

FCC Maximum Permissible RF Exposure (MPE) Estimation Report

In accordance with the requirements of
FCC 47 CFR Part 2(2.1091), ANSI/IEEE C95.1-1992 and
KDB 447498 D01

Product Name: HomeBase
Trademark: eufy Security
Model Name: T8001
Serial Model: N/A
Report No.: SER180625001003E
FCC ID: 2AOKB-T8001

Prepared for

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TEST RESULT CERTIFICATION**Applicant's name** : Anker Innovations Limited

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Manufacturer's Name : Anker Innovations Limited

Address : Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok, Kowloon, Hong Kong

Product description

Product name : HomeBase

Trademark : eufy Security

Model and/or type reference : T8001

Serial Model : N/A

Standards : FCC 47 CFR Part 1(1.1310)
FCC 47 CFR Part 2(2.1091)
ANSI/IEEE C95.1-1992
KDB 447498 D01

This device described above has been tested by Shenzhen NTEK. Testing has shown that this device is capable of compliance with MPE specified in FCC 47 CFR Part 2(2.1091) and ANSI/IEEE C95.1-1992. The test results in this report apply only to the tested sample of the stated device/equipment. Other similar device/equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

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Date of Test

Date (s) of performance of tests : 25 Jun. 2018~ 15 Aug. 2018

Date of Issue : 24 Aug. 2018

Test Result : **Pass**

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※ ※ Revision History ※ ※

REV.	DESCRIPTION	ISSUED DATE	REMARK
Rev.1.0	Initial Test Report Release	Aug 24, 2018	Eileen Liu

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1 General Information

1.1 RF Exposure Requirements

1.1.1 RF Exposure Limits

Table - Limits For Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f ²	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30
f = frequency in MHz * = Plane-wave equivalent power density				

A rough estimation of the expected exposure in power flux density on a given point can be made with the following equation:

$$S = \frac{P_t * G_t}{4 * \pi * R^2}$$

Where:

S = Power density (mW/cm²)

P_t = Conducted output power (dBm)

G_t = numeric gain of the antenna in the direction of interest relative to an isotropic radiator (dBi)

R = distance to the centre of radiation of the antenna (cm)

EIRP = P_t * G_t

The antenna of the product, under normal use condition is at least 20 cm away from the body of the user. Warning statement to the user for keeping at least 20cm separation distance and the prohibition of operating to a person has been printed on the user's manual. Therefore, the S of the device is calculated with R=20cm, and if it is below the limit S, then we can conclude the device complies with the rules.

1.1.2 Additional Description

An estimation of MPE in this application for product is used to ensure if it complies to the rules of the standard in the regulation list above.

Maximum permissible exposure (MPE) refers to the RF energy that is acceptable for human exposure. It is broken down into two categories, Occupational/controlled and General population/uncontrolled.

Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

We analysis if it comply with the limits for General population/uncontrolled exposure. The FCC's MPE limits for field strength and power density are given in 47CFR 1.1310(Table below).These limits are generally based on recommended exposure guidelines published by the National Council on Radiation Protection and Measurements (NCRP), and also partly based on guidelines recommended by the American National Standards Institute (ANSI) in Section 4.1 of ANSI/IEEE C95.1.

1.2 EUT Description

Device Information	
Product Name	HomeBase
Trade Name	eufy Security
Model Name	T8001
Serial Model	N/A
FCC ID	2AOKB-T8001
Device Phase	Identical Prototype
Exposure Category	General population / Uncontrolled environment
Antenna Type	See Note 1
Antenna Gain	See Note 1
Device Operating Configurations	
Operating Frequency	2412-2462MHz for 802.11b/g/11n(HT20); 2422-2452MHz for 802.11n(HT40); 902-928 for DTS
Smart system	☒ SISO for 802.11b/g ☒ MIMO for 802.11n ☒ SISO for DTS
Modulation	DSSS with DBPSK/DQPSK/CCK for 802.11b; OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n; GFSK for DTS

Note 1:

The EUT has three types of antenna.

