TÜVRheinland®

Produkte
Products

Prüfbericht - Nr.: *Test Report No.:*	**14034535 001**	**Seite 1 von 12** *Page 1 of 12*
Auftraggeber: *Client:*	**Rip Curl Pty Ltd.** **101 Surfcoast Hwy, Torquay** **Victoria, Australia 3228**	
Gegenstand der Prüfung: *Test Item:*	**Bluetooth Low Energy Watch with GPS receiver**	
Bezeichnung: *Identification:*	**A1111**	**Serien-Nr.:** *Serial No.:* **Engineering sample**
Wareneingangs-Nr.: *Receipt No.:*	**A000035633-003,** **A000035824-001**	**Eingangsdatum:** *Date of Receipt:* **17.01.2014, 21.01.2014**
Prüfort: *Testing Location:*	**TÜV Rheinland Hong Kong Ltd.** 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: *Condition of test item at delivery:*	Test sample(s) is/are not damaged and suitable for testing.	
Prüfgrundlage: *Test Specification:*	**FCC Part 15 Subpart C** **ANSI C63.4-2003** **CISPR 22:1997**	
Prüfergebnis: *Test Results:*	**Das vorstehend beschriebene Gerät wurde geprüft und entspricht oben genannter Prüfgrundlage.** The above mentioned product was tested and **passed**.	
Prüflaboratorium: *Testing Laboratory:*	**TÜV Rheinland Hong Kong Ltd.** 8 - 10/F., Goldin Financial Global Square, 7 Wang Tai Road, Kowloon Bay Kowloon, Hong Kong	

geprüft/ *tested by:*			**kontrolliert/** *reviewed by:*		
13.03.2014	Hugo Wan Senior Project Manager		13.03.2014	Sharon Li Section Manager	
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

Sonstiges: **FCCID: 2ABSOA1111**
Other Aspects

Abkürzungen:				*Abbreviations:*			
	P(ass)	=	*entspricht Prüfgrundlage*		*P(ass)*	=	*passed*
	F(ail)	=	*entspricht nicht Prüfgrundlage*		*F(ail)*	=	*failed*
	N/A	=	*nicht anwendbar*		*N/A*	=	*not applicable*
	N/T	=	*nicht getestet*		*N/T*	=	*not tested*

Table of Content

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Product information

Manufacturers declarations

	Transceiver BLE Mode
Operating frequency range	2402 - 2480 MHz
Type of modulation	GFSK
Number of channels	40
Channel separation	2 MHz
Type of antenna	Metal Plate
Antenna gain (dBi)	0
Power level	fix
Type of equipment	stand alone radio device
Connection to public utility power line	No
Nominal voltage	V_{nor}: 3.7 VDC from lithium ion battery
Independent Operation Modes	Transmitting Receiving

Product function and intended use

The A1111 is a Bluetooth enabled watch with GPS receiver that allows user to connect it with the smart phone for synchronizing the GPS data into the smart phone.

For details, please refer to the user manual.

Submitted documents

Circuit Diagram
Block Diagram
Bill of material
User manual

Remark

Special accessories and auxiliary equipment

Nil

List of Test and Measurement Instruments

Hong Kong Productivity Council (FCC Registration number: 90656)

Equipment	Manufacturer	Type	S/N	Due Date
Semi-anechoic Chamber	Frankonia	Nil	Nil	12-Apr-14
Test Receiver	R & S	ESU40	100190	19-Feb-14
Bi-conical Antenna	R & S	HK116	100241	11-Jun-15
Log Periodic Antenna	R & S	HL223	841516/017	10-Jun-15
Coaxial cable 50ohm	Rosenberger	RTK081-05S-05S-10m	LA2-001-10M / 001	15-Nov-15
Microwave amplifer 0.5-26.5GHz, 25dB gain	HP	83017A	3123A00437	30-Dec-15
High Pass Filter (cutoff freq. =1000MHz)	Trilithic	23042	9829213	28-Oct-15
Horn Antenna	EMCO	3115	9002-3347	11-Jun-15
Active Loop Antenna	EMCO	6502	9107-2651	21-Jun-14

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Equipment	Manufacturer	Type	S/N	Due Date
FSP 30 Spectrum Analyser	Rohde & Schwarz	FSP 30	100007	03-Dec-14

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:	Permanent attached antenna
Verdict:	Pass

FCC 15.204 – Antenna Requirement 2		**Pass**
FCC Requirement:	Provide information for every antenna proposed for the use with the EUT	
Results:	a) Antenna type:	Metal Plate
	b) Manufacturer and model no:	N.A.
	c) Gain with reference to an isotropic radiator:	0 dBi
Verdict:	Pass	

FCC 15.207 – Disturbance Voltage on AC Mains	**N/A**
The EUT does not have AC mains power input power, hence this test is not applicable.	

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 : FCC Part 15 Subpart A – Subclause 15.31 Mode of operation : BLE Tx mode, (2402MHz, 2440MHz, 2480MHz) Port of testing : Temporary antenna port Detector : Peak RBW/VBW : 100KHz/ 300KHz Supply voltage : 3.7 VDC from DC power supply Temperature : 23ºC Humidity : 50%	
Results:	For test protocols please refer to Appendix 1, page 2-3.

