ATTACHMENT H.

- Tune-Up Procedure -

2.4.1 Overview

This Document defines Message Interfaces between RMP-RSS.

Internal RAS Interfaces between RMP-BRS are

- CC interface for the message exchange control between peer IPC layers
- RC interface that should be supported by IPC layer of systems inside RAS
- RN interface for the network management
- TM interface for the BRS management

To clarify the Interface objects, Logical functional entities are defined as

- FE_RC_T : a logical functional entity to process the RC interface in BRS
- FE_RC_R : a logical functional entity to process the RC interface in RMP

- FE_RN_T : a logical functional entity to process the RN interface in BRS
- FE_RN_R : a logical functional entity to process the RN interface in RMP

- FE_TM_T : a logical functional entity to process the TM interface in BRS
- FE_TM_R : a logical functional entity to process the TM interface in RMP

2.4.2 Requirements

This document is effective on the assumption that NISU L2 switch in Outdoor RAS is divided into RAS internal switch for BRS and external switch for ACR/BBP
BRS cannot be equipped without L2 Ethernet defined by POSDATA because L2 switch in Proto-type RAS is not divided into internal and external In case of linked test between RMP and BRS, private IP could be allocated to BRS and Proto-type RAS

2.4.3 Design considerations

2.4.3.1 Node ID

The Node is one of the RAS entities and unique identifier. The Node ID is constructed with

Field Name	Size (bytes)	Description
System Identifier	4	Uniquely identifies a system in the network. Could be IPv4 address Of a representative processor card of the system 0xFFFFFFFF is used To represent a broadcast Node ID
Entity Type	1	Type of an entity. Usually mapped from a processor card name 0x00 : Multicast. See several Multicast Node IDs defined below
		0x01 : ET_RAS RMP 0x03 : ET-RAS-BRS

		0x04 ~ 0x2F : Reserved for RAS entities 0x31 ~ 0xFE : Reserved for other entities 0xFF : Reserved
Entity Index		Discriminates among multiple entities of same type. Usually mapped From Slot ID that a processor card can read from a backplane 0 : Reserved 1 ~ 254 : Allowed index values, The first entity should have an Index 1 255Reserved

2.4.3.1.1 Node IDs of RMP and BRS

2.4.3.1.1.1 RMP Node ID

Field Name	Value
System Identifier	Private Ipv4 Address for RMP
Entity Type	ET_RAS_BRS
Entity Index	1

2.4.3.1.1.2 BRS Node ID

Field Name	Value
System Identifier	Private Ipv4 Address for RMP
Entity Type	ET_RAS_BRS
Entity Index	1 ~

2.4.3.1.1.3 RC Broadcast Node ID

Field Name	Size (bytes)	Description
Multicast Node ID	6	0xFFFFFFFFFFFF

In case of sending Broadcast message from FE_RC_R to FE_RC_B(Channel Card)/ FE_RC_E, RC Broadcast Node ID is used in Destination Node ID field in MSG_CC_HDR. Broadcast Node ID is dismissed by IPC layer except used in FE_RC_R

2.4.3.1.1.4 RC Multicast Node ID

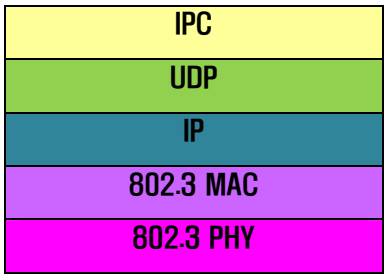
Field Name	Size (bytes)	Description
Multicast Node ID	6	0xFFFFFFFF0001

In Case of sending Multicast message from FE_RC_R to FE_RC Multicast Node ID is used in Destination node ID field in MSG_CC_HDR. Multicast Node ID is dismissed by IPC layer except used in FE_RC_R

2.4.3.2 UDP as IPC transport between RMP and BRS

Define IPC in UDP/IP to communicate with RAS internal equipment.

RAS IPC protocol stack



UDP port uses 65000

2.4.3.3 Private IP address

The subnet mask is 255.255.0.0 and IP address for RAS inside equipment is allocated as

Entity Type	Entity Index	Description	IP address
0x00	0x01	RAS Multicast	192.168.255.255
0x01	0x01	RMP #1	192.168.1.1
	0x02	RMP #2	192.168.1.2
0xff	0xff	RAS Broadcast	255.255.255.255
0x02	0x01		
	~0x10		
0x03	0x01	BRS #1	192.168.3.1
	~		~
0x04	0x01	RDTU	192.168.4.1
0x05	0x01	Reserved	192.168.5.1

2.4.3.4 MSG_xx_R(RMP) interface

The Internal equipments should send to Duplex RMP same packet twice. In other words, after receiving packet from RMP#1 or RMP#2, same IPC packet should be sent to RMP#1 and RMP#2 twice

2.4.4 RC Procedures

2.4.4.1 RC Advertisement Procedure

FE_RC_R broadcasts or multicasts MSG_RC_ADV every 20 seconds in order to FE_RC_E could notice the information of FE_RC_R.

