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## FCC TEST REPORT

Product Name:	Mobile Phone
Trade Mark:	BLU
Model No.:	C4
<b>Report Number:</b>	180621009RFC-2
Test Standards:	FCC 47 CFR Part 15 Subpart C
FCC ID:	YHLBLUC4
Test Result:	PASS
Date of Issue:	July 17, 2018

Prepared for:

BLU Products, Inc. 10814 NW 33rd St#100 Doral, FL33172

Prepared by:

Shenzhen UnionTrust Quality and Technology Co., Ltd. 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China TEL: +86-755-2823 0888 FAX: +86-755-2823 0886

Tested by: _	Henry Lu	Reviewed by:	Kevin Liang
Approved by:	Project Engineer	Date: _	Assistant Manager
_	Billy Li Technical Director		UnionTrust

## Version

Version No.	Date	Description
V1.0	July 17, 2018	Original



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## 1. GENERAL INFORMATION

**1.1 CLIENT INFORMATION** 

Applicant:	BLU Products, Inc.
Address of Applicant:	10814 NW 33rd St#100 Doral, FL33172
Manufacturer:	BLU Products, Inc.
Address of Manufacturer:	10814 NW 33rd St#100 Doral, FL33172

## **1.2 EUT INFORMATION**

### 1.2.1 General Description of EUT

Product Name:	Mobile Phone			
Model No.:	C4	C4		
Add. Model No.:	N/A			
Trade Mark:	BLU			
DUT Stage:	Identical Prototype			
	GSM Bands:	GSM850/1900		
EUT Supports Function:	UTRA Bands:	Band II/ Band V		
EUT Supports Function.	2.4 GHz ISM Band:	IEEE 802.11b/g/n		
		Bluetooth V4.2		
Software Version:	BLU-C050_V8.1.G01.01.GENERIC-05-06-201819:37			
Hardware Version:	FS286-MB-V6.0			
IMEI Code:	863595039993246, 863595039993253; 863595039993261, 863595039993279			
Sample Received Date:	June 22, 2018			
Sample Tested Date:	June 22, 2018 to June	28, 2018		

## 1.2.2 Description of Accessories

	Adapter
Input:	100-240 V~50/60 Hz 0.15 A
Output:	5.0 V == 500 mA
AC Cable:	N/A
DC Cable:	1 Meter, Shielded without ferrite

Battery			
Battery Type:	Lithium-ion Rechargeable Battery		
Rated Voltage:	3.7 Vdc		
Rated Capacity:	1300 mAh		

## **1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD**

Frequency Band:	2400 MHz to 2483.5 MHz	
Frequency Range:	2402 MHz to 2480 MHz	
Bluetooth Version:	Bluetooth BR+EDR	
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)	
Type of Modulation:	GFSK, π/4DQPSK, 8DPSK	
Number of Channels:	79	
Channel Separation:	1 MHz	
Hopping Channel Type:	Adaptive Frequency Hopping Systems	
Antenna Type:	PIFA Antenna	
Antenna Gain:	0.5 dBi	
Maximum Peak Power:	9.73 dBm	
Normal Test Voltage:	3.7 Vdc	
Extreme Test Voltage:	3.5 to 4.25Vdc	
Extreme Test Temperature:	-20 °C to +60 °C	

## **1.4 OTHER INFORMATION**

	Operation Frequency Each of Channel			
	f = 2402 + k MHz, k = 0,,78			
Note:				
f	is the operating frequency (MHz);			
k	is the operating channel.			

Modulation Configure				
Modulation	Packet	Packet Type	Packet Size	
	1-DH1	4	27	
GFSK	1-DH3	11	183	
	1-DH5	15	339	
	2-DH1	20	54	
π/4 DQPSK	2-DH3	26	367	
	2-DH5	30	679	
	3-DH1	24	83	
8DPSK	3-DH3	27	552	
	3-DH5	31	1021	

## **1.5 DESCRIPTION OF SUPPORT UNITS**

The EUT has been tested with associated equipment below. 1) Support Equipment

Description	Manufacturer	Model No.	Serial Number	Supplied by
Notebook	Lenovo	E450	SL10G10780	UnionTrust

2) Support Cable

Cable No. Description		Connector	Length	Supplied by	
1	Antenna Cable	SMA	0.30 Meter	UnionTrust	

# Uni⊛nTrust

## **1.6 TEST LOCATION**

#### Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China 518109 Telephone: +86 (0) 755 2823 0888 Fax: +86 (0) 755 2823 0886

## 1.7 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

#### CNAS-Lab Code: L9069

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC/EN 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

#### IC-Registration No.: 21600-1

The 3m Semi-anechoic chamber of Shenzhen UnionTrust Quality and Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 21600-1.

