DataCast
UMTSIups OHDR

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Except where otherwise indicated, the information contained in this document represents the planned capabilities and intended functionality offered by the product and version number identified on the front of this document. Screen images depicted in this document are representative and intended to serve as example images only. Wherever possible, actual screen images are included.

Contents

Revision History

The revision history shows the documentation updates for this release. These updates include new features and changes to existing features. They also include changes resulting from documentation requests and issues.

Revision	Description
001	Original from 6.11.2; added MSIP in IPv6 format and IE description
002	Updated per F-03848 Merge GeoBlade code into mainstream, DC-8553.

1 Introduction

1.1 Confidentiality Restrictions

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1.2 Disclaimer

Tektronix reserves the right to revise this document for any reason, including but not limited to, conformity with standards promulgated by various agencies, utilization of advances in the state of the technical arts, or the reflection of changes in the design of any equipment, techniques, or procedures described or referred to herein. Tektronix is under no obligation to provide any feature listed in this document.

1.3 Purpose

The purpose of this document is to describe the OHDR format for Binary Streaming and Binary and ASCII file output. Tektronix created this document for the development of an OHDR receiver in a third part application.

1.4 Scope

The OHDR parameters described in this document are limited to DataCast. The ASCII and Binary outputs described in this document are limited to the OHDR receiver software developed by Tektronix.

1.5 Content

Structures and parameters described in this document are related to:

- IUPS-RANAP

1.6 Definitions

Listed below are common definitions for this guide.

xDR	Generic term to indicate Data Records generated by SpIprobes and G10, GeoBlade probes
UMTSIupsDR	UMTS IuPs Packet Detail Record
DR	Data Record. Within this document the term refers to components of a OHDR, resulting from the transformation of individual xDRs
HDR	Hybrid Data Record
OHDR	Output Hybrid Data Record. Output format generated by DataCast by processing xDRs
Blob	Blob is a chunk of binary data a receiver obtains on a TCP/IP socket from a DataCast server.
IE	Information Element

2 Defining the DataCast Mediation Platform

The DataCast Mediation platform provides an efficient and flexible process for generating a unique output—OHDRs. It provides the following functions:

- Filtering of data records for specific application needs
- Correlation of data records
- Serves as a single feed to multiple applications

The DataCast system's filtering capabilities enhance the bandwidth efficiency on Local and Wide Area Networks (LAN/WAN). The Flexible Component attachment allows a system administrator to combine the DataCast processing components in different ways to provide an efficient output to a downstream application. This feature helps the downstream application receive only those records of interest, reducing the number of records that must be discarded.

DataCast receives Programmable Detail records (xDRs) from the GeoProbe system. DataCast filters and correlates these input data records so it can produce the DataCast format, which is an OHDR. One OHDR contains content from one or more xDRs plus additional information.

After correlating the xDR into an OHDR, DataCast then broadcasts the OHDRs to multiple applications for business intelligence, planning, and service management. This result enables DataCast to reduce the load placed on network resources by alleviating the production of duplicated and customized data records from each network information source. DataCast also assists the network applications by delivering packaged and customized OHDRs.

NOTE: DataCast uses the Sun server family and is independent from the GeoProbe system's SpIserver.

3 Working with Binary OHDR Output – TCP/IP Streaming

The DataCast Transmitter can send OHDR to external application over a TCP/IP socket. It can also write the same content to disk in binary format. In either case, the content follows the same format.

This section describes the layout of the OHDR Binary Large Object (BLOB) that DataCast Transmitter sends out.

3.1 Overview

The HDR is kind of container to hold the DRs. The HDR may carry only one DR if correlation is not involved. If the DRs were correlated, all the DRs involved in the correlation will be put together in the HDR.

The DrCount field in the header shall tell if there are more DRs in the OHDR sent out. Every DR in the OHDR follows the same structure.

The data record is encoded in the BLOB. Fields of the OHDR are divided into the following categories based on their sizes:

- OHDR header
- DR header
- Fixed section
  - First category for fixed section elements: four bytes in length
  - Second category for fixed section elements: two bytes in length
  - Third category for fixed section elements: various lengths, which can be any length other than four bytes and two bytes
- Variable section

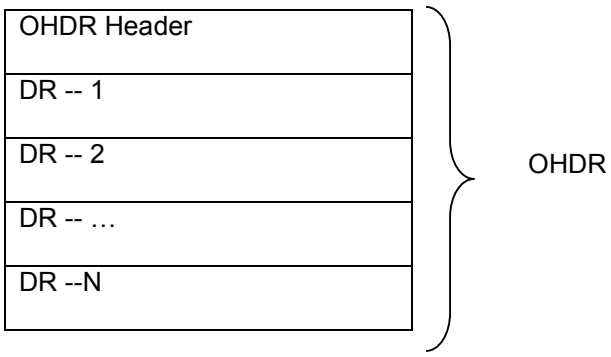
Fixed section refers to fields that are always present in the OHDR.

Variable section contains information that can be present in the OHDR if the probes have been programmed to include it in xDRs.

