

Performance Analyzer Protocol Specification

Table of Contents

2	Introduction							
3	Scop	Scope						
4	l Protocol							
	4.1	Message Format	5					
		Message Identifier						
	4.3	Message payload Descriptions	11					
	4.3.1							
	4.3.2	IDENTIFY_BOARD_CONFIRM (0X10)	11					
	4.3.3	PERF_START_REQ (0X01)	13					
	4.3.4	PERF_START_CONFIRM (0X11)	13					
	4.3.5	PERF_SET_REQ (0X02)/(0X82)	18					
	4.3.6	PERF_SET_CONFIRM (0X12)/(0X92)	18					
	4.3.7	PERF_GET_REQ (0X03)/(0X83)	19					
	4.3.8	PERF_GET_CONFIRM (0X13)/(0X93)	19					
	4.3.9	IDENTIFY_PEER_NODE_REQ (0X04)	20					
	4.3.1	0 IDENTIFY_PEER_NODE_CONFIRM (0X14)	20					
	4.3.1	1 CONT_PULSE_TX_REQ (0X05)/(0X85)	20					
	4.3.1	2 CONT_PULSE_TX_CONFIRM (0X15)/(0X95)	21					
	4.3.1	3 CONT_WAVE_TX_REQ (0X06)/(0X86)	21					
	4.3.1	4 CONT_WAVE_TX_CONFIRM (0X16)/(0X96)	22					
	4.3.1	.5 REGISTER_READ_REQ (0X07)/(0X87)	23					
	4.3.1	6 REGISTER_READ_CONFIRM (0X17)/(0X97)	23					
	4.3.1	7 REGISTER_WRITE_REQ (0X08)/(0X88)	24					
	4.3.1	8 REGISTER_WRITE_CONFIRM (0X18)/(0X98)	24					
	4.3.1	9 REGISTER_DUMP_REQ (0X09)/(0X89)	25					
	4.3.2	0 REGISTER_DUMP_CONFIRM (0X19)/(0X99)	25					
	4.3.2	1 ED_SCAN_START_REQ (0X0A)	26					
	4.3.2	2 ED_SCAN_START_CONFIRM (0X1A)	26					

	4.3.23	ED_SCAN_END_INDICATION (0X1B)	27
	4.3.24	SENSOR_DATA_REQ (0X0B)	28
	4.3.25	SENSOR_DATA_CONFIRM (0X1C)	28
	4.3.26	PER_TEST_START_REQ (0X0C)	29
	4.3.27	PER_TEST_START_CONFIRM (0X1D)	29
	4.3.28	PER_TEST_END_INDICATION (0X1E)	30
	4.3.29	PEER_DISCONNECT_REQ (0X0D)	32
	4.3.30	PEER_DISCONNECT_CONFIRM (0X1F)	32
	4.3.31	SET_DEFAULT_CONFIG_REQ (0X0E)/(0X8E)	32
	4.3.32	SET_DEFAULT_CONFIG_CONFIRM (0X20)/(0XA0)	33
	4.3.33	GET_CURRENT_CONFIG_REQ (0X0F)/(0X8F)	36
	4.3.34	GET_CURRENT_CONFIG_CONFIRM (0X21)/(0XA1)	36
	4.3.35	RANGE_TEST_START_REQ (0X50)	39
	4.3.36	RANGE_TEST_START_CONFIRM (0X51)	10
	4.3.37	RANGE_TEST_STOP_REQ (0X52)	10
	4.3.38	RANGE_TEST_STOP_CONFIRM (0X53)	10
	4.3.39	RANGE_TEST_BEACON_RESPONSE (0X54)	11
	4.3.40	RANGE_TEST_BEACON (0X55)	12
	4.3.41	RANGE_TEST_MARKER_INDICATION (0X56)	12
	4.3.42	PHY Payload for Range Test Beacon/Beacon Reply/Marker	13
	4.3.43	PKT_STREAM_REQ (0X22)/(0XA2)	14
	4.3.44	PKT_STREAM_CONFIRM (0X23)/(0XA3)	1 5
	4.3.45	RX_ON_REQ (0X24)/(0XA4)	16
	4.3.46	RX_ON_CONFIRM (0X25)/(0XA5)	16
ļ	.4 Perf	formance test Configuration parameters2	16
ļ	.5 Erro	or codes	50
	Abbrevia	tions	52
	REVISION	N HISTORY5	53

5

2 Introduction

This document explains about serial protocol that is used to communicate between the Wireless Performance Analyzer application which is running on host PC and Performance Analyzer firmware which is running on the Atmel Evaluation kit. Atmel EVKs are pre-flashed with Performance Analyzer firmware. This application is targeted to evaluate various Atmel transceivers in terms of Packet Error Rate, Range etc. Wireless Performance Analyzer is an application (part of Studio) on host PC is connects to Atmel Evaluation kit using USB or UART interface. This application is used to configure various parameters like CSMA, Antenna Diversity, TX power, Rx sensitivity to evaluate transceiver. The format of the messages used to communicate is given below.

3 Scope

The scope of the document is to describe the frame format of the messages that are used for communication between the Wireless Performance Analyzer Application running on the host PC and Performance Analyzer Firmware on the kit. The following sections describe the messages and its definitions in detail.

4 Protocol

4.1 Message Format

The Performance Analyzer protocol uses a common message format for both directions of communication.

RX/TX message format:

SOT	Msg Length	Protocol	Msg Id	Msg Payload	EOT
		ld			
(1 byte)	(1 byte)	(1 byte)	(1 byte)	(Msg Length – 2) bytes	(1 byte)

The details of message format are presented below:

Field	Size	Values	Description
SOT	1 byte	0X01	Start of the Transmission
Msg Length	1 byte	0- 255	Length of the message including Protocol Id, Msg Id and Msg Payload
Protocol Id	1 byte	0X00-0XFF	Describes the protocol used TAL – 0X00 MAC– 0X01 etc Performance Analyzer is an application on TAL, so it has the

			protocol id as 0X00
Msg Id	1 byte	0X00-0XFF	Describes what message sent.
Msg Payload	(Msg Length – 2) bytes		Payload for the message. This does not includes Protocol Id and Msg Id
EOT	1 byte	0X04	End of Transmission

4.2 Message Identifier

The message identifier indicates what the message is all about. The interpretation of the data packet will depend on the message identifier. Wireless Performance Analyzer application which is running on host PC sends Request packets, which are received and interpreted by the Performance Analyzer firmware in the kit. The Performance Analyzer firmware then performs the necessary operations and sends a confirmation or response back to the Performance Analyzer application running on the host PC or it sends the packet to Remote node over the air if the request packet is for remote node. Then the remote node performs necessary operations and sends response back to the initiator.

Performance analyzer firmware differentiates the remote node messages with the help of Message identifier value. For example, Message id value of PERF_SET_REQ is 0x02 which sets the configuration parameter for performance test in the Initiator kit connected to PC whereas to set the configuration parameter in Remote node PERF_SET_REQ value is 0X82 (Note that bit b7 is set). Therefore, if MSB(b7) in message identifier is set it is intended to be send to the remote node.

Message that can be sent to the remote node is marked with diamond symbol (♦).

Request packet Identifiers are shown below:

Message Type	Value	Description
IDENTIFY_BOARD_REQ	0X00	Identifies the connected board and get the details
PERF_START_REQ	0X01	Starting performance test in Range or PER mode
PERF_SET_REQ	0X02/ 0X82 •	Sets the various configuration parameters for the performance Test. (Note: Refer to Section 4.4 – "Performance test Configuration parameters" to get the details on various parameters types and values.)
PERF_GET_REQ	0X03 / 0X83•	Gets the various configuration parameters for the performance Test. (Note: Refer to Section 4.4 – "Performance test Configuration parameters" to get the details on various parameters types and values.)

