

GPS L1 Antenna

Wavelet_GPS_14_30_V00

A compact, high-efficiency GPS antenna for the L1 civil carrier at 1575.42 MHz. Across the acquisition window it holds 80–85% total efficiency, better than 1.44:1 VSWR and 2.28 dBi realized gain — an off-the-shelf part for asset trackers and telematics that needs no custom antenna programme.

Wavelet
PROCESSED BY ANTIPODES

CENTRE FREQ.	PEAK GAIN	PEAK EFFICIENCY	FOOTPRINT
1575.42 MHz	2.28 dBi	85%	30 × 14 mm

FEATURES

- Tuned for the GPS L1 civil carrier at 1575.42 MHz
- Total efficiency of 80–85% across the acquisition window
- Realized gain of 1.98 to 2.28 dBi
- VSWR better than 1.44:1 across 1565–1585 MHz
- Near-omnidirectional pattern in the horizontal plane
- Compact 14 × 30 mm footprint, 1 mm profile
- 100 mm of 1.13 mm coaxial cable with I-PEX MHF connector
- Passive — no LNA, no bias voltage required

1. DESCRIPTION

Wavelet_GPS_14_30_V00 is a compact printed circuit antenna tuned for GPS L1 reception, cabled on I-PEX MHF. Unlike the cellular parts in the range it is a narrowband, receive-only element, and that is what allows 85% total efficiency at this size. It is a passive antenna: it contains no low-noise amplifier and needs no bias, so receiver sensitivity and any external LNA remain part of the system budget rather than of this part.

2. APPLICATIONS

- Asset tracking and telematics
- Fleet and vehicle tracking
- IoT devices
- Routers and gateways
- eHealth equipment
- Modules and sensors

3. GENERAL DATA

Centre frequency	1575.42 MHz (GPS L1)
Operating window	1565 – 1585 MHz
Polarization	Linear
Impedance	50 Ω
Direction	Receive only — no transmit power rating applies
Operating temperature	-40 °C to +85 °C
Antenna type	Rigid FR-4 printed circuit antenna
Dimensions (W × L × H)	14 × 30 × 1 mm
Connector	U.FL / I-PEX MHF
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_GPS_14_30_V00 is the GPS part in a 14 × 30 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_GPS_14_30_V00	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
14.0 mm	30.0 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
1565 – 1585 MHz	1.98 dBi	2.28 dBi	80 %	85 %	-14.9 dB	1.44:1

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 across the stated window, not the value at resonance.

