S T S L A B

RADIO TEST REPORT

Report No: STS1608099F01

Issued for

Apex Toys(Shenzhen)Co.,Ltd.

A.Floor 4,A001 Building,Zhi Ji Industrial Park,No.92
KuiChong Street, LongGang district,Shenzhen,China

Product Name:	Wifi Foam Drone
Brand Name:	APEX™ Through in the sky
Model Name:	GD-230H
Series Model:	N/A
FCC ID:	2ADSOGD-230H
Test Standard:	FCC Part 15.247

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TEST RESULT CERTIFICATION

Applicant's name ..... : Apex Toys(Shenzhen)Co.,Ltd.

Address ..... : A.Floor 4,A001 Building,Zhi Ji Industrial Park,No.92 KuiChong Street, LongGang district,Shenzhen,China

Manufacture's Name ..... : Apex Toys(Shenzhen)Co.,Ltd.

Address ..... : A.Floor 4,A001 Building,Zhi Ji Industrial Park,No.92 KuiChong Street, LongGang district,Shenzhen,China

Product description

Product name..... : Wifi Foam Drone

Model and/or type reference : GD-230H

Series Model ..... : N/A

Standards ..... : FCC Part15.247

Test procedure ..... ANSI C63.10-2013 ; ANSI C63.4-2014

This device described above has been tested by STS, 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..... : 12 Aug. 2016 ~17 Sep. 2016

Date of Issue ..... : 18 Sep. 2016

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

Testing Engineer : (Tony Liu)

Technical Manager : (Vita Li)

Authorized Signatory : (Bovey Yang)

TESTING CONSULTING SOLUTION CERTIFICATION STS APPROVAL

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Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	18 Sep. 2016	STS1608099F01	ALL	Initial Issue

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:
KDB 558074 D01 DTS Meas Guidance v03r05

FCC Part 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)(3)	Output Power	PASS	
15.247 (c)	Radiated Spurious Emission	PASS	
15.247 (d)	Conducted Spurious & Band Edge Emission	PASS	
15.247 (e)	Power Spectral Density	PASS	
15.205	Radiated Band Edge Emission	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

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

(2)all tests are according to ANSI C63.10-2013 .

1.1 TEST FACTORY

Shenzhen STS Test Services Co., Ltd.
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Fuyong Street, Bao'an District, Shenzhen, Guangdong, China

CNAS Registration No.: L7649;

FCC Registration No.: 842334; IC Registration No.: 12108A-1

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 (9KHz-150KHz)	±2.88dB
2	Conducted Emission (150KHz-30MHz)	±2.67dB
3	RF power,conducted	±0.70dB
4	Spurious emissions,conducted	±1.19dB
5	All emissions,radiated(<30M) (9KHz-30MHz)	±2.45dB
6	All emissions,radiated(<1G) 30MHz-200MHz	±2.83dB
7	All emissions,radiated(<1G) 200MHz-1000MHz	±2.94dB
8	All emissions,radiated(>1G)	±3.03dB
9	Temperature	±0.5°C
10	Humidity	±2%

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

<table>
<tr><td>Equipment</td><td>Wifi Foam Drone</td></tr>
<tr><td>Trade Name</td><td>APEX™ Through in the sky</td></tr>
<tr><td>Model Name</td><td>GD-230H</td></tr>
<tr><td>Series Model</td><td>N/A</td></tr>
<tr><td>Model Difference</td><td>N/A</td></tr>
<tr><td>Product Description</td><td>The EUT is a Wifi Foam Drone
<table>
<tr><td>Operation Frequency:</td><td>802.11b/g: 2412~2462 MHz</td></tr>
<tr><td>Modulation Type:</td><td>CCK/BPSK/QPSK/16QAM</td></tr>
<tr><td>Bit Rate of Transmitter</td><td>802.11b:11/5.5/2/1 Mbps
802.11g:54/48/36/24/18/12/9/6 Mbps</td></tr>
<tr><td>Number Of Channel</td><td>802.11b/g: 11CH</td></tr>
<tr><td>Antenna Designation:</td><td>Please see Note 3.</td></tr>
<tr><td>Antenna Gain (dBi)</td><td>2 dBi</td></tr>
<tr><td>Duty Cycle</td><td>>98%</td></tr>
</table></td></tr>
<tr><td>Channel List</td><td>Please refer to the Note 2.</td></tr>
<tr><td>Battery</td><td>Rated Voltage: 3.7V
Charge Limit: 4.2V
Capacity :500mAh</td></tr>
<tr><td>Hardware version number</td><td>V1.1</td></tr>
<tr><td>Software version number</td><td>V1.1</td></tr>
<tr><td>Connecting I/O Port(s)</td><td>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

Operation Frequency of channel			
802.11b/g			
Channel	Frequency		
01	2412		
02	2417		
03	2422		
04	2427		
05	2432		
06	2437		
07	2442		
08	2447		
09	2452		
10	2457		
11	2462		

3 Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Carrier Frequency Channel

2.4GHz Test Frequency:

For 802.11b/g			
Channel	Freq.(MHz)		
01	2412		
06	2437		
11	2462		

3

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	APEX Through in the sky	GD-230H	Dipole Antenna	N/A	2	WIFI Antenna

2.2 DESCRIPTION OF TEST MODES

Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Worst Mode	Description	Data Rate
Mode 1	TX IEEE 802.11b CH1	1 Mbps
Mode 2	TX IEEE 802.11b CH6	1 Mbps
Mode 3	TX IEEE 802.11 b CH11	1 Mbps
Mode 4	TX IEEE 802.11g CH1	6 Mbps
Mode 5	TX IEEE 802.11g CH6	6 Mbps
Mode 6	TX IEEE 802.11g CH11	6 Mbps

Note:
(1) 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

Radiation Test Setup

E-1
EUT

2.4 DESCRIPTION OF SUPPORT UNITS

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.	Serial No.	Note
E-1	Wifi Foam Drone	APEX™ Through in the sky	GD-230H	N/A	EUT

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

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.
(3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Spectrum Analyzer	Agilent	E4407B	MY50140340	2015.10.25	2016.10.24
Test Receiver	R&S	ESCI	101427	2015.10.25	2016.10.24
Bilog Antenna	TESEQ	CBL6111D	34678	2015.11.25	2016.11.24
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-1343	2016.03.06	2017.03.05
Horn Antenna	Schwarzbeck	BBHA 9170	9170-0741	2016.03.06	2017.03.05
50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2016.06.06	2017.06.05
PreAmplifier	Agilent	8449B	60538	2015.10.25	2016.10.24
Loop Antenna	ARA	PLA-1030/B	1029	2016.06.08	2017.06.07
Preamplifier	Agilent	8449B	60538	2015.11.05	2016.11.05
Low frequency cable (30MHz-1GHz)	EM	R01	N/A	2015.10.25	2016.10.24
High frequency cable (1GHz-25G)	SCHWARZBECK	AK9515H	SN-96286/96287	2015.10.25	2016.10.24

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESPI	102086	2015.11.20	2016.11.19
LISN	R&S	ENV216	101242	2015.10.25	2016.10.24
LISN	EMCO	3810/2NM	000-23625	2015.10.25	2016.10.24
Conduction Cable (9KHz-30MHz)	EM	C01	N/A	2015.10.25	2016.10.24

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
USB RF power sensor	DARE	RPR3006W	15I00041SNO03	2015.10.25	2016.10.24
Spectrum Analyzer	Agilent	E4407B	MY50140340	2015.10.25	2016.10.24
Signal Analyzer	Agilent	N9020A	MY49100060	2015.11.18	2016.11.17

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

operating frequency band. In case the emission fall within the restricted band specified on Part 15. 207(a) limit in the table below has to be followed.

FREQUENCY (MHz)	Conducted Emission limit (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

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.

