



Dialogic[®] DSI Signaling Controller

Performance Measurements Reference Manual

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Revision History

Issue	Date	Description
4	July 2017	Addition of MSL Resource Usage measurements for SWS mode. Document applicability extended to DSI G5x Signaling Controllers and renamed.
3	September 2015	Additional updated measurements
2	December 2014	Addition of M3UA measurements
1	October 2014	Initial Release

Note: The current version of this guide can be found at:
<http://www.dialogic.com/support/helpweb/signaling>

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1 Introduction

The Dialogic® DSI Signaling Controller family interfaces to SS7 and SIGTRAN networks to provide network connectivity for application servers using either message-based application programming interfaces over a TCP/IP interface (SIU mode) or using a web-services API (SWS mode). In addition the unit can operate as a stand-alone turnkey appliance within a network providing message routing based on different signaling elements within the received traffic.

The products support a wide range of SS7 protocols (MTP, ISUP, BICC, SCCP, TCAP, MAP, IS41 and INAP) and SIGTRAN protocols (M3UA, M2PA) operating on the unit and maintains a number of per-protocol measurements and counters to monitor traffic levels, peak utilization and quality of service. These measurements can either be assessed interactively by the user or written to a CSV text file for exporting to offline tools for data analysis.

This Reference Manual is for use in conjunction with the measurements written to CSV file for offline analysis. It documents operation of the feature, specifies the format of the CSV file and the detailed content of all the individual measurement records.

1.1 Applicability

This document is applicable to the following products and software versions:

- Dialogic® DSI G5x with SIU software Release 1.1.3 or later.
- Dialogic® DSI SS7G41 with SIU mode software Release 2.3.2 or later.
- Dialogic® DSI SS7G41 with SWS mode software Release 2.1.1 or later.

The products are generically referred to in this manual as Signaling Controllers.

2 Operation

The Signaling Controllers provide the ability to automatically gather measurements on a periodic basis and store them in CSV format. Measurements are available for different layers of the protocol stack and are used for monitoring traffic levels and error performance.

Traffic measurements include, for example, the number of messages sent and received, the number of octets sent and received and the peak traffic rate and peak link load. Performance monitoring includes features such as error counts (to assist detection of transmission path issues), routing failure causes (to detect possible configuration issues) and a number of other parameters to assist with smooth operation of the network.

Measurements are collected on a per-entity basis (eg. per-link, per-origin, per-network context) according to the type of measurement. The frequency of measurement collection can be selected on a per measurement type basis from the following values: 5 min, 10 min, 15 min, 30 min, 1 hour, 4 hours and 1 day.

Measurements are logged to a Comma Separated Variable (CSV) format text file called "stats.csv" which is located in the syslog/stats subdirectory and is available for access by the user using ftp/sftp or directly using the browser interface. The file accumulates data until either the system restarts or the file size reaches a maximum value (5Mbytes) at which point a new file is created and the original file is rotated into a file called "stats.n.csv" where n is a digit. A maximum of 10 files are retained.

The user can select which measurements are gathered by configuring a Measurement Report. When active, a Measurement Report causes measurement

records to be collected for all configured instances of the object (eg. Link, Origin etc). On a per Measurement report basis the user can adjust the frequency of the measurement and whether or not the measurement counters should be reset at the start of a new day. This is achieved using the browser interface and selecting the following operation:

System Administration > Diagnostics > Stats Reports

The following figure shows a typical result when displaying the current configuration of Measurement Reports. Only the reports applicable to the loaded user configuration data will be displayed in the list (for example if SCCP is not in use then the SCCP_NC measurements will not be listed).

