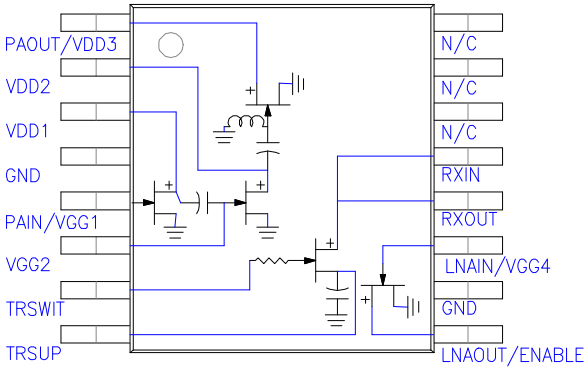
3.6V Integrated RF Front-End for 2.4GHz ISM
ITT2302GF

PRELIMINARY

FEATURES

- Suitable for HomeRF, SWAP or World-Wide DECT
- 3.6V operation
- Single positive supply
- Saturated version of ITT2304GF
- 45% power added efficiency
- 100% duty cycle
- 1.6 dB LNA noise figure
- 16 Pin TSSOP full downset plastic package
- Self-Aligned MSAG®-Lite MESFET process



Note: Full Downset Paddle Soldered to Board Ground

Description

The ITT2302GF is an integrated RF front-end that includes a power amplifier, low noise amplifier, and switch in one surface mount package. This product is not intended for use in linear applications – use the ITT2304GF for linear modulation schemes.

Maximum Ratings (T_A = 25 °C unless otherwise noted)

Rating	Symbol	Value	Unit
DC Drain Supply Voltage	V_{DD}	5.5 V	Vdc
RF Input Power, PA_{IN}	P_{IN}	30	mW
RF Input Power, LNA_{IN}	P_{IN}	10	mW
Junction Temperature	T_J	+150	°C
Storage Temperature	T_{STG}	-40 to +150	°C

ELECTRICAL CHARACTERISTICS T_S = 33 °C (Note 1), Output externally matched to 50 Ω

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency	f	2400	—	2500	MHz
Transmit Path (Power Amplifier + T/R Switch) $V_{DD1,2,3}$= 3.6V, P_{IN}= -2 dBm, TR_{SUP}=3.6V, TR_{SWIT}=3.6V, LNA_{ENABLE}=0.0V, f=2450MHz					
Load Power (at Ant)	P_{OUT}		25		dBm
Current Consumption	$I_{DD1,2,3}$		280		mA
Input VSWR			2:1		
Harmonics	—		-35		dBc
Duty Cycle	—			100	%
Forward Isolation (RF_{IN} to Ant) $V_{DD1,2,3}$=0.0V	—		55		dB
Forward Isolation (ANT to LNA_{OUT})	—		33		dB
Thermal Resistance (Junction of 3rd stage FET to solder point of downset paddle)	R_{th}		34.6		°C/W
Receive Path (T/R Switch + Low Noise Amplifier) $V_{DD1,2,3}$= 0.0V, TR_{SUP}=3.6V, TR_{SWIT}=0.0V, LNA_{ENABLE}=2.4V, f=2450MHz					
Current Consumption	LNA_{ENABLE}		4.5		mA
Noise Figure (Ant to LNA_{OUT})	NF		2.4		dB
Gain (Ant to LNA_{OUT})	G		14		dB
Reverse Isolation (LNA_{OUT} to ANT)	—		20		dB
Third-Order Input Intercept Point	IIP_3		3.2		dBm

Note 1: T_S is the temperature measured at the soldering point of the downset paddle on the bottom of the IC, mounted on 10 mil FR4 evaluation board in a free air condition with ambient room temperature T_A=25 °C. The electrical data presented herein was taken with the evaluation board shown in Figure 6, under room temperature conditions and CW operation, unless otherwise specified.

