



## ***AISG Extension: Configurable Power Monitor***

### ***Configurable Power Monitor Extension to the Control Interface for Antenna Line Devices***

***Supplementary to AISG Standard No. AISG version 2.0***

#### **Revision History**

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## 1. FOREWORD

The Antenna Interface Standards Group (AISG) published the AISG standard to facilitate the introduction of antenna line products with remote control and monitoring facilities. The purpose of that standard is to ensure basic interoperability of antennas and control infrastructure. The AISG standard covers two basic types of Antenna Line Devices: Actuators capable of altering the electrical downtilt of the antenna and tower mounted amplifiers.

It has become evident that commercial antenna line devices are evolving beyond this set of capabilities. The AISG has decided to publish extensions to the basic standard rather than adding all possible branches to the core specification. For purposes of compliance, users should note that this entire Extension Standard is *optional*. However, once a given Extension Standard is elected for inclusion in a device, the entire option becomes mandatory.

This extension to the AISG standard adds procedures for antenna line devices that implement forward power, reflected power, and/or return loss measurement and/or monitoring of components such as feeders, jumpers, and antennas.

## 2. SCOPE

This document contains extensions to layers 2 and 7 of AISG specification, version 2.0 [1], and applies to Antenna Line Devices that implement Configurable Power Monitor (CPM) functionality.

## 3. REFERENCES

This AISG Extension Standard incorporates provisions from other publications. These are cited in the text and the referenced publications are listed below. Where references are dated, subsequent amendments or revisions of these publications apply only when specifically incorporated by amendment or revision of this AISG extension. For undated references the latest edition of the publication referred to applies.

- 1 AISG Version 2.0, "Control Interface for Antenna Line Devices"
- 2 3GPP TS25.460 UTRAN Iuant Interface General Aspects and Principles Release 6
- 3 3GPP TS25.461 UTRAN Iuant Interface Layer 1, Release 6
- 4 3GPP TS25.462 UTRAN Iuant Interface Signalling Transport, Release 6
- 5 [Not Used]
- 6 3GPP TS25.463 UTRAN Iuant Interface: Application Part, Release 6
- 7 3GPP TS25.466 UTRAN Iuant Interface: Application Part, Release 7

Note the 3GPP references are to Release 6 unless otherwise indicated. These documents are referred to in AISG Version 2.0, although they may have been superseded.



## 4. ABBREVIATIONS

Where abbreviations or acronyms are used in this document they have the following meanings:

ALD	Antenna Line Device
CPM	Configurable Power Monitor
dB	decibel
dBm	decibel referenced to 1 milliwatt
RET	Remote Electrical Tilt
TCP	Time Consuming Procedure
TMA	Tower Mounted Amplifier

## 5. TERMINOLOGY AND DEFINITIONS

Where the following terms are used in this document, they have the meanings listed below.

Return Loss	A measure of the similarity of the impedance of a transmission line and the impedance at its terminations. It is a ratio, expressed in decibels, of the power of the outgoing signal to the power of the signal reflected back. As applied herein, the power of the reflected signal will be lower than that of the outgoing and therefore, Return Loss will be a positive value.
Configurable Power Monitor (CPM) device	Antenna line device which performs return loss, forward power, and/or reflected power measurements on one or more transmission line interfaces and may generate alarms based on the results.
Forward Power Threshold	The level of measured forward RF power below which the CPMPowerAlarm shall be raised.
Return Loss Threshold	The level of measured return loss below which return loss alarm shall be raised. Major and minor thresholds are defined, associated with the CPMMajorAlarm and CPMMinorAlarm, respectively.
Return Loss Validity	The minimum level of forward RF power required to enable return loss alarm generation. Below this level, CPMMajorAlarm and CPMMinorAlarm will always be cleared.

## 6. LAYER 1

All definitions and specifications for RET devices in references [1], [2] and [3] regarding luant layer 1 apply to Configurable Power Monitor (CPM) devices complying with this Extension Standard unless otherwise stated by requirements in this document.

### 6.1.1. CPM DC power consumption

Power consumption shall be given by the product data sheet.



During the power-up period a CPM unit shall exhibit the circuit equivalent of a DC power consumer with a current consumption of maximum 200 mA in parallel with a capacitor of maximum 0.5  $\mu$ F.

