$$C_{qd}^{(1)}\ \text{i1\_i2\_i3\_i4\_}\rightarrow$$

$$-\frac{1}{6}\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}+\hbar\,\Big(-\frac{1}{1296}\frac{1}{m_\Phi^2}\Big(81s_\gamma^2\overline{y_d}^{ri3}\overline{y_d}^{i2p}\big(12c_\gamma^2y_d^{ri4}y_d^{i1p}+y_d^{rp}y_d^{i1i4}(1+s_\gamma^2)\big)+$$

$$s_\gamma^2\Big(81\overline{y_d}^{pr}\overline{y_d}^{i2i3}\big(y_d^{pi4}y_d^{i1r}(1+s_\gamma^2)-8c_\gamma^2y_d^{pr}y_d^{i1i4}\big)+$$

$$3\overline{y_d}^{i2i3}\big(y_d^{i1i4}(5g_1^2+27g_2^2+96g_3^2)-9y_d^{pi4}\overline{y_u}^{pr}y_u^{i1r}(-1+c_\gamma^2)\big)+$$

$$\overline{y_d}^{pi3}\big(27\overline{y_u}^{i2r}\big(-y_d^{i1i4}y_u^{pr}(-1+c_\gamma^2)+12c_\gamma^2y_d^{pi4}y_u^{i1r}\big)+2g_1^2y_d^{pi4}\delta_{i1i2}\big)\Big)+$$

$$2g_1^2\big(5s_\gamma^2\overline{y_d}^{i2p}y_d^{i1p}-13c_\gamma^2\overline{y_u}^{i2p}y_u^{i1p}\big)\delta_{i3i4}\Big)-$$

$$\frac{1}{12}\sum_p s_\gamma g_1^2\frac{1}{m_\Phi^4}\overline{y_d}^{i2i3}y_d^{i1i4}(2s_{2\gamma}c_\gamma+s_\gamma c_{2\gamma})LF_{1,0}[m_{\tilde d}^p]-$$

$$\frac{2}{243}\sum_p g_1^4LF_{3,0}[m_{\tilde d}^p]\delta_{i1i2}\delta_{i3i4}+$$

$$\frac{5}{324}\sum_p g_1^4LF_{4,-1}[m_{\tilde d}^p]\delta_{i1i2}\delta_{i3i4}-$$

$$\frac{8}{1215}\sum_p g_1^4LF_{5,-2}[m_{\tilde d}^p]\delta_{i1i2}\delta_{i3i4}-$$

$$\frac{1}{2}s_\gamma\frac{1}{m_\Phi^4}\overline{y_d}^{pr}\overline{y_d}^{i2i3}y_d^{pr}y_d^{i1i4}(-s_{2\gamma}c_\gamma+s_\gamma^3)LF_{1,0}[m_{\tilde d}^r]-$$

$$\frac{1}{12}\sum_p s_\gamma g_1^2\frac{1}{m_\Phi^4}\overline{y_d}^{i2i3}y_d^{i1i4}(2s_{2\gamma}c_\gamma+s_\gamma c_{2\gamma})LF_{1,0}[m_{\tilde e}^p]-$$

$$\frac{2}{81}\sum_p g_1^4LF_{3,0}[m_{\tilde e}^p]\delta_{i1i2}\delta_{i3i4}+\frac{5}{108}\sum_p g_1^4LF_{4,-1}[m_{\tilde e}^p]\delta_{i1i2}\delta_{i3i4}-$$

$$\frac{8}{405}\sum_p g_1^4LF_{5,-2}[m_{\tilde e}^p]\delta_{i1i2}\delta_{i3i4}-$$

$$\frac{1}{6}s_\gamma\frac{1}{m_\Phi^4}\overline{y_d}^{i2i3}y_d^{i1i4}\overline{y_e}^{pr}y_e^{pr}(-s_{2\gamma}c_\gamma+s_\gamma^3)LF_{1,0}[m_{\tilde e}^r]+$$

$$\frac{1}{12}s_\gamma\frac{1}{m_\Phi^4}\overline{y_d}^{i2i3}y_d^{i1i4}\Big(2\overline{y_e}^{pr}y_e^{pr}(s_{2\gamma}c_\gamma-s_\gamma^3)+\sum_p g_1^2(2s_{2\gamma}c_\gamma+s_\gamma c_{2\gamma})\Big)LF_{1,0}[m_{\tilde l}^p]-$$

$$\frac{1}{81}\sum_p g_1^4LF_{3,0}[m_{\tilde l}^p]\delta_{i1i2}\delta_{i3i4}+\frac{5}{216}\sum_p g_1^4LF_{4,-1}[m_{\tilde l}^p]\delta_{i1i2}\delta_{i3i4}-$$

$$\frac{4}{405}\sum_p g_1^4LF_{5,-2}[m_{\tilde l}^p]\delta_{i1i2}\delta_{i3i4}-\frac{1}{12}s_\gamma\frac{1}{m_\Phi^4}\overline{y_d}^{i2i3}y_d^{i1i4}$$

$$\Big(6\overline{y_d}^{pr}y_d^{pr}(-s_{2\gamma}c_\gamma+s_\gamma^3)+6c_\gamma\overline{y_u}^{pr}y_u^{pr}(s_{2\gamma}+s_\gamma c_\gamma)+\sum_p g_1^2(2s_{2\gamma}c_\gamma+s_\gamma c_{2\gamma})\Big)$$

$$LF_{1,0}[m_{\tilde q}^p]-\frac{1}{243}\sum_p g_1^4LF_{3,0}[m_{\tilde q}^p]\delta_{i1i2}\delta_{i3i4}+$$

$$\frac{5}{648}\sum_p g_1^4LF_{4,-1}[m_{\tilde q}^p]\delta_{i1i2}\delta_{i3i4}-\frac{4}{1215}\sum_p g_1^4LF_{5,-2}[m_{\tilde q}^p]\delta_{i1i2}\delta_{i3i4}+$$

$$\frac{1}{6}\sum_p s_\gamma g_1^2\frac{1}{m_\Phi^4}\overline{y_d}^{i2i3}y_d^{i1i4}(2s_{2\gamma}c_\gamma+s_\gamma c_{2\gamma})LF_{1,0}[m_{\tilde u}^p]-\frac{8}{243}\sum_p g_1^4LF_{3,0}[m_{\tilde u}^p]\delta_{i1i2}\delta_{i3i4}+$$

$$\frac{5}{81}\sum_p g_1^4LF_{4,-1}[m_{\tilde u}^p]\delta_{i1i2}\delta_{i3i4}-\frac{32}{1215}\sum_p g_1^4LF_{5,-2}[m_{\tilde u}^p]\delta_{i1i2}\delta_{i3i4}-$$

$$\frac{1}{2}s_\gamma c_\gamma\frac{1}{m_\Phi^4}\overline{y_d}^{i2i3}y_d^{i1i4}\overline{y_u}^{pr}y_u^{pr}(s_{2\gamma}+s_\gamma c_\gamma)LF_{1,0}[m_{\tilde u}^r]-\frac{1}{24}s_\gamma\frac{1}{m_\Phi^4}\overline{y_d}^{i2i3}y_d^{i1i4}$$

