

TEST REPORT

FCC PART 15 SUBPART C 15.247

Test report On Behalf of Dongguan Daksing Industrial Co.,Ltd For Bluetooth Headset

Model No.: MG-1 BT, TT-HFB-RB, Ranger, MG-2, MG-3, MG-4, MG-5, MG-6, MG-7, MG-8, MG-9

FCC ID: 2AMOO-MG-2

Prepared for : Dongguan Daksing Industrial Co.,Ltd No233 Shizhou Rd.,Shipai Town Dongguan Guangdong Provine

Prepared By : Shenzhen HUAK Testing Technology Co., Ltd. 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

 Date of Test:
 Dec. 21, 2018 ~ Dec. 28, 2018

 Date of Report:
 Dec. 28, 2018

 Report Number:
 HK1812292047E

TEST RESULT CERTIFICATION

Applicant's name Dongguan Daksing Industrial Co.,Ltd				
Address	No233 Shizhou Rd.,Shipai Town Dongguan Guangdong Provine			
Manufacture's Name	Dongguan Daksing Industrial Co.,Ltd			
Address	No233 Shizhou Rd.,Shipai Town Dongguan Guangdong Provine			
Product description				
Trade Mark:	Nubwo			
Product name	Bluetooth Headset			
Model and/or type reference	MG-1 BT, TT-HFB-RB, Ranger, MG-2, MG-3, MG-4, MG-5, MG-6, MG-7, MG-8, MG-9			
Difference description	All the same except for the model name, appearance color and screen LOGO			
Standards	47 CFR FCC Part 15 Subpart C 15.247			

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Date of Test	
Date (s) of performance of tests:	Dec. 21, 2018 ~ Dec. 26, 2018
Date of Issue	Dec. 28, 2018
Test Result:	Pass

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Testing Engineer

Gorf Di an (Gary Qian)

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Page

1. SUMMARY 4 1.1. TEST STANDARDS 4 1.2. TEST DESCRIPTION 4 TEST FACILITY 5 1.3. STATEMENT OF THE MEASUREMENT UNCERTAINTY 5 2. GENERAL INFORMATION 6 2.1. ENVIRONMENTAL CONDITIONS 6 2.2. GENERAL DESCRIPTION OF EUT 6 2.3. DESCRIPTION OF TEST MODES AND TEST FREQUENCY 6 2.4. RELATED SUBMITTAL(S) / GRANT (S) 8 2.5. MODIFICATIONS 8 2.6. RECEIVER INPUT BANDWIDTH. 8 2.7. EXAMPLE OF A HOPPING SEQUENCE IN DATA MODE 8 2.8. EQUALLY AVERAGE USE OF FREQUENCIES AND BEHAVIOUR 8 2.9. EQUIPMENT USED 9 3.1. MEASUREMENT PROCEDURE 10 3.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) 10 3.1. MEASUREMENT PROCEDURE 17 4.1. MEASUREMENT RESULT 17 4.1. MEASUREMENT RESULT 17 4.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) 17			
	1.2. TEST	TEST DESCRIPTION	4 5
2.	G	ENERAL INFORMATION	. 6
	 2.2. 2.3. 2.4. 2.5. 2.6. 2.7. 2.8. 	GENERAL DESCRIPTION OF EUT DESCRIPTION OF TEST MODES AND TEST FREQUENCY RELATED SUBMITTAL(S) / GRANT (S) MODIFICATIONS RECEIVER INPUT BANDWIDTH EXAMPLE OF A HOPPING SEQUENCE IN DATA MODE EQUALLY AVERAGE USE OF FREQUENCIES AND BEHAVIOUR	6 8 8 8 8
3.	Pl	EAK OUTPUT POWER	10
	3.2.	TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	10
4.	20)DB BANDWIDTH	17
	4.2.	TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	17
5.	C	ONDUCTED SPURIOUS EMISSION	24
	5.2.	TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	24
6.	R	ADIATED EMISSION	34
	6.2.	TEST SETUP	36
7.	N	UMBER OF HOPPING FREQUENCY	47
	7.1. 7.2. 7.3.	MEASUREMENT PROCEDURE TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION) LIMITS AND MEASUREMENT RESULT	47
8.	ТІ	ME OF OCCUPANCY (DWELL TIME)	48
	8.1. 8.2. 8.3.	MEASUREMENT PROCEDURE TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION) LIMITS AND MEASUREMENT RESULT	48
9.	FF	REQUENCY SEPARATION	52
	9.1. 9.2. 9.3.	Measurement Procedure Test Setup (Block Diagram of Configuration) Limits and Measurement Result	52
10).	TEST SETUP PHOTOS OF THE EUT	53
11		PHOTOGRAPH OF EUT	54



1. SUMMARY

1.1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

ANSI C63.10:2013 : American National Standard for Testing Unlicensed Wireless Devices

1.2. Test Description

FCC PART 15.247				
FCC Part 15.207	AC Power Conducted Emission	N/A		
FCC Part 15.247(a)(1)(i)	20dB Bandwidth	PASS		
FCC Part 15.247(d)	Spurious RF Conducted Emission	PASS		
FCC Part 15.247(b)	Maximum Peak Output Power PASS			
FCC Part 15.247(b)	Pseudorandom Frequency Hopping Sequence	PASS		
FCC Part 15.247(a)(1)(iii)	Number of hopping frequency& Time of Occupancy	PASS		
FCC Part 15.247(a)(1)	Frequency Separation	PASS		
FCC Part 15.205/15.209	Radiated Emissions	PASS		
FCC Part 15.247(d)	Band Edge Compliance of RF Emission	PASS		

NOTE: N/A stands for not applicable. The device can not use the BT function in charging mode.



Test Facility

1.3.1 Address of the test laboratory

Shenzhen HUAK Testing Technology Co., Ltd. Add.:1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 32/EN 55032 requirements.

1.3.2 Laboratory accreditation

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

IC Registration No.: 21210

The 3m alternate test site of Shenzhen HUAK Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 21210 on May 24, 2016.

FCC Registration No.: CN1229

Test Firm Registration Number : 616276

1.3. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the Shenzhen HUAK Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for HUAK laboratory is reported:

Test	Measurement Uncertainty	Notes
Transmitter power conducted	±0.57 dB	(1)
Transmitter power Radiated	±2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	±2.20 dB	(1)
Occupied Bandwidth	±0.01ppm	(1)
Radiated Emission 30~1000MHz	±4.10dB	(1)
Radiated Emission Above 1GHz	±4.32dB	(1)
Conducted Disturbance0.15~30MHz	±3.20dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



2. GENERAL INFORMATION

2.1. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2. General Description of EUT

Product Name:	Bluetooth Headset	
Model/Type reference:	MG-1 BT, TT-HFB-RB, Ranger, MG-2, MG-3, MG-4, MG-5, MG-6, MG-7, MG-8, MG-9	
Power supply:	DC 3.7V by Battery	
Version:	V5.0	
Modulation:	GFSK, π/4DQPSK, 8DPSK	
Operation frequency:	2402MHz~2480MHz	
Channel number:	79	
Channel separation:	1MHz	
Antenna type:	PCB Antenna	
Antenna gain:	1.75dBi	
Hardware Version:	V1.6	
Software Version:	V2.3	

Note: For more details, refer to the user's manual of the EUT.

2.3. Description of Test Modes and Test Frequency

The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing.

There are 79 channels provided to the EUT and Channel 00/39/78 was selected for testing.

Operation Frequency :

Channel	Frequency (MHz)
00	2402
01	2403
:	÷
38	2440
39	2441
40	2442
:	÷
77	2479
78	2480

Note: The line display in grey were the channel selected for testing



NO.	TEST MODE DESCRIPTION	
1	Low channel TX	
2	Middle channel TX	
3	High channel TX	
4	Normal Operating (BT)	

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.

Radiated Emission Configure :

EUT



2.4. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.5. Modifications

No modifications were implemented to meet testing criteria.