When FE_RC_E receives MSG_RC_ADV for the first time, FE_RC_E decides its Node ID by using the information of FE_RC_R in MSG_RC_ADV. In case of BRS, if the Node ID field of FE_RC_R

= 1”, FE_RC_T decides its Node ID as (system Identifier = 0x12345678, Entity Type = ET_RAS_BRS, Entity Index=1

2.4.5 RN Procedures

2.4.5.1 RN Keep-Alive Procedure

2.4.5.1.1 FE_RN_T Side

When initial service is enable by reason of power on, FE_RN_T Broadcasts MSG_RN_KEEP_ALIVE_RPT. The System Identifier in source Node ID is 0.
Afterwards, FE_RN_T sends to RE_RN_R MSG_RN_KEEP_ALIVE_RPT by response of MSG_RC_ADV within 100mS. Also FE_RN_Tsends MSG_TM_KEEPP_ALIVE_RPTat 10 sec interval regardless of response to MSG_RC_ADV

2.4.5.1.2 FE_RN_R Side

FE_RN_R sends MSG_RC_ADV every 20 sec. FE_RN_R regards as link down if it doesn’t receive MSG_RN_KEEP_ALIVE_RPT within 30 sec.

2.4.6 CC Procedures

2.4.6.1 CC Message Acknowledgement Procedure

When IPC layer A receives a message from a peer IPC layer B that requires an acknowledgement, A immediately generates and sends MSG_CC_ACK to B. The IPC layer can know if the received message requires the acknowledgement by checking the “Ack” subfield of the “Message Type” field in MSG_CC_HDR
If B doesn’t get MSG_CC_ACK within 3 seconds, B regards the message has not been acknowledged and sends the same message again to A. This retry can be done tow more times
Matching between the initial message and MSG_CC_ACK is done through the “message identifier” field in MSG_CC_HDR
If the initial try and then two retires of sending the message to A all have failed, B regards A has not responded to the message, and indicates an upper layer of the message delivery failure

2.4.6.1.1 Requirement for MSG_XXXX_REQ and MSG_XXXX_RSP

Every defined MSG_XXXX_REQ has its corresponding MSG_XXXX_RSP, and they do not require IPC_level message acknowledgement by having ACK_NO property in their message types
By default, an entity that has sent out MSG_XXXX_REQ expects MSG_XXXX_RSP in 2 seconds, that is, if the entity does not receive MSG_XXXX_RSP within the 2seconds, the request should be considered to have failed
In case other than 2 seconds is required, it should be specified in description of related procedure

2.4.6.2 CC File Transfer Procedure

The CC file transfer procedure requires two entities, FT Commander and FT Follower, For this procedure, “Block” concept of the TFTP is used, where Block is of size 512 except the last Block

2.4.6.2.1 FT Commander Side

The file transfer procedure is always initiated by FT Commander by sending MSG_CC_FT_CMD(Start). The sent message has information of the file to be transferred to FT Follower

Whenever FT Commander receives MSG_CC_FT_REQ, it should immediately respond with MSG_CC_FT_RSP. When FT Commander receives MSG_CC_FT_RPT, it can know whether the file transfer has succeeded or not

During the procedure, if FT Commander receives MSG_CC_FT_RPT(Fail), it should terminate the procedure without generating any additional message

During the procedure, FT Commander terminates the procedure by sending MSG_CC_FT_CMD(Terminate) if it detects any error, and it should invalidate the used “Transfer ID.” In this case, it is recommended to supply IE_U2U_MSG

During the procedure, FT Commander should regard the procedure has unsuccessfully terminated if fit has not received any file transfer related massage for 10 seconds.

If FT Commander receives MSG_CC_FT_REQ or MSG_CC_FT_RPT that has an invalid “Transfer ID,” it should discard the received message silently

2.4.6.2.2 FT Follower Side

If FT Follower receives MSG_CC_FT_CMD(Start), it immediately stars the file transfer by sending MSG_CC_FT_REQ

Whenever FT Follower receives MSG_CC_FT_RSP matching for the last sent MSG_CC_FT_REQ, it stores the received block in MSG_CC_FT_RSP and sends out MSG_CC_FT_REQ for the next block until it gets the last block

After the last block is received, FT Follower should report the successful file transfer to FT Commander by sending MSG_CC_FT_RPT. If the transferred file is an image file, FT Follower should reboot with the new image 5 seconds after MSG_CC_FT_RPT was sent

During the procedure, FT Follower should regard the procedure has unsuccessfully terminated if it has not received any file transfer related massage for 10 seconds. In this failure case, FT Follower has to send out MSG_CC_FT_RPT(Fail)

During the procedure, if FT Follower meets some problem and could not proceed, it should terminate the current file transfer procedure and send out MSG_CC_FT_RPT(Fail)

It is recommended that MSG_CC_FT_RPT(Fail)supplies IE_U2U_MSG

During the procedure, if FT Follower receives MSG_CC_FT_CMD(Terminate), it should stop the procedure immediately without generating MSG_CC_FT_RPT

2.4.7 Message Format

This section describes formats of IPC SDU IPC SDU is simply called Massage in this document if not mentioned otherwise.

