$$C^{(1)}_{lequ}\text{i1\_i2\_i3\_i4\_} \to s_\gamma c_\gamma \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} +$$

$$\hbar \Big(\frac{1}{72} s_\gamma c_\gamma \frac{1}{m_\Phi^2} \Big(9 y_e^{i1i2} y_u^{pi4} \big(\overline{y_d}^{pr} y_d^{i3r} (1 + 2 c_\gamma^2 + s_\gamma^2) + 3 \overline{y_u}^{pr} y_u^{i3r} (1 + c_\gamma^2)\big) +$$

$$y_u^{i3i4} \big(9 \overline{y_e}^{pr} (3 y_e^{pi2} y_e^{i1r} (1 + s_\gamma^2) + 4 s_\gamma^2 y_e^{pr} y_e^{i1i2}) +$$

$$y_e^{i1i2} (31 g_1^2 + 27 g_2^2 + 48 g_3^2 + 108 c_\gamma^2 \overline{y_u}^{pr} y_u^{pr})\big)\Big) +$$

$$\frac{1}{2} \textstyle\sum_p g_1^2 \frac{1}{m_\Phi^4} y_e^{i1i2} y_u^{i3i4} (s_{2\gamma} c_\gamma^2 + s_\gamma c_{2\gamma} c_\gamma - s_{2\gamma} s_\gamma^2) LF_{1,0}[m_{\tilde{d}}^{p}] +$$

$$\frac{3}{2} \frac{1}{m_\Phi^4} \overline{y_d}^{pr} y_d^{pr} y_e^{i1i2} y_u^{i3i4} (-s_{2\gamma} c_\gamma^2 + s_{2\gamma} s_\gamma^2 + 2 c_\gamma s_\gamma^3) LF_{1,0}[m_{\tilde{d}}^{r}] +$$

$$\frac{1}{2} \textstyle\sum_p g_1^2 \frac{1}{m_\Phi^4} y_e^{i1i2} y_u^{i3i4} (s_{2\gamma} c_\gamma^2 + s_\gamma c_{2\gamma} c_\gamma - s_{2\gamma} s_\gamma^2) LF_{1,0}[m_{\tilde{e}}^{p}] +$$

$$\frac{1}{2} \frac{1}{m_\Phi^4} \overline{y_e}^{pr} y_e^{pr} y_e^{i1i2} y_u^{i3i4} (-s_{2\gamma} c_\gamma^2 + s_{2\gamma} s_\gamma^2 + 2 c_\gamma s_\gamma^3) LF_{1,0}[m_{\tilde{e}}^{r}] + \frac{1}{2} \frac{1}{m_\Phi^4} y_e^{i1i2} y_u^{i3i4}$$

$$\big(\overline{y_e}^{pr} y_e^{pr} (-s_{2\gamma} c_\gamma^2 + s_{2\gamma} s_\gamma^2 + 2 c_\gamma s_\gamma^3) - \textstyle\sum_p g_1^2 (s_{2\gamma} c_\gamma^2 + s_\gamma c_{2\gamma} c_\gamma - s_{2\gamma} s_\gamma^2)\big) LF_{1,0}[m_{\tilde{l}}^{p}] +$$

$$\frac{1}{2} \frac{1}{m_\Phi^4} y_e^{i1i2} y_u^{i3i4} \big(3 \overline{y_d}^{pr} y_d^{pr} (-s_{2\gamma} c_\gamma^2 + s_{2\gamma} s_\gamma^2 + 2 c_\gamma s_\gamma^3) +$$

$$3 \overline{y_u}^{pr} y_u^{pr} (s_{2\gamma} c_\gamma^2 + 2 s_\gamma c_\gamma^3 - s_{2\gamma} s_\gamma^2) + \textstyle\sum_p g_1^2 (s_{2\gamma} c_\gamma^2 + s_\gamma c_{2\gamma} c_\gamma - s_{2\gamma} s_\gamma^2)\big) LF_{1,0}[m_{\tilde{q}}^{p}] -$$

$$\textstyle\sum_p g_1^2 \frac{1}{m_\Phi^4} y_e^{i1i2} y_u^{i3i4} (s_{2\gamma} c_\gamma^2 + s_\gamma c_{2\gamma} c_\gamma - s_{2\gamma} s_\gamma^2) LF_{1,0}[m_{\tilde{u}}^{p}] +$$

$$\frac{3}{2} \frac{1}{m_\Phi^4} y_e^{i1i2} \overline{y_u}^{pr} y_u^{pr} y_u^{i3i4} (s_{2\gamma} c_\gamma^2 + 2 s_\gamma c_\gamma^3 - s_{2\gamma} s_\gamma^2) LF_{1,0}[m_{\tilde{u}}^{r}] + \frac{1}{8} \frac{1}{m_\Phi^4} y_e^{i1i2} y_u^{i3i4}$$

$$\big(3 s_{4\gamma} c_\gamma^2 (g_1^2 + g_2^2) + 2 s_\gamma c_\gamma (g_1^2 (-1 + 3 c_{2\gamma}^2) + 3 g_2^2 (-1 + c_{2\gamma}^2)) - 3 s_{4\gamma} s_\gamma^2 (g_1^2 + g_2^2)\big)$$

$$LF_{1,0}[m_\Phi] + \frac{1}{4} s_\gamma c_\gamma \frac{1}{m_\Phi^2} \big(3 y_e^{i1i2} y_u^{pi4} (s_\gamma^2 \overline{y_d}^{pr} y_d^{i3r} - c_\gamma^2 \overline{y_u}^{pr} y_u^{i3r}) +$$

