ATTACHMENT E.

- USER MANUAL -

RAS1041 Operation Manual

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Preface

Purpose of this manual

This document provides detailed descriptions for operating RAS Radio Access Station (Radio Access Station, hereafter RAS) used in Mobile WiMAX (Wibro-Wireless Broadband Service in Korea) System.

Hereafter we will call RAS1041 system ‘RAS’ or ‘RAS1000’ for the sake of convenience unless there’s a specific need for distinction.

Manuals are available on RAS1000 specific to the subject. Refer to the following documents for detailed information on system management or operation.

- RAS1000 System Description
- RAS1000 Installation Manual

Changes & Updates

SeAH Networks keeps the manual updated so the document coincides with the changes made to the system. There, however, may be minor discrepancies resulting from the process of system upgrade or error correction. If there is any confusion due to the system change or error correction, contact the address provided in the “Contact Information” section for the accurate information.

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Contact Information

Contact us through the following contact channel to find out more detailed information on our products.

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Legend of Signs

Notes

Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the publication.

Caution

Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

FLYVO

FLYVO

FLYVO, a compound word of Fly + Voyage, is the Mobile WiMAX brand name of SeAH Networks.

System Overview

RAS1041 system is the system base station of Mobile WiMAX which supports Base band call processing, ACR interoperability and interface, RF signal processing over the air from the MS(Mobile Station) in a single unit.

RAS1041 is a base station that supports system profile mp05 (Formerly 3A: 2.5GHz/10MHz) of WiMAX Forum.

RAS1041 was designed to support 1FA/Omni service within a building.

RAS1041 system supports the IEEE 802.16e-2005 standard, WiMAX Forum NWG(Network Working Group) standard, and Telcodia & NEMA standards.

Notes

Changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Caution

In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, it must also have a minimum distance of 200 cm from the body during normal operation.

RAS1041 Overview

RAS1041 is a single indoor type system that can load 1FA/Omni Mobile WiMAX Channel in a single building and process hardware such as Network Interface, Digital, and RF. RAS1041 is light and compact in size for simple installation within a building. Patch Antenna for MIMO Service is placed at the front cover of RAS1041 and RF emits 200mW + 200mW.

RAS1041 was designed not for units but for a single building and used dependable equipments to secure Mobile WiMAX service without any system replacement.

RAS1041 is designed to utilize 1FA/Omni Service and provides easy indoor-type network configuration, increased capacity and affordable price range to provide basic network synchronization function.

[Figure 1 RAS1000 System]

1) RAS1041 supports the following standards and configuration.

- Supports IEEE 802.16e-2005 Cor2/D3 standard
- Has NWG system profile C structure of WiMAX Forum and supports R6 standard interface including GRE as interface between ACR and RAS
- Supports WiMAX PHY/MAC Wave 1 and MIMO (2Tx/2Rx) feature of Wave 2
- Provides filtering function to eliminate noise and small Power Amplifier to emit (200m) Watt per channel
- Has configuration structure to support maximum of 1FA/Omni
- Supports RF Band 2.496~2.690GHz and 10MHz channel bandwidth

RF Band class

Profile ID put into groups at the WiMAX Forum and was defined as band class. Band class 1 include profile ID 1.A & 1.B, Band class 2 include Profile ID 2.A, 2.B, 2.C, Band class 3 include 3.A. Refer to R1.0 Certification Profile document of WiMAX Forum for reference.

2) Main features of RAS1041 are as follows:

- Call Access Control: MS network access leads to communication between the RAS system, WiMAX system and Core Network through control signal for subscriber identification process then authorizes MS access before connecting the MS to the network.
- System Synchronization: Multiple base stations operating in adjacent locations require synchronization to the reference time and frequency to avoid interference and support handover. RAS synchronizes the system time and frequency according to the time provided by the GPS.
- Baseband Signal Processing: Provides Coding/Decoding and Modulation/Demodulation for wireless transmission of traffic data and control signal.
- Network Connection Function: Provides ACR connection function for data transmission and control signal to ACR.
- QoS Support: Provides functions necessary to maintain quality required to support uninterrupted service.
- Operation & Maintenance: Supports system operation and maintenance functions. RAS operation environment and operational characteristics can remotely be monitored via EMS since RAS administrators are working in remote locations.

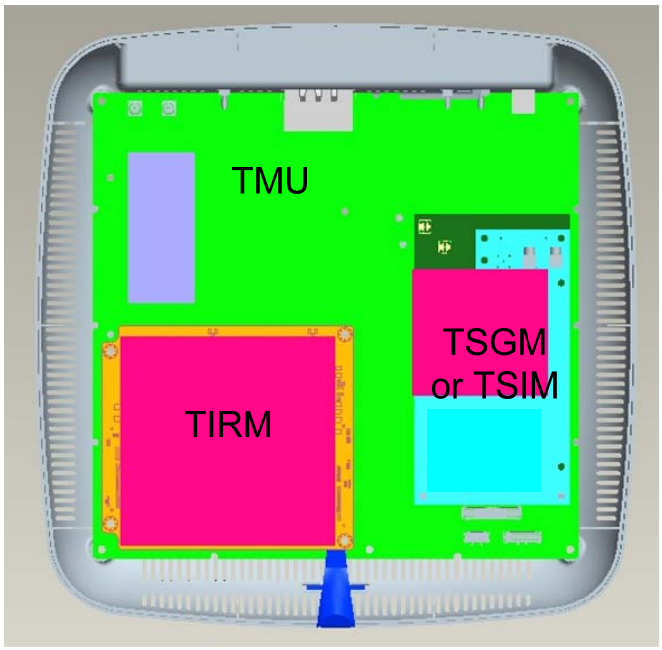
Mobile WiMAX Wave 2 Support

RAS1041 supports Mobile WiMAX Wave 2 Feature including MIMO.

RAS1000 Composition

RAS1041 is a single small/light type that supports Base band call processing, ACR interoperability and interface, RF signal processing over the air from the Mobile Station.Connection with antenna and ACR is possible through the I/O connector located at the lower bottom of the equipment. TSGM and TIRM resides as a daughter module within TMU and is connected via connector.

RAS1041 internal composition diagram is shown in Figure 2.



[Figure 2 RAS1000 Internal Composition Diagram]

(Note: Capital letter 'T' in front of every word implies RAS1041)

Item		Function
TMU (Main Unit)		• Provides WiMAX PHY/MAC modem function • Provides WiMAX 1 Carrier • Operates overall RAS system • Routing interface function to support R6 interface • ACR-RAS connection interface function and provides Fast Ethernet or Gigabit Ethernet Interface • Provides indoor RAS or outdoor IP based interface • Monitors RAS1041 operation and status and alerts error of each unit and module
Selective	**TSGM (Synchronization GPS Module)**	• Provides GPS Receiver/Clock Distributor that allocates and receives GPS signals • 24 Hour Hold-over time function • Performs IEEE1588 Master function
	TSIM (Synchronization IEEE1588 Module)	• Provides TSGM to additional RAS1041 expansion at the Multi-cell Application
TIRM (Indoor Radio Unit)		• Transmits baseband signal Up-conversion and Tx RF signal • Down-conversion of received RX IF signal and baseband signal • Modifies received frequency • Tx/Rx amplifying function • Amplifies Tx/Rx Low Noise signal • Controls Tx/Rx signal emission • Emits 200mWatts at both ANT0 & ANT1 port respectively • Tx/Rx signal filtering function

[**Table** 1 **RAS1041 Composition Description]**

RAS1041 System Specification

RAS1041 System Specifications are as follows.

Parameters		Value	Comments
General	Operating Frequency	2.496~2.690GHz	
	Channel Bandwidth	10 MHz	
	Output Power Max	200mW/Branch	@ANT port
	RF Configuration	2Tx / 2Rx	
	Numbers of TX/RX channel	2 Ports	SMA-Type Female
	Frequency Stability	0.02ppm	
	Frequency Step	250KHz	Channel raster
	ALC Range	10dB	
	Maximum input signal	-45dBm	
	Output Power Dynamic Range	30dB/1dB step	
	RX Sensitivity	-109.9dBm	@QPSK 1/2 CTC, 10MHz, AWGN, UL AMC, WiMAX RCT2.0
	Dimensions (W x H x D, mm)	270 x 270 x 87.9	
	Weight (kg)	<3Kg	Excluding Installation Bracket type
	Power Input	90~260VAC to 12VDC	External AC/DC Adaptor
		12VDC	Option
	Power Consumptions	57 Watts (Max), 50Watts (Avg)	
	Rack type	Enclosure	
	Max Capacity	1-channel	e.g.) 1FA/Omni

	Cooling	Natural convection cooling	
	ANT. Tech.	MIMO	
		SIMO/SISO	Supporting MRC in case of SIMO
	Backhaul Interface Media	10/100/1000BASE-T	
Environment	Installation Site	Indoor	Wall or Ceiling Mounting
	Operating Temperature	0 ~ + 50C°	
	Storage Temperature	- 40 ~ + 70C°	
	Operating Humidity	+10% ~ +95 %	
	Acoustic Noise	45 dBA	
Standard Compliance	Spectral Emission Mask	FCC and WiMAX Forum	
	Seismic Performance	GR-487 Core	Zone3 default,Zone4 optional
	Random Vibration	GR-487 Core	
	Sinusoidal Vibration	GR-487 Core	
	Shock	GR-487 Core	
	EMI	Class A for KN22 (EN 55022, CISPR22)	
	EMC	Class B	

[Table 2 RAS1041 System Specifications]

RAS Initial Configuration

FLYVO RAS1041 system, by default, is remotely managed by using the EMS system. For detailed description, refer to EMS Operation manual.

This document provides explanations not only for operations instructions using the EMS system but also for basic operations instructions using CLI(Command Line Interface) for various status-checking and debugging required at the time of initial RAS1041 system configuration or when needed.

Since TMU is the unit responsible for main control functions, this document also provides basic operations instruction concerning TMU.

System Operation

Checking Operation Status

CLI Start & Telnet Access

CLI Start

To use CLI command, enter the CLI start command “cliMain” from the RMP Console and switch to CLI mode by entering USER ID and PASSWORD (rmp/password).

When switched to CLI mode, CLI prompt appears in RMP console.

RMP Console

```
[BBP(0) ==>RMP]>cliMain

  USER ID :
  PASSWORD :

RMP_CLI>
RMP_CLI>
```

Telnet Access

Access Telnet to RMP console then enter USER ID and PASSWORD(rmp/password) and change to CLI mode.

RMP Console

```
User Access Verification
 USER ID  :
 PASSWORD :

Welcome to the Flyvo System
RMP_CLI>
```

Checking RAS Operation Status

Card Status

To check the working status of each module constituting RAS, enter “show card sts” from EMS or RMP console, and access the configuration information and working status of each module.

```
RMP_CLI>show card sts
CARD INFO  STATUS
 ..................
     RMP      NOR
     BBP 0    NOR
     TRP 0    NOR
     PAP 0    NOR
     PAP 1    NOR
     GPS      NOR

 RESULT : OK
 COMPLETED
```

RAS DL/UL Information Verification

Information on RAS DL/UL can be found via EMS or through “show dl/ul info” of RMP console. DL/UL information on FA/Sec is also verifiable.

```
RMP_CLI>show dl info
LOC : FA00 SECT00
-------------------------------------------------
 CCC                              :    2
 BS EIRP                           :   55 dBm
 TTG                              :   296 PSs
 RTG                              :   168 PSs
 EIRxP                            :   -88 dBm
 Frequency                         : 2550000 khz
 BSID                             : 00:00:00:01:00:40(OP:0 NSP:0 ACR:1
RAS:4 FA:0 SECT:0)
 Mac Version                       :    6
 HO type Support                    :    1
 HO Add_Threshold                   :    3 dB
 HO Del_Threshold                   :    3 dB
 Default RSSI and CINR Avg Parameter  :  0x0
 ASR slot length and switching period :  0x25
 Paging Group Id                   :  0,0,0,0
 DL AMC Allocated Physical Bands     :  0x00 00 00 ff ff ff
```

```
 Hysteresis Magin                  :    0 dB
 Time-trigger Duration             :   100 ms
 Default HO RSSI & CINR Avg Parameter :  0x2255
 maximum Retransmission            :    3
 TRIGGER INFO
 ID TYPE FUNCTION ACTION VALUE DURATION  EQUIP
 00  0x0     0x1    0x2  0x06   0x64    0x1
 01  0x0     0x0    0x0  0x00   0x00    0x0
 02  0x0     0x0    0x0  0x00   0x00    0x0
 03  0x0     0x0    0x0  0x00   0x00    0x0
 04  0x0     0x0    0x0  0x00   0x00    0x0
 05  0x0     0x0    0x0  0x00   0x00    0x0
 06  0x0     0x0    0x0  0x00   0x00    0x0
 07  0x0     0x0    0x0  0x00   0x00    0x0
 08  0x0     0x0    0x0  0x00   0x00    0x0
 09  0x0     0x0    0x0  0x00   0x00    0x0
 10  0x0     0x0    0x0  0x00   0x00    0x0
 11  0x0     0x0    0x0  0x00   0x00    0x0

 RESULT : OK
 COMPLETED

RMP_CLI>show ul info
 LOC : FA00 SECT00
-------------------------------------------------
 CCC                                : 1
 Contention-based Reservation Timeout    : 10
 HO_ranging_start                    : 1
 HO_ranging_end                      : 4
 Initial Ranging Backoff Start         : 1
 Initial Ranging Backoff End           : 4
 Bandwidth Request Backoff Start        : 1
 Bandwidth Request Backoff End          : 4
 Size of CQICH_ID Field                : 7
 Normalized C/N Override2              : 0x00 00 06 01 50 40 00 06
 Initial Ranging Codes                 : 4
 Periodic Ranging Codes                : 4
 Bandwidth Request Codes               : 16
 Periodic Ranging Backoff Start         : 1
 Periodic Ranging Backoff End           : 4
 Start of Ranging Codes Group           : 0
 Permutation Base                      : 20
 UL Allocated Subchannels Bitmap        : 0x00 00 00 00 07 ff ff ff ff
 Band AMC Allocation Threshold          :    3 dB
 Band AMC Release Threshold             :    6 dB
 Band AMC Allocation Timer              :   20 frames
 Band AMC Release Timer                 :   20 frames
 Band Status Reporting MAX Period       :  128 frames
 Band AMC Retry Timer                   :  128 frames
 Band AMC entry Average CINR            :   19 dB
 H-ARQ ACK Delay DL Burst               :    1 frames
 CQICH Band AMC Transition Delay        :   20 frames
 UL AMC Allocated physical bands bitmap  : 0x00 00 00 ff ff ff
 Use CQICH Indication flag              :    6
 Handover Raning Codes                  :    8
 initial Ranging Interval               :    4 frames
```

```
 Tx Power Report                      : 0x08 30 83
 HARQ ACk Region                      : 0x283f
 Normalized C/N Channel Sounding        : 0x64 01 2c
 Relative Power Offset For UL HARQ burst : 0xa
 Relative Power Offset for UL Burst Containing MAC Management Message :
0xe8
 Maximum Retransmission               : 3
 Fast Feedback Region                 : 0x00000c0c70
 Ranging Region                      :
0x00000000000000000000000000008300002000434

 RESULT : OK
 COMPLETED
```

Checking RAS Link Status

To check on the RAS link status, enter “show link sts” from EMS or RMP console and check the number of RAS-ACR links and working status, number of Ethernet links and operational status, ACR working status and etc.

```
RMP_CLI>show link sts
 ACR   LNK1   :   UP (Copper)
 Daisy-chain SFP: DOWN
 ACR Status   :   NOR

 RESULT : OK
COMPLETED
```

Checking RAS RF Status

Information on RAS RF can be found via EMS or through “show rf status” of RMP console.

```
RMP_CLI>show rf status
 BBPID[0]
DL Throughput:    0
UL Throughput:    0
Per         :    0

 RESULT : OK
 COMPLETED
```

Checking RAS S/W Information

With RAS S/W information inquiry, information can be retrieved on the S/W that RMP downloaded from FTP/TFTP server through EMS or CLI which is then stored in the flash memory.

Information on RAS S/W can be found on RMP Console via “show sw version” in each individual board.

```
RMP_CLI>show sw version
 bbp
 fallback
 pld
 rmp
 ru
```

ex> BBP S/W Information

```
RMP_CLI>show sw version bbp
 BBPID[0]
Software version : 3.6.1
(DCCU2 type(10))
Firmware version : 0.0.0
(DCCU1 type(0))
CPLD    version : 1.2.4
(DCCU2 type(10))
DCCU PHY   version : 0.0.0.0

 RESULT : OK
 COMPLETED
```

ex> Fallback S/W Information

```
RMP_CLI>show sw version fallback
          FallBack_Image_Name            version
        /tffs0/rmp-rlib.backup             3.6.1
        /tffs0/RASConf.backup
        /tffs0/bbp-rbpb.backup
        /tffs0/trp-rtcb.backup
        /tffs0/rep-recb.backup
        /tffs0/rpp-rpcb.backup
        /tffs0/nip-rncb.backup
        /tffs0/gpp-rgcb.backup
        /tffs0/rmp-oamb.backup             3.6.0
```

```
        /tffs0/rmp-rccb.backup              3.6.0
          /tffs0/rmp-os.backup              3.6.1
        /tffs0/bop-rbcb.backup
        /tffs0/dtp-rdcb.backup

 RESULT : OK
 COMPLETED
```

ex> PLD Information

```
RMP_CLI>show sw version pld
        PLD INFO
        Version : 0.10.3
        RelYear : 1970
        RelMonth: 0
        RelDay  : 1
        RelHour : 0
        RelMin  : 0

RESULT : OK
COMPLETED
```

ex> RMP S/W Information

```
RMP_CLI>show sw version rmp
Block Type         size         blkname       LD_STS
Flash_Ver/Rmp_Run_Ver    Loading Time        Compile Time
        0      4597772        rmp-rlib      LD_INIT      3.6.1(     3.6.1)
1980/01/01 00:13:08 2009/11/03 14:55:43
        1       650685         RASConf      LD_INIT     0.10.3
1980/01/01 00:11:32 0000/00/00 00:00:00
        8            0        gpp-rgcb      LD_INIT      0.0.0
--------------------
       10      5658472        rmp-oamb      LD_INIT      3.6.1(     3.6.1)
1980/01/01 00:16:54 2009/11/03 14:55:43
       11      5149804        rmp-rccb      LD_INIT      3.6.1(     3.6.1)
1980/01/01 01:36:34 2009/11/03 13:59:14
       12      6726972          rmp-os      LD_INIT      3.6.1(     3.6.1)
1980/01/01 01:25:50 2009/11/03 13:59:53

 TCU F/W Version : 1.2.4
 TIU F/W Version : 9.4.4

RESULT : OK
COMPLETED
```

Managing RAS Loading History

RMP manages loading history on the processors, which retrieves the loading history from the RAS system.