Channel frequency (MHz)	**6 dB left (MHz)**	**6 dB right (MHz)**	**6dB bandwidth (MHz)**
2402	0.594	0.102	0.696
2440	0.594	0.108	0.702
2480	0.102	0.576	0.678

FCC 15.247 (b) (1), (3) – Maximum Peak Output Power					**Pass**
BLE Tx mode					
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 : FCC Part 15 Subpart A – Subclause 15.31 Mode of operation : BLE Tx mode, (2402MHz, 2440MHz, 2480MHz) Port of testing : Temporary antenna port Detector : Peak RBW/VBW : ≥ DTS BW / ≥ 3xRBW Span : ≥ 3 x RBW Supply voltage : 3.7 VDC from DC power supply Temperature : 23ºC Humidity : 50%					
Results:	For test protocols please refer to Appendix 1, page 4-5.				
Frequency (MHz)	**Maximum peak output power (dBm)**	**Cable attenuation (dB)**	**Output power (dBm)**	**Limit (W/dBm)**	**Verdict**
2402	-6.31	0.00	-6.31	1 / 30.0	Pass
2440	-7.18	0.00	-7.18	1 / 30.0	Pass
2480	-8.08	0.00	-8.08	1 / 30.0	Pass

FCC 15.247 (d) – Spurious Conducted Emissions **Pass**

Test Specification : FCC Part 15 Subpart A – Subclause 15.31
Mode of operation : Tx mode (2402MHz, 2440MHz, 2480MHz)
Port of testing : Temporary antenna port
Detector : Peak
RBW/VBW : 100 kHz / 300 kHz
Supply voltage : 3.7 VDC from DC power supply
Temperature : 23 ºC
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: All three transmit frequency modes comply with the limit stated in subclause 15.247(d). For test protocols refer to Appendix 1, page 6-7.

BLE Tx mode

Operating frequency (MHz)	Spurious frequency (MHz)	Spurious Level (dBm)	Reference value (dBm)	Delta (dB)	Verdict
2402	4850.007	-48.05	-7.60	-40.45	Pass
2440	4850.007	-49.29	-8.42	-40.87	Pass
2480	4950.007	-49.67	-9.19	-40.48	Pass

FCC 15.247 (d) – Spurious Radiated Emissions **Pass**

Test Specification : ANSI C63.4 – 2003
Mode of operation : Tx mode (2402MHz, 2440MHz, 2480MHz), hopping off
Port of testing : Enclosure
Detector : Peak
RBW/VBW : 100 kHz / 300 kHz for f < 1 GHz
1 MHz / 1 MHz for f > 1 GHz
Supply voltage : 3.7 VDC from battery
Temperature : 23ºC
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 section15.205(a), must also comply with the radiated emission limits specified in section 15.209(a).

Results: Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types.

All three transmit frequency modes comply with the field strength within the restricted bands. There is no spurious found below 30MHz.

BLE Tx mode

Tx frequency 2402MHz Vertical Polarization

Freq MHz	**Level dBµV/m**	**Limit/ Detector dBµV/m**
4804.737	54.7	74.0 / P
4804.128	49.7	54.0 / A

Tx frequency 2402MHz Horizontal Polarization

Freq MHz	**Level dBµV/m**	**Limit/ Detector dBµV/m**
4804.433	53.8	74.0 / P
4804.128	48.3	54.0 / A

Tx frequency 2440MHz Vertical Polarization

Freq MHz	**Level dBµV/m**	**Limit/ Detector dBµV/m**
4880.577	53.6	74.0 / P
4880.144	48.0	54.0 / A

Tx frequency 2440MHz Horizontal Polarization

Freq MHz	**Level dBµV/m**	**Limit/ Detector dBµV/m**
4880.529	55.0	74.0 / P
4880.144	50.2	54.0 / A

Tx frequency 2480MHz Vertical Polarization

Freq MHz	**Level dBµV/m**	**Limit/ Detector dBµV/m**
4959.567	52.2	74.0 / P

4960.128	45.6	54.0 / A
Tx frequency 2480MHz	Horizontal Polarization	
Freq MHz	**Level dBµV/m**	**Limit/ Detector dBµV/m**
4959.647	54.1	74.0 / P
4960.128	48.3	54.0 / A

FCC 15.247 (d) – Band Edge Emissions	**Pass**
Test Specification : FCC Part 15 Subpart A – Subclause 15.31 Mode of operation : BLE Tx mode (2402MHz, 2480MHz) Port of testing : Temporary antenna port Detector : Peak RBW/VBW : 100 kHz / 300 kHz Supply voltage : 3.7 VDC from DC power supply Temperature : 23ºC 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:	The peak found outside any 100 kHz bandwidth of the operating frequency band comply with the requirement. For test protocols refer to Appendix 1, page 8.

FCC 15.205 – Restricted Bands Next to The Band Edge	**Pass**
Test Specification : FCC Part 15 Subpart A – Subclause 15.31 Mode of operation : BLE Tx mode (2402MHz, 2480MHz) Port of testing : Enclosure Detector : Peak RBW/VBW : 1 MHz / 1 MHz Supply voltage : 3.7 VDC from battery Temperature : 23ºC Humidity : 50%	
FCC Requirement:	Radiated emissions which fall in the restricted bans, as defined in 15.205 (a), must also comply with the radiated emission limits specified in 15.209(a).
Results:	There is no peak found in the restricted bands. For test protocols refer to Appendix 1, page 9-12.

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 : FCC Part 15 Subpart A – Subclause 15.31
Mode of operation : BLE Tx mode (2402MHz, 2440MHz, 2480MHz)
Port of testing : Temporary antenna port
Detector : Peak
RBW/VBW : ≥100 KHz / ≥3xRBW
span : ≥1.5 x DTS BW
Supply voltage : 3.7 VDC from DC power supply
Temperature : 23ºC
Humidity : 50%

Results: For test protocols please refer to Appendix 1, page 13-14.

Operating frequency (MHz)	Power density (dBm)	Limit (dBm)	Verdict
2402	-6.27	8.00	Pass
2440	-7.14	8.00	Pass
2480	-8.04	8.00	Pass