BHW Technologies (博泓微科技有限公司)

RF Chips & Beyond

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

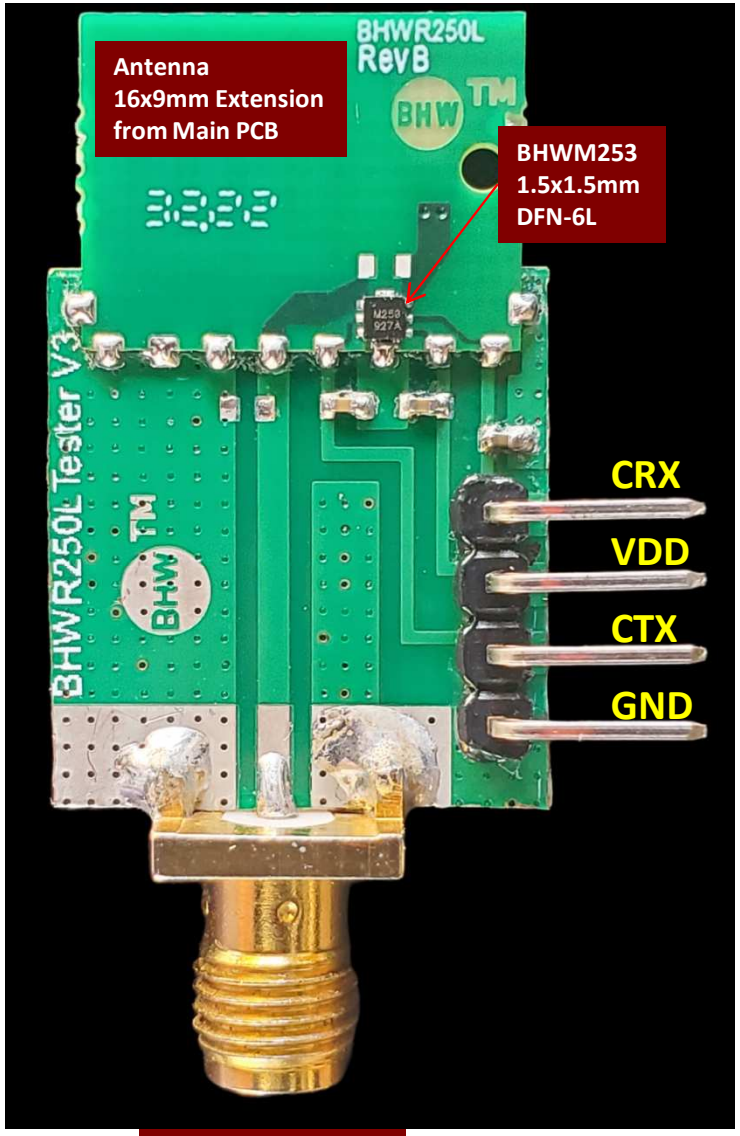
BHW AppNote #020

Multiplying the Range for 2.4GHz Music Streaming with BHWR250L Active Integrated Antenna (AiA)

