



Prüfbericht-Nr.: <i>Test report No.:</i>	60394152 002	Auftrags-Nr.: <i>Order No.:</i>	168258723	Seite 1 von 17 <i>Page 1 of 17</i>																					
Kunden-Referenz-Nr.: <i>Client reference No.:</i>	N/A	Auftragsdatum: <i>Order date.:</i>	20.06.2020																						
Auftraggeber: <i>Client:</i>	AfterShokz LLC 3200 Gracie Kiltz Lane, 4th Floor, Austin, TX 78758																								
Prüfgegenstand: <i>Test item:</i>	OpenMove																								
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	AS660 (Trademark: AfterShokz)																								
Auftrags-Inhalt: <i>Order content:</i>	FCC and IC approval																								
Prüfgrundlage: <i>Test specification:</i>	CFR47 FCC Part 15: Subpart B Section 15.107 CFR47 FCC Part 15: Subpart B Section 15.109 ICES-003 Issue 6 January 2016																								
Wareneingangsdatum: <i>Date of receipt:</i>	20.06.2020	Please refer to photo documents																							
Prüfmuster-Nr.: <i>Test sample No.:</i>	A002851811-001																								
Prüfzeitraum: <i>Testing period:</i>	20.06.2020 - 22.07.2020																								
Ort der Prüfung: <i>Place of testing:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.																								
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.																								
Prüfergebnis*: <i>Test result*:</i>	Pass																								
geprüft von / tested by:		kontrolliert von / reviewed by:																							
																									
29.07.2020	Jackson Yang / Project Engineer	29.07.2020	Winnie Hou / Technical Certifier																						
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>																				
Sonstiges / Other:																									
Factory: Shenzhen Voxtech Co.,Ltd. Floors 1-4, Factory Building 26, Shancheng Industrial Park, Shiyan Street, Bao'an District, Shenzhen, Guangdong, China																									
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>			Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged:</i>																						
<table border="0"> <tr> <td>* 1 = sehr gut</td> <td>2 = gut</td> <td>3 = befriedigend</td> <td>4 = ausreichend</td> <td>5 = mangelhaft</td> </tr> <tr> <td>P(ass) = entspricht o.g. Prüfgrundlage(n)</td> <td>F(ail) = entspricht nicht o.g. Prüfgrundlage(n)</td> <td>N/A = nicht anwendbar</td> <td>N/T = nicht getestet</td> <td></td> </tr> <tr> <td>Legend: 1 = very good</td> <td>2 = good</td> <td>3 = satisfactory</td> <td>4 = sufficient</td> <td>5 = poor</td> </tr> <tr> <td>P(ass) = passed a.m. test specifications(s)</td> <td>F(ail) = failed a.m. test specifications(s)</td> <td>N/A = not applicable</td> <td>N/T = not tested</td> <td></td> </tr> </table>						* 1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft	P(ass) = entspricht o.g. Prüfgrundlage(n)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet		Legend: 1 = very good	2 = good	3 = satisfactory	4 = sufficient	5 = poor	P(ass) = passed a.m. test specifications(s)	F(ail) = failed a.m. test specifications(s)	N/A = not applicable	N/T = not tested	
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<p>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</p> <p><i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i></p>																									

V05

Test Summary

5.1 Conducted emissions

RESULT: Pass

5.2 Radiated emissions

RESULT: Pass

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1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:
Appendix A: Test result.

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd.

East of F/1, F/2 - F/4, Building 1, Cybio Technology Building, No. 6 Langshan No. 2 Road, North Hi-tech Industry Park, Nanshan District, Shenzhen, P.R. China

The tests at the test sites have been conducted under the supervision of a TÜV engineer.

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

TÜV Rheinland (Shenzhen) Co., Ltd.

Conducted Emission				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
EMI Test Receiver	R&S	ESR3	EMI Test Receiver	2020-09-03
Artificial Mains Network	R&S	ENV216	Artificial Mains Network	2020-08-19
Radiated Emission (10m chamber)				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
EMI Test Receiver	R&S	ESR7	102022	2020-08-19
EMI Test Receiver	R&S	ESR7	102023	2020-08-19
Bilog Antenna	TESEQ	CBL6112D	51321	2020-08-29
Bilog Antenna	TESEQ	CBL6112D	51322	2020-08-29
Preamplifier	SCHWARZBECK	BBV9745	115	2020-10-09
Preamplifier	EMCI	EMC9135-P	980629	2020-12-27
Preamplifier	FIT	SCU-18F	180076	2020-08-19
Horn Antenna	R&S	HF907	102707	2020-09-01

