BHWR250T

Production Datasheet

2.4GHz Surface-Independent FPC Magnetic Dipole Antenna

Description

Occupying about one-third of a penny and implemented in ultra-thin, low-cost Flex Printed Circuit (FPC) technology, BHWR250T is a complete, self-contained half-wavelength magnetic dipole antenna engineered for 2.4GHz embedded applications with the most stringent space limitations. Furthermore, using 0.5mm thick 3M PE Foam double-sided tape at its backside, BHWR250T can be easily applied to most common plastic surfaces with practically no or minimal frequency detuning, or even metallic surfaces such as coin cell batteries. BHWR250T can be connected to the RF port of any 2.4GHz systems using standard IPX/UFL cable assembly, without the need for any additional ground plane or impedance matching. The foldable, patent-pending design has overcome the issue of the VSWR sensitivity typical of electrically small antennas (ESAs), including traditional FPC antennas, and provides a significantly simplified alternative antenna solution for a vast range of wireless devices such as BLE audio, beacons, wearables, electronic shelf label (ESL), medical as well as Wi-Fi or any other wireless systems in the 2.4-2.5GHz frequency band.

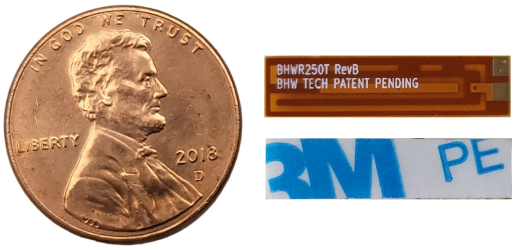
Key Features

- Foldable Flex PCB Design
- Miniature Size: 5x20x0.2mm
- 2.4-2.5GHz Operation Frequency Range
- VSWR < 2:1 over 2.4-2.5GHz
- Stable VSWR over Cable Assemblies
- No Need for Ground Plane for Operation

Key Applications

- Bluetooth Embedded Solutions
- LE Audio, Auracast, ESL, Channel Sounding
- Wi-Fi 3/4/5/6/6E/7
- ZigBee/Thread/Matter IoT Devices
- FPC / LDS Antenna Alternatives

Product Information



5x20x0.2mm Flex PCB with 0.5mm 3M PE Foam Double-Sided Tape for IPX/UFL Cable Assembly

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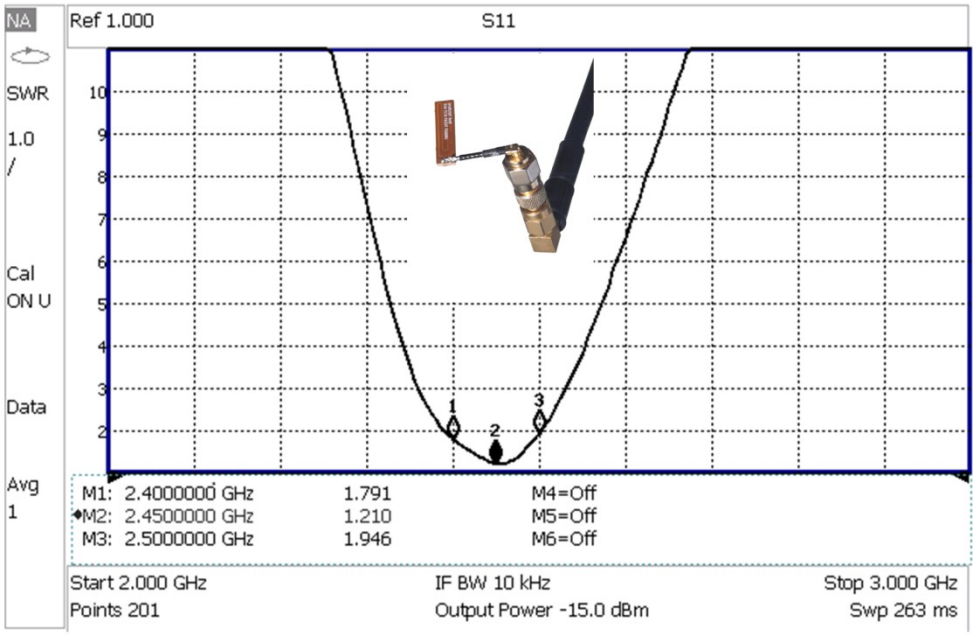
Electrical and Mechanical Specifications

