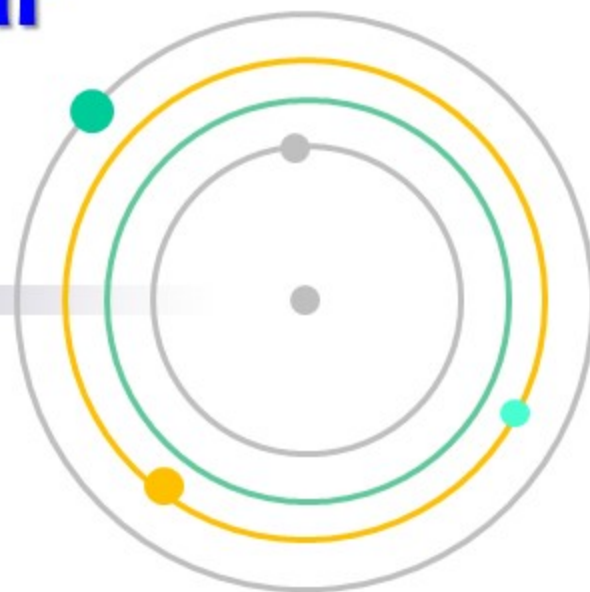


EMC Technical Seminar



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Contents

1. Fundamentals of EMC
2. Shielding Techniques and Components
3. Grounding Techniques and Components
4. Filtering Techniques with Ferrite Cores

What is EMC?

EMC: **E**lectro-**M**agnetic **C**ompatibility



EUT: Equipment Under Test

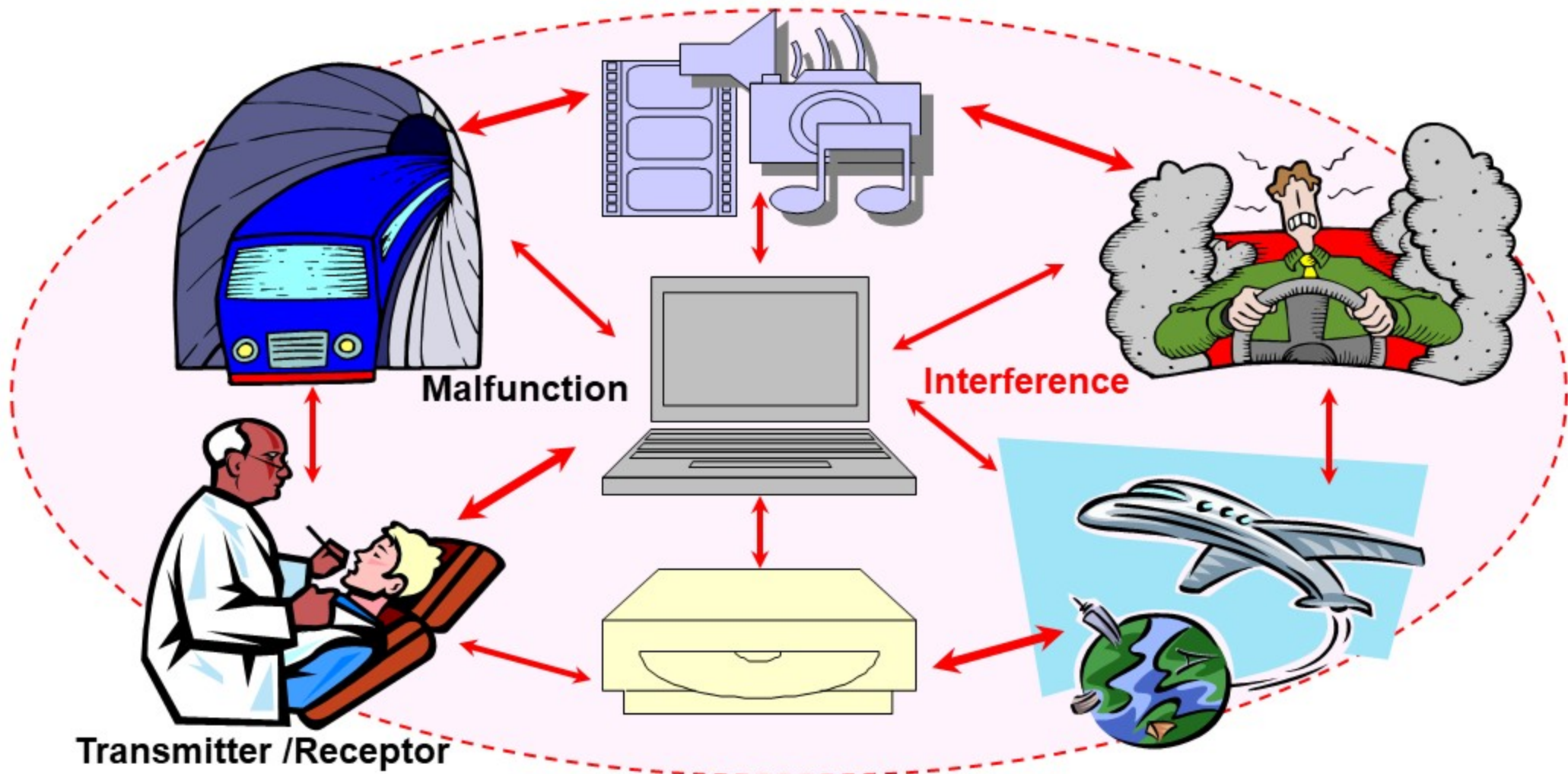
EMI: **E**lectro-**M**agnetic **I**nterference

