

Maximum Permissible Exposure Evaluation

FCC ID:2BGOH-VC05-I

1. Client Information

Applicant	:	Shenzhen liyuanchuang electronics technology co.,ltd
Address	:	Room 708~709 in Tiancheng Building, No.1221 on Guanguang Road, Guanlan Subdistrict, Longhua District, Shenzhen, China.
Manufacturer	:	Shenzhen liyuanchuang electronics technology co.,ltd
Address	:	Room 708~709 in Tiancheng Building, No.1221 on Guanguang Road, Guanlan Subdistrict, Longhua District, Shenzhen, China.

2. General Description of EUT

EUT Name	:	Wireless intercom doorbell
Model(s) No.	:	VC05-I, VC05A-I, VC05B-I, VC05C-I, VC05D-I, VC05E-I, VC05S-I
Model Difference	:	All these models are identical in the same PCB layout and electrical circuit, the only difference is that names.
Product Description	:	Operation Frequency: 433.39 MHz
	:	Antenna Gain: 0dBi FPC Antenna
Power Rating	:	Input: 5V \rightarrow 1.0A
Li-ion Polymer Battery	:	3.7V by 1200mAh Rechargeable Li-ion battery
Software Version	:	V2.0
Hardware Version	:	LYC-100 V7
Remark: The antenna gain provided by the applicant, the adapter and verified for the RF conduction test and adapter provided by TOBY test lab.		

Note: More test information about the EUT please refer the RF Test Report.

Evaluation Method

Systems operating under the provisions of FCC 47 CFR section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as mobile device whereby a distance of 0.2m normally can be maintained between the user and the device, and below RF Permissible Exposure limit shall comply with.

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 modelled 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.

Calculations

1. Antenna Information:

Antenna type	Maximum antenna gain	Notes
FPC	0	SRD

2. Limit:

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

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

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 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

3. Exposure Evaluation:

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

Where:

S: power density

P: power input to the 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

4. Test Result:

$$E = \text{EIRP} - 20\log D + 104.8$$

where:

E = electric field strength in dBμV/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

$$\text{EIRP} = E - 104.8 + 20 \log D = 67.11 - 104.8 + 20 \log 3 = -28.15 \text{ dBm}$$

MPE Result							
Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/cm ²) [S]	Limit Power Density (mW/cm ²) [S]
433.39	-28.15	-28 ± 1	-27	1.0000	20	0.0000004	0.29

Note:
N_{TX}= Number of Transmit Antennas
RF Output power specifies that Maximum Conducted Peak Output Power.

5. Conclusion:

So, RF exposure limit warning or SAR test are not required.

The EUT will only be used with a separation of 20cm or greater between the antenna and nearby persons and can therefore be considered a mobile transmitter per 47 CFR2.1091 (b). The RF Exposure Information page from the manual is included here for reference.

-----END OF REPORT-----