

## Comparative Execution and Outcome Report

**Document Scope.** Compact execution-level reference summary of compiled circuit characteristics and distribution-based outcome metrics across execution modes, computed from raw measurement counts.

**Execution metadata and compiled execution configuration.** This table records the execution environment, compilation context, and immutable provenance information that define the reference frame for all subsequent measurements reported in this document.

Execution Details		
Date/Time	2025-10-10 15:16:03	
Backend	ibm marrakesh	
Avg T1 ( $\mu$ s)	195.92	
Avg T2 ( $\mu$ s)	113.08	
Avg Readout Error	2.67%	

  

	Baseline	Conditioned
Qubit Count	15	15
Qubits Used	[Q0–Q14]	[Q0–Q14]
Shots	10,000	10,000
Transpiler	L3	L2
Job ID	d3kmirodd19c73966ud0	d3kmis0dd19c73966udg

**Compiled circuit structural metrics.** This table reports circuit depth and gate-count characteristics obtained after compilation for each execution mode, providing a structural accounting of the executed circuits independent of measurement outcomes.

	Baseline	Conditioned	$\Delta(\%)$
Circuit Depth	64	92	+43.75
Total Gate Count	157	257	+63.69
Single Qubit Gates	57	139	+143.86
Two Qubit Gates	27	41	+51.85

**Distribution-level statistical descriptors of measured outcomes.** This table reports entropy, divergence, and moment-based metrics computed directly from the observed outcome probability distributions for each execution mode, without assuming an underlying state model.

	Baseline	Conditioned	$\Delta(\%)$
Entropy (bits)	4.278339	3.441062	−19.57
TVD (versus Ideal)	0.403600	0.290200	−28.10
Avg Hamming Weight	7.551000	7.373200	−2.35
Std Dev of State Probabilities	0.018044	0.027479	+52.29
Max State Probability	0.304600	0.355400	+16.68

**Logical-manifold outcome probabilities and associated entropy measures.** This table reports probabilities of selected logical-manifold outcomes and entropy-based aggregates computed from the measured outcome distributions for each execution mode.  $H_{\text{near}}$  and  $H_{\text{far}}$  denote Shannon entropies of the distributions conditioned on  $d(x) \leq k$  and  $d(x) > k$  respectively, with probabilities renormalized within each region.

Metric	Baseline	Conditioned	$\Delta(\%)$
$P(0^{15})$	0.3046	0.3544	+16.35
$P(1^{15})$	0.2918	0.3554	+21.79
$P_{\text{GHZ}}$	0.5964	0.7098	+19.01
$H(P)$ [bits]	4.2783	3.4411	−19.57
$H_{\text{near}}$ [bits]	3.4979	2.8682	−18.00
$H_{\text{far}}$ [bits]	7.7344	5.8635	−24.19

**Distance-resolved outcome structure relative to the logical manifold.** This table reports conditional probabilities and entropy measures computed from measured outcomes partitioned by Hamming distance from a predefined logical manifold for each execution mode.

Metric	Baseline	Conditioned	$\Delta(\%)$
$P(d \leq 2)$	0.9149	0.9304	+1.69
$P(d > 2)$	0.0851	0.0696	−18.21
$P_{\text{GHZ}} _{d \leq 2}$	0.6519	0.7629	+17.03
Near-leakage fraction 1 − $P_{\text{GHZ}} _{d \leq 2}$	0.3481	0.2371	−31.89
$H_{\text{near}}^{(d)}$ [bits]	1.1874	0.9372	−21.07

**Distribution concentration, normalization, and inter-mode divergence metrics.** This table reports rank-ordered concentration measures, low-distance leakage mass, burden-normalized quantities, and distributional divergence metrics computed from measured outcomes to facilitate comparative characterization across execution modes.

Metric	Baseline	Conditioned	$\Delta(\%)$
$P_{\text{top-4}}$	0.6825	0.7411	+8.59
$P_{\text{top-8}}$	0.7346	0.7868	+7.11
$P_{\text{top-16}}$	0.7950	0.8439	+6.15
Leakage mass $d = 1$	0.2531	0.1866	−26.27
Leakage mass $d = 2$	0.0654	0.0340	−48.01
$P_{\text{GHZ}}/\text{depth}$	0.00931875	0.00771522	−17.17
$P_{\text{GHZ}}/\text{total gates}$	0.00379873	0.00276187	−27.30
$P_{\text{GHZ}}/2q \text{ gates}$	0.02208889	0.01731220	−21.64
$\text{TVD}(P, Q)$	—	0.2003	—
$\text{JSD}(P, Q)$ [bits]	—	0.0908	—