

# FCC RADIO TEST REPORT

## FCC ID: 2ALMJEN-C0012W

**Product :** Central Controller

**Trade Name :** ENZD

**Model Name:** EN-C0012W

EN-C0012P, EN-C00182W,

**Serial Model :** EN-C0022W, EN-C1012W, EN-C2012W,  
EN-C3012W, EN-C4012W, EN-C5012W,  
EN-C6012W

**Report No. :** BZT-20170309214F2

### Prepared for

iTsEasy Electronics Co., Ltd.

Suite 1409 Digital Building, Huizhan East Road 16 , Torch Development Zone,  
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### Prepared by

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## TEST RESULT CERTIFICATION

**Applicant's name** ..... : iTsEasy Electronics Co., Ltd.

Address ..... : Suite 1409 Digital Building, Huizhan East Road 16 , Torch Development Zone,Zhongshan,Guangdong,China

**Manufacture's Name** ..... : iTsEasy Electronics Co., Ltd.

Address ..... : Suite 1409 Digital Building, Huizhan East Road 16 , Torch Development Zone,Zhongshan,Guangdong,China

### Product description

Product name ..... : Central Controller

Trade Name ..... : ENZD

**Standards** ..... : FCC Part15.247

Test procedure ..... : ANSI C63.4-2014

This device described above has been tested by BZT, 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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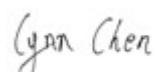
**Date of Test** ..... :

Date (s) of performance of tests ..... : 1 Apr. 2017 ~10 Apr. 2017

Date of Issue ..... : 10 Apr. 2017

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

Testing Engineer ..... :



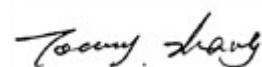
(Lynn Chen)

Technical Manager ..... :



(Carlen Liu)

Authorized Signatory :



(Tommy Zhang)

**Table of Contents**

	Page
<b>1 . SUMMARY OF TEST RESULTS</b>	<b>5</b>
1.1 TEST FACILITY	6
1.2 MEASUREMENT UNCERTAINTY	6
<b>2 . GENERAL INFORMATION</b>	<b>7</b>
2.1 GENERAL DESCRIPTION OF EUT	7
2.2 DESCRIPTION OF TEST MODES	9
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	10
2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)	11
2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS	12
<b>3 . EMC EMISSION TEST</b>	<b>13</b>
3.1 CONDUCTED EMISSION MEASUREMENT	13
3.1.1 POWER LINE CONDUCTED EMISSION LIMITS	13
3.1.2 TEST PROCEDURE	14
3.1.3 DEVIATION FROM TEST STANDARD	14
3.1.4 TEST SETUP	14
3.1.5 EUT OPERATING CONDITIONS	14
3.1.6 TEST RESULTS	15
3.2 RADIATED EMISSION MEASUREMENT	17
3.2.1 RADIATED EMISSION LIMITS	17
3.2.2 TEST PROCEDURE	18
3.2.3 DEVIATION FROM TEST STANDARD	18
3.2.4 TEST SETUP	19
3.2.5 EUT OPERATING CONDITIONS	20
3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)	21
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)	22
3.2.8 TEST RESULTS (ABOVE 1000 MHZ)	23
3.2.9 BAND EDGE EMISSION(RADIATED MEASUREMENT):	24
<b>4 . POWER SPECTRAL DENSITY TEST</b>	<b>34</b>
4.1 APPLIED PROCEDURES / LIMIT	34
4.1.1 TEST PROCEDURE	34
4.1.2 DEVIATION FROM STANDARD	34
4.1.3 TEST SETUP	34
4.1.4 EUT OPERATION CONDITIONS	34
4.1.5 TEST RESULTS	35
<b>5 . BANDWIDTH TEST</b>	<b>41</b>
5.1 APPLIED PROCEDURES / LIMIT	41
5.1.1 TEST PROCEDURE	41

**Table of Contents**

	<b>Page</b>
5.1.2 DEVIATION FROM STANDARD	41
5.1.3 TEST SETUP	41
5.1.4 EUT OPERATION CONDITIONS	41
5.1.5 TEST RESULTS	42
<b>6 . PEAK OUTPUT POWER TEST</b>	<b>48</b>
6.1 APPLIED PROCEDURES / LIMIT	48
6.1.1 TEST PROCEDURE	48
6.1.2 DEVIATION FROM STANDARD	48
6.1.3 TEST SETUP	48
6.1.4 EUT OPERATION CONDITIONS	48
6.1.5 TEST RESULTS	49
<b>7 . 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE</b>	<b>50</b>
7.1 DEVIATION FROM STANDARD	50
7.2 TEST SETUP	50
7.3 EUT OPERATION CONDITIONS	50
7.4 TEST RESULTS	51
<b>8 . ANTENNA REQUIREMENT</b>	<b>55</b>
8.1 STANDARD REQUIREMENT	55
8.2 EUT ANTENNA	55
<b>9 . EUT TEST PHOTO</b>	<b>56</b>

## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

<b>FCC Part15 (15.247) , Subpart C</b>			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	
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

BZT Testing Technology Co., Ltd.

Add. : Buliding 17,Xinghua Road Xingwei industrial Park Fuyong,Baoan  
District, Shenzhen,Guangdong,China  
FCC Registration No.: 701733

## 1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$  , 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	$\pm 1.38\text{dB}$
2	RF power,conducted	$\pm 0.16\text{dB}$
3	Spurious emissions,conducted	$\pm 0.21\text{dB}$
4	All emissions,radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^\circ\text{C}$
7	Humidity	$\pm 2\%$

## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Equipment	Central Controller	
Trade Name	ENZD	
Model Name	EN-C0012W	
Serial Model	EN-C0012P, EN-C00182W, EN-C0022W, EN-C1012W, EN-C2012W, EN-C3012W, EN-C4012W, EN-C5012W, EN-C6012W	
Model Difference	All the model are the same circuit and RF module, except the model name.	
Product Description	The EUT is a Central Controller	
	Operation Frequency:	802.11b/g/n:2412~2462 MHz
	Modulation Type:	CCK/OFDM/DBPSK/DAPS
	Bit Rate of Transmitter	802.11b:11/5.5/2/1 Mbps 802.11g:54/48/36/24/18/12/9/6Mbps 802.11n:78/52/6.5Mbps
	Number Of Channel	802.11b/g/n:11CH
	Antenna Designation:	Please see Note 3.
	Output Power(Conducted):	802.11b: 13.32 dBm (Max.) 802.11g: 10.81 dBm (Max.) 802.11n: 9.63 dBm (Max.)
	Antenna Gain (dBi)	1.13dbi
	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.	
Channel List	Please refer to the Note 2.	
Connecting I/O Port(s)	Please refer to the User's Manual	

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/n(20)							
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	Integrated antenna	N/A	1.13	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	802.11n CH1/ CH6/ CH11
Mode 4	Link Mode

For Conducted Emission	
Final Test Mode	Description
Mode 4	Link Mode

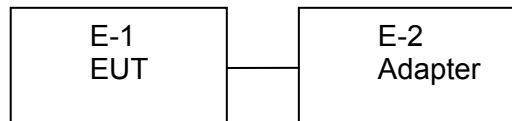
For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11b CH1/ CH6/ CH11
Mode 2	802.11g CH1/ CH6/ CH11
Mode 3	802.11n CH1/ CH6/ CH11
Mode 4	Link Mode

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**

C1



## 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	Brand	Model/Type No.	Series No.	Note
E-1	Central Controller	ENZD	EN-C0012W	N/A	EUT
E-2	Adapter	ENZD	HS36-1200500CH	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C1	N/A	N/A	0.6	

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
1	EMI Test Receiver	R&S	ESU8	100316	2016/10/25	2017/10/24
2	Double Ridged Horn Antenna (0.8GHz-18GHz)	R&S	HF907	100276	2016/11/01	2017/10/31
3	Log-periodic Dipole Antenna (30MHz-1GHz)	R&S	HL223	100435	2016/11/01	2017/10/31
4	Biconical Antenna (9K-30MHz)	R&S	HK116	100431	2016/10/25	2017/10/24
5	Pre-amplifier	Schwarzbeck	VULB 9163	9163-462	2016/04/12	2017/04/11
6	Signal Conditioning Unit	R&S	SCU-08	10008	2016/10/25	2017/10/24
7	Rod Antenna (9K-30MHz)	R&S	HFH2-Z6	100386	2016/11/01	2017/10/31
8	Pre-amplifier	R&S	SCU-01	10049	2016/10/25	2017/10/24
9	Active loop antenna (9K-30MHz)	Schwarzbeck	FMZB1519	1519-038	2016/11/01	2017/10/31
10	Spectrum Analyzer	Agilent	E4407B	MY45109572	2016/11/01	2017/10/31
11	Power Meter	R&S	NRVS	100696	2016/11/01	2017/10/31
12	Power Sensor	R&S	URV5-Z4	0395.1619.05	2016/11/01	2017/10/31

### Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Test Receiver	R&S	ESU8	100316	2016/10/25	2017/10/24
	Current Probe	R&S	EZ-17	100532	2016/10/25	2017/10/24
3	Two Line V-Network	R&S	ENV216	101109	2016/10/25	2017/10/24
4	Passive Voltage Probe	R&S	ESH2-Z3	100169	2016/10/25	2017/10/24
5	V-Network	R&S	ESH3-Z6	100694	2016/10/25	2017/10/24
6	V-Network	R&S	ESH3-Z6	100690	2016/10/25	2017/10/24
7	Artificial mains	R&S	ESH2-Z5	100309	2016/10/25	2017/10/24
8	Pulse Limiter	R&S	ESH3-Z2	101242	2016/10/25	2017/10/24

### 3. EMC EMISSION TEST

#### 3.1 CONDUCTED EMISSION MEASUREMENT

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

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

0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	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

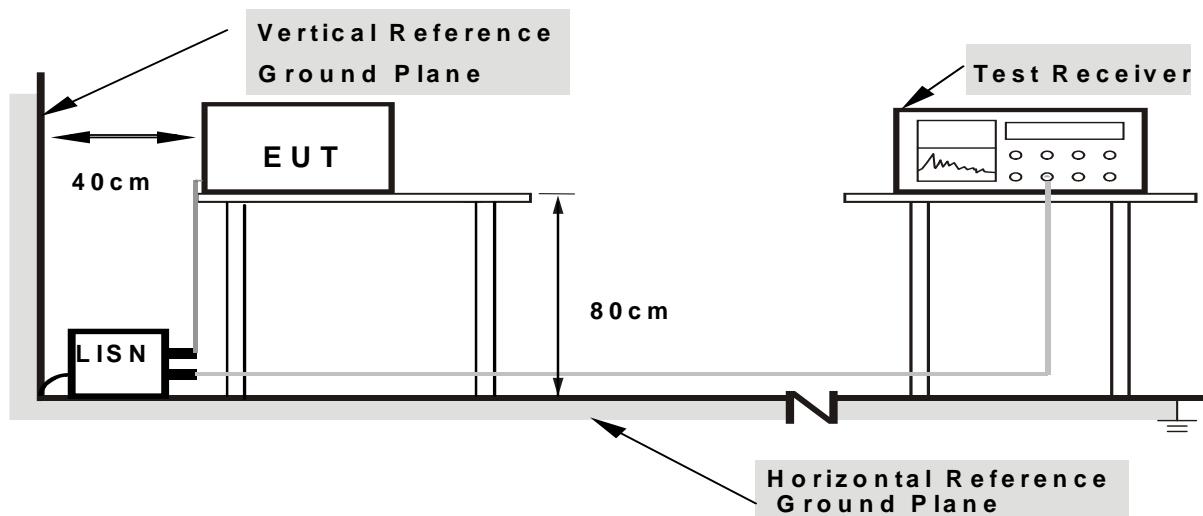
### 3.1.2 TEST PROCEDURE

- 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 cm 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.

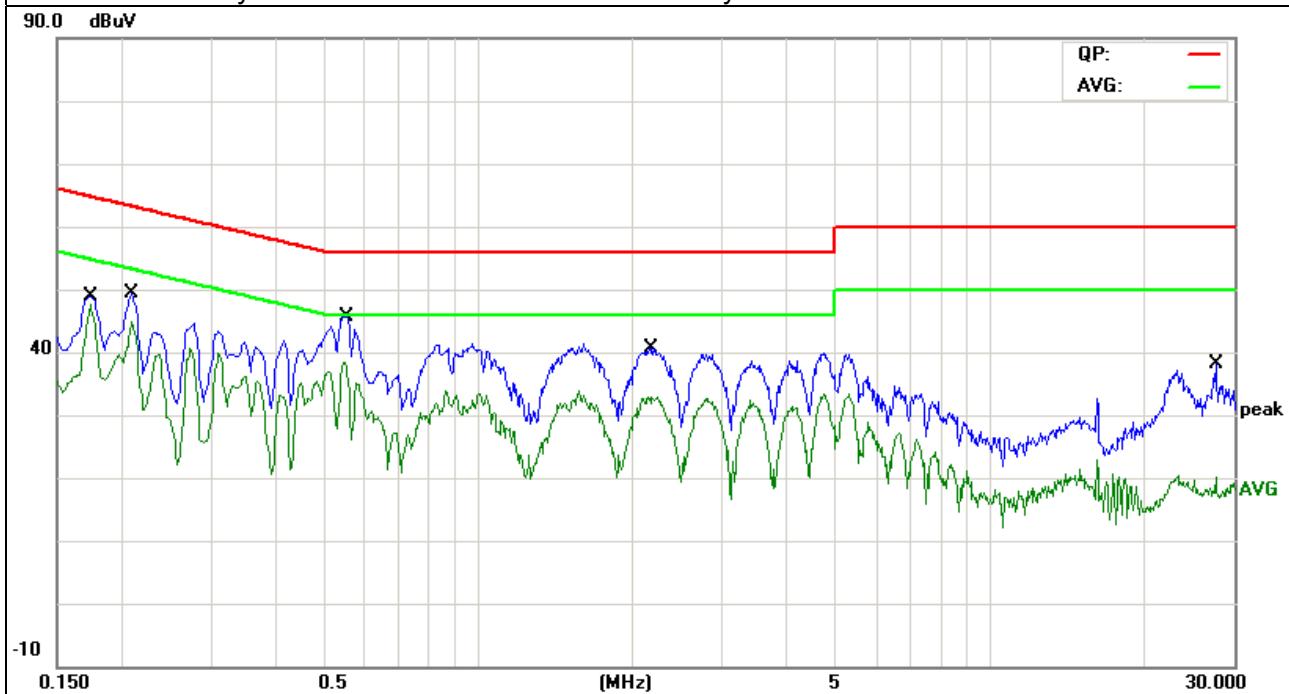
### 3.1.6 TEST RESULTS

EUT :	Central Controller	Model Name. :	EN-C0012W
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	L
Test Voltage :	AC 120V/60Hz	Test Mode :	Mode 1

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V)	(dB $\mu$ V)	(dB)	
0.1740	38.18	9.97	48.15	64.76	-16.61	QP
0.1740	37.69	9.97	47.66	54.76	-7.10	AVG
0.2100	38.07	10.02	48.09	63.20	-15.11	QP
0.2100	34.74	10.02	44.76	53.20	-8.44	AVG
0.5540	35.29	10.05	45.34	56.00	-10.66	QP
0.5540	27.45	10.05	37.50	46.00	-8.50	AVG
2.1860	28.69	10.05	38.74	56.00	-17.26	QP
2.1860	22.87	10.05	32.92	46.00	-13.08	AVG
27.5860	12.32	10.21	22.53	60.00	-37.47	QP
27.5860	2.74	10.21	12.95	50.00	-37.05	AVG

#### Remark:

1. All readings are Quasi-Peak and Average values.
2. lever = Read lever + factor (LISN Factor +cable loss)  
Factor added by measurement software automatically.



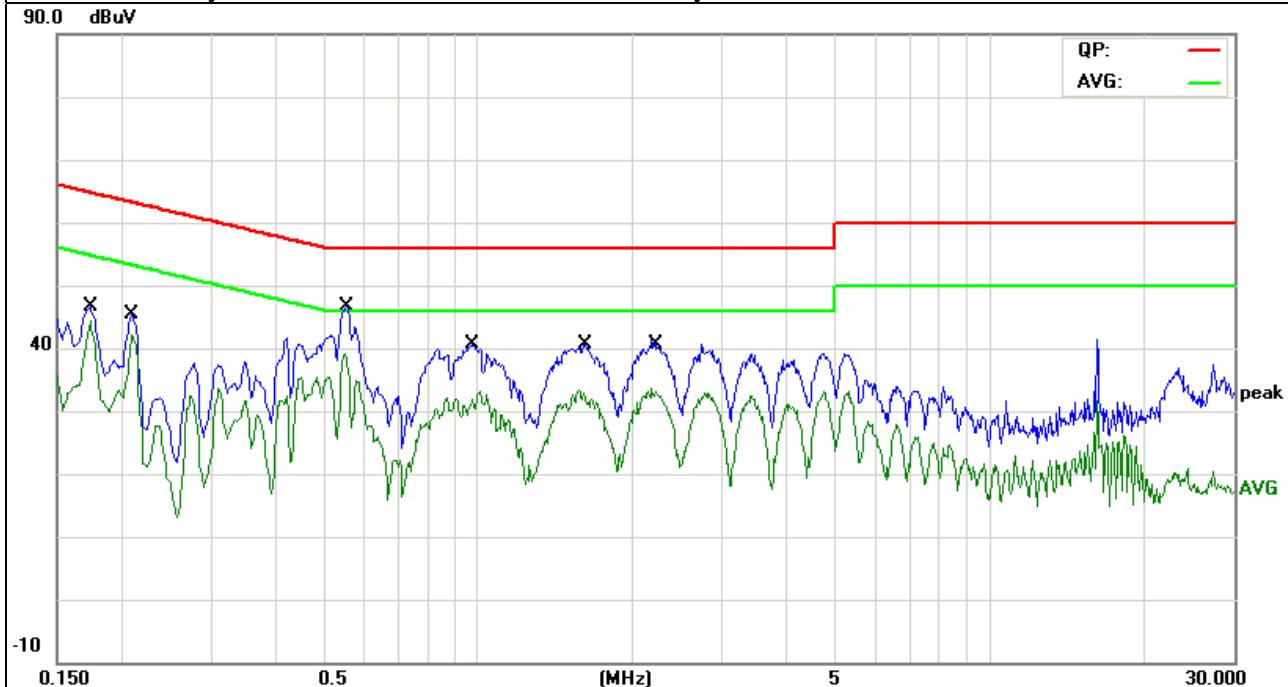
EUT :	Central Controller	Model Name. :	EN-C0012W
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	N
Test Voltage :	AC 120V/60Hz	Test Mode :	Mode 1

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V)	Limits (dB $\mu$ V)	Margin (dB)	Detector Type
0.1740	34.64	10.12	44.76	64.76	-20.00	QP
0.1740	34.04	10.12	44.16	54.76	-10.60	AVG
0.2100	34.18	10.12	44.30	63.20	-18.90	QP
0.2100	32.34	10.12	42.46	53.20	-10.74	AVG
0.5540	36.21	10.02	46.23	56.00	-9.77	QP
0.5540	28.24	10.02	38.26	46.00	-7.74	AVG
0.9700	28.87	10.15	39.02	56.00	-16.98	QP
0.9700	21.06	10.15	31.21	46.00	-14.79	AVG
1.6220	28.51	10.10	38.61	56.00	-17.39	QP
1.6220	21.66	10.10	31.76	46.00	-14.24	AVG
2.2260	27.44	10.06	37.50	56.00	-18.50	QP
2.2260	22.86	10.06	32.92	46.00	-13.08	AVG

## Remark:

1. All readings are Quasi-Peak and Average values.
2. lever = Read lever + factor (LISN Factor +cable loss)

Factor added by measurement software automatically.



