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

Rev. 1.5

www.bhw-tech.com

Background: Better Wireless Audio with 5GHz

Background & Challenges:

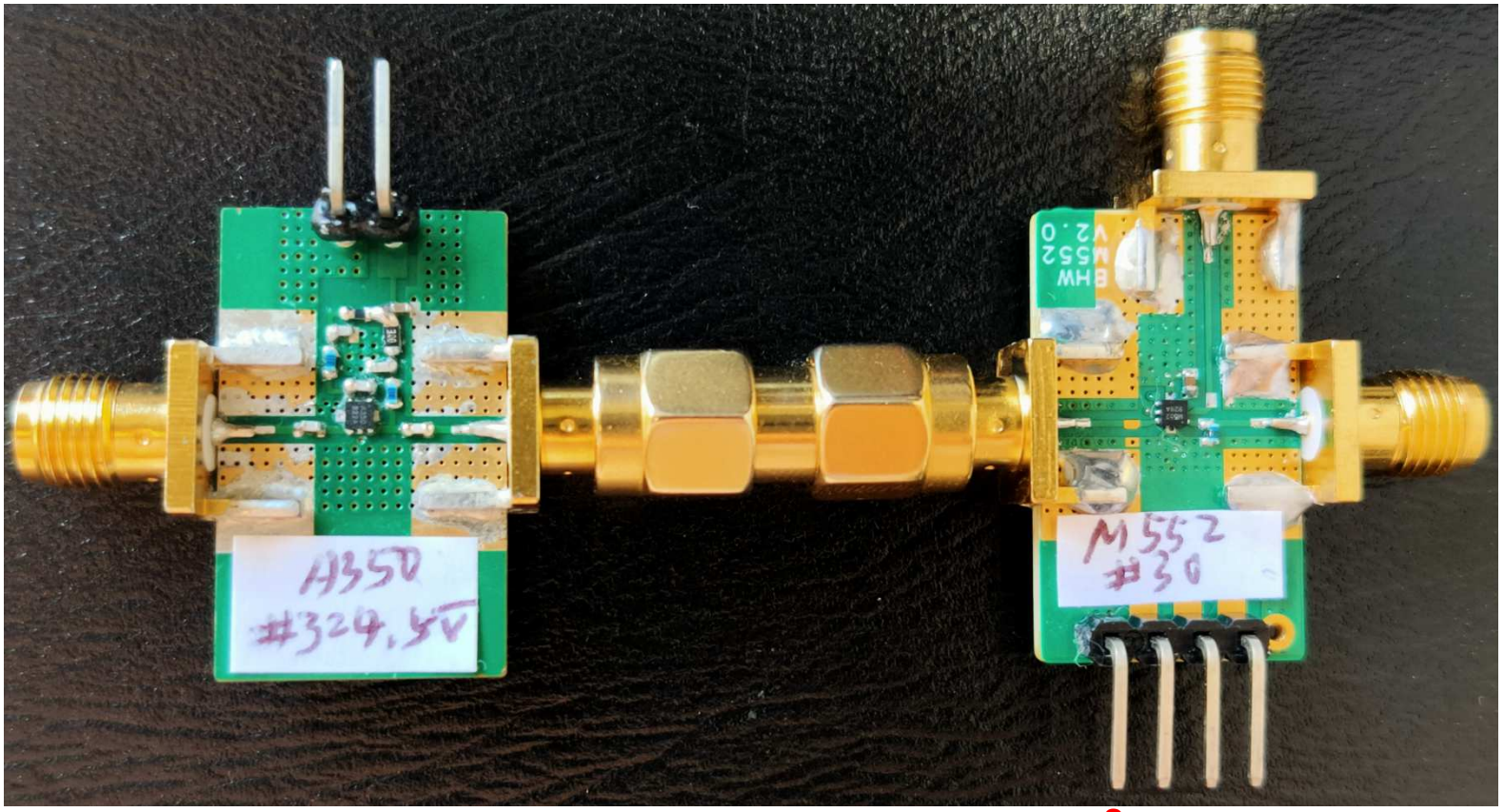
- Wireless Audio & Sound Solutions Have Been Offered through a Great Variety of Technologies, from Proprietary Protocols to Major International Standards at Different Frequencies from UHF, 2.4GHz to 5.8GHz
- Wireless Audio at 5GHz, such as the Emerging WISA (Wireless Speaker & Audio) Standard, Promises 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