### **6.1.2. CPM power-up characteristics**

Devices complying with this Extension Standard shall have a maximum power-up period of 3 seconds.

After the power-up period, the device shall be fully functional.

## **6.2. Resumption of operation after interruption of supply**

Normal operation shall be resumed after restoration of the power supply after any interruption or arbitrary reduction of the supply voltage (brown-out) in accordance with [3].

### **6.2.1. Data to be retained**

After reset (see [4]) or power-up, the following data shall be retained:

- Return Loss Validity level setting
- Return Loss Threshold setting(s)
- Forward Power Threshold setting

## **7. LAYER 2**

All definitions and specifications for RET devices in reference [4] regarding Layer 2 shall be valid for all antenna line devices included in this Extension Standard regardless of whether the device implements RET functionality.

Extended specifications for layer 2 are defined in the following chapter.

### **7.1. Device Type**

For the purposes of reverse compliance with [4], devices implementing this Extension Standard shall report the device type in compliance with provisions in [6].

The following table shows the additional device type for this Extension Standard:

**Table 7.1.1: Device type**

<b>Device Type</b>	<b>1-octet hexadecimal code</b>
Configurable Power Monitor	0x27



## **8. LAYER 7**

This chapter defines which procedures defined in [1] shall be re-used by CPM devices. This chapter also includes additional procedures which are specific to CPM devices.

### **8.1. General Aspects**

#### **8.1.1. Geometry and Numbering**

All CPM devices shall be defined as multiple subunit devices.

NOTE: Devices with single CPM units shall be implemented as multiple subunit devices with the number of subunits equal to 1.

#### **8.1.2. Parallel Procedure Handling for Time Consuming Procedures (TCPs)**

The CPM device does not define any TCPs. Therefore parallel procedure handling is not supported by the CPM.

### **8.2. Return and alarm codes**

An annotated table of return and alarm codes is given in [6] and extended in Annex A of this document.

### **8.3. Elementary Procedures for Configurable Power Monitors**

To avoid prematurely exhausting the available space in the command table through the proliferation of extensions, certain codes defined for other devices are reused by this extension. This process is called “overloading”.

For all device subunits compliant with this extension, the overloaded code shall refer to a member of the CPM procedure set defined herein, and not to the procedure assigned by the original specification.

This section defines those procedures that are defined by overloading existing procedure codes without any significant changes in the procedure initiation message, response message, and/or return code values. For clarity, only differences from the language of the referenced specification are elaborated for these procedures.

**Table 8.3.1: Elementary procedures specified for Configurable Power Monitors**

<b>Command</b>	<b>Overloads</b>	<b>Code Value</b>	<b>Requirement</b>
CPMClearActiveAlarms	TMAClearActiveAlarms [1]	0x77	mandatory
CPMGetAlarmStatus	TMAGetAlarmStatus [1]	0x78	mandatory

These commands shall be implemented as specified in the corresponding paragraphs of [1].



## 8.4. Device-Specific Elementary Procedures for CPM Subunits

This section defines procedures that are defined by overloading existing procedures in [1], [6], and [7] that include significant changes in the procedure message initiation, response, and/or return code values or formats. No requirements from the corresponding procedure clauses in [1], [6], or [7] shall be inferred unless re-stated in this Extension Standard.

**Table 8.4.1: CPM specific elementary procedures**

CPM Command	Overloaded command	Code Value	Requirement
CPMSetReturnLossValidity	TMASetMode [1]	0x70	optional
CPMGetReturnLossValidity	TMAGetMode [1]	0x71	optional
CPMSetReturnLossThresholds	TMASetGain [1]	0x72	optional
CPMGetReturnLossThresholds	TMAGetGain [1]	0x73	optional
CPMAlarmIndication	TMAAlarmIndication [1]	0x76	Mandatory
CPMGetSupportedFunctions	TMAGetSupportedFunctions [1]	0x7A	Mandatory
CPMGetSupportedNonLinearReturnLossThresholdValues	TMAGetSupportedNonLinearGainValues [7]	0x7B	Optional
CPMGetMeasurements		0x7C	Optional
CPMSetForwardPowerThreshold	AntennaSetTilt [6]	0x81	Optional
CPMGetForwardPowerThreshold	AntennaGetTilt [6]	0x82	Optional

### 8.4.1. CPM Set Return Loss Validity

The procedure CPMSetReturnLossValidity shall only be supported if the CPM subunit Return Loss Validity level can be adjusted. On receipt of the initiating message, the secondary device shall first set the addressed CPM subunit Return Loss Validity level to the power level determined by the Return Loss Validity parameter, and then return the response message. The Return Loss Validity parameter is calculated as 4 times the desired validity level expressed in dBm.

