NON-INTERCONNECTED ISLANDS SYSTEM & MARKET OPERATOR

Project Implementation of the Athens Central Energy Control Center (ECC) and the Local ECC for the Electrical Power System in Rhodes

TECHNICAL AND FUNCTIONAL REQUIREMENTS

PART G:
TESTING, AVAILABILITY, AND PERFORMANCE

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List of Acronyms

AGC	Automatic Generation Control
CPU	Central Processing Unit
DC	Data Concentrator
DS	Dispatch Scheduling
DW	Data Warehouse
ECC	Energy Control Center
EMS	Energy Management System
FAT	Factory Acceptance Tests
HMI	Human Machine Interface
IT	Information Technology
LAN	Local Area Network
MIS	Management Information System
MMS	Market Management System
NII	Non-Interconnected Islands
NII SMO	Non-Interconnected Islands System and Market Operator
RDAS	Rolling Day-Ahead Scheduling
RES	Renewable Energy Sources
RTD	Real Time Dispatch
RTU	Remote Terminal Unit
SAT	Site Acceptance Tests
UI	User Interface

1 Introduction

This document presents the testing, performance and availability requirements for the Project of implementation of the Central Energy Control Center (ECC) in Athens and the Local ECC in Rhodes.

The objective of the testing is to confirm the compliance of the NII IT Systems to be procured within this Project with the technical and functional requirements as well as with the stability, the availability and performance requirements defined for each of the following NII IT Systems:

- Energy Management System (EMS);
- Market Management System (MMS);
- Corporate Systems:
  - DW/MIS;
  - Helpdesk.

The Contractor has the full responsibility to design and implement respective systems and to provide appropriate hardware and software able to meet the functional, operational stability, performance and availability requirements.

The NII IT Systems functionality, stability, performance and availability will be checked and measured during the NII IT Systems testing as this is foreseen in the Technical and Functional Requirements, and particularly Part F - Project Execution, and as updated during Detailed Design Phase of the Project.

In case the technical and functional requirements and the respective stability, availability and performance requirements defined for each system are not met, the Contractor has the sole responsibility to proceed to the necessary actions in order to meet all the requirements at no additional cost to the NII SMO.

In case the Contractor fails to meet the above requirements, the NII SMO may reject the respective NII IT System or the whole Project.

In what follows:

- Testing Requirements and Procedures are listed in Section 2.
- Performance Requirements are listed in Section 3.
- Availability Requirements for the Trial Operation Period are listed in Section 4.

2 NII IT Systems Testing Requirements and Procedures

2.1 General

Testing should be performed by the Contractor with the participation of the NII SMO. The tests will be performed at the Contractor's factory and at NII SMO's sites.

It is clarified that the acceptance of Factory Acceptance Tests (FAT) and Site Acceptance Tests (SAT) results by the NII SMO does not release the Contractor from his responsibility concerning the compliance of the NII IT Systems to the respective requirements set forth in the NII IT Systems Technical and Functional Requirements. This is the case when the NII IT Systems during trial or normal operation are not compliant with the technical requirements as updated during the Detailed Design Phase of the Project. In such a case, the Contractor should take actions to comply with the requirements.

The Contractor has to organize and successfully execute, up to the full satisfaction of NII SMO, the testing foreseen in the Technical and Functional Requirements as updated during the Detailed Design Phase of the Project, and meet the respective performance and reliability requirements that are as follows:

- Factory Acceptance Tests (Section 2.1.1);
- Inspection and Equipment Testing (Section 2.1.2);
- Site Acceptance Tests (Section 2.1.3).

2.1.1 Factory Acceptance Tests (FAT)

FAT should prove at the factory environment that the NII IT Systems implementation has been successfully executed so that the system is operating according to the Technical and Functional Requirements, as analyzed and updated in the Detailed Design Phase of the Project Execution. The Contractor has the full responsibility to perform the FAT on a test environment that at least simulates the main system components either by using the actual hardware environment of the system or by simulating it properly in its own infrastructure.

The FAT shall be performed with all applications in operation and the electrical system fully modeled with the appropriate data. Also available existing data should be migrated to the new system. Import/output files that will be defined during the Detailed Design Phase of the Project will be used to simulate the communication with the NII SMO existing infrastructure.

The FAT shall include functional tests that have to be successfully completed to the full satisfaction of the NII SMO.