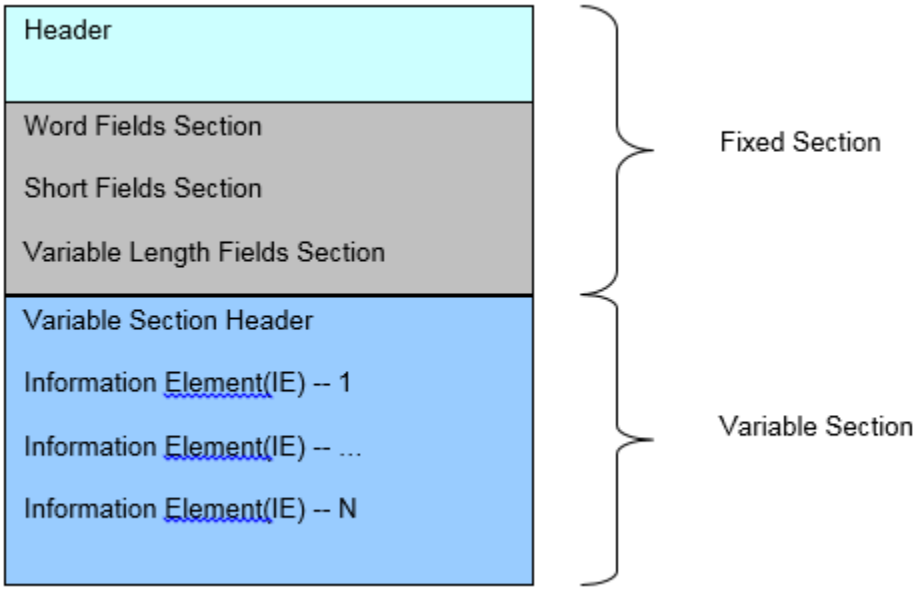
3.2 Pictorial representation of the encoded OHDR blob

In general every outgoing HDR has the following structure. The fields in each section may or may not present based on what is requested on OHDR.format file for a particular application in question.

OHDR Structure



DR Structure



3.3 Defining the Rules for Decoding a BLOB

To ensure the receiver decodes a BLOB, use the following generic rules:

- Each BLOB might contain multiple DR's and every DR is word aligned. The entire BLOB is always word aligned.
- When blobbing one single DR, all the 4 byte-sized parameters (in the fixed section of that DR) are packed together at the beginning. This section is followed by all the 2 byte-sized parameters (in the fixed section of that DR). This section is followed by the all the miscellaneous-sized parameters (in the fixed section of that DR). The last section in the blob is the variable section of the DR. Since all parameters in a DR (whether they belong to the fixed section or the variable section) are configurable, separate element-id masks are used for the three different categories (that are present in the fixed section of a DR). The purpose of these element-id masks is to indicate the different individual elements/parameters (that belong to a particular category) that are packed into this BLOB (based on the user's choice).
- When one single DR is packed into the BLOB, there might be instances where all three different categories of data are to be blobbed or only one category has to be blobbed (based on the user's choice). The number of element-id masks present in the blob is directly dependent on the number of different categories you had to pack into the blob.
- For a DR count that is greater than the value zero, you must read each record according to its specification and move on to the next record. For the purpose of this document, if the DR count is greater than the value zero, one or more data records are present:

3.4 OHDR Header

For the purpose of this document, bit positions are based on the digit one, not the digit zero. Bits one through eight in this document are identical to bits zero through seven in an environment that is based on the digit zero. The following table is an example of the OHDR header.

Parameter	Size (Bytes)	Description
Length of Data Blob	4	The length is not inclusive of this field.
Message Type	1	In the case of a data record, the value is 130
Data Type	1	This value defines the application ID from the OHDR.format and Transmitter.
Format Type	1	This value defines the FormatID from the OHDR.format and Transmitter.
[Version (4 bits) – Spare (4 bits)]	1	Indicates the version of the data type (HDR). The maximum value of the version number is assumed to be 15
DrCount	1	This value defines the total number of DRs. If the value is zero, no data sections appear.
<internal>	1	
Reserved	2	This parameter is reserved for future use.

3.5 DR Header, Fixed section

Parameter	Size (Bytes)	Parameter Id Used only in ASCII decoding	Geo	G10, GeoBlade	Description
Total length of DR	2				This field indicates the length of this xDR. The length indicated also includes the size of this field and any word padding at the end of the DR. The length unit is in number of (4 byte) words.
Bitmask DR Type (bits 1-3) Number of Element ID Masks: 2 bits (bits 4-5) Interface Type: 3 bits (bits 6-8)	1				If the bitmask contains a value of zero for a data element, the element does not appear in the record. The value for this parameter is 5 for UMTSIuPs DR. Indicates the number of Element IDs used in the next Fixed Sections (up to three sections as described below). The value for this parameter is 0.
Total Length of Element ID Section	1				This value indicates the length of the entire Element ID section. This value is exclusive of the size of this field, but is inclusive of the padding bytes for the Element ID. The length unit shall be in number of (4 byte) words.
Word Fields Section					
Element ID Mask 1	4				This value is the Bitmask for all elements in Section 1. The byte order is Big Endian. The three most significant bits (32–30) indicate the number of bytes within the parameters from this section. The following values are: **000: Word size (4 bytes)** 001: Short size (2 bytes) 010: Miscellaneous sizes (anything other than 4 or 2 bytes)
Call Number	4	40961	✓		This field is present if the Element ID Mask 1 bit location 1 is set. **Detailed description:** the value is an ID defined by the probe and incremented by one each time a new call starts

