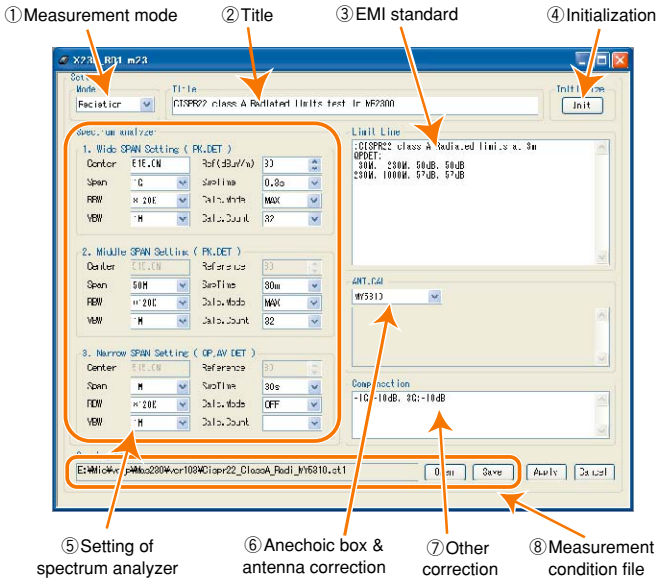
PC software MAS230

As MR2300 can be easily used even if inexperienced in the operation of a spectrum analyzer and EMI test, the parameters of spectrum analyzer and typical EMI standards are preset. Furthermore, to simplify the procedures from searching out the spectrums out of specification until measuring with QP or AV detection, the automatic measurement mode is prepared. By the way, the measurement value of the radiated emission is converted into 3 meters in measurement distance.

Setting of measurement parameter



① Selection of measurement mode
The radiated or conducted emission measurement is selected.

② Entry of title
The title of the test is entered. The content is arbitrary because this is a comment sentence.

③ Setting of EMI standard value
As the main standards are stored in the file explained in item ⑧, the necessary standard is selected and set from among them after opening it. The standard value not supported or the original value of user is input with the format like the example shown below.

```
;CISPR22 class B Conducted limits for main port
QPDET:
0.15M, 0.50M, 66dB, 56dB, log
0.50M,     5M, 56dB, 56dB
5M,       30M, 60dB, 60dB
AVDET:
0.15M, 0.50M, 56dB, 46dB, log
0.50M,     5M, 46dB
5M,       30M, 50dB
```

④ Setting of initialization
The various setting values in the current measurement mode are set to the initial values. They mean the setting parameters of the spectrum analyzer, the setting values of EMI standard, the correction coefficient of the anechoic box & antenna (or LISN) and other correction coefficient.

⑤ Setting of Spectrum analyzer
The frequency span is divided into three bands of Wide, Middle and Narrow for the automatic measurement or for shortening the measurement time. The center frequency and the sweep time are set in each span. However, as all of the setting parameters are stored in the file, it is possible to set them easily by opening it.

⑥ Setting of correction coefficient of anechoic box & antenna
The corrections of the distance between EUT and antenna in the anechoic box and the frequency characteristics of antenna are performed. Two kinds of correction values are automatically set by designating an anechoic box because the anechoic box and the antenna are a couple, for instance MAN101 is always installed in MY5310. However, the attenuation of LISN is corrected in the conducted emission measurement. These correction values are usually set by opening the file but the original correction values by user can be also input.