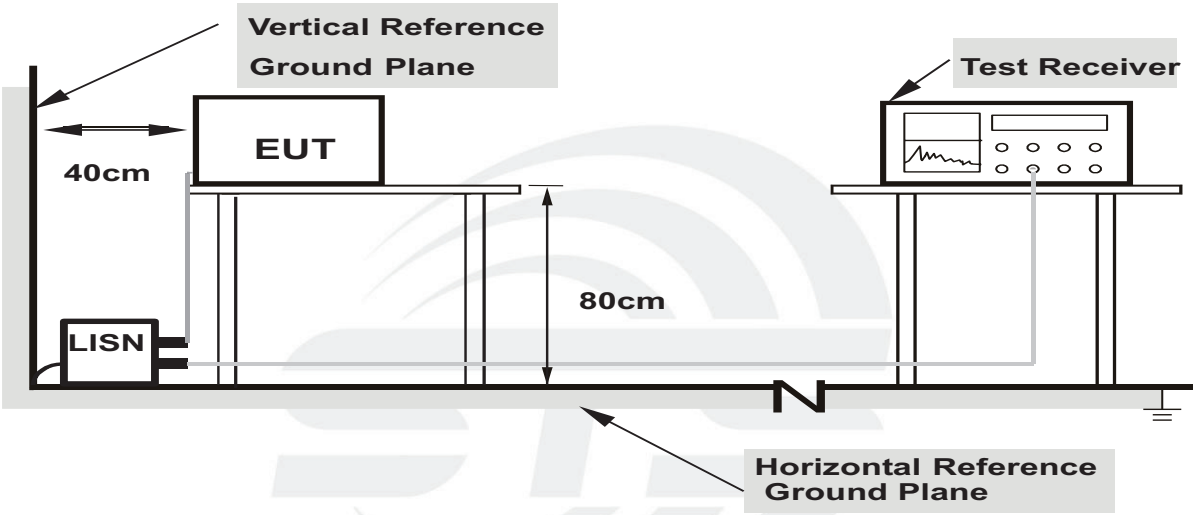
The following table is the setting of the receiver

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 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

3.1.4 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.

3.1.5 TEST RESULT

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	L/N
Test Voltage :	DC 3.7V	Test Mode :	N/A

.

Note: This device is battery power products, is not applicable this test; to recharge the battery, the battery need to be removed and then use the USB cable charge alone.

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS

in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on Part 15. 205(a)&209(a) limit in the table below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (0.009MHz - 1000MHz)

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 (1000MHz-25GHz)

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).

For Radiated Emission

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak
Start Frequency	1000 MHz(Peak/AV)
Stop Frequency	10th carrier hamonic(Peak/AV)
RB / VB (emission in restricted band)	1 MHz /3MHz

For Band edge

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	Lower Band Edge: 2300 to 2430 MHz Upper Band Edge: 2450 to 2500 MHz
RB / VB (emission in restricted band)	1 MHz /3MHz

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	90kHz~110kHz / RB 200Hz for QP
Start ~ Stop Frequency	110kHz~490kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	490kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

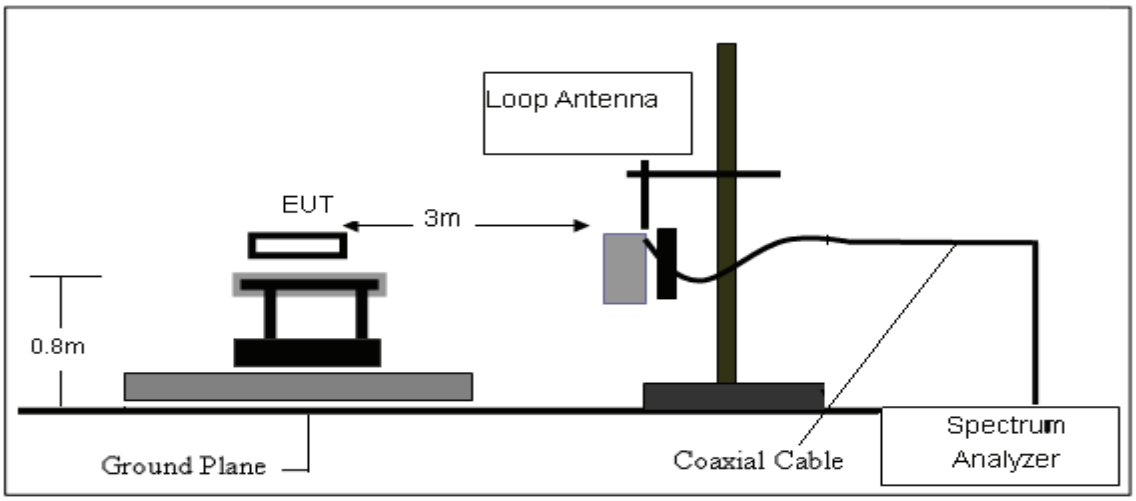
a. The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz, and above 1GHz
b. The EUT was placed on the top of a rotating table 0.8 meters(above 1GHz is 1.5 m) above the ground at a 3 meter anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment shall be 0.8 m(above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. 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:

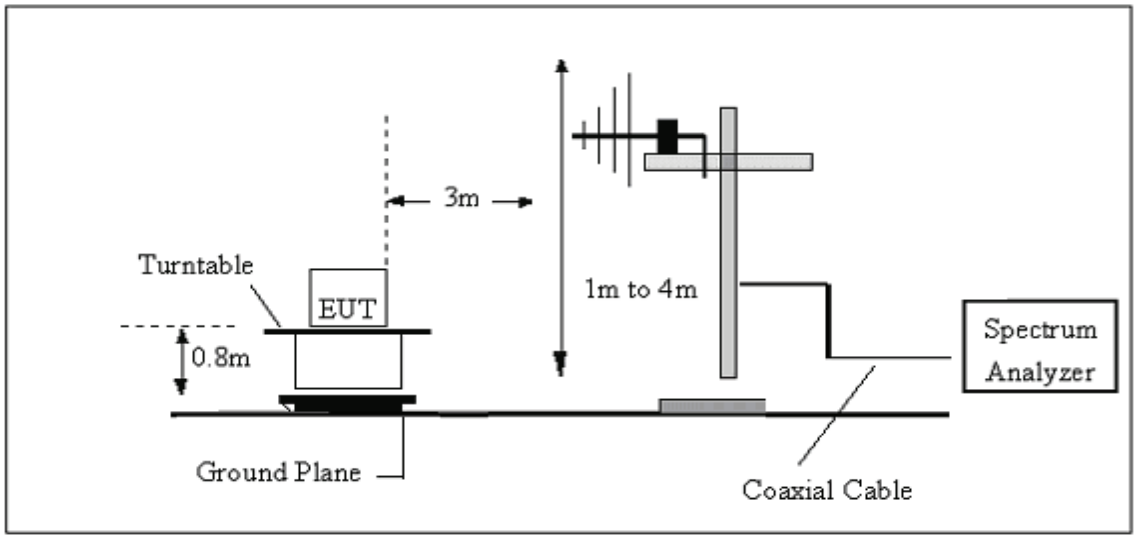
Both horizontal and vertical antenna polarities were tested and performed test to three orthogonal axis. The worst case emissions were reported

3.2.3 TEST SETUP

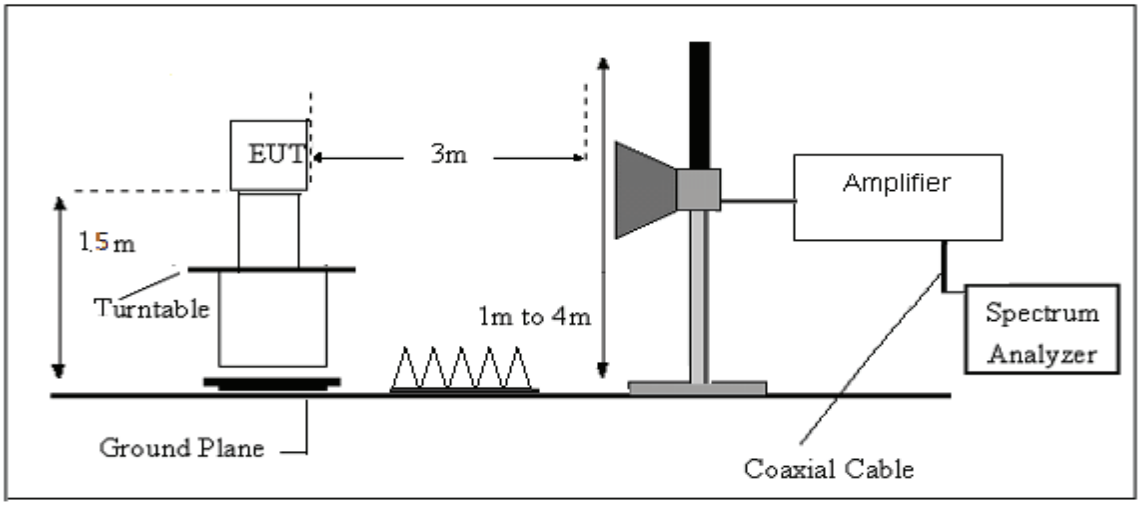
（A）Radiated Emission Test-Up Frequency Below 30MHz



