


Outline:

This software that is sample software for the radio wave monitoring and the floating electric field strength measurement was developed for our spectrum analyzer U3700 series (SA). (Tentative name FEFS: Floating Electric Field Strength) The measurement data can memorize to several hours or several days same as wave image of SA. One graph data is recorded with the personal computer automatically as one file. The kinds of measurement data are the MAX-MIN of total measurement and the P-max/P-min of measurement from point to point. (During interval time) We named this data the partial Max-Min. (P-max/P-min). There are 4 kinds. (8 kinds for two channels) Therefore, we can understand the signal condition or the decrease or the state of intermittent discontinuity. Moreover, the maximum electric field and a minimum electric field can be measured in the floating electric field strength measurement. Moreover, the generation time can be understood. In the P-max/P-min data between the measurement spacing, data compression is done by the Max-Min data processing.

Operating environment:

Spectrum Analyzer:	U3700 series (U3741/51/71/72) + OPT10 (or OPT11) (2 channel input option) or U3800 series.
Initial setting:	Setup the conditions: 2ch-Mode/On, Trace-1001Points, AT Command-Mode, (The setting from this software becomes the frequency, the reference level, the units, and the dB/div.)
Personal Computer:	Windows XP (Recommendation), Interface: LAN
Driver:	NI_VISA made by the National Instruments is necessary. Please install it from the home page of NI or an attached driver when PC has not the driver. (There are for XP/2000 or VISTA/7)

Installation and startup of software:

1. The installation: Execute the setup.exe in directory of Installer.
2. Run: Start -> Programs -> U3700 2ch FEFS Viewer -> 2ch FEFS Viewer
3. Measurement: IP address of SA is confirmed, and it inputs it to the IP address column of the menu. Press the CONNECT& Measure button.
(The last measurement parameter is done from the startup of the second times and the recall is done.)
4. Local mode: Press the LOCAL button. SA becomes the local mode. The measurement conditions are set by manual operation.
(Afterwards, the measurement can be restarted by the CONNECT & Measure button.)
5. Stop and Reboot: It stops with the STOP button. The reboot presses an upper right  and presses the CONNECT& Measure. The end is ×.
6. Help: When "Display Help" is selected from help of the pull-down menu, the explanation of the button of the mouse point is displayed.

Measuring methods:

1. Before measuring, you set all measurement conditions to SA by manual operation. This software only monitors the waveform of SA. (It doesn't set the conditions from this software. However, it is necessary to display the frequency data, etc. of the cursor point. So please input the conditions data, but please do not press the SET CH1/2 key.)
2. (Or,) you can set the basic conditions to SA from this software. Press the SET CH1/2 key, then the frequency, the reference level, the level unit, and dB/div, etc. are set to SA. Please set other conditions to SA by manual operation. Or the GPIB command can be sent by the command setting function.

Application:

- | | | |
|----|---|--|
| 1. | Radio wave monitoring (quality control): | 2 input measurement at the same time. (Horizontal and Vertical, etc) |
| | >Level monitoring: | The level of the specific frequency can be measured to the time trend. |
| | >Level decrease and intermittent discontinuity: | Because data compression is done with Max and Min during point to point, Intermittent discontinuity of the radio wave can be confirmed.
(The point means sampling point.) |
| | >Wave quality (sideband characteristic etc.): | The sideband characteristic can be measured to the time trend. |
| 2. | Floating Electric Field Strength measurement: | 2 input measurement or 2 frequency bands at the same time. |
| | >Surveillance of intermittent noise: | Max Hold function gets the intermittent noise. |
| | >Floating Electric Field Strength measurement: | The data save is possible for several hours or several days.
(To radio wave status check when area ONE-SEG begins) |

Data Structure and Display: (Example: Sampling Time = 60 sec → One-Graph = 2 hours 24 minutes)

1. MAX Trace of total measurement
2. MIN Trace of total measurement
3. P-max of sampling point to point
4. P-min of sampling point to point
5. Date & Time of sampling point

1. MAX is max trace of total measurement
2. MIN is min trace of total measurement

3. P-max is made at the time of each sampling.
4. P-min is made at the time of each sampling.

The display is cursor position.

