



# WLTGFC Gemtek TDD LTE Small Cell User Guide

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# 1. Overview

This document will lead you to learn more about Web Management Interface features of Gemtek LTE Small Cell. The Web Management Interface is an intuitive Web GUI used to configure, monitor and perform diagnostics on Gemtek LTE Small Cell. It can be run as a stand-alone application, or as part of the management system.

The available features include:

#### A. Status

- *System Status*: Display Model Name, RF/BB Temperature, Memory, System Up Time, etc.
- *Network Status*: Display Small Cell IP Address, MAC Address, Default/Security Gateway, NTP/SON Server information, and IPSec Status.
- *LTE Status*: Display the LTE general configuration about information of Frequency band, PLMN, MME/eNodeB IP address, Bandwidth, EARFCN, and, etc.
- *UEs Status*: Show the UL/DL MCS Selection, Throughput and BLER.

#### B. LTE Configuration

- *General* : Configure eNodeB basic setting including, eNodeB type, Cell ID, Physical Cell/Group Cell ID, PLMN, MME IP and its SCTP Port.
- *Radio Access Network*: Configure RF Bandwidth, Tx Power and EARFCN.
- *Neighbor List*: Set Neighbor List for Intra-Frequency and Inter-Frequency usage.
- *Measurement Report Triggers*: Set Trigger conditions for A1/A2/A3/A4/A5 events.

#### C. Syslog

- Alarm Log
- Operation Log
- Configuration Log
- Export Log Files



#### D. Management

- *Network Configuration*: Configure eNodeB IP, DNS, DHCP.
- *IPsec Configuration:* Configure IPSec status and Certificate.
- *System Configuration*: Configure NTP and Syslog Servers.
- Routing Configuration: Configure Route Type 
   Destination 
   Mask 
   Gateway 
   Interface.
- *Configuration File*: Provide configuration file Export, Import and Restore functions.
- *Firmware Utility*: Support Firmware Upgrade and Rollback utilities.
- Change Login Password: Reset Web GUI password.
- *Software Package Manager*: To install debug utility.
- *Time Setting:* Configure TimeZone.
- CSFB Configuration :Configure Circuit Switch Fallback Priority.(3G \ 4G)
- *Reset to Factory Default :* Select reset default type.
- *Reboot*: Reboot eNodeB.

#### E. Logout

• Logout the Small Cell Web GUI

#### F. LED Behavior

Before starting accessing the Gemtek LTE Web Management Interface, we will show you show to install the Gemtek LTE Small Cell first in the next Chapter.

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# 2. Gemtek Small Cell Installation and Test Environment

Shown below are the features of Gemtek LTE Small Cell and POE (Power over Ethernet).









Output Input

Figure below shows us how to install the Gemtek LTE Small Cell in overall test environment.



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# 3. Accessing Web Management Interface

This chapter introduce the requirements and procedures for accessing the Web Management Interface of Gemtek LTE Small Cell. The following information is covered in this chapter:

- System Requirements
- Getting Started

# 3.1 System Requirement

Web Management Interface has been tested on the following platforms:

- Microsoft Windows XP/7/10
- Red Hat Enterprise Linux 6.3

The suggested Web browsers are:

- Google Chrome 40.0 or higher
- Firefox 10.0 or higher
- Windows Internet Explorer 8.0 or higher

# 3.2 Getting Started

This section covers how to start Gemtek LTE Small Cell Web Management. Before accessing the Web GUI, make sure that your PC must follows the network setting listed below.

- A. Set the network card to use static IP address as <10.102.81.X>
- B. Set the subnet mask as <255.255.255.0>



#### 3.2.1 Login

Open Web browser to login Gemtek LTE Small Cell Web Management

- Default Login Website: <u>https://10.102.81.59</u>
- Username/Password: admin/admin

# Certek DLGEC-105 Login

- Homepage

Ge	mtek <sup>2.1.1</sup>	I 878.562-wl	tgfc105-gemtek-	tdd-X		
Status	LTE Configuration	Syslog	Management	Logout		
System S	Status			System Status		
LTE Statu	IS			Model Name	WLTGFC-105	
UEs Statu	JS			Serial Number		
				Baseband HW Version	V00	
				RF HW Version	V01	
				Temperature	RF: 40, BB: 47	
				CPU Loading	1.66% 2.21% 2.38%	
				Current Date/Time	2015-05-17 22:12:19	
				System Up Time	0 Day 0 Hour 13 Min 9 Sec	
				LTE Service Up Time	0 Day 0 Hour 0 Min 0 Sec	
				Total Memory	516476 KB	
				Used Memory	188000 KB	
				Free Memory	328600 KB	
				Sync Source	internal	
				Sync Status	N/A	

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#### 3.2.2 Modify Configuration

If you want to edit any configurations (except reboot, firmware upgrade/rollback or export/import/restore configuration files), you should lock eNodeB first by clicking the button on top-right corner of the page and then you can edit what you want when the button become . At this time, you must allow all UEs to be disconnected (if any UE attached at any time).

← → C ▲ 不安全   10.102.81.59/main.html			☆ 🔊 🕏 🚼 🛞 🗄
Gemtek <sup>2.1.1878.562-wltgfc105-gemtek-td</sup>	d-X Locking e	31.59 顯示 NodeB will disconnect all UEs, are you sure?	
Status LTE Configuration Syslog Management	Logout	確定取消	
System Status	System Status		
LTE Status	lodel Name	WLTGFC-105	
UEs Status S	erial Number		
в	aseband HW Version	V00	
R	RF HW Version	V01	
Т	emperature	RF: 40, BB: 47	
c	PU Loading	1.66% 2.21% 2.38%	
c	Current Date/Time	2015-05-17 22:12:19	
s	system Up Time	0 Day 0 Hour 13 Min 9 Sec	
L L L L L L L L L L L L L L L L L L L	TE Service Up Time	0 Day 0 Hour 0 Min 0 Sec	
Т	otal Memory	516476 KB	
U	Jsed Memory	188000 KB	
F	ree Memory	328600 KB	
s	sync Source	internal	
S	sync Status	N/A	
	BRS Status	(null) (null)	