### 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:

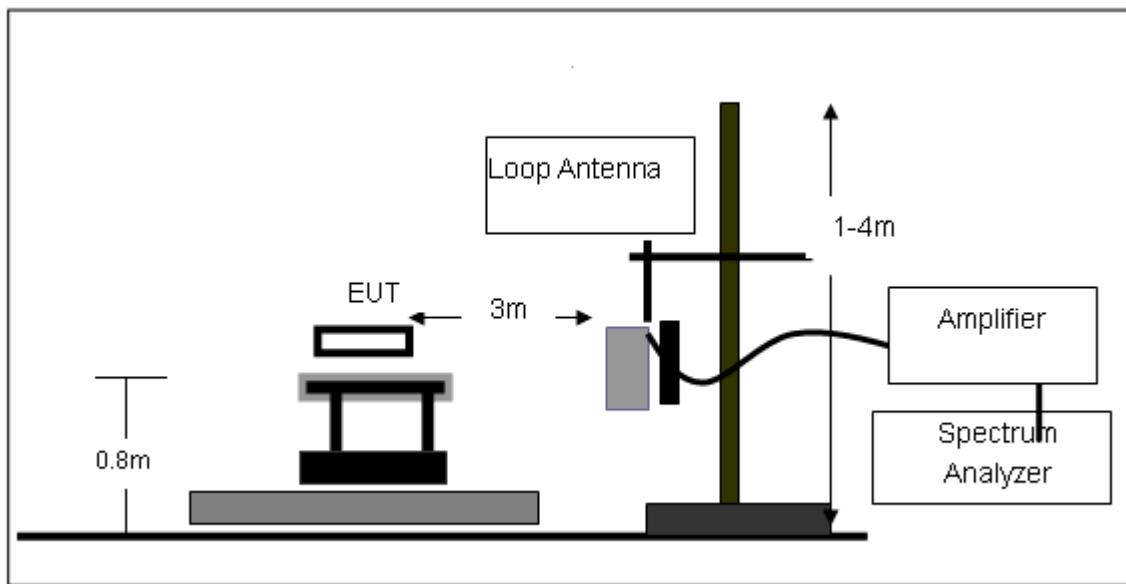
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

### 3.2.3 DEVIATION FROM TEST STANDARD

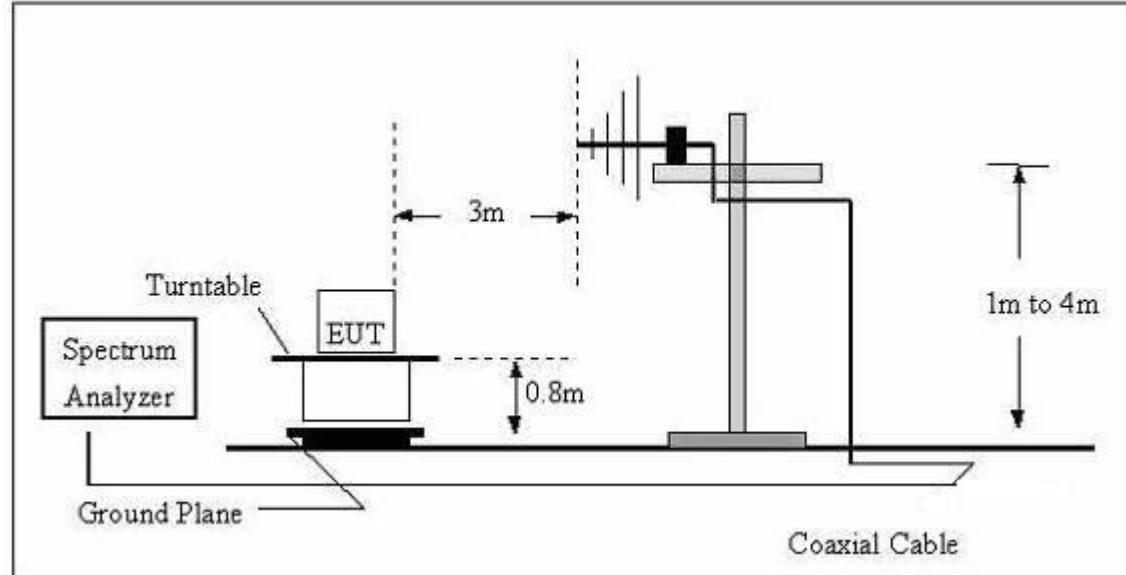
No deviation

### 3.2.4 TEST SETUP

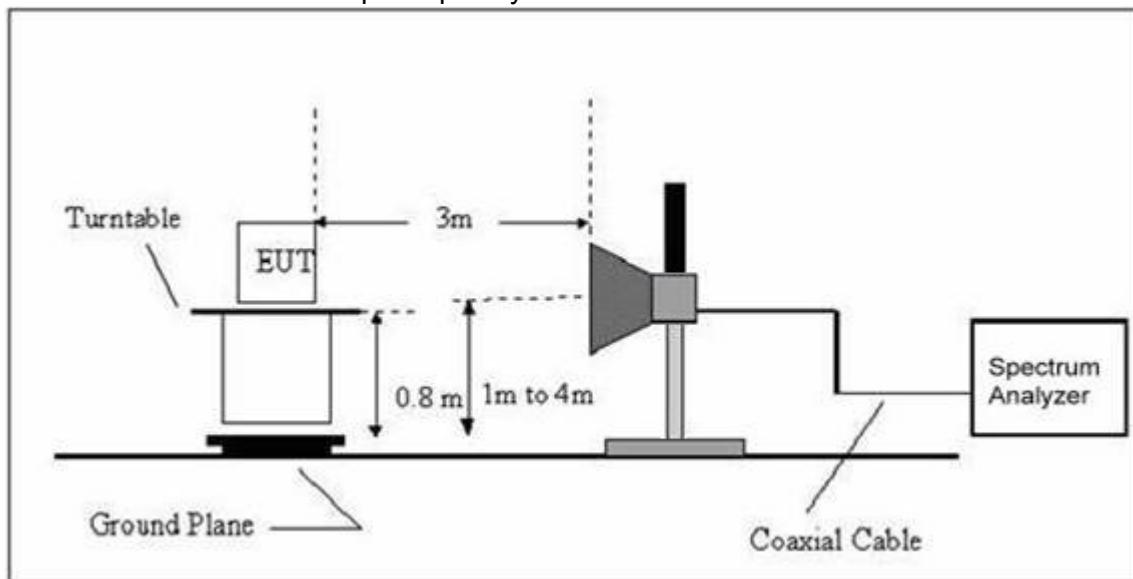
#### (A) Radiated Emission Test-Up Frequency Below 30MHz



#### (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:	Central Controller	Model Name. :	EN-C0012W
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX	Polarization :	--

Freq. (MHz)	Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	State
--	--	--	--	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 = $40 \log (\text{specific distance}/\text{test distance})$ (dB);  
Limit line = specific limits(dBuV) + distance extrapolation factor.

**3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)**

EUT :	Central Controller	Model Name :	EN-C0012W
Temperature :	20 °C	Relative Humidity :	48%
Pressure:	1010 hPa	Test Voltage :	AC 120V
Test Mode :	TX		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	73.3593	29.73	6.56	36.29	40.00	-3.71	QP
V	112.5241	28.24	11.79	40.03	43.50	-3.47	QP
V	167.8240	29.03	10.59	39.62	43.50	-3.88	QP
V	252.9482	27.98	13.94	41.92	46.00	-4.08	QP
V	336.0350	18.96	16.03	34.99	46.00	-11.01	QP
V	533.8318	17.52	21.58	39.10	46.00	-6.90	QP
H	76.7806	28.56	7.14	35.70	40.00	-4.30	QP
H	155.9097	27.35	11.38	38.73	43.50	-4.77	QP
H	215.2675	27.39	9.91	37.30	43.50	-6.20	QP
H	330.1949	21.14	15.85	36.99	46.00	-9.01	QP
H	416.1791	15.58	18.92	34.50	46.00	-11.50	QP
H	595.1326	14.92	22.60	37.52	46.00	-8.48	QP

**Remark:**

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

Factor added by measurement software automatically.

**3.2.8 TEST RESULTS (ABOVE 1000 MHZ)****802.11b**

Normal Voltage

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
<b>Mid Channel (2412 MHz)</b>							
Horizontal	4824.143	34.35	10.44	44.79	54.00	-9.21	AVG
Horizontal	4824.156	54.85	10.44	65.29	74.00	-8.71	peak
Vertical	7236.126	45.21	12.39	57.60	74.00	-16.40	peak
Vertical	7236.135	30.12	12.39	42.51	54.00	-11.49	AVG
Vertical	4824.128	36.23	10.44	46.67	54.00	-7.33	AVG
Vertical	4824.213	53.68	10.44	64.12	74.00	-9.88	peak
<b>Mid Channel (2437 MHz)</b>							
Horizontal	4874.158	33.12	10.40	43.52	54.00	-10.48	AVG
Horizontal	4874.258	50.23	10.40	60.63	74.00	-13.37	peak
Vertical	7311.125	25.13	12.75	37.88	54.00	-16.12	AVG
Vertical	7311.235	42.02	12.75	54.77	74.00	-19.23	peak
Vertical	4874.144	52.12	10.40	62.52	74.00	-11.48	peak
Vertical	4874.156	32.65	10.40	43.05	54.00	-10.95	AVG
<b>High Channel (2462 MHz)</b>							
Horizontal	4924.123	53.21	10.39	63.60	74.00	-10.40	peak
Horizontal	4924.220	34.03	10.39	44.42	54.00	-9.58	AVG
Vertical	7386.121	29.12	12.68	41.80	54.00	-12.20	AVG
Vertical	7386.145	42.03	12.68	54.71	74.00	-19.29	peak
Vertical	4924.135	34.26	10.39	44.65	54.00	-9.35	AVG
Vertical	4924.147	53.26	10.39	63.65	74.00	-10.35	peak

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

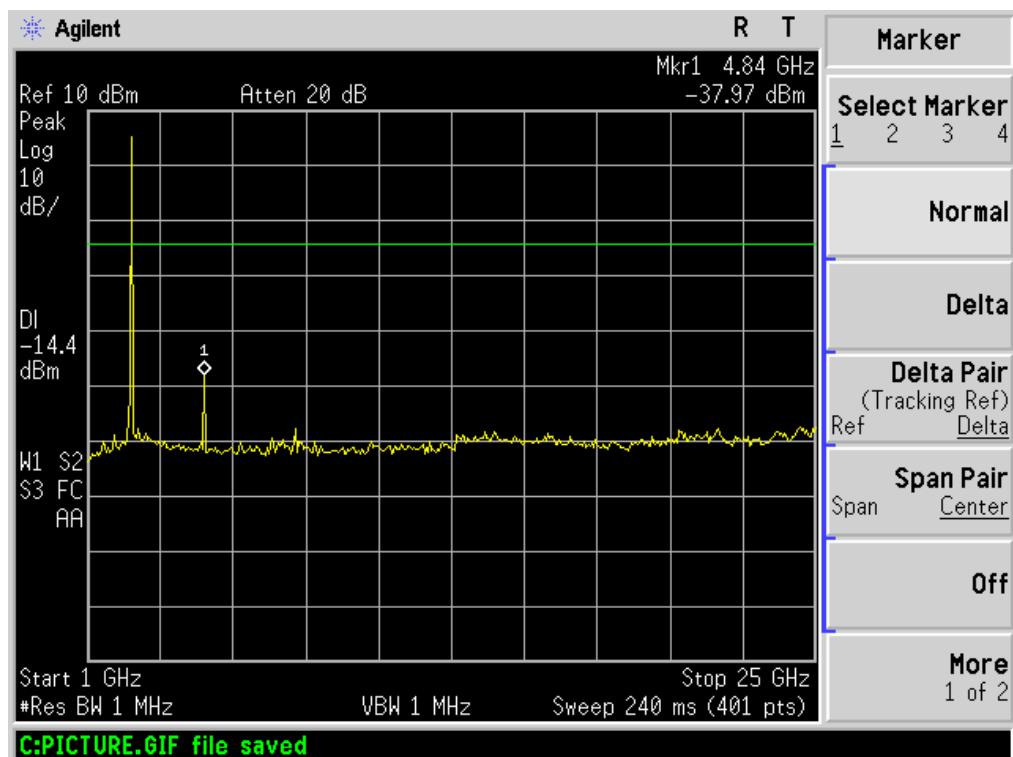
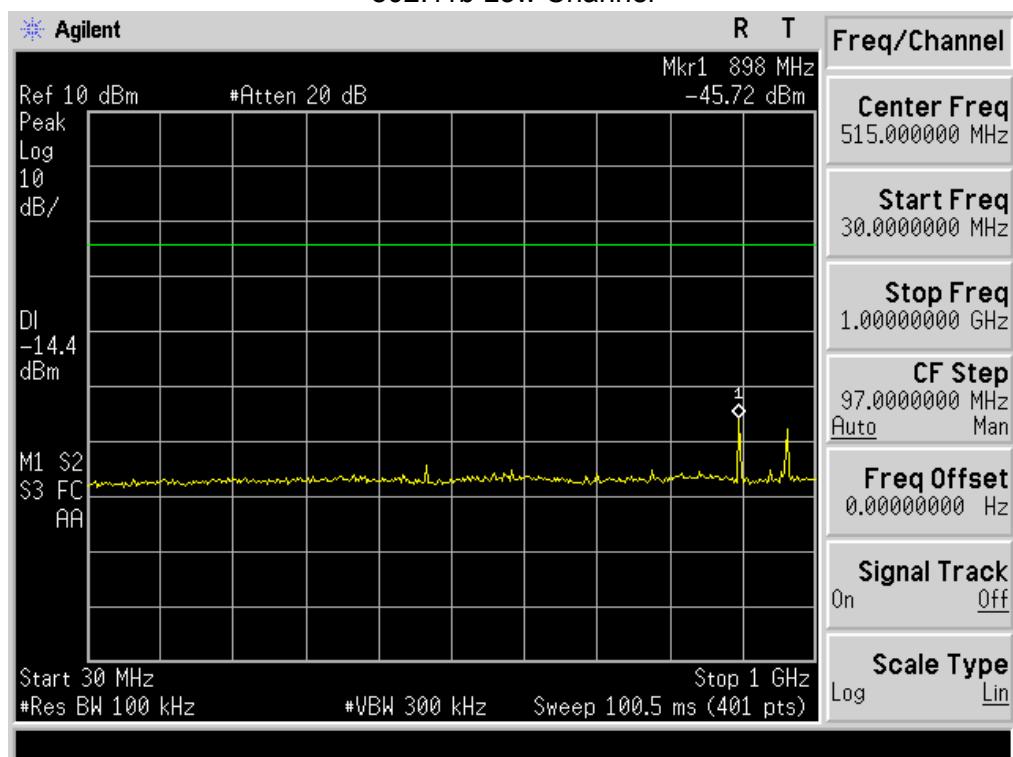
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Factor added by measurement software automatically.

