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DIGITAL PAY-TV SYSTEMS

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NAGRAVISION SMS GATEWAY

Interface Specification

ISSUE 2.7.5

SAS

EMC

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Conventions used in this guide

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Important	Information that must not be ignored when carrying out some task or tasks.
Note	Further information, advice or exceptions etc…
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	Provides information by way of a 'TIP' to carry out a task more effectively or efficiently.
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Acronyms and abbreviations

Term	Definition	Description
ANI	Automatic Number Identification	Also known as caller id
CAS	Conditional Access System	A generic term for a system used in pay television.
CC	Call Collector	This is the sub-system of the CAS managing the callback coming from the STB
DVB	Digital Video Broadcasting	DVB is a family of international standards for all program delivery media: satellite, cable, terrestrial, microwave, MDS, CATV, and SMATV.
EBNF	Extended Backus-Naur Form	A formal mathematical way to describe a language
EMM	Entitlement Management Message	Carries data from the system to one or many smart cards.
ICC	Integrated Circuit Card	Smart card
IPPV	Impulse Pay Per View	A PPV event product, which can be impulsively purchased through the STB and results in the acquisition of the related entitlement needed in the ICC.
ITM	Interactive Transaction Manager	This is the new name of the call-collector
MOP	Management Operator	The commercial program provider who manages subscribers and subscriptions.
NVOD	Near Video On Demand.	
PPV	Pay Per View	
Product		A single or group of services or events that may be purchased as a single entity.
SAS	Subscriber Authorization System	This is the sub-system of the CAS that converts the SMS command to EMM
SMS	Subscriber Management System	
SMSgw	SMS gateway	SMSgw is an application and an interface described in this document.
STB	Set-Top-Box	The decoder installed at the end-user home
STU	See STB	
UA	Unique Address	This is the id or number of the smart card
UTC	Coordinated Universal Time	Formerly known as GMT (Greenwich mean time).

Table 0-1 Acronyms, abbreviations and other terms

Data formats

Format	Description	Samples	Data
hex	Raw hexadecimal value	19 or 13(hex) in 2 bytes 88564006 or 05476126(hex) in 4 bytes	0x00:0x13 0x05:0x47:0x61:0x26
HHMMSS	time hour-min-sec represented in ASCII	102500 (10h25 and 00 sec)	0x31:0x30:0x32:0x35:0x30:0x30
ip_num	human representation of an IP address. The length is fixed to 15 bytes (4 x 3-digit num value separated with dot characters).	As an example the IP address 1.112.25.2 must be formatted as: 001.112.025.002	0x30:0x30:0x31:0x2E:0x31:0x31:0x32:0x2E 0x30:0x32:0x35:0x2E:0x30:0x30:0x32
num	numerical value represented in ASCII.	206	0x32:0x30:0x36
num_x	hexadecimal numerical value represented in ASCII.	6A10F9	0x36:0x3A:0x31:0x30:0x3F:0x39
r_num	numerical value represented in ASCII. The range is restricted.	see num samples	
r_num_x	hexadecimal value represented in ASCII. The range is restricted.	see num_x samples	
r_p_num	numerical value represented in ASCII and padded with “space” char. The range is restricted.	see p_num samples	
p_num	numerical value represented in ASCII and padded with “space” char	206__ (the value is a string of 5 digit, 3 significant digit and padded with 2 space)	0x32:0x30:0x36:0x20:0x20
r_text	any text represented in ASCII characters. The range is restricted.	N as No Y as Yes	0x4E 0x59
text	any text represented in ASCII characters.	SMS_GWY	0x53:0x4D:0x53:0x5F:0x47:0x57:0x59
YYYYMMDD	date year-month-day represented in ASCII.	20030518 (18 May 2003)	0x32:0x30:0x30:0x33:0x30:0x35:0x31:0x38

Table 0-2 Data formats

1. Introduction

This document presents the interface that links the SMS and the Nagravision conditional access system. It provides the specifications of the connection, the commands and the communication protocol used in the interface.

1.1 Audience

This guide is directed at the following people:

1. The customer's personnel involved in the management of the SMS – CAS interface
2. SMS vendor's personnel involved in the development of the interface between the SMS and the CAS.
3. Nagravision's personnel involved in the CAS (marketing, customer support, developer, test team)

1.2 How to use this specification

You do not need to read this specification from cover to cover—as some information is reference material only, therefore depending on your needs chose from the following :

- Chapter 2: System overview and communication protocols
- Chapter 3: SMS-SMSgw connection
- Chapter 4: The command format
- Chapter 5: The error codes

1.3 Related documents

[1] "Information technology – Syntactic meta-language – Extended BNF" (ISO/IEC 14977:1996)

[2] SMS Gateway Implementation Guide (This document is customer specific)

2. System overview

This chapter presents different aspects of the system related with the SMS gateway interface.

2.1 SMSgw purpose

The figure below illustrates the location of the SMS gateway (SMSgw). The SMSgw is an internal component of the Nagravision CAS system. From the outside world, it can be seen as a gate to the CAS. Throughout this gate, one or several SMS entities send instructions or commands toward the CAS. On the reverse way, the CAS sends to a given SMS information related to IPPV.

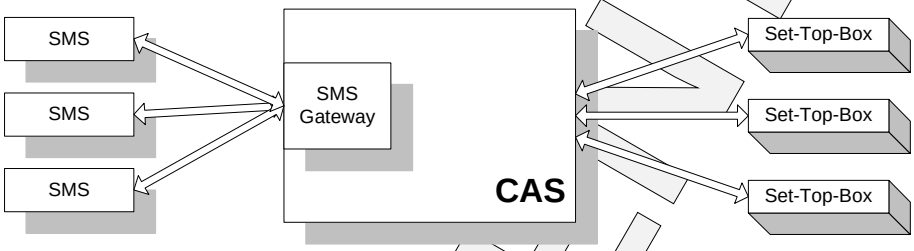


Fig. 2-1 CAS overview

2.2 Communication protocols

2.2.1 Layers

There are three communication layers. The lower level is the TCP/IP and the most abstract level is the SMSgw protocol. Between them, there is the Device IO layer whose role is to gather commands from the TCP/IP stream.

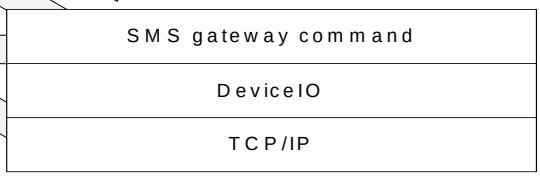


Fig. 2-2 SMSgw protocol – communication layers

2.2.2 TCP/IP protocol

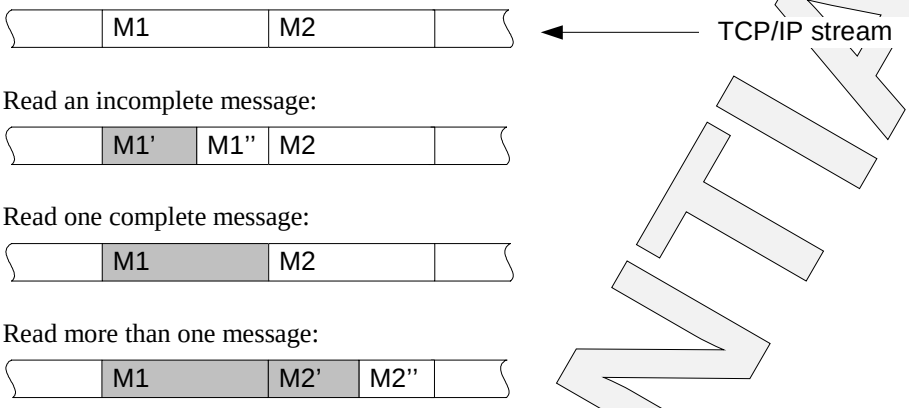
TCP/IP is a stream-based protocol. The application-oriented messages are joined together and there is no separator between these messages. When reading an application-oriented message from a stream, like TCP/IP, using OS primitives, we may have the three following possibilities:

1. The message is incomplete (only n bytes of the data have been read)

2. The message is complete (only the expected message has been read)

3. More than the expected message has been read.

The diagram below shows these three possibilities: Let's assume that the TCP/IP stream contains two application-oriented messages M1 and M2.



2.2.3 Device_IO protocol

The Device_IO is a protocol above TCP/IP used to exchange data as a buffer of known size. It consists of a fixed size header followed by the application data. The header size is two bytes, and the application data is a stream of n bytes.

Header section	Payload section
Length (2 bytes)	Application data (n bytes)

The header is a 2-byte hexadecimal value that corresponds to the number of bytes of the payload section. Warning: only the payload section length is indicated in the header. The first transmitted byte is the most significant byte of the "Length value".

The payload section content is described in the following chapters.

2.2.4 SMSgw protocol

The SMSgw protocol defines the application-oriented message. It is a high level protocol for which the user data consists of human readable ASCII characters (from ASCII code 32 to 127) used to describe the value of the command attributes.

2.3 Device_IO communication

2.3.1 Overview

Communications are established through entry points called services. An application establishes a communication with another application by specifying the service name of the target.

For Device_IO communications between applications running on different machines, a communication

must first be established at the TCP/IP transport level.

To manage a communication between two systems the following questions must be addressed:

- How to establish the communication with a Device_IO server and how to indicate for which internal client the communication is intended.
- How to transmit and receive data to/from a Device_IO server.

In the following description, the commands used (open, send, receive, listen, close) are the commands of the underlying transport protocol used (TCP/IP). Device_IO does not redefine these commands. The names used below (open, send, receive, listen and close) are generic names representing the corresponding available system calls. Consequently, the calls described below only show their Device_IO parameters. Transport protocol parameters (like socket pointers for instance) are not shown in the generic description of the calls.

2.3.2 Establishing a connection with a Device_IO server

To open a communication with a Device_IO server, an application must call the Device_IO server. Two parameters must be provided:

1. The machine name on which the server is running
2. The port number (TCP-IP) corresponding to the Device_IO server.

Once the TCP communication with the server has been established, the name of the target service shall be communicated (message_1) to the Device_IO server in order to establish a link between the calling client and the requested service.

As a reply, the server shall send one or two messages. The first message (message_2) contains a connection status and, if the communication attempt has been successful, a second message (message_3) specifies whether the call has been accepted or rejected.

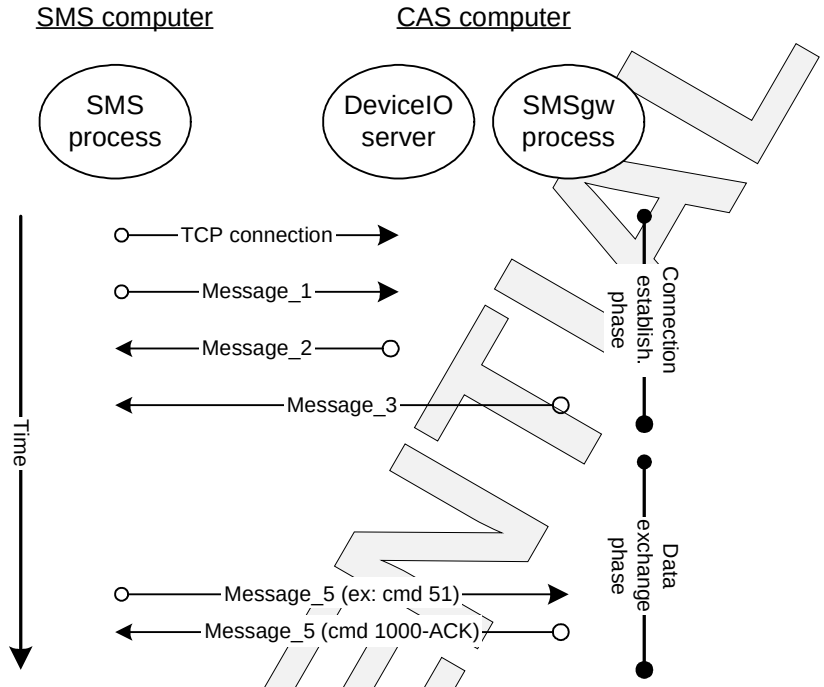


Fig. 2-3: Device_IO connection establishment and data exchange phases

An example of a Device_IO connection can be found in the chapter 6: Examples (on page 81).

2.3.3 Data exchange between client and server

After the communication link is established, messages can be exchanged (message_5) between the client (here, the SMS) and the Device_IO server.

2.3.4 Closing a connection with a Device_IO server

The connection is closed when the communication at the TCP level is closed.

2.3.5 Rules of use

If, for any reason, either the message_2 or the message_3 are not received within a specified time out (e.g. 30 sec) by the SMS at the establishment of the communication, the SMS should close the communication and retry later. The same rule applies if the connection status returned by message_2 is different from "SUCCESS" or if the answer code returned by message_3 indicates that the call is rejected.

2.3.6 Messages format

There are four different message types in the Device_IO protocol. The next sections present the different messages and how they should be utilized.

2.3.7 Message_1 (connect to DeviceIO server)

This is the first message that is sent by the client (the SMS) to the Device_IO server.

Syntax	Size (byte)	Format	Description
len	2	hex	Length in byte of the message (see 2.2.3).
op_mode	1	r_num	Data transfer operation mode 0 = Normal data transfer
ob_name_len	1	num	Length of the object name attribute (in bytes).
ob_name	ob_name_len	text	Name of the applicative service to which the connection should be established. Ob_name is a string of bytes at least one byte long and at most 32 byte long: 1 <= ob_name_len <= 32. This Name is compulsory but its content is up to the client (ex: "SMS_GWY")

2.3.8 Message_2 (answer from DeviceIO server)

This message is a response from the Device_IO server to the client (in this case the SMS); this validates the connection.

MESSAGE_2			
Syntax	**Size (byte)**	**Format**	**Description**
Len	2	hex	Length in byte of the message. In this case, the length is always 1 byte.
connect_status	1	r_num	Connection status. Refers to table below for applicable value.

