# RF Controller Data Sheet.

**Project Overview (initial) – 19/6/25**

* Communicate with RF instruments like:
* Signal Generators (e.g., EA257D, Keysight N5173B)
* Spectrum Analyzers (e.g., Keysight N9010B)
* Send SCPI commands to control them (set frequency, amplitude, etc.)
* Read back responses (like current settings or measurements)
* Display or log the results in your Python application

“A Python-based SCPI instrument control hub that communicates with RF test equipment over Ethernet or USB, allowing users to send commands (like frequency sweep, amplitude set) and receive responses (like signal levels, spectral data).”

Softwares to be installed :- NI MAX, Keysight Connection Expert, Python 3.11

Library pre-requisites - PyVISA – for the transfer and communication of SCPI commands.

Instruments to be handled -   
EA2F7D or N5173B – signal generators.

N9010B – Spectrum Analyzer.

**Keysight N5713B EXG X-Series RF Signal Generator.**

Microwave analogue signal generator.  
Parametric Testing of :-

* Broadband filters
* Amplifiers
* Receivers

Specifications :-

* Frequency range – 9KHz – 20GHz
* Output Power - +20dBm
* Low Phase noise
* Modulation types – AM, FM, I/Q, Pulse
* Sweep Capabilities – Frequency Sweep, Power Sweep(dBm), List Sweep (customized sweep)
  + Functions:- START, STOP, MODE,TYPE,STEP

Connectivity:-

USB, Ethernet, GPIB(General Purpose Interface Bus)

**Keysight E8257D PSG Analogue Signal Generator**

The E8257D is a high-end RF/microwave signal generator, ideal for testing:

* Receivers
* Amplifiers
* Mixers
* Radar systems
* High-speed digital devices

Specifications:-

* Frequency range – 100KHz – 67GHz (expandable – 1.1THz)
* Output Power - +30dBm
* Ultra low Phase noise
* Modulation types – AM, FM, I/Q, Pulse
* Sweep Capabilities – Frequency Sweep, Power Sweep(dBm), List Sweep (customized sweep)
  + Functions:- START, STOP, MODE,TYPE,STEP

**Keysight N9010B EXA Signal Analyzer**

A spectrum analyzer is a powerful electronic instrument that measures and displays the amplitude of signals across a range of frequencies. Instead of showing how a signal changes over time (like an oscilloscope does), it shows how much energy is present at each frequency—this is called the frequency domain.

The **N9010B** is a **mid-range spectrum analyzer** with advanced measurement capabilities, making it suitable for:

* RF system design
* Wireless testing
* EMI troubleshooting
* Radar and satellite communication analysis

Specifications:-

* Frequency range:- 10Hz – 11GHz(expandable)
* Resolution Bandwidth – 1Hz – 10 Mhz
* Display Range - >100dB dynamic range
* Connectivity – LAN, USB, GPIB
* Modulation Analysis - Optional licenses for AM/FM/PM, LTE, WLAN, etc.
* Applications - Spectrum, power, harmonics, phase noise, demodulation