

نېب PRA ىلغ مئاقلا يلىضافتلا نحلشلا ئكېشللاو عبارلا لىجلا ئكېش يىف كرتشملا (NSA) سماخلا لىجلا

تايوتحمللا

[ئمدقملا](#)

[ئىساسلا تابلطتملا](#)

[تابلطتملا](#)

[ئمدختىسىملا تانوكملا](#)

[ئىساسلا تامولعم](#)

[PRA فرعم لىغ ىلغ قماع قرظن](#)

[تاراصتخالا](#)

[ئلمتحملا تارابتعالا اورا ئالا](#)

[ئارخاللا](#)

[MME End نىوكت تارىيىغىت](#)

[GW نىوكت تارىيىغىت](#)

[ققحتلا](#)

[ئىساسلا Wireshark رىسا](#)

[ئىساسلا رىسا ئىللىبىدىج](#)

ئمدقملا

(NSA) يلىضافتلا يىموقلا نمألا ئلاكوب سماخلا تىنرتنالا ربع نحلشلا لىغ قوتىتولا هذە فرصت
دىجاوتلا رىراقت دادعلا قىطنم ىلغ مئاقلا

ئىساسلا تابلطتملا

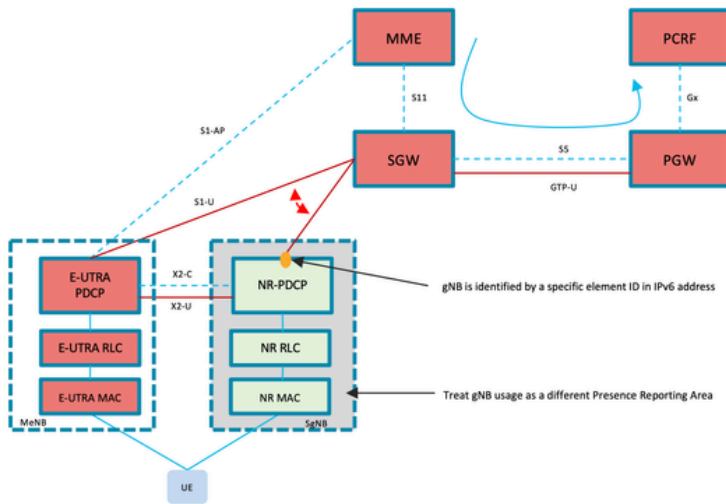
تابلطتملا

ئىلالتلا عىضاوملاب فرعم كىدل نوكت نأب Cisco يىصوت:

- ئىشچ
- (MME) لىقننتلا قرادلا دىجو
- Cisco نم (PGW) مزحللا تانايىب ئكېش قىبواب Cisco/ نم (SGW) قىمدخلا قىبواب
- (PCRF) قىسايسىملا نحلشلا دىواوق قىفىظو

ئىضى،

- "PRA فرعم" ىلا "S1-U IP ناوئىغى" نىيىغىتلا PRA قىزىم نىسختلا ممدل MME
- PCRF ھاچتلاب PRA لىغشم PGW ممدى



- MME identifies gNB vs. eNB usage.
- MME sends Modify Bearer Request with Presence Reporting Area to SPGW and then PCRF

Element	High Level Changes
MME	Vendor specific solution, needs to be consulted with the MME vendor. Identify UE movement to gNB coverage. Send MBRs to PGW.
PGW	Support Presence Reporting Area reports (standard feature) Inform PCRF
SGW	Support Presence Reporting Area reports (standard feature)
PCRF	Support Presence Reporting Area reports (standard feature) Implement policies based on reports

