RF Exposure Evaluation per FCC §1.1307
for
IntelliSense
C2DLWSN-30-DX

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Prepared for:

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1. Radio frequency exposure evaluation (§1.1307)

FCC §1.1307 calls out the criteria for evaluation of radio frequency exposure. The SN931 is a fixed device that is designed to be mounted outdoors and is not to be moved once installed.

The highest RF output power of the unit was measured at 21.45 dBm at 923.58 MHz. According to §1.1310 of the FCC rules, the limit for general population/uncontrolled RF exposure is defined as S = f/1500. For the frequency of 923.58 MHz, the Power Density limit is calculated to be 0.616mW/cm^2. The gain of the antenna is 0 dBi. To comply with the exposure limits for this section, humans must maintain a safe distance from the transmit antenna. The following formula was used to calculate the minimum distance:

$$S = \frac{PG}{4pR^2}$$

Where:

S = Power Density
P = Output Power at the Antenna Terminals
G = Gain of Transmit Antenna (linear gain)
R = Distance from Transmitting Antenna

For this device, the calculation is as follows:

S = FCC Limit = 0.616mW/cm^2
P = Output Power = 139.6 mW
G = Worst Case Gain = 0 dBi = INVLOG(0/10) = 1

0.616 mW/ cm^2 = (139.6mW)(1)/(4π R^2)

Solving for the required minimum safe distance using the following formula:

$$\boxed{R = \sqrt{\frac{PG}{4pS}}}$$

$$R = \sqrt{\frac{139.6 \times 1}{4 \times p \times 0.616}} = 18 \text{ cm}$$

The minimum safe distance for this device is 18 cm. Used outdoors as part of a residential security system, the unit is designed to transmit a signal to a receiver/control panel when a magnetic contact is tripped. Since the unit is normally mounted on window and doorframes and only transmitting during an alarm situation, the minimum safe distance of 18 cm is maintained.