CONNECT_STATUS		
Value	**Identifier**	**Description**
0	CONNECT_FAILURE	The connection has failed for any unexpected reason
6	SUCCESS	The operation has been successfully completed.

2.3.9 Message_3 (answer from SMSgw)

This message is a response from the Device_IO server, which validates the connection with the other process (in our case: the SMSgw).

MESSAGE_3			
Syntax	**Size (byte)**	**Format**	**Description**
len	2	hex	Length in byte of the message. In this case, the length is always 1 byte.
answer_code	1	r_num	0: call accepted 1: call rejected

2.3.10 Message_5 (message from SMS or message from SMSgw)

This message shall contain only one SMSgw command.

MESSAGE_5			
Syntax	**Size (byte)**	**Format**	**Description**
len	2	hex	Length in byte of the message (see 2.2.3).
data	len	see note	SMSgw command data

The data section of the message_5 follows the structure shown below:

root header	common to all commands - see chapter 0
address header	depends on command type (EMM, CTRL, Feedback, Operation) - see chapters 4.5.2 to 4.5.5
command body	depends on command type - see chapters 4.6 to 4.9

Note The content of this section is command specific, refers to the format described in chapters 4.7 to 4.11.

3. SMS-SMSgw connections

3.1 Overview

The figure below illustrates the connections utilized by the SMS and the Nagravision SMSgw. As depicted in the figure a connection can be seen as a data channel. On the same channel, there are on one way the commands and on the opposite way there are the associated responses ("ack" or "Nack"). An "ack" response means that the incoming command is correctly formatted and it has been proceeded successfully. A "Nack" response means that either the format or the data structure of the command is not appropriate or the command has encountered some problems during the processing in the system. The SMS is responsible for opening both channels. The commands flow from the SMS to the CAS in the channel "EMM&Control" whereas the commands flow from the CAS to the SMS in the channel "Feedback command".

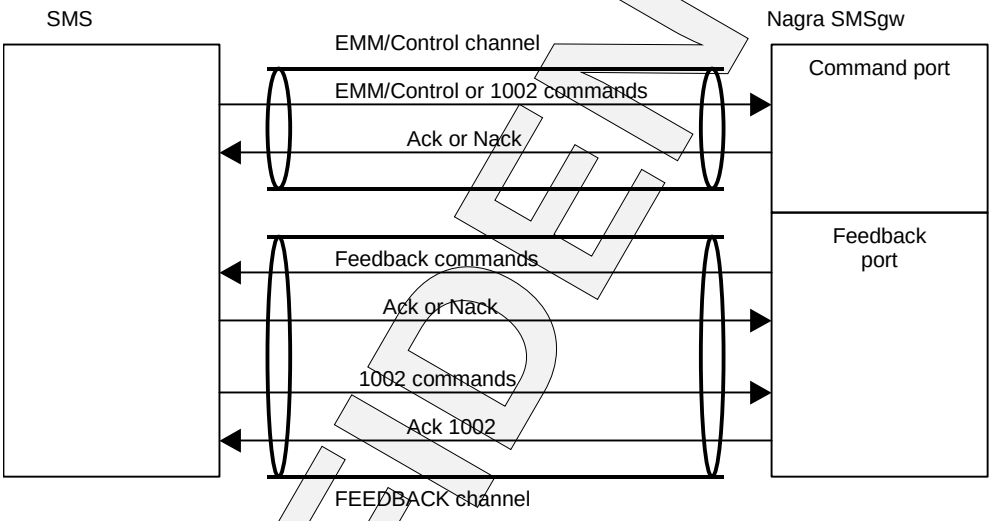


Fig. 3-1: SMS – SMSgw connections

Several SMS may be connected to the same port as shown in the following figure.

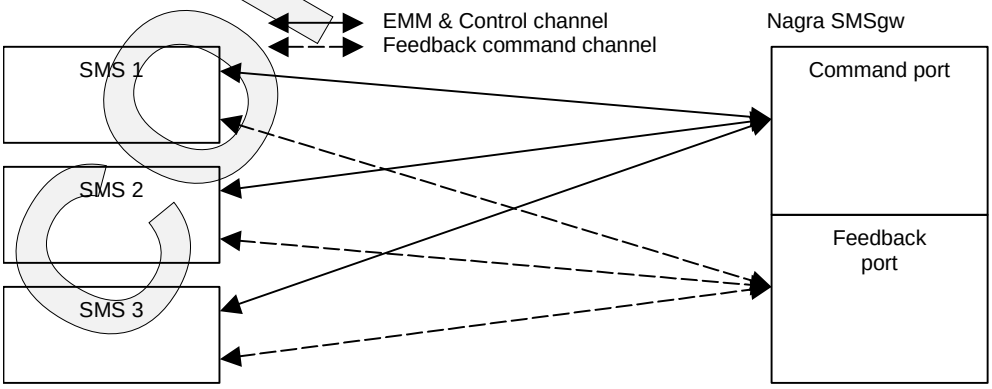


Fig. 3-2: Multi SMS connections

Please refer to the document “SMS Gateway Implementation Guide” for operational details and constrains regarding the connections.

3.2 EMM and Control command flow

The *EMM and Control* commands are the commands sent by the SMS to the CAS. Some examples of such commands are “add product to a smartcard”, “create credit”, “set authorized phone number“.

3.3 Feedback commands flow

The *feedback* commands are the commands sent by the CAS to the SMS. This kind of information issued by the CAS is one of the following:

- list of impulsive purchases that have been made by the subscribers
- error condition in the smartcard (memory full, low credit)
- list of subscription products (reply of command 71: Get product)

3.4 Feedback commands routing

The routing of a *feedback* command means to which SMS the CAS should send a message. The type of message is described in the previous section.

The routing of a *feedback* command depends on the SMS source_id associated for a given ICC, i.e. for a given subscriber. The source_id, that is available in the header of any command, is extracted by the CAS during the initialization phase of a subscriber. Please refer to the Important note below for more details.

Any time a SMS opens a connection on a feedback channel and after the initial Device_IO handshake has been successful, the SMS must issue also a command 1002 in order to associate a SMS_id to the connection. The CAS uses that SMS_id to enable the routing of feedback commands only if appropriate SMS is up and running.

Important

- The source_id identifies an SMS; its value shall not change over time, for the system’s lifetime. The source_id and dest_id MUST be distributed by Nagravision.
- ITM-DNASP2 system: command 52 is used to catch SMS source_id
- ITM-Aladin system: command 13 is used to catch SMS source_id

3.5 Rules of use

3.5.1 Source identifier

A source identifier is associated to each connection established between the SMS and the Nagravision CAS. Each connection must have its own source identifier and two connections may not share the same source identifier at any given time. The source identifier associated to a connection is given by the field "source_id" present in the header of each message sent from the SMS toward the CAS.

3.5.2 Transaction number

Each transaction number used must be unique during the life of a given connection. The transaction number is a field located in the header of each message sent from the SMS to the CAS. This is necessary to determine which commands have been processed successfully (ACK, command 1000) or not (NACK, command 1001).

3.5.3 SMS connection is alive

During periods of SMS-CAS interface inactivity, the SMS must send periodically a command 1002 on both ports (EMM/Control and feedback) to the CAS. The main reason for such a recommendation is that idle TCP connections may not be kept open forever by intelligent network devices (such as switches or firewalls). Nagravision recommends that the command 1002 is sent every 5 minutes on both ports.

3.5.4 SMS connection establisment

Any time the SMS opens a connection on either the EMM/Control port or on the Feedback port, it must generate first a command 1002.

4. SMSgw commands

4.1 Specification

4.1.1 Command-response

The SMS sends a command to the CAS. As a response, the CAS sends an acknowledgment message back to the SMS. The same occurs for feedback commands: the CAS sends a feedback command to the SMS. As a response, the SMS sends an acknowledgement back to the CAS. The acknowledgment messages are, of course, reported on the same communication channel by which the corresponding commands have been sent.

Note

The system will not behave as expected if the following values are not handled correctly:

- Transaction_id
- Source_id
- Dest_id

4.1.2 Asynchronous by nature

The protocol between the SMS and the CAS is an asynchronous protocol. Several SMS commands may be sent before acknowledgement messages are received. In other words, there is no need to wait for the acknowledgement of a given command, before sending the next commands to the CAS.

Important

The acknowledgement messages may be received (by the SMS) in a different order than the order in which the corresponding commands have been sent. However for a given ICC, the sequence of EMM will follow the sequence of SMS commands.

Please note also that at the end of the transmission chain, i.e. the ICC, the sequence of command is not guaranteed.

4.1.3 Feedback

If there is no return path, then the SMS need not open a connection on the feedback port, unless command 71 (Get Products) is sent on the control port to trigger the generations of commands 215 (Product List) on the feedback port.

4.2 Metrics

Metric	Value range (typical)
Connection	The *EMM&control* port and *feedback* ports may accept up to 10 connections each.
SMS commands	The CAS can process up to10 to 20 SMS *EMM&control* commands per second.
Feedback commands	The CAS can generate and send up to 500 *feedback* commands per seconds. The flow of data is not necessarily smooth.

Note Those metrics depend on factors such as system architecture and processing power; they are provided here to give an order of magnitude.

4.3 Time and date

All dates and times must be in UTC.

4.4 Identifiers

This section contains descriptions of all identifiers used throughout this document:

ID	Definition
circuit_id	A number uniquely identifying a video/audio/data stream.
command_id	The identifier of a SMS command, this field is part of the command. It is documented by the SMS for all commands except the FEEDBACK commands that are documented by the IMS or the CC.
dest_id	Identifier of the addressed SMS command. It is entered at the time of system configuration.
IMS_event_id	An IMS generated identifier for each event. Entered through the IMS editor or generated when processing the EPG data feed.
IMS_product_id	The identifier of a product in the IMS. It is the only product identifier known to the IMS.
MOP_PPID	The identifier of the management operator. This identifier is provided at system configuration time by Nagravision.
SMS_product_id	A product identifier for the SMS. It is provided and managed by the SMS. It is entered in the system when the SMS Gateway through commands: 300, 303, 305 or 307.
source_id	An identifier for the source of SMS commands. This identifier is entered in the system at the time of system configuration.
STB serial number	The set-top box hardware serial number.
STU_number	This Nagravision STB number is used to identify the set-top box in the CA system for pairing purposes.

Table 4-1 Identifiers

4.5 Headers

The structure of any message is as follow:

root header	common to all commands (chapter 0)			
address header	EMM 4.5.2	CTRL 4.5.3	Feedback 4.5.4	Operation 4.5.5
command body	cmd 0nn 4.6	cmd 1nn 4.7	cmd 2nn 4.8	cmd 1000 4.9

The chapters below detail the internal structure of the 3 modules (root header, address header and command body).

4.5.1 Root header

Field	Size	Format	Description
transaction_number	9	num	Number used to uniquely identify a transaction across the interface for each source. range: 000000000 to 999999999
command_type	2	r_num	01: EMM 02: CONTROL 04: FEEDBACK 05: OPERATION.
source_id	4	num	A number that identifies a source such as the SMS or IMS (this number is provided by Nagravision) range: 0000 to 9999
dest_id	4	num	Identifier of the addressed SMS. This number is defined at system configuration. range: 0000 to 9999
MOP_PPID	5	num	Identifier of the technical management operator. This number is provided at system configuration by: Nagravision. range: 00000 to 99999
creation_date	8	YYYYMMDD	Creation date of the command (UTC).

List of error codes (NACK messages) are listed in section 4.5.6.

4.5.2 Address header – EMM cmd

Field	Size	Format	Description
broadcast_mode	1	r_text	N = Normal: standard broadcasting mode. B = Batch: command with a lower priority
broadcast_start_date	8	YYYYMMDD	Broadcast start date (UTC). The command must be sent to the ICC from this date. See note.
broadcast_end_date	8	YYYYMMDD	Broadcast end date (UTC). The command must be sent to the ICC until this date. See note.
address_type	1	r_text	EMM addressing mode for EMM commands U = Unique G = Global (all ICC of the MOP are addressed).
UA	10 or 0	num	UA is the Unique Address of the card for which the command is intended. If the "address_type" field = G, then this field is void.

Note The Nagravision CAS system can be configured to set the broadcast period of the EMM by using either the broadcast dates provided by the SMS (mode A) or the CAS system manages entirely the broadcast dates (mode B). In this mode B, the SMS should set the broadcast dates as "today". Nagravision recommends setting-up the CAS system in mode B.

List of error codes (NACK messages) are listed in section 4.5.6.

4.5.3 Address header – Control cmd

Field	Size	Format	Description
broadcast_mode	1	r_text	N = Normal: standard broadcasting mode. B = Batch: command with a lower priority
broadcast_start_date	8	YYYYMMDD	Current date (today, UTC)
broadcast_end_date	8	YYYYMMDD	Current date (today, UTC)
address_type	1	r_text	EMM addressing mode for EMM commands U = Unique
UA	10	num	UA is the Unique Address of the card for which the command is intended. ex: 2018327794

List of error codes (NACK messages) are listed in section 4.5.6.

4.5.4 Address header – Feedback cmd

Field	Size	Format	Description
UA	10	num	UA is the Unique Address of the card for which the command is intended. ex: 2018327794

List of error codes (NACK messages) are listed in section 4.5.6.

4.5.5 Address header – Operation cmd

Field	Size	Format	Description
none			There is no header for this command type.

List of error codes (NACK messages) are listed in section 4.5.6.

