



Moso Canopy 4G Outdoor Radios

Model: SC04255P

Configuration Guide

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Introduction

This document provides the user guide for Moso Canopy 4G Outdoor radio devices ("Moso Canopy"), including accessing key features such as: firmware management, configuration file management, basic functions configuration, and EPC configuration.

Notes: After modifying settings, the user should reboot device.

Access Device

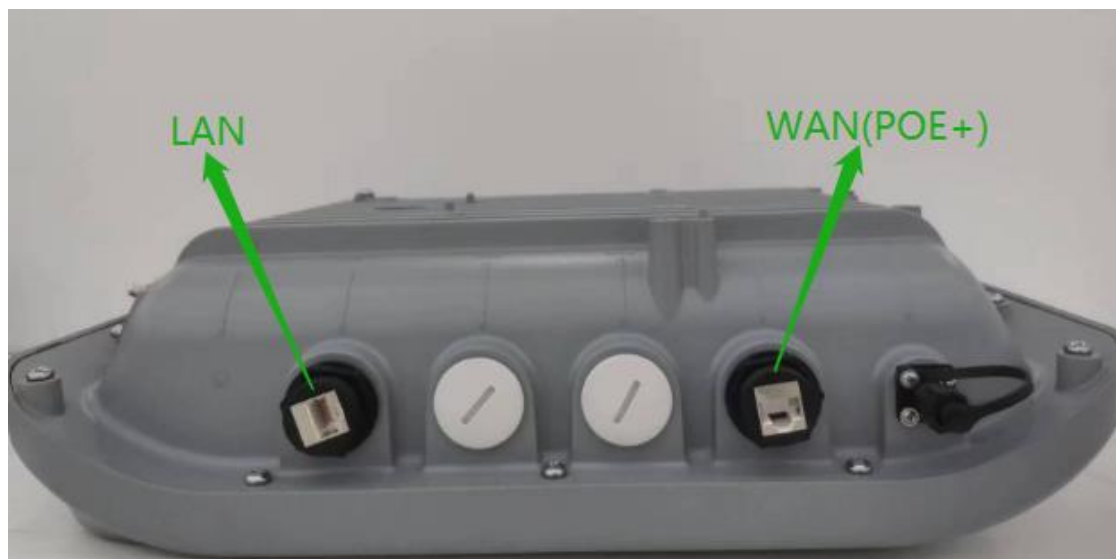
Ethernet LAN Connection

This section provides details of LAN connection between the Moso Canopy and the PC if the Moso Canopy supports the Ethernet LAN port.

Step 1. Connect PC's Ethernet interface to the LAN port of the Moso Canopy with an RJ45 cable.

Step 2. Power on the Moso Canopy device.

Step 3. Check if the PC gets the dynamic IP address: 11.11.11.xx.



Device WAN Connection

This section provides details of WAN connection of the Moso Canopy after the PC is connected to the Moso Canopy via Ethernet interface and has a dynamic IP address.

Notes: If device has more than ONE physical WAN interface, please just select one WAN interface to use.

Step 1. Use an RJ45 cable to connect the WAN port of the Moso Canopy to a Router which is connected to Internet or Intranet.

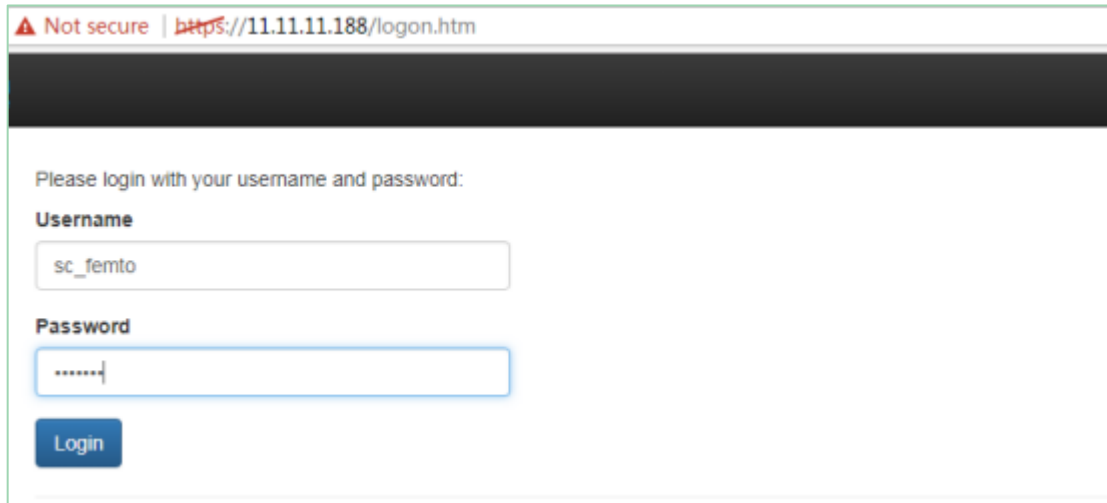
Step 2. The WAN port of the Moso Canopy will be able to get one dynamic IP if the router supports DHCP server. Or refer to "Configure Device's Network" section to setup the WAN port of the Moso Canopy.

Access Web

This section provides details of accessing the web GUI of the Moso Canopy.

After the PC connect to the Moso Canopy with Ethernet LAN interface, open a web browser on the PC and visit <https://11.11.11.188> and input username and password, and then click "Login" button.

Please get the general account from MosoLabs team.



For testing purposes, the Moso Canopy opens the remote login function temporarily, to determine the IP of the Moso Canopy's WAN port and to find a PC on the WAN side of the Moso Canopy. Open a web browser on the PC and type the URL https://wan_ip_address and input username and password, and then click "Login" button.

The remote login function will be disabled in the formal shipment firmware.

Device Status Check

This section provides details of how to check the basic status of Moso Canopy device.

Visit "State" page under "State" group to check the system status and network status, SAS state, GPS state, IPSEC state of Moso Canopy device, this page is the default one after login.

System Status		LTE Status	
System		Network	
Device name	TDD_LTE_FAP	Physical address	3C:62:F0:0B:87:2A
Serial number	2201CW5001963	Connect type	DHCP
System state	henb running	Connect status	CONNECTED
GPS module	Unlock	IP address	10.41.3.32
Bands supported	48	Subnet mask	255.255.255.0
Hardware version	2.0	Default gateway	10.41.3.254
BOOT version	02.1.0	DNS server	10.41.1.196
Software version	RC3925@2205121731	IPv6 Connect type	
Additional version		IPv6 address	
System start time	2022-07-08 19:10:35	Prefix Length	
Current time	2022-07-08 19:13:55	Next Hop	

SAS state		GPS state	
Status	Disabled	Status	InProgress
Additional info		UTC Time	2022-06-20T02:21:34Z
Grant Time	0001-01-01T00:00:00Z	Latitude	0
Grant ID		Longitude	0
Grant Spectrum		Satellite Number	0
Available Spectrum		Satellite Info	

IPSEC State	
Current status	Disabled
Additional info	

IPSEC Tunnel Info					
ConnName	Status	PeerAddress	CreationTime	IPAddress	SubnetMask

Visit "LTE State" page under "State" group to check the cell parameters and 2nd cell state, neighbor list of Moso Canopy device.

System Status	LTE Status
-------------------------------	-------------------

Primary Cell State			
CellParameters		State	
EARFCN DL / UL	55340 / 55340	S1 State	Connected
BandWidth	20MHz	HeMS State	IDLE
PCI	100	Init HeMS State	IDLE
ECGI	108941342	Cell State	Stack Running
HomeNodeB Name	george	Cell Sync Type	FREE_RUNNING
PLMN	10894	TX power	13dBm
MME IP	10.41.3.200	RS power	-18dBm
HeMS IP		Cell Mode	Standalone
Init HeMS IP	acs.sc.sercomm.com		

NeighborList of PCell In Use							
ID	PLMNID	CID	ARFCN	PCI	SRCTYPE	ENBTYPE	RSRP
1	315010	630034	55340	1		MACRO	-95
2	315010	630035	55540	2		MACRO	-83

Secondary Cell State			
CellParameters		State	
EARFCN DL / UL	55540 / 55540	S1 State	Connected
BandWidth	20MHz	Cell State	Stack Running
PCI	101	CA State	Enable
ECGI	108941345	TX power	13dBm
HomeNodeB Name	george	RS power	-18dBm
PLMN	10894		
MME IP	10.41.3.200		

The "Cell State" has a total of 3 status as follows:

Setup S1

Stack Running

Down

Firmware and Configuration File Management

Firmware Switch

This section provides details of how to switch the firmware for the Moso Canopy device.

The Moso Canopy supports dual firmware images. You can use this function as following steps.

Step 1. Visit "Firmware Management" page under "Manage" group.

Step 2. Check the current version and backup version, click "Switch Firmware" button if the backup version is needed. The Moso Canopy will perform a reboot automatically after switching. This takes about 3 minutes.

Step 3. Visit "Firmware Management" page under "Manage" group to check firmware version again.

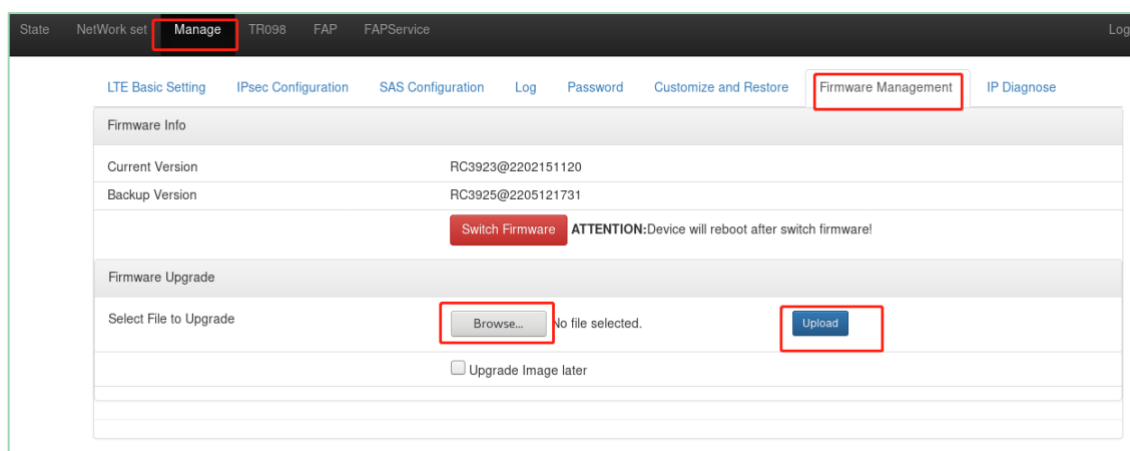
Firmware Upgrade

This chapter provides details of upgrading the firmware onto the Moso Canopy device.

Step 1. Get the new firmware from MosoLabs and store it in the local disk.

Step 2. Visit "Firmware Management" page under "Manage" group.

Step 3. Click "Select a File" button and select the new firmware restored on the local disk.



Step 4. Click "Upload" button and start the firmware upgrading, the Moso Canopy will perform a reboot automatically after upgrading. This will take 4 to 6 minutes.

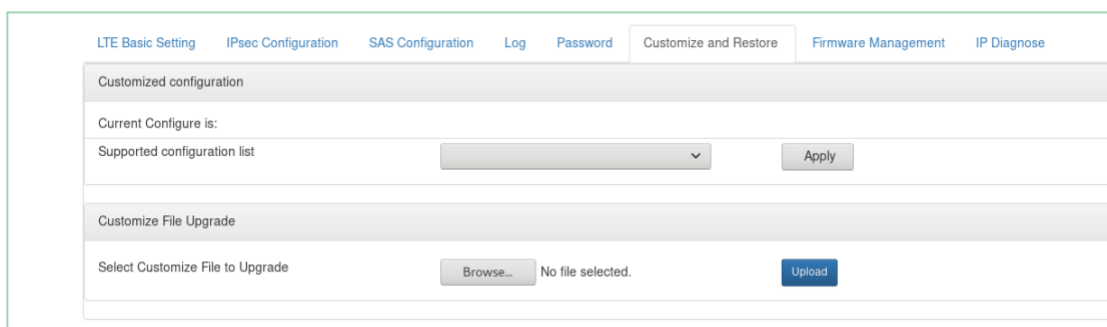
Configuration File Management

This section provides details of management of the Moso Canopy's configuration file.

