

FCC Test Report

Report No.: AGC01518200901FE03

FCC ID	8:	2AMNM-LINNER
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	TWS Bluetooth Headset
BRAND NAME	÷	LINNER
MODEL NAME	: @	LINNER Soapbuds
APPLICANT	39	Shenzhen shengyuan tech co.ltd
DATE OF ISSUE	: ©	Sep. 16,2020
STANDARD(S)	:	FCC Part 15.247
REPORT VERSION	:	V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	. /	Sep. 16,2020	Valid	Initial Release

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1. VERIFICATION OF CONFORMITY

Applicant	Shenzhen shengyuan tech co.ltd	
Address	309/Block C, Lan Guang Tech Park, No.6 Rd of Gaoxin North, Nanshan District, Shenzhen, China	
Manufacturer	SHENZHEN DOSHI ELECTRONICS CO.,LTD	
Address	Room 101,201,301 and 401 No.23 Guanlan Industrial Park, Grain Group,No.299 Guanping Road ,Songyuanxia Community, Guanhu Street, Longhua District, Shenzhen	
Factory	SHENZHEN DOSHI ELECTRONICS CO.,LTD	
Address	Room 101,201,301 and 401 No.23 Guanlan Industrial Park, Grain Group,No.299 Guanping Road ,Songyuanxia Community, Guanhu Street, Longhua District, Shenzhen	
Product Designation	TWS Bluetooth Headset	
Brand Name	LINNER	
Test Model	LINNER Soapbuds	
Date of test	Sep. 02,2020 to Sep. 16,2020	
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**

Sep. 16,2020

Max Zhan

Reviewed By

Max Zhang Reviewer

Sep. 16,2020

Approved By

Forrest Lei

Authorized Officer

Sep. 16,2020

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2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

The EUT is designed as "TWS Bluetooth Headset". It is designed by way of utilizing the GFSK, π /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	4.269dBm (Max)
Bluetooth Version	V 5.0
Modulation	BR ⊠GFSK, EDR ⊠π /4-DQPSK, ⊠8DPSK BLE □GFSK 1Mbps □GFSK 2Mbps
Number of channels	79
Hardware Version	V1.2
Software Version	35.2.2.2
Antenna Designation	Ceramic Antenna (Comply with requirements of the FCC part 15.203)
Antenna Gain	1.0dBi
Power Supply	DC 3.7V by battery

Note: The EUT comprises left and right channel earphone, both are the same and have been tested, only the test data of left earphone recorded in this report.

2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
0	0	2402 MHz
	1	2403 MHz
0	38	2440 MHz
2402~2480MHz	39	2441 MHz
	40	2442 MHz
~ C •		
No. CO	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: 40,21,44,23,42,53,46,55,48,33,52,35,50,65,54,67 56,37,60,39,58,69,62,71,64,25,68,27,66,57,70,59 72,29,76,31,74,61,78,63,01,41,05,43,03,73,07,75 09,45,13,47,11,77,15,00,64,49,66,53,68,02,70,06 01, 51, 03, 55, 05, 04

2.5. EQUALLY AVERAGE USE OF FREQUENCIES AND BEHAVIOUR

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

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

2. Internal master clock.

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

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

Regarding short transmissions the Bluetooth system has the following behavior:

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

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

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

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

2.7. TEST METHODOLOGY

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

2.8. SPECIAL ACCESSORIES

Refer to section 5.2.

