

# **FCC Test Report**

# Report No.: AGC05031201101FE03

FCC ID	: 2AV3Z-FORCE2
APPLICATION PURPOSE	: Original Equipment
PRODUCT DESIGNATION	: Bluetooth Speaker
BRAND NAME	: Tronsmart
MODEL NAME	: Force 2
APPLICANT	: Shenzhen Geekbuy E-commerce Co., Ltd.
DATE OF ISSUE	: Dec. 10,2020
STANDARD(S)	: FCC Part 15.247
REPORT VERSION	: V1.0

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



Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the bedicated restriction of Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written aphorization of AGE the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issues of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc~cert.com.

station of G

 Attestation of Global Compliance(Shenzhen)Co., Ltd

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

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

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



# **REPORT REVISE RECORD**

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	© /	Dec. 10,2020	Valid	Initial Release

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "Dedicated Festive/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the writter explorization of AGE" the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issues of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.

 Attestation of Global Compliance(Shenzhen)Co., Ltd

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

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



# TABLE OF CONTENTS

	1. VERIFICATION OF CONFORMITY	5
	2. GENERAL INFORMATION	6
	2.1. PRODUCT DESCRIPTION	6
	2.2. TABLE OF CARRIER FREQUENCYS	
	2.3. RECEIVER INPUT BANDWIDTH	7
	2.4. EXAMPLE OF A HOPPING SEQUENCY IN DATA MODE	7
	2.5. EQUALLY AVERAGE USE OF FREQUENCIES AND BEHAVIOUR	7
	2.6. RELATED SUBMITTAL(S) / GRANT (S)	8
	2.7. TEST METHODOLOGY	8
	2.8. SPECIAL ACCESSORIES	8
	2.9. EQUIPMENT MODIFICATIONS	
	2.10. ANTENNA REQUIREMENT	
	3. MEASUREMENT UNCERTAINTY	9
	4. DESCRIPTION OF TEST MODES	
	5. SYSTEM TEST CONFIGURATION	11
	5.1. CONFIGURATION OF EUT SYSTEM	11
	5.2. EQUIPMENT USED IN TESTED SYSTEM	11
	5.3. SUMMARY OF TEST RESULTS	11
	6. TEST FACILITY	12
	7. PEAK OUTPUT POWER	
	7.1. MEASUREMENT PROCEDURE	
	7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	
	7.3. LIMITS AND MEASUREMENT RESULT	14
	8. 20DB BANDWIDTH	
	8.1. MEASUREMENT PROCEDURE	
	8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	
	8.3. LIMITS AND MEASUREMENT RESULTS	
	9. CONDUCTED SPURIOUS EMISSION	
St pr	9.1. MEASUREMENT PROCEDURE Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "bedicated Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issue Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.	AGC. The test results



9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	
9.3. MEASUREMENT EQUIPMENT USED	
9.4. LIMITS AND MEASUREMENT RESULT	
10. RADIATED EMISSION	
10.1. MEASUREMENT PROCEDURE	
10.2. TEST SETUP	
10.3. LIMITS AND MEASUREMENT RESULT	
10.4. TEST RESULT	
11. NUMBER OF HOPPING FREQUENCY	
11.1. MEASUREMENT PROCEDURE	
11.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)	
11.3. MEASUREMENT EQUIPMENT USED	
11.4. LIMITS AND MEASUREMENT RESULT	
12. TIME OF OCCUPANCY (DWELL TIME)	
12.1. MEASUREMENT PROCEDURE	
12.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)	
12.3. MEASUREMENT EQUIPMENT USED	
12.4. LIMITS AND MEASUREMENT RESULT	
13. FREQUENCY SEPARATION	
13.1. MEASUREMENT PROCEDURE	
13.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)	
13.3. MEASUREMENT EQUIPMENT USED	
13.4. LIMITS AND MEASUREMENT RESULT	
14. FCC LINE CONDUCTED EMISSION TEST	
14.1. LIMITS OF LINE CONDUCTED EMISSION TEST	
14.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST	59
14.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST	60
14.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST	
14.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST	61
APPENDIX A: PHOTOGRAPHS OF TEST SETUP	
APPENDIX B: PHOTOGRAPHS OF EUT	G

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the Bedicated Perturg/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issuer of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.

# **1. VERIFICATION OF CONFORMITY**

Applicant	Shenzhen Geekbuy E-commerce Co., Ltd.
Address	19th Floor, Galaxy World Tower B, #1 YaBao Rd., LongGang District, Shenzhen, China
Manufacturer	Shenzhen Geekbuy E-commerce Co., Ltd.
Address 19th Floor, Galaxy World Tower B, #1 YaBao Rd., LongGang District, Shenzhen, China	
Factory	Shenzhen Geekbuy E-commerce Co., Ltd.
Address         19th Floor, Galaxy World Tower B, #1 YaBao Rd., LongGang Distr           Shenzhen, China         19th Floor, Galaxy World Tower B, #1 YaBao Rd., LongGang Distr	
Product Designation	Bluetooth Speaker
Brand Name	Tronsmart
Test Model	Force 2
Date of test	Nov. 30,2020 to Dec. 10,2020
Deviation	No any deviation from the test method
Condition of Test Sample Normal	
Test Result	Pass
Report Template	AGCRT-US-BR/RF

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

John Zerry

John Zeng Project Engineer

Dec. 10,2020

**Reviewed By** 

Max Zhans

Max Zhang Reviewer

Dec. 10,2020

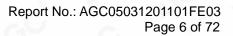
Approved By

Forrest Lei Authorized Officer

Dec. 10,2020

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the stand inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC in the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issues of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.

