

FCC Test Report

Report No.: AGC01110201143FE03

FCC ID : 2AOKB-A3126

APPLICATION PURPOSE : Original Equipment

PRODUCT DESIGNATION: Wireless Speaker

BRAND NAME : Soundcore

MODEL NAME : A3126

APPLICANT: Anker Innovations Limited

DATE OF ISSUE : Dec. 30, 2020

STANDARD(S) : FCC Part 15.247

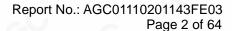
REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

Sylvenico.



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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	· /	Dec. 30, 2020	Valid	Initial Release

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TABLE OF CONTENTS

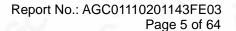
1. VERIFICATION OF CONFORMITY	5
2. GENERAL INFORMATION	6
2.1. PRODUCT DESCRIPTION	6
2.2. TABLE OF CARRIER FREQUENCYS	6
2.3. RECEIVER INPUT BANDWIDTH	7
2.4. EXAMPLE OF A HOPPING SEQUENCY IN DATA MODE	7
2.5. EQUALLY AVERAGE USE OF FREQUENCIES AND BEHAVIOUR	7
2.6. RELATED SUBMITTAL(S) / GRANT (S)	8
2.7. TEST METHODOLOGY	8
2.8. SPECIAL ACCESSORIES	
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	14
7.1. MEASUREMENT PROCEDURE	14
7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	14
7.2 LIMITS AND MEASUDEMENT DESILIT	15
8. 20DB BANDWIDTH	21
8.1. MEASUREMENT PROCEDURE	∠ I
8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	
8.3. LIMITS AND MEASUREMENT RESULTS	22
9. CONDUCTED SPURIOUS EMISSION	28
9.1. MEASUREMENT PROCEDURE	28

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9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	28
9.3. MEASUREMENT EQUIPMENT USED	28
9.4. LIMITS AND MEASUREMENT RESULT	28
10. RADIATED EMISSION	41
10.1. MEASUREMENT PROCEDURE	41
10.2. TEST SETUP	43
10.3. LIMITS AND MEASUREMENT RESULT	
10.4. TEST RESULT	
11. NUMBER OF HOPPING FREQUENCY	
11.1. MEASUREMENT PROCEDURE	54
11.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)	54
11.3. MEASUREMENT EQUIPMENT USED	54
11.4. LIMITS AND MEASUREMENT RESULT	54
12. TIME OF OCCUPANCY (DWELL TIME)	55
12.1. MEASUREMENT PROCEDURE	55
12.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)	55
12.3. MEASUREMENT EQUIPMENT USED	
12.4. LIMITS AND MEASUREMENT RESULT	
13. FREQUENCY SEPARATION	
13.1. MEASUREMENT PROCEDURE	59
13.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)	59
13.3. MEASUREMENT EQUIPMENT USED	59
13.4. LIMITS AND MEASUREMENT RESULT	
14. FCC LINE CONDUCTED EMISSION TEST	60
14.1. LIMITS OF LINE CONDUCTED EMISSION TEST	60
14.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST	60
14.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST	61
14.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST	
14.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST	
APPENDIX A: PHOTOGRAPHS OF TEST SETUP	64
APPENDIX B: PHOTOGRAPHS OF EUT	64

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1. VERIFICATION OF CONFORMITY

Applicant	Anker Innovations Limited		
Address	Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok, Kowloon, Hongkong		
Manufacturer	Anker Innovations Limited		
Address	Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok, Kowloon, Hongkong		
Factory	GANZHOU DEHUIDA TECHNOLOGY CO., LTD		
Address	Dehuida Science and Technology Park, Huoyanshan Road, Anyuan District, Ganzhou City, Jiangxi Province. P.R China.		
Product Designation	Wireless Speaker		
Brand Name	Soundcore		
Test Model	A3126		
Date of test	Nov. 20, 2020 to Dec. 01, 2020 and Dec. 30, 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	
NGC G	John Zeng (Project Engineer)	Dec. 30, 2020
Reviewed By	Max Zhang	
10° 10°	Max Zhang (Reviewer)	Dec. 30, 2020
Approved By	Towardies	
	Forrest Lei (Authorized Officer)	Dec. 30, 2020

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Report No.: AGC01110201143FE03

Page 6 of 64

2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

The EUT is designed as "Wireless 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

r i i i ajor to o i i i i o ai a o o i i p ii o i o o	
Operation Frequency	2.402 GHz to 2.480 GHz
RF Output Power	10.450dBm (Max)
Bluetooth Version	V5.0
Modulation	BR ⊠GFSK, EDR ⊠π /4-DQPSK, ⊠8DPSK BLE □GFSK 1Mbps □GFSK 2Mbps
Number of channels	79
Hardware Version	V2.0
Software Version	V0.02
Antenna Designation	FPC Antenna (Comply with requirements of the FCC part 15.203)
Antenna Gain	3.25dBi
Power Supply	DC 7.2V by battery

2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency	
8	0	2402 MHz	
	. 1	2403 MHz	
		- C	
0 0	38	2440 MHz	
2402~2480MHz	39	2441 MHz	
	40	2442 MHz	
C			
	77	2479 MHz	
	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, 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.

