

# HL7 CONFORMANCE STATEMENT

## PRODUCT DETAILS:

### Product type:

Data Analysis Software  
Image Management Software

### Product Name:

TOMTEC-ARENA TTA2

## MANUFACTURER:

TOMTEC IMAGING SYSTEMS GMBH  
Freisinger Strasse 9  
85716 Unterschleissheim

## USED STANDARDS:

HL7 standard v 2

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## 1 INTRODUCTION

This document provides the requirements to interoperate with TOMTEC-ARENA TTA2 using the Health Level Seven (HL7) standard.

Objective of this document is to provide a standard set of HIS/CIS/RIS requirements to effectively support and connect to TOMTEC-ARENA TTA2.

This chapter provides general information about the purpose, scope and contents of the HL7 Interface Specification.

### 1.1 INTENDED AUDIENCE

The user of this document is involved with system integration and/or software design. We assume that the reader is familiar with the terminology and concepts that are used in HL7 V2 standard and the IHE technical framework. Readers not familiar with HL7 terminology should first read the appropriate parts of the HL7 standard itself, prior to reading this conformance statement.

Although the use of this conformance statement in conjunction with the HL7 standard is intended to facilitate communication with TOMTEC-ARENA, it is not sufficient to guarantee, by itself the inter-operation of the connection between TOMTEC-ARENA and the 3rd party HL7-based system.

The integration of any device into a system of interconnected devices goes beyond the scope of the HL7 standard and this conformance statement when interoperability is desired. The responsibility for analyzing the applications requirements and developing a solution that integrates the TOMTEC equipment with other vendors' systems is the user's responsibility.

### 1.2 STANDARD VERSION SUPPORT

By default, TOMTEC-ARENA supports HL7 standard in version 2.3.1 In general, TOMTEC-ARENA is capable to be configured supporting higher versions of V2. In such cases contact the TOMTEC service for further advice.

### 1.3 ACRONYMS AND ABBREVIATIONS

The following acronyms and abbreviations are used in this document:

ADT	Admission, Discharge, and Transfer Message
EVN	Event Type Segment
HL7	Health Level 7
IHE	Integrating the Healthcare Enterprise
DICOM	Digital Imaging and Communication in Medicine
MRG	Merge Segment
MSH	Message Header Segment
OBR	Observation Request Segment
OBX	Observation Result Segment
ORC	Common Order Segment
ORM	Order Request Message
ORU	Observation Results - Unsolicited Message
PDF	Portable Document Format
PID	Patient Identification Segment
PV1	Patient Visit 1 Segment
TXA	Transcription Document Header Segment
MDM	Medical Document Management Message

## 2 MESSAGE SPECIFICATION

### 2.1 INBOUND MESSAGES

The TOMTEC-ARENA TTA2 performs the creation, the update or the deletion of information for patient, visit and examination information stored in the TTA database.

The TOMTEC-ARENA TTA2 stores the links between patient, visits and planned examinations which are later being linked to DICOM studies.

#### 2.1.1 Supported Trigger Events

##### 2.1.1.1 ADT Messages

Event Code	Description	Inbound Supported
ADT^A01	Admit/visit notification	Yes
ADT^A04	Register a patient	Yes
ADT^A05	Pre-admit a patient	Yes
ADT^A08	Update patient information	Yes
ADT^040	Merge patient – patient identifier list	Yes

It is possible to configure additional ADT trigger events to establish create, update or merge patient's functionality as described above.

##### 2.1.1.2 ORM Messages

Event Code	Description	Inbound Supported
ORM^001	Order message	Yes

Control Code	Description	Inbound Supported
NW	New order	Yes
XO	Change order request	Yes
SC	Status changed	Yes
DC	Discontinue order request	Yes

It is possible to configure additional control codes to establish create, update or terminate order functionality as described above.

#### 2.1.2 Escaping

Character	Description	Inbound Supported
\Cxyy\	Single-byte character set escape sequence with two hexadecimal values not converted	No
\E\	Escape character converted to escape character (e.g. '\')	Yes
\F\	Field separator converted to field separator character (e.g. ' ')	Yes
\H\	Start highlighting not converted	No
\Mxyyzz\	Multi-byte character set escape sequence with two or three hexadecimal values (zz is optional) not converted	No

\N\	Normal text (end highlighting) not converted	No
\R\	Repetition separator converted to repetition separator character (e.g. '~')	Yes
\S\	Component separator converted to component separator character (e.g. '^')	Yes
\T\	Subcomponent separator converted to subcomponent separator character (e.g. '&')	Yes
\Xdd.\	Hexadecimal data (dd must be hexadecimal characters) converted to the characters identified by each pair of digits	Yes
\Zdd.\	Locally defined escape sequence not converted	No
\.br\	Carriage return	No

