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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS  
Infrastructure of audiovisual services – Communication  
procedures

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**Gateway control protocol: Basic CAS packages**

ITU-T Recommendation H.248.25

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ITU-T H-SERIES RECOMMENDATIONS  
AUDIOVISUAL AND MULTIMEDIA SYSTEMS

CHARACTERISTICS OF VISUAL TELEPHONE SYSTEMS	H.100–H.199
INFRASTRUCTURE OF AUDIOVISUAL SERVICES	
General	H.200–H.219
Transmission multiplexing and synchronization	H.220–H.229
Systems aspects	H.230–H.239
<b>Communication procedures</b>	<b>H.240–H.259</b>
Coding of moving video	H.260–H.279
Related systems aspects	H.280–H.299
SYSTEMS AND TERMINAL EQUIPMENT FOR AUDIOVISUAL SERVICES	H.300–H.399
SUPPLEMENTARY SERVICES FOR MULTIMEDIA	H.450–H.499
MOBILITY AND COLLABORATION PROCEDURES	
Overview of Mobility and Collaboration, definitions, protocols and procedures	H.500–H.509
Mobility for H-Series multimedia systems and services	H.510–H.519
Mobile multimedia collaboration applications and services	H.520–H.529
Security for mobile multimedia systems and services	H.530–H.539
Security for mobile multimedia collaboration applications and services	H.540–H.549
Mobility interworking procedures	H.550–H.559
Mobile multimedia collaboration inter-working procedures	H.560–H.569
BROADBAND AND TRIPLE-PLAY MULTIMEDIA SERVICES	
Broadband multimedia services over VDSL	H.610–H.619

*For further details, please refer to the list of ITU-T Recommendations.*

## **ITU-T Recommendation H.248.25**

### **Gateway control protocol: Basic CAS packages**

#### **Summary**

This Recommendation defines Basic Channel Associated Signalling (CAS) and R1 packages and supplemental CAS packages that, in association with the H.248 Protocol, can be used to control a Media Gateway (MG) from an external Media Gateway controller (MGC).

#### **Source**

ITU-T Recommendation H.248.25 was approved by ITU-T Study Group 16 (2001-2004) under the ITU-T Recommendation A.8 procedure on 14 July 2003.

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## CONTENTS

	<b>Page</b>
1 Scope .....	1
2 References.....	1
3 Definitions .....	1
4 Abbreviations.....	1
5 Assumptions and partitioning .....	1
6 Basic CAS package.....	2
6.1 Properties.....	2
6.2 Events .....	2
6.3 Signals .....	4
6.4 Statistics.....	5
6.5 Procedures .....	5
7 Basic CAS addressing package .....	6
7.1 Properties.....	6
7.2 Events .....	6
7.3 Signals .....	7
7.4 Statistics.....	8
7.5 Procedures .....	8
8 Robbed bit signalling package.....	8
8.1 Properties.....	9
8.2 Events .....	9
8.3 Signals .....	10
8.4 Statistics.....	11
8.5 Procedures .....	11
9 Operator services and emergency services package.....	11
9.1 Properties.....	11
9.2 Events .....	11
9.3 Signals .....	12
9.4 Statistics.....	12
9.5 Procedures .....	12
10 Operator services extension package.....	12
10.1 Properties.....	12
10.2 Events .....	12
10.3 Signals .....	13
10.4 Statistics.....	14
10.5 Procedures .....	14

	<b>Page</b>
Appendix I – Call Flows .....	15
I.1    Basic single-stage MF or DTMF wink start or immediate start.....	15
I.2    EAOSS termination – Telephone company operator services call .....	16
I.3    EAOSS termination – IC/INC operator services call indirect through an access tandem (Overlap outpulsing).....	17
I.4    EAOSS termination – IC/INC operator services call indirect through an access tandem (No overlap outpulsing).....	18
I.5    EAOSS termination – IC/INC "National" operator direct to the IC/INC (Overlap outpulsing).....	19
I.6    EAOSS termination – IC/INC "National" operator direct to the IC/INC (No overlap outpulsing).....	20
I.7    EAOSS origination – Telephone operating company serves the call.....	21

# ITU-T Recommendation H.248.25

## Gateway control protocol: Basic CAS packages

### 1 Scope

The Basic Channel Associated Signalling (CAS) Package provides a baseline package. Basic CAS defines abstract events and signals that are common to all CAS protocols. For some protocols, Basic CAS provides all of the functionality required to satisfy the line interface, such as North American single-stage dialling applications or R1 signalling. For other protocols, Basic CAS provides a baseline package for which additional protocol specific extension packages can be defined. Further line signals and events required for international signalling protocols can be provided through extension packages.

The Basic CAS Addressing package extends the Basic CAS package to add the signals and events required for basic addressing. This would satisfy addressing functionality for many protocols such as North American single-stage dialling applications or R1 signalling.

The Robbed Bit Signalling (RBS) Package, Operator Services and Emergency Services Package and the Operator Services Extension Package can be used to provide functionality required in addition to the Basic CAS Package.

The support of these packages is optional.

### 2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- ITU-T Recommendation H.248.1 (2002), *Gateway Control Protocol: Version 2*.

### 3 Definitions

None.

### 4 Abbreviations

This Recommendation uses the following abbreviations:

CAS	Channel Associated Signalling
MG	Media Gateway
MGC	Media Gateway Controller
RBS	Robbed Bit Signalling
TS	Time Slot

### 5 Assumptions and partitioning

The termination the MGC addresses is the channel. With TS16, the MG associates the line signal with the appropriate channel.

For some applications, the Basic CAS package provides all of the functionality needed to satisfy the interface. In other cases (e.g. operator services), additional supplementary packages may be needed to meet the complete interface requirements. This Recommendation includes three supplementary packages which may be used to provide additional functionality required by some interfaces:

- The Robbed Bit Signalling package provides basic RBS supervisory signalling that is required in addition to the Basic CAS package.
- The Operator Services and Emergency Services package provides supervisory signalling that is specific to North American Operator Services and Emergency Services.
- The Operator Services Extension package provides supervisory signalling that is specific to North American Operator Services and is required in addition to the Operator Services and Emergency Services package.

## **6 Basic CAS package**

PackageID: bcas (0x003f)

Version: 1

Extends: none

This package provides basic event and signal handling for terminations that support CAS Signalling.

