

Norav ECG Systems

DICOM Conformance Statement

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1. Conformance Statement Overview

Norav Systems NEMS-A and NEMS-Q Data Management System, PC-ECG 1200, NH-301 Holter, NM-700 Telemetry, NBP-24NG ABPM with the **DICOM Interface** option enabled for following operations:

- a. Receive examination orders using DICOM Modality Work list.
- b. Store study reports in Encapsulated PDF format.
- c. Store Resting ECG study as 12-Lead ECG Waveform.
- d. Store Resting ECG study reports in Secondary Capture Image format.

The table below shows a list of DICOM services supported by the Norav ECG Systems:

1.1. Network Services

| <i>DICOM SOP Class Name</i> | <i>User of Service (SCU)</i> | <i>Provider of Service (SCP)</i> |
|---|------------------------------|----------------------------------|
| Workflow Management | | |
| Modality Work list Information Model FIND | Yes | No |
| Transfer | | |
| Encapsulated PDF | Yes | No |
| 12-Lead ECG Waveform | Yes | No |
| Secondary Capture Image | Yes | No |

2. Introduction

2.1. Audience

This document is the DICOM Conformance Statement for the Norav ECG Systems having the **DICOM Interface** option. It is intended for hospital staff, health system integrators, software designers or implementers. It is assumed that the reader has a working understanding of DICOM.

3. Implementation Model

3.1. Application Data Flow Diagram

The Norav ECG System having the **DICOM Interface** option supports MWL query functionality using the C-FIND message. It sends query keys to an SCP and awaits responses. The returned list of work items is cached by Norav ECG System and used whenever a new ECG recording needs to be initiated.

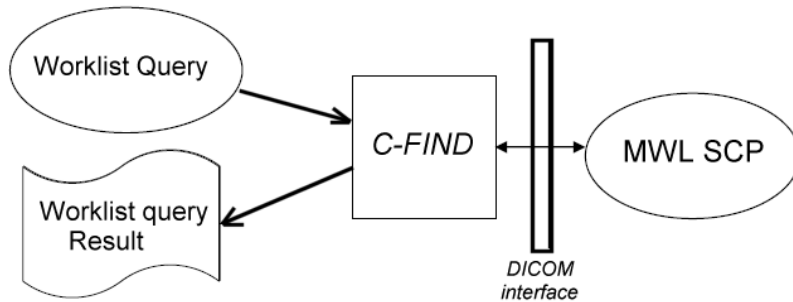


Figure 1. Query MWL

At the end of study recording the Norav ECG System uses C-STORE message for save the study results (Encapsulated PDF report and 12-lead ECG Waveform) into the configured Storage SCP.

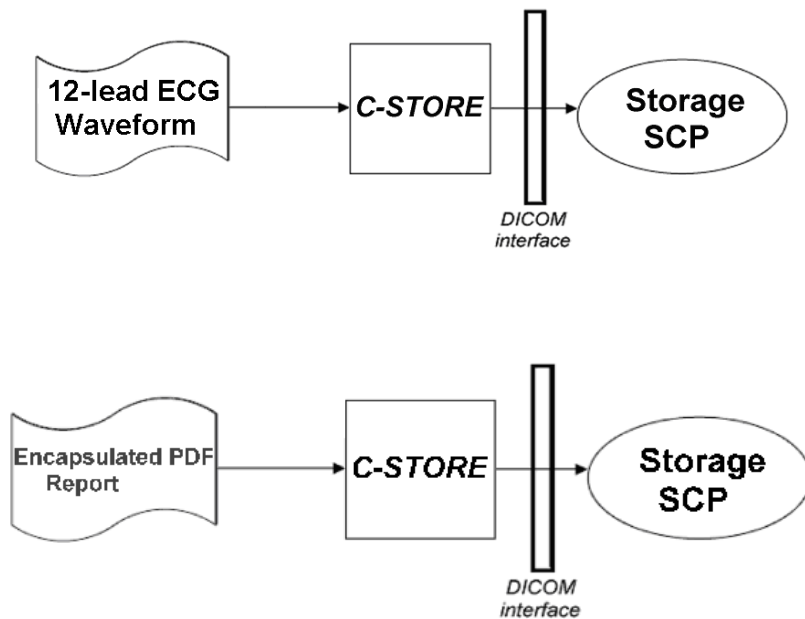


Figure 2. Store study results

3.2. Functional Definition of Norav ECG System AE

AE handles querying a Work list SCP for a list of scheduled procedures using the C-FIND DICOM query.

Steps taken to Query a Work list SCP:

```
A-ASSOCIATE
SEND C-FIND Request command
{
    RECEIVE C-FIND Response
} While C-FIND status == pending AND responses <= TIMEOUT
A-RELEASE
```

Study results saved as an Encapsulated PDF Report uses the C-STORE DICOM message.

Steps taken to store an Encapsulated PDF Report into the SCP:

```
A-ASSOCIATE
{
    SEND C-STORE message
}
A-RELEASE
```

Study results saved as 12-lead ECG Waveform uses the C-STORE DICOM message.