$$\Big(3s_{4\gamma}c_\gamma(g_1^2+g_2^2)+s_\gamma\big(g_1^2(-1+3c_{2\gamma}^2)+3g_2^2(-1+c_{2\gamma}^2)\big)\Big)LF_{1,0}[m_\Phi]+$$

$$\frac{1}{24}\frac{1}{m_\Phi^2}s_\gamma^2\Big(3s_\gamma^2\overline{y_d}^{pr}\overline{y_d}^{i2i3}y_d^{pi4}y_d^{i1r}+3y_d^{i1i4}\big(s_\gamma^2\overline{y_d}^{ri3}\overline{y_d}^{i2p}y_d^{rp}-c_\gamma^2\overline{y_d}^{pi3}\overline{y_u}^{i2r}y_u^{pr}\big)-$$

$$\overline{y_d}^{i2i3}\big(2y_d^{i1i4}(g_1^2+3g_2^2)+3c_\gamma^2y_d^{pi4}\overline{y_u}^{pr}y_u^{i1r}\big)\Big)LF_{1,1}[m_\Phi]+\frac{1}{216}$$

$$\Big(s_\gamma^2\Big(-108c_\gamma^2\overline{y_d}^{ri3}\overline{y_d}^{i2p}y_d^{ri4}y_d^{i1p}+9\overline{y_d}^{i2i3}\big(y_d^{i1i4}(g_1^2+3g_2^2)+2c_\gamma^2y_d^{pi4}\overline{y_u}^{pr}y_u^{i1r}\big)+$$

$$2\overline{y_d}^{pi3}\big(9c_\gamma^2\overline{y_u}^{i2r}(y_d^{i1i4}y_u^{pr}-6y_d^{pi4}y_u^{i1r})-2g_1^2y_d^{pi4}\delta_{i1i2}\big)\Big)-$$

$$8g_1^2\big(s_\gamma^2\overline{y_d}^{i2p}y_d^{i1p}-2c_\gamma^2\overline{y_u}^{i2p}y_u^{i1p}\big)\delta_{i3i4}\Big)LF_{1,2}[m_\Phi]+$$

$$\frac{1}{36}\Big(-9s_\gamma^4\overline{y_d}^{ri3}\overline{y_d}^{i2p}y_d^{ri4}y_d^{i1p}+s_\gamma^2\overline{y_d}^{pi3}y_d^{pi4}\big(9c_\gamma^2\overline{y_u}^{i2r}y_u^{i1r}+g_1^2\delta_{i1i2}\big)+$$

$$g_1^2\big(s_\gamma^2\overline{y_d}^{i2p}y_d^{i1p}-c_\gamma^2\overline{y_u}^{i2p}y_u^{i1p}\big)\delta_{i3i4}\Big)LF_{2,1}[m_\Phi]-$$

$$\frac{1}{324}g_1^2\Big(9s_\gamma^2\overline{y_d}^{pi3}y_d^{pi4}\delta_{i1i2}+\big(9s_\gamma^2\overline{y_d}^{i2p}y_d^{i1p}-9c_\gamma^2\overline{y_u}^{i2p}y_u^{i1p}+4g_1^2\delta_{i1i2}\big)\delta_{i3i4}\Big)$$

$$LF_{3,0}[m_\Phi]+\frac{5}{216}g_1^4LF_{4,-1}[m_\Phi]\delta_{i1i2}\delta_{i3i4}-\frac{4}{405}g_1^4LF_{5,-2}[m_\Phi]\delta_{i1i2}\delta_{i3i4}-$$

$$\frac{1}{81}g_1^4LF_{3,0}[\tilde\mu]\delta_{i1i2}\delta_{i3i4}-\frac{1}{54}g_1^4LF_{4,-1}[\tilde\mu]\delta_{i1i2}\delta_{i3i4}+$$

$$\frac{8}{405}g_1^4LF_{5,-2}[\tilde\mu]\delta_{i1i2}\delta_{i3i4}+\frac{1}{54}g_1^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,0}[m_1,m_{\tilde d}^{i3}]-$$

$$\frac{1}{108}g_1^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{2,1,-1}[m_1,m_{\tilde d}^{i3}]+\frac{1}{54}g_1^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,0}[m_1,m_{\tilde d}^{i4}]-$$

$$\frac{1}{108}g_1^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{2,1,-1}[m_1,m_{\tilde d}^{i4}]-\frac{1}{486}g_1^4LF_{2,1,0}[m_1,m_{\tilde d}^{i4}]\delta_{i1i2}\delta_{i3i4}-$$

$$\frac{1}{486}g_1^4LF_{2,2,-1}[m_1,m_{\tilde d}^{i4}]\delta_{i1i2}\delta_{i3i4}+\frac{1}{243}g_1^4LF_{3,1,-1}[m_1,m_{\tilde d}^{i4}]\delta_{i1i2}\delta_{i3i4}-$$

$$\frac{1}{486}g_1^4LF_{4,1,-2}[m_1,m_{\tilde d}^{i4}]\delta_{i1i2}\delta_{i3i4}+\frac{1}{216}g_1^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,0}[m_1,m_{\tilde q}^{i1}]-$$

$$\frac{1}{432}g_1^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{2,1,-1}[m_1,m_{\tilde q}^{i1}]+\frac{1}{216}g_1^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,0}[m_1,m_{\tilde q}^{i2}]-$$

$$\frac{1}{432}g_1^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{2,1,-1}[m_1,m_{\tilde q}^{i2}]-\frac{1}{1944}g_1^4LF_{2,1,0}[m_1,m_{\tilde q}^{i2}]\delta_{i1i2}\delta_{i3i4}-$$

$$\frac{1}{1944}g_1^4LF_{2,2,-1}[m_1,m_{\tilde q}^{i2}]\delta_{i1i2}\delta_{i3i4}+\frac{1}{972}g_1^4LF_{3,1,-1}[m_1,m_{\tilde q}^{i2}]\delta_{i1i2}\delta_{i3i4}-$$

$$\frac{1}{1944}g_1^4LF_{4,1,-2}[m_1,m_{\tilde q}^{i2}]\delta_{i1i2}\delta_{i3i4}+\frac{1}{6}g_1^2\frac{1}{m_\Phi^4}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}(c_\gamma^2+s_\gamma^2)LF_{1,1,-1}[m_1,\tilde\mu]+$$

$$\frac{1}{3}m_1s_\gamma\tilde\mu c_\gamma g_1^2\frac{1}{m_\Phi^4}\overline{y_d}^{i2i3}y_d^{i1i4}(c_\gamma^2-2s_\gamma^2)LF_{1,1,0}[m_1,\tilde\mu]+$$

$$\frac{1}{8}g_2^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,0}[m_2,m_{\tilde q}^{i1}]-\frac{1}{16}g_2^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{2,1,-1}[m_2,m_{\tilde q}^{i1}]+$$

$$\frac{1}{8}g_2^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,0}[m_2,m_{\tilde q}^{i2}]-\frac{1}{16}g_2^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{2,1,-1}[m_2,m_{\tilde q}^{i2}]-$$

$$\frac{1}{72}g_1^2g_2^2LF_{2,1,0}[m_2,m_{\tilde q}^{i2}]\delta_{i1i2}\delta_{i3i4}-\frac{1}{72}g_1^2g_2^2LF_{2,2,-1}[m_2,m_{\tilde q}^{i2}]\delta_{i1i2}\delta_{i3i4}+$$

