

Schedule E
Modified Z Test and K Table

Z-Test:

SWBT agrees with the following formulae for determining parity using Z-Test:

For Measurement results that are expressed as Averages or Means: $z = (\text{DIFF}) / \delta_{\text{DIFF}}$

Where;

$$\text{DIFF} = M_{\text{ILEC}} - M_{\text{CLEC}}$$

$$M_{\text{ILEC}} = \text{ILEC Average}$$

$$M_{\text{CLEC}} = \text{CLEC Average}$$

$$\delta_{\text{DIFF}} = \text{SQRT} [\delta_{\text{ILEC}}^2 (1/n_{\text{CLEC}} + 1/n_{\text{ILEC}})]$$

$$\delta_{\text{ILEC}}^2 = \text{Calculated variance for ILEC.}$$

$$n_{\text{ILEC}} = \text{number of observations or samples used in ILEC measurement}$$

$$n_{\text{CLEC}} = \text{number of observations or samples used in CLEC measurement}$$

For Measurement results that are expressed as Percentages or Proportions:

Step 1:

$$\rho = \frac{(n_{\text{ILEC}}P_{\text{ILEC}} + n_{\text{CLEC}}P_{\text{CLEC}})}{n_{\text{ILEC}} + n_{\text{CLEC}}}$$

Step 2:

$$\sigma_{P_{\text{ILEC}}-P_{\text{CLEC}}} = \text{sqrt}[[\rho(1-\rho)]/n_{\text{ILEC}} + [\rho(1-\rho)]/n_{\text{CLEC}}]$$

Step 3:

$$Z = (P_{\text{ILEC}} - P_{\text{CLEC}}) / \sigma_{P_{\text{ILEC}}-P_{\text{CLEC}}}$$

Where: n = Number of Observations

P = Percentage or Proportion

For Measurement results that are expressed as Rates or Ratio:

$$z = (\text{DIFF}) / \delta_{\text{DIFF}}$$

Where;

$$\text{DIFF} = R_{\text{ILEC}} - R_{\text{CLEC}}$$

$$R_{\text{ILEC}} = \text{num}_{\text{ILEC}} / \text{denom}_{\text{ILEC}}$$

$$R_{\text{CLEC}} = \text{num}_{\text{CLEC}} / \text{denom}_{\text{CLEC}}$$

$$\delta_{\text{DIFF}} = \text{SQRT} [R_{\text{ILEC}} (1/\text{denom}_{\text{CLEC}} + 1/\text{denom}_{\text{ILEC}})]$$

$$R_{\text{pool}} = (\text{Num}_{\text{ILEC}} + \text{num}_{\text{CLEC}}) / (\text{denom}_{\text{ILEC}} + \text{denom}_{\text{CLEC}})$$

$$\delta_{\text{DIFF}} = \text{SQRT} [R_{\text{POOL}} (1/\text{denom}_{\text{CLEC}} + 1/\text{denom}_{\text{ILEC}})]$$

4.0 Qualifications to use Z-Test:

The proposed Z- tests are applicable to reported measurements that contain 30 or more data points.

In calculating the difference between the performances the formula proposed above applies when a larger CLEC value indicates a higher quality of performance. In cases where a smaller CLEC

value indicates a higher quality of performance the order of subtraction should be reversed (i.e., $M_{CLEC} - M_{ILEC}$, $P_{CLEC} - P_{ILEC}$, $R_{CLEC} - R_{ILEC}$).

For measurements where the applicable performance criterion is a benchmark rather than parity performance compliance will be determined by setting the denominator of the Z-test formula as one in calculating the Z-statistic.

For measurements where the performance delivered to CLEC is compared to SWBT performance and for which the number of data points are 29 or less, SWBT agrees to application of the following alternatives for compliance.

4.1 Alternative 1:

For measurements that are expressed as averages, performance delivered to a CLEC for each observation shall not exceed the ILEC averages plus the applicable critical Z-value. If the CLEC's performance is outside the ILEC average plus the critical Z-value and it is the second consecutive month, SWBT can utilize the Z-test as applicable for data sets of 30 or greater data points or the permutation test to provide evidence of parity. If SWBT uses the Z-test for data sets under 30, the CLEC can independently perform the permutation test to validate SWBT's results. SWBT will supply all data required to perform the permutation test, including the complete ILEC and CLEC data sets for the measure, to CLEC upon request. The results of the permutation test will control over the results of the Z-test analysis as applicable for data sets 30 or greater.

For measurements that are expressed as percentages, the percentage for CLEC shall not exceed ILEC percentage plus the applicable critical Z-value. If the CLEC's performance is outside the ILEC percentage plus the critical Z-value and it is the second consecutive month, SWBT can utilize the Z-test as applicable for data sets of 30 or greater data points or the permutation test to provide evidence of parity. If SWBT uses the Z-test for data sets under 30, the CLEC can independently perform the permutation test to validate SWBT's results. SWBT will supply all data required to perform the permutation test, including the complete ILEC and CLEC data sets for the measure, to CLEC upon request. The results of the permutation test will control over the results of the Z-test analysis as applicable for data sets 30 or greater.

4.2 Alternative 2:

Permutation analysis will be applied to calculate the z-statistic using the following logic:

Choose a sufficiently large number T.

Pool and mix the CLEC and ILEC data sets.

Randomly subdivide the pooled data sets into two pools, one the same size as the original CLEC data set (n_{CLEC}) and one reflecting the remaining data points, (which is equal to the size of the original ILEC data set or n_{ILEC}).

Compute and store the Z-test score (Z_S) for this sample.

Repeat steps 3 and 4 for the remaining $T-1$ sample pairs to be analyzed. (If the number of possibilities is less than 1 million, include a programmatic check to prevent drawing the same pair of samples more than once).

Order the Z_S results computed and stored in step 4 from lowest to highest.

Compute the Z-test score for the original two data sets and find its rank in the ordering determined in step 6.

Repeat the steps 2-7 ten times and combine the results to determine $P = (\text{Summation of ranks in each of the 10 runs divided by } 10T)$.

Using a cumulative standard normal distribution table, find the value Z_A such that the probability (or cumulative area under the standard normal curve) is equal to P calculated in step 8.

Compare Z_A with the desired critical value as determined from the critical Z table. If $Z_A >$ the designated critical Z-value in the table, then the performance is non-compliant.

Critical Z - Statistic Table

Number of Performance Measures	K Values	Critical Z-value
1	0	1.65
2	0	1.96
3	0	2.12
4	0	2.23
5	0	2.32
6	0	2.39
7	0	2.44
8	1	1.69
9	1	1.74
10-19	1	1.79
20-29	2	1.73
30-39	3	1.68
40-49	3	1.81
50-59	4	1.75
60-69	5	1.7
70 -79	6	1.68
80 - 89	6	1.74
90 - 99	7	1.71
100 - 109	8	1.68
110 -119	9	1.7
120 - 139	10	1.72
140 - 159	12	1.68
160 - 179	13	1.69
180 - 199	14	1.7
200 - 249	17	1.7
250 - 299	20	1.7
300 - 399	26	1.7
400 - 499	32	1.7
500 - 599	38	1.72
600 - 699	44	1.72
700 - 799	49	1.73
800 - 899	55	1.75
900 - 999	60	1.77
1000 and above	Calculated for Type-1 Error Probability of 5%	Calculated for Type-1 Error Probability of 5%