30	-3.78	39.52	54.00	-14.48	AV
H	15.73	61.16	-3.78	57.38	74.00	-16.62	Pk
H	15.73	44.42	-3.78	40.64	54.00	-13.36	AV

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level

802.11n(40MHz)

Normal Voltage

Polar (H/V)	Frequency (GHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5190							
V	15.58	58.49	-3.75	54.74	74.00	-19.26	Pk
V	15.58	41.86	-3.75	38.11	54.00	-15.89	AV
H	15.58	60.40	-3.75	56.65	74.00	-17.35	Pk
H	15.58	43.17	-3.75	39.42	54.00	-14.58	AV
Remark: Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level							

802.11n(40MHz)

Normal Voltage

Polar (H/V)	Frequency (GHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5230							
V	15.69	58.21	-3.78	54.43	74.00	-19.57	Pk
V	15.69	42.47	-3.78	38.69	54.00	-15.31	AV
H	15.69	59.99	-3.78	56.21	74.00	-17.79	Pk
H	15.69	43.34	-3.78	39.56	54.00	-14.44	AV
Remark: Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level							

802.11ac(20MHz)

Normal Voltage

Polar (H/V)	Frequency (GHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5180							
V	15.55	59.99	-3.75	56.24	74.00	-17.76	Pk
V	15.55	43.54	-3.75	39.79	54.00	-14.21	AV
H	15.55	61.39	-3.75	57.64	74.00	-16.36	Pk
H	15.55	43.92	-3.75	40.17	54.00	-13.83	AV
Remark: Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level							

802.11ac(20MHz)

Normal Voltage

Polar (H/V)	Frequency (GHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5200							
V	15.65	60.34	-3.77	56.57	74.00	-17.43	Pk
V	15.65	43.11	-3.77	39.34	54.00	-14.66	AV
H	15.65	61.59	-3.77	57.82	74.00	-16.18	Pk
H	15.65	44.24	-3.77	40.47	54.00	-13.53	AV
Remark: Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level							

802.11ac(20MHz)

Normal Voltage

Polar (H/V)	Frequency (GHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5240							
V	15.73	60.14	-3.78	56.36	74.00	-17.64	Pk
V	15.73	43.67	-3.78	39.89	54.00	-14.11	AV
H	15.73	61.04	-3.78	57.26	74.00	-16.74	Pk
H	15.73	44.63	-3.78	40.85	54.00	-13.15	AV
Remark: Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level							

802.11ac(40MHz)

Normal Voltage

Polar (H/V)	Frequency (GHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5190							
V	15.58	58.20	-3.75	54.45	74.00	-19.55	Pk
V	15.58	42.07	-3.75	38.32	54.00	-15.68	AV
H	15.58	60.53	-3.75	56.78	74.00	-17.22	Pk
H	15.58	42.99	-3.75	39.24	54.00	-14.76	AV
Remark: Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level							

802.11ac(40MHz)

Normal Voltage

Polar (H/V)	Frequency (GHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5230							
V	15.69	58.07	-3.78	54.29	74.00	-19.71	Pk
V	15.69	42.65	-3.78	38.87	54.00	-15.13	AV
H	15.69	60.10	-3.78	56.32	74.00	-17.68	Pk
H	15.69	43.53	-3.78	39.75	54.00	-14.25	AV
Remark: Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level							

802.11ac(80MHz)

Normal Voltage

Polar (H/V)	Frequency (GHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5210							
V	15.63	58.35	-3.77	54.58	74.00	-19.42	Pk
V	15.63	42.00	-3.77	38.23	54.00	-15.77	AV
H	15.63	59.52	-3.77	55.75	74.00	-18.25	Pk
H	15.63	42.10	-3.77	38.33	54.00	-15.67	AV
Remark: Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level							

Results of Band Edges Test:

802.11a

Normal Voltage

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5180							
V	5150.00	55.42	-3.69	51.73	74.00	-22.27	Pk
V	5150.00	38.84	-3.69	35.15	54.00	-18.85	AV
H	5150.00	55.37	-3.69	51.68	74.00	-22.32	Pk
H	5150.00	39.22	-3.69	35.53	54.00	-18.47	AV
Remark: Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level							

802.11a

Normal Voltage

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5240							
V	5350.00	55.19	-3.71	51.48	74.00	-22.52	Pk
V	5350.00	39.43	-3.71	35.72	54.00	-18.28	AV
H	5350.00	55.60	-3.71	51.89	74.00	-22.11	Pk
H	5350.00	38.96	-3.71	35.25	54.00	-18.75	AV
Remark: Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level							

Note: All modes have been tested and we only record the worst result.

4. MAXIMUM CONDUCTED OUTPUT POWER

4.1 APPLIED PROCEDURES / LIMIT

For 5150~5250MHz

For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

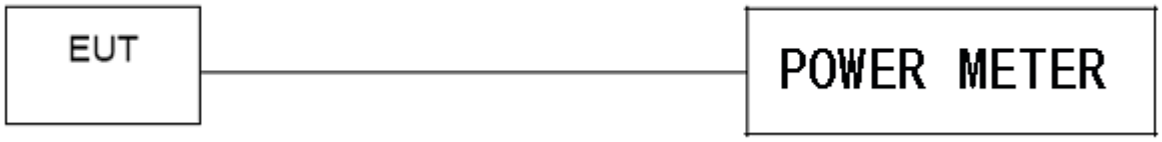
4.2 TEST PROCEDURE

The transmitter output (antenna port) was connected to the power sensor. Read the test result from the power meter and record it.

4.3 DEVIATION FROM STANDARD

No deviation.

4.4 TEST SETUP



4.5 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.

4.6 TEST RESULTS

EUT：	Wireless USB Adapter	Model Name ：	GWF-5B06
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1015 hPa	Test Voltage ：	DC 5V

Test Channel	Frequency	Maximum Conducted Output Power(PK)	Maximum Conducted Output Power(AV)	LIMIT
	(MHz)	(dBm)	(dBm)	dBm
TX 802.11a Mode				
CH36	5180	15.31	12.02	24
CH40	5200	15.54	12.75	24
CH48	5240	14.65	11.15	24
TX 802.11n-HT20 Mode				
CH36	5180	14.12	11.03	24
CH40	5200	14.67	11.83	24
CH48	5240	13.93	10.94	24
TX 802.11n-HT40 Mode				
CH38	5190	13,62	9.82	24
CH46	5230	13.87	10.53	24
TX 802.11ac(20MHz) Mode				
CH36	5180	14.47	12.14	24
CH40	5200	15.16	12.69	24
CH48	5240	14.23	11.23	24
TX 802.11ac(40MHz) Mode				
CH38	5190	15.46	12.94	24
CH46	5230	15.98	13.15	24
TX 802.11ac(80MHz) Mode				
CH42	5210	15.34	12.66	24

5. POWER SPECTRAL DENSITY TEST

5.1 APPLIED PROCEDURES / LIMIT

The power spectral density is defined as the highest level of power in dBm per MHz generated by the transmitter within the power envelope. The power spectral density limits as show follow.