Attestation of Global Compliance(Shenzhen)Co., Ltd Attestation of Global Compliance(Shenzhen)Std & Tech Co., Ltd Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Web: http://cn.agc-cert.com/





# 2. GENERAL INFORMATION

# 2.1. PRODUCT DESCRIPTION

The EUT is designed as "Bluetooth Speaker". 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	4.160dBm (Max)
Bluetooth Version V5.1	
Modulation     BR ⊠GFSK, EDR ⊠π/4-DQPSK, ⊠8DPSK       BLE □GFSK 1Mbps □GFSK 2Mbps	
Number of channels 79	
Hardware Version BTM321_V01A (Bluetooth Module)	
Software Version V5.1	
Antenna Designation PCB Antenna (Comply with requirements of the FCC part 15.203)	
Antenna Gain	3.4dBi
Power Supply	DC 7.4V by battery or DC 5V by adapter

Note: The EUT doesn't support BLE.

# 2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
	0	2402 MHz
		2403 MHz
0		
	38	2440 MHz
2402~2480MHz	39	2441 MHz
	40	2442 MHz
So do d		
	77	2479 MHz
	78	2480 MHz

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the bedicated restriction of Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written approver, and the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15da to after the issue of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.



# 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, 04, 15, 66, 56, 19, 78, 07, 28, 69, 55, 36, 45, 05, 13, 43, 74, 57, 35, 67, 76, 02, 34, 54, 63, 42, 11, 30, 06, 64, 25, 75, 48, 17, 33, 58, 01, 29, 14, 51, 72, 03, 31, 50, 61, 77, 18, 10, 47, 12, 68, 08, 49, 20, 79, 73, 09, 16, 60, 71, 41, 24, 53, 38, 26, 46, 37, 65, 32, 70, 52, 27, 59, 22, 62, 39,

## 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.

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the bedicated Pasting/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGE. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issues of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.



The second connection will be established. A new hopping sequence is generated. Due to the fact the 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: 2AV3Z-FORCE2** 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.

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the stand resting/inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGS. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issues of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.



# **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:  $Uc = \pm 2 \%$

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the stand resting in section of a stamp. Is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGE in the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day affective for the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc~cert.com.

 Attestation of Global Compliance(Shenzhen)Co., Ltd

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

 Tel: +86-755 2523 4088
 E-mail: agc@agc-cert.com
 Web: http://cn.agc-cert.com/



# **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

Test Commands	Test Arguments			
PAUSE RADIO STATUS	LO Freq. (MDHz)	2402	Close	
RADIO STATUS FULL	Power (Atn, Mag, Exp)	2 5 0	Help	
TXSTART TXDATA1	(Ath, Mag, Exp)			
TXDATA2 TXDATA3			Execute	
TXDATA4			Reset	
RISTART1			rezet	
	se for f ni	lau : G Stord I		
Save to file Brow C:\Users\agc\AppData\L	ocal \QTIL\BlueTest3\te	play : 🕫 Standard extapplog. txt	C BER	
Save to file Brow C:\Users\ago\AppData\L adio Text TXDATAI succe adio Text TXDATAI succe adio Text TXDATA succe adio Text TRDATA succe adio Text CFO PMT succe adio Text CFO PMT faile hip reset : success	sful sful sful sful sful		C BER	
Test Results Save to file Brow C: Wsers'ago'AppData'L C: Wsers'ago'AppData'L adio Test TXDATAI succes adio Test TXDATAI succes adio Test TXDATA adio Test TCDATA adio Test CFO PHT succes adio Test CFO PHT succes	stul stul stul stul stul stul stul stul			

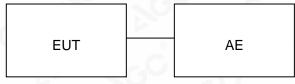
Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the stead of the test results of the test results are apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day affective is not permitted without the written authorization of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc~cert.com.



# **5. SYSTEM TEST CONFIGURATION**

**5.1. CONFIGURATION OF EUT SYSTEM** 

Radiated Emission Configure:



Conducted Emission Configure:

EUT	AE

## 5.2. EQUIPMENT USED IN TESTED SYSTEM

ltem	Equipment	Model No.	ID or Specification	Remark
1	Bluetooth Speaker	Force 2	2AV3Z-FORCE2	EUT
2	Adapter	TY0500100E1MN	N/A	AE
3	Charger line	G258	N/A	AE
4	Control board	N/A	TRBI200	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)	Time of Occupancy	Compliant
15.247 (a)(1)	Frequency Separation	Compliant
15.207	Conducted Emission	Compliant

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the step of the stamp of the stamp. Stamp is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGE. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issues of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.

Attestation of Global Compliance(Shenzhen)Co., Ltd Attestation of Global Compliance(Shenzhen)Std & Tech Co., Ltd Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Web: http://cn.agc-cert.com/



# 6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd				
Location 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Commun 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	Sep. 03,2020	Sep. 02,2022
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 09, 2019	Jan. 08, 2021
Test software	Tonscend	JS32-RE (Ver.2.5)	N/A	N/A	N/A

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the bedicated for the formation of the stamp. Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issuer of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.



# 7. PEAK OUTPUT POWER

# 7.1. MEASUREMENT PROCEDURE

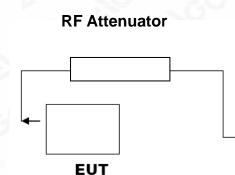
For peak power test:

- 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.

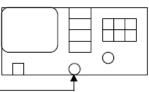
Allow trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power, after any corrections for external attenuators and cables.

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

# PEAK POWER TEST SETUP







**RF** Cable

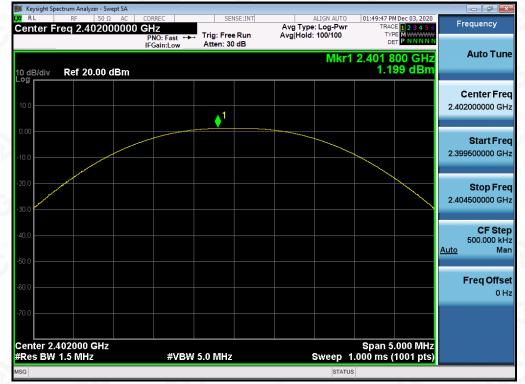
Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the stand in the stand of the stand in the report is not permitted without the written authorization of AGC. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issues of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.



