HL7 2.5 Communication Protocol specifications

RADIOMETER

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HL7 2.5 Protocol

Overview

Introduction This chapter describes the structure of version 2.5 of the HL7 high-level protocol. In the product setup program for analyzers, this is the HL7 version 2.5 ver. option. In the Product setup program for the RADIANCE system, it is HL7 2.5 ER Codec.

This chapter describes how the ABL800 FLEX analyzers, ABL80 FLEX analyzers, the AQT90 FLEX analyzers, the ABL9 analyzer and the RADIANCE system implement the HL7 2.5 protocol. Throughout this manual, these systems will be referred to as the Radiometer System. Some features of the HL7 2.5 Protocol are supported when the interface is configured through the RADIANCE system. These features will be noted accordingly. All other RMED analyzers do not support this protocol.

Contents This chapter contains the following topics.

Message flow

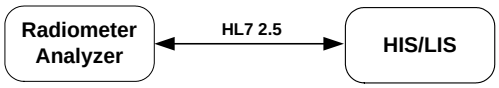
Introduction

HL7 2.5 high-level Communication between the Radiometer System and the HIS/LIS system is specified in this manual as a series of messages flowing between these systems.

The exchanged messages can be divided into 3 groups:

1. Unsolicited messages sent by the Radiometer System to the HIS/LIS.
2. Unsolicited messages received by the Radiometer System from the HIS/LIS.
3. Query-Response messages where the Radiometer System sends a query message and expects a response message from the HIS/LIS.

These messages are exchanged between the Radiometer System and the HIS/LIS depending upon the installation setup:



When the RADIANCE system is used to interface with the HIS/LIS the process of sending messages to the HIS/LIS is a 2-step sequence where the analyzer first sends a message to the RADIANCE system, which then sends a message to HIS/LIS. Likewise, the process of receiving messages from the HIS/LIS is a 2-step sequence where the RADIANCE system receives the message and then forwards it to the analyzer.

Note:

The acknowledgment sent by the Radiometer System to the HIS/LIS system depends on the acknowledgment requested in the HL7 message header received from the HIS/LIS.

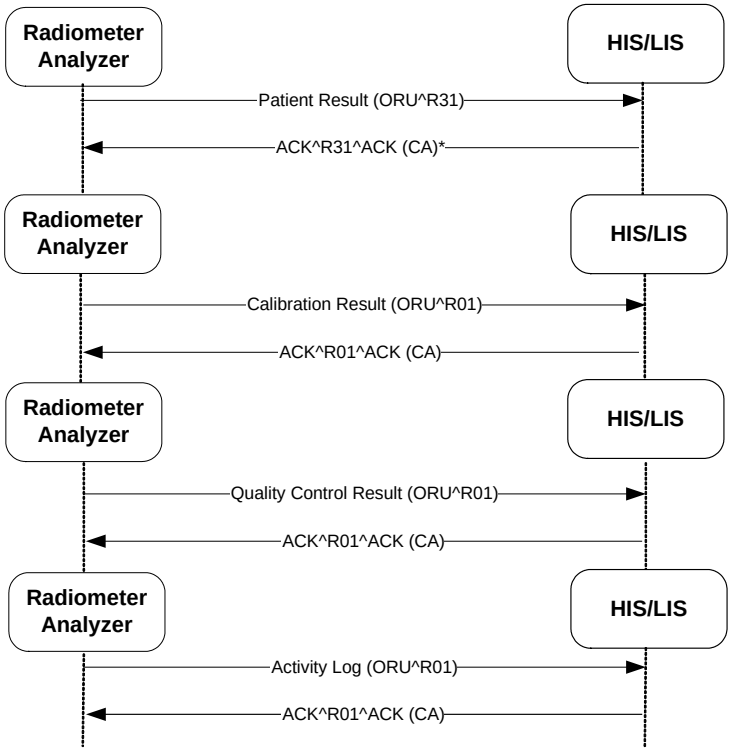
Unsolicited Messages Sent

The unsolicited messages sent by the Radiometer System to the HIS/LIS system are:

- Patient Result
- Calibration Result
- Quality Control Result
- Activity Log Message
- Calibration Verification Result (AQT90 FLEX analyzer specific)

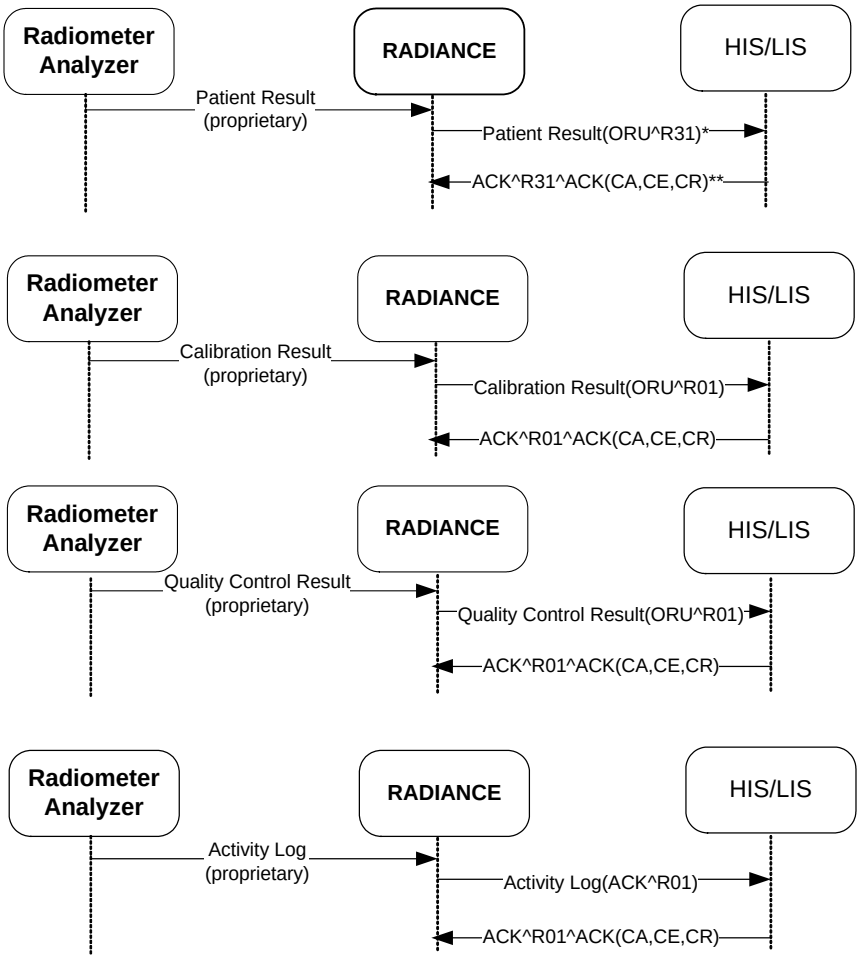
- Built-in QC Result (AQT90 FLEX analyzer specific)
- Calibration Adjustment Result (AQT90 FLEX analyzer specific)

The following diagram illustrates the flow of messages sent from Radiometer analyzers when connected to the HIS/LIS system directly.



- CA=Enhanced mode; Accept Acknowledgment: Commit Accept. If the HIS/LIS does not accept the transmission this should be set to CE (Commit Error) or CR (Commit Reject).

The following illustrates the flow of messages when Radiometer analyzers are connected to the RADIANCE system and the RADIANCE system communicates with the HIS/LIS system.



*The trigger event R31 signals the receiving system that this is a patient result, which may or may not have an associated test order. It instructs the receiving system to look for an order based on the information contained in the patient result (e.g. if an accession number is present use this to look up the order).

In the RADIANCE system you can change this trigger by configuring a “User defined protocol”. In this case the following tag in the protocol stack Config section for the HL7_25 protocol module must be set accordingly:

<Name>HL7_25</Name>

<Config>

…

<HL7_25_PatService>R31</ HL7_25_PatServicE>

…

</Config>

Value	Description – HIS/LIS action
"R30"	Patient result has no order – create an order
"R31"	Patient result may or may not have an order – search for order
"R32"	Patient result has an order – Accession number is included and should be used to look up order

** The acknowledgment uses enhanced mode where it can be a positive response (CA=Commit Accept) or negative response (CR=Commit Reject or CE=Commit Error)

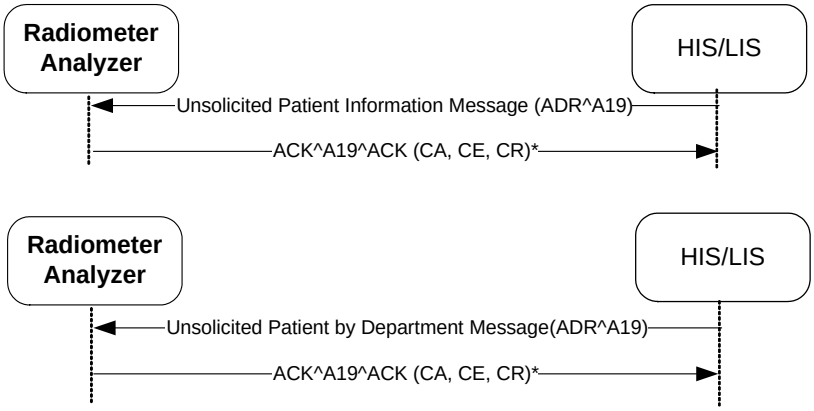
*** The ABL9 analyzer transmits R30 and R32, but not R31

Unsolicited Messages Received

The unsolicited messages received by the Radiometer System from the HIS/LIS system are:

- Unsolicited Test Order Message (in the RADIANCE system only)
- Unsolicited Patient Information Message
- Unsolicited Patient by Department Message

The following diagram illustrates the flow of unsolicited messages received by Radiometer analyzer when connected to the HIS/LIS system directly.

