

Produkte
Products

Prüfbericht - Nr.: 14045366 001

Test Report No.:

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Auftraggeber: Wincotime Electronic Ltd
Client: Room 2, 8/F, Fonda Ind Bld
 37-39, Au Pui Wan Street
 Fo Tan, Sha Tin, NT
 Hong Kong

Gegenstand der Prüfung: Bluetooth Low Energy device - Wireless Activity Band
Test Item:

Bezeichnung: YOO-RX
Identification:

Serien-Nr.: Engineering sample
Serial No.:

Wareneingangs-Nr.: A000397540-005
Receipt No.:

Eingangsdatum: 21.07.2016
Date of Receipt:

Prüfstandort: TÜV Rheinland Hong Kong Ltd.
Testing Location: 8/F, First Group Centre, 14 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong
Hong Kong Productivity Council
 HKPC Building, 78 Tat Chee Avenue, Kowloon, Hong Kong

Zustand des Prüfgegenstandes bei Anlieferung: Test samples are not damaged and suitable
Condition of test item at delivery: for testing.

Prüfgrundlage: FCC Part 15 Subpart C
Test Specification: ANSI C63.10-2013

Prüfergebnis: Das vorstehend beschriebene Gerät wurde geprüft und entspricht oben
Test Results: genannter Prüfgrundlage.
 The above mentioned product was tested and **passed**.

Prüflaboratorium: TÜV Rheinland Hong Kong Ltd.
Testing Laboratory: 8 - 10/F., Goldin Financial Global Square, 7 Wang Tai Road, Kowloon Bay,
 Kowloon, Hong Kong

geprüft/ tested by:

kontrolliert/ reviewed by:

05.12.2016	David Cheng	
Datum Date	Name/Stellung Name/Position	Unterschrift Signature

05.12.2016	Benny Lau	
Datum Date	Senior Project Manager	Unterschrift Signature

Sonstiges: FCC ID: 2ABPTYX4850
 Other Aspects

Abkürzungen: P(pass) = entspricht Prüfgrundlage
 F(fail) = entspricht nicht Prüfgrundlage
 N/A = nicht anwendbar
 N/T = nicht getestet

Abbreviations: P(pass) = passed
 F(fail) = 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.
 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.

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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)	1 dBi
Power level	fix
Type of equipment	stand alone radio device
Connection to public utility power line	No
Nominal voltage	V_{nor} : 3.7 VDC (1 x 3.7V rechargeable batteries)
Independent Operation Modes	Transmitting

Product function and intended use

The equipment under test (EUT) is a wireless activity band with Bluetooth Low Energy transceiver. It is powered by 3.7V re-chargeable battery. It uses a 3-Axis accelerometer to monitor your movements during the day and your sleep patterns at night. The information will send to the App via Bluetooth Low Energy. The Bluetooth function will be turned off during charging.

FCC ID: 2ABPTYX4850

Models	Product description
YOO-RX	Bluetooth Low Energy device - Wireless Activity Band

Submitted documents

Circuit Diagram
 Block Diagram
 Operation description
 User manual
 Label

Independent Operation Modes

The basic operation modes are:
 - Transmitting mode.

For further information refer to User Manual

Related Submittal(s) Grants

This is a single application for certification of the transmitter.

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.

The EUT was programmed to test mode by manufacturer to transmit continuously in the lowest, middle and highest frequency channel. The output power of EUT was fixed by the manufacturer.

Special Accessories and Auxiliary Equipment

- None

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.

