

Produkte
Products

Prüfbericht - Nr.: 14048742 001		Seite 1 von 17	
<i>Test Report No.:</i>		<i>Page 1 of 17</i>	
Auftraggeber: <i>Client:</i>		Shenzhen Fushike Electronic Technology CO., LTD 2F, Building A1, Yuguan Industrial park, Bulong Road, Longhua New District, Shenzhen, China	
Gegenstand der Prüfung: <i>Test Item:</i>		Bluetooth Headset	
Bezeichnung: <i>Identification:</i>	K10, K10S	Serien-Nr.: <i>Serial No.:</i>	Engineering sample
Wareneingangs-Nr.: <i>Receipt No.:</i>	A000515675-001	Eingangsdatum: <i>Date of Receipt:</i>	18.03.2017
Prüfort: <i>Testing Location:</i>	TÜV Rheinland Hong Kong Ltd. 3/F., Fou Wah Industrial Building, 10-16 Pun Shan Street, Tsuen Wan, N.T., Hong Kong Global United Technology Services Co., Ltd. 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, China		
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of test item at delivery:</i>		Test sample is not damaged and suitable for testing.	
Prüfgrundlage: <i>Test Specification:</i>	FCC Part 15 Subpart C ANSI C63.10-2013		
Prüfergebnis: <i>Test Results:</i>	Das vorstehend beschriebene Gerät wurde geprüft und entspricht oben genannter Prüfgrundlage. The above mentioned product was tested and passed .		
Prüflaboratorium: <i>Testing Laboratory:</i>	TÜV Rheinland Hong Kong Ltd. 3-4, 11/F., Fou Wah Industrial Building, 10-16 Pun Shan Street, Tsuen Wan, N.T., Hong Kong		
geprüft/ tested by:		kontrolliert/ reviewed by:	
07.04.2017	Joey Leung Project Manager	07.04.2017	Benny Lau Senior Project Manager
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>
	Unterschrift <i>Signature</i>		Unterschrift <i>Signature</i>
Sonstiges: <i>Other Aspects</i>		FCC ID: 2AHRO-K10K10S	
Abkürzungen: P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet		Abbreviations: P(ass) = passed F(ail) = failed N/A = not applicable N/T = not tested	
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. <i>This test report 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 safety mark on this or similar products.</i>			

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Product information

Manufacturers declarations

	Transceiver
Operating frequency range	2402 - 2480 MHz
Type of modulation	GFSK
Number of channels	40
Channel separation	2 MHz
Type of antenna	PCB Antenna
Antenna gain (dBi)	3 dBi
Power level	fix
Type of equipment	stand alone radio device
Connection to public utility power line	Yes
Nominal voltage	3.7VDC
Independent Operation Modes	Transmitting

Product function and intended use

The equipment under test (EUT) is a Bluetooth headset. It is powered by 3.7V Li-Ion rechargeable battery. The EUT has a multi-function button for power ON/OFF, receiving and end calls, etc. In addition, the EUT has a micro-USB connector for charging purpose only.

FCC ID: 2AHRO-K10K10S

Models	Product description
K10, K10S	Bluetooth Headset

Submitted documents

Circuit Diagram
 Block Diagram
 Technical Description
 User manual
 Label

Independent Operation Modes

The basic operation modes are:

- Transmitting mode.
- Normal operation mode
- Charging mode

For further information refer to User Manual

Related Submittal(s) Grants

This device is a composite device.
This is a single application for certification of the transmitter.
The Bluetooth Basic Rate and Enhanced Data Rate portion is authorized under the certification procedure (refer to test report 14048644 001 issued by TÜV Rheinland HK Ltd).

Remark

The test results in this test report are only relevant to the tested sample and does not involve any assessment in the production.

Test Set-up and Operation Mode

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.

Test Operation and Test Software

Test operation should refer to test methodology.

- During test, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power was selected according to the instruction given by the manufacturer (rfpower =1). The setting of the RF output power expected by the customer shall be fixed on the firmware of the final end product.

Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

- AC/DC Adaptor
Model: ADP-60AD T V85
Input: 100-240VAC, 50-60Hz, 1.5A
Output: 16.5VDC, 3.65A
- MacBookPro
Model: A1278
S/N: C1MN99ERDTY3

Countermeasures to achieve EMC Compliance

- none

Test Methodology

Radiated Emission

The radiated emission measurements of the transmitter part were performed according to the procedures in ANSI C63.10-2013.

For measurement below 1GHz - the equipment under test (EUT) was placed at the middle of the 80 cm height turntable. For measurement above 1GHz - the EUT was placed at the middle of the 1.5 m height turntable and RF absorbing material was placed on ground plane between turntable and measuring antenna. During the testing, the EUT was operated standalone and arranged for maximum emissions. The EUT was tested in three orthogonal planes.

The investigation is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.

All radiated tests were performed at an antenna to EUT with 3 meters distance, unless stated otherwise in particular parts of this test report.

Field Strength Calculation

The field strength at 3 m was established by adding the meter reading of the spectrum analyzer to the factors associated with antenna correction factor, cable loss, preamplifiers and filter attenuation.

The equation is expressed as follow:

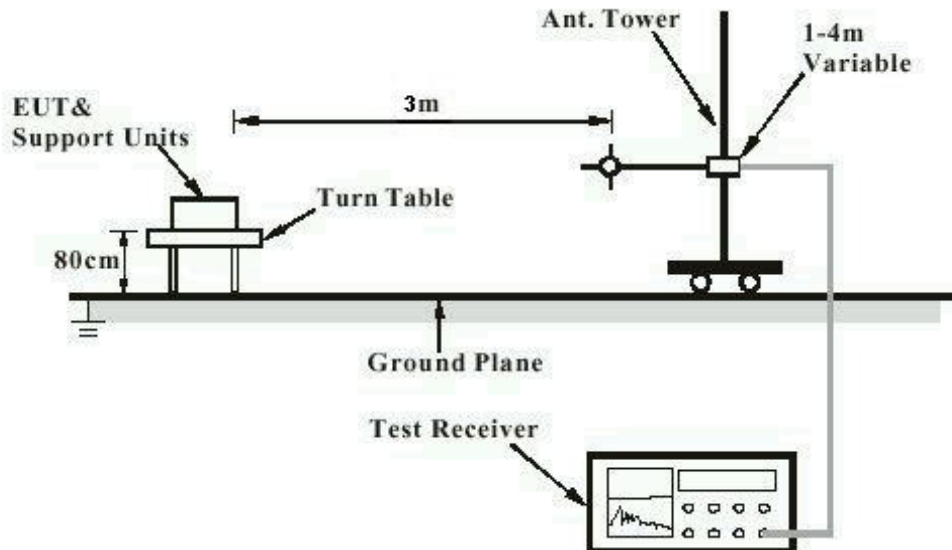
$$FS = R + AF + CF + FA - PA$$

Where FS = Field Strength in dBuV/m at 3 meters.
R = Reading of Spectrum Analyzer in dBuV.
AF = Antenna Factor in dB.
CF = Cable Attenuation Factor in dB.
FA = Filter Attenuation Factor in dB.
PA = Preamplifier Factor in dB.

FA and PA are only be used for the measuring frequency above 1 GHz.

Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 1 GHz are done with a table height of 1.5m. In addition, there is RF absorbing material on the floor of the test site for above 1GHz measurement.

Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)

