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QCRIL Android™ Overview

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Revision History

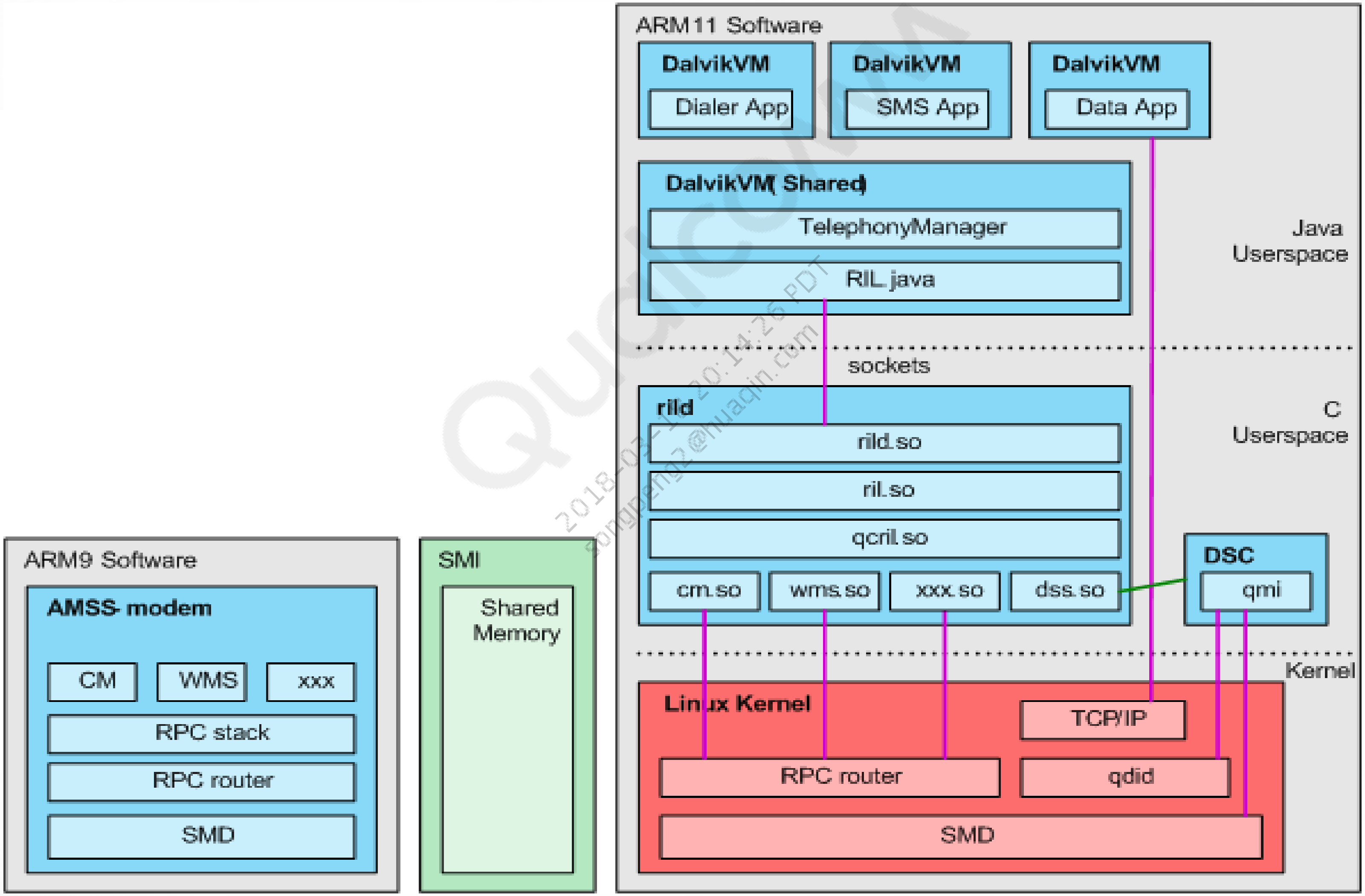
Version	Date	Description
A	Jun 2012	Initial release

Contents

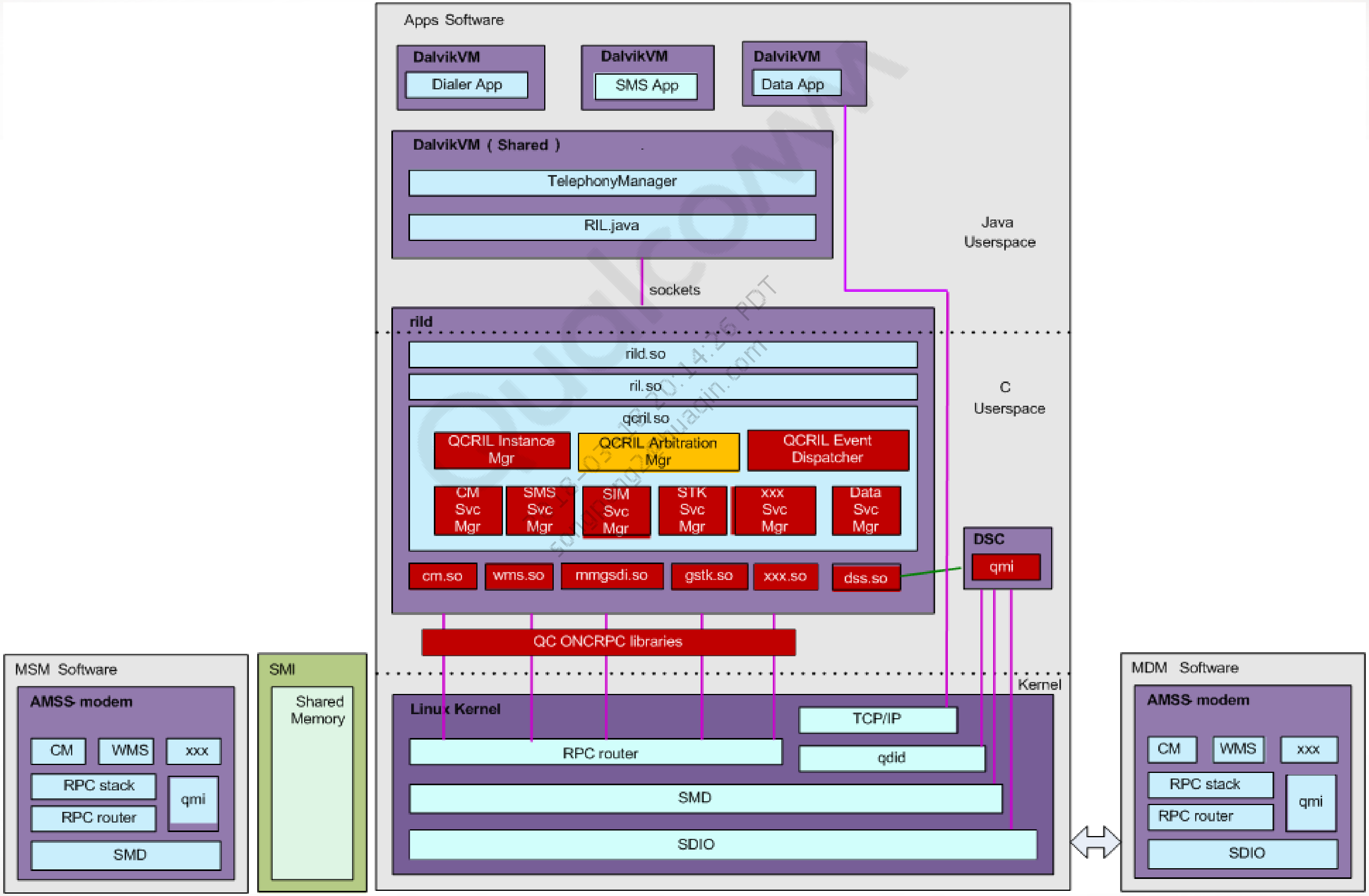
- Android RIL Architecture Evolution
- QCRIL Arbitration Manager
- QCRIL Event Manager
- Android RIL Software Components Interface
- Communication Using RPC
- Android QCRIL Debugging
- Power ON Scenario (for MSM7x27A Chipsets)
- References
- Questions?

