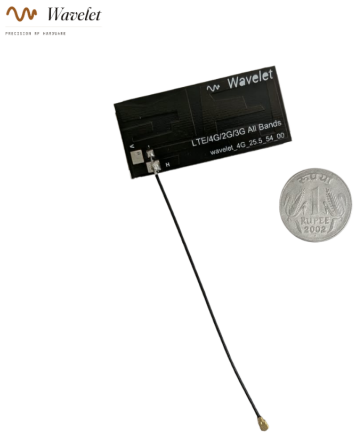
4G/LTE PCB Antenna

`Wavelet_4G_25.5_54_00`

A wideband PCB cellular antenna covering the three main LTE band groups — 824–960, 1710–2170 and 2300–2690 MHz — so 2G, 3G and 4G/LTE run on every regional band plan with no variant to select per market. The largest radiator in the range, and the one to specify when board area allows: it reaches up to 5.0 dBi with 94% total efficiency through the mid band.



FREQUENCY	PEAK GAIN	PEAK EFFICIENCY	FOOTPRINT
3 LTE bands	5.0 dBi	94%	54 × 25.5 mm

FEATURES

- Covers 824–960, 1710–2170 and 2300–2690 MHz — 2G, 3G and 4G/LTE on all regional band plans
- Peak realized gain of 5.0 dBi, with up to 94% total efficiency
- Return loss to −38 dB at resonance
- Single part number for global deployments
- Near-omnidirectional pattern in the horizontal plane
- 100 mm of 1.13 mm coaxial cable with I-PEX MHF I connector
- 1 mm profile, adhesive or mechanical mounting
- RoHS compliant

1. DESCRIPTION

Wavelet_4G_25.5_54_00 is a wideband printed circuit antenna for cellular applications, cabled on I-PEX MHF I. It covers the three main LTE band groups — 824–960, 1710–2170 and 2300–2690 MHz — so a single BOM line serves deployments across Europe, North America, India and APAC without a regionally tuned variant. It is the largest radiator in the range and correspondingly the best performer: mid-band efficiency reaches 94% and realized gain peaks at 5.0 dBi. Silkscreen reads `LTE/4G/2G/3G All Bands`.

2. APPLICATIONS

- Network devices, gateways and routers
- Remote monitoring and CCTV cameras
- Point-of-sale terminals
- Digital signage
- Asset tracking
- Smart meters — water and electricity
- IoT devices
- eHealth equipment
- Modules and sensors

3. GENERAL DATA

Frequency bands	824–960, 1710–2170 and 2300–2690 MHz
Polarization	Linear
Impedance	50 Ω
Operating temperature	-40 °C to +85 °C
Antenna type	Rigid FR-4 printed circuit antenna
Dimensions (W × L × H)	25.5 × 54 × 1 mm
Connector	U.FL / I-PEX MHF I
Cable	1.13 mm coaxial, black
Mounting	3M adhesive tape, or mechanical fixing to the host enclosure

4. PART NUMBER

The part code gives the band and the footprint in millimetres: `Wavelet_4G_25.5_54_00` is the 4G part in a 25.5 × 54 mm footprint. The standard build is 100 mm of 1.13 mm coaxial cable; other lengths and connector types are available to order.

Part number	Cable	Connector	Description
Wavelet_4G_25.5_54_00	100 mm	U.FL	Standard length

Cable length, connector type and cable grade are all build options. State the length required with the enquiry — lengths other than the 100 mm standard are supplied to order and do not carry a separate part number until a build is agreed.

5. MECHANICAL DIMENSIONS

Width (W)	Length (L)	Height (H)	Tolerance
25.5 mm	54.0 mm	1.0 mm	± 0.2 mm

All dimensions in millimetres. Cable exits from the connector edge; the U.FL plug adds approximately 2.5 mm to the overall height at the termination.

6. RF CHARACTERISTICS

Frequency band	Min. gain	Max. gain	Min. eff.	Max. eff.	Return loss	VSWR
824 – 960 MHz	-4.7 dBi	1.1 dBi	20 %	52 %	-7.0 dB	2.61:1
1710 – 2170 MHz	2.9 dBi	4.9 dBi	68 %	94 %	-10.9 dB	1.80:1
2300 – 2690 MHz	3.6 dBi	5.0 dBi	53 %	72 %	-9.2 dB	2.07:1

Test conditions. Characterised in free space on the Wavelet reference layout, fed through 100 mm of 1.13 mm coaxial cable terminated in a U.FL plug. Gain figures are realized gain, which includes mismatch loss; efficiency is total radiated efficiency. Return loss and VSWR are the worst case within each sub-band, not the value at resonance.

