

Supplementary file of “MTMO/DRL-AT

Table. S1 Detailed numerical values of MTMO/DRL-AT and LSMOVRPTW

Table. S2 Detailed numerical values of MTMO/DRL-AT and MOMT-AT

Table. S3 Detailed numerical values of MTMO/DRL-AT and MTMO/DRL-AT_ST

Table. S4 Detailed numerical values of MTMO/DRL-AT and MTMO/DRL-ATw/oLS

Table. S5 Detailed numerical values of MTMO/DRL-AT and MMA-ALSC

Table. S6 Detailed numerical values of MTMO/DRL-AT and HEMT

Table. S1 Detailed numerical values of MTMO/DRL-AT and LSMOVRPTW

Instance	IGD		HV	
	MTMO/DRL-AT	LSMOVRPTW	MTMO/DRL-AT	LSMOVRPTW
50-0-0	1.26E-01(4.22E-02)	5.43E-01(1.07E-01)-	9.77E-01(5.90E-03)	9.59E-01(1.04E-02)-
50-0-1	1.62E-01(3.86E-02)	9.29E-01(3.76E-02)-	9.67E-01(8.29E-03)	9.22E-01(1.17E-03)-
50-0-2	1.54E-01(4.56E-02)	9.64E-01(5.95E-02)-	9.62E-01(1.01E-02)	9.08E-01(4.40E-04)-
50-0-3	1.26E-01(4.98E-02)	9.05E-01(1.75E-01)-	9.43E-01(1.20E-02)	8.63E-01(7.00E-05)-
50-0-4	1.35E-01(2.69E-02)	1.00E+00(3.13E-02)-	9.72E-01(8.40E-03)	9.38E-01(1.69E-04)-
50-1-0	1.47E-01(3.61E-02)	6.00E-01(6.07E-02)-	9.70E-01(4.15E-03)	9.56E-01(9.88E-04)-
50-1-2	1.81E-01(4.53E-02)	9.75E-01(5.00E-02)-	9.64E-01(8.56E-03)	9.22E-01(7.94E-04)-
50-1-3	1.56E-01(2.97E-02)	9.91E-01(6.06E-02)-	9.60E-01(7.67E-03)	9.08E-01(5.62E-04)-
50-1-4	1.40E-01(4.06E-02)	9.73E-01(1.30E-01)-	9.43E-01(8.49E-03)	8.63E-01(9.00E-06)-
50-1-5	1.70E-01(2.68E-02)	1.03E+00(2.56E-02)-	9.67E-01(5.91E-03)	9.38E-01(1.11E-03)-
50-2-0	1.24E-01(4.92E-02)	5.27E-01(7.69E-02)-	9.57E-01(9.36E-03)	8.98E-01(3.63E-04)-
50-2-1	1.58E-01(4.58E-02)	9.50E-01(3.52E-02)-	9.34E-01(1.33E-02)	8.81E-01(4.16E-04)-
50-2-2	7.25E-02(2.05E-02)	9.56E-01(4.02E-02)-	9.35E-01(1.10E-02)	8.78E-01(3.43E-04)-
50-2-3	7.20E-02(2.35E-02)	9.84E-01(9.09E-02)-	9.32E-01(1.10E-02)	8.63E-01(5.60E-05)-
50-2-4	9.04E-02(4.15E-02)	9.38E-01(8.90E-02)-	9.54E-01(1.12E-02)	8.79E-01(2.63E-04)-
150-0-0	5.33E-02(1.67E-02)	4.69E-01(7.43E-02)-	9.34E-01(1.53E-02)	9.13E-01(3.20E-03)-
150-0-1	1.30E-01(3.29E-02)	5.37E-01(7.35E-02)-	9.16E-01(2.04E-02)	8.69E-01(2.13E-03)-
150-0-2	1.46E-01(5.82E-02)	5.53E-01(8.90E-02)-	8.91E-01(3.30E-02)	8.43E-01(1.96E-03)-
150-0-3	1.42E-01(4.17E-02)	5.32E-01(1.03E-01)-	8.35E-01(1.49E-02)	7.65E-01(6.24E-04)-
150-0-4	1.53E-01(5.37E-02)	6.07E-01(8.19E-02)-	8.96E-01(1.96E-02)	8.54E-01(2.59E-03)-
150-1-0	5.26E-02(1.34E-02)	5.27E-02(4.75E-02)-	9.29E-01(1.22E-02)	9.12E-01(2.81E-03)-
150-1-1	1.40E-01(4.31E-02)	5.55E-01(5.99E-02)-	9.11E-01(1.92E-02)	8.70E-01(2.28E-03)-
150-1-2	1.57E-01(3.93E-02)	5.74E-01(1.08E-01)-	8.81E-01(2.69E-02)	8.43E-01(2.25E-03)-
150-1-3	1.15E-01(3.02E-02)	5.62E-01(5.39E-02)-	8.95E-01(2.12E-02)	7.64E-01(9.10E-04)-
150-1-4	1.33E-01(3.92E-02)	6.36E-01(6.97E-02)-	9.02E-01(1.68E-02)	8.55E-01(2.90E-03)-