The following commands enable to check the most recent loading status and operating status.

```
RMP_CLI>load show sw info

Block Type         size         blkname       LD_STS
Flash_Ver/Rmp_Run_Ver    Loading Time        Compile Time
        0      4594812        rmp-rlib      LD_INIT      3.6.0(    3.6.0)
1980/01/01 00:06:22 2009/10/30 15:23:25
        1       650685         RASConf      LD_INIT     0.10.3
1980/01/01 00:09:18 0000/00/00 00:00:00
        8            0        gpp-rgcb      LD_INIT      0.0.0
--------------------
       10      5658432        rmp-oamb      LD_INIT      3.6.0(    3.6.0)
1980/01/01 00:07:22 2009/10/30 15:23:25
       11      5151560        rmp-rccb      LD_INIT      3.6.0(    3.6.0)
1980/01/01 00:08:26 2009/10/30 15:23:26
       12      6726296          rmp-os      LD_INIT      3.6.0(    3.6.0)
1980/01/01 00:03:34 2009/10/30 15:24:01

 TCU F/W Version : 1.2.4
 TIU F/W Version : 9.4.4
 RESULT : OK
COMPLETED
```

Alarm Processing System

When alarm sets off, RMP immediately detects the alarm and reports it to EMS. In addition, RAS stores 1000 alarm incidents and sends the stored information to EMS when requested.

Checking RAS Alarm Information

The following command enables to verify the current alarm status.

```
RMP_CLI>show alarm info

type :0(RMP),1(BBP),2(TRB),3(PAB),4(FEB),7(REMU),9(FAN),10(GPS),11(RECT),
17(ACR),20(LINK)
```

ex> GPS Alarm Information

```
RMP_CLI>show alarm info 10
CARD    ALAM INFO       INH/ALW      Alarm Time
 ------------------------------------------------------
  GPS_A  LOCK FAIL          ALW

 RESULT : OK
 COMPLETED
```

RAS Alarm LIST Information

RAS alarm information can be checked by using “show alarm list” command. The following command enables to verify the entire alarm information administrated by RMP (alarm code, alarm name, and alarm level). Alarm level is classified and indicated as Critical (CRI), Major (MAJ), and Minor (MIN).

```
RMP_CLI>show alarm list
 ================================
   CODE        DESCRIPTION    GRADE
 ................................
```

A1000	RMP	BOARD DELETION	CRI
A1001	RMP	FUCNTION FAIL	CRI
A1002	RMP	PROCESSOR DOWN	CRI
A1003	RMP	CPU CRI OVERLOAD	CRI
A1004	RMP	CPU MAJ OVERLOAD	MAJ
A1005	RMP	CPU MIN OVERLOAD	MIN
A1006	RMP	CPU WARN OVERLOAD	WRN
A1007	RMP	PROCESS ALARM	CRI
A1008	RMP	HIGH TEMP ALARM	CRI
A1009	RMP	LOW TEMP ALARM	CRI
A1050	RMP	POWER FAIL	CRI
A1053	RMP	MEM CRI OVERLOAD	CRI
A1054	RMP	MEM MAJ OVERLOAD	MAJ
A1055	RMP	MEM MIN OVERLOAD	MIN
A1056	RMP	MEM WARN OVERLOAD	WRN
A1010	GPS	BOARD DELETION	CRI
A1011	GPS	PROCESSOR DOWN	CRI
A1012	GPS	PWR_FAIL	CRI
A1013	GPS	OCXO_FAI	CRI
A1014	GPS	HOLDOVER	CRI
A1015	GPS	FEC_END_FULL_RANGE	CRI
A1016	GPS	ANT_OPEN	CRI
A1017	GPS	ANT_SHORT	CRI
A1018	GPS	CLK_FAIL	CRI
A1019	GPS	ENGINE_FAIL	CRI
A1020	GPS	LOCK FAIL	CRI
A1021	GPS	HOLDOVER_STS	CRI
A1022	GPS	FUNCITON FAIL	CRI
A1100	BBP	BOARD DELETION	CRI
A1101	BBP	FUCNTION FAIL	CRI
A1102	BBP	PROCESSOR DOWN	CRI
A1103	BBP	CPU CRI OVERLOAD	CRI
A1104	BBP	CPU MAJ OVERLOAD	MAJ
A1105	BBP	CPU MIN OVERLOAD	MIN
A1106	BBP	CPU WARN OVERLOAD	WRN
A1107	BBP	PHY DOWN	CRI
A1108	BBP	USER CRI OVERLOAD	CRI
A1109	BBP	USER MAJ OVERLOAD	MAJ
A1110	BBP	USER MIN OVERLOAD	MIN
A1111	BBP	USER WARN OVERLOAD	WRN
A1112	BBP	MEM CRI OVERLOAD	CRI
A1113	BBP	MEM MAJ OVERLOAD	MAJ
A1114	BBP	MEM MIN OVERLOAD	MIN
A1115	BBP	MEM WARN OVERLOAD	WRN
A1116	BBP	ACTSF CRI OVERLOAD	CRI
A1117	BBP	ACTSF MAJ OVERLOAD	MAJ
A1118	BBP	ACTSF MIN OVERLOAD	MIN
A1119	BBP	ACTSF WRN OVERLOAD	WRN
A1120	BBP	THRUP CRI OVERLOAD	CRI
A1121	BBP	THRUP MAJ OVERLOAD	MAJ
A1122	BBP	THRUP MIN OVERLOAD	MIN
A1123	BBP	THRUP WAN OVERLOAD	WRN
A1124	BBP	THRDN CRI OVERLOAD	CRI
A1125	BBP	THRDN MAJ OVERLOAD	MAJ
A1126	BBP	THRDN MIN OVERLOAD	MIN
A1127	BBP	THRDN WAN OVERLOAD	WRN

A1128	BBP	ROT MEASURE WAN	WRN
A1129	BBP	SYSTEM CLOCK FAIL	CRI
A1130	BBP	1PPS FAILURE	CRI
A1131	BBP	PLL FAIL	CRI
A1132	BBP	BBP PHY LOAD FAIL	CRI
A1200	TRB	BOARD DELETION	CRI
A1201	TRB	FUCNTION FAIL	CRI
A1202	TRB	PROCESSOR DOWN	CRI
A1203	TRB	IF PLL LOCK FAIL	CRI
A1204	TRB	RF PLL LOCK FAIL	CRI
A1205	TRB	A SERDES UNLOCK	CRI
A1206	TRB	B SERDES UNLOCK	CRI
A1207	TRB	FREQUENCY MISMATCH	CRI
A1208	TRB	C SERDES UNLOCK	CRI
A1300	PAB	BOARD DELETION	CRI
A1301	PAB	FUCNTION FAIL	CRI
A1302	PAB	OVER POWER	CRI
A1303	PAB	OVER TEMPERATURE	CRI
A1304	PAB	VSWR	CRI
A1305	PAB	DC FAIL	CRI
A1306	PAB	FRAME SYNC	CRI
A1307	PAB	LOW GAIN	CRI
A1308	PAB	OVER POWER WARN	WRN
A1309	PAB	DISABLE	CRI
A1310	PAB	LOW INPUT POWER	CRI
A1400	FEB	BOARD DELETION	CRI
A1402	FEB	LNA A FAULT	CRI
A1403	FEB	LNA B FAULT	CRI
A2300	RECT	RECT CABLE OPEN	MIN
A2301	RECT	RECT FUNCTION FAIL	MIN
A2302	RECT	RECT AC INPUT FAIL	CRI
A2303	RECT	RECT SHOUTDOWN	MIN
A2304	RECT	RECT OUT VOL HIGH	MIN
A2305	RECT	RECT OUT VOL LOW	MIN
A2306	RECT	RECT OUT CURRENT	MIN
A2307	RECT	RECT BATT DISCONN	MIN
A2308	RECT	RECT BATT LOW	MIN
A2309	RECT	RECT BATT CELL	MIN
A2310	RECT	RECT AC NFB FAIL	MIN
A2311	RECT	RECT MODULE 1 FAIL	MIN
A2312	RECT	RECT MODULE 2 FAIL	MIN
A2313	RECT	RECT MODULE 3 FAIL	MIN
A2314	RECT	RECT MODULE 4 FAIL	MIN
A2315	RECT	RECT MODULE 5 FAIL	MIN
A2316	RECT	RECT HMS FAIL	MIN
A2317	RECT	RECT FIRE	MIN
A2318	RECT	RECT HUMIDITY	MIN
A2319	RECT	RECT DOOR OPEN	MIN
A2321	RECT	RECT FLOOD	MIN
A2322	RECT	RECT BATT RELAY ALM	MIN
A2323	RECT	RECT BATT HEAT FAIL	MIN
A2324	RECT	RECT TEMP SENSOR	MIN
A2325	RECT	RECT TEMP HIGH	MIN
A2326	RECT	RECT TEMP LOW	MIN
A2327	RECT	RECT DC NFB FAIL	MIN
A2328	RECT	RECT SYS RELAY FAIL	MIN

```
 A2331  RECT RECT MODULE 1 DEL      MIN
 A2332  RECT RECT MODULE 2 DEL      MIN
 A2333  RECT RECT MODULE 3 DEL      MIN
 A2400  RECT BAT CABLE OPEN        MIN
 A2401  RECT BAT FUNCTION FAIL      MIN
 A2402  RECT BAT DOOR OPEN         MIN
 A2403  RECT BAT FLOOD            MIN
 A2404  RECT BAT FIRE             MIN
 A2405  RECT BAT TEMP SENSOR       MIN
 A2406  RECT BAT HEAT FAIL         MIN
 A2407  RECT BAT FAN FAIL          MIN
 A2408  RECT BAT TEMP HIGH         MIN
 A2409  RECT BAT TEMP LOW          MIN
 A3000  ACR   PROCESSOR DOWN       CRI
 A3001  ACR   LINK FAIL           CRI
 A3002  ETH   LINK FAIL           CRI

RESULT : OK
COMPLETED
```

Checking RAS Alarm History

Alarm history occurred in RAS can be checked by using “show alarm history”.

```
RMP_CLI>show alarm history
 history count : 0-1000
RMP_CLI>show alarm history 100
larmHistCnt 119 alarmHistCur 119
 index  code type severity shelf slot link alarmtime     flag  inh
BlkName
    0 A1712   7       0    0    0    0 20091011103242    1    0
    1 A2510   15      0    1    9  255 20091011103239    1    0
    2 A2509   15      0    1    9  255 20091011103239    1    0
    3 A1102   1       1    1    7    0 20091011103225    1    0
    4 A1712   7       0    0    0    0 20091011103217    1    0
    5 A2510   15      1    1    9  255 20091011103217    1    0
    6 A2509   15      1    1    9  255 20091011103217    1    0
    7 A1712   7       0    0    0    0 20091011103205    1    0
    8 A1101   1       1    1    7    0 20091011103205    1    0
    9 A1100   1       1    1    7    0 20091011103205    1    0
   10 A2519   15      0    1    9    1 20091011103158    1    0
   11 A2519   15      1    1    9    1 20091011103158    1    0
   12 A2518   15      0    1    9    1 20091011103158    1    0
   13 A1202   2       1    4    5    0 20091011103155    1    0
   14 A2518   15      1    1    9    2 20091011103155    1    0
   15 A1309   3       0    4    6    0 20091010161636    1    0
   16 A1309   3       0    4    7    0 20091010161622    1    0
   17 A1309   3       1    4    7    0 20091010161507    1    0
   18 A1309   3       1    4    6    0 20091010161456    1    0
   19 A3001   20      0    1    2    1 20091010161448    1    0
   20 A3001   20      1    1    2    1 20091010161440    1    0
   21 A3001   20      0    1    2    1 20091010161439    1    0
   22 A3001   20      1    1    2    1 20091010161435    1    0
   23 A1309   3       0    4    7    0 20091010145411    1    0
   24 A1309   3       0    4    6    0 20091010145314    1    0
   25 A1309   3       1    4    7    0 20091010145219    1    0
   26 A1309   3       1    4    6    0 20091010145208    1    0
   27 A3001   20      0    1    2    1 20091010145201    1    0
   28 A3001   20      1    1    2    1 20091010145152    1    0
   29 A3001   20      0    1    2    1 20091010145152    1    0
   30 A3001   20      1    1    2    1 20091010145148    1    0
   31 A1021   10      0    1    4    0 20091010122401    1    0
   32 A1021   10      1    1    4    0 20091010122319    1    0
   33 A1021   10      0    1    4    0 20091010122014    1    0
   34 A1021   10      1    1    4    0 20091010121923    1    0
   35 A1309   3       0    4    6    0 20091010095421    1    0
   36 A1102   1       0    1    7    0 20091010095304    1    0
   37 A1712   7       0    0    0    0 20091010095247    1    0
   38 A1101   1       0    1    7    0 20091010095247    1    0
   39 A2512   15      0    1    9  255 20091010095245    1    0
   40 A2511   15      0    1    9  255 20091010095245    1    0
   41 A1102   1       1    1    7    0 20091010095244    1    0
```

```
42 A1309    3       1     4     6     0 20091010095236    1    0
43 A1712    7       0     0     0     0 20091010095223    1    0
44 A1101    1       1     1     7     0 20091010095223    1    0
45 A2512   15       1     1     9   255 20091010095223    1    0
46 A2511   15       1     1     9   255 20091010095223    1    0
47 A1106    1       0     1     7   255 20091010095005    1    0
48 A1105    1       0     1     7   255 20091010095004    1    0
49 A1106    1       1     1     7   255 20091010095004    1    0
50 A1104    1       0     1     7   255 20091010095002    1    0
51 A1105    1       2     1     7   255 20091010095002    1    0
52 A1103    1       0     1     7   255 20091010095001    1    0
53 A1104    1       3     1     7   255 20091010095001    1    0
54 A1104    1       0     1     7   255 20091010094844    1    0
55 A1103    1       4     1     7   255 20091010094844    1    0
56 A1105    1       0     1     7   255 20091010094843    1    0
57 A1104    1       3     1     7   255 20091010094843    1    0
58 A1106    1       0     1     7   255 20091010094842    1    0
59 A1105    1       2     1     7   255 20091010094842    1    0
60 A1106    1       1     1     7   255 20091010094839    1    0
61 A1006    0       0     1     4   255 20091010094640    1    0
62 A1005    0       0     1     4   255 20091010094638    1    0
63 A1006    0       1     1     4   255 20091010094638    1    0
64 A1006    0       0     1     4   255 20091010094635    1    0
65 A1005    0       2     1     4   255 20091010094635    1    0
66 A1005    0       0     1     4   255 20091010094625    1    0
67 A1006    0       1     1     4   255 20091010094625    1    0
68 A1006    0       0     1     4   255 20091010094613    1    0
69 A1005    0       2     1     4   255 20091010094613    1    0
70 A1006    0       1     1     4   255 20091010094517    1    0
71 A1309    3       0     4     7     0 20091009175816    1    0
72 A1309    3       0     4     6     0 20091009175715    1    0
73 A1309    3       1     4     7     0 20091009175548    1    0
74 A1309    3       1     4     6     0 20091009175536    1    0
75 A3001   20       0     1     2     1 20091009175530    1    0
76 A3001   20       1     1     2     1 20091009175522    1    0
77 A3001   20       0     1     2     1 20091009175521    1    0
78 A3001   20       1     1     2     1 20091009175517    1    0
79 A3001   20       0     1     2     1 20091009175051    1    0
80 A3001   20       0     1     2     2 20091009175050    1    0
81 A1011   10       0     1     4     0 20091009175045    1    0
82 A3001   20       1     1     2     1 20091009175045    1    0
83 A3001   20       1     1     2     2 20091009175011    1    0
84 A3001   20       0     1     2     1 20091009175011    1    0
85 A3001   20       1     1     2     1 20091009175009    1    0
86 A3001   20       1     1     2     2 20091009174936    1    0
87 A3001   20       0     1     2     1 20091009174936    1    0
88 A3001   20       1     1     2     1 20091009174933    1    0
89 A1011   10       1     1     4     0 20091009174920    1    0
90 A1309    3       0     4     7     0 20091009174901    1    0
91 A1306    3       0     4     7     0 20091009174901    1    0
92 A3001   20       1     1     2     2 20091009174900    1    0
93 A3001   20       0     1     2     1 20091009174900    1    0
94 A3001   20       1     1     2     2 20091009174858    1    0
95 A3001   20       1     1     2     1 20091009174857    1    0
96 A1309    3       0     4     6     0 20091009174836    1    0
97 A1301    3       0     4     7     0 20091009174836    1    0
```

```
   98 A1301    3       0     4    6    0 20091009174836    1    0
   99 A1712    7       0     0    0    0 20091009174816    1    0

RESULT : OK
COMPLETED
```

Overload Control System

Control RAS overload by adjusting the threshold value of overload control parameter in the BBP and RMP in TMU. The following show how each card controls the overload control parameters.