2.9. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

2.10. ANTENNA REQUIREMENT

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

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3. MEASUREMENT UNCERTAINTY

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

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

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

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4. DESCRIPTION OF TEST MODES

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

Note:

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

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

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

Software Setting

-	Password:	
	Password:	Log
сом4 - 💦 🖏		
Memory ^ 3	RF Freq.(MHz) 2402	
A Tx Single Tone	Packet Type 2DH5 From Channel 0 to 78	
Burst		
LE BTx		
⊿ Rx	Pattern Type PRBS-9 •	
Rx Continuous	GC (range= 0~63) 48	
Crystal Trim		
Test Mode	BD Address: 0x 00006BC6967E	
Enter Controller Mode	BD Address: 0x 00006BC6967E	
 Touch Touch Setting 		
✓ Audio	Enable Temp Compensation	
ANC Setting	Report GC	
Gain Setting		
 VirtualCom VirtualCom 	Stop	
VirtualCom		
v)	COMPENSALION SUCCEDED	
13:56:51.651] Tx Burst succeeded 13:56:51.652] API-BT_BT3_packet_		
14:09:58.487] Tx Burst stopped.		
[14:09:58.487] API-BT_BT3_packet_ [14:10:01.187] Read Temperature C	ix_stop	
14:10:01.187] Disable Temperature		
[14:10:01.187] Tx Burst succeeded [14:10:01.187] API-BT_BT3_packet_	x start	

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5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Radiated Emission Configure:

EUT

Conducted Emission Configure:

	5	
EUT		AE

5.2. EQUIPMENT USED IN TESTED SYSTEM

ltem	Equipment	Model No.	ID or Specification	Remark
1	TWS Bluetooth Headset	LINNER Soapbuds	2AMNM-LINNER	EUT
2	control board	N/A	USB_TTL	AE

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
15.247 (b)(1)	Peak Output Power	Compliant
15.247 (a)(1)	20 dB Bandwidth	Compliant
15.247 (d)	Conducted Spurious Emission	Compliant
15.209	Radiated Emission	Compliant
15.247 (a)(1)(iii)	Number of Hopping Frequency	Compliant
15.247 (a)(1)(iii)	Time of Occupancy	Compliant
15.247 (a)(1)	Frequency Separation	Compliant
15.207	Conducted Emission	Not applicable

Note: The EUT is powered by battery. The EUT can not use the BT function with charging

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6. TEST FACILITY

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

TEST EQUIPMENT OF RADIATED EMISSION TEST

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

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7. PEAK OUTPUT POWER

7.1. MEASUREMENT PROCEDURE

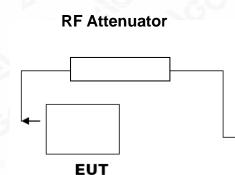
For peak power test:

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

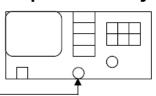
Allow trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power, after any corrections for external attenuators and cables.

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

PEAK POWER TEST SETUP



Spectrum Analyzer



RF Cable

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7.3. LIMITS AND MEASUREMENT RESULT

PEAK OUTPUT POWER MEASUREMENT RESULT FOR GFSK MOUDULATION						
Frequency (GHz)Peak Power (dBm)Applicable Limits (dBm)Pass or Fail						
2.402	2.107	30	Pass			
2.441	2.634	30	Pass			
2.480	2.885	30	Pass			

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Keysight Spectrum Analyzer - Swept SA				
₩ RL RF 50Ω AC Center Freq 2.480000000	CORREC SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	07:17:11 PM Sep 10, 2020 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast ↔ Trig: Free Run IFGain:Low Atten: 30 dB	Avg Hold: 100/100 Mkr1	2.479 845 GHz 2.885 dBm	Auto Tune
10 dB/div Ref 20.00 dBm				Center Free 2.48000000 GH
.10.0				Start Fre 2.477500000 GH
10.0 -20.0				Stop Fre 2.482500000 GH
-40.0				CF Ste 500.000 k⊦ <u>Auto</u> Ma
60.0				Freq Offse 0 H
-70.0			Span 5.000 MHz	
#Res BW 1.5 MHz	#VBW 5.0 MHz		.000 ms (1001 pts)	
MSG		STATUS		

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PEAK OUTPUT POWER MEASUREMENT RESULT FOR Π/4-DQPSK MODULATION					
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail		
2.402	3.125	21	Pass		
2.441	3.543	21	Pass		
2.480	3.837	21	Pass		



