

High Efficiency EMC Pretest Solution

EMI Test - Faster - Easier!



Spectrum Analyzer GSP-9330:
 Frequency Range : 3.25GHz
 EMC Pretest dedicated functions
 Peak, QP, Average detectors



GKT-008 EMI Probe Set:
 Sensing probes: ANT-04, ANT-05
 Contact probes: AC & RF probes



Transient Limiter



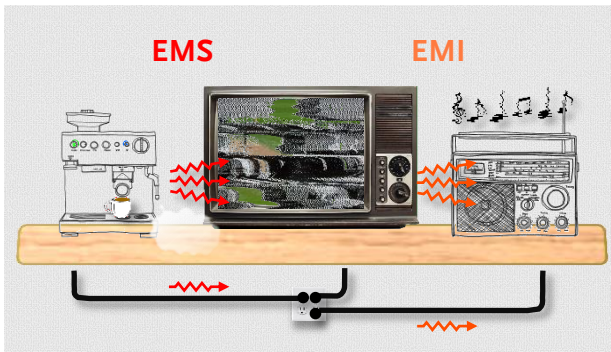
LISN



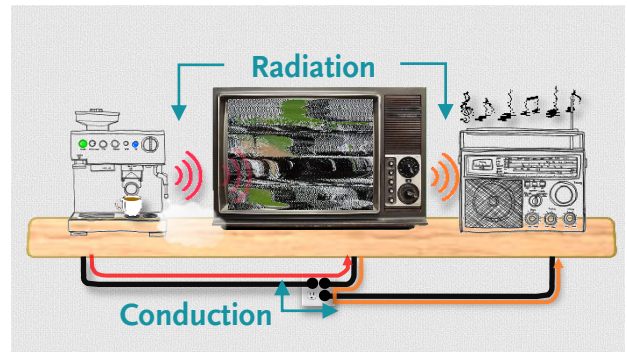
Isolation Transformer

EMC and Coupling Paths

EMC = EMS + EMI



Radiation via air & Conduction via power



GSP-9330 EMC Pretest Dedicated Functions

Built-in EMI test standards

EMC	EMC	EMC	EMC	EMC
EMC On	BandA 9-150kHz	Band> 30M-300MHz	Scale Type Log	None
EMI Test>	BandB 150k-30MHz	Amb.Noise Reject None	GLN-5040 A 10dB Comp. On	EN55022A
Field Sensor>	BandA+ B 9kHz-30MHz	Correction None	Limit line offset 0.000dB	EN55022B
Source Contact Probe>	BandC 30-300MHz	Recall limit None	QP Analysis>	FCC A
AC Voltage Probe>	BandD 300M-1GHz	Peak Table On		FCC B
EMS Test>	BandC+D 30M-1GHz	More 1/2		EN55015
	More 1/2	Return	Return	User Define>