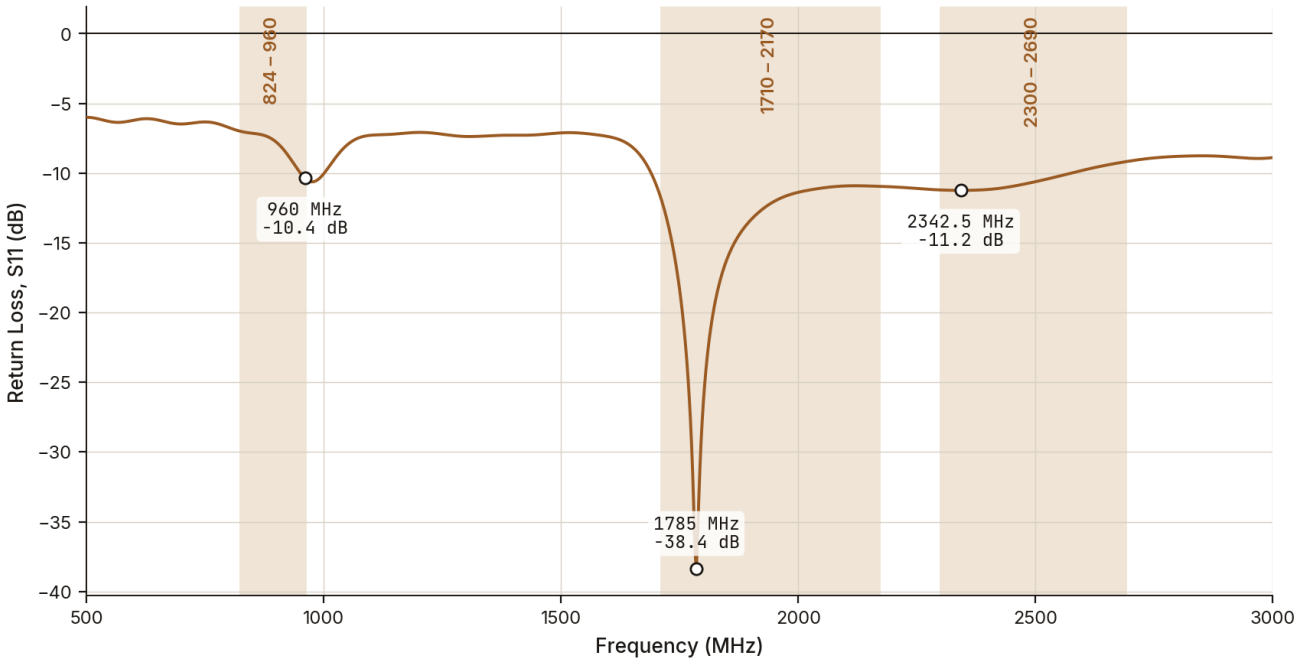
> LOW-BAND PERFORMANCE
>
> The figures are quoted per sub-band rather than as one number across the range, because this part does not perform uniformly across it. Low band is the weak one: at 824–960 MHz the match reaches only −6.3 dB and gain falls as low as −4.7 dBi, where mid band holds −10.9 dB and +4.9 dBi. That behaviour is expected — 54 mm is a small fraction of a wavelength at 824 MHz — and the ground plane matters more there than anywhere else in the range. If your deployment depends on low-band LTE (B12, B13, B17, B20, B28), size the link budget from the figures above rather than from the peak, and talk to engineering@wavelet.in before committing the layout.

