

UWA-02规格书

Datasheet

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目录 Content

1. 简介 General Description.....	4
2. 结构尺寸 Dimension figure.....	5
3. 工作条件 Operating Conditions.....	5
4. 仿真结果 Simulation Results.....	6
4.1 辐射方向图 Radiation patterns.....	6
4.2 反射系数 Return Loss (S11).....	8
4.3 天线效率 Antenna Efficiency.....	8
4.5 群时延变化 Group Delay Variation.....	9
4.6 时域保真度 Fidelity Factor.....	10
5. 联系方式 Contact.....	11

1. 简介 General Description

UWA-02 天线旨在集成到基于 DW1000 的标签或基站设计中。它可以与 95Power 的 DW1000 UWB 收发器配合使用，提供低成本、高效率、紧凑型、高保真度和低群延时变化的解决方案。

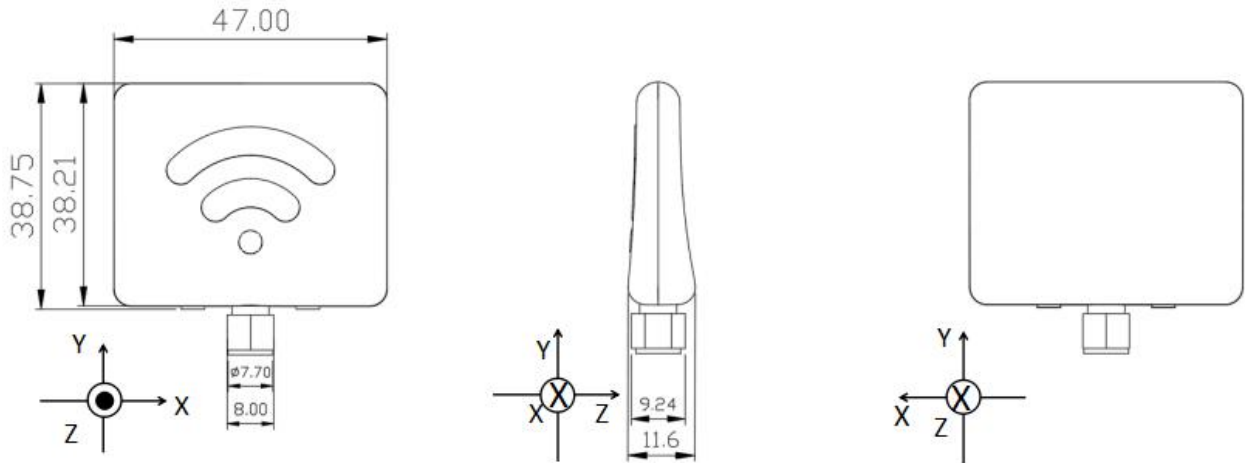
The UWA-02 antenna is designed to be integrated onto a DW1000 based tag or anchor design. It is designed specifically to work with 95Power's DW1000 UWB transceiver providing a low cost, high efficiency compact solution with excellent fidelity and low group delay variation with antenna orientation.



Figure 1 UWA-02 antenna

2. 结构尺寸 Dimension figure

单位: mm Unit:mm



3. 工作条件 Operating Conditions

参数 Parameter	规格 Specification
工作频率范围 Operational Frequency Range	3 GHz to 8 GHz
最大增益 Maximum Gain	2.2 dBi at 4 GHz 3.3 dBi at 6.5 GHz
方向性 Radiation Pattern	全向天线 Omni-direct
输入阻抗 Impedance	50 Ω
存储及使用温度 Operating & Storage Temperature	-40~+85°C
天线接口 Antenna interface	SMA 公头(内螺纹内针) SMA Male
外壳材质 Shell material	PC

4. 仿真结果 Simulation Results

以下结果显示了 WB002 预期性能: The following results show the expected performance of WB002:

4.1 辐射方向图 Radiation patterns

以下图表显示了不同天线方向的预期辐射方向图(3 轴方向参考第 2 节)

The following plots show the expected radiation patterns for different antenna orientations (3-axis is shown in chapter 2)