4.5.6 List of errors applicable to the header sections

Field	Error codes	Error codes extension
transaction_number	BAD_HEADER_SYNTAX	BAD_TRANSACTION_NUMBER_FORMAT
transaction_number	BAD_USAGE	TRANS_NR_ALREADY_IN_USE
command_type	BAD_HEADER_SYNTAX	BAD_COMMAND_TYPE
source_ID	BAD_HEADER_SYNTAX	BAD_SOURCE_ID
source_ID	BAD_USAGE	SOURCE_NOT_AUTHORIZED
source_ID	BAD_USAGE	SOURCE_ALREADY_IN_USE
dest_ID	BAD_HEADER_SYNTAX	BAD_DEST_ID
dest_ID	BAD_USAGE	DEST_NOT_AUTHORIZED
MOP_PPID	BAD_HEADER_SYNTAX	BAD_MOP_PPID
MOP_PPID	INVALID_PPID	MOP_NOT_AUTHORIZED
creation_date	BAD_HEADER_SYNTAX	BAD_DATE_FORMAT
creation_date	BAD_USAGE	DATE_IN_THE_FUTURE
broadcast_mode	BAD_HEADER_SYNTAX	BAD_BROADCAST_MODE
broadcast_start_date	BAD_HEADER_SYNTAX	BAD_DATE_FORMAT
broadcast_end_date	BAD_HEADER_SYNTAX	BAD_DATE_FORMAT
broadcast_end_date	BAD_HEADER_SYNTAX	BAD_DATE_SEQUENCE
broadcast_end_date	BAD_HEADER_SYNTAX	DATE_IN_THE_PAST
address_type	BAD_HEADER_SYNTAX	BAD_ADDRESS_TYPE
address_type	BAD_USAGE	ADDRESS_TYPE_NOT_AUTHORIZED
UA	BAD_HEADER_SYNTAX	BAD_UA_FORMAT
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_ID	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT

4.6 EMM commands (0nn)

In this section, we present the structure of all commands related to the alteration of the smartcard. The SMS will generate these commands. For each command, there are two tables. The first table illustrates the data structure of the command. The second table provides the different types of error message that could be returned by the CAS.

4.6.1 Command 2: Add Product

This command is used to add a subscription product to an end-user smartcard.

Important Command 2 shall not be used to authorize a PPV. The command 10 should be used instead.

COMMAND 2: ADD PRODUCT			
Field	**byte**	**Format**	**Description**
command_id	4	r_num	command_id = 0002
IMS_product_id	12	num	IMS product ID range: 000000000000 to 999999999999
begin_date	8	YYYYMMDD	Subscription begin date (UTC). Subscription is not valid before this date.
end_date	8	YYYYMMDD	Subscription end date (UTC). Subscription is not valid after this date.

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
IMS_product_id	BAD_COMMAND_SYNTAX	BAD_IMS_PRODUCT_ID_FORMAT
IMS_product_id	PRODUCT_NOT_FOUND	NO_EXTENDED_ERROR_CODE
IMS_product_id	BAD_PRODUCT_TYPE	PPV_PRODUCT
IMS_product_id	BAD_PRODUCT_STATUS	CANCELLED_PRODUCT
IMS_product_id	BAD_PRODUCT_STATUS	SUSPENDED_PRODUCT
IMS_product_id	BAD_PRODUCT_STATUS	INVALID_PURCHASE_DATE
IMS_product_id	BAD_PRODUCT_TYPE	DRAFT_PRODUCT
begin_date	BAD_COMMAND_SYNTAX	BAD_DATE_FORMAT
begin_date	BAD_COMMAND_SYNTAX	BAD_DATE_SEQUENCE
end_date	BAD_COMMAND_SYNTAX	BAD_DATE_FORMAT
end_date	BAD_COMMAND_SYNTAX	BAD_DATE_SEQUENCE
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE
MOP_PPID	INVALID_PPID	ISD_MOP_NOT_FOUND
MOP_PPID	DATABASE_ERROR	DATA_ERROR

4.6.2 Command 3: Product Renewal (Obsolete)

This command is obsolete and is not to be used while positive addressing is activated in the CAS system.

4.6.3 Command 4: Product Suspension

Suspends the subscription to services of the product.

The subscriber will not be able to watch the product until a product reactivation command is sent. This command may be used when there is a payment problem with the subscriber. This command does not impact callbacks.

COMMAND 4: PRODUCT SUSPENSION			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0004
IMS_product_id	12	num	IMS product ID range: 000000000000 to 999999999999

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
IMS_product_id	BAD_COMMAND_SYNTAX	BAD_IMS_PRODUCT_ID_FORMAT
IMS_product_id	PRODUCT_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE

4.6.4 Command 5: Product Reactivation

Grants access to all the subscriptions included in the product that have been previously suspended. The subscriber will be able to watch the product again. Used after *command 4: Product Suspension*.

COMMAND 5: PRODUCT REACTIVATION			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0005
IMS_product_id	12	num	IMS Product ID range: 000000000000 to 999999999999

List of error codes (in NACK messages) applicable for this section of the message.

Field	**Error codes**	**Error codes extension**
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
IMS_product_id	BAD_COMMAND_SYNTAX	BAD_IMS_PRODUCT_ID_FORMAT
IMS_product_id	PRODUCT_NOT_FOUND	NO_EXTENDED_ERROR_CODE
IMS_product_id	RIGHT_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE

4.6.5 Command 6: Product Cancellation

Allows the SMS to remove the product (subscription services) from the ICC in case of error or if a subscriber asked for a cancellation.
Event products (purchased through the SMS), which have been purchased with a viewing time in the future, may also be cancelled through this command. The cancellation of a non-impulsively purchased event product has no impact on the subscriber's credit in the ICC.

COMMAND 6: PRODUCT CANCELLATION			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0006
IMS_product_id	12	num	IMS Product ID range: 000000000000 to 999999999999

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
IMS_product_id	BAD_COMMAND_SYNTAX	BAD_IMS_PRODUCT_ID_FORMAT
IMS_product_id	PRODUCT_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE

4.6.6 Command 7: All products cancellation

Allows the SMS to remove all subscriptions and PPV stored in the ICC.

This command will also remove all non-watched IPPV; however, it does not affect non-call collected IPPV that have been watched. Such IPPV will be normally collected when the next callback occurs.

Important This command will also **suspend the IPPV purchases** (equivalent to command 14, "Suspend Impulse Purchase")

COMMAND 7: ALL PRODUCTS CANCELLATION			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0007

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE
address_type	BAD_USAGE	ADDRESS_TYPE_NOT_AUTHORIZED
MOP_PPID	INVALID_PPID	ISD_MOP_NOT_FOUND

4.6.7 Command 8: Credit management

This command is used to modify the data of an existing credit record (in the smartcard) reserved for impulse-pay-per-view.

Important

- The credit information in a smartcard can be updated every 4 seconds.
- Only the mode SET CREDIT is authorized
- The initial credit value in the smartcard is set with the *command 13: Create credit for impulse purchase.*

The credit field shall not exceed the maximum value of 65535.99. This is taken care of by the Call Collector. If there is no return path, the responsibility lies with the SMS.

COMMAND 8: CREDIT MANAGEMENT			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0008
credit_mode	2	r_num	03 = SET CREDIT. Set the new credit value.
credit	7	r_num	Credit amount (in the local currency) representing the Range: 00000.00 to 65535.99

List of error codes (in NACK messages) applicable for this section of the message.

Field	**Error codes**	**Error codes extension**
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
credit_mode	BAD_COMMAND_SYNTAX	BAD_CREDIT_MODE
credit	BAD_COMMAND_SYNTAX	BAD_CREDIT_FORMAT
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE
MOP_PPID	ACCOUNT_NOT_FOUND	NO_EXTENDED_ERROR_CODE

4.6.8 Command 9: Update Credit Threshold

Updates the impulse credit threshold value below which the ICC should call back the Call Collector.

This command should **not** be used to initialize the Credit Threshold value. The initialization must be done through the *command 13: Create Credit For Impulse Purchase*. If the credit threshold (field threshold_credit) is set to 0 (zero), then no callback will be issued when the threshold limit is reached.

COMMAND 9: UPDATE CREDIT THRESHOLD			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0009
threshold_credit	7	r_num	Lower limit under which the ICC must do a low credit call back representing the range 00000.00 to 65535.99

List of error codes (in NACK messages) applicable for this section of the message.

Field	**Error codes**	**Error codes extension**
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
threshold_credit	BAD_COMMAND_SYNTAX	BAD_THRESHOLD_CREDIT_FORMAT
threshold_credit	BAD_COMMAND_SYNTAX	CREDIT_THRESHOLD_TOO_HIGH
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE
MOP_PPID	ACCOUNT_NOT_FOUND	NO_EXTENDED_ERROR_CODE

4.6.9 Command 10: Add Event Product

Adds an event product entitlement in the ICC. Used to allow PPV purchase by phoning the customer service center. If the product referenced by IMS_product_id is no longer valid then a PPV_IN_THE_PAST error is raised. When an event product is purchased through the SMS (by calling customer service), the ICC credit and debit values are not impacted.

Important

- The event product is pre-flagged as "call collected" in the smartcard. Consequently, the purge mechanism will delete an event product once the purge date condition matches the event product date.
- The data in the *event_name* field of the command are not altered by the CAS. The data is transmitted as it is in the ICC. Then the STB will display the data as it does with the EIT (Event Information Table) data. Consequently, the SMS must format this string in accordance wich the specification of the charset used by the STB.
- The *event_name* string must also include control character. This means that the number of displayable characters is reduced consequently.

COMMAND 10: ADD EVENT PRODUCT			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0010
IMS_product_id	12	num	IMS Product ID range: 000000000000 to 999999999999
length_event_name	2	r_num	Length of valid data in *event_name* field. The number of bytes should not exceed 30. This is due to the ICC storage limitation.
event_name	32	text	Event name as displayed in the PPV purchase history in the STB user interface. The number of characters must match the length *length_event_name*. The remaining bytes should be filled-up with 0x00.
price	5	num	Price of the product, representing 000.00 to 999.99

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
IMS_product_id	BAD_COMMAND_SYNTAX	BAD_IMS_PRODUCT_ID_FORMAT
IMS_product_id	PRODUCT_NOT_FOUND	NO_EXTENDED_ERROR_CODE
IMS_product_id	PPV_IN_THE_PAST	NO_EXTENDED_ERROR_CODE
IMS_product_id	BAD_PRODUCT_TYPE	REGULAR_PRODUCT

IMS_product_id	BAD_PRODUCT_STATUS	CANCELLED_PRODUCT
IMS_product_id	BAD_PRODUCT_STATUS	SUSPENDED_PRODUCT
IMS_product_id	BAD_PRODUCT_STATUS	INVALID_PURCHASE_DATE
IMS_product_id	BAD_PRODUCT_TYPE	DRAFT_PRODUCT
length_event_name	BAD_COMMAND_SYNTAX	LENGTH_TOO_LONG
length_event_name	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
price	BAD_COMMAND_SYNTAX	BAD_PRICE_FORMAT
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE
MOP_PPID	INVALID_PPID	ISD_MOP_NOT_FOUND
MOP_PPID	DATABASE_ERROR	DATA_ERROR

4.6.10 Command 13: Create Credit for Impulse Purchase

This command creates a credit data structure in a given ICC. This will allow the subscriber to perform impulse PPV purchase. This command should be sent only at the initialization process of an ICC. There is no command to remove the credit data structure in a given ICC.

If threshold_credit is equal to 0 (zero), then no callback will be issued when the threshold limit is reached.

Important

- Constraint: credit >= 1.00
- Once command 13 has been issued on a given day, either the command 8 or 9 can be executed the same day.

COMMAND 13: CREATE CREDIT FOR IMPULSE PURCHASE			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0013
credit	7	r_num	Credit amount set in the smartcard. Warning: the range is **00001.00** to 65535.99.
threshold_credit	7	r_num	Lower limit under which the ICC must initiate a low credit call back. It represents 00000.00 to 65535.99. Note: The ICC will truncate this value, i.e. it will only consider the integer part.

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
credit	BAD_COMMAND_SYNTAX	BAD_CREDIT_FORMAT
threshold_credit	BAD_COMMAND_SYNTAX	BAD_THRESHOLD_CREDIT_FORMAT
threshold_credit	BAD_COMMAND_SYNTAX	CREDIT_THRESHOLD_TOO_HIGH
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE
MOP_PPID	INVALID_PPID	ISD_MOP_NOT_FOUND
MOP_PPID	DATABASE_ERROR	DATA_ERROR

4.6.11 Command 14: Suspend impulse purchase

This command suspends the privilege of making impulse purchases.

Reactivation of impulse purchases may be completed using *command 15: Reactivate impulse purchase*. This command has no impact on callback operations.

COMMAND 14: SUSPEND IMPULSE PURCHASE			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0014

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE

4.6.12 Command 15: Reactivate impulse purchase

Reactivates the privilege of making impulse purchases. It is used after command 14 (Suspend impulse purchase), or command 20 (Suspend subscriber ICC).

COMMAND 15: REACTIVATE IMPULSE PURCHASE			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0015

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
MOP_PPID	ACCOUNT_NOT_FOUND	NO_EXTENDED_ERROR_CODE

4.6.13 Command 20: Suspend subscriber ICC

Suspends all subscriptions on the ICC and the impulse purchase capability, but “free access” services can still be watched.

Important In order to reactivate the subscriber ICC, use *command 21* and *command 15*, if needed.

The SMS can still continue to send EMM command to a deactivated ICC (no error returned). This command does not impact callback operations.

COMMAND 20: SUSPEND SUBSCRIBER ICC			
Field	**byte**	**Format**	**Description**
command_id	4	r_num	command_id = 0020

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE
MOP_PPID	INVALID_PPID	ISD_MOP_NOT_FOUND

4.6.14 Command 21: Reactivate subscriber ICC

Grants access to all the subscriptions again. Used after command 20: Suspend subscriber ICC.

COMMAND 21: REACTIVATE SUBSCRIBER ICC			
Field	**byte**	**Format**	**Description**
command_id	4	r_num	command_id = 0021

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE
MOP_PPID	INVALID_PPID	ISD_MOP_NOT_FOUND

4.6.15 Command 22: Reserved

This command is reserved for Nagravision's use.