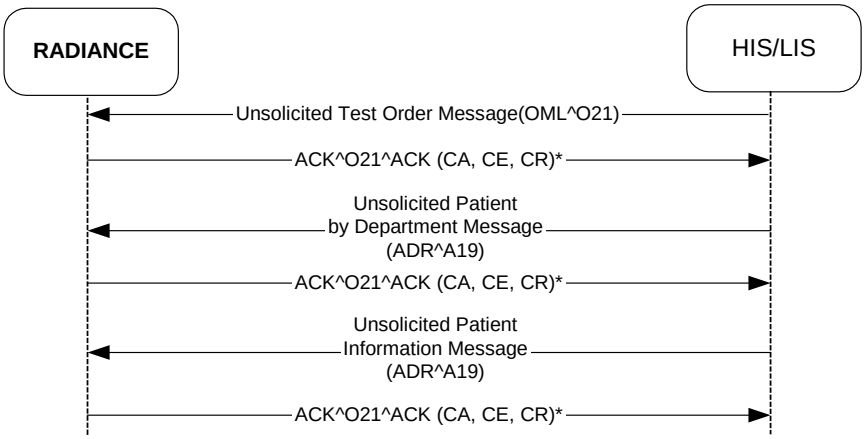


*CA=Commit Accept, CE=Commit Error, CR=Commit Reject

When the Radiometer analyzer receives a ***Patient Information Response*** or a ***Patient by Department Response*** and there is no outstanding query then it is considered unsolicited.

In these cases the information is stored in the patient profile database and is not attached to any patient test result.

The following diagram illustrates the flow of unsolicited messages when the RADIANCE system is connected to the HIS/LIS system using HL7 V2.5.



*CA=Commit Accept, CE=Commit Error, CR=Commit Reject

In addition to ***Patient by Department Response*** and ***Patient Information Response*** messages, the RADIANCE system can also receive ***Test Order*** messages.

When the RADIANCE system receives a ***Test Order, Patient by Department Response*** or ***Patient Information Response*** and there is no outstanding query then it is considered unsolicited.

This message is used to update the RADIANCE database with the latest patient information or test order for a given patient department. It is not forwarded to the analyzer. When receiving unsolicited information, only information that is stored in the database is retained. All other information is lost.

Query-Response Messages

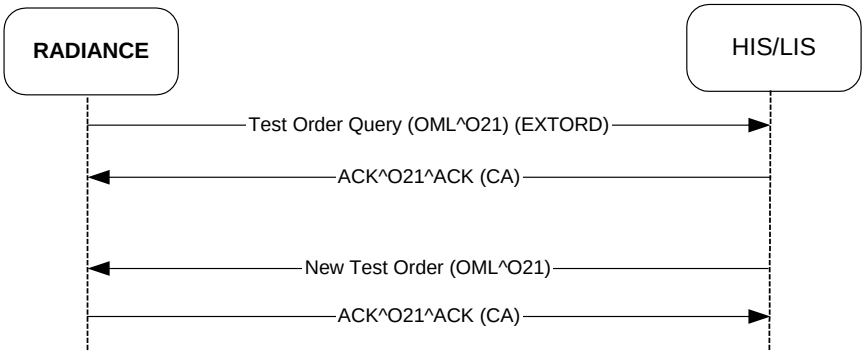
The Query-Response messages where the Radiometer System sends a query message and expects a response message from the HIS/LIS include:

- Test Order Query/Test Order (the RADIANCE system Only)
- Patient Information Query/Patient Information Response
- Patient by Department Query/Patient by Department Response

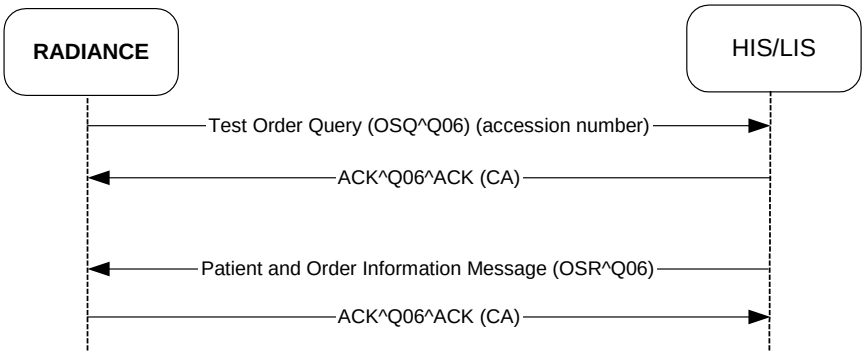
The RADIANCE system supports querying for test orders from the HIS/LIS. This is not supported on the analyzer.

A Test order query can be either an order to create a new order or it can be a query for patient demographics based on an existing order number (accession number).

When used to generate a new order for a patient result received from the analyzer, which has no order, it is referred to as EXTORD or External Order and is typically initiated when processing the result.



When used to query patient demographics based on an existing order number then the messages exchanged are as follows:

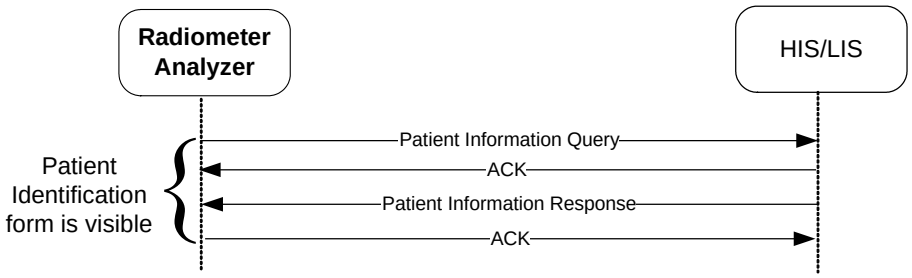


If a Radiometer analyzer is connected to the RADIANCE system, then the RADIANCE system relays the queries from the analyzer to the HIS/LIS system, and, likewise, relays responses from the HIS/LIS system to the analyzer.*

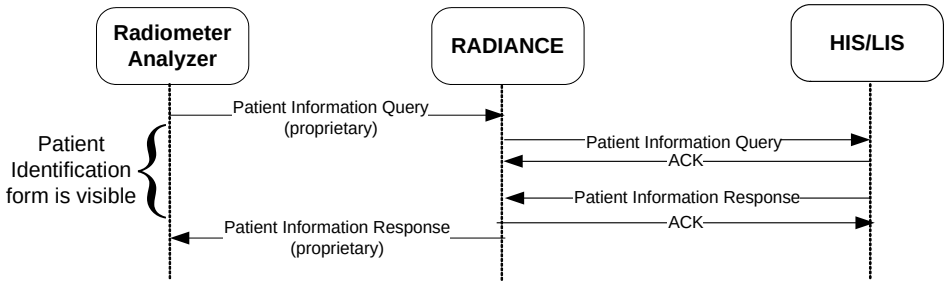
The following diagram illustrates the flow of messages for the Patient Information Query when the analyzer is connected to the HIS/LIS system directly.

Note: *If the Patient Identification Form on the analyzer is closed before the response to a patient information request has been received, the response is treated as an unsolicited patient information message. Hence, a response received after the Patient Identification form has been closed is stored as a patient profile in the analyzer's database, but the information received is not attached to any patient test result.*

* Not implemented by the ABL9



The following diagram illustrates the flow of messages for the Patient Information Query when the analyzer is connected to the RADIANCE system.

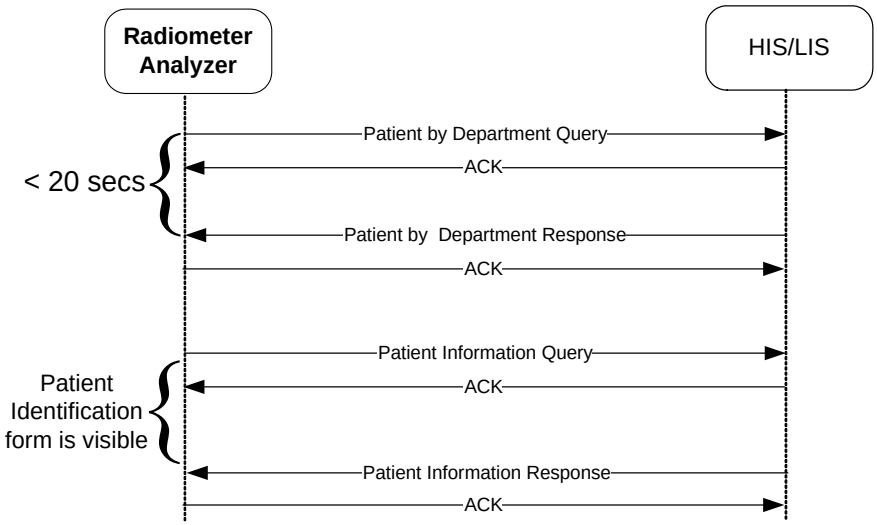


When the ***Patient Lookup*** function is activated on the Radiometer Analyzer*, a series of queries is made. First the Patient by Department Query is made to obtain a list of patients. When the user chooses a patient the analyzer then sends a Patient Information Query to obtain more detailed demographics information on the chosen patient.

