



# SLOVENSKI STANDARD

## SIST ETS 300 615 E1:2003

01-december-2003

---

8 ][ JhUb]WW] b]hYY\_ca i b]\_UWg]g]ghYa 'fUhU&L%EA YfYYbYYdcXUh\_cj 'c  
na c[ `1j cgh] 'f] GA %&\$(\$(Ł

Digital cellular telecommunications system (Phase 2) (GSM); Performance data measurements (GSM 12.04)

## iTeh STANDARD PREVIEW

(standards.iteh.ai)

Ta slovenski standard je istoveten z: SIST ETS 300 615 E1:2003  
<https://standards.iteh.ai/catalog/standards/sist/a3a/3c64-1d3e-47a2-a154-f6246cf1ab3f/sist-ets-300-615-e1-2003>

---

**ICS:**

33.070.50	Globalni sistem za mobilno telekomunikacijo (GSM)	Global System for Mobile Communication (GSM)
-----------	---	--

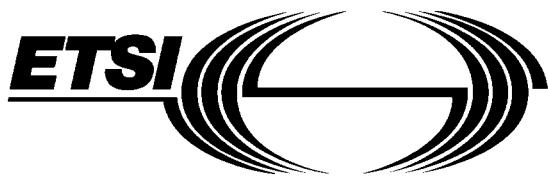
**SIST ETS 300 615 E1:2003**

**en**

**iTeh STANDARD PREVIEW  
(standards.iteh.ai)**

[SIST ETS 300 615 E1:2003](#)

<https://standards.iteh.ai/catalog/standards/sist/a3a73c64-1d3e-47a2-a154-f6246cf1ab3f/sist-ets-300-615-e1-2003>



# EUROPEAN TELECOMMUNICATION STANDARD

**ETS 300 615**

August 1996

Source: ETSI TC-SMG

Reference: DE/SMG-061204P

ICS: 33.060.50

**Key words:** Digital cellular telecommunications system, Global System for Mobile Communications (GSM)



SIST ETS 300 615 E1:2003  
**Digital cellular telecommunications system (Phase 2);  
 Performance data measurements  
 (GSM 12.04)**

**ETSI**

European Telecommunications Standards Institute

**ETSI Secretariat**

**Postal address:** F-06921 Sophia Antipolis CEDEX - FRANCE

**Office address:** 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE

**X.400:** c=fr, a=atlas, p=etsi, s=secretariat - **Internet:** secretariat@etsi.fr

Tel.: +33 92 94 42 00 - Fax: +33 93 65 47 16

---

**Copyright Notification:** No part may be reproduced except as authorized by written permission. The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 1996. All rights reserved.

Page 2

ETS 300 615: August 1996 (GSM 12.04 version 4.3.1)

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST ETS 300 615 E1:2003](#)

<https://standards.iteh.ai/catalog/standards/sist/a3a73c64-1d3e-47a2-a154-f6246cf1ab3f/sist-ets-300-615-e1-2003>

## Contents

Foreword .....	15
Introduction.....	15
1 Scope .....	17
1.1 Normative references .....	17
1.2 Abbreviations .....	19
2 Performance measurement concept.....	22
2.1 Measurement data requirements.....	22
2.1.1 Traffic measurements .....	23
2.1.2 Network configuration evaluation .....	23
2.1.3 Resource access.....	23
2.1.4 Quality Of Service (QOS) .....	23
2.1.5 Resource availability.....	23
2.2 Measurement administration .....	23
2.2.1 Measurement job administration .....	24
2.2.2 Measurement result collection method .....	24
2.2.3 Local storage of results at the Network Element.....	25
2.2.4 Measurement result transfer .....	25
2.2.5 Performance data presentation.....	25
2.3 Measurement definition .....	25
2.3.1 Nature of the result.....	25
2.3.2 Perceived accuracy.....	25
2.3.3 Comparability of measurement data .....	26
2.3.4 Measurement identification.....	26
3 Performance management requirements <a href="https://standards.itech.ai/catalog/standards/sist/a3a73c64-1d3e-47a2-a154-f6246cfab3f/sist-ets-300-615-e1-2003">https://standards.itech.ai/catalog/standards/sist/a3a73c64-1d3e-47a2-a154-f6246cfab3f/sist-ets-300-615-e1-2003</a> .....	27
3.1 Introduction .....	27
3.1.1 Basic functions .....	27
3.1.2 Measurement administration.....	28
3.2 Measurement jobs .....	28
3.2.1 Measurement job characteristics .....	28
3.2.1.1 Measurement types .....	28
3.2.1.2 Measurement schedule .....	28
3.2.1.3 Granularity period .....	29
3.2.1.4 Measurement reporting .....	29
3.2.2 Measurement job state and status attributes .....	29
3.2.3 Measurement job administration .....	30
3.3 Measurement results .....	30
3.3.1 Measurement result characteristics .....	30
3.3.2 Transfer of measurement results .....	31
4 Detailed description of the measurement system for a PLMN .....	32
4.1 Introduction .....	32
4.1.1 Basic measurement system functions.....	32
4.1.2 Measurement Object Administration .....	32
4.2 Modelling of measurement jobs.....	33
4.2.1 Measurement job characteristics .....	33
4.2.1.1 Measurement Function .....	33
4.2.1.2 Measurement schedule .....	34
4.2.1.3 Granularity period .....	34
4.2.1.4 Scan reports .....	35
4.2.2 Scanner state and status attributes.....	35
4.2.3 Scanner administration.....	36
4.3 Modelling of measurement results .....	37
4.3.1 Characteristics of the result report .....	37

