

FCC ID: 2ACIA-TTBT008 Report No.: T180528N06-RP1-1



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# FCC 47 CFR PART 15 SUBPART C AND ANSI C63.10: 2013

## TEST REPORT

For

## 30W Wall Plate Audio Amplifier with CSR Bluetooth v4.2

## Model: A-1430WP

## Data Applies To: N/A

## Brand Name: N/A

Issued for

Ten Tronics Co., Ltd. No.33, Lane 347, Chung-San S.Road Young-Kang District, Tainan, Taiwan 710

Issued By

**Compliance Certification Services Inc.** 

**Tainan Laboratory** No.8, Jiucengling, Xinhua Dist., Tainan City 712, Taiwan (R.O.C.) TEL: 886-6-580-2201 FAX: 886-6-580-2202 http://www.ccsrf.com Issued Date: October 30, 2018

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部分複製。

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### **REVISION HISTORY**

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	October 30, 2018	Initial Issue	ALL	Gina Lin



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# **1. TEST REPORT CERTIFICATION**

Applicant	:	<b>Ten Tronics Co., Ltd.</b> No.33, Lane 347, Chung-San S.Road Young-Kang District, Tainan, Taiwan 710
Manufacturer	:	<b>Ten Tronics Co., Ltd.</b> No.33, Lane 347, Chung-San S.Road Young-Kang District, Tainan, Taiwan 710
Equipment Under Test	:	30W Wall Plate Audio Amplifier with CSR Bluetooth v4.2
Model Number	:	A-1430WP
Data Applies To	:	N/A
Brand Name	:	N/A
Date of Test	:	September 25, 2018 ~ October 05, 2018

APPLICABLE STANDARD		
STANDARD	TEST RESULT	
FCC Part 15 Subpart C AND ANSI C63.10: 2013	PASS	

## 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 C63.10: 2013** and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247.

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

Approved by:

**Jeter Wu** Assistant Manager

Reviewed by:

Eric Huang Section Manager



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# 2. TEST RESULT SUMMARY

FCC Standard Section	Report Section	Test Item	Result
15.203	3	ANTENNA REQUIREMENT	Pass
15.247(a)(1)	8.1	20dB BANDWIDTH	Pass
15.247(b)(1)	8.2	MAXIMUM PEAK OUTPUT POWER	Pass
15.247(a)(1)	8.3	HOPPING CHANNEL SEPARATION	Pass
15.247(a)(1)(iii)	8.4	NUMBER OF HOPPING FREQUENCY USED	Pass
15.247(a)(1)(iii)	8.5	DWELL TIME	Pass
-	8.6	DUTY CYCLE	-
15.247(d)	8.7	CONDUCTED SPURIOUS EMISSION	Pass
15.247(d)	8.8	RADIATED EMISSIONS	Pass
15.207(a)	8.9	POWERLINE CONDUCTED EMISSIONS	Pass



# **3. EUT DESCRIPTION**

# **3.1 DESCRIPTION OF EUT & POWER**

Product	30W Wall Plate Audio Amplifier with CSR Bluetooth v4.2	
Model Number	A-1430WP	
Data Applies To	N/A	
Brand Name	N/A	
Identify Number	T180528N06	
Received Date	May 28, 2018	
Frequency Range	2402 ~ 2480 MHz	
Transmit Peak Power	GFSK : 1.127dBm / 1.296283521mW 8DPSK: 1.929dBm / 1.559193444mW	
Channel Spacing	1MHz	
Transmit Data Rate	GFSK Mode : 1 Mbps 4/ DQPSK Mode : 3Mbps 8DPSK Mode : 24Mbps	
Modulation Type	Frequency Hopping Spread Spectrum	
Number of Channels	79 Channels	
Power Supply	AC100-240V, 60/50Hz	
Antenna Type	Manufacturer: Ten Tronics Co., Ltd. Type: PCB Antenna Model: TT-ANT01 Gain: -2.00 dBi	
Firmware Version	V2	
Software Version	TT- A-1430WP-6196_20180307	

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#### **Power Adapter :**

No.	Manufacturer	Model No.	Power Input	Power Output
1	CT ADAPTER TECH.	ATS072T-P240	100-240Vac, 50-60Hz, 1.6A	24Vdc, 3A

#### Remark:

1. The sample selected for test was production product and was provided by manufacturer.

2. This submittal(s) (test report) is intended for FCC ID: 2ACIA-A-1430WPBT008 filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.

3. For more details, please refer to the User's manual of the EUT.



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# 4. DESCRIPTION OF TEST MODES

The EUT had been tested under operating condition.

There are three channels have been tested as following :

Channel	Frequency (MHz)
Low	2402
Middle	2441
High	2480

#### Radiated Emission Test (Below 1 GHz):

- ☑ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

Normal Operation

#### Radiated Emission Test (Above 1 GHz):

- ☑ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Example Selected for the final test as listed below.

Tested Channel	Modulation Technology	Modulation Type	Packet Type
Low, Mid, High	FHSS	GFSK	DH5
Low, Mid, High	FHSS	8-DPSK	3-DH5



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#### Bandedge Measurement :

- ☑ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

Tested Channel	Modulation Technology	Modulation Type	Packet Type
Low, High	FHSS	GFSK	DH5
Low, High	FHSS	8-DPSK	3-DH5

### Antenna Port Conducted Measurement :

- ☑ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

Tested Channel	Modulation Technology	Modulation Type	Packet Type
Low, Mid, High	FHSS	GFSK	DH5
Low, Mid, High	FHSS	8-DPSK	3-DH5



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# **5. TEST METHODOLOGY**

The tests documented in this report were performed in accordance with ANSI C63.10 : 2013 and FCC CFR 47 15.207, 15.209 and 15.247.



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# 6. FACILITIES AND ACCREDITATIONS

## 6.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

No.8, Jiucengling, Xinhua Dist., Tainan City 712, Taiwan (R.O.C.)

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 22.

## 6.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

## **6.3 LABORATORY ACCREDITATIONS LISTINGS**

The test facilities used to perform radiated and conducted emissions tests are accredited by Taiwan Accreditation Foundation for the specific scope of accreditation under Lab Code: 1109 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by TAF or any agency of the Government. In addition, the test facilities are listed with Federal Communications Commission (registration no: TW1109).



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## 6.4 TABLE OF ACCREDITATIONS AND LISTINGS

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

Taiwan TAF

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

Canada	INDUSTRY CANADA
Germany	TUV NORD
Taiwan	BSMI
USA	FCC

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



## 6.5 MEASUREMENT EQUIPMENT USED

#### For §8.8.2~8.8.3

	Chamber 966 Room (Radiation Test)					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due		
Active Loop Antenna	ETS-LINDREN	6502	8905-2356	07/19/2019		
Amplifier	HP	8447F	2443A01671	01/21/2019		
Bi-Log Antenna	Sunol	JB1	A070506-2	02/08/2019		
Cable	Rosnol+Suhner	SUCOFLEX 104PEA	SN25737 /4PEA	01/26/2019		
Double Ridged Guide Horn Antenna	ETS-LINDGREN	3116	00078900	03/19/2019		
EMI Test Receiver	R&S	ESCI	100960	10/30/2018		
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/04/2019		
Hi-Pass Filter	MICRO-TRONIC S	BRM50702-01	018	01/21/2019		
Horn Antenna	Com-Power	AH-118	071032	04/18/2019		
Pre-Amplifier	EMCI	EMC012645	980098	01/21/2019		

### For §8.1~8.7 8.8.4

Chamber 966 Room (Conducter Test)						
Name of Equipment Manufacturer Model Serial Number Calibration Due						
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/04/2019		
Power Meter	Anritsu	ML2487A	6K00003888	05/01/2019		
Power Sensor	Anritsu	MA2491A	033265	05/01/2019		
SMA Cable + 10dB Attenuator	CCS	SMA + 10dB Att	O6	01/21/2019		

#### For §8.9

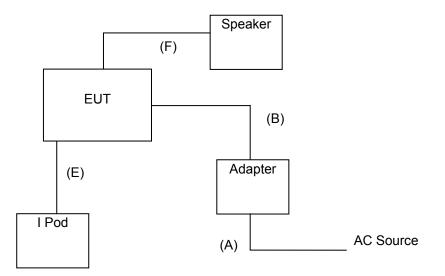
Conducted Emission room #1							
Name of Equipment	Name of Equipment Manufacturer Model Serial Number Calibration Due						
BNC Coaxial Cable	CCS	BNC50	11	01/23/2019			
EMI Test Receiver	R&S	ESCS 30	100348	01/30/2019			
LISN	SCHWARZBECK	NNLK8130	8130124	11/30/2018			
LISN	FCC	FCC-LISN-50-32- 2	08009	05/23/2019			
Pulse Limiter	R&S	ESH3-Z2	100116	01/23/2019			
Test S/W	e-3 (5.04211j)						



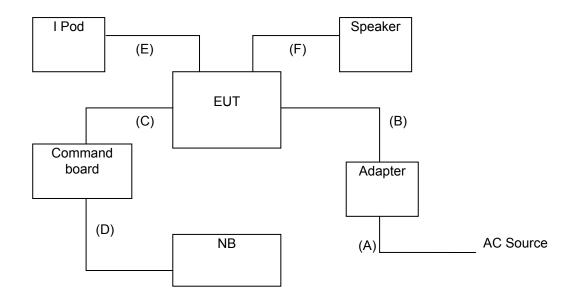
# 7. SETUP OF EQUIPMENT UNDER TEST

## 7.1 SETUP CONFIGURATION OF EUT

EMI



RF



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## **7.2 SUPPORT EQUIPMENT**

#### For EMI test

No.	Product	Manufacturer	Model No.	Certify No.	Signal cable
1	IPod nano	Apple	MA477TA/A	DoC	USB cable, shd, 1.4m
2	Speaker System	ECHO	LA-227	DoC	Audio cable, unshd, 1.6m

No.	Signal cable description		
А	Power	Unshielded, 1.7m 1 pcs.	
В	Power	Unshielded, 1.7m 1 pcs.	
Е	Audio	Unshielded, 1.6m 1 pcs.	
F	Audio	Unshielded, 1.0m 1 pcs.	

#### For RF test

No.	Product	Manufacturer	Model No.	Certify No.	Signal cable
1	Note Book	Acer	AS 3830TG	DoC	Power cable, unshd, 1.6m
2	IPod nano	Apple	MA477TA/A	DoC	USB cable, shd, 1.4m
3	Speaker System	ECHO	LA-227	DoC	Audio cable, unshd, 1.6m

No.	Signal cable description		
А	Power	Unshielded, 1.7m 1 pcs.	
В	Power	Unshielded, 1.7m 1 pcs.	
С	Command	Unshielded, 0.2m 1 pcs.	
D	USB	Shielded, 1.0m 1 pcs.	
Е	Audio	Unshielded, 1.6m 1 pcs.	
F	Audio	Unshielded, 1.0m 1 pcs.	

#### Note:

- 1) All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- 2) Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
- 3) shd. = shielded; unshd. = unshielded

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#### EUT OPERATING CONDITION

1. Set up all computers like the setup diagram.

2. 2. The "CSR BlueSuite 2.4.8", "Blue Test 3" software was used for testing.

3. Choose Transport "SPI" and Port "USB SPI (10003)".

#### TX Mode:

#### GFSK(DH1):

CFG PKT > Packet Type : 4 , Packet Type : 27

TXDATA1 > LO Freq : 2402 (2402,2441,2480) , Power : 255,30 (20,10) **GFSK(DH3):** 

CFG PKT > Packet Type : 11 , Packet Type : 183

TXDATA1 > LO Freq : 2402 (2402,2441,2480) , Power : 255,30 (20,10)

#### GFSK(DH5):

CFG PKT > Packet Type : 15 , Packet Type : 339

TXDATA1 > LO Freq : 2402 (2402,2441,2480) , Power : 255,30 (20,10)

#### 8-DPSK(3DH1):

CFG PKT > Packet Type : 24 , Packet Type : 83 TXDATA1 > LO Freq : 2402 (2402,2441,2480) , Power : 255,50 **8-DPSK(3DH3):** CFG PKT > Packet Type : 27 , Packet Type : 552 TXDATA1 > LO Freq : 2402 (2402,2441,2480) , Power : 255,50 **8-DPSK(3DH5):** CFG PKT > Packet Type : 31 , Packet Type : 1021 TXDATA1 > LO Freq : 2402 (2402,2441,2480) , Power : 255,50

#### GFSK(4.2):

BLE TEST TX > Channel :0 (0,20,39) Length : 37(0,37) Bit pattern : 0

#### **RX Mode:**

GFSK , 8-DPSK: RXDATA1

#### GFSK(4.2): BLE TEST RX

4. All of the function are under run.

5 .Start test.



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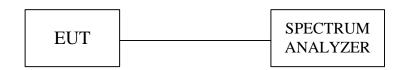
# 8. APPLICABLE LIMITS AND TEST RESULTS

## 8.1 20dB BANDWIDTH FOR HOPPING

### <u>LIMIT</u>

None; for reporting purposes only.

## TEST SETUP



### TEST PROCEDURE

The 20dB band width was measured with a spectrum analyzer connected to RF antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency. The analyzer center frequency was set to the EUT carrier frequency, using the analyzer. Display Line and Marker Delta functions, the 20dB band width of the emission was determined.



