

# **FCC Test Report**

Report No.: AGC01278200910FE03

FCC ID	8 :	2AOW6HPBT010
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	Wireless Headphones
BRAND NAME	E	N/A
MODEL NAME	: @	HPBT010
APPLICANT	5.	Shantou Xinyu Industry Co., Ltd.
DATE OF ISSUE	© :	Sep. 29,2020
STANDARD(S)	:	FCC Part 15.247
REPORT VERSION		V1.0

# Attestation of Global Compliance (Shenzhen) Co., Ltd



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## **REPORT REVISE RECORD**

	Report Version	Revise Time	Issued Date	Valid Version	Notes
ĺ	V1.0	. /	Sep. 29,2020	Valid	Initial Release

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Applicant	Shantou Xinyu Industry Co., Ltd.			
Address	Heping Zhongzhai Industial Zone Chaoyang District			
Manufacturer	Shantou Xinyu Industry Co., Ltd.			
Address	Heping Zhongzhai Industial Zone Chaoyang District			
Factory	Shantou Xinyu Industry Co., Ltd.			
Address	Heping Zhongzhai Industial Zone Chaoyang District			
Product Designation	Wireless Headphones			
Brand Name	N/A			
Test Model	HPBT010			
Date of test	Sep. 22,2020 to Sep. 29,2020			
Deviation	No any deviation from the test method			
Condition of Test Sample	mple Normal			
Test Result	Pass			
Report Template	AGCRT-US-BR/RF			

## **1. VERIFICATION OF CONFORMITY**

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. 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 radiated emission limits of FCC PART 15.247.

Prepared By

**Reviewed By** 

John Zerry

John Zeng Project Engineer

Sep. 29,2020

Max Zhan

Max Zhang Reviewer

Sep. 29,2020

Approved By

Forrest Lei Authorized Officer

Sep. 29,2020

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## 2. GENERAL INFORMATION

## 2.1. PRODUCT DESCRIPTION

The EUT is designed as "Wireless Headphones". It is designed by way of utilizing the GFSK,  $\pi$  /4-DQPSK and 8DPSK technology to achieve the system operation.

A major technical description of EUT is described as following

Operation Frequency	2.402 GHz to 2.480 GHz
RF Output Power	0.089dBm (Max)
Bluetooth Version	V5.1
Modulation	BR ⊠GFSK, EDR ⊠π /4-DQPSK, ⊠8DPSK BLE □GFSK 1Mbps □GFSK 2Mbps
Number of channels 79	
Hardware Version	V1.2
Software Version	V1.2
Antenna Designation	PCB Antenna (Comply with requirements of the FCC part 15.203)
Antenna Gain	-0.6dBi
Power Supply	DC 3.7V by battery or DC 5V by adapter

Note: 1. The EUT doesn't support BLE.

2. The EUT has two type of battery(250mAh and 400mAh). Both have been test. Only the worst data of 250mAh battery had been recorded in the test report.

## 2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
.0	0	2402 MHz
	<u> </u>	2403 MHz
	38	2440 MHz
2402~2480MHz	39	2441 MHz
$\odot$	40	2442 MHz
SC 2		al a
L'AL	77	2479 MHz
6	78	2480 MHz

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## 2.3. RECEIVER INPUT BANDWIDTH

The input bandwidth of the receiver is 1.3MHz, in every connection one Bluetooth device is the master and the other one is slave. The master determines the hopping sequence. The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master. Additionally, the type of connection (e.g. single of multi slot packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also, the slave of the connection will use these settings. Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.

## 2.4. EXAMPLE OF A HOPPING SEQUENCY IN DATA MODE

Example of a hopping sequence in data mode: 40,21,44,23,42,53,46,55,48,33,52,35,50,65,54,67 56,37,60,39,58,69,62,71,64,25,68,27,66,57,70,59 72,29,76,31,74,61,78,63,01,41,05,43,03,73,07,75 09,45,13,47,11,77,15,00,64,49,66,53,68,02,70,06 01, 51, 03, 55, 05, 04

## 2.5. EQUALLY AVERAGE USE OF FREQUENCIES AND BEHAVIOUR

The generation of the hopping sequence in connection mode depends essentially on two input values:

1. LAP/UAP of the master of the connection.

2. Internal master clock.

The LAP (lower address part) are the 24 LSB's of the 48 BD\_ADDRESS. The BD\_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP (upper address part) are the 24MSB's of the 48BD\_ADDRESS

The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and is never turned off. For behavior action with other units only offset is used. It has no relation to the time of the day. Its resolution is at least half the RX/TX slot length of 312.5us. The clock has a cycle of about one day(23h30). In most case it is implemented as 28 bits counter. For the deriving of the hopping sequence the entire. LAP (24 bits),4LSB's(4bits) (Input 1) and the 27MSB's of the clock (Input 2) are used. With this input values different mathematical procedures (permutations, additions, XOR-operations) are performed to generate the Sequence. This will be done at the beginning of every new transmission.

Regarding short transmissions the Bluetooth system has the following behavior:

The first connection between the two devices is established, a hopping sequence was generated. For Transmitting the wanted data the complete hopping sequence was not used. The connection ended. The second connection will be established. A new hopping sequence is generated. Due to the fact the

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Bluetooth clock has a different value, because the period between the two transmission is longer (and it Cannot be shorter) than the minimum resolution of the clock(312.5us). The hopping sequence will always differ from the first one.

## 2.6. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2AOW6HPBT010** filing to comply with the FCC PART 15.247 requirements.

## 2.7. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013). Radiated testing was performed at an antenna to EUT distance 3 meters.

#### 2.8. SPECIAL ACCESSORIES

Refer to section 5.2.