2.6. 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.

2.7. Example of a Hopping Sequence 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

2.8. 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 following8ehavior:

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.



2.9. Equipment Used

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	R&S	ENV216	HKE-002	Dec. 28, 2017	1 Year
2.	Receiver	R&S	ESCI 7	HKE-010	Dec. 28, 2017	1 Year
3.	RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 28, 2017	1 Year
4.	Spectrum analyzer	R&S	FSP40	HKE-025	Dec. 28, 2017	1 Year
5.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 28, 2017	1 Year
6.	Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Dec. 28, 2017	1 Year
7.	EMI Test Receiver	Rohde & Schwarz	ESCI 7	HKE-010	Dec. 28, 2017	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	Dec. 28, 2017	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Dec. 28, 2017	1 Year
10.	Horn Antenna	Schewarzbeck	9120D	HKE-013	Dec. 28, 2017	1 Year
11.	Pre-amplifier	EMCI	EMC051845 SE	HKE-015	Dec. 28, 2017	1 Year
12.	Pre-amplifier	Agilent	83051A	HKE-016	Dec. 28, 2017	1 Year
13.	EMI Test Software EZ-EMC	Tonscend	JS1120-B Version	HKE-083	Dec. 28, 2017	N/A
14.	Power Sensor	Agilent	E9300A	HKE-086	Dec. 28, 2017	1 Year
15.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 28, 2017	1 Year
16.	Signal generator	Agilent	N5182A	HKE-029	Dec. 28, 2017	1 Year
17.	Signal Generator	Agilent	83630A	HKE-028	Dec. 28, 2017	1 Year
18.	Shielded room	Shiel Hong	4*3*3	HKE-039	Dec. 28, 2017	3 Year

The calibration interval was one year



3. Peak Output Power

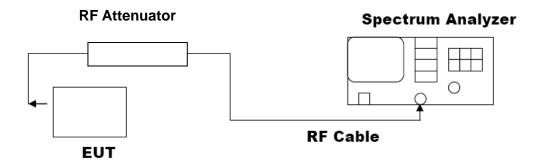
3.1. Measurement Procedure

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.

3.2. Test Set-Up (Block Diagram of Configuration)





3.3. Limits and Measurement Result

PEAK OUTPUT POWER MEASUREMENT RESULT FOR GFSK MOUDULATION				
FrequencyPeak PowerApplicable Limits(GHz)(dBm)(dBm)				
2.402	4.039	30	Pass	
2.441	4.688	30	Pass	
2.480	4.288	30	Pass	







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CF	139

Keysight Spectrum	Analyzer - Swept SA 50 Ω AC		SENSE:I	NT	ALIGN AUTO			
	4084500000) GHz PNO: Fast	Trig: Free Ru	Avg T	ype: Log-Pwr old:>100/100	TYP	E 1 2 3 4 5 6 E M WWWW	Peak Search
		IFGain:Low	Atten: 30 dB		Mkr1		45 GHz	NextPea
dB/div Re	f 20.00 dBm					4.6	88 dBm	
			Į					Next Pk Rig
			•'					
00								Next Pk L
).0								Nextrice
1.0								MarkerDe
0.0								Marker De
J.O								
								Mkr→0
).0								
).0								Mkr→RefL
D.O								
anton 2 4440						On on 5		Мо 1 о
enter 2.4410 Res BW 1.5 I		#VBW	5.0 MHz		Sweep 1	span 5 .000 ms (.000 MHz 1001 pts)	
G					STATUS			

Keysight Sp	pectrum Analyzer - Swept SA					
Marker 1	RF 50 Ω AC	GHz	NSE:INT Avg Typ	ALIGN AUTO	TRACE 1 2 3 4 5 6	Peak Search
		PNO: Fast Free IFGain:Low Atten: 30		d:>100/100 Mkr1 2 4	TYPE MWWWWW DET PNNNNN 79 770 GHz	Next Peak
10 dB/div Log	Ref 20.00 dBm				4.288 dBm	
- ° 9						
10.0		1-				Next Pk Right
0.00						
						Next Pk Left
-10.0						
-20.0						
						Marker Delta
-30.0						
-40.0						Mkr→CF
-50.0						
30.0						
-60.0						Mkr→RefLvl
-70.0						
						More
	.480000 GHz			Sp	an 5.000 MHz	1 of 2
#Res BW	1.5 MHz	#VBW 5.0 MHz		Sweep 1.000	ms (1001 pts)	
MSG				STATUS		



PEAK OUTPUT POWER MEASUREMENT RESULT FOR Π /4-DQPSK MODULATION					
Frequency (GHz)Peak Power (dBm)Applicable Limits (dBm)Pass or Fail					
2.402	3.812	30	Pass		
2.441	3.915	30	Pass		
2.480	3.646	30	Pass		



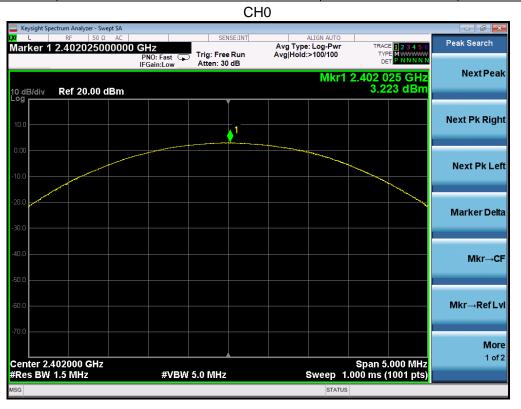


🔤 Keysight Spectrum Analyzer - Swept SA 👘			
X L RF 50 Ω AC Marker 1 2.440840000000	PNO: Fast 😱 Trig: Free Run	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100 TY	EII23456 Peak Search MWWWWW PNNNNN
10 dB/div Ref 20.00 dBm	IFGain:Low Atten: 30 dB	Mkr1 2.440 8	
10.0	1		Next Pk Right
.10.0			Next Pk Left
20.0			Marker Delta
40.0			Mkr→CF
60.0			Mkr→RefLv
-70.0 Center 2.441000 GHz		Span 5	More 1 of 2
#Res BW 1.5 MHz ^{IISG}	#VBW 5.0 MHz	Sweep 1.000 ms (1001 pts)

🛄 Keysight Sp	ectrum Analyzer - Swept SA					
<mark>⊯</mark> Marker 1	RF 50 Ω AC 2.47992000000) GHz	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6	Peak Search
		PNO: Fast 🖵 IFGain:Low	Trig: Free Run Atten: 30 dB	Avg Hold:>100/100	DET P NNNN	NextPeak
10 dB/div Log	Ref 20.00 dBm			Mkr1	2.479 920 GHz 3.646 dBm	Nextreak
10.0			Ĭ			Next Pk Right
0.00			\			
-10.0						Next Pk Left
-20.0						
-30.0						Marker Delta
-40.0						Mkr→CF
-50.0						
-60.0						Mkr→RefLvl
-70.0						More
	480000 GHz				Span 5.000 MHz	1 of 2
#Res BW	1.5 MHz	#VBW	5.0 MHz	Sweep 1	.000 ms (1001 pts)	
				314103		



PEAK OUTPUT POWER MEASUREMENT RESULT FOR 8-DPSK MODULATION					
Frequency (GHz)Peak Power (dBm)Applicable Limits (dBm)Pass or Fail					
2.402	3.223	30	Pass		
2.441	4.056	30	Pass		
2.480	3.828	30	Pass		





🚾 Keysight Spectrum Analyzer - Swept SA 🚽			
X L RF 50 Ω AC Marker 1 2.440995000000	PNO: Fast 😱 Trig: Free Run	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100 DET P NNI	Peak Search
10 dB/div Ref 20.00 dBm	IFGain:Low Atten: 30 dB	Mkr1 2.440 995 G 4.056 dE	Next Peak
10.0	1		Next Pk Right
.10.0			Next Pk Left
-20.0			Marker Delta
-40.0			Mkr→CF
60.0			Mkr→RefLv
-70.0 Center 2.441000 GHz		Span 5.000 M	More 1 of 2
#Res BW 1.5 MHz	#VBW 5.0 MHz	Sweep 1.000 ms (1001 p	ots)

