

# **TEST REPORT**

Blade-Advance True Wireless Earbuds

**Product Name**: with Heart Rate Monitor and A.I Voice

coaching

Brand Mark : SOUL

Model No. : Blade, SB51

FCC ID 2AAWE-SB51

Report Number : BLA-EMC-202103-A3603

Date of Sample Receipt : 2021/3/11

**Date of Test** : 2021/3/11 to 2021/5/13

**Date of Issue** : 2021/5/17

Test Standard : 47 CFR Part 15, Subpart C 15.247

Test Result : Pass

Prepared for:

Soul Electronics Limited
Suite 2108, Exchange Tower, 33 Wang Chiu Road, Kowloon Bay, Hong
Kong, China

Prepared by:

BlueAsia of Technical Services(Shenzhen) Co.,Ltd.
Building C, No. 107, Shihuan Road, Shiyan Sub-District, Baoan District,
Shenzhen, Guangdong Province, China

TEL: +86-755-23059481

Compiled by:

Jozu.

Approved by:

Review by:



Sweet. Linng





Page 2 of62

## **REPORT REVISE RECORD**

Version No. Date		Description
00 2021/5/17		Original





## **TABLE OF CONTENTS**

1	7	TEST SUMMARY	6
2	(	GENERAL INFORMATION	7
3	(	GENERAL DESCRIPTION OF E.U.T	
4		TEST ENVIRONMENT	
5		TEST MODE	
6	N	MEASUREMENT UNCERTAINTY	8
7		DESCRIPTION OF SUPPORT UNIT	
8		LABORATORY LOCATION	
9	7	TEST INSTRUMENTS LIST	10
1		CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ)	
•			
	1.1		
	1.2 1.3		
	1.3		
_		CONDUCTED BAND EDGES MEASUREMENT	
2	(		
	2.1		
	2.2		
	2.3		
3	F	RADIATED SPURIOUS EMISSIONS	19
	3.1	LIMITS	19
	3.2	BLOCK DIAGRAM OF TEST SETUP	20
	3.3		
	3.4	TEST DATA	22
4	F	RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS	30
	4.1	LIMITS	30
	4.2	BLOCK DIAGRAM OF TEST SETUP	31
	4.3	PROCEDURE	31
	4.4	TEST DATA	33
5	(	CONDUCTED SPURIOUS EMISSIONS	37
	5.1	LIMITS	37



10.3

10.4

10.5

10.6

	5.2	BLOCK DIAGRAM OF TEST SETUP	3/
	5.3	TEST Data	38
6	P	OWER SPECTRUM DENSITY	39
	6.1	LIMITS	39
	6.2	BLOCK DIAGRAM OF TEST SETUP	39
	6.3	TEST Data	39
7	С	ONDUCTED PEAK OUTPUT POWER	40
	7.1	LIMITS	40
	7.2	BLOCK DIAGRAM OF TEST SETUP	40
	7.3	TEST DATA	41
3	M	IINIMUM 6DB BANDWIDTH	42
	8.1	LIMITS	42
	8.2	BLOCK DIAGRAM OF TEST SETUP	
	8.3	TEST Data	42
9	Α	NTENNA REQUIREMENT	43
	9.1	CONCLUSION	43
10	) A	PPENDIX	44
	10.1	Appendix A: DTS Bandwidth	44
		est Result	
	Te	est Graphs	45
	10.2		
		est Result	
	Te	est Graphs	47

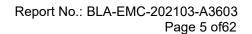
 Test Result.
 48

 Test Graphs.
 49

 Test Result.
 51

 Test Graphs.
 52

Test Result.......56





Test Graphs	57
APPENDIX A: PHOTOGRAPHS OF TEST SETUP	60
APPENDIX B. PHOTOGRAPHS OF FUT	62





Page 6 of 62

## 1 TEST SUMMARY

Test item	Test Requirement	Test Method	Class/Severity	Result
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.8 & Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.6 & Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass
Power Spectrum Density	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.5	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Minimum 6dB Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	Pass