### **6.1 Properties**

None.

### **6.2 Events**

#### **6.2.1 Seizure**

EventID: sz (0x0001)

Description:

The Seizure event shall be reported when an incoming "Seizing" signal occurs on the termination. The event is reported by the MG if either the timed transition to this line signal is detected or the line signal already exists. The line signal condition against which the "Seizing" signal is verified is provisioned in the MG.

EventsDescriptor parameters: None

ObservedEventsDescriptor parameters: None

#### **6.2.2 Seize acknowledge**

EventID: sza (0x0002)

Description:

The Seize Acknowledge event shall be reported when an incoming "Seize Acknowledge" signal occurs on the termination. This event also acts as a start dial notification, indicating that out-pulsing should begin. For R1 interfaces, the event is reported when the "start dialling"/"proceed to send" signal occurs. For wink start trunks, the "Seize Acknowledge" event is reported when the trailing edge of the wink-start signal occurs. For immediate start trunks, the "Seize Acknowledge" event is provided by the media gateway as an immediate response to the request for that event from the MGC.

EventsDescriptor parameters: None

ObservedEventsDescriptor parameters: None

### 6.2.3 Answer

EventID: ans (0x0003)

Description:

The Answer event shall be reported when an incoming line signal "Answer" occurs on the termination. The event is reported by the MG if either the timed transition to this line signal is detected or the line signal already exists. The line signal condition against which the "Answer" signal is verified is provisioned in the MG.

EventsDescriptor parameters: None

ObservedEventsDescriptor parameters: None

### 6.2.4 Idle

EventID: idle (0x0004)

Description:

This event applies to an incoming interface and is reported when a "Clear" or "Idle" line signal occurs on the termination. For an R1 interface, the Idle event shall be reported when an "Idle" line signal occurs on the termination. For robbed bit signalling digital interfaces, it corresponds to an "on-hook" indication on the termination. The event is reported by the MG if either the timed transition to this line signal is detected or the line signal already exists. The condition against which the signal is verified is provisioned in the MG.

EventsDescriptor parameters:

#### *Idle Guard Timing*

ParameterID: idlgt (0x0001)

Type: Boolean

Possible values:

True when the idle guard timing is requested and false when the idle guard timing is turned off.

Description:

Specifies whether the MG shall start a idle guard timer for the receipt of the "idle" signal. If the idle guard timer expires prior to the detection of idle signal and the CAS Failure event is active, the MG shall report a CAS Failure event with a "idlto" error code. The timer value is provisioned on the MG. If the idlgt parameter is not provided, the MG does not perform timing by default.

ObservedEventsDescriptor parameters: None

### 6.2.5 CAS Failure

EventID: casf (0x0005)

Description:

Reports general CAS failures associated with this package.

EventsDescriptor parameters: None

ObservedEventsDescriptor parameters:

*Error Code*

ParameterID: ec (0x0001)  
Type: Enumeration  
Possible values: "ULS" (0x0001) Unexpected line signal  
"LTO" (0x0002) Line signal timeout  
"SME" (0x0004) Protocol State machine malfunction  
"IDLTO" (0x0005) Idle Guard Timeout

Description:

Describes the reasons for failure encountered at MG. The MGC may take corrective actions in context of the call on receiving one of these error codes (clear the call, reattempt on new trunk, etc.). "ULS" is reported when the MG receives a signal request from the MGC which is not expected due to the line signalling state at the MG. "LTO" is reported when a timeout occurs locally on the MG while waiting for a line signal on the CAS trunk. "SME" is reported when the MG encounters a line signal on the CAS trunk other than the one expected for the current state of the trunk. "IDLTO" is reported when the idle guard timer expires on the MG while waiting for the idle line signal on the trunk.

## 6.3 Signals

### 6.3.1 Seize

SignalID: sz (0x0001)

Description:

Applies a "Seizing" signal on the termination. The signal that is actually sent on the physical termination is provisioned in the MG.

Signal Type: Brief

Duration: Not Applicable (See "Signal Procedures").

Additional parameters: None

### 6.3.2 Seize acknowledge

SignalID: sza (0x0002)

Description:

Applies a "Seize Acknowledge" signal on the termination. The signal that is actually sent on the physical termination is provisioned in the MG.

Signal Type: Brief

Duration: Not Applicable (See "Signal Procedures").

Additional parameters: None

### 6.3.3 Answer

SignalID: ans (0x0003)

Description:

Applies an "Answer" signal on the termination. The signal that is actually sent on the physical termination is provisioned in the MG.

Signal Type: Brief

Duration: Not Applicable (See "Signal Procedures").

Additional parameters: None

### 6.3.4 Idle

SignalID: idle (0x0004)

Description:

This signal applies to an outgoing interface and is used to idle a trunk. This signal is used as a clear signal in some variants to clear down a call either in the forward or backward direction. The signal that is actually sent on the physical termination is provisioned in the MG.

Signal Type: Brief

Duration: Not Applicable (See "Signal Procedures").

Additional parameters: None

## 6.4 Statistics

None.

## 6.5 Procedures

### 6.5.1 Glare procedures

MGs shall have a configurable glare information element on a per-DS0 basis that can be set to indicate whether the MG is the controlling or non-controlling "switch".

In the case of PBX interconnect, PBXs are either preconfigured or can be configured to behave as non-controlling switches. In this case, if they see an off-hook that exceeds the allowable wink length, they will attach a receiver, go on-hook, and await digits for a new call. The PBX will in addition, retry its original call on another trunk.

In the case where the DS0 is configured for the non-controlling switch, the MG will indicate a glare occurrence by reporting a seizure event to the MGC. Upon receipt of the seizure event, the MGC begins procedures to release the outgoing call attempt and begins procedures to process the incoming call attempt.

If the MG is a controlling switch, when glare is detected, the MG will wait for a timeout value (default value of 4 seconds) until the incoming off-hook changes to an on-hook state, at which time it will start out-pulsing in the normal manner. If the timeout occurs before the state change to on-hook occurs, the far end has refused to back down. This may occur if both ends of the interface are provisioned as the controlling switch. In this case, when the timeout occurs, the MG reports the seizure event to the MGC. The MGC, upon receipt of the notify with seizure event, begins procedures to back down on the outgoing call attempt and begins procedures to process the incoming call attempt.