#### Gemtek<sup>2.1.1878.562-wltgfc105-gemtek-tdd-x</sup>

Status LTE Configuration	Syslog Ma	nagement Logout	
General		General Configuration	
Radio Access Network		ENodeB Type	Home eNodeB V
Neighbor List		Cell Identity	10
Measurement Report Triggers		PHY Cell Group ID	10
		PHY Cell ID	1
		PLMN Identity(MCC+MNC)	00101
		Tracking Area Code	1
		MME IP	10.102.81.101
		MME SCTP Port	36412
		Keep local GTP-U Tunnel IP same as eNB IP	
		local GTP-U Tunnel IP	10.102.81.59
		UE Inactivity Timer	More than 30 days 🔹
		DSCP Control	0
		DSCP Data	0
		Update	

Shown below is an example of how "General Configuration" was modified and saved. All other configurations will be dealt with in detail in Chapter 3.



Once finish editing the configuration, you have to click **Update** button.

Gemtek <sup>2.1.1878.562-wltgfc105-gemtek-tdd-x</sup>											
Status LTE Configuration Syslog Management Logout											
General	General Configuration										
Radio Access Network	ENodeB Type	Home eNodeB v									
Neighbor List	Cell Identity	10									
Measurement Report Triggers	PHY Cell Group ID	10									
	PHY Cell ID	1									
	PLMN Identity(MCC+MNC)	00101									
	Tracking Area Code	1									
	MME IP	10.102.81.101									
	MME SCTP Port	36412									
	Keep local GTP-U Tunnel IP same as eNB IP	2									
	local GTP-U Tunnel IP	10.102.81.59									
	UE Inactivity Timer	More than 30 days v									
	DSCP Control	0									
	DSCP Data	0									
	Update										

**Before saving the configuration**, be sure to **unlock** eNodeB by clicking the button **unlock** to make it turn green. Hence, the result shows that all fields can't be edited anymore when finishing unlock.

Then click the button 🔜 on the top-right corner to save the configuration.

Gemtek <sup>2.1.1878.562-witgfc105-gemtek-tdd-X</sup>									
Status	LTE Configuration	Syslog	Management	Logout		0			
General				General Configuration					
Radio Aco	cess Network			ENodeB Type	Home eNodeB <b>v</b>				
Neighbor	List			Cell Identity	10				
Measurer	ment Report Triggers			PHY Cell Group ID	10				
				PHY Cell ID	1				
				PLMN Identity(MCC+MNC)	00101				
				Tracking Area Code	1				
				MME IP	10.102.81.101				
				MME SCTP Port	36412				
				Keep local GTP-U Tunnel IP same as eNB IP					
				local GTP-U Tunnel IP	10.102.81.59				
				UE Inactivity Timer	More than 30 days				
				DSCP Control	0				
				DSCP Data	0				
				Update					



If you ever **FORGOT** to unlocke NodeB and save the configuration, you will see the pop-up message to inform you that "Saving configuration when eNodeB locked will cause eNodeB stop radiating after next reboot, are you sure?" In this situation, go back to **unlock** eNodeB and save again.





#### **3.2.3** Reconfiguration Reboot

To validate reconfiguration, you should **reboot** eNodeB via the "Management" menu and click "Reboot".





# 4. Web Management Interface Reference Manual

## 4.1 Status

#### 4.1.1 Status | System Status

Select list item – Status | System Status, you can see the information about model name, RF/BB temperature, system up time, memory status, and etc.

System Status								
Model Name	WLTGFC-105							
Serial Number								
Baseband HW Version	∨00							
RF HW Version	V01							
Temperature	RF: 41, BB: 49							
CPU Loading	4.22% 2.68% 2.38%							
Current Date/Time	2015-05-17 22:02:31							
System Up Time	0 Day 0 Hour 3 Min 21 Sec							
LTE Service Up Time	0 Day 0 Hour 0 Min 0 Sec							
Total Memory	516476 KB							
Used Memory	186828 KB							
Free Memory	329788 KB							
Sync Source	internal							
Sync Status	N/A	<b>x</b> r						
CBRS Status	(null),(null)		These two blocks can check the sync.					
Location	N/A		status if the cell boots with GPS mode.					



#### 4.1.2 Status | Network Status

Select list item – Status | Network Status, you can see Small Cell Local/MAC IP address and other Ethernet related information.

Network Status					
Small Cell Local IP Address	10.102.81.59				
Small Cell Local MAC Address	1C:49:7B:FB:1C:D1				
Default Gateway	10.102.81.254				
DNS Server	8.8.4.4				
IEEE-1588v2 Grand Master	N/A				
NTP Server	Disabled				
EMS/ACS Server	N/A				
SON Server	N/A				
Security Gateway	Disabled				
IPSec Status					
status					



#### 4.1.3 Status | LTE Status

Select list item – Status | LTE Status, you can get the LTE general configuration about information of Frequency band, PLMN, MME/eNodeB IP address, Bandwidth, EARFCN, and, etc.

General Configuration	
Cell State	UP
Frequency Band	48
MME IP address	10.102.81.100
Small Cell IP address	10.102.81.59
ENodeB Type	Home eNodeB
Cell Identity	10
PHY Cell Group ID	10
PHY Cell ID	1
PLMN Identity(MCC+MNC)	00101
EARFCN	55990
Bandwidth	10MHz
Current TX Power	9.78000000000001
FDD/TDD Mode	TDD



#### 4.1.4 Status | UEs Status

Select list item – Status | UEs Status shown as bellow, you will see here were 2 UEs attached in this case. The DL/UL throughput and MCS index of UE#1 were 7,903/8,465 Kbps and 19/27. And the DL/UL throughput and MCS index of UE#2 were 8,417/5,018 Kbps Kbps and 20/27.