150-2-0	4.36E-02(1.19E-02)	4.14E-01(4.91E-02)-	9.12E-01(7.51E-03)	8.73E-01(8.04E-04)-
150-2-1	1.67E-01(4.61E-02)	5.77E-01(6.90E-02)-	8.83E-01(1.19E-02)	8.57E-01(9.50E-04)-
150-2-2	1.56E-01(4.30E-02)	6.16E-01(6.94E-02)-	8.82E-01(1.45E-02)	8.43E-01(1.59E-03)-
150-2-3	1.53E-01(3.88E-02)	5.46E-01(1.06E-01)-	8.49E-01(2.20E-02)	7.65E-01(7.43E-04)-
150-2-4	1.86E-01(5.31E-02)	6.59E-01(8.41E-02)-	8.78E-01(1.16E-02)	8.51E-01(3.12E-03)-
250-0-0	2.25E-02(5.17E-03)	5.34E-01(6.13E-02)=	9.22E-01(1.25E-02)	8.70E-01(4.08E-03)-
250-0-1	1.47E-01(5.82E-02)	5.82E-01(9.17E-02)-	8.31E-01(4.46E-02)	7.94E-01(4.65E-03)-
250-0-2	1.90E-01(6.70E-02)	6.95E-01(2.27E-01)-	7.73E-01(5.21E-02)	7.48E-01(3.48E-03)-
250-0-3	1.08E-01(5.35E-02)	4.19E-01(2.59E-01)-	8.23E-01(4.52E-02)	6.19E-01(1.20E-03)-
250-0-4	1.15E-01(2.39E-02)	4.77E-01(9.10E-02)-	9.61E-01(6.75E-03)	7.75E-01(5.15E-03)-
250-1-0	3.96E-02(1.26E-02)	6.31E-01(7.83E-02)=	9.08E-01(1.39E-02)	8.68E-01(3.33E-03)-
250-1-1	1.64E-01(5.00E-02)	6.29E-01(1.43E-01)-	8.17E-01(4.05E-02)	7.92E-01(3.62E-03)-
250-1-2	1.78E-01(7.25E-02)	6.76E-01(1.35E-01)-	8.00E-01(4.81E-02)	7.49E-01(2.87E-03)-
250-1-3	3.42E-01(7.48E-02)	8.90E-01(3.66E-01)=	6.98E-01(3.55E-02)	6.19E-01(1.47E-03)-
250-1-4	3.73E-02(1.74E-02)	5.21E-01(7.45E-02)-	8.85E-01(1.44E-02)	7.73E-01(4.82E-03)-
250-2-0	3.60E-02(9.72E-03)	4.98E-01(1.01E-01)=	8.89E-01(9.34E-03)	8.54E-01(5.08E-03)-
250-2-1	8.75E-02(1.87E-02)	4.72E-01(7.79E-02)-	8.42E-01(9.40E-03)	7.90E-01(8.61E-03)-
250-2-2	1.92E-01(5.11E-02)	6.37E-01(2.02E-01)-	7.54E-01(3.84E-02)	7.47E-01(3.23E-03)-
250-2-3	1.33E-01(3.51E-02)	5.91E-01(7.39E-02)-	6.93E-01(1.19E-02)	6.19E-01(1.49E-03)-
250-2-4	1.17E-01(2.45E-02)	8.10E-01(1.29E-01)-	8.28E-01(9.88E-03)	6.89E-01(3.68E-03)-
	-	41/4/0	-	45/0/0

Table. S2 Detailed numerical values of MTMO/DRL-AT and MOMT-AT

Instance	IGD		HV	
	MTMO/DRL-AT	MTMO-AT	MTMO/DRL-AT	MTMO-AT
50-0-0	4.58E-02(1.10E-02)	1.04E-01(2.06E-01)-	9.86E-01(9.68E-01)	9.87E-01(9.12E-01)=
50-0-1	7.27E-02(7.60E-02)	1.15E-01(1.67E-01)-	9.79E-01(8.89E-01)	9.73E-01(7.94E-01)=
50-0-2	7.80E-02(9.91E-02)	1.39E-01(1.50E-01)-	9.75E-01(8.33E-01)	9.78E-01(7.61E-01)=
50-0-3	6.41E-02(4.00E-02)	1.92E-01(2.39E-01)-	9.60E-01(9.35E-01)	9.32E-01(5.89E-01)+
50-0-4	4.70E-02(4.04E-02)	1.42E-01(2.28E-01)-	9.85E-01(9.82E-01)	9.60E-01(7.71E-01)+
50-1-0	4.45E-02(9.47E-03)	1.08E-01(2.41E-01)-	9.78E-01(9.54E-01)	9.84E-01(9.10E-01)-
50-1-2	7.76E-02(8.96E-02)	1.11E-01(1.59E-01)-	9.76E-01(8.71E-01)	9.78E-01(7.94E-01)=
50-1-3	8.20E-02(7.89E-02)	1.51E-01(1.90E-01)-	9.74E-01(8.62E-01)	9.75E-01(7.60E-01)=
50-1-4	6.89E-02(1.36E-01)	2.09E-01(2.89E-01)-	9.60E-01(7.64E-01)	9.29E-01(5.89E-01)+
50-1-5	4.99E-02(7.01E-03)	1.23E-01(2.55E-01)-	9.78E-01(9.55E-01)	9.56E-01(7.76E-01)+
50-2-0	1.63E-01(1.27E-03)	2.23E-01(1.93E-01)-	9.65E-01(9.31E-01)	9.87E-01(8.74E-01)-
50-2-1	1.00E-01(3.38E-02)	1.45E-01(1.78E-01)-	9.47E-01(9.01E-01)	9.76E-01(7.97E-01)-