Visit "Customize and Restore" page under "Manage" group.

Function 1. Choose customized file. Select a configuration file from "Supported configuration list" and click the "Apply" button. The Moso Canopy will reboot automatically after applying the new configuration. This will take 3 to 5 minutes.

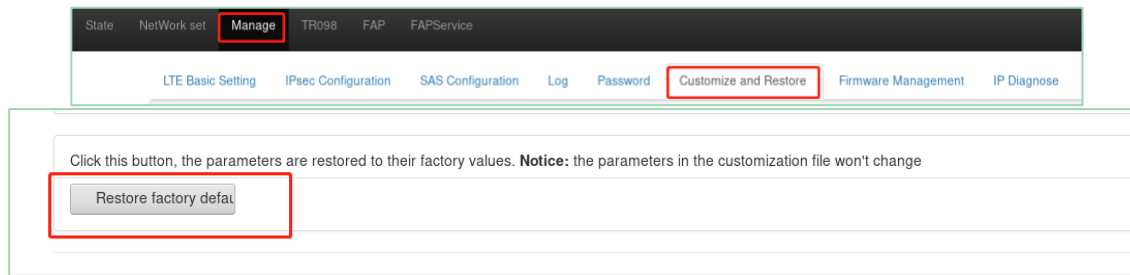
Function 2. Upgrade customized file. Click "Select a File" button and select a customized configuration file stored locally and click "Upload" button and start the configuration upgrade. The Moso Canopy will reboot automatically after upgrading. This will take 3-5 minutes. The customized configuration can be obtained from MosoLabs.



Factory Reset

This section provides how to factory reset on the webGUI.

Visit "Customize and Restore" page under "Manage" group.



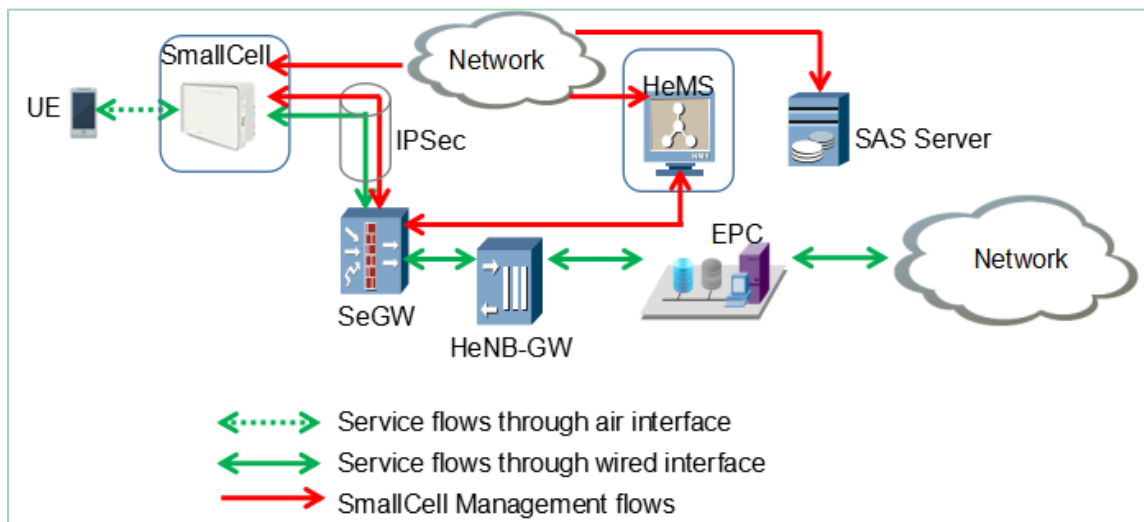
Click "Restore factory default" button to use factory values. The Moso Canopy will reboot automatically after restoring default values. This will take 2-3 minutes.

Device Functions Configuration

Configure Device's Network

This section provides details of configuration of the Moso Canopy's WAN IP address.

The following figure is a reference to the Network Architecture and useful for the setup the test environment.



1. Visit "IPv4 Set" page under "Network set" group and configure the WAN IPv4 address of the Moso Canopy device. The default IPv4 connection type of the Moso Canopy device is "DHCP" which means the Moso Canopy's WAN is a DHCP client. The Moso Canopy will get the dynamic IP from DHCP server in the network.

State	NetWork set	Manage	TR098	FAP	FAPService
<div>IPv4 set IPv6 set Port Status</div>					
IP Address					
Connect type <input checked="" type="radio"/> DHCP <input type="radio"/> Static IP <input type="radio"/> NAT					
IP Address 172.21.7.33					
Network mark 255.255.255.0					
Gateway address 172.21.7.248					
DNS Address					
DNS type <input checked="" type="radio"/> Obtain DNS server address automatically <input type="radio"/> Use the following IP address					
Preferred DNS server 172.21.1.245					
Alternate DNS server 172.21.1.231					

- Visit "IPv6 Set" page under "Network set" group and configure the WAN IPv6 address of the Moso Canopy device.

State	NetWork set	Manage	TR098	FAP	FAPService
<div>IPv4 set IPv6 set Port Status</div>					
IPv6 Address					
Connect type <input type="radio"/> Stateful <input type="radio"/> Stateless <input checked="" type="radio"/> Static IP <input type="radio"/> Not use					
IPv6 Address <input type="text"/>					
Prefix Length <input type="text"/>					
Gateway address <input type="text"/>					
DNS Address					
<input type="radio"/> Obtain DNS server address automatically <input checked="" type="radio"/> Use the following IP address					
Preferred DNS server <input type="text"/>					
Alternate DNS server <input type="text"/>					
Network time					
Network time server 10.70.2.43					
VLAN Setting					
IPv6 Enable <input type="checkbox"/>					
IPv6 Connect type <input type="radio"/> Stateful <input type="radio"/> Stateless <input checked="" type="radio"/> Static IP <input type="radio"/> Not Use					
VLAN ID 17					
IPv6 VLAN IP <input type="text"/>					
IPv6 VLAN Prefix Length <input type="text"/>					
IPv6 VLAN Network Gateway <input type="text"/>					
Default Interface <input type="checkbox"/>					
<div>Save Cancel Help</div>					

- Visit "IP" page under "TR098" group. Click Device.IP.Interface
The first IPv6Address View List button, then it will open another page. Please enable Device.IP.Interface.1.IPv6Address and click Modify button to save it to flash.

The screenshot shows the MosoLabs configuration interface. At the top, the 'TR098' group is selected. Under the 'IP' tab, the 'Device.IP.Interface' section is highlighted. It contains a table with the following data:

ID	Enable	Alias	Name	LowerLayers	MaxMTUSize	IPv4Address.	IPv6Address.
1	<input checked="" type="checkbox"/>	cpe-ifr-default	eth0	Device.Ethernet.Interface	1500	View List	View List
2	<input type="checkbox"/>	cpe-ifr-vlan	eth0.17	Device.Ethernet.VLANTe	1500	View List	View List
3	<input checked="" type="checkbox"/>	cpe-ifr-management	eth0.1	Device.Ethernet.VLANTe	1500	View List	View List
4	<input type="checkbox"/>	cpe-ifr-management	eth0.2	Device.Ethernet.Interface	1500	View List	View List

Below this table, the 'Device.IP.Interface.1.IPv6Address' section is shown. It contains a table with the following data:

ID	Enable	IP Address	Origin	Prefix	Del	Modify
1	<input checked="" type="checkbox"/>	2001:1998:2e0:1a::11	Stateful	64	Del	Modify
	<input type="checkbox"/>				Add	

- Visit "IP" page under "TR098" group and enable ForwardingPolicy of IPv6. Click IPv6Forwarding. View List button, then it will open another page. Please set ForwardingPolicy to 1 and then click Modify button to save it to flash.

Bring up S1 with MME

This section provides details of the configuration of Moso Canopy's S1, which can support the CA function.

- Visit "LTE Basic Setting" page under "Manage" group to set Cell parameters.

LTE Basic Setting		IPsec Configuration	SAS Configuration	Log	Password	Customize and Restore	Firmware Management	IP Diagnose
Cell Configuration								
AdminState	<input type="checkbox"/>							
Carrier Number	2							
Auto Internal Neighbors	<input type="checkbox"/>							
Carrier Aggregation	<input checked="" type="checkbox"/>							
Contiguous CC	<input type="checkbox"/>							
BandWidth	20							
FrequencyBand	48,48							
EARFCN	55340,55540							
CellIdentity	1342,1345							
PCI	100,101							
TxPower	13							
S1 Configuration								
Tunnel Type	IPv4							
MME IP Address	10.41.3.200							
PLMNID	10894							
TAC	2							
Sync Source								
Sync Source	FREE_RUNNING							

AdminState: enable or disable Moso Canopy

Carrier Number: number of carriers which will be enabled.

Auto Internal Neighbors: Indicate whether add internal neighbor cells for each other.

Carrier Aggregation: enable or disable Carrier Aggregation

Contiguous CC: contiguous component carrier

Bandwidth: each carrier bandwidth

FrequencyBand: frequency band indicator, need to input 2 parameters for CA mode.

EARFCN: EUTRA-Frequency, need to input 2 parameters if CA mode.

CellIdentity: Cell Identity, need to input 2 parameters if CA mode.

PCI: SmallCell's phycellid list, need to input 2 parameters if CA mode.

TxPower: the output power of each path and the unit is dB

Tunnel Type: The type of tunnel such as IPv4, IPSEC

MME IP Address: IP of MME

PLMNID: PLMN of Moso Canopy

TAC: TAC of Moso Canopy

Sync Source: The sync type, default is FREE_RUNNING

Notes: If you configured **Carrier Number** to 2, means you enabled 2 cells. In this case, you should be aware of that our eNB must be set to macro cell and work in the mode of Intra- eNB with two cells. So

CellIdentity should be set two values, and these two values use the same eNB-Id and different cell ids. For macro mode of eNBType, you should configure PCI to ensure their values are out the range of Moso Canopy PCI.

Data Model Nodes Table
Device.Services.FAPService.1.FAPControl.LTE.AdminState
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_RRMConfig.X_000E8F_Cell_Number
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_RRMConfig.X_000E8F_CA_Enable
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_RRMConfig.X_000E8F_CELL_Freq_Contiguous
Device.Services.FAPService.1.CellConfig.LTE.RAN.RF.DLBandwidth
Device.Services.FAPService.1.CellConfig.LTE.RAN.RF.ULBandwidth
Device.Services.FAPService.1.CellConfig.LTE.RAN.RF.FreqBandIndicator
Device.Services.FAPService.1.CellConfig.LTE.RAN.RF.EARFCNDL
Device.Services.FAPService.1.CellConfig.LTE.RAN.RF.EARFCNUL
Device.Services.FAPService.1.CellConfig.LTE.RAN.Common.CellIdentity
Device.Services.FAPService.1.CellConfig.LTE.RAN.RF.PhyCellID
Device.Services.FAPService.1.CellConfig.LTE.RAN.RF.X_000E8F_TxPowerConfig
Device.Services.FAPService.1.CellConfig.LTE.Tunnel.1.TunnelRef
Device.Services.FAPService.1.FAPControl.LTE.Gateway.S1SigLinkServerList
Device.Services.FAPService.1.FAPControl.LTE.Gateway.S1SigLinkPort
Device.Services.FAPService.1.CellConfig.LTE.EPC.PLMNList.1.PLMNID
Device.Services.FAPService.1.CellConfig.LTE.EPC.TAC
Device.Services.FAPService.1.REM.X_000E8F_tfcsManagerConfig.primSrc

2. Config Multi-MME

Visit "FAPControl" page under "FAPService" group to find "S1SigLinkServerList" and fill.

S1SigLinkServerList	{{1,1,172.21.143.206}}
---------------------	------------------------

S1SigLinkServerList:{{mmeld1,noOfIp,mmelp1,mmelp2,...},{mmeld2,noOfIp,mmelp1,mmelp2,...},...}.

Configure this parameter in the data format as above, with the meaning of each parameter from left to right: MME ID, number of MME IP, and each MME IP address.

Ex.: {{1,1,172.21.143.206},{2,1,172.21.143.220}}.Represents a total of two MMEs configured with MMEID of 1 and 2, and each MME has only one IP, 172.21.143.206 and 172.21.143.220, respectively.

