



**FCC 47 CFR PART 15 SUBPART C**

**TEST REPORT**

**For**

**2.4GHz Digital Headphone**

**Model: DHP980**

**Brand: ARKON**

**Test Report Number:**

**C130307Z01-RP1**

Prepared for:

**Uni-Art Precise Products Ltd**

**11-12/F, Yue Xiu Industrial Building, 87 Hung To Road, Kowloon, Hong Kong**

Issued by:

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**Issued Date: April 12, 2013**



TESTING CERT #2861.01

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Revision History

Rev.	Issue No.	Revisions	Effect Page	Revised By
00	C130307Z01-RP1	Initial Issue	ALL	Amay Tang



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## 1 TEST RESULT CERTIFICATION

<b>Product:</b>	2.4GHz Digital Headphone
<b>Model:</b>	DHP980
<b>Brand:</b>	ARKON
<b>Tested:</b>	March 7 ~ April 11, 2013
<b>Applicant:</b>	<b>Uni-Art Precise Products Ltd</b> 11-12/F, Yue Xiu Industrial Building, 87 Hung To Road, Kowloon, Hong Kong
<b>Manufacturer:</b>	<b>Uni-Art Precise Products Ltd</b> 11-12/F, Yue Xiu Industrial Building, 87 Hung To Road, Kowloon, Hong Kong

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart C	No non-compliance noted

### We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4: 2009 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.207, 15.209 and 15.247.

The test results of this report relate only to the tested sample EUT identified in this report.

**Approved by:**

Tom Gan  
Supervisor of EMC Dept.  
Compliance Certification Service Inc.

**Reviewed by:**

Ruby Zhang  
Supervisor of Report Dept.  
Compliance Certification Service Inc.



## 2 EUT DESCRIPTION

<b>Product</b>	2.4GHz Digital Headphone
<b>Model Number</b>	DHP980
<b>Trade Name</b>	ARKON
<b>Model Discrepancy</b>	N/A
<b>Identify Number</b>	C130307Z01-RP1
<b>Power Supply</b>	DC5V supplied by the adapter
<b>Adapter Manufacturer / Model No.</b>	Dongguan Yinll Electronics Co., Ltd. YLS0041-T050055 Input: AC100-240V, 50/60Hz, 0.3A Output: DC5V, 550mA DC output cable: Unshielded, 1.80m
<b>Audio Cable</b>	Unshielded, 1.00m & Unshielded 0.20m
<b>Received Date</b>	March 7, 2013
<b>Frequency Range</b>	2406 ~ 2472 MHz
<b>Transmit Power</b>	11.33dBm
<b>Modulation Technique</b>	GFSK
<b>Number of Channels</b>	31Channels
<b>Antenna Specification</b>	PIFA Antenna: -1.7dBi (Max)
<b>Temperature Range</b>	-10°C ~ +55°C

**Note:** This submittal(s) (test report) is intended for FCC ID: MVADHP981-001T filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.



### 3 TEST METHODOLOGY

#### 3.1. DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

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

The following test mode(s) were scanned during the preliminary test below 1G:

Test Item	Test mode	Worse mode
Conducted Emission	Mode 1: Charging Mode 2: Play Music	Mode 1
Radiated Emission	Mode 1: TX	Mode 1

Above 1G, Channel Low (2406MHz) 、Mid (2444MHz) and High (2472MHz) were chosen for full testing for GFSK.



## 4 FACILITIES AND ACCREDITATIONS

### 4.1. FACILITIES

All measurement facilities used to collect the measurement data are located at **No.10-1, Mingkeda Logistics Park, NO.18, Huanguan south Rd.,Guan Lan Town, Baoan District, Shenzhen, China**

The sites are constructed in conformance with the requirements of ANSI C63.4:2009, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

### 4.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

<b>USA</b>	<b>A2LA</b>
<b>China</b>	<b>CNAS</b>

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

<b>USA</b>	<b>FCC</b>
<b>Japan</b>	<b>VCCI(C-3478, R-3135, T-652, G-642)</b>
<b>Canada</b>	<b>INDUSTRY CANADA</b>
<b>Taiwan</b>	<b>BSMI</b>
<b>Norway</b>	<b>Nemko</b>

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.ccsrf.com>

### 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

<b>Measurement</b>	<b>Frequency</b>	<b>Uncertainty</b>
Conducted emissions	9kHz~30MHz	+/- 3.18dB
Radiated emissions	30MHz ~ 200MHz	+/- 3.79dB
	200MHz ~1000MHz	+/- 3.62dB
	Above 1000MHz	+/- 5.04dB
Band Edges	+/-0.182 dB	

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

The measured result is above (below) the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to state compliance based on the 95% level of confidence. However, the result indicates that compliance (non-compliance) is more probable than non-compliance) with the specification limit.



## 5 SETUP OF EQUIPMENT UNDER TEST

### 5.1. SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

### 5.2. SUPPORT EQUIPMENT

No.	Equipment	Model No.	Serial No.	FCC ID	Trade Name	Data Cable	Power Cord
1	IPOD	A1285	YM908BYU3QX	N/A	iPod	N/A	N/A
2	2.4GHz Digital Headphone (RX)	DHP980	N/A	N/A	ARKON	N/A	N/A

**Note:**

Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.





## 6 FCC PART 15.247 REQUIREMENTS

### 6.1. 20DB BANDWIDTH

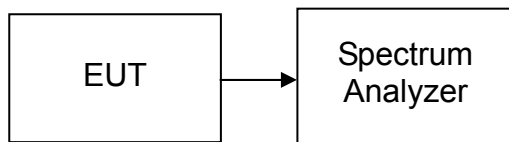
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

### MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	Agilent	E4446A	US44300399	03/09/2013	03/08/2014

**Remark:** Each piece of equipment is scheduled for calibration once a year.

### TEST CONFIGURATION



### TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT, then connect a low loss RF cable from antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=100kHz, VBW=300kHz, Span=5MHz, Sweep = auto.
4. Mark the peak frequency and 20dB (upper and lower) frequency.
5. Repeat until all the test channels are investigated.

### TEST RESULTS

No non-compliance noted

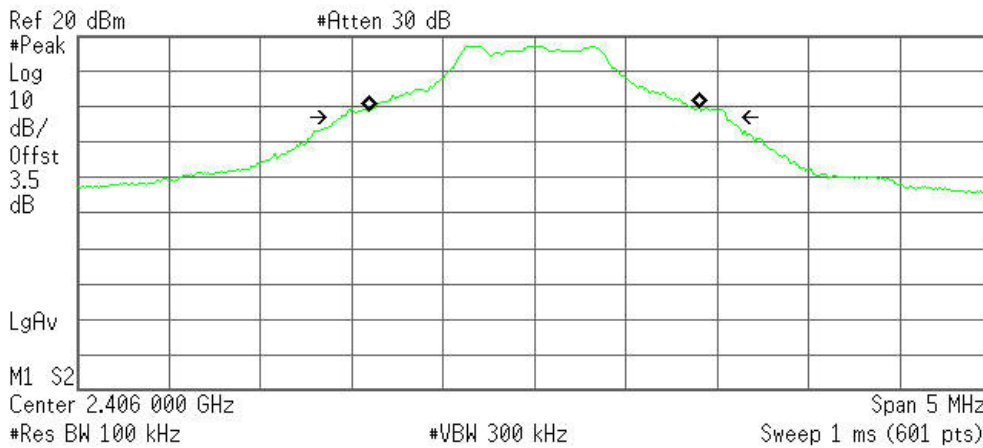


## Test plot

### 20dB Bandwidth (CH Low)

Agilent

R T



Occupied Bandwidth  
1.8034 MHz

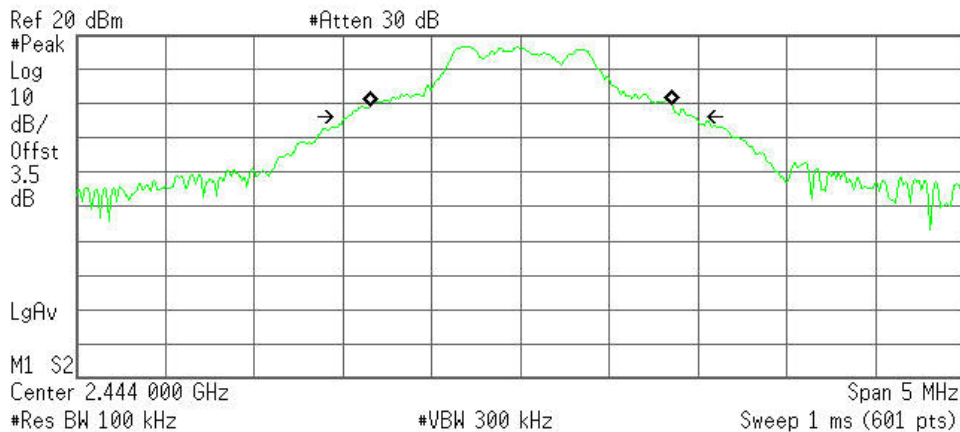
Occ BW % Pwr 99.00 %  
x dB -20.00 dB

Transmit Freq Error -1.780 kHz  
x dB Bandwidth 2.117 MHz

### 20dB Bandwidth (CH Mid)

Agilent

R T



Occupied Bandwidth  
1.6898 MHz

Occ BW % Pwr 99.00 %  
x dB -20.00 dB

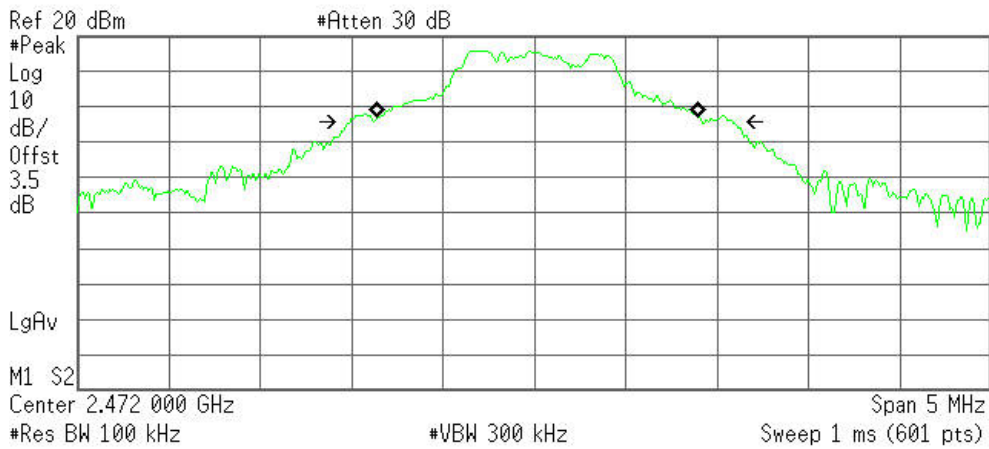
Transmit Freq Error 2.266 kHz  
x dB Bandwidth 1.927 MHz



## 20dB Bandwidth (CH High)

Agilent

R T



Occupied Bandwidth  
1.7511 MHz

Occ BW % Pwr 99.00 %  
x dB -20.00 dB

Transmit Freq Error 19.808 kHz  
x dB Bandwidth 2.100 MHz



## 6.2. PEAK POWER

### LIMIT

The maximum peak output power of the intentional radiator shall not exceed the following:

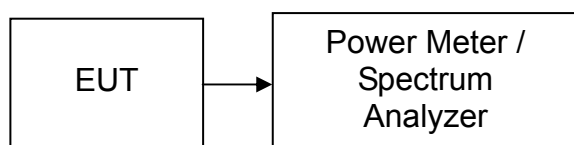
1. For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.
2. Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6dBi.
3. The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Power Meter	Anritsu	ML2495A	1204003	03/09/2013
Spectrum Analyzer	Agilent	E4446A	US44300399	03/09/2013
Power Sensor	Anritsu	MA2411B	1126150	03/09/2013

**Remark:** Each piece of equipment is scheduled for calibration once a year.

### Test Configuration



### TEST PROCEDURE

The transmitter output is connected to the RF Power Meter. The RF Power Meter is set to the peak power detection.



