

Automatic EMC Measurement Software for Vehicles and Vehicle Components

Overview

Our EMC Measurement Software Applications for Vehicles and Vehicle Components are designed specifically for the purpose. Being as reliable and user-friendly as the EP5/IM5 series, the EMC Measurement Software Applications for Vehicles and Vehicle Components conduct measurements unique to vehicles and vehicle components, display reports, and control the turntable and other devices. Besides, as an all-in-one solution, the EMC Measurement Software Applications for Vehicles and Vehicle Components allow you to perform all the measurements required for this application, ranging from pre-compliance to full-compliance tests.

Software Lineup and Supported Standards

Emission measurement

- EP9/VE : 2004/104/EC emission measurement
95/54/EC emission measurement
CISPR12, 25 emission measurement

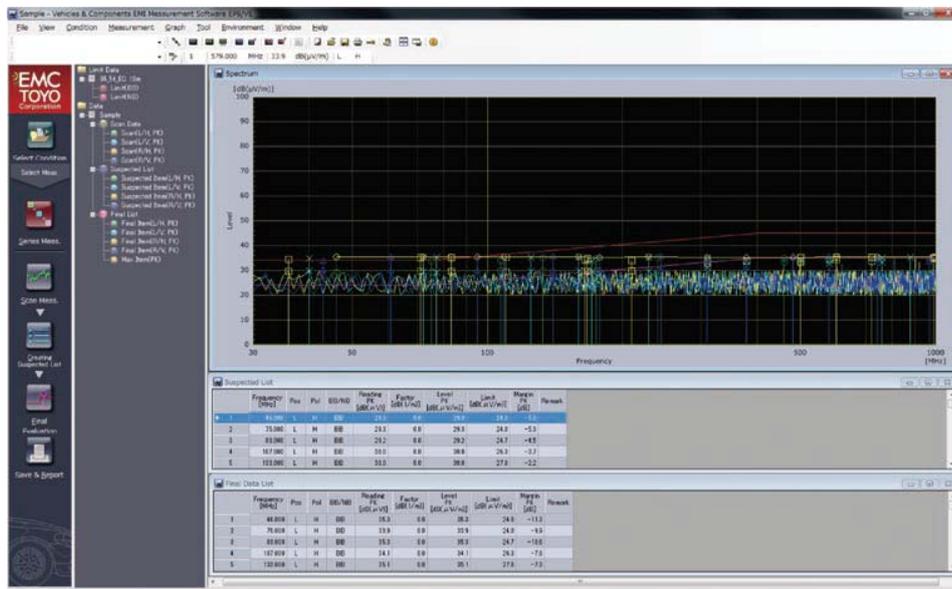
SAE J551/1113 emission measurement
JASO emission measurement

Vehicle manufacturers' internal standards

Immunity measurement

- VI5/RS : 2004/104/EC Radiated immunity
95/54/EC Radiated immunity
SAE J551/1113 Radiated immunity
JASO Radiated immunity
ISO 11451/2 Radiated immunity
Vehicle manufacturers' internal standards (e.g. GM, FORD, D.C.)
- IM5/CS : 2004/104/EC BCI immunity
95/54/EC BCI immunity
SAE BCI immunity
JASO BCI immunity
ISO 11451/2BCI, DRFI
Vehicle manufacturers' internal standards (e.g. GM, FORD, D.C.)

EP9/VE: Automatic EMI Measurement Software for Vehicles and Vehicle components



Overview

EP9/VE has been developed by incorporating the features of all our vehicle EMI measurement software applications to support diversifying international standards and vehicle manufacturers' internal standards as an all-in-one solution. With a matrix table

which allows you to narrow down a measurement condition by selecting a standard and a transducer, you can make a measurement condition setting even more easily on EP9/VE. This will also enable speedy support of new standards, a key need of our valued customers, with no delay.

EP9/VE: Automatic EMI Measurement Software for Vehicles and Vehicle components

Supported Standards

- 2004/104/EC (Oct.2004)
- 95/54/EC (Oct.1995)
- CISPR12 Edition 6 (2007)
- CISPR25 Edition 3 (2008)
- Vehicle manufacturers' internal standards

Basic Measurement Functions

Scan Measurement

In this measurement, a noise spectrum output by an EUT is recorded over an entire frequency range set in advance. The thus recorded spectrum will be corrected as needed and displayed in a graph on the spot, allowing you to make a pass/fail judgment through comparison with the limit values of the relevant standard shown in the same graph. Scan Measurement runs both with a spectrum analyzer and a receiver and allows you to set measurement parameters as you wish, making it possible to use whatever setting required for your intended measurement.

