

SZEMC-TRF-01 Rev. A/1 Report No.: SZCR240200064502

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TEST REPORT

Application No.: SZCR2402000645AT **Applicant:** B&W Group Ltd.,

Address of Applicant: Dale Road, Worthing, West Sussex, BN11 2BH, England

Manufacturer: B&W Group Ltd.,

Address of Manufacturer: Dale Road, Worthing, West Sussex, BN11 2BH, England

Factory: Merry Electronics (Shenzhen) Co., Ltd. The Second Longhua Branch Address of Factory: Floor1~5, Building A&B, Merry Industrial Park, Huarong Road, Dalang

Street, Longhua New District, 518109 Shenzhen City, Guangdong Province,

PEOPLE'S REPUBLIC OF CHINA

Equipment Under Test (EUT):

EUT Name: In-ear True Wireless Earbuds

Model No.: Pi6

Trade Mark: **Bowers & Wilkins** EN 301 489-1 V2.2.3 Standard(s):

EN 301 489-17 V3.2.4

Date of Receipt: 2024-02-27

Date of Test: 2024-02-29 to 2024-03-08

2024-03-19 Date of Issue:

Pass* Test Result:

Keny Xu **EMC Laboratory Manager**

Ceny. Ku



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^{*} In the configuration tested, the EUT complied with the standards specified above.



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	Revision Record					
Version	Version Chapter Date Modifier Remark					
01		2024-03-19		Original		

Authorized for issue by:		
	Brie Chan	
	Bill Chen/Project Engineer	
	Exic Fu	
	Eric Fu/Reviewer	



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Test Summary 2

Emission Part							
Item	Standard	Method	Requirement	Result			
Radiated Emissions (30MHz-1GHz)	EN 301 489-1 V2.2.3 EN 301 489-17 V3.2.4	EN 55032: 2015+A11:2020 +A1:2020	Class B	Pass			

Immunity Part				
Item	Standard	Method	Requirement	Result
Electrostatic Discharge	EN 301 489-1 V2.2.3	EN 61000-4-2:2009	4kV Contact Discharge 8kV Air Discharge	Pass
Radiated Immunity (80MHz-6GHz)	EN 301 489-17 V3.2.4	EN IEC 61000-4-3: 2020	3V/m, 80%, 1kHz Amp. Mod.	Pass



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General Information

Details of E.U.T. 4.1

Power supply:	Lithium Ion Battery: DC 3.85V 80mAh 0.308Wh rechargeable battery which charged by charging case for left earbud and right earbud Lithium Ion Battery: DC 3.7V 500mAh 1.85Wh rechargeable battery which charged by USB port for charging case
Cable(s):	USB-C charging cable:55cm unshielded
The highest working frequency:	32MHz

Remark: The information in this section is provided by the applicant or manufacturer, SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
iPhone 13	Apple	MLE03ZA/A	REF. No.SEA16Q01

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty				
Radiated Emissions (30MHz-1GHz)	± 5.0dB				
Electrostatic Discharge	± 6%				
Radiated Immunity (80MHz-6GHz)	± 2.1dB				

Remark:

The U_{lab} (lab Uncertainty) is less than $U_{cispr/ETSI}$ (CISPR/ETSI Uncertainty), so the test results

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.



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4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 Test Facility

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

A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

VCCI (Member No. 1937)

The 3m Fully-anechoic chamber for above 1GHz. 10m Semi-anechoic chamber for below 1GHz. Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen EMC laboratory have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC -Designation Number: CN1336

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1336. Test Firm Registration Number: 787754.

Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

4.8 Monitoring of EUT for All Immunity Test

Visual: Monitored the light status of the EUT.

Monitored the sound the EUT. Audio:



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Equipment List 5

Radiated Emissions (30MHz-1GHz)						
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date	
10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2021-03-27	2024-03-26	
MXE EMI receiver	KEYSIGHT	N9038A	SEM004-16	2023-10-19	2024-10-18	
Trilog-Broadband Antenna	Schwarzbeck	VULB9168	SEM003-18	2023-09-23	2025-09-22	
Pre-amplifier	Sonoma Instrument Co	310N	SEM005-04	2023-03-31	2024-03-30	
Loop Antenna	ETS-Lindgren	6502	SEM003-08	2023-11-20	2025-11-19	
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A	
Coaxial Cable	SGS	N/A	SEM029-01	2023-07-07	2024-07-06	

Electrostatic Discharge					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
ESD Generator	TESEQ AG	NSG 437	SEM019-02	2023-03-22	2024-03-21