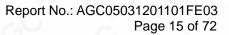
#### 7.3. LIMITS AND MEASUREMENT RESULT

PEAK OUTPUT POWER MEASUREMENT RESULT FOR GFSK MOUDULATION					
Frequency (GHz)Peak Power (dBm)Applicable Limits (dBm)Pass or Fail					
2.402	1.199	30	Pass		
2.441	1.058	30	Pass		
2.480	1.526	30	Pass		

#### CH0



Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the Bedicated Pesting/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC, the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day Safer the issues of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.







CH78

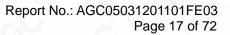
📕 Keysight Spectrum Analyzer - Swept SA				
X RL RF 50 Ω AC Center Freq 2.48000000	CORREC SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	01:50:51 PM Dec 03, 2020 TRACE 123456	Frequency
	PNO: Fast +++ Trig: Free Run IFGain:Low Atten: 30 dB	Avg Hold: 100/100	DET PNNNN	
10 dB/div Ref 20.00 dBm		Mkr1	2.479 985 GHz 1.526 dBm	Auto Tun
				Center Fre
10.0	1			2.480000000 GH
0.00				Start Fre
10.0				2.477500000 GH
-20.0				Stop Fre
-30.0				2.482500000 GH
(0.0)				CF Ste
40.0				500.000 kH <u>Auto</u> Ma
50.0				
60.0				FreqOffse 0⊦
70.0				
Center 2.480000 GHz #Res BW 1.5 MHz	#VBW 5.0 MHz	Sweep 1	Span 5.000 MHz .000 ms (1001 pts)	
MSG		STATUS		

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the Bedicated Festing/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written exchanged by the Bedicated Festing/Inspection presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issues of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.

PEAK OUTPUT POWER MEASUREMENT RESULT FOR Π/4-DQPSK MODULATION					
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail		
2.402	3.601	21	Pass		
2.441	3.412	21	Pass		
2.480	3.678	21	Pass		



Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the Bedicated Pesting/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written approver, and the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issuerce of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.







CH78

Keysight Spectrum Analyzer - Swept SA	CORREC	CENCE ANT		01/52/22 PM Dec 02, 2020	
Center Freq 2.48000000	) GHz	SENSE:INT	ALIGN AUTO	01:52:23 PM Dec 03, 2020 TRACE 1 2 3 4 5 6 TYPE MWWWWW	Frequency
	PNO: Fast +++ IFGain:Low	Trig: Free Run Atten: 30 dB	Avg Hold:>100/100		
			Mkr1	2.480 115 GHz 3.678 dBm	Auto Tune
10 dB/div Ref 20.00 dBm				3.678 dBm	
					Center Free
10.0		1			2.480000000 GH:
0.00					
					Start Fred 2.477500000 GHz
-10.0					2.477500000 GH2
-20.0					Stop Fred
					2.482500000 GH;
-30.0					
-40.0					CF Step 500.000 kH
					Auto Mar
-50.0					
-60.0					Freq Offse
					0 Ha
-70.0					
Center 2.480000 GHz #Res BW 1.5 MHz	#VBW	5.0 MHz	Sweep 1	Span 5.000 MHz I.000 ms (1001 pts)	
MSG			STATU		
		_			

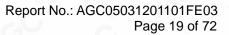
Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the Bedicated Pesting/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC, the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day Safer the issues of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.



PEAK OUTPUT POWER MEASUREMENT RESULT					
	FOR 8-DPSK MODUL				
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail		
2.402	3.998	21	Pass		
2.441	3.972	21	Pass		
2.480	4.160	21	Pass		



Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "Dedicated Pestivo/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the square of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.







CH78

Keysight Spectrum Analyzer - Swept SA						
RL RF 50 Ω AC Center Freq 2.48000000		SENSE:INT	Avg Type: Log	J-Pwr TF	PM Dec 03, 2020 RACE 123456	Frequency
	PNO: Fast +++ Irig:	Free Run n: 30 dB	Avg Hold: 100/			A
0 dB/div Ref 20.00 dBm				4. Wkr1 2.479	980 GHz 160 dBm	Auto Tu
10.0		1				<b>Center Fr</b> 2.480000000 G
0.00		-				Start Fr
10.0						2.477500000 G
20.0						<b>Stop Fr</b> 2.482500000 G
0.0						CF St 500.000 F Auto M
0.0						Freq Off
0.0						
enter 2.480000 GHz Res BW 1.5 MHz	#VBW 5.0 M	Hz	Swe	Span ep 1.000 ms	5.000 MHz s (1001 pts)	
SG				STATUS		

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the Bedicated Pesting/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written approver, and the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issuer of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.

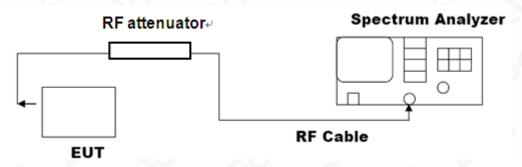


# 8. 20DB BANDWIDTH

#### **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)



Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the stand inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC in the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issues of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.



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

MEASUREMENT RESULT FOR GFSK MOUDULATION					
Angliachte Limite		Measurement Resu	lt		
Applicable Limits	Test Data	Criteria			
N/A	Low Channel	0.964	PASS		
	Middle Channel	0.966	PASS		
	High Channel	0.963	PASS		

#### 01:49:41 PM Dec 03, 2020 SENSE:INT Center Freq: 2.402000000 GHz Trig: Free Run Avg|Hol #Atten: 30 dB Frequency 402000000 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> 8.61 dBm **Occupied Bandwidth Total Power** 874.75 kHz Freq Offset 0 Hz 1.186 kHz **Transmit Freq Error** 99.00 % **OBW Power** 964.4 kHz x dB Bandwidth x dB -20.00 dB

#### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the bedicated fresh g/inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written approver, being a standard fresh g/inspection of AGC in the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issues of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.





