

ETSI TS 128 552 V17.9.0 (2023-01)



**5G;
Management and orchestration;
5G performance measurements
(3GPP TS 28.552 version 17.9.0 Release 17)**

[ETSI TS 128 552 V17.9.0 \(2023-01\)](https://standards.iteh.ai/catalog/standards/sist/46609d62-2d01-4ff6-869b-8b54d38a7606/etsi-ts-128-552-v17-9-0-2023-01)

<https://standards.iteh.ai/catalog/standards/sist/46609d62-2d01-4ff6-869b-8b54d38a7606/etsi-ts-128-552-v17-9-0-2023-01>



Reference

RTS/TSGS-0528552vh90

Keywords

5G

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° w061004871

Important notice

The present document can be downloaded from:

<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the prevailing version of an ETSI deliverable is the one made publicly available in PDF format at www.etsi.org/deliver.

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommitteeSupportStaff.aspx>

If you find a security vulnerability in the present document, please report it through our

Coordinated Vulnerability Disclosure Program:

<https://www.etsi.org/standards/coordinated-vulnerability-disclosure>

Notice of disclaimer & limitation of liability

The information provided in the present deliverable is directed solely to professionals who have the appropriate degree of experience to understand and interpret its content in accordance with generally accepted engineering or other professional standard and applicable regulations.

No recommendation as to products and services or vendors is made or should be implied.

No representation or warranty is made that this deliverable is technically accurate or sufficient or conforms to any law and/or governmental rule and/or regulation and further, no representation or warranty is made of merchantability or fitness for any particular purpose or against infringement of intellectual property rights.

In no event shall ETSI be held liable for loss of profits or any other incidental or consequential damages.

Any software contained in this deliverable is provided "AS IS" with no warranties, express or implied, including but not limited to, the warranties of merchantability, fitness for a particular purpose and non-infringement of intellectual property rights and ETSI shall not be held liable in any event for any damages whatsoever (including, without limitation, damages for loss of profits, business interruption, loss of information, or any other pecuniary loss) arising out of or related to the use of or inability to use the software.

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2023.
All rights reserved.

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM®** and the GSM logo are trademarks registered and owned by the GSM Association.

Legal Notice

This Technical Specification (TS) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities. These shall be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between 3GPP and ETSI identities can be found under <http://webapp.etsi.org/key/queryform.asp>.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

Intellectual Property Rights	2
Legal Notice	2
Modal verbs terminology.....	2
Foreword.....	20
1 Scope	21
2 References	21
3 Definitions, abbreviations and measurement family	23
3.1 Definitions	23
3.2 Abbreviations	23
3.3 Measurement family.....	24
4 Concepts and overview	25
4.1 Performance indicators.....	25
4.2 Filters and filter naming	25
4.2.0 General.....	25
4.2.1 Filters	25
4.2.2 Filter naming.....	26
5 Performance measurements for 5G network functions	26
5.1 Performance measurements for gNB.....	26
5.1.0 Relation to RAN L2 measurement specification	26
5.1.1 Performance measurements valid for all gNB deployment scenarios.....	27
5.1.1.1 Packet Delay	27
5.1.1.1.1 Average delay DL air-interface	27
5.1.1.1.2 Distribution of delay DL air-interface	27
5.1.1.1.3 Average delay UL on over-the-air interface	28
5.1.1.1.4 Average RLC packet delay in the UL.....	28
5.1.1.1.5 Average PDCP re-ordering delay in the UL.....	29
5.1.1.1.6 Distribution of DL delay between NG-RAN and UE.....	29
5.1.1.1.7 Distribution of UL delay between NG-RAN and UE.....	30
5.1.1.1.8 DL packet delay between NG-RAN and PSA UPF.....	31
5.1.1.2 Radio resource utilization	32
5.1.1.2.1 DL Total PRB Usage.....	32
5.1.1.2.2 UL Total PRB Usage.....	33
5.1.1.2.3 Distribution of DL Total PRB Usage	33
5.1.1.2.4 Distribution of UL total PRB usage.....	34
5.1.1.2.5 Mean DL PRB used for data traffic.....	34
5.1.1.2.6 DL total available PRB.....	35
5.1.1.2.7 Mean UL PRB used for data traffic.....	35
5.1.1.2.8 UL total available PRB.....	35
5.1.1.2.9 Peak DL PRB used for data traffic	36
5.1.1.2.10 Peak UL PRB used for data traffic	36
5.1.1.2.11 PDSCH PRB Usage per cell for MIMO	36
5.1.1.2.12 PUSCH PRB Usage per cell for MIMO	37
5.1.1.2.13 SDM PDSCH PRB Usage	38
5.1.1.2.14 SDM PUSCH PRB Usage	39
5.1.1.3 UE throughput.....	40
5.1.1.3.1 Average DL UE throughput in gNB.....	40
5.1.1.3.2 Distribution of DL UE throughput in gNB	41
5.1.1.3.3 Average UL UE throughput in gNB.....	42
5.1.1.3.4 Distribution of UL UE throughput in gNB	43
5.1.1.3.5 Percentage of unrestricted DL UE data volume in gNB.....	45
5.1.1.3.6 Percentage of unrestricted UL UE data volume in gNB.....	45
5.1.1.4 RRC connection number	46
5.1.1.4.1 Mean number of RRC Connections.....	46

