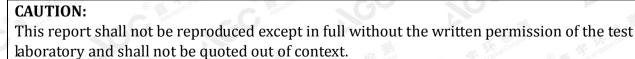


FCC Test Report

Report No.: AGC00184190203FE03

FCC ID	: RGR-EB200
APPLICATION PURPOSE	: Original Equipment
PRODUCT DESIGNATION	: Bluetooth Sports Earbuds
BRAND NAME	: KICKER
MODEL NAME	: EB200
CLIENT	: Stillwater Designs & Audio, Inc.
DATE OF ISSUE	: Mar. 25, 2019
STANDARD(S)	: FCC Part 15 Subpart C Section 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	V1.0		Valid	Initial release

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1. VERIFICATION OF CONFORMITY

Applicant	Stillwater Designs & Audio, Inc.			
Address	3100 N Husband Street. Stillwater, Stillwater OK 74075 United States Of America			
Manufacturer	WATA ELECTRONIC CO., LTD			
Address	NO 142, South Tanshen Road, Tanzhou Town, Zhongshan City, Guangdong, China			
Factory	WATA ELECTRONIC CO., LTD			
Address	NO 142, South Tanshen Road, Tanzhou Town, Zhongshan City, Guangdong, China			
Product Designation	Bluetooth Sports Earbuds			
Brand Name	KICKER			
Test Model	EB200			
Date of test	Mar. 01, 2019 to Mar. 20, 2019			
Deviation	None			
Condition of Test Sample	Normal			
Report Template	AGCRT-US-BR/RF (2013-03-01)			

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, the energy emitted by the sample tested as described in this report is in compliance with the requirements of FCC Rules Part 15.247. The test results of this report relate only to the tested sample identified in this report.

John Zeng

Tested By

John Zeng(Zeng Weiqiang) Mar. 20, 2019

Max 2hang

Reviewed By

Max Zhang(Zhang Yi)

Mar. 25, 2019

Forvesto en

Approved By

Forrest Lei(Lei Yonggang) Authorized Officer

Mar. 25, 2019

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2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

The EUT is "Bluetooth Sports Earbuds " designed as a "Communication Device". It is designed by way of utilizing the FHSS 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** 1.307dBm(Max) V4.2 **Bluetooth Version** Modulation GFSK, π /4-DQPSK, 8DPSK for BR/EDR Number of channels 79 for BR/EDR Hardware Version AKHT21_BES1638_V1 V1.4 Software Version **Antenna Designation** Ceramic Antenna Antenna Gain 0dBi DC 3.7V by battery **Power Supply** Note: 1.The EUT doesn't support BLE. 2. The USB port only used for charging and can't be used to transfer data with PC.

2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
E The Comment	00	2402MHz
C And C A	01	2403MHz
GO NOT		The Stranger of Stranger
The state of the s	38 9 5 5 5 6 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	2440 MHz
2402~2480MHz	39	2441 MHz
	40	2442 MHz
		Sound Contraction and Contraction
The the second second	Same 0 1 77 60	2479 MHz
· And And Contraction	78	2480 MHz

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2.3. RECEIVER INPUT BANDWIDTH

The input bandwidth of the receiver is 1.3MHZ, In every connection one Bluetooth device is the master and the other one is slave. The master determines the hopping sequence. The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master. Additionally the type of connection(e.g. single of 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 synchronization 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 following behavior:

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

All measurements contained in this report were conducted with ANSI C63.10-2013.

2.7. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

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, $Uc = \pm 3.2 \text{ dB}$
- Uncertainty of Radiated Emission below 1GHz, Uc = ±3.9 dB
- Uncertainty of Radiated Emission above 1GHz, Uc = ±4.8 dB

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4. DESCRIPTION OF TEST MODES

Allo		
	NO.	TEST MODE DESCRIPTION
Compliance	1 Harman	Low channel GFSK
© 🐐	2	Middle channel GFSK
GC *	3	High channel GFSK
- 1	4	Low channel π /4-DQPSK
Fration of Global	5 5 100 a constance	Middle channel π /4-DQPSK
Aller	6	High channel π /4-DQPSK
	7	Low channel 8DPSK
8	8	Middle channel 8DPSK
C.C	9	High channel 8DPSK
	10	BT Link

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. The EUT used fully-charged battery when tested.

4. The BT function of EUT doesn't work when charging.

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

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5. SYSTEM TEST CONFIGURATION 5.1. CONFIGURATION OF EUT SYSTEM

Configure 1: (Normal hopping)

EUT

Configure 2: (Control continuous TX)

			Kan Con		Jobal Co
EUT	Haton	Control box	Dr.	PC	N

5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Equipment Mfr/Brand M		Remark	
1	Bluetooth Sports Earbuds	KICKER	EB200	EUT	
2	battery	∳HT	75300	Accessory	
3	Control box	AIROHA	BT-USB TO UART	A.E	
4	USB Cable	N/A	0.6m unshielded	A.E	
5	IPOD	APPLE	A1367	A.E	
6	PC	APPLE	A1465	A.E	

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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		
§15.247 d §15.209	Radiated Emission	Compliant		
§15.247 d	Band Edges	Compliant		
§15.247 a(1)(iii)	Number of hopping frequency	Compliant		
§15.247 a(1)(iii)	Time of Occupancy	Compliant		
§15.247 a(1)	Frequency Separation	Compliant		
§15.207	Line conduction Emission	N/A		

Note: N/A means it's not applicable to this item.