2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table

Test	Parameters	Expanded uncertainty (U_{lab})	Expanded uncertainty (U_{CISPR})
Conducted Emission	Level accuracy (150kHz to 30MHz)	± 3.30 dB	± 3.4 dB
Radiated Emission (3m SAC)	Level accuracy (30MHz to 1000MHz)	± 4.66 dB	± 6.3 dB
	Level accuracy (above 1000MHz)	± 4.35 dB	N/A

2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

The TÜV Rheinland (Shenzhen) Co., Ltd. Test facility located at East of F/1, F/2 - F/4, Building 1, Cybio Technology Building, No. 6 Langshan No. 2 Road, North Hi-tech Industry Park, Nanshan District, Shenzhen, P.R. China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3 General Product Information

3.1 Product Function and Intended Use

The EUT is an OpenMove which supports Bluetooth 5.0 (BDR&EDR) technology.

The EUT has two alternative batteries:

Battery Model	Manufacturer	Ratings
AEC521224	Apower Electronics Co.,Ltd.	DC 3.8V 135mAh
VDL 541222	VDL Electronics Co., LTD.	DC 3.8V 135mAh

For details refer to the User Manual, Technical Description and Circuit Diagram.

3.2 Ratings and System Details

Table 2: Technical Specification of EUT

Technical Specification	Value
Kind of Equipment	OpenMove
Type Designation	AS660
Operating Frequency	2402 - 2480 MHz
Operating Voltage	DC 3.8V via battery or DC 5V via USB port
Type of Modulation	GFSK, $\pi/4$ DQPSK, 8DPSK
Channel Number	BDR & EDR mode:79 channels
Channel Separation	BDR & EDR mode:1MHz
Wireless Technology	Bluetooth 5.0
Antenna Type	Integral Antenna
Max. Antenna Gain	4.97 dBi

Table 3: RF Channel and Frequency of Bluetooth

RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
00	2402.00	20	2422.00	40	2442.00	60	2462.00
01	2403.00	21	2423.00	41	2443.00	61	2463.00
02	2404.00	22	2424.00	42	2444.00	62	2464.00
03	2405.00	23	2425.00	43	2445.00	63	2465.00
04	2406.00	24	2426.00	44	2446.00	64	2466.00
05	2407.00	25	2427.00	45	2447.00	65	2467.00
06	2408.00	26	2428.00	46	2448.00	66	2468.00
07	2409.00	27	2429.00	47	2449.00	67	2469.00
08	2410.00	28	2430.00	48	2450.00	68	2470.00
09	2411.00	29	2431.00	49	2451.00	69	2471.00
10	2412.00	30	2432.00	50	2452.00	70	2472.00
11	2413.00	31	2433.00	51	2453.00	71	2473.00
12	2414.00	32	2434.00	52	2454.00	72	2474.00
13	2415.00	33	2435.00	53	2455.00	73	2475.00
14	2416.00	34	2436.00	54	2456.00	74	2476.00
15	2417.00	35	2437.00	55	2457.00	75	2477.00
16	2418.00	36	2438.00	56	2458.00	76	2478.00
17	2419.00	37	2439.00	57	2459.00	77	2479.00
18	2420.00	38	2440.00	58	2460.00	78	2480.00
19	2421.00	39	2441.00	59	2461.00	--	--

3.3 Independent Operation Modes

The basic operation modes are:

- A. On, Bluetooth Connecting
- B. On, Charging
- C. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- Application Form
- Block Diagram
- Schematics
- Technical Description
- FCC/IC Label and Location Info
- Photo Document
- User Manual

4 Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All testing were performed according to the procedures in ANSI C63.4: 2014.

4.3 Special Accessories and Auxiliary Equipment

Table 4: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	S/N
Cell phone	MI	Redmi 8A	MIUI 10.3.4
adapter	MI	Mdy-08-eh	YJ2808009002135 Input: 100-240V~ 50/60Hz 0.5A Output: DC 5V 2.5A/9V 2A/12V 1.5A