Keysight Spectrum A		1				
Marker 1 2.47	50 Ω AC 9950000000		SENSE:INT	ALIGN AUTO	TRACE 1 2 3 4 5 6 TYPE M WWWWW	Peak Search
10 dB/div Ref	20.00 dBm	PNO: Fast 🖵 IFGain:Low	Trig: Free Run Atten: 30 dB	Avg Hold:>100/100	2.479 950 GHz 3.828 dBm	Next Peak
10.0			1			Next Pk Right
-10.0						Next Pk Left
-20.0						Marker Delta
-40.0						Mkr→CF
-60.0						Mkr→RefLv
Center 2.48000 #Res BW 1.5 N		#VBW	5.0 MHz	Sweep 1	Span 5.000 MHz .000 ms (1001 pts)	More 1 of 2
MSG				STATUS		

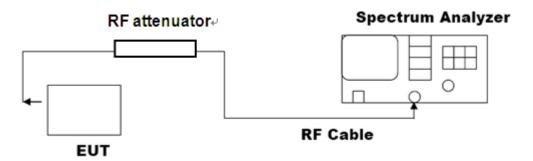


4. 20dB Bandwidth

4.1. 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.

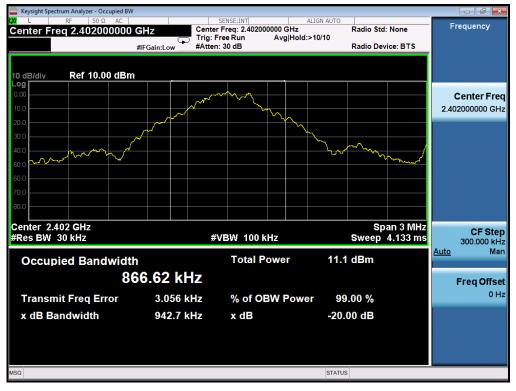
4.2. Test Set-Up (Block Diagram of Configuration)



4.3. Limits and Measurement Results

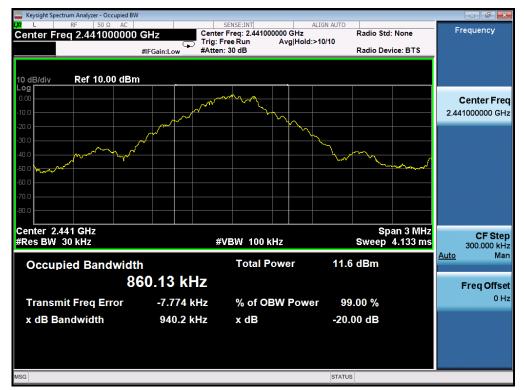
MEASUREMENT RESULT FOR GFSK MOUDULATION					
Annlinghla Limita	Measurement Result				
Applicable Limits	Test Da	Criteria			
	Low Channel	0.9427	PASS		
N/A	Middle Channel	0.9402	PASS		
	High Channel	0.9350	PASS		

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

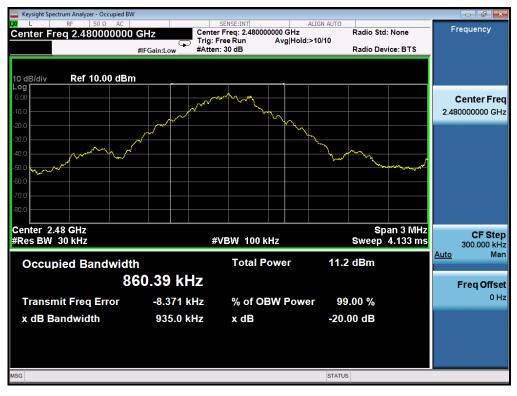




TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



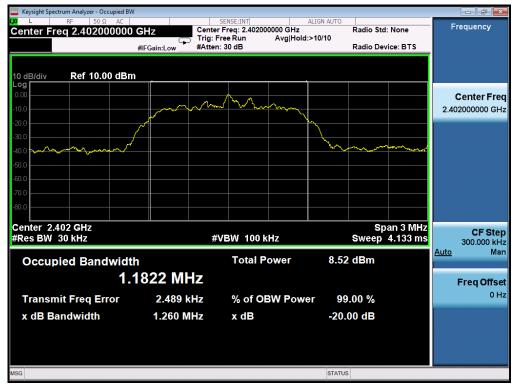
TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL





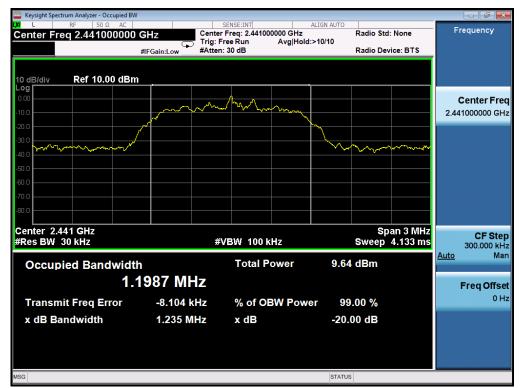
MEASUREMENT RESULT FOR IT /4-DQPSK MODULATION					
Annlinghla Limita	ılt				
Applicable Limits	Test Data (MHz)		Criteria		
	Low Channel	1.260	PASS		
N/A	Middle Channel	1.235	PASS		
	High Channel	1.234	PASS		

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL





TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



Keysight Spectrum Analyzer - Occupied BW GHZ Center Freq: 2.48000000 GHz #IFGain:Low #Atten: 30 dB Avg|Hold:>10/10 Frequency Radio Std: None Center Freq 2.480000000 GHz Radio Device: BTS Ref 10.00 dBm 10 dB/div **Center Freq** 2.48000000 GHz Center 2.48 GHz #Res BW 30 kHz Span 3 MHz Sweep 4.133 ms CF Step 300.000 kHz #VBW 100 kHz <u>Auto</u> Man **Total Power** 9.65 dBm **Occupied Bandwidth** 1.1986 MHz Freq Offset 0 Hz Transmit Freq Error -6.806 kHz % of OBW Power 99.00 % x dB Bandwidth 1.234 MHz x dB -20.00 dB STATUS

TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



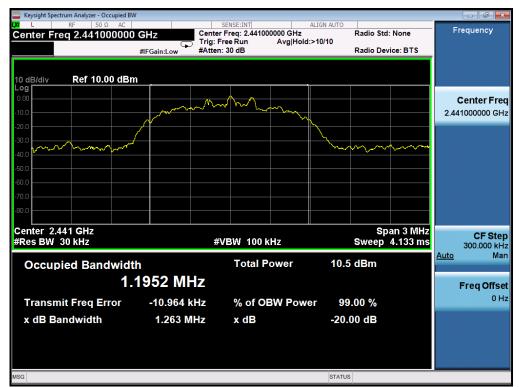
MEASUREMENT RESULT FOR 8-DPSK MODULATION					
Annlinghla Limita	Measurement Result				
Applicable Limits	Test Da	Criteria			
	Low Channel	1.278	PASS		
N/A	Middle Channel	1.263	PASS		
	High Channel	1.263	PASS		

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL





TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



Keysight Spectrum Analyzer - Occupied BW GHz Center Freq: 2.48000000 GHz #IFGain:Low #Atten: 30 dB Frequency Radio Std: None Center Freq 2.480000000 GHz Radio Device: BTS Ref 10.00 dBm 10 dB/div **Center Freq** 2.48000000 GHz Center 2.48 GHz #Res BW 30 kHz Span 3 MHz Sweep 4.133 ms CF Step 300.000 kHz #VBW 100 kHz <u>Auto</u> Man **Total Power** 10.2 dBm **Occupied Bandwidth** 1.2023 MHz Freq Offset 0 Hz Transmit Freq Error -11.017 kHz % of OBW Power 99.00 % x dB Bandwidth 1.263 MHz x dB -20.00 dB STATUS

TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



5. Conducted Spurious Emission

5.1. 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.

