

Manual

VENTUS-A+ DTV Analyzer

USB DTV Analyzer – ATSC/QAM/DVB-T2/DVB-T/DVB-C



FREE S/W UPDATE - Closed Caption Analysis
EIA-608 & EIA-708 Simultaneous Caption Decoding/Recording

VENTUS-A+ DTV Analyzer Manual

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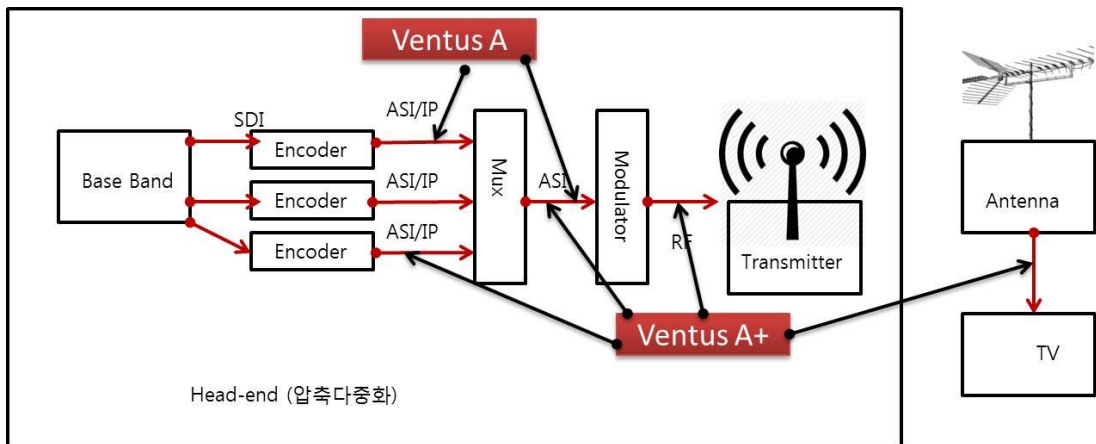
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VENTUS-A+ DTV Analyzer

USB type DTV Analyzer for ATSC/QAM/DVB-T2/DVB-T/DVB-C

1. Introduction

VENTUS-A DTV Analyzer is designed to analyze MPEG-2 TS stream in real time/off line bases, Hardware and Software as in a package. The Hardware interlocks with the PC via USB cable to maximize its utilization as a mobile analyzer. Furthermore, it supports TS file output through ASI and real time input can re-transmitted via ASI.



1-1. Features

- ① Real time analysis via RF/ASI/IP input plus offline analysis via TS files
- ② ETSI TR 101 290 based error detection
- ③ Bit-rate, PTS-PCR, DTS-PCR measurement, Table repetition cycle analysis
- ④ Provide configuration information for each PID, Service and Table
- ⑤ Provide Table History and detailed Table analysis tool
- ⑥ Provide Media player and detailed analysis information for each services
- ⑦ Load/Save TS recording & Analysis log
- ⑧ Support the newest TTA standard (Korean type 3D TV and multi-channel service)
- ⑨ Provide MER/Packet error rate and receiver sensitivity during RF reception

1.2 Specification

- Demodulation : 8VSB, OpenCable(64QAM, 256QAM)
- Size : 154mm x 76.8mm x 28.4mm
- USB 2.0 bus powered, no power supply required.
- RF input connector : 75Ω F-Type 1ea
- ASI/SMPTE310M input connector : 75Ω BNC 1ea
- ASI/SMPTE310M output connector : 75Ω BNC 1ea
- ASI input bit-rate : 0~108Mbps
- ASI output bit-rate : 0~108Mbps
- SMPTE310M input bit-rate : 19.392Mbps
- SMPTE310M output bit-rate : 19.392Mbps
- RF Input Frequency Range : 40 ~ 1002 MHz
- RF Input Level : +7 ~ -84 dBm +6 ~ - 75 dBm(64QAM), +6 ~ -66dBm(256QAM)

1.3 Software Specification

- TS input : ASI, SMPTE310M, File, IP(UDP/TS or UDP/RTP/TS), RF
- TS output : ASI or SMPTE310M (Not supported in IP Input, high speed analysis mode)
- Analysis mode : MPEG-2, ATSC, DVB
- Analysis Result Window
- Service, PID, Table, Service View, Bit-rate, TR 101 290, Table History
- Minimum System Requirements
- CPU : Intel Core i3 3.1GHz (Sandy Bridge) or above
- RAM : 2GB or above
- OS : Window 7
- Resolution : 1680x1050 or above

2 VENTUS-A Plus System Package

2.1 Parts Name



2.2 Package Contents



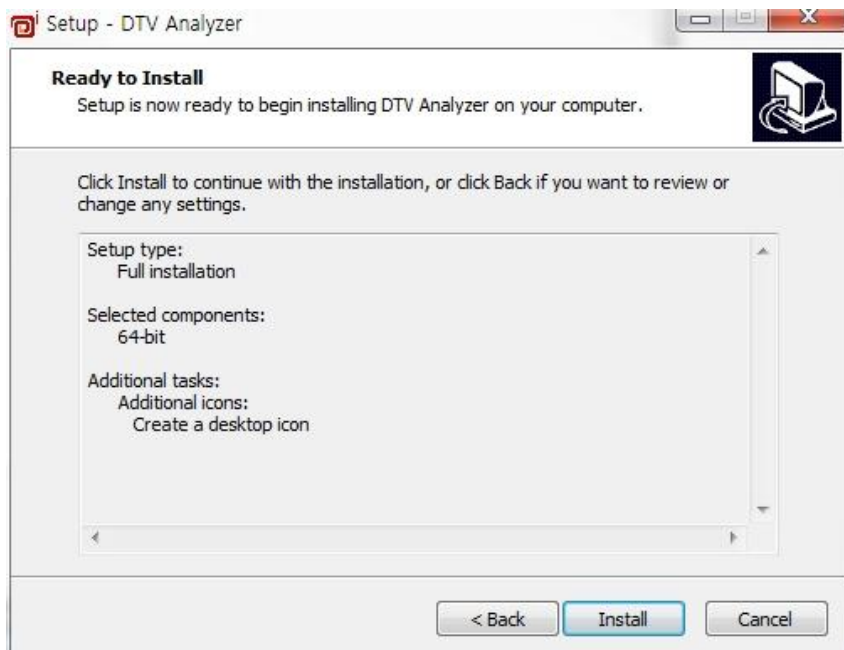
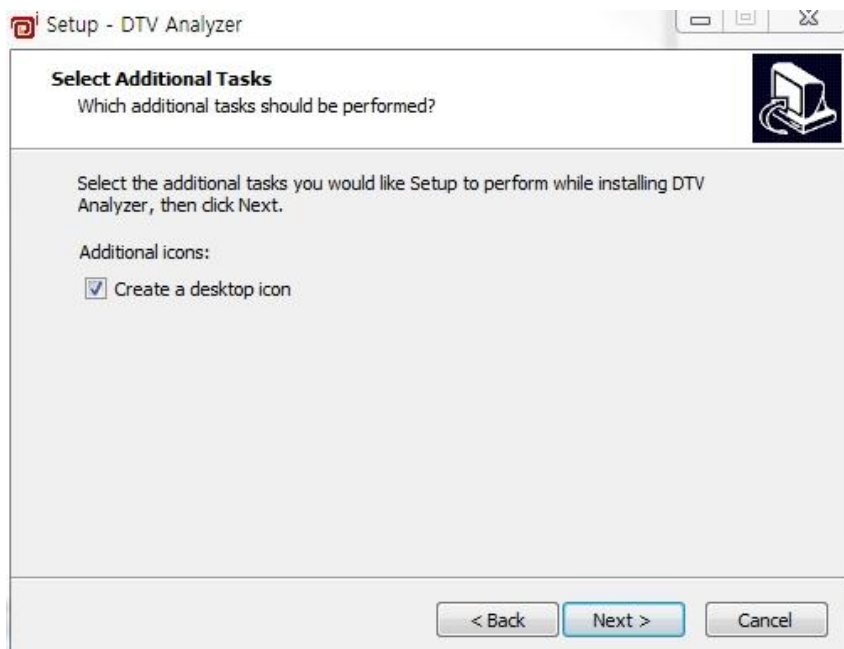
3 Installation

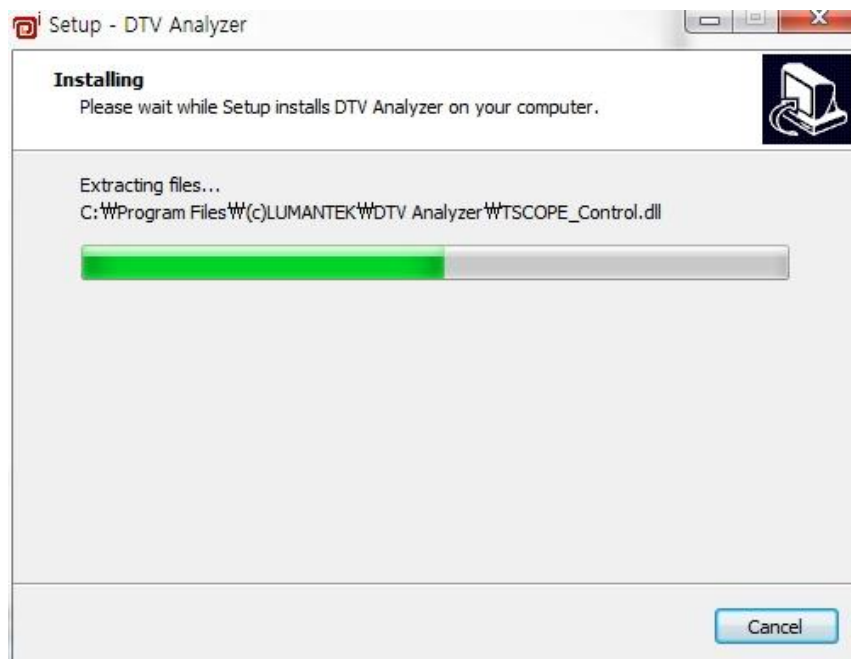
3.1 Software Installation

Please disconnect USB cables from the DTV analyzer before installation.

Run 'DTV Analyzer Setup' file in the USB memory provided with the package. Press 'Next' to proceed installation. (Run under 'Administrator Authority' for Windows OS 7 or above)







After the installation is completed, the 'WinPcap' file needs to be installed. This must be done during the installation, no reinstallation required for version updates.





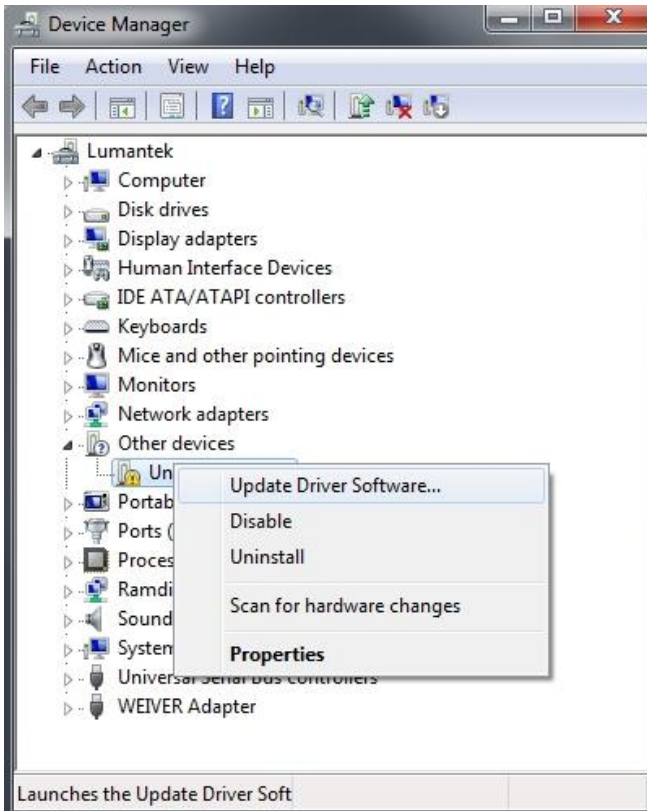
Automatically start the WinPcap driver at boot time' must be selected during the installation.

After the software installation is completed, the Driver will automatically start its installation when the hardware is connected. If not, please run '3.2 Driver Installation'.

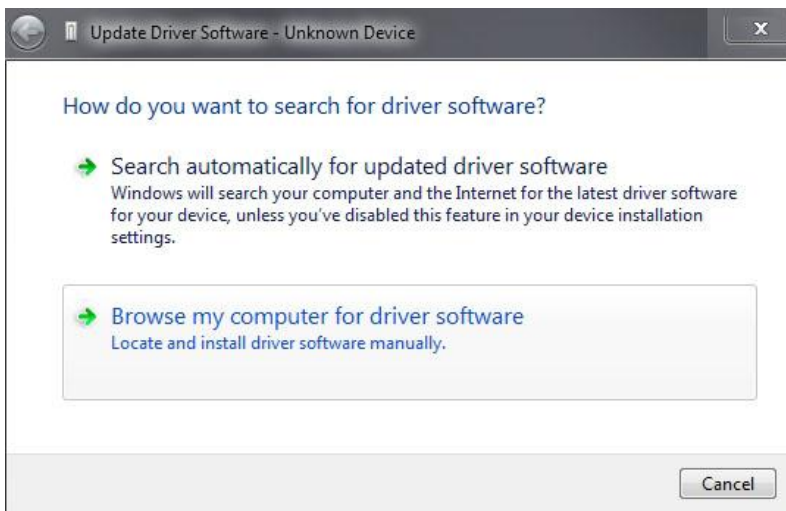


3.2 Driver Installation

Connect DTV-Analyzer to PC with USB cable.



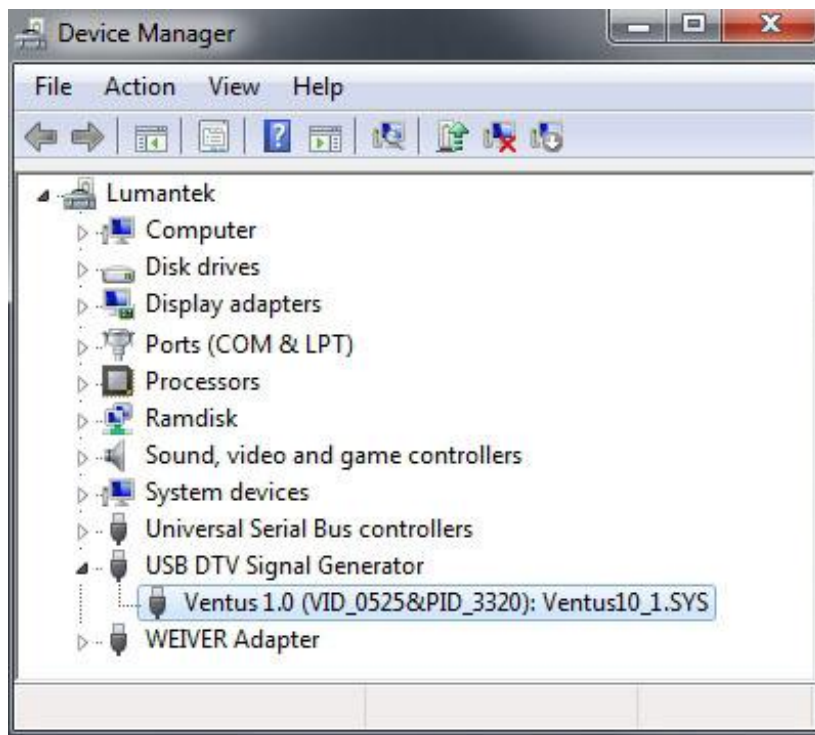
Right Click on 'Unknown device' in Device manager then click on Software upgrade.