50-2-2	3.97E-02(1.04E-01)	2.17E-01(1.48E-01)-	9.49E-01(8.07E-01)	9.72E-01(7.71E-01)-
50-2-3	5.06E-02(1.81E-02)	1.73E-01(3.62E-01)-	9.48E-01(7.87E-01)	9.64E-01(5.91E-01)-
50-2-4	5.56E-02(2.97E-02)	1.46E-01(1.87E-01)-	9.65E-01(8.99E-01)	9.79E-01(7.80E-01)-
150-0-0	5.41E-02(2.26E-02)	9.98E-02(1.65E-02)-	9.60E-01(1.68E-02)	9.78E-01(4.37E-03)-
150-0-1	7.41E-02(2.92E-02)	1.22E-01(1.97E-02)-	9.52E-01(2.40E-02)	8.83E-01(1.08E-02)+
150-0-2	5.94E-02(3.30E-02)	1.21E-01(2.38E-02)-	9.29E-01(3.73E-02)	8.75E-01(1.51E-02)+
150-0-3	6.02E-02(2.54E-02)	2.11E-01(3.95E-02)-	8.74E-01(1.78E-02)	7.91E-01(1.40E-02)+
150-0-4	4.86E-02(1.74E-02)	1.25E-01(1.78E-02)-	9.29E-01(2.27E-02)	8.76E-01(1.17E-02)+
150-1-0	5.10E-02(1.88E-02)	1.04E-01(2.02E-02)-	9.51E-01(1.19E-02)	9.78E-01(4.15E-03)-
150-1-1	7.42E-02(3.36E-02)	1.28E-01(2.21E-02)-	9.43E-01(2.07E-02)	8.82E-01(1.15E-02)+
150-1-2	8.70E-02(4.63E-02)	1.28E-01(3.15E-02)-	9.17E-01(2.84E-02)	8.75E-01(1.39E-02)+
150-1-3	6.44E-02(2.59E-02)	2.53E-01(3.69E-02)-	9.28E-01(2.16E-02)	7.92E-01(1.16E-02)+
150-1-4	5.65E-02(2.62E-02)	1.31E-01(2.09E-02)-	9.31E-01(1.71E-02)	8.75E-01(1.04E-02)+
150-2-0	6.26E-02(2.33E-02)	7.88E-02(1.23E-02)-	9.30E-01(7.52E-03)	9.65E-01(4.06E-03)-
150-2-1	7.69E-02(2.69E-02)	1.03E-01(1.71E-02)-	9.12E-01(1.18E-02)	8.83E-01(1.54E-02)+
150-2-2	6.83E-02(2.98E-02)	1.12E-01(1.77E-02)-	9.13E-01(1.46E-02)	8.71E-01(5.61E-03)+
150-2-3	5.80E-02(3.42E-02)	2.04E-01(4.32E-02)-	8.87E-01(2.26E-02)	7.96E-01(1.12E-02)+
150-2-4	6.89E-02(3.65E-02)	1.09E-01(1.99E-02)-	9.08E-01(1.12E-02)	8.71E-01(4.52E-03)+
250-0-0	1.10E-02(1.07E-02)	2.06E-01(2.94E-02)-	9.68E-01(1.55E-02)	9.12E-01(1.29E-02)+
250-0-1	7.60E-02(3.23E-02)	1.67E-01(3.01E-02)-	8.89E-01(5.66E-02)	7.94E-01(1.19E-02)+
250-0-2	9.91E-02(5.59E-02)	1.50E-01(3.67E-02)=	8.33E-01(6.38E-02)	7.61E-01(1.33E-02)+
250-0-3	4.00E-02(2.34E-02)	2.39E-01(3.73E-02)-	9.35E-01(5.79E-02)	5.89E-01(2.50E-02)+
250-0-4	4.04E-02(1.05E-02)	2.28E-01(4.03E-02)-	9.82E-01(3.64E-03)	7.71E-01(1.15E-02)+
250-1-0	9.47E-03(9.00E-03)	2.41E-01(4.90E-02)-	9.54E-01(1.20E-02)	9.10E-01(1.05E-02)+
250-1-1	8.96E-02(3.56E-02)	1.59E-01(2.76E-02)-	8.71E-01(4.72E-02)	7.94E-01(1.17E-02)+
250-1-2	7.89E-02(3.48E-02)	1.90E-01(4.00E-02)-	8.62E-01(5.63E-02)	7.60E-01(1.55E-02)+
250-1-3	1.36E-01(3.30E-02)	2.89E-01(5.35E-02)-	7.64E-01(4.45E-02)	5.89E-01(2.12E-02)+
250-1-4	7.01E-03(4.46E-03)	2.55E-01(3.17E-02)-	9.55E-01(1.73E-02)	7.76E-01(1.23E-02)+
250-2-0	1.27E-03(2.05E-03)	1.93E-01(6.11E-02)-	9.31E-01(1.12E-02)	8.74E-01(4.13E-03)+
250-2-1	3.38E-02(1.37E-02)	1.78E-01(3.02E-02)-	9.01E-01(1.10E-02)	7.97E-01(1.43E-02)+
250-2-2	1.04E-01(5.41E-02)	1.48E-01(3.53E-02)-	8.07E-01(4.20E-02)	7.71E-01(1.22E-02)+
250-2-3	1.81E-02(9.07E-03)	3.62E-01(5.54E-02)-	7.87E-01(3.21E-02)	5.91E-01(2.24E-02)+
250-2-4	2.97E-02(1.78E-02)	1.87E-01(2.84E-02)-	8.99E-01(5.57E-03)	7.80E-01(1.02E-02)+
	-	44/1/0	-	31/5/9