Radiated Immunity (80MHz-6GHz)						
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date	
Fully-Anechoic Chamber 2	Chang Zhou Zhong Shuo	854	SEM001-05	2023-06-19	2026-06-18	
Power Sensor	Rohde & Schwarz	NRP-Z91	SEM009-09	2023-03-21	2024-03-20	
Stacked LogPer Broadband Antenna	Schwarzbeck	STLP 9129	SEM003-25	N/A	N/A	
Signal Generator	Rohde & Schwarz	SMB100A	SEM006-11	2023-03-21	2024-03-20	
Broadband Amplifier	Rohde & Schwarz	BBA150- BC250	SEM005-12	2023-09-19	2024-09-18	
Broadband Amplifier	Rohde & Schwarz	BBA150-D110	SEM005-13	2023-03-21	2024-03-20	
Broadband Amplifier	Rohde & Schwarz	BBA150-E60	SEM005-16	2023-03-21	2024-03-20	
Measurement Software	Rohde & Schwarz	EMC32 V9.25.00	N/A	N/A	N/A	



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General used equipmen	t				
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	deli	8838	SEM002-32	2023-07-28	2024-07-27
Humidity/ Temperature Indicator	deli	8838	SEM002-33	2023-07-28	2024-07-27
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2023-03-23	2024-03-22



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6 **Emission Test Results**

6.1 Radiated Emissions (30MHz-1GHz)

Test Requirement: EN 301 489-1 V2.2.3

EN 301 489-17 V3.2.4

Test Method: EN 55032: 2015+A11:2020+A1:2020

Measurement Distance: 10m

Limit:

ERECHENCY (MH-)	dBuV/m (At 10m)	dBuV/m (At 3m)		
FREQUENCY (MHz)	Class B	Class B		
30 ~ 230	30	40		
230 ~ 1000	37	47		
Detector: Peak for pre-scan (120kHz resolution bandwidth) 30MHz to 1000MHz				

6.1.1 E.U.T. Operation

Operating Environment:

Humidity: 45.8 % RH Atmospheric Pressure: 1020 mbar Temperature: 25.1 °C

6.1.2 Test Mode Description

0.1.2 1000	orize reachioac beautipation				
Pre-scan / Final test	Mode Code	Description			
Final test	14	Operation(BT): Keep the EUT playing music by connecting to your cell phone's Bluetooth.			
Pre-scan	15	Idle:Keep the EUT standby.			



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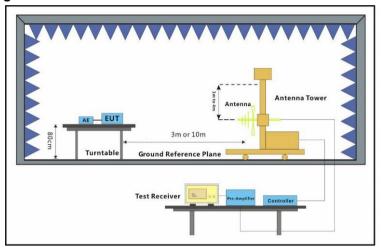
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6.1.3 Test Setup Diagram



6.1.4 Measurement Procedure and Data

Frequency range: 30MHz-1GHz

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.

The red line show in graphic is the limit in standard used in this section.

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



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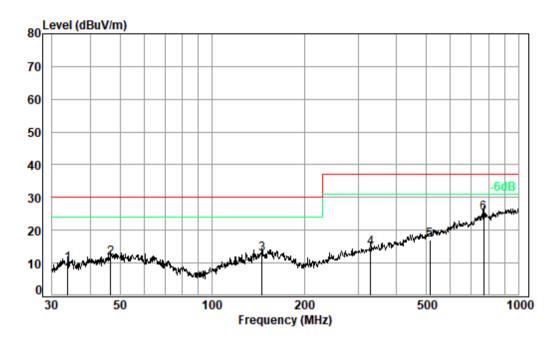


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Test Mode: 14; Polarity: Horizontal



Condition: 10m HORIZONTAL

Job No. : 00645AT

Test Mode: 14

	nouc. I								
		Read	Ant	Cable	Preamp		Limit	0ver	
	Fre	q Level	Factor	Loss	Factor	Level	Line	Limit	Remark
	MH	z dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	33.79	9 25.59	16.29	0.41	32.50	9.79	30.00	-20.21	QP
2	46.66	6 25.78	17.78	0.49	32.50	11.55	30.00	-18.45	QP
3	145.35	1 26.63	17.53	0.94	32.40	12.70	30.00	-17.30	QP
4	329.03	9 27.00	18.38	1.48	32.30	14.56	37.00	-22.44	QP
5	513.63	3 25.40	22.13	1.86	32.31	17.08	37.00	-19.92	QP
6 r	op 768.74	8 28.54	26.42	2.39	32.09	25.26	37.00	-11.74	OP