UEs Status										
	UpLink				DownLin	k				
1	RNTI	BLER(%)	Tput(Kbps)	MCSidx	RNTI	BLER(%)	Tput(Kbps)	MCSidx		
	101	0.02(0.08)	7903	19	101	0.00(0.01)	8465	27		
2	RNTI	BLER(%)	Tput(Kbps)	MCSidx	RNTI	BLER(%)	Tput(Kbps)	MCSidx		
	138	0.00(0.10)	8417	20	138	0.00(0.01)	5018	27		



## 4.2 LTE Configuration

#### 4.2.1 LTE Configuration | General

Select list item – LTE Configuration | General, you will see that eNodeB Type have 2 selections to choose, Marco eNodeB and Home eNodeB. As for the other parameters, you can input the responding values to configure your eNodeB.

General Configuration	
ENodeB Type	Home eNodeB V
Cell Identity	Home eNodeB
PHY Cell Group ID	10
PHY Cell ID	1
PLMN Identity(MCC+MNC)	00101
Tracking Area Code	1
MME IP	10.102.81.100
MME SCTP Port	36412
Keep local GTP-U Tunnel IP same as eNB IP	
local GTP-U Tunnel IP	10.102.81.59
UE Inactivity Timer	More than 30 days
DSCP Control	0
DSCP Data	0
Update	

General Configuration	
ENodeB Type	Home eNodeB V
Cell Identity	10
PHY Cell Group ID	10
PHY Cell ID	
PLMN Identity(MCC+MNC)	00101
Tracking Area Code	1
MME IP	10.102.81.100
MME SCTP Port	36412
Keep local GTP-U Tunnel IP same as eNB IP	SCTP Port default is 36412,
local GTP-U Tunnel IP	if it is X-Cell, the SCTP Port
UE Inactivity Timer	More than 30 da will change to 36413
DSCP Control	0
DSCP Data	0
Update	



#### 4.2.2 LTE Configuration | Radio Access Network

Select list item – LTE Configuration | Radio Access Network, you will see that Bandwidth can be configured as to 5, 10, 15 and 20 MHz. As for Tx Power, its maximum value is 20. You can also configure the DL EARFCN to what you want, as for the responding UL EARFCN, the system will automatically help you finish it. And RX gain is to adjust the receiver gain of RF.

Radio Access Network	
Frequency Band	48
Bandwidth	10 V MHz
RS Power	-7 dBm
Path Loss	1 dBm
Antenna Gain	5 dBm
TX Power	17.78 dBm
EIRP	21.78 dBm
DL EARFCN	55990
RX Gain	35
Uplink Downlink Configuration	2 •
Special Subframe Configuration	7 🔻
Update	

TDD has an additional mode, you can change "<u>Uplink Downlink Configuration</u>" to setup the UL/DL ratio according to your requirement. We support configuration 1~5.



Note that the following chapters (4.2.3 & 4.2.4) are the settings with multiple small cells. Thus, if you are X-cell, you can ignore these parts.

#### 4.2.3 LTE Configuration | Neighbor List

Before adding neighbors, you first have to check the frequency is intra or inter. If the neighbor is an intra-frequency neighbor, you can directly add a neighbor cell under the frequency of the eNodeB. If no cells are added, ANR will still be working to add any neighbor cell that UE reports to the neighbor relation table of this eNodeB.

Neighbor List			
Intra Frequency			
EARFCN	55990		
QRxLevMin	-60		
			Add New Cell
		1 bbA	New Frequency
Update			

Edit the information of the neighbor cell, especially the Cell ID, PHY cell group ID, PHY Cell ID, and Bandwidth. If X2 HO is not needed, IP, Port, eNB Type, eNB ID, MCC, MNC, and MME CGI can be ignored. After edited, press the **Update** button to apply the changes. And don't forget to save your changes.

Neighbor List						
Intra Frequency						
EARFCN		55990				
QRxLevMin		-60				
Cell 0[Delete]						
Cell Identity	100		TAC	123		
PHY Cell Group ID	10		PHY Cell ID	1		
Include in SIB5	Enabl	ed 🔻	QOffset	15		
Allow HO	Enabl	ed 🔻	Force S1-HO	Disabled •		
IP	192.16	58.1. <mark>1</mark>	Port	36422		
eNB Type	Home	eNodeB 🔻	eNB ID	100		
MCC	123		MNC	45		
					Add Nev	w Cell
					Add New Frequ	Jency
Update						



If the neighbor cell is inter-frequency, press the "Add New Frequency" button to add a new EARFCN. The "Delete" link can be used to delete this frequency. Press the "Add New Cell" button under this inter-frequency to add a new neighbor cell. If no cells are added, ANR will still be working to add any neighbor cell that UE reports to the neighbor relation table of this eNodeB.

Neighbor List		
Intra Frequency		
EARFCN	55990	]
QRxLevMin	-60	]
	'	Add New Cell
Inter Frequency		
EARFCN [Delete]	56090	]
QRxLevMin	-60	]
	'	Add New Cell
		Add New Frequency
Update		

Edit the information of the neighbor cell. The "Delete" link can be used to delete the cell. After edited, press the **Update** button to apply the changes. And don't forget to save your changes.

Intra Frequency						
EARFCN		55990				
QRxLevMin		-60				
					Add Ne	w Cell
Inter Frequency						
EARFCN [Delete]		56090				
QRxLevMin		-60				
Cell 0[Delete]						
Cell Identity	100		TAC	123		
PHY Cell Group ID	10		PHY Cell ID	1		
Include in SIB5	Enabled •		QOffset	15		
Allow HO	Enabled •		Force S1-HO	Disabled •	]	
IP	192.168.1.1		Port	36422		
eNB Type	Home eNodeB	T	eNB ID	100		
MCC	123		MNC	45		
					Add Ne	w Cell
					Add New Freq	uency
Update						



#### 4.2.4 LTE Configuration | Measurement Report Triggers

Select list item – LTE Configuration | Measurement Report Triggers, you can edit the A1/A2/A3/A4/A5 trigger conditions.