$$\frac{1}{36}g_1^2g_2^2LF_{3,1,-1}[m_2,m_{\tilde q}^{i2}]\delta_{i1i2}\delta_{i3i4}-\frac{1}{72}g_1^2g_2^2LF_{4,1,-2}[m_2,m_{\tilde q}^{i2}]\delta_{i1i2}\delta_{i3i4}+$$

$$\frac{1}{2}g_2^2\frac{1}{m_\Phi^4}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}(c_\gamma^2+s_\gamma^2)LF_{1,1,-1}[m_2,\tilde\mu]+$$

$$m_2s_\gamma\tilde\mu c_\gamma g_2^2\frac{1}{m_\Phi^4}\overline{y_d}^{i2i3}y_d^{i1i4}(c_\gamma^2-2s_\gamma^2)LF_{1,1,0}[m_2,\tilde\mu]+$$

$$\frac{2}{9}g_3^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,0}[m_3,m_{\tilde d}^{i3}]-\frac{1}{9}g_3^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{2,1,-1}[m_3,m_{\tilde d}^{i3}]+$$

$$\frac{2}{9}g_3^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,0}[m_3,m_{\tilde d}^{i4}]-\frac{1}{9}g_3^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{2,1,-1}[m_3,m_{\tilde d}^{i4}]-$$

$$\frac{2}{81}g_1^2g_3^2LF_{2,1,0}[m_3,m_{\tilde d}^{i4}]\delta_{i1i2}\delta_{i3i4}-\frac{2}{81}g_1^2g_3^2LF_{2,2,-1}[m_3,m_{\tilde d}^{i4}]\delta_{i1i2}\delta_{i3i4}+$$

$$\frac{4}{81}g_1^2g_3^2LF_{3,1,-1}[m_3,m_{\tilde d}^{i4}]\delta_{i1i2}\delta_{i3i4}-\frac{2}{81}g_1^2g_3^2LF_{4,1,-2}[m_3,m_{\tilde d}^{i4}]\delta_{i1i2}\delta_{i3i4}+$$

$$\frac{2}{9}g_3^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,0}[m_3,m_{\tilde q}^{i1}]-\frac{1}{9}g_3^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{2,1,-1}[m_3,m_{\tilde q}^{i1}]+$$

$$\frac{2}{9}g_3^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,0}[m_3,m_{\tilde q}^{i2}]-\frac{1}{9}g_3^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{2,1,-1}[m_3,m_{\tilde q}^{i2}]-$$

$$\frac{2}{81}g_1^2g_3^2LF_{2,1,0}[m_3,m_{\tilde q}^{i2}]\delta_{i1i2}\delta_{i3i4}-\frac{2}{81}g_1^2g_3^2LF_{2,2,-1}[m_3,m_{\tilde q}^{i2}]\delta_{i1i2}\delta_{i3i4}+$$

$$\frac{4}{81}g_1^2g_3^2LF_{3,1,-1}[m_3,m_{\tilde q}^{i2}]\delta_{i1i2}\delta_{i3i4}-\frac{2}{81}g_1^2g_3^2LF_{4,1,-2}[m_3,m_{\tilde q}^{i2}]\delta_{i1i2}\delta_{i3i4}+$$

$$\frac{1}{12}\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{ri3}\overline{y_d}^{i2p}y_d^{rp}y_d^{i1i4}LF_{1,1,0}[m_{\tilde d}^p,\tilde\mu]-\frac{1}{27}g_1^2\overline{y_d}^{i2p}y_d^{i1p}LF_{2,1,0}[m_{\tilde d}^p,\tilde\mu]\delta_{i3i4}+$$

$$\frac{1}{54}g_1^2\overline{y_d}^{i2p}y_d^{i1p}LF_{2,2,-1}[m_{\tilde d}^p,\tilde\mu]\delta_{i3i4}+\frac{1}{54}g_1^2\overline{y_d}^{i2p}y_d^{i1p}LF_{3,1,-1}[m_{\tilde d}^p,\tilde\mu]\delta_{i3i4}+$$

$$\frac{1}{2}s_\gamma\frac{1}{m_\Phi^4}\overline{y_d}^{i2i3}y_d^{i1i4}\Big(\tilde\mu c_\gamma\overline{y_d}^{pr}\big(a_d^{pr}(c_\gamma^2-2s_\gamma^2)-3s_\gamma\tilde\mu c_\gamma y_d^{pr}\big)+$$

$$\overline{a_d}^{pr}\big(a_d^{pr}(2s_\gamma c_\gamma^2-s_\gamma^3)+\tilde\mu c_\gamma y_d^{pr}(c_\gamma^2-2s_\gamma^2)\big)\Big)LF_{1,1,0}[m_{\tilde d}^r,m_{\tilde q}^p]+$$

$$\frac{1}{12}\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{pr}\overline{y_d}^{i2i3}y_d^{pi4}y_d^{i1r}LF_{1,1,0}[m_{\tilde d}^r,\tilde\mu]+\frac{1}{243}g_1^4LF_{2,1,0}[m_{\tilde d}^{i4},m_1]\delta_{i1i2}\delta_{i3i4}-$$

$$\frac{1}{486}g_1^4LF_{3,1,-1}[m_{\tilde d}^{i4},m_1]\delta_{i1i2}\delta_{i3i4}+\frac{4}{81}g_1^2g_3^2LF_{2,1,0}[m_{\tilde d}^{i4},m_3]\delta_{i1i2}\delta_{i3i4}-$$

$$\frac{2}{81}g_1^2g_3^2LF_{3,1,-1}[m_{\tilde d}^{i4},m_3]\delta_{i1i2}\delta_{i3i4}+$$

$$\frac{1}{6}s_\gamma\frac{1}{m_\Phi^4}\overline{y_d}^{i2i3}y_d^{i1i4}\Big(\tilde\mu c_\gamma\overline{y_e}^{pr}\big(a_e^{pr}(c_\gamma^2-2s_\gamma^2)-3s_\gamma\tilde\mu c_\gamma y_e^{pr}\big)+$$

$$\overline{a_e}^{pr}\big(a_e^{pr}(2s_\gamma c_\gamma^2-s_\gamma^3)+\tilde\mu c_\gamma y_e^{pr}(c_\gamma^2-2s_\gamma^2)\big)\Big)LF_{1,1,0}[m_{\tilde e}^r,m_{\tilde l}^p]+\frac{1}{6}s_\gamma c_\gamma\frac{1}{m_\Phi^2}\overline{y_d}^{i2i3}$$

$$y_d^{i1i4}\Big(\tilde\mu\overline{y_e}^{pr}\big(a_e^{pr}(-c_\gamma^2+s_\gamma^2)+2s_\gamma\tilde\mu c_\gamma y_e^{pr}\big)+\overline{a_e}^{pr}\big(-2s_\gamma c_\gamma a_e^{pr}+\tilde\mu y_e^{pr}(-c_\gamma^2+s_\gamma^2)\big)\Big)$$

$$LF_{2,1,0}[m_{\tilde l}^p,m_{\tilde e}^r]+\frac{1}{6}s_\gamma c_\gamma\frac{1}{m_\Phi^2}\overline{y_d}^{i2i3}y_d^{i1i4}\Big(\tilde\mu\overline{y_e}^{pr}\big(a_e^{pr}(c_\gamma^2-s_\gamma^2)-2s_\gamma\tilde\mu c_\gamma y_e^{pr}\big)+$$