Measurements Report Configuration						
	Report	Type	Active	Daily Reset	Frequency	Description
Change	LIU_PCM	t5e36	Y	N	1DAY	LIU PCM Measurements
Change	SCTP_LK	t6292	Y	N	1HOUR	SCTP Link Measurements
Change	M2PA_LK	t6225	Y	N	10MIN	M2PA Link Measurements
Change	M3UA_NC	t62b2	Y	N	10MIN	M3UA Per Network Context Measurements
Change	M3UA_NCPK	t62b4	Y	N	1HOUR	M3UA Per-NC Peak Utilisation
Change	M3UA_LK	t62b3	Y	N	1HOUR	M3UA Link Measurements
Change	M3UA_LKPK	t62b5	Y	N	1HOUR	M3UA Per-Link Peak Utilisation
Change	MTP2_LK	t6214	Y	N	1DAY	MTP2 Link Measurements
Change	MTP3_LS	t631a	Y	N	1HOUR	MTP3 Link Set Measurements
Change	MTP3_LKPK	t6326	Y	N	1HOUR	MTP3 Per-Link Peak Utilisation
Change	MRF_OG	t6918	Y	N	4HOUR	Message Router Origin Measurements
Change	MRF_DE	t6920	Y	N	4HOUR	Message Router Destination Measurements
Change	MRF_RK	t6919	Y	N	4HOUR	Message Router Routing Key Measurements
Change	SCCP_NC	t6752	Y	N	5MIN	SCCP Per Network Context Measurements
Change	MSL_RU	t6949	N	Y	5MIN	MSL Resource Usage Measurements

1 to 15 of 15 rows 20 Refresh

Figure 1 – Measurements Report Configuration Screen

The following information is presented: the report type, the type of record generated for this report, whether the report is currently active, whether the measurement counters are reset at the start of a new day, the frequency that the report is run and a description of the report.

Settings for a specific Measurement Report can be changed by clicking on “Change” which will result in the following form being displayed. Once the new settings have been selected clicking “Submit” causes the change to take effect:

Measurements Report Configuration	
Report	MTP2_LK
Type	t6214
Active	Y
Daily Reset	N
Frequency	1HOUR
Description	MTP2 Link Measurements

[Submit](#) [Cancel](#)

Figure 2 – Measurements Report Configuration Change Screen

3 File Format

This section describes in detail the format of the periodic measurement files.

3.1 Filename

All periodic measurements files are stored within the user accessible directory: syslog/stats.

Users can log on using ftp or sftp to read or transfer files to another platform.

The filename of the current (most recent) file is stats.csv

The maximum size of a file is limited to 5Mbytes and it will contain only complete records, in the event that the next record does not fit completely then the next file will be started.

The previous nine files are retained on the unit with filenames stats.1.csv (the most recent archived file) through to stats.9.csv (the oldest archived file).

A new file is automatically created whenever the unit is restarted.

3.2 Global Header

The first line in each file contains fixed text and is known as the Global Header:

Node,Date,Hour,Min,Sec,RecordType,ObjectID,Status,p1,p2,p3,...

The Global Header contains generic headings applicable to all record types allowing (for example) easy filtering of records when loaded into a spreadsheet). This includes headings for columns common to all records including: node identity, the date and time at which the readings were taken, the record type and status and generic parameter identifiers.

3.3 Report Header

The Report Header contains the specific headings for one type of record. It is generated once per file and will appear prior to the first row of data for that record type:

Node,Date,Hour,Min,Sec,t6918,OGID,Status,RXMSU,RXOCT,TXMSU,TXOCT,DROPMSU,DROPOCT,PERIOD

In addition to the common header fields the Report Header contains the record type mnemonic, the meaning of the ObjectID field and the per-record headers for each column (p1 .. pN) that is applicable for the record type, identifying the individual meaning of each measurement.

3.4 Individual Records

The format of individual records is as documented in the following table:

Global Header Field	Column Description
Node	This field is used to identify the node on which the measurements are generated. It is a user configurable, alpha numeric identifier containing up to 9 characters. This field allows records from different units to be merged without loss of meaning.
Date	Date the measurement was taken in the format yyyy-mm-dd.
Hour	Hour the measurement was taken in the range 0 to 23.
Min	Minute the measurement was taken in the range 0 to 59.
Sec	Second the measurement was taken in the range 0.000 to 59.999.
RecordType	Text label identifying the type of the record (eg "t6214"). This implies the meaning of the ObjectID and the meaning of the contents of the fields p1 .. pN.
ObjectID	Single integer identifying which instance of the object this record relates to. (eg. which signaling link)
Status	Status of the data contained in the record, this is an integer set to 0 when the data is valid. Non-zero represents an error code and the data may not be valid.
p1, p2, .. pN	Generic headers for record-specific data fields

