Product Introduction

MX705110A Wi-SUN Protocol Monitor

MS2690A/MS2691A/MS2692A/MS2830A
Signal Analyzer

MX705110A
Wi-SUN Protocol Monitor

Version 1.1
October 2013

Anritsu Corporation

What is Wi-SUN Protocol Monitor?

This software analyzes the contents of the communications handled by two communications modules to perform and confirm communications using the correct protocols.

◆The GFSK wireless signals (IEEE 802.15.4g/e) between communicating devices are captured as I/Q data using the signal analyzer digitize function and data analysis is performed by this software.

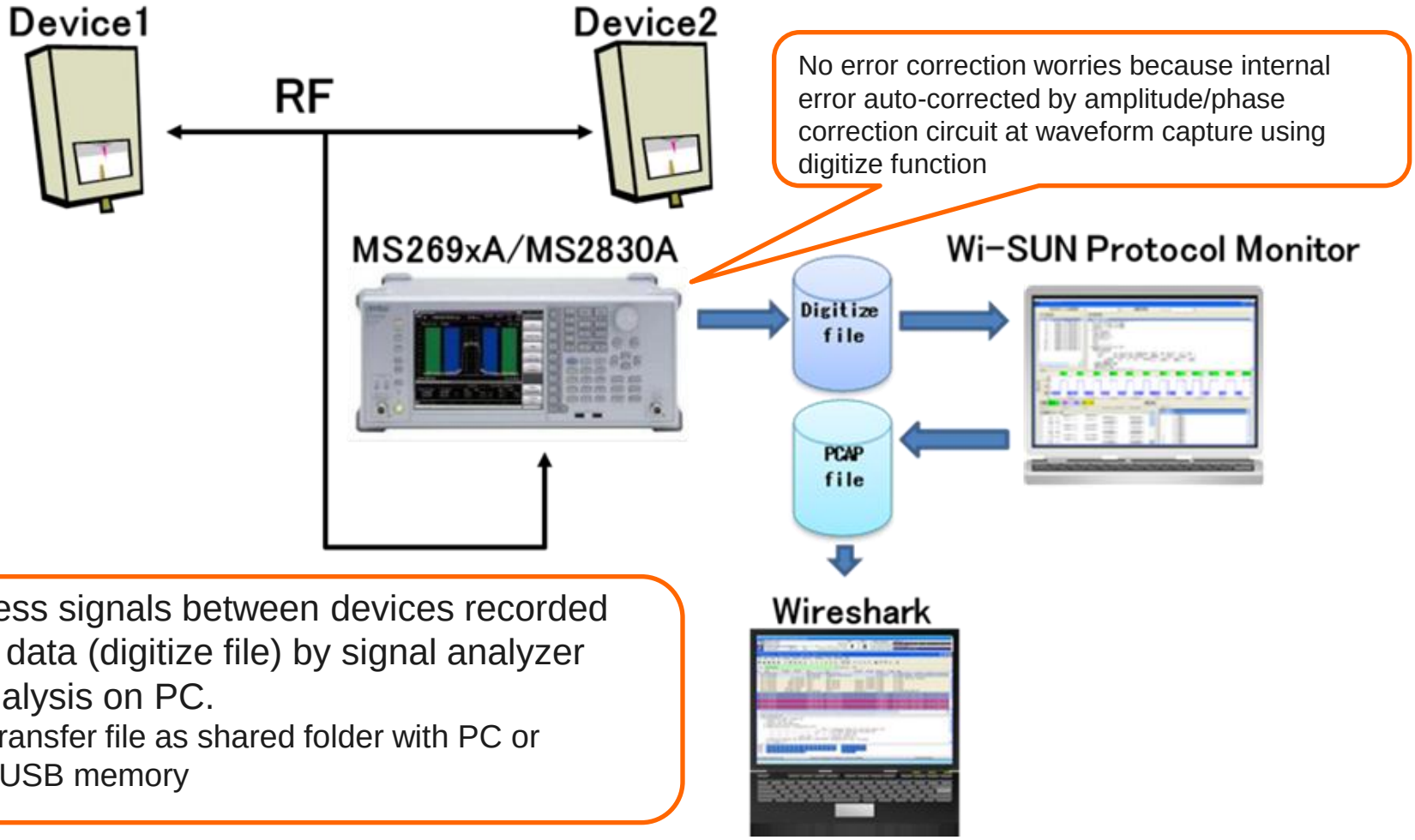
- Data analysis displays the PHY analysis results, the MAC analysis results, the RF signal waveform amplitude, Tx timing and Tx power based on the IQ data.
- The analysis results are converted to a file format that can be read by WireShark (*1) and saved for later detailed analysis using the WireShark function.