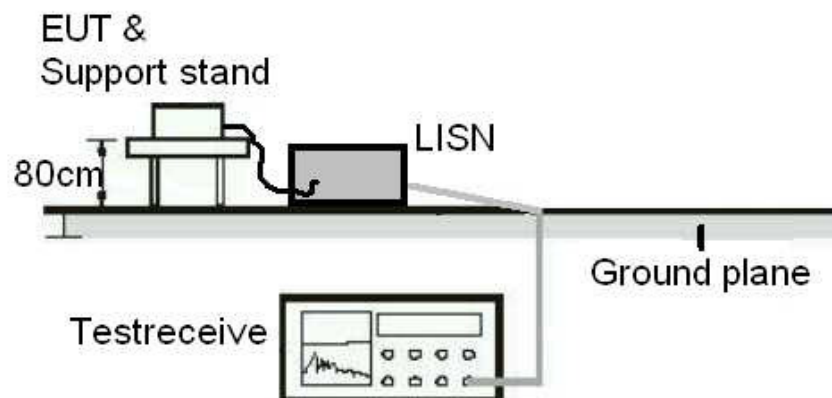
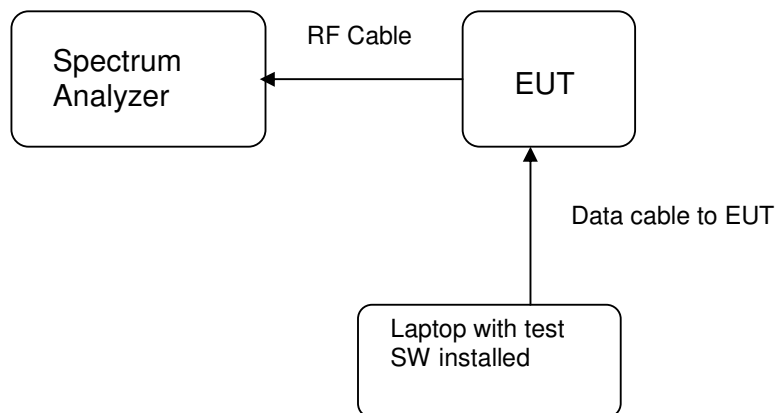


Diagram of Equipment Configuration for Antenna-port Conducted Measurement (if applicable)



List of Test and Measurement Instruments

Global United Technology Services Co., Ltd. (FCC Registration number: 600491)

Radiated Emission

Equipment	Manufacturer	Type	Cal. Date	Due Date
3m Semi- Anechoic Chamber	ZhongYu Electron	9.0(L)*6.0(W)*6.0(H)	03 Jul 2015	02 Jul 2020
Control Room	ZhongYu Electron	6.2(L)*2.5(W)*2.4(H)	N/A	N/A
ESU EMI Test Receiver	R&S	ESU26	29 Jun 2016	28 Jun 2017
Loop Antenna	Zhinan	ZN30900A	29 Jun 2016	28 Jun 2017
BiConiLog Antenna	SCHWARZBECK	VULB9163	29 Jun 2016	28 Jun 2017
Double-ridged horn antenna	SCHWARZBECK	9120D	29 Jun 2016	28 Jun 2017
Horn Antenna	ETS-LINDGREN	3160-09	29 Jun 2016	28 Jun 2017
RF Amplifier	HP	8347A	29 Jun 2016	28 Jun 2017
RF Amplifier	HP	8349B	29 Jun 2016	28 Jun 2017
Broadband Preamplifier	SCHWARZBECK	BBV9718	29 Jun 2016	28 Jun 2017
EMI Test Software	AUDIX	E3	N/A	N/A
Coaxial cable	GTS	N/A	N/A	N/A
Coaxial Cable	GTS	N/A	N/A	N/A
Thermo meter	N/A	N/A	29 Jun 2016	28 Jun 2017

AC Mains Conducted Emission

Equipment	Manufacturer	Type	Cal. Date	Due Date
Shielding Room	ZhongYu Electron	7.3(L)*3.1(W)*2.9(H)	16 May 2014	15 May 2019
EMI Test Receiver	R&S	ESCI 7	29 Jun 2016	28 Jun 2017
Pulse Limiter	R&S	ESH3-Z2	29 Jun 2016	28 Jun 2017
Coaxial Switch	ANRITSU CORP	MP59B	29 Jun 2016	28 Jun 2017
Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	29 Jun 2016	28 Jun 2017
Coaxial Cable	GTS	N/A	N/A	N/A
EMI Test Software	AUDIX	E3	N/A	N/A
Thermo meter	KTJ	TA328	29 Jun 2016	28 Jun 2017

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Radio Test

Equipment	Manufacturer	Type	Cal. Date	Due Date
Spectrum Analyzer	R&S	FSV40	22 Jan 2017	22 Jan 2018

Measurement Uncertainty

The estimated combined standard uncertainty for power-line conducted emissions measurements is ± 2.96 dB.