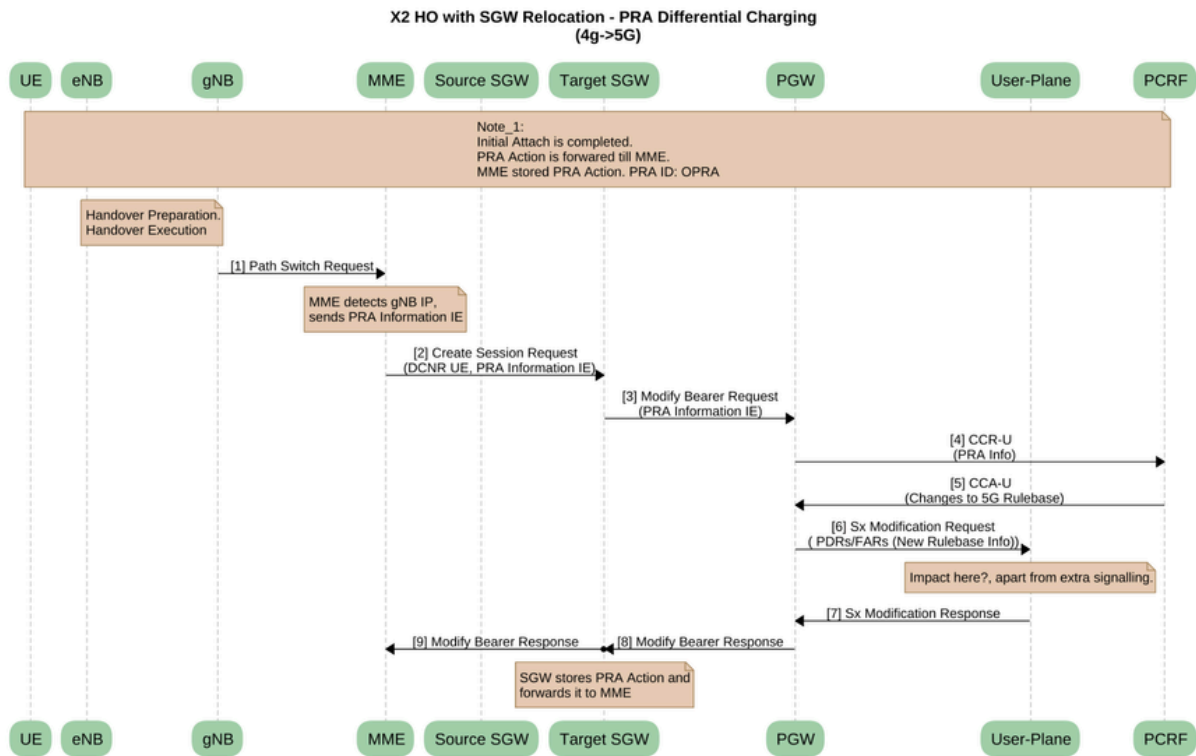
يوتس م ال ايع اءاع ا قينب

تاراصت خال

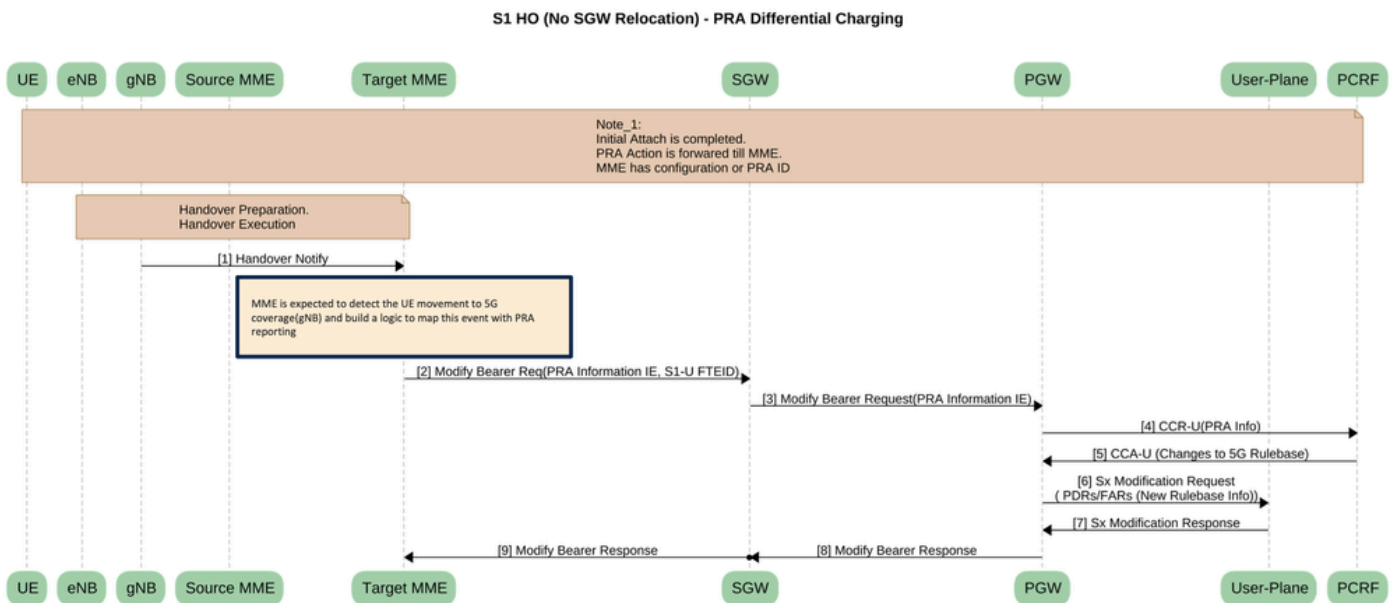
ةعشج	ءءاوتل ريراقء ءءاع ا قطنم
OCS	تنرن ا رءع نءشلل ماظن
طاواغيغ	ءءاوبل (GGSN/PGW)
PCRF	نءشلل ءءاوق ءفيظو ءساي سل او
MOP	ءارءال ءقيرط
ما م	لقننل ءراءا ءءوو
ويغس	ءمءءل ءراءع
PGW	Packet Gateway

ءلمءءم ال تارابءءال او راءال

- طقف 5 G NSA رشنل Option3x ءصول ءرءقم ال ءءل
- مءي ءبءءل اءه اءف ، 4G ال 5G نم و 5G ال 4G نم UE ءءء بقاءء مءي هءال ارظنو



X2 HO ع قوم ريغت عم - SGW ي لضافت نحش - PRA (4G*5G)



S1 HO (دجوي ال) - SGW هي جوت ة داع | نحش - PRA ي لضافت نحش

- CNO-ULI لالځ نم "دجاوتل ريراقت دادع| ةقطنم تامولعم نع غالبإل" ةزيم نيكمت
- 5G مادختسا نع غالبإل ل RG م دختسا سي. لصفنم RG نيوكتب مق

configure

```
context context_name
ims-auth-service service_name
policy-control
diameter encode-supported-features cno-uli
{ default | no } diameter encode-supported-features
end
```

config

```
active-charging service ECS
group-of-ruledefs NPR1_5G
group-of-ruledefs-application gx-alias
add-ruledef priority 2 ruledef RG_5G_default_IP_ANY_PrePaid
add-ruledef priority 40 ruledef tethering_ip_ttl_RG
exit
```

```
ruledef RG_5G_default_IP_ANY_PrePaid
ip any-match = TRUE
exit
```

rulebase <rulbase Name>

```
action priority 702 static-and-dynamic ruledef RG_5G_default_IP_ANY_PrePaid charging-action 5G_IP_ANY_
exit
end
```

تاطحال م:

- **diameter encode-supported-features** : AVP ةم و عدمل تازيم ل لاسراو زيمرت ل طاعي وأ نكمي .

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cno-uli : "دجاوتل ريراقت دادع| ةقطنم تامولعم نع غالبإل" ةزيم نيكمت .

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no : اقبس م اهن نيوكتب مت يتل ةم و عدمل تازيم ل لزي .

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default: رمال اذهل يضا رت فال دادعإل قبطي .