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6. TEST FACILITY

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

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7. TEST EQUIPMENT LIST

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Jun. 12, 2018	Jun. 11, 2019
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 20, 2018	Dec. 19, 2019
2.4GHz Fliter	Micro-tronics	087	N/A	Jun. 12, 2018	Jun. 11, 2019
Attenuator	Weinachel Corp	58-30-33	N/A	Jun. 12, 2018	Jun. 11, 2019
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep. 21, 2017	Sep. 20, 2020
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	Jun. 14, 2018	Jun. 13, 2020
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May. 26, 2018	May. 25, 2020
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Oct. 25, 2018	Oct. 24, 2019
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep. 28, 2017	Sep. 27, 2019

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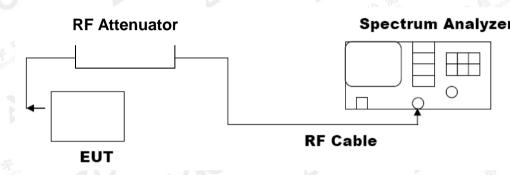
8. PEAK OUTPUT POWER

8.1. MEASUREMENT PROCEDURE

For peak power test:

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Set the EUT Work on the top, middle and the bottom operation frequency individually.
- 3. RBW > the 20 dB bandwidth of the emission being measured, VBW \ge RBW.
- 4. Record the maximum power from the Spectrum Analyzer.
- 5. The maximum peak power shall be less 21dBm.

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



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8.3. LIMITS AND MEASUREMENT RESULT

PEAK OUTPUT POWER MEASUREMENT RESULT FOR GFSK MOUDULATION								
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail					
2.402	0.674	21	Pass					
2.441	0.980	21 Support	Pass					
2.480	0.813	21	Pass					



CH00

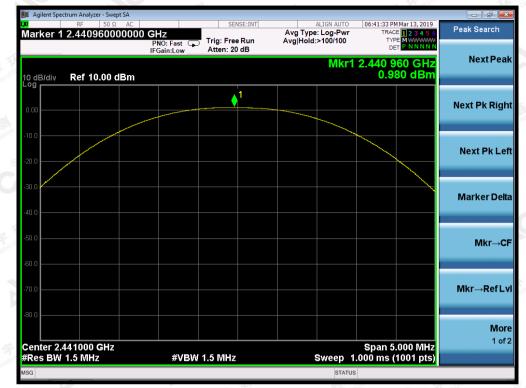
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	PEAK OUTPUT PO	WER MEASUREMENT RESULT						
	FOR II /4-DQPSK MODULATION							
Frequency (GHz)	Pass or Fail							
2.402	1.047	21	Pass					
2.441	1.151	21	Pass					
2.480	1.210	21	Pass					
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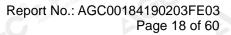
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CH00



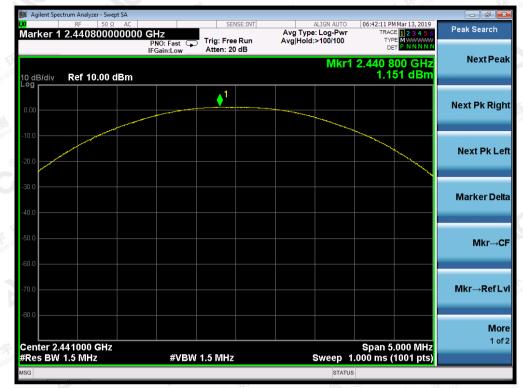
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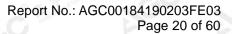
PEAK OUTPUT POWER MEASUREMENT RESULT								
FOR 8-DPSK MODULATION								
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail					
2.402	1.307	21	Pass					
2.441	1.305	21 0 m 21	Pass					
2.480	1.279	21	Pass					

CH00



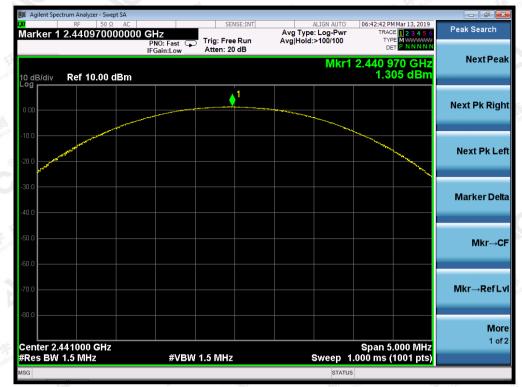
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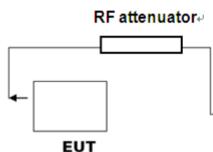
Report No.: AGC00184190203FE03 Page 21 of 60

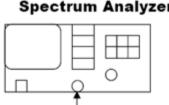
9. BANDWIDTH

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 Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hoping channel RBW \ge 1% of the 20 dB bandwidth, VBW \ge 3RBW; Sweep = auto; Detector function = peak
- 4. Set SPA Trace 1 Max hold, then View.

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





RF Cable

Note: The EUT has been used temporary antenna connector for testing. **9.3. LIMITS AND MEASUREMENT RESULTS**

BLUETOOTH 1MBPS LIMITS AND MEASUREMENT RESULT								
	Measurement Result							
Applicable Limits		Test Data (MHz)	D 14					
		99%OBW (MHz)	-20dB BW(MHz)	Result				
The stand	Low Channel	0.821	0.853	PASS				
C N/A	Middle Channel	0.817	0.832	PASS				
	High Channel	0.819	0.862	PASS				

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TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

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G(C)

TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



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STATUS

TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

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	BLUETOOTH 2	2MBPS LIMITS AN	D MEASUREMENT RE	SULT		
	Measurement Result					
Applicable Limits		Decult				
		99%OBW (MHz)	-20dB BW(MHz)	Result		
The the flag	Low Channel	1.168	1.267	G PASS		
N/A	Middle Channel	1.172	1.277	PASS		
	High Channel	1.175	1.265	PASS		

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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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BLUETOOTH 3MBPS LIMITS AND MEASUREMENT RESULT								
	Measurement Result							
Applicable Limits		Pooult						
		99%OBW (MHz)	-20dB BW(MHz)	Result				
	Low Channel	1.179	1.271	C PASS				
N/A	Middle Channel	1.173	1.271	PASS				
	High Channel	1.182	1.270	PASS				

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TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

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TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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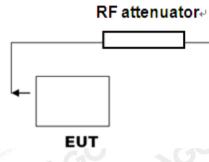
Report No.: AGC00184190203FE03 Page 28 of 60

10. CONDUCTED SPURIOUS EMISSION

10.1. 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 = 300kHz; Sweep = auto; Detector function = peak.
- 4. Set SPA Trace 1 Max hold, then View.