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💓 Keysight Spe	ectrum Analyzer - Swept SA RF 50 Ω AC	CORREC	SENSE:INT	A11	IGN AUTO	07-19-25 04	Sep 10, 2020	
	req 2.48000000	0 GHz		Avg Type: L Avg Hold: 1	.og-Pwr	TRAC	1 2 3 4 5 6 E MWWWW	Frequency
		PNO: Fast ++ IFGain:Low	Trig: Free Run Atten: 30 dB	Avg Hold: 1	00/100	DE		
10 dB/div Log	Ref 20.00 dBm				Mkr1 2	2.479 8 3.83	15 GHz 37 dBm	Auto Tune
10.0			1					Center Freq 2.480000000 GHz
0.00								Start Freq 2.477500000 GHz
-20.0 M								Stop Fre q 2.482500000 GHz
-40.0								CF Step 500.000 kH: <u>Auto</u> Mar
-60.0								Freq Offse 0 Hz
-70.0	180000 GHz					Span 5	000 MHz	
#Res BW		#VBW	5.0 MHz	S	weep 1.0	00 ms (1001 pts)	
MSG					STATUS			

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PEAK OUTPUT POWER MEASUREMENT RESULT							
	FOR 8-DPSK MODULATION						
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail				
2.402	3.471	21	Pass				
2.441	3.913	21	Pass				
2.480	4.269	21	Pass				



CH0

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CH39



CH78

50 Ω AC	CORREC	CENCE-INT			07:10:28.0	M Son 10, 2020	
	GHz		Avg Type	: Log-Pwr	TRAC	E 1 2 3 4 5 6	Frequency
	PNO: Fast ++ IFGain:Low	Atten: 30 dB	Avg Hold:		DE		
				Mkr1	2.480 0	20 GHz	Auto Tune
0.00 dBm					4.2		
							Center Fred
		↓ ¹					2.480000000 GHz
							Start Freq 2.477500000 GHz
						- North	Stop Freq
							2.482500000 GHz
							CF Step 500.000 kHz
							<u>Auto</u> Mar
							Freq Offset 0 Hz
							0 H2
					A		
GHZ Z	#VBW	5.0 MHz		Sweep 1	span 5 .000 ms ((1001 pts)	
	80000000 0.00 dBm	80000000 GHz PN0: Fast → IFGain:Low 0.00 dBm	S0000000 GHz PN0: Fast	80000000 GHz PNO: Fast →→ IFGain:Low 0.00 dBm 1 1 1 1 1 1 1 1 1 1 1 1 1	Avg Type: Log-Pwr Avg Hold: 100/100 Mkr1 0.00 dBm 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	S0000000 GHz Avg Type: Log-Pwr Tradition PN0: Fast Trig: Free Run Avg[Hold: 100/100 Trig Mkr1 2.480 0 4.2 4.2 0.00 dBm 4.2 4.2 GHz GHz Span 5	80000000 GHz IFGain:Low Trig: Free Run Atten: 30 dB Avg Type: Log-Pwr AvgHoid: 100/100 TRACE ID 34 3 5 G TYPE TRACE ID 34 3 5 G TYPE 0.00 dBm Mkr1 2.480 020 GHz 4.269 dBm 4.269 dBm 0.00 dBm 1 1 1 0.00 dBm 1 1 1 1 0.00 dBm 1 1 1 1 1 0.00 dBm 1 1 1 1 1 1 0.00 dBm 1 1 1 1 1 1 1 0.00 dBm 1

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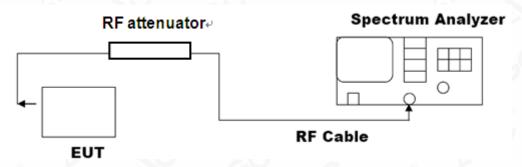


8. 20DB BANDWIDTH

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					
Appliachte Limite	Measurement Result				
Applicable Limits	Test Data	a (MHz)	Criteria		
	Low Channel	0.929	PASS		
N/A	Middle Channel	0.921	PASS		
	High Channel	0.922	PASS		