*1: Wireshark is an open source network protocol analyzer commonly used worldwide.

This software is a powerful tool for "Troubleshooting Communications Problems by Checking the Status of Communications between Devices"

- Analyzing device communications for R&D
- Checking interoperability between multiple devices

What is Wi-SUN Protocol Monitor?



Wireless signals between devices recorded as IQ data (digitize file) by signal analyzer for analysis on PC.

*Can transfer file as shared folder with PC or Using USB memory

Product Configuration

■ Protocol Monitor

Model	Name	Explanation
MX705110A	Wi-SUN Protocol Monitor	Software for timing and frame analysis of IQ data

■ Measuring Instrument

MS269xA or MS2830A (Signal Analyzer) can be used.

[Conditions for use]

■ MS269xA
Require the latest firmware of MS269xA.(V5.05.01 or newer)

■ MS2830A
Analysis Bandwidth 10MHz (or more) is necessary.
Require the latest firmware of MS2830A.(V5.05.01 or newer)

Product Configuration

[Configuration examples]

■ MS269xA

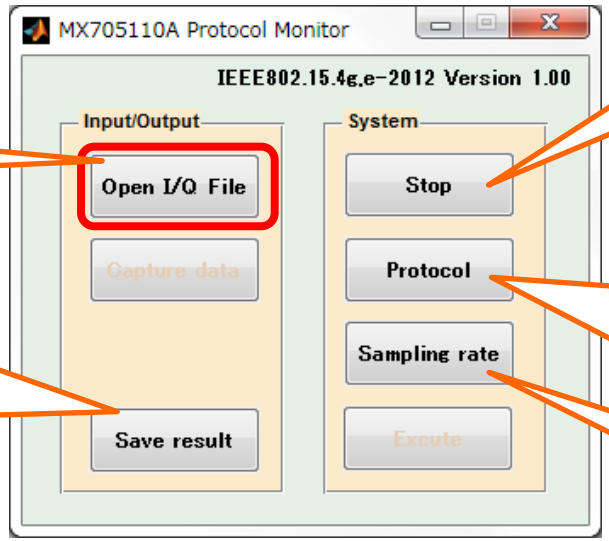
Model	Name	Remarks
MS2690A or MS2691A or MS2692A	Signal Analyzer	V5.05.01 or newer

■ MS2830A

Model	Name	Remarks
MS2830A	Signal Analyzer Main Frame	V5.05.01 or newer
MS2830A-040 or MS2830A-041 or MS2830A-043	3.6GHz Signal Analyzer 6 GHz Signal Analyzer 13.5GHz Signal Analyzer	
MS2830A-006	10 MHz Analysis Bandwidth	

Functions and Features (1/11)

Simple Start Screen



Loads Digitize Data

Stops Processing

Selects Protocol for Monitoring (50 kbps,100 kbps, 200 kbps)

- Saves analysis results file
- Saves as Wireshark file format (PCAP file)

Selects Monitoring Rate

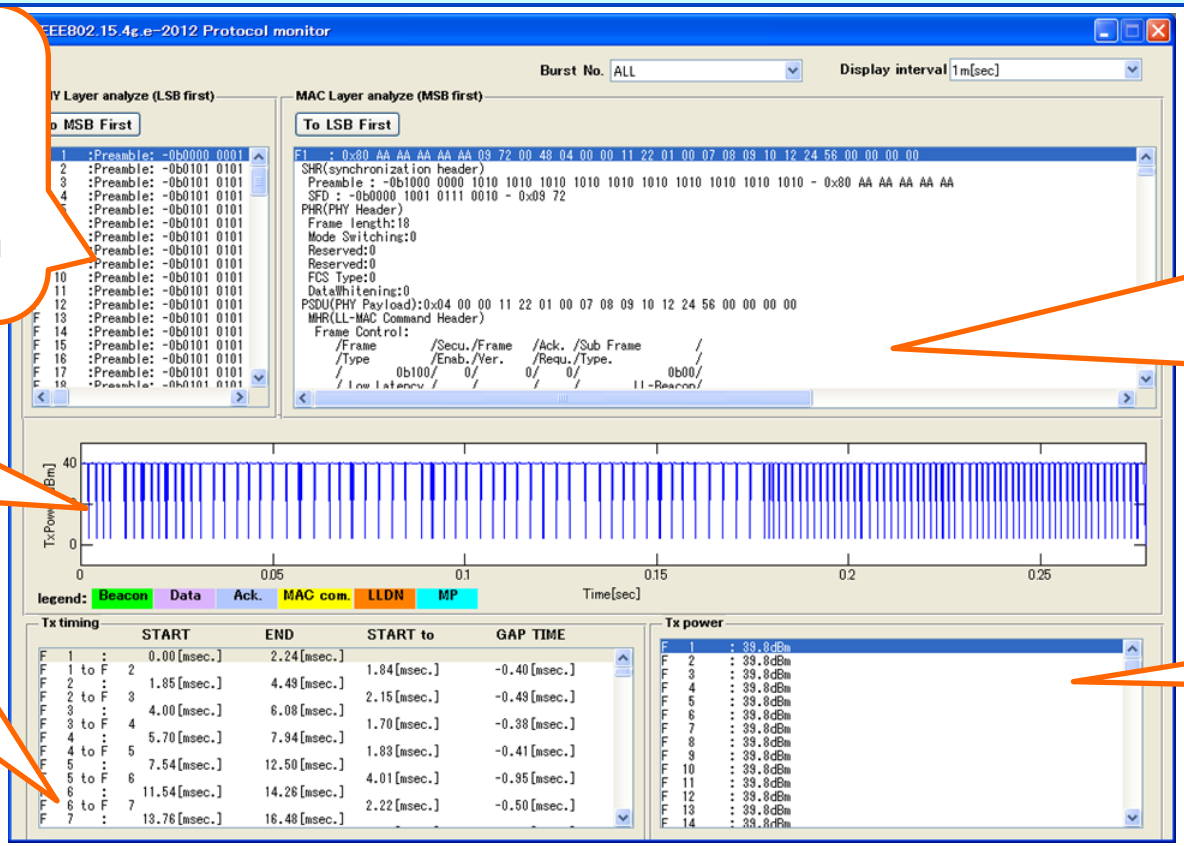
Functions and Features (2/11)