Measurement Report Triggers		
	A1 event	
RSRP Threshold	70	
Hysteresis	2	
Time to Trigger	640 <b>v</b> ms	
Max Report Cells	4	
Report Interval	2048ms •	
Report Amount	Infinity <b>T</b>	
	A2 event	
RSRP Threshold	60	
Hysteresis	2	
Time to Trigger	640 <b>v</b> ms	
Max Report Cells	4	
Report Interval	2048ms •	
Report Amount	Infinity V	

A3 event		
Offset	6	
Report on Leave	False •	
Hysteresis	4	
Time to Trigger	320 <b>v</b> ms	
Max Report Cells	4	
Report Interval	480ms •	
Report Amount	Infinity V	
	A4 event	
RSRP Threshold	80	
Hysteresis	6	
Time to Trigger	640 <b>v</b> ms	
Max Report Cells	8	
Report Interval	1min v	
Report Amount	64 🔻	

	A5 event
RSRP Threshold 1	70
RSRP Threshold 2	70
Hysteresis	2
Time to Trigger	640 <b>v</b> ms
Max Report Cells	4
Report Interval	480ms •
Report Amount	Infinity <b>v</b>
Update	



#### 4.2.5 CBRS Configuration

#### **※**Please make sure that the time of the eNB is the same as the time of the SAS Server. Otherwise, the certificate will fail.

CBRS Configuration	
CBRS Enable	Enabled V
SAS Server	10.102.81.66
SAS Server port	443
SAS Version	v1.2
SAS Host	www.gemteks.com.tw
Load Certificate	Enabled V
Cert Authentication	Enabled •
CA Bundle Certificate	選擇檔案 未選擇任何檔案 Upload
Issuer: Subject:	
Client Certificate	選擇檔案 未選擇任何檔案 Upload
Issuer: Subject:	
Client Private Key	選擇檔案 未選擇任何檔案 Upload
Status:	
CRL Check	Disabled •
CRL File	選擇檔案 未選擇任何檔案 Upload
Update	

CBRS Enable: Enable CBRS Function

SAS Server: SAS Server's IP Address or Domain Name

SAS Server port: SAS Service Port Number

SAS Version: SAS-CBSD protocol version

SAS Host: SAS Server's host name

Load Certificate: Use certificate (default is enable)

Cert Authentication: Enable mutual authentication (client side)

CRL Check: enable CRL check

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☆This page is visible when CBRS Enable = Enable.

User can set CBRS protocol parameter using this page.

Registration Request Parame	ter
userld	gtkUser01
fccld	gtkCbsd01
cbsdSerialNumber	gtkCbsdSn01
callSign	
cbsdCategory	A
cbsdlnfo	
airInterface	E_UTRA
measCapability	RECEIVED_POWER_WITH
installationParam(Optional)	
latitude	44
longitude	-93
height	9
heightType	AGL
horizontalAccuracy	
verticalAccuracy	
indoorDeployment	1
antennaAzimuth	
antennaDowntilt	
antennaGain	5
eirpCapability	
antennaBeamwidth	
antennaModel	
groupingParam(Optional)	
groupType	
groupId	
cpiSignatureData(Optional)	
protectedHeader	
encodedCpiSignedData	
digitalSignature	
SpectrumInquiry Request Par	ameter
inquiredSpectrum	368000000,369000000;3
Update	



#### 4.3 Syslog

#### 4.3.1 Syslog | Operation Log

Jan 1 00:00:23 (none) local1.info root: [MSG\_CENTER] : Operation Normal Jan 1 00:00:23 (none) local1.info root: [CMS] : Operation Normal Jan 1 00:00:24 (none) local1.info root: [Network Static ip] : Operation Normal Dec 31 16:00:24 (none) local1.info root: [NTP] : Operation Disable Jan 2 00:00:00 LSM local1.info root: [Telent] : Operation Normal Jan 2 00:00:00 LSM local1.info root: [Zabbix] : Operation Disable Jan 2 00:00:35 LSM local1.info root: [MIF] : Operation Normal Jan 2 00:00:48 LSM local1.info root: [GEMTEK-RF] : Operation Normal

#### 4.3.2 Syslog | Configuration Log

Jan 2 00:05:25 LSM local2.info root: admin login to web management console success Jan 2 00:11:13 LSM local2.info root: admin login to web management console success Jan 2 00:16:12 LSM local2.info root: adminstate changed to 0 Jan 2 00:22:44 LSM local2.info root: adminstate changed to 1

#### 4.3.3 Syslog | Alarm Log

Jan 2 00:00:50 LSM local3.info gtkSwitch: SFP0 link state change to [down] Jan 2 00:00:50 LSM local3.info gtkSwitch: SFP1 link state change to [down] Jan 2 00:00:50 LSM local3.info gtkSwitch: ETH link state change to [up]

#### 4.3.4 Syslog | Export Log Files

Export Log File	
Export Log File	Export



#### 4.4 Management

#### 4.4.1 Management | Network Configuration

Below is the default setting. Here, you can edit eNodeB static IP VLAN and DNS.

Network Configuration	
DHCP	Disabled <b>v</b>
VLAN	Disabled <b>v</b>
IP +	10 . 102 . 81 . 59
Netmask	255 . 255 . 255 . 0
Default Gateway	10 . 102 . 81 . 254
Primary DNS	8
Secondary DNS	8
Update	

#### 4.4.2 Management | IPsec Configuration

Below is the default setting. you can edit eNodeB Server IP 、 Client IP and fill in the empty blocks.

IPsec Configuration		
IPsec Function	Disabled V	
Server IP	· · · · · · · · · · · · · · · · · · ·	
Client ID	Default 🔻	
Server ID	Same as IP V	
Authentication	Pre-shared Key V	
Remote Subnet	· · · · · · · · · · · · · · · · · · ·	
Pre-shared Key		
Root CA Certificate	選擇檔案 未選擇任何檔案	Upload
Issuer: Subject:		
Client Certificate	選擇檔案 未選擇任何檔案	Upload
lssuer: Subject:		
Client Private Key	選擇檔案 未選擇任何檔案	Upload
Status:		
Update		



#### 4.4.3 Management | System Configuration

Below is the default setting.

System Configuration	
Redirect to Syslog Server	Disabled •
ReEst Function	Disabled •
ANR Function	Enabled •
SON Function	Disabled V
EMS Function	Disabled V
Bootstrap Function	Disabled V
Logdisp Function	Disabled V
Update	

#### 4.4.4 Management | Routing Configuration

Below is the default setting. You can edit the Route Type, Destination, Mask, Gateway, Interface and fill in the empty blocks.

