EM/MC74xx Auto SIM Feature

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Hardware Compatibility	Product Line	AirPrime	Series	EM	
				MC74xx	

Software Compatibility	ALL	Document Type	Application Note	✓	Technical Note	

1 Version

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2 Introduction

This document is provided to Sierra Wireless distributors and clients to aid more rapid development of embedded applications using the Sierra Wireless portfolio of cellular solutions. To request a new application/technical note, contact your regional Sierra Wireless Product Marketing Manager.

3 AUTO-SIM Feature

The AirPrime EM and MC74xx modules support the AUTO-SIM feature wherein the module will select the correct FW+ carrier PRI to use with the detected SIM.

This feature is intended for use with the module when the host application does not wish to perform management of FW image switching.

If the current FW is not compatible with the detected SIM, then the module will switch to the correct FW+ carrier PRI combination after a module reset.

4 AUTO-SIM FW Selection Procedure

The FW selection preference order is illustrated below:

- Preference 1: FW matches the SIM (for example VZW FW for VZW SIM).
- Preference 2: If matching carrier's FW is not preset in the module, thenthe module switches to GENERIC firmware.
- Preference 3: If both matching carrier FW and GENERIC FW are not available in the module, then the module does not switch FW, and the current FW is kept active.

Note: Any unsupported carrier's SIM (for which Sierra Wireless does not have a matching FW), will trigger a switch to the GENERIC FW (if available). For example, a new carrier's SIM for which MCC and MNC was not previously known will trigger a switch to GENERIC FW.

It is recommended to always have a GENERIC FW available in the module if the AUTO-SIM feature is to be used.

4.1 AUTO-SIM FW Selection Procedure – Examples

Example 1	Example 2	Example 3	Example 4	Example 5
1. SIM: VZW	1. SIM: VZW	1. SIM: VZW	1. SIM: VZW	1. SIM: VZW
2. FW: VZW(Active), ATT, GENERIC and SPRINT	2. FW: VZW(Active), GENERIC and SPRINT	2. FW: VZW(Active) and SPRINT	2. FW: VZW(Active), ATT, GENERIC and SPRINT	2. FW: VZW(Active), ATT and SPRINT
3. VZW SIM removed and ATT SIM card inserted	3. VZW SIM removed and ATT SIM card inserted	3. VZW SIM removed and ATT SIM card inserted	3. VZW SIM removed and UKNOWN SIM card inserted	3. VZW SIM removed and UKNOWN SIM card inserted
4. Module switches to ATT FW	4. Module switches to GENERIC FW	4. Module stays on VZW FW	4. Module switches to GENERIC FW	4. Module stays on VZW FW

Note: FW indicates a valid FW+CARRIER PRI combination.

4.2 Enabling AUTO-SIM SIM

AUTO-SIM can be enabled via the AT command AT!IMPREF or Linux QMI SDK API function SetImagesPreference() and resetting the module.

After the module resets, the AUTO-SIM feature is active.

4.2.1 Enabling AUTO-SIM with AT Commands

```
AT Command:
AT!IMPREF="AUTO-SIM"
OK
AT!RESET
OK
```

Figure 1. AT Commands

4.2.2 Enabling AUTO-SIM via Linux QMI SDK APIs

```
SetImagesPreference:
Set both FW and PRI preference with below values:
Image ID : “000.000_000”
Build ID : “00.00.00.00_AUTO-SIM”
Sample code:
struct PrefImageList preferredImage;
memset (&preferredImage,0,sizeof(preferredImage));
preferredImage.listSize = 2; //FW+PRI
// FW
char *image_id = "000.000_000";
char *build_id = "00.00.00.00_AUTO-SIM";
preferredImage.listEntries[IMG_TYPE_FW].imageType = IMG_TYPE_FW;
memcpy(preferredImage.listEntries[IMG_TYPE_FW].imageId,image_id,
strlen(image_id));
preferredImage.listEntries[IMG_TYPE_FW].buildIdLength = (BYTE)strlen((const
char *)build_id);
memcpy
(preferredImage.listEntries[IMG_TYPE_FW].buildId,build_id,preferredImage.lis
tEntries[IMG_TYPE_FW].buildIdLength);
//PRI
preferredImage.listEntries[IMG_TYPE_PRI].imageType = IMG_TYPE_PRI;
memcpy(preferredImage.listEntries[IMG_TYPE_PRI].imageId,image_id,
strlen(image_id));
preferredImage.listEntries[IMG_TYPE_PRI].buildIdLength = (BYTE)strlen((const
char *)build_id);
memcpy (preferredImage.listEntries[IMG_TYPE_PRI].buildId,build_id,

preferredImage.listEntries[IMG_TYPE_PRI].buildIdLength);
SetImagesPreference ();
SetPower(RESET);
```

Figure 2. Enabling AUTO-SIM via Linux QMI SDK APIs

4.3 Disabling AUTO-SIM SIM

The AUTO-SIM feature can be disabled by setting the image preference to a specific carrier combination and resetting the module.

After the module resets, the AUTO-SIM feature is disabled.

Below is an example of issuing an AT Command to disable AUTO-SIM by switching to Verizon.

```
AT Command:
AT!IMPREF="VERIZON"
OK
AT!RESET
OK
```

Figure 3. Example: AT Command to Disable AUTO-SIM

The AUTO-SIM feature can be disabled via QMI by performing a FW download. This process will set the image preference to the carrier being downloaded, using the command below.

`UpgradeFirmware2k()`

Performing a device-based carrier FW switch via QMI APIs will also disable AUTO-SIM, using the command below.

`SLQSSwiGetAllCarrierImages() and UpgradeFirmware2k()`

4.4 Events That Trigger AUTO-SIM

The AUTO-SIM feature will trigger on the following events.

- ON EM7455 (with SIM DETECT line connected):
  - When the module is powered ON and a new SIM is inserted. If the FW detects the need for a FW switch, it resets the module to activate the new FW+ carrier PRI.
  - If the module is powered OFF when a new SIM is inserted, then the FW detects the need for a FW switch during boot time. It triggers a reset to activate the correct FW + carrier PRI (needs Release 16 FW which has bugs addressed).
- ON MC7455 and EM7455 (without SIM DETECT line connected):
  - When the module is powered ON and a new SIM is inserted, the host has to reset the module (AT!RESET or SetPower()) to trigger a FW switch.
  - If the module is powered OFF when a new SIM is inserted, then the FW detects the need for a FW switch during boot time. It triggers a reset to activate the correct FW + carrier PRI (needs Release 16 FW which has bugs addressed).

4.5 AUTO-SIM and Dual SIM

- EM 7455 with SIM DETECT lines connected:
  - When a SIM slot is switched, the FW detects the need for a FW switch and performs a module reset to activate the correct FW + carrier PRI.
- MC 7455 and EM 7455 (without SIM DETECT lines connected):
  - After a SIM slot is switched, the host has to initiate a module reset for the FW to detect the correct FW + carrier PRI during module boot up. The module will then initiate the required module reset (needs Release 16 FW which has bugs addressed).

5 Support

For direct clients: contact your Sierra Wireless FAE

For distributor clients: contact your distributor FAE

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6 Document History

Level	Date	History
1.0	September 5, 2012	Creation
1.1	July 1, 2016	Updated
1.2	March 23, 2017	Converted to applicaton note

7 Legal Notice