Protocol Monitor Screen

Displays demodulation results for each burst
Switch between LSB/MSB First

Displays Time vs. Amplitude graph

Displays Tx timing for each burst



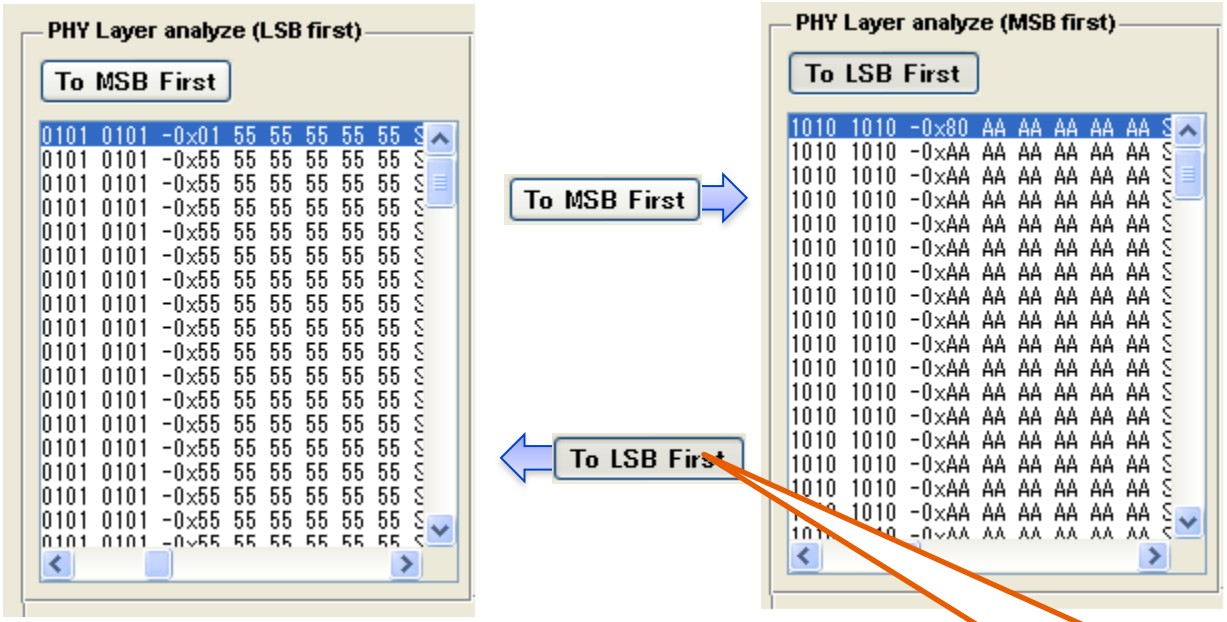
Displays MAC frame analysis results
Switch between LSB/MSB First

Displays Tx power

Brings all key data together on one screen!