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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**: **2AOKB-A3126** 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 ±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 = ±3.1 dB
- Uncertainty of Radiated Emission below 1GHz, Uc = ±4.0 dB
- Uncertainty of Radiated Emission above 1GHz, Uc = ±4.8 dB
- Uncertainty of total RF power, conducted, Uc = ±0.8dB
- Uncertainty of spurious emissions, conducted, Uc = ±2.7dB
- Uncertainty of Occupied Channel Bandwidth: Uc = ±2 %
- Uncertainty of Dwell Time: Uc = ±2 %
- Uncertainty of Frequency: Uc = ±2 %

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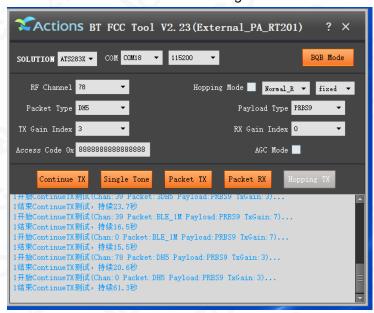
4. DESCRIPTION OF TEST MODES

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



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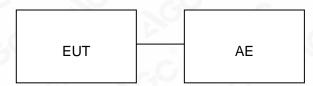
Report No.: AGC01110201143FE03

Page 11 of 64

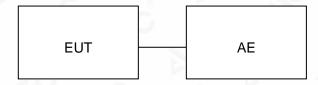
5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Radiated Emission Configure:



Conducted Emission Configure:



5.2. EQUIPMENT USED IN TESTED SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Wireless Speaker A3126 2AOKB-A3126		2AOKB-A3126	EUT
2	Control Box N/A USB-TTL		AE	
3	Charger line	Charger line N/A 1.0m unshielded		Accessory
4	Load	Load N/A 5ohm		AE

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT Compliant	
15.247 (b)(1)	Peak Output Power		
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	

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Report No.: AGC01110201143FE03

Page 12 of 64

6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd		
Location	Location 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Communi 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			

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 (Nov. 20, 2020 to Dec. 01, 2020)

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	Sep. 03, 2020	Sep. 02, 2022
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep. 21, 2019	Sep. 20, 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

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Report No.: AGC01110201143FE03 Page 13 of 64

TEST EQUIPMENT OF RADIATED EMISSION TEST (Dec. 30, 2020)

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. 07, 2020	Dec. 06, 2021
2.4GHz Filter	EM Electronics	2400-2500MHz	N/A	Mar. 23, 2020	Mar. 22, 2022
Attenuator	ZHINAN	E-002	N/A	Sep. 03, 2020	Sep. 02, 2022
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep. 21, 2019	Sep. 20, 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

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7. PEAK OUTPUT POWER

7.1. MEASUREMENT PROCEDURE

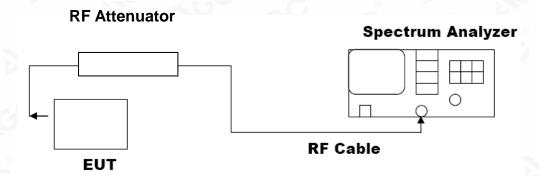
For peak power test:

- 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 ≥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



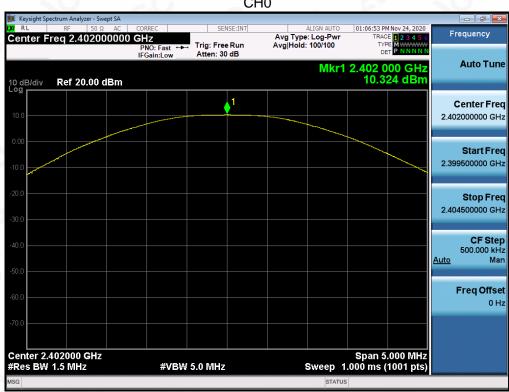
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7.3. LIMITS AND MEASUREMENT RESULT

