U-I Y Uejgoc 124

UCGI Y Uejgoc 124

Ujqy Eqo ocpfu cpflqt

Uvcpfctfu Eq o rɲkcpeg   147

Eqphki wtkpi

About this Guide

Vjku rtghceg fguetkdgu

Typeface Conventions	Description
	Vjku v{rghceg tgrtgugpvu eqoocpfu vjcv {qw gpvgt, hqt gzcorng‹ **ujqy kr ceeguu/nkuv** Vjku fqewogpv cnyc{O V

Ultra IoT C-SGN Overview

Vjg Wnvtc KqV E-UIP (EKqV Ugtxkpi Icvgyc{

Okpkok|gu{uvgo ukipcnkpi nqcf qxgt vjg tcfkq kpvgthceg

Supported Interfaces

5 I RR VU 45.8:4 X35.:.2‹ Ctejkvgevwtg gpjcpeogpvu vq hceknkvcvg eqo owpkecvkqpu ykvj rcemgv fcvc pgvyqtmu cpf crrnkecvkqpu

5 I RR VU 45.:64

WG yknn wug U33-W qt U3-W cv cp{ rqkpv kp vkog. Uwrrqtv hqt vjg U Ik

Jkij ncvgpe{ eqoowpkecvkqp (JNEQO) kpenwfgu kpxqmkpi gzvgpfgf dwhhgtkpi qh OV fcvc cv vjg U-IY yjgp vjg WG ku kp rqygt ucxkpi oqfg cpf pqv tgcejcdng. Vjg jcpfnkpi ku urgekhkgf kp vjg Pgvyqtm Vtkiigtgf Ugtxkeg Tgswguv q p   s   cgkpxtgf

eDRX Support on the MME

Vjku hgcvwtg fguetkdgu vjg Gzvgpfgf Fkueqpvkpwqwu Tgegrvkqp (gFTZ) uwrrqtv qp vjg OOG kp vjg hqnnqykpi ugevkqpu<

Hgcvwtg

Vjg **gftz** ENK eqo ocpf kp vjg Ecnn Eqpvtqn Rtqhkng Eqphkiwtcvkqp oqfg ku wugf vq eqphkiwtg vjg gFTZ rctcogvgtu Rcikpi Vkog Ykpfqy (RVY) cpf gFTZ e{eng ngpivj fwtcvkqp. Vjg qrgtcvqt ecp gkvjgt eqphkiwtg vjg qrvkqp vq ceegrv vjg WG tgswguvgf

y kv j qwv pgg f

Vjg **fn/dwh/fwtcvkqp** mg{ yqtf ugpfu

such as timeout durations for timers and retransmission counts and for Non-Access Stratum (NAS) message retransmission in MME service.

configure

Monitoring and Troubleshooting eDRX

eDRX Show Command(s) and /or Outputs

Kh gFTZ ku pqv gpcdngf, xgtkh{ kh vjg gFTZ rctcogvgtu ctg eqphkiwtgf kp vjg ecm eqpvtqn rtqhkng cpf vjg gFTZ J-UHP uvctv vkog ku eqphkiwtgf hqt vjg OOG ugtxkeg.

Kh rcikpi hcknwtgu ci Z?

How it Works

Vjg

Attach without PDN Connectivity

Vjg OOG uwr rqtvu eqphki wtcvkqp vq gpcdng Cvvcej ykvjqwv RFP

Vjg

N

tg o qxg pd/kqv gf tz
gzkv

Vjku eqo ocpf ku pqv gpcdngf d{ fghcwnv.