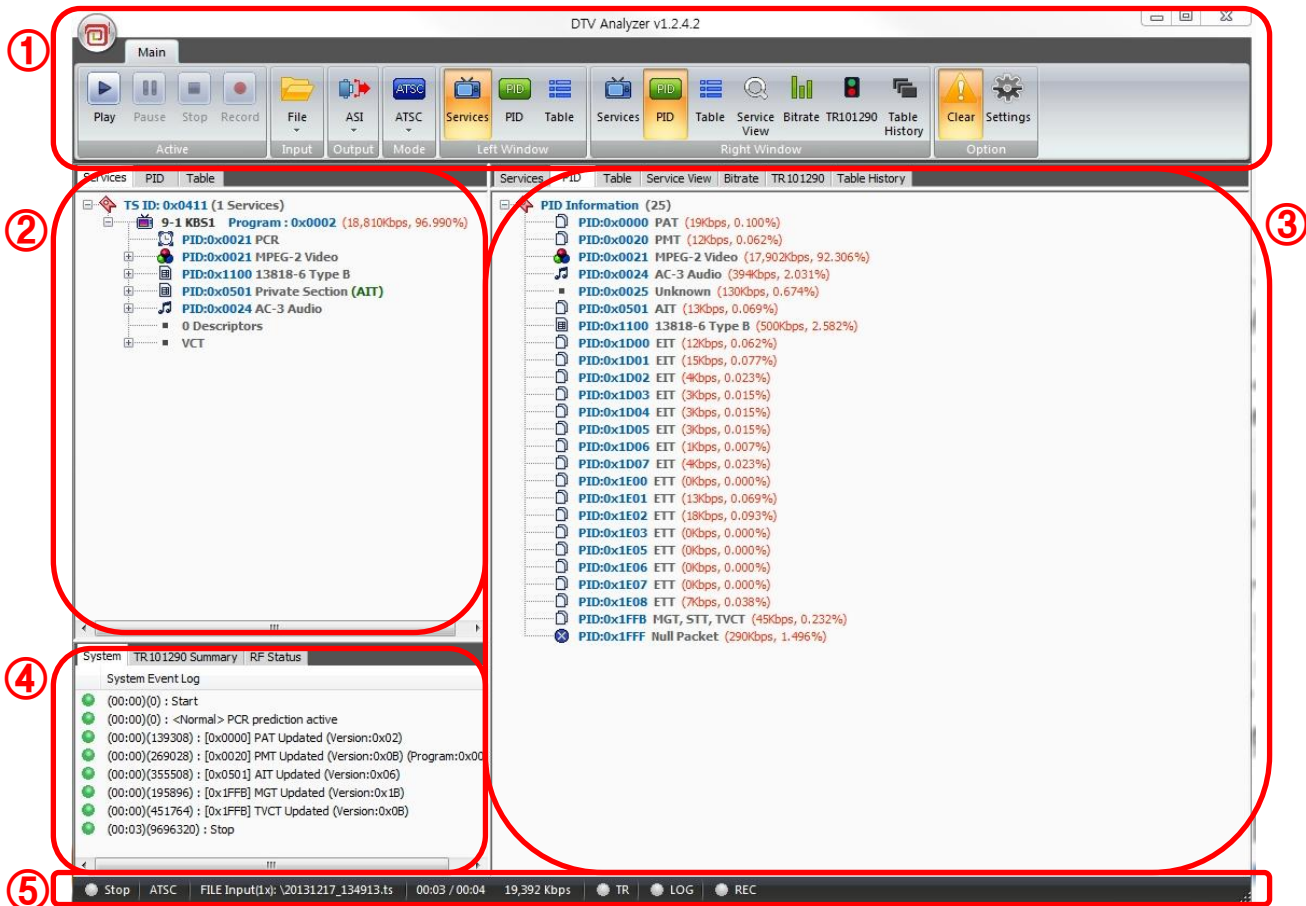
Select 'Browse my computer for driver software' then select either "`\Driver\Windows32bit.1`" or "`\Driver\Windows64bit.1`" based on your Window OS. Click on 'Next'.



Please check 'USB DTV Signal Generator -> Ventus 1.0' is shown in device manager after driver installation is completed.



4 DTV Analyzer Software



- ① Control Window
- ② Analysis Result Display (Left)
- ③ Analysis Result Display (Right)
- ④ System Message Display
- ⑤ Operation Status Indicator

4.1 Control Window

The Control Window shows the entire operational control and settings, with series of tabs including Active tab, Input tab, Output tab, Mode tab, Left/Right Window tab, and Option tab. ('Settings' Button for Input tab, Output tab, Mode tab and Option tab is activated only when system is NOT running)



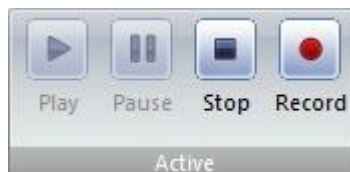
- Active Tab

Controls 'Start', 'Pause' (in file analysis mode), 'stop', 'record' function. 'Record' button is activated only during the analysis in progress. It is a toggle switch, you can start/stop recording during the analysis at any point.

< Status: STOP >



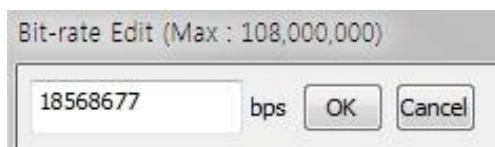
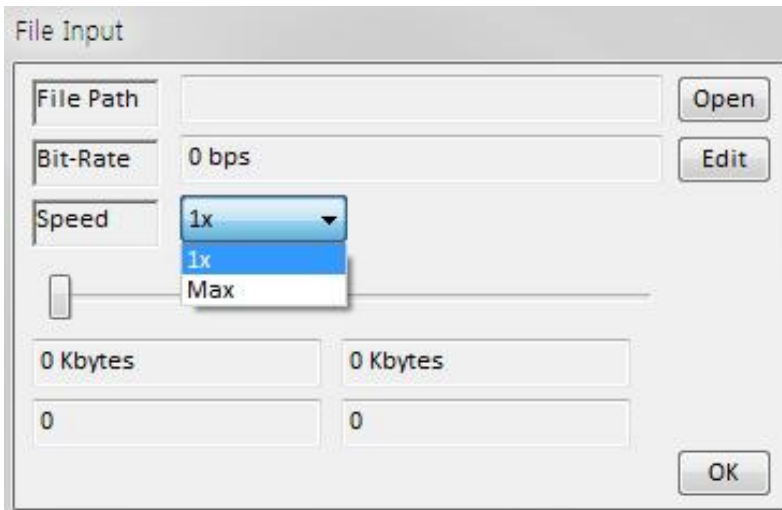
< Status: PLAY >



- Input Tab

You can select input port and detailed settings. File, TS-In, IP-In, and RF-In can be selected and each option comes with pop-up window for detailed settings.

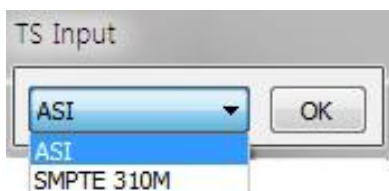
< File Input Detailed setting Window >



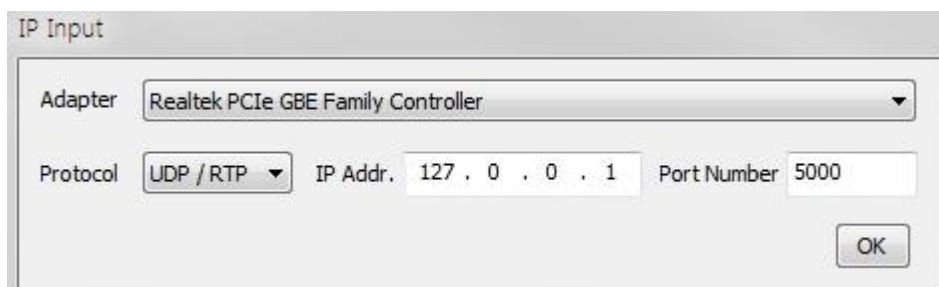
- ① Select a file with 'Open' button.
- ② Bit-rate is calculated automatically when the file has been selected, can be modified with 'Edit' button if necessary.
- ③ Speed: You can select among 1x analysis mode and High Speed Analysis mode('Max')(1x mode run its analysis based on its designated Bit-rate with time, Data output through Media Player and output port is available. 'Max mode enables High Speed Analysis but Data output through Media Player and output port is NOT available
- ④ You can select the Analysis starting point by adjusting the navigation bar.

< TS-In Input detailed setting window >

You can select either ASI Input or SMPTE-310M.

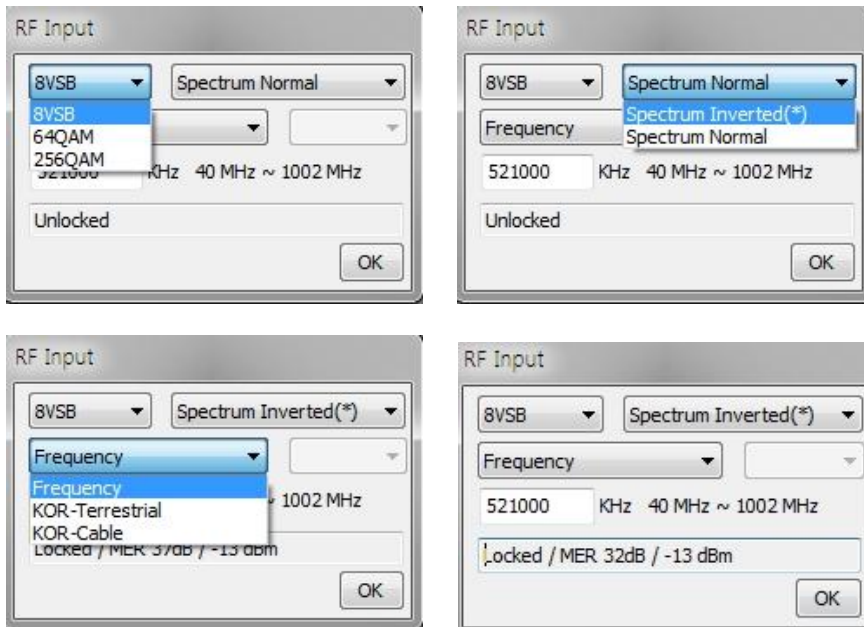


< IP-In Input Detailed setting Window>

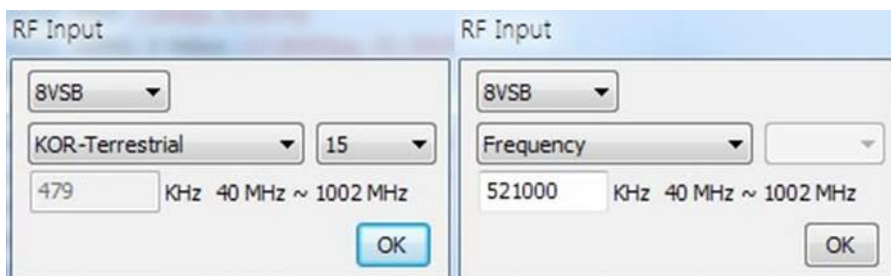


- ① You can select network adapter for IP input through the Adapter
- ② You can select UDP or RTP through Protocol
- ③ You can select the IP address and UDP through the Address and Port Number

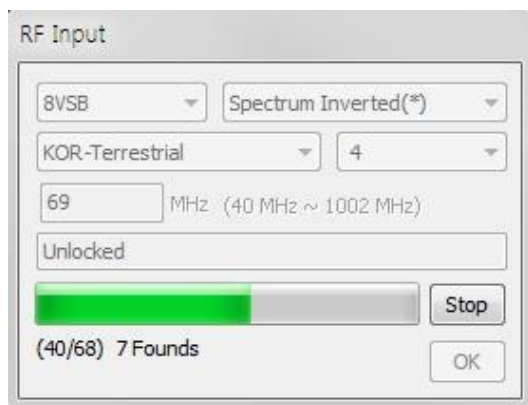
< RF-In Input Detailed setting Window >



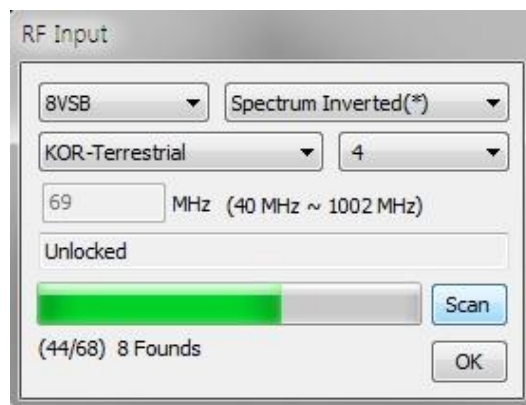
- ① You can select the modulation type, such as 8VSB, 64QAM, 256QAM in drop box menu on top left corner
- ② You can select 'spectrum INPUT type 'Spectrum Inverted' or 'Spectrum Normal'. The 'Spectrum Inverted' is set as the default.
- ③ It supports both frequency allocation, based on supported channel chart and direct selection of the frequency. (Current Selectable Chart: KOR-Terrestrial, KOR-Cable)
- ④ You can check the RF INPUT status with status bar at the bottom



- ⑤ Frequency Scanning Feature is available when such frequencies are selected based on the Channel Chart.

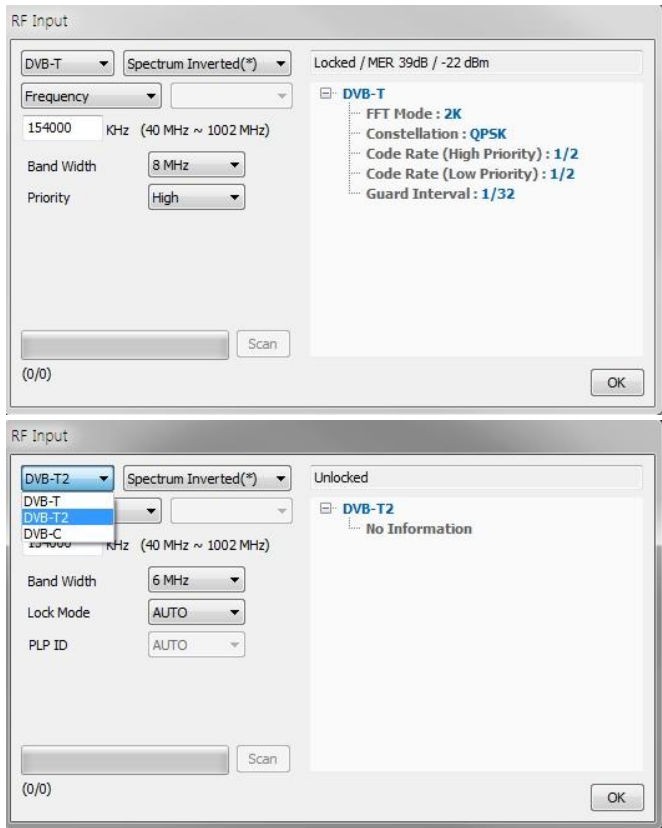


<Scanning >



<Scanning Completed>

< DVB-T2/T/C Type >

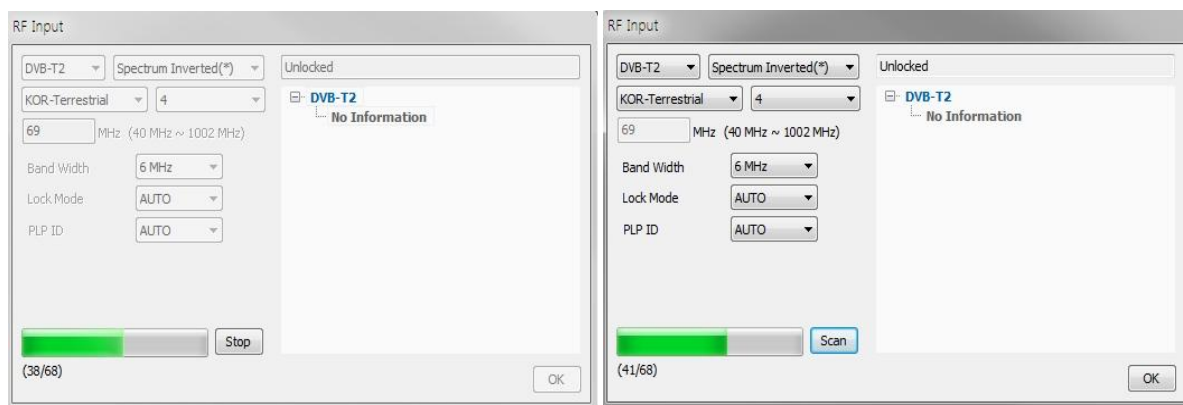


- ① Select frequency modulation from the drop down menu on top left. (DVB-T, DVB-T2, DVB-C)
- ② Please see the chart below for additional parameter settings for each modulation

<Additional Parameter Setting>

| | 1 | 2 | 3 |
|--------|--|---|--|
| DVB-T | Band Width (6MHz/7MHz/8MHz) | Priority (High/Low) | |
| DVB-T2 | Band Width (1.7MHz/5MHz/6MHz/7MHz/8MHz) | Lock Mode (BASE/LITE) | PLP ID (*Default: AUTO, Selectable after 'LOCK') |
| DVB-C | Symbol Rate (* unit: Ksps) | Constellation (16QAM/32QAM/64QAM/ 128QAM/256 QAM) | |

- ③ Select spectrum input format through drop down menu on top center of the UI.
- ④ Spectrum Inverted, Spectrum Normal
- ⑤ Direct frequency input and allocation of frequencies based on the frequency chart settings supported.
- ⑥ KOR-Terrestrial, KOR-Cable EU-Normal, EU-Special(Radio), EU-Digital
- ⑦ RF Input Status Indicator.
- ⑧ Frequency scan features available when frequency is allocated based on the channel chart.



<Scan in Progress>

<Scan Completed>

- Output Tab

Select Output type of the Output port.

You can select between ASI output and SMPTE-310M output, internal Re-mux will be activated when it is necessary. (*When Re-Mux is being activated, the PCR related data will be modified from its original input data.)

Please refer to the following Chart for more details.

| Input Port and Settings | Output Port | Data Output | Re-Mux Activation |
|-------------------------|-------------|-------------|-------------------|
| File (1x Mode) | ASI | O | X |
| | SMPTE-310M | O | X |
| File (Max Mode) | ASI | X | X |
| | SMPTE-310M | X | X |
| TS-In (ASI) | ASI | O | X |
| | SMPTE-310M | O | O |
| TS-In (SMPTE-310M) | ASI | O | X |
| | SMPTE-310M | O | X |
| IP-In | ASI | X | X |
| | SMPTE-310M | X | X |
| RF-In | ASI | O | X |
| | SMPTE-310M | O | O |

- Mode Tab

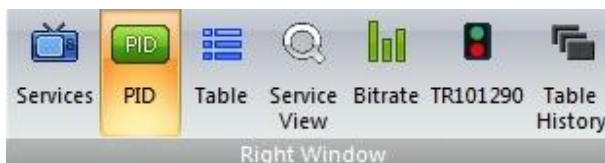
You can select Broadcasting standard applied for the analysis. Supporting MPEG-2, ATSC, DVB, and etc. (When MPEG-2 is selected, only items categorized in MPEG Standard will be analyzed)

If analysis mode and current selected TR101290 profile mode is conflicted, then a popup window prompt to change setting.