#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the Bedicated Pesting/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written approver, be test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issuence of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc~cert.com.

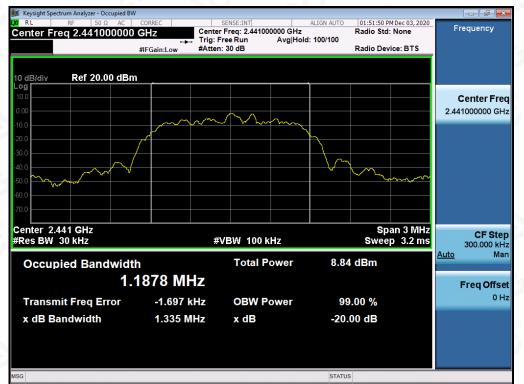


MEASUREMENT RESULT FOR II /4-DQPSK MODULATION				
Applicable Limits Measurement Result				
Applicable Limits	Test Data	Test Data (MHz)		
N/A	Low Channel	1.335	PASS	
	Middle Channel	1.335	PASS	
	High Channel	1.336	PASS	

#### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the strend in the stamp of the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issue of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc~cert.com.



#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the Bedicated Pesting/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written approver, be test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issuence of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc~cert.com.



MEASUREMENT RESULT FOR 8-DPSK MODULATION					
Applicable Limits					
Applicable Limits	Test Data	a (MHz)	Criteria		
	Low Channel	1.308	PASS		
N/A	Middle Channel	1.307	PASS		
	High Channel	1.308	PASS		

#### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the bedicated frame/inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC in the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15da/Castra the issues of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc~cert.com.



#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the Bedicated Pesting/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written aphroization of AGE the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issuence of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc~cert.com.



# 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

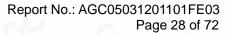
## 9.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6

#### 9.4. LIMITS AND MEASUREMENT RESULT

LIMITS AND MEAS	SUREMENT RESULT					
Annlinghta Limita	Measurement Resu	irement 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				

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the selected "Pesting/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day affective in the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc~cert.com.



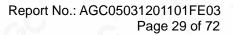


# TEST RESULT FOR ENTIRE FREQUENCY RANGE

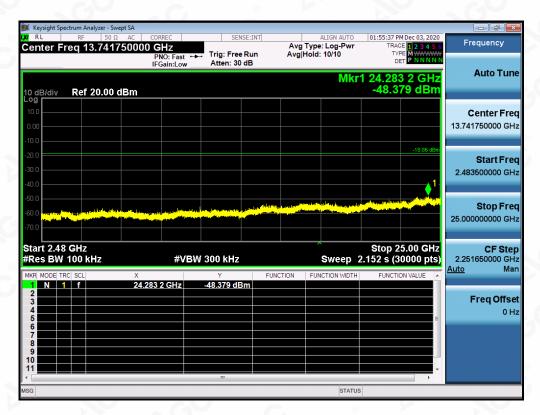
TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE OF 8DPSK MODULATION IN LOW CHANNEL



Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the Bedicated Festing/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the writter authorization of AGC. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issues of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc~cert.com.







Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the Bedicated Pesting/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written approver, and the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issuer of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.

 Attestation of Global Compliance(Shenzhen)Co., Ltd

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

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



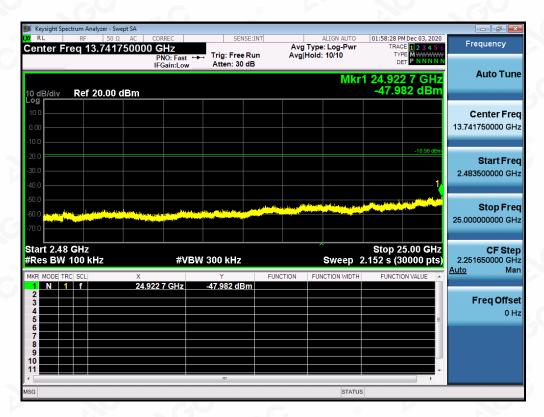
📕 Keysight Spectrum Analyzer - Sv	Wept SA				CHAN		
RL RF 50 S Center Freg 2.4410		SENSI		ALIGN AUTO g Type: Log-Pwr	TRACE	Dec 03, 2020	Frequency
	PNO: Wide IFGain:Low	→→ Trig: Free F Atten: 30 d	lun Avg	Hold: 10/10	TYPI DE		
				Mkr1 2	2.441 164	4 GHz	Auto Tu
0 dB/div Ref 20.00	dBm				1.02	2 dBm	
10.0			1				Center F
0.00			m				2.441000000 0
10.0							
20.0							Start F
40.0	The second s				harren		2.439500000 0
50.0							
50.0							Stop F 2.442500000 0
70.0							
Center 2.441000 GHz						000 MHz	CF St
Res BW 100 kHz		3W 300 kHz			000 ms (30		300.000 k Auto N
MKR MODE TRC SCL	× 2.441 164 4 GHz	۲ 1.022 dBr	FUNCTION	FUNCTION WIDTH	FUNCTIO	N VALUE	
2 3							Freq Off
4						=	0
6 7							
8 9 10							
						•	
G		m		STATU	IS	•	
Keysight Spectrum Analyzer - Sv	wept SA						
RL RF 50 Ω enter Freg 1.2150	Ω AC CORREC 00000 GHz	SENS	Av	ALIGN AUTO g Type: Log-Pwr	TRACE	Dec 03, 2020	Frequency
	PNO: Fast IFGain:Low	→→ Trig: Free F Atten: 30 d		g Hold: 10/10	TYPI DE		
				М	kr1 824.9		Auto Tu
0 dB/div Ref 20.00	dBm				-52.75	7 dBm	
10.0							Center Fr
0.00							1.215000000 G
20.0						-18.98 dBm	
30.0							Start Fr 30.000000 M
40.0	+						00.000000 11
50.0							Stop Fr
50.0 advertise of the standard state of the state							2.400000000 0
Start 30 MHz Res BW 100 kHz	-#\/E	3W 300 kHz		Swoon 2	.28.0 ms (30	400 GHz	CF St 237.000000 M
KR MODE TRC SCL	X	999 300 KHZ	FUNCTION	FUNCTION WIDTH	,		Auto N
1 N 1 f	824.92 MHz	-52.757 dBn					
3							Freq Off
5 6						E	0
7 8							
9							
						-	

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

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the Bedicated Festing/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the writter authorization of AGE. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issues of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.