Functions and Features (3/11)

Display IEEE802.15.4g PHY Layer Analysis Results

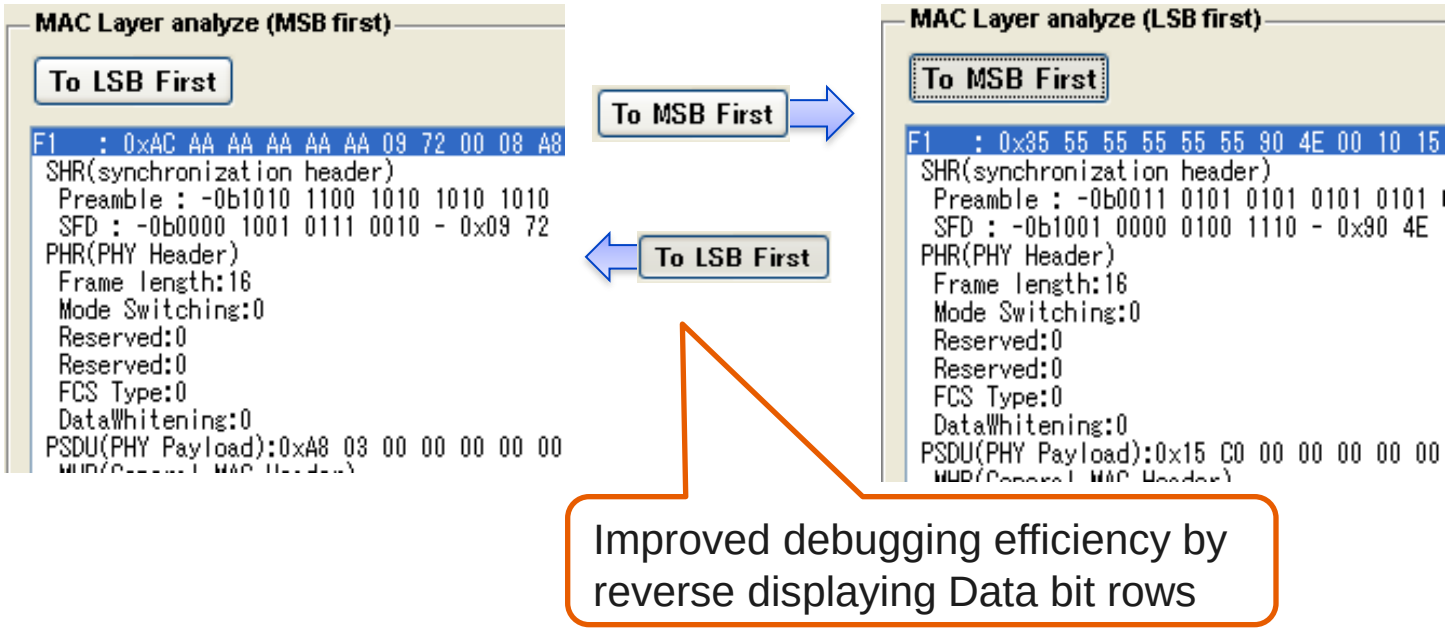


- Toggles between LSB first/MSB first
- Displayed Analysis Results Contents:
  - Preamble (Binary, Hex)
  - SFD (Binary, Hex)
  - PHY Payload (HEX only)

Improves debugging efficiency by reverse displaying data bit rows

Functions and Features (4/11)

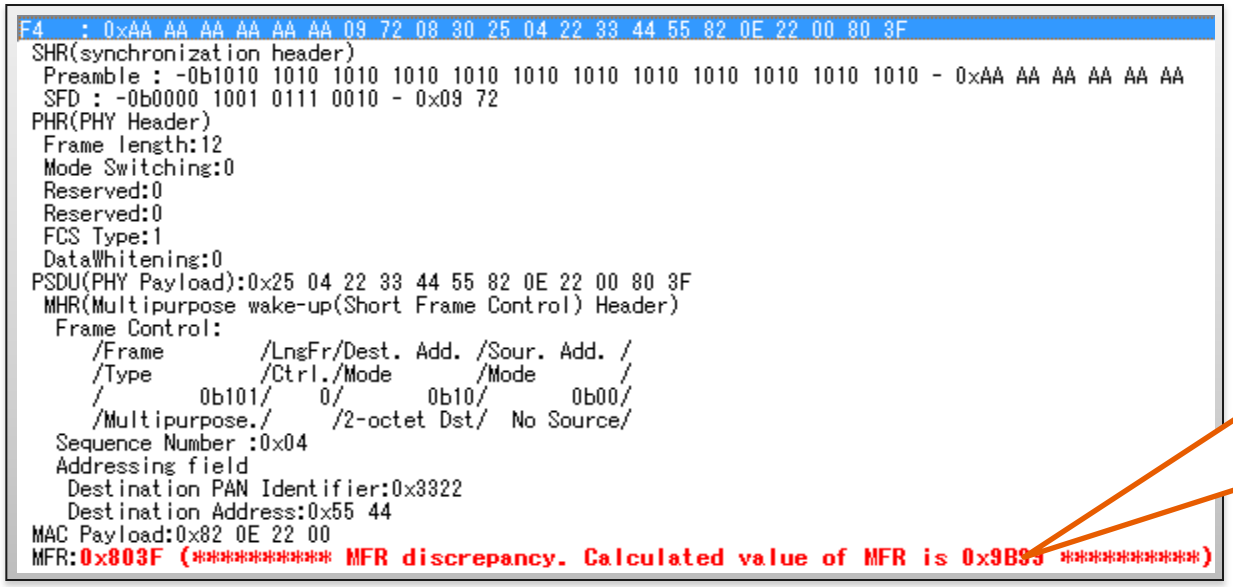
Display IEEE802.15.4g MAC Layer Analysis Results