## 2.1.3 Supported Attributes

### 2.1.3.1 MSH

SEQ	Element Name	Value Required (Yes / No)	Default Mapping (Yes / No)	Comment
1	Field Separator	Yes	n/a	Default ' '
2	Encoding Characters	Yes	n/a	Default ''
3	Sending Application	No	Yes	
4	Sending Facility	No	n/a	
5	Receiving Application	No	n/a	Default TOMTEC-ARENA
6	Receiving Facility	No	n/a	Empty by default
7	Date/Time Of message	No	n/a	
8	Security	No	n/a	
9	Message Type	Yes	n/a	
10	Message Control ID	Yes	n/a	
11	Processing ID	Yes	n/a	
12	Version ID	Yes	n/a	Default configuration conforms V2.3.1
13	Sequence Number	No	n/a	
14	Continuation Pointer	No	n/a	
15	Accept Acknowledgement Type	No	n/a	
16	Application Acknowledgement Type	No	n/a	
17	Country Code	No	n/a	
18	Character Set	No	n/a	If not valued, US-ASCII is assumed by default. See chapter 2.3 language support
19	Principal Language Of Message			
20	Alternate Character Set Handling Scheme	No	n/a	

### 2.1.3.2 EVN

SEQ	Element Name	Value Required (Yes / No)	Default Mapping (Yes / No)	Comment
1	Event Type Code	No	No	
2	Recorded Date/Time	Yes	No	
3	Date/Time Planned Event	No	No	
4	Event Reason Code	No	No	
5	Operator ID	No	No	

6	Event Occured	No	No	
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### 2.1.3.3 PID

SEQ	Element Name	Value Required (Yes / No)	Default Mapping (Yes / No)	Comment
1	Set ID - PID	No	No	
2	Patient ID	No	No	
3	Patient Identifier List	Yes	Yes	Default PID.3.1
4	Alternate Patient ID – PID	No	No	
5	Patient Name	Yes	Yes	
6	Mother’s Maiden Name	No	No	
7	Date/Time Of Birth	No	Yes	
8	Sex	No	Yes	If missing “U” is used
9	Patient Alias	No	No	
10	Race	No	No	
11	Patient Address	No	No	
12	Country Code	No	No	
13	Phone Number - Home	No	No	
14	Phone Number - Business	No	No	
15	Primary Language	No	No	
16	Martial Status	No	No	
17	Religion	No	No	
18	Patient Account Number	No	No	
19	SSN Number - Patient	No	No	
20	Driver’s License Number - Patient	No	No	
21	Mother’s Identifier	No	No	
22	Ethnic Group	No	No	
23	Birth Place	No	No	
24	Multiple Birth Indicator	No	No	
25	Birth Order	No	No	
26	Citizenship	No	No	
29	Patient Death Date and Time	No	No	
30	Patient Death Indicator	No	No	

### 2.1.3.4 PV1

SEQ	Element Name	Value Required (Yes / No)	Default Mapping (Yes / No)	Comment
1	Set ID - PV1	No	No	
2	Patient Class	Yes	No	
3	Assigned Patient Location	No	No	
4	Admission Type	No	No	
5	Preadmit Number	No	No	
6	Prior Patient Location	No	No	
7	Attending Doctor	No	No	
8	Referring Doctor	No	No	
9	Consulting Doctor	No	No	
10	Hospital Service	No	No	

11	Temporary Location	No	No	
12	Preadmit Test Indicator	No	No	
13	Re-admission Indicator	No	No	
14	Admit Source	No	No	
15	Ambulatory Status	No	No	
16	VIP Indicator	No	No	
17	Admitting Doctor	No	No	
18	Patient Type	No	No	
19	Visit Number	No	Yes	Default PV1.19.1
20	Financial Class	No	No	
21	Charge Price Indicator	No	No	
22	Courtesy Code	No	No	
23	Credit Rating	No	No	
24	Contract Code	No	No	
25	Contract Effective Date	No	No	
26	Interest Code	No	No	
29	Transfer To Bed Debt Code	No	No	
30	Transfer To Bad Debt Date	No	No	
31	Bad Debt Agency Coed	No	No	
32	Bad Debt Transfer Amount	No	No	
33	Bad Debt Recovery Amount	No	No	
34	Delete Account Indicator	No	No	
35	Delete Account Date	No	No	
36	Discharge Disposition	No	No	
37	Discharged to Location	No	No	
36	Diet Type	No	No	
39	Servicing Facility	No	No	
40	Bed Status	No	No	
41	Account Status	No	No	
42	Pending Location	No	No	
43	Prior Temporary Location	No	No	
44	Admit Date/Time	No	No	
45	Discharge Date/Time	No	No	
46	Current Patient Balance	No	No	
47	Total Charges	No	No	
46	Total Adjustments	No	No	
49	Total Payments	No	No	
50	Alternate Visit ID	No	No	
51	Visit Indicator	No	No	
52	Other Healthcare Provider	No	No	

### 2.1.3.5 MRG

SEQ	Element Name	Value Required (Yes / No)	Default Mapping (Yes / No)	Comment
1	Prior Patient Identifier List	Yes	Yes	Default MRG 1.1
2	Prior Alternate Patient ID	No	No	
3	Prior Patient Account Number	No	No	
4	Prior Patient ID	No	No	