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TYPICAL CHARACTERISTICS

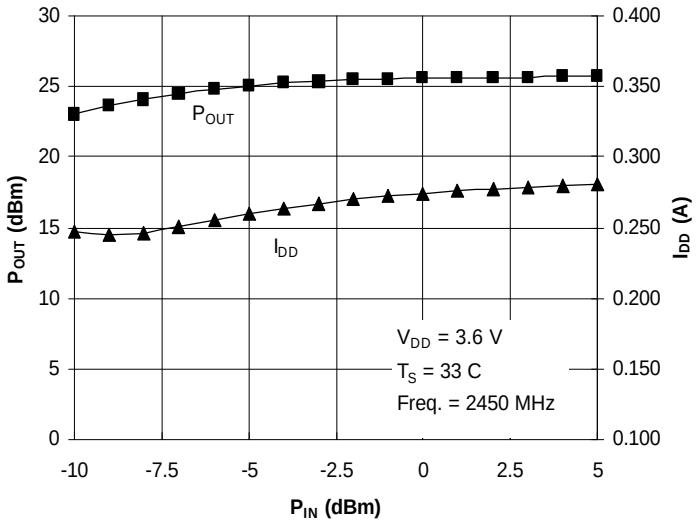

Figure 1. Output power and supply current vs. input power

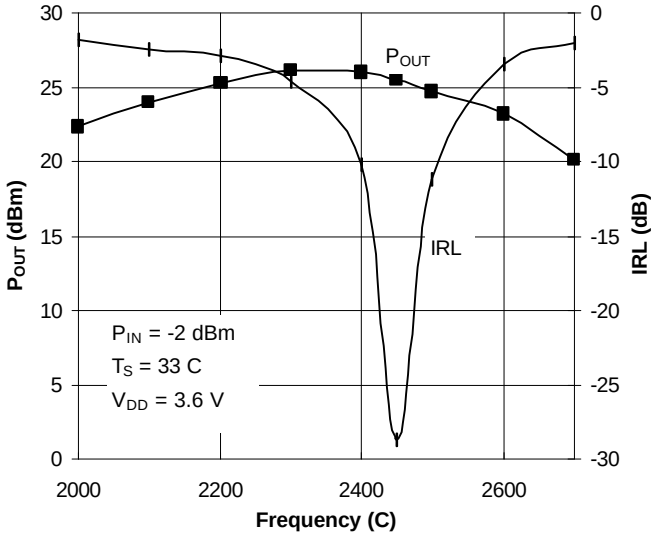

Figure 2. Output power and input return loss vs. frequency.