- Radiated disturbance
- Conducted disturbance

EMS: **E**lectro-**M**agnetic **S**usceptibility

- Radiated immunity
- Conducted immunity

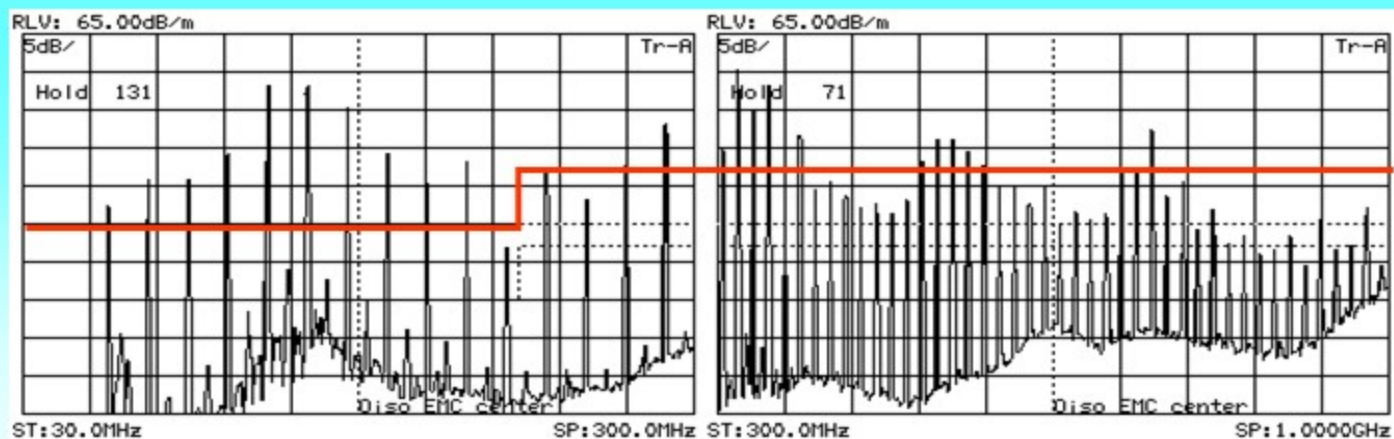
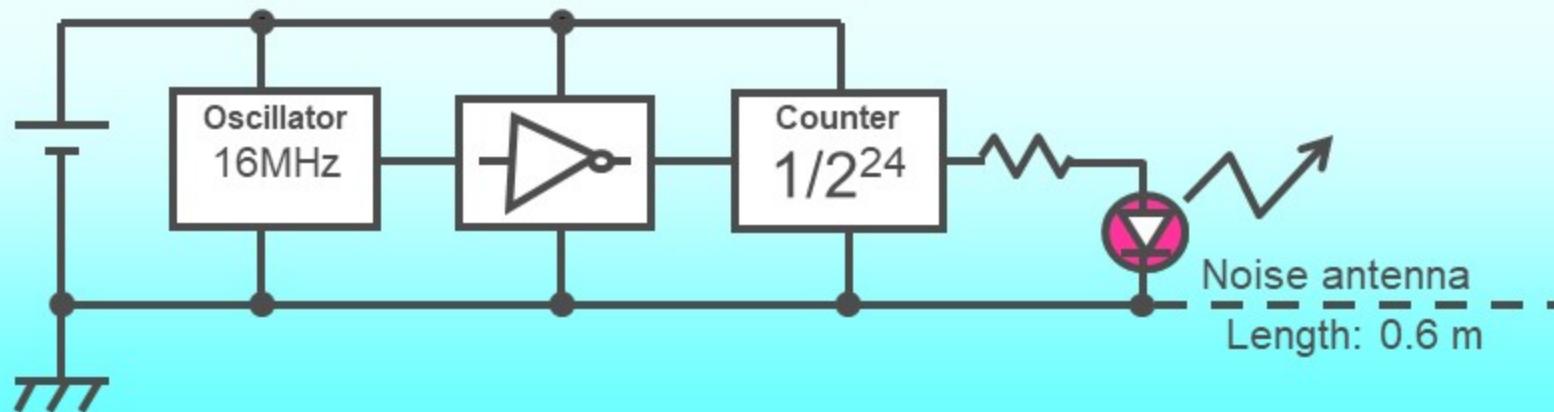
Daily Life filled with Electromagnetic energy