3.5 Data Types

All measurement data fields presented in columns p1 .. pN are represented in one of the formats listed in the following table:

Data Type	Description
16bit	16 bit integer in the range 0 to 65,535.
32bit	32 bit integer in the range 0 to 4,294,967,295.
32bit1dp	32 bit value presented to 1 decimal place in the range 0.0 to 429,496,729.5
32bit2dp	32 bit value presented to 2 decimal places in the range 0.00 to 42,949,672.95
32bit3dp	32 bit value presented to 3 decimal places in the range 0.000 to 4,294,967.295

4 Measurement Record Formats

4.1 LIU Measurements

4.1.1 LIU_PCM Record

The LIU_PCM record contains measurements for the E1 / T1 interface. It is used for performance monitoring.

The record includes various raw error counters, and normalized durations for errored and severely errored seconds.

RECORD HEADER		
Attribute	Value	
Report Name	LIU_PCM	
Record Type	t5e36	
Object ID	PORTID	
RECORD STRUCTURE		
Field	Type	Description
p1	32bit	period - Period (in seconds) during which the measurements have been collected.
p2	32bit	bit_errors – Raw count of the actual number of bit errors detected by the framer device for the LIU.
p3	32bit	code_violations – Count of line code violations detected on the interface.
p4	32bit	frame_slips - Count of the number of frame slips that have occurred on the interface.
p5	32bit	oos_transitions - Count of the number of transitions from the in synchronization state to the out of synchronization state.
p6	32bit	errored_seconds - The number of seconds during which the interface contained errors. An errored second is any second during which the interface is out of synchronization, or there are frame slips or bit errors. If the liu frame format is configured as either D4 or E1, with CRC generation disabled, then line code violations are also included in the errored second count.
p7	32bit	severely_errored_seconds - The number of severely errored seconds. A severely errored second is a second during which the interface is out of synchronization or the bit error rate exceeds 1 in 1,000.

4.2 SCTP Measurements

4.2.1 SCTP_LK Record

The Sctp_LK record contains measurements for the SIGTRAN Sctp Association. It is used for traffic measurement and performance monitoring.

RECORD HEADER		
Attribute	Value	
Report Name	SCTP_LK	
Record Type	t6292	
Object ID	SNLINK	
RECORD STRUCTURE		
Field	Type	Description
p1	32bit	est_client – Number of times the associations has been established from this host
p2	32bit	est_server – Number of times the association has been established from the remote end.
p3	32bit	aborted – Number of associations ended by ABORT.
p4	32bit	shutdown – Number of associations ended gracefully.
p5	32bit	chunks_tx – Number of chunks transmitted.
p6	32bit	chunks_rx – Number of chunks received.
p7	32bit	uchunks_tx – Number of unordered chunks transmitted.
p8	32bit	uchunks_rx – Number of unordered chunks received.
p9	32bit1dp	period - Period (in seconds) during which the measurements have been collected.
p10	32bit1dp	time_oos - Time (in seconds) for which the association has been out of service.

4.3 M3UA Measurements

4.3.1 M3UA_NC Record

The M3UA_NC record contains measurements gathered at the M3UA layer for a specific Network Context.

It is used to provide an overview of the total traffic carried over all associations in a specific network context and includes the number of Message Signal Units (MSU) transmitted and received and the number of payload octets in each direction.

RECORD HEADER		
Attribute	Value	
Report Name	M3UA_NC	
Record Type	t62b2	
Object ID	NC	
RECORD STRUCTURE		
Field	Type	Description
p1	32bit1dp	period - Period (in seconds) during which the measurements have been collected.
p2	32bit	rx_octets - Number of SIF and SIO octets received.
p3	32bit	rx_msu - Number of MSU's received.
p4	32bit	tx_octets - Number of SIF and SIO octets transmitted.
p5	32bit	tx_msu - Number of MSU's transmitted.