5.2. Test Set-Up (Block Diagram of Configuration)

The same as described in section 4.2

5.3. Limits and Measurement Result

LIMITS AND MEASUREMENT RESULT			
Annlinghla Limita	Measurement Result		
Applicable Limits	Test Data	Criteria	
In any 100 KHz Bandwidth Outside the	At least -20dBc than the limit		
frequency band in which the spread spectrum	Specified on the BOTTOM	PASS	
intentional radiator is operating, the radio	Channel		
frequency 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	

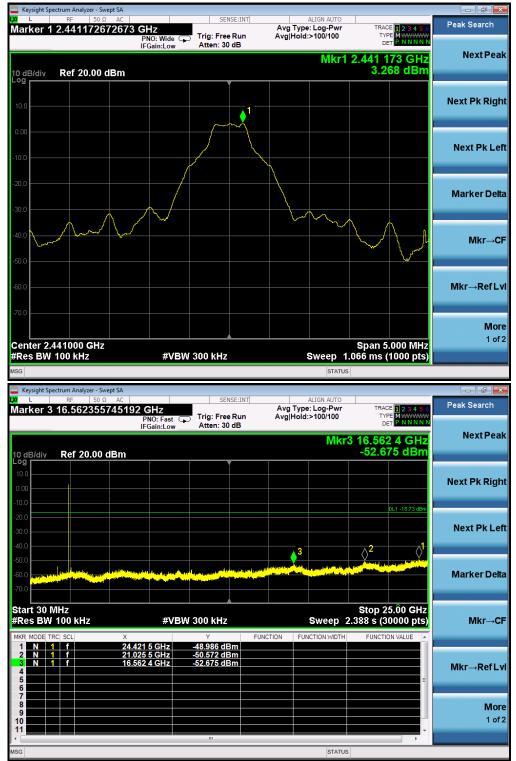


TEST RESULT FOR ENTIRE FREQUENCY RANGE TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE OF GFSK MODULATION IN LOW CHANNEL





TEST PLOT OF OUT OF BAND EMISSIONS OF GFSK MODULATION IN MIDDLE CHANNEL





Keysight Spectrum Analyzer - Swe					
L RF 50 Ω arker 1 2.48000750		Trig: Free Run	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	TRACE 123456 TYPE MWWWW DET PNNNNN	Peak Search
dB/div Ref 20.00 d	IFGain:Low	Atten: 30 dB	Mkr1	2.480 008 GHz 4.131 dBm	NextPea
					Next Pk Rig
.0					Next Pk Le
.0					Marker De
					Mkr→C
.0					Mkr→RefL
.0					Мо
			9 1	Span 5.000 MHz	1 o
Res BW 100 kHz	#VBW	/ 300 kHz	Sweep 1.	Span 5.000 MHz 066 ms (1000 pts)	1 oʻ
Res BW 100 kHz		300 kHz		Span 5.000 MHz 066 ms (1000 pts)	1 of
Res BW 100 kHz ເ Keysight Spectrum Analyzer - Swe L RF 50 Ω	ept SA AC	300 kHz	STATUS ALIGN AUTO	066 ms (1000 pts)	1 o' Peak Search
Res BW 100 kHz ເ keysight Spectrum Analyzer - Swe L RF 50 Ω	ept SA AC	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	066 ms (1000 pts) TRACE 12345 6 TYPE MWWWWW DET P NNNNN	
Res BW 100 kHz 3 Keysight Spectrum Analyzer - Swe L RF 50 Ω arker 3 22.3164678 0 dB/diy Ref 20.00 c	AC AC 382263 GHz PNO: Fast IFGain:Low	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	066 ms (1000 pts)	Peak Search
Res BW 100 kHz a keysight Spectrum Analyzer - Swe L RF sarker 3 22.3164678 dB/div Ref 20.00 c	AC AC 382263 GHz PNO: Fast IFGain:Low	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	0066 ms (1000 pts) TRACE 1 2 3 4 5 6 TYPE MWWWW DET PINNNN 2 22.316 5 GHz -52.558 dBm	Peak Search Next Pea
Res BW 100 kHz a Keysight Spectrum Analyzer - Swe RF 50 Ω arker 3 22.3164678 B/div Ref 20.00 c 00 0 01 0	AC AC 382263 GHz PNO: Fast IFGain:Low	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	0066 ms (1000 pts) TRACE 12 3 4 5 6 TYPE MYNYWY DET P NNNNN 22.316 5 GHz	Peak Search
BW 100 kHz Keysight Spectrum Analyzer - Swo L RF SO Q arker 3 22.3164678 B/div Ref 20.00 c 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	AC AC 382263 GHz PNO: Fast IFGain:Low	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	0066 ms (1000 pts) TRACE 1 2 3 4 5 6 TYPE MWWWW DET PINNNN 2 22.316 5 GHz -52.558 dBm	Peak Search Next Pea Next Pk Rig
Res BW 100 kHz Keysight Spectrum Analyzer - Swe RF 50 Ω arker 3 22.3164678 B/div Ref 20.00 c 9 1 00 1 01 1 02 1 100 1 <	ac 382263 GHz PNO: Fast IFGain:Low IBM IBM IBM IBM IBM IBM IFGain:Low IBM IBM IBM IFGain:Low IBM IFGain:Low IBM IFGain:Low IBM IFGain:Low IBM IFGain:Low IBM IFGain:Low IFGain:Low IBM IFGain:Low IFGain:Low IBM IFGain:Low IFGain:Low IBM IFGain:Low IBM IFGain:Low IBM IFGain:Low IBM IFGain:Low IBM IFGAIN:Low IBM IFGAIN:Low IBM IFGAIN:Low IBM IFGAIN:Low IBM IFGAIN:Low IBM IFGAIN:Low IFGAIN:Low IBM IFGAIN:Low IBM IFGAIN:Low IBM IFGAIN:Low IFGAIN:Low IBM IFGAIN:Low IFGAIN:Low IBM IFGAIN:Low IBM IFGAIN:Low IBM IFGAIN:Low IBM IFGAIN:Low IBM IFGAIN:Low IBM IFGAIN:Low IBM IFGAIN:Low IBM IFGAIN:Low IFGAIN:Low IBM IFGAIN:Low IFGAIN IFGAIN IFGAIN IFGAIN IFGAIN IFGAIN IFGAIN IFGAIN IFGAIN IFGAIN IFGAIN IFGAIN	SENSE:INT Trig: Free Run Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100 MKr3	0666 ms (1000 pts)	Peak Search Next Pea Next Pk Rig Next Pk Lu Marker De
Res BW 100 kHz 3 Keysight Spectrum Analyzer - Swe arker 3 22.3164678 arker 3 22.3164678 00	AC A	SENSE:INT Trig: Free Run Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100 MKr3	D66 ms (1000 pts)	Peak Search Next Pea Next Pk Rig Next Pk Lu Marker De
arker 3 22.3164678	AC 382263 GHz PNO: Fast IFGain:Low IBm IBm IBm IBm IBM IBM IBM IBM IBM IBM IBM IBM	SENSE:INT Trig: Free Run Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100 MKr3	0666 ms (1000 pts)	Peak Search Next Pea Next Pk Rig Next Pk Lo

