

**Additional file 1: Table S1.** ENC<sup>a</sup> and GC<sub>3</sub>S<sup>b</sup> values for recoded HIV-1 constructs.

HIV-1 constructs	ENC	GC <sub>3</sub> S
HIV-Pwt	40.290	0.232
HIV-Pmax	39.780	0.200
HIV-PminA	39.640	0.295
HIV-PminB	52.320	0.337
HIV-PminC	54.240	0.326
HIV-PminAB	57.170	0.421
HIV-PminAC	53.060	0.379
HIV-PminBC	53.160	0.453
HIV-Pmin	54.930	0.537
HIV-Gwt	45.330	0.352
HIV-GminA	50.560	0.400
HIV-GminB	49.810	0.388
HIV-GminC	52.280	0.410
HIV-GminD	47.940	0.360
HIV-GminAB	52.270	0.435
HIV-GminAC	54.680	0.458
HIV-GminAD	52.530	0.408
HIV-GminBC	53.950	0.446
HIV-GminBD	53.030	0.396
HIV-GminCD	53.260	0.419
HIV-GminABC	52.440	0.494
HIV-GminABD	54.150	0.444

<sup>a</sup>ENC. effective number of codons. <sup>b</sup>GC<sub>3</sub>S. the frequency of use of G+C in synonymous variable third positions of codons.