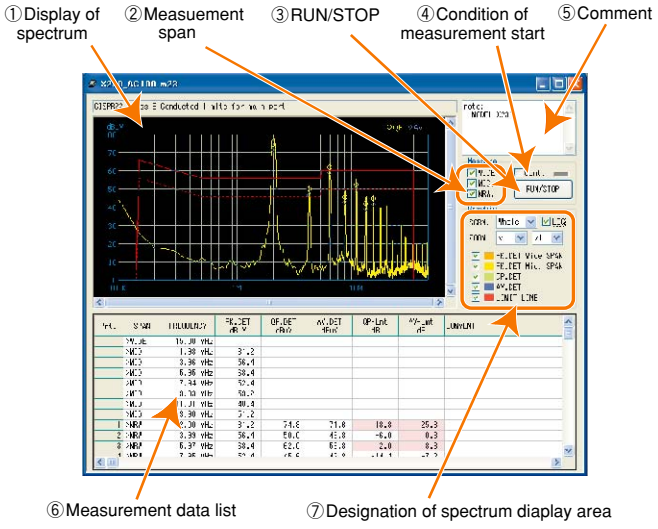
⑦ Setting of other correction coefficient
When the frequency characteristics of a coaxial cable and other should be corrected, this setting is useful. MR2300 has no correction data in this item.

⑧ Measurement condition file
The table below shows the files for CISPR22 as an example. All the standards supported (refer to "Standards supported" in Specifications described in the final page) are made to the files.

CISPR 22classA/powerline conducted emission	:	Cispr22_ClassA_Cond_MainPort. st1
CISPR 22classB/powerline conducted emission	:	Cispr22_ClassB_Cond_MainPort. st1
CISPR 22classA/radiated emission	:	Cispr22_ClassA_Radi_MY5310. st1
CISPR 22classB/radiated emission	:	Cispr22_ClassB_Radi_MY5310. st1

Automatic measurement

If measured in the wide span with the QP or AV detection all at once, the measurement time becomes very long because the time constant of these detections is very large. Therefore, the measurement is first performed in the wide span with the PK detection, in which the measurement time is short, from the expression of PK≧QP≧AV, and then only spectrums out of specification are measured with the PK detection as well in the middle span. In addition, only spectrums out of specification even in this middle span are measured with the QP or AV detection in the narrow span. Even if the detection mode is QP or AV, the measurement time is only 30 seconds in the radiated emission measurement or only 10 seconds in the conducted emission measurement because the frequency span is narrow.



① Display of spectrum
The measured spectrum of the disturbance noise and the limit line of the EMI standard are displayed. The solid line shows a limit line of the QP detection and the broken line shows a limit line of the AV detection. Besides, the level measured in the QP or AV detection is displayed on the spectrum with ○ or ◇ mark respectively.

② Selection of measurement span
When all of wide span (WIDE), middle span (MID) and narrow span (NRW) are selected, all the procedures until measuring spectrums out of specification with the QP or AV detection are automatically carried out.

The measurement in each span can be independently performed, but only spectrums out of specification in the wide span or the middle span are measured by the middle span or the narrow span respectively.

③ RUN/STOP

The measurement starts or stops.

④ Condition of measurement start

If it is off, the measurement starts newly after deleting the measured data. If it is on, the unmeasured spectrum is measured by continuing the last measurement.

⑤ Comment

The comment sentence is entered.

⑥ Measurement data list

[SPAN] shows in which span the measurement is done and ">" is marked after finishing the measurement. [PK.DET], [QP.DET] or [AV.DET] displays the measured value by PK, QP or AV detection respectively. In the wide span and the middle span, only the measured value by the PK detection is displayed. [QP-Lmt] or [AV-Lmt] means the value in which the limit value is subtracted from the measured value by QP or AV detection respectively. Furthermore, when [SPAN] is selected and [DEL] key is pushed, that line and the related data are deleted.