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### **TEST RESULTS**

Model Name	A-1430WP	Test By	Ted Huang
Temp & Humidity	26.4°C, 53%	Test Date	2018/10/05

### Modulation Type: GFSK / DH5

Channel	Channel Frequency (MHz)	20dB Bandwidth (kHz)	Pass / Fail
Low	2402	893.00	N/A
Middle	2441	895.00	N/A
High	2480	893.00	N/A

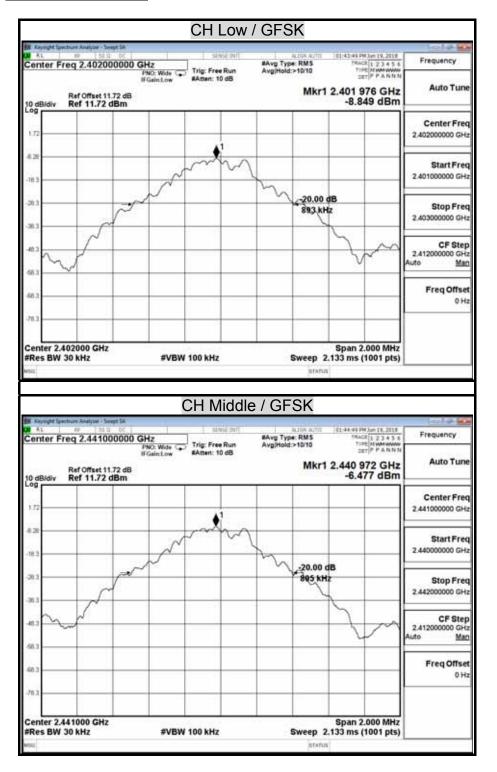
### Modulation Type: 8-DPSK / 3-DH5

Channel	Channel Frequency (MHz)	20dB Bandwidth (kHz)	Pass / Fail
Low	2402	1261.00	N/A
Middle	2441	1260.00	N/A
High	2480	1262.00	N/A



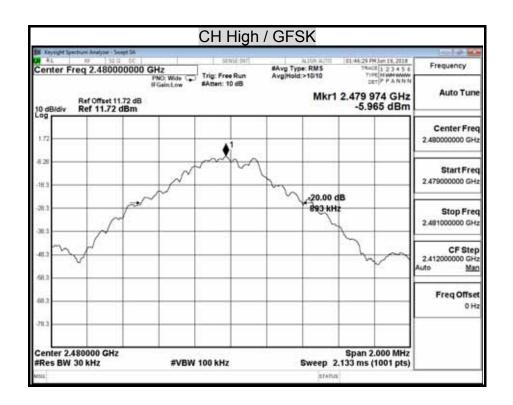
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#### 20dB BANDWIDTH





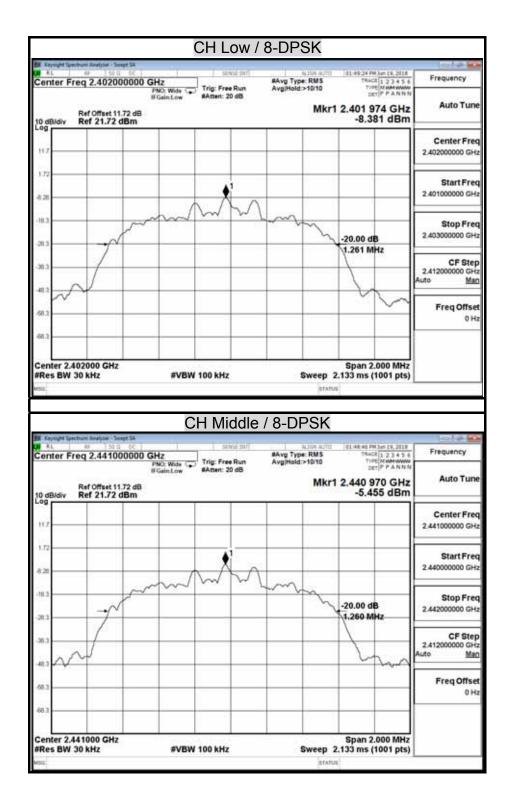
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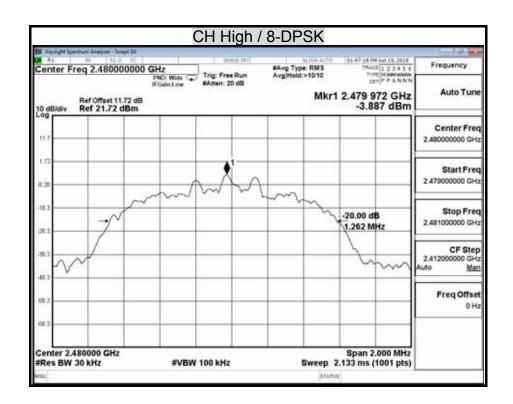
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## 8.2 MAXIMUM PEAK OUTPUT POWER

### <u>LIMIT</u>

§15.247(b)(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.

### Test Configuration



### TEST PROCEDURE

The RF power output was measured with a Spectrum Analyzer connected to the RF Antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency, A power meter was used to record the shape of the transmit signal.

Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel RBW > the 20 dB bandwidth of the emission being measured VBW  $\geq$  RBW Sweep = auto Detector function = peak Trace = max hold



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### TEST RESULTS

Model Name	A-1430WP	Test By	Ted Huang
Temp & Humidity	26.4°C, 53%	Test Date	2018/10/05

### Modulation Type: GFSK / DH5

Channel	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Output (mW)	Limit (mW)	Result
Low	2402	-7.33	0.18484		PASS
Mid	2441	-1.04	0.78668	125	PASS
High	2480	1.13	1.29628		PASS

#### Modulation Type: 8-DPSK / 3-DH5

Channel	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Output (mW)	Limit (mW)	Result
Low	2402	-2.33	0.58479		PASS
Mid	2441	0.75	1.18796	125	PASS
High	2480	1.93	1.55919		PASS



## **Average Power Data**

### Modulation Type: GFSK / DH5

Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2402	-8.77
Middle	2441	-2.35
High	2480	-0.15

## Modulation Type: 8-DPSK / 3-DH5

Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2402	-6.46
Middle	2441	-3.32
High	2480	-2.05

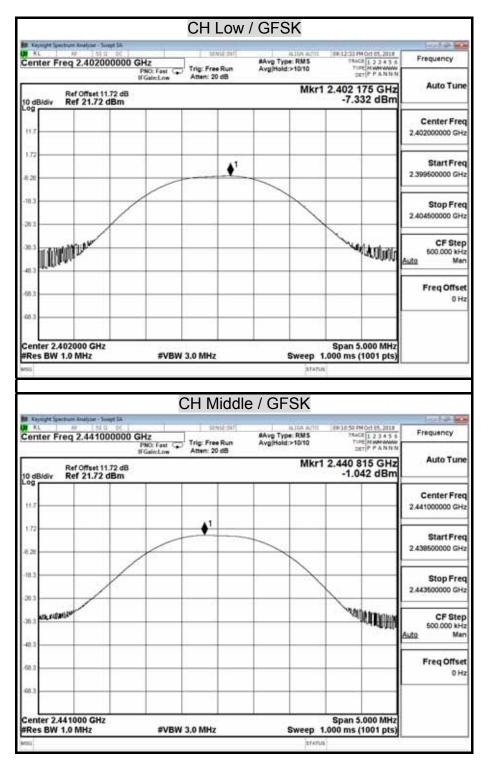
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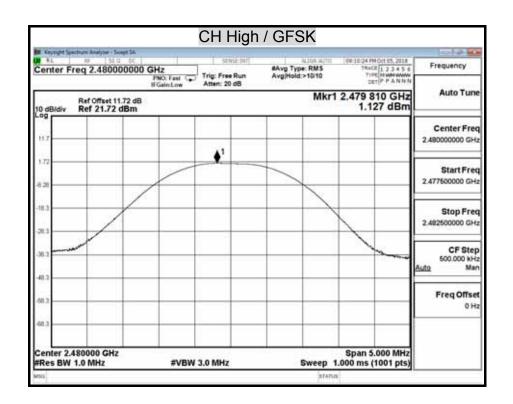
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### MAXIMUM PEAK OUTPUT POWER



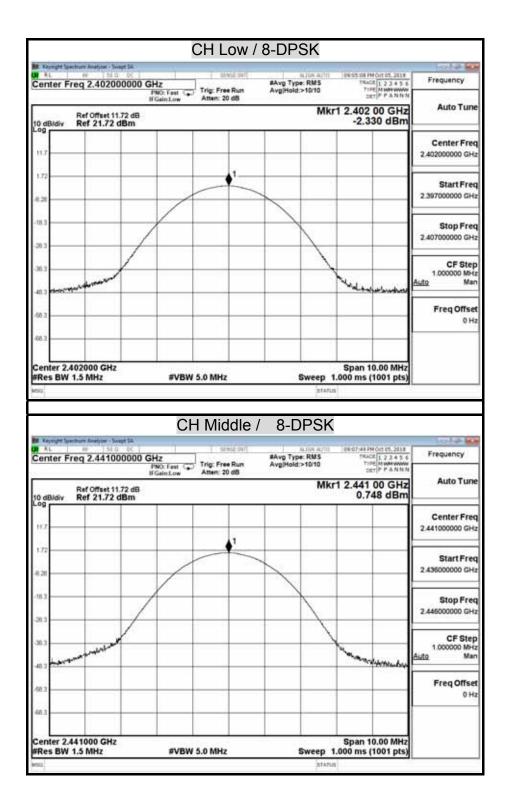


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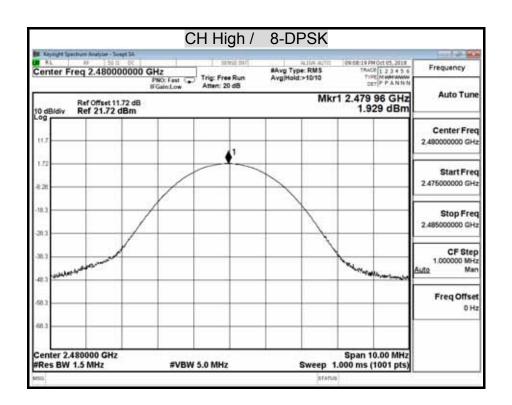


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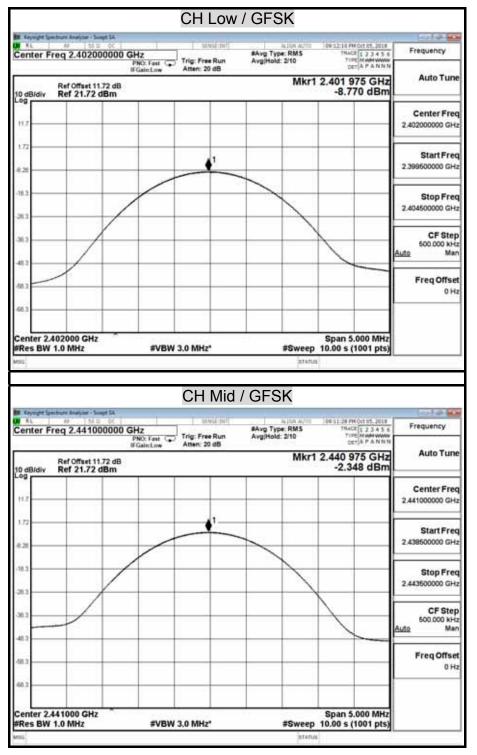
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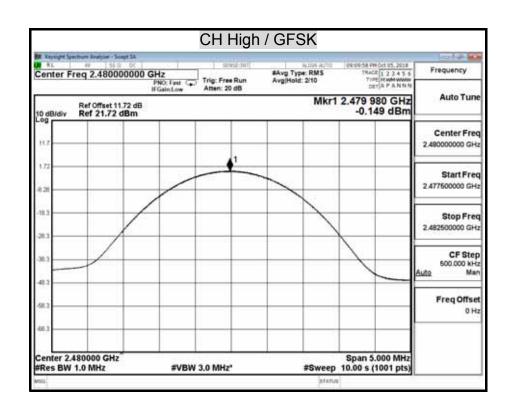
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#### **AVERAGE POWER**





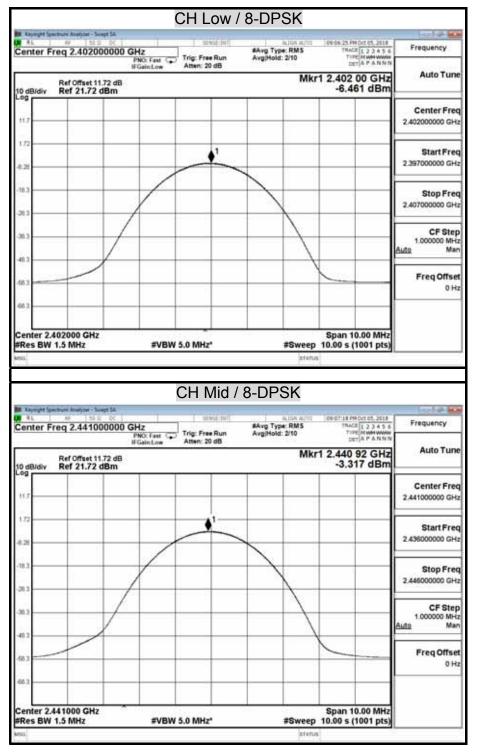
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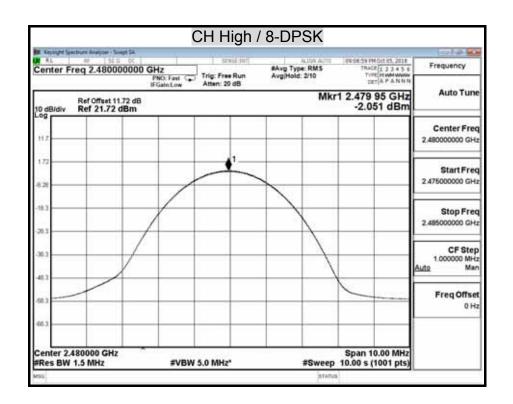
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#### **AVERAGE POWER**





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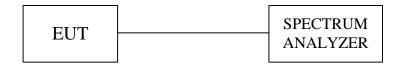
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## 8.3 HOPPING CHANNEL SEPARATION

## <u>LIMIT</u>

§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. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo andomly 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.

## TEST SETUP



## TEST PROCEDURE

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Position the EUT as shown in test setup without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
- 3. By using the MaxHold function record the separation of adjacent channels.
- 4. Measure the frequency difference of these two adjacent channels by spectrum analyzer MARK function. And then plot the result on spectrum analyzer screen.
- 5. Repeat above procedures until all frequencies measured were complete.



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Refer to section 8.1, 20dB bandwidth measurement, the measured channel separation should be greater than two-third of 20dB bandwidth or Minimum bandwidth.