#### A2LA-Lab Certificate No.: 4312.01

Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

#### FCC Accredited Lab.

Designation Number: CN1194 Test Firm Registration Number: 259480

## **1.8 DEVIATION FROM STANDARDS**

None.

## **1.9 ABNORMALITIES FROM STANDARD CONDITIONS**

None.

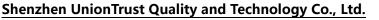
## 1.10OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

## **1.11 MEASUREMENT UNCERTAINTY**

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Measurement Uncertainty
1	Conducted emission 9KHz-150KHz	±3.8 dB
2	Conducted emission 150KHz-30MHz	±3.4 dB
3	Radiated emission 9KHz-30MHz	±4.9 dB
4	Radiated emission 30MHz-1GHz	±4.7 dB
5	Radiated emission 1GHz-18GHz	±5.1 dB
6	Radiated emission 18GHz-26GHz	±5.2 dB
7	Radiated emission 26GHz-40GHz	±5.2 dB



## 2. TEST SUMMARY

FCC 47 CFR Part 15 Subpart C Test Cases								
Test Item	Test Requirement	Test Method	Result					
Antenna Requirement	Requirement FCC 47 CFR Part 15 Subpart C Section 15.203/15.247 (c)		PASS					
AC Power Line Conducted Emission	FCC 47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013	PASS					
Conducted Peak Output Power	FCC 47 CFR Part 15 Subpart C Section 15.247 (b)(1)	ANSI C63.10-2013	PASS					
20 dB Bandwidth	FCC 47 CFR Part 15 Subpart C Section 15.247 (a)(1)	ANSI C63.10-2013	PASS					
Carrier Frequencies Separation	FCC 47 CFR Part 15 Subpart C Section 15.247 (a)(1)	ANSI C63.10-2013	PASS					
Number of Hopping Channel	FCC 47 CFR Part 15 Subpart C Section 15.247 (b)(1)	ANSI C63.10-2013	PASS					
Dwell Time	FCC 47 CFR Part 15 Subpart C Section 15.247 (a)(1)	ANSI C63.10-2013	PASS					
Conducted Out of Band Emission	FCC 47 CFR Part 15 Subpart C Section 15.247(d)	ANSI C63.10-2013	PASS					
Radiated Emissions	FCC 47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS					
Band Edge Measurement	FCC 47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS					

## 3. EQUIPMENT LIST

	'' Radiated Emission Test Equipment List         Serial       Cal. date       Cal. Due date									
Used	Equipment	Manufacturer	Model No.	Model No. Serial Number		Cal. Due date (mm dd, yyyy)				
	3M Chamber & Accessory Equipment	ETS-LINDGREN	ЗM	N/A	Dec. 20, 2015	Dec. 19, 2018				
	Receiver	R&S	ESIB26	100114	Dec. 10, 2017	Dec. 10, 2018				
	Loop Antenna	ETS-LINDGREN	6502	00202525	Dec. 22, 2017	Dec. 22, 2018				
2	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Dec. 17, 2017	Dec. 17, 2018				
2	Preamplifier	HP	8447F	2805A02960	Dec. 10, 2017	Dec. 10, 2018				
	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201874	May 22, 2018	May 22, 2019				
>	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	Dec. 17, 2017	Dec. 17, 2018				
>	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A				
	Band Rejection Filter (2400MHz~2500MHz)	Micro-Tronics	BRM50702	G248	June 06, 2018	June 06, 2019				
N	Wideband Radio Communication Tester	R&S	CMW500	1201.002k50- 104945-zQ	Mar. 05, 2018	Mar. 04, 2019				
	Test Software	Audix	e3	Sof	Software Version: 9.160323					

1	Conducted Emission Test Equipment List										
	Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)				
	K	Receiver	R&S	ESR7	1316.3003K07 -101181-K3	Dec. 10, 2017	Dec. 10, 2018				
	K	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	Dec. 10, 2017	Dec. 10, 2018				
	K	LISN	R&S	ESH2-Z5	860014/024	Dec. 10, 2017	Dec. 10, 2018				
	K	Test Software	Audix	e3	Sof	tware Version: 9.16	0323				