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



Spectrum Analyze

RF Cable

10.3. LIMITS AND MEASUREMENT RESULT

LIMITS AND MEASUREMENT RESULT							
	Measurement Result						
Applicable Limits	Test Data	Result					
In any 100 KHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency	At least -20dBc than the limit Specified on the BOTTOM Channel	PASS					
power that is produce by the intentional radiator shall be at least 20 dB below that in 100KHz bandwidth within the band that contains the highest	· The stand of the	CC There is a construction of the construction					
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))	CC ³ CC ³						

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1 of 2

PM Mar 13, 2019 ACE 1 2 3 4 5 (Peak Search Avg Type: Log-Pw Avg|Hold:>100/100 Marker 1 943.867659626 MHz Trig: Free Run Atten: 20 dB PNO: Fast Next Peak Mkr1 943.87 MHz -68.892 dBm Ref 10.00 dBm 0 dB/div Next Pk Right Next Pk Left Marker Delta Start 30.0 MHz #Res BW 100 kHz Stop 1.0000 GHz Sweep 92.83 ms (8192 pts) #VBW 300 kHz Mkr→CF FUNCTION ELINC 943.87 MHz -68.892 dBm Mkr→RefLvl More 1 of 2 07:12:57 PM Mar 13, 2019 TRACE 1 2 3 4 5 6 ALIGN AUTO Peak Search 2 6.603162007081 GHz Avg Type: Log-Pwr Avg|Hold: 10/100 Trig: Free Run Atten: 20 dB PNO: Fast IFGain:Low Next Pea Mkr2 6.603 2 GHz -64.812 dBm Ref 10.00 dBm Next Pk Right Next Pk Leff Marker Delta Start 1.000 GHz #Res BW 100 kHz Stop 12.750 GHz 1.123 s (8192 pts) #VBW 300 kHz Sweep Mkr→CF 2.401 5 GHz 6.603 2 GHz -0.059 dBm -64.812 dBm Mkr→RefLv More

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

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STATUS



21 PM Mar 13, 2019 TRACE 1 2 3 4 5 6 Peak Search Avg Type: Log-Pwi Avg|Hold:>100/100 Marker 1 899.459162495 MHz Trig: Free Run Atten: 20 dB PNO: Fast Next Peak Mkr1 899.46 MHz -65.143 dBm Ref 10.00 dBm 0 dB/div Next Pk Right Next Pk Left Marker Delta Start 30.0 MHz #Res BW 100 kHz Stop 1.0000 GHz Sweep 92.83 ms (8192 pts) #VBW 300 kHz Mkr→CF ELINCTION ELINC 899.46 MHz -65.143 dBm Mkr→RefLvl More 1 of 2 07:13:27 PM Mar 13, 2019 TRACE 1 2 3 4 5 6 ALIGN AUTO Peak Search Avg Type: Log-Pwr Avg|Hold: 13/100 2 5.924642900745 GHz Trig: Free Run Atten: 20 dB PNO: Fast IFGain:Low Next Pea Mkr2 5.924 6 GHz -64.828 dBm Ref 10.00 dBm Next Pk Right Next Pk Leff <mark>∧</mark>2 Marker Delta Start 1.000 GHz #Res BW 100 kHz Stop 12.750 GHz 1.123 s (8192 pts) #VBW 300 kHz Sweep Mkr→CF 2.441 7 GHz 5.924 6 GHz -0.142 dBm -64.828 dBm Mkr→RefLv More 1 of 2 STATUS

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

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35 PM Mar 13, 2019 TRACE 1 2 3 4 5 6 Peak Search Avg Type: Log-Pw Avg|Hold:>100/100 Marker 1 757.351971676 MHz Trig: Free Run Atten: 20 dB PNO: Fast Next Peak Mkr1 757.35 MHz -69.883 dBm Ref 10.00 dBm 0 dB/div Next Pk Right Next Pk Left Marker Delta Start 30.0 MHz #Res BW 100 kHz Stop 1.0000 GHz Sweep 92.83 ms (8192 pts) #VBW 300 kHz Mkr→CF FUNCTION ELINC 757.35 MHz -69.883 dBm Mkr→RefLvl More 1 of 2 07:13:50 PM Mar 13, 2019 TRACE 1 2 3 4 5 6 ALIGN AUTO Peak Search 2 9.377487486265 GHz Avg Type: Log-Pwr Avg|Hold: 11/100 Trig: Free Run Atten: 20 dB PNO: Fast IFGain:Low Next Pea Mkr2 9.377 5 GHz -65.265 dBm Ref 10.00 dBm Next Pk Right Next Pk Leff 2 Marker Delta Start 1.000 GHz #Res BW 100 kHz Stop 12.750 GHz 1.123 s (8192 pts) #VBW 300 kHz Sweep Mkr→CF 2.480 4 GHz 9.377 5 GHz -0.284 dBm -65.265 dBm Mkr→RefLv More 1 of 2 STATUS

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

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11. RADIATED EMISSION

11.1. TEST LIMIT

Frequency	Distance	Field Strengths Limit				
(MHz)	Meters	μ V/m	dB(µV)/m			
0.009 ~ 0.490	300	2400/F(kHz)	te (R) - Frank Com			
0.490 ~ 1.705	30	24000/F(kHz)	-G			
1.705 ~ 30	30	30				
30 ~ 88	3	100	40.0			
88 ~ 216	3	150	43.5			
216 ~ 960	1 N 2 N 2	200	46.0			
960 ~ 1000	3	500	54.0			
Above 1000	3	Other:74.0 dB(µV)/m (Peak) 54.0 dB(µV)/m (Average				

Remark: (1) Emission level dB μ V = 20 log Emission level μ V/m.

