

NAGRAVISION SMS GATEWAY

Interface Specification

ISSUE 2.7.1

SAS

CABLESOFT

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Conventions used in this guide

Pull-quotes

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CAUTION	Provides information to avoid undesirable effects or indicates that an operation or action could give unexpected results or is irreversible (e.g., data loss etc.).
Important	Information that must not be ignored when carrying out some task or tasks.
Note	Further information, advice or exceptions etc.
NOTICE	Information that Nagravision S.A. respectfully requires its customers and/or partners to observe.
	Technical stuff that only need be read by technical staff.
	Provides information by way of a TIP to carry out a task more effectively or efficiently.
	Indicates advice, which if not observed may result in injury and/or equipment damage.

Convention for Windows

Item	Description
Menu commands	In bold type: e.g., Select Save .
Field names, radio buttons and check boxes	In bold type: e.g., Select the Needs publishing check box.
Items selected in a list box	Items selected are shown inverted .
Unselected items appear normal	Items unselected are shown without any treatment.

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Acronyms and abbreviations

Term	Definition	Description
►	Follows a command on a window menu window to indicate a submenu	
ANI		Automatic Number Identification, (Also known as caller id).
CA System	Conditional Access System	A generic term for a system used in pay television.
CC	Call Collector	
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.
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.
SMS	Subscriber Management System	
SMSGw	Product Acronym	SMSGw is an application described in this guide.
Special PPV Event		An event impulsively purchased which will initiate an automatic call back once it has been watched. This event among others will be fed back to the SMS, enabling it to estimate the audience
STB	Set-Top Box	
STU	See STB	
UTC	Coordinated Universal Time	Formerly known as GMT (Greenwich mean time).
uimbf	Unsigned Integer Most Significant Byte First.	

Table 0-1 Acronyms, abbreviations and other terms

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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 persons:

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

1.2 How to use this specification

You do not need to read this specification from cover to cover, because some information is only reference material, therefore depending on your needs make your choice from the following list:

- 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 ñ Syntactic metalanguage ñ Extended BNF (ISO/IEC 14977:1996)
- [2] SMS Gateway Implementation Guide.

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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.

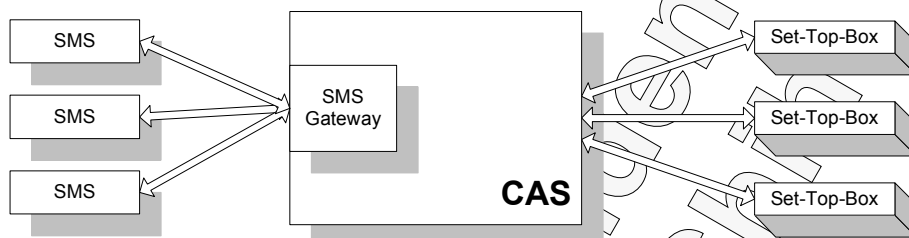


Fig. 2-1 CAS overview

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.

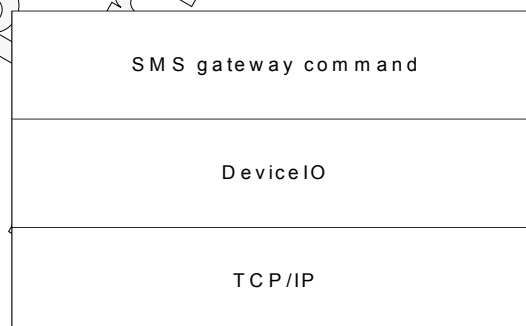


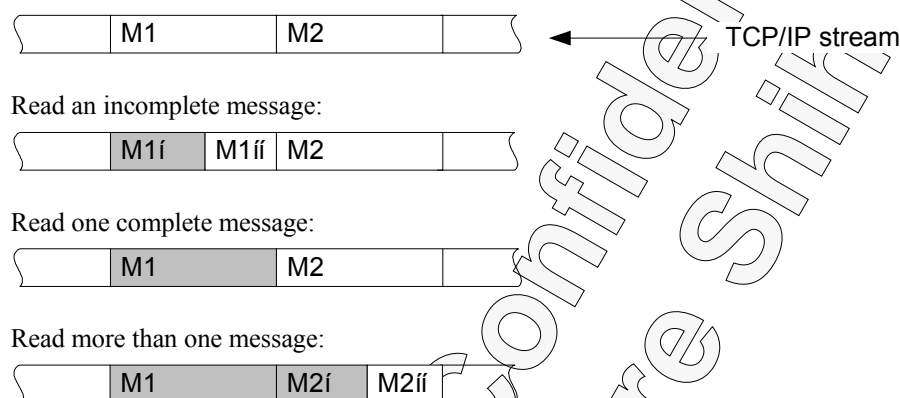
Fig. 2-2 SMSgw protocol communication layers

2.2.2 TCP/IP

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

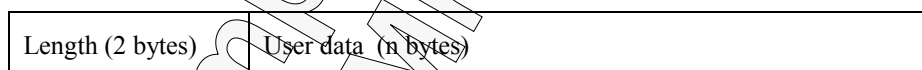
1. The message is incomplete (only n bytes of the data have been read)
2. The message is complete (only the expected message has been read)
3. More than the expected message has been read.

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



2.2.3 DeviceIO

The DeviceIO is a protocol above TCP/IP used to exchange data with their effective length. It merely consists of a fixed size header followed by the application data. The header size is 2 bytes, and the application data is a stream of n bytes.



2.2.4 SMSgw protocol

The SMSgw protocol defines the application oriented message. It is a high level protocol of 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 DeviceIO communication

2.3.1 Overview

Communications are established through entry points called services. An application wishing to establish a communication with another one must specify the service name it wants to communicate through.

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.