#### Report No.: AGC05031201101FE03 Page 31 of 72





Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the Bedicated Pesting/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written approver, and the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issuer of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.

 Attestation of Global Compliance(Shenzhen)Co., Ltd

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

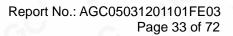
 Tel: +86-755 2523 4088
 E-mail: agc@agc-cert.com
 Web: http://cn.agc-cert.com/



RL RF 50	Swept SA Ω AC CORREC	SENSE:INT	ALIGN AUTO	01:59:22 PM Dec 03, 2020	
enter Freq 2.4800		T	Avg Type: Log-Pwr Avg Hold: 10/10	TRACE 123456 TYPE MWWWW DET PNNNN	Frequency
dB/div Ref 20.00			Mkr1 2.4	79 836 1 GHz 1.004 dBm	Auto Tu
9 .0 .0		1			Center Fr 2.480000000 G
0					<b>Start F</b> 2.478500000 0
					<b>Stop F</b> 2.481500000
enter 2.480000 GH Res BW 100 kHz		W 300 kHz	Sweep 2.00	Span 3.000 MHz 0 ms (30000 pts)	CF S1 300.000
R MODE TRC SCL	Х		UNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> N
1 N 1 f 2 3 3 4 5 5	2.479 836 1 GHz	1.004 dBm			Freq Offs 0
6 7 8 9 9					
				•	
3		m	STATUS	P	
Keysight Spectrum Analyzer - S	Swent SA				
RL RF 50	Ω AC CORREC	SENSE:INT		01:59:31 PM Dec 03, 2020	Frequency
enter Freq 1.2150	PNO: Fast +	→ Trig: Free Run Atten: 30 dB	Avg Type: Log-Pwr Avg Hold: 10/10	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N N	
dB/div Ref 20.00	IFGain:Low _	Atten: 30 db	Mkr1	2.241 92 GHz -57.435 dBm	Auto Tu
					Center Fr 1.215000000 G
0.0				-19.00 dBm	Start Fr 30.000000 M
	Anton a parameter and a start of the start o	allen ja, sende a lästenskopte il eta stanomista.			Stop Fr 2.40000000 G
D.O. Malegers &	ali ali a provinci de a cata de la cita de la	n a she an a she an bha an pill, an mar à nhar a truch fhint dhin defin tan a'			2.4000000000
art 30 MHz Res BW 100 kHz	#VB	W 300 kHz		Stop 2.400 GHz 0 ms (30000 pts)	CF St 237.000000 M Auto M
KR MODE TRC SCL	× 2.241 92 GHz	Y F -57.435 dBm	UNCTION FUNCTION WIDTH	FUNCTION VALUE	
2 3 4					Freq Off 0
5					
6 7 8					
5 6 7 8 9 0 1					

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

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the bedicated for the formation of the stamp. Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issuer of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.





	ht Spectr	um A	nalyzer - Sw													
Cente	х Биа	RF	50 Ω		CORRE			SEI	NSE:INT	Δν		ALIGN AUTO		M Dec 03, 2020		Frequency
Cente		q	3.7500	0000	PNO	E Fast in:Low		Trig: Free Atten: 30				10/10	TYI DI		Ň	Auto Tune
10 dB/d Log	liv	Ref	20.00	dBm								Mkr	1 24.24	3 2 GHz 70 dBm		Auto Tune
10.0																Center Freq 13.75000000 GHz
-20.0 == -30.0 == -40.0 ==														-19.00 dBm		<b>Start Freq</b> 2.500000000 GHz
-50.0					<b>tit</b> e step it				a distant di second		ala baging Santang tar	tal <sup>11</sup> Marana ang Kabu				<b>Stop Freq</b> 25.00000000 GHz
Start 2 #Res E	3W 1	00		×		#VE	3W 3	)0 kHz		JNCTION		Sweep 2	2.152 s (3	5.00 GHz 0000 pts		<b>CF Step</b> 2.250000000 GHz <u>Auto</u> Man
					.243 2 (	GHz	-4	T 8.370 dB		INCTION		STATUS				<b>Freq Offset</b> 0 Hz

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

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the Bedicated Pesting/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC, the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issues of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.

 Attestation of Global Compliance(Shenzhen)Co., Ltd

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

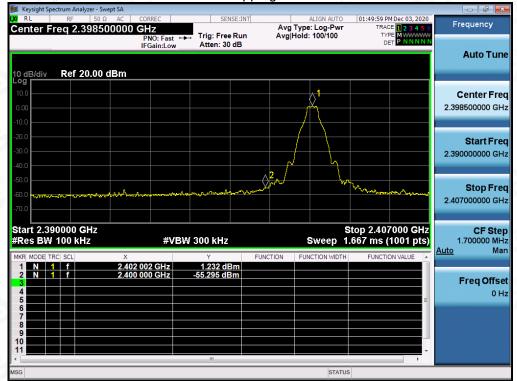
 Tel: +86-755 2523 4088
 E-mail: agc@agc-cert.com