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

11.2. MEASUREMENT PROCEDURE

- The measuring distance of 3m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation(Below 1GHz)
- The measuring distance of 3m shall used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation(Above 1GHz)
- 3. The height of the test antenna shall vary between 1m to 4m.Both horizontal and vertical polarization Of the antenna are set to make the measurement.
- 4. The initial step in collecting radiated emission data is a receive peak detector mode. Pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- 5. All readings are peak unless otherwise stated QP in column of Note. Peak denoted that the Peak reading compliance with the QP limits and then QP Mode measurement didn't perform(Below 1GHz)
- 6. All readings are Peak mode value unless otherwise stated AVG in column of Note. If the Peak mode measured value compliance with the Peak limits and lower than AVG Limits, the EUT shall be deemed to meet Peak&AVG limits and then only Peak mode was measured, but AVG mode didn't perform.(Above 1GHz)

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	Spectrum Parameter	Setting
K Compliance	Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
1000°	Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
GC *	Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP
The state of the state	Start ~Stop Frequency	1GHz~26.5GHz RBW 1MHz/ VBW 3MHz for Peak RBW 1MHz/ VBW 3MHz for Average

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

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

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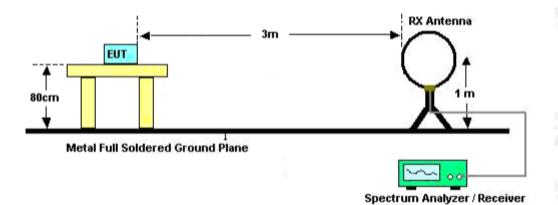




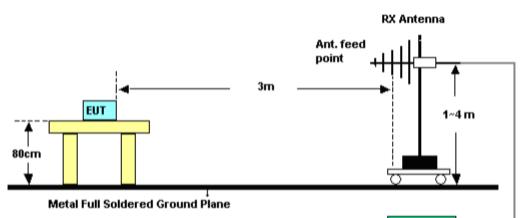
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11.3. TEST SETUP

RADIATED EMISSION TEST SETUP BELOW 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



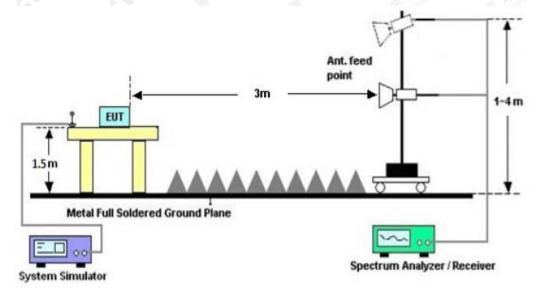
Spectrum Analyzer / Receiver

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RADIATED EMISSION TEST SETUP ABOVE 1000MHz

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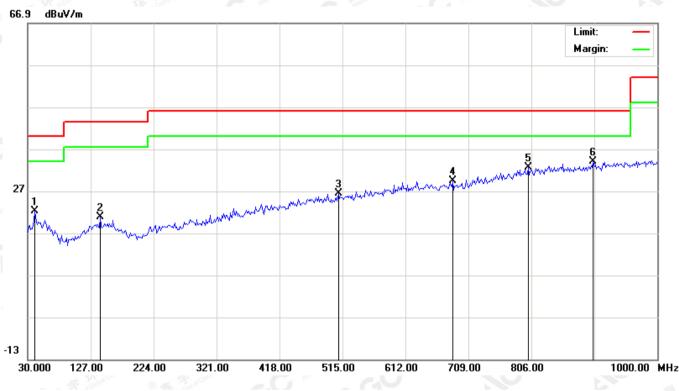
11.4. TEST RESULT

(Worst Modulation: 8DPSK)

RADIATED EMISSION BR/EDR OW 30MHz

No emission found between lowest internal used/generated frequencies to 30MHz. **RADIATED EMISSION BR/EDR OW 1GHz**

RADIATED EMISSION TEST- (30MHz-1GHz)-LOW CHANNEL-HORIZONTAL



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		41.3167	2.15	20.04	22.19	40.00	-17.81	peak			
2		141.5500	1.52	19.23	20.75	43.50	-22.75	peak			
3		508.5333	1.25	25.16	26.41	46.00	-19.59	peak			
4		684.7500	1.51	27.97	29.48	46.00	-16.52	peak			
5		801.1500	2.24	30.42	32.66	46.00	-13.34	peak			
6	*	901.3833	2.29	31.71	34.00	46.00	-12.00	peak			

RESULT: PASS

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66.9 dBuV/m Limit: Margin: 27 13 30.000 127.00 224.00 321.00 418.00 515.00 612.00 709.00 806.00 1000.00 MHz

RADIATED EMISSION TEST- (30MHz-1GHz)-LOW CHANNEL -VERTICAL

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G(C)

	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	
8	1		41.3167	1.33	20.04	21.37	40.00	-18.63	peak			
	2		146.4000	-0.57	19.22	18.65	43.50	-24.85	peak			
	3		518.2333	0.03	25.35	25.38	46.00	-20.62	peak			
	4		652.4167	0.66	27.58	28.24	46.00	-17.76	peak			
1	5		793.0667	0.94	30.25	31.19	46.00	-14.81	peak			
	6	*	956.3500	1.21	32.18	33.39	46.00	-12.61	peak			

RESULT: PASS

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

- 2. The "Factor" value can be calculated automatically by software of measurement system.
- 3.All modes were tested, and only the data of worst case mode 10 was recorded in this report.