5	Prior Visit Number	No	Yes	Default MRG.5.1
6	Prior Alternate Visit ID	No	No	
7	Prior Patient Name	No	Yes	

### 2.1.3.6 ORC

SEQ	Element Name	Value Required (Yes / No)	Default Mapping (Yes / No)	Comment
1	Order Control	Yes	No	
2	Placer Order Number	No	Yes	Default HL7Order
3	Filler Order Number	No	Yes	Default Accession Number
4	Placer Group Number	No	No	
5	Order Status	No	No	
6	Response Flag	No	No	
7	Quantity/Timing	No	No	
8	Parent Order	No	No	
9	Date/Time of Transmission	No	No	
10	Entered By	No	No	
11	Verified By	No	No	
12	Ordering Provider	No	No	
13	Enterer's Location	No	No	
14	Call Back Phone Number	No	No	
15	Order Effective Date/Time	No	No	
16	Order Control Code Reason	No	No	
17	Entering Organization	No	No	
18	Entering Device	No	No	
19	Action By	No	No	
20	Advanced Beneficiary Notice Code	No	No	
21	Ordering Facility Name	No	No	
22	Ordering Facility Address	No	No	
23	Ordering Facility Phone Number	No	No	
24	Ordering Provider Address	No	No	

### 2.1.3.7 OBR

SEQ	Element Name	Value Required (Yes / No)	Default Mapping (Yes / No)	Comment
1	Set ID - OBR	No	No	
2	Placer Order Number	No	No	
3	Filler Order Number	No	No	
4	Universal Service ID	Yes	Yes	
5	Priority-OBR	No	No	
6	Requested Date/Time	No	Yes	Default study date/time from OBR.6.1
7	Observation Date/Time	No	No	
8	Observation End Date/Time	No	No	
9	Collection Volume	No	No	



10	Collection Identifier	No	No	
11	Specimen Action Code	No	No	
12	Danger Code	No	No	
13	Relevant Clinical Info	No	No	
14	Specimen Received Date/Time	No	No	
15	Specimen Source	No	No	
16	Ordering Provider	No	No	
17	Order Callback Phone Number	No	No	
18	Placer Field 1	No	No	
19	Placer Field 2	No	No	
20	Filler Field 1	No	No	
21	Filler Field 2	No	No	
22	Results Rpt/Status Chng - Date/Time	No	No	
23	Charge to Practice	No	No	
24	Diagnostic Serv Sect ID	No	No	
25	Result Status	No	No	
26	Parent Result	No	No	
27	Quantity/Timing	No	No	
28	Result Copies To	No	No	
29	Parent Number	No	No	
30	Transportation Mode	No	No	
31	Reason For Study	No	No	
32	Principal Result Interpreter	No	No	
33	Assistant Result Interpreter	No	No	
34	Technician	No	No	
35	Transcriptionist	No	No	
36	Scheduled Date/Time	No	No	
37	Number of Sample Containers	No	No	
38	Transport Logistics of Collected Sample	No	No	
39	Collector's Comment	No	No	
40	Transport Arrangement Responsibility	No	No	
41	Transport Arranged	No	No	
42	Escord Required	No	No	
43	Planned Patient Transport Comment	No	No	
44	Procedure Code	No	No	
45	Procedure Code Modifier	No	No	

### 2.1.3.8 OBX

SEQ	Element Name	Value Required (Yes / No)	Default Mapping (Yes / No)	Comment
1	Set ID - OBX	No	No	
2	Value Type	No	No	
3	Observation Identifier	Yes	No	
4	Observation Sub-ID	No	No	
5	Observation Value	No	No	
6	Units	No	No	
7	References Range	No	No	

8	Abnormal Flags	No	No	
9	Probability	No	No	
10	Nature of Abnormal Test	No	No	
11	Observation Result Status	Yes	No	
12	Date Last Obs Normal Values	No	No	
13	User Defined Access Checks	No	No	
14	Date/Time of the Observation	No	No	
15	Producer's ID	No	No	
16	Responsible Observer	No	No	
17	Observation Method	No	No	

### 2.1.3.9 ZDS

SEQ	Element Name	Value Required (Yes / No)	Default Mapping (Yes / No)	Comment
1	Study Instance UID	No	Yes	

## 2.1.4 Configuration

Further information of the incoming HL7 messages, being full segments or individual fields, can be additionally stored associated to the patient, visit and study level. This stored information can be reused and added to any outbound message by configuration.

## 2.1.5 Examples

### 2.1.5.1 ADT^A01 Admit Patient/Visit

```
MSH|^~\&|HIS|HISFacility|TOMTEC-ARENA||20200911110137||ADT^A01|42|P|2.3|||||ENG|8859/1|ENG|
EVN|A01|20200911110149||||
PID||P0001||Doe^John^^|19010101|M||||||D|||
PV1|1|I||||||V0001||||||WL-KIS||||202104280800||||
```

A patient record with the Patient ID P0001, John Doe (male) birthdate 01-01-1901 and a visit record with the visit ID V001 will be added to the TTA database. There is no action if the identical patient record or the visit record already exists. By default ADT^A04 and ADT^A05 messages are processed in the same way as described above.