Android RIL Architecture Evolution

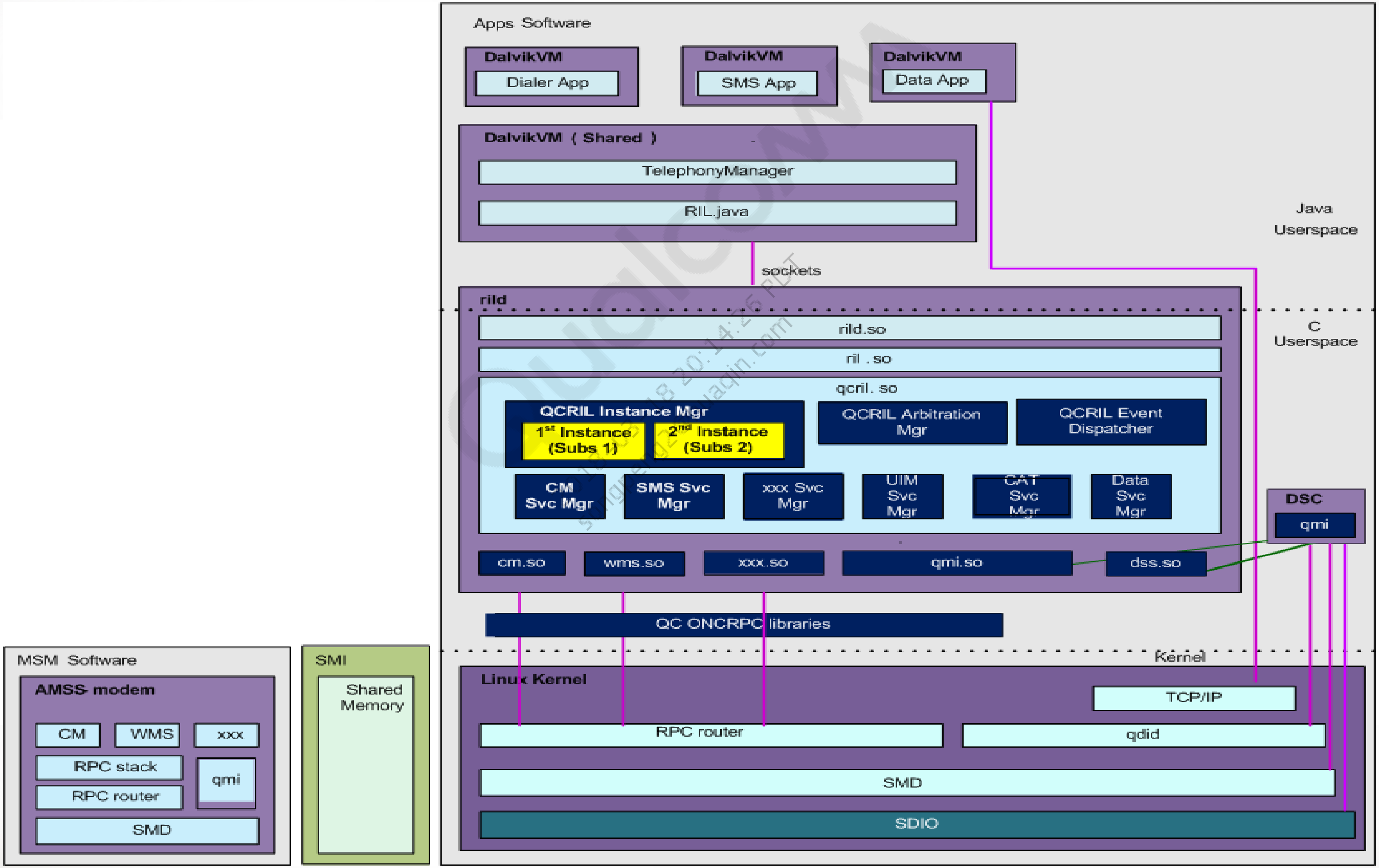
Android RIL Multimode Architecture (Legacy)



Android Fusion RIL Architecture



Android RIL Architecture for DSDS



Android RIL SW Components – Brief

- RIL.Java
  - Java utility for RIL message/socket handling (Google)
  - Communication between RIL.Java and RILD is through commands (messages) over sockets
- RILD.so
  - The daemon (Google)
  - Device/commands/RILD
- RIL.so
  - Utility library for RIL message/socket handling (Google)
  - Device/libs/telephony
  - Communication between RILD and qcril.so is through functions like OnRequest(), OnStateRequest(), supports(), OnCancel(), getVersion(), OnRequestComplete() etc.

Android RIL SW Components – Brief (cont.)

- QCRIL.so
  - Utility library for RIL command handling (Qualcomm)
  - Communication between RILD and baseband (modem) is through RPC and QMI
- cm.so, wms.so, xxxx.so
  - QC remote API libs (Qualcomm)
- QCRIL instance manager
  - Maintains the state/data space and modem configuration for each RIL instance that has a socket connection (session) with Android telephony
  - Each RIL instance is identified by a RIL Instance ID
  - Two RIL instances are created for DSDS, each corresponding to different SIM instance
  - Each RIL instance is used as a dedicated communication channel for modem services requested on the associated SIM

Android RIL SW Components – Brief (cont.)

- QCRIL Arbitration Manager
  - QCRIL performs the arbitration of voice/SMS/NAS/PBM
  - Maintains the voice service arbitration policy for each RIL instance
- QCRIL event dispatcher
  - Dispatches RIL requests and AMSS events to Radio Service Manager (RSM)
- RSMs
  - Almost every task in the modem (e.g. CM, NAS, UIM etc.) has corresponding client module in QCRIL that is termed as RSM of that specific module.
  - RSMs are responsible for handling the interactions with modem(s) for solicited RIL commands and AMSS events and controlling the reporting of response to solicited RIL commands and unsolicited RIL indications originated by AMSS events

QCRIL Arbitration Manager

QCRIL Arbitration Manager

- QCRIL Arbitration Manager is the module that maintains the details of complete system architecture, current system state, functionalities supported etc.
- All RDMs rely upon the QCRIL Arbitration Manager data to get relevant information
- QCRIL_ARB provides different APIs to be used from RSMs to update/retrieve the data stored in ARB context
- Key Information
  - Modem architecture, number of modems, number of slots, number of instances
  - CM Info, SMS Info, PBM Info etc.
  - Preferred network settings for voice and data on each instance
  - Subscription info
  - Radio state, Modem state, Primary/Secondary GW/1X state, voice radio technology

System Properties

- Important system properties over which QCRIL ARB module is dependent:

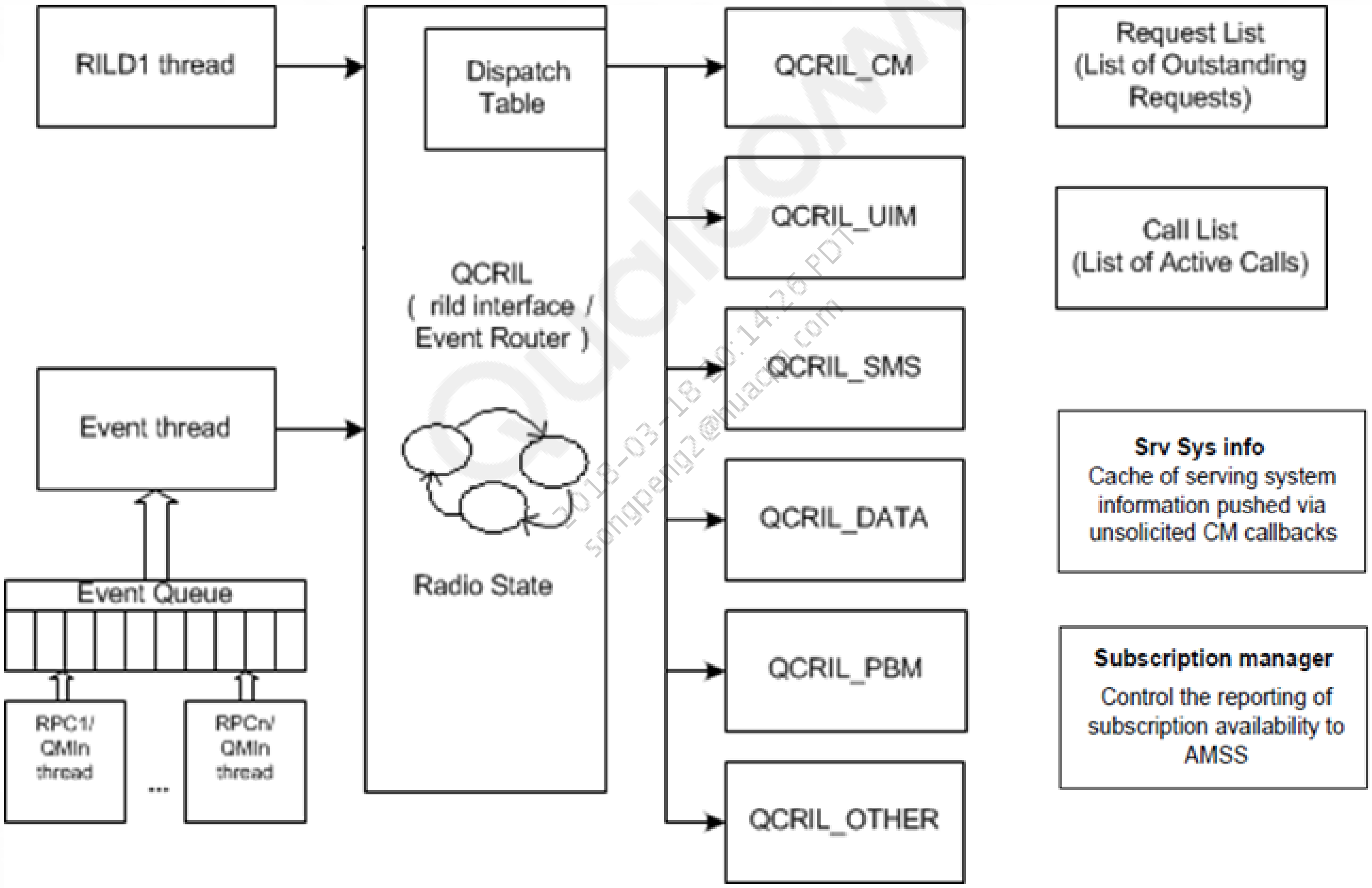
System Property	Description
persist.radio.sma	Indicates split modem architecture
persist.radio.voip_enabled	Indicates VOIP support
persist.radio.sma_voice_3gpp	Indicates split modem's global mode voice preference
persist.dsds.enabled	Indicates whether DSDS is enabled
persist.radio.net_pref	Indicates the network preference
ro.ril.svlte1x	Allows voice + data The default value is true for SVLTE type as per telephony requirement

QCRIL Event Manager

QCRIL Event Manager

- QCRIL event manager is responsible for handling internal and external events
- The token in the event is used as a reference to track and map the sub-events for asynchronous events to/from the modem
- The QCRIL event table maintains the list of events handled, event handler and the radio state in which the event can be handled
  - This lookup table is used by event manager for event handling
- Key functions of QCRIL event manager
  - Queuing
  - De-queuing
  - Dispatching
- Once the event is processed, the unsolicited responses are sent to telephony (if required) based on the state changes (radio/SIM/registration etc.)

QCRIL Event Dispatcher Block Diagram


RILD1 thread
Dispatch Table
QCRIL
(rild interface / Event Router)
Radio State
Event thread
Event Queue
RPC1/ QMIn thread
...
RPCn/ QMIn thread
QCRIL_CM
QCRIL_UIM
QCRIL_SMS
QCRIL_DATA
QCRIL_PBM
QCRIL_OTHER
Request List (List of Outstanding Requests)
Call List (List of Active Calls)
Srv Sys info
Cache of serving system information pushed via unsolicited CM callbacks
Subscription manager
Control the reporting of subscription availability to AMSS

Android RIL Software Components Interface

Interface Between RILD and QCRIL.so

- qcril.so implements the following functions (QCRIL APIs called from RILD module)
  - onRequest(int request, void *data, size_t datalen, RIL_Token t) – dispatches RIL command request and returns immediately
    - qcril must call onRequestComplete() when operation is complete and it can be called within onRequest()
  - onStateRequest() – synchronously returns the radio state
  - supports(int requestCode) – returns 1 if the RIL_REQUEST command is supported
  - onCancel(RIL_Token t)
    - Makes a best attempt to cancel pending RIL request
    - Returns immediately and does not wait for cancellation
    - RILD must call onRequestComplete when done
    - Called from a separate RILD thread from the request thread
  - getVersion()
    - Returns a string of the QCRIL implementation version

Interface Between RILD and QCRIL.so (cont.)

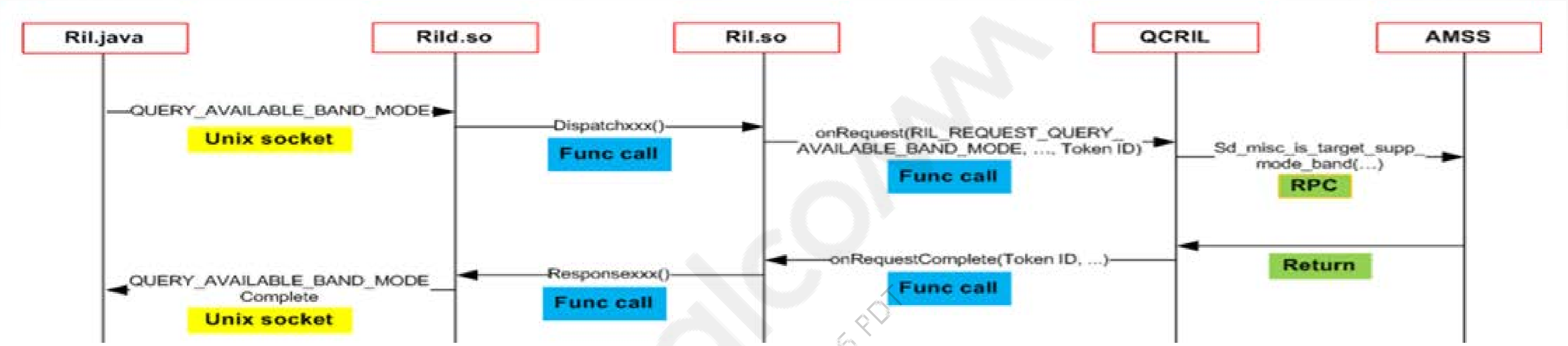
- qcril.so calls the following functions (calls qcril will make into RILD)
  - OnRequestComplete(RIL_Token t, RIL_Errno e, void *response, size_t responselen) is called when:
    - An ril request command is complete
    - A cancellation is complete
  - OnUnsolicitedResponse(int unsolResponse, const void *data, size_t datalen) is called when qcril.so receives a notification that must be propagated
  - RequestTimedCallback(RIL_TimedCallback callback, void *param, const struct timeval *relativeTime) is called to request a callback in the same RILD thread as the RIL request thread.
- qcrild must implement only RIL_Init()
  - RIL_Init() is a structure of RILD exported functions passed as parameters
  - RIL_Init() returns a structure of qcrild exported functions

Interface Between RILD and QCRIL.so (cont.)