PEAK OUTPUT POWER MEASUREMENT RESULT					
FOR GFSK MOUDULATION					
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail		
2.402	10.324	21	Pass		
2.441	10.268	21	Pass		
2.480	8.555	21	Pass		

CH₀



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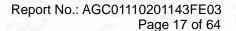
CH39



CH78



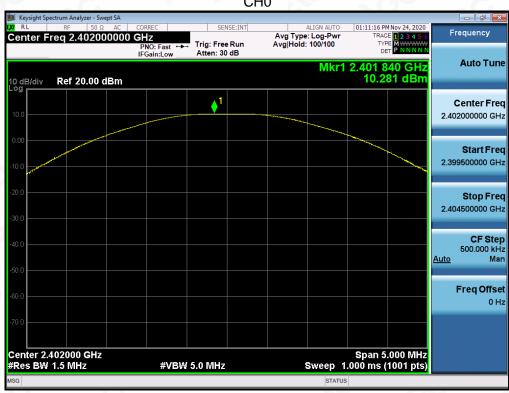
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PEAK OUTPUT POWER MEASUREMENT RESULT					
FOR Π/4-DQPSK MODULATION					
Frequency (GHz) Peak Power (dBm) Applicable Limits (dBm) Pass or Fa					
2.402	10.281	21	Pass		
2.441	10.182	21	Pass		
2.480	8.608	21	Pass		

CH₀



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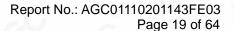
CH39



CH78



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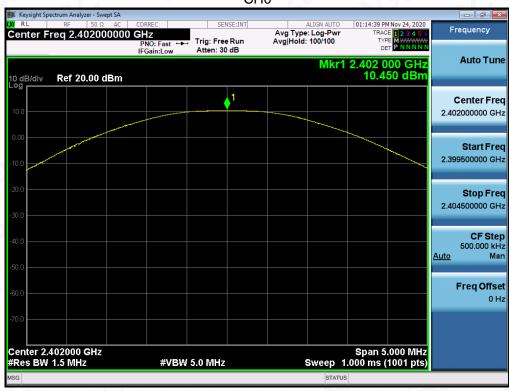


he test results the test report.



PEAK OUTPUT POWER MEASUREMENT RESULT						
FOR 8-DPSK MODULATION						
Frequency (GHz)	Pass or Fall					
2.402	10.450	21	Pass			
2.441	10.350	21	Pass			
2.480	8.757	21	Pass			

CH₀



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CH39



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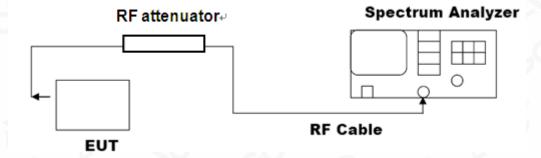


8. 20DB BANDWIDTH

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				
Annii abla Lineita		Measurement Result		
Applicable Limits	Test Data	(MHz)	Criteria	
N/A	Low Channel	0.956	PASS	
	Middle Channel	0.971	PASS	
	High Channel	0.967	PASS	

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



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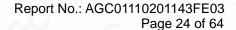
TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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 MEASUREMENT RESULT FOR II /4-DQPSK MODULATION

 Measurement Result

 Test Data (MHz)
 Criteria

 Low Channel
 1.278
 PASS

 Middle Channel
 1.288
 PASS

 High Channel
 1.284
 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				
Amplicable Limite		Measurement Result		
Applicable Limits	Test Data	(MHz)	Criteria	
N/A	Low Channel	1.258	PASS	
	Middle Channel	1.253	PASS	
	High Channel	1.268	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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Report No.: AGC01110201143FE03

Page 28 of 64

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.
- 3. 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