IDENTIFY_PEER_NODE_REQ	0X04	Allows to identify the remote node by blinking
CONT_PULSE_TX_REQ	0X05/	Allows continuous wave pulse mode transmission from the radio transceiver in current channel
	0X85 ♦	
CONT_WAVE_TX_REQ	0X06/	Requests to start continuous transmission in CW or PRBS mode in current channel
	0X86 ♦	
REGISTER_READ_REQ	0X07/	Requests to read the value of the given register address
	0X87 ♦	
REGISTER_WRITE_REQ	0X08/	Requests to write the value into the given register
	0X88 ♦	address
REGISTER_DUMP_REQ	0X09/	Dumps the register values of the given set of the register
	0X89 ♦	address
ED_SCAN_START_REQ	0X0a	Starts the Energy Detection Scan stops automatically on
		completion
SENSOR_DATA_REQ	0X0b	Requests to get the sensor data like battery voltage
PER_TEST_START_REQ	0X0c	Starts the Packet Error Rate with current user settings
PEER_DISCONNECT_REQ	0X0d	Initiates the disconnection with the peer node
SET_DEFAULT_CONFIG_REQ	0X0e/	All configurable parameters shall be set to their default
	0X8e◆	values.
GET_CURRENT_CONFIG_REQ	0X0f/	Current values of all configurable parameters shall be
	0X8f ♦	read
RANGE_TEST_START_REQ	0X50	Starts the Range test with current user settings
RANGE_TEST_STOP_REQ	0X52	Stops the Range test
PKT_STREAM_REQ	0X22/	Starts or stops the packet streaming test based on

Page **8** of **55**



	0XA2◆	start/stop field value in request message with current user settings
RX_ON_REQ	0X24/ 0XA4◆	Starts or stops the continuous receive mode test based on start/stop field value in request message

Confirmations and response identifiers for the above requests are shown below:

Message Identifier	Value	Description
IDENTIFY_BOARD_CONFIRM	0X10	Identifies the connected board and gives the details of
		board like MCU, Transceiver and FW version
PERF_START_CONFIRM	0X11	Starting performance test in Range or PER mode and
		gives the status and all configurable parameters
PERF_SET_CONFIRM	0X12/	Sets the various configuration parameters for the
	0X92 ♦	performance Test
PERF_GET_CONFIRM	0X13/	Gets the various configuration parameters for the
	0X93 ♦	performance Test
IDENTIFY_PEER_NODE_CONFIRM	0X14	Allows to identify the remote node by blinking
CONT_PULSE_TX_CONFIRM	0X15/	Provide the status on completion of continuous wave
	0X95 ♦	pulse mode transmission from the radio transceiver in current channel
CONT_WAVE_TX_CONFIRM	0X16/	Start continuous transmission in CW or PRBS mode in
	0X96 ♦	current channel and provide the status
REGISTER_READ_CONFIRM	0X17/	Register Read status with the register value
	0X97 ♦	
REGISTER_WRITE_CONFIRM	0X18/	Register write status with the register address
	0X98 ♦	

REGISTER_DUMP_CONFIRM	0X19/	Dumps the register values of the given set of the register address
	0X99 ♦	
ED_SCAN_START_CONFIRM	0X1a	Provides the time required for scan and Starts the Energy
		Detection Scan stops automatically on completion
ED_SCAN_END_INDICATION	0X1b	Provides Energy values of all channels on completion of
		Energy detection
SENSOR_DATA_CONFIRM	0X1c	Provides the information like Battery voltage and temperature.
PER_TEST_START_CONFIRM	0X1d	Starts the Packet Error Rate with current user settings.
PER_TEST_END_INDICATION	0X1e	Provides information like No. of transmitted frames,
		Received frames LQI and RSSI Value on successful
		completion of PER test
PEER_DISCONNECT_CONFIRM	0x1f	Provides the result of peer Disconnect req
SET_DEFAULT_CONFIG_CONFIRM	0X20/	Provides the result for the Set default config req
	0XA0 ♦	
GET_CURRENT_CONFIG_CONFIRM	0X21/	Provides the result for the Get current config req
	0XA1◆	
RANGE_TEST_BEACON_RESPONSE	0X54	Response Frame for the Beacon Transmitted from the
		Host Node
RANGE_TEST_BEACON	0X55	Beacon Frame Transmitted over the air in Range Test
		Mode
	0X56	Marker Indication Frame which is sent when a button is
RANGE_TEST_MARKER_INDICATION		pressed at the receptor end. The LQI and ED of the
		Marker Cmd is sent to the GUI

PKT_STREAM_CONFIRM	0X23/	Starts or stops the packet streaming test and provides
	0XA3◆	the status
RX_ON_CONFIRM	0X25/	Starts or stops the continuous receive test and provides
	0XA5◆	the status

4.3 Message payload Descriptions

The following sections explain the format of payloads of all the message types.

4.3.1 IDENTIFY_BOARD_REQ (0X00)

Field	Type/	Values	Description
	Size		
Start up parameter	unsigned integer /	0X00-0XFF	Start up parameter to identify the request.
	1 byte		Default value id 0Xaa

4.3.2 IDENTIFY_BOARD_CONFIRM (0X10)

Field	Type/	Values	Description
	Size		
Status	1 byte	OX00-OXFF	Status of the request
			0X00 = SUCCESS
			Non zero = FAILURE, This board/port
			is not a Performance test pre-flashed board. User may need to manual
			check and flash the application.
			For error codes refer Section 4.5 – "Error codes"

Page **11** of **55**



IC type MCU/SoC name	unsigned integer / 1 byte Array of chars / (first byte of the array indicates the	0X00 - 0X01 	IC type on Kit. 0X00 = MCU- TRX 0X01 = SoC This represents the name of SoC or MCU used on the Kit based on the IC type parameter
Transceiver name	length) Array of chars / (first byte of the array indicates the length)		This represents the name of the transceiver used on the kit. Ignore this field if IC type = SoC
Board name	Array of chars / (first byte of the array indicates the length)		Name of Board/ kit used for Transmitter/Initiator node
MAC address	unsigned integer/ 8 bytes	0X00000000000000000001 — 0Xfffffffffffffe	MAC address of the Transmitter/Initiator node
FW version	Floating point value/4 bytes	Starts from - 1.0	Current FW version on the Kit

Features	unsigned	0X00000001 - 0X0000001F	Each bit set represents a particular
supported	integer/		feature is supported. Ex: If bit b0 is
	4 bytes		set it says channel selection option is available.
			If bit b1 is set, Range test mode is available.
			If bit b2 is set, Remote configuration mode functionalities are available.
			If bit b3 is set, Packet streaming test is available.
			If bit b4 is set, continuous Receive mode is available.