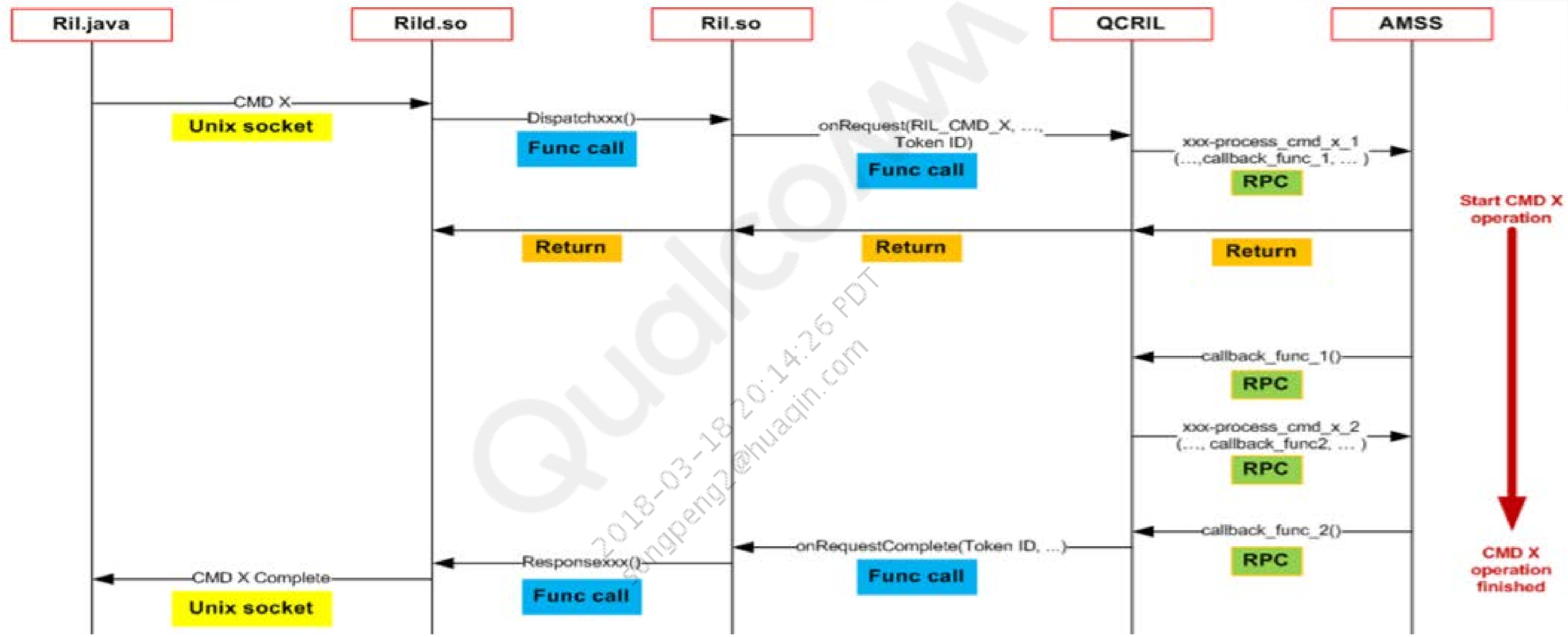
- There are two types of RIL commands
  - Solicited commands
    - Originated by Rild.so such as DIAL and HANGUP
    - Associated with a unique token ID assigned by Ril.java
    - Ril.so calls OnRequest(…., Token ID) to have QCRIL.so to process the RIL command
    - While processing the RIL command, Qcril.so calls AMSS API that either executes the operation and returns or dispatches internal command to AMSS task to schedule the time for the operation and returns
  - Qcril.so calls OnRequestComplete(Token ID, …) when the AMSS operation is completed
- Unsolicited responses
  - Originated by AMSS events such as CALL_STATE_CHANGED and NEW_SMS
  - QCRIL.so calls OnUnsolicitedResponse() to report the notification

Communication Using RPC

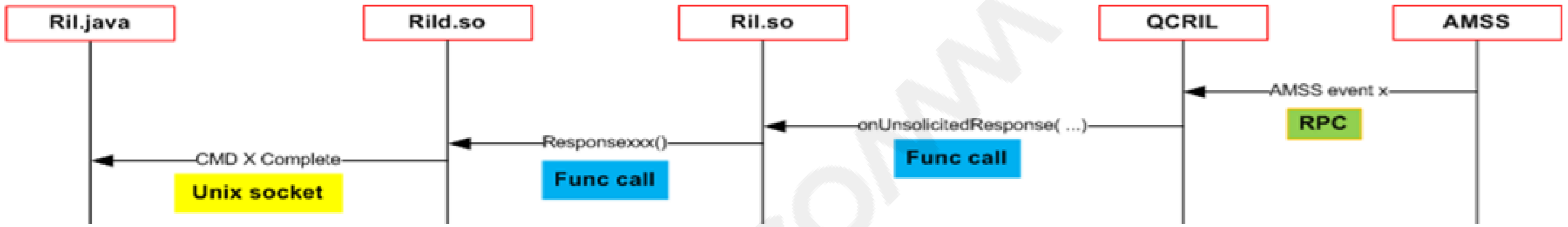
Solicited Command and Synchronous Response


Ril.java
Rild.so
Ril.so
QCRIL
AMSS
QUERY_AVAILABLE_BAND_MODE
Unix socket
Dispatchxxx()
Func call
onRequest(RIL_REQUEST_QUERY_AVAILABLE_BAND_MODE, ..., Token ID)
Func call
Sd_misc_is_target_supp_mode_band(...)
RPC
Return
onRequestComplete(Token ID, ...)
Func call
Responsexxx()
Func call
QUERY_AVAILABLE_BAND_MODE Complete
Unix socket

Solicited Command and Asynchronous Response



Unsolicited Commands



From RPCs to QMI

- Two implementations are available with QCRIL based on:
  - RPCs
  - QMI
- In the latest software, all services are based on QMI
  - RIL Framework in this case : QMI RIL
- In 7x27A and 7x30 4.0 chipsets data and UIM are based on QMI services. All the other services (CM, SMS etc.) are based on RPC
  - RIL Framework in this case: RPC/FUSION RIL
- The “rild.libpath” in system.prop file specifies the type of RIL (QMI/RPC RIL) being used.

Communication Using QMI

- All the QMI messages exchanged between the application and modem processors are ASYNC in nature
- However, the radio service managers in QCRIL can decide if they would like to process a request synchronously or asynchronously
  - Asynchronous
    - The QMI message is sent to modem processor and the control is returned to the radio service manager (caller) immediately
    - The transaction information is returned back
    - Asynchronous message communication can be aborted using this transaction information
  - **Synchronous**
    - The QMI message is sent to modem processor and it waits until the QMI service on modem processor responds back or the timer expires
    - The timer value is decided by the RSM while sending the message
      - Default timeout value = 5 seconds
      - Extended timeout = 30 seconds
        - For example, for client allocation during initialization, get version request
      - Customized timer value
        - For example, for SNI request and for SOFTAP bring up, the timer value is 60 s

Communication Using QMI (cont.)

- Aborting QMI transaction
  - When a QMI message is sent asynchronously, the RSMs receive a transaction ID that can be used for aborting the transaction (if needed)
  - For aborting a transaction, another QMI message is to sent to modem
    - For example, QMI_WDS_ABORT_MSG_ID

Android QCRIL Debugging

Android and Qualcomm USB Driver Installation

- To enable ADB and DIAGTASK to work on a Windows PC, the Qualcomm USB driver and the Android ADB USB driver must be installed on the PC
- When installation of the two drivers is complete, the devices must appear in the device manager as follows:
  - ADB interface
    - Android sooner composite ADB interface
    - Ports (COM and LPT)
  - Qualcomm Android diagnostics (COMxx)
    - COMxx corresponds to the com port at which the DIAGTASK service can be accessed using QPST

Useful Logs

- ADB logs
  - Radio logs capture the telephony and QCRIL logs
    - adb logcat -vtime -b radio > radio.txt
  - Main logs/ADB logs capture the logs of Android application framework and telephony
    - adb logcat -vtime > tee adb.txt
  - Kernel logs capture the Linux kernel level logs
    - adb shell cat /proc/kmsg > tee klog.txt
- To capture QCRIL logs on the ADB, set the system property persist.radio.adb_log_on to 1
- To capture ADB logs in the QXDM, select “Android ADB” in message view configuration or log view configuration