## **TEST RESULTS**

*No non-compliance noted*

### **Test Data**

Channel	Frequency (MHz)	Reading Power (dBm)	Factor (dB)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2406	11.26	3.50	14.76	0.02992	1	PASS
Mid	2444	11.33	3.50	14.83	0.03041		PASS
High	2472	10.83	3.50	14.33	0.02710		PASS



### 6.3. PEAK POWER SPECTRAL DENSITY

#### LIMIT

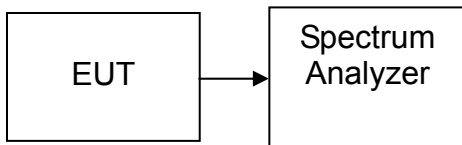
1. For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.
2. The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

#### MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	Agilent	E4446A	US44300399	03/09/2013	03/08/2014

**Remark:** Each piece of equipment is scheduled for calibration once a year.

#### Test Configuration



#### TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 3kHz, VBW = 10kHz, Span = 300kHz, Sweep=100s
4. Record the max. reading.
5. Repeat the above procedure until the measurements for all frequencies are completed.

#### TEST RESULTS

*Not applicable. Since EUT is the FHSS device.*



## 6.4. BAND EDGES MEASUREMENT

### LIMIT

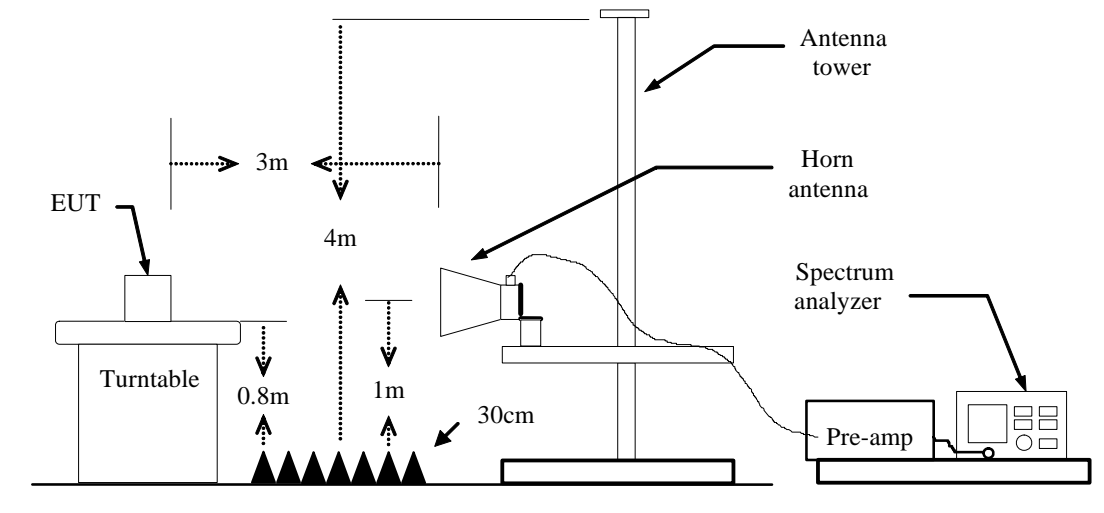
According to §15.247(c), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power. 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).

### MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
PSA Series Spectrum Analyzer	Agilent	E4446A	US44300399	03/09/2013	03/08/2014
ESCI EMI TEST RECEIVER.ESCI	ROHDE&SCHWARZ	ESCI	100783	03/09/2013	03/08/2014
Amplifier	MITEQ	AM-1604-3000	1123808	03/18/2013	03/18/2014
High Noise Amplifier	Agilent	8449B	3008A01838	03/18/2013	03/18/2014
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	06/21/2012	06/21/2013
Bilog Antenna	SCHAFFNER	CBL6143	5082	03/02/2013	03/01/2014
Horn Antenna	SCHWARZBECK	BBHA9120	D286	03/02/2013	03/01/2014
Loop Antenna	A、R、A	PLA-1030/B	1029	03/23/2013	03/23/2014
Turn Table	N/A	N/A	N/A	N.C.R	N.C.R
Controller	Sunol Sciences	SC104V	022310-1	N.C.R	N.C.R
Controller	CT	N/A	N/A	N.C.R	N.C.R
Temp. / Humidity Meter	Anymetre	JR913	N/A	03/04/2013	03/03/2014
Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			



## **Test Configuration**



## **TEST PROCEDURE**

1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
  - (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
  - (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

## **TEST RESULTS**

Refer to attach spectrum analyzer data chart.





## Test Data

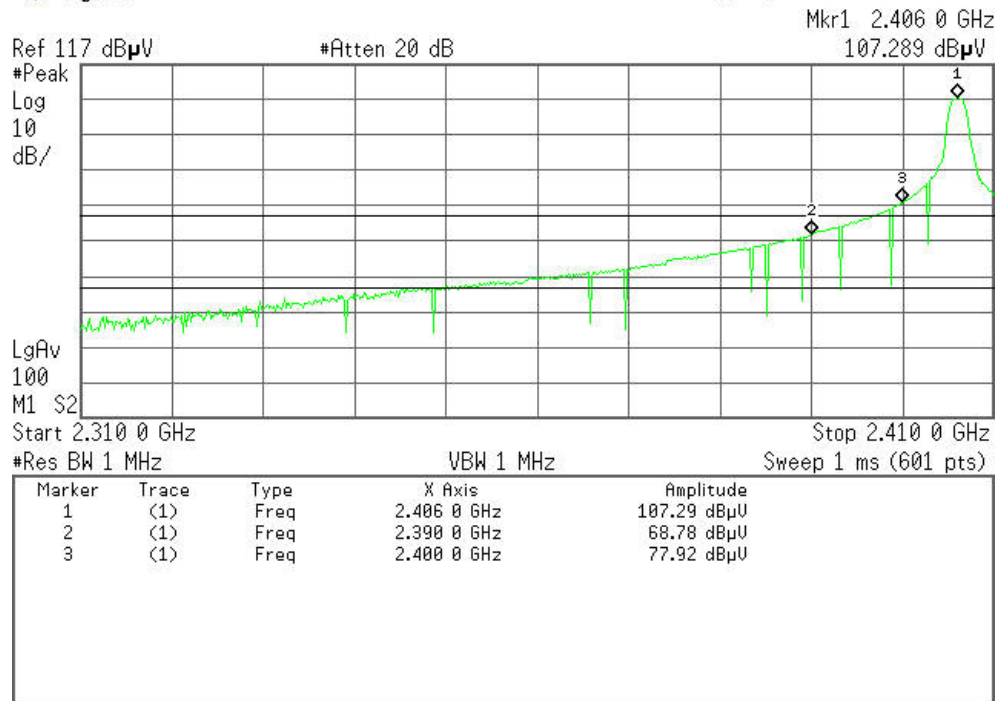
### Band Edges (CH-Low)

