# APGEN3000 Preliminary Specification 0.9

A compact 9 kHz to 3.0 GHz RF Signal Generator


The APGEN3000 is a fast-switching RF Signal Generator with dedicated modulation and trigger capabilities. The APGEN3000 covers a frequency range from 9 kHz to 3.0 GHz and is ideally suited for a wide range of application, where good signal quality, fast switching, and accurate and wide output power range is required.

The APGEN3000 offers various control interfaces like USB, LAN, or (optionally) GPIB. Each interface allows easy and fast communication using SCPI 1999 command set. Remote control of the instrument can be quickly attained from any host system. A customer-supplied application programming interface (API) or programming examples for Matlab, Labview, C++, and other commercially available tools make implementation very straightforward.

# Specifications

The specifications in the following pages describe the warranted performance of the signal generator for 25 ± 10 °C after a 30 minute warm-up period. Typical specifications describe expected, but not warranted performance. Min and Max specifications are warranted.

| Parameter | Min. | Typ. | Max. | Note |
|---|---|---|---|---|
| **Frequency range** | 9 KHz | | 3.0 GHz | |
| resolution | | 0.1 Hz | | |
| Phase resolution | | | | |
| Switching speed | | 5 ms | | |
| **SSB Phase noise at 1 GHz** | | | | |
| at 20 kHz from carrier<br>at 1 MHz | | -102 dBc/Hz<br>-130 dBc/Hz | | scales with frequency at 20 dB/dec |
| **Power level** | | | | |
| Range | -65 dBm | | +10 dBm | |
| Resolution | | 0.1 dB | | |
| Level uncertainty | | | ±1.0 dB | over specified power range |
| Output impedance | | 50 Ohms | | |
| VSWR<br>f < 200 MHz<br>200 MHz < f < 2 GHz | | 1.4 | <br><br>1.8 | |
| | | | | |
| **Spectral purity**<br>Output harmonics | | | -30 dBc | at + 10 dBm output power |
| Non-harmonic spurious | | | -55 dBc | |
| | | | | |
| **Internal reference frequency** | | | | |
| Temperature stability (10 to 45 degC) | | | ±5 ppm | |
| | | | | |
| | | | | |
| **Frequency sweep**<br>Sweep type: linear, logarithmic, random | | | | |
| Step time | 2 ms | | | |
| Dwell time | 1 ms | | 10 s | |
| Off-time (incl. transient time) | 1 ms | | | |
| Timing accuracy per point | | 0.2 µs | 0.2 µs | |

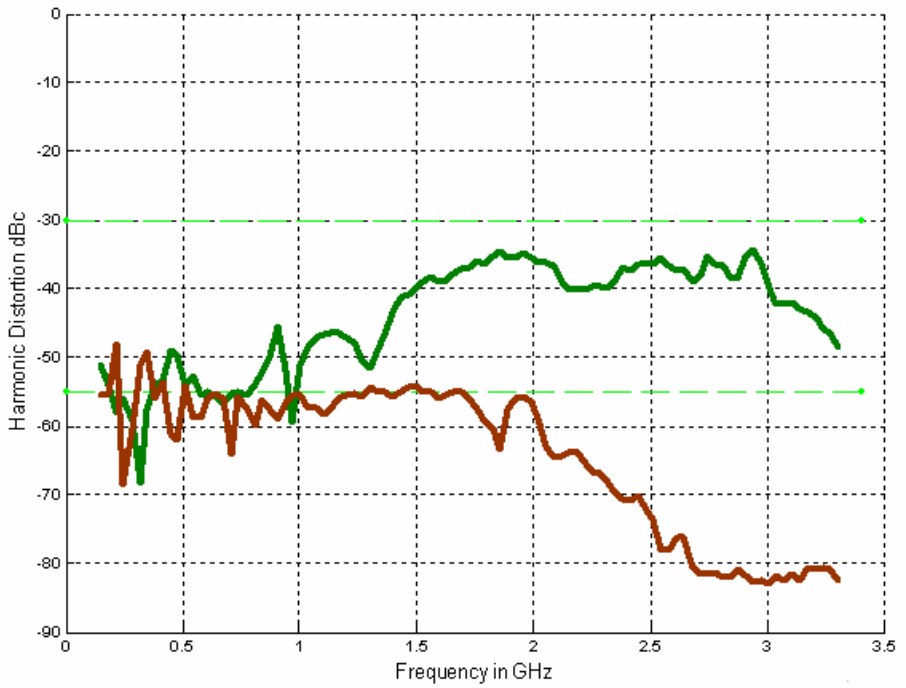
# Modulation Capabilities

Any combination of sweeps and internal/external AM and pulse modulation is allowed