- Left Window Tab & Right Window Tab

You can select window portions to be shown either left or right.



- ① You can select Services, PID, Table in Left Window Tab
- ② You can select Services, PID, Table, Service View, Bit-rate, TR101290, Table History Right Window Tab

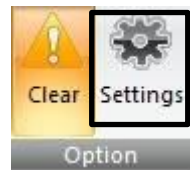
- Option Tab

Option Tab is comprised of 'Clear' and 'Settings' button . 'Clear' button will cancel the alarm and alarm status. The Color of the button will change to yellow with exclamation mark when the alarm is triggered. Click 'Clear' to clear alarm and initialize the status

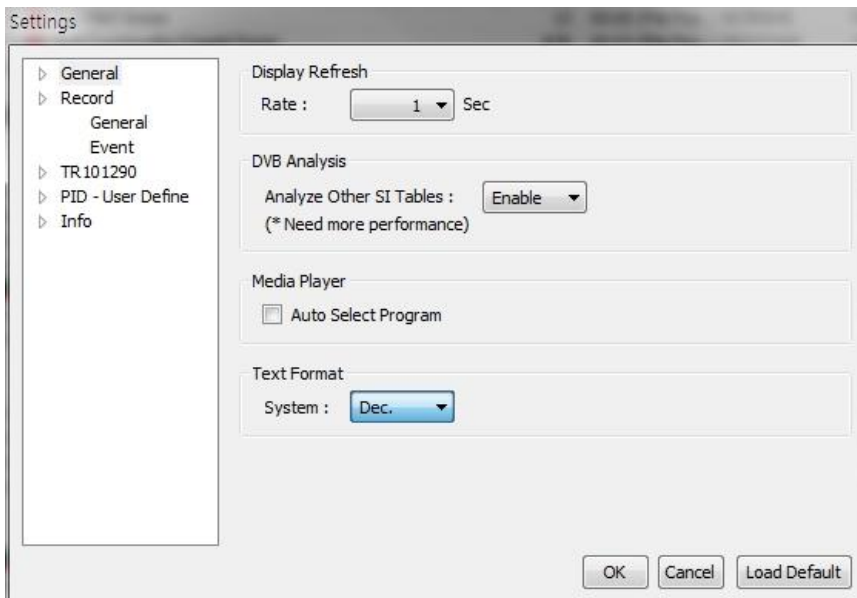
< Normal >



< Error Occurred >

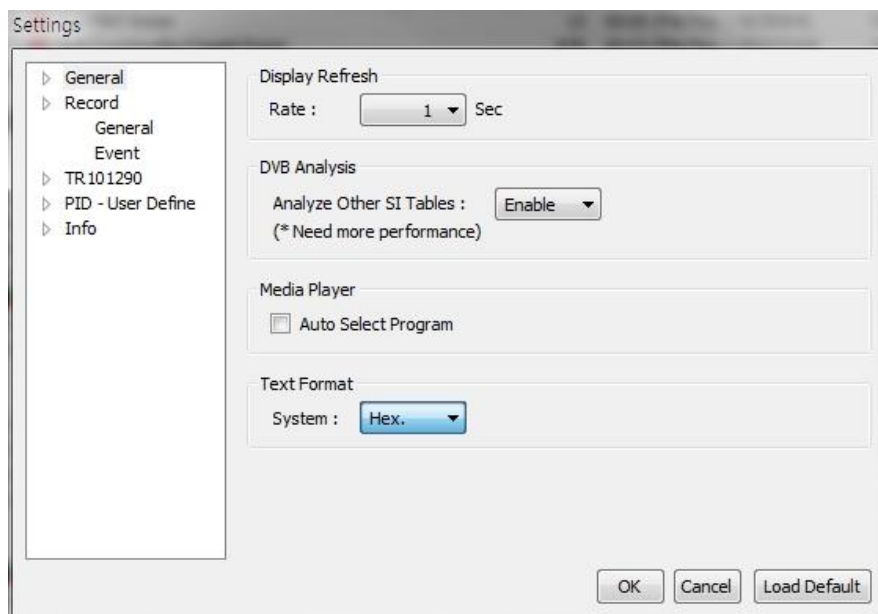


When 'Settings' is clicked, Pop-up Window will appeared.



- ① 'Settings' Pop-up Window enables you to configure 5 categories. This includes General, Record, TR 101290, PID-User Default, and Info
- ② Selecting the option on left will display details of selected option on right
- ③ Press 'Ok' to save settings, 'Cancel' to cancel changes, 'Load Default' to initialize setting.

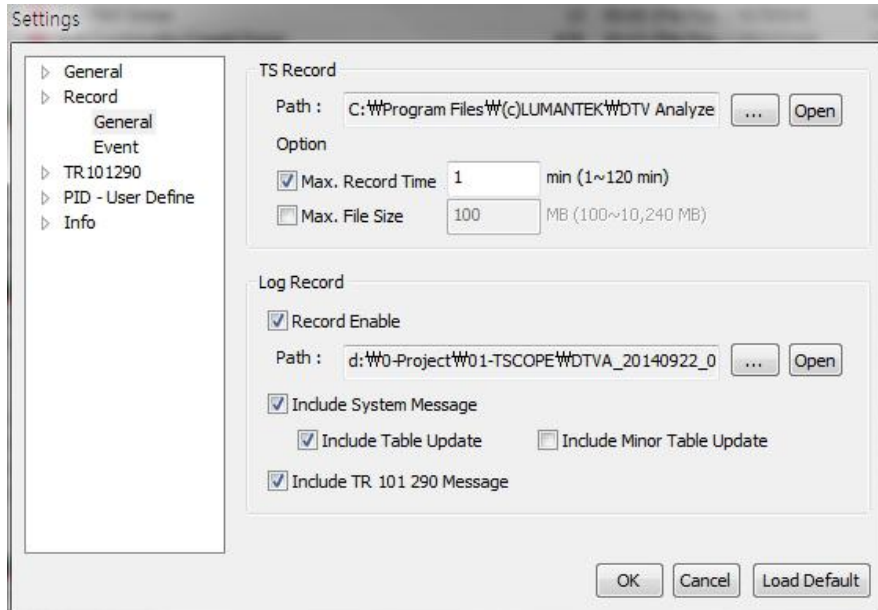
<Settings Popup Window– General>



- ① You can configure GUI refresh rate with 'Display Refresh'. (1~10 sec)
- ② DVB Analysis – Analyze Other SI Tables". During DVB analysis mode, determine whether to perform analyzing NIT-other and SDT-other as well as information on network and etc. When this mode is activated, may require higher performance PC
- ③ "Media Player – click on "Auto Select Program" enable automatically analyze service and if it finds services then display first program in "Service View Window ."
- ④ Turn ON/OFF Deinterlace option for 'interlaced Video' with 'Media Player – Deinterlace if necessary' checkbox.
- ⑤ Adjust HEVC Decoding option with 'Media Player-HEVC decode Mode' checkbox.
- ⑥ You can select text option with "Text Format" to display in decimal or hexadecimal.

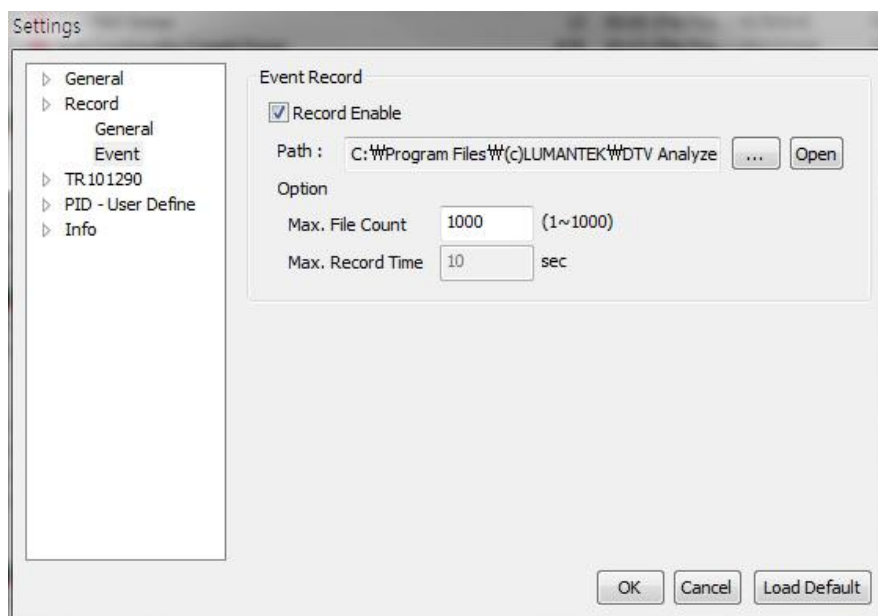
<Settings Popup Window– Record Tab>

- General



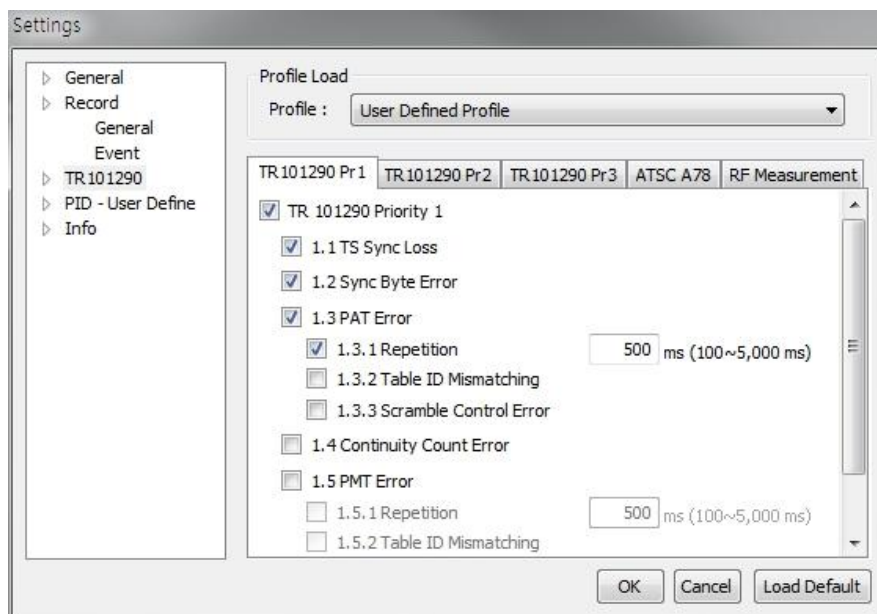
- ① TS Record path and name can be configured by pressing ‘...’ button. (Recording date and time will be added to the actual file name)
- ② Press ‘Open’ button to see the file path in TS Record.
- ③ TS Record item Option – check box allows to save the file by maximum size and time (Maximum recording time and size is 120 Minutes or 10240 MB, respectively)
- ④ Check “Record Enable” box to save the log
- ⑤ Click ‘...’ button in Log Record to configure file path and file name. (Recording date and time of the log data will be added to the actual file name) Log file is saved in ‘*.csv’ format.
- ⑥ Press ‘Open’ button in Log Record to see file path.
- ⑦ Check ‘Include System Message’ box in Log Record to save system operation related message log data.
- ⑧ Check ‘Include Table Update’ box in Log Record to save information table update message log data during system operation
- ⑨ Check ‘Include Minor Table Update’ in Log Record to save frequently updated information table message log data during system operation. Frequently updated information table includes STT, EIT, STT in ATSC.)
- ⑩ Check ‘Include TR 101 290 Message’ box in Log Record to save TR 101 290 error message log data during system operation.

- Event



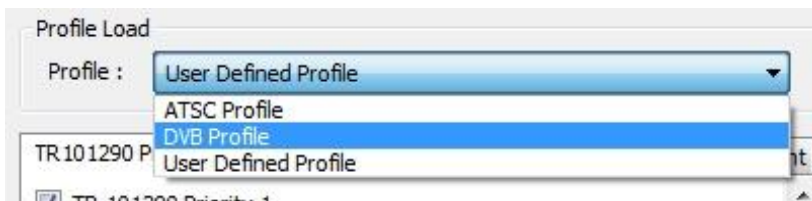
- ① Check "Record Enable" box from 'Event Record' to save event files during system operation.
- ② Designate the file name and path with "..." button in 'Event Record'(The recording date and time will be added to the actual saved file name)
- ③ Use "Open" button to check the file path of the 'Event Record'
- ④ Configure the maximum number of files for event recording with 'Max, File Count' edit box in 'Option' of 'Event Record'.

<Settings Popup window – TR101290 >

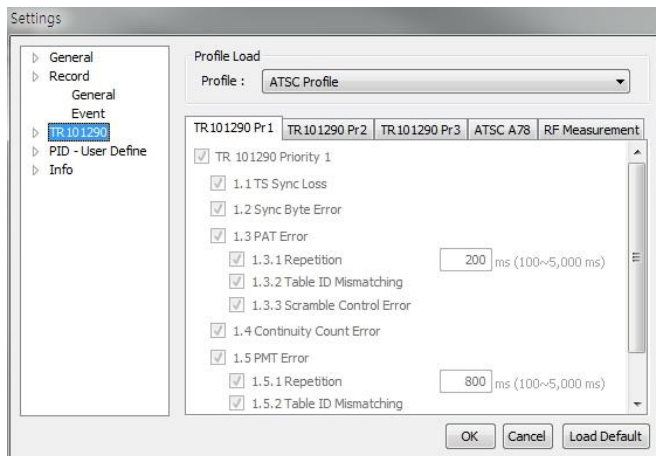


- ① You can configure ETSI TR 101 290 , ATSC A78 and RF Measurement analysis settings
- ② You can select ATSC, DVB, User-defined Profile
- ③ TR101290, ATSC A78 can be edited only if it is 'User-defined Profile'
- ④ RF Measurement can be edited at anytime
- ⑤ Use check box to enable/disable operation during analysis process
- ⑥ Parts with the numerical limitation would display such limitation on the right, and the ranges indicated in that box is the adjustable within its range.

- Profile setting



<Settings Popup Window– ETSI TR 101 290



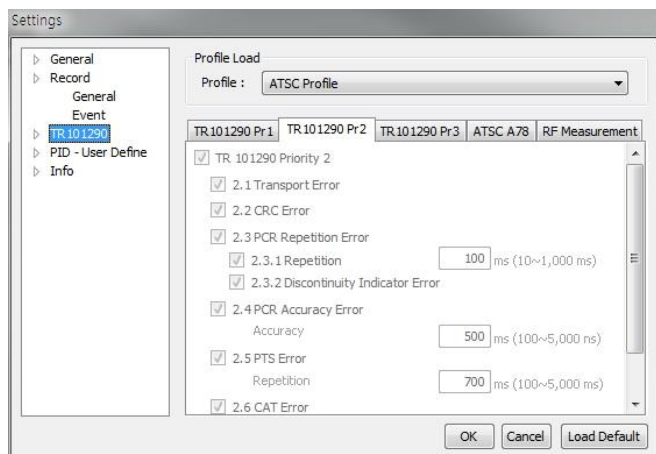
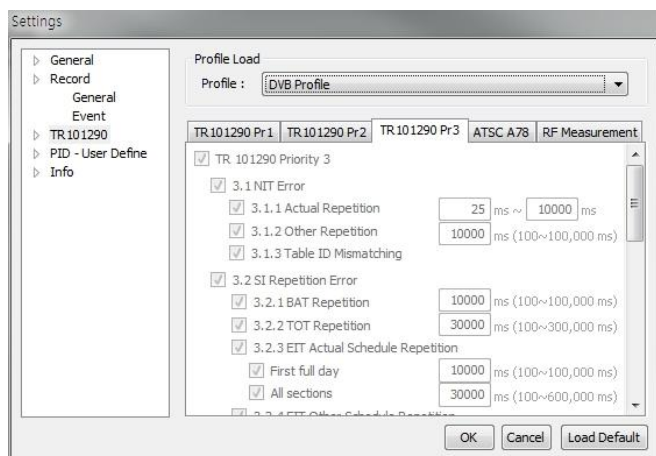
Detailed Setting for TR 101 290 Analysis.

Can select from ATSC, DVB and User-defined Profile. You can set only preferred analysis items in User-defined Profile menu.