	Conducted RF test Equipment List										
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)					
2	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	Dec.10, 2017	Dec. 10, 2018					
	Wideband Radio Communication Tester	R&S	CMW500	1201.002k50- 104945-zQ	Mar. 05, 2018	Mar. 04, 2019					

## 4. TEST CONFIGURATION 4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

### 4.1.1 Normal or Extreme Test Conditions

Environment Parameter	Selected Values During Tests						
Test Condition	Ambient						
Test Condition	Temperature (°C)	Voltage (V)	Relative Humidity (%)				
NT/NV	+15 to +35	3.7	20 to 75				
Remark:							

1) NV: Normal Voltage; NT: Normal Temperature

## **4.2TEST CHANNELS**

Mode	Tx/Rx Frequency	Test RF Channel Lists					
WOUE	TX/KX Frequency	Lowest(L)	Highest(H)				
GFSK	2402 MHz to 2480 MHz	Channel 0	Channel 39	Channel 78			
(DH1, DH3, DH5)		2402 MHz	2441 MHz	2480 MHz			
π/4DQPSK	2402 MHz to 2480 MHz	Channel 0	Channel 39	Channel 78			
(DH1, DH3, DH5)		2402 MHz	2441 MHz	2480 MHz			
8DPSK	2402 MHz to 2480 MHz	Channel 0	Channel 39	Channel 78			
(DH1, DH3, DH5)		2402 MHz	2441 MHz	2480 MHz			

## **4.3EUT TEST STATUS**

Type of Modulation	Tx Function	Description					
GFSK/π/4DQPSK/ 8DPSK	1Tx	<ol> <li>Keep the EUT in continuously transmitting with Modulation test single</li> <li>Keep the EUT in continuously transmitting with Modulation test Hopping Frequency.</li> </ol>					

**Power Setting** 

**Test Software** 

## Power Setting: not applicable, test used software default power level.

EngineerMode

## 4.4 PRE-SCAN

### 4.4.1 Pre-scan under all packets at middle channel

Conducted Average Power (dBm) for packets										
Type of Modulation		GFSK			π/4DQPSK			8DPSK		
Packets	1-DH1	1-DH3	1-DH5	2-DH1	2-DH3	2-DH5	3-DH1	3-DH3	3-DH5	
Power (dBm)	1.58	3.00	3.22	1.01	2.44	2.68	1.07	2.43	2.56	

### 4.4.2 Worst-case data packets

Type of Modulation	Worst-case data rates
GFSK	1-DH5
π/4DQPSK	2-DH5
8DPSK	3-DH5

### 4.4.3 Tested channel detail

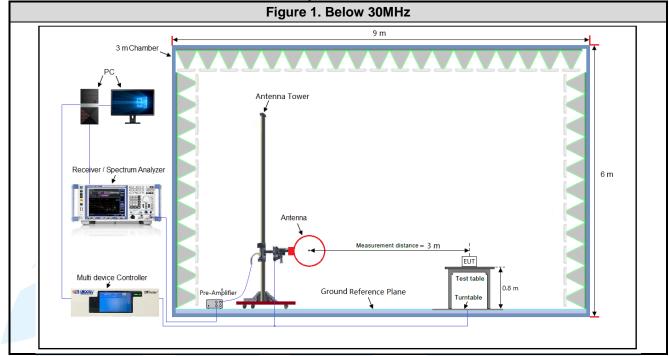
Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data packets and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.