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EUT :	Bluetooth Sports Earbuds	Model Name. :	EB200			
Temperature :	20 °C	Relative Humidtity :	48%			
Pressure :	1010 hPa	Test Voltage :	DC 3.7V			
Test Mode :	Mode 7	Polarization :	Horizontal			

RADIATED EMISSION ABOVE 1GHZ FOR BR/EDR

	tion of Global	GU	C.U	S	Margin	1
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Smillance ®
4804.026	46.09	3.76	49.85	74	-24.15	peak
4804.026	44.61	3.76	48.37	54	-5.63	AVG
7206.039	35.65	8.17	43.82	74	-30.18	peak
7206.039	31.64	8.17	39.81	54	-14.19	AVG
Remark:				a a free	S Clobal C	station of Glov

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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EUT :	Bluetooth Sports Earbuds	Model Name. :	EB200
Temperature :	20 °C	Relative Humidtity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 7	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
4804.026	48.95	3.76	52.71	74	-21.29	peak
4804.026	43.09	3.76	46.85	54	-7.15	AVG
7206.039	38.21	8.17	46.38	74	-27.62	peak
7206.039	35.64	8.17	43.81	54	-10.19	AVG
Remark:		0			lle de la companya de	
_				. 版.	ance	omplie.

Factor = Antenna Factor + Cable Loss - Pre-amplifier.

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EUT :	Bluetooth Sports Earbuds	Model Name. :	EB200
Temperature :	20 ℃	Relative Humidtity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 8	Polarization :	Horizontal

Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
46.7	3.78	50.48	74	-23.52	peak
42.5	3.78	46.28	54	-7.72	AVG
40.62	8.23	48.85	74	-25.15	peak
39.15	8.23	47.38	54	-6.62	AVG
ALC Avesta	60			litter	The state
	(dBµV) 46.7 42.5 40.62	(dBµV) (dB) 46.7 3.78 42.5 3.78 40.62 8.23	(dBµV) (dB) (dBµV/m) 46.7 3.78 50.48 42.5 3.78 46.28 40.62 8.23 48.85	(dBµV) (dB) (dBµV/m) (dBµV/m) 46.7 3.78 50.48 74 42.5 3.78 46.28 54 40.62 8.23 48.85 74	Meter Reading Factor Emission Level Limits (dBµV) (dB) (dBµV/m) (dBµV/m) (dB) 46.7 3.78 50.48 74 -23.52 42.5 3.78 46.28 54 -7.72 40.62 8.23 48.85 74 -25.15

Factor = Antenna Factor + Cable Loss - Pre-amplifier.

EUT :	Bluetooth Sports Earbuds	Model Name. :	EB200
Temperature :	20 ℃	Relative Humidtity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 8	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
4882.032	48.05	3.78	51.83	74	-22.17	peak
4882.032	43.63	3.78	47.41	54	-6.59	AVG
7323.048	39.61	8.23	47.84	74	-26.16	peak
7323.048	36.93	8.23	45.16	54	-8.84	AVG

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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EUT :	Bluetooth Sports Earbuds	Model Name. :	EB200	8
Temperature :	20 ℃	Relative Humidtity :	48%	5
Pressure :	1010 hPa	Test Voltage :	DC 3.7V	
Test Mode :	Mode 9	Polarization :	Horizontal	、龙

V/m) (dBµV/m) (dB)
.65 74 -24.35 peak
.16 54 -6.84 AVG
.23 74 -26.77 peak
.47 54 -9.53 AVG

Factor = Antenna Factor + Cable Loss - Pre-amplifier.

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EUT :	Bluetooth Sports Earbuds	Model Name. :	EB200
Temperature :	20 °C	Relative Humidtity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 9	Polarization :	Vertical

1105			-		12 Januar
Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
46.02	3.81	49.83	74	-24.17	peak
44.33	3.81	48.14	54	-5.86	AVG
40.18	8.27	48.45	74	-25.55	peak
37.04	8.27	45.31	54	-8.69	AVG
The Global Company	@ # Fnorcional Cu	B Anestalion C	Alleston		
	(dBµV) 46.02 44.33 40.18	(dBµV) (dB) 46.02 3.81 44.33 3.81 40.18 8.27	(dBµV) (dB) (dBµV/m) 46.02 3.81 49.83 44.33 3.81 48.14 40.18 8.27 48.45	(dBµV) (dB) (dBµV/m) (dBµV/m) 46.02 3.81 49.83 74 44.33 3.81 48.14 54 40.18 8.27 48.45 74	Meter Reading Factor Emission Level Limits σ (dBμV) (dB) (dBμV/m) (dBμV/m) (dB) 46.02 3.81 49.83 74 -24.17 44.33 3.81 48.14 54 -5.86 40.18 8.27 48.45 74 -25.55

Note: Other emissions from 8G to 25 GHz are considered as ambient noise. No recording in the test report. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin=Measurement-Limit.

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

The 8DPSK modulation was the worst case and only the data of worst recorded in this report.

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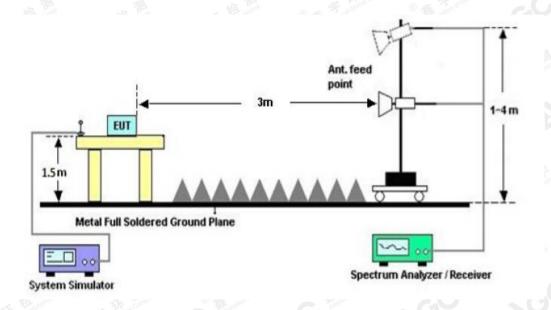
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12. BAND EDGE EMISSION

12.1. MEASUREMENT PROCEDURE

- 1. Set the EUT Work on the top, the bottom operation frequency individually.
- 2. Set SPA Start or Stop Frequency=Operation Frequency, For unrestricted band: RBW=100kHz, VBW=300kHz For restricted band: RBW=1MHz, VBW=3*RBW
 - Center frequency = Operation frequency
- 3. The band edges was measured and recorded.