Parameter	Condition	Specification			Unit
		Min.	Typ.	Max.	
Operating Frequency		2.4		2.5	GHz
Peak Gain			TBD		dBi
Radiation Efficiency	Including Loss of 76mm IPX Cable	44	56	58	%
Input VSWR	Nominal IPX Cable Assembly		2:1	3:1	
Height	H		20		mm
Width	W		5		mm
Thickness	T		0.2		mm
Backside Tape Thickness	3M PE Foam		0.5	1.1	mm

Typical In-Band Input VSWR



Typical measured standalone VSWR with 15mm short IPX cable and IPX-to-SMA adapter

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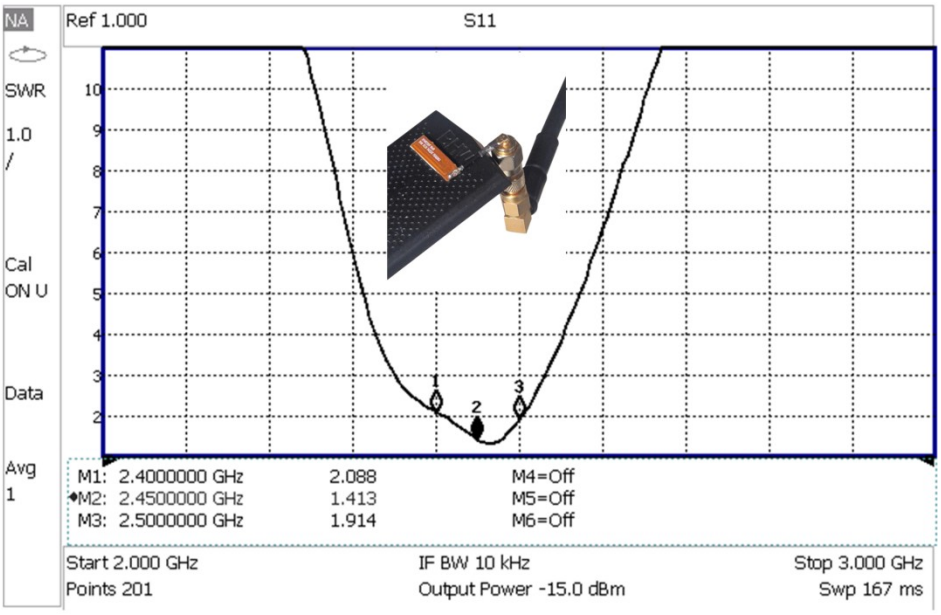
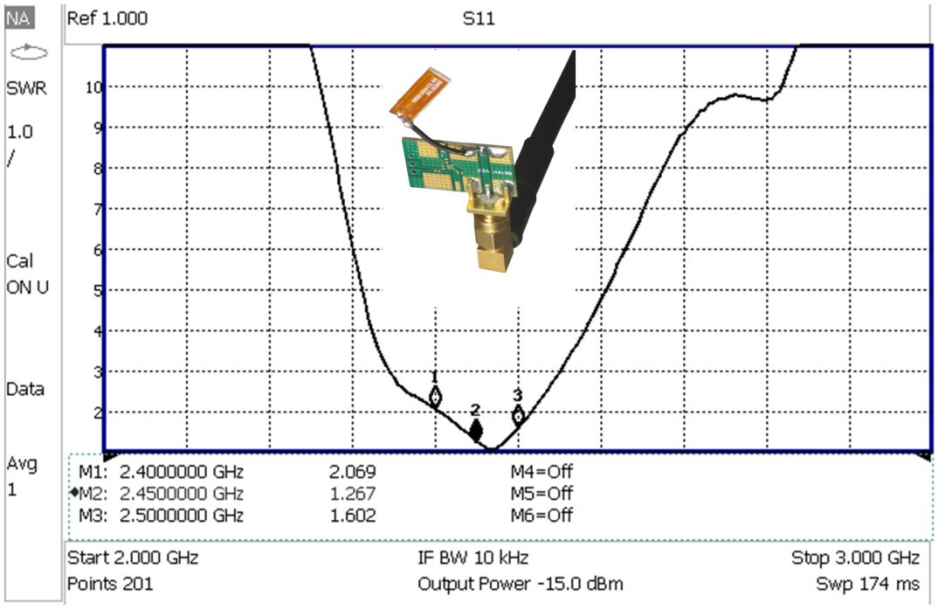