EMC Suppression



EMI Noise Measurement (demo)



Electric field strength radiated from noise generator

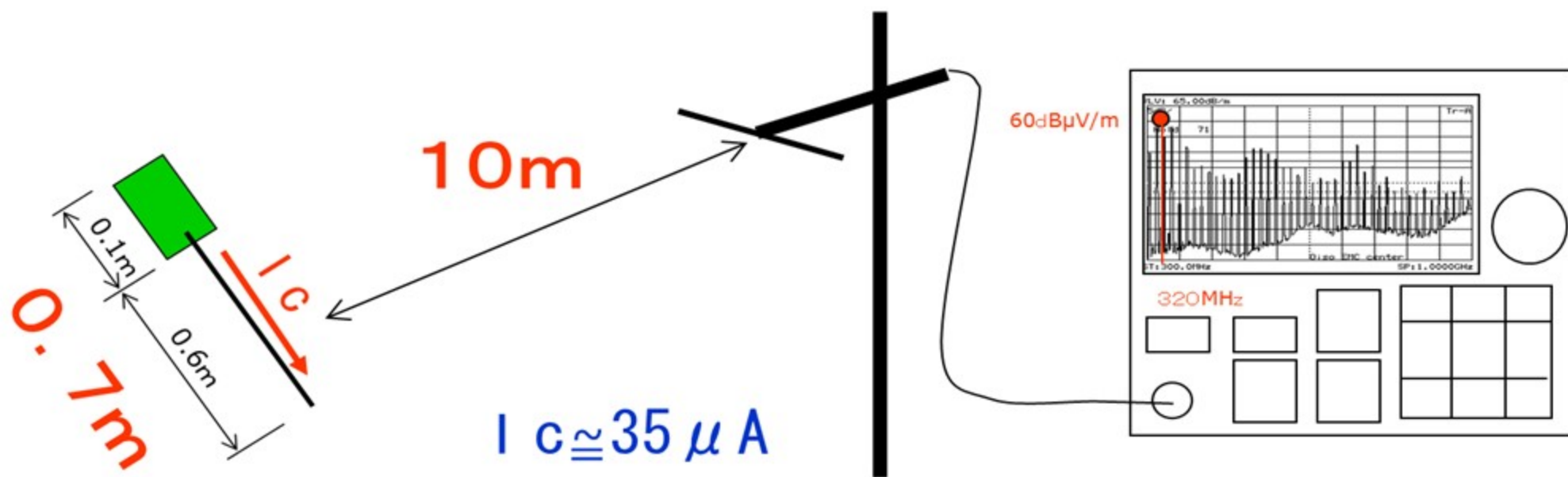
Common Mode Noise

Field strength generated by common mode current (distance: 10m)