- Toggles LSB first/MSB first in same way as PHY analysis results

Functions and Features (5/11)

Display Example: SHR (Synchronization header) and PHR (PHY header)



Errors are emphasized in red for easy recognition at a glance.

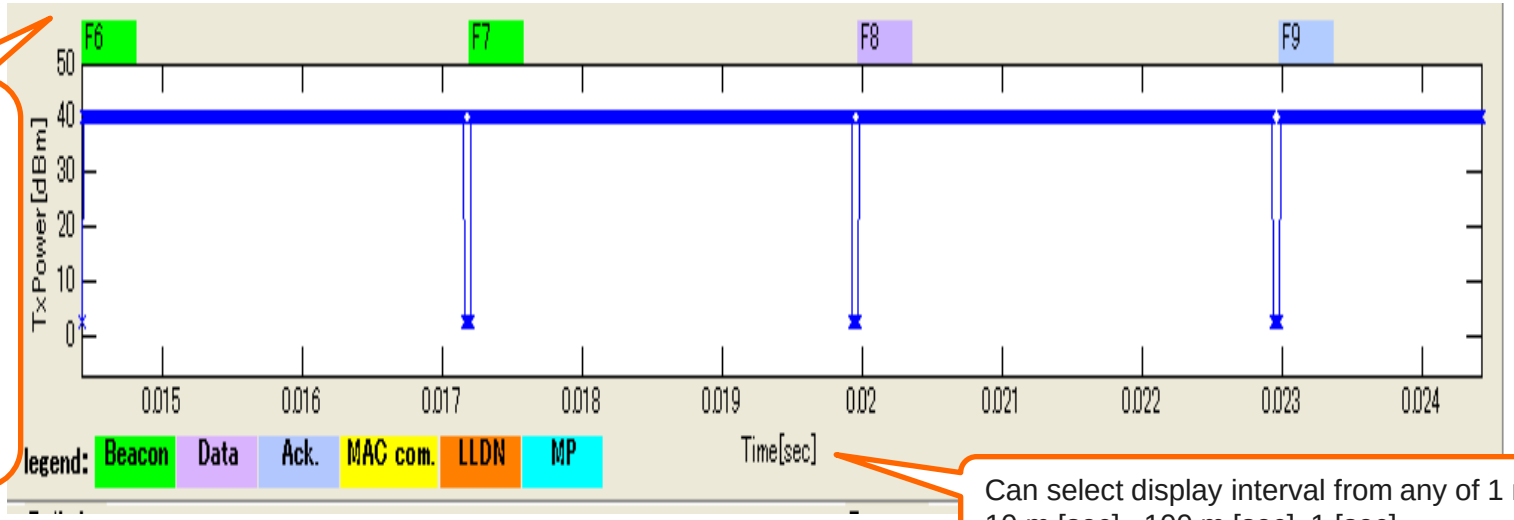
- Displays Preamble, SFD, and PHY Payload on first line as hex code
- Displays SHR (Synchronization header) on second line in binary and hex code
- Displays simple translation of PHR (PHY header) on third and later lines as well as PSDU part
- Auto-IDs 16-bit or 32-bit FCS according to PHY Header-FCS Type and computes FCS to display results by comparing Frame FCS data

*The FCS generation polynomial uses the CRC-16-CCITT recommendation for 16-bit FCS and the CRC-32-IEEE802.3 recommendation for 32-bit FCS.