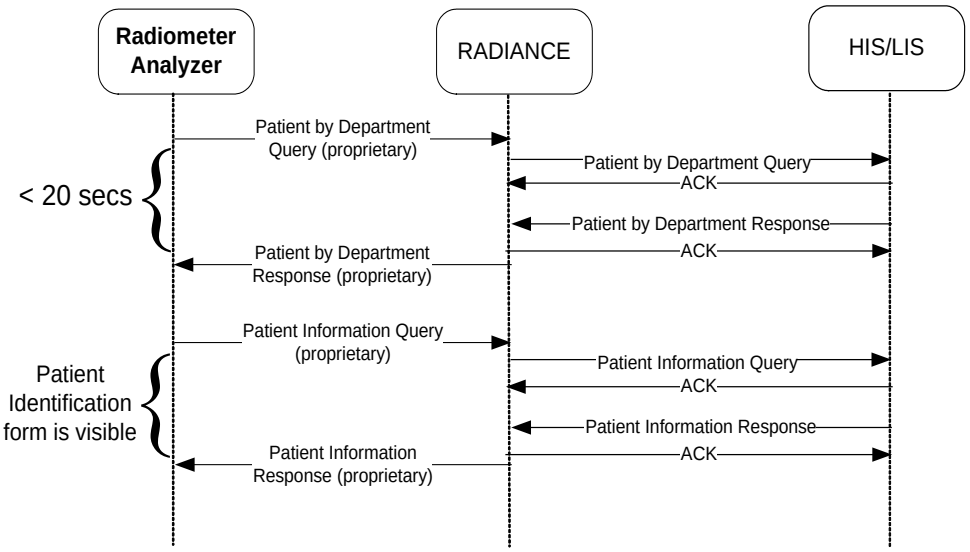
* Not implemented by the ABL9 Analyzer.

Note: *If the analyzer does not receive a response to a Patient by Department Query within 20 seconds of sending the query, the query times out. A response received after the timeout is treated as an unsolicited Patient by Department message and is stored in the patient by department list in the analyzer's database. The information received is not attached to any patient test result.*

The following diagram illustrates the flow of messages when the analyzer is connected directly to the HIS/LIS system.



The following diagram illustrates the flow of messages for ***Patient by Department*** Query when the analyzer is connected to the RADIANCE system, and the RADIANCE system is configured for these queries.



Note:

- *The timeout value on the analyzer of 20 seconds may be changed to meet site-specific requirements. Please consult your Radiometer Service Representative if necessary.*

Message structure

Introduction

The following table briefly describes concepts used when describing the HL7 2.5 high-level protocol. For further details refer to the original HL7 version 2.5 standard specifications.

Concept	Definition
Message	A complete, self-contained entity of data. An example of a message is a complete patient test result including patient identification, order information, parameter values and error messages
Segment	A message is composed of segments each containing related elements of data. Examples of segments are the patient information segment keeping all the patient data that is common to all orders and the order segment keeping data that is common for the individual order.
Field	Each segment has a number of fields each holding one or more data elements. For instance, the patient information segment has a field containing the patient's name and a field holding the patient's birth data.
Component field	A field may be divided into several components. The name field of the patient information segment has the components *last name, first name* and *middle initials*.

Message

Messages consist of various segment types that are listed in the table below.

Segment Type	Name
MSH	Message header segment
MSA*	Message acknowledgement segment
SFT*	Software segment
PID	Patient identification segment
PV1	Patient visit segment
ORC	Common order segment
OBR	Observation request segment
OBX	Observation/result segment
NTE	Notes and comments segment
QRD*	Query definition segment

* Not transmitted by the ABL9 analyzer

Message Structure Example

To exchange information, the Radiometer System sends messages to the HIS/LIS as a sequence of segments.

The example below shows the message structure for reporting a measurement.

Segment Type	Name
MSH	Message header segment
PID	Patient identification segment
PV1	Patient visit segment
ORC	Common order segment
OBR	Observation request segment
NTE	Notes and comments segment
NTE	Notes and comments segment
OBX	Observation/result segment 1
NTE	Notes and comments segment
OBX	Observation/result segment 2
NTE	Notes and comments segment
OBX	Observation/result segment 3
OBX	Observation result segment 4
OBX	Observation result segment 5
OBX	Observation result segment 6
OBX	Observation/result segment 7

The Notes and Comments segment are only transmitted if a system message, or an Audit Trail, applies to the previous segment. See 8-21 for details on how the Audit trail is transmitted via Notes and Comments segments.

The Notes and Comments segments following the Observation request segment apply to the entire result, whereas Notes and comments segments following the Observation/result segment apply to individual parameters.

Delimiters Delimiters are used to separate the segment into fields and components. Delimiters may vary from implementation to implementation, and are defined as part of the header segment. The following delimiters are used in the Radiometer System:

Delimiter	Name	Dec. Code	Hex. Code
"|"	Field delimiter	124	7C
"~"	Repeat field delimiter	126	7E
"^"	Component field delimiter	94	5E
"&"	Sub compound delimiter	38	26
"\"	Escape character	92	5C
<CR>	Segment	13	D

Note *The Segment delimiter is always <CR> Carriage Return*

Dec code: 13

The Segment delimiter <CR> is applied to the end of all segment types.

**The ABL9 analyzer escapes all delimiter characters shown in the chart above except the ampersand (&).*

Dates and Times Dates are always represented as: YYYYMMDD

Times are always represented as: HHMMSS

Dates and times together are represented as: YYYYMMDDHHMMSS

Decimal Values Decimal values are transmitted with a period as the decimal separator, e.g. 7.243

Messages sent from the Radiometer system

Introduction This section outlines messages that are sent from the Radiometer System to the HIS/LIS and which segments are currently supported.

Patient result

Message Structure The message structure of a patient result is shown below. Segments contained within brackets [] are optional and may not be in some messages. Segments contained within braces {} may be present more than one time. The segment type NTE is only sent if a comment is present. The number of OBX segments depends on analyzer.

Segment Type	Name
MSH	**Header segment**
PID	**Patient identification segment**
PV1	**Patient visit segment**
ORC	**Common order segment**
OBR	**Observation request segment**
[{NTE}]	**0 or more Notes and comments segments associated with entire patient result**
[{OBX	**0 or more Observation/result segments each containing a parameter value in the patient result**
[{NTE}]	**0 or more Notes and comments segments associated with previous OBX segment (parameter value)**
}]	

Example

```
MSH|^~\&|ABL835^ABL|ABL835^ABL|||20061121122450||ORU^R31|10|P
|2.5|||AL|NE|US|8859/1

PID|1||564322

PV1|1|U

ORC|NW|||||||||||||||||||||||||||

OBR|1|||Syringe^||||||||||BLD^^^LLFA^^^P|^||||||200611211219
00|||F
```

```
OBX|1|ST|^^^Glu^M||.....|mmol/L||<|||F|||20061121121900
NTE|1|L|210^Calibration error(s) present
NTE|2|L|476^Measurement unstable
NTE|3|L|94^Value below the reportable range
OBX|2|ST|^^^T^I||37.0|Cel||N|||F
OBX|3|ST|^^^Cl-^M||.....|mmol/L||<|||F
NTE|1|L|94^Value below the reportable range
OBX|4|ST|^^^Ca++^M||2.11|mmol/L||N|||F
OBX|5|ST|^^^Na+^M||4|mmol/L||<|||F
NTE|1|L|94^Value below the reportable range
OBX|6|ST|^^^pO2(T)^M||186|mmHg||N|||F
OBX|7|ST|^^^pO2^M||186|mmHg|>158|N|||F
OBX|8|ST|^^^MetHb^M||.....|%||N|||F
NTE|1|L|789^? on parameter
OBX|9|ST|^^^COHb^M||.....|%||N|||F
NTE|1|L|789^? on parameter
OBX|10|ST|^^^sO2^M||.....|%||N|||F
NTE|1|L|789^? on parameter
OBX|11|ST|^^^O2Hb^M||.....|%||N|||F
NTE|1|L|789^? on parameter
OBX|12|ST|^^^RHb^M||.....|%||N|||F
NTE|1|L|789^? on parameter
OBX|13|ST|^^^tHb^M||0.01|g/dL||N|||F
OBX|14|ST|^^^pCO2(T)^M||8.9|mmHg||N|||F
OBX|15|ST|^^^pCO2^M||8.9|mmHg||N|||F
OBX|16|ST|^^^pH^M||8.619||6.950-7.150|>|||F
NTE|1|L|476^Measurement unstable
NTE|2|L|93^Value above the reportable range
OBX|17|ST|^^^K+^M||0.1|mmol/L||<|||F
NTE|1|L|94^Value below the reportable range
OBX|18|ST|^^^pdepartment^||0|||N|||F
```

Calibration result

Message Structure

The message structure of a calibration result is shown below. Segments contained within brackets [] are optional and may not be in some messages. Segments contained within braces {} may be present more than one time. The record segment type <NTE> is only sent if a comment is present. The number of OBX records segments depends on the analyzer.