A general message format is as below:

Field Name	Description
MSG_CC_HDR	See the section "MSG_CC_HDR"
First IE . . . Last IE	See below See below
Unrecognized IE Lists Padding Byte(s)	See below For 4 byte alignment
Value Space	See below

A message is composed of a header, zero or mere IE(s), and then value space. For the convenient message composition and processing the message format is designed to have a static structure, The concept of V_OFFSET and Value Space is key in achieving such a goal

A special type V_OFFSET is of one-byte length and represents how far the value of the IE is from the end of "MSG_CC_HDR" field. Its unit is 4 bytes, In case V_OFFSET is NULL, it means the corresponding IE is not present and there is no value

A value that appears in the "value Space" field should be formatted as below. The length "N" should be 4 or a multiple of 4.

Field Name	Size (bytes)	Description
Value	N	Formatted according to associated IE

If V_OFFSET is not NULL, the corresponding IE value should be present somewhere in the Value Space

2.4.7.1 MSG_CC_HDR

Field Name	Size (bytes)	Description
IPC Workspace	4	Allocated for the efficient operation of IPC layer. Should not be used by application layer
Version Reserved	4/8 4/8	IPC protocol version 1 0

Reserved		1	0
Message Identifier		2	See the section “Message Identifier”
Destination Node ID		6	See the section “Node ID”
Length		2	It covers from “IPC Workspace” to “Value Space” field Its min value is 24, and its max value is 1500 #define MSG_MIN_SIZE 24 #define MSG_MAX_SIZE 1500
Source Node ID		6	See the section “Node ID”
Massage Type	Reserved	1/16	0
	Ack	1/16	Bit indicating whether this message requires acknowledgement or not 0 : ACK_NO, Massage acknowledgement NOT required 1 : ACK_YES, Message acknowledgement required Please use macros below to compose message types #define ACK_SFT 14 #define ACK_YES(0x01<<ACK_SFT) 0
	Interface Identifier	5/16	0x00 : Not used 0x01 : IID_CC,IPC-internal control interface 0x02 ~ 0x0F : Reserved 0x10 : IDD_RC, RAS- specific IPC control interface 0x12 : IDD, Network management interface between BRS And RMP 01c ~ 0x1F : Reserved Please use macros below to compose message types #define IID_SFT 8 #define IID_CC(0x01<<IID_SFT) #define IID_RC(0x10<<IID_SFT) #define IID_RN(0x12<<IID_SFT) #define IID_TM(0x1b<<IID_SFT)
	Message Code	8/16	See the section “message Type”

2.4.7.1.1 Message Identifier

When IPC layer is requested to send a message whose type indicates the need of acknowledgement, the IPC layer should set the ‘Message Identifier” field with a value that should not be used again for a while, and then send the message out.

When IPC layer receives a message whose message type indicates the need of acknowledgement, the IPC layer generates MSG_CC_ACK with the same “message Identifier” value of the received message, send out the MSG_CC_ACK, and then delivers the received message to an upper layer based on the “Interface Identifier” field

2.4.7.1.2 Message Type

2.4.7.1.2.1 Message Type for IID_CC

Message Type	Value
MSG_CC_ACK	(ACK_NO | IID_CC | 0x01)
MSG_CC_FT_CMD	(ACK_YSS | IID_CC | 0x11)
MSG_CC_FT_REQ	(ACK_NO | IID_CC | 0x12)
MSG_CC_FT_RSP	(ACK_NO | IID_CC | 0x13)
MSG_CC_FT_RPT	(ACK_YES | IID_CC | 0x14)

2.4.7.1.2.2 Message Typesfor IID_RC

Message Type	Value
MSG_RC_ADV	(ACK_NO | IID_RC | 0x01)

2.4.7.1.2.3 Message Types for IID_RN

Message Type	Value
MSG_RN_KEEP_ALIVE_RPT	(ACK_YES | IID_RN | 0x01)
MSG_RN_IPC_PATH_REQ	(ACK_NO | IID_RN | 0x41)
MSG_RN_IPC_PATH_RSP	(ACK_NO | IID_RN | 0x42)

2.4.7.1.2.4 Message Types for IID_TM

Message Type	Value
MSG_TM_ALARM_REQ	(ACK_NO | IID_TM | 0x01)
MSG_TM_ALARM_RSP	(ACK_NO | IID_TM | 0x02)
MSG_TM_ALARM_IND	(ACK_NO | IID_TM | 0x03)
MSG_TM_CONFIG_CMD	(ACK_NO | IID_TM | 0x06)
MSG_TM_CONFIG_RSP	(ACK_NO | IID_TM | 0x07)
MSG_TM_ATTEN_SET_REQ	(ACK_NO | IID_TM | 0x08)