Functions and Features (6/11)

Display RF Signal Amplitude

Easy Frame type identification by color coding Frame number (Ex: F6 is Beacon and F8 is Data)

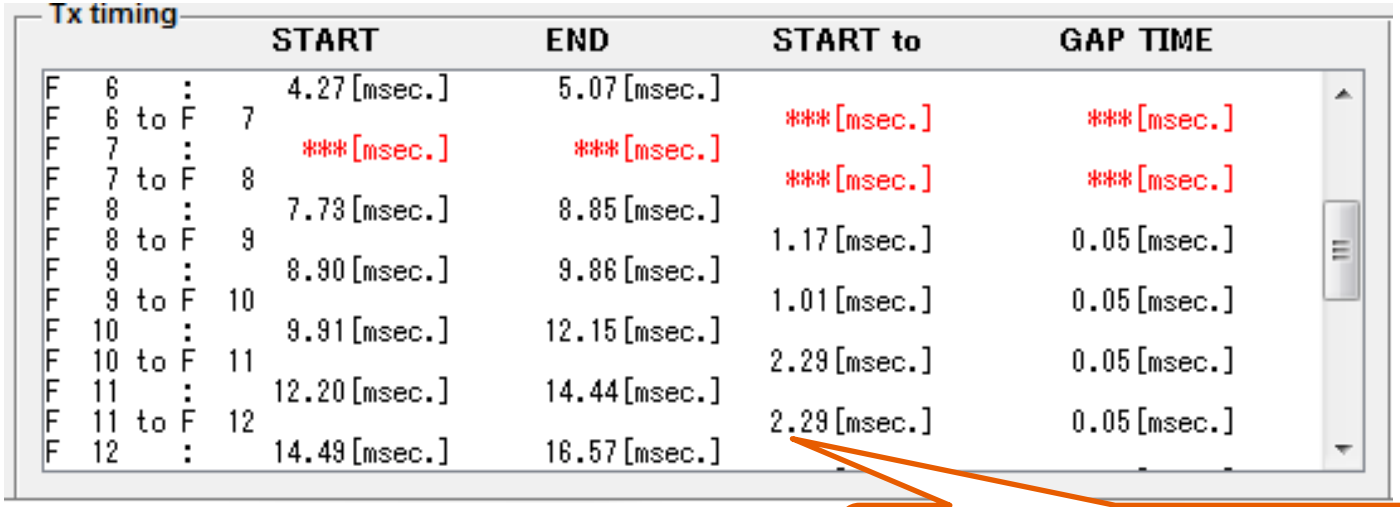


Can select display interval from any of 1 m[sec], 10 m [sec], 100 m [sec], 1 [sec]

- Displays x-axis time scale according to Display interval setting
- Color codes Frame number in burst data header for identification of Frame type
  - Frames Types:
    Beacon, Data, Ack, MAC command, LLDN, MP (Multipurpose)

Functions and Features (7/11)

Display Tx Timing

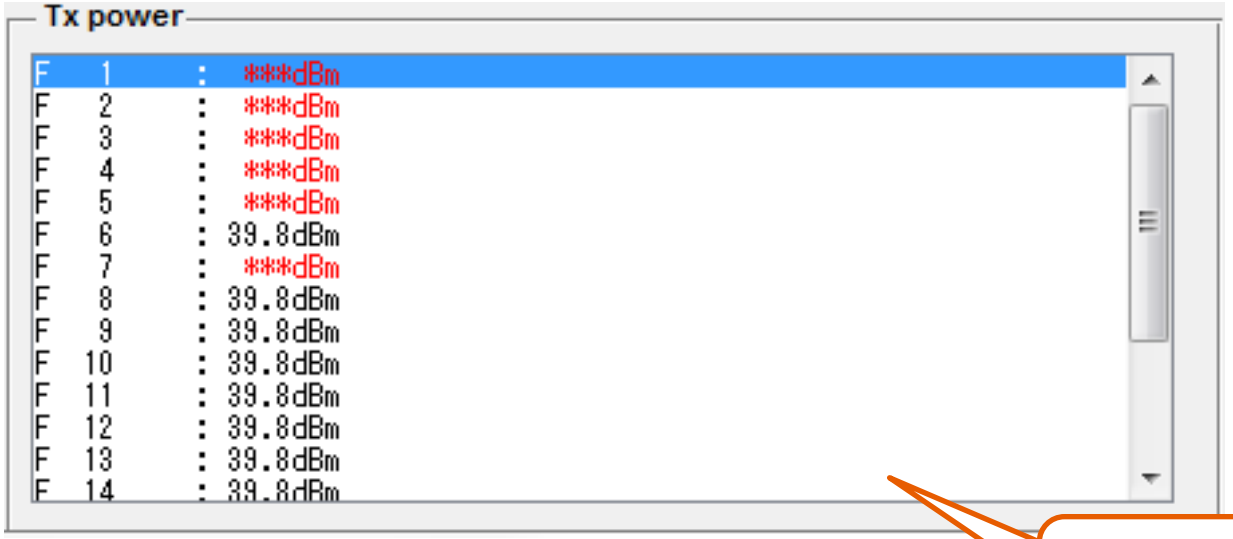


Displays burst lengths and intervals in time units for confirmation

- Displays burst start and end times plus time difference from burst start to end, as well as time difference (GAP TIME) from burst end to start
- Displays *** [msec.] for burst data not supporting Frame analysis

