

RF EXPOSURE EVALUATION REPORT FROM UL

For: ELIWELL CONTROLS SRL

Product: Interface for Refrigeration Controllers

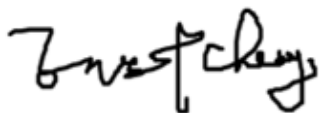
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This RF Exposure Evaluation Report Is Issued Under The Authority
Of Andrew Hoare, Head of Certification:


Pp

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1. Client Information

Company Name:	ELIWELL CONTROLS SRL
Address:	Via dell'Industria 15 ALPAGO – 32010 Belluno Italy
Contact Name:	Nicola Filosa

2. Description Of The Apparatus And Its Operational Environment

Model / Type Reference:	AEBW00R0001100, AEBW00T0001100, AEBWE0R0001100, AEBWE0T0001100, IOTSWPH
Basic Direct Function:	WiFi / Ethernet interface for Refrigeration controllers
Intended Operating Environment:	Indoors

The Interface for Refrigeration Controllers operates in the 2.4 GHz frequency band (WLAN 802.11b/g/n and BLE), 5 GHz frequency band (WLAN 802.11a/n).

All models are identical except for the connection type and connectivity.

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3. Equipment Specifications

Equipment Category:	2.4 GHz WLAN / 5 GHz WLAN / BLE
Type of Unit:	Eliwell AIR Edge is an IoT connectivity module that enables remote monitoring, data logging, and maintenance for commercial refrigeration systems.
Operating Frequency Range: 2.4GHz WLAN 5GHz WLAN Bluetooth LE	2412 – 2462 MHz 5180 – 5825 MHz 2402 – 2480 MHz
*RF Output Power (max. dBm): WLAN 2.4GHz WLAN 5GHz Bluetooth LE	13.0 dBm 13.0 dBm 2.0 dBm
*Antenna Gain (max. peak values dBi): WLAN 2.4GHz WLAN 5GHz Bluetooth LE	2.89 dBi (external), 4.89 dBi (internal) 2.81 dBi (external), 8.71 dBi (internal) 2.89 dBi (external), 4.89 dBi (internal)
EIRP (max. dBm): WLAN 2.4GHz WLAN 5GHz Bluetooth LE	17.89 dBm 21.71 dBm 6.89 dBm

* Specification values have been supplied by the manufacturer. The maximum power and maximum antenna gain will be used in the calculations, as these will show worst case.

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4. Methods and Procedures

Reference:	KDB 447498 D01 v06
Title:	RF Exposure Procedures and Equipment Authorisation Policies for Mobile and Portable Devices
Reference:	FCC §1.1310
Title:	Radiofrequency radiation exposure limits

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5. Calculations

5.1 MPE

The MPE calculation to calculate the safe operating distance for the user is.

$$S = \text{EIRP} / (4 * \pi * R^2)$$

Where S = Power density
 EIRP = Effective Isotropic Radiated Power
 R = distance to the centre of radiation of the antenna (safe operating distance)

Power Density Requirement

From table 1 (ii) - Limits for General Population/ Uncontrolled Exposure of FCC §1.1310 (1)(e) for $f > 1500\text{MHz}$, $S_{\text{req}} = 1.0 \text{ mW/cm}^2$

(f = operating frequency in MHz)

VALUES

Frequency Range (MHz)	Operating Band	EIRP (dBm)	EIRP (mW)	Power Density S mw/ cm ²		
				Limit S _{req}	Calculated S _n @ 20cm	S _n /S _{req}
2412 – 2462	WLAN	17.89	61.52	1.00	0.012	0.012
5180 – 5825	WLAN	21.71	148.25	1.00	0.029	0.029
2402 – 2480	BLE	6.89	4.89	1.00	0.001	0.001

The device does not support the simultaneous transmission.

6. Conclusion

The required 20cm RF exposure limits for General Population/Uncontrolled Exposure will not be exceeded.