Model Name	A-1430WP	Test By	Ted Huang
Temp & Humidity	26.4°C, 53%	Test Date	2018/10/05

#### Modulation Type: GFSK / DH5

Channel	Adjacent Hopping Channel Separation (MHz)	Two –third of 20dB bandwidth (MHz)	Minimum Bandwidth (kHz)	Result
2402MHz	1.00	0.60	25 KHz	PASS
2441MHz	1.00	0.60	25 KHz	PASS
2480MHz	1.00	0.60	25 KHz	PASS

### Modulation Type: 8-DPSK / 3-DH5

Channel	Adjacent Hopping Channel Separation (kHz)	Two –third of 20dB bandwidth (kHz)	Minimum Bandwidth (kHz)	Result
2402MHz	1.00	0.84	25 KHz	PASS
2441MHz	1.00	0.84	25 KHz	PASS
2480MHz	1.00	0.84	25 KHz	PASS



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## **HOPPING CHANNEL SEPARATION**

	GFSH	K(Low)		
X Keysight Spectrum Analyzer - 3 X AL RP 51	A straight and str	8,158,8,70	(2221-39 PM) (9.2018	ale a
Center Freq 2.4020	D00000 GHz PNO: Wide 😱 Trig: Free Run	#Avg Type: RMS Avg[Hold:>10/10	THACE 1 2 3 4 5 6 TUPE MINH WHAT DET P P A N N N	Frequency
Ref Offset		الم	Mkr1 1.000 MHz 1.584 dB	Auto Tun
11.7 1.72				Center Free 2,402000000 GH
40.3 (20.3	1			Start Fre 2.400500000 GH
48.3 (8.3 (8.3				Stop Fre 2.403500000 GH
Center 2.402000 GH #Res BW 100 kHz	z #VBW 300 kHz	Sweep	Span 3.000 MHz 1.000 ms (1001 pts)	CF Ste 2.412000000 GH
	1.000 MHz (Δ) 1.584 dB	ANCTON FUNCTION MOTO	FUNCTION WALLE	Auto <u>Ma</u>
2 F 1 3 4 5 6 7	2.401 970 GHz -7.410 dBm			Freq Offse 0 H
7 8 9 10 11				
esis:	3	STATU		

	GFSK(I	Viddle)		
Kaysight Spectrum Analyzer - Swept S		AUGA AUTO	(22.24.28 PM) as 19, 2018	1010
Center Freq 2.4410000		#Avg Type: RMS Avg/Hold:>10/10	TRACE 1 2 3 4 5 6 TIPE MUST WAR	Frequency
	IFGain:Low #Atten: 20 dB	solution of the		Auto Tun
Ref Offset 11.72		Δ	Mkr1 1.000 MHz 0.017 dB	Auto Tun
Log				ContexEre
172			▲1∆2	Center Free 2,441000000 GH
83		+ r	In the second	
-10.3				Start Fre
28.3				2.439500000 GH
-36.3				
48.3				Stop Fre
48.3				2.442500000 GH
Center 2.441000 GHz			Span 3.000 MHz	CF Ste
#Res BW 100 kHz	#VBW 300 kHz	Sweep	1.000 ms (1001 pts)	2.412000000 GH
1231 12223 1222 1223		NOTION FUNCTION MOTO	FUNCTION VALUE	Auto <u>Ma</u>
1 Δ2 f (Δ) 2 F f	1.000 MHz (Δ) 0.017 dB 2.440 970 GHz -5.009 dBm			Freq Offse
	-1.000 MHz (Δ) -0.194 dB 2.440 970 GHz -4.961 dBm			OH
5 6 7				200
8				
9 10 11				
	1.0	1	200	
4515		STAR	5	15



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GFSK(High) 22.52 PH Jun 19, 2018 TRACE 1 2 3 4 5 6 TUPE ACMINING DET P P A N N N Center Freq 2.480000000 GHz If GainLow #Rent 20 dB ..... Frequency #Avg Type: RM5 Avg(Hold:>10/10 ΔMkr1 -1.000 MHz -0.086 dB Auto Tun Ref Offset 11.72 dB Ref 21.72 dBm 11 Center Freq ♦142 2.48000000 GHz 1.7 8.2 10. Start Freq 28. 2.478500000 GHz 38.3 48. Stop Freq na-2.481500000 GHz Center 2.480000 GHz #Res BW 100 kHz Span 3.000 MHz Sweep 1.000 ms (1001 pts) CF Step 2.412000000 GHz Auto Man #VBW 300 kHz IN COMPANY AND A DESCRIPTION OF 1 (4) A2 F -1.000 MHz (Δ) 2.479 967 GHz -0.085 dB -4.592 dBm Freq Offset 0 Hz 10 11 STATUS

enter Freq 2.4020		ALIA AUTO SAvg Type: RMS Avg/Hold:>10/10	12220-28 PH Jun 19, 2018 TRACE 1 2 3 4 5 6	Frequency
	PNO: Wide Trig: Free Run IFGain:Low #Atten: 20 dB	200 <b>0</b> 000000000000000000000000000000000	DET P PANNN	Auto Tune
0 dB/div Ref 0ffset 1		ΔM	kr1 1.000 MHz 1.160 dB	Auto Tun
og 11.7				Center Free
8.28	- And		↓1Δ2	2.402000000 GH
20.3				Start Fre 2.400500000 GH
				Stop Fre 2.403500000 GH
enter 2.402000 GH Res BW 100 kHz	z #VBW 300 kHz	Sweep 1.	Span 3.000 MHz 000 ms (1001 pts)	CF Stej 2.412000000 GH Auto Ma
	1.000 MHz (Δ) 1.160 dB	ACTON FUNCTION MOTH	FUNCTION VALUE	
2 F f 3 4 5	2.401 967 GHz -7.684 dBm			Freq Offse 0 H
6 7 8 9 10				
11	-			



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Report No.: T180522N07-RP1-1

8-DPSK (Middle) 25:53 PH Jun 19, 2018 TRACE 1 2 3 4 5 6 TIPE N MM WWW DET P P A N N N ..... Center Freq 2.441000000 GHz FNO: Wide Trig: Free Run If GainLow Frequency #Avg Type: RMS Avg/Hold:>10/10 ΔMkr1 1.000 MHz 0.074 dB Auto Tun Ref Offset 11.72 dB Ref 21.72 dBm 10 11 Center Freq 2.441000000 GHz 1.7 ♦1∆2 344 8.2 10. Start Freq 28. 2.439500000 GHz 38.3 48. Stop Freq nı: 2.442500000 GHz 8 Center 2.441000 GHz #Res BW 100 kHz Span 3.000 MHz Sweep 1.000 ms (1001 pts) CF Step 2.412000000 GHz Auto Man #VBW 300 kHz CONTRACTOR DATE: † (Δ) † † (Δ) † Δ2 F Δ4 F 
 1.000 MHz
 Δ)
 0.074 dB

 2.440 973 GHz
 -10.124 dBm

 -1.000 MHz
 Δ)
 -0.074 dB

 2.440 975 GHz
 -10.142 dBm
 Freq Offset 0 Hz 10 11 STATUS

	8-DPSK	(High)		
AL SSS Center Freq 2.480000	0000 GHz D000 GHz D000 GHz	ALINA AUTO RAvg Type: RMS Avg(Hold.>10/10	10221120 PM Jun 19, 2018 TRACE 1 2 3 4 5 6 TrPE M WH WHW	Frequency
Ref Offset 11.7 10 dBidiy Ref 21.72 dl	IFGainLow #Atten: 20 dB	ΔΜκ	r1 -1.000 MHz -0.068 dB	Auto Tun
				Center Free 2.48000000 GH
828 103 203 303				Start Fre 2.478500000 GH
48.3				Stop Fre 2.481500000 GH
Center 2.480000 GHz Res BW 100 kHz	#VBW 300 kHz	Sweep 1.0	Span 3.000 MHz 000 ms (1001 pts)	CF Step 2.412000000 GH Auto Ma
Δ2 f (Δ) 2 F f 3 4 5 6 7 8	-1.000 MHz (Δ) -0.068 dB 2.479 970 GHz -3.432 dBm			Freq Offse 0 H
9 10 11		5149.0		



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**Report No.:** T180522N07-RP1-1

# 8.4 NUMBER OF HOPPING FREQUENCY USED

## <u>LIMIT</u>

§15.247(a)(1)(iii) For frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

# TEST SETUP



## TEST PROCEDURE

- 1 Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.
- 2 Position the EUT as shown in test setup 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.
- 3 Set the spectrum analyzer on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
- 4 Set the spectrum analyzer on View mode and then plot the result on spectrum analyzer screen.
- 5 Repeat above procedures until all frequencies measured were complete.



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# **TEST RESULTS**

Model Name	A-1430WP	Test By	Ted Huang
Temp & Humidity	26.4°C, 53%	Test Date	2018/10/05

## Modulation Type: GFSK / DH5

Result(No.of CH)	Limit(No.of CH)	Result
79	>75	PASS

# Modulation Type: 8-DPSK / 3-DH5

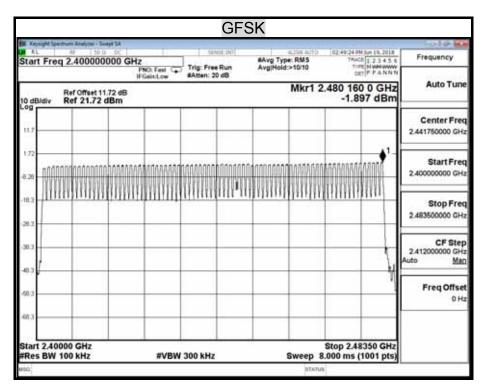
Result(No.of CH)	Limit(No.of CH)	Result
79	>75	PASS



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Report No.: T180522N07-RP1-1

# NUMBER OF HOPPING FREQUENCY USED



KL Store Contraction Statute - Section 14 KL Statt Freq 2.400000000 G		ALISH ALITO #Avg Type: RMS Avg[Hold:>10/10	02:42:55 PM Jun 19, 2018 TRACE 1 2 3 4 5 6 Triffe Midda units	Frequency
Ref Offset 11.72 dB	PNO: Fest Trig: Free Run IFGain:Low #Atten: 20 dB	10171010000000	479 826 0 GHz -3.416 dBm	Auto Tun
117 Kerzi.72 dbm				Center Fre 2.441750000 GH
1.72 8.28	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	A MANAMANA MANAMANA MANA	MMMMM	Start Fre 2.40000000 GH
19.3				Stop Fre 2.483500000 GH
38.3				CF Ste 2.412000000 GH Auto Ma
60.3			ų	Freq Offse 0 H
68.3				
Start 2.40000 GHz #Res BW 100 kHz	#VBW 300 kHz		Stop 2.48350 GHz	



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**Report No.:** T180522N07-RP1-1

# 8.5 DWELL TIME ON EACH CHANNEL

# <u>LIMIT</u>

§15.247(a)(1)(iii) For frequency hopping system operating in the 2400-2483.5MHz band, the average time of occupancy on any frequency shall not be greater than 0.4 second within a 31.6 second period.

# TEST SETUP



# TEST PROCEDURE

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Position the EUT as shown in test setup 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.
- 3. Adjust the center frequency of spectrum analyzer on any frequency be measured and set spectrum analyzer to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
- 4. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
- 5. Repeat above procedures until all frequencies measured were complete.
- 6. The Bluetooth Headset has 3 type of payload, DH1, DH3, DH5. The hopping rate is 1600 per second. The longer the payload is, the slower the hopping rate is.



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Report No.: T180522N07-RP1-1 TEST RESULTS

Time of occupancy on the TX channel in 31.6sec = time domain slot length × hop rate  $\div$  number of hop per channel × 31.6

Refer to the attached graph.

The hopping rates of Bluetooth devices change with different types of payload. The longer the payload is, the slower the hopping rate. The hopping rate scenario is defined in Bluetooth core specification.

Model Name	A-1430WP	Test By	Ted Huang
Temp & Humidity	26.4°C, 53%	Test Date	2018/10/05

#### Modulation Type: GFSK / DH5

Transmitting Frequency	Packet type	Dwell time (ms)	Time of occupancy on the TX channel in 31.6sec (ms)	Limit for Time of occupancy on the TX channel in 31.6sec (ms)	Results
2441MHz	DH1	0.405	129.60	400.00	PASS
2441MHz	DH3	1.650	264.00	400.00	PASS
2441MHz	DH5	2.900	309.33	400.00	PASS
2441MHz	AFH	2.900	154.67	400.00	PASS
DH1 Dwell tine= DH3 Dwell tine=		×(1600÷2)÷79×3 ×(1600÷4)÷79×3			

DH3 Dwell tine=1.650 ms×(1600÷4)÷79×31.6=264.00(ms)DH5 Dwell tine=2.900 ms×(1600÷6)÷79×31.6=309.33(ms)AFH Dwell tine=2.900 ms×(800÷6)÷20×8=154.67(ms)

# Modulation Type: 8-DPSK / 3-DH5

Transmitting Frequency	Packet type	Dwell time (ms)	Time of occupancy on the TX channel in 31.6sec (ms)	Limit for Time of occupancy on the TX channel in 31.6sec (ms)	Results
2441MHz	3DH1	0.420	134.40	400.00	PASS
2441MHz	3DH3	1.670	267.20	400.00	PASS
2441MHz	3DH5	2.920	311.47	400.00	PASS
2441MHz	AFH	2.920	155.73	400.00	PASS
3DH1 Dwell tine=		×(1600÷2)÷79×3	31.6= 134.40 (ms)		

3DH1 Dwell tine= $0.420 \text{ ms} \times (1600 \div 2) \div /9 \times 31.6 = 134.40 \text{ (ms)}$ 3DH3 Dwell tine= $1.670 \text{ ms} \times (1600 \div 4) \div 79 \times 31.6 = 267.20 \text{ (ms)}$ 3DH5 Dwell tine= $2.920 \text{ ms} \times (1600 \div 6) \div 79 \times 31.6 = 311.47 \text{ (ms)}$ AFH Dwell tine= $2.920 \text{ ms} \times (800 \div 6) \div 20 \times 8 = 155.73 \text{ (ms)}$ 



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## Report No.: T180522N07-RP1-1 DWELL TIME ON EACH PAYLOAD