The Return Loss Validity level requested shall be accepted if it is within the range between and including the minimum and maximum levels supported by the subunit (as reported by CPMGetSupportedFunctions). For all other values requested, the CPM subunit shall respond UnsupportedValue.

**Table 8.4.1.1: Elementary procedure CPMSetReturnLossValidity**

Name: CPMSetReturnLossValidity				
Code:	Issued by:	Procedure class:	DownloadMode state:	Power mode:
0x70	Primary device	1	No	n/a





**Table 8.4.1.2: Initiating message parameters and format for CPMSetReturnLossValidity**

Field	Length	Type	Description
1	1 octet	Unsigned integer	Subunit number
2	2 octets	Signed integer	Return Loss Validity (expressed in dBm/4)

**Table 8.4.1.3: Response message parameters and format for CPMSetReturnLossValidity**

Field	Length	Type	Description
1	1 octet	Unsigned integer	Subunit number
2	1 octet	Return code	Return code: OK

**Table 8.4.1.4: Return codes for CPMSetReturnLossValidity**

OK	FAIL	Comment
	FormatError HardwareError WorkingSoftwareMissing UnsupportedProcedure UnsupportedValue	See [6]

#### 8.4.2. CPM Get Return Loss Validity

The procedure CPMGetReturnLossValidity shall only be supported if the CPM subunit supports the Return Loss Alarm Major function (as reported by CPMGetSupportedFunctions). On receipt of the initiating message, the secondary device shall return the set Return Loss Validity level of the CPM subunit. Fixed validity level CPM subunits shall return their fixed validity level. Unspecified validity level subunits may return the validity level currently in use, if applicable. Otherwise, 0x8000 shall be returned. The Return Loss Validity parameter is calculated as 4 times the set (or used) validity level expressed in dBm.

**Table 8.4.2.1: Elementary procedure CPMGetReturnLossValidity**

Name: CPMGetReturnLossValidity				
Code:	Issued by:	Procedure class:	DownloadMode state:	Power mode:
0x71	Primary device	1	No	n/a





**Table 8.4.2.2: Initiating message parameters and format for CPMGetReturnLossValidity**

Field	Length	Type	Description
1	1 octet	Unsigned integer	Subunit number

**Table 8.4.2.3: Response message parameters and format for CPMGetReturnLossValidity**

Field	Length	Type	Description
1	1 octet	Unsigned integer	Subunit number
2	1 octet	Return code	Return code: OK
3	2 octets	Signed integer	Return Loss Validity (expressed in dBm/4)

**Table 8.4.2.4: Return codes for CPMGetReturnLossValidity**

OK	FAIL	Comment
	FormatError HardwareError WorkingSoftwareMissing UnSupportedProcedure	See [6]

### 8.4.3. CPM Set Return Loss Thresholds

The procedure CPMSetReturnLossThresholds shall only be supported if the CPM subunit supports the Return Loss Alarm Major function (as reported by CPMGetSupportedFunctions). On receipt of the initiating message the secondary device shall first set the addressed CPM subunit Major and Minor Return Loss Thresholds to the values determined by the ThresholdAlarmMajor and ThresholdAlarmMinor parameters, respectively, and then return the response message. The threshold parameters are calculated as 4 times the requested thresholds expressed in dB.

Return loss thresholds requested shall be accepted if they are among the values supported by the subunit (as reported by CPMGetSupportedFunctions and CPMGetSupportedNonLinearReturnLossThresholdValues, if applicable).

