

# **FCC Test Report**

Report No.: AGC08188200601FE03

FCC ID : 2AMNQ-T19

**APPLICATION PURPOSE** : Original Equipment

**PRODUCT DESIGNATION**: TWS Earphones

BRAND NAME : UiiSii

**MODEL NAME** : Tuddrom T19

**APPLICANT**: Dongguan UiiSii Electronics Co.,Ltd

**DATE OF ISSUE** : Jul. 20, 2020

**STANDARD(S)** : FCC Part 15.247

**REPORT VERSION** : V1.0

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

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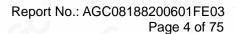
#### REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	1	Jul. 20, 2020	Valid	Initial Release



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# 1. VERIFICATION OF CONFORMITY

Applicant	Dongguan UiiSii Electronics Co.,Ltd		
Address	8, Hengxing Road, Hengkeng industrial Park, Liaobu Town, Dongguan , Guangdong Province, China		
Manufacturer	Dongguan UiiSii Electronics Co.,Ltd		
Address	No.8, Hengxing Road, Hengkeng industrial Park, Liaobu Town, Dongguan City, Guangdong Province, China		
Factory	Dongguan UiiSii Electronics Co.,Ltd		
Address  No.8, Hengxing Road, Hengkeng industrial Park, Liaobu Town, Dong City, Guangdong Province, China			
Product Designation	TWS Earphones		
Brand Name	UiiSii		
Test Model Tuddrom T19			
Date of test	Jul. 03, 2020 to Jul. 14, 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	Then Huany	
GC T	Thea Huang Project Engineer	Jul. 14, 2020
Reviewed By	Max Zhang	
P. VO.	Max Zhang Reviewer	Jul. 20, 2020
Approved By	Formestico	
	Forrest Lei Authorized Officer	Jul. 20, 2020



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#### 2. GENERAL INFORMATION

#### 2.1. PRODUCT DESCRIPTION

The EUT is designed as "TWS Earphones". 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 2.480GHz		
RF Output Power	6.389dBm(Max)		
Bluetooth Version	V5.0		
Modulation	BR ⊠GFSK, EDR ⊠π /4-DQPSK, ⊠8DPSK BLE □GFSK 1Mbps □GFSK 2Mbps		
Number of channels	79		
Hardware Version	V1.2		
Software Version	V0.1.4		
Antenna Designation	FPC Antenna(Comply with requirements of the FCC part 15.203)		
Antenna Gain -0.2dBi			
Power Supply DC 3.7V by battery			

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

2.The EUT comprises left and right channel headsets, both are the same in SCH but different in the PC B Layout. The RF output power of each headset had been tested and recorded in the report. For the other test items, the right headset had been tested and recorded in this report as the worst case because of the higher power.

#### 2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency	
	0	2402MHZ	
	1 6	2403MHZ	
GO CO			
10	38	2440 MHZ	
2402~2480MHZ	39	2441 MHZ	
	40	2442 MHZ	
100			
9	77	2479 MHZ	
20° -C	78	2480 MHZ	





#### 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 multislot 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 79 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 ehavior zation with other units only offset are 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 bit 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 te Sequence. This will be done at the beginning of every new transmission.

Regarding short transmissions the Bluetooth system has the following7ehavior:

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 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.



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

This submittal(s) (test report) is intended for **FCC ID**: 2AMNQ-T19 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.

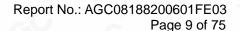
#### 2.9. EQUIPMENT MODIFICATIONS

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.





#### 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 %



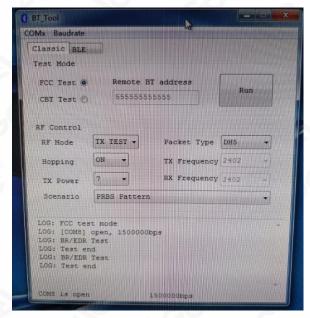
# 4. DESCRIPTION OF TEST MODES

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			
0 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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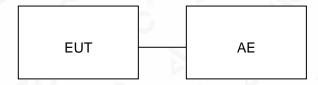
# 5. SYSTEM TEST CONFIGURATION

#### **5.1. CONFIGURATION OF EUT SYSTEM**

Radiated Emission Configure:



Conducted Emission Configure:



Note: During conduction and radiation tests, the battery is in full charge.