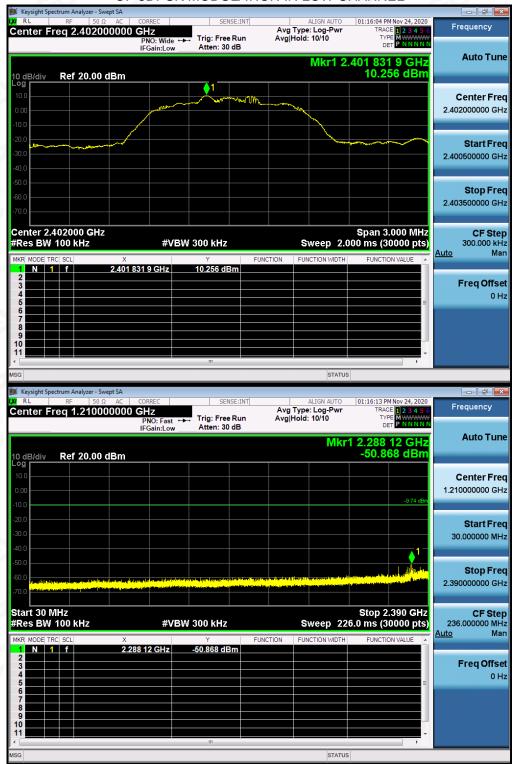
LIMITS AND MEASUREMENT RESULT				
Applicable Limite	Measurement Result			
Applicable Limits	Test Data	Criteria		
In any 100 kHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency	At least -20dBc than the limit Specified on the BOTTOM 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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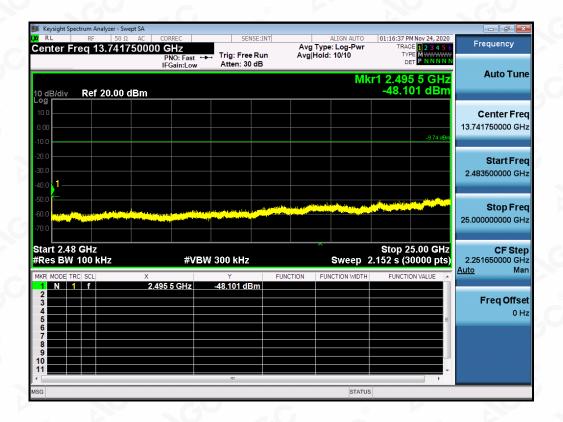
TEST RESULT FOR ENTIRE FREQUENCY RANGE

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



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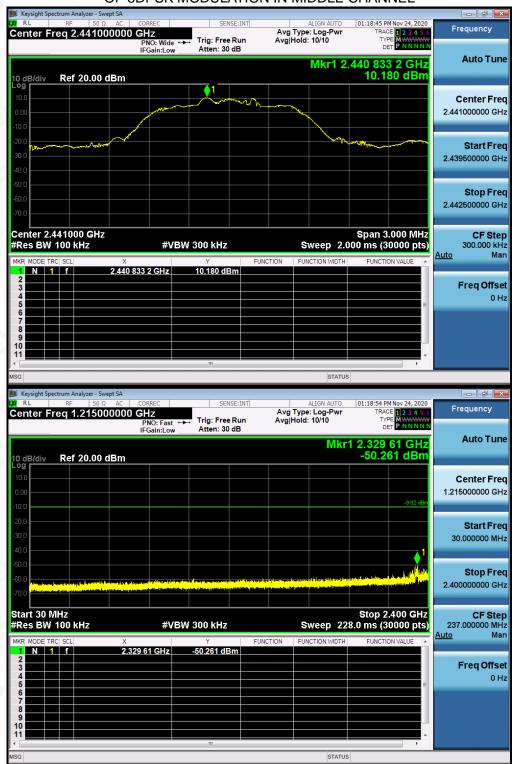




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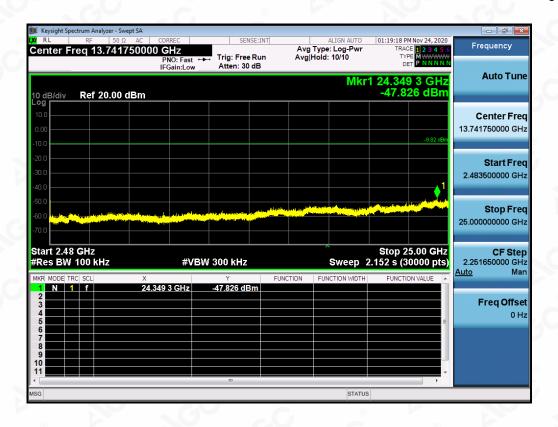


TEST PLOT OF OUT OF BAND EMISSIONS OF 8DPSK MODULATION IN MIDDLE CHANNEL



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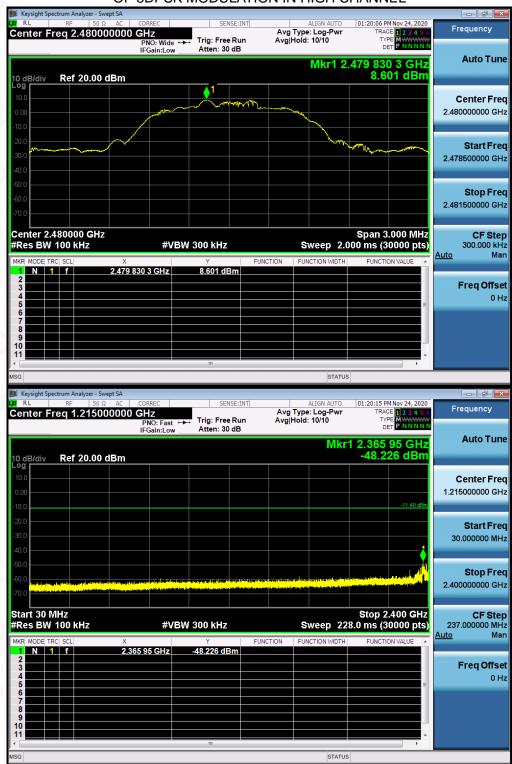