5.1.1.4.2	Max number of RRC Connections	47
5.1.1.4.3	Mean number of stored inactive RRC Connections	47
5.1.1.4.4	Max number of stored inactive RRC Connections	47
5.1.1.5	PDU Session Management.....	48
5.1.1.5.1	Number of PDU Sessions requested to setup	48
5.1.1.5.2	Number of PDU Sessions successfully setup	48
5.1.1.5.3	Number of PDU Sessions failed to setup	49
5.1.1.5.4	Mean number of PDU sessions being allocated	49
5.1.1.5.5	Peak number of PDU sessions being allocated.....	49
5.1.1.6	Mobility Management.....	50
5.1.1.6.1	Inter-gNB handovers	50
5.1.1.6.1.1	Number of requested legacy handover preparations	50
5.1.1.6.1.2	Number of successful legacy handover preparations	50
5.1.1.6.1.3	Number of failed legacy handover preparations	51
5.1.1.6.1.4	Number of requested legacy handover resource allocations	51
5.1.1.6.1.5	Number of successful legacy handover resource allocations	51
5.1.1.6.1.6	Number of failed legacy handover resource allocations	52
5.1.1.6.1.7	Number of requested legacy handover executions.....	52
5.1.1.6.1.8	Number of successful legacy handover executions.....	53
5.1.1.6.1.9	Number of failed legacy handover executions.....	53
5.1.1.6.1.10	Mean Time of requested legacy handover executions	54
5.1.1.6.1.11	Max Time of requested legacy handover executions	54
5.1.1.6.1.12	Number of successful handover executions per beam pair	54
5.1.1.6.1.13	Number of failed handover executions per beam pair	55
5.1.1.6.2	Intra-gNB handovers	56
5.1.1.6.2.1	Number of requested legacy handover executions.....	56
5.1.1.6.2.2	Number of successful legacy handover executions.....	56
5.1.1.6.3	Handovers between 5GS and EPS.....	56
5.1.1.6.3.1	Number of requested preparations for handovers from 5GS to EPS.....	56
5.1.1.6.3.2	Number of successful preparations for handovers from 5GS to EPS	57
5.1.1.6.3.3	Number of failed preparations for handovers from 5GS to EPS.....	57
5.1.1.6.3.4	Number of requested resource allocations for handovers from EPS to 5GS.....	57
5.1.1.6.3.5	Number of successful resource allocations for handovers from EPS to 5GS	58
5.1.1.6.3.6	Number of failed resource allocations for handovers from EPS to 5GS.....	58
5.1.1.6.3.7	Number of requested executions for handovers from 5GS to EPS	58
5.1.1.6.3.8	Number of successful executions for handovers from 5GS to EPS	59
5.1.1.6.3.9	Number of failed executions for handovers from 5GS to EPS	59
5.1.1.6.3.10	Number of requested preparations for EPS fallback handovers.....	59
5.1.1.6.3.11	Number of successful preparations for EPS fallback handovers	60
5.1.1.6.3.12	Number of failed preparations for EPS fallback handovers.....	60
5.1.1.6.3.13	Number of successful executions for EPS fallback handovers	60
5.1.1.6.3.14	Number of failed executions for EPS fallback handovers	61
5.1.1.6.3.15	Mean Time of EPS fallback handover	61
5.1.1.6.3.16	Mean Time of EPS fallback handover executions	62
5.1.1.6.4	RRC redirection measurement.....	62
5.1.1.6.5	Intra/Inter-frequency Handover related measurements	62
5.1.1.6.5.1	Number of requested intra-frequency handover executions.....	62
5.1.1.6.5.2	Number of successful intra-frequency handover executions	63
5.1.1.6.5.3	Number of requested inter-frequency handover executions.....	63
5.1.1.6.5.4	Number of successful inter-frequency handover executions	63
5.1.1.6.6	Inter-gNB conditional handovers	64
5.1.1.6.6.1	Number of requested conditional handover preparations.....	64
5.1.1.6.6.2	Number of successful conditional handover preparations	64
5.1.1.6.6.3	Number of failed conditional handover preparations.....	65
5.1.1.6.6.7	Number of configured conditional handover candidates	66
5.1.1.6.6.8	Number of UEs configured with conditional handover.	66
5.1.1.6.6.9	Number of successful conditional handover executions	67
5.1.1.6.6.10	Void	67
5.1.1.6.6.11	Mean Time of requested conditional handover executions.....	67
5.1.1.6.6.12	Max Time of requested conditional handover executions.....	68
5.1.1.6.6.13	Number of UEs for which conditional handover preparations are requested.....	68
5.1.1.6.6.14	Number of UEs for which conditional handover preparations were successful.....	68

5.1.1.6.6.15	Number of UEs for which conditional handover preparations failed.....	69
5.1.1.6.7	Intra-gNB conditional handovers	69
5.1.1.6.7.1	Number of configured conditional handover candidates	69
5.1.1.6.7.2	Number of UEs configured with conditional handover	70
5.1.1.6.7.3	Number of successful handover executions	70
5.1.1.6.8	Inter-gNB DAPS handovers	70
5.1.1.6.8.1	Number of requested DAPS handover preparations	70
5.1.1.6.8.2	Number of successful DAPS handover preparations	71
5.1.1.6.8.3	Number of failed DAPS handover preparations	71
5.1.1.6.8.4	Number of requested DAPS handover resource allocations	72
5.1.1.6.8.5	Number of successful DAPS handover resource allocations	72
5.1.1.6.8.6	Number of failed DAPS handover resource allocations	72
5.1.1.6.8.7	Number of requested DAPS handover executions.....	73
5.1.1.6.8.8	Number of successful DAPS handover executions.....	73
5.1.1.6.8.9	Number of failed DAPS handover executions	73
5.1.1.6.9	Intra-gNB DAPS handovers	74
5.1.1.6.9.1	Number of requested handovers	74
5.1.1.6.9.2	Number of successful DAPS handovers	75
5.1.1.7	TB related Measurements	75
5.1.1.7.1	Total number of DL initial TBs.....	75
5.1.1.7.2	Initial error number of DL TBs	75
5.1.1.7.3	Total number of DL TBs	76
5.1.1.7.4	Total error number of DL TBs	76
5.1.1.7.5	Residual error number of DL TBs.....	77
5.1.1.7.6	Total number of UL initial TBs.....	77
5.1.1.7.7	Error number of UL initial TBs.....	77
5.1.1.7.8	Total number of UL TBs	78
5.1.1.7.9	Total error number of UL TBs	78
5.1.1.7.10	Residual error number of UL TBs.....	78
5.1.1.8	Void.....	79
5.1.1.9	Void.....	79
5.1.1.10	DRB related measurements.....	79
5.1.1.10.1	Number of DRBs attempted to setup.....	79
5.1.1.10.2	Number of DRBs successfully setup	79
5.1.1.10.3	Number of released active DRBs	80
5.1.1.10.4	In-session activity time for DRB	81
5.1.1.10.7	Number of DRBs attempted to be resumed	82
5.1.1.10.8	Number of DRBs successfully resumed	82
5.1.1.10.9	Mean number of DRBs being allocated.....	83
5.1.1.10.10	Peak number of DRBs being allocated.....	83
5.1.1.10.11	Mean number of DRBs undergoing from User Plane Path Failures	84
5.1.1.11	CQI related measurements	84
5.1.1.11.1	Wideband CQI distribution	84
5.1.1.12	MCS related Measurements.....	84
5.1.1.12.1	MCS Distribution in PDSCH	84
5.1.1.12.2	MCS Distribution in PUSCH	85
5.1.1.12.3	PDSCH MCS Distribution for MU-MIMO	85
5.1.1.12.4	PUSCH MCS Distribution for MU-MIMO	85
5.1.1.13	QoS flow related measurements.....	86
5.1.1.13.1	QoS flow release.....	86
5.1.1.13.1.2	Number of QoS flows attempted to release	87
5.1.1.13.2	QoS flow activity.....	87
5.1.1.13.3	QoS flow setup	88
5.1.1.13.3.1	Number of QoS flow attempted to setup.....	88
5.1.1.13.3.2	Number of QoS flow successfully established.....	88
5.1.1.13.3.3	Number of QoS flow failed to setup	89
5.1.1.13.4	QoS flow modification	91
5.1.1.13.4.1	Number of QoS flows attempted to modify.....	91
5.1.1.13.4.2	Number of QoS flows successfully modified	91
5.1.1.13.4.3	Number of QoS flows failed to modify.....	91
5.1.1.14	Void.....	92
5.1.1.15	RRC connection establishment related measurements.....	92

