CISPR25 Class5 Conducted EMI Setup

LM53601 – Q1

Internal EMI Lab in Santa Clara TI/SVA

- Not a certified EMI Lab -

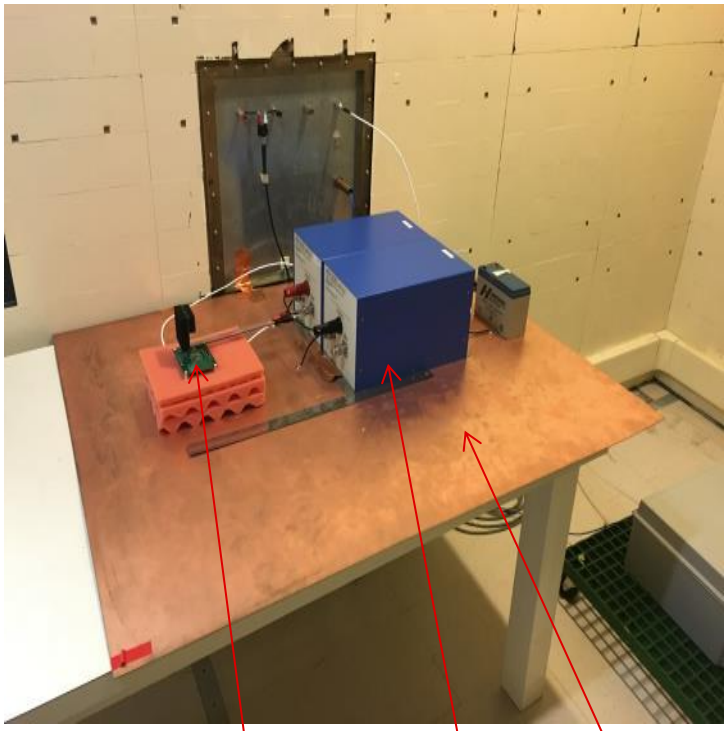
Conducted EMI Setup – General Overview

Screen Room

Spectrum Analyzer

Power Supply 13.5V

EMI Chamber

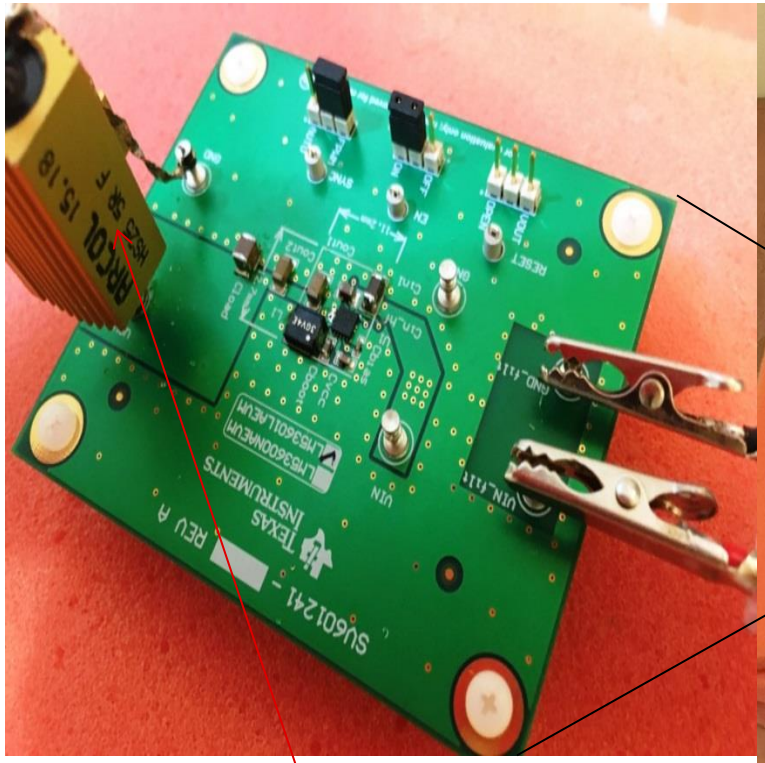


DUT

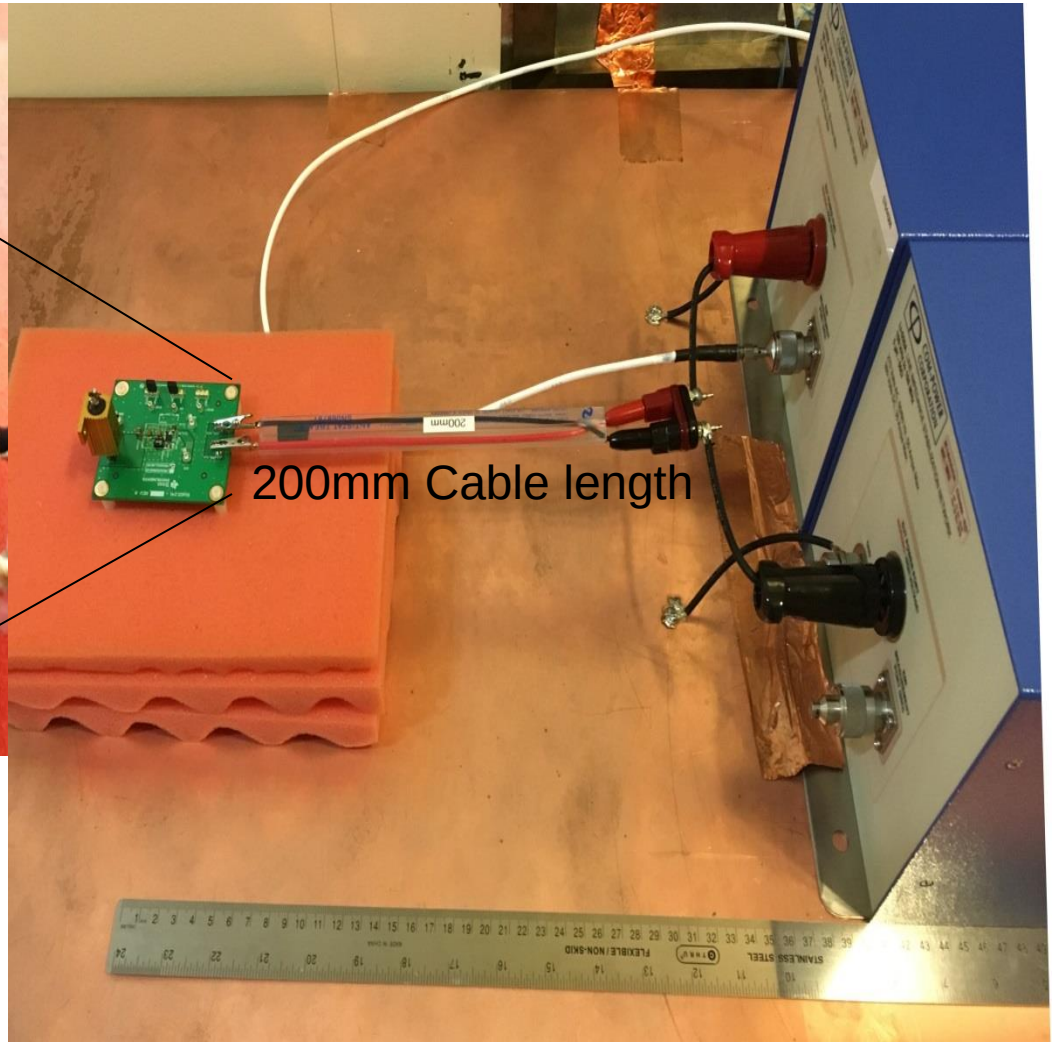
2x LISN

Copper Ground

LM53601 EVM in Conducted EMI Setup

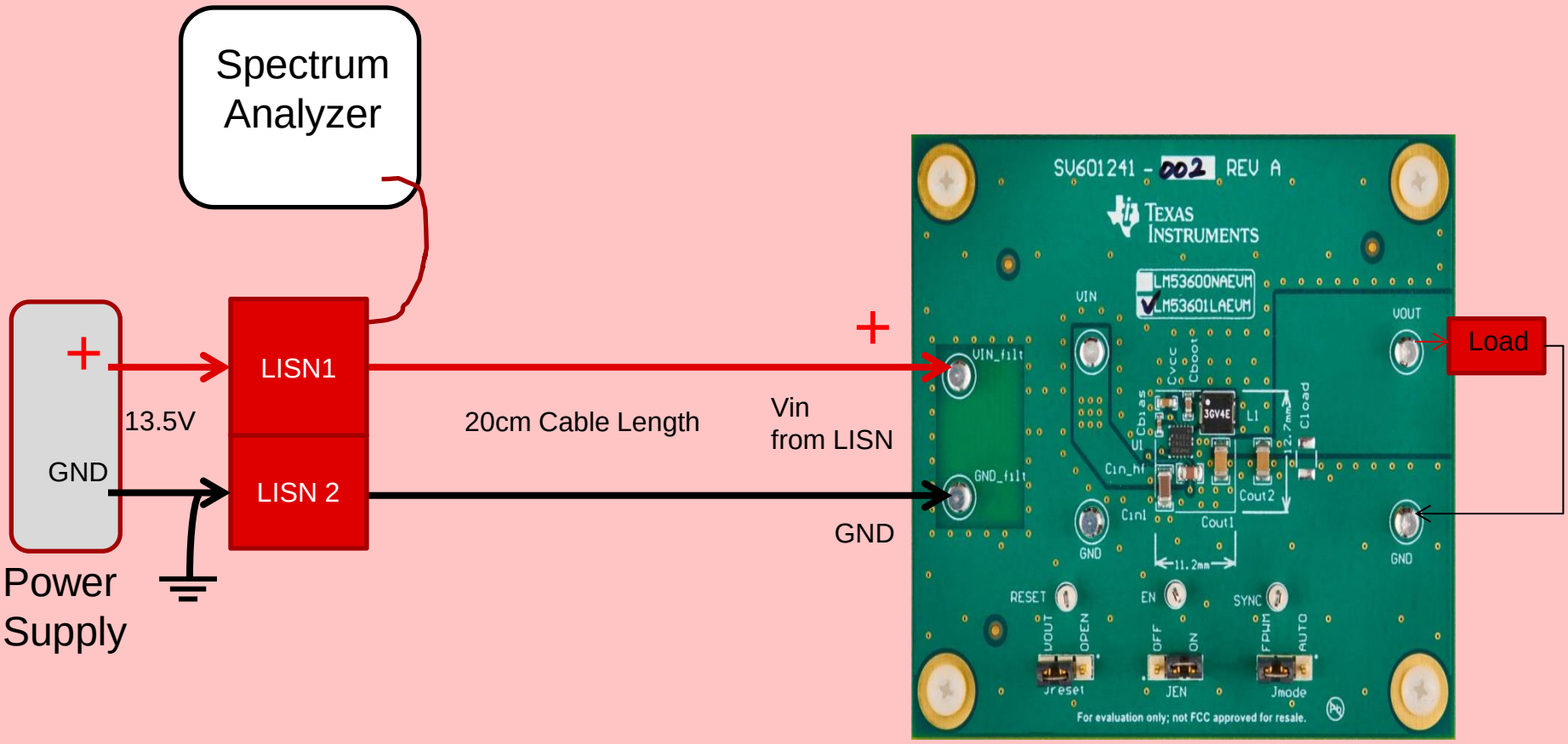


Soldered 5 Ohm Load Resistor



200mm Cable length

