

## Permissive change request for Silver Spring Networks

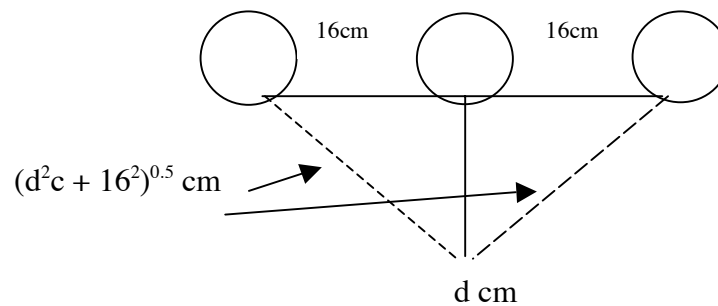
Product: 902-928 MHz FHSS/900MHz/2.4 GHz DTS radio module for electric meters

FCC ID: OWS-NIC508

Nature of change: To permit co-location with other Silver Spring meter modules

For most installations, electric meters using Silver Spring Networks radio modules are single installations, one meter on an exterior residential wall being the most common example. For some apartment installations, the electric meters for all the individual apartments are mounted on the same wall in a meter room or closet.

In the meter room configuration, a meter module antenna will be co-located with the meter module antenna to its right and to its left, because the minimum separation distance is 16 cm, less than the 20cm distance defining non-co-located configurations. All other meter antennas in the same row will be at least 32cm away so they are not co-located. The meter antennas on the rows above and below any particular meter are not co-located either, as the separation distance is 30 cm or more.



At a point located a distance  $d$  from a meter module antenna, the power density is the sum of the contributions from the center meter and the two adjacent meters. Each adjacent meters is further away, at a distance of  $(d^2c + 16^2)^{0.5}$  cm, and therefore will contribute less power density at  $d$  for the same transmitter eirp.

# Meter Room Configuration Example



## Horizontal Separation



## Vertical Separation





Silver Spring Networks manufactures a number of radio modules that can be used in electric meters. Any of these modules may be used in different combinations in an apartment meter room. The operating output power and antenna gain for highest eirp, and 20 cm power densities of the different modules, are listed below.

Module FCC ID:	Operating Mode	Pout Max.,dBm	Antenna gain, dBi	MPE, cm	S @ 20cm, mW/cm <sup>2</sup>
OWS-NIC514	900 MHz FHSS	29.86	4	18	0.48
	2.4 GHz DTS	20.8	3	4.4	0.05
OWS-NIC511	900 MHz FHSS	29.86	4	18	0.48
OWS-NIC509	900 MHz FHSS	29.56	2.4	14.4	0.31
OWS-NIC508	900 MHz FHSS	29.56	2.4	14.4	0.31
	900 MHz DTS	25.3	2.4	8.9	0.12
	2.4 GHz DTS	23.56	1.5	5.2	0.07
OWS-NIC507	900 MHz FHSS	29.56	2.4	14.4	0.31
	2.4 GHz DTS	23.5	1.5	5.2	0.07

a. For FCC ID: OWS-NIC508, for 900 MHz FHSS operation, the worst-case configuration would be for both adjacent meters to be either OWS-NIC514 or OWS-NIC511, as they both produce the maximum product line power density of 0.48 mW/cm<sup>2</sup> at 20 cm.

MPE calculations show that for a separation  $d = 26.5$  cm from the center meter, the power density is 0.58 mW/cm<sup>2</sup>, less than the maximum allowed 0.6 mW/cm<sup>2</sup>.

b. For FCC ID: OWS-NIC508, for 900 MHz DTS operation, RF exposure calculations show that maximum MPE distance from the center meter will be less than 21 cm worst-case with adjacent meters producing maximum product line power density of 0.48 mW/cm<sup>2</sup> at 23 cm.

c. For FCC ID: OWS-NIC508, for 2.4 GHz DTS operation, RF exposure calculations show that maximum MPE distance from the center meter will be less than 21 cm worst-case with adjacent meters producing maximum product line power density of 0.48 mW/cm<sup>2</sup> at 20 cm.

**Therefore, the MPE distance for co-located configuration of FCC ID: OWS-NIC508 will be 26.5cm.**