Detector mode: Peak

Polarity: Vertical

Agilent

R T

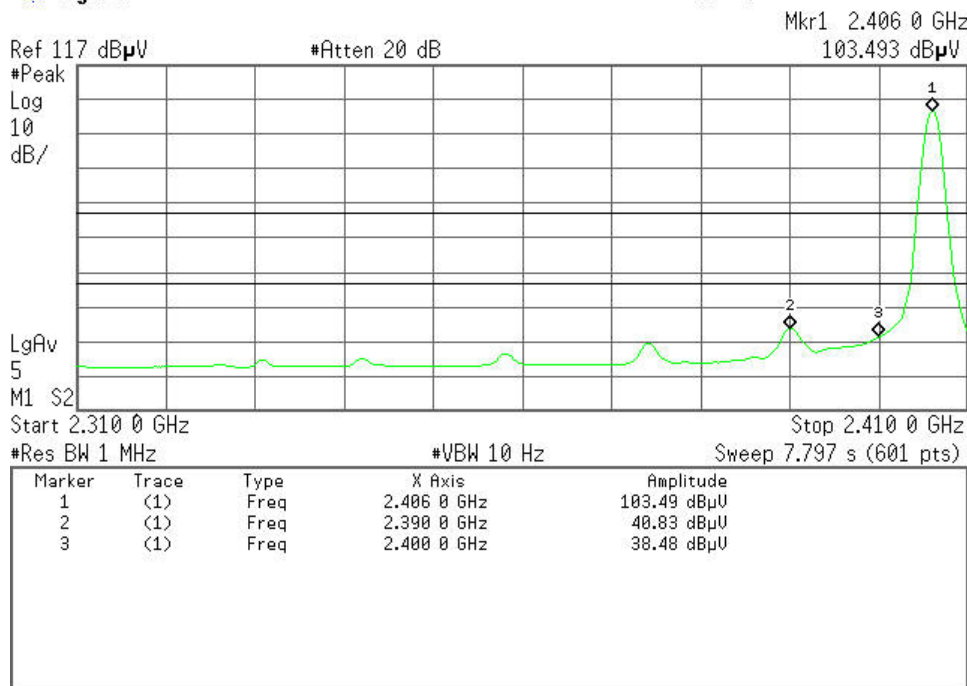


Detector mode: Average

Polarity: Vertical

Agilent

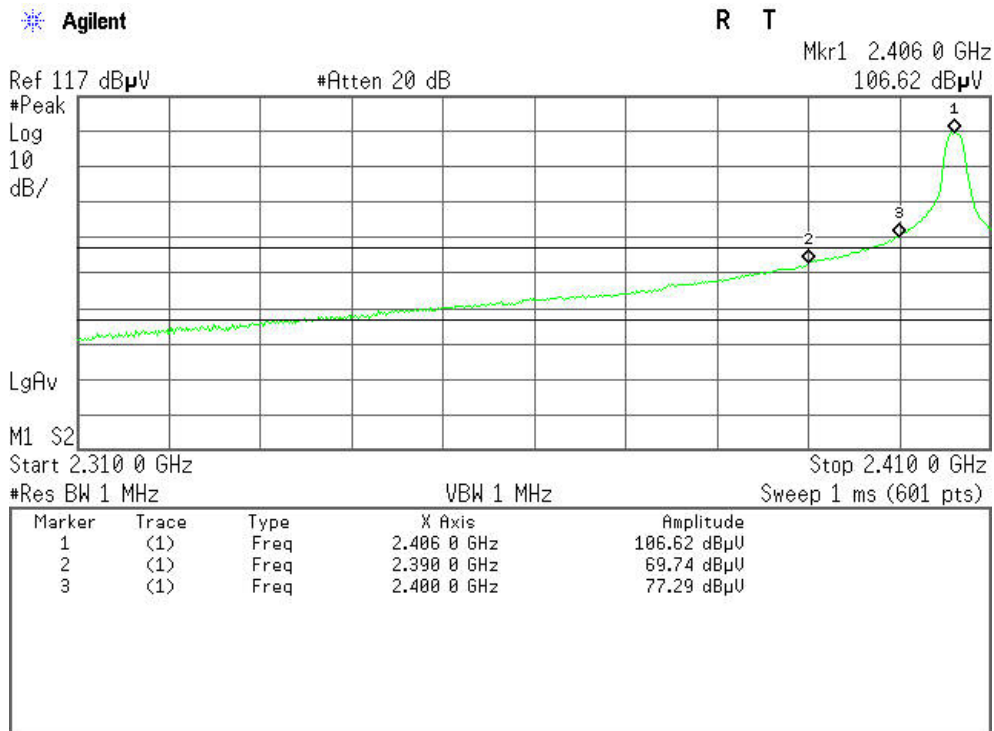
R T





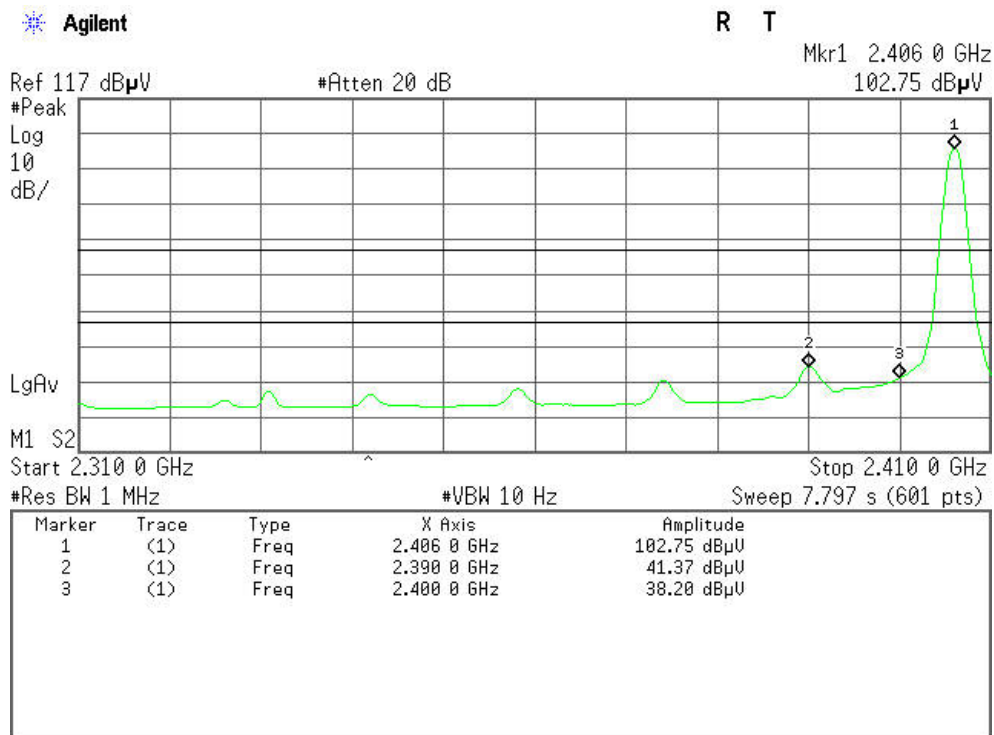
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal





## Band Edges (CH-High)

Detector mode: Peak

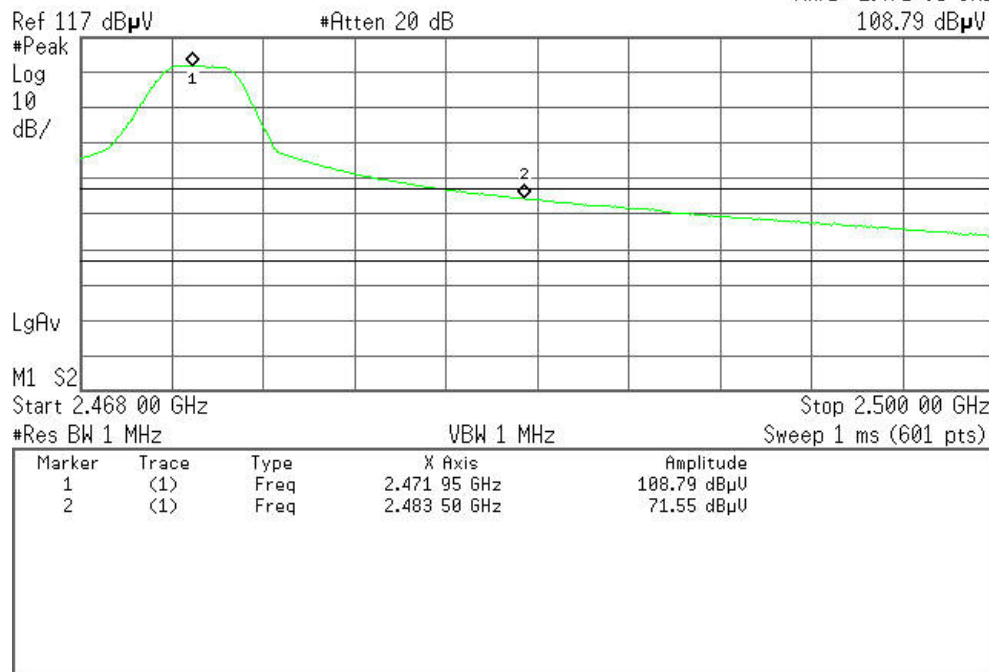
Polarity: Vertical

Agilent

R T

Mkr1 2.471 95 GHz

108.79 dBμV



Detector mode: Average

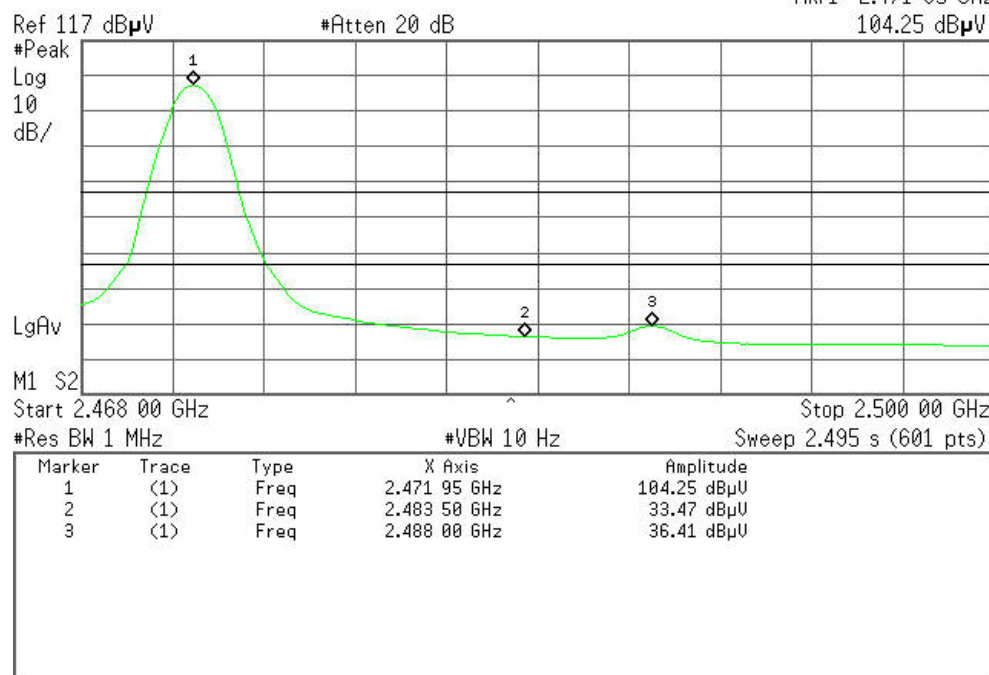
Polarity: Vertical

Agilent

R T

Mkr1 2.471 95 GHz

104.25 dBμV





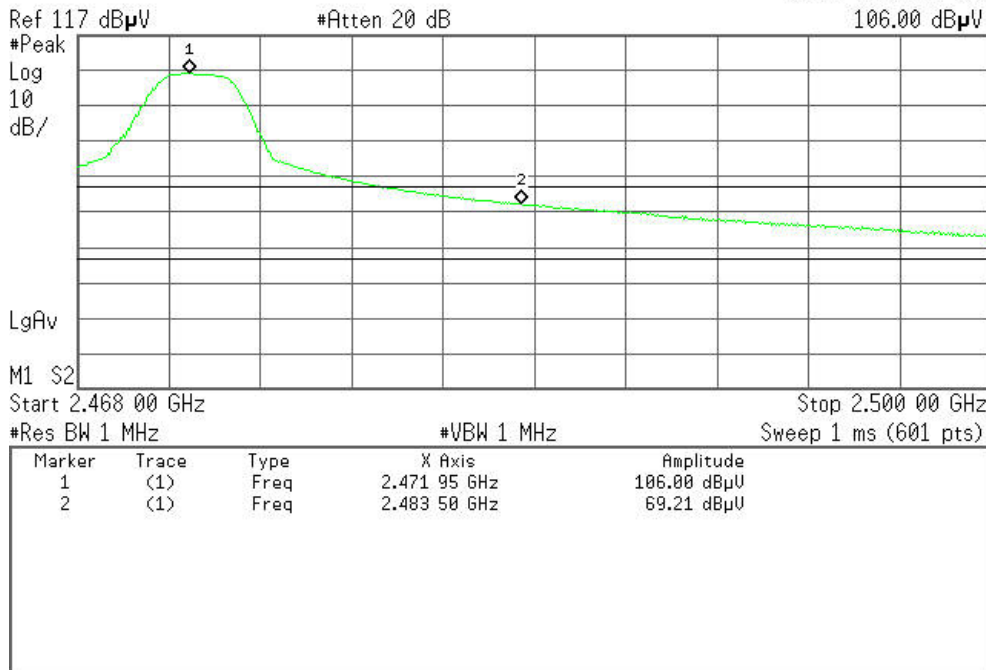
Detector mode: Peak

Polarity: Horizontal

Agilent

R T

Mkr1 2.471 95 GHz



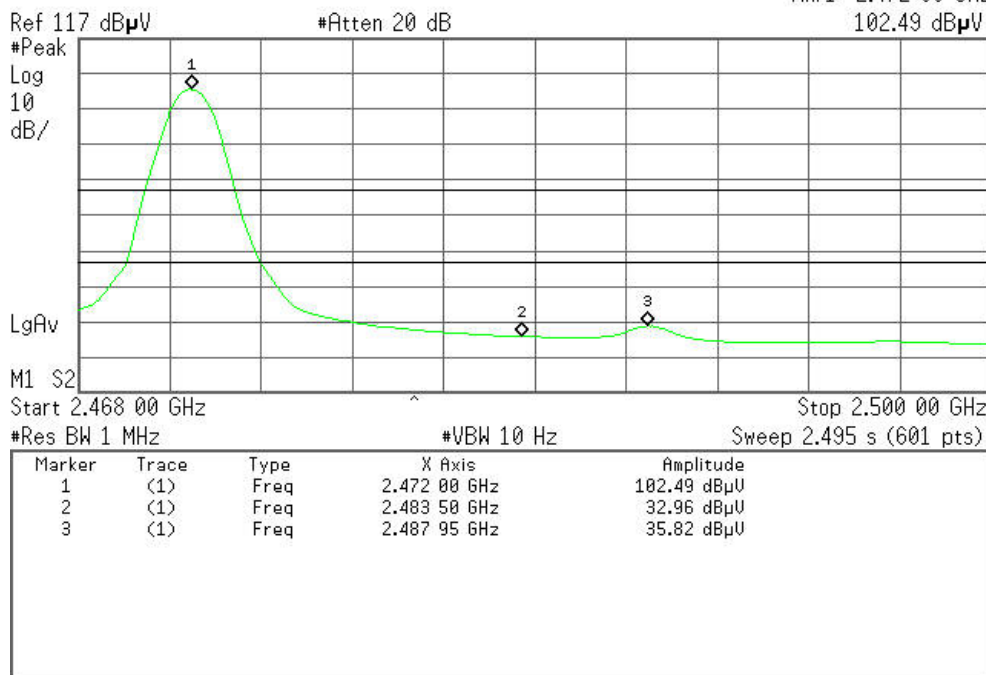
Detector mode: Average

Polarity: Horizontal

Agilent

R T

Mkr1 2.472 00 GHz





## 6.5. FREQUENCY SEPARATION

### LIMIT

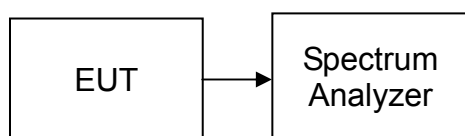
According to §15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

### MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	Agilent	E4446A	US44300399	03/09/2013	03/08/2014

**Remark:** Each piece of equipment is scheduled for calibration once a year.

### Test Configuration



## TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = middle of hopping channel.
4. Set the spectrum analyzer as RBW=30kHz, VBW=30kHz, Adjust Span to 8 MHz, Sweep = auto.
5. Max hold. Mark 3 Peaks of hopping channel and record the 3 peaks frequency.

## TEST RESULTS

*No non-compliance noted*

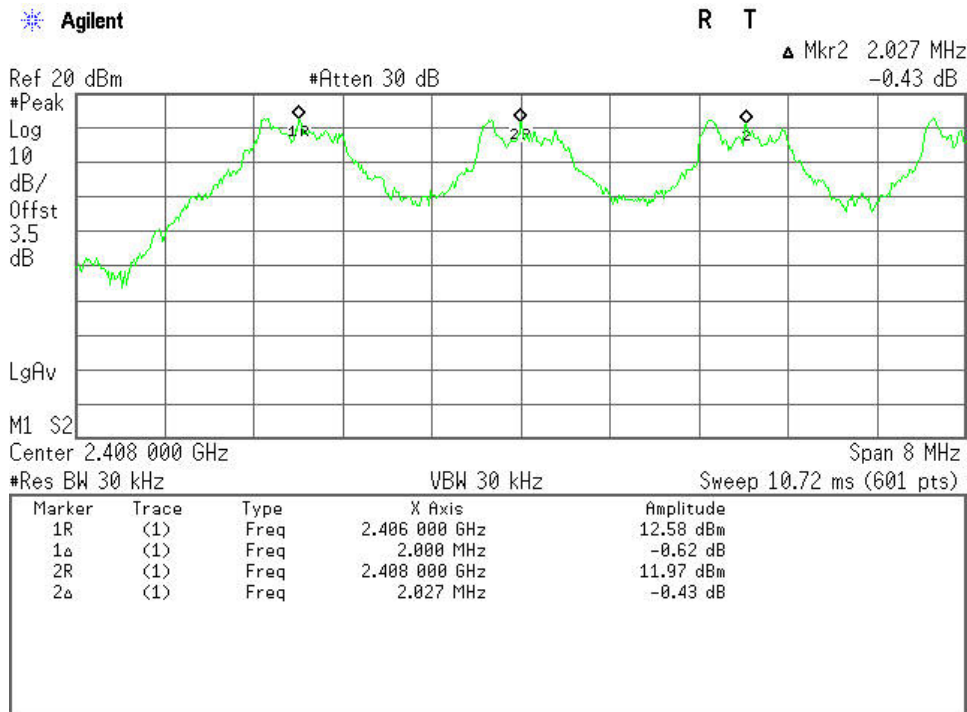
### Test Data

Channel Separation (MHz)	Two-thirds of the 20 dB Bandwidth (kHz)	Channel Separation Limit	Result
2.000	1411.33	> Two-thirds of the 20 dB Bandwidth	Pass

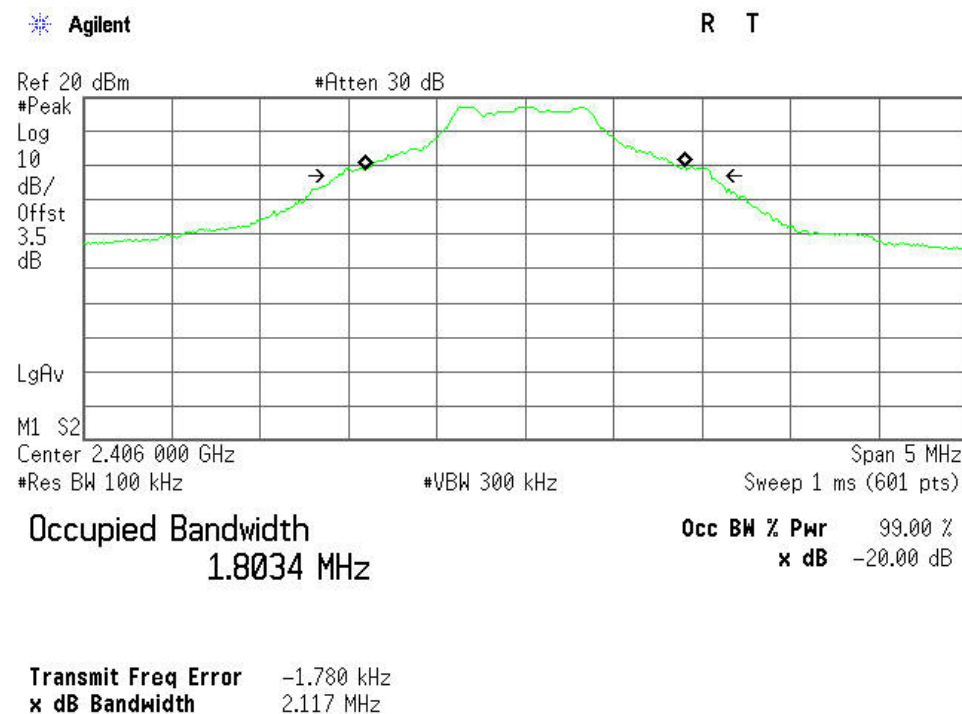


## Test Plot

### Measurement of Channel Separation



### 20 dB bandwidth(CH High)





## 6.6. NUMBER OF HOPPING FREQUENCY

### LIMIT

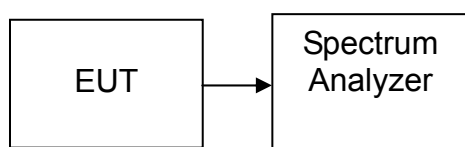
According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands shall use at least 15 hopping frequencies.

### MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	Agilent	E4446A	US44300399	03/09/2013	03/08/2014

**Remark:** Each piece of equipment is scheduled for calibration once a year.

### Test Configuration



### TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set spectrum analyzer Start=2400MHz, Stop = 2480MHz, Sweep = 1.08ms
4. Set the spectrum analyzer as RBW, VBW=300kHz,
5. Max hold, view and count how many channel in the band.