4.3.2 M3UA_NCPK Record

The M3UA_NCPK record contains peak traffic level measurements gathered at the M3UA layer across all the associations in a specific Network Context. Peak traffic levels are recorded for both transmit and receive directions over each 10 second interval and the peak values are stored.

The measurements include the peak utilization over the previous 5 minute interval, the previous 1 hour interval and the previous 24 hour interval.

The monitor tracks utilization in terms of the peak Message Signal Unit (MSU) rate of messages transmitted and received over a 10 second interval and the total number of octets transmitted and received in a 10 second period.

The peak rate is expressed as MSU/s to one decimal place.

The peak load is based upon the number of payload octets transmitted or received and expressed as the number of 'Link Equivalents' to two decimal places.

RECORD HEADER		
Attribute	Value	
Report Name	M3UA_NCPK	
Record Type	t62b4	
Object ID	NC	
RECORD STRUCTURE		
Field	Type	Description
p1	32bit2dp	RXLOAD5M – Peak receive link utilisation during the previous 5 minutes. Expressed in Link Equivalents.
p2	32bit2dp	RXLOAD1H - Peak receive link utilisation during the previous hour. Expressed in Link Equivalents.
p3	32bit2dp	RXLOAD1D - Peak receive link utilisation during the previous day. Expressed in Link Equivalents.
p4	32bit1dp	RXRATE5M - Peak rate of MSUs received during the last 5 minutes (msu/s)
p5	32bit1dp	RXRATE1H - Peak rate of MSUs received during the last hour (msu/s)
p6	32bit1dp	RXRATE1D - Peak rate of MSUs received during the last day (msu/s)
p7	32bit2dp	TXLOAD5M – Peak transmit link utilisation during the previous 5 minutes. Expressed in Link Equivalents.
p8	32bit2dp	TXLOAD1H - Peak transmit link utilisation during the previous hour. Expressed in Link Equivalents.
p9	32bit2dp	TXLOAD1D - Peak transmit link utilisation during the previous day. Expressed in Link Equivalents.
p10	32bit1dp	TXRATE5M - Peak rate of MSUs transmitted during the last 5 minutes (msu/s)
p11	32bit1dp	TXRATE1H - Peak rate of MSUs transmitted during the last hour (msu/s)
p12	32bit1dp	TXRATE1D - Peak rate of MSUs transmitted during the last day (msu/s)

4.3.3 M3UA_LK Record

The M3UA_LK record contains per association measurements gathered at the M3UA layer. It is used for traffic measurements and performance monitoring.

Traffic measurements include the number of Message Signal Units (MSU) transmitted and received and the number of payload octets in each direction.

Performance monitoring comprises of “out of service” count and duration.

RECORD HEADER		
Attribute	Value	
Report Name	M3UA_LK	
Record Type	t62b3	
Object ID	SNLINK	
RECORD STRUCTURE		
Field	Type	Description
p1	32bit1dp	period - Period (in seconds) during which the measurements have been collected.
p2	32bit	rx_octets - Number of SIF and SIO octets received.
p3	32bit	rx_msu - Number of MSU's received.
p4	32bit	tx_octets - Number of SIF and SIO octets transmitted.
p5	32bit	tx_msu - Number of MSU's transmitted.
p6	32bit	oos_count - Number of out of service transitions.
p7	32bit1dp	oos_duration - Duration (in seconds) out of service condition.

4.3.4 M3UA_LKPK Record

The MTP3_LKPK record contains per association peak traffic level measurements gathered at the M3UA layer. Peak traffic levels are recorded for both transmit and receive directions over each 10 second interval and the peak values are stored.

The measurements include the peak utilization over the previous 5 minute interval, the previous 1 hour interval and the previous 24 hour interval.

The monitor tracks utilization in terms of the peak Message Signal Unit (MSU) rate of messages transmitted and received over a 10 second interval and the total number of octets transmitted and received in a 10 second period.

The peak rate is expressed as MSU/s to one decimal place.

The peak load is based upon the number of payload octets transmitted or received and expressed as the number of 'Link Equivalents' to two decimal places.