The estimated combined standard uncertainty for radiated emissions measurements is shown in below table.

Frequency Range	Uncertainty
9kHz – 30MHz	± 3.70 dB
30MHz – 1GHz	± 4.64 dB
1GHz – 18GHz	± 4.83 dB
18GHz – 25GHz	± 5.20 dB

The estimated combined standard uncertainty for antenna conducted emission is ± 2.1 dB

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of $k=2$, which for the level of confidence is approximately 95%.

Results FCC Part 15 – Subpart C / RSS-247 Issue 2

FCC 15.203 – Antenna Requirement 1		Pass
FCC Requirement: No antenna other than that furnished by the responsible party shall be used with the device		
Results:	a) Antenna type: Integral PCB antenna b) Manufacturer and model no: N/A c) Peak Gain: 3 dBi	
Verdict:	Pass	

FCC 15.204 – Antenna Requirement 2		N/A
FCC Requirement: An intentional radiator may be operated only with the antenna with which it is authorized. If an antenna is marketed with the intentional radiator, it shall be of a type which is authorized with the intentional radiator.		
Results:	Only one integral antenna can be used.	
Verdict:	N/A	

FCC 15.207 – Conducted Emission on AC Mains						Pass
Test Specification : ANSI C63.10 – 2013 Mode of operation : TX mode Port of testing : AC Mains input port of power supply Detector : Quasi-peak and Average RBW : 9 kHz Supply voltage : 120VAC 60Hz Temperature : 23°C Humidity : 50%						
Requirement:		15.207(a)				
Results:		Pass				
Live measurement						
Frequency range (MHz)	Frequency (MHz)	Quasi-peak dBµV	Average dBµV	Limit QP (dBµV)	Limit AV (dBµV)	Verdict
0.15 – 0.5	0.150	51.7	39.3	66.0	56.0	Pass
	0.202	44.9	34.5	63.5	53.5	Pass
> 0.5 - 5	0.535	38.8	25.3	56.0	46.0	Pass
> 5 - 30	No peak found	---	---	60.0	50.0	Pass

Neutral measurement						
Frequency range (MHz)	Frequency (MHz)	Quasi-peak dBμV	Average dBμV	Limit QP (dBμV)	Limit AV (dBμV)	Verdict
0.15 – 0.5	0.184	50.1	39.6	64.3	54.3	Pass
	0.317	38.4	27.9	59.8	49.8	Pass
> 0.5 - 5	0.634	39.9	27.3	56.0	46.0	Pass
> 5 - 30	No peak found	---	---	60.0	50.0	Pass
Results: Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and data rate. The radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150kHz to 30MHz does not exceed the limits. For test Results plots refer to Appendix 1						

FCC 15.247 (a)(2) – 6dB Bandwidth Measurement				Pass
FCC Requirement: Systems using digital modulation techniques may operate in the 902 – 928 MHz, 2400 – 2483.5 MHz, and 5725 – 5850 MHz bands. The minimum 6dB bandwidth shall be at least 500kHz.				
Test Specification : ANSI C63.10 – 2013 Mode of operation : TX mode Port of testing : Temporary antenna port Detector : Peak Supply voltage : 3.7V internal battery Temperature : 23°C Humidity : 50%				
Results: For test protocols please refer to Appendix 1				
Channel frequency (MHz)	6 dB left (MHz)	6 dB right (MHz)	6dB bandwidth (kHz)	
2402	2401.606	2402.318	712.0	
2440	2439.601	2440.318	717.8	
2480	2479.586	2480.316	729.4	

