LUMIPULSE G1200

Fully automatic chemiluminescence
enzyme immunoassay system

On-Line Specifications

Revision 1.48

Established on May 23, 2008

FUJIREBIO INC.

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1. Introduction

This set of specifications describes the standards for on-line communication between the G1200 fully automatic chemiluminescence enzyme immunoassay system (referred to as analyzer hereafter) and the assay system computer (referred to as host hereafter). The Specifications is applicable when a host computer is integrated in the G1200 system. (*1)

*1) Integration of the host computer to the G1200 system is achieved by configuring host computer properties. (Refer to separately provided G1200 Instruction Manual.)

2. Overview

The communication between the G1200 and the host includes (1) assay request query, (2) assay request, (3) assay result, (4) system status query, and (5) system status. Communication is done in real time during assay or by batch processing in the standby mode or during assay.

(1) Assay request query

The analyzer queries the host for assay request using a patient ID, rack ID/position or sample number as a keyword.
Assay request query can be used for either specimens or stats. (*2)

(2) Assay request

The analyzer receives assay request with analyte information from the host.

(3) Assay result

The analyzer transmits assay results for specimens, stats, or QC to the host. (*3)

(4) System status query

The analyzer receives a query on system status from the host.
When the host does not need status information, this message is unnecessary.

(5) System status

The analyzer responds to a system status query and transmits system status information to the host.

*2) Real-time transmission of an assay request query (specimen/stat) can be enabled/disabled by configuring the host computer property in Communication setup under Configuration.

*3) Real-time transmission of assay results (specimen/stat/QC) can be enabled/disabled by configuring the host computer property in Communication setup under Configuration.

Note: When transmitting an assay request query, analyzer performance may be affected depending on the load on the host computer.

Note: The on-line operation is available in Assay per rack ID and Assay per Patient ID modes only; it is unavailable in Assay per sequence No. mode.

3. Message specifications (application layer)

3.1 Message types

The message types include assay request query messages, assay request messages, assay result messages, system status query messages, and system status messages.

Message types	Generation timing	Direction	Remarks
Assay request query message	Real time	Analyzer to host	Transmitted after reading in the rack ID or patient ID.
	Batch		Transmitted after specifying the sample No. range.
Assay request messages	Real time	Host to analyzer	Transmitted in response to an assay request query message.
	Batch		Transmitted in response to an assay request query message.
Assay result messages	Real time	Analyzer to host	Transmitted immediately after an assay is complete.
	Batch		Assay results selected on the screen are transmitted by batch processing.
System status query messages	Real time	Host to analyzer	Transmitted when the analyzer status needs to be confirmed.
System status messages	Real time	Analyzer to host	Transmitted in response to a system status query message.

Note: After the analyzer sends an assay request query message, the assay result massage may be sent to the host before receiving the assay request message.

3.2 Message flow

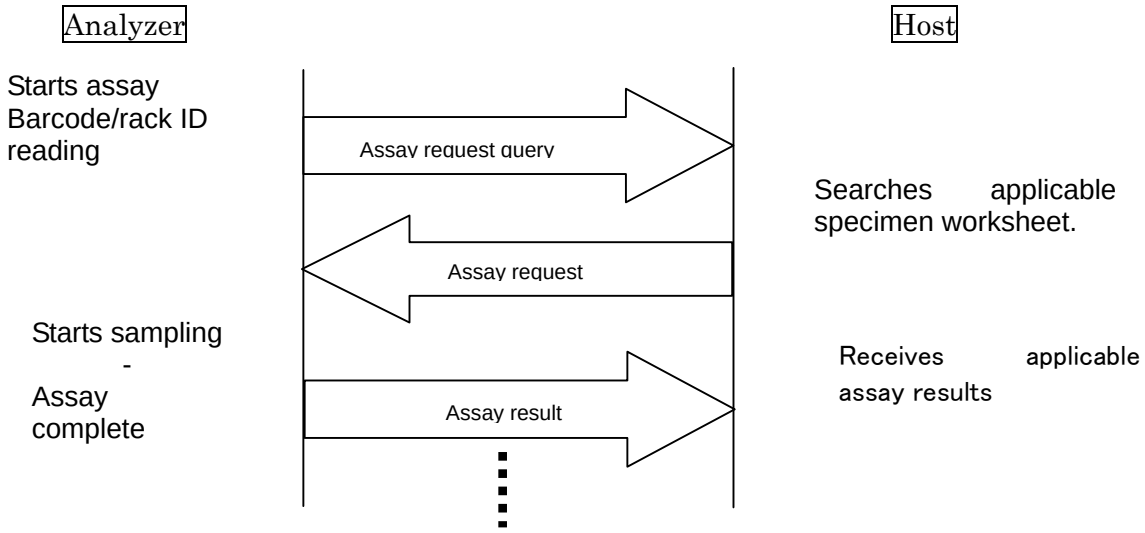
(1) Assay request (Real time)

(a) After starting an assay, the analyzer reads the sample barcode ID (patient ID) or rack ID.

(b) When the corresponding sample has been registered on the analyzer in advance, the sample will be analyzed. Otherwise, the analyzer sends an assay request query message to the host to query for the sample.

(c) The host sends an assay request message for the sample corresponding to the received patient ID or rack ID/position.

(d) After the analyzer analyzed the sample, the analyzer sends an assay result message to the host.