### TEST RESULTS

*No non-compliance noted*

### Test Data

#### GFSK

Result (No. of CH)	Limit (No. of CH)	Result
31	≥ 15	PASS

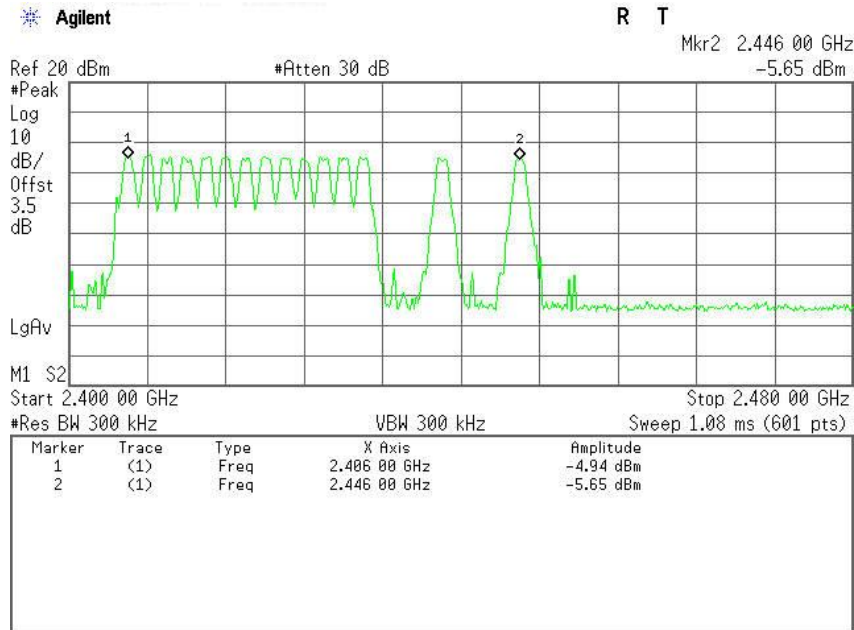




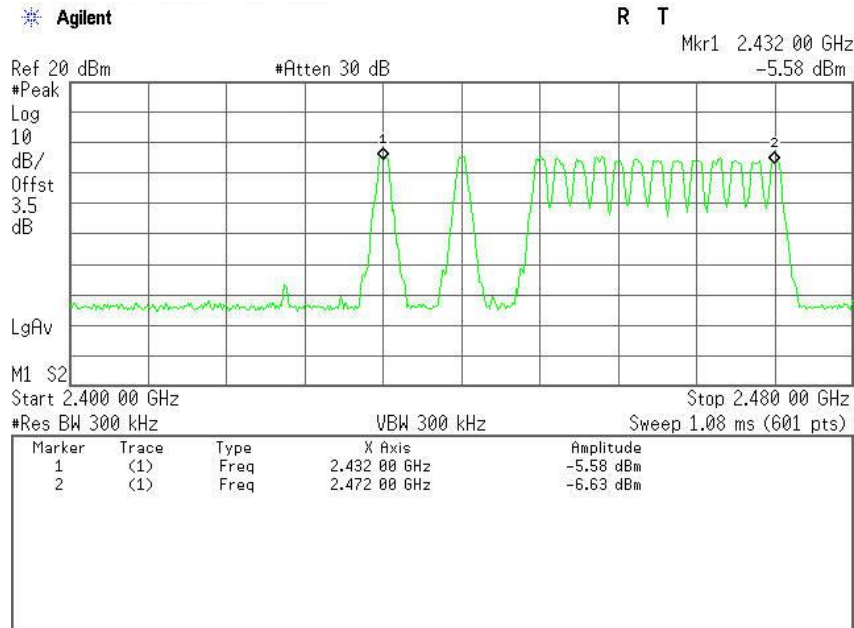
## Test Plot

### Channel Number

#### 2.400 GHz – 2.480GHz



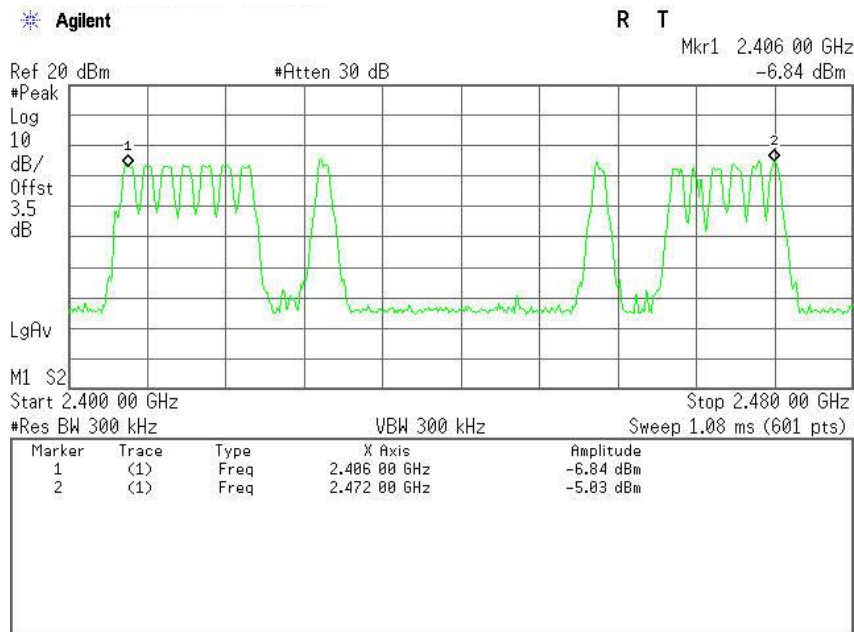
#### 2.400 GHz – 2.480GHz



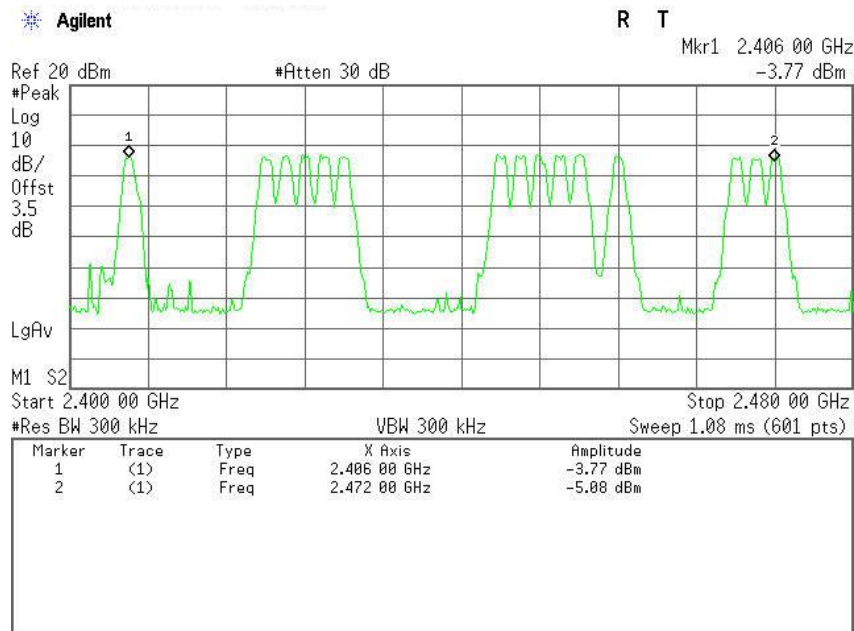




## 2.400 GHz – 2.480GHz



## 2.400 GHz – 2.480GHz





## 6.7. TIME OF OCCUPANCY (DWELL TIME)

### LIMIT

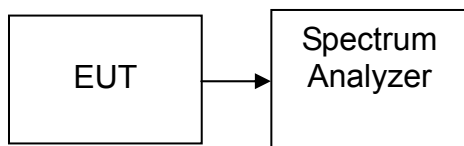
According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands. The average time of occupancy on any channels shall not greater than 0.4 s within a period 0.4 s multiplied by the number of hopping channels employed.

### MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	Agilent	E4446A	US44300399	03/09/2013	03/08/2014

**Remark:** Each piece of equipment is scheduled for calibration once a year.

### Test Configuration



### TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=1MHz, Span = 0Hz, Sweep = auto.
5. Repeat above procedures until all frequency measured were complete.



## **TEST RESULTS**

*No non-compliance noted*

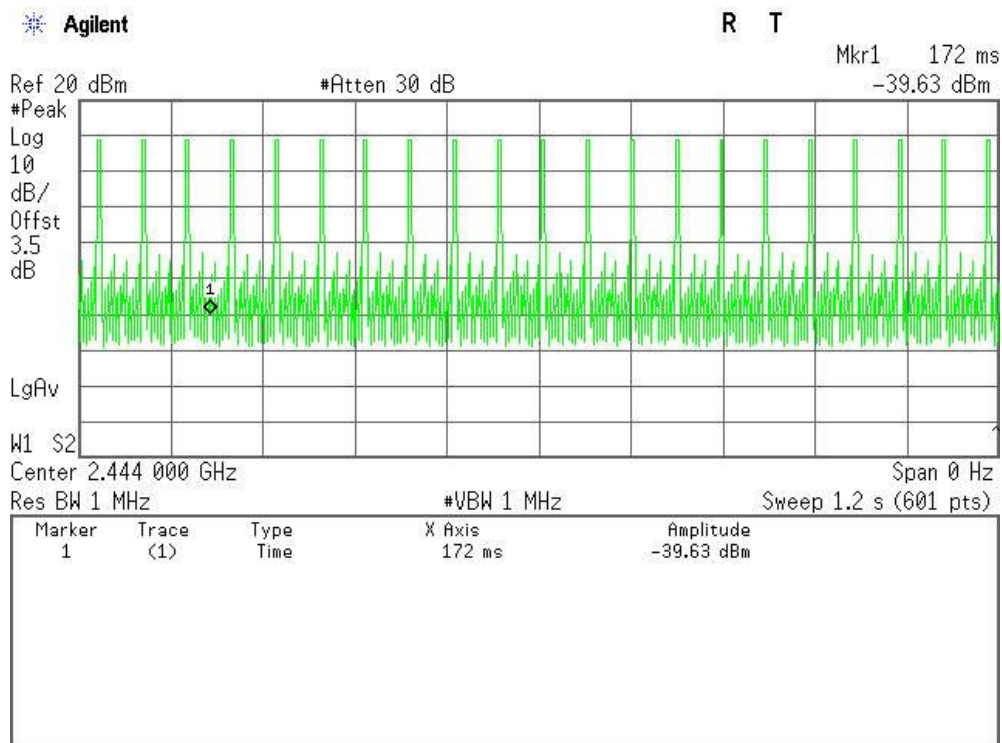
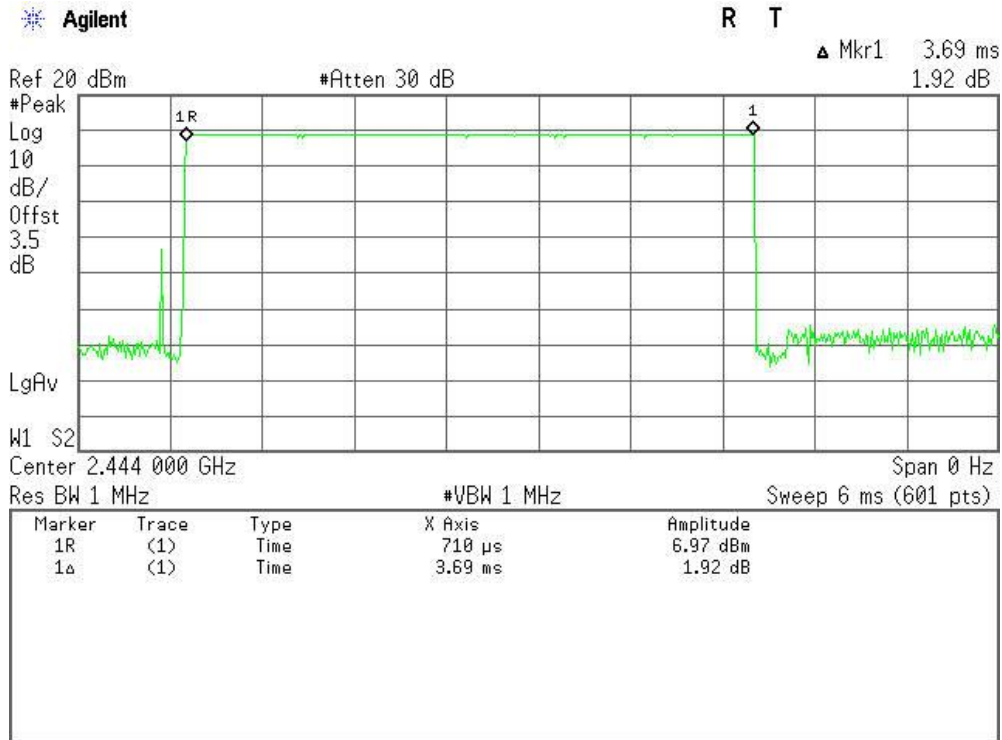
### **Test Data**

CH Mid:  $3.69 * (15 * 0.4 / 1.2) * 21 = 387.45(\text{ms})$

CH	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
Mid	3.69	387.45	6.0	400.00	PASS



## Test Plot





## 6.8. SPURIOUS EMISSIONS

### 6.8.1. Conducted Measurement

#### **LIMIT**

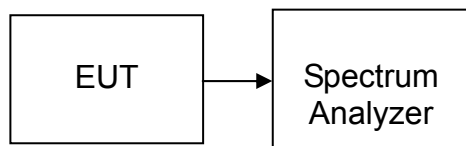
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

#### **MEASUREMENT EQUIPMENT USED**

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	Agilent	E4446A	US44300399	03/09/2013	03/08/2014

**Remark:** Each piece of equipment is scheduled for calibration once a year.

#### **Test Configuration**



#### **TEST PROCEDURE**

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 KHz. The video bandwidth is set to 100 KHz.

