



**ISED RF EXPOSURE REPORT
CERTIFICATION TEST REPORT**

For

BE22000 Whole Home Mesh Wi-Fi 7 System

MODEL NUMBER: Deco BE85

IC: 26583-BE85

REPORT NUMBER: 4790768464-1-RF-4

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Prepared for

TP-Link Corporation Limited

Room 901, 9/F. , New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hong Kong

Prepared by

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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V0	March 29, 2023	Initial Issue	Kebo.Zhang
V1	March 30, 2023	Add WIFI 5G UNII-2A and UNII-2C and WIFI 6G test data	Kebo.Zhang

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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: TP-Link Corporation Limited
Address: Room 901, 9/F. , New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hong Kong

Manufacturer Information

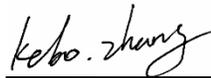
Company Name: TP-Link Corporation Limited
Address: Room 901, 9/F. , New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hong Kong

EUT Information

EUT Name: BE22000 Whole Home Mesh Wi-Fi 7 System
Model: Deco BE85
Brand: tp-link
Sample Received Date: March 6, 2023
Sample Status: Normal
Sample ID: 5853578
Date of Tested: March 6, 2023 to March 30, 2023

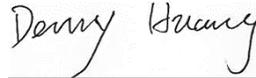
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
RSS-102 Issue 5 March 2015	PASS

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Stephen Guo
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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with RSS-102.

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	<p>A2LA (Certificate No.: 4102.01) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA.</p> <p>FCC (FCC Designation No.: CN1187) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Delcaration of Conformity (DoC) and Certification rules</p> <p>ISED (Company No.: 21320) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED. The Company Number is 21320 and the test lab Conformity Assessment Body Identifier (CABID) is CN0046.</p> <p>VCCI (Registration No.: G-20019, R-20004, C-20012 and T-20011) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793. Facility Name: Chamber D, the VCCI registration No. is G-20019 and R-20004 Shielding Room B , the VCCI registration No. is C-20012 and T-20011</p>
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Note: All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China.

4. DESCRIPTION OF EUT

EUT Name/PMN:		BE22000 Whole Home Mesh Wi-Fi 7 System
Model/HVIN:		Deco BE85
Product Description (2.4G WLAN)	Frequency Range:	2412 MHz ~ 2462 MHz
	Type of Modulation:	IEEE 802.11b: DSSS(CCK, DQPSK, DBPSK) IEEE 802.11g/n: OFDM(64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11ax: OFDMA(1024-QAM,64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11be: OFDMA(4096-QAM, 1024-QAM,64-QAM, 16-QAM, QPSK, BPSK)
	Radio Technology:	IEEE802.11b/g/n HT20/n HT40/n VHT20/n VHT40/ax HE20/ax HE40/be EHT20/be EHT40
Product Description (5G RLAN)	Frequency Range:	UNII-1 Band 5180 MHz ~ 5240 MHz UNII-2A Band 5260 MHz ~ 5320 MHz (Only BW 160M support UNII-2A) UNII-2C Band 5500 MHz ~ 5700 MHz UNII-3 Band 5745 MHz ~ 5825 MHz
	Type of Modulation:	IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac: OFDM(256QAM, 64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ax: OFDMA(1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK) IEEE 802.11be: OFDMA(4096QAM, 1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK)
	Radio Technology:	IEEE802.11a/n HT20/n HT40/ ac VHT20/ac VHT40/ac VHT80/ac VHT160/ ax HE20/ax HE40/ax HE80/ax HE160/ be EHT20/be EHT40/be EHT80/be EHT160/be EHT240
Product Description (6G RLAN)	Operation Frequency:	UNII-5 Band: 6115 MHz ~ 6415 MHz UNII-6 Band: 6435 MHz ~ 6515 MHz UNII-7 Band: 6535 MHz ~ 6875 MHz UNII-8 Band: 6895 MHz ~ 7115 MHz
	Type of Modulation:	IEEE 802.11ax: OFDMA (BPSK, QPSK,16QAM,64QAM, 256QAM, 1024QAM) IEEE 802.11be: OFDMA (BPSK, QPSK,16QAM,64QAM, 256QAM, 1024QAM, 4096QAM)
	Radio Technology:	IEEE802.11ax HE20/ax HE40/ax HE80/ax HE160 IEEE802.11be EHT20/be EHT40/be HE80/be EHT160/be EHT320
FVIN:		V1.0
Normal Test Voltage:		12 or 15Vdc via adapter

5. REQUIREMENT

Routine Evaluation

According to the RSS-102 the following RF exposure evaluation shall to demonstrate RF exposure compliance.

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

below 20 MHzFootnote6 and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);

at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;

at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);

at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.683}$ W (adjusted for tune-up tolerance), where f is in MHz;

at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

Multiple Transmitters

According to RSS-102 Issue 5 Section 3.2 RF Exposure Evaluations of Devices:

A device requiring an RF exposure evaluation shall be made in accordance with the latest version of IEEE C95.3.

