

XSA1000P Series Spectrum Analyzer Specifications

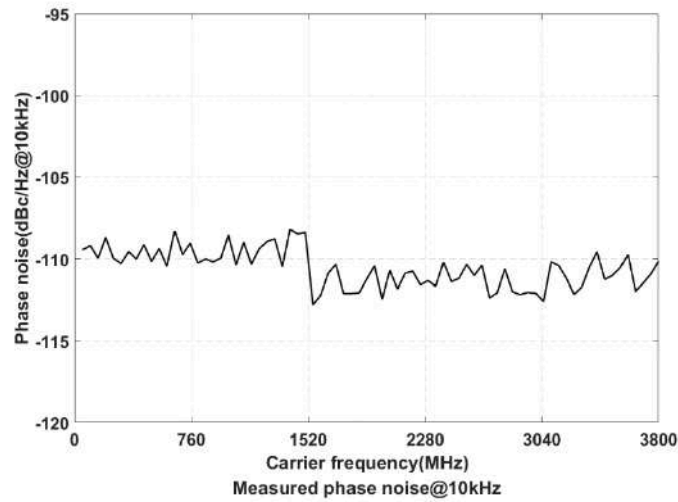
All technical specifications are guaranteed when the following conditions are met, unless otherwise stated:

- The instrument has been preheated for 30 minutes before use.
- The instrument is in the calibration cycle and has been self-calibrated.

"Typical" and "nominal" for this product are defined as follows

- Typical: Refers to the performance of the product under certain conditions.
- Nominal: Refers to the approximate value under product application process.

| Frequency | | |
|--|---|------------------------------|
| Frequency Range | XSA1015P (TG) | 9.000 kHz to 1.500000000 GHz |
| | XSA1032P (TG) | 9.000 kHz to 3.200000000 GHz |
| | XSA1036P (TG) | 9.000 kHz to 3.600000000 GHz |
| | XSA1075P (TG) | 9.000 kHz to 7.500000000 GHz |
| Frequency Resolution | 1 Hz | |
| Internal Reference Frequency | | |
| Reference Frequency | 10 MHz | |
| Reference Frequency Accuracy | $\pm[(\text{days since last calibrate} \times \text{freq aging rate}) + \text{temperature stability} + \text{initial accuracy}]$ | |
| Initial calibration accuracy | <1 ppm | |
| Temperature stability | 0°C to 50°C, reference to 25°C < 0.5 ppm | |
| Aging rate | <1 ppm/year | |
| Frequency Readout Accuracy | | |
| Marker frequency resolution | span / (number of sweep points - 1) | |
| Marker frequency uncertainty | $\pm(\text{frequency indication} \times \text{reference frequency accuracy} + 1\% \times \text{span} + 10\% \times \text{resolution bandwidth} + \text{marker frequency resolution})$ | |
| Frequency Counter | | |
| Resolution | 1 Hz, 10 Hz, 100 Hz, 1 kHz | |
| Uncertainty | $\pm(\text{frequency indication} \times \text{reference frequency accuracy} + \text{counter resolution})$ | |
| Frequency Span | | |
| Range | 0 Hz, 100 Hz to maximum frequency of instrument | |
| Uncertainty | $\pm \text{span} / (\text{number of sweep points} - 1)$ | |
| SSB Phase Noise (20°C to 30°C, fc=1 GHz) | | |
| Carrier Offset | 10 kHz | < -106 dBc/Hz (typical) |
| | 100 kHz | < -104 dBc/Hz (typical) |
| | 1 MHz | < -115dBc/Hz (typical) |



Residual FM (20°C to 30°C, RBW = VBW = 1 kHz)

Residual FM < 50 Hz (nominal)

Bandwidth

Resolution Bandwidth(-3dB) 1 Hz to 1 MHz (1-3-5-10 steps by sequence)

RBW accuracy < 5%, typical

Resolution Filter Shape Factor (60 dB : 3 dB) < 5 typical

Video Bandwidth (-3 dB) 10 Hz to 3 MHz(1-3-5-10 steps by sequence)