Frequency range(MHz)	Power Spectral Density Limit
5150~5250	11 dBm/MHz

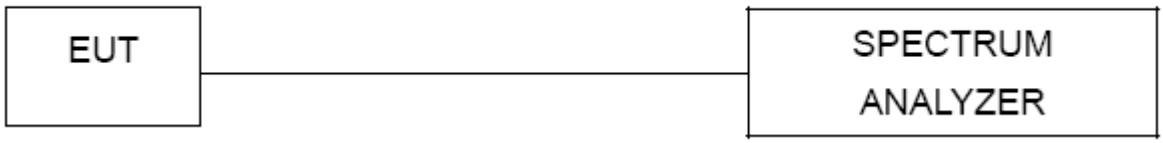
5.2 TEST PROCEDURE

1. The transmitter was connected directly to a Spectrum Analyzer through a directional couple.
2. The power was monitored at the coupler port with a Spectrum Analyzer. The power level was set to the maximum level.
3. Set the RBW = 1000 kHz.
4. Set the VBW ≥ 3*RBW
5. Span=Encompass the entire emissions bandwidth (EBW) of the signal
6. Detector = peak.
7. Sweep time = auto couple.
8. Trace mode = max hold.
9. Allow trace to fully stabilize.
10. Use the peak marker function to determine the maximum power level in any 1MHz band segment within the fundamental EBW.

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



5.5 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.

5.6 TEST RESULTS

EUT：	Wireless USB Adapter	Model Name ：	GWF-5B06
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 5V

Channel	Frequency (MHz)	Power Density (dBm/MHz)	Duty cycle factor (dB)	Sum PSD (dBm/MHz)	Max. Limit (dBm/MHz)	Result
TX 802.11a Mode						
CH36	5180	-2.639	0	-2.639	11	Complies
CH40	5220	-2.180	0	-2.180	11	Complies
CH48	5240	-1.233	0	-1.233	11	Complies
TX 802.11n-HT20 Mode						
CH36	5180	-1.767	0	-1.767	11	Complies
CH40	5220	-1.189	0	-1.189	11	Complies
CH48	5240	-1.096	0	-1.096	11	Complies
TX 802.11n-HT40 Mode						
CH38	5190	-3.904	0	-3.904	11	Complies
CH46	5230	-3.659	0	-3.659	11	Complies
TX 802.11ac(20MHz) Mode						
CH36	5180	-2.388	0	-2.388	11	Complies
CH40	5220	-2.037	0	-2.037	11	Complies
CH48	5240	-1.195	0	-1.195	11	Complies
TX 802.11ac(40MHz) Mode						
CH38	5190	-4.877	0	-4.877	11	Complies
CH46	5230	-4.311	0	-4.311	11	Complies
TX 802.11ac(80MHz) Mode						
CH42	5210	-7.214	0	-7.214	11	Complies

Duty cycle factor=10log(Ton/Tperiod)=10log[1/100%]dB =0 dB

802.11a mode-ch36

802.11a mode-ch40

802.11a mode-ch48

802.11n-HT20 mode-ch36

802.11n-HT20 mode-ch40

802.11n-HT20 mode-ch48

802.11n-HT40 mode-ch38

802.11n-HT40 mode-ch46

802.11ac(20MHz) mode-ch36

802.11ac(20MHz) mode-ch40

802.11ac(20MHz) mode-ch48

802.11ac(40MHz) mode-ch38

802.11ac(40MHz) mode-ch46

802.11ac(80MHz) mode-ch42

6. 99% AND 26DB OCCUPIED BANDWIDTH TEST

6.1 APPLIED PROCEDURES / LIMIT

No restriction limits. But resolution bandwidth within band edge measurement is 1% of the 99% occupied bandwidth.

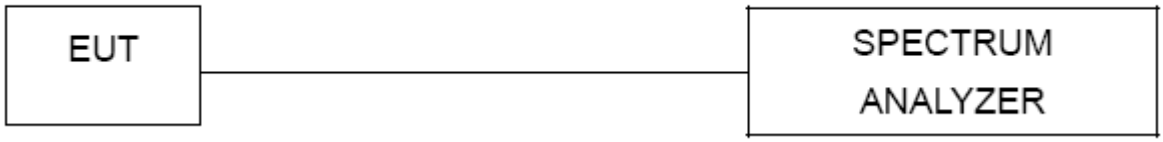
6.2 TEST PROCEDURE

1. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
2. The resolution bandwidth of 300 kHz and the video bandwidth of 1000 kHz were used.
3. Measured the spectrum width with power higher than 26dB below carrier.

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

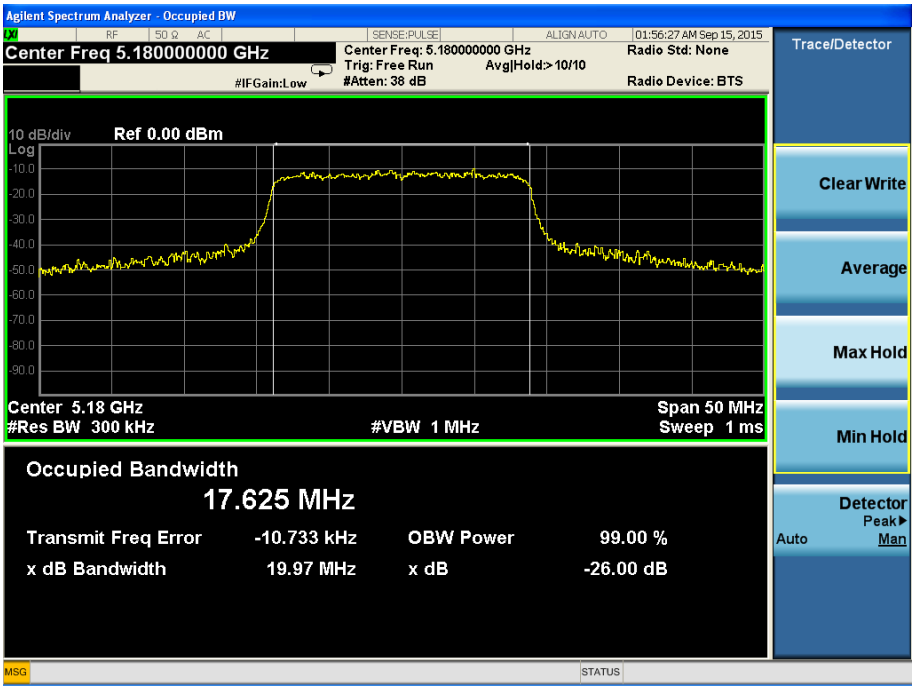
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.6 TEST RESULTS