Frequency	12214-11 PH Jan 19, 2018 TRACE 1, 2, 3, 4, 5, 6 TVPE WWW WWW DET P P A N N N	RMS	RAvg Type:	rig: Free Ru Atten: 20 dB	Hz PNO: Fast -+-	2.402000000 C	AL.
Auto Tun	∆Mkr1 405.0 µs 15.32 dB	2				ef Offset 11.72 dB ef 21.72 dBm	0 dB/div
Center Fre 2.402000000 GH							113
Start Fre 2.402000000 GH	h r	[***	1Δ2			pr-	1.72 6.26
Stop Fre 2.40200000 GH				×2			78.3
CF Ste 2.412000000 GH Auto Ma							20.3
Freq Offse 0 H	WHININGHIAAH	y.	ghentalwood	mili	-latility	yalamanaya	40.3 58.3
Frequency	() (2)1502 PH her 19, 2018	FSK	ldle ( G	CH M	Hz	e000000 GHz MHz m Analyser - Sweet SA 55 (2) (2) (2) (2) (2) (4) (0) (0) (0) (2) (2) (4) (0) (0) (0) (2)	Kes BW 1
Frequency	5.000 ms (1001 pts) n (2.15 0) PM Jan 13, 2018 TRACE [1.2.3 4 3 6 TOPE [V P A N N 40 ΔMkr1 405.0 us]	FSK	ldle ( G	CH M	DH1	MHz ************************************	Annation F
	5.000 ms (1001 pts)	FSK	ldle ( G		DH1	MHz n Androw - Sweet SA 9 54 0 00 2.4410000000 C	Annual Contents
Auto Tun Center Fre	5.000 ms (1001 pts) n (2.15 0) PM Jan 13, 2018 TRACE [1.2.3 4 3 6 TOPE [V P A N N 40 ΔMkr1 405.0 us]	FSK	ldle ( G	CH N strift: Free Ru Atten: 20 db	DH1	MHz ************************************	Context and the second
Auto Tun Center Fre 2.44100000 GH Start Fre	5.000 ms (1001 pts) n (2.15 0) PM Jan 13, 2018 TRACE [1.2.3 4 3 6 TOPE [V P A N N 40 ΔMkr1 405.0 us]	FSK	Idle ( G	CH N strift: Free Ru Atten: 20 db	DH1	MHz ************************************	Kes BW 1
Auto Tun Center Fre 2.44100000 GH Start Fre 2.44100000 GH Stop Fre	5.000 ms (1001 pts) n (2.15 0) PM Jan 13, 2018 TRACE [1.2.3 4 3 6 TOPE [V P A N N 40 ΔMkr1 405.0 us]	FSK	Idle ( G	CH N strig: Free Rt Atten: 20 dB	DH1	MHz ************************************	0 dB/div

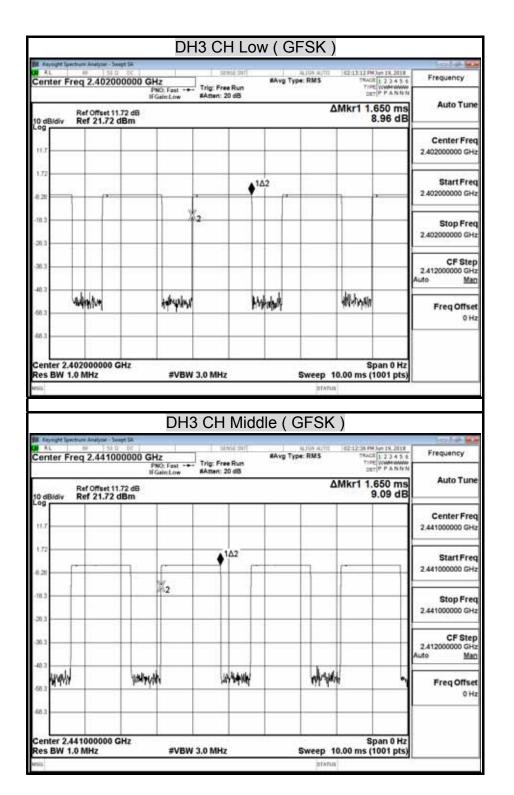


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AL.	r Freq 2.48000	0000 G	Hz PND: Fast -+	Trig: Fr	ansi Ind	RAvg Type	RMS	G2-15-ME PH TRACE Type	1 2 3 4 5 6 Web Web	Frequency
10 dB/d	Ref Offset 11.	72 dB	FGainLow	#Atten:	20 68			ΔMkr1 4	-	Auto Tuni
ng										Center Fre 2.48000000 GH
8.26	1			F	∳ <sup>1∆2</sup>			1	-	Start Free 2.48000000 GH
18.3										Stop Fre 2.48000000 GH
30.3				×2						CF Ste 2.412000000 GH Auto <u>Ma</u>
40.2	ninter the particular		and the state	oliogidate	<b>\$</b> ##}	hhipungh		nilelaria	kityw	Freq Offse 0 H
Center	r 2.480000000 G	Hz						S	oan 0 Hz	



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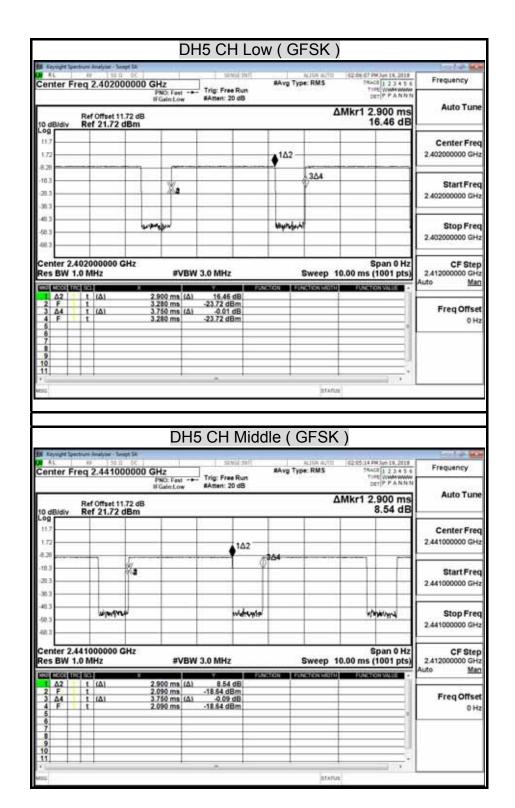


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Center Freq 2.48	PNO: Fast +++	Strid: Infl BAvg Trig: Free Run #Amen: 20 dB	AURA AUTO (621) Type: RMS	50 PH Jun 19, 2018 TRACE 1 2 3 4 5 6 TUPE WWH WWW DET P P A N N N	Frequency
Ref Offse 0 dB/div Ref 21.	t 11.72 dB	Antient ab du	ΔMkr	1 1.650 ms 6.55 dB	Auto Tuni
11.7					Center Free 2.480000000 GH
6.20		162			Start Free 2.480000000 GH
-18.3 	×2				Stop Free 2.48000000 GH
30.3				[	CF Step 2.412000000 GH Suto Ma
40.3 60.3	megaliya	hardinal	anti-read		Freq Offse 0 H
68.1 Center 2.48000000				Span 0 Hz	



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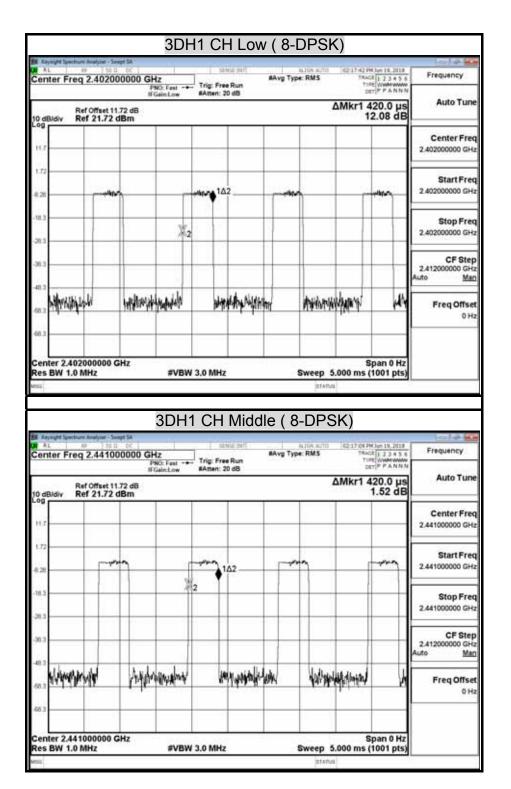


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122-01-42 EN 1-4 19, 2018	-14
TRACE 1 2 3 4 5 6 Frequ	quency
DET P P A N N N	
ΔMkr1 2.900 ms 7.63 dB	Auto Tun
Cen	enter Fre
	000000 GH
	Start Fre
	000000 GH
	Stop Fre
	000000 GH
	0.4563.6553.0
	CF Ste
Auto	000000 GH
H FUNCTION WILLIE	
Fre	reg Offse
	01
U	

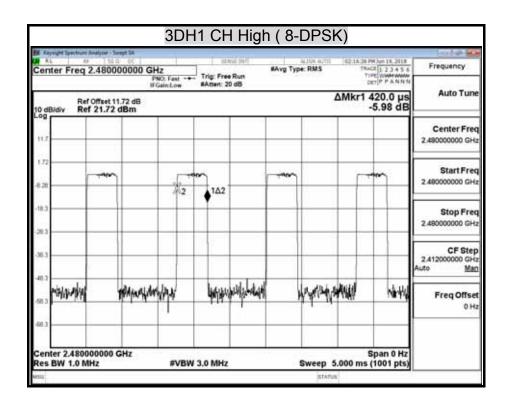


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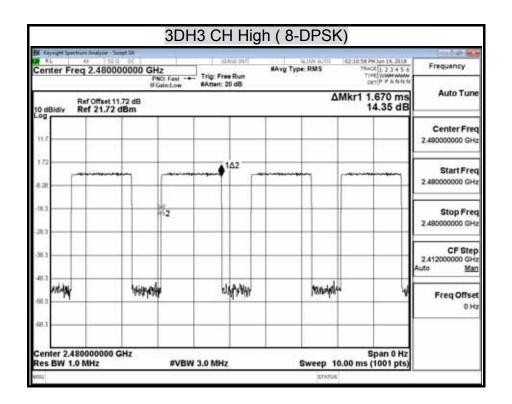


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1 200 200 200 200 200 200 200 200 200 20	Oun 19, 2018 1 2 3 4 5 6 7 P A N N N	38AC	wg Type: RMS	e Run	1 2200	000 GHz PNC: Fast - IF Gain Low	2.4020000	enter Fred
Auto Tun	670 ms 3.43 dB	ΔMkr1 1.				2 dB Im	ef Offset 11.72 tef 21.72 dBr	dB/div R
Center Free 2,402000000 GH								13
Start Free 2.402000000 GH		-	0440N	2 -			-	72 26
Stop Free 2.40200000 GH						<u>%</u> 2		1.3
CF Step 2.412000000 GH Auto Mar	_		_					0.3
								ul l
Freq Offse 0 H	Open 19, 2018	\$ 10.00 ms ( is SK)	( 8-DP	Middle	вж з.о мна	#VB 3DH	2000000 GHz MHz	Keyneld Sector
Frequency	pan 0 Hz 1001 pts)	SK) 10.00 ms ( s SK) 162-16-22 PF TRAC TRAC TRAC TRAC TRAC TRAC TRAC TRAC TRAC	Sweep state ( 8-DPS auton action vg Type: RMS	Middle	BW 3.0 MH2	z #VB 3DH	2000000 GHz MHz m Railyse - Smgt B 2 2.4410000 ef Offset 11.72	enter 2,402 es BW 1.0 I s AL enter Freq
Frequency	pan 0 Hz 1001 pts)	SK) 10.00 ms ( s SK) 162-16-22 PF TRAC TRAC TRAC TRAC TRAC TRAC TRAC TRAC TRAC	Sweep state ( 8-DPS auton action vg Type: RMS	Middle	BW 3.0 MH	z #VB 3DH	2000000 GHz MHz m Religion - Swept B M 51 0 0 2 2.4410000	enter 2,402 es BW 1.0 I s AL enter Freq
Frequency Auto Tun Center Freq	pan 0 Hz 1001 pts)	SK) 10.00 ms ( s SK) 162-16-22 PF TRAC TRAC TRAC TRAC TRAC TRAC TRAC TRAC TRAC	Sweep state ( 8-DPS auton action vg Type: RMS	Middle	BW 3.0 MH	z #VB 3DH	2000000 GHz MHz m Railyse - Smgt B 2 2.4410000 ef Offset 11.72	enter 2,402 es BW 1.0 l es BW 1.0 l enter Freq dBidiv R
Frequency Auto Tune 2.44100000 GH	pan 0 Hz 1001 pts)	SK) 10.00 ms ( s SK) 162-16-22 PF TRAC TRAC TRAC TRAC TRAC TRAC TRAC TRAC TRAC	Sweep state ( 8-DPS auton action vg Type: RMS	Middle wilder e Run to de	BW 3.0 MH	Iz #VB 3DH Se 0000 GHz PNC: Fast - IFGaintow 2 dB Im	2000000 GHz MHz m Railyse - Smgt B 2 2.4410000 ef Offset 11.72	enter 2,402 ess BW 1.0 I ess BW 1.0 I enter Freq all 17 72
Center Free 2.44100000 GH Start Free 2.44100000 GH	pan 0 Hz 1001 pts)	SK) 10.00 ms ( s SK) 162-16-22 PF TRAC TRAC TRAC TRAC TRAC TRAC TRAC TRAC TRAC	Sweep state ( 8-DPS auton action vg Type: RMS	Middle wilder e Run to de	BW 3.0 MH2 H3 CH	Iz #VB 3DH Se 0000 GHz PNC: Fast - IFGaintow 2 dB Im	2000000 GHz MHz m Railyse - Smgt B 2 2.4410000 ef Offset 11.72	enter 2.402 es BW 1.0 I enter Frec enter Frec