## 2.9. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

#### 2.10. ANTENNA REQUIREMENT

This intentional radiator is designed with a permanently attached antenna of an antenna to ensure that no antenna other than that furnished by the responsible party shall be used with the device. For more information of the antenna, please refer to the APPENDIX B: PHOTOGRAPHS OF EUT.

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## **3. MEASUREMENT UNCERTAINTY**

The reported uncertainty of measurement y  $\pm$ U, where expended uncertainty U is based on a standard

uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

- Uncertainty of Conducted Emission, Uc = ±3.2 dB
- Uncertainty of Radiated Emission below 1GHz, Uc = ±3.9 dB
- Uncertainty of Radiated Emission above 1GHz, Uc = ±4.8 dB
- Uncertainty of total RF power, conducted,  $Uc = \pm 0.8$ dB
- Uncertainty of spurious emissions, conducted, Uc = ±2.7dB
- Uncertainty of Occupied Channel Bandwidth: Uc = ±2 %
- Uncertainty of Dwell Time:  $Uc = \pm 2\%$
- Uncertainty of Frequency:  $Uc = \pm 2\%$

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## **4. DESCRIPTION OF TEST MODES**

NO.	TEST MODE DESCRIPTION		
1	Low channel GFSK		
2	Middle channel GFSK		
3	High channel GFSK		
4	Low channel π/4-DQPSK		
5	Middle channel π/4-DQPSK		
6	High channel π/4-DQPSK		
7	Low channel 8DPSK		
8	Middle channel 8DPSK		
9	High channel 8DPSK		
10	Hopping mode GFSK		
11	Hopping mode π/4-DQPSK		
12	Hopping mode 8DPSK		

Note:

1. Only the result of the worst case was recorded in the report, if no other cases.

2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.

3. For Conducted Test method, a temporary antenna connector is provided by the manufacture.

Software Setting

8 BT_Tool			-	x
COMx Baudrate				
Classic BLE				
Test Mode				
				<b>-</b>
FCC Test 🍥		e BT address	Stop	
CBT Test 🔘	55555	5555555		
RF Control				
RF Mode	TX TEST -	Packet Typ	e 3DH5	-
Hopping	OFF 🔻	TX Frequer	1Cy 2402	<b>-</b>
TX Power	7 🔹	RX Frequer	асу 2402 ч	r]
Scenario	PRBS Patte	≥rn		-
	L			
LOG: BR/EDR	Test			
LOG: Test en	d			
LOG: BR/EDR	Test			
LOG: Test en	-			
LOG: BR/EDR				-
LOG: Test en				=
LOG: BR/EDR	Test			-
COM2 is open		19200bps		
				_

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## **5. SYSTEM TEST CONFIGURATION**

5.1. CONFIGURATION OF EUT SYSTEM

Radiated Emission Configure:

EUT

Conducted Emission Configure:

	D	
EUT		AE

## 5.2. EQUIPMENT USED IN TESTED SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Wireless Headphones	HPBT010	2AOW6HPBT010	EUT
2	Adapter	TY0500100E1MN	N/A	AE
3	Charger line	G258	N/A	AE
4	control board	N/A	USB_TTL	AE

## **5.3. SUMMARY OF TEST RESULTS**

FCC RULES DESCRIPTION OF TEST		RESULT
15.247 (b)(1)	Peak Output Power	Compliant
15.247 (a)(1)	20 dB Bandwidth	Compliant
15.247 (d)	Conducted Spurious Emission	Compliant
15.209	Radiated Emission	Compliant
15.247 (a)(1)(iii)	Number of Hopping Frequency	Compliant
15.247 (a)(1)(iii)	47 (a)(1)(iii) Time of Occupancy	
15.247 (a)(1) Frequency Separation		Compliant
15.207	Conducted Emission	Compliant

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## 6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Designation Number	CN1259
FCC Test Firm Registration Number	975832
A2LA Cert. No.	5054.02
Description	Attestation of Global Compliance (Shenzhen) Co., Ltd is accredited by A2LA

## TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	May 15, 2020	May 14, 2021
LISN	R&S	ESH2-Z5	100086	Jul. 03,2020	Jul. 02,2021
Test software	R&S	ES-K1(Ver.V1.71)	N/A	N/A	N/A

## TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	May 15, 2020	May 14, 2021
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 12, 2019	Dec. 11, 2020
2.4GHz Filter	EM Electronics	2400-2500MHz	N/A	Mar. 23, 2020	Mar. 22, 2022
Attenuator	ZHINAN	E-002	N/A	N/A	N/A
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep. 09, 2019	Sep. 08, 2021
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	May 22, 2020	May 21, 2022
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May 17, 2019	May 16, 2021
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Oct. 15, 2019	Oct. 16, 2020
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 09, 2019	Jan. 08, 2021
Test software	Tonscend	JS32-RE (Ver.2.5)	N/A	N/A	N/A

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## 7. PEAK OUTPUT POWER

## 7.1. MEASUREMENT PROCEDURE

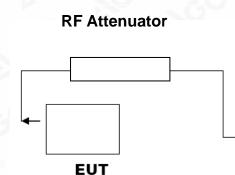
For peak power test:

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
- 3. RBW > 20 dB bandwidth of the emission being measured.
- 4. VBW  $\geq$ RBW.
- 5. Sweep: Auto.
- 6. Detector function: Peak.
- 7. Trace: Max hold.

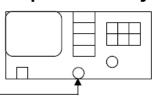
Allow trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power, after any corrections for external attenuators and cables.