If the device is designed such that more than one antenna can functionally transmit at the same time, the RF exposure evaluation shall be conducted while all antennas are transmitting. The individual exposure level ratios shall be totaled and used for compliance purposes.

If the device has more than one antenna, but is not designed to have more than one antenna functionally transmit at the same time, the RF exposure evaluation of the device shall be performed for each of the individually transmitting antennas. The maximum RF field strength value shall be recorded and used for compliance purposes.

If the device combines groups of simultaneous and non-simultaneous transmitting antennas, the worst-case of the above scenarios applies.

In accordance with KDB447498D01 for Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modeled or measured field strengths or power density, is ≤ 1.0 . The MPE ratio of each antenna is determined at the minimum test separation distance required by the operating configurations and exposure conditions of the host device, according to the ratio of field strengths or power density to MPE limit, at the test frequency. Either the maximum peak or spatially averaged results from measurements or numerical simulations may be used to determine the MPE ratios. Spatial averaging does not apply when MPE is estimated using simple calculations based on far-field plane-wave equivalent conditions. The antenna installation and operating requirements for the host device must meet the minimum test separation distances required by all antennas, in both standalone and simultaneous transmission operations, to satisfy compliance.

Power Density Limit:

Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)				
Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ²¹	83	90	-	Instantaneous*
0.1-10	-	0.73/ f	-	6**
1.1-10	87/ f ^{0.5}	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ f ^{0.25}	0.1540/ f ^{0.25}	8.944/ f ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 f ^{0.3417}	0.008335 f ^{0.3417}	0.02619 f ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ f ^{1.2}
150000-300000	0.158 f ^{0.5}	4.21 x 10 ⁻⁴ f ^{0.5}	6.67 x 10 ⁻⁵ f	616000/f ^{1.2}

Note: f is frequency in MHz.
* Based on nerve stimulation (NS).
** Based on specific absorption rate (SAR).

Calculation Method:

Predication of MPE limit at a given distance

$$S = PG / 4\pi R^2$$

Where: S=power density

P=power input to antenna

G=power gain of the antenna in the direction of interest relative to an isotropic radiator

R=distance to the center of radiation of the antenna

CALCULATED RESULTS

Equipment types	Frequency	Power				Threshold
		Conducted		EIRP		
	MHz	dBm	W	dBm	W	W
2.4GHz WIFI	2412-2462	29.8	0.95499	31.8	1.51356	2.68-2.72
5GHz WIFI	5180-5825	29.8	0.95499	32.8	1.90546	4.51-4.89
6GHz WIFI	6115-7115	26.0	0.398107	29.0	0.794328	5.05-5.60

Note: The power and eirp were derived from measurement of output power at the antenna port and nominal antenna gain specified by the antenna manufacturer.

Note:

1. The minimum separation distance of the device is greater than 25 cm.
2. Calculate by WORST-CASE mode.
3. Owing to the EIRP of the EUT is below the limit defined in RSS-102, so it deemed to comply with the basic restrictions without testing which means that no SAR is required.

CALCULATED SIMULTANEOUS RESULTE

Worst Case					
Mode	Output Power	Antenna Gain	Power Density	Power Density Limit	Test Result
	dBm	dBi	mW/cm ²	mW/cm ²	--
WIFI 2.4G	29.8	2	0.19271	0.5	Complies
WIFI 5G	29.8	3	0.24261	0.9	Complies
WIFI 6G	26.0	3	0.10114	1.0	Complies

Power Density Limit Calculation Method:

WIFI 2.4G Power Density Limit = $0.02619 f^{0.6834} \text{ W/m}^2 = 0.02619 * 2412^{0.6834} \text{ W/m}^2 = 5 \text{ W/m}^2 = 0.5 \text{ mW/cm}^2$
WIFI 5G Power Density Limit = $0.02619 f^{0.6834} \text{ W/m}^2 = 0.02619 * 5180^{0.6834} \text{ W/m}^2 = 5 \text{ W/m}^2 = 0.9 \text{ mW/cm}^2$

Worst Mode						
	Maximum 2.4G WLAN Power Density/ Limit(mW/cm ²)	Maximum 5G WLAN Power Density/ Limit(mW/cm ²)	Maximum 6G WLAN Power Density/ Limit(mW/cm ²)	∑ (Power Density /Limit(mW/cm ²)) of 2.4G WLAN + 5G WLAN+6G WLAN	Limit (mW/cm ²)	Test Result
ISED	0.38542	0.26957	0.10114	0.75613	1.0	Complies
2.4G WLAN MPE /0.5+5G WLAN /0.9+6G WLAN /1.0<1.0						

Note:

1. The minimum separation distance of the device is greater than 25 cm.
2. Calculate by WORST-CASE mode.

END OF REPORT