MSG_TM_ATTEN_SET_RSP	(ACK_NO | IID_TM | 0x09)
MSG_TM_ENABLE_CMD	(ACK_NO | IID_TM | 0x0A)
MSG_TM_ENABLE_RSP	(ACK_NO | IID_TM | 0x0B)
MSG_TM_RESET_CMD	(ACK_NO | IID_TM | 0x0C)
MSG_TM_RESET_RSP	(ACK_NO | IID_TM | 0x0D)
MSG_TM_ATTEN_REQ	(ACK_NO | IID_TM | 0x0E)
MSG_TM_ATTEN_RSP	(ACK_NO | IID_TM | 0x0F)
MSG_TM_POWER_REQ	(ACK_NO | IID_TM | 0x10)
MSG_TM_POWER_RSP	(ACK_NO | IID_TM | 0x11)
MSG_TM_CHG_ALC_LMT_REQ	(ACK_NO | IID_TM | 0x12)
MSG_TM_CHG_ALC_LMT_RSP	(ACK_NO | IID_TM | 0x13)
MSG_TM_CHG_SHUTDOWN_TEMP_REQ	(ACK_NO | IID_TM | 0x14)
MSG_TM_CHG_SHUTDOWN_TEMP_RSP	(ACK_NO | IID_TM | 0x15)
MSG_TM_CHG_SHUTDOWN_VSWR_REQ	(ACK_NO | IID_TM | 0x16)
MSG_TM_CHG_SHUTDOWN_VSWR_RSP	(ACK_NO | IID_TM | 0x17)
MSG_TM_READ_PAB_DATA_REQ	(ACK_NO | IID_TM | 0x18)
MSG_TM_READ_PAB_DATA_RSP	(ACK_NO | IID_TM | 0x19)
MSG_TM_CHG_CTL_PAB_CMD	(ACK_NO | IID_TM | 0x1A)
MSG_TM_CHG_CTL_PAB_RSP	(ACK_NO | IID_TM | 0x1B)
MSG_TM_READ_PAB_CUR_STATUS_RSP	(ACK_NO | IID_TM | 0x1C)
MSG_TM_READ_PAB_CUR_STATUS_RSP	(ACK_NO | IID_TM | 0x1D)
MSG_TM_INVENTORY_REQ	(ACK_NO | IID_TM | 0x3A)
MSG_TM_INVENTORY_RSP	(ACK_NO | IID_TM | 0x3B)
MSG_TM_INVENTORY_SET_REQ	(ACK_NO | IID_TM | 0x3C)
MSG_TM_INVENTORY_SET_ACK	(ACK_NO | IID_TM | 0x3D)
MSG_TM_DCCU_ALIVE_CMD	(ACK_NO | IID_TM | 0x13E)
MSG_TM_DCCU_ALIVE_RSP	(ACK_NO | IID_TM | 0x3F)
MSG_TM_AMP_LD_RPT	(ACK_NO | IID_TM | 0x42)
MSG_TM_FALLBACK_REQ	(ACK_NO | IID_TM | 0x43)
MSG_TM_FALLBACK_REQ	(ACK_NO | IID_TM | 0x44)

2.4.7.2 MSG_CC_ACK

Field Name	Size (bytes)	Description
Header	–	MSG_CC_HDR

This message is used to acknowledge a received message to the peer, Because matching between sent message and acknowledged message is done through the “Message Identifier” field, IPC layer should be careful in generating a value of the a “Massage Identifier” field

2.4.7.3 MSG_CC_FT_COM

Field Name	Size (bytes)	Description
Header	–	MSG_CC_HDR
Transfer ID	2	Uniquely identifies this file transfer from other transfers .same ID
Command	1	Commands what action FT Follower should take 0 : Not used 1 : Start the file transfer 2 : Error detected, please terminate the file transfer Other : Reserved
File Type	1	Indicates a type of the file to transfer 0x00 : Not used 0x01 : Image file 0x02 ~ 0x09 : Reserved 0x10 : Configuration file Other : Reserved
Block Count	2	Indicates the total number of blocks that the file has,. Allowed value Rang is 0 to 32767(0x7fff), that is, MSB is always 0.
Reserved	1	
Card Type	1	1: TRB, 2:PAB

2.4.7.4 MSG_CC_FT_REQ

Field Name	Size (bytes)	Description
Header	–	MSG_CC_HDR
Transfer ID	2	Copy of “Transfer ID” field of MSG_CC_FT_CMD
Black Number	2	Indicates which block of the file should be transferred “Block Number” starts from 1 and can increase up to “Block Count” given In MSG_CC_FT_CMD

2.4.7.5 MSG_CC_FT_RSP

Field Name		Size (bytes)	Description
Header		–	MSG_CC_HDR
Transfer ID		2	Copy of "Transfer ID" field of MSG_CC_FT_REQ
Block Information	Last Block	1/16	Indicates whether this is the last block or not 0 : Not last block 1 : Last block
	Block Number Or block Length	15/16	If "Last Block" is 0, Block Number The "Block" field is fully filled in copy of "block Number" Field of MSG_CC_FT_REQ If " Last Block" is 1, Block Length The "Block" field may not be fully filled in Number of bytes Filled in the "Block" field
Block		512	The request block of the file
CRC		4	

2.4.7.6 MSG_CC_FT_RPT

Field Name	Size (bytes)	Description
Header	–	MSG_CC_HDR
Transfer ID	2	Copy of "Transfer ID" field of MSG_CC_FT_CMD
Code	1	Indicates the status of the file transfer 0 : Not used 1 : Loading Success, The file transfer has successfully Completed 2 : Fail, The file transfer has terminated due to some error That may be explained by the "U2U Message" field 3 : Rom Burning completed Other : Reserved
Reserved	1	

