

Telenor Networks

Introduction to

Test procedures

for Signalling System No.7

Norwegian national interconnect

between Telenor Networks

and another telecom operator

(Informative text in English)

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1 Prerequisites on availability of information

A test manager must be appointed and the telephone and fax numbers to the contact persons for the test must be exchanged.

The necessary agreements must be entered into with regard to the connection points for primary system access, signalling connection, including signalling addresses (point codes) and routing of signalling traffic, what protocol version of ISUP shall be used for the relevant primary system access and identification of what primary system accesses shall be used for testing, including circuit identification codes (CIC codes).

A compliance statement for the interface protocol must be delivered by the TELECOM OPERATOR and discussed in negotiations with a view to identifying possible technical limitations or problems.

2 Prerequisites on implementation of resources

It is a prerequisite that a 2 Mbit/s (transmission) circuit has been installed and tested from the TELECOM OPERATOR's switch to the interconnect connection point before the test starts. Normally a test of the bit error rate (BER) or corresponding quality parameters (ITU-T G.821) for 24 hours prior to the leased 2 Mbit/s circuit is connected to the primary system access in TELENOR's switch is expected.

3 Test planning

The parties' test managers shall cooperate with regard to the planning and execution of tests.

The test managers agree on what tests are to be performed and the practical information that is necessary for execution of the tests is exchanged. This includes for example the test configurations and instruments that will be used, test number and the name and telephone/fax number to the relevant contact persons who are to carry out different parts of the test. The timing for execution of the various parts of the test shall be agreed on.

Lists of relevant tests to be selected for the interconnect test are included in this annex. If no exceptions are agreed between the parties, then it is expected that all tests are performed. However, in most cases it will be possible to omit a number of tests, depending upon the network configuration, and this can be agreed between the test managers.

4 Purpose of tests

The interconnect testing with Telenor is not a conformance test or a certification of a specific type of equipment. Conformance testing of the own network shall instead be

performed independently by or for each party in advance, and the results presented as an interface specification (i.e. compliance statement).

The interconnect testing with Telenor is primarily a verification and compatibility test. The purpose of the tests is to establish a reasonable level of confidence that the implementations are as described in the interface specifications, and that they are actually compatible.

If the telecom operator carries out a major upgrade of his network with a new software version or significantly adds to the used functionality of the network, the need for new testing shall be investigated and discussed with Telenor. All significantly upgraded or new functionality shall be verified in a new interconnect test unless it has been agreed with Telenor that this can be omitted.

5 Selection of tests

The tests necessary for establishing interconnect on a signalling link set and a primary system access with the relevant traffic products and services shall be carried out.

The scope of the test will depend on the circumstances.

For a first-time connection for a telecom operator a full test in accordance with the Telenor test lists shall be carried out unless otherwise agreed. A reduced ISUP or end-to-end test can be agreed depending upon the network configuration and the network functionality used by the network operator. See some examples below.

End-to-end tests are described for termination on analogue subscriber line, ISDN access, SIP IP telephony access and H.323 IP telephony access.

When significantly new functionality is included in the network at a later date, a new compliance statement must be provided and the appropriate interconnect tests which were omitted in the initial testing must be performed.

For a specific test set all the listed services shall in principle be tested. If the telecom operator does not provide a certain service to his own customers, the content of the test will be to verify that the service is properly rejected. E.g. if the telecom operator is unable to provide the CUG service, the content of the interconnect test will be first to make a CUG call from Telenor with the Optional forward call indicators coded "outgoing access not allowed" and verify that the telecom operator network rejects the call with cause 87, and then to make a CUG call from Telenor with the Optional forward call indicators coded "outgoing access allowed" and verify that the telecom operator network lets the call proceed as a non CUG call.

For connection of a new switch with the same software version as already tested with the same network operator, a simplified ISUP test ("repeat test") will be sufficient. I.e. "repeat test" applies for new trunk groups (defined by new combination of two signalling point codes). The primary aim of "repeat tests" is to verify correct setting of data for the interface at both sides.

For expansion, i.e. connection of additional primary system accesses within the same trunk group (i.e. between the same two signalling point codes), no further testing is required.

