



Application Note 51

Verizon LTE Provisioning on Digi TransPort

www.digi.com/support

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1 INTRODUCTION

1.1 Purpose

This document provides the procedures necessary to activate and use a Digi TransPort router on the Verizon Wireless LTE Network.

1.2 Necessary Documents / Tools

The Digi TransPort User Guide and Application Notes are available on the Digi support site at www.digi.com/support. The User Guide and Install Guide are essential to have.

You should also have available an Ethernet cable (supplied with the unit) to connect to the TransPort to access its WebUI via web browser using HTTP or HTTPS or to the TransPort's command line interface (CLI) via SSH or Telnet. CLI access via the serial port is also supported.

1.3 Assumptions / Requirements

This guide has been written for use by technically competent personnel with a good understanding of the communications technologies used in the product and of the requirements for their specific application.

It also assumes the user has supplied the TransPort LTE Module IMEI listed on the bottom of the Digi TransPort unit, and received an activated LTE SIM from Verizon or a Verizon agent.

Compatible Models: Digi TransPort WR11, WR21, WR41 and WR44 with Verizon LTE module. Other models may be supported in the future.

Firmware Versions: 5176 and later

Configuration: This Application Note assumes the devices are set to their factory default configurations. Most configuration commands are only shown if they differ from the factory default.

1.4 Version

Version Number	Status
0.2 (2013-Jun)	Draft with minor updates
1.1 (2015-Sep)	Updated for new module support and clarification on APN configuration

2 DEFAULT DIGI TRANSPORT SETUP

The Digi TransPort is shipped with the following defaults (details are in the User and Install Guides):

- Ethernet Port IP address: 192.168.1.1
- DHCP Server: Enabled; starting IP address 192.168.1.100
- Web UI Server: Enabled for HTTP
- CLI Access: Via SSH, Telnet and serial port (DCE, 115200, 8, 1, n)

3 VERIZON LTE PLAN INFO

New Verizon LTE devices normally receive their plan info automatically over the air (OTA). This is unlike CDMA (1xRTT/EvDO) where the modem must be provisioned or GSM where APN information must be manually entered into the user interface. Like GSM, LTE uses a SIM and an APN (access point name) to identify the device and to tell it how to behave on the network (i.e., what IP address to get: whether it is static or dynamic and whether the plan is publicly routable over the Internet or private).

In most cases *no LTE plan information input is needed* on the Digi TransPort router. The information is pushed down automatically to the device. However, there may be cases where the APN must be manually entered. See below for information on how that is done.

4 WIRELESS WAN SETUP OVERVIEW

Full details are below.

1. Obtain an activated LTE SIM from Verizon Wireless or Verizon agent. (The embedded LTE module serial number (IMEI) must be submitted to Verizon.)
2. Insert the SIM into slot 1 (top) on the Digi TransPort.
3. Attach Antennas. (The use of both antennas is strongly recommended.)
4. Apply power to the Digi TransPort. (Be sure to twist-lock the locking barrel connector.)
5. Observe that the signal LEDs illuminate after a minute or so – good signal is imperative for proper operation. Refer to your Digi TransPort router's Quick Start or Install Guide for details on how signal quality is shown. LTE signal quality info is listed below.
6. Wait a few minutes for the provisioning information to be pushed down to the module.
7. Connect to the TransPort's WebUI and verify the connection status and mobile IP address.

The mobile IP address will be shown on the WebUI Home Page.

5 SIGNAL QUALITY INFORMATION

5.1 2G and 3G

2G devices used one antenna. Most 3G (HSPA and EvDO) devices use two antennas where one antenna is for Receive Diversity. While two are strongly recommended, they are not required.

All devices report RSSI, Received Signal Strength Indicator, measured in dBm. Many CDMA and WCDMA (3G on GSM, AKA: UMTS and HSPA) also report Ec/Io which is essentially a signal to noise ratio and is generally a better indicator of signal quality than RSSI alone.

Table 1 - 2G & 3G Signal Quality

RSSI in dBm	Ec/Io in dB	Quality
> -70	> -6	Excellent
-70 to -85	-7 to -9	Good to Fair
< -85	< -9	Poor to Unusable

5.2 4G LTE

LTE devices use MIMO, so two antennas are required for proper operation.

LTE uses three signal quality indicators:

RSRP, or Reference Signal Received Power, indicates the signal strength and is roughly analogous to RSSI

RSRQ, or Reference Signal Received Quality, indicates the signal quality and is similar to Ec/Io.

SINR (also called SNR), or Signal to Interference and Noise Ratio, indicates the throughput capacity of the channel. As the name implies, SINR is the strength of the signal divided by the strength of any interference.

Table 2 - LTE Signal Quality Chart

RSRP in dBm	RSRQ in dB	SINR in dB	Quality
> -85	> -9	>10	Excellent
-85 to -110	-9 to -12	0-10	Good to Fair
< -110	< -12	<0 (i.e. negative)	Poor to Unusable

6 DIGI TRANSPORT LTE CONFIGURATION

6.1 Configure the Cellular (LTE) WAN interface

Once the Digi TransPort's LTE module's IMEI (serial number) and SIM have been activated, the LTE plan information (APN) should be pushed down automatically after it has been on-line for several minutes. The amount of time depends on many factors including signal quality and amount of load on the local network.