Segment Type	Name
MSH	**Header segment**
PID	**Patient Information identification segment. Always contains fixed string PID|1**
OBR	**Test order Observation request segment. Identifies calibration result.**
[{NTE}]	**0 or one Comment Notes and comments segments associated with entire calibration result** ***Note*:** *Analyzers can only have 0 or 1 comment records*
[{OBX	**0 or more Result Observation / result segments each containing a parameter value in the calibration result**
[{NTE}]	**Optional 0 or more Comment Notes and comments segments associated with previous result OBX segment (parameter value)** ***Note*:** Analyzers *can only have 0 or 1 comment records*
}]	

Example

```
MSH|^~\&|ABL835^ABL|ABL835^ABL|||20061121122549||ORU^R01|13|P
|2.5|||AL|NE|US|8859/1

PID|1

OBR|1||2461^Cal #|RMED Calibration|||||||O||||2 Point
Calibration

OBX|1|ST|^B^M||745|mmHg|||||F|||20061121084100

OBX|2|ST|^pH^M||7.396||||||F
```

```
OBX|3|ST|^pH^M||6.873||||||F
OBX|4|ST|^pH^M||-0.001||||||F
OBX|5|ST|^pH^M||-0.001||||||F
OBX|6|ST|^pH^M||7.202||||||F
OBX|7|ST|^pH^M||92.7|%|||||F
OBX|8|ST|^pCO2^M||39.0|mmHg|||||F
OBX|9|ST|^pCO2^M||78.2|mmHg|||||F
OBX|10|ST|^pCO2^M||1.0|mmHg|||||F
OBX|11|ST|^pCO2^M||0.8|mmHg|||||F
OBX|12|ST|^pCO2^M||48.6|mmHg|||||F
OBX|13|ST|^pCO2^M||79.3|%|||||F
NTE|1||378^Calibration sensitivity out of range
OBX|14|ST|^pO2^M||138.1|mmHg|||||F
OBX|15|ST|^pO2^M||0.1|mmHg|||||F
OBX|16|ST|^pO2^M||-1.2|mmHg|||||F
OBX|17|ST|^pO2^M||-0.1|mmHg|||||F
OBX|18|ST|^pO2^M||25.3|pA/mmHg|||||F
OBX|19|ST|^pO2^M||1.1|mmHg|||||F
OBX|20|ST|^tHb^M||611.44|pA|||||F
OBX|21|ST|^tHb^M||0.20|pA|||||F
OBX|22|ST|^K+^M||4.0|mmol/L|||||F
OBX|23|ST|^K+^M||38.7|mmol/L|||||F
OBX|24|ST|^K+^M||0.0|mmol/L|||||F
OBX|25|ST|^K+^M||0.3|mmol/L|||||F
OBX|26|ST|^K+^M||2.7|mmol/L|||||F
OBX|27|ST|^K+^M||93.7|%|||||F
OBX|28|ST|^Na+^M||145|mmol/L|||||F
OBX|29|ST|^Na+^M||20|mmol/L|||||F
OBX|30|ST|^Na+^M||1|mmol/L|||||F
OBX|31|ST|^Na+^M||0|mmol/L|||||F
OBX|32|ST|^Na+^M||37|mmol/L|||||F
OBX|33|ST|^Na+^M||93.4|%|||||F
OBX|34|ST|^Ca++^M||1.26|mmol/L|||||F
OBX|35|ST|^Ca++^M||5.00|mmol/L|||||F
OBX|36|ST|^Ca++^M||0.01|mmol/L|||||F
OBX|37|ST|^Ca++^M||0.02|mmol/L|||||F
OBX|38|ST|^Ca++^M||3.94|mmol/L|||||F
OBX|39|ST|^Ca++^M||91.9|%|||||F
OBX|40|ST|^Cl-^M||102|mmol/L|||||F
OBX|41|ST|^Cl-^M||50|mmol/L|||||F
```

```
OBX|42|ST|^Cl-^M||-0|mmol/L|||||F
OBX|43|ST|^Cl-^M||-0|mmol/L|||||F
OBX|44|ST|^Cl-^M||119|mmol/L|||||F
OBX|45|ST|^Cl-^M||86.8|%|||||F
OBX|46|ST|^Glu^M||.....|pA/mM|||||F
NTE|1||378^Calibration sensitivity out of range
OBX|47|ST|^Glu^M||6.2|mmol/L|||||F
NTE|1||376^Calibration Drift 1 out of range
OBX|48|ST|^Glu^M||10.1|mmol/L|||||F
```

Quality Control result

Message Structure

The message structure of a quality control result is shown below. Segments contained within brackets [] are optional and may not be in some messages. Segments contained within braces {} may be present more than one time. The segment type <NTE> is only sent if a comment is present. The number of OBX segments depends on the analyzer.

<table>
<tr><th>Segment Type</th><th>Name</th></tr>
<tr><td>MSH</td><td>Header segment</td></tr>
<tr><td>PID</td><td>Patient Information Identification segment. Contains fixed string P|1||||||||||||||||||||||||||||||||||||||</td></tr>
<tr><td>OBR</td><td>Test order Observation request segment.
Identifies Quality Control result.</td></tr>
<tr><td>[{NTE}]</td><td>0 or one Notes and Comments segments associated with entire QC result
Note: Analyzers can only have 0 or 1 comment records</td></tr>
<tr><td>[{OBX</td><td>0 or more Observation/result Result segments each containing a parameter value in the QC result</td></tr>
<tr><td>[{NTE}]</td><td>Optional 0 or more Notes and Comments segments associated with previous result OBX segment (parameter value)
Note: Analyzers can only have 0 or 1 comment records.</td></tr>
<tr><td>}]</td><td></td></tr>
</table>

Example

```
MSH|^~\&|ABL835^ABL|ABL835^ABL|||20061121122545||ORU^R01|12|P
|2.5|||AL|NE|US|8859/1

PID|1

OBR|1||513^QC #|RMED QC|||||||O||||S7745^111

OBX|1|ST|^B^M||746|mmHg|||||F|||20061121080500||^autocheck

OBX|2|ST|^pH^M||7.404||||||F
```

```
OBX|3|ST|^pH(T)^M||7.404|||||F
OBX|4|ST|^pCO2^M||39.1|mmHg|||||F
OBX|5|ST|^pCO2(T)^M||39.0|mmHg|||||F
OBX|6|ST|^tHb^M||13.0|g/dL|||||F
OBX|7|ST|^O2Hb^M||92.2|%|||||F
OBX|8|ST|^sO2^M||96.9|%|||||F
OBX|9|ST|^COHb^M||2.8|%|||||F
OBX|10|ST|^MetHb^M||2.0|%|||||F
OBX|11|ST|^HbF^M||79|%|||||F
OBX|12|ST|^pO2^M||102|mmHg|||||F
OBX|13|ST|^pO2(T)^M||102|mmHg|||||F
OBX|14|ST|^K+^M||3.7|mmol/L|||||F
OBX|15|ST|^Na+^M||138|mmol/L|||||F
OBX|16|ST|^Ca++^M||0.48|mmol/L|||||F
OBX|17|ST|^Cl-^M||96|mmol/L|||||F
OBX|18|ST|^T^M||24.7|Cel|||||F
OBX|19|ST|^Glu^M||21.5|mmol/L|||||F
NTE|1||452^Interference during measurement
NTE|2||210^Calibration error(s) present
NTE|3||476^Measurement unstable
NTE|4||589^Measured QC value higher than statistical range
OBX|20|ST|^tBil^M||299|micromol/L|||||F
```

Calibration verification result

Message Structure

The message structure of a calibration verification result is shown below. Segments contained within brackets [] are optional and may not be in some messages. Segments contained within braces {} may be present more than one time. The segment type <NTE> is only sent if a comment is present. The number of OBX segments depends on the analyzer.

Segment Type	Name
MSH	**Header segment**
PID	**Patient Information Identification segment. Contains fixed string P|1**
OBR	**Test order Observation request segment.** **Identifies result.**
[ORC]	**Test order Order control segment. Only used if done as LCR** **Contains fixed string 1|NW**
[{NTE}]	**0 or one Notes and Comments segments associated with entire result** ***Note*: *Analyzers can only have 0 or 1 comment records***
[{OBX	**0 or more Observation / result segments each containing a parameter value in the result**
[SID]	**0 or more Substance identifier segments, one per OBX of a Calibration verification if done as LCR**
[{NTE}]	**Optional 0 or more Notes and comments segments associated with previous result OBX segment (parameter value)** ***Note*: *Analyzers can only have 0 or 1 comment records.***
}]	

Examples First example is a calibration verification done as a LQC:

```
MSH|^~\&|AQT90 FLEX^R0071N0005|AQT90
FLEX^R0071N0005|||20110405144005||ORU^R01|1|P|2.5|||AL|NE|US|
8859/1

PID|1

OBR|1||1^CV #^LQC|RMED Calibration
Verification|||20110317092056||||O||||Non-R-
^1234||||||||||||||||||||the Operator||

OBX|1|ST|^TnI^M||20|ug/L||N|||F|||||^||

SID|100
```

Second example is a calibration verification done as a patient sample:

```
MSH|^~\&|AQT90 FLEX^R0071N0005|AQT90
FLEX^R0071N0005|||20110405143949||ORU^R01|1|P|2.5|||AL|NE|US|
8859/1

PID|1||1234||John^Michael|||

PV1|1||

ORC|NW

OBR|1||7^CV #^LCR|RMED Calibration
Verification|||||||O||||^^^^^^P||||||||||||||||||the
Operator||

NTE|1||1071^1071: MaxSampleAge Exceeded

OBX|1|ST|^TnI^M||>25|ug/L||>|||F|||||^||

SID|100

NTE|1||93^0093: Value above the reportable range
```

AQT90 Built-in QC result

Message Structure

The message structure of an AQT90 Built-in QC result is shown below. Segments contained within brackets [] are optional and may not be in some messages. Segments contained within braces {} may be present more than one time. The segment type <NTE> is only sent if a comment is present. The number of OBX segments depends on the analyzer.