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



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



3.2.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.5 TEST RESULT

9KHz-30MHz

Temperature:	20 ℃	Relative Humidtity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX Mode	Polarization :	--

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

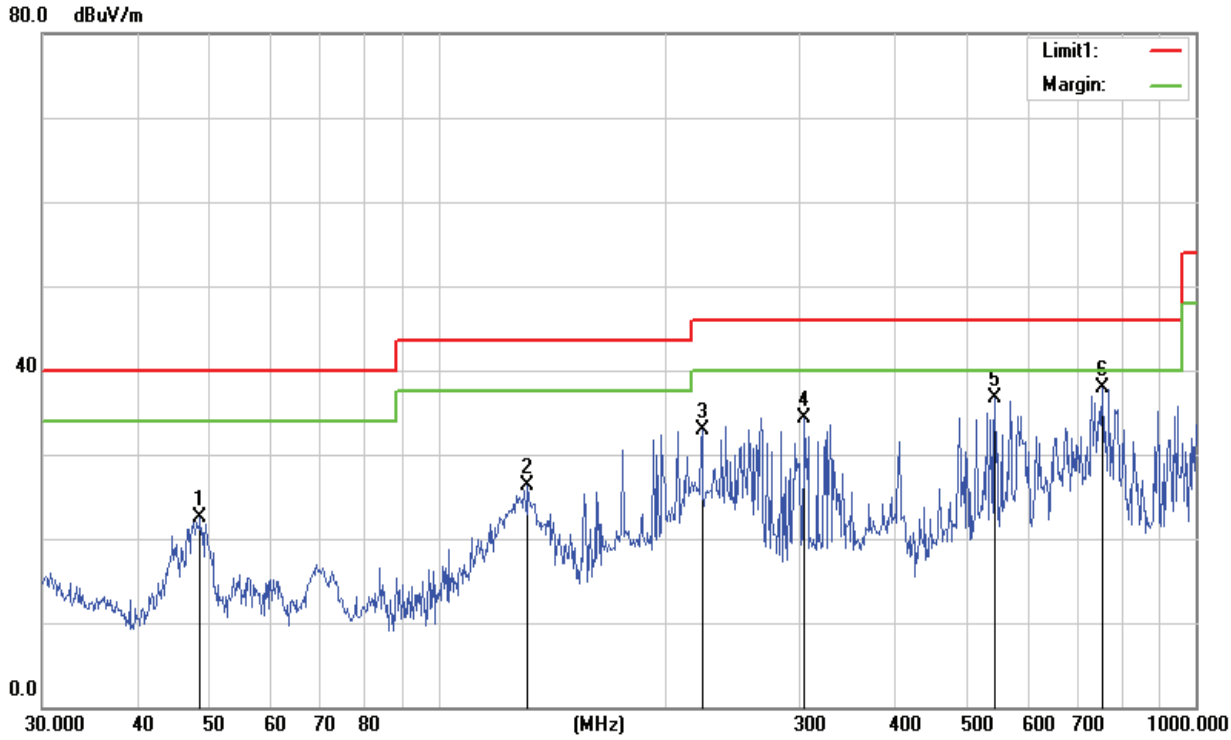
(30MHz - 1000MHz)

Temperature:	20 ℃	Relative Humidtity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 1/2/3/4/5/6 (Mode 1-1M worst mode)	Polarization :	Horizontal

Frequency	Reading	Correct	Result	Limit	Margin	Remark
(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
48.5016	43.29	-20.71	22.58	40.00	-17.42	QP
131.2965	43.88	-17.55	26.33	43.50	-17.17	QP
222.9500	51.91	-18.93	32.98	46.00	-13.02	QP
304.6100	48.98	-14.66	34.32	46.00	-11.68	QP
543.2740	43.59	-6.92	36.67	46.00	-9.33	QP
752.7432	41.40	-3.57	37.83	46.00	-8.17	QP

Remark:

1. Margin = Result (Result =Reading + Factor)–Limit

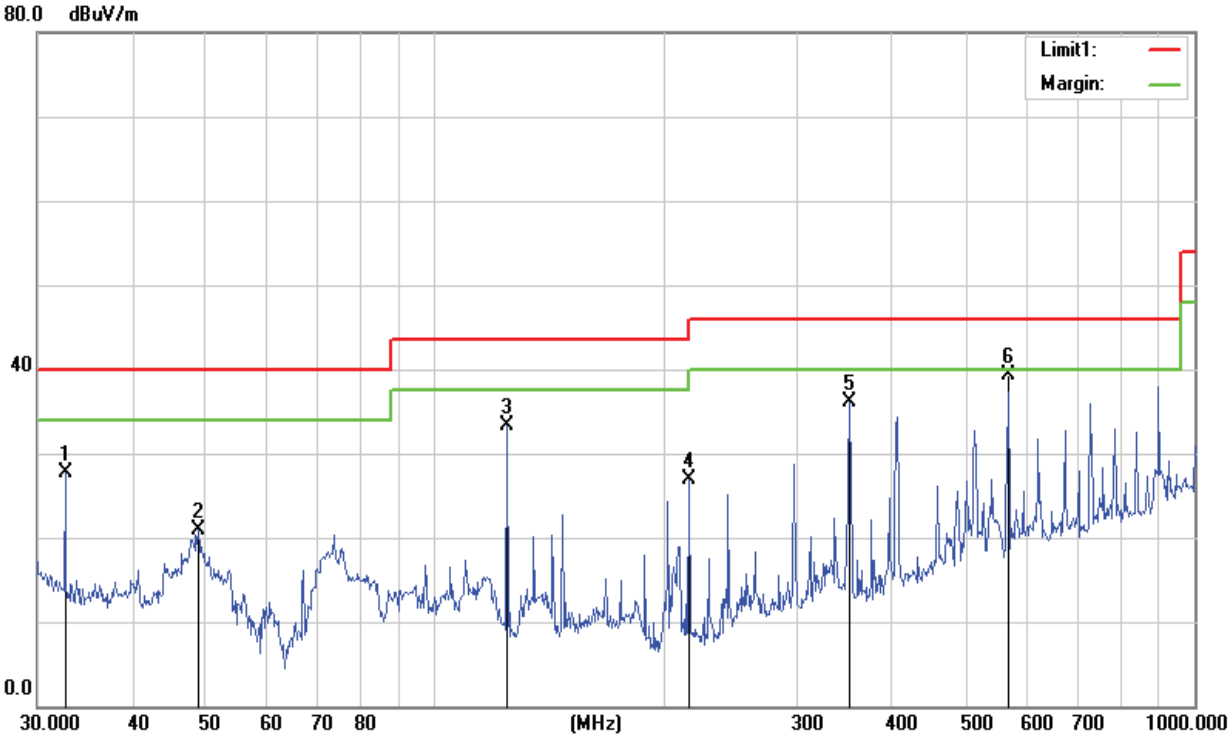


Temperature:	20 ℃	Relative Humidtity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 1/2/3/4/5/6 (Mode 1-1M worst mode)	Polarization :	Vertical

Frequency	Reading	Correct	Result	Limit	Margin	Remark
(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
32.6340	40.16	-12.54	27.62	40.00	-12.38	QP
48.8430	41.87	-20.89	20.98	40.00	-19.02	QP
124.5690	50.88	-17.63	33.25	43.50	-10.25	QP
216.0240	46.34	-19.37	26.97	46.00	-19.03	QP
351.7080	49.59	-13.51	36.08	46.00	-9.92	QP
568.6127	45.89	-6.62	39.27	46.00	-6.73	QP

Remark:.