Setup the sampling time:

0: No wait (depend on system cycle)

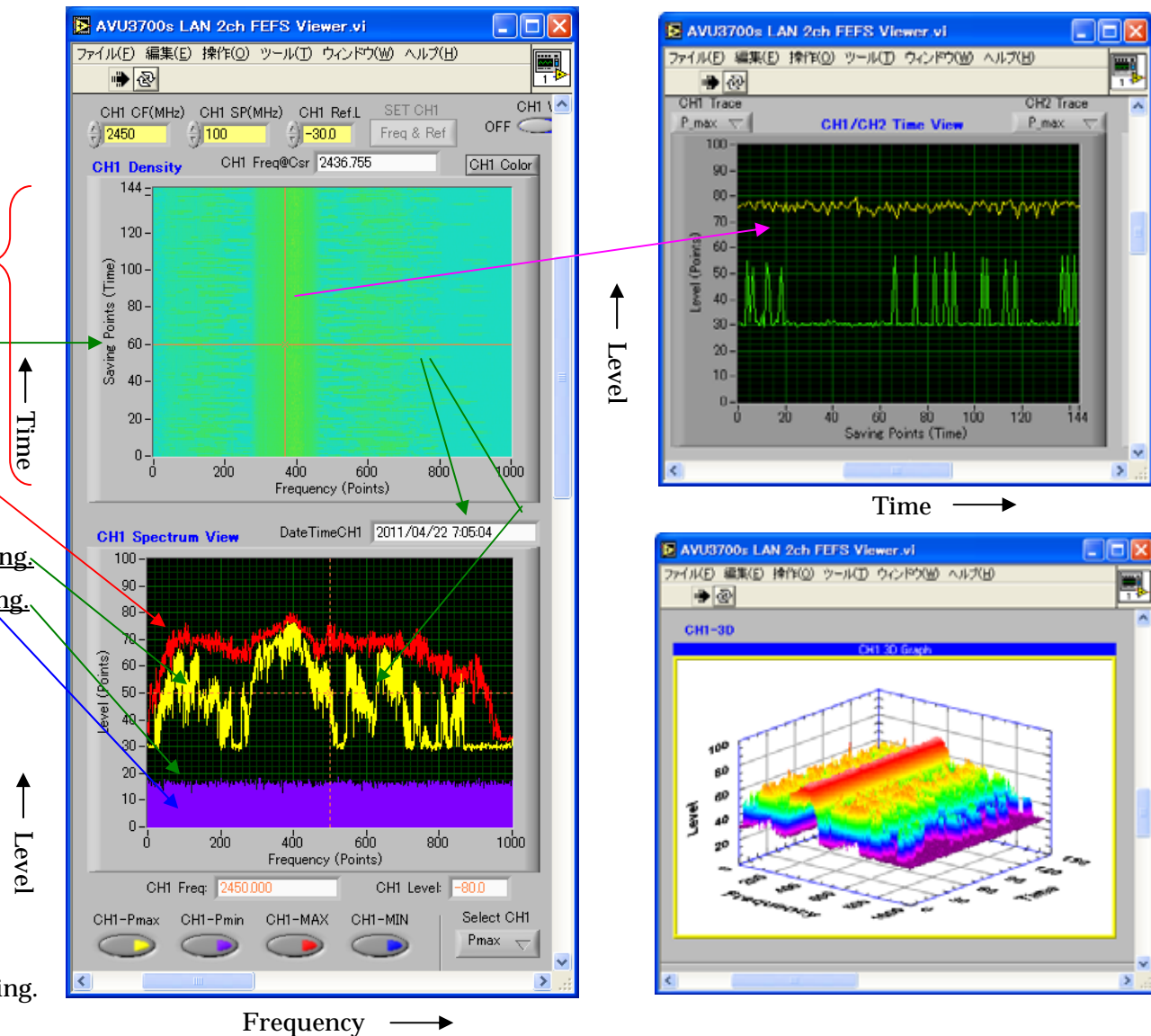
1 to 600(sec): Measurement cycle

(During sampling, P-max/ P-min)

Data is automatic save on every one screen.