2.1.2 Inspection and Equipment Testing

The purpose of the equipment tests is to check that the hardware equipment is fully compliant with the Contract as updated during the Detailed Design Phase of the Project.

All hardware and software specified in the Technical Tender and updated during the Detailed Design Phase of the Project or later during project implementation will be installed at the respective NII SMO premises (Central ECC in Athens, and Local ECC in Rhodes) and will be put in operation.

The following will be checked, before SAT:

- Identification of the equipment, equipment function, equipment characteristics, and equipment name;
- Identification of the contractor and third party software installations and licenses;
- Equipment operational tests.

All equipment shall be supplied defect free. Defects found during site commissioning and within the warranty period will result in the part(s) concerned being returned to the supplier for immediate correction/replacement at the cost of the supplier.

It is noted that the NII SMO retains the right to proceed in equipment inspection at the Contractor's or manufacturer's premises, before it is transferred to the NII SMO sites.

2.1.3 Site Acceptance Tests (SAT)

SAT will start after the completion of installation of hardware and software of the NII IT Systems at the respective NII SMO premises and its integration to the NII SMO existing infrastructure.

SAT will be similar to FAT, but the NII IT Systems should operate in real Operating Environment, and they should communicate and exchange real time data with the Electrical System and the NII SMO existing infrastructure.

2.2 FAT - SAT Planning and Implementation

2.2.1 FAT and SAT Plans

Detailed Test procedures for FAT and SAT for each system that will prove the full compliance to the Technical and Functional requirements shall be prepared by the Contractor. The following shall be included in the test plans:

- The schedule for the test;
- The responsibilities of the Contractor and the NII SMO personnel, including record-keeping assignments;

- Any forms to be completed as part of the tests and the instructions for completing the forms;
- Procedures for monitoring, correcting, and re-testing;
- Procedures for controlling and documenting all changes made to the hardware and software after the start of testing;
- Block diagrams of the hardware and software test configuration, including any test or simulation hardware/software;
- Clear descriptions of the test cases which should cover the entire scope of the Project as well as the personnel responsible to carry out the tests.

The FAT and SAT Handbooks with all the FAT and SAT tests respectively will be submitted for approval to the NII SMO at least 4 weeks before the beginning of the tests and must be approved at least 1 week before the beginning of the respective tests.

2.2.2 FAT and SAT Testing Procedures

The Test procedures will be detailed enough so that a normally informed user will be able to follow and participate step by step in the testing process. The level of detail will change depending on the function to be tested. The execution steps of these scheduled tests (structured tests) shall be described.

General parts examined in test procedures include:

- Objective of the test;
- Equipment necessary to make the test;
- Functions to be tested;
- Procedure of the structured test;
- Installation and conditions of test;
- All inputs and outputs;
- Descriptions and lists of testing software;
- Expected results;
- Criteria of acceptance.

Discovered failures (variances) during the tests and the reasons for these failures will be documented.

During the FAT and/or SAT, the NII SMO may find necessary to perform additional tests (non initially scheduled, i.e., unstructured tests). In this case, the Contractor shall assist the NII SMO to set up these tests and to execute them. The FAT and/or SAT period can be extended up to 15 days each for performing unstructured tests.

2.2.3 FAT Tests

The purpose of FAT is to check all the functions of the system at the Central ECC in Athens and at the Local ECC in Rhodes.

In order to exhaustively test all the functions, simulators of the Electrical Systems of the NII as well as simulation of data exchange with other IT Systems should be used. The database sizing will also be checked against the requirements described in the specifications.

FAT should include but not limited to the following tests:

- All part of the software and hardware shall be tested in all operational modes.
- All functional interfaces shall be verified; interfaces with other systems shall be tested with simulated procedures;
- Data communication and transfer between the systems;
- All HMI functions shall be demonstrated to be operational and in accordance with the specific performance requirements.
- All fail-over switching procedures;
- All data display formats;
- All alarm functions;
- All diagnostic functions.

Factory testing of each RTU shall be conducted at the manufacturer's premises. Provision shall be made for witness testing of all equipment, although HEDNO may elect to only undertake a visual inspection before accepting delivery. Two weeks notice shall be provided to HEDNO prior to testing. Each RTU shall be fully assembled and configured for factory testing, prior to dispatch. The RTUs should be connected through communication lines with the Communication servers or DCs, in 9600 bps speed or higher, and dummy high amount of signals should be produced).