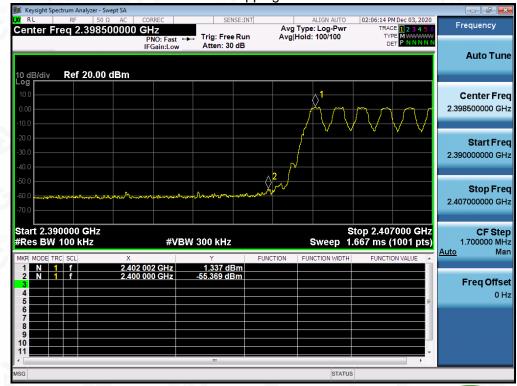
#### TEST RESULT FOR BAND EDGE

#### GFSK MODULATION IN LOW CHANNEL

Hopping off

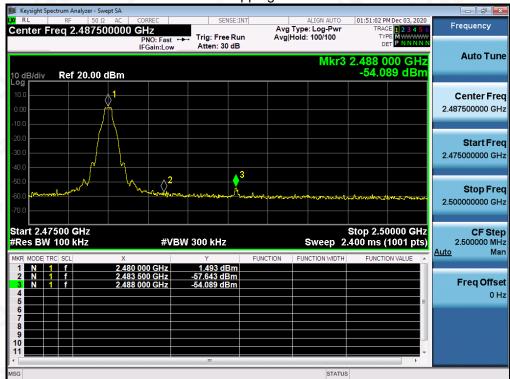


Hopping on



Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "Dedicated Figure/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written approver, be test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issuence of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc~cert.com.

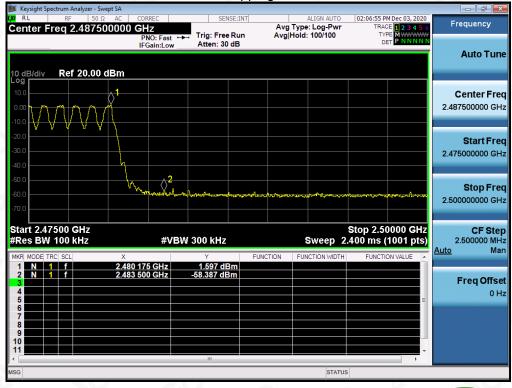




# GFSK MODULATION IN HIGH CHANNEL

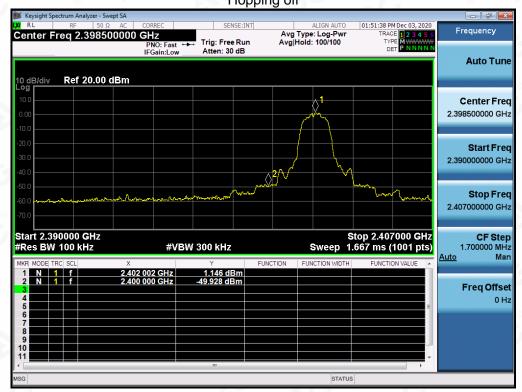
Hopping off

Hopping on



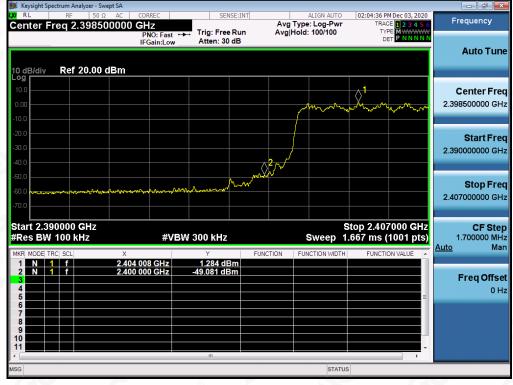
Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the Bedicated Presting/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGE. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issuence of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc~cert.com.





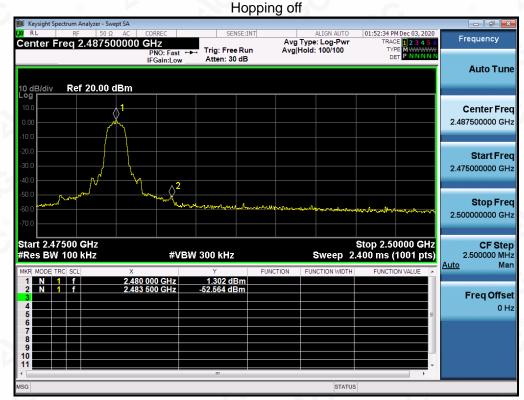
# $\pi$ /4-DQPSK MODULATION IN LOW CHANNEL Hopping off

Hopping on



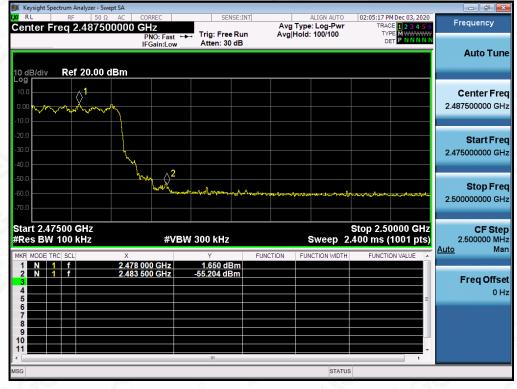
Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the Bedicated Pesting/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written approver, be test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issuence of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc~cert.com.





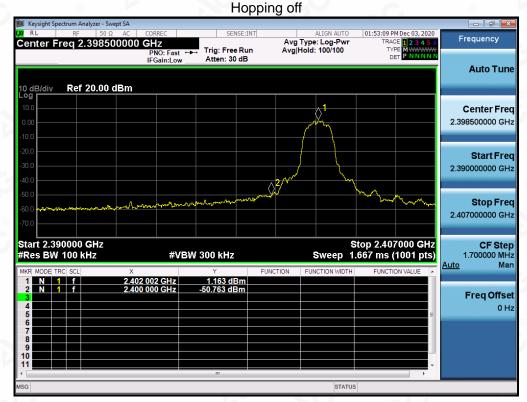
# $\pi$ /4-DQPSK MODULATION IN HIGH CHANNEL

Hopping on



Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the bedicated resting/inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written approver, between the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issuence of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc~cert.com.