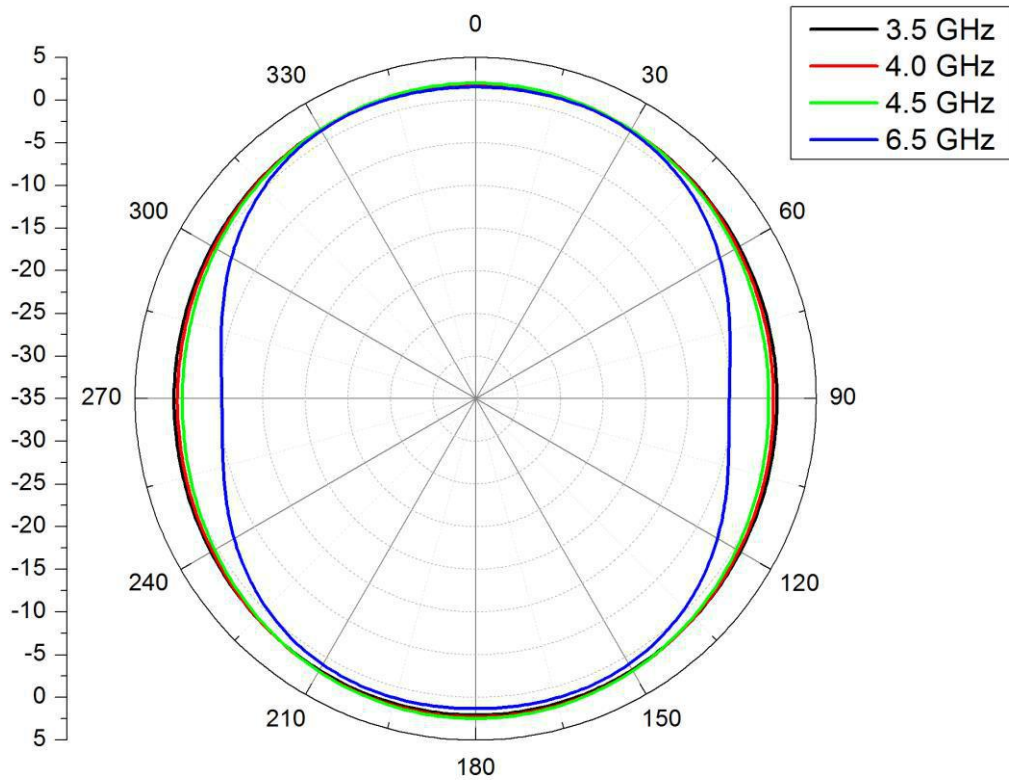


Figure 2 x-y 水平面辐射方向图 Radiation Patterns Azimuth plane (Theta 90°)

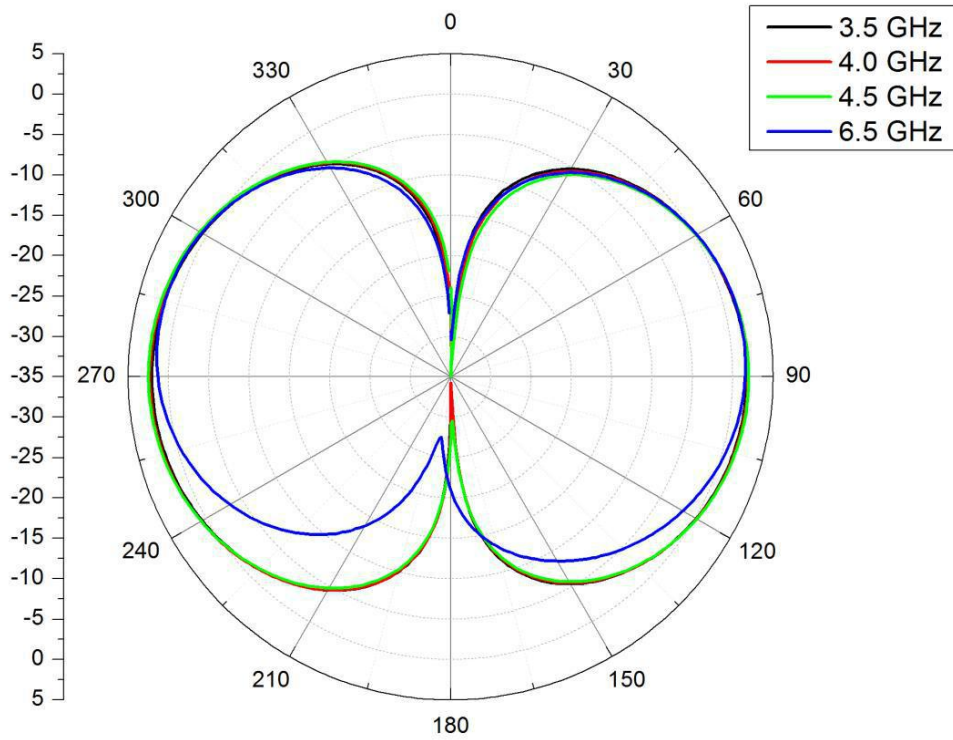


Figure 3 x-z 平面方向图 Radiation Patterns Elevation (phi 0°)