Segment Type	Name
MSH	**Header segment**
PID	**Patient Information Identification segment. Contains fixed string P|1**
OBR	**Test order Observation request segment.** **Identifies result.**
[{NTE}]	**0 or one Notes and Comments segments associated with entire result** ***Note*: *Analyzers can only have 0 or 1 comment records***
[{OBX	**0 or more Observation/result segments each containing a parameter value in the result**
[{NTE}]	**Optional 0 or more Notes and comments segments associated with previous result OBX segment (parameter value)** ***Note*: *Analyzers can only have 0 or 1 comment records.***
}]	

Example

```
MSH|^~\&|AQT90 FLEX^R0071N0005|AQT90
FLEX^R0071N0005|||20110830032802||ORU^R01|1|P|2.5|||AL|NE|US|
8859/1

PID|1

OBR|1||1^BuiltinQC #|RMED Builtin
QC|||20110317103128||||O|||||||||||||||||||||the Operator||

OBX|1|ST|^^^Power^AU Voltage
12V||12.0||10.8^13.2||||F||OK|||||

OBX|2|ST|^^^Power^AU Voltage
24AV||24.0||21.6^26.4||||F||OK|||||
```

```
OBX|3|ST|^^^Power^AU Voltage
24BV||24.0||21.6^26.4||||F||OK|||||

OBX|4|ST|^^^Power^AU Voltage
24CV||24.0||21.6^26.4||||F||OK|||||

OBX|5|ST|^^^Software^Software versions||||^||||F||OK|||||

OBX|6|ST|^^^Instrument^Instrument
Temperature||26.5||15^38||||F||OK|||||

OBX|7|ST|^^^Wet Section^Needle Pierce
Count||5000||0^10000||||F||OK|||||

OBX|8|ST|^^^Shaker Incubator^Incubation
Temperature||37.0||36.5^37.5||||F||OK|||||

OBX|9|ST|^^^Dryer^Dry Temperature
Before||70.0||68^72||||F||OK|||||

OBX|10|ST|^^^Dryer^Flow Temperature||||^||||F||OK|||||

OBX|11|ST|^^^Optical Unit^Maximum dark||||0^115||||F||OK|||||

OBX|12|ST|^^^Optical Unit^Maximum dark
difference||69||0^70||||F||OK|||||

OBX|13|ST|^^^Optical Unit^Reference Sample||5.0||-
20^30||||F||OK|||||

OBX|14|ST|^^^Optical Unit^Integrator||0.0||-
10^10||||F||OK|||||

OBX|15|ST|^^^Optical Unit^||||-10^10||||F||OK|||||
```

Calibration adjustment result

Message Structure

The message structure of a Calibration adjustment result is shown below. Segments contained within brackets [] are optional and may not be in some messages. Segments contained within braces {} may be present more than one time. The segment type <NTE> is only sent if a comment is present. The number of OBX segments depends on the analyzer.

Segment Type	Name
MSH	**Header segment**
PID	**Patient Information Identification segment. Contains fixed string P|1**
OBR	**Test order Observation request segment.** **Identifies result.**
[{NTE}]	**0 or one Notes and Comments segments associated with entire result** ***Note*: *Analyzers can only have 0 or 1 comment records***
[{OBX	**0 or more Observation/result segments each containing a parameter value in the result**
[{NTE}]	**Optional 0 or more Notes and comments segments associated with previous result OBX segment (parameter value)** ***Note*: *Analyzers can only have 0 or 1 comment records.***
}]	

Example

```
MSH|^~\&|AQT90 FLEX^R0071N0005|AQT90
FLEX^R0071N0005|||20110407113535||ORU^R01|1|P|2.5|||AL|NE|US|
8859/1

PID|1

OBR|1||11^CalAdjust #|RMED Calibration
Adjustment|||20110311114135||||O||20130301||CRP^100|||||||||
|||||||||the Operator||

OBX|1|ST|^^^Blank outliers|OK|0||0^2||||F|||||||

OBX|2|ST|^^^Calibration outliers|OK|0||0^2||||F|||||||
```

Activity log

Message Structure

The message structure of an activity log is shown below.

Segment Type	Name
MSH	**Header segment**
PID	**Patient Information Identification segment. Contains fixed string PID|1**
OBR	**Test order Observation request segment.** **Contains fixed string OBR|1||^Error||||||||||||**
OBX	**Result segment containing system message code, optional text and timestamp**
[NTE]	**Optional Comment segment used to include Extra Info field of activity log. Analyzers only.**

Example

A transmission example for an activity log is given below.

```
MSH|^~\&|ABL835^ABL|ABL835^ABL|||20061121122615||ORU^R01|14|P
|2.5|||AL|NE|US|8859/1
PID|1
OBR|1||^Error||||||||||||
OBX|1|ST|^Errors||697|||||||||20061121121248
```

Patient information query

Message Structure

The message is sent to the HIS/LIS to request patient demographics for a patient identified via the patient ID. Structure of a Patient Information Query is shown below.

Segment Type	Name
MSH	**Header segment**
QRD	**Query definition segment. Contains patient ID used as query key.**

* Not implemented by the ABL9 analyzer

Example

A transmission example for a query packet is given below.

Message control Id = 1002

Request information on patient id: 124511

```
MSH|^~\&|ABL835^ABL|ABL835^ABL|||20061108162816||QRY^A19|1002
|P|2.5|||AL|NE|US|8859/1||||

QRD||R|I|1|||||1^RD|124511|DEM||
```

Patient by department query

Message Structure

This message is sent to the HIS/LIS to request for a list of patients checked into a specified patient department. The structure of a Patient by Department Query is shown below.

Segment Type	Name
MSH	**Header segment**
QRD	**Query definition segment. Contains patient department used as query key.**

* Not implemented by the ABL9 analyzer

Example

A transmission example for a patient by department query is given below.

Message control id: 1003

Requesting patient department list on patient department: ICU-2.

```
MSH|^~\&|ABL835^ABL|ABL835^ABL|||20061108162816||QRY^A19|1003
|P|2.5|||AL|NE|US|8859/1||||

QRD||R|I|1|||||ANU|ICU-2
```

Test order query

Message Structure

The message structure of a Test Order Query is shown below.

Segment Type	Name
MSH	**Header segment**
QRD	**Query definition segment. Contains accession number used as query key.**

* Not implemented by the ABL9 analyzer

Example

A transmission example for a test order is given below.

Message control id: 1004

Requesting test order information on accession number: 121132121

```
MSH|^~\&|ABL835^ABL|ABL835^ABL|||20061108162816||OSQ^Q06|1004
|P|2.5|||AL|NE|US|8859/1||||

QRD||R|I|1|||||ORD|121132121
```

Acknowledgement

Message Structure

The message structure of an Acknowledgement is shown below.

Segment Type	Name
MSH	**Header segment**
MSA	**Acknowledgement message. Contain acknowledgement code and the message control id of the message that is being acknowledged**

* Not implemented by the ABL9 analyzer

Example

A transmission example:

Message control Id that is being acknowledged: 1006

```
MSH|^~\&|LIS-System^|LIS-PC^|Radiance^|Radiance-
PC^|20061121122450||ACK|40|P|2.5|AL|NE|US|8859/1

MSA|AA|1006|||
```

Messages received by the Radiometer system

Introduction This section gives examples of outlines messages that are received by the ABL800 FLEX, ABL80 FLEX, ABL90 FLEX, AQT90 FLEX and ABL9 analyzers from the HIS/LIS and which segments are currently supported.

Patient information response

Message Structure The message structure of a Patient Information Response is shown below. This message is sent by the HIS/LIS in response to a Patient Information Query or can be sent as unsolicited patient information. Segments contained within brackets [] are optional and not required from the HIS/LIS.

Segment Type	Name
MSH	Header segment
[MSA]	Optional Message Acknowledgement segment. If this segment is included in the message, the acknowledgement code must be 'AA' (MSA| AA). The ABL800 FLEX and the ABL700 Series analyzers ignore (do not use) the remaining elements of the MSA segment.
[QRD]	Optional Query Definition segment.
[EVN]	Optional Event segment. All elements of this segment are ignored (not used) by ABL800 FLEX and ABL700 Series analyzers.
[PID	Patient Identification segment.
PV1]	Patient Visit segment.

Example

A transmission example for a patient information record is given below.