4.4	4.3.2 Result report transfer control .....	37
	Conformance requirements .....	38
	4.4.1 Simple scanner.....	38
	4.4.2 Scan report record.....	40
	4.4.3 Scan report notification .....	40
	4.4.4 Activate scan report action .....	40
4.5	Application Context .....	40
5	Future Enhancements .....	41
Annex A (Informative): Graphical examples .....		42
Annex B (Normative): Performance Measurement Requirements Summary .....		44
B.1	Measurements Related To The BSC.....	45
B.1.1	BSC Measurement Function .....	45
B.1.1.1	Unsuccessful requests for service.....	45
B.1.1.2	Unsuccessful requests for service, per cause.....	45
B.1.1.3	Mean Inter-arrival Time.....	45
B.1.1.4	Attempted Transmission of Paging Messages, per BSC .....	46
B.1.1.5	Unsuccessful Transmission of Paging Messages, per BSC .....	46
B.1.1.6	Attempted IMMEDIATE ASSIGNMENT Procedures, per BSC .....	46
B.1.1.7	Successful IMMEDIATE ASSIGNMENT Procedures, per BSC .....	47
B.1.1.8	Successful Internal Handovers, intra-CELL, per BSC .....	47
B.1.1.9	Unsuccessful Internal Handovers, intra-CELL, per BSC .....	47
B.1.1.10	Successful Internal Handovers per BSC .....	48
B.1.1.11	Successful Internal Handovers per cause .....	48
B.1.1.12	Unsuccessful Internal Handovers with reconnection to old channels, per BSC .....	48
B.1.1.13	Unsuccessful Internal Handovers with loss of connection, per BSC .....	49
B.2	Measurements related to the BTS.....	49
B.2.1	CELL Measurement Function SIST ETS 300 615 E1:2003 .....	49
B.2.1.1	Mean PCH-AGCH queue length <a href="http://www.etsi.org/standards/etsi_300_615_13_a_47_a_2_a_154.htm">http://www.etsi.org/standards/etsi_300_615_13_a_47_a_2_a_154.htm</a> .....	49
B.2.1.2	Attempted Transmission of Paging Messages (the PCH) .....	49
B.2.1.3	Unsuccessful Transmission of Paging Messages (the PCH) .....	50
B.2.1.4	Attempted IMMEDIATE ASSIGNMENT Procedures .....	50
B.2.1.5	Successful IMMEDIATE ASSIGNMENT Procedures .....	50
B.2.1.6	Attempted IMMEDIATE ASSIGNMENT Procedures, per cause .....	51
B.2.1.7	Successful IMMEDIATE ASSIGNMENT Procedures, per cause .....	51
B.2.1.8	Number of Pages Discarded from the PCH Queue.....	51
B.2.1.9	Mean duration of a successful Paging Procedure .....	51
B.2.1.10	Number of Available TCHs .....	52
B.2.1.11	Mean number of busy TCHs.....	52
B.2.1.12	Maximum number of busy TCHs .....	53
B.2.1.13	Mean number of idle TCHs per interference band .....	53
B.2.1.14	Attempted TCH seizures.....	53
B.2.1.15	Successful TCH seizures .....	54
B.2.1.16	Attempted TCH Seizures meeting an TCH blocked state .....	54
B.2.1.17	All Available TCH Allocated Time .....	54
B.2.1.18	Mean TCH busy time .....	55
B.2.1.19	Mean TCH queue length.....	55
B.2.1.20	Number of lost Radio links while using a TCH .....	55
B.2.1.21	Number of Available SDCCHs.....	56
B.2.1.22	Mean number of busy SDCCHs .....	56
B.2.1.23	Maximum number of busy SDCCHs.....	56
B.2.1.24	Attempted SDCCH Seizures meeting an SDCCH blocked state.....	57
B.2.1.25	All Available SDCCH Allocated Time.....	57
B.2.1.26	Mean SDCCH queue length .....	57
B.2.1.27	Number of lost Radio links while using an SDCCH .....	58
B.2.1.28	Relative time downlink power control at maximum.....	58
B.2.1.29	Relative time uplink power control at maximum .....	58
B.2.1.30	Successful Internal Handovers, intra-CELL.....	59

