

z8811
RF Front End Module
PXI



Port Descriptions



Front Panel

| Label | Type | Description |
|--------------|------|---------------------|
| RF 1 IN | SMA | RF1 Input |
| RFT/R IN/OUT | SMA | RF Transmit/Receive |
| RF2 OUT | SMA | RF2 Output |

RF Input

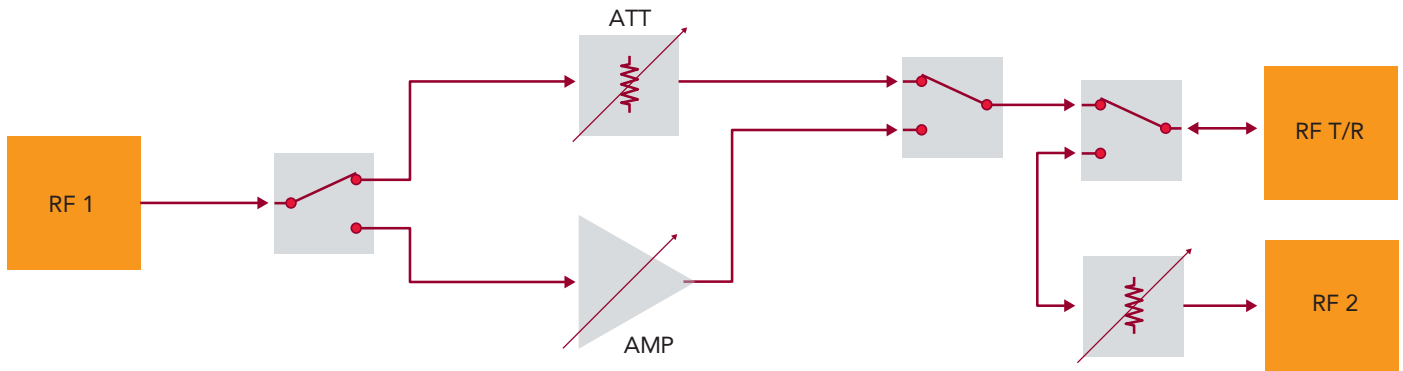


Figure 1: Simplified Block Diagram Showing RF Channels

RF1 Input

| Specification | Value |
|------------------------------------|----------------------------|
| Input Impedance | 50 Ω |
| Frequency Range | 250 MHz to 6 GHz |
| Input VSWR | |
| Attenuator Path (0 dB ATT) | |
| 500 MHz to 3 GHz | $\leq 1.2:1$ (-20.8 dB RL) |
| 3 GHz to 4 GHz | $\leq 1.4:1$ (-15.5 dB RL) |
| 4 GHz to 6 GHz | $\leq 1.9:1$ (-10.1 dB RL) |
| Attenuator Path (10 dB ATT) | |
| 500 MHz to 3 GHz | $\leq 1.2:1$ (-20.8 dB RL) |
| 3 GHz to 6 GHz | $\leq 1.5:1$ (-14.0 dB RL) |
| Amplifier Path | |
| 500 MHz to 3 GHz | $\leq 1.5:1$ (-14.0 dB RL) |
| 3 GHz to 6 GHz | $\leq 1.7:1$ (-11.7 dB RL) |
| Typical Configuration | Gain: Typical settings |
| Attenuator Path | -30 to -7 dB |
| Amplifier Path | -7 to +20 dB |
| Absolute Maximum Input (no damage) | +25 dBm |
| Connectors | SMA |

RF1 Input Programmable Gain

| Specification | Value |
|--|--|
| Gain Range (0.5 dB steps) 500 MHz to 2000 MHz 2000 MHz to 5800 MHz 5800 MHz to 6000 MHz | -35 dB to +20 dB -37 dB to +17 dB -38 dB to +16 dB |
| Gain Accuracy (at 25°C ambient) | ≤ ±0.5 dB ≤ ±0.25 dB typical |
| Gain Temperature Drift | < -0.01 dB/°C |
| Gain Switching Speed | ≤ 1 ms |

