

The Hat Creek Radio Observatory

Screen Room Tests



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1 General

A screen room (figure 1) has been built in the "Lab 2" building to test new RF equipment. A metallic mesh around the room acts as a Faraday cage and shields the ATA from electromagnetic interferences from the tests inside the room. The measurement of the shielding effectiveness are described in this document.



Figure 1: Outside view of the screen room in the "Lab 2".

2 Testing setup

The shielding effectiveness of the screen room is tested with a radio emitter and receiver. The emitter is made from an "E4420B Agilent RF Generator" connected to an "OmniLOG 30800" omnidirectional antenna with a two-meter Female-Female SMA cable "ABC-CA18-SMSM-2.OM". The antenna is placed at the center of the room on a tripod and the RF generator emits a +20 dBm signal first at 800 MHz, then at 2 GHz. A schematic of the emitter setup is shown in figure 2 and a picture in figure 3.

The receiver is held by hand around the room to make several power level measurement around the room. The "Keysight N9938A FieldFox Microwave Spectrum Analyzer" is connected to a RF-preamplifier "Aaronia UBBV X 17823" which is then connected to an "OmniLOG 30800" omnidirectional antenna. Only the power level is recorded at the frequency we know is emitted inside the screen room.

TODO: Add more details on the measurement A schematic of the receiver setup is shown in figure 4 and a picture in figure 5.

TODO: ADD spectrum analyzer settings list.

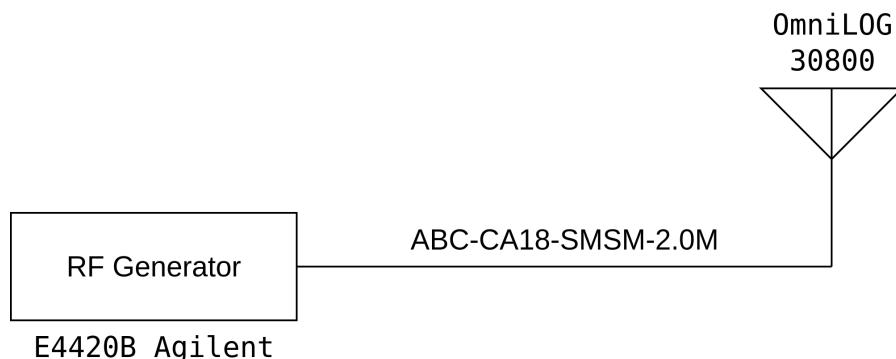


Figure 2: Schematic of the emitter test setup.



Figure 3: Function generator emitting through a omnidirectional antenna in the middle of the screen room.

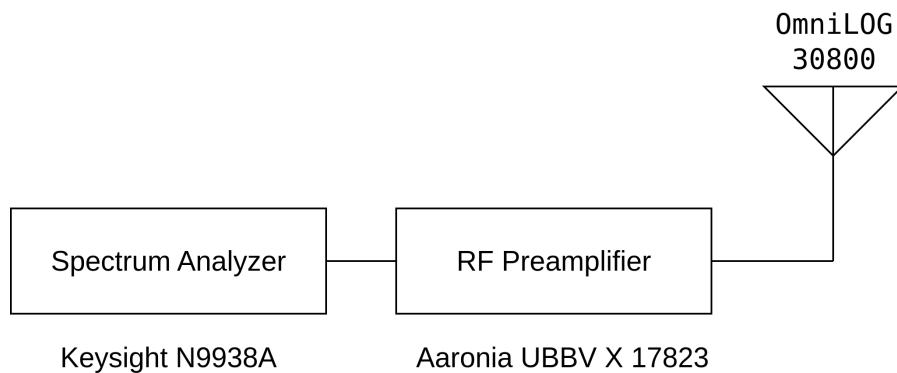


Figure 4: Schematic of the receiver test setup.



Figure 5: The spectrum analyzer used for the measurement, connected to the antenna through a signal amplifier.

2.1 Results

The result of the measurements for both 800 MHz and 2 GHz are shown in figure 6 and 7 respectively. The -5 dB measurement indicates a signal leak at the right of the door and the problem will need to be fixed.