Conducted EMI – Block Diagram



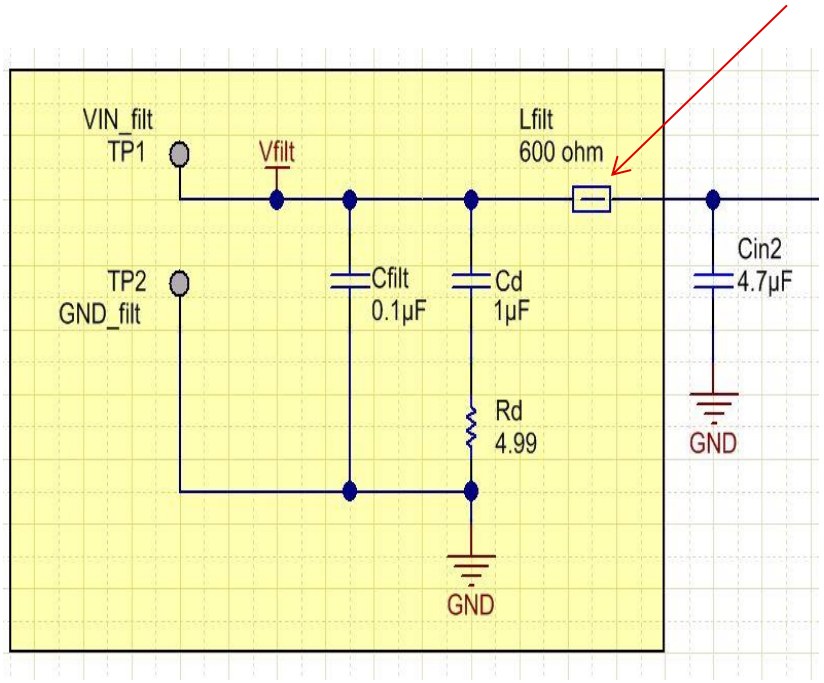
Large Copper GROUND Plate on Table

LM53601 EVM Board

Conducted EMI – Help / Suggestions

- Make sure to have the Power Supply GND cable connected in Input side of LISN2, down to the Table Copper Plate.
- Make sure good connection between LISN Metal Chassis to Copper GROUND plate. Make sure the copper GROUND Table Plate is well connected to EMI chamber/room!