5.1.1.15.1	Attempted RRC connection establishments	92
5.1.1.15.2	Successful RRC connection establishments	92
5.1.1.15.3	Failed RRC connection establishments	92
5.1.1.16	UE-associated logical NG-connection related measurements	93
5.1.1.16.1	Attempted UE-associated logical NG-connection establishment from gNB to AMF	93
5.1.1.16.2	Successful UE-associated logical NG-connection establishment from gNB to AMF	93
5.1.1.17	RRC Connection Re-establishment	94
5.1.1.17.1	Number of RRC connection re-establishment attempts	94
5.1.1.17.2	Successful RRC connection re-establishment with UE context	94
5.1.1.17.3	Successful RRC connection re-establishment without UE context	94
5.1.1.17.4	Number of RRC connection re-establishment attempts followed by RRC Setup	95
5.1.1.18	RRC Connection Resuming	95
5.1.1.18.1	Number of RRC connection resuming attempts	95
5.1.1.18.2	Successful RRC connection resuming	95
5.1.1.18.3	Successful RRC connection resuming with fallback	96
5.1.1.18.4	RRC connection resuming followed by network release	96
5.1.1.18.5	RRC connection resuming followed by network suspension	96
5.1.1.18.6	Number of RRC connection resuming attempts followed by RRC Setup	97
5.1.1.19	Power, Energy and Environmental (PEE) measurements	97
5.1.1.19.1	Applicability of measurements	97
5.1.1.19.2	PNF Power Consumption	97
5.1.1.19.2.1	Average Power	97
5.1.1.19.2.2	Minimum Power	97
5.1.1.19.2.3	Maximum Power	98
5.1.1.19.3	PNF Energy consumption	98
5.1.1.19.4	PNF Temperature	98
5.1.1.19.4.1	Average Temperature	98
5.1.1.19.4.2	Minimum Temperature	98
5.1.1.19.4.3	Maximum Temperature	99
5.1.1.19.5	PNF Voltage	99
5.1.1.19.6	PNF Current	99
5.1.1.19.7	PNF Humidity	100
5.1.1.20	Received Random Access Preambles	100
5.1.1.20.1	Received Random Access Preambles per cell	100
5.1.1.20.2	Received Random Access Preambles per SSB	101
5.1.1.20.3	Distribution of number of RACH preambles per cell	101
5.1.1.20.4	Distribution of RACH access delay	102
5.1.1.21	Intra-NRCell SSB Beam switch Measurement	102
5.1.1.21.1	Number of requested Intra-NRCell SSB Beam switch executions	102
5.1.1.21.2	Number of successful Intra-NRCell SSB Beam switch executions	103
5.1.1.22	RSRP Measurement	103
5.1.1.22.1	SS-RSRP distribution per SSB	103
5.1.1.22.2	SS-RSRP distribution per SSB of neighbor NR cell	103
5.1.1.22.3	RSRP distribution per neighbor E-UTRAN cell	104
5.1.1.23	Number of Active Ues	104
5.1.1.23.1	Mean number of Active UEs in the DL per cell	104
5.1.1.23.2	Max number of Active UEs in the DL per cell	105
5.1.1.23.3	Mean number of Active UEs in the UL per cell	105
5.1.1.23.4	Max number of Active UEs in the UL per cell	106
5.1.1.24	5QI 1 QoS Flow Duration Monitoring	106
5.1.1.24.1	Average Normally Released Call (5QI 1 QoS Flow) Duration	106
5.1.1.24.2	Average Abnormally Released Call (5QI 1 QoS Flow) Duration	107
5.1.1.24.3	Distribution of Normally Released Call (5QI 1 QoS Flow) Duration	107
5.1.1.24.4	Distribution of Abnormally Released Call (5QI 1 QoS Flow) Duration	108
5.1.1.25	Measurements related to MRO	108
5.1.1.25.1	Handover failures related to MRO for intra-system mobility	108
5.1.1.25.2	Handover failures related to MRO for inter-system mobility	109
5.1.1.25.3	Unnecessary handovers for inter-system mobility	109
5.1.1.25.4	Handover ping-pong for inter-system mobility	110
5.1.1.25.5	Handover failures per beam-cell pair related to MRO for intra-system mobility	110
5.1.1.26	PHR Measurement	110
5.1.1.26.1	Type 1 power headroom distribution	110