Routing Configuration			
Route Type	net 🔻		
Destination			
Mask			
Gateway			
Interface			
Update Delete			
Destination	Gateway	Genmask	Iface



## 4.4.5 Management | Configuration File

Here provide "Export Configuration", "Import Configuration" and "Restore Last Configuration" functions to manage your eNodeB configuration files.

Configuration File	
Export Configuration	Export
Import Configuration	選擇檔案 未選擇任何檔案 Import
Restore Last Configuration	Restore

#### a. Export Configuration:

Click **Export** button and select "Download Link", your browser will download "config.tar.gz" file config.tar.gz to your computer.

Configuration File	
Export Configuration	Export Download Link
Import Configuration	選擇檔案 未選擇任何檔案 Import
Restore Last Configuration	Restore

#### b. Import Configuration:

Select a backup "config.tar.gz" and press **Import** button. You will change the configuration files on your eNodeB (Pop-up message will show: Import success).

Configuration File		
Export Configuration	Export	
Import Configuration	<b>選擇檔案</b> 未選擇任何檔案	Import activate
Restore Last Configuration	Restore	
Configuration File		
Export Configuration	Export	
Import Configuration	選擇檔案 config.tar.gz	Import activate

# Gemtek

TDD LTE Small Cell User Guide

← → C ▲ 不安全   10.102.81.59/ma	in.html			
Gemtek <sup>2.1.1878.562-wltgfc1</sup>	05-gemtek-tdd-X	10.102.81.59 顯示 Import success		
Status LTE Configuration Syslog Ma	nagement Logout		確定	
	_			
Network Configuration				
IPsec Configuration	Configuratio	on File		
System Configuration	Export Configurat	ation Export		
Routing Configuration	Import Configurat	ation 選擇檔案 config.tgz	Import activate	
Configuration File	Restore Last Con	nfiguration		]
Firmware Utility				
Change Login Password				
Coffware Deskage Manager				

#### Click the 'active' button to active the new configuration file.

← → C ▲ 不安全   10.102.81.59/main.html		🖈 🔎 🕅 🚺 🚯 🗄
Gemtek <sup>2.1.1878.562-witgfc105-gemtek-tdd-X</sup>	10.102.81.59 顯示 Imported configuration activated	
Status LTE Configuration Syslog Management Logo	確定	0-
Network Configuration		
IPsec Configuration		
System Configuration Export Co	figuration	
Routing Configuration Import Co	figuration 選擇檔案 config.tgz Import activate	
Configuration File Restore La	st Configuration Restore	
Firmware Utility		
Change Login Password		
Software Package Manager		

Then **reboot** eNodeB to validate the reconfiguration.



#### c. Restore Last Configuration:

This function can help you recover eNodeB to the last version of configuration. You should just select **Restore** button and get "Restore success" pop-up message. But you should also **reboot** eNodeB to get recovery.

← → C 🔺 不安全   10.102.81.59/main.html		🖈 🗵 🚺 🔞 :
Gemtek <sup>2.1.1878.562-witgfc105-gemtek-tdd-X</sup>	10.102.81.59 顯示 Restore success	
Status LTE Configuration Syslog Management Logout	確定	<b>O</b>
Network Configuration         IPsec Configuration         System Configuration         Routing Configuration         Configuration File         Firmware Utility         Change Login Password         Software Package Manager         Time Settings	tion File uration Export uration 道理確案 copy tgz Import activate Configuration Restore	



#### 4.4.6 Management | Firmware Utility

The Web GUI provides "Firmware Rollback" and "Core Firmware" functions for customer to change image. You will see below eNodeB having dual images, now, Dual Block 1 is in Active and Dual Block 2 is in Inactive. In this case, the image saved in Dual Block 2 will become active (1) to recover your eNodeB if you run "Firmware Rollback", or (2) to be replaced by new image if you run "Firmware Upgrade".

#### a. Firmware Rollback:

Once press the **Firmware Rollback** button, the Small cell will rollback to another block immediately.

Core Firmware				
選擇檔案     未選擇任何檔案     Firmware Upgrade				
Dual Block 1	2.1.1878.562-wltgfc105-gemtek-tdd-X	Inactive		
Dual Block 2	2.1.1878.562-wltgfc105-gemtek-tdd-X	Active		
Firmware Rollback				
Boot Loader				

← → C ▲ 不安全   10.102.81.59/main.html							
Gemtek <sup>2.1.1878.562-wltgfc105-gemtek-tdd-X</sup>			10.102.81.59 顯示 Do you want to perfo	rm eNodeB firmware ro	ollback?		
Status LTE Configuration	n Syslog	Management	Logout			確定 取消	
Network Configuration			l				
IPsec Configuration		(	Core Fir <u>m</u> v	ware			
System Configuration			選擇檔案 未	選擇任何檔案	Firmware Upgrade		
Routing Configuration			Dual Block 1	2.4.4070.562 with	afe 105 geographic total V		Inastivo
Configuration File			Dual Block 1	2.1.1878.302-WIG	gic 105-gemiek-idd-X		Activo
Firmware   Itility			JUAI BIOCK Z	2.1.1878.502-WI	gic rub-gemiek-idd-X		Active
Chapge Login Password			Firmware Roll	lback			
Software Deskage Measure			Boot Load	er			
Software Package Manager			選擇檔案 未	選擇任何檔案	Firmware Upgrade		
Time Settings				Version		svn1335.v4	
CSFB Settings							
Reset to Factory Default							



Core Firmware						
Dual Block 1	2.1.1878.562-wltgfc105-gemtek-tdd-X	Active				
Dual Block 2	Inactive					
Firmware rolled back. Rebooting						
Boot Loader						

Here, you can see the Dual Block 1 image become "Active".

#### b. Firmware Upgrade:

Choose a new image from PC directory that contains the new image and press **Firmware Upgrade** button.