- Use shortest 20cm cable length. CISPR25 allows 200mm+200mm. Shorter cable will allow less coupling, and provide better results. Always use same length (shortest) to guarantee comparable and re-producable results. Soldered input cable to the Bottom PCB Side would be ideal.
- To minimize influence from Vout noise solder a Resistive Load to Vout with very shorter connection. On the Load resistor use the longer wire to GND. If metal encapsulated power resistor are used make sure to connect the metal surrounding of Resistor to GND to “shield” the Load resistor.
- Use Styrofoam under the EVM to keep the board on constant height / distance 5cm to copper Ground plate is mandatory from CISPR.
- Stay away from the setup and make sure your body is not building any capacitive coupling to the setup. Make sure not to have any probe point or have any wire soldered to Switch node!

Mini EVM – EMI Filter Schematic



Used EMI Filter on mini EVM.

Ferrite Bead

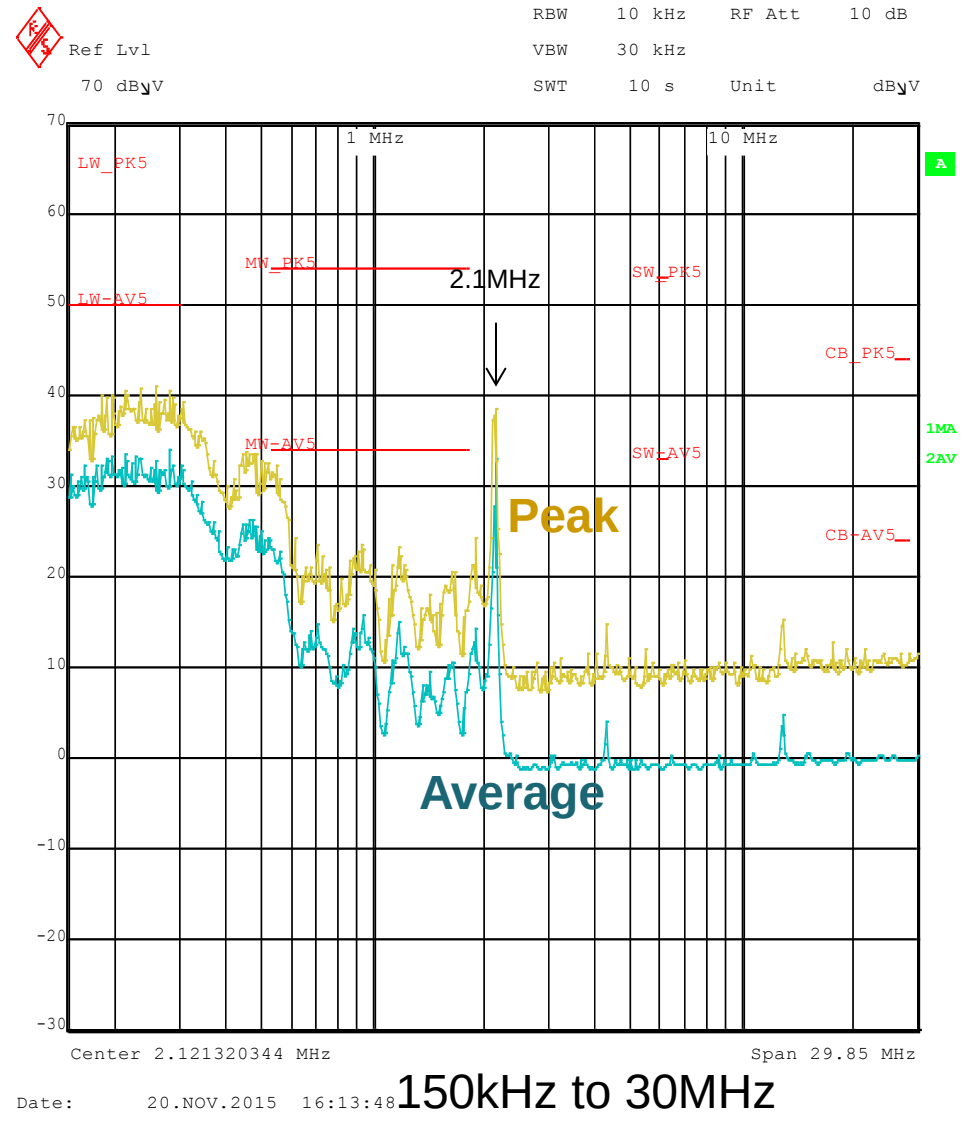
Alternatively a 2.2uH Wire Wound Inductor can be used.