Page 7 of 62

## 2 GENERAL INFORMATION

Applicant	Soul Electronics Limited		
Address	Suite 2108,Exchange Tower, 33 Wang Chiu Road, Kowloon Bay,Hong Kong,China		
Manufacturer	Soul Electronics Limited		
Address Suite 2108,Exchange Tower, 33 Wang Chiu Road, Kowloon Kong,China			
Soul Electronics Limited			
Address Suite 2108, Exchange Tower, 33 Wang Chiu Road, Kowloon Bay, F Kong, China			
Product Name  Blade-Advance True Wireless Earbuds with Heart Rate Monitor and Voice coaching			
Test Model No.	Blade		

## 3 GENERAL DESCRIPTION OF E.U.T.

Hardware Version	V0.4
Software Version	V1.4
Operation Frequency:	2402MHz-2480MHz
Modulation Type:	GFSK
Channel Spacing:	2MHz
Number of Channels:	40
Antenna Type:	FPC Antenna
Antenna Gain:	-1.84dBi(Provided by customer)



Page 8 of 62

# 4 TEST ENVIRONMENT

Environment	Temperature	Voltage	
Normal	25°C	DC3.7V	

## 5 TEST MODE

TEST MODE	TEST MODE DESCRIPTION		
Transmitting mode	Keep the EUT in continuously transmitting mode with modulation.		
Remark: Full battery is used during all test except ac conducted emission, Only the worst mode would be recorded in this report.			

## **6 MEASUREMENT UNCERTAINTY**

Parameter	Expanded Uncertainty (Confidence of 95%)		
Radiated Emission(9kHz-30MHz)	±4.34dB		
Radiated Emission(30Mz-1000MHz)	±4.24dB		
Radiated Emission(1GHz-18GHz)	±4.68dB		
AC Power Line Conducted Emission(150kHz-30MHz)	±3.45dB		



Page 9 of62

# 7 DESCRIPTION OF SUPPORT UNIT

Device Type Manufacturer		Model Name	Serial No.	Remark
AC Adapter	UGREEN	CD112	N/A	N/A
PC	HASEE	K610D	N/A	N/A

## 8 LABORATORY LOCATION

All tests were performed at:

BlueAsia of Technical Services(Shenzhen) Co., Ltd.

Building C, No. 107, Shihuan Road, Shiyan Sub-District, Baoan District, Shenzhen, Guangdong Province, China

Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673

No tests were sub-contracted.



Page 10 of62

# 9 TEST INSTRUMENTS LIST

Test Equipment Of Conducted Emissions at AC Power Line (150kHz-30MHz)					
Equipment	Cal.Date	Cal.Due			
Shield room	SKET	833	N/A	2020/11/25	2023/11/24
Receiver	R&S	ESPI3	101082	2020/10/12	2021/10/11
LISN	R&S	ENV216	3560.6550.15	2020/10/12	2021/10/11
LISN	AT	AT166-2	AKK1806000003	2020/10/12	2021/10/11
EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A

Test Equipment Of 0	Test Equipment Of Conducted Band Edges Measurement								
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due				
Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11				
Spectrum	Agilent	N9020A	MY49100060	2020/10/12	2021/10/11				
Signal Generator	Agilent	N5182A	MY49060650	2020/10/12	2021/10/11				
Signal Generator	Agilent	E8257D	MY44320250	2020/10/12	2021/10/11				

Test Equipment Of	Test Equipment Of Radiated Spurious Emissions								
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due				
Chamber	SKET	966	N/A	2020/11/10	2023/11/9				
Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11				
Receiver	R&S	ESR7	101199	2020/10/12	2021/10/11				
broadband Antenna	Schwarzbeck		00836 P:00227	2020/9/26	2022/9/25				
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	2020/9/26	2022/9/25				



Page 11 of62

Amplifier	SKET	PA-000318G-45	N/A	2020/10/16	2021/10/15
EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	2020/9/26	2022/9/25
Controller	SKET	N/A	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-02	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-03	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-01	LA-XC-01 N/A N/A		N/A