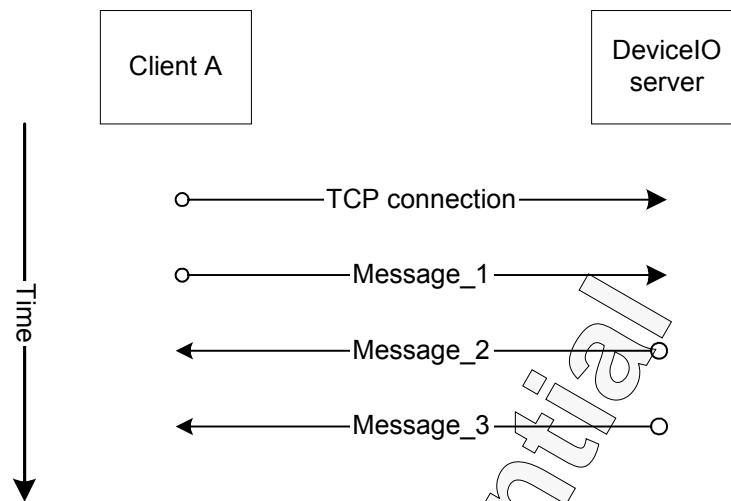
2.3.2 Establishing a connection with a DeviceIO server

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: DeviceIO connection establishment**

An example of a DeviceIO connection can be found in the chapter 6: Examples (on page 65).

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 DeviceIO server.

2.3.4 Closing a connection with a DeviceIO 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 than "SUCCESS" or of 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 DeviceIO protocol. The next sections present the different messages and how they should be utilized.

Message_1 (connect to server)

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

Syntax	Length [byte]	Format	Description
len	2	uimsbf	length of the message to be sent or received (in bytes) which starts just after this field. The first transmitted byte is the most significant byte. Len = (MSB, LSB).
op_mode	1	uimsbf	Data transfer operation mode 0 = Normal data transfer (allows message tracing) 1 = Fast data transfer (does not allow message tracing) The preferred value is 0.
ob_name_len	1	uimsbf	Length of the object name attribute (in bytes).
ob_name	ob_name_len	uimsbf	Name of the applicative service to which the connection should be established. Obj_name is a string of bytes at least one byte long and at most 32 byte long: $1 \leq \text{obj_name_len} \leq 32$. This Name is compulsory but its content is up to the client (ex: i SMS_GWYi)

Message_2 (answer from server)

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

MESSAGE_2			
Syntax	Length [byte]	Format	Description
Len	2	uimsbf	0x0001
connect_status	1	uimsbf	Connection status (see below)

CONNECT_STATUS		
Value	Identifier	Description
0	CONNECT_FAILURE	The connection has failed for any unexpected reason
2	ERROR_PROTOCOL	There was a protocol error during the communication establishment or during data transfer (see the remark below).
4	LINK_HANDLER_BUSY	The link handler is busy. The communication cannot be established at this moment
5	NO_FREE_LINK	There is no available free link
6	SUCCESS	The operation has been successfully done.
9	UNKNOWN_SERVICE	The specified service is unknown

Message_3 (answer from client)

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

MESSAGE_3			
Syntax	Length [byte]	Format	Description
len	2	uimbsf	0x0001
answer_code	1	uimbsf	0: call accepted 1: call rejected

Message_5 (message to/from client)

This message shall contain only one SMSgw command.

MESSAGE_5			
Syntax	Length [byte]	Format	Description
len	2	uimbsf	0x0001
data	Len	uimbsf	Data (SMSgw command)

2.4 Terminology**2.4.1 Products**

A product, by definition, consists of one or several entitlements giving access to one or several services (Radio, TV channels...)

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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 is on one way the commands and on the opposite way there is the associated response (Ack or Nack). An Ack response means that the incoming command is correctly formatted and it has been processed 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 problem during the processing in the system. The SMS is responsible to open both channels. Note that 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.

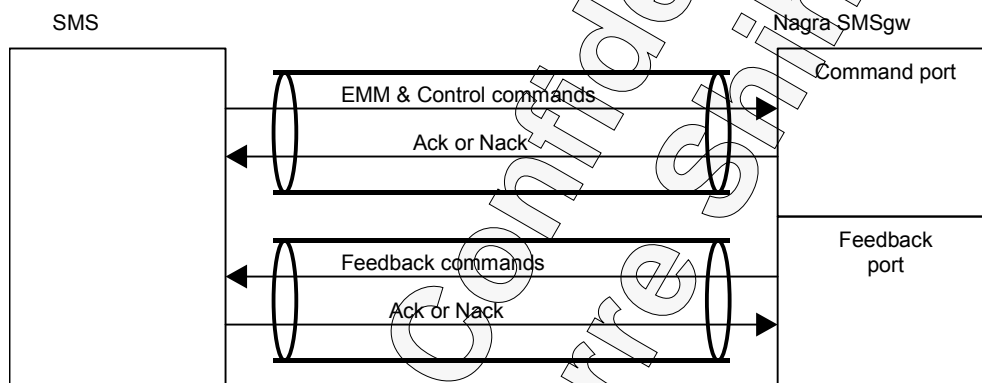


Fig. 3-1: SMS to SMSgw connections

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

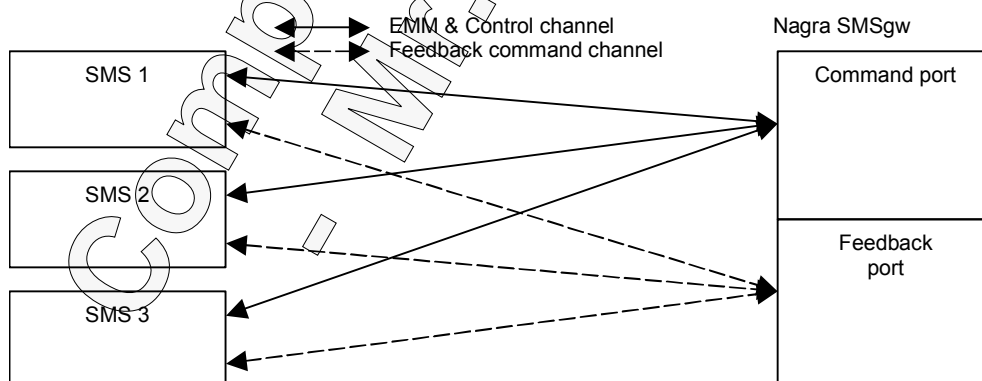


Fig. 3-2: Multi SMS connections

Please refer to the document *i SMS Gateway Implementation Guidei* for operational details and constraints 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 *i add product to an ICCi*, *i create credit in ICCi*, *i set authorized phone numberi*.

3.3 Feedback commands flow

The *feedback* commands are the commands sent by the CAS to the SMS. They hold information about the impulsive purchases that have been made by the subscribers.