Typical measured VSWR with 15mm IPX after attached to surface of a plastic housing



Typical measured VSWR with 15mm IPX soldered directly to 50-Ohm feedline on PCB

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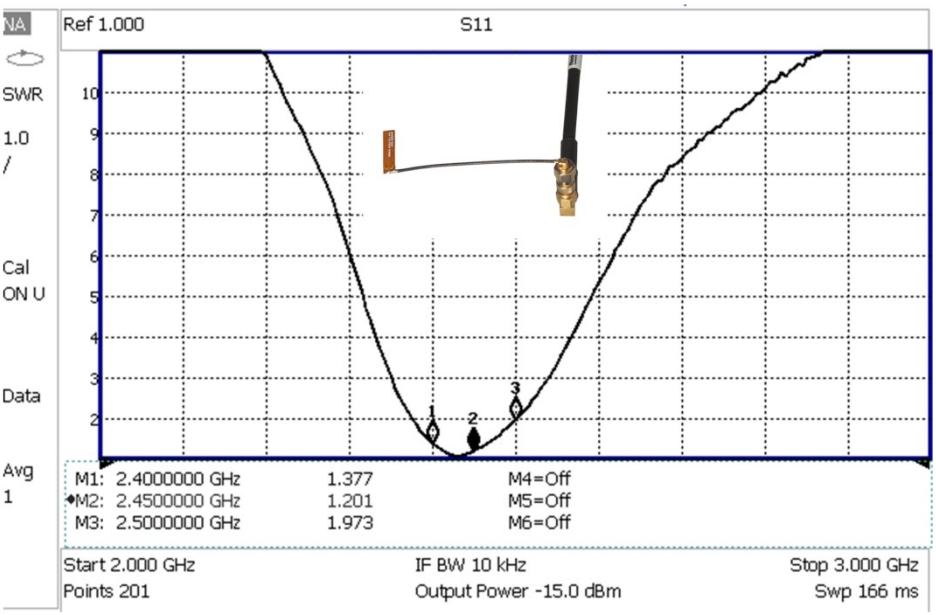
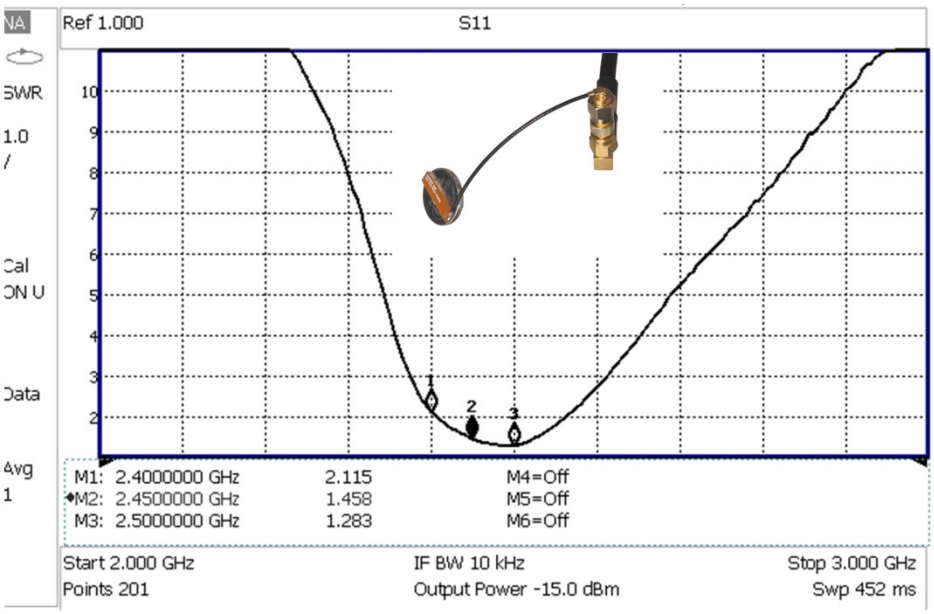