1. Margin = Result (Result =Reading + Factor)–Limit



(1000MHz-25GHz)

802.11b Low Channel

Frequency (MHz)	Meter Reading (dBμV)	Amplifier (dB)	Loss (dB)	Antenna Factor (dB/m)	Orrected Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type	Comment
(2412 MHz)										
3265.10	49.99	44.70	6.70	28.20	-9.80	40.19	74.00	-33.81	PK	Vertical
3265.10	39.91	44.70	6.70	28.20	-9.80	30.11	54.00	-23.89	AV	Vertical
3265.06	49.92	44.70	6.70	28.20	-9.80	40.12	74.00	-33.88	PK	Horizontal
3265.06	39.94	44.70	6.70	28.20	-9.80	30.14	54.00	-23.86	AV	Horizontal
4824.78	60.25	44.20	9.04	31.60	-3.56	56.69	74.00	-17.31	PK	Vertical
4824.78	50.29	44.20	9.04	31.60	-3.56	46.73	54.00	-7.27	AV	Vertical
4824.81	60.27	44.20	9.04	31.60	-3.56	56.71	74.00	-17.29	PK	Horizontal
4824.81	50.24	44.20	9.04	31.60	-3.56	46.68	54.00	-7.32	AV	Horizontal
5360.09	47.13	44.20	9.86	32.00	-2.34	44.79	74.00	-29.21	PK	Vertical
5360.09	39.16	44.20	9.86	32.00	-2.34	36.82	54.00	-17.18	AV	Vertical
5360.07	47.18	44.20	9.86	32.00	-2.34	44.84	74.00	-29.16	PK	Horizontal
5360.07	39.17	44.20	9.86	32.00	-2.34	36.83	54.00	-17.17	AV	Horizontal
7236.18	52.65	43.50	11.40	35.50	3.40	56.05	74.00	-17.95	PK	Vertical
7236.18	44.63	43.50	11.40	35.50	3.40	48.03	54.00	-5.97	AV	Vertical
7236.16	52.63	43.50	11.40	35.50	3.40	56.03	74.00	-17.97	PK	Horizontal
7236.16	44.64	43.50	11.40	35.50	3.40	48.04	54.00	-5.96	AV	Horizontal
11036.22	41.91	43.60	14.30	39.50	10.20	52.11	74.00	-21.89	PK	Vertical
11036.22	31.88	43.60	14.30	39.50	10.20	42.08	54.00	-11.92	AV	Vertical
11036.47	41.90	43.60	14.30	39.50	10.20	52.10	74.00	-21.90	PK	Horizontal
11036.47	31.87	43.60	14.30	39.50	10.20	42.07	54.00	-11.93	AV	Horizontal
13299.62	41.73	42.60	15.90	38.90	12.20	53.93	74.00	-20.07	PK	Vertical
13299.62	31.72	42.60	15.90	38.90	12.20	43.92	54.00	-10.08	AV	Vertical
13299.74	41.75	42.60	15.90	38.90	12.20	53.95	74.00	-20.05	PK	Horizontal
13299.74	30.72	42.60	15.90	38.90	12.20	42.92	54.00	-11.08	AV	Horizontal
16000.15	41.78	42.70	18.00	37.10	12.40	54.18	74.00	-19.82	PK	Vertical
16000.15	31.77	42.70	18.00	37.10	12.40	44.17	54.00	-9.83	AV	Vertical
16000.04	41.74	42.70	18.00	37.10	12.40	54.14	74.00	-19.86	PK	Horizontal
16000.04	31.01	42.70	18.00	37.10	12.40	43.41	54.00	-10.59	AV	Horizontal
17998.14	31.87	42.70	19.40	46.50	23.20	55.07	74.00	-18.93	PK	Vertical
17998.14	21.93	42.70	19.40	46.50	23.20	45.13	54.00	-8.87	AV	Vertical
17998.01	31.93	42.70	19.40	46.50	23.20	55.13	74.00	-18.87	PK	Horizontal
17998.01	21.95	42.70	19.40	46.50	23.20	45.15	54.00	-8.85	AV	Horizontal

802.11b Mid Channel

Frequency (MHz)	Meter Reading (dBμV)	Amplifier (dB)	Loss (dB)	Antenna Factor (dB/m)	Orrected Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type	Comment
(2437 MHz)										
3265.00	49.89	44.70	6.70	28.20	-9.80	40.09	74.00	-33.91	PK	Vertical
3265.00	39.87	44.70	6.70	28.20	-9.80	30.07	54.00	-23.93	AV	Vertical
3264.95	49.85	44.70	6.70	28.20	-9.80	40.05	74.00	-33.95	PK	Horizontal
3264.95	39.88	44.70	6.70	28.20	-9.80	30.08	54.00	-23.92	AV	Horizontal
4874.76	60.14	44.20	9.04	31.60	-3.56	56.58	74.00	-17.42	PK	Vertical
4874.76	50.19	44.20	9.04	31.60	-3.56	46.63	54.00	-7.37	AV	Vertical
4874.70	60.20	44.20	9.04	31.60	-3.56	56.64	74.00	-17.36	PK	Horizontal
4874.70	50.13	44.20	9.04	31.60	-3.56	46.57	54.00	-7.43	AV	Horizontal
5359.97	47.08	44.20	9.86	32.00	-2.34	44.74	74.00	-29.26	PK	Vertical
5359.97	39.11	44.20	9.86	32.00	-2.34	36.77	54.00	-17.23	AV	Vertical
5360.00	47.11	44.20	9.86	32.00	-2.34	44.77	74.00	-29.23	PK	Horizontal
5360.00	39.08	44.20	9.86	32.00	-2.34	36.74	54.00	-17.26	AV	Horizontal
7336.05	52.54	43.50	11.40	35.50	3.40	55.94	74.00	-18.06	PK	Vertical
7336.05	44.54	43.50	11.40	35.50	3.40	47.94	54.00	-6.06	AV	Vertical
7336.04	52.58	43.50	11.40	35.50	3.40	55.98	74.00	-18.02	PK	Horizontal
7336.04	44.56	43.50	11.40	35.50	3.40	47.96	54.00	-6.04	AV	Horizontal
11036.11	41.87	43.60	14.30	39.50	10.20	52.07	74.00	-21.93	PK	Vertical
11036.11	31.77	43.60	14.30	39.50	10.20	41.97	54.00	-12.03	AV	Vertical
11036.11	41.83	43.60	14.30	39.50	10.20	52.03	74.00	-21.97	PK	Horizontal
11036.11	31.82	43.60	14.30	39.50	10.20	42.02	54.00	-11.98	AV	Horizontal
13299.71	41.63	42.60	15.90	38.90	12.20	53.83	74.00	-20.17	PK	Vertical
13299.71	31.65	42.60	15.90	38.90	12.20	43.85	54.00	-10.15	AV	Vertical
13299.62	41.73	42.60	15.90	38.90	12.20	53.93	74.00	-20.07	PK	Horizontal
13299.62	30.65	42.60	15.90	38.90	12.20	42.85	54.00	-11.15	AV	Horizontal
15999.98	41.69	42.70	18.00	37.10	12.40	54.09	74.00	-19.91	PK	Vertical
15999.98	31.70	42.70	18.00	37.10	12.40	44.10	54.00	-9.90	AV	Vertical
15999.99	41.72	42.70	18.00	37.10	12.40	54.12	74.00	-19.88	PK	Horizontal
15999.99	30.95	42.70	18.00	37.10	12.40	43.35	54.00	-10.65	AV	Horizontal
17998.13	31.79	42.70	19.40	46.50	23.20	54.99	74.00	-19.01	PK	Vertical
17998.13	21.84	42.70	19.40	46.50	23.20	45.04	54.00	-8.96	AV	Vertical
17998.00	31.88	42.70	19.40	46.50	23.20	55.08	74.00	-18.92	PK	Horizontal
17998.00	21.88	42.70	19.40	46.50	23.20	45.08	54.00	-8.92	AV	Horizontal