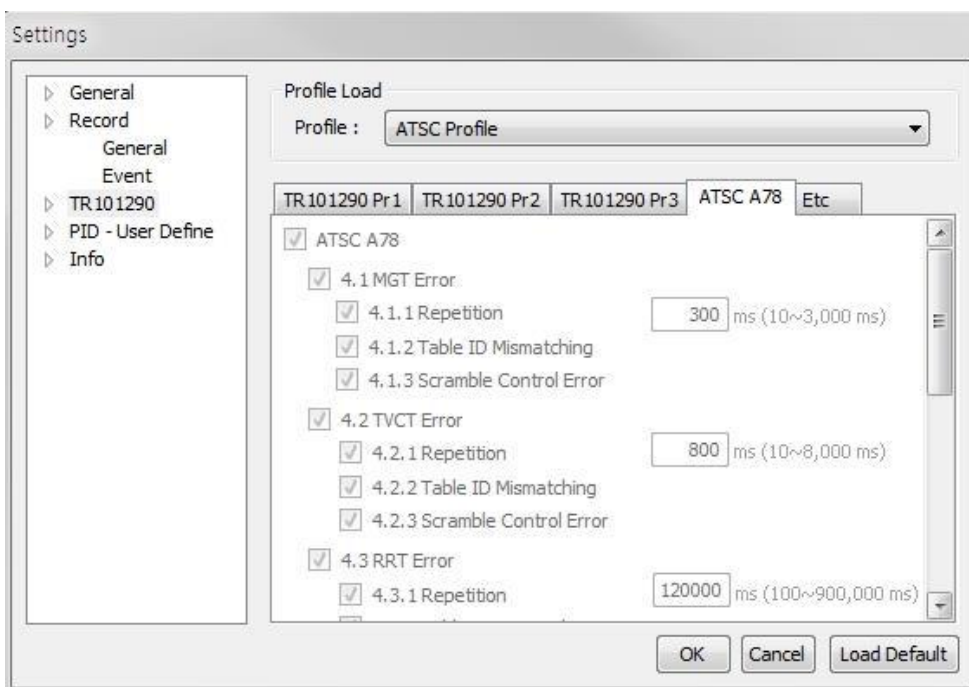
Analyze only checked box items, when it operate.

if there are numerical values in analysis and the limit values are configured as defined by to ATSC or DVB. Alternatively User can setup this limit value in User-defined Profile.

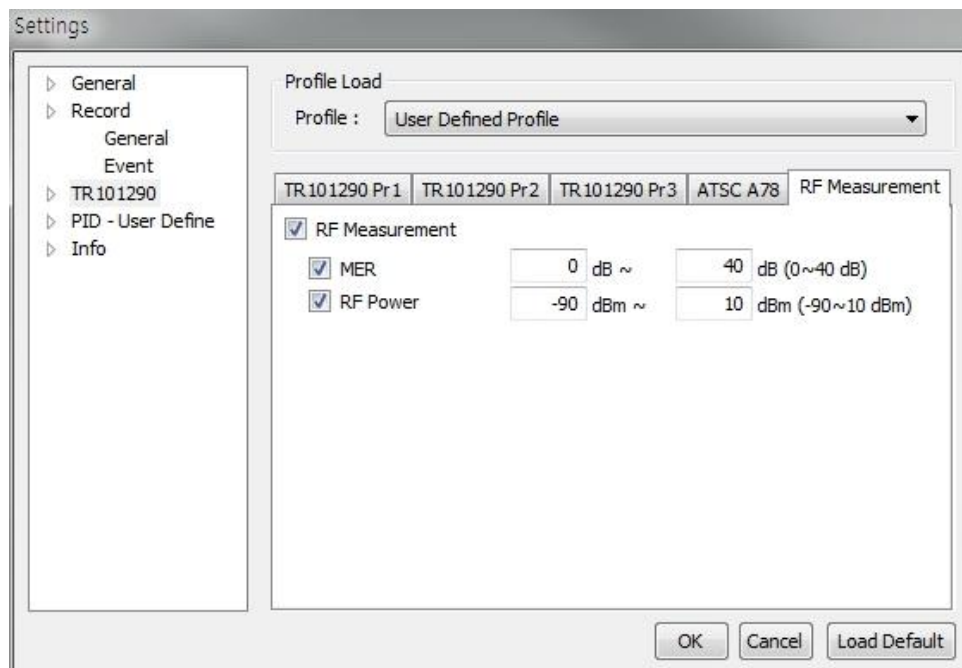
(in Priority 4 cases, the numerical limits range were set on basis of ATSC standard . You can configure related ATSC table value.)



- ATSC A78



- RF Measurement



<Settings Popup Window– PID-User Define>

Settings

- General
- Record
 - General
 - Event
- TR101290
- PID - User Define
- Info

PID - User Define

☒ Hex. Program Number : 0x PID : 0x

☐ Dec. Program Number : PID :

| No. | Program Number | PID |
|-----|----------------|--------|
| 1 | 0x0002 | 0x0025 |
| 2 | 0x0002 | 0x0026 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Settings

- General
- Record
 - General
 - Event
- TR101290
- PID - User Define
- Info

PID - User Define

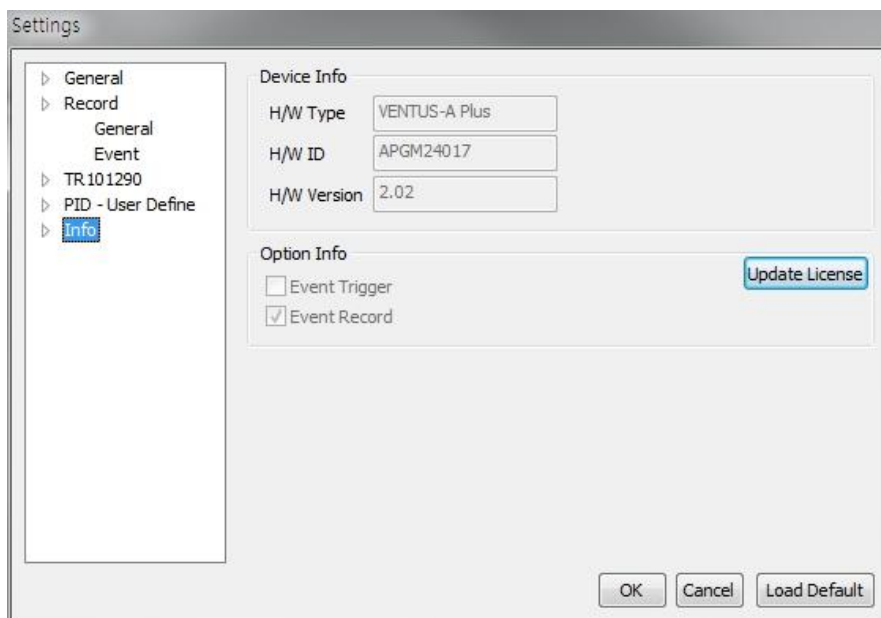
☐ Hex. Program Number : 0x PID : 0x

☒ Dec. Program Number : PID :

| No. | Program Number | PID |
|-----|----------------|-----|
| 1 | 2 | 37 |
| 2 | 2 | 38 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

- ① Analyze PIDs in specific Program Number.
- ② Decimal/Hexadecimal INPUT supported
- ③ Insert Program Number and PID then press ADD button
- ④ Press 'DEL' to remove added PID (If there is no selected PID, it will delete from the most recently added files)

<Settings Popup Window– Info Tab>



- ① Can check the serial number and properties of connected Device with “Device Info”
- ② Can Check the options supported by the connected Device with “Option Info” (Event Trigger option, Event Record option supported)
- ③ Press ‘Update License’ button to register /apply new license option

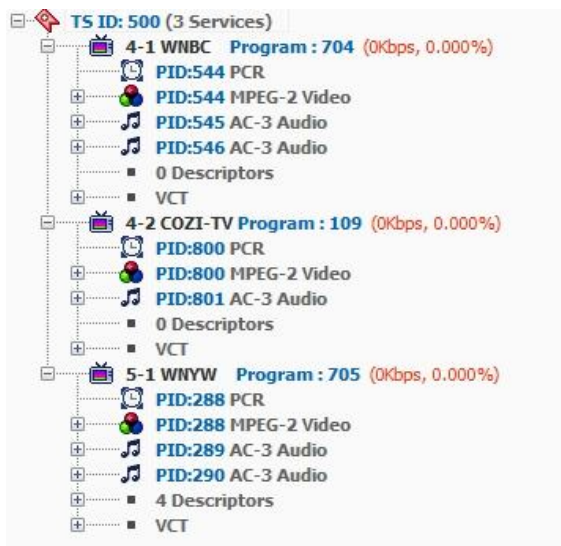
4.2 Analysis Window – Services Tab

Service Tab shows the analysis result of service components in a tree structure format.

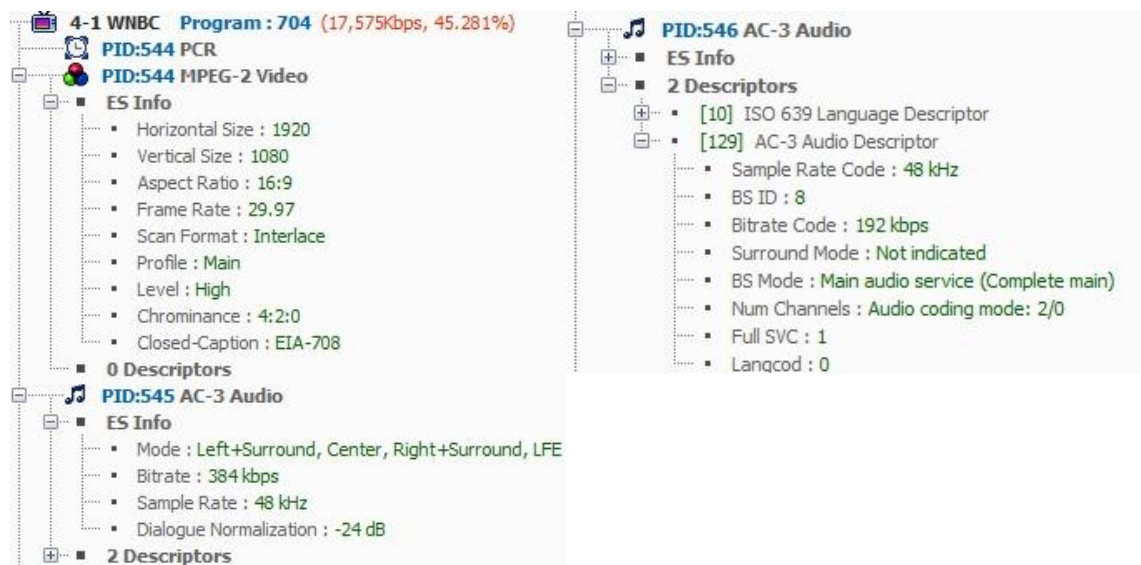
Double Click on node or click on '+', '-' to expand or fold displays.

The top of tree structure shows the number of TS ID and number of Services.

For each services, the Service name, Program Number, bit rate and occupancy information is shown along with the configuration information in sub-node.



The component of each program shows PID and properties along with the ES Info and Descriptor in sub-node. The ES info shows component information analysis inside the ES (elementary Stream) data and Descriptor shows contents included in PMT information table.



4.3 Analysis Window – PID Tab

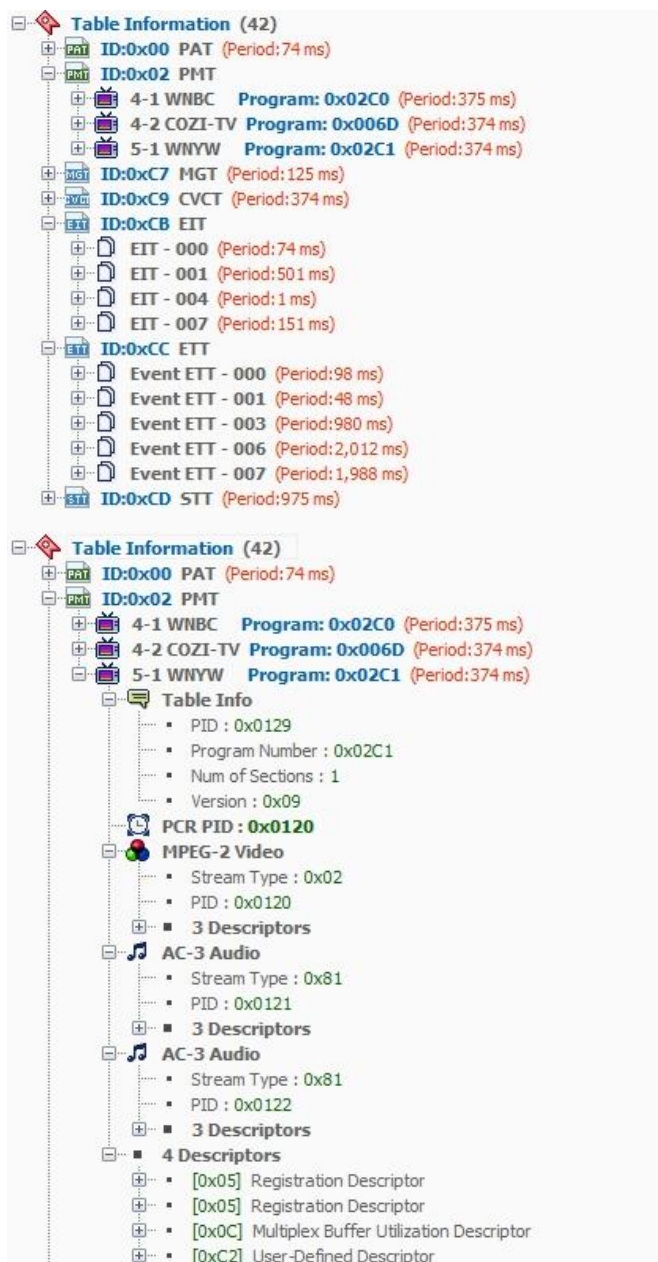
PID Tab shows the total number of analyzed PID with its properties, bit rate and occupancy.

| PID Information (56) | |
|----------------------|--|
| | PID:0x0000 PAT (7Kbps, 0.014%) |
| | PID:0x0001 CAT (15Kbps, 0.029%) |
| | PID:0x0010 NIT-Actual (39Kbps, 0.075%) |
| | PID:0x0011 SDT-Other, BAT, SDT-Actual (323Kbps, 0.626%) |
| | PID:0x0012 EIT-Actual p/f, EIT-Other Schedule, EIT-Actual Schedule (533Kbps, 1.034%) |
| | PID:0x0014 TDT (1Kbps, 0.002%) |
| | PID:0x0021 User Defined PID (172Kbps, 0.335%) |
| | PID:0x00C0 EMM (84Kbps, 0.163%) |
| | PID:0x00C1 EMM (51Kbps, 0.099%) |
| | PID:0x0410 H.264/AVC Video (3,908Kbps, 7.576%) |
| | PID:0x0413 PES Private Data (400Kbps, 0.775%) |
| | PID:0x041A PMT (15Kbps, 0.029%) |
| | PID:0x041B ECM (13Kbps, 0.026%) |
| | PID:0x0420 H.264/AVC Video (8,157Kbps, 15.811%) |
| | PID:0x0423 PES Private Data (400Kbps, 0.775%) |
| | PID:0x042A PMT (7Kbps, 0.014%) |
| | PID:0x042B ECM (16Kbps, 0.032%) |
| | PID:0x0430 H.264/AVC Video (3,889Kbps, 7.538%) |
| | PID:0x0433 PES Private Data (398Kbps, 0.772%) |
| | PID:0x043A PMT (7Kbps, 0.014%) |
| | PID:0x0440 H.264/AVC Video (5,400Kbps, 10.467%) |
| | PID:0x0443 PES Private Data (398Kbps, 0.772%) |
| | PID:0x044A PMT (7Kbps, 0.014%) |
| | PID:0x044B ECM (15Kbps, 0.029%) |
| | PID:0x0450 H.264/AVC Video (3,113Kbps, 6.034%) |
| | PID:0x0453 PES Private Data (400Kbps, 0.775%) |
| | PID:0x045A PMT (7Kbps, 0.014%) |
| | PID:0x045B ECM (16Kbps, 0.032%) |
| | PID:0x0460 H.264/AVC Video (4,041Kbps, 7.832%) |
| | PID:0x0463 PES Private Data (398Kbps, 0.772%) |
| | PID:0x046A PMT (7Kbps, 0.014%) |
| | PID:0x046B ECM (13Kbps, 0.026%) |
| | PID:0x0470 H.264/AVC Video (7,368Kbps, 14.280%) |
| | PID:0x0473 PES Private Data (400Kbps, 0.775%) |
| | PID:0x047A PMT (7Kbps, 0.014%) |
| | PID:0x047B ECM (16Kbps, 0.032%) |
| | PID:0x0480 H.264/AVC Video (3,754Kbps, 7.275%) |
| | PID:0x0483 PES Private Data (400Kbps, 0.775%) |
| | PID:0x048B ECM (15Kbps, 0.029%) |
| | PID:0x0490 H.264/AVC Video (4,533Kbps, 8.785%) |
| | PID:0x0493 PES Private Data (400Kbps, 0.775%) |
| | PID:0x049B ECM (15Kbps, 0.029%) |
| | PID:0x04DA PMT (7Kbps, 0.014%) |
| | PID:0x04EA PMT (7Kbps, 0.014%) |
| | PID:0x0BAB AIT (1Kbps, 0.002%) |
| | PID:0x0CC9 User Private (282Kbps, 0.548%) |
| | PID:0x0CCA User Private (282Kbps, 0.548%) |
| | PID:0x1441 ECM (15Kbps, 0.029%) |
| | PID:0x1442 ECM (15Kbps, 0.029%) |
| | PID:0x1444 ECM (15Kbps, 0.029%) |
| | PID:0x1445 ECM (15Kbps, 0.029%) |
| | PID:0x1446 ECM (15Kbps, 0.029%) |
| | PID:0x1447 ECM (15Kbps, 0.029%) |
| | PID:0x1448 ECM (15Kbps, 0.029%) |
| | PID:0x1449 ECM (15Kbps, 0.029%) |
| | PID:0x1FFF Null Packet (1,719Kbps, 3.331%) |