Typical measured standalone VSWR with 76mm long IPX cable and IPX-to-SMA adapter



Typical measured VSWR with the antenna taped to a CR2032 coin cell battery

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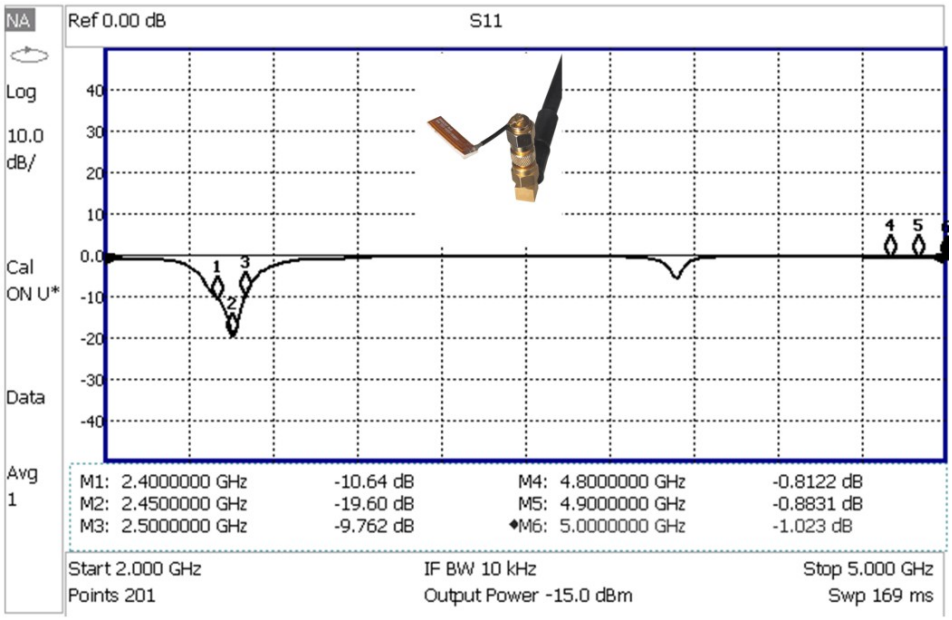
Typical Broadband Return Loss over 2-5GHz



Typical measured broadband S11 with 15mm IPX cable and IPX-to-SMA adapter

Note: Typical measured S11 for BHWR250T with short (~15mm) IPX, indicating some built-in second harmonic rejection. S11 in 4800-5000MHz band may be slightly lower for longer IPX cable assembly due to extra cable losses.