802.11b High Channel

Frequency (MHz)	Meter Reading (dBμV)	Amplifier (dB)	Loss (dB)	Antenna Factor (dB/m)	Orrected Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type	Comment
(2462 MHz)										
3265.07	49.80	44.70	6.70	28.20	-9.80	40.00	74.00	-34.00	PK	Vertical
3265.07	39.78	44.70	6.70	28.20	-9.80	29.98	54.00	-24.02	AV	Vertical
3265.04	49.73	44.70	6.70	28.20	-9.80	39.93	74.00	-34.07	PK	Horizontal
3265.04	39.82	44.70	6.70	28.20	-9.80	30.02	54.00	-23.98	AV	Horizontal
4924.82	60.04	44.20	9.04	31.60	-3.56	56.48	74.00	-17.52	PK	Vertical
4924.82	50.13	44.20	9.04	31.60	-3.56	46.57	54.00	-7.43	AV	Vertical
4924.78	60.13	44.20	9.04	31.60	-3.56	56.57	74.00	-17.43	PK	Horizontal
4924.78	50.04	44.20	9.04	31.60	-3.56	46.48	54.00	-7.52	AV	Horizontal
5360.04	46.98	44.20	9.86	32.00	-2.34	44.64	74.00	-29.36	PK	Vertical
5360.04	39.01	44.20	9.86	32.00	-2.34	36.67	54.00	-17.33	AV	Vertical
5360.03	47.03	44.20	9.86	32.00	-2.34	44.69	74.00	-29.31	PK	Horizontal
5360.03	38.99	44.20	9.86	32.00	-2.34	36.65	54.00	-17.35	AV	Horizontal
7386.16	52.48	43.50	11.40	35.50	3.40	55.88	74.00	-18.12	PK	Vertical
7386.16	44.47	43.50	11.40	35.50	3.40	47.87	54.00	-6.13	AV	Vertical
7386.20	52.54	43.50	11.40	35.50	3.40	55.94	74.00	-18.06	PK	Horizontal
7386.20	44.43	43.50	11.40	35.50	3.40	47.83	54.00	-6.17	AV	Horizontal
11036.21	41.74	43.60	14.30	39.50	10.20	51.94	74.00	-22.06	PK	Vertical
11036.21	31.74	43.60	14.30	39.50	10.20	41.94	54.00	-12.06	AV	Vertical
11036.19	41.75	43.60	14.30	39.50	10.20	51.95	74.00	-22.05	PK	Horizontal
11036.19	31.76	43.60	14.30	39.50	10.20	41.96	54.00	-12.04	AV	Horizontal
16000.09	41.62	42.70	18.00	37.10	12.40	54.02	74.00	-19.98	PK	Vertical
16000.09	31.59	42.70	18.00	37.10	12.40	43.99	54.00	-10.01	AV	Vertical
16000.05	41.60	42.70	18.00	37.10	12.40	54.00	74.00	-20.00	PK	Horizontal
16000.05	30.88	42.70	18.00	37.10	12.40	43.28	54.00	-10.72	AV	Horizontal
17998.22	31.73	42.70	19.40	46.50	23.20	54.93	74.00	-19.07	PK	Vertical
17998.22	21.79	42.70	19.40	46.50	23.20	44.99	54.00	-9.01	AV	Vertical
17998.09	31.76	42.70	19.40	46.50	23.20	54.96	74.00	-19.04	PK	Horizontal
17998.09	21.78	42.70	19.40	46.50	23.20	44.98	54.00	-9.02	AV	Horizontal

Remark: 802.11b /g all have been tested， only worse case 802.11b is reported

3.2.6 TEST RESULTS (Band edge)

	Frequency (MHz)	Meter Reading (dBμV)	Amplifier (dB)	Loss (dB)	Antenna Factor (dB/m)	Orrected Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type	Comment
	802.11b										
CH L	2400.00	69.17	43.80	4.91	25.90	-12.99	56.18	74	-17.82	PK	Vertical
	2400.00	55.02	43.80	4.91	25.90	-12.99	42.03	54	-11.97	AV	Vertical
CH L	2400.00	70.19	43.80	4.91	25.90	-12.99	57.20	74	-16.80	PK	Horizontal
	2400.00	54.14	43.80	4.91	25.90	-12.99	41.15	54	-12.85	AV	Horizontal
CH H	2483.50	71.04	43.80	5.12	25.90	-12.78	58.26	74	-15.74	PK	Vertical
	2483.50	54.07	43.80	5.12	25.90	-12.78	41.29	54	-12.71	AV	Vertical
CH H	2483.50	71.10	43.80	5.12	25.90	-12.78	58.32	74	-15.68	PK	Horizontal
	2483.50	54.05	43.80	5.12	25.90	-12.78	41.27	54	-12.73	AV	Horizontal
	802.11g										
CH L	2400.00	67.99	43.80	4.91	25.90	-12.99	55.00	74	-19.00	PK	Vertical
	2400.00	54.08	43.80	4.91	25.90	-12.99	41.09	54	-12.91	AV	Vertical
CH L	2400.00	67.12	43.80	4.91	25.90	-12.99	54.13	74	-19.87	PK	Horizontal
	2400.00	54.95	43.80	4.91	25.90	-12.99	41.96	54	-12.04	AV	Horizontal
CH H	2483.50	67.08	43.80	5.12	25.90	-12.78	54.30	74	-19.70	PK	Vertical
	2483.50	54.28	43.80	5.12	25.90	-12.78	41.50	54	-12.50	AV	Vertical
CH H	2483.50	67.04	43.80	5.12	25.90	-12.78	54.26	74	-19.74	PK	Horizontal
	2483.50	54.16	43.80	5.12	25.90	-12.78	41.38	54	-12.62	AV	Horizontal

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.
Low measurement frequencies is range from 2310 to 2400 MHz, high measurement frequencies is range from 2483.5 to 2500 MHz.

Only show the worst point data of the emissions in the frequency 2310-2400 MHz and 2483.5-2500 MHz.

4. Conducted Spurious & Band Edge Emission

4.1 APPLIED PROCEDURES / LIMIT

According to FCC section 15.247(d), in any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

4.2 TEST PROCEDURE

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	30 MHz to 10th carrier harmonic
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

.

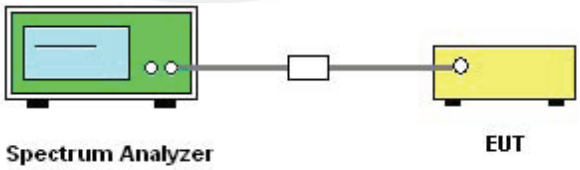
For Band edge

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	Lower Band Edge: 2300 to 2430 MHz Upper Band Edge: 2450 to 2500 MHz
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

4.3 DEVIATION FROM STANDARD

No deviation.