4. 4 Analysis Window– Table Tab

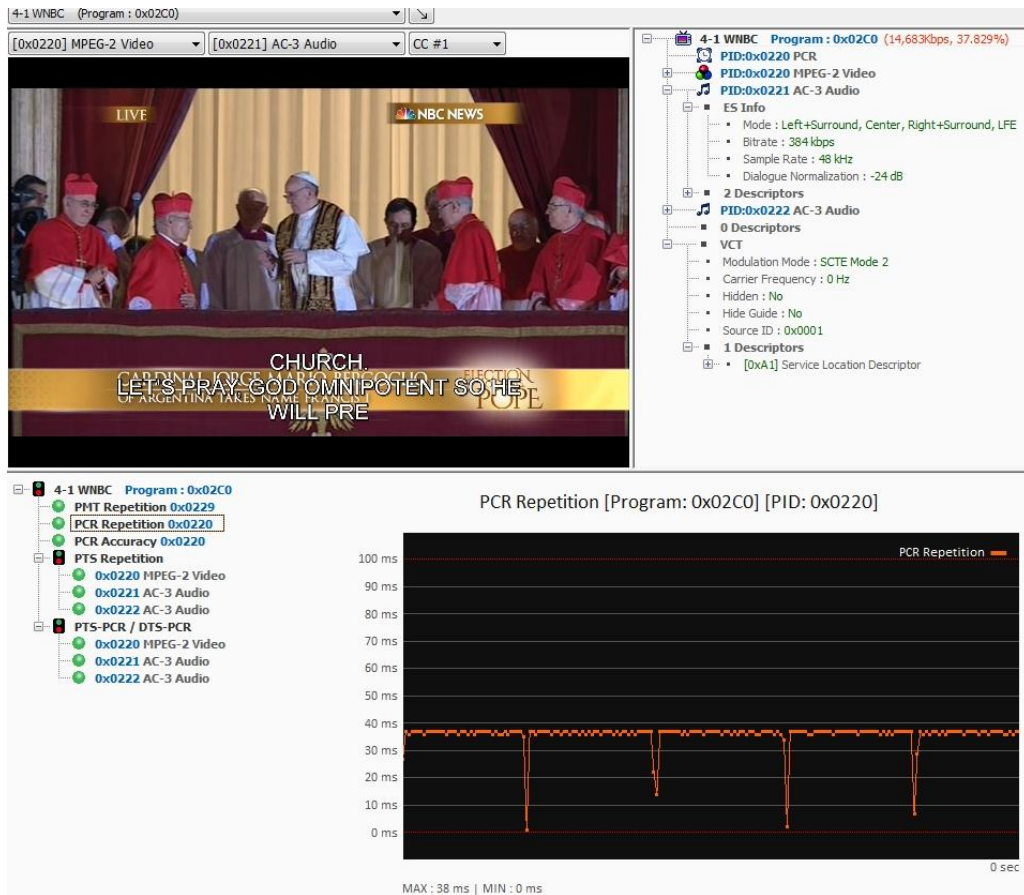
Service Tab shows collected information tables in sequence by its Table ID in a tree structure format.

Double Click on node or click on '+', '-' to expand or fold displays. It shows the information collected and the named of the tables, repeated cycle. the summary of the information displayed in sub-node.



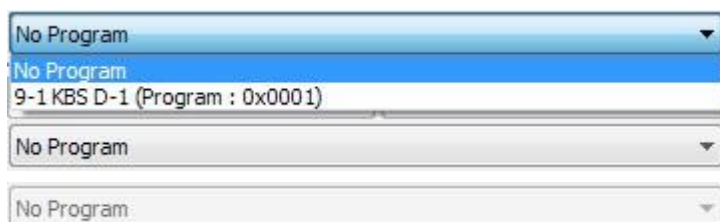
4.5 Analysis Window – Service View Tab

Service View Tab shows service component timing related error detection items with Media Player for one(1) selected program.



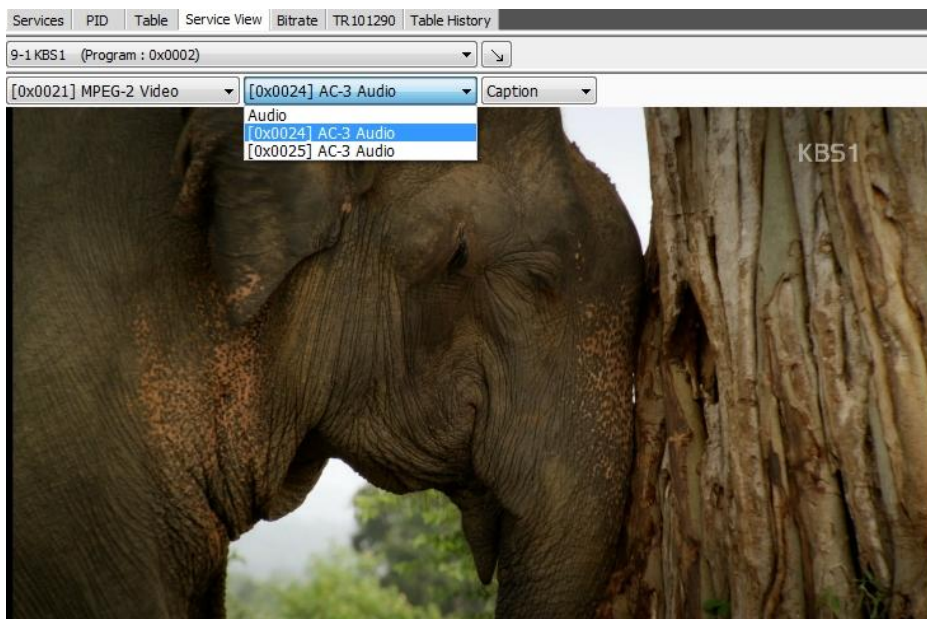
During the Analysis operation, the drop-box menu selection is inactivated until the program is detected. Upon the program detection the drop-box is activated.

(If 'Auto Select Program' has been selected in 'Settings-Service View' tab, the first program detected is specified as a program)



Once program is specified, Media player will be activated. (Not supported in 'Max Speed' or 'File input' Mode)

Three(3) drop box menus right above the Media Player screen will be activated after the program has been specified, you can select Video, Audio and Caption/Sub- title. (Only supports English sub-titles) Closed Caption will be displayed in a separate screen.

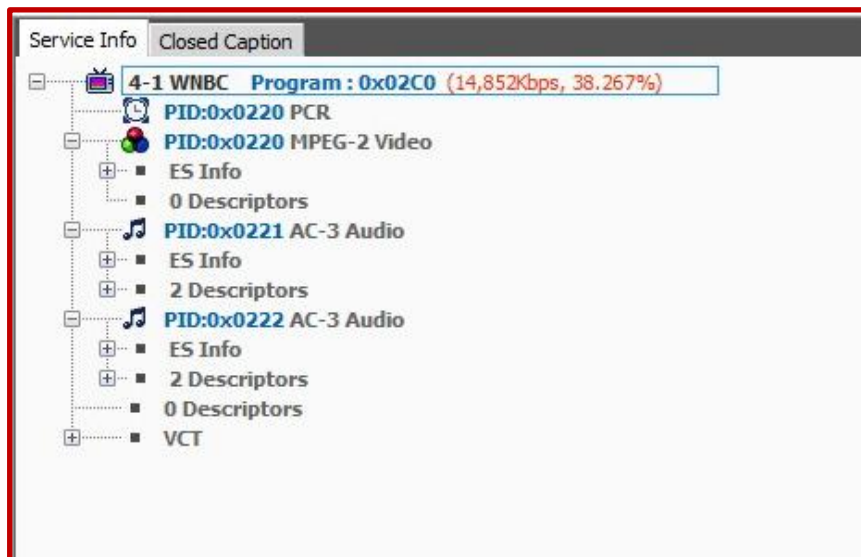


Arrow icon allows to expand or restore size of media player

The screenshot displays the VENTUS-A+ DTV Analyzer interface. The top section shows the 'Services' list with columns for PID, Table, and Service View. The selected service is 4-1 WNBC (Program: 0x02C0). The media player window shows a live broadcast from NBC News with the text 'ALL THOSE THAT RECEIVE THE BLESSINGS THROUGH THE RADIO, THE TV AND THE NEW COMMUNICATION'. The bottom right section shows a graph of PCR Accuracy for the selected service, with a title 'PCR Accuracy [Program: 0x02C0] [PID: 0x0220]'. The graph shows a fluctuating signal over time, with a maximum value of 111 ns and a minimum value of -148 ns.

Screen on the right is switchable between the Service configuration or Closed Caption service.

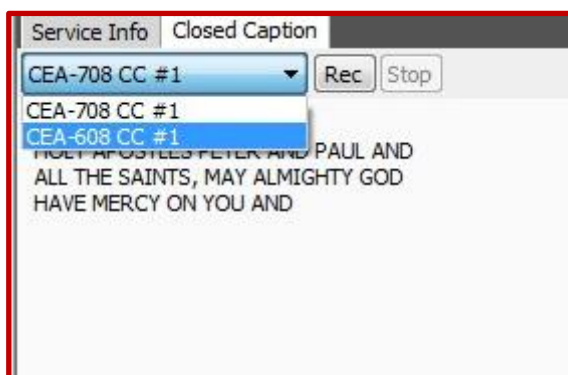
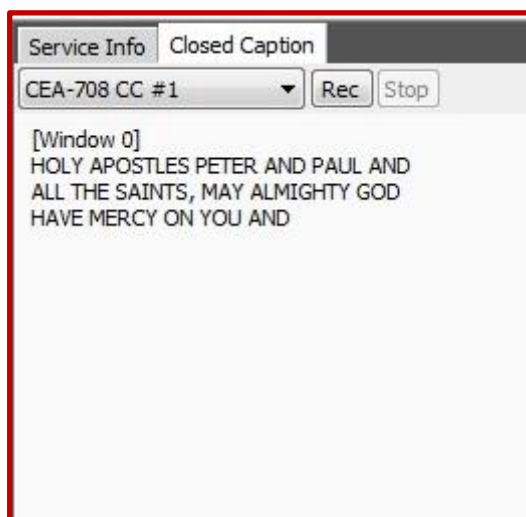
Configuration tree on the right shows the components of the specified program and is same configuration as 'Service Tab'



Closed Caption displays the CEA 608/708 data on screen.

Switchable CC Chanel through the channel list.

'Rec' allows users to record a detailed information of the Closed Caption data in '.csv' format. (file saving path is as same as 'Setting-Record-TS Record' path.)

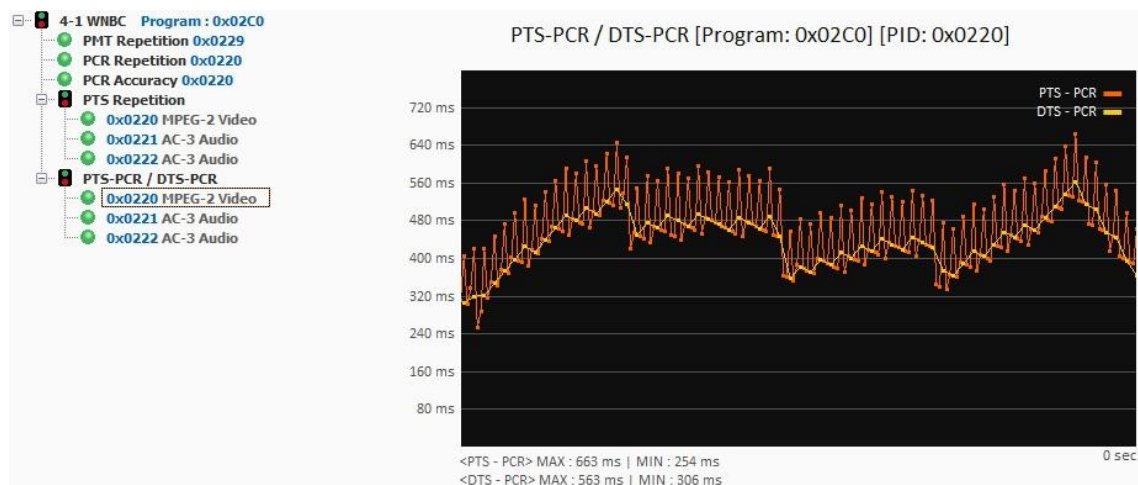


The timing related error items at the bottom shows PMT Repetition, PCR Repetition, PCR Accuracy, PTS Repetition plus PTS-PCR, PTS-PCR value as defined in TR 101 290.
 (PTS-PCR indicates the difference in its value compare to PCR input value right before PTS)
 (DTS-PCR indicates the difference in its value compare to PCR input value right before DTS)

Icon color indication:

Gray: (Not analyzed), Green (normal), Red (error)

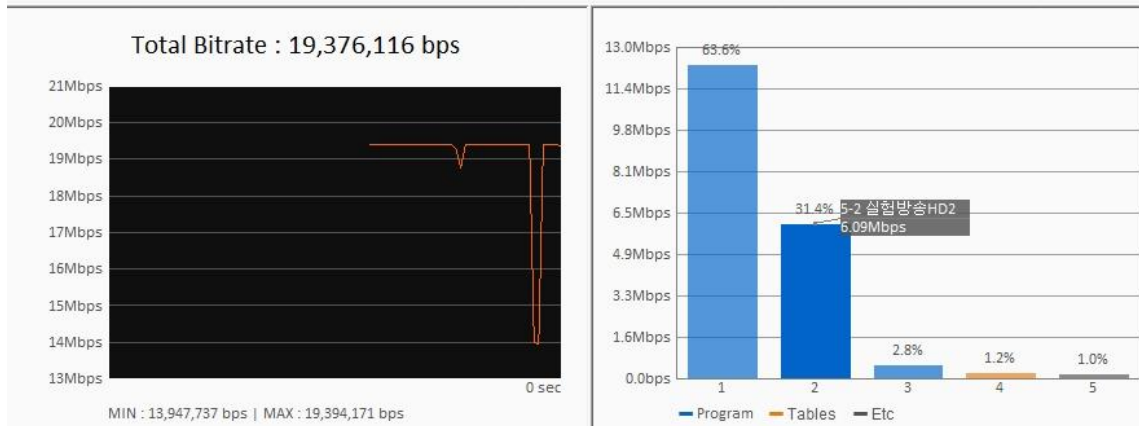
Select each item on the left side table to show related graph.



4.6 Analysis Result Window – ‘Bit-Rate’ Tab

‘Bit-rate’ tab shows detailed information about measurement components of the ‘Bit-rate’.

| Service Bitrate | | PID Bitrate | | | | | | |
|-----------------|--------------------------------|-------------|-----------|---------------|---------------|---------------|----------|--|
| PID | type | ratio(%) | btr(kbps) | btr_min(kbps) | btr_max(kbps) | btr_avg(kbps) | CC error | |
| Program | 5-1 실험방송HD1 (Program : 0x0002) | 63.561 | 12,315 | 8,964 | 12,532 | 12,224 | | |
| 0x0021 | MPEG-2 Video / PCR | 61.535 | 11,923 | 8,678 | 12,133 | 11,834 | 103 | |
| 0x0024 | AC-3 Audio | 2.26 | 392 | 285 | 398 | 389 | 11 | |
| Program | 5-2 실험방송HD2 (Program : 0x0003) | 31.446 | 6,093 | 4,437 | 6,199 | 6,047 | | |
| 0x0031 | H.264/AVC Video / PCR | 30.771 | 5,962 | 4,340 | 6,067 | 5,917 | 52 | |
| 0x0034 | AC-3 Audio | 0.675 | 130 | 96 | 133 | 129 | 6 | |
| Program | 5-99 업그레이드 (Program : 0x0063) | 2.779 | 538 | 200 | 703 | 491 | | |
| 0x1200 | User Defined PID | 2.779 | 538 | 200 | 703 | 491 | 4 | |
| Tables | | 1.203 | 233 | 109 | 239 | 222 | | |
| 0x0000 | PAT | 0.240 | 46 | 36 | 49 | 47 | 4 | |
| 0x0020 | PMT | 0.62 | 12 | 6 | 12 | 11 | 4 | |
| 0x0030 | PMT | 0.62 | 12 | 6 | 12 | 11 | 4 | |
| 0x0060 | PMT | 0.62 | 12 | 6 | 12 | 11 | 4 | |
| 0x0500 | EIT - 000 | 0.155 | 30 | 7 | 30 | 26 | 2 | |
| 0x0501 | EIT - 001 | 0.77 | 15 | 7 | 22 | 17 | 3 | |
| 0x0502 | EIT - 002 | 0.38 | 7 | 0 | 7 | 7 | 2 | |
| 0x0503 | EIT - 003 | 0.38 | 7 | 0 | 7 | 7 | 4 | |
| 0x0504 | EIT - 004 | 0.38 | 7 | 0 | 7 | 7 | 1 | |
| 0x0505 | EIT - 005 | 0.38 | 7 | 0 | 7 | 7 | 2 | |
| 0x0506 | EIT - 006 | 0.38 | 7 | 0 | 7 | 7 | 1 | |
| 0x0507 | EIT - 007 | 0.38 | 7 | 0 | 7 | 7 | 1 | |
| 0x0600 | Channel ETT | 0.23 | 4 | 0 | 4 | 0 | 0 | |
| 0x1FFB | MGT, TVCT, STT, RRT | 0.287 | 55 | 36 | 57 | 52 | 5 | |

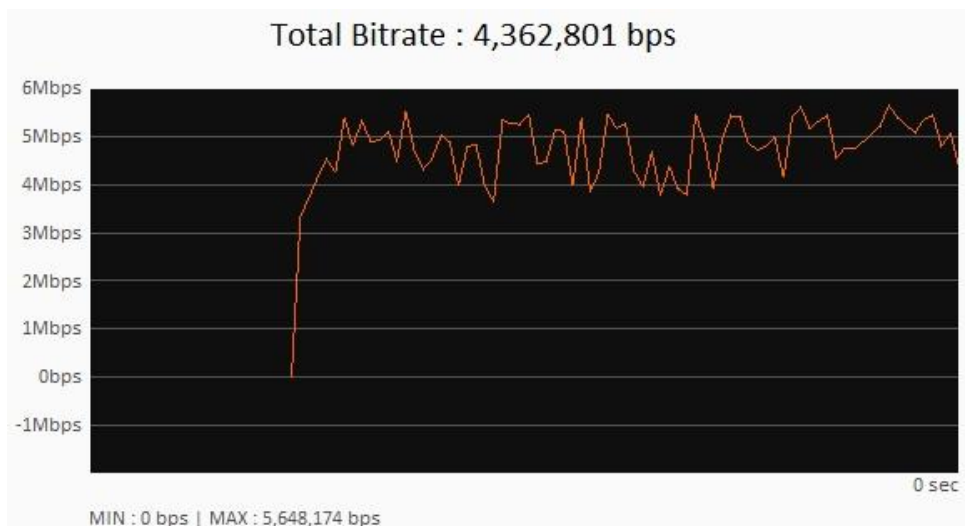


The upper window shows occupancy of each PIDs, Min/Max/Avg Bit-rate and number of Continuity Count error. These items can be organized and sorted by its components for each services PID.