B.2.1.31	Unsuccessful Internal Handovers, intra-CELL .....	59
B.2.1.32	Attempted incoming Internal inter CELL Handovers .....	59
B.2.1.33	Successful incoming Internal inter CELL Handovers .....	60
B.2.1.34	Attempted outgoing Internal inter CELL Handovers.....	60
B.2.1.35	Successful outgoing Internal inter CELL Handovers.....	60
B.2.1.36	Unsuccessful Internal Handovers with reconnection to old channels .....	60
B.2.1.37	Unsuccessful Internal Handovers with loss of connection .....	61
<b>B.2.2</b>	<b>Internal HDO Measurement Function .....</b>	<b>61</b>
B.2.2.1	Attempted incoming Internal inter CELL Handovers per originating CELL ...	61
B.2.2.2	Successful incoming Internal inter CELL Handovers per originating CELL ..	61
B.2.2.3	Attempted outgoing Internal inter CELL Handovers per target CELL .....	62
B.2.2.4	Successful outgoing Internal inter CELL Handovers per target CELL .....	62
<b>B.3</b>	<b>Measurements Related to the MSC .....</b>	<b>62</b>
<b>B.3.1</b>	<b>MSC Measurement Function .....</b>	<b>62</b>
B.3.1.1	Number of class mark updates .....	62
B.3.1.2	Attempted mobile originating calls.....	63
B.3.1.3	Successful mobile originating calls.....	63
B.3.1.4	Answered mobile originating calls .....	63
B.3.1.5	Attempted mobile terminating calls .....	63
B.3.1.6	Successful mobile terminating calls .....	64
B.3.1.7	Answered mobile terminating calls.....	64
B.3.1.8	Attempted Mobile Emergency calls .....	64
B.3.1.9	Successful Mobile Emergency calls .....	65
B.3.1.10	Answered Mobile Emergency calls .....	65
B.3.1.11	Attempted ciphering mode control procedures .....	65
B.3.1.12	Successful ciphering mode control procedures .....	65
B.3.1.13	Attempted interrogations of HLRs for routing .....	66
B.3.1.14	Successful interrogations of HLR (MSRN obtained) .....	66
B.3.1.15	Successful interrogations of HLR (call Forwarding) .....	66
B.3.1.16	Attempted operations for mobile originating point to point SMs .....	67
B.3.1.17	Successful operations for mobile originating point to point SMs .....	67
B.3.1.18	Attempted operations for mobile terminating point to point SMs.....	67
B.3.1.19	Successful operations for mobile terminating point to point SMs.....	68
B.3.1.20	Number of transmitted check IMEI request.....	68
B.3.1.21	Number of white answers in MSC .....	68
B.3.1.22	Number of grey answers in MSC .....	68
B.3.1.23	Number of black answers in MSC.....	69
B.3.1.24	Number of unknown IMEI answers .....	69
B.3.1.25	Mean time to provide the CALL SETUP service .....	69
B.3.1.26	Mean time to provide the LOCATION UPDATING service .....	70
B.3.1.27	Transactions on the MM-layer where subscriber was identified with TMSI... <td>70</td>	70
B.3.1.28	Transactions on the MM-layer where subscriber was identified with IMSI....	70
B.3.1.29	Attempted TMSI re-allocations .....	71
B.3.1.30	Successful TMSI re-allocations.....	71
B.3.1.31	IMSI detach procedures .....	71
B.3.1.32	IMSI attach procedures .....	71
B.3.1.33	Attempted incoming External intra-MSC Handovers.....	72
B.3.1.34	Successful incoming External intra-MSC Handovers.....	72
B.3.1.35	Attempted outgoing External intra-MSC Handovers .....	72
B.3.1.36	Successful outgoing External intra-MSC Handovers .....	72
B.3.1.37	Attempted incoming inter-MSC Handovers.....	73
B.3.1.38	Successful incoming inter-MSC Handovers .....	73
B.3.1.39	Attempted outgoing inter-MSC Handovers.....	73
B.3.1.40	Successful outgoing inter-MSC Handovers.....	73
B.3.1.41	Attempted subsequent inter-MSC Handovers (back to MSCa).....	74
B.3.1.42	Successful subsequent inter-MSC Handovers (back to MSCa).....	74
B.3.1.43	Attempted subsequent inter-MSC Handovers (to MSCc) .....	74
B.3.1.44	Successful subsequent inter-MSC Handovers (to MSCc) .....	75
B.3.1.45	External Handovers .....	75
B.3.1.46	External Handovers per cause .....	75
B.3.1.47	Unsuccessful External Handovers with reconnection to old channels, per MSC .....	75

B.3.2	B.3.1.48 Unsuccessful External Handovers with loss of connection, per MSC .....	76
	External HDO Measurement Function .....	76
	B.3.2.1 Attempted incoming External intra-MSC Handovers per originating CELL ..	76
	B.3.2.2 Successful incoming External intra-MSC Handovers per originating CELL .	76
	B.3.2.3 Attempted outgoing External intra-MSC Handovers per target CELL .....	77
	B.3.2.4 Successful outgoing External intra-MSC Handovers per target CELL .....	77
	B.3.2.5 Attempted incoming inter-MSC Handovers per originating CELL .....	77
	B.3.2.6 Successful incoming inter-MSC Handovers per originating CELL .....	78
	B.3.2.7 Attempted outgoing inter-MSC Handovers per target CELL.....	78
	B.3.2.8 Successful outgoing inter-MSC Handovers per target CELL .....	78
B.4	<b>Measurements Related to the HLR .....</b>	<b>79</b>
B.4.1	HLR Measurement Function .....	79
	B.4.1.1 Number of current MS's Roaming outside HPLMN .....	79
	B.4.1.2 Attempted requests for Authentication sets received by HLR from VLRs ....	79
	B.4.1.3 Successful returned Authentication sets from HLR to VLRs .....	79
	B.4.1.4 Empty responses to request for Authentication sets from HLR to VLRs.....	80
	B.4.1.5 Attempted insert subscriber data service .....	80
	B.4.1.6 Successful insert subscriber data service .....	80
	B.4.1.7 Attempted Location Updates .....	81
	B.4.1.8 Successful Location Updates .....	81
	B.4.1.9 Attempted SS related operations in HLR.....	81
	B.4.1.10 Successful SS related operations in HLR.....	82
	B.4.1.11 Attempted request for SM routing information.....	82
	B.4.1.12 Successful request for SM routing information.....	82
	B.4.1.13 Attempted SM delivery status report procedures.....	83
	B.4.1.14 Successful SM delivery status report procedures.....	83
	B.4.1.15 Attempted number of send alerts .....	83
	B.4.1.16 Successful number of send alerts .....	83
	B.4.1.17 Attempted request for MSRN.....	84
	B.4.1.18 Successful request for MSRN .....	84
B.5	<b>Measurements Related to the VLR .....</b>	<b>84</b>
B.5.1	VLR Measurement Function .....	84
	B.5.1.1 Attempted MS memory available notifications.....	84
	B.5.1.2 Successful MS memory available notifications.....	85
	B.5.1.3 Attempted Identification requests to PVLRs .....	85
	B.5.1.4 Successful Identification requests to PVLRs .....	85
	B.5.1.5 Attempted page requests.....	85
	B.5.1.6 Successful page requests .....	86
	B.5.1.7 Attempted page requests per Location Area .....	86
	B.5.1.8 Successful page requests per Location Area .....	86
	B.5.1.9 Attempted requests for Authentication sets sent to HLR by VLRs .....	86
	B.5.1.10 Successful received Authentication sets from HLR to VLRs .....	87
	B.5.1.11 Empty responses to request for Authentication sets from HLR to VLRs.....	87
	B.5.1.12 Attempted authentication procedures in VLR .....	87
	B.5.1.13 Successful authentication procedures in the VLR .....	88
	B.5.1.14 Attempted intra-VLR Location Updates .....	88
	B.5.1.15 Successful intra-VLR Location Updates .....	88
	B.5.1.16 Attempted inter-VLR Location Updates .....	89
	B.5.1.17 Successful inter-VLR Location Updates .....	89
	B.5.1.18 Arrivals of Visitors from other PLMNs.....	89
B.6	<b>Measurements Related to the EIR .....</b>	<b>90</b>
B.6.1	EIR Measurement Function .....	90
	B.6.1.1 Number of received IMEI check requests.....	90
	B.6.1.2 Number of white answers in EIR .....	90
	B.6.1.3 Number of grey answers in EIR.....	90
	B.6.1.4 Number of black answers in EIR .....	91
	B.6.1.5 Number of unknown IMEI answers.....	91
B.7	<b>Measurements Related to the SMS IWMSC/GMSC .....</b>	<b>91</b>
B.7.1	SMS Measurement Function.....	91