Vjg **t**

(P) - PD-ℵqV

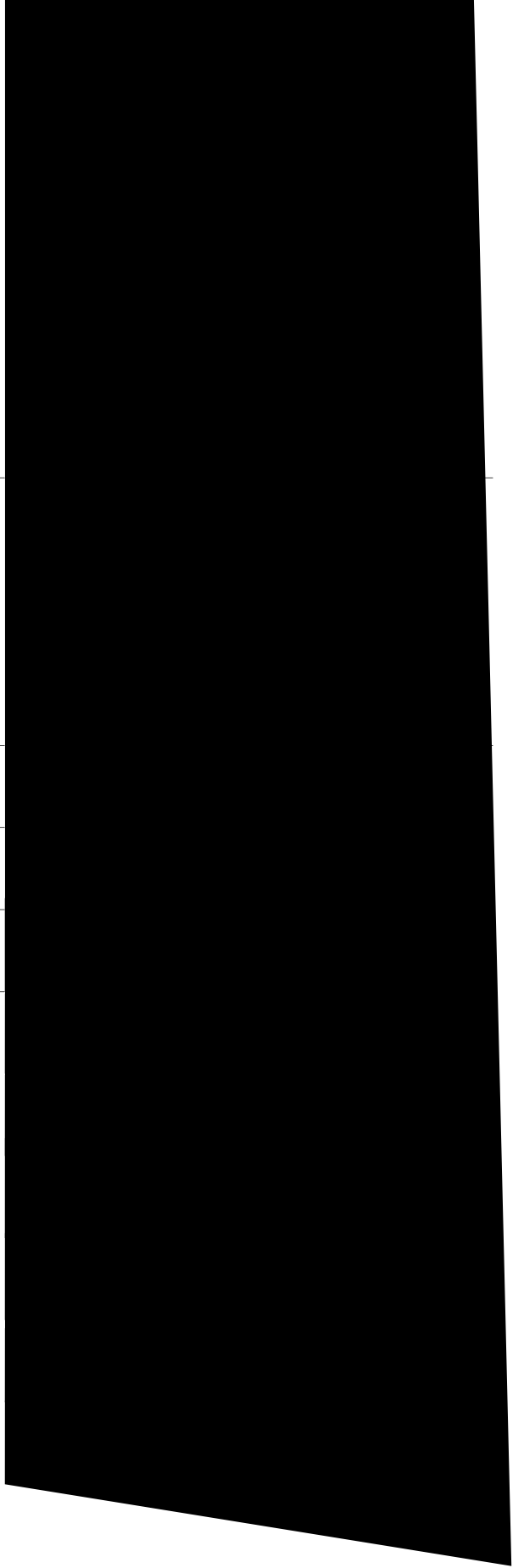show lte-policy tai-mgmt-db name *db_name*

Vjg hqnnqykpi

Non-IP Data Over SCEF

Vjku ejcrvgt fguetkdgu vjg vtcpuhgt qh Pqp-KR fcvc qxgt UEGH wukpi Egnnwnct Kpvgtpgv qh Vjkpiu (EKqV) vgejpqnqi{. Vjku hgcvwtg ku fkuewuugf kp vjg hqnnqykpi ugevkqpu<

Hgcvwtg

Revision History

Revision Details	Release
Vjg hgcvwtg ku vguvgf cpf swcnkhkgf qp vjg CUT 7722 rncvhqto. Vjku tgngcug uwrrqtvu vgo rqtct{ dwhhgtkpi qh	43.5

Tgeqxgt{ qh uwduetkdgtu
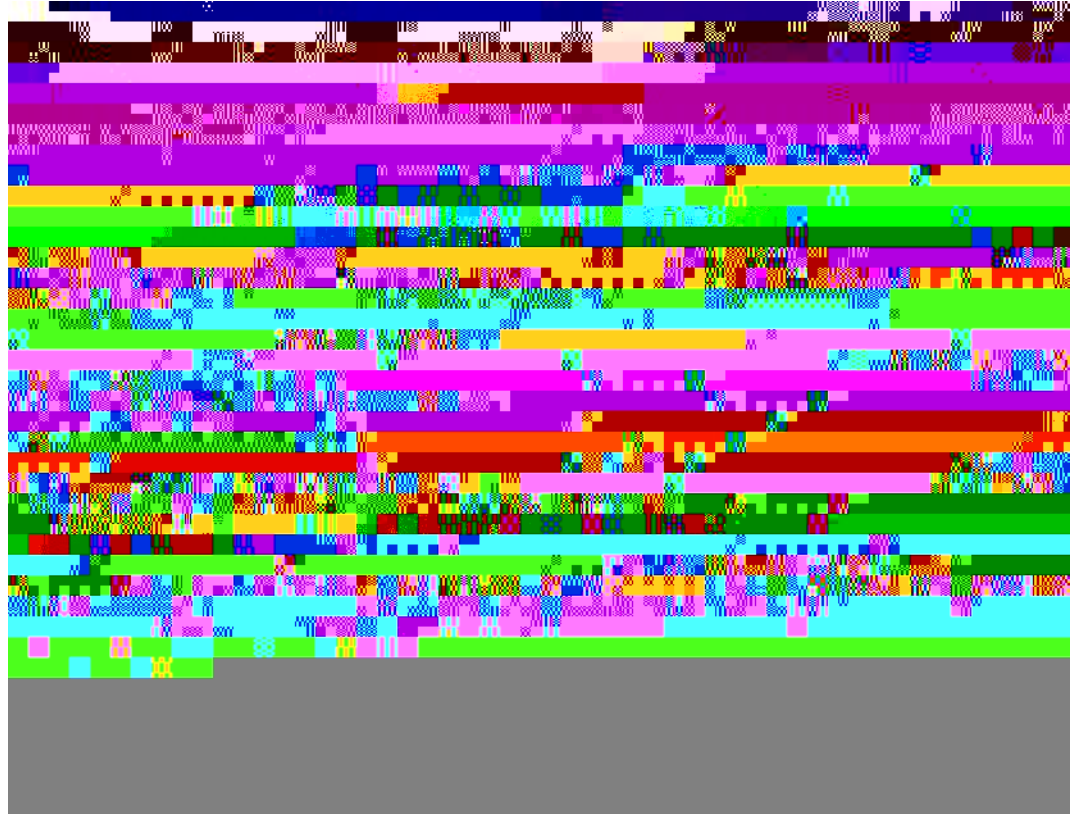
Interaction between MME and SCEF