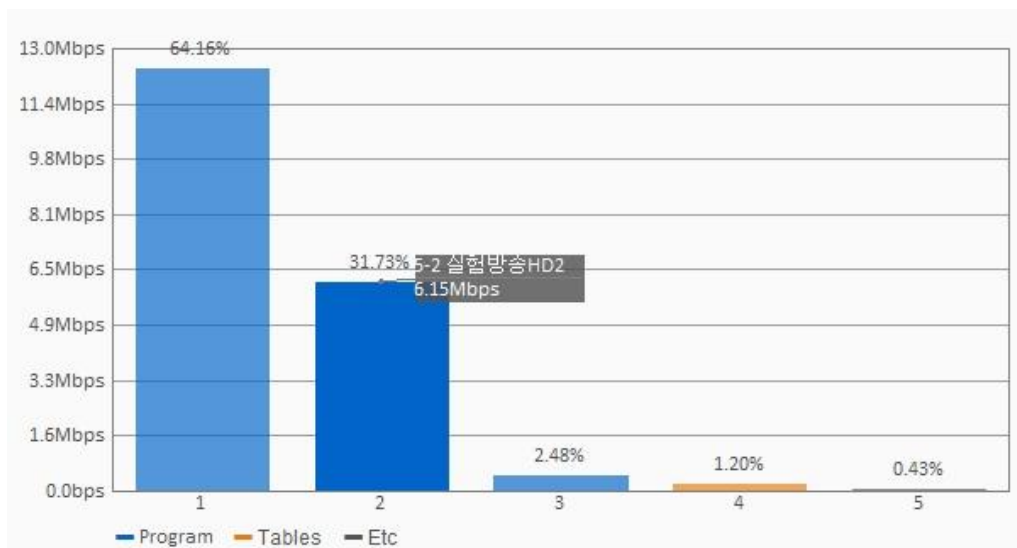
| Service Bitrate | PID Bitrate | | | | | | | |
|-----------------|--------------------------------|----------|-----------|---------------|---------------|---------------|----------|--|
| PID | type | ratio(%) | btr(kbps) | btr_min(kbps) | btr_max(kbps) | btr_avg(kbps) | CC error | |
| Program | 4-2 COZI-TV (Program : 0x006D) | 10.990 | 4,265 | 1,213 | 5,596 | 3,986 | | |
| 0x0320 | MPEG-2 Video / PCR | 10.478 | 4,067 | 1,016 | 5,399 | 3,789 | 0 | |
| 0x0321 | AC-3 Audio | 0.511 | 198 | 197 | 198 | 197 | 0 | |
| Program | 4-1 WNBC (Program : 0x02C0) | 37.422 | 14,524 | 13,193 | 17,575 | 14,803 | | |
| 0x0220 | MPEG-2 Video / PCR | 35.900 | 13,933 | 12,601 | 16,982 | 14,211 | 0 | |
| 0x0221 | AC-3 Audio | 1.15 | 394 | 394 | 395 | 394 | 0 | |
| 0x0222 | AC-3 Audio | 0.507 | 197 | 197 | 198 | 197 | 0 | |
| Program | 5-1 WNYW (Program : 0x02C1) | 36.469 | 14,154 | 14,097 | 14,400 | 14,279 | | |
| 0x0120 | MPEG-2 Video / PCR | 34.768 | 13,494 | 13,437 | 13,738 | 13,618 | 0 | |
| 0x0121 | AC-3 Audio | 1.185 | 460 | 460 | 463 | 461 | 0 | |
| 0x0122 | AC-3 Audio | 0.515 | 200 | 198 | 200 | 199 | 0 | |
| Tables | | 0.352 | 136 | 126 | 148 | 137 | | |
| 0x0000 | PAT | 0.54 | 21 | 19 | 21 | 20 | 0 | |
| 0x0129 | PMT | 0.11 | 4 | 3 | 4 | 4 | 0 | |
| 0x0229 | PMT | 0.11 | 4 | 3 | 4 | 4 | 0 | |
| 0x0329 | PMT | 0.11 | 4 | 3 | 4 | 4 | 0 | |
| 0x1000 | EIT - 006 | 0.0 | 0 | 0 | 1 | 0 | 0 | |
| 0x1001 | EIT - 007 | 0.0 | 0 | 0 | 6 | 0 | 0 | |
| 0x1002 | EIT - 000 | 0.46 | 18 | 18 | 24 | 19 | 0 | |
| 0x1003 | EIT - 001 | 0.11 | 4 | 0 | 10 | 3 | 0 | |
| 0x1004 | EIT - 002 | 0.0 | 0 | 0 | 4 | 0 | 0 | |

| Service Bitrate | PID Bitrate | | | | | | | |
|-----------------|--------------------|----------|-----------|---------------|---------------|---------------|----------|--|
| PID | type | ratio(%) | btr(kbps) | btr_min(kbps) | btr_max(kbps) | btr_avg(kbps) | CC error | |
| 0x0000 | PAT | 0.50 | 19 | 19 | 21 | 20 | 0 | |
| 0x0120 | MPEG-2 Video / PCR | 35.264 | 13,687 | 13,437 | 13,738 | 13,619 | 0 | |
| 0x0121 | AC-3 Audio | 1.189 | 461 | 460 | 463 | 461 | 0 | |
| 0x0122 | AC-3 Audio | 0.515 | 200 | 198 | 200 | 199 | 0 | |
| 0x0129 | PMT | 0.7 | 3 | 3 | 4 | 3 | 0 | |
| 0x0220 | MPEG-2 Video / PCR | 34.768 | 13,494 | 12,601 | 16,982 | 14,198 | 0 | |
| 0x0221 | AC-3 Audio | 1.19 | 395 | 394 | 395 | 394 | 0 | |
| 0x0222 | AC-3 Audio | 0.507 | 197 | 197 | 198 | 197 | 0 | |
| 0x0229 | PMT | 0.7 | 3 | 3 | 4 | 3 | 0 | |
| 0x0320 | MPEG-2 Video / PCR | 11.617 | 4,509 | 1,016 | 5,399 | 3,802 | 0 | |
| 0x0321 | AC-3 Audio | 0.507 | 197 | 197 | 198 | 197 | 0 | |
| 0x0329 | PMT | 0.7 | 3 | 3 | 4 | 3 | 0 | |
| 0x1000 | EIT - 006 | 0.0 | 0 | 0 | 1 | 0 | 0 | |
| 0x1001 | EIT - 007 | 0.0 | 0 | 0 | 6 | 0 | 0 | |
| 0x1002 | EIT - 000 | 0.46 | 18 | 18 | 24 | 19 | 0 | |
| 0x1003 | EIT - 001 | 0.0 | 0 | 0 | 10 | 3 | 0 | |
| 0x1004 | EIT - 002 | 0.0 | 0 | 0 | 4 | 0 | 0 | |
| 0x1005 | EIT - 003 | 0.0 | 0 | 0 | 3 | 0 | 0 | |
| 0x1006 | EIT - 004 | 0.0 | 0 | 0 | 9 | 0 | 0 | |
| 0x1007 | EIT - 005 | 0.0 | 0 | 0 | 1 | 0 | 0 | |
| 0x1080 | Event ETT - 006 | 0.0 | 0 | 0 | 3 | 0 | 0 | |
| 0x1081 | Event ETT - 007 | 0.3 | 1 | 0 | 3 | 0 | 0 | |
| 0x1082 | Event ETT - 000 | 0.93 | 36 | 36 | 40 | 37 | 0 | |
| 0x1083 | Event ETT - 001 | 0.31 | 12 | 6 | 12 | 8 | 0 | |
| 0x1084 | Event ETT - 002 | 0.0 | 0 | 0 | 3 | 0 | 0 | |
| 0x1085 | Event ETT - 003 | 0.7 | 3 | 0 | 3 | 0 | 0 | |
| 0x1086 | Event ETT - 004 | 0.0 | 0 | 0 | 3 | 0 | 0 | |
| 0x1087 | Event ETT - 005 | 0.0 | 0 | 0 | 3 | 0 | 0 | |
| 0x1FFF | MGT, STT, CVCT | 0.89 | 34 | 31 | 34 | 33 | 0 | |
| 0x1FFF | Null Packet | 14.264 | 5,536 | 5,486 | 5,792 | 5,604 | 0 | |
| Total | | 100.0 | 38,812 | 38,812 | 38,812 | 38,812 | | |

'Total Bit-rate' at the bottom shows the information of the entire bit-rate with its Max/Min information. Color graph on the right shows the program occupancy in percentage.



Below bar graph indicates share of each programs, If you put mouse point on the specific bar it will show the associated program name or program number as well as Bit-rate.

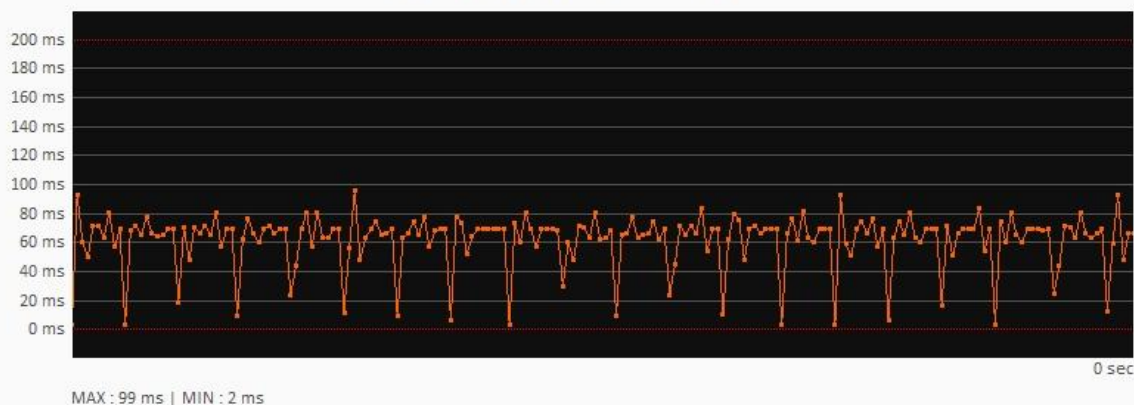


4.7 Analysis result window – TR 101 290 Tab

'TR 101 290' Tab shows the result of error analysis based on 'ESTI TR 101 290', and ATSC A78 standard. Double Click on each nodes or click '+', '-' to expand or fold displays.

| Parameter | # Error | Last Error Time/Pos | Event Detail |
|-----------------------------------|---------|---------------------|--------------|
| TR101290 Priority 1 | | | |
| 1.1 TS Sync Loss | 0 | | |
| 1.2 Sync Byte Error | 0 | | |
| 1.3 PAT Error | 0 | | |
| 1.3.1 Repetition | 0 | | |
| 1.3.2 Table ID Mismatching | 0 | | |
| 1.3.3 Scramble Control Error | 0 | | |
| 1.4 Continuity Count Error | 0 | | |
| 1.5 PMT Error | 0 | | |
| 1.6 PID Error | | | |
| TR101290 Priority 2 | | | |
| 2.1 Transport Error | 0 | | |
| 2.2 CRC Error | 0 | | |
| 2.3 PCR Repetition Error | 0 | | |
| 2.4 PCR Accuracy Error | 0 | | |
| 2.5 PTS Error | 0 | | |
| 2.6 CAT Error | | | |
| TR101290 Priority 3 | | | |
| ATSC A78 | | | |
| 1 MGT Error | 0 | | |
| 2 VCT Error | 0 | | |
| 3 RRT Error | | | |
| 4 EIT Error | 0 | | |
| 5 ETT Error | | | |
| 6 STT Error | 0 | | |
| RF Measurement | | | |
| 1. MER Error | 0 | | |
| 2. RF Power Error | 0 | | |

PAT Repetition [TS ID: 0x0C11]



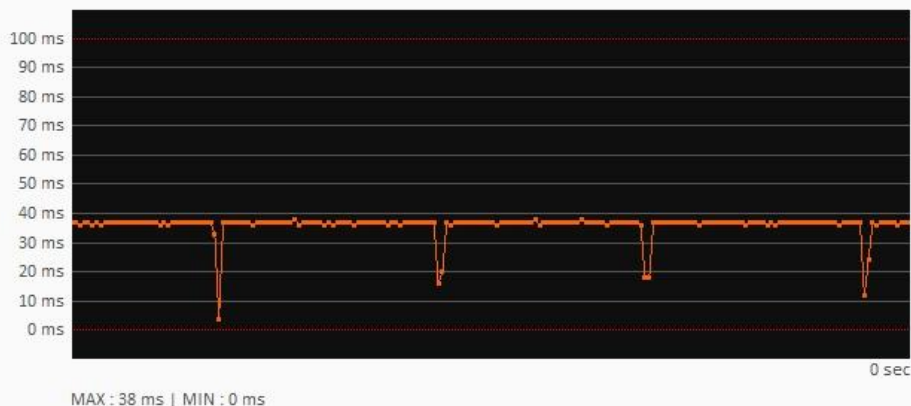
More detailed information is provided for nodes with 'Expand' and 'Fold' indicators

| Parameter | # Error | Last Error Time/Pos | Event Detail |
|---------------------------------|---------|---------------------|--------------|
| TR101290 Priority 1 | | | |
| 1.1 TS Sync Loss | 0 | | |
| 1.2 Sync Byte Error | 0 | | |
| 1.3 PAT Error | 0 | | |
| 1.3.1 Repetition | 0 | | |
| 1.3.2 Table ID Mismatching | 0 | | |
| 1.3.3 Scramble Control Error | 0 | | |
| 1.4 Continuity Count Error | 0 | | |
| 1.5 PMT Error | 0 | | |
| 1.6 PID Error | 0 | | |
| TR101290 Priority 2 | | | |
| 2.1 Transport Error | 0 | | |
| 2.2 CRC Error | 0 | | |
| 2.3 PCR Repetition Error | 0 | | |
| 2.4 PCR Accuracy Error | 0 | | |
| 2.5 PTS Error | 0 | | |
| 2.6 CAT Error | 0 | | |
| TR101290 Priority 3 | | | |
| ATSC A78 | | | |
| 1 MGT Error | 0 | | |
| 2 VCT Error | 0 | | |
| 3 RRT Error | 0 | | |
| 4 EIT Error | 0 | | |
| 5 ETT Error | 0 | | |
| 6 STT Error | 0 | | |
| RF Measurement | | | |
| 1. MER Error | 0 | | |
| 2. RF Power Error | 0 | | |

Clicking on the timing related measurement items will display its relevant graphs at the bottom.