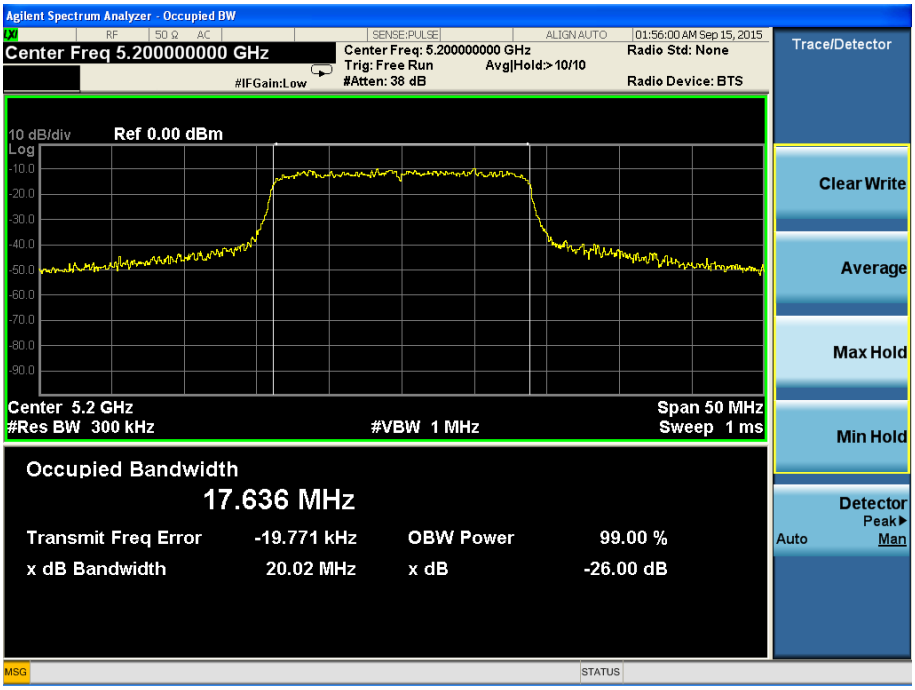
EUT：	Wireless USB Adapter	Model Name ：	GWF-5B06
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 5V

Test Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
TX 802.11a Mode			
CH36	5180	19.970	17.625
CH40	5200	20.020	17.636
CH48	5240	19.800	17.676
TX 802.11n-HT20 Mode			
CH36	5180	20.280	17.647
CH40	5200	20.420	17.642
CH48	5240	20.010	17.621
TX 802.11n-HT40 Mode			
CH38	5190	43.960	36.521
CH46	5230	41.440	36.469
TX 802.11ac(20MHz) Mode			
CH03	5180	20.000	17.624
CH06	5200	19.820	17.610
CH09	5240	19.800	17.637
TX 802.11ac(40MHz) Mode			
CH38	5190	45.880	36.740
CH46	5230	46.020	36.699
TX 802.11ac(80MHz) Mode			
CH42	5210	83.690	75.509