Test Equipment Of	Test Equipment Of Radiated Emissions which fall in the restricted bands							
Equipment	Manufacturer	Model S/N		Cal.Date	Cal.Due			
Chamber	SKET	966	N/A	2020/11/10	2023/11/9			
Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11			
Receiver	R&S	ESR7	101199	2020/10/12	2021/10/11			
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	2020/9/26	2022/9/25			
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	2020/9/26	2022/9/25			
Amplifier	SKET	PA-000318G-45	N/A 2020/10/16		2021/10/15			
EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A			
Loop antenna	SCHNARZBECK	FMZB1519B	00102	2020/9/26	2022/9/25			
Controller	SKET	N/A	N/A	N/A	N/A			
Coaxial Cable	BlueAsia	BLA-XC-02	N/A	N/A	N/A			
Coaxial Cable	BlueAsia	BLA-XC-03	N/A	N/A	N/A			
Coaxial Cable	BlueAsia	BLA-XC-01	N/A	N/A	N/A			

Test Equipment Of Conducted Spurious Emissions							
Equipment	Manufacturer	Manufacturer Model S/N Cal.Da					
Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11		



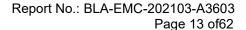
Page 12 of62

Spectrum	Agilent	N9020A	MY49100060	2020/10/12	2021/10/11
Signal Generator	Agilent	N5182A	MY49060650	2020/10/12	2021/10/11
Signal Generator	Agilent	E8257D	MY44320250	2020/10/12	2021/10/11

Test Equipment Of	Test Equipment Of Power Spectrum Density								
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due				
Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11				
Spectrum	Agilent	N9020A	MY49100060	2020/10/12	2021/10/11				
Signal Generator	Agilent	N5182A	MY49060650	2020/10/12	2021/10/11				
Signal Generator	Agilent	E8257D	MY44320250	2020/10/12	2021/10/11				

Test Equipment Of Conducted Peak Output Power								
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due			
Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11			
Spectrum	Agilent	N9020A	MY49100060	2020/10/12	2021/10/11			
Signal Generator	Agilent	N5182A	MY49060650	2020/10/12	2021/10/11			
Signal Generator	Agilent	E8257D	MY44320250	2020/10/12	2021/10/11			

Test Equipment Of Minimum 6dB Bandwidth								
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due			
Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11			
Spectrum	Agilent	N9020A	MY49100060	2020/10/12	2021/10/11			
Signal Generator	Agilent	N5182A	MY49060650	2020/10/12	2021/10/11			
Signal Generator	Agilent	E8257D	MY44320250	2020/10/12	2021/10/11			





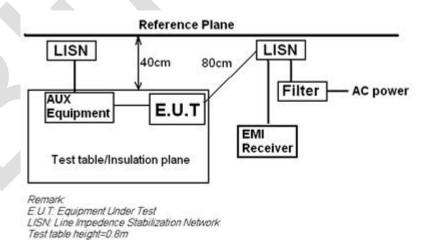
1 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ)

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

## 1.1 LIMITS

Frequency of	Conducted limit(dBμV)				
emission(MHz)	Quasi-peak	Average			
0.15-0.5	66 to 56*	56 to 46*			
0.5-5	56	46			
5-30	-60	50			
5-30 *Decreases with the logarithm		50			

## 1.2 BLOCK DIAGRAM OF TEST SETUP



1.3 PROCEDURE

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50H + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as



Page 14 of62

the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

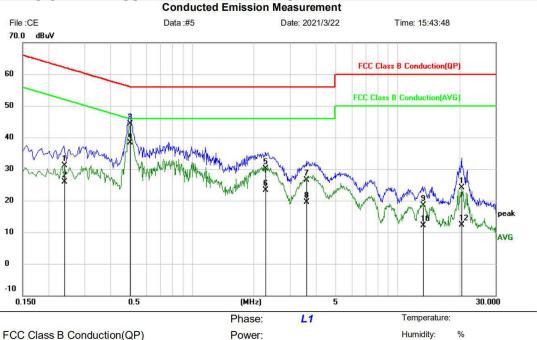
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor



## **TEST DATA**

# [TestMode: TX]; [Line: Line]; [Power: AC120V/60Hz]



Limit: FCC Class B Conduction(QP)

EUT: Blade-Advance True Wireless M/N: Blade

Mode: BLE mode

Note:

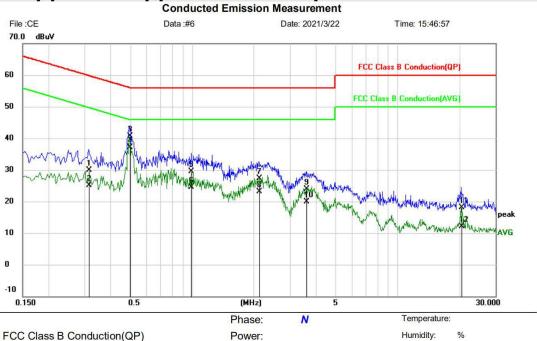
Site

No. N	۸k.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2380	21.21	9.84	31.05	62.17	-31.12	QP	
2		0.2380	16.13	9.84	25.97	52.17	-26.20	AVG	
3		0.4980	34.47	9.87	44.34	56.03	-11.69	QP	
4 *	k	0.4980	28.38	9.87	38.25	46.03	-7.78	AVG	
5		2.2740	20.16	9.95	30.11	56.00	-25.89	QP	
6		2.2740	13.34	9.95	23.29	46.00	-22.71	AVG	
7		3.6220	16.53	9.98	26.51	56.00	-29.49	QP	
8		3.6220	9.59	9.98	19.57	46.00	-26.43	AVG	
9		13.2740	8.14	10.29	18.43	60.00	-41.57	QP	
10		13.2740	1.79	10.29	12.08	50.00	-37.92	AVG	
11		20.5540	13.77	10.42	24.19	60.00	-35.81	QP	
12		20.5540	1.81	10.42	12.23	50.00	-37.77	AVG	

\*:Maximum data (Reference Only x:Over limit !:over margin



[TestMode: TX]; [Line: Neutral] ;[Power:AC120V/60Hz]



Limit: FCC Class B Conduction(QP)

EUT: Blade-Advance True Wireless

M/N: Blade Mode: BLE mode

Note:

Site

No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.3140	20.18	9.77	29.95	59.86	-29.91	QP	
2	0.3140	15.35	9.77	25.12	49.86	-24.74	AVG	
3	0.4980	30.91	9.79	40.70	56.03	-15.33	QP	
4 *	0.4980	27.33	9.79	37.12	46.03	-8.91	AVG	
5	0.9900	19.67	9.84	29.51	56.00	-26.49	QP	
6	0.9900	14.74	9.84	24.58	46.00	-21.42	AVG	
7	2.1180	17.42	9.86	27.28	56.00	-28.72	QP	
8	2.1180	13.25	9.86	23.11	46.00	-22.89	AVG	
9	3.6220	13.93	9.91	23.84	56.00	-32.16	QP	
10	3.6220	10.01	9.91	19.92	46.00	-26.08	AVG	
11	20.3819	7.59	10.42	18.01	60.00	-41.99	QP	
12	20.3819	1.64	10.42	12.06	50.00	-37.94	AVG	

\*:Maximum data x:Over limit Reference Only !:over margin



Page 17 of 62

## 2 CONDUCTED BAND EDGES MEASUREMENT

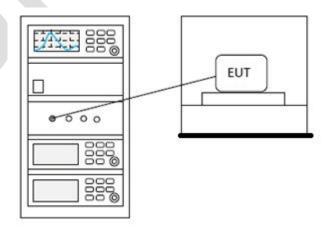
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.8 & Section 11.13.3.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

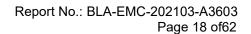
## 2.1 LIMITS

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated 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) (see §15.205(c)).

## 2.2 BLOCK DIAGRAM OF TEST SETUP







2.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details





Page 19 of 62

## 3 RADIATED SPURIOUS EMISSIONS

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.4,6.5,6.6
Test Mode (Pre-Scan)	TX mode (SE) below 1G;TX mode (SE) Above 1G
Test Mode (Final Test)	TX mode (SE) below 1G;TX mode (SE) Above 1G
Tester	Jozu
Temperature	25℃
Humidity	60%

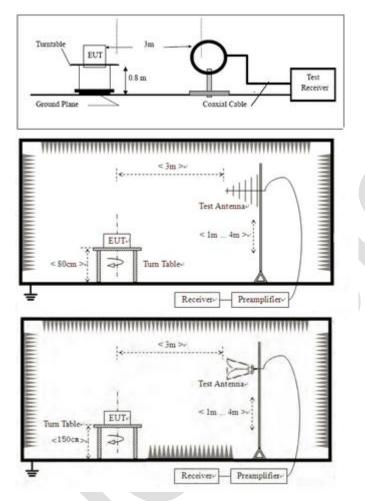
## 3.1 LIMITS

Frequency(MHz)	Field strength(microvolts/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

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.