Functions and Features (8/11)

Display Tx Power

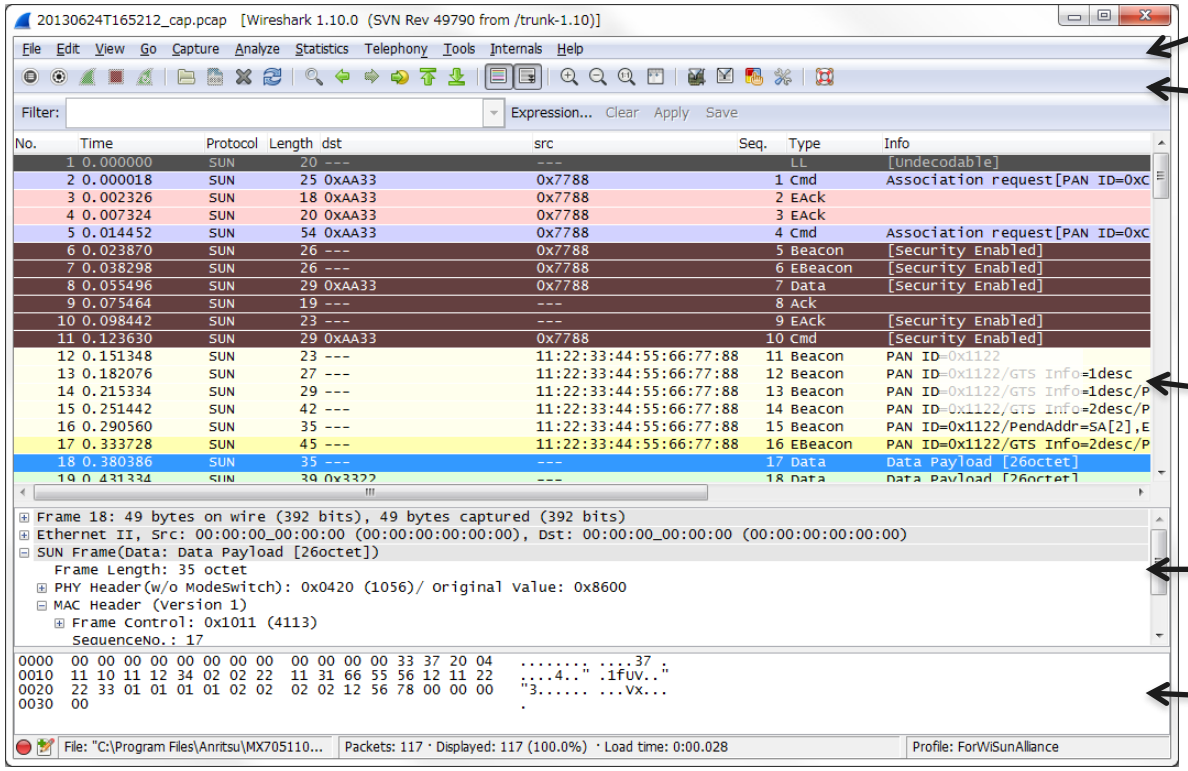


Displays average power numerically to confirm randomness

- Displays average Tx power of each burst
- Displays *** dBm for burst data not supporting Frame analysis

Functions and Features (9/11)

Frame Display Analysis using Wireshark Dissector Function



*When requiring detailed analysis of PHR (PHY header) and PSDU, can create PCAP format file for analysis by Wireshark.

Functions and Features (10/11)