It is possible for internal glare to occur between the MGC and the MG. With internal glare, the MG detects a seizure event on the DS0, signals a seize acknowledge and reports the seizure event to

the MGC. At the same time, the MG reports the seizure event to the MGC, the MGC sends a request to the MG to signal a seizure on the DS0. In this case, the start dial has already been signalled by the MG in response to the incoming seizure. Therefore, the MGC must back down on the outgoing call attempt. The MG, upon receipt of the modify request to signal a seizure, recognizes internal glare has occurred and takes no action on the modify request. The MGC, upon receipt of the notify with seizure event, recognizes internal glare has occurred and begins procedures to back down on the outgoing call attempt and begins procedures to process the incoming call attempt.

### 6.5.2 Timestamp procedures

Inclusion of a timestamp in the ObservedEvents descriptor is mandatory for the basic CAS package. The timestamp reflects the detection time for the event and may be used by services (e.g., automatic message accounting) on the MGC.

### 6.5.3 Signal procedures

A line signal must always be present on a CAS interface. Therefore, the Seizure, Answer, Seize Acknowledge and Idle signals shall be considered to be state changes in the line signal state, rather than as persistent signals in themselves. The state change shall be considered to be completed instantaneously by the MG. Consequently, there is no active signal to be terminated by any subsequent event detection.

The MG shall maintain the existing line signal state on a CAS interface until such time as the MGC sends a new line signal to the MG to change state.

## 7 Basic CAS addressing package

PackageID: bcasaddr (0x00??)

Version: 1

Extends: bcas version 1

This package defines events and signals that are specific to Basic CAS Addressing and are required in addition to the base CAS functionality provided by the bcas package.

### 7.1 Properties

None.

### 7.2 Events

#### 7.2.1 Address

EventID: addr (0x0006)

Description:

Reports the collected address parameter and termination method for the digits received by the MG.

EventsDescriptor parameters: None

ObservedEventsDescriptor parameters:

*Digit String*

ParameterID: ds (0x0001)

Type: String

Possible values:

A sequence of the characters '0' through '9' as well as 'A' through 'H' ('A' through 'H' used for MF signalling: refer to the symbols defined for the digit map in the MF Tone Detection package).

Description:

The string of collected digits that matched all or part of the sequence specified in the digit map.

#### *Termination Method*

ParameterID: meth (0x0002)

Type: Enumeration

Possible values: "UM" (0x0001) Unambiguous Match  
"PM" (0x0002) Partial Match  
"FM" (0x0003) Full Match

Description: Indicates the reason for the generation of the Address event.

### **7.2.2 CAS Failure**

EventID: casf (0x0005)

Description:

Extends the bcas casf event to handle general failure or abnormal line and register signalling conditions associated with this package.

EventsDescriptor parameters: None

ObservedEventsDescriptor parameters:

#### *Error Code*

ParameterID: ec (0x0001)

Type: Enumeration

Possible values: "RTO" (0x0003) Register Signalling Timeout  
"ADR" (0x0006) Error during outpulsing

Description: Describes the failure reason.

## **7.3 Signals**

### **7.3.1 Address**

SignalID: addr (0x0005)

Description:

Applies the address signals in the form of DTMF, dial-pulse or MF-tones on the trunk. The actual frequency, cadence, duration and amplitude values for the multi-frequency tones that convey the address information are provisioned in the MG.

Signal Type: Brief

Duration: Provisioned

Additional parameters:

*Digit String*

ParameterID: ds (0x0001)

Type: String

Possible values:

A sequence of the characters '0' through '9' as well as 'A' through 'H' ('A' through 'H' used for MF signalling: refer to the symbols defined for the digit map in the MF Tone Detection package).

Description: The digit string that needs to be sent as address signals.

*Address Delay*

ParameterID: ad (0x0002)

Type: Integer

Possible values: 0 and up in milliseconds

Description:

Specifies a timed delay that is applied prior to the signalling address being outpulsed. The address delay is optional. If the address delay parameter is not provided, the MG uses the provisioned value by default.

*Address Coding*

ParameterID: ac (0x0003)

Type: Enumeration

Possible values: "DTMF" (0x0001) DTMF Digits  
"MF" (0x0002) MF Digits  
"DP" (0x0003) Dial Pulse Digits

Description:

Specifies the coding of Digit String parameter in tones or DC pulses. Address Coding is optional; if not provided, the MG uses the value provisioned as an attribute of the circuit associated with the signal.

#### **7.4 Statistics**

None.

#### **7.5 Procedures**

None.

### **8 Robbed bit signalling package**

PackageID: rbs (0x0040)

Version: 1

Extends: none

This package defines events and signals that are specific to robbed bit signalling and are required in addition to the base CAS functionality provided by the bcas package.

## 8.1 Properties

### 8.1.1 Pulse generation duration

PropertyID: psgen (0x0001)

Description:

Specifies the duration for a pulse signal.

Type: Integer

Possible Values: Any non-negative integral number of milliseconds

Defined In: TerminationState Descriptor

Characteristics: Read/Write

### 8.1.2 Minimum pulse detection duration

PropertyID: minpsdet (0x0002)

Description: Specifies the minimum duration for detecting a pulse.

Type: Integer

Possible Values: Any non-negative integral number of milliseconds

Defined In: TerminationState Descriptor

Characteristics: Read/Write

### 8.1.3 Maximum pulse detection duration

PropertyID: maxpsdet (0x0003)

Description: Specifies the maximum duration for detecting a pulse.

Type: Integer

Possible Values: Any non-negative integral number of milliseconds

Defined In: TerminationState Descriptor

Characteristics: Read/Write

## 8.2 Events

### 8.2.1 Pulse off

EventID: psoff (0x0001)

Description:

The MG detects and reports a timed transition from on-hook to off-hook (leading edge) to on-hook (trailing edge). The parameter "pulse timeout" can be optionally included to specify a timeout for the receipt of the pulse. The default value for the timer is provisioned in the MG. The minimum and maximum duration of the pulse are defined by the Minimum Pulse Detection Duration and Maximum Pulse Detection Duration properties respectively.

EventsDescriptor parameters:

*Pulse Timeout*

ParameterID: psto (0x0001)

Type: Integer

Possible values: Any non-negative integral number of milliseconds

Description:

Specifies the timer for the receipt of the pulse. A value of 0 indicates a timer should not be applied.