Table. S3 Detailed numerical values of MTMO/DRL-AT and MTMO/DRL-AT_ST

	IGD	HV
--	-----	----

Instance	MTMO/DRL-AT	MTMO/DRL-AT_ST	MTMO/DRL-AT	MTMO/DRL-AT_ST
50-0-0	8.18E-02(3.85E-02)	3.37E-02(5.52E-02)+	9.85E-01(9.59E-01)	9.85E-01(9.59E-01)=
50-0-1	9.82E-02(8.68E-02)	6.41E-02(7.60E-02)+	9.77E-01(8.79E-01)	9.77E-01(8.79E-01)=
50-0-2	9.44E-02(9.63E-02)	6.87E-02(1.03E-01)+	9.73E-01(8.22E-01)	9.73E-01(8.22E-01)=
50-0-3	9.50E-02(5.72E-02)	7.62E-02(1.61E-01)=	9.57E-01(9.16E-01)	9.57E-01(9.16E-01)+
50-0-4	8.88E-02(5.27E-02)	7.25E-02(2.43E-01)+	9.83E-01(9.79E-01)	9.83E-01(9.79E-01)=
50-1-0	7.31E-02(7.90E-02)	7.83E-02(8.82E-02)=	9.77E-01(9.44E-01)	9.77E-01(9.44E-01)=
50-1-2	1.07E-01(9.24E-02)	7.36E-02(8.38E-02)+	9.74E-01(8.60E-01)	9.74E-01(8.60E-01)-
50-1-3	1.10E-01(8.52E-02)	6.60E-02(1.42E-01)+	9.72E-01(8.50E-01)	9.72E-01(8.50E-01)=
50-1-4	1.04E-01(1.53E-01)	7.19E-02(9.60E-02)+	9.57E-01(7.52E-01)	9.57E-01(7.52E-01)-
50-1-5	1.05E-01(2.58E-02)	8.06E-02(1.58E-01)+	9.76E-01(9.40E-01)	9.76E-01(9.40E-01)+
50-2-0	7.52E-02(5.14E-02)	2.85E-01(1.59E-01)-	9.64E-01(9.22E-01)	9.64E-01(9.22E-01)=
50-2-1	1.01E-01(5.26E-02)	1.20E-01(1.49E-01)-	9.45E-01(8.88E-01)	9.45E-01(8.88E-01)+
50-2-2	4.46E-02(1.11E-01)	1.71E-01(9.63E-02)-	9.46E-01(7.98E-01)	9.46E-01(7.98E-01)-
50-2-3	4.79E-02(5.38E-02)	1.49E-01(2.42E-01)-	9.45E-01(7.65E-01)	9.45E-01(7.65E-01)+
50-2-4	5.36E-02(7.31E-02)	1.57E-01(1.56E-01)-	9.63E-01(8.83E-01)	9.63E-01(8.83E-01)-
150-0-0	6.75E-02(2.83E-02)	4.56E-02(2.19E-02)+	9.56E-01(1.65E-02)	9.56E-01(1.65E-02)-
150-0-1	8.20E-02(3.32E-02)	6.93E-02(3.27E-02)=	9.45E-01(2.33E-02)	9.45E-01(2.33E-02)=
150-0-2	7.55E-02(3.19E-02)	9.65E-02(4.18E-02)=	9.22E-01(3.61E-02)	9.22E-01(3.61E-02)+
150-0-3	9.63E-02(3.57E-02)	7.03E-02(4.05E-02)+	8.67E-01(1.66E-02)	8.67E-01(1.66E-02)-
150-0-4	8.84E-02(3.80E-02)	8.85E-02(3.78E-02)=	9.23E-01(2.21E-02)	9.23E-01(2.21E-02)=
150-1-0	5.27E-02(2.14E-02)	6.75E-02(2.71E-02)=	9.47E-01(1.16E-02)	9.47E-01(1.16E-02)-
150-1-1	8.17E-02(3.04E-02)	8.59E-02(5.05E-02)=	9.37E-01(2.02E-02)	9.37E-01(2.03E-02)-
150-1-2	1.02E-01(3.27E-02)	6.80E-02(3.20E-02)+	9.10E-01(2.79E-02)	9.10E-01(2.79E-02)-
150-1-3	5.79E-02(2.11E-02)	1.39E-01(4.73E-02)-	9.21E-01(2.12E-02)	9.21E-01(2.12E-02)-
150-1-4	6.98E-02(2.81E-02)	1.02E-01(3.40E-02)-	9.25E-01(1.68E-02)	9.25E-01(1.68E-02)+
150-2-0	3.29E-02(2.26E-02)	1.69E-01(4.29E-02)-	9.26E-01(7.36E-03)	9.26E-01(7.36E-03)+
150-2-1	7.90E-02(3.40E-02)	1.04E-01(3.78E-02)=	9.06E-01(1.16E-02)	9.06E-01(1.16E-02)=
150-2-2	8.13E-02(2.69E-02)	1.20E-01(4.53E-02)-	9.06E-01(1.44E-02)	9.06E-01(1.44E-02)-
150-2-3	7.95E-02(3.35E-02)	1.03E-01(3.86E-02)-	8.80E-01(2.21E-02)	8.80E-01(2.21E-02)-
150-2-4	8.96E-02(3.11E-02)	9.63E-02(3.54E-02)=	9.02E-01(1.11E-02)	9.02E-01(1.11E-02)-
250-0-0	3.85E-02(1.73E-02)	5.52E-02(2.45E-02)-	9.59E-01(1.51E-02)	9.59E-01(1.51E-02)-
250-0-1	8.68E-02(4.82E-02)	7.60E-02(4.57E-02)=	8.79E-01(5.42E-02)	8.79E-01(5.42E-02)-
250-0-2	9.63E-02(5.93E-02)	1.03E-01(5.70E-02)-	8.22E-01(6.12E-02)	8.22E-01(6.12E-02)-
250-0-3	5.72E-02(3.86E-02)	1.61E-01(6.17E-02)-	9.16E-01(5.56E-02)	9.16E-01(5.56E-02)+
250-0-4	5.27E-02(2.13E-02)	2.43E-01(4.50E-02)-	9.79E-01(3.52E-03)	9.79E-01(3.54E-03)-

250-1-0	7.90E-02(1.57E-02)	8.82E-02(3.03E-02)=	9.44E-01(1.20E-02)	9.44E-01(1.20E-02)-
250-1-1	9.24E-02(3.30E-02)	8.38E-02(4.37E-02)=	8.60E-01(4.54E-02)	8.60E-01(4.53E-02)+
250-1-2	8.52E-02(4.11E-02)	1.42E-01(8.63E-02)-	8.50E-01(5.41E-02)	8.50E-01(5.41E-02)+
250-1-3	1.53E-01(4.55E-02)	9.60E-02(4.39E-02)+	7.52E-01(4.19E-02)	7.52E-01(4.19E-02)+
250-1-4	2.58E-02(9.91E-03)	1.58E-01(5.58E-02)-	9.40E-01(1.66E-02)	9.40E-01(1.65E-02)-
250-2-0	5.14E-02(2.39E-02)	1.59E-01(7.10E-02)-	9.22E-01(9.48E-03)	9.22E-01(9.47E-03)-
250-2-1	5.26E-02(1.67E-02)	1.49E-01(3.32E-02)-	8.88E-01(1.03E-02)	8.88E-01(1.04E-02)-
250-2-2	1.11E-01(6.00E-02)	9.63E-02(4.96E-02)+	7.98E-01(4.04E-02)	7.98E-01(4.04E-02)+
250-2-3	5.38E-02(2.00E-02)	2.42E-01(6.49E-02)-	7.65E-01(2.18E-02)	7.65E-01(2.19E-02)-
250-2-4	7.31E-02(1.97E-02)	1.56E-01(3.33E-02)=	8.83E-01(6.12E-03)	8.83E-01(6.11E-03)-
	-	19/13/13	-	23/10/12