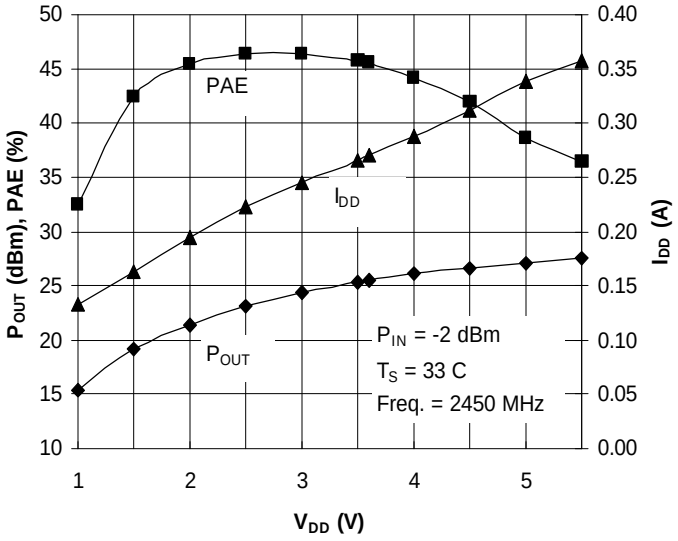

Figure 3. Output power and supply current vs. supply voltage

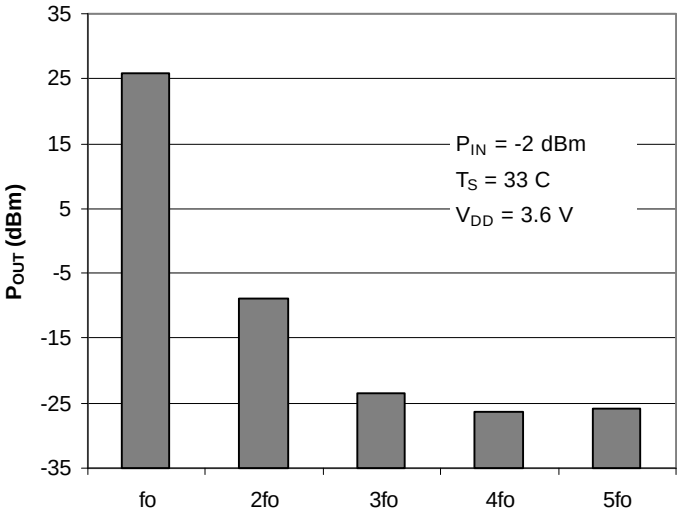

Figure 4. Harmonics

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TYPICAL CHARACTERISTICS (CONT)