4.6.16 Command 30: Reserved

This command is reserved for Nagravision's use

4.6.17 Command 31: Reserved

This command is reserved for Nagravision's use.

4.6.18 Command 32: Reserved

This command is reserved for Nagravision's use.

4.6.19 Command 48: Set Zip code

Sets or updates the Zip code on the ICC. This should also be used when the subscriber moves to another location. Zip code information is used for blackout and time zone management.

Important For countries that use a different zip code scheme, the operator should create a lookup map table that translates local zip code format to this zip code format.

COMMAND 48: SET ZIP CODE			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0048
zip_code	5	num	subscriber's zip code. Range: 00000…99999

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
zip_code	BAD_COMMAND_SYNTAX	BAD_ZIP_CODE_FORMAT
zip_code	ZIP_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE

4.6.20 Command 49: Set Callback phone number

Sets or updates the parameter “phone-number” in the ICC. This parameter allows the ICC/STB to open a connection with the Call Collector.

The parameter can be a phone number or a MAC address. The STB will determine how to interpret this number. Here are two samples:

- Phone number 1-800-555-1212, cc_number_1 is 18005551212 (with 5 trailing spaces).
- MAC address 00-06-5B-BC-8F-92, cc_number_1 is in decimal as 27308887954 (with 5 trailing spaces).

To reset the phone number in the ICC, the two following ways are accepted:

- cc_number_1 is 16 space characters (ASCII 0x20)
- cc_number_1 is 16 F character (ASCII 0x46)

Important

- No character (ex: “-“ or “/”) must be present in the field cc_number_1
- To set an IP address in the ICC, the SMS must send a command 54 (Set Callback IP address).

COMMAND 49: SET CALLBACK PHONE NUMBER			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0049
cc_number_1	16	p_num	Call Collector phone number. This field must be right padded with trailing ASCII space characters.

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
cc_number_1	BAD_COMMAND_SYNTAX	BAD_PHONE_NUMBER_FORMAT
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE
MOP_PPID	CB_PROFILE_NOT_FOUND	NO_EXTENDED_ERROR_CODE

4.6.21 Command 50: Cancel ICC

An ICC cancellation is performed when a card is removed from operation (stolen, lost, or presumed failed for example). The SMS is not allowed to reuse the ICC because the ICC *is not recoverable* after such operation. In addition the ICC is flagged as cancelled and deactivated in the CAS database.

COMMAND 50: CANCEL ICC			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0050

List of error codes (in NACK messages) applicable for this section of the message.

Field	**Error codes**	**Error codes extension**
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
address_type	BAD_USAGE	ADDRESS_TYPE_NOT_AUTHORIZED

4.6.22 Command 51: Initialize Card

Initializes the Management Operator (MOP) zone of a new ICC.

This command is used when a new ICC is registered in the SMS. In addition the ICC is flagged as initialized in the SAS database. This command must be performed before subscriptions will be allowed on the ICC. Initialization of an ICC can occur several times and has no effect on the entitlements stored in the ICC.

Important

- This command must be the first command issued by the SMS for a new ICC
- The purpose of this command is not to "reset" the ICC content, i.e. this command does not perform any cleanup of the ICC.
- This command does not perform any refurbishing process of an ICC.

COMMAND 51: INITIALIZE CARD			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0051

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
UA	UA_OUT_OF_RANGE	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE
MOP_PPID	CB_PROFILE_NOT_FOUND	NO_EXTENDED_ERROR_CODE

4.6.23 Command 52: Pair the ICC with the STB

Used to pair an ICC with the STB. This command is mandatory before any services may be authorized. The ICC must have previously been initialized with *command 51: Initialize ICC* before pairing can take place. This command may be issued several times to pair an ICC with a different STB.

Important

- The STU_number is a 14 digits string representing a decimal value
- The STU_number can be one of the following formats:
  a) 10 digit string followed by four space characters in the range "0000000000 " to "4294967295 "
  b) 14 digit string in the range 00000000000000 to 00004294967295
- The "un-pairing" action is performed with the same command 52, but with STU_number "0000000000 " or 00000000000000
- The STB_number provided in the command by the SMS must not include any checksum.

COMMAND 52: PAIR THE ICC WITH THE STB			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0052
STU_number	14	r_num	CA STB serial number in decimal. range: see "important" note above

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
STU_number	BAD_COMMAND_SYNTAX	BAD_STU_NUMBER_FORMAT
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE

4.6.24 Command 53: Clear PIN code (Obsolete)

This command is obsolete and has been replaced by command 69.

4.6.25 Command 54: Set Callback IP address

Sets or updates the ICC field containing the IP-address of the Call Collector.

COMMAND 54: SET CALLBACK IP ADDRESS			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0054
CC_IP_address	15	ip_num	Call Collector IP address. ~~Field format is~~ 000.000.000.000 to 255.255.255.255.
CC_IP_port	5	num	Call Collector TCP/IP port.

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
CC_IP_address	BAD_COMMAND_SYNTAX	BAD_IP_ADDRESS_FORMAT
CC_IP_port	BAD_COMMAND_SYNTAX	BAD_CC_PORT_FORMAT
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE
MOP_PPID	CB_PROFILE_NOT_FOUND	NO_EXTENDED_ERROR_CODE

4.6.26 Command 55: Set Callback Parameters

Sets or updates the ICC field containing the IP-address / phone-number of the Call Collector.

COMMAND 55: SET CALLBACK PARAMETERS			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0055
phone_field	1	r_num	Smartcard Phone field selector (for future use) Must be set to 1 for the moment.
CC_number_1	16	p_num	Call Collector phone number. This field must be right padded with trailing ASCII space characters.
CC_IP_address	15	ip_num	Call Collector IP address. Field format is 000.000.000.000 to 255.255.255.255.
CC_IP_port	5	num	Call Collector TCP/IP port. As an example port 1458 must be formatted as “01458”
callback_type	1	r_num	0: phone & IP. This is used when the return path is a phone line and the connection is PPP. 1: phone only. This is used when the return path is a phone line and the connection is not PPP. 2: IP only. This is used when the return path is a bi-directional cable.

List of error codes (in NACK messages) applicable for this section of the message.

Field	**Error codes**	**Error codes extension**
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
CC_number_1	BAD_COMMAND_SYNTAX	BAD_PHONE_NUMBER_FORMAT
CC_IP_address	BAD_COMMAND_SYNTAX	BAD_IP_ADDRESS_FORMAT
CC_IP_port	BAD_COMMAND_SYNTAX	BAD_CC_PORT_FORMAT
callback_type	BAD_COMMAND_SYNTAX	BAD_CALLBACK_FORMAT
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE
MOP_PPID	CB_PROFILE_NOT_FOUND	NO_EXTENDED_ERROR_CODE

4.6.27 Command 56: Set PIN code

Set or update one of the 16 PIN code values that can be stored in the ICC.

The PIN code is a 4 digits numeric value. The CAS performs no checks other than boundaries on the PIN code, i.e. the same PIN code can be updated many times. The CAS does not hold the PIN code in its database.

Important The usage of this command is customer specific. Thus, a document should be prepared to illustrate how this feature works end-to-end.

COMMAND 56: SET PIN CODE			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0056
Index	2	r_num	PIN code number. Range: 01-16
PIN	4	num	PIN code value

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
Index	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
Index	VALUE_OUT_OF_RANGE	NO_EXTENDED_ERROR_CODE
PIN	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE

4.6.28 Command 60: Immediate Call Back

Requests an ICC/STB to call back the CAS system immediately. Due to the architecture of the system, an immediate call means that the CAS system expects to receive a call back from a given ICC/STB in a time frame from 10 min to several hours. The best case is 10 min; this is due to the ICC functionality. The worst case is several hours; this is due to the behavior of STB. Indeed, when a STB performs a call back, and if the call fails for any reason (e.g. the line is busy), the STB will try again within a period of a couple of minutes to several hours.

COMMAND 60: IMMEDIATE CALL BACK			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0060
CbDate	8	YYYYMMDD	**warning: the value provided by the SMS is ignored and the Nagra CAS system will manage the call back date as today.**
CbTime	6	HHMMSS	**warning: the value provided by the SMS is ignored and the Nagra CAS system will manage the call back time as now + 10 min.**

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE
MOP_PPID	CB_PROFILE_NOT_FOUND	NO_EXTENDED_ERROR_CODE

4.6.29 Command 61: Enable Automatic Call Back

Turns on the automatic feedback feature of the STB. Please refer to section 4.10 (Feedback commands) for more details related to the information received by the SMS when an ICC/STB performs a call back.

COMMAND 61: ENABLE AUTOMATIC CALL BACK			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0061
call_freq	2	r_num_x	01 = annual 02 = semi-annual 03 = quarterly 04 = monthly 05 = semimonthly 1m = every m days (1 should be considered as a flag) m range is 1 .. F (F meaning 15 days)
date_first_call	8	YYYYMMDD	first date (UTC) on which the ICC should call back.
CbTime	6	HHMMSS	**warning: the value provided by the SMS is ignored and the Nagra CAS system will manage a random call back time. Consequently, the value should be 000000.**

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
call_freq	BAD_COMMAND_SYNTAX	BAD_FREQUENCY_FORMAT
date first call	BAD_COMMAND_SYNTAX	BAD_DATE_FORMAT
date_first_call	BAD_USAGE	BAD_DATE_SEQUENCE
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE
MOP_PPID	CB_PROFILE_NOT_FOUND	NO_EXTENDED_ERROR_CODE

4.6.30 Command 62: Disable Automatic Call Back

Disables automatic call back for an ICC.

Callbacks triggered by memory_full, Credit threshold limit reached, special events, or as a consequence of an immediate callback command will still occur.

COMMAND 62: DISABLE AUTOMATIC CALL BACK			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0062

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE
MOP_PPID	CB_PROFILE_NOT_FOUND	NO_EXTENDED_ERROR_CODE

4.6.31 Command 63: Reserved

This command is reserved for Nagravision.

4.6.32 Command 64: Update event right (Reserved)

This command is reserved for Nagravision

4.6.33 Command 65 to 68: Reserved

Commands 65 to 68 are reserved for Nagravision.

4.6.34 Command 69: Send Generic IRD Command

This command allows the SMS to send an "IRD command" to the decoder. The decoder will execute an operation based on the "IRD command" instruction (ex: reset PIN code, set network ID, force tune, etc.). In other word, this command is not intended to modify the data of the smart card, but it is intended to start an action executed by the decoder. The CAS provides with this command a secure transport mechanism between the head-end and the STB.

The data structure that is sent to the STB is described below. The SMS Gateway calculates the fields "sequence_number" and "checksum" for the convenience of SMS. It means that the SMS does not provide these two parameters.

```
command_body{
   sequence_number      32 uimsbf
   command_id           8  uimsbf
   operation            8  uimsbf
   for (i=0;i<N;i++){
      data              8  uimsbf
   }
   checksum             8  uimsbf
}
```

As explained above, the purpose of an "IRD command" is to provide the decoder with a message that will conduct the decoder to execute an action (ex: reset PIN code). The "command_id" and "operation" parameters provided to the decoder represent two indexes that will indicate which subroutine should be executed by the decoder.

Nagravision provides the STB manufacturers with a list of "command_id" and "operation" that map a list of given actions. This document is referenced as "Conditional Access Kernel – IRD Command Specification".

COMMAND 69: SEND GENERIC IRD COMMAND			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0069
IRD_command_id	3	r_um	command_id field of IRD command_body. Range: 000 to 255
IRD_operation	3	r_num	operation field of IRD command_body. Range: 000 to 255
IRD_data_length	2	r_num	length in bytes of useful part of IRD_data field Range: 00 to 48
IRD_data	96	r_text (see note below)	hexadecimal data coded in ASCII format. The complete string must be transferred (96 chars representing 48 bytes). However, only the first left IRD_data_length bytes will be included in the data field of the IRD command_body.

Important

As indicated in the table above, the format of the IRD_data field is r_text. However, this data is not a common string, i.e. it is not a text field such as “this is a sentence with characters and 1 2 3 4 numerical values“. The data in this field is a sequence of hexadecimal number coded in text format. Consequently, only alpha characters A, B, C, D, E, F representing in hexadecimal the number 10 to 15 are accepted.

As an example the following IRD_data is accepted by the CAS:

“A0BCD12A29327B9F”

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
IRD_command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
IRD_operation	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
IRD_data_length	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
IRD_data	BAD_COMMAND_SYNTAX	BAD_DATA_FORMAT
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE

4.6.35 Command 71: Get Products

This command allows SMS to retrieve all the non-impulsive products (subscriptions or PPV) known to the CA system for a subscriber.

The information comes from the CA system database. The products are returned asynchronously in command 215: Products List on the feedback port.

Impulsively purchasable products can be retrieved in the same way using command 111: Get History From Call Collector.

COMMAND 71: GET PRODUCTS			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0071

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE

4.6.36 Command 72: Set Products (Obsolete)

This command is obsolete and should be replaced by a set of commands such as cmd 2, 10, 20, 21. A specific study should be conducted with the help of a Nagravision representative to validate an alternative solution.

4.6.37 Command 73: Add ALC product

This command is reserved for future use.

4.6.38 Command 74: Modify ALC product

This command is reserved for future use.

4.6.39 Command 75: Renew ALC product

This command is reserved for future use.

4.6.40 Command 76: ALC product suspension

This command is reserved for future use.

4.6.41 Command 77: ALC product Reactivation

This command is reserved for future use.

4.6.42 Command 78: ALC product Cancellation

This command is reserved for future use.

4.6.43 Command 79: Force Tune (Obsolete)

This command is obsolete and has been replaced by command 69.

4.6.44 Command 80: Send message (Obsolete)

This command is obsolete and has been replaced by command 69.

4.6.45 Command 90: Create BTV mop (Reserved)

This command is reserved for Nagravision. It MUST NOT BE USED by the SMS.