ققحتل

رسا Wireshark ل MME

Source	Destination	protocol	EPS Bearer ID	F-TEID IPv4	transportLayerAddress	Action	Inside Presence	AMBR	Info	uEAggregateMaxBitRate
SGW-S11	MME-S11	GTPv2	5	172.25.64.221...		Start Reporting chan...		300000	Create Session Response	
MME-S11	SGW-S11	GTPv2	5	100.92.59.57					Modify Bearer Request	
SGW-S11	MME-S11	GTPv2	5	10.1.159.103					Modify Bearer Response	
ENB	S1-MME	S1AP			2401:4900:4:84a4::82				E-RABModificationIndication	
MME-S11	SGW-S11	GTPv2	5				True		Modify Bearer Request	
SGW-S11	MME-S11	GTPv2	5	10.1.159.103					Modify Bearer Response	
S1-MME	ENB	S1AP							E-RABModificationConfirm	
SGW-S11	MME-S11	GTPv2	5					2000000	Update Bearer Request	
S1-MME	ENB	S1AP							UEContextModificationRequest	2000000000bits/s
MME-S11	SGW-S11	GTPv2	5						Update Bearer Response	
ENB	S1-MME	S1AP							UEContextModificationResponse	
ENB	S1-MME	S1AP							UEContextReleaseRequest [RadioNetwork-causeuser-ina...	
MME-S11	SGW-S11	GTPv2	5	100.92.59.57			False		Modify Bearer Request	
SGW-S11	MME-S11	GTPv2	5					300000	Update Bearer Request	
MME-S11	SGW-S11	GTPv2	5						Update Bearer Response	
SGW-S11	MME-S11	GTPv2	5	10.1.159.103					Modify Bearer Response	
SGW-S11	MME-S11	GTPv2	5					300000	Update Bearer Request	
S1-MME	ENB	S1AP							UEContextModificationRequest	3000000000bits/s
ENB	S1-MME	S1AP							UEContextModificationResponse	
MME-S11	SGW-S11	GTPv2	5						Update Bearer Response	
ENB	S1-MME	S1AP			2401:4900:4:84a4::82				E-RABModificationIndication	
MME-S11	SGW-S11	GTPv2	5				True		Modify Bearer Request	
SGW-S11	MME-S11	GTPv2	5	10.1.159.103					Modify Bearer Response	
S1-MME	ENB	S1AP							E-RABModificationConfirm	
SGW-S11	MME-S11	GTPv2	5					2000000	Update Bearer Request	
S1-MME	ENB	S1AP							UEContextModificationRequest	2000000000bits/s

ENB-UE-S1AP-ID: 7992141

دنع True ك راهظا Inside Presence Reporting 5G، لى لاقتنال دنع .

False ةيىه لىع روهظالا Inside Presence Reporting 4G، لى لقتنت امدنع .