## 7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

## PEAK POWER TEST SETUP



## Spectrum Analyzer



RF Cable

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#### 7.3. LIMITS AND MEASUREMENT RESULT

	PEAK OUTPUT POWER MEA FOR GFSK MOUI		
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.402	-2.589	30	Pass
2.441	-3.775	30	Pass
2.480	-4.949	30	Pass

#### CH0



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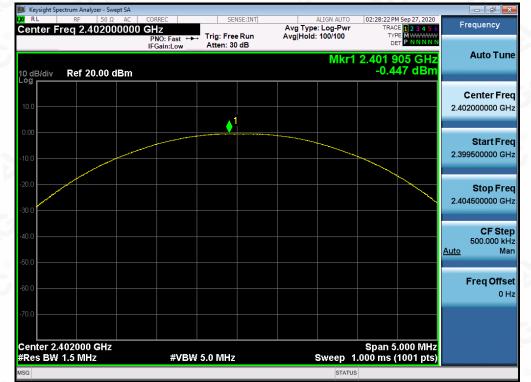
CH78



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	PEAK OUTPUT POWER MEASU FOR Π/4-DQPSK MODU		
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.402	-0.447	21	Pass
2.441	-1.625	21	Pass
2.480	-2.798	21	Pass



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Keysight Spectrum Analyzer - Swept SA	CORREC	SENSE:INT	ALIGN AUTO	02:29:22 PM Sep 27, 2020	
Center Freq 2.48000000	GHz		Avg Type: Log-Pwr Avg Hold: 100/100	TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast +++ IFGain:Low	Trig: Free Run Atten: 30 dB	Avg Hold: 100/100	DET	
10 dB/div Ref 20.00 dBm			Mkr1	2.480 140 GHz -2.798 dBm	Auto Tune
10.0					Center Fre 2.480000000 GH
-10.0		<b>\</b>			<b>Start Fre</b> 2.477500000 GH
-20.0					<b>Stop Fre</b> 2.482500000 GH
-40.0					CF Ste 500.000 kH Auto Ma
-60.0					Freq Offs 0 ⊦
-70.0 Center 2.480000 GHz				Span 5.000 MHz	
#Res BW 1.5 MHz	#VBW	5.0 MHz		l.000 ms (1001 pts)	
MSG			STATU	S	

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PEAK OUTPUT POWER MEASUREMENT RESULT FOR 8-DPSK MODULATION					
Frequency (GHz)Peak Power (dBm)Applicable Limits (dBm)Pass or Fail					
2.402	0.089	21	Pass		
2.441	-1.071	21	Pass		
2.480	-2.254	21	Pass		



CH0

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#### Report No.: AGC01278200910FE03 Page 19 of 72



CH39



CH78

🚺 Keysight Spectrum Analyzer - Swept SA 🙀 RL RF 50 Ω AC	CORREC	SENSE:INT			PM Sep 27, 2020	
Center Freq 2.48000000	OGHZ PNO: Fast ↔	Trig: Free Run	Avg Type: Lo Avg Hold:>10	0/100 T	ACE 1 2 3 4 5 6 YPE MWWWW	Frequency
	IFGain:Low	Atten: 30 dB	-		DET	Auto Tune
10 dB/div Ref 20.00 dBm				Mkr1 2.480 -2.3	040 GHz 254 dBm	Auto Tunc
202						Center Free
10.0						2.480000000 GH:
0.00		<b>≬</b> ¹				Oto at East
-10.0						Start Fred 2.477500000 GH:
10.0						
-20.0						<b>Stop Fred</b> 2.482500000 GH:
-30.0 0						05.010
-40.0						CF Step 500.000 kH Auto Mar
-50.0						
-60.0						Freq Offse
						0 Hz
-70.0						
Center 2.480000 GHz #Res BW 1.5 MHz	#VBW	5.0 MHz	Sw	Span eep 1.000 ms	5.000 MHz (1001 pts)	
MSG				STATUS		

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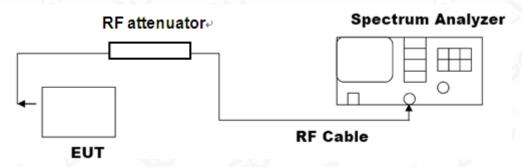


## 8. 20DB BANDWIDTH

#### **8.1. MEASUREMENT PROCEDURE**

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2, Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 3. Set Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a hoping channel The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW; Sweep = auto; Detector function = peak
- 4. Set SPA Trace 1 Max hold, then View.

## 8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



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#### **8.3. LIMITS AND MEASUREMENT RESULTS**

MEASUREMENT RESULT FOR GFSK MOUDULATION					
Angliachte Limite		Measurement Resu	lt		
Applicable Limits	Test Dat	Criteria			
N/A	Low Channel	0.948	PASS		
	Middle Channel	0.950	PASS		
	High Channel	0.951	PASS		

#### 02:26:12 PM Sep 27, 2020 SENSE:INT Center Freq: 2.402000000 GHz Trig: Free Run Avg|Hol #Atten: 30 dB Frequency 102000000 GHz Radio Std: None Avg|Hold:>100/100 #IFGain:Low Radio Device: BTS Ref 20.00 dBm **Center Freq** 2.402000000 GHz Center 2.402 GHz #Res BW 30 kHz Span 3 MHz Sweep 3.2 ms CF Step 300.000 kHz #VBW 100 kHz <u>Auto</u> **Occupied Bandwidth Total Power** 4.60 dBm 845.24 kHz Freq Offset 0 Hz 42.781 kHz **Transmit Freq Error OBW Power** 99.00 % x dB Bandwidth 948.0 kHz x dB -20.00 dB

#### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

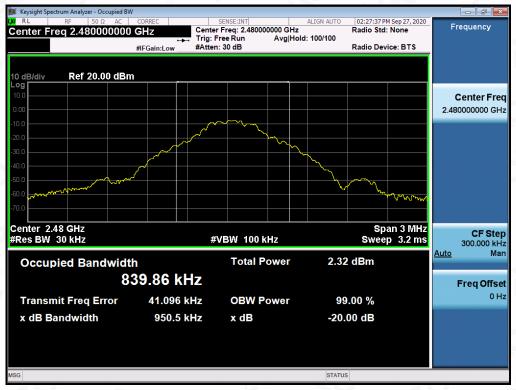
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#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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MEASURE	MENT RESULT FOR II /4-D	OQPSK MODULATIO	N
Annlinghle Limite		Measurement Resu	lt
Applicable Limits	Test Data	(MHz)	Criteria
N/A	Low Channel	1.318	PASS
	Middle Channel	1.318	PASS
	High Channel	1.319	PASS

#### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



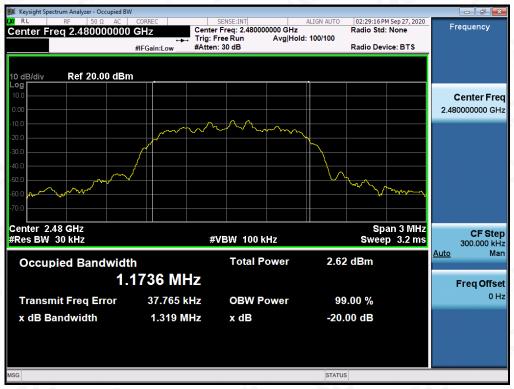
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#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

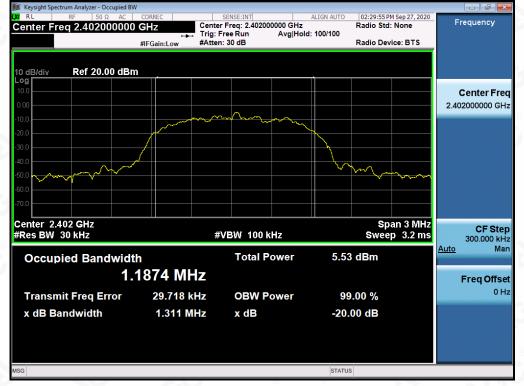


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MEASUREMENT RESULT FOR 8-DPSK MODULATION					
Applicable Limits					
Applicable Limits	Test Data	(MHz)	Criteria		
N/A	Low Channel	1.311	PASS		
	Middle Channel	1.309	PASS		
	High Channel	1.310	PASS		

#### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



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#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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## 9. CONDUCTED SPURIOUS EMISSION

## 9.1. MEASUREMENT PROCEDURE

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Set the EUT Work on the top, the Middle and the bottom operation frequency individually.
- Set the Span = wide enough to capture the peak level of the in-band emission and all spurious emissions from the lowest frequency generated in the EUT up through the 10th harmonic.
   RBW = 100 kHz; VBW= 300 kHz; Sweep = auto; Detector function = peak.
- 4. Set SPA Trace 1 Max hold, then View.

#### 9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 8.2

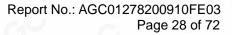
#### 9.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6

#### 9.4. LIMITS AND MEASUREMENT RESULT

LIMITS AND MEASUREMENT RESULT					
Angliaghta Limita	Measurement Result				
Applicable Limits	Test Data	Criteria			
In any 100 kHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency	At least -20dBc than the limit Specified on the BOTTOM Channel	PASS			
power that is produce by the intentional radiator shall be at least 20 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power. In addition, radiation 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))	At least -20dBc than the limit Specified on the TOP Channel	PASS			

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## TEST RESULT FOR ENTIRE FREQUENCY RANGE

TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE OF 8DPSK MODULATION IN LOW CHANNEL



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#### Report No.: AGC01278200910FE03 Page 29 of 72



🇊 Keysight Spectrum Analyzer - Swept SA 🛛 🕞 💌																
LXI R	L	i.	RF	50	0Ω /	AC	CORREC		SEI	NSE:INT	Arres The	ALIGN AUTO		M Sep 27, 2020	F	requency
Cen	iter	Fre	q 1	3.74	1/5	0000	0 GHz	ast 🔶	. Trig: Free		Avg Ty Avg Hol	pe: Log-Pwr ld: 10/10	TYP	DE 123456 PE MWWWW		
							IFGain:		Atten: 30	) dB			DE	T P NNNNN		A
												Mkr1 4.804 3 GHz				Auto Tune
	0 dB/div Ref 20.00 dBm												-41.3	66 dBm		
Log 10.0			ĒF													
																Center Freq
0.00															13.7	41750000 GHz
-10.0																
-20.0														-22.94 dDm		Start Freq
-30.0			4	1				ص							24	83500000 GHz
-40.0																50000000 0.12
-50.0																
								Differentia en el	والمحاور وم	and the second						Stop Freq
-60.0	Married Street		al la compañía de la Compañía de la compañía				ingening bilder Researcher	and the second	No. of Contract of Contract						25.0	00000000 GHz
-70.0																
Sta	+ 2	48 0										<u> </u>	Stop 2	5.00 GHz		CF Step
Start 2.48 GHz #Res BW 100 kHz #VBW 3						#VB₩	/ 300 kHz			Sweep 2	2.152 s (3	0000 pts)	2.2	51650000 GHz		
	MODE					X			Y		CTION F	UNCTION WIDTH			Auto	Man
MKR		1 TRC		-	_		804 3 GH	IZ	-41.366 dl			UNCTION WIDTH	FUNCTION	JN VALUE		
2	ک							کال		کی						Freq Offset
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 Attestation of Global Compliance(Shenzhen)Std & Tech Co., Ltd