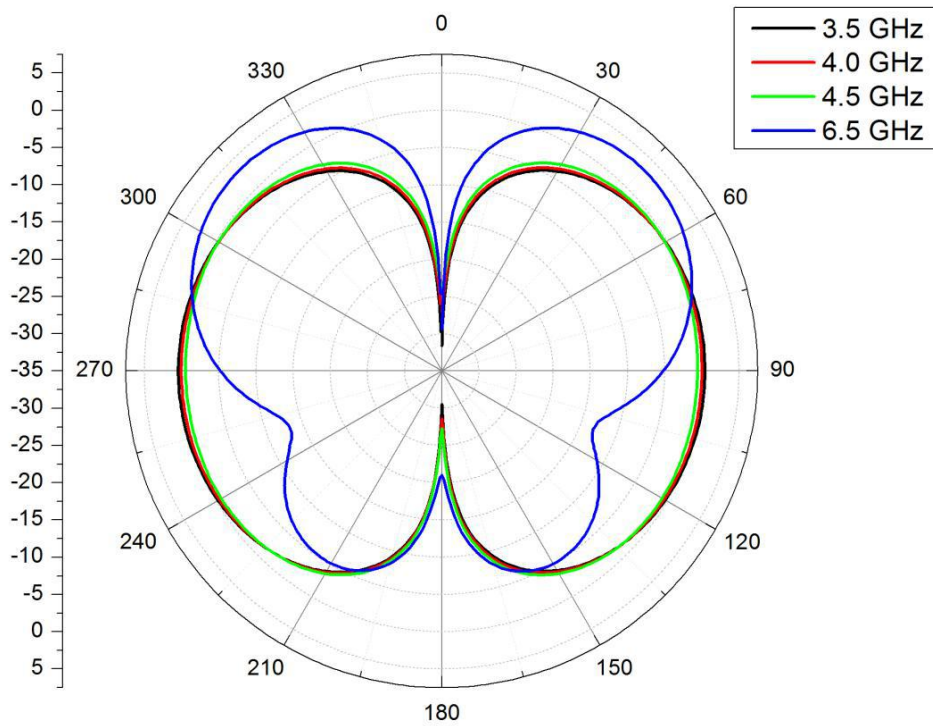


Figure 4 y-z 方向辐射方向图 Radiation Patterns Elevation (phi 90°)

4.2 反射系数 Return Loss (S11)

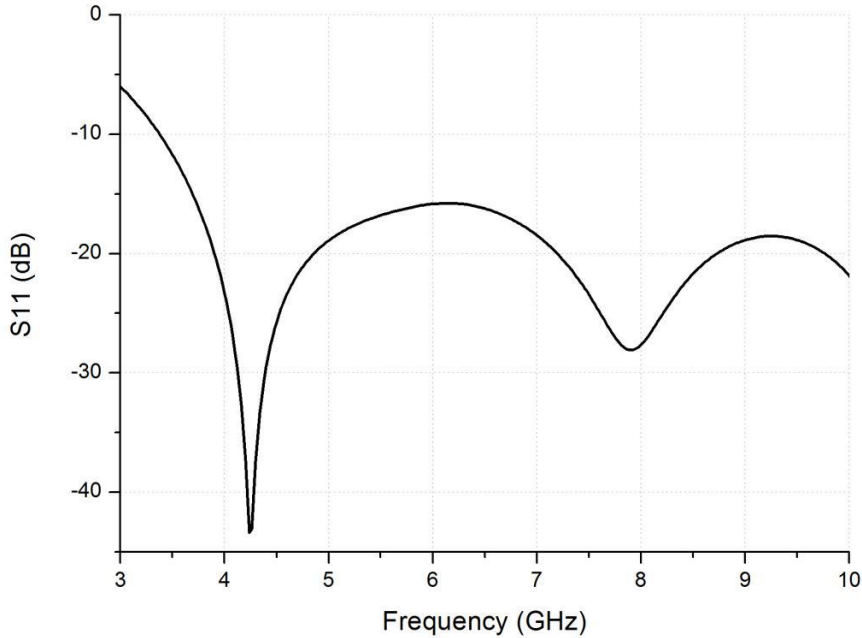


Figure 5 Antenna match versus frequency 天线匹配与频率关系图

4.3 天线效率 Antenna Efficiency

下图显示了自由空间中模拟的 UWA-02 效率，以及与大型金属板间隔 5 mm 时的效率。这表明，为了获得最佳性能，天线的位置应远离墙壁等。

The following plot shows simulated UWA-02 efficiency in free space and when spaced 5 mm from a large metal plate. This shows that for best performance the antenna should be position away from walls etc.