- RMP : CPU usage
- BBP : Slot usage

Overload control target of TMU (RMP)

Currently only the CPU usage rate of RMP is being periodically monitored and controlled.

Overload control target of TMU (BBP)

Currently for BBP, Slot usage are being periodically monitored and controlled

RAS overload status is classified into the following four types. The table below defines the control details according to the overload status.

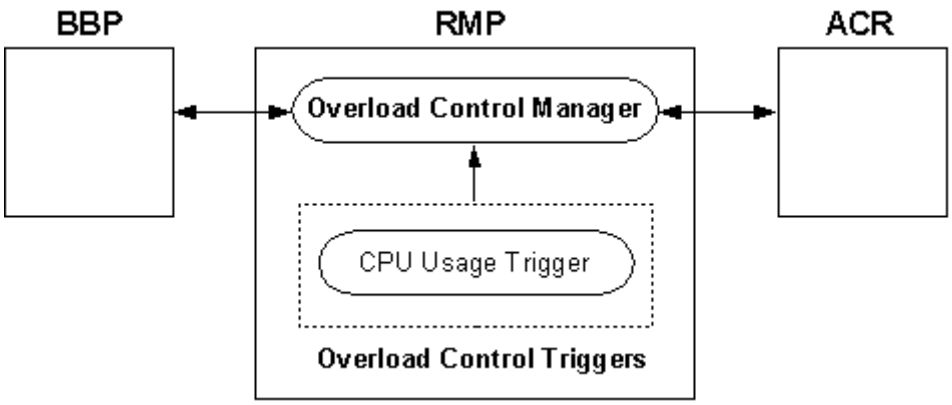
- Normal (or White)
- Minor (or Yellow)
- Major (or Orange)
- Critical (or Red)

Overload Status	Overload Command Status	Overload Control
Normal	● (White)	No Action
Minor	● (Yellow)	Performs DREG on the calls in Network Entry
Major	● (Orange)	Ignores Initial CDMA code ranging request, but processes handover CDMA code ranging and handover reservation request.
Critical	● (Red)	Ignores all CDMA code ranging including handover reservation request.

[Table 3 RAS1041 Overload Status]

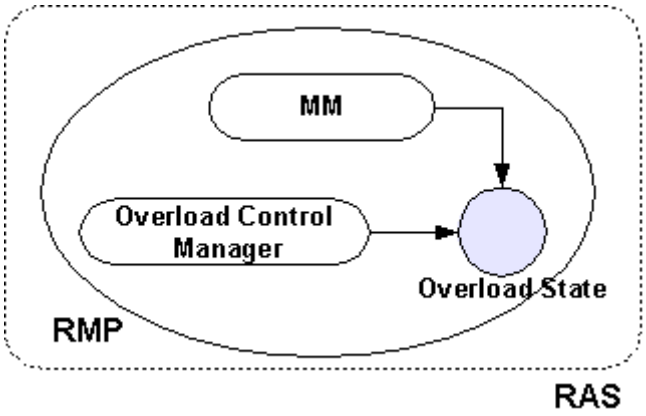
RMP overload control consists of Overload Control Triggers and Overload Control manager as shown in Figure 3. Functions each block performs are as follows.

- Overload Control Triggers
  Sends periodic monitors on usage rate of each resource, and periodic reports on current usage rate to “Overload Control Manager”.
- Overload Control Manager
  Control system overload status according to the values detected from the overload control triggers. It reports to BBP and ACR the corresponding status every time RMP’s overload status changes and BBP and ACR responds appropriately according to RMP’s overload status.

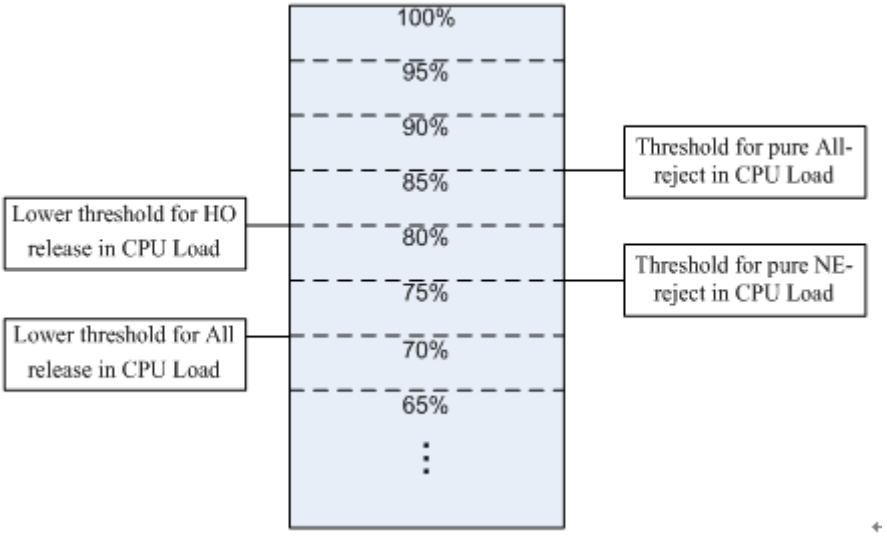


[Figure 3 Overload Control Flow of RMP]

RMP consists of blocks such as ADM, PKM, & MM and it interacts with MM block that processes handover for overload control. MM block determines whether to perform handover according to overload control status of RMP. As illustrated in Figure 5, BBP, as in RMP's overload control mechanism, manages overload status according to CPU usage rate. RAS system operates according to each overload status as shown in the Table 4 and Table 5.



[Figure 4 Overload Control Composition of RMP]



[Figure 5 BBP Overload Control threshold]

Identifier	Call Processing for New Users	NHO	Call Processing for Current Users
Critical	deny	deny	deny
Suspended Zone (critical to major)	N/A	N/A	N/A
Major	deny	allow	allow
Suspended Zone (major to minor)	N/A	N/A	N/A
Minor	deny	allow	allow
Suspended Zone (minor to normal)	N/A	N/A	N/A
Normal	allow	allow	allow

[Table 4 Overload control status per each status]

Threshold Name	Size (Bytes)	Default Value (%)	Min	Max
Upper threshold value of CPU usage (%) for Suspended Zone for Critical	1	70	60	80
Lower threshold value of CPU usage(%) for Suspended Zone for Critical	1	65	55	75
Upper threshold value of CPU usage(%) for Suspended Zone for Major	1	60	50	70
Lower threshold value of CPU usage(%) for Suspended Zone for Major	1	55	45	65
Upper threshold value of CPU usage(%) for Suspended Zone for Minor	1	40	30	50
Lower threshold value of CPU usage(%) for Suspended Zone for Minor	1	35	25	45

[**Table** 5 **Default threshold value for Overload Control]**

Setting up and storing of overload control threshold value

Default threshold value for RAS overload control is provided as PLD. Using EMS, operator can modify and store each threshold value

Checking Threshold Value

Overload threshold value can be inquired by using the “show overload” command. Use “0” for CPU and “1” for BBP Slot in the TYPE field.

```
RMP_CLI>show overload
param : 0(CPU),1(BBP Slot)
```


Ex) To inquire overload status of TMU, enter “show overload 0” as shown in the example below.

```
RMP_CLI>show overload 0
PROCESSOR  ID  CPU  MEM
      TMU  -   01   60

 RESULT : OK
 COMPLETED

RMP_CLI>sh overload 1
 BBPID  DL_SLOT UL_SLOT
  0        000    000

 RESULT : OK
 COMPLETED
```

Statistics

RAS provides the following statistics.

Code	Name	Fields	Description
1301	Handover	ACR_HO_ATT	Total inter ACR handover attempt
		ACR_HO_SUC	Total inter ACR handover Success
		RAS_HO_ATT	tempt
		RAS_HO_SUC	Total inter RAS handover Success
		FA_HO_ATT	Total FA handover attempt
		FA_HO_SUC	Total FA handover Success
1302	Inter Sector &Inter RAS HHO	HHO_ATT	Hard Handover Attempt count
		HHO_SUC	Hard Handover Success count
		HHO_TOT_FAIL	HHO Total Fail count
		Hard_Sec_HO	Between Sector HO at Hard Handover success
		Hard_RAS_HO	Between RAS HO at Hard Handover success
		Hard_Freq_HO	Between FA HO at Hard Handover success
		HHO_SYSFLT	the number that Hard handover fail reason is unknown (system fault)
		HO_INV_NBR	Mismatch between the neighbor list in PSS and the neighbor list in RAS
		HO_DST_TO	No response from target RAS after sending Pre-Notification Message from target RAS within S_HO_DECISION time
		HO_RSV_FAIL	Fail response from BBP to resource reservation request
		HO_RSV_TO	No response from BBP after resource reservation request within T_HO_RSRC_PENDING time
		HO_NO_RE	When Hard Handover, PSS does not reentry to target cell within T_HO_PSS_ENTRY time
		HO_IND_TO	No MOB-HO-IND from PSS after sending MOB-BSHO-RSP within T_HO-IND-PENDING time
		HO_CFM_TO	No confirm or withdraw response from serving RAS to Pre-Notification Response of target RAS within

Code	Name	Fields	Description
			T_HO_CONFIRM_PENDING time
		HO_RM_DSX_TIMEOUT	No response from BBP to service flow Add/Delete/Change request of RMP within certain time in target RAS
1303	FBSS Handover	FBSS_ADD_ATT	FBSS ADD Handover Attempt Count
		FBSS_ADD_SUC	FBSS ADD Handover Success Count
		FBSS_DROP_ATT	FBSS DROP Handover Attempt Count
		FBSS_DROP_SUC	FBSS DROP Handover Success Count
		HO_INV_NBR	Mismatch between the neighbor list in PSS and the neighbor list in RAS
		HO_INV_AS	Mismatch between active set in PSS and active set in RAS
		HO_DST_TO	No response from target RAS after sending Pre-Notification Message from target RAS within S_HO_DECISION time
		HO_RSV_FAIL	Fail response from BBP to resource reservation request
		HO_RSV_TO	No response from BBP after resource reservation request within T_HO_RSRC_PENDING time
		HO_IND_TO	No MOB-HO-IND from PSS after sending MOB-BSHO-RSP within T_HO-IND-PENDING time
		HO_CFM_TO	No confirm or withdraw response from serving RAS to Pre-Notification Response of target RAS within T_HO_CONFIRM_PENDING time
		HO_AU_FAIL	Fail response from RAS in Active set to Anchor Update for SHO/FBSS
		HO_AU_TO	No response from RAS in active set to Anchor Update for SHO/FBSS within the T_ANCHOR_UPDATE
		HO_DSX_FAIL	Fail response from Active Set to Service Flow Add/Delete/Change request for SHO/FBSS
		HO_DSX_TO	No response to service flow add/delete/change request for SHO/FBSS within a certain time
		HO_RM_DSX_FAIL	Fail response from BBP to service flow add/delete/change request of RMP for SHO/FBSS
		HO_RM_DSX_TIMEOUT	No response from BBP to service flow Add/Delete/Change request of RMP within certain time in target RAS

Code	Name	Fields	Description
		FBSS_SYSFLT	FBSS handover fail reason is unknown (system fault)

Code	Name	Fields	Description
1304	Inter ACR Hard Handover	ACR_ATT	Inter ACR Handover attempt
		HO_ACR_ATT	HHO success count in Inter ACR Handover attempt
		FBSS_ACR_ATT	FBSS success count in Inter ACR Handover attempt
		HHO_ACR_NFA_SUC	Success count without frequency change for Inter ACR HHO
		HHO_ACR_FA_SUC	Success count with frequency change for Inter ACR HHO
		HHO_ACR_FAIL	Total fail count for inter ACR HHO
		HO_INV_NBR	Mismatch between the neighbor list in PSS and the neighbor list in RAS
		HO_INV_AS	Mismatch between active set in PSS and active set in RAS
		HO_DST_TO	No response from target RAS after sending Pre-Notification Message from target RAS within S_HO_DECISION time
		HO_RSV_FAIL	Fail response from BBP to resource reservation request
		HO_RSV_TO	No response from BBP after resource reservation request within T_HO_RSRC_PENDING time
		HO_NO_RE	When Hard Handover, PSS does not reentry to target cell within T_HO_PSS_ENTRY time
		HO_IND_TO	No MOB-HO-IND from PSS after sending MOB-BSHO-RSP within T_HO-IND-PENDING time
		HO_CFM_TO	No confirm or withdraw response from serving RAS to Pre-Notification Response of target RAS within T_HO_CONFIRM_PENDING time
		HO_AU_FAIL	Fail response from RAS in Active set to Anchor Update for SHO/FBSS
		HO_AU_TO	No response from RAS in active set to Anchor Update for SHO/FBSS within the T_ANCHOR_UPDATE
		HO_DSX_FAIL	Fail response from Active Set to Service Flow Add/Delete/Change request for SHO/FBSS
		HO_DSX_TO	No response to service flow

Code	Name	Fields	Description
			add/delete/change request for SHO/FBSS within a certain time
		HO_RM_DSX_FAIL	Fail response from BBP to service flow add/delete/change request of RMP for SHO/FBSS
		HO_RM_DSX_TIMEOUT	No response from BBP to service flow Add/Delete/Change request of RMP within certain time in target RAS
		HHO_ACR_UNKWN	the number that Inter ACR Hard Handover fail reason is unknown reason (system fault)
1401	RF Transmitter	TX_PWS	Average Transmitter Power Gain
		PRE_PWS	Average Preamble Power Gain
		DL_THRU	Downstream Throughput
1402	RF Receiver	RX_PWS	Average Receiver Power Gain
		RSSI	Received Signal Strength Indication
		CINR	Carrier to Interference and Noise Ratio
		P_VSWR	Average Primary Tx/Rx VSWR
		S_VSWR	Average Secondary Rx VSWR
		T_VSWR	Average Third Rx VSWR
		F_VSWR	Average Fourth Rx VSWR
		UL_THRU	Upstream Throughput
1403	DL Traffic	DL_MAC_SDU	the number of MAC SDUs that have been transmitted (refer wmanIfBsSsMacSduCount in 802.16f)
		DL_OCTET	the number of octets of MAC SDUs that have been transmitted (refer wmanIfBsSsOctetCount in IEEE802.16f)
		DL_MAC_PDU	The number of MAC PDUs that have been transmitted (wmanIfBsSsMacPduCount in IEEE802,16f)
1405	UL Traffic	UL_MAC_SDU	the number of MAC SDUs that have been received (refer wmanIfBsSsMacSduCount in 802.16f)
		UL_OCTET	the number of octets of MAC SDUs that have been received (refer wmanIfBsSsOctetCount in IEEE802.16f)
		UL_MAC_PDU	The number of MAC PDUs that have been transmitted (wmanIfBsSsMacPduCount in IEEE802,16f)
		UL_MAC_CRCERR	the number of MAC PDUs received with CRC verification failed. (wmanIfBsSsMacPduCrcErrCount in IEEE 802.16f)
1002	Connection	NW_ATT	Network Entry Attempt Count , from

Code	Name	Fields	Description
	Status		Ranging to SBC-REQ through Uplink Channel
		NW_SUC	Network Entry Success Count, from SBC-REQ to first DSA-REQ
		SVC_CON	ongoing connection count
		NORM_REL	Normal released PSS count using DEREG
		BS_REL	Force released PSS count by RAS OAM Demand Message
		PWR_DWN	Force released PSS count by PSS power off
		NO_MAC	No MAC Address when RNG-REQ/REG-REQ
		AUTH_FAIL	Authentication Fail Count
		SF_UNA	Service Flow Unavailable
		AVR_DL_THRU	Average downlink throughput per User (MAC Address)
		AVR_UL_THRU	Average uplink throughput per User (MAC Address)
		AVR_SUC	Average Success Rate(%) = NW_SUC/NW_ATT * 100
		AVR_FAIL	Average Fail Rate (%)= (NO_MAC + AUTH_FAIL + SF_UNA+ACR_FAIL+ACR_UNA) /NW_ATT * 100
		AVR_USG	Average Usage Rate(%) = (AVR_DL_THRU+AVR_UL_THRU)/(MAX_DL_THRU+MAX_UL_THRU) * 100
1003 Network Entry Fail Reason	NOR_REL	Normal Network Exit through deregistration	
		HO_REL	Normal Network Exit caused by HO
		OAM_REL	Connection Release forcedly as OAM side
		NO_MAC	No MAC Address in BBP during RNG-REQ /REG-REQ processing
		AUTH_FAIL	Authentication Fail
		SF_UNA	Service Flow Unavailable, no more resource to create service flow at BBP
		DSA_FAIL	Service Flow DSA Fail
		DSC_FAIL	Service Flow DSC Fail
		DSD_FAIL	Service Flow DSD Fail
		INVD_CID	Invalid CID in 802.16 MAC management

Code	Name	Fields	Description
			messages
		UNK_MSG	Unknown 802.16 MAC management messages
		UNK_PARA	Unknown Parameter in 802.16 MAC management messages
1101	Processing Time	AVG_CONN_TIME	Average Duration From Registration to Deregistration
		AVG_SVC_TIME	Average Duration on service
		AVG_DELAY_TIME	Average Duration Time From Scanning to Registration
1102	CID	USD_BASIC	Average Used Basic CID Count
		ALLOC_BASIC	Allocated BASIC CID Count
		USD_PRIM	Average Used Primary Mgmt CID Count
		ALLOC_PRIM	Allocated Primary Mgmt CID Count
		USD_TRANS	Average Used Transport CID Count
		ALLOC_TRANS	Allocated Transport or Secondary Management CID Count
		USD_MCAST	Average Multicast CID Count
		ALLOC_MCAST	Allocated Multicast CID Count
1201	PSS State Transition	TOT_CNT	Total PSS Count
		TOT_ACT	PSS Count in Active Mode
		TOT_SLP	PSS Count in Sleep Mode
		TOT_IDL	PSS Count in Idle Mode
1202	PSS Attach	RNG_CNT	number of PSS completed initial network entry
		SBC_CNT	number of PSS completed Capability Negotiation
		PKM_CNT	number of PSS completed authentication
		REG_CNT	number of PSS completed registration
1501	RAS MAC Message	RNG_ATT	Ranging Attempt count
		RNG_SUC	Ranging Success Count
		SBC_ATT	SBC(SS Basic Capability) Attempt count
		SBC_SUC	SBC(SS Basic Capability) Success Count
		PKM_ATT	PKM Attempt count
		PKM_SUC	PMK Success Count
		REG_ATT	Registration Attempt count
		REG_SUC	Registration Success Count
		DEREG_ATT	MAC Deregistration Attempt Count
		DEREG_SUC	MAC Deregistration Success Count
		DSX_ATT	DSA/DSC/DSD Total Attempt Count
		DSX_SUC	DSA/DSC/DSD Total Success Count

Code	Name	Fields	Description
		MCA_ATT	Multicast Polling Assignment Attempt Count
		MCA_SUC	Multicast Polling Assignment Success Count
		DPBC_ATT	Downlink Burst Profile Change Attempt Count
		DPBC_SUC	Downlink Burst Profile Change Success Count

[Table 6 RAS1041 Statistics]

Statistics on RAS can be checked via EMS.