 Tel: +86-755 2523 4088
 E-mail: agc@agc-cert.com



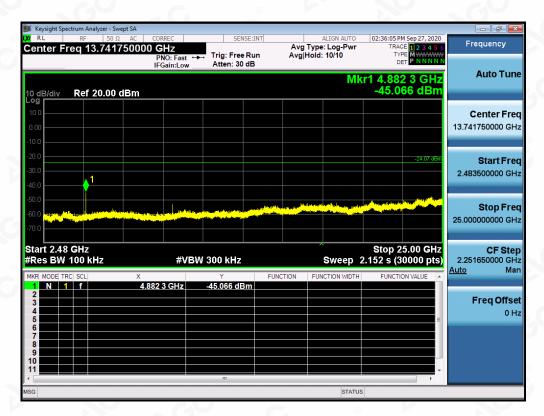


## TEST PLOT OF OUT OF BAND EMISSIONS OF 8DPSK MODULATION IN MIDDLE CHANNEL

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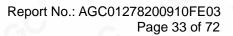
Web: http://cn.agc-cert.com/





## TEST PLOT OF OUT OF BAND EMISSIONS OF 8DPSK MODULATION IN HIGH CHANNEL

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📕 Keysight Spectrum Analyzer - Swept SA 👘 🕞 💌																
			RF	50				SEI	NSE:INT	۵w		ALIGN AUTO		4 Sep 27, 2020		Frequency
Ce	nter Freq 13.750000000 GHz PNO: Fast ↔ IFGain:Low						Trig: Free Run Atten: 30 dB			Avg Hold: 10/10						
<u>10 (</u>	dB/div	ł	Ref	20.00	dBm							Mkr	1 24.33 -47.9	7 0 GHz 52 dBm		Auto Tune
Log 10. 0.0 -10.1	o —														13.7	<b>Center Freq</b> 50000000 GHz
-20.0 -30.0 -40.0														-25.30 dBm	2.5	Start Freq 60000000 GHz
-50,1 -60,1 -70,1												a shirten a a statistica The second se			25.0	Stop Freq 000000000 GHz
Start 2.50 GHz           #Res BW 100 kHz           MKR MODE TRC SCL         X					X	#	VBW	300 kHz Y		UNCTION		Sweep 2	2.152 s (3	5.00 GHz 0000 pts) DN VALUE	2.2 <u>Auto</u>	<b>CF Step</b> 50000000 GHz Man
1 2 3 4 5 6 7 8 9 10 11			f		24	.337 0 GHz		-47.952 dB	3m							Freq Offset 0 Hz
MSG		_	-								_	STATUS				

Note: The 8DPSK modulation is the worst case and only those data recorded in the report.

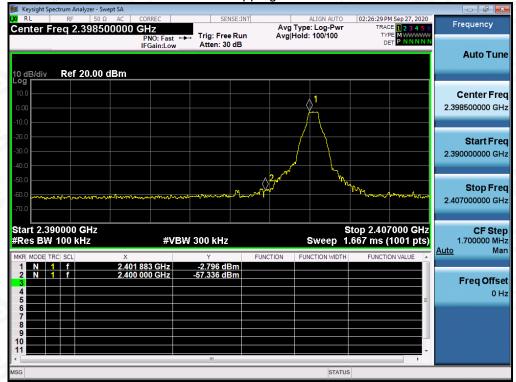
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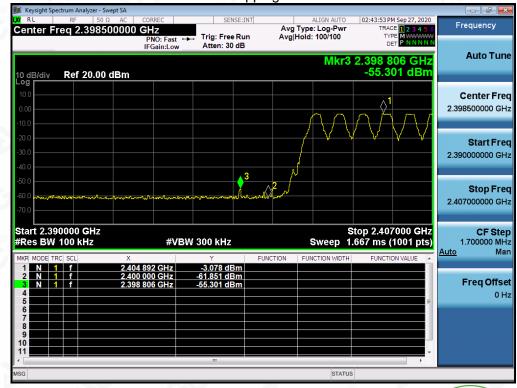
#### TEST RESULT FOR BAND EDGE

#### **GFSK MODULATION IN LOW CHANNEL**

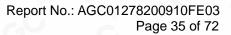
Hopping off



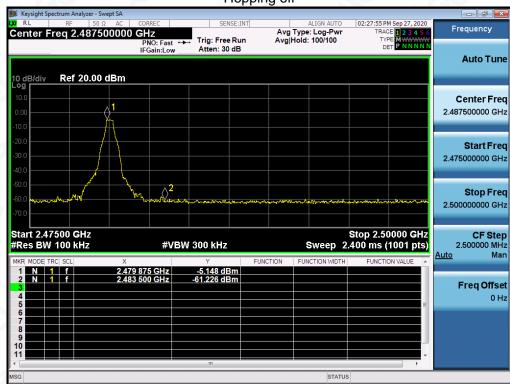
Hopping on



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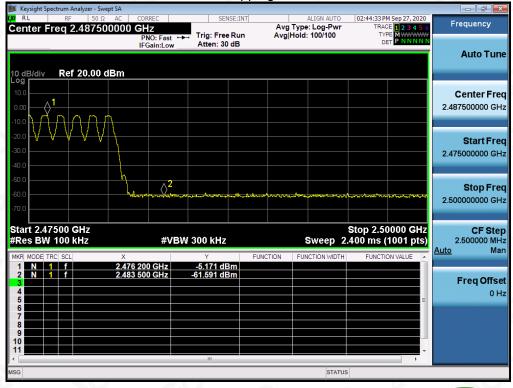