كراشريو رسا ويلى بد يچ

Source	Destination	protocol	EPS Bearer ID	Action	Inside Pres	AMBR	Charging-Rule-Base-Name	Rating-Group	Info
Gx	Gx	DIAMETER					BHARTI_VOLUME_PLAN		cmd-Credit-Control Request(272) flags=RP-- appl=3GPP Gx(1)
Gx	Gx	DIAMETER					BHARTI_VOLUME_PLAN		cmd-Credit-Control Answer(272) flags=P-- appl=3GPP Gx(1)
PGW-OUT	SGW-IN	GTPv2	5	Start Reporting change		300000			Create Session Response
PGW-OUT	SGW-IN	GTPv2	5	Start Reporting change		300000			Create Session Response
SGW-S11	MME-S11	GTPv2	5	Start Reporting change		300000			Create Session Response
MME-S11	SGW-S11	GTPv2	5						Modify Bearer Request
SGW-S11	MME-S11	GTPv2	5						Modify Bearer Response
Gx	Gy	DIAMETER					PostpaidAirtelgprs.com		403 cmd-Credit-Control Request(272) flags=RP-- appl=Diameter
Gy	Gx	DIAMETER					PostpaidAirtelgprs.com		403 cmd-Credit-Control Answer(272) flags=P-- appl=Diameter
MME-S11	SGW-S11	GTPv2	5		True				Modify Bearer Request
SGW-IN	PGW-OUT	GTPv2			True				Modify Bearer Request
SGW-IN	PGW-OUT	GTPv2			True				Modify Bearer Request
Gx	Gx	DIAMETER					BHARTI_VOLUME_PLAN,BHARTI_VOLUME_PLAN_5G		cmd-Credit-Control Request(272) flags=RP-- appl=3GPP Gx(1)
Gx	Gx	DIAMETER					BHARTI_VOLUME_PLAN,BHARTI_VOLUME_PLAN_5G		cmd-Credit-Control Answer(272) flags=P-- appl=3GPP Gx(1)
PGW-OUT	SGW-IN	GTPv2				2000000			Modify Bearer Response
PGW-OUT	SGW-IN	GTPv2	5						Update Bearer Request
PGW-OUT	SGW-IN	GTPv2							Modify Bearer Response
SGW-S11	MME-S11	GTPv2	5						Modify Bearer Response
PGW-OUT	SGW-IN	GTPv2	5			2000000			Update Bearer Request
SGW-S11	MME-S11	GTPv2	5			2000000			Update Bearer Request
Gx	Gy	DIAMETER					PostpaidAirtelgprs.com	623	cmd-Credit-Control Request(272) flags=RP-- appl=Diameter
MME-S11	SGW-S11	GTPv2	5						Update Bearer Response
SGW-IN	PGW-OUT	GTPv2	5						Update Bearer Response
SGW-IN	PGW-OUT	GTPv2	5						Update Bearer Response
Gy	Gx	DIAMETER					PostpaidAirtelgprs.com	623	cmd-Credit-Control Answer(272) flags=P-- appl=Diameter
MME-S11	SGW-S11	GTPv2	5		False				Modify Bearer Request
SGW-IN	PGW-OUT	GTPv2	5		False				Modify Bearer Request
SGW-IN	PGW-OUT	GTPv2	5		False				Modify Bearer Request
Gx	Gx	DIAMETER					BHARTI_VOLUME_PLAN_5G,BHARTI_VOLUME_PLAN		cmd-Credit-Control Request(272) flags=RP-- appl=3GPP Gx(1)
Gx	Gx	DIAMETER					BHARTI_VOLUME_PLAN_5G,BHARTI_VOLUME_PLAN		cmd-Credit-Control Answer(272) flags=P-- appl=3GPP Gx(1)
PGW-OUT	SGW-IN	GTPv2	5						Modify Bearer Response
PGW-OUT	SGW-IN	GTPv2	5			300000			Update Bearer Request

نع غالبال مات امنىب RG: 623 مادختساب اهنع مالعال مات يتال 5G ةحاسم لى مادختس مال لقتنى يتم ىرت نأ كنكمي مع RG: 403 4G مادختسا .