4.6.46 Command 92: Purge old Products. (Obsolete)

This command is obsolete. It must be replaced by command 96 for systems working in prepaid mode, as it offers more control.

4.6.47 Command 93: Enable Automatic Call Back (Reserved)

This command is reserved for Nagravision. It MUST NOT BE USED by the SMS.

4.6.48 Command 96: Purge PPV and IPPV Records

This command allows the SMS to purge some old PPV and IPPV records in individual smartcards. There are two use cases to illustrate how this command works:

Example 1: to purge some old PPV and IPPV records stored in a smartcard when a subscriber complains that its smartcard is full. As a result, the subscriber will be capable to proceed to future IPPV purchase.

Example 2: to avoid the smartcard to be filled up with useless PPV and IPPV records. This can be seen as a preventive cleanup task. For this example, any time a subscriber calls the SMS center to ask for additional credit, the SMS should issue this command 96.

Important This command will purge only IPPV records set as "call collected". The command 97 should be use in conjunction with the command 96 to delete old IPPV records.

The SMS provides the two following parameters:

- *cleanup_date* is the date by which PPV or IPPV records older than this date will be deleted.
- *condition_date* is a parameter with a contextual meaning. It allows to differentiate STB with or without a return path. For any STB with return path capability, the *condition date* = 19920101. For other STB, the *condition date = cleanup_date*

The SMS is responsible to manage correctly these parameters because the CAS system cannot verify the coherence of these parameters.

COMMAND 96: PURGE PPV AND IPPV RECORDS			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0096
cleanup_date	8	YYYYMMDD	Delete any PPV-IPPV record stored in a smart card if the PPV-IPPV expiration date is older than the cleanup_date.
condition_date	8	YYYYMMDD	- return path exists, date = 19920101 - return path does not exist, date = cleanup_date

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
cleanup_date	BAD_COMMAND_SYNTAX	BAD_DATE_FORMAT
cleanup_date	BAD_COMMAND_SYNTAX	DATE_NOT_IN_THE_PAST
condition_date	BAD_COMMAND_SYNTAX	BAD_DATE_FORMAT
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE
MOP_PPID	INVALID_PPID	ISD_MOP_NOT_FOUND

4.6.49 Command 97: Set IPPV Records as Reported

Important This command should be used only in pre-paid mode environment

This command allows the SMS to set some IPPV records on a given smartcard, as reported. This command should be used to address ONLY decoders working in *prepaid without return path* mode. A decoder without return path means a decoder that is not connectable to a Nagravision call collector.

This command should be used by the SMS to pre-cleanup IPPV in ICC. There are two typical examples that illustrate how to use this command. The objective is the same; to avoid the smart card to be filled up with useless IPPV records. This can be seen as a preventive cleanup task. What differentiates the two examples is the condition that triggers the operation:

Example 1: In this scenario, the SMS sends periodically and automatically the command 97 to specific smartcards.

Example 2: In this scenario, any time a subscriber asks for additional credit (prepaid mode), the SMS issues this command 97.

COMMAND 97: SET IPPV RECORDS AS REPORTED			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0097
collect_date	8	YYYYMMDD	Set any IPPV record stored in a smart card as reported (flag “call-collected” = 1) if the IPPV expiration date is older than or equal to the parameter “collect_date”.

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
collect_date	BAD_COMMAND_SYNTAX	BAD_DATE_FORMAT
collect_date	BAD_COMMAND_SYNTAX	DATE_NOT_IN_THE_PAST
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE
MOP_PPID	INVALID_PPID	ISD_MOP_NOT_FOUND

4.7 CONTROL commands (1nn)

The series of commands 1nn are utilized to set in the Call Collector module data related with callback generated by the STB. The data provided in the command 1nn is stored in the Call Collector database. This means that the data is persistent.

4.7.1 Command 100: Redefine Credit Limit

The Call Collector utilizes this data to increment the credit in the smartcard during any callback. The Call Collector will set the new ICC credit as the addition of the credit_limit and the current ICC debit. The new credit limit will be communicated to the ICC during the callback of the STB.

If an immediate update of the ICC credit on the smartcard is required, the SMS shall send a command 100 followed by a command 8.

Important

- The credit_limit field of the command is a 7-digit value. However, the smartcard reads this value as a 5-digit integer unit, followed by 2-digit representing "cents". Furthermore, the greatest value applicable in the smartcard is 65535.99. As a consequence, for countries where the currency contains several 0 (ex: Yen), the credit value should be considered a a divided currency value, i.e. divided by 100 or 1000.
- In a customer's site with pre-paid mode and with STB with return path, the credit_limit should be set to 00000.00. This means that the ICC credit will not be updated during any callback.

COMMAND 100: REDEFINE CREDIT LIMIT			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0100
credit_limit	7	r_num	credit limit range: 00000.00 to 65535.99

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
credit_limit	BAD_COMMAND_SYNTAX	BAD_CREDIT_FORMAT
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE
MOP_PPID	ACCOUNT_NOT_FOUND	NO_EXTENDED_ERROR_CODE

4.7.2 Command 101: Set Authorized Phone Number

Sets or updates the Call Collector database with the phone numbers that an ICC is allowed to use as caller id.

These numbers will be checked upon each callback. Command 205 will be generated from the Call Collector in case there is a difference.

The number can be a phone number, an IP address, or a MAC address. See command 49 for the exact description.

COMMAND 101: SET AUTHORIZED PHONE NUMBER			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0101
phone_number_1	16	p_num	Primary phone number. This field must be padded with trailing ASCII space characters for numbers not requiring 16 digits.
phone_number_2	16	p_num	Alternate phone number. This field must be padded with trailing ASCII space characters for numbers not requiring 16 digits.
phone_number_3	16	p_num	Alternate phone number. This field must be padded with trailing ASCII space characters for numbers not requiring 16 digits.

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
phone_number_1	BAD_COMMAND_SYNTAX	BAD_PHONE_NUMBER_FORMAT
phone_number_2	BAD_COMMAND_SYNTAX	BAD_PHONE_NUMBER_FORMAT
phone_number_3	BAD_COMMAND_SYNTAX	BAD_PHONE_NUMBER_FORMAT
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE
MOP_PPID	CB_PROFILE_NOT_FOUND	NO_EXTENDED_ERROR_CODE

4.7.3 Command 104: Create ICC On Call Collector (Obsolete)

Important

- In an Aladin system this command will always be acknowledged but without any further processing.
- The syntax of the incomming command is anyway analyzed. Consequently, it can be rejected if there is any formatting mistake.

4.7.4 Command 105: Cancel ICC On Call Collector

Cancels an existing ICC in the CC database. This command should be issued when the ICC is deleted from the SMS database.

Important

The different records for a given subscriber in the CAS database are set as cancelled. As a result of this command, the CAS will not accept any callback from STB. Furthermore, a cancelled ICC on the Call Collector will not report a command 206 (STB responding status).

COMMAND 105: CANCEL ICC ON CALL COLLECTOR			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0105

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE
MOP_PRID	CB_PROFILE_NOT_FOUND	NO_EXTENDED_ERROR_CODE
MOP_PPID	ACCOUNT_NOT_FOUND	NO_EXTENDED_ERROR_CODE

4.7.5 Command 110: EMM cleanup

Erases all EMMs in the CAS and EMM broadcaster for one ICC. This command can be used if a discrepancy is suspected between SMS customer data and EMM for this customer.

COMMAND 110: EMM CLEANUP			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0110

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE

4.7.6 Command 111: Get History From Call Collector

Allows the SMS to retrieve a two-month history of IPPV information stored in the Call Collector database. The response of the CAS system will be generated on the Feedback channel. Each PPV record will generate a separate Command 202 (PPV Purchase List).

COMMAND 111: GET HISTORY FROM CALL COLLECTOR			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0111

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
UA	UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
UA	CANCELLED_CARD	NO_EXTENDED_ERROR_CODE

4.8 FEEDBACK commands (2nn)

The commands described in this section are commands sent by the Nagravision CAS system to the SMS. The “FEEDBACK” commands are used to provide to the SMS information and data related to the IPPV functionality available to a customer. For instance, the “FEEDBACK” command will report to the SMS the list of events (movies) that have been purchased impulsively by the customer. In this context, an impulsive purchase means that the customer purchased a movie with its remote control.

Depending on the CAS configuration up to six kind of FEEDBACK commands will be generated and sent to the SMS:

```
Command 211: Start of report
Command 201: Current credit and debit
for (I=0; I<nb_new_PPV; I++)
{
   Command 202:PPV purchase list
}
Command 205: Calling phone discrepancies (if ANI is enabled)
Command 206:STU Responding Status (responding = Y)
Command 212: End of report
```

Important **ITM-DNASP2 and Aladin™ systems**

The different types of command 2nn that are in the report generated by the CAS can be selected. As a result, the typical recommended report structure based on the Nagravision experience should be

```
Command 211: Start of report
for (I=0; I<nb_new_PPV; I++)
{
   Command 202:PPV purchase list
}
Command 212: End of report
```

In the scenario a STB does not callback within the designated time frame defined in the call collector database, the following FEEDBACK command will be generated:

```
Command 206: STU Responding Status (responding = N)
```

Important In the scenario described above, the CAS will issue only the command 206. The command 211 and 212 will not be sent.

4.8.1 Command 200: Low credit alarm

The difference between the credit and debit in the ICC is smaller than the threshold credit.

At the time when the SMS is made aware of this alarm, the credit has already been restored by the CC.

COMMAND 200: LOW CREDIT ALARM			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0200
STU_number	14	Num	Nagravision STB serial number
credit	7	r_num	Credit amount representing 00000.00 to 65535.99
debit	7	r_num	Debit amount representing 00000.00 to 65535.99

List of error codes (in NACK messages) applicable for this section of the message.

Field	**Error codes**	**Error codes extension**
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
STU_number	BAD_COMMAND_SYNTAX	BAD_STU_NUMBER_FORMAT
credit	BAD_COMAMND_SYNTAX	BAD_CREDIT_FORMAT
debit	BAD_COMMAND_SYNTAX	BAD_DEBIT_FORMAT

4.8.2 Command 201: Current Debit and Credit

Sends the credit and debit reported by the ICC.

COMMAND 201: CURRENT DEBIT AND CREDIT			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0201
STU_number	14	num	STB CA serial number ex: 72664281 will be formatted as “00000072664281”
credit	7	r_num	Credit amount representing 00000.00 to 65535.99
debit	7	r_num	Debit amount representing 00000.00 to 65535.99

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
STU_number	BAD_COMMAND_SYNTAX	BAD_STU_NUMBER_FORMAT
credit	BAD_COMAMND_SYNTAX	BAD_CREDIT_FORMAT
debit	BAD_COMMAND_SYNTAX	BAD_DEBIT_FORMAT

4.8.3 Command 202: PPV Purchase List

This command is sent by the CAS to the SMS when there is a new IPPV item that has been communicated by the smart card during the last callback.

This command is sent as many time there are new IPPV items provided during the last callback.

COMMAND 202: PPV PURCHASE LIST			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0202
STU_number	14	num	STB CA serial number ex: 72664281 will be formatted as “00000072664281”
IMS_product_id	12	num	IMS_product_id of the event product purchased impulsively through the EPG
purchase_date	8	YYYYMMDD	date of IPPV purchase (UTC)
watched_status	1	r_text	Indicates if the IPPV has been watched (Y) or (N). The IPPV is watched if the accumulated viewing time exceeds the limit defined for the event or the limit predefined for the service carrying the event.

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
STU_number	BAD_COMMAND_SYNTAX	BAD_STU_NUMBER_FORMAT
IMS_product_id	BAD_COMAMND_SYNTAX	BAD_IMS_PRODUCT_ID_FORMAT
purchase_date	BAD_COMMAND_SYNTAX	BAD_DATE_FORMAT
watched_status	BAD_COMMAND_SYNTAX	BAD_FLAG_FORMAT

4.8.4 Command 205: Phone Discrepancies

This command sends to the SMS any phone discrepancy information.

Occurs if the phone number (caller_ID) of the customer does not match any authorized phone numbers for that given customer.

The number can be a phone number, or an IP address or a MAC address. See command 49 and command 54 for the exact description.

COMMAND 205: PHONE DISCREPANCIES			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0205
STU_number	14	num	STB CA serial number ex: 72664281 will be formatted as "00000072664281"
phone_number_1	16	num	first phone number stored in the CC
phone_number_2	16	num	second phone number stored in the CC
phone_number_3	16	num	third phone number stored in the CC
abnormal_phone	16	num	number used by STB to call CC

List of error codes (in NACK messages) applicable for this section of the message.

Field	**Error codes**	**Error codes extension**
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
STU_number	BAD_COMMAND_SYNTAX	BAD_STU_NUMBER_FORMAT
Phone_number_1	BAD_COMAMND_SYNTAX	BAD_PHONE_NUMBER_FORMAT
Phone_number_2	BAD_COMMAND_SYNTAX	BAD_PHONE_NUMBER_FORMAT
Phone_number_3	BAD_COMMAND_SYNTAX	BAD_PHONE_NUMBER_FORMAT
abnormal_phone	BAD_COMMAND_SYNTAX	BAD_PHONE_NUMBER_FORMAT

4.8.5 Command 206: STU Responding Status

Sends to the SMS the new STB responding status.

This command is generated upon every successful callback as well as callbacks that are expected but not received. A non-responding STB is defined by the call collector's callback expiration parameter (typically 3 days). Automatic callbacks and immediate callbacks requested from the SMS will always generate the STB Responding Status command. Alarm based callbacks and Special event callbacks will never generate a STU Responding Status with responding = N.