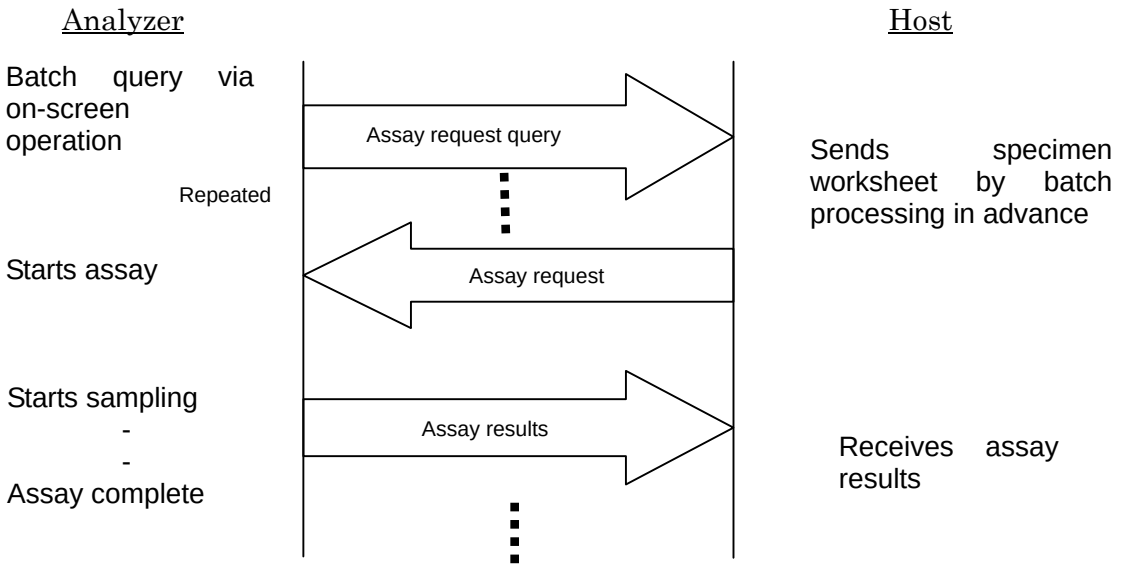


(2) Assay request (Batch)

(a) Prior to starting assay, the sample number range needs to be specified to register the samples for assay request by batch processing.

(b) Assay starts and the samples are analyzed according to the assay request.

(c) After the analyzer completes analyzing the samples, the assay result message is sent to the host.



3.3 Message content

The codes in the messages are defined below.

Message ID

R	Represents assay request query messages.
W	Represents assay request messages.
D	Represents assay result messages.
Q	Represents system status query messages.
S	Represents system status messages.

System No.

0 - 9 A system No. is an ID number given to an analyzer. The number is configured on the analyzer.

(Default value = 1)

Sample category

N	Specimen (placed on a specimen rack or in the LA system.)
E	Stat (When analyzed by the stat mechanism.)
C	Control for QC (placed on a control rack)

Sequence No.

1 - 9999 Sequence No.: After the date has changed and the system is started, sequence numbers starting from 1 are automatically generated and output in the analyzer.
In the example below, the specimen sequence number returns to 1 after reaching 9999.
The default values for the specimen, stat, or control sequence numbers are specified on the analyzer.
Default value: Specimen sequence No. = 1, Stat sequence No. = 7001,
Control sequence No. = 8001

Sample No.

1 - 9999 The "sample No." specified in an assay request message from the host or the value automatically generated on the specimen registration screen is output.

Sample ID

A sample ID is a code with up to 26 digits and basically placed on a sample as a barcode.
When the ID is less than 26 digits, the ID is left aligned and followed by spaces.
Do not include spaces in the ID.
Sample IDs are set for specimens and stats, and spaces are set for controls.

Rack ID, position

The rack ID for the rack where samples are placed and (cup) position are set. Spaces are set for stats and LA system samples.

Sample type

Represents sample types.

S	Blood serum, plasma
U	Urine
O	Others

Sample lot No.

Sample lot numbers are set. Spaces are set for specimens and stats, and control lots are set for controls.

Manual dilution ratio

When the applicable samples are diluted in advance, the dilution ratios are set.
When no dilution occurs, the dilution ratio is set to "0001".

Number of analytes

24 analytes maximum.

Analyte number

The analyte number to be measured is set. The analyte number system is independent of the reagent number system.
For the analyte number default value, refer to the latest analyte parameter list.
The analyte numbers not registered on the analyzer will cause an error.

Count value (Spaces are entered in the result data of error and unmeasured items.)

0 – 99999999 Luminescence intensity, the value of luminescence intensity detected by the analyzer.

Concentration (Spaces are entered into the result data for error and unmeasured items.)

The value (qualitative) calculated based on the cut-off index, Inh%, or calibration curve.
The output numbers of decimal places shall be those specified for each analyte on the analyzer.

Judgment (Spaces are entered in the result data of error and unmeasured items.)

+/− /± for qualitative items are set.
Spaces are set for quantitative items. For items pertaining to arithmetic processing shown below, judgment symbols are set. For HBcrAg, a log converted value is set.

Pepsinogen type	: 3+, 2+, +, -
PSA type	:+, -
HBcrAg	: Log converted value

Remark

1 to FFFFFFFF FFFFFFFF

Indicates an error that may affect assay results due to sample/reagent shortage. The value is set in hexadecimal. When there is no error, a space is set.

Auto dilution ratio

Dilution ratio when the analyzer automatically performs dilution

1	x 1
2	x 10
3	x 100
4	x 200
5	x 1000

Status

An analyzer system status is set.

0	Reception of assay request unavailable
1	Reception of assay request available (Standby)
2	Reception of assay request available (Assay)

Comment

The comment is set. The character that can be used is an alphanumeric character. When the character other than the alphanumeric character is detected, space is substituted for the comment.

3.4 Data format of messages

(1) Assay request query message

Message ID	System No.	Query ID	Sample category
1 byte	1 byte	26 bytes	0 to 1 byte

Item	Size	Example	Description
Message ID	1	R	Represents an assay request query message.
System No.	1	1	System ID number (Default value = 1)
Query ID	26	01012345	Real time query (assay per patient ID): Sample ID (left aligned)
		0001-1	Real time query (assay per rack ID): Rack ID, position No. (left aligned)
		101	Batch query: Sample No. (right aligned)
Sample category	1	N	Represents a sample category. N:Specimen E:Stat(*1)
Total	28 to 29 bytes (variable length)		

Note: When a rack ID and a position are set into specimen information, the ID and position are separated by "-".
Note: For batch processing of queries, sample Nos. can be set as query IDs (right aligned).

*1) Specify "Sample category" to "On" in the host computer setting of LUMIPULSE G1200 when the sample category is used.

(2) Assay request message

Message ID	System No.	Sample category	Sample information	Number of analytes	Analyte information	・・	Analyte information
1 byte	1 byte	1 byte	48 to 128 bytes	2 bytes	3 bytes		3 bytes

Repeated for the number of analytes.