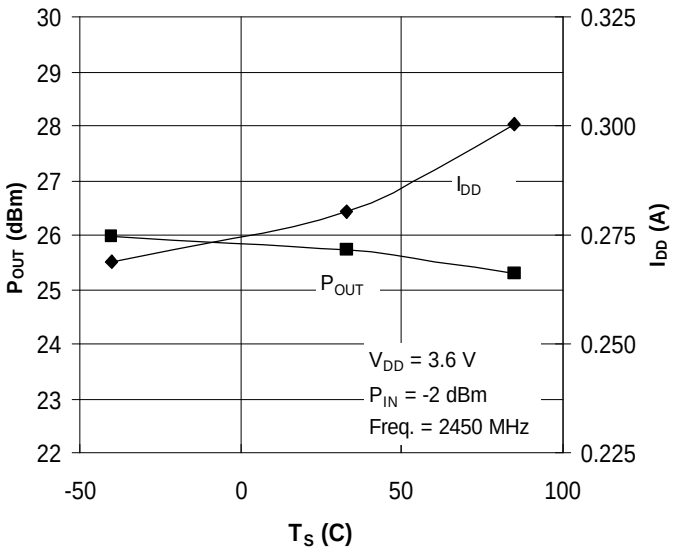

Figure 5. Output power and supply current vs. temperature

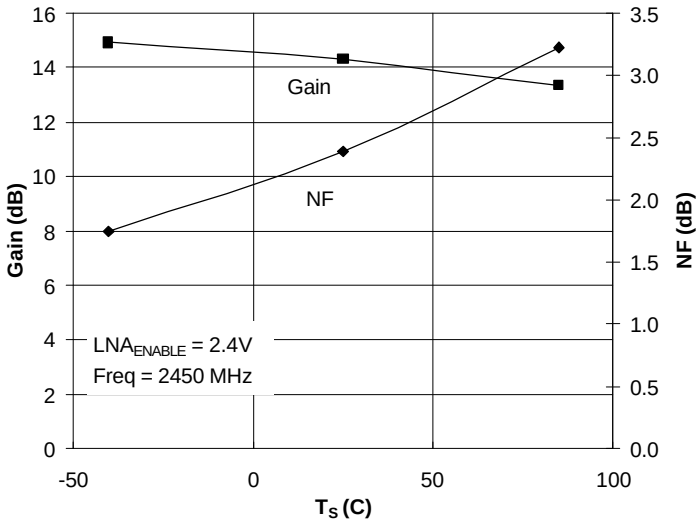

Figure 6. Noise figure and gain vs. temperature

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APPLICATION INFORMATION

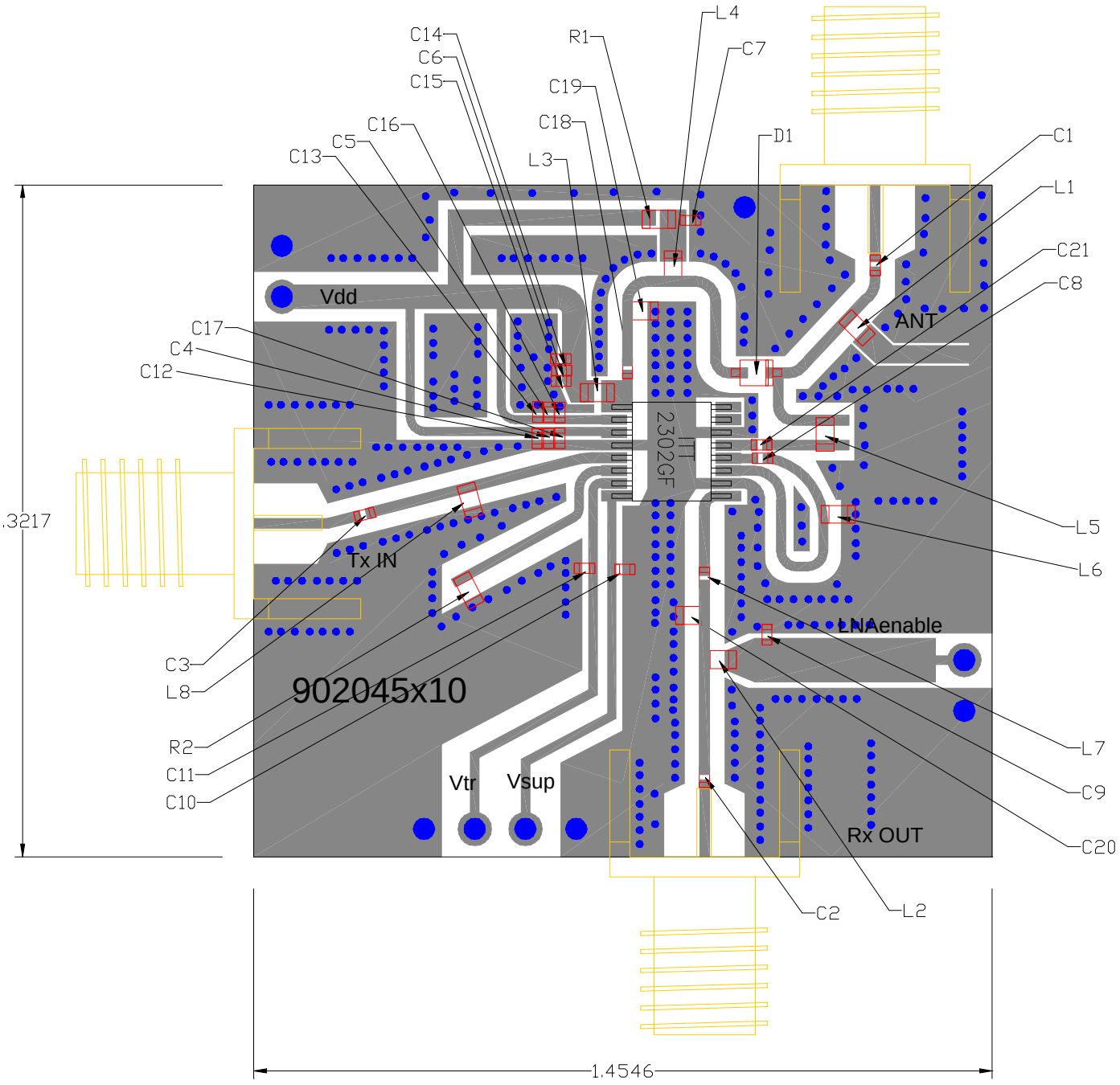

Figure 7. Component layout and printed circuit drawing for evaluation board.