3. Config Multi-MME with one PLMNID

Visit "CellConfig" page under "FAPService" group to find "Device.Services.FAPService.1.CellConfig.LTE.EPC.PLMNList" and fill in "X_000E8F_CFG_MMEIdList" parameter.

Device.Services.FAPService.1.CellConfig.LTE.EPC.PLMNList.					
RRR_RESOURCES	X_SCM_PLMNID_Priority	X_SCM_Selected_MME_ByPriority	X_SCM_Ignore_RegisterMME_IE	X_SCM_CFG_MMEIdList	X_SCM_Supported_CellId
	6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	{1,2}	0
		<input type="checkbox"/>	<input type="checkbox"/>		

X_000E8F_CFG_MMEIdList: Data format is {mmeld1,mmeld2,...}. The MME to which the PLMNID belongs is described in the form of MMEID. The configuration order determines the priority of the MME to the PLMN. Each parameter represents the MMEID of the MME configured by the PLMNID. Such as {2,1}, MME ID 2 represents MME 172.21.143.220 in S1SigLinkServerList, so MME ID 2 has more priority than MME ID 1.

X_000E8F_Ignore_RegisterMME_IE: Indicate if according to the RegisterMME_IE to decide which MME to be used. The IE will be in RRConnectionComplete message, and it is an optional IE. If there is no RegisterMME_IE, then will select MME according to parameter X_000E8F_CFG_MMEIdList.

4. MOCN configuration

Firstly, configure the Multi-MME as description in "Config Multi-MME" above, then configure the Multi-PLMN, visit "CellConfig" page under "FAPService" group to add a ID for "Device.Services.FAPService.1.CellConfig.LTE.EPC.PLMNList" and fill the configuration as below:

Device.Services.FAPService.1.CellConfig.LTE.EPC.PLMNList.						
ID	Enable	Alias	IsPrimary	PLMNID	CellReservedForOperatorUse	X_SCM_DEDICATED_PLMN_USER_RESOURCES
1	<input checked="" type="checkbox"/>	Primary PLMNID	<input checked="" type="checkbox"/>	11805	<input checked="" type="checkbox"/>	0
2	<input checked="" type="checkbox"/>	Second PLMNID	<input type="checkbox"/>	11132	<input checked="" type="checkbox"/>	0
	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	

Device.Services.FAPService.1.CellConfig.LTE.EPC.PLMNList.					
PLMN_BEARER_RESOURCES	X_SCM_PLMNID_Priority	X_SCM_Selected_MME_ByPriority	X_SCM_Ignore_RegisterMME_IE	X_SCM_CFG_MMEIdList	X_SCM_Supported_CellId
<input type="checkbox"/>	6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	{1}	0
<input type="checkbox"/>	6	<input type="checkbox"/>	<input type="checkbox"/>	{2}	0
<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		

Ex.: {1} in X_000E8F_CFG_MMEIdList represents 172.21.143.206 configured in 4.3.2 and {2} represents 172.21.143.220. Cell with PLMNID 11805 will connect to MME ID 1, and cell with 11132 will connect to MME ID 2.

5. eNodeB Type Configuration

Visit "FAPControl" page under "FAPService" group to find "FAPService_FAPControl_LTE_X_000E8F_RRMConfig" Object and below parameter.

X_000E8F_CSGSmallCellPCISStart	0
X_000E8F_CSGSmallCellPCIRange	0

X_000E8F_CSGSmallCellPCISStart: Start PCI for Moso Canopy

X_000E8F_CSGSmallCellPCIRange: The range of PCI for small cell, these two parameters define the range of PCI for small cell, the rest of PCI is used for macro cell.

6. Visit "FAPControl" page under "FAPService" group to enable S1 "AdminState", then click "Save" button in the end of the page and reboot the Moso Canopy device, then S1 will be work.

Data Model Nodes Table
Device.Services.FAPService.1.FAPControl.LTE.AdminState

7. Visit "Capabilities" page under "FAPService" group and check the MaxTxPower which the Moso Canopy device hardware supports. Make sure value of TxPower is smaller than Moso Canopy capability.

State	NetWork set	Manage	TR098	FAP	FAPService	EPC
FAPService	Capabilities	FAPControl	AccessMgmt	CellConfig	REM	Transport
FAPService_Capabilities						
GPSEquipped		<input type="checkbox"/>				
MaxTxPower		21		[0:36] ?		

Moso Canopy Output Power

This section provides details of configuration of Moso Canopy's output power. Bring up S1.

1. Visit "CellConfig" page under "FAPService" group and set ReferenceSignalPower, it's in dBm with a range between -60 and 50.

State	NetWork set	Manage	TR098	FAP	FAPService	EPC
FAPService	Capabilities	FAPControl	AccessMgmt	CellConfig	REM	Transport
FreqBandIndicator		2		[1:68]		
X_000E8F_FreqBandIndicator2		40		[1:68]		
DLBandwidth		50		▼		
ULBandwidth		50		▼		
ReferenceSignalPower		-27				
X_000E8F_ReferenceSignalPowerPriority						
PhvCellID		13				

Data Model Nodes Table
Device.Services.FAPService.1.CellConfig.LTE.RAN.RF.ReferenceSignalPower

2. Visit "LTE Basic Settings" page under "Manage" group and select the bandwidth.

Cell Configuration	
BandWidth	10
FrequencyBand	12
EARFCNDL	5050
EARFCNUL	23050
Home eNB	<input checked="" type="checkbox"/>
CellIDentity	23 [0:268435455]
PCI	21

3. Follow the below formula to calculate the TxPower

$\text{TxPower} = \text{ReferenceSignalPower} + 28$, if Bandwidth = 10MHz.

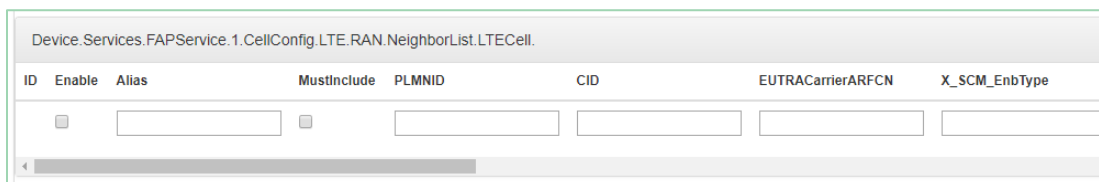
$\text{TxPower} = \text{ReferenceSignalPower} + 31$, if Bandwidth = 20MHz.

The calculated TxPower will be announced to the UE in packets sent from the small cell device to UE, then the UE will use that value from the Moso Canopy device to perform the communication preparation.

Add one Neighbor Cell

This section provides details of the configuration of Moso Canopy's neighbor cell list.

1. Visit "CellConfig" page under "FAPService" group and find "Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.LTECell" table to add a neighbor cell or additional devices.



Cell Configure page (Neighbor cell list)

Enable: enable option of this item.

Alias: the alias name for this neighbor cell list.

MustInclude: enable it if this neighbor cell always exists.

PLMNID: PLMN of neighbor cell.

CID: CID of neighbor cell.

EUTRACarrierARFCN: EARFCN DL of neighbor cell.

X_000E8F_EnbType: 0 if neighbor cell is Macrocell, 1 for Home Moso Canopy.

X_000E8F_EnbAddr: input it if X2 interface will be needed.

X_000E8F_TAC: TAC of neighbor cell.

X_000E8F_TrgrX2: enable this if the X2 interface is needed.

X_000E8F_AccessMode: Access mode of neighbor cell, set it to 1 (Open Mode) normally

X_000E8F_CSGID: CSG ID of neighbor cell. Leave it blank if it is open mode.

PhyCellID: PCI of neighbor cell.

QOffset: QOffset of neighbor cell. Leave it blank for normal priority neighbor cell.

CIO: CIO of neighbor cell. Leave it blank for normal priority neighbor cell.

RSTxPower: RS power of neighbor cell. Leave it blank if not knowing this value.

Blacklisted: enable it if putting this neighbor cell to black list of HO.

TAC/EnbType: not modify it.

Data Model Nodes Table
Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.LTECell.{i}.Enable
Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.LTECell.{i}.Alias
Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.LTECell.{i}.MustInclude
Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.LTECell.{i}.PLMNID
Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.LTECell.{i}.CID
Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.LTECell.{i}.EUTRACarrierARFCN
Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.LTECell.{i}.X_000E8F_EnbType
Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.LTECell.{i}.X_000E8F_EnbAddr

Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.LTECell.{i}.X_000E8F_TAC
Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.LTECell.{i}.X_000E8F_TrgrX2
Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.LTECell.{i}.X_000E8F_AccessMode
Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.LTECell.{i}.X_000E8F_CSGID
Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.LTECell.{i}.PhyCellID
Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.LTECell.{i}.QOffset
Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.LTECell.{i}.CIO
Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.LTECell.{i}.RSTxPower
Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.LTECell.{i}.Blacklisted
Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.LTECell.{i}.TAC (Same as ".X_000E8F_TAC")
Device.Services.FAPService.1.CellConfig.LTE.RAN.NeighborList.LTECell.{i}.EnbType (Same as ".X_000E8F_EnbType")

2. Click "Add" Button in the end of a new neighbor cell. And click "Modify" button in the end of an existing neighbor cell if some parameters will need to be modified. Click "Save" button in the end of the page.
3. Reboot the Moso Canopy device.
4. Notes:
 - If you add neighbor cell by the above method, you have better to disable TPM function first. Visit "CellConfig" page under "FAPService" group and find "FAPService_CellConfig_LTE_X_000E8F_ULTRASON_CONFIG_TPMConfig" object to disable TPMEnabled as below:

FAPService_CellConfig_LTE_X_000E8F_ULTRASON_CONFIG_TPMConfig

TPMEnabled
☐

- If you configured two carriers as described in "Moso Canopy Output Power" section. If you want to add neighbors for internal cells, please visit "LTE Basic Setting" page under "Manage" group and find "Cell Configuration" object to enable "Auto Internal Neighbors" as below:

Cell Configuration

Carrier Number

2

Auto Internal Neighbors
☒

GPS Sync

This section provides details of the configuration of GPS.

1. Visit "REM" page under "FAPService" group and find "FAPService_REM_X_000E8F_tfcsManagerConfig" table. Select "GNSS" for primSrc item, then the GPS module will function after powering on the Moso Canopy device.

FAPService_REM_X_000E8F_tfcsManagerConfig	
srcSwitch	<input type="checkbox"/> ?
primSrc	GNSS
syncMode	TIME
freqErrLimit	250
timeErrLimit	1000
fttr1	50
fttr2	50
ttr1	500
srl	3
gpsLeapSeconds	18
resyncSrl	3
alarmDurationTimer	5

2. Reboot the Moso Canopy device and visit "LTEState" page under "State" group to check the status of GPS sync.

The Moso Canopy device starts to do GPS Sync. It will take a couple of minutes to run GPS Sync function. After it's completed, the "LTE State" page shows GPS Sync.

Data Model Nodes Table
Device.Services.FAPService.1.REM.X_000E8F_tfcsManagerConfig.primSrc

1588 Sync

This section provides details of configuration of 1588.

1. Visit "REM" page under "FAPService" group and find "FAPService_REM_X_000E8F_tfcsManagerConfig" table, Select "PTP" for primSrc.

FAPService_REM_X_000E8F_tfcsManagerConfig	
srcSwitch	<input type="checkbox"/>
primSrc	PTP
syncMode	TIME
freqErrLimit	250
timeErrLimit	1000
flr1	200
flr2	200
ttr1	500
srl	3
gpsLeapSeconds	18
resyncSrl	3
alarmDurationTimer	5

2. Visit "REM" page and find "X_000E8F_PTP_Cfg" table to modify PTP parameters of 1588.

X_000E8F_PTPConfigUnicastEnable	<input checked="" type="checkbox"/>
X_000E8F_PTPConfigUnicastMaster	172.21.143.199 0

The following 3 parameters will need to be modified:

X_000E8F_PTPConfigUnicastEnable: If selected, enable Unicast mode, otherwise use Multicast mode. Default is Multicast.

X_000E8F_PTPConfigUnicastMaster: If unicast mode is enabled, configure PTP master related parameters. The format is as below:

<address><priority><log_sync_interval><log_delay_req_interval>

<address>: PTP master IP address

<priority>: 0

<log_sync_interval>: 0

<log_delay_req_interval>: 0

- Reboot the Moso Canopy device and visit "LTEState" page under "State" group to check the status of 1588 sync. The following screen will be shown when sync is OK.