4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

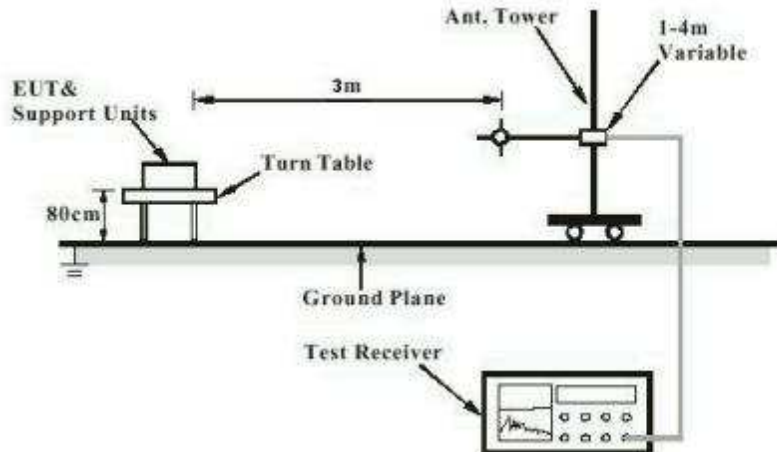


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

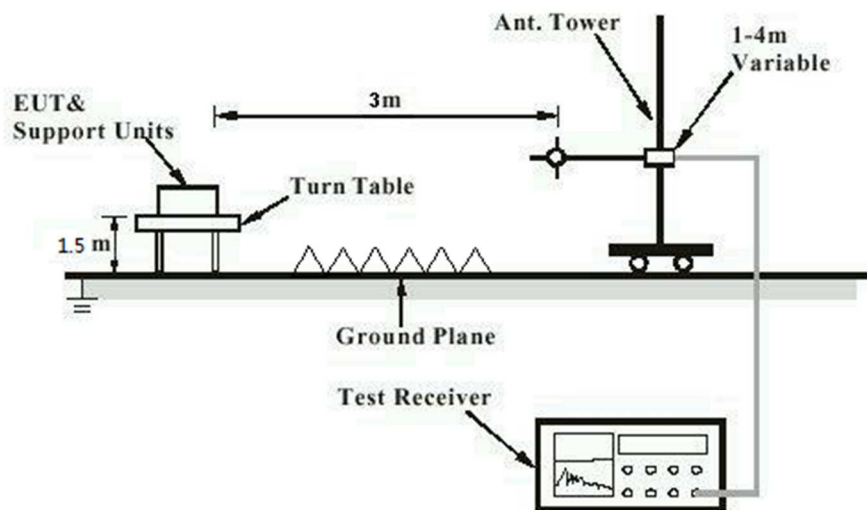
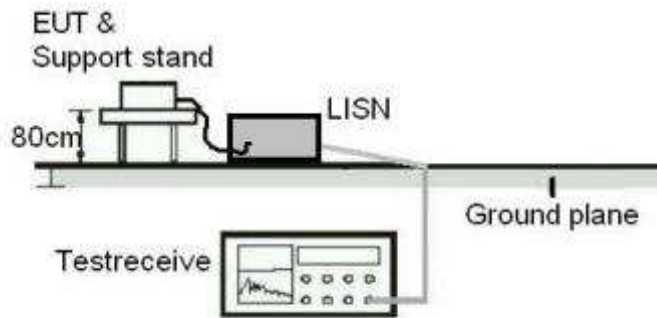


Diagram of Measurement Configuration for Mains Conduction Measurement



5 Test Results

5.1 Conducted emissions

RESULT:

Pass

Test Specification

Test standard	: FCC Part 15.107(a) & ICES-003
Basic standard	: ANSI C63.4: 2014
Frequency range	: 150KHz - 30MHz
Classification	: Class B
Limit	FCC Part 15.107(a) & ICES-003 Table 2
Kind of test site	: Shielded Room

Test Setup

Date of testing	: 09.07.2020
Input voltage	: AC 120V, 60Hz
Operation mode	: B
Earthing	: Not connected
Ambient temperature	: 25 °C
Relative humidity	: 60 %
Atmospheric pressure	: 101 kPa

For the measurement records, refer to the appendix A.

5.2 Radiated Emission

RESULT:

Pass

Test Specification

Test standard	: FCC Part 15.109(a) & ICES-003
Basic standard	: ANSI C63.4: 2014
Frequency range	: 30 - 6000MHz
Classification	: Class B
Limit	FCC Part 15.109(a) ICES-003 Table 5 & Table 7
Kind of test site	: 3m Semi-anechoic Chamber

Test Setup

Date of testing	: 08.07.2020 – 09.07.2020
Input voltage	: AC 120V, 60Hz for charging mode DC 3.8V via battery for Bluetooth Connecting mode
Operation mode	: A, B
Earthing	: Not connected
Ambient temperature	: 25 °C
Relative humidity	: 60 %
Atmospheric pressure	: 101 kPa

For the measurement records, refer to the appendix A.