Measurements are made over the 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

#### **TEST RESULTS**

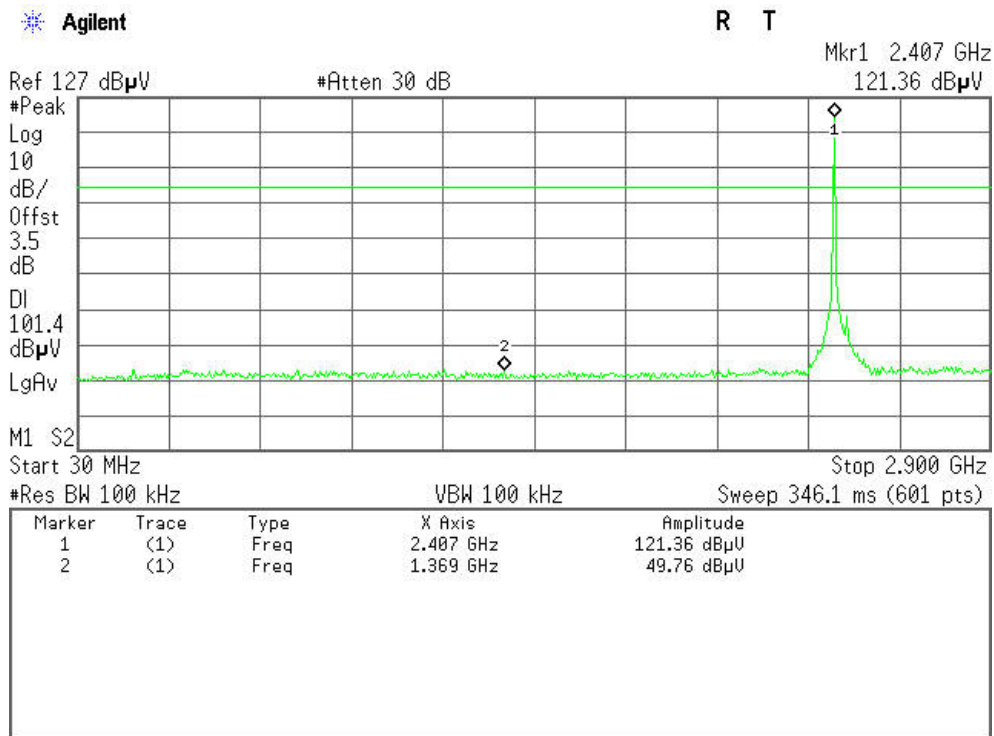
*No non-compliance noted*



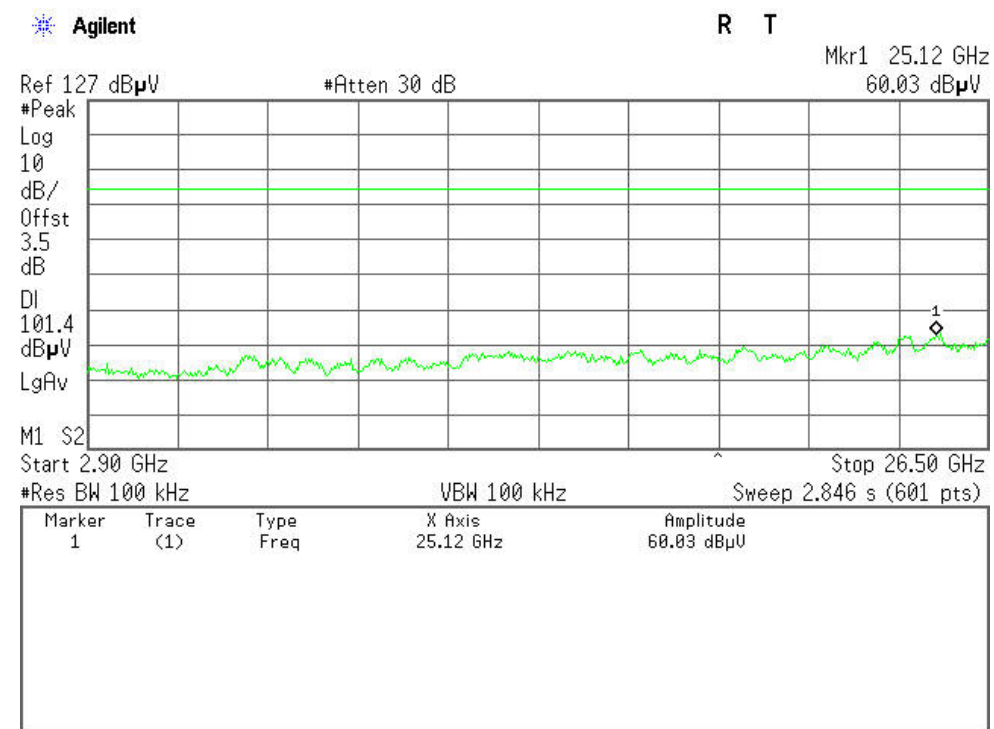
## Test Plot

### CH Low

#### 30MHz ~2.9GHz



#### 2.9MHz ~26.5GHz



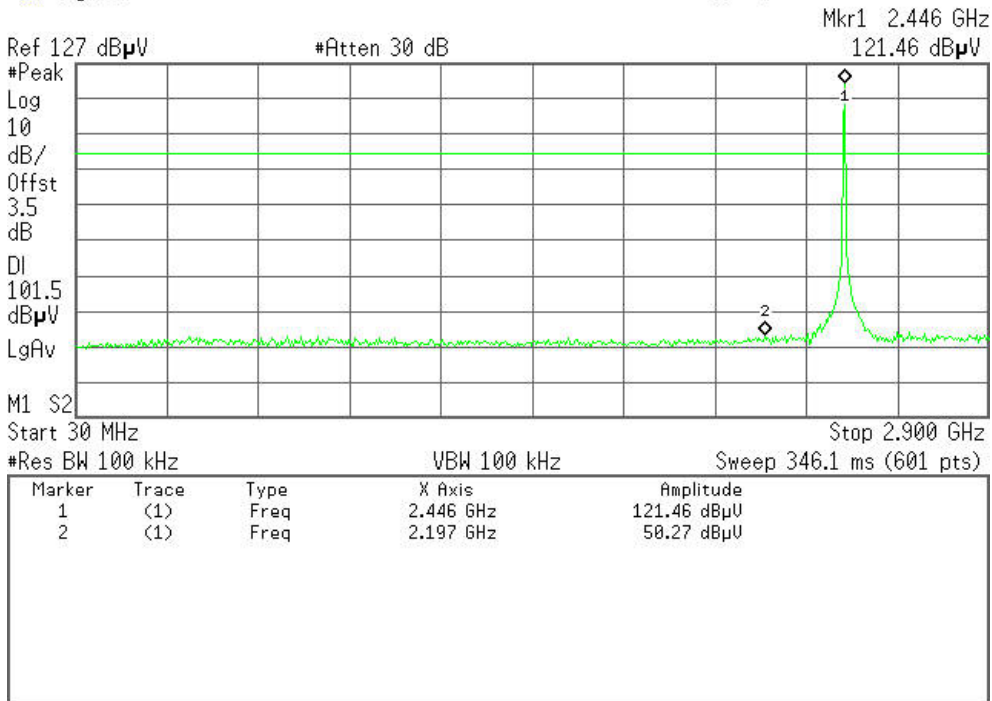


## CH Mid

### 30MHz ~ 2.9GHz

Agilent

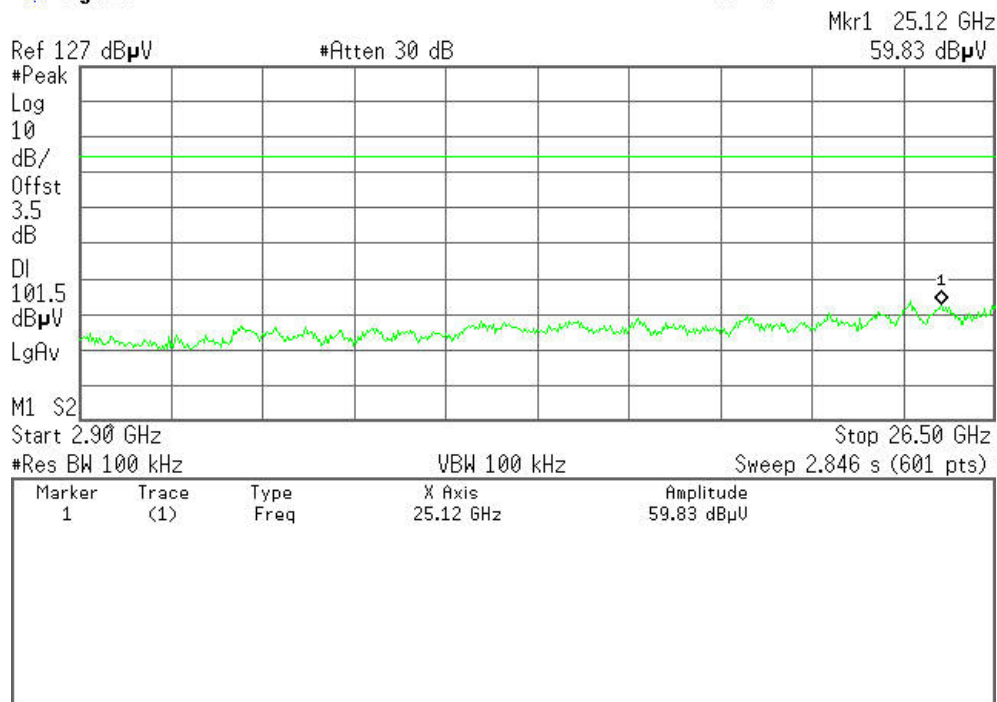
R T



### 2.9GHz ~ 26.5GHz

Agilent

R T



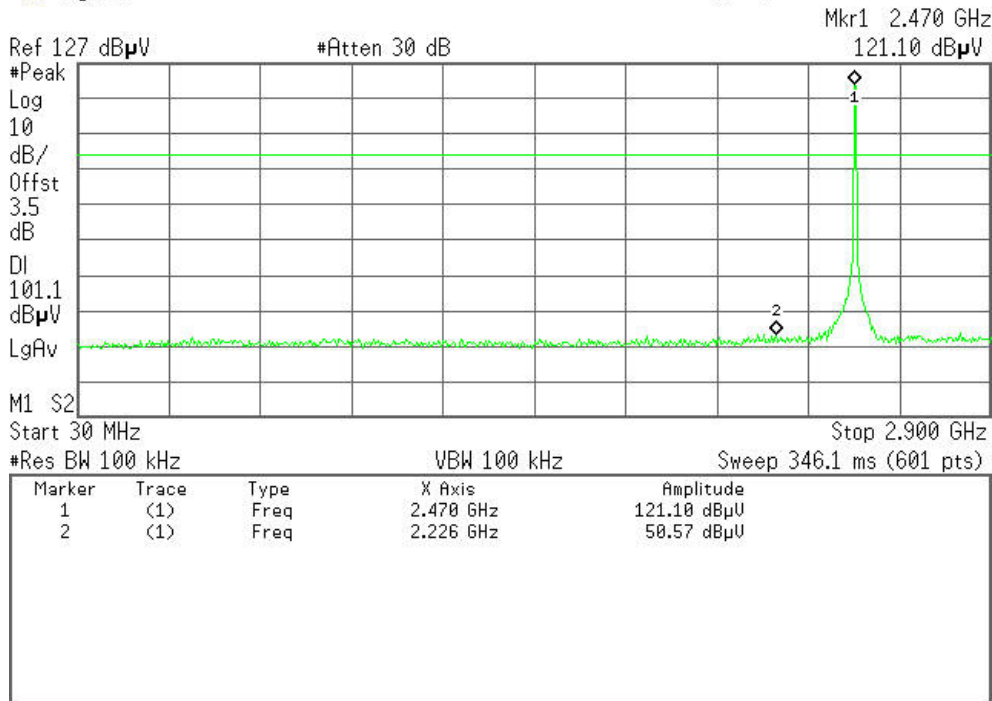


## CH High

### 30MHz ~ 2.9GHz

Agilent

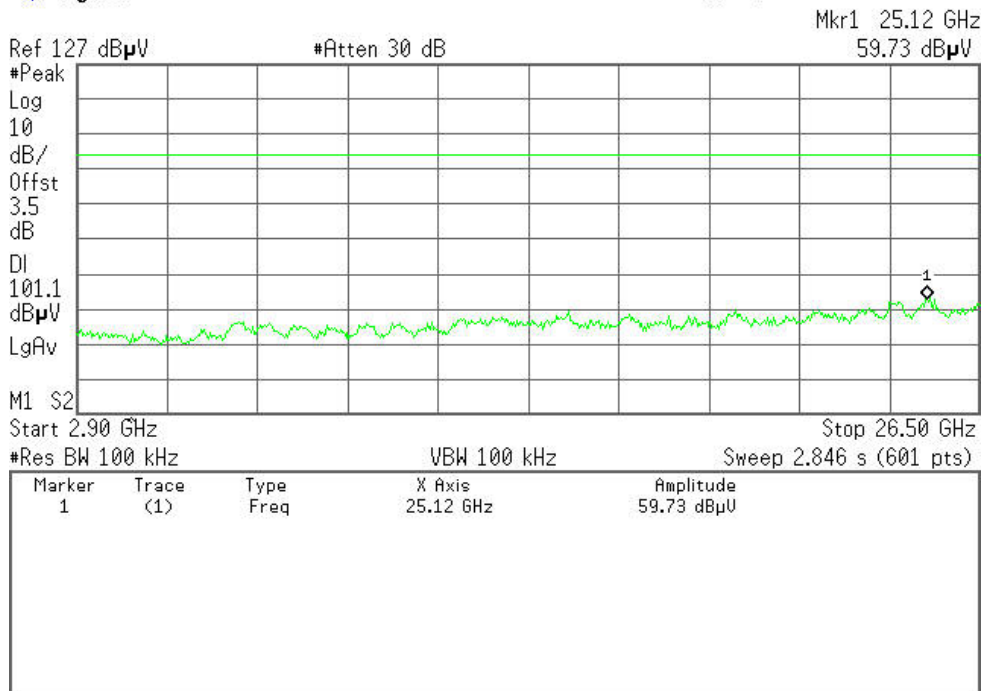
R T



### 2.9GHz ~ 26.5GHz

Agilent

R T







## 6.8.2. Radiated Emissions

### LIMIT

1. Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (mV/m)	Measurement Distance (m)
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

**Note:** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

2. In the above emission table, the tighter limit applies at the band edges.

Frequency (Hz)	Field Strength ( $\mu$ V/m at 3-meter)	Field Strength (dB $\mu$ V/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54



## **MEASUREMENT EQUIPMENT USED**

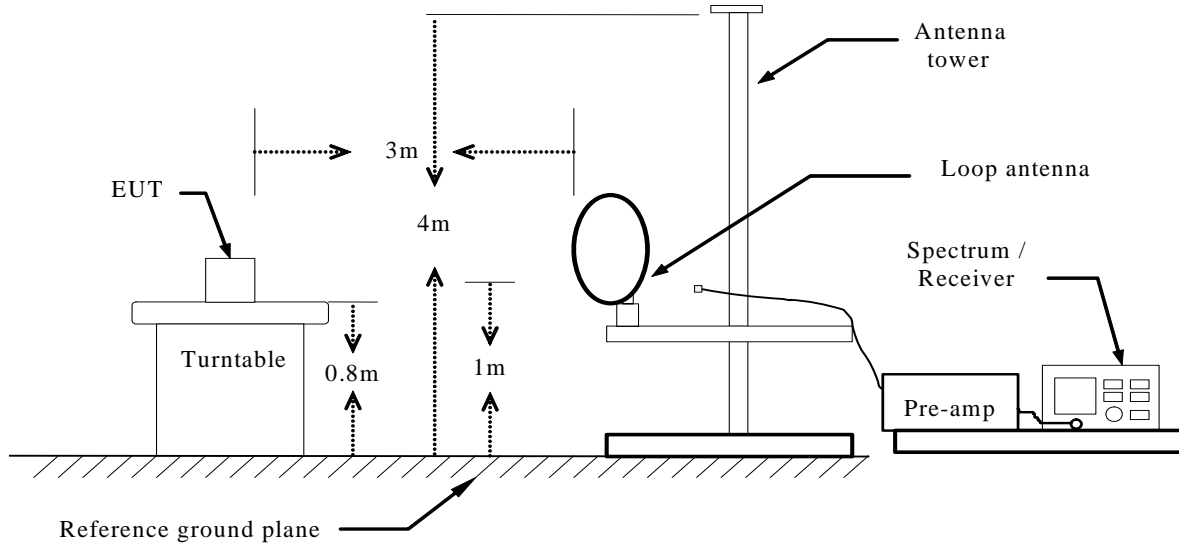