And, Save/Recall is possible by manual.

The CSV file is also possible for data processing.



Menu and Operation:

Short Help On/Off

Input IP address *IP Address Format: TCPIP::192.168.0.1::5025::SOCKET

Connect Button

LOCAL Button

STOP Button

Re-Start Button

Freq. display at cursor position

Select trace display

Setup Frequency, Level

Input CF, Span, Level

Getting trace On/Off

Select trace data of Density Graph

ALARM LAMP
Alarm happened: Red
Alarm Conditions:
0: None
1: Upper limit
2: Lower limit
3: Both

Select data of trace calculation:
Select: MAX, MIN
P-max, P-min
Display:
CH1-CH2,
CH2-CH1

Freq. and Level display at cursor position

Select trace data

Adjustment display area using scroll

Please press the CONNECT & Measure button. Then, the connected message appears in the message box.

Instr. Preset: Initialize the SA

Getting Data:

Free: asynchronous data

TS: synchronous data

(after sweep end)

*Take Sweep

Caution: Please set these button before
press the CONNECT & Measure

SA Control directly:

Input GPIB command, and press
the Set-CMND Button.

CH1/CH2 are selected by Access
CH Button

Connected message box

Data of SA

Trace data of time domain
at cursor position

Trace data of frequency
domain at cursor position

Alarm conditions at
cursor position

CH1 data display

CH1/CH2 display

CH2 data display

It is moved by the scroll bar like seeing the lower side on the screen.

The screenshot shows the AVUK3700s LAN 2ch FEFS Viewer software interface. The main window displays a 2D graph of CH2 Trace P_{max} over time. Below the graph, there are controls for Sampling Interval (set to 60), Re-Start, Select CH (Pmax), Max Files (set to 10), Auto Save, Saved Files (set to 0), and CH2 Max Min CLEAR. At the bottom, there are Manual Save and Recall buttons, and two 3D graph toggle buttons for CH1-3D and CH2-3D, both currently set to OFF. Two 3D surface plots are shown: one for CH1-3D on the left and one for CH2-3D on the right. The interface also includes a menu bar with options like ファイル(F), 編集(E), 操作(O), ツール(T), ウィンドウ(W), and ヘルプ(H).

The sampling interval of data acquisition is specified. The data processing of P-max and P-min is done in the specified spacing. Graph Spectrum Viewer is rewritten at data acquisition.

0: No wait (depend on system cycle)
1 to 600(sec): Measurement cycle

This function is Auto Save. When this is ON and data acquisition in one graph ends, one file is saved automatically. A necessary number of files are set with Max Files. When the display of Saved Files reaches Max Files, Auto Save automatically becomes OFF. Please press the Re-Start button before doing Auto Save in ON. The Re-Start button clears the clearness of the Sampling Interval reestablishment and the Saved Files count, MAX, and the MIN data.

The save recall of the measurement data can be done manually. Wavy acquisition stops when the recall is done.

MAX and MIN data can be cleared by manual when it is necessary.

Rewriting ON/OFF of 3D graph: Because it takes the operation time, this button is off usually. Please set it to turning off when it makes to turning on when it is necessary and drawing ends.