Configuration Management

Boot Parameter Configuration

For RMP initialization, load the RMP image file stored in local flash memory. If RMP image file does not exist in the local flash memory of RMP, download RMP image from EMS via FTP or TFTP and boot RMP. In order to do so, following steps need to be followed for boot parameter change and rebooting.

- To check Boot command, type in “help” from VxWorks prompt. That is, “[VxWorks Boot]: help”.
- To change boot parameter, enter “c” from VxWorks prompt. That is, “[VxWorks Boot]: c”.
- To reboot after changing boot parameter, enter “@” command from VxWorks prompt. That is “[VxWorks Boot]: @”.

RMP Console

```
[RAS1041 Boot]: help
?                   - print this list
@                   - boot (load and go)
p                   - print boot params
c                   - change boot params
l                   - load boot file
g adrs               - go to adrs
d adrs[,n]            - display memory
m adrs               - modify memory
f adrs, nbytes, value - fill memory
t adrs, adrs, nbytes  - copy memory
e                   - print fatal exception
v                   - print boot logo with version
P                   - print error log
C                   - clear error log
T                   - tffs file commands
n netif              - print network interface device address
M [dev][unitNo] [MAC] - set/display ethernet address
$dev(0,procnum)host:/file h=# e=# b=# g=# u=usr [pw=passwd] f=#
                      tn=targetname s=script o=other
boot device: tffs=drive,removable    file name: /tffs0/vxWorks
Boot flags:
  0x02  - load local system symbols
  0x04  - don't autoboot
  0x08  - quick autoboot (no countdown)
```

```
   0x20  - disable login security
   0x40  - use bootp to get boot parameters
   0x80  - use tftp to get boot image
   0x100 - use proxy arp
   0x2800 - use ftp to get VXWORKS and store it to TFFS(C0)
   0x2880 - use tftp to get VXWORKS and store it to TFFS
   0x3000 - use ftp to install ALL and store it to TFFS
   0x4400 - use ftp to get BOOTROM and store it to TFFS/FLASH(C2)
   0x4480 - use tftp to get BOOTROM and and store it to TFFS/FLASH

available boot devices:Enhanced Network Devices
 mottsec0 mottsec1 tffs

[RAS1041 Boot]:
[RAS1041 Boot]: c                          ← Change Boot Parameters

'.' = clear field;  '-' = go to previous field;  ^D = quit

boot device         : tffs=0,01
processor number    : 0
host name           : flyvo
file name           : /tffs0/rmp-os
inet on ethernet (e) : 210.181.13.79:ffffff00
inet on backplane (b):
host inet (h)       : 210.181.13.35
gateway inet (g)    : 210.181.13.1
user (u)            : shkang
ftp password (pw) (blank = use rsh): *******
flags (f)           : 0x8
target name (tn)    :
startup script (s)  :
other (o)           : mottsec1

[RAS1041 Boot]: @                          ← Reboot Command

Press any key to stop auto-boot...
 1 0
auto-booting...


boot device         : tffs=0,0
unit number         : 1
processor number    : 0
host name           : flyvo
file name           : /tffs0/rmp-os
inet on ethernet (e) : xxx.xxx.xxx.xxx:ffffff00
host inet (h)       : xxx.xxx.xxx.xxx
gateway inet (g)    : xxx.xxx.xxx.xxx
user (u)            : shkang
flags (f)           : 0x8
other (o)           : mottsec1

Loading /tffs0/rmp-os...5426616 + 55578680

IHU (Image Header Utility) V1.0: /tffs0/rmp-os
ID    - 0xdeaddead
```

```
TYPE   - app
EXT    - 0
UP     - 0
VER    - 3.6.2
CTIME  - THU JAN 01 09:00:00 1970
OWNER  - shkang
LENGTH - 6726780 (0x66a47c) bytes
CRC    - 0x6d5ef1a3

Starting at 0x100000...

Target Name: vxTarget
Attaching interface lo0... done
0x3fff9d50 (tRootTask): MAC 00:15:7d:01:09:44
0x3fff9d50 (tRootTask): MAC 00:15:7d:01:09:45
0x3fff9d50 (tRootTask): MAC 00:15:7d:01:09:46
0x3fff9d50 (tRootTask): MAC 00:00:00:00:00:00
Attached IPv4 interface to mottsec unit 1

Adding 14986 symbols for standalone.
wdbCommDevInit: Could not find device tffs=0,0, unit 1 !
ERR [KERN] if_add.c:100: ipAttach() failed for fei1

 CPU: Freescale CDS MPC8548E - Security Engine.  Processor #0.
 Memory Size: 0x3fffa000.  BSP version 1.0/0.
 Created: Nov  4 2009, 15:03:56
 ED&R Policy Mode: deployed
 WDB Comm Type: WDB_COMM_END
 WDB: Ready.
 Attaching to TFFS        : DONE
Check EDR Log ...Done

************************************************************
* Copyright POSDATA co., 2004-2008
* Version: 3.6.2(S/W), 0.1.0(H/W)
************************************************************

Starting tmu initialization...

System reset reason: reset by S/W
System clock source: 1588 1IP
Initializing the FPGA Module....DONE
Initializing the SPI Module.....DONE
Initializing the TMU PLL........DONE
Initializing the IF Module......DONE
PHY driver $Revision: 1.11 $ for Nov  4 2009 09:23:56
TMU RF Control Config. Set......DONE

PM Parser.................DONE
Low MAC...................DONE
SDU Reconstruction........DONE
Rx ARQ....................DONE
PDU Construction..........DONE
Scheduler.................DONE
BPM,BWR...................DONE
QMS.......................DONE
```

```
Tx ARQ...................DONE
Convergence sublayer......DONE
Data plane simulator......DONE
TLV.......................DONE
RNG.......................DONE
Control Plane.............DONE
Core MAC task.............DONE
taskMacTxEnd..............DONE
taskMacRxEnd..............DONE
Management module.........DONE
HVT.......................DONE
audit/trace...............DONE
timer task................DONE

Waiting CPM response...
Configuration Callback Function Registration DONE.
Ethernet Driver Enable DONE.
System Initialized DONE ..


POSLOG....................................DONE
RMP Task Monitoring Task Spawn............DONE
rmpExcHookInit............................DONE
RLDB Main Task............................DONE
Rldb Main Task Spawn......................DONE
tLdTimer Task Spawn.......................DONE
Reading  /tffs0/RASConf...................DONE
  PLD Version OLD(0.10.3), NEW(0.10.3)
  CheckSum for config : 0x3a5788(3823496)
  Current fa(1) sect(1) Model(28)
Generating Neighbor Configuration.........DONE
Time Zone: LOCAL_TIME_OFFSET   32400.....DONE
Default RAS Time  1970/01/01 00:00:41.....DONE
D16 TLV Library Init......................DONE
cBuffer Library Init......................DONE
cWMI Library Init.........................DONE
rasWMI Library Init.......................DONE
rasCPI Library Init.......................DONE
tRcmbMain task spawn......................DONE
tOLCheck Spawn............................DONE
tKeepAlive(rn,acr) Task Spawn.............DONE
tIndAlm(alarm) Spawn......................DONE
tTmuHwAlarm Spawn.........................DONE
RSFB Status & Mmc Spawn...................DONE
tStatTimer Task Spawn.....................DONE
STAT Loaded...............................DONE
tRemb Task Spawn..........................DONE
tRgpb Task Spawn..........................DONE
tRdtb task Spawn..........................DONE
tSwBlockDiag Task Spawn...................DONE
TimerLibrary Load.........................DONE
rrcTimerLibrary...........................DONE
RRC(Radio Resource Controller)............DONE
CAC(Call Admission Control)...............DONE
RAS Init..................................DONE
RAS-SNMP swLoadMngInit....................DONE
```

```
Set Frequency -> 2560000 kHz.. SUCCESS
MIMO UL CSM turned off
Ieee1588SlaveInit...Done..
vlanTagIfIngressTypeSet OK(2)
vlanTagIfEgressTypeSet OK(1)
Device ID    : 0x105
Base Reg Addr : 0x0
No of Ports   : 6
CPU Ports    : 2
LED Init     : Eth-1 Done
Optic Init   : Eth-5 Equip (1000base-X)
Network Configuration initialization : DONE

todDrv Not Open or Error. Configuration Change(cnt=1)...DONE
[ 1588 ] IEEE1588 UDP(319) bind OK!(11)
[ 1588 ] IEEE1588 UDP(320) bind OK!(12)
####
################################################################################
#
#### Start 1588_Slave_Uart_Task() : ttyS2(__fd_uart=19)  : acib_max_fd=19
####
################################################################################
#
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
Becuase of Previous RF Alarm, DL MIMO will be off! (txAPath Alarm : 1,
txBPath Alarm: 1)
MIMO UL CSM turned on
Configuration Change(cnt=1)...DONE
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
Becuase of Previous RF Alarm, DL MIMO will be off! (txAPath Alarm : 1,
txBPath Alarm: 1)
MIMO UL CSM turned on
Wait for GPS ACTIVE set...
Wait for GPS ACTIVE set...


User Access Verification
 USER ID  : Wait for GPS ACTIVE set...
Wait for GPS ACTIVE set...
Set Frequency -> 2560000 kHz.. SUCCESS
Set Frequency -> 2560000 kHz.. SUCCESS
Configuration Change(cnt=1)...DONE
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
Becuase of Previous RF Alarm, DL MIMO will be off! (txAPath Alarm : 1,
txBPath Alarm: 1)
MIMO UL CSM turned on
Configuration Change(cnt=1)...DONE
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
Becuase of Previous RF Alarm, DL MIMO will be off! (txAPath Alarm : 1,
txBPath Alarm: 1)
MIMO UL CSM turned on
Configuration Change(cnt=1)...DONE
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
Becuase of Previous RF Alarm, DL MIMO will be off! (txAPath Alarm : 1,
```

```
txBPath Alarm: 1)
MIMO UL CSM turned on
Configuration Change(cnt=1)...DONE
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
Becuase of Previous RF Alarm, DL MIMO will be off! (txAPath Alarm : 1,
txBPath Alarm: 1)
MIMO UL CSM turned on
Wait for GPS ACTIVE set...
Wait for GPS ACTIVE set...
Set Frequency -> 2560000 kHz.. SUCCESS
Configuration Change(cnt=1)...DONE
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
MIMO UL CSM turned on
Configuration Change(cnt=1)...DONE
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
MIMO UL CSM turned on
Wait for GPS ACTIVE set...
Wait for GPS ACTIVE set...
Set Frequency -> 2560000 kHz.. SUCCESS
Configuration Change(cnt=1)...DONE
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
MIMO UL CSM turned on
Configuration Change(cnt=1)...DONE
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
MIMO UL CSM turned on
Wait for GPS ACTIVE set...
Wait for GPS ACTIVE set...
Set Frequency -> 2560000 kHz.. SUCCESS
Configuration Change(cnt=1)...DONE
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
MIMO UL CSM turned on
Configuration Change(cnt=1)...DONE
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
MIMO UL CSM turned on
...GPS LOCK(0)...
Wait for GPS ACTIVE set...
...GPS LOCK(1)...
...GPS LOCK(2)...
...GPS LOCK(3)...
TMU RF Control Tasks (Temp, Alc, Vswr) spawned
 Frequency Range Set (2300.00) ~ (2700.00)
Initializing the RF Module......rf: indoor detected.
ad9352DcOffsetCallInit Main(b1=10, b2=10)
ad9352DcOffsetCallInit Success(dir=0)!!.
ad9352DcOffsetCallInit Div(b1=10, b2=10)
ad9352DcOffsetCallInit Success(dir=1)!!.
rf: indoor was successfully initialized.
DONE
PC203 detected x 2
PC203 dev 0 successfully loaded.(/tffs0/FPGAIMG/dev0_10M_R1000.pa)
Processing: /tffs0/FPGAIMG/dev0_10M_R1000.pa (dev #0)...Verify Device #0:
Success!
PC203 dev 1 successfully loaded.(/tffs0/FPGAIMG/dev1_10M_R1000.pa)
Processing: /tffs0/FPGAIMG/dev1_10M_R1000.pa (dev #1)...Verify Device #1:
Success!
PC203 devices started
current state = API_IDLE next state = API_PARAM
```



```
phyInterruptThread started
phyDriverRxThread started
current state = API_PARAM next state = API_CONFIG
current state = API_CONFIG next state = API_START
current state = API_START next state = API_RUNNING
CPM Send OK
[BBP(0) =>RMP] : MSG_RN_CFG_CMPLT_RPT
Set Frequency -> 2560000 kHz.. SUCCESS
```

Checking RAS Information

Checking RAS Network Information

To check current RAS network configuration, use “show network” command from CLI mode. It displays information such as ACR IP address, RAS IP address, subnet mask, default router, active EMS IP, and standby EMS IP address.

```
RMP_CLI>show network
ACRIP          : xxx.xxx.xxx.xxx
 RASIP         : xxx.xxx.xxx.xxx
 SUBNET  Mask    : xxx.xxx.xxx.xxx
 Default Router  : xxx.xxx.xxx.xxx
 Active  EMS IP  : xxx.xxx.xxx.xxx
 Standby EMS IP  : xxx.xxx.xxx.xxx
 Ntp Server  IP  : xxx.xxx.xxx.xxx
 DP Mode        : per-SF
 PC  IP         : xxx.xxx.xxx.xxx
 1588 Master  IP : xxx.xxx.xxx.xxx
 Authenticator IP: xxx.xxx.xxx.xxx
 HO Routing Mode : R8 Routing

 RESULT : OK
 COMPLETED
```

Checking RAS Configuration Information

To check information of current RAS configuration, use “show ras” command from CLI mode. It displays information such as ACR ID and RAS ID.

```
RMP_CLI>show ras
```

```
OP Id     : 00:00:00
 ACR Id    : xx
 RAS Id    : xx
 RAS MODEL  : xxxxx
 Sect Num   : 1
 FA   Num   : 1
 Clock Mode : GPS and 1588 Master Mode
 Master RAS Id: xx
 Slave  RAS Id: xx
 Clock Info  : 1588 Slave Mode
 ASN-GW Type: AGW20000(0)

 RESULT : OK
 COMPLETED
```

System Replacement

Items to Check Before System Replacement

Error status of the system or module must be checked prior to the system replacement. Use the following steps to check on the error status of the system or module.

1. Check if the cables are equipped correctly and cable connection is normal.
2. Check if power is being supplied normally.
3. Check for any alarm output pertaining to the system or module from the operator's terminal.

Items to Check After System Replacement

After replacing the system, check the result as explained below.

1. After replacing the system, check if the cables are equipped correctly.
2. After replacing the system, check if power is being supplied normally.
3. Check if the alarm corresponding to the system or module is removed from the operator's terminal.

Appendix

Abbreviation and Definitions

- 1000Base-Tx/Fx : 1Gbps Ethernet or Fiber Optic Interface
- 100Base- Tx : 100Mbps Ethernet
- ACR: Access Control Router
- ADC: Analog to Digital Converter
- ARQ: Automatic Repeat reQuest
- ASN-GW, AGW: Access Service Network Gateway
- BBP : Base Band Processor
- CC: Convolutional Code
- CLI : Command Line Interface
- CTC : Convolutional Turbo Code
- DAC : Digital to Analog Converter
- DPD : Digital Pre-Distortion
- EMS : Element Management System
- FA : Frequency Assignment
- IF : Intermediate Frequency
- LPM: Line Protection Unit
- MIMO : Multi Input Multi Output
- MM : Mobility Management
- MRC : Maximum Ratio Combining
- OAM : Operations and Maintenance
- OFDMA: Orthogonal Frequency Division Multiple Access

- PKM : Privacy Key Management
- PLD : Programmable Loading Data
- PSS : Portable Subscriber Station
- PTP : Precision Time Protocol
- PUSC: Partial Usage of Sub-Channel
- RAS : Radio Access Station
- RMP: RAS Management Processor
- SNMP : Simple Network Management Protocol
- TDD: Time Division Duplex
- TFEU : Front End Unit
- TIFM : Intermediate Frequency Module
- TMU : Main Unit
- TPAU : Power Amplifier Unit
- TPSU : Power Supply Unit
- TSGM : Synchronization GPS Module
- TSIM : Synchronization IEEE 1588 Module
- TTRU : TRansceiver Unit
- WiBro : Wireless Broadband Network, the service name of Mobile WiMAX in Korea
- WiMAX : Worldwide Interoperability for Microwave Access Forum

True Freedom New Experience with FLYVO

RAS1041 Operation Manual

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Preface

Purpose of this manual

This document provides detailed descriptions for operating RAS Radio Access Station (Radio Access Station, hereafter RAS) used in Mobile WiMAX (Wibro-Wireless Broadband Service in Korea) System.