Threshold shall be accepted if  $Min \leq Threshold \leq Max$

For linear steps:  $Threshold = Min + N \times Resolution$  where N is a non-negative integer

For non-linear steps: Threshold must be equal to a supported value

Min, Max, and Resolution are reported by CPMGetSupportedFunctions.

Threshold value 0x00 (zero) shall always be accepted (while ThresholdAlarmMajor  $\leq$  ThresholdAlarmMinor). With the threshold(s) set to zero, CPMMajorAlarm (and CPMMinorAlarm) shall always be cleared.



For all other threshold values requested, the CPM subunit shall respond UnsupportedValue.

If only one threshold is requested, Major and Minor Return Loss Thresholds shall be set at the same value by the subunit. When both thresholds are at the same (non-zero) value, CPMMajorAlarm shall be returned if an alarm is detected.

If the subunit does not support the Return Loss Alarm Minor function, ThresholdAlarmMajor shall be accepted. ThresholdAlarmMinor, if requested, shall be ignored if it is the same value as ThresholdAlarmMajor. If two unequal thresholds are requested, UnsupportedValue shall be returned.

If ThresholdAlarmMajor > ThresholdAlarmMinor, FormatError shall be returned.

**Table 8.4.3.1: Elementary procedure CPMSetReturnLossThresholds**

Name: <b>CPMSetReturnLossThresholds</b>				
Code:	Issued by:	Procedure class:	DownloadMode state:	Power mode:
0x72	Primary device	1	No	n/a

**Table 8.4.3.2: Initiating message parameters and format for CPMSetReturnLossThresholds**

Field	Length	Type	Description
1	1 octet	Unsigned integer	Subunit number
2	1 octet	Unsigned integer	ThresholdAlarmMajor (expressed in dB/4)
3	1 octet	Unsigned integer	ThresholdAlarmMinor (expressed in dB/4)

**Table 8.4.3.3: Response message parameters and format for CPMSetReturnLossThresholds**

Field	Length	Type	Description
1	1 octet	Unsigned integer	Subunit number
2	1 octet	Return code	Return code: OK



**Table 8.4.3.4: Return codes for CPMSetReturnLossThresholds**

OK	FAIL	Comment
	FormatError HardwareError WorkingSoftwareMissing UnsupportedProcedure UnsupportedValue	See [6]

#### 8.4.4. CPM Get Return Loss Thresholds

The procedure CPMGetReturnLossThresholds shall only be supported if the CPM subunit supports the Return Loss Alarm Major function (as reported by CPMGetSupportedFunctions). On receipt of the initiating message, the secondary device shall return the set Major and Minor Return Loss Thresholds of the CPM subunit. The threshold parameters are calculated as 4 times the set thresholds expressed in dB.

If the subunit does not support the Return Loss Alarm Minor function, the value of the ThresholdAlarmMinor response parameter shall be that of ThresholdAlarmMajor.

**Table 8.4.4.1: Elementary procedure CPMGetReturnLossThresholds**

Name: CPMGetReturnLossThresholds				
Code:	Issued by:	Procedure class:	DownloadMode state:	Power mode:
0x73	Primary device	1	No	n/a

**Table 8.4.4.2: Initiating message parameters and format for CPMGetReturnLossThresholds**

Field	Length	Type	Description
1	1 octet	Unsigned integer	Subunit number

**Table 8.4.4.3: Response message parameters and format for CPMGetReturnLossThresholds**

Field	Length	Type	Description
1	1 octet	Unsigned integer	Subunit number
2	1 octet	Return code	Return code: OK
3	1 octet	Unsigned integer	ThresholdAlarmMajor (expressed in dB/4)
4	1 octet	Unsigned integer	ThresholdAlarmMinor (expressed in dB/4)



**Table 8.4.4.4: Return codes for CPMGetReturnLossThresholds**

OK	FAIL	Comment
	FormatError HardwareError WorkingSoftwareMissing UnsupportedProcedure	See [6]

**8.4.5. CPM Get Supported Functions**

On receipt of the initiating message, the secondary device shall respond with the function flags and parameters indicating the supported functionality of the addressed CPM subunit.

The Return Loss Measure, Forward Power Measure, and Reflected Power Measure functions provide an instantaneous measurement of the respective quantity. The results are reported by CPMGetMeasurements. The measurements are unaffected by validity level and thresholds but any averaging or other signal conditioning is at the discretion of the manufacturer.