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

$$\frac{1}{6}c_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}(c_\gamma\overline{a_e}^{pr}-s_\gamma\tilde\mu\overline{y_e}^{pr})(c_\gamma a_e^{pr}-s_\gamma\tilde\mu y_e^{pr})LF_{3,1,0}[m_{\tilde l}^p,m_{\tilde e}^r]+$$

$$\frac{1}{2}c_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}(c_\gamma\overline{a_e}^{pr}-s_\gamma\tilde\mu\overline{y_e}^{pr})(c_\gamma a_e^{pr}-s_\gamma\tilde\mu y_e^{pr})LF_{4,1,-1}[m_{\tilde l}^p,m_{\tilde e}^r]-$$

$$\frac{1}{3}c_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}(c_\gamma\overline{a_e}^{pr}-s_\gamma\tilde\mu\overline{y_e}^{pr})(c_\gamma a_e^{pr}-s_\gamma\tilde\mu y_e^{pr})LF_{5,1,-2}[m_{\tilde l}^p,m_{\tilde e}^r]+$$

$$\frac{1}{2}s_\gamma c_\gamma\frac{1}{m_\Phi^2}\overline{y_d}^{i2i3}y_d^{i1i4}$$

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

$$LF_{2,1,0}[m_{\tilde q}^p,m_{\tilde d}^r]+\frac{1}{2}s_\gamma c_\gamma\frac{1}{m_\Phi^2}\overline{y_d}^{i2i3}y_d^{i1i4}\Big(\tilde\mu\overline{y_d}^{pr}\big(a_d^{pr}(c_\gamma^2-s_\gamma^2)-2s_\gamma\tilde\mu c_\gamma y_d^{pr}\big)+$$

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

$$\frac{1}{2}c_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}(c_\gamma\overline{a_d}^{pr}-s_\gamma\tilde\mu\overline{y_d}^{pr})(c_\gamma a_d^{pr}-s_\gamma\tilde\mu y_d^{pr})LF_{3,1,0}[m_{\tilde q}^p,m_{\tilde d}^r]+$$

$$\frac{3}{2}c_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}(c_\gamma\overline{a_d}^{pr}-s_\gamma\tilde\mu\overline{y_d}^{pr})(c_\gamma a_d^{pr}-s_\gamma\tilde\mu y_d^{pr})LF_{4,1,-1}[m_{\tilde q}^p,m_{\tilde d}^r]-$$

$$c_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}(c_\gamma\overline{a_d}^{pr}-s_\gamma\tilde\mu\overline{y_d}^{pr})(c_\gamma a_d^{pr}-s_\gamma\tilde\mu y_d^{pr})LF_{5,1,-2}[m_{\tilde q}^p,m_{\tilde d}^r]+$$

$$\frac{1}{2}s_\gamma\frac{1}{m_\Phi^4}\overline{y_d}^{i2i3}y_d^{i1i4}\Big(c_\gamma\overline{a_u}^{pr}\big(-3s_\gamma c_\gamma a_u^{pr}+\tilde\mu y_u^{pr}(c_\gamma^2-2s_\gamma^2)\big)+$$

$$\tilde\mu\overline{y_u}^{pr}\big(a_u^{pr}(c_\gamma^3-2c_\gamma s_\gamma^2)-s_\gamma\tilde\mu y_u^{pr}(-2c_\gamma^2+s_\gamma^2)\big)\Big)LF_{1,1,0}[m_{\tilde q}^p,m_{\tilde u}^r]+$$

$$\frac{1}{6}\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{pr}\overline{y_d}^{i2i3}y_d^{pi4}y_d^{i1r}LF_{1,1,0}[m_{\tilde q}^p,\tilde\mu]-\frac{1}{54}g_1^2\overline{y_d}^{pi3}y_d^{pi4}LF_{2,1,0}[m_{\tilde q}^p,\tilde\mu]\delta_{i1i2}+$$

$$\frac{1}{108}g_1^2\overline{y_d}^{pi3}y_d^{pi4}LF_{2,2,-1}[m_{\tilde q}^p,\tilde\mu]\delta_{i1i2}+\frac{1}{108}g_1^2\overline{y_d}^{pi3}y_d^{pi4}LF_{3,1,-1}[m_{\tilde q}^p,\tilde\mu]\delta_{i1i2}+$$

$$\frac{1}{6}\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{ri3}\overline{y_d}^{i2p}y_d^{rp}y_d^{i1i4}LF_{1,1,0}[m_{\tilde q}^r,\tilde\mu]+$$

$$\frac{1}{972}g_1^4LF_{2,1,0}[m_{\tilde q}^{i2},m_1]\delta_{i1i2}\delta_{i3i4}-\frac{1}{1944}g_1^4LF_{3,1,-1}[m_{\tilde q}^{i2},m_1]\delta_{i1i2}\delta_{i3i4}+$$

$$\frac{1}{36}g_1^2g_2^2LF_{2,1,0}[m_{\tilde q}^{i2},m_2]\delta_{i1i2}\delta_{i3i4}-\frac{1}{72}g_1^2g_2^2LF_{3,1,-1}[m_{\tilde q}^{i2},m_2]\delta_{i1i2}\delta_{i3i4}+$$

$$\frac{4}{81}g_1^2g_3^2LF_{2,1,0}[m_{\tilde q}^{i2},m_3]\delta_{i1i2}\delta_{i3i4}-\frac{2}{81}g_1^2g_3^2LF_{3,1,-1}[m_{\tilde q}^{i2},m_3]\delta_{i1i2}\delta_{i3i4}+$$

$$\frac{2}{27}g_1^2\overline{y_u}^{i2p}y_u^{i1p}LF_{2,1,0}[m_{\tilde u}^p,\tilde\mu]\delta_{i3i4}-\frac{1}{27}g_1^2\overline{y_u}^{i2p}y_u^{i1p}LF_{2,2,-1}[m_{\tilde u}^p,\tilde\mu]\delta_{i3i4}-$$

$$\frac{1}{27}g_1^2\overline{y_u}^{i2p}y_u^{i1p}LF_{3,1,-1}[m_{\tilde u}^p,\tilde\mu]\delta_{i3i4}+\frac{1}{2}s_\gamma c_\gamma\frac{1}{m_\Phi^2}\overline{y_d}^{i2i3}y_d^{i1i4}$$

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

$$LF_{2,1,0}[m_{\tilde u}^r,m_{\tilde q}^p]+\frac{1}{2}s_\gamma c_\gamma\frac{1}{m_\Phi^2}\overline{y_d}^{i2i3}y_d^{i1i4}\Big(\tilde\mu\overline{y_u}^{pr}\big(a_u^{pr}(c_\gamma^2-s_\gamma^2)+2s_\gamma\tilde\mu c_\gamma y_u^{pr}\big)+$$

