SPECIFICATIONS

PXI-5690

RF Amplifier

Contents

Definitions

Warranted specifications describe the performance of a model under stated operating conditions and are covered by the model warranty.

NATIONAL INSTRUMENTS

The following characteristic specifications describe values that are relevant to the use of the model under stated operating conditions but are not covered by the model warranty.

- *Typical* specifications describe the performance met by a majority of models.
- *Nominal* specifications describe an attribute that is based on design, conformance testing, or supplemental testing.

Specifications are *Typical* unless otherwise noted.

Conditions

Specifications are valid under the following conditions unless otherwise noted.

- 15-minute warm-up time at 25 °C ambient temperature.
- Calibration cycle maintained
- 100 kHz to 3.0 GHz

Frequency Range

Frequency range	100 kHz to 3.0 GHz

Channels

Number of channels	2
Gain	
Channel 0	Fixed
Channel 1	Programmable

Channel 0 (CH 0)

Channel 0 (CH 0) Main Path

Gain calibration accuracy	±0.4 dB[1]
Gain variation by temperature	Less than -0.03 dB/°C
Maximum output power	+20 dBm
Output 1 dB compression	+18 dBm, typical
Second harmonic at +4 dBm	-40 dBc, typical

[1] Under 500 kHz, ±1.5 dB. For all frequencies, degrades by ±0.03 dB/°C outside by 15 °C to 35 °C temperature range.

Survival input power	-10 dBm, maximum
DC voltage at input	±20 V, maximum[2]

Channel 0 Performance

Figure 1. Gain [3]

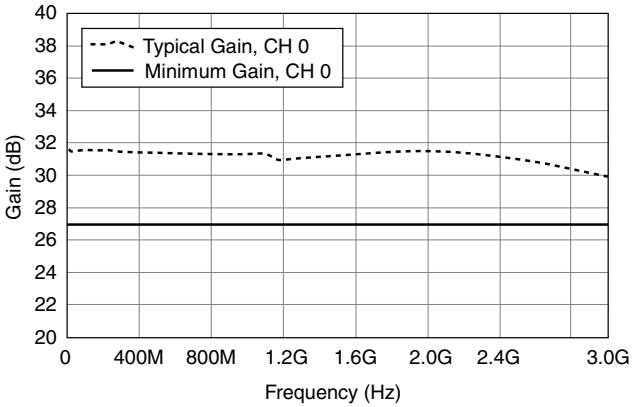
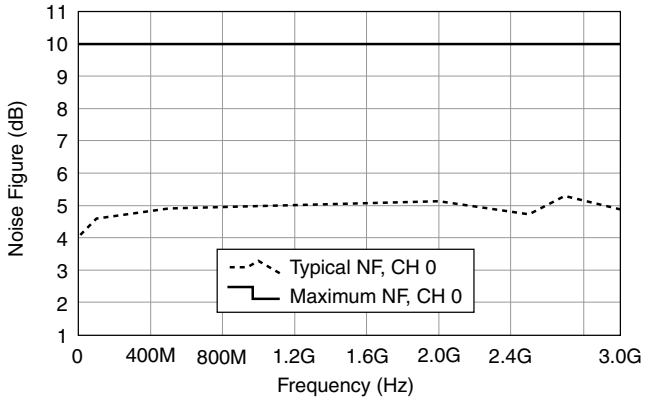


Figure 2. Noise Figure (NF) [4]



[2] Nondamaging for steady-state DC only. Direct path passes input DC level to output.
[3] Typical flatness ±0.5 dB.
[4] For all frequencies, typical NF variation of ≤0.8 dB across entire operating temperature range.

