Purpose
This Scheme Note aims to clarify the requirements on the evaluator to demonstrate developer test coverage in CEM v3.1, for EAL 1-5.

Background
At EAL 1, there are no requirements for the evaluator to verify the coverage of the developer's testing.

The relevant CEM requirement for EAL 2 is:

\textit{ATE\_COV.1-1} \\
\textit{The evaluator shall examine} the test coverage evidence to determine that the correspondence between the tests identified in the test documentation and the TSFIs described in the functional specification is accurate. \\
Correspondence may take the form of a table or matrix. The coverage evidence required for this component will reveal the extent of coverage, rather than to show complete coverage. In cases where coverage is shown to be poor the evaluator should increase the level of independent testing to compensate.

The relevant CEM requirements for EAL 3-5 are:

\textit{ATE\_COV.2-1} \\
\textit{The evaluator shall examine} the test coverage analysis to determine that the correspondence between the tests in the test documentation and the interfaces in the functional specification is accurate. \textit{A simple cross-table may be sufficient to show test correspondence. The identification of the tests and the interfaces presented in the test coverage analysis has to be unambiguous. The evaluator is reminded that this does not imply that all tests in the test documentation must map to interfaces in the functional specification.}

\textit{ATE\_COV.2-4} \\
The evaluator \textit{shall examine} the test coverage analysis to determine that the correspondence between the interfaces in the functional specification and the tests in the test documentation is complete. \textit{All TSFIs that are described in the functional specification have to be present in the test coverage analysis and mapped to tests in order for completeness to be claimed, although exhaustive specification testing of interfaces is not required. Incomplete coverage would be evident if an interface was identified in the functional specification and no test was mapped to it.}
The evaluator is reminded that this does not imply that all tests in the test documentation must map to interfaces in the functional specification.

According to these three requirements, the work units in the CEM appear to indicate that one test for each TSFI would be sufficient (please note that “TSFI” and “interface” have identical meaning in this context). In the functional specification, it is common to specify a few interfaces, covering all the functionality of the TSF. Thus, an evaluator may argue that given three named TSFI in the functional specification, it is sufficient that test cases can be mapped to each of these three named TSFI. However, this is not sufficient.

The mapping of test cases against the TSFI is not limited to the named (main) interfaces. The CEM, section 14.2.3 *Verifying the adequacy of tests*, paragraph 1264, states that:

“... each characteristic of the TSFI behavior explicitly described in the functional specification should have tests and expected results to verify that behavior”

The TSFI behavior described in the functional specification shall be a complete representation of the SFRs, as required by the CEM:

*ADV_FSP.1-6 The evaluator shall examine the functional specification to determine that it is a complete instantiation of the SFRs.*

Note that this requirement is applicable for all EALs.

**Conclusions**

At EAL 1, the evaluator's do not need to verify the coverage of the developer's testing.

At EAL 2, the evaluator verifies that the developer's test cases are mapped to the TSFI accurately but not necessarily covering all TSFI. The evaluator completes the test coverage so that the developer's and the evaluator's independent testing provides full coverage of the TSFI.

At EAL 3-5, The evaluator verifies that the developer's test cases are mapped to the TSFI accurately, and that the developer testing completely covers the TSFI. The evaluator independent testing improves the test coverage where the developer's testing is sparse.

Test coverage of the TSFI implies coverage of the TSF functionality, on the same level of description as in the SFRs. In the FSP, the TSFI should be described on the same level of description as the SFRs and completely cover the functionality in the SFRs.

Alternatively, a mapping directly from the SFRs to the test cases would demonstrate the test coverage in an equivalent manner.