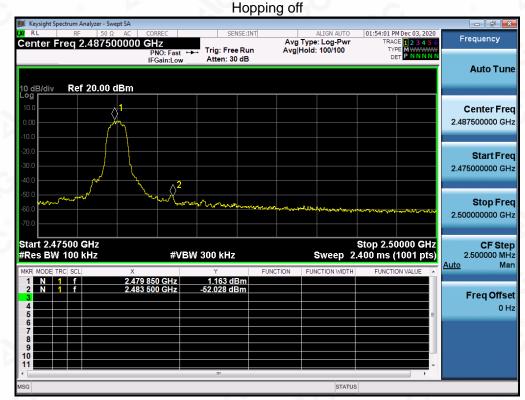
# 8-DPSK MODULATION IN LOW CHANNEL

Hopping on



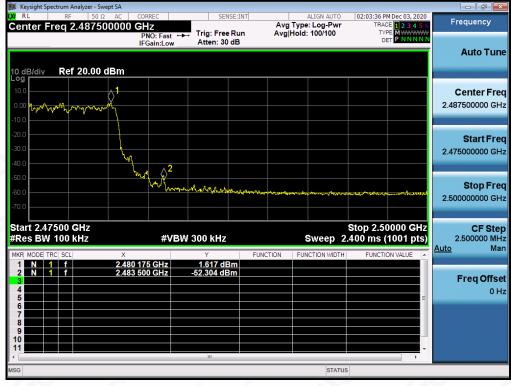
Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the Bedicated Pesting/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written approver, be test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issuence of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc~cert.com.





# 8-DPSK MODULATION IN HIGH CHANNEL

Hopping on



Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the Bedicated Pesting/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written approver, be test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issuence of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc~cert.com.



## **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.

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the abdicated Pesting/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issuance of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc~cert.com.



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

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the Bedicated Pesting/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written approver, and the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issuer of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.

 Attestation of Global Compliance(Shenzhen)Co., Ltd

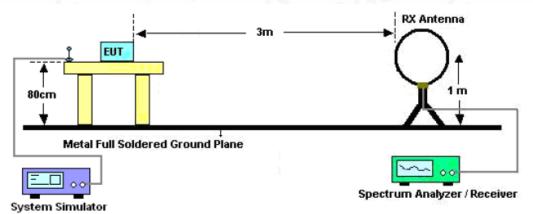
 Attestation of Global Compliance(Shenzhen)Std & Tech Co., Ltd

 Tel: +86-755 2523 4088
 E-mail: agc@agc-cert.com
 Web: http://cn.agc-cert.com/

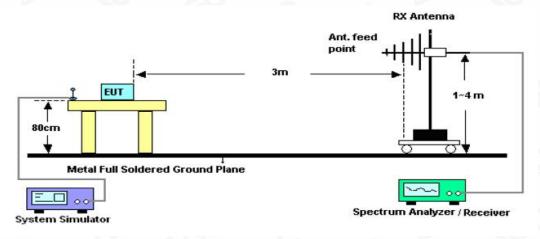


## 10.2. TEST SETUP

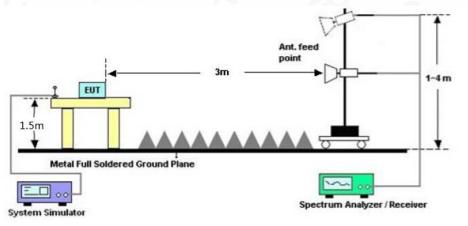
Radiated Emission Test-Setup Frequency Below 30MHz



## RADIATED EMISSION TEST SETUP 30MHz-1000MHz



## RADIATED EMISSION TEST SETUP ABOVE 1000MHz



Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the stand inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGE in the test estimates and the test estimates and the test estimates are presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issues of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.

Attestation of Global Compliance(Shenzhen)Co., Ltd Attestation of Global Compliance(Shenzhen)Std & Tech Co., Ltd Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Web: http://cn.agc-cert.com/

### **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	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Note: 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.

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "Dedicated Pastro/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGE The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issues of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.



# **RADIATED EMISSION BELOW 1GHz**

JT		Bluetooth	Bluetooth Speaker		Model	Model Name		Force 2	
mperature		25°C		8	Relativ	ve Humid	lity 5	55.4%	
essure		960hPa	NO.	- 6	Test V	Test Voltage		Normal Vol	tage
st Mode		Mode 9			Anten	na	H	Horizontal	
66.9 dBuV	′m								
<u> </u>								Limit: — Margin: —	
		2							G
27 	1,r			nandraham	- Month Market	ununun	www.www		*
-13 30.000	127.00	224.00 3	21.00 418.0	0 515.00	612.00	709.00 8	306.00	1000.00	MHz
No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	
	1	118.9167	11.40	17.86	29.26	43.50	-14.24	peak	
	> *	170 6500	21 54	18.09	39.63	43 50	-3.87	neak	

	•	110.0101			20.20	10.00		poun
	2 *	170.6500	21.54	18.09	39.63	43.50	-3.87	peak
	3	249.8667	11.21	18.49	29.70	46.00	-16.30	peak
	4	350.1000	7.53	21.23	28.76	46.00	-17.24	peak
	5	384.0500	6.55	22.42	28.97	46.00	-17.03	peak
Ċ,	6	860.9667	0.81	31.20	32.01	46.00	-13.99	peak

## **RESULT: PASS**

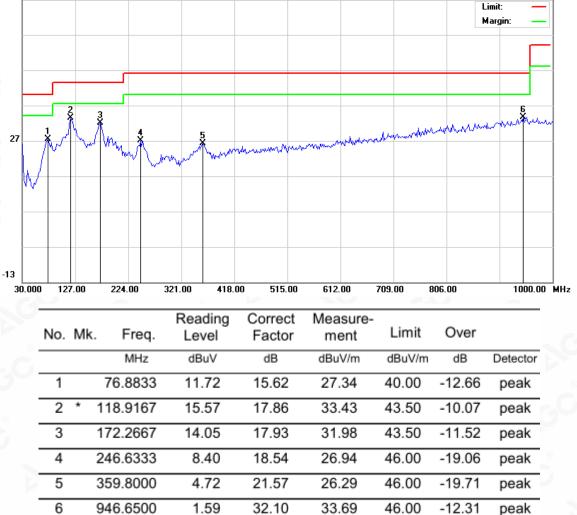
Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the Bedicated Pesting/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issuer of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc~cert.com.