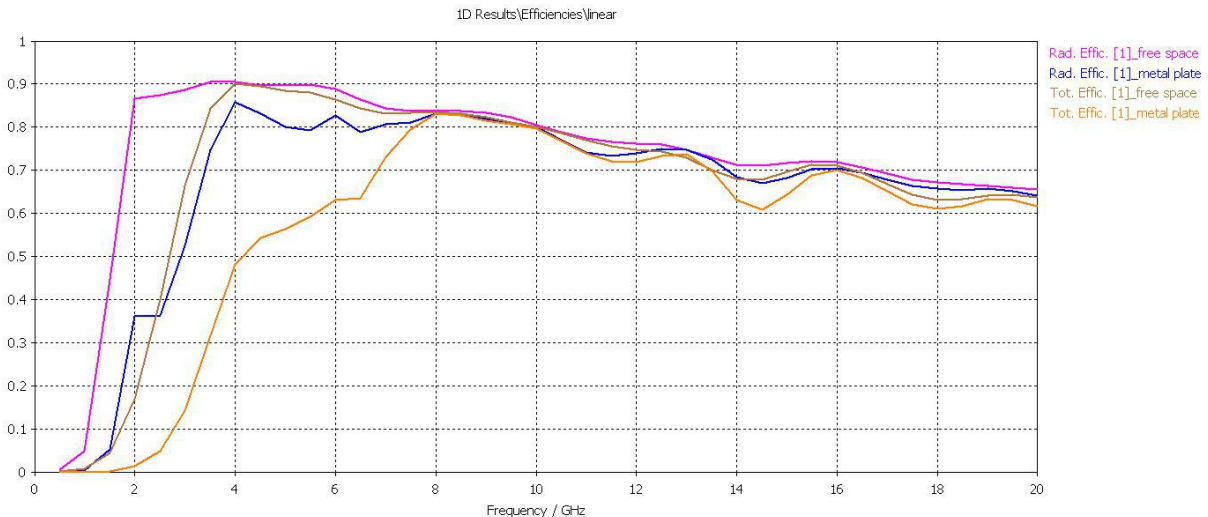


Figure 7 自由空间和靠近金属空间的效率 Efficiency in free space and in proximity to a metal space