Resolution bandwidth (-6 dB) (EMI) 200 Hz, 9 kHz, 120 kHz, 1 MHz

Amplitude

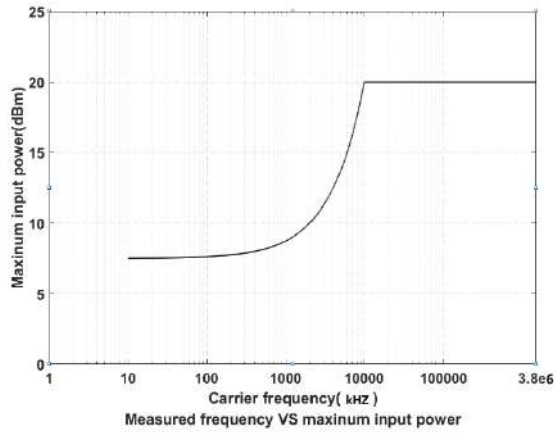
| | | |
|-----------------------------|---------------|---|
| Amplitude measurement range | XSA1015P (TG) | DANL to +10 dBm, 100 kHz to 10MHz, Preamp Off DANL to +20 dBm, 10 MHz to 1.5 GHz, Preamp Off |
| | XSA1032P (TG) | DANL to +10 dBm, 100 kHz to 10MHz, Preamp Off DANL to +20 dBm, 10 MHz to 3.2 GHz, Preamp Off |
| | XSA1036P (TG) | DANL to +10 dBm, 100 kHz to 10MHz, Preamp Off DANL to +20 dBm, 10 MHz to 3.6 GHz, Preamp Off |
| | XSA1075P (TG) | DANL to +10 dBm, 100 kHz to 10MHz, Preamp Off DANL to +20 dBm, 10 MHz to 7.5 GHz, Preamp Off |

Max Input Level

Input DC Voltage 50 V

Continuous power Attenuator =40dB
+20dBm (100 mW)

Max. damage level +30 dBm (1 W)



Display Average Noise Level

(attenuation = 0 dB, RBW = VBW = 100 Hz, sample detector, trace average ≥ 50, 20 °C to 30 °C, input impedance = 50 Ω)

| | | | |
|------------------|---------------|-------------------------------|-------------------------------|
| Preamp Off | XSA1015P (TG) | 9 kHz to 1 MHz | -95 dBm (Typical), <-88 dBm |
| | | 1 MHz to 500 MHz | -140 dBm (Typical), <-130dBm |
| | | 500 MHz to 1.5 GHz | -138 dBm (Typical), <-128dBm |
| | XSA1032P (TG) | 9 kHz to 1 MHz | -95 dBm (Typical), <-88 dBm |
| | | 1 MHz to 500 MHz | -140 dBm (Typical), <-130dBm |
| | | 500 MHz to 3.2 GHz | -138 dBm (Typical), <-128dBm |
| | XSA1036P (TG) | 9 kHz to 1 MHz | -95 dBm (Typical), <-88 dBm |
| | | 1 MHz to 500 MHz | -140 dBm (Typical), <-130dBm |
| | | 500 MHz to 3.6 GHz | -138 dBm (Typical), <-128dBm |
| | XSA1075P (TG) | 9 kHz to 1 MHz | -95 dBm (Typical), <-88 dBm |
| | | 1 MHz to 500 MHz | -140 dBm (Typical), <-130dBm |
| | | 500 MHz to 3.6 GHz | -138 dBm (Typical), <-128dBm |
| 3.6 GHz to 6 GHz | | -134 dBm (Typical), <-124dBm | |
| 6 GHz to 7.5 GHz | | -129 dBm (Typical), <-119dBm | |
| Preamp On | XSA1015P (TG) | 100 kHz to 1 MHz | -135 dBm (Typical), <-128 dBm |
| | | 1 MHz to 500 MHz | -160 dBm (Typical), <-150 dBm |
| | | 500 MHz to 1.5 GHz | -158 dBm (Typical), <-148 dBm |
| | XSA1032P (TG) | 100 kHz to 1 MHz | -135 dBm (Typical), <-128 dBm |
| | | 1 MHz to 500 MHz | -160 dBm (Typical), <-150 dBm |
| | | 500 MHz to 3.2 GHz | -158 dBm (Typical), <-148 dBm |
| | XSA1036P (TG) | 100 kHz to 1 MHz | -135 dBm (Typical), <-128 dBm |
| | | 1 MHz to 500 MHz | -160 dBm (Typical), <-150 dBm |
| | | 500 MHz to 3.6 GHz | -158 dBm (Typical), <-148 dBm |
| | XSA1075P (TG) | 100 kHz to 1 MHz | -135 dBm (Typical), <-128 dBm |
| | | 1 MHz to 500 MHz | -160 dBm (Typical), <-150 dBm |
| | | 500 MHz to 3.6 GHz | -158 dBm (Typical), <-148 dBm |
| 3.6 GHz to 6 GHz | | -154 dBm (Typical), <-144 dBm | |
| 6 GHz to 7.5 GHz | | -149 dBm (Typical), <-139 dBm | |