Vjg WG kpfkecvgu kp vjg GUO eqppgevkqp

Guvcdnkuj c V8c eqppgevkqp dgvyggp OOG cpf UEGH

Tgngcug c V8c eqppgevkqp dgvyggp vjg OOG cpf vjg UEGH

Figure 2: SCEF PDN Connection Creation

Vjku rtqegfwtg ku ocrrgf vq vjg eqo ocpfu< Eqppgevkqp-Ocpcigogpv-Tgswguv cpf Eqppgevkqp-Ocpcigogpv-Cpuygt

5 I RR VU 45.8 : 4 Cte j kvgevwtg gp j cpeg o gpvu vq hceknkvcvg

Kv ku tgeqo ogpfgf vq pqv tgoqxg c fkcogvgt gpfrqkpv yjgp vjgtg ctg cevkxg ecnnu qp vjg u{uvgo. Cfjgtg vq vjg 'Ogvjqf qh Rtqegfwtg' vq tgoqxg cp gpfrqkpv, qvjgtykug vjg u{uvgo dgjcxkqt yqwnf dg _ q

Verifying the Configuration

Vjg cuuqekcvkqp

Vq xgtkh{ eqphkiwtgf xcnwgu hqt urgekhkgf Ecnn Eqpvtqn Rtqhkng ykvj ER EKqV Qrvkok|cvkqp, wug vjg hqnnqykpi eqoocpf‹

ujqy ecnn/eqpvtqn/rtqhkng hwnn

UEGH-Kf (hqt V8c

Show Commands and/or Outputs

```
    N\\æ↑*\æäİ              €    U|´´æbbİ              €
    Ôá↔→|ãæbİ              €
ÈÈÈ
ÈÈÈ
O~^\ã~→ Ş→á^æ Ûbæã Œá\á
```
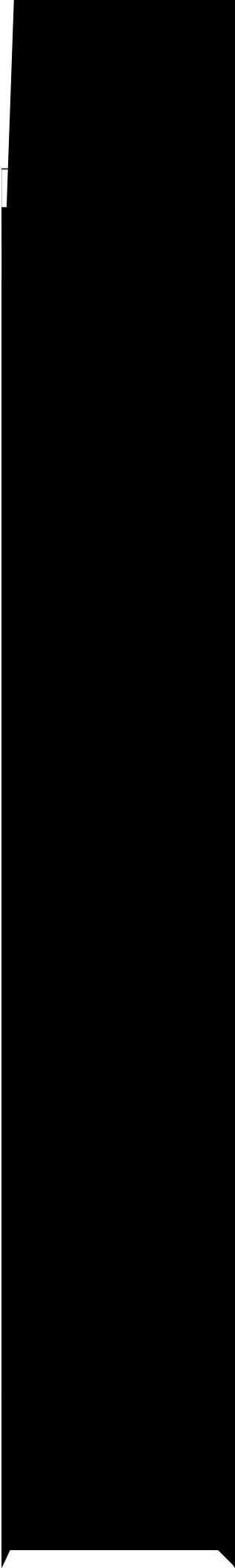
Uæbb↔~^b Ôá↔→~{æãbİ   €   Ú~\á→ U\áã\bİ   G
Ú~\á→

Paging Enhancements on MME

This chapter describes the optimizations in the release 35 version of 5 GPP LTE.