RECORD HEADER		
Attribute	Value	
Report Name	M3UA_LKPK	
Record Type	t62b5	
Object ID	SNLINK	
RECORD STRUCTURE		
Field	Type	Description
p1	32bit2dp	RXLOAD5M – Peak receive link utilisation during the previous 5 minutes. Expressed in Link Equivalents.
p2	32bit2dp	RXLOAD1H - Peak receive link utilisation during the previous hour. Expressed in Link Equivalents.
p3	32bit2dp	RXLOAD1D - Peak receive link utilisation during the previous day. Expressed in Link Equivalents.
p4	32bit1dp	RXRATE5M - Peak rate of MSUs received during the last 5 minutes (msu/s)
p5	32bit1dp	RXRATE1H - Peak rate of MSUs received during the last hour (msu/s)
p6	32bit1dp	RXRATE1D - Peak rate of MSUs received during the last day (msu/s)
p7	32bit2dp	TXLOAD5M – Peak transmit link utilisation during the previous 5 minutes. Expressed in Link Equivalents.
p8	32bit2dp	TXLOAD1H - Peak transmit link utilisation during the previous hour. Expressed in Link Equivalents.
p9	32bit2dp	TXLOAD1D - Peak transmit link utilisation during the previous day. Expressed in Link Equivalents.
p10	32bit1dp	TXRATE5M - Peak rate of MSUs transmitted during the last 5 minutes (msu/s)
p11	32bit1dp	TXRATE1H - Peak rate of MSUs transmitted during the last hour (msu/s)
p12	32bit1dp	TXRATE1D - Peak rate of MSUs transmitted during the last day (msu/s)

4.4 MTP Measurements

4.4.1 MTP2_LK Record

The MTP2_LK record contains per-link measurements gathered at the MTP2 layer. It is used for traffic measurements and performance monitoring.

Traffic measurements include the number of Message Signal Units (MSU) transmitted and received and the number of payload octets in each direction.

Performance monitoring includes various error counters, retransmission data and measurements relating to the detection of local busy condition and outgoing congestion events.

RECORD HEADER		
Attribute	Value	
Report Name	MTP2_LK	
Record Type	t6214	
Object ID	LINK	
RECORD STRUCTURE		
Field	Type	Description
p1	32bit1dp	oos_duration - Duration (in seconds) of link "Out of Service" state.
p2	16bit	align_failures - Number of failed alignment attempts.
p3	32bit	SU_err_count - Number of signal units received in error. <i>This field is not supported for the SS7MD board</i>
p4	32bit	NACK_count - Count of negative acknowledgements received from the far end.
p5	32bit1dp	busy_duration - Duration (in seconds) of local busy condition.
p6	32bit	tx_octets - Number of SIF and SIO octets transmitted.
p7	32bit	rtx_octets - Number of octets re-transmitted. <i>This field is not supported for the SS7MD board</i>
p8	32bit	tx_msu_count - Number of MSU's transmitted.
p9	32bit	rx_octets - Number of SIF and SIO octets received.
p10	32bit	rx_msu_count - Number of MSU's received.
p11	32bit	cong_count - Number of congestion events. This is the number of times that the link has entered the congestion condition as a result of the number of messages queued for transmission exceeding the congestion onset threshold
p12	32bit1dp	cong_duration - Accumulated duration (in seconds) for which the link has been in the congested condition.
p13	32bit	discard_count - Number of MSU's discarded at the MTP2 layer due to congestion.
p14	32bit	discard_events - Number of congestion events resulting in discard of messages queued for transmission.
p15	32bit1dp	period - Period (in seconds) during which the measurements have been collected.

4.4.2 M2PA_LK Record

The M2PA_LK record contains per-link measurements gathered at the M2PA layer. It is used for traffic measurements and performance monitoring.

Traffic measurements include the number of Message Signal Units (MSU) transmitted and received and the number of payload octets in each direction.

Performance monitoring includes error counters, and measurements relating to the detection of local busy condition and outgoing congestion events.