5.1.1.27	Paging Measurement.....	111
5.1.1.27.1	Number of CN Initiated paging records received by the gNB-CU.....	111
5.1.1.27.2	Number of NG-RAN Initiated paging records received by the gNB-CU.....	111
5.1.1.27.3	Number of paging records received by the NRCellDU.....	111
5.1.1.27.4	Number of CN Initiated paging records discarded at the gNB-CU.....	112
5.1.1.27.5	Number of NG-RAN Initiated paging records discarded at the gNB-CU.....	112
5.1.1.27.6	Number of paging records discarded at the NRCellDU.....	112
5.1.1.28	SSB beam related Measurement.....	113
5.1.1.28.1	Number of UE related the SSB beam Index (mean).....	113
5.1.1.29	Transmit power utilization measurements.....	113
5.1.1.29.1	Maximum transmit power of NR cell.....	113
5.1.1.29.2	Mean transmit power of NR cell.....	113
5.1.1.30	MU-MIMO related measurements.....	114
5.1.1.30.1	Scheduled PDSCH RBs per layer of MU-MIMO.....	114
5.1.1.30.2	Scheduled PUSCH RBs per layer of MU-MIMO.....	114
5.1.1.30.3	PDSCH Time-domain average Maximum Scheduled Layer Number of cell for MIMO scenario.....	114
5.1.1.30.4	PUSCH Time-domain average Maximum Scheduled Layer Number of cell for MIMO scenario.....	115
5.1.1.30.5	Average value of scheduled MIMO layers per PRB on the DL.....	115
5.1.1.30.6	Average value of scheduled MIMO layers per PRB on the UL.....	116
5.1.1.31	RSRQ measurement.....	117
5.1.1.32	SINR measurement.....	117
5.1.1.33	Timing Advance.....	117
5.1.1.33.1	Timing Advance distribution for NR Cell.....	117
5.1.1.34	Incoming GTP Data Packet Loss in gNB over N3.....	118
5.1.2	Performance measurements valid only for non-split gNB deployment scenario.....	118
5.1.2.1	PDCP Data Volume.....	118
5.1.2.1.1	DL PDCP SDU Data Volume Measurements.....	118
5.1.2.1.2	UL PDCP SDU Data Volume Measurements.....	120
5.1.2.2	Packet Success Rate.....	122
5.1.2.2.1	UL PDCP SDU Success Rate.....	122
5.1.3	Performance measurements valid for split gNB deployment scenario.....	122
5.1.3.1	Packet Loss Rate.....	122
5.1.3.1.1	UL PDCP SDU Loss Rate.....	122
5.1.3.1.2	UL F1-U Packet Loss Rate.....	123
5.1.3.1.3	DL F1-U Packet Loss Rate.....	123
5.1.3.2	Packet Drop Rate.....	124
5.1.3.2.1	DL PDCP SDU Drop rate in gNB-CU-UP.....	124
5.1.3.2.2	DL Packet Drop Rate in gNB-DU.....	124
5.1.3.3	Packet delay.....	125
5.1.3.3.1	Average delay DL in CU-UP.....	125
5.1.3.3.2	Average delay DL on F1-U.....	125
5.1.3.3.3	Average delay DL in gNB-DU.....	126
5.1.3.3.4	Distribution of delay DL in CU-UP.....	127
5.1.3.3.5	Distribution of delay DL on F1-U.....	127
5.1.3.3.6	Distribution of delay DL in gNB-DU.....	128
5.1.3.4	IP Latency measurements.....	128
5.1.3.4.1	General information.....	128
5.1.3.4.2	Average IP Latency DL in gNB-DU.....	128
5.1.3.4.3	Distribution of IP Latency DL in gNB-DU.....	129
5.1.3.5	UE Context Release.....	129
5.1.3.5.1	UE Context Release Request (gNB-DU initiated).....	129
5.1.3.5.2	Number of UE Context Release Requests (gNB-CU initiated).....	130
5.1.3.6	PDCP data volume measurements.....	130
5.1.3.6.1	PDCP PDU data volume Measurement.....	130
5.1.3.6.2	PDCP SDU data volume Measurement.....	131
5.1.3.6.2.4	UL PDCP SDU Data Volume per interface.....	133
5.1.3.7	Handovers measurements.....	133
5.1.3.7.1	Intra-gNB handovers.....	133
5.1.3.7.1.1	Number of requested legacy handover preparations.....	133
5.1.3.7.1.2	Number of successful legacy handover preparations.....	134

5.1.3.7.1.3	Number of requested conditional handover preparations.....	134
5.1.3.7.1.4	Number of successful conditional handover preparations	134
5.1.3.7.1.5	Number of requested DAPS handover preparations	135
5.1.3.7.1.6	Number of successful DAPS handover preparations	135
5.1.3.7.1.7	Number of UEs for which conditional handover preparations are requested.....	136
5.1.3.7.1.8	Number of UEs for which conditional handover preparations are successful	136
5.1.3.8	Void.....	136
5.1.3.9	Void.....	136
5.2	Performance measurements for AMF.....	136
5.2.1	Registered subscribers measurement	136
5.2.1.1	Mean number of registered subscribers.....	136
5.2.1.2	Maximum number of registered subscribers	137
5.2.2	Registration procedure related measurements	137
5.2.2.1	Number of initial registration requests	137
5.2.2.2	Number of successful initial registrations	137
5.2.2.3	Number of mobility registration update requests	138
5.2.2.4	Number of successful mobility registration updates	138
5.2.2.5	Number of periodic registration update requests.....	139
5.2.2.6	Number of successful periodic registration updates.....	139
5.2.2.7	Number of emergency registration requests.....	139
5.2.2.8	Number of successful emergency registrations.....	140
5.2.2.9	Mean time of Registration procedure	140
5.2.2.10	Max time of Registration procedure.....	141
5.2.3	Service Request procedure related measurements	141
5.2.3.1	Number of attempted network initiated service requests	141
5.2.3.2	Number of successful network initiated service requests.....	141
5.2.3.3	Total number of attempted service requests (including both network initiated and UE initiated)	142
5.2.3.4	Total number of successful service requests (including both network initiated and UE initiated)	142
5.2.4	Measurements related to registration via untrusted non-3GPP access.....	142
5.2.4.1	Number of initial registration requests via untrusted non-3GPP access.....	142
5.2.4.2	Number of successful initial registrations via untrusted non-3GPP access.....	143
5.2.4.3	Number of mobility registration update requests via untrusted non-3GPP access.....	143
5.2.4.4	Number of successful mobility registration updates via untrusted non-3GPP access	143
5.2.4.5	Number of periodic registration update requests via untrusted non-3GPP access	144
5.2.4.6	Number of successful periodic registration updates via untrusted non-3GPP access	144
5.2.4.7	Number of emergency registration requests via untrusted non-3GPP access	145
5.2.4.8	Number of successful emergency registrations via untrusted non-3GPP access.....	145
5.2.5	Mobility related measurements.....	145
5.2.5.1	Inter-AMF handovers.....	145
5.2.5.1.1	Number of PDU sessions requested for inter-AMF incoming handovers	145
5.2.5.1.2	Number of PDU sessions failed to setup for inter-AMF incoming handovers	146
5.2.5.1.3	Number of QoS flows requested for inter-AMF incoming handovers	146
5.2.5.1.4	Number of QoS flows failed to setup for inter-AMF incoming handovers	147
5.2.5.2	Measurements for 5G paging	147
5.2.5.2.1	Number of 5G paging procedures.....	147
5.2.5.2.2	Number of successful 5G paging procedures	147
5.2.5.3	Handovers from 5GS to EPS.....	148
5.2.5.3.1	Number of attempted handovers from 5GS to EPS via N26 interface	148
5.2.5.3.2	Number of successful handovers from 5GS to EPS via N26 interface.....	148
5.2.5.3.3	Number of failed handovers from 5GS to EPS via N26 interface	148
5.2.5.4	Handovers from EPS to 5GS.....	149
5.2.5.4.1	Number of attempted handovers from EPS to 5GS via N26 interface	149
5.2.5.4.2	Number of successful handovers from EPS to 5GS via N26 interface.....	149
5.2.5.4.3	Number of failed handovers from EPS to 5GS via N26 interface	149
5.2.6	Measurements related to Service Requests via Untrusted non-3GPP Access.....	150
5.2.6.1	Number of attempted service requests via Untrusted non-3GPP Access	150
5.2.6.2	Number of successful service requests via Untrusted non-3GPP Access	150
5.2.7	Measurements related to SMS over NAS	150
5.2.7.1	Registration of SMS over NAS.....	150
5.2.7.1.1	Number of registration requests for SMS over NAS via 3GPP access.....	150
5.2.7.1.2	Number of successful registrations allowed for SMS over NAS via 3GPP access	151
5.2.7.1.3	Number of registration requests for SMS over NAS via non-3GPP access	151