4.3.3 PERF_START_REQ (0X01)

Field	Type/	Values	Description
	Size		
Start mode	unsigned integer / 1 byte	0X01-0X02	Start mode for the Performance test 0X01 = PER measurement mode 0X02 = Single node tests

4.3.4 PERF_START_CONFIRM (0X11)

	Туре/	Values	Description
	Size		
Status	unsigned integer /	0X00-0XFF	Status of the PERF_START_REQ 0X00 = SUCCESS

Page **13** of **55**



	1 byte		Non zero = FAILURE.
			For error codes refer Section 4.5 – "Error codes"
Start mode	unsigned integer /	0X01- 0X02	Start mode in which the Performance test is started
	1 byte		0X01 = PER mode
			0X02 =Single node test mode
Channel	unsigned	11-26 for 2.4GHz	The default channel in which the
	integer /	0-10 for 868/915 Sub GHz band	Performance test is started
	2 bytes		
Channel Page	unsigned	0,2,5,16,17,18, 19	The channel page in which the
Ü	integer /		Performance test is started
	1 byte		
TX Power dBm value	signed integer /	-17dBm to +21dBm	TX power value in dBm
	1 byte		
TX Power	unsigned	0X00 – 0X0f	TX power register value, if exists
Register value	integer /		0Xff= does not exists for this kit, do
	1 byte		not show it in GUI
			This field exists does not exist for
			AT86RF212B
CSMA	Boolean/	True/false	CSMA-CA default value
	1 byte		True = enabled
			False = disabled
Frame Retry	Boolean /	True/false	Frame retransmission default value

	1 byte		True = enabled
			False = disabled
ACK Request	Boolean /	True/false	Ack Request default value
	1 byte		True = enabled
			False = disabled
Rx desensitization	unsigned integer/	True/false	Rx De-sensitivity default value
descrisitization			OXff= does not exists for this kit, do
	1 byte /		not show it in GUI
			0X00- disabled
			0X01 – enabled
RPC	unsigned integer/	0X00- 0Xff	RPC default value if it exists
			0Xff= does not exists for this kit, do
	1 byte		not show it in GUI
			0X00- disabled
			0X01 – enabled
Antenna	unsigned	0X00- 0Xff	Antenna diversity default value if it
Diversity	integer/		exists
	1 byte		OXff= does not exists for this kit, do not show it in GUI
			0X00- enabled,
			0X01- disabled, ANT A1/X2 selected
			0X02 - disabled, ANT A2/X3 selected
Transceiver	unsigned	0X00- 0Xff	Default transceiver state
state	integer/		0X08 = TRX OFF Single node tests
	1 byte		0X16 = RX AACK ON for PER test

No. of test	Unsigned	1-4294967295(2^32 - 1)	Default test frames for PER test =
frames	integer/		100.
	4 bytes		Ignore this field if start mode
			parameter is not equal to 0X01
PHY frame	unsigned	12 - 127	Default PHY frame length = 20.
length	integer/		less are their field if about one de
	2 hytos		Ignore this field if start mode parameter is not equal to 0X01
	2 bytes		parameter is not equal to 0x01
Antenna	unsigned	0X00- 0Xff	Antenna diversity default value if it
Diversity on	integer/		exists
Peer	1 hyd-0		OXff= does not exists for this kit, do
	1 byte		not show it in GUI
			not show it in doi
			0X00- enabled,
			0X01- disabled, ANT A1/X2 selected
			0X02 - disabled, ANT A2/X3 selected
CRC Setting on	Boolean/	TRUE/FALSE	Indicate whether Counting of packets
Peer			with wrong CRC is enabled
	1 byte		
			TRUE = enable
			FALSE = disable
			These disable
Peer IC type	unsigned	0X00 – 0X01	IC type on Peer node.
	integer /		0X00 = MCU- TRX
	1 byte		OXOG - WEG THA
			0X01- SOC
			Ignore this field if start mode
			parameter is not equal to 0x01
			parameter is not equal to one I
Peer MCU/SoC	Array of		This represents the name of SoC or
name	chars /		MCU used on Peer node based on the
	(first byte of		Peer IC type parameter
		1	

	the array indicates the length)		Ignore this field if start mode parameter is not equal to 0X01
Peer Transceiver name	Array of chars / (first byte of the array indicates the length)		This represents the name of the transceiver used on Peer node. Ignore this field if IC type = SoC Ignore this field if start modes parameter is not equal to 0X01
Peer Board name	Array of chars / (first byte of the array indicates the length)		Board/ kit name of the Peer node
Peer MAC address	unsigned integer/	0X000000000000001 - 0Xfffffffffffffe	MAC address of the Peer node
Peer FW version	Floating point value/4 bytes		Current FW version on the peer node
Features supported on peer	unsigned integer/ 4 bytes	0X00000001 - 0X0000001F	Each bit set represents a particular feature is supported. If bit b3 is set, Packet streaming test is available. If bit b4 is set, continuous Receive mode is available.

4.3.5 PERF_SET_REQ (0X02)/(0X82)

Field	Type/	Values	Description
	Size		
Parameter	unsigned	0X00-0XFF	Parameter type that needs to be set.
Туре	integer /		Types of parameter are defined in the
	1 byte		table 1
Parameter	Various	Parameter Specific.	The value to set for Performance test
Value	(first byte indicates the length)		parameters

Note: Refer to Section 4.4 - Performance test Configuration parameters to get the details on various parameters types and values.

4.3.6 PERF_SET_CONFIRM (0X12)/(0X92)

Field	Type/	Values	Description
	Size		
Status	unsigned integer / 1 byte	OX00-OXFF	Status of the PERF_SET_REQ 0X00 = SUCCESS Non zero = FAILURE and previous value should be retained. For error codes refer Section 4.5 – "Error codes"
Parameter Type	unsigned integer / 1 byte	OX00-OXFF	Parameter type that had been set. Types of parameters are defined in the table 1
Parameter Value	Various (first byte	Parameter Specific	The parameter value that has been set

Page **18** of **55**



inc	dicates the	
len	ngth)	

4.3.7 PERF_GET_REQ (0X03)/(0X83)

Field	Type/	Values	Description
	Size		
Parameter	unsigned	0X00-0XFF	Parameter type to read
Туре	integer /		
	1 byte		

4.3.8 PERF_GET_CONFIRM (0X13)/(0X93)

Field	Туре/	Values	Description
	Size		
Status	unsigned integer / 1 byte	0X00-0XFF	Status of the PERF_GET_REQ 0X00 = SUCCESS Non zero = FAILURE and do not consider the following fields. For error codes refer Section 4.5 –
			"Error codes"
Parameter	unsigned	0X00-0XFF	Parameter type that was requested
Туре	integer /		to get.
	1 byte		
Parameter Value	various	Parameter Specific	The value of the parameter value that was read

4.3.9 IDENTIFY_PEER_NODE_REQ (0X04)

Field	Type/	Values	Description
	Size		
Dummy byte	unsigned integer /	OX00-OXFF	Dummy byte. It has no meaning Default value is 0xaa

4.3.10 IDENTIFY_PEER_NODE_CONFIRM (0X14)

Field	Type/	Values	Description
	Size		
Status	unsigned integer / 1 byte	OXOO-OXFF	Status of the IDENTIFY_PEER_NODE_REQ 0X00 = SUCCESS, the Peer node has been identified Non zero = FAILURE, Not able to contact peer node.
			For error codes refer Section 4.5 – "Error codes". This feature is available only if the start mode of the PERF_START_CONFIRM has a value 0x01(sec 1.3.4)

4.3.11 CONT_PULSE_TX_REQ (0X05)/(0X85)

Field	Type/ Size	Values	Description
Dummy byte	unsigned integer /1 byte	OX00-0XFF	Dummy byte. It has no meaning Default value is 0xaa

Page **20** of **55**



CONT_PULSE_TX_CONFIRM (0X15)/(0X95) 4.3.12

Field	Type/	Values	Description
	Size		
Status	unsigned	0X00-0XFF	Status of the CONT_
	integer / 1		CONT_PULSE_TX_REQ
	byte		OX00 = SUCCESS, the continuous pulse wave transmission is done Non zero = FAILURE, Not done. For error codes refer Section 4.5 – "Error codes".

4.3.13 CONT_WAVE_TX_REQ (0X06)/(0X86)

Field	Type/	Values	Description
	Size		
Start stop	Boolean /	TRUE/FALSE	This parameter indicates whether
parameter	1 byte		Continuous transmission has to start or stop the ongoing transmission.
			0X00 = Stop Continuous transmission
			0X01 = Start Continuous
			Transmission
TX mode	unsigned	0X00- 0X01	Indicates the mode in which
	integer /		Continuous Transmission should
	1 byte		start.
	,		0X00 = CW- Continuous Wave
			OX01 = PRBS- Pseudo Random Binary Sequence

Page **21** of **55**



Time out value	Unsigned	0X0000 - 0X0E10	This parameter indicates how long
	integer/		the continuous transmission has to
(seconds)			take place
	2 bytes		
			Default value is 0X1E (30 sec)
			This field has dummy values if
			continuous transmission starts at
			Initiator node.

