Appendix A: FCC Part 1.1307, 1.1310, 2.1091, 2.1093: RF Exposure / MPE Colocation

MPE Colocation Calculations

The maximum permissible RF exposure for an uncontrolled environment is specified in FCC 1.1310 Table 1B.

From OET 65, $S = EIRP / 4\pi R^2$

where:
S = Power density (mw/cm^2)
EIRP = Equivalent Isotropic Radiated Power
R = 20 cm separation distance

Power Density for Z-Wave

The MPE limit for the above device operating at 921.4 MHz for uncontrolled environments is 0.6 mW/cm^2.

EUT fundamental field strength at 921.4 MHz = 91.8 dBuV/m at 3 meters (from DXT test report)

S = 0.00001 mW/cm^2 = at 20 cm separation

Power Density for FCC ID: RI7LE910CxLA and Z-Wave

Colocation Calculations			
Frequency (MHz)	**Band**	**Power (Watt)**	**Antenna Gain (dBi) / Numeric**
836.5	5	0.209	4.3 / 2.7
1747.5	3	0.209	5 / 3.2
1880	2	0.219	6.14 / 4.1
2535	7	0.233	3.8 / 2.4

The table above contains the conducted output power and antenna gain for the Alarm.com-supported frequencies of the Telit cellular modem colocated with a Z-Wave module in Model ADC-SEM-300, Variant Paraguay.

Calculation of Colocation MPE per Section 7.2 of KDB 447498 D01 General RF Exposure Guidance v06.

Band 5:

1. The MPE limit for the above device operating at 824.2 – 848.8 MHz for uncontrolled environments is 0.6 mW/cm^2.
2. The worst-case conducted power for the low band is 0.209 W (from Telit grant).
3. The maximum antenna gain for this frequency range of operation is 4.3 dBi /2.7 numeric (from Alarm.com).
4. S = 0.18 mW/cm^2 = at 20 cm separation.

Band 3:

1. The MPE limit for the above device operating at 1710.7 – 1754.3 MHz for uncontrolled environments is 1 mW/cm^2.
2. The conducted power for this band is 0.209 W (from Telit grant).
3. The maximum antenna gain for this frequency range of operation is 5 dBi /3.2 numeric (from Alarm.com).
4. S = 0.13 mW/cm^2 = at 20 cm separation.

Band 2:

1. The MPE limit for the above device operating at 1850.7 – 1909.3 MHz for uncontrolled environments is 1 mW/cm^2.
2. The conducted power for this band is 0.219 W (from Telit grant).
3. The maximum antenna gain for this frequency range of operation is 6.14 dBi /4.1 numeric (from Alarm.com).
4. S = 0.27 mW/cm^2 = at 20 cm separation.

Band 7:

1. The MPE limit for the above device operating at 2502.5 – 2567.5 MHz for uncontrolled environments is 1 mW/cm^2.
2. The conducted power for this band is 0.223 W (from Telit grant).
3. The maximum antenna gain for this frequency range of operation is 3.8 dBi / 2.4 numeric (from Alarm.com).
4. S = 0.14 mW/cm^2 = at 20 cm separation.

Colocation - Summary of MPE: Z-Wave + FCC ID: RI7LE910CxLA

Transmitter	Frequency (MHz)	MPE Result (mW/cm^2)	FCC Limit (mW/cm^2)	Ratio
Z-Wave	921.4	0.00015	**0.6**	0.00025
LTE	824.2 – 848.8	0.18	**0.6**	0.30
LTE	17071.7 – 1754.3	0.13	**1**	0.13
LTE	1850.7 – 1909.3	0.27	**1**	0.27
LTE	2502.5 – 2567.5	0.14	**1**	0.14
			Sum of Ratios	**0.84**

Note: Represents the worst-case bands for FCC ID: RI7LE910CxLA supported by Alarm.com for the model and variant in this report.

The sum of ratios = 0.84 < 1, therefore, is compliant.

The EUT meets the uncontrolled exposure limit of 20 cm when all transmitters transmit simultaneously.