Item	Size	Example	Description
Message ID	1	W	Represents an assay request message.
System No.	1	1	System ID number (Default value = 1)
Sample category	1	N	Specimen category (refer to Sample category on page 5.)
Sample information	4	123	Sample No. (Left aligned or right aligned if specified by the host. If not specified, a space is entered.) (*4)
	26	12345678	Sample ID (when a barcode is used, left aligned)(*1)
	4	0001	Rack ID (Not required when a barcode is used) (*2)
	1	1	Position (Not required when a barcode is used) (*2)
	1	S	Sample type (refer to Sample type on page 5.)
	8	12345678	Sample lot (left aligned) (refer to Sample lot No. on page 6.)
	4	1000	Manual dilution ratio (left aligned)
	80	Fujirebio123	Comment (left aligned) (Space is entered when there is no data) (*5)

No. of analytes	2	3	24 items maximum (0 is set when there is no order.) (*3)
Analyte information	2	4	Analyte number (right aligned) (refer to Analyte number on page 6.)
	1	1	Auto dilution ratio (refer to Auto dilution ratio on page 6.)
Total	53 to 205 bytes (variable length)		

*1) When requesting an assay per patient ID from the host, a patient ID must be specified.
*2) When requesting an assay per rack ID from the host, a patient ID and position must be specified.
*3) When the order for a patient ID queried by the analyzer does not exist on the host, the transmitted number of item will be “0”. The corresponding item will be forwarded without dispensing a sample.
*4) Please do not transmit repeated sample No. of assay on the same day if set by the host.
*5) Specify "Comment" to "On" in the host computer setting of LUMIPULSE G1200 when the comment is used.

(3) Assay result message

Message ID	System No.	Sample category	Sample information	Analyte data
1 byte	1 byte	1 byte	52 to 132 bytes	69 bytes

Item	Size	Example	Description
Message ID	1	D	Represents an assay request message.
System No.	1	1	System ID number (Default value = 1)
Sample category	1	N	Specimen category (refer to Sample category on page 5.)
Sample information	4	123	Sample No. (left aligned or right aligned)
	4	1	Sequence No. (right aligned)
	26	12345678	Sample ID
	4	0001	Rack ID
	1	1	Position
	1	S	Sample type (refer to Sample type on page 5.)
	8	12345678	Sample lot (left aligned) (refer to Sample type on page 5.) (*1)
	4	1000	Manual dilution ratio (left aligned)
	80	Fujirebio123	Comment (left aligned) (Space is entered when there is no data) (*4)
Analyte data	2	22	Item No. (right aligned)
	8	12345678	Count value (right aligned)
	10	45.2	Concentration value (right aligned)
	10	+	Judgment (left aligned, - , +-, +) (Refer to Judgment on page 6.)
	16	1	Remark (right aligned) (Refer to Remark on page 6.) (*2)
	1	1	Auto dilution ratio (refer to Auto dilution ratio on page 6.)
	4	7128	Cartridge Lot No.
	4	7119	Substrate Lot No.
	8	20070807	Measurement date(yyyymmdd)(*3)
	6	102301	Measuring time (hhmmss)(*3)
Total	124 to 204 bytes (variable length)		

*1) A space is set for specimen and stat measurement results. A control lot number is set for control measurement results.

*2) The count, concentration value, or judgment may not be output depending on the remark, in which case a space is set. Refer to the separate sheet “G1200 Remark specifications” for remark types and their count/concentration value data presentation.

*3) The formats of the measurement date and measurement time are shown below.
Measurement date yyyy: year, mm: month, dd: day
Measurement time hh: hour, mm: minute, ss: second
If the number of digits is less than that shown in the above formats, set 0 before the number.
For example, set 08 when the day is 8 and set 01 when the second is 1.

*4) Specify "Comment" to "On" in the host computer setting of LUMIPULSE G1200 when the comment is used.

(4) System status query message

Message ID	System No.
1 byte	1 byte

Item	Size	Example	Description
Message ID	1	Q	Represents a system status query message.
System No.	1	1	System ID number (Default value = 1)
Total	2 bytes (fixed length)		

Note: The system status query is not mandatory for on-line operation and can be omitted.

(5) System status message

Message ID	System No.	Status
1 byte	1 byte	1 byte

Item	Size	Example	Description
Message ID	1	S	Represents a system status message.
System No.	1	1	System ID number (Default value = 1)
Status	1	1	Represents the status of the analyzer. (Refer to Status on page 6.)
Total	3 bytes (fixed length)		

4. Lower layer communication protocol (data link layer) specifications

This set of specifications defines the mechanism to send the above messages correctly to a destination at a given timing.

4.1 Frame structure

The frame comprises the message start code, message, message end code, and error check byte.
Each message is a string of ASCII characters framed by STX(02H) and ETX(03H) as shown below. The message end code ETX is followed by 2-byte block check characters (BCC) (*1). The BCC is an exclusive or'ed characters after STX to ETX represented in hexadecimal and converted to 2-byte text characters (ASCII).