<b>Radiated Emission Test Site 966 (2)</b>					
<b>Name of Equipment</b>	<b>Manufacturer</b>	<b>Model Number</b>	<b>Serial Number</b>	<b>Last Calibration</b>	<b>Due Calibration</b>
PSA Series Spectrum Analyzer	Agilent	E4446A	US44300399	03/09/2013	03/08/2014
ESCI EMI TEST RECEIVER.ESCI	ROHDE&SCHWARZ	ESCI	100783	03/09/2013	03/08/2014
Amplifier	MITEQ	AM-1604-3000	1123808	03/18/2013	03/18/2014
High Noise Amplifier	Agilent	8449B	3008A01838	03/18/2013	03/18/2014
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	06/21/2012	06/21/2013
Bilog Antenna	SCHAFFNER	CBL6143	5082	03/02/2013	03/01/2014
Horn Antenna	SCHWARZBECK	BBHA9120	D286	03/02/2013	03/01/2014
Loop Antenna	A、R、A	PLA-1030/B	1029	03/23/2013	03/23/2014
Turn Table	N/A	N/A	N/A	N.C.R	N.C.R
Controller	Sunol Sciences	SC104V	022310-1	N.C.R	N.C.R
Controller	CT	N/A	N/A	N.C.R	N.C.R
Temp. / Humidity Meter	Anymetre	JR913	N/A	03/04/2013	03/03/2014
Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			

**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The FCC Site Registration number is 93105/90471.  
3. N.C.R = No Calibration Required.