3.4 Feedback commands routing

The routing of a *feedback* command means any time the call collector (i.e. the CAS module handling STB calls) has something to report to the SMS, to which SMS this information should be sent.

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 pairing process (command 52). When the call collector prepares a *feedback* command, the *SMS_id* is set using that *source_id*.

Any time a SMS opens a connection on a *feedback* channel, it 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. Refer to the document *i Implementation Guidei* for details.

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.

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 a 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 inactivity it is recommended to send periodically a command 1002 on both ports (EMM/Control and feedback) to the CAS in order to check the state of the line. 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 a ping occurs every 5 minutes on both ports.

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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 acknowledgment back to the CAS. The acknowledgment messages are, of course, reported on the same communication channel by which the corresponding commands have been sent.

NOTICE

The system will not behave as expected if the:

- Transaction_id
- Source_id
- Dest_id

are not handled as they should!

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 <i>EMM&control</i> port and <i>feedback</i> ports may accept up to 10 connections each.
SMS commands	The CAS can process up to 10 to 20 SMS <i>EMM&control</i> commands per second.
Feedback commands	The CAS can generate and send up to 500 <i>feedback</i> 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 Format

A message exchanged between the SMS and the CAS (EMM/Control, Feedback or Acknowledgement message) consists of the length (on two bytes) of the user data followed by the user data (as specified by the Device IO protocol). The user data itself is composed of displayable ASCII characters (from ASCII code 32 to 127). It is composed of a root header, of which the format is common to all messages exchanged. According to the kind of the message, the root header may be followed by an address header, which itself may be followed by the command body. Expressed in EBNF, the messages exchanged between the SMS and the CAS have the following general syntax:

```

SMS-CASMessage ::= (UserDataLen UserData
UserDataLen ::= MSB LSB
MSB ::= byte (range 0..127)
LSB ::= byte (range 0..255)
UserData ::= RootHeader [AddressHeader] CommandBody
RootHeader ::= FieldSet
AddressHeader ::= FieldSet
CommandBody ::= FieldSet
FieldSet ::= FieldValue {FieldValue}
FieldValue ::= displayableChar {displayableChar}
displayableChar ::= ASCII'32 | ASCII'33 ... ASCII'127

```

Keys:

[] Specify that the enclosed expression is optional

{ } Specify the enclosed expression may appear one or several times.

| Specify a choice (left or right expression)

Two elements separated by a space indicates that both element must be present and in the given sequence.

::= indicates that the left member is composed of the elements given in the right member.

An example of command 52 is given on page 70.

4.5 Fields format

All fields are in ASCII format (from ASCII code 32 to ASCII code 127).

Numeric types are decimal, 0 filled and right justified. For example, the value 3 for a LENGTH field will be coded as i003i

Alpha/Num are left aligned, blank padded and capitalized. For example, the value NASPv1.0 for an ICC_version field will be coded "NASPV1.0 " (with two spaces at the end).

4.6 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

4.7 Headers

4.7.1 Root header

Field	Size	Format	Description
transaction_number	9	000000000 to 999999999	Number used to uniquely identify a transaction across the interface for each source.
command_type	2	00 to 99	01: EMM 02: CONTROL 04: FEEDBACK 05: OPERATION.
source_ID	4	0000 to 9999	A number that identifies a source such as the SMS or IMS (this number is provided by Nagravision)
Dest_ID	4	0000 to 9999	Identifier of the addressed SMS. This number is defined at system configuration.
MOP_PPID	5	00000 to 99999	Identifier of the technical management operator. This number is provided at system configuration by: Nagravision.
creation_date	8	YYYYMMDD	Creation date of the command (UTC).

4.7.2 Address header ñ EMM cmd

Field	Size	Format	Description
broadcast_mode	1	i Ni or i Bi	Normal: Standard broadcasting mode. 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 1.
broadcast_end_date	8	YYYYMMDD	Broadcast end date (UTC). The command must be sent to the ICC until this date. See note 1.
address_type	1	i Ui or i Gi	EMM addressing mode for EMM commands Unique (U) - An ICC is addressed by its unique address (UA). Global (G) - All ICCs 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 previous field (i address_typei) contains i Gi, then this field is void.

Note 1: 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 i todayi. Nagravision recommends to setup the CAS system in mode B.

4.7.3 Address header ñ Control cmd

Field	Size	Format	Description
broadcast_mode	1	i Nî or i Bî	Normal: Standard broadcasting mode. 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	i Uî	EMM addressing mode for EMM commands Unique (U) - An ICC is addressed by its unique address (UA).
UA	10	Num	UA is the Unique Address of the card for which the command is intended.

4.7.4 Address header ñ Feedback cmd

Field	Size	Format	Description
UA	10	Num	UA is the Unique Address of the card for which the command is intended.

4.7.5 Address header ñ Operation cmd

There is no header for this command type.

4.8 EMM commands (0nn)

Note

In this section two tables are shown for each command.

1. Structure is given, as the command has to be sent by the SMS.
2. Different kind of errors detected by the CAS on reception of a command sent by the SMS.

4.8.1 Command 2: Add Product

Used to add a new product (service product, non-impulsively purchasable event product and package product) to an ICC.

This command shall not be used to renew an existing product or to send an impulsively purchasable event product to a subscriber. Command 3 is used to renew an existing product and Command 10 to send an impulsively purchasable event product (which will then appear in the purchase list). However, if the product already exists, this command will have the same effect as a Product renewal command.

Note

Command 2 shall not be used to authorize a PPV in case there is no return path.