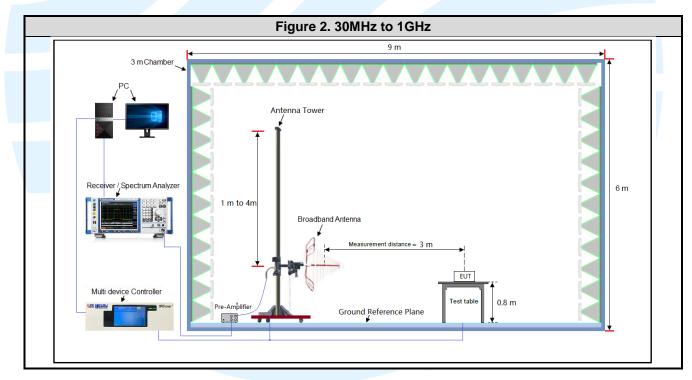
Type of Modulation		GFSK		Т	r/4DQPS	К		8DPSK	
Data Packets	1-	1-	1-	2-	2-	2-	3-	3-	3-
	DH1	DH3	DH5	DH1	DH3	DH5	DH1	DH3	DH5
Available Channel					0 to 78				
Test Item			Test cha	nnel and	d choose	e of data	packets	;	
AC Power Line Conducted		Frequency Hopping Channel 0 to 78							
Emission					Link				
Conducted Peak Output				Chan	nel 0 & 3	9 & 78			
Power			<b>V</b>			<b>V</b>			1
				Chan	nel 0 & 3	9 & 78			
20 dB Bandwidth			V			V			<b>v</b>
Carrier Frequencies			Freq	uency Ho	opping Cl	hannel 0	to 78		
Separation									•
Number of Liepping Channel	Frequency Hopping Channel 0 to 78								
Number of Hopping Channel						•			~
Durall Time	Channel 39								
Dwell Time	>		<b>V</b>		▼	<b>V</b>	<ul><li>✓</li></ul>	<ul><li>✓</li></ul>	>
Conducted Out of Band				Chan	nel 0 & 3	9 & 78			
Emission									>
Dedicted Engineering				Chan	nel 0 & 3	9 & 78			
Radiated Emissions									
Band Edge Measurements				Ch	annel 0 8	k 78			
(Radiated)									
Remark:									
1. The mark "🗹 " means is chos	sen for te	sting;							
1. The mark in means is chose		•							

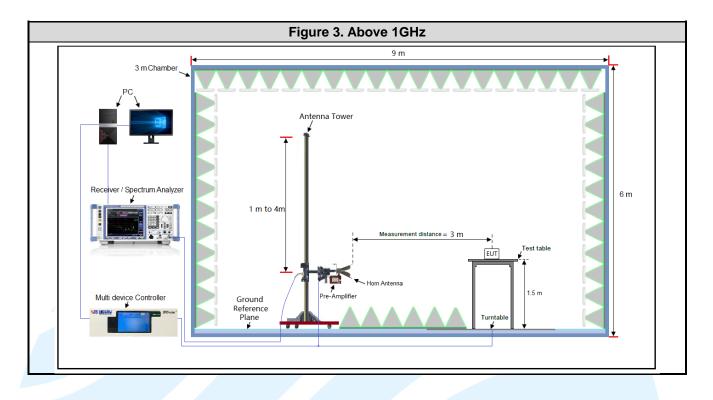
2. The mark "<sup>—</sup>" means is not chosen for testing.

## **4.5 TEST SETUP**

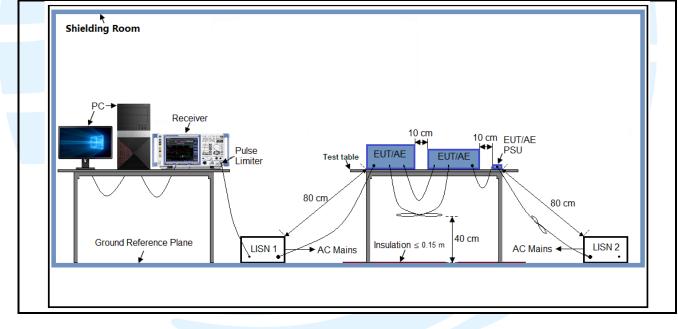
### 4.5.1 For Radiated Emissions test setup



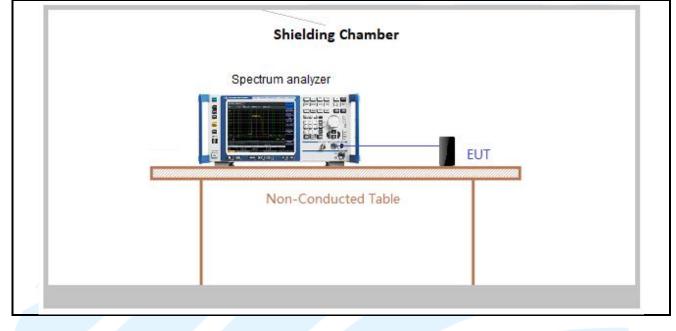




## 4.5.2 For Conducted Emissions test setup



### 4.5.3 For Conducted RF test setup



## 4.6 SYSTEM TEST CONFIGURATION

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, radiated emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario. It was powered by a 3.7Vdc rechargeable Li-on battery. Only the worst case data were recorded in this test report.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. Therefore, all final radiated testing was performed with the EUT in orientation.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

## **4.7 DUTY CYCLE**

Type o Modulat	Packets	On Time (msec)	Period (msec)	Duty Cycle (linear)	Duty Cycle (%)	Duty Cycle Factor (dB)	1/ T Minimum VBW (kHz)	Average Factor (dB)
GFSł	1-DH1	2.865	3.750	0.76	76.40	1.17	0.35	-2.34

#### Remark:

- 1) Duty cycle= On Time/ Period;
- 2) Duty Cycle factor = 10 \* log(1/ Duty cycle);
- 3) Average factor =  $20 \log_{10}$  Duty Cycle.

