



Application Note

AH103 130 – 170 MHz Reference Design

The Communications Edge™

Product Information

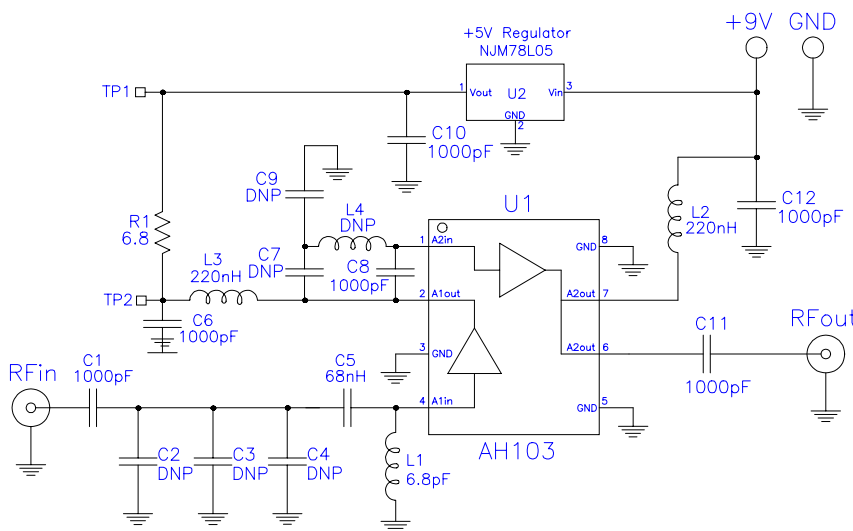
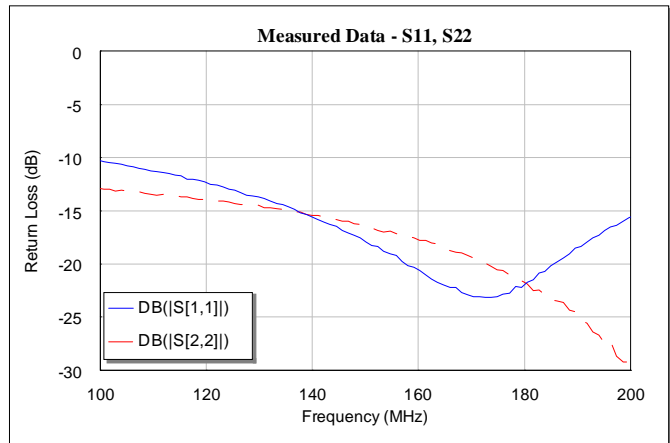
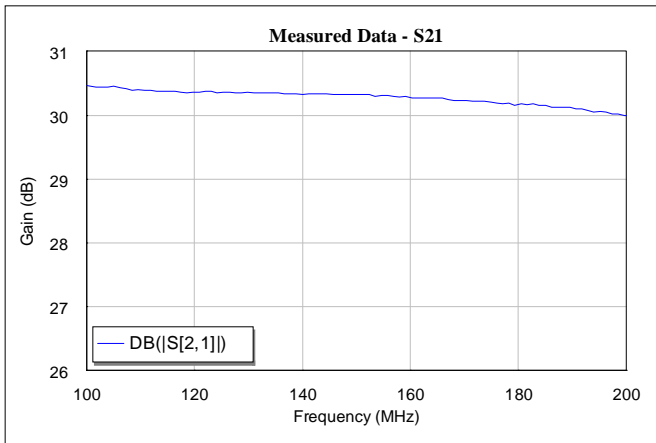
Summary:

The AH103 is a high linearity, ½ W dual-stage amplifier targeted at mobile infrastructure. Although the part was originally envisioned for operation between the 700 – 2700 MHz frequency range (as stated on the datasheet), it was later determined that the amplifier is capable of achieving excellent performance for applications outside of the stated frequency range. This application note details the operation and schematic of an AH103 device optimized for performance between 130 – 170 MHz. The amplifier achieves a gain of 30 dB while providing excellent performance for IP3, P1dB, and Noise Figure. The WJ Communications low-cost amplifier requires only a single supply that can be sourced directly from a voltage regulator. This circuit is ideal for use as a driver amplifier for homeland security wireless infrastructure equipment.

Measured RF Performance

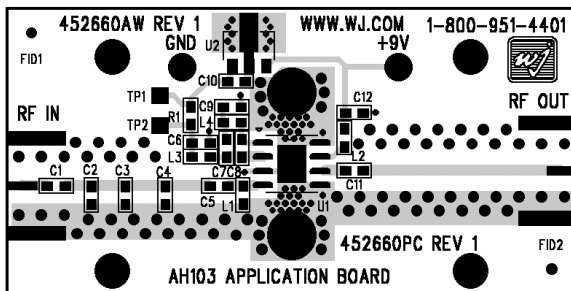
Frequency	MHz	130	170
S21 – Gain	dB	30.4	30.2
S11 – Input Return Loss	dB	-14	-23
S22 – Output Return Loss	dB	-15	-19
Output IP3 (+12 dBm / tone, 1 MHz spacing)	dBm	+49	
Output P1dB	dBm	+26.5	
Noise Figure	dB	3.6	
Supply Bias		9 V @ 275 mA	

Measured parameters were taken at 25 °C.



Bill of Materials

Ref. Desig.	Size	Component
C1	0603	0 Ω chip resistor
C5	0603	68 nH chip inductor
C6	0603	68 pF chip capacitor
C1, C8, C10 C11, C12	0603	1000 pF chip capacitor
C2, C3, C4 C7, C9, L4	---	DNP
L1	0603	6.8 pF chip capacitor
L2, L3	0805	220 nH wirewound inductor
R1	0603	6.8 Ω chip resistor
U1		WJ AH103 Amplifier
U2		+5V Regulator, National Semiconductor NJM78L05



Notes:

1. DNP = Do not place this component.
2. Circuit Board Material: .014" FR-4, 4 layers, .062" total thickness
3. A voltage regulator is used in this circuit (U2) to drop the +9 V to a +5 V usable supply for the first internal amplifier. It is permissible to remove the regulator and operate the 1st amplifier stage directly off of +5 V supply onto Test Point 1 (TP1). The use of a +5 V supply on the 1st amplifier stage requires a dropping resistor of 6.8 Ω.
4. A +4.5 V supply can also be used to bypass the 6.8 Ω and can be applied to Test Point 2 (TP2).
5. The AH103 is internally grounded at the input. C1 is not required if there is no DC signal present on pin 4.

Specifications and information are subject to change without notice