⑦ Designation of spectrum display area

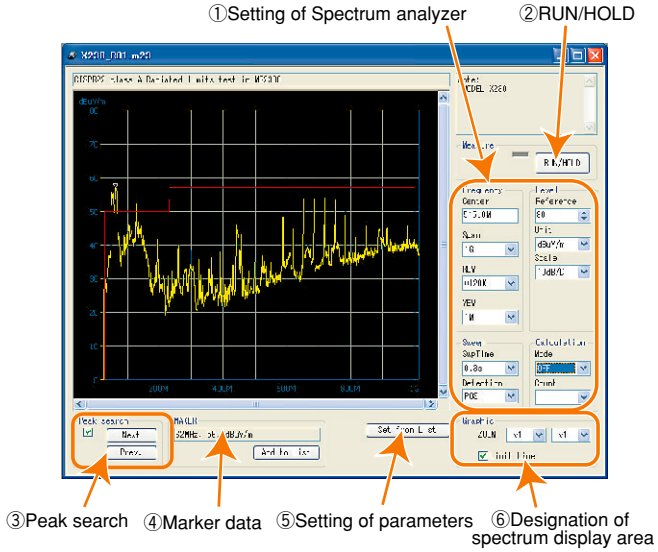
- SCRN : When "Whole" is selected, the whole of spectrum display area is displayed, and when "Part" is selected, the area of selection cell shown by ▽ marker is displayed.
- LOG : The frequency axis is displayed in logarithm.
- ZOOM : The display magnification is changed.
- Display/non-display: On/off of each display item is selected.

< About minimum detection level >

In the measurement with the wide span or the middle span, the measurement finishes at this point when there is no noise exceeding the limit line. Therefore, there is no data by the QP or AV detection because the measurement is not continued. Then, the spectrum larger than 5dB low from the limit line is considered as a noise out of specification if −5dB is set in the wide span as shown by the example of picture.

Manual measurement

The manual measurement is very convenient for debugging EUT and removing the disturbance noise. It is possible to measure by freely setting the center frequency, the frequency span and so on.



① Setting of Spectrum analyzer

MSA338E is set. It is recommended to set to PosPeak detection and MaxHold (off) when debugging, and QP/AV detection and MaxHold (on) when confirming finally.

② RUN/HOLD

Capturing the signal is restarted or stopped.

③ Peak search

The peak level of spectrum is searched and the marker moves to that point. The next smaller level is searched by Next. Prev is opposite against it.

④ Marker data

The data in the marker point is displayed. The marker moves with the peak search or the mouse.

⑤ Setting of parameters

When [Set from List] is clicked by a mouse after designating a line of the measurement data list on the automatic measurement screen, the measurement condition of this line is set as parameters of the manual measurement.

⑥ Designation of spectrum display area

On/off of the display magnification and the limit line is set.

＜Reference＞ Standards of the world

①CISPR（Comite International Special des Perturbations Radioelectriques）

Basic standards	
CISPR16-1	Specification for radio disturbance and immunity measuring apparatus and methods Part1: Radio disturbance and immunity measuring apparatus

Product standards	
CISPR11	Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio frequency equipment
CISPR12	Limits and methods of measurement of radio disturbance characteristics of vehicles, motor boats and spark-ignited engine driven devices
CISPR13	Limits and methods of measurement of radio disturbance characteristics of sound and television broadcast receivers and associated equipment
CISPR14-1	Limits and methods of measurement of radio disturbance characteristics of electrical motor-operated and thermal appliances for household and similar purposes, electric tools and similar electric apparatus
CISPR14-2	Requirements for household appliances, tools and similar apparatus. Part2: Immunity
CISPR15	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
CISPR20	Limits and methods of measurement of immunity characteristics of sound and television broadcast receivers and associated equipment
CISPR22	Limits and methods of measurement of radio disturbance characteristics of ITE
CISPR24	Limits and methods of measurement of the immunity characteristics of ITE
CISPR25	Limits and methods of measurement of radio disturbance characteristics for the protection of receivers used on board vehicles

② CENELEC（European Committee for Electrotechnical Standardization）

CENELEC and CISPR are almost same. The corresponding table of two standards is shown right.

CENELEC	CISPR
EN55011	CISPR11
EN55012	CISPR12
EN55013	CISPR13
EN55014	CISPR14
EN55015	CISPR15
EN55020	CISPR20
EN55022	CISPR22

③FCC（Federal Communications Commission / USA）

Standards	Contents
Part15	Regulations relating to unnecessary emission of various radiofrequency equipments including broadcast receiver and computer
Part18	Regulations relating to industrial, scientific and medical equipments

④VCCI（Voluntary Control Council for Interference by Information Technology Equipment / Japan）

CISPR16-1 and CISPR22 are quated.