COMMAND 206: STU RESPONDING STATUS			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0206
STU_number	14	num	STB CA serial number ex: 72664281 will be formatted as "00000072664281"
responding	1	r_text	A STB may be responding: Y or N

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
STU_number	BAD_COMMAND_SYNTAX	BAD_STU_NUMBER_FORMAT
responding	BAD_COMAMND_SYNTAX	BAD_FLAG_FORMAT

4.8.6 Command 207: ICC Memory Full Alarm

Forwards to the SMS a message sent by the ICC: memory full.

This information is retrieved by the CC during the callback. The ICC will remove all obsolete data (expired subscriptions).

COMMAND 207: ICC MEMORY FULL ALARM			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0207
STU_number	14	num	STB CA serial number ex: 72664281 will be formatted as “00000072664281”

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
STU_number	BAD_COMMAND_SYNTAX	BAD_STU_NUMBER_FORMAT

4.8.7 Command 208: Event Definition Error (Obsolete)

The CAS does not support this feature any more. As a result, the CAS will not send this command to the SMS any more.

4.8.8 Command 209: Null Event Error (Obsolete)

The CAS does not support this feature any more. As a result, the CAS will not send this command to the SMS any more.

4.8.9 Command 210: EPG Data Feed Format Error (Obsolete)

The CAS does not support this feature any more. As a result, the CAS will not send this command to the SMS any more.

4.8.10 Command 211: Start of Report

The CAS issues this command to advise the SMS that a set of FEEDBACK messages for a given subscriber will follow. The set of messages are bounded or terminated with command 212.

COMMAND 211: START OF REPORT			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 0211
STU_callback_date	8	YYYYMMDD	date (UTC) of the callback being reported
STU_callback_time	6	HHMMSS	Time (UTC) of the callback being reported

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
STU_callback_date	BAD_COMMAND_SYNTAX	BAD_DATE_FORMAT
STU_callback_time	BAD_COMMAND_SYNTAX	BAD_TIME_FORMAT

4.8.11 Command 212: End of Report

This command is used by the CC to signal the end of a call collector report, consisting of a set of commands 202.

This command is *usually* sent as the last command after all call collector information (for the ICC whose UA is in the command header) is sent to the SMS.; as this command may not be the last one of the set, we advise the SMS not to synchronize on this command.

COMMAND 212: END OF REPORT			
Field	**byte**	**Format**	**Description**
command_id	4	r_num	command_id = 0212
number_of_IPPV	2	num	The number of IPPV reports (occurrences of command 202) that should have been sent in this report.

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
number_of_IPPV	BAD_COMMAND_SYNTAX	BAD_NUMBER_OF_IPPV_FORMAT

4.8.12 Command 213: Event Product Schedule Change (Obsolete)

The CAS does not support this feature any more. As a result, the CAS will not send this command to the SMS any more.

4.8.13 Command 214: Event Remove Error (Obsolete)

The CAS does not support this feature any more. As a result, the CAS will not send this command to the SMS any more.

4.8.14 Command 215: Products List

This command reports the list of products known to the CA system for one particular subscriber. It is sent asynchronously in answer from command 71: Get Products, and contains the transaction-number of the received instance of this last command as a reference.

COMMAND 215: PRODUCTS LIST			
Field	**byte**	**Format**	**Description**
command_id	4	r_num	command_id = 0215
original_transaction_number	9	num	Transaction number of the command 71 that triggered the generation of this command
STU_number	14	r_num	STB/CA serial number ex: 72664281 will be formatted as "00000072664281"
ICC_suspended	1	r_text	ICC suspend state: Y or N
nb_of_products	2	num	Number of products returned in this command
for(i=0;i<nb_of_products; i++)			
{			
IMS_product_id	12	num	IMS product ID range: 000000000000 to 999999999999
product_suspended	1	r_text	Product suspend state: Y or N
}			

List of error codes (in NACK messages) applicable for this section of the message.

Field	**Error codes**	**Error codes extension**
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
original_transaction_number	BAD_COMMAND_SYNTAX	BAD_TRANSACTION_NUMBER_FORMAT
STU_number	BAD_COMMAND_SYNTAX	BAD_STU_NUMBER_FORMAT
ICC_suspended	BAD_COMMAND_SYNTAX	BAD_FLAG_FORMAT
nb_of_products	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
IMS_product_id	BAD_COMMAND_SYNTAX	BAD_IMS_PRODUCT_ID_FORMAT
product_suspended	BAD_COMMAND_SYNTAX	BAD_FLAG_FORMAT

4.8.15 Command 216: PPV Purchase List Extended

Command available for Aladin™ system and on special request only

This command is sent by the CAS to the SMS when there is a new IPPV item that has been communicated by the smart card during a callback.

This command is sent as many times as there are new IPPV items provided during the last callback.

Important This command is similar to command 202. It provides only an additional parameter, the purchase_time.

COMMAND 216: PPV PURCHASE LIST EXTENDED			
Field	**byte**	**Format**	**Description**
command_id	4	r_num	command_id = 0216
STU_number	14	num	STB CA serial number ex: 72664281 will be formatted as "00000072664281"
IMS_product_id	12	num	IMS_product_id of the event product purchased impulsively through the EPG
purchase_date	8	YYYYMMDD	date of IPPV purchase (UTC)
purchase_time	6	HHMMSS	Timestamp of IPPV purchase (UTC)
watched_status	1	r_text	Indicates if the IPPV has been watched (Y) or (N). The IPPV is watched if the accumulated viewing time exceeds the limit defined for the event or the limit predefined for the service carrying the event.

List of error codes (in NACK messages) applicable for this section of the message.

Field	Error codes	Error codes extension
command_id	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
command_id	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
STU_number	BAD_COMMAND_SYNTAX	BAD_STU_NUMBER_FORMAT
IMS_product_id	BAD_COMAMND_SYNTAX	BAD_IMS_PRODUCT_ID_FORMAT
purchase_date	BAD_COMMAND_SYNTAX	BAD_DATE_FORMAT
purchase_time	BAD_COMMAND_SYNTAX	BAD_TIME_FORMAT
watched_status	BAD_COMMAND_SYNTAX	BAD_FLAG_FORMAT

4.9 OPERATION commands (10nn)

4.9.1 Command 1000: Acknowledge Command

The command identified in the field “transaction_number” has been completed successfully.

The fields IMS_product_id and SMS_product_id are not applicable anymore since the series of cmd 3nn is not supported by the interface. Consequently, these fields will be set respectively to 000000000000 and 000000000000.

COMMAND 1000: ACKNOWLEDGE COMMAND			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 1000
transaction_ number	9	num	transaction number acknowledged range: 000000000 to 999999999
IMS_product_id	12	num	IMS product ID is always 000000000000
SMS_product_id	12	num	SMS product ID is always 000000000000

4.9.2 Command 1001: Non-acknowledge Command

The command specified could not be completed because it is either REJECTED or POSTPONED. A rejected command is a consequence of a mistake in the command format or in the command processing. A postponed command is a consequence of a CAS system that is busy.

Important When a command is POSTPONED, the SMS should resubmit the command after a time delay of 60 min. Note that the resubmitted command should be identified with a new transaction id.

COMMAND 1001: NON-ACKNOWLEDGE COMMAND			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command ID = 1001
transaction_ number	9	num	transaction_number acknowledged range: 000000000 to 999999999
nack_status	1	r_num	1 = REJECTED means that the command has been rejected because an error has been detected. 2 = POSTPONED means that the command could not be completed because the system is busy.
error_code	4	r_num	Main error code, refers to chapter 5.1
error_code_ext	4	r_num	Extension error code, refers to chapter 5.2
length_of_command_body	3	num	Length of the following section
command_section	n		command section of the command that caused the error. n = length_of_command_body

4.9.3 Command 1002: No Command

The SMS should send this command in the two following conditions:

1. While the SMS opens a channel.
2. While there is no activity, i.e. no command to send or to receive.

The SMS should manage separately the EMM/CONTROL channel and the FEEDBACK channel:

COMMAND 1002: NO COMMAND			
Field	**byte**	**format**	**Description**
command_id	4	r_num	command_id = 1002

5. Error codes

If an error occurs when executing a SMS command, it is reported by the use of an error code and an error code extension." The error code indicates an error category and the error code extension gives more detail concerning the error source (e.g., an incorrectly specified field or value exceeded).

An error code is always followed by an error code extension (possibly extension 0000: NO_EXTENDED_ERROR_CODE). The available error codes and extensions are indicated in the following tables.

5.1 Table of Error codes

ERROR CODE NAME	CODE	DESCRIPTION
FATAL_ERROR	0000	The Oracle database interface returns an exception as database error or protocol error due to a non-understood field in the SMS command. All SMS EMM commands might generate such FATAL_ERROR.
BAD_ROOT_HEADER_SYNTAX	0001	The syntax of the command root header is not correct. See error code extension
BAD_HEADER_SYNTAX	0002	The syntax of the command header is not correct. See error code extension
BAD_COMMAND_SYNTAX	0003	The syntax of the command is not correct. See error code extension.
DATABASE_ERROR	0004	An error occurred during an IMS database query processing.
MESSAGE_NOT_FOUND	0005	The message referenced in the command does not exist.
PRODUCT_NOT_FOUND	0006	The product_id used in the command does not exist in the IMS database.
CANCELED_CARD	0007	The ICC referenced in the command has been canceled.
UA_NOT_FOUND	0008	The ICC UA referenced in the command does not exist
PPV_IN_THE_PAST	0009	The command attempts to access a PPV whose validity is expired.
STU_ALREADY_EXISTS	0010	The command attempts to create an ICC in the CC database, but the ICC is bound to an already existing STB.
SERVICE_NOT_FOUND	0011	The service referenced in the command does not exist in the IMS database.
PRODUCT_ALREADY_EXISTS	0013	The command attempts to create an already existing product.
UA_ALREADY_EXISTS	0014	The command attempts to create in the CC database an ICC that already exists.

ERROR CODE NAME	CODE	DESCRIPTION
BAD_EPG_FORMAT	0015	The format of the EPG data feed is not correct.
DB_INCONSISTENT_TOO_MANY_ROWS	0021	Inconsistency in the IMS database
DB_INCONSISTENT_INVALID_PRODUCT	0022	Inconsistency in the IMS database
PRODUCT_INCONSISTENT	0024	There is an inconsistency between the received product definition and the internal SMS Gateway product database.
TOO_MANY_ITEMS	0025	Too many items are given in the list.
VALUE_OUT_OF_RANGE	0026	The value in the incoming command is out of the authorized range
BAD_USAGE	0027	The usage of this parameter is not correct. See error code extension.
INVALID_PPID	0028	The MOP PPID used in this command is invalid.
SYSTEM_ERROR	0029	An error not related to the business or to the field value occurs within the system. See error code extension.
BAD_PRODUCT_TYPE	0030	The type of the product is wrong (i.e. PPV instead of SUBSCRIPTION).
BAD_PRODUCT_STATUS	0031	The status of the product does not allow the execution of this command.
ACCOUNT_NOT_FOUND	0032	The account that corresponds to this UA and to this MOP does not exist in the database.
CB_PROFILE_NOT_FOUND	0033	The callback profile that corresponds to this UA and to this MOP does not exist in the database.
ZIP_NOT_FOUND	0034	The Zip code does not exist in the database.
RIGHT_NOT_FOUND	0035	The Right does not exist in the database

Table 5-1 Error codes

5.2 Table of Error code extensions

ERROR CODE EXTENSION NAME	CODE	DESCRIPTION
NO_EXTENDED_ERROR_CODE	0000	No error code extension is available for the error code specified.
BAD_DEBIT_FORMAT	0001	The command contains a debit field whose format is incorrect.
BAD_CREDIT_FORMAT	0002	The command contains a credit field whose format is incorrect.
BAD_CREDIT_MODE	0003	The command contained a credit_mode field whose value is not one of the authorized ones.
BAD_DATE_FORMAT	0004	The command contains a date whose format is incorrect.
BAD_DATE_SEQUENCE	0005	The command contains a begin date and an end date that are out of sequence.
BAD_FREQUENCY_FORMAT	0006	The field call_freq of the command contains a value whose format is incorrect.
BAD_STU_NUMBER_FORMAT	0007	The format of the STB number specified in the command is incorrect.
BAD_IMS_PRODUCT_ID_FORMAT	0008	The format of the IMS_product_id of the command is incorrect.
BAD_MESSAGE_NUMBER_FORMAT	0010	The value of the message_number field of the command is incorrect.
BAD_PHONE_NUMBER_FORMAT	0011	The format of the value of a phone_number field of the command is incorrect.
BAD_PRICE_FORMAT	0013	The value of the price field of the command is incorrect.
BAD_THRESHOLD_CREDIT_FORMAT	0014	The value of the threshold_credit field of the command is incorrect.
BAD_UA_FORMAT	0015	The value of the UA field of the command is incorrect.
BAD_ZIP_CODE_FORMAT	0016	The value of the zip code field of the command is incorrect.
DIFFERENT_PRODUCTS	0017	The command attempts to define a product with a product_id already attributed to a different product.
BAD_BROADCAST_MODE	0019	The broadcast mode is incorrect.
BAD_ADDRESS_TYPE	0020	The format of the value of the address_type field of the command is incorrect.
BAD_MOP_PPID	0021	The MOP_PPID indicated in the command is not valid.
BAD_DEST_ID	0022	The dest_id indicated in the command is not valid.
BAD_SOURCE_ID	0023	The source_id indicated in the command is not valid.