Table. S4 Detailed numerical values of MTMO/DRL-AT and MTMO/DRL-ATw/oLS

Instance	IGD		HV	
	MTMO/DRL-AT	MTMO/DRL-ATw/oLS	MTMO/DRL-AT	MTMO/DRL-ATw/oLS
50-0-0	2.60E-01(4.44E-01)	6.49E-01(6.10E-01)-	9.35E-01(6.15E-01)	5.56E-01(1.94E-01)-
50-0-1	6.39E-01(7.41E-01)	6.97E-01(8.03E-01)-	8.76E-01(5.77E-01)	1.62E-01(7.16E-02)-
50-0-2	6.31E-01(7.56E-01)	9.27E-01(7.54E-01)-	8.64E-01(5.67E-01)	1.18E-01(5.65E-02)-
50-0-3	5.94E-01(7.88E-01)	1.28E+00(1.35E+00)-	8.45E-01(5.63E-01)	6.66E-02(2.62E-02)-
50-0-4	7.77E-01(7.59E-01)	3.65E-01(6.83E-01)+	9.01E-01(5.77E-01)	1.20E-01(6.33E-02)-
50-1-0	3.44E-01(4.11E-01)	4.56E-01(5.57E-01)-	9.33E-01(6.19E-01)	6.03E-01(1.97E-01)-
50-1-2	7.12E-01(5.78E-01)	8.57E-01(5.87E-01)-	8.77E-01(5.73E-01)	1.58E-01(7.16E-02)-
50-1-3	7.51E-01(6.29E-01)	1.04E+00(5.71E-01)-	8.62E-01(5.67E-01)	1.15E-01(5.67E-02)-
50-1-4	8.15E-01(4.78E-01)	1.30E+00(1.26E+00)-	8.46E-01(5.60E-01)	6.66E-02(2.60E-02)-
50-1-5	7.71E-01(6.22E-01)	3.13E-01(4.67E-01)+	9.01E-01(5.75E-01)	1.19E-01(6.20E-02)-
50-2-0	4.36E-01(4.40E-01)	6.58E-01(6.37E-01)-	8.79E-01(6.09E-01)	6.08E-01(2.10E-01)-
50-2-1	7.47E-01(6.67E-01)	8.93E-01(8.05E-01)-	8.08E-01(5.80E-01)	1.60E-01(6.96E-02)-
50-2-2	7.58E-01(7.44E-01)	1.05E+00(7.83E-01)-	8.03E-01(5.73E-01)	1.14E-01(5.57E-02)-
50-2-3	8.74E-01(5.02E-01)	1.34E+00(1.19E+00)-	8.02E-01(5.59E-01)	6.65E-02(2.59E-02)-
50-2-4	7.57E-01(7.05E-01)	1.04E+00(5.42E-01)-	8.53E-01(5.78E-01)	1.05E-01(6.21E-02)-
150-0-0	4.06E-01(5.26E-02)	5.15E-01(3.85E-02)-	7.52E-01(4.29E-03)	3.62E-01(3.21E-02)-
150-0-1	7.11E-01(4.71E-02)	7.32E-01(6.23E-02)=	7.24E-01(3.73E-03)	1.02E-01(8.78E-03)-
150-0-2	7.88E-01(3.32E-02)	7.31E-01(5.84E-02)=	7.20E-01(3.44E-03)	7.81E-02(2.18E-03)-
150-0-3	7.74E-01(7.20E-02)	1.29E+00(4.02E-02)-	7.11E-01(4.38E-03)	5.17E-02(3.36E-04)-
150-0-4	7.45E-01(3.41E-02)	6.42E-01(6.93E-02)+	7.27E-01(4.37E-03)	8.12E-02(4.06E-03)-
150-1-0	3.95E-01(4.49E-02)	4.92E-01(3.96E-02)-	7.53E-01(4.09E-03)	3.65E-01(4.07E-02)-
150-1-1	5.97E-01(3.19E-02)	5.73E-01(5.32E-02)=	7.25E-01(5.43E-03)	1.04E-01(1.18E-02)-

