



RF Exposure Requirements

1 General Information

Client Information

Applicant : ZHONGSHAN CITY ZHOUYANG ELECTRICS TECHNOLOGY CO.,LTD

Address of applicant : No:123,GuangCheng Road JiXi XiaoLan Town,ZhongShan CiTy.GuanDong

Manufacturer..... : The same as above

Address of manufacturer..... : The same as above

General Description of E.U.T

FCC ID..... : 2BORD-SQ01-30L

Product Name : NOBLEZA Smart Aquarium

Model No. : SQ01-30L

Model Description : ---

Rated Voltage..... : DC 12V

Battery Capacity : ---

Power Adapter : ZC024AHL120200U:
Input: 100-240V~, 50/60Hz, 0.8A; Output: DC 12.0V, 2.0A, 24.0W

Technical Characteristics of WiFi

Support Standards : 802.11b, 802.11g, 802.11n

Frequency Range : 2412-2462MHz for 802.11b/g/n(HT20)

RF Output Power : 15.55dBm (Conducted)

Modulation : 802.11b: DSSS(DBPSK/DQPSK/CCK)
802.11g/n: OFDM (BPSK/QPSK/16QAM/64QAM)

Data Rate : 1Mbps for 802.11b; 54Mbps for 802.11g; MCS7 for 802.11n

Quantity of Channels : 11 for 802.11b/g/n(HT20)

Channel Separation..... : 5MHz

Type of Antenna : PCB Antenna

Antenna Gain : 2.05dBi



Technical Characteristics of BLE

Bluetooth Version	: Bluetooth LE
Frequency Range	: 2402-2480MHz
RF Output Power	: 4.55dBm (Conducted)
Modulation	: GFSK
Data Rate	: 1Mbps
Quantity of Channels	: 40
Channel Separation.....	: 2MHz
Type of Antenna	: PCB Antenna
Antenna Gain	: 2.05dBi

2 Applicable Standard

According to §1.1307(b)(1) and KDB 447498 D01 General RF Exposure Guidance v06, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

(a) Limits for Occupational / Controlled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	F/300	6
1500-100000	/	/	5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-100000	/	/	1	30

Note: f = frequency in MHz; * = Plane-wave equivalents power density



3 Calculation Method

$$S = (30 \cdot P \cdot G) / (377 \cdot R^2)$$

S = power density (in appropriate units, e.g., mw/cm²)

P = power input to the antenna (in appropriate units, e.g., mw)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor is normally numeric gain.

R = distance to the center of radiation of the antenna (in appropriate units, e.g., cm), R=20cm.

4 MPE Calculation Result

Frequency (MHz)	Antenna Gain (dBi)	Numeric gain	Conducted Power (dBm)	Maximum Tune-up output power		PD (mW/cm ²)	Limit (mW/cm ²)
				(dBm)	(mW)		
2462 (WiFi)	2.05	1.60	15.55	16.00	39.81	0.01270	1
2480 (BLE)	2.05	1.60	4.55	5.00	3.16	0.00101	1

Result: Pass

=====End of Report=====

WALTEK