2.4.7.7 MSG_RC_ADV

Field Name	Size (bytes)	Description
Header	–	MSG_CC_HDR The "Destination Node ID" should be RC Multicast Node ID. See The section 3.1.2 "RC Multicast Node ID"
Node ID of	6	RMP Node ID
FE_RC_R Side		
Reserved	2	0
Ipv4 Address of FE_RC_R Side	4	RMP Ipv4 address
MAC Address of FE_RC_R Side	6	RMP MAC address
Reserved	2	0

2.4.7.8 MSG_RN_KEEP_ALIVE_RPT

RMP recognizes Init Stage from OP State filed to download configuration to BRS If the OP State is Init stage RMP downloads configuration

Field Name	Size (bytes)	Description
Header	–	MSG_CC_HDR
Reserved	2	0
Reserved	2	0
Reserved	1	
OP State	1	0 : Init stage, 1 : Normal Operation
Reserved	2	0
MAC Address of FE_RN_T Side	6	BRS MAC address
Reserved	2	0
Major version	1	
Minor version	1	
Patch version	1	
Reserved	1	
UL Processing Delay	4	
Reserved	8	
DL Processing	4	

Delay		
Reserved	8	

2.4.7.9 MSG_RN_IPC_PATH_REQ

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Reserved	2	
Tick	4	

2.4.7.10 MSG_RN_IPC_TATH_RSP

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Reserved	2	
Tick	4	Copy of MSG_RN_IPC_PATH_REQ

2.4.7.11 MSG_TM_ALARM_REQ

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Reserved	2	

In case that there are not alarm at BRS,PAB,FEU,RMP sends this REQ MSG to get alarm report.

2.4.7.12 MSG_TM_ALARM_RSP

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Reserved	2	
IE_ALARM_INFO		IE_ALARM_INFO

2.4.7.13 MSG_TM_ALARM_IND

BRS sends MSG_TM_ALARM_IND to RMP without the request from RMP when TRB,PAB,FEB

Occur the alarm data. For this, BRS execute the internal alarm checking logic.

When RMP requests the alarm data, BRS sends the current alarm data to RMP if there is no alarm occurrence

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
IE_ALARM_INFO		

2.4.7.14 MSG_TM_CONFIG_COM

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Reserved	1	
Reserved	1	
Mode	1	0 : initial, 1 : Frequency Change
Reserved	1	
Reserved	1	
BRS type	1	1 : 1T, 2 : 2T
Frequency	4	
TX ATTEN A	2	
TX ATTEN B	2	
RF RX A PATH ATTEN	2	
RF RX B PATH ATTEN	2	
Reserved	2	
Reserved	2	
Reserved	2	
Reserved	2	
Reserved	2	
Reserved	2	

2.4.7.15 MSG_TM_CONFIG_RSP

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp

Result	1	0 : Fail, 1 : Success
Error ID	1	0x1 : Frequency Mismatch

2.4.7.16 MSG_TM_ATTEN_SET_REQ

BRS increases decreases Attenuation value according to MSG_ATTEN_SET_REQ from RMP.BRS sends the response MSG which indicates the Attenuation setting result

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Direction	1	0 : Tx, 1 : Rx
Path	1	0 : A, 1 : B
Attenuation Type	1	0:RF
Attenuation	2	1dB step(ex. 31dB_>310)
Reserved	1	

2.4.7.17 MSG_TM_ATTEN_SET_RSP

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Direction	1	0 : Tx, 1 : Rx
Path	1	0 : A, 1 : B
Attenuation Type	1	0:RF
Attenuation	2	1dB step(ex. 31dB_>310) (Copy of "Attenuation" field of MSG_TM_ATTEN_RET_REQ)
Reserved	1	0:Fail, 1:Success

2.4.7.18 MSG_TM_ENABLE_CMD

MSG_TM_ENABLE_CMD indicates the card status to be set. Enable/Disable means Unblock/block And controls the operation of the equipped card Disable(Block) doesn't transmit RF TX Signal

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Reserved	1	
Path	1	A=0, B=1

Enable/Disable	1	0:Enable, 1:Disable
Reserved	3	

2.4.7.19 MSG_TM_ENABLE_RSP

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Reserved	1	
Path	1	A=0, B=1
Enable/Disable	1	-1:Fail, 0: Enable OK 1: Disable OK
Reserved	3	

2.4.7.20 MSG_TM_RESET_CMD

BRS receives the reset command from PMP by MSG_TM_RESET_CMD If the command is PAB Reset, TRB resets PAB and executes the initialize process of PAB

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Card Type	1	1: TRB 2:PAB
Delay time	2	Delay Time TRB reboots after delay time (Second). 0 : TRB reboots immediately when it receives message 0~1000 : Allowed values
Reserved	3	

2.4.7.21 MSG_TM_RESET_RSP

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Card Type	1	1: TRB 2:PAB
Result	1	0:Fail 1: Reset OK