Rev. 2.4

www.bhw-tech.com

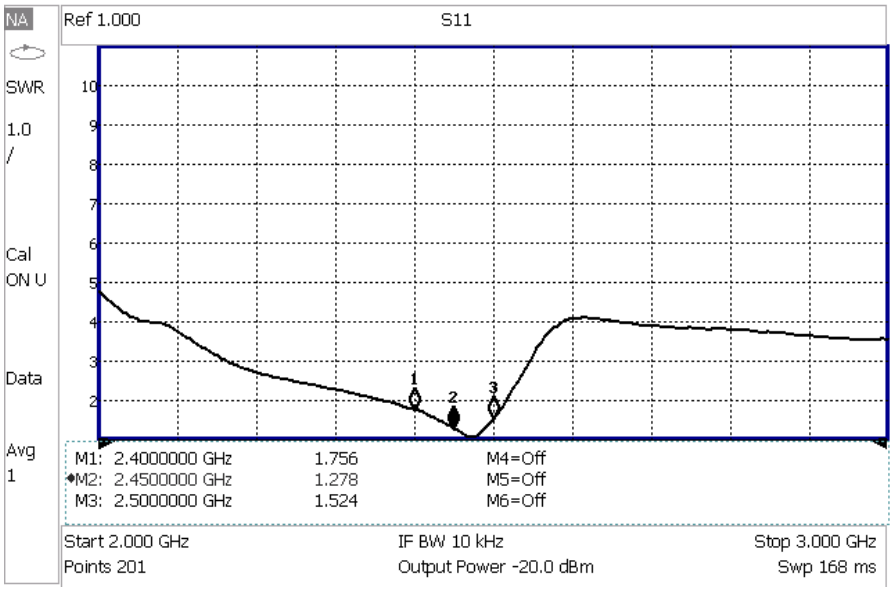
BHWR250L 2.4GHz AiA for Rx Improvement

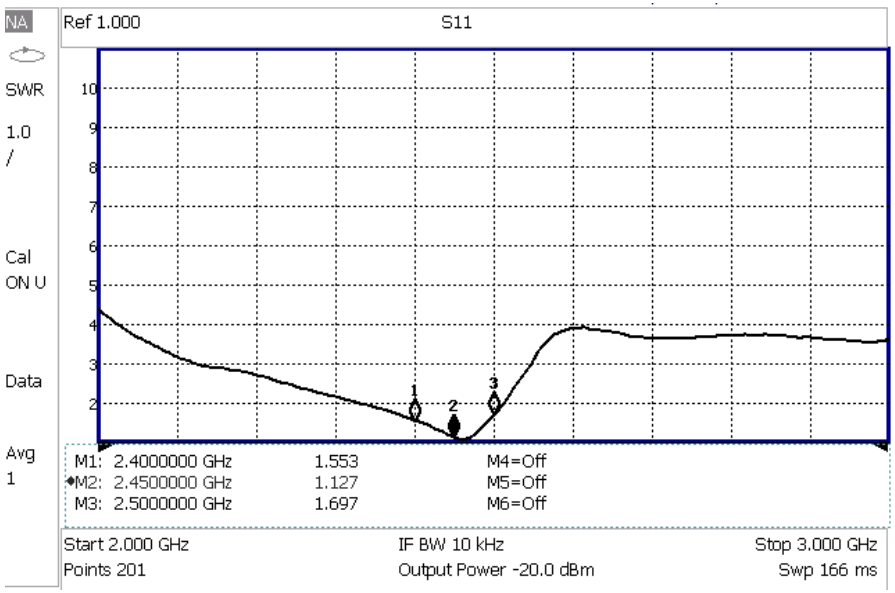


Features & Benefits:

- Innovative, Patented RF Active Integrated Antenna (RFAiA™) Architecture
- Compact Size: 16x12x0.6mm Total Size, Including Antenna and BHWM253 Front-End IC
- Simple Surface-Mount Interface to Main Product PCB
- 12x9mm Extension from Edge of Main PCB
- Minimum RF Design Requirement for Main PCB
- Comparable Antenna Efficiency to Much Larger Dipoles
- Industry-Leading Noise Figure: ~1.8dB at Antenna
- Significant Improvement in Rx Sensitivity (3~6dB)
- Simple Single-Port Interface with all 2.4GHz SoCs
- Option to Insert a 2nd BHWM253 as PA to Achieve both Tx Power and Rx Sensitivity Enhancement
- Range Extension of 200~300 Meters Feasible with BHWR250L on one or both Sides of TX and RX Terminals

BHWR250L VSWR for Rx Mode

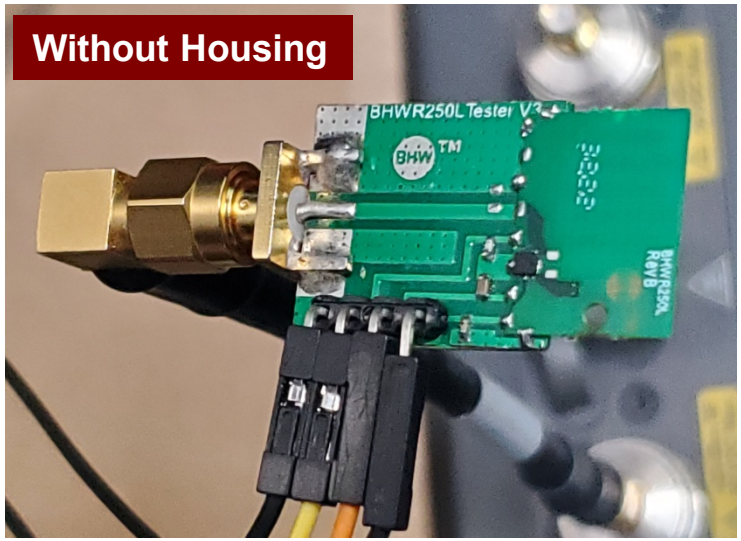




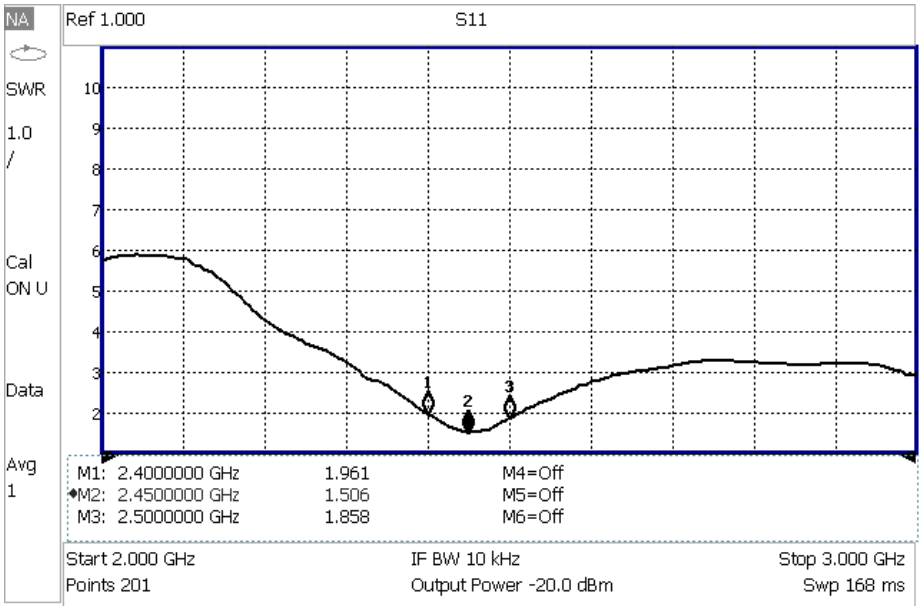
DC Bias: Vdd=CRX=3.3V, CTX=0, Idd~12mA; Vdd/Idd=1.2~4.2V/3~18mA Operational