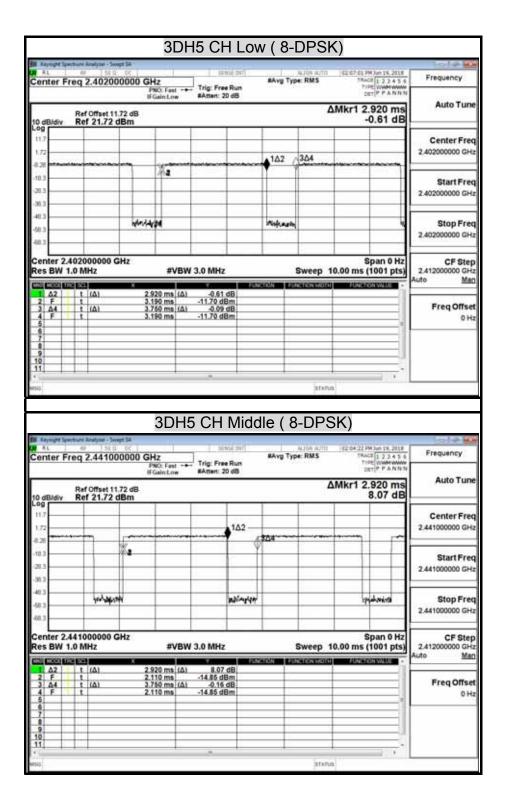


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AL RF 1	- Swept SA	I SING INT	AUG A	701 142-03-13 PM 3-0 19, 2018	Leta 🖬
Center Freq 2.480	DO00000 GHz	Trig: Free Run	#Avg Type: RMS		Frequency
	IFGainLow	#Atten: 20 dB			Auto Tune
Ref Offse to dBidiv Ref 21.2	t 11.72 dB 72 dBm			ΔMkr1 2.920 ms 10.00 dB	<ol> <li>J. A. STATATO, 453</li> </ol>
11.7		8			Center Free
1.72					2.480000000 GH
8.28			324		
10.3	42				Start Free
20.3					2.48000000 GH
-36.3					
48.3	in the		COMPENSION IN		Stop Free
48.3					2.48000000 GH
Center 2.4800000			-	Span 0 Hz	CF Ste
Res BW 1.0 MHz	#VBW	3.0 MHz		p 10.00 ms (1001 pts)	2.412000000 GH Auto Ma
1 Δ2 t (Δ)	2.920 ms (Δ)	10.00 dB	ACTION FUNCTION W	FUNCTION VALUE	
2 F t 3 Δ4 t (Δ)	3.250 ms 3.750 ms (Δ)	-14.91 dBm -0.19 dB			Freq Offse
4 F t	3.250 ms	-14.91 dBm			OH
6					
7 8 9 10					



# 8.6 DUTY CYCLE

### <u>LIMIT</u>

Nil (No dedicated limit specified in the Rules)

#### TEST SETUP



## 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. The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value. Set VBW ≥ RBW. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span measuring duty cycle shall not be used if T ≤ 16.7 microseconds.)

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### **TEST RESULTS**

No non-compliance noted.

### TEST DATA

Model Name	A-1430WP	Test By	Ted Huang
Temp & Humidity	26.4°C, 53%	Test Date	2018/10/05

# Modulation Type: GFSK / DH5

	us	Times	Ton	Total Ton time(ms)
Ton1	2900.000	1	2900	
Ton2		0	0	
Ton3			0	2.9
Тр				3.75

Ton	2.9
Tp(Ton+Toff)	3.75
Duty Cycle	0.773333333
Duty Factor	1.116332698

# Modulation Type: 8-DPSK / 3-DH5

	us	Times	Ton	Total Ton time(ms)
Ton1	2920.000	1	2920	
Ton2		0	0	
Ton3			0	2.92
Тр				3.75

Ton	2.92
Tp(Ton+Toff)	3.75
Duty Cycle	0.778666667
Duty Factor	1.086484163



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#### TEST PLOT

## Duty Cycle

										(	Gł	-S	5K(	(Lo	W)										
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	entrure Analyzer - Al 50					ALC: NOT	1iddle	ALISA AL		Territori	PM Oct 85, 20	
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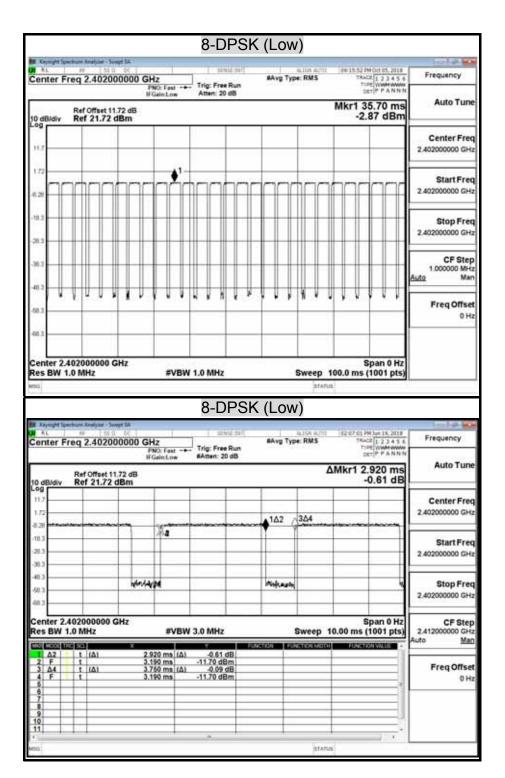


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t (Δ) t t (Δ) t	3.	100 ms 750 ms 100 ms	(Δ)	-0.07 -12.35 d	Bm								01
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Res BW           ms           ms           Market           Market <td>Ref 0 Ref 2</td> <td>z 1990 - San 1990 - San 2900 - San 2000 - C 2</td> <td>172 dBm</td> <td>299 110 299 3.27</td> <td>Z RO: Fis Jaint</td> <td>evB</td> <td></td> <td>8-</td> <td>-D Free m: 20</td> <td>Run Run dB</td> <td></td> <td></td> <td>Avg 1 1Δ2</td> <td>ype www.s</td> <td>) RM 322</td> <td>ep</td> <td>ΔN</td> <td>sz s:</td> <td>1 2 1</td> <td>92 92</td> <td>19.22 22.24 PAT 0 r 0 c</td> <td>ns iB Hz</td> <td>Auto Cente 2.4800000 Stat 2.4800000 2.4800000 2.4800000</td> <td>r Fre 00 GH t Fre 00 GH F Ste 00 GH</td>	Ref 0 Ref 2	z 1990 - San 1990 - San 2900 - San 2000 - C 2	172 dBm	299 110 299 3.27	Z RO: Fis Jaint	evB		8-	-D Free m: 20	Run Run dB			Avg 1 1Δ2	ype www.s	) RM 322	ep	ΔN	sz s:	1 2 1	92 92	19.22 22.24 PAT 0 r 0 c	ns iB Hz	Auto Cente 2.4800000 Stat 2.4800000 2.4800000 2.4800000	r Fre 00 GH t Fre 00 GH F Ste 00 GH



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**Report No.:** T180522N07-RP1-1

# 8.7 CONDUCTED SPURIOUS EMISSION

# **LIMITS**

§ 15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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 and 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 § 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 SETUP



# TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The spectrum from 30 MHz to 26.5 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.



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Report No.: T180522N07-RP1-1 TEST RESULTS

Model Name	A-1430WP	Test By	Ted Huang
Temp & Humidity	26.4°C, 53%	Test Date	2018/10/05

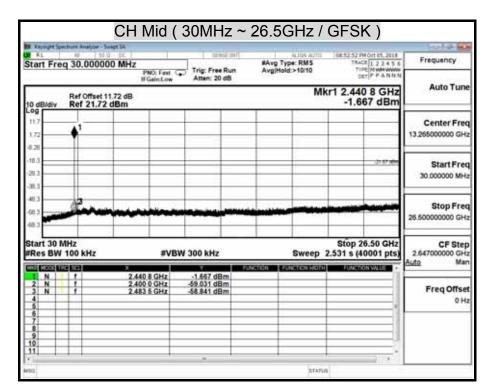
#### **OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT**

Keysight Spectrum Analyze	st 0. DC	I save out		08:51-46 PH Oct 05, 2018	1214
tart Freq 2.3100			#Avg Type: RMS Avg(Hold:>10/10	TRACE 1 2 3 4 5 6	Frequency
	IFGainLow	Atten: 20 dB		DET PANNN	Auto Tun
0 dB/div Ref 21.	et 11.72 dB 72 dBm		MKr1 2.4	402 155 0 GHz -7.715 dBm	0.000
.og					Center Fre
1,72				↓ <sup>1</sup>	2.36000000 GH
10.3				13772.004	Start Fre 2.31000000 GH
16.3 49.3 59.3					Stop Fre 2.41000000 GH
tart 2.31000 GHz		W 300 kHz		top 2.41000 GHz 57 ms (40001 pts)	CF Sto 10.000000 M
200 (2000) (100 (200)	X		UNCTION FUNCTION MODEL		Auto M
1 N f 2 N f 3 N f 4	2,402 155 0 GHz 2,400 0 GHz 2,483 5 GHz	-7.715 dBm -67.559 dBm dBm			Freq Offs
6 7 8 9					
11					

CHARLES CONTRACTOR	PH Oct 85, 2018		ALTIN AUTO	- 100 Lan	stand date			58-9 - DC [	ectrure Analyter RF	AL.
Frequency	ACE 123456 TPE MIMMWWWW DET P P A N N N	TRA	pe: RM5 d:>10/10			Trig: Fre	PNO: Fast	0000 MHz	q 30.000	rt Fre
Auto Tu				2.57.251.0	20 dB	Atten: 2	IFGainLow			
	1 7 GHz 398 dBm		MK					et 11.72 dB 72 dBm		:B/div
Center Fr			1		2			-		
13,265000000 G										
			-	-	-	-	-		•	
Start Fr	-		-	-	-	-	-	-		-
30.000000 M	(31.40 dbm			+	-	-	-	-		-
	-			-	-			-		-
Stop Fr	-	and inclusion			11112	1 2	1.20	57.51 S	13	1
25.50000000 G					Contraction of the local division of the loc		-			-
									2	
CF Str 2.54700000 G	26.50 GHz 40001 pts)		Sweep 2		17	W 300 kHz	#VB		MHz 100 kHz	rt 30
Auto M			state of the state			in overland				The second second
				1	dBm	-8.398 d	017 GHz		1	N.
Freq Offs				-	dBm	-59.341 d -59.118 d	00 0 GHz 83 5 GHz	2.4	1	N
0	-			-						
				-			-			
					-		-			



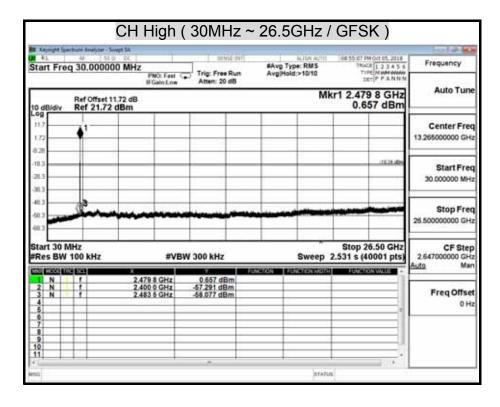
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Frequency	CE 123456 PE MMMMMM PF PANNN	778.0 77		#Avg Typ Avg(Hold		Trig: Free	NO: Fast G				art
Auto Tur	375 GHz	9 826 8	kr1 2.47	M	) dB	Atten: 20	Gain:Low	1.72 dB	ef Offset 1		
Center Fre		0.0				1 3			ef 21.72	N R	dB/
2.487500000 GH								\$.			72
Start Fre	-13.05.495			-	-	-	-	++			3
2.475000000 GH								5	mand		3
Stop Fre 2.50000000 GH			Museux	- Marcharetters		an san an a	ne sa	- h		~	32
CF Ste 2.500000 MH	0000 GHz					/ 300 kHz	#\/B\			.47500 SW 100	art
Auto Ma			weep 2.0					×	4		
Freq Offs 0 F			_		Bm	0.345 di d 65.345 di	0 GHz 5 GHz			1	N
	=1				-					Ħ	

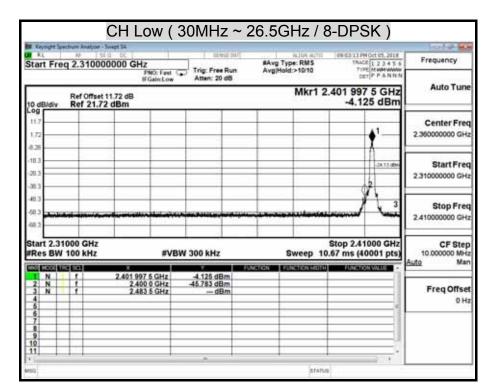


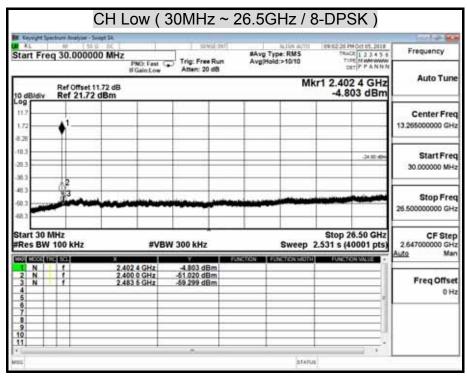
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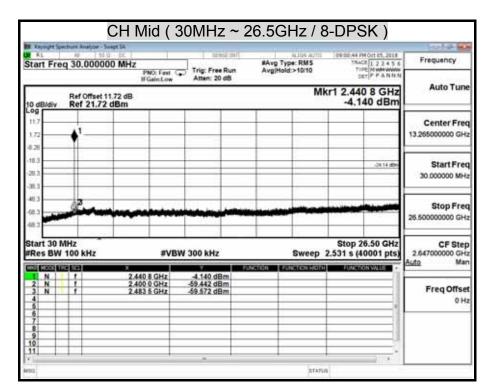
#### Page: 68 / 102 Rev.: 00

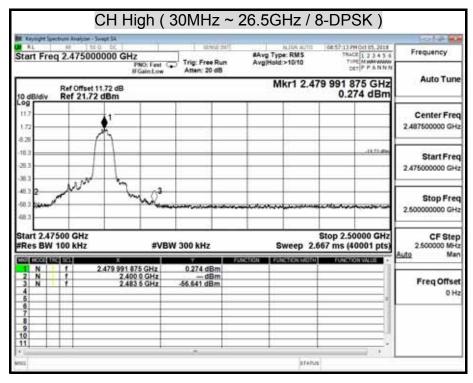






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tart Fre	g 30.0000	19 - DC [	stast	#Avy	AURA AUTO Type: RMS	08:58:27 PH Oct 05, 2018 TRACE 1 2 3 4 5 6	Frequency
- care r r c		PNO: Fat IFGainLo			Hold:>10/10	DET P P A N N N	Section 202 APR
0 dBidiy	Ref Offset				Mk	-2.834 dBm	Auto Tun
09			- <u>1</u> -				Center Fre
. 72			-		-		13.265000000 GH
10.3						-2210.664	StartFree
28.3							30.000000 MH
48.3	0				-		Stop Fre
20.3 10.3	-	manne					25.50000000 GH
tart 30 l	MHz 100 kHz		VBW 300 kHz		Swaan (	Stop 26.50 GHz 2.531 s (40001 pts)	CF Ste
Res Dev		*	VDW JOU KHZ	102000	Sweep /		Auto Ma
1 N 2 N	1	2.479 8 GHz 2.400 0 GHz			1	(1	
3 N 4 5	î	2.483 5 GHz					Freq Offse
6 7 8							
9						U	
<u></u>				-	-		



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# 8.8 RADIATED EMISSIONS

# 8.8.1 TRANSMIA-1430WPER RADIATED SUPURIOUS EMSSIONS

## **LIMITS**

§ 15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 -1710	10.6 -12.7
6.26775 - 6.26825	108 -121.94	1718.8 - 1722.2	13.25 -13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 – 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 -16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3338	36.43 - 36.5
12.57675 - 12.57725	322 -335.4	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41			

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

§ 15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown is Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.



