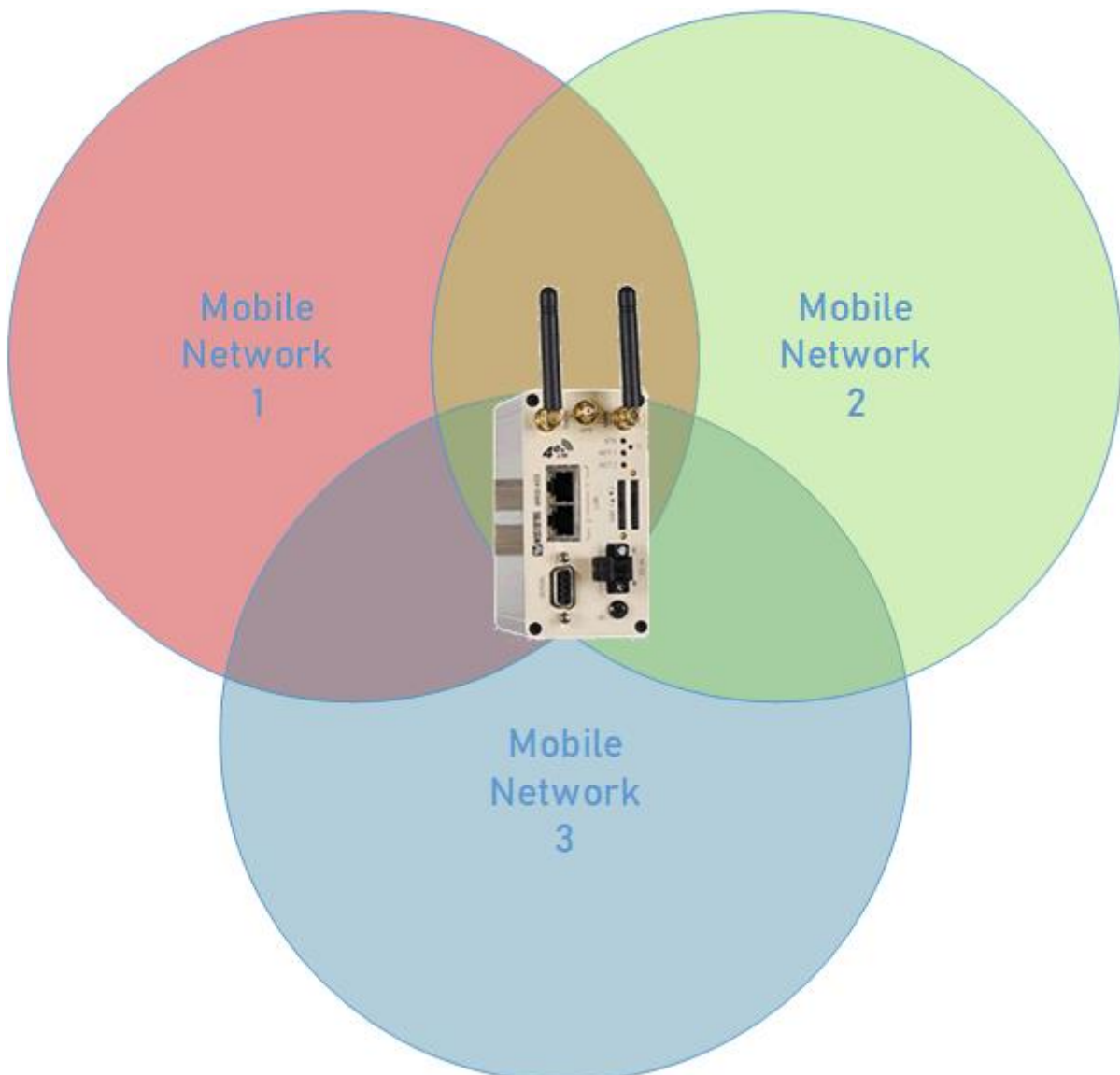


QN-010-WUK

Using roaming SIM cards with the MRD series routers.

This application note shows how to set up resilience for your 4G/3G network by using roaming SIM cards.



Introduction

What is Data Roaming?

Data roaming is a term used when your SIM card is using data on a mobile network, outside of your mobile provider's network. This could be whilst the SIM card is abroad or outside of the range of your native network.