B.7.1.1	Attempted mobile originating SM Forwarding .....	91
B.7.1.2	Successful mobile originating SM Forwarding .....	92
B.7.1.3	Attempted Mobile Terminating SM Forwarding.....	92
B.7.1.4	Successful Mobile Terminating SM Forwarding.....	92
Annex C (Normative): Performance Measurement Object Model .....		93
C.1	Measurement Managed Object Classes .....	94
C.1.1	object class from CCITT ISO.....	94
C.1.2	bscMeasurementFunction .....	94
C.1.3	cellMeasurementFunction.....	94
C.1.4	internalHdoMeasurementFunction.....	95
C.1.5	mscMeasurementFunction .....	96
C.1.6	externalHdoMeasurementFunction.....	97
C.1.7	hlrMeasurementFunction .....	98
C.1.8	vlrMeasurementFunction .....	98
C.1.9	eirMeasurementFunction .....	99
C.1.10	smsMeasurementFunction .....	99
C.2	Measurement Package Definitions .....	100
C.2.1	General Measurement Function Packages .....	100
C.2.1.1	basicMeasurementFunctionPackage .....	100
C.2.2	BSC Measurement Function Related Packages .....	100
C.2.2.1	requestForServicePackage .....	100
C.2.2.2	requestForServicePerCausePackage .....	100
C.2.2.3	interArrivalTimePackage .....	100
C.2.2.4	pagingMessagePerBSCPackage .....	101
C.2.2.5	immediateAssignmentProceduresPerBSCPackage .....	101
C.2.2.6	internalHandoversIntraCellPerBSCPackage.....	101
C.2.2.7	internalHandoversPerBSCPackage .....	101
C.2.2.8	internalHandoversPerCausePackage .....	101
C.2.2.9	internalHandoverFailuresPerBSCPackage .....	102
C.2.3	CELL Measurement Function Related Packages.....	102
C.2.3.1	pchagchQueuePackage .....	102
C.2.3.2	pagingMessagePackage .....	102
C.2.3.3	immediateAssignmentProceduresPackage .....	102
C.2.3.4	immediateAssignmentProceduresPerCausePackage .....	102
C.2.3.5	pageDiscardPackage .....	103
C.2.3.6	durationOfPagingProceduresPackage .....	103
C.2.3.7	tchAvailablePackage .....	103
C.2.3.8	tchBusyPackage.....	103
C.2.3.9	idleTCHsPerInterferenceBandPackage .....	103
C.2.3.10	tchSeizuresPackage.....	104
C.2.3.11	tchAllocatedTimePackage .....	104
C.2.3.12	tchBusyTimePackage.....	104
C.2.3.13	tchQueuePackage.....	104
C.2.3.14	lostRadioLinksPerTCHPackage .....	104
C.2.3.15	sdcchAvailablePackage .....	104
C.2.3.16	sdcchBusyPackage .....	105
C.2.3.17	sdcchSeizuresPackage .....	105
C.2.3.18	sdcchAllocatedTimePackage .....	105
C.2.3.19	sdcchQueuePackage .....	105
C.2.3.20	lostRadioLinksPerSDCCHPackage .....	105
C.2.3.21	downlinkPowerControlPackage.....	105
C.2.3.22	uplinkPowerControlPackage .....	106
C.2.3.23	internalHandoversIntraCellPackage .....	106
C.2.3.24	incomingInternalInterCellHandoversPackage .....	106
C.2.3.25	outgoingInternalInterCellHandoversPackage .....	106
C.2.3.26	internalHandoverFailurePackage .....	106
C.2.4	internal HDO Measurement Function Related Packages .....	107
C.2.4.1	incomingInternalInterCellPerCellHandoversPackage .....	107
C.2.4.2	outgoingInternalInterCellPerCellHandoversPackage .....	107
C.2.5	MSC Measurement Function Related Packages.....	107