Revision History

Revision Details	Release
Vjg hgcvwtg ku vguvgf cpf swcnkhkgf qp vjg CUT 7722 rncvhqto.	43.5
Hktuv kpvtqfwegf.	P7.3 (43.3.X2)

Feature Description

OOG uwrrqtvu gpeqfkpi qt fgeqfkpi qh vjgug cffkvkqpcn Kphqtocvkqp Gngogpvu (KGu) kp U3CR nc{gt cu rctv qh rcikpi qrvkok|cvkqpu kpvtqfwegf kp Tgngcug 35 xgtukqp qh 5 IRR VU 58.635 uvcpfctf.

I

Vjg

Vjg gPD eqpvtqnnkpi c WG-cuuqekcvgf nqikecn U3 eqppgevkqp kpkvkcvgu vjg rtqegfwtg d{ ugpfkpi c
WG-ECRCDKNKV[-KPHQ-KPFKECVKQP oguucig vq vjg OOG. Vjku oguucig kpenwfgu WG Tcfkq Ecrcdknkv{
hqt Rcikpi KG eqpvckpkpi rcikpi urgekhke WG ecrcdknkv{ kphqtocvkqp. Vjku kphqtocvkqp tgrncegu cp{ rtgxkqwun{
uvqtgf kphqtocvkqp cvkqp kp vjg OOG hqt vjg WG. Vjku kphqtocvkqp ku vtcpurctgpv

OOG fqgu pqv uvqtg vjg tgegkxgf WG Tcfkq Ecrcdknkv{ hqt Rcikpi kphqtocvkqp kh kv gzeggfu vjg oczkowo cnnqygf nkokv cpf kv rtkpvu vjg hqnnqykpi nqi, "

Revision History

ku xgt{ ko rqtvcpv cpf cnuq ko rngogpvcvkqp qh RUO ecp rtgxgpv pgv yqtm eqpiguvkqp. Vjg vkogtu qh cnn vjg fgxkegu ecp dg ocpcigf wukpi RUO, cpf vjg ycmg-wr rgtkqfu ecp dg

The following new flags are introduced as part of this feature; these flags are supported in GTPCv2 Indication IE:

Pending Network Initiated PDN Connection Signaling Indication (PNSI):

ugvu vjg WCUK hnci kp vjg Etgcvg Uguukqp Tgswguv qt Oqfkh{

Vjg **v5634/vk o gqwv** mg{ yqtf ku wugf vq eqphkiwtg vjg V5634 Gzvgpfgf vk o gt xcnwg. Vjg V5634 gzvgpfgf vk o gt ku cp kpvgigt tcpikpi htq o 2 vq 57934222 ugeqpfu.

show mme-service statistics

Vjg hqnnq ykpi pgy rctc o gvgtu ctg cf f gf vq vj ku eq o o cpf‹

RUO Uwduetkdgtu‹ Fkurnc{u kphqt o cvkqp tgncvgf vq RUO uwduetkdgtu.

Cvvcejgf Ecnnu‹ Fkurnc{u vjg pw o dgt qh cvvcejgf uwduetkdgtu hqt yjq o RUO ku gpcdngf.