وأ (g) 5 ةبذاج عراست ةدحو مادختسا دنع (0) ةقطنم لىف لالحال وه امك دجاوتال نع غالبال ةقطنم ةلاح لىع DRA لصحيس ،راضال تازاغل نم عبارال لىجل نم (g) 4 ةبذاج عراست ةدحو مادختسا دنع (1) ةقطنم لىجراخ


```

> AVP: Session-Id(263) l=71 f=-M- val=0001-diamproxy.upe.pracups.gx;221084798;329321261;63a0c5ba-2d02
> AVP: Auth-Application-Id(258) l=12 f=-M- val=3GPP Gx (16777238)
> AVP: Origin-Host(264) l=37 f=-M- val=0001-diamproxy.upe.pracups.gx
> AVP: Origin-Realm(296) l=41 f=-M- val=pgw.mnc054.mcc405.3gppnetwork.org
> AVP: Destination-Realm(283) l=35 f=-M- val=delsdp85vip.airtelindia.com
> AVP: CC-Request-Type(416) l=12 f=-M- val=UPDATE_REQUEST (2)
> AVP: CC-Request-Number(415) l=12 f=-M- val=1
> AVP: Destination-Host(293) l=33 f=-M- val=delsdp85a.airtelindia.com
> AVP: Origin-State-Id(278) l=12 f=-M- val=1670878206
> AVP: Subscription-Id(443) l=40 f=-M-
> AVP: Subscription-Id(443) l=44 f=-M-
> AVP: Framed-IP-Address(8) l=12 f=-M- val=100.72.107.141 (100.72.107.141)
> AVP: Framed-IPv6-Prefix(97) l=18 f=-M- val=2401:4900:5db1:f7e7::/64
> AVP: User-Equipment-Info(458) l=44 f=-M-
> AVP: Called-Station-Id(30) l=22 f=-M- val=airtelgprs.com
> AVP: Event-Trigger(1006) l=16 f=VM- vnd=TGPP val=CHANGE_OF_UE_PRESENCE_IN_PRESENCE_REPORTING_AREA_REPORT (48)
> AVP: Access-Network-Charging-Address(501) l=18 f=VM- vnd=TGPP val=117.96.117.8 (117.96.117.8)
✓ AVP: Presence-Reporting-Area-Information(2822) l=44 f=V-- vnd=TGPP
  AVP Code: 2822 Presence-Reporting-Area-Information
  > AVP Flags: 0x80, Vendor-Specific: Set
  AVP Length: 44
  AVP Vendor Id: 3GPP (10415)
  ✓ Presence-Reporting-Area-Information: 00000b05800000f00028af80000000000b07800001000028af00000000
    > AVP: Presence-Reporting-Area-Identifier(2821) l=15 f=V-- vnd=TGPP val=800000
    ✓ AVP: Presence-Reporting-Area-Status(2823) l=16 f=V-- vnd=TGPP val=In area (0)
      AVP Code: 2823 Presence-Reporting-Area-Status
      > AVP Flags: 0x80, Vendor-Specific: Set
      AVP Length: 16
      AVP Vendor Id: 3GPP (10415)
      Presence-Reporting-Area-Status: In area (0)

```

CCR-U

Source	Destinati	APN-Agri	CC-Req	Prese	RAT	QoS-	Info	Charging-Rule-Ba	Event-Trigger
GW-GX	DRA-GX	2147484900	INITIAL_REQ		EUTRAN	QCI_9	cmd=Credit-Control Request(
DRA->PCRF	PCRF	2147484900	INITIAL_REQ		EUTRAN	QCI_9	cmd=Credit-Control Request(
PCRF	DRA->PCRF	3000000000	INITIAL_REQ			QCI_9	cmd=Credit-Control Answer(2	BHARTI_NPRI1	QOS_CHANGE,RAT_CHANGE,PLMN_CHANGE,DEFAULT_EPS_BEARER_QOS_CHANGE,REVALIDATION_TIMEOUT
DRA-GX	GW-GX	3000000000	INITIAL_REQ			QCI_9	cmd=Credit-Control Answer(2	BHARTI_NPRI1	QOS_CHANGE,RAT_CHANGE,PLMN_CHANGE,DEFAULT_EPS_BEARER_QOS_CHANGE,REVALIDATION_TIMEOUT,CHANGE_OF_UE_PRESENCE_IN_PRESENCE_REPORTING_AR
GW-GX	DRA-GX		UPDATE_REQ	In area			cmd=Credit-Control Request(CHANGE_OF_UE_PRESENCE_IN_PRESENCE_REPORTING_AREA_REPORT
DRA->PCRF	PCRF		UPDATE_REQ		GAN		cmd=Credit-Control Request(
PCRF	DRA->PCRF	2000000000	UPDATE_REQ			QCI_6	cmd=Credit-Control Answer(2	BHARTI_NPRI1,BHARTI_NPRI1_5G	QOS_CHANGE,RAT_CHANGE,PLMN_CHANGE,DEFAULT_EPS_BEARER_QOS_CHANGE,REVALIDATION_TIMEOUT
DRA-GX	GW-GX	2000000000	UPDATE_REQ			QCI_6	cmd=Credit-Control Answer(2	BHARTI_NPRI1,BHARTI_NPRI1_5G	QOS_CHANGE,RAT_CHANGE,PLMN_CHANGE,DEFAULT_EPS_BEARER_QOS_CHANGE,REVALIDATION_TIMEOUT,CHANGE_OF_UE_PRESENCE_IN_PRESENCE_REPORTING_AR
GW-GX	DRA-GX		UPDATE_REQ	Out of			cmd=Credit-Control Request(CHANGE_OF_UE_PRESENCE_IN_PRESENCE_REPORTING_AREA_REPORT
DRA->PCRF	PCRF		UPDATE_REQ		EUTRAN		cmd=Credit-Control Request(
PCRF	DRA->PCRF	3000000000	UPDATE_REQ			QCI_9	cmd=Credit-Control Answer(2	BHARTI_NPRI1_5G,BHARTI_NPRI1	QOS_CHANGE,RAT_CHANGE,PLMN_CHANGE,DEFAULT_EPS_BEARER_QOS_CHANGE,REVALIDATION_TIMEOUT
DRA-GX	GW-GX	3000000000	UPDATE_REQ			QCI_9	cmd=Credit-Control Answer(2	BHARTI_NPRI1_5G,BHARTI_NPRI1	QOS_CHANGE,RAT_CHANGE,PLMN_CHANGE,DEFAULT_EPS_BEARER_QOS_CHANGE,REVALIDATION_TIMEOUT,CHANGE_OF_UE_PRESENCE_IN_PRESENCE_REPORTING_AR
GW-GX	DRA-GX		UPDATE_REQ	In area			cmd=Credit-Control Request(CHANGE_OF_UE_PRESENCE_IN_PRESENCE_REPORTING_AREA_REPORT
DRA->PCRF	PCRF		UPDATE_REQ		GAN		cmd=Credit-Control Request(
PCRF	DRA->PCRF	2000000000	UPDATE_REQ			QCI_6	cmd=Credit-Control Answer(2	BHARTI_NPRI1,BHARTI_NPRI1_5G	QOS_CHANGE,RAT_CHANGE,PLMN_CHANGE,DEFAULT_EPS_BEARER_QOS_CHANGE,REVALIDATION_TIMEOUT
DRA-GX	GW-GX	2000000000	UPDATE_REQ			QCI_6	cmd=Credit-Control Answer(2	BHARTI_NPRI1,BHARTI_NPRI1_5G	QOS_CHANGE,RAT_CHANGE,PLMN_CHANGE,DEFAULT_EPS_BEARER_QOS_CHANGE,REVALIDATION_TIMEOUT,CHANGE_OF_UE_PRESENCE_IN_PRESENCE_REPORTING_AR

