

REQUIREMENTS FOR REMOTE ASSET MANAGEMENT AND MONITORING AT NATIONAL GRID SUBSTATIONS

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PURPOSE AND SCOPE

This specification covers the functionality required for the Remote Asset Management and Monitoring Solution at National Grid Substations.

The scope of this specification covers the functionality of a device referred to in this document as the RAMM Gateway and also provides information relating to the design and implementation of the RAMM Gateway in connection with Ethernet LANs for Remote Access purposes.

Systems that utilise an Ethernet LAN as part of their internal communication include Substation Control Systems or NICAP Circuit Protection Bays e.g. Feeder Protection Bays, Transformer Protection Bays etc.

This specification defines the functionality required to ensure secure and controlled remote access to Remotely Accessed Systems within any National Grid electricity transmission substation or at an external but operational electricity transmission location.

PART 1 - FUNCTIONAL AND PERFORMANCE REQUIREMENTS

1 GENERAL

1.1.1 A Remotely Accessed System shall be defined as any device or system, situated at a substation or remote location, that is manufactured with a communications port that can be used to undertake any of the tasks stated below from an alternative location if connected to a compatible communications system:

- a) Configure, change or upload settings, functionality or firmware
- b) Undertake diagnostics to determine the cause of or resolve a fault.

- c) access and operate a user interface to view graphically displayed information, and/or download data e.g. remotely access and control the system or device HMI or operator interface
 - d) access and download data to any user or automatic data collection system using a specific protocol
 - e) Tasks yet to be identified and not excluded by section 1.1.2 below
- 1.1.2 The scope of Remotely Accessed Systems in this specification shall exclude interference with or operation or control of the electricity transmission primary network by the following methods:
- a) operation or control through remote access to the Substation Control Systems or any associated control systems
 - b) diverting or connection to the communication ports utilised by the Electricity Network Control Centre / Network Operations Centre SCADA system
- 1.1.3 Remote Access shall be defined as any connection and communication between a user or data collection system and a Remotely Accessed System to undertake a specified task.
- 1.1.4 The remote access communication link shall be any communications connection to a Remotely Accessed System that is primarily for Remote Access and shall not be a core part of the essential communication infrastructure for the Remotely Accessed System
- 1.1.5 The essential communication infrastructure for a Remotely Accessed System shall be any communication link that is required by a system to perform functions essential to the system intended and specified operation.
- 1.1.6 RAMM or Remote Access for Management and Monitoring is a generic name given to a specific infrastructure, functionality and type of communications. This shall enable users or data collection systems to connect to Remotely Accessed Systems.
- 1.1.7 All communication types undertaken as Remote Access shall be undertaken via the RAMM infrastructure.

Informative: Communication types undertaken using Remote Access shall be discussed later in this document.

2 FUNCTIONAL REQUIREMENTS

2.1 Remote Access for Management and Monitoring - RAMM

- 2.1.1 Remote Access shall be undertaken securely using role based access controls.

Informative: Role based access control is where a specific user or data collection system is granted Remote Access to use specifically defined communication types to operate, configure or extract data or information from a Remotely Accessed System depending on need and authorisation to undertake specific tasks.

- 2.1.2 The RAMM infrastructure shall provide the necessary functionality to provide manual or automatic role based access controls between any Remotely Accessed System and users or data collection systems.
- 2.1.3 All users or data collection systems undertaking Remote Access via the RAMM system shall be authorised individuals, group of individuals or authorised systems capable of performing automatic data transfers. These users shall be collectively referred to as RAMM Users.

- 2.1.4 The RAMM Gateway, which is the key component of the RAMM infrastructure, shall provide the necessary role based authentication and control of RAMM Users and access to Remotely Accessed Systems
- 2.1.5 All Remote Access communication types between RAMM Users and Remotely Accessed Systems shall pass through the RAMM Gateway.
- 2.1.6 The RAMM Gateway shall have a minimum of two Ethernet ports. Ethernet port 1 shall be used to allow RAMM Users to connect to the RAMM Gateway. Ethernet port 1 shall be referred to as the RAMM Gateway external port. Ethernet port 2 shall be used to allow Remotely Accessed Systems to be connected to the RAMM Gateway. This port shall be referred to as the RAMM Gateway internal port.
- 2.1.7 Where a RAMM Gateway is installed, Remotely Accessed Systems shall be connected to the RAMM Gateway internal port via a RAMM Primary Ethernet switch and an Ethernet IP network referred to as the RAMM Local Network Infrastructure.
- 2.1.8 The RAMM Gateway and anything connected to the external port of the RAMM Gateway shall be referred to as the RAMM Core Infrastructure.
- 2.1.9 The specific security functionality of the RAMM Gateway, which is the key component of the RAMM system at each substation site shall comply with the requirements specified in Section 2.2 of this specification.
- 2.1.10 The RAMM Gateway and any other Ethernet network hardware used as part of the RAMM Local Network Infrastructure shall provide Ethernet networking functionality compliant with the respective international standards. This functionality shall comply with National Grid Technical Specification NGTS 3.24.22 (Ethernet Network Hardware for Substation Systems) and the environmental performance and hardware platform shall comply with TS 3.24.15 (Environmental and Test Requirements for Electronic Systems) and TS 3.24.04 (Hardware Platform).
- 2.1.11 The RAMM Gateway and RAMM Primary Ethernet Switch shall be installed in a designated central location that shall be a designated cubicle in the substation telecoms room. This location shall be referred to as the Point Of Presence for the National Grid RAMM Local Network Infrastructure and shall be referred to as the RAMM POP. An alternative installation location may be considered but shall be agreed with National Grid prior to system design.
- 2.1.12 The RAMM POP shall allow systems to be easily connected to the RAMM Local Network Infrastructure to enable Remote Access by RAMM Users.
- 2.1.13 RAMM Local Network Infrastructure at any substation shall be implemented using a design agreed with National Grid. The design selected shall be dependent on the availability of existing RAMM local network or media infrastructure or the provision of new infrastructure as part of a substation project.
- In some instances the RAMM POP and RAMM Local Network Infrastructure may be installed at the substation as part of a substation project prior to the availability of the RAMM Core Infrastructure. The RAMM Local Network Infrastructure for any new substation system installed at new or existing substation shall be planned and provided to share a common media infrastructure where possible. This specification details common infrastructure requirements for all types of substation LANs. Appendix A gives more details.*
- 2.1.14 Connections between the RAMM Core Infrastructure and any Remotely Accessed System shall be undertaken at the RAMM Primary Ethernet Switch at the RAMM POP located at a designated central location. Alternative connection locations may be considered but shall be agreed with National Grid