## GFSK MODULATION IN HIGH CHANNEL

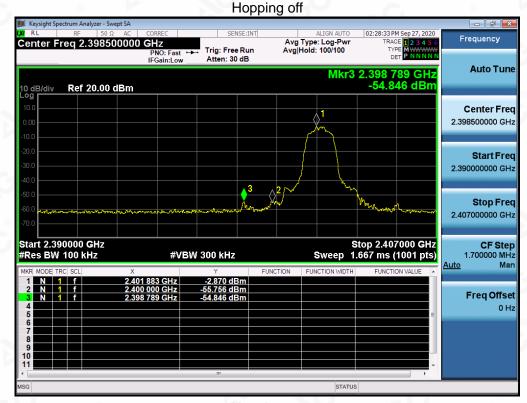
Hopping off

Hopping on



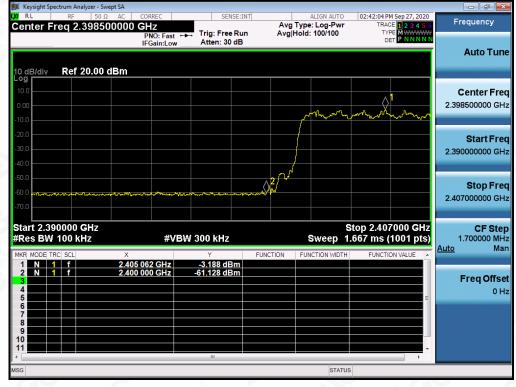
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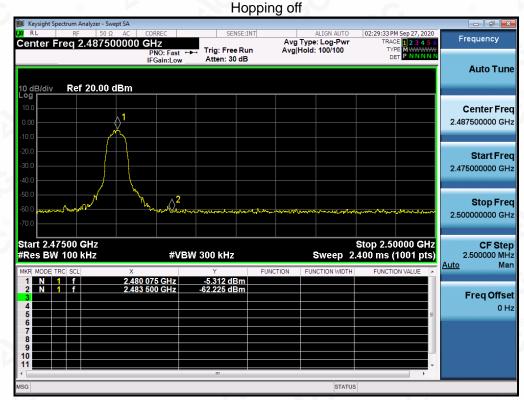
# $\pi$ /4-DQPSK MODULATION IN LOW CHANNEL

Hopping on



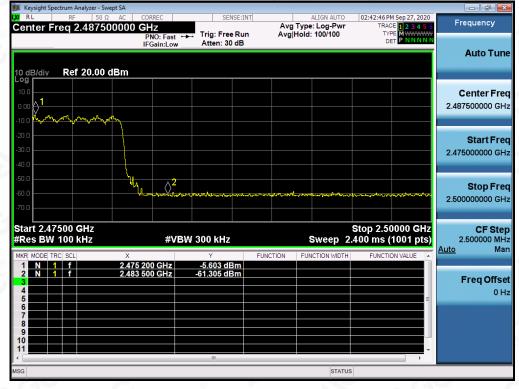
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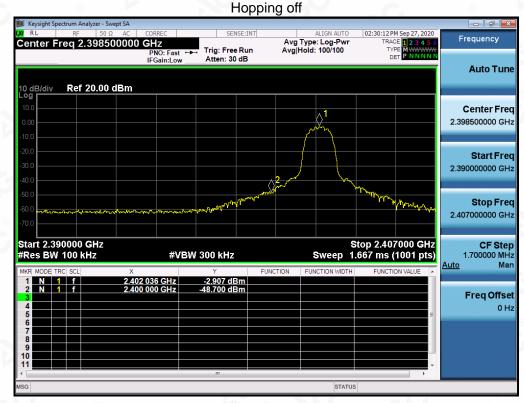
# $\pi$ /4-DQPSK MODULATION IN HIGH CHANNEL

Hopping on



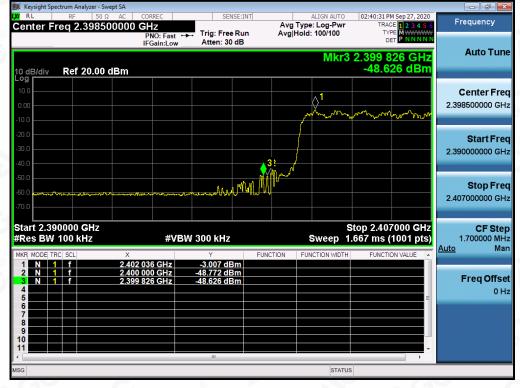
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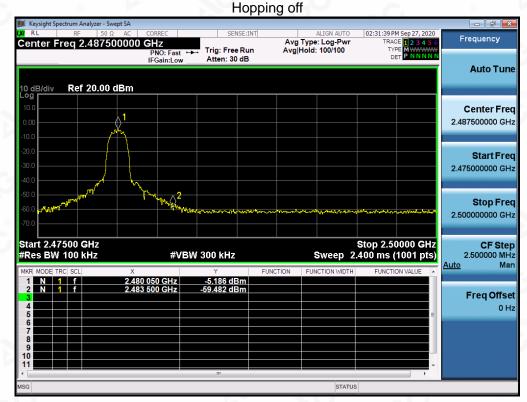
# 8-DPSK MODULATION IN LOW CHANNEL

Hopping on



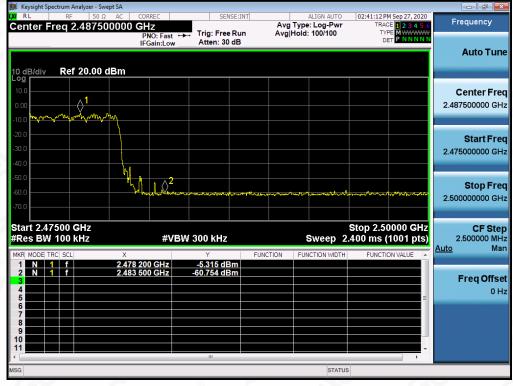
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# 8-DPSK MODULATION IN HIGH CHANNEL

Hopping on



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## **10. RADIATED EMISSION**

#### **10.1. MEASUREMENT PROCEDURE**

- 1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
- 2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- 3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
- 4. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
- 5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
- 6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- 7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
- 8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
- 9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- 10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High Low scan is not required in this case.