COMMAND 2: ADD PRODUCT			
Field	byte	Format	Description
command_ID	4	0002	command_ID = 2
IMS_product_ID	12	000000000000 to 999999999999	IMS product ID
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 sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
IMS_product_ID	BAD_COMMAND_SYNTAX PRODUCT_NOT_FOUND	BAD_IMS_PRODUCT_ID_FORMAT NO_EXTENDED_ERROR_CODE
begin_date	BAD_COMMAND_SYNTAX BAD_COMMAND_SYNTAX	BAD_DATE_FORMAT BAD_DATE_SEQUENCE
end_date	BAD_COMMAND_SYNTAX BAD_COMMAND_SYNTAX	BAD_DATE_FORMAT BAD_DATE_SEQUENCE

4.8.2 Command 3: Product Renewal (Obsolete)

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

4.8.3 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	0004	command_ID = 4
IMS_product_ID	12	000000000000 to 999999999999	IMS Product ID

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
IMS_product_ID	BAD_COMMAND_SYNTAX PRODUCT_NOT_FOUND	BAD_IMS_PRODUCT_ID_FORMAT NO_EXTENDED_ERROR_CODE

4.8.4 Command 5: Product Reactivation

Grants access to all the subscriptions included in the product that has 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	0005	command_ID = 5
IMS_product_ID	12	000000000000 to 999999999999	IMS Product ID

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
IMS_product_ID	BAD_COMMAND_SYNTAX PRODUCT_NOT_FOUND	BAD_IMS_PRODUCT_ID_FORMAT NO_EXTENDED_ERROR_CODE

4.8.5 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 canceled 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	0006	command_ID = 6
IMS_product_ID	12	000000000000 to 999999999999	IMS Product ID

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
IMS_product_ID	BAD_COMMAND_SYNTAX PRODUCT_NOT_FOUND	BAD_IMS_PRODUCT_ID_FORMAT NO_EXTENDED_ERROR_CODE

4.8.6 Command 7: All products cancellation

Allows the SMS to remove all products stored on the ICC.

This command will remove non-watched IPPVs; however, it does not affect non-call collected IPPVs that have been watched (this also applies to events in progress). Such IPPVs will be normally collected when the next callback occurs.

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

COMMAND 7: ALL PRODUCTS CANCELLATION			
Field	byte	format	Description
command_ID	4	0007	command_ID = 7

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID

4.8.7 Command 8: Credit management

This command is used to manage an existing credit reserved for impulse-pay-per-view on the ICC.

The initial credit is set once through the *command 13: Create credit for impulse purchase*. Command 8 may be used to update immediately (just after command 13) the credit limit of a subscriber's ICC.

Important

The credit information of a smartcard can be changed only once per day (UTC day). If a second change is attempted to the smartcard the same day, it will be rejected. However, such a command may be broadcast for more than a day; the ICC will accept it the day after.

N.B.: The credit update during a callback is considered as a *credit management*, therefore, it must also be taken into account.

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	0008	command_ID = 8
credit_mode	2	03 = SET CREDIT 04 = SET BALANCE 05 = SUB OFFSET	Set the new credit value. Set the debit to 0 and the credit to the new value. Subtract the debit and credit by the same amount. This is used to avoid counters overflow on the ICC.
credit	7	0000000 to 6553599	Credit amount (in the local currency) representing the Range: 0.00 to 65535.99

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
credit_mode	BAD_COMMAND_SYNTAX	BAD_CREDIT_MODE
credit	BAD_COMMAND_SYNTAX	BAD_CREDIT_FORMAT

4.8.8 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.

This command can be applied more than once per day (contrary to command 8).

COMMAND 9: UPDATE CREDIT THRESHOLD			
Field	byte	format	Description
command_ID	4	0009	command_ID = 9
threshold credit	7	0000000 to 6553599	Lower limit under which the ICC must do a low credit call back representing the range 0.00 to 65535.99

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
threshold credit	BAD_COMMAND_SYNTAX	BAD_THRESHOLD_CREDIT_FORMAT
	BAD_COMMAND_SYNTAX	CREDIT_THRESHOLD_TOO_HIGH

4.8.9 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.

Note The event product is pre-flagged as i call collected.

COMMAND 10: ADD EVENT PRODUCT			
Field	byte	format	Description
command_ID	4	0010	command_ID = 10
IMS_product_ID	12	000000000000 to 999999999999	IMS Product ID
length_event_name	2	Up to 17 characters	Length of event_name
event_name	32	Alpha/Num	Event name as displayed in the PPV purchase history.
price	5	00000 to 99999	Price of the product, representing 0.00 to 999.99

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
IMS_product_ID	BAD_COMMAND_SYNTAX PRODUCT_NOT_FOUND PPV_IN_THE_PAST	BAD_IMS_PRODUCT_ID_FORMAT NO_EXTENDED_ERROR_CODE NO_EXTENDED_ERROR_CODE
length_event_name	BAD_COMMAND_SYNTAX BAD_COMMAND_SYNTAX	LENGTH_TOO_LONG BAD_NUMBER_FORMAT
price	BAD_COMMAND_SYNTAX	BAD_PRICE_FORMAT

4.8.10 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

N.B.: Commands 8 and 9 can be executed the same day.

COMMAND 13: CREATE CREDIT FOR IMPULSE PURCHASE			
Field	byte	format	Description
command_ID	4	0013	command_ID = 13
credit	7	0000100 to 6553599	Credit amount (in the local currency). Representing 1.00 to 65535.99.
threshold_credit	7	00000000 6553599	Lower limit under which the ICC must initiate a low credit call back. It represents 0.00 to 65535.99. N.B.: The ICC will truncate this value, i.e. it will only consider the integer part.

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
credit	BAD_COMMAND_SYNTAX	BAD_CREDIT_FORMAT
threshold_credit	BAD_COMMAND_SYNTAX BAD_COMMAND_SYNTAX	BAD_THRESHOLD_CREDIT_FORMAT CREDIT_THRESHOLD_TOO_HIGH

4.8.11 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	0014	command_ID = 14

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID

4.8.12 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	0015	command_ID = 15

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID

4.8.13 Command 20: Suspend subscriber ICC

Suspends all subscriptions on the ICC and the impulse purchase capability, but i 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	0020	command_ID = 20

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID

4.8.14 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	0021	command_ID = 21

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID

4.8.15 Command 22: Reserved

This command is reserved for Nagravision usage.

4.8.16 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.

COMMAND 48: SET ZIP CODE			
Field	byte	format	Description
command_ID	4	0048	command_ID = 48
zip_code	5	000000 99999	subscriber's zip code ¹

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
zip_code	BAD_COMMAND_SYNTAX	BAD_ZIP_CODE_FORMAT

4.8.17 Command 49: Set Callback phone number (End of life notice)

Sets or updates the parameter 'phone-number' of 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:

¹ This is the US zip code format; the UK 10 alpha/num format is as well supported. This is configured at the system setup.

- If it is a phone number, 18005551212 (with 5 trailing spaces) means 1-800-555-1212.
- If it is a MAC address in decimal, 281474976710655 (with 1 trailing space) represents the MAC address FFFFFFFF.