$$y_u^{i3i4} (-3 s_\gamma^2 \overline{y_e}^{pr} y_e^{pi2} y_e^{i1r} + 2 y_e^{i1i2} (g_1^2 + 3 g_2^2))\big) LF_{1,1}[m_\Phi] +$$

$$\frac{1}{4} s_\gamma c_\gamma y_e^{i1i2} \big(2 c_\gamma^2 \overline{y_d}^{pr} y_d^{i3r} y_u^{pi4} - y_u^{i3i4} (g_1^2 + 3 g_2^2)\big) LF_{1,2}[m_\Phi] -$$

$$s_\gamma c_\gamma g_1^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{1,1,0}[m_1, m_{\tilde{e}}^{i2}] + \frac{1}{2} s_\gamma c_\gamma g_1^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{2,1,-1}[m_1, m_{\tilde{e}}^{i2}] -$$

$$\frac{1}{4} s_\gamma c_\gamma g_1^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{1,1,0}[m_1, m_{\tilde{l}}^{i1}] + \frac{1}{8} s_\gamma c_\gamma g_1^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{2,1,-1}[m_1, m_{\tilde{l}}^{i1}] -$$

$$\frac{1}{36} s_\gamma c_\gamma g_1^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{1,1,0}[m_1, m_{\tilde{q}}^{i3}] +$$

$$\frac{1}{72} s_\gamma c_\gamma g_1^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{2,1,-1}[m_1, m_{\tilde{q}}^{i3}] - \frac{4}{9} s_\gamma c_\gamma g_1^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{1,1,0}[m_1, m_{\tilde{u}}^{i4}] +$$

$$\frac{2}{9} s_\gamma c_\gamma g_1^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{2,1,-1}[m_1, m_{\tilde{u}}^{i4}] - s_\gamma c_\gamma g_1^2 \frac{1}{m_\Phi^4} y_e^{i1i2} y_u^{i3i4} LF_{1,1,-1}[m_1, \tilde{\mu}] -$$

$$m_1 \tilde{\mu} g_1^2 \frac{1}{m_\Phi^4} y_e^{i1i2} y_u^{i3i4} (c_\gamma^4 - 4 s_\gamma^2 c_\gamma^2 + s_\gamma^4) LF_{1,1,0}[m_1, \tilde{\mu}] -$$

$$\frac{3}{4} s_\gamma c_\gamma g_2^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{1,1,0}[m_2, m_{\tilde{l}}^{i1}] +$$

$$\frac{3}{8} s_\gamma c_\gamma g_2^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{2,1,-1}[m_2, m_{\tilde{l}}^{i1}] - \frac{3}{4} s_\gamma c_\gamma g_2^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{1,1,0}[m_2, m_{\tilde{q}}^{i3}] +$$

$$\frac{3}{8} s_\gamma c_\gamma g_2^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{2,1,-1}[m_2, m_{\tilde{q}}^{i3}] - 3 s_\gamma c_\gamma g_2^2 \frac{1}{m_\Phi^4} y_e^{i1i2} y_u^{i3i4} LF_{1,1,-1}[m_2, \tilde{\mu}] -$$

$$3 m_2 \tilde{\mu} g_2^2 \frac{1}{m_\Phi^4} y_e^{i1i2} y_u^{i3i4} (c_\gamma^4 - 4 s_\gamma^2 c_\gamma^2 + s_\gamma^4) LF_{1,1,0}[m_2, \tilde{\mu}] -$$

$$\frac{4}{3} s_\gamma c_\gamma g_3^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{1,1,0}[m_3, m_{\tilde{q}}^{i3}] + \frac{2}{3} s_\gamma c_\gamma g_3^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{2,1,-1}[m_3, m_{\tilde{q}}^{i3}] -$$

$$\frac{4}{3} s_\gamma c_\gamma g_3^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{1,1,0}[m_3, m_{\tilde{u}}^{i4}] + \frac{2}{3} s_\gamma c_\gamma g_3^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{2,1,-1}[m_3, m_{\tilde{u}}^{i4}] -$$

$$3 \frac{1}{m_\Phi^4} y_e^{i1i2} y_u^{i3i4} \big(s_\gamma \tilde{\mu} c_\gamma \overline{y_d}^{pr} (-3 s_\gamma c_\gamma a_d^{pr} + \tilde{\mu} y_d^{pr} (-2 c_\gamma^2 + s_\gamma^2)) +$$

$$\overline{a_d}^{pr} (s_\gamma c_\gamma a_d^{pr} (c_\gamma^2 - 2 s_\gamma^2) + \tilde{\mu} y_d^{pr} (c_\gamma^4 - s_\gamma^2 c_\gamma^2 + s_\gamma^4))\big)$$

$$LF_{1,1,0}[m_{\tilde{d}}^{r}, m_{\tilde{q}}^{p}] - \frac{1}{2} s_\gamma c_\gamma \frac{1}{m_\Phi^2} \overline{y_d}^{pr} y_d^{i3r} y_e^{i1i2} y_u^{pi4} LF_{1,1,0}[m_{\tilde{d}}^{r}, \tilde{\mu}] -$$