Suspected List Generation

This function is to pick out the noise to be evaluated by the detector (e.g. QP detector) required by the relevant standard for each frequency - from the Scan Measurement results yielded with the Peak detector, a detector with a shorter measurement time, the Suspected List Generation function identifies those noises close to the relevant limit values, since these noises will most likely affect the pass/fail judgment.

Interference Level Measurement

In this measurement, the frequencies in the suspected list will be received by a receiver one by one and then measured by the detector specified by the relevant standard. To confirm whether each of the frequencies in the suspected list is certainly the center frequency, EP9/VE checks nearby frequencies and, if it finds a frequency at which the level is maximum, EP9/VE adjusts the frequency in the list accordingly.

Besides, to ensure the capture of the maximum value of a noise level which varies with time, you can set a monitor time in advance - the maximum level acquired during the monitor time will be recorded as the maximum value

The screenshot displays three windows showing measurement results. The top window, 'Suspected List', contains a table with columns: Frequency [MHz], Pol., Filter, BW [Hz], Range [dBμV], Factor [dB], Limit [dBμV], Lock [dBμV], Margin [dB], and Pass/Fail. It lists 20 entries with various frequency and level values. The middle window, 'Suspected List 1', and the bottom window, 'Suspected List 2', show similar tables with fewer entries, likely representing filtered or specific measurement results.

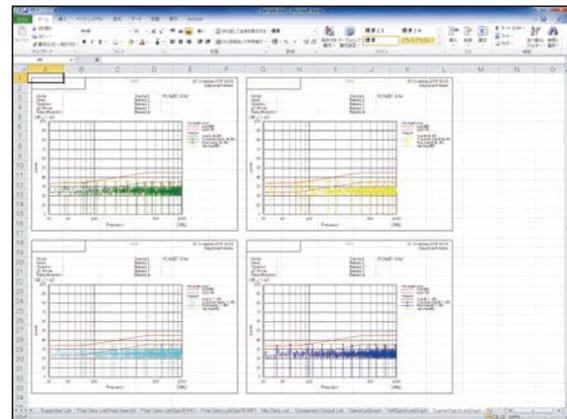
Suspected List / Interference Measurement Results

Displaying measurement results

Data from more than one measurement can be displayed on the monitor at the same time, allowing you to make a comparison among them. You can display only the data you need, making the graph easy to read. Not to mention, it also is possible to change such graph parameters as the scale, color, and line type.

Report generation

EP9/VE has a [Report print] function which prints out measurement data in the preset templates, and an [Excel/Word export] function which exports measurement data to Word and Excel (Word and Excel need to be prepared by the user). With the [Word/Excel export] function, you can output measurement data to a location specified in advance and print out the data in your own report formats.



Output to Excel (an example)

Features

- Improved user convenience
- Test selection on a matrix table

You can set up the required measurement condition by selecting a standard and a transducer (antenna/AMN/probe) on a matrix table.

The screenshot shows a dialog box titled 'Standard Matrix'. It contains a table for selecting measurement conditions. The table has columns for 'Antenna (Horizontal/Vertical Polarization)', 'Antenna (No Polarization/Vertical Only/Flod Loop)', 'AMN', and 'Others (Probe/Cell, etc.)'. The rows list various standards: 95/54/EC, 2004/104/EC (ES4), 2004/104/EC (Vehicle), CISPR12 Edition6, CISPR25 Edition3 (ES4), and CISPR25 Edition3 (Vehicle On-Board). Each cell in the table has a dropdown menu for selection.