WHERE RESONANCE SITS

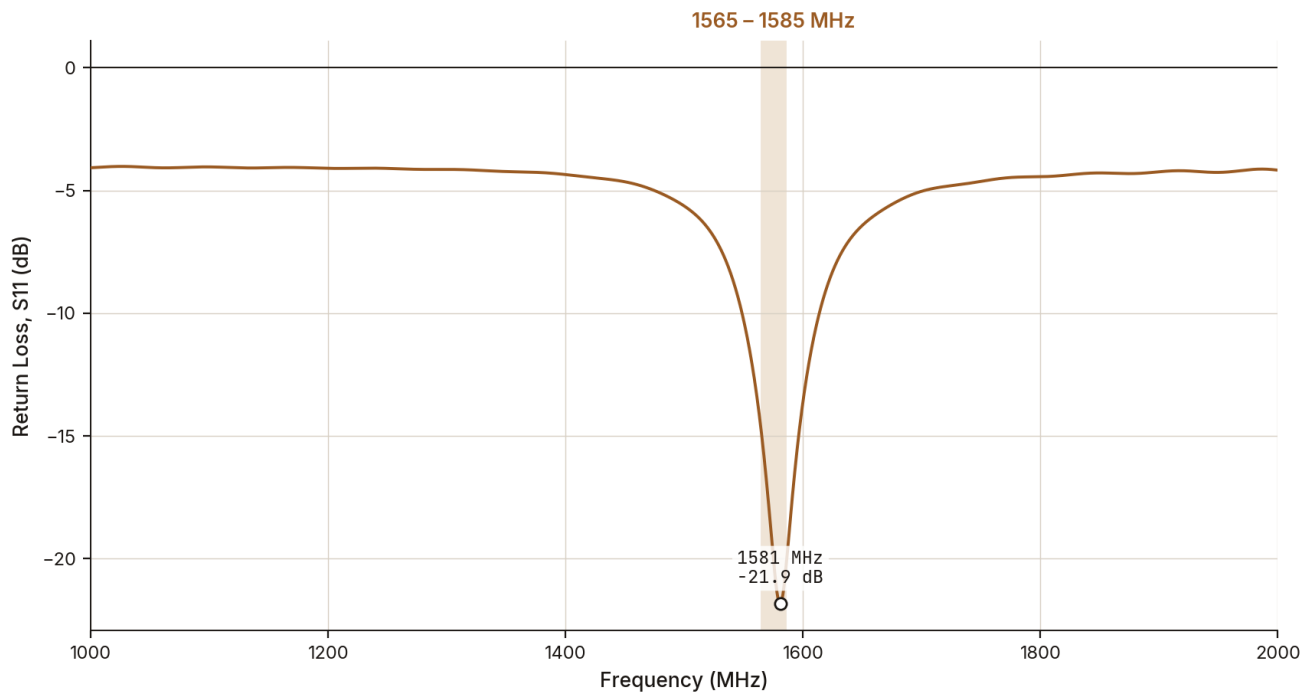
The match is deepest at 1581 MHz — about 6 MHz above the L1 carrier — rather than exactly on 1575.42 MHz. It makes no practical difference: the response is broad enough that the carrier still sees better than -20 dB return loss and within a percentage point of peak efficiency, and every figure in section 6 is the worst case across the whole window rather than the value at the notch. Nothing needs retuning in the host design.

7. INTEGRATION GUIDELINES

Orientation	Mount with the radiating face toward the sky. A GNSS antenna is aimed at satellites, not at a base station, so sky view matters more than proximity to the edge of the board
Obstruction	Metal above the element, vehicle roof lines and carbon-fibre panels cost fix time and position accuracy directly
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 the pattern overhead
Co-located transmitters	A cellular transmitter close by can desensitise the GNSS receiver. Where the design carries both, ask engineering@wavelet.in before committing the layout
Amplification	Passive part, no LNA fitted. Receiver sensitivity and any external low-noise amplification belong to the system budget