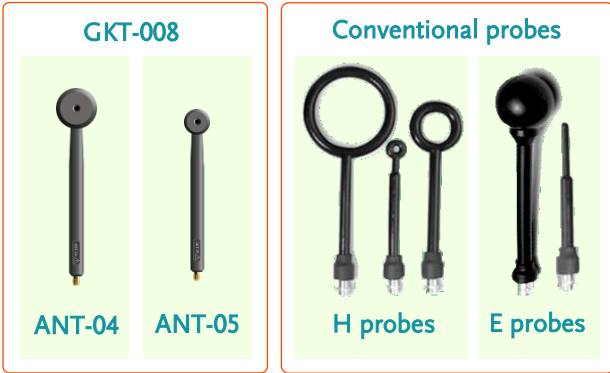
Log scale frequency axis and peak table



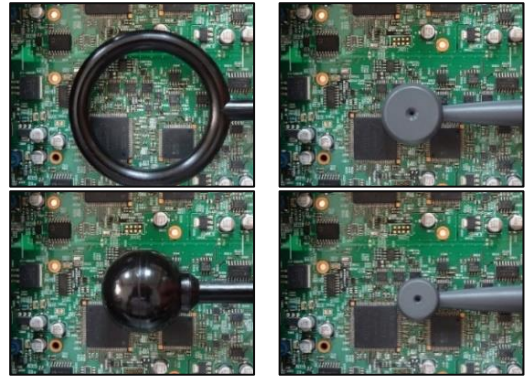
Key features of GKT-008

1. Small size, high sensitivity

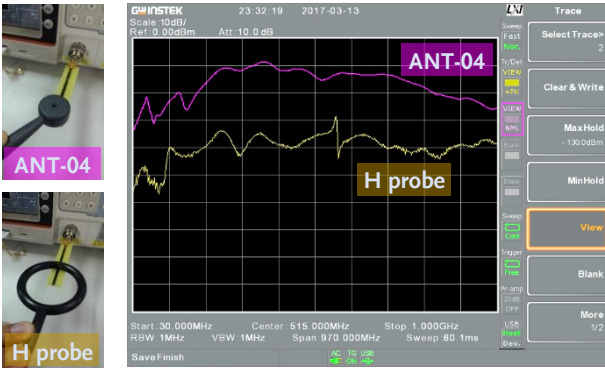
GKT-008 vs conventional probes



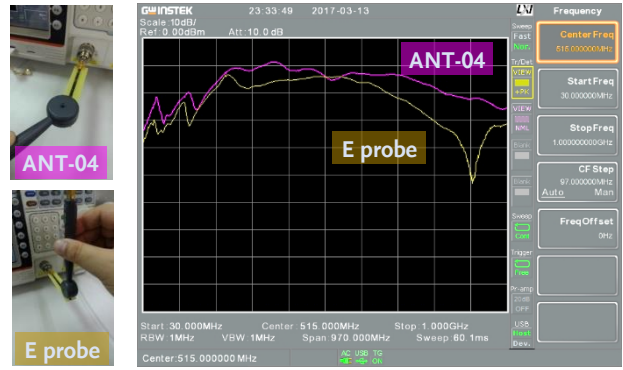
Identify EMI source better by small size