A common Mode Choke could be added on Input side to reduce Common Mode EMI Noise.

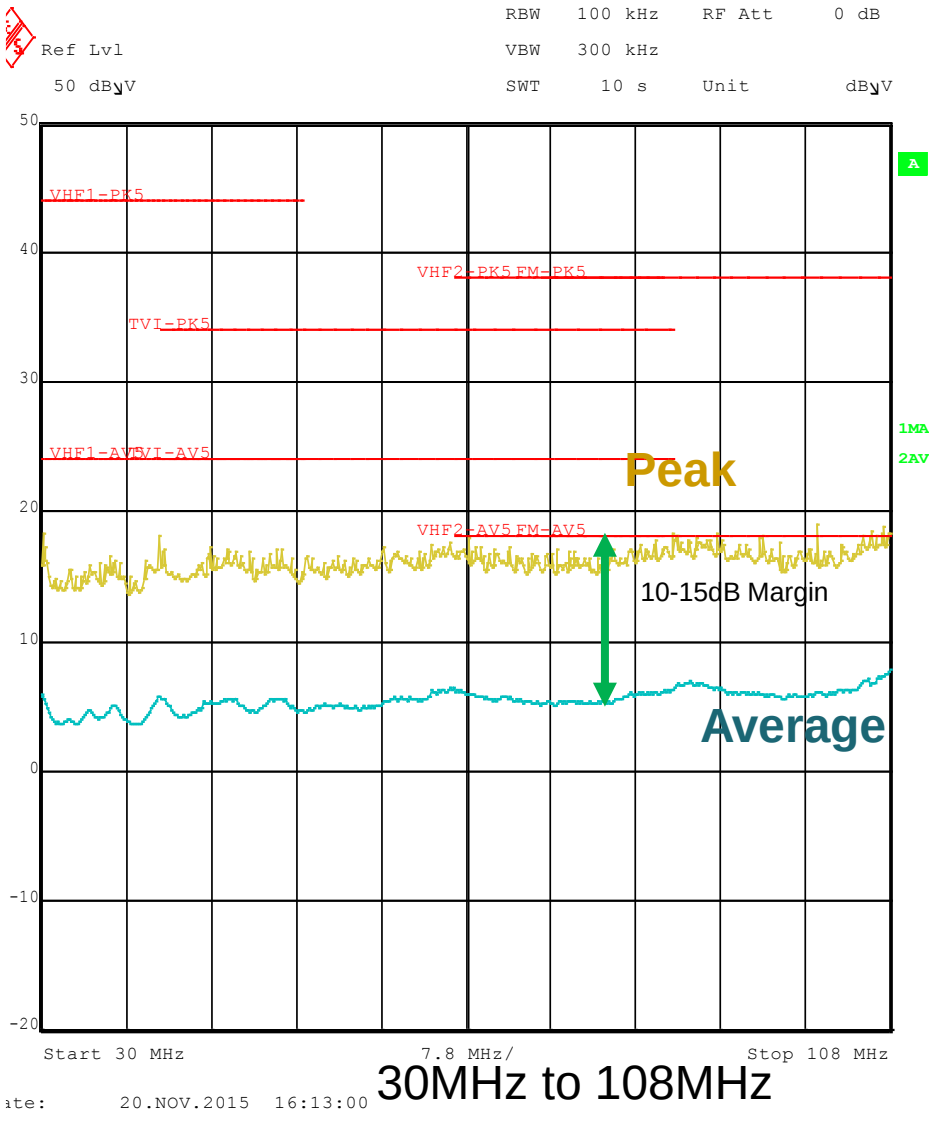
Conducted EMI

Vout=5V / 1A	Low Frequency	High Frequency	Comments
Mini off the Shelf with Spread Spectrum	Very Effective Filter	Very good. No Harmonics peaks to see.	Very good 10-15dB margin to Class5 Limit for FM-Band in Average Measurement. Spread Spectrum will rise the lower frequency 150kHz to 1MHz Noise floor. Spread Spectrum is very effective in reducing Harmonics in high Frequency band.
Mini off the Shelf without Spread Spectrum	Very Effective Filter	65-108MHz close to FM band	Below AM Band very low Noise Floor without Spread Spectrum.

