SAR Exemption Evaluation Report

Product Name	:	Barcode Scanner
Model No.	:	1991i
FCC ID	:	HD5-1991A

Applicant	:	HONEYWELL INTERNATIONAL INC Honeywell Safety and Productivity Solutions
Address	:	9680 OLD BAILES RD FORT MILL SC 29707-7539,USA

Date of Receipt	:	Feb. 19, 2020
Issued Date	:	Apr. 07, 2020
Report No.	:	2022045R-RF-US-P20V02
Report Version	:	V1.0

Test Report Certification

Issued Date : Apr. 07, 2020
Report No. : 2022045R-RF-US-P20V02

Product Name	:	Barcode Scanner
Applicant	:	HONEYWELL INTERNATIONAL INC Honeywell Safety and Productivity Solutions
Address	:	9680 OLD BAILES RD FORT MILL SC 29707-7539,USA
Manufacturer	:	HONEYWELL INTERNATIONAL INC Honeywell Safety and Productivity Solutions
Address	:	9680 OLD BAILES RD FORT MILL SC 29707-7539,USA
Factory	:	1.Metro(Suzhou)Technologies Co.,Ltd 2.HONEYWELL OPTOELECTRONICS DE MEXICO S, A DE CV
Address	:	1.No.221 Xinghai street China-Singapore Suzhou Industrial Park 2.Parque Industrial Juarez 3328, 32630 Juarez,Chihuahua,MEXICO
Model No.	:	1991i
FCC ID	:	HD5-1991A
EUT Voltage	:	DC 5V
Test Voltage	:	Battery 3.7V
Applicable Standard	:	KDB 447498 D01v06
Test Result	:	Complied
Performed Location	:	DEKRA Testing & Certification (Suzhou) Co., Ltd. No.99 Hongye Rd., Suzhou Industrial Park, Suzhou, 215006, Jiangsu, China TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098 FCC Designation Number: CN1199

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1. RF Exposure Evaluation

1.1. Limits

According to **KDB 447498 D01 General RF Exposure Guidance v06**

4.3.1 Standalone SAR test exclusion considerations

1) 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:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 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 ≤ 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) At 100 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following, and as illustrated in Appendix B:

a) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·(f(MHz)/150)] mW, at 100 MHz to 1500 MHz

b) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz

3) The 1-g and 10-g SAR test exclusion thresholds for below 100 MHz at test separation distances ≤ 50 mm are determined by:

a) The power threshold at the corresponding test separation distance at 100 MHz in step 2) is multiplied by [1 + log(100/f(MHz))] for test separation distances > 50 mm and < 200 mm

b) The power threshold determined by the equation in a) for 50 mm and 100 MHz is multiplied by ½ for test separation distances ≤ 50 mm

c) SAR measurement procedures are not established below 100 MHz. When SAR test exclusion cannot be applied, a KDB inquiry is required to determine SAR evaluation requirements for any test results to be acceptable. Note: when the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

1.2. 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℃and 78％ RH.

1.3. Test Result of RF Exposure Evaluation

Product	:	Barcode Scanner
Test Item	:	RF Exposure Evaluation
Test Site	:	AC-6

- **Antenna Information**

Antenna model	Dielectric Chip Antenna					
Antenna Delivery	☒	1*TX+1*RX	☐	2*TX+2*RX	☐	3*TX+3*RX
Antenna technology	☒	SISO				
	☐	MIMO	☐	Basic		
			☐	CDD		
			☐	Beam-forming		
Antenna Type	☐	External	☐	Dipole		
	☒	Internal	☐	PIFA		
			☐	PCB		
			☒	Ceramic Chip Antenna		
			☐	Stamping Antenna		
			☐	Metal plate type F antenna		
			☐	Monopole antenna		
Antenna Gain	2.9dBi					

Based on The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm and the formula below:

$$\text{SAR test exclusion thresholds} = \sqrt{f(GHz)} * \frac{(\text{Max Power of channel, mW})}{\text{Min. Separation Distance, mm}}$$

The Maximum tune-up power is 0.5dB higher than Maximum Measurement power, so the maximum conducted power we used to calculate RF exposure is 3.83dBm.

Band	Exposure Condition	Pmax (dBm)	Pmax (mw)	Distance (mm)	f(GHz)	calculation result	Stand-alone Test exclusion threshold	SAR Test
BT	Body	3.83	2.42	5	2.402	0.75	3.00	No

Conclusion: 2.4GHz SAR was not required.

The End