Power ON Scripts/Files w.r.t. QCRIL

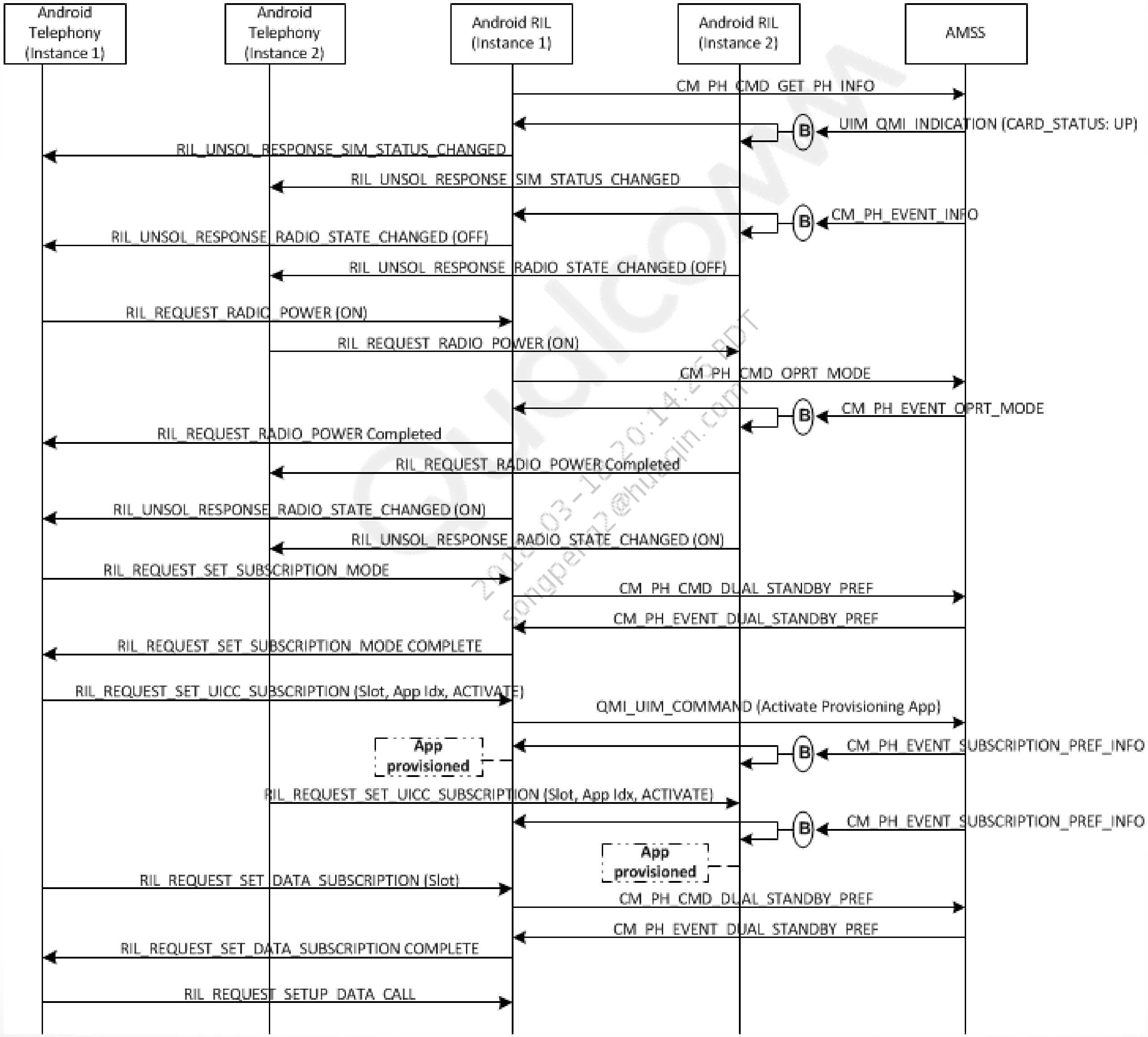
- System.prop – has information based on which the RIL (QMI/RPC) has to be loaded
- Init.qcom.rc – Provides information on RIL daemon, netmgr daemon, QMUX Daemon
- Init.rc – disables the RIL daemon in GB by default except in ICS
- Init.qcom.sh – Shell script to enable the RIL daemon in GB
- Init.qcom.ril.libpath.sh (Applicable only for 7x30) – If modem build ID is 4.0x, this shell script loads the RPC RIL even if the system.prop specifies the RIL to be used is QMI RIL

Power ON Scripts/Files w.r.t. QCRIL (cont.)

- Basic power on sequence
  1. The init process (init.c) during Linux boot-up
     - i. Reads init.qcom.rc to understand the daemons to be loaded
     - ii. Checks init.qcom.sh to see if RIL daemon is enabled
     - iii. Reads “system.prop” file and updates the system property “rild.libpath” to understand what type of RIL has to be loaded
  2. RILD (in rild.c) reads rild.libpath and loads the corresponding binary

Power ON Scenario (for MSM7x27A Chipsets)

Power ON


Android Telephony (Instance 1)
Android Telephony (Instance 2)
Android RIL (Instance 1)
Android RIL (Instance 2)
AMSS
CM_PH_CMD_GET_PH_INFO
UIM_QMI_INDICATION (CARD_STATUS: UP)
B
RIL_UNSOL_RESPONSE_SIM_STATUS_CHANGED
RIL_UNSOL_RESPONSE_SIM_STATUS_CHANGED
CM_PH_EVENT_INFO
B
RIL_UNSOL_RESPONSE_RADIO_STATE_CHANGED (OFF)
RIL_UNSOL_RESPONSE_RADIO_STATE_CHANGED (OFF)
RIL_REQUEST_RADIO_POWER (ON)
RIL_REQUEST_RADIO_POWER (ON)
CM_PH_CMD_OPRT_MODE
CM_PH_EVENT_OPRT_MODE
B
RIL_REQUEST_RADIO_POWER Completed
RIL_REQUEST_RADIO_POWER Completed
RIL_UNSOL_RESPONSE_RADIO_STATE_CHANGED (ON)
RIL_UNSOL_RESPONSE_RADIO_STATE_CHANGED (ON)
RIL_REQUEST_SET_SUBSCRIPTION_MODE
CM_PH_CMD_DUAL_STANDBY_PREF
CM_PH_EVENT_DUAL_STANDBY_PREF
RIL_REQUEST_SET_SUBSCRIPTION_MODE COMPLETE
RIL_REQUEST_SET_UICC_SUBSCRIPTION (Slot, App Idx, ACTIVATE)
QMI_UIM_COMMAND (Activate Provisioning App)
CM_PH_EVENT_SUBSCRIPTION_PREF_INFO
B
App provisioned
RIL_REQUEST_SET_UICC_SUBSCRIPTION (Slot, App Idx, ACTIVATE)
CM_PH_EVENT_SUBSCRIPTION_PREF_INFO
B
App provisioned
RIL_REQUEST_SET_DATA_SUBSCRIPTION (Slot)
CM_PH_CMD_DUAL_STANDBY_PREF
CM_PH_EVENT_DUAL_STANDBY_PREF
RIL_REQUEST_SET_DATA_SUBSCRIPTION COMPLETE
RIL_REQUEST_SETUP_DATA_CALL