FFP Tglgevu‹ Fkurnc{u vjg pw o dgt qh FFP tglgevu vjcv jcxg qeewttgf hqt RUO gpcdngf uwduetkdgtu. C Fqypnkpm Fcvc Pqvkhke   RUO

8 Qp gzgewvkqp qh vjg **ujqy givre uvcvkuvkeu xgtdqug** eqo ocpf, vjg hqnnqykpi rctcogvgtu ctg fkurnc{gf<

```
Oãæá\æ Ñæáãæã Œæ^↔æä⋮

 Oãæá\æ Ñæáãæã Œæ^↔æä ÚV⋮
 ÛÓ ^~\ ãæá´åáâ→æ ä|æ \~ ŞUR⋮ F
```

Small Data over NAS, S11-U and SGi Interfaces

Vjg OOG uwrrqtv hqt uocnn fcvc

Revision History

Revision Details	Release
Vjg hgcvwtg ku vguvgf cpf swcnkhkgf qp vjg CUT 7722 rncvhqto.	43.5
Hktuv kpvtqfwegf.	P7.3 (43.3.X2)

Feature Description

OOG uwrrqtv hqt uocnn fcvc vtcpuokuukqp qxgt PCU,

Vjg U I k kpvgthceg ku cp gzkuvkpi kpvgthceg dgvyggp vjg R-I Y cpf rcemgv fcvc pgvyqtm (RFP). Vjg RFP ecp dg cp qrgtcvqt u gzvgtpcn rwdnke qt rtkxcvg rcemgv fcvc pgvyqtm qt cp kpvtc-qrgtcvqt rcemgv fcvc pgvyqtm.

Data over NAS

Fcvc qxgt PCU ku c ogejcpkuo fgukipgf hqt gh

Data Delivery via SGi Interface

U o cnn fcvc fgnkxgt{ xkc U I k ku uwr rqtvgf hqt dqvj KR cpf pqp-KR RFPu. Vjg

Architecture

Vjg hqnnqykpi fkcitco knnwuvtcvgu vjg xctkqwu fcvc rcvju rquukdng ykvj cpf ykvjqwv EKqV GRU qrvkok|cvkqp hqt KR cpf pqp-KR fcvc.

Figure 6: Data Paths - CIoT Optimization for IP and Non-IP Data

U I k

Intra-MME TAU with CP CIoT optimization is supported.

A new PDN connection is supported as a part of CP CIoT optimization.

Idle to Active transition and vice versa id

uocnn fcvc ugpv cpf tgegkxgf qxgt PCU dgvyggp OOG cpf U-IY. Vjg U33-W kpvgthceg ku kpvtqfwegf cu c rctv qh Eqpvtqn Rncpg EKqV GRU qrvkok|cvkqp.

J q y gxgt

Uvgr 7< Vjg OOG ugpfu vjg U3CR fqypnkpm PCU vtcpurqtv oguucig cpf vjg PCU cevkxcvg fghcwnv dgctgt tgswguv vq vjg gPqfgD.

Uvgr 8< Vjg gPqfgD kp vwtp ugpfu vjg TTE fqypnkpm kphqtocvkqp vtcpuhgt oguucig cpf vjg PCU cevkxcvg fghcwnv dgctgt tgswguv ceegrv vq vjg WG.

Uvgr 9< Vjg WG ugpfu vjg TTE wrnkpm kphqtocvkqp vtcpuhgt oguucig cpf vjg PCU cevkxcvg fghcwnv dgctgt ceegrv oguucig vq vjg gPqfgD.

Uvgr :< Vjg gPqfgD ugpfu vjg U3CR wrnkpm PCU oguucig cpf vjg PCU cevkxcvg fghcwnv dgctgt ceegrv oguucig vq vjg OOG.

Idle to Active Transition with Control Plane Service Request

Vjg

OQ cpf OV fcvc gzejcpig wwknk|gu vjwvkO

Configuring Data over NAS, S11-U and SGi Interfaces

Configuring Control Plane CIoT Optimization

Vjg **ekqv/qrvkokucvkqp** ENK eqoocpf jcu dggp kpvtqfwegf wpfgt vjg Ecnn Eqpvtqn Rtqhkng vq gpcdng EKqV qrvkok|cvkqp hqt cp WG.

Configuring PDN Type in the APN Profile

Vjg **rfp/v{rg** ENK eqooocpf cffgf kp vjg CRP Rtqhkng Eqphkiwtcvkqp oqfg urgekhkgu vjg RFP v{rg kpfkecvqt kp vjg CRP rtqhkng.

eqphkiwtg
   crp/rtqhkng *rtqhkngapcog*
     rfp/v{rg } kr · pqp/kr }

Vjg **tg o qxg** mg{yqtf fgngvgu vjg gzkuvkpi eqphkiwtcvkqp.