The Return Loss Alarm Major and Minor, and the Forward Power Alarm functions evaluate measurements against validity level and thresholds. The results are reported by CPMGetAlarmStatus and CPMAAlarmIndication.

The Min and Max Return Loss Validity parameters indicate the range of supported validity levels that will be accepted by CPMSetReturnLossValidity. If the validity level cannot be adjusted, a fixed level may be supported or the level may be unspecified (e.g., the subunit makes adjustments autonomously).

The Min and Max Return Loss Threshold, and Return Loss Threshold Resolution parameters indicate the range of supported thresholds (other than zero) that will be accepted by CPMSetReturnLossThresholds. Supported thresholds can be used in both the ThresholdAlarmMajor and ThresholdAlarmMinor parameters.

The Min and Max Forward Power Threshold parameters indicate the range of supported thresholds (other than 0x8000) that will be accepted by CPMSetForwardPowerThreshold.

**Table 8.4.5.1: Elementary procedure CPM Get Supported Functions**

Name: <b>CPMGetSupported Functions</b>				
Code:	Issued by:	Procedure class:	DownloadMode state:	Power mode:
<b>0x7A</b>	<b>Primary device</b>	<b>1</b>	<b>No</b>	<b>n/a</b>



**Table 8.4.5.2: Initiating message parameters and format for CPMGetSupportedFunctions**

Field	Length	Type	Description
1	1 octet	Unsigned integer	Subunit number

**Table 8.4.5.3: Response message parameters and format for CPMGetSupportedFunctions**

Field	Length	Type	Description
1	1 octet	Unsigned integer	Subunit number
2	1 octet	Return code	Return code: OK
3	1 octet	Unsigned integer	Function Flags
4	2 octets	Signed integer	Min Return Loss Validity (expressed in dB/4)
5	2 octets	Signed integer	Max Return Loss Validity (expressed in dB/4)
6	1 octet	Unsigned integer	Min Return Loss Threshold (expressed in dB/4)
7	1 octet	Unsigned integer	Max Return Loss Threshold (expressed in dB/4)
8	1 octet	Unsigned integer	Return Loss Threshold Resolution (expressed in dB/4)
9	2 octets	Signed integer	Min Forward Power Threshold (expressed in dBm/4)
10	2 octets	Signed integer	Max Forward Power Threshold (expressed in dBm/4)

**8.4.5.4: Description of response message parameters**

- 4-5: Min > Max is disallowed. Fixed Return Loss Validity level shall be shown as Min = Max. Unspecified validity level shall be shown as 0x8000 in both parameters.
- 6-7: Min > Max is disallowed. Single threshold value shall be shown as Min = Max. If the Return Loss Alarm Major function is unsupported, 0x00 shall be shown in both parameters. If non-linear steps are supported, then Max > Min + 2 is required.
- 8: If linear steps are supported, then Resolution = (Max – Min) / N is required where N is a positive integer. If non-linear steps are supported, 0x00 shall be shown.
- 9-10: Fixed threshold value shall be shown as Min = Max. If the Forward Power Alarm function is unsupported, 0x8000 shall be shown in both parameters.



**Table 8.4.5.5: Return codes for CPMGetSupportedFunctions**

OK	FAIL	Comment
	FormatError HardwareError WorkingSoftwareMissing	See [6]

**Table 8.4.5.6: Function flags for CPMGetSupportedFunctions**

Bit	6-7	5	4	3	2	1	0
Function	Spare	Reflected Power Measure	Forward Power Alarm	Forward Power Measure	Return Loss Alarm Minor	Return Loss Alarm Major	Return Loss Measure

- Bits are numbered from 0...7, bit number 0 set to 1 represents the value 0x01
- Bit value 0 represents function is not supported
- Bit value 1 represents function is supported
- Spare bit shall be set to 0
- If Return Loss Alarm Minor is supported, then Return Loss Alarm Major shall also be supported

#### **8.4.6. CPM Get Supported Non-Linear Return Loss Threshold Values**

The procedure CPMGetSupportedNonLinearReturnLossThresholdValues shall only be supported if the CPM subunit supports the Return Loss Alarm Major function with non-linear threshold steps (as reported by CPMGetSupportedFunctions). On receipt of the initiating message, the secondary device shall respond with a message containing a list of supported values in numerical order (e.g., 6 dB, 9.5 dB, and 14 dB), preceded by the number (N) of such values contained in the list. The list shall include a minimum of three and a maximum of 32 values ( $3 \leq N \leq 32$ ) and shall include the Min and Max Return Loss Threshold values (as reported by CPMGetSupportedFunctions). The threshold parameters are calculated as 4 times the supported thresholds expressed in dB.

