



## RF Exposure evaluation

**Report Reference No.....: GTSR16070031-MPE**

**FCC ID.....: 2AH68-PIVOTHUB**

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Date of issue.....: Jul. 16, 2016

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**Applicant's name.....: TuringSense, Inc**

Address .....: 4675 Stevens Creek Blvd. #101,Santa Clara,CA 95051,U.S.A.

**Test specification .....**

Standard .....: **47CFR §1.1310**  
**47CFR §2.1091**  
**KDB447498 v06**

TRF Originator .....: Shenzhen Global Test Service Co.,Ltd.

Master TRF.....: Dated 2014-12

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**Test item description .....** Wireless 9-axis motion sensors to capture

Trade Mark .....: /

Manufacturer .....: **TuringSense, Inc**

Model/Type reference.....: PIVOT Hub1.0

Listed Models .....: /

Exposure category.....: General population/uncontrolled environment

EUT Type .....: Production Unit

Hardware Version .....: PIVOTHUB\_Rev D

Software Version .....: Hub\_ V1.0

Rating .....: DC 3.7V

Result.....: **PASS**

# TEST REPORT

<b>Test Report No. :</b>	<b>GTSR16070031-MPE</b>	Jul. 16, 2016
		Date of issue

Equipment under Test : Wireless 9-axis motion sensors to capture

Model /Type : PIVOT Hub1.0

Listed Models : /

**Applicant** : **TuringSense, Inc**

Address : 4675 Stevens Creek Blvd. #101,Santa Clara,CA  
95051,U.S.A.

**Manufacturer** : **TuringSense, Inc**

Address : 4675 Stevens Creek Blvd. #101,Santa Clara,CA  
95051,U.S.A.

<b>Test Result:</b>	<b>PASS</b>
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The test report merely corresponds to the test sample.  
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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# 1. SUMMARY

## 1.1. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

<input type="radio"/>	/	M/N:	/
<input type="radio"/>		Manufacturer:	/

## 1.2. Note

	Test Standards	Reference Report
WLAN	FCC Part 15 Subpart C	GTSR16070031-WLAN
EMF	FCC Per 47 CFR 2.1093(d)	GTSR16060031-MPE

## 2. TEST ENVIRONMENT

### 2.1. Address of the test laboratory

**Shenzhen Global Test Service Co.,Ltd.**

1F, Building No. 13A, Zhonghaixin Science and Technology City, No.12,6 Road, Ganli Industrial Park, Buji Street, Longgang District, Shenzhen, Guangdong

### 2.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

**FCC-Registration No.: 964637**

Shenzhen Global Test Service Co.,Ltd EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 964637, Jul 24, 2015.

**CNAS-Lab Code: L8169**

Shenzhen Global Test Service Co.,Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories. Date of Registration: Dec. 11, 2015. Valid time is until Dec. 10, 2018.

### 2.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

### 2.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the Shenzhen Global Test Service Co.,Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen GTS laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.57 dB	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

### 3. Method of measurement

#### 3.1. Applicable Standard

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to §1.1310 and §2.1093 RF exposure requirement  
KDB447498 v06: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

#### 3.2. Requirement

According to KDB447498 D01 General RF Exposure Guidance v06 Section 4.3.1 Standalone SAR test exclusion considerations: "Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition, listed below, is satisfied. These test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.<sup>22</sup> The minimum test separation distance is determined by the smallest distance from the antenna and radiating structures or outer surface of the device, according to the host form factor, exposure conditions and platform requirements, to any part of the body or extremity of a user or bystander (see 5) of section 4.1). To qualify for SAR test exclusion, the test separation distances applied must be fully explained and justified by the operating configurations and exposure conditions of the transmitter and applicable host platform requirements, typically in the SAR measurement or SAR analysis report, according to the required published RF exposure KDB procedures. When no other RF exposure testing or reporting is required, a statement of justification and compliance must be included in the equipment approval, in lieu of the SAR report, to qualify for the SAR test exclusion. When required, the device specific conditions described in the other published RF exposure KDB procedures must be satisfied before applying these SAR test exclusion provisions; for example, handheld PTT two-way radios, handsets, laptops & tablets etc.<sup>23</sup> "

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f} (\text{GHz})]$   
 $\leq 3.0$  for 1-g SAR and  $\leq 7.5$  for 10-g extremity SAR, where:

- f (GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum test separation distance is  $\leq 50$  mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is  $< 5$  mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

#### 3.3. Conducted Power Results

Mode	Channel	Frequency (MHz)	Worst case Data rate	Conducted Output Power (dBm)	
				PK	Average
802.11b	01	2412	1Mbps	9.14	7.21
	06	2437	1Mbps	9.43	7.51
	13	2472	1Mbps	9.59	7.77
802.11g	01	2412	6Mbps	9.21	6.67
	06	2437	6Mbps	9.86	6.35
	13	2472	6Mbps	9.62	6.92
802.11n HT20	01	2412	6.5 Mbps	9.06	5.17
	06	2437	6.5 Mbps	9.24	5.58
	13	2472	6.5 Mbps	9.40	5.01
802.11n HT40	03	2422	13.5 Mbps	5.55	2.11
	06	2437	13.5 Mbps	5.92	2.46
	09	2452	13.5 Mbps	5.47	2.17

**Manufacturing tolerance**

<b>IEEE 802.11b (Average)</b>			
Frequency	2412	2437	2462
Target (dBm)	7	7	7
Tolerance ±(dB)	1.0	1.0	1.0
<b>IEEE 802.11g (Average)</b>			
Frequency	2412	2437	2462
Target (dBm)	6	6	6
Tolerance ±(dB)	1.0	1.0	1.0
<b>IEEE 802.11n HT20 (Average)</b>			
Frequency	2412	2437	2462
Target (dBm)	5	5	5
Tolerance ±(dB)	1.0	1.0	1.0
<b>IEEE 802.11n HT40 (Average)</b>			
Frequency	2422	2437	2452
Target (dBm)	2	2	2
Tolerance ±(dB)	1.0	1.0	1.0

**4. Evaluation Result**

Band/Mode	f (GHz)	Antenna Distance (mm)	RF output power (including tune-up tolerance)		SAR Test Exclusion Threshold	SAR Test Exclusion
			dBm	mW		
WLAN	2.462	5	8	6.31	1.98<3.0	Yes

**5. Conclusion**

The measurement results comply with the FCC Limit per 47 CFR 2.1093 for the uncontrolled RF Exposure and SAR Exclusion Threshold per KDB 447498 v06.

.....**End of Report**.....