Figure 3. Input and Output Voltage Standing Wave Ratio (VSWR)

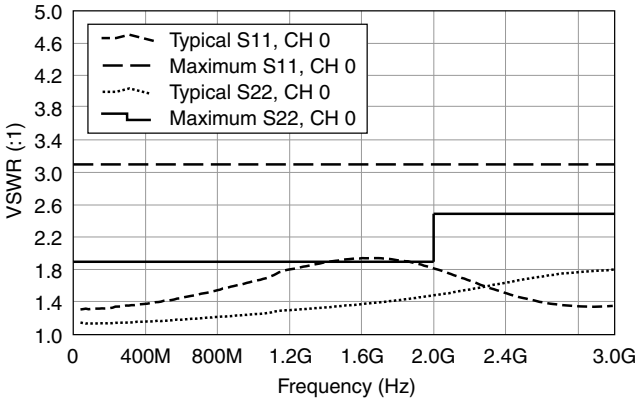
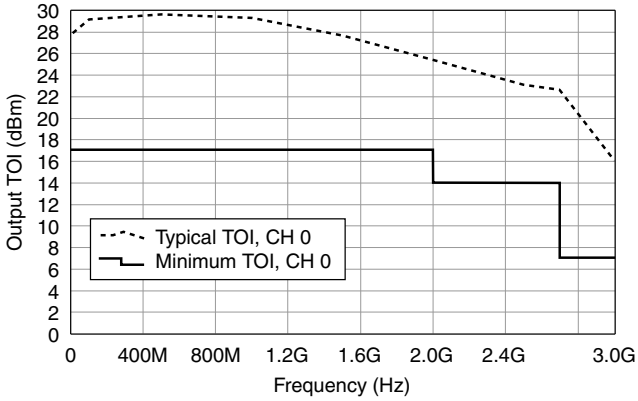
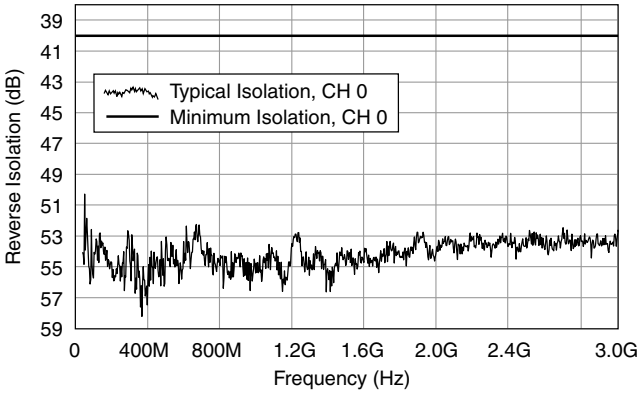


Figure 4. Output Third Order Intercept (TOI)[5]



[5] For all frequencies, typical TOI variation of ≤2.5 dB across entire operating temperature range.

Figure 5. Reverse Isolation



Channel 1

Channel 1 (CH 1) Main Path

Gain calibration accuracy	±0.4 dB[6]
Gain variation by temperature	Less than -0.03 dB/°C
Maximum output power	+20 dBm
Output 1 dB compression	+16 dBm, typical
Second harmonic at +4 dBm	-40 dBc, typical
Survival input power	+20 dBm, maximum (with attenuation)
DC voltage at input	±20 V, maximum[7]

[6] Under 500 kHz, ±1.5 dB. For all frequencies, degrades by ±0.03 dB/°C outside by 15 °C to 35 °C temperature range.

[7] Nondamaging for steady-state DC only. Direct path passes input DC level to output.

Channel 1 Performance, Main Path

Figure 6. Programmable Gain Range [8]