7. INTEGRATION GUIDELINES

Placement	Along an outer edge of the host PCB, as far from metal as the enclosure allows. Corners generally outperform mid-edge positions
Keep-out	Clear of copper pour, ground fill and components on all layers beneath and around the radiating element
Ground plane	The host ground plane forms part of the radiating structure. A larger continuous plane improves low-band performance directly, and this part needs it most below 960 MHz
Cable routing	Keep the coaxial run away from switching regulators, displays and high-speed digital traces. Do not coil the surplus against the antenna
Nearby metal	Batteries, shield cans, displays and metal bezels detune the antenna. Verify the match in the assembled enclosure rather than on a bare board
Mounting surface	3M adhesive tape onto a non-conductive surface. Avoid mounting directly onto metal

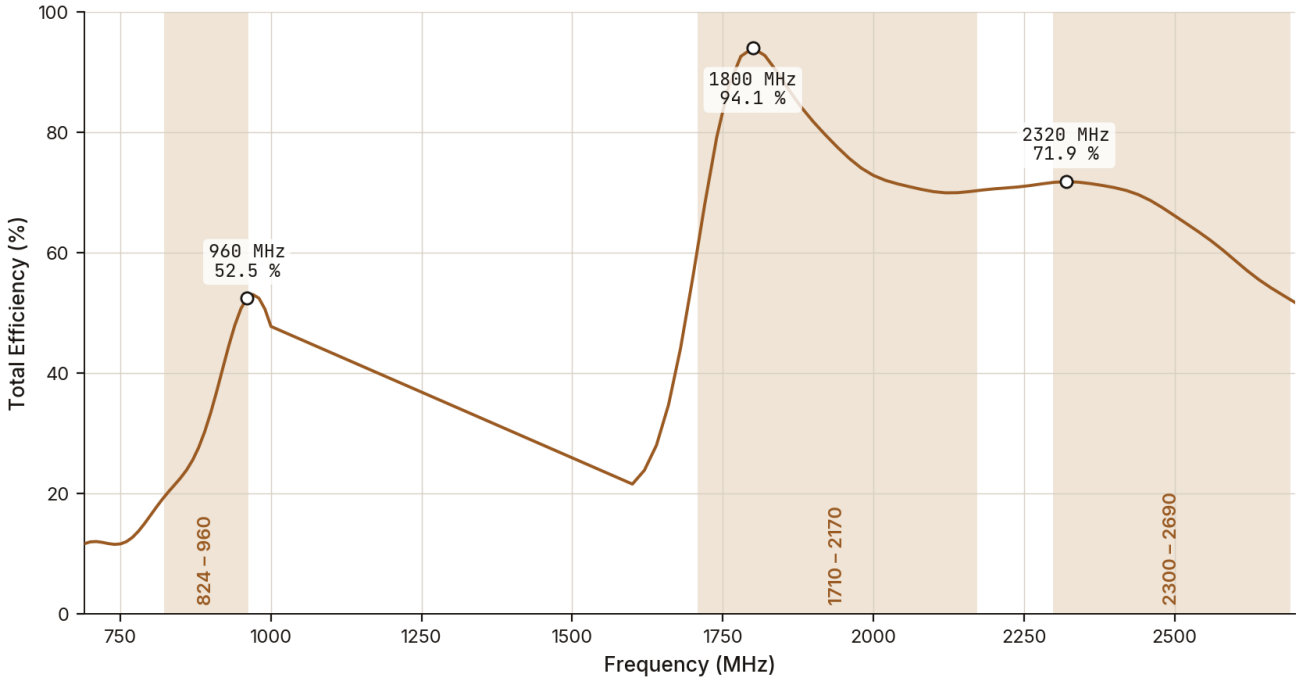
8. RF PERFORMANCE

8.1 Return Loss



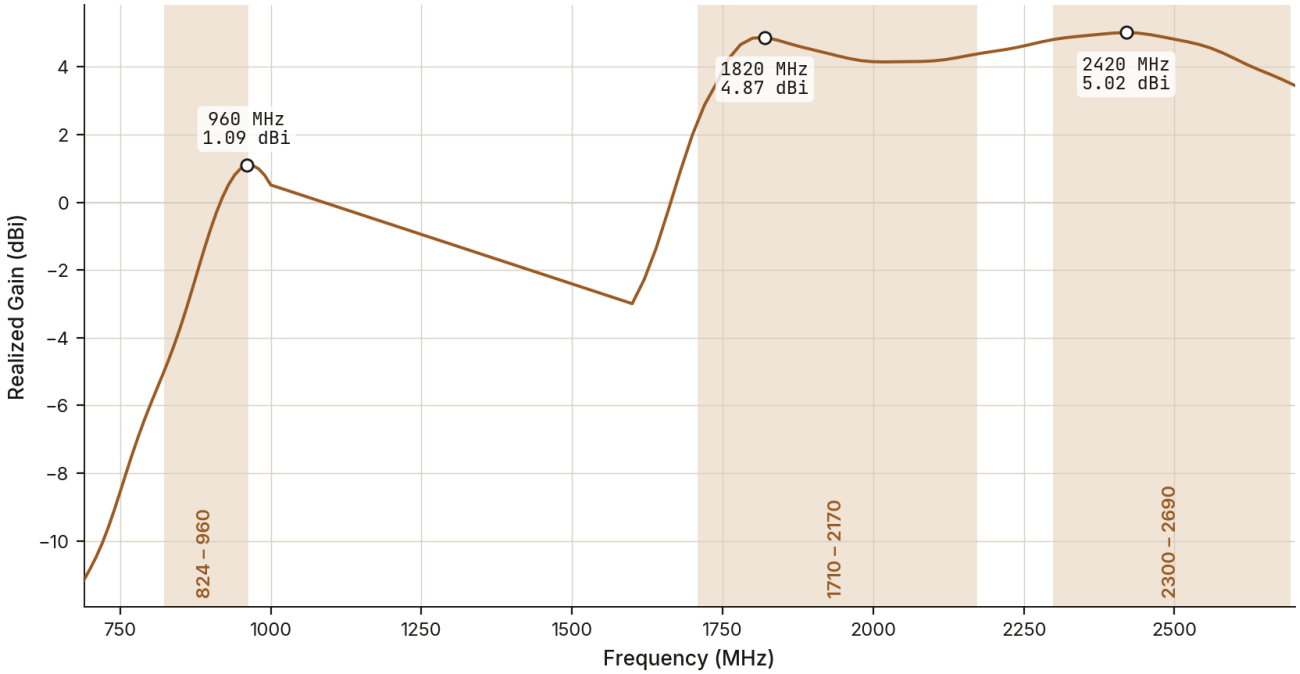
S11 from 500 to 3000 MHz; the shaded region marks the 690–2700 MHz operating band. Resonance falls at 1785 MHz with a return loss of −38.4 dB. The match degrades toward the low edge, reaching −7.0 dB in the 824–960 MHz band.

8.2 Total Efficiency



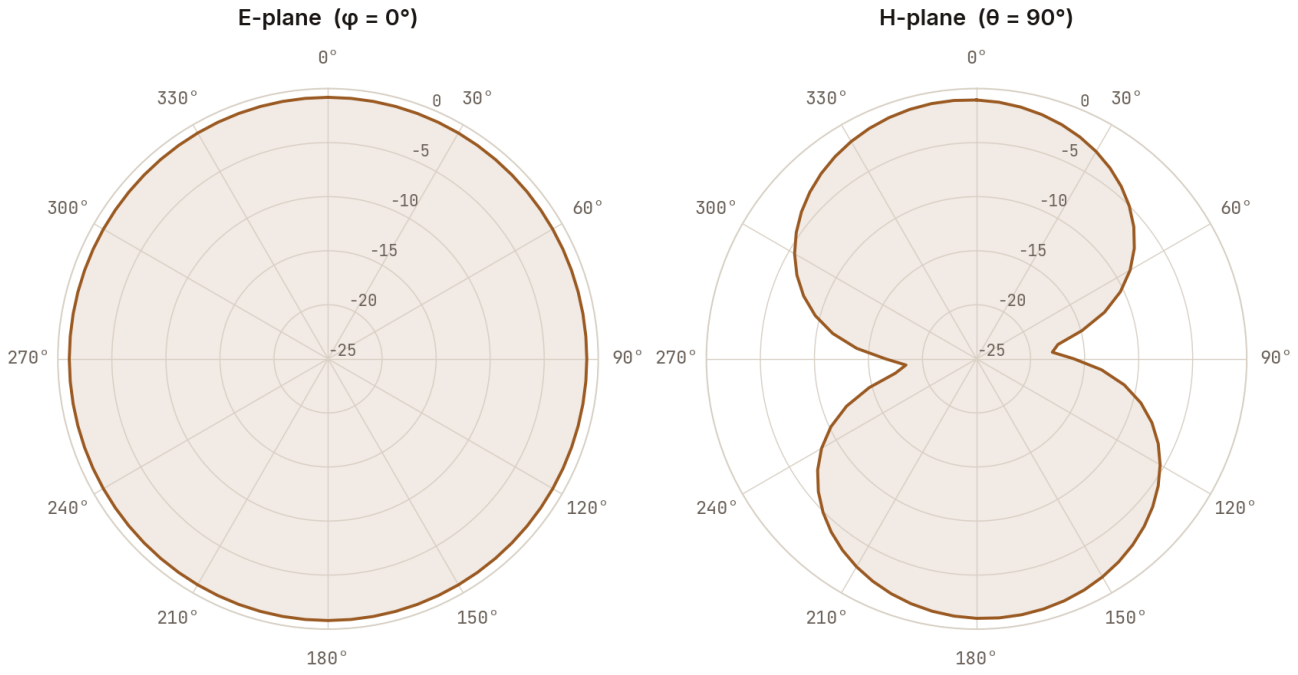
Total radiated efficiency, mismatch and material loss included. The curve peaks at 94% near 1800 MHz and falls to 20% at the bottom of the low band, which is the same low-band behaviour the return-loss trace shows.

