

Test Report for FCC

Report Number		ESTRGC2510-004		
Applicant	Company name	Link Electronics Co., Ltd.		
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	Telephone	+82 070-8785-0629		
Product	Product name	DIGITAL DOOR LOCK		
	Factory address	17F-5, Parkview Office Tower, 248, Jeongjail-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, South Korea		
	Model No.	CMF-1000KBT	Manufacturer	Link Electronics Co., Ltd.
	Serial No.	NONE	Country of origin	KOREA
Test date	02-Oct-25 ~ 13- Oct-25		Date of issue	29-Oct-25
FCC ID			2AK5D-CMF-1000KBT	
Testing location		140-16, Eongmali-ro, Majang-myeon, Icheon-si, Gyeonggi-do, Rep. of Korea		
Standard		FCC 1.1307 and 1.1310		
MRA Registration number		FCC:659627		
Tested by	Engineer H.G. Lee		(Signature)	
Reviewed by	Engineering Manager K.B. Lee		(Signature)	
Abbreviation	OK, Pass = Passed, Fail = Failed, N/A = not applicable			
* Note - This test report is not permitted to copy partly without our permission - This test result is dependent on only equipment to be used - This test report is not related to KOLAS accreditation -Add Derivative Model Name Derivative Model Name:CMF-1100K - Software version:V1.0 - Hardware version:R02				

RF Exposure Measurement

1. Introduction

The maximum Gain measured in Fully Anechoic Chamber

Because this device is transmitting the high power signal, it is regarded specially as a dangerous band for its heating harmfulness to the human body. The manufacturer whose product is working in this frequency band is obligatory to prove the harmfulness of his product. In this document, we try to prove the safety of radiation harmfulness to the human body for our product. The limit for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 and is followed. The Gain of the antenna used in this product is measured in a Fully Anechoic Chamber (FAC), and the maximum total power input to the antenna is measured. Through the Friis transmission formula and the maximum gain of the antenna, we can calculate the distance, away from the product, where the limit of MPE is reached.

2. Classification

MODE: (CMF-1000KBT+BT3L)

The antenna of the product, under normal use condition, is at least 20 cm away from the body of the user. Warning statement for keeping 20 cm separation distance and the prohibition of operating next to a person has been printed on the user's manual. So, this product is classified as the Mobile Device.

3. RF Exposure Limit

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency(RF) radiation as specified in 1.1307(b).

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE) – Class A

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Average Time (minutes)
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 – 1500			F/300	6
1500 – 100,000			5	6

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE) – Class B

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Average Time (minutes)
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 – 1500	–	–	F/1500	30
1500 – 100,000	–	–	1.0	30

F = Frequency in MHz * = Plane-wave equivalent power density

TABLE 4:RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Frequency Range (MHz)	Electric Field Strength (V/m)(RMS)	Magnetic Field Strength(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	2.0	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}	0.02619f ^{0.6834}	6
6000 – 15000	61.4	0.613	10	6
15000 – 150000	61.4	0.613	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}

TABLE 6: Reference Levels for Electric Field Strength, Magnetic Field Strength and Power Density in Controlled Environments

Frequency Range (MHz)	Electric Field Strength (V/m)(RMS)	Magnetic Field Strength(A/m)	Power Density (W/m ²)	Reference Period (minutes)
0.003 – 10 ²³	170	180	–	Instantaneous*
0.1–10	–	1.6/ f	–	6**
1.1–10	193/ f ^{0.5}	–	–	6**
10 – 20	61.4	0.163	10.0	6
20 – 48	129.8/ f ^{0.25}	0.3444/ f ^{0.25}	44.72/ f ^{0.5}	6
48 – 300	49.33	0.1309	6.455	6
300 – 6000	15.6 f ^{0.25}	0.04138 f ^{0.25}	0.6455f ^{0.5}	6
6000 – 15000	137	0.364	50	6
15000 – 150000	137	0.364	50	616000/ f ^{1.2}
150000 – 300000	0.354 f ^{0.5}	9.4 x 10 ⁻⁴ f ^{0.5}	3.33 x 10 ⁻⁴ f	616000/ f ^{1.2}

4. Friis Formula

$$R = \sqrt{\frac{PG}{4\pi S}}$$

The maximum Gain measured in Fully Anechoic Chamber

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

MODE: (CMF–1000KBT+BT3L)

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.

The software provided by Manufacturer enabled the EUT to transmit with max power at lowest, middle and highest channel individually.

5. Test Results

5.1 The maximum Gain measured in Fully Anechoic Chamber

Band	antenna gain (dBi)	nemeric
NFC	–	–
BT	2.5 dBi	1.778

MODE: NFC

Frequency Range (MHz)	Field Strength (dBuV/m)	Output Power (mW)	Power Density (mW/cm ²)
13.56	40.57	0.0000002	0.00000000005

MODE: BT

Channel	Output Power (dBm)	Output Power (mW)	Power Density (mW/cm ²)
First ch	10.71	11.78	0.00416748859
Middle ch	10.57	11.40	0.00403305347
Last ch	10.46	11.12	0.00393399602

MODE:NFC+BT

0.0041675 (mW/cm²) < 1.0 (mW/cm²)

SAR was not required