

TC300 MURATA ANTENNA VERSION

DUAL BAND WIFI ANTENNA

Honeywell (Beijing) Technology Solutions Labs Co., Ltd.

**A1 Building, C&W Industry Zone, No.14 Jiuxianqiao Road, Chaoyang District, 100015, Beijing,
P.R. China**

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WiFi Antenna Specifications :

Parameters	Values
Antenna dimension	15.75 x 6.28 mm
Antenna Gain	2.543 dBi at 2.45 GHz 3.582 dBi at 5.5 GHz
Return Loss max in band (S11)	-31.92 dB
Bandwidth	91.4 MHz , at 2.4 GHz band 1.1 GHz , at 5 GHz band
Efficiency (System total Efficiency)	-1.895 dB (64.6 %) at 2.45 GHz -1.021 dB (79 %) at 5.5 GHz
Impedance	50 ohm
Antenna Diversity	No

Table 1 : Performance Specifications of Dual Band WiFi Antenna

WiFi Antenna Design Model

Figure 1 : Dual Band WiFi Antenna