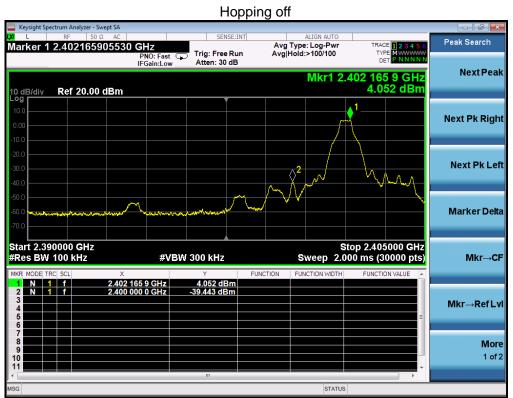
TEST PLOT OF OUT OF BAND EMISSIONS OF GFSK MODULATION IN HIGH CHANNEL

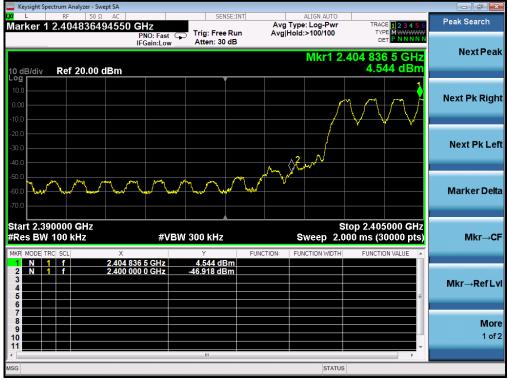
Note: The peak emissions without marker on the above plots are fundamental wave and need not to compare with the limit. The GFSK modulation is the worst case and only those data recorded in the report.



TEST RESULT FOR BAND EDGE

GFSK MODULATION IN LOW CHANNEL



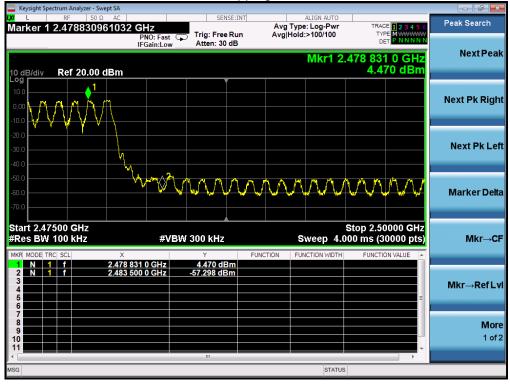




Page 29 of 59

	Норр	ing off	
🚾 Keysight Spectrum Analyzer - Swept SA			
Marker 1 2.480166005534 Ω	SENSE:INT	ALIGN AUTO AVg Type: Log-Pwr TRACE	4.5.6 Peak Search
Marker 1 2.400 1000000004	PNO: Fast Trig: Free Run IFGain:Low Atten: 30 dB	Avg Hold:>100/100 TYPE	
10 dB/div Ref 20.00 dBm		Mkr1 2.480 166 0 0 4.467 d	Hz NextPeak Bm
Log 10.0 0.00 -10.0			Next Pk Right
-20.0			Next Pk Left
-50.0 -60.0 -70.0		wayaalaati	Marker Delta
Start 2.47500 GHz #Res BW 100 kHz	#VBW 300 kHz	Stop 2.50000 Sweep 4.000 ms (30000	pts) Mkr→CF
	66 0 GHz 4.467 dBm 00 0 GHz -57.298 dBm	UNCTION FUNCTION WIDTH FUNCTION VALUE	E Mkr→RefLvl
7 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9			More 1 of 2
MSG	III	STATUS	•

GFSK MODULATION IN HIGH CHANNEL Hopping off





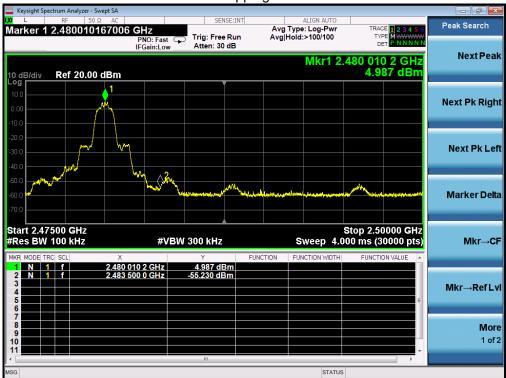
π /4-DQPSK MODULATION IN LOW CHANNEL Hopping off



🔤 Keysight Spectrum Analyzer - Swept SA				
Marker 1 2.404004966832		ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	TRACE 123456 TYPE MWWWWW	Search
10 dB/div Ref 20.00 dBm	PNO: Fast Trig: Free Run IFGain:Low Atten: 30 dB		DETPNNNN	ext Peak
Log 10.0 0.00 -10.0			Next	Pk Right
-20.0		2 ² /	Ne>	t Pk Left
-50.0 -60.0 -70.0	rear with the on the second		Mar	ker Delta
Start 2.390000 GHz #Res BW 100 kHz	#VBW 300 kHz 905 0 GHz 4.732 dBm	Sweep 2.000 r	2.405000 GHz ns (30000 pts)	Mkr→CF
2 N 1 f 2.400 0 3 4 5 6 6	100 0 GHz -44.141 dBm		■	→RefLvi
7 8 9 10 11 11	m			More 1 of 2
MSG		STATUS		



π /4-DQPSK MODULATION IN HIGH CHANNEL Hopping off



Keysight Spectrum Analyzer - Swept SA					
<mark>₩ L RF 50Ω AC</mark> Marker 1 2.476005033501	GH7	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6	Peak Search
	PNO: Fast	rig: Free Run Atten: 30 dB	Avg Hold:>100/100	476 005 0 GHz 4.930 dBm	NextPeak
10 dB/div Ref 20.00 dBm Log 10.0 0.00				4.000 abiii	Next Pk Right
-20.0 -30.0 -40.0					Next Pk Left
-50.0 -60.0 -70.0		hentradalar pertamontal and a	WW.watersong.plitery.deta.us	weyner fan yn fan fan fan fan yn fan fan yn fan	Marker Delta
Start 2.47500 GHz #Res BW 100 kHz MKR MODE TRC SCL X	#VBW 3	Y FUI	Sweep 4.0	Stop 2.50000 GHz 00 ms (30000 pts)	Mkr→CF
1 1 f 2.476 0 2 N 1 f 2.483 5 3 - - - 4 - - - 5 - - - 6 - - -		4.930 dBm 4.834 dBm		=	Mkr→RefLvi
7 8 9 10 11 11				*	More 1 of 2
MSG			STATUS		



8-DPSK MODULATION IN LOW CHANNEL Hopping off



Keysight Spectrum Analyzer - Swept SA				
Marker 1 2.403006433548		ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	TRACE 1 2 3 4 5 6 TYPE MWWWW	Peak Search
10 dB/div Ref 20.00 dBm	PNO: Fast Trig: Free Run IFGain:Low Atten: 30 dB	•	3 006 4 GHz 4.817 dBm	NextPeak
10.0 000 -10.0			1 Martin Martin Martin	Next Pk Right
-20.0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		Next Pk Left
-50.0 -60.0 -70.0	Mahar Manager and Manager a			Marker Delta
Start 2.390000 GHz #Res BW 100 kHz MKR MODE TRC SCL X			2.405000 GHz ms (30000 pts)	Mkr→CF
2 N 1 f 2.400 0 3 4 5 6 6	006 4 GHz 4.817 dBm 000 0 GHz -49.964 dBm		E	Mkr→RefLvl
7 8 9 10 11				More 1 of 2
MSG		STATUS		



Page 33 of 59

8-DPSK MODULATION IN HIGH CHANNEL Hopping off



Keysight Spectrum Analyzer - Swept SA					
₩ L RF 50 Ω AC Marker 1 2.478815960532		SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	TRACE 1 2 3 4 5 6 TYPE MWWWWW	Peak Search
10 dB/div Ref 20.00 dBm	PNO: Fast IFGain:Low	Atten: 30 dB	-	.478 816 0 GHz 4.259 dBm	NextPeak
10.0 0.00 44444474444444444444444444444444444					Next Pk Right
-20.0	0.4 . 2				Next Pk Left
-50.0 -60.0 -70.0	Mar Carrow	geld ^{er} terse ^{hl} eterse ^{fte} terse ^{fte} ter	and a second and a s	Managaran ang kanang manang manang kanang	Marker Delta
Start 2.47500 GHz #Res BW 100 kHz	#VBW 3	Y FL	Sweep 4.0	Stop 2.50000 GHz 000 ms (30000 pts) FUNCTION VALUE	Mkr→CF
	816 0 GHz 500 0 GHz -	4.259 dBm 55.043 dBm			Mkr→RefLvl
7 8 9 10 11		m		· ·	More 1 of 2
MSG			STATUS	3	



6. Radiated Emission

6.1. Measurement Procedure

- 1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
- 2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- 3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
- 4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
- 5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
- 6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- 7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
- 8.If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
- 9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- 10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High Low scan is not required in this case.