$$\frac{1}{m_\Phi^4} y_e^{i1i2} y_u^{i3i4} \big(s_\gamma \tilde{\mu} c_\gamma \overline{y_e}^{pr} (-3 s_\gamma c_\gamma a_e^{pr} + \tilde{\mu} y_e^{pr} (-2 c_\gamma^2 + s_\gamma^2)) +$$

$$\overline{a_e}^{pr} (s_\gamma c_\gamma a_e^{pr} (c_\gamma^2 - 2 s_\gamma^2) + \tilde{\mu} y_e^{pr} (c_\gamma^4 - s_\gamma^2 c_\gamma^2 + s_\gamma^4))\big)$$

$$LF_{1,1,0}[m_{\tilde{e}}^{r}, m_{\tilde{l}}^{p}] - \frac{1}{2} s_\gamma c_\gamma \frac{1}{m_\Phi^2} \overline{y_e}^{pr} y_e^{pi2} y_e^{i1r} y_u^{i3i4} LF_{1,1,0}[m_{\tilde{e}}^{r}, \tilde{\mu}] +$$

$$\frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} \big(s_\gamma \tilde{\mu} c_\gamma \overline{y_e}^{pr} (-2 s_\gamma c_\gamma a_e^{pr} + \tilde{\mu} y_e^{pr} (-c_\gamma^2 + s_\gamma^2)) +$$

$$\overline{a_e}^{pr} (s_\gamma c_\gamma a_e^{pr} (c_\gamma^2 - s_\gamma^2) + \tilde{\mu} y_e^{pr} (c_\gamma^4 + s_\gamma^4))\big) LF_{2,1,0}[m_{\tilde{l}}^{p}, m_{\tilde{e}}^{r}] +$$

$$\frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} \big(s_\gamma \tilde{\mu} c_\gamma \overline{y_e}^{pr} (2 s_\gamma c_\gamma a_e^{pr} + \tilde{\mu} y_e^{pr} (c_\gamma^2 - s_\gamma^2)) +$$

$$\overline{a_e}^{pr} (s_\gamma c_\gamma a_e^{pr} (-c_\gamma^2 + s_\gamma^2) - \tilde{\mu} y_e^{pr} (c_\gamma^4 + s_\gamma^4))\big) LF_{3,1,-1}[m_{\tilde{l}}^{p}, m_{\tilde{e}}^{r}] -$$

$$s_\gamma c_\gamma y_e^{i1i2} y_u^{i3i4} (c_\gamma \overline{a_e}^{pr} - s_\gamma \tilde{\mu} \overline{y_e}^{pr}) (c_\gamma a_e^{pr} - s_\gamma \tilde{\mu} y_e^{pr}) LF_{3,1,0}[m_{\tilde{l}}^{p}, m_{\tilde{e}}^{r}] +$$

$$3 s_\gamma c_\gamma y_e^{i1i2} y_u^{i3i4} (c_\gamma \overline{a_e}^{pr} - s_\gamma \tilde{\mu} \overline{y_e}^{pr}) (c_\gamma a_e^{pr} - s_\gamma \tilde{\mu} y_e^{pr}) LF_{4,1,-1}[m_{\tilde{l}}^{p}, m_{\tilde{e}}^{r}] -$$

$$2 s_\gamma c_\gamma y_e^{i1i2} y_u^{i3i4} (c_\gamma \overline{a_e}^{pr} - s_\gamma \tilde{\mu} \overline{y_e}^{pr}) (c_\gamma a_e^{pr} - s_\gamma \tilde{\mu} y_e^{pr}) LF_{5,1,-2}[m_{\tilde{l}}^{p}, m_{\tilde{e}}^{r}] -$$

$$s_\gamma c_\gamma \frac{1}{m_\Phi^2} \overline{y_e}^{pr} y_e^{pi2} y_e^{i1r} y_u^{i3i4} LF_{1,1,0}[m_{\tilde{l}}^{p}, \tilde{\mu}] +$$

$$3 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} \big(s_\gamma \tilde{\mu} c_\gamma \overline{y_d}^{pr} (-2 s_\gamma c_\gamma a_d^{pr} + \tilde{\mu} y_d^{pr} (-c_\gamma^2 + s_\gamma^2)) +$$

$$\overline{a_d}^{pr} (s_\gamma c_\gamma a_d^{pr} (c_\gamma^2 - s_\gamma^2) + \tilde{\mu} y_d^{pr} (c_\gamma^4 + s_\gamma^4))\big) LF_{2,1,0}[m_{\tilde{q}}^{p}, m_{\tilde{d}}^{r}] -$$

$$3 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} \big(s_\gamma \tilde{\mu} c_\gamma \overline{y_d}^{pr} (-2 s_\gamma c_\gamma a_d^{pr} + \tilde{\mu} y_d^{pr} (-c_\gamma^2 + s_\gamma^2)) +$$

$$\overline{a_d}^{pr} (s_\gamma c_\gamma a_d^{pr} (c_\gamma^2 - s_\gamma^2) + \tilde{\mu} y_d^{pr} (c_\gamma^4 + s_\gamma^4))\big) LF_{3,1,-1}[m_{\tilde{q}}^{p}, m_{\tilde{d}}^{r}] -$$

$$3 s_\gamma c_\gamma y_e^{i1i2} y_u^{i3i4} (c_\gamma \overline{a_d}^{pr} - s_\gamma \tilde{\mu} \overline{y_d}^{pr}) (c_\gamma a_d^{pr} - s_\gamma \tilde{\mu} y_d^{pr}) LF_{3,1,0}[m_{\tilde{q}}^{p}, m_{\tilde{d}}^{r}] +$$

