How to track EMI Emission Source

By Near Field Probe Set SY5030 and SA9275 Spectrum Analyzer

Instrument's electromagnetic compatibility: instrument can work under the working requirement in its electromagnetic environment and doesn't make any unbearable electromagnetic interference to any instrument in its environment.

Therefore there are two requirements: one is the electromagnetic interference made by the testing instrument to its environment shouldn't surpass certain limitation, that is EMI. The other is the instrument should have some immunity to interference to the electromagnetic interference in its environment, that is EMS.

Here we just introduce the EMI related testing. In traditional EMI testing, we usually use the EMI receiver in the specialized laboratory's darkroom. This can make a strict test to the whole EMI emission, but it has some disadvantages of long period, high cost, and only having the testing result, not providing the specific emission position. During these years' development, the combination of nearby probe and spectrum analyzer develops a new direction on both find the EMI emission the position.

Below is the introduction of how to use nearby probe and SA9275 spectrum analyzer to test nearby EMI.

Before the introduction, we need to know why to do the nearby testing. In EMC standard, it is always distant field testing, which can't provide the specific location of the emission but only provide the frequency information and the emission intensity of each frequency point. To improve the circuit and reduce the researching period, we must search for the emission source, which requires the nearby probe to locate the interference source.

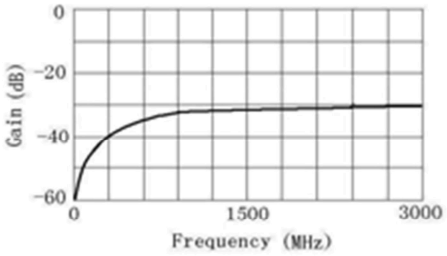
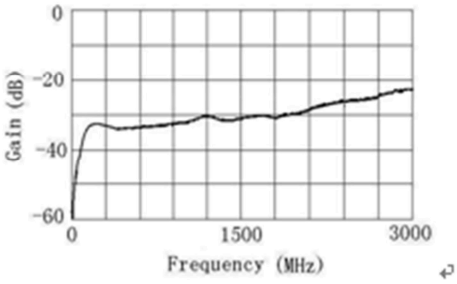
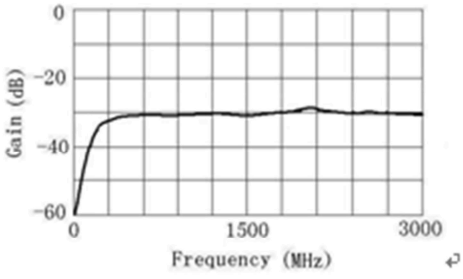
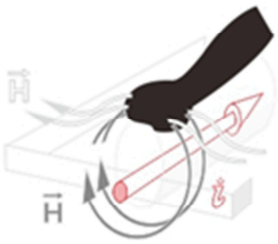
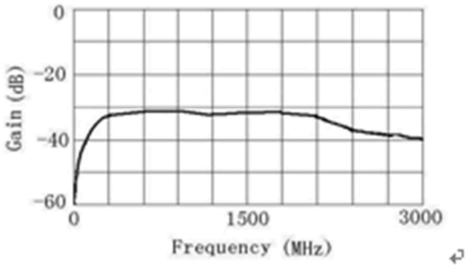
Nearby probe sets are as follows:

Nearby probe includes: EMI electric field probe and EMI magnetic field probe.

Features: several shapes probe, applying to different occasions, with wide frequency range.

Magnetic field distribution and directions could be test.

Power supply and amplifier (option) could be added additionally to improve the test sensitivity.

 SY5030—4	◆ H probe can be used to detect the vertical H field. ◆ Mainly used to track the emission leakage of the circuits on a PCB. ◆ Frequency range:30MHz to 3GHz ◆ Resolution : 2mm	
 SY5030—1	◆ H probe for detecting H field 10 cm around ◆ Mainly used to track the emission leakage of a device or cable ◆ Frequency range:30MHz to 3GHz ◆ Resolution :25mm	
 SY5030—2	◆ H probe for detecting H field 3 cm around ◆ Frequency range:30MHz to 3GHz ◆ Resolution :10mm	
 SY5030—3	◆ H probe mainly used to detect the emission leakage of a wire. ◆ Frequency range:30MHz to 2GHz ◆ Resolution : 5mm	

Application field:

Search for the interference source and positioning it, which can accurate to component's pin or traces on the board.

Check magnetic distribution and leakage of components, PCB and inner instrument.

Test methods:

Set spectrum analyzer's sweep range and analyzing bandwidth according to the interference frequency.