C.2.5.1	classMarkPackage .....	107
C.2.5.2	mobileOriginatingCallsPackage .....	107
C.2.5.3	mobileTerminatingCallsPackage .....	107
C.2.5.4	mobileEmergencyCallsPackage .....	108
C.2.5.5	cipheringModePackage .....	108
C.2.5.6	interrogatingHLRPackage .....	108
C.2.5.7	mobileOriginatingPointToPointSMPackage .....	108
C.2.5.8	mobileTerminatingPointToPointSMPackage .....	108
C.2.5.9	imeiRequestPackage .....	109
C.2.5.10	whiteAnswersInMSCPackage .....	109
C.2.5.11	greyAnswersInMSCPackage .....	109
C.2.5.12	blackAnswersInMSCPackage .....	109
C.2.5.13	unknownIMEIAnswersInMSCPackage .....	109
C.2.5.14	callSetupServicePackage .....	109
C.2.5.15	locationUpdatingServicePackage .....	110
C.2.5.16	subscriberIdentifiedWithTMSIPackage .....	110
C.2.5.17	subscriberIdentifiedWithIMSIpackage .....	110
C.2.5.18	tmsiReallocationsPackage .....	110
C.2.5.19	imsiDetachProceduresPackage .....	110
C.2.5.20	incomingExternalIntraMSCHandoversPackage .....	111
C.2.5.21	outgoingExternalIntraMSCHandoversPackage .....	111
C.2.5.22	incomingInterMSCHandoversPackage .....	111
C.2.5.23	outgoingInterMSCHandoversPackage .....	111
C.2.5.24	subsequentInterMSCHandoversToMACaPackage .....	111
C.2.5.25	subsequentInterMSCHandoversToMACcPackage .....	112
C.2.5.26	externalHandoversPackage .....	112
C.2.5.27	externalHandoversPerCausePackage .....	112
C.2.5.28	externalHandoverFailurePerMSCPackage .....	112
C.2.6	external HDO Measurement Function Related Packages .....	112
C.2.6.1	incomingExternalIntraMSCHandoversPerCellPackage .....	112
C.2.6.2	outgoingExternalIntraMSCHandoversPerCellPackage .....	113
C.2.6.3	incomingExternalInterMSCHandoversPerCellPackage .....	113
C.2.6.4	outgoingExternalInterMSCHandoversPerCellPackage .....	113
C.2.7	HLR Measurement Function Related Packages .....	113
C.2.7.1	msRoamingOutsideHPLMNPackage .....	113
C.2.7.2	authenticationSetsHLRToVLRPackage .....	113
C.2.7.3	insertSubscriberDataServicePackage .....	114
C.2.7.4	locationUpdatePackage .....	114
C.2.7.5	ssRelatedOperationsInHLRPackage .....	114
C.2.7.6	requestForSMRoutingPackage .....	114
C.2.7.7	smDeliveryStatusReportProceduresPackage .....	114
C.2.7.8	sendAlertsPackage .....	115
C.2.7.9	requestForMSRNPackage .....	115
C.2.8	VLR Measurement Function Related Packages .....	115
C.2.8.1	msMemoryAvailableNotificationsPackage .....	115
C.2.8.2	identificationRequestToPVLRPackage .....	115
C.2.8.3	pageRequestPackage .....	115
C.2.8.4	pageRequestPerLocationAreaPackage .....	116
C.2.8.5	authenticationSetsVLRToHLRPackage .....	116
C.2.8.6	authenticationInVLRPackage .....	116
C.2.8.7	intraVLRLocationUpdatePackage .....	116
C.2.8.8	interVLRLocationUpdatePackage .....	116
C.2.8.9	visitorsFromOtherPLMNPackage .....	117
C.2.9	EIR Measurement Function Related Packages .....	117
C.2.9.1	receivedIMEIcheckRequestPackage .....	117
C.2.9.2	whiteAnswersInEIRPackage .....	117
C.2.9.3	greyAnswersInEIRPackage .....	117
C.2.9.4	blackAnswersInEIRPackage .....	117
C.2.9.5	unknownIMEIAnswersInEIRPackage .....	117
C.2.10	SMS Measurement Function Related Packages .....	118
C.2.10.1	mobileOriginatingSMForwardingPackage .....	118
C.2.10.2	mobileTerminatingSMForwardingPackage .....	118