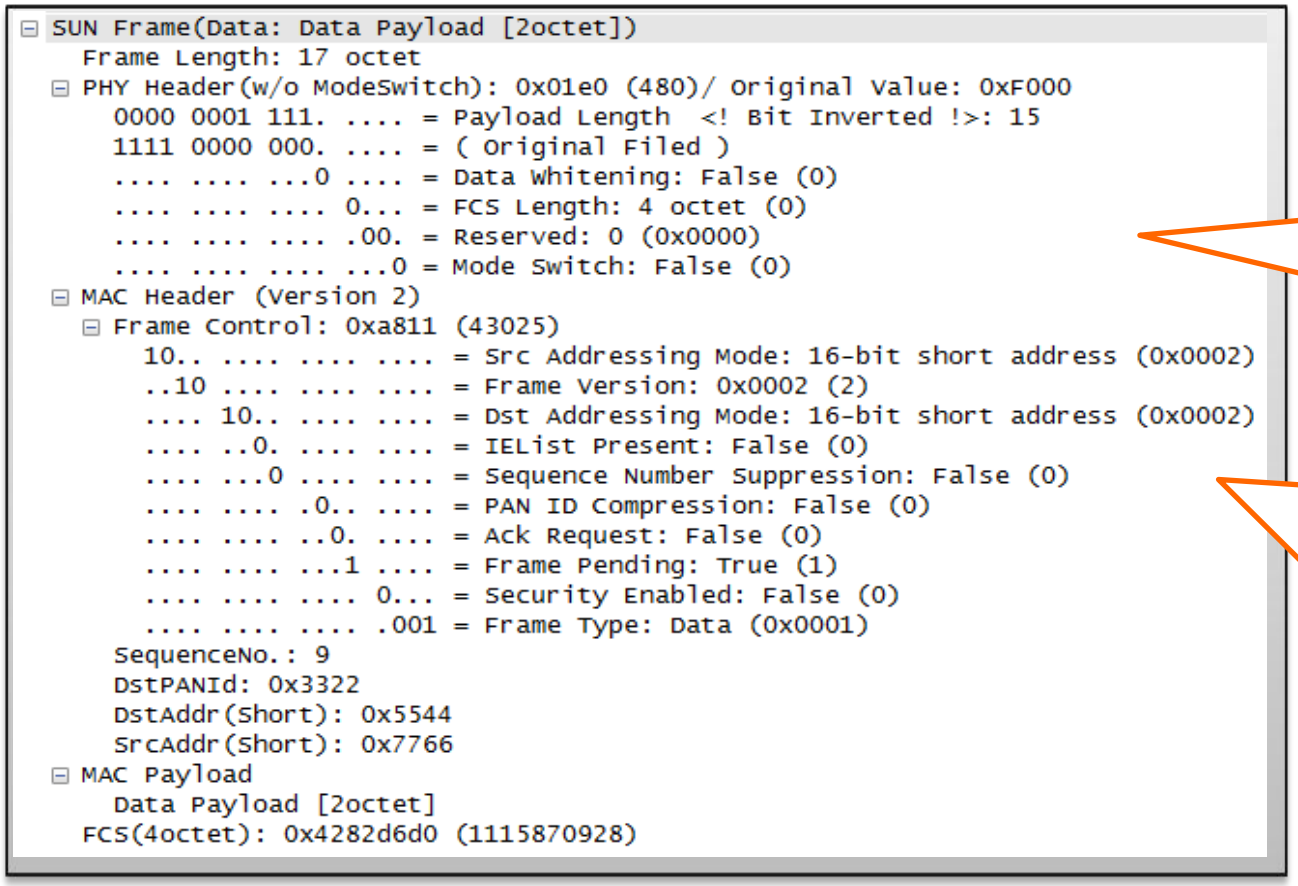
Screen Composition List

No.	Part Name (Wireshark)	Function Name	Outline
(1)	Menu Bar	Menu	Supports access to each function
(2)	Dialog Bar	Dialog Menu	Supports setting procedures for some functions such as display filters
(3)	Packet List Pane	Times Series Display	Pane for displaying Rx Frames as consecutive time series in row units Can switch sorting order
(4)	Packet Details Pane	Detailed Decode Display	Pane for displaying details of Frames selected in (3) as hierarchical tree Can separate from screen as modeless dialog* (Item (5) can also be separated.)
(5)	Packet Bytes Pane	Graph Display	Pane for displaying data dump for Frames selected in (3). When tree node selected at (4), reverse displays corresponding protocol field. (Not reverse displayed when filter not set at field). Like (4) and (3), can be separated as mode-less dialog*

*No effect on selection condition of (3) after separation

Functions and Features (11/11)

Wireshark Packet Detail Pane (4)



Displays detailed analysis results for packet to be confirmed

Uses versatile range of Wireshark functions
(Ex: Sorting for each filter, category, etc., in descending order)

Operating Environment/Related Recommendations

Operating Environment

Item	Explanation
CPU	x86 32 bit 1 GHz or better
OS	Windows® 7 Professional SP1 32-bit
Memory	4 GB min. recommended
HDD Free Space	500 GB recommended
Display Resolution	1024 x 768
Software	Wireshark (Version 1.10.0 or newer recommended)

Related Recommendations

No.	Explanation
1	IEEE Std 802.15.4g™-2012 Part 15.4: Low-Rate Wireless Personal Area Networks (LR-WPANs) Amendment 3: Physical Layer (PHY) Specifications for Low-Data-Rate, Wireless, Smart Metering Utility Networks
2	IEEE Std 802.15.4e™-2012 Part 15.4: Low-Rate Wireless Personal Area Networks (LR-WPANs) Amendment 1: MAC sublayer
3	Wi-SUN Alliance IEEE802.15.4g™ PHY Test Suite Specification Version 0.1 (TCWG)

Note

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Specifications are subject to change without notice.

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