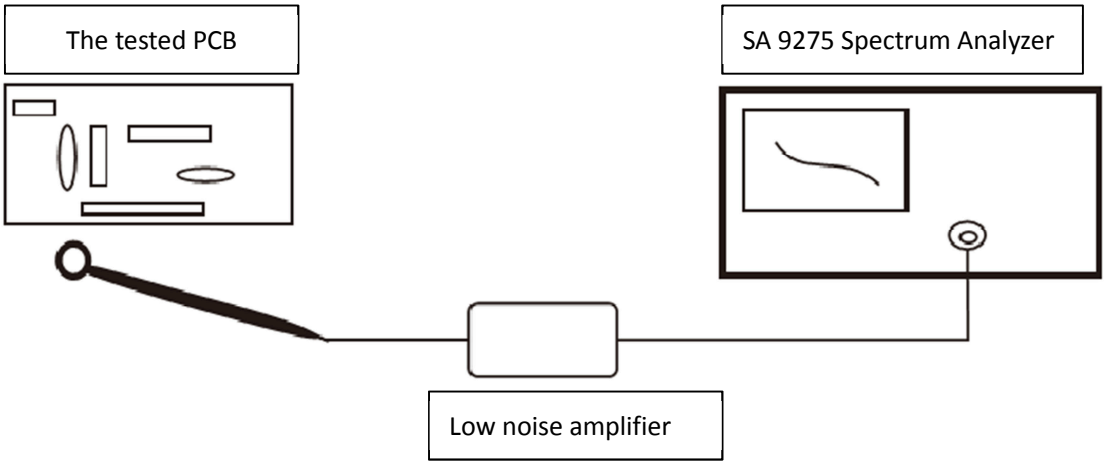
The corresponding relationship between sweep range and analyzing bandwidth are as follows:

Sweep range	Analyzing bandwidth
9kHz~150 kHz	200Hz(6dB)
150kHz~30MHz	9kHz(6dB)
30MHz ~1GHz	120kHz(6dB)
1GHz ~18GHz	1MHz(3dB)

To set SA9275 Spectrum analyzer's sweep range, you need only press【FREQ】firstly, and then set *Starting frequency* and *Stop frequency*.

To set the analyzing bandwidth, you need to press【BW】firstly, and then choose or input the needed bandwidth which should be within the range of this instrument.

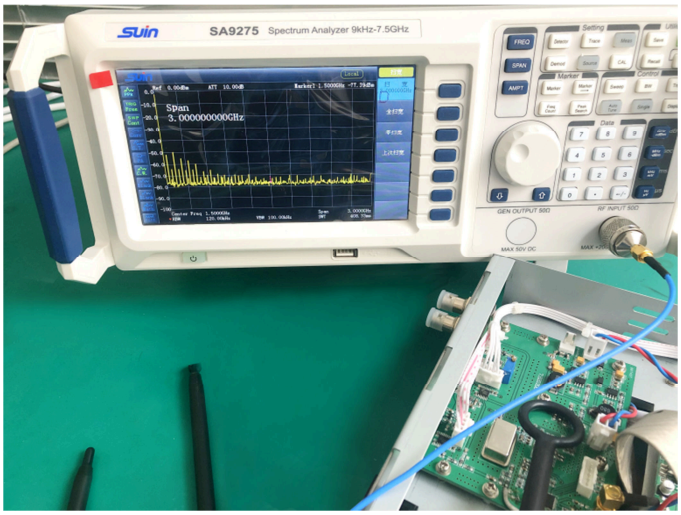
Diagrams:



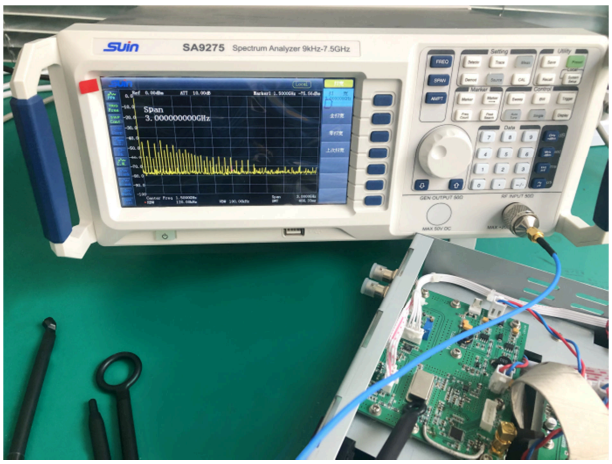
Note: Low noise amplifier can only be used in the condition that interference signal is very small.

Application example:

Firstly, use SY5030-1 to search for the high emission area.



Secondly use SY5030-2 to find the specific emission position.



Finally use SY5030-4 to precisely positioning the magnetic source in PCB.