TÜVRheinland®

Produkte
Products

Prüfbericht - Nr.: *Test Report No.:*	**14035413 001**	**Seite 1 von 11** *Page 1 of 11*
Auftraggeber: *Client:*	**StickNFind LLC** **3201 Griffin Road, Bldg 2** **Sutie 200, Fort Lauderdale** **FL 33312**	
Gegenstand der Prüfung: *Test Item:*	**Bluetooth Low Energy Sticker**	
Bezeichnung: *Identification:*	**StickNFind**	**Serien-Nr.:** *Serial No.:* **Engineering sample**
Wareneingangs-Nr.: *Receipt No.:*	**A000039587-001**	**Eingangsdatum:** *Date of Receipt:* **03.03.2014**
Zustand des Prüfgegenstandes bei Anlieferung: *Condition of test item at delivery:*	Test sample(s) is/are not damaged and suitable for testing.	
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	
Prüfgrundlage: *Test Specification:*	**FCC Part 15 Subpart C** **ANSI C63.4-2003**	
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:*		
17.04.2014	Joey Leung Project Engineer		17.04.2014	Hugo Wan Senior Project Manager	
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

Sonstiges: **FCCID: SL6-STICKNFIND-9**
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*

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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	PCB Antenna
Antenna gain (dBi)	6
Power level	fix
Type of equipment	stand alone radio device
Connection to public utility power line	No
Nominal voltage	V_{nor}: 3.0 VDC
Independent Operation Modes	Transmitting Receiving

Product function and intended use

Stick-N-Find is designed and to be used solely to help find your personal possessions. The product should not be relied on to find persons or monitor a person's location and should be used to act as an aid in locating your personal items. Stick-N-Find is not to be used or relied upon to find or track the whereabouts of persons. This product does not substitute parental, adult or professional supervision.

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	14 Apr 2015
Cable	Hubersuhner	SUCOFLEX 104	72799 /6	31 Mar 2016
Test Receiver	R & S	ESU40	100190	18 Sep 2014
Log Periodic Antenna	R & S	HL223	841516/017	10 Jun 2015
Coaxial cable 50ohm	Rosenberger	RTK081-05S-05S-10m	LA2-001-10M / 001	15 Nov 2015
Microwave amplifer 0.5-26.5GHz, 25dB gain	HP	83017A	3123A00437	30 Dec 2015
High Pass Filter (cutoff freq. =1000MHz)	Trilithic	23042	9829213	28 Oct 2015
Horn Antenna	EMCO	3115	9002-3347	11 Jun 2015
Active Loop Antenna	EMCO	6502	9107-2651	21 Jun 2014
FSP 30 Spectrum Analyzer	Rohde & Schwarz	FSP 30	100007	03 Dec 2014

Results FCC Part 15 – Subpart C

Subclause 15.203 – Antenna Requirement 1		**Pass**
Requirement:	No antenna other than that furnished by the responsible party shall be used with the device	
Results:	Permanent attached antenna	
Verdict:	Pass	

Subclause 15.204 – Antenna Requirement 2		**Pass**
Requirement:	Provide information for every antenna proposed for the use with the EUT	
Results:	a) Antenna type: b) Manufacturer and model no: c) Gain with reference to an isotropic radiator:	PCB Antenna N.A. 6 dBi
Verdict:	Pass	

Subclause 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.	

Subclause 15.247 (a)(2) – 6dB Bandwidth Measurement	**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 : 100KHz/ 300KHz
Supply voltage : 3.0 VDC from DC power supply
Temperature : 23ºC
Humidity : 50%

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.

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	0.348	0.342	0.690
2440	0.342	0.336	0.678
2480	0.336	0.348	0.684

Subclause 15.247 (b) (1), (3) – Maximum Peak Output Power	**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 : ≥ DTS BW / ≥ 3xRBW
Span : ≥ 3 x RBW
Supply voltage : 3.0 VDC from DC power supply
Temperature : 23ºC
Humidity : 50%

Requirement: For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850MHz bands: 1 Watt (30dBm)

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	0.76	0.00	0.76	1 / 30.0	Pass
2440	1.01	0.00	1.01	1 / 30.0	Pass
2480	0.90	0.00	0.90	1 / 30.0	Pass

Subclause 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 : 3.0 VDC from DC power supply
Temperature : 23 ºC
Humidity : 50 %

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.