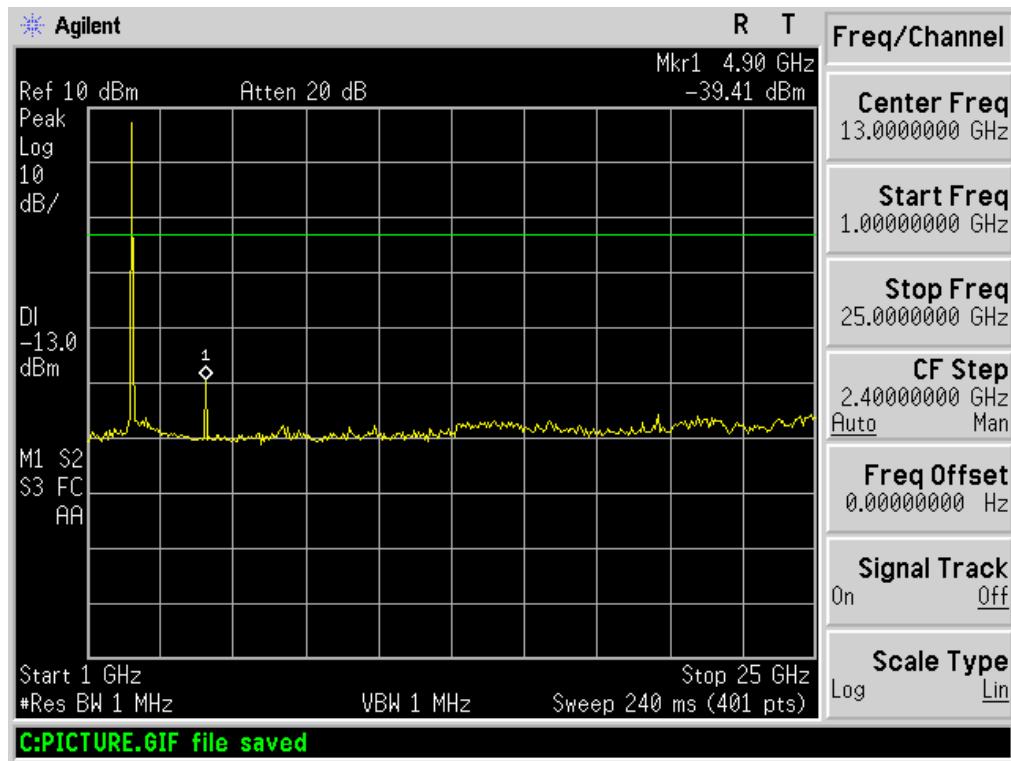
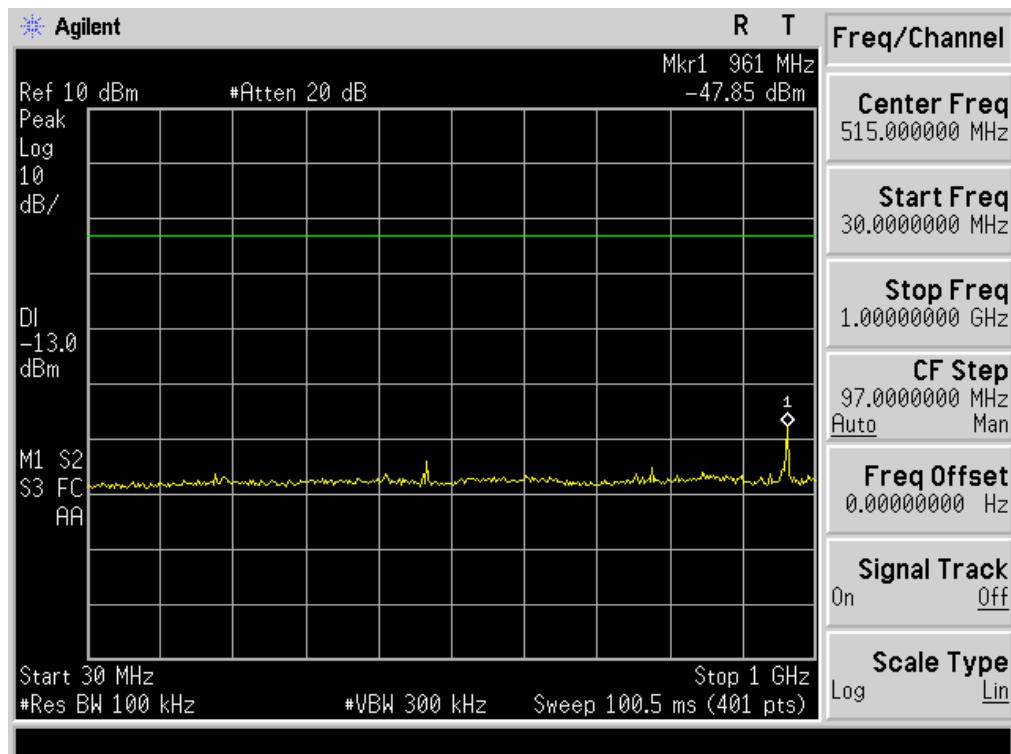
**3.2.9 BAND EDGE EMISSION(RADIATED MEASUREMENT):**

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type	Comment
802.11b							
2400	82.19	-12.99	69.2	74	-4.8	peak	Vertical
2400	84.39	-12.99	71.4	74	-2.6	peak	Horizontal
2400	59.82	-12.99	46.83	54	-7.17	AVG	Vertical
2400	59.62	-12.99	46.63	54	-7.37	AVG	Horizontal
2483.5	59.20	-12.78	46.42	74	-27.58	peak	Vertical
2483.5	52.74	-12.78	39.96	74	-34.04	peak	Horizontal
802.11g							
2400	79.32	-12.99	66.33	74	-7.67	peak	Horizontal
2400	57.27	-12.99	44.28	54	-9.72	AVG	Horizontal
2400	83.59	-12.99	70.6	74	-3.4	peak	Vertical
2400	60.37	-12.99	47.38	54	-6.62	AVG	Vertical
2483.5	60.51	-12.78	47.73	74	-26.27	peak	Vertical
2483.5	61.19	-12.78	48.41	74	-25.59	peak	Horizontal
802.11n							
2400	84.29	-12.99	71.3	74	-2.7	peak	Horizontal
2400	60.84	-12.99	47.85	54	-6.15	AVG	Horizontal
2400	83.79	-12.99	70.8	74	-3.2	peak	Vertical
2400	60.33	-12.99	47.34	54	-6.66	AVG	Vertical
2483.5	58.21	-12.78	45.46	74	-28.54	peak	Vertical
2483.5	55.51	-12.78	42.73	74	-31.27	peak	Horizontal

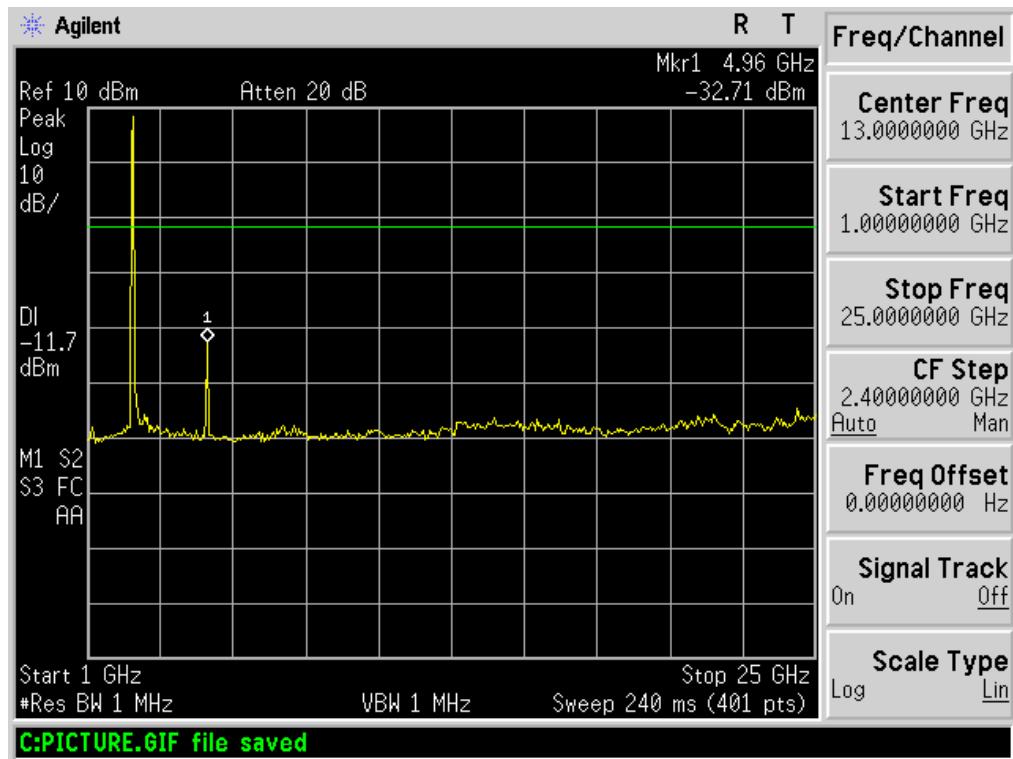
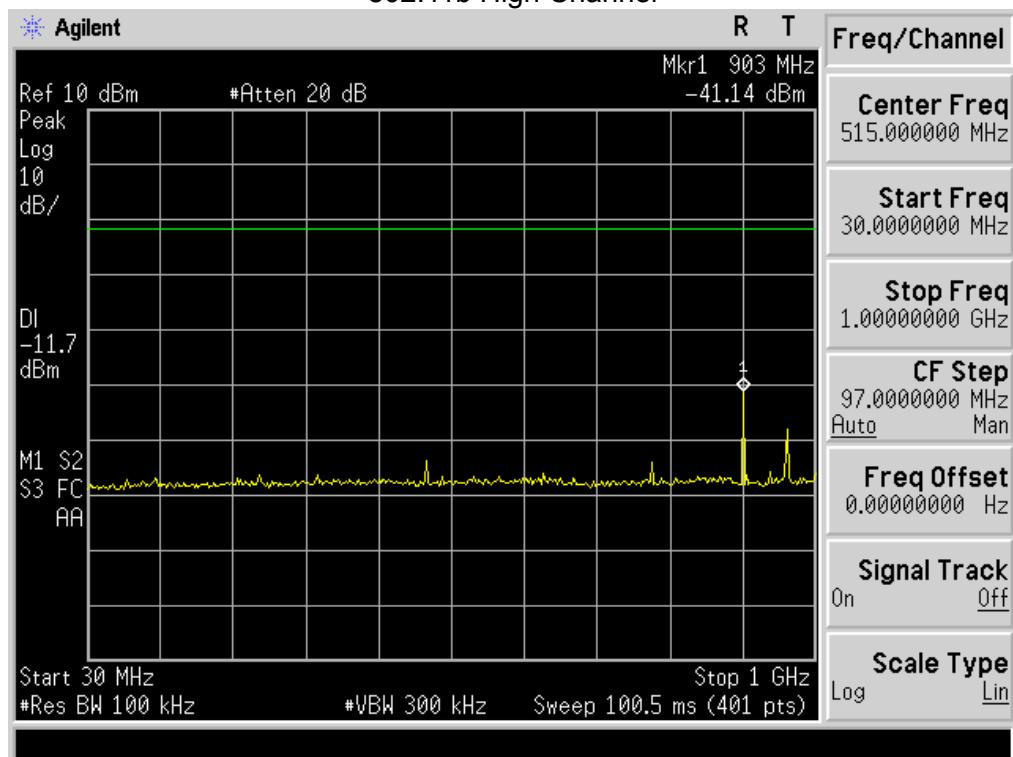
Note: Factor = Antenna Factor + Cable Loss – Pre-amplifier.  
Factor added by measurement software automatically.  
Emission Level is less(PK) than AV Limits, No need AV lever

Conducted Spurious Emissions at Antenna Port:  
802.11b Low Channel

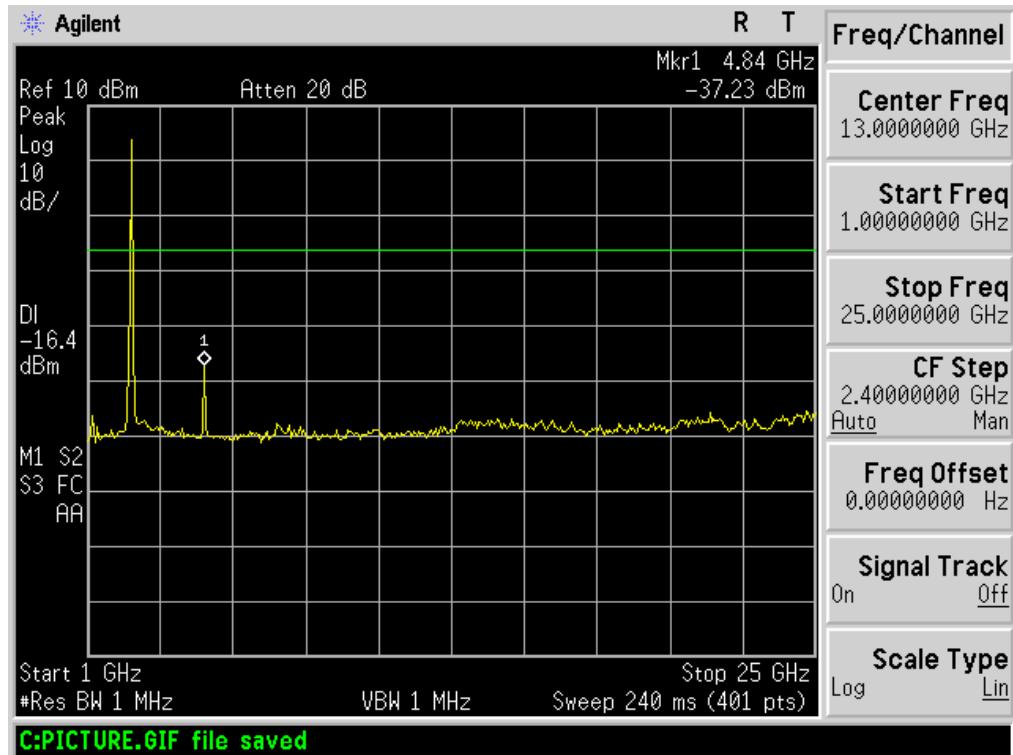
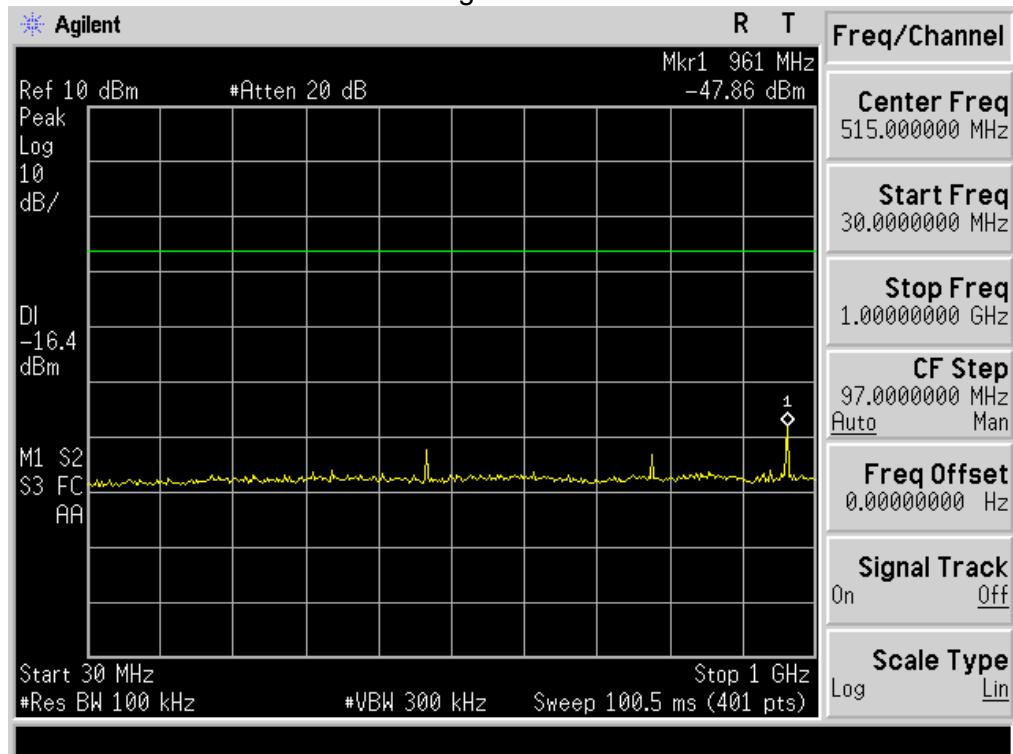
## 802.11b Middle Channel