PatientId: 556677

Name: Peter Hansen

Birthdate: Feb. 21 1954

Doctor: Petersen

```
MSH|^~\&|LIS^LIS|LIS^LIS|||20061208141100||ADR^A19|7|P|2.5|||
AL|NE|US|8859/1
MSA|AA|5|||
QRD||R|I|1|||||1^RD|556677|DEM|
PID|1||556677||Hansen^Peter||19540221|M|||||||||0|
PV1|1||ICU|||||||||||||01^Petersen|||||||||||||||||||||||||
|20061205|||||||||
```

Patient by department list

Introduction

Message structure

The message structure of a Patient by Department List is shown below. This message is sent by the HIS/LIS in response to a Patient by Department Query. Segments contained within brackets [ ] are optional and may not be in some messages. Segments contained within braces {} may be present more than one time.

Segment Type	Name
MSH	Header segment
[MSA]	Optional Message Acknowledgement segment. If this segment is included in the message, the acknowledgement code must be 'AA' (MSA|AA). The remaining elements of the MSA segment are ignored (not used) by ABL800 FLEX and the ABL700 Series analyzers.
QRD	Optional Query Definition segment. Note: this is a mandatory segment.
[{[	
PID	0 or more Patient Identification segment-Patient Visit segment pairs.
PV1	Patient visit segment.
]}]	

Example A transmission example for a Patient By Department list sent by the HIS/LIS in response to a Patient By Department Query is given below. Patient department -ICU. The department has 4 patients. The segments of the example message include elements not used (e.g. MSA – Timestamp; EVN segment) by the ABL800 FLEX, ABL80 FLEX, ABL90 FLEX and AQT90 FLEX analyzers.

```
MSH|^~\&|LDS-
LAB|LABOR|RADIANS|ABL700|20000311165904||ADR^A19|R_0000000450
|P|2.5
MSA|AA|20001214145000||
QRD||R|I|1||||ICU|ANU
EVN|A19|20000301165904||
PID|1||1234|56|Doe^John||19610102|M
PV1||I|ICU
PID|2||9966|9966|TheKid^Billy||19650708|M
PV1||I|ICU
PID|3||007|007|Bond^James||19320511|M
PV1||I|ICU
PID|4||066|066|Palmer^Laura||19750713|F
PV1||I|ICU
```

Test order response

Message Structure

The message structure of a Test Order Response is shown below. This message is sent by the HIS/LIS in response to a Test Order Query. Segments contained within brackets [] are optional and not required from the HIS/LIS.

Segment Type	Name
MSH	**Header segment**
[QRD]	**Query definition segment.**
PID	**Patient identification segment.**
PV1	**Patient visit segment.**
ORC	**Common order segment**
OBR	**Observation request segment**

Example

A transmission example for a patient information test order record response is given below.

```
MSH|^~\&|||||20010521123420||ADR^A19
PID||||12345|Doe^John||19560521|M
PV1|||ICU-1
```

Detailed structure of each segment type

Overview

Introduction This section deals with the structure of each segment type.

Message header segment

Introduction The Message header segment contains general information and identifies the sender. The Message header segment is always the first record in a transmission.

Field definitions

Field	Name	Example	Comments
0	Segment identifier	MSH	Fixed entry
1	Field Separator	|	This field contains the separator between the segment ID and the first real field. As such it serves as the separator and defines the character to be used as a separator for the rest of the message.
2	Encoding Characters	^~\&	Fixed entry
3	Sending Application	ABL725^ ICU	This field uniquely identifies the sending application among all other applications within the network enterprise. Analyzer type and user definable analyzer name.
4	Sending Facility	ABL725^ ICU	This field contains the address of one of several occurrences of the same application within the sending system. Analyzer type and user definable analyzer name.
5	Receiving Application	Not used	

Field	Name	Example	Comments
6	Receiving Facility	Not used	
7	Date/Time Of Message	19991207 131842	Year: 1999 month/day:12.07 time: 13:18,42
8	Security	Not used	
9	Message Type	ORU^ R31	This field contains the message type and trigger event and will be dependent on the message being sent and the Radiometer System being used Message types: ORU, ACK, ADR, QRY Trigger event: R01, R30, R31, R32, A19
10	Message Control ID	19991207 131842	Typically using transmission time, but could be any number or other entry, which uniquely identifies this message. This ID is echoed back by the receiving system in the MSA segment.
11	Processing ID	P	Fixed entry
12	Version ID	2.5	Fixed entry
13	Sequence Number	Not used	
14	Continuation pointer	Not used	

Field	Name	Example	Comments
15	Accept acknowledgment type	AL	This field identifies the conditions under which accept acknowledgements are required to be returned in response to this message AL – Always NE – Never ER – Error/reject conditions only SU – Successful completion only
16	Application acknowledgment type	NE	This field contains the conditions under which application acknowledgements are required to be returned in response to this message. AL – Always NE – Never ER – Error/reject conditions only SU – Successful completion only
17 *	Country code	US	This field contains the country of origin for the message. It will be used primarily to specify default elements, such as currency denominations.
18 *	Character set	8859/1	This field contains the character set for the entire message.

Example

```
MSH|^~\&|AQT90 FLEX^R0071N0005|AQT90
FLEX^R0071N0005|||20110407113535||ORU^R01|1|P|2.5|||AL|NE|US|
8859/1
```

ABL9 Analyzer

Fields marked * are different for the ABL9 analyzers, as indicated in the table below.

Field	Name	Example	Comments
17	Country code	Not used	
18	Character set	Not used	

Message acknowledgement segment

Introduction After a record has been sent, the system will wait for a message from the target host to acknowledge that the record has been accepted. A message header must precede the message acknowledgment segment. The Message Acknowledgement segment is used by the receiving system to notify the sender of the status of transaction just received. The use of this segment is dependent upon the acknowledgement settings defined in the MSH segment.

* Not implemented by the ABL9 Analyzer

Field definitions

Field	HL7 Element Name	ABL80 Field Name / Data Example	Comments
0	Segment Type ID	MSA	Fixed entry
1	Acknowledgement Code	AA (Accepted)	This field contains an acknowledgment code. The allowable entries will be dependent upon the acknowledgement settings defined in the MSH segment (See table below)
2	Message Control ID	19991207131842	This field must contain the Message Control ID from the message sent by the sending system in MSH-10
3	Text message	Not used	
4	Expected sequence number	Not used	
5	Delayed acknowledgment type	Not used	
6	Error Condition	0	Numbered error status (will not re reacted upon).

Possible entries for MSA-1

Value	Description
AA	Original mode: Application Accept (General acknowledgement) Enhanced mode: Application acknowledgment: Accept
AE	Original mode: Application Error Enhanced mode: Application acknowledgment: Error
AR	Original mode: Application Reject Enhanced mode: Application acknowledgment: Reject
CA	Enhanced mode: Accept acknowledgment: Commit Accept
CE	Enhanced mode: Accept acknowledgment: Commit Error
CR	Enhanced mode: Accept acknowledgment: Commit Reject

Examples

```
MSA|AA|1006|||
```

```
MSA|CA|1||||0
```

Patient identification segment

Introduction The Patient Identification segment contains general information about the patient. Information transmitted in the patient identification segment is entered during the analysis.

Note: *The patient identification segment can also be received after a "query for patient information" has been issued.*

Field definitions

Field	Name	Example	Comments
0	Identifier Segment	PID	Fixed entry
1	Set Patient ID	1	Always 1 in transmissions (only one PID segment is transmitted). In most transmissions sent/received by the Radiometer system, this will be a fixed entry of '1'. The exception to this is the Patient by Department List received in response to a query.
2 *	Patient ID (External ID)	MFR1234	The Mainframe Reference number within the Radiometer System
3	Patient ID (Internal ID) Medical Record Number	PID1234	The Patient ID number within the Radiometer System
4	Alternate Patient ID - PID	117118112	The Medical Record Number within the Radiometer System
5	Patient Name	Doe^ William^ John	The patient name is contained as separate components within this field. <family Last name>^ <given First name>^ <Middle name> Can be entered during analysis or retrieved from the HIS/LIS system via a query.

Field	Name	Example	Comments
6	Mother's Maiden Name	Not used	
7	Date/Time of Birth	19601218	Date/Time of birth, if entered during analysis. Date of birth is transmitted in the format: YYYYMMDD
8	Patient Sex	M	M – Male F - Female U – Unknown Sex is entered during analysis.
9	Patient Alias	Not used	
10	Race	Not used	
11	Patient Address	Not used	
12	County Code	Not used	
13	Phone Number - Home	Not used	
14	Phone Number - Business	Not used	
15	Primary Language	Not used	
16	Marital Status	Not used	
17	Religion	Not used	
18	Patient Account Number / Billing number	B1234	This is the Billing Number in the Radiometer System
19	SSN Number - Patient ID External	SN1234	External Patient ID assigned by the HIS/LIS. Not used by Radiometer system or analyzer.

Example

The following is an example of a patient identification segment.

PID|1||556677||Hansen^Peter||19540221|M|||||||||B1234|SN1234

ABL9 Analyzer

Fields marked * are different for the ABL9 analyzers, as indicated in the table below.

Field	Name	Example	Comments
2	Patient ID (External ID)	Not used	

Patient visit segment

Background Introduction

RADIOMETER uses this segment to communicate the patient department. The Patient Visit segment contains patient information relevant to this specific admission/visit to the facility.

*Not transmitted by the ABL9 Analyzer.