#### Report No.: AGC05031201101FE03 Page 45 of 72

EUT	Bluetooth Speaker	Model Name	Force 2
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 9	Antenna	Vertical

66.9 dBuV/m



### **RESULT: PASS**

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

2. All test modes had been pre-tested. The mode 9 is the worst case and recorded in the report.

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "Bedicated Participation" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the writter authorization of AGC the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issues of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc~cert.com.



## Report No.: AGC05031201101FE03 Page 46 of 72

# **RADIATED EMISSION ABOVE 1GHz**

EUT	Bluetooth Speaker	Model Name	Force 2
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)	
4804.000	46.58	0.08	46.66	74	-27.34	peak
4804.000	36.32	0.08	36.4	54	-17.6	AVG
7206.000	39.47	2.21	41.68	74	-32.32	peak
7206.000	32.41	2.21	34.62	54	-19.38	AVG
			®.			- C
emark:						

EUT	Bluetooth Speaker	Model Name	Force 2
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	
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Value Type
4804.000	45.89	0.08	45.97	74	-28.03	peak
4804.000	35.65	0.08	35.73	54	-18.27	AVG
7206.000	39.36	2.21	41.57	74	-32.43	peak
7206.000	31.47	2.21	33.68	54	-20.32	AVG
- 66				50	G	
emark:						
actor = Anter	nna Factor + Cable	Loss – Pre-ar	mplifier.	8		

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the Bedicated Pasting/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issuer of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.



#### Report No.: AGC05031201101FE03 Page 47 of 72

EUT	Bluetooth Speaker	Model Name	Force 2
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)	value Type
4882.000	47.85	0.14	47.99	74	-26.01	peak
4882.000	36.64	0.14	36.78	54	-17.22	AVG
7323.000	40.49	2.36	42.85	74	-31.15	peak
7323.000	33.32	2.36	35.68	54	-18.32	AVG
®				C		
	8				8	
emark:	- 6	8			- 6	8
actor = Anter	na Factor + Cable	Loss – Pre-	amplifier.			- 6

EUT Model Name **Bluetooth Speaker** Force 2 Temperature 25°C **Relative Humidity** 55.4% Pressure 960hPa **Test Voltage** Normal Voltage **Test Mode** Mode 8 Vertical Antenna

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Value Type
4882.000	47.72	0.14	47.86	74	-26.14	peak
4882.000	39.85	0.14	39.99	54	-14.01	AVG
7323.000	41.46	2.36	43.82	74	-30.18	peak
7323.000	33.37	2.36	35.73	54	-18.27	AVG
®						
	®					

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

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the Bedicated Fasting/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15day after the issuer of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.



#### Report No.: AGC05031201101FE03 Page 48 of 72

EUT	Bluetooth Speaker	Model Name	Force 2
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	45.58	0.22	45.8	74	-28.2	peak
4960.000	36.44	0.22	36.66	54	-17.34	AVG
7440.000	39.19	2.64	41.83	74	-32.17	peak
7440.000	30.36	2.64	33	54	-21	AVG
®				() ()		
C.	8				®	
emark:		8		100	- Ci	
actor = Anter	nna Factor + Cable	Loss – Pre-	amplifier.			

EUT	Bluetooth Speaker	Model Name	Force 2	
Temperature	25°C	Relative Humidity	55.4%	
Pressure	960hPa	Test Voltage	Normal Voltage	
Test Mode	Mode 9	Antenna	Vertical	

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4960.000	45.68	0.22	45.9	74	-28.1	peak
4960.000	35.36	0.22	35.58	54	-18.42	AVG
7440.000	39.25	2.64	41.89	74	-32.11	peak
7440.000	30.24	2.64	32.88	54	-21.12	AVG
		00	©	© 1		9
emark:	0			- C	C	

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, Margin= Level -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.

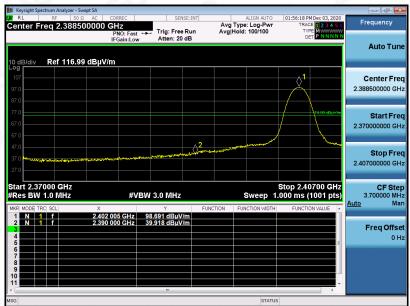
Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the bedicated Pestua/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGE. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issues of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.



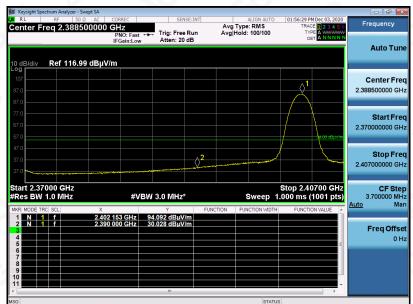
EUT	Bluetooth Speaker	Model Name	Force 2		
Temperature	25°C	Relative Humidity	55.4%		
Pressure	960hPa	Test Voltage	Normal Voltage		
Test Mode	Mode 7	Antenna	Horizontal		

#### TEST RESULT FOR RESTRICTED BANDS REQUIREMENTS

PK



AV



## **RESULT: PASS**

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the stand of t

Attestation of Global Compliance(Shenzhen)Co., Ltd Attestation of Global Compliance(Shenzhen)Std & Tech Co., Ltd Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Web: http://cn.agc-cert.com/