### 2.1.5.2 ADT^A08 Update Patient

```
MSH|^~\&|HISApplication|HISFacility|TOMTEC-ARENA||20210911110211||ADT^A08|42|P|2.3|||||ENG|8859/1|ENG|
EVN|A08|20210911110255||||
PID||P0001||Doe^Jane^^|19080101|M||||||D|||
PV1|1|I||||||V0001||||||WL-KIS||||202104280800||||
```

The name, the gender and the birthdate information of the patient record with the patient ID P0001 will be updated to Jane Doe (female) birthday 01-01-1908. If the record doesn't exist, Jane Doe will be created as a new record.

### 2.1.5.3 ADT^A40 Merge Patient

```
MSH|^~\&|HISApplication|HISFacility|TOMTEC-ARENA||20211010080545||ADT^A40|42|P|2.3||||ENG|8859/1|ENG|
EVN|A40|20211010080551||||
PID||P0001||Doe^John^^^|19010101|M||||||||||||D|||
PV1|1|I||||||||V0001|||||||||WL-KIS||||202104280800|||||
MRG|P0002||||EMERGENCY329|
```

The visits and DICOM studies of the patients with the Patient ID EMERGENCY329 and P0001 will be merged to only one patient record with the Patient ID P0001. After this the empty patient record for Patient ID EMERGENCY00329 will be deleted.

### 2.1.5.4 ORM^O01 Order Message

```
MSH|^~\&|HISApplication|HISFacility|TOMTEC-ARENA||20200911110137||ORM^O01|42|P|2.3||||ENG|8859/1|ENG|
PID||P0001||Doe^John^^^|19010101|M||||||||||||D|||
PV1|1|I||||||||V0001|||||||||WL-KIS||||202104280800|||||
ORC|NW|O0001|A0001|||||||||NW|||||
ZDS|1.2.826.0.1.3680043.9.6629.249636145320900.2020091111012182.19|
```

For the patient with the Patient ID P001 a new order and study record with the Study Instance UID 1.2.826.0.1.3680043.9.6629.249636145320900.2020091111012182.19 will be created.

If the Study Instance UID is not available in the message, a temporary one starting with the Root ID of TOMTEC (1.2.276.0.48) will be created and the DICOM Study will be associated to the HL7 order by Accession Number (default used from ORC.3) on arrival to TOMTEC-ARENA.

In addition, TOMTEC-ARENA TTA2 will update or delete existing orders. The supported control codes are XO for updating existing order information, SC for updating the order status and DC for discontinuing existing orders. Further details can be found in [section 2.1.1.2 ORM Messages](#).

## 2.2 OUTBOUND MESSAGES

The TOMTEC-ARENA TTA2 can be used to send ORU^R01 HL7 messages with the following contents:

- Reports (PDF) as an Base64 embedded document
- A link to a copy of the Report (PDF) in a shared folder
- A partial or a complete list of measurements
- Any information stored to TTA2 related to the patient, visit or study.
- Any information stored with the incoming ADT or ORM messages.

In default configuration the full report content including all measurements are transferred via ORU^R01.

The TOMTEC-ARENA TTA2 can be used to send MDM^T02 HL7 messages with the Reports (PDF) as an Base64 embedded document.

### 2.2.1 Supported Triggers

The TOMTEC-ARENA TTA2 supports the following reporting status triggers:

- Preliminary
- Finalized

The TOMTEC-ARENA TTA2 supports the following study status trigger:

- Analyzed

### 2.2.2 Supported Message Types

#### 2.2.2.1 ORU

Event Code	Description	Outbound Supported
ORU^R01	Unsolicited transmission of an observation message	Yes

#### 2.2.2.2 MDM

Event Code	Description	Outbound Supported
MDM^T02	Original document notification and content	Yes

### 2.2.3 Escaping

Character	Description	Outbound
\	Escape character	\\E\
	Field separator	\\F\
~	Repetition separator	\\R\
^	Component separator	\\S\
&	Subcomponent separator	\\T\
Line break	Carriage return	\\XOD\

## 2.2.4 Supported Attributes

### 2.2.4.1 MSH

SEQ	Element Name	Value Required (Yes / No)	Default Mapping (Yes / No)	Comment
1	Field Separator	Yes	n/a	Default ' '
2	Encoding Characters	Yes	n/a	Default ''
3	Sending Application	No	Yes	Default TOMTEC-ARENA
4	Sending Facility	No	Yes	Empty by default
5	Receiving Application	No	n/a	
6	Receiving Facility	No	n/a	
7	Date/Time Of message	No	n/a	
8	Security	No	n/a	
9	Message Type	Yes	n/a	
10	Message Control ID	Yes	n/a	
11	Processing ID	Yes	n/a	
12	Version ID	Yes	n/a	
13	Sequence Number	No	n/a	
14	Continuation Pointer	No	n/a	
15	Accept Acknowledgement Type	No	n/a	
16	Application Acknowledgement Type	No	n/a	
17	Country Code	No	n/a	
18	Character Set	No	n/a	Default '8859/1' - see chapter 2.3 Language Support
19	Principal Language Of Message			
20	Alternate Character Set Handling Scheme	No	n/a	