5.2.7.1.4	Number of successful registrations allowed for SMS over NAS via non-3GPP access	151
5.2.7.2	MO SMS over NAS	152
5.2.7.2.1	Number of attempted MO SMS messages over NAS via 3GPP access	152
5.2.7.2.2	Number of MO SMS messages successfully transported over NAS via 3GPP access.....	152
5.2.7.2.3	Number of attempted MO SMS messages over NAS via non-3GPP access	152
5.2.7.2.4	Number of MO SMS messages successfully transported over NAS via non-3GPP access.....	153
5.2.7.3	MT SMS over NAS.....	153
5.2.7.3.1	Number of attempted MT SMS messages over NAS via 3GPP access.....	153
5.2.7.3.2	Number of MT SMS messages successfully transported over NAS via 3GPP access	153
5.2.7.3.3	Number of attempted MT SMS messages over NAS via non-3GPP access.....	154
5.2.7.3.4	Number of MT SMS messages successfully transported over NAS via non-3GPP access	154
5.2.8	UE Configuration Update procedure related measurements.....	154
5.2.8.1	Number of UE Configuration Update	154
5.2.8.2	Number of successful UE Configuration Update	155
5.2.9	Measurements related to registration via trusted non-3GPP access.....	155
5.2.9.1	Number of initial registration requests via trusted non-3GPP access.....	155
5.2.9.2	Number of successful initial registrations via trusted non-3GPP access.....	155
5.2.9.3	Number of mobility registration update requests via trusted non-3GPP access.....	156
5.2.9.4	Number of successful mobility registration updates via trusted non-3GPP access	156
5.2.9.5	Number of periodic registration update requests via trusted non-3GPP access	156
5.2.9.6	Number of successful periodic registration updates via trusted non-3GPP access	157
5.2.9.7	Number of emergency registration requests via trusted non-3GPP access	157
5.2.9.8	Number of successful emergency registrations via trusted non-3GPP access.....	157
5.2.10	Measurements related to Service Requests via trusted non-3GPP Access.....	158
5.2.10.1	Number of attempted service requests via trusted non-3GPP Access	158
5.2.10.2	Number of successful service requests via trusted non-3GPP Access	158
5.2.11	Authentication procedure related measurements	158
5.2.11.1	Number of authentication requests.....	158
5.2.11.2	Number of failed authentications due to parameter error.....	159
5.2.11.3	Number of authentication rejection.....	159
5.3	Performance measurements for SMF	159
5.3.1	Session Management	159
5.3.1.1	Number of PDU sessions (Mean).....	159
5.3.1.2	Number of PDU sessions (Maximum)	160
5.3.1.3	Number of PDU session creation requests	160
5.3.1.4	Number of successful PDU session creations	160
5.3.1.5	Number of failed PDU session creations	161
5.3.1.6	PDU session modifications	161
5.3.1.6.1	Number of requested PDU session modifications (UE initiated)	161
5.3.1.6.2	Number of successful PDU session modifications (UE initiated)	162
5.3.1.6.3	Number of failed PDU session modifications (UE initiated)	162
5.3.1.6.4	Number of requested PDU session modifications (SMF initiated).....	162
5.3.1.6.5	Number of successful PDU session modifications (SMF initiated)	163
5.3.1.6.6	Number of failed PDU session modifications (SMF initiated).....	163
5.3.1.7	PDU session releases.....	163
5.3.1.7.1	Number of released PDU sessions (AMF initiated)	163
5.3.1.8	Number of PDU session creation requests in HR roaming scenario	164
5.3.1.9	Number of successful PDU session creations in HR roaming scenario	164
5.3.1.10	Number of failed PDU session creations in HR roaming scenario	165
5.3.1.11	Mean time of PDU session establishment.....	165
5.3.1.12	Max time of PDU session establishment.....	166
5.3.2	QoS flow monitoring	166
5.3.2.1	QoS flow monitoring.....	166
5.3.2.1.1	Number of QoS flows requested to create	166
5.3.2.1.2	Number of QoS flows successfully created.....	167
5.3.2.1.3	Number of QoS flows failed to create	167
5.3.2.1.4	Number of QoS flows requested to modify	167
5.3.2.1.5	Number of QoS flows successfully modified	168
5.3.2.1.6	Number of QoS flows failed to modify	168
5.3.2.1.7	Mean number of QoS flows.....	169
5.3.2.1.8	Peak number of QoS flows	169
5.3.3	Performance measurement for N4 interface	169