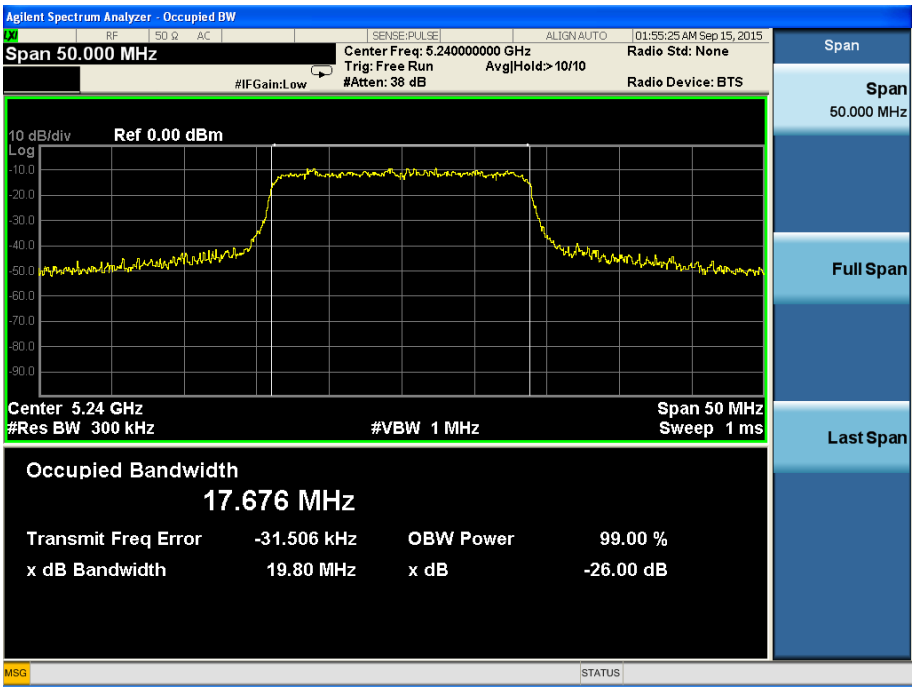
802.11a mode-ch36



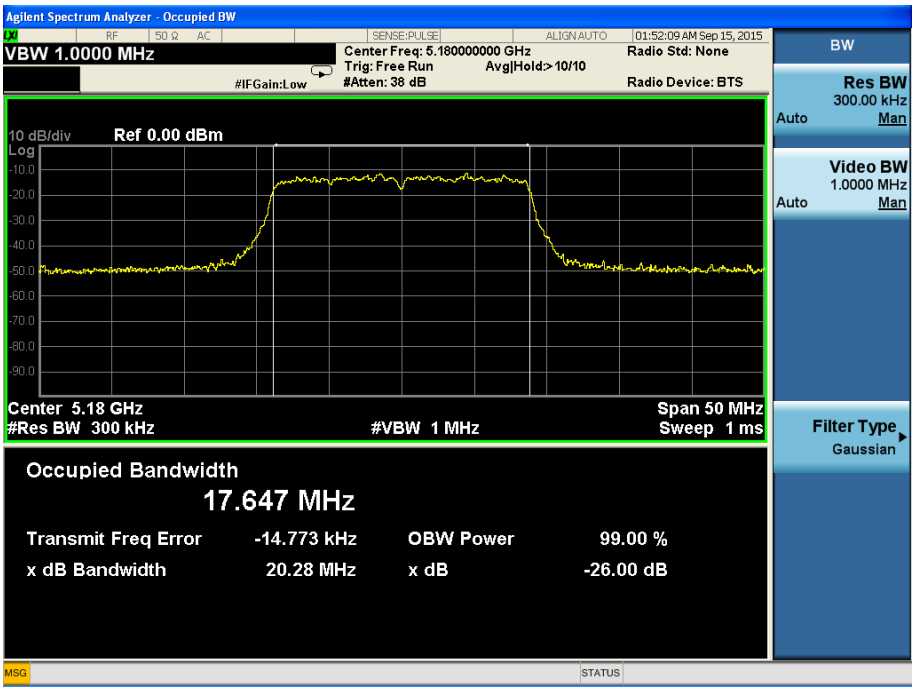
802.11a mode-ch40



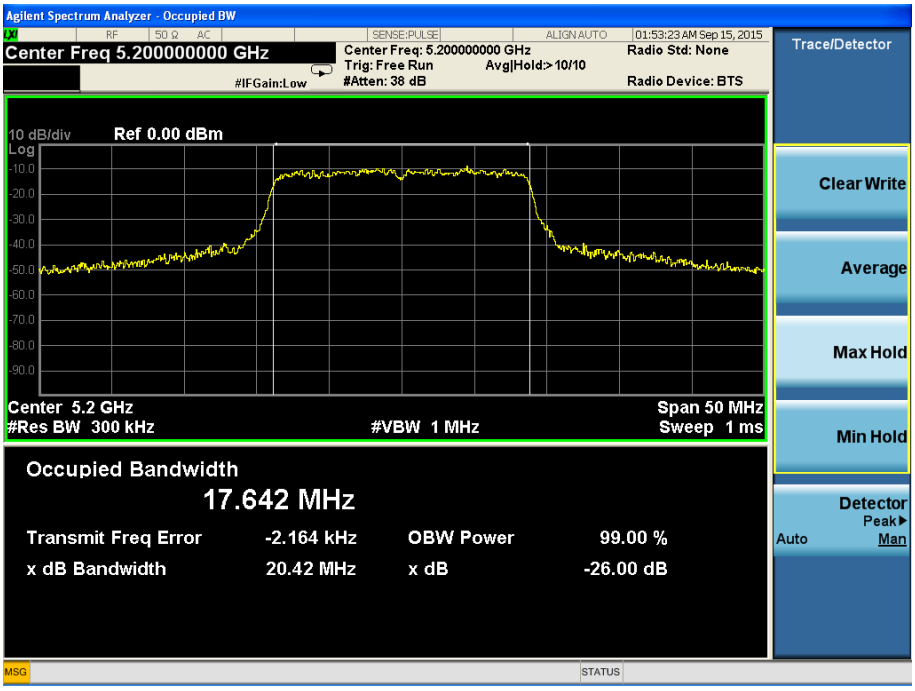
802.11a mode-ch48



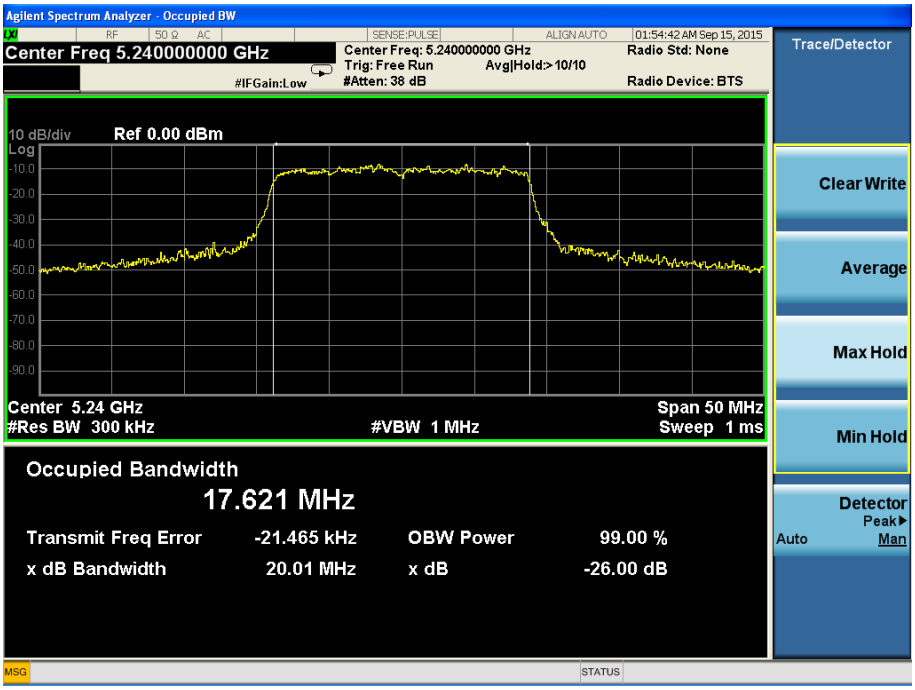
802.11n-HT20 mode-ch36



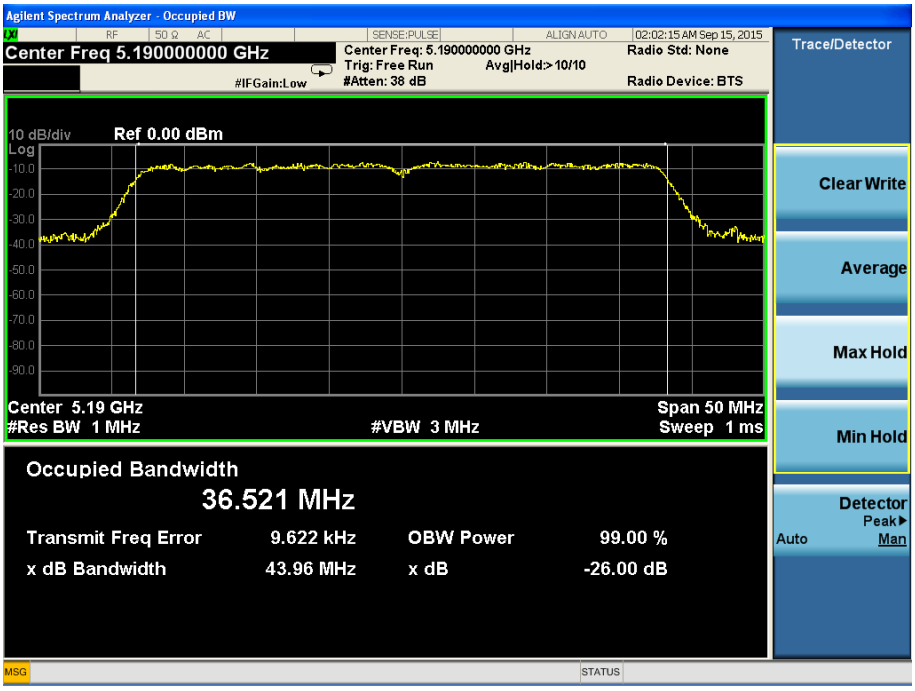
802.11n-HT20 mode-ch40



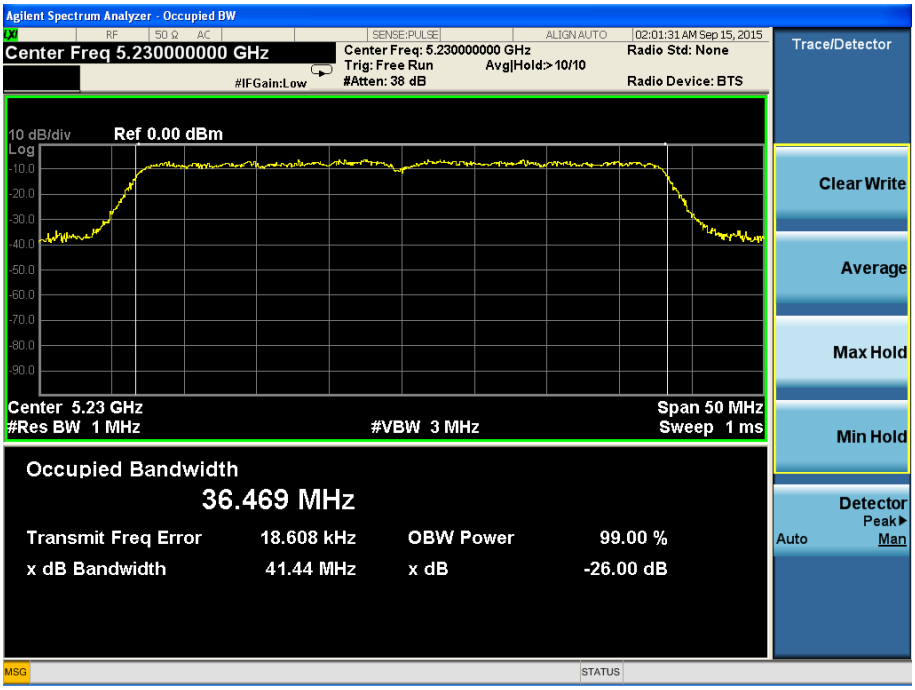
802.11n-HT20 mode-ch48



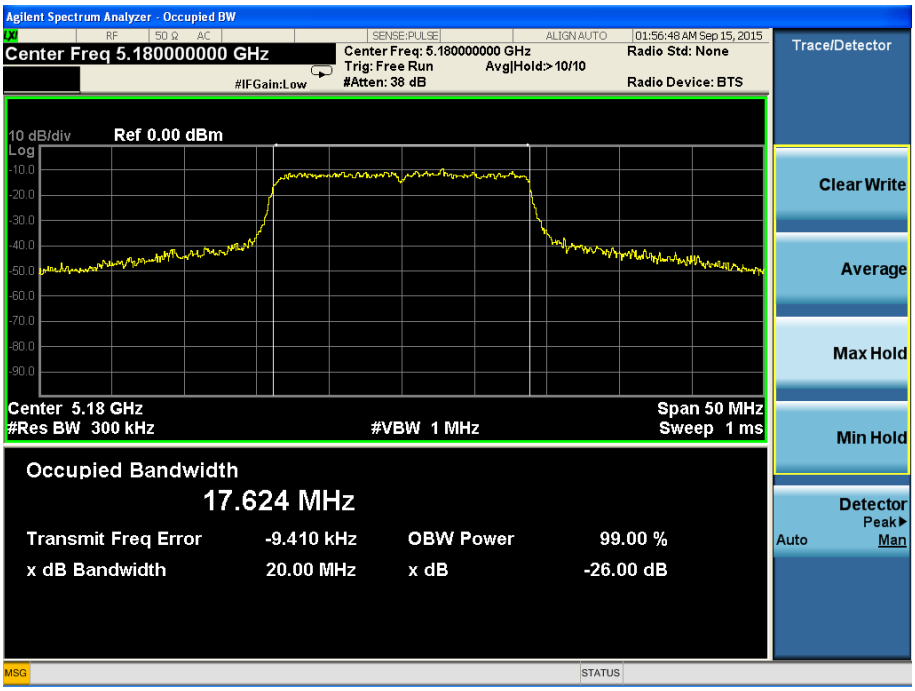
802.11n-HT40 mode-ch38



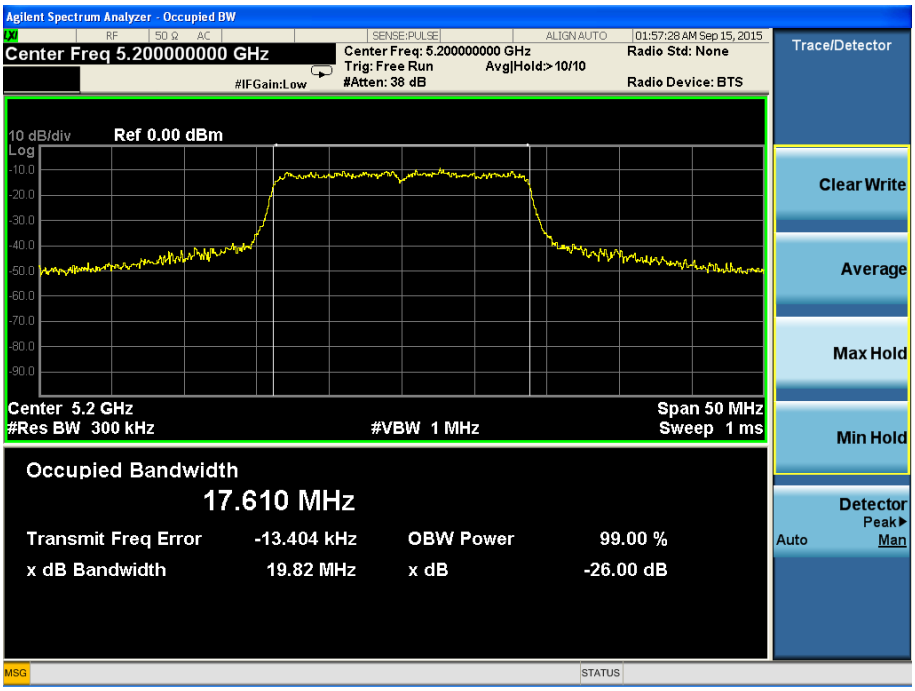