Field definitions

Field	Name	Example	Comments
0	Identifier	PV1	Fixed entry
1	Set ID - PV1	1	Always 1Fixed entry
2 *	Patient Class	Not used	Patient class in the Radiometer System
3	Assigned Patient Location	ICU	Patient Department This is the Patient Department in the Radiometer System. ***Note: If the* RADIANCE *system is used, the field in the* RADIANCE *system may be Room/Bed depending on a setting in the Rime.Ini file.***
4	Admission Type	Not used	
5	Preadmit Number	Not used	
6	Prior Patient Location	Not used	
7	Attending Doctor	Not used	
8	Referring Doctor	Not used	
9	Consulting Doctor	Not used	
10	Hospital Service	Not used	
11	Temporary Location	Not used	
12	Preadmit Test Indicator	Not used	
13	Readmission Indicator	Not used	
14	Admit Source	Not used	
15	Ambulatory Status	Not used	
16	VIP Indicator	Not used	

Field	Name	Example	Comments
17 *	Admitting Doctor	90876^ DR.JOHN SMITH	This will be the admitting physician in the Radiometer System. The first component is the physician's code and the second component is the physician's name.
18	Patient Type	Not used	
19	Visit Number	Not used	
20	Financial Class	Not used	
21	Financial Class	Not used	
22	Courtesy Code	Not used	
23	Credit Rating	Not used	
24	Contract Code	Not used	
25	Contract Effective Date	Not used	
26	Contract Amount	Not used	
27	Contract Period	Not used	
28	Interest Code	Not used	
29	Transfer to Bad Debt Code	Not used	
30	Transfer to Bad Debt Date	Not used	
31	Bad Debt Agency Code	Not used	
32	Bad Debt Transfer Amount	Not used	
33	Bad Debt Recovery Amount	Not used	
34	Delete Account Indicator	Not used	
35	Delete Account Date	Not used	
36	Discharge Disposition	Not used	
37	Discharged to Location	Not used	
38	Diet Type	Not used	
39	Servicing Facility	Not used	
40	Bed Status	Not used	
41	Account Status	Not used	
42	Pending Location	Not used	

Field	Name	Example	Comments
43	Prior Temporary Location	Not used	
44 *	Admit Date/Time	20090131170000	Patient admit Date/Time in the Radiometer System
45 *	Discharge Date/Time	20090203190000	Patient discharge Date/Time in the Radiometer System

ABL80 FLEX Analyzer

The ABL80 FLEX analyzer only sends this Segment for Patient Results.

Fields marked * are different for the ABL80 FLEX analyzer, as indicated in the table below.

Field	Name	Example	Comments
2	Patient Class	U	This field always set to U
17	Admitting Doctor	Not used	
44	Admit Date/Time	Not used	
45	Discharge Date/Time	Not used	

Example

PV1|1|||ICU|||||||||||||||01^Petersen|||||||||||||||||||||||||||2006 1205|

Common order segment

Introduction The Common Order segment contains information common to the different types of tests that can be ordered.

Example ORC|NW|9876-5689|***xDPatientResult|||||||||||||||||||||||||||

Field definitions

Field	Name	Example	Comments
0	Identifier	ORC	Fixed entry
1	Order Control	NW	The Order Control determines the function of the order segment. In a Radiometer System, this will always be one of the following: NW – New Order RE – Observations to follow SR – Response to send order status request
2	Placer Order Number	9876-5689	This will be the Accession Number in the Radiometer System.
3 *	Filler Order Number	***xDPatientResult	This field will contain a unique identifier generated by the Radiometer System.
4 *	Placer Group Number	GRP123	Field: <PlacerGroup Number>
5 *	Order Status		Field: <OrderStatus>
6 *	Response Flag		Field: <ResponseFlag>
7 *	Quantity/Timing		Field: <TimingQuantity>
8 *	Parent		Field: <Parent>
9	Date/Time of Transaction		Field: <Transaction Timestamp>
10 *	Entered By		Field: <EnteredBy>

Field	Name	Example	Comments
11 *	Verified By		Field: <VerifiedBy>
12 *	Ordering Provider		Field: <OrderingProvider>
13 *	Enterer's Location		Field: <EnterersLocation>
14 *	Call Back Phone Number		Field: <CallbackPhone Number>
15 *	Order Effective Date/Time		Field: <EffectiveOrderTime stamp>
16 *	Order Control Code Reason		Field: <OrderControlCode Reason>
17	Entering Organization	Not used	
18	Entering Device	Not used	
19	Action By	Not used	

ABL80 FLEX and ABL9 Analyzers

Fields marked * are different for the ABL80 FLEX and the ABL9 analyzers, as indicated in the table below.

Field	Name	Example	Comments
3	Filler Order Number	Not used	
4	Placer Group Number	Not used	
5	Order Status	Not used	
6	Response Flag	Not used	
7	Quantity/Timing	Not used	
8	Parent	Not used	
10	Entered By	Not used	
11	Verified By	Not used	
12	Ordering Provider	Not used	
13	Enterer's Location	Not used	
14	Call Back Phone Number	Not used	
15	Order Effective Date/Time	Not used	
16	Order Control Code Reason	Not used	

Observation request segment

Introduction The observation request segment contains information about the particular test on a single specimen.

Field definitions

Field	Name	Example	Comments
0	Identifier	OBR	Fixed entry
1	Set ID - OBR	1	Always 1 in transmissions from the ABL800 FLEX, ABL700 Series analyzers (only one OBR segment is transmitted).
2	Placer Order Number	9876-5689	This will be the Accession Number in the Radiometer System. Will be empty if no accession no. has been assigned.
3	Filler Order Number	Test order or Patient result: Patient result: **xDPatientResult Other: 12^ QC # 12^ Cal # 42^ BuiltinQC # 42^ CalAdjust # 42^ CV #^ LCR 42^ CV #^ LQC	Orders and Patient results: contains the internal order number if there is a test order. Maybe empty for patient results. QC, Calibration, Built-in QC, Cal. verif. and Cal. adjust results: Sample number^ result type #^ subtype (optional) Result types: QC - Quality control Cal – Calibration BuiltinQC CalAdjust CV – Cal. verification Subtypes (CV): LQC – QC-based LCR – Sample based For Activity Log messages, this field will be the fixed entry '^Error'.

Field	Name	Example	Comments
4	Universal Service ID	Patient results and orders: 364753773498^ ABG ONLY RMED QC RMED Calibration RMED Builtin QC RMED Calibration Adjustment RMED Calibration Verification	Patient results and orders: Order item code^ order item QC results: RMED QC Calibration results: RMED Calibration Built-in QC: RMED Builtin QC Calibration adjust: RMED Calibration Adjustment Calibration verific.: RMED Calibration Verification
5	Priority	Not used	
6	Requested Date/time	Not used	
7	Observation Date/Time	19990916125604	Draw time entered during analysis. This field is the SampleDrawTime in the Radiometer system. Format is YYYYMMDDHHMMSS 1999 - Year 09 – Month 16 - Day 12:56:04 - Time
8	Observation End Date/Time	Not used	
9	Collection Volume	Not used	
10	Collector Identifier	NHG Dr. Johnson	Physician entered This is the DrawnBy field in the Radiometer System

Field	Name	Example	Comments
11	Specimen Action Code	O	Always set to O. Specimen obtained by service other than Lab. The Radiometer System on patient results does not use this field. On QC and Calibration results, this field is the fixed entry 'O'.
12	Danger Code	Not used	
13	Relevant Clinical Info.	Not used Cal. adjust, only: 20111231	Used for Expiry date for calibration adjustment results. Not used for other results.
14 *	Specimen Received Date/Time	19990916125404	For patient results, this is the SampleReceivedTime in the Radiometer System. The field is not used on QC and Calibration results.
15	Specimen Source	Whole Blood^ ^ ^ LLFA^ ^ ^ P 2 Point Calibration S7730^ 4 TnI^ 100	Patient results and orders: 1: <SampleType> 2: not used 3: not used 4: <SampleSite> 5: not used 6: not used P Calibration results: Calibration type. QC results and Cal. verif. (LQC): Solution id^ Lot number Cal. verification: <ParameterName>^ <Lot>

Field	Name	Example	Comments
16	Ordering Provider	8754367^ Dr. Jones	This field represents the ordering physician in the Radiometer System and is comprised of two components. The first component is the physician's code and the second component contains the physicians' name.
17	Order Callback Phone Number	Not used.	
18	Placer field 1	Not used	
19	Placer field 2	Not used	
20	Filler Field 1	Not used	
21	Filler Field 2	Not used	
22 *	Results Rpt/Status Chng - Date/Time		This is the SampleReportedTime in the Radiometer System.
23	Charge to Practice	Not used	
24	Diagnostic Serv Sect ID	Not used	
25	Result Status	F C	F: initially transmitted result. C: retransmitted result. Only set when Audit Trail is enabled. Edited results will contain a status "C"orrected.
26	Parent Result	Not used	
27	Quantity/Timing	Not used	
28	Result Copies To	Not used	
29	Parent	Not used	
30	Transportation Mode	Not used	
31	Reason for Study	Not used	
32	Principal Result Interpreter	Not used	
33	Assistant Result Interpreter	Not used	

Field	Name	Example	Comments
34	Technician	ALS	This is the operator who analyzed the sample in the Radiometer System.
35	Transcriptionist	Not used	
36 *	Scheduled Date/Time		This is the ScheduledTimestamp in the Radiometer System.