Matrix table for standard selection

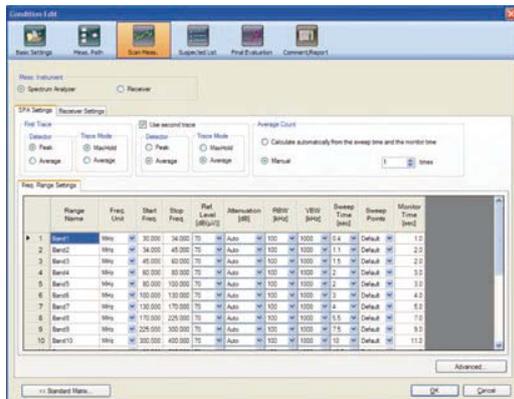
- Pre-installed condition files for individual vehicle manufacturers' internal standards

With the standard installation, conditions files for the

EP9/VE: Automatic EMI Measurement Software for Vehicles and Vehicle components

international standards will be available. If requested, condition files for vehicle manufacturers' internal standards will also be installed before delivery.

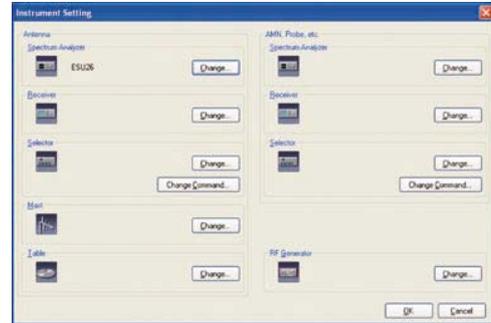
- **Functions added to shorten the measurement time**
- **Spectrum analyzer dual-trace function**
In the measurement in the spectrum analyzer mode, peak and average values can be traced at the same time, making it possible to obtain both data in one measurement.
- **Simultaneous measurements with multiple detectors**
In the receiver mode measurement, the Peak/QP/Average detectors can be used at the same time.



Scan measurement setting screen

- **Thorough support of relevant standards**
- Peak measurement result' s margin from the Average Limit can be displayed. (CISPR25 Ed.3)
- Detectors can be changed depending on the frequency. (CISPR25 Ed.3)
- Unit for spectrum analyzer measurement can be changed to dBm. (This is required by Company T in the radio noise measurement.)
- In the final measurement, different detectors can be specified for individual frequency ranges.
- **Support of a wide variety of hardware instruments**
- **EMI Test receivers**
N9038A (including time domain Scan)
ESR, ESU (including time domain Scan)
ESIB (including time domain Scan)
ESCI and others
- **Spectrum analyzers**
N9030A, N9020A, N9010A (including Dual Trace)
ESU (including Dual Trace)
ESIB (including Dual Trace)
ESCI (including Dual Trace) and others
- **Masts/Turntables**
DEVICE, INNCO, RIKEN, MFW and others
- **Signal generators:**
SMB100A and others
- **Enhanced design for a better, more professional appearance**
- Icons and logos designed by a professional designer are adopted to make the user interface look more sophisticated.

- **Support of the latest OSs**
- Windows Vista, Windows 7 are already supported.



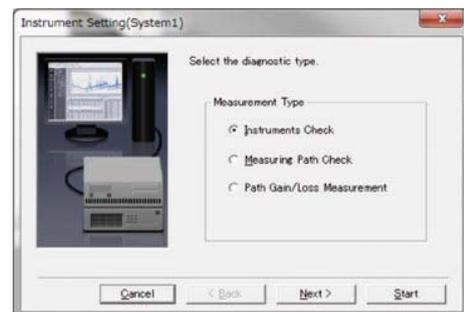
Instrument setting screen

Other Functions

- **Template setting**
- Using a template, you can make an instrument setting, an environment setting, and an option setting at a time. If you make several template files and condition files in advance, you can restore all the settings required simply by selecting relevant files. As for template files, you can make icons for them - if you make an icon for a template file, you can boot up EP9/VE with the settings in the file loaded by double-clicking the icon.
- **Password setting**
If you set a password on EP9/VE, you can prevent your files from being modified by other operators and limit the functions that can be used.

Instrument Diagnosis Function

With the instrument diagnosis test, you can check the path factor reproducibility using a signal generator and the connection with instruments. Diagnosis results can be saved in a log file.