State			
LTEState		LTE ScellState	
CellParameters		State	
EARFCN DL / UL	-- / --	S1 State	Disconnected
BandWidth	--	HeMS State	IDLE
PCI	--	Cell State	Down
ECGI	4600013365	Cell Sync Type	PTP
HomeNodeB Name	FemtoAP	Sync State	In Sync
PLMN	46000	PTP State	Up
MME IP	172.21.143.206	TX power	0dBm
HeMS IP		RS power	None

Data Model Nodes Table

Device.Services.FAPService.1.REM.X_000E8F_tfcsManagerConfig.primSrc

Device.Services.FAPService.1.REM.LTE.X_000E8F_PTP_Cfg.*

IPsec Configuration

This section provides details of the configuration of IPsec in 2 modes.

Please refer to section "Multiple IPsec Configuration" for multiple IPsec configuration.

Steps are as follows.

1. IPsec Cert Assign
 - a) IPsec cert should have two files: cert.pem and key file. We need assign the cert to our device. they can upload by GUI.
 - b) Open Web Page, then go to https://11.11.11.188:/cert_mgt.htm (Notice: This is a hidden page, you need go to it manually).
 - c) Select "Third Party Certification Service" as IPsec and select "Certification File" to local cert file.
 - d) Click "Upload" to Assign cert file.
 - e) Select "Third Party Certification Service" as IPsec and select "Private Key" to local key file.
 - f) Click "Upload" to Assign key file.

Third Party Certification

Service: IPsec

Certification File: [Upload]

Private Key: [Upload]

[Download] Note: Download the service cert that has been uploaded.

- g) Reboot Device and check the "Device.Security Certificate." list in below picture (FAP->FAP_Security). It will add a new cert. Check the "Subject" value to validate the cert.

SERCOMM State Network Manage TR098 FAP FAPService

FAP_Tunnel FAP_PerfMgmt FAP_Security FAP_MrMgmt

Device_Security

X_000E8F_InsecureCipherSuiteEnable ☐

X_000E8F_CertConfigStatus Unconfigured

Device.Security.Certificate.

ID	Enable	LastModif	X_SCM_CertificateName	SerialNumber	Issuer	NotBefore	NotAfter
1	<input checked="" type="checkbox"/>	0001-01-01T00:00:00Z	ipsec.cert	B7B0EF16873BBA27	/C=CN/O=Sercomm/OU=SC	Wed Oct 16 08:10:03 2019	Thu Jan
	<input type="checkbox"/>						

2. Modify the IPsec Configuration
 - a) Enter Manage->IPsec Configuration, Modify the value as follows (cert mode):
 - Enable:** Turn on the IPsec if IPsec functionality is required. This should be verified.
 - UseForCWMP:** Check this field if CWMP should use IPsec tunnel
 - IPsec Mode:** There are 4 IPsec modes,PSK\CERT\AKA\CUSTOM. The required CERT is chosen here.
 - Certificate Subject:** Cert subject
 - SecGW Server:** SecGWServer's IP Address
 - SecGW ID:** The ID of SecGW, use %any when unsure

Subnet: The right subnet that IPsec use for S1 connection and/or CWMP (Don't configure to 0.0.0.0/0 otherwise the DUT will not be accessible)

InnerIP: The IP in IPsec tunnel, left blank to auto obtain IP from SecGW (This will appear when IPsec Mode is set to PSK)

For example: Enable: ✓

IPsec Mode: CERT

Certificate Subject: XXX

SecGW Server: 10.41.3.240

SecGW ID: %any

Subnet: 10.42.3.0/24

- b) Then click on the Save button.

LTE Basic Setting	IPsec Configuration	SAS Configuration	Log	Password	Customize and R
IPsec Configuration					
Enable	<input checked="" type="checkbox"/>				
IPsec Mode	CERT ▼				
Certificate Subject	/C=CN/O=Sercomm/CN=Cloud Englev				
SecGW Server	10.41.3.240				
SecGW ID	%any				
Subnet	10.42.3.0/24				
InnerIP					

If you want to set IPsec mode to PSK, you can refer to below configuration.

IPsec Configuration	
Enable	<input checked="" type="checkbox"/>
IPsec Mode	PSK ▼
SecGW Server	172.21.7.218
SecGW ID	cn@strongswan.org
Subnet	172.21.7.206/32,172.21.7.207/32
InnerIP	
Secrets	*****

3. Modify the Tunnel type

- a) Enter Manage->LTE Basic Setting->S1 Configuration, Modify the value as follows:
Tunnel Type: IPSEC

S1 Configuration	
Tunnel Type	IPSEC
MME IP Address	10.42.3.200
PLMNID	10894
TAC	1

- Then click on the Save button.
 - Please make sure you've configured other cell parameters properly following < How To Bring Up S1 With MME> manual, especially you need to change the default CellIdentity.
 - When everything is done, reboot the device and you are good to go.
- (Tips: it may take a while for IPsec connect, please wait).

4. Check IPsec Status

You can view Cell status in LTE_status.htm webpage, if Cell is up, the status will be "Stack Running".

State		LTEState	
CellParameters		State	
EARFCN DL / UL	44890 / 44890	S1 State	Connected
BandWidth	20MHz	HeMS State	IDLE
PCI	499	Cell State	Stack Running
ECGI	1166612354	Cell Up Time	2020-09-23 15:42:26
HeNB Name	HNB_01	Sync Type	1588
PLMN	11666	Sync State	In Sync
MME IP	172.31.29.140	TX power	21dBm
HeMS IP	172.21.143.252	RS power	-7dBm

You can view IPsec status in TR098->SysPara->

Device.X_000E8F_DeviceFeature.SystemParams.RunControl.Service. If the IPsec is up, the status will be "running".

State

NetWork set

Manage

TR098

FAP

FAPService

DevFeature

SysPara

DevInfo

IP

MngtServer

Time

KPI

WiFi

X_000E8F_KUR_Enable

Device_X_000E8F_DeviceFeature_SystemParams_RunControl

WatchdogPollingPeriod

30

[1:]

ServiceNotReadyTimeout

180

[1:]

Device_X_SCM_DeviceFeature.SystemParams.RunControl.Service.

ID	Name	Alias	Status	Dependency	CrashAction	CrashMaxAc
1	linkstatd	rc_linkstatd	running		100_REBOOT_SERVICE	200_REBOO
12	son	rc_son	disabled	fsmintd.sniffer	100_REBOOT_SERVICE	100_REBOO
13	ipsec	rc_ipsec	running	wan	100_REBOOT_SERVICE	100_REBOO

Besides, you can visit rma_support page(https://11.11.11.188/rma_support.htm) to check IPsec status, the web page will show that status is OK if IPsec is established successfully.

Refresh							
HeNB System Check							
WAN:OK	IPSEC:OK	CWMP:FAIL	SAS:disable	GPS:undefined	RF:OK	Cell:undefined	Cert:INVALID
eNB System Check							
Check Options	State	Description && Exceptions Handling					
WAN/POE Port Local Connection	OK	Everything goes well					
WAN/POE Port Internet Connection	OK	Everything goes well					
IPsec Tunnel State	OK	Everything goes well					
ACS Connection State	FAIL	Please contact the GateWay staff to deal with					
SAS Connection State	disable	Disable state.Please config corresponding params if you need					

Data Model Nodes Table
Device.FAP.Tunnel.CryptoProfile.1.Enable
Device.FAP.Tunnel.UseForCWMP
Device.FAP.Tunnel.CryptoProfile.1.AuthMethod
Device.Services.FAPService.1.FAPControl.LTE.Gateway.SecGWServer1
Device.Security.X_000E8F_IPsec.X_000E8F_Ipsecconf.X_000E8F_Connection.1.X_000E8F_Rightid
Device.Security.X_000E8F_IPsec.X_000E8F_Ipsecconf.X_000E8F_Connection.1.X_000E8F_Rightsubnet
Device.Security.X_000E8F_IPsec.X_000E8F_Ipsecconf.X_000E8F_Connection.1.X_000E8F_Leftsubnet
Device.Security.X_000E8F_IPsec.X_000E8F_Ipsecsecrets.X_000E8F_Entries.1.X_000E8F_Secret

Multiple IPsec Configuration

This section provides details of the configuration of the Multiple IPsec tunnels, the qty can be 1 or 2. And the section "IPsec Configuration" only provides details of the configuration of one IPsec tunnel.

The Multiple IPsec is to set up two IPsec at the same time. And each IPsec has a different purpose, for example, the first IPsec is used to connect the first MME, and the second IPsec is used to connect the second MME.

1. Visit "Manage" page under "IPsec Configuration" group to configure the two IPsec tunnels.

[LTE Basic Setting](#)
[IPsec Configuration](#)
[SAS Configuration](#)
[Log](#)
[Password](#)
[Customize and Restore](#)

IPsec Configuration

Enable	<input checked="" type="checkbox"/>
IPsec Mode	CERT
Certificate Subject	/C=CN/O=Sercomm/CN=Cloud Englewo
SecGW Server	10.41.3.240
SecGW ID	%any
Subnet	10.42.3.0/24
InnerIP	

IPsec2 Configuration

Enable	<input checked="" type="checkbox"/>
IPsec Mode	CERT
Certificate Subject	/C=CN/O=Sercomm/CN=Cloud Englewo
SecGW Server	10.41.3.243
SecGW ID	%any
Subnet	10.43.3.0/24

Enable: to check it

IPsec Mode: choose CERT, because the second tunnel only support CERT mode now.

Certificate Subject: The cert subject of devices which can refer to page
FAP->FAP_Security->Device.Security.Certificate.{i}.Subject

SecGW Server: server address

SecGW ID: rightid in ipsec.conf section

Subnet: rightsubnet in ipsec.conf section

Note: Should upload the 2nd IPsec cert and key file from webgui for test purpose.

2. Visit "State" -> "System Status" page to check IPsec status. The page will be shown in the following figure if the configuration is correct.

IPSEC State					
Current status		ESTABLISHED			
Additional info		ipsec established successfully			
IPSEC Tunnel Info					
ConnName	Status	PeerAddress	CreationTime	IPAddress	SubnetMask
FMT_0000000000000000_0000_00	Active	sercomm.cloudepc.net	2022-07-15T15:07:40	10.11.13.104	255.255.255.255
FMT_0000000000000000_0000_01	Active	sercomm.cloudepc.net	2022-07-15T15:07:40	10.11.13.106	255.255.255.255

System Status Page

The 1st ConnName is configured with FMT_0000000000000000_0000_00.

The 2nd ConnName is configured with FMT_0000000000000000_0000_01.

3. Visit "Manage"->"LTE Basic Setting" to configure the tunnel of S1 connection.

S1 Configuration	
Tunnel Type	IPSEC2
MME IP Address	10.41.3.200
PLMNID	315010
TAC	1

Visit "Device Configuration"->"Management Server-TR69" to configure the tunnel of cwmf. (This page is available to account operator.)

Overview	NetWork Configuration	Device Configuration	Management and Diagnostics
LTE Basic Settings IPsec Configuration SAS Configuration Management Server-TR69 Radio Configuration			
Management Server			
EnableCWMP	<input type="checkbox"/>		
HeMS tunnel	IPSEC		
URL	http://10.70.2.39:9090		
Username			

Modify Events Threshold

This section provides details of the configuration of A2 threshold and A5 threshold.