Roaming is a new feature in firmware v1.7.9.2 in the MRD series

Requirements

Firmware v1.7.9.2 or later.

Roaming enabled SIM card.

Applicable to mobile routers MRD-455, MRD-355, MRD-315, MRD-405 and MRD-305.

Data Charges

Check your tariff for any additional costs that might be incurred during roaming.

Packet Mode Connection Profile

Enter the details for your 4G or 3G packet network connection.

Browse to **Wireless > Packet Mode**.

Connection APN: enter the APN (Access Point Name) for your 4G/3G connection.

Use custom initialisation APN: ✓

NB: *This setting is required for certain roaming vendors and other private clouds on 4G/LTE.*

If the router falls back to 3G or GPRS this setting will still work as intended. However if the SIM card does NOT support 4G/LTE, then this setting will stop the 3G from working so use with caution.

If the wireless link does not establish, try toggling this setting, as your vendor may not require or support it.

Authentication: CHAP (Check your account to see if authentication is required).

Username: enter the username for your 4G/3G link (if any).

Password: enter the password for your 4G/3G link (if any).



Packet Mode

Editing profile 1	
Connection APN	<input type="text" value="your_APN_goes_here"/>
Use custom initialisation APN	<input checked="" type="checkbox"/>
Initial APN	<input type="text"/>
Authentication	CHAP ▾
Username	<input type="text" value="your_username_here"/>
Password	Set New: <input checked="" type="checkbox"/> <input type="text" value="your_password_here"/>
Cancel	Update

Packet Mode Connection Profile

Enter the details for your 4G or 3G packet network connection.

Wireless > Packet Mode continued...

Connection Mode: Always Connect.



SIM 1 Profile: select the correct index number for your roaming profile

Click **Update**.



Packet Mode

Connection Configuration						
Connection Mode	Always connect ▼					
SIM 1 profile (active)	1 ▼					
SIM 2 profile	1 ▼					
Reset						Update

Index	APN	Auth	User	Password	Edit	Delete
1	Your APN Here	CHAP	web	Set		
Add new profile						

Roaming

Enter the details for your 4G or 3G packet network connection.

Wireless >Network.

Operating Mode: Packet mode.

Primary SIM: 1 (Choose the slot where the roaming SIM card is fitted).

Roaming: First network meeting minimum RSSI *

Minimum RSSI: 14 (-85dbm)

Include Internal List in Roaming: ✓

Enable Extended Logging: ✓

Click **Update**.

Roaming Options

How it works.

The network selection process takes place on **power up** or after a **connection loss** only. As there is only one wireless modem fitted, It can not continuously check in the background for the best available connection on other networks. To achieve background checking the router would need to drop the existing connection every time it did a check.

Network with best RSSI: The router will connect to the network with the best signal strength regardless of mobile operator.



Wireless Network

Network Configuration	
Operating mode	Packet mode (HSDPA/GPRS) ▼
Primary SIM	1 ▼
SIM 1 PIN	Not enabled Edit
SIM 2 PIN	Not enabled Edit
Roaming	Network with Best RSSI ▼
Include internal list in roaming	<input checked="" type="checkbox"/>
Enable extended logging	<input checked="" type="checkbox"/>
<input type="button" value="Reset"/> <input type="button" value="Update"/>	

Frequency Band Selection	
Band selection	Automatic ▼
<input type="button" value="Reset"/> <input type="button" value="Update"/>	

Roaming Options

Wireless >Network continued

First network meeting minimum RSSI: Here the router will connect to the first network that meets the minimum signal strength. The above example shows a minimum RSSI of 14 (-85dBm)



Wireless Network

Network Configuration	
Operating mode	Packet mode (HSDPA/GPRS) ▼
Primary SIM	1 ▼
SIM 1 PIN	Not enabled Edit
SIM 2 PIN	Not enabled Edit
Roaming	First network meeting minimum RSSI ▼ 14
Include internal list in roaming	<input checked="" type="checkbox"/>
Enable extended logging	<input checked="" type="checkbox"/>
Reset Update	

Frequency Band Selection	
Band selection	Automatic ▼
Reset Update	

Allow: Here the roaming is controlled by the network only, not the router.