### 2.2.4.2 EVN

SEQ	Element Name	Value Required (Yes / No)	Default Mapping (Yes / No)	Comment
1	Event Type Code	No	No	
2	Recorded Date/Time	Yes	No	
3	Date/Time Planned Event	No	No	
4	Event Reason Code	No	No	
5	Operator ID	No	No	
6	Event Occured	No	No	

### 2.2.4.3 PID

SEQ	Element Name	Value Required (Yes / No)	Default Mapping (Yes / No)	Comment
1	Set ID - PID	No	No	
2	Patient ID	No	No	
3	Patient Identifier List	Yes	Yes	PID.3.1
4	Alternate Patient ID – PID	No	No	

5	Patient Name	Yes	Yes	
6	Mother's Maiden Name	No	No	
7	Date/Time Of Birth	No	Yes	
8	Sex	No	Yes	
9	Patient Alias	No	No	
10	Race	No	No	
11	Patient Address	No	No	
12	Country Code	No	No	
13	Phone Number - Home	No	No	
14	Phone Number - Business	No	No	
15	Primary Language	No	No	
16	Martial Status	No	No	
17	Religion	No	No	
18	Patient Account Number	No	No	
19	SSN Number - Patient	No	No	
20	Driver's License Number - Patient	No	No	
21	Mother's Identifier	No	No	
22	Ethnic Group	No	No	
23	Birth Place	No	No	
24	Multiple Birth Indicator	No	No	
25	Birth Order	No	No	
26	Citizenship	No	No	
29	Patient Death Date and Time	No	No	
30	Patient Death Indicator	No	No	

#### 2.2.4.4 PV1

SEQ	Element Name	Value Required (Yes / No)	Default Mapping (Yes / No)	Comment
1	Set ID - PV1	No	No	
2	Patient Class	Yes	No	
3	Assigned Patient Location	No	No	
4	Admission Type	No	No	
5	Preadmit Number	No	No	
6	Prior Patient Location	No	No	
7	Attending Doctor	No	No	
8	Referring Doctor	No	No	
9	Consulting Doctor	No	No	
10	Hospital Service	No	No	
11	Temporary Location	No	No	
12	Preadmit Test Indicator	No	No	
13	Re-admission Indicator	No	No	
14	Admit Source	No	No	
15	Ambulatory Status	No	No	
16	VIP Indicator	No	No	
17	Admitting Doctor	No	No	
18	Patient Type	No	No	
19	Visit Number	No	Yes	
20	Financial Class	No	No	
21	Charge Price Indicator	No	No	
22	Courtesy Code	No	No	

23	Credit Rating	No	No	
24	Contract Code	No	No	
25	Contract Effective Date	No	No	
26	Interest Code	No	No	
29	Transfer To Bed Debt Code	No	No	
30	Transfer To Bad Debt Date	No	No	
31	Bad Debt Agency Coed	No	No	
32	Bad Debt Transfer Amount	No	No	
33	Bad Debt Recovery Amount	No	No	
34	Delete Account Indicator	No	No	
35	Delete Account Date	No	No	
36	Discharge Disposition	No	No	
37	Discharged to Location	No	No	
36	Diet Type	No	No	
39	Servicing Facility	No	No	
40	Bed Status	No	No	
41	Account Status	No	No	
42	Pending Location	No	No	
43	Prior Temporary Location	No	No	
44	Admit Date/Time	No	No	
45	Discharge Date/Time	No	No	
46	Current Patient Balance	No	No	
47	Total Charges	No	No	
46	Total Adjustments	No	No	
49	Total Payments	No	No	
50	Alternate Visit ID	No	No	
51	Visit Indicator	No	No	
52	Other Healthcare Provider	No	No	

#### 2.2.4.5 ORC

SEQ	Element Name	Value Required (Yes / No)	Default Mapping (Yes / No)	Comment
1	Order Control	Yes	No	Default 'CN'
2	Placer Order Number	No	Yes	By default HL7 Order Number
3	Filler Order Number	No	Yes	By default DICOM Accession Number
4	Placer Group Number	No	No	
5	Order Status	No	No	
6	Response Flag	No	No	
7	Quantity/Timing	No	No	
8	Parent Order	No	No	
9	Date/Time of Transmission	No	No	
10	Entered By	No	No	
11	Verified By	No	No	
12	Ordering Provider	No	No	
13	Enterer's Location	No	No	
14	Call Back Phone Number	No	No	
15	Order Effective Date/Time	No	No	

16	Order Control Code Reason	No	No	
17	Entering Organization	No	No	
18	Entering Device	No	No	
19	Action By	No	No	
20	Advanced Beneficiary Notice Code	No	No	
21	Ordering Facility Name	No	No	
22	Ordering Facility Address	No	No	
23	Ordering Facility Phone Number	No	No	
24	Ordering Provider Address	No	No	