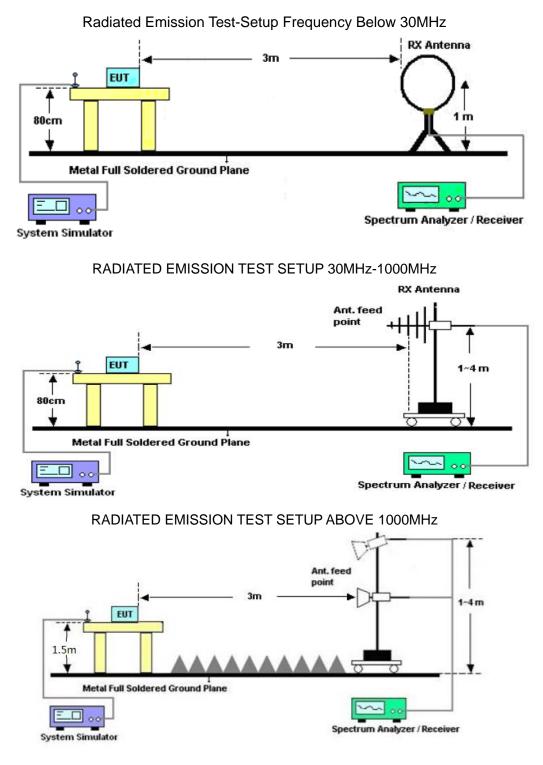
The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP
Start ~Stop Frequency	1GHz~26.5GHz
Start ~Stop Frequency	1MHz/3MHz for Peak, 1MHz/10Hz for Average

Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP



Test Setup





6.2. Limits and Measurement Result

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Note: All modes were tested For restricted band radiated emission,

the test records reported below are the worst result compared to other modes.



RADIATED EMISSION BELOW 30MHZ

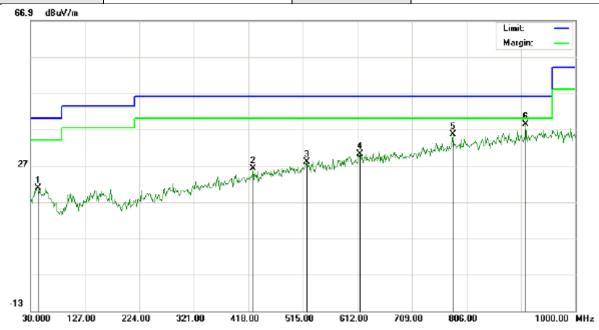
No emission found between lowest internal used/generated frequencies to 30MHz. RADIATED EMISSION BELOW 1GHZ

T	Bluetooth Headset	Model Name	MG-1 BT
mperature	25°C	Relative Humidity	55.4%
essure	960hPa	Test Voltage	Normal Voltage
st Mode	Mode 4	Antenna	Horizontal
66.9 dBuW/m	Martin Martin Martin Martin	native and a ferred and the second seco	Limit: Margin:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	•	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		52.6333	-0.19	21.14	20.95	40.00	-19.05	peak			
2		440.6333	1.64	25.77	27.41	46.00	-18.59	peak			
3		576.4333	1.39	28.72	30.11	46.00	-15.89	peak			
4		767.2000	2.55	32.38	34.93	46.00	-11.07	peak			
5	*	880.3667	2.73	34.38	37.11	46.00	-8.89	peak			
6		951.5000	1.51	35.19	36.70	46.00	-9.30	peak			



EUT	Bluetooth Headset	Model Name	MG-1 BT
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 4	Antenna	Vertical



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	•	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		42.9333	-0.72	21.55	20.83	40.00	-19.17	peak			
2		426.0833	0.83	25.44	26.27	46.00	-19.73	peak			
3		521.4667	0.43	27.58	28.01	46.00	-17.99	peak			
4		616.8500	0.78	29.47	30.25	46.00	-15.75	peak			
5		781.7500	2.92	32.73	35.65	46.00	-10.35	peak			
6	*	911.0833	3.59	34.78	38.37	46.00	-7.63	peak			

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. All test modes had been pre-tested. The mode 4 is the worst case and recorded in the report.



EUT	Bluetooth Headset	Model Name	MG-1 BT				
Temperature	25°C	Relative Humidity	55.4%				
Pressure	960hPa	Test Voltage	Normal Voltage				
Test Mode	Mode 1	Antenna	Horizontal				

RADIATED EMISSION ABOVE 1GHZ

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)			
4804.064	47.02	3.76	50.78	74.00	-23.22	peak		
4804.064	44.36	3.76	48.12	54.00	-5.88	AVG		
7206.096	37.44	8.17	45.61	74.00	-28.39	peak		
7206.096	34.68	8.17	42.85	54.00	-11.15	AVG		
Remark:								
Factor = Antenna Factor + Cable Loss – Pre-amplifier.								

EUT	Bluetooth Headset	Model Name	MG-1 BT
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type	
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)		
4804.064	49.36	3.76	53.12	74.00	-20.88	peak	
4804.064	44.46	3.76	48.22	54.00	-5.78	AVG	
7206.096	37.98	8.17	46.15	74.00	-27.85	peak	
7206.096	37.64	8.17	45.81	54.00	-8.19	AVG	
Remark:							
Factor = Antenna Factor + Cable Loss – Pre-amplifier.							



EUT	Bluetooth Headset	Model Name	MG-1 BT
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)			
4882.064	48.16	3.78	51.94	74.00	-22.06	peak		
4882.064	42.20	3.78	45.98	54.00	-8.02	AVG		
7323.096	39.92	8.23	48.15	74.00	-25.85	peak		
7323.096	39.53	8.23	47.76	54.00	-6.24	AVG		
Remark:								
Factor = Antenna Factor + Cable Loss – Pre-amplifier.								

EUT	Bluetooth Headset	Model Name	MG-1 BT
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type	
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)		
4882.064	47.98	3.78	51.76	74.00	-22.24	peak	
4882.064	44.34	3.78	48.12	54.00	-5.88	AVG	
7323.096	41.72	8.23	49.95	74.00	-24.05	peak	
7323.096	7323.096 37.40 8.23 45.63 54.00 -8.37 AVG						
Remark:							
Factor = Anter	nna Factor + Cable	e Loss – Pre-a	amplifier.				



EUT	Bluetooth Headset	Model Name	MG-1 BT
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре		
4960.064	47.96	3.81	51.77	74.00	-22.23	peak		
4960.064	44.67	3.81	48.48	54.00	-5.52	AVG		
7440.096	39.71	8.27	47.98	74.00	-26.02	peak		
7440.096	38.57	8.27	46.84	54.00	-7.16	AVG		
Remark:								
Factor = Anter	Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

EUT	Bluetooth Headset	Model Name	MG-1 BT
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4960.064	51.80	3.81	55.61	74.00	-18.39	peak
4960.064	42.54	3.81	46.35	54.00	-7.65	AVG
7440.096	38.84	8.27	47.11	74.00	-26.89	peak
7440.096	37.34	8.27	45.61	54.00	-8.39	AVG
Remark:						
Factor = Anter	nna Factor + Cable	e Loss – Pre-a	amplifier.			