#### The test plot as follows

		GFSK_1-I	DH5		
Agilent Spectrum Analyzer - Sw ເໝື່ອເຊັ່ງ ເຊິ່ງ Marker 3 Δ 3.75000	2 DC	SENSE:INT  SOURCE O # Trig: Free Run A #Atten: 30 dB	FF ALIGN OFF 10:5 Avg Type: Log-Pwr vg Hold: 1/1	3:37 PM Jun 23, 2018 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P N N N N N	Marker
Ref Offset 6. 10 dB/div Ref 16.50 6.50		<u></u>	ΔMkr	3 3.750 ms -0.001 dB	3 Norma
-3.50 -13.5 -23.5 -33.5					Deita
-43.5 -53.5 -63.5 -73.5	Harli Ma	W Ver	www.ee	φ*19[,s	Fixed⊳
Center 2.441000000 Res BW 1.0 MHz		1.0 MHz Y FUNCTION 1.006 dB	Sweep 15.00 I	Span 0 Hz ns (1001 pts) JNCTION VALUE	on
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	3.735 ms 3.750 ms (Δ) 3.755 ms	7.268 dBm -0.001 dB 7.268 dBm			Properties ►
8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9			STATUS		More 1 of 2

## 5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION 5.1 REFERENCE DOCUMENTS FOR TESTING

No.	Identity	Document Title		
1	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations		
2	FCC 47 CFR Part 15	Radio Frequency Devices		
3	ANSI C63.10-2013	American National Standard for Testing Unlicesed Wireless Devices		

## **5.2 ANTENNA REQUIREMENT**

#### **Standard Requirement**

#### 15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

#### 15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### **EUT Antenna:**

Antenna in the interior of the equipment and no consideration of replacement. The gain of the antenna is 0.5 dBi.

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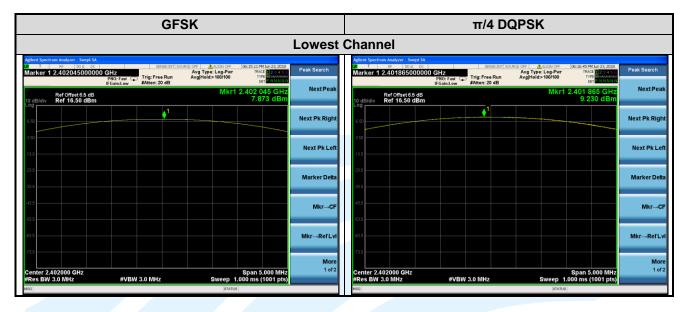
## **5.3 CONDUCTED PEAK OUTPUT POWER**

Test Requirement: Test Method: Limit:	FCC 47 CFR Part 15 Subpart C Section15.247 (b)(1) ANSI C63.10-2013 Section 7.8.5 For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems
Test Procedure:	operate with an output power no greater than 125 mW. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
	<ul> <li>a) Use the following spectrum analyzer settings: <ol> <li>Span: Approximately 5 x 20 dB bandwidth, centered on a hopping channel.</li> <li>RBW &gt; 20 dB bandwidth of the emission being measured.</li> <li>VBW ≥ RBW.</li> <li>Sweep: Auto.</li> <li>Detector function: Peak.</li> <li>Trace: Max hold.</li> </ol></li></ul>
	<ul> <li>b) Allow trace to stabilize.</li> <li>c) Use the marker-to-peak function to set the marker to the peak of the emission.</li> <li>d) The indicated level is the peak output power, after any corrections for external attenuators and cables.</li> </ul>
Test Setup:	e) A plot of the test results and setup description shall be included in the test report. Refer to section 4.5.3 for details.
Instruments Used:	Refer to section 3 for details
Test Mode:	Transmitter mode
Test Results:	Pass
Test Data:	

Type of	Peak	Output Power (	dBm)	Peak Output Power (mW)			
Modulation	Channel 0	Channel 39	Channel 78	Channel 0	Channel 39	Channel 78	
GFSK	7.87	7.87	5.53	6.13	6.12	3.57	
π/4 DQPSK	9.23	9.21	6.85	8.38	8.34	4.84	
8DPSK	9.70	9.73	7.33	9.34	9.40	5.41	

Note: The antenna gain of 0.5 dBi less than 6dBi maximum permission antenna gain value based on 1 watt peak output power limit.

