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Report No.: 1606RSU01508
Report Version: V05
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RF Exposure Evaluation Declaration

FCC ID: 2AJNDGMPT401

APPLICANT: HONEYWELL GLOBAL TRACKING LTD

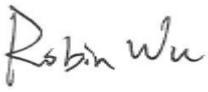
Application Type: Certification


Product: Personal Tracker

Model No.: GMPT-401, GMPT-401-C1D2

Brand Name: Honeywell

FCC Classification: Digital Transmission System (DTS)
Licensed Non-Broadcast Transmitter Worn on Body
(TNT)

Reviewed By : 
Manager : _____
(Robin Wu)

Approved By : 
CEO : _____
(Marlin Chen)



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

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Revision History

Report No.	Version	Description	Issue Date	Note
1606RSU01508	Rev. 01	Initial report	08-26-2016	Invalid
1606RSU01508	Rev. 02	Revised some test data	10-07-2016	Invalid
1606RSU01508	Rev. 03	Revised some test data	10-08-2016	Invalid
1606RSU01508	Rev. 04	Revised test description	10-10-2016	Invalid
1606RSU01508	Rev. 05	Updated the output power	10-15-2016	Valid

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name	Personal Tracker
Model No.	GMPT-401, GMPT-401-C1D2
Brand Name	Honeywell
Bluetooth Specification	v4.1
GPS	1575.42MHz
Satellite Specification	1624MHz
Components	
AC Adapter	Model No.: ADS-12B-06 05010E Input Power: 100 - 240V ~ 50/60Hz, 0.3A Output Power: 5VDC/2A
Car Adapter	Model No.: C15E-0520CAZ-S0 Input Power: 12/24VDC, 1300mA Max Output Power: 5VDC, 2A

1.2. Antenna Description

Antenna Type	Manufacturer	Model No.	Max Peak Gain (dBi)
Dipole Antenna 1#	Maxtena Inc.	M1600HCT-P-SMA	2.8 for 1616~1626MHz -3dBi for 1575.42MHz
Dipole Antenna 2#	Maxtena Inc.	M1600HCT-P-SMA	2.8 for 1616~1626MHz -3dBi for 1575.42MHz
PCB Antenna	N/A	N/A	0dBi for 2.4GHz

2. RF Exposure Evaluation

2.1. Limits

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table. The equation and threshold in Note 1 must be applied to determine SAR test exclusion.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	
MHz	30	35	40	45	50	mm
150	232	271	310	349	387	SAR Test Exclusion Threshold (mW)
300	164	192	219	246	274	
450	134	157	179	201	224	
835	98	115	131	148	164	
900	95	111	126	142	158	
1500	73	86	98	110	122	
1900	65	76	87	98	109	
2450	57	67	77	86	96	
3600	47	55	63	71	79	
5200	39	46	53	59	66	
5400	39	45	52	58	65	
5800	37	44	50	56	62	

Note: The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

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

- $f(\text{GHz})$ 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 ≤ 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.

2.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

The temperature and related humidity: 18°C and 78% RH.

2.3. Test Result of RF Exposure Evaluation

Product	Personal Tracker
Test Item	RF Exposure Evaluation

Antenna Gain: Refer to clause 1.2.

Output Power into Antenna:

Test Mode	Frequency Band (MHz)	Maximum output power to antenna (mW)	SAR Test Exclusion Threshold (mW)
Bluetooth	2402 ~ 2480	0.29	10
Satellite	1624	0.0530	12

Note: For the satellite, the time average power = average power - DC factor.

Minimum working period = 2min, Maximum message size = 270 bytes, Minimum data rate = 33.6kbps which are declared by the manufacturer and detail see the operation description.

DC factor = $10 \cdot \log[1 / (270 \text{ bytes} \cdot 8 \text{ bits} / 1000 / 33.6 \text{ kbps} / (2 \cdot 60 \text{ s}))] = 32.76$

So the time average power = average power - DC factor = 20.0dBm – 32.76 = -12.76dBm

Per FCC KDB 447498 D01v06, the SAR exclusion threshold for distances < 50mm is defined by the following equation:

$$\frac{\text{Max Power of Channel (mW)}}{\text{Test Separation Dist (mm)}} \cdot \sqrt{\text{Frequency (GHz)}} \leq 3.0$$

Based on the maximum conducted power of Bluetooth and the antenna to use separation distance, Bluetooth SAR was not required;

$[(0.29 \text{ mW} / 5) \cdot \sqrt{2.402}] = 0.0899 < 3.0$;

Satellite SAR was not required;

$[(0.0530 \text{ mW} / 5) \cdot \sqrt{1.624}] = 0.0135 < 3.0$;

The Max $P_d = 0.0899 < 3.0$

Note: When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

For simultaneous transmission

Per FCC KDB 447498 D01v06 section 4.3.2

The standalone SAR value = [(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] · [$\sqrt{f(\text{GHz})/x}$] W/kg, for test separation distances ≤ 50 mm;

Where $x = 7.5$ for 1-g SAR and $x = 18.75$ for 10-g SAR.

For Bluetooth, SAR value = $(0.29\text{mW}/5\text{mm}) \cdot (\sqrt{2.402}/7.5) = 0.012$ W/kg;

For Satellite, SAR value = $(0.0530\text{mW}/5\text{mm}) \cdot (\sqrt{1.624}/7.5) = 0.002$ W/kg;

Simultaneous transmission SAR value = 0.012 W/kg + 0.002 W/kg = 0.014 W/kg < 1.6 W/kg.

When the sum of 1-g or 10-g SAR of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit, SAR test exclusion applies to that simultaneous transmission configuration.

Conclusion: This device can satisfy the SAR test exclusion requirement.

The End