Hereafter we will call RAS1041 system ‘RAS’ or ‘RAS1000’ for the sake of convenience unless there’s a specific need for distinction.

Manuals are available on RAS1000 specific to the subject. Refer to the following documents for detailed information on system management or operation.

- RAS1000 System Description
- RAS1000 Installation Manual

Changes & Updates

SeAH Networks keeps the manual updated so the document coincides with the changes made to the system. There, however, may be minor discrepancies resulting from the process of system upgrade or error correction. If there is any confusion due to the system change or error correction, contact the address provided in the “Contact Information” section for the accurate information.

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Contact Information

Contact us through the following contact channel to find out more detailed information on our products.

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  Seoul, South Korea (138-950)

- Telephone: 82- 2-2142-0800

Legend of Signs

Notes

Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the publication.

Caution

Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

FLYVO

FLYVO

FLYVO, a compound word of Fly + Voyage, is the Mobile WiMAX brand name of SeAH Networks.

System Overview

RAS1041 system is the system base station of Mobile WiMAX which supports Base band call processing, ACR interoperability and interface, RF signal processing over the air from the MS(Mobile Station) in a single unit.

RAS1041 is a base station that supports system profile mp05 (Formerly 3A: 2.5GHz/10MHz) of WiMAX Forum.

RAS1041 was designed to support 1FA/Omni service within a building.

RAS1041 system supports the IEEE 802.16e-2005 standard, WiMAX Forum NWG(Network Working Group) standard, and Telcodia & NEMA standards.

Notes

Changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Caution

In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, it must also have a minimum distance of 200 cm from the body during normal operation.

RAS1041 Overview

RAS1041 is a single indoor type system that can load 1FA/Omni Mobile WiMAX Channel in a single building and process hardware such as Network Interface, Digital, and RF. RAS1041 is light and compact in size for simple installation within a building. Patch Antenna for MIMO Service is placed at the front cover of RAS1041 and RF emits 200mW + 200mW.

RAS1041 was designed not for units but for a single building and used dependable equipments to secure Mobile WiMAX service without any system replacement.

RAS1041 is designed to utilize 1FA/Omni Service and provides easy indoor-type network configuration, increased capacity and affordable price range to provide basic network synchronization function.

[Figure 1 RAS1000 System]

1) RAS1041 supports the following standards and configuration.

- Supports IEEE 802.16e-2005 Cor2/D3 standard
- Has NWG system profile C structure of WiMAX Forum and supports R6 standard interface including GRE as interface between ACR and RAS
- Supports WiMAX PHY/MAC Wave 1 and MIMO (2Tx/2Rx) feature of Wave 2
- Provides filtering function to eliminate noise and small Power Amplifier to emit (200m) Watt per channel
- Has configuration structure to support maximum of 1FA/Omni
- Supports RF Band 2.496~2.690GHz and 10MHz channel bandwidth

RF Band class

Profile ID put into groups at the WiMAX Forum and was defined as band class. Band class 1 include profile ID 1.A & 1.B, Band class 2 include Profile ID 2.A, 2.B, 2.C, Band class 3 include 3.A. Refer to R1.0 Certification Profile document of WiMAX Forum for reference.

2) Main features of RAS1041 are as follows:

- Call Access Control: MS network access leads to communication between the RAS system, WiMAX system and Core Network through control signal for subscriber identification process then authorizes MS access before connecting the MS to the network.
- System Synchronization: Multiple base stations operating in adjacent locations require synchronization to the reference time and frequency to avoid interference and support handover. RAS synchronizes the system time and frequency according to the time provided by the GPS.
- Baseband Signal Processing: Provides Coding/Decoding and Modulation/Demodulation for wireless transmission of traffic data and control signal.
- Network Connection Function: Provides ACR connection function for data transmission and control signal to ACR.
- QoS Support: Provides functions necessary to maintain quality required to support uninterrupted service.
- Operation & Maintenance: Supports system operation and maintenance functions. RAS operation environment and operational characteristics can remotely be monitored via EMS since RAS administrators are working in remote locations.

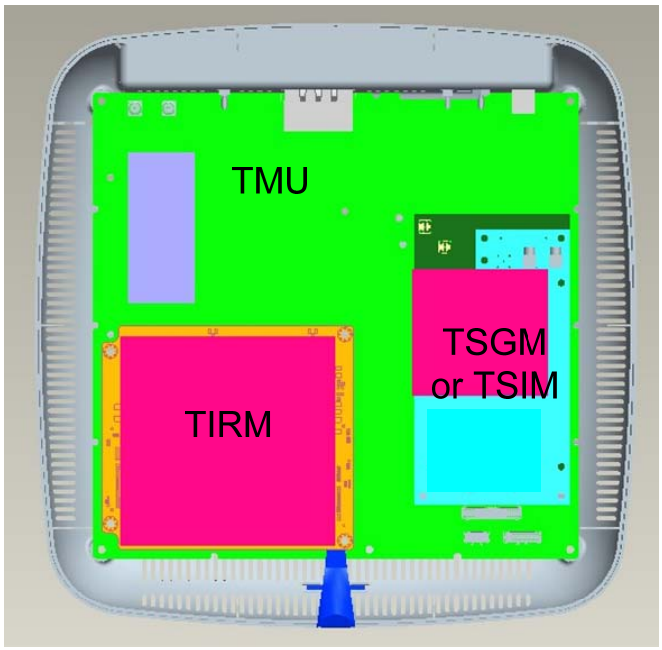
Mobile WiMAX Wave 2 Support

RAS1041 supports Mobile WiMAX Wave 2 Feature including MIMO.

RAS1000 Composition

RAS1041 is a single small/light type that supports Base band call processing, ACR interoperability and interface, RF signal processing over the air from the Mobile Station.Connection with antenna and ACR is possible through the I/O connector located at the lower bottom of the equipment. TSGM and TIRM resides as a daughter module within TMU and is connected via connector.

RAS1041 internal composition diagram is shown in Figure 2.



[Figure 2 RAS1000 Internal Composition Diagram]

(Note: Capital letter 'T' in front of every word implies RAS1041)

Item		Function
TMU (Main Unit)		• Provides WiMAX PHY/MAC modem function • Provides WiMAX 1 Carrier • Operates overall RAS system • Routing interface function to support R6 interface • ACR-RAS connection interface function and provides Fast Ethernet or Gigabit Ethernet Interface • Provides indoor RAS or outdoor IP based interface • Monitors RAS1041 operation and status and alerts error of each unit and module
Selective	**TSGM (Synchronization GPS Module)**	• Provides GPS Receiver/Clock Distributor that allocates and receives GPS signals • 24 Hour Hold-over time function • Performs IEEE1588 Master function
	TSIM (Synchronization IEEE1588 Module)	• Provides TSGM to additional RAS1041 expansion at the Multi-cell Application
TIRM (Indoor Radio Unit)		• Transmits baseband signal Up-conversion and Tx RF signal • Down-conversion of received RX IF signal and baseband signal • Modifies received frequency • Tx/Rx amplifying function • Amplifies Tx/Rx Low Noise signal • Controls Tx/Rx signal emission • Emits 200mWatts at both ANT0 & ANT1 port respectively • Tx/Rx signal filtering function

[**Table** 1 **RAS1041 Composition Description]**

RAS1041 System Specification

RAS1041 System Specifications are as follows.

Parameters		Value	Comments
General	Operating Frequency	2.496~2.690GHz	
	Channel Bandwidth	10 MHz	
	Output Power Max	200mW/Branch	@ANT port
	RF Configuration	2Tx / 2Rx	
	Numbers of TX/RX channel	2 Ports	SMA-Type Female
	Frequency Stability	0.02ppm	
	Frequency Step	250KHz	Channel raster
	ALC Range	10dB	
	Maximum input signal	-45dBm	
	Output Power Dynamic Range	30dB/1dB step	
	RX Sensitivity	-109.9dBm	@QPSK 1/2 CTC, 10MHz, AWGN, UL AMC, WiMAX RCT2.0
	Dimensions (W x H x D, mm)	270 x 270 x 87.9	
	Weight (kg)	<3Kg	Excluding Installation Bracket type
	Power Input	90~260VAC to 12VDC	External AC/DC Adaptor
		12VDC	Option
	Power Consumptions	57 Watts (Max), 50Watts (Avg)	
	Rack type	Enclosure	
	Max Capacity	1-channel	e.g.) 1FA/Omni

	Cooling	Natural convection cooling	
	ANT. Tech.	MIMO	
		SIMO/SISO	Supporting MRC in case of SIMO
	Backhaul Interface Media	10/100/1000BASE-T	
Environment	Installation Site	Indoor	Wall or Ceiling Mounting
	Operating Temperature	0 ~ + 50C°	
	Storage Temperature	- 40 ~ + 70C°	
	Operating Humidity	+10% ~ +95 %	
	Acoustic Noise	45 dBA	
Standard Compliance	Spectral Emission Mask	FCC and WiMAX Forum	
	Seismic Performance	GR-487 Core	Zone3 default,Zone4 optional
	Random Vibration	GR-487 Core	
	Sinusoidal Vibration	GR-487 Core	
	Shock	GR-487 Core	
	EMI	Class A for KN22 (EN 55022, CISPR22)	
	EMC	Class B	

[Table 2 RAS1041 System Specifications]

RAS Initial Configuration

FLYVO RAS1041 system, by default, is remotely managed by using the EMS system. For detailed description, refer to EMS Operation manual.

This document provides explanations not only for operations instructions using the EMS system but also for basic operations instructions using CLI(Command Line Interface) for various status-checking and debugging required at the time of initial RAS1041 system configuration or when needed.

Since TMU is the unit responsible for main control functions, this document also provides basic operations instruction concerning TMU.

System Operation

Checking Operation Status

CLI Start & Telnet Access

CLI Start

To use CLI command, enter the CLI start command “cliMain” from the RMP Console and switch to CLI mode by entering USER ID and PASSWORD (rmp/password).

When switched to CLI mode, CLI prompt appears in RMP console.

RMP Console

```
[BBP(0) ==>RMP]>cliMain

  USER ID :
  PASSWORD :

RMP_CLI>
RMP_CLI>
```

Telnet Access

Access Telnet to RMP console then enter USER ID and PASSWORD(rmp/password) and change to CLI mode.

RMP Console

```
User Access Verification
 USER ID  :
 PASSWORD :

Welcome to the Flyvo System
RMP_CLI>
```

Checking RAS Operation Status

Card Status

To check the working status of each module constituting RAS, enter “show card sts” from EMS or RMP console, and access the configuration information and working status of each module.

```
RMP_CLI>show card sts
CARD INFO  STATUS
 ..................
     RMP      NOR
     BBP 0    NOR
     TRP 0    NOR
     PAP 0    NOR
     PAP 1    NOR
     GPS      NOR

 RESULT : OK
 COMPLETED
```

RAS DL/UL Information Verification

Information on RAS DL/UL can be found via EMS or through “show dl/ul info” of RMP console. DL/UL information on FA/Sec is also verifiable.

```
RMP_CLI>show dl info
LOC : FA00 SECT00
-------------------------------------------------
 CCC                              :    2
 BS EIRP                           :   55 dBm
 TTG                              :   296 PSs
 RTG                              :   168 PSs
 EIRxP                            :   -88 dBm
 Frequency                         : 2550000 khz
 BSID                             : 00:00:00:01:00:40(OP:0 NSP:0 ACR:1
RAS:4 FA:0 SECT:0)
 Mac Version                       :    6
 HO type Support                    :    1
 HO Add_Threshold                   :    3 dB
 HO Del_Threshold                   :    3 dB
 Default RSSI and CINR Avg Parameter  :  0x0
 ASR slot length and switching period :  0x25
 Paging Group Id                   :  0,0,0,0
 DL AMC Allocated Physical Bands     :  0x00 00 00 ff ff ff
```

```
 Hysteresis Magin                  :    0 dB
 Time-trigger Duration             :   100 ms
 Default HO RSSI & CINR Avg Parameter :  0x2255
 maximum Retransmission            :    3
 TRIGGER INFO
 ID TYPE FUNCTION ACTION VALUE DURATION  EQUIP
 00  0x0     0x1    0x2  0x06   0x64    0x1
 01  0x0     0x0    0x0  0x00   0x00    0x0
 02  0x0     0x0    0x0  0x00   0x00    0x0
 03  0x0     0x0    0x0  0x00   0x00    0x0
 04  0x0     0x0    0x0  0x00   0x00    0x0
 05  0x0     0x0    0x0  0x00   0x00    0x0
 06  0x0     0x0    0x0  0x00   0x00    0x0
 07  0x0     0x0    0x0  0x00   0x00    0x0
 08  0x0     0x0    0x0  0x00   0x00    0x0
 09  0x0     0x0    0x0  0x00   0x00    0x0
 10  0x0     0x0    0x0  0x00   0x00    0x0
 11  0x0     0x0    0x0  0x00   0x00    0x0

 RESULT : OK
 COMPLETED

RMP_CLI>show ul info
 LOC : FA00 SECT00
-------------------------------------------------
 CCC                                : 1
 Contention-based Reservation Timeout    : 10
 HO_ranging_start                    : 1
 HO_ranging_end                      : 4
 Initial Ranging Backoff Start         : 1
 Initial Ranging Backoff End           : 4
 Bandwidth Request Backoff Start        : 1
 Bandwidth Request Backoff End          : 4
 Size of CQICH_ID Field                : 7
 Normalized C/N Override2              : 0x00 00 06 01 50 40 00 06
 Initial Ranging Codes                 : 4
 Periodic Ranging Codes                : 4
 Bandwidth Request Codes               : 16
 Periodic Ranging Backoff Start         : 1
 Periodic Ranging Backoff End           : 4
 Start of Ranging Codes Group           : 0
 Permutation Base                      : 20
 UL Allocated Subchannels Bitmap        : 0x00 00 00 00 07 ff ff ff ff
 Band AMC Allocation Threshold          :    3 dB
 Band AMC Release Threshold             :    6 dB
 Band AMC Allocation Timer              :   20 frames
 Band AMC Release Timer                 :   20 frames
 Band Status Reporting MAX Period       :  128 frames
 Band AMC Retry Timer                   :  128 frames
 Band AMC entry Average CINR            :   19 dB
 H-ARQ ACK Delay DL Burst               :    1 frames
 CQICH Band AMC Transition Delay        :   20 frames
 UL AMC Allocated physical bands bitmap  : 0x00 00 00 ff ff ff
 Use CQICH Indication flag              :    6
 Handover Raning Codes                  :    8
 initial Ranging Interval               :    4 frames
```

```
 Tx Power Report                      : 0x08 30 83
 HARQ ACk Region                      : 0x283f
 Normalized C/N Channel Sounding        : 0x64 01 2c
 Relative Power Offset For UL HARQ burst : 0xa
 Relative Power Offset for UL Burst Containing MAC Management Message :
0xe8
 Maximum Retransmission               : 3
 Fast Feedback Region                 : 0x00000c0c70
 Ranging Region                      :
0x00000000000000000000000000008300002000434

 RESULT : OK
 COMPLETED
```

Checking RAS Link Status

To check on the RAS link status, enter “show link sts” from EMS or RMP console and check the number of RAS-ACR links and working status, number of Ethernet links and operational status, ACR working status and etc.

```
RMP_CLI>show link sts
 ACR   LNK1   :   UP (Copper)
 Daisy-chain SFP: DOWN
 ACR Status   :   NOR

 RESULT : OK
COMPLETED
```

Checking RAS RF Status

Information on RAS RF can be found via EMS or through “show rf status” of RMP console.

```
RMP_CLI>show rf status
 BBPID[0]
DL Throughput:    0
UL Throughput:    0
Per         :    0

 RESULT : OK
 COMPLETED
```

Checking RAS S/W Information

With RAS S/W information inquiry, information can be retrieved on the S/W that RMP downloaded from FTP/TFTP server through EMS or CLI which is then stored in the flash memory.

Information on RAS S/W can be found on RMP Console via “show sw version” in each individual board.

```
RMP_CLI>show sw version
 bbp
 fallback
 pld
 rmp
 ru
```

ex> BBP S/W Information

```
RMP_CLI>show sw version bbp
 BBPID[0]
Software version : 3.6.1
(DCCU2 type(10))
Firmware version : 0.0.0
(DCCU1 type(0))
CPLD    version : 1.2.4
(DCCU2 type(10))
DCCU PHY   version : 0.0.0.0

 RESULT : OK
 COMPLETED
```

ex> Fallback S/W Information

```
RMP_CLI>show sw version fallback
          FallBack_Image_Name            version
        /tffs0/rmp-rlib.backup             3.6.1
        /tffs0/RASConf.backup
        /tffs0/bbp-rbpb.backup
        /tffs0/trp-rtcb.backup
        /tffs0/rep-recb.backup
        /tffs0/rpp-rpcb.backup
        /tffs0/nip-rncb.backup
        /tffs0/gpp-rgcb.backup
        /tffs0/rmp-oamb.backup             3.6.0
```

```
        /tffs0/rmp-rccb.backup              3.6.0
          /tffs0/rmp-os.backup              3.6.1
        /tffs0/bop-rbcb.backup
        /tffs0/dtp-rdcb.backup

 RESULT : OK
 COMPLETED
```

ex> PLD Information

```
RMP_CLI>show sw version pld
        PLD INFO
        Version : 0.10.3
        RelYear : 1970
        RelMonth: 0
        RelDay  : 1
        RelHour : 0
        RelMin  : 0

RESULT : OK
COMPLETED
```

ex> RMP S/W Information

```
RMP_CLI>show sw version rmp
Block Type         size         blkname       LD_STS
Flash_Ver/Rmp_Run_Ver    Loading Time        Compile Time
        0      4597772        rmp-rlib      LD_INIT      3.6.1(     3.6.1)
1980/01/01 00:13:08 2009/11/03 14:55:43
        1       650685         RASConf      LD_INIT     0.10.3
1980/01/01 00:11:32 0000/00/00 00:00:00
        8            0        gpp-rgcb      LD_INIT      0.0.0
--------------------
       10      5658472        rmp-oamb      LD_INIT      3.6.1(     3.6.1)
1980/01/01 00:16:54 2009/11/03 14:55:43
       11      5149804        rmp-rccb      LD_INIT      3.6.1(     3.6.1)
1980/01/01 01:36:34 2009/11/03 13:59:14
       12      6726972          rmp-os      LD_INIT      3.6.1(     3.6.1)
1980/01/01 01:25:50 2009/11/03 13:59:53

 TCU F/W Version : 1.2.4
 TIU F/W Version : 9.4.4

RESULT : OK
COMPLETED
```

Managing RAS Loading History

RMP manages loading history on the processors, which retrieves the loading history from the RAS system.