#### **5.2 EQUIPMENT USED IN TESTED SYSTEM**

Item	Equipment	Model No.	ID or Specification	Remark
1	TWS Earphones	Tuddrom T19	2AMNQ-T19	EUT
2	Control Box	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	15.209 Radiated Emission		
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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#### 6. TEST FACILITY

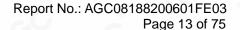
Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd		
Location  1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Commun Fuhai Street, Bao'an District, Shenzhen, Guangdong, China			
Designation Number	CN1259		
FCC Test Firm Registration Number	975832		
A2LA Cert. No.	5054.02		
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	10096	May 15, 2020	May 14, 2022
LISN	R&S	ESH2-Z5	100086	Aug. 26, 2019	Aug. 25, 2020
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, 2022
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 12, 2019	Dec. 11, 2020
2.4GHz Fliter	EM Electronics	2400-2500MHz	N/A	Mar. 23, 2020	Mar. 22, 2022
Attenuator	ZHINAN	E-002	N/A	Sep. 09, 2019	Sep. 08, 2020
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	Oct. 25, 2019	Oct. 26, 2021
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Oct. 15, 2019	Oct. 16, 2020
ANTENNA	SCHWARZBECK	VULB9168	494	Sep. 20, 2019	Sep. 19, 2021
Test software	FARA	EZ-EMC (Ver RA-03A)	N/A	N/A	N/A





#### 7. PEAK OUTPUT POWER

#### 7.1. MEASUREMENT PROCEDURE

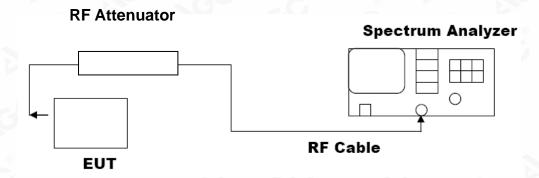
For peak power test:

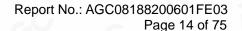
- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
- 3. RBW > 20 dB bandwidth of the emission being measured.
- 4. VBW ≥RBW.
- 5. Sweep: Auto.
- 6. Detector function: Peak.
- 7. Trace: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







#### 7.3. LIMITS AND MEASUREMENT RESULT

Right:

PEAK OUTPUT POWER MEASUREMENT RESULT FOR GFSK MOUDULATION  Frequency (GHz) Peak Power (dBm) Pass or Fail				
2.441	4.656	30	Pass	
2.480	3.645	30	Pass	

CH<sub>0</sub>



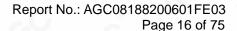


#### **CH39**



#### CH78







PEAK OUTPUT POWER MEASUREMENT RESULT FOR II /4-DQPSK MODULATION Frequency **Peak Power Applicable Limits** Pass or Fail (dBm) (GHz) (dBm) 5.933 2.402 21 **Pass** 2.441 5.267 21 **Pass** 21 4.237 2.480 Pass

#### CH<sub>0</sub>



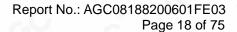


#### **CH39**



#### **CH78**







	PEAK OUTPUT POWER MEASUR	EMENT RESULT	
	FOR 8-DPSK MODULA	TION	
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.402	6.389	21	Pass
2.441	5.719	21	Pass
2.480	4.652	21	Pass

#### CH<sub>0</sub>





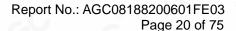
#### **CH39**



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g/Inspection The test results he test report.



Left:

PEAK OUTPUT POWER MEASUREMENT RESULT FOR GFSK MOUDULATION				
2.402	4.674	30	Pass	
2.441	2.271	30	Pass	
2.480	1.757	30	Pass	

# CH<sub>0</sub>



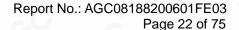


#### **CH39**



#### **CH78**







PEAK OUTPUT POWER MEASUREMENT RESULT FOR  $\, \Pi \,$  /4-DQPSK MODULATION Frequency **Peak Power Applicable Limits** Pass or Fail (dBm) (GHz) (dBm) 2.402 4.670 21 **Pass** 2.441 3.408 21 Pass 21 2.263 2.480 Pass

#### CH<sub>0</sub>





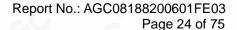
#### **CH39**



#### CH78



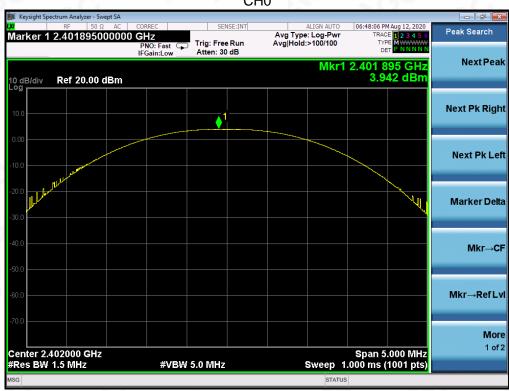
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PEAK OUTPUT POWER MEASUREMENT RESULT **FOR 8-DPSK MODULATION** Frequency **Peak Power Applicable Limits** Pass or Fail (dBm) (GHz) (dBm) 2.402 3.942 21 **Pass** 2.441 3.521 21 Pass 21 2.732 2.480 Pass