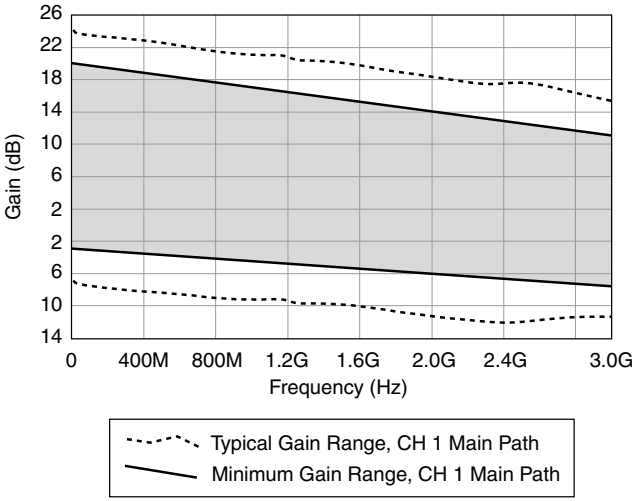
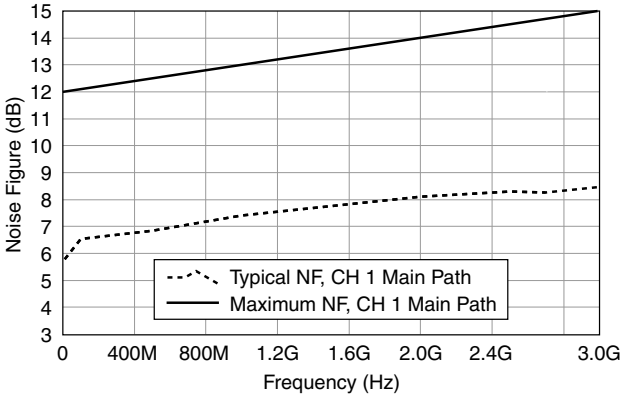


Figure 7. Noise Figure (NF)[9]



[8] Available in nominal 1 dB steps.

[9] For all frequencies, typical NF variation of ≤0.8 dB across entire operating temperature range.

Figure 8. Input and Output VSWR

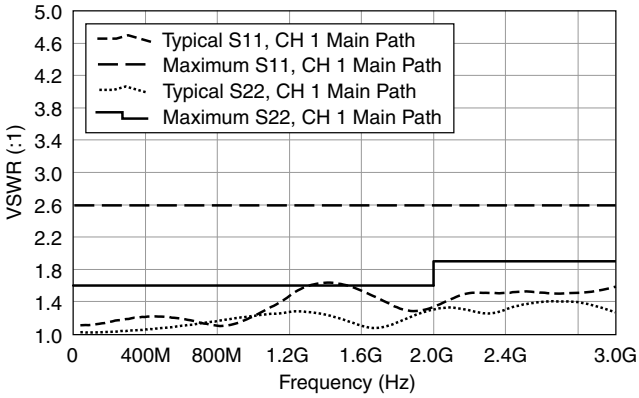
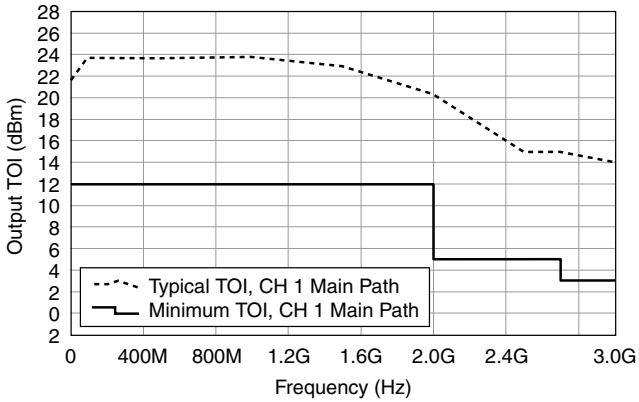
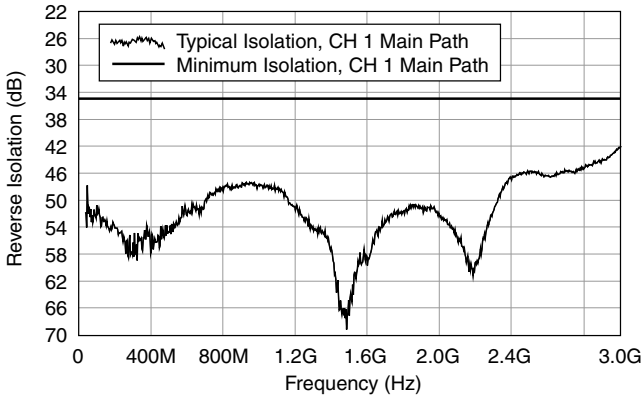


Figure 9. Output TOI [10]



[10] For all frequencies, typical TOI variation of ≤2.5 dB across entire operating temperature range.