Parameter	Size (Bytes)	Parameter Id Used only in ASCII decoding	Geo	G10, GeoBlade	Description
Start Time (seconds)	4	40962	✓		This field is present if the Element ID Mask 1 bit location 2 is set. **Detailed description:** this field indicates the Greenwich Mean Time (GMT) time of the call start.
Start Time (micro seconds)	4	40963	✓		This field is present if the Element ID Mask 1 bit location 3 is set. **Detailed description:** the value expresses in microseconds the fractional part of the Start Time
End Time (seconds)	4	40964	✓		This field is present if the Element ID Mask 1 bit location 4 is set. **Detailed description:** this field indicates the Greenwich Mean Time (GMT) time of the call end
End Time (microseconds)	4	40965	✓		This field is present if the Element ID Mask 1 bit location 5 is set. **Detailed description:** the value expresses in microseconds the fractional part of the Call End Time
Interface ID	4	40966	✓		This field is present if the Element ID Mask 1 bit location 6 is set. **Detailed description:** this field can be used to derive the two end nodes of the IuPS interface. For RANAP PS Paging Transaction (on IuPS), the system populates the Interface ID field as follows: • When there is no response detected for the Paging, the Interface ID will be populated from the first paging request seen. • If a response is detected for the Paging, the Interface ID will be populated from this response.
Status Bits	4	40967	✓		This field is present if the Element ID Mask 1 bit location 7 is set.
Timeout Bits	4	40968	✓		This field is present if the Element ID Mask 1 bit location 8 is set.

Parameter	Size (Bytes)	Parameter Id Used only in ASCII decoding	Geo	G10, GeoBlade	Description
Condition Indicator	4	40969	✓		This field is present if the Element ID Mask 1 bit location 9 is set. **Detailed description:** this field indicates various conditions within an IuPS transaction. Bit Position 17, Transaction Type is the only currently available condition indicator. This condition is triggered within the PDR by the occurrence of the transaction selected in the Multiple PDR configuration.
Iu Signaling Connection Id	4	40970	✓		This field present if the Element ID Mask 1 bit location 10 is set. **Detailed description:** the value is extracted from the RANAP IU-SIGID IE (0x4F)
ProcedureId	4	40971	✓		This field present if the Element ID Mask 1 bit location 11 is set. **Detailed description:** the value is provided by DataCast mapping the Transaction Type
Short Fields Section					
Element ID Mask 2	4				This value is the bitmask for all elements in Section 2. The three most significant bits (32–30) indicate the number of bytes within the parameters from this section. The following values are: 000: Word size (4 bytes) **001: Short size (2 bytes)** 010: Miscellaneous sizes (anything other than 4 or 2 bytes)
Application Protocol	2	41985	✓		This field is present if the Element ID Mask 2 bit location 1 is set. **Detailed description:** this field identifies the application protocol of the PDR. The application Protocol ID for IuPS RANAP is 239.

Parameter	Size (Bytes)	Parameter Id Used only in ASCII decoding	Geo	G10, GeoBlade	Description
EquipmentId	2	41986	✓		This field is present if the Element ID Mask 2 bit location 2 is set. **Detailed description:** The value is the ID of the GeoProbe that created the call record, unique in the system.
Processor	2	41987	✓		This field is present if the Element ID Mask 2 bit location 3 is set. **Detailed description:** The value is the ID of the processing unit that created the call record, unique in the system.
Call Type	2	41988	✓		This field is present if the Element ID Mask 2 bit location 4 is set. **Detailed description:** this field indicates the call type that generated this data record. Refer to sections **6.2**
Transaction Type	2	41989	✓		This field is present if the Element ID Mask 2 bit location 5 is set. **Detailed description:** this field indicates the transaction that generated this data record. Refer to section **6.1**
LAC	2	41990	✓		This field is present if the Element ID Mask 2 bit location 6 is set.
SAC	2	41991	✓		This field is present if the Element ID Mask 2 bit location 7 is set.
Transaction Status	2	41992	✓		This field is present if the Element ID Mask 2 bit location 8 is set. **Detailed description:** this field indicates the contents of the Status field as defined in section **6.4**