RECORD HEADER		
Attribute	Value	
Report Name	M2PA_LK	
Record Type	t6225	
Object ID	LINK	
RECORD STRUCTURE		
Field	Type	Description
p1	32bit1dp	oos_duration - Duration (in seconds) of link "Out of Service" state.
p2	32bit1dp	period - Period (in seconds) during which the measurements have been collected.
p3	16bit	align_failures - Number of failed alignment attempts.
p4	32bit	tx_octets - Number of SIF and SIO octets transmitted.
p5	32bit	tx_msu_count - Number of MSU's transmitted.
p6	32bit	rx_octets - Number of SIF and SIO octets received.
p7	32bit	rx_msu_count - Number of MSU's received.
p8	32bit	cong_count - Number of congestion events. This is the number of times that the link has entered the congestion condition as a result of the number of messages queued for transmission exceeding the congestion onset threshold
p9	32bit1dp	cong_duration - Accumulated duration (in seconds) for which the link has been in the congested condition.
p10	32bit	discard_count - Number of MSU's discarded at the M2PA layer due to congestion.
p11	32bit	discard_events - Number of congestion events resulting in discard of messages queued for transmission.

4.4.3 MTP3_LS Record

The MTP2_LS record contains per link set measurements gathered at the MTP3 layer. It is used for monitoring performance of the network.

The measurements capture the number and total duration of link set outages and the duration for which the adjacent signaling point has been inaccessible.

RECORD HEADER		
Attribute	Value	
Report Name	MTP3_LS	
Record Type	t631a	
Object ID	LINKSET	
RECORD STRUCTURE		
Field	Type	Description
p1	32bit1dp	unavail_dur - Duration (in seconds) of link set being unavailable.
p2	32bit	ajSP_inac_count - Number of times the adjacent signaling point has been inaccessible.
p3	32bit1dp	ajSP_inac_dur – Duration (in seconds) for which the adjacent signaling point has been inaccessible.

4.4.4 MTP3_PEAK Record

The MTP3_PEAK record contains per-link peak traffic level measurements gathered at the MTP3 layer. Peak traffic levels are recorded for both transmit and receive directions over each 10 second interval and the peak values are stored.

The measurements include the peak utilization over the previous 5 minute interval, the previous 1 hour interval and the previous 24 hour interval.

The monitor tracks utilization in terms of the peak Message Signal Unit (MSU) rate of messages transmitted and received over a 10 second interval and the total number of octets transmitted and received in a 10 second period.

The peak rate is expressed as MSU/s to one decimal place.

The peak load as measured by the number of payload octets transmitted or received is expressed to two decimal places. For MTP2 TDM interfaces this is the utilization of the available bandwidth and for SIGTRAN M2PA links it is the number of 'Link Equivalents'.

Note that traffic rates are recorded within MTP3 and may therefore exceed 100% link occupancy in the case that MTP3 is sending more traffic to MTP2 than the underlying link can support.

RECORD HEADER		
Attribute	Value	
Report Name	MTP3_PEAK	
Record Type	t6326	
Object ID	LINK	
RECORD STRUCTURE		
Field	Type	Description
p1	32bit2dp	RXLOAD5M – Peak receive link utilisation during the previous 5 minutes. Expressed in Erlangs for TDM links or Link Equivalents for M2PA links.
p2	32bit2dp	RXLOAD1H - Peak receive link utilisation during the previous hour. Expressed in Erlangs for TDM links or Link Equivalents for M2PA links.
p3	32bit2dp	RXLOAD1D - Peak receive link utilisation during the previous day. Expressed in Erlangs for TDM links or Link Equivalents for M2PA links.
p4	32bit1dp	RXRATE5M - Peak rate of MSUs received during the last 5 minutes (msu/s)
p5	32bit1dp	RXRATE1H - Peak rate of MSUs received during the last hour (msu/s)
p6	32bit1dp	RXRATE1D - Peak rate of MSUs received during the last day (msu/s)
p7	32bit2dp	TXLOAD5M – Peak transmit link utilisation during the previous 5 minutes. Expressed in Erlangs for TDM links or Link Equivalents for M2PA links.
p8	32bit2dp	TXLOAD1H - Peak transmit link utilisation during the previous hour. Expressed in Erlangs for TDM links or Link Equivalents for M2PA links.
p9	32bit2dp	TXLOAD1D - Peak transmit link utilisation during the previous day. Expressed in Erlangs for TDM links or Link Equivalents for M2PA links.
p10	32bit1dp	TXRATE5M - Peak rate of MSUs transmitted (from MTP3 to MTP2/M2PA) during the last 5 minutes (msu/s)
p11	32bit1dp	TXRATE1H - Peak rate of MSUs transmitted (from MTP3 to MTP2/M2PA) during the last hour (msu/s)
p12	32bit1dp	TXRATE1D - Peak rate of MSUs transmitted (from MTP3 to MTP2/M2PA) during the last day (msu/s)

4.5 Message Router Measurements

4.5.1 MRF_OG Record

The MRF_OG record contains traffic measurements for an Origin as gathered within the Message Router Functionality. It is used for traffic measurements and detection of messages that failed to route as a result of no valid routing key match.

RECORD HEADER		
Attribute	Value	
Report Name	MRF_OG	
Record Type	t6918	
Object ID	OGID	
RECORD STRUCTURE		
Field	Type	Description
p1	32bit	RXMSU – Number of Message Signal Units (MSU) received on the Origin.
p2	32bit	RXOCT - Number of payload octets received on the Origin.
p3	32bit	TXMSU – Number of MSUs received on the Origin that successfully matched a Routing Key.
p4	32bit	TXOCT - Number of payload octets received on the Origin that that successfully matched a Routing Key.
p5	32bit	DROPMSU – Number of MSUs received on the Origin that were discarded because a matching Routing Key did not exist.
p6	32bit	DROPOCT - Number of payload octets contained within MSUs that were discarded because a matching Routing Key did not exist
p7	32bit	PERIOD - Period (in seconds) during which the measurements have been collected.

4.5.2 MRF_RK Record

The MRF_RK record contains traffic measurements for a Routing Key as gathered within the Message Router Functionality. It is used for traffic measurements and detection of messages that failed to route as a result of no valid accessible destination.

RECORD HEADER		
Attribute	Value	
Report Name	MRF_RK	
Record Type	t6919	
Object ID	RKI	
RECORD STRUCTURE		
Field	Type	Description
p1	32bit	RKMSU – Number of Message Signal Units (MSU) that matched the Routing Key.
p2	32bit	RKOCT - Number of payload octets received in MSUs that matched the Routing Key.
p3	32bit	TXMSU – Number of MSUs that matched the Routing Key and were successfully transmitted to a Destination.
p4	32bit	TXOCT - Number of payload octets contained within MSUs that were successfully transmitted to a Destination.
p5	32bit	DROPMSU – Number of MSUs that were discarded because an accessible Destination was not available.
p6	32bit	DROPOCT - Number of payload octets contained within MSUs that were discarded because an accessible Destination was not available.
p7	32bit	BAKMSU - Number of MSUs that were passed to the partner unit (in a dual configuration) because an accessible Destination was not available locally.
p8	32bit	BAKOCT - Number of payload octets contained within MSUs that were passed to the partner unit for routing.
p9	32bit	PERIOD - Period (in seconds) during which the measurements have been collected.

4.5.3 MRF_DE Record

The MRF_DE record contains traffic measurements for a Destination as gathered within the Message Router Functionality. It is used to measure traffic for the Destination.

RECORD HEADER		
Attribute	Value	
Report Name	MRF_DE	
Record Type	t6920	
Object ID	DESTID	
RECORD STRUCTURE		
Field	Type	Description
p1	32bit	TXMSU – Number of MSUs that that were sent to this Destination.
p2	32bit	TXOCT - Number of payload octets contained within MSUs that were sent to this Destination.
p3	32bit	PERIOD - Period (in seconds) during which the measurements have been collected.

4.6 SCCP Measurements

4.6.1 SCCP_NC Record

The SCCP_NC record contains measurements gathered at the SCCP layer for a specific Network Context. It is used for traffic measurements and performance monitoring. The content is based on the SCCP sections of ITU-T recommendation Q.752.

Traffic measurements include the number of Class 0 and Class 1 messages originated or terminated at the node.

Performance monitoring includes counters for several conditions including counts of the number of routing failures for specific reasons, the number of UDTs messages generated and other error counts.

RECORD HEADER		
Attribute	Value	
Report Name	SCCP_NC	
Record Type	t6752	
Object ID	NC	
RECORD STRUCTURE		
Field	Type	Description
p1	32bit	rtf_ttype – Routing Failure – No translation tables exist for the address format received. Table 7/Q.752 para 7.1
p2	32bit	rtf_tval – Routing Failure – No translation for this specific address. Table 7/Q.752 para 7.2
p3	32bit	rtf_net_fail – Routing Failure – Network Failure (Point Code not available). Table 7/Q.752 para 7.3

p4	32bit	rtf_net_cong – Routing Failure – Network Congestion. Table 7/Q.752 para 7.4
p5	32bit	rtf_ss_fail – Routing Failure – Subsystem Failure (unavailable). Table 7/Q.752 para 7.5
p6	32bit	rtf_ss_cong – Routing Failure – Subsystem congestion. Table 7/Q.752 para 7.6
p7	32bit	rtf_uu – Routing Failure – Unequipped User (subsystem). Table 7/Q.752 para 7.7
p8	32bit	rtf_sif_err – Routing Failure – Message length exceeds max_sif length for transport layer.
p9	32bit	rtf_too_long – Routing Failure – Maximum message length exceeded.
p10	32bit	rtf_unknown – Routing Failure – Unqualified. Table 7/Q.752 para 7.9
p11	32bit	stx_err – Syntax Error Detected. Table 7/Q.752 para 7.8
p12	32bit	sor_grant – Subsystem out-of-service grant message received. Table 8/Q.752 para 8.6
p13	32bit	sor_deny – Subsystem out-of-service request denied (T_{coord} expiry). Table 8/Q.752 para 8.7
p14	32bit	udts_tx – UDTS messages sent. Table 9/Q.752 para 9.1
p15	32bit	udts_rx – UDTS messages received. Table 9/Q.752 para 9.2
p16	32bit	num_msg – Total messages handled (from local or remote subsystems). Table 9/Q.752 para 9.3
p17	32bit	lss_msg – Total messages intended for local subsystems. Table 9/Q.752 para 9.4
p18	32bit	num_gtt – Number of messages requiring global title translation. Table 9/Q.752 para 9.5
p19	32bit	txm_cl0 – Number of Class 0 messages originated at this node. Table 9/Q.752 para 9.6
p20	32bit	txm_cl1 – Number of Class 1 messages originated at this node. Table 9/Q.752 para 9.6
p21	32bit	rxm_cl0 – Number of Class 0 messages terminated at this node. Table 9/Q.752 para 9.7
p22	32bit	rxm_cl1 – Number of Class 1 messages terminated at this node. Table 9/Q.752 para 9.7
p23	32bit	rtf_no_reass – Routing Failure – Unable to reassemble segmented message
p24	32bit1dp	period – Period (in seconds) during which the measurements have been collected

4.7 MSL Resource Usage Measurements

4.7.1 MSL_RU Record

The MSL_RU record contains measurements gathered by the MSL module when running in SWS mode. It is used for performance monitoring.

Performance monitoring includes counters for several conditions including counts of the number of and other error counts.

RECORD HEADER		
Attribute	Value	
Report Name	MSL_RU	
Record Type	t6949	
Object ID	0	
RECORD STRUCTURE		
Field	Type	Description
p1	32bit1dp	period – period (in seconds) during which the measurements have been collected
p2	32bit	Scomplete – total sessions completed
p3	32bit	Ssuccess – successful sessions
p4	32bit	Sactive – currently active sessions
p5	32bit	OGDcomplete – outgoing MAP dialogs completed
p6	32bit	OGDactive – currently active outgoing MAP dialogs
p7	32bit	ICDcomplete – incoming MAP dialogs completed
p8	32bit	ICDactive – currently active incoming MAP dialogs
p9	32bit	SPNDqueued – network receptions pending user service request
p10	32bit	RPNDqueued – user service requests pending network reception
p11	32bit	SMSRcount – multi-part SMS references created
p12	32bit	SMSRactive – multi-part SMS references in use