See below on verifying the connection, stored APN and IP address.

NOTE: If your Digi TransPort uses the **MC7354** Gobi module (designated with "L5" in the second part of the Digi TransPort part number, example: WR21-L52B-DE1-SU), make sure the module is set to Verizon, which is the default setting. See [QN39 - Carrier Switching with Sierra Wireless MC7354](#) for details.

6.2 Optional: Configure Manual APN

There may be times when the APN must be manually entered. Examples are a change in APN (example: from public to private plan) or when the SIM has been moved from one device to another.

In the event the automatic APN push fails or the APN (plan) has changed, or otherwise at the direction of Verizon, you have the ability to manually enter APN information via:

Configuration - Network > Interfaces > Mobile > Mobile Settings > Mobile Service Provider Settings

Select the "Use custom APN instead of built-in APN" checkbox and enter the appropriate Custom APN provided by Verizon.

Configuration - Network > Interfaces > Mobile

Interfaces

- Ethernet
- Mobile**

Select a SIM to configure from the list below

Settings on this page apply to the selected SIM

SIM: 1 (PPP 1) ▼
 IMSI: 310410630172949

Mobile Settings

Select the service plan and connection settings used in connecting to the mobile network.

Mobile Service Provider Settings

Use custom APN instead of built-in APN

Custom APN: mw01.vzwstatic

SIM PIN: (Optional)

Confirm SIM PIN:

Username: (Optional)

Password: (Optional)

Confirm Password:

Parameter	Setting	Description
Custom APN	Your APN	Provided by Verizon
SIM PIN	Your PIN code	The SIM PIN (Optional)
Username	APN Username	Generally Not Required
Password	APN Password	Generally Not Required

Click **Apply**, **save** the changes, and **reboot**. The TransPort will attempt a connection upon reboot.

7 VERIFYING THE CONNECTION / TROUBLESHOOTING

7.1 Check the assigned Mobile (PPP) IP address

The LTE data connection should be established a few moments after power-up or reboot. The Link or Service LED will indicate when the data connection is established. The TransPort's web UI home page will show the Mobile IP address:

Cellular

Module: LE910-SVG

SIM: Detected (using SIM 1)

Signal Strength: Good (-102 dBm)

Signal Quality: Fair to Poor (-17 dB)

Uptime: 14 Seconds

Temperature: 31°C

IP address: 100.115.183.223

DNS Server: 198.224.183.135

Data Received: 1.88 KB

Data Sent: 1.77 KB

[more](#)

The Mobile IP can also be viewed via:

[Management - Network Status > Interfaces > Mobile](#) or

[Management - Connections > PPP Connections > PPP 1](#)

CLI command: `ppp 1 status`

If the connection fails, refer to the **Event Log** for messages relate to PPP 1 (or PPP 3 on some models).

When connecting properly the log will appear as (latest messages listed first):

```
17:11:18, 03 Jun 2013,PPP 1 up
17:11:17, 03 Jun 2013,PPP 1 Start
17:11:17, 03 Jun 2013,Modem connected on asy 2
17:11:16, 03 Jun 2013,Modem dialing on asy 2 #:*98*3#
```

7.2 Verify Signal Quality and APN in Use

See [Management - Network Status > Interfaces > Mobile](#):

Data Sent: 1.73 KB

Mobile Information

Results of Last Module Status Poll at 1 Jan 1970 00:03:19

Outcome: Got modem status OK

SIM status: Ready (PIN checking disabled)

Signal strength: -80 dBm

Radio technology: LTE

Signal quality (LTE): RSSI -80 dBm, RSRP -110 dBm, RSRQ -11 dB, SINR 10.2 dB

Radio band: E-UTRA Operating Band 4

Channel: 2050

Manufacturer: QUALCOMM INCORPORATED

Model: LE910-SVG

IMEI: 353238060037610

ESN: 8095F17B

IMSI: 311480004583609

MDN: 61228C

ICCID: 8914800000046034212

Firmware: 17.00.573 1 [April 07 2014 23:00:00]

Hardware version: 30000

APN in use: Context 3: VZWINTERNET

Attachment status: Attached

Registration State: 1 (registered) tac:A109 ci:070BFB20

Network: Verizon, 311480

Preferred system: Auto

Network Technology: LTE

Temperature: 34C

CLI command: `modemstat` ?

NOTE: The mobile status output will vary based on the module installed and/or the technology being used. For example, if the module is connected to 3G (EvDO or HSPA), it will not display the same information as when connected to LTE.

Need Help? Contact Verizon to verify your APN settings. Digi tech support is available at www.digi.com/support where you can download docs and post support cases.

8 CLI / CONFIGURATION COMMANDS

The applicable CLI commands listed below can be entered directly into the CLI. These commands are stored in the `config.da0` configuration file loaded when the TransPort boots up.

Manual APN (provided by Verizon – the one listed is just an example):

```
modemcc 0 apn "mw01.vzwstatic"
```

Save the config, then reboot. The CLI commands are:

```
saveall
reboot
```