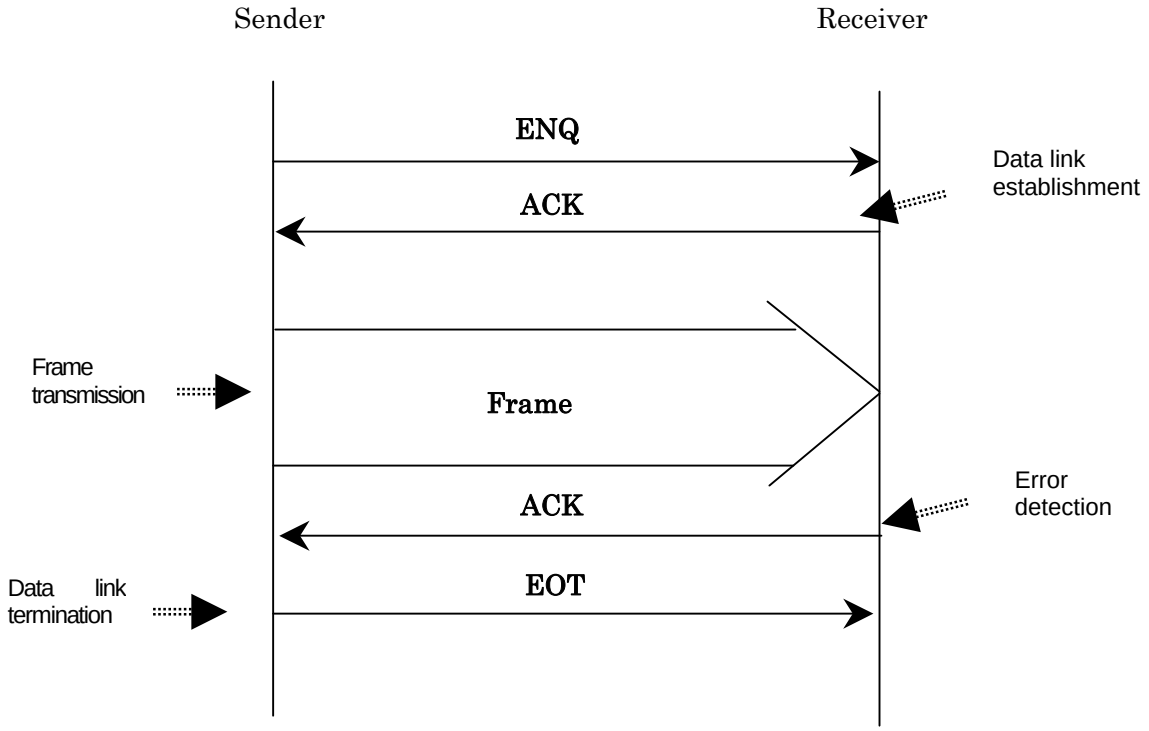
Frame

STX	Message	ETX	BCC
1 byte		1 byte	2 bytes

*1) Enter '0' or space when the first byte of BCC is '0'.

4.2 Frame transmission control procedure

The frame transmission procedure is shown below.



The communication procedure is described in detail below.

(1) Data link establishment.
(2) Frame transmission.
(3) Error detection and retransmission control.
(4) Data link termination.

(1) Data link establishment

As the first step in the procedure, the sender transmits ENQ (05H) to establish a data link..
The sender sends an ENQ sequence to confirm that the receiver receives the frame...
After an ACK (06H) is returned, a data link is established and the transmission right is granted. If there is no response (*1) or a NAK (15H) is returned, link establishment is aborted. (*2)..
When the analyzer receives ENQ from the host right after transmitting ENQ, the analyzer will be the receiver. After receiving ENQ, the analyzer sends ACK and receives frame data from the host first. After the data link is terminated, it sends ENQ again to establish a data link..

*1) The waiting time for ACK (timeout period) is 3 seconds.
*2) If there is no response in the ENQ sequence or a NAK (15H) is received, the sender will re-transmit an ENQ. The maximum retry count is 6. If the limit is exceeded, a communication error results. When an error occurs, the system will return to the initial (idle) state.

(2) Frame transmission

After a data link is established, the sender initiates frame transmission.
Refer to 4.1 Frame structure for the frame structure. (*1)(*2)

*1) The timeout period is 3 seconds for the receiver to receive one byte data.
*2) If the timeout period limit for reception is exceeded, a communication error results. The frame is annulled, and the data link is terminated. The system will return to the initial (idle) state.

(3) Error detection and re-transmission control

In this procedure, a 2-byte check character (BCC) is added at the end of each frame to check for errors. When the data is error-free, the receiver will send an ACK.
The sender receives the ACK, determines the data is error free, and terminates the data link.
If the data contains an error, the receiver will transmit a NAK.
If a NAK is received or if there is no response, the sender determines the data contains an error and re-transmits the frame (*2).
When the receiver receives an ACK or the retry limit is exceeded, the data link is terminated.

*1) The waiting time for ACK (timeout period) is 3 seconds.
*2) If there is no response or a NAK (15H) is received after the sender sent a frame, the sender will re-transmit the frame. The maximum retry count is 6. If the limit is exceeded, a communication error results. When an error occurs, the system will return to the initial (idle) state.

(4) Data link termination

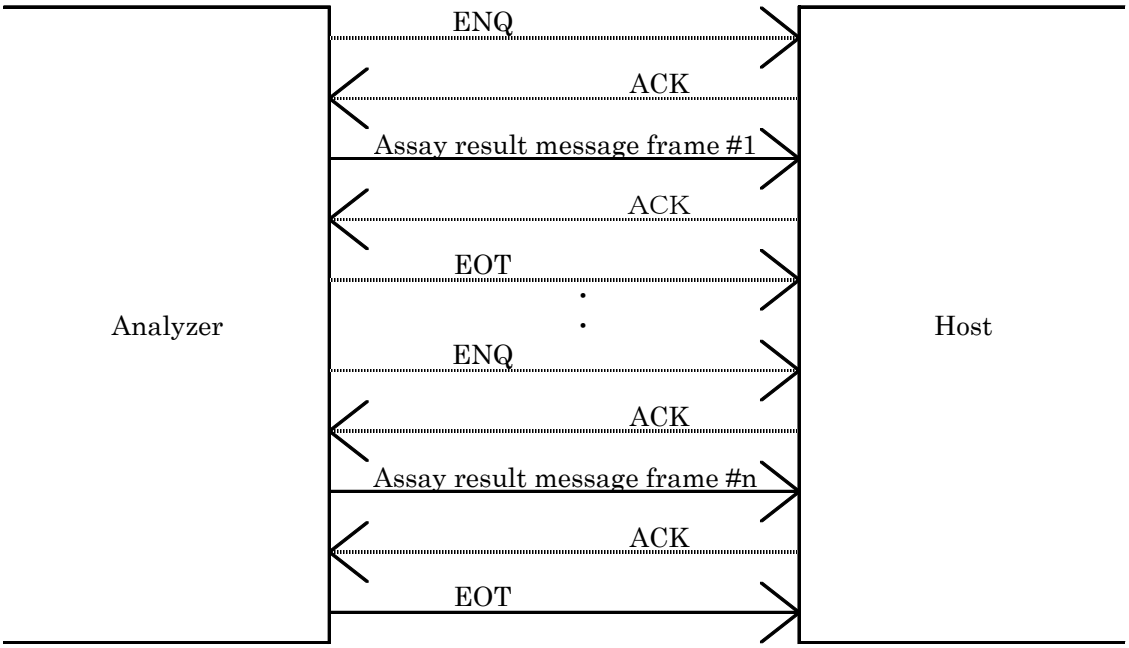
After transmitting a frame, the sender sends EOT (04H) to terminate the data link.