5.3.3.1	Number of N4 session modifications	169
5.3.3.2	Number of failed N4 session modifications	170
5.3.3.3	Number of N4 session deletions	170
5.3.3.4	Number of failed N4 session deletions	170
5.4	Performance measurements for UPF	171
5.4.1	N3 interface related measurements	171
5.4.1.1	Number of incoming GTP data packets on the N3 interface, from (R)AN to UPF	171
5.4.1.2	Number of outgoing GTP data packets of on the N3 interface, from UPF to (R)AN	171
5.4.1.3	Number of octets of incoming GTP data packets on the N3 interface, from (R)AN to UPF	172
5.4.1.4	Number of octets of outgoing GTP data packets on the N3 interface, from UPF to (R)AN	172
5.4.1.5	Data volume of incoming GTP data packets per QoS level on the N3 interface, from (R)AN to UPF	172
5.4.1.6	Data volume of outgoing GTP data packets per QoS level on the N3 interface, from UPF to (R)AN	173
5.4.1.7	Incoming GTP Data Packet Loss in UPF over N3	173
5.4.1.8	Outgoing GTP Data Packet Loss	173
5.4.1.9	Round-trip GTP Data Packet Delay	174
5.4.1.9.1	Average round-trip N3 delay on PSA UPF	174
5.4.1.9.2	Distribution of round-trip N3 delay on PSA UPF	174
5.4.1.9.3	Average round-trip N3 delay on I-UPF	175
5.4.1.9.4	Distribution of round-trip N3 delay on I-UPF	175
5.4.1.10	Number of incoming GTP data packets out-of-order on the N3 interface, from (R)AN to UPF	175
5.4.2	N6 related measurements	176
5.4.2.1	N6 incoming link usage	176
5.4.2.2	N6 outgoing link usage	176
5.4.3	N4 interface related measurements	176
5.4.3.1	Session establishments	176
5.4.3.1.1	Number of requested N4 session establishments	176
5.4.3.1.2	Number of failed N4 session establishments	177
5.4.3.2	N4 Session reports	177
5.4.3.2.1	Number of requested N4 session reports	177
5.4.3.2.2	Number of successful N4 session reports	177
5.4.4	N9 interface related measurements	178
5.4.4.1	Round-trip GTP Data Packet Delay on N9 interface	178
5.4.4.1.1	Average round-trip N9 delay on PSA UPF	178
5.4.4.1.2	Distribution of round-trip N9 delay on PSA UPF	178
5.4.4.1.3	Average round-trip N9 delay on I-UPF	179
5.4.4.1.4	Distribution of round-trip N9 delay on I-UPF	179
5.4.4.2	GTP Data Packets and volume on N9 interface	179
5.4.4.2.1	Number of incoming GTP data packets on the N9 interface for PSA UPF	179
5.4.4.2.2	Number of outgoing GTP data packets of on the N9 interface for PSA UPF	180
5.4.4.2.3	Number of octets of incoming GTP data packets on the N9 interface for PSA UPF	180
5.4.4.2.4	Number of octets of outgoing GTP data packets on the N9 interface for PSA UPF	180
5.4.5	GTP packets delay in UPF	181
5.4.5.1	DL GTP packets delay in UPF	181
5.4.5.1.1	Average DL GTP packets delay in PSA UPF	181
5.4.5.1.2	Distribution of DL GTP packets delay in PSA UPF	181
5.4.5.1.3	Average DL GTP packets delay in I-UPF	181
5.4.5.1.4	Distribution of DL GTP packets delay in I-UPF	182
5.4.5.2	UL GTP packets delay in UPF	182
5.4.5.2.1	Average UL GTP packets delay in PSA UPF	182
5.4.5.2.2	Distribution of UL GTP packets delay in PSA UPF	183
5.4.5.2.3	Average UL GTP packets delay in I-UPF	183
5.4.5.2.4	Distribution of UL GTP packets delay in I-UPF	183
5.4.6	Void	184
5.4.7	One way packet delay between NG-RAN and PSA UPF	184
5.4.7.1	UL packet delay between NG-RAN and PSA UPF	184
5.4.7.1.1	Average UL GTP packet delay between PSA UPF and NG-RAN	184
5.4.7.1.2	Distribution of UL GTP packet delay between PSA UPF and NG-RAN	185
5.4.8	Round-trip packet delay between PSA UPF and NG-RAN	185
5.4.8.1	Average round-trip packet delay between PSA UPF and NG-RAN	185
5.4.8.2	Distribution of round-trip packet delay between PSA UPF and NG-RAN	186

5.4.9	One way packet delay between PSA UPF and UE	187
5.4.9.1	DL packet delay between PSA UPF and UE	187
5.4.9.1.1	Average DL packet delay between PSA UPF and UE	187
5.4.9.1.2	Distribution of DL packet delay between PSA UPF and UE	188
5.4.9.2	UL packet delay between PSA UPF and UE	189
5.4.9.2.1	Average UL packet delay between PSA UPF and UE	189
5.4.9.2.2	Distribution of UL packet delay between PSA UPF and UE	189
5.4.10	QoS flow related measurements	190
5.4.10.1	Mean number of QoS flows	190
5.4.10.2	Maximum number of QoS flows.....	190
5.5	Performance measurements for PCF	191
5.5.1	AM policy association related measurements.....	191
5.5.1.1	Number of AM policy association requests	191
5.5.1.2	Number of successful AM policy associations	191
5.5.1.3	Number of AM policy association update requests.....	192
5.5.1.4	Number of successful AM policy association updates.....	192
5.5.1.5	Number of AM policy association update notify requests	192
5.5.1.6	Number of successful AM policy association update notifies	192
5.5.2	SM policy association related measurements	193
5.5.2.1	Number of SM policy association requests	193
5.5.2.2	Number of successful SM policy associations	193
5.5.2.3	Number of SM policy association update requests	193
5.5.2.4	Number of successful SM policy association updates.....	194
5.5.2.5	Number of SM policy association update notify requests.....	194
5.5.2.6	Number of successful SM policy association update notifies	194
5.5.3	UE policy association related measurements.....	195
5.5.3.1	Number of UE policy association requests	195
5.5.3.2	Number of successful UE policy associations.....	195
5.5.4	Background data transfer policy control related measurements	196
5.5.4.1	Background data transfer policy creation.....	196
5.5.4.1.1	Number of background data transfer policy creation requests	196
5.5.4.1.2	Number of successful background data transfer policy creations.....	196
5.5.4.1.3	Number of failed background data transfer policy creations.....	196
5.5.5	AM policy authorization related measurements	197
5.5.5.1	Creation of AM policy authorization	197
5.5.5.1.1	Number of AM policy authorization creation requests.....	197
5.5.5.1.2	Number of successful AM policy authorization creations.....	197
5.5.5.1.3	Number of failed AM policy authorization creations	197
5.5.5.2	Update of AM policy authorization	198
5.5.5.2.1	Number of AM policy authorization update requests.....	198
5.5.5.2.2	Number of successful AM policy authorization updates	198
5.5.5.2.3	Number of failed AM policy authorization updates	198
5.5.5.3	Deletion of AM policy authorization	199
5.5.5.3.1	Number of AM policy authorization deletion requests.....	199
5.5.5.3.2	Number of successful AM policy authorization deletions.....	199
5.5.5.3.3	Number of failed AM policy authorization deletions	199
5.5.6	SM policy authorization related measurements	200
5.5.6.1	Creation of SM policy authorization	200
5.5.6.1.1	Number of SM policy authorization creation requests	200
5.5.6.1.2	Number of successful SM policy authorization creations	200
5.5.6.1.3	Number of failed SM policy authorization creations.....	200
5.5.6.2	Update of SM policy authorization	201
5.5.6.2.1	Number of SM policy authorization update requests	201
5.5.6.2.2	Number of successful SM policy authorization updates.....	201
5.5.6.2.3	Number of failed SM policy authorization updates	201
5.5.6.3	Deletion of SM policy authorization	202
5.5.6.3.1	Number of SM policy authorization deletion requests	202
5.5.6.3.2	Number of successful SM policy authorization deletions	202
5.5.6.3.3	Number of failed SM policy authorization deletions.....	202
5.5.7	Event exposure related measurements	203
5.5.7.1	Event exposure subscribe.....	203
5.5.7.1.1	Number of event exposure subscribe requests.....	203