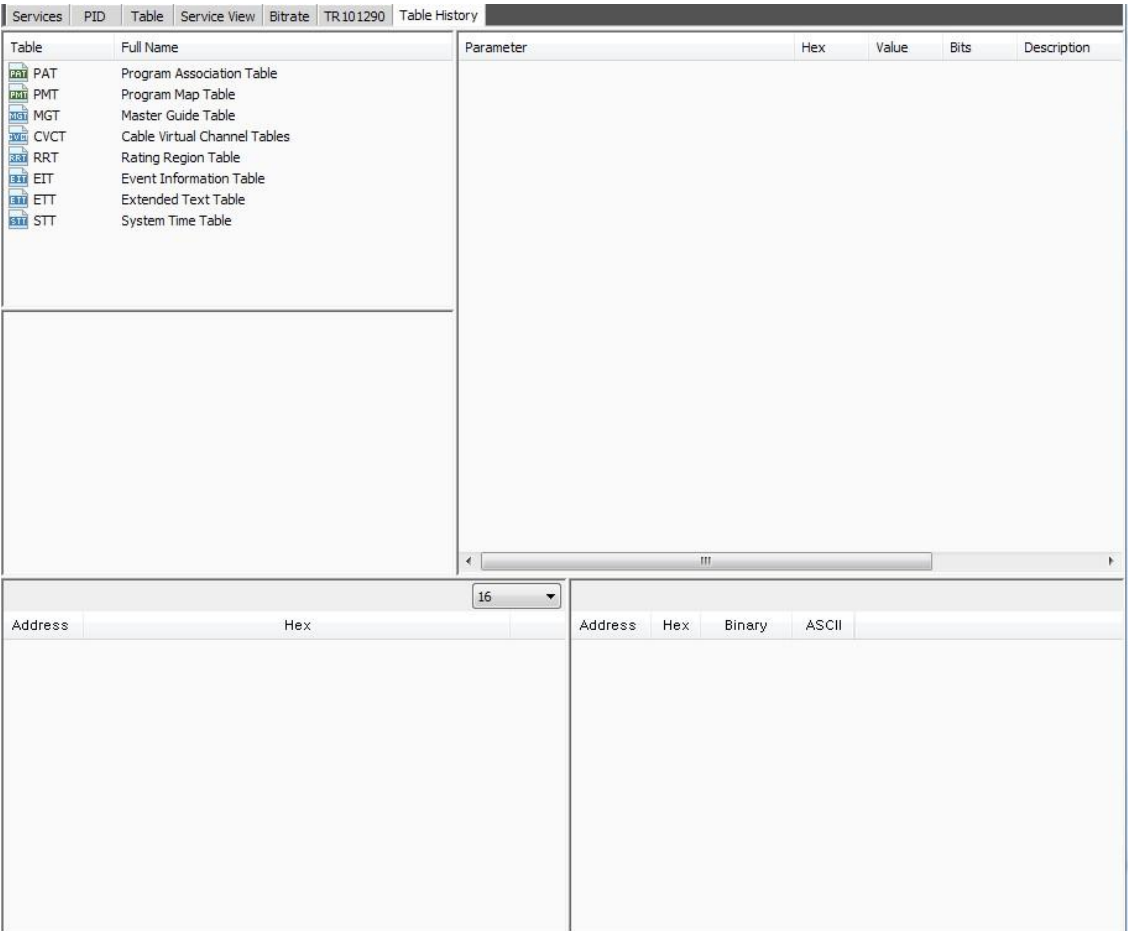
| | | | |
|---|---|--|--|
| 2.2 CRC Error | 0 | | |
| 2.3 PCR Repetition Error | 0 | | |
| 4-2 COZI-TV PID : 0x0320 | 0 | | |
| 2.3.1 PCR Repetition Error | 0 | | |
| 2.3.2 PCR Discontinuity Indicator Error | 0 | | |
| 4-1 WNBC PID : 0x0220 | 0 | | |
| 5-1 WNYW PID : 0x0120 | 0 | | |

PCR Repetition [Program: 0x006D] [PID: 0x0320]

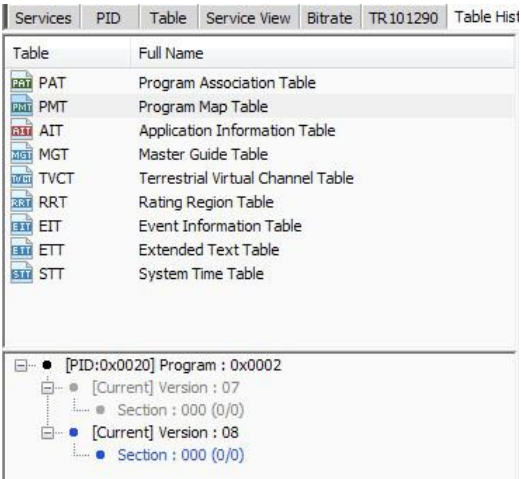


4. 8 Analysis Result Window– Table History Tab

‘Table History’ Tab shows all the components of collected information table and its history.



Top-left window shows the type of collected information table. When a specific information table has been clicked, a relevant collected history of information table appears on mid-left.



The collected information table data is saved as by the 'section'.

When specific 'section' has been selected for the analysis, the analysis components will be displayed on the right upper window by information table configuration chart along with the byte-data information of such section shown at the bottom left.

(Section Number/Last Section Number will be indicated in the Section text)

(the latest information table data is indicated in 'blue' while previous ones are in 'gray')

The screenshot displays the LUMANTEK VENTUS-A+ DTV Analyzer interface. The top menu bar includes Services, PID, Table, Service View, Bitrate, TR.101290, and Table History. The main window is divided into several sections:

- Table History:** A list of tables with their full names and current status. The selected table is PMT (Program Map Table).
- Table Configuration:** A tree view showing the structure of the selected table. The selected section is 'Section : 000 (0/0)'.
- Table Configuration Table:** A table showing the parameters of the selected section. The parameters are listed in the table below.
- Hex Data:** A table showing the raw data of the selected section. The data is displayed in hexadecimal and ASCII format.

| Parameter | Hex | Value | Bits | Description |
|--|----------|----------|------|-----------------|
| PMT - Transport Stream Program Map Section | | | | |
| Section Header | 0x02 | 2 | 64 | PMT Information |
| Table ID | 0x02 | 2 | 8 | |
| Section Syntax Indicator | 0x01 | 1 | 1 | |
| '0' | 0x00 | 0 | 1 | |
| Reserved | 0x03 | 3 | 2 | |
| Section Length | 0x0098 | 152 | 12 | |
| Program Number | 0x0002 | 2 | 16 | |
| Reserved | 0x03 | 3 | 2 | |
| Version Number | 0x08 | 8 | 5 | |
| Current Next Indicator | 0x01 | 1 | 1 | Current |
| Section Number | 0x00 | 0 | 8 | |
| Last Section Number | 0x00 | 0 | 8 | |
| Reserved | 0x07 | 7 | 3 | |
| PCR PID | 0x0021 | 33 | 13 | |
| Reserved | 0x0F | 15 | 4 | |
| Program Info Length | 0x0000 | 0 | 12 | |
| ES Info | 0x02 | 2 | 272 | MPEG-2 Video |
| ES Info | 0x08 | 11 | 448 | 13818-6 Type E |
| ES Info | 0x05 | 5 | 80 | Private Section |
| ES Info | 0x81 | 129 | 312 | AC-3 Audio |
| CRC 32 | 0x376... | 92962... | 32 | CRC OK |

| Address | Hex | Binary | ASCII |
|---------|---|--------|-----------|
| 00000 | 02 80 98 00 02 D1 00 00 E0 21 F0 00 02 E0 21 F0 | | ... |
| 00010 | 1D A3 12 01 6B 6F 72 01 00 3F 0A 00 56 00 69 00 | | ... k |
| 00020 | 64 00 65 00 6F 86 07 E1 6B 6F 72 C1 DF FF 0B F1 | | d, e, o |
| 00030 | 00 F0 33 66 04 00 F0 00 06 14 0D 00 10 00 00 08 | | ... 3f, |
| 00040 | FF FF FF FF FF FF FF FF 52 01 10 13 19 00 00 0D | | ... |
| 00050 | BB 01 02 51 89 0F E2 00 00 FF 41 00 00 00 FF 41 | | ... Q, |
| 00060 | FF 04 00 03 12 C8 05 E5 01 F0 05 6F 03 00 06 F0 | | ... |
| 00070 | 81 E0 24 F0 22 A3 12 01 6B 6F 72 01 00 3F 0A 00 | | ... \$, " |
| 00080 | 41 00 75 00 64 00 69 00 6F 81 06 80 38 05 FF 1F | | A, u, d |
| 00090 | 00 0A 04 6B 6F 72 00 37 68 F6 07 | | ... k o |

The byte-data is highlighted at the bottom left along with the binary data on the right when certain items have been selected from the analysis chart on upper right window.

| Table | Full Name | Parameter | Hex | Value | Bits | Description |
|-------|-----------------------------------|-------------------------------------|----------|----------|------|-----------------|
| PAT | Program Association Table | PMT - Transport Stream Program M... | | | | |
| PMT | Program Map Table | Section Header | 0x02 | 2 | 64 | PMT Information |
| AIT | Application Information Table | Table ID | 0x02 | 2 | 8 | |
| MGT | Master Guide Table | Section Syntax Indicator | 0x01 | 1 | 1 | |
| TVCT | Terrestrial Virtual Channel Table | 'I' | 0x00 | 0 | 1 | |
| RRT | Rating Region Table | Reserved | 0x03 | 3 | 2 | |
| EIT | Event Information Table | Section Length | 0x0098 | 152 | 12 | |
| ETT | Extended Text Table | Program Number | 0x0002 | 2 | 16 | |
| STT | System Time Table | Reserved | 0x03 | 3 | 2 | |
| | | Version Number | 0x1E | 30 | 5 | |
| | | Current Next Indicator | 0x01 | 1 | 1 | Current |
| | | Section Number | 0x00 | 0 | 8 | |
| | | Last Section Number | 0x00 | 0 | 8 | |
| | | Reserved | 0x07 | 7 | 3 | |
| | | PCR PID | 0x0021 | 33 | 13 | |
| | | Reserved | 0x0F | 15 | 4 | |
| | | Program Info Descriptor Length | 0x0000 | 0 | 12 | |
| | | ES Info | 0x02 | 2 | 272 | MPEG-2 Video |
| | | ES Info | 0x0B | 11 | 448 | 13818-6 Type B |
| | | ES Info | 0x05 | 5 | 80 | Private Section |
| | | ES Info | 0x81 | 129 | 312 | AC-3 Audio |
| | | CRC 32 | 0x1C7... | 47755... | 32 | CRC OK |

| [PID:0x0020] Program : 0x0002 | |
|-------------------------------|--|
| [Current] Version : 0x1D | |
| Section : 000 (1/1) | |
| [Current] Version : 0x1E | |
| Section : 000 (1/1) | |

| Address | Hex | Address | Hex | Binary | ASCII |
|---------|---|---------|-----|-----------|-------|
| 00000 | 02 B0 98 00 02 FD 00 00 E0 21 F0 00 02 E0 21 F0 | 00008 | E0 | 1110 0000 | . |
| 00010 | 1D A3 12 01 6B 6F 72 01 00 3F 0A 00 56 00 69 00 | 00009 | 21 | 0010 0001 | ! |
| 00020 | 64 00 65 00 6F 86 07 E1 6B 6F 72 C1 DF FF 0B F1 | | | | |
| 00030 | 00 F0 33 66 04 00 F0 00 06 14 0D 00 10 00 00 08 | | | | |
| 00040 | FF FF FF FF FF FF FF 52 01 10 13 19 00 00 0D | | | | |
| 00050 | 8B 01 02 50 E6 0F E2 00 01 01 82 00 00 01 01 82 | | | | |
| 00060 | FF 04 00 03 0C 86 05 E5 01 F0 05 6F 03 00 06 E6 | | | | |
| 00070 | 81 E0 24 F0 22 A3 12 01 6B 6F 72 01 00 3F 0A 00 | | | | |
| 00080 | 41 00 75 00 64 00 69 00 6F 81 06 80 38 05 FF 1F | | | | |
| 00090 | 00 0A 04 6B 6F 72 00 1C 76 D9 AE | | | | |

4.9 System message and TR101290 summary window

System message and TR101290 summary window is divided into 'System' and 'TR 101 290 Summary' tab.

< 'System' Tab >

'System' shows operation system messages in colors. Operation and stop message (Green) information table refresh message (Green), internal operation warning message (Orange).

| System | TR101290 Summary | RF Status |
|------------------|---|-----------|
| System Event Log | | |
| ● | (2014-09-29, 16:38:55) : Start | |
| ● | (2014-09-29, 16:38:56) : <Normal> PCR prediction active | |
| ● | (2014-09-29, 16:38:56) : [0] PAT Updated (Version:15) | |
| ● | (2014-09-29, 16:38:56) : [553] PMT Updated (Version:25) (Program:704) | |
| ● | (2014-09-29, 16:38:56) : [8187] CVCT Updated (Version:23) | |
| ● | (2014-09-29, 16:38:56) : [8187] MGT Updated (Version:8) | |
| ● | (2014-09-29, 16:38:57) : [809] PMT Updated (Version:26) (Program:109) | |
| ● | (2014-09-29, 16:38:57) : [297] PMT Updated (Version:9) (Program:705) | |
| ● | (2014-09-29, 16:39:38) : <Warning> PCR prediction failed | |
| ● | (2014-09-29, 16:39:39) : <Normal> PCR prediction active | |
| ● | (2014-09-29, 16:39:48) : [8187] RRT Updated (Version:0) | |

Warning messages are as follows.

| | Description | Reason |
|---|--|-------------------------|
| <Warning> PCR prediction failed | The system cannot carry out PCR data related analysis on input data | Input data |
| <Warning> [PID] "Name" Update failed | Abnormal data detected during the 'update' process after the table data collection | Input data |
| <Warning> [PID] "Name" PACKET COLLECTING FAILED | Information table packet collection failure | Input data |
| <Warning> Clean Unknown PIDs | Deleting any unknown PIDs from the memory when there is too many types of PID | Input data |
| <Warning> Media Player Packet Loss Occur | Packet Loss occurred during its data transfer to the Media Player while Media Player is in its operation at 'Service View' | PC calculation overflow |
| <SYS> Input Buffer Overflow | Data not processed. Omitted. | PC calculation overflow |

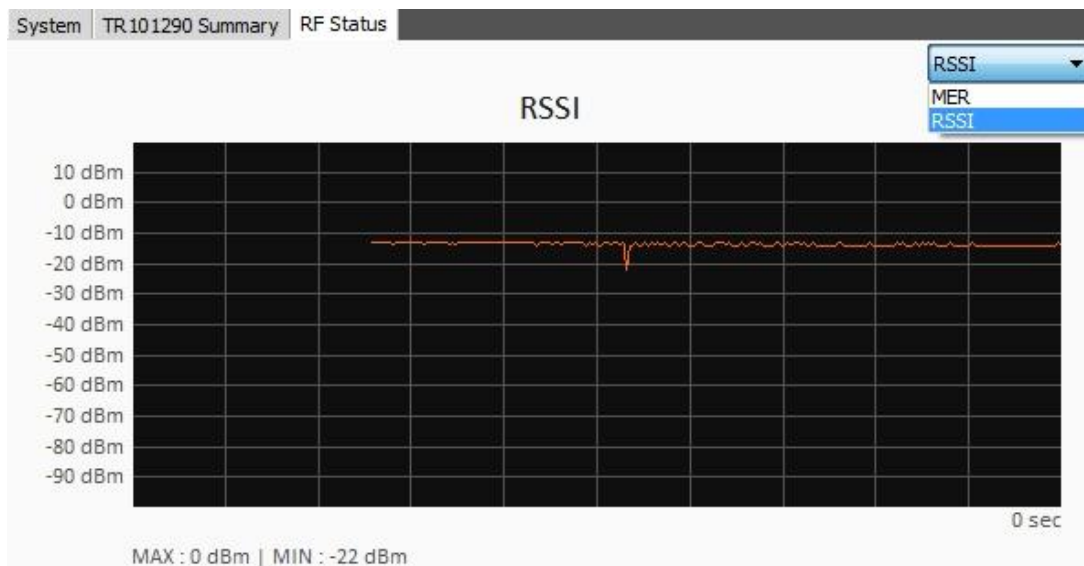
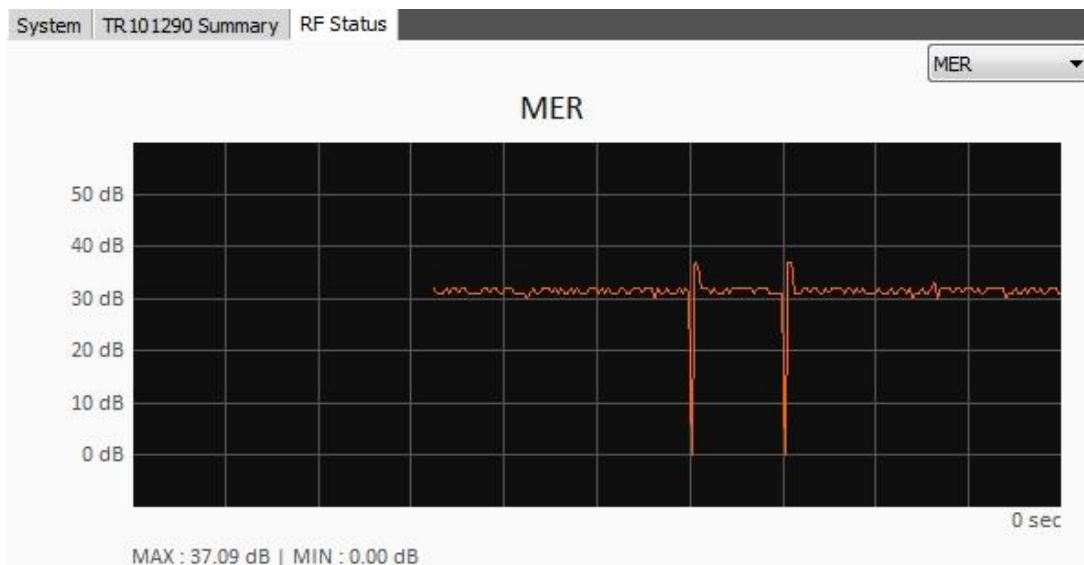
4.10 TR 101 290 Summary' Tab