RESULT: PASS

Note:

Other emissions from 1G to 25 GHz are considered as ambient noise. No recording in the test report.

Factor = Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.

The "Factor" value can be calculated automatically by software of measurement system.

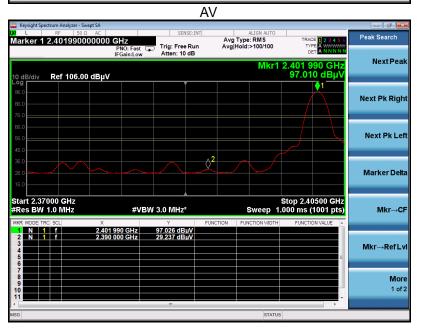
All test modes had been tested. The GFSK modulation is the worst case and recorded in the report.



EUT	Bluetooth Headset	Model Name	MG-1 BT
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal









EUT	Bluetooth Headset	Model Name	MG-1 BT
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical



AV





EUT	Bluetooth Headset	Model Name	MG-1 BT
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal



AV

Keysight Spectr	rum Analyzer - Swept SA					
larker 1 2	RF 50 Ω A 4800020000	DOO GHz PNO: Fast	SENSE:INT	ALIGN AUTO Avg Type: RMS Avg Hold:>100/100	TRACE 1 2 3 4 5 6 TYPE A WWWWW DET A NNNNN	Peak Search
) dB/div	Ref 106.00 dE	IFGain:Low _	Atten: 10 dB	Mkr	1 2.480 002 GHz 97.921 dBµV	NextPea
29 6.0 6.0						Next Pk Rig
5.0						Next Pk L
5.0 5.0 5.0						Marker De
art 2.478 Res BW 1.	.0 MHz	#VB	W 3.0 MHz*	Sweep	Stop 2.50000 GHz 1.000 ms (1001 pts)	Mkr⊸0
N 1 N 1	f 2	2.480 002 GHz 2.483 500 GHz	97.933 dBµV 42.900 dBµV			Mkr→RefL
7 8 9 0 1					-	M a 1 o
			m		•	



EUT	Bluetooth Headset	Model Name	MG-1 BT
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical



RESULT: PASS

Note: The factor had been edited in the "Input Correction" of the Spectrum Analyzer. So the Amplitude of test plots is equal to Reading level plus the Factor in dB. Use the A dB(μ V) to represent the Amplitude. Use the F dB(μ V/m) to represent the Field Strength. So A=F. All test modes had been pre-tested. The GFSK modulation is the worst case and recorded in the report.



7. Number of Hopping Frequency

7.1. Measurement Procedure

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.

2. RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.

3. VBW \geq RBW. Sweep: Auto. Detector function: Peak. Trace: Max hold.

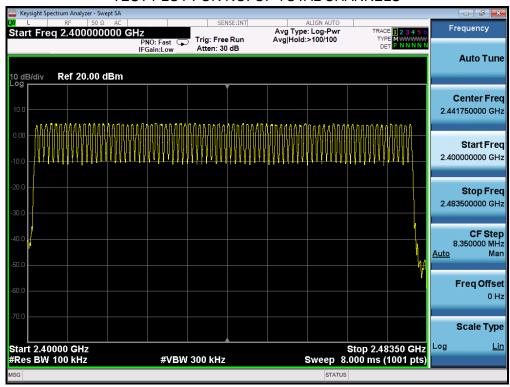
4. Allow the trace to stabilize.

7.2. Test Setup (Block Diagram of Configuration)

Same as described in section 4.2

7.3. Limits and Measurement Result

TOTAL NO. OF HOPPING CHANNEL	LIMIT (NO. OF CH)	MEASUREMENT (NO. OF CH)	RESULT		
	>=15	79	PASS		
TEST PLOT FOR NO. OF TOTAL CHANNELS					



Note: The 8-DPSK modulation is the worst case and recorded in the report.



8. Time Of Occupancy (Dwell Time)

8.1. Measurement Procedure

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: Zero span, centered on a hopping channel.

2. RBW shall be \leq channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.

3. Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.

4. Detector function: Peak. Trace: Max hold.

5. Use the marker-delta function to determine the transmit time per hop.

6. Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements. Determine the number of hops over the sweep time and calculate the total number of hops in the period specified in the requirements, using the following equation:

(Number of hops in the period specified in the requirements) = (number of hops on spectrum analyzer) \times (period specified in the requirements / analyzer sweep time)

7. The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified in the requirements.

8.2. Test Setup (Block Diagram of Configuration)

Same as described in section 4.2

8.3. Limits and Measurement Result

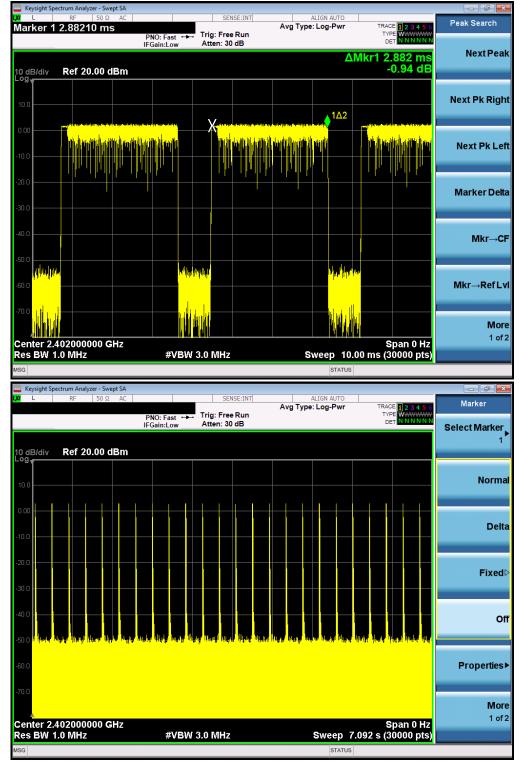
Channel	Time of Pulse for DH5 (ms)	Number of hops in the period specified in the requirements	Sweep Time (ms)	Limit (ms)
Low	2.882	24*4	276.672	400
Middle	2.875	24*4	276.000	400
High	2.880	24*4	276.480	400

Note: The 8-DPSK modulation is the worst case and recorded in the report.