1. Visit "CellConfig" page under "FAPService" group to find "FAPService_CellConfig_LTE_RAN_Mobility_ConnMode_EUTRA" table to set A2ThresholdRSRP

FAPService_CellConfig_LTE_RAN_Mobility_ConnMode_EUTRA		
FilterCoefficientRSRP	4	
FilterCoefficientRSRQ	4	
A1ThresholdRSRP	60	[0:97]
A1ThresholdRSRQ	25	[0:34]
A2ThresholdRSRP	45	[0:97]
A2ThresholdRSRQ	25	[0:34]

2. In same page and same table, set X_000E8F_INTER_A5Threshold1RSRP and X_000E8F_INTER_A5Threshold2RSRP

The real threshold value will be the configuration value minus 140dBm, for example. A5 threshold1 will be -90dBm as 50-140 = -90

X_000E8F_INTRA_A5Threshold2RSRP	50	
X_000E8F_INTRA_A5Threshold2RSRQ	25	[0:34]
X_000E8F_INTER_A5Threshold1RSRP	35	[0:97]
X_000E8F_INTER_A5Threshold1RSRQ	25	[0:34]
X_000E8F_INTER_A5Threshold2RSRP	50	[0:97]
X_000E8F_INTER_A5Threshold2RSRQ	25	[0:34]
X_000E8F_INTER_A5HoThresholdRSRQ	0	[0:34]

Data Model Nodes Table
Device.Services.FAPService.1.CellConfig.LTE.RAN.Mobility.ConnMode.EUTRA.A2ThresholdRSRP
Device.Services.FAPService.1.CellConfig.LTE.RAN.Mobility.ConnMode.EUTRA.X_000E8F_INTER_A5Threshold1RSRP
Device.Services.FAPService.1.CellConfig.LTE.RAN.Mobility.ConnMode.EUTRA.X_000E8F_INTER_A5Threshold2RSRP

Configure SAS

This section provides details of the configuration of SAS function.

1. SAS Cert Assign

This section provides details of the assignment of the certificate files. These certificate files can be used to work with SAS or IPsec. IPsec cert assign steps are the same as SAS. By default, SAS and IPsec certificates should be assigned in manufacturing, and just jump to step (8). If you want to use your certificate, follow below steps.

SAS cert should have two file: cert.pem and key file. We need assign the cert to our device. they can upload by GUI.

- 1) Open Web Page Like below: 11.11.11.188 is the device IP. This page is hide page, so you should fill the whole address.(/cert_mgt.htm cannot be omitted)
- 2) Select "Third Party Certification Service" as SAS .
- 3) select "Certification File" to local cert file.
- 4) Click "Upload" to Assign cert file.
- 5) Select "Third Party Certification Service" as SAS.
- 6) Select "Private Key" to local key file.
- 7) Click "Upload" to Assign key file.

- 8) Reboot Device and check the "Device.Security Certificate." list in below picture. It will add a new cert. Check the "Subject" value to validate the cert.

ID	Enable	LastModif	SerialNumber	Issuer	NotBefore	NotAfter	Subject	Sut
1	<input checked="" type="checkbox"/>	0001-01-01T00:00:00Z	0EF335C992DA4D370B02	/C=TW/ST=Taipei/L=Taipei/	Thu Jan 20 10:05:20 2022	Sun Jan 18 10:05:20 2032	/C=TW/ST=Taipei/L=Taipei/	<input type="checkbox"/>
2	<input checked="" type="checkbox"/>	0001-01-01T00:00:00Z	423697B5EF606C46BDBF	/C=US/O=Kyrio Inc./OU=R	Wed Jul 6 02:31:19 2022	Tue Jul 6 02:31:18 2032	/C=TW/O=Sercomm/OU=V	<input type="checkbox"/>
3	<input checked="" type="checkbox"/>	0001-01-01T00:00:00Z	629ED6E30FA5B78A3E42	/C=CN/O=Sercomm/OU=Sc	Tue Mar 8 04:42:54 2022	Fri Mar 5 04:42:54 2032	/C=CN/O=Sercomm/CN=Ci	<input type="checkbox"/>

- 9) Configure the "CertSubject" item in table

SAS Configuration of Manage->SAS Configuration page with the Subject value see from above setup. See the below Picture.

ICGGroupId	1
Category	B
ChannelType	GAA
Measure Configuration	RECEIVED_POWER_WITHOUT_GRANT
CertSubject	/C=TW/O=Sercomm/

2. Visit "SAS Configuration" page under "Manage" group to configure the SAS function and manually input Location if GPS can't work.

Single step (CPI disable):

SAS OAM Configuration

Parameter	value
SAS Enable	Enable
Method (support from FF3922)	0
ManufacturerPrefixEnable (Only the Google platform may need to be enabled)	Disable
Installation Method	Single-step
CPI Enable	Disable
Server	https://developer-sc-02.federatedwireless.com/v1.2/[sample]
UserID	SDC[sample]
ICGGroupID	1
Category	B
ChannelType	GAA
CertSubject	/C=TW/O=Sercomm/OU=WInnForum CBSD Certificate/CN=P27-SCE4255W:%s[sample]
Location	outdoor
Location Source	GPS
HeightType	AMSL

Location Configuration	
Location	outdoor ▼
Location Source	GPS ▼
HeightType	AMSL ▼

Single step (CPI enable):

SAS OAM Configuration

Parameter	value
SAS Enable	Enable
Method (support from FF3922)	0
ManufacturerPrefixEnable (Only the Google platform needs to be enabled)	Disable

Installation Method	Single-step
CPI Enable	Enable
Server	https://developer-sc-02.federatedwireless.com/v1.2/[sample]
UserID	SDC[sample]
ICGGroupID	1
Category	B
ChannelType	GAA
CPISignatureData	ABCD[sample]
CertSubject	/C=TW/O=Sercomm/OU=WinnForum CBSD Certificate/CN=P27-SCE4255W:%s[sample]
Location	outdoor
Location Source	GPS
HeightType	AMSL

Location Configuration	
Location	outdoor ▼
Location Source	GPS ▼
HeightType	AMSL ▼

Multi step:

SAS OAM Configuration

Parameter	value
SAS Enable	Enable
Method (support from FF3922)	0
ManufacturerPrefixEnable (Only the Google platform needs to be enabled)	Disable
Installation Method	Multi-step
Server	https://developer-sc-02.federatedwireless.com/v1.2/[sample]
UserID	SDC[sample]
ICGGroupID	
Category	B
ChannelType	GAA
CertSubject	/C=TW/O=Sercomm/OU=WinnForum CBSD Certificate/CN=P27-SCE4255W:%s

Location	outdoor
Location Source	GPS
HeightType	AMSL

SAS Configuration	
Enable	<input checked="" type="checkbox"/>
Method	0 [0:1]
ManufacturerPrefixEnable	<input type="checkbox"/>
Installation Method	Multi-Step ▼
Server	Developer-Federated ▼
Server Url	https://developer-sc-02.federatedwireless.com/v1.2/
UserID	SDC
FCCIdentificationNumber	P27-SCO4255PA10
SerialNumber	2203DPT000013
EIRP Capability	42
AntennaGain	10
AntennaBeamwidth	360
ICGGroupID	
Category	B ▼
ChannelType	GAA ▼
Measure Configuration	RECEIVED_POWER_WITHOUT_GRANT
CertSubject	/C=TW/O=Sercomm/O ⓘ

Location Configuration	
Location	outdoor ▼
Location Source	GPS ▼
HeightType	AMSL ▼

Enable: Turn on the SAS function, the Moso Canopy will use the EARFCNDL/UL set in "LTE Basic Setting" page to query spectrum for enable S1.

Method: SAS method 0: SAS Client 1: SAS Domain proxy

ManufacturerPrefixEnable: Enable or disable CBSD serial number with manufacturer's name.

Installation Method: Single-Step Registration refers to the Registration procedure where the REG-Conditional parameters are included in the "RegistrationRequest Object". Multi-Step Registration refers to the Registration procedure in which the "REG-Conditional" parameters are preloaded into the SAS UUT prior to initiating the CBSD Registration Procedure and excluded from the CBSD Registration Request Message.

CPIEnable: Enable or disable CBSD registration with CPI data.

Server: SAS server

Server URL: SAS server URL

UserID: Required by CFR 96.39(c). User contact information can be inferred from a registered User ID to which the CBSD Registration is tied.

ICGGroupId: ICG Group ID

Category: If an indoor device, configure Category to be "A"; if an outdoor device, configure Category to be "B".

ChannelType: PAL or GAA. Instead of having it in the registration, providing protection level in grant request allows more flexible operation of CBSD. For PAL use, a PAL ID and authentication credential must be presented for access.

CertSubject: The Distinguished Name (DN) of the entity associated with the Public Key; i.e., the Subject field in an X.509 certificate, see [RFC5280].

Location: Indoor or Outdoor device

Location Source: Manual Input or GPS

Latitude: manually input Latitude. Value equal to latitude multiply 1 million.

Longitude: manually input Longitude. Value equal to longitude multiply 1 million.

HeightType: The value should be "AGL" or "AMSL". AGL height is measured relative to the ground level. AMSL height is measured relative to the mean sea level.

Elevation: manually input Elevation

Data Model Nodes Table
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_SAS.Enable
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_SAS.Method
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_SAS.ManufacturerPrefixEnable
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_SAS.CPIEnable
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_SAS.Server
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_SAS.UserContactInformation
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_SAS.ICGGroupId
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_SAS.Category
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_SAS.ProtectionLevel
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_SAS.CertSubject
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_SAS.Location
Device.FAP.GPS.LockedLatitude
Device.FAP.GPS.LockedLongitude
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_SAS.HeightType
Device.FAP.GPS.X_000E8F_Elevation

Setup for S1 or X2 Handover

This section provides details of the configuration of S1 or X1 handover function.

1. Visit "REM" page under "FAPService" group to enable "X_000E8F_X2InterfaceConfig" if X2 Handover is needed, otherwise S1 Handover will work.

X_000E8F_X2InterfaceConfig	<input checked="" type="checkbox"/>
X_000E8F_LocationAllowNeighborPLMNList	<input type="text"/>

Data Model Nodes Table

Device.Services.FAPService.1.REM.LTE.X_000E8F_X2InterfaceConfig

2. Refer to "Add One Neighbor Cell" section to manually add Neighbor Cell.
3. Visit "REM" page under "FAPService" group to find "FAPService_REM_LTE" table to set "EUTRACarrierARFCNDLList". This is needed to set ANR frequency. This list is comma-separated (maximum length 256) of strings and each entry is a EARFCN in the DL direction to measure.

FAPService_REM_LTE	
InServiceHandling	<input type="text"/>
ScanOnBoot	<input type="checkbox"/>
ScanPeriodically	<input type="checkbox"/>
PeriodicInterval	<input type="text" value="0"/>
PeriodicTime	<input type="text" value="0001-01-01T00:00:00Z"/>
REMPLMNList	<input type="text"/>
REMBandList	<input type="text" value="48"/>
EUTRACarrierARFCNDLList	<input type="text" value="55340,55540"/>
X_000E8F_ScannedEARFCNListSelectAlg	<input type="text" value="UseBandAndBz"/>
X_000E8F_NbrARFCNDLList	

Data Model Nodes Table

Device.Services.FAPService.1.REM.LTE.EUTRACarrierARFCNDLList

4. The eNB type of neighbor cell must be set correctly. Otherwise Handovers will fail. When adding neighbor cell manually, X_000E8F_EnbType needs to be set for each neighbor cell entry: 0 means Macro eNB and 1 means Home eNB.

ID	Enable	Alias	MustInclude	PLMNID	CID	EUTRACarrierARFCN	X_SCM_EnbType
1	<input type="checkbox"/>	6.sc.03	<input checked="" type="checkbox"/>	310014	60616116	55990	0
2	<input type="checkbox"/>	juni.01	<input checked="" type="checkbox"/>	310014	5175689	55990	0
3	<input checked="" type="checkbox"/>	Ruckus.04	<input checked="" type="checkbox"/>	310014	40417157	56140	0
	<input type="checkbox"/>		<input type="checkbox"/>				

The PCI range of different type eNB will need to be configured if using ANR to add neighbor cell. Visit "FAPControl" page under "FAPService" group to configure X_000E8F_CSGSmallCellPCISStart and X_000E8F_CSGSmallCellPCIRange. In the following figure, PCI range of Home eNB is from 485 to 503 (both 485 and 503 are included).

X_000E8F_CSGSmallCellPCISStart	485
X_000E8F_CSGSmallCellPCIRange	19

Data Model Nodes Table
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_RRMConfig.X_000E8F_CSGSmallCellPCISStart
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_RRMConfig.X_000E8F_CSGSmallCellPCIRange

- Visit "CellConfig" page under "FAPService" group to find "FAPService_CellConfig_LTE_RAN_Mobility_ConnMode_EUTRA" table to set Intra-frequency handover parameter "A3Offset"

X_000E8F_A3TriggerQuantity	RSRP
A3Offset	6

Data Model Nodes Table
Device.Services.FAPService.1.CellConfig.LTE.RAN.Mobility.ConnMode.EUTRA.A3Offset

- Visit "CellConfig" page under "FAPService" group to find "FAPService_CellConfig_LTE_RAN_Mobility_ConnMode_EUTRA" table to set Inter-frequency handover parameters "A2ThresholdRSRP", "X_000E8F_INTER_A5Threshold1RSRP" and "X_000E8F_INTER_A5Threshold2RSRP".