ANT-04: higher sensitivity than H probe

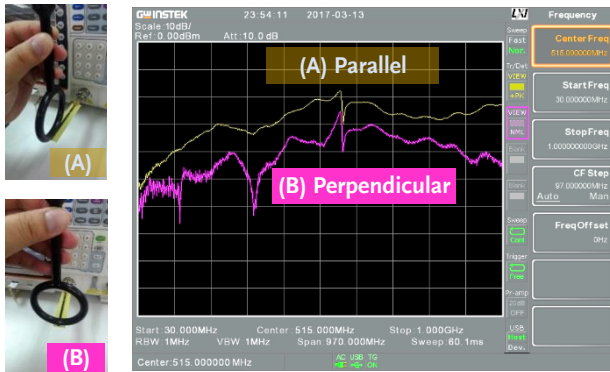


ANT-04: higher sensitivity than E probe

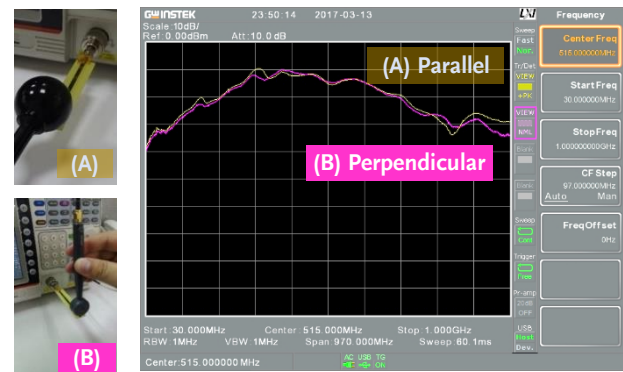


2. No directivity issues for ANT-04, ANT-05

H probe: Different results with different angles

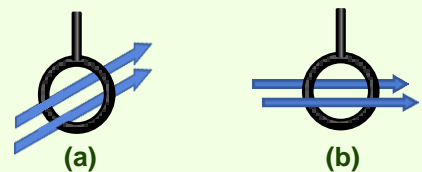


ANT-04: Similar results with different angles

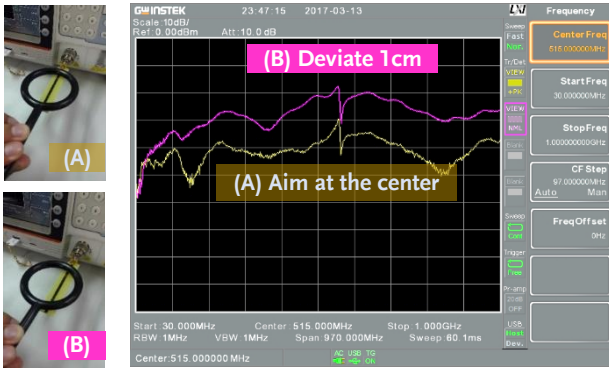


Working principle of conventional H probe (I)

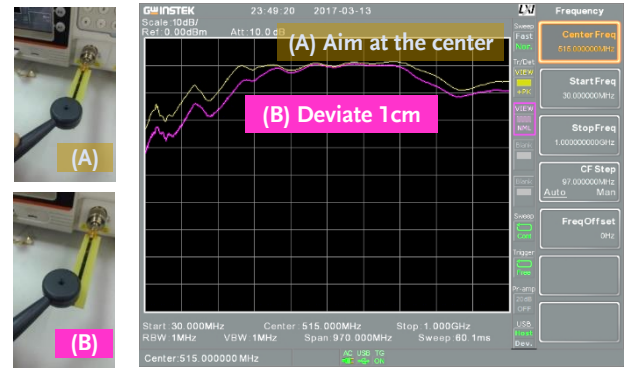
H probe works as a loop antenna. If more magnetic field passes through loop, more signal is detected as shown in fig. (a). If it is parallel to loop surface, magnetic field can't be detected.



H probe detects much more while deviating 1cm

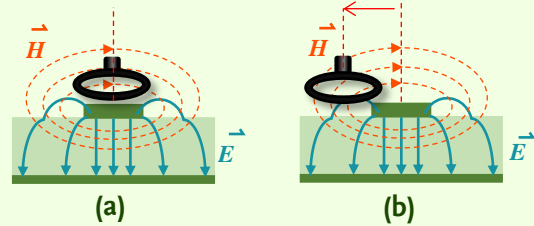


ANT-04 detects more while aiming the center



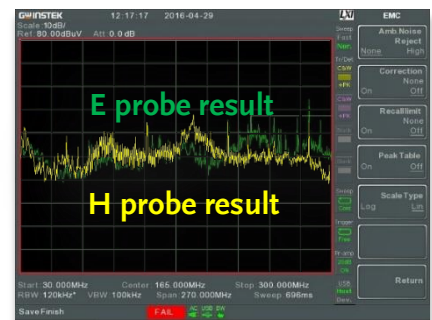
Why H probe aiming at center detects less signal?

According to the working principle, H probe deviates from the PCB center shown in fig. (b) will detect more passing magnetic field. In fig. (a) H probe aims at the center will detect less magnetic field. This will leave incorrect clue to engineer.



3. Detecting separate H field and E field vs Sensing EMI energy

H probe's results differ from E probe



H field & E field are two components of EMI

The actual electromagnetic energy is the vector outer product of E and H fields. This operation can't be done by the measurement of spectrum analyzer. The information is not complete for engineers to identify the EMI source.

$$S = \mathbf{E} \times \mathbf{H} = \begin{bmatrix} i & j & k \\ E_1 & E_2 & E_3 \\ H_1 & H_2 & H_3 \end{bmatrix}$$

