

Objective – Improve Transmission and Distribution Power Conditioning Technology

Approach – Wirelessly Couple to Transmission/Distribution Lines at Discrete Frequencies between 50 kHz and 190 kHz, and Measure the Response of Power Conditioning Components

Description – Experimental Equipment

- Signal Generator – Rigol DG1032Z, Frequency Accuracy = ± 1 PPM $\Rightarrow$ Bandwidth < 1 Hz for $50 \text{ kHz} \leq f \leq 190 \text{ kHz}$
- Amplifiers – AE TECHRON, 5 kW x 4 = 20 kW Peak Power
- Antenna – Electrically Small Loop Antenna
 - Multi-Turn Rectangular Loop – 10' x 4', 5 Turns
 - Isotropic Radiator (Gain = 0 dBi)

Approach – Experiment Conduct

- Dates of Experiments: 18 October 2021 – 28 January 2022
- Location of Experiments
 - Joint Electric Power Range (JEPR) on Fort Carson
 - $38^{\circ}25'39.2''\text{N}$ $104^{\circ}45'46.3''\text{W}$
- Radiated Frequency – Single Frequencies Between 50 kHz and 190 kHz
 - Constant Amplitude
 - No Modulation
 - Repeated Multiple Times at Different Single Tones
- Illuminate Distribution/Transmission Lines with Various Components Connected
 - 5 Seconds On Every 10 Minutes $\Rightarrow P_{\text{ave}} = 167 \text{ W}$
 - Assess Collected Data
 - Observe and Document Component Response

Frequencies Requested – All in kHz

50	125
55	130
60	135
65	140
70	145
75	150
80	155
85	160
90	165
95	170
100	175
105	180
110	185
115	190
120	