4.4 TEST SETUP



The EUT which is powered by the Battery, is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

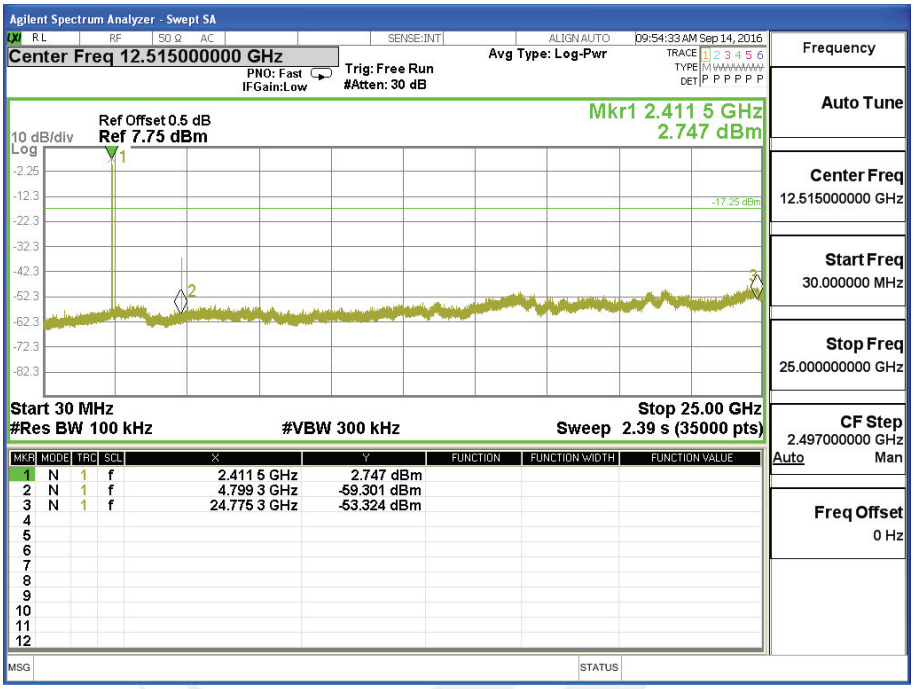
4.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

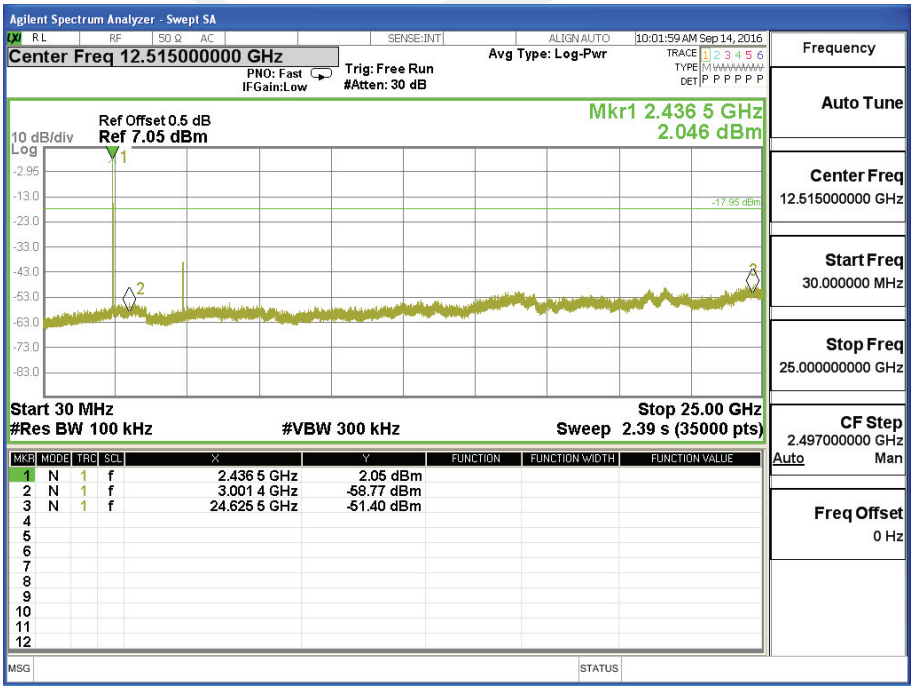
4.6 TEST RESULTS

Temperature :	25 ℃	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX b Mode /CH01, CH06, CH11		