**Table 8.4.6.1: Elementary procedure CPMGetSupportedNonLinearReturnLossThresholdValues**

Name: CPMGetSupportedNonLinearReturnLossThresholdValues				
Code:	Issued by:	Procedure class:	DownloadMode state:	Power mode:
0x7B	Primary device	1	No	n/a



**Table 8.4.6.2: Initiating message parameters and format for CPMGetSupportedNonLinearReturnLossThresholdValues**

Field	Length	Type	Description
1	1 octet	Unsigned integer	Subunit number

**Table 8.4.6.3: Response message parameters and format for CPMGetSupportedNonLinearReturnLossThresholdValues**

Field	Length	Type	Description
1	1 octet	Unsigned integer	Subunit number
2	1 octet	ReturnCode	Return code OK
3	1 octet	Unsigned integer	Number of non-linear Return Loss Threshold values supported (N)
3 + i	1 octet	Unsigned integer	Supported Return Loss Threshold number i (expressed in dB/4)

i = 1 .. N

**Table 8.4.6.4: Return codes CPMGetSupportedNonLinearReturnLossThresholdValues**

OK	FAIL	Comment
	FormatError HardwareError WorkingSoftwareMissing UnsupportedProcedure	See [6]

### 8.4.7. CPM Get Measurements

The procedure CPMGetMeasurements shall only be supported if the CPM subunit supports any of the Return Loss Measure, Forward Power Measure, or Reflected Power Measure functions (as reported by CPMGetSupportedFunctions). On receipt of the initiating message, the secondary device shall respond with a message containing the current value of measured Return Loss, Forward Power, and/or Reflected Power. Return Loss is expressed in hundredths of dB on two octets while Forward Power and Reflected Power are each expressed in hundredths of dBm on two octets.

If the Return Loss Measure, the Forward and/or Reflected Power Measure functions are unsupported, 0x8000 shall be shown in the corresponding octet(s).

If the level of forward RF power exceeds the operating dynamic range of the CPM subunit, CPMOverRange shall be returned.





If the level of Reflected Power exceeds the Forward Power, the value of the Return Loss parameter shall be set as 0x0000.

**Table 8.4.7.1: Elementary procedure CPMGetMeasurements**

Name: <b>CPMGetMeasurements</b>				
Code:	Issued by:	Procedure class:	DownloadMode state:	Power mode:
0x7C	Primary device	1	No	n/a

**Table 8.4.7.2: Initiating message parameters and format for CPMGetMeasurements**

Field	Length	Type	Description
1	1 octet	Unsigned integer	Subunit number

**Table 8.4.7.3: Response message parameters and format for CPMGetMeasurements**

Field	Length	Type	Description
1	1 octet	Unsigned integer	Subunit number
2	1 octet	Return code	Return code: OK
3	2 octets	Unsigned integer	Return Loss (expressed in dB/100)
4	2 octets	Signed integer	Forward Power (expressed in dBm/100)
5	2 octets	Signed integer	Reflected Power (expressed in dBm/100)

**Table 8.4.7.4: Return codes CPMGetMeasurements**

OK	FAIL	Comment
	FormatError NotReady  HardwareError WorkingSoftwareMissing UnsupportedProcedure CPMOverRange	See [6]  Preparation of measurement data is in progress



**8.4.8. CPM Set Forward Power Threshold**

The procedure CPMSetForwardPowerThreshold shall only be supported if the CPM subunit supports the Forward Power Alarm function (as reported by CPMGetSupportedFunctions). On receipt of the initiating message, the secondary device shall first set the addressed CPM subunit Forward Power Threshold level to the power level determined by the ThresholdAlarmPower parameter, and then return the response message. The threshold parameter is calculated as 4 times the requested threshold level expressed in dBm.