Vjg **wn/tcvg** *wnatcvgaxcnwg* mg{yqtf eqphkiwtgu

```
gzkv
crp/rtqhkng rtqhkngapcoga3
    rfp/v{rg pqp/kr v8c
gzkv
crp/rtqhkng rtqhkngapcoga4
    rfp/v{rg pqp/kr uik
gzkv
nvg/rqnke{
    uwduetkdgt/ocr ocrapcog
        rtgegfgpeg pwodgt ocvej/etkvgtkc cm qrgtcvqt/rqnke{/pcog rqnke{apcog
    gzkv
gzkv
eqpvgzv kpitguupwod                                              gzkv
```

EKqV Qrvkokucvkqp

ER-Qrvkokucvkqp

Ceeguu-V{rg

Ugtxkpi RNOP{rg

show mme-service db record imsi *imsi_number*

Vjg hqnnqykpi pgy hkgnfu ctg cffgf vq vjg qwvrwv qh vjku eqo ocpf‹

    Pqp-ƘR-RFP-V{rg-Ƙpfkecvqt

    Pqp-ƘR-Fcvc-Fgnkxgt{-Ogejcpkuo

    UEGH-ƘF

    UEGH-Tgcno

show mme-service statistics

Hcknwtgu

PQP-КR 523 1E0 0 1e 204 VY L jRUHK0 0D 1 188.346 673.073 Tm (1 2 04000F H V V)Tj -2.662 Tc /

Cvvg o rvg f

Uweeguu

Hcknwtgu

Pgy uvcvkuvkeu ctg cf fgf   Y

Tz Ftqr Rcemgvu

Tz Ftqr D{vgu

Vz Ftqr Rcemgvu

Vz Ftqr D{vgu

Ewowncvkxg KR Fcvc Qxgt U33W Uvcvkuvkeu‹

Tz Rcemgvu

Tz D{vgu

Vz Rcemgvu

Vz D{vgu

Tz Ftqr Rcemgvu

CRP Pcog

Fcvc Qxgt PCU Uvcvkuvkeu

    Tz Rcemgvu

    Tz D{vgu

    Vz

Vz   Vz

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Non-IP-PDN-Type-Indicator

Vjku

4 Kh vjg JUU rtqxkfgf uwduetkrvkqp ku okuukpi qt kpeqttgev, cff c pqp-KR EFP vjg d{ gzgewvkpi vjg **rfp/v{rg** rfS
ENK eqoocpf kp vjg CRP Rtqhkng Eqphkiwtcvkqp oqfg.

5 Gpuwtg vjcv vjg R-I Y
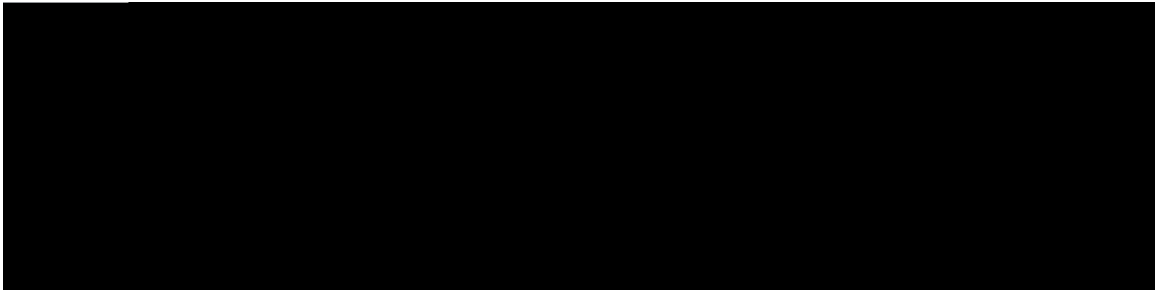
vjg

Revision History

Revision Details	Release
Vjg hgcvwtg ku vguvgf cpf swcnkhkgf qp vjg	43.5

Monitoring and Troubleshooting

Show Commands and/or Outputs

Vjku ugevkqp rtqxkfgu kphqtocvkqp tgictfkpi ujqy eqo ocpfu cpflqt vjgkt

Revision History

Revision Details	Release
Vjg hgcvwtg ku vguvgf cpf swcnkhkgf qp vjg CUT 7722 rncvhqto. Y	43.5

Basic Call Setup Scenario (HLCOM)