Figure 10. Reverse Isolation



Channel 1 (CH 1) Direct Path

Insertion loss calibration accuracy	±0.4 dB[11]
Survival input power	+20 dBm, maximum (with attenuation)
DC voltage at input	±20 V, maximum[12]

[11] Under 500 kHz, ±1.5 dB. For all frequencies, degrades by ±0.03 dB/°C outside by 15 °C to 35 °C temperature range.

[12] Nondamaging for steady-state DC only. Direct path passes input DC level to output.

Channel 1 Performance, Direct Path

Figure 11. Insertion Loss

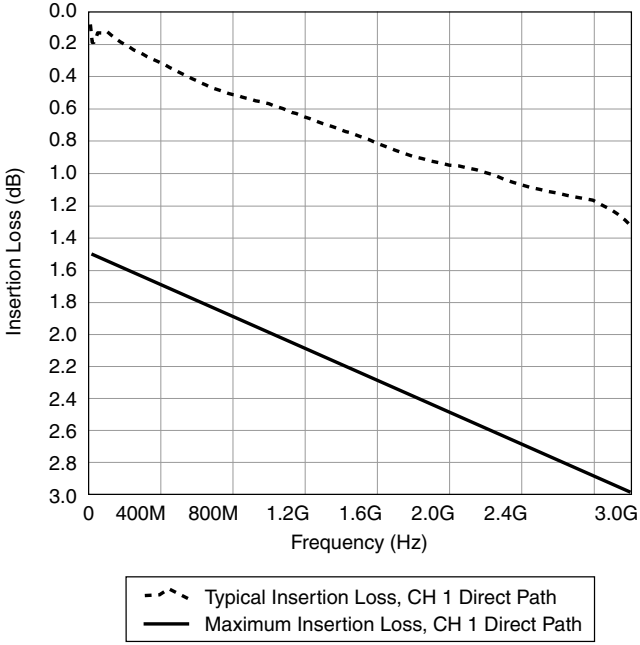
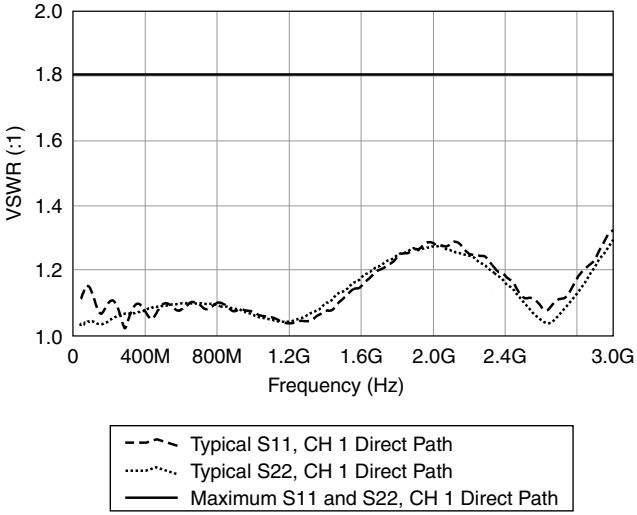


Figure 12. Input and Output VSWR



Power Requirements

Power Rail (V_{DC})	Maximum Current (mA)	Typical Current (mA)
+3.3	150	110
+5	0	0
+12	350	300
–12	10	3