150-1-2	6.81E-01(4.57E-02)	5.41E-01(6.32E-02)+	7.21E-01(4.31E-03)	7.76E-02(1.52E-03)-
150-1-3	5.02E-01(9.61E-02)	1.21E+00(4.91E-02)-	7.14E-01(4.22E-03)	5.16E-02(3.47E-04)-
150-1-4	6.60E-01(4.69E-02)	4.64E-01(4.85E-02)+	7.27E-01(4.22E-03)	8.16E-02(3.00E-03)-
150-2-0	3.81E-01(5.27E-02)	5.98E-01(4.28E-02)-	7.38E-01(2.99E-03)	4.39E-01(2.11E-02)-
150-2-1	7.00E-01(4.34E-02)	7.03E-01(5.94E-02)=	7.23E-01(4.01E-03)	1.08E-01(8.69E-03)-
150-2-2	7.90E-01(4.11E-02)	7.76E-01(5.91E-02)=	7.19E-01(2.79E-03)	7.84E-02(2.71E-03)-
150-2-3	7.56E-01(7.89E-02)	1.27E+00(4.38E-02)-	7.12E-01(4.71E-03)	5.21E-02(3.44E-04)-
150-2-4	7.58E-01(3.60E-02)	6.74E-01(4.81E-02)+	7.23E-01(4.25E-03)	8.18E-02(4.73E-03)-
250-0-0	4.44E-01(5.54E-02)	6.10E-01(8.77E-02)=	6.15E-01(8.18E-03)	1.94E-01(3.49E-02)-
250-0-1	7.41E-01(4.07E-02)	8.03E-01(5.78E-02)-	5.77E-01(5.07E-03)	7.16E-02(1.89E-03)-
250-0-2	7.56E-01(3.68E-02)	7.54E-01(7.04E-02)+	5.67E-01(6.62E-03)	5.65E-02(1.95E-03)-
250-0-3	7.88E-01(8.13E-02)	1.35E+00(3.24E-02)-	5.63E-01(5.64E-03)	2.62E-02(4.46E-04)-
250-0-4	7.59E-01(4.45E-02)	6.83E-01(5.60E-02)+	5.77E-01(5.76E-03)	6.33E-02(1.69E-03)-
250-1-0	4.11E-01(6.56E-02)	5.57E-01(8.00E-02)-	6.19E-01(7.49E-03)	1.97E-01(3.25E-02)-
250-1-1	5.78E-01(5.04E-02)	5.87E-01(5.63E-02)-	5.73E-01(4.87E-03)	7.16E-02(2.89E-03)-
250-1-2	6.29E-01(4.95E-02)	5.71E-01(4.41E-02)+	5.67E-01(5.46E-03)	5.67E-02(1.23E-03)-
250-1-3	4.78E-01(6.02E-02)	1.26E+00(2.60E-02)-	5.60E-01(4.15E-03)	2.60E-02(5.65E-04)-
250-1-4	6.22E-01(4.93E-02)	4.67E-01(4.93E-02)+	5.75E-01(5.08E-03)	6.20E-02(1.62E-03)-
250-2-0	4.40E-01(5.41E-02)	6.37E-01(7.68E-02)=	6.09E-01(5.23E-03)	2.10E-01(4.56E-02)-
250-2-1	6.67E-01(4.34E-02)	8.05E-01(7.11E-02)-	5.80E-01(5.00E-03)	6.96E-02(4.24E-03)-
250-2-2	7.44E-01(4.27E-02)	7.83E-01(5.24E-02)-	5.73E-01(6.45E-03)	5.57E-02(1.20E-03)-
250-2-3	5.02E-01(1.16E-01)	1.19E+00(4.66E-02)-	5.59E-01(4.76E-03)	2.59E-02(5.26E-04)-
250-2-4	7.05E-01(4.92E-02)	5.42E-01(6.85E-02)+	5.78E-01(4.51E-03)	6.21E-02(8.94E-04)-
	-	27/7/11	-	45/0/0

Table. S5 Detailed numerical values of MTMO/DRL-AT and MMA-ALSC

Instance	IGD		HV	
	MTMO/DRL-AT	MMA-ALSC	MTMO/DRL-AT	MMA-ALSC
50-0-0	3.88E-02(1.18E-02)	5.84E-01(6.17E-01)-	9.14E-01(9.59E-01)	7.70E-01(8.72E-01)-
50-0-1	1.37E-01(2.58E-01)	4.75E-01(3.14E-01)-	8.63E-01(8.78E-01)	6.69E-01(8.20E-01)-
50-0-2	8.64E-02(2.11E-01)	5.54E-01(4.46E-01)-	8.40E-01(8.21E-01)	6.36E-01(7.75E-01)-
50-0-3	3.31E-02(3.28E-02)	6.96E-01(4.22E-01)-	7.82E-01(9.15E-01)	5.21E-01(6.58E-01)-
50-0-4	2.50E-01(1.48E-01)	3.05E-01(1.99E-01)-	8.80E-01(9.79E-01)	7.10E-01(8.19E-01)-
50-1-0	4.10E-02(1.33E-02)	6.67E-01(7.47E-01)-	8.94E-01(9.44E-01)	7.64E-01(8.72E-01)-
50-1-2	1.50E-01(2.92E-01)	5.33E-01(3.63E-01)-	8.60E-01(8.60E-01)	6.70E-01(8.21E-01)-
50-1-3	9.30E-02(1.99E-01)	5.67E-01(4.99E-01)-	8.39E-01(8.49E-01)	6.36E-01(7.75E-01)-
50-1-4	3.16E-02(6.74E-02)	7.31E-01(7.45E-01)-	7.83E-01(7.52E-01)	5.21E-01(6.58E-01)-