ERROR CODE EXTENSION NAME	CODE	DESCRIPTION
BAD_COMMAND_TYPE	0024	This type of SMS command does not exist.
BAD_COMMAND_ID	0025	The command ID given in the SMS command does not exist.
BAD_NUMBER_FORMAT	0027	A non-numerical character was found in the content of a Num field.
BAD_ERROR_CODE	0032	The error code specified in the command does not exist (section 8)
BAD_ERROR_CODE_EXT	0033	The error code extension specified in the command does not exist (section 8).
CREDIT_THRESHOLD_TOO_HIGH	0034	The value of the threshold_credit field of the command is too high.
BAD_SERVICE_UID_FORMAT	0040	The format of the value of a service_UID field of the command is incorrect.
BAD_SERVICE_NUMBER_FORMAT	0041	The format of the value of the service_number field of the command is incorrect.
BAD_NUMBER_OF_IPPV_FORMAT	0044	The format of the number_of_IPPV field in the command is incorrect.
BAD_IP_ADDRESS_FORMAT	0045	The format of the IP address in the command is incorrect.
EXTERNAL_SYSTEM_NOT_RESPONDING	0048	The other components of the CAS system do not respond to the gateway process.
EXTERNEL_SYSTEM_ERROR	0049	The other components of the CAS system have not processed successfully the command.
BAD_SERVICE_ID_FORMAT	0052	The format of the service ID is incorrect.
BAD_TRANSPORT_ID_FORMAT	0053	The format of the transport ID is incorrect.
BAD_NETWORK_ID_FORMAT	0054	The format of the network ID is incorrect.
BAD_LID_FORMAT	0055	The format of the lid is incorrect.
BAD_PRIORITY_FORMAT	0056	The format of the priority is incorrect.
BAD_MODE_FORMAT	0057	The format of the mode is incorrect.
LENGTH_TOO_LONG	0058	The length is out of range.
BAD_FLAG_VALUE	0059	The flag value is not recognized.
BAD_CC_PORT_FORMAT	0060	The format of the CC port is incorrect.
BAD_TRANSACTION_NUMBER_FORMAT	0061	The format of the transaction number is incorrect.
BAD_PURGE_MODE_FORMAT	0062	The format of the purge mode is incorrect.
BAD_CALLBACK_FORMAT	0063	The format of the callback type is incorrect
BAD_TIME_FORMAT	0064	The time format is incorrect
DATE_NOT_IN_THE_PAST	0065	This date must be set in the past
ACCESS_ERROR	0066	Error when trying to access database
TRANSACTION_ERROR	0067	An error occurs during a database transaction (i.e. limitation reached, overflow…)

ERROR CODE EXTENSION NAME	CODE	DESCRIPTION
DATA_ERROR	0068	An error related to the data contained in database occurs (i.e. expected record is missing)
TRANS_NR_ALREADY_IN_USE	0069	This transaction number is already in use within the system
COMMUNICATION_ERROR	0070	Communication error between components within the system
INTERNAL_ERROR	0071	System internal error
SOURCE_NOT_AUTHORIZED	0072	Use of this source identifier is not allowed
SOURCE_ALREADY_IN_USE	0073	This source identifier is already used by an other source
DEST_NOT_AUTHORIZED	0074	Use of this destination identifier is not allowed
MOP_NOT_AUTHORIZED	0075	Use of this MOP PPID is not allowed
DATE_IN_THE_FUTURE	0076	This date must be set in the present or in the past
CANCELLED_PRODUCT	0077	The product has been cancelled
SUSPENDED_PRODUCT	0078	The product has been suspended
INVALID_PURCHASE_DATE	0079	The purchase date is invalid
DRAFT_PRODUCT	0080	The product is a draft
PPV_PRODUCT	0081	The product is a PPV
DATE_IN_THE_PAST	0082	This date must be set in the present or in the future
ADDRESS_TYPE_NOT_AUTHORIZED	0083	This type of address is not allowed for this command
ISD_MOP_NOT_FOUND	0084	The MOP record does not exist for this UA
BAD_DATA_FORMAT	0085	The format of the data is invalid
REGULAR_PRODUCT	0086	This product is a regular (subscription) product

Table 5-2 Error code extensions

5.3 Error codes and extensions for Command Root Header section

Among the error codes and extensions defined above, those that are applicable to report errors in the root header fields are:

ERROR CODE	ERROR CODE EXTENSION
BAD_ROOT_HEADER_SYNTAX	BAD_COMMAND_TYPE BAD_SOURCE_ID BAD_DEST_ID BAD_MOP_PPID BAD_DATE_FORMAT

The error code and error code extension are used in the following way:

FIELD	ERROR CODE	ERROR CODE EXTENSION
transaction_number	BAD_ROOT_HEADER_SYNTAX	NO_EXTENDED_ERROR
command_type	BAD_ROOT_HEADER_SYNTAX	BAD_COMMAND_TYPE
source_id	BAD_ROOT_HEADER_SYNTAX	BAD_SOURCE_ID
dest_id	BAD_ROOT_HEADER_SYNTAX	BAD_DEST_ID
MOP_PPID	BAD_ROOT_HEADER_SYNTAX	BAD_MOP_PPID
creation_date	BAD_ROOT_HEADER_SYNTAX	BAD_DATE_FORMAT

5.4 Error codes and extensions for Command Header section

ERROR CODE	ERROR CODE EXTENSION
BAD_HEADER_SYNTAX	BAD_BROADCAST_MODE BAD_ADDRESS_TYPE BAD_DATE_SEQUENCE BAD_DATE_FORMAT
UA_NOT_FOUND	NO_EXTENDED_ERROR_CODE
CANCELED_CARD	NO_EXTENDED_ERROR_CODE

The error codes and error code extensions are used in the following way to report errors in command header fields.

FIELD	ERROR CODE	ERROR CODE EXTENSION
broadcast_mode	BAD_HEADER_SYNTAX	BAD_BROADCAST_MODE
broadcast_start_date	BAD_HEADER_SYNTAX	BAD_DATE_FORMAT BAD_DATE_SEQUENCE
broadcast_end_date	BAD_HEADER_SYNTAX	BAD_DATE_FORMAT BAD_DATE_SEQUENCE
address_type	BAD_HEADER_SYNTAX	BAD_ADDRESS_TYPE
UA	UA_NOT_FOUND CANCELED_CARD BAD_HEADER_SYNTAX	NO_EXTENDED_ERROR_CODE NO_EXTENDED_ERROR_CODE BAD_UA_FORMAT

6. UA and CA-S/N checksum

This chapter describes the procedure to manage UA (unique address) and CA-S/N (conditional access serial number) at the customer site.

6.1 Definitions

The mandatory information to allow a CAS to fully recognize a given customer is:

UA Unique address of the smart card. This is a 12-digits long number that uniquely identifies the smart card. The first 10 digits represent the address itself; the last 2 digits are a checksum allowing the SMS to verify the number given by the customer. The preferred (but not mandatory) format is:

nn nnnn nnnn cc

This number is printed and bar-coded on the card and is normally accessible through a set-top box menu on the TV screen.

CA-S/N Conditional access serial number. This is a 12-digits long number that identifies uniquely the set-top box for the conditional access system. The first 10 digits represent the serial number; the last 2 digits are a checksum allowing the SMS to verify the number given by the customer. The preferred (but not mandatory) format is:

nn nnnn nnnn cc

This number may be printed (and possibly bar-coded) on a sticker on the set-top box and is normally accessible through a set-top box menu on the TV screen.

This number may differ (and usually differs) from the manufacturing S/N, which identifies the set-top box for the manufacturer himself. We had to use a common format throughout the system and different numbers for all set-top boxes whatever the format chosen by the manufacturer.

6.2 Pairing operation

The pairing operation links a smart card with a set-top box. The pairing operation is mandatory. Without the pairing operation, the subscriber STB does not work.

This operation requires from the SMS the two unique numbers described above. Therefore, the end-user must communicate his UA and his CA-S/N to the SMS. Those numbers may be filled in the contract or in any place the customer finds suitable for this purpose.

The pairing key, which is used to effectively prevent the use of a card in another set-top box, is provided in the Nagravision system.

6.3 Data files

Nagravision usually provides the customer with files containing the list of the produced cards. Those files contain a list of UA. They are given by production box (250 smart cards) and/or by production batch (indeterminate number of boxes in one file).

On the other hand, the set-top box manufacturer has the responsibility to provide files containing the list of set-top boxes effectively produced. Those files must contain a list or range of CAS/N. If needed by the customer, those files may provide a link between the CAS/N and the manufacturing S/N for each box, but this is not requested by the Nagravision system.

Nagravision may possibly provide the range of CAS/N allocated for each manufacturer but has no view on what is effectively produced.

6.4 CA-S/N – Pairing keys

The CA-S/N is chosen by Nagravision and provided to the set-top box manufacturer, each of them associated with a pairing key. This pairing key is an element of security of the system and shall not be known by the end-user, or by the customer, or by any unauthorized people at the manufacturing site. Thus this pairing key shall not appear on any support (label, screen, paper, accessible memory, file…). A violation of this rule is a severe security breach and may induce Nagravision into litigation actions.

6.5 Checksum algorithm

The following C routine describes the formula used for the computation of the checksum:

```
unsigned char calcCheckSum (unsigned long SN)
{
  return ((6*(SN/100000000L)+19*(SN/10000000L%10)+
           8*(SN/10000L%1000)+(SN/100L%100))%23+
          (SN%100))%100;
}
```

7. ASCII Table

Decimal	Hex	Binary	Value
00	00	00000000	NUL (Null char.)
32	20	00100000	SP (Space)
33	21	00100001	! (exclamation mark)
34	22	00100010	" (double quote)
35	23	00100011	# (number sign)
36	24	00100100	$ (dollar sign)
37	25	00100101	% (percent)
38	26	00100110	& (ampersand)
39	27	00100111	' (single quote)
40	28	00101000	((left/opening parenthesis)
41	29	00101001	) (right/closing parenthesis)
42	2A	00101010	* (asterisk)
43	2B	00101011	+ (plus)
44	2C	00101100	, (comma)
45	2D	00101101	- (minus or dash)
46	2E	00101110	. (dot)
47	2F	00101111	/ (forward slash)
48	30	00110000	0
49	31	00110001	1
50	32	00110010	2
51	33	00110011	3
52	34	00110100	4
53	35	00110101	5
54	36	00110110	6
55	37	00110111	7
56	38	00111000	8
57	39	00111001	9
58	3A	00111010	: (colon)
59	3B	00111011	; (semi-colon)
60	3C	00111100	< (less than)
61	3D	00111101	= (equal sign)
62	3E	00111110	> (greater than)
63	3F	00111111	? (question mark)
64	40	01000000	@ (AT symbol)
65	41	01000001	A
66	42	01000010	B
67	43	01000011	C
68	44	01000100	D
69	45	01000101	E
70	46	01000110	F
71	47	01000111	G
72	48	01001000	H
73	49	01001001	I
74	4A	01001010	J
75	4B	01001011	K

76	4C	01001100	L
77	4D	01001101	M
78	4E	01001110	N
79	4F	01001111	O
80	50	01010000	P
81	51	01010001	Q
82	52	01010010	R
83	53	01010011	S
84	54	01010100	T
85	55	01010101	U
86	56	01010110	V
87	57	01010111	W
88	58	01011000	X
89	59	01011001	Y
90	5A	01011010	Z
91	5B	01011011	[(left/opening bracket)
92	5C	01011100	\ (back slash)
93	5D	01011101	] (right/closing bracket)
94	5E	01011110	^ (caret/cirumflex)
95	5F	01011111	_ (underscore)
96	60	01100000	`
97	61	01100001	a
98	62	01100010	b
99	63	01100011	c
100	64	01100100	d
101	65	01100101	e
102	66	01100110	f
103	67	01100111	g
104	68	01101000	h
105	69	01101001	i
106	6A	01101010	j
107	6B	01101011	k
108	6C	01101100	l
109	6D	01101101	m
110	6E	01101110	n
111	6F	01101111	o
112	70	01110000	p
113	71	01110001	q
114	72	01110010	r
115	73	01110011	s
116	74	01110100	t
117	75	01110101	u
118	76	01110110	v
119	77	01110111	w
120	78	01111000	x
121	79	01111001	y
122	7A	01111010	z

