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Honeywell (Beijing) Technology Solutions Labs Co., Ltd

MPE ASSESSMENT REPORT

Report Type:
FCC MPE assessment report

Model:
TC500A-N, TC500B-N

REPORT NUMBER:
200402664SHA-004

ISSUE DATE:
August 18, 2020

DOCUMENT CONTROL NUMBER:
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TEST REPORT

Report no.: 200402664SHA-004

Applicant:	Honeywell (Beijing) Technology Solutions Labs Co., Ltd A1 Building, C&W Industry Zone, No. 14, Jiuxianqiao Road, Chaoyang District, Beijing 100015, P.R.China
Manufacturer:	Honeywell (Beijing) Technology Solutions Labs Co., Ltd A1 Building, C&W Industry Zone, No. 14, Jiuxianqiao Road, Chaoyang District, Beijing 100015, P.R.China
FCC ID:	2ARTN-00002

SUMMARY:

The equipment complies with the requirements according to the following standard(s) or Specification:
KDB447498 D01 General RF Exposure Guidance v06 FCC Part2.1091, FCC Part2.1093 FCC Part1.1307(b)

PREPARED BY:	**REVIEWED BY:**
Project Engineer Erick Liu	Reviewer Daniel Zhao

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Revision History

Report No.	Version	Description	Issued Date
200402664SHA-004	Rev. 01	Initial issue of report	August 18, 2020

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TEST REPORT

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name:	Thermostat
Type/Model:	TC500A-N, TC500B-N
Description of EUT:	The products covered by this report are thermostats for fixed installation, it has WIFI, BT, BLE function. TC500A-N and TC500B-N are different product numbers for marketing purpose, the electrical circuit design, layout and components used are identical, after evaluation, we choose the model name TC500A-N for all the tests.
Rating:	24VAC 50/60Hz
Category of EUT:	Class B
EUT type:	☒ Table top ☐ Floor standing
Software Version:	00.01.04.00
Hardware Version:	Revision A
Sample received date:	May 23, 2020
Date of test:	May 27, 2020 – July 11, 2020

1.2 Technical Specification

WiFi:

Frequency Band:	2400MHz ~ 2483.5MHz
Support Standards:	IEEE 802.11b, IEEE 802.11g, IEEE 802.11n-HT20, IEEE 802.11n-HT40
Type of Modulation:	IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11n-HT20: OFDM (64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11n-HT40: OFDM (64-QAM, 16-QAM, QPSK, BPSK)
Channel Number:	11 Channels for 802.11b, 802.11g and 802.11n(HT20) 9 Channels for 802.11n(HT40)
Data Rate:	IEEE 802.11b: Up to 11 Mbps IEEE 802.11g: Up to 54 Mbps IEEE 802.11n-HT20: Up to MCS7 IEEE 802.11n-HT40: Up to MCS7
Channel Separation:	5 MHz
Antenna:	FPC antenna, 4dBi

BT:

Frequency Band:	2400MHz ~ 2483.5MHz
Support Standards:	Bluetooth 4.2(BR+EDR)
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Type of Modulation:	GFSK, π/4 DQPSK, 8DPSK
Channel Number:	79 (0 - 78)
Data Rate:	Max 3 Mbps
Channel Separation:	1 MHz
Antenna:	FPC antenna, 4dBi

BLE:

Frequency Band:	2400MHz ~ 2483.5MHz
Support Standards:	IEEE 802.15.1
Type of Modulation:	GFSK
Channel Number:	40
Data Rate:	1Mbps
Channel Separation:	2MHz
Antenna:	FPC antenna, 4dBi

1.3 Description of Test Facility

Name:	Intertek Testing Services Shanghai
Address:	Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Telephone:	86 21 61278200
Telefax:	86 21 54262353

The test facility is recognized, certified, or accredited by these organizations:	CNAS Accreditation Lab Registration No. CNAS L0139
	FCC Accredited Lab Designation Number: CN1175
	IC Registration Lab CAB identifier.: CN0051
	VCCI Registration Lab Registration No.: R-14243, G-10845, C-14723, T-12252
	A2LA Accreditation Lab Certificate Number: 3309.02

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2 MPE Assessment

Test result: Pass

2.1 MPE Assessment Limit

Mobile device exposure for standalone operations:

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (uT)	Equivalent plane wave power density S_{eq} (W/m^2)
0-1 Hz	-	$3,2 \times 10^4$	4×10^4	-
1-8 Hz	10 000	$3,2 \times 10^4/f^2$	$4 \times 10^4/f^2$	-
8-25 Hz	10 000	4 000/f	5 000/f	-
0,025-0,8 kHz	250/f	4/f	5/f	-
0,8-3 kHz	250/f	5	6,25	-
3-150 kHz	87	5	6,25	-
0,15-1 MHz	87	0,73/f	0,92/f	-
1-10 MHz	$87/f^{1/2}$	0,73/f	0,92/f	-
10-400 MHz	28	0,073	0,092	2
400-2 000 MHz	$1,375\ f^{1/2}$	$0,0037\ f^{1/2}$	$0,0046\ f^{1/2}$	f/200
2-300 GHz	61	0,16	0,20	10

Mobile device exposure for simultaneous transmission operations: **the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in a host device is ≤ 1.0**

2.2 Assessment Results

Power density (S) is calculated according to the formula:

$S = P / (4\pi R^2)$

Where S = power density in mW/cm^2

P = Radiated transmit power in mW

G = numeric gain of transmit antenna

R = distance (cm)

As we can see from the test report 200402664SHA-001, 200402664SHA-002, 200402664SHA-003:

The calculations in the table below use the highest gain of antenna for client EUT. These calculations represent worst case in terms of the exposure levels.

The WiFi, BT and BLE cannot support simultaneous transmission.

Mode	Frequency band	Max Power	Antenna Gain	R	S	Limits
	(MHz)	dBm	dBi	(cm)	(mW/cm2)	(mW/cm2)
WIFI	2400 -2483.5	22.75	4.0	20	0.0942	1
BT	2400 -2483.5	-5.50	4.0	20	0.0001	1
BLE	2400 -2483.5	-9.36	4.0	20	0.0001	1

The worst MPE = 0.0942 mW/cm2 < 1 mW/cm2.

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Appendix I

Definition below must be outlined in the User Manual:

To satisfy FCC RF exposure requirements, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation.
To ensure compliance, operations at closer than this distance is not recommended.

********** END **********