ObservedEventsDescriptor parameters: None

### 8.2.2 Pulse On

EventID: pson (0x0002)

Description:

The MG detects and reports a timed transition from off-hook to on-hook (leading edge) to off-hook (trailing edge). The parameter "pulse timeout" can be optionally included to specify a timeout for the receipt of the pulse. The default value for the timer is provisioned in the MG. The minimum and maximum duration of the pulse are defined by the Minimum Pulse Detection Duration and Maximum Pulse Detection Duration properties respectively.

EventsDescriptor parameters:

*Pulse Timeout*

ParameterID: psto (0x0001)

Type: Integer

Possible values: Any non-negative integral number of milliseconds

Description:

Specifies the timer for the receipt of the pulse. A value of 0 indicates a timer should not be applied.

ObservedEventsDescriptor parameters: None

### 8.2.3 RBS failure

EventID: rbsfail (0x0003)

Description:

Reports a failure condition when a RBS failure occurs.

EventsDescriptor parameters: None

ObservedEventsDescriptor parameters:

*Error Code*

ParameterID: ec (0x0001)

Type: Enumeration

Possible values: "PSTO" (0x0001) Timeout waiting for a pulse event

Description: Describes the failure reason.

## 8.3 Signals

### 8.3.1 Pulse off-hook

SignalID: psoff (0x0001)

Description:

The MG signals a timed transition from on-hook to off-hook (leading edge) to on-hook (trailing edge).

Signal Type: Brief  
Duration: Defined by Pulse Generation Duration property.  
Additional parameters: None

### **8.3.2 Pulse on-hook**

SignalID: pson (0x0002)

Description:

The MG signals a timed transition from off-hook to on-hook (leading edge) to off-hook (trailing edge).

Signal Type: Brief  
Duration: Defined by Pulse Generation Duration property.  
Additional parameters: None

## **8.4 Statistics**

None.

## **8.5 Procedures**

### **8.5.1 Timestamp procedures**

Inclusion of a timestamp in the ObservedEvents descriptor is mandatory for the RBS package. The timestamp reflects the detection time for the event and may be used by services (e.g., automatic message accounting) on the MGC.

## **9 Operator services and emergency services package**

PackageID: oses (0x0041)  
Version: 1  
Extends: none

This package defines the CAS events and signals that are required for North American Operator Services and North American Emergency Services Signalling.

### **9.1 Properties**

None.

### **9.2 Events**

#### **9.2.1 Ringback**

EventID: rgbk (0x0001)

Description:

The ringback event is reported when a ringback signal is detected. The type of ringback signal and characteristics of the ringback signal are provisioned in the MG.

EventsDescriptor parameters: None  
ObservedEventsDescriptor parameters: None

### **9.3 Signals**

#### **9.3.1 Ringback**

SignalID: rgbk (0x0001)

Description:

Applies a ringback signal on the termination. The type of ringback signal and characteristics of the ringback signal are provisioned on the MG.

Signal Type: Brief

Duration: Provisioned

Additional parameters: None

#### **9.4 Statistics**

None.

#### **9.5 Procedures**

None.

### **10 Operator services extension package**

PackageID: osex (0x0042)

Version: 1

Extends: osex version 1

This package defines the CAS events and signals that are specific to North American Operator Services Signalling and are required in addition to the events and signals defined in the Operator Services and Emergency Services package.

#### **10.1 Properties**

None.

#### **10.2 Events**

##### **10.2.1 Recall**

EventID: rcl (0x0002)

Description:

The recall event is reported when a recall signal is detected on a termination. The recall signal is a timed transition from off-hook to on-hook (leading edge) to off-hook (trailing edge). The duration of the timed transition is provisioned on the MG.

EventsDescriptor parameters: None

ObservedEventsDescriptor parameters: None

##### **10.2.2 Coin collect**

EventID: cc (0x0003)

Description:

The coin collect event is reported when a coin collect signal is detected on a termination. The type of coin collect signal and characteristics of the coin collect signal are provisioned on the MG.

EventsDescriptor parameters: None

ObservedEventsDescriptor parameters: None

### **10.2.3 Coin return**

EventID: cr (0x0004)

Description:

The coin return event is reported when a coin return signal is detected on a termination. The type of coin return signal and characteristics of the coin return signal are provisioned on the MG.

EventsDescriptor parameters: None

ObservedEventsDescriptor parameters: None

### **10.2.4 Operator attached**

EventID: oa(0x0005)

Description:

The operator attached event is reported when an operator attached signal is detected on a termination. The type of operator attached signal and characteristics of the operator attached signal are provisioned on the MG.

EventsDescriptor parameters: None

ObservedEventsDescriptor parameters: None

### **10.2.5 Operator released**

EventID: or (0x0006)

Description:

The operator released event is reported when an operator released signal is detected on a termination. The type of operator released signal and characteristics of the operator released signal are provisioned on the MG.

EventsDescriptor parameters: None

ObservedEventsDescriptor parameters: None

## **10.3 Signals**

### **10.3.1 Recall**

SignalID: rcl (0x0002)

Description:

Applies a timed transition from off-hook to on-hook (leading edge) to off-hook (trailing edge).

Signal Type: Brief

Duration: Provisioned

Additional parameters: None

### **10.3.2 Coin collect**

SignalID: cc (0x0003)

Description:

Applies a coin collect signal on the termination. The type of coin collect signal and characteristics of the coin collect signal are provisioned on the MG.

Signal Type: Brief

Duration: Provisioned

Additional parameters: None

### **10.3.3 Coin return**

SignalID: cr (0x0004)

Description:

Applies a coin return signal on the termination. The type of coin return signal and characteristics of the coin return signal are provisioned on the MG.

Signal Type: Brief

Duration: Provisioned

Additional parameters: None

### **10.3.4 Operator attached**

SignalID: oa (0x0005)

Description:

Applies an operator attached signal on the termination. The type of operator attached signal and characteristics of the operator attached signal are provisioned on the MG.

Signal Type: Brief

Duration: Provisioned

Additional parameters: None

### **10.3.5 Operator released**

SignalID: or (0x0006)

Description:

Applies an operator released signal on the termination. The type of operator released signal and characteristics of the operator released signal are provisioned on the MG.