To set an IP address in the ICC, the SMS must send a command 54 (Set Callback IP address).

Warning: this command should be replaced by command 55 in any new SMS development or any new SMS software modification.

COMMAND 49: SET CALLBACK PHONE NUMBER			
Field	byte	format	Description
command_ID	4	0049	command_ID = 49
cc_number_1	16	Alpha/Num	Call Collector phone number. This field must be padded with trailing ASCII space characters for numbers not requiring 16 digits. Example: 18005551212 (with 6 trailing spaces) represents 1-800-555-1212

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
cc_number_1	BAD_COMMAND_SYNTAX	BAD_PHONE_NUMBER_FORMAT

4.8.18 Command 50: Cancel ICC

An ICC cancellation is performed when a card is removed from operation (stolen, lost, or presumed failed for example).

Because the ICC is *not recoverable* after such operation, the SMS is not allowed to reuse the ICC. In addition the ICC is flagged as canceled and deactivated in the SAS database.

COMMAND 50: CANCEL ICC			
Field	byte	format	Description
command_ID	4	0050	command_ID = 50

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID

4.8.19 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.

COMMAND 51: INITIALIZE CARD			
Field	byte	format	Description
command_ID	4	0051	command ID = 51

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID

4.8.20 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 pairing key process is limited to a 4 bytes value, which is converted in decimal, the STU number will be then a 10 digits string followed by four (4) space characters.

The un-pairing is performed with the same command 52, but with STU_number 0 (i 0000000000 i)

COMMAND 52: PAIR THE ICC WITH THE STB			
Field	byte	format	Description
command_ID	4	0052	command_ID = 52
STU_number	14	Num	<p>Nagravision STB serial number in decimal: The data structure must 10 digits and 4 trailing spaces. The range is as follow:</p> <p>Ex: "00000000000 " "</p> <p>Ex: "4294967296 " "</p> <p>The STB serial number provided by the SMS must not include any checksum.</p>

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
STU_number	BAD_COMMAND_SYNTAX	BAD_STU_NUMBER_FORMAT

4.8.21 Command 53: Clear PIN code (Obsolete)

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

4.8.22 Command 54: Set Callback IP address (End of life notice)

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

Warning: this command should be replaced by command 55 in any new SMS development or any new SMS software modification.

COMMAND 54: SET CALLBACK IP ADDRESS			
Field	byte	format	Description
command_ID	4	0054	command_ID = 54
cc_ip_address	15	Alpha/Num	Call Collector IP address. Field format is 000.000.000.000 to 255.255.255.255. The length is fixed to 15 bytes and the sub-addresses are filled with leading 0 characters. As an example the IP address 1.112.25.2 must be formatted as 001.112.025.002
cc_ip_port	5	Num	Call Collector TCP/IP port.

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
cc_ip_address	BAD_COMMAND_SYNTAX	BAD_IP_ADDRESS_FORMAT
cc_ip_port	BAD_COMMAND_SYNTAX	BAD_CC_PORT_FORMAT

4.8.23 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	0055	command_ID = 55
phone_field	1	Num	Smartcard Phone field selector (for future use) Must be set to 1 for the moment.
cc_number_1	16	Alpha/Num	Call Collector phone number. This field must be padded with trailing ASCII space characters for numbers not requiring 16 digits. Example: 18005551212 (with 6 trailing spaces) represents 1-800-555-1212
cc_ip_address	15	Alpha/Num	Call Collector IP address. Field format is 000.000.000.000 to 255.255.255.255. The length is fixed to 15 bytes and the sub-addresses are filled with leading 0 characters. As an example the IP address 1.112.25.2 must be formatted as 001.112.025.002
cc_ip_port	5	Num	Call Collector TCP/IP port. As an example port 1458 must be formatted as 01458
callback_type	1	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 sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
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

4.8.24 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 expect 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 (ex: the line is busy), the STB retry in a period in the range of a couple of minutes to several hours.

COMMAND 60: IMMEDIATE CALL BACK			
Field	byte	format	Description
command_ID	4	0060	command_ID = 60
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 sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID

4.8.25 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 a ICC/STB performs a call back.

COMMAND 61: ENABLE AUTOMATIC CALL BACK			
Field	byte	format	Description
command_ID	4	0061	command_ID = 61
call_freq	2	01 02 03 04 05 1m	annual semi-annual quarterly monthly semimonthly every m days (1 should be considered as a flag)
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.

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
call_freq	BAD_COMMAND_SYNTAX	BAD_FREQUENCY_FORMAT
date first call	BAD_COMMAND_SYNTAX	BAD_DATE_FORMAT

4.8.26 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	0062	command_ID = 62

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID

4.8.27 Command 63: Reserved

This command is reserved for Nagravision.

4.8.28 Command 64: Update event right

This command updates the End_date for event products and event package products in the ICCs.

It is generated automatically by the IMS when an event schedule change is detected for an event product or for an event belonging in an event package product.

COMMAND 64: UPDATE EVENT RIGHT			
Field	byte	format	Description
command_ID	4	0064	command_ID = 64
IMS_product_ID	12	000000000000 to 999999999999	IMS Product ID that covers the data stream.
end_date	8	YYYYMMDD	The new end date (UTC) of the event product.

IMS Acknowledge

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
IMS_product_ID	PRODUCT_NOT_FOUND	NO_EXTENDED_ERROR_CODE
End_date	BAD_COMMAND_SYNTAX	BAD_DATE_FORMAT

4.8.29 Command 65 to 68: Reserved

Commands 65 to 68 are reserved for Nagravision.

4.8.30 Command 69: Send Generic IRD Command

This command allows SMS to send any command to the STB.

The CA system provides with this command a secure transport mechanism between the head-end and the STB.

The data received by the STB consists of the following data structure. The SMS Gateway calculates the field's `sequence_number` and `checksum` for the convenience of SMS.

```

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
}

```

Command definitions are STB's responsibility.

COMMAND 69: SEND GENERIC IRD COMMAND			
Field	byte	format	Description
command_ID	4	0069	command_ID = 69
IRD_command_id	3	Num	command_id field of IRD command_body (0..255)
IRD_operation	3	Num	operation field of IRD command_body (0..255)
IRD_data_length	2	Num	length in bytes of useful part of IRD_data field (0..48)
IRD_data	96	Alpha/Num	data field 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.