The test plot as follows:



	imaale	Channel
nd Spectrames Analyzer - Neurof SA. Terr Fore Store account - Server2n1 Score cont - At 159107 00 1596 970 2+23. rker 1 2.440850000000 GHZ. FWO Fast → Trig: Free Run Avg Heid>100100 Trig: Free Run Avg Heid>1001000	Peak Search	Ref Offset 6.5 dB WIRFT 2.440 890 GHZ
BBdly Ref 16.50 dBm 7.870 db	Next Pk Right	
	Next Pk Left	3:0 Next Pk 1
	Marker Delta	And
	Mkr→CF	495 Mkr
	Mkr→RefLvl	1 835 Mkr→Re
nter 2.441000 GHz Span 5.000 fl es BW 3.0 MHz #VBW 3.0 MHz Sweep 1.000 ms (1001	More 1 of 2 pts)	

				Highest	Channel				
ilent Spectrum Analyzer - Swept SA T RF S0 & DC arker 1 2.479940000000	D GHZ PN0: Fast Trig: Free Run #Atten: 20 dB	DURCE OFF ALIGN OFF Avg Type: Log-Pwr Avg Hold>100/100	06:16:12 PM Jun 23, 2018 TRACE 2 3 4 5 6 TYPE DET P NN NN N	Peak Search	Agilent Spectrum Analyzer - Swept OCTRFS02 1 Marker 1 2.479860000	DC SENSE:INT SC	ALIGN OFF Avg Type: Log-Pwr Avg Hold>100/100	06:17:30 PMJun 23, 2018 TRACE 2 3 4 5 6 TYPE DET PINNINN	Peak Searc
Ref Offset 6.5 dB I dB/div Ref 16.50 dBm		Mkr1	2.479 940 GHz 5.529 dBm	Next Peak	Ref Offset 6.5 di 10 dB/div Ref 16.50 dB	3	Mkr1	2.479 860 GHz 6.848 dBm	Next P
50				Next Pk Right	6.50	1			Next Pk R
3.6				Next Pk Left	-13.6				Next Pk
3.5				Marker Delta	-23.5				Marker
1.5				Mkr→CF	-43.5				Mkr
.6				Mkr→RefLvl	-63.5				Mkr→Re
enter 2.480000 GHz	#\/BW(3.0.MHz	Sween 1	Span 5.000 MHz	More 1 of 2	Center 2.480000 GHz	#\/BW 3.0 MH7	Sween 1	Span 5.000 MHz	N 1
#Res BW 3.0 MHz	#VBW 3.0 MHz	Sweep 1.	000 ms (1001 pts)		#Res BW 3.0 MHz	#VBW 3.0 MHz	Sweep 1.	000 ms (1001 pts)	

	8D	PSK
Lowest (	Channel	Middle Channel
Marker 1 2.40200000000 GHz PRO: Faz IFGainz.tow Ref Offset 5.5 dB 10 dB/dly Ref 10.50 dBm	Avg Type: Log-Pwr         Tito: Dialog MM to 12,000         Peak Search           Avg Type: Log-Pwr         Tito: Dialog MM to 12,000         Peak Search           Avg Type: Log-Pwr         Tito: Dialog MM to 12,000         Peak Search           Avg Type: Log-Pwr         Tito: Dialog MM to 12,000         Peak Search           Avg Type: Log-Pwr         Tito: Dialog MM to 12,000         Peak Search           Mkr1 2.402 000 GHz         Next Peak         Next Peak	Anderdysections Analysis         Section 2010/2019/10.123.0000           Image: Source Section 2010/2019/10.123.0000         Avg Type: Log-Pert PROF.tat         Trad. Tog. Free Run Prof. Fatter: 20 dB         Avg Type: Log-Pert Avg Type: Log-Pert Prof. Fatter: 20 dB         Trad. Tog. Fatter: 2010/100         Peak Search           Ref Orfset 55.08         Mkr1 2.440 980 GHz         Next Peak           Ing Efforts         97.07.58         Next Peak
5.50 • 1	Next Pk Right	6 50 Next Pk Right
-3.50	Next Pk Left	1350 Next Pk Left
335	Marker Delta	A235 Marker Delta
43.5	Mkr→CF	-435 Mkr→CF
63.5	Mkr→RefLvl	©5 Mkr→RefLvl
Center 2.402000 GHz #Res BW 3.0 MHz #VBW 3.0 MHz	Span 5.000 MHz         More           Sweep 1.000 ms (1001 pts)         1 of 2	Center 2.41000 GHz         Span 5.000 MHz         More 1 of 2           #Res BW 3.0 MHz         #VBW 3.0 MHz         Sweep 1.000 ms (1001 pts)