Signal Type: Brief

Duration: Provisioned

Additional parameters: None

## **10.4 Statistics**

None.

## **10.5 Procedures**

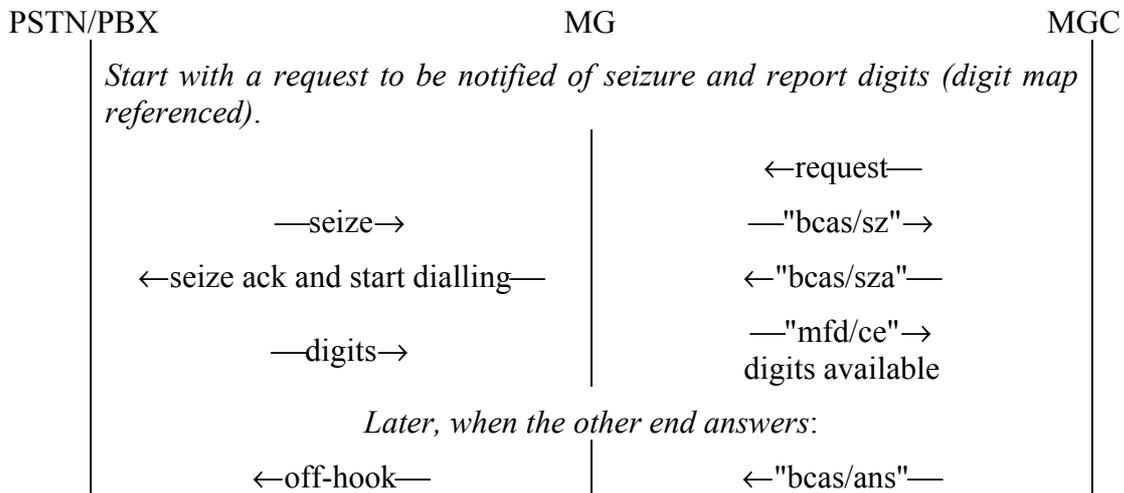
None.

# Appendix I

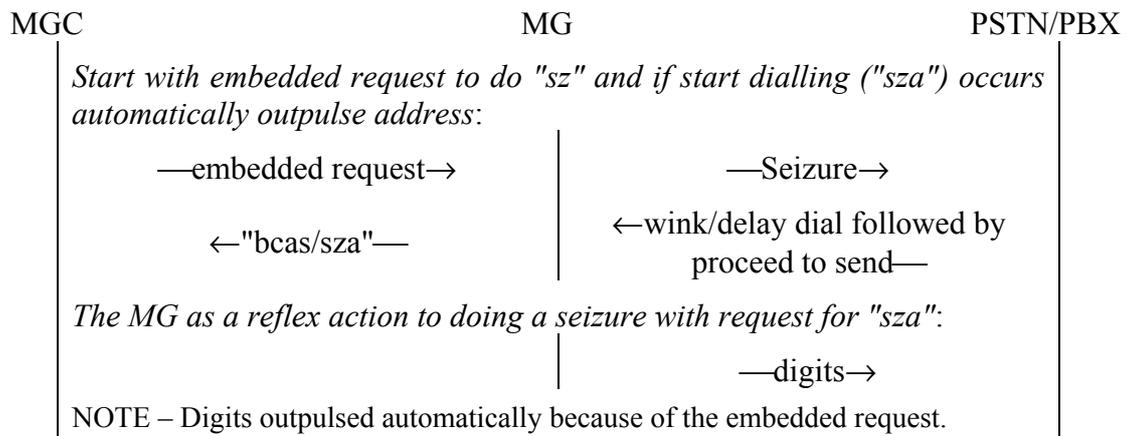
## Call Flows

### I.1 Basic single-stage MF or DTMF wink start or immediate start

Origination:

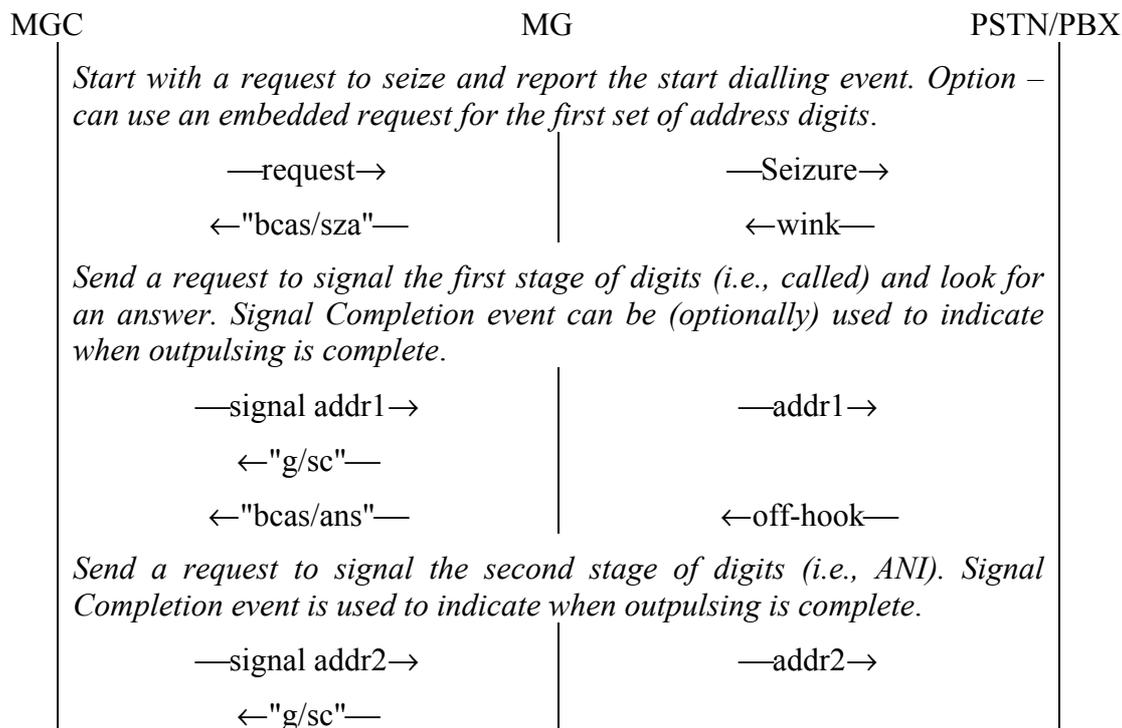


Termination:



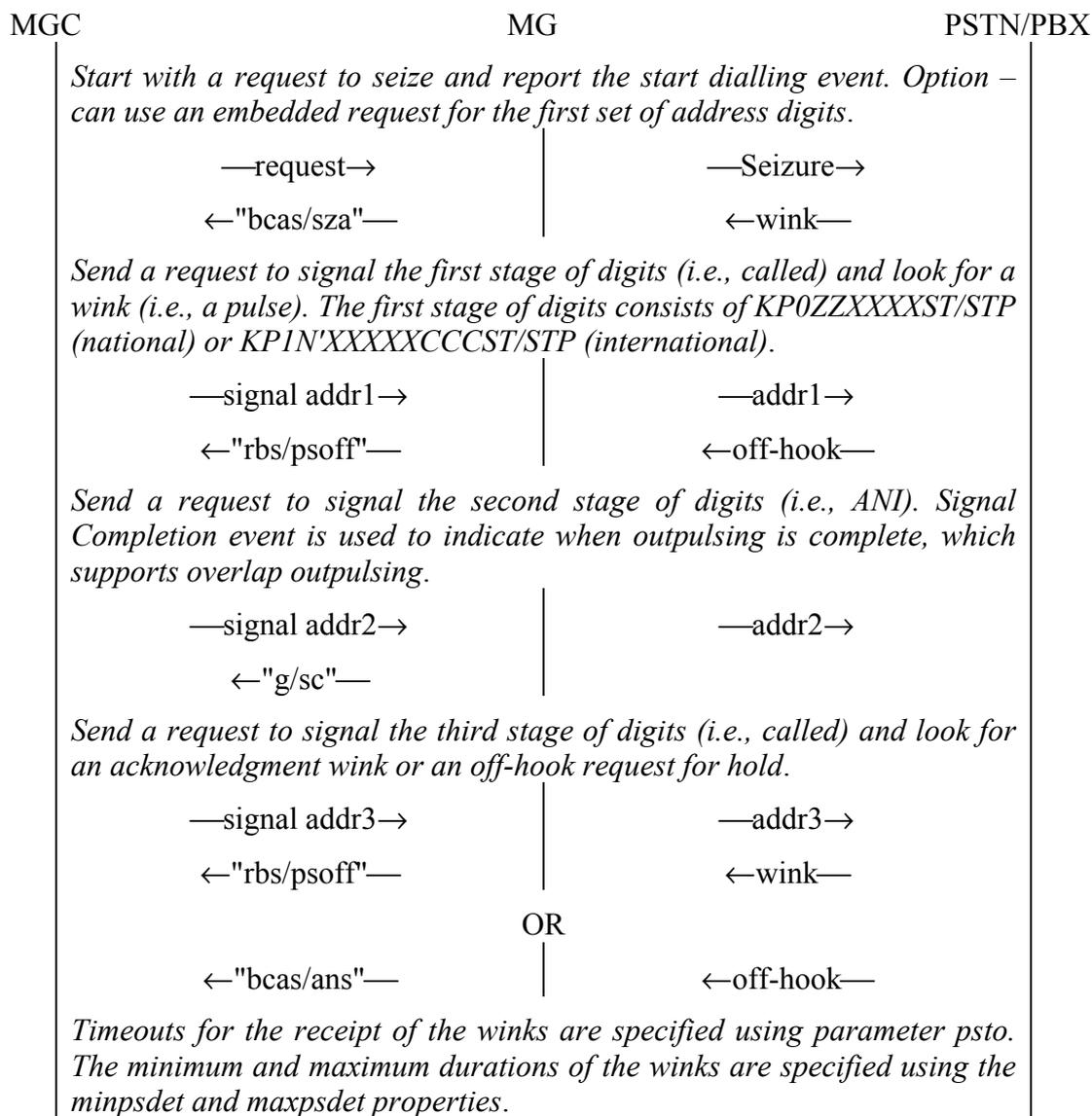
## I.2 EAOSS termination – Telephone company operator services call

The following call flow also applies to operator services signalling interfaces defined prior to Exchange Access Operator Services Signalling (EAOSS).



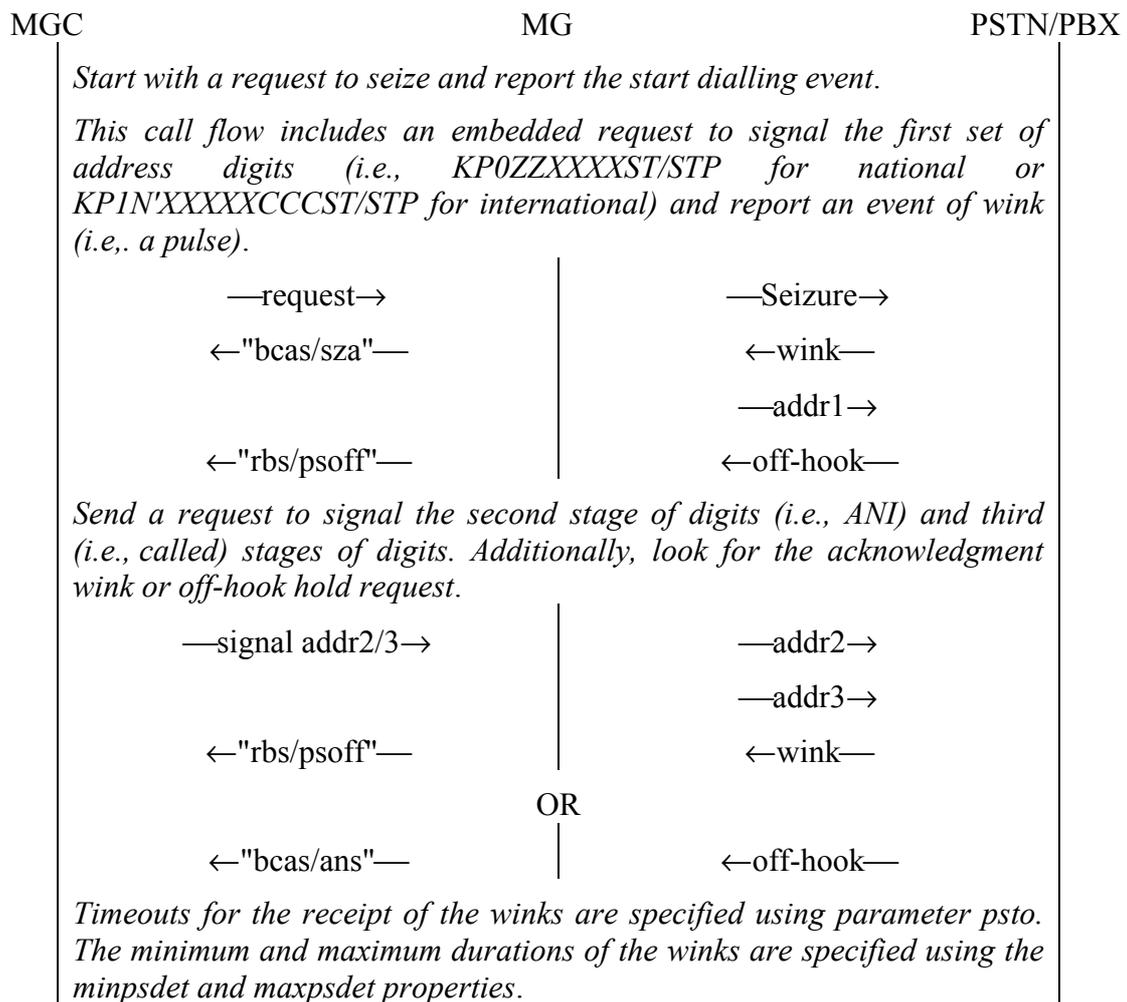
### I.3 EAOSS termination – IC/INC operator services call indirect through an access tandem (Overlap outpulsing)