$$9 s_\gamma c_\gamma y_e^{i1i2} y_u^{i3i4} (c_\gamma \overline{a_d}^{pr} - s_\gamma \tilde{\mu} \overline{y_d}^{pr}) (c_\gamma a_d^{pr} - s_\gamma \tilde{\mu} y_d^{pr}) LF_{4,1,-1}[m_{\tilde{q}}^{p}, m_{\tilde{d}}^{r}] -$$

$$6 s_\gamma c_\gamma y_e^{i1i2} y_u^{i3i4} (c_\gamma \overline{a_d}^{pr} - s_\gamma \tilde{\mu} \overline{y_d}^{pr}) (c_\gamma a_d^{pr} - s_\gamma \tilde{\mu} y_d^{pr}) LF_{5,1,-2}[m_{\tilde{q}}^{p}, m_{\tilde{d}}^{r}] -$$

$$3 \frac{1}{m_\Phi^4} y_e^{i1i2} y_u^{i3i4} \big(s_\gamma \tilde{\mu} c_\gamma \overline{y_u}^{pr} (-3 s_\gamma c_\gamma a_u^{pr} + \tilde{\mu} y_u^{pr} (c_\gamma^2 - 2 s_\gamma^2)) +$$

$$\overline{a_u}^{pr} (s_\gamma c_\gamma a_u^{pr} (-2 c_\gamma^2 + s_\gamma^2) + \tilde{\mu} y_u^{pr} (c_\gamma^4 - s_\gamma^2 c_\gamma^2 + s_\gamma^4))\big)$$

$$LF_{1,1,0}[m_{\tilde{q}}^{p}, m_{\tilde{u}}^{r}] - s_\gamma c_\gamma \frac{1}{m_\Phi^2} y_e^{i1i2} \overline{y_u}^{pr} y_u^{pi4} y_u^{i3r} LF_{1,1,0}[m_{\tilde{q}}^{p}, \tilde{\mu}] +$$

$$3 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} \big(s_\gamma \tilde{\mu} c_\gamma \overline{y_u}^{pr} (-2 s_\gamma c_\gamma a_u^{pr} + \tilde{\mu} y_u^{pr} (c_\gamma^2 - s_\gamma^2)) +$$

$$\overline{a_u}^{pr} (s_\gamma c_\gamma a_u^{pr} (-c_\gamma^2 + s_\gamma^2) + \tilde{\mu} y_u^{pr} (c_\gamma^4 + s_\gamma^4))\big) LF_{2,1,0}[m_{\tilde{u}}^{r}, m_{\tilde{q}}^{p}] +$$

$$3 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} \big(s_\gamma \tilde{\mu} c_\gamma \overline{y_u}^{pr} (2 s_\gamma c_\gamma a_u^{pr} + \tilde{\mu} y_u^{pr} (-c_\gamma^2 + s_\gamma^2)) +$$

$$\overline{a_u}^{pr} (s_\gamma c_\gamma a_u^{pr} (c_\gamma^2 - s_\gamma^2) - \tilde{\mu} y_u^{pr} (c_\gamma^4 + s_\gamma^4))\big) LF_{3,1,-1}[m_{\tilde{u}}^{r}, m_{\tilde{q}}^{p}] -$$

$$3 s_\gamma c_\gamma y_e^{i1i2} y_u^{i3i4} (-s_\gamma \overline{a_u}^{pr} + \tilde{\mu} c_\gamma \overline{y_u}^{pr}) (-s_\gamma a_u^{pr} + \tilde{\mu} c_\gamma y_u^{pr}) LF_{3,1,0}[m_{\tilde{u}}^{r}, m_{\tilde{q}}^{p}] +$$

$$9 s_\gamma c_\gamma y_e^{i1i2} y_u^{i3i4} (-s_\gamma \overline{a_u}^{pr} + \tilde{\mu} c_\gamma \overline{y_u}^{pr}) (-s_\gamma a_u^{pr} + \tilde{\mu} c_\gamma y_u^{pr}) LF_{4,1,-1}[m_{\tilde{u}}^{r}, m_{\tilde{q}}^{p}] -$$

$$6 s_\gamma c_\gamma y_e^{i1i2} y_u^{i3i4} (-s_\gamma \overline{a_u}^{pr} + \tilde{\mu} c_\gamma \overline{y_u}^{pr}) (-s_\gamma a_u^{pr} + \tilde{\mu} c_\gamma y_u^{pr}) LF_{5,1,-2}[m_{\tilde{u}}^{r}, m_{\tilde{q}}^{p}] -$$

$$\frac{1}{2} s_\gamma c_\gamma \frac{1}{m_\Phi^2} y_e^{i1i2} \overline{y_u}^{pr} y_u^{pi4} y_u^{i3r} LF_{1,1,0}[m_{\tilde{u}}^{r}, \tilde{\mu}] +$$

$$m_1 \tilde{\mu} g_1^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{2,1,0}[\tilde{\mu}, m_1] (c_\gamma^2 - s_\gamma^2)^2 +$$

$$g_1^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} \big(2 s_\gamma c_\gamma m_\Phi^2 - m_1 \tilde{\mu} (c_\gamma^2 - s_\gamma^2)^2\big) LF_{3,1,-1}[\tilde{\mu}, m_1] +$$