2.4.7.22 MSG_TM_POWER_REQ

RMP requests BRS RX power by this REQ MSG

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Reserved		

2.4.7.23 MSG_TM_POWER-RSP

BRS sends BRS RX power to RMP by response of MSG_TM_POWER_REQ

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Reserved	2	
Path A for Rx Value[2]	4	0.01dB Step (0x00FF 이면 2.55dBm)
Path B for Rx Value[2]	4	0.01dB step (0x00FF 이면 2.55dBm)

2.4.7.24 MSG_TM_CHG_ALC_LMT_REQ

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Card ID	1	PAB ID
ALC value	1	44dBm(1T2R):0x01 41dBm(1T2R) :0x02

2.4.7.25 MSG_TM_CHG_ALC_LMT_RSP

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Card ID	1	PAB ID
Result	1	Fail :1, Success :1
ALC value	1	CHG_ALC_OK=(ALC value:0x01,0x02)
Reserved	3	

2.4.7.26 MSG_TM_CHG_SHUTDOWN_TEMP_REQ

Field Name	Size	Description

	(bytes)	
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Card ID	1	PAB ID
Temperature value	1	Range 70℃ ~ 100℃, Step 1℃ Ex) 70℃=0x46, 100℃=0x64

2.4.7.27 MSG_TM_CHG_SHTDOWN_TEMP_RSP

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Card ID	1	PAB ID
Result	1	Fail :1, Success :1
Temperature value	1	CHG_SHUTDOWN_TEMP_OK=(Shutdown value:0x46~0x64)
Reserved	3	

2.4.7.28 MSG_TM_CHG_SHUDOWN_VSWR_REQ

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Card ID	1	PAB ID
VSWR value	2	Range 10 ~ 1000, Step 1 (10 이면 1.0, 1000 이면 100.0 즉, 소수점 생략)
Reserved	3	

2.4.7.29 MSG_TM_CHG_SHUTDOWN_VSWR_RSP

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Card ID	1	PAB ID
Error Code	2	Fail:0 CHG_SHUDOWN_VSWR_OK=(Shutdown Value:10(0x000A) ~ 1000(0x03E8)
Reserved	3	

2.4.7.30 MSG_TM_READ_PAB_DATA_REQ

Field Name	Size (bytes)	Description
Header	–	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Card ID	1	PAB ID
Request Field	1	0x01 : ALC Value 0x02: Temperature Value 0x04: VSWR Value

2.4.7.31 MSG_TM_READ_PAB_DATA_RSP

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Card ID	1	PAB ID
Request Field	1	0x01 : ALC Value 0x02: Temperature Value 0x04: VSWR Value
Value	2	If Request Value=0x01 44dBm(1T2R): 0x01 41dBm(2T2R): 0x02 If Request Value=0x02 Temperature value Range 70℃ ~ 100℃, Step 1℃ Ex) 70℃=0x46, 100℃=0x64 If Request Value=0x04 VSWR value Range 10 ~1000, Step 1 (10(0x000A)이면 1.0, 1000(0x03E8)이면 100.0 즉 소수점생략
Reserved	2	

2.4.7.32 MSG_TM_READ_PAB_CUR_STATUS_REQ

Field Name	Size (bytes)	Description
Header	–	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Card ID	1	PAB ID
Request Field	1	0x01 : Current RF Output Level(Forward) 0x02: Current RF Input Level

		0x04: Current Temperature 0x08 : Current DC/DC Input Voltage 0x10 : Current VSWR

2.4.7.33 MSG_TM_READ_PAB_CUR_SPATUS_RSP

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Card ID	1	PAB ID
Request Field	1	0x01 : Current RF Output Level(Forward) 0x02: Current RF Input Level 0x04: Current Temperature 0x08 : Current DC/DC Input Voltage 0x10 : Current VSWR
Result	1	0:Fail, 1:Success-자세한 Reason 추후 정의(Fail reason)
RF Output Level (Forward)	2	If Request Field= 0x01 RF Output Level(Forward)Range 0 ~ 500(00.0 ~ 50.0 dBm) Ex) 소수점 생략함 즉, 500 이면 50.0dBm If Request Field = 0x02 RF Input Level Range -380 ~ -10 (-38.0 ~ -1.0 dBm) Ex) 소수점 생략함 즉 -80 이면 -8.0dBm If Request Field = 0x04 Temperature value Range -40℃ ~ 125℃ Ex) 35 이면 35℃ If Request Field = 0x08 DC/DC input Voltage Range 190~350 (19.0 ~ 35.0 V) Ex) 소수점 생략함 즉 350 이면 35.0V
Reserved	1	

2.4.7.34 MSG_TM_INVENTORY_REQ

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Card Type	1	1: TRB 2:PAB(2)

Card ID	1	PAB ID (if Card Type==PAB)

2.4.7.35 MSG_TM_INVENTORY_RSP

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Card Type	1	1: TRB 2:PAB(2)
Card ID	1	PAB ID (if Card Type==PAB)
Inventory	Size of IE_INVENTORY_INFO	IE_INVENTORY_INFO