RF T/R Input

| Specification | Value |
|--|--|
| Input Impedance | 50 Ω |
| Frequency Range | 250 MHz to 6 GHz |
| Input VSWR 500 MHz to 3 GHz 3 GHz to 4 GHz 4 GHz to 6 GHz | ≤ 1.2:1 (-20.8 dB RL) ≤ 1.4:1 (-15.5 dB RL) ≤ 2.0:1 (-9.5 dB RL) |
| Typical Configuration Attenuator OFF Attenuator ON | Gain: 0 dB + Insertion Loss -10 dB + Insertion Loss |
| Absolute Maximum Input (no damage) | +30 dBm |
| Connectors | SMA |

RF T/R Input Programmable Gain

| Specification | Value |
|---------------------------------|---|
| Gain Range | -10 to 0 dB + Insertion Loss 1 Bit Step Attenuator |
| Gain Accuracy (at 25°C ambient) | ≤ ±0.5 dB |
| Gain Temperature Drift | < -0.01 dB/°C |
| Gain Switching Speed | ≤ 1 ms |

RF Output

RFT/R Output

| Specification | Value |
|---|---|
| Output Impedance | 50 Ω |
| Frequency Range | 250 MHz to 6 GHz |
| Output VSWR 500 MHz to 4 GHz 4 GHz to 5.4 GHz 5.4 GHz to 6 GHz | $\leq 1.2:1$ (-20.8 dB RL) $\leq 1.4:1$ (-15.5 dB RL) $\leq 2.0:1$ (-9.5 dB RL) |
| Absolute Maximum Output | +32 dBm |
| Connectors | SMA |

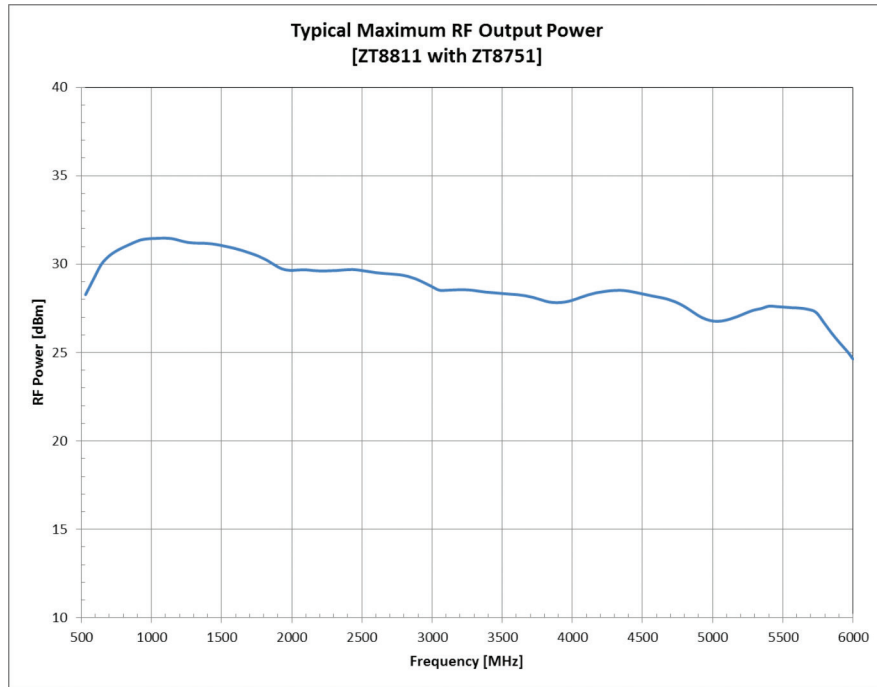
RF 2 Output

| Specification | Value |
|--|--|
| Output Impedance | 50 Ω |
| Frequency Range | 250 MHz to 6 GHz |
| Output VSWR Attenuator Path (0 dB ATT) 500 MHz to 3 GHz 3 GHz to 4 GHz 4 GHz to 6 GHz Attenuator Path (10 dB ATT) 500 MHz to 3 GHz 3 GHz to 6 GHz | $\leq 1.2:1$ (-20.8 dB RL) $\leq 1.4:1$ (-15.5 dB RL) $\leq 1.9:1$ (-10.1 dB RL) $\leq 1.2:1$ (-20.8 dB RL) $\leq 1.5:1$ (-14.0 dB RL) |
| Absolute Maximum Output | +27 dBm |
| Connectors | SMA |