$$2 m_1 \tilde{\mu} g_1^2 s_\gamma^2 c_\gamma^2 y_e^{i1i2} y_u^{i3i4} LF_{3,1,0}[\tilde{\mu}, m_1] - 4 s_\gamma c_\gamma g_1^2 y_e^{i1i2} y_u^{i3i4} LF_{4,1,-2}[\tilde{\mu}, m_1] -$$

$$6 m_1 \tilde{\mu} g_1^2 s_\gamma^2 c_\gamma^2 y_e^{i1i2} y_u^{i3i4} LF_{4,1,-1}[\tilde{\mu}, m_1] +$$

$$2 s_\gamma c_\gamma g_1^2 y_e^{i1i2} y_u^{i3i4} LF_{5,1,-3}[\tilde{\mu}, m_1] + 4 m_1 \tilde{\mu} g_1^2 s_\gamma^2 c_\gamma^2 y_e^{i1i2} y_u^{i3i4} LF_{5,1,-2}[\tilde{\mu}, m_1] +$$

$$3 m_2 \tilde{\mu} g_2^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{2,1,0}[\tilde{\mu}, m_2] (c_\gamma^2 - s_\gamma^2)^2 +$$

$$3 g_2^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} \big(2 s_\gamma c_\gamma m_\Phi^2 - m_2 \tilde{\mu} (c_\gamma^2 - s_\gamma^2)^2\big) LF_{3,1,-1}[\tilde{\mu}, m_2] +$$

$$6 m_2 \tilde{\mu} g_2^2 s_\gamma^2 c_\gamma^2 y_e^{i1i2} y_u^{i3i4} LF_{3,1,0}[\tilde{\mu}, m_2] - 12 s_\gamma c_\gamma g_2^2 y_e^{i1i2} y_u^{i3i4} LF_{4,1,-2}[\tilde{\mu}, m_2] -$$

$$18 m_2 \tilde{\mu} g_2^2 s_\gamma^2 c_\gamma^2 y_e^{i1i2} y_u^{i3i4} LF_{4,1,-1}[\tilde{\mu}, m_2] +$$

$$6 s_\gamma c_\gamma g_2^2 y_e^{i1i2} y_u^{i3i4} LF_{5,1,-3}[\tilde{\mu}, m_2] + 12 m_2 \tilde{\mu} g_2^2 s_\gamma^2 c_\gamma^2 y_e^{i1i2} y_u^{i3i4} LF_{5,1,-2}[\tilde{\mu}, m_2] +$$

$$\frac{1}{4} s_\gamma c_\gamma \frac{1}{m_\Phi^2} \overline{y_d}^{pr} y_d^{i3r} y_e^{i1i2} y_u^{pi4} LF_{2,1,-1}[\tilde{\mu}, m_{\tilde{d}}^{r}] +$$

$$\frac{1}{4} s_\gamma c_\gamma \frac{1}{m_\Phi^2} \overline{y_e}^{pr} y_e^{pi2} y_e^{i1r} y_u^{i3i4} LF_{2,1,-1}[\tilde{\mu}, m_{\tilde{e}}^{r}] +$$

$$\frac{1}{2} s_\gamma c_\gamma \frac{1}{m_\Phi^2} \overline{y_e}^{pr} y_e^{pi2} y_e^{i1r} y_u^{i3i4} LF_{2,1,-1}[\tilde{\mu}, m_{\tilde{l}}^{p}] +$$

$$\frac{1}{2} s_\gamma c_\gamma \frac{1}{m_\Phi^2} y_e^{i1i2} \overline{y_u}^{pr} y_u^{pi4} y_u^{i3r} LF_{2,1,-1}[\tilde{\mu}, m_{\tilde{q}}^{p}] +$$

$$\frac{1}{4} s_\gamma c_\gamma \frac{1}{m_\Phi^2} y_e^{i1i2} \overline{y_u}^{pr} y_u^{pi4} y_u^{i3r} LF_{2,1,-1}[\tilde{\mu}, m_{\tilde{u}}^{r}] +$$

$$m_1 c_\gamma g_1^2 \frac{1}{m_\Phi^2} y_u^{i3i4} (s_\gamma a_e^{i1i2} + \tilde{\mu} c_\gamma y_e^{i1i2}) LF_{1,1,1,0}[m_1, m_{\tilde{e}}^{i2}, m_{\tilde{l}}^{i1}] +$$

$$\frac{1}{4} m_1 s_\gamma g_1^2 y_u^{i3i4} (c_\gamma a_e^{i1i2} - s_\gamma \tilde{\mu} y_e^{i1i2}) LF_{2,2,1,-1}[m_1, m_{\tilde{e}}^{i2}, m_{\tilde{l}}^{i1}] +$$

$$s_\gamma c_\gamma g_1^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{1,1,1,-1}[m_1, m_{\tilde{e}}^{i2}, \tilde{\mu}] -$$

$$m_1 \tilde{\mu} g_1^2 \frac{1}{m_\Phi^2} c_\gamma^2 y_e^{i1i2} y_u^{i3i4} LF_{1,1,1,0}[m_1, m_{\tilde{e}}^{i2}, \tilde{\mu}] +$$

$$\frac{1}{4} m_1 s_\gamma g_1^2 y_u^{i3i4} (c_\gamma a_e^{i1i2} - s_\gamma \tilde{\mu} y_e^{i1i2}) LF_{2,2,1,-1}[m_1, m_{\tilde{l}}^{i1}, m_{\tilde{e}}^{i2}] -$$