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The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/3MHz for Peak, 1MHz/3MHz for Average

Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

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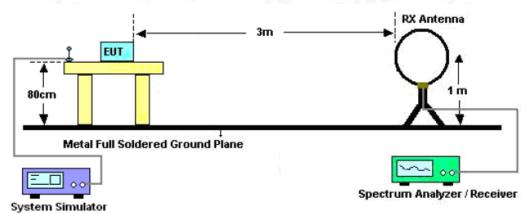
 Attestation of Global Compliance(Shenzhen)Std & Tech Co., Ltd

 Tel: +86-755 2523 4088
 E-mail: agc@agc-cert.com

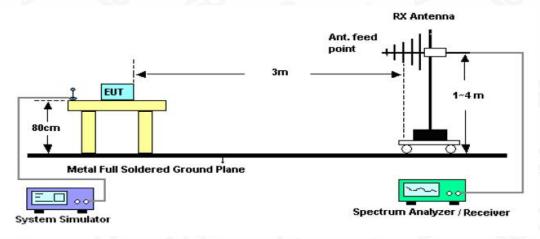


#### 10.2. TEST SETUP

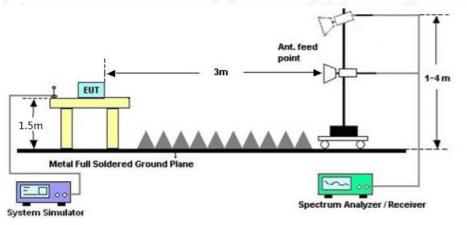
Radiated Emission Test-Setup Frequency Below 30MHz



### RADIATED EMISSION TEST SETUP 30MHz-1000MHz



### RADIATED EMISSION TEST SETUP ABOVE 1000MHz



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#### **10.3. LIMITS AND MEASUREMENT RESULT**

#### 15.209 Limit in the below table has to be followed

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	0.490~1.705 24000/F(kHz)	
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Note: All modes were tested for restricted band radiated emission, the test records reported below are the worst result compared to other modes.

#### **10.4. TEST RESULT**

#### **RADIATED EMISSION BELOW 30MHz**

The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.

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#### **RADIATED EMISSION BELOW 1GHz**

UT		Wireless	Wireless Headphones		Model N	lame	HPE	3T010
emperature		25°C	0	Relative Humidity		55.4	55.4% Normal Voltage	
ressure		960hPa	960hPa <b>Te</b>		Test Vol	Test Voltage		
est Mode		Mode 7	8		Antenna	a	Hori	izontal
66.9	dBuV/m		3			2 May Martin	Limit: Margi	in:
Jun Jun	min	u Min Marry	www.dw.dwile	Mr Mynum yn arallan ar				
-13	0 127.00	224.00	321.00 418 Reading	8.00 515.00 Correct	612.00 70 Measure-	09.00 806.0	00	1000.00 MHz
30.000		224.00 :	321.00 418 Reading Level	00 515.00 Correct M Factor	612.00 70 Measure- ment	09.00 806.0 Limit	00 Over	1000.00 MHz
30.000	0 127.00 D. Mk.	224.00 STREET	321.00 418 Reading Level dBuV	00 515.00 Correct M Factor dB	612.00 70 Measure- ment dBuV/m	09.00 806.0 Limit dBuV/m	oo Over dB	1000.00 MHz
30.000	0 127.00 0. Mk. 1 120	224.00 : Freq. MHz 0.5333	321.00 418 Reading Level dBuV -0.53	Correct M Factor dB 17.87	612.00 70 Measure- ment dBuV/m 17.34	09.00 806.0 Limit dBuV/m 43.50	Over dB -26.16	1000.00 MHz Detector peak
30.000	0 127.00 0. Mk. 1 12( 2 248	224.00 : Freq. MHz 0.5333 3.2500	321.00 418 Reading Level dBuV	00 515.00 Correct M Factor dB 17.87 18.52	612.00 70 Measure- ment dBuV/m	09.00 806.0 Limit dBuV/m 43.50 46.00	Over dB -26.16 -24.95	1000.00 MHz
30.000	0 127.00 0. Mk. 1 12( 2 248	224.00 : Freq. MHz 0.5333	321.00 418 Reading Level dBuV -0.53	Correct M Factor dB 17.87	612.00 70 Measure- ment dBuV/m 17.34	09.00 806.0 Limit dBuV/m 43.50	Over dB -26.16	1000.00 MHz Detector peak
30.000	0 127.00 0. Mk. 1 120 2 248 3 400	224.00 : Freq. MHz 0.5333 3.2500	321.00 418 Reading Level dBuV -0.53 2.53	00 515.00 Correct M Factor dB 17.87 18.52	612.00 70 Measure- ment dBuV/m 17.34 21.05	09.00 806.0 Limit dBuV/m 43.50 46.00	Over dB -26.16 -24.95	Detector peak peak
30.000	0 127.00 0. Mk. 1 120 2 248 3 400 4 552	224.00 Freq. MHz 0.5333 3.2500 0.2167	321.00 418 Reading Level dBuV -0.53 2.53 2.98	200 515.00 Correct M Factor dB 17.87 18.52 20.99	612.00 70 Measure- ment dBuV/m 17.34 21.05 23.97	09.00 806.0 Limit dBuV/m 43.50 46.00 46.00	Over dB -26.16 -24.95 -22.03	Detector peak peak peak