The Forward Power Threshold level requested shall be accepted if it is within the range between and including the minimum and maximum levels supported by the subunit (as reported by CPMGetSupportedFunctions).

Threshold value 0x8000 shall always be accepted. With the threshold set to 0x8000, CPMPowerAlarm shall always be cleared.

For all other values requested, the CPM subunit shall respond UnsupportedValue.

**Table 8.4.8.1: Elementary procedure CPMSetForwardPowerThreshold**

Name: <b>CPMSetForwardPowerThreshold</b>				
Code:	Issued by:	Procedure class:	DownloadMode state:	Power mode:
<b>0x81</b>	<b>Primary device</b>	<b>1</b>	<b>No</b>	<b>n/a</b>

**Table 8.4.8.2: Initiating message parameters and format for CPMSetForwardPowerThreshold**

Field	Length	Type	Description
1	1 octet	Unsigned integer	Subunit number
2	2 octets	Signed integer	ThresholdAlarmPower (expressed in dBm/4)

**Table 8.4.8.3: Response message parameters and format for CPMSetForwardPowerThreshold**

Field	Length	Type	Description
1	1 octet	Unsigned integer	Subunit number
2	1 octet	Return code	Return code: OK



**Table 8.4.8.4: Return codes CPMSetForwardPowerThreshold**

OK	FAIL	Comment
	FormatError HardwareError WorkingSoftwareMissing UnsupportedProcedure UnsupportedValue	See [6]

### 8.4.9. CPM Get Forward Power Threshold

The procedure CPMGetForwardPowerThreshold shall only be supported if the CPM subunit supports the Forward Power Alarm function (as reported by CPMGetSupportedFunctions). On receipt of the initiating message, the secondary device shall return the set Forward Power Threshold level of the CPM subunit. Fixed threshold level CPM subunits shall return their fixed threshold level. The ThresholdAlarmPower parameter is calculated as 4 times the set threshold level expressed in dBm.

**Table 8.4.9.1: Elementary procedure CPMGetForwardPowerThreshold**

Name: CPMGetForwardPowerThreshold				
Code:	Issued by:	Procedure class:	DownloadMode state:	Power mode:
0x82	Primary device	1	No	n/a

**Table 8.4.9.2: Initiating message parameters and format for CPMGetForwardPowerThreshold**

Field	Length	Type	Description
1	1 octet	Unsigned integer	Subunit number

**Table 8.4.9.3: Response message parameters and format for CPMGetForwardPowerThreshold**

Field	Length	Type	Description
1	1 octet	Unsigned integer	Subunit number
2	1 octet	Return code	Return code: OK
3	2 octets	Signed integer	ThresholdAlarmPower (expressed in dBm/4)



**Table 8.4.9.4: Return codes CPMGetForwardPowerThreshold**

OK	FAIL	Comment
	FormatError HardwareError WorkingSoftwareMissing UnsupportedProcedure	See [6]

## **9. PRODUCT IDENTIFICATION**

### **9.1. Marking of conforming products with extensions**

In order to allow users to identify products which conform to the requirements of this extension standard, member companies are encouraged to use the AISG logo on conforming products and on any brochures, advertisements or product literature associated with them. In addition, the legends 'AISG 2.0 (Configurable Power Monitor)' or 'Conforms to interface standard AISG 2.0 with Configurable Power Monitor Extension' may be used on such products and associated literature.



## **Annex A: Return Codes for Secondary AISG Devices (Normative)**

**Table A.1: Additional Return Codes for Secondary CPM Devices**

<b>Code</b>	<b>Name</b>	<b>Comment</b>	<b>Alarm</b>	<b>Download Mode State</b>
0x28	CPMMinorAlarm	Measured Return Loss is < ThresholdAlarmMinor value	X	
0x29	CPMMajorAlarm	Measured Return Loss is < ThresholdAlarmMajor value	X	
0x2A	CPMPowerAlarm	Measured Forward Power < ThresholdAlarmPower value	X	
0x2B	CPMOverRange	Measured Forward Power exceeds the operating dynamic range of the CPM	X	