Antenna	Brand	Model Name (P/N)	Antenna Type	Connector	Antenna Gain(dBi)	
					2.4G	2.4G
A(main)	N/A	N/A	PCB	/	0	0
B(aux)	N/A	N/A	PCB	/	0	0
1(DTS)			Monopole metal	/	0	

1.3 Test specification(s)

FCC 47 CFR Part 1(1.1310)	
FCC 47 CFR Part 2(2.1091)	
ANSI/IEEE C95.1-1992	
KDB 447498 D01 General RF Exposure Guidance	

1.4 Ambient Condition

Ambient temperature	20°C – 24°C	
Relative Humidity	30% – 70%	

2 RF Output Power

2.1 Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
DARE	Power Meter	DARE/ RPR3006W	15I00041SNO84	2018.08.06	2019.08.05

2.2 RF Output Power

WIFI:

Mode	Frequency (MHz)	Peak Output Power(dBm)		Total (dBm)		Tune-up (dBm)		Max Tune-up (dBm)	
		ANT A	ANT B						
B	2412	23.3	23.2	-	-	23±1	23±1	24	24
	2437	23.0	23.1	-	-	23±1	23±1	24	24
	2462	23.2	23.0	-	-	23±1	23±1	24	24
G	2412	22.8	23.1	-	-	22±1	22±1	23	23
	2437	22.8	23.3	-	-	22±1	22±1	23	23
	2462	23.1	23.2	-	-	23±1	23±1	24	24
N20	2412	12.4	12.3	15.36		15±1		16	
	2437	12.3	12.2	15.26		15±1		16	
	2462	12.5	12.0	15.26		15±1		16	
N40	2422	12.4	12.2	15.31		15±1		16	
	2437	12.3	12.1	15.21		15±1		16	
	2452	12.1	12.0	15.06		15±1		16	

DTS:

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)
902.4	GFSK	13.66	13±1	14
906.8		13.64	13±1	14
920.2		13.58	13±1	14

3 RF Exposure Evaluation

3.1 Operation in WLAN 2.4G FOR SISO MODE

ANT A:

Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm ²)	MPE Limit (mW/cm ²)	Conclusion
24.00	0	24	251.19	20	0.05000	1.000	Pass

ANT B:

Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm ²)	MPE Limit (mW/cm ²)	Conclusion
24.00	0	24	251.19	20	0.05000	1.000	Pass

3.2 Operation in DTS MODE

ANT 1:

Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm ²)	MPE Limit (mW/cm ²)	Conclusion
14	0	14	25.12	20	0.00500	0.6	Pass

4 Exposure calculations for multiple sources

When a number of sources at different frequencies, and/or broadband sources, contribute to the total exposure, it becomes necessary to weigh each contribution relative to the MPE in accordance with the provisions of Table (A) and Table (B). To comply with the MPE, the fraction of the MPE in terms of E^2 , H^2 (or power density) incurred within each frequency interval should be determined and the sum of all such fractions should not exceed unity.

In order to ensure compliance with the MPE for a controlled environment, the sum of the ratios of the power density to the corresponding MPE should not exceed unity. That is

$$\sum_{i=1}^n \frac{S_i}{MPE_i}$$

The product also has multiple transmitters The Simultaneous Transmission Possibilities are as below:

Simultaneous Tx Combination	Configuration
1	WLAN 2.4G MIMO
2	WLAN 2.4G+DTS

4.1 Estimation for WLAN MIMO 2.4G

ANT	Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm ²)	Total S (mW/cm ²)	MPE Limit (mW/cm ²)	Conclusion
A	16.00	0	16	39.81	20	0.0079	0.0158	1.000	Pass
B	16.00	0	16	39.81		0.0079			

4.2 Estimation for WLAN 2.4G+DTS

ANT	Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm ²)	Total S (mW/cm ²)	MPE Limit (mW/cm ²)	Conclusion
A	24.00	0	24	251.19	20	0.05000	0.05833	1.000	Pass
1	14.00	0	14	25.12		0.00500			

According to the Table above, we can conclude that the calculation results of all simultaneous transmission possibilities are less than 1, so it is into compliance.

Therefore the product also meets the requirements under multiple sources condition.

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