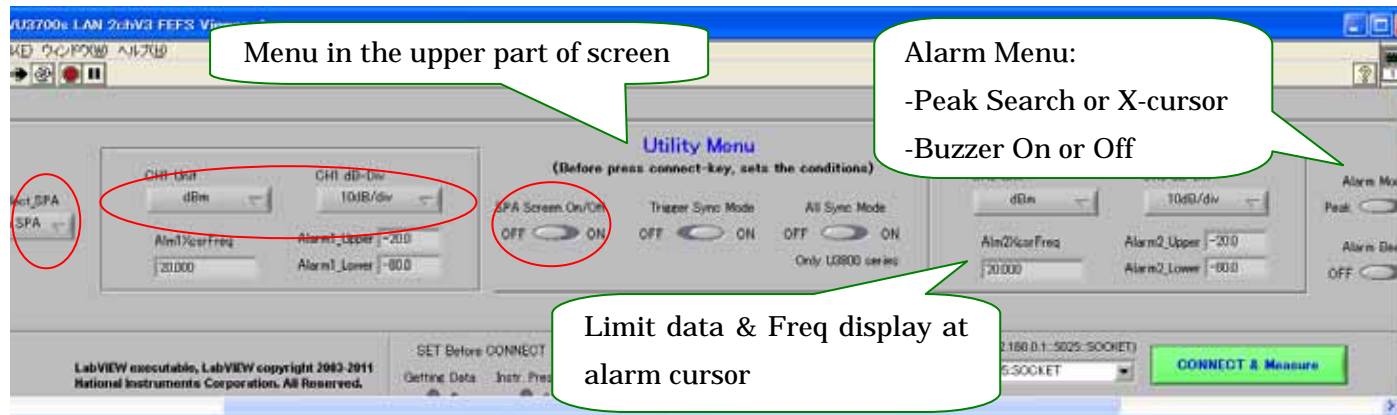
Aspect movement and expansion: Rewriting is turned off after it draws, the mouse is moved, and the dice mark is moved by the left-click.

Detail of Graph:

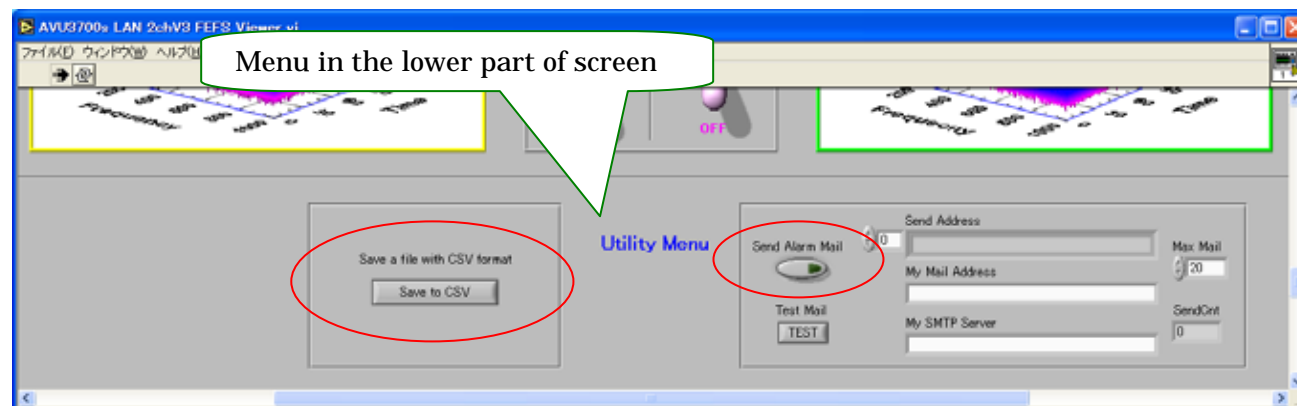
CH1, CH2:	CH1, CH2 measurement trace data of SA are displayed. It is same as the SA screen.
CH1&CH2 Density:	<p>The spectrum is observed, and the signal intensity is observed on and the time-varying is observed by the Y axis in the color. In this graph, there are X cursor and Y cursor, and the data of the part there is displayed in another graph. Y cursor is Spectrum Viewer, and the spectrum at a certain time can be observed.</p> <p>X cursor can observe the level change in a certain frequency with the time base in Time Viewer.</p> <p>Each cursor can be moved with the mouse. Moreover, it is possible to observe it slowly by turning off rewriting when it is necessary. As for the data of this graph, Save/Recall can be done.</p>
CH1&CH2 Spectrum Viewer:	It specified with cursor Y in the CH1&CH2 Density graph, and the spectrum at a certain time is displayed with the frequency axle. The indicative data can be selected with the button under the graph. (P-max, P-min, MAX, MIN, CH1/2-CH2/1) It is possible to select calculation data as calculation CH2-CH1 CH1-CH2.
CH1&CH2 Time Viewer:	The level in a certain frequency specified with cursor X in the CH1&CH2 Density graph is displayed with the time base.
3D Graph:	<p>Each channel data can be observed by three dimensions. It somewhat takes time for the operation, and turn off rewriting, please when rewriting the shape of waves that wants to be observed ends.</p> <p>Moreover, the aspect angle and the size are changed using the mouse.</p>