## 802.11b High Channel

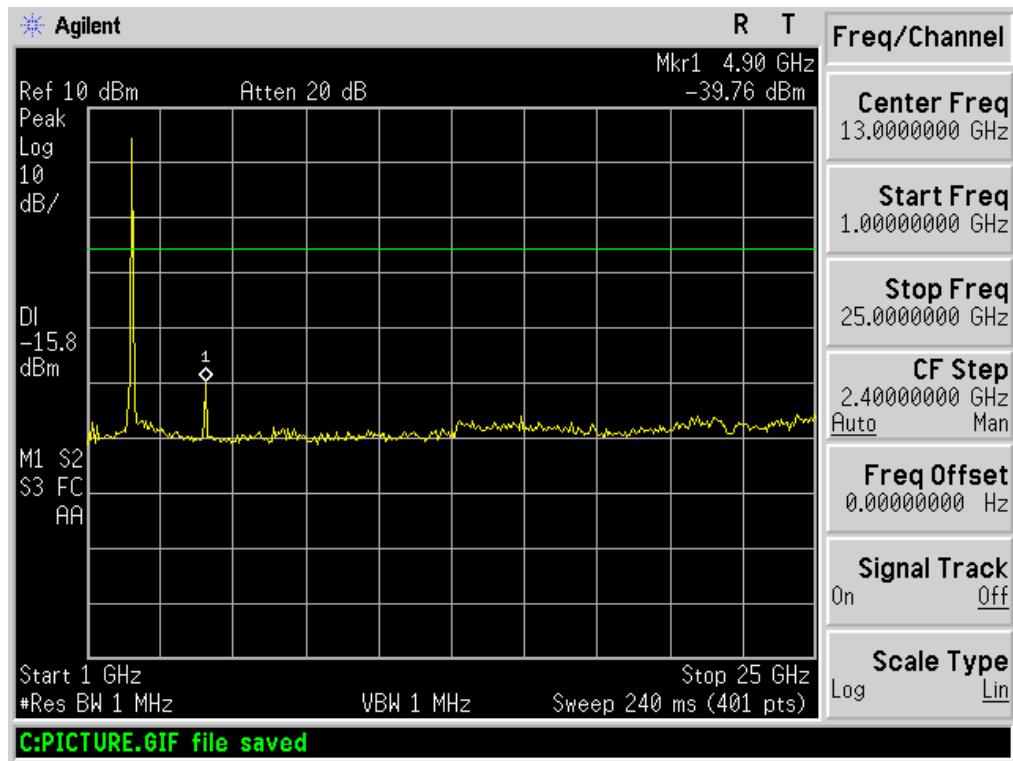
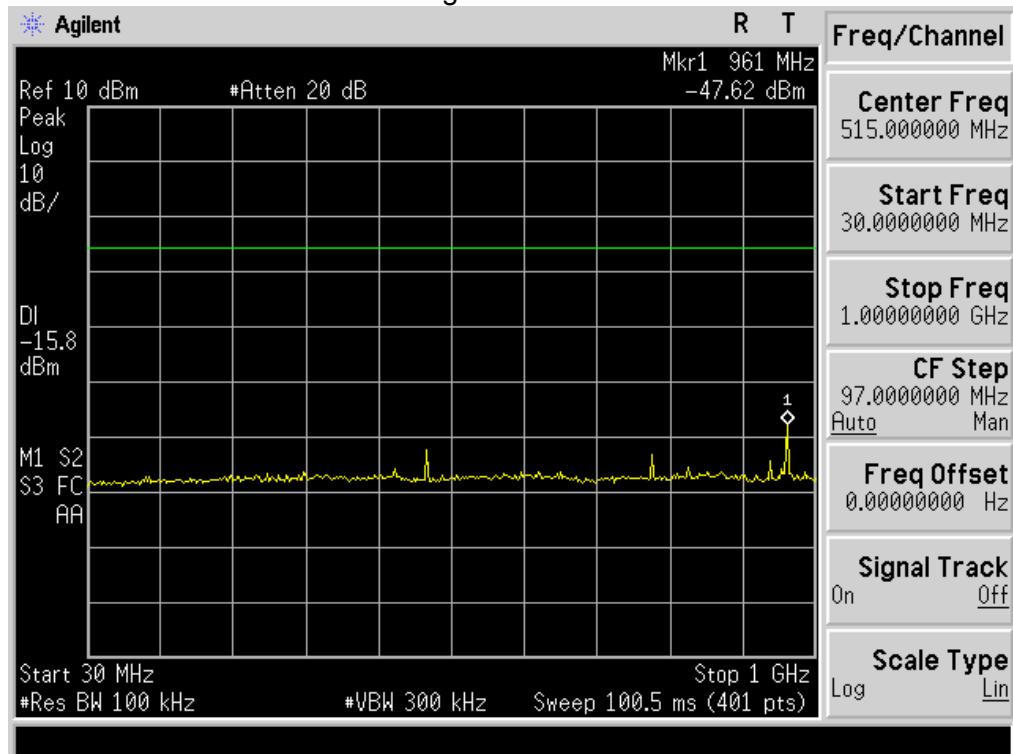


## 802.11g Low Channel

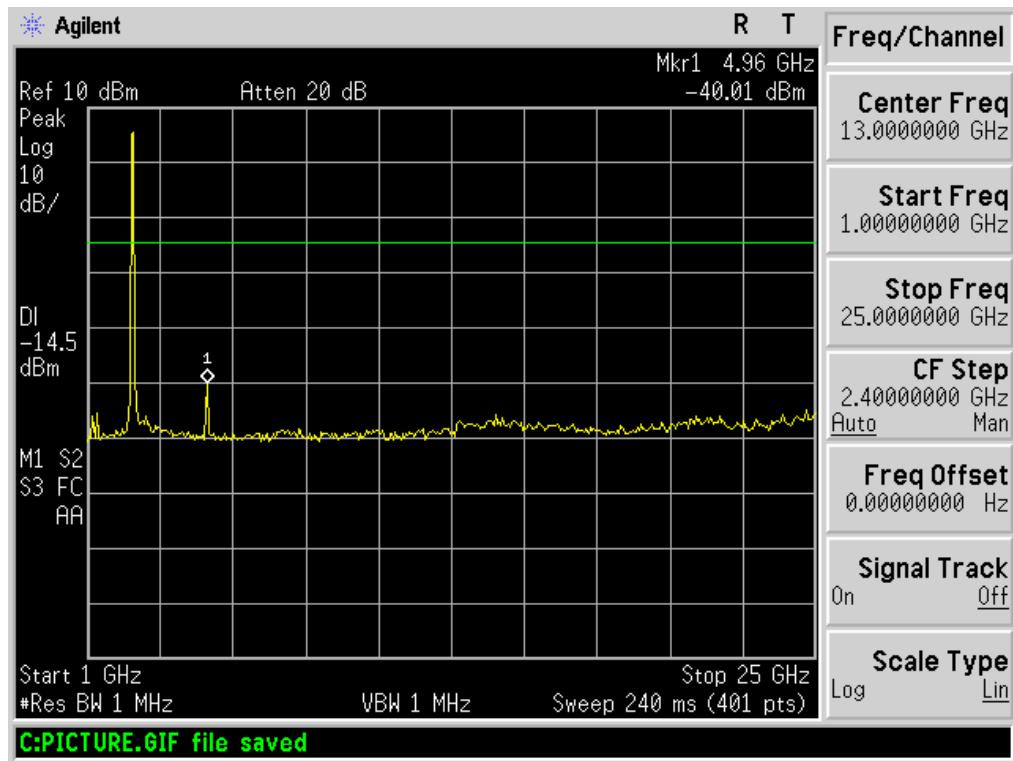
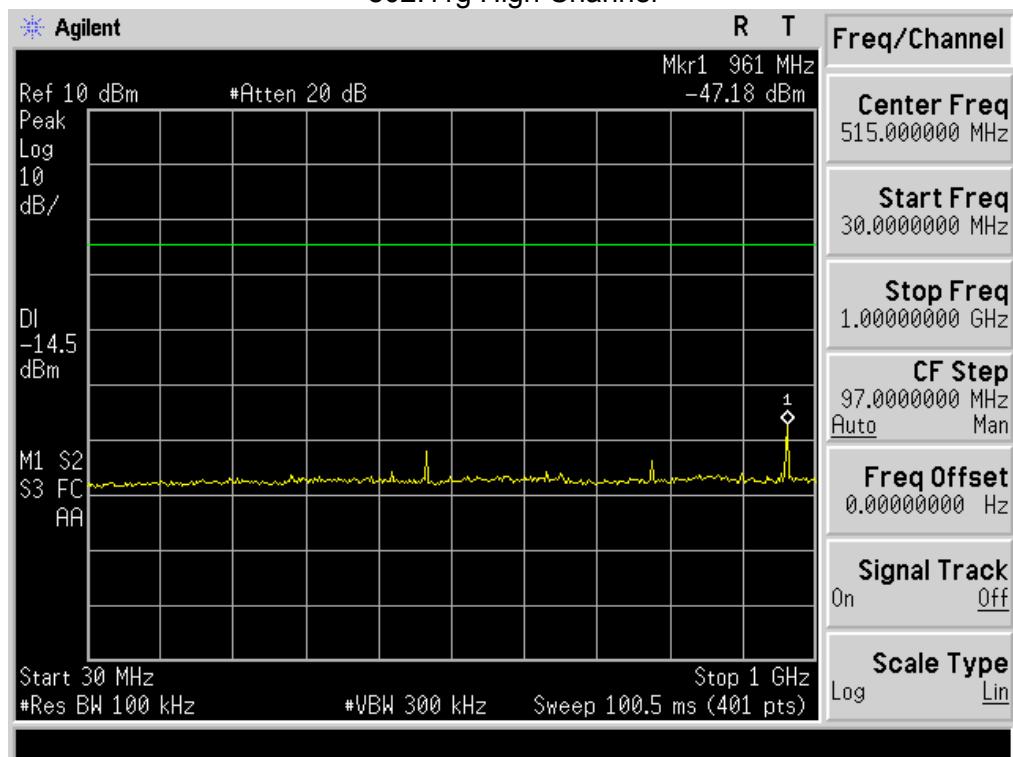


C:PICTURE.GIF file saved

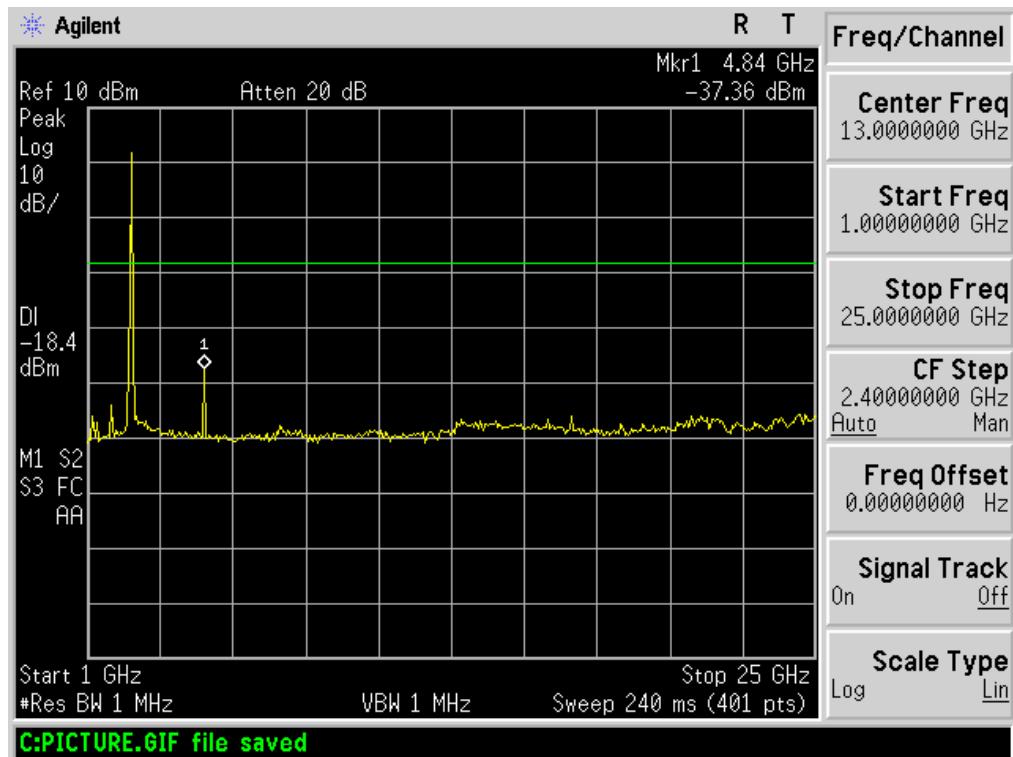
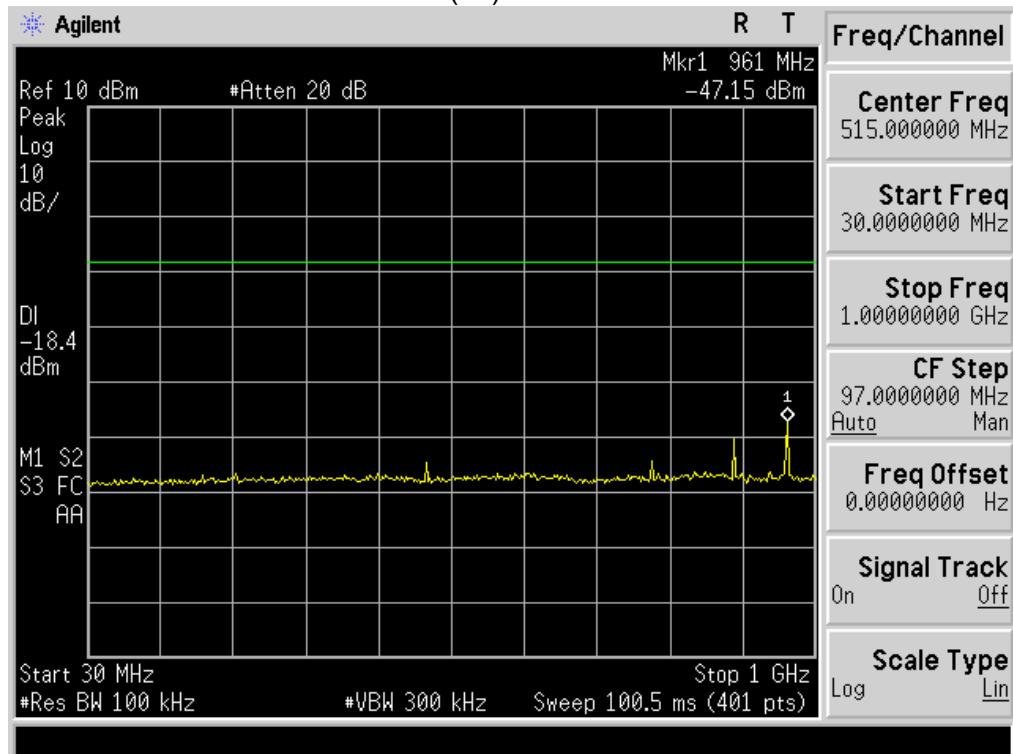
## 802.11g Middle Channel



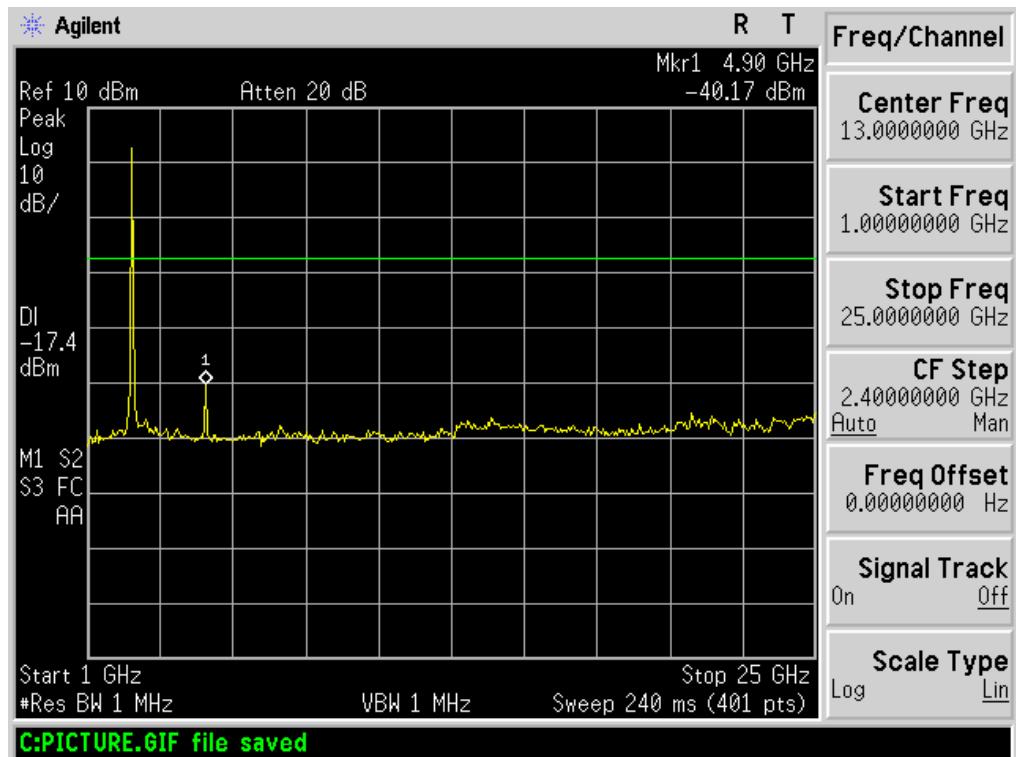
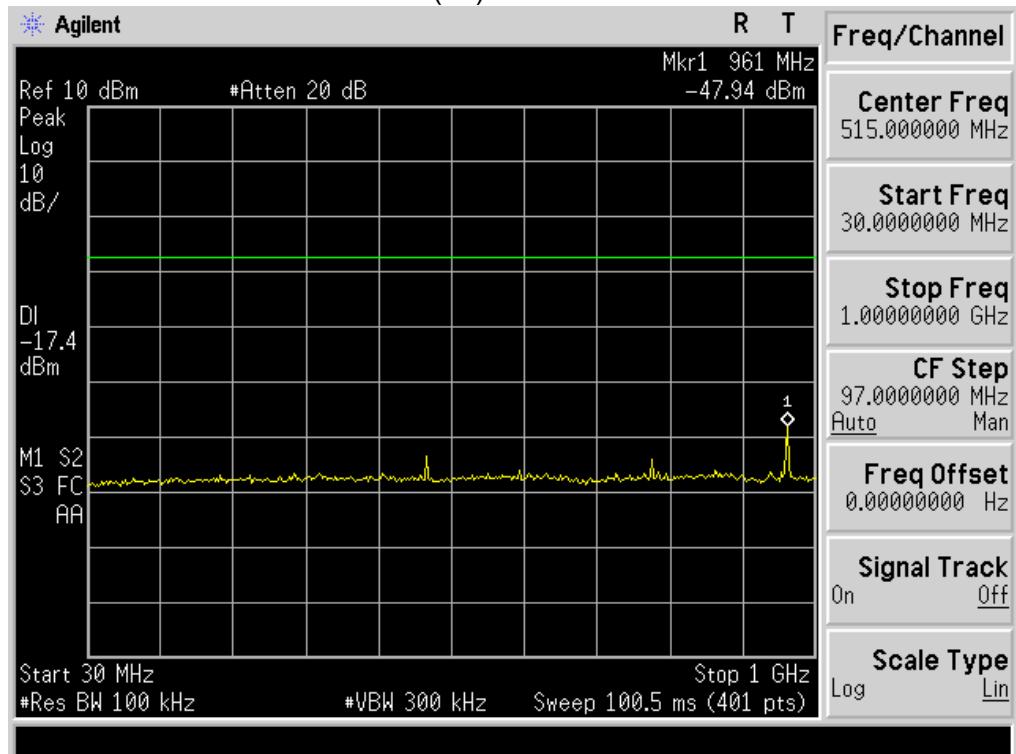
## 802.11g High Channel