Wireless Network

Network Configuration	
Operating mode	Packet mode (HSDPA/GPRS) ▼
Primary SIM	1 ▼
SIM 1 PIN	Not enabled Edit
SIM 2 PIN	Not enabled Edit
Roaming	Allow ▼ 0
Include internal list in roaming	<input checked="" type="checkbox"/>
Enable extended logging	<input checked="" type="checkbox"/>
Reset Update	

Frequency Band Selection	
Band selection	Automatic ▼
Reset Update	

Roaming Status

Which network is the router connected to?

It is possible to see which mobile network the router is currently connected by browsing to:

Wireless >Network.

Signal Strength: The signal strength in RSSI and dBm.

Provider: Here you will see the network provider, the type of packet network, (i.e. 4G/LTE, 3G, GPRS etc) and the cell information.

Status: Link status (Up or Down).

IP Address: The IP Address assigned to the SIM card.



The screenshot shows the Westermo MRD-455 web interface. The top navigation bar includes: Status, System, Wireless, Network, Routing, Firewall, VPN, Serial Server, and Management. The 'Wireless' menu is expanded, showing sub-items: Alarms, Wireless, LAN, VPN, GRE, Serial Server, and System Log. The user is logged in as 'admin' on host 'MRD-455-01-59-30'.

Wireless

Network Status	
Active SIM	SIM 1
SIM Card	OK
Network Registration	Yes
Roaming	Yes
Signal Strength (RSSI)	31 / 31 (-51 dBm)
Frequency Band	LTE BAND 7
Provider	vodafone UK DATA ONLY LTE (Location: 609B / Cell ID: 2CD91C)
Connection Status	
Status	Up
Current Session Time	00:39:31
Total Session Time	2 days 00:49:58
IP Address	[REDACTED]

Roaming Status

System Log

Providing **Enable extended logging** has been enabled, (browse to **Wireless > Network** to check), the system log will show the process of selecting the network.

Browse to **Status > System Log**.

```
Jan 9 12:16:15 msp: Connected to band LTE 800
Jan 9 12:16:15 mrx[2080]: SIM 1: OK
Jan 9 12:17:07 msp: SelectNetwork: trying network vodafone UK (23415) using
LTE, listed on SIM
Jan 9 12:17:21 msp: SelectNetwork: network registration yes, RSSI 21
Jan 9 12:17:21 msp: SelectNetwork: trying network O2 - UK (23410) using LTE,
listed on SIM
Jan 9 12:17:29 msp: SelectNetwork: network registration no, RSSI Unknown
Jan 9 12:17:29 msp: SelectNetwork: using network vodafone UK (23415) using LTE
Jan 9 12:17:31 msp: Wireless: RSSI 20, BER 0.4%-0.8%
Jan 9 12:17:31 msp: Wireless: network provider: vodafone UK LTE
Jan 9 12:17:32 mrx[2080]: Time: changing timezone to +0000
Jan 9 12:17:32 mrx[2080]: PacketMode: Session connected
Jan 9 12:17:32 mrx[2080]: : IP : ██████████
Jan 9 12:17:32 mrx[2080]: : DNS 1: ██████████
Jan 9 12:17:32 mrx[2080]: : DNS 2: ██████████
Jan 9 12:17:32 mrx[2080]: Signal Info: RSSI: -73 dBm, RSRQ: -8 to -7 dBm
```


Revision history for version 1.0

Revision	Rev by	Revision note	Date
1.0	GJM	First edition	Dec 2018
1.1	GJM	Added roaming process and system log plus other enhancements	9 Jan 2018
1.2	GJM	Minor enhancements and highlighted important parameter settings	11 Jan 2019



H E A D O F F I C E

Sweden

Westermo
SE-640 40 Stora Sundby
Tel: +46 (0)16 42 80 00
Fax: +46 (0)16 42 80 01
info@westermo.se
www.westermo.com

Sales Units

Westermo Data Communications

China

sales.cn@westermo.com
www.cn.westermo.com

France

infos@westermo.fr
www.westermo.fr

Germany

info@westermo.de
www.westermo.de

North America

info@westermo.com
www.westermo.com

Singapore

sales@westermo.com.sg
www.westermo.com

Sweden

info.sverige@westermo.se
www.westermo.se

United Kingdom

sales@westermo.co.uk
www.westermo.co.uk

Other Offices



For complete contact information, please visit our website at www.westermo.com/contact or scan the QR code with your mobile phone.