(∗1)(∗2)

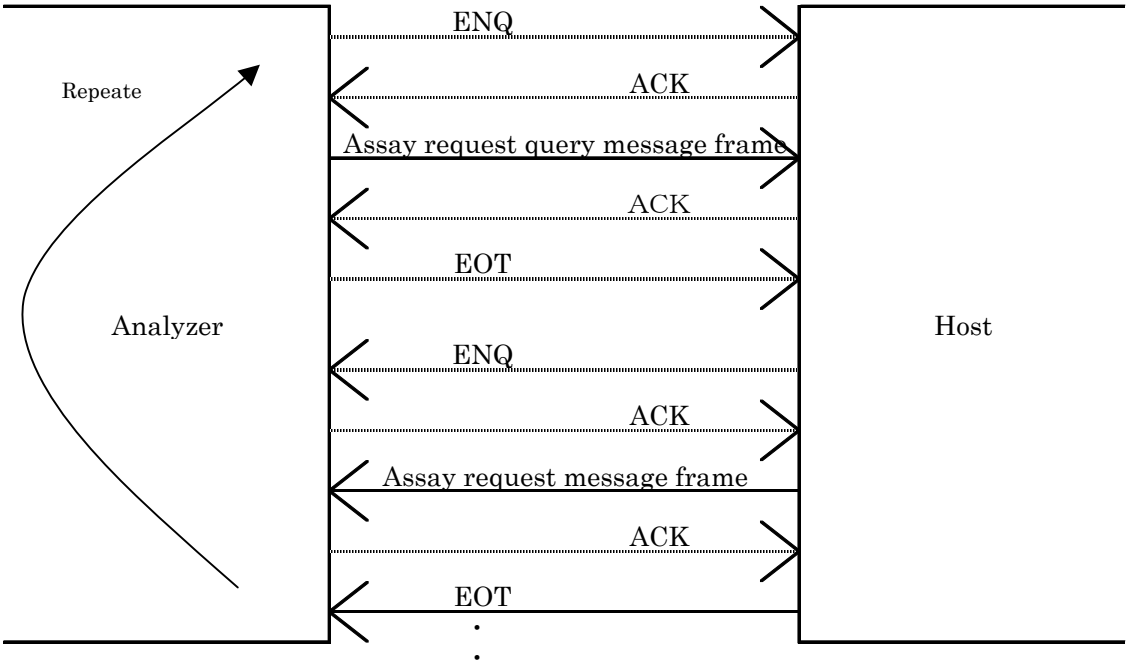
*1) The timeout period is 3 seconds for the receiver to receive EOT.
*2) If the timeout period limit for reception is exceeded, a communication error results. The frame is annulled, and the data link is terminated. The system will return to the initial (idle) state.

4.3 Frame transmission phase

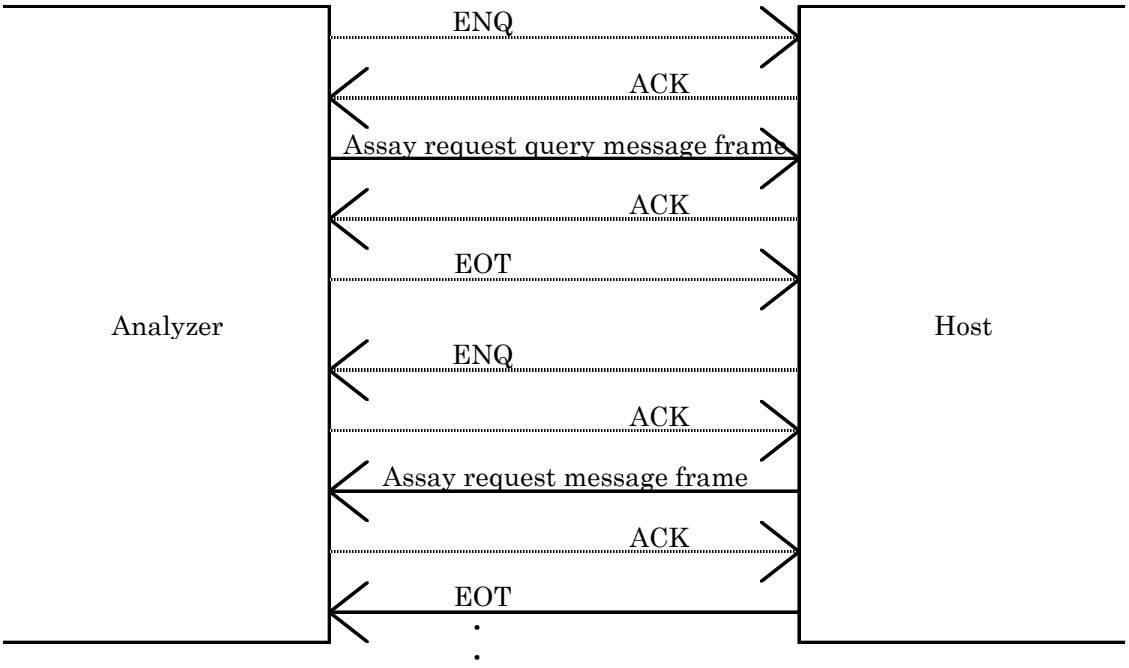
Assay result message frame transmission phase (real time, batch)



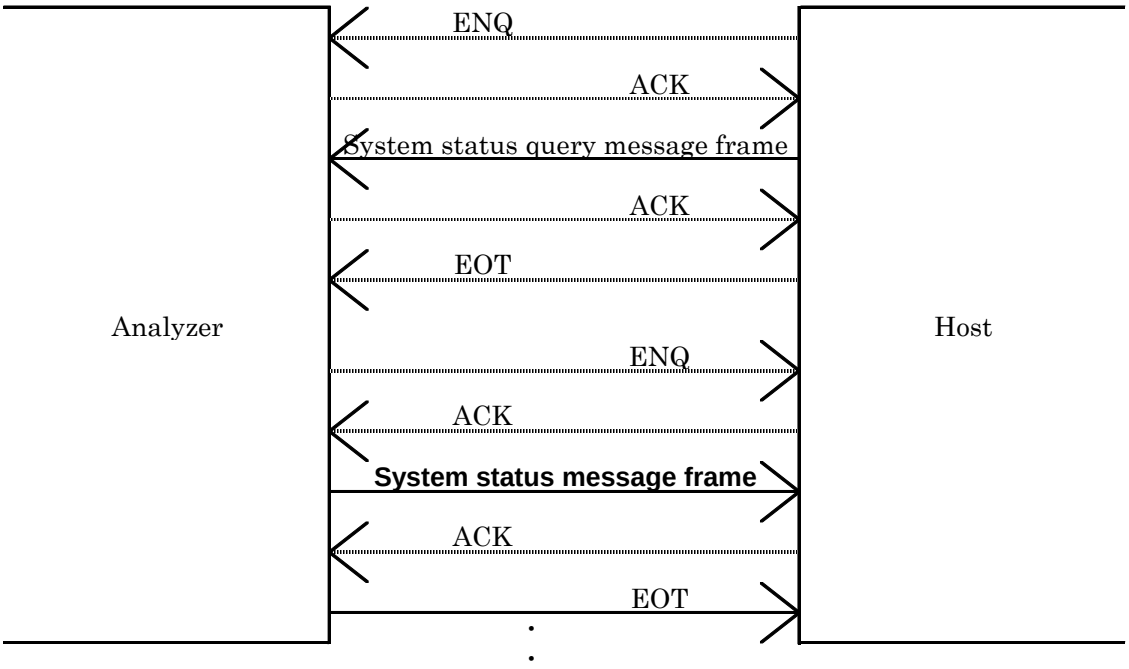
Assay request message frame reception phase (batch)