CONT_WAVE_TX_CONFIRM (0X16)/(0X96) 4.3.14

Field	Type/	Values	Description
	Size		
Status	unsigned integer / 1 byte	OX00-OXFF	Status of the CONT_ CONT_WAVE_TX_REQ 0X00 = SUCCESS, the continuous wave transmission is started or stopped Non zero = FAILURE, Not done. For error codes refer Section 4.5 – "Error codes".
Start stop parameter	Boolean / 1 byte	TRUE/FALSE	This same as Start stop parameter in the Req
TX mode	unsigned integer / 1 byte	0X00- 0X01	This is same as TX mode parameter in the Req

4.3.15 REGISTER_READ_REQ (0X07)/(0X87)

Field	Type/	Values	Description
	Size		
Register address	unsigned integer/ 2 bytes	0X00- 0X3f – for regular transceivers 0X141- 0X16F for SoC	Address of the Register to be read. Valid range is based on the whether the kit has regular transceiver or SoC, for this information refer IC type parameter of IDENTIFY_BOARD_CONFRM (Sec
			<u>1.3.2</u>)

REGISTER_READ_CONFIRM (0X17)/(0X97) 4.3.16

Field	Type/	Values	Description
	Size		
Status	unsigned integer / 1 byte	OX00-0XFF	Status of the REGISTER_READ_REQ 0X00 = SUCCESS, Non zero = FAILURE, Do not consider following fields. For error codes refer Section 4.5 —
Decision of		over over f	"Error codes".
Register address	unsigned integer/ 2 bytes	0X00- 0X3f – for regular transceivers 0X141- 0X16F for SoC	The address of the register that has been read
Register value	unsigned integer / 1 byte	OXOO- OXFF	The value in the specified register address that has been read

4.3.17 **REGISTER_WRITE_REQ (0X08)/(0X88)**

Field	Type/	Values	Description
	Size		
Register	unsigned	0X00- 0X3f – for regular transceivers	The address of the register that has
address	integer/	0X141- 0X16F for SoC	to be written
	2 bytes		
Register value	unsigned	0X00- 0XFF	Value to be written in the specified
	integer /		register address
	1 byte		

4.3.18 REGISTER_WRITE_CONFIRM (0X18)/(0X98)

Field	Type/	Values	Description
	Size		
Status	unsigned integer / 1 byte	0X00-0XFF	Status of the REGISTER_WRITE_REQ 0X00 = SUCCESS, Non zero = FAILURE, Do not consider following fields. For error codes refer Section 4.5 — "Error codes".
Register address	unsigned integer/ 2 bytes	0X00- 0X3f – for regular transceivers 0X141- 0X16F for SoC	The address of the register that has been written
Register value	unsigned integer /	0X00- 0XFF	Value written in the specified register address

4.3.19 REGISTER_DUMP_REQ (0X09)/(0X89)

Field	Type/	Values	Description
	Size		
Start register	unsigned	0X00- 0X3f – for regular transceivers	The start address of the register set
address	integer/	0X141- 0X16F for SoC	that has to be read
	2 bytes		
End register	unsigned	0X00- 0X3f – for regular transceivers	The end address of the register set
address	integer /	0X141- 0X16F for SoC	that has to be read. The End register address Should be always greater
	2 bytes		than Start register address

4.3.20 REGISTER_DUMP_CONFIRM (0X19)/(0X99)

Field	Type/ Size	Values	Description
Status	unsigned integer / 1 byte	0X00-0XFF	Status of the REGISTER_DUMP_REQ 0X00 = SUCCESS, Non zero = FAILURE, Do not consider following fields. For error codes refer Section 4.5 – "Error codes".
Start register address	unsigned integer/ 2 bytes	0X00- 0X3f – for regular transceivers 0X141- 0X16F for SoC	The start address of the register set that has been read
End register address	unsigned integer / 2 bytes	0X00- 0X3f – for regular transceivers 0X141- 0X16F for SoC	The end address of the register set that has been read.
Register values	Array of register		The list of register values that had

Page **25** of **55**



List	values/	been read.
	(First byte of the array indicates	
	the length)	

4.3.21 ED_SCAN_START_REQ (0X0A)

Field	Type/	Values	Description
	Size		
Scan duration	unsigned	0X00- 0X0e	A value used to calculate the length
	integer/		of time to spend scanning each
	1 byte		channel for ED
Channels	Unsigned	0X00000000-0X07FFF800 – Ghz band	A 32-bit value used to represent 32
Selected	integer/4	0,000,000,000,000,000,000,000	channels, from 0-31.
	bytes	0X00000000-0X000007FF – Subghz	
		bands	Assuming the lower byte is
			transmitted first to firmware.

4.3.22 ED_SCAN_START_CONFIRM (0X1A)

Field	Type/ Size	Values	Description
Status	unsigned integer/ 1 byte	0X00- 0XFF	Status of the ED_SCAN_START_REQ 0X00 = SUCCESS, ED scan started Non zero = FAILURE, Not started, do not consider following fields For error codes refer Section 4.5 – "Error codes".

Page **26** of **55**



Scan time	unsigned	0X00- 0X32	Minutes part of the approximate
minutes part	integer/		time to be taken to complete scan. If
	4 1 1 1		this value is '0' means the scan may
	1 byte		take less than 1 minute
Scan time	Floating		Seconds part of the approximate
seconds part	point/4		time to be taken to complete scan.
	bytes		First three decimal point values shall
			give milliseconds value

4.3.23 ED_SCAN_END_INDICATION (0X1B)

Field	Type/ Size	Values	Description
No of channels	unsigned integer/ 1 byte	0- 16	The no of channels scanned 16 for 2.4GHZ 10 for 868/915MHZ
Energy detection List	Array of ED values along with channel		The list of Energy values in all channels found during the ED scan. Each element in the List is channel followed by ED value. No. of channels parameter indicates the No. of elements in the list. Refer 3.3.23.1 for details

4.3.23.1 **Energy detection List**

Field	Type/ Size	Values	Description
Channel number	unsigned integer/ 2 bytes	0- 26	The channel number scanned 11- 26 for 2.4GHZ 0-10 for 868/915MHZ
ED value	signed integer/1 byte	-91dBm to -7dBm	The Energy detected in a channel during the ED scan.

SENSOR_DATA_REQ (0X0B) 4.3.24

Field	Type/	Values	Description
	Size		
Dummy byte	unsigned	0X00-0XFF	Dummy byte. It has no meaning
	integer/		Default value is Over
	1 byto		Default value is 0xaa
	1 byte		

4.3.25 SENSOR_DATA_CONFIRM (0X1C)

Field	Type/	Values	Description
	Size		
Status	unsigned	0X00- 0XFF	Status of the SENSOR_DATA_REQ
	integer/		request.
	1 byte		0X00 = SUCCESS, Got the sensor
			data
			Non zero = FAILURE, do not consider
			following fields.
			For error codes refer Section 4.5 –

Page **28** of **55**



		"Error codes".
Battery voltage	floating point/ 4 bytes	 Battery voltage of the current kit. The value shall be in volts
Temperature	floating point/ 4 bytes	 Temperature measured in the degrees Celsius. This field is available only for SoC which will be know by IC type parameter of the IDENTIFY_BOARD_CONFIRM(refer Sec1.3.2)

4.3.26 PER_TEST_START_REQ (0X0C)

Field	Type/	Values	Description
	Size		
Dummy byte	unsigned integer/	0X00-0XFF	Dummy byte. It has no meaning Default value is 0Xaa
	1 byte		

4.3.27 PER_TEST_START_CONFIRM (0X1D)

Field	Type/	Values	Description
	Size		
Status	unsigned integer/ 1 byte	0X00-0XFF	Status of the PER_TEST _START REQ 0X00 = SUCCESS, PER test Initiated Non zero = FAILURE, Not initiated. For error codes refer Section 4.5 – "Error codes".