$$E_C = 4\pi \times 10^{-7} \frac{I_C \cdot f \cdot L}{d}$$

$$= 60\text{dB } \mu\text{V/m}$$

$$(L : 0.7\text{m}, d : 10\text{m}, f : 320\text{MHz})$$



Component Solutions

Grounding



Shielding



Filtering



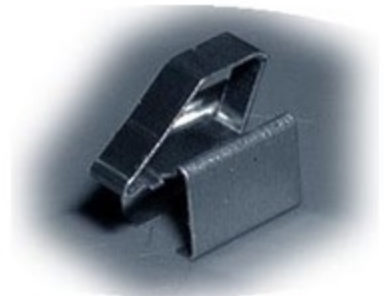
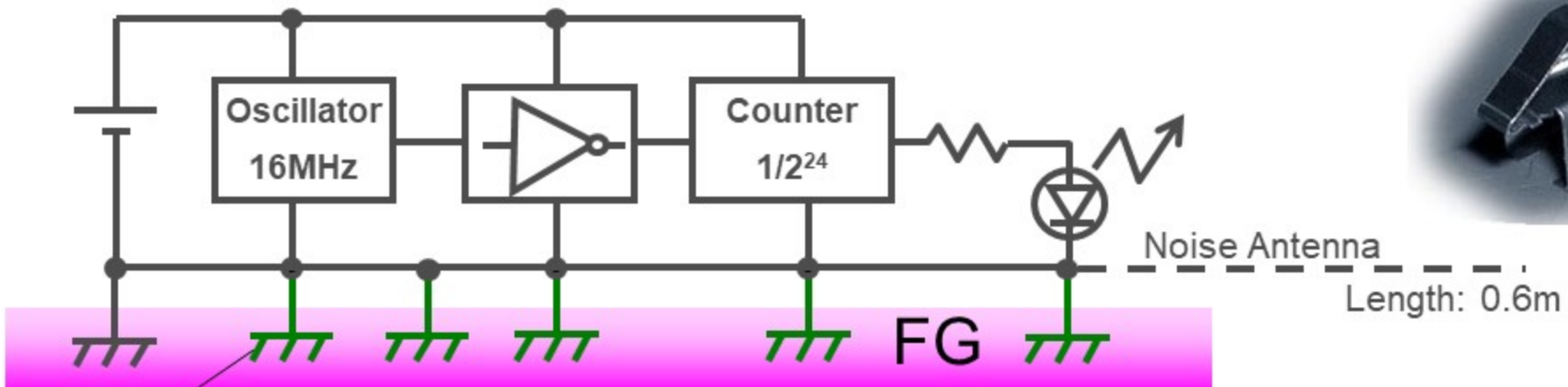
Wide variety of electric components, EMC solutions