07:16:11 PM Sep 10, 2020 SENSE:INT Center Freq: 2.402000000 GHz Trig: Free Run Avg|Hol #Atten: 30 dB Frequency Radio Std: None 102000000 GHz 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> 9.74 dBm **Occupied Bandwidth Total Power** 868.99 kHz Freq Offset 0 Hz 5.883 kHz **Transmit Freq Error OBW Power** 99.00 % x dB Bandwidth 929.1 kHz x dB -20.00 dB

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

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TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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MEASUREMENT RESULT FOR II /4-DQPSK MODULATION				
Applicable Limite		Measurement Resu	lt	
Applicable Limits	Test Data	(MHz)	Criteria	
N/A	Low Channel	1.255	PASS	
	Middle Channel	1.230	PASS	
	High Channel	1.228	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						
Measurement Result						
Applicable Limits	Test Da	ata (MHz)	Criteria			
	Low Channel	1.270	PASS			
N/A	Middle Channel	1.259	PASS			
-0	High Channel	1.258	PASS			

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



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TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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9. CONDUCTED SPURIOUS EMISSION

9.1. MEASUREMENT PROCEDURE

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

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

The same as described in section 8.2

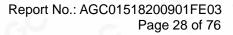
9.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6

9.4. LIMITS AND MEASUREMENT RESULT

LIMITS AND MEAS	SUREMENT RESULT			
Annlinghig 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		

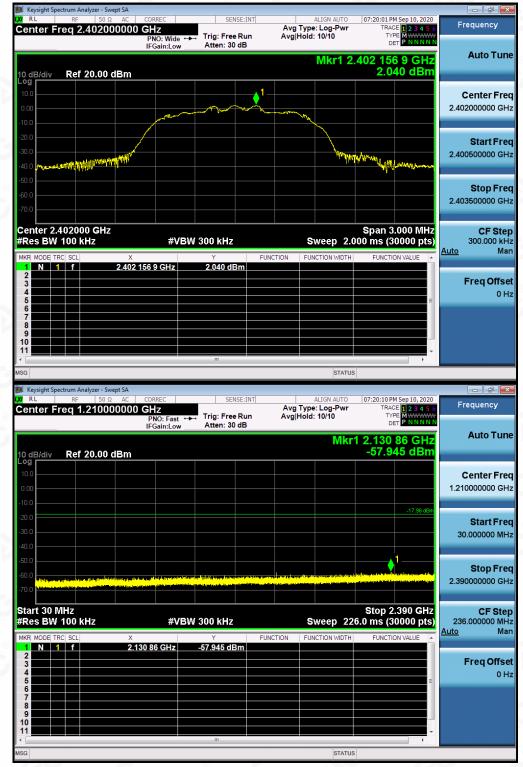
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TEST RESULT FOR ENTIRE FREQUENCY RANGE

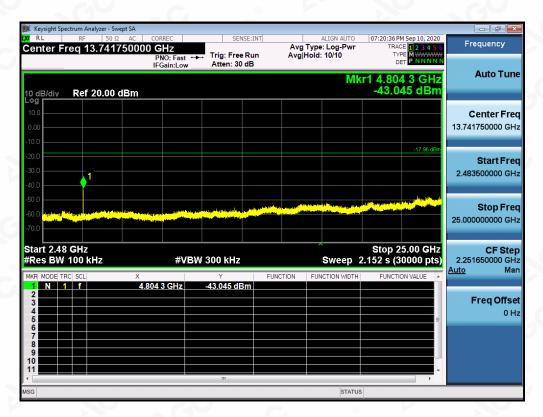
TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE OF 8DPSK MODULATION IN LOW CHANNEL



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 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/