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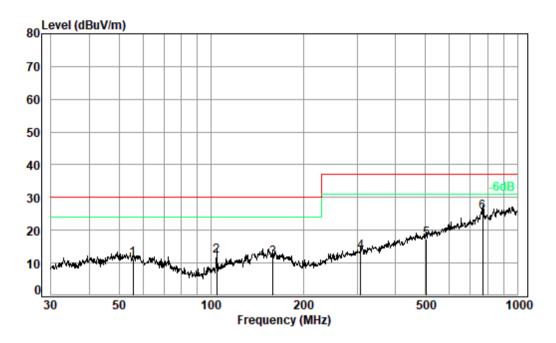


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Test Mode: 14; Polarity: Vertical



Condition: 10m VERTICAL

Job No. : 00645AT

Test Mode: 14

	5		Ant						Damanta
	Freq	revel	Factor	LOSS	Factor	revel	Line	Limit	Kemark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	55.609	25.40	17.84	0.53	32.48	11.29	30.00	-18.71	QP
2	104.170	30.15	13.78	0.74	32.40	12.27	30.00	-17.73	QP
3	159.225	25.29	17.80	0.99	32.40	11.68	30.00	-18.32	QP
4	307.831	26.48	17.72	1.43	32.30	13.33	37.00	-23.67	QP
5	504.706	25.97	21.96	1.83	32.31	17.45	37.00	-19.55	QP
6 pp	768.748	28.84	26.42	2.39	32.09	25.56	37.00	-11.44	QP



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Immunity Test Results 7

Performance Criteria Description in EN 301 489-1 V2.2.3

1 chormance officina description in EN 001 405-1 V2:2:0					
Performance criteria for	During the test, the equipment shall:				
continuous phenomena	continue to operate as intended;				
	not unintentionally transmit;				
	not unintentionally change its operating state;				
	not unintentionally change critical stored data.				
Performance criteria for transient phenomena	For all ports and transient phenomena with the exception described below, the following applies:				
	The application of the transient phenomena shall not result in a change of the mode of operation (e.g. unintended transmission) or the loss of critical stored data.				
	After application of the transient phenomena, the equipment shall operate as intended.				
	For surges applied to symmetrically operated wired network ports intended to be connected directly to outdoor lines the following criteria applies:				
	• For products with only one symmetrical port intended for connection to outdoor lines, loss of function is allowed, provided the function is self-recoverable, or can be otherwise restored. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.				
	• For products with more than one symmetrical port intended for connection to outdoor lines, loss of function on the port under test is allowed, provided the function is self-recoverable. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.				



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Performance Criteria Description in EN 301 489-17 V3.2.4

Criteria	During Test	After Test		
		(i.e. as a result of the application of the test)		
	Shall operate as intended.	Shall operate as intended.		
	(see note).	Shall be no degradation of performance.		
Α	Shall be no loss of function.	Shall be no loss of function.		
	Shall be no unintentional transmissions.	Shall be no loss of critical stored data.		
	May be loss of function.	Functions shall be self-recoverable.		
В		Shall operate as intended after recovering.		
		Shall be no loss of critical stored data.		
	May be loss of function.	Functions shall be recoverable by the operator.		
С		Shall operate as intended after recovering.		
		Shall be no loss of critical stored data.		

NOTE: Operate as intended during the test allows a level of degradation in accordance with Minimum performance level.

Minimum performance level

For equipment that supports a PER or FER, the minimum performance level shall be a PER or FER less than or equal to 10 %.

For equipment that does not support a PER or a FER, the minimum performance level shall be no loss of the wireless transmission function needed for the intended use of the equipment.

Performance criteria for Continuous phenomena

The performance criteria A shall apply.

Where the EUT is a transmitter in standby mode, unintentional transmission shall not occur during the test. Where the EUT is a transceiver in receive mode, unintentional transmission shall not occur during the test.

Performance criteria for Transient phenomena

The performance criteria B shall apply, except for voltage dips greater than or equal to 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply.

Where the EUT is a transmitter in standby mode, unintentional transmission shall not occur as a result of the application of the test.

Where the EUT is a transceiver in receive mode, unintentional transmission shall not occur as a result of the application of the test.