Test of traffic routing (as part of the ISUP test) is performed by making calls and checking that one actually gets through to the desired directions. Normally this shall only be carried out on the basis of spot tests.

Testing of accounting (as part of the ISUP test) is only carried out as random spot tests. One makes a call and checks that it is registered by the switch's accounting system.

Some examples of test set selections:

- a) The telecom operator has a network that only supports the national interconnect ISUP version 1 interface. The additional version 2 tests are omitted.
- b) The telecom operator has a network that only supports transit traffic. The end-to-end tests are omitted.
- c) The telecom operator has a network with analogue and ISDN accesses. Some ISUP tests for supplementary services can be substituted by corresponding end-to-end tests.
- d) The telecom operator has a network that only supports dial in Internet access. Only a limited set of test calls in the direction from Telenor to the network operator is performed.
- e) The telecom operator has no IP telephony gateway in his network. The H.323/SIP end-to-end tests are omitted.
- f) The telecom operator has only a SIP IP telephony gateway in his network (no ISUP transit, no analogue access, no ISDN access, no H.323 gateway). Only the SIP tests are performed.

6 Test sequence

1) Testing of SS No. 7 lower layers (MTP)

Testing of the signalling connection (MTP) shall be carried out if a signalling connection is not available in advance. If instead of a new link set, an STP in another switch and the available link set is used, then the test can be limited to verification that layer 3 of the protocol and traffic routing for MTP are operative. In case only one link is available in an early phase of the testing, test of MTP layer 3 functionality with two link sets can be delayed until after the ISUP and end-to-end testing has been performed.

2) ISUP protocol test

ISUP protocol test (compatibility test) shall be carried out next.

3) End-to-end test

End-to-end test shall be carried if the traffic product in question encompasses originating/terminating traffic. Note that the ISDN end-to-end test also includes termination on an analogue line, a limited set of application tests and testing of various end-to-end quality parameters.

End-to-end test descriptions are provided for termination on analogue access, ISDN access and IP telephony access (H.323 and SIP).

4) Accounting test

A test shall be carried out to verify that the accounting function is active for the primary system access in question.

5) Traffic routing test

A traffic test (calling test numbers) shall be performed to verify that traffic routing has been implemented for the desired number series.

6) Verification period

A short verification period during which a small number of traffic circuits (channels) are opened to "live" traffic shall be included as part of the test.

7 Estimated consumption of time

The signalling test shall be agreed on well in advance, at least 3 months prior to the start of testing for a full test. However, when resources are available, Telenor will provide testing at a shorter notice. TELENOR cannot guarantee that it will have the resources for parallel testing against a number of TELECOM OPERATORS at the same time. In the event of simultaneous orders from more than one telecom operator there may be a waiting period.

With a normal test progression for a full test it should be possible to finish the test in 2 months after the start of the signalling test.

Table V.8-1.1 Estimated consumption of time

Test preparations, establishment, connection and testing of the necessary resources in the switch	1 week
Establishment and testing of signalling connection (MTP)	1 week
a) Establishment of traffic termination and connection of ISUP, in addition to compatibility	2 weeks

testing of ISUP	
or b) Simplified protocol test	1 day
Test of traffic routing	1 day
Test of settlement	1 day
ISDN end-to-end test	2 weeks
Verification period	2 weeks

Note: If the telecom operator personnel is well qualified and prepared for the test, and no serious technical problems or other delays are encountered, it is expected that the test actually can be completed in a shorter time (typically 2 weeks).

8 Conclusion of test

When the test has been completed with acceptable results, notice of this shall be sent from TELENOR (by the Key Account Manager) to the TELECOM OPERATOR. Documentation of the test results shall be exchanged between the parties at the same time. This documentation shall be a list with a description of the test result achieved.

If serious errors or faults are detected during the test, it may be necessary to interrupt the test. When such serious errors or faults have been corrected, the test may resume from the subtest where the error or fault was detected. In this case the parties shall negotiate a new schedule for implementation of the test. Neither of the parties can refuse to start such retesting within three (3) weeks after the party with the error or fault has requested retesting in writing and documented adequately that the error or fault has been corrected. If one of the parties can document that the scope of the test in connection with retesting is significantly greater than can be regarded as normal, then this party may demand that his retesting costs are reimbursed.