Page **29** of **55**



PER_TEST_END_INDICATION (0X1E) 4.3.28

Status unsigned integer/ 1 byte No. of frames transmitted No. of frames received integer/ 4 bytes Status of the PER test. Sent on completion of PER test OX00 = SUCCESS, PER test completed Non zero = FAILURE, Not able to contact remote node to get the test results after the completion of the test. Ignore following fields in this case. For error codes refer Section 4.5 – "Error codes". Average RSSI value Indicates average RSSI value of the PER test No. of frames integer/ 4 bytes No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test	Field	Type/	Values	Description
integer/ 1 byte Non zero = FAILURE, Not able to contact remote node to get the test results after the completion of the test. Ignore following fields in this case. For error codes refer Section 4.5 – "Error codes". Average RSSI value 1 byte Average LQI unsigned value No. of frames transmitted No. of frames transmitted integer/ 4 bytes No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames failled to be transmitted		Size		
integer/ 1 byte Non zero = FAILURE, Not able to contact remote node to get the test results after the completion of the test. Ignore following fields in this case. For error codes refer Section 4.5 – "Error codes". Average RSSI value 1 byte Average LQI unsigned value No. of frames transmitted No. of frames transmitted integer/ 4 bytes No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames failled to be transmitted	Status	unsigned	OVOO OVEE	Status of the DEP test. Sent on
1 byte DX00 = SUCCESS, PER test completed Non zero = FAILURE, Not able to contact remote node to get the test results after the completion of the test. Ignore following fields in this case. For error codes refer Section 4.5 - "Error codes".	Status	_	0.000-0.04F	
Completed Non zero = FAILURE, Not able to contact remote node to get the test results after the completion of the test. Ignore following fields in this case. For error codes refer Section 4.5 - "Error codes". Average RSSI value Indicates average RSSI value of the per test				
Non zero = FAILURE, Not able to contact remote node to get the test results after the completion of the test. Ignore following fields in this case. Average RSSI value of the per test integer/ 1 byte Average LQI value Indicates average RSSI value of the PER test No. of frames transmitted No. of frames integer/ 4 bytes OX00- OXFFFFFFFF Frame failures Indicates average LQI of the PER test No. of frames transmitted from Transmitter node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test		1 byte		·
Contact remote node to get the test results after the completion of the test. Ignore following fields in this case. For error codes refer Section 4.5 - "Error codes". Average RSSI value Indicates average RSSI value of the PER test				Completed
results after the completion of the test. Ignore following fields in this case. For error codes refer Section 4.5 – "Error codes". Average RSSI value integer/ 1 byte Average LQI unsigned integer/ 1 byte No. of frames transmitted integer/ 4 bytes No. of frames received integer/ 4 bytes No. of frames received by Receptor node during the PER test received unsigned integer/ 4 bytes No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames failed to be transmitted				
test. Ignore following fields in this case. For error codes refer Section 4.5 – "Error codes". Average RSSI value Signed integer/ 1 byte DX00- 0XFF Indicates average RSSI value of the PER test Indicates average LQI of the PER test Indicates average LQI of the PER test No. of frames transmitted integer/ 4 bytes No. of frames received unsigned integer/ 4 bytes No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames failed to be transmitted				_
Average RSSI value Average LQI unsigned integer/ 1 byte No. of frames transmitted No. of frames transmitted No. of frames received No. of frames unsigned integer/ 4 bytes Case. For error codes refer Section 4.5 – "Error codes". Indicates average RSSI value of the PER test Indicates average LQI of the PER test No. of frames transmitted from Transmitter node during the PER test No. of frames received by Receptor node during the PER test Trame failures Unsigned integer/ 4 bytes No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test				
Average RSSI value Signed integer/ 1 byte Average LQI unsigned integer/ 1 byte No. of frames transmitted No. of frames received No. of frames received No. of frames received No. of frames received integer/ 4 bytes No. of frames received ox00- 0xfffffffff 4 bytes No. of frames received ox00- 0xfffffffff No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test				
Average RSSI value Average RSSI value Signed integer/ 1 byte				For error codes refer Section 4.5 –
value integer/ 1 byte PER test Average LQI value unsigned integer/ 1 byte 0X00- 0XFF Indicates average LQI of the PER test No. of frames transmitted unsigned integer/ 4 bytes 0X00- 0XFFFFFFFF Integer/ 4 bytes No. of frames transmitted from Transmitter node during the PER test No. of frames received unsigned integer/ 4 bytes 0X00- 0XFFFFFFFF Integer/ 4 bytes No. of frames received by Receptor node during the PER test Frame failures unsigned integer/4 0X00- 0XFFFFFFFF Integer/ 4 bytes No. of frames failed to be transmitted				"Error codes".
Average LQI unsigned integer/ 1 byte No. of frames transmitted unsigned integer/ 4 bytes No. of frames received unsigned integer/ 4 bytes No. of frames unsigned integer/ 4 bytes No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test	Average RSSI	Signed		Indicates average RSSI value of the
Average LQI unsigned integer/ 1 byte No. of frames transmitted No. of frames unsigned integer/ 4 bytes No. of frames received No. of frames unsigned integer/ 4 bytes OX00- OXFFFFFFFF No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test	value	integer/		PER test
value integer/ 1 byte No. of frames transmitted unsigned integer/ 4 bytes No. of frames received unsigned integer/ 4 bytes No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test		1 byte		
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No. of frames transmitted unsigned integer/ 4 bytes No. of frames transmitted from Transmitter node during the PER test No. of frames unsigned integer/ 4 bytes No. of frames received by Receptor node during the PER test Frame failures unsigned integer/ 4 bytes No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test	value	integer/		
transmitted integer/ 4 bytes No. of frames received integer/ 4 bytes No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames received by Receptor node during the PER test No. of frames failures unsigned integer/4 No. of frames failed to be transmitted		1 byte		
No. of frames received unsigned integer/ 4 bytes No. of frames received by Receptor node during the PER test Frame failures unsigned integer/4 OX00- OXFFFFFFFF No. of frames failed to be transmitted	No. of frames	unsigned	0X00- 0XFFFFFFF	No. of frames transmitted from
No. of frames received unsigned integer/ 4 bytes Frame failures unsigned integer/4 OX00- OXFFFFFFFF No. of frames received by Receptor node during the PER test No. of frames failed to be transmitted	transmitted	integer/		Transmitter node during the PER test
received integer/ 4 bytes node during the PER test Frame failures unsigned integer/4 0X00- 0XFFFFFFFF node transmitted		4 bytes		
4 bytes Frame failures unsigned integer/4 OX00- OXFFFFFFF No. of frames failed to be transmitted	No. of frames	unsigned	0X00-0XFFFFFFF	I
Frame failures unsigned integer/4 OX00- OXFFFFFFFF unsimitted No. of frames failed to be transmitted	received	integer/		node during the PER test
integer/4 transmitted		4 bytes		
	Frame failures	unsigned	0X00- 0XFFFFFFF	No. of frames failed to be
		_		transmitted
bytes		bytes		