Parameter	Size (Bytes)	Parameter Id Used only in ASCII decoding	Geo	G10, GeoBlade	Description
SubscriberInfo	2	41993	✓		This field is present if the Element ID Mask 2 bit location 9 is set. **Detailed description:** this field is composed by SubscriberGroup (1B) + SubscriberType (1B) Subscriber Group: (0-Undefined, 1-National, 2-Foreign Visitor) Subscriber Type: (0-Undefined, 1-Home, 2-Visitor)
SCCP Cause	2	41994	✓		This value is present if the Element ID Mask2 bit location 10 is set. **Detailed description:** The second significant nibble (bits 9-12) of the SCCP Cause field is used to indicate the type of cause: Bits 1-8: Cause value Bits 9-12: SCCP Cause type indicated: • 0000: Unknown • 0001: Release • 0010: Return • 0011: Error • 0100: Refusal • 0101: Reset Bits 13-16: Spare
Extension Bitmask	2	41995	✓		This field is present if the Element ID Mask 2 bit location 11 is set. **Detailed description:** • Bits 1: Transaction Cause Extension: when set it indicates that Transaction Cause parameter in Variable Length Section has to be decoded as CauseRadioNetworkExtension (offset 127 is applied to Transaction Cause field content) • Bits 2-16: Spare
Variable Length Section					

Parameter	Size (Bytes)	Parameter Id Used only in ASCII decoding	Geo	G10, GeoBlade	Description
Element ID Mask 3	4				This value is the bitmask for all elements in Section 2. The three most significant bits (32–30) indicate the number of bytes within the parameters from this section. The following values are: 000: Word size (4 bytes) 001: Short size (2 bytes) **010: Miscellaneous sizes (anything other than 4 or 2 bytes)**
Transaction ID	variable	43009	✓		This field is present if the Element ID Mask 3 bit location 1 is set. Field is composed by a length (1B), not inclusive of itself, followed by the actual content. **Detailed description:** this numeric value indicates the transaction identifier in the standard Level 3 message.
NSAPI	variable	43010	✓		This field is present if the Element ID Mask 3 bit location 2 is set. Field is composed by a length (1B), not inclusive of itself, followed by the actual content. **Detailed description:** if data is ciphered, the NSAPI on the IuPS interface requires successful deciphering
Transaction Cause or Reject Cause	variable	43011	✓		This field is present if the Element ID Mask 3 bit location 3 is set. Field is composed by a length (1B), not inclusive of itself, followed by the actual content. **Detailed description:** In the case that one RAB Assignment transaction has multiple RAB IDs, the first RAB ID with a valid cause value is used. For Iu Release transaction with Iu Release Request message, the transaction cause is extracted from Iu Release Request message. In cases without Iu Release Request message, the transaction cause is from Iu Release Command. If Extension Bitmask bit 1 is set, the actual Transaction Cause value is obtained adding offset 127 to Transaction Cause field content.
RAC	variable	43012	✓		This field is present if the Element ID Mask 3 bit location 4 is set. Field is composed by a length (1B), not inclusive of itself, followed by the actual content.

Parameter	Size (Bytes)	Parameter Id Used only in ASCII decoding	Geo	G10, GeoBlade	Description
IMSI	variable	43013	✓		This field is present if the Element ID Mask 3 bit location 5 set. Field is composed by a length (1B), not inclusive of itself, followed by the actual content.
Last P-TMSI	variable	43014	✓		This field is present if the Element ID Mask 3 bit location 6 set. Field is composed by a length (1B), not inclusive of itself, followed by the actual content.
MCC	variable	43015	✓		This field is present if the Element ID Mask 3 bit location 7 set. Field is composed by a length (1B), not inclusive of itself, followed by the actual content.
MNC	variable	43016	✓		This field is present if the Element ID Mask 3 bit location 8 set. Field is composed by a length (1B), not inclusive of itself, followed by the actual content.
IMEI	variable	43017	✓		This field is present if the Element ID Mask 3 bit location 9 set. Field is composed by a length (1B), not inclusive of itself, followed by the actual content.
MSISDN	variable	43018	✓		This field is present if the Element ID Mask 3 bit location 10 set. Field is composed by a length (1B), not inclusive of itself, followed by the actual content.
IMEISV	variable	43019	✓		This field is present if the Element ID Mask 3 bit location 11 set. Field is composed by a length (1B), not inclusive of itself, followed by the actual content.
Iu Rnc Name	variable	43020	✓		This field is present if the Element ID Mask 3 bit location 12 set. Field is composed by a length (1B), not inclusive of itself, followed by the actual content.
Iu Sgsn Name	variable	43021	✓		This field is present if the Element ID Mask 3 bit location 13 set. Field is composed by a length (1B), not inclusive of itself, followed by the actual content.

Parameter	Size (Bytes)	Parameter Id Used only in ASCII decoding	Geo	G10, GeoBlade	Description
APN	variable	43022	✓		This field is present if the Element ID Mask 3 bit location 14 set. Field is composed by a length (1B), not inclusive of itself, followed by the actual content.
Subscriber MCCMNC	variable	43023	✓		This field is present if the Element ID Mask 3 bit location 15 set. Field is composed by a length (1B), not inclusive of itself, followed by the actual content.
First PTMSI	variable	43024	✓		This field is present if the Element ID Mask 3 bit location 16 set. Field is composed by a length (1B), not inclusive of itself, followed by the actual content.
MSIP IPv6	variable	43025	✓		This field is present if the Element ID Mask 3 bit location 17 set. Field is composed by a length (1B), not inclusive of itself, followed by the actual content. **Detailed description:** This field contains the string representing the MSIP when it is encoded in IPv6 format. If multiple value are available in variable part, the first one is considered.
Padding	variable				This field ensures that the entire Element ID section associated with the fixed section of the DR content ends on a four-byte word boundary.