#### CH<sub>0</sub>



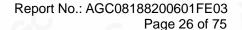


#### **CH39**



#### CH78





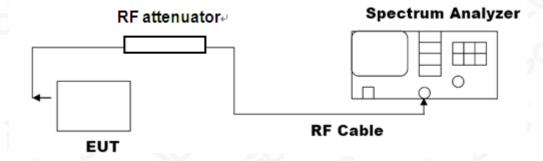


#### 8. 20DB BANDWIDTH

#### **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)





#### 8.3. LIMITS AND MEASUREMENT RESULTS

MEASUF	REMENT RESULT FOR GF	SK MOUDULATION	
Amuliaahla Limita		Measurement Result	
Applicable Limits	Test Data	(MHz)	Criteria
N/A	Low Channel	0.951	PASS
	Middle Channel	0.951	PASS
	High Channel	0.951	PASS

#### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



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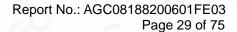
#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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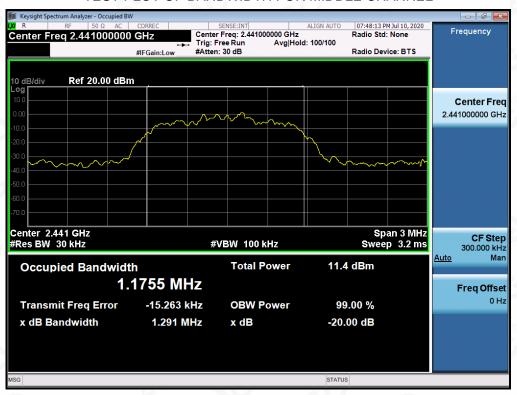
MEASUREMENT RESULT FOR ∏ /4-DQPSK MODULATION				
Measurement Res		Result		
Applicable Limits	Test Data (MHz)		Criteria	
N/A	Low Channel	1.289	PASS	
	Middle Channel	1.291	PASS	
	High Channel	1.312	PASS	

# TEST PLOT OF BANDWIDTH FOR LOW CHANNEL





#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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MEASUR	EMENT RESULT FOR 8-D	PSK MODULATION	
Amuliaahla Liusita	Measurement Result		
Applicable Limits	Test Data	(MHz)	Criteria
N/A	Low Channel	1.318	PASS
	Middle Channel	1.319	PASS
	High Channel	1.317	PASS

# TEST PLOT OF BANDWIDTH FOR LOW CHANNEL





#### 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.
- 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

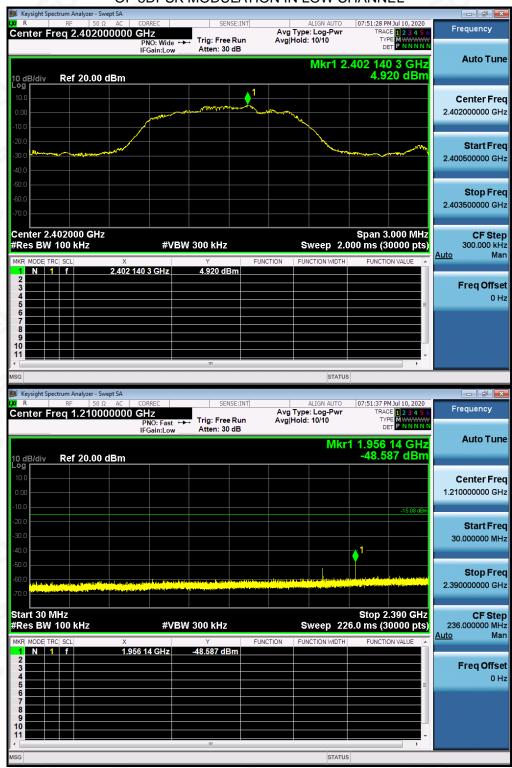
#### 9.4. LIMITS AND MEASUREMENT RESULT

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	At least -20dBc than the limit Specified on the BOTTOM	PASS	
intentional radiator is operating, the radio frequency	Channel		
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	At least -20dBc than the limit Specified on the TOP Channel	PASS	
in§15.209(a))	20 2		