Page **30** of **55**



Frames w/o ACK	unsigned integer/ 4 bytes	0X00- 0XFFFFFFF	No of transmitted frames didn't get the ACK from receptor. Ignore this field if ACK request parameter is disabled for the current PER test. Refer. ACK Request parameter in the PERF_START_CONFIRM in Sec 1.3.4. Value if disabled is OXffffffff.
Frames with Access failures	unsigned integer/ 4 bytes	OXOO- OXFFFFFFF	No. of frames could not be transmitted due to CHANNEL_ACCESS_FAILURE. Ignore this field if CSMA is disabled for the current PER test. Refer. CSMA parameter in the PERF_START_CONFIRM in Sec 1.3.4. Value if disabled is 0Xffffffff.
Frames with wrong CRC Test Duration	unsigned integer/ 4 bytes Floating	0X00- 0XFFFFFFF	No. of frames received with wrong CRC. Ignore this field if CRC setting on remote node is disabled for the current PER test. Refer CRC Setting on Peer parameter in the PERF_START_CONFIRM in Sec 1.3.4 .Value if disabled is OXfffffffff.
Net data rate	point / 4 bytes Floating point /		in seconds Net data rate for the test.
	4 bytes		

4.3.29 PEER_DISCONNECT_REQ (0X0D)

Field	Type/	Values	Description
	Size		
Dummy byte	unsigned	OX00-0XFF	Dummy byte. It has no meaning
	integer/		Default value is 0Xaa
	1 byte		

4.3.30 PEER_DISCONNECT_CONFIRM (0X1F)

Field	Type/ Size	Values	Description
Status	unsigned integer/ 1 byte	OXOO- OXFF	Status of the PEER_DISCONNECT_REQ 0X00 = SUCCESS, Peer is disconnected successfully. After this confirm, the nodes are again to open for new peer search. Non zero = FAILURE. For error codes refer Section 4.5 – "Error codes".

SET_DEFAULT_CONFIG_REQ (0X0E)/(0X8E) 4.3.31

Field	Type/	Values	Description
	Size		
Dummy byte	unsigned integer/ 1 byte	0X00-0XFF	Dummy byte. It has no meaning Default value is 0Xaa

Page **32** of **55**



SET_DEFAULT_CONFIG_CONFIRM (0X20)/(0XA0) 4.3.32

Field	Туре/	Values	Description
	Size		
Status	unsigned	0X00- 0XFF	Status of the
	integer/		SET_DEFAULT_CONFIG_REQ
	1 byte		0X00 = SUCCESS.
			Non zero = FAILURE.
			For error codes refer Section 4.5 –
			"Error codes".
Channel	unsigned	11-26 for 2.4GHz	The default channel in which the
	integer /	0- 10 for 868/915 Sub GHz band	Performance test is started
	2 bytes	·	
Channel Page	unsigned	0,2,5,16,17,18, 19	The channel page in which the
	integer /		Performance test is started
	1 byte		
TX Power dBm	signed	-17dBm to +21dBm	TX power value in dBm
value	integer /		
	1 byte		
TX Power	unsigned	0X00 – 0X0f	TX power register default value, if
Register value	integer /		exists
	1 byte		0Xff= does not exists for this kit, do
			not show it in GUI
			This field does not exists for
			AT86RF212B transceiver
CSMA	Boolean/	True/false	CSMA-CA default value
	1 byte		True = enabled

			False = disabled
Frame Retry	Boolean /	True/false	Frame retransmission default value
	1 byte		True = enabled
			False = disabled
ACK Request	Boolean /	True/false	Ack Request default value
	1 byte		True = enabled
			False = disabled
Rx	unsigned	True/false	Rx De-sensitivity default value
desensitization	integer/ 1 byte /		OXff= does not exists for this kit, do not show it in GUI
			0X00- disabled
			0X01 – enabled
RPC	unsigned	0X00- 0Xff	RPC default value if it exists
	integer/ 1 byte		OXff= does not exists for this kit, do not show it in GUI
			This field exists for AT86RF233 only
			0X00- disabled
			0X01 – enabled
Antenna Diversity	unsigned integer/	0X00- 0Xff	Antenna diversity default value if it exists
	1 byte		0Xff= does not exists for this kit, do not show it in GUI
			0X00- enabled,
			0X01- disabled, ANT A1/X2 selected
			0X02 - disabled, ANT A2/X3 selected

unsigned	0X00- 0Xff	Default transceiver state
integer/		0X08 = TRX OFF Single node tests
1 byte		0X16 = RX AACK ON for PER test
Unsigned	0 – 4294967295(2^32 - 1)	Default test frames for PER test =
integer/		100.
4 bytes		Ignore this field if start mode
,		parameter is not equal to 0X01
unsigned	12 - 127	Default PHY frame length = 20.
integer/		Ignore this field if start mode
2 bytes		parameter is not equal to 0X01
unsigned	0X00-0Xff	Antenna diversity current value if it
integer/		exists and the peer is connected
1 byte		0X00- enabled,
		0X01- disabled, ANT A1/X2 selected
		0X02 - disabled, ANT A2/X3 selected
		Ignore this field if start mode
		parameter is not equal to 0X01
Boolean/	TRUE/FALSE	Indicate whether Counting of packets
1 byte		with wrong CRC is enabled
-		TRUE = enable
		FALSE = disable
		Ignore this field if start mode
		parameter is not equal to 0X01
	integer/ 1 byte Unsigned integer/ 4 bytes unsigned integer/ 2 bytes unsigned integer/ 1 byte Boolean/	integer/ 1 byte Unsigned integer/ 4 bytes unsigned integer/ 2 bytes unsigned integer/ 1 byte TRUE/FALSE

4.3.33 GET_CURRENT_CONFIG_REQ (0X0F)/(0X8F)

Field	Type/	Values	Description
	Size		
Dummy byte	unsigned	0X00-0XFF	Dummy byte. It has no meaning
	integer/		Default value is 0Xaa
	1 byte		

GET_CURRENT_CONFIG_CONFIRM (0X21)/(0XA1) 4.3.34

Field	Type/	Values	Description
	Size		
Status	unsigned	0X00- 0XFF	Status of the
	integer/		GET_CURRENT_CONFIG_REQ
	1 byte		0X00 = SUCCESS.
			Non zero = FAILURE.
			For error codes refer Section 4.5 –
			"Error codes".
Channel	unsigned	11-26 for 2.4GHz	The current channel in which the
	integer /	0 - 10 for 868/915 Sub GHz band	Performance test is running now
	2 bytes		
Channel Page	unsigned	0,2,5,16,17,18, 19	The current channel page in which
	integer /		the Performance test is running now
	1 byte		
TX Power dBm	signed	-17dBm to +21dBm	Current TX power value in dBm
value	integer /		
	1 byte		
TX Power	unsigned	0X00 – 0X0F	Current TX power register value, if

Page **36** of **55**



Register value	integer /		exists
	1 byte		OXFF= does not exists for this kit, do not show it in GUI
			This field does not exists for AT86RF212B transceiver
CSMA	Boolean/	True/false	CSMA-CA current value
	1 byte		True = enabled
			False = disabled
Frame Retry	Boolean /	True/false	Frame retransmission default value
	1 byte		True = enabled
			False = disabled
ACK Request	Boolean /	True/false	Ack Request current value
	1 byte		True = enabled
			False = disabled
Rx	unsigned	True/false	Rx De-sensitivity current value
desensitization	integer/		0Xff= does not exists for this kit, do
	1 byte /		not show it in GUI
			0X00- disabled
			0X01 – enabled
RPC	unsigned	0X00- 0Xff	RPC current value if it exists
	integer/		OXff= does not exists for this kit, do not show it in GUI
	1 byte		
			This field exists for AT86RF233 only.
			0X00- disabled
			0X01 — enabled