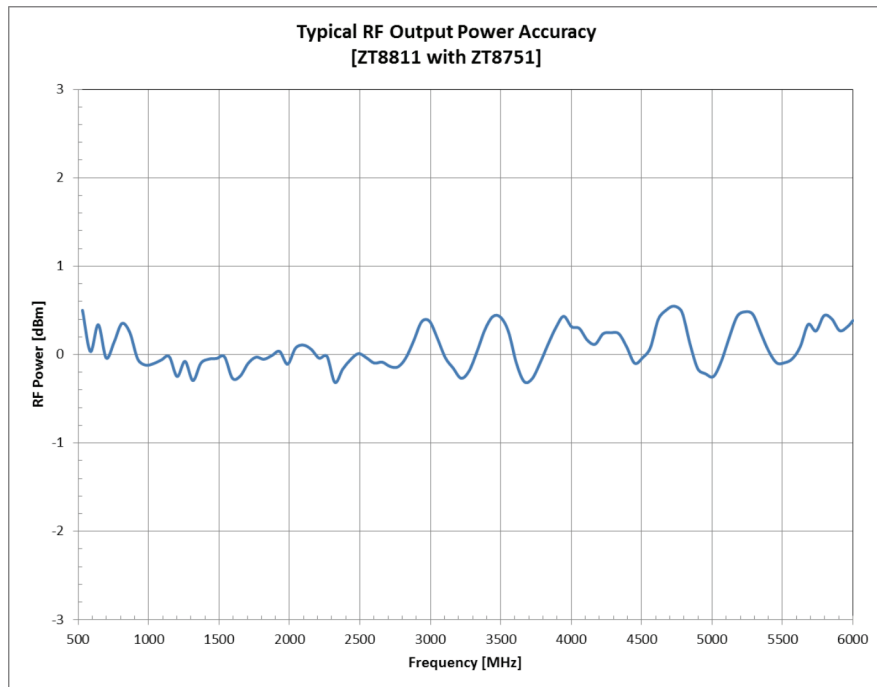
RF T/R MAX Output Level (Saturated Output Power)

| Specification | Value |
|---|--|
| Saturated Output Power (Peak Power) 500 MHz to 2000 MHz 2000 MHz to 4000 MHz 4000 MHz to 5800 MHz 5800 MHz to 6000 MHz | +31.25 dBm +29.75 dBm +27.75 dBm +25.50 dBm |

RF T/R Typical MAX Output Power when used with z8751



RF T/R Typical Output Level Accuracy when used with z8751 (< +/- 0.5 dB)



RF Programmable Amplifier/Attenuator

Noise Figure

| Specification | Value |
|---------------------|---------------------------|
| 500 MHz to 6000 MHz | < 5 dB (Max Gain Setting) |

OIP3

| Specification | Value |
|----------------------|------------|
| 500 MHz to 750 MHz | +37.00 dBm |
| 750 MHz to 1500 MHz | +38.00 dBm |
| 1500 MHz to 5800 MHz | +37.00 dBm |
| 5800 MHz to 6000 MHz | +36.00 dBm |

P1dB

| Specification | Value |
|----------------------|------------|
| 500 MHz to 750 MHz | +26.00 dBm |
| 750 MHz to 1500 MHz | +27.25 dBm |
| 1500 MHz to 4500 MHz | +26.25 dBm |
| 4500 MHz to 5800 MHz | +25.75 dBm |
| 5800 MHz to 6000 MHz | +25.00 dBm |

Backplane Trigger 0-7

| Specification | Value |
|---------------|---------------|
| Functionality | Not supported |
| Direction | Input |

Instrument Stored States

| Specification | Value |
|---------------|---|
| Functionality | Non-volatile storage of instrument setup configuration |
| Stored States | 30 State 0 is Reset State Power-On State programmable |

LED Indicators

| Specification | Value |
|---------------|--|
| RDY (Ready) | OFF: Hardware failure ON: Passed power-up self-test TOGGLE: Error pending in queue |
| HST (Host) | ON: Idle PULSE: Instrument Identify enabled |

PXI Interface

| Specification | Value |
|--|---|
| PXI Slot Compatibility | PXI Standard Slot and PXIe Hybrid Slot Compatible |
| PXI Timing & Triggering Signals (XJ4 Connector) | PXI_TRIG[0:7] input/output PXI_STAR input PXI_CLK10 input |