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

$$\frac{1}{2}c_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}(-s_\gamma\overline{a_u}^{pr}+\tilde\mu c_\gamma\overline{y_u}^{pr})(-s_\gamma a_u^{pr}+\tilde\mu c_\gamma y_u^{pr})LF_{3,1,0}[m_{\tilde u}^r,m_{\tilde q}^p]+$$

$$\frac{3}{2}c_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}(-s_\gamma\overline{a_u}^{pr}+\tilde\mu c_\gamma\overline{y_u}^{pr})(-s_\gamma a_u^{pr}+\tilde\mu c_\gamma y_u^{pr})LF_{4,1,-1}[m_{\tilde u}^r,m_{\tilde q}^p]-$$

$$c_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}(-s_\gamma\overline{a_u}^{pr}+\tilde\mu c_\gamma\overline{y_u}^{pr})(-s_\gamma a_u^{pr}+\tilde\mu c_\gamma y_u^{pr})LF_{5,1,-2}[m_{\tilde u}^r,m_{\tilde q}^p]+$$

$$\frac{1}{12}\frac{1}{m_\Phi^2}s_\gamma^2\big(\overline{y_d}^{pi3}y_d^{i1i4}\overline{y_u}^{i2r}y_u^{pr}+\overline{y_d}^{i2i3}y_d^{pi4}\overline{y_u}^{pr}y_u^{i1r}\big)LF_{1,1,0}[m_{\tilde u}^r,\tilde\mu]+$$

$$\frac{1}{3}m_1s_\gamma\tilde\mu c_\gamma g_1^2\frac{1}{m_\Phi^2}\overline{y_d}^{i2i3}y_d^{i1i4}(-c_\gamma^2+s_\gamma^2)LF_{2,1,0}[\tilde\mu,m_1]+$$

$$\frac{1}{3}c_\gamma g_1^2\frac{1}{m_\Phi^2}\overline{y_d}^{i2i3}y_d^{i1i4}\big(c_\gamma m_\Phi^2(c_\gamma^2+s_\gamma^2)+m_1s_\gamma\tilde\mu(c_\gamma^2-s_\gamma^2)\big)LF_{3,1,-1}[\tilde\mu,m_1]+$$

$$\frac{1}{3}m_1s_\gamma\tilde\mu g_1^2c_\gamma^3\overline{y_d}^{i2i3}y_d^{i1i4}LF_{3,1,0}[\tilde\mu,m_1]-$$

$$\frac{2}{3}g_1^2c_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}(c_\gamma^2+s_\gamma^2)LF_{4,1,-2}[\tilde\mu,m_1]-$$

$$m_1s_\gamma\tilde\mu g_1^2c_\gamma^3\overline{y_d}^{i2i3}y_d^{i1i4}LF_{4,1,-1}[\tilde\mu,m_1]+\frac{1}{3}g_1^2c_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}(c_\gamma^2+s_\gamma^2)LF_{5,1,-3}[\tilde\mu,m_1]+$$

$$\frac{2}{3}m_1s_\gamma\tilde\mu g_1^2c_\gamma^3\overline{y_d}^{i2i3}y_d^{i1i4}LF_{5,1,-2}[\tilde\mu,m_1]+$$

$$m_2s_\gamma\tilde\mu c_\gamma g_2^2\frac{1}{m_\Phi^2}\overline{y_d}^{i2i3}y_d^{i1i4}(-c_\gamma^2+s_\gamma^2)LF_{2,1,0}[\tilde\mu,m_2]+$$

$$c_\gamma g_2^2\frac{1}{m_\Phi^2}\overline{y_d}^{i2i3}y_d^{i1i4}\big(c_\gamma m_\Phi^2(c_\gamma^2+s_\gamma^2)+m_2s_\gamma\tilde\mu(c_\gamma^2-s_\gamma^2)\big)LF_{3,1,-1}[\tilde\mu,m_2]+$$

$$m_2s_\gamma\tilde\mu g_2^2c_\gamma^3\overline{y_d}^{i2i3}y_d^{i1i4}LF_{3,1,0}[\tilde\mu,m_2]-2g_2^2c_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}(c_\gamma^2+s_\gamma^2)LF_{4,1,-2}[\tilde\mu,m_2]-$$

$$3m_2s_\gamma\tilde\mu g_2^2c_\gamma^3\overline{y_d}^{i2i3}y_d^{i1i4}LF_{4,1,-1}[\tilde\mu,m_2]+$$

$$g_2^2c_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}(c_\gamma^2+s_\gamma^2)LF_{5,1,-3}[\tilde\mu,m_2]+2m_2s_\gamma\tilde\mu g_2^2c_\gamma^3\overline{y_d}^{i2i3}y_d^{i1i4}LF_{5,1,-2}[\tilde\mu,m_2]-$$

$$\frac{1}{24}\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{ri3}\overline{y_d}^{i2p}y_d^{rp}y_d^{i1i4}LF_{2,1,-1}[\tilde\mu,m_{\tilde d}^p]+\frac{1}{54}g_1^2\overline{y_d}^{i2p}y_d^{i1p}LF_{2,1,0}[\tilde\mu,m_{\tilde d}^p]\delta_{i3i4}+$$

$$\frac{5}{108}g_1^2\overline{y_d}^{i2p}y_d^{i1p}LF_{3,1,-1}[\tilde\mu,m_{\tilde d}^p]\delta_{i3i4}-\frac{1}{108}g_1^2\overline{y_d}^{i2p}y_d^{i1p}LF_{4,1,-2}[\tilde\mu,m_{\tilde d}^p]\delta_{i3i4}-$$

$$\frac{1}{24}\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{pr}\overline{y_d}^{i2i3}y_d^{pi4}y_d^{i1r}LF_{2,1,-1}[\tilde\mu,m_{\tilde d}^r]-$$

$$\frac{1}{12}\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{pr}\overline{y_d}^{i2i3}y_d^{pi4}y_d^{i1r}LF_{2,1,-1}[\tilde\mu,m_{\tilde q}^p]+\frac{1}{108}g_1^2\overline{y_d}^{pi3}y_d^{pi4}LF_{2,1,0}[\tilde\mu,m_{\tilde q}^p]\delta_{i1i2}+$$

$$\frac{7}{108}g_1^2\overline{y_d}^{pi3}y_d^{pi4}LF_{3,1,-1}[\tilde\mu,m_{\tilde q}^p]\delta_{i1i2}-\frac{1}{54}g_1^2\overline{y_d}^{pi3}y_d^{pi4}LF_{4,1,-2}[\tilde\mu,m_{\tilde q}^p]\delta_{i1i2}-$$

$$\frac{1}{12}\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{ri3}\overline{y_d}^{i2p}y_d^{rp}y_d^{i1i4}LF_{2,1,-1}[\tilde\mu,m_{\tilde q}^r]-\frac{1}{27}g_1^2\overline{y_u}^{i2p}y_u^{i1p}LF_{2,1,0}[\tilde\mu,m_{\tilde u}^p]\delta_{i3i4}-$$

$$\frac{1}{108}g_1^2\overline{y_u}^{i2p}y_u^{i1p}LF_{3,1,-1}[\tilde\mu,m_{\tilde u}^p]\delta_{i3i4}-\frac{1}{108}g_1^2\overline{y_u}^{i2p}y_u^{i1p}LF_{4,1,-2}[\tilde\mu,m_{\tilde u}^p]\delta_{i3i4}-$$