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APPLICATION INFORMATION (CONT)

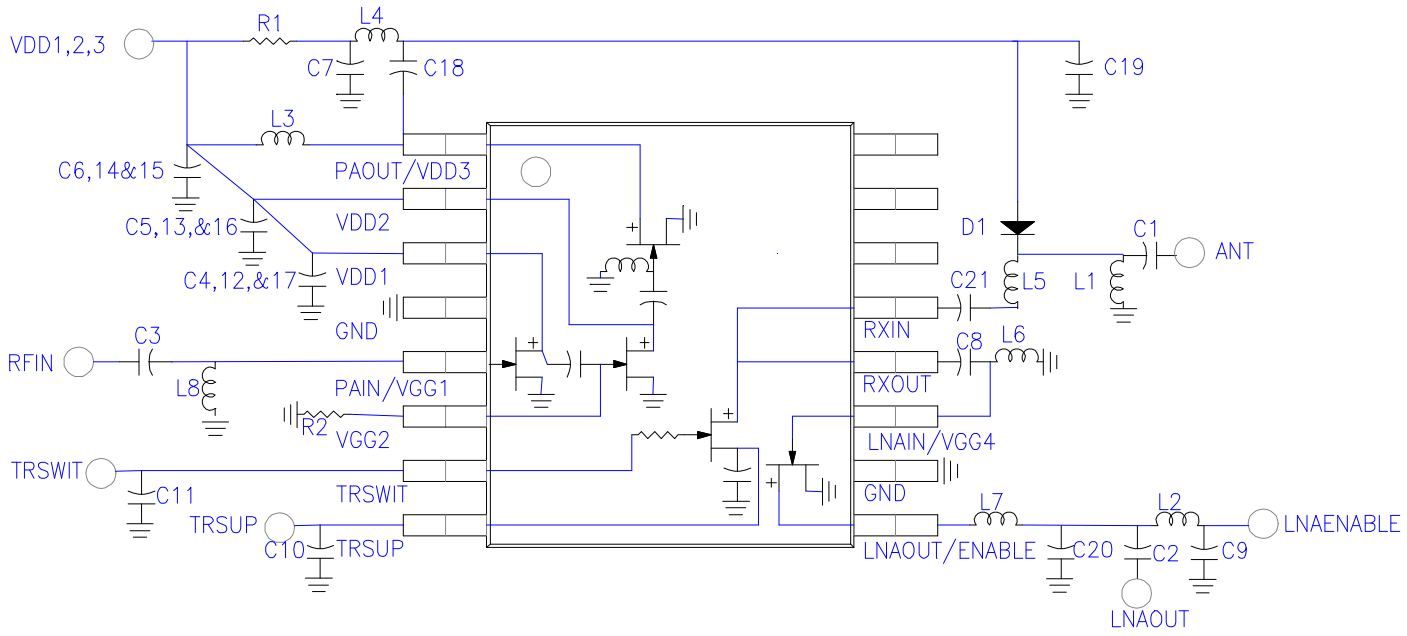

Figure 8. Evaluation Board Schematic

External components:

C1 – C11	MuRata 100 pF 0402 GRM36C0G101J50
C12 – C14	MuRata 0.1 µF 0402 GRM36X5R104K10
C15 – C17	MuRata 15 pF 0402 GRM36C0G150J50
C18	MuRata 2.0 pF 0402 GRM36C0G020C50
C19	Dielectric Laboratories 1.0 pF 0603 C06CF1R0B5UL
C20	Dielectric Laboratories 1.5 pF 0603 C06CF1R5B5UL
C21	MuRata 22pF 0402 GRM36C0G220G50
L1 – L4	Coilcraft 22 nH 0603 0603CS-22NXJBB
L5	Toko 3.9 nH 0603 LL1608-F3N9K
L6	Toko 1.8 nH 0603 LL1608-F1N8S
L7	Toko 3.3 nH 0402 LL1005-FH3N3KBULK
L8	Toko 1.5 nH 0603 LL1608-F1N5S
R1	Panasonic 301Ω 0603 ERJ-3EKF3010
R2	Panasonic 10 Ω 0603 ERJ-3EKF10RO
D1	Siemens Pin Diode BAR6303W