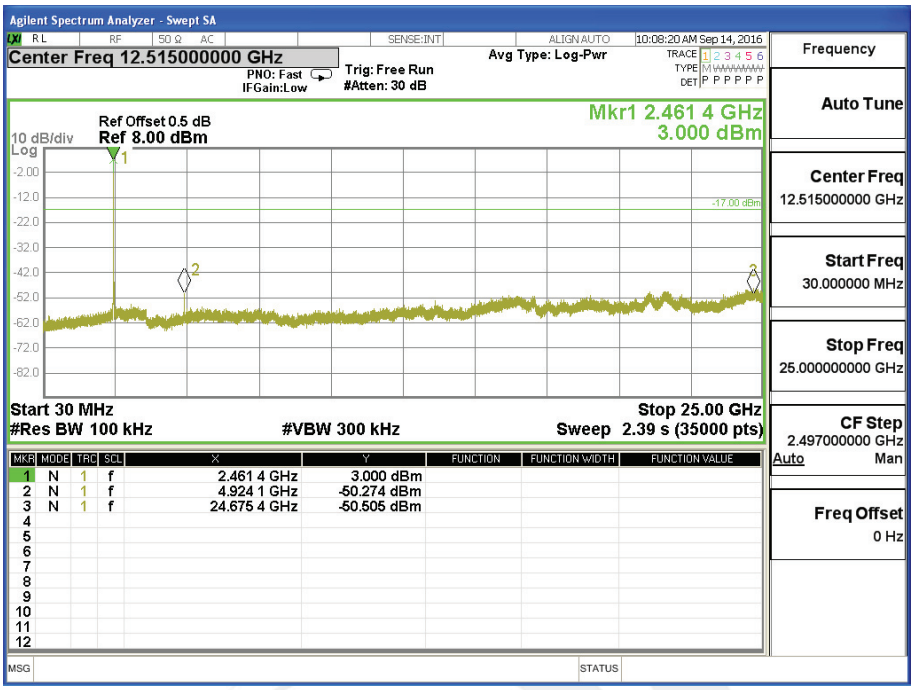
CH 01



CH 06

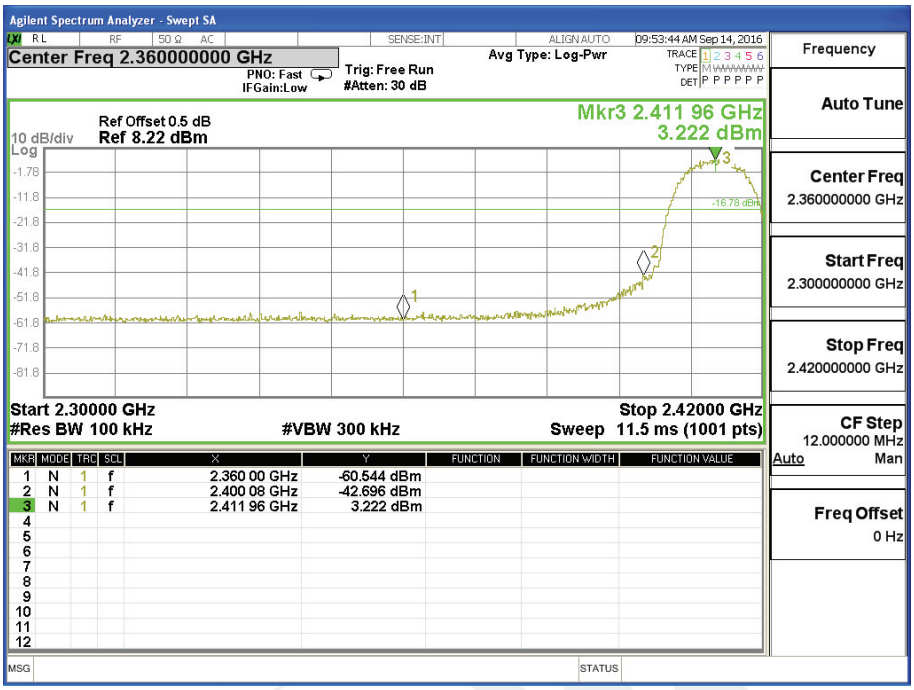


CH 11

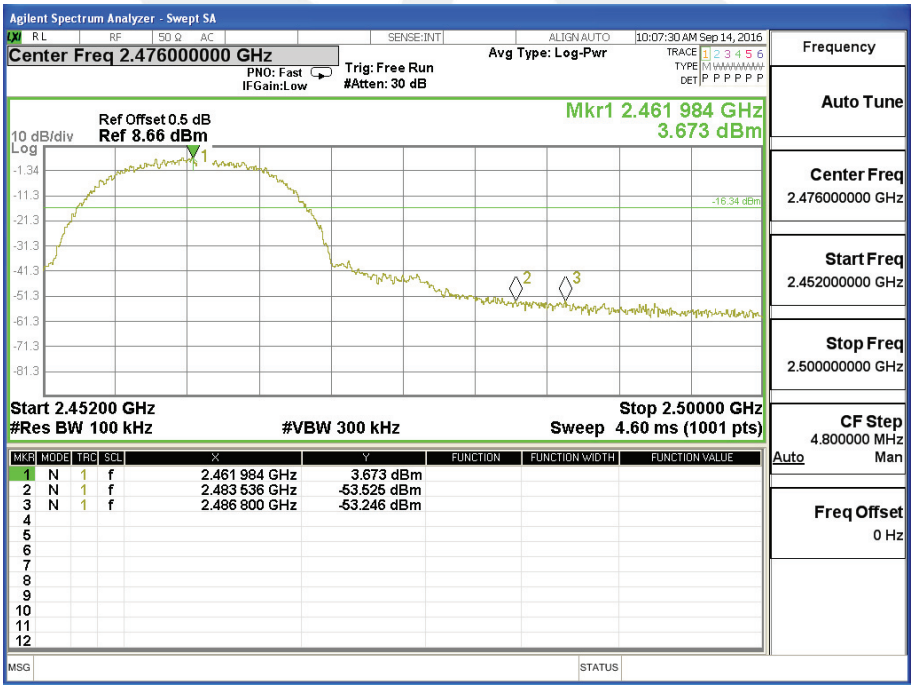

Agilent Spectrum Analyzer - Swept SA
Center Freq 12.515000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
10:08:20 AM Sep 14, 2016
Ref Offset 0.5 dB
10 dB/div
Ref 8.00 dBm
Log
Mkr1 2.461 4 GHz
3.000 dBm
-17.00 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.00 GHz
Sweep 2.39 s (35000 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 2.461 4 GHz 3.000 dBm
2 N 1 f 4.924 1 GHz -50.274 dBm
3 N 1 f 24.675 4 GHz -50.505 dBm
Frequency
Auto Tune
Center Freq
12.515000000 GHz
Start Freq
30.000000 MHz
Stop Freq
25.000000000 GHz
CF Step
2.497000000 GHz
Auto Man
Freq Offset
0 Hz
MSG
STATUS

Band edge

CH 01

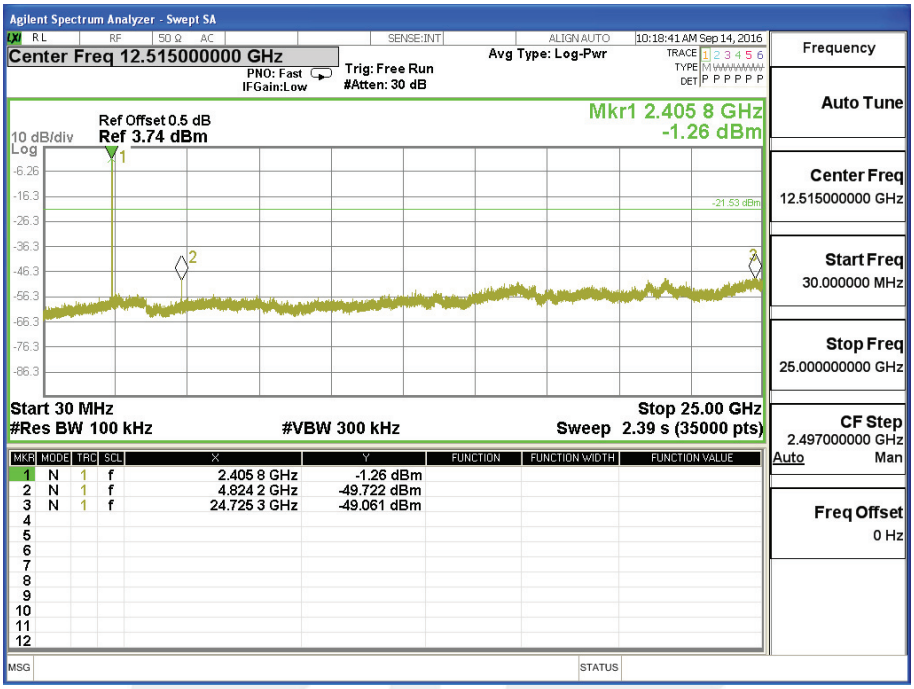


CH 11

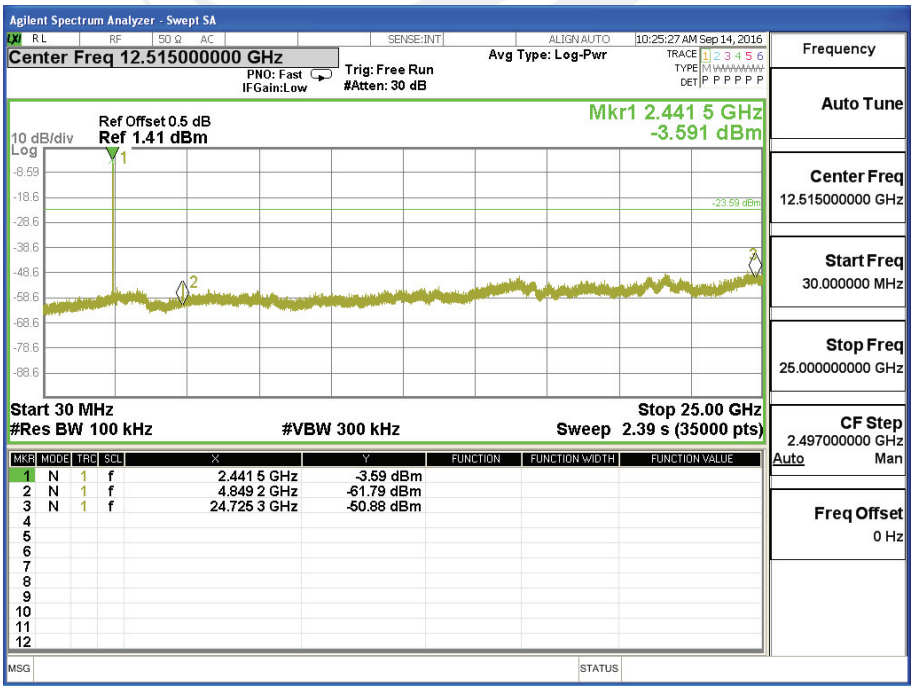


Temperature :	25 ℃	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX g Mode /CH01, CH06, CH11		