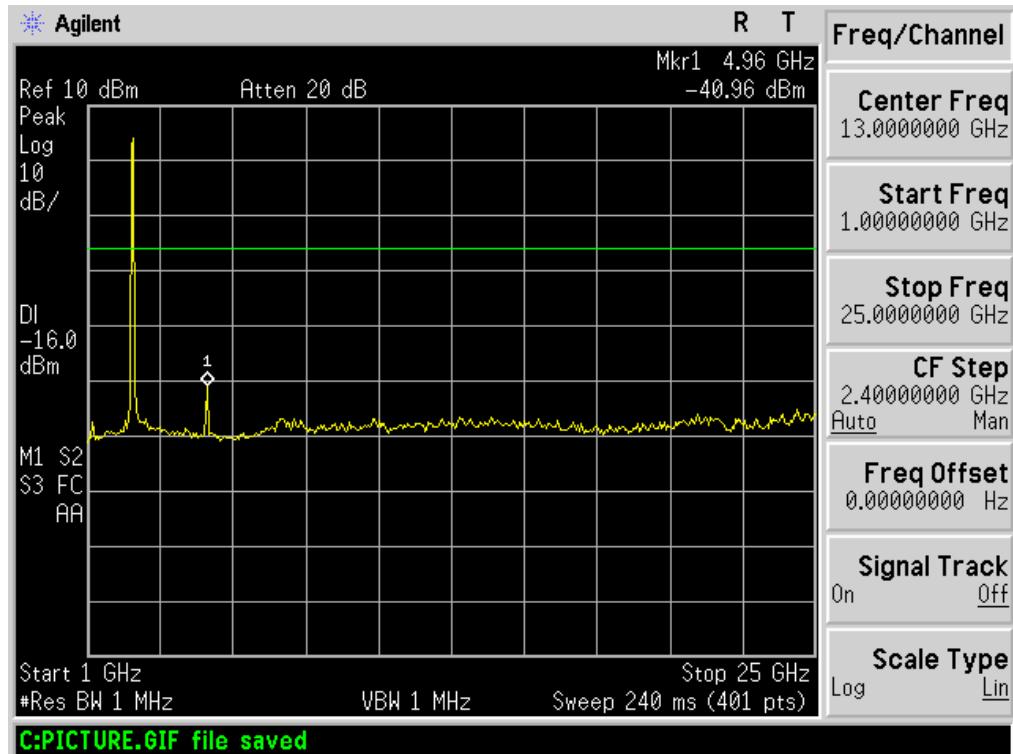
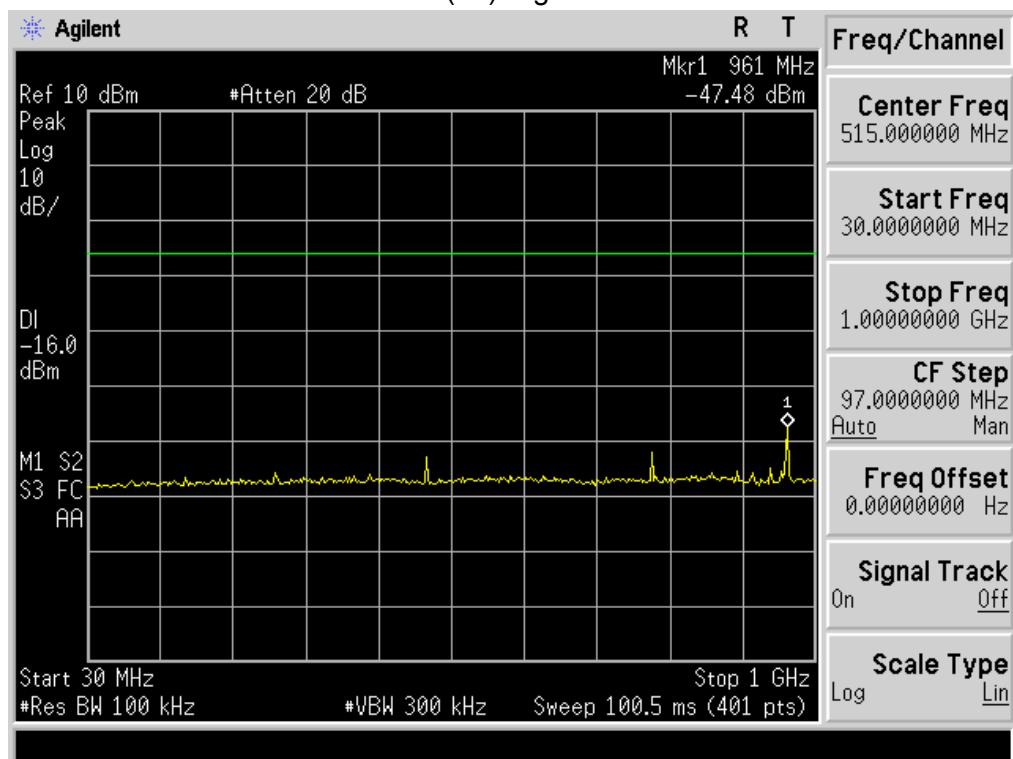
## 802.11n(20) Low Channel



## 802.11n(20) Middle Channel



## 802.11n(20) High Channel



## 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  $\geq$  3 kHz.
4. Set the VBW  $\geq$  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



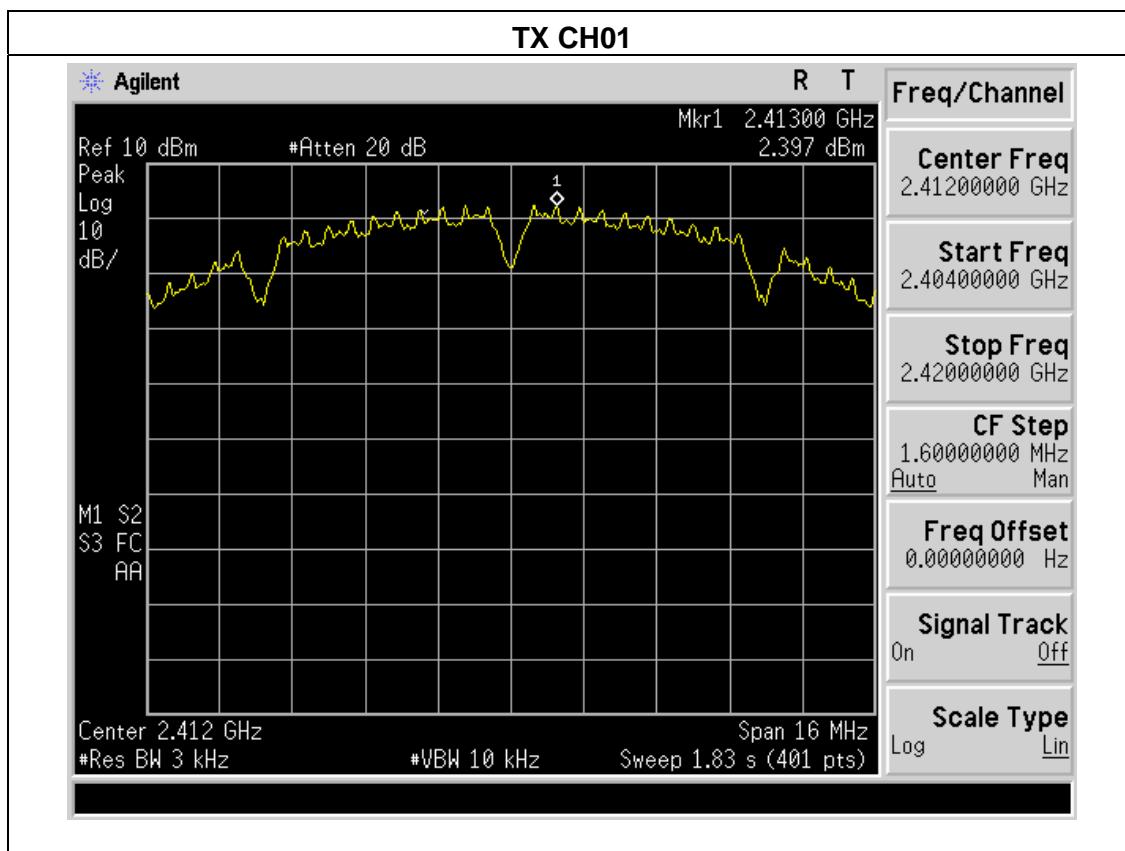
#### 4.1.4 EUT OPERATION CONDITIONS

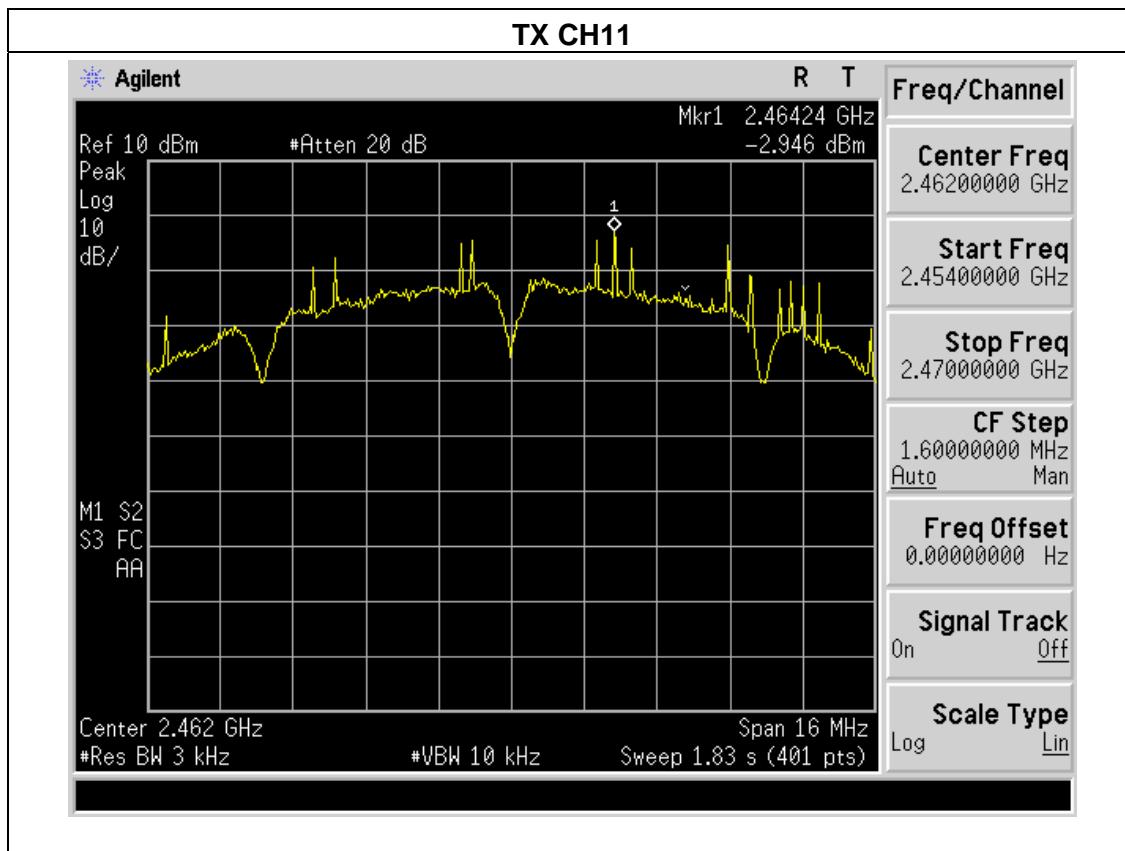
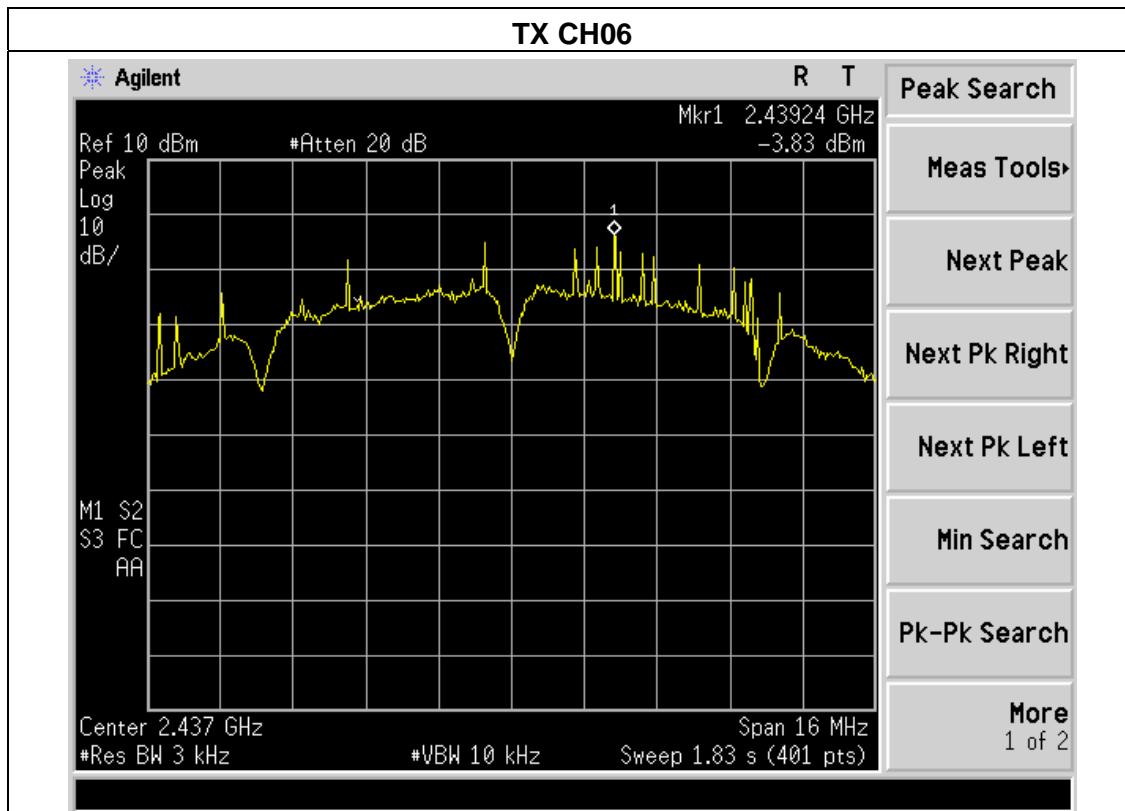
The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

#### 4.1.5 TEST RESULTS

EUT :	Central Controller	Model Name :	EN-C0012W
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	AC 120V
Test Mode :	TX b Mode /CH01, CH06, CH11		

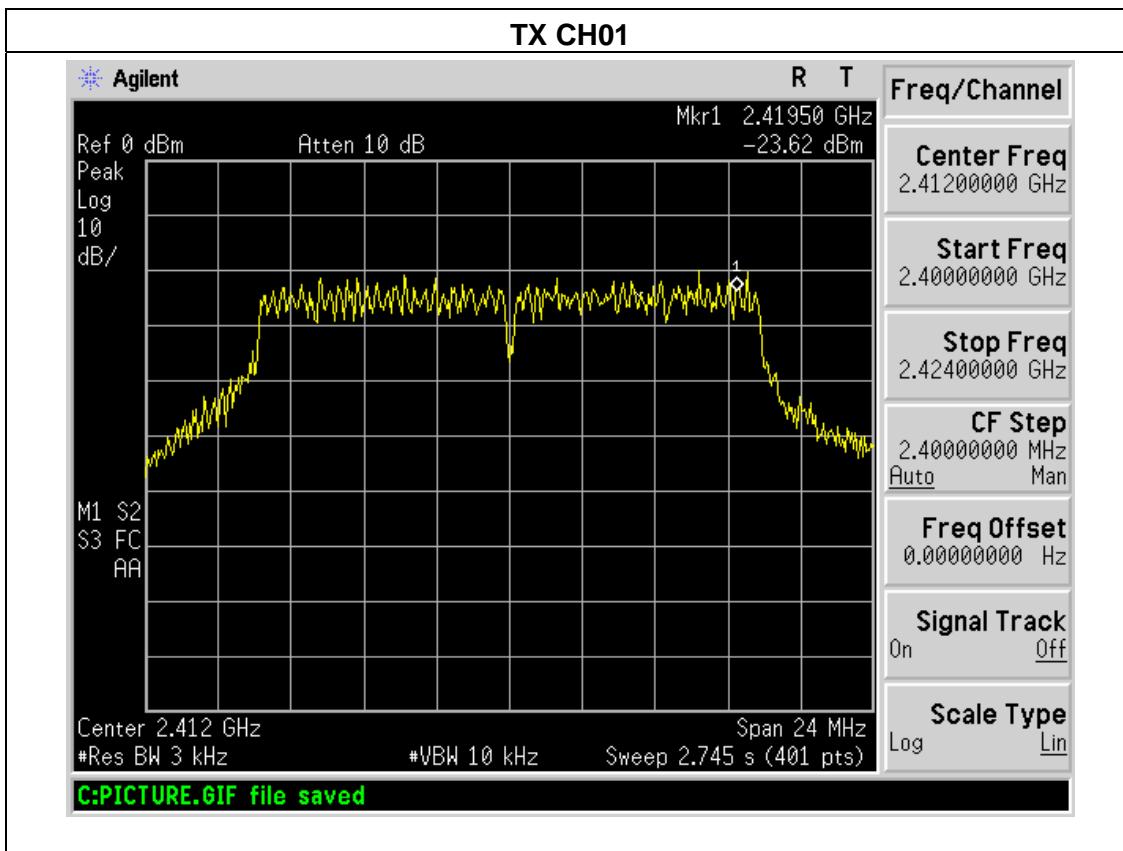
Frequency	Power Density (dBm)	Limit (dBm)	Result
2412 MHz	2.397	8	PASS
2437 MHz	-3.83	8	PASS
2462 MHz	-2.94	8	PASS