4.4 最大增益 Maximum Gain

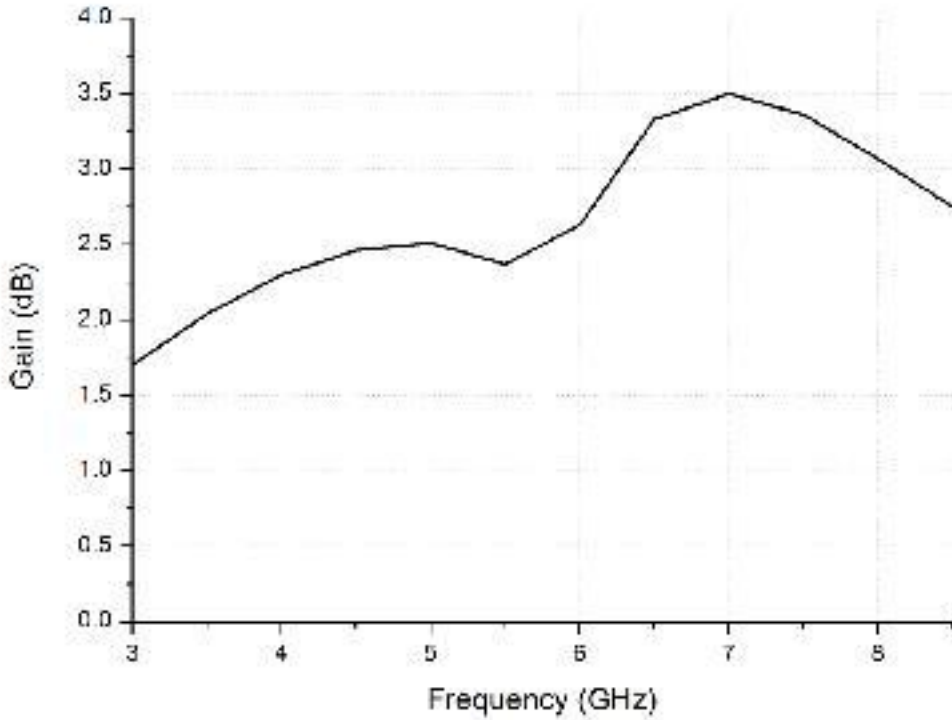


Figure 8 Maximum Gain across frequency 不同频率下的最大增益

4.5 群时延变化 Group Delay Variation

群时延变化是用于 DW1000 等超宽带定位的天线需要考虑的一个重要参数。这里我们指的是当天线旋转时，天线的群延时是如何变化的。1ns 的变化将代表报告距离中 30 cm 的变化，因此我们的目标是天线旋转 $<\pm 100$ ps 的群延迟变化。下图显示了天线旋转时群延迟的变化。尺度以纳秒为单位，可以看出，天线的群时延变化很小。

Group delay variation is an important parameter to consider for antennas to be used in location solutions using IR-UWB such as DW1000. Here we mean how the group delay of the antenna changes as the antenna is rotated. 1ns of variation would represent 30 cm variation in the reported distance, so we aim for a group delay variation with antenna rotation of $<\pm 100$ ps. The plot below shows the variation in group delay as the antenna is rotated. The scale is in nanoseconds and as can be seen there is very little variation with the antenna.

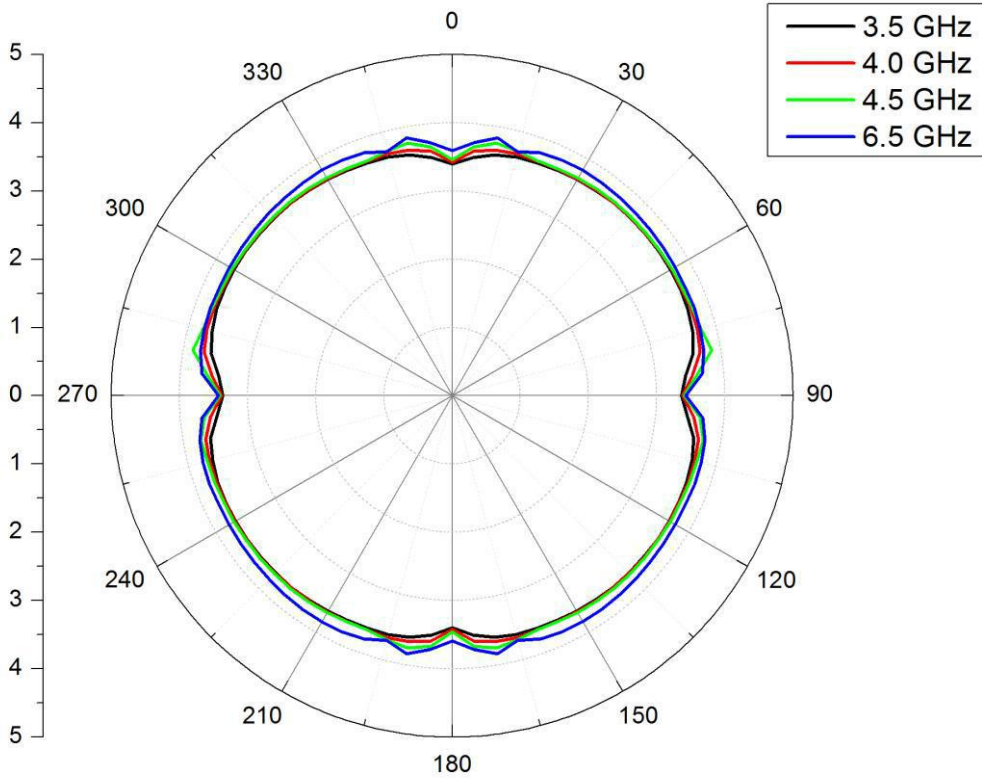


Figure 9 群延时随方位角变化图 (xy 平面距离天线 1m) Variation in group delay with angle (Azimuth plane at 1m)

4.6 时域保真度 Fidelity Factor

对于 IR-UWB 系统中使用的天线，保真度系数表示天线在时域的性能。理想的数字是 1，目标是 0.9。该天线在 3-8ghz 的工作频率范围内，在方位平面上的保真度系数大于 90%

For antennas used in IR-UWB systems Fidelity Factor shows how well the antenna will perform in the time domain. A figure of 1 is ideal with 0.9 being the target. This antenna presents a Fidelity Factor which is above 90% in the azimuth plane across the operational frequency range 3 – 8 GHz

5. 联系方式 Contact

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