50-1-5	3.00E-01(1.19E-01)	2.99E-01(3.11E-01)=	8.69E-01(9.39E-01)	7.09E-01(8.19E-01)-
50-2-0	1.25E-01(1.67E-02)	6.96E-01(6.76E-01)-	8.45E-01(9.21E-01)	6.56E-01(8.55E-01)-
50-2-1	1.40E-01(2.25E-01)	5.50E-01(3.29E-01)-	7.71E-01(8.88E-01)	5.74E-01(8.22E-01)-
50-2-2	4.13E-02(2.23E-01)	6.64E-01(4.97E-01)-	7.67E-01(7.97E-01)	5.63E-01(7.74E-01)-
50-2-3	1.25E-02(2.29E-02)	7.26E-01(8.50E-01)-	7.54E-01(7.64E-01)	5.21E-01(6.58E-01)-
50-2-4	5.79E-02(1.84E-01)	6.63E-01(3.59E-01)-	8.27E-01(8.82E-01)	5.62E-01(8.19E-01)-
150-0-0	2.53E-02(9.02E-03)	7.58E-01(1.28E-01)-	8.97E-01(1.56E-02)	8.45E-01(3.86E-03)-
150-0-1	2.79E-01(9.16E-02)	2.54E-01(3.85E-02)=	8.57E-01(1.75E-02)	8.05E-01(1.18E-03)-
150-0-2	1.52E-01(5.54E-02)	4.16E-01(7.51E-02)-	8.25E-01(2.94E-02)	7.69E-01(4.57E-04)-
150-0-3	6.16E-02(2.66E-02)	6.61E-01(9.50E-02)-	7.60E-01(1.58E-02)	6.79E-01(4.50E-05)-
150-0-4	2.50E-01(9.85E-02)	2.35E-01(6.79E-02)=	8.37E-01(1.94E-02)	7.96E-01(6.98E-04)-
150-1-0	2.69E-02(8.39E-03)	8.47E-01(8.36E-02)-	8.91E-01(1.27E-02)	8.45E-01(3.77E-03)-
150-1-1	2.87E-01(9.20E-02)	2.79E-01(4.39E-02)=	8.54E-01(1.94E-02)	8.05E-01(9.91E-04)-
150-1-2	2.03E-01(6.15E-02)	4.56E-01(5.81E-02)-	8.16E-01(2.86E-02)	7.69E-01(2.98E-04)-
150-1-3	6.53E-02(2.83E-02)	6.60E-01(9.13E-02)-	8.39E-01(2.21E-02)	6.79E-01(4.00E-05)-
150-1-4	2.79E-01(7.78E-02)	2.99E-01(9.64E-02)=	8.46E-01(1.89E-02)	7.96E-01(7.30E-04)-
150-2-0	1.70E-02(6.68E-03)	6.34E-01(7.88E-02)-	8.71E-01(8.14E-03)	8.14E-01(1.09E-03)-
150-2-1	2.88E-01(8.67E-02)	3.67E-01(5.46E-02)-	8.26E-01(1.33E-02)	7.86E-01(9.47E-04)-
150-2-2	1.97E-01(5.86E-02)	4.98E-01(6.75E-02)-	8.21E-01(1.65E-02)	7.69E-01(5.95E-04)-
150-2-3	5.50E-02(2.81E-02)	6.44E-01(1.11E-01)-	7.78E-01(2.49E-02)	6.79E-01(3.90E-05)-
150-2-4	2.85E-01(9.63E-02)	2.12E-01(4.71E-02)+	8.20E-01(1.39E-02)	7.84E-01(5.65E-04)-
250-0-0	1.18E-02(3.77E-03)	6.17E-01(1.28E-01)=	9.59E-01(1.50E-02)	8.72E-01(2.61E-03)-
250-0-1	2.58E-01(1.04E-01)	3.14E-01(7.11E-02)-	8.78E-01(5.41E-02)	8.20E-01(1.82E-03)-
250-0-2	2.11E-01(7.96E-02)	4.46E-01(7.92E-02)-	8.21E-01(6.11E-02)	7.75E-01(1.21E-03)-
250-0-3	3.28E-02(2.66E-02)	4.22E-01(1.10E-01)-	9.15E-01(5.54E-02)	6.58E-01(9.00E-06)-
250-0-4	1.48E-01(2.14E-02)	1.99E-01(3.99E-02)-	9.79E-01(3.65E-03)	8.19E-01(9.14E-04)-
250-1-0	1.33E-02(5.38E-03)	7.47E-01(1.19E-01)-	9.44E-01(1.20E-02)	8.72E-01(1.43E-03)-
250-1-1	2.92E-01(9.13E-02)	3.63E-01(7.63E-02)-	8.60E-01(4.53E-02)	8.21E-01(2.22E-03)-
250-1-2	1.99E-01(6.05E-02)	4.99E-01(6.35E-02)-	8.49E-01(5.40E-02)	7.75E-01(1.69E-03)-
250-1-3	6.74E-02(4.55E-02)	7.45E-01(6.93E-02)=	7.52E-01(4.18E-02)	6.58E-01(7.00E-06)-
250-1-4	1.19E-01(2.02E-02)	3.11E-01(6.24E-02)=	9.39E-01(1.65E-02)	8.19E-01(1.80E-04)-
250-2-0	1.67E-02(8.40E-03)	6.76E-01(9.95E-02)=	9.21E-01(9.48E-03)	8.55E-01(1.04E-03)-
250-2-1	2.25E-01(5.26E-02)	3.29E-01(6.37E-02)-	8.88E-01(1.03E-02)	8.22E-01(2.58E-03)-
250-2-2	2.23E-01(7.72E-02)	4.97E-01(6.86E-02)-	7.97E-01(4.04E-02)	7.74E-01(1.29E-03)-
250-2-3	2.29E-02(1.65E-02)	8.50E-01(9.31E-02)-	7.64E-01(2.16E-02)	6.58E-01(1.10E-05)-
250-2-4	1.84E-01(4.22E-02)	3.59E-01(5.54E-02)-	8.82E-01(6.13E-03)	8.19E-01(9.69E-04)-