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**Report No.:** T180522N07-RP1-1 Rev.: 00 § 15.209 (a) 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 (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

\*\* 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.

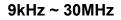
§ 15.209 (b) In the emission table above, the tighter limit applies at the band edges.

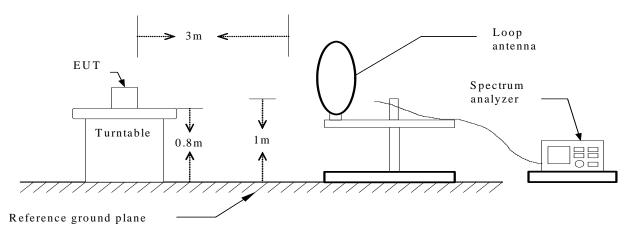


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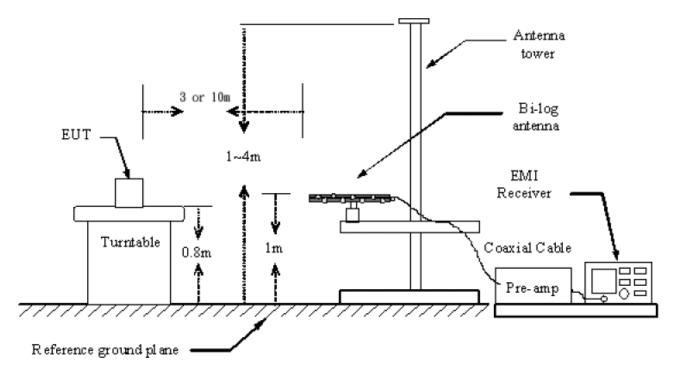
# **TEST SETUP**

The diagram below shows the test setup that is utilized to make the measurements for emission from below 1GHz.





30MHz ~ 1GHz

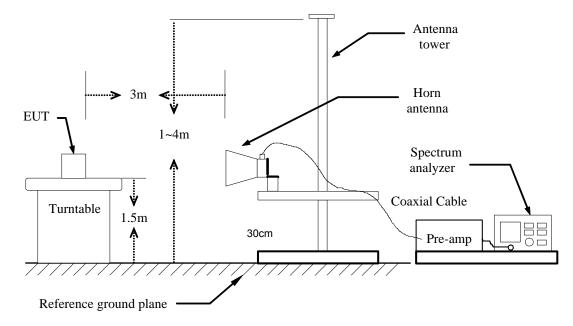




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The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



# TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8/1.5 meters above the ground at a 10/3 meter open site/chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. White measuring the radiated emission below 1GHz, the EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. White measuring the radiated emission above 1GHz, the EUT was set 3 or 10 meters away from the interference-receiving antenna
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Note :

- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
- 2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.
- 3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 510 Hz for Average detection (AV) at frequency above 1GHz.



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**Report No.:** T180522N07-RP1-1

# 8.8.2 WORST-CASE RADIATED EMISSION BELOW 1 GHz

# BELOW 1 GHz (9kHz ~ 30MHz)

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

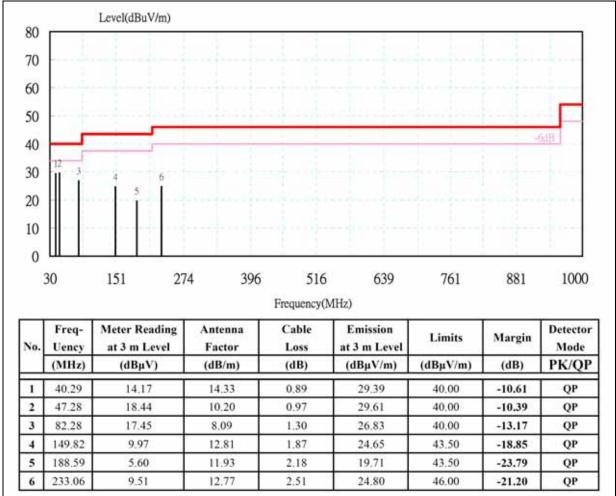


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## Report No.: T180522N07-RP1-1 BELOW 1 GHz (30MHz ~ 1GHz)

Product Name	30W Wall Plate Audio Amplifier with CSR Bluetooth v4.2	Test Date	2018/09/25
Model Name	A-1430WP	Test By	Ted Huang
Test Mode	ТХ	Temp & Humidity	26.5°C, 62%

## Vertical



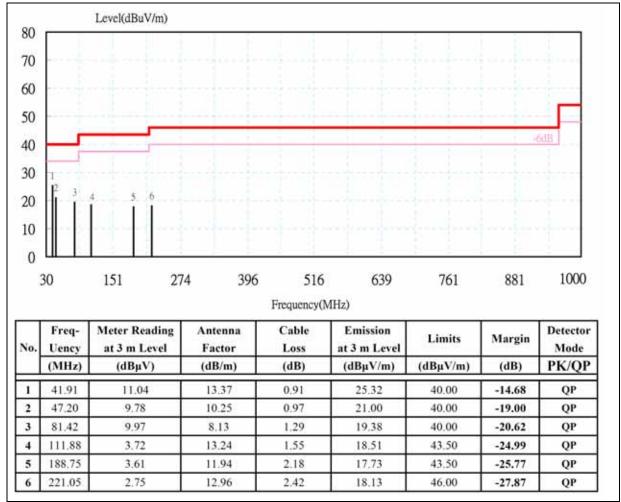
- No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).
- 2. Radiated emissions measured were made with an instrument using peak/quasi-peak detector mode.
- 3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
- 4. Margin (dB) = Remark result (dBuV/m) Quasi-peak limit (dBuV/m).



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Product Name	30W Wall Plate Audio Amplifier with CSR Bluetooth v4.2	Test Date	2018/09/25
Model Name	A-1430WP	Test By	Ted Huang
Test Mode	ТХ	Temp & Humidity	26.5°C, 62%

#### Horizontal



- 1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).
- 2. Radiated emissions measured were made with an instrument using peak/quasi-peak detector mode.
- 3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
- 4. Margin (dB) = Remark result (dBuV/m) Quasi-peak limit (dBuV/m).



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# 8.8.3 TRANSMIA-1430WPER RADIATED EMISSION ABOVE 1 GHz

Product Name	30W Wall Plate Audio Amplifier with CSR Bluetooth v4.2	Test Date	2018/10/05
Model Name	A-1430WP	Test By	Ted Huang
Test Mode	CH Low TX / GFSK	Temp & Humidity	26.4°C, 53%

#### Horizontal

		e / CH Low	Measurement Distance at 3m Horizontal polarity							
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(P/Q/A)
*	1114.42	58.24	24.88	1.97	45.34	0.41	40.16	74.00	-33.84	Р
*	1114.42	47.00	24.88	1.97	45.34	0.41	28.92	54.00	-25.08	А
*	4803.98	63.70	32.91	4.37	44.32	0.22	56.89	74.00	-17.11	Р
*	4803.98	59.32	32.91	4.37	44.32	0.22	52.51	54.00	-1.49	А
	7205.61	57.73	38.70	5.50	44.04	0.27	58.17	74.00	-15.83	Р
	7205.61	48.31	38.70	5.50	44.04	0.27	48.74	54.00	-5.26	А

#### Vertical

		Measurement Distance at 3m Vertical polarity								
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(P/Q/A)
*	1108.24	58.80	24.85	1.96	45.34	0.41	40.69	74.00	-33.31	Р
*	1108.24	48.32	24.85	1.96	45.34	0.41	30.20	54.00	-23.80	А
*	4803.97	64.08	32.91	4.37	44.32	0.22	57.27	74.00	-16.73	Р
*	4803.97	59.89	32.91	4.37	44.32	0.22	53.08	54.00	-0.92	А
	7206.24	57.49	38.70	5.50	44.04	0.27	57.93	74.00	-16.07	Р
	7206.24	49.46	38.70	5.50	44.04	0.27	49.90	54.00	-4.10	А

- 1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=510Hz
- 3. The result basic equation calculation is as follow:
- Level = Reading + AF + Cable Preamp + Filter, Margin = Level-Limit
- 4. The other emission levels were 20dB below the limit
- 5. The test limit distance is 3M limit.
- 6. \*=Restricted bands of operation



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Product Name	30W Wall Plate Audio Amplifier with CSR Bluetooth v4.2	Test Date	2018/10/05
Model Name	A-1430WP	Test By	Ted Huang
Test Mode	CH Mid TX / GFSK	Temp & Humidity	26.4°C, 53%

#### Horizontal

		TX mode	e / CH Mid		Measurement Distance at 3m Horizontal polarity					
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(P/Q/A)
*	1114.54	58.35	24.88	1.97	45.34	0.41	40.27	74.00	-33.73	Р
*	1114.54	47.18	24.88	1.97	45.34	0.41	29.10	54.00	-24.90	А
*	4881.95	64.01	33.15	4.42	44.34	0.23	57.47	74.00	-16.53	Р
*	4881.95	59.42	33.15	4.42	44.34	0.23	52.87	54.00	-1.13	А
*	7322.98	58.11	39.10	5.53	43.94	0.27	59.07	74.00	-14.93	Р
*	7322.98	49.86	39.10	5.53	43.94	0.27	50.82	54.00	-3.18	А

#### Vertical

		TX mod	e / CH Mid		Measurement Distance at 3m Vertical polarity					
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(P/Q/A)
*	1108.34	58.68	24.86	1.96	45.34	0.41	40.57	74.00	-33.43	Р
*	1108.34	48.16	24.86	1.96	45.34	0.41	30.05	54.00	-23.95	А
*	4884.85	63.03	33.15	4.42	44.34	0.23	56.49	74.00	-17.51	Р
*	4884.85	59.27	33.15	4.42	44.34	0.23	52.73	54.00	-1.27	А
*	7322.79	57.04	39.10	5.53	43.94	0.27	58.01	74.00	-15.99	Р
*	7322.79	47.41	39.10	5.53	43.94	0.27	48.38	54.00	-5.62	А

- 1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=510Hz
- 3. The result basic equation calculation is as follow:
- Level = Reading + AF + Cable Preamp + Filter, Margin = Level-Limit
- 4. The other emission levels were 20dB below the limit
- 5. The test limit distance is 3M limit.
- 6. \*=Restricted bands of operation



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Ted Huang 26.4°C, 53%

Temp & Humidity

Product Name30W Wall Plate Audio Amplifier with<br/>CSR Bluetooth v4.2Test Date2018/10/05Model NameA-1430WPTest ByTed Huang

CH High TX / GFSK

#### Horizontal

**Test Mode** 

		TX mode	e / CH High		Measurement Distance at 3m Horizontal polarity					
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(P/Q/A)
*	1114.36	58.68	24.88	1.97	45.34	0.41	40.60	74.00	-33.40	Р
*	1114.36	47.38	24.88	1.97	45.34	0.41	29.30	54.00	-24.70	А
*	4959.93	64.03	33.38	4.46	44.36	0.24	57.74	74.00	-16.26	Р
*	4959.93	59.34	33.38	4.46	44.36	0.24	53.05	54.00	-0.95	А
*	7439.80	59.19	39.50	5.56	43.83	0.27	60.68	74.00	-13.32	Р
*	7439.80	51.48	39.50	5.56	43.83	0.27	52.97	54.00	-1.03	А

#### Vertical

			Measurement Distance at 3m Vertical polarity							
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(P/Q/A)
*	1108.18	59.18	24.85	1.96	45.34	0.41	41.07	74.00	-32.93	Р
*	1108.18	48.48	24.85	1.96	45.34	0.41	30.37	54.00	-23.63	А
*	4959.82	63.85	33.38	4.46	44.36	0.24	57.56	74.00	-16.44	Р
*	4959.82	59.16	33.38	4.46	44.36	0.24	52.87	54.00	-1.13	А
*	7439.91	58.05	39.50	5.56	43.83	0.27	59.54	74.00	-14.46	Р
*	7439.91	49.34	39.50	5.56	43.83	0.27	50.83	54.00	-3.17	А

- 1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- 2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=510Hz
- 3. The result basic equation calculation is as follow:
- Level = Reading + AF + Cable Preamp + Filter, Margin = Level-Limit
- 4. The other emission levels were 20dB below the limit
- 5. The test limit distance is 3M limit.
- 6. \*=Restricted bands of operation