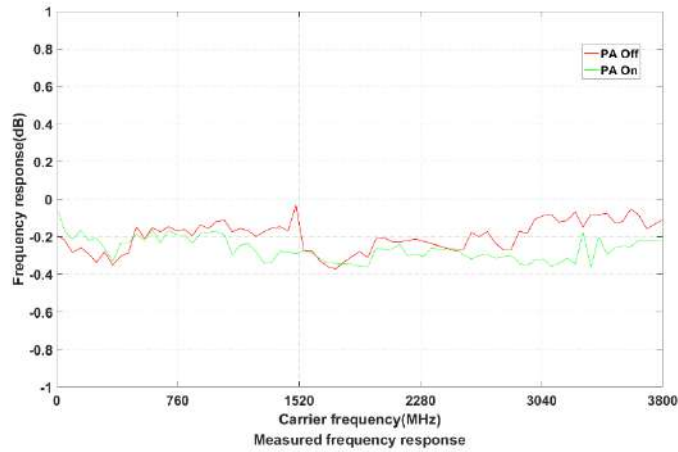
Level Display

| | |
|--------------------------|----------------------|
| Logarithmic level axis | 0.01 dB to 1000 dB |
| Linear level axis | 0 to reference level |
| Number of display points | 801 |
| Number of traces | 8 |

| | |
|---------------------|--|
| Trace detectors | positive-peak, negative-peak, normal, sample, RMS, voltage average |
| | quasi-peak |
| Trace functions | clear write, max hold, min hold, average, view, blank, trace math |
| Units of level axis | dBm, dBμW, dBpW, dBmV, dBμV, W, V |

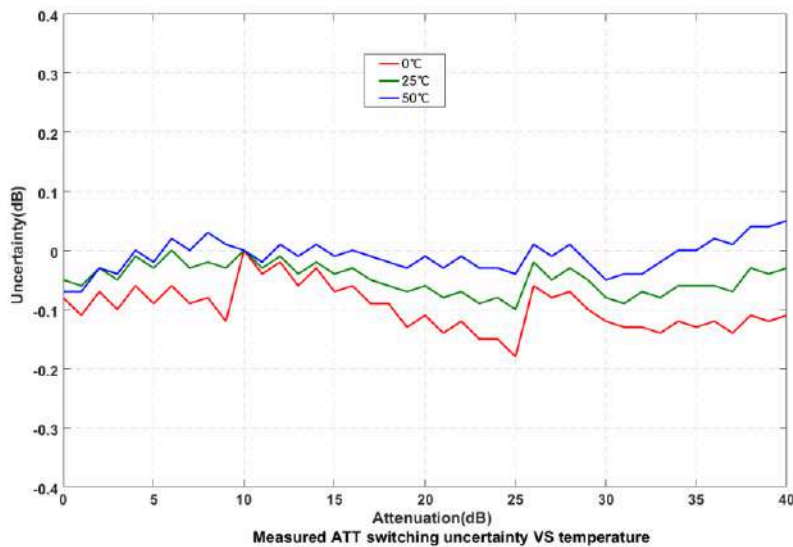
Frequency response
(20°C to 30°C, input attenuation=10 dB, reference frequency=50 MHz)

| | |
|-----------------------------------|--------------|
| Preamp Off ($f_c \geq 9K$) | ± 0.7 dB |
| Preamp On ($f_c \geq 50$ MHz) | ± 1.0 dB |