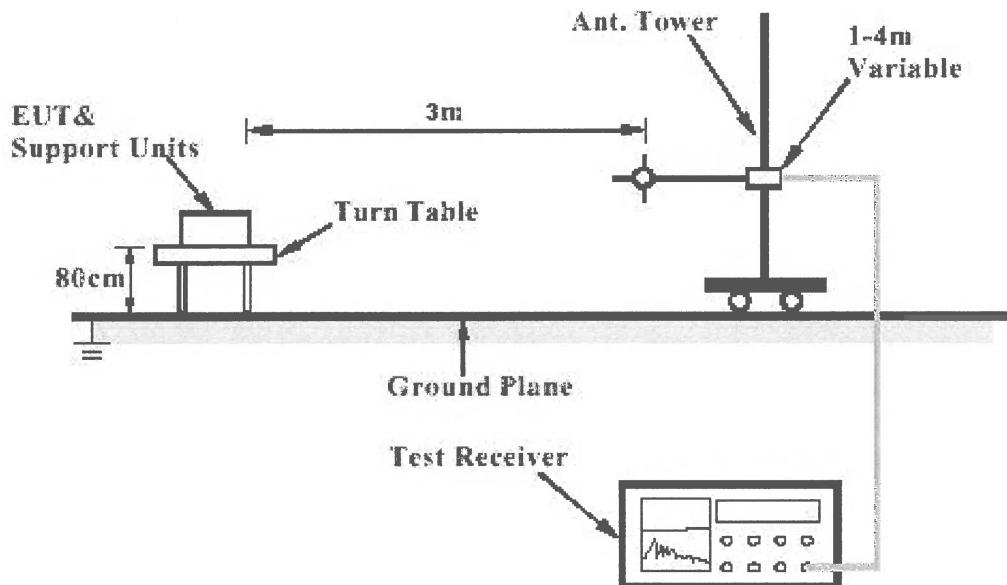
FA = Filter Attenuation Factor in dB.

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)

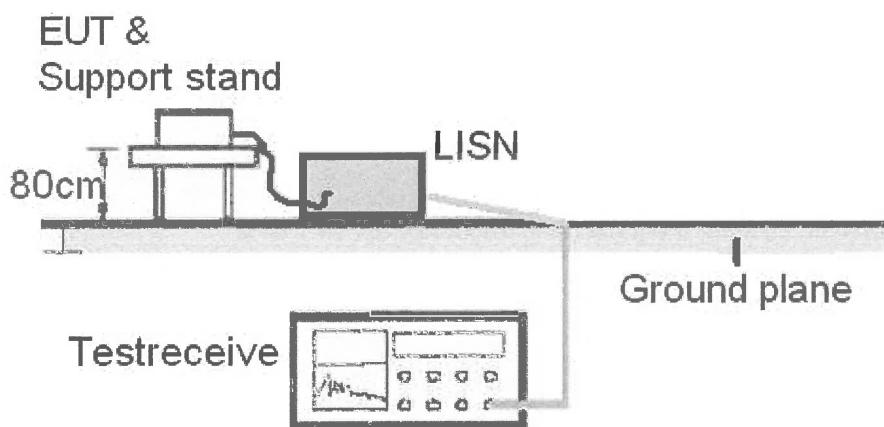
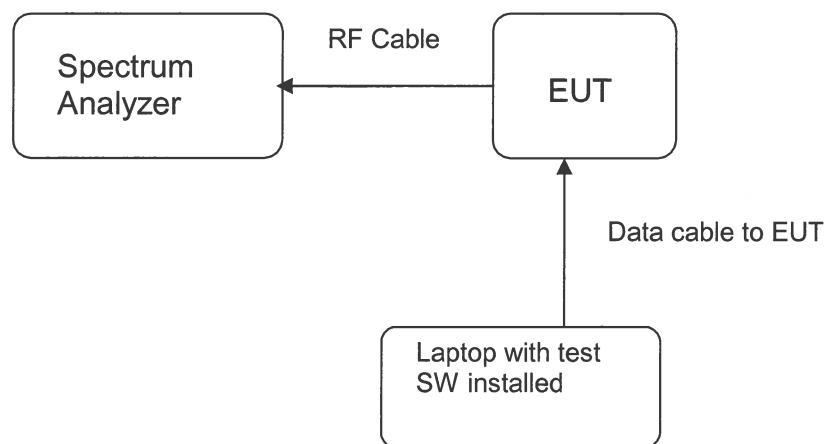


Diagram of Equipment Configuration for Antenna-port Conducted Measurement (if applicable)



List of Test and Measurement Instruments

Hong Kong Productivity Council (Registration number: 90656)