$$\frac{1}{24}\frac{1}{m_\Phi^2}s_\gamma^2\big(\overline{y_d}^{pi3}y_d^{i1i4}\overline{y_u}^{i2r}y_u^{pr}+\overline{y_d}^{i2i3}y_d^{pi4}\overline{y_u}^{pr}y_u^{i1r}\big)LF_{2,1,-1}[\tilde\mu,m_{\tilde u}^r]+$$

$$\frac{1}{54}m_1s_\gamma g_1^2\frac{1}{m_\Phi^2}y_d^{i1i4}(s_\gamma\overline{a_d}^{i2i3}+\tilde\mu c_\gamma\overline{y_d}^{i2i3})LF_{1,1,1,0}[m_1,m_{\tilde d}^{i3},m_{\tilde q}^{i2}]+$$

$$\frac{1}{216}m_1c_\gamma g_1^2y_d^{i1i4}(-c_\gamma\overline{a_d}^{i2i3}+s_\gamma\tilde\mu\overline{y_d}^{i2i3})LF_{2,2,1,-1}[m_1,m_{\tilde d}^{i3},m_{\tilde q}^{i2}]-$$

$$\frac{1}{18}g_1^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,1,-1}[m_1,m_{\tilde d}^{i3},\tilde\mu]+$$

$$\frac{1}{18}m_1s_\gamma\tilde\mu c_\gamma g_1^2\frac{1}{m_\Phi^2}\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,1,0}[m_1,m_{\tilde d}^{i3},\tilde\mu]+$$

$$\frac{1}{54}m_1s_\gamma g_1^2\frac{1}{m_\Phi^2}\overline{y_d}^{i2i3}(s_\gamma a_d^{i1i4}+\tilde\mu c_\gamma y_d^{i1i4})LF_{1,1,1,0}[m_1,m_{\tilde d}^{i4},m_{\tilde q}^{i1}]+$$

$$\frac{1}{216}m_1c_\gamma g_1^2\overline{y_d}^{i2i3}(-c_\gamma a_d^{i1i4}+s_\gamma\tilde\mu y_d^{i1i4})LF_{2,2,1,-1}[m_1,m_{\tilde d}^{i4},m_{\tilde q}^{i1}]-$$

$$\frac{1}{324}g_1^4LF_{2,1,1,-1}[m_1,m_{\tilde d}^{i4},m_{\tilde q}^{i2}]\delta_{i1i2}\delta_{i3i4}-\frac{1}{162}g_1^4m_1^2LF_{2,1,1,0}[m_1,m_{\tilde d}^{i4},m_{\tilde q}^{i2}]\delta_{i1i2}\delta_{i3i4}-$$

$$\frac{1}{18}g_1^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,1,-1}[m_1,m_{\tilde d}^{i4},\tilde\mu]+$$

$$\frac{1}{18}m_1s_\gamma\tilde\mu c_\gamma g_1^2\frac{1}{m_\Phi^2}\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,1,0}[m_1,m_{\tilde d}^{i4},\tilde\mu]+$$

$$\frac{1}{216}m_1c_\gamma g_1^2\overline{y_d}^{i2i3}(-c_\gamma a_d^{i1i4}+s_\gamma\tilde\mu y_d^{i1i4})LF_{2,2,1,-1}[m_1,m_{\tilde q}^{i1},m_{\tilde d}^{i4}]-$$

$$\frac{1}{36}g_1^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,1,-1}[m_1,m_{\tilde q}^{i1},\tilde\mu]+$$

$$\frac{1}{36}m_1s_\gamma\tilde\mu c_\gamma g_1^2\frac{1}{m_\Phi^2}\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,1,0}[m_1,m_{\tilde q}^{i1},\tilde\mu]+$$

$$\frac{1}{216}m_1c_\gamma g_1^2y_d^{i1i4}(-c_\gamma\overline{a_d}^{i2i3}+s_\gamma\tilde\mu\overline{y_d}^{i2i3})LF_{2,2,1,-1}[m_1,m_{\tilde q}^{i2},m_{\tilde d}^{i3}]-$$

$$\frac{1}{36}g_1^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,1,-1}[m_1,m_{\tilde q}^{i2},\tilde\mu]+$$

$$\frac{1}{36}m_1s_\gamma\tilde\mu c_\gamma g_1^2\frac{1}{m_\Phi^2}\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,1,0}[m_1,m_{\tilde q}^{i2},\tilde\mu]-$$

$$\frac{1}{36}g_1^2c_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{2,2,1,-2}[m_1,\tilde\mu,m_{\tilde d}^{i3}]-$$

$$\frac{1}{36}m_1s_\gamma\tilde\mu c_\gamma g_1^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{2,2,1,-1}[m_1,\tilde\mu,m_{\tilde d}^{i3}]-$$

$$\frac{1}{36}g_1^2c_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{2,2,1,-2}[m_1,\tilde\mu,m_{\tilde d}^{i4}]-$$

$$\frac{1}{36}m_1s_\gamma\tilde\mu c_\gamma g_1^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{2,2,1,-1}[m_1,\tilde\mu,m_{\tilde d}^{i4}]-$$

$$\frac{1}{72}g_1^2c_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{2,2,1,-2}[m_1,\tilde\mu,m_{\tilde q}^{i1}]-$$

$$\frac{1}{72}m_1s_\gamma\tilde\mu c_\gamma g_1^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{2,2,1,-1}[m_1,\tilde\mu,m_{\tilde q}^{i1}]-$$

$$\frac{1}{72}g_1^2c_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{2,2,1,-2}[m_1,\tilde\mu,m_{\tilde q}^{i2}]-$$

$$\frac{1}{72}m_1s_\gamma\tilde\mu c_\gamma g_1^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{2,2,1,-1}[m_1,\tilde\mu,m_{\tilde q}^{i2}]-$$

$$\frac{1}{4}g_2^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,1,-1}[m_2,m_{\tilde q}^{i1},\tilde\mu]+$$

$$\frac{1}{4}m_2s_\gamma\tilde\mu c_\gamma g_2^2\frac{1}{m_\Phi^2}\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,1,0}[m_2,m_{\tilde q}^{i1},\tilde\mu]-$$

$$\frac{1}{4}g_2^2\frac{1}{m_\Phi^2}s_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,1,-1}[m_2,m_{\tilde q}^{i2},\tilde\mu]+$$

$$\frac{1}{4}m_2s_\gamma\tilde\mu c_\gamma g_2^2\frac{1}{m_\Phi^2}\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,1,0}[m_2,m_{\tilde q}^{i2},\tilde\mu]-$$

$$\frac{1}{8}g_2^2c_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{2,2,1,-2}[m_2,\tilde\mu,m_{\tilde q}^{i1}]-$$

$$\frac{1}{8}m_2s_\gamma\tilde\mu c_\gamma g_2^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{2,2,1,-1}[m_2,\tilde\mu,m_{\tilde q}^{i1}]-$$

$$\frac{1}{8}g_2^2c_\gamma^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{2,2,1,-2}[m_2,\tilde\mu,m_{\tilde q}^{i2}]-$$