The real value equals to (configuration value - 140)dBm. Ex. A5 threshold1 is 35-140=-105dBm. The A1Threshold couldn't be less than A2Threshold.

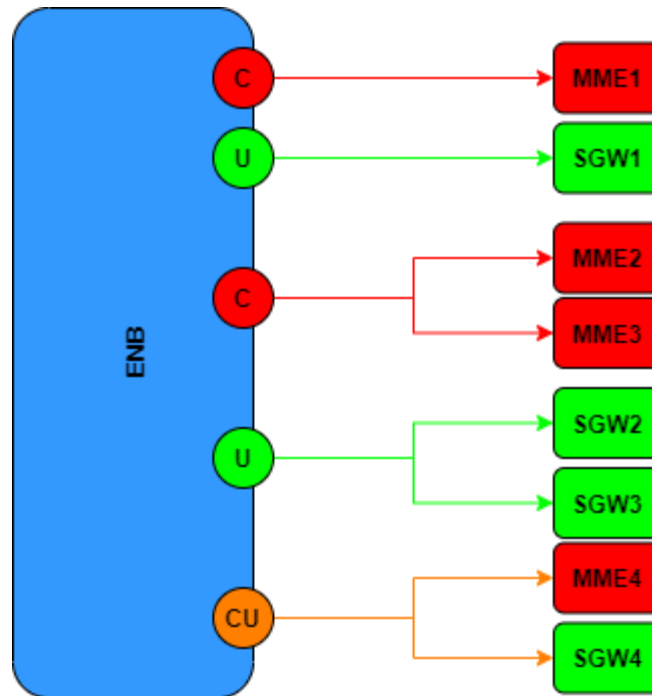
FAPService_CellConfig_LTE_RAN_Mobility_ConnMode_EUTRA		
FilterCoefficientRSRP	<input type="text" value="4"/>	
FilterCoefficientRSRQ	<input type="text" value="4"/>	
A1ThresholdRSRP	<input type="text" value="60"/>	[0:97]
A1ThresholdRSRQ	<input type="text" value="25"/>	[0:34]
A2ThresholdRSRP	<input type="text" value="45"/>	[0:97]
A2ThresholdRSRQ	<input type="text" value="25"/>	[0:34]

X_000E8F_INTRA_A5Threshold2RSRP	<input type="text" value="50"/>	
X_000E8F_INTRA_A5Threshold2RSRQ	<input type="text" value="25"/>	[0:34]
X_000E8F_INTER_A5Threshold1RSRP	<input type="text" value="35"/>	[0:97]
X_000E8F_INTER_A5Threshold1RSRQ	<input type="text" value="25"/>	[0:34]
X_000E8F_INTER_A5Threshold2RSRP	<input type="text" value="50"/>	[0:97]
X_000E8F_INTER_A5Threshold2RSRQ	<input type="text" value="25"/>	[0:34]
X_000E8F_INTER_A5HoThresholdRSRQ	<input type="text" value="0"/>	[0:34]

Split C/U Plane for MoCN

This section introduces how to split the control plane and user plane by using different IP address.

The eNB can be configured to different interface IP to make control plane connect to different MMEs and make user plane connect to different SGWs.



1. Visit Manage->LTE Basic Setting page to add Multi MME IP address.

State Network set **Manage** TR098 FAP FAPService Login as s

LTE Basic Setting IPsec Configuration SAS Configuration Log Password Customize and Restore Firmware Management IP Diagnose

Cell Configuration

AdminState ☒

Carrier Number

Auto Internal Neighbors ☐

Carrier Aggregation ☒

Contiguous CC ☐

BandWidth

FrequencyBand

EARFCN

CellIDentity

PCI

TxPower

S1 Configuration

Tunnel Type

MME IP Address

PLMNID

2. Visit FAPService->CellConfig page to configure the PLMN according to different MMEs.

Device.Services.FAPService.1.CellConfig.LTE.EPC.PLMNList.

ID	Enable	Alias	IsPrimary	PLMNID	CellReservedForOperatorUse	X_SCM_DEDICATED_PLMN_USER_RESOURCES	X_SCM_DEDICATED
1	<input checked="" type="checkbox"/>	Primary PLMNID	<input checked="" type="checkbox"/>	<input type="text" value="11132"/>	<input checked="" type="checkbox"/> Used for first MME	<input type="text" value="0"/>	<input type="text" value="0"/>
2	<input checked="" type="checkbox"/>	Second PLMN	<input type="checkbox"/>	<input type="text" value="11133"/>	<input checked="" type="checkbox"/> Used for second MME	<input type="text" value="0"/>	<input type="text" value="0"/>
	<input type="checkbox"/>	<input type="text" value=""/>	<input type="checkbox"/>	<input type="text" value=""/>	<input type="checkbox"/>	<input type="text" value=""/>	<input type="text" value=""/>

Device.Services.FAPService.1.CellConfig.LTE.EPC.PLMNList					
RESOURCES	X_SCM_PLMNID_Priority	X_SCM_Selected_MME_ByPriority	X_SCM_Ignore_RegisterMME_IE	X_SCM_CFG_MMEIdList	X_SCM_Supported_Cellid
6	<input checked="" type="checkbox"/>	Corresponding to first MME →	<input style="border: 2px solid red;" type="text" value="{1}"/>	0	<input type="button" value="Del"/>
6	<input type="checkbox"/>	Corresponding to second MME →	<input style="border: 2px solid red;" type="text" value="{2}"/>	0	<input type="button" value="Del"/>
	<input type="checkbox"/>		<input type="text"/>		<input type="button" value="Add"/>

For explanation of nodes, please refer to section “Bring up S1 with MME.”

- Visit FAPService->CellConfig page to configure the SGW IP (such as 10.41.3.201,10.41.1.207) and then to enable the function.

FAPService_CellConfig_LTE_MultiTunnelConfig	
MultiTunnelConfigEnable	<input checked="" type="checkbox"/>
EGTPLinkIPList	<input type="text" value="10.41.1.201,10.41.1.2"/>
multiTunnelConfigTag	
TunnelListNumberOfEntries	0

MultiTunnelConfigEnable: enable the function.

EGTPLinkIPList: SGW IP configure List.

- Visit FAPService->CellConfig page to configure the tunnel list

Device.Services.FAPService.1.CellConfig.LTE.MultiTunnelConfig.TunnelList					
ID	X_SCM_Enable	X_SCM_Tunnel_Ref	X_SCM_Tunnel_Type	X_SCM_CFG_DestIdList	
1	<input checked="" type="checkbox"/>	Device.Ethernet.Interface.1	<input style="border: 2px solid red;" type="text" value="C"/> Control Plane	<input style="border: 2px solid red;" type="text" value="{1}"/> MME index 1	<input type="button" value="Del"/>
2	<input checked="" type="checkbox"/>	Device.FAP.Tunnel.IKESA.1	<input style="border: 2px solid red;" type="text" value="U"/> User Plane	<input style="border: 2px solid red;" type="text" value="{1}"/> SGW index 1	<input type="button" value="Del"/>
3	<input checked="" type="checkbox"/>	Device.Ethernet.Interface.1	<input type="text" value="C"/>	<input style="border: 2px solid red;" type="text" value="{2}"/> MME index 2	<input type="button" value="Del"/>
4	<input checked="" type="checkbox"/>	Device.FAP.Tunnel.IKESA.1	<input type="text" value="U"/>	<input style="border: 2px solid red;" type="text" value="{2}"/> SGW index 2	<input type="button" value="Del"/>
	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="button" value="Add"/>

X_000E8F_Enable: enable the tunnel list.

X_000E8F_Tunnel_Ref: the corresponding interface IP. For example, “Device.Ethernet.Interface.1.” means the data will go out of the IPsec tunnel and “Device.FAP.Tunnel.IKESA.2.” means the data will go through the IPsec tunnel.

X_000E8F_Tunnel_Type: indicate the tunnel list is used for control plane or user plane. “C” means control and “U” means user plane.

X_000E8F_CFG_DestList: index of corresponding MME or SGW. If the X_000E8F_Tunnel_Type is “C” which means it is an index of MME, otherwise is SGW.

CMP Configuration

The section provides details of CMP configuration.

1. First, the device must have the factory certificate and private key, and the root certificate has been placed on the CMP server.
2. Visit "FAPControl" page under "FAPService" group to set CMP configuration.

Device.Services.FAPService.1.FAPControl.LTE.X_SCM_CMP.Config.						
ID	Server	FQDN	Port	X_SCM_CertificateName	Path	Subject
1	<input type="text" value="10.41.3.249"/>	<input type="text"/>	<input type="text" value="8080"/>	<input type="text" value="test_cert.pem"/>	<input type="text"/>	<input type="text" value="/C=TW/ST=Taipei/L=Taipei/"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Device.Services.FAPService.1.FAPControl.LTE.X_SCM_CMP.Config.						
ProtoType	EMSURL	EMSIPv6Address	Recipient	CmpInTunnel	CertEncodeMethod	AltName
<input type="text" value="HTTP"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="/C=CN/ST=JS/L=SZ/O=SC/"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>

Server: CMPv2 server IP address

Port: CMPv2 server service port

X_000E8F_CertificateName: Name of new certificate which request from CMP server (Suffix must be. Cert or. PEM or. Der) and name should be unique.

Path: CMPv2 server service path . eg. ejbca/publicweb/cmp

Subject: subject of new client certification. need add quote here

ProtoType: The protocol type of customer for theCMPv2, HTTP or HTTPS

Recipient: subject of the CMPv2 server certification, used to verify the CMPv2 server

CertEncodeMethod: CMPv2 the cert encode method (Optional, or fill in "V_ASN1_APP_CHOOSE"[default])

AltName: CMPv2 process needs to have an Alternative Name

Data Model Nodes Table
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_CMP.Config.{i}.Server
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_CMP.Config.{i}.Port
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_CMP.Config.{i}.X_000E8F_CertificateName
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_CMP.Config.{i}.Path
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_CMP.Config.{i}.Subject
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_CMP.Config.{i}.Recipient
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_CMP.Config.{i}.CertEncodeMethod
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_CMP.Config.{i}.AltName
Device.Services.FAPService.1.FAPControl.LTE.X_000E8F_CMP.Config.{i}.ProtoType

KPI Configuration

This section provides details of the configuration of KPI.

1. Visit "FAP_PerfMgmt" page under "FAP" group to the "Device.Security Certificate."

The screenshot shows the SERCOMM web interface for FAP configuration. The 'FAP_PerfMgmt' tab is selected. Under 'Device_FAP_PerfMgmt_Config_1', the 'Enable' checkbox is checked. The 'URL' field is 'http://hems-sercomm.', 'Username' is 'upload', and 'Password' is 'upload'. 'PeriodicUploadInterval' is set to 900 seconds. 'PeriodicUploadTime' is '0001-01-01T00:00:00'. 'X_000E8F_MaxWaitTime' is 1, and 'BackUpKpiFileNum' is 48.

Enable: the KPI statistics function is turned on or off.

URL: URL is the address of file server for the XML file of KPI statistics upload.

Username, Password: Username and password used by the device to authenticate the file server. If authentication is not used, it is set to an empty string.

PeriodicUploadInterval: The duration in seconds of the interval for which the device MUST create a Performance File. If Enable is true, try uploading the file to the URL and delete the local file.

DSCP Configuration

This section provides details of the configuration of DSCP of outgoing GTP packet.

Visit "CellConfig" page under "FAPService" group to "Device.Services.FAPService.1.CellConfig.LTE.EPC.QoS."

Device.Services.FAPService.1.CellConfig.LTE.EPC.QoS.								
ID	Enable	Alias	QCI	Type	Priority	PacketDelayBudget	DSCP	VL
1	<input type="checkbox"/>	-	1	GBR	2	100	46	0
2	<input type="checkbox"/>	-	2	GBR	4	150	46	0
3	<input type="checkbox"/>	-	3	GBR	3	50	46	0
4	<input type="checkbox"/>	-	4	GBR	5	300	46	0
5	<input type="checkbox"/>	-	5	Non-GBR	1	100	46	0
6	<input type="checkbox"/>	-	6	Non-GBR	6	300	46	0
7	<input type="checkbox"/>	-	7	Non-GBR	7	100	46	0
8	<input type="checkbox"/>	-	8	Non-GBR	8	300	46	0
9	<input type="checkbox"/>	-	9	Non-GBR	9	300	46	0

Enable: modify DSCP feature is turned on or off of corresponding QCI number

DSCP: specific DSCP number

NOTE: You need to click Modify button at the end of this line after you modify and then you need to click Save button at the bottom of this page.

