(a)
$$\mathbf{i} = |\tilde{\mathbf{0}}, \tilde{\mathbf{0}}\rangle$$
 (b) $\mathbf{i} = |\tilde{\mathbf{1}}, \tilde{\mathbf{0}}\rangle$ (c) $\mathbf{i} = |\tilde{\mathbf{2}}, \tilde{\mathbf{0}}\rangle$

$$\tilde{n}_r$$

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