ABL80 FLEX and ABL9 Analyzers

Fields marked * are different for the ABL80 FLEX and ABL9 analyzers, as indicated in the table below.

Field	Name	Example	Comments
14	Specimen Received Date/Time	Not used	
22	Results Rpt/Status Chng - Date/Time	Not used	
36	Scheduled Date/Time	Not used	

Example

The following is an example of an observation request segment.

OBR|1||63^Sample #|3647537734|||19990916125604|||Dr. Johnson|O||||Arterial^ ^ ^ ^ ^P|||||||||F

Observation / result segment

Introduction

The observation/result segment contains information about a single parameter in a particular test. Note: The parameter can be an input (a keyed-in value), default, and measured, calculated, or estimated parameter: Fields 14 and greater are only sent on the first OBX segment.

Field definitions

Field	Name	Example	Comments
0	Identifier	OBX	Fixed entry Sequence number starts with 1 and increments for each new OBX segment sent.
1	Set ID - OBX	1	Field begins at 1 and is incremented with each OBX segment sent.
2	Value Type	ST	Data type. ST = String Data Fixed entry *(This is really a RMED misunderstanding of the HL7 standard, but maintained for backwards compatibility)*

Field	Name	Example	Comments
3	Observation Identifier	12180^ ^ LN^ Ca++^ M or ^ ^ ^ FIO2^ M ^ O2Hb^ M ^ tHb^ ZeroDrift^ M ^^^ Power^ AU Voltage 12V ^^^Blank outliers ^ TnI^ M ^Errors	For patient results, this field is five components as shown below: <LOINC code>^ ^ <LOINC description>^ <Parameter name>^ <Parameter type> Radiometer parameter names are listed in *Appendix 1* Possible parameter types are: C Calculated parameter D Default parameter E Estimated parameter I Input parameter M Measured parameter “ ” Parameter type not specified For QC results, the field is three components. The first component is not used, the second component is the Radiometer parameter name and the third component is the parameter type. For Calibration results, the field is four components. The first component is not used, the second component is the Radiometer parameter name, the third component is an extension to the parameter name and the fourth component is the parameter type. Built-in QC: ^^^ DeviceType^ CheckpointName Cal. adjustment: ^^^ <%CheckpointName%> Cal. verification: ^ <ParameterName>^ <ParameterType> For Activity Log messages, this field will contain the fixed entry ‘^Errors’.

Field	Name	Example	Comments
4	Observation Sub-ID	Not used, except Cal. adjust: OK	AQT Calibration adjustment, only: Status OK – check passed ? – check failed
5	Observation Value	7.273	For results, this is the actual value of the parameter in the current units of the Radiometer System. For Activity Log messages, this is a code representing the activity being sent.
6	Units	mmHg	Possible units are available in *Appendix 1*
7	References Range	6.732-8.452 <30.4 >1.05 10.09^ 65.01^ 31.8^ 50.9	Patient samples: Specifies the upper and lower ranges. If the parameter only has an upper range then it will be preceded with a '<'. If the parameter only has an lower range then it will be preceded with a '>'. QC results: <QCMinStatisticalLimit>^ <QCMaxStatisticalLimit>^ <QCControlRangeLow>^ <QCControlRangeHigh>
8	Abnormal Flags	N	Possible result flags are: "N" Normal value "L" Below low normal range "H" Above high normal range "LL" Below low critical range "HH" Above high critical range "<" Below analyzer measuring range ">" Above analyzer measuring range This field may also be empty.
9	Probability	Not used	
10	Nature of Abnormal Test	Not used	
11	Observation Result Status	F C	Always "F" indicating final result. "C" indicating corrected result (only used if Audit trail is enabled)

Field	Name	Example	Comments
12	Date Last Obs Normal Values	Not used	
13	User Defined Access Checks	Not used, except AQT90 Builtin QC: OK	AQT90 Builtin QC, only: Status OK – check passed ? – check failed
14	Date/Time of the Observation	19990920123412	Time stamp generated when analysis is completed. Only send with the first “OBX” message. 19990920: date 12:34,12: time This is the SampleReportedTime in the Radiometer System in the format YYYYMMDDHHMSS
15	Producer's ID	Not used	
16	Responsible Observer	McCoyNHG^ Nils Graversen	The operator ID. Only sent with the first “OBX” segment. This field is two components representing the user who analyzed the sample in the Radiometer System. The first component is the operator’s ID and the second component is operator’s name.
17	Observation Method	Not used	
18 *	Equipment Instance Identifier		This field will contain the Device ID from the Radiometer System
19	Date/Time of the Analysis		This field will contain the DateTimeAnalyzed from the Radiometer system in the format YYYYMMDDHHMMSS.

Example The following is an example of an observation/result segment.

```
OBX|1|ST|^pH^M||7.273|||N|||F|||19990920123412||McCoy||
```

ABL9 Analyzer Fields marked * are different for the ABL9 analyzers, as indicated in the table below.

Field	Name	Example	Comments
18	Equipment Instance Identifier	Not used	

Substance identification segment

Introduction Identifies what substance the sample consists of.

* Not implemented by the ABL9 analyzer

Field definitions

Field	Name	Example	Comments
0	Identifier	SID	Fixed entry
1	Substance Lot Number	100	Cartridge lot number

Example The following is an example of a query definition segment.

SID|100

Notes and comments segment (ABL800 FLEX and ABL700 series analyzers)

Introduction Notes and comments segments sent by the ABL800 FLEX and ABL700 Series analyzers contain information concerning the general conditions of the analyzer or errors/flags on individual parameters. Radiometer System is used to convey additional information on results as well as indicate errors on the system. The ABL80 FLEX analyzer utilizes the notes and comments segment to send the edit log (if any) for the patient analysis result.

On result messages, NTE segments sent prior to the first OBX segment are general entries, which pertain to the entire result and not a specific parameter value. NTE segments sent after an OBX segment pertain specifically to the parameter value in the preceding OBX segment.

Note: *Notes and comments segments sent by the ABL800 FLEX and ABL700 Series analyzers before the first OBX segment are general messages. Comment segments sent after an OBX segment, are related to the preceding OBX segment.*

Field definitions

Field	Name	Example	Comments
0	Identifier	NTE	Fixed entry
1	Set ID - NTE	1	Field begins at 1 and is incremented with each NTE segment sent until a different segment type is sent. Field is reset to 1 when the next series of NTE segments begins.
2	Source of Comment	L	This field indicates the source of the comment. If the source is the actual analyzer then this field will be an ‘L’. If the source of the comment is due to an activity in the RADIANCE system, this field will be ‘O’. Always L, denoting that Ancillary (filler) department is source of comment

Field	Name	Example	Comments
3	Comment	377^Calibration drift 2 out of range	The format of this field is always two components but the content is different depending on the type of comment. For errors on the result or a parameter, the first component is a numeric code representing the error and the second component is the description of the error. <error code>^<error text> A list of error codes is available in *Appendices, System Error Codes* One or more error codes separated by component delimiters (e.g. 94^123). A list of error codes is available in *Appendices, System Error Codes*
		CHANGE^2005-01-05 10:35:54 (rjohnson) firstName: Ray -> Jay 94 CHANGE^20050105103554 (rjohnson) FirstName: <no entry> -> Jay	If the comment is an audit trail entry, the first component will be the fixed entry 'CHANGE' and the second component will be a description of the change made in the format: "Timestamp of the change" "operator who made the change" "name of the field/parameter changed": "previous value"->"new value"

Example The following is an example of a notes and comments segment.

```
NTE|1|L|94
```

Query definition segment

Introduction A query message, which contains a query segment, can be sent by the analyzer if it is configured for one or both of the following: The Query Definition segment identifies the information that is being requested by the Radiometer System.

- Patient Information Query
- Patient by Department Query

For the Patient Information Query, patient information can be requested using the patient ID.

For Patient by Department Query, a list of patients is requested using the patient department as the query criteria.

* Not implemented by the ABL9 analyzer

Note: *Query by Accession number is not supported using HL7 protocol*.

Field definitions

Field	Name	Example	Comments
0	Identifier	QRD	Fixed entry
1	Query Date/Time	Not used	Not used
2	Query Format Code	R	Always R signifying that the response is in record-oriented format Fixed entry
3	Query Priority	I	Fixed entry Always I signifying that the priority is immediate
4	Query ID	1	Fixed entry This field contains a unique identifier for the query. Assigned by the querying application. Returned intact by the responding application
5	Deferred Response Type	Not used	Not used
6	Deferred Response Date/Time	Not used	Not used

Field	Name	Example	Comments
7	Quantity Limited Request	1^RD	Not used. Always 1^RD. This is the maximum length of the response that can be accepted by the requesting system in this case one segment.
8	Who Subject Filter	11475	Not used. In patient information query this field is used for the patient ID.
9	What Subject Filter	ANU	This field signifies what type of information is required to satisfy the request. The Radiometer System uses the following entries. DEM is - used for patient information query. ANU is - used for patient by dept. query. ORD - used for test order query.
10	What Department Data Code	ICU	In patient-by-dept. queries this field is used to identify the patient dept. This field contains the specific item being queried and may contain a patient number, department, or accession number.

Example The following is an example of a query definition segment.

QRD||R|I|1|||1^RD|11475|DEM

Date of issue

Radiometer representative:

RADIOMETER

If you have any questions
or need assistance,
please contact your local
Radiometer representative.

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