8.3 Realized Gain



Peak realized gain across the band, mismatch loss included.

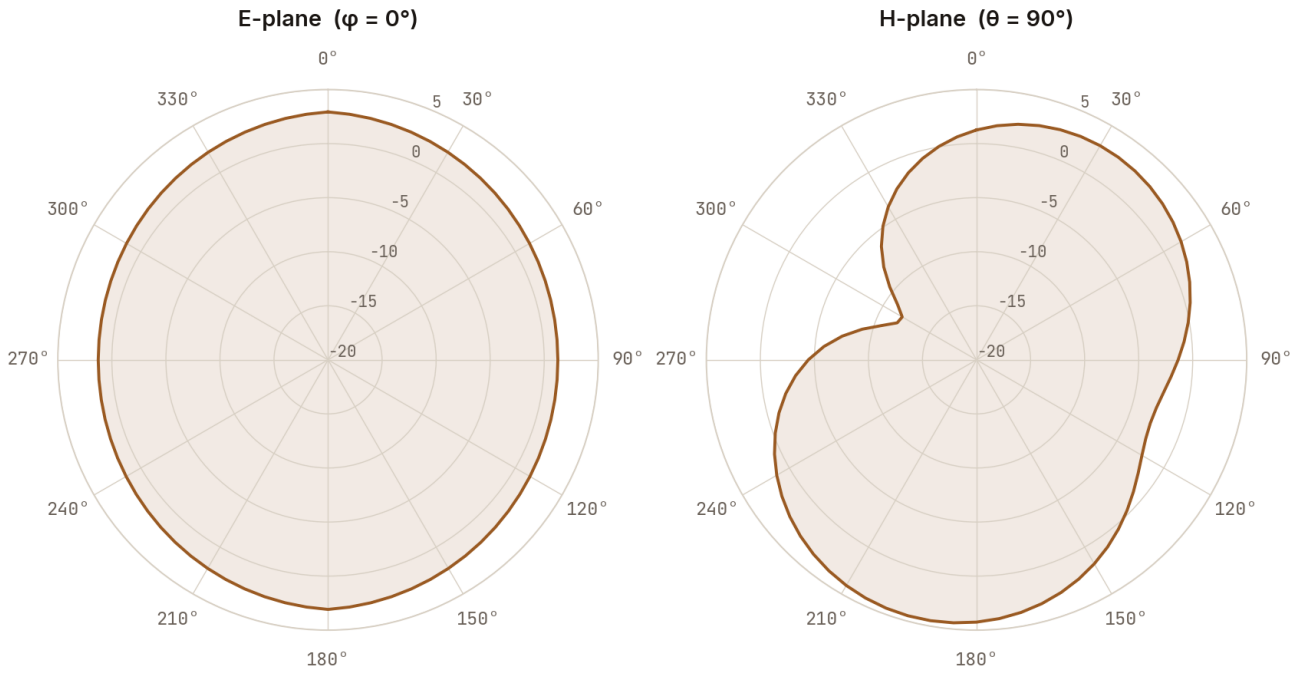
8.4 Radiation Pattern at 900 MHz



Realized gain (dBi) at 900 MHz · peak -0.80 dBi

E-plane and H-plane cuts at 900 MHz, low band.