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Report No.: T180522N07-RP1-1

Product Name	30W Wall Plate Audio Amplifier with CSR Bluetooth v4.2	Test Date	2018/10/05
Model Name	A-1430WP	Test By	Ted Huang
Test Mode	CH Low TX / 8-DPSK	Temp & Humidity	26.4°C, 53%

#### Horizontal

		Measurement Distance at 3m Horizontal polarity					arity			
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(P/Q/A)
*	1114.38	58.76	24.88	1.97	45.34	0.41	40.68	74.00	-33.32	Р
*	1114.38	47.46	24.88	1.97	45.34	0.41	29.38	54.00	-24.62	А
*	4804.03	60.89	32.91	4.37	44.32	0.22	54.08	74.00	-19.92	Р
*	4804.03	55.00	32.91	4.37	44.32	0.22	48.20	54.00	-5.80	А
	7206.10	56.68	38.70	5.50	44.04	0.27	57.12	74.00	-16.88	Р
	7206.10	46.04	38.70	5.50	44.04	0.27	46.48	54.00	-7.52	А

#### Vertical

		TX mode	e / CH Low		Measurement Distance at 3m Vertical polarity					
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(P/Q/A)
*	1108.25	59.36	24.85	1.96	45.34	0.41	41.25	74.00	-32.75	Р
*	1108.25	48.57	24.85	1.96	45.34	0.41	30.46	54.00	-23.54	А
*	4804.07	61.44	32.91	4.37	44.32	0.22	54.63	74.00	-19.37	Р
*	4804.07	56.02	32.91	4.37	44.32	0.22	49.21	54.00	-4.79	А
	7205.91	56.33	38.70	5.50	44.04	0.27	56.76	74.00	-17.24	Р
	7205.91	46.26	38.70	5.50	44.04	0.27	46.70	54.00	-7.30	А

- 1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- 2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=510Hz
- 3. The result basic equation calculation is as follow:
- Level = Reading + AF + Cable Preamp + Filter, Margin = Level-Limit
- 4. The other emission levels were 20dB below the limit
- 5. The test limit distance is 3M limit.
- 6. \*=Restricted bands of operation



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Report No.: T180522N07-RP1-1

Product Name	30W Wall Plate Audio Amplifier with CSR Bluetooth v4.2	Test Date	2018/10/05
Model Name	A-1430WP	Test By	Ted Huang
Test Mode	CH Mid TX / 8-DPSK	Temp & Humidity	26.4°C, 53%

#### Horizontal

		TX mode	e / CH Mid		Measurement Distance at 3m Horizontal polarity						
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark	
	(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(P/Q/A)	
*	1114.40	58.36	24.88	1.97	45.34	0.41	40.28	74.00	-33.72	Р	
*	1114.40	47.25	24.88	1.97	45.34	0.41	29.17	54.00	-24.83	А	
*	4881.91	62.20	33.15	4.42	44.34	0.23	55.66	74.00	-18.34	Р	
*	4881.91	57.51	33.15	4.42	44.34	0.23	50.96	54.00	-3.04	А	
*	7323.07	55.91	39.10	5.53	43.94	0.27	56.88	74.00	-17.12	Р	
*	7323.07	47.64	39.10	5.53	43.94	0.27	48.60	54.00	-5.40	А	

#### Vertical

		TX mod	e / CH Mid		Measurement Distance at 3m Vertical polarity						
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark	
	(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(P/Q/A)	
*	1108.28	58.66	24.85	1.96	45.34	0.41	40.55	74.00	-33.45	Р	
*	1108.28	48.08	24.85	1.96	45.34	0.41	29.97	54.00	-24.03	А	
*	4881.86	61.45	33.15	4.42	44.34	0.23	54.90	74.00	-19.10	Р	
*	4881.86	56.32	33.15	4.42	44.34	0.23	49.78	54.00	-4.22	А	
*	7323.38	55.62	39.10	5.53	43.94	0.27	56.59	74.00	-17.41	Р	
*	7323.38	45.83	39.10	5.53	43.94	0.27	46.79	54.00	-7.21	А	

- 1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- 2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=510Hz
- 3. The result basic equation calculation is as follow:
- Level = Reading + AF + Cable Preamp + Filter, Margin = Level-Limit
- 4. The other emission levels were 20dB below the limit
- 5. The test limit distance is 3M limit.
- 6. \*=Restricted bands of operation



#### Page: 83 / 102 Rev.: 00

Product Name30W Wall Plate Audio Amplifier with<br/>CSR Bluetooth v4.2Test Date2018/10/05Model NameA-1430WPTest ByTed HuangTest ModeCH High TX / 8-DPSKTemp & Humidity26.4°C, 53%

#### Horizontal

		TX mode	e / CH High		Measurement Distance at 3m Horizontal polarity						
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark	
	(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(P/Q/A)	
*	1114.58	58.43	24.88	1.97	45.34	0.41	40.35	74.00	-33.65	Р	
*	1114.58	47.26	24.88	1.97	45.34	0.41	29.18	54.00	-24.82	А	
*	4959.85	61.72	33.38	4.46	44.36	0.24	55.44	74.00	-18.56	Р	
*	4959.85	56.08	33.38	4.46	44.36	0.24	49.79	54.00	-4.21	А	
*	7439.79	56.15	39.50	5.56	43.83	0.27	57.65	74.00	-16.35	Р	
*	7439.79	46.62	39.50	5.56	43.83	0.27	48.11	54.00	-5.89	А	

#### Vertical

		TX mode	e / CH High		Measurement Distance at 3m Vertical polarity						
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark	
	(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(P/Q/A)	
*	1108.32	58.75	24.85	1.96	45.34	0.41	40.64	74.00	-33.36	Р	
*	1108.32	48.35	24.85	1.96	45.34	0.41	30.24	54.00	-23.76	А	
*	4960.01	61.51	33.38	4.46	44.36	0.24	55.22	74.00	-18.78	Р	
*	4960.01	56.50	33.38	4.46	44.36	0.24	50.22	54.00	-3.78	А	
*	7440.20	57.48	39.50	5.56	43.83	0.27	58.97	74.00	-15.03	Р	
*	7440.20	48.88	39.50	5.56	43.83	0.27	50.37	54.00	-3.63	А	

- 1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- 2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=510Hz
- 3. The result basic equation calculation is as follow:
- Level = Reading + AF + Cable Preamp + Filter, Margin = Level-Limit
- 4. The other emission levels were 20dB below the limit
- 5. The test limit distance is 3M limit.
- 6. \*=Restricted bands of operation



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# 8.8.4 RESTRICTED BAND EDGES

Model Name	A-1430WP	Test By	Ted Huang
Temp & Humidity	26.4°C, 53%	Test Date	2018/10/05

Detector Mode : Peak

# Polarity : Horizontal

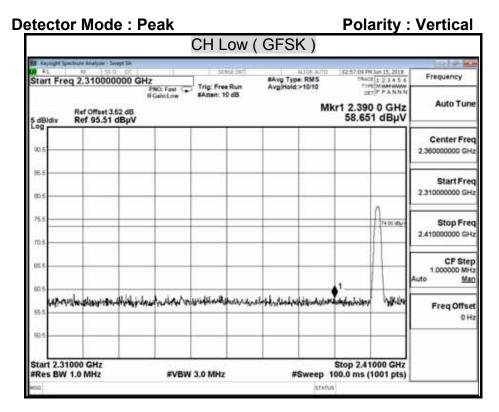
Keyoght Spectrum Analyzer - Swept 1		and the second			-	- 10 M
Start Freq 2.31000000			Avg Type: RMS Avg/Hold:>10/10	162-52:17 PM 3/ 3RACE	m 15.2018 1 2 3 4 5 6 2 004 WWW	Frequency
Ref Offset 3.52 o 5 dB/div Ref 95.51 dB	IFGainLow #Atten	E 10 dB	10.500 (10.500) 10.500 (10.500)	kr1 2.390 57.043	0 GHz	Auto Tune
90.5						Center Fred 2.360000000 GHz
80.5				1		Start Free 2.31000000 GH
75.5					74.00.db//	Stop Free 2.41000000 GH
65.5						CF Step 1.000000 MH Auto Mar
55.5	houder an entrance for much	hoonichaajaha	ofosed the structure	<b>Signal sign</b>	Siste	Freq Offse 0 H
60.5					_	
Start 2.31000 GHz #Res BW 1.0 MHz	#VBW 3.0 M	Hz	#Sweep 1	Stop 2.410 00.0 ms (10		

# Detector Mode : Average Polarity : Horizontal

Keysight Spectrum Analyzer -	Swept SA					- 10 a -
Start Freq 2.31000		SENSE 3NT	#Avg Type: RMS	38a	H3un 15,2018 CR 1 2 3 4 5 6	Frequency
Ref Offset 5 dB/div Ref 95.5			AvgiHold:>10/10	kr1 2.39	0 0 GHz 34 dBµV	Auto Tune
90.5						Center Fred 2.360000000 GH
80.5					Λ	Start Free 2.31000000 GH
75.5 70.5						Stop Free 2.41000000 GH
05.5						CF Step 1.000000 MH Auto <u>Ma</u>
60.5					64.00 albu/s	Freq Offse 0 H
50.5				•1		
Start 2.31000 GHz #Res BW 1.0 MHz	#\	/BW 360 Hz	Sweep 3		1000 GHz (1001 pts)	



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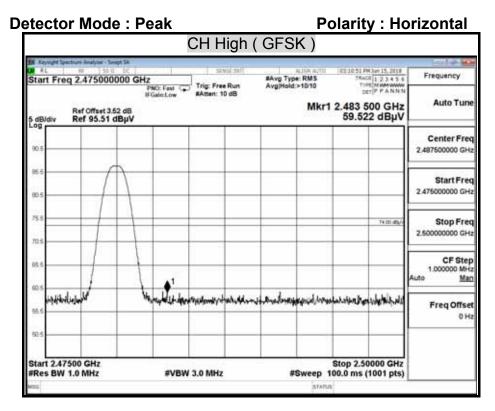
**Detector Mode : Average** 

**Polarity : Vertical** 

Keysight Spectrum Analyzer - Swept S				1010
Start Freq 2.31000000	0 GHz PMC East (C) Trig: Free Run	#Avg Type: RMS Avg/Hold:>10/10	12:57:32 PH Jun 15, 2018 TRACE 1 2 3 4 5 6	Frequency
Ref Offset 3.52 d 5 dB/div Ref 95.51 dBj	If Gain:Low #Atten: 10 dB	899 <b>-</b> 2010/07-07	r1 2.390 0 GHz 48.017 dBµV	Auto Tune
90.5				Center Fred 2.360000000 GHz
80.5				Start Free 2.31000000 GH
75.5			A	Stop Free 2.41000000 GH
05.5				CF Step 1.000000 MH Auto Mar
55.5			\$4.00 atty/s	Freq Offse 0 H
50.5			<u>1</u>	
Start 2.31000 GHz #Res BW 1.0 MHz	#VBW 360 Hz		Stop 2.41000 GHz 16.6 ms (1001 pts)	



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**Detector Mode : Average** 

## **Polarity : Horizontal**

Keysight Spectrum Analyzer - See	CALCULATION OF THE OWNER		sing out	AUSA AUTO	0111011903-015,2014	
Start Freq 2.475000	000 GHz		Turner and	#Avg Type: RMS Avg/Hold:>10/10	TRACE11 12 2 4 5 4	Frequency
Ref Offset 3. dB/div Ref 95.51 (	1F 52 dB	NO: Fast Gain:Low	#Atten: 10 dB	89 <b>5</b> 9698 11	1 2.483 500 GHz 48.106 dBµV	Auto Tuni
90.5						Center Free 2.487500000 GH
80.5	$\Lambda$					Start Fre 2.475000000 GH
r5.5						Stop Fre 2.50000000 GH
05.6	$\left  \right $					CF Ste 1.000000 MH Auto <u>Ma</u>
65.5					54.00 atty/s	Freq Offse 0 H
50.5		•				
Start 2.47500 GHz Res BW 1.0 MHz		#VBW	360 Hz	Sweep	Stop 2.50000 GHz 54.20 ms (1001 pts)	



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	CH	High (GFSK )		
Keynight Spectrum Analyzer - Swep     KL		manuer in more services		ale a
Start Freq 2.4750000	00 GHz	#Avg Type: RMS ee Run Avg/Hold>10/10	TRACE 1 2 2 4 5 6	Frequency
Ref Offset 3.52 5 dB/div Ref 95.51 db	IFGainLow #Atten:	10 dB	1 2.483 500 GHz 57.254 dBµV	Auto Tun
90.5				Center Fre 2.487500000 GH
05.5				Start Fre 2.475000000 GH
75.5			74.00.db/s	Stop Fre 2.50000000 GH
05.5				CF Ste 1.000000 MH Auto <u>Ma</u>
ss.s	Hendenlegelinger	here and the second	and the second second	Freq Offse
50.5				
Start 2.47500 GHz #Res BW 1.0 MHz	#VBW 3.0 MH	z #Sweep	Stop 2.50000 GHz 100.0 ms (1001 pts)	

# Detector Mode : Average Polarity : Vertical

AL	eq 2.475000	000 GHz	NO: Fast Ca	Strig: Free Run	ALIDA A SAvg Type: RM3 Avg(Hold:>1010	5	5 PH Jun 15, 2018 RACE 1 2 3 4 5 6 TUPE ROMANNA DET P P A N N N	Frequency
5 dB/div	Ref Offset 3. Ref 95.51 (	52 dB	GainLow	#Atten: 10 dB	м		3 500 GHz 096 dBµV	Auto Tun
90.5								Center Fre 2.487500000 GH
66.5 60.5		h						Start Fre 2.475000000 GH
75.5 70.5								Stop Fre 2.50000000 GH
65.5		$\left  \right $						CF Ste 1.000000 Mr Auto Ma
60.5 65.5							54.00 abu/s	Freq Offse
50.5			•					
	7500 GHz / 1.0 MHz		#VBV	/ 360 Hz			.50000 GHz s (1001 pts)	