FCC 15.247(b)(3) – Maximum Peak Conducted Output Power			Pass
FCC Requirement: For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850MHz bands: 1 Watt (30dBm)			
Test Specification : ANSI C63.10 – 2013 Mode of operation : TX mode Port of testing : Temporary antenna port Detector : Peak Supply voltage : 3.7V internal battery Temperature : 23°C Humidity : 50%			
Results: For test protocols please refer to Appendix 1			
Frequency (MHz)	Measured Output Power (dBm)	Limit (W/dBm)	Verdict
2402	8.44	1 / 30.0	Pass
2440	9.76	1 / 30.0	Pass
2480	9.67	1 / 30.0	Pass

FCC 15.247(e) – Power Spectral Density			Pass
FCC Requirement: For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.			
Test Specification : ANSI C63.10 – 2013 Mode of operation : TX mode Port of testing : Temporary antenna port Detector : Peak Supply voltage : 3.7 Vdc Temperature : 23°C Humidity : 50%			
Results: For test protocols please refer to Appendix 1.			
Operating frequency (MHz)	Power density (dBm)	Limit (dBm)	Verdict
2402	6.96	8.0	Pass
2440	1.84	8.0	Pass
2480	1.84	8.0	Pass

FCC 15.247(d) – Spurious Conducted Emissions					Pass
Test Specification : ANSI C63.10 – 2013 Mode of operation : TX mode Port of testing : Temporary antenna port Detector : Peak Supply voltage : 3.7 Vdc Temperature : 23 °C Humidity : 50 %					
FCC Requirement: 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.					
Results: Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and data rate. Only the worst cases is shown below. For test protocols refer to Appendix 1					
Operating frequency (MHz)	Spurious frequency (MHz)	Spurious Level (dBm)	Reference value (dBm)	Delta (dB)	Verdict
2402	4807.500	-31.21	8.19	-39.40	Pass
2440	4877.000	-28.79	9.57	-38.36	Pass
2480	4963.800	-29.01	9.49	-38.50	Pass

FCC 15.205 – Radiated Emissions in Restricted Frequency Bands			Pass
Test Specification : ANSI C63.10 – 2013 Mode of operation : TX mode Port of testing : Enclosure Detector : Peak Supply voltage : 3.7 Vdc Temperature : 23°C Humidity : 50%			
FCC Requirement: In any 100kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in section 15.205(a), must also comply with the radiated emission limits specified in section 15.205(c).			
Results: Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and data rate. All three transmit frequency modes comply with the field strength within the restricted bands. There is no spurious found below 30MHz.			
Mode: 2402MHz TX		Vertical Polarization	
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	
798.980	32.62	46.0 / QP	
2400.000	35.94	74.0 / PK	
2400.000	28.20	54.0 / AV	
4804.081	43.10	74.0 / PK	
4804.081	38.81	54.0 / AV	
7206.000	43.14	74.0 / PK	
7206.000	39.24	54.0 / AV	
Mode: 2402MHz TX		Horizontal Polarization	
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	
821.710	32.10	74.0 / PK	
2400.000	43.67	74.0 / PK	
2400.000	34.93	54.0 / AV	
4804.101	45.95	74.0 / PK	
4804.101	40.66	54.0 / AV	
Mode: 2440MHz TX		Vertical Polarization	
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	
801.786	31.72	46.0 / QP	
4880.019	44.33	74.0 / PK	
4880.019	40.16	54.0 / AV	
Mode: 2440MHz TX		Horizontal Polarization	
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	
824.597	32.28	46.0 / QP	

4880.034	48.74	74.0 / PK
4880.034	44.56	54.0 / AV
Mode: 2480MHz TX Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
798.980	32.29	46.0 / QP
2483.500	42.21	74.0 / PK
2483.500	32.43	54.0 / AV
4960.017	44.28	74.0 / PK
4960.017	39.23	54.0 / AV
7444.036	44.79	74.0 / PK
7444.036	39.60	54.0 / AV
Mode: 2480MHz TX Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
824.597	32.94	46.0 / QP
2483.500	46.47	74.0 / PK
2483.500	36.95	54.0 / AV
4960.054	49.41	74.0 / PK
4960.054	43.68	54.0 / AV
7444.000	46.60	74.0 / PK
7444.000	40.63	54.0 / AV