5.5.7.1.2	Number of successful event exposure subscribe	203
5.5.7.1.3	Number of failed event exposure subscribe.....	203
5.5.7.2	Event exposure unsubscription.....	204
5.5.7.2.1	Number of event exposure unsubscribe requests.....	204
5.5.7.2.2	Number of successful event exposure unsubscribe	204
5.5.7.2.3	Number of failed event exposure unsubscribe.....	204
5.5.7.3	Event exposure notification.....	205
5.5.7.3.1	Number of event exposure notifications.....	205
5.6	Performance measurements for UDM.....	205
5.6.1	Mean number of registered subscribers through UDM.....	205
5.6.2	Maximum number of registered subscribers through UDM	205
5.6.3	Mean number of unregistered subscribers through UDM.....	206
5.6.4	Maximum number of unregistered subscribers through UDM	206
5.6.5	Distribution of subscriber profile sizes in UDM.....	206
5.6.6	Mean size of subscriber profiles in UDM.....	207
5.6.7	Distribution of UDM SubscriberDataManagement message sizes	207
5.6.8	Subscriber data management related measurements.....	207
5.6.8.1	Subscription data getting	207
5.6.8.1.1	Number of subscription data getting requests.....	207
5.6.8.1.2	Number of successful subscription data gettings.....	208
5.6.8.1.3	Number of failed subscription data gettings	208
5.6.8.2	SDM subscription	208
5.6.8.2.1	Number of SDM subscribing requests.....	208
5.6.8.2.2	Number of successful SDM subscribings	209
5.6.8.2.3	Number of failed SDM subscribings	209
5.6.8.3	Subscription data notification.....	209
5.6.8.3.1	Number of subscription data notifications.....	209
5.6.9	Parameter provisioning related measurements.....	210
5.6.9.1	Parameter creations	210
5.6.9.1.1	Number of parameter creation requests	210
5.6.9.1.2	Number of successful parameter creations	210
5.6.9.1.3	Number of failed parameter creations	210
5.6.9.2	Parameter update	211
5.6.9.2.1	Number of parameter update requests	211
5.6.9.2.2	Number of successful parameter updates	211
5.6.9.2.3	Number of failed parameter updates.....	211
5.6.9.3	Parameter deletion.....	212
5.6.9.3.1	Number of parameter deletion requests.....	212
5.6.9.3.2	Number of successful parameter deletions	212
5.6.9.3.3	Number of failed parameter deletions	212
5.6.9.4	Parameter getting	213
5.6.9.4.1	Number of parameter getting requests.....	213
5.6.9.4.2	Number of successful parameter gettings.....	213
5.6.9.4.3	Number of failed parameter gettings	213
5.7	Common performance measurements for NFs.....	214
5.7.1	VR usage of NF	214
5.7.1.1	Virtual CPU usage	214
5.7.1.1.1	Mean virtual CPU usage.....	214
5.7.1.2	Virtual memory usage	214
5.7.1.2.1	Mean virtual memory usage	214
5.7.1.3	Virtual disk usage.....	215
5.7.1.3.1	Mean virtual disk usage.....	215
5.7.2	Connection data volumes of NF	216
5.7.2.1	Data volume of incoming bytes to EAS.....	216
5.7.2.2	Data volume of outgoing bytes from EAS	216
5.7.2.3	Data volume of incoming packets to EAS	217
5.7.2.3	Data volume of Outgoing packets to EAS	217
5.8	Performance measurements for N3IWF.....	217
5.8.1	PDU Session Resource management	217
5.8.1.1	PDU Session Resource setup	217
5.8.1.1.1	Number of PDU Sessions requested to setup	217
5.8.1.1.2	Number of PDU Sessions successfully setup	218