Assay request query message frame transmission phase (real time, batch)

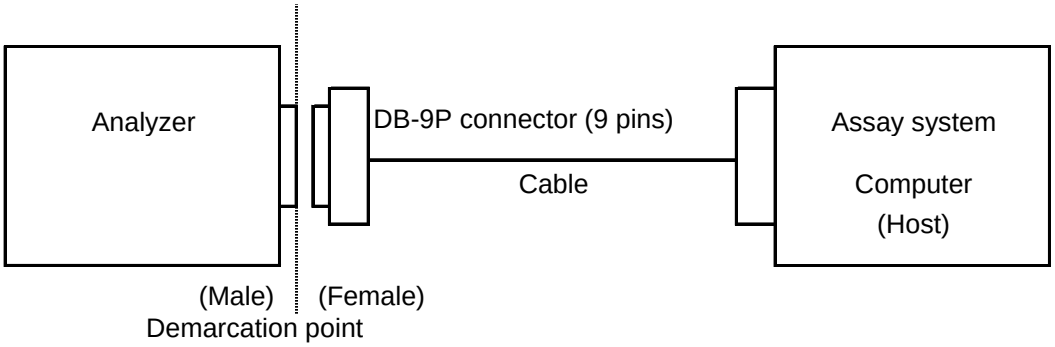


System status query message frame transmission phase (real time)



5. Hardware (physical layer) specifications

5.1 Connector



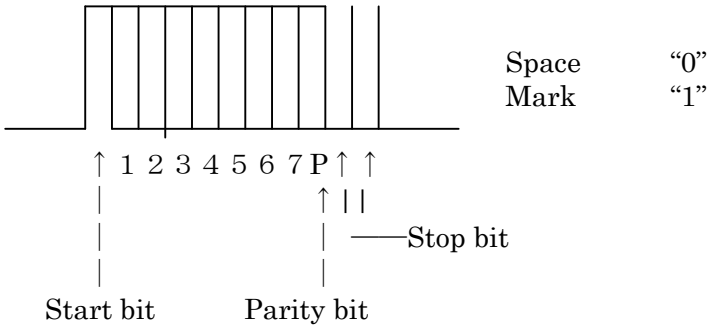
5.2 Transmission method

1. Signal type ——— RS-232C
2. Synchronization ——— Half-duplex start-stop synchronization
3. Baud rate ——— 9600 bps (or 2400, 4800, 19200, 38400, 57600, 115200 bps)
4. Data structure ——— Start bit: 1 bit
   Data bit: 8 bits (or 7 bit)
   Parity bit: None (or odd, even)
   Stop bit: 1 bit (or 2 bit)

5.3 Signal level

Level	Data signal	Controller
+3 V and higher	Logic ″0″ Start bit	ON
−3 V and lower	Logic ″1″ Stop bit	OFF

Controller: Refers to the analyzer computer



Note: In the figure above, the bars with bottom and top lines (-) show that the logic could be either “0” or “1” with the start bit always being “1” and stop bit always being “0” .

5.4 Input signal interface

(1) Terminal numbers and signals

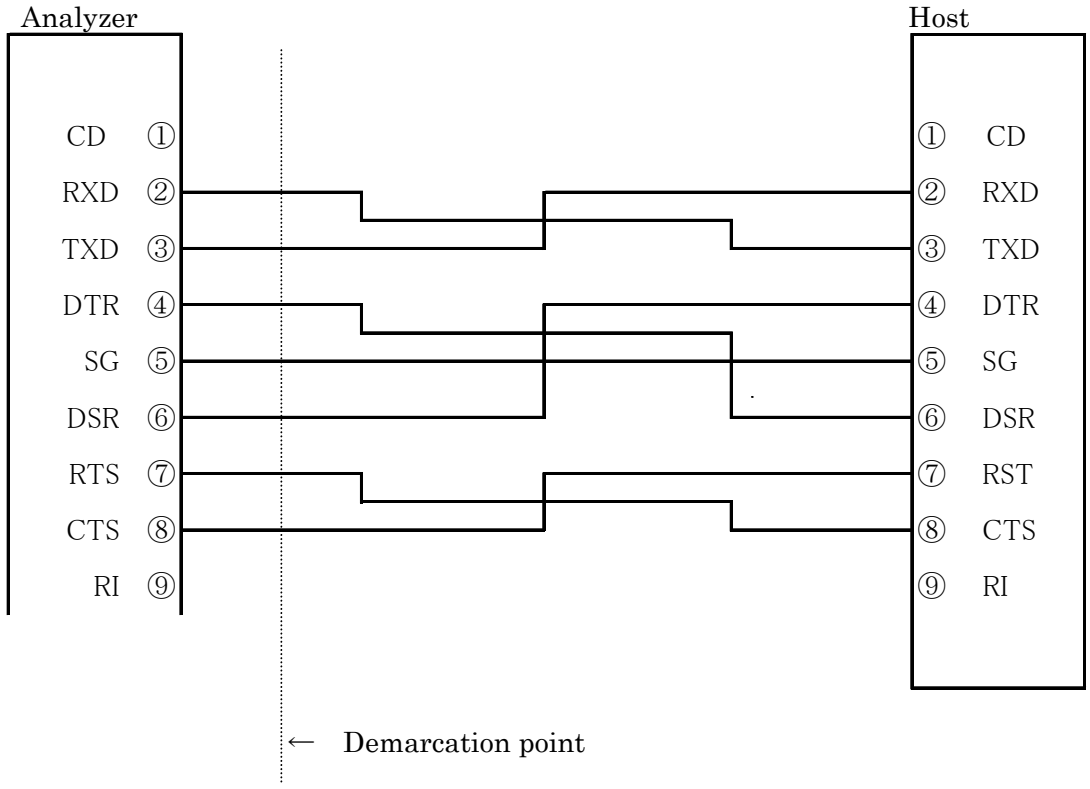
Terminal No.	Code	Item	Direction
9	RI	Ring (RI)	IN
3	TXD	Send Data (SD)	OUT
2	RXD	Receive Data (RD)	IN
7	RTS	Request to Send (RS)	OUT
8	CTS	Clear to Send (CS)	IN
6	DSR	Data Set Ready (DR)	IN
5	SG	Signal Ground (SG)	― ― ―
1	CD	Carrier Detect (CD)	IN
4	DTR	Data Terminal Ready (ER)	OUT