Steps taken to store an 12-lead ECG Waveform into the SCP:

```
A-ASSOCIATE
{
    SEND C-STORE message
}
A-RELEASE
```

4. AE Specifications

4.1. Norav ECG System Application Entity

4.1.1. SOP Classes

This Application Entity provides Standard Conformance to the following SOP Classes:

| <i>SOP Class Name</i> | <i>SOP class UID</i> | <i>Role</i> |
|---|-------------------------------|-------------|
| Modality Work list Information Model FIND | 1.2.840.10008.5.1.4.31 | SCU |
| Encapsulated PDF Storage | 1.2.840.10008.5.1.4.1.1.104.1 | SCU |
| 12-Lead ECG Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.1.1 | SCU |
| Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7 | SCU |

4.1.2. SOP Specific Conformance for Modality Work list

The following elements present in the Modality Work list query. Most fields can be set to fixed values.

| <i>Attribute</i> | <i>Tag</i> | <i>Note</i> |
|---------------------------------------|------------|--|
| Accession Number | 0008,0050 | |
| Patient's Name | 0010,0010 | |
| Patient's ID | 0010,0020 | |
| Patient's Birth Date | 0010,0030 | |
| Patient's Sex | 0010,0040 | |
| Study Instance UID | 0020,000d | |
| Requesting Physician | 0032,1032 | |
| Scheduled Procedure Step Sequence | 0040,0100 | |
| Modality | 0008,0060 | Set this filter to query for necessary modality. Examples: "ECG", "OT" Or leave it empty to query whole list. |
| Scheduled Station AE Title | 0040,0001 | |
| Scheduled Procedure Step Start Date | 0040,0002 | Query code can only be mapped to the current date. Example: "20141021" |
| Scheduled Procedure Step Start Time | 0040,0003 | |
| Scheduled Performing Physician's Name | 0040,0006 | |
| Scheduled Procedure Step ID | 0040,0009 | |
| Scheduled Station Name | 0040,0010 | |
| Scheduled Procedure Step Location | 0040,0011 | |
| Requested Procedure ID | 0040,1001 | |
| Requested Procedure Priority | 0040,1003 | |

The following elements are used from the returned Modality Work list.

| <i>Attribute</i> | <i>Tag</i> | <i>Note</i> |
|-------------------------------------|------------|-------------|
| Accession Number | 0008,0050 | |
| Modality | 0008,0060 | |
| Patient's Name | 0010,0010 | |
| Patient's ID | 0010,0020 | |
| Patient's Birth Date | 0010,0030 | |
| Patient's Sex | 0010,0040 | |
| Patient's Size | 0010,1020 | |
| Patient's Weight | 0010,1030 | |
| Scheduled Procedure Step Start Date | 0040,0002 | |
| Scheduled Procedure Step ID | 0040,0009 | |

4.1.3. SOP Specific Conformance for Encapsulated PDF Storage

The Norav ECG System returns an encapsulated PDF reports with the following DICOM attributes.

| <i>Attribute</i> | <i>Tag</i> | <i>Note</i> |
|----------------------|------------|-------------|
| Accession Number | 0008,0050 | |
| Patient's Name | 0010,0010 | |
| Patient's ID | 0010,0020 | |
| Patient's Birth Date | 0010,0030 | |
| Study Date | 0008,0020 | |
| Study Time | 0008,0030 | |
| Manufacturer | 0008,0070 | |
| Document Title | 0042,0010 | |

4.1.4. SOP Specific Conformance for 12-lead ECG Waveform Storage

The Norav ECG System stores a 12-lead ECG Waveforms with the following DICOM attributes.

| <i>Attribute</i> | <i>Tag</i> | <i>Note</i> |
|----------------------|------------|-------------|
| Accession Number | 0008,0050 | |
| Patient's Name | 0010,0010 | |
| Patient's ID | 0010,0020 | |
| Patient's Birth Date | 0010,0030 | |
| Patient's Sex | 0010,0040 | |
| Study Date | 0008,0020 | |
| Study Time | 0008,0030 | |
| Manufacturer | 0008,0070 | |

Network Interfaces

4.2. Physical Network Interface

Uses wired Ethernet or wireless LAN.

5. Configuration

Norav ECG supports the following configuration parameters.

| <i>Parameter</i> | <i>Configurable</i> | <i>Default Value</i> |
|---|---------------------|----------------------|
| Modality Work list SCP IP Address | Yes | (none) |
| Modality Work list SCP Port Number | Yes | (none) |
| Modality Work list Calling SCU AE Title | Yes | (none) |
| Modality Work list Called SCP AE Title | Yes | (none) |
| SCP Storage IP Address | Yes | (none) |
| SCP Storage Port Number | Yes | (none) |
| SCP Storage Calling SCU AE Title | Yes | (none) |
| SCP Storage Called SCP AE Title | Yes | (none) |