The tests shall include, but not be limited to:

- Point to point wiring check;
- Serial numbers of all cards and modules shall be listed in an Excel spreadsheet;
- Confirmation of all digital inputs & outputs, from the field terminal through to the diagnostic laptop;
- Verification of analogue values received (at least zero, half full scale, full scale values and negative full scale values for bipolar analogues) using a DC current or voltage signal generator measured from the field terminals to the diagnostic laptop;

- Confirmation of control functions from the diagnostic laptop to the field terminals, including exercising the dummy circuit breaker, and the controls isolate switch;
- Confirmation of effective communications between the RTU and other devices using the specified protocols;
- All powered tests shall be carried out at the specified power supply rating of the RTU;
- Testing of all Power Stations RTUs;
- Measuring the time from the source (substation open or close signal or analogical signal change, to the alarm display to the Local ECC or to the substation displays);
- Insulation breakdown voltage tests.

Test results for each RTU showing tests undertaken, results and any corrective action taken shall be provided in an approved format and shipped with the RTU. Color photographs shall be included in the test results to record the equipment layout.

If at the completion time, any signals that may have not been wired up to the marshalling cubicle, the Contractor shall simulate them, using auxiliary devices (relays, leds, switches, etc.) so that complete testing can take place for the entire system, up to the interim cabinets prior to delivery.

Testing shall take place with simultaneous simulations by different RTUs, so that the load can be simulated and tested. It is important that the testing should simulate actual operating and emergency conditions. Therefore, the maximum amount of RTUs with the maximum amount of signals should be tested. Dummy signals should be created and used if necessary. In case, all new RTUs have not been installed on time, a procedure will be proposed by the Contractor to create a real communication with all RTUs in order to finish all tests.

The Contractor should execute the tests with the following indicative values for the number of RTUs and signals to be agreed upon the Detailed Design Phase of the Project:

- Number of RTUs for Rhodes 10;
- Number of signals (digital and analogical from real or virtual RTUs) for Rhodes 4.000.

The Contractor should correct all defects of the NII IT Systems found - during FAT - and retesting of the corrections should be scheduled and implemented. The FAT should be considered as successfully performed when all issues are corrected and re-tested and approved by the NII SMO.

2.2.4 SAT Tests

During SAT, all the functions of the system at the Central ECC in Athens, and at the Local ECC in Rhodes will be tested. SAT will be implemented in real site operational conditions and with actual measurements /controls. All functions will be exhaustively tested.

All the technical and functional requirements should be thoroughly tested until they fully comply with the functional and technical requirements as updated during the Detailed Design Phase.

Tests related to the switching from main to stand-by systems and vice versa will also be performed during SAT.

Contractor should take all appropriate actions to correct all defects found during SAT and to schedule and retest changes in order to confirm the correctness of the actions and the compliance with the technical and functional requirements.

During SAT, operational and performance tests shall be executed under normal operating conditions and under simulated conditions to enable operation and performance under abnormal/stress conditions.

All scenarios should be executed with each NII IT System with all applications in operation.

The Contractor, for the EMS, should prepare, simulate and submit for approval the following three (3) testing scenarios that will be executed during SAT, in order to check and measure the NII IT System operation, stability and performance.

- A steady-state scenario representing normal NII IT System operation;
- A high-activity scenario representing stressed NII IT System operation;
- An avalanche-activity scenario representing overstressed NII IT System operation.

The above scenarios should be executed with the maximum capacity of the NII Systems and the Contractor should simulate the NII assets/components that are not physically connected.

The descriptions of the above three scenarios are as follows:

2.2.4.1 Steady-state Scenario

The purpose of this scenario is to test the functional behavior of the system and perform a load test to identify problems that may occur during normal NII IT System operation to prove system stability and to measure performance.

During this test, the behavior of the hardware and software will be monitored and the response times of all critical business transactions will be recorded.

2.2.4.2 High-activity Scenario

The high-activity scenario corresponds to stress-testing the system. The purpose of the stress-test is to ensure that hardware and software will behave as expected from a functional and operational point of view. Also, it is important to ensure that performance will be satisfactory and there is no unexpected behavior or bottlenecks under high activity conditions such as a big (brownout) incident in the EMS.