GW - DRA - PCRF

GW نم (1) ةقطنم لاجراخ وأ (0) ةقطنم لاجراخ يف امك دجاوتال نع ةقطنم لاجراخ DRA قىلتت امدنع هنا ىرت نأ كنك مي، انه ةدعاق ريغتت ب PCRF اذه دجلا عون ىلع ساسأل موقى PCRF وحن ىلاوتال ىلع EUTRAN و GA ك دجلا عون لسرت انه نإف 5G و 4G ةمدخل ةدوج لىدعتت ةىساسأل دعاقول

ةمچرتل هذه ل و ح

ةلأل تاي نقتل ن م ة و مچ م ادخت ساب دن تسم ل ا ذه Cisco ت مچرت
م ل ا ل ا ا ن ا ع مچ ي ف ن ي م دخت س م ل ل م عد ي و ت ح م م ي دقت ل ة ي ر ش ب ل و
ا م ك ة ق ي ق د ن و ك ت ن ل ة ي ل ا ة مچرت ل ض ف ا ن ا ة ظ ح ا ل م ي ج ر ي . ة ص ا خ ل ا م ه ت غ ل ب
Cisco ي ل خ ت . ف ر ت ح م مچرت م ا ه م د ق ي ي ت ل ا ة ي ف ا ر ت ح ا ل ا ة مچرت ل ا ع م ل ا ح ل ا و ه
ي ل ا م ا د ا د ع و ج ر ل ا ب ي ص و ت و ت ا مچرت ل ا هذه ة ق د ن ع ا ه ت ي ل و ئ س م Cisco
Systems (ر ف و ت م ط ب ا ر ل ا) ي ل ص ا ل ا ي ز ي ل ج ن ا ل ا دن ت س م ل ا