Moso Canopy NL Syn Configuration

This section provides details of the configuration of the NL sync.

Visit "REM" page under "FAPService" group:

1. Under "FAPService_REM_X_000E8F_tfcsManagerConfig", set primSrc to be NL, and syncMode to be PHASE.

FAPService_REM_X_000E8F_tfcsManagerConfig	
srcSwitch	<input type="checkbox"/>
primSrc	<input type="text" value="NL"/>
syncMode	<input type="text" value="PHASE"/>
freqErrLimit	<input type="text" value="250"/>

2. Under "FAPService_REM_X_000E8F_NISync", enable EnableSync.

FAPService_REM_X_000E8F_NISync	
EnableSync	<input checked="" type="checkbox"/>
MaxCellInfoEntries	8
CellInfoNumberOfEntries	0
SyncedBand	0
SyncedChanNumber	0
SyncedPCI	-1

3. Under "Device.Services.FAPService.1.REM.X_000E8F_NISync.CellInfo", add an entry to set the sync source cell information. Set the right "Band" info, "ChanNumber" means the earfcn , and "CellId" means the PhyCellID(PCI)". Setting "CellId" to be "-1" means that it will synchronize with all cells at this earfcn.

Device.Services.FAPService.1.REM.X_SCM_NISync.CellInfo.						
ID	Priority	Technology	Band	Channel	ChanNumber	CellId
1	7		48	0	55300	-1

ANR Configuration

1. Enable ANR

Enter FAPService->FAPControl page, configure enable parameter:

X_000E8F_AnTimerConfigValue	3	[0:6]
-----------------------------	---	-------

AnTimerConfigValue: Enable or disable ANR feature. 0 means disable ANR and is default value, 3 means enable ANR.

Enter FAPService->REM page, configure EARFCN list:

FAPService_REM_LTE	
EUTRACarrierARFCNDLList	55340,55540

EUTRACarrierARFCNDLList: This is a comma-separated list and means which EARFCN numbers will be configured into UE for ANR measurement.

2. PCI Range Configuration

According to above ANR configurations, UE will try to measure specific EARFCN and find existed neighbor cells. If measured, UE will report ECGI info of the neighbor cell to serving cell. But serving cell cannot know whether reported neighbor cell is macro or home cell. So our eNodeB uses the specific configuration to pre-assign small cell PCI range. If neighbor cell's PCI is in the range of small cell, neighbor cell is home type. If neighbor cell's PCI is out of range of small cell, neighbor cell is macro type. So for serving eNodeB and neighbor eNodeB, they should keep the same configuration for small cell PCI range. Small cell PCI range configuration should be set in FAPService->FAPControl:

X_000E8F_CSGSmallCellPCIStart	<input type="text" value="0"/>
X_000E8F_CSGSmallCellPCIRange	<input type="text" value="0"/>

Default value for CSGSmallCellPCIStart and CSGSmallCellPCIRange is 0, means all PCIs are used for macro cell.

For example:

If your server eNodeB is enabled ANR and Small cell PCI range is configured as below, then your neighbor eNodeB should also set the same configuration for small cell range, which means PCI in the range of 40~49 is used for home cell and the other PCIs are used for macro cell.

X_000E8F_CSGSmallCellPCIStart	<input type="text" value="40"/>
X_000E8F_CSGSmallCellPCIRange	<input type="text" value="10"/>

There will be 4 alternative configuration groups for two carrier disabled case:

- 1) Neighbor cell PCI is configured into home type, such as 45 and serving cell is configured into home type, such as 47, then serving cell will add this neighbor cell into home cell by ANR;
- 2) Neighbor cell PCI is configured into home type, such as 45 and serving cell is configured into macro type, such as 55, then serving cell will add this neighbor cell into home cell by ANR;
- 3) Neighbor cell PCI is configured into macro type, such as 55 and serving cell is configured into home type, such as 47, then serving cell will add this neighbor cell into macro cell by ANR;
- 4) Neighbor cell PCI is configured into macro type, such as 55 and serving cell is configured into macro type, such as 56, then serving cell will add this neighbor cell into macro cell by ANR;

There will be 2 alternative configuration groups for two carrier enabled case since our device only supports macro mode in the case of two carrier enabled.

- 1) Neighbor cell PCI is configured into macro type, such as 55,56 and serving cell is macro type, such as 65,66, then serving cell will add this neighbor cell into macro cell by ANR;
- 2) Neighbor cell (other vendor product) PCI is configured into home type, such as 45 and serving cell is macro type, such as 65,66, then serving cell will add this neighbor cell into home cell by ANR.

EPC Configuration

Connect to MosoLabs' Cloud EPC

This section provides details of the configuration of the MosoLabs' Cloud EPC.

MosoLabs' Cloud EPC function should be used only after the discussion with the MosoLab team.

1. Visit "IPSec" page under "Manage" group to set IPSec with certification mode, MosoLabs' Cloud EPC parameters are as below:

IPsec Mode: CERT

SecGW Server: Get From MosoLab

SecGW ID: Get From MosoLab

Subnet: Get From MosoLab

The screenshot shows the 'Manage' tab selected in the top navigation bar. Under the 'Manage' group, the 'IPsec Configuration' sub-tab is active. The page displays a form with the following fields:

IPsec Configuration	
Enable	<input checked="" type="checkbox"/>
IPsec Mode	CERT
Certificate Subject	<input type="text"/>
SecGW Server	<input type="text"/>
SecGW ID	<input type="text"/>
Subnet	<input type="text"/>
InnerIP	<input type="text"/>

2. Visit "LTE Basic Setting" page under "Manage" group to set S1 configuration as below parameters. Refer to section "Bring up S1 with MME" to set correct Cell Configuration. Reboot the Moso Canopy device.

MME IP Address: 172.31.29.140

MME Port: 36412

The first screenshot shows the 'S1 Configuration' form with the following values:

S1 Configuration	
MME IP Address	172.31.29.140
MME Port	36412
PLMNID	11346

The second screenshot shows the 'S1 Configuration' form with the following values:

S1 Configuration	
Tunnel Type	IPSEC
MME IP Address	172.31.29.140
PLMNID	10894
TAC	53274

3. Refer to "IPsec Configuration" section to check IPsec status after rebooting. The status should indicate OK.

4. Visit "LTEState" page under "State" group to check "Cell State". The status should be "Stack Running."

SERCOM

State

NetWork set

Manage

TR098

FAP

FAPService

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Log Management

View Log from GUI

Visit "Manage" page under "Log" group to select type , then you can Select the type of log and view it. Etc. It will show you enodeb log after you select "enodeb.log"

We advice you to check log at this sort

1st wan, 2nd cwmp, 3rd sas, 4th ipsec ,5th enodeb

State	NetWork set	Manage	TR098	FAP	FAPService	Login
-------	-------------	--------	-------	-----	------------	-------

LTE Basic Setting
IpsEc Configuration
SAS Configuration
Log
Password
Customize and Restore
Firmware Management
IP Diagnose

Log

Please Select the type of log:
enodeb.log

Please Input the name of process:

```

[2022-07-06 11:02:21] enodeb_net: Connect to EPC[10.41.1.220] success.
[2022-07-06 11:02:23] enodeb_net: Henb start success.
[2022-07-06 11:02:23] enodeb_net: Primary cell: EARFCN[55890] PCI[100] CellIdentity[1342].
[2022-07-06 12:29:11] enodeb_net: Try to connection to EPC[10.41.1.220].
[2022-07-06 12:29:40] enodeb_net: Try to connection to EPC[10.41.1.220].
[2022-07-06 12:29:40] enodeb_net: Connect to EPC[10.41.1.220] success.
[2022-07-08 18:15:56] enodeb_net: Starting to run henb.
[2022-07-08 18:16:19] enodeb_net: Try to connection to EPC[10.41.1.220].
[2022-07-08 18:16:19] enodeb_net: Connect to EPC[10.41.1.220] success.
[2022-07-08 18:16:22] enodeb_net: Henb start success.
[2022-07-08 18:16:22] enodeb_net: Primary cell: EARFCN[55890] PCI[100] CellIdentity[1342].
[2022-07-08 19:11:26] enodeb_net: Starting to run henb.
[2022-07-08 19:12:09] enodeb_net: Try to connection to EPC[10.41.3.200].
[2022-07-08 19:12:09] enodeb_net: Connect to EPC[10.41.3.200] success.
[2022-07-08 19:12:11] enodeb_net: Henb start success.
[2022-07-08 19:12:14] enodeb_net: Henb start success.
[2022-07-08 19:12:14] enodeb_net: Primary cell: EARFCN[55340] PCI[100] CellIdentity[1342].
[2022-07-08 19:12:14] enodeb_net: Secondary cell: EARFCN[55540] PCI[101] CellIdentity[1345].

```

Stop Refresh
Text File Log Download
Zipped File Log Download
ClearLog

Get txt Log

Visit "Manage" page under "Log" group. Select the type of log and then click "Text File Log Download" button. Then you can get txt log you want.

The screenshot shows the 'Log' management interface. At the top, there are navigation tabs: 'LTE Basic Setting', 'IPsec Configuration', 'SAS Configuration', 'Log' (highlighted with a red box), 'Password', 'Customize and Restore', 'Firmware Management', and 'IP Diagnose'. Below the tabs, there's a section titled 'Log'. It contains a dropdown menu labeled 'Please Select the type of log:' with 'rf.log' selected (highlighted with a red box). Below this is a text input field labeled 'Please Input the name of process:'. At the bottom, there are four buttons: 'Stop Refresh', 'Text File Log Download' (highlighted with a red box), 'Zipped File Log Download', and 'ClearLog'.

Get log.zip

Visit "Manage" page under "Log" group to click "Zipped File Log Download" button, then you can get log.zip. Normally, you may need to click "ClearLog" button to clear old log before testing.

The screenshot shows the 'Log' management interface. At the top, there are navigation tabs: 'LTE Basic Setting', 'IPsec Configuration', 'SAS Configuration', 'Log' (highlighted with a red box), 'Password', 'Customize and Restore', 'Firmware Management', and 'IP Diagnose'. Below the tabs, there's a section titled 'Log'. It contains a dropdown menu labeled 'Please Select the type of log:' with 'wan.log' selected (highlighted with a red box). Below this is a text input field labeled 'Please Input the name of process:'. The main area displays a list of log entries, including timestamps and network-related events like DHCP requests and IP assignments. At the bottom, there are four buttons: 'Stop Refresh', 'Text File Log Download', 'Zipped File Log Download' (highlighted with a red box), and 'ClearLog'.

Clear Log

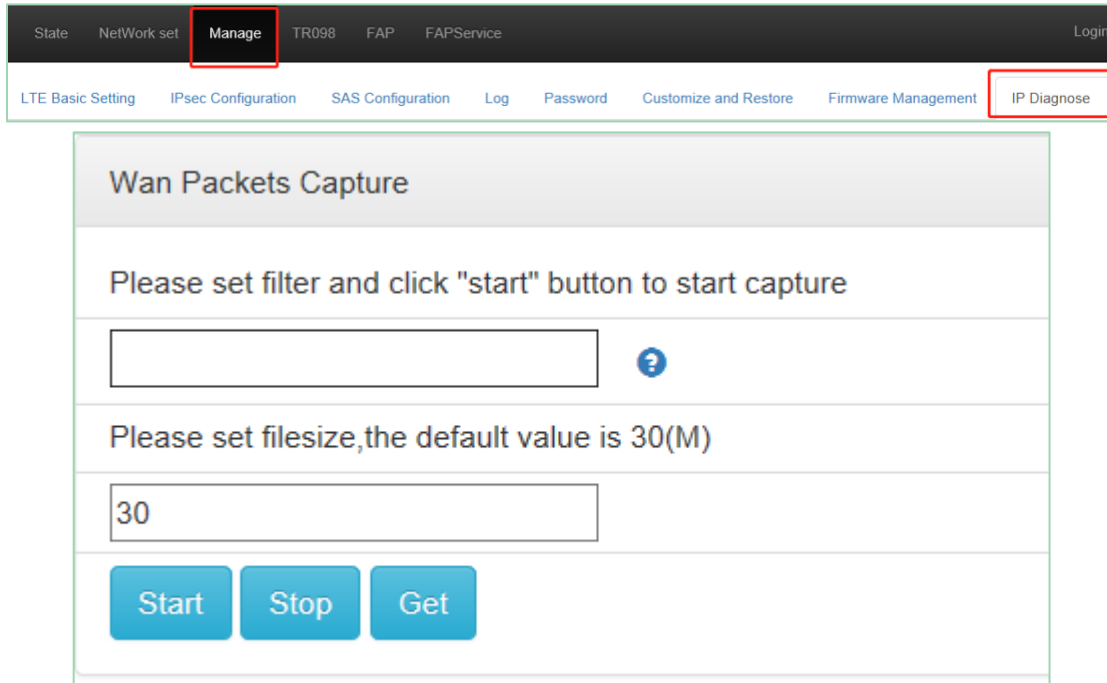
Normally, you may need to click "ClearLog" button to clear old log before testing.