## 3.2 BLOCK DIAGRAM OF TEST SETUP



## 3.3 PROCEDURE

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.



Report No.: BLA-EMC-202103-A3603 Page 21 of62

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

### Remark:

- 1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
- 2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

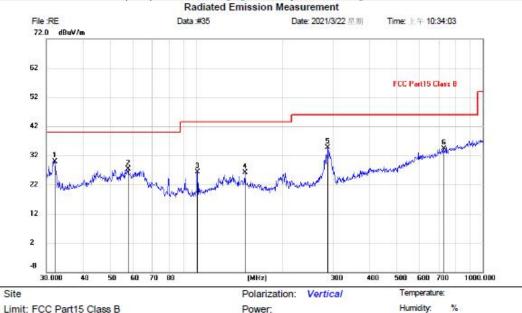
Final Test Level =Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor

- 3) Scan from 9kHz to 25GHz, the disturbance above 7GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. fundamental frequency is blocked by filter, and only spurious emission is shown.
- 4) For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



### **TEST DATA** 3.4

# [TestMode: TX mode (SE) below 1G]; [Polarity: Vertical]



Limit: FCC Part15 Class B

EUT: Blade-Advance True Wireless

Mode: BLE mode

Note:

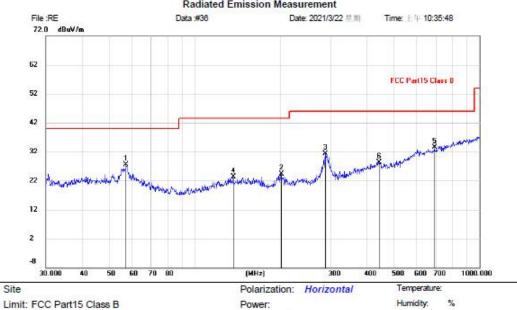
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	31.9546	7.53	22.40	29.93	40.00	-10.07	QP			
2		57.7962	3.73	23.53	27.26	40.00	-12.74	QP			
3		100.9339	5.69	20.55	26.24	43.50	-17.26	QP			
4		147.9214	2.87	23.32	26.19	43.50	-17.31	QP			
5	1	287.9904	10.97	23.73	34.70	46.00	-11.30	QP			
6		729.3583	1.15	33.12	34.27	46.00	-11.73	QP			

Power:

Distance: 3m



# [TestMode: TX mode (SE) below 1G]; [Polarity: Horizontal]



Distance: 3m

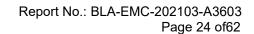
Limit: FCC Part15 Class B

EUT: Blade-Advance True Wireless

M/N: Blade Mode: BLE mode

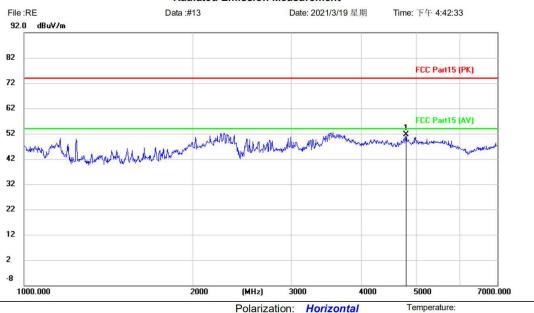
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	57.3923	4.02	23.54	27.56	40.00	-12.44	QP			
2		200.6881	3.61	20.72	24.33	43.50	-19.17	QP			
3		287.9904	7.65	23.73	31.38	46.00	-14.62	QP			
4		135.9822	0.12	23.22	23.34	43.50	-20.16	QP			
5		694.4174	1.09	32.39	33.48	46.00	-12.52	QP			
6		441.7426	0.36	27.97	28.33	46.00	-17.67	QP			





[TestMode: TX Low channel]; [Polarity: Horizontal]
Radiated Emission Measurement



Site

Limit: FCC Part15 (PK)