Mini EVM off the Shelf – Spread Spectrum

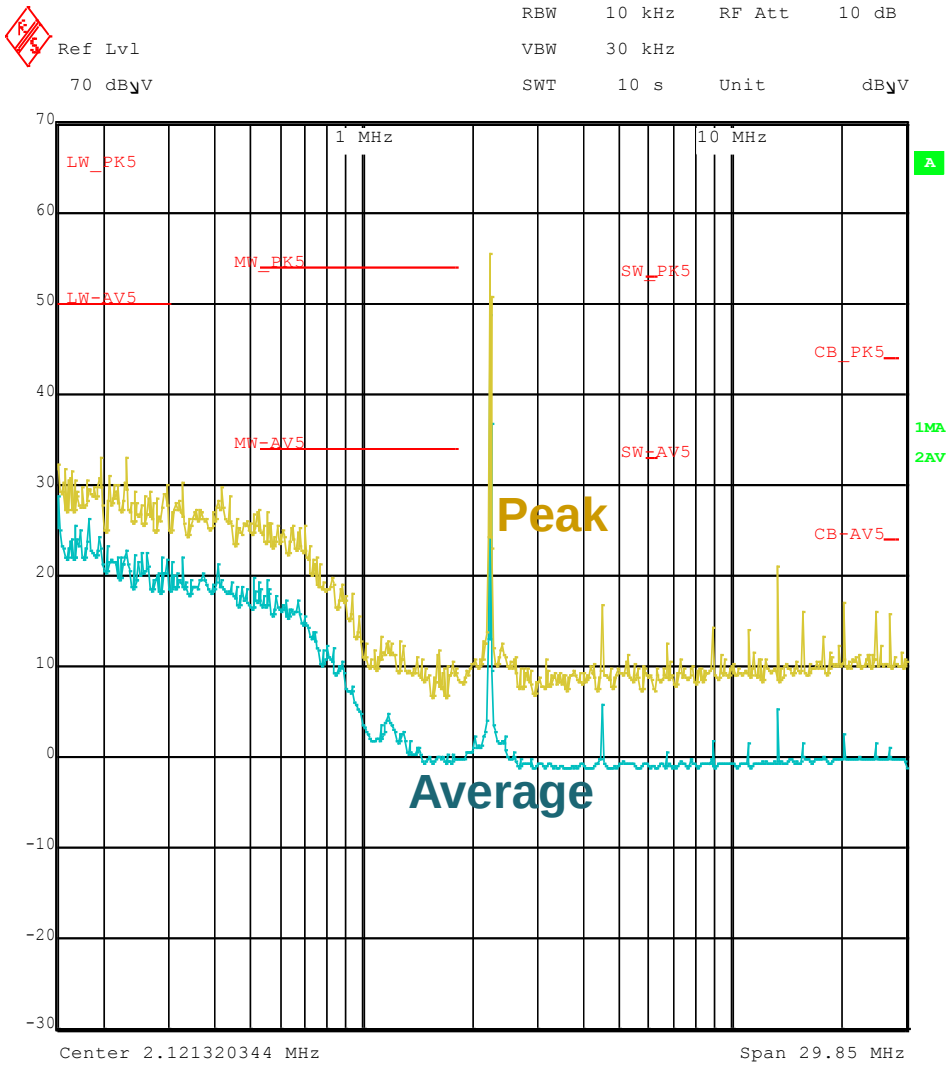


150kHz to 30MHz

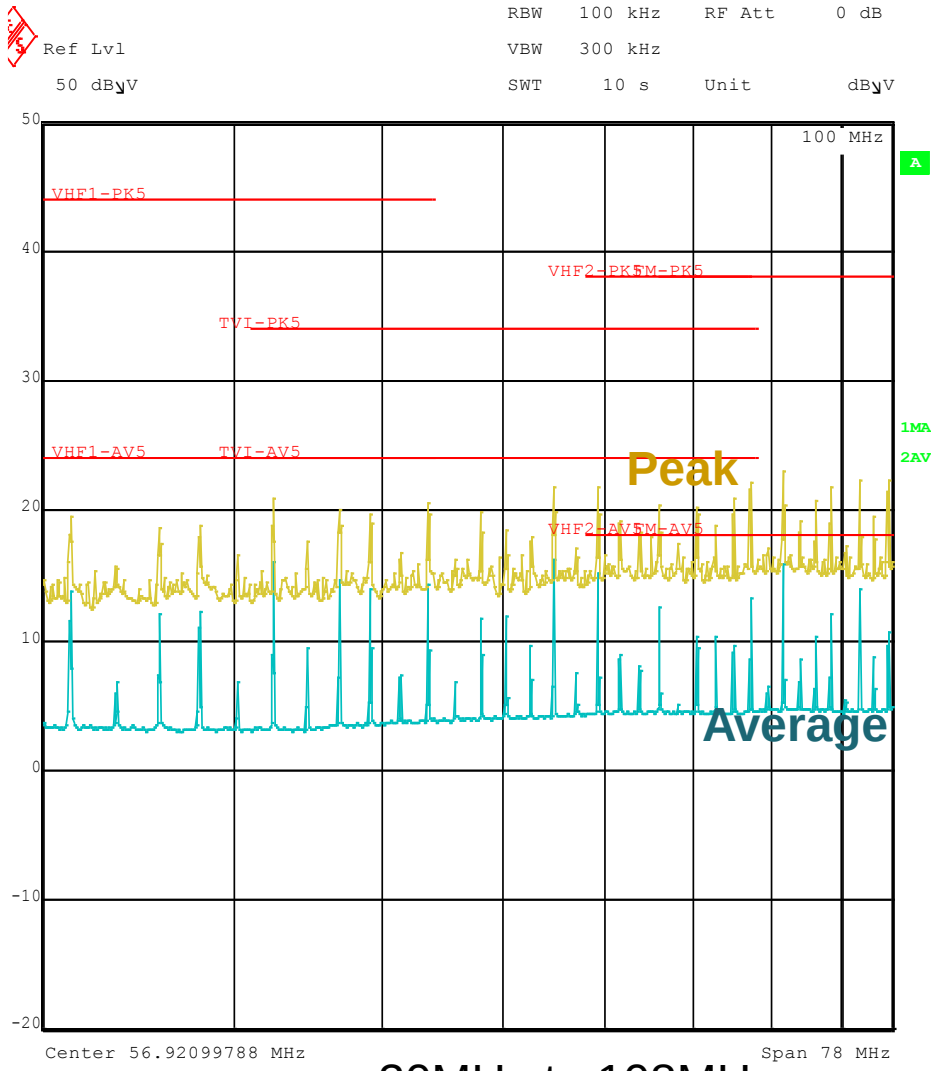


30MHz to 108MHz

Mini EVM off the Shelf – Without Spread Spectrum



150kHz to 30MHz



30MHz to 108MHz