Instrument diagnosis wizard

Operation Environment

- OS : Windows Vista, Windows 7
- CPU : 2GHz or higher Pentium or equivalent processor recommended
- Memory : 2GB or higher recommended
- Display : 1280 x 1024 or higher resolution

VI5/RS: Radiated Immunity Measurement Software

Basic Functions

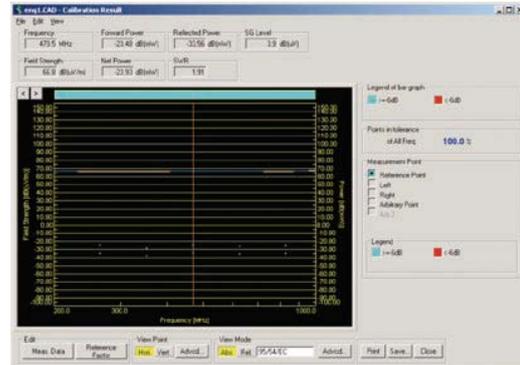
- Electric field uniformity test
- Radiated immunity test by the substitution method
- Radiated immunity test by the feedback method
- Measurement result display: Supporting all major formats
- Report output : Supporting all major formats
- Measurement result saving : Supporting all major media

Measurement Overview

VI5/RS evaluates the radiated electric field uniformity of the measurement area in compliance with the measurement conditions of relevant standards. On this software, you can switch among the uniformity evaluation methods of 2004/104/EC, 95/54/EC, and ISO11451/2 with a single button. Based on the data acquired by these methods, VI5/RS performs a radiated immunity test either by the substitution method or the feedback method. In the substitution method, electric field strength can be adjusted either by the electric power (forward power, net power) or by the signal generator output level. In the feedback

method, electric field strength is adjusted through feedback from the sensors set in the anechoic chamber.

When more than one radiation antenna is needed to cover a wide frequency band, the turntable will be automatically controlled so that the EUT will face the antennas.



Example of electric field uniformity measurement by VI5/RS

Error Detection Option



The Error Detection Option monitors the EUT during an immunity test and automatically determines the EUT as having exhibited an erroneous behavior when any of the thresholds set by the user is exceeded. Error Detection is done in the two ways described below.

Through CAN/LIN Bus Monitoring

During an immunity test, an erroneous behavior of the EUT can be automatically detected through CAN/LIN bus monitoring. When an electric field is being emitted (for a few seconds to a few tens of seconds), the following information is recorded:

- Typical measurement data at each frequency on the CAN/LIN channels
- Pass/Fail decision

CAN DB Information										Error Detection Setting	
Index	Node	Message ID	Name	Y-Unit	Start Bit[bit]	Length[bit]	Y-Factor	offset	Error Detection	Upper Limit	Lower Limit
1	1	100	Car Speed01	km/h	0	16	4.98E-04	0	<input checked="" type="checkbox"/>	0.5	0.2
2	1	100	Car Speed02	km/h	16	16	4.98E-04	0	<input type="checkbox"/>		
3	1	100	Temperature01	°C	32	16	8.48E-05	0	<input checked="" type="checkbox"/>	30	25
4	1	100	Temperature02	°C	48	16	8.48E-05	0	<input type="checkbox"/>		
5	1	101	Temperature03	°C	0	16	8.48E-05	0	<input type="checkbox"/>		
6	1	101	Temperature04	°C	16	16	8.48E-05	0	<input type="checkbox"/>		
7	1	101	Temperature05	°C	32	16	8.48E-05	0	<input type="checkbox"/>		
8	1	101	Pressure01	Pa	48	16	4.98E-04	0	<input checked="" type="checkbox"/>	0.5	0.2
9	1	102	Pressure02	Pa	0	16	4.98E-04	0	<input type="checkbox"/>		
10	1	102	Brake_Mio01	dBISPL	16	16	4.98E-04	0	<input checked="" type="checkbox"/>	70	50
11	1	102	Brake_Mio02	dBISPL	32	16	4.98E-04	0	<input type="checkbox"/>		
12	1	102	Test_Channel01	V	48	16	4.98E-04	0	<input type="checkbox"/>		
13	1	103	Test_Channel02	V	0	16	4.98E-04	0	<input type="checkbox"/>		

CAN Data Channels Setting Dialog of VI5/RS

Through Image Recognition

During an immunity test, an erroneous behavior of the EUT can be automatically detected from numerical speed data (obtained by monitoring an analog speed meter on an automobile dashboard with a camera) and LED status. When an electric field is being emitted (for a few seconds to a few tens of seconds), the following information is recorded:

- Numerical speed data at each frequency, obtained from an analog speed meter
- LED on/off status at each frequency
- Still images of the automobile dashboard monitored

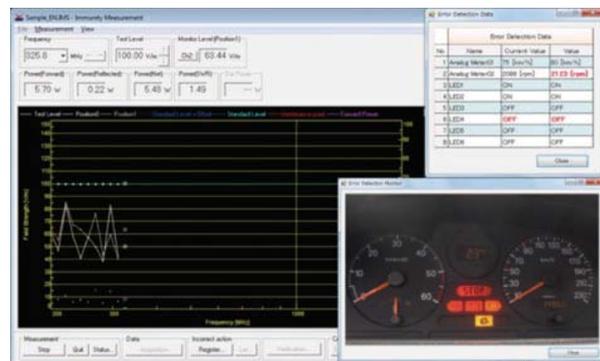


Image Recognition Function of VI5/RS

IM5/CS: Automatic BCI Immunity Software

Basic Functions

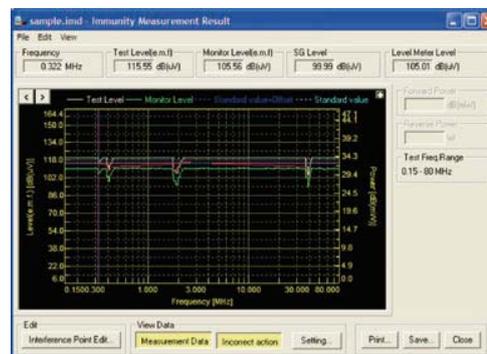
- BCI probe calibration data acquisition
- BCI through calibration power feedback
- BCI through current probe feedback
- BCI by the substitution method
- Measurement result display: Supporting all major formats
- Report output : Supporting all major formats
- Measurement result saving : Supporting all major media

Measurement Overview

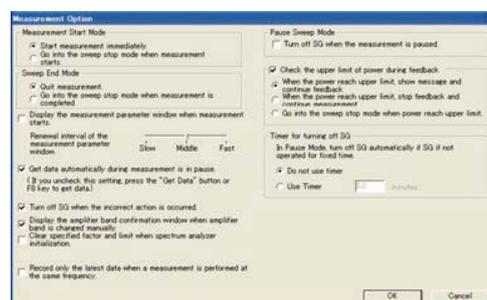
In compliance with the relevant standards, IM5/CS measures the power (forward power, reverse power, net power) and the signal generator output level, both required to obtain the target test current. Then, based on this data, IM5/CS performs the BCI immunity test either by the substitution method or by the feedback method.

The feedback method is controlled so that the forward power and net power obtained through calibration will be the same as the test power.

You can add an option for detecting a malfunction signal from EUT. With the option, the malfunction detection signals can be recorded on a graph, and the current application level can be controlled so that the detection signal will be of the level specified.



Example of BCI test screen of VI5/CS



BCI test condition setting screen of VI5/CS

Full Line of EMC Measurement Software

EMI

- EP5/RE : Radiated emission measurement software
- EP9/CE : Conducted emission measurement software
- EP5/RFP : RF power emission measurement software
- EP5/NSA : Site attenuation measurement software
- EP5/ME : Multi-purpose EMI measurement software
- EP5/RSE : Radiated Spurious emission measurement software
- EP7/RE : Radiated emission evaluation and measurement software
- EP7/CE : Terminal noise evaluation and measurement software

Immunity

- IM5/RS : Radiated immunity measurement software
- IM5/CS : Conducted immunity measurement software

Broadcast Receivers and Associated Equipment

- EP5/AT : Antenna terminal emission measurement software
- EP5/RET : Tuner radiated emission measurement software
- IM5/A : EN55020-compliant Audio immunity measurement software
- IM5/V : EN55020-compliant TV/video immunity measurement software
- IM5/S4A : Screening effectiveness measurement software for audio equipment
- IM5/S4V : Screening effectiveness measurement software for video equipment

Vehicles and Electrical/Electronic Components

- EP9/VE : 2004/104/EC, CISPR25 Ed3, CISPR12, MIL461 radiated and conducted emission measurement software
- VI5/RS : Radiated immunity measurement software
- IM5/CS : Bulk current injection (BCI) immunity measurement software