$$\frac{1}{2} s_\gamma c_\gamma g_1^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{1,1,1,-1}[m_1, m_{\tilde{l}}^{i1}, \tilde{\mu}] +$$

$$\frac{1}{2} m_1 \tilde{\mu} g_1^2 \frac{1}{m_\Phi^2} c_\gamma^2 y_e^{i1i2} y_u^{i3i4} LF_{1,1,1,0}[m_1, m_{\tilde{l}}^{i1}, \tilde{\mu}] +$$

$$\frac{2}{9} m_1 s_\gamma g_1^2 \frac{1}{m_\Phi^2} y_e^{i1i2} (c_\gamma a_u^{i3i4} + s_\gamma \tilde{\mu} y_u^{i3i4}) LF_{1,1,1,0}[m_1, m_{\tilde{q}}^{i3}, m_{\tilde{u}}^{i4}] +$$

$$\frac{1}{18} m_1 c_\gamma g_1^2 y_e^{i1i2} (s_\gamma a_u^{i3i4} - \tilde{\mu} c_\gamma y_u^{i3i4}) LF_{2,2,1,-1}[m_1, m_{\tilde{q}}^{i3}, m_{\tilde{u}}^{i4}] -$$

$$\frac{1}{6} s_\gamma c_\gamma g_1^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{1,1,1,-1}[m_1, m_{\tilde{q}}^{i3}, \tilde{\mu}] +$$

$$\frac{1}{6} m_1 \tilde{\mu} g_1^2 \frac{1}{m_\Phi^2} s_\gamma^2 y_e^{i1i2} y_u^{i3i4} LF_{1,1,1,0}[m_1, m_{\tilde{q}}^{i3}, \tilde{\mu}] +$$

$$\frac{1}{18} m_1 c_\gamma g_1^2 y_e^{i1i2} (s_\gamma a_u^{i3i4} - \tilde{\mu} c_\gamma y_u^{i3i4}) LF_{2,2,1,-1}[m_1, m_{\tilde{u}}^{i4}, m_{\tilde{q}}^{i3}] +$$

$$\frac{2}{3} s_\gamma c_\gamma g_1^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{1,1,1,-1}[m_1, m_{\tilde{u}}^{i4}, \tilde{\mu}] -$$

$$\frac{2}{3} m_1 \tilde{\mu} g_1^2 \frac{1}{m_\Phi^2} s_\gamma^2 y_e^{i1i2} y_u^{i3i4} LF_{1,1,1,0}[m_1, m_{\tilde{u}}^{i4}, \tilde{\mu}] -$$

$$\frac{1}{2} s_\gamma c_\gamma g_1^2 y_e^{i1i2} y_u^{i3i4} LF_{2,2,1,-2}[m_1, \tilde{\mu}, m_{\tilde{e}}^{i2}] -$$

$$\frac{1}{2} m_1 \tilde{\mu} g_1^2 s_\gamma^2 y_e^{i1i2} y_u^{i3i4} LF_{2,2,1,-1}[m_1, \tilde{\mu}, m_{\tilde{e}}^{i2}] +$$

$$\frac{1}{4} s_\gamma c_\gamma g_1^2 y_e^{i1i2} y_u^{i3i4} LF_{2,2,1,-2}[m_1, \tilde{\mu}, m_{\tilde{l}}^{i1}] +$$

$$\frac{1}{4} m_1 \tilde{\mu} g_1^2 s_\gamma^2 y_e^{i1i2} y_u^{i3i4} LF_{2,2,1,-1}[m_1, \tilde{\mu}, m_{\tilde{l}}^{i1}] +$$

$$\frac{1}{12} s_\gamma c_\gamma g_1^2 y_e^{i1i2} y_u^{i3i4} LF_{2,2,1,-2}[m_1, \tilde{\mu}, m_{\tilde{q}}^{i3}] +$$

$$\frac{1}{12} m_1 \tilde{\mu} g_1^2 c_\gamma^2 y_e^{i1i2} y_u^{i3i4} LF_{2,2,1,-1}[m_1, \tilde{\mu}, m_{\tilde{q}}^{i3}] -$$

$$\frac{1}{3} s_\gamma c_\gamma g_1^2 y_e^{i1i2} y_u^{i3i4} LF_{2,2,1,-2}[m_1, \tilde{\mu}, m_{\tilde{u}}^{i4}] -$$

$$\frac{1}{3} m_1 \tilde{\mu} g_1^2 c_\gamma^2 y_e^{i1i2} y_u^{i3i4} LF_{2,2,1,-1}[m_1, \tilde{\mu}, m_{\tilde{u}}^{i4}] +$$

$$\frac{3}{2} s_\gamma c_\gamma g_2^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{1,1,1,-1}[m_2, m_{\tilde{l}}^{i1}, \tilde{\mu}] -$$

$$\frac{3}{2} m_2 \tilde{\mu} g_2^2 \frac{1}{m_\Phi^2} c_\gamma^2 y_e^{i1i2} y_u^{i3i4} LF_{1,1,1,0}[m_2, m_{\tilde{l}}^{i1}, \tilde{\mu}] +$$

$$\frac{3}{2} s_\gamma c_\gamma g_2^2 \frac{1}{m_\Phi^2} y_e^{i1i2} y_u^{i3i4} LF_{1,1,1,-1}[m_2, m_{\tilde{q}}^{i3}, \tilde{\mu}] -$$