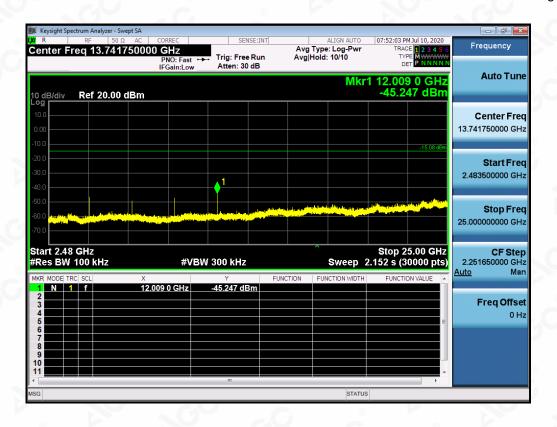


#### **TEST RESULT FOR ENTIRE FREQUENCY RANGE**

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

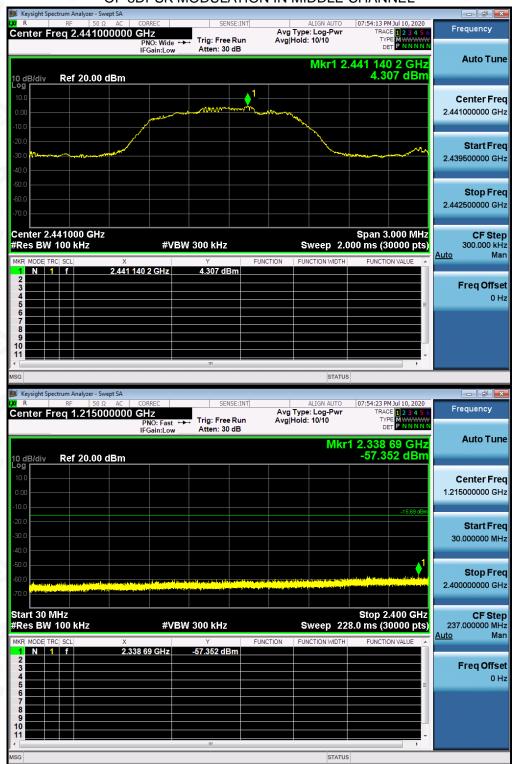




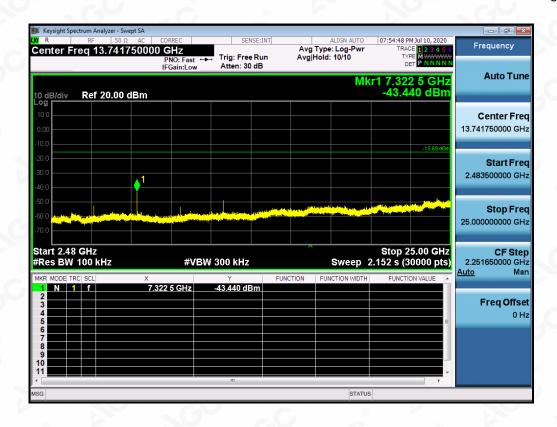




# TEST PLOT OF OUT OF BAND EMISSIONS OF 8DPSK MODULATION IN MIDDLE CHANNEL

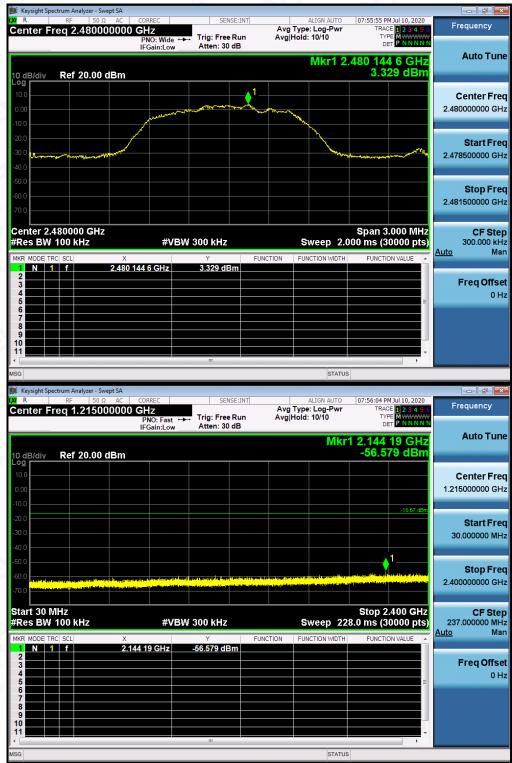








# TEST PLOT OF OUT OF BAND EMISSIONS OF 8DPSK MODULATION IN HIGH CHANNEL







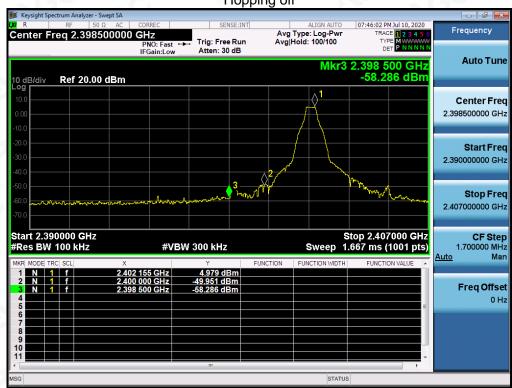
Note: The 8DPSK modulation is the worst case and only those data recorded in the report.



