Case 2 $i \geq \frac{row}{2}$ and $j < \frac{col}{2}$.

$$\Gamma'_{ij} = \left\langle \frac{A^R_{ri,j} - A^R_{ri+1}}{\sqrt{2}}, \frac{B^C_{cj} + B^C_{cj+1}}{\sqrt{2}} \right\rangle$$

$$\Gamma'_{i,j} = \frac{1}{2}(\left\langle A^R_{ri}, B^C_{cj} \right\rangle - \left\langle A^R_{ri+1}, B^C_{cj} \right\rangle + \left\langle A^R_{ri}, B^C_{cj+1} \right\rangle - \left\langle A^R_{ri+1}, B^C_{cj+1} \right\rangle)$$

$$\psi(AB) = \psi(\Gamma)$$

$$(\Gamma) = \psi \left\langle A_{ri}, B_{cj} \right\rangle$$

Expands

$$\psi_{1C}(\Gamma)_{i,j} = \frac{1}{\sqrt{2}} \left\langle A_{ri}, B_{cj} \right\rangle - \left\langle A_{ri+1}, B_{cj} \right\rangle$$

$$\psi_{1C}(\Gamma)_{i,j+1} = \frac{1}{\sqrt{2}} \left\langle A_{ri}, B_{cj+1} \right\rangle - \left\langle A_{ri+1}, B_{cj+1} \right\rangle$$

$$\psi(\Gamma) = \frac{1}{\sqrt{2}}(\psi_{1C}(\Gamma)_{i,j} + \psi_{1C}(\Gamma)_{i,j+1})$$

$$\psi(\Gamma) = \frac{1}{2}(\left\langle A_{ri}, B_{cj} \right\rangle - \left\langle A_{ri+1}, B_{cj} \right\rangle + \left\langle A_{ri}, B_{cj+1} \right\rangle - \left\langle A_{ri+1}, B_{cj+1} \right\rangle)$$