The following commands enable to check the most recent loading status and operating status.

```
RMP_CLI>load show sw info

Block Type         size         blkname       LD_STS
Flash_Ver/Rmp_Run_Ver    Loading Time        Compile Time
        0      4594812        rmp-rlib      LD_INIT      3.6.0(    3.6.0)
1980/01/01 00:06:22 2009/10/30 15:23:25
        1       650685         RASConf      LD_INIT     0.10.3
1980/01/01 00:09:18 0000/00/00 00:00:00
        8            0        gpp-rgcb      LD_INIT      0.0.0
--------------------
       10      5658432        rmp-oamb      LD_INIT      3.6.0(    3.6.0)
1980/01/01 00:07:22 2009/10/30 15:23:25
       11      5151560        rmp-rccb      LD_INIT      3.6.0(    3.6.0)
1980/01/01 00:08:26 2009/10/30 15:23:26
       12      6726296          rmp-os      LD_INIT      3.6.0(    3.6.0)
1980/01/01 00:03:34 2009/10/30 15:24:01

 TCU F/W Version : 1.2.4
 TIU F/W Version : 9.4.4
 RESULT : OK
COMPLETED
```

Alarm Processing System

When alarm sets off, RMP immediately detects the alarm and reports it to EMS. In addition, RAS stores 1000 alarm incidents and sends the stored information to EMS when requested.

Checking RAS Alarm Information

The following command enables to verify the current alarm status.

```
RMP_CLI>show alarm info

type :0(RMP),1(BBP),2(TRB),3(PAB),4(FEB),7(REMU),9(FAN),10(GPS),11(RECT),
17(ACR),20(LINK)
```

ex> GPS Alarm Information

```
RMP_CLI>show alarm info 10
CARD    ALAM INFO       INH/ALW      Alarm Time
 ------------------------------------------------------
  GPS_A  LOCK FAIL          ALW

 RESULT : OK
 COMPLETED
```

RAS Alarm LIST Information

RAS alarm information can be checked by using “show alarm list” command. The following command enables to verify the entire alarm information administrated by RMP (alarm code, alarm name, and alarm level). Alarm level is classified and indicated as Critical (CRI), Major (MAJ), and Minor (MIN).

```
RMP_CLI>show alarm list
 ================================
   CODE        DESCRIPTION    GRADE
 ................................
```

A1000	RMP	BOARD DELETION	CRI
A1001	RMP	FUCNTION FAIL	CRI
A1002	RMP	PROCESSOR DOWN	CRI
A1003	RMP	CPU CRI OVERLOAD	CRI
A1004	RMP	CPU MAJ OVERLOAD	MAJ
A1005	RMP	CPU MIN OVERLOAD	MIN
A1006	RMP	CPU WARN OVERLOAD	WRN
A1007	RMP	PROCESS ALARM	CRI
A1008	RMP	HIGH TEMP ALARM	CRI
A1009	RMP	LOW TEMP ALARM	CRI
A1050	RMP	POWER FAIL	CRI
A1053	RMP	MEM CRI OVERLOAD	CRI
A1054	RMP	MEM MAJ OVERLOAD	MAJ
A1055	RMP	MEM MIN OVERLOAD	MIN
A1056	RMP	MEM WARN OVERLOAD	WRN
A1010	GPS	BOARD DELETION	CRI
A1011	GPS	PROCESSOR DOWN	CRI
A1012	GPS	PWR_FAIL	CRI
A1013	GPS	OCXO_FAI	CRI
A1014	GPS	HOLDOVER	CRI
A1015	GPS	FEC_END_FULL_RANGE	CRI
A1016	GPS	ANT_OPEN	CRI
A1017	GPS	ANT_SHORT	CRI
A1018	GPS	CLK_FAIL	CRI
A1019	GPS	ENGINE_FAIL	CRI
A1020	GPS	LOCK FAIL	CRI
A1021	GPS	HOLDOVER_STS	CRI
A1022	GPS	FUNCITON FAIL	CRI
A1100	BBP	BOARD DELETION	CRI
A1101	BBP	FUCNTION FAIL	CRI
A1102	BBP	PROCESSOR DOWN	CRI
A1103	BBP	CPU CRI OVERLOAD	CRI
A1104	BBP	CPU MAJ OVERLOAD	MAJ
A1105	BBP	CPU MIN OVERLOAD	MIN
A1106	BBP	CPU WARN OVERLOAD	WRN
A1107	BBP	PHY DOWN	CRI
A1108	BBP	USER CRI OVERLOAD	CRI
A1109	BBP	USER MAJ OVERLOAD	MAJ
A1110	BBP	USER MIN OVERLOAD	MIN
A1111	BBP	USER WARN OVERLOAD	WRN
A1112	BBP	MEM CRI OVERLOAD	CRI
A1113	BBP	MEM MAJ OVERLOAD	MAJ
A1114	BBP	MEM MIN OVERLOAD	MIN
A1115	BBP	MEM WARN OVERLOAD	WRN
A1116	BBP	ACTSF CRI OVERLOAD	CRI
A1117	BBP	ACTSF MAJ OVERLOAD	MAJ
A1118	BBP	ACTSF MIN OVERLOAD	MIN
A1119	BBP	ACTSF WRN OVERLOAD	WRN
A1120	BBP	THRUP CRI OVERLOAD	CRI
A1121	BBP	THRUP MAJ OVERLOAD	MAJ
A1122	BBP	THRUP MIN OVERLOAD	MIN
A1123	BBP	THRUP WAN OVERLOAD	WRN
A1124	BBP	THRDN CRI OVERLOAD	CRI
A1125	BBP	THRDN MAJ OVERLOAD	MAJ
A1126	BBP	THRDN MIN OVERLOAD	MIN
A1127	BBP	THRDN WAN OVERLOAD	WRN

A1128	BBP	ROT MEASURE WAN	WRN
A1129	BBP	SYSTEM CLOCK FAIL	CRI
A1130	BBP	1PPS FAILURE	CRI
A1131	BBP	PLL FAIL	CRI
A1132	BBP	BBP PHY LOAD FAIL	CRI
A1200	TRB	BOARD DELETION	CRI
A1201	TRB	FUCNTION FAIL	CRI
A1202	TRB	PROCESSOR DOWN	CRI
A1203	TRB	IF PLL LOCK FAIL	CRI
A1204	TRB	RF PLL LOCK FAIL	CRI
A1205	TRB	A SERDES UNLOCK	CRI
A1206	TRB	B SERDES UNLOCK	CRI
A1207	TRB	FREQUENCY MISMATCH	CRI
A1208	TRB	C SERDES UNLOCK	CRI
A1300	PAB	BOARD DELETION	CRI
A1301	PAB	FUCNTION FAIL	CRI
A1302	PAB	OVER POWER	CRI
A1303	PAB	OVER TEMPERATURE	CRI
A1304	PAB	VSWR	CRI
A1305	PAB	DC FAIL	CRI
A1306	PAB	FRAME SYNC	CRI
A1307	PAB	LOW GAIN	CRI
A1308	PAB	OVER POWER WARN	WRN
A1309	PAB	DISABLE	CRI
A1310	PAB	LOW INPUT POWER	CRI
A1400	FEB	BOARD DELETION	CRI
A1402	FEB	LNA A FAULT	CRI
A1403	FEB	LNA B FAULT	CRI
A2300	RECT	RECT CABLE OPEN	MIN
A2301	RECT	RECT FUNCTION FAIL	MIN
A2302	RECT	RECT AC INPUT FAIL	CRI
A2303	RECT	RECT SHOUTDOWN	MIN
A2304	RECT	RECT OUT VOL HIGH	MIN
A2305	RECT	RECT OUT VOL LOW	MIN
A2306	RECT	RECT OUT CURRENT	MIN
A2307	RECT	RECT BATT DISCONN	MIN
A2308	RECT	RECT BATT LOW	MIN
A2309	RECT	RECT BATT CELL	MIN
A2310	RECT	RECT AC NFB FAIL	MIN
A2311	RECT	RECT MODULE 1 FAIL	MIN
A2312	RECT	RECT MODULE 2 FAIL	MIN
A2313	RECT	RECT MODULE 3 FAIL	MIN
A2314	RECT	RECT MODULE 4 FAIL	MIN
A2315	RECT	RECT MODULE 5 FAIL	MIN
A2316	RECT	RECT HMS FAIL	MIN
A2317	RECT	RECT FIRE	MIN
A2318	RECT	RECT HUMIDITY	MIN
A2319	RECT	RECT DOOR OPEN	MIN
A2321	RECT	RECT FLOOD	MIN
A2322	RECT	RECT BATT RELAY ALM	MIN
A2323	RECT	RECT BATT HEAT FAIL	MIN
A2324	RECT	RECT TEMP SENSOR	MIN
A2325	RECT	RECT TEMP HIGH	MIN
A2326	RECT	RECT TEMP LOW	MIN
A2327	RECT	RECT DC NFB FAIL	MIN
A2328	RECT	RECT SYS RELAY FAIL	MIN

```
 A2331  RECT RECT MODULE 1 DEL      MIN
 A2332  RECT RECT MODULE 2 DEL      MIN
 A2333  RECT RECT MODULE 3 DEL      MIN
 A2400  RECT BAT CABLE OPEN        MIN
 A2401  RECT BAT FUNCTION FAIL      MIN
 A2402  RECT BAT DOOR OPEN         MIN
 A2403  RECT BAT FLOOD            MIN
 A2404  RECT BAT FIRE             MIN
 A2405  RECT BAT TEMP SENSOR       MIN
 A2406  RECT BAT HEAT FAIL         MIN
 A2407  RECT BAT FAN FAIL          MIN
 A2408  RECT BAT TEMP HIGH         MIN
 A2409  RECT BAT TEMP LOW          MIN
 A3000  ACR   PROCESSOR DOWN       CRI
 A3001  ACR   LINK FAIL           CRI
 A3002  ETH   LINK FAIL           CRI

RESULT : OK
COMPLETED
```

Checking RAS Alarm History

Alarm history occurred in RAS can be checked by using “show alarm history”.

```
RMP_CLI>show alarm history
 history count : 0-1000
RMP_CLI>show alarm history 100
larmHistCnt 119 alarmHistCur 119
 index  code type severity shelf slot link alarmtime     flag  inh
BlkName
    0 A1712   7       0    0    0    0 20091011103242    1    0
    1 A2510   15      0    1    9  255 20091011103239    1    0
    2 A2509   15      0    1    9  255 20091011103239    1    0
    3 A1102   1       1    1    7    0 20091011103225    1    0
    4 A1712   7       0    0    0    0 20091011103217    1    0
    5 A2510   15      1    1    9  255 20091011103217    1    0
    6 A2509   15      1    1    9  255 20091011103217    1    0
    7 A1712   7       0    0    0    0 20091011103205    1    0
    8 A1101   1       1    1    7    0 20091011103205    1    0
    9 A1100   1       1    1    7    0 20091011103205    1    0
   10 A2519   15      0    1    9    1 20091011103158    1    0
   11 A2519   15      1    1    9    1 20091011103158    1    0
   12 A2518   15      0    1    9    1 20091011103158    1    0
   13 A1202   2       1    4    5    0 20091011103155    1    0
   14 A2518   15      1    1    9    2 20091011103155    1    0
   15 A1309   3       0    4    6    0 20091010161636    1    0
   16 A1309   3       0    4    7    0 20091010161622    1    0
   17 A1309   3       1    4    7    0 20091010161507    1    0
   18 A1309   3       1    4    6    0 20091010161456    1    0
   19 A3001   20      0    1    2    1 20091010161448    1    0
   20 A3001   20      1    1    2    1 20091010161440    1    0
   21 A3001   20      0    1    2    1 20091010161439    1    0
   22 A3001   20      1    1    2    1 20091010161435    1    0
   23 A1309   3       0    4    7    0 20091010145411    1    0
   24 A1309   3       0    4    6    0 20091010145314    1    0
   25 A1309   3       1    4    7    0 20091010145219    1    0
   26 A1309   3       1    4    6    0 20091010145208    1    0
   27 A3001   20      0    1    2    1 20091010145201    1    0
   28 A3001   20      1    1    2    1 20091010145152    1    0
   29 A3001   20      0    1    2    1 20091010145152    1    0
   30 A3001   20      1    1    2    1 20091010145148    1    0
   31 A1021   10      0    1    4    0 20091010122401    1    0
   32 A1021   10      1    1    4    0 20091010122319    1    0
   33 A1021   10      0    1    4    0 20091010122014    1    0
   34 A1021   10      1    1    4    0 20091010121923    1    0
   35 A1309   3       0    4    6    0 20091010095421    1    0
   36 A1102   1       0    1    7    0 20091010095304    1    0
   37 A1712   7       0    0    0    0 20091010095247    1    0
   38 A1101   1       0    1    7    0 20091010095247    1    0
   39 A2512   15      0    1    9  255 20091010095245    1    0
   40 A2511   15      0    1    9  255 20091010095245    1    0
   41 A1102   1       1    1    7    0 20091010095244    1    0
```

```
42 A1309    3       1     4     6     0 20091010095236    1    0
43 A1712    7       0     0     0     0 20091010095223    1    0
44 A1101    1       1     1     7     0 20091010095223    1    0
45 A2512   15       1     1     9   255 20091010095223    1    0
46 A2511   15       1     1     9   255 20091010095223    1    0
47 A1106    1       0     1     7   255 20091010095005    1    0
48 A1105    1       0     1     7   255 20091010095004    1    0
49 A1106    1       1     1     7   255 20091010095004    1    0
50 A1104    1       0     1     7   255 20091010095002    1    0
51 A1105    1       2     1     7   255 20091010095002    1    0
52 A1103    1       0     1     7   255 20091010095001    1    0
53 A1104    1       3     1     7   255 20091010095001    1    0
54 A1104    1       0     1     7   255 20091010094844    1    0
55 A1103    1       4     1     7   255 20091010094844    1    0
56 A1105    1       0     1     7   255 20091010094843    1    0
57 A1104    1       3     1     7   255 20091010094843    1    0
58 A1106    1       0     1     7   255 20091010094842    1    0
59 A1105    1       2     1     7   255 20091010094842    1    0
60 A1106    1       1     1     7   255 20091010094839    1    0
61 A1006    0       0     1     4   255 20091010094640    1    0
62 A1005    0       0     1     4   255 20091010094638    1    0
63 A1006    0       1     1     4   255 20091010094638    1    0
64 A1006    0       0     1     4   255 20091010094635    1    0
65 A1005    0       2     1     4   255 20091010094635    1    0
66 A1005    0       0     1     4   255 20091010094625    1    0
67 A1006    0       1     1     4   255 20091010094625    1    0
68 A1006    0       0     1     4   255 20091010094613    1    0
69 A1005    0       2     1     4   255 20091010094613    1    0
70 A1006    0       1     1     4   255 20091010094517    1    0
71 A1309    3       0     4     7     0 20091009175816    1    0
72 A1309    3       0     4     6     0 20091009175715    1    0
73 A1309    3       1     4     7     0 20091009175548    1    0
74 A1309    3       1     4     6     0 20091009175536    1    0
75 A3001   20       0     1     2     1 20091009175530    1    0
76 A3001   20       1     1     2     1 20091009175522    1    0
77 A3001   20       0     1     2     1 20091009175521    1    0
78 A3001   20       1     1     2     1 20091009175517    1    0
79 A3001   20       0     1     2     1 20091009175051    1    0
80 A3001   20       0     1     2     2 20091009175050    1    0
81 A1011   10       0     1     4     0 20091009175045    1    0
82 A3001   20       1     1     2     1 20091009175045    1    0
83 A3001   20       1     1     2     2 20091009175011    1    0
84 A3001   20       0     1     2     1 20091009175011    1    0
85 A3001   20       1     1     2     1 20091009175009    1    0
86 A3001   20       1     1     2     2 20091009174936    1    0
87 A3001   20       0     1     2     1 20091009174936    1    0
88 A3001   20       1     1     2     1 20091009174933    1    0
89 A1011   10       1     1     4     0 20091009174920    1    0
90 A1309    3       0     4     7     0 20091009174901    1    0
91 A1306    3       0     4     7     0 20091009174901    1    0
92 A3001   20       1     1     2     2 20091009174900    1    0
93 A3001   20       0     1     2     1 20091009174900    1    0
94 A3001   20       1     1     2     2 20091009174858    1    0
95 A3001   20       1     1     2     1 20091009174857    1    0
96 A1309    3       0     4     6     0 20091009174836    1    0
97 A1301    3       0     4     7     0 20091009174836    1    0
```

```
   98 A1301    3       0     4    6    0 20091009174836    1    0
   99 A1712    7       0     0    0    0 20091009174816    1    0

RESULT : OK
COMPLETED
```

Overload Control System

Control RAS overload by adjusting the threshold value of overload control parameter in the BBP and RMP in TMU. The following show how each card controls the overload control parameters.