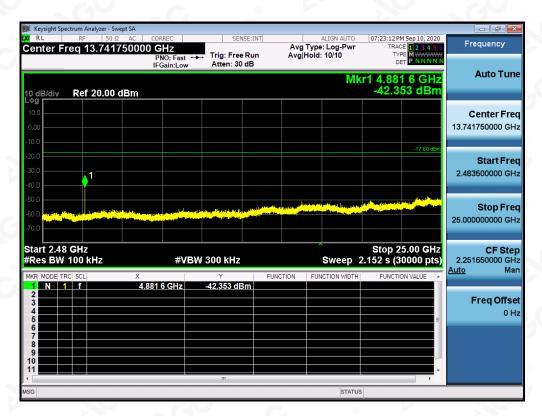


TEST PLOT OF OUT OF BAND EMISSIONS OF 8DPSK MODULATION IN MIDDLE CHANNEL

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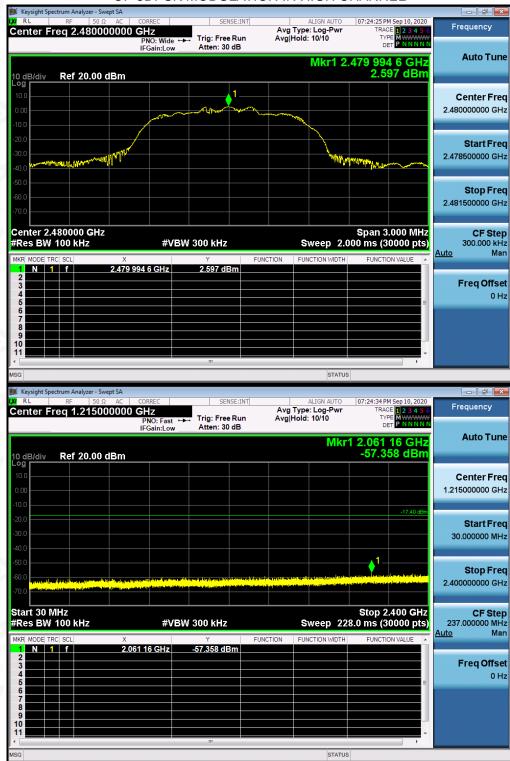
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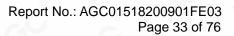
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TEST PLOT OF OUT OF BAND EMISSIONS OF 8DPSK MODULATION IN HIGH CHANNEL

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IXI F			RF	50 Ω				SEI	NSE:INT	Ava		ALIGN AUTO		4 Sep 10, 2020		Frequency
66	enter Freq 13.75000000					PNO: Fast +++ Trig: Free Ru				un Avg Hold: 10/10			TYPE MWWWWW DET P N N N N N			
						IFGain:Lo	w	Atten: 30								Auto Tune
	Mkr1 4.960 1 GH dB/div Ref 20.00 dBm -44.419 dBn															
10 d Log	IB/div	4	Rei	20.00 0	авт											
10.																Center Freq
0.0															13	.750000000 GHz
-10.0																
-20.0														-17.40 dBm		Start Freq
-30.0															2	500000000 GHz
-40.0			_	1												
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-60.0				l _{en} nderfinstelder	and the state of the state			to alternative	and the state					the state of the s		Stop Freq
-70.0	Philadelle	<u>.</u>		and the second secon				ويطلقه المرجلة أربيه							25	.000000000 GHz
-10.0																
	start 2.50 GHz Stop 25.00 GH Res BW 100 kHz #VBW 300 kHz Sweep 2.152 s (30000 pr											5.00 GHz		CF Step		
#Res BW 100 kHz #VBW 300 kHz Sw										Sweep 2	2.152 s (3	0000 pts)	Aut	2.250000000 GHz		
	MODE	TRC			Х			۲ -44.419 dl		ICTION	FUN	CTION WIDTH	FUNCTION	ON VALUE	7.44	<u>to</u> murr
1	N	1	T		4.90	60 1 GHz		-44.419 01	sm							E
3																Freq Offset 0 Hz
5														E		0 H2
67																
89																
10																
11								m								
MSG			-									STATUS	3			