	-	35/9/1	-	45/0/0
--	---	--------	---	--------

Table. S6 Detailed numerical values of MTMO/DRL-AT and HEMT

Instance	IGD		HV	
	MTMO/DRL-AT	HEMT	MTMO/DRL-AT	HEMT
50-0-0	7.67E-02(1.88E-02)	4.16E-01(4.95E-01)-	9.14E-01(9.59E-01)	8.35E-01(8.69E-01)-
50-0-1	1.48E-01(1.46E-01)	4.08E-01(5.41E-01)-	8.63E-01(8.78E-01)	6.80E-01(8.09E-01)-
50-0-2	8.25E-02(2.02E-01)	5.73E-01(4.54E-01)-	8.40E-01(8.21E-01)	6.37E-01(7.72E-01)-
50-0-3	3.11E-02(4.57E-02)	7.02E-01(3.56E-01)-	7.82E-01(9.15E-01)	5.21E-01(6.57E-01)-
50-0-4	2.56E-01(1.59E-01)	2.85E-01(2.74E-01)=	8.80E-01(9.79E-01)	7.09E-01(7.97E-01)-
50-1-0	8.77E-02(2.65E-02)	4.62E-01(6.09E-01)-	8.94E-01(9.44E-01)	8.22E-01(8.68E-01)-
50-1-2	1.60E-01(1.81E-01)	4.78E-01(5.51E-01)-	8.60E-01(8.60E-01)	6.80E-01(8.11E-01)-
50-1-3	8.75E-02(1.93E-01)	5.84E-01(5.13E-01)-	8.39E-01(8.49E-01)	6.37E-01(7.71E-01)-
50-1-4	2.98E-02(9.71E-02)	7.36E-01(6.22E-01)-	7.83E-01(7.52E-01)	5.21E-01(6.57E-01)-
50-1-5	2.99E-01(7.52E-02)	2.97E-01(4.00E-01)=	8.69E-01(9.39E-01)	7.09E-01(7.95E-01)-
50-2-0	1.50E-01(4.00E-02)	6.04E-01(5.44E-01)-	8.45E-01(9.21E-01)	6.62E-01(8.61E-01)-
50-2-1	1.24E-01(1.33E-01)	5.86E-01(6.12E-01)-	7.71E-01(8.88E-01)	5.74E-01(8.07E-01)-
50-2-2	3.75E-02(2.13E-01)	6.71E-01(5.00E-01)-	7.67E-01(7.97E-01)	5.63E-01(7.72E-01)-
50-2-3	1.24E-02(3.54E-02)	7.26E-01(7.61E-01)-	7.54E-01(7.64E-01)	5.21E-01(6.57E-01)-
50-2-4	4.96E-02(1.36E-01)	6.88E-01(4.26E-01)-	8.27E-01(8.82E-01)	5.61E-01(7.95E-01)-
150-0-0	5.11E-02(1.80E-02)	4.89E-01(6.88E-02)-	8.97E-01(1.56E-02)	8.68E-01(3.68E-03)-
150-0-1	1.81E-01(6.19E-02)	4.29E-01(8.59E-02)-	8.57E-01(1.74E-02)	8.03E-01(1.98E-03)-
150-0-2	1.52E-01(5.56E-02)	4.04E-01(7.88E-02)-	8.25E-01(2.95E-02)	7.70E-01(5.34E-04)-
150-0-3	9.48E-02(4.19E-02)	5.42E-01(7.37E-02)-	7.60E-01(1.58E-02)	6.77E-01(3.58E-04)-
150-0-4	1.97E-01(8.24E-02)	3.38E-01(6.40E-02)-	8.37E-01(1.94E-02)	7.82E-01(2.80E-03)-
150-1-0	4.98E-02(1.21E-02)	5.49E-01(5.13E-02)-	8.91E-01(1.27E-02)	8.66E-01(3.88E-03)-
150-1-1	1.78E-01(6.41E-02)	4.85E-01(7.40E-02)-	8.54E-01(1.94E-02)	8.02E-01(2.21E-03)-
150-1-2	2.09E-01(6.38E-02)	4.21E-01(7.50E-02)-	8.16E-01(2.86E-02)	7.70E-01(5.34E-04)-
150-1-3	1.00E-01(4.20E-02)	5.51E-01(7.47E-02)-	8.39E-01(2.21E-02)	6.77E-01(3.06E-04)-
150-1-4	2.01E-01(5.98E-02)	4.15E-01(9.00E-02)-	8.46E-01(1.88E-02)	7.83E-01(3.48E-03)-
150-2-0	3.25E-02(1.80E-02)	5.55E-01(6.09E-02)-	8.71E-01(8.12E-03)	8.23E-01(3.15E-03)-
150-2-1	2.20E-01(6.66E-02)	4.74E-01(7.45E-02)-	8.26E-01(1.33E-02)	7.89E-01(7.51E-04)-
150-2-2	1.91E-01(5.23E-02)	4.92E-01(5.76E-02)-	8.22E-01(1.65E-02)	7.70E-01(1.21E-03)-
150-2-3	8.34E-02(3.90E-02)	5.47E-01(1.01E-01)-	7.78E-01(2.49E-02)	6.77E-01(3.34E-04)-
150-2-4	1.98E-01(7.13E-02)	3.88E-01(5.98E-02)-	8.20E-01(1.39E-02)	7.76E-01(2.98E-03)-
250-0-0	1.88E-02(7.78E-03)	4.95E-01(8.22E-02)-	9.59E-01(1.50E-02)	8.69E-01(3.34E-03)-
250-0-1	1.46E-01(6.27E-02)	5.41E-01(1.05E-01)-	8.78E-01(5.41E-02)	8.09E-01(3.20E-03)-

250-0-2	2.02E-01(7.89E-02)	4.54E-01(7.71E-02)-	8.21E-01(6.10E-02)	7.72E-01(2.49E-03)-
250-0-3	4.57E-02(3.69E-02)	3.56E-01(1.02E-01)-	9.15E-01(5.54E-02)	6.57E-01(8.40E-05)-
250-0-4	1.59E-01(2.74E-02)	2.74E-01(6.79E-02)=	9.79E-01(3.64E-03)	7.97E-01(3.75E-03)-
250-1-0	2.65E-02(1.27E-02)	6.09E-01(1.08E-01)-	9.44E-01(1.20E-02)	8.68E-01(2.38E-03)-
250-1-1	1.81E-01(5.47E-02)	5.51E-01(8.14E-02)-	8.60E-01(4.53E-02)	8.11E-01(3.28E-03)-
250-1-2	1.93E-01(5.97E-02)	5.13E-01(7.00E-02)-	8.49E-01(5.40E-02)	7.71E-01(2.37E-03)-
250-1-3	9.71E-02(6.85E-02)	6.22E-01(7.44E-02)-	7.52E-01(4.18E-02)	6.57E-01(9.30E-05)-
250-1-4	7.52E-02(1.96E-02)	4.00E-01(9.68E-02)-	9.39E-01(1.65E-02)	7.95E-01(3.08E-03)-
250-2-0	4.00E-02(3.64E-02)	5.44E-01(8.24E-02)-	9.21E-01(9.48E-03)	8.61E-01(1.87E-03)-
250-2-1	1.33E-01(3.71E-02)	6.12E-01(8.44E-02)-	8.88E-01(1.03E-02)	8.07E-01(3.01E-03)-
250-2-2	2.13E-01(7.09E-02)	5.00E-01(7.40E-02)=	7.97E-01(4.04E-02)	7.72E-01(2.54E-03)-
250-2-3	3.54E-02(2.59E-02)	7.61E-01(8.52E-02)-	7.64E-01(2.17E-02)	6.57E-01(6.70E-05)-
250-2-4	1.36E-01(3.31E-02)	4.26E-01(7.10E-02)=	8.82E-01(6.14E-03)	7.95E-01(3.10E-03)-
	-	40/5/0	-	45/0/0