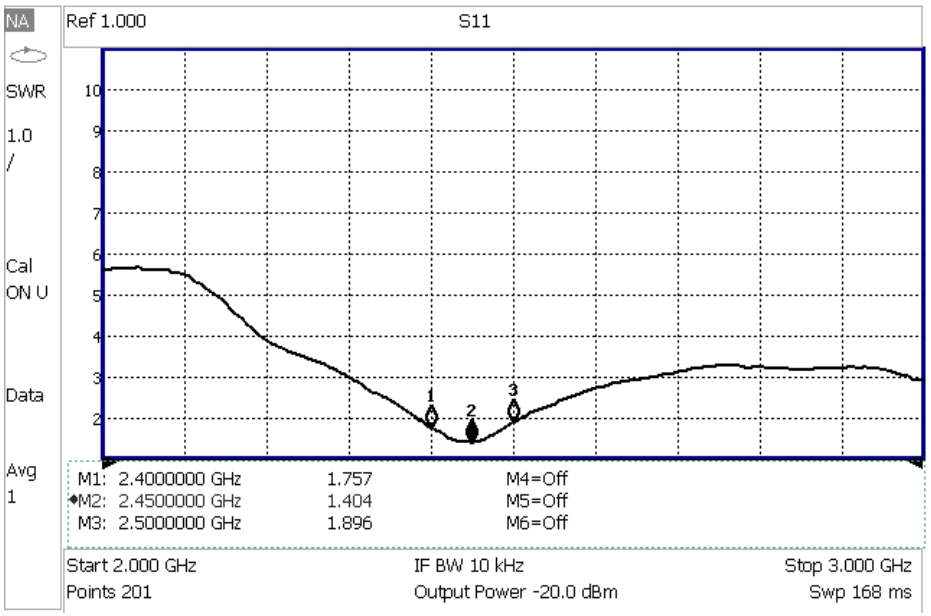
BHWR250L VSWR for Tx Mode

Without Housing



With Housing



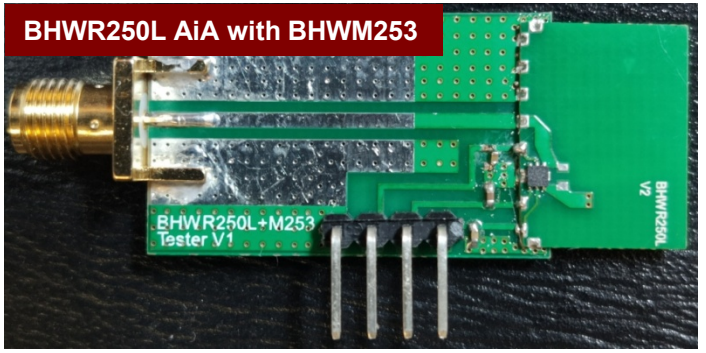


DC Bias: Vdd=CTX=3.3V, CRX=0; Vdd=1.2~4.2V Operational

Qualcomm QCC3021 Audio Streaming Range Test: Case #1

Source for Music Streaming:
Samsung Galaxy S7 Edge (Site 1)
Placed on Plastic Stand ~1m above GND
Music Playback:
QCC3021 Module with BHWR250L AiA
Vdd: 3.8V (1.8~4.2V Operational)
Range Test Results:
Site 2: ~30m, No Intermittency at All Angles
Site 3: ~60m, Very Minor Intermittency
Site 4: ~110m, >50% Connection
Site 5: ~167m, NOL, ~20% Connection

BHWR250L AiA with BHWM253



Test Site 5: Antenna Held at 1m Height on Walkway

Qualcomm QCC3021 Audio Streaming Range Test: Case #2

Source for Music Streaming:
Samsung Galaxy S7 Edge
Placement: ~1m above Ground (Site 1)

Music Playback:
QCC3021 BLE Module with BHWR250L AiA and BHWM253 PA EVB with FCC Compliance
Vdd: 3.75V (1.8~4.2V Operational)

Range Test Results:
Site 2: ~60m, No Intermittency at All Angles
Site 3: ~235m, No Intermittency at All Angles

Site 1 | Site 2 | Site 3

BHW RF Front-End AppNote Library

This is an abridged version of BHW AppNote #020. 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.