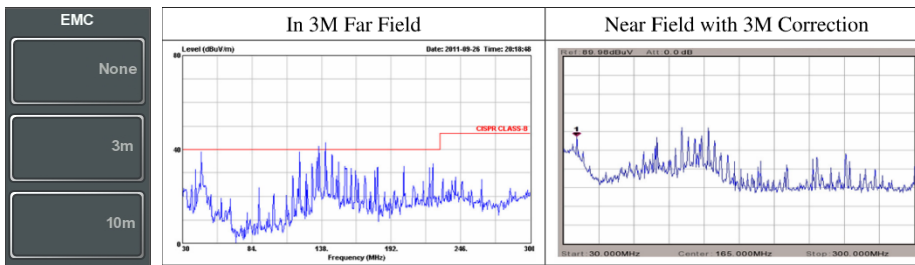
ANT-04 and 05 directly sense EMI energy



Patent designed ANT-04 & ANT-05 can directly detect EMI energy, no any intermediate operation is necessary. With the compact size and high sensitivity, the EMI source spots can be easily discovered.

GSP-9330 built-in GKT-008 associated functions

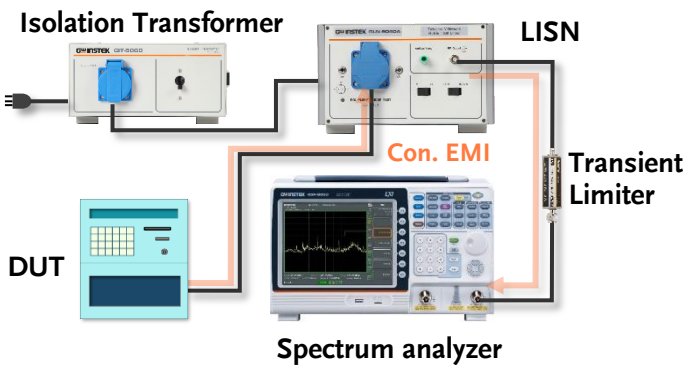
Far field response estimation



- Convert the near field measurement results to far field response (3m or 10m can be selected).
- Helpful to confirm whether the EMI trimming works or not.

Conducted EMI Test Solution

Test system configuration



Isolation Transformer: To prevent the main power system from shutdown.



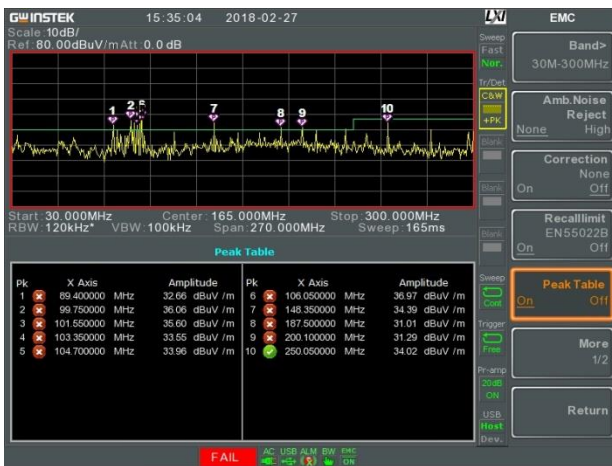
LISN: To filter out the noise from DUT power line.



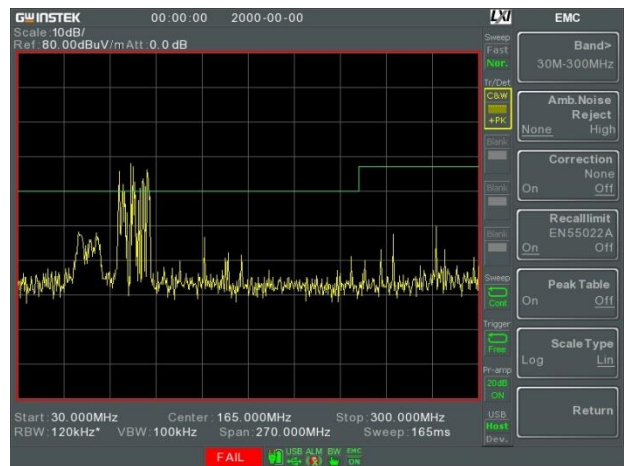
Transient Limiter: To protect the spectrum analyzer.

GSP-9330 Auxiliary Functions

Peak Table: Automatically search 10 peaks



Pass/Fail: Inspection result display



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