C16 Ksp Calculations

What is the solubility of silver chloride @25°C given the solubility constant of 1.6×10^{-10} .

Molar Concentrations or moles in 1 L

	$AgCl(s)$	⇄	$Ag^+(aq)$	+	$Cl^-(aq)$
Initial			0		0
Change	$-s$		$+s$		$+s$
Equilibrium					

$$K_{sp} = [Ag^+][\ Cl^-]$$

$$K_{sp} = 1.6\times10^{-10}$$

$$1.6\times10^{-10} = [Ag^+][\ Cl^-]$$

$$1.6\times10^{-10} = [s][\ s]$$

$$1.3\times10^{-5} = s$$

Concentration of $Ag^+(aq)$ @ equilibrium = $1.3\times10^{-5}\ M$
Concentration of $Cl^-(aq)$ @ equilibrium = $1.3\times10^{-5}\ M$

Amount of silver chloride that dissolves in 1.00 L of solution = 1.3×10^{-5} moles

$$1.3\times10^{-5}\text{mol AgCl} \times \frac{143.34\text{g AgCl}}{1\text{mol AgCl}} = 0.0018\text{g AgCl}$$

Only 2 milligrams of silver chloride will dissolve in a full liter of water.