EUT: Blade-Advance True Wireless

M/N: Blade Mode: BLE-TX-L

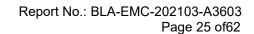
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4808.328	56.05	-4.54	51.51	74.00	-22.49	peak			

Power:

Distance:

\*:Maximum data (Reference Only x:Over limit !:over margin





[TestMode: TX Low channel]; [Polarity: Vertical]
Radiated Emission Measurement



Site

Limit: FCC Part15 (PK)

EUT: Blade-Advance True Wireless

M/N: Blade Mode: BLE-TX-L

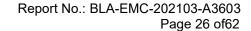
Note:

No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4808.328	55.62	-4.54	51.08	74.00	-22.92	peak			

Power:

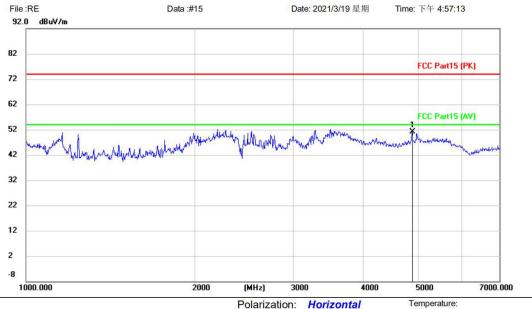
Distance:

\*:Maximum data (Reference Only x:Over limit !:over margin





[TestMode: TX middle channel]; [Polarity: Horizontal]
Radiated Emission Measurement



Site

Limit: FCC Part15 (PK)

EUT: Blade-Advance True Wireless

M/N: Blade Mode: BLE-TX-M

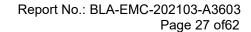
Note:

No.	Mk	c. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4883.767	55.55	-4.51	51.04	74.00	-22.96	peak			

Power:

Distance:

\*:Maximum data (Reference Only x:Over limit !:over margin





[TestMode: TX middle channel]; [Polarity: Vertical]
Radiated Emission Measurement



Site

Limit: FCC Part15 (PK)

EUT: Blade-Advance True Wireless

M/N: Blade Mode: BLE-TX-M

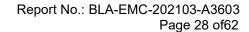
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4883.767	53.68	-4.51	49.17	74.00	-24.83	peak			

Power:

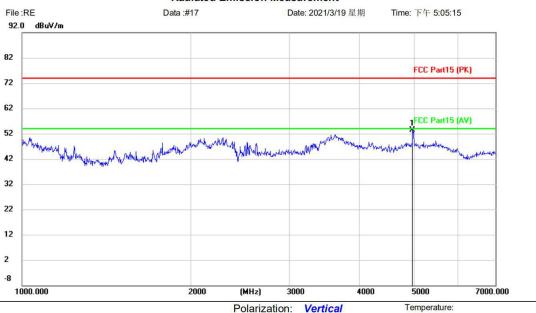
Distance:

\*:Maximum data (Reference Only x:Over limit !:over margin





[TestMode: TX high channel]; [Polarity: Vertical]
Radiated Emission Measurement



Site

Limit: FCC Part15 (PK)

EUT: Blade-Advance True Wireless

M/N: Blade Mode: BLE-TX-H

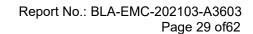
Note:

No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4979.731	56.81	-3.47	53.34	74.00	-20.66	peak			

Power:

Distance:

\*:Maximum data (Reference Only x:Over limit !:over margin





# [TestMode: TX high channel]; [Polarity: Horizontal] Radiated Emission Measurement



Site

Limit: FCC Part15 (PK)

EUT: Blade-Advance True Wireless

M/N: Blade Mode: BLE-TX-H

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4960.388	55.37	-3.73	51.64	74.00	-22.36	peak			

Power:

Distance:

\*:Maximum data (Reference Only x:Over limit !:over margin





## RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS

Test Standard	47 CFR Part 15, Subpart C 15.247			
Test Method	ANSI C63.10 (2013) Section 6.10.5			
Test Mode (Pre-Scan)	TX			
Test Mode (Final Test)	TX			
Tester	Jozu			
Temperature	25℃			
Humidity	60%			

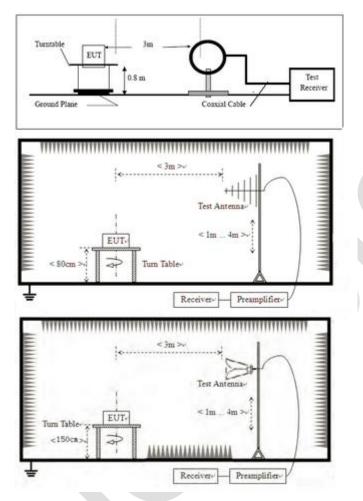
### 4.1 LIMITS

Frequency(MHz)	Field strength(microvolts/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

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.