12.2. TEST SET-UP



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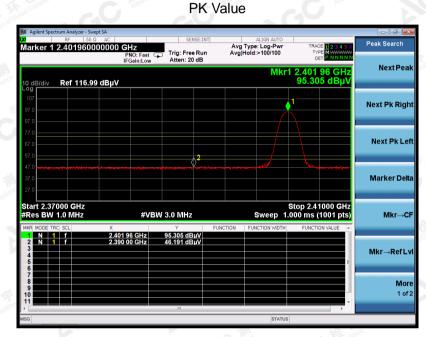


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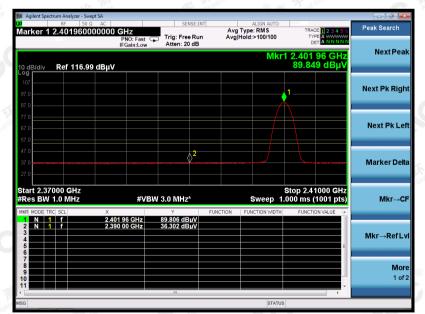
12.3. TEST RESULT

FOR BR/EDR:

EUT :	Bluetooth Sports Earbuds	Model Name. :	EB200
Temperature :	20 °C	Relative Humidtity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 7	Polarization :	Horizontal



AV Value



RESULT: PASS

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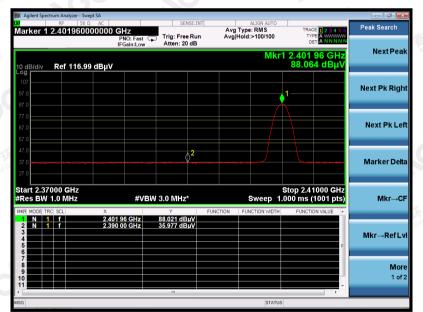
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EUT :	Bluetooth Sports Earbuds	Model Name. :	EB200
Temperature :	20 °C	Relative Humidtity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 7	Polarization :	Vertical



PK Value

AV Value



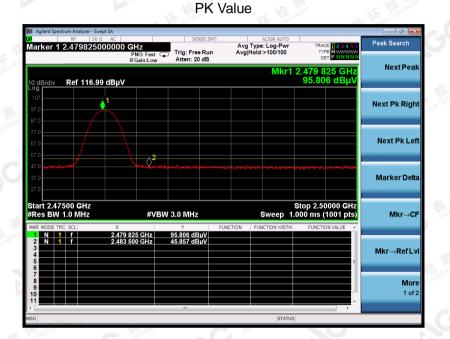
RESULT: PASS

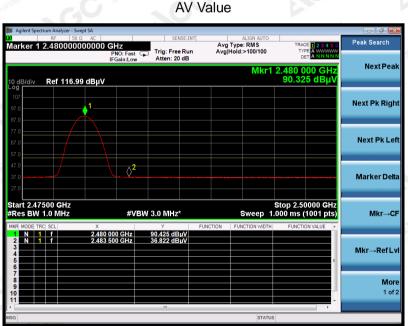
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Hest			Course Course
EUT :	Bluetooth Sports Earbuds	Model Name. :	EB200
Temperature :	20 °C	Relative Humidtity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 9	Polarization :	Horizontal
		100-	





RESULT: PASS

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Hest			Course Course
EUT :	Bluetooth Sports Earbuds	Model Name. :	EB200
Temperature :	20 °C	Relative Humidtity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 9	Polarization :	Vertical
		200	



AV Value



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 8DPSK modulation is the worst case and recorded in the report.

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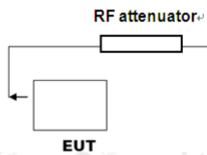
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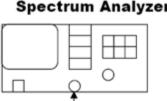
13. NUMBER OF HOPPING FREQUENCY

13.1. MEASUREMENT PROCEDURE

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer.
- 3. Set the spectrum analyzer Start = 2.4GHz Stop = 2.4835GHz
- 4. Set the Spectrum Analyzer as RBW>=1%span, VBW>=3RBW.

13.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)





RF Cable

13.3. LIMITS AND MEASUREMENT RESULT

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

TEST PLOT FOR NO. OF TOTAL CHANNELS (1Mbps)

💓 Agilent Spectrum Analyzer - Swept SA					- J -
Marker 1 Δ 78.26000000 M			ALIGN AUTO 0	16:57:40 PM Mar 13, 2019 TRACE 1 2 3 4 5 6	Marker
	PNO: Fast 🖵 Trig: Free	Run Avg Hold	d:>100/100		
	FGain:Low Atten: 20	dB			Select Marker
				78.260 MHz 0.955 dB	1
10 dB/div Ref 10.00 dBm				0.935 dB	
	ինոննեններություններ	****	14 460 460 460 160	1100/10/202	
-10.0		WARD WARD WA		YYYHHUU YYY	Normal
-20.0	a a a a a a a a a a a a a a a a a a a	111101111111111111111111111111111111111	101111111111	manna	
-30.0					
-40.0					Delta
-50.0					
-70.0				Ŵ	Fixed⊳
-80.0					TIACUP
-00.0					
Center 2.44175 GHz			٤	Span 86.00 MHz	
#Res BW 100 kHz	#VBW 300 kHz		Sweep 8.26	7 ms (1001 pts)	Off
MKR MODE TRC SCL X	Y		INCTION WIDTH	FUNCTION VALUE	
1 Δ2 1 f (Δ) 78.2 2 F 1 f 2.4017	60 MHz (Δ) 0.955 60 GHz -0.779 dB				
3					Properties►
5				E	-
8					More
10					1 of 2
				-	
MSG			STATUS		

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14. TIME OF OCCUPANCY (DWELL TIME)

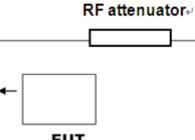
14.1. MEASUREMENT PROCEDURE

1. Place the EUT on the table and set it in transmitting mode

2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer.