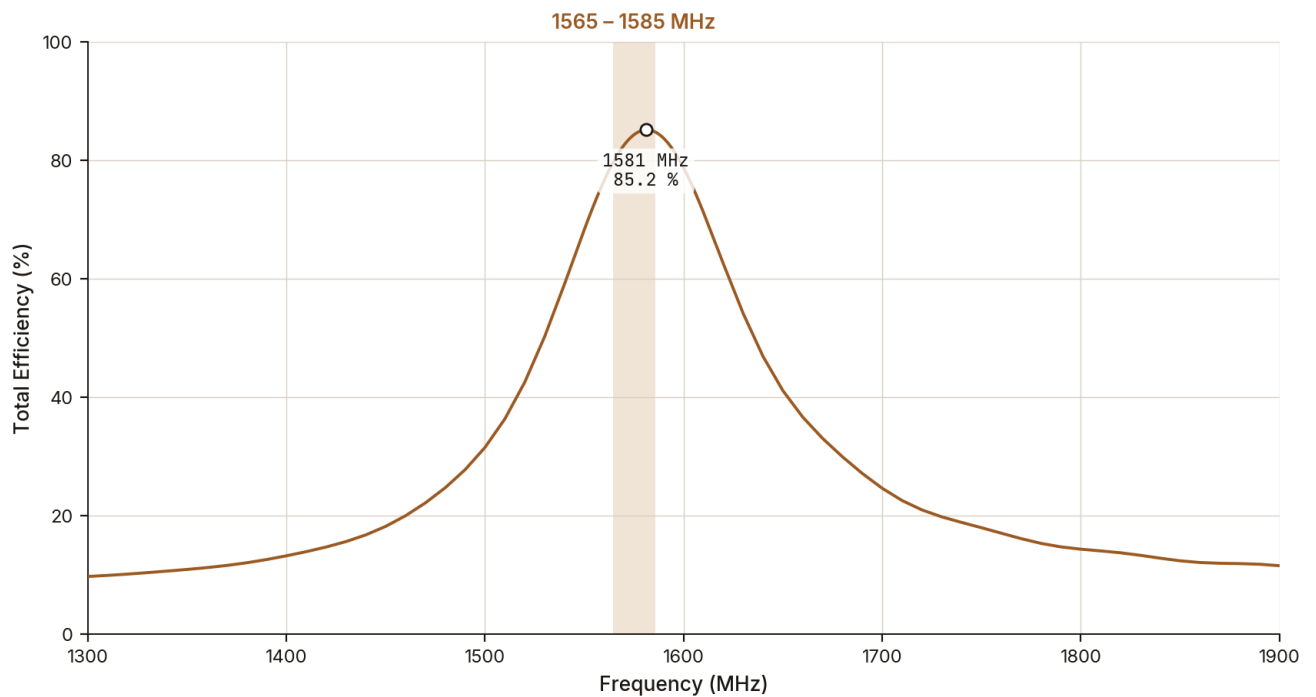
8. RF PERFORMANCE

8.1 Return Loss



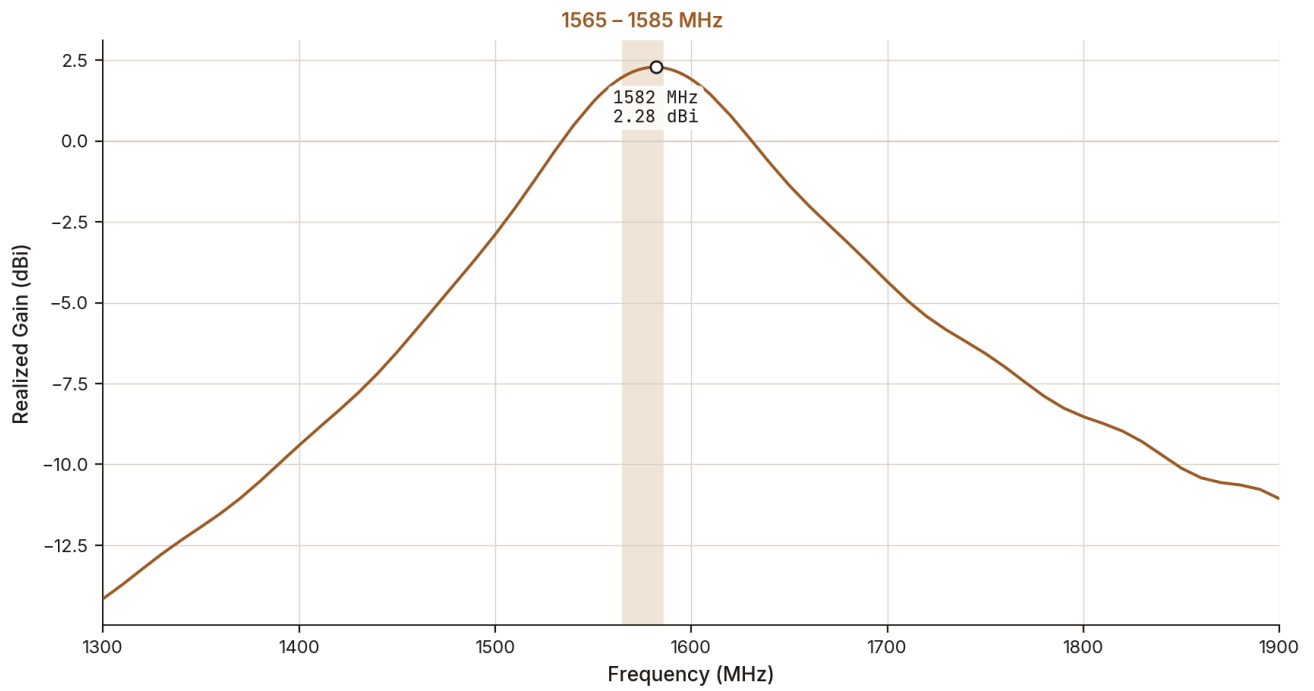
S11 from 1000 to 2000 MHz; the shaded region marks the 1565–1585 MHz acquisition window. Resonance falls at 1581 MHz with a return loss of -21.9 dB.