4.2 BLOCK DIAGRAM OF TEST SETUP



## 4.3 PROCEDURE

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.



Page 32 of 62

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

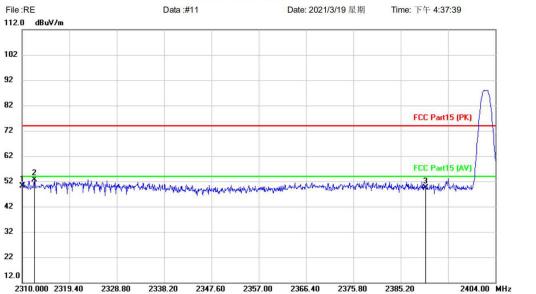


Page 33 of 62

## **TEST DATA**

# [TestMode: TX Low channel]; [Polarity: Horizontal]

## **Radiated Emission Measurement**



Site

Limit: FCC Part15 (PK)

EUT: Blade-Advance True Wireless

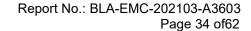
M/N: Blade Mode: BLE-TX-L

Note:

							-
							-
	2357.00 olarizati	0.750	66.40	2375.80	2385.20 Temp	2404.00 erature:	MHz
	ower:	OH.	110112	Contai	Humid		
Di	stance:						

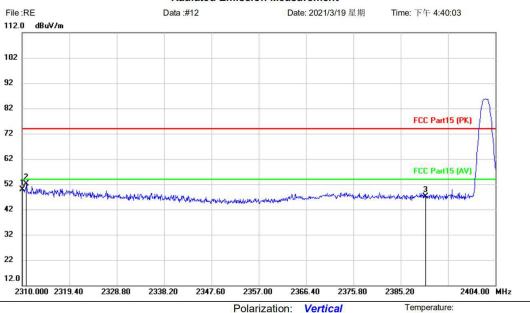
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2310.000	65.04	-14.84	50.20	74.00	-23.80	peak			
2	*	2312.444	67.40	-14.82	52.58	74.00	-21.42	peak			
3		2390.000	64.01	-14.60	49.41	74.00	-24.59	peak			

\*:Maximum data (Reference Only x:Over limit !:over margin





[TestMode: TX Low channel]; [Polarity: Vertical]
Radiated Emission Measurement



Site

Limit: FCC Part15 (PK)

EUT: Blade-Advance True Wireless

M/N: Blade Mode: BLE-TX-L

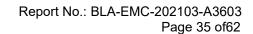
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2310.000	64.64	-14.84	49.80	74.00	-24.20	peak			
2	*	2310.846	66.97	-14.84	52.13	74.00	-21.87	peak			
3		2390.000	61.71	-14.60	47.11	74.00	-26.89	peak			

Power:

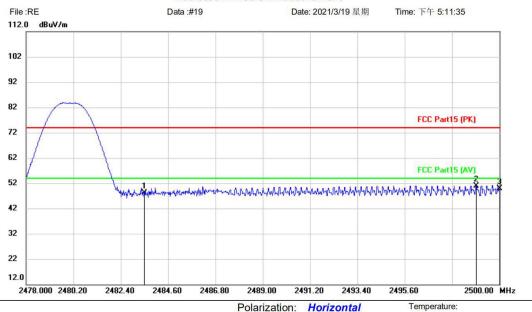
Distance:

\*:Maximum data (Reference Only x:Over limit !:over margin





[TestMode: TX high channel]; [Polarity: Horizontal]
Radiated Emission Measurement



Site

Limit: FCC Part15 (PK)