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ITT GaAsTEK TEST SETUPS

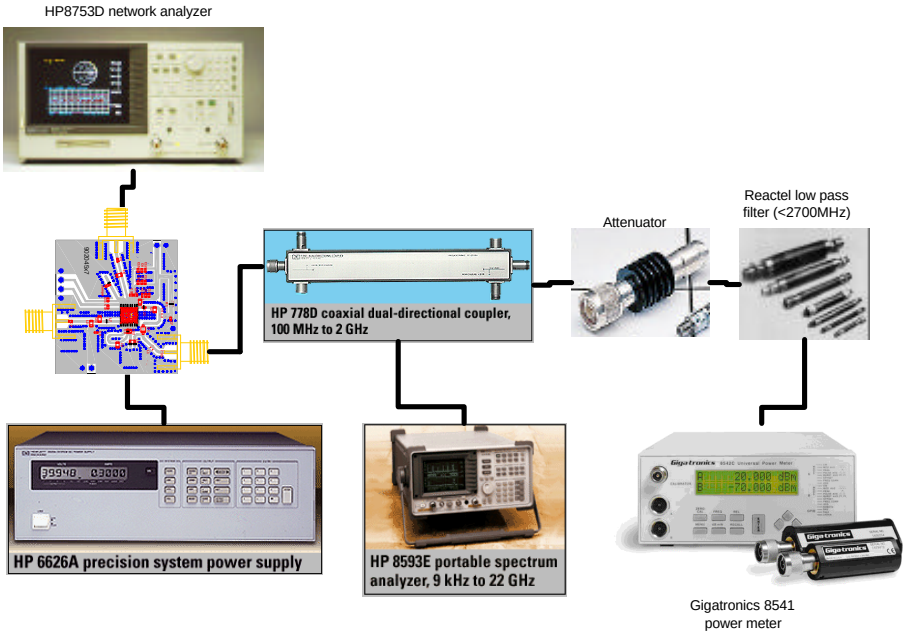

Figure 9. Transmit path power, current, and spurious.

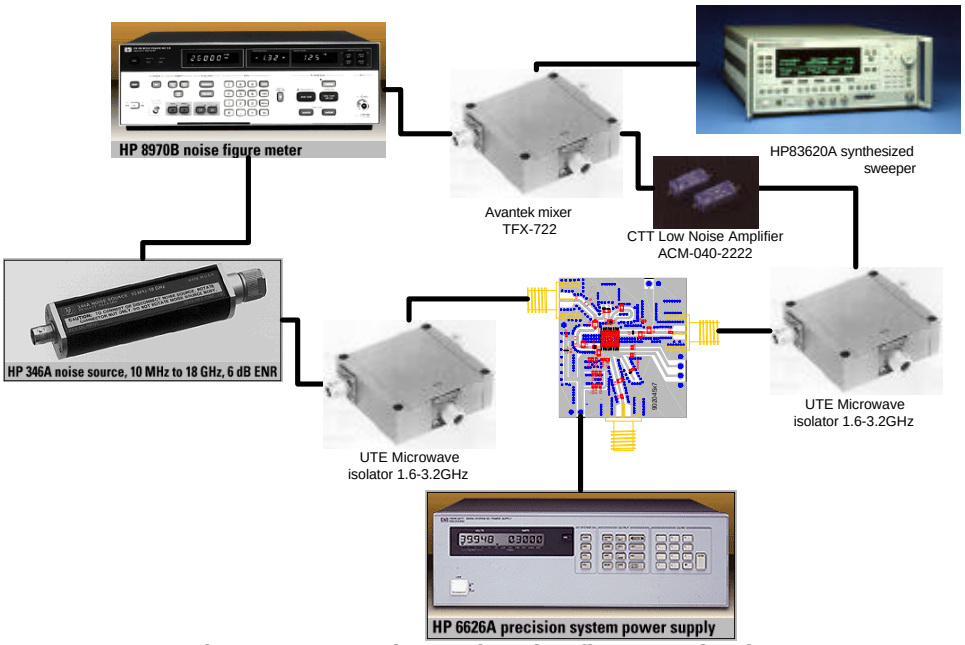

Figure 10. Receive path noise figure and gain.

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