Core Firmware					
<b>選擇檔案</b> 未選擇任何	檔案	Firmware Upgrade			
Dual Block 1	2.1.1878.562-witgf	c105-gemtek-tdd-X		Active	
Dual Block 2				Inactive	
Firmware Rollback					
Boot Loader					
選擇檔案 未選擇任何檔案 Firmware Upgrade					
Versio	on		svn1335.v4		

This process need several seconds loading new image and then show the below information for you to check.



Core Firmware					
	Up	bloadingPlease Wait			
Dual Block 1	2.1.1878.562-witgfo	c105-gemtek-tdd-X		Active	
Dual Block 2				Inactive	
Firmware Rollback					
Boot Loader					
選擇檔案 未選擇任何檔案 Firmware Upgrade					
Version svn1335.v4					

#### Check the image and click **Upgrade** button to upgrade firmware. Wait a few minutes for the process to finish.

Cor	Core Firmware					
N	/ersion	2.1.1878.562-wltgfc105-gemtek-tdd-X				
S	Signature	19138DA0E00EBF80281392D62237DD1A 17C4BFAAAE73C3DE1A2CCBAD0B148236 B597CFD0A5582786374A3882B1FA0626 E1DD22E4F31B0DF28C0865BB672DE24C FE66FF05A43D170BF7D0555EF9931DAE 0CA133A67EC08D2B0B34DF24C91434AE 32751CD99CF3C8A86872B3F627685F0C E840E3DDFE87B306903CBBE435A224AD				
K	Kernel	4011129 bytes				
9	Software	40378404 bytes				
	Upgrade					



Gemtek	Gemtek
Upgrading software	Upgrade completed. Rebooting
Please wait while upgrading firmware	Please wait while upgrading firmware

After finishing firmware upgrade and login Web GUI, you will find that the upgrade process results in Dual Block 2 become "Active" and the older one saved on Dual Block 1 was marked as "Inactive".

Core Firmware					
選擇檔案 未選擇任何檔案 Firmware Upgrade					
Dual Block 1	2.1.1878.562-wltgfc105-gemtek-tdd-X	Inactive			
Dual Block 2	2.1.1878.562-witgfc105-gemtek-tdd-X	Active			
Firmware Rollback					



#### 4.4.7 Management | Change Login Password

- Default password: admin (length is 5 characters long)
- New password length should be 6-10characters long.

Change Login Password	
Old Password	
New Password	
Confirm New Password	
Update	

- Once "Update" the new password, you will be asked to login with new password again as follows.

Gemtek WLTGFC-105 Login
Username Password
Keep me logged in     Login
Copyright® 2015 Gemtek Technology Co., Ltd.



#### 4.4.8 Management | Software Package Management

Normally, customer will not use this function. This feature is used to install some utilities to debug Small Cell issues and will be under Gemtek engineer authorization and manipulation.

Status	LTE Configuration	Syslog	Managemen	t Logout	
Network	Configuration				
IPsec Co	onfiguration			Software Package Manager	
System	Configuration			Free space: 6.5M	
Routing	Configuration			Name	Status
Configur	ation File			tcpdump[Remove]	Valid
Firmwar	e Utility			telnetd[Remove]	Valid
Change	Login Password			選擇檔案 未選擇任何檔案 Install	
Software	e Package Manager				
Time Se	ttings				
CSFB S	ettings				
Reset to	Factory Default				
Rehoot					



#### 4.4.9 Management | Time Setting

- 1) 1588 Function: Enable/Disable
- 2) Protocol: 802.3/udp

802.3 is ethernet's protocol.

Udp is ipv4's protocol.

Before using 1588, please make sure your eNodeB can access 1588 server via ping operation without issue.

- 3) 1588 Type: multicast/unicast
  - multicast is group communication where data transmission is addressed to a group of destination computers simultaneously. Multicast can be one-to-many or many-to-many distribution
  - Inicast refers to a one-to-one transmission from one point in the network to another point; that is, one sender and one receiver, each identified by a network address.
- 4) NTP Function: Disable/Enable

The Network Time Protocol (NTP) is a networking protocol for clock synchronization between computer systems over packet-switched, variable-latency data networks.

- 5) Timezone: Please select the time of your location.
- 6) NTP Server Name: Default setting is 2015-5-17 14:0:0 (year-month-day hr:min:sec.

* Not required to lock eNodeB to change settings at this page				
Time Setting				
1588 Function	Enabled -			
1588 Protocol	802.3 🔻			
1588 Type	multicast 👻			
NTP Function	Disabled 👻			
Timezone	(GMT+08:00) Taipei 🗸			
Initial System Time (UTC) <b>?</b>	2015 -5 -17 14 :0 :0			
Update				



#### 4.4.10 Management | CSFB Configuration

Below is the default setting. You can select the different modes of priority

* Not required to lock eNodeB to change settings at this page				
CSFB Configuration				
Normal Priority RatType	DEFAULT V			
Normal Priority Action	Cell Redir V			
Normal Priorty UtraFDD_DL_Arfcn				
High Priority RatType	DEFAULT V			
High Priority Action	Cell Redir V			
High Priorty UtraFDD_DL_Arfcn				
Geran CSFB Configuration				
Band Indicator	DCS1800 V			
Number of GSM Arfcn	0 •			
Update				

#### 4.4.11 Management | Reset to Factory Default

Factory default mode, there are three modes. Please select the operating mode.