802.11n-HT40 mode-ch46



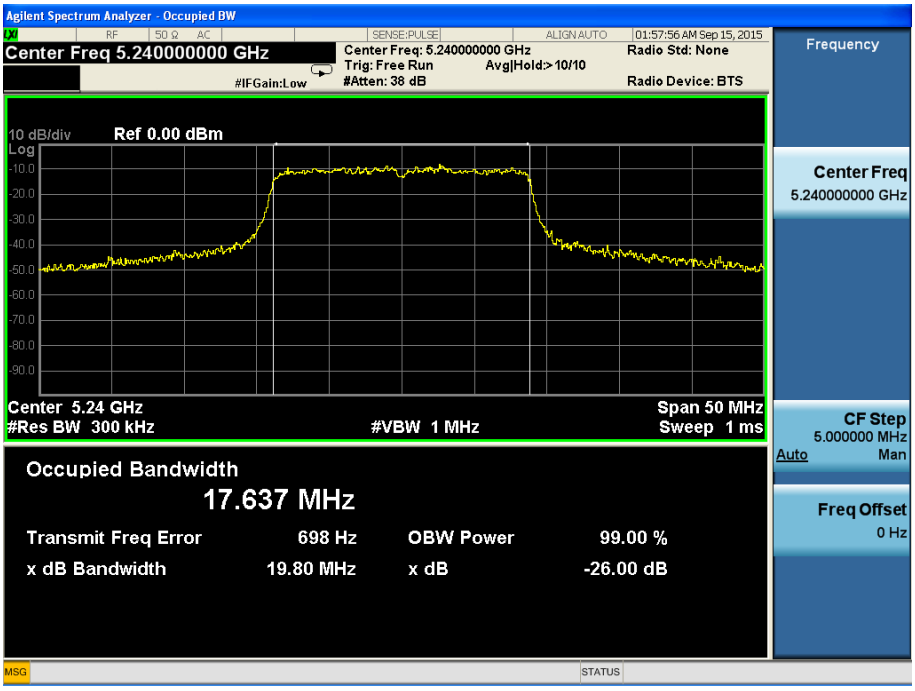
802.11ac(20MHz) mode-ch36



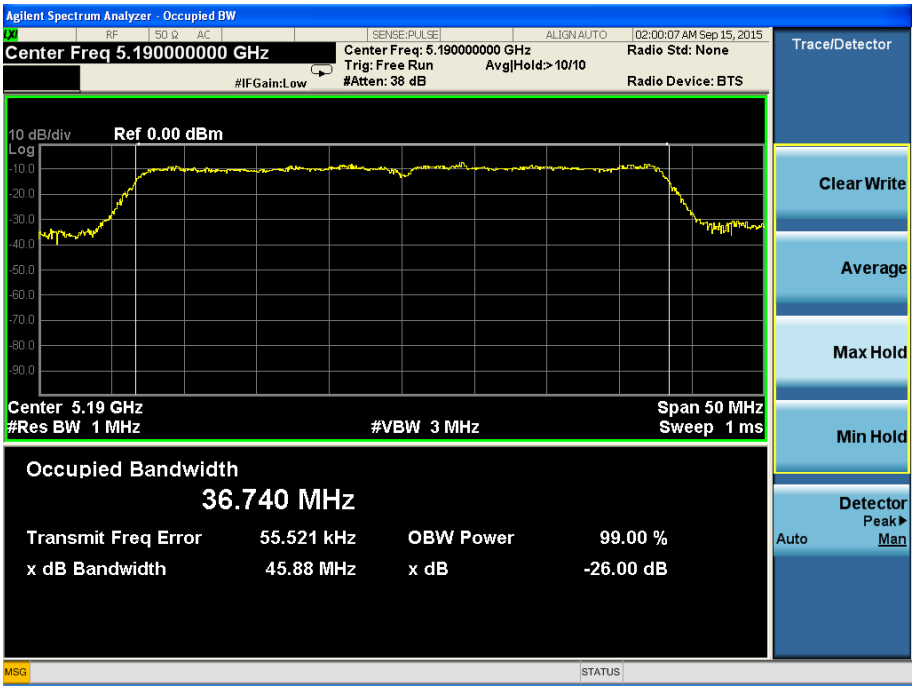
802.11ac(20MHz) mode-ch40



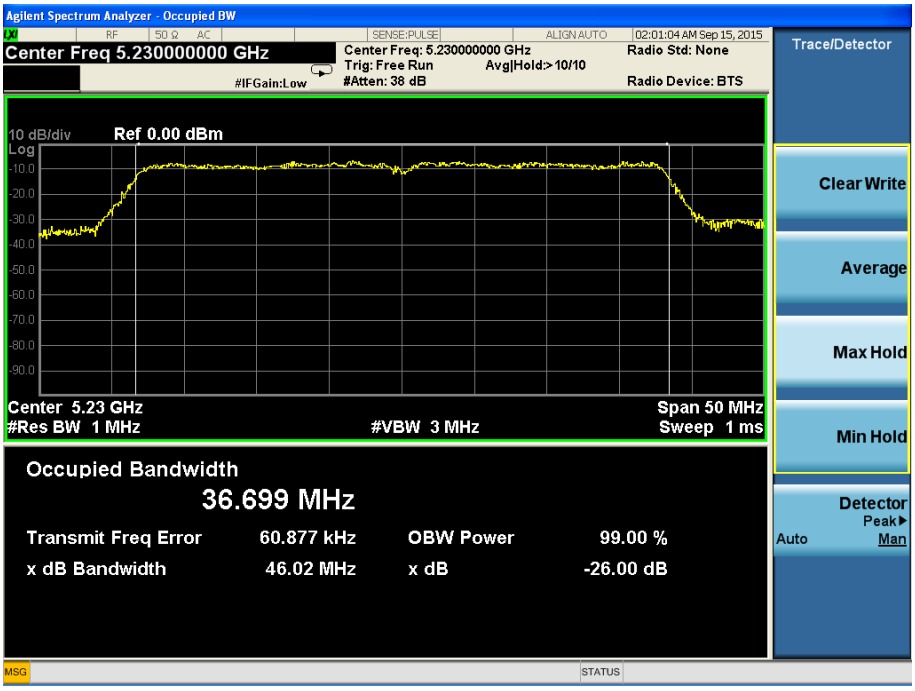
802.11ac(20MHz) mode-ch48



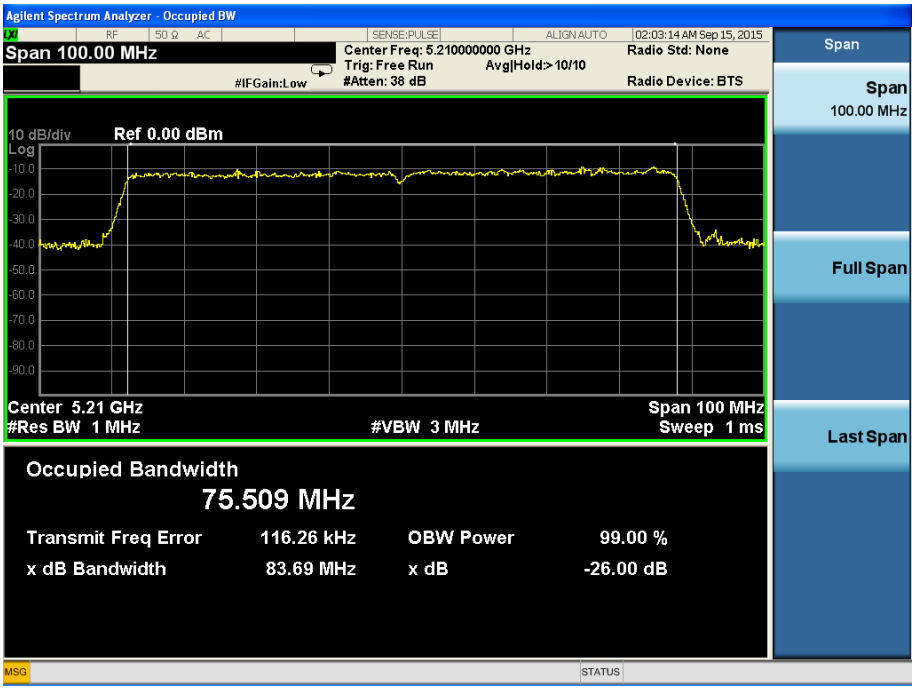
802.11ac(40MHz) mode-ch38



802.11ac(40MHz) mode-ch46



802.11ac(80MHz) mode-ch42



7. PEAK EXCURSION TEST

7.1 APPLICABLE STANDARD

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emissions bandwidth whichever is less.

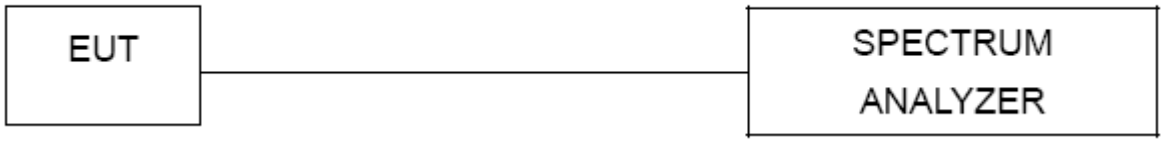
7.2 TEST PROCEDURE

1. The transmitter output is connected to the spectrum analyzer.
2. Trace A, Set RBW =1MHz, VBW = 3MHz, Span >26dB bandwidth, Max. hold.
3. Delta Mark trace A Maximum frequency and trace B same frequency.
4. Repeat the above procedure until measurements for all frequencies were complete.

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 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.