Operating frequency (MHz)	Spurious frequency (MHz)	Spurious Level (dBm)	Reference value (dBm)	Delta (dB)	Verdict
2402	4800.007	-47.62	0.65	-48.27	Pass
2440	4850.007	-48.40	0.94	-49.34	Pass
2480	4950.007	-47.81	-0.25	-47.56	Pass

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

Test Specification : ANSI C63.4 – 2003
Mode of operation : Tx mode (2402MHz, 2440MHz, 2480MHz)
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 : 3.0 VDC from new battery
Temperature : 23ºC
Humidity : 50%

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.

Tx frequency 2402MHz Vertical Polarization

Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
623.983	28.50	46.0 / QP
4804.321	50.97	74.0 / PK
4803.936	35.00	54.0 / AV
7206.266	53.37	74.0 / PK
7205.946	36.93	54.0 / AV

Tx frequency 2402MHz Horizontal Polarization

Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
623.983	40.70	46.0 / QP
4804.503	52.38	74.0 / PK
4803.878	36.50	54.0 / AV

Tx frequency 2440MHz Vertical Polarization

Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
4879.167	51.05	74.0 / PK
4879.808	35.76	54.0 / AV
7320.436	59.51	74.0 / PK
7319.859	41.28	54.0 / AV

Tx frequency 2440MHz Horizontal Polarization

Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
607.984	43.50	46.0 / QP
4879.888	54.84	74.0 / PK
4879.904	37.01	54.0 / AV

Tx frequency 2480MHz	Vertical Polarization	
Freq MHz	**Level dBµV/m**	**Limit/ Detector dBµV/m**
4960.080	50.05	74.0 / PK
4959.872	35.66	54.0 / AV
7439.808	59.11	74.0 / PK
7439.824	41.40	54.0 / AV
Tx frequency 2480MHz	Horizontal Polarization	
Freq MHz	**Level dBµV/m**	**Limit/ Detector dBµV/m**
607.983	43.60	46.0 / QP
2573.237	63.92	74.0 / PK
2574.026	28.43	54.0 / AV
4959.423	52.02	74.0 / PK
4959.856	36.97	54.0 / AV

Subclause 15.247 (d) – Band Edge Emissions	**Pass**
Test Specification : FCC Part 15 Subpart A – Subclause 15.31 Mode of operation : Tx mode (2402MHz, 2480MHz) Port of testing : Temporary antenna port Detector : Peak RBW/VBW : 100 kHz / 300 kHz Supply voltage : 3.0 VDC from DC power supply Temperature : 23ºC Humidity : 50%	
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.

Subclause 15.205 – Restricted Bands Next to The Band Edge **Pass**

Test Specification : FCC Part 15 Subpart A – Subclause 15.31
Mode of operation : Tx mode (2402MHz, 2480MHz)
Port of testing : Enclosure
Detector : Peak
RBW/VBW : 1 MHz / 1 MHz
Supply voltage : 3.0 VDC from new battery
Temperature : 23ºC
Humidity : 50%

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). For test protocols refer to Appendix 1, page 9-16.

Tx frequency 2402MHz Vertical Polarization

Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
2382.308	50.83	74.0 / PK
2385.897	27.64	54.0 / AV

Tx frequency 2402MHz Horizontal Polarization

Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
2326.282	52.24	74.0 / PK
2380.513	27.51	54.0 / AV

Tx frequency 2480MHz Vertical Polarization

Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
2497.990	50.55	74.0 / PK
2483.500	30.60	54.0 / AV

Tx frequency 2480MHz Horizontal Polarization

Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
2497.832	52.32	74.0 / PK
2483.500	30.30	54.0 / AV

Subclause 15.247 (e) – Power Spectral Density	**Pass**
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 / RSS-Gen
Mode of operation : 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 : 3.0 VDC from DC power supply
Temperature : 23ºC
Humidity : 50%

Results: For test protocols please refer to Appendix 1, page 17-18.

Operating frequency (MHz)	**Power density (dBm)**	**Limit (dBm)**	**Verdict**
2402	0.64	8.0	Pass
2440	0.90	8.0	Pass
2480	0.76	8.0	Pass