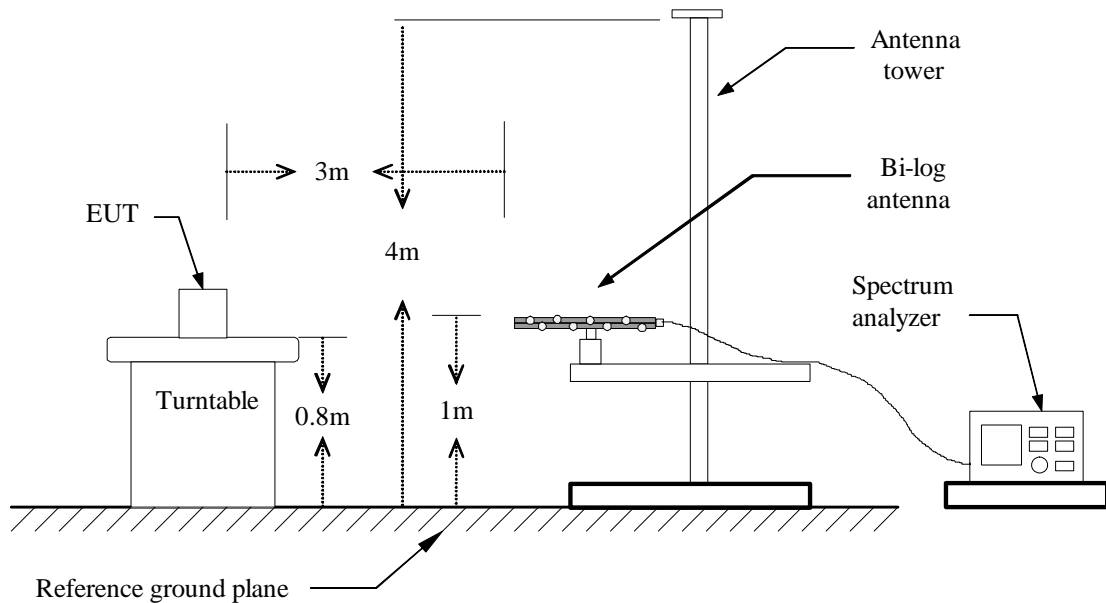


## Test Configuration

### Below 30MHz

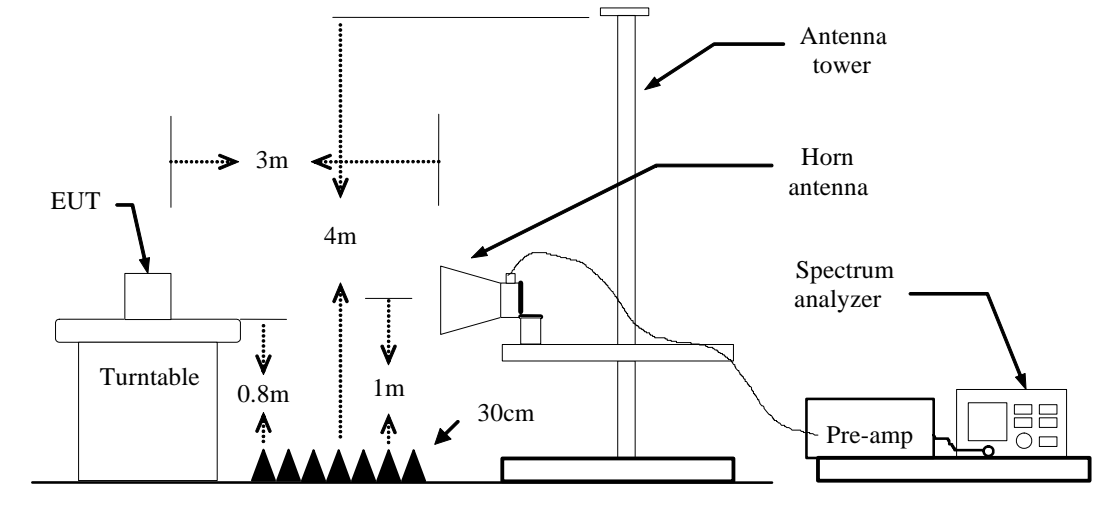


### Below 1 GHz





## Above 1 GHz



## TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.



## TEST RESULTS

### Below 1 GHz

Operation Mode: TX

Test Date: April 1, 2013

Temperature: 24°C

Tested by: Leevin Li

Humidity: 52% RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
36.4667	42.81	-13.55	29.26	40.00	-10.74	V	QP
118.9167	48.10	-20.30	27.80	43.50	-15.70	V	QP
190.0500	47.36	-18.86	28.50	43.50	-15.00	V	QP
432.5500	48.90	-14.80	34.10	46.00	-11.90	V	QP
463.2667	49.28	-14.97	34.31	46.00	-11.69	V	QP
768.8167	39.15	-10.87	28.28	46.00	-17.72	V	QP
36.4667	46.15	-13.55	32.60	40.00	-7.40	H	QP
122.1500	46.65	-20.19	26.46	43.50	-17.04	H	QP
190.0500	47.41	-18.86	28.55	43.50	-14.95	H	QP
432.5500	49.13	-14.80	34.33	46.00	-11.67	H	QP
463.2667	49.72	-14.97	34.75	46.00	-11.25	H	QP
767.2000	39.89	-10.92	28.97	46.00	-17.03	H	QP

**Remark:** No emission found between lowest internal used/generated frequency to 30MHz.

#### Notes:

1. Measuring frequencies from 9kHz to the 1GHz.
2. Radiated emissions measured in frequency range from 30MHz to 1GHz were made with an instrument using Peak/Quasi-peak detector mode.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. The IF bandwidth of Receiver between 30MHz to 1GHz was 120kHz.

**Above 1 GHz****Operation Mode:** TX / CH Low**Test Date:** April 1, 2013**Temperature:** 24°C**Tested by:** Leevin Li**Humidity:** 52% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1425.0000	47.95	-7.94	40.01	74.00	-33.99	V	Peak
3380.0000	47.03	-4.01	43.02	74.00	-30.98	V	Peak
4825.0000	48.40	0.52	48.92	74.00	-25.08	V	Peak
5788.3333	44.17	2.73	46.90	74.00	-27.10	V	Peak
6383.3333	45.48	4.21	49.69	74.00	-24.31	V	Peak
6950.0000	44.72	6.09	50.81	74.00	-23.19	V	Peak
3153.3332	48.32	-4.12	44.20	74.00	-29.80	H	Peak
4230.0000	44.92	-1.47	43.45	74.00	-30.55	H	Peak
4825.0000	47.08	0.52	47.60	74.00	-26.40	H	Peak
6411.6665	43.90	4.29	48.19	74.00	-25.81	H	Peak
6978.3333	45.18	6.24	51.42	74.00	-22.58	H	Peak
9613.3333	49.20	10.29	59.49	74.00	-14.51	H	Peak
9613.3333	39.98	10.29	50.27	54.00	-3.73	H	AVG

**REMARKS:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX / CH Mid**Test Date:** April 1, 2013**Temperature:** 24°C**Tested by:** Leevin Li**Humidity:** 52% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
3805.0000	45.59	-2.49	43.10	74.00	-30.90	V	Peak
4286.6667	45.84	-1.25	44.59	74.00	-29.41	V	Peak
5306.6667	44.45	1.53	45.98	74.00	-28.02	V	Peak
6015.0000	45.00	3.13	48.13	74.00	-25.87	V	Peak
6780.0000	45.10	5.43	50.53	74.00	-23.47	V	Peak
6950.0000	45.25	6.09	51.34	74.00	-22.66	V	Peak
3125.0000	45.84	-4.15	41.69	74.00	-32.31	H	Peak
3606.6667	45.90	-2.99	42.91	74.00	-31.09	H	Peak
4258.3333	45.37	-1.36	44.01	74.00	-29.99	H	Peak
4853.3333	45.28	0.65	45.93	74.00	-28.07	H	Peak
5760.0000	44.80	2.61	47.41	74.00	-26.59	H	Peak
6921.6667	44.63	5.95	50.58	74.00	-23.42	H	Peak

**REMARKS:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).



**Operation Mode:** TX / CH High  
**Temperature:** 24°C  
**Humidity:** 52% RH

**Test Date:** April 1, 2013  
**Tested by:** Leevin Li  
**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBUV)	Correction Factor (dB/m)	Result (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1283.3333	49.22	-8.36	40.86	74.00	-33.14	V	Peak
3238.3333	46.83	-4.07	42.76	74.00	-31.24	V	Peak
3861.6667	45.60	-2.50	43.10	74.00	-30.90	V	Peak
4995.0000	45.35	1.30	46.65	74.00	-27.35	V	Peak
5845.0000	44.38	2.85	47.23	74.00	-26.77	V	Peak
6921.6667	46.36	5.95	52.31	74.00	-21.69	V	Peak
2841.6667	47.82	-4.87	42.95	74.00	-31.05	H	Peak
3776.6667	47.10	-2.55	44.55	74.00	-29.45	H	Peak
4258.3333	45.35	-1.36	43.99	74.00	-30.01	H	Peak
4938.3333	46.51	1.04	47.55	74.00	-26.45	H	Peak
6156.6667	45.56	3.55	49.11	74.00	-24.89	H	Peak
6695.0000	45.38	5.14	50.52	74.00	-23.48	H	Peak

**REMARKS:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBUV/m) – Average limit (dBUV/m).





## 6.9. POWER LINE CONDUCTED EMISSIONS

### LIMIT

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dB $\mu$ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

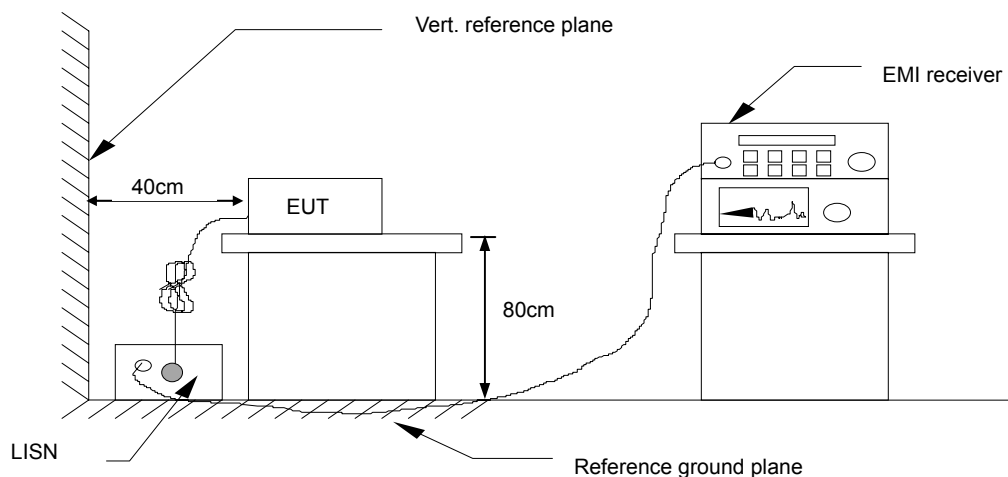
### MEASUREMENT EQUIPMENT USED

Conducted Emission Test Site					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
ESCI EMI TEST RECEIVER.ESCI	ROHDE&SCHWARZ	ESCI	100783	03/09/2013	03/08/2014
LISN(EUT)	ROHDE&SCHWARZ	ENV216	101543-WX	09/20/2012	09/20/2013
LISN	EMCO	3825/2	8901-1459	03/09/2013	03/08/2014
Temp. / Humidity Meter	VICTOR	HTC-1	N/A	03/04/2013	03/03/2014
Test S/W	FARAD	EZ-EMC/ CCS-3A1-CE			

**Remark:** Each piece of equipment is scheduled for calibration once a year.



## Test Configuration



See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

## TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

## TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

**Test Data**

<b>Model No.</b>	DHP980	<b>RBW,VBW</b>	9 kHz
<b>Environmental Conditions</b>	22°C, 45% RH	<b>Test Mode</b>	Mode 1
<b>Tested by</b>	Leevin Li		

(The chart below shows the highest readings taken from the final data.)

Frequency (MHz)	QuasiPeak Reading (dBuV)	Average Reading (dBuV)	Correction Factor (dB)	QuasiPeak Result (dBuV)	Average Result (dBuV)	QuasiPeak Limit (dBuV)	Average Limit (dBuV)	QuasiPeak Margin (dB)	Average Margin (dB)	Line (L1/L2)
0.3500	40.64	22.98	9.64	50.28	32.62	58.96	48.96	-8.68	-16.34	L1
0.8940	33.45	11.45	9.68	43.13	21.13	56.00	46.00	-12.87	-24.87	L1
2.0100	33.19	11.85	9.68	42.87	21.53	56.00	46.00	-13.13	-24.47	L1
3.1260	33.08	11.75	9.71	42.79	21.46	56.00	46.00	-13.21	-24.54	L1
4.4380	30.77	4.89	9.74	40.51	14.63	56.00	46.00	-15.49	-31.37	L1
26.2060	25.11	0.34	9.98	35.09	10.32	60.00	50.00	-24.91	-39.68	L1
0.3379	32.74	15.82	9.64	42.38	25.46	59.25	49.25	-16.87	-23.79	L2
0.7140	29.30	1.68	9.68	38.98	11.36	56.00	46.00	-17.02	-34.64	L2
1.4340	24.47	0.36	9.68	34.15	10.04	56.00	46.00	-21.85	-35.96	L2
3.4900	27.90	3.43	9.71	37.61	13.14	56.00	46.00	-18.39	-32.86	L2
5.0380	25.69	2.68	9.75	35.44	12.43	60.00	50.00	-24.56	-37.57	L2
26.1180	12.84	3.15	9.98	22.82	13.13	60.00	50.00	-37.18	-36.87	L2

**NOTE:** 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).  
2. Those frequencies only show peak emission level because that was below the Average limit, so no need to check average anymore.