TR 101 290 & ATSC A78 error detection results are presented in a summarized format. For further information see. 'analysis window – TR101290'

| System | TR101290 Summary | RF Status | | | |
|-----------------------------------|------------------|-----------|----------------------|-----------------------------------|--|
| Parameter | | # Error | Last Error Time/Pos | Event Detail | |
| TR101290 Priority 1 | | | | | |
| 1.1 TS Sync Loss | | 0 | | | |
| 1.2 Sync Byte Error | | 0 | | | |
| 1.3 PAT Error | | 2 | 2014-12-19, 15:23:23 | PAT Repetition Error [205 ms] | |
| 1.4 Continuity Count Error | | 593 | 2014-12-19, 15:23:24 | TS Continuity Counter Error [PID: | |
| 1.5 PMT Error | | 0 | | | |
| 1.6 PID Error | | | | | |
| TR101290 Priority 2 | | | | | |
| 2.1 Transport Error | | 8595 | 2014-12-19, 15:23:23 | TS Error Indicator Error [PID:0x0 | |
| 2.2 CRC Error | | 0 | | | |
| 2.3 PCR Repetition Error | | 4 | 2014-12-19, 15:23:23 | PCR Discontinuity Indicator Error | |
| 2.4 PCR Accuracy Error | | 0 | | | |
| 2.5 PTS Error | | 0 | | | |
| 2.6 CAT Error | | | | | |
| TR101290 Priority 3 | | | | | |
| 3.1 NIT Error | | | | | |
| 3.2 SI Repetition Error | | | | | |
| 3.3 Buffer Error | | | | | |
| 3.4 Unreferenced PID Error | | 208 | 2014-12-19, 15:25:00 | Unreferenced PID Error [PID:0x0 | |
| 3.5 SDT Error | | | | | |
| 3.6 EIT Error | | | | | |
| 3.7 RST Error | | | | | |
| 3.8 TDT Error | | | | | |
| 3.9 Empty Buffer Error | | | | | |
| 3.10 Data Delay Error | | | | | |
| ATSC A78 | | | | | |
| 1 MGT Error | | 2 | 2014-12-19, 15:23:23 | MGT Repetition Error [316 ms] | |
| 2 TVCT Error | | 1 | 2014-12-19, 15:23:23 | VCT Repetition Error [1291 ms] | |
| 3 RRT Error | | | | | |
| 4 EIT Error | | 1 | 2014-12-19, 15:23:23 | EIT-0 Repetition Error [1258 ms] | |
| 5 ETT Error | | | | | |
| 6 STT Error | | 0 | | | |
| Etc | | | | | |
| 1 MER Error | | 0 | | | |
| 2 RF Power Error | | 0 | | | |
| 3 PTS-PCR/ DTS-PCR Error | | 1 | 2014-12-19, 15:23:22 | PTS-PCR Error [-47721742 ms] | |

4.11 RF Status Window

In RF quality, MER and RSSI measurement values of the last 150 seconds data are displayed in a Graph.



4. 12 Operation Status Window

Operation status window shows the summary of overall operation information. Various operating status is shown below

| | | | | | | | |
|--------|------|---|---------------|--------------------------|------|-------|----------------------------|
| ● Play | ATSC | FILE Input(Max): \SBS_3D_광고후전환_20131201_001932.ts | 01:03 / 05:46 | 19,364 Kbps | ● TR | ● LOG | ● REC |
| ● Play | ATSC | TS Input: ASI | 00:00:00:07 | 19,392 Kbps | ● TR | ● LOG | ● REC 00:00:04 (9 MBytes) |
| ● Play | ATSC | IP Input: udp:\127.0.0.1:5000 | 00:00:00:04 | 0 Kbps | ● TR | ● LOG | ● REC |
| ● Play | ATSC | RF Input: 8VSB 521,000 KHz | 00:00:00:12 | Locked / 30 dB / -56 dBm | ● TR | ● LOG | ● REC 00:00:06 (13 MBytes) |
| ● Play | ATSC | RF Input: 8VSB 521,000 KHz | 00:00:00:03 | Locked / 31 dB / -56 dBm | ● TR | ● LOG | ● REC |
| ● Stop | ATSC | RF Input: 8VSB 521,000 KHz | 00:00:00:13 | Locked / 30 dB / -56 dBm | ● TR | ● LOG | ● REC |

Summarized information will be shown in following sequence.

- ① Operation status (Play, Stop, Pause , -current operating status)
- ② analysis mode (selected mode among MPEG-2, ATSC, DVB and ISDB)
- ③ input configuration (input port and detailed configuration information)
- ④ analysis processing time and input status (File/TS/IP input status shows its Bit-rate, whereas RF input shows quality of RF status - Lock, SNR, RSSI in this orders.)
- ⑤ TR 101 290 error detection status (Gray – operation disabled, Green- normal , Red –error occurred)
- ⑥ LOG record status (Grey –recording disabled , Green – recording)
- ⑦ TS Recording Status (Grey - recording disabled, Green – recording) (file size and recording time is shown additional during recording status)

APPENDIX A..TR 101 290 Analysis Criteria Description (Crucial items in Bold)

General Error categorization

- ① Data Loss
- ② Transmitter Defect
- ③ Error caused without the data loss factors. (Transmitter Defect)

| | Item | Description (General Cause of the Error) |
|-------------------|-------------------------------------|---|
| Priority 1 | 1.1 TS Sync Loss | Unable to Sync TS data in analysis stream. (①) |
| | 1.2 Sync Byte Error | Fragmentary Sync error after TS data Sync. |
| | 1.3 PAT Error | PAT Info table error (③) |
| | 1.3.1 Repetition | PAT info table unable to repeat within its time limit |
| | 1.3.2 Table ID Mismatching | PAT info Table ID do not match |
| | 1.3.3 Scramble Control Error | PAT info table is scrambled |
| | 1.4 Continuity Counter Error | Data Continuity cut off on TS data for each PID (①) |
| | 1.5 PMT Error | PMT Info table error. (③) |
| | 1.5.1 Repetition | PMT info table unable to repeat within its time limit |
| | 1.5.2 Table ID Mismatching | PMT info Table ID do not match |
| | 1.5.3 Scramble Control Error | PMT info table is scrambled |
| | 1.6 PID Error | PID & PID data cycle unable to meet its parameter defined by user |

| | Item | Description |
|-------------------|---|---|
| Priority 2 | 2.1 Transport Error | Error bit included in internal data of the TS packet (①) |
| | 2.2 CRC Error | CRC for each info data do not match(②) |
| | 2.3 PCR Error | PCR Time info error(③) |
| | 2.3.1 PCR Repetition Error | PCR Time info unable to repeat within its time limit |
| | 2.3.2 PCR Discontinuity Indicator Error | PCR Time info showing significant deviation without discontinuity command |
| | 2.4 PCR Accuracy Error | PCR Time Info accuracy off its margin of error parameter (③) |
| | 2.5 PTS Error | PTS Time info unable to repeat within its time limit. (③) |
| | 2.6 CAT Error | CAT Info table error. (③) |
| | 2.6.1 Table ID Mismatching | CAT info Table ID do not match |
| | 2.6.2 Scramble Control Error | CAT info table is scrambled |

| | Item | Description |
|------------|-------------------------------------|--|
| Priority 3 | 3.1 NIT Error | NIT Info table error. (③) |
| | 3.1.1 Actual Repetition | NIT-Actual info table unable to repeat within its time limit |
| | 3.1.2 Other Repetition | NIT-Other info table unable to repeat within its time limit |
| | 3.1.3 Table ID Mismatching | NIT info table is scrambled |
| | 3.2 SI Repetition Error | SI Info table error. (③) |
| | 3.2.1 BAT Repetition | BAT info table unable to repeat within its time limit |
| | 3.2.2 TOT Repetition | TOT info table unable to repeat within its time limit |
| | 3.2.3 EIT Actual Repetition | EIT-Actual info table unable to repeat within its time limit |
| | 3.2.3 EIT Other Repetition | EIT-Other info table unable to repeat within its time limit |
| | 3.3 Buffer Error | TS buffer overflow (Not supported) |
| | 3.4 Unreferenced PID Error | Unidentified PID reference (③) |
| | 3.5 SDT Error | SDT Info table error. (③) |
| | 3.5.1 Actual P/F Repetition | SDT-Actual Present/Follow info table unable to repeat within its time limit |
| | 3.5.2 Other P/F Repetition | SDT-Other Present/Follow info table unable to repeat within its time limit |
| | 3.5.3 Table ID Mismatching | SDT info table unable to repeat within its time limit |
| | 3.6 EIT Error | EIT Info table error. (③) |
| | 3.6.1 Actual Repetition | EIT-Actual info table unable to repeat within its time limit. |
| | 3.6.2 Other Repetition | EIT-Other info table unable to repeat within its time limit. |
| | 3.6.3 Table ID Mismatching | EIT info Table ID do not match. |
| | 3.6.4 Present/Following Exist Error | EIT info Table without the 'Present' or 'Following' info. |
| | 3.7 RST Error | RST Info table error. . (③) |
| | 3.7.1 Repetition | RST info table unable to repeat within its time limit. |
| | 3.7.2 Table ID Mismatching | RST info Table ID do not match. |
| | 3.8 TDT Error | TDT Info table error. (③) |
| | 3.8.1 Repetition | TDT info table unable to repeat within its time limit. |
| | 3.8.2 Table ID Mismatching | TDT info Table ID do not match. |
| | 3.9 Empty Buffer Error | TS buffer underflow. (Not supported) |
| | 3.10 Data Delay Error | A single data delayed more than 1sec or a still cut image delayed more then 60 sec.(Not supported) |

| | Item | Description |
|-----------|----------------------------|--|
| ATSC A.78 | 1 MGT Error | MGT Info table error. (③) |
| | 1.1 Repetition | MGT info table unable to repeat within its time limit. |
| | 1.2 Table ID Mismatching | MGT info Table ID do not match. |
| | 1.3 Scramble Control Error | MGT info table is scrambled. |
| | 2 VCT Error | VCT Info table error. (③) |
| | 2.1 Repetition | VCT info table unable to repeat within its time limit. |
| | 2.2 Table ID Mismatching | VCT info Table ID do not match. |
| | 2.3 Scramble Control Error | VCT info table is scrambled. |
| | 3 RRT Error | RRT Info table error. (③) |
| | 3.1 Repetition | RRT info table unable to repeat within its time limit. |
| | 3.2 Table ID Mismatching | RRT info Table ID do not match. |
| | 3.3 Scramble Control Error | RRT info table is scrambled. |
| | 4 EIT Error | EIT Info table error. (③) |
| | 4.1 EIT-0 Repetition | EIT-0 info table unable to repeat within its time limit. |
| | 4.2 EIT-1 Repetition | EIT-1 info table unable to repeat within its time limit. |
| | 4.3 EIT-2 Repetition | EIT-2 info table unable to repeat within its time limit. |
| | 4.4 EIT-3 Repetition | EIT-3 info table unable to repeat within its time limit. |
| | 4.5 Table ID Mismatching | EIT info Table ID do not match. |
| | 4.6 Scramble Control Error | EIT info table is scrambled |
| | 5 ETT Error | ETT Info Table error. (③) |
| | 5.1 Table ID Mismatching | ETT Info Table ID do not match. |
| | 5.2 Scramble Control Error | Error occurs when ETT info Table is scrambled |
| | 6 STT Error | STT Info table error. (③) |
| | 6.1 Repetition | STT info table unable to repeat within its time limit. |
| | 6.2 Table ID Mismatching | STT info Table ID do not match. |

| | Item | Description |
|-----|-------------------------|--|
| Etc | 1. MER Error | RF Signal OFF the limited MER Range. |
| | 2 RF Power Error | RF Signal OFF the limited Power Range. |
| | 3 PTS-PCR/DTS-PCR Error | Deviation between PTS/DTS and PCR value off the limited range(③) |

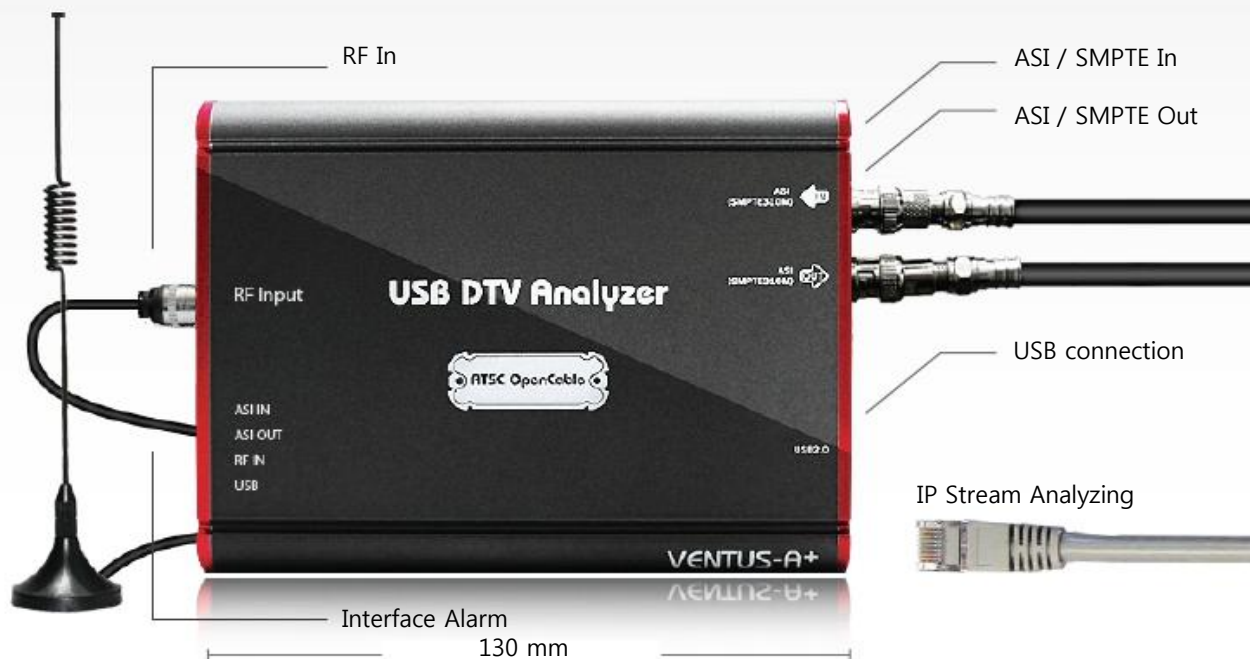
H/W Specification (ATSC type)

| | |
|---------------------------------|--|
| Demodulation | 8VSB, QAM-B(64QAM,256QAM) |
| Size | 154mm x 77mm x 29mm |
| POWER | USB2.0buspowered, No power supply required. |
| RF input connector | 75 Ω F-Type 1ea |
| ASI/SMPTE310M connector | 75 Ω BNC 1ea |
| ASI /SMPTE310M output connector | 75 Ω BNC 1ea |
| ASI input bit-rate | 0~108 Mbps |
| ASI output bit-rate | 0~108 Mbps |
| SMPTE310M input bit-rate | 19.392 Mbps |
| SMPTE310M output bit-rate | 19.392 Mbps |
| RF Input Frequency Range | 40~1002 MHz |
| RF Input Level | 8VSB:+7~-84dBm OpenCable(QAM):+6~-66dBm |

S/W Specification (ATSC type)

| | |
|---------------------------------|---|
| TS Input | ASI,SMPTE310M,File,IP(UDP/TS or UDP/RTP/TS),RF |
| TS Out | ASI or SMPTE310M (Allow when input is ASI,SMPT E310M,File,RF) |
| Analysis Mode | MPEG-2,ATSC,DVB |
| 7 Analysis Window Tab | Service, PID, Table, Service View, Bit-rate,TR101290,TableHistory |
| Closed caption | |
| Real-time decoder | |
| Recommended system requirements | |
| -CPU | : better than IntelCore i3 3.1GHz (SandyBridge) |
| -RAM | : betterthan2GB |
| -OS | : Window7 |
| -Resolution | : bigger than 1680x1050 |

USB type DTV Analyzer (ATSC type)



| H/W Specification (DVB type) | | S/W Specification (DVB type) | |
|------------------------------|---|---|---|
| Demodulation | DVB-T2, DVB-T, DVB-C | TS Input | ASI,SMPTE310M,File, IP(UDP/Ts or UDP/RTP/TS),RF |
| Size | 154mm x 77mm x 29mm | TS Out | ASI or SMPTE310M (Allow when input is ASI,SMPTE310M,File,RF) |
| POWER | USB2.0buspowered, No power supply required | Analysis Mode | MPEG-2,ATSC,DVB |
| RF input connector | 75 Ω F-Type 1ea | 7 Analysis Window Tab | Service, PID, Table, Service View, Bit-rate,TR101290,TableHistory |
| ASI input connector | 75 Ω BNC 1ea | Closed caption | |
| ASI output connector | 75 Ω BNC 1ea | Real-time decoder | |
| ASI input bit-rate | 0~108 Mbps | Recommended system requirements | |
| RF Input Frequency Range | 40~1002 MHz | -CPU : better than IntelCore i3 3.1GHz(SandyBridge) | |
| RF Input Level | DVB-T2:+5~-78 dBm DVB-T:+7~-83 dBm DVB-C:+2~-67 dBm | -RAM : betterthan2GB | |
| | | -OS : Window7 | |
| | | -Resolution : bigger than 1680x1050 | |

USB type DTV Analyzer (DVB type)