The following call flow also applies to Feature Group D (FGD) signalling with the exception of an acknowledgment wink in place of the off-hook hold request.

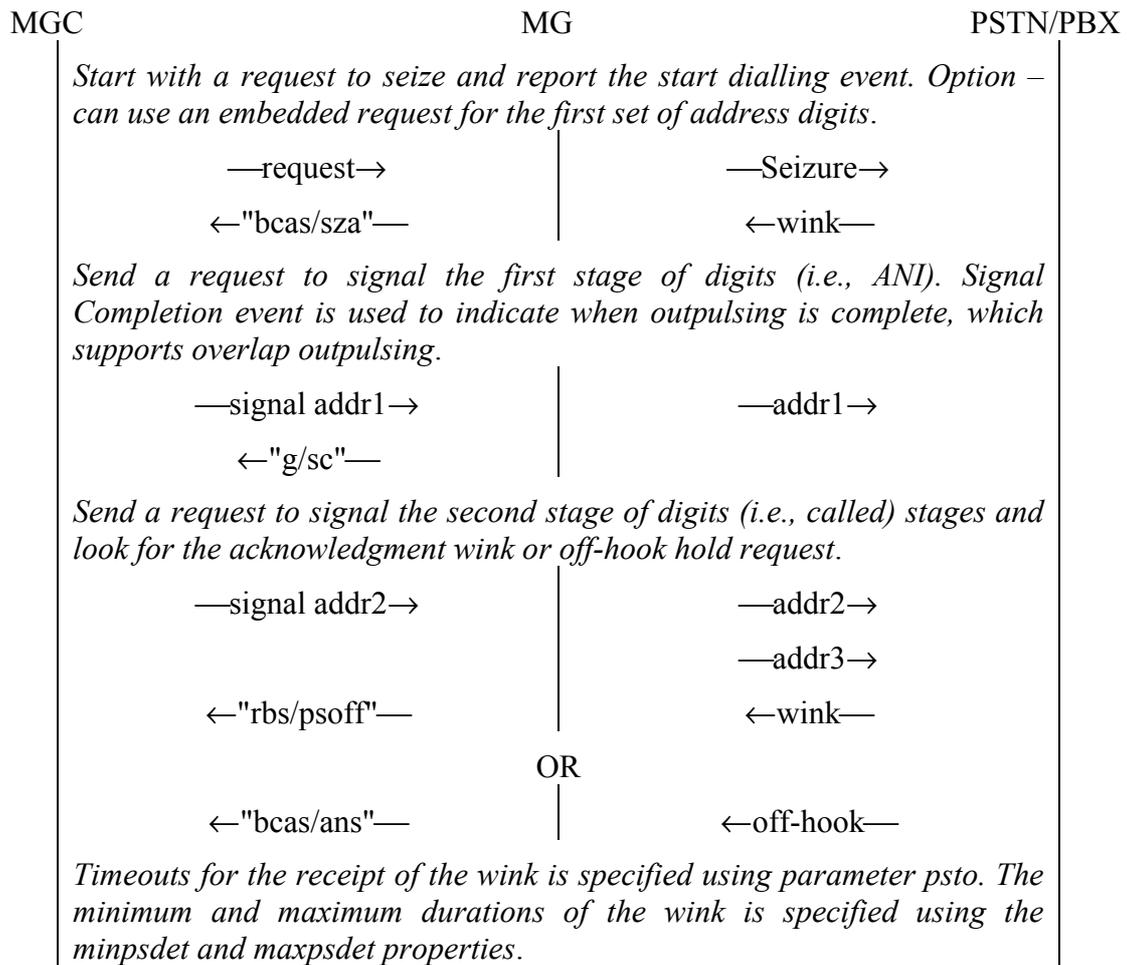


#### I.4 EAOSS termination – IC/INC operator services call indirect through an access tandem (No overlap outpulsing)

This call flow is an optimization of the previous call flow when overlap outpulsing is not required.

