SCS 9001 Measurement Outputs and Calculations – Release 1.0

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All measurement calculations are performed using the formulas in the SCS 9001Supply Chain Security Management System Handbook Annex B, Release 1.0. This document provides supplemental information about how the Performance Data Reports (PDRs) are calculated – including smoothing and data eligibility rules.

The SCS 9001 PDRs use data only from certified registrations. Data from registrations that are not certified are not used. In addition, the PDRs must meet the requirements of B4.1 e) 4), which states the data for any output data point must be derived from data submitted by three or more companies.

All calculated outputs are reported by the calendar quarter.

Certified Registration

A certified registration is a SCS 9001 registration that has been certified to SCS 9001 by an accredited certification body.

Outputs

There are four SCS 9001 PDR outputs derived from the submitted SCS 9001 data per product category and per measurement

- Best-in-Class
- Worst-in-Class
- Industry Average
- Calendar quarterly Average

Best-in-Class, Worst-in-Class, and Industry Average calculations for a particular calendar quarter are based on data submitted from four consecutive calendar quarters, which is called a smoothing window. The smoothing window is 4 calendar quarters. The calendar quarterly Average is derived from data submitted for a single calendar quarter.

Best-in-Class is the best performance from a single registration for a particular measurement. For some measurements, the optimum performance is zero while for others it is 100%, as shown in Table 2. Worst-in-Class is the worst performance from a single certified registration. Industry Average is the composite average of data from all eligible submissions over a defined smoothing window.

Smoothed Outputs

Best-in-Class, Worst-in-Class, and Industry Average performance data calculations are derived from data over a period of four consecutive calendar quarters, which is referred to as ‘smoothing’. Reporting of smoothed data starts after 4 consecutive calendar quarters of data are available.

Best-in-Class

The Best-in-Class data point, in a particular calendar quarter, is the best performance from a single certified registration for that measurement over the four quarter smoothing window, from all eligible data submitted.

Worst-in-Class

The Worst-in-Class data point, in a particular calendar quarter, is the worst performance from a single certified registration for that measurement over the four quarter smoothing window, from all eligible data submitted.

Industry Average

For most measurements, the Industry Average data point, in a particular calendar quarter, is the composite average data for that measurement over the smoothing window from all eligible data submitted. For VC and UA, the Industry Average is based on the average value calculation.

Calendar quarterly Average

The Calendar quarterly Average data point, in a particular calendar quarter, is the composite average data for that measurement for that calendar quarter only. The only eligibility rule that applies to the calendar quarterly average is that the data comes from certified registrations from three or more companies.

Composite Average

The composite average applies only to data from multiple submissions. Each output measurement is defined in the SCS 9001 Measurements Handbook as a formula applied to one or more input data points. The composite average is derived by applying the formula to the summed values of the individual inputs of the data submissions. That is, all the values for the same measurement are summed from the data submissions and then the summed values are used in the formula. Scaling factors such as percentage are not summed.

Composite Average Example for a Single Calendar quarter

The SCS 9001 outputs, such as SR, are derived from certified registration data submitted to the Measurements Repository System. These data are combined to produce the average by adding the individual numerators and denominators, and then applying the appropriate formula from Annex B to the summed inputs. For example, the formula for SR is

$$SR = 100 \times (SRc / SRd)$$

Assume there are 5 data submissions from certified registrations during a single calendar quarter for SR as follows:

Submission	1	2	3	4	5
SRc	2	5	4	2	3
SRd	15	30	20	16	30

The calculated output, SR, for each submission is

Submission	1	2	3	4	5
SR	10.0%	16.7%	20.0%	12.5%	10.0%

The total of numerators, SRc, is 2+5+4+2+3 = 16 and the total of denominators, SRd, is 15+30+20+16+30 = 111. The Calendar quarterly Average is therefore 100*16/111 = 14.4%.

The Industry Average is calculated in a similar way. It simply includes all eligible data submitted over the defined smoothing window. Note that eligibility rules are applied to all smoothed calculations.

Average Value

By rule, the value of VC or UA for any calendar quarter with no data is set to 100%. To accurately reflect this in the Calendar quarterly Average, Industry Average, Best-in-Class, and Worst-in-Class values for VC or UA are calculated based on the average of the calendar quarterly values.

Average Value Example

Calendar quarter	1	2	3	4	5	6	6 Mo. Rolling
VCMcc	1	0	2	0	1	0	
VCMdc	1	0	2	1	1	0	
VCM1	100	100	100	0	100	100	83.3

Eligibility Rules

Only data from certified registrations are eligible for inclusion in these calculations.

Data from a certified registration are eligible for the Best-in-Class designation in a particular calendar quarter when the data from the registration meet represent 2% or more of the sum of the denominators for that measurement over the smoothing window.

Data from a certified registration are eligible for the Worst-in-Class designation in a particular calendar quarter when the data from the registration meet one or more of the following two conditions:

1) The data represent 2% or more of the sum of the denominators for that measurement over the smoothing window.
2) The data from the registration represent 5% or more of the sum of the numerators for that measurement over the smoothing window.

Data from a certified registration are eligible for the Industry Average calculation in a particular calendar quarter when the data are eligible for the Best-in-Class designation. If data are excluded from the Best-in-Class calculation or Worst-in-Class calculation, they are also excluded from the Industry Average calculation.

Rules for Zero Denominator Data

In SCS 9001 it is possible for the denominator to be zero when calculating an output data point. There are two different cases

Both numerator and denominator are 0 – that is 0/0
Numerator is not zero but denominator is 0 – that is n/0

For example, if a registration had no vulnerabilities to fix in a given calendar quarter, then they would report 0 for the number of vulnerabilities mitigated and also 0 for the number of vulnerability mitigations due. This leads to the 0/0 condition.

The correct interpretation of these conditions is different depending on the measurement – the result could be interpreted as a '0', '100%', 'Not Valid', or 'No Data' as shown in Table 1.

Table 1 – Interpreting Zero Denominators

Measurement	**Defined value**		**Comments**
	0/0	**n/0**	
VCM1, VCM2 VCR1, VCR2	100%	Not valid	
UTe, UTn	No data	Not valid	
SSC	No data	Not valid	
SR	No data	Not valid	
PAS	No data	n/n	
UER	No data	Not valid	
UAT	No data	Not valid	
UAM, UAR	100%	Not valid	

These interpretations are based on

- SCS 9001 SCS Management System Handbook 1.0 Annex B
- Rewarding desired behavior, e.g., no vulnerabilities are due to be mitigated
- Not rewarding undesired behavior, e.g., successful phishing attack found in later calendar quarters

Application of the rules is as follows:

No data	Ignore the data in calendar quarterly and summary data calculations
Not valid	Fail the data submission
n/n	Treat as if the calendar quarterly data submission denominator had been n. In summary calculations across calendar quarters, use actual denominator(s) as soon as they are equal to or greater than n

Table 2 – Measurement Optimum Values

Measurement	Optimum Value
VC	100%
UT	100%
SSC	0
SR	0
PAS	0
UER	0
UAT	100%