#### 2.2.4.6 OBR

SEQ	Element Name	Value Required (Yes / No)	Default Mapping (Yes / No)	Comment
1	Set ID - OBR	No	No	
2	Placer Order Number	No	No	
3	Filler Order Number	No	No	
4	Universal Service ID	Yes	Yes	Default Study Date/Time
5	Priority-OBR	No	No	
6	Requested Date/Time	No	No	
7	Observation Date/Time	No	No	
8	Observation End Date/Time	No	No	
9	Collection Volume	No	No	
10	Collection Identifier	No	No	
11	Specimen Action Code	No	No	
12	Danger Code	No	No	
13	Relevant Clinical Info	No	No	
14	Specimen Received Date/Time	No	No	
15	Specimen Source	No	No	
16	Ordering Provider	No	No	
17	Order Callback Phone Number	No	No	
18	Placer Field 1	No	No	
19	Placer Field 2	No	No	
20	Filler Field 1	No	No	
21	Filler Field 2	No	No	
22	Results Rpt/Status Chng - Date/Time	No	No	
23	Charge to Practice	No	No	
24	Diagnostic Serv Sect ID	No	No	
25	Result Status	No	Yes	
26	Parent Result	No	No	
27	Quantity/Timing	No	No	
28	Result Copies To	No	No	
29	Parent Number	No	No	
30	Transportation Mode	No	No	
31	Reason For Study	No	No	
32	Principal Result Interpreter	No	No	
33	Assistant Result Interpreter	No	No	
34	Technician	No	No	



35	Transcriptionist	No	No	
36	Scheduled Date/Time	No	No	
37	Number of Sample Containers	No	No	
38	Transport Logistics of Collected Sample	No	No	
39	Collector's Comment	No	No	
40	Transport Arrangement Responsibility	No	No	
41	Transport Arranged	No	No	
42	Escord Required	No	No	
43	Planned Patient Transport Comment	No	No	
44	Procedure Code	No	No	
45	Procedure Code Modifier	No	No	

#### 2.2.4.7 TXA

SEQ	Element Name	Value Required (Yes / No)	Default Mapping (Yes / No)	Comment
1	Set ID - TXA	Yes	No	Default '1'
2	Document Type	Yes	No	Default 'DI'
3	Document Content Presentation	No	No	Default 'application/pdf'
4	Activity Date/Time	No	No	
5	Primary Activity Provider Code/Name	No	No	
6	Orgination Date/Time	No	No	
7	Transcription Date/Time	No	No	
8	Edit Date/Time	No	No	
9	Orginator Code/Name	No	No	
10	Assigned Document Authenticator	No	No	
11	Transcrptionist Code/Name	No	No	
12	Unique Document Number	Yes	No	By default empty
13	Parent Document Number	No	No	
14	Placer Order Number	No	No	
15	Filler Order Number	No	No	
16	Unique Document File Name	No	No	
17	Document Completion Status	Yes	No	Default 'AU'
18	Document Confidentiality Status	No	No	
19	Document Availability Status	No	No	
20	Document Storage Status	No	No	
21	Document Change Reason	No	No	
22	Authentication Person, Time Stamp	No	No	
23	Distriputed Copies	No	No	

#### 2.2.4.8 OBX

SEQ	Element Name	Value Required (Yes / No)	Default Mapping (Yes / No)	Comment
1	Set ID - OBX	No	No	By default, increment values are set automatically.
2	Value Type	No	No	HD, ED, FT, DT or NM
3	Observation Identifier	Yes	No	Identifier^Text^Name of Coding System^Alternate Text  Exceptions: "Study Instance UID" "Link to PDF" "Encapsulated Data PDF"
4	Observation Sub-Id	No	No	Main in case no context is available
5	Observation Value	No	No	Content of defined field  Exceptions: Link to PDF shared folder Report PDF, Base 64 encoded
6	Units	No	No	Identifier^Text^Name of Coding System
7	References Range	No	No	
8	Abnormal Flag	No	No	
9	Probability	No	No	
10	Nature of Abnormal Test	No	No	
11	Observation Result Status	Yes	No	ReportState (P or F)
12	Date Last Obs Normal Values	No	No	
13	User Defined Access Checks	No	No	
14	Date/Time of the Observation	No	No	
15	Producer's ID	No	No	
16	Responsible Observer	No	No	
17	Observation Method	No	No	

## 2.2.5 Configuration

### 2.2.5.1 PDF Reports

PDF Reports can also be send in an OBX segment of an ORU^001 message. The PDF can be embedded in the message or stored to a shared folder where only the link to the file is added to the HL7 message.

### 2.2.5.2 Measurements and Report Text

By default, all of the measurements and report text segments are added to the message, but it is possible to configure special measurements or text blocks to be added to the outbound message.