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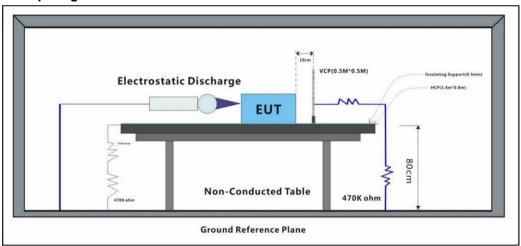
7.1 Electrostatic Discharge

Test Requirement: EN 301 489-1 V2.2.3

EN 301 489-17 V3.2.4

Test Method: EN 61000-4-2:2009

7.1.1 Test Setup Diagram



7.1.2 E.U.T. Operation

Operating Environment:

Temperature: 26.3 °C Humidity: 46.2 % RH Atmospheric Pressure: 1020 mbar

7.1.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description				
Final test	14	Operation(BT): Keep the EUT playing music by connecting to your cell phone's Bluetooth.				
Final test	15	Idle:Keep the EUT standby.				



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7.1.4 Test Condition and Results:

Performance Criterion: B

Discharge Impedance: 330Ω/150pF

Number of Discharge: Minimum 10 times at each test point

Discharge Mode: Single Discharge Discharge Period: 1 second minimum

Test Point: 1. All insulated enclosure and seams.

2. All accessible metal parts of the enclosure.

3. All side

Discharge type	Level (kV)	Polarity	Test Point	Result / Observations
Air Discharge	2,4,8	+	1	Α
Air Discharge	2,4,8	-	1	Α
Contact Discharge	4	+	2	Α
Contact Discharge	4	-	2	Α
Horizontal Coupling	4	+	3	А
Horizontal Coupling	4	-	3	А
Vertical Coupling	4	+	3	Α
Vertical Coupling	4	-	3	Α
A: No degradation in the performance of the EUT was observed				



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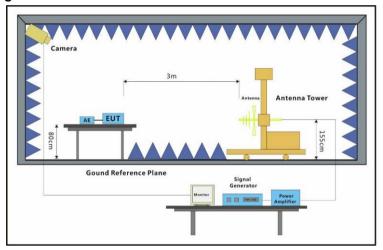
7.2 Radiated Immunity (80MHz-6GHz)

Test Requirement: EN 301 489-1 V2.2.3

EN 301 489-17 V3.2.4

Test Method: EN IEC 61000-4-3: 2020

7.2.1 Test Setup Diagram



7.2.2 E.U.T. Operation

Operating Environment:

Temperature: 23.5 °C Atmospheric Pressure: 1020 mbar Humidity: 48.7 % RH

7.2.3 Test Mode Description

· · · · · · · · · · · · · · · · · · ·					
Pre-scan / Final test	Mode Code	Description			
Final test	14	Operation(BT): Keep the EUT playing music by connecting to your cell phone's Bluetooth.			
Final test	15	Idle:Keep the EUT standby.			



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7.2.4 Test Condition and Results:

Performance Criterion: A

Frequency Range: 80MHz to 6GHz

Antenna Polarisation: Vertical and Horizontal Modulation: 1kHz,80% Amp. Mod,1% increment

Frequency	Level (V/m)	EUT Face	Dwell time	Result / Observations	
80MHz-6GHz	3	Front	2s	Α	
80MHz-6GHz	3	Back	2s	Α	
80MHz-6GHz	3	Left	2s	Α	
80MHz-6GHz	3	Right	2s	Α	
80MHz-6GHz	3	Тор	2s	Α	
80MHz-6GHz	3	Underside	2s	Α	
A: No degradation in the performance of the EUT was observed					



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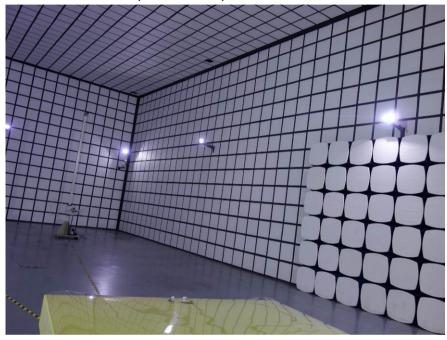


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Test Setup Photo 8

Radiated Emissions (30MHz-1GHz)



Electrostatic Discharge





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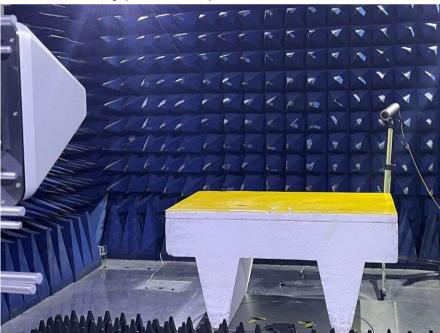
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Radiated Immunity (80MHz-6GHz)





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EUT Constructional Details (EUT Photos) 9

Refer to Appendix - Photographs of EUT Constructional Details for SZCR2402000645AT - End of the Report -



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