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TEST PLOT OF OUT OF BAND EMISSIONS OF 8DPSK MODULATION IN HIGH CHANNEL



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

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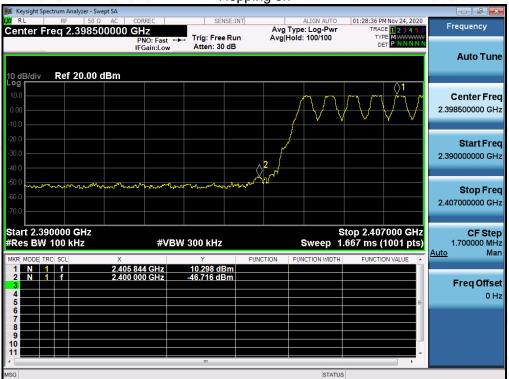
TEST RESULT FOR BAND EDGE

GFSK MODULATION IN LOW CHANNEL

Hopping off



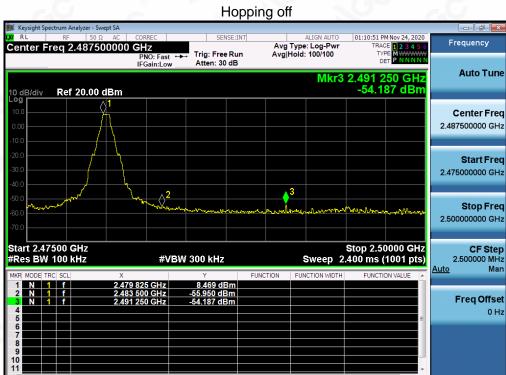




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GFSK MODULATION IN HIGH CHANNEL



Hopping on RE RE SO AC CONSTRUCTION OF RESERVED TO THE RE Avg Type: Log-Pwi Avg|Hold: 100/100 **Auto Tune** Mkr3 2.495 800 GHz -46.160 dBm Ref 20.00 dBm Center Freq 2.487500000 GHz Start Fred 2.475000000 GHz Stop Freq 2.500000000 GHz Start 2.47500 GHz #Res BW 100 kHz Stop 2.50000 GHz Sweep 2.400 ms (1001 pts) **CF Step** #VBW 300 kHz 2.500000 MH <u>Auto</u> **Freq Offset** STATUS

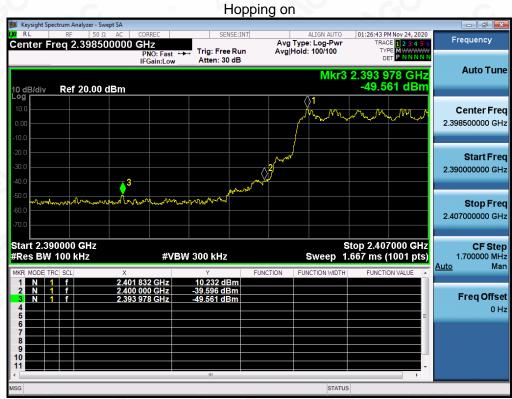
STATUS

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π /4-DQPSK MODULATION IN LOW CHANNEL Hopping off





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π /4-DQPSK MODULATION IN HIGH CHANNEL Hopping off

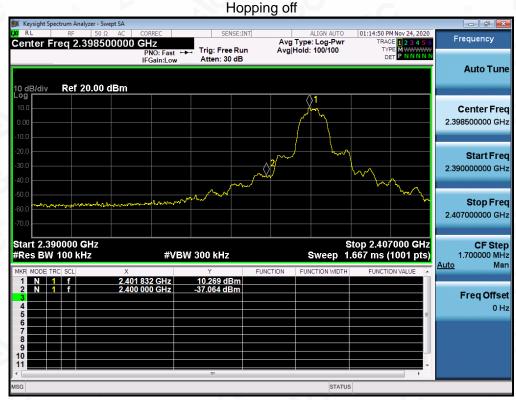




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8-DPSK MODULATION IN LOW CHANNEL





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8-DPSK MODULATION IN HIGH CHANNEL Hopping off





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