## 2.2.6 Examples

### 2.2.6.1 ORU^R01 Transmit Full Report Content

```
MSH|^~\&|TOMTEC-ARENA||HIS|HISFacility|202111312133861||ORU^R01^ORU_R01|6059be33c2a34178ab1d|P|2.3.1||||8859/1
```

```

EVN|R01
PID||P0001||Doe^John||19000101|M
PV1|||||V0001
ORC|CN|O0001|A0001
OBR|||||F
OBX|1|HD|Study Instance UID|1|1.2.276.0.48.250265.20210831074847755.1||||F
OBX|2|NM|US.CA.LV.MINAXD:BMODE^LVIDd^99Tomtec-2.0^Left Ventricle - 2D|Main|50|mm^mm^UCUM||||F
OBX|3|NM|US.CA.LV.EDV:TEI:BMODE^EDV (Teichholz)^99Tomtec-2.0^Left Ventricle - 2D|Main|118.24|ml^ml^UCUM||||F
OBX|4|NM|US.CA.LV.SV:TEI:BMODE^SV^99Tomtec-2.0^Left Ventricle - 2D|Main|83.24|ml^ml^UCUM||||F
OBX|5|NM|US.CA.LV.EF:TEI:BMODE^EF^99Tomtec-2.0^Left Ventricle - 2D|Main|70.4|%^%^UCUM||||F
OBX|6|NM|US.CA.LV.ESV:TEI:BMODE^ESV (Teichholz)^99Tomtec-2.0^Left Ventricle - 2D|Main|35.00|ml^ml^UCUM||||F
OBX|7|NM|US.CA.LV.IVSD:BMODE^IVSd^99Tomtec-2.0^Left Ventricle - 2D|Main|7|mm^mm^UCUM||||F
OBX|8|FT|Indication.Cardiac^Indication^99Tomtec-2.0^Study - Indication|Main|abnormal CXR||||F
OBX|9|NM|US.CA.LV.PWD:BMODE^LVPWd^99Tomtec-2.0^Left Ventricle - 2D|Main|8|mm^mm^UCUM||||F
OBX|10|NM|US.CA.LV.FS:BMODE^FS^99Tomtec-2.0^Left Ventricle - 2D|Main|40.0|%^%^UCUM||||F
OBX|11|NM|US.CA.LV.MASS:BMODE:MASSPENN^LV Mass Penn^99Tomtec-2.0^Left Ventricle - 2D|Main|142|g^g^UCUM||||F
OBX|12|FT|LV.General^General^99Tomtec-2.0^Left Ventricle|Main|normal||||F
OBX|13|FT|LV.CavitySize^Cavity size^99Tomtec-2.0^Left Ventricle|Main|normal||||F
OBX|14|NM|US.CA.LV.RWT:BMODE^LV RWT^99Tomtec-2.0^Left Ventricle - 2D|Main|0.32|^UCUM||||F
OBX|15|NM|US.CA.LV.MASS:BMODE:MASSMMODE^LV Mass-c^99Tomtec-2.0^Left Ventricle - 2D|Main|125|g^g^UCUM||||F
OBX|16|FT|Study.Quality^Study quality^99Tomtec-2.0^Procedure Details|Main|excellent||||F
OBX|17|NM|US.CA.LV.MINAXS:BMODE^LVIDs^99Tomtec-2.0^Left Ventricle - 2D|Main|30|mm^mm^UCUM||||F
OBX|18|FT|Title_TransthoracicEchocardiography^Transthoracic Echocardiography Report^99Tomtec-2.0|Main||||F
OBX|19|FT|PatientName^99Tomtec-2.0|Main|Patient^X0a^Doe John||||F
OBX|20|FT|PatientInfo^99Tomtec-2.0|Main|Patient ID P0001^X0a^Accession Number 2324555280^X0a^Visit Number 7565953846||||F
OBX|21|FT|Indication_TTE^Indication^99Tomtec-2.0|Main|Abnormal CXR. ||||F
OBX|22|FT|ProcedureDetails_TTE^Procedure^99Tomtec-2.0|Main|Study quality: excellent. ||||F
OBX|23|FT|AutoSummary_TTE^Summary^99Tomtec-2.0|Main|^* Left Ventricle: The left ventricle cavity size, wall thickness and systolic function are within normal limits. There are no wall motion abnormalities. Ejection fraction is normal. The left ventricle cavity size is normal. ||||F
OBX|24|FT|Measurements_2D_MMode01_Dynamic_Block^2D and MMode^99Tomtec-2.0|Main||||F
OBX|25|FT|LeftVentricle^Left Ventricle^99Tomtec-2.0|Main|The left ventricle cavity size, wall thickness and systolic function are within normal limits. There are no wall motion abnormalities. Ejection fraction is normal. The left ventricle cavity size is normal. ||||F
OBX|26|FT|Images2xn^99Tomtec-2.0|Main||||F
OBX|27|FT|FinalizerInfoMultiline^99Tomtec-2.0|Main|Finalized by^X0a^Admin TomTec^X0a^11/08/2021, 01:38:57 PM||||F

```

### 2.2.6.2 ORU^R01 Transmit Specific Report Content

```

MSH|^~\&|TOMTEC-ARENA||HIS|HISFacility|202111312133861||ORU^R01^ORU_R01|6059be33c2a34178ab1d|P|2.3.1||||8859/1
EVN|R01
PID||P0001||Doe^John||19000101|M
PV1|||||V0001
ORC|CN|O0001|A0001
OBR|||||F
OBX|1|FT|AutoSummary_TTE^Summary^99Tomtec-2.0|Main|^* Left Ventricle: The left ventricle cavity size, wall thickness and systolic function are within normal limits. There are no wall motion abnormalities. Ejection fraction is normal. The left ventricle cavity size is normal. ||||F