Input Attenuation Switching Uncertainty

| | |
|-----------------------|---|
| Setting range | 0 dB to 40 dB, in 1 dB step |
| Switching uncertainty | $f_c = 50$ MHz, relative to 10 dB, 20°C to 30°C |
| | < 0.5 dB |



Absolute Amplitude Uncertainty

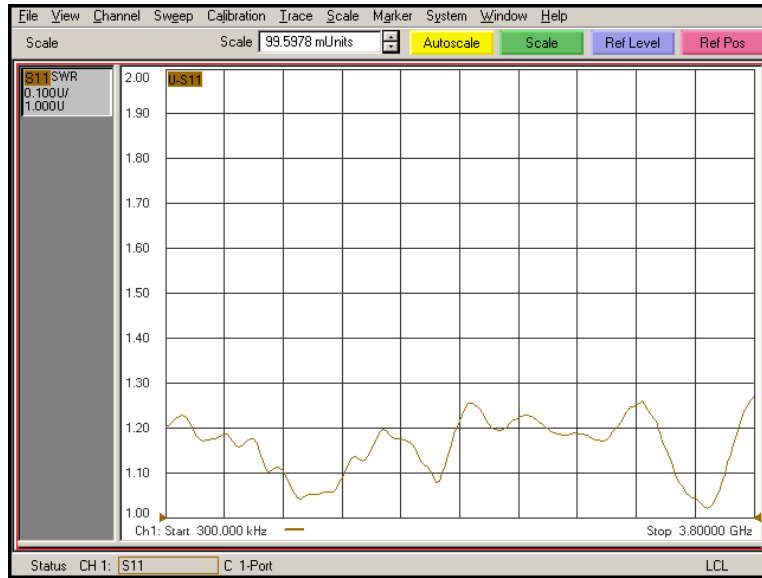
| | |
|-------------|---|
| Uncertainty | $f_c = 50$ MHz, peak detector, preamplifier off, attenuation = 10 dB, input signal level = -10dBm, 20°C to 30°C |
| | < 0.4 dB |

RBW Switching Uncertainty

| | |
|-------------|------------------------|
| Uncertainty | relative to 10 kHz RBW |
| | < 0.1 dB |