2.2.4.3 Avalanche-activity Scenario

The avalanche activity scenario corresponds to a major incident of the NII system. The purpose of the test is to monitor system behavior and to measure performance under overstressed system conditions (sudden and extensive changes in the status of the NII system) such as a major (blackout) incident in EMS.

Even in case the operational conditions are more severe than the ones given with the avalanche-activity scenario, the NII IT system must operate in a safe and reliable manner.

2.2.5 System Stability Testing

System stability tests will be performed in FAT and SAT, as well as during the Trial Operation Period.

The system stability tests are performed at the end of FAT and SAT tests provided that all other functional and performance tests have been completed successfully. The stability tests will run for a period of 72 hours (three days) for FAT and 168 hours (one week) for SAT.

During these periods, the system will be configured and operated according to FAT and SAT environment and the following must not occur:

- Critical hardware failure;
- Un-commanded Failover;
- System restart.

In case of fault, the test shall be repeated for another equal period, after proper actions of the Contractor to identify, correct and improve system stability have taken place.

The above incidents should not also occur during the Trial Operation Period. In case such an incident occurs, the Contractor should provide clear explanation of the reasons that caused each incident and shall take all actions to correct them.

In case of instability, the Trial Operation Period shall be repeated for another equal period, after proper actions of the Contractor to identify, correct and improve system stability have taken place.

3 NII IT Systems Performance Requirements

Under no circumstances shall the NII IT Systems lose any information or shall break down. Failure in meeting the requirements stipulated in the Technical Tender Technical and Functional requirements as updated during the Detailed Design of the Project or during the next project execution phases may result in the rejection of the whole system or parts of it.

Performance requirements for each of the NII IT Systems are presented as follows:

- EMS performance requirements in Section 3.1;
- MMS performance requirements in Section 3.2;
- Corporate Systems performance requirements in Section 3.3.

3.1 EMS Performance Requirements

3.1.1 Reliability Requirements

The EMS/SCADA equipment should have Mean Time Between Failures (MTBF) greater than 8760 hours.

3.1.2 Indication and Control Requirements

Indications

The SCADA equipment shall detect and process any change of a state information which is maintained for longer than the given RTU specific acquisition time. Important status indications and alarms shall be brought to the attention of the operator within 1 second as an average, excluding data transmission time that depends on the telecommunications provided.

Controls

The operator shall be able to supervise the execution of an initiated command. This requires adequate data transmission supervisory functions, as well as return information or measurements in order to confirm the following:

- Acceptance and correct transfer of the command message by the tele-control equipment;
- Execution of the initiated action in the peripheral equipment.

Any control command shall be processed with priority. It shall be made available within 1 second as an average value. Time needed for communication to the Data Concentrators and RTUs shall be excluded. The completion time of the command at the station depends on the related equipment.

3.1.3 HMI Performance Requirements

The HMI performance requirements concern the responsiveness of the EMS Systems in connection with display requests, display updates, image scaling and translation, alarms and events, reports, display hardcopies, trend displays, Display Walls updates, etc.

Display Response Time

The display call up response time shall be measured from display call request up to appearance of the requested display on the screen completed with data values.

The display data entry response time shall be measured from data entry to completion of the data entry operation, signified by appearance of the newly-entered data in its final displayed form.

The requests for displays with long response times shall be acknowledged immediately with an indication that the request is being processed.

At no time shall the EMS System delay the acceptance of a display request or “lock out” console operations due to the processing of lengthy application functions.

Alarm and Event Response Time

Alarm and event response times shall be measured from the time the EMS system receives the alarm message at the inputs of the Communication Servers from the telemetry source until the alarm or event message appears on the screen. The alarm and event actions shall include internal event processing, highlighting of alarm conditions, and audible and visual annunciation.

Alarm acknowledgement and deletion shall be measured from the time the Operator initiates the action until the Operator observes the system’s completion of this action.

Printout and Hardcopy Response Time

The response time for printouts and hardcopies shall be measured from the time the request is made until the printing or hardcopy processing starts on the printing or copying device. Requests for timely printing or hardcopy jobs shall be acknowledged immediately with an indication that the request is being processed.

The performance requirements have to be fulfilled even in the case of a necessary release update of the software or hardware upgrade. The requirements under the three test scenarios, (normal, high activity and avalanche conditions), include the following:

- The Five Minute Average CPU and LAN Load;
- HMI and Application Maximum Response Times;
- System Startup and Failover Maximum Times.