C.3	Measurement Attribute Definitions .....	119
C.3.1	General Measurement Function Related Attributes.....	119
C.3.1.1	measurementFunctionId .....	119
C.3.1.2	observedCell .....	119
C.3.1.3	adjacentCell.....	119
C.3.2	BSC Measurement Function Related Attributes .....	119
C.3.2.1	unsuccReqsForService .....	119
C.3.2.2	unsuccReqsForServicePerCause .....	120
C.3.2.3	meanInterArrivalTime .....	120
C.3.2.4	attTransOfPagingMessagesPerBSC.....	120
C.3.2.5	unsuccTransOfPagingMessagesPerBSC .....	120
C.3.2.6	atIMmediateAssingProcsPerBSC .....	120
C.3.2.7	sucIMmediateAssingProcsPerBSC .....	120
C.3.2.8	succInternalHDOsIntraCellPerBSC.....	121
C.3.2.9	unsuccInternalHDOsIntraCellPerBSC.....	121
C.3.2.10	succInternalHDOsPerBSC .....	121
C.3.2.11	succInternalHDOsPerCause .....	121
C.3.2.12	unsuccInternalHDOsWithReconnectionPerBSC.....	121
C.3.2.13	unsuccInternalHDOsWithLossOfConnectionPerBSC .....	121
C.3.3	CELL Measurement Function Related Attributes .....	122
C.3.3.1	meanPCHAGCHQueueLength.....	122
C.3.3.2	attTransOfPagingMessagesThePCH.....	122
C.3.3.3	unsuccTransOfPagingMessagesThePCH .....	122
C.3.3.4	atIMmediateAssingProcs .....	122
C.3.3.5	sucIMmediateAssingProcs .....	122
C.3.3.6	atIMmediateAssingProcsPerCause .....	122
C.3.3.7	sucIMmediateAssingProcsPerCause .....	123
C.3.3.8	nbrOfPagesDiscardedFromPCHQueue .....	123
C.3.3.9	meanDurationOfSuccPagingProcs .....	123
C.3.3.10	nbrOfAvailableTCHs.....	123
C.3.3.11	meanNbrOfBusyTCHs .....	123
C.3.3.12	maxNbrOfBusyTCHs .....	123
C.3.3.13	meanNbrOfidleTCHsPerInterferenceBand .....	124
C.3.3.14	attTCHSeizures .....	124
C.3.3.15	succTCHSeizures .....	124
C.3.3.16	attTCHSeizuresMeetingTCHBlockedState.....	124
C.3.3.17	allAvailableTCHAllocatedTime .....	124
C.3.3.18	meanTCHBusyTime .....	124
C.3.3.19	meanTCHQueueLength .....	125
C.3.3.20	nbrOfLostRadioLinksTCH .....	125
C.3.3.21	nbrOfAvailableSDCCHs .....	125
C.3.3.22	meanNbrOfBusySDCCHs .....	125
C.3.3.23	maxNbrOfBusySDCCHs .....	125
C.3.3.24	attSDCCHSeizuresMeetingSDCCHBlockedState .....	125
C.3.3.25	allAvailableSDCCHAllocatedTime.....	126
C.3.3.26	meanSDCCHQueueLength.....	126
C.3.3.27	nbrOfLostRadioLinksSDCCH .....	126
C.3.3.28	relativeTimeDLPowerControlAtMax .....	126
C.3.3.29	relativeTimeULPowerControlAtMax .....	126
C.3.3.30	succInternalHDOsIntraCell.....	126
C.3.3.31	unsuccInternalHDOsIntraCell.....	127
C.3.3.32	attIncomingInternalInterCellHDOs.....	127
C.3.3.33	succIncomingInternalInterCellHDOs .....	127
C.3.3.34	attOutgoingInternalInterCellHDOs.....	127
C.3.3.35	succOutgoingInternalInterCellHDOs .....	127
C.3.3.36	unsuccHDOsWithReconnection .....	127
C.3.3.37	unsuccHDOsWithLossOfConnection .....	128
C.3.4	internal HDO Measurement Function Related Attributes.....	128
C.3.4.1	attIncomingInternalInterCellHDOsPerOriginatingCell .....	128
C.3.4.2	succIncomingInternalInterCellHDOsPerOriginatingCell .....	128
C.3.4.3	attOutgoingInternalInterCellHDOsPerTargetCell .....	128
C.3.4.4	succOutgoingInternalInterCellHDOsPerTargetCell .....	128
C.3.5	MSC Measurement Function Related Attributes .....	129

