

# Safety Human Exposure

## 1.1 Radio Frequency Exposure Compliance

### 1.1.1 Electromagnetic Fields

#### RESULT:

Pass

Test item : testo smart valve  
Identification / Type No. : 0560 5600  
FCC ID : WAF-05605600  
IC : 6127B-05605600  
HVIN : 0560 5600  
Test standard : CFR47 FCC Part 2: Section 2.1091  
CFR47 FCC Part 1: Section 1.1310  
FCC KDB Publication 447498 v06  
RSS-102 Issue 5 February 2021

#### ➤ Product Classification

This device defined as a transmitting device designed to be used in fixed locations and to generally be used in such a way that the RF source's radiating structure(s) is/are over 20 centimeters of the body of the user.

Max 1.54 dBi

#### ➤ Radio Frequency Exposure Limit

##### a. For FCC:

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

Table 1 – Limits for Maximum Permissible Exposure(MPE)

Frequency range [MHz]	Electric field strength [v/m]	Magnetic field strength [A/m]	Power density [mw/cm <sup>2</sup> ]	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 <sup>2</sup> )	≤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 <sup>2</sup> )	≤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.

**b. For IC:**

For the purpose of this standard, Industry Canada has adopted the SAR and RF field strength limits established in Health Canada's RF exposure guideline, Safety Code 6.

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 <sup>2</sup> ]	Reference Period [minutes]
0.003 - 10 <sup>21</sup>	83	90	-	Instantaneous*
0.1 - 10	-	0.73/f	-	6**
1.1 - 10	87/f <sup>0.5</sup>	-	-	6**
10 - 20	27.46	0.0728	2	6
20 - 48	58.07/f <sup>0.25</sup>	0.1540/f <sup>0.25</sup>	8.944/f <sup>0.5</sup>	6
48 - 300	22.06	0.05852	1.291	6
300 - 6000	3.142f <sup>0.3417</sup>	0.008335 f <sup>0.3417</sup>	0.02619 f <sup>0.6834</sup>	6
6000 - 15000	61.4	0.163	10	6
15000 - 150000	61.4	0.163	10	616000/f <sup>1.2</sup>
150000 - 300000	0.158f <sup>0.5</sup>	4.21*10 <sup>-4</sup> f <sup>0.5</sup>	6.67*10 <sup>-5</sup> f	616000/f <sup>1.2</sup>
Note: F is frequency in MHz *Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR)				

➤ **Radio Frequency Exposure Calculation Formula**  
**a. Power Density**

$$S = \frac{PG}{4\pi R^2}$$

where:

S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>)

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

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

or:

$$S = \frac{EIRP}{4\pi R^2}$$

where:

EIRP = equivalent (or effective) isotropically radiated power

➤ **EUT RF Exposure Evaluation**

**a. Evaluation for Standalone Transmission Operation**

Mode	Frequency [MHz]	Measured RF Output Power [dBm]	Antenna Gain [dBi]	E.I.R.P [dBm]	Distance [cm]	Power Density [mW/cm <sup>2</sup> ]	FCC Limit [mW/cm <sup>2</sup> ]	IC Limit [W/m <sup>2</sup> ]
BLE	2480	6.552	1.54	8.092	20	0.0013	1	5.469

Note:

1. BLE RF Output Power refer to, CN22LZS6 001

➤ **Conclusion**

The maximum calculations result of above are meet the requirement of Radio Frequency Exposure (MPE) limit.