＊Signal direction

OUT ――― Analyzer ⇨ Host

IN ――― Analyzer ⇦ Host

(2) Connector pin connection (for interlink cable)



Note: There is no control for hardware flow on the Analyzer.When the control line is used on the Host, or the fixation of CST signal level is necessary, short-circuit between ④ and ⑥, and between ⑦ and ⑧, respectively.

6. Reference

6.1 Remark specifications

When an error occurs during measurement on G1200 that obviously compromises the reliability of assay data, a remark is added to the assay results and the relevant specimens are registered in the re-test list for remeasurement, depending on the remarks. Tests with a remark not listed in the re-test list can be registered in the re-test list by manually selecting multiple error conditions on the [Result Data] screen. Remarks are output as a 64-bit ASCII code. The remark code format is shown below.

(Least significant bit)

B16	B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1
B32	B31	B30	B29	B28	B27	B26	B25	B24	B23	B22	B21	B20	B19	B18	B17
B48	B47	B46	B45	B44	B43	B42	B41	B40	B39	B38	B37	B36	B35	B34	B33
B64	B63	B62	B61	B60	B59	B58	B57	B56	B55	B54	B53	B52	B51	B50	B49

(Most significant bit)

BIT	Type	Remark	Description	Data value (Y/N)		Registration in the retest list
				Count	Concentration	
1	No Immunoreaction Cartridge error	Fc	Added when a Immunoreaction cartridge is not set or cannot be transferred for some reason.	N	N	Y
2	Sample aspirating Error (not enough)	#	Added when aspiration of half the required quantity of specimen is detected.	N	N	Y
3	Sample aspirating error (Clogging)	N	Added when a specimen is clogged.	N	N	Y
4	Sample aspirating error (Empty)	As	Added when a specimen is not aspirated.	N	N	Y
5	No diluent error	Sd	Added when diluent solution is not set during sampling of diluted items.	N	N	Y
6	Wash failure error	Fw	Added when the capacitance sensor detects inappropriate aspiration and discharge of wash solution by Nozzle wash 1, 2, or 3.	Y	Y	Y
7	Detector error	Os	Added when abnormal operation of the shutter or detector is detected.	Y	N	Y
8	Sampling tip check error	Ds	Added when a tip is not attached.	N	N	Y
9	Sample dispensing error	Fs	Added when a tip was not attached before disposal or a sample was not appropriately discharged during dispensing.	N	N	Y
10	Measured Count error (ND filter 0%)	M0	Added when the 0% photometric value is outside the normal range.	Y	N	Y
11	Measured Count error (ND filter 1%)	Mn	Added when the 1% photometric value is outside the normal range.	Y	N	Y
12	The emission rate is out of the range	Mr	Added when the ratio of the 100% and 1% photometric values is outside the normal range.	Y	N	Y
13	Temperature error in Immunoreaction cartridge pre-heater unit	Tp	Added when abnormal temperature of the Immunoreaction cartridge pre-heater unit is detected during assay.	Y	Y	N
14	Temperature error in Immunological reaction unit	Ti	Added when abnormal temperature of the Immunoreaction unit is detected during assay.	Y	Y	N
15	Wash solution aspiration test Error	Td	Added when abnormal temperature of wash solution B/F2 or B/F3 is detected during assay.	Y	Y	N
16	Temperature error in Substrate pre-heater unit	Th	Added when abnormal temperature of the Substrate pre-heater unit is detected during assay.	Y	Y	N
17	Enzyme reaction unit	Te	Added when abnormal temperature of the Enzyme	Y	Y	N

	temperature error		reaction unit is detected during assay.			
18	Photomultiplier temperature error	Tm	Added when abnormal temperature of the photomultiplier pre-heater unit is detected during assay.	Y	Y	N
19	Reagent cooler box temperature error	Tc	Added when abnormal temperature of the Immunoreaction cartridge Refrigerator is detected during assay.	Y	Y	N
20	Calibration error	B	Added when there is no calibration curve for the Reagent Lot used.	Y	N	N
21	Immunoreaction Cartridge expiration error	Ec	Added when an expired Immunoreaction Cartridge is detected.	Y	Y	N
22	Substrate expiration date error	Eu	Added when an expired Substrate solution is Detected.	Y	Y	N
23	Calibration expiration date error	Eb	Added when an expired Calibration curve is Detected.	Y	Y	N
24	Error that data during multi-measurements is out of difference allowable range	A	Added when the divergence between data from multiple measurements is outside the acceptable range.	Y	N	Y
25	Error of inability to calculate concentration	?	Added when a concentration calculation cannot be performed.	Y	N	Y
26	Calibration error (Out of range)	Gb	Added when the calibration type is outside the normal range.	Y	Y	N
27	Dynamic range error (upper)	GH	Added when the dynamic range exceeds the upper limit of the normal range.	Y	Y	N
28	Dynamic range error (lower)	GL	Added when the dynamic range falls below the lower limit of the normal range.	Y	Y	N
29	Not measured (due to a forced rack discharge)	Um	Added when racks are forcibly discharged.	N	N	N
30	Retest range error (Ra) Over	Ra	Added when out of the Ra re-measurement range.	Y	Y	Y
31	Retest range error (Rb)	Rb	Added when within the Rb measurement range.	Y	Y	Y
32	Panic value exceeded	P	Added when the calculated concentration value exceeds the panic value.	Y	Y	N
33	The number of pieces of effective data at the time of the multiple measurement = 1	n1	Added when there is only one effective data set for Multi-measurement No.	Y	Y	N
34	Reference value input error (X-bar control chart)	Cx	Added when control result data are out of the reference value range (X-bar control value range).	Y	Y	N
35	No reference value	Cj	Added when the X-bar and R reference value are not set.	Y	Y	N
36	Abnormal reagent	Re	Added when abnormal reagent is detected.	N	N	Y
37	Data edited (edit manual dilution ratio)	ed	Added to inspection data for which a manual dilution ratio has been changed.	Y	Y	N
38	Data edit (recalculation)	c	Added to inspection data which have been recalculated.	Y	Y	N
39	Data edited (edit calibration curve)	ef	Added when the calibration curve count for calibration result data has been changed.	Y	Y	N
40	Data edited (recalculation by calibration curve edited)	eb	Added to inspection data when recalculation has been performed with a changed calibration curve.	Y	Y	N
41	Data edited (edit QC concentration)	ec	Added when a concentration value for quality control result data has been changed.	Y	Y	N
42	Data transmission to host computer error	h	Added to inspection data that were not successfully transmitted to the host computer.	Y	Y	N
43-64	Reserved					