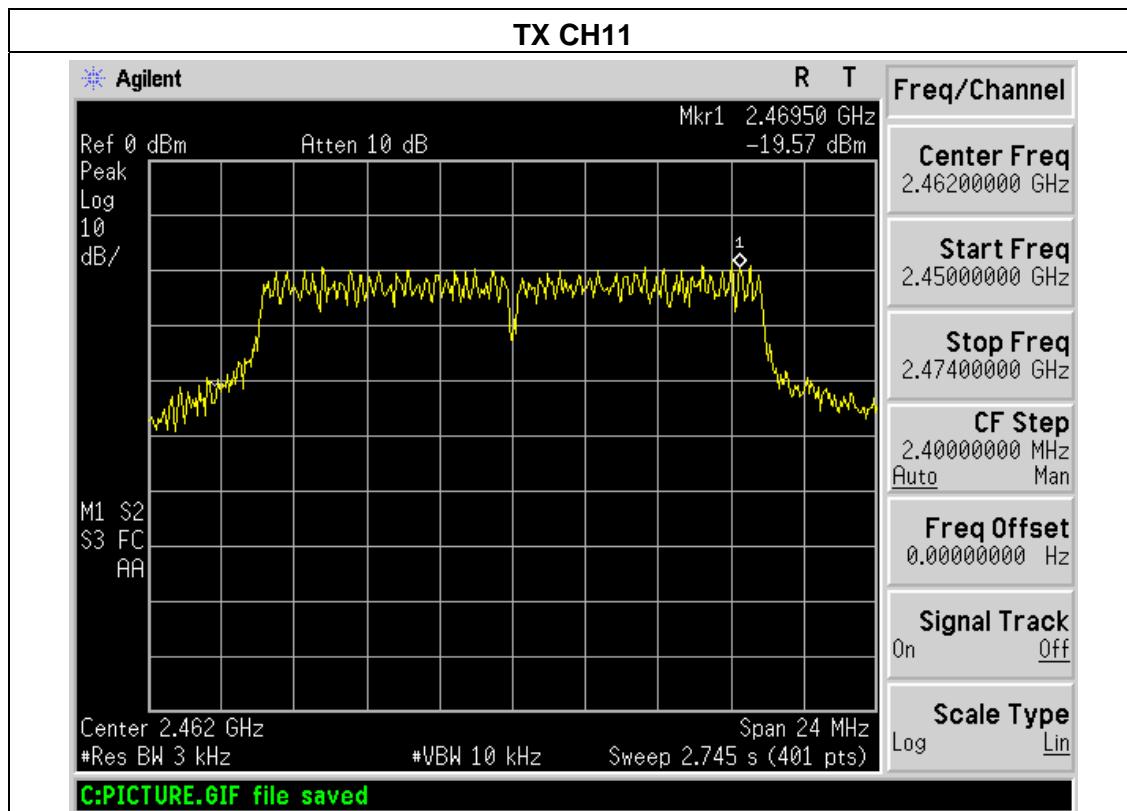
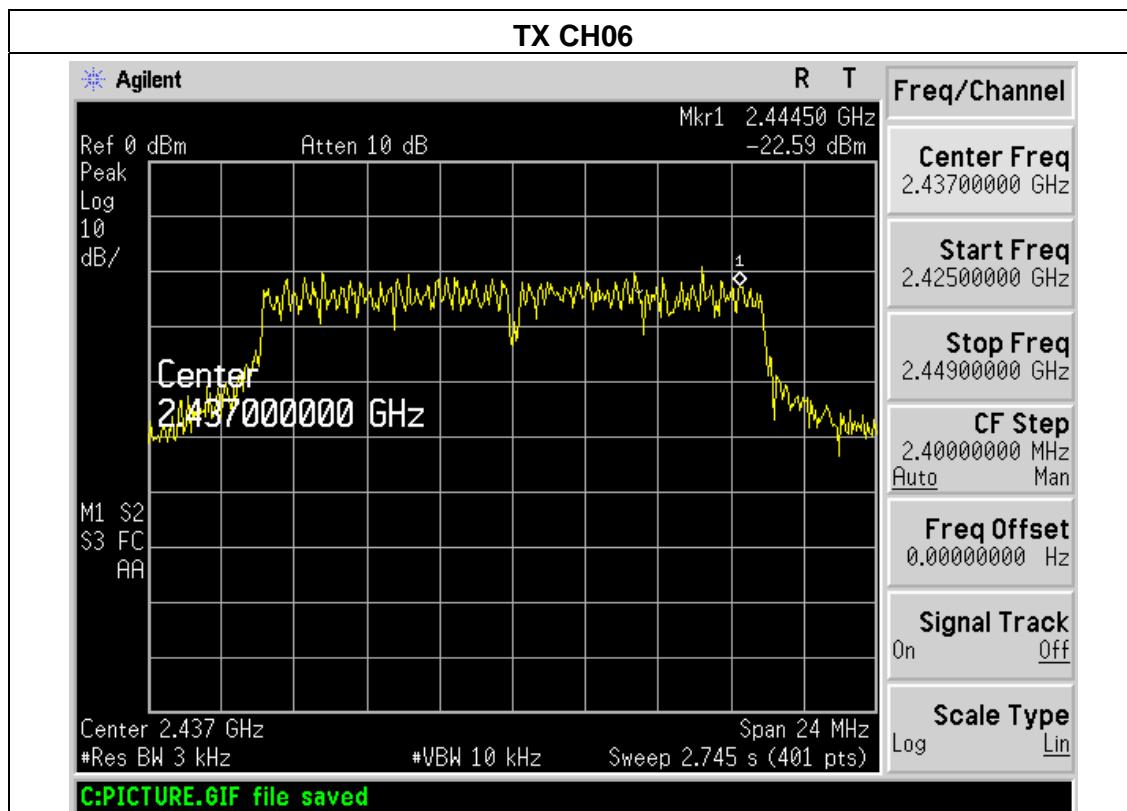




EUT :	Central Controller	Model Name :	EN-C0012W
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	AC 120V
Test Mode :	TX g Mode /CH01, CH06, CH11		

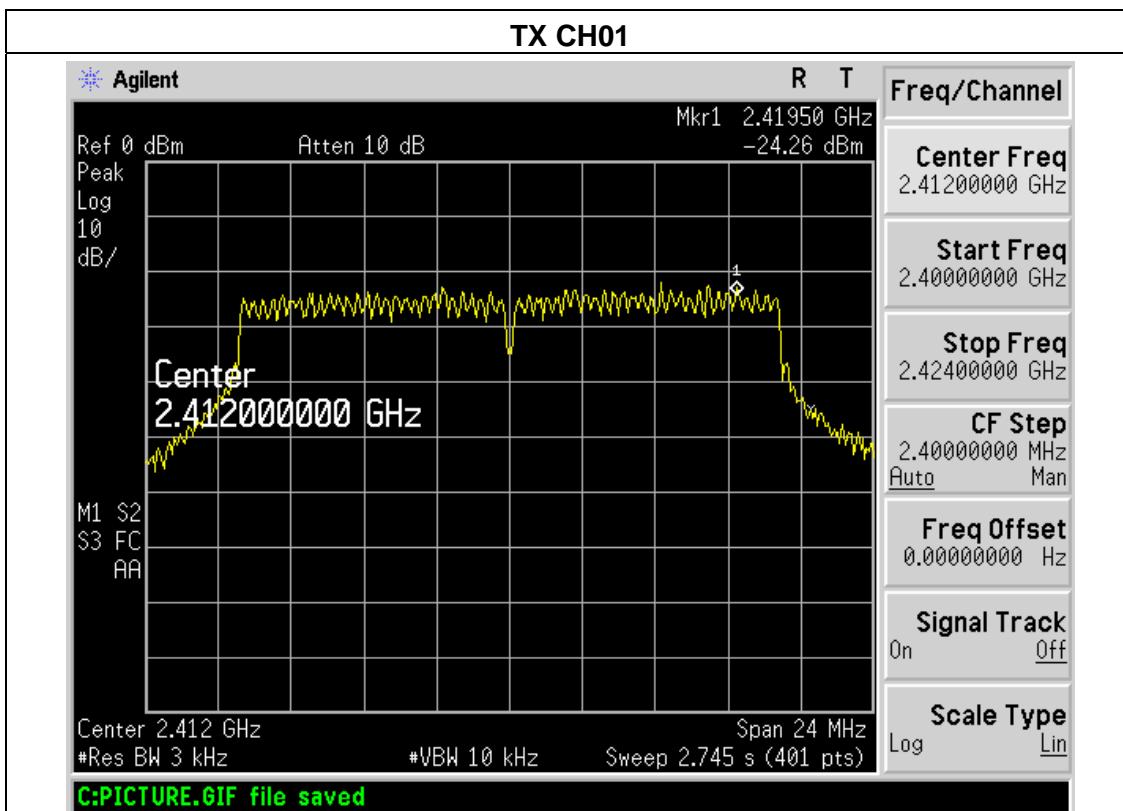
Frequency	Power Density (dBm)	Limit (dBm)	Result
2412 MHz	-23.62	8	PASS
2437 MHz	-22.59	8	PASS
2462 MHz	-19.57	8	PASS

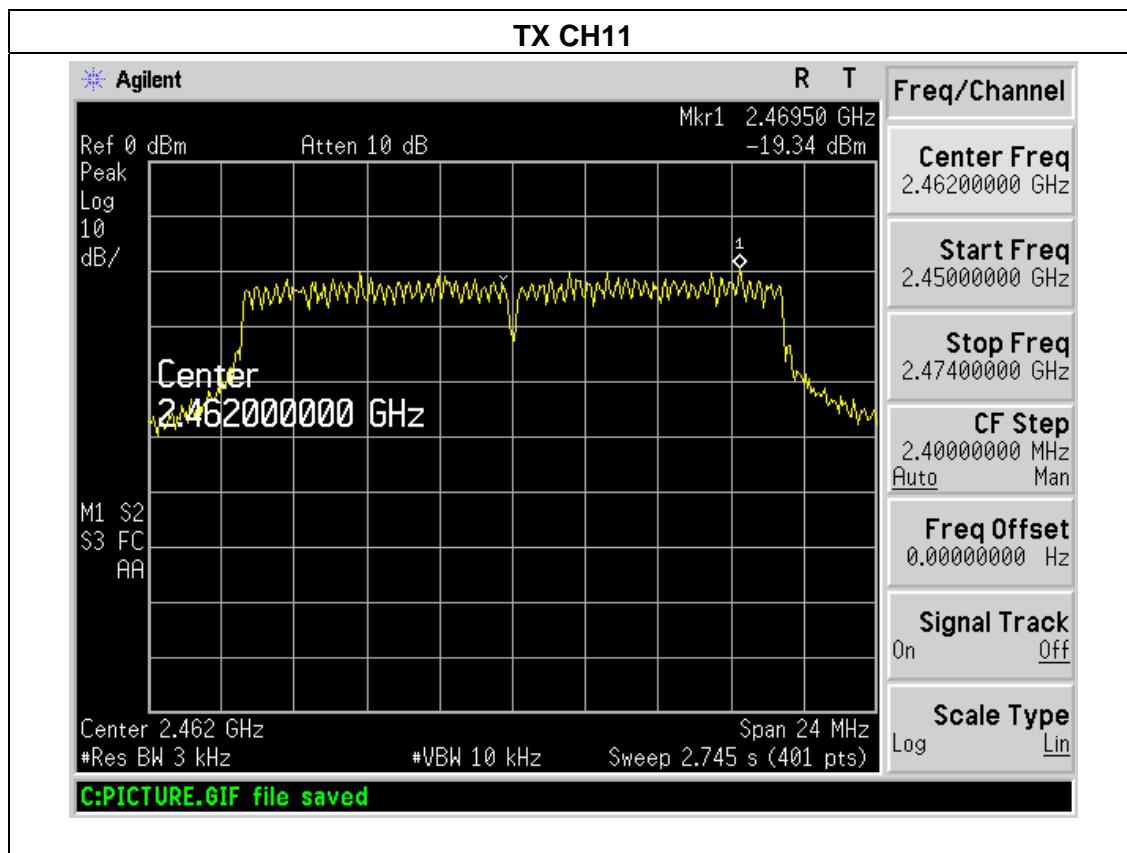
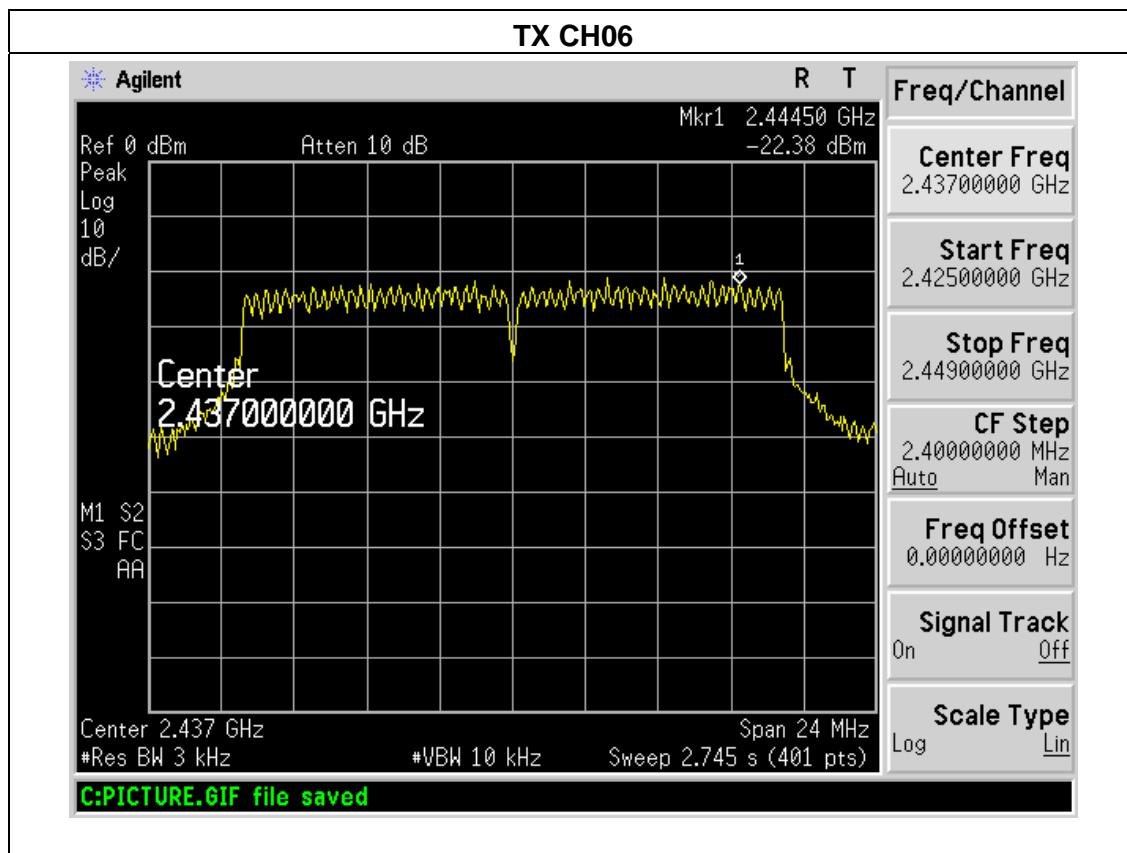




EUT :	Central Controller	Model Name :	EN-C0012W
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	AC 120V
Test Mode :	TX n(20) Mode /CH01, CH06, CH11		

Frequency	Power Density (dBm)	Limit (dBm)	Result
2412 MHz	-24.26	8	PASS
2437 MHz	-22.38	8	PASS
2462 MHz	-19.34	8	PASS





## 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

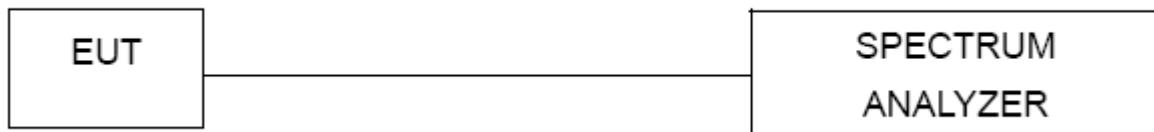
#### 5.1.1 TEST PROCEDURE

1. Set RBW= 100 kHz.
2. Set the video bandwidth (VBW)  $\geq 3 \times$  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



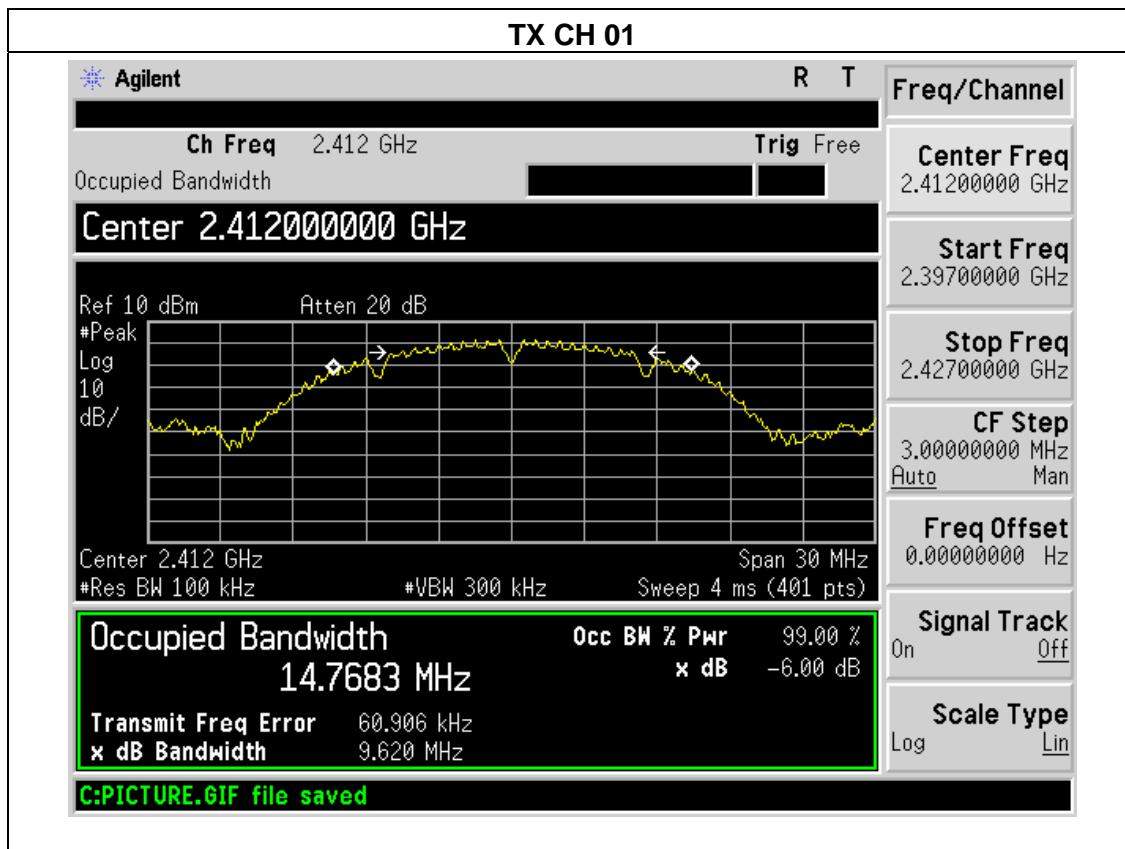
#### 5.1.4 EUT OPERATION CONDITIONS

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.