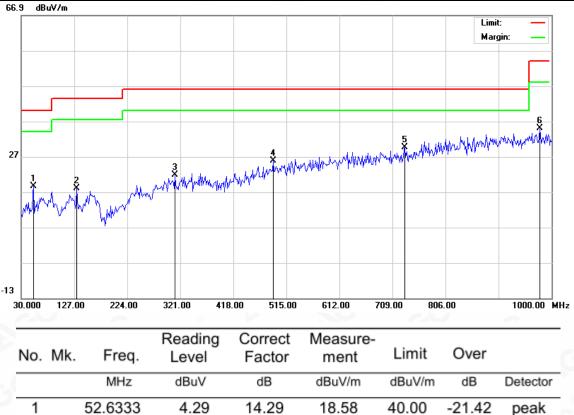
## **RESULT: PASS**

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EUT	Wireless Headphones	Model Name	HPBT010
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 7	Antenna	Vertical



15.75

21.41

24.62

28.86

32.38

17.95

21.79

25.85

29.69

34.99

43.50

46.00

46.00

46.00

54.00

-25.55

-24.21

-20.15

-16.31

-19.01

peak

peak

peak

peak

peak

#### **RESULT: PASS**

2

3

4

5

6

131.8500

311.3000

490.7500

731.6332

978.9833

Note: 1. Factor=Antenna Factor + Cable loss, Over= Measurement -Limit.

2.20

0.38

1.23

0.83

2.61

2. All test modes had been pre-tested. The mode 7 is the worst case and recorded in the report.

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#### Report No.: AGC01278200910FE03 Page 46 of 72

## **RADIATED EMISSION ABOVE 1GHz**

EUT	Wireless Headphones	Model Name	HPBT010
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 7	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value i ype
4804.000	46.13	0.08	46.21	74	-27.79	peak
4804.000	38.25	0.08	38.33	54	-15.67	AVG
7206.000	39.89	2.21	42.1	74	-31.9	peak
7206.000	31.46	2.21	33.67	54	-20.33	AVG
				60		
			(R)			

EUT	Wireless Headphones	Model Name	НРВТ010
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 7	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4804.000	43.95	0.08	44.03	74	-29.97	peak
4804.000	35.42	0.08	35.5	54	-18.5	AVG
7206.000	39.23	2.21	41.44	74	-32.56	peak
7206.000	31.52	2.21	33.73	54	-20.27	AVG
- 60-	0			50	<u>.</u>	
emark:	< GY					
ctor = Anter	nna Factor + Cable	Loss – Pre-	amplifier.	8		

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EUT	Wireless Headphones	Model Name	HPBT010
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 8	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
4882.000	45.28	0.14	45.42	74	-28.58	peak
4882.000	39.62	0.14	39.76	54	-14.24	AVG
7323.000	42.71	2.36	45.07	74	-28.93	peak
7323.000	34.2	2.36	36.56	54	-17.44	AVG
®				0		

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

EUT	Wireless Headphones	Model Name	HPBT010
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 8	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Tree
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Value Type
4882.000	46.41	0.14	46.55	74	-27.45	peak
4882.000	36.85	0.14	36.99	54	-17.01	AVG
7323.000	41.52	2.36	43.88	74	-30.12	peak
7323.000	33.26	2.36	35.62	54	-18.38	AVG
8						
					C	R
mark:						

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EUT	Wireless Headphones	Model Name	HPBT010
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 9	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4960.000	46.57	0.22	46.79	74	-27.21	peak
4960.000	39.62	0.22	39.84	54	-14.16	AVG
7440.000	42.54	2.64	45.18	74	-28.82	peak
7440.000	33.68	2.64	36.32	54	-17.68	AVG
0				() ()		
	8			2		
emark:	- 61	8			Ū.	8
actor = Anter	na Factor + Cable	Loss – Pre-	amplifier.		NO.	

EUT Wireless Headphones **Model Name HPBT010** 25°C Temperature **Relative Humidity** 55.4% 960hPa Pressure **Test Voltage** Normal Voltage **Test Mode** Mode 9 Antenna Vertical

Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
45.36	0.22	45.58	74	-28.42	peak
39.68	0.22	39.9	54	-14.1	AVG
42.71	2.64	45.35	74	-28.65	peak
33.6	2.64	36.24	54	-17.76	AVG
	CC -		8		
	(dBµV) 45.36 39.68 42.71	(dBµV)         (dB)           45.36         0.22           39.68         0.22           42.71         2.64	(dBµV)         (dB)         (dBµV/m)           45.36         0.22         45.58           39.68         0.22         39.9           42.71         2.64         45.35	(dBµV)         (dB)         (dBµV/m)         (dBµV/m)           45.36         0.22         45.58         74           39.68         0.22         39.9         54           42.71         2.64         45.35         74	(dBµV)         (dB)         (dBµV/m)         (dBµV/m)         (dB)           45.36         0.22         45.58         74         -28.42           39.68         0.22         39.9         54         -14.1           42.71         2.64         45.35         74         -28.65

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

## **RESULT: PASS**

Note:

The amplitude of other spurious emissions from 1G to 25 GHz which are attenuated more than 20 dB below the permissible value need not be reported.

Factor = Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.

The "Factor" value can be calculated automatically by software of measurement system.

All test modes had been tested. The 8DPSK modulation is the worst case and recorded in the report.

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