Page 49 of 59

TEST PLOT OF LOW CHANNEL





Page 50 of 59

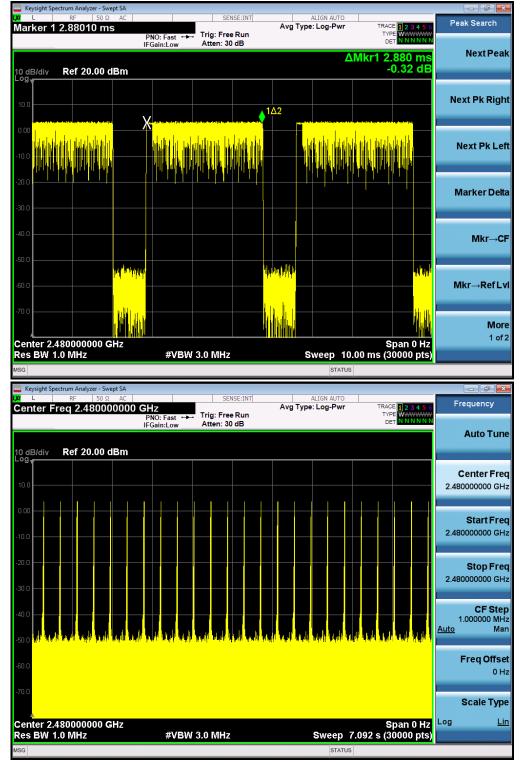
	IIDDLE CHANNEL	
Keysight Spectrum Analyzer - Swept SA μ RF 50 Ω AC SENSE:INT	ALIGN AUTO	– 🗗 💌
Marker 1 2.87543 ms	Avg Type: Log-Pwr TRACE 1 2 3 4 5 TYPE WWWWW	
IFGain:Low Atten: 30 dB	ΔMkr1 2.875 m	NextPea
10 dB/div Ref 20.00 dBm	0.03 dE	
Log		
10.0	1Δ2	Next Pk Righ
ىلى 1 يىلىن ما يەلىك ايولىد بارى ئەلىك ايولى	i bar	
-10.0		Next Pk Le
	and have defined and the last of the last	
		Marker Delt
-30.0		
-40.0		Mkr→C
50.0		
Ne aptily all	<mark>Alahatan a</mark> ta ata ata ata ata ata ata ata ata at	
60.0		Mkr→RefL
-70.0		
ti da	i de light de la companya de la comp	Mor
Center 2.441000000 GHz	Span 0 H	1 of
Res BW 1.0 MHz #VBW 3.0 MHz	Sweep 10.00 ms (30000 pts	Ð
ASG	STATUS	
Keysight Spectrum Analyzer - Swept SA L RF 50 Ω AC SENSE:INT	ALIGN AUTO	
PNO: Fast 🛶 Trig: Free Run	Avg Type: Log-Pwr TRACE 12 3 4 5 TYPE WWWWW	6 ₩ ₩
IFGain:Low Atten: 30 dB	DET <mark>N N N N N</mark>	Select Marker
10 dB/div Ref 20.00 dBm		1
10.0		
		Norm
0.00		Norm
		Norm
10.0		
		Delt
-10.0		Dell Fixed
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-10.0		Delt Fixed O Properties
		Delt Fixed O Properties Mor
-10.0	Span 0 Hz Symep 7.092 s (30000 pts	Norma Delt Fixed Of Properties Mor 1 of

TEST PLOT OF MIDDLE CHANNEL



Page 51 of 59

TEST PLOT OF HIGH CHANNEL





9. Frequency Separation

9.1. Measurement Procedure

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: Wide enough to capture the peaks of two adjacent channels.

2. 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.

3. Video (or average) bandwidth (VBW) \geq RBW.

4. Sweep: Auto. e) Detector function: Peak. f) Trace: Max hold. g) Allow the trace to stabilize.

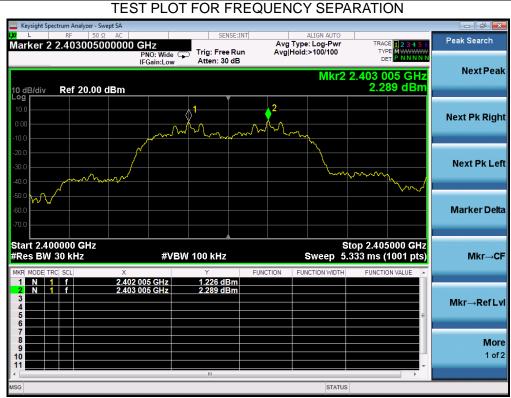
Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

9.2. Test Setup (Block Diagram of Configuration)

Same as described in section 4.2

9.3. Limits and Measurement Result

CHANNEL	CHANNEL SEPARATION	LIMIT	RESULT
	KHz	KHz	Data
CH01-CH02	1000	>=25 KHz or 2/3 20 dB BW	Pass



Note: The 8-DPSK modulation is the worst case and recorded in the report.

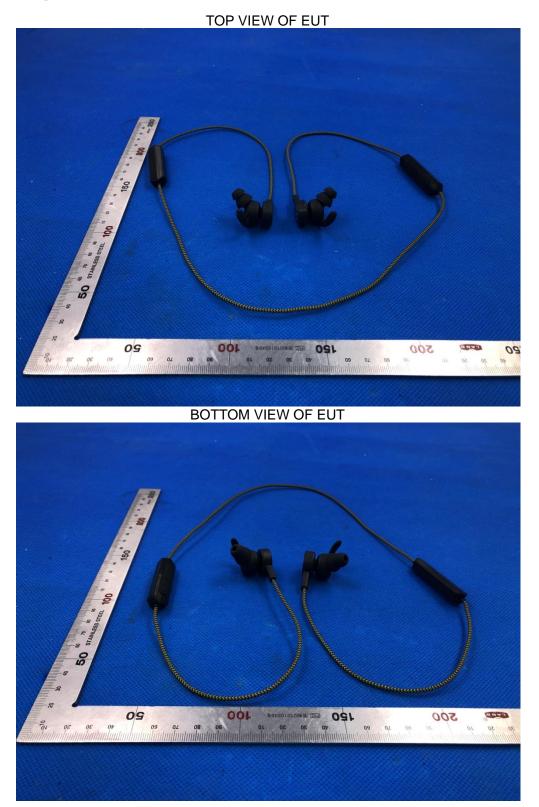


10. Test Setup Photos of the EUT





11. Photograph of EUT





FRONT VIEW OF EUT



ж и зыл 250 8 200 66 8 2 150 " 100 60 70 80 STAINLESS 50 - 9 300 80 30 50 40 100 09 500 80 40 60 40 30 30 50 02 08



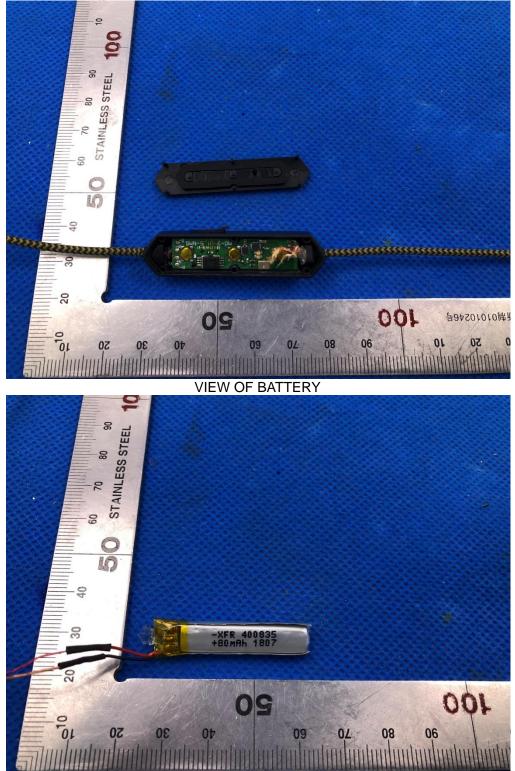
LEFT VIEW OF EUT





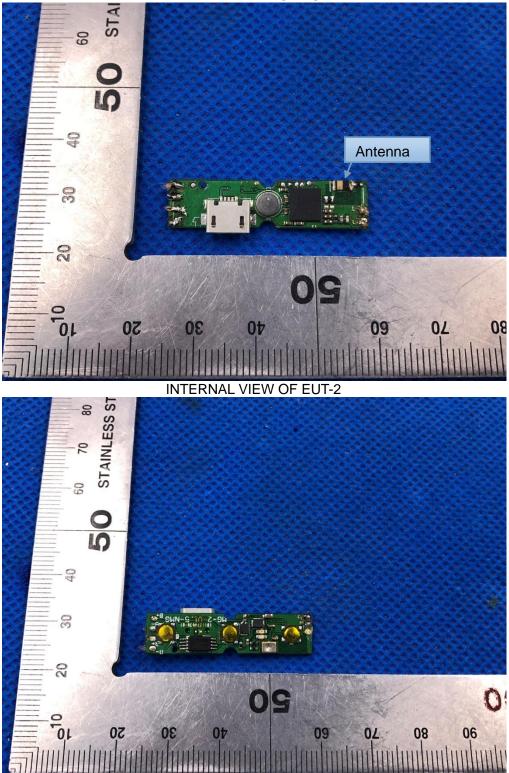


OPEN VIEW OF EUT





INTERNAL VIEW OF EUT-1





INTERNAL VIEW OF EUT-3



----END OF REPORT----