



RF Exposure Evaluation Declaration

FCC ID: 2A3Y3-NSB01
APPLICANT: Honeywell Safety Products USA, Inc.
Product: Smart Proximity Beacon
Model No.: NSB-01
Brand Name: Honeywell and/or NORTH
FCC Classification: Ultra Wideband Transmitter
FCC Rule Part(s): FCC Part 2 (Section 2.1091)

Reviewed By:

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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.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
2111RSU021-U2	Rev. 01	Initial Report	01-12-2022	Valid

CONTENTS

Description	Page
1. General Information	4
1.1. Applicant.....	4
1.2. Manufacturer	4
1.3. Testing Facility	4
1.4. Product Information	5
1.5. Radio Specification.....	5
1.6. Applied Standards	5
2. RF Exposure Evaluation	6
2.1. Test Limit	6
2.2. Standalone SAR Test Exclusion Considerations	7
2.3. Test Result.....	9

1.4. Product Information

Product Name	Smart Proximity Beacon
Model No.	NSB-01
Hardware Version	V1.2
Software Version	V1.0
UWB Specification	3993.6MHz, Single Channel
Bluetooth Specification	v5.1, Single mode
Power Supply	DC 5V,1A
Remark: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	

1.5. Radio Specification

Operation Frequency	3993.6MHz
Channel Number	1
Type of modulation	BPM-BPSK

Note: For other features of this EUT, test report will be issued separately.

1.6. Applied Standards

KDB 447498 D01v06

2. RF Exposure Evaluation

2.1. Test Limit

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	f/1500	6
1500-100,000	--	--	1	30

f= Frequency in MHz

Calculation Formula: $Pd = (Pout \cdot G) / (4 \cdot \pi \cdot r^2)$

Where

Pd = power density in mW/cm²

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

r = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, 1mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

2.2. Standalone SAR Test Exclusion Considerations

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 \leq 50 mm are determined by:

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

2.3. Test Result

Product	Smart Proximity Beacon
Test Item	RF Exposure Evaluation

Frequency Band (MHz)	Maximum Output Power (dBm)	SAR Test Exclusion Threshold @ 5mm (mW)
2402 ~ 2480	-1.74	10
3993.6	-16.14	10

Note 1: Per FCC KDB 447498 D01v06, the SAR exclusion threshold for distances < 50mm is defined by the following equation:

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

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

Bluetooth: $(0.6699\text{mW} / 5\text{mm}) * (2.480\text{GHz}^{0.5}) = 0.2110 \ll 3.0$;

Note 2: UWB power is low enough and exempted from SAR evaluation;

Note 3: When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

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