- 3. Set Span = zero span, centered on a hoping channel
- 4. Set the spectrum analyzer as RBW=1MHz, VBW>=RBW, Span = 0 Hz

14.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)



EUT

Spectrum Analyzei

RF Cable

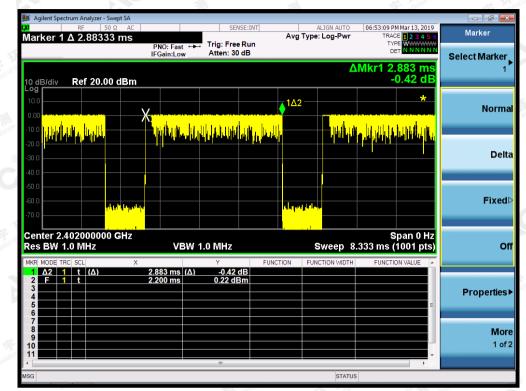
14.3. LIMITS AND MEASUREMENT RESULT

Channel	Time of Pulse for DH5 (ms)	Period Time (s)	Sweep Time (ms)	Limit (ms)
Low	2.883	31.6	307.52	400
Middle	2.883	31.6	307.52	400
High	2.883	31.6	307.52	400

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

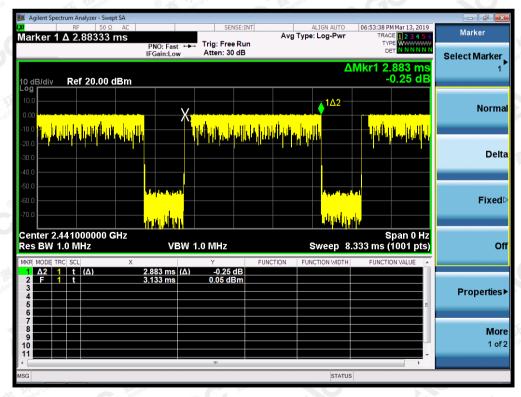
Low Channel Time 2.883*(1600/6)/79*31.6=307.62ms Middle Channel Time 2.883*(1600/6)/79*31.6=307.52ms **High Channel Time** 2.883*(1600/6)/79*31.6=307.52ms

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TEST PLOT OF LOW CHANNEL

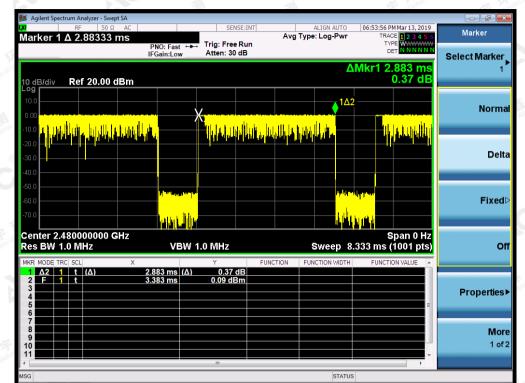
TEST PLOT OF MIDDLE CHANNEL



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TEST PLOT OF HIGH CHANNEL

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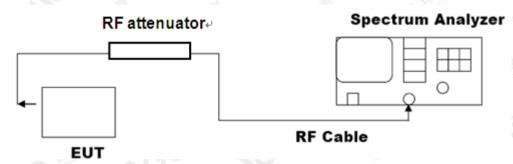
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15. FREQUENCY SEPARATION

15.1. MEASUREMENT PROCEDURE

- 1. Place the EUT on the table and set it in transmitting mode
- 2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer
- 3. Set Span = wide enough to capture the peaks of two adjacent channels Resolution (or IF) Bandwidth $(RBW) \ge 1\%$ of the span Video (or Average) Bandwidth (VBW) $\ge RBW$; Sweep = auto; Detector function = peak; Trace = max hold

15.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)



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15.3. LIMITS AND MEASUREMENT RESULT

CHANNEL	CHANNEL SEPARATION	LIMIT	RESULT
	KHz	KHz	
CH00-CH01	1000	>=25 KHz or 2/3 20 dB BW	Pass

TEST PLOT FOR FREQUENCY SEPARATION (3Mbps)



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16. LINE CONDUCTED EMISSION TEST

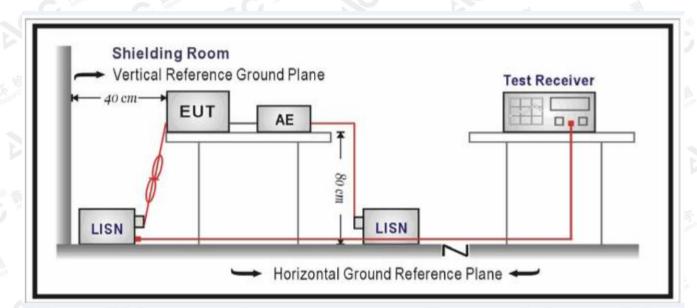
16.1. LIMITS OF LINE CONDUCTED EMISSION TEST

5 31 C	Fromosov	Maximum RF Line Voltage			
	Frequency Q.P.	Q.P.(dBuV)	Average(dBuV)		
	150kHz~500kHz	66-56	56-46		
	500kHz~5MHz	56	46		
C	5MHz~30MHz	60	50		

Note: 1. The lower limit shall apply at the transition frequency.

2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

16.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



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16.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

- 1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2. Support equipment, if needed, was placed as per ANSI C63.10.
- 3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4. All support equipments received AC120V/60Hz power from a LISN, if any.
- 5. The EUT received DC voltage by Adapter which received 120V/60Hzpower by a LISN.
- 6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
- 8. During the above scans, the emissions were maximized by cable manipulation.
- 9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

16.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

- 1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
- A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
- 3. The test data of the worst case condition(s) was reported on the Summary Data page.