```

### 2.2.6.3 ORU^R01 Transmit Measurements from Worksheet

```

MSH|^~\&|TOMTEC-ARENA||HIS|HISFacility|20220202121212||ORU^R01^ORU_R01|6059be33c2a34178ab1d|P|2.3.1||||8859/1
EVN|R01
PID||P0001||Doe^John||19000101|M
PV1|||||V0001
ORC|CN|O0001|A0001
OBR|||||2010-07-02 15:37:33.000000|||||R

```

```
OBX|1|NM|US.CA.LV.EDV:TEI:BMODE^EDV (Teichholz)^99Tomtec-2.0^Left Ventricle - 2D|Main|19.54|ml^ml^UCUM||||R
OBX|2|NM|US.CA.LV.SV:TEI:BMODE^SV^99Tomtec-2.0^Left Ventricle - 2D|Main|10.89|ml^ml^UCUM||||R
OBX|3|NM|US.CA.MV.PHT:ANTFLOW:DOPPLER^MV PHT^99Tomtec-2.0^Mitral Valve - MV|Main|146|ms^ms^UCUM||||R
```

#### 2.2.6.4 ORU^R01 Transmit Link to Report PDF

```
MSH|^~\&|TOMTEC-ARENA||HIS|HISFacility|202111312133861||ORU^R01^ORU_R01|6059be33c2a34178ab1d|P|2.3.1||||8859/1
EVN|R01
PID||P0001||Doe^John||19000101|M
PV1||||||||||||V0001
ORC|CN|O0001|A0001
OBR||||||||||||F
OBX|1|HD|Study Instance UID|1|1.3.46.670589.14.9006.301.2.4.46.678.1.4312.1424608560858.2||||F
OBX|2|ED|Link to PDF|3|D:/Export/PDF/1.3.46.670589.14.9006.301.2.4.46.678.1.4312.1424608560858.2-20220101124555.pdf||||F
```

#### 2.2.6.5 ORU^R01 Transmit Report PDF embedded

```
MSH|^~\&|TOMTEC-ARENA||HIS|HISFacility|202111312133861||ORU^R01^ORU_R01|6059be33c2a34178ab1d|P|2.3.1||||8859/1
EVN|R01
PID||P0001||Doe^John||19000101|M
PV1||||||||||||V0001
ORC|CN|O0001|A0001
OBR||||||||||||F
OBX|1|HD|Study Instance UID|1|1.3.46.670589.14.9006.301.2.4.46.678.1.4312.1424608560858.2||||F
OBX|2|ED|Encapsulated Data PFD|2|^application/pdf^^Base64^JVBERi0xLj ... ||||F
```

#### 2.2.6.6 MDM^T02 Transmit Report PDF embedded

```
MSH|^~\&|TOMTEC-ARENA||HIS|HISFacility|20220202121212||MDM^T02^MDM_T02|42|P|2.3.1||||8859/1
EVN|T02
PID||P0001||Doe^John||19010101|M
PV1||||||||||||V0001
ORC|CN|O0001|A0001
OBR||||||||||||F
TXA|1|DI|application/pdf||||||AU
OBX|1|ED|Encapsulated Data PDF|2|^application/pdf^^Base64^JVBERi0xLj ... ||||F
```

## 2.3 LANGUAGE SUPPORT

The following language encodings are recommended:

#	Language	Language Code (ISO 639-2) ETF (*)	HL7 Character Set
1	English	ENG	8859/1
2	Bulgarian	BUL	8859/5
3	Chinese simplified	ZHO-Hans	UNICODE UTF-8
4	Chinese traditional	ZHO-Hant	UNICODE UTF-8
5	Croatian	HRV	8859/2
6	Czech	CES	8859/2
7	Danish	DAN	8859/1
8	Dutch	NLD	8859/1
9	Estonian	EST	8859/1
10	Finnish	FIN	8859/1
11	French	FRA	8859/1
12	German	DEU	8859/1
13	Greek	ELL	8859/7
14	Hungarian	HUN	8859/2
15	Indonesian	IND	UNICODE UTF-8
16	Italian	ITA	8859/1
17	Japanese	JPN	UNICODE UTF-8
18	Kazakh	KAZ	8859/2
19	Korean	KOR	UNICODE UTF-8
20	Latvian	LAV	8859/4
21	Lithuanian	LIT	8859/4
22	Macedonian	MKD	8859/5
23	Norwegian	NOR	8859/1
24	Polish	POL	8859/1
25	Portuguese	POR	8859/1
26	Romanian	RON	8859/2
27	Russian	RUS	8859/5
28	Serbian	SRP	8859/2
29	Slovak	SLK	8859/2
30	Slovenian	SLV	8859/2
31	Spanish	SPA	8859/1
32	Swedish	SWE	8859/1
33	Turkish	TUR	8859/9
34	Vietnamese	VIE	UNICODE UTF-8

The 'UNICODE UTF-8' encoding can be used for all languages, if the receiving device supports UTF-8 encoding.