Reset to Factory Default	
Keep network settings	Reset all settings 🔹
60	Reset all settings
66	Keep all configurable settings



## 4.4.12 Management | Reboot System

← → C ▲ 不安全   10.10	2.81.59/main.html		☆ 🔎 🕏 🔚 🎯 🗄
Gemtek <sup>2.1.1878.</sup>	i62-wltgfc105-gemtek-tdd-X		
Status LTE Configuration Sys	log Management Logout		
Network Configuration         IPsec Configuration         System Configuration         Routing Configuration         Configuration File         Firmware Utility         Change Login Password         Software Package Manager         Time Settings         CSFB Settings         Reset to Factory Default	Reboot System Are you sure?	Yes	
Reboot			

Status       LTE Configuration       Syslog       Management       Logout         Network Configuration       IPsec Configuration       Reboot System         System Configuration       Reboot System       Yes	← → C ▲ 不安全   10.102.8	31.59/main.html		\$ 9	
Status     LTE Configuration     Syslog     Management     Logout       Network Configuration     IPsec Configuration       System Configuration       System Configuration       Routing Configuration	Gemtek <sup>2.1.1878.56</sup>	2-wltgfc105-gemtek-tdd-X	10.102.81.59 顯示 Reboot eNodeB will disconnect all UEs and disconnect with EPC, are		
Network Configuration       IPsec Configuration       System Configuration       Routing Configuration	Status LTE Configuration Syslo	g Management Logout			
Configuration File       Firmware Utility       Change Login Password       Software Package Manager       Time Settings	Network Configuration         IPsec Configuration         System Configuration         Routing Configuration         Configuration File         Firmware Utility         Change Login Password         Software Package Manager         Time Settings         CSER Softinge	Reboot Sy Are you sure?	ystem		
Reset to Factory Default Reboot	Reset to Factory Default Reboot				

Reboot System			



## 4.5 Logout

You can click "Logout" tab in any window to log out and then go back to Login page.

Gemtek <sup>2.1.1878.562-witgfc105-gemtek-td</sup>				tdd-X	
Status	LTE Configuration	Syslog	Management	Logout	
			_		
Syster	m Status			0	
Netwo	ork Status			System Status	3
LTE S	tatus			Model Name	WLTGFC-105
UEs S	Itatus	_		Serial Number	
				Baseband HW Versi	ion V00
				RF HW Version	V01
				Temperature	RF: 45, BB: N/A
				CPU Loading	(null)% (null)% (null)%
				Current Date/Time	2015-05-17 22:00:35
				System Up Time	0 Day 0 Hour 1 Min 25 Sec
				LTE Service Up Time	e N/A

Gemtek
WLTGFC-105 Login

Password	Username	
Keep me logged in	Password	
	Keep me logged in	Login



#### 4.6 LED Definition

# 4.6.1 LED Behavior



#### LED ON/OFF Sequence:

Uboot LED light Process :

#### LTE user LED ON ->LTE LED ON ->Power LED ON ->LTE user LED OFF ->LTE LED OFF ->Power LED OFF

LED display	Behavior		
	Green : Power ready and system ready(default)		
Power & System LED	<b>Red</b> : 1. Power ok during booting the device		
	2. System Error or Alarm.		
	<b>On</b> : UEs attached.		
LTE User LED	Blink :UE's Traffic Tx/Rx		
	Off : No active UE on line		
	On: Cell Setup successfully, LTE service is ready.		
LTE LED	Blink : Tx/Rx LTE Traffic		
	Off: No LTE server.		
	On: Ethernet connected		
Ethernet LED	Blink: Under Ethernet traffic		
	Off: No Ethernet can be connected		
	<b>On:</b> GPS source is ready		
GPS sync. LED	Blink: Under Synchronization		
	Off: No GPS can be detected		



# 5. All-In-One Small Cell (X-Cell) Web Management Interface Reference Manual

Since the web management of the All-In-One small cell (X-cell) is the same except for the "EPC" icon. Please follow "Chapter 3.2.2Modify Configuration" to modify the X-cell configuration parameters. **The following part is the settings of the embedded EPC.** 

# 5.1 EPC

# 5.1.1 EPC | EPC-MME Configuration

Select list item – EPC | EPC-MME Configuration, You can set MME code, APN and UE Start IP for EPC. Then, you can select LTE MQTT status and Time Zone.

Gemtek	EPCv105-2.1.1	878.562-wltgfc10	)5-gemtek-t	dd-X		
Status LTE Configuration	Syslog	Management	EPC	Logout		
EPC-MME Configuration User Configuration			EPC-MN MME Code APN UE Start IP LTE MQTT LTE NAT Time Zone Update	/E Configu	Internet	This field name must be the same as the cell phone's APN

- 1. Click 'EPC' tag.
- 2. Click 'EPC-MME' Configuration
- 3. Please base on your test environment to configure these parameters for MME.
  - i. MME Code : 1~255
  - ii. APN : The max length is 64
  - iii. UE Start IP : UE IP Address
  - iv. LTE MQTT: **This is for special application use only. Please don't enable it**. If enable it, it will reduce the system throughput performance.
  - v. Time Zone: The value is assigned to UEs after UEs have attached completed.
- 4. If you update the value, you must reboot the system.



#### 5.1.2 EPC | HSS-KEY Configuration

Select list item – EPC | HSS-KEY Configuration, You can check IMSI list.

HSS-KEY Configuration					
Update	Clear	Delete			
IMSI					
KEY					
OP					
IMSI					
001010000001318	00101000002004				

#### When you click IMSI number, you can see the information of KEY and OP.

HSS-KEY Configu	ration			
Update	Clear	Delete		
IMSI	00101000001318			
KEY	5639F31C279C36EF00DEAB6E5354A14E			
OP	3883BA4151FCC2C26437A5D4DE0BB09C			
IMSI				
001010000001318	001010000002004			

#### You can add IMSI by input IMSI, KEY and OP field and click Update button.

HSS-KEY Configu	ration			
Update	Clear	Delete		
IMSI	00101000001319			
KEY	5639F31C279C36EF00DEAB6E5354A14E			
OP	3883BA4151FCC2C26437A5D4DE0BB09C			
IMSI				
001010000001318	001010000002004			



HSS-KEY Configuration			
Update	Clear	Delete	
IMSI			
KEY			
OP			
IMSI			
001010000001318	00101000002004	001010000001319	

You can delete IMSI by input IMSI, KEY and OP field and click Delete button.

HSS-KEY Configuration			
Update	Clear	Delete	
IMSI	00101000001319		
KEY	5639F31C279C36EF00DEAB6E5354A14E		
OP	3883BA4151FCC2C26437A5D4DE0BB09C		
IMSI			
001010000001318	001010000002004	001010000001319	

HSS-KEY Configuration			
Update	Clear	Delete	
IMSI			
KEY			
OP			
IMSI			
001010000001318	00101000002004		



# 5.2 X-Cell Network Planning

- For Example



1. The X-Cell need to setup the Default Gateway to Router.

Ex: In the Figure, the IP of Router is 10.102.81.1. We must setup the GW to 10.102.81.1. How to set the Default Gateway, you can reference [4.4.1 Management | Network Configuration].