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
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

4.8.31 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	0071	command_ID = 71

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID

4.8.32 Command 72: Set Products

This command allows modifying the list of products on the subscriber smart card.

This command operates in conjunction with the known data in Positive Addressing to send only the minimum required EMMs.

The following is a summary of the command algorithm. The update of the known state is never mentioned, but of course occurs as necessary.

1. Check the command syntax and semantics¹.
If bad, send NACK and stop
2. Remove duplicate entries in the command product list.
If two entries have the same product-id but another field is different, send NACK and stop
3. Check that all the IMS-product-ids in the command product list exist and are of the correct type
If not, send NACK and stop
4. If the force-EMM flag is set, send commands unconditionally according to the command content.
5. If the command suspend-ICC flag is set and different from the known state, produce the equivalent of command 20: Suspend subscriber ICC
6. If the command suspend-ICC flag is not set and different from the known state, produce the equivalent of command 21: Reactivate subscriber ICC
7. If the nb-of-products field is 0 and the type_of_products field is B (empty command list), produce an equivalent of command 7: All products cancellation
8. For all subscription products in the command that are known to Positive Addressing, all fields taken into account:
Refresh the subscription on the card if the validity dates are different.
9. For all products in the command that are not known to Positive Addressing, taking the type into account:
Produce an equivalent of command 2: Add Product
10. For all products known to Positive Addressing that are not in the command, taking the type into account:
Produce an equivalent of command 6: Product Cancellation
11. For all products known to Positive Addressing that are in the command, taking the type into account:

¹ Explicitly, this means subscription_begin_date and subscription_end_date must be valid dates, that subscription_end_date is in the future and that subscription_begin_date < subscription_end_date.

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If the suspend-product flag is different, produce the equivalents of commands 4: Product Suspension and/or 5: Product Reactivation as necessary.

Important

If for some reason, the command is NACKed by the SMS Gateway, it needs to be sent again with the force-EMM flag set.

COMMAND 72: SET PRODUCTS			
Field	byte	format	Description
command_ID	4	0072	command_ID = 72
force_emm	1	Y..N	If set to Y, EMMs are sent unconditionally
suspend_ICC	1	Y..N	ICC Suspension status
type_of_products	1	S, E or B	Types of products defined in this command: S: Service products E: Event products B: Both event and service products
begin_date	8	YYYYMMDD	Subscriptions begin date (UTC). Subscriptions are not valid before this date. For event products, this date is ignored.
end_date	8	YYYYMMDD	Subscriptions end date (UTC). Subscriptions are not valid after this date. For event products, this date is ignored.
nb_of_products	2	00..99	Number of products defined in this command
for(i=0;i<nb_of_products;i++) {	3	Num	Counter
IMS_product_ID	12	000000000000 to 999999999999	IMS product ID Products must be of the type specified above The same product may occur multiple times
suspend_product	1	Y..N	Product suspension status
}			

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Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
suspend_ICC	BAD_COMMAND_SYNTAX	BAD_FLAG_VALUE
type_of_products	BAD_COMMAND_SYNTAX	BAD_FLAG_VALUE
nb_of_products	BAD_COMMAND_SYNTAX	BAD_NUMBER_FORMAT
IMS_product_ID	BAD_COMMAND_SYNTAX PRODUCT_NOT_FOUND PRODUCT_ALREADY_EXISTS PRODUCT_INCONSISTENT	BAD_IMS_PRODUCT_ID_FORMAT NO_EXTENDED_ERROR_CODE DIFFERENT_PRODUCTS NO_EXTENDED_ERROR_CODE
suspend_product	BAD_COMMAND_SYNTAX	BAD_FLAG_VALUE
begin_date	BAD_COMMAND_SYNTAX BAD_COMMAND_SYNTAX	BAD_DATE_FORMAT BAD_DATE_SEQUENCE
end_date	BAD_COMMAND_SYNTAX BAD_COMMAND_SYNTAX	BAD_DATE_FORMAT BAD_DATE_SEQUENCE
	CANCELED_CARD	NO_EXTENDED_ERROR_CODE

4.8.33 Command 73: Add ALC product (Future use)

This command is reserved for future use.

4.8.34 Command 74: Modify ALC product (Future use)

This command is reserved for future use.

4.8.35 Command 75: Renew ALC product (Future use)

This command is reserved for future use.

4.8.36 Command 76: ALC product suspension (Future use)

This command is reserved for future use.

4.8.37 Command 77: ALC product Reactivation (Future use)

This command is reserved for future use.

4.8.38 Command 78: ALC product Cancellation (Future use)

This command is reserved for future use.

4.8.39 Command 79: Force Tune (Obsolete)

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

4.8.40 Command 80: Send message (Obsolete)

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

4.8.41 Command 90: Create BTV mop (Nagra Private)

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

4.8.42 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.

4.8.43 Command 93: Enable Automatic Call Back (Nagra Private)

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

4.8.44 Command 96: Purge PPV and IPPV Records

This command allows an operator of the SMS to purge some PPV and IPPV records in individual smart cards. There are two typical examples that illustrate how to use this command:

Example 1: to purge old PPV and IPPV records when a subscriber's smartcard is full. In this scenario, the SMS operator will send this command when a subscriber complains that he/she can not purchase any

new IPPV because the STB indicates that the ICC memory is full.

Example 2: to avoid the smartcard to be filled up with useless PPV and IPPV records. This can be seen as an preventive cleanup task. In this scenario, any time a subscriber asks for additional credit (prepaid mode), the SMS application should issue this command 96.

The SMS provides the two following parameters:

- *cleanup_date* is the date by which the PPV or IPPV will be purged. In other words, any PPV or IPPV older or equal to this date will be deleted.
- *condition_date* is used to distinguish between smartcards that are in STB with a return path, and STB without a return path.
 - a) ICC/STB with return path: the *condition_date* = 19920101
 - b) ICC/STB without return path: 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	0096	command_ID = 96
cleanup_date	8	YYYYMMDD	Delete any PPV-IPPV record stored in a smartcard if the PPV-IPPV expiration date is older than or equal to the parameter i cleanup_date.
condition_date	8	YYYYMMDD	- return path exists, date = 19920101 - return path does not exist, date = cleanup_date

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
cleanup_date	BAD_COMMAND_SYNTAX	BAD_DATE_FORMAT
condition_date	BAD_COMMAND_SYNTAX	BAD_DATE_FORMAT

4.8.45 Command 97: Set IPPV Records as Reported

This command allows the SMS to set any 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. This objective is the same; to avoid the smartcard to be filled up with useless IPPV records. This can be seen as a preventive cleanup task. What differs 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 ICCs.

