Process	Control Region 1	Control Region 2
QCD multi-jet	$9833.2 \pm 98.8 \pm 1076.4$	$57.9 \pm 7.6 \pm 6.5$
TOP	$3.8 \pm 0.2 \pm 0.5$	$100.2 \pm 0.9 \pm 13.3$
Di-boson	$0.9 \pm 0.1 \pm 0.1$	$1.61 \pm 0.5 \pm 1.8$
W + h.f.	$10.7 \pm 2.0 \pm 1.3$	$93.1 \pm 7.0 \pm 17.9$
Z + h.f.	$22.9 \pm 3.9 \pm 3.5$	$16.8 \pm 1.3 \pm 3.1$
Mistag	$3081.1 \pm 9.5 \pm 523.8$	$135.1 \pm 1.56 \pm 23.0$
Total Expected BCK	$12952.6 \pm 99.4 \pm 1198.2$	$415.8 \pm 10.6 \pm 40$
Observed	13020	482

Table 5: Number of expected background events in the control regions after applying the basic cuts in the Exclusive Single Tag events.

Process	Control Region 1	Control Region 2
QCD multi-jet	$687.7 \pm 21.3 \pm 63.3$	$2.7 \pm 1.3 \pm 0.3$
TOP	$0.69 \pm 0.07 \pm 0.09$	$25.62 \pm 0.33 \pm 3.62$
Di-boson	$0.03 \pm 0.02 \pm 0.004$	$0.86 \pm 0.08 \pm 0.13$
W + h.f.	$0.81 \pm 0.63 \pm 0.11$	$6.8 \pm 1.7 \pm 1.3$
Z + h.f.	$5.29 \pm 1.93 \pm 0.85$	$1.53 \pm 0.4 \pm 0.3$
Mistag	$257.1 \pm 2.2 \pm 43.7$	$7.0 \pm 0.3 \pm 1.2$
Total Expected BCK	$951.6 \pm 21.5 \pm 77.2$	$44.5 \pm 2.3 \pm 4.5$
Observed	974	40

Table 6: Number of expected background events in the control regions after applying the basic cuts in the Inclusive Double Tag events.

Process	Single Tag	Double Tag
QCD multi-jet	$3.48 \pm 1.56 \pm 0.71$	$104.5 \pm 10.4 \pm 22.12$
TOP	$5.48 \pm 0.17 \pm 0.75$	$28.28 \pm 0.5 \pm 3.62$
Di-boson	$0.63 \pm 0.065 \pm 0.08$	$7.05 \pm 0.34 \pm 1.02$
W + h.f.	$2.92 \pm 1.22 \pm 0.43$	$36.12 \pm 3.58 \pm 7.18$
Z + h.f.	$2.25 \pm 0.42 \pm 0.37$	$23.62 \pm 1.42 \pm 5.02$
Mistag	$4.81 \pm 0.26 \pm 0.82$	$110.4 \pm 1.58 \pm 18.77$
Total Expected BCK	$19.58 \pm 2.05 \pm 1.58$	$309.9 \pm 11.3 \pm 38.2$
Observed	24	333

Table 7: Number of expected background and signal events in the signal region after applying the optimized cuts.