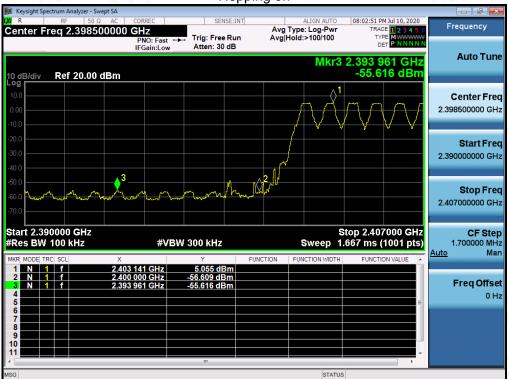
#### **TEST RESULT FOR BAND EDGE**

# GFSK MODULATION IN LOW CHANNEL

Hopping off

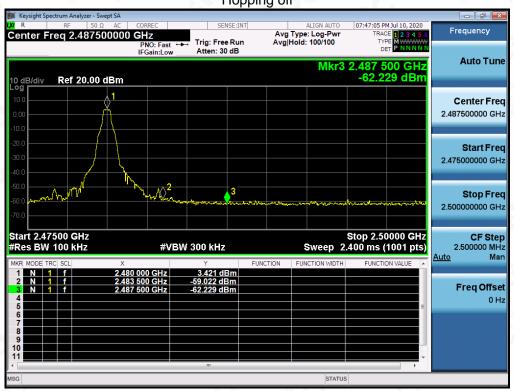


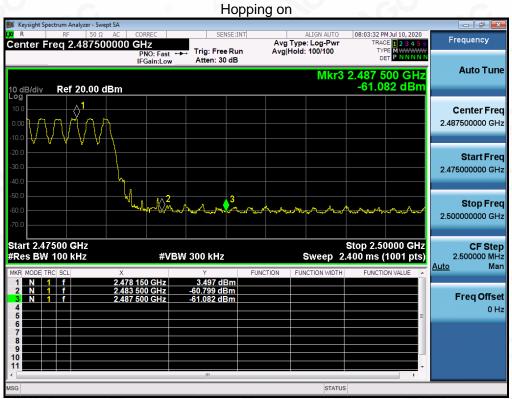






# GFSK MODULATION IN HIGH CHANNEL Hopping off







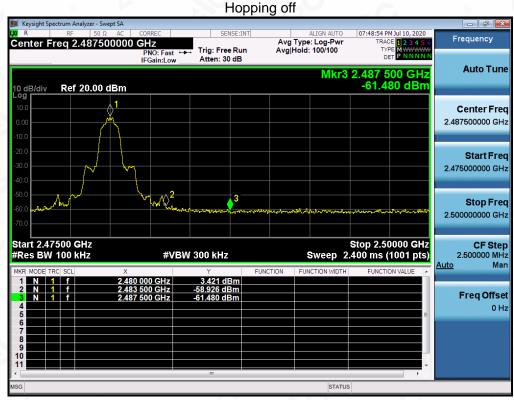
# $\pi$ /4-DQPSK MODULATION IN LOW CHANNEL Hopping off







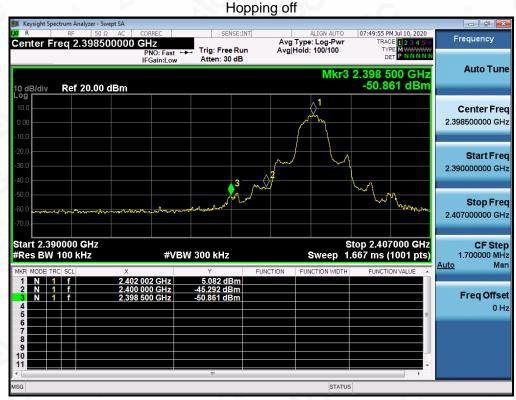
# $\pi$ /4-DQPSK MODULATION IN HIGH CHANNEL







# 8-DPSK MODULATION IN LOW CHANNEL







# 8-DPSK MODULATION IN HIGH CHANNEL