3.1.3.1 Five minute Average CPU and LAN Load

The five (5) minute average load of CPU and LAN should be less than the values presented in the following Table.

Table 3-1. Five Minute Average CPU and LAN Load

Description	Steady State	High Activity	Avalanche Activity
CPU load	<25%	<50%	<70%
LAN Load	<20%	<40%	<60%

3.1.3.2 Maximum HMI and Application Response Times

The performance of the System shall perform better than the maximum response times specified in the following Table.

Table 3-2. Maximum System Response Times (Seconds)

Description	Steady State	High Activity	Avalanche Activity
Confirmation of point selection on a Display	1	1	1
Light Display (menu, help) call up time	1	1	1
Heavy Display (one-line diagram, overview display) call up time	2	2	3
Display of pull down menu , of pop-up menu	1	1	1
Acknowledgement of a single alarm	1	1	1
Acknowledgement of a page of alarms	2	2	3
Transfer time of any fresh SCADA data value from the input ports of the DC to any SCADA display of the Local ECC.	2	2	2
The total time of the execution of any SCADA calculation and the display of its results on the appropriate UI	2	2	2
AGC processing and presentation of data received from SCADA	1	1	2

Description	Steady State	High Activity	Avalanche Activity
AGC control data to SCADA	1	1	2
AGC execution time	2	2	2
Acknowledgement of an operator's request for a report	3	5	10
Time for complete presentation of pre-formatted reports	10	10	10
Time from operator’s request until start of processing of printouts or hardcopies on the printers	5	20	30
State Estimator execution time	10	15	20
Contingency Analysis (for 300 contingencies)	50	60	90
Study Contingency Analysis (for 300 contingencies)	60	70	90
Dispatcher Power Flow execution time	15	20	25
Study Optimal Power Flow execution time	30	40	50
Short Circuit Analysis execution time including I/O	180	180	180

3.1.3.3 System Startup and Failover Maximum Times

The Startup and failover times should be better than the values of the following Table.

Table 3-3. System Startup and Failover Times

Description	Time
Failover including new databases online	60 sec
Failover without new databases online	10 sec
Recovery from LAN communication failure	1 sec
Complete system startup from power off condition	3 minutes
Complete system startup from power on condition	1 minute

3.2 MMS Performance Requirements

3.2.1 MMS Applications Performance Maximum Requirements

The following are performance requirements for the MMS system.

- Running RDAS maximum for 1 pass is 2 minutes including time necessary for retrieving input data from Database, RDAS execution and publishing results.
- Running DS maximum for 1 pass is 2 minutes including time necessary for retrieving input data from Database, DS execution and publishing results.
- Running RTD maximum for one pass is 30 seconds including time necessary for retrieving input data from Database, RTD execution, transferring results to the EMS and publishing results.
- Store and retrieve Save Case (Post Production) Processing for individual runs of the RDAS, DS and RTD:
  - Maximum 10 seconds for RDAS and DS;
  - Maximum 5 seconds for RTD.
- Shut Down / Re-Start Applications:
  - Maximum 10 seconds for DAS & DS;
  - Maximum 5 seconds for RTD.
- Running Load and RES Generation Forecasting maximum for one pass is 60 seconds including time necessary for retrieving input data and transferring output data to the MMS Applications.

3.2.2 HMI Response Rate Maximum Requirements

When any display call-up is requested, the display, complete with data values, shall appear on the screen within two (2) seconds.

When data entry is performed on a display, the data entry operation shall be completed and the newly entered values shall be displayed within two (2) seconds for users and within three (3) seconds for Data entry into system database by the Administrator.

Queries into system database shall be displayed within five (5) seconds.

Requests for displays with response times longer than one (1) second shall be acknowledged by the system within one (1) second, at any console, with an indication the request is being processed. The user shall be able to enter display requests and perform any other console operations while the system is executing application functions.

3.2.3 Display Update Rate

The system shall provide the capability for display screens to be refreshed periodically. The system shall provide the capability to configure the refresh periodicity for display screens.

Once a display containing data that changes appears on the screen, the display shall be periodically updated, unless defined as non-updating by the user. The data on workstation consoles shall be updated every five (5) seconds. The data update rate for each display shall be adjustable by the user or shall be defined as not updating. Each full display update shall be completed within two (2) seconds.