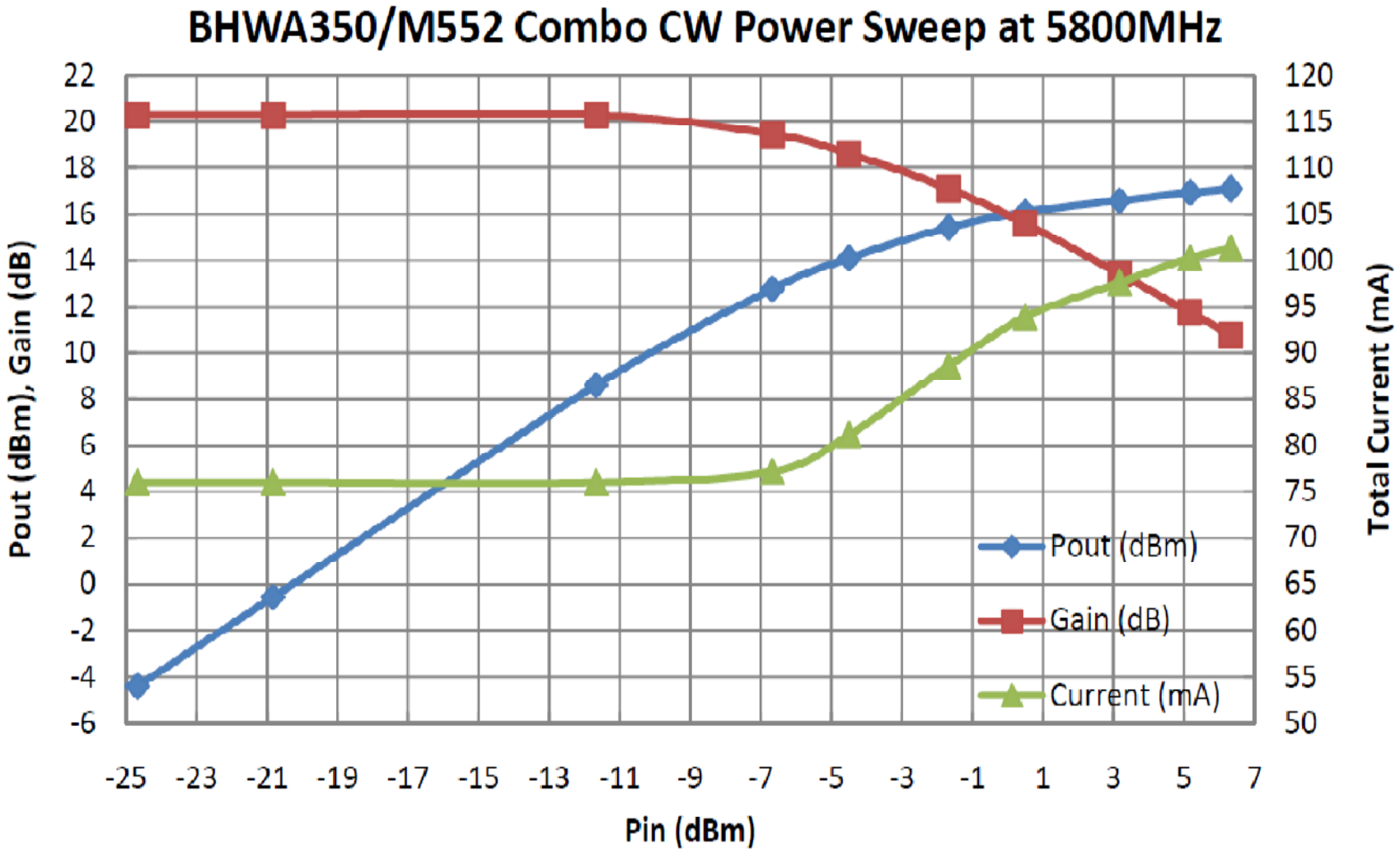
This AppNote Introduces a Complete 5GHz RF Front-End Solution Based on BHWA350 PA and BHWM552 Rx Front-End IC, which Delivers up to ~17dBm Tx Power and 1.6dB NF at Antenna, with Minimal Power Consumption and Disruptive BOM Cost

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



Notes:
-BHWA350 DC Bias: Vcc=5V, Icq~76mA
-BHWM552 DC Bias: Vdd=CTX=3.3V, CRX=0
-SMA connector/adapter and PCB feedline losses (estimated total ~0.6dB at 5.8GHz from PA output to antenna)

BHW RF Front-End AppNote Library

This is an abridged version of BHW AppNote #009. Please contact BHW Support or your local sales rep/distributor for a complete copy of the document and other related information.

BHW RF Front-End Solutions AppNote Library

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 2.4GHz Systems
- 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 RC and IoT
- BHW AppNote #012 - Enabling Cost-Effective High-Precision GNSS Using BHWL161 and Linear-Polarization PCB Antenna
- BHW AppNote #013 - GNSS Noise Floor vs Receiver Architecture
- 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 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 - Multiplying the Range for 2.4GHz Music Streaming with BHWR250L Active Integrated Antenna (AiA)
- BHW AppNote #021 - Range Extension for 2.4GHz Wireless Systems with BHWR250M Active Integrated Antenna (AiA)
- BHW AppNote #022 - Enabling Long-Range Angle-of-Arrival for High-Precision Indoor Positioning with BHWR250N RF AiA
- BHW AppNote #023 - Extend the Range for 5.8GHz Audio/Video Streaming with BHWR580M Active Integrated Antenna (AiA)
- BHW AppNote #024 - Improving 5.8GHz Radio Link Budget with BHWR580L Active Integrated Antenna (AiA)
- BHW AppNote #025 - Improving Range and Throughput of 2.4GHz Wi-Fi with BHWR250 Array Antenna
- BHW AppNote #026 - Improving Range and Throughput of 5GHz Wi-Fi with BHWR550 Array Antenna
- BHW AppNote #027 - Multi-Band High-Accuracy GNSS Solutions Using BHWP150 DFN1x1 Ultra-Compact Power Divider & Combiner
- BHW AppNote #028 - Use BHWM252 Cascade to Extend Range of 2.4GHz Wireless Systems with Single-Port SoCs
- BHW AppNote #029 - Improving Range of 2.4GHz Wireless Microphones and Audio Systems with BHWR250A Active Integrated Antenna (AiA)
- BHW AppNote #030 - Simultaneous Improvement in Range and Battery Life of 2.4GHz Wireless Systems with BHWR250M AiA

Contact support@bhwtechnologies.com or BHW distributors/representatives for your copy of the above and new up-coming documents.