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	CH Low (	8-DPSK)		
BR Keysight Spectrum Analyzer - Swept SA	11 0.00000000	a summer of		
Start Freq 2.310000000 GH		#Avg Type: RM5	12:49:30 PH 3un 15, 2018 TRACE 1 2:3 4 5:6	Frequency
Ref Offset 3.52 dB 5 dB/div Ref 95.51 dBµV	PNC: Feet CT Trig: Free Run IFGain:Low #Atten: 10 dB		2.390 0 GHz 57.433 dBµV	Auto Tun
90.5				Center Fre 2.36000000 GH
80.5			Δ	Start Fre 2.31000000 GH
75.5			74.00.db//	Stop Fre 2.41000000 GH
105 105 105				CF Ste 1.000000 Mr Auto Ma
1.17.0	langenterranisection and	riddichillowid program and the	mane hand	Freq Offs
60.5				
Start 2.31000 GHz #Res BW 1.0 MHz	#VBW 3.0 MHz		op 2.41000 GHz .0 ms (1001 pts)	

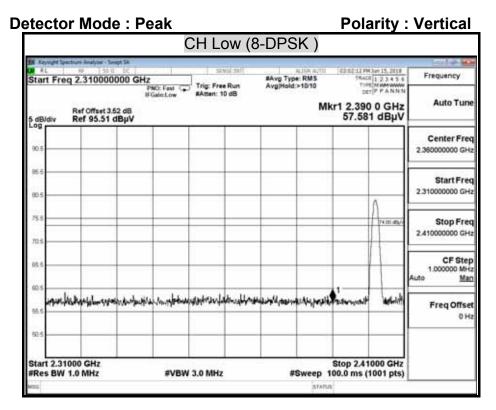
**Detector Mode : Average** 

# **Polarity : Horizontal**

Start Freq 2.31000	0 DC SING ON	AUTA AUTO 1425 SAvg Type: RMS Avg/Hold:>10/10	12 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Frequency
Ref Offset 3 dB/div Ref 95.51	IFGain:Low #Atten: 10 dB	Mkr1 2 4	2.390 0 GHz 7.982 dBµV	Auto Tune
90.5				Center Fred 2.36000000 GHz
85.5				Start Free 2.31000000 GH
75.5				Stop Free 2.41000000 GH
65.6				CF Step 1.000000 MH Auto Mat
55.5			\$4.00 alberte	Freq Offse 0 H
50.5				
Start 2.31000 GHz Res BW 1.0 MHz	#VBW 360 Hz		2.41000 GHz ms (1001 pts)	



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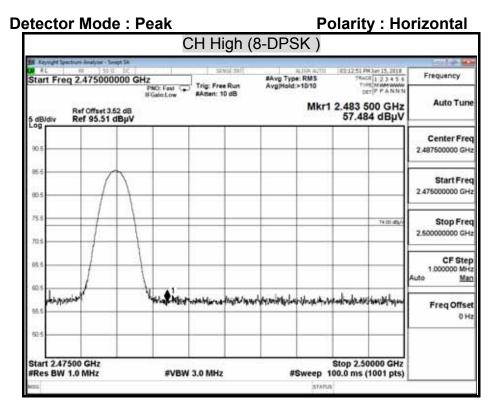
**Detector Mode : Average** 

# **Polarity : Vertical**

Keysight Spectrum Analyzer - Swept SA		CINIC DAY		1010
Start Freq 2.31000000 0	GHz PMC Free Run	#Avg Type: RMS Avg(Hold:>10/10	12:58:27 PH 3un 15, 2018 TRACE 1 2 3 4 5 6 TIPE M MM WWW	Frequency
Ref Offset 3.52 dB 6 dB/div Ref 95.51 dBµV	If GainLow #Atten: 10 dB	Mk	Auto Tune	
90.5				Center Free 2.36000000 GH
80.5				Start Free 2.31000000 GH
755			A	Stop Free 2.41000000 GH
05.5				CF Step 1.000000 MH Auto Ma
66.5			ta co atu-s	Freq Offse 0 H
50.5			<u>-</u>	
Start 2.31000 GHz #Res BW 1.0 MHz	#VBW 360 Hz		Stop 2.41000 GHz 16.6 ms (1001 pts)	

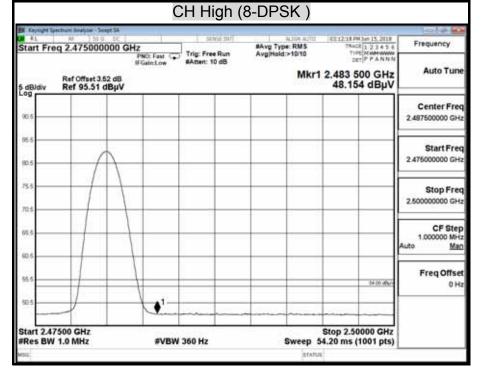


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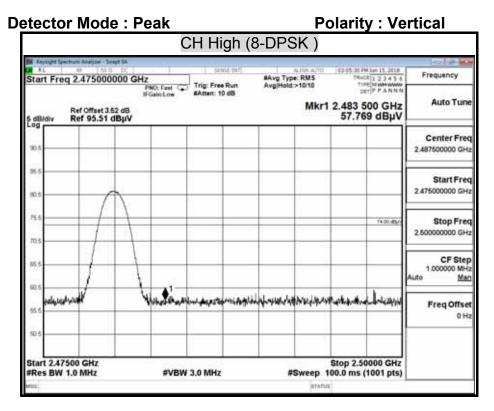
**Detector Mode : Average** 

# **Polarity : Horizontal**



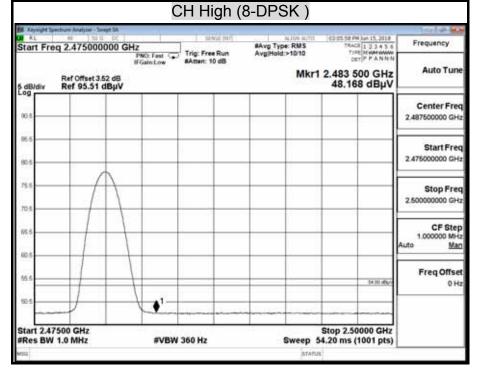


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Detector Mode : Average Polarit

**Polarity : Vertical** 





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**Report No.:** T180522N07-RP1-1

# **8.9 POWERLINE CONDUCTED EMISSIONS**

# LIMITS

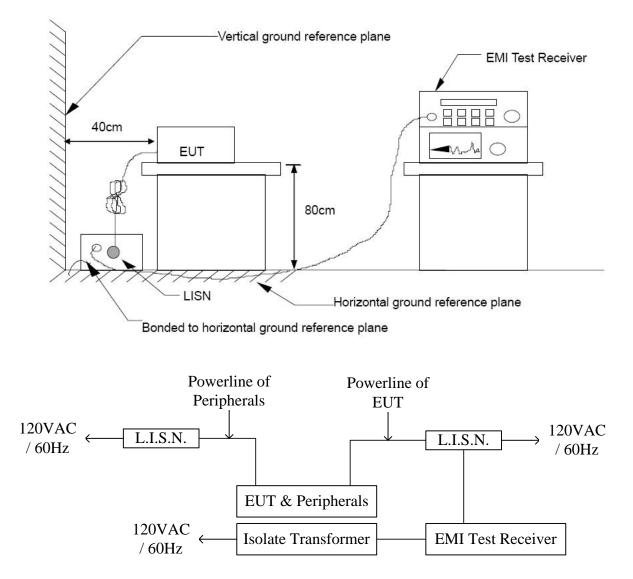
§ 15.207 (a) Except as shown in paragraph (b) and (c) this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted limit (dBµv)		
	Quasi-peak	Average	
0.15 - 0.5	66 to 56	56 to 46	
0.5 - 5	56	46	
5 - 30	60	50	



Report No.: T180522N07-RP1-1 TEST SETUP Page: 93 / 102 Rev.: 00



# TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80cm above the horizontal ground plane. The EUT IS CONFIGURED IN ACCORDANCE WITH ANSI C63.10 : 2013.

The resolution bandwidth is set to 9 kHz for both quasi-peak detection and average detection measurements.

Line conducted data is recorded for both NEUTRAL and LINE.

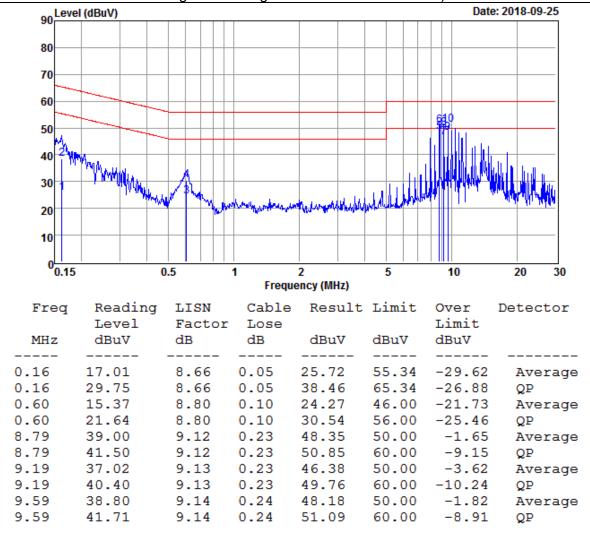


# TEST RESULTS

Model No.	A-1430WP	Test Mode	AUX IN
Environmental Conditions	1239 h/% RH	Resolution Bandwidth	9 kHz
Tested by	Andy Yang		

#### LINE

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



REMARKS : 1. Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB) 2. Over Limit (dBuV) = Measured Level (dBuV) – Limits (dBuV)

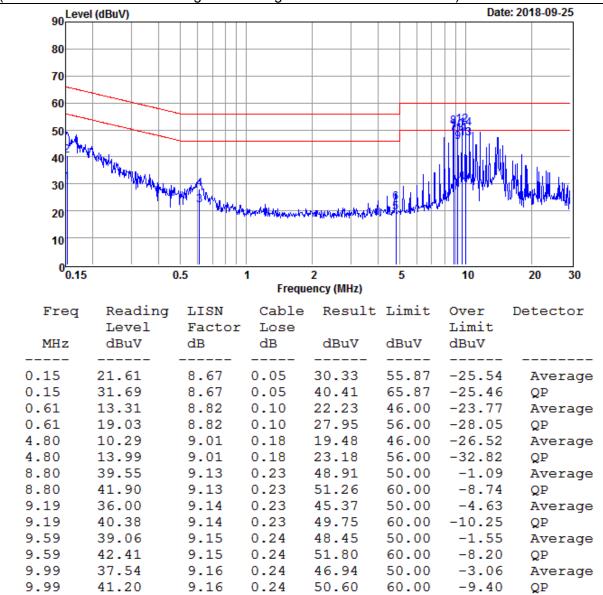


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Model No.	A-1430WP	Test Mode	AUX IN
Environmental Conditions	239 h/% RH	Resolution Bandwidth	9 kHz
Tested by	Andy Yang		

#### NEUTRAL

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



REMARKS : 1. Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB)

2. Over Limit (dBuV) = Measured Level (dBuV) – Limits (dBuV)

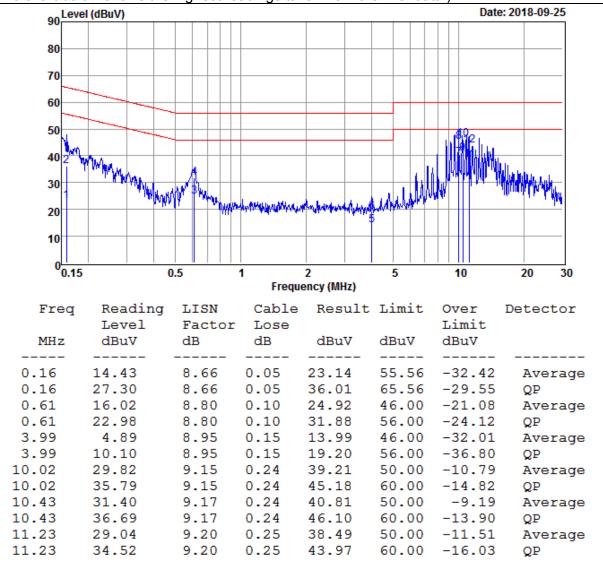


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Model No.	A-1430WP	Test Mode	Bluetooth
Environmental Conditions	23.9 , 67% RH	Resolution Bandwidth	9 kHz
Tested by	Andy Yang		

## LINE

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



REMARKS : 1. Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB) 2. Over Limit (dBuV) = Measured Level (dBuV) – Limits (dBuV)

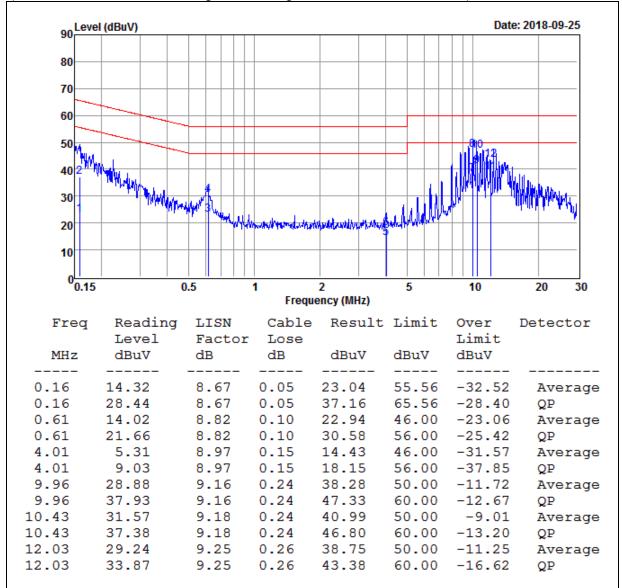


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Model No.	A-1430WP	Test Mode	Bluetooth
Environmental Conditions	239 67% RH	Resolution Bandwidth	9 kHz
Tested by	Andy Yang		

#### NEUTRAL

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



REMARKS : 1. Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB) 2. Over Limit (dBuV) = Measured Level (dBuV) – Limits (dBuV)

=== END of Report ===