Calibration

Interval	1 year

Physical Characteristics

Front Panel Connectors

CH 0 IN	
Connector	SMA female
Impedance	50 Ω
Coupling	AC
Input amplitude	-10 dBm, maximum
CH 0 OUT	
Connector	SMA female
Impedance	50 Ω
Output amplitude	+20 dBm, maximum
CH 1 IN	
Connector	SMA female
Impedance	50 Ω
Main path coupling	AC [13]
Input amplitude	+20 dBm, maximum (with attenuation)[14]
CH 1 OUT	
Connector	SMA female
Impedance	50 Ω
Output amplitude	+20 dBm, maximum

Physical Dimensions

Dimensions	3U, One Slot, PXI/cPCI Module 21.6 cm × 2.0 cm × 13.0 cm (8.5 in. × 0.8 in. × 5.1 in.)
Weight	263 g (9.2 oz)

[13] Direct path passes input DC level to output.

[14] To achieve required level of attenuation, set gain to ≤15 dB for input frequencies ≤1.5 GHz or set gain to ≤10 dB for input frequencies >1.5 GHz .

Environment

Maximum altitude	2,000 m (at 25 °C ambient temperature)
Pollution Degree	2

Indoor use only.

Operating Environment

Ambient temperature range	0 to 55 °C (Tested in accordance with IEC 60068-2-1 and IEC 60068-2-2.)
Relative humidity range	10% to 90%, noncondensing (Tested in accordance with IEC 60068-2-56.)

Storage Environment

Ambient temperature range	-40 °C to 70 °C (Tested in accordance with IEC 60068-2-1 and IEC 60068-2-2.)
Relative humidity range	5% to 95%, noncondensing (Tested in accordance with IEC 60068-2-56.)

Shock and Vibration

Operational shock	30 g peak, half-sine, 11 ms pulse (Tested in accordance with IEC 60068-2-27. Test profile developed in accordance with MIL-PRF-28800F.)
Random vibration	
Operating	5 Hz to 500 Hz, 0.3 g_{rms}
Nonoperating	5 Hz to 500 Hz, 2.4 g_{rms} (Tested in accordance with IEC 60068-2-64. Nonoperating test profile exceeds the requirements of MIL-PRF-28800F, Class 3.)

Compliance and Certifications

Safety

This product is designed to meet the requirements of the following electrical equipment safety standards for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA C22.2 No. 61010-1

Note For UL and other safety certifications, refer to the product label or the *Online Product Certification* section.

Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326-1 (IEC 61326-1): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

Note In the United States (per FCC 47 CFR), Class A equipment is intended for use in commercial, light-industrial, and heavy-industrial locations. In Europe, Canada, Australia, and New Zealand (per CISPR 11), Class A equipment is intended for use only in heavy-industrial locations.

Note Group 1 equipment (per CISPR 11) is any industrial, scientific, or medical equipment that does not intentionally generate radio frequency energy for the treatment of material or inspection/analysis purposes.

Note For EMC declarations, certifications, and additional information, refer to the *Online Product Certification* section.

CE Compliance CE

This product meets the essential requirements of applicable European Directives, as follows:

- 2014/35/EU; Low-Voltage Directive (safety)
- 2014/30/EU; Electromagnetic Compatibility Directive (EMC)

Online Product Certification

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for this product, visit *ni.com/*

certification, search by model number or product line, and click the appropriate link in the Certification column.

Environmental Management

NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the *Minimize Our Environmental Impact* web page at *ni.com/environment*. This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

Waste Electrical and Electronic Equipment (WEEE)

EU Customers At the end of the product life cycle, all NI products must be disposed of according to local laws and regulations. For more information about how to recycle NI products in your region, visit *ni.com/environment/weee*.

电子信息产品污染控制管理办法（中国 RoHS）

中国客户 National Instruments 符合中国电子信息产品中限制使用某些有害物质指令(RoHS)。关于 National Instruments 中国 RoHS 合规性信息，请登录 `ni.com/environment/rohs_china`。(For information about China RoHS compliance, go to `ni.com/environment/rohs_china`.)

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