Power ON (cont.)

```
//CARD Status Unknown → UP
MSG        [00063/02] Android QCRIL/High     07:58:24.596     qcril.c  02856  RIL <--- UIM_QMI_INDICATION(196610), RID 0, MID 0 --- AMSS
MSG        [00063/02] Android QCRIL/High     07:58:24.598     qcril.c  02842  RIL --- CM_CARD_STATUS_UPDATED(94209), RID 0, MID 0 ---> RIL
MSG        [00063/02] Android QCRIL/High     07:58:24.600             qcril_cm.c  05213  Slot 0 Card status: Unknown --> Up
MSG        [00063/02] Android QCRIL/High     07:58:24.602     qcril.c  02842  RIL --- CM_CARD_STATUS_UPDATED(94209), RID 0, MID 0 ---> RIL
MSG        [00063/02] Android QCRIL/High     07:58:24.602             qcril_cm.c  05213  Slot 1 Card status: Unknown --> Up
MSG        [00063/02] Android QCRIL/High     07:58:24.602             qcril_cm.c  03130  MID 0 Phone capability not known
MSG        [00063/02] Android QCRIL/High     07:58:24.603     qcril.c  01845  UI <--- RIL_UNSOL_RESPONSE_SIM_STATUS_CHANGED (1019) --- RIL [RID 0, Len 0, (null)]
MSG        [00063/02] Android QCRIL/High     07:58:24.605     qcril.c  01845  UI <--- RIL_UNSOL_RESPONSE_SIM_STATUS_CHANGED (1019) --- RIL [RID 1, Len 0, (null)]

//Card status
MSG        [00063/02] Android QCRIL/High     07:58:24.605       qcril_uim_card.c  02401  Index of GW primary prov: 0Xffff
MSG        [00063/02] Android QCRIL/High     07:58:24.605       qcril_uim_card.c  02410  card[0].card_state: 1
MSG        [00063/02] Android QCRIL/High     07:58:24.605       qcril_uim_card.c  02410  card[1].card_state: 1
MSG        [00063/01] Android QCRIL/Medium          07:58:24.605       qcril_uim_card.c  02689   new modem state 0x0, new pri GW sim state 0x1, new pri CDMA sim state 0x1,
new sec GW sim state 0x1 curr sec CDMA sim state 0x1

//Radio Unavailable → Radio OFF
MSG        [00063/02] Android QCRIL/High     07:58:24.605     qcril.c  02856  RIL <--- CM_PH_EVENT_INFO(69644), RID 0, MID 0 --- AMSS
MSG        [00063/02] Android QCRIL/High     07:58:24.606             qcril_cm.c  09730  RID 0 MID: 0, Prev Oprt mode: -1, Oprt mode: 0, Mode pref: -1, GW acq order: -1, Band
pref: 0, Roam pref: 0, Network sel mode: -1, plmn[0]=255, plmn[1]=255, plmn[2]=255, rtre control: 2
MSG        [00063/02] Android QCRIL/High     07:58:24.606             qcril_cm.c  03138  Overall phone capability is known
MSG        [00063/02] Android QCRIL/High     07:58:24.607     qcril.c  02240  RID 0 [CM_PH_EVENT_INFO(69644)] RadioState Radio Unavailable --> Radio Off
MSG        [00063/02] Android QCRIL/High     07:58:24.607     qcril.c  01845  UI <--- RIL_UNSOL_RESPONSE_RADIO_STATE_CHANGED (1000) --- RIL [RID 0, Len 0, (null)]
MSG        [00063/02] Android QCRIL/High     07:58:24.607     qcril.c  02254  RID 1 [CM_PH_EVENT_INFO(69644)] RadioState Radio Unavailable --> Radio Off
MSG        [00063/02] Android QCRIL/High     07:58:24.607     qcril.c  01845  UI <--- RIL_UNSOL_RESPONSE_RADIO_STATE_CHANGED (1000) --- RIL [RID 1, Len 0, (null)]


//Radio Off → Radio ON
MSG        [00063/02] Android QCRIL/High     07:58:31.955     qcril.c  02627  UI --- RIL_REQUEST_RADIO_POWER (23) ---> RIL [RID 0, token id 2, data len 4]
MSG        [00063/02] Android QCRIL/High     07:58:31.957             qcril_cm.c  07260  RID 0 Request Radio On, APM_SIM_NOT_PWDN=0
MSG        [00063/02] Android QCRIL/High     07:58:31.962     qcril.c  02856  RIL <--- CM_PH_EVENT_OPRT_MODE(69632), RID 0, MID 0 --- AMSS
MSG        [00063/02] Android QCRIL/High     07:58:31.963     qcril.c  01759  UI <--- RIL_REQUEST_RADIO_POWER (23) Complete --- RIL [RID 0, Token 2, Success, Len 0 ]

MSG        [00063/02] Android QCRIL/High     07:58:31.963     qcril.c  02217  Sync modem state and SIM state among instances
MSG        [00063/02] Android QCRIL/High     07:58:31.963     qcril.c  02240  RID 0 [CM_PH_EVENT_OPRT_MODE(69632)] RadioState Radio Off --> Radio On
MSG        [00063/02] Android QCRIL/High     07:58:31.963     qcril.c  01845  UI <--- RIL_UNSOL_RESPONSE_RADIO_STATE_CHANGED (1000) --- RIL [RID 0, Len 0, (null)]
MSG        [00063/02] Android QCRIL/High     07:58:31.965     qcril.c  02254  RID 1 [CM_PH_EVENT_OPRT_MODE(69632)] RadioState Radio Off --> Radio On
MSG        [00063/02] Android QCRIL/High     07:58:31.965     qcril.c  01845  UI <--- RIL_UNSOL_RESPONSE_RADIO_STATE_CHANGED (1000) --- RIL [RID 1, Len 0, (null)]
```

Power ON (cont.)

```
MSG        [00063/02] Android QCRIL/High                07:58:34.206               qcril.c  02627  UI --- RIL_REQUEST_SET_SUBSCRIPTION_MODE (116) ---> RIL [RID 0, token id 67, data len 4]
MSG        [00063/02] Android QCRIL/High                07:58:34.207            qcril_cm.c  07442  Subscription mode 2
MSG        [00063/02] Android QCRIL/High                07:58:34.207            qcril_cm.c  07461  Subscription mode 2, already in dual standby - tune away enabled
MSG        [00063/02] Android QCRIL/High      07:58:34.207        qcril.c  01759  UI <--- RIL_REQUEST_SET_SUBSCRIPTION_MODE (116) Complete --- RIL [RID 0, Token 67, Success, Len 0 ]

//Activating the Primary GW subscription
MSG        [00063/02] Android QCRIL/High     07:58:34.743     qcril.c  02627  UI --- RIL_REQUEST_SET_UICC_SUBSCRIPTION (112) ---> RIL [RID 0, token id 69, data len 16]
MSG        [00063/02] Android QCRIL/High     07:58:34.743      qcril_cm.c  07596  RID 0 Activate sub: slot 0 app_index 0
MSG        [00063/02] Android QCRIL/High     07:58:34.750     qcril.c  02842  RIL --- QCRIL_EVT_INTERNAL_MMGSDI_ACTIVATE_SUBS(200714), RID 0, MID 0 ---> RIL
MSG        [00063/02] Android QCRIL/High     07:58:34.750     qcril_uim_card.c  00207  New session state, session_type:0, session_state:1

MSG        [00063/02] Android QCRIL/High     07:58:34.750     qcril.c  02842  RIL --- CM_ACTIVATE_PROVISION_STATUS(94210), RID 0, MID 0 ---> RIL
MSG        [00063/02] Android QCRIL/High     07:58:34.750     qcril_cm.c  05759  RID 0, UIM activate subscription in progress, slot 0, app_index 0, session_type 0

MSG        [00063/01] Android QCRIL/Medium  07:58:34.755   qcril_uim_card.c  02486  qcril_uim_change_prov_session_callback
MSG        [00063/02] Android QCRIL/High     07:58:34.755     qcril_uim_card.c  00207  New session state, session_type:0, session_state:2

MSG        [00063/02] Android QCRIL/High     07:58:34.755     qcril.c  02842  RIL --- CM_ACTIVATE_PROVISION_STATUS(94210), RID 0, MID 0 ---> RIL
MSG        [00063/02] Android QCRIL/High     07:58:34.755    qcril_cm.c  05770  RID 0, UIM activate subscription success, slot 0, app_index 0, session_type 0

MSG      [00063/02] Android QCRIL/High 07:58:34.755 qcril_arb.c  02629  RID 0 olds subs info, state = Not provisioned(0), act_status = 0, slot_id = -1, app_index = -1, session_type = 0,
as_id = 0
MSG      [00063/02] Android QCRIL/High  07:58:34.755 qcril_arb.c  02643  RID 0 new subs info, state = Apps selected(1), act_status = 1, slot_id = 0, app_index = 0, session_type = 0, as_id
= -1
MSG        [00063/02] Android QCRIL/High     07:58:34.755     qcril.c  01759  UI <--- RIL_REQUEST_SET_UICC_SUBSCRIPTION (112) Complete --- RIL [RID 0, Token 69, Success, Len 0 ]



MSG        [00063/02] Android QCRIL/High     07:58:34.757     qcril.c  02856  RIL <--- UIM_QMI_INDICATION(196610), RID 0, MID 0 --- AMSS
MSG        [00063/02] Android QCRIL/High     07:58:34.757       qcril_uim_card.c  01645  GW primary index changed: 0xffff -> 0x0
MSG        [00063/02] Android QCRIL/High     07:58:34.758     qcril.c  01845  UI <--- RIL_UNSOL_RESPONSE_SIM_STATUS_CHANGED (1019) --- RIL [RID 0, Len 0, (null)]
MSG        [00063/02] Android QCRIL/High     07:58:34.758     qcril.c  01845  UI <--- RIL_UNSOL_RESPONSE_SIM_STATUS_CHANGED (1019) --- RIL [RID 1, Len 0, (null)]

//PIN Status Change
MSG        [00063/02] Android QCRIL/High                07:58:34.941               qcril.c  02856  RIL <--- UIM_QMI_INDICATION(196610), RID 0, MID 0 --- AMSS
MSG        [00063/02] Android QCRIL/High                07:58:34.941       qcril_uim_card.c  01802  PIN1 changed: 0x0 -> 0x3
MSG        [00063/02] Android QCRIL/High                07:58:34.941               qcril.c  01845  UI <--- RIL_UNSOL_RESPONSE_SIM_STATUS_CHANGED (1019) --- RIL [RID 0, Len 0, (null)]
MSG        [00063/02] Android QCRIL/High                07:58:34.942               qcril.c  01845  UI <--- RIL_UNSOL_RESPONSE_SIM_STATUS_CHANGED (1019) --- RIL [RID 1, Len 0, (null)]
```