16.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

N/A

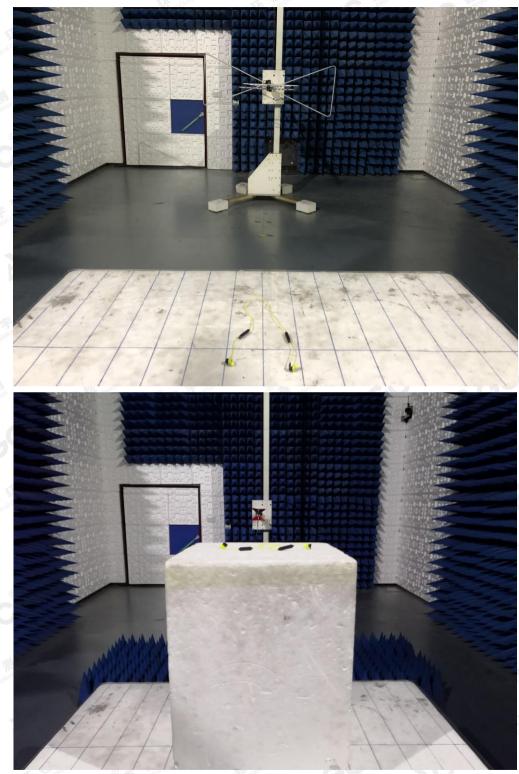
Note: The BT function of EUT didn't work when charging.

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APPENDIX A: PHOTOGRAPHS OF TEST SETUP FCC RADIATED EMISSION TEST SETUP



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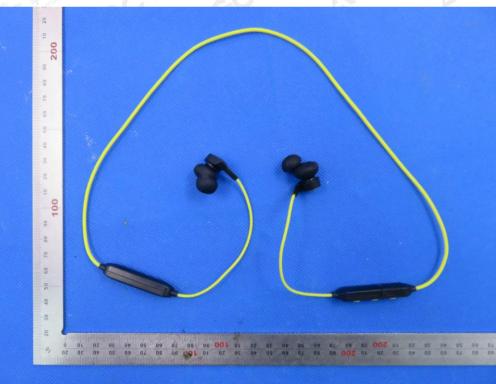


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APPENDIX B: PHOTOGRAPHS OF EUT TOP VIEW OF EUT

BOTTOM VIEW OF EUT



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FRONT VIEW OF EUT



BACK VIEW OF EUT



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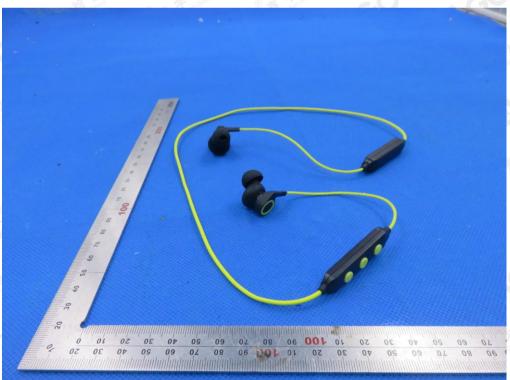


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LEFT VIEW OF EUT



RIGHT VIEW OF EUT



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VIEW OF EUT (PORT)



OPEN VIEW OF EUT

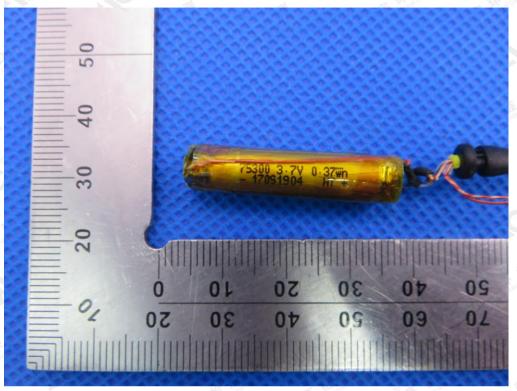


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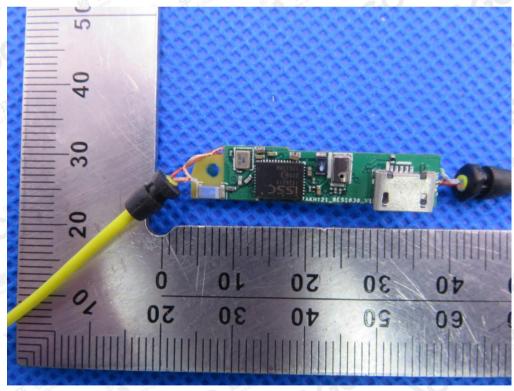


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INTERNAL VIEW OF EUT-1

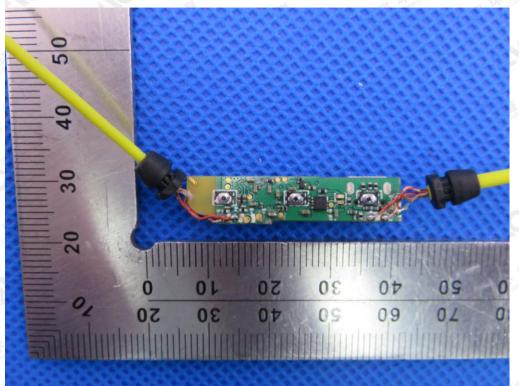


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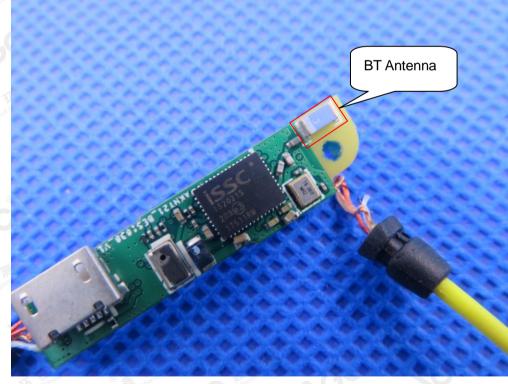


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INTERNAL VIEW OF EUT-2



INTERNAL VIEW OF EUT-3



----END OF REPORT----

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