7.6 TEST RESULT FOR CONDUCTED SPURIOUS EMISSIONS TEST

EUT：	Wireless USB Adapter	Model Name ：	GWF-5B06
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 5V

Test Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Result
TX 802.11a Mode				
CH36	5180	2.225	13	Complies
CH40	5200	3.018	13	Complies
CH48	5240	2.439	13	Complies
TX 802.11n-HT20 Mode				
CH36	5180	3.783	13	Complies
CH40	5200	3.689	13	Complies
CH48	5240	4.116	13	Complies
TX 802.11n-HT40 Mode				
CH38	5190	3.798	13	Complies
CH46	5230	4.094	13	Complies
TX 802.11ac(20MHz) Mode				
CH03	5180	3.048	13	Complies
CH06	5200	3.113	13	Complies
CH09	5240	2.819	13	Complies
TX 802.11ac(40MHz) Mode				
CH38	5190	3.470	13	Complies
CH46	5230	3.307	13	Complies
TX 802.11ac(80MHz) Mode				
CH42	5210	3.140	13	Complies

802.11a mode-ch36

802.11a mode-ch40

802.11a mode-ch48

802.11n-HT20 mode-ch36

802.11n-HT20 mode-ch40

802.11n-HT20 mode-ch48

802.11n-HT40 mode-ch38

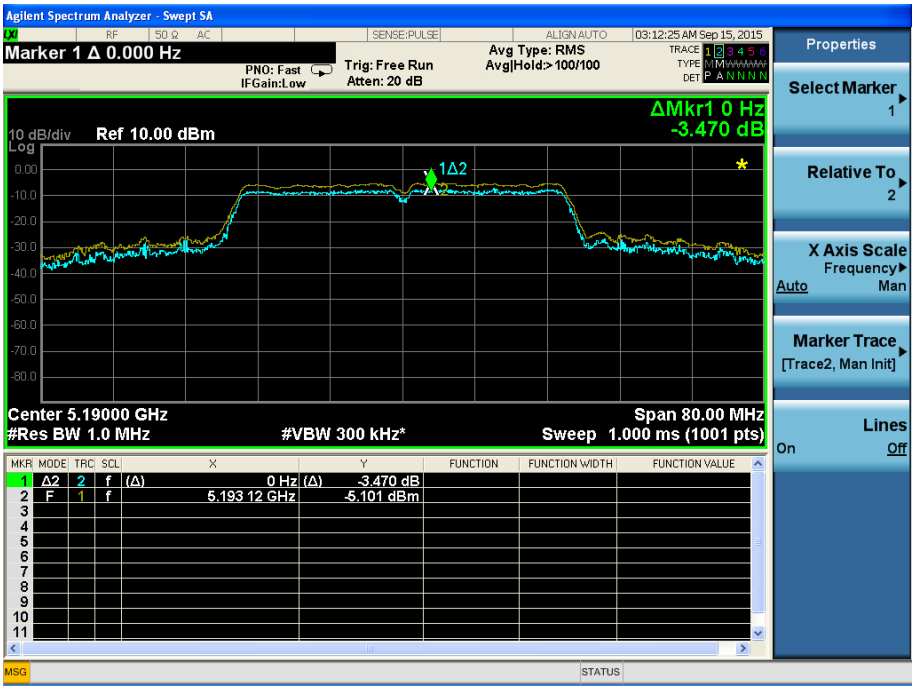
802.11n-HT40 mode-ch46

802.11ac(20MHz) mode-ch36

802.11ac(20MHz) mode-ch40

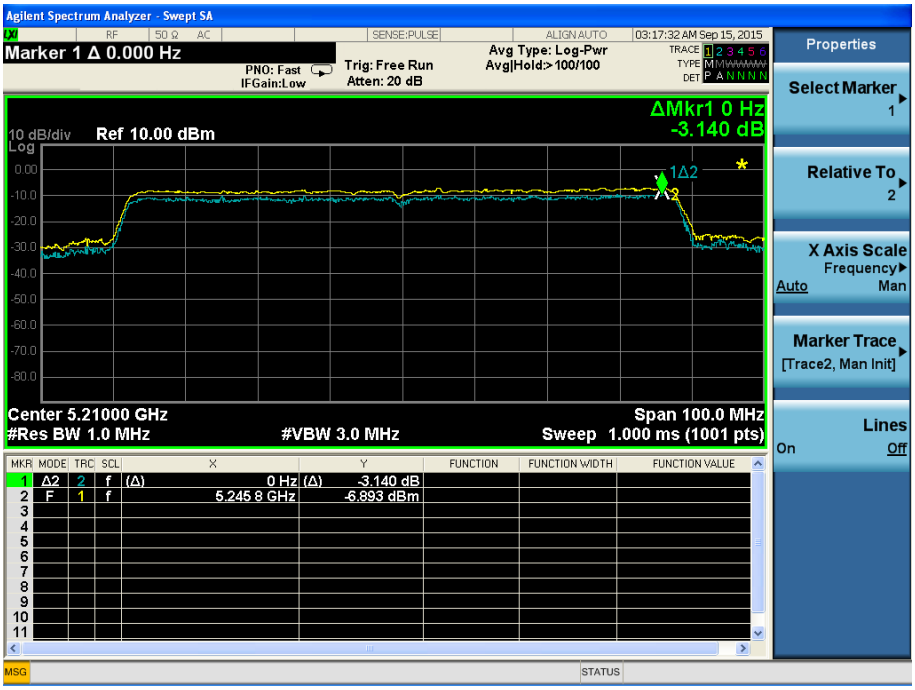
802.11ac(20MHz) mode-ch48

802.11ac(40MHz) mode-ch38



802.11ac(40MHz) mode-ch46

802.11ac(80MHz) mode-ch42



8. FREQUENCY STABILITY TEST

8.1 APPLICABLE STANDARD

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emissions is maintained within the band of operation under all conditions of normal operation as specified in the user's manual or ±20ppm (IEEE 802.11nspecification).

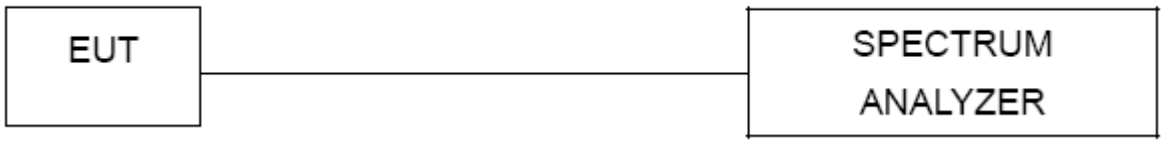
8.2 TEST PROCEDURE

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 106 ppm and the limit is less than ±20ppm (IEEE 802.11nspecification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature rule is -30°C~50°C.

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP



8.5 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.

8.6 TEST RESULT FOR CONDUCTED SPURIOUS EMISSIONS TEST

EUT：	Wireless USB Adapter	Model Name ：	GWF-5B06
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 5V

Test Result for 802.11a:

Voltage vs. Frequency Stability

Voltage	Measure Frequency (MHz)
(V)	5200
4.5	5199.9988
5.0	5199.9964
5.5	5199.9981
Max. Deviation (MHz)	-0.0036
Max. Deviation (ppm)	-0.69

Temperature vs. Frequency Stability

Temperature	Measure Frequency (MHz)
(℃)	5200
-30	5199.9984
-20	5199.9976
-10	5199.9958
0	5199.9947
+10	5199.9967
+20	5199.9993
+30	5199.9974
+40	5199.9961
+50	5199.9953
Max. Deviation (MHz)	-0.0053
Max. Deviation (ppm)	-1.02

Test Result for 802.11n-HT20:

Voltage vs. Frequency Stability

Voltage	Measure Frequency (MHz)
(V)	5200
4.5	5199.9976
5.0	5199.9985
5.5	5199.9967
Max. Deviation (MHz)	-0.0033
Max. Deviation (ppm)	-0.63

Temperature vs. Frequency Stability

Temperature	Measure Frequency (MHz)
(℃)	5200
-30	5199.9943
-20	5199.9989
-10	5199.9954
0	5199.9982
+10	5199.9956
+20	5199.9930
+30	5199.9981
+40	5199.9985
+50	5199.9947
Max. Deviation (MHz)	-0.0070
Max. Deviation (ppm)	-1.35