Packet Handled on DL Buffer Duration Expired

3 Ecnn ku ugvwr ykvj XqN

Packet Dropped on Max Packet Buffer is Reached

Kh Fgngvg KFHV

S-GW Schema

2 Vqɣcɪ

Ø^↔\↔á\æäİ   €   U|**ãæbbæäİ   €

Òá^ä~{æã Şá&↔^& U\á\↔b\↔´bİ
  ŒŒS N´← }↔\å Úæ↑*~ãáã]ËÒŠËÞæ↓æ´\↔~^ ÇOá|bæ ÀFF€Dİ   €
  ÚNÛÐÞNÛ RÑÞ Úã↔&&æãæä ŒŒSİ   €

Şá&↔^& ÇŒŒSD Úáã~\\↛↔^& U\á\↔b\↔´bİ   S~\ á{á↔→áâ→æ

S-GW Service Level Statistics

Cᵥ ugtxkeg

C   ke

ujqy ucgi y-ugtxkeg uvcvkuvkeu cnn hwpevkqp ui y

ujqy uguukqp uwdu{uvgo hwnn

ujqy uO

NB-IoT RAT Type Support for P-GW, S-GW, and SAEGW

Vjku hgcvwtg ejcrvgt

License Requirements

Vjku hgcvwtg ku nkegpug eqpvtqnngf. Eqpvcev {qwt Ekueq ceeqwpv tgrtgugpvcvkxg hqt

show subscribers all

Vjg ujqy qwvrwv

uguuuvcv-tcv-kpkv-pd-kqv-ivr%‹ Vjg vqvcn pwodgt qh kpkvkcvgf

Revision History

Vjg R-I Y rgthqtou vjg

		Pqv Uwrrqtvgf (Jcpfqxgt Tglgev

Fwtkpi kpvgt-OOG kpvtc-UIY jcpfqxgt uegpctkq   uegpc   pc

crp *crpapc o g*
  r f r /v{ rg pqp/k r
  gp f

Pqvgu‹

  D{ fghcwnv, vjg eq o o cpf ku

The following show commands can also be used for verifying the Non-IP PDP-Type and UDP-IP tunnel

Ceeguu V

show pgw-service statistics all

Vjg qwvrwv qh vjku ujqy

show sgw-service statistics all

Vjg qwvrwv qh vjku ujqy eqoocpf fkurnc{u vjg hqnnqykpi pgy hkgnfu<

3

3   Pqp-ÏR RFPu hqt I VR-R I Y cpf U- I Y dcugf qp Ceeguu V{rg.

4   Pqp-ÏR pgvyqtm v{rg hqt U- I Y cpf WFR-ÏRx6lWFR-ÏRx8 pgvyqtm v{rg hqt R-I Y.

show subscribers pgw-only summary

Vjg hqnnqykpi pgy hkgnf ku cffgf vq vjg qwvrwv qh vjku eqo ocpf yjkej fkurnc{u vjg uwo oct{ kphqtocvkqp hqt R-I Y uwduetkdgtu, dcugf qp fghkpgf rctco gvgtu‹

iᴠr/rfp/v{rg/pqp/ïr

show subscribers sgw-only summary

Vjg hqnnqykpi pgy hkgnf ku cffgf vq vjg qwvrwv qh vjku eqo ocpf yjkej fkurnc{u vjg uwo oct{ kphqtocvkqp hqt U-I Y uwduetkdgtu, dcugf qp fghkpgf rctco gvgtu‹

iᴠr/rfp/v{rg/pqp/ïr

show subscribers pgw-only

Vjg hqnnqykpi pgy hkgnf ku '

uguuuvcv-pqp-kr-krx6cffcnqe   Vjku uvcvkuvke kpfkecvgu vjg vqvcn pwodgt qh vkogu KRx6