8.2 Total Efficiency



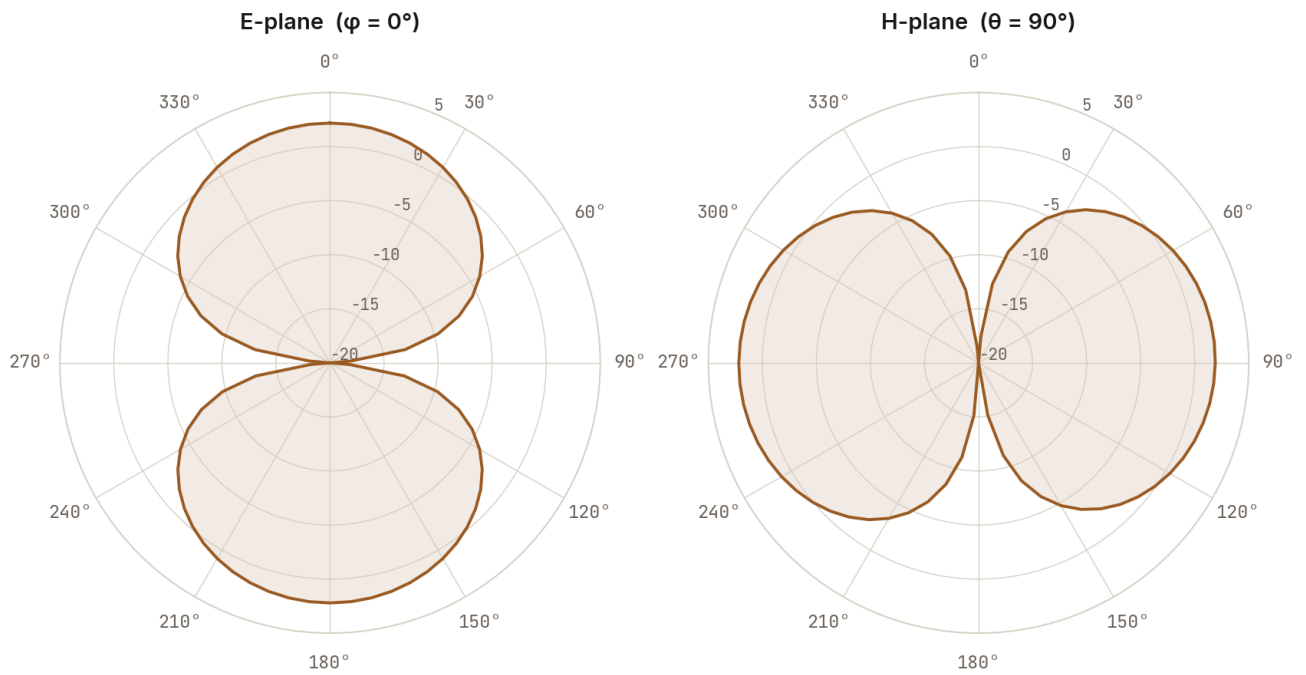
Total radiated efficiency, mismatch and material loss included. The curve peaks at 85.2% at 1581 MHz and holds above 80% across the window.

8.3 Realized Gain



Peak realized gain across the band, mismatch loss included.

8.4 Radiation Pattern at 1575 MHz



E-plane and H-plane cuts at the L1 carrier.

9. PACKAGING & STORAGE

Packaging Individual PE bag, 100 pieces per outer bag

Storage temperature $-10\text{ }^\circ\text{C}$ to $+40\text{ }^\circ\text{C}$

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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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.