Utility Functions:

1. Unit and x dB/div of menu are used with the SET CH1/2 button of the frequency setting. Please set it carefully.
2. The measurement can be confirmed by displaying the measurement screen in SA. (SA Screen On/Off) It is assumed Off for the speedup usually.
3. This software is for 2 channels SA. However it can be connected to 1 channel SA. But, the data of CH1 and CH2 becomes the same.



4. The save of data can be done by the CSV format. Because it can be read directly by Excel etc., it is possible to use it for data processing. One screen's data is recorded. The saved the DAT File is read once, and can be saved with CSV afterwards.



5. You can send an e-mail to assignment address at the time of alarm outbreak. (The e-mail contains the channel and alarm data.) However an e-mail server and your account are necessary in connected LAN.

CSV Format:

	A B C D E F
1	CH1 Conditions
nm	CH2 Conditions
nm	Sampling Interval (sec)
nm	Number of Max Files
nm	CH1 Data
nm	CH2 Data
nm	Alarm Data

Detail of CH1/2 Conditions:

Center Frequency	(MHz)	0 to 43000.000 (MHz)
Span Frequency	(MHz)	0 to 43000.000 (MHz)
Reference Level	(dB)	-140 to +40 (dBm)
Unit	0:dBm, 1:dBmV, 2:dBuV	0:dBm Default
dB/div	0:10dB, 1:5dB, 2:3dB, 3:2dB, 4:1dB	0:10dB Default

Detail of CHx Data: (x=1 or 2)

Px-max	1001 * 145 data table	Data = 0 to 12800 (Full scale)
Px-min	1001 * 145 data table	Data = 0 to 12800 (Full scale)
CHx-MAX	1001 points data	Data = 0 to 12800 (Full scale)
CHx-MIN	1001 points data	Data = 0 to 12800 (Full scale)
CHx-DateTime	145 data	YYYY/MM/DD/HH/MM/SS

Detail of Alarm Data

CH1 Alarm Data	145 data	0:None, 1:Upper ,2:Lower, 3:Both
CH2 Alarm Data	145 data	0:None, 1:Upper ,2:Lower, 3:Both
Upper Cursor, Lower Cursor	Cursor data	Data = 0 to 12800 (Y cursor)
Alarm Mode	0:Peak Search, 1:X Cursor Position	And next line: X cursor data

Formula:

1. Total Measurement Time

Setup the Sampling Interval. (1 to 600 sec) (0 = included the system cycle time)

Measurement time of one graph = (Sampling Interval * 144) (sec).

Example: Sample Interval = 600 sec, Measurement time of one graph = $600 * 144 = 86400$ (sec): (= 24 Hours) = (1day)

Total measurement time of Auto-Save = (Measurement time of one graph) * number of the Max Files.

2. Frequency of X Points(n)

Frequency (n) = (Center Frequency – (Span Frequency/2)) + ((Span Frequency/1000) * X Points (n))

3. Level (dB) from Y Points data (integer to real)

Full Scale = (dB/div)*10

Reference Base = Reference level – Full Scale

Level (dB) = Reference Base + (Full Scale / 12800) * Y points (n)