5.8.1.1.3	Number of PDU Sessions failed to setup	218
5.8.1.2	PDU Session Resource modification	218
5.8.1.2.1	Number of PDU Sessions requested to modify	218
5.8.1.2.2	Number of PDU Sessions successfully modified	219
5.8.1.2.3	Number of PDU Sessions failed to modify	219
5.8.2	QoS flow management.....	220
5.8.2.1	QoS flow setup via untrusted non-3GPP access.....	220
5.8.2.1.1	Number of initial QoS flows attempted to setup via untrusted non-3GPP access	220
5.8.2.1.2	Number of initial QoS flows successfully setup via untrusted non-3GPP access	220
5.8.2.1.3	Number of initial QoS flows failed to setup via untrusted non-3GPP access.....	220
5.8.2.1.4	Number of additional QoS flows attempted to setup via untrusted non-3GPP access	221
5.8.2.1.5	Number of additional QoS flows successfully setup via untrusted non-3GPP access.....	221
5.8.2.1.6	Number of additional QoS flows failed to setup via untrusted non-3GPP access	222
5.8.2.2	QoS flow modification via untrusted non-3GPP access.....	222
5.8.2.2.1	Number of QoS flows attempted to modify via untrusted non-3GPP access	222
5.8.2.2.2	Number of QoS flows successfully modified via untrusted non-3GPP access.....	222
5.8.2.3	QoS flow release via untrusted non-3GPP access.....	223
5.8.2.3.1	Number of QoS flows attempted to release	223
5.8.2.3.2	Number of QoS flows successfully released	223
5.8.2.3.3	Number of released active QoS flows	224
5.8.3	Void	225
5.8.4	Void	225
5.9	Performance measurements for NEF.....	225
5.9.1	Measurements related to application triggering.....	225
5.9.1.1	Number of application trigger requests	225
5.9.1.2	Number of application trigger requests accepted for delivery.....	225
5.9.1.3	Number of application trigger requests rejected for delivery.....	225
5.9.1.4	Number of application trigger delivery reports	226
5.9.2	Measurements related to PFD management.....	226
5.9.2.1	PFD creation	226
5.9.2.1.1	Number of PFD creation requests.....	226
5.9.2.1.2	Number of successful PFD creations.....	226
5.9.2.2	PFD update.....	227
5.9.2.2.1	Number of PFD update requests.....	227
5.9.2.2.2	Number of successful PFD updates.....	227
5.9.2.3	PFD deletion	227
5.9.2.3.1	Number of PFD deletion requests.....	227
5.9.2.3.2	Number of successful PFD deletions.....	228
5.9.2.4	PFD fetch	228
5.9.2.4.1	Number of PFD fetch requests	228
5.9.2.4.2	Number of successful PFD fetch	228
5.9.2.5	PFD subscription	229
5.9.2.5.1	Number of PFD subscribing requests	229
5.9.2.5.2	Number of successful PFD subscribings	229
5.9.3	NIDD configuration related measurements	229
5.9.3.1	NIDD configuration creation and update	229
5.9.3.1.1	Number of NIDD configuration creation requests	229
5.9.3.1.2	Number of successful NIDD configuration creations.....	229
5.9.3.1.3	Number of failed NIDD configuration creations	230
5.9.3.1.4	Number of NIDD configuration trigger requests.....	230
5.9.3.1.5	Number of NIDD configuration update notifications	230
5.9.3.2	NIDD configuration deletion	231
5.9.3.2.1	Number of NIDD configuration deletion requests	231
5.9.3.2.2	Number of successful NIDD configuration deletions.....	231
5.9.3.2.3	Number of failed NIDD configuration deletions	231
5.9.4	NIDD service related measurements.....	232
5.9.4.1	Mobile originated NIDD delivery	232
5.9.4.1.1	Number of mobile originated NIDD delivery requests.....	232
5.9.4.1.2	Number of successful mobile originated NIDD deliveries.....	232
5.9.4.1.3	Number of failed mobile originated NIDD deliveries	232
5.9.4.2	Mobile terminated NIDD delivery	233
5.9.4.2.1	Number of mobile terminated NIDD delivery requests.....	233

5.9.4.2.2	Number of successful mobile terminated NIDD deliveries	233
5.9.4.2.3	Number of failed mobile terminated NIDD deliveries	233
5.9.5	AF traffic influence related measurements	234
5.9.5.1	AF traffic influence creation	234
5.9.5.1.1	Number of AF traffic influence creation requests	234
5.9.5.1.2	Number of successful AF traffic influence creations	234
5.9.5.1.3	Number of failed AF traffic influence creations.....	234
5.9.5.2	AF traffic influence update	235
5.9.5.2.1	Number of AF traffic influence update requests	235
5.9.5.2.2	Number of successful AF traffic influence updates.....	235
5.9.5.2.3	Number of failed AF traffic influence updates	235
5.9.5.3	AF traffic influence deletion	235
5.9.5.3.1	Number of AF traffic influence deletion requests	235
5.9.5.3.2	Number of successful AF traffic influence deletions	236
5.9.5.3.3	Number of failed AF traffic influence deletions.....	236
5.9.6	External parameter provisioning related measurements	236
5.9.6.1	External parameter creation	236
5.9.6.1.1	Number of external parameter creation requests	236
5.9.6.1.2	Number of successful external parameter creations	237
5.9.6.1.3	Number of failed external parameter creations.....	237
5.9.6.2	External parameter update.....	237
5.9.6.2.1	Number of external parameter update requests	237
5.9.6.2.2	Number of successful external parameter updates.....	238
5.9.6.2.3	Number of failed external parameter updates.....	238
5.9.6.3	External parameter deletion	238
5.9.6.3.1	Number of external parameter deletion requests	238
5.9.6.3.2	Number of successful external parameter deletions	239
5.9.6.3.3	Number of failed external parameter deletions.....	239
5.9.7	Connection establishment related measurements.....	239
5.9.7.1	SMF-NEF connection creation.....	239
5.9.7.1.1	Number of SMF-NEF connection creation requests.....	239
5.9.7.1.2	Number of successful SMF-NEF connection creations	240
5.9.7.1.3	Number of failed SMF-NEF connection creations	240
5.9.7.2	SMF-NEF Connection release	240
5.9.7.2.1	Number of SMF-NEF Connection release requests	240
5.9.7.2.2	Number of successful SMF-NEF Connection releases.....	240
5.9.7.2.3	Number of failed SMF-NEF Connection releases	241
5.9.8	Service specific parameters provisioning related measurements	241
5.9.8.1	Service specific parameters creation	241
5.9.8.1.1	Number of service specific parameters creation requests.....	241
5.9.8.1.2	Number of successful service specific parameters creations	241
5.9.8.1.3	Number of failed service specific parameters creations	242
5.9.8.2	Service specific parameters update	242
5.9.8.2.1	Number of service specific parameters update requests	242
5.9.8.2.2	Number of successful service specific parameters updates	242
5.9.8.2.3	Number of failed service specific parameters updates	243
5.9.8.3	Service specific parameters deletion	243
5.9.8.3.1	Number of service specific parameters deletion requests.....	243
5.9.8.3.2	Number of successful service specific parameters deletions	243
5.9.8.3.3	Number of failed service specific parameters deletions	244
5.9.9	Background data transfer policy related measurements.....	244
5.9.9.1	Background data transfer policy negotiation.....	244
5.9.9.1.1	Number of background data transfer policy negotiation creation requests.....	244
5.9.9.1.2	Number of successful background data transfer policy negotiation creations.....	244
5.9.9.1.3	Number of failed background data transfer policy negotiation creations	245
5.9.9.1.4	Number of background data transfer policy negotiation update requests.....	245
5.9.9.1.5	Number of successful background data transfer policy negotiation updates	245
5.9.9.1.6	Number of failed background data transfer policy negotiation updates	246
5.9.9.2	Background data transfer policy application.....	246
5.9.9.2.1	Number of background data transfer policy application requests.....	246
5.9.9.2.2	Number of successful background data transfer policy applications.....	246
5.9.9.2.3	Number of failed background data transfer policy applications	246