		High	est Cr	annel		
	50 2 DC		e Run A	FF ALIGN OFF vg Type: Log-Pwr vg Hold>100/100	06:20:13 PM Jun 23, 2018 TRACE 2 3 4 5 0 TYPE M MANAGEM DET 2 N N N N N	Peak Search
10 dB/div Re	Offset 6.5 dB f 16.50 dBm			Mkr1	2.480 000 GHz 7.328 dBm	NextPo
6.50			<b>↓</b> 1			Next Pk Ri
-3.50						Next Pk L
-23.5						Marker D
-33.5						Mkr–
-53.5						Mkr→Ref
-73.6						M
Center 2.4800 #Res BW 3.01		#VBW 3.0 MH			Span 5.000 MHz .000 ms (1001 pts)	1

Test Data:

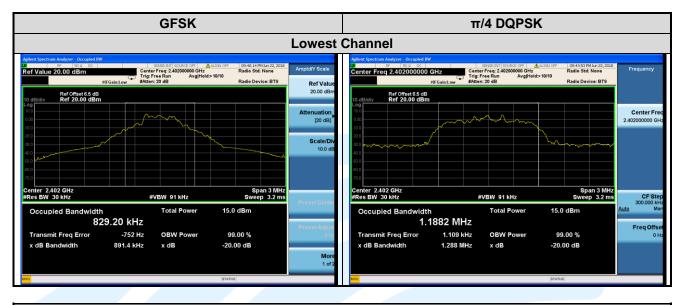
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## 5.420 DB BANDWIDTH

Test Requirement:	FCC 47 CFR Part 15 Subpart C Section 15.247 (a)(1)							
Test Method:	ISI C63.10-2013 Section 6.9.2							
Limit:	ne; for reporting purposes only.							
Test Procedure:	Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer. Jse the following spectrum analyzer settings:							
	<ul> <li>a) Span = approximately 2 to 5 times the OBW, centered on a hopping channel.</li> <li>b) RBW = 1% to 5% of the OBW.</li> <li>c) VBW ≥ 3 x RBW</li> <li>d) Sweep = auto;</li> <li>e) Detector function = peak</li> <li>f) Trace = max hold</li> <li>g) All the trace to stabilize, use the marker-to-peak function to set the marker to the peak of the emission, use the marker-delta function to measure and record the 20dB down bandwidth of the emission.</li> </ul>							
	Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.							
Test Setup:	Refer to section 4.5.3 for details.							
Instruments Used:	Refer to section 3 for details							
Test Mode:	Transmitter mode							
Test Results:	Pass							

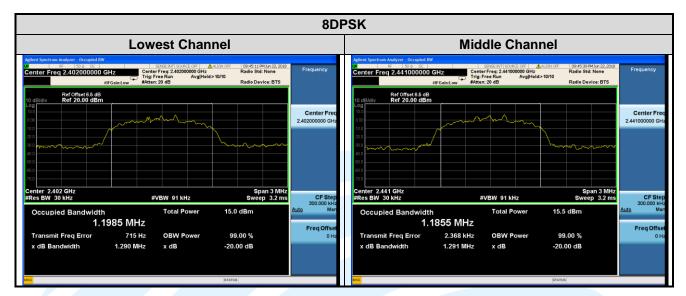
Type of	20 d	B Bandwidth (M	/Hz)	99% Bandwidth (MHz)			
Modulation	Channel 0	Channel 39	Channel 78	Channel 0	Channel 39	Channel 78	
GFSK	0.8914	0.9471	0.9421	0.8292	0.8370	0.8360	
π/4 DQPSK	1.2880	1.2870	1.2920	1.1882	1.1801	1.1883	
8DPSK	1.2900	1.2910	1.3010	1.1985	1.1855	1.2006	