$$\frac{3}{2} m_2 \tilde{\mu} g_2^2 \frac{1}{m_\Phi^2} s_\gamma^2 y_e^{i1i2} y_u^{i3i4} LF_{1,1,1,0}[m_2, m_{\tilde{q}}^{i3}, \tilde{\mu}] -$$

$$\frac{3}{4} s_\gamma c_\gamma g_2^2 y_e^{i1i2} y_u^{i3i4} LF_{2,2,1,-2}[m_2, \tilde{\mu}, m_{\tilde{l}}^{i1}] -$$

$$\frac{3}{4} m_2 \tilde{\mu} g_2^2 s_\gamma^2 y_e^{i1i2} y_u^{i3i4} LF_{2,2,1,-1}[m_2, \tilde{\mu}, m_{\tilde{l}}^{i1}] -$$

$$\frac{3}{4} s_\gamma c_\gamma g_2^2 y_e^{i1i2} y_u^{i3i4} LF_{2,2,1,-2}[m_2, \tilde{\mu}, m_{\tilde{q}}^{i3}] -$$

$$\frac{3}{4} m_2 \tilde{\mu} g_2^2 c_\gamma^2 y_e^{i1i2} y_u^{i3i4} LF_{2,2,1,-1}[m_2, \tilde{\mu}, m_{\tilde{q}}^{i3}] +$$

$$\frac{8}{3} m_3 s_\gamma g_3^2 \frac{1}{m_\Phi^2} y_e^{i1i2} (c_\gamma a_u^{i3i4} + s_\gamma \tilde{\mu} y_u^{i3i4}) LF_{1,1,1,0}[m_3, m_{\tilde{q}}^{i3}, m_{\tilde{u}}^{i4}] +$$

$$\frac{2}{3} m_3 c_\gamma g_3^2 y_e^{i1i2} (s_\gamma a_u^{i3i4} - \tilde{\mu} c_\gamma y_u^{i3i4}) LF_{2,2,1,-1}[m_3, m_{\tilde{q}}^{i3}, m_{\tilde{u}}^{i4}] +$$

$$\frac{2}{3} m_3 c_\gamma g_3^2 y_e^{i1i2} (s_\gamma a_u^{i3i4} - \tilde{\mu} c_\gamma y_u^{i3i4}) LF_{2,2,1,-1}[m_3, m_{\tilde{u}}^{i4}, m_{\tilde{q}}^{i3}] +$$

$$s_\gamma \tilde{\mu} \frac{1}{m_\Phi^2} y_d^{i3r} y_e^{i1i2} y_u^{pi4} (s_\gamma \overline{a_d}^{pr} + \tilde{\mu} c_\gamma \overline{y_d}^{pr}) LF_{1,1,1,0}[m_{\tilde{d}}^{r}, m_{\tilde{q}}^{p}, \tilde{\mu}] +$$

$$\frac{1}{2} \tilde{\mu} c_\gamma y_d^{i3r} y_e^{i1i2} y_u^{pi4} (c_\gamma \overline{a_d}^{pr} - s_\gamma \tilde{\mu} \overline{y_d}^{pr}) LF_{2,1,1,0}[m_{\tilde{d}}^{r}, m_{\tilde{q}}^{p}, \tilde{\mu}] +$$

$$\frac{1}{2} \tilde{\mu} c_\gamma y_d^{i3r} y_e^{i1i2} y_u^{pi4} (-c_\gamma \overline{a_d}^{pr} + s_\gamma \tilde{\mu} \overline{y_d}^{pr}) LF_{3,1,1,-1}[m_{\tilde{d}}^{r}, m_{\tilde{q}}^{p}, \tilde{\mu}] +$$

$$\frac{1}{4} \tilde{\mu} c_\gamma y_d^{i3r} y_e^{i1i2} y_u^{pi4} (-c_\gamma \overline{a_d}^{pr} + s_\gamma \tilde{\mu} \overline{y_d}^{pr}) LF_{2,2,1,-1}[m_{\tilde{d}}^{r}, \tilde{\mu}, m_{\tilde{q}}^{p}] +$$

$$\frac{1}{2} m_1 s_\gamma g_1^2 y_u^{i3i4} (-c_\gamma a_e^{i1i2} + s_\gamma \tilde{\mu} y_e^{i1i2}) LF_{2,1,1,0}[m_{\tilde{e}}^{i2}, m_1, m_{\tilde{l}}^{i1}] +$$

$$\frac{1}{2} m_1 s_\gamma g_1^2 y_u^{i3i4} (c_\gamma a_e^{i1i2} - s_\gamma \tilde{\mu} y_e^{i1i2}) LF_{3,1,1,-1}[m_{\tilde{e}}^{i2}, m_1, m_{\tilde{l}}^{i1}] +$$

$$\frac{1}{2} m_1 s_\gamma g_1^2 y_u^{i3i4} (-c_\gamma a_e^{i1i2} + s_\gamma \tilde{\mu} y_e^{i1i2}) LF_{2,1,1,0}[m_{\tilde{l}}^{i1}, m_1, m_{\tilde{e}}^{i2}] +$$

$$\frac{1}{2} m_1 s_\gamma g_1^2 y_u^{i3i4} (c_\gamma a_e^{i1i2} - s_\gamma \tilde{\mu} y_e^{i1i2}) LF_{3,1,1,-1}[m_{\tilde{l}}^{i1}, m_1, m_{\tilde{e}}^{i2}] +$$