3.6 Variable Section

Parameter	Size (Bytes)	Description
Length of Variable Section	2	This value indicates the length of the entire variable section. The value is inclusive of the size of this field plus all the padded bytes. The length unit shall be in number of (4 byte) words.
Number of Varfields Present	2	This value is defined by the total number of variable field.
Format ID	2	This value is defined by the format ID from the GeoProbe FSF file.
Variable Fields (IEs)		This value is defined by the number of present variable fields in the Number of Varfields Present parameter. See Section 0 for more information about the Variable Fields (IEs) format.
Padding	Variable	If you need to use padding, this value is defined to end by a four-byte boundary.

3.6.1 Variable Fields (IEs)

The Variable Fields (IEs) format is defined by the following table.

Parameter	Size (Bytes)	Description
Data ID	2	
Bitmask for Variable Options	1	This bitmask defines for the optional value (for example, timestamp secs and usecs) after the Data Field.
Length of Data Field	1	
Data Field	Variable	This size is equal to the value in the Length of Data Field parameter.
Timestamp (secs)	4	This value is defined by bit 1 in the Bitmask for Variable Options parameter.
Timestamp (usecs)	4	This value is defined by bit 2 in the Bitmask for Variable Options parameter.

3.6.2 Parameter Types Supported for IE definition

All IEs defined by the standards for the RANAP, GMM and SM transactions will also be supported in the IuPs PDR Variable Part. Section **6.3** provides a description of each additional IE defined by Tektronix.

4 ASCII OHDR Output – File Based

In case a DataCast feed needs to be delivered in file format instead of as TCP data stream, the drRcvr standalone application will be deployed.

drRcvr receives OHDRs in Binary format and records them in a Binary or ASCII file depending on the configuration parameters.

4.1 Command Usage

The following text displays the command usage for DataCast ASCII OHDR output:

drRcvr [-hdr_port <value>] [-output_dir <value>] [-timeout_interval <value>] [-write_binary <value>]

4.1.1 Configuration Parameters

The following table displays the configuration parameters for the OHDR ASCII format.

Parameter	Name	Default Value	Possible Values	Description
Hdr Port Number—TCP/IP Listening port resource number	hdr_port	9171	Any available port resource number of the machine.	This parameter describes a port number, which is used to accept connections from the DataCast servers.
Output Directory Path—output directory path name	output_dir	$HOME/dr	output directory path name, path can contain environment variable	The path where the received data to be stored.
Timeout Interval—timer for generating log and statistics data.	timeout_interval	300	300, 600, 900, 1200, and 3600	This parameter is defined by the seconds of the timer.
Write Binary	write_binary	no	yes and no	You use this parameter only for the received HDRs that are dumped in either binary format or ASCII format.

4.1.2 Output Format Structure

The drRcvr decodes the OHDR and records it in the ASCII format associating the tag to the value for each parameter. The general ASCII format of the drRcvr appears below. The information in upper case letters appears as it is in the data record and the information in lower case letters is replaced by the actual content of the data record.

BEGIN_HDR_CONTENT|hdr_header|

BEGIN_DR_CONTENT|dr_name;

BEGIN_DR_FIRST_SECTION;fixed_section_data;END_DR_FIRST_SECTION;

BEGIN_DR_SECOND_SECTION;variable_section_data;END_DR_SECOND_SECTION;

END_DR_CONTENT|

END_HDR_CONTENT

The first section of the ASCII format corresponds to the fixed section of the data record and it is coded as a list of couples (tag values) that are separated by a comma. The second section of the ASCII format corresponds to the variable section of the data record.

IMPORTANT NOTE: after tag or label END_HDR_CONTENT there is a single space character followed by a single newline character (both not shown in above example).

5 ASCII Formats

5.1 FIRST_SECTION – ASCII format

Each Parameter of the First Section is in the format DATA_ID:VALUE.

The DATA_ID of the Parameters that can be present in the first section of an ASCII format are listed in section **3.5** under the column “Parameter Id Used only in ASCII decoding”.

5.1.1 FIRST_SECTION – Example

BEGIN_HDR_CONTENT|1;0;2;1;0|BEGIN_DR_CONTENT|UMTS_IUPS_INTERFACE;BEGIN_DR_FIRST_SECTION;40961:814416;40962:1266512202;40963:619000;40964:1266512202;40965:685000;40966:853380154;40967:0;40968:0;40969:65536;40970:4294967295;40971:0;41985:239;41986:71;41987:2698;41988:0;41989:129;41990:15001;41991:62415;41992:16384;41993:0;41994:65535;43009:1,0;43012:1,40;43013:15,222103100734418;43014:8,D0228A17;43015:3,222;43016:2,10;43024:8,D0228A17;END_DR_FIRST_SECTION;BEGIN_DR_SECOND_SECTION;2;3;34,[0a bb 08 82 0a bd 18 12 58 38 0b 59],0,0;34,[0a bb 08 8a 0a bd 18 10 3d 23 0b 59],0,0;END_DR_SECOND_SECTION;END_DR_CONTENT|END_HDR_CONTENT