Power ON (cont.)

```
//Card Status
MSG        [00063/02] Android QCRIL/High                07:58:34.943       qcril_uim_card.c  02442  card[0].application[0].pin1_state: 3
MSG        [00063/02] Android QCRIL/High                07:58:34.943       qcril_uim_card.c  02444  card[0].application[0].pin1_num_retries: 3
MSG        [00063/02] Android QCRIL/High                07:58:34.943       qcril_uim_card.c  02446  card[0].application[0].puk1_num_retries: 10

MSG        [00063/02] Android QCRIL/High                07:58:34.943                qcril.c  02856  RIL <--- UIM_QMI_INDICATION(196610), RID 0, MID 0 --- AMSS
MSG        [00063/02] Android QCRIL/High                07:58:34.943       qcril_uim_card.c  01829  PIN2 changed: 0x0 -> 0x1
MSG        [00063/02] Android QCRIL/High                07:58:34.943                qcril.c  01845  UI <--- RIL_UNSOL_RESPONSE_SIM_STATUS_CHANGED (1019) --- RIL [RID 0, Len 0, (null)]
MSG        [00063/02] Android QCRIL/High                07:58:34.945                qcril.c  01845  UI <--- RIL_UNSOL_RESPONSE_SIM_STATUS_CHANGED (1019) --- RIL [RID 1, Len 0, (null)]

//Card Status
MSG        [00063/02] Android QCRIL/High                07:58:34.948       qcril_uim_card.c  02448  card[0].application[0].pin2_state: 1
MSG        [00063/02] Android QCRIL/High                07:58:34.948       qcril_uim_card.c  02450  card[0].application[0].pin2_num_retries: 3
MSG        [00063/02] Android QCRIL/High                07:58:34.948       qcril_uim_card.c  02452  card[0].application[0].puk2_num_retries: 10

MSG        [00063/02] Android QCRIL/High                07:58:35.180                qcril.c  02856  RIL <--- UIM_QMI_INDICATION(196610), RID 0, MID 0 --- AMSS
MSG        [00063/02] Android QCRIL/High                07:58:35.180       qcril_uim_card.c  01740  App state changed: 0x1 -> 0x4
MSG        [00063/02] Android QCRIL/High                07:58:35.180                qcril.c  01845  UI <--- RIL_UNSOL_RESPONSE_SIM_STATUS_CHANGED (1019) --- RIL [RID 0, Len 0, (null)]
MSG        [00063/02] Android QCRIL/High                07:58:35.180                qcril.c  01845  UI <--- RIL_UNSOL_RESPONSE_SIM_STATUS_CHANGED (1019) --- RIL [RID 1, Len 0, (null)]

//Card Status
MSG        [00063/02] Android QCRIL/High                07:58:35.180       qcril_uim_card.c  02423  card[0].application[0].app_state: 4
MSG        [00063/02] Android QCRIL/High                07:58:35.181       qcril_uim_card.c  02425  card[0].application[0].perso_state: 2

//Activate Application on Slot 1
MSG        [00063/02] Android QCRIL/High                07:58:35.693                qcril.c  02627  UI --- RIL_REQUEST_SET_UICC_SUBSCRIPTION (112) ---> RIL [RID 1, token id 79, data len 16]
MSG        [00063/02] Android QCRIL/High                07:58:35.693             qcril_cm.c  07596  RID 1 Activate sub: slot 1 app_index 0
MSG        [00063/02] Android QCRIL/High                07:58:35.695                qcril.c  02842  RIL --- QCRIL_EVT_INTERNAL_MMGSDI_ACTIVATE_SUBS(200714), RID 1, MID 0 ---> RIL
MSG        [00063/02] Android QCRIL/High                07:58:35.696       qcril_uim_card.c  00207  New session state, session_type:2, session_state:1
MSG        [00063/02] Android QCRIL/High                07:58:35.696                qcril.c  02842  RIL --- CM_ACTIVATE_PROVISION_STATUS(94210), RID 1, MID 0 ---> RIL
MSG        [00063/02] Android QCRIL/High                07:58:35.696             qcril_cm.c  05759  RID 1, UIM activate subscription in progress, slot 1, app_index 0, session_type 2

//Received App state provisioning information for Slot 0 (in Parallel) – when waiting for provisioning information on Slot 1
MSG        [00063/02] Android QCRIL/High    07:58:36.012               qcril.c  02856  RIL <--- UIM_QMI_INDICATION(196610), RID 0, MID 0 --- AMSS
MSG        [00063/02] Android QCRIL/High    07:58:36.013      qcril_uim_card.c  01740  App state changed: 0x4 -> 0x7

//Card Status
MSG        [00063/02] Android QCRIL/High                07:58:36.016       qcril_uim_card.c  02423  card[0].application[0].app_state: 7
```

Power ON (cont.)

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//Received Provisioning Session Response for Slot 1 from modem
MSG        [00065/02] Linux Data/High        07:58:36.013         qmi_uim_srvc.c  04227  qmi_uim_srvc_async_cb: msg_id = 0x38 (QMI_UIM_CHANGE_PROVISIONING_SESSION)
MSG        [00063/02] Android QCRIL/High 07:58:36.013       qcril_uim_card.c  00207  New session state, session_type:2, session_state:2
MSG        [00063/02] Android QCRIL/High 07:58:36.013                qcril.c  02842  RIL --- CM_ACTIVATE_PROVISION_STATUS(94210), RID 1, MID 0 ---> RIL
MSG        [00063/02] Android QCRIL/High 07:58:36.013             qcril_cm.c  05770  RID 1, UIM activate subscription success, slot 1, app_index 0, session_type 2

MSG      [00063/02] Android QCRIL/High  07:58:36.013  qcril_arb.c  02629 RID 1 olds subs info, state = Not provisioned(0),act_status = 0, slot_id = -1, app_index = -1, session_type = 0, as_id
= 0
MSG      [00063/02] Android QCRIL/High 07:58:36.015  qcril_arb.c  02643  RID 1 new subs info, state = Apps selected(1), act_status = 1, slot_id = 1, app_index = 0, session_type = 2, as_id = -1

MSG        [00063/02] Android QCRIL/High 07:58:36.015   qcril.c  01759  UI <--- RIL_REQUEST_SET_UICC_SUBSCRIPTION (112) Complete --- RIL [RID 1, Token 79, Success, Len 0 ]

MSG        [00063/02] Android QCRIL/High                07:58:36.017                qcril.c  02856  RIL <--- UIM_QMI_INDICATION(196610), RID 0, MID 0 --- AMSS
MSG        [00063/02] Android QCRIL/High                07:58:36.017       qcril_uim_card.c  01661  GW secondary index changed: 0xffff -> 0x100

MSG        [00063/02] Android QCRIL/High                07:58:36.242                qcril.c  02856  RIL <--- UIM_QMI_INDICATION(196610), RID 0, MID 0 --- AMSS
MSG        [00063/02] Android QCRIL/High                07:58:36.243       qcril_uim_card.c  01802  PIN1 changed: 0x0 -> 0x3
MSG        [00063/02] Android QCRIL/High                07:58:36.243                qcril.c  01845  UI <--- RIL_UNSOL_RESPONSE_SIM_STATUS_CHANGED (1019) --- RIL [RID 0, Len 0, (null)]
MSG        [00063/02] Android QCRIL/High                07:58:36.245                qcril.c  01845  UI <--- RIL_UNSOL_RESPONSE_SIM_STATUS_CHANGED (1019) --- RIL [RID 1, Len 0, (null)]

