Investigation on the signal contribution from the new sample

Table 2: Expected number of events in the leptonic decay mode for each selection step.

Selection	S1 ($\gamma\gamma$)	S2 ($N_l \geq 1$)	S3 ($N_j \geq 2$)	S4 ($N_b = 1$)	S5 ($m_{j\gamma\gamma}$)
$t \to cH(\gamma\gamma)$	1008 (44%)	263 (13%)	221 (8.9 %)	97.1 (3.9%)	46.5 (1.6%)
$t \to cH(\gamma\gamma)$ in lepton+jets	240 (43%)	104 (19%)	78.1 (14 %)	31.7 (5.7%)	15.4 (2.8%)
$t \to uH(\gamma\gamma)$ in lepton+jets	240 (43%)	105 (19%)	78.0 (14 %)	31.1 (5.6%)	15.0 (2.7%)
$\gamma\gamma$+jets	889517	6.4	0.4	0	0
$t\bar{t}$ dilepton	2583	532	424	209	31.7
$t\bar{t}$ semilepton	1957	225	214	105	16.8
Single top	533	64.9	21.1	9.2	2.8
Z+jets	72761	6649	1908	37.3	1.4
W+jets	32860	2156	523	0	0
$S/\sqrt{S+B}$ ($t \to cH(\gamma\gamma)$)	1.0	2.6	3.8	4.5	4.7
$S/\sqrt{S+B}$ ($t \to cH(\gamma\gamma)$ in lepton+jets)	0.2	1.1	1.4	1.6	1.9
$S/\sqrt{S+B}$ ($t \to uH(\gamma\gamma)$ in lepton+jets)	0.2	1.1	1.4	1.6	1.8

- W → mu+nu and electron+nu 10.8%x2 = 21.6%
- W → tau → muon (electron)+nu 10.8%x0.35= 3.78%
- total 21.6%+3.78% = 25.4% which is consistent with the ratio of 240/1008 = 23.8%