- RMP : CPU usage
- BBP : Slot usage

Overload control target of TMU (RMP)

Currently only the CPU usage rate of RMP is being periodically monitored and controlled.

Overload control target of TMU (BBP)

Currently for BBP, Slot usage are being periodically monitored and controlled

RAS overload status is classified into the following four types. The table below defines the control details according to the overload status.

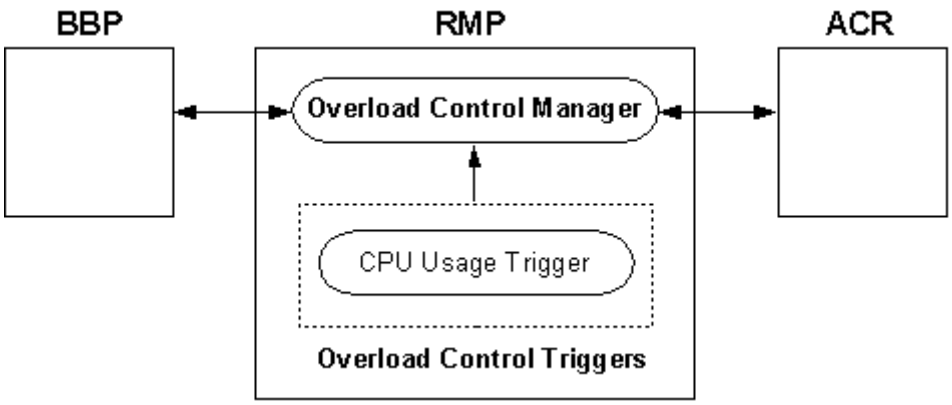
- Normal (or White)
- Minor (or Yellow)
- Major (or Orange)
- Critical (or Red)

Overload Status	Overload Command Status	Overload Control
Normal	● (White)	No Action
Minor	● (Yellow)	Performs DREG on the calls in Network Entry
Major	● (Orange)	Ignores Initial CDMA code ranging request, but processes handover CDMA code ranging and handover reservation request.
Critical	● (Red)	Ignores all CDMA code ranging including handover reservation request.

[Table 3 RAS1041 Overload Status]

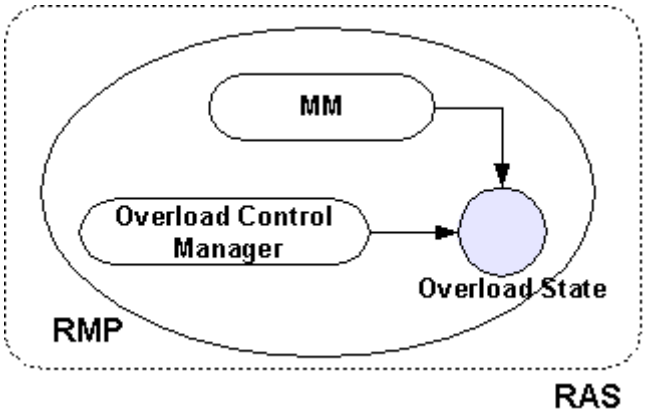
RMP overload control consists of Overload Control Triggers and Overload Control manager as shown in Figure 3. Functions each block performs are as follows.

- Overload Control Triggers
  Sends periodic monitors on usage rate of each resource, and periodic reports on current usage rate to “Overload Control Manager”.
- Overload Control Manager
  Control system overload status according to the values detected from the overload control triggers. It reports to BBP and ACR the corresponding status every time RMP’s overload status changes and BBP and ACR responds appropriately according to RMP’s overload status.

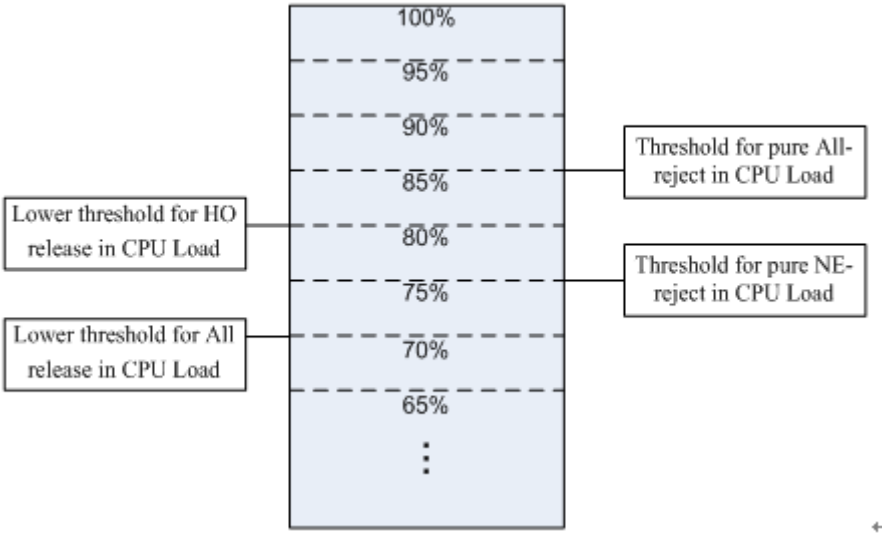


[Figure 3 Overload Control Flow of RMP]

RMP consists of blocks such as ADM, PKM, & MM and it interacts with MM block that processes handover for overload control. MM block determines whether to perform handover according to overload control status of RMP. As illustrated in Figure 5, BBP, as in RMP's overload control mechanism, manages overload status according to CPU usage rate. RAS system operates according to each overload status as shown in the Table 4 and Table 5.



[Figure 4 Overload Control Composition of RMP]



[Figure 5 BBP Overload Control threshold]

Identifier	Call Processing for New Users	NHO	Call Processing for Current Users
Critical	deny	deny	deny
Suspended Zone (critical to major)	N/A	N/A	N/A
Major	deny	allow	allow
Suspended Zone (major to minor)	N/A	N/A	N/A
Minor	deny	allow	allow
Suspended Zone (minor to normal)	N/A	N/A	N/A
Normal	allow	allow	allow

[Table 4 Overload control status per each status]

Threshold Name	Size (Bytes)	Default Value (%)	Min	Max
Upper threshold value of CPU usage (%) for Suspended Zone for Critical	1	70	60	80
Lower threshold value of CPU usage(%) for Suspended Zone for Critical	1	65	55	75
Upper threshold value of CPU usage(%) for Suspended Zone for Major	1	60	50	70
Lower threshold value of CPU usage(%) for Suspended Zone for Major	1	55	45	65
Upper threshold value of CPU usage(%) for Suspended Zone for Minor	1	40	30	50
Lower threshold value of CPU usage(%) for Suspended Zone for Minor	1	35	25	45

[**Table** 5 **Default threshold value for Overload Control]**

Setting up and storing of overload control threshold value

Default threshold value for RAS overload control is provided as PLD. Using EMS, operator can modify and store each threshold value

Checking Threshold Value

Overload threshold value can be inquired by using the “show overload” command. Use “0” for CPU and “1” for BBP Slot in the TYPE field.

```
RMP_CLI>show overload
param : 0(CPU),1(BBP Slot)
```


Ex) To inquire overload status of TMU, enter “show overload 0” as shown in the example below.

```
RMP_CLI>show overload 0
PROCESSOR  ID  CPU  MEM
      TMU  -   01   60

 RESULT : OK
 COMPLETED

RMP_CLI>sh overload 1
 BBPID  DL_SLOT UL_SLOT
  0        000    000

 RESULT : OK
 COMPLETED
```

Statistics

RAS provides the following statistics.

Code	Name	Fields	Description
1301	Handover	ACR_HO_ATT	Total inter ACR handover attempt
		ACR_HO_SUC	Total inter ACR handover Success
		RAS_HO_ATT	tempt
		RAS_HO_SUC	Total inter RAS handover Success
		FA_HO_ATT	Total FA handover attempt
		FA_HO_SUC	Total FA handover Success
1302	Inter Sector &Inter RAS HHO	HHO_ATT	Hard Handover Attempt count
		HHO_SUC	Hard Handover Success count
		HHO_TOT_FAIL	HHO Total Fail count
		Hard_Sec_HO	Between Sector HO at Hard Handover success
		Hard_RAS_HO	Between RAS HO at Hard Handover success
		Hard_Freq_HO	Between FA HO at Hard Handover success
		HHO_SYSFLT	the number that Hard handover fail reason is unknown (system fault)
		HO_INV_NBR	Mismatch between the neighbor list in PSS and the neighbor list in RAS
		HO_DST_TO	No response from target RAS after sending Pre-Notification Message from target RAS within S_HO_DECISION time
		HO_RSV_FAIL	Fail response from BBP to resource reservation request
		HO_RSV_TO	No response from BBP after resource reservation request within T_HO_RSRC_PENDING time
		HO_NO_RE	When Hard Handover, PSS does not reentry to target cell within T_HO_PSS_ENTRY time
		HO_IND_TO	No MOB-HO-IND from PSS after sending MOB-BSHO-RSP within T_HO-IND-PENDING time
		HO_CFM_TO	No confirm or withdraw response from serving RAS to Pre-Notification Response of target RAS within

Code	Name	Fields	Description
			T_HO_CONFIRM_PENDING time
		HO_RM_DSX_TIMEOUT	No response from BBP to service flow Add/Delete/Change request of RMP within certain time in target RAS
1303	FBSS Handover	FBSS_ADD_ATT	FBSS ADD Handover Attempt Count
		FBSS_ADD_SUC	FBSS ADD Handover Success Count
		FBSS_DROP_ATT	FBSS DROP Handover Attempt Count
		FBSS_DROP_SUC	FBSS DROP Handover Success Count
		HO_INV_NBR	Mismatch between the neighbor list in PSS and the neighbor list in RAS
		HO_INV_AS	Mismatch between active set in PSS and active set in RAS
		HO_DST_TO	No response from target RAS after sending Pre-Notification Message from target RAS within S_HO_DECISION time
		HO_RSV_FAIL	Fail response from BBP to resource reservation request
		HO_RSV_TO	No response from BBP after resource reservation request within T_HO_RSRC_PENDING time
		HO_IND_TO	No MOB-HO-IND from PSS after sending MOB-BSHO-RSP within T_HO-IND-PENDING time
		HO_CFM_TO	No confirm or withdraw response from serving RAS to Pre-Notification Response of target RAS within T_HO_CONFIRM_PENDING time
		HO_AU_FAIL	Fail response from RAS in Active set to Anchor Update for SHO/FBSS
		HO_AU_TO	No response from RAS in active set to Anchor Update for SHO/FBSS within the T_ANCHOR_UPDATE
		HO_DSX_FAIL	Fail response from Active Set to Service Flow Add/Delete/Change request for SHO/FBSS
		HO_DSX_TO	No response to service flow add/delete/change request for SHO/FBSS within a certain time
		HO_RM_DSX_FAIL	Fail response from BBP to service flow add/delete/change request of RMP for SHO/FBSS
		HO_RM_DSX_TIMEOUT	No response from BBP to service flow Add/Delete/Change request of RMP within certain time in target RAS

Code	Name	Fields	Description
		FBSS_SYSFLT	FBSS handover fail reason is unknown (system fault)

Code	Name	Fields	Description
1304	Inter ACR Hard Handover	ACR_ATT	Inter ACR Handover attempt
		HO_ACR_ATT	HHO success count in Inter ACR Handover attempt
		FBSS_ACR_ATT	FBSS success count in Inter ACR Handover attempt
		HHO_ACR_NFA_SUC	Success count without frequency change for Inter ACR HHO
		HHO_ACR_FA_SUC	Success count with frequency change for Inter ACR HHO
		HHO_ACR_FAIL	Total fail count for inter ACR HHO
		HO_INV_NBR	Mismatch between the neighbor list in PSS and the neighbor list in RAS
		HO_INV_AS	Mismatch between active set in PSS and active set in RAS
		HO_DST_TO	No response from target RAS after sending Pre-Notification Message from target RAS within S_HO_DECISION time
		HO_RSV_FAIL	Fail response from BBP to resource reservation request
		HO_RSV_TO	No response from BBP after resource reservation request within T_HO_RSRC_PENDING time
		HO_NO_RE	When Hard Handover, PSS does not reentry to target cell within T_HO_PSS_ENTRY time
		HO_IND_TO	No MOB-HO-IND from PSS after sending MOB-BSHO-RSP within T_HO-IND-PENDING time
		HO_CFM_TO	No confirm or withdraw response from serving RAS to Pre-Notification Response of target RAS within T_HO_CONFIRM_PENDING time
		HO_AU_FAIL	Fail response from RAS in Active set to Anchor Update for SHO/FBSS
		HO_AU_TO	No response from RAS in active set to Anchor Update for SHO/FBSS within the T_ANCHOR_UPDATE
		HO_DSX_FAIL	Fail response from Active Set to Service Flow Add/Delete/Change request for SHO/FBSS
		HO_DSX_TO	No response to service flow

Code	Name	Fields	Description
			add/delete/change request for SHO/FBSS within a certain time
		HO_RM_DSX_FAIL	Fail response from BBP to service flow add/delete/change request of RMP for SHO/FBSS
		HO_RM_DSX_TIMEOUT	No response from BBP to service flow Add/Delete/Change request of RMP within certain time in target RAS
		HHO_ACR_UNKWN	the number that Inter ACR Hard Handover fail reason is unknown reason (system fault)
1401	RF Transmitter	TX_PWS	Average Transmitter Power Gain
		PRE_PWS	Average Preamble Power Gain
		DL_THRU	Downstream Throughput
1402	RF Receiver	RX_PWS	Average Receiver Power Gain
		RSSI	Received Signal Strength Indication
		CINR	Carrier to Interference and Noise Ratio
		P_VSWR	Average Primary Tx/Rx VSWR
		S_VSWR	Average Secondary Rx VSWR
		T_VSWR	Average Third Rx VSWR
		F_VSWR	Average Fourth Rx VSWR
		UL_THRU	Upstream Throughput
1403	DL Traffic	DL_MAC_SDU	the number of MAC SDUs that have been transmitted (refer wmanIfBsSsMacSduCount in 802.16f)
		DL_OCTET	the number of octets of MAC SDUs that have been transmitted (refer wmanIfBsSsOctetCount in IEEE802.16f)
		DL_MAC_PDU	The number of MAC PDUs that have been transmitted (wmanIfBsSsMacPduCount in IEEE802,16f)
1405	UL Traffic	UL_MAC_SDU	the number of MAC SDUs that have been received (refer wmanIfBsSsMacSduCount in 802.16f)
		UL_OCTET	the number of octets of MAC SDUs that have been received (refer wmanIfBsSsOctetCount in IEEE802.16f)
		UL_MAC_PDU	The number of MAC PDUs that have been transmitted (wmanIfBsSsMacPduCount in IEEE802,16f)
		UL_MAC_CRCERR	the number of MAC PDUs received with CRC verification failed. (wmanIfBsSsMacPduCrcErrCount in IEEE 802.16f)
1002	Connection	NW_ATT	Network Entry Attempt Count , from

Code	Name	Fields	Description
	Status		Ranging to SBC-REQ through Uplink Channel
		NW_SUC	Network Entry Success Count, from SBC-REQ to first DSA-REQ
		SVC_CON	ongoing connection count
		NORM_REL	Normal released PSS count using DEREG
		BS_REL	Force released PSS count by RAS OAM Demand Message
		PWR_DWN	Force released PSS count by PSS power off
		NO_MAC	No MAC Address when RNG-REQ/REG-REQ
		AUTH_FAIL	Authentication Fail Count
		SF_UNA	Service Flow Unavailable
		AVR_DL_THRU	Average downlink throughput per User (MAC Address)
		AVR_UL_THRU	Average uplink throughput per User (MAC Address)
		AVR_SUC	Average Success Rate(%) = NW_SUC/NW_ATT * 100
		AVR_FAIL	Average Fail Rate (%)= (NO_MAC + AUTH_FAIL + SF_UNA+ACR_FAIL+ACR_UNA) /NW_ATT * 100
		AVR_USG	Average Usage Rate(%) = (AVR_DL_THRU+AVR_UL_THRU)/(MAX_DL_THRU+MAX_UL_THRU) * 100
1003 Network Entry Fail Reason	NOR_REL	Normal Network Exit through deregistration	
		HO_REL	Normal Network Exit caused by HO
		OAM_REL	Connection Release forcedly as OAM side
		NO_MAC	No MAC Address in BBP during RNG-REQ /REG-REQ processing
		AUTH_FAIL	Authentication Fail
		SF_UNA	Service Flow Unavailable, no more resource to create service flow at BBP
		DSA_FAIL	Service Flow DSA Fail
		DSC_FAIL	Service Flow DSC Fail
		DSD_FAIL	Service Flow DSD Fail
		INVD_CID	Invalid CID in 802.16 MAC management

Code	Name	Fields	Description
			messages
		UNK_MSG	Unknown 802.16 MAC management messages
		UNK_PARA	Unknown Parameter in 802.16 MAC management messages
1101	Processing Time	AVG_CONN_TIME	Average Duration From Registration to Deregistration
		AVG_SVC_TIME	Average Duration on service
		AVG_DELAY_TIME	Average Duration Time From Scanning to Registration
1102	CID	USD_BASIC	Average Used Basic CID Count
		ALLOC_BASIC	Allocated BASIC CID Count
		USD_PRIM	Average Used Primary Mgmt CID Count
		ALLOC_PRIM	Allocated Primary Mgmt CID Count
		USD_TRANS	Average Used Transport CID Count
		ALLOC_TRANS	Allocated Transport or Secondary Management CID Count
		USD_MCAST	Average Multicast CID Count
		ALLOC_MCAST	Allocated Multicast CID Count
1201	PSS State Transition	TOT_CNT	Total PSS Count
		TOT_ACT	PSS Count in Active Mode
		TOT_SLP	PSS Count in Sleep Mode
		TOT_IDL	PSS Count in Idle Mode
1202	PSS Attach	RNG_CNT	number of PSS completed initial network entry
		SBC_CNT	number of PSS completed Capability Negotiation
		PKM_CNT	number of PSS completed authentication
		REG_CNT	number of PSS completed registration
1501	RAS MAC Message	RNG_ATT	Ranging Attempt count
		RNG_SUC	Ranging Success Count
		SBC_ATT	SBC(SS Basic Capability) Attempt count
		SBC_SUC	SBC(SS Basic Capability) Success Count
		PKM_ATT	PKM Attempt count
		PKM_SUC	PMK Success Count
		REG_ATT	Registration Attempt count
		REG_SUC	Registration Success Count
		DEREG_ATT	MAC Deregistration Attempt Count
		DEREG_SUC	MAC Deregistration Success Count
		DSX_ATT	DSA/DSC/DSD Total Attempt Count
		DSX_SUC	DSA/DSC/DSD Total Success Count

Code	Name	Fields	Description
		MCA_ATT	Multicast Polling Assignment Attempt Count
		MCA_SUC	Multicast Polling Assignment Success Count
		DPBC_ATT	Downlink Burst Profile Change Attempt Count
		DPBC_SUC	Downlink Burst Profile Change Success Count

[Table 6 RAS1041 Statistics]

Statistics on RAS can be checked via EMS.