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

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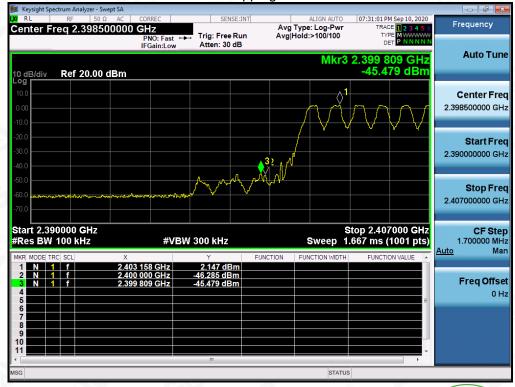
16:28 PM Sep 10, 2020 Frequency Avg Type: Log-Pwr Avg Hold: 100/100 000000 GHz PNO: Fast ↔ IFGain:Low Cente Trig: Free Run Atten: 30 dB TYPE DE1 Auto Tune Mkr3 2.398 823 GHz -44.489 dBm Ref 20.00 dBm **Center Freq** 2.398500000 GHz Start Fred 2.39000000 GHz $\sim \sim \sim$ Stop Freq 2.407000000 GHz Start 2.390000 GHz #Res BW 100 kHz Stop 2.407000 GHz Sweep 1.667 ms (1001 pts) **CF** Step #VBW 300 kHz 1.700000 MH <u>Auto</u> Mar FUNCTION Freq Offset 0 Hz STATUS

TEST RESULT FOR BAND EDGE

GFSK MODULATION IN LOW CHANNEL

Hopping off

Hopping on



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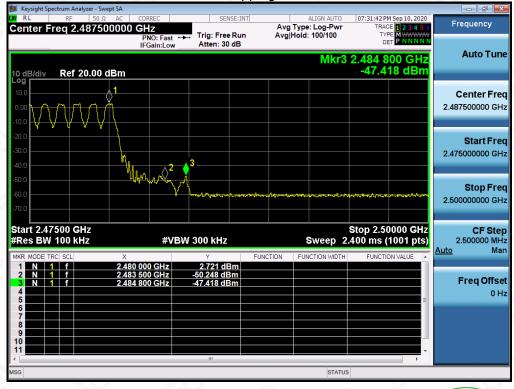




GFSK MODULATION IN HIGH CHANNEL

Hopping off

Hopping on



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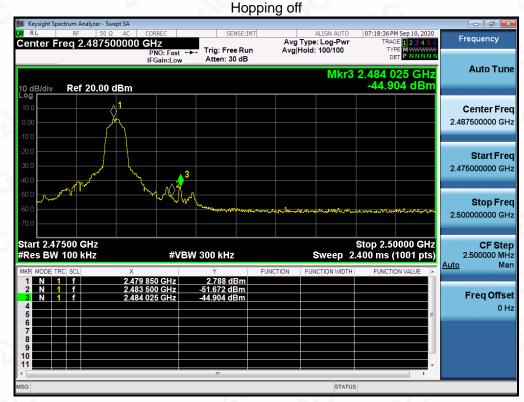
π /4-DQPSK MODULATION IN LOW CHANNEL Hopping off

Hopping on



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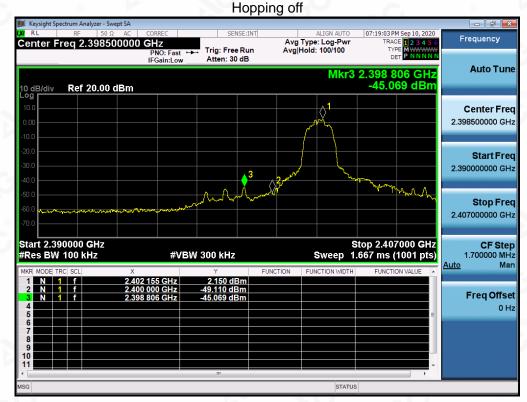
π /4-DQPSK MODULATION IN HIGH CHANNEL

Hopping on



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8-DPSK MODULATION IN LOW CHANNEL

Hopping on



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