$$\frac{1}{8}m_2s_\gamma\tilde\mu c_\gamma g_2^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{2,2,1,-1}[m_2,\tilde\mu,m_{\tilde q}^{i2}]-$$

$$\frac{4}{9}m_3s_\gamma g_3^2\frac{1}{m_\Phi^2}y_d^{i1i4}(s_\gamma\overline{a_d}^{i2i3}+\tilde\mu c_\gamma\overline{y_d}^{i2i3})LF_{1,1,1,0}[m_3,m_{\tilde d}^{i3},m_{\tilde q}^{i2}]+$$

$$\frac{1}{9}m_3c_\gamma g_3^2y_d^{i1i4}(c_\gamma\overline{a_d}^{i2i3}-s_\gamma\tilde\mu\overline{y_d}^{i2i3})LF_{2,2,1,-1}[m_3,m_{\tilde d}^{i3},m_{\tilde q}^{i2}]-$$

$$\frac{4}{9}m_3s_\gamma g_3^2\frac{1}{m_\Phi^2}\overline{y_d}^{i2i3}(s_\gamma a_d^{i1i4}+\tilde\mu c_\gamma y_d^{i1i4})LF_{1,1,1,0}[m_3,m_{\tilde d}^{i4},m_{\tilde q}^{i1}]+$$

$$\frac{1}{9}m_3c_\gamma g_3^2\overline{y_d}^{i2i3}(c_\gamma a_d^{i1i4}-s_\gamma\tilde\mu y_d^{i1i4})LF_{2,2,1,-1}[m_3,m_{\tilde d}^{i4},m_{\tilde q}^{i1}]-$$

$$\frac{2}{9}g_3^4LF_{2,1,1,-1}[m_3,m_{\tilde d}^{i4},m_{\tilde q}^{i2}]\delta_{i1i2}\delta_{i3i4}-\frac{4}{9}g_3^4m_3^2LF_{2,1,1,0}[m_3,m_{\tilde d}^{i4},m_{\tilde q}^{i2}]\delta_{i1i2}\delta_{i3i4}+$$

$$\frac{1}{9}m_3c_\gamma g_3^2\overline{y_d}^{i2i3}(c_\gamma a_d^{i1i4}-s_\gamma\tilde\mu y_d^{i1i4})LF_{2,2,1,-1}[m_3,m_{\tilde q}^{i1},m_{\tilde d}^{i4}]+$$

$$\frac{1}{9}m_3c_\gamma g_3^2y_d^{i1i4}(c_\gamma\overline{a_d}^{i2i3}-s_\gamma\tilde\mu\overline{y_d}^{i2i3})LF_{2,2,1,-1}[m_3,m_{\tilde q}^{i2},m_{\tilde d}^{i3}]+$$

$$\frac{1}{108}m_1c_\gamma g_1^2y_d^{i1i4}(c_\gamma\overline{a_d}^{i2i3}-s_\gamma\tilde\mu\overline{y_d}^{i2i3})LF_{2,1,1,0}[m_{\tilde d}^{i3},m_1,m_{\tilde q}^{i2}]+$$

$$\frac{1}{108}m_1c_\gamma g_1^2y_d^{i1i4}(-c_\gamma\overline{a_d}^{i2i3}+s_\gamma\tilde\mu\overline{y_d}^{i2i3})LF_{3,1,1,-1}[m_{\tilde d}^{i3},m_1,m_{\tilde q}^{i2}]+$$

$$\frac{2}{9}m_3c_\gamma g_3^2y_d^{i1i4}(-c_\gamma\overline{a_d}^{i2i3}+s_\gamma\tilde\mu\overline{y_d}^{i2i3})LF_{2,1,1,0}[m_{\tilde d}^{i3},m_3,m_{\tilde q}^{i2}]+$$

$$\frac{2}{9}m_3c_\gamma g_3^2y_d^{i1i4}(c_\gamma\overline{a_d}^{i2i3}-s_\gamma\tilde\mu\overline{y_d}^{i2i3})LF_{3,1,1,-1}[m_{\tilde d}^{i3},m_3,m_{\tilde q}^{i2}]+$$

$$\frac{1}{108}m_1c_\gamma g_1^2\overline{y_d}^{i2i3}(c_\gamma a_d^{i1i4}-s_\gamma\tilde\mu y_d^{i1i4})LF_{2,1,1,0}[m_{\tilde d}^{i4},m_1,m_{\tilde q}^{i1}]+$$

$$\frac{1}{108}m_1c_\gamma g_1^2\overline{y_d}^{i2i3}(-c_\gamma a_d^{i1i4}+s_\gamma\tilde\mu y_d^{i1i4})LF_{3,1,1,-1}[m_{\tilde d}^{i4},m_1,m_{\tilde q}^{i1}]+$$

$$\frac{2}{9}m_3c_\gamma g_3^2\overline{y_d}^{i2i3}(-c_\gamma a_d^{i1i4}+s_\gamma\tilde\mu y_d^{i1i4})LF_{2,1,1,0}[m_{\tilde d}^{i4},m_3,m_{\tilde q}^{i1}]+$$

$$\frac{2}{9}m_3c_\gamma g_3^2\overline{y_d}^{i2i3}(c_\gamma a_d^{i1i4}-s_\gamma\tilde\mu y_d^{i1i4})LF_{3,1,1,-1}[m_{\tilde d}^{i4},m_3,m_{\tilde q}^{i1}]-$$

$$\frac{1}{6}s_\gamma\tilde\mu\frac{1}{m_\Phi^2}\big(\overline{y_d}^{i2i3}y_d^{pi4}y_u^{i1r}(c_\gamma\overline{a_u}^{pr}+s_\gamma\tilde\mu\overline{y_u}^{pr})+\overline{y_d}^{pi3}y_d^{i1i4}\overline{y_u}^{i2r}(c_\gamma a_u^{pr}+s_\gamma\tilde\mu y_u^{pr})\big)$$

$$LF_{1,1,1,0}[m_{\tilde q}^p,m_{\tilde u}^r,\tilde\mu]+\frac{1}{12}\tilde\mu c_\gamma\Big(\overline{y_d}^{i2i3}y_d^{pi4}y_u^{i1r}(s_\gamma\overline{a_u}^{pr}-\tilde\mu c_\gamma\overline{y_u}^{pr})+$$

$$\overline{y_d}^{pi3}y_d^{i1i4}\overline{y_u}^{i2r}(s_\gamma a_u^{pr}-\tilde\mu c_\gamma y_u^{pr})\Big)LF_{2,1,1,0}[m_{\tilde q}^p,m_{\tilde u}^r,\tilde\mu]+$$

$$\frac{1}{12}\tilde\mu c_\gamma\big(\overline{y_d}^{i2i3}y_d^{pi4}y_u^{i1r}(-s_\gamma\overline{a_u}^{pr}+\tilde\mu c_\gamma\overline{y_u}^{pr})+\overline{y_d}^{pi3}y_d^{i1i4}\overline{y_u}^{i2r}(-s_\gamma a_u^{pr}+\tilde\mu c_\gamma y_u^{pr})\big)$$