Antenna Diversity	unsigned integer/	0X00- 0Xff	Antenna diversity current value if it exists
	1 byte		
			OXff= does not exists for this kit, do not show it in GUI
			0X00- enabled,
			0X01- disabled, ANT A1/X2 selected
			0X02 - disabled, ANT A2/X3 selected
Transceiver	unsigned	0X00- 0Xff	Current transceiver state
state	integer/		0X08 = TRX OFF Single node tests
	1 byte		0X16 = RX AACK ON for PER test
No. of test	Unsigned	0 - 4294967295(2^32-1)	Current test frames for PER test =
frames	integer/		100.
	4 bytes		
			Ignore this field if start mode
			parameter is not equal to 0X01
PHY frame	unsigned	12 - 127	Default PHY frame length = 20.
length	integer/		
	2 bytes		Ignore this field if start mode
			parameter is not equal to 0X01
Antenna	unsigned	0X00-0Xff	Antenna diversity current value if it
Diversity on	integer/		exists and the peer is connected
Peer	1 byte		
			0X00- enabled,
			0X01- disabled, ANT A1/X2 selected
			0X02 - disabled, ANT A2/X3 selected

			Ignore this field if start mode parameter is not equal to 0x01
CRC Setting on Peer	Boolean/ 1 byte	TRUE/FALSE	Indicate whether Counting of packets with wrong CRC is enabled currently TRUE = enable FALSE = disable Ignore this field if start mode parameter is not equal to 0x01
ISM frequency	Floating point/ 4 bytes	2322.0 – 2527.0	Indicates the ISM frequency in which transceiver currently being operated. range.Ex:2323.5,2526.0 etc This field is valid only If Transceiver is AT86RF233 and channel parameter(of this CONFIRM) is equal to 0xff only, ignore this field otherwise

RANGE_TEST_START_REQ (0X50) 4.3.35

Field	Type/	Values	Description
	Size		
Dummy byte	unsigned integer/	0X00-0XFF	Dummy byte. It has no meaning Default value is 0XBB
	1 byte		

4.3.36 RANGE_TEST_START_CONFIRM (0X51)

Field	Type/ Size	Values	Description
Status	unsigned integer/ 1 byte	OX00-OXFF	Status of the RANGE_TEST_START REQ 0X00 = SUCCESS, Range test Initiated Non zero = FAILURE, Not initiated. For error codes refer Section 4.5 – "Error codes".

4.3.37 RANGE_TEST_STOP_REQ (0X52)

Field	Type/	Values	Description
	Size		
Dummy byte	unsigned integer/	0X00-0XFF	Dummy byte. It has no meaning
	1 byte		Default value is OXCC

4.3.38 RANGE_TEST_STOP_CONFIRM (0X53)

Field	Type/ Size	Values	Description
Status	unsigned integer/ 1 byte	OX00-0XFF	Status of the RANGE_TEST _STOP REQ
			0X00 = SUCCESS, Range test Initiated

Page **40** of **55**



	Non zero = FAILURE, Not initiated.
	For error codes refer Section 4.5 – "Error codes".

4.3.39 RANGE_TEST_BEACON_RESPONSE (0X54)

Field	Type/	Values	Description
	Size		
PHY Payload	Array of	0X00-0XFF	The PHY Payload of the Range
	unsigned		Test Beacon Response Frame
	integers/		which was received from the
	4 5 4 5		receptor node is sent to the Host
	1 byte		application. Refer Table 3.3.42
LQI-R	unsigned	0X00-0XFF	Postfix-R indicates, the LQI value
	integer/		detected at the remote node.
	1 byte		
ED value- R	signed	0X00-0XFF	Postfix-R indicates, the ED value
	integer/		detected at the remote node.
	1 byte		
LQI-h	unsigned	0X00-0XFF	Postfix-h indicates, the LQI value
	integer/		detected at the host node.
	1 byte		
D value- h	signed	0X00-0XFF	Postfix-h indicates, the ED value
	integer/		detected at the host node.
	1 byte		

RANGE_TEST_BEACON (0X55) 4.3.40

Field	Type/	Values	Description
	Size		
PHY Payload	Array of	0X00-0XFF	The PHY Payload of the Range Test
	unsigned		Beacon Frame which is transmitted
	integers/1		over the air is sent to the Host
	byte		application. Refer
			Table 3.3.42

4.3.41 RANGE_TEST_MARKER_INDICATION (0X56)

Field	Type/ Size	Values	Description
PHY Payload	Array of unsigned integers/1 byte	OX00-0XFF	The PHY Payload of the Range Test Marker Frame which was received from the receptor node on event of Button Press on receptor side , is sent to the Host application. Refer Table 3.3.42
LQI	unsigned integer/1 byte	0X00-0XFF	LQI of the received Marker Indication Frame
ED	signed integer/1 byte	0X00-0XFF	ED Value of the received Marker Indication Frame

PHY Payload for Range Test Beacon/Beacon Reply/Marker 4.3.42

Field	Type/	V	alues		
	Size	Beacon*	Beacon Reply	Marker	Description
Frame Length	unsigned integer/2 bytes	0X0000 - 0X007F	0X0000- 0X007F	0X0000- 0X007F	The Length of the PHY payload which is sent over the air.(Including the FCS Field)
FCF	unsigned integer/2by tes	OXOO-OXFF	0X00-0XFF	0X00-0XFF	The two byte FCF occupies the first two octets of the MPDU.(0X8861 is the default used in the application)
Sequence Number-PHY	unsigned integer/1 byte	0X00-0XFF	0X00-0XFF	0X00-0XFF	The one-octet sequence number following the FCF identifies a particular frame
PAN ID	unsigned integer/2by tes	0X00-0XFF	0X00-0XFF	0X00-0XFF	Both Source and Destination PAN ID are same (Intra-PAN).(0XCAFE is the default PAN ID used in the application)
Destination Short Address	unsigned integer/2by tes	0X00-0XFF	0X00-0XFF	0X00-0XFF	16-bit Destination Short address
Source Short Address	unsigned integer/2by tes	OXOO-OXFF	0X00-0XFF	0X00-0XFF	16-bit Source Short address

CMD ID	unsigned integer/1 byte	0X12	0X13	0X15	I byte command ID to identify the type of frame(beacon/beacon reply/marker)
Sequence Number	unsigned integer/1 byte	0X00-0XFF	0X00-0XFF	0X00-0XFF	The one-octet sequence number to Identify the range Test Beacon frame
Range Test Frame Count	Unsigned - 32 bit integer/ 4 bytes	0 – 4294967295 (2^32 - 1)	0 – 4294967295 (2^32 - 1)	0 – 4294967295 (2^32 - 1)	Indicates the Range Test Beacon frame count
Range Test Payload	Signed*/un signed integer/2 bytes(only 1 byte for Marker)	0X00	OX00-OXFF First Byte is Signed followed by unsigned integer Byte	OXAA	The Range Test Beacon Frame has 0X00 in both the two fields and the receptor node fills these two bytes with ED and LQI value respectively .For Marker cmd it is a dummy value.

^{*}Beacon name is used to indicate periodic transmissions .IEEE 802.15.4 Compliant Data frame is used for all the above cases.

PKT_STREAM_REQ (0X22)/(0XA2) 4.3.43

Field	Type/	Values	Description
	Size		
Start/stop	Boolean /	TRUE/FALSE	This parameter indicates whether
	4.1.		Packet streaming has to start or stop
	1 byte		the ongoing transmission.
			0X00 = Stop Packet streaming
			0X01 = Start Packet streaming

Page **44** of **55**



Frame Length	unsigned	0X0000 – 0X007F	This parameter indicates length of
	integer/		each frame sent during packet
	2 bytes		streaming
Gap time	Unsigned	0X0000 – 0XFFFF	Delay between successive frames
(ms)	integer/		while sending in ms.
	2 bytes		
Time out	Unsigned	0X0000 - 0X0E10	This parameter indicates how long the
(seconds)	integer/		packet streaming has to takes place
	2 bytes		Default value is 0X1E (30 sec)
			This field has dummy values if packet
			streaming starts at Initiator node.