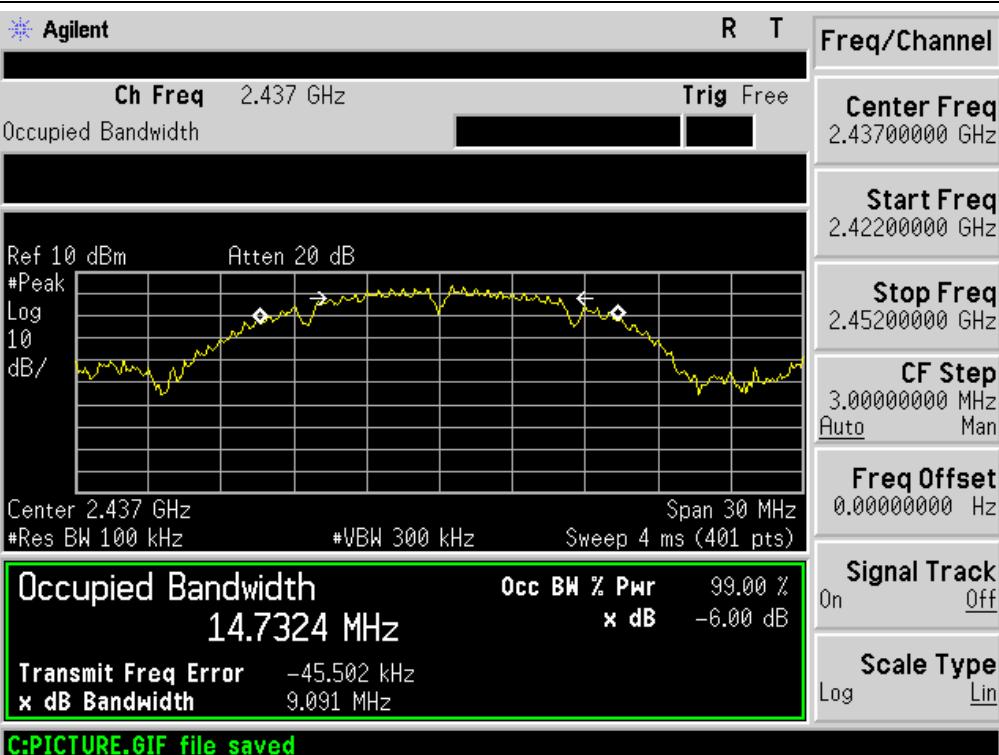
### 5.1.5 TEST RESULTS

EUT :	Central Controller	Model Name :	EN-C0012W
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	AC 120V
Test Mode :	TX b Mode /CH01, CH06, CH11		

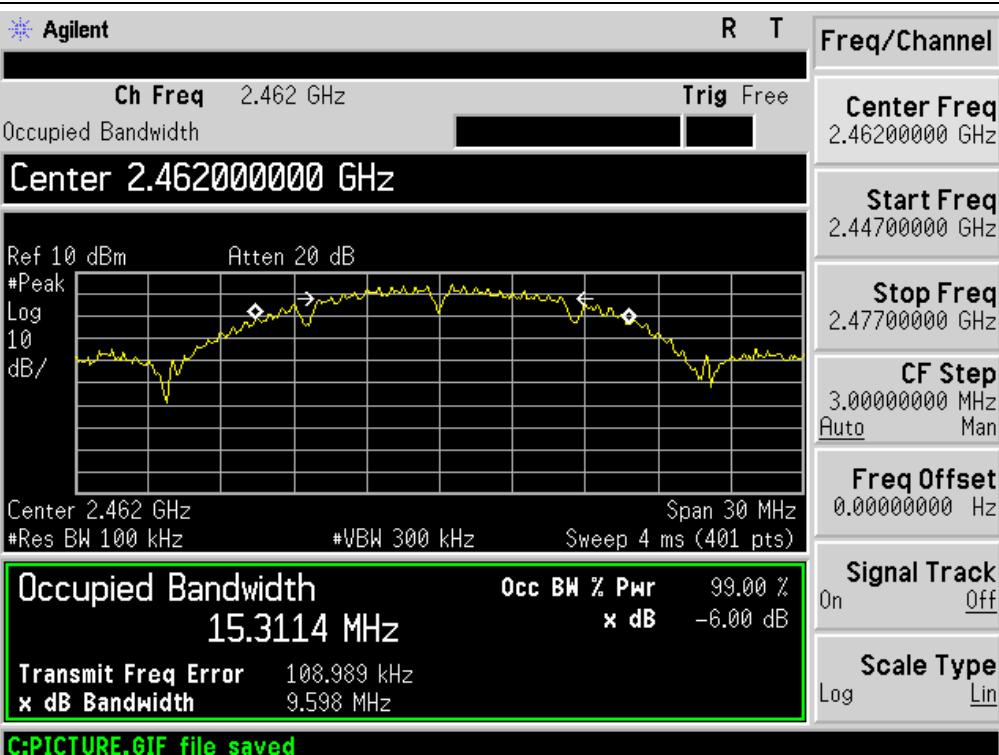
Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	9.62	500	Pass
Middle	2437	9.09	500	Pass
High	2462	9.59	500	Pass



## TX CH 06

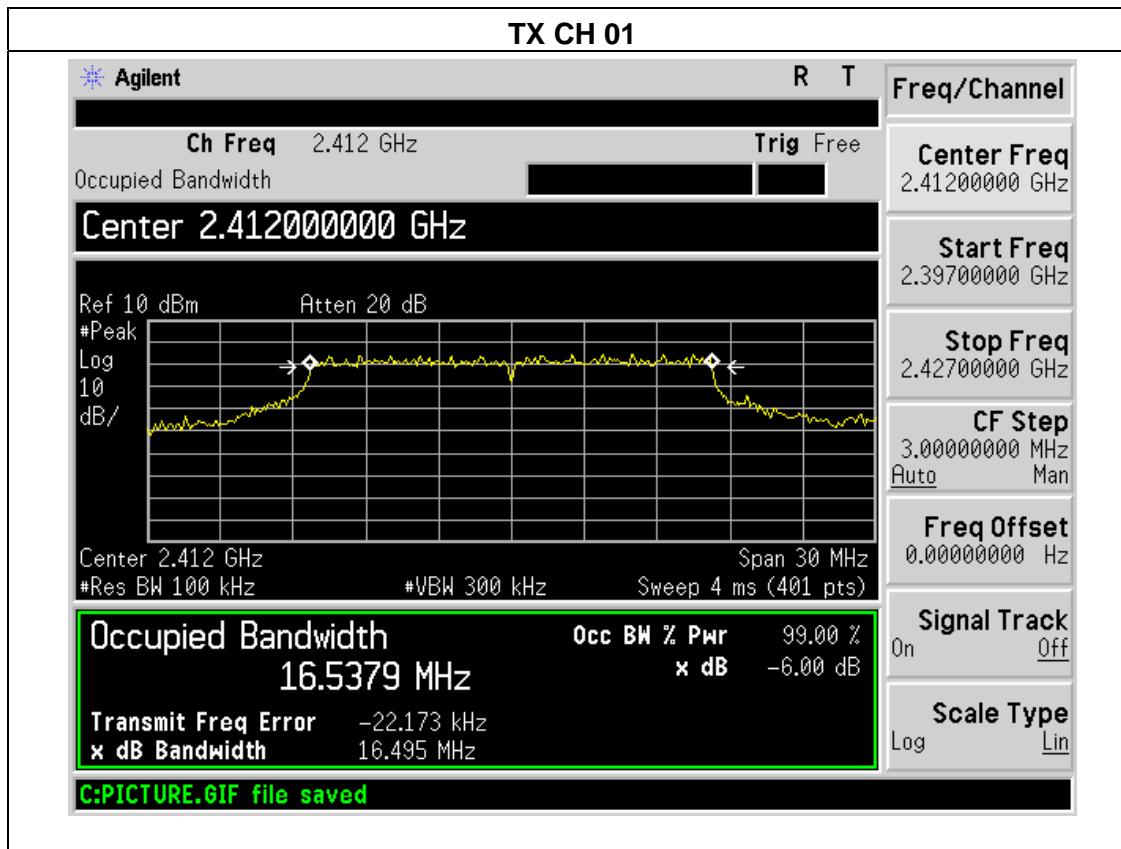


## TX CH 11

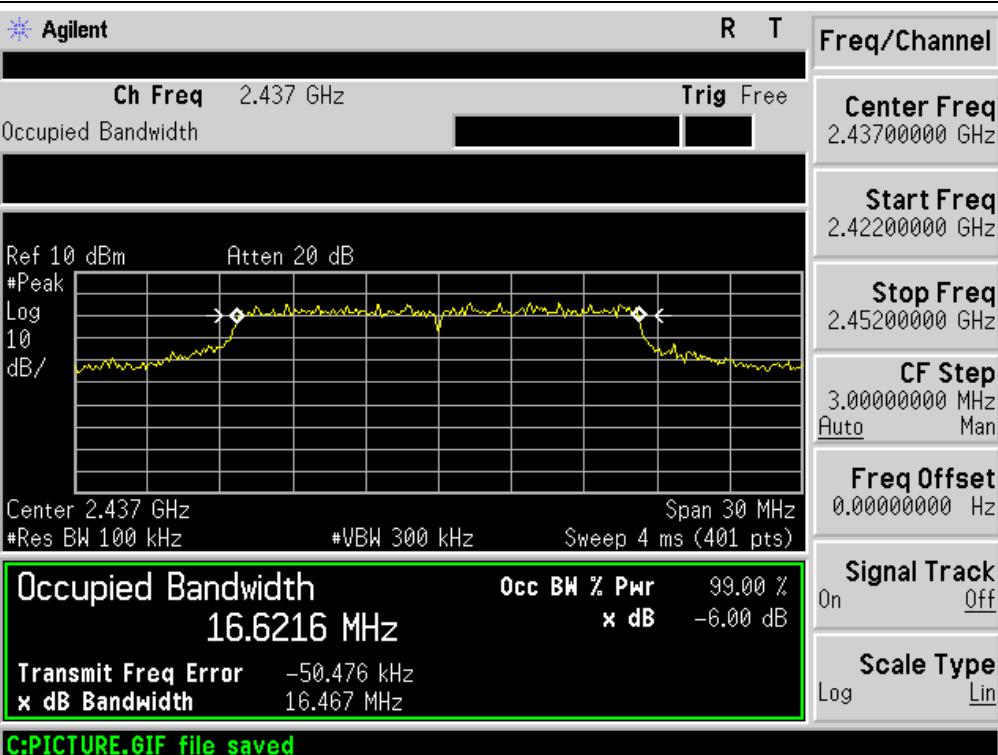


EUT :	Central Controller	Model Name :	EN-C0012W
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	AC 120V
Test Mode :	TX g Mode /CH01, CH06, CH11		

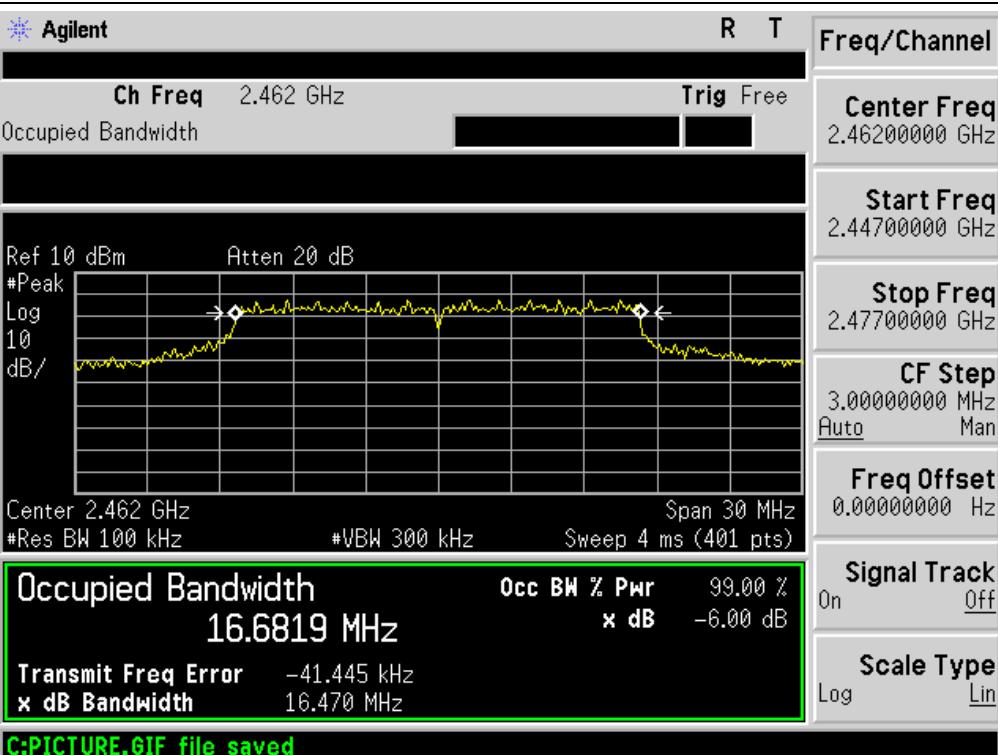
Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.49	500	Pass
Middle	2437	16.46	500	Pass
High	2462	16.47	500	Pass



## TX CH 06

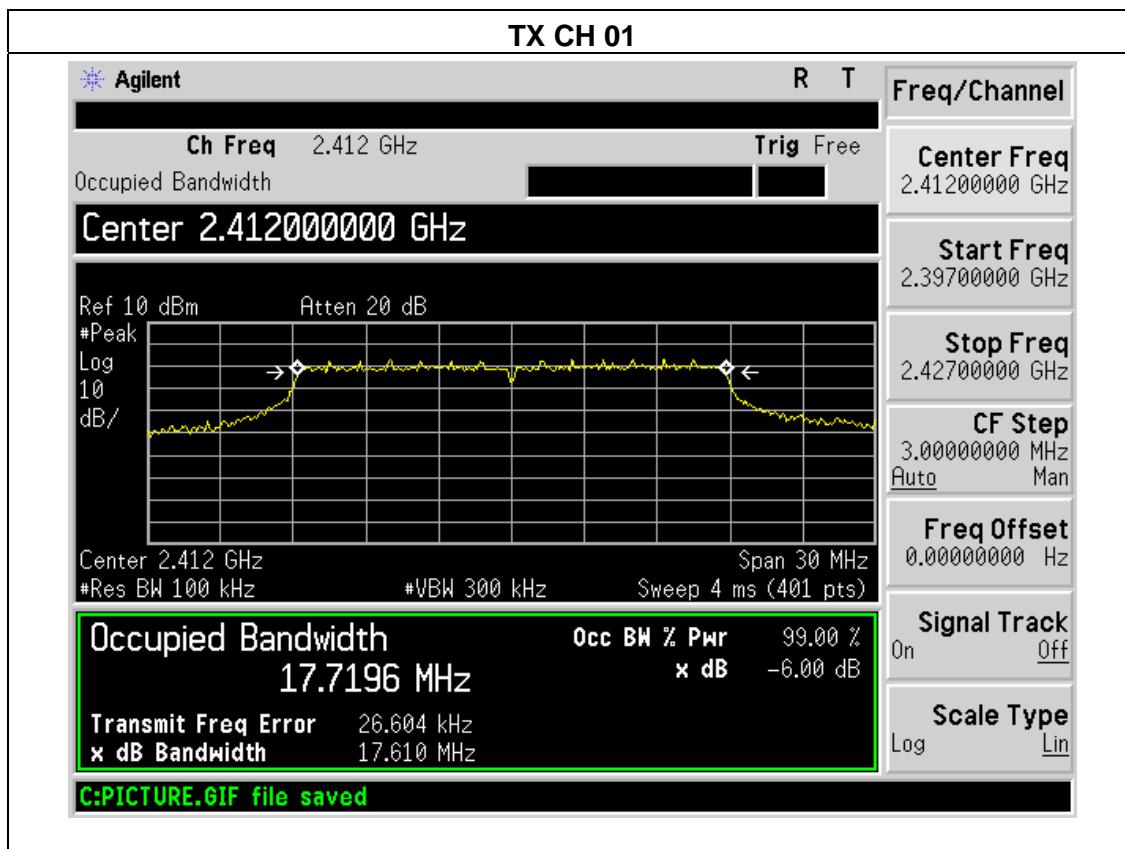


## TX CH 11

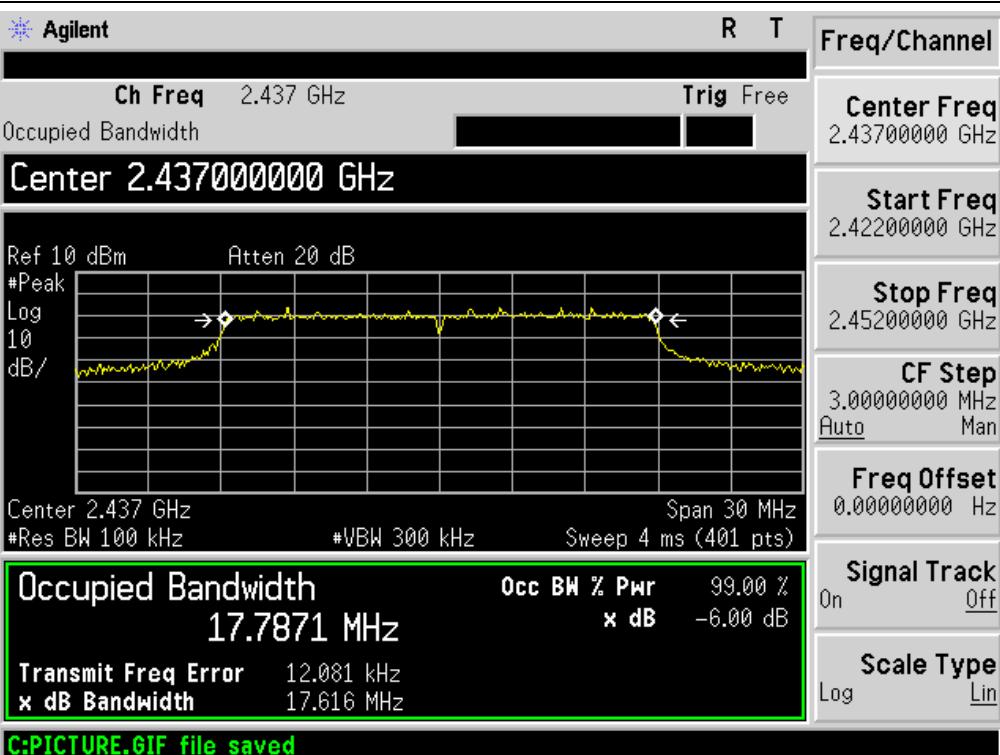


EUT :	Central Controller	Model Name :	EN-C0012W
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	AC 120V
Test Mode :	TX n(20) Mode /CH01, CH06, CH11		