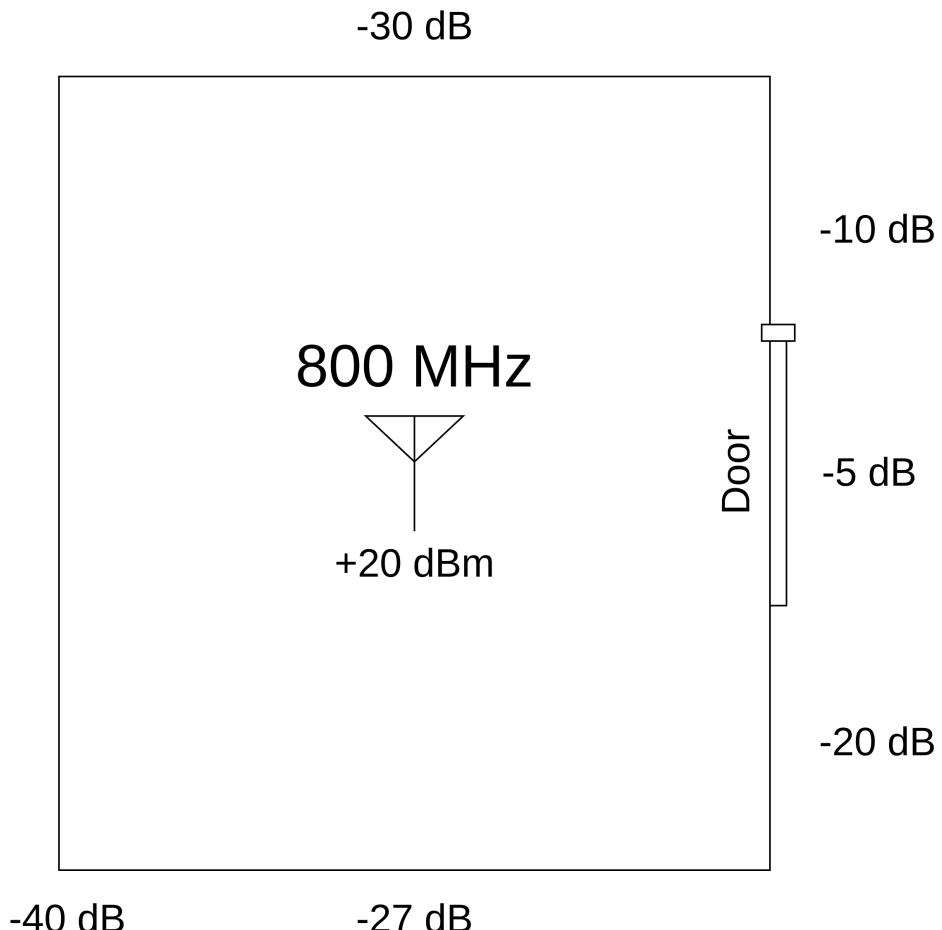


Figure 6: Power level detected outside the screen room for a $+20\text{ dBm}$ signal emitted at 800 MHz.

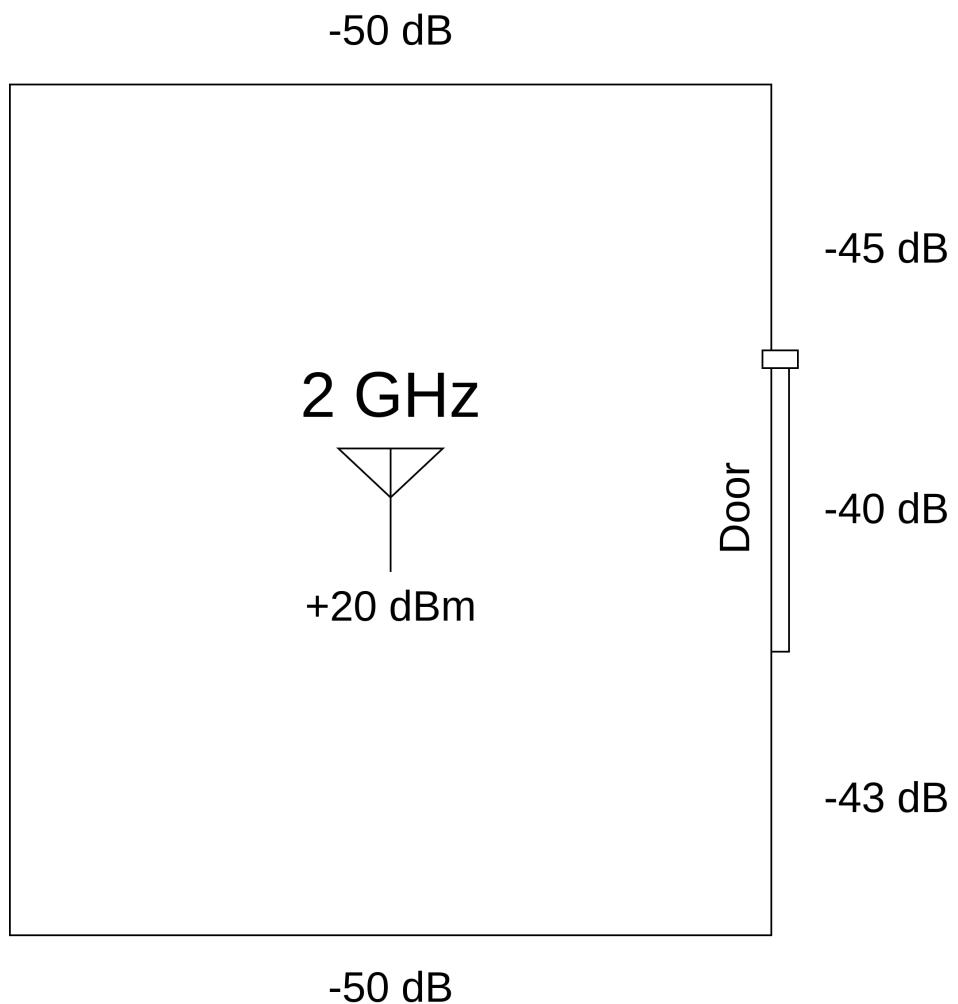


Figure 7: Power level detected outside the screen room for a +20 dBm signal emitted at 2 GHz.