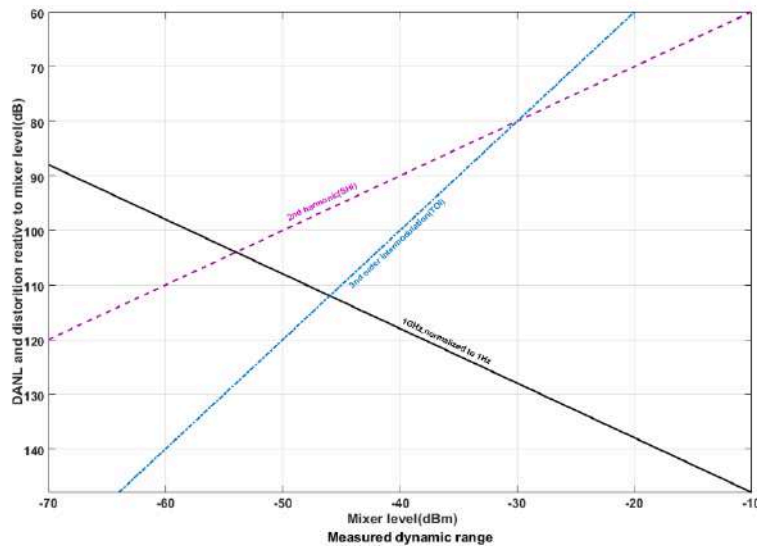
Reference Level

| | | | |
|---|---------------|----------------------------------|-----------------|
| Range | | -80 dBm to +30 dBm, in 1 dB step | |
| Resolution | log scale | 0.01 dB | |
| | linear scale | 4 digits | |
| Preamplifier input signal range 0 dBm to -50 dBm | | | |
| Gain | XSA1015P (TG) | 100 kHz to 1.5 GHz | 20 dB (nominal) |
| | XSA1032P (TG) | 100 kHz to 3.2 GHz | |
| | XSA1036P (TG) | 100 kHz to 3.6 GHz | |
| | XSA1075P (TG) | 100 kHz to 7.5 GHz | |
| Level Measurement Uncertainty (95% confidence level, S/N > 20 dB, RBW = VBW = 1 kHz, preamplifier off, attenuation = 10 dB, -50 dBm < input level ≤ 0 dBm, fc > 10 MHz, 20°C to 30°C) | | | |
| Level Measurement Uncertainty | | <0.7 dB | |
| <p>Measured level measurement uncertainty(-10dBm input) VS temperature</p> | | | |
| RF Input VSWR (attenuation ≥ 10 dB) | | | |
| VSWR | XSA1015P (TG) | 300 kHz to 1.5 GHz | <1.8 (nominal) |
| | XSA1032P (TG) | 300 kHz to 3.2 GHz | |
| | XSA1036P (TG) | 300 kHz to 3.6 GHz | |
| | XSA1075P (TG) | 300 kHz to 7.5 GHz | |



Distortion

| | |
|---------------------------------------|--|
| Second harmonic distortion | $f_c \geq 50$ MHz, Preamp off, signal input -20 dBm, attenuation = 10 dB $> +45$ dBc |
| Third-order intermodulation | $f_c \geq 50$ MHz, two -20 dBm tones at input mixer spaced by 200 kHz, attenuation = 0 dB $> +14$ dBm |
| 1 dB Gain Compression | |
| 1dB compression of input mixer (P1dB) | $f_c \geq 50$ MHz, 0 dB RF attenuation > -2 dBm, nominal |



Spurious Response

| | |
|--------------------------|---|
| Residual response | connect 50 Ω load at input port, 0 dB input attenuation, 20°C to 30°C < -90 dBm, typical |
| Intermediate frequency | < -60 dBc |
| System related sidebands | referenced to local oscillators, referenced to A/D conversion, referenced to subharmonic of first LO, referenced to harmonic of first LO < -60 dBc |
| Input related spurious | -30 dBm signal at input mixer < -80 dBc |

| Sweep | | |
|--|--|---|
| Sweep Time | Span≥10 Hz | 10 ms to 3000 s |
| | Zero Span | 33.33 us to 3000 s |
| Sweep time uncertainty | span ≥ 100 Hz: 5% (nominal) zero span (sweep time setting value > 1 ms): 5% (nominal) | |
| Sweep Mode | Continuous, Single | |
| Trigger | | |
| Trigger source | free run, video, external | |
| External trigger level | 5 V TTL level | |
| Tracking Generator (Option) | | |
| Tracking Generator Output | | |
| Frequency Range | XSA1075P (TG) | 100 kHz to 1.5 GHz |
| | XSA1032P (TG) | 100 kHz to 3.2 GHz |
| | XSA1036P (TG) | 100 kHz to 3.6 GHz |
| | XSA1075P (TG) | 100 kHz to 7.5 GHz |
| Output power level range | -40 dBm to 0 dBm | |
| Output power level resolution | 1 dB | |
| Output flatness | relative to 50 MHz ±3 dB(nominal) | |
| Tracking generator spurious | Harmonic spurious | -20 dBc (Tracking generator output power = -10 dBm) |
| | Non-harmonic | -20 dBc(Tracking generator output power = -10 dBm) |
| Tracking generator to input terminal isolation | -60 dB (Tracking generator output power = 0 dBm) | |



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V1.0.1