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

COMMAND 97: SET IPPV RECORDS AS REPORTED			
Field	byte	format	Description
command_ID	4	0097	command_ID = 97
collect_date	8	YYYYMMDD	Set any IPPV record stored in a smartcard as reported (flag <code>i-call-collected</code> = 1) if the IPPV expiration date is older than or equal to the parameter <code>i-collect_date</code>

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
collect_date	BAD_COMMAND_SYNTAX	BAD_DATE_FORMAT

4.9 CONTROL commands (1nn)

4.9.1 Command 100: Redefine Credit Limit

Tells the Call Collector which credit limit for impulse purchase will be associated to an ICC.

The Call Collector will restore the ICC credit to the sum of this value and the current debit at each billing date. The new credit limit will be communicated to the ICC during the next callback from the STB. If an immediate update on the ICC is required, the SMS shall send a command 100 followed by command 8.

COMMAND 100: REDEFINE CREDIT LIMIT			
Field	byte	format	Description
command_ID	4	0100	command_ID = 100
credit_limit	7	0000000 Ö 6553599	the credit limit representing the range 0.00 to 65535.99

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
credit_limit	BAD_COMMAND_SYNTAX	BAD_CREDIT_FORMAT

4.9.2 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	0101	command_ID = 101
phone_number_1	16	Num + trailing spaces	Primary phone number. This field must be padded with trailing ASCII space characters for numbers not requiring 16 digits.
phone_number_2	16	Num + trailing spaces	Alternate phone number. This field must be padded with trailing ASCII space characters for numbers not requiring 16 digits.
phone_number_3	16	Num + trailing spaces	Alternate phone number. This field must be padded with trailing ASCII space characters for numbers not requiring 16 digits.

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
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

4.9.3 Command 104: Create ICC On Call Collector

Creates a new ICC record in the CC database.

The correctly paired STB serial number must be provided for proper operation.

COMMAND 104: CREATE ICC ON CALL COLLECTOR			
Field	Byte	format	Description
command_ID	4	0104	command_ID = 104
STU_number	14	Num	Nagravision STB serial number in decimal: 10 digits, with 4 trailing spaces. Ex: "1234567890 "

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
STU_number	BAD_COMMAND_SYNTAX STU_ALREADY_EXISTS	BAD_STU_NUMBER_FORMAT NO_EXTENDED_ERROR_CODE

4.9.4 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.

COMMAND 105: CANCEL ICC ON CALL COLLECTOR			
Field	byte	format	Description
command_ID	4	0105	command_ID = 105

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID

4.9.5 Command 110: EMM cleanup

Erases all EMMs in the SAS and EMM broadcaster for one ICC.

This command can be used if a discrepancy is suspected between SMS customer data and EMMs for this customer.

COMMAND 110: EMM CLEANUP			
Field	byte	format	Description
command_ID	4	0110	command_ID = 110

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Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID

4.9.6 Command 111: Get History From Call Collector

Allows the SMS to retrieve a two-month history of IPPV information stored in the Call Collector.

Each PPV record will generate a separate *Command 202: PPV Purchase List* command from the SMS.

COMMAND 111: GET HISTORY FROM CALL COLLECTOR			
Field	byte	format	Description
command_ID	4	0111	command_ID = 111

List of error codes sent by the CAS (NACK messages).

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID

4.10 FEEDBACK commands (2nn)

The commands described in this section are commands sent by the Nagravision CAS system to the SMS. The i feedbacki commands are used to provide to the SMS information and data related to the IPPV functionality available for a customer. For instance, the i feedbacki 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 with its remote control a movie.

Depending on the CAS configuration up to six separate feedback commands will be generated and sent to the SMS:

Command 211: Start of report

Command 201: Current credit and debit

Command 202: PPV purchase list

Command 205: Calling phone discrepancies (if ANI is enabled)

Command 206: STU Responding Status (responding = Y)

Command 211: Start of report

Command 212: End of report

In the event the STB does not phone back within the designated time defined by the call collector the following FEEDBACK command will be generated:

Command 206: STU Responding Status (responding = N)

4.10.1 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	0200	command_ID = 200
STU_number	14	Num	Nagravision STB serial number
credit	7	0000000 Ö 6553599	Credit amount representing 0.00 to 65535.99
debit	7	0000000 Ö 6553599	Debit amount representing 0.00 to 65535.99

Errors must be reported by the SMS using the following table:

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

4.10.2 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	0201	command_ID = 201
STU_number	14	Num	Nagravision/STB serial number
credit	7	0000000 Ö 6553599	Credit amount representing 0.00 to 65535.99
debit	7	0000000 Ö 6553599	Debit amount representing 0.00 to 65535.99

Errors must be reported by the SMS using the following table:

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

4.10.3 Command 202: PPV Purchase List

Sends a single IPPV record to allow detailed billing.

COMMAND 202: PPV PURCHASE LIST			
Field	byte	format	Description
command_ID	4	0202	command_ID = 202
STU_number	14	Num	Nagravision STB serial number
IMS_product_ID	12	000000000000 Ö 999999999999	IMS_product_ID of the event product purchased impulsively through the EPG
purchase_date	8	YYYYMMDD	date of IPPV purchase (UTC)
watched_status	1	Y or N	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.

Errors must be reported by the SMS using the following table:

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
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

4.10.4 Command 205: Phone Discrepancies

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	0205	command_ID = 205
STU_number	14	Num	Nagravision STB serial number
phone_number_1	16	Alpha/Num	first phone number stored in the CC
phone_number_2	16	Alpha/Num	second phone number stored in the CC
phone_number_3	16	Alpha/Num	third phone number stored in the CC
abnormal_phone	16	Alpha/Num + trailing spaces	number used by STB to call CC

Errors must be reported by the SMS using the following table:

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
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

4.10.5 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	0206	command_ID = 206
STU_number	14	Num	Nagravision STB serial number
responding	1	Y Ö N	A STB may be responding (Y) or not (N).

