



BHW Technologies (博泓微科技有限公司)



**Advanced RF IC, Antenna, Filter, RF Front-End
and Wireless System Solutions**

BHW Application Note #009

**5GHz RF Front-End Using BHWA350 and BHWM552
for Wireless Audio**

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Background: Better Wireless Audio with 5GHz



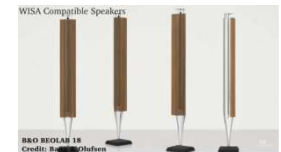
Background & Challenges:

- Wireless Audio & Sound Solutions Have Been Offered through a Great Variety of Technologies, from Proprietary Protocols to Major International Standards including Bluetooth and Wi-Fi, at Different Frequencies from UHF, 2.4GHz to 5.8GHz
- Wireless Audio at 5GHz, such as the Emerging WISA (Wireless Speaker & Audio) Standard, Promises up to 8 Channels of Uncompressed, 24-bit, 96kHz Sound, with Minimal Latency, for the Ultimate Immersion into Movies, Music and eSports
- Wireless Audio Has Near-Zero Tolerance for Packet Dropping, among the Toughest for All Wireless Products
- RF Front-End (Power Amplifiers and Low Noise Amplifiers) Play a Critical Role for Successful Deployment of High-Quality Wireless Audio Products, Regardless of Frequency

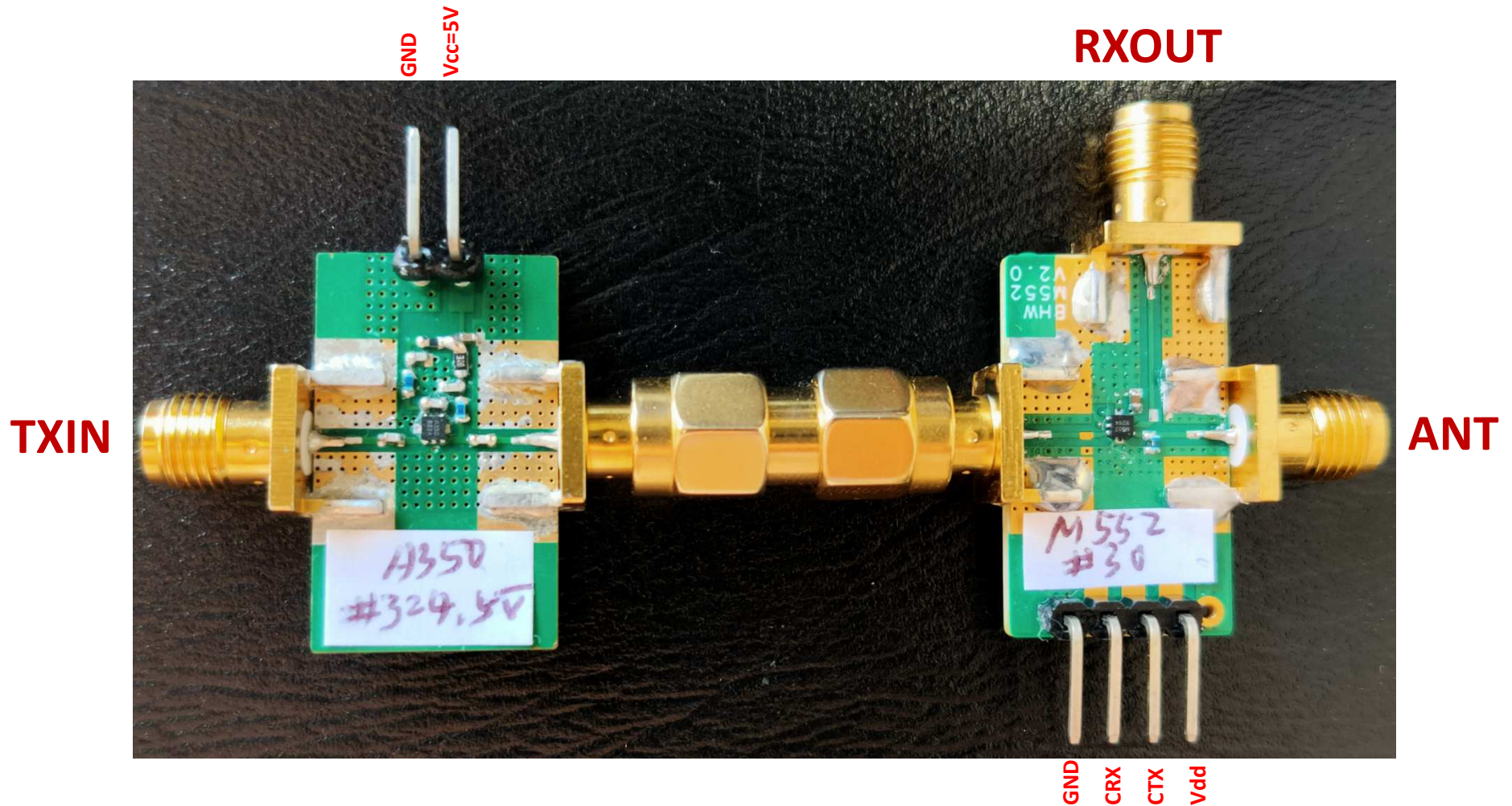
BHW Solutions & Benefits:

- Using Advanced GaAs HBT & ED-PHEMT Technologies, BHW has Developed a Broad Portfolio of High-Performance, Cost-Effect RF Front-End ICs for Various Wireless Applications from 300MHz to 6GHz
- BHWA555 is a Wideband Power Amplifier Delivering up to 1Watt Maximum Tx Power with 28dB Gain in the 5GHz Band
- BHWA350 is a Unique 2-in-1 Cost-Effective Wideband Gain Block with up to 18dBm Output Power and 20dB Gain at 5.8GHz with Very Low Current (sub-100mA), inside a 1.5x1.5mm DFN-6L Package
- BHWM552 is a LNA/SW Rx Front-End IC with Complete On-Chip Impedance Matching, Delivering Ultra-Low 1.6dB NF at Antenna and 0.8dB Switch Insertion Loss, in a Compact 1.5x1.5mm DFN-6L Package

This AppNote Introduces a Complete 5GHz RF Front-End Solution Based on BHWA350 PA and BHWM552 Rx Front-End IC, which Delivers up to ~17dBm Tx Power and 1.6dB NF at Antenna, with Minimal Power Consumption and Disruptive BOM Cost



BHWA350 & M552 Combo Breadboard

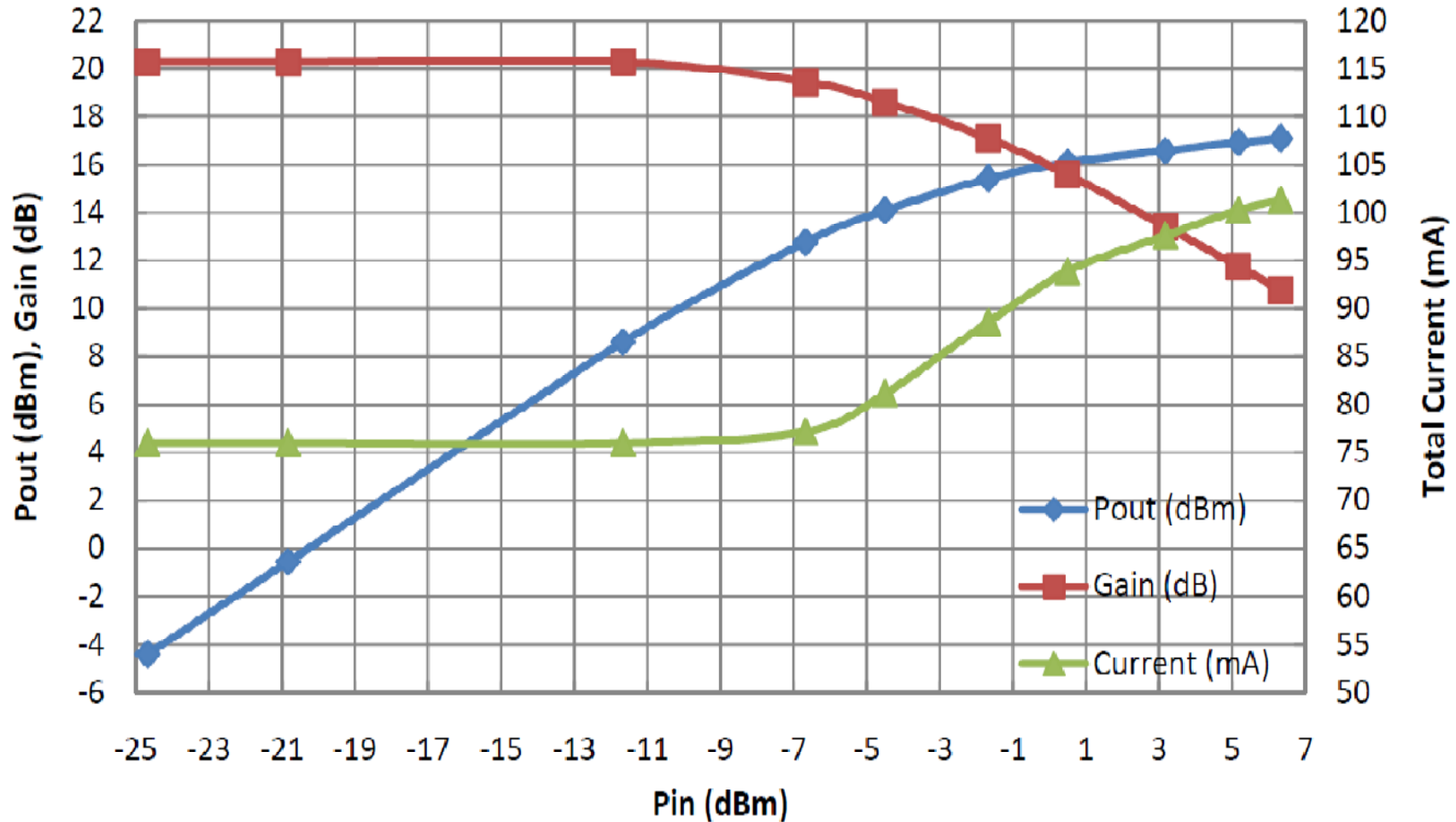


- BHWA350 cascade provides ~18dBm maximum power and ~20dB gain at 5.8GHz at Vcc=5V
- BHWM552 provides ~0.8dB insert loss in Tx mode, resulting in ~17dBm Tx power at antenna
- BHWM552 provides ~1.6dB noise figure at antenna, with ~10dB Rx gain in the 5-6GHz band

BHWA350 & M552 Combo CW Power Sweep



BHWA350/M552 Combo CW Power Sweep at 5800MHz



Notes:

-BHWA350 DC Bias: $V_{cc}=5V$, $I_{cq}\sim 76mA$

-BHWM552 DC Bias: $V_{dd}=CTX=3.3V$, $CRX=0$

-SMA connector/adaptor and PCB feedline losses (estimated total $\sim 0.6dB$ at 5.8GHz from PA output to antenna)

BHW RF Front-End AppNote Library



For further information, please email to support@bhwtechnologies.com, or contact your local BHW Sales Rep or Distributor. We will send you the complete AppNote as well as additional related information.

In addition to standard datasheets and EVB/BOM info, BHW publishes an AppNote series that address various topics on RF front-end design and performance over a wide frequency range from 300MHz to 6GHz, as an effort to assist customers in developing cutting-edge, cost-competitive products:

- BHW AppNote #001 - Cross-Over Cascade of BHWM253 to Boost Tx Power and Rx Sensitivity of BLE and 2.4GHz IoT
- BHW AppNote #002 - Accurate Benchmark of GNSS CN0 Using the Power-Splitter Method
- BHW AppNote #003 - Boosting Wi-Fi Tx Power and Rx Sensitivity with BHWA251 and BHWM252
- BHW AppNote #004 - UHF 900MHz RF Front-End Solution Using BHWA251 Half-Watt PA and BHWL160 Sub-1dB-NF LNA
- BHW AppNote #005 - Sub-1GHz Applications of BHWA350 2-in-1 Wideband Fully Matched Amplifier
- BHW AppNote #006 - Low-Noise High-IIP3 LNB Architecture for Dual-Band High-Precision GNSS Using Cascade of BHWL160
- BHW AppNote #007 - UWB RF Front-End Solution Using BHWA350 and BHWM552
- BHW AppNote #008 - High-Power 5.8GHz RF Front-End Solution Using BHWA555 and BHWM552 for ETC, V2X and Wireless Video
- BHW AppNote #009 - 5.8GHz RF Front-End Using BHWA350 and BHWM552 for Wireless Audio
- BHW AppNote #010 - Multi-Constellation GNSS Active Antenna Using BHWL161 Cascade and Single-Fed Dual-Band Antenna
- BHW AppNote #011 - BHWL161 Super-Compact Low-Power Low Noise Amplifier for Range Extension of 2.4GHz BLE, RC and IoT
- BHW AppNote #012 - Enabling Cost-Effective High-Precision GNSS Using BHWL160 and Linear-Polarization PCB Antenna
- BHW AppNote #013 - Enabling Long-Range BLE AoA&AoD for High-Precision Indoor Positioning with BHW GaAs RF Front-End ICs
- BHW AppNote #014 - Designing Ultra Low-Power High-Performance GNSS Products Using BHWL160 GaAs PHEMT LNA
- BHW AppNote #015 - BHWL161 GNSS Full-Band High-Performance LNA in Super-Compact 1x1mm DFN with Relaxed Pin Pitch
- BHW AppNote #016 - Improving GNSS NF Measurement Accuracy Using Broadband LNA BHWL161 as Pre-Amp
- BHW AppNote #017 - High-Efficiency, Low-NF 2.4GHz Front-End Solution for BLE & IoT Using BHWA251 and BHWM252
- BHW AppNote #018 - Optimizing BHWA555 Wideband One-Watt PA for Long-Range 5.8GHz Transmitter Applications
- BHW AppNote #019 - Miniature 2.4GHz RF Front-End with Integrated Chip Antenna and BHWM253 for TWS and IoT
- BHW AppNote #020 - Doubling the Range for BLE Music Streaming with BHW250L Active Integrated Antenna (AIA)