EMC compliance
measurement
EMC design support
Technical seminar

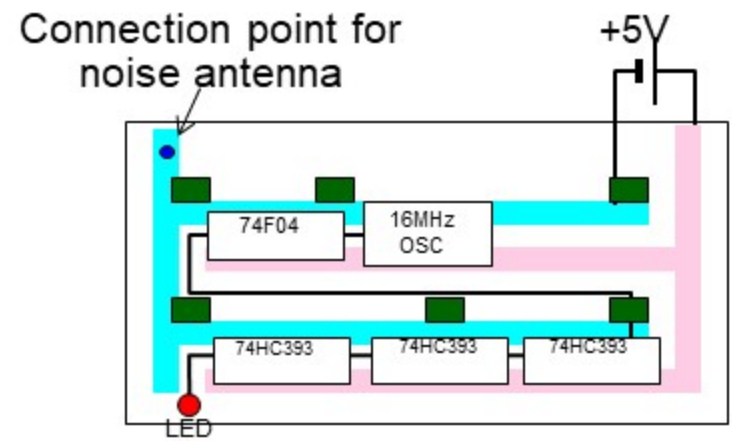
Thermal management
Vibration control

Total Component Solutions

In Review: Grounding

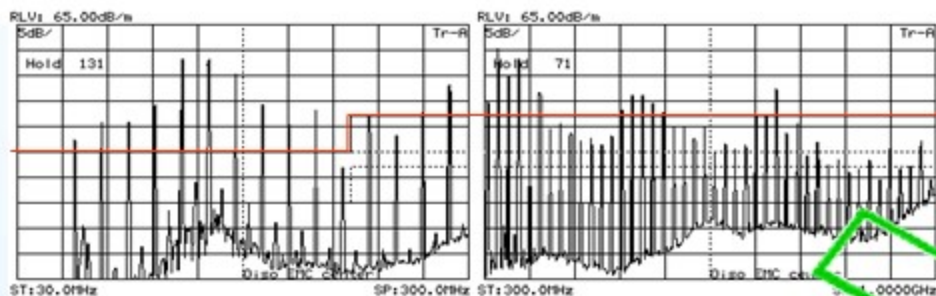


Grounding with lower impedance

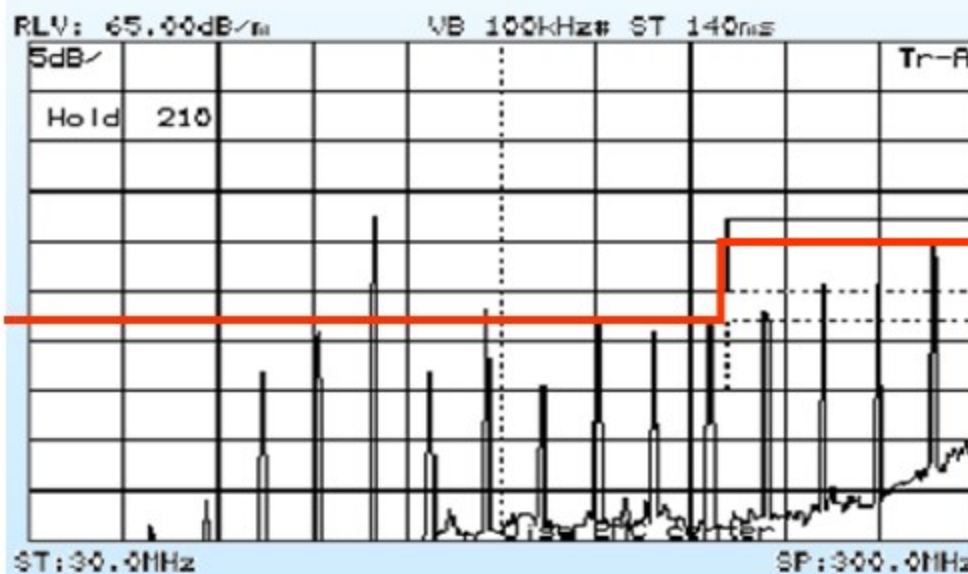


- Vcc
- Ground
- Grounding to FG with 6 pieces of on-board ground contacts

Noise Suppression with Grounding Contacts

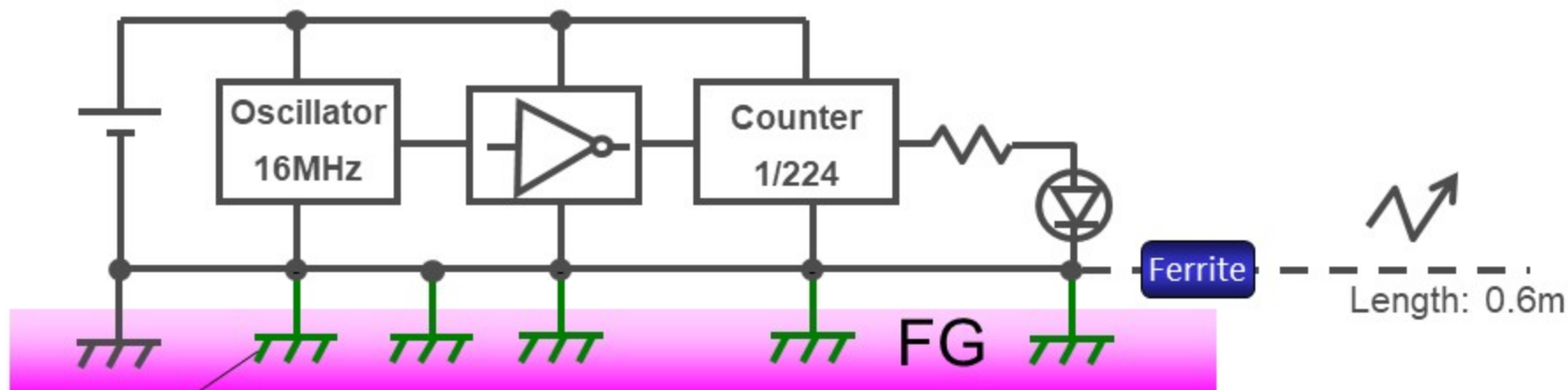


Multiple grounding points