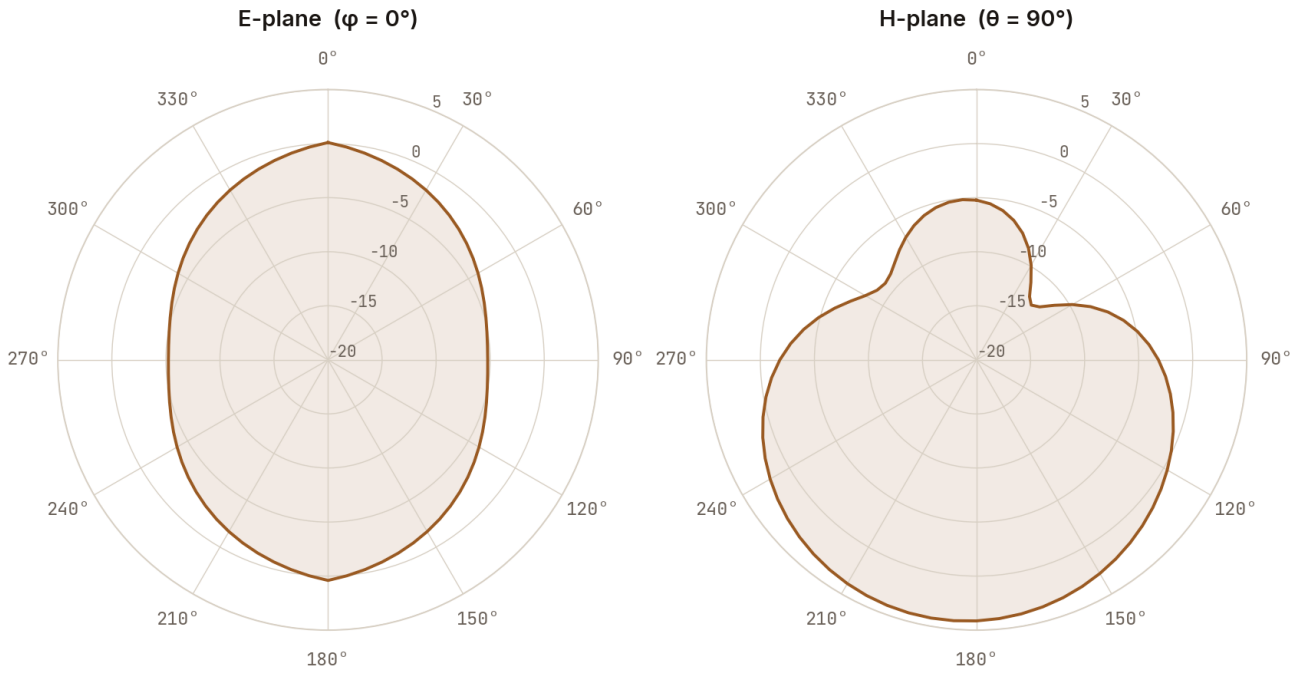
8.5 Radiation Pattern at 1900 MHz



Realized gain (dBi) at 1900 MHz · peak 4.51 dBi

E-plane and H-plane cuts at 1900 MHz, mid band — where this part performs best.

8.6 Radiation Pattern at 2600 MHz



Realized gain (dBi) at 2600 MHz · peak 4.25 dBi

E-plane and H-plane cuts at 2600 MHz, high band.

9. PACKAGING & STORAGE

Packaging	Individual PE bag, 100 pieces per outer bag
Storage temperature	-10 °C to +40 °C
Humidity	Below 75 % RH
Shelf life	18 months in sealed packaging
Compliance	RoHS compliant

REVISION HISTORY

Rev.	Date	Description
1.0	24 Sep 2026	Initial release

CONTACT

Quote this part number when enquiring. Samples, volume pricing and lead times are issued per enquiry; an RF engineer answers technical questions directly.

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Engineering	engineering@wavelet.in
Web	www.wavelet.in

REGISTERED OFFICE

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Specification notice. Performance of any embedded antenna depends on the host PCB, the ground plane it is matched against, enclosure materials and nearby metal. The figures in this document are measured under the test conditions stated in section 6 and should be verified in your own design. Wavelet reserves the right to change specifications without notice. Data is believed to be accurate at the time of release and is provided for design guidance only; it does not constitute a warranty.