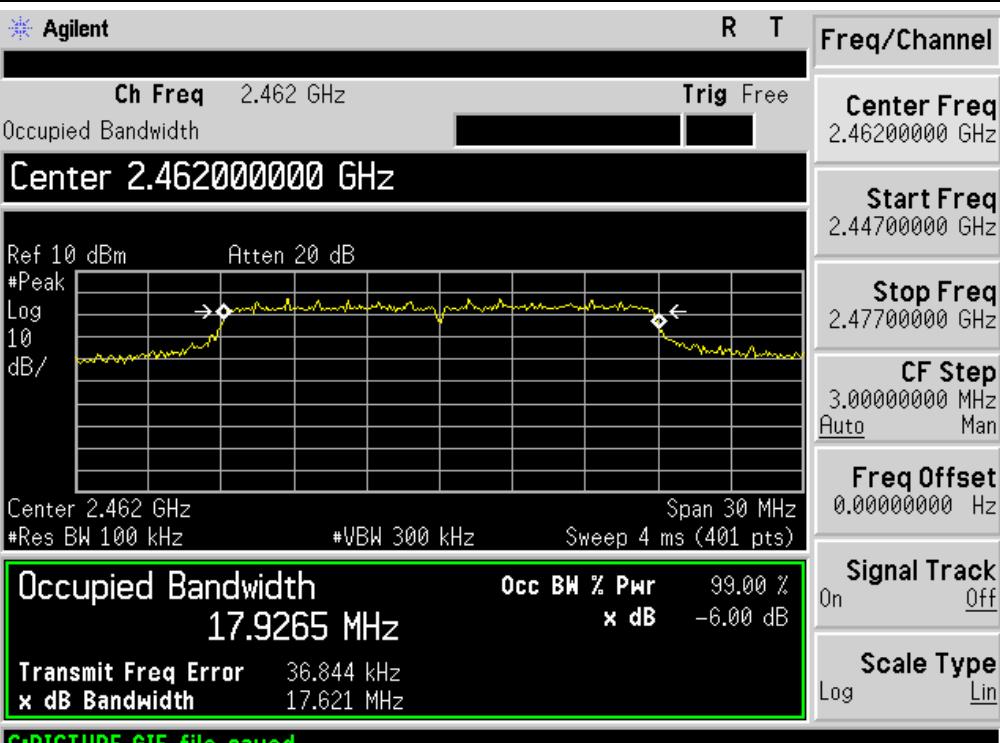
Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	17.61	500	Pass
Middle	2437	17.61	500	Pass
High	2462	17.62	500	Pass



## 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

- 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 :	Central Controller	Model Name :	EN-C0012W
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	AC 120V
Test Mode :	TX b/g/n Mode /CH01, CH06, CH11		

<b>TX 802.11b Mode</b>			
Test Channel	Frequency	Maximum Conducted Output Power(PK)	LIMIT
	(MHz)	(dBm)	dBm
CH01	2412	13.32	30
CH06	2437	13.12	30
CH11	2462	13.16	30

<b>TX 802.11g Mode</b>			
CH01	2412	10.81	30
CH06	2437	10.13	30
CH11	2462	10.12	30

<b>TX 802.11n Mode</b>			
CH01	2412	9.63	30
CH06	2437	9.14	30
CH11	2462	9.21	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.

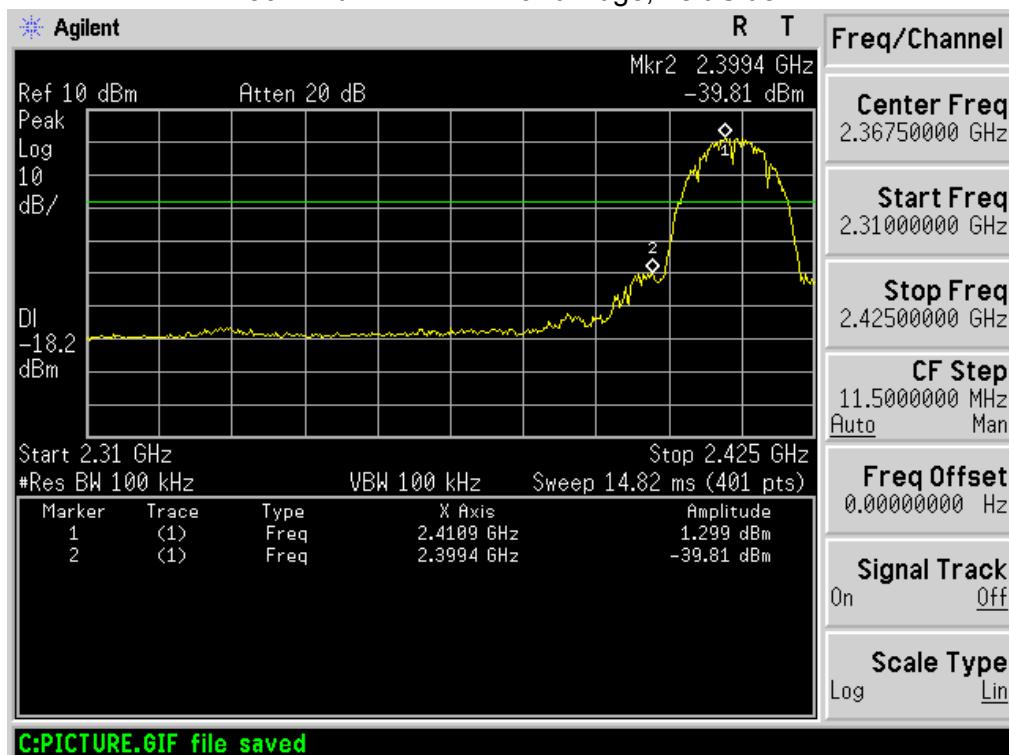
#### 7.4 TEST RESULTS

EUT :	Central Controller	Model Name :	EN-C0012W
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	AC 120V

Frequency Band	Delta Peak to band emission (dBc)	>Limit (dBc)	Result
802.11b mode			
Left-band	41.10	20	Pass
Right-band	30.20	20	Pass
802.11g mode			
Left-band	31.13	20	Pass
Right-band	38.25	20	Pass
802.11n mode			
Left-band	31.55	20	Pass
Right-band	31.95	20	Pass

**BAND EDGE (CONDUCTED)**

802.11b/2412MHz: Band Edge, Left Side



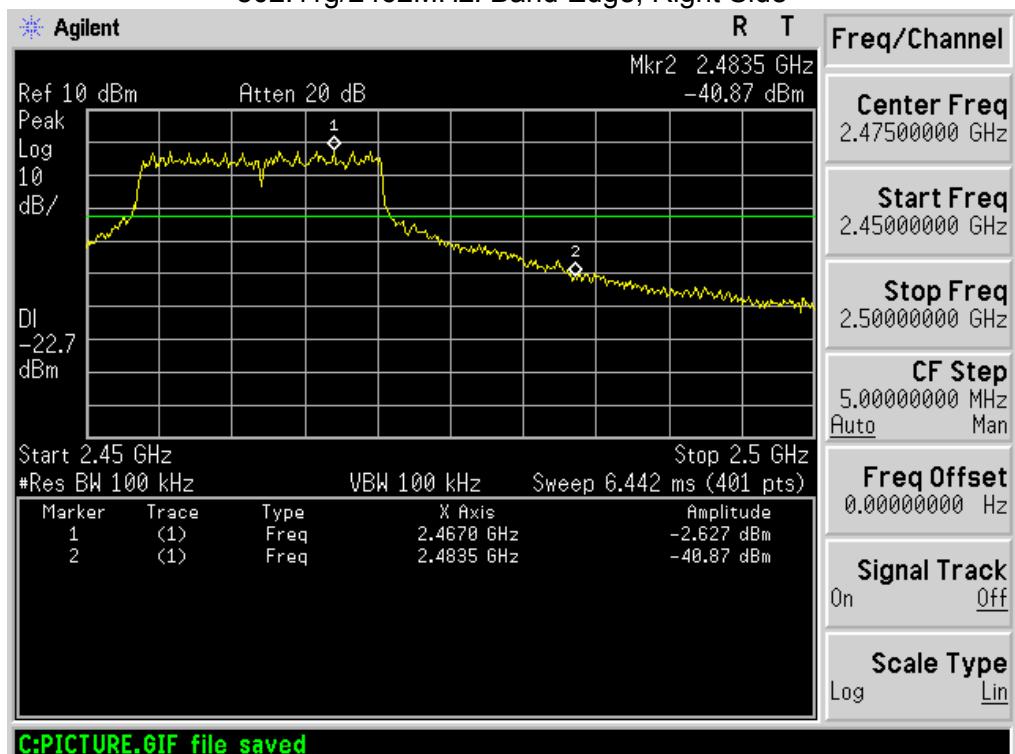
802.11b/2462MHz: Band Edge, Right Side



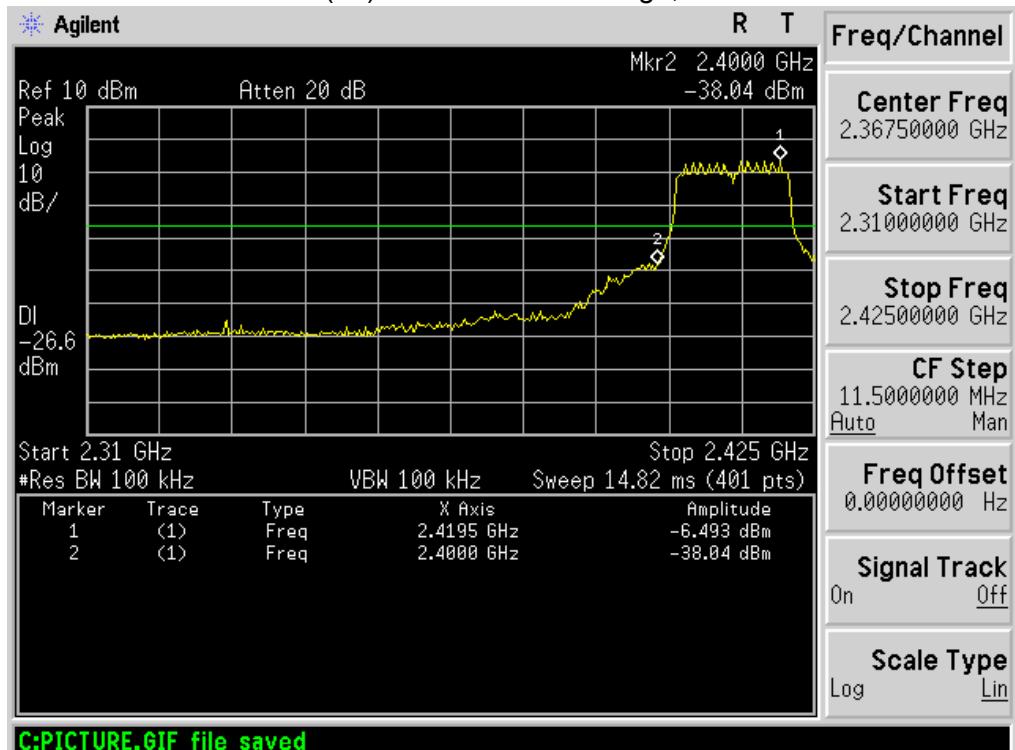
## 802.11g/2412MHz: Band Edge, Left Side



## 802.11g/2462MHz: Band Edge, Right Side



## 802.11n(20)/2412MHz: Band Edge, Left Side



## 802.11n(20)/2462MHz: Band Edge, Right Side



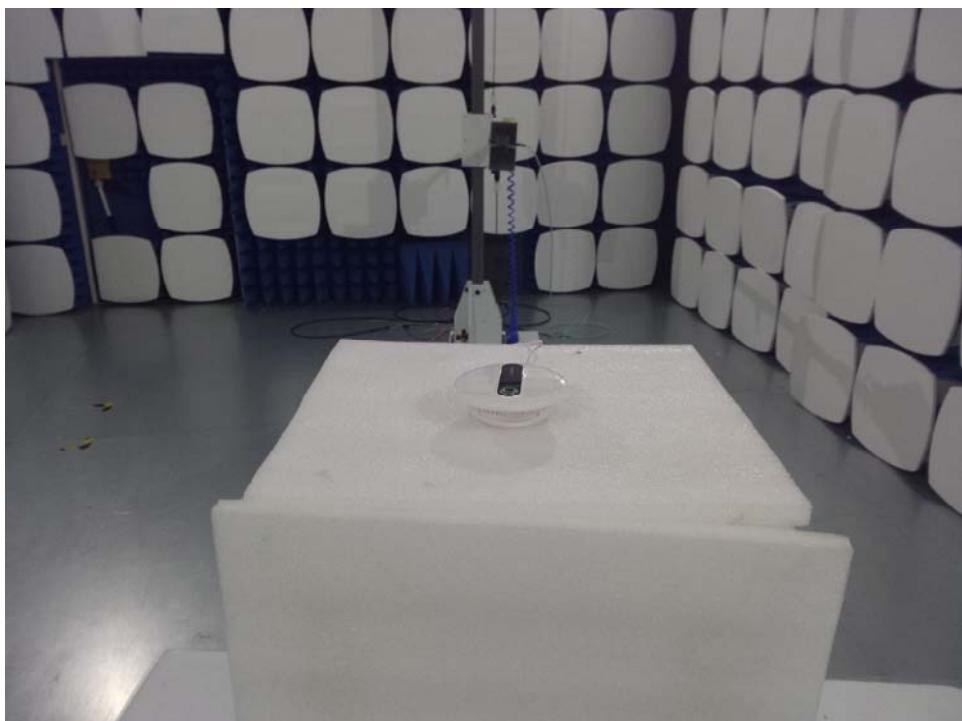
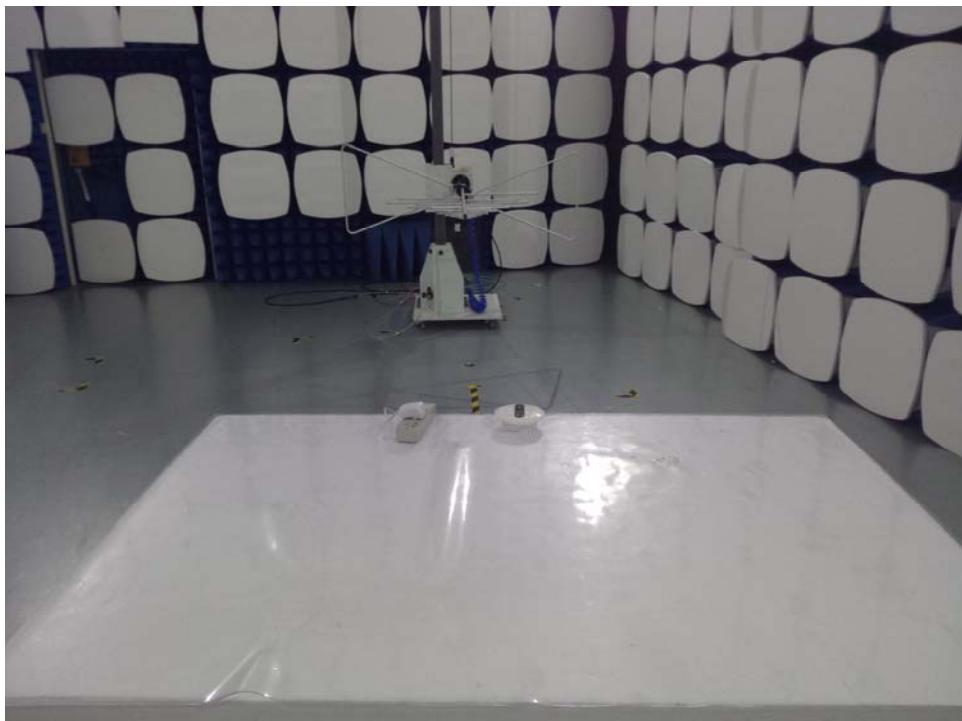
## **8. ANTENNA REQUIREMENT**

### **8.1 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.

### **8.2 EUT ANTENNA**

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

**9. EUT TEST PHOTO****Radiated Measurement Photos**

**Conducted Measurement Photos**