$$\frac{1}{2} \tilde{\mu} c_\gamma y_d^{i3r} y_e^{i1i2} y_u^{pi4} (c_\gamma \overline{a_d}^{pr} - s_\gamma \tilde{\mu} \overline{y_d}^{pr}) LF_{2,1,1,0}[m_{\tilde{q}}^{p}, m_{\tilde{d}}^{r}, \tilde{\mu}] +$$

$$\frac{1}{2} \tilde{\mu} c_\gamma y_d^{i3r} y_e^{i1i2} y_u^{pi4} (-c_\gamma \overline{a_d}^{pr} + s_\gamma \tilde{\mu} \overline{y_d}^{pr}) LF_{3,1,1,-1}[m_{\tilde{q}}^{p}, m_{\tilde{d}}^{r}, \tilde{\mu}] +$$

$$\frac{1}{4} \tilde{\mu} c_\gamma y_d^{i3r} y_e^{i1i2} y_u^{pi4} (-c_\gamma \overline{a_d}^{pr} + s_\gamma \tilde{\mu} \overline{y_d}^{pr}) LF_{2,2,1,-1}[m_{\tilde{q}}^{p}, \tilde{\mu}, m_{\tilde{d}}^{r}] +$$

$$\frac{1}{9} m_1 c_\gamma g_1^2 y_e^{i1i2} (-s_\gamma a_u^{i3i4} + \tilde{\mu} c_\gamma y_u^{i3i4}) LF_{2,1,1,0}[m_{\tilde{q}}^{i3}, m_1, m_{\tilde{u}}^{i4}] +$$

$$\frac{1}{9} m_1 c_\gamma g_1^2 y_e^{i1i2} (s_\gamma a_u^{i3i4} - \tilde{\mu} c_\gamma y_u^{i3i4}) LF_{3,1,1,-1}[m_{\tilde{q}}^{i3}, m_1, m_{\tilde{u}}^{i4}] +$$

$$\frac{4}{3} m_3 c_\gamma g_3^2 y_e^{i1i2} (-s_\gamma a_u^{i3i4} + \tilde{\mu} c_\gamma y_u^{i3i4}) LF_{2,1,1,0}[m_{\tilde{q}}^{i3}, m_3, m_{\tilde{u}}^{i4}] +$$

$$\frac{4}{3} m_3 c_\gamma g_3^2 y_e^{i1i2} (s_\gamma a_u^{i3i4} - \tilde{\mu} c_\gamma y_u^{i3i4}) LF_{3,1,1,-1}[m_{\tilde{q}}^{i3}, m_3, m_{\tilde{u}}^{i4}] +$$

$$\frac{1}{9} m_1 c_\gamma g_1^2 y_e^{i1i2} (-s_\gamma a_u^{i3i4} + \tilde{\mu} c_\gamma y_u^{i3i4}) LF_{2,1,1,0}[m_{\tilde{u}}^{i4}, m_1, m_{\tilde{q}}^{i3}] +$$

$$\frac{1}{9} m_1 c_\gamma g_1^2 y_e^{i1i2} (s_\gamma a_u^{i3i4} - \tilde{\mu} c_\gamma y_u^{i3i4}) LF_{3,1,1,-1}[m_{\tilde{u}}^{i4}, m_1, m_{\tilde{q}}^{i3}] +$$

$$\frac{4}{3} m_3 c_\gamma g_3^2 y_e^{i1i2} (-s_\gamma a_u^{i3i4} + \tilde{\mu} c_\gamma y_u^{i3i4}) LF_{2,1,1,0}[m_{\tilde{u}}^{i4}, m_3, m_{\tilde{q}}^{i3}] +$$

$$\frac{4}{3} m_3 c_\gamma g_3^2 y_e^{i1i2} (s_\gamma a_u^{i3i4} - \tilde{\mu} c_\gamma y_u^{i3i4}) LF_{3,1,1,-1}[m_{\tilde{u}}^{i4}, m_3, m_{\tilde{q}}^{i3}] -$$

$$\frac{1}{6} m_1 \tilde{\mu} g_1^2 y_e^{i1i2} y_u^{i3i4} LF_{1,1,1,1,0}[m_1, m_{\tilde{e}}^{i2}, m_{\tilde{q}}^{i3}, \tilde{\mu}] +$$

$$\frac{2}{3} m_1 \tilde{\mu} g_1^2 y_e^{i1i2} y_u^{i3i4} LF_{1,1,1,1,0}[m_1, m_{\tilde{e}}^{i2}, m_{\tilde{u}}^{i4}, \tilde{\mu}] +$$

$$\frac{1}{12} m_1 \tilde{\mu} g_1^2 y_e^{i1i2} y_u^{i3i4} LF_{1,1,1,1,0}[m_1, m_{\tilde{l}}^{i1}, m_{\tilde{q}}^{i3}, \tilde{\mu}] -$$

$$\frac{1}{3} m_1 \tilde{\mu} g_1^2 y_e^{i1i2} y_u^{i3i4} LF_{1,1,1,1,0}[m_1, m_{\tilde{l}}^{i1}, m_{\tilde{u}}^{i4}, \tilde{\mu}] +$$

$$\frac{3}{4} m_2 \tilde{\mu} g_2^2 y_e^{i1i2} y_u^{i3i4} LF_{1,1,1,1,0}[m_2, m_{\tilde{l}}^{i1}, m_{\tilde{q}}^{i3}, \tilde{\mu}]\Big)$$