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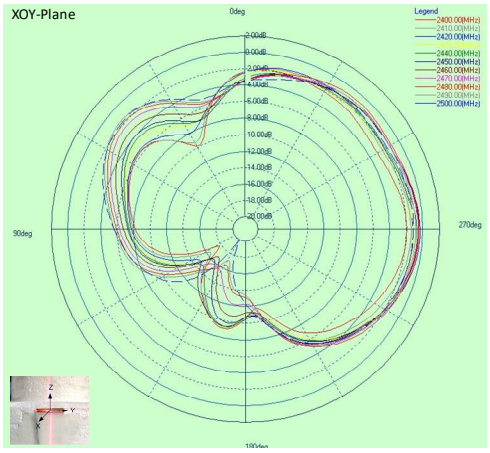
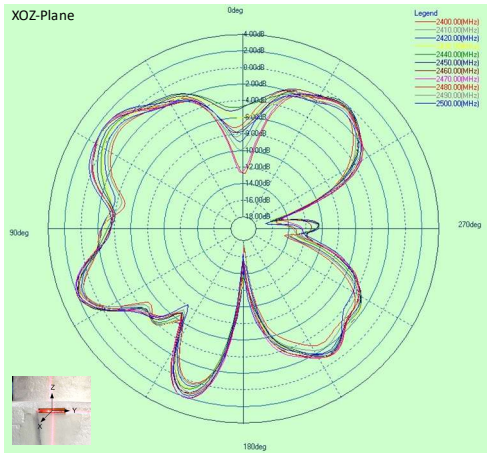
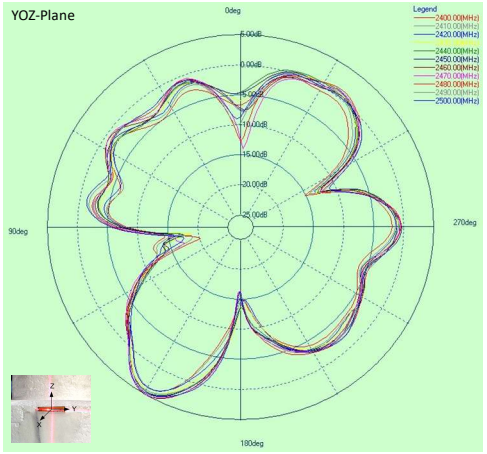
Radiation Patterns







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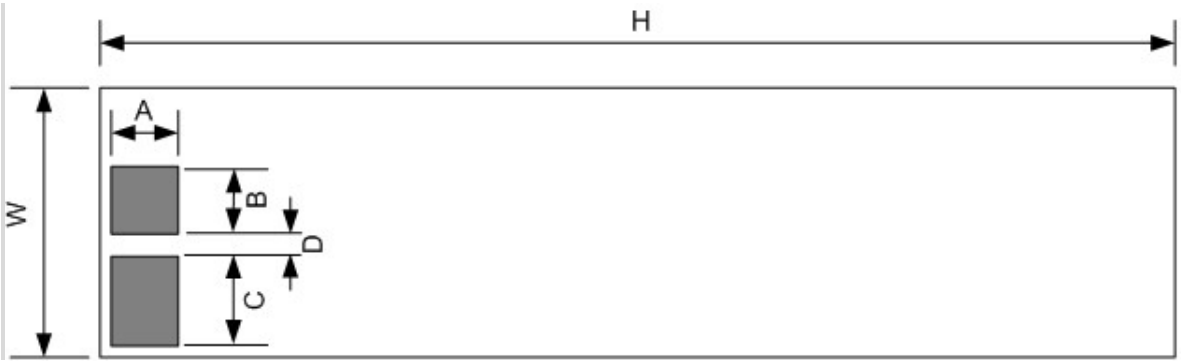
Mechanical Drawings



Symbol	Min. (mm)	Typ. (mm)	Max. (mm)
A	1.2	1.3	1.4
B	1.4	1.5	1.6
C	1.5	1.6	1.7
D	0.4	0.5	0.6
H	19.9	20	20.1
W	4.9	5	5.1

Note: Grey area is solder mask opening for IPX/UFL cable assembly. Upper=Signal, Lower=GND.