Power & Cooling

Power Supplies

| Platform | Voltage | Typical Current | Maximum Current |
|----------|--|--------------------------------------|--------------------------------------|
| PXI | +3.3 VDC +5 VDC +12 VDC -12 VDC | 0.25 A 3.12 A 0.03 A 0.00 A | 0.25 A 3.33 A 0.03 A 0.00 A |

Total Cooling & Power Consumption

| Platform | Typical Cooling & Power | Maximum Cooling & Power |
|----------|-------------------------|-------------------------|
| PXI | 16.7 W | 17.8 W |

Physical & Environmental

Size & Weight

| Specification | Value |
|---------------|--|
| Physical Size | Single-Wide 3U PXI Instrument |
| Dimensions | 8.25" x 0.79" x 5.25" (L x W x H) 20.96 cm x 2.01 cm x 13.34 cm (L x W x H) |
| Weight | 12.35 oz or 350 g |

Temperature Range

| Specification | Value |
|-------------------|---|
| Operating | 0°C to +50°C ambient (MIL-PRF28800F Class 3) |
| Storage | -40°C to +75°C ambient (MIL-PRF28800F Class 3) |
| Calibration Range | +20°C to +30 °C ambient, after 20 minute warm-up period, to meet all specification accuracies |
| Over-Temperature | Automatic shutdown if internal temperature exceeds +70°C |

Relative Humidity

| Specification | Value |
|---|--|
| Operating or Storage < +30 °C +30 °C to +40 °C > 40 °C | 5 to 95 ± 5%, non-condensing 5 to 75 ± 5%, non-condensing 5 to 45 ± 5%, non-condensing |

Altitude

| Specification | Value |
|---------------|-------------|
| Operating | Up to 5 km |
| Storage | Up to 15 km |

Terminology

Numeric Prefixes

When referring to numeric values, this document will use SI (International System of Units) and IEC (International Electrotechnical Commission) standard prefixes. Prefix definitions are in the following table.

| Prefix | Multiplier |
|------------|--------------------|
| n (nano) | 1/(1000x1000x1000) |
| μ (micro) | 1/(1000x1000) |
| m (milli) | 1/1000 |
| k/K (kilo) | 1000 |
| M (Mega) | 1000x1000 |
| G (Giga) | 1000x1000x1000 |
| Ki (Kibi) | 1024 |
| Mi (Mebi) | 1024x1024 |
| Gi (Gibi) | 1024x1024x1024 |

Differential Outputs

Single-Ended is used to refer to the output on either the + or – output pin

Differential is used to refer to the output between the + and- output pins

Vd indicates Volts differential

Vppd indicates Volts peak-to-peak differential

Safety

This product is designed to meet the requirements of the following standard of safety for electrical equipment for measurement, control and laboratory use: EN 61010-1

Electromagnetic Compatibility

CE Marking EN 61326-1:1997 with A1:1998 and A2:2001 Compliant

FCC Part 15 (Class A) Compliant

Emissions

| | |
|---------------|--|
| EN 55011 | Radiated Emissions, ISM Group 1, Class A, distance 10 m, emissions < 1 GHz |
| EN 55011 | Conducted Emissions, Class A, emissions < 30 MHz Immunity |
| EN 61000-4-2 | Electrostatic Discharge (ESD), 4 kV by Contact, 8 kV by Air |
| EN 61000-4-3 | RF Radiated Susceptibility, 10 V/m |
| EN 61000-4-4 | Electrical Fast Transient Burst (EFTB), 2 kV AC Power Lines |
| EN 61000-4-5 | Surge |
| EN 61000-4-6 | Conducted Immunity |
| EN 61000-4-8 | Power Frequency Magnetic Field, 30 A/m |
| EN 61000-4-11 | Voltage Dips and Interrupts |

CE Compliance

This product meets the necessary requirements of applicable European Directives for CE Marking as follows:

73/23/EEC Low Voltage Directive (Safety)

89/336/EEC Electromagnetic Compatibility Directive (EMC)

See Declaration of Conformity for this product for additional regulatory compliance information.

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Doc: 1075-1008-001
March 2014 Rev 1