PKT_STREAM_CONFIRM (0X23)/(0XA3) 4.3.44

Field	Type/ Size	Values	Description
Status	unsigned integer/ 1 byte	0X00 – 0XFF	Status of the PKT_STREAM_REQ 0X00 = SUCCESS, Range test Initiated Non zero = FAILURE, Not initiated. For error codes refer Section 4.5 – "Error codes".
Start/Stop	Boolean/ 2 bytes	TRUE/FALSE	This same as Start stop parameter in the Req

RX_ON_REQ (0X24)/(0XA4) 4.3.45

Start/Stop	Boolean/	TRUE/FALSE	This parameter indicates whether
			Continuous receive mode has to
	1 byte		enable or not.
			0X00 = Disables continuous receive mode
			0X01 = Enables continuous receive
			mode

RX_ON_CONFIRM (0X25)/(0XA5) 4.3.46

Status	unsigned integer/ 1 byte	0X00 – 0XFF	Status of the RX_ON_REQ 0X00 = SUCCESS, Range test Initiated Non zero = FAILURE, Not initiated. For error codes refer Section 4.5 – "Error codes".
Start/Stop	Boolean/ 1 byte	TRUE/FALSE	This same as Start stop parameter in the Req

4.4 Performance test Configuration parameters

The following table shows the parameters that can be configured (written to kit) using the PERF_SET_REQ and can be read from the kit using PERF_GET_REQ.

Parameter	Identifier	Type/	Valid range	Default value	Description
		Size			
Channel	0X00	unsigned integer/ 2 bytes	11-26 for 2.4GHz band 0 – 10 for	21	Indicates the physical channel on which the PER test is running

Page **46** of **55**



			868/915 Sub GHz	1	
Channel Page	0X01	unsigned integer/ 1 byte	0,2,16,17 for 2.4GHz band 0,2,5,16,17, 18,19 for	0	Indicates the on which channel page currently PER test is running. This is to support high data rates
			868/915 Sub GHz		
TX power in Reg∳	0X02	unsigned integer/ 1 byte	0X00- 0X1F	O for EVT DA	Indicate the TX power setting in terms of TX_PWR register value
				9 for EXT_PA enabled kits	
TX power in dBm•	0X03	signed integer/ 1 byte	-17 dBm – 3 or 4 dBm	3 or 4 dBm (depend on Transceiver)	Indicate the TX power setting in terms of dBm value

Page **47** of **55**



CSMA	0X04	boolean / 1 byte	4dBm to 21dBm TRUE or FLASE	21 for EXT_PA enabled kits	Indicate whether CSMA- CA mechanism is enabled TRUE = enable
Frame retry	0X05	boolean / 1 byte	TRUE or FLASE	FALSE	FALSE = disable Indicate whether Frame Retransmission feature is enabled TRUE = enable FALSE = disable
ACK Request	0X06	Boolean / 1 byte	TRUE or FLASE	TRUE	Indicate whether Auto ACK feature is enabled TRUE = enable FALSE = disable
Antenna Diversity	0X07	unsigned integer/ 1 byte	0X00- 0X02	0 – non RF233 based boards 1- for RF233 based boards	Indicates whether Antenna diversity on source node is enabled and antenna selected in case of disabled 0 = ant div enabled 1= ant div disabled & ant1 i.e. A1/X2 is selected 2= ant div disabled & ant2 i.e. A2/X3 is selected
Antenna	0X08	unsigned	0X00- 0X02	0 – non	Indicates whether Antenna

Page **48** of **55**



Diversity on Peer		integer/ 1 byte		RF233 based boards 1- for RF233 based boards	diversity on source node is enabled and antenna selected in case of disabled 0 = ant div enabled 1= ant div disabled & ant1 i.e. A1/X2 is selected 2= ant div disabled & ant2 i.e. A2/X3 is selected
	0X09	boolean /	TRUE or	FALSE	Indicate whether Receiver
Desensitization		1 byte	FLASE		desensitization is enabled
*					TRUE = enable
					FALSE = disable
Transceiver	0X0a	unsigned	0 - 5	0X16 for PER	Indicates the transceiver state
state		integer/		test	RESET = 0X00
		1 byte			TRX_OFF = 0X08
				0X08 for	
				Single node	PLL_ON = 0X09
				tests	RX_ON = 0X16
					SLEEP = 0X0f
					DEEP_SLEEP= 0X20 (only
					RF233 only)
CRC on Peer	0X0b	Boolean /	TRUE or	FALSE	Indicate whether Counting of
node		1 byte	FLASE		packets with wrong CRC is enabled
					TRUE = enable
					FALSE = disable
No. of test	0X0c	unsigned	0 –	100	Indicates no. of packets to be

frames		integer/	4294967295		transmitted for PER test
		4 bytes	(2^32 - 1)		
PHY frame length	0X0d	unsigned integer/ 2 bytes	12- 2047	20	Length of frame to be used for PER test
RPC	0X0e	Boolean / 1 byte	TRUE or FLASE	TRUE	Indicate whether RPC feature is enabled. This parameter is exists only for RF233 transceiver only TRUE = enable FALSE = disable
ISM frequency	OXOf	Floating point/ 4 bytes	2322.0 – 2527.0		Indicates the ISM frequency in which transceiver should be operated. Only frequencies with multiples of 0.5 is allowed in the given range.Ex:2323.5,2526.0 etc This parameter is exists only for RF233 transceiver only

4.5 Error codes

Error code	value	Description
SUCCESS	0X00	Requested operation is completed successfully
INVALID_CMD	0X20	Invalid command identifier is given in the request

Page **50** of **55**



ED_SCAN_UNDER_PROCESS	0X21	Currently Energy Detection Scan is under progress, no requests are serviced
TX_UNDER_PROGRESS	0X22	Currently Transmission is under progress, no requests are serviced
CONT_WAVE_TX_UNDER_PROGRESS	0X23	Currently Continuous Wave transmission is under progress, no requests are serviced
NO_PEER_FOUND	0X24	No peer device found after peer search
UNABLE_TO_CONTACT_PEER	0X25	Unable to contact peer node
INVALID_ARGUMENT	0X26	Arguments in the request are wrong
VALUE_OUT_OF_RANGE	0X27	Argument/parameter value in the request is out of the range
INVALID_REGISTER_ORDER	0X28	Start register address should be lesser than the End register address
TRANSCEIVER_IN_SLEEP	0X29	Currently Transceiver in Sleep.
TRANSMISSION_FAILURE	0X30	Transmission to the Peer node is failed
RANGE_TEST_IN_PROGRESS	0X31	Indicates a PER Mode Range Test is in Progress
PKT_STREAM_IN_PROGRESS	0X32	Indicates Packet streaming test is in progress
RX_ON_MODE_IN_PROGRESS	0X33	Indicates Continuous receive mode test is in progress

5 Abbreviations

RPC Reduced Power Consumption

CW **Continuous Wave**

PRBS Pseudo Random Binary Sequence

ED **Energy Detection**

LQI **Link Quality Indication**

RSSI Received Signal Strength Index

CSMA- CA Carrier Sense Multiple Access – Collision Avoidance

PER Packet Error Rate

CRC Cyclic Redundancy Check

PHY **Physical Layer**

MCU Micro Controller Unit

IC **Integrated Chip**

System on Chip SoC

FEM Front End Module

FCF Frame Control Field

FCS Frame Check Sequence

PAN Personal Area Network

6 REVISION HISTORY

DOC. REV.	DATE	COMMENTS
Α	31/AUGUST/2012	PERFORMANCE ANALYZER v1.0
А	21/JUNE/2013	UPDATED DOCUMENT FOR PERFORMANCE ANALYZER v2.1 NEW FEATURES
В	20/DECEMBER/2014	UPDATED DOCUMENT FOR PERFORMANCE ANALYZER v3.0 NEW FEATURES (PACKET STREAMING AND REMOTE CONFIGURATION)



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Page **54** of **55**



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