(a) Performance Metrics Heatmap (Hierarchically Clustered) 1.7 1.4 -1.4 1.2 -1.7 -1.7 -1.7 Conformer-lite 1.0 Standardized Score - 0.5 - 0.0 - 0.5 0.7 0.8 1.4 0.6 -0.7 -0.9 0.2 Enhanced 0.7 -0.8 0.3 -1.0 0.5 0.1 -0.4 CNN -1.0-1.1 BiLSTM 0.5 -0.6 0.5 0.6 1.0 -0.1 (b) Model Comparison Radar Chart LORO F1 (c) Metric Correlation Matrix LOSO_F1 - 1.00 LORO_F1 - -0.69 Cross_Domain_Gap - -0.99 1.00 0.5 0.6 0.4 0.2 LOSO F1 Stability Index Stability_Index --0.99 1.00 ECE --0.83 0.31 0.76 -0.77 1.00 Efficiency_Ratio --0.60 0.94 -0.85 -0.96 0.92 1.00 Deployment_Readiness --0.17 0.89 -0.84 -0.83 Efficiency Ratio Deployment Readiness (d) Overall Model Ranking (Composite Score) (e) Performance by Model (LOSO vs LORO) 1.0 0.757 Enhanced 0.8 0.701 CNN 0.6 Wacro F1 0.4 0.689 BiLSTM LOSO F1 0.486 Conformer-lite LORO F1 0.0 0.0 0.2 0.7 07/1/2 0.1 0.3 0.4 0.5 0.6 Composite Performance Score

Model