C.3.5.1	nbrOfClassMarkUpdates .....	129
C.3.5.2	attMobileOriginatingCalls .....	129
C.3.5.3	succMobileOriginatingCalls .....	129
C.3.5.4	ansMobileOriginatingCalls .....	129
C.3.5.5	attMobileTerminatingCalls .....	129
C.3.5.6	succMobileTerminatingCalls.....	129
C.3.5.7	ansMobileTerminatingCalls .....	130
C.3.5.8	attMobileEmergencyCalls .....	130
C.3.5.9	succMobileEmergencyCalls.....	130
C.3.5.10	ansMobileEmergencyCalls .....	130
C.3.5.11	attCipheringModeControlProcs.....	130
C.3.5.12	succCipheringModeControlProcs .....	130
C.3.5.13	attInterrogationOfHLRsForRouting .....	131
C.3.5.14	succInterrogationOfHLRsMSRNObtained .....	131
C.3.5.15	succInterrogationOfHLRsCallForwarding .....	131
C.3.5.16	attOpForMobileOriginatingPointToPointSMs.....	131
C.3.5.17	succOpForMobileOriginatingPointToPointSMs .....	131
C.3.5.18	attOpForMobileTerminatingPointToPointSMs .....	131
C.3.5.19	succOpForMobileTerminatingPointToPointSMs.....	132
C.3.5.20	nbrOfTransCheckIMEIRequests.....	132
C.3.5.21	nbrOfWhiteAnsInMSC .....	132
C.3.5.22	nbrOfGreyAnsInMSC .....	132
C.3.5.23	nbrOfBlackAnsInMSC .....	132
C.3.5.24	nbrOfUnknownIMEIAnsInMSC .....	132
C.3.5.25	meanTimeToCallSetupService .....	133
C.3.5.26	meanTimeToLocationUpdateService .....	133
C.3.5.27	transSubIdentifiedWithTMSI .....	133
C.3.5.28	transSubIdentifiedWithIMSI .....	133
C.3.5.29	attTMSIReallocations.....	133
C.3.5.30	succTMSIReallocations .....	133
C.3.5.31	imsiDetachProcs.....	134
C.3.5.32	imsiAttachProcs .....	134
C.3.5.33	attIncomingExternalIntraMSCHDOs .....	134
C.3.5.34	succIncomingExternalIntraMSCHDOs .....	134
C.3.5.35	attOutgoingExternalIntraMSCHDOs .....	134
C.3.5.36	succOutgoingExternalIntraMSCHDOs .....	134
C.3.5.37	attIncomingInterMSCHDOs .....	135
C.3.5.38	succIncomingInterMSCHDOs.....	135
C.3.5.39	attOutgoingInterMSCHDOs .....	135
C.3.5.40	succOutgoingInterMSCHDOs.....	135
C.3.5.41	attSubsequentInterMSCHDOsMSCa.....	135
C.3.5.42	succSubsequentInterMSCHDOsMSCa .....	135
C.3.5.43	attSubsequentInterMSCHDOsMSCc .....	136
C.3.5.44	succSubsequentInterMSCHDOsMSCc .....	136
C.3.5.45	externalHDOs .....	136
C.3.5.46	externalHDOsPerCause .....	136
C.3.5.47	unsuccExternHDOsWithReconnectionPerMSC .....	136
C.3.5.48	unsuccExternHDOsWithLossOfConnectionPerMSC .....	136
C.3.6	external HDO Measurement Function Related Attributes .....	137
C.3.6.1	attIncomingExternalIntraMSCHDOsPerOriginatingCell.....	137
C.3.6.2	succIncomingExternalIntraMSCHDOsPerOriginatingCell .....	137
C.3.6.3	attOutgoingExternalIntraMSCHDOsPerTargetCell.....	137
C.3.6.4	succOutgoingExternalIntraMSCHDOsPerTargetCell .....	137
C.3.6.5	attIncomingInterMSCHDOsPerOriginatingCell .....	137
C.3.6.6	succIncomingInterMSCHDOsPerOriginatingCell .....	137
C.3.6.7	attOutgoingInterMSCHDOsPerTargetCell .....	138
C.3.6.8	succOutgoingInterMSCHDOsPerTargetCell .....	138
C.3.7	HLR Measurement Function Related Attributes.....	138
C.3.7.1	nbrOfCurrentMSsRoamingOutsideHPLMN .....	138
C.3.7.2	attReqForAuthSetsReceivedByHLRFromVLRs.....	138
C.3.7.3	succReturnedAuthSetsFromHLRToVLRs .....	138
C.3.7.4	emptyResponsesForAuthSetsFromHLRToVLRs .....	138
C.3.7.5	attInsertSubDataService.....	139

C.3.7.6	succInsertSubDataService .....	139
C.3.7.7	attLocationUpdate .....	139
C.3.7.8	succLocationUpdate.....	139
C.3.7.9	attSSRelatedOperationsInHLR .....	139
C.3.7.10	succSSRelatedOperationsInHLR .....	139
C.3.7.11	attReqForSMRoutingInfo.....	140
C.3.7.12	succReqForSMRoutingInfo .....	140
C.3.7.13	attSMDeliveryStatusReportProcs .....	140
C.3.7.14	succSMDeliveryStatusReportProcs .....	140
C.3.7.15	attNbrOfSendAlerts .....	140
C.3.7.16	succNbrOfSendAlerts.....	140
C.3.7.17	attReqForMSRN .....	141
C.3.7.18	succReqForMSRN .....	141
C.3.8	VLR Measurement Function Related Attributes .....	141
C.3.8.1	attMSMemoryAvailableNotifications .....	141
C.3.8.2	succMSMemoryAvailableNotifications .....	141
C.3.8.3	attIdentificationReqToPVLRs .....	141
C.3.8.4	succIdentificationReqToPVLRs.....	141
C.3.8.5	attPageReqs.....	142
C.3.8.6	succPageReqs .....	142
C.3.8.7	attPageReqsPerLocationArea.....	142
C.3.8.8	succPageReqsPerLocationArea .....	142
C.3.8.9	attReqForAuthSetsSentToHLR .....	142
C.3.8.10	succReceivedAuthSetsFromHLR.....	142
C.3.8.11	emptyResponsesForAuthFromHLR .....	143
C.3.8.12	attAuthProcsInVLR .....	143
C.3.8.13	succAuthProcsInVLR .....	143
C.3.8.14	attIntraVLRLocationUpdates.....	143
C.3.8.15	succIntraVLRLocationUpdates.....	143
C.3.8.16	attInterVLRLocationUpdates .....	143
C.3.8.17	succInterVLRLocationUpdates .....	144
C.3.8.18	arrivalOfVisitorsFromOtherPLMNs.....	144
C.3.9	EIR Measurement Function Related Attributes .....	144
C.3.9.1	<a href="https://standards.ieee.org/standard/sist-ets-300-615-e1-2003.html">nbrOfReceivedIMEICheckReqs</a> .....	144
C.3.9.2	<a href="https://standards.ieee.org/standard/sist-ets-300-615-e1-2003.html">nbrOfWhiteAnsInEIR</a> .....	144
C.3.9.3	<a href="https://standards.ieee.org/standard/sist-ets-300-615-e1-2003.html">nbrOfGreyAnsInEIR</a> .....	144
C.3.9.4	<a href="https://standards.ieee.org/standard/sist-ets-300-615-e1-2003.html">nbrOfBlackAnsInEIR</a> .....	144
C.3.9.5	<a href="https://standards.ieee.org/standard/sist-ets-300-615-e1-2003.html">nbrOfUnknownIMEIAnsInEIR</a> .....	145
C.3.10	SMS Measurement Function Related Attributes.....	145
C.3.10.1	attMobileOriginatingSMForwardings .....	145
C.3.10.2	succMobileOriginatingSMForwardings .....	145
C.3.10.3	attMobileTerminatingSMForwardings .....	145
C.3.10.4	succMobileTerminatingSMForwardings .....	145
C.4	Name Bindings .....	146
C.4.1	BSS Name Binding .....	146
C.4.1.1	simpleScanner-bssFunction.....	146
C.4.2	BSC Name Binding .....	146
C.4.2.1	bscMeasurementFunction-bsc .....	146
C.4.3	BTS Name Binding .....	146
C.4.3.1	cellMeasurementFunction-bts .....	146
C.4.3.2	internalHdoMeasurementFunction-bts .....	146
C.4.4	MSC Name Binding .....	147
C.4.4.1	mscMeasurementFunction-mscFunction .....	147
C.4.4.2	externalHdoMeasurementFunction-mscFunction .....	147
C.4.4.3	simpleScanner-mscFunction.....	147
C.4.5	HLR Name Binding .....	147
C.4.5.1	hlrMeasurementFunction-hlrFunction .....	147
C.4.5.2	simpleScanner-hlrFunction.....	148
C.4.6	VLR Name Binding .....	148
C.4.6.1	vlrMeasurementFunction-vlrFunction .....	148
C.4.6.2	simpleScanner-vlrFunction.....	148
C.4.7	EIR Name Binding .....	148