Configuration Management

Boot Parameter Configuration

For RMP initialization, load the RMP image file stored in local flash memory. If RMP image file does not exist in the local flash memory of RMP, download RMP image from EMS via FTP or TFTP and boot RMP. In order to do so, following steps need to be followed for boot parameter change and rebooting.

- To check Boot command, type in “help” from VxWorks prompt. That is, “[VxWorks Boot]: help”.
- To change boot parameter, enter “c” from VxWorks prompt. That is, “[VxWorks Boot]: c”.
- To reboot after changing boot parameter, enter “@” command from VxWorks prompt. That is “[VxWorks Boot]: @”.

RMP Console

```
[RAS1041 Boot]: help
?                   - print this list
@                   - boot (load and go)
p                   - print boot params
c                   - change boot params
l                   - load boot file
g adrs               - go to adrs
d adrs[,n]            - display memory
m adrs               - modify memory
f adrs, nbytes, value - fill memory
t adrs, adrs, nbytes  - copy memory
e                   - print fatal exception
v                   - print boot logo with version
P                   - print error log
C                   - clear error log
T                   - tffs file commands
n netif              - print network interface device address
M [dev][unitNo] [MAC] - set/display ethernet address
$dev(0,procnum)host:/file h=# e=# b=# g=# u=usr [pw=passwd] f=#
                      tn=targetname s=script o=other
boot device: tffs=drive,removable    file name: /tffs0/vxWorks
Boot flags:
  0x02  - load local system symbols
  0x04  - don't autoboot
  0x08  - quick autoboot (no countdown)
```

```
   0x20  - disable login security
   0x40  - use bootp to get boot parameters
   0x80  - use tftp to get boot image
   0x100 - use proxy arp
   0x2800 - use ftp to get VXWORKS and store it to TFFS(C0)
   0x2880 - use tftp to get VXWORKS and store it to TFFS
   0x3000 - use ftp to install ALL and store it to TFFS
   0x4400 - use ftp to get BOOTROM and store it to TFFS/FLASH(C2)
   0x4480 - use tftp to get BOOTROM and and store it to TFFS/FLASH

available boot devices:Enhanced Network Devices
 mottsec0 mottsec1 tffs

[RAS1041 Boot]:
[RAS1041 Boot]: c                          ← Change Boot Parameters

'.' = clear field;  '-' = go to previous field;  ^D = quit

boot device         : tffs=0,01
processor number    : 0
host name           : flyvo
file name           : /tffs0/rmp-os
inet on ethernet (e) : 210.181.13.79:ffffff00
inet on backplane (b):
host inet (h)       : 210.181.13.35
gateway inet (g)    : 210.181.13.1
user (u)            : shkang
ftp password (pw) (blank = use rsh): *******
flags (f)           : 0x8
target name (tn)    :
startup script (s)  :
other (o)           : mottsec1

[RAS1041 Boot]: @                          ← Reboot Command

Press any key to stop auto-boot...
 1 0
auto-booting...


boot device         : tffs=0,0
unit number         : 1
processor number    : 0
host name           : flyvo
file name           : /tffs0/rmp-os
inet on ethernet (e) : xxx.xxx.xxx.xxx:ffffff00
host inet (h)       : xxx.xxx.xxx.xxx
gateway inet (g)    : xxx.xxx.xxx.xxx
user (u)            : shkang
flags (f)           : 0x8
other (o)           : mottsec1

Loading /tffs0/rmp-os...5426616 + 55578680

IHU (Image Header Utility) V1.0: /tffs0/rmp-os
ID    - 0xdeaddead
```

```
TYPE   - app
EXT    - 0
UP     - 0
VER    - 3.6.2
CTIME  - THU JAN 01 09:00:00 1970
OWNER  - shkang
LENGTH - 6726780 (0x66a47c) bytes
CRC    - 0x6d5ef1a3

Starting at 0x100000...

Target Name: vxTarget
Attaching interface lo0... done
0x3fff9d50 (tRootTask): MAC 00:15:7d:01:09:44
0x3fff9d50 (tRootTask): MAC 00:15:7d:01:09:45
0x3fff9d50 (tRootTask): MAC 00:15:7d:01:09:46
0x3fff9d50 (tRootTask): MAC 00:00:00:00:00:00
Attached IPv4 interface to mottsec unit 1

Adding 14986 symbols for standalone.
wdbCommDevInit: Could not find device tffs=0,0, unit 1 !
ERR [KERN] if_add.c:100: ipAttach() failed for fei1

 CPU: Freescale CDS MPC8548E - Security Engine.  Processor #0.
 Memory Size: 0x3fffa000.  BSP version 1.0/0.
 Created: Nov  4 2009, 15:03:56
 ED&R Policy Mode: deployed
 WDB Comm Type: WDB_COMM_END
 WDB: Ready.
 Attaching to TFFS        : DONE
Check EDR Log ...Done

************************************************************
* Copyright POSDATA co., 2004-2008
* Version: 3.6.2(S/W), 0.1.0(H/W)
************************************************************

Starting tmu initialization...

System reset reason: reset by S/W
System clock source: 1588 1IP
Initializing the FPGA Module....DONE
Initializing the SPI Module.....DONE
Initializing the TMU PLL........DONE
Initializing the IF Module......DONE
PHY driver $Revision: 1.11 $ for Nov  4 2009 09:23:56
TMU RF Control Config. Set......DONE

PM Parser.................DONE
Low MAC...................DONE
SDU Reconstruction........DONE
Rx ARQ....................DONE
PDU Construction..........DONE
Scheduler.................DONE
BPM,BWR...................DONE
QMS.......................DONE
```

```
Tx ARQ...................DONE
Convergence sublayer......DONE
Data plane simulator......DONE
TLV.......................DONE
RNG.......................DONE
Control Plane.............DONE
Core MAC task.............DONE
taskMacTxEnd..............DONE
taskMacRxEnd..............DONE
Management module.........DONE
HVT.......................DONE
audit/trace...............DONE
timer task................DONE

Waiting CPM response...
Configuration Callback Function Registration DONE.
Ethernet Driver Enable DONE.
System Initialized DONE ..


POSLOG....................................DONE
RMP Task Monitoring Task Spawn............DONE
rmpExcHookInit............................DONE
RLDB Main Task............................DONE
Rldb Main Task Spawn......................DONE
tLdTimer Task Spawn.......................DONE
Reading  /tffs0/RASConf...................DONE
  PLD Version OLD(0.10.3), NEW(0.10.3)
  CheckSum for config : 0x3a5788(3823496)
  Current fa(1) sect(1) Model(28)
Generating Neighbor Configuration.........DONE
Time Zone: LOCAL_TIME_OFFSET   32400.....DONE
Default RAS Time  1970/01/01 00:00:41.....DONE
D16 TLV Library Init......................DONE
cBuffer Library Init......................DONE
cWMI Library Init.........................DONE
rasWMI Library Init.......................DONE
rasCPI Library Init.......................DONE
tRcmbMain task spawn......................DONE
tOLCheck Spawn............................DONE
tKeepAlive(rn,acr) Task Spawn.............DONE
tIndAlm(alarm) Spawn......................DONE
tTmuHwAlarm Spawn.........................DONE
RSFB Status & Mmc Spawn...................DONE
tStatTimer Task Spawn.....................DONE
STAT Loaded...............................DONE
tRemb Task Spawn..........................DONE
tRgpb Task Spawn..........................DONE
tRdtb task Spawn..........................DONE
tSwBlockDiag Task Spawn...................DONE
TimerLibrary Load.........................DONE
rrcTimerLibrary...........................DONE
RRC(Radio Resource Controller)............DONE
CAC(Call Admission Control)...............DONE
RAS Init..................................DONE
RAS-SNMP swLoadMngInit....................DONE
```

```
Set Frequency -> 2560000 kHz.. SUCCESS
MIMO UL CSM turned off
Ieee1588SlaveInit...Done..
vlanTagIfIngressTypeSet OK(2)
vlanTagIfEgressTypeSet OK(1)
Device ID    : 0x105
Base Reg Addr : 0x0
No of Ports   : 6
CPU Ports    : 2
LED Init     : Eth-1 Done
Optic Init   : Eth-5 Equip (1000base-X)
Network Configuration initialization : DONE

todDrv Not Open or Error. Configuration Change(cnt=1)...DONE
[ 1588 ] IEEE1588 UDP(319) bind OK!(11)
[ 1588 ] IEEE1588 UDP(320) bind OK!(12)
####
################################################################################
#
#### Start 1588_Slave_Uart_Task() : ttyS2(__fd_uart=19)  : acib_max_fd=19
####
################################################################################
#
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
Becuase of Previous RF Alarm, DL MIMO will be off! (txAPath Alarm : 1,
txBPath Alarm: 1)
MIMO UL CSM turned on
Configuration Change(cnt=1)...DONE
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
Becuase of Previous RF Alarm, DL MIMO will be off! (txAPath Alarm : 1,
txBPath Alarm: 1)
MIMO UL CSM turned on
Wait for GPS ACTIVE set...
Wait for GPS ACTIVE set...


User Access Verification
 USER ID  : Wait for GPS ACTIVE set...
Wait for GPS ACTIVE set...
Set Frequency -> 2560000 kHz.. SUCCESS
Set Frequency -> 2560000 kHz.. SUCCESS
Configuration Change(cnt=1)...DONE
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
Becuase of Previous RF Alarm, DL MIMO will be off! (txAPath Alarm : 1,
txBPath Alarm: 1)
MIMO UL CSM turned on
Configuration Change(cnt=1)...DONE
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
Becuase of Previous RF Alarm, DL MIMO will be off! (txAPath Alarm : 1,
txBPath Alarm: 1)
MIMO UL CSM turned on
Configuration Change(cnt=1)...DONE
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
Becuase of Previous RF Alarm, DL MIMO will be off! (txAPath Alarm : 1,
```

```
txBPath Alarm: 1)
MIMO UL CSM turned on
Configuration Change(cnt=1)...DONE
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
Becuase of Previous RF Alarm, DL MIMO will be off! (txAPath Alarm : 1,
txBPath Alarm: 1)
MIMO UL CSM turned on
Wait for GPS ACTIVE set...
Wait for GPS ACTIVE set...
Set Frequency -> 2560000 kHz.. SUCCESS
Configuration Change(cnt=1)...DONE
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
MIMO UL CSM turned on
Configuration Change(cnt=1)...DONE
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
MIMO UL CSM turned on
Wait for GPS ACTIVE set...
Wait for GPS ACTIVE set...
Set Frequency -> 2560000 kHz.. SUCCESS
Configuration Change(cnt=1)...DONE
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
MIMO UL CSM turned on
Configuration Change(cnt=1)...DONE
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
MIMO UL CSM turned on
Wait for GPS ACTIVE set...
Wait for GPS ACTIVE set...
Set Frequency -> 2560000 kHz.. SUCCESS
Configuration Change(cnt=1)...DONE
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
MIMO UL CSM turned on
Configuration Change(cnt=1)...DONE
[BPM] loaded Normalized C/N override 2 table of UCD from RMP
MIMO UL CSM turned on
...GPS LOCK(0)...
Wait for GPS ACTIVE set...
...GPS LOCK(1)...
...GPS LOCK(2)...
...GPS LOCK(3)...
TMU RF Control Tasks (Temp, Alc, Vswr) spawned
 Frequency Range Set (2300.00) ~ (2700.00)
Initializing the RF Module......rf: indoor detected.
ad9352DcOffsetCallInit Main(b1=10, b2=10)
ad9352DcOffsetCallInit Success(dir=0)!!.
ad9352DcOffsetCallInit Div(b1=10, b2=10)
ad9352DcOffsetCallInit Success(dir=1)!!.
rf: indoor was successfully initialized.
DONE
PC203 detected x 2
PC203 dev 0 successfully loaded.(/tffs0/FPGAIMG/dev0_10M_R1000.pa)
Processing: /tffs0/FPGAIMG/dev0_10M_R1000.pa (dev #0)...Verify Device #0:
Success!
PC203 dev 1 successfully loaded.(/tffs0/FPGAIMG/dev1_10M_R1000.pa)
Processing: /tffs0/FPGAIMG/dev1_10M_R1000.pa (dev #1)...Verify Device #1:
Success!
PC203 devices started
current state = API_IDLE next state = API_PARAM
```

```
phyInterruptThread started
phyDriverRxThread started
current state = API_PARAM next state = API_CONFIG
current state = API_CONFIG next state = API_START
current state = API_START next state = API_RUNNING
CPM Send OK
[BBP(0) =>RMP] : MSG_RN_CFG_CMPLT_RPT
Set Frequency -> 2560000 kHz.. SUCCESS
```

Checking RAS Information

Checking RAS Network Information

To check current RAS network configuration, use “show network” command from CLI mode. It displays information such as ACR IP address, RAS IP address, subnet mask, default router, active EMS IP, and standby EMS IP address.

```
RMP_CLI>show network
ACRIP          : xxx.xxx.xxx.xxx
 RASIP         : xxx.xxx.xxx.xxx
 SUBNET  Mask    : xxx.xxx.xxx.xxx
 Default Router  : xxx.xxx.xxx.xxx
 Active  EMS IP  : xxx.xxx.xxx.xxx
 Standby EMS IP  : xxx.xxx.xxx.xxx
 Ntp Server  IP  : xxx.xxx.xxx.xxx
 DP Mode        : per-SF
 PC  IP         : xxx.xxx.xxx.xxx
 1588 Master  IP : xxx.xxx.xxx.xxx
 Authenticator IP: xxx.xxx.xxx.xxx
 HO Routing Mode : R8 Routing

 RESULT : OK
 COMPLETED
```

Checking RAS Configuration Information

To check information of current RAS configuration, use “show ras” command from CLI mode. It displays information such as ACR ID and RAS ID.

```
RMP_CLI>show ras
```

```
OP Id     : 00:00:00
 ACR Id    : xx
 RAS Id    : xx
 RAS MODEL  : xxxxx
 Sect Num   : 1
 FA   Num   : 1
 Clock Mode : GPS and 1588 Master Mode
 Master RAS Id: xx
 Slave  RAS Id: xx
 Clock Info  : 1588 Slave Mode
 ASN-GW Type: AGW20000(0)

 RESULT : OK
 COMPLETED
```

System Replacement

Items to Check Before System Replacement

Error status of the system or module must be checked prior to the system replacement. Use the following steps to check on the error status of the system or module.

1. Check if the cables are equipped correctly and cable connection is normal.
2. Check if power is being supplied normally.
3. Check for any alarm output pertaining to the system or module from the operator's terminal.

Items to Check After System Replacement

After replacing the system, check the result as explained below.

1. After replacing the system, check if the cables are equipped correctly.
2. After replacing the system, check if power is being supplied normally.
3. Check if the alarm corresponding to the system or module is removed from the operator's terminal.

Appendix

Abbreviation and Definitions

- 1000Base-Tx/Fx : 1Gbps Ethernet or Fiber Optic Interface
- 100Base- Tx : 100Mbps Ethernet
- ACR: Access Control Router
- ADC: Analog to Digital Converter
- ARQ: Automatic Repeat reQuest
- ASN-GW, AGW: Access Service Network Gateway
- BBP : Base Band Processor
- CC: Convolutional Code
- CLI : Command Line Interface
- CTC : Convolutional Turbo Code
- DAC : Digital to Analog Converter
- DPD : Digital Pre-Distortion
- EMS : Element Management System
- FA : Frequency Assignment
- IF : Intermediate Frequency
- LPM: Line Protection Unit
- MIMO : Multi Input Multi Output
- MM : Mobility Management
- MRC : Maximum Ratio Combining
- OAM : Operations and Maintenance
- OFDMA: Orthogonal Frequency Division Multiple Access

- PKM : Privacy Key Management
- PLD : Programmable Loading Data
- PSS : Portable Subscriber Station
- PTP : Precision Time Protocol
- PUSC: Partial Usage of Sub-Channel
- RAS : Radio Access Station
- RMP: RAS Management Processor
- SNMP : Simple Network Management Protocol
- TDD: Time Division Duplex
- TFEU : Front End Unit
- TIFM : Intermediate Frequency Module
- TMU : Main Unit
- TPAU : Power Amplifier Unit
- TPSU : Power Supply Unit
- TSGM : Synchronization GPS Module
- TSIM : Synchronization IEEE 1588 Module
- TTRU : TRansceiver Unit
- WiBro : Wireless Broadband Network, the service name of Mobile WiMAX in Korea
- WiMAX : Worldwide Interoperability for Microwave Access Forum

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