3.2.4 Alarm and Event Response Time

All alarm and event messages shall be displayed within three (3) seconds, measured from the time the alarm or event is initiated. The alarm and event actions shall include message production, highlighting of alarm conditions, and audible and visual annunciation.

Alarm acknowledgment and deletion shall be completed within three (3) seconds after the user initiates the acknowledgment or deletion.

3.2.5 Report Response Time

Requests for reports shall be acknowledged by the system within three (3) seconds, at any console, with an indication the report is being processed.

Pre-formatted reports shall be in the print queue within ten (10) seconds of their scheduled time, regardless of the level of system activity.

3.2.6 Failover and Restoration Times

Failover of the Market Applications shall be completed within three (3) minutes. The Contractor should provide detailed information and procedures for the failover process. Failback shall take one minute after the databases have been resynchronized with all data generated after the failure. The Contractor should provide detailed information and procedures for the application failback, including the mechanism of re-synchronizing the data from the backup system.

3.3 Corporate Systems Performance Requirements

Both Corporate Systems DW/MIS and Helpdesk should have the following performance requirements.

3.3.1 HMI Response Rate Maximum Requirements

When any display call-up is requested, the display complete with data values shall appear on the screen within the five (5) seconds.

When data entry is performed on a display, the data entry operation shall be completed and the newly entered values shall be displayed within five (5) seconds for users and within eight (8) seconds for Data entry into the system database by the Administrator.

Queries into system database shall be displayed within thirty (30) seconds.

Requests for displays with response times longer than one (1) second shall be acknowledged by the system within one (1) second, at any console, with an indication the request is being processed. The user shall be able to enter display requests and perform any other console operations while the system is executing application functions.

3.3.2 Display Update Rate

The system shall provide the capability for display screens to be refreshed periodically. The system shall provide the capability to configure the refresh periodicity for display screens.

Once a display containing data that changes appears on the screen, the display shall be periodically updated, unless defined as non-updating by the user. The data on workstation consoles shall be updated every five (5) seconds. The data update rate for each display shall be adjustable by the user or shall be defined as not updating.

Each full display update shall be completed within two (2) seconds.

3.3.3 Alarm and Event Response Time

All alarm and event messages shall be displayed within three (3) seconds, measured from the time the alarm or event is initiated. The alarm and event actions shall include message production, highlighting of alarm conditions, and audible and visual annunciation.

Alarm acknowledgment and deletion shall be completed within three (3) seconds after the user initiates the acknowledgment or deletion.

3.3.4 Report Response Time

Requests for reports shall be acknowledged by the system within three (3) seconds, at any console, with an indication the report is being processed.

Pre-formatted reports shall be in the print queue within ten (10) seconds of their scheduled time, regardless of the level of system activity.

4 NII IT Systems Availability Requirements during Trial Operation Period

During the Trial Operation Period, the NII IT Systems should meet the availability requirements, as set forth in Part H - Maintenance Requirements of the Technical Tender Technical and Functional Requirements.

The availability will be calculated for a period of sixty consecutive calendar days, within the Trial Operation Period, which will start after the successful completion of SAT. During this period, the NII IT Systems are fully interconnected with NII SMO's infrastructure, communicate with other IT systems, and are in normal operation. Also, they are used for NII activities and there is not any scheduled maintenance or software upgrade.

The availability of each NII IT System over this period is calculated based on the availability of the respective crucial and main functions as well as the related equipment. It is noted that when a function is transferred and operated to the redundant system it does not affect the respective system availability. The details for the calculation of availability, the availability requirements as well as the respective crucial and main functions for each one of the NII IT Systems are presented in Part H - Maintenance Requirements of the Technical Tender Technical and Functional Requirements.

In case the NII IT System availability requirements during Trial Period are not met, the Contractor has to execute all appropriate actions for the improvement of the NII IT System availability. When the Contractor's actions to improve system availability are implemented, then, upon the approval of the NII SMO, the Trial Period for the respective NII IT System is repeated. The above process should be repeated until all NII IT Systems meet all availability requirements.

In case the Contractor is not capable to meet the availability requirements after three trials, then the NII SMO reserves the right to reject the respective NII IT System or the whole Project.

During the Trial Operation Period, an availability requirement is set for the EMS and MMS development systems and the Dispatchers Training Simulator, at 98% during working hours. The availability should be calculated over a minimum of 200 hours.