$$LF_{3,1,1,-1}[m_{\tilde q}^p,m_{\tilde u}^r,\tilde\mu]+\frac{1}{24}\tilde\mu c_\gamma\Big(\overline{y_d}^{i2i3}y_d^{pi4}y_u^{i1r}(-s_\gamma\overline{a_u}^{pr}+\tilde\mu c_\gamma\overline{y_u}^{pr})+$$

$$\overline{y_d}^{pi3}y_d^{i1i4}\overline{y_u}^{i2r}(-s_\gamma a_u^{pr}+\tilde\mu c_\gamma y_u^{pr})\Big)LF_{2,2,1,-1}[m_{\tilde q}^p,\tilde\mu,m_{\tilde u}^r]+$$

$$\frac{1}{108}m_1c_\gamma g_1^2\overline{y_d}^{i2i3}(c_\gamma a_d^{i1i4}-s_\gamma\tilde\mu y_d^{i1i4})LF_{2,1,1,0}[m_{\tilde q}^{i1},m_1,m_{\tilde d}^{i4}]+$$

$$\frac{1}{108}m_1c_\gamma g_1^2\overline{y_d}^{i2i3}(-c_\gamma a_d^{i1i4}+s_\gamma\tilde\mu y_d^{i1i4})LF_{3,1,1,-1}[m_{\tilde q}^{i1},m_1,m_{\tilde d}^{i4}]+$$

$$\frac{2}{9}m_3c_\gamma g_3^2\overline{y_d}^{i2i3}(-c_\gamma a_d^{i1i4}+s_\gamma\tilde\mu y_d^{i1i4})LF_{2,1,1,0}[m_{\tilde q}^{i1},m_3,m_{\tilde d}^{i4}]+$$

$$\frac{2}{9}m_3c_\gamma g_3^2\overline{y_d}^{i2i3}(c_\gamma a_d^{i1i4}-s_\gamma\tilde\mu y_d^{i1i4})LF_{3,1,1,-1}[m_{\tilde q}^{i1},m_3,m_{\tilde d}^{i4}]+$$

$$\frac{1}{108}m_1c_\gamma g_1^2y_d^{i1i4}(c_\gamma\overline{a_d}^{i2i3}-s_\gamma\tilde\mu\overline{y_d}^{i2i3})LF_{2,1,1,0}[m_{\tilde q}^{i2},m_1,m_{\tilde d}^{i3}]+$$

$$\frac{1}{108}m_1c_\gamma g_1^2y_d^{i1i4}(-c_\gamma\overline{a_d}^{i2i3}+s_\gamma\tilde\mu\overline{y_d}^{i2i3})LF_{3,1,1,-1}[m_{\tilde q}^{i2},m_1,m_{\tilde d}^{i3}]+$$

$$\frac{2}{9}m_3c_\gamma g_3^2y_d^{i1i4}(-c_\gamma\overline{a_d}^{i2i3}+s_\gamma\tilde\mu\overline{y_d}^{i2i3})LF_{2,1,1,0}[m_{\tilde q}^{i2},m_3,m_{\tilde d}^{i3}]+$$

$$\frac{2}{9}m_3c_\gamma g_3^2y_d^{i1i4}(c_\gamma\overline{a_d}^{i2i3}-s_\gamma\tilde\mu\overline{y_d}^{i2i3})LF_{3,1,1,-1}[m_{\tilde q}^{i2},m_3,m_{\tilde d}^{i3}]+$$

$$\frac{1}{12}\tilde\mu c_\gamma\big(\overline{y_d}^{i2i3}y_d^{pi4}y_u^{i1r}(s_\gamma\overline{a_u}^{pr}-\tilde\mu c_\gamma\overline{y_u}^{pr})+\overline{y_d}^{pi3}y_d^{i1i4}\overline{y_u}^{i2r}(s_\gamma a_u^{pr}-\tilde\mu c_\gamma y_u^{pr})\big)$$

$$LF_{2,1,1,0}[m_{\tilde u}^r,m_{\tilde q}^p,\tilde\mu]+\frac{1}{12}\tilde\mu c_\gamma\Big(\overline{y_d}^{i2i3}y_d^{pi4}y_u^{i1r}(-s_\gamma\overline{a_u}^{pr}+\tilde\mu c_\gamma\overline{y_u}^{pr})+$$

$$\overline{y_d}^{pi3}y_d^{i1i4}\overline{y_u}^{i2r}(-s_\gamma a_u^{pr}+\tilde\mu c_\gamma y_u^{pr})\Big)LF_{3,1,1,-1}[m_{\tilde u}^r,m_{\tilde q}^p,\tilde\mu]+$$

$$\frac{1}{24}\tilde\mu c_\gamma\big(\overline{y_d}^{i2i3}y_d^{pi4}y_u^{i1r}(-s_\gamma\overline{a_u}^{pr}+\tilde\mu c_\gamma\overline{y_u}^{pr})+\overline{y_d}^{pi3}y_d^{i1i4}\overline{y_u}^{i2r}(-s_\gamma a_u^{pr}+\tilde\mu c_\gamma y_u^{pr})\big)$$

$$LF_{2,2,1,-1}[m_{\tilde u}^r,\tilde\mu,m_{\tilde q}^p]-\frac{1}{4}\overline{y_d}^{ri3}\overline{y_d}^{i2p}y_d^{ri4}y_d^{i1p}LF_{2,1,1,-1}[\tilde\mu,m_{\tilde d}^p,m_{\tilde q}^r]-$$

$$\frac{1}{2}\tilde\mu^2\overline{y_d}^{pi3}y_d^{pi4}\overline{y_u}^{i2r}y_u^{i1r}LF_{2,1,1,0}[\tilde\mu,m_{\tilde q}^p,m_{\tilde u}^r]+$$

$$\frac{1}{108}g_1^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,1,1,-1}[m_1,m_{\tilde d}^{i3},m_{\tilde q}^{i1},\tilde\mu]+$$

$$\frac{1}{54}g_1^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,1,1,-1}[m_1,m_{\tilde d}^{i4},m_{\tilde d}^{i3},\tilde\mu]+$$

$$\frac{1}{108}g_1^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,1,1,-1}[m_1,m_{\tilde d}^{i4},m_{\tilde q}^{i2},\tilde\mu]+$$

$$\frac{1}{216}g_1^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,1,1,-1}[m_1,m_{\tilde q}^{i2},m_{\tilde q}^{i1},\tilde\mu]+$$

$$\frac{1}{8}g_2^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,1,1,-1}[m_2,m_{\tilde q}^{i2},m_{\tilde q}^{i1},\tilde\mu]-$$

$$\frac{2}{9}g_3^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,1,1,-1}[m_3,m_{\tilde d}^{i3},m_{\tilde q}^{i1},\tilde\mu]+$$

$$\frac{2}{9}g_3^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,1,1,-1}[m_3,m_{\tilde d}^{i4},m_{\tilde d}^{i3},\tilde\mu]-$$

$$\frac{2}{9}g_3^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,1,1,-1}[m_3,m_{\tilde d}^{i4},m_{\tilde q}^{i2},\tilde\mu]+$$

$$\frac{2}{9}g_3^2\overline{y_d}^{i2i3}y_d^{i1i4}LF_{1,1,1,1,-1}[m_3,m_{\tilde q}^{i2},m_{\tilde q}^{i1},\tilde\mu]\Big)$$