enhance noise suppression

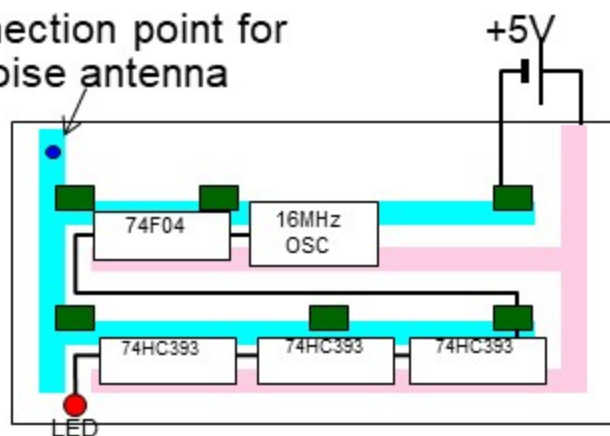


There would be little to no effect with ferrite cores in the higher frequency range;
however, a striking effect can be observed with grounding in this area.

Combination of Grounding and Filtering



Connection point for noise antenna

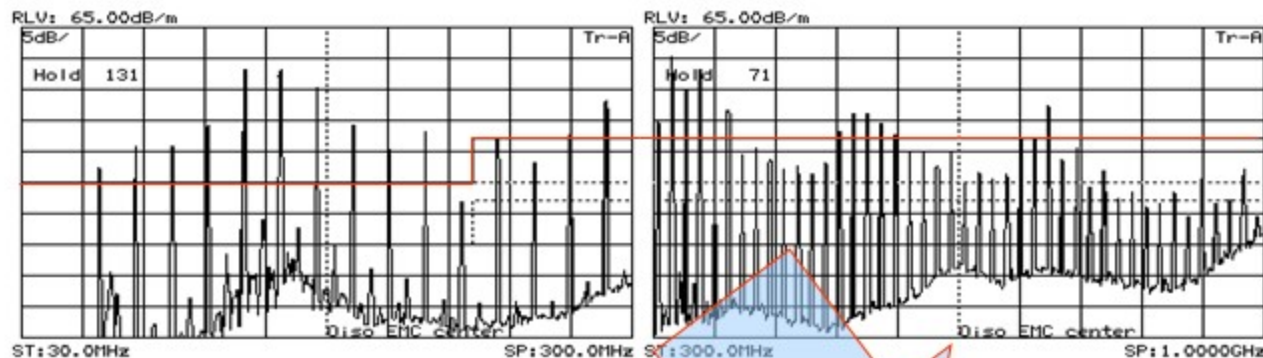


Vcc

Ground

Grounding to FG with 6 pieces of on-board ground contacts

Combination of Grounding and Filtering



Achieved broadband noise suppression!