EUT: Blade-Advance True Wireless

M/N: Blade Mode: BLE-TX-H

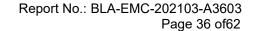
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2483.500	62.38	-14.33	48.05	74.00	-25.95	peak			
2	*	2498.922	65.26	-14.28	50.98	74.00	-23.02	peak			
3		2500.000	64.03	-14.27	49.76	74.00	-24.24	peak			

Power:

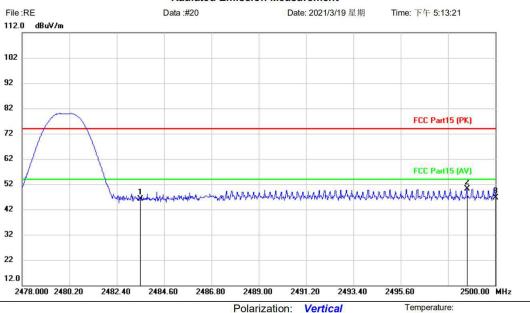
Distance:

\*:Maximum data (Reference Only x:Over limit !:over margin





[TestMode: TX high channel]; [Polarity: Vertical]
Radiated Emission Measurement



Site

Limit: FCC Part15 (PK) EUT: Blade-Advance True Wireless

M/N: Blade Mode: BLE-TX-H

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2483.500	60.57	-14.33	46.24	74.00	-27.76	peak			
2	*	2498.680	64.37	-14.28	50.09	74.00	-23.91	peak			
3		2500.000	60.99	-14.27	46.72	74.00	-27.28	peak			

Power:

Distance:

\*:Maximum data (Reference Only x:Over limit !:over margin



Page 37 of 62

## 5 CONDUCTED SPURIOUS EMISSIONS

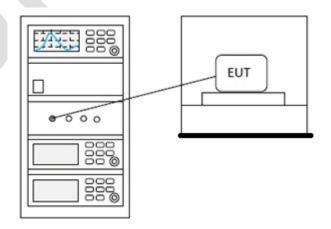
Test Standard	47 CFR Part 15, Subpart C 15.247					
Test Method	ANSI C63.10 (2013) Section 7.8.6 & Section 11.11					
Test Mode (Pre-Scan)	TX					
Test Mode (Final Test)	TX					
Tester	Jozu					
Temperature	25℃					
Humidity	60%					

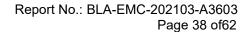
## 5.1 LIMITS

me
Limit: cor

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated 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) (see §15.205(c)).

## 5.2 BLOCK DIAGRAM OF TEST SETUP







5.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details





Page 39 of 62

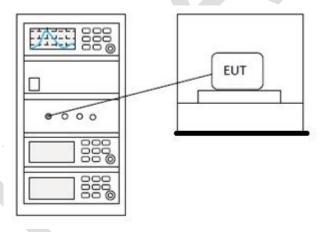
## 6 POWER SPECTRUM DENSITY

Test Standard	47 CFR Part 15, Subpart C 15.247					
Test Method	ANSI C63.10 (2013) Section 11.10.2					
Test Mode (Pre-Scan)	TX					
Test Mode (Final Test)	TX					
Tester	Jozu					
Temperature	25℃					
Humidity	60%					

## 6.1 LIMITS

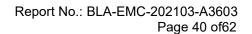
**Limit:** | ≤8dBm in any 3 kHz band during any time interval of continuous transmission

## 6.2 BLOCK DIAGRAM OF TEST SETUP



## 6.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details





7 CONDUCTED PEAK OUTPUT POWER

Test Standard	47 CFR Part 15, Subpart C 15.247					
Test Method	ANSI C63.10 (2013) Section 7.8.5					
Test Mode (Pre-Scan)	TX					
Test Mode (Final Test)	TX					
Tester	Jozu					
Temperature	25℃					
Humidity	60%					

## 7.1 LIMITS

Frequency range(MHz)	Output power of the intentional radiator(watt)
	1 for ≥50 hopping channels
902-928	0.25 for 25≤ hopping channels <50
	1 for digital modulation
	1 for ≥75 non-overlapping hopping channels
2400-2483.5	0.125 for all other frequency hopping systems
	1 for digital modulation
5505 5050	1 for frequency hopping systems and digital
5725-5850	modulation

## 7.2 BLOCK DIAGRAM OF TEST SETUP