Radiated Emission

Equipment	Manufacturer	Type	Cal. Date	Due Date
Semi-anechoic Chamber	Frankonia	Nil	25-Apr-16	25-Apr-17
New Fully Anechoic Chamber	TDK	N/A	26-Jul-16	26-Jul-17
Cable	Hubersuhner	SUCOFLEX 104	1-Sep-15	1-Sep-17
Test Receiver	R & S	ESU26	1-Sep-15	1-Sep-17
Bi-conical Antenna	R & S	HK116	10-Jun-16	10-Jun-18
Log Periodic Antenna	R & S	HL223	18-Jul-16	18-Jul-18
Coaxial cable	Harbour	LL335	28-Oct-15	28-Oct-17
Microwave amplifier 0.5-26.5GHz, 25dB gain	HP	83017A	26-Aug-15	26-Aug-17
High Pass Filter (cutoff freq. =1000MHz)	Trilithic	23042	27-Oct-16	27-Oct-17
Horn Antenna	EMCO	3115	25-Apr-16	25-Apr-17
Active Loop Antenna	EMCO	6502	26-Jul-16	26-Jul-17

AC Mains Conducted Emission

Equipment	Manufacturer	Type	Cal. Date	Due Date
Test Receiver	R & S	ESU40	7-Dec-15	07-Dec-16
RF Voltage Probe	Schwarzbeck	TK9416	11-Feb-16	11-Feb-17
LISN	R&S	ESH3-Z5	15-Jun-16	15-Jun-17
Double Shield Cable	Radiall	RG142	14-Sep-15	14-Sep-17
Pulse Limiter	R&S	ESH3-Z2	3-Jun-16	03-Jun-18

TÜV Rheinland Hong Kong Ltd

Radio Test

Equipment	Manufacturer	Type	Cal. Date	Due Date
Spectrum Analyzer	R & S	FSP30	18-Jan-16	19-Jan-2017

Measurement Uncertainty

The estimated combined standard uncertainty for power-line conducted emissions measurements is $\pm 3.43\text{dB}$.

The estimated combined standard uncertainty for radiated emissions measurements is $\pm 5.10\text{dB}$ (30MHz to 200MHz) and $\pm 5.08\text{dB}$ (200MHz to 1000MHz) and is $\pm 5.10\text{dB}$ (30MHz to 200MHz) and $\pm 5.08\text{dB}$ (above 1GHz).

The estimated combined standard uncertainty for antenna conducted emission is $\pm 1.56\text{dB}$

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

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: b) Manufacturer and model no: c) Peak Gain:	Integral PCB antenna N/A 1 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		N/A
There is no AC power input or output ports on the EUT and the Bluetooth function will be turned off during charging.		

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 : 3.7 Vdc 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	2401.416	2402.036	620
2440	2439.702	2440.334	632
2480	2479.696	2480.344	648

FCC 15.247(b)(3) – Maximum Peak Coudected 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 : 3.7 Vdc Temperature : 23°C Humidity : 50%																		
Results: For test protocols please refer to Appendix 1																		
<table border="1"> <thead> <tr> <th>Frequency (MHz)</th> <th>Measured Output Power (dBm)</th> <th>Limit (dBm)</th> <th>Verdict</th> </tr> </thead> <tbody> <tr> <td>2402</td> <td>-27.46</td> <td>30.0</td> <td>Pass</td> </tr> <tr> <td>2440</td> <td>-26.81</td> <td>30.0</td> <td>Pass</td> </tr> <tr> <td>2480</td> <td>-25.74</td> <td>30.0</td> <td>Pass</td> </tr> </tbody> </table>			Frequency (MHz)	Measured Output Power (dBm)	Limit (dBm)	Verdict	2402	-27.46	30.0	Pass	2440	-26.81	30.0	Pass	2480	-25.74	30.0	Pass
Frequency (MHz)	Measured Output Power (dBm)	Limit (dBm)	Verdict															
2402	-27.46	30.0	Pass															
2440	-26.81	30.0	Pass															
2480	-25.74	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.																		
<table border="1"> <thead> <tr> <th>Operating frequency (MHz)</th> <th>Power density (dBm)</th> <th>Limit (dBm)</th> <th>Verdict</th> </tr> </thead> <tbody> <tr> <td>2402</td> <td>-27.46</td> <td>8.0</td> <td>Pass</td> </tr> <tr> <td>2440</td> <td>-26.80</td> <td>8.0</td> <td>Pass</td> </tr> <tr> <td>2480</td> <td>-25.56</td> <td>8.0</td> <td>Pass</td> </tr> </tbody> </table>			Operating frequency (MHz)	Power density (dBm)	Limit (dBm)	Verdict	2402	-27.46	8.0	Pass	2440	-26.80	8.0	Pass	2480	-25.56	8.0	Pass
Operating frequency (MHz)	Power density (dBm)	Limit (dBm)	Verdict															
2402	-27.46	8.0	Pass															
2440	-26.80	8.0	Pass															
2480	-25.56	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:	<p>Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and data rate.</p> <p>Only the worst cases is shown below. For test protocols refer to Appendix 1</p>				
Operating frequency (MHz)	Spurious frequency (MHz)	Spurious Level (dBm)	Reference value (dBm)	Delta (dB)	Verdict
2402	24280	-50.19	-27.46	22.73	Pass
2440	24592	-49.55	-26.80	22.75	Pass
2480	24592	-50.17	-25.56	24.61	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:	<p>Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and data rate.</p> <p>All three transmit frequency modes comply with the field strength within the restricted bands. There is no spurious found below 30MHz.</p>	
Mode: 2402MHz TX	Vertical Polarization	
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2390.000	47.32	74.0 / PK
2390.000	33.86	54.0 / AV