C.4.7.1	eirMeasurementFunction-eirFunction .....	148
C.4.7.2	simpleScanner-eirFunction .....	149
C.4.8	SMS Name Binding .....	149
C.4.8.1	smsMeasurementFunction-smsGIWFunction .....	149
C.4.8.2	simpleScanner-smsGIWFunction .....	149
C.5	Behaviour Definitions .....	150
C.5.1	simple scanner behaviour .....	150
C.5.2	general measurement function behaviour .....	150
C.5.3	general measurement package behaviour .....	150
C.5.4	general measurement attribute behaviour .....	150
C.6	Abstract syntax definitions .....	151
Annex D (Normative): Data Transfer Requirements .....		154
D.1	Data Transfer Requirements .....	154
D.1.1	General .....	154
D.2	Object Model .....	154
D.2.1	Managed Object Classes .....	154
D.2.1.1	"Recommendation X.721: 1992": log .....	154
D.2.1.2	"Recommendation X.738: 1993": scanReportRecord .....	154
D.2.2	Name Bindings .....	154
D.2.2.1	log-managedElement .....	154
D.2.2.2	scanReportRecord-log .....	154
Annex E (Informative): Non Standardised Measurements of Interest to PLMN Management .....		156
<b>The STANDARD PREVIEW (standards.iteh.ai)</b>		
E.1	Measurement Related to the BSC .....	156
E.1.1	BSC Measurement Function .....	156
E.2	Measurement Related to the BTS .....	156
E.2.1	<a href="#">BTS Measurement Function</a> .....	156
E.2.2	<a href="#">CELL Measurement Function</a> .....	156
E.2.3	Internal HDO Measurement Function .....	156
E.3	Measurement Related to the MSC .....	157
E.3.1	MSC Measurement Function .....	157
E.3.1.1	Attempted Mobile to Mobile Calls .....	157
E.3.1.2	Successful Mobile to Mobile Calls .....	157
E.3.1.3	Answered Mobile to Mobile Calls .....	157
E.3.1.4	Attempted Mobile to Land Calls .....	157
E.3.1.5	Successful Mobile to Land Calls .....	157
E.3.1.6	Answered Mobile to Land Calls .....	157
E.3.1.7	Attempted Land to Mobile Calls .....	157
E.3.1.8	Successful Land to Mobile Calls .....	157
E.3.1.9	Answered Land to Mobile Calls .....	157
E.3.1.10	Mean Holding Time of Calls .....	158
E.3.2	External HDO Measurement Function .....	158
E.4	Measurements related to the HLR .....	159
E.4.1	HLR Measurement Function .....	159
E.4.1.1	Instantaneous number of HLR subscribers .....	159
E.4.1.2	Barred subscribers in the HLR .....	159
E.4.1.3	Bearer service indication .....	159
E.4.1.4	SS operation indication .....	159
E.4.1.5	Attempted requests for Authentication sets from the AUC by the HLR .....	159
E.4.1.6	Successful returned Authentication sets from the AUC to the HLR .....	159
E.5	Measurements related to the VLR .....	160
E.5.1	VLR Measurement Function .....	160
E.5.1.1	Subscribers from other PLMNs registered in the VLR .....	160

E.5.1.2	Number of roamers in the VLR .....	160
E.6	Measurements related to the EIR .....	160
E.7	Measurements related to the SMS-IWMSC/GMSC .....	160
E.8	Performance Measurements on non-specific GSM Objects.....	160
E.8.1	Measurements related to a PCM system.....	160
E.8.2	Measurements related to MTP .....	160
E.8.3	Measurements related to SCCP and TCAP .....	160
E.8.4	Measurements related to ISUP.....	160
Annex F (informative): Index of Measurement Attribute Names.....		161
Annex G (informative): Bibliography .....		164
History.....		165

## iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST ETS 300 615 E1:2003  
<https://standards.iteh.ai/catalog/standards/sist/a3a73c64-1d3e-47a2-a154-f6246cf1ab3f/sist-ets-300-615-e1-2003>