//Card Status
MSG        [00063/02] Android QCRIL/High                07:58:36.245       qcril_uim_card.c  02442  card[1].application[0].pin1_state: 3
MSG        [00063/02] Android QCRIL/High                07:58:36.245       qcril_uim_card.c  02444  card[1].application[0].pin1_num_retries: 10
MSG        [00063/02] Android QCRIL/High                07:58:36.245       qcril_uim_card.c  02446  card[1].application[0].puk1_num_retries: 10

MSG        [00063/02] Android QCRIL/High                07:58:36.245                qcril.c  02856  RIL <--- UIM_QMI_INDICATION(196610), RID 0, MID 0 --- AMSS
MSG        [00063/02] Android QCRIL/High                07:58:36.245       qcril_uim_card.c  01829  PIN2 changed: 0x0 -> 0x1
MSG        [00063/02] Android QCRIL/High                07:58:36.245                qcril.c  01845  UI <--- RIL_UNSOL_RESPONSE_SIM_STATUS_CHANGED (1019) --- RIL [RID 0, Len 0, (null)]
MSG        [00063/02] Android QCRIL/High                07:58:36.258                qcril.c  01845  UI <--- RIL_UNSOL_RESPONSE_SIM_STATUS_CHANGED (1019) --- RIL [RID 1, Len 0, (null)]

//Card Status
MSG        [00063/02] Android QCRIL/High                07:58:36.261       qcril_uim_card.c  02448  card[1].application[0].pin2_state: 1
MSG        [00063/02] Android QCRIL/High                07:58:36.261       qcril_uim_card.c  02450  card[1].application[0].pin2_num_retries: 10
MSG        [00063/02] Android QCRIL/High                07:58:36.261       qcril_uim_card.c  02452  card[1].application[0].puk2_num_retries: 10

//Subscription Preference Info for Slot 0
MSG        [00063/02] Android QCRIL/High                07:58:36.288                qcril.c  02856  RIL <--- CM_PH_EVENT_SUBSCRIPTION_PREF_INFO(69672), RID 0, MID 0 --- AMSS
MSG        [00063/02] Android QCRIL/High                07:58:36.290            qcril_arb.c  00536  RID 0, ma=DSDS(3), restored=1, query net_pref=WCDMA only(2)
MSG        [00063/02] Android QCRIL/High                07:58:36.290             qcril_cm.c  03924  Sync network preference from modem
MSG  [00063/02] Android QCRIL/High 07:58:36.297 qcril_arb.c  02696  RID 0 new subs info, state = Provisioned(2), act_status = 1, slot_id = 0, app_index = 0, session_type = 0, as_id = 0
MSG        [00063/02] Android QCRIL/High                07:58:36.297                qcril.c  01845  UI <--- RIL_UNSOL_UICC_SUBSCRIPTION_STATUS_CHANGED (1041) --- RIL [RID 0, Len 4, (null)]
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Power ON (cont.)

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MSG        [00063/02] Android QCRIL/High            07:58:36.433              qcril.c  02856  RIL <--- CM_PH_EVENT_SUBSCRIPTION_AVAILABLE(69647), RID 0, MID 0 --- AMSS
MSG        [00063/02] Android QCRIL/High            07:58:36.435           qcril_cm.c  10810  gw_subscription_available is available,  sim_state = 1
MSG        [00063/01] Android QCRIL/Medium          07:58:36.435      qcril_reqlist.c  00331  [RID 1] Not found ReqList entry waiting for CM_PH_EVENT_SUBSCRIPTION_AVAILABLE (69647)
MSG        [00063/02] Android QCRIL/High            07:58:36.435           qcril_cm.c  00502  Ignore CM_PH_EVENT_SUBSCRIPTION_AVAILABLE(69647)

//Set the Data Subscription – The request goes on Slot 0
MSG        [00063/02] Android QCRIL/High            07:58:36.580              qcril.c  02627  UI --- RIL_REQUEST_SET_DATA_SUBSCRIPTION (113) ---> RIL [RID 0, token id 106, data len 0]
//Though AMSS gives CM_PH_EVENT_DUAL_STANDBY_PREF for both slots, the CM event on the second slot is ignored (as there is no SET_DATA_SUBSCRIPTION on slot 1)
MSG        [00063/02] Android QCRIL/High            07:58:36.592              qcril.c  02856  RIL <--- CM_PH_EVENT_DUAL_STANDBY_PREF(69671), RID 0, MID 0 --- AMSS
MSG        [00063/02] Android QCRIL/High            07:58:36.592           qcril_cm.c  10558  DV pref == 0, DD pref = 0, Standby Pref  =2
MSG        [00063/02] Android QCRIL/High            07:58:36.592              qcril.c  01759  UI <--- RIL_REQUEST_SET_DATA_SUBSCRIPTION (113) Complete --- RIL [RID 0, Token 106, Success,
Len 0 ]

//APP state on Slot 2 changed
MSG        [00063/02] Android QCRIL/High            07:58:36.651              qcril.c  02856  RIL <--- UIM_QMI_INDICATION(196610), RID 0, MID 0 --- AMSS
MSG        [00063/02] Android QCRIL/High            07:58:36.652      qcril_uim_card.c  01740  App state changed: 0x1 -> 0x4
MSG        [00063/02] Android QCRIL/High            07:58:36.652              qcril.c  01845  UI <--- RIL_UNSOL_RESPONSE_SIM_STATUS_CHANGED (1019) --- RIL [RID 0, Len 0, (null)]
MSG        [00063/02] Android QCRIL/High            07:58:36.652              qcril.c  01845  UI <--- RIL_UNSOL_RESPONSE_SIM_STATUS_CHANGED (1019) --- RIL [RID 1, Len 0, (null)]

//Card Status
MSG        [00063/02] Android QCRIL/High            07:58:36.652      qcril_uim_card.c  02423  card[1].application[0].app_state: 4
MSG        [00063/02] Android QCRIL/High            07:58:36.652      qcril_uim_card.c  02425  card[1].application[0].perso_state: 2

MSG        [00063/02] Android QCRIL/High            07:58:38.325              qcril.c  02856  RIL <--- UIM_QMI_INDICATION(196610), RID 0, MID 0 --- AMSS
MSG        [00063/02] Android QCRIL/High            07:58:38.326      qcril_uim_card.c  01740  App state changed: 0x4 -> 0x7
MSG        [00063/02] Android QCRIL/High            07:58:38.327              qcril.c  01845  UI <--- RIL_UNSOL_RESPONSE_SIM_STATUS_CHANGED (1019) --- RIL [RID 0, Len 0, (null)]
MSG        [00063/02] Android QCRIL/High            07:58:38.327              qcril.c  01845  UI <--- RIL_UNSOL_RESPONSE_SIM_STATUS_CHANGED (1019) --- RIL [RID 1, Len 0, (null)]
MSG        [00063/02] Android QCRIL/High            07:58:38.328      qcril_uim_card.c  02423  card[1].application[0].app_state: 7

MSG        [00063/02] Android QCRIL/High            07:58:40.471              qcril.c  02856  RIL <--- CM_PH_EVENT_SUBSCRIPTION_PREF_INFO(69672), RID 1, MID 0 --- AMSS
MSG        [00063/02] Android QCRIL/High            07:58:40.472           qcril_cm.c  03924  Sync network preference from modem
MSG        [00063/02] Android QCRIL/High            07:58:40.481          qcril_arb.c  02696  RID 1 new subs info, state = Provisioned(2), act_status = 1, slot_id = 1, app_index = 0,
session_type = 2, as_id = 1
MSG        [00063/02] Android QCRIL/High            07:58:40.481              qcril.c  01845  UI <--- RIL_UNSOL_UICC_SUBSCRIPTION_STATUS_CHANGED (1041) --- RIL [RID 1, Len 4, (null)]

MSG        [00063/02] Android QCRIL/High            08:50:37.031              qcril.c  02627  UI --- RIL_REQUEST_SETUP_DATA_CALL (27) ---> RIL [RID 0, token id 363, data len 28]

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References

Ref.	Document	
Qualcomm		
Q1	*Application Note: Software Glossary for Customers*	CL93-V3077-1
Q2	*Presentation: QCRIL Impact for DSDS*	80-NB239-1
Resources		
R1	*Android Telephony APIs*	http://developer.android.com/reference/packages.html

Questions?

https://support.cdmatech.com