Errors must be reported by the SMS using the following table:

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
STU_number	BAD_COMMAND_SYNTAX	BAD_STU_NUMBER_FORMAT
responding	BAD_COMAMND_SYNTAX	BAD_FLAG_FORMAT

4.10.6 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	0207	command_ID = 207
STU_number	14	Num	Nagravision STB serial number

Errors must be reported by the SMS using the following table:

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
STU_number	BAD_COMMAND_SYNTAX	BAD_STU_NUMBER_FORMAT

4.10.7 Command 211: Start of Report

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

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

COMMAND 211: START OF REPORT			
Field	byte	format	Description
command_ID	4	0211	command_ID = 211
STU_callback_date	8	YYYYMMDD	date (UTC) of the callback being reported
STU_callback_time	6	000000 .. 235959	Time (UTC) of the callback being reported

Errors must be reported by the SMS using the following table:

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
STU_callback_date	BAD_COMMAND_SYNTAX	BAD_DATE_FORMAT
STU_callback_time	BAD_COMMAND_SYNTAX	BAD_TIME_FORMAT

4.10.8 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	0212	command_ID = 212
number_of_IPPV	2	00 .. 99	The number of IPPV reports (occurrences of command 202) that should have been sent in this report.

Errors must be reported by the SMS using the following table:

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
number_of_IPPV	BAD_COMMAND_SYNTAX	BAD_NUMBER_OF_IPPV_FORMAT

4.10.9 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	0215	command_ID = 215
original_transaction_number	9	Num	Transaction number of the command 71 that triggered the generation of this command
STU_number	14	Num	Nagravision STB serial number
ICC_suspended	1	Y..N	ICC suspend state
nb_of_products	2	00..99	Number of products returned in this command
for(i=0;i<nb_of_products;i++) {	3	Num	Counter
IMS_product_ID	12	000000000000 to 999999999999	IMS product ID
product_suspended	1	Y..N	Product suspend state
}			

Errors must be reported by the SMS using the following table:

Field	Error codes	Error codes extension
command_ID	BAD_COMMAND_SYNTAX	BAD_COMMAND_ID
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

4.11 OPERATION commands (10nn)

4.11.1 Command 1000: Acknowledge Command

The command specified has been completed without error.

If the command being acknowledged with the command 1000 contained a SMS_product_ID, the fields IMS_product_ID and SMS_product_ID of the acknowledgment command will be documented. In all other cases, these fields will be set respectively to 000000000000 and 000000000000.

COMMAND 1000: ACKNOWLEDGE COMMAND			
Field	byte	format	Description
command_ID	4	1000	command_ID = 1000
transaction_number	9	000000000 to 999999999	transaction number acknowledged
IMS_product_ID (if applicable)	12	000000000000 to 999999999999	IMS product ID
SMS_product_ID (if applicable)	12	000000000000 to 999999999999	SMS product ID

4.11.2 Command 1001: Non-acknowledge Command

The command specified could not be completed.

COMMAND 1001: NON-ACKNOWLEDGE COMMAND			
Field	byte	format	Description
command_ID	4	1001	command ID = 1001
transaction_number	9	000000000 Ö 999999999	transaction_number acknowledged
nack_status	1	1 Ö 2	1 = REJECTED means that the command has been rejected. 2 = POSTPONED means that the command could not be completed because of a technical problem in the addressable system (SMS, SAS, CC or IMS database). In this case, the command should be resubmitted after a time delay.
error_code	4	0000 Ö 9999	Main error code (PRODUCT NOT FOUND, BAD_COMMAND_SYNTAX,...)
error_code_ext	4	0000 Ö 9999	Extension error code BAD_DATE_FORMAT, BAD_IMS_PRODUCT_ID_FORMAT, ...)
length_of_command_body	3	000 Ö 999	
command_section			command section of the command that caused the error.

4.11.3 Command 1002: No Command

This command will be transmitted when no other commands are sent. It should be sent on the feedback port when a connection is established to indicate which source ID this connection is using.

It allows both systems SMS and SMS Gateway to check anytime the communication layer.

COMMAND 1002: NO COMMAND			
Field	byte	format	Description
command_ID	4	1002	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. Where the code indicates an error category and the extension giving more precise detail concerning the error source (e.g., an incorrectly specified field or value exceeded etc.).

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.

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5.1 Error codes

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.
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.

Table 5-1 Error codes

5.2 Error code extensions

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_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.
BAD_COMMAND_TYPE	0024	This type of SMS command does not exist.

NAME	CODE	DESCRIPTION
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.
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_TYPE	0063	The format of the callback type is incorrect

Table 5-2 Error code extensions

5.3 Command root header error codes and extensions

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 Command header error codes and extensions

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

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6. Examples

6.1 DeviceIO connection establishment

The following example is a network capture of one whole DeviceIO 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: %00000000
    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

```

SMS Gateway Interface - Specification

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```

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:  1524200407
Ack Number:       55595
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

```

SMS Gateway Interface - Specification

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```

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): 0xB8648A1

```

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

SMS Gateway Interface - Specification

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```

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

```


SMS Gateway Interface - Specification

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```
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
```

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6.2 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@...0.....
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...N000000000
0064: 32 30 31 30 30 30 31 30 30 30 32 30 30 32 35 37  2010001000200257
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  920011009U0000000
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:Us: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: 000
    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 ff-las
  Destination Port: 20000 smg_guluvuy
  Sequence Number: 55672
  Ack Number: 1524200484
  Offset: 5 (20 bytes)
  Reserved: 00000000
  Code: 0110000 Ack Push
  Window: 8683
  Checksum: 0x7B6B
  Urgent Pointer: 0
  No TCP Options

SMSgateway spec. 2.6.2 - decoder v.0.8
  DeviceID: message 5, # 1
  Len: 78
  SMS command root header
    transaction_number: 000000002
    command_type: 01 MM
    source_id: 0001
    dest_id: 0002
    MOP_PPID: 00257
    creation_date: 20011009
  MM
    broadcast_mode: N
    broadcast_start_date: 20011009
    broadcast_end_date: 20011009
    address_type: U
    VA: 0000000001
  Pair the ICC with the STB:
    command_ID: 0052
    STW_number: 1234567890
  FCS - Frame Check Sequence
    FCS (Calculated): 0x7C887CFC

```

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