2.4.7.36 MSG_TM_INVENTORY_SET_REQ

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Card Type	1	1: TRB 2:PAB(2)
Card ID	1	PAB ID (if Card Type==PAB)
Set Inventory Field -1	1	Bit#0: Hardware Version Bit#1: Firmware version Bit#2: S/W version & S/W Data Time Bit#3: Installed Data Bit#4: Reserved Bit#5: PLD1 Bit#6: PLD2 Bit#7; PLD3 (위의 해당 Bit 가 1=Set / 0=No Action 임)
Set Inventory Field -2	1	Bit#0: Recent repair date & Change Notice1 Bit#1: Recent repair date & Change Notice2 Bit#2: Recent repair date & Change Notice3 Bit#3: Recent repair date & Change Notice4 Bit#4: Major Alarm1 Bit#5: Major alarm2 Bit#6: Major alarm3

		Bit#7: Major alarm4 (위의 해당 Bit 가 1=Set / 0=No Action 임)
Reserved	2	
Inventory	Size of IE_INVENTORY_SET	IE_INVENTORY_SET

2.4.7.37 MSG_TM_INVENTORY_SET_ACK

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Card Type	1	1: TRB 2:PAB(2)
Card ID	1	PAB ID (if Card Type==PAB)
Set Inventory Field -1	1	Bit#0: Hardware Version Bit#1: Firmware version Bit#2: S/W version & S/W Data Time Bit#3: Installed Data Bit#4: Reserved Bit#5: PLD1 Bit#6: PLD2 Bit#7; PLD3 (위의 해당 Bit 가 1=Set / 0=No Action 임)Bit#:Installed data
Set Inventory Field -2	1	Bit#0: Recent repair date & Change Notice1 Bit#1: Recent repair date & Change Notice2 Bit#2: Recent repair date & Change Notice3 Bit#3: Recent repair date & Change Notice4 Bit#4: Major Alarm1 Bit#5: Major alarm2 Bit#6: Major alarm3 Bit#7: Major alarm4 (위의 해당 Bit 가 1=Set / 0=No Action 임)
Reserved	2	

2.4.7.38 MSG_TM_ATTEN_REQ

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Reserved	2	

2.4.7.39 MSG_TM_ATTEN_RSP

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Reserved	2	
TX ATTEN A	2	
TX ATTEN B	2	
RF RX A PATH ATTEN	2	
RF RX B PATH ATTEN	2	
AGC A path Atten	2	
AGC B path Atten	2	

2.4.7.40 MSG_TM_AMP_LD_RPT

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Amp Id	1	0: A Path Amp 1: B Path Amp
Result	1	1 : AMP Loading Start 2 : Loading Success 3 : Rom Burning completed 4 : Loading Fail Other : Reserved
Reserved	2	

2.4.7.41 MSG_TM_DCCU_ALIVE_CMD

RPM notices DCCU status to RU by MSG_DCCU_ALIVE_CMD

Field Name	Size (bytes)	Description

Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Status	1	0 : Normal 1 : Abnormal
Reserved	1	
UL Delay	4	DL Delay (ns)== (Time Advance-(DCCU Delay +BOMU Delay +RU Delay-optic Delay)
UL Delay	4	UL Delay (ns)== (Time Advance (DCCU Delay + BUMU Delay +RU Delay +optic Delay)

2.4.7.42 MSG_TM_DCCU_ALIVE_RSP

If DCCU is normal, RU enables AMP of a PATH and B PATH

RU sends MSG_TM_DCCU_ALIVE_RSP to RMP by response.

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	For the correlation between req and rsp
Status	1	0 : Normal 1 : Abnormal
Reserved	1	
Reserved	4	
UL Processing Delay	4	
DL Processing Delay	4	

2.4.7.43 MSG_TM_IMG_FALLBACK_REQ

The RU shall have enough nonvolatile memory such as flash memory or hard disk to save at Least two versions of software and firmware files. At each upgrade previously running files should be stored in Nonvolatile memory.

BRS receives ht fallback command from RMP by MSG_TM_FALLBACK_REQ RU should be Previously running files

Field Name	Size (bytes)	Description
Header	-	MSG_CC_HDR
Transfer ID	2	
Card Type	1	1:TRB
reserved	1	

2.4.7.44 MSG_TM_IMG_FALLBACK_RSP

Field Name	Size (bytes)	Description
Header	–	MSG_CC_HDR
Transfer ID	2	
Card Type	1	1:TRB
reserved	1	

2.4.8 Information Element Format

2.4.8.1 IE_IMAGE_VER

Field Name	Size (bytes)	Description
Major Version	1	Major Version of the image
Minor Version	1	Minor Version of the image
Patch Version	1	Patch Version of the image
Reserved	1	0
Compile Time	8	Indicates when the image was built. See the section ”Timestamp”

2.4.8.2 Timestamp

Timestamp is 8-byte long and represents how many milliseconds have passed since the reference time 0000 UTC 1 January 1970

2.4.8.3 IE_U2U_MSG

This U2U(User-to-User)message is mainly for easy debugging. For example, one system delivers an informative message through this IE to the peer system, and the peer system is presumed to print out the message on the console to that system developers can easily identify reason of some problem by reading the console output.