Note: When the system is operated on-line and remeasurement of specimens registered in the re-test list is performed, the worksheet reference to the host computer is not conducted and assay is performed in accordance with the information registered in the re-test list.

Note: When recalculation is conducted without a calibration curve, BIT38 is set and BIT20 cleared.

Revision history

Date	Rev.	Chapter/item	Description
07/8/8	1.0	2. Overview	Added a note on the transmission timing of assay result messages.
			Added a note describing that on-line operation is unavailable in Assay per sequence No. mode.
07/8/8	1.0	3.4 Data format of messages (3) Assay result message	Added measurement date/time. Changed the data size (fixed length) to 108 bytes.
07/8/8	1.0	3.3 Message content	Modified the sequence No. description, 9999 => 7000
07/8/8	1.0	5.2 Transmission method	Added 2400 bps to baud rates.
07/8/8	1.0	3.2 Message flow	(2) Modified the description of Assay request (Batch).
07/8/8	1.0	3.4 Data format of messages	Added a note on batch processing to (1) Assay request query message.
07/8/8	1.0	6.1 Remark specifications	Deleted BIT19 Substrate cooler box error (the hardware is removed).
07/9/12	1.1	3.3 Message content	Modified the sequence No. description, 7000=>9999
07/10/30	1.1	3.1 Message types	Modified the remarks on batch processing of assay request query message as shown below. "Transmitted after specifying the sample ID range."
07/10/30	1.1	3.2 Message flow	Modified (2) Assay request (Batch), (a).
07/10/30	1.1	3.4 Data format of messages (1)Assay request query message	Added a description on batch query to the Query ID description.
07/10/30	1.1	4.3 Frame transmission phase	Modified the sequence of Assay request message frame reception phase (batch).
07/10/30	1.1	3.4 Data format of messages (3) Assay result message	Modified the measurement date and measurement time formats. Changed the data size (fixed length) to 104 bytes.
08/1/16	1.2	3.4 Data format of messages (3) Assay result message	Modified the judgment field size from 2 bytes to 10 bytes.
08/1/16	1.2	3.3 Message content	Modified the judgment description, added the HBcrAg description.
08/1/17	1.3	Entire specifications	Changed FR9 to G1200.
08/1/17	1.3	3.3 Message content	Modified the analyte number description.
08/1/17	1.3	3.4 Data format of messages (3) Assay result message	Changed the remark field from 8 bytes to 16 bytes.
08/1/17	1.3	6.1 Remark specifications	Changed to the 64-bit version.
08/1/17	1.4	6.1 Remark specifications	Changed the concentration of dynamic range errors (BIT27,28) to Y.
08/2/18	1.41	3.4 Data format of messages (3) Assay result message	Corrected measurement date/time size errors. Modified the data size (fixed length) to 120.
08/3/10	1.42	3.4 Data format of messages (3) Assay result message	Added the data format to Sequence No. Changed the data size (fixed value) to 124 bytes.
08/5/12	1.43	3.4 Data format of messages (5)System	Changed the message ID to S.

		status message	
08/5/12	1.43	2. Overview (2) Assay request	Deleted QC.
08/5/23	1.44	3.4 Data format of messages (1)Assay request message	Modified the analyte information size from 2 bytes to 3 bytes.
08/8/21	1.45	3.3 Message content	Content alteration of Sample ID
08/8/21	1.45	3.3 Message content	Content alteration of Count value.
08/8/21	1.45	3.3 Message content	Content alteration of Remark.
08/8/21	1.45	3.4 Data format of messages (2) Assay request message	The reference page of Auto dilution ratio is changed to P6.
08/8/21	1.45	3.4 Data format of messages (3) Assay result message	The reference page of Auto dilution ratio is changed to P6.
08/8/21	1.45	3.4 Data format of messages (5) System status message	The reference page of Status is changed to P6.
08/8/21	1.45	3.4 Data format of messages (2) Assay request message	Content alteration of Sample No.
09/6/16	1.46	4.2Frame transmission control procedure (2)Frame transmission (4)Data link termination	Added a note on timeout period of reception. Added a note that the frame is annulled, and the data link is terminated if the limit is exceeded.
09/7/16	1.46	3.4 Data format of messages (1) Assay request query message	Added the "Sample category"(1 byte) Changed the message size Added a note on the "Sample category".
09/7/16	1.46	3.4Data format of messages (2)Assay request message	Added the "Comment" (80 bytes) Changed the message size Added a note on the " Comment ".
09/7/16	1.46	3.4Data format of messages (3) Assay result message	Added the "Comment" (80 bytes) Changed the message size Added a note on the " Comment ".
09/7/23	1.46	3.3Message content	Changed from “Preset dilution ratio” to “Manual dilution ratio”
09/7/23	1.46	3.4Data format of messages (2)Assay request message (3) Assay result message	Added a description that the “Manual dilution ratio” is left aligned.
09/7/23	1.46	3.4Data format of messages (2)Assay request message (3) Assay result message	Added a description that the “Sample No.” is left aligned or right aligned.

09/7/28	1.46	3.3Message content	Added the ”Comment”
09/9/18	1.47	5.4Input signal interface	Added the note
10/2/2	1.48	3.3Message content	Change of default value “Control sequence No. = 8001”
10/3/11	1.48	6.1Remark specifications	Added the “Re” remark
10/3/24	1.48	3.3Message content	Added a description of manual dilution ratio
10/3/24	1.48	4.1 Frame structure	Added the note