#### 2. The Router must set a static routing rule:

Ex: The X-Cell assigns the IP 10.200.59.X to UEs. We must set a routing rule for this router.

Linux cmd: route add -net 10.200.59.0/24 gw 10.102.81.59

10.200.59.0 is UE's IP

24 is the mask of UE's IP and this value = 255.255.255.0

10.102.81.59 is X-Cell's IP

3. If the Router has a web management. You can reference the User's Guild of the router to add a static routing rule. You can set the ip10.200.59.0, mask255.255.255.0, and GW is 10.102.81.59.



## 5.3 Cell Phone APN Settings:

iOS (Please follow these operating steps by taking iPhone7 as an example)
Step1:Settings →Cellular →Cellular Data Options →Cellular Data Network
Step2: Please enter 「internet」 for the APN field(other fields just left as blank)
Step3: Back to Setting →Carrier→Network Selection →Turn on "Automatic"
Step4: After a few seconds or minutes, it will be connected to the small cell automatically.
※If not, please reboot and let the phone to search signal again.





Cellular Data		Voice & Data	LTE
Cellular Data Options	Roaming On >	Data Roaming	C
ALL TIME		Turn off cellular data to restrict all c including email, web browsing, and	lata to Wi-Fi, push notification:
Current Period	0 Minutes		
ifetime	0 Minutes	Cellular Data Network	
CELLULAR DATA USAGE			
Current Period	47.4 MB		
Current Period Roaming	0 bytes		
JSE CELLULAR DATA FOR:			
App Store			
Calendar & Reminder	6		

Contraction Contraction	Cellular Data	
CELLULAR I	DATA	
APN	internet	
Jsername	9	
Password		
TE SETUP (	(OPTIONAL)	
APN		
Jsername	2	
Password		
MMS		
APN		
Username	9	
Password		
MMSC		





Android (Please follow these operating steps by taking Samaung as an example)

Step1: Settings  $\rightarrow$  Connections  $\rightarrow$  Mobile networks  $\rightarrow$  Access Point Names  $\rightarrow$  ADD

Step2: Edit access point  $\rightarrow$  Edit Name (input "internet" in the field) $\rightarrow$  Edit APN (input

"internet" in the field)→Press the top right corner of the screen to save (Other

fields just left as blank)

Step3: After a few seconds or minutes, it will be connected to the small cell automatically. %If not, please reboot and let the phone to search signal again.





16. <sup>46</sup> . ⊿	d 31% 📕 02:13		4º 📶 31% 🗏 02:13
< Connections	SEARCH	< Mobile netwo	orks
Wi-Fi Connect to Wi-Fi networks.		Data roaming Using mobile data whi in additional charges,	ile roaming may result
Bluetooth Connect to nearby Bluetooth devices.		Network mode 4G/3G/2G (auto conn	ect)
Data usage		Access Point Na	mes
Airplane mode Turn off calling, messaging functions, and Mobile data.	d   OD	Network operato	rs
Mobile hotspot and tethering			
Mobile networks			
SIM card manager			
Location High accuracy			
More connection estringe			







	46 .dl 31% 📕 02:14		
< Edit access point	1	< Edit access point Save	
Name internet		Name Disc	
APN		APN	
internet		internet	
Proxy		Proxy	
Not set		Not set	
Port		Port	
Not set		Not set	
Username		Username	
Not set		Not set	
Password		Password	
Not set		Not set	
Server		Server	
Not set		Not set	
MMSC		MMSC	
Not set		Not set	
Multimedia messade proxv		Multimedia messade proxv	

46 📶 31% 🗏 02:14 ccess point Save Discard

51



# 5.4 Small Cell Wall Mount Accessory Installation



<Gemtek Small Cell Standard Wall Mount Equipment Installation>



<Gemtek Small Cell Wall Mount Equipment Installation Example>



<Installation Steps>



#### About Gemtek Small Cell Grounding Construction

(1)The position of the grounding rod and the Gemtek Small Cell must be the shortest position of the grounding wire.

(2)The grounding rod needs at least 8 inches from the ground.

(3)Connect the grounding clip to the grounding rod. You will use this grounding clip to provide a grounding band connection between the Small Cell and the outdoor antenna, refer to the ground connection diagram.

(4)Connect the grounding band to the grounding wire.

(5)Remove the ground screw of Gemtek Small Cell. Position the ground screw through the grounding band and reinstall the Gemtek Small Cell.

(6)Connect the grounding band to the grounding clamp and refer to the ground connection diagram.

(7) Gemtek Small Cell grounding construction is completed.



<Gemtek Small Cell Grounding Point Diagram>

<Ground Connection Diagram>



## 6 Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**FCC Caution:** Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

#### **IMPORTANT NOTE:**

#### FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.



## **Professional installation instruction**

Please be advised that due to the unique function supplied by this product, the device is intended for use with our interactive entertainment software and licensed third-party only. The product will be distributed through controlled distribution channel and installed by trained professional and will not be sold directly to the general public through retail store.

1). Installation personal

This product is designed for specific application and needs to be installed by a qualified personal who has RF and related rule knowledge. The general user shall not attempt to install or change the setting.

2). Installation location

The product shall be installed at a location where the radiating antenna can be kept 20 cm from nearby person in normal operation condition to meet regulatory RF exposure requirement.

3). External antenna

Use only the antennas which have been approved by Gemtek. The non-approved antenna(s) may produce unwanted spurious or excessive RF transmitting power which may lead to the violation of FCC limit and is prohibited.

4). Installation procedure

Please refer to user's manual for the detail.

#### 5). Warning

Please carefully select the installation position and make sure that the final output power does not exceed the limit set force in relevant rules. The violation of the rule could lead to serious federal penalty.

Since WLTGFC-105/CBRS is a Category A device the product can only be installed outdoors below 6m height AGL or indoors.