The screenshot shows the 'Log' management interface. At the top, there are navigation tabs: 'LTE Basic Setting', 'IPsec Configuration', 'SAS Configuration', 'Log' (highlighted with a red box), 'Password', 'Customize and Restore', 'Firmware Management', and 'IP Diagnose'. Below the tabs, there's a section titled 'Log'. It contains a dropdown menu labeled 'Please Select the type of log:' with 'rf.log' selected (highlighted with a red box). Below this is a text input field labeled 'Please Input the name of process:'. At the bottom, there are four buttons: 'Stop Refresh', 'Text File Log Download', 'Zipped File Log Download', and 'ClearLog' (highlighted with a red box).

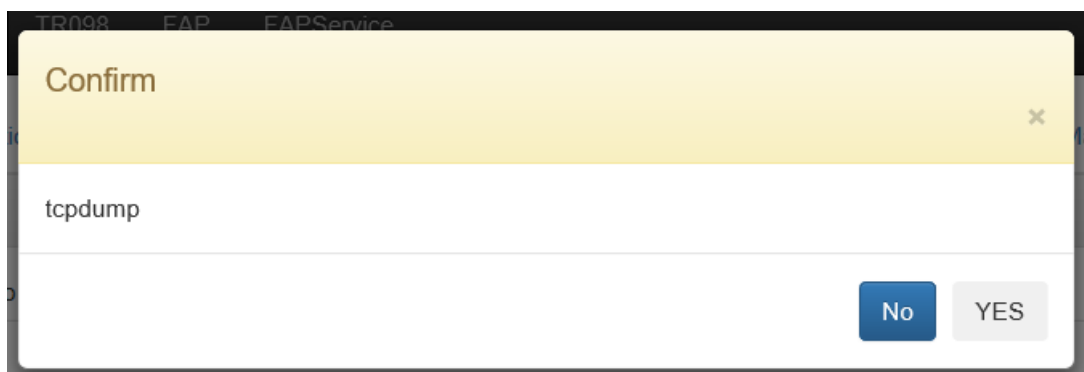
Tcpdump Capture Procedure

Tcpdump Capture Procedure on GUI

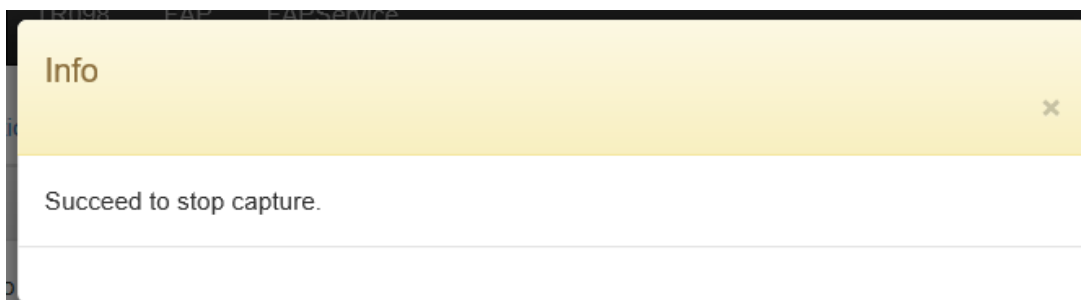
Select the IP Diagnose on the Manage page, input the tcpdump filter condition in the first text box (tcpdump is the default value for capturing all packets if you don't input anything), and the second text box can set the maximum size of the pcap file where the capture results are stored. It will automatically stop capturing packets when that value is reached (30M by default).



Click Start and the following prompt will appear. After confirming the tcpdump command is correct, click Yes button to Start capturing packets. If the command is incorrect, you can click No and re-input the command.



Click Stop to stop the tcpdump capture.



Click the Get Button. It will prompt to download the relevant compressed file, and you can choose your own path to download and unzip it. After that, you can open it with Wireshark to view the captured content.

Abbreviations

Abbreviation	Full Characteristics
1xRTT	CDMA2000 1x Radio Transmission Technology
3GPP	3rd Generation Partnership Project
ABS	Almost Blank Subframe
ADR	Average Data Rate
AIS	Alarm Indication Signal
AM	Acknowledged Mode
AMBR	Aggregate Maximum Bit Rate
ANR	Automatic neighbor Relation
ARP	Allocation and Retention Priority
AS	Access Stratum
AWGN	Additive White Gaussian Noise
BCCH	Broadcast Control Channel
BCH	Broadcast Channel
BFD	Bidirectional Forwarding Detection
BLER	Block Error Rate
BSR	Buffer Status Report
CA	Carrier Aggregation
CC	Chase-Combining
CCCH	Common Control Channel
CCE	Channel Control Element

Abbreviation	Full Characteristics
CCO	Cell Change Order
CCO	Coverage and Capacity Optimization
CDT/MR	Call Detail Trace / Measurement Report
CESoPSN	Circuit Emulation Service over Packet Switched Network
CGI	Cell Global Identifier
CLSM	Close-Loop Spatial Multiplexing
CMC	Connection Mobility Control
COC	Cell Outage Compensation
CoMP	Coordinated Multipoint Tx/Rx
COS	Class of Service
CQI	Channel Quality Indicator
CS	Certification Server
CSFB	CS Fallback
CTS	Call Trace System
C-RNTI	Cell Radio Networks Temporary Identifier
DCCH	Dedicated Control Channel
DCI	Downlink Control Information
DES	Data Encryption Standard
DHCP	Dynamic Host Configuration Protocol
DiffServ	Differentiated Services
DL	Downlink
DL-SCH	DL Dedicated Channel
DRX	Discontinuous Reception
DSCP	Differentiated Services Code Point
DTCH	Dedicated Traffic Channel
DTX	Discontinuous Transmission
EMBMS	Evolved Multimedia Broadcast and Multicast Service
SmallCell	E-UTRAN NodeB
EAP	Extensible Authentication Protocol
EAPOL	EAP over LAN
ECN	Explicit Congestion Notification

Abbreviation	Full Characteristics
EPC	Evolved Packet Core
EPS	Evolved Packet System
ESP	Encapsulating Security Payload
E-UTRAN	Evolved UTRAN
ETWS	Earthquake and Tsunami Warning System
EVC	Ethernet Virtual Connection
FDD	Frequency Division Duplex
FE	Fast Ethernet
FFR	Fractional Frequency Reuse
FTP	File Transfer Protocol
GCI	Global Cell ID
GE	Gigabit Ethernet
GERAN	GSM EDGE Radio Access Network
GNSS	Global Navigation Satellite System
GSM	Global System for Mobile communication
GBR	Guaranteed Bit Rate
GPS	Global Positioning System
GTP	GPRS Tunneling Protocol
GUMMEI	Globally Unique MME Identifier
HARQ	Hybrid Automatic Repeat Request
HeNB	Home E-UTRAN NodeB
Het-Net	Heterogeneous Network
HII	High Interference Indicator
HSDPA	High Speed Downlink Packet Access
HRPD	CDMA2000 High Rate Packet Data
HTTP	HyperText Transfer Protocol
ICIC	Inter-Cell Interference Coordination
IEEE	Institute of Electrical and Electronics Engineers
IKE	Internet Key Exchange
IMS	Inventory Management Server
IP	Internet Protocol

Abbreviation	Full Characteristics
IPsec	Internet Protocol Security
IP-CAN	IP Connectivity Access Network
IP-SM-GW	IP-Short-Message-Gateway
IR	Incremental-Redundancy
ITU	International Telecommunication Union
LAA	Licensed Assisted Access
LB	Load Balancing
LDAP	Lightweight Directory Access Protocol
LMT	Local Maintenance Terminal
LTE	Long Term Evolution
MAC	Medium Access Control
MBMS	Multimedia Broadcast Multicast Service
MBR	Maximum Bit Rate
MCCH	MBMS point-to-multipoint Control Channel
MCH	Multicast Channel
MIB	Master Information Block
MIMO	Multiple Input Multiple Output
MLB	Mobility Load Balancing
MME	Mobility Management Entity
MPLS	Multi-Protocol Label Switching
MTCH	MBMS point-to-multipoint Traffic Channel
NACC	Network Assisted Cell Change
NAS	Non-Access Stratum
NCL	Neighbor Cell List
NE	Net Element
NRT	Neighbor Relation Table
O&M	Operation & Maintenance
OAM	Operation Administration Maintenance
OFDM	Orthogonal Frequency Division Multiplexing
OI	Overload Indicator
OLSM	Open-Loop Spatial Multiplexing

Abbreviation	Full Characteristics
OMC	Operation and Maintenance Center
PBCH	Physical broadcast channel
PBR	Prioritised Bit Rate
PCCH	Paging Control Channel
PCH	Paging Channel
PCFICH	Physical control format indicator channel
PCI	Physical Cell Identity
PDB	Packet Delay Budget
PDCCH	Physical downlink control channel
PDCP	Packet Data Convergence Protocol
PDSCH	Physical downlink shared channel
PE	Provider Edge
PER	Packet Error Rate
PHB	Per-Hop Behavior
PKI	Public Key Infrastructure
PHICH	Physical Hybrid ARQ Indicator Channel
PLMN	Public Land Mobile Network
PMCH	Physical multicast channel
PQ	Priority Queueing
PRACH	Physical random access channel
PRB	Physical Resource Block
PTP	Precision Time Protocol
PUCCH	Physical uplink control channel
PUSCH	Physical uplink shared channel
PWE	Pseudo Wire Emulate
QCI	QoS Class Identifier
QoS	Quality of Service
QPSK	Quadrature Phase Shift Keying
RACH	Random Access Channel
RADIUS	Remote Authentication Dial In User Service
RAT	Radio Access Technology

Abbreviation	Full Characteristics
RBC	Radio Bearer Control
RDI	Remote Defect Indication
RF	Radio Frequency
RLC	Radio Link Control
RNTP	Relative Narrowband Transmit Power
RO	RACH Optimization
ROHC	Robust Header Compression
RS	Reference Signal
RSRP	Reference Signal Received Power
RRC	Radio Resource Control
RRM	Radio Resource Management
RTP	Real-time Transport Protocol
RV	Redundancy Version
SAE	System Architecture Evolution
SAP	Service Access Point
SDH	Synchronous Digital Hierarchy
SDR	Software Defined Radio
SFR	Soft Frequency Reuse
SHA	Secure Hash Algorithm
S-GW	Serving Gateway
SINR	Signal Interference Noise Ratio
SIB	System Information Block
SM	Short Message
SON	Self Organizing Network
SONET	Synchronous Optical Network
SPS	Semi-Persistent Scheduling
SRVCC	Single Radio Voice Call Continuity
SSR	Setup Success Rate
SU-MIMO	Single-User Multi Input and Multi Output
SW	Software
TA	Tracking Area

Abbreviation	Full Characteristics
TAU	Tracking Area Update
TBS	Transport Block Size
TCP	Transport Control Protocol
TTI	Transmission Time Interval
UDP	User Datagram Protocol
UE	User Equipment
UL	Uplink
UL-SCH	UL Dedicated Channel
UTRAN	Universal Terrestrial Radio Access Network
VPN	Virtual Private Network
VLAN	Virtual Local Area Network
VoIP	Voice over IP