Test Result for 802.11n-HT40:

Voltage vs. Frequency Stability

Voltage	Measure Frequency (MHz)
(V)	5190
4.5	5190.0053
5.0	5190.0036
5.5	5190.0047
Max. Deviation (MHz)	0.0053
Max. Deviation (ppm)	1.02

Temperature vs. Frequency Stability

Temperature	Measure Frequency (MHz)
(℃)	5190
-30	5190.0023
-20	5190.0065
-10	5190.0044
0	5190.0038
+10	5190.0071
+20	5190.0051
+30	5190.0023
+40	5190.0046
+50	5190.0029
Max. Deviation (MHz)	0.0071
Max. Deviation (ppm)	1.37

Test Result for 802.11ac(20MHz):

Voltage vs. Frequency Stability

Voltage	Measure Frequency (MHz)
(V)	5200
4.5	5199.9982
5.0	5199.9966
5.5	5199.9954
Max. Deviation (MHz)	-0.0046
Max. Deviation (ppm)	-0.88

Temperature vs. Frequency Stability

Temperature	Measure Frequency (MHz)
(℃)	5200
-30	5199.9983
-20	5199.9946
-10	5199.9975
0	5199.9937
+10	5199.9971
+20	5199.9968
+30	5199.9953
+40	5199.9982
+50	5199.9976
Max. Deviation (MHz)	-0.0063
Max. Deviation (ppm)	-1.21

Test Result for 802.11ac(40MHz):

Voltage vs. Frequency Stability

Voltage	Measure Frequency (MHz)
(V)	5190
4.5	5190.9963
5.0	5190.9975
5.5	5190.9972
Max. Deviation (MHz)	0.0037
Max. Deviation (ppm)	0.71

Temperature vs. Frequency Stability

Temperature	Measure Frequency (MHz)
(℃)	5190
-30	5190.0053
-20	5190.0042
-10	5190.0066
0	5190.0032
+10	5190.0052
+20	5190.0027
+30	5190.0038
+40	5190.0035
+50	5190.0062
Max. Deviation (MHz)	0.0066
Max. Deviation (ppm)	1.27

Test Result for 802.11ac(80MHz):

Voltage vs. Frequency Stability

Voltage	Measure Frequency (MHz)
(V)	5210
4.5	5210.9963
5.0	5210.9975
5.5	5210.9972
Max. Deviation (MHz)	0.0037
Max. Deviation (ppm)	0.71

Temperature vs. Frequency Stability

Temperature	Measure Frequency (MHz)
(℃)	5200
-30	5210.0043
-20	5210.0071
-10	5210.0033
0	5210.0062
+10	5210.0069
+20	5210.0053
+30	5210.0028
+40	5210.0045
+50	5210.0037
Max. Deviation (MHz)	0.0069
Max. Deviation (ppm)	1.32

9. ANTENNA REQUIREMENT

9.1 STANDARD REQUIREMENT

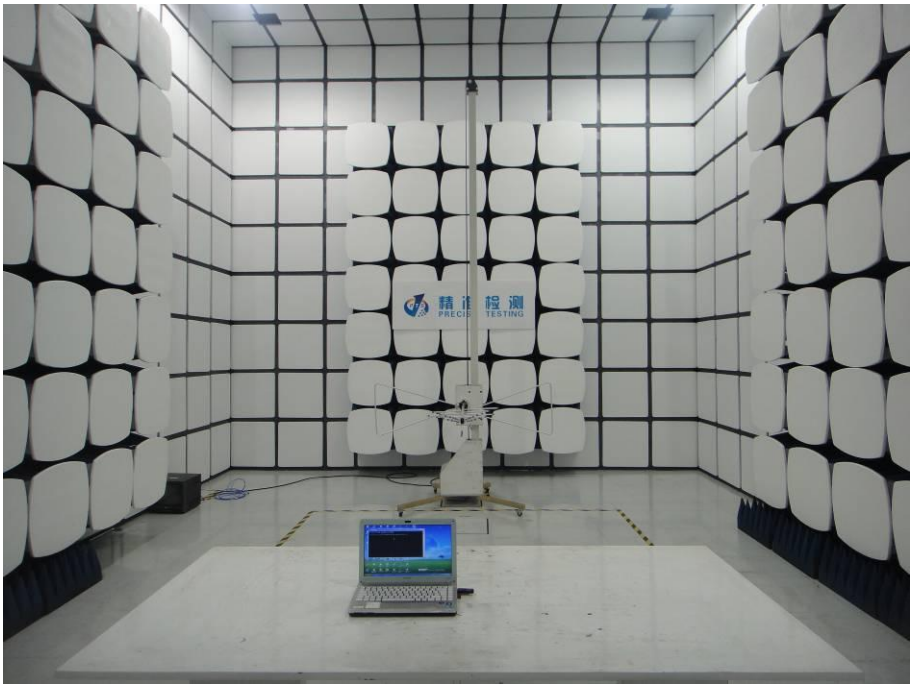
15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

9.2 EUT ANTENNA

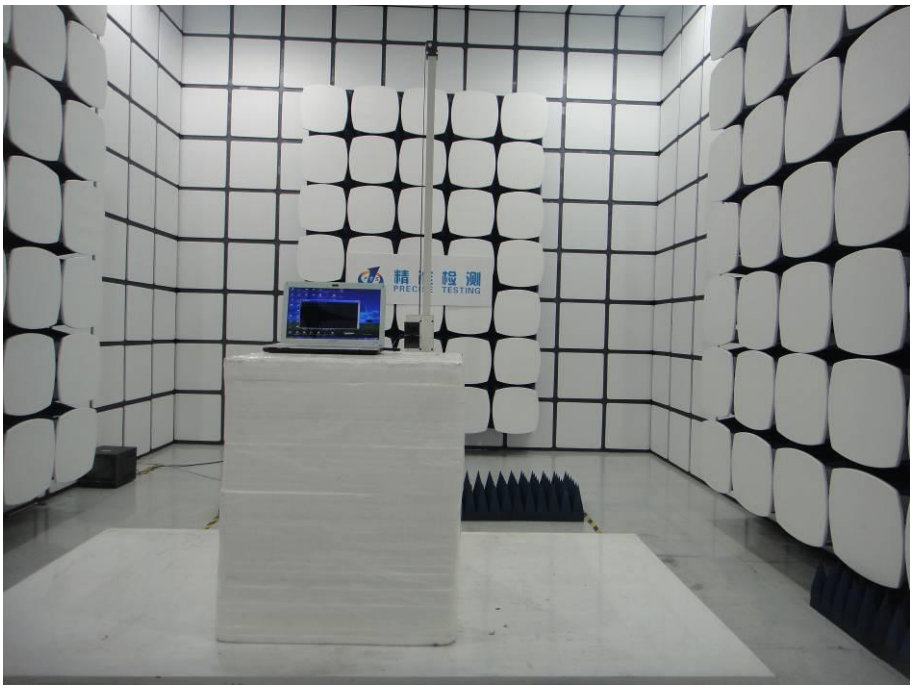
The EUT antenna is Integrated(PCB) antenna and the gain is 2.8dBi. It's permanent attached antenna. It comply with the standard requirement.

10. EUT TEST PHOTO

Radiated Measurement Photos



Radiated Measurement Photos



Conducted Measurement Photos