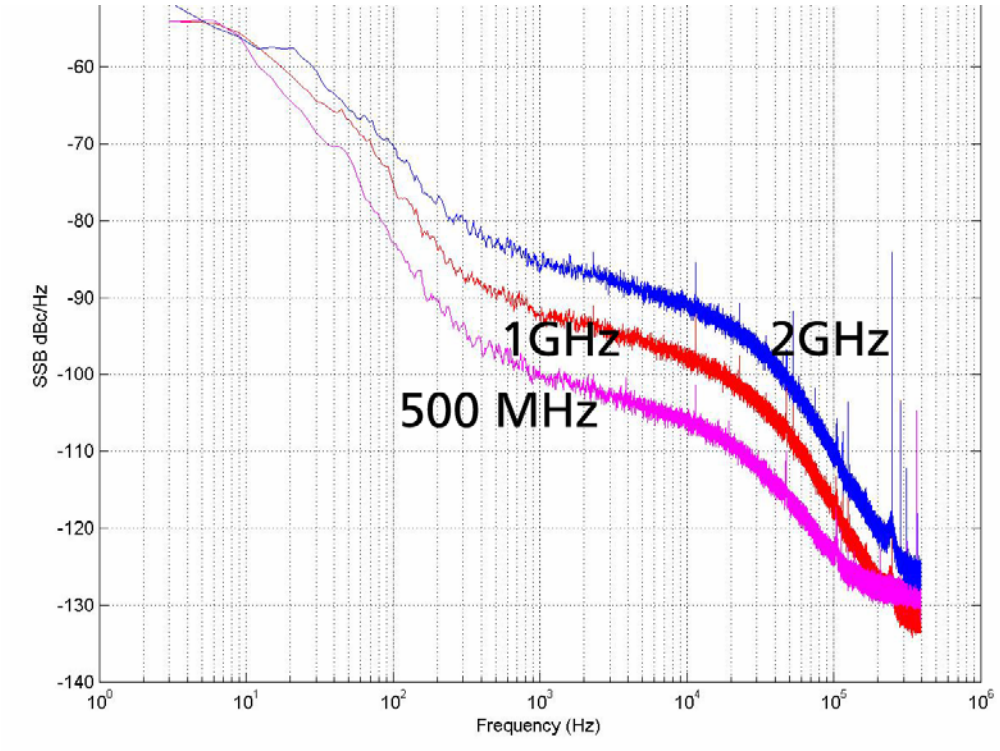
| Parameter | Min. | Typ. | Max. | Note |
|---|---|---|---|---|
| **Pulse Modulation**<br>On/off ratio | | >50 dB | | at +10 dBm |
| Repetition frequency | 0.1 Hz<br>0.1 Hz | | 500 kHz<br>100 kHz | External<br>Internal |
| Duty cycle | 1 % to 99 % in 1% steps * | | | within specified minimum pulse width |
| Minimum Pulse width | 50 ns | | | |
| Pulse rise/fall time | | 10 ns | | |
| External input amplitude | TTL | | | |
| | | | | |
| **AM Modulation**<br>Modulation rate<br><br>resolution | 0.1 Hz<br>1 Hz | <br><br>0.02 Hz | 30 kHz<br>30 kHz | for RF>1 MHz<br>for RF< 1 MHz; ALC hold |
| Modulation depth<br>Resolution | 0 % | <br>1 % | 90 % | |
| Distortion | | 1.5 % at 30%<br>2.5 % at 80% | | |
| Modulation waveforms | Sinusoidal, triangular, square | | | |

# Measurements

## 2nd (green) and 3rd (brown) harmonics at +10 dBm output power




## SSB phase noise



# Housing


**Front** **Rear**

**Weight** 1 kg (2 lbs) net, 1.5 kg (3 lb.) shipping

**Dimensions** 60 mm H x 106 mm W x 220 mm L

# Connectors

## Front panel:

1. RF output: N female
2. RF on/off button
3. Power on/off switch
4. AM modulation input: BNC female
5. Pulse modulation: BNC female
6. Function output: BNC female
7. Trigger input: BNC female

## Rear panel:

1. LAN connection: RJ-45
2. USB 2.0 host and device
3. DC Power plug (6V, 2.5A)

# General Characteristics

**Remote programming interfaces**
Ethernet 100BaseT LAN interface,
USB 2.0 host & device
GPIB (IEEE-488.2,1987) with listen and talk (optional)
Control language SCPI Version 1999.0

**Power requirements** 6 VDC; 20 W maximum
**Mains adapter supplied:** 100-240 VAC in/ 6V 2.5A DC out
**Operating temperature range** 0 to 45 °C
**Storage temperature range** –40 to 70 °C
**Operating and storage altitude** up to 15,000 feet

**CE notice**
Safety/EMC complies with applicable Safety and EMC regulations and directives.

# Options

- ***GPIB***: IEEE-488.2,1987 programming interface


**Document History**

| Version/Status | Date | Author | | Notes |
|---|---|---|---|---|
| V09 | 2010-08-01 | jk | | first release |