Field Name	Size (bytes)	Description
U2U Message	Variable	Null-terminated string
Padding Bytes	0,1,2, or 3	Padding bytes for 4-byte alignment

2.4.8.4 IE_ALARM_INFO

Field Name	Size (bytes)	Description
BRS TX(DL)PLL	1	0 : BRS TX PLL LOCK Restore 1 :

BRS RX(UL)PLL	1	0 : BRS RX PLL LOCK Restore 1 : BRS RX PLL LOCK FAIL
PAB Frame Sync[2]		0 : Frame sync Alarm Clear 1 : Frame Sync Alarm
PAB Function[2]		0 : PAB Function Fail Clear (Normal) 1 : PAB Function Fail (Abnormal)
PAB VSWR[2]		0 : PAB VSWR Alarm Clear 1 : PAB VSWR Alarm
PAB VSWR warning][2]		0 : PAB VSWR warning Alarm Clear 1 : PAB VSWR warning Alarm Warning 기준값 = shout down 기준값 -1 Ex: shut down=4:1, warning 3:1
PAB Overpower Warning[2]		0 : PAB Overpower Warning Alarm Clear 1 : PAB Overpower Warning Alarm Warning 기준값 = shut down 기준값-1 Ex : shut down= 41, warning=40
PAB Enable/Disable[2]		0 : Enable, 1 : Disable
PAB Temperature[2]		0 : PAB Over Temperature Alarm Clear 1 : PAB Over Temperature Alarm
PAB Overpower[2]		0 : PAB Overpower Alarm Clear 1 : PAB Overpower Alarm
PAB DC Fail[2]		0 : PAB DC Fail Clear 1 : PAB DC Fail
FEU LAN Fault[2]		0 : FEU LNA Fault Alarm Clear 1: FEU LNA Fault Alarm
A Serdes Lock		0 : A Serdes Lock Alarm Clear 1 : A Serdes Lock Alarm
B Serdes Lock		0 : B Serdes Lock Alarm Clear 1 : B Serdes Lock Alarm
C Serdes Lock		0 : C Serdes Lock Alarm Clear 1 : C Serdes Lock Alarm
PFU Presence[2]		0 : PFU Presence Alarm Clear 1 : PFU Presence Alarm
FEU Presence[2]		0 : FEU Presence Alarm Clear 1 : FEU Presence Alarm
LOS		0 : Loss of signal clear

		1 : Loss of signal Alarm
LOF		0 : Loss of signal clear 1 : Loss of signal Alarm
RAI		0 : Remote Alarm Indication clear 1 : Remote Alarm Indication Alarm
SAP		0 : Service Access Pont clear 1 : Service Access Point Alarm
Door Open		0 : Door Open Alarm Clear

2.4.8.5 IE_INVENTORY_INFO

Inventory information data should be able to be changed to reflect the modification in the field or 349
the manufacturing process

The command to change inventory info should be hidden

Field Name	Size (bytes)	Description
Unit Name	8	Unit Name
Serial Number	8	Serial number of Inventory unit.
H/W version	4	XXYY : XX(major version) YY(minor version)
Firmware version	4	XXYY ex)Boot ROM
S/W Version	4	XXYY : XX(major version) YY(minor version)
S/W Compiled Date & Time	14	YYYY MM DD HH CC SS
Reserved	2	
Manufacture date	8	YYYY MM DD (생산날짜)
Install date	8	YYYY MM DD (설치날짜)
Recent repair date PLD1 PLD2	8 4 4	YYYY MM DD (Repair of inventory unit) Ex)Xilinx program version
PLD3	4	
Maker Name	8	
MAC Reserved Major_ALARM_1	6 2 20	Ethernet MAC address Ex)200508121355 Loop Alarm
Major-ALARM_2	20	
Major-ALARM_3	20	
Major-ALARM_4	20	
Change Notice_1	40	수리이력(1) ex: 2005.04.15 XXXX 부품교체

Change Notice_2	40	수리이력(2)
Change Notice_3	40	수리이력(3)
Change Notice_4	40	수리이력(4)

주)colored fields are Optional

2.4.8.6 IE_INVENTORY_SET

To change inventory info is able to by the command from RMP

Field Name	Size (bytes)	Description
H/’ W version	4	XXYY : XX(major version) YY(minor version)
Firmware version	4	XXYY ex)Boot ROM
S/W Version	4	XXYY : XX(major version) YY(minor version)
S/W Compiled Date & Time	14	YYYY MM DD HH MM SS
Reserved	2	
Install date	8	YYYY MM DD (설치날짜)
Recent repair date		YYYY MM DD (Repair of inventory unit)
PLD1 PLD2 PLD3 Major_ALARM_1		Ex) Xilinx program version Ex) 200508121355 Loop Alm
Major_ALARM_1		
Major_ALARM_1		
Major_ALARM_1		
Change Notice_1		수리이력(1) ex: 2005.04.15 XXXX 부품교체
Change Notice_2		수리이력(2)
Change Notice_3		수리이력(3)
Change Notice_4		수리이력(4)