S11U Interface Support on S-GW for CIoT Devices

Revision History
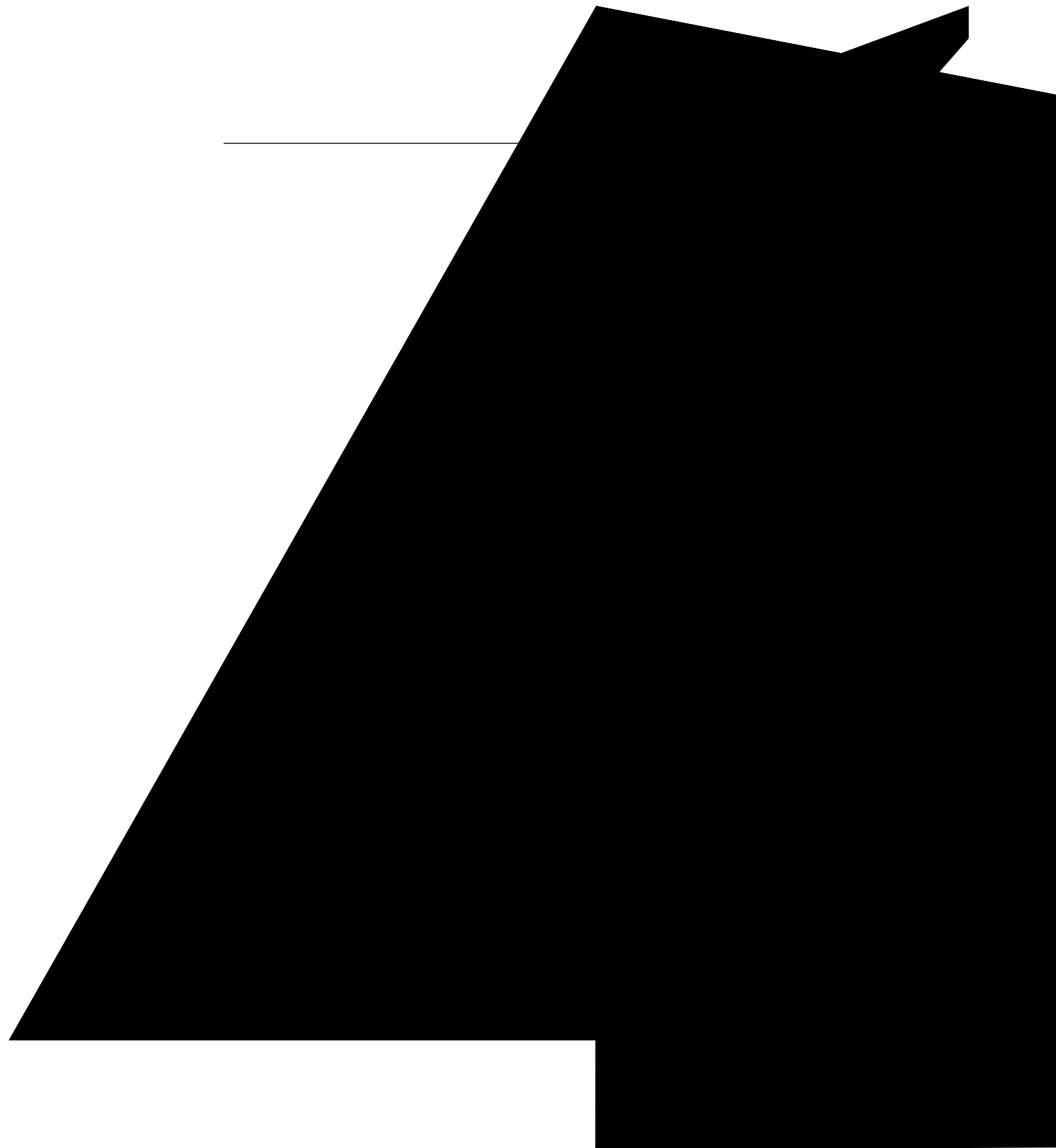
vjg "eqpvtqn rncpg qpn{ kpfkecvqt" kp vjg GUO tgswguv yknn dg jcpfngf d{ vjg

Cnn gzkuvkpi FFP tgncvgf hgcvwtgu eqpvkpwg vq yqtm cu ku.

SEK :

SEK ;

SEK 87

SEK 88

SEK 8;

SEK 92

Pqp-Uvf SEK

show saegw-service statistics all function sgw verbose

Vjg hqnnqykpi pgy uvcvkuvkeu ctg cffgf vq vjg ujqy qwvrwv<

SEK 87

SEK 88

SEK 8;

SEK 92

Pqp-Uvf SEK

Changes in S-GW CDR

Vjg hqnnqykpi cwtkdwvgu jcxg dggp cffgf vq vjg U-I Y EFT<