7205.737	59.71	74.0 / PK
7205.737	45.18	54.0 / AV
Mode: 2402 MHz TX		Horizontal Polarization
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2390.000	49.94	74.0 / PK
2390.000	33.88	54.0 / AV
4804.000	53.54	74.0 / PK
4804.000	No peak found	54.0 / AV
Mode: 2440 MHz TX		Vertical Polarization
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4880.000	55.47	74.0 / PK
4880.000	46.20	54.0 / AV
Mode: 2440 MHz TX		Horizontal Polarization
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4880.000	53.77	74.0 / PK
4880.000	40.27	54.0 / AV
Mode: 2480MHz TX		Vertical Polarization
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2483.500	47.84	74.0 / PK
2483.500	33.85	54.0 / AV
4960.000	56.46	74.0 / PK
4960.000	47.09	54.0 / AV
Mode: 2480 MHz TX		Horizontal Polarization
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2484.081	52.79	74.0 / PK
2483.500	35.69	54.0 / AV
4960.000	54.31	74.0 / PK
4960.000	40.50	54.0 / AV

Results FCC Part 15 – Subpart B

FCC 15.107 – Conducted Emission on AC Mains						Pass
Test Specification : ANSI C63.4 – 2014						
Mode of operation : Charging 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: 15.107(a)						
Results: Pass						
Live measurement						
Frequency range (MHz)	Frequency (MHz)	Quasi-peak dB μ V	Average dB μ V	Limit QP (dB μ V)	Limit AV (dB μ V)	Verdict
0,15 – 0,5	0.459	37.6	27.3	66 - 56	56 - 46	Pass
> 0,5 - 5	No peak found	---	---	56	46	Pass
> 5 - 30	No peak found	---	---	60	50	Pass
Neutral measurement						
Frequency range (MHz)	Frequency (MHz)	Quasi-peak dB μ V	Average dB μ V	Limit QP (dB μ V)	Limit AV (dB μ V)	Verdict
0,15 – 0,5	0.182	31.6	13.8	66 - 56	56 - 46	Pass
> 0,5 - 5	No peak found	---	---	56	46	Pass
> 5 - 30	No peak found	---	---	60	50	Pass

FCC 15.109 – Radiated Emission		Pass
Test Specification	:	ANSI C63.4 – 2014
Mode of operation	:	Charging mode
Port of testing	:	Enclosure
Frequency range	:	30MHz to 1GHz
Supply voltage	:	120VAC
Temperature	:	23°C
Humidity	:	50%
FCC Requirement: 15.109(a)		
Results:	Pass	
Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
51.9	14.1	40.0 / QP
165.1	19.8	43.5 / QP
300.0	20.1	46.0 / QP
No peak found	---	54.0 / AV
Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
200.0	14.1	43.5 / QP
300.0	20.0	54.0 / AV