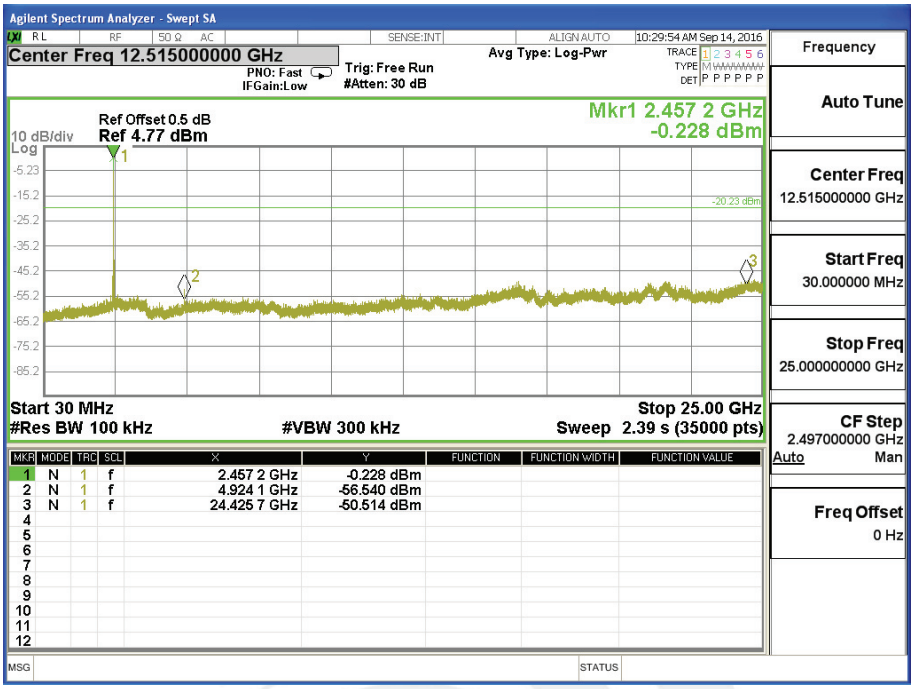
CH 01



CH06

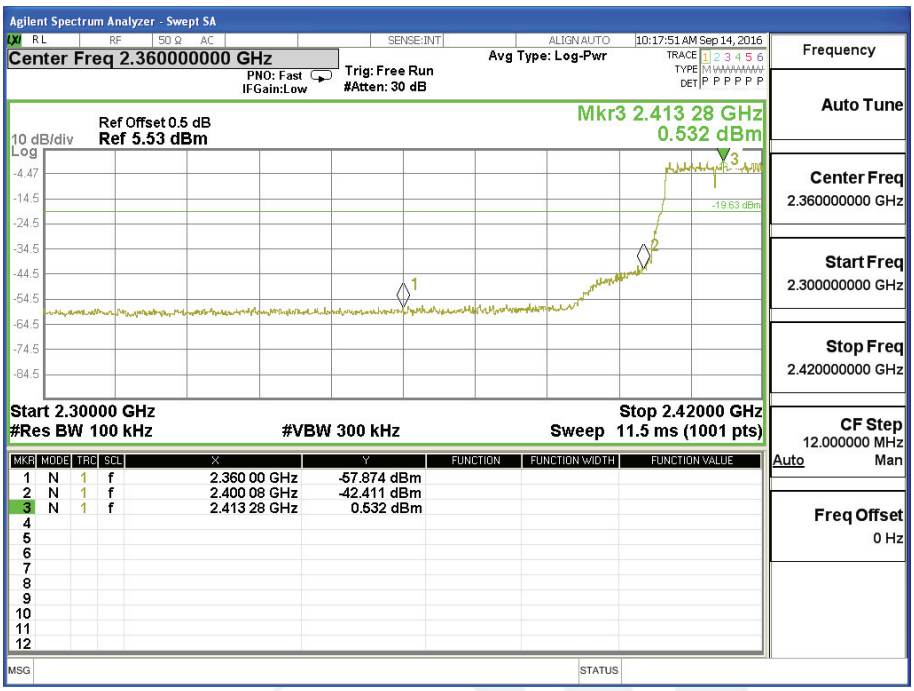


CH 11

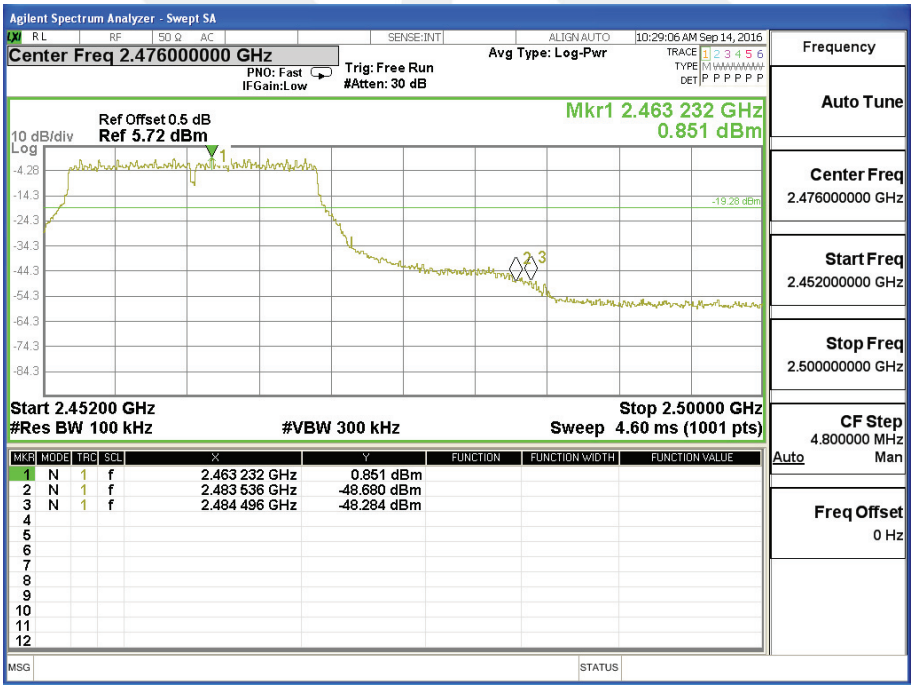

Agilent Spectrum Analyzer - Swept SA
Center Freq 12.515000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
10:29:54 AM Sep 14, 2016
Ref Offset 0.5 dB
10 dB/div
Ref 4.77 dBm
Log
Mkr1 2.457 2 GHz
-0.228 dBm
-20.23 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.00 GHz
Sweep 2.39 s (35000 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 2.457 2 GHz -0.228 dBm
2 N 1 f 4.924 1 GHz -56.540 dBm
3 N 1 f 24.425 7 GHz -50.514 dBm
Frequency
Auto Tune
Center Freq
12.515000000 GHz
Start Freq
30.000000 MHz
Stop Freq
25.000000000 GHz
CF Step
2.497000000 GHz
Auto Man
Freq Offset
0 Hz
MSG
STATUS

Band edge

CH 01



CH11



5. POWER SPECTRAL DENSITY TEST

5.1 APPLIED PROCEDURES / LIMIT

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

5.2 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 100 kHz ≥ 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.

5.3 DEVIATION FROM STANDARD

No deviation.

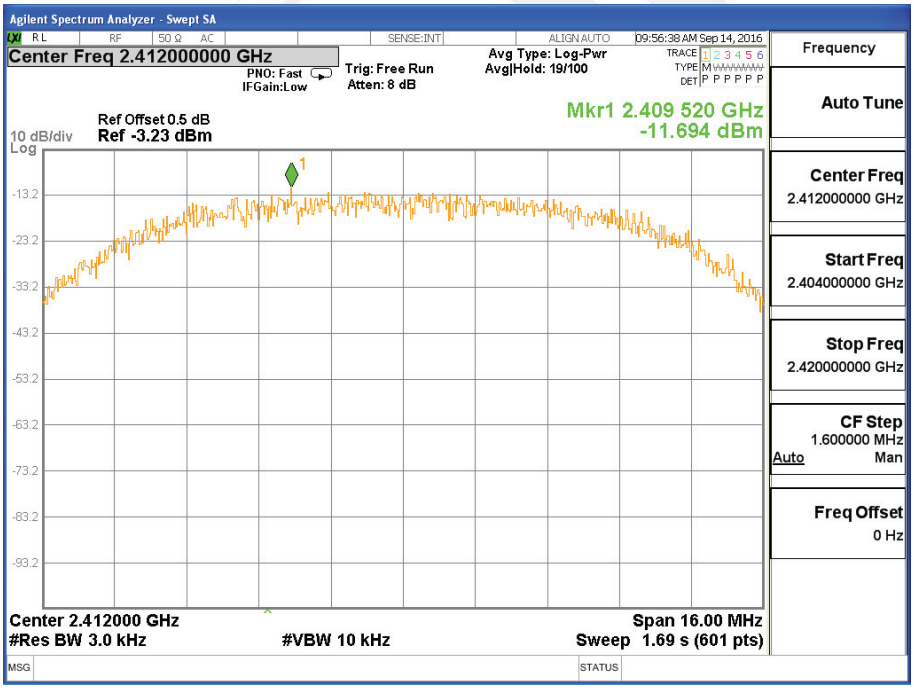
5.4 TEST SETUP

5.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

5.6 TEST RESULTS

Temperature :	25 ℃	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX b Mode /CH01, CH06, CH11		

Frequency	Power Density (dBm/3kHz)	Limit (dBm)	Result
2412 MHz	-11.694	≤8	PASS
2437 MHz	-12.228	≤8	PASS
2462 MHz	-11.545	≤8	PASS

TX CH01