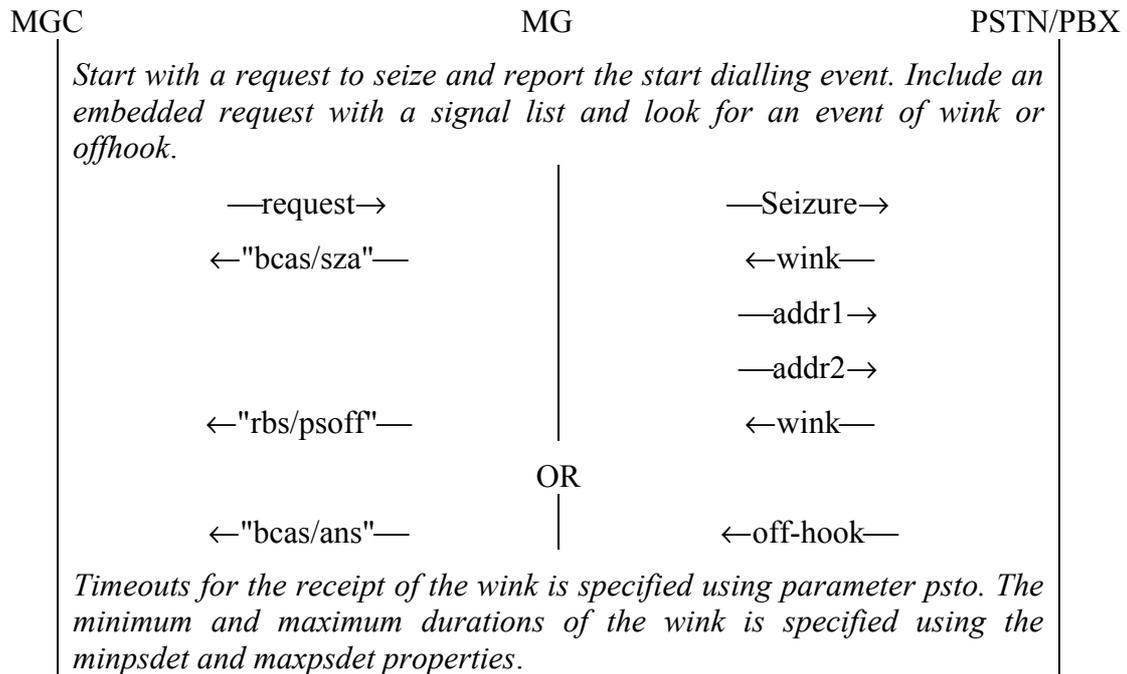


**I.5 EAOSS termination – IC/INC "National" operator direct to the IC/INC (Overlap outpulsing)**



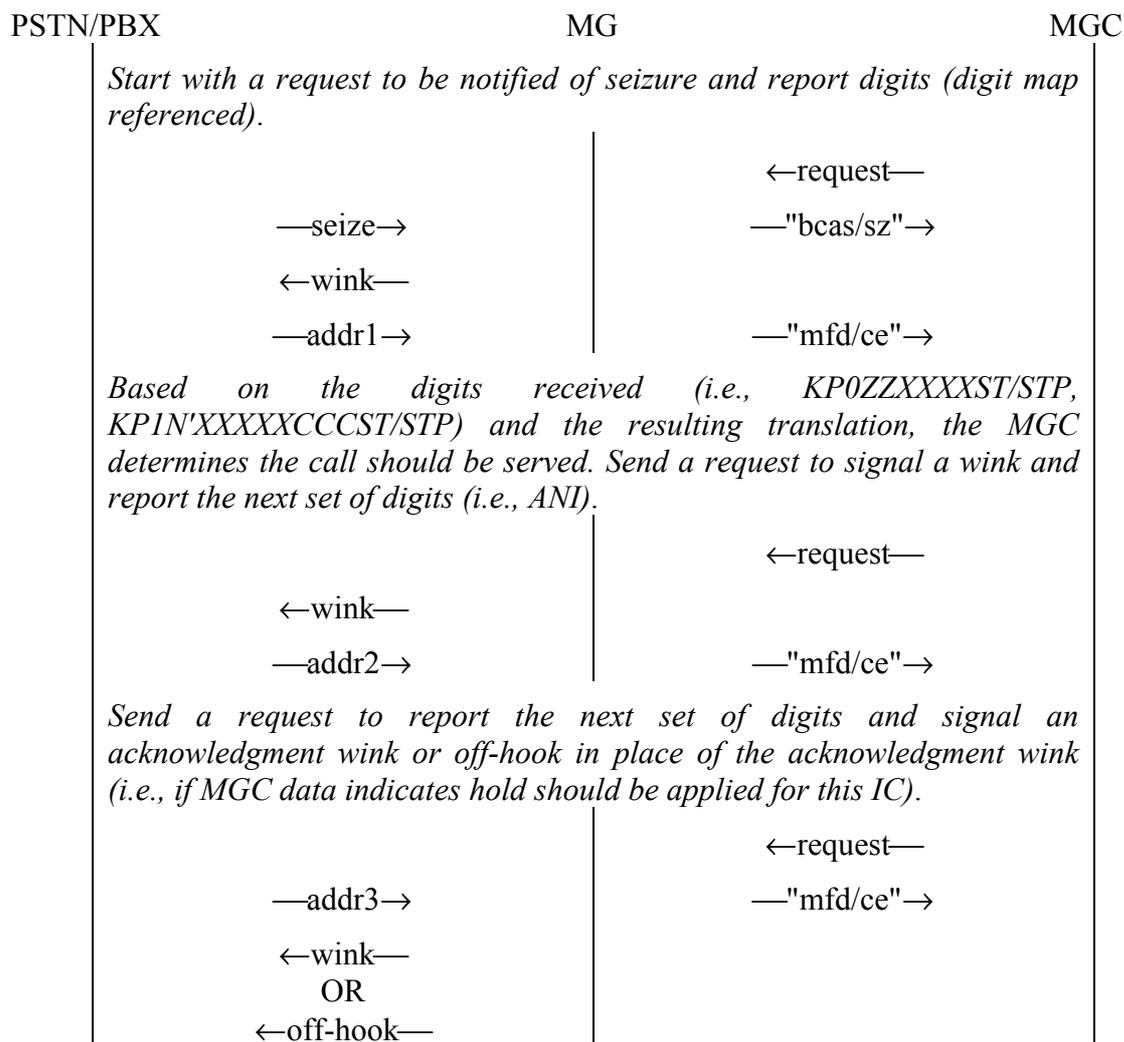
**I.6 EAOSS termination – IC/INC "National" operator direct to the IC/INC (No overlap outpulsing)**

This call flow is an optimization of the previous call flow when overlap outpulsing is not required.



## I.7 EAOSS origination – Telephone operating company serves the call

In this call flow, the MGC is the Telephone Operating Company switch that is providing operator services. The call originates from a PSTN EO and terminates to the MGC for operator handling. Following operator handling, the call completes to the packet network (not shown).







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