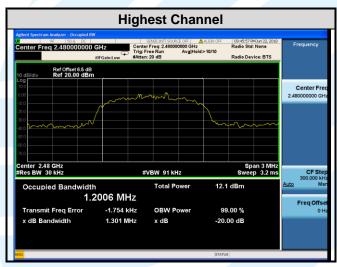
The test plot as follows:











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## **5.5CARRIER FREQUENCIES SEPARATION**

Test Requirement: Test Method: Limit: Test Procedure:	FCC 47 CFR Part 15 Subpart C Section 15.247 (a)(1) ANSI C63.10-2013 Section 7.8.2 Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer. Use the following spectrum analyzer settings:
	<ul> <li>a) Span: Wide enough to capture the peaks of two adjacent channels.</li> <li>b) RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.</li> <li>c) Video (or average) bandwidth (VBW) ≥ RBW.</li> <li>d) Sweep: Auto.</li> <li>e) Detector function: Peak.</li> <li>f) Trace: Max hold.</li> <li>g) Allow the trace to stabilize.</li> <li>h) Use the marker-delta function to determine the separation between the peaks of the adjacent channels.</li> </ul>
	Note: The cable loss and attenuator loss were offset into measure device as an
Test Setup:	amplitude offset. Refer to section 4.5.3 for details.
Instruments Used:	Refer to section 3 for details
Test Mode:	Hopping Frequencies Transmitter mode
Test Results:	Pass
Test Data:	

Type of Modulation	Adjacent Channel Separation (MHz)	Minimum Limit (MHz)		
Type of Modulation	Channel 39	Channel 39		
GFSK	1.000	0.594		
π/4 DQPSK	1.000	0.858		
8DPSK	1.000	0.860		
Note: The minimum limit is two-t	hird 20 dB bandwidth.			

The test plot as follows:

GFSK			π/4 DQPSK					
Marker 1 A 1.00000000 MHz		09:50:20 PM Jun 22, 2018 TRACE 2 2 4 5 6 TYPE 0 CET 0	Marker Select Marker	Agilent Spectrum Analyzer - Swept SA	PNO: Fast Trig: Free Run IFGain:Low #Atten: 20 dB	Avg Type: Log-Pwr Avg Hold:>10/10	9:51:49 PM Jun 22, 2018 TRACE 2 3 4 5 6 TYPE MWWWWW DET P N N N N	Marker Select Marker
Ref Offset 6.5 dB 10 dB/div Ref 15.33 dBm	Δι	0.308 dB-0.308 dB-0.3	1	Ref Offset 6.5 dB 10 dB/div Ref 15.33 dBm		ΔMk	r1 1.000 MHz -0.118 dBm	2
6.33	X2 1∆2		Norma	5.33 million	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	1 <u>Δ2</u>		Norma
147		¥	Delta	-4.67				Delta
347			Fixed▷	-24.7				Fixed▶
44.7 54.7			Ofi	-44.7 -54.7				Off
847			Properties►	-74.7				Properties►
Center 2.441000 GHz #Res BW 300 KHz #VBW 910 kH	Hz Sweep	Span 5.000 MHz 1.000 ms (1001 pts)	More 1 of 2	Center 2.441000 GHz #Res BW 300 kHz	#VBW 910 kHz	Sweep 1.00	Span 5.000 MHz 10 ms (1001 pts)	More 1 of 2
MSG	STATU			MSG		STATUS		

	8DPSK								
	um Analyzer - Swept SA								
<u>x</u>	RF 50.Q DC	PNO: Fast 😱 IFGain:Low	SENSE:INT 90 Trig: Free Run #Atten: 20 dB	Aug Type: Log-Pwr Avg Hold>10/10	09:54:40 PM Jun 22, 2018 TRACE 2 3 4 5 6 TYPE M MANAGE DET P NNNNN	Marker Select Marke			
10 dB/div	Ref Offset 6.5 dB Ref 15.33 dBm			ΜΙΔΙ	/lkr1 1.000 MHz -0.068 dBm	:			
5.33			X2	1Δ2		Norm			
-4.67						De			
-24.7						Fixe			
-44.7									
-54.7									
-74.7						Propertie			
Center 2.4 #Res BW	141000 GHz 300 kHz	#VBW	910 kHz	Sween	Span 5.000 MHz 1.000 ms (1001 pts)	Ма 1 о			