8. Examples

8.1 Device_IO connection establishment

The following example is a network capture of one whole Device_IO connection process.

```
Packet #1
  Flags:          0x00
  Status:         0x01
  Packet Length:64
  Timestamp:      18:04:12.473073 10/09/2001
Ethernet Header
  Destination:              08:00:2B:C5:7E:2A
  Source:                   00:C0:F0:3D:7F:9D
  Protocol Type:            0x0800  IP
IP Header - Internet Protocol Datagram
  Version:                  4
  Header Length:            5  (20  bytes)
  Type of Service:          %00000000
  Precedence: Routine,   Normal Delay,   Normal Throughput,   Normal Reliability
  Total Length:             44
  Identifier:               63087
  Fragmentation Flags:      %010  Do Not Fragment   Last Fragment
  Fragment Offset:          0  (0  bytes)
  Time To Live:             128
  Protocol:                 6  TCP - Transmission Control Protocol
  Header Checksum:          0x82E9
  Source IP Address:        192.168.0.31
  Dest. IP Address:         192.168.0.3
  No IP Options
TCP - Transport Control Protocol
  Source Port:              1090  ff-fms
  Destination Port:         20000  sms_gateway
  Sequence Number:          55594
  Ack Number:               0
  Offset:                   6  (24  bytes)
  Reserved:                 %000000
  Code:                     %000010    Synch
  Window:                   8192
  Checksum:                 0xCB26
  Urgent Pointer:           0
TCP Options:
  Option Type:              2  Maximum Segment Size
    Length:                 4
    MSS:                    1460

  TCP Data Area:            No more data.
Extra bytes (Padding):
  ..                  00 00
FCS - Frame Check Sequence
  FCS (Calculated):         0x5FAFB276
```

```
Packet #2
  Flags:          0x00
  Status:         0x01
  Packet Length:64
  Timestamp:      18:04:12.473409 10/09/2001
Ethernet Header
  Destination:              00:C0:F0:3D:7F:9D
  Source:                   08:00:2B:C5:7E:2A
  Protocol Type:            0x0800  IP
IP Header - Internet Protocol Datagram
  Version:                  4
  Header Length:            5  (20  bytes)
  Type of Service:          %00000000
  Precedence: Routine,   Normal Delay,   Normal Throughput,   Normal Reliability
  Total Length:             44
  Identifier:               56682
  Fragmentation Flags:      %010  Do Not Fragment   Last Fragment
  Fragment Offset:          0  (0  bytes)
  Time To Live:             60
  Protocol:                 6  TCP - Transmission Control Protocol
  Header Checksum:          0xDFEE
  Source IP Address:        192.168.0.3
  Dest. IP Address:         192.168.0.31
  No IP Options
TCP - Transport Control Protocol
  Source Port:              20000  sms_gateway
  Destination Port:         1090  ff-fms
  Sequence Number:          1524200406
  Ack Number:               55595
  Offset:                   6  (24  bytes)
  Reserved:                 %000000
  Code:                     %010010    Ack    Synch
```

```
  Window:               33580
  Checksum:             0x9939
  Urgent Pointer:       0
TCP Options:
  Option Type:          2  Maximum Segment Size
    Length:             4
    MSS:                1460

  TCP Data Area:        No more data.
Extra bytes (Padding):
  ..                 00 00
FCS - Frame Check Sequence
  FCS (Calculated):     0x36B97026
```

```
Packet #3
  Flags:          0x00
  Status:         0x01
  Packet Length:64
  Timestamp:      18:04:12.473450 10/09/2001
Ethernet Header
  Destination:          08:00:2B:C5:7E:2A
  Source:               00:C0:F0:3D:7F:9D
  Protocol Type:        0x0800  IP
IP Header - Internet Protocol Datagram
  Version:              4
  Header Length:        5  (20  bytes)
  Type of Service:      %00000000
  Precedence: Routine,   Normal Delay,   Normal Throughput,   Normal Reliability
  Total Length:         40
  Identifier:           63343
  Fragmentation Flags:  %010  Do Not Fragment   Last Fragment
  Fragment Offset:      0  (0  bytes)
  Time To Live:         128
  Protocol:             6  TCP - Transmission Control Protocol
  Header Checksum:      0x81ED
  Source IP Address:    192.168.0.31
  Dest. IP Address:     192.168.0.3
  No IP Options
TCP - Transport Control Protocol
  Source Port:          1090  ff-fms
  Destination Port:     20000  sms_gateway
  Sequence Number:      55595
  Ack Number:           1524200407
  Offset:               5  (20  bytes)
  Reserved:             %000000
  Code:                 %010000    Ack
  Window:               8760
  Checksum:             0x11EB
  Urgent Pointer:       0
  No TCP Options
  TCP Data Area:        No more data.
Extra bytes (Padding):
  ......             00 00 00 00 00 00
FCS - Frame Check Sequence
  FCS (Calculated):     0x62217FDC
```

```
Packet #4
  Flags:          0x00
  Status:         0x01
  Packet Length:69
  Timestamp:      18:04:12.485934 10/09/2001
Ethernet Header
  Destination:          08:00:2B:C5:7E:2A
  Source:               00:C0:F0:3D:7F:9D
  Protocol Type:        0x0800  IP
IP Header - Internet Protocol Datagram
  Version:              4
  Header Length:        5  (20  bytes)
  Type of Service:      %00000000
  Precedence: Routine,   Normal Delay,   Normal Throughput,   Normal Reliability
  Total Length:         51
  Identifier:           63599
  Fragmentation Flags:  %010  Do Not Fragment   Last Fragment
  Fragment Offset:      0  (0  bytes)
  Time To Live:         128
  Protocol:             6  TCP - Transmission Control Protocol
  Header Checksum:      0x80E2
  Source IP Address:    192.168.0.31
  Dest. IP Address:     192.168.0.3
  No IP Options
TCP - Transport Control Protocol
  Source Port:          1090  ff-fms
  Destination Port:     20000  sms_gateway
  Sequence Number:      55595
  Ack Number:           1524200407
  Offset:               5  (20  bytes)
  Reserved:             %000000
  Code:                 %011000    Ack    Push
  Window:               8760
  Checksum:             0xC9C3
  Urgent Pointer:       0
  No TCP Options
SMSgateway  spec. 2.6.2 - decoder v.0.8
DeviceIO: message_1
  len:                  9
```

```
  op_mode:              1  Fast data transfer (do not allow tracing)
  ob_name_len:          7
  ob_name:              SMS_GWY
FCS - Frame Check Sequence
  FCS (Calculated):     0xC6762DDA
```

```
Packet #5
  Flags:          0x00
  Status:         0x01
  Packet Length:64
  Timestamp:      18:04:12.486303 10/09/2001
Ethernet Header
  Destination:          00:C0:F0:3D:7F:9D
  Source:               08:00:2B:C5:7E:2A
  Protocol Type:        0x0800  IP
IP Header - Internet Protocol Datagram
  Version:              4
  Header Length:        5  (20  bytes)
  Type of Service:      %00000000
  Precedence: Routine,   Normal Delay,   Normal Throughput,   Normal Reliability
  Total Length:         43
  Identifier:           56683
  Fragmentation Flags:  %010  Do Not Fragment   Last Fragment
  Fragment Offset:      0  (0  bytes)
  Time To Live:         60
  Protocol:             6  TCP - Transmission Control Protocol
  Header Checksum:      0xDFEE
  Source IP Address:    192.168.0.3
  Dest. IP Address:     192.168.0.31
  No IP Options
TCP - Transport Control Protocol
  Source Port:          20000  sms_gateway
  Destination Port:     1090  ff-fms
  Sequence Number:      1524200407
  Ack Number:           55606
  Offset:               5  (20  bytes)
  Reserved:             %000000
  Code:                 %011000    Ack    Push
  Window:               33580
  Checksum:             0xAADF
  Urgent Pointer:       0
  No TCP Options
SMSgateway  spec. 2.6.2 - decoder v.0.8
DeviceIO: message_2
  len:                  1
  value:                6
Extra bytes (Padding):
  ...             00 00 00
FCS - Frame Check Sequence
  FCS (Calculated):     0xBDB648A1
```

```
Packet #6
  Flags:          0x00
  Status:         0x01
  Packet Length:64
  Timestamp:      18:04:12.640961 10/09/2001
Ethernet Header
  Destination:          08:00:2B:C5:7E:2A
  Source:               00:C0:F0:3D:7F:9D
  Protocol Type:        0x0800  IP
IP Header - Internet Protocol Datagram
  Version:              4
  Header Length:        5  (20  bytes)
  Type of Service:      %00000000
  Precedence: Routine,   Normal Delay,   Normal Throughput,   Normal Reliability
  Total Length:         40
  Identifier:           63855
  Fragmentation Flags:  %010  Do Not Fragment   Last Fragment
  Fragment Offset:      0  (0  bytes)
  Time To Live:         128
  Protocol:             6  TCP - Transmission Control Protocol
  Header Checksum:      0x7FED
  Source IP Address:    192.168.0.31
  Dest. IP Address:     192.168.0.3
  No IP Options
TCP - Transport Control Protocol
  Source Port:          1090  ff-fms
  Destination Port:     20000  sms_gateway
  Sequence Number:      55606
  Ack Number:           1524200410
  Offset:               5  (20  bytes)
  Reserved:             %000000
  Code:                 %010000    Ack
  Window:               8757
  Checksum:             0x11E0
  Urgent Pointer:       0
  No TCP Options
  TCP Data Area:        No more data.
Extra bytes (Padding):
  ......          00 00 00 00 00 00
FCS - Frame Check Sequence
  FCS (Calculated):     0xB161CF21
```

```
Packet #7
  Flags:          0x00
  Status:         0x01
  Packet Length:64
  Timestamp:      18:04:12.641152 10/09/2001
Ethernet Header
  Destination:            00:C0:F0:3D:7F:9D
  Source:                 08:00:2B:C5:7E:2A
  Protocol Type:          0x0800  IP
IP Header - Internet Protocol Datagram
  Version:                4
  Header Length:          5  (20  bytes)
  Type of Service:        %00000000
  Precedence: Routine,   Normal Delay,   Normal Throughput,   Normal Reliability
  Total Length:           43
  Identifier:             56686
  Fragmentation Flags:    %010  Do Not Fragment   Last Fragment
  Fragment Offset:        0  (0  bytes)
  Time To Live:           60
  Protocol:               6  TCP - Transmission Control Protocol
  Header Checksum:        0xDFEB
  Source IP Address:      192.168.0.3
  Dest. IP Address:       192.168.0.31
  No IP Options
TCP - Transport Control Protocol
  Source Port:            20000  sms_gateway
  Destination Port:       1090  ff-fms
  Sequence Number:        1524200410
  Ack Number:             55606
  Offset:                 5  (20  bytes)
  Reserved:               %000000
  Code:                   %011000    Ack    Push
  Window:                 33580
  Checksum:               0xB0DC
  Urgent Pointer:         0
  No TCP Options
SMSgateway  spec. 2.6.2 - decoder v.0.8
DeviceIO: message_3
  len:                    1
  value:                  0
Extra bytes (Padding):
  ...                  00 00 00
FCS - Frame Check Sequence
  FCS (Calculated):       0x77CEA603
```

```
Packet #14
  Flags:          0x00
  Status:         0x01
  Packet Length:64
  Timestamp:      18:04:12.841621 10/09/2001
Ethernet Header
  Destination:            08:00:2B:C5:7E:2A
  Source:                 00:C0:F0:3D:7F:9D
  Protocol Type:          0x0800  IP
IP Header - Internet Protocol Datagram
  Version:                4
  Header Length:          5  (20  bytes)
  Type of Service:        %00000000
  Precedence: Routine,   Normal Delay,   Normal Throughput,   Normal Reliability
  Total Length:           40
  Identifier:             65135
  Fragmentation Flags:    %010  Do Not Fragment   Last Fragment
  Fragment Offset:        0  (0  bytes)
  Time To Live:           128
  Protocol:               6  TCP - Transmission Control Protocol
  Header Checksum:        0x7AED
  Source IP Address:      192.168.0.31
  Dest. IP Address:       192.168.0.3
  No IP Options
TCP - Transport Control Protocol
  Source Port:            1090  ff-fms
  Destination Port:       20000  sms_gateway
  Sequence Number:        55606
  Ack Number:             1524200413
  Offset:                 5  (20  bytes)
  Reserved:               %000000
  Code:                   %010000    Ack
  Window:                 8754
  Checksum:               0x11E0
  Urgent Pointer:         0
  No TCP Options
  TCP Data Area:          No more data.
Extra bytes (Padding):
  ......               00 00 00 00 00 00
FCS - Frame Check Sequence
  FCS (Calculated):       0x22659BEF
```

8.2 Example of command (52)

Raw data:

```
0000: 08 00 2B C5 7E 2A 00 C0 F0 3D 7F 9D 08 00 45 00  ..+.~*..8=....E.
0016: 00 78 29 70 40 00 80 06 4F 9D C0 A8 00 1F C0 A8  .x)p@...O.......
0032: 00 03 04 42 4E 20 00 00 D9 78 5A D9 74 24 50 18  ...BN ...xZ.t$P.
0048: 21 EB 7B 6B 00 00 00 4E 30 30 30 30 30 30 30 30  !.{k...N00000000
0064: 32 30 31 30 30 30 30 31 30 30 30 32 30 30 32 35 37  20100010002002 57
0080: 32 30 30 31 31 30 30 39 4E 32 30 30 31 31 30 30  20011009N2001100
0096: 39 32 30 30 31 31 30 30 39 55 30 30 30 30 30 30  920011009U000000
0112: 30 30 30 31 30 30 35 32 31 32 33 34 35 36 37 38  0001005212345678
0128: 39 30 20 20 20 20 00 00 00 00                    90    ....
```

Whole network packet, interpreted:

```
Flags:          0x00
Status:         0x00
Packet Length:  138
Timestamp:      18:05:08.580530 10/09/2001
Ethernet Header
    Destination:        08:00:2B:C5:7E:2A
    Source:             00:C0:F0:3D:7F:9D
    Protocol Type:      0x0800  IP
IP Header - Internet Protocol Datagram
    Version:            4
    Header Length:      5  (20  bytes)
    Type of Service:    %00000000
                        000. .... Precedence: Routine,
                        ...0 .... Normal Delay,
                        .... 0... Normal Throughput,
                        .... .0.. Normal Reliability
                        .... ..0. ECT bit - transport protocol will ignore the CE bit
                        .... ...0 CE bit - no congestion
    Total Length:       1200x00
    Identifier:         10608
    Fragmentation Flags: %010
                        0.. Reserved
                        .1. Do Not Fragment
                        ..0 Last Fragment
    Fragment Offset:    0  (0  bytes)
    Time To Live:       128
    Protocol:           6  TCP - Transmission Control Protocol
    Header Checksum:    0x4F9D
    Source IP Address:  192.168.0.31
    Dest. IP Address:   192.168.0.3
    No IP Options
TCP - Transport Control Protocol
    Source Port:        1090  tf-fms
    Destination Port:   20000  sms_gateway
    Sequence Number:    55672
    Ack Number:         1524200484
    Offset:             5  (20  bytes)
    Reserved:           %000000
    Code:               %011000    Ack    Push
    Window:             8683
    Checksum:           0x7B6B
    Urgent Pointer:     0
    No TCP Options
SMSgateway  spec. 2.6.2 - decoder v.0.8
    DeviceIQ: message 5  # 1
        len:                78
        SMS command root header
            transaction_number:   000000002
            command_type:         01  EMM
            source_id:            0001
            dest_id:              0002
            MOP_PPID:             00257
            creation_date:        20011009
        EMM
            broadcast_mode:       N
            broadcast_start_date: 20011009
            broadcast_end_date:   20011009
            address_type:         U
            UA:                   0000000001
            Pair the ICC with the STB:
                command_ID:           0052
                STU_number:           1234567890
FCS - Frame Check Sequence
    FCS (Calculated):   0x7CA87CFC
```

—— END OF DOCUMENT ——