Here is an example of how such format should be decoded:

41989:129

41989	corresponding to Transaction Type
129	0X81 = SCCP Connection Closure

43013:15,222103100734418

43013	corresponding to IMSI parameter
15	MSI length
222103100734418	IMSI value

5.2 SECOND_SECTION – ASCII format

The second section (variable part) follows the same structure defined in **3.6**

In the ASCII format its generic structure is:

BEGIN_DR_SECOND_SECTION; (NOTE: Stat section for Variable Part parameter)

Numbers of IEs

Format Id used by Probe)

IE description

Data Id, [Value of Parameter], time sec., time msec.;

END_DR_SECOND_SECTION;

5.2.1 SECOND_SECTION - Example

BEGIN_DR_SECOND_SECTION;

2;

3;

34,[0a bb 08 82 0a bd 18 12 58 38 0b 59],0,0;

34,[0a bb 08 8a 0a bd 18 10 3d 23 0b 59],0,0

END_DR_SECOND_SECTION;

(NOTE: Where all fields are decimal but the value of the parameter is a list of bytes in hexadecimal format and the timestamp reports a 0 if these fields are not configured in the option bit mask of the IE in the FSF file)

6 Appendix A

This appendix contains detailed information for the OHDR parameter's status bits, condition indicators, timeout bits, and call types.

6.1 UMTS IuPS Transaction Types

6.1.1 IuPS Transaction Types

The following table contains IuPS Transactions data records.

Transaction Type	Hex
Attach	0x0001
Detach	0x0002
RAU	0x0003
P-TMSI Reallocation	0x0004
Authentication and Ciphering	0x0005
Identity	0x0006
Service	0x0007
Status	0x0008
Information	0x0009

6.1.2 SM Transaction Types

The following table contains IuPS Transactions SM data records

Transaction Type	Hex
Activate PDPC	0x000a
Request PDPC Activation	0x000b
Deactivate PDPC	0x000c
Modify PDPC	0x000d
Activate 2nd PDPC	0x000e
SM Status	0x000f

6.1.3 RANAP Transaction Types

The following table contains IuPS Transactions RANAP data records

Transaction Type	Hex
PS Paging	0x0010
Relocation Resource Allocation	0x0011
Overload	0x0012
Reset	0x0013

Transaction Type	Hex
Reset Resource	0x0014
Error Indication	0x0015
Relocation Preparation	0x0016
RAB Assignment	0x0017
Iu Release	0x0018
RAB Modify	0x0019
RAB Release	0x001a
Security Mode Control	0x001b
SRSN Context Transfer	0x001d
Data Volume Report	0x001e
Location Related Data	0x001f
Transfer Indication	0x0020
Location Reporting Control	0x0021
Location Report	0x006a

6.1.4 SMS Transaction Types

The following table contains IuPS Transactions SMS data records

Transaction Type	Hex
SMS Deliver	0x0030
SMS Deliver Report	0x0031
SMS Submit	0x0032
SMS-Command	0x0033
SMS-SMMA	0x0034

6.1.5 SCCP Transaction Types

The following table contains IuPS Transactions SCCP data records

Transaction Type	Hex
SCCP Connection Establishment	0x0080
SCCP Connection Closure	0x0081

6.2 IuPS Call Types

The following table contains IuPS Call Types

Call Type	Hex
SCCP Connection with no payload	0x817
SCCP Connectionless with no payload	0x818
RANAP Relocation	0x816
RANAP Overload	0x814

Call Type	Hex
RANAP Reset	0x811
RANAP Reset Resource	0x812
RANAP Error Indication	0x813
RANAP Info Xfer	0x815
Paging with no response	0x810
Paging on CS Domain	0x81B
GMM Procedure	0x819

6.3 IuPS IEs

This section provides a list of IE (information elements) that can be sent with the IuPS PDR variable section.

Information Element (IE)	Hex	Comments
Number of Paging Requests Sent	0x8000	This IE provides the number of Paging Request messages sent within a paging call. The content of this IE is 1 byte in length.
RABs Info	0x9002	This parameter is implemented for the RAB Assignment transaction. Transaction type must be specific. Message type must be set to Don't Care (0xfffe). See **6.3.1** for this parameter's content and format.
Call Duration Stats	0x9005	See Call Duration Stats IE Parameter Format for this parameter's content and format.
Endpoint IP Addresses	0x9006	See Endpoint IP Address IE Parameter Format for this parameter's content and format.
MSIP IPv6	0xB000	Hexadecimal value of the address
MSIP IPv4	0xB001	Hexadecimal value of the address
Location Report	0xC000	This IE is implemented for the Location Report transaction that is sent by the RNC to the CN with information about the UE location. See

6.3.1 IuPS RABS Info Parameters

Field	Field Length	Comments
RAB ID	1 Byte	When there is more than one RAB in a transaction, this parameter is iterated per RAB ID (that is, the same Data ID repeats per RAB)

Field	Field Length	Comments
RAB Status Bit Mask	1 Byte	For each RAB ID, the system has to determine the RABs type (Establishment/Modification/Release) and who (RNC/CN) initiated the RAB request. Bit 1 – RAB Establishment Bit 2 – RAB Modification Bit 3 – RAB Release Bit 4 – RAB request imitated by RNC Bit 5 – RAB request initiated by CN Bit 6 – RAB Queued Bits 7 – 8 reserved for future By default, all bits are set to “0." Specific bit is set to “1” when the actual status is determined.
Setup Time (ms)	4 Bytes	Time calculated from the RABs Assignment Request to Response. ▪ Set field to 0xFFFFFFFF for RABs response timeout between RAB Assignment Request to Response ▪ Set field to 0xFFFFFFFE for RAB encounters an event that causes the transaction to close. Events such as new RAB procedure, Ranap Reset, mobile station Detach, State Machine Abort, Sequence Error, SCCP connection closure will cause all pending transactions to close.
Information Bit Mask	2 Bytes	The following bit positions are used to indicate whether actual data is populated for certain fields pertaining to the RAB ID: Bit 1 - Traffic Class Bit 2 - Traffic Direction Bit 3 - RAB Failed to Released Cause Bit 4 - RAB Failed to Setup/Modify Cause Bit 5 - RAB to be Released Cause Bit 6 - Transfer Delay Bit 7 - Maximum Bit Rate Bit 8 - Guaranteed Bit Rate Bit 9 - SDU Error Ratio Bit 10 - Residual Bit Error Ratio Bit 11 - Call Duration Stats Bits 12-16 reserved for future use By default, all bits are set to “0." Specific bit is set to “1” when the actual data is populated.
(The following fields are optional presence and transaction dependent. The system does not send the following fields if their Information Bit Mask indicates “0.”)		
Traffic Class	1 Byte	Specified in RAB Parameters IE (from Assignment Request message) under >Traffic Class

Field	Field Length	Comments
Traffic Direction	1 Byte	Specified in RAB Parameters IE (from Assignment Request message) under >RAB Asymmetry Indicator
RAB Failed to Released Cause	1 Byte	IE specified in the RAB Assignment Response message
RAB Failed to Setup/Modify Cause	1 Byte	IE specified in the RAB Assignment Response message
RAB to be Released Cause	1 Byte	IE specified in the RAB Assignment Request message
Transfer Delay	2 Byte	Specified in RAB Parameters IE (from Assignment Request message)
Maximum Bit Rate	5 or 9 Bytes	Specified in RAB Parameters IE (from Assignment Request message). See Maximum Bit Rate and Guaranteed Bit Rate IE Parameters Format for this parameter's content and format.
Guaranteed Bit Rate	5 or 9 Bytes	Specified in RAB Parameters IE (from Assignment Request message). See Maximum Bit Rate and Guaranteed Bit Rate IE Parameters Format for this parameter's content and format.
SDU Error Ratio	3 - 15 Bytes	Specified in RAB Parameters IE (from Assignment Request message). See SDU Error Ratio and Residual Bit Error Ratio IE Parameters Format for this parameter's content and format.
Residual Bit Error Ratio	3 - 15 Bytes	Specified in RAB Parameters IE (from Assignment Request message). See SDU Error Ratio and Residual Bit Error Ratio IE Parameters Format for this parameter's content and format.
Call Duration Stats	16 Bytes	Specified in RAB Parameters IE (from Assignment Request message). See Call Duration Stats IE Parameter Format for this parameter's content and format.

Table 5.10 - Maximum Bit Rate and Guaranteed Bit Rate IE Parameters Format

Field	Length	Comments
# of iterations	1 B	Value can be 1 or 2.
Data Field	4 or 8 B	Contains data field content.

Table 5.11 - SDU Error Ratio and Residual Bit Error Ratio IE Parameters Format

Field	Length	Comments
# of iterations	1 B	Value can be 1 - 7.
Data Field	2 - 14 B	Contains data field content.

Table 5.12 - Call Duration Stats IE Parameter Format

Field	Length	Comments
Call Setup Time (ms)	4 B	{PDPC activation request to PDPC activation response}
Call Holding Time (ms)	4 B	{PDPC activation request to PDPC deactivation request}
Call Ringing Time (ms)	4 B	N/A
Call Conversation Time (min)	4 B	{PDPC activation response to PDPC de-activation request}

Table 5.13 - Endpoint IP Address IE Parameter Format

Field	Length	Comments
RNC IP Address	4 Bytes	Organized in network order
SGSN IP Address (for IuPS) Or MSC IP Address (for IuCS)	4 Bytes	Organized in network order

Table 5.26 - Location Report IE

Field	Length	Comments
MCC	2 Bytes	Last MCC
MNC	2 Bytes	Last MNC
LAC	2 Bytes	Last LAC

SAC	2 Bytes	Last SAC
Request Type	2 Bytes	Request Type from Location Report message
Cause	2 Bytes	Cause from Location Report message

Fields are populated with 0xFFFF when data is unavailable.

Request type field is divided as follow:

Event	4 B	From Request Type field from Location Report message
Report Area	4 B	From Request Type field from Location Report message
Accuracy code	1 Bytes	From Request Type field from Location Report message

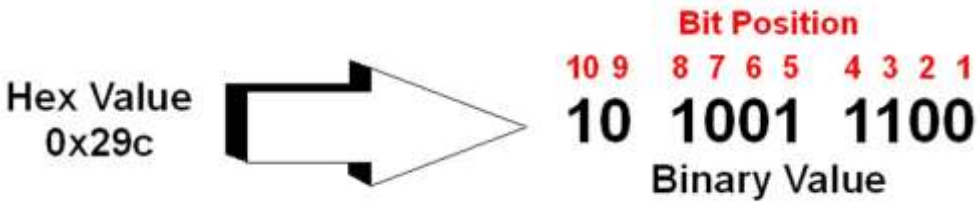
6.4 UMTS IuPS Status Bits

This section contains the names and values of status bits you can use in an FSF file:

- Common DR Status Bits
- UMTS IuPS Status Bits

6.4.1 Decoding Status Bits

In data records, status events are aggregated into one hex value that must be converted to binary and decoded to interpret the status events that occurred during the call or transaction. For example, assume the statusBits value in the Fixed Part of a data record shows a hex value of 0x29c. The following graphic shows an example of hex to binary conversion.



Once you convert the hex value to a binary value, you can read the bits from right to left. The bit number at the farthest right position is Bit 1; Bit 2 is the next bit at the left, continuing until all bits are counted as shown in graphic above. Each bit containing a “1” can be mapped to a status value using the status bit tables in this guide. In the graphic above, bits 3, 4, 5, 8, and 10 each represent a different status event that occurred during the call or transaction (not necessarily in chronological order).

6.4.2 UMTS IuPS Transaction Status Bits

The following table provides the names of the UMTS IuPS status bits, their descriptions, and hexadecimal values. In data records, status events are aggregated into one hex value that must be converted to binary and decoded to interpret the status events that occurred during the call or transaction. See Decoding Status Bits for more information.

Bit Position	Status Bit	Value (Hex)	Within IuPS PDR this Status is Triggered by:
1	Sequence Error	0x0001	Any instance where a message is received out of sequence
2	Error SU	0x0002	Various error scenarios (such as parsing error)
3	Timeout	0x0004	Transaction timeout
4	Closed by SCCP	0x0008	An SCCP call closure condition that causes the closure of an open transaction. For open transactions abnormally closed by SCCP, the system reports the event as follows: • Turns on the fourth Transaction Status bit (Closed by SCCP) • Populates the SCCP cause seen in the SCCP Cause field

Bit Position	Status Bit	Value (Hex)	Within IuPS PDR this Status is Triggered by:
5	Closed by RANAP Reset	0x0010	The RANAP Reset that causes the closure of an open transaction. For open transactions abnormally closed by RANAP Reset, the system will report the event as follows: • Turns on the fifth Transaction Status bit (Closed by RANAP Reset) • Populates the Reset cause in the Transaction Cause/Reject field • Sets the third Informational Bit Mask on to indicate the presence of a valid cause
5 (cont.)	Closed by RANAP Reset	0x0010	In the case of an open RANAP Reset transaction that gets closed by SCCP, the system will report the event as follows: • Turns on the fourth Transaction Status bit (Closed by SCCP) • Populates the SCCP cause seen in the SCCP Cause field • Populates the Reset cause in the Transaction Cause/Reject field • Sets the third Informational Bit Mask on to indicate the presence of a valid cause
6	State Machine Abort	0x0020	GeoProbe abort processing logic
7	Closed by Detach	0x0040	The Detach event that causes the closure of an open transaction. For Detach transaction with MS power switch off, this status will be triggered. For Detach transaction with response, this status will not be triggered.
8	Reserved for future use	0x0080	NA
9	Network Triggered	0x0100	When the network actually triggers the transaction. Only one case is supported at this time; this status will be set for the Activate PDPC transaction that follows the successful network Request PDPC Activation, even though the Activate PDPC Request message sent from MS to SGSN.
10	Closed by a New Procedure	0x0200	A new procedure that causes the closure of an open transaction.
11	Closed by Iu Release Procedure	0x0400	An Iu Release procedure (Iu Release Command not Iu Release Request) that causes the closure of an open transaction.

Bit Position	Status Bit	Value (Hex)	Within IuPS PDR this Status is Triggered by:
12	Closed by MMAbort	0x0800	MMAbort that causes the closure of an open transaction.
13	Closed by CCRelease	0x1000	CCRelease that causes the closure of an open transaction.
14	Static PDP Address	0x2000	When the Activate PDPC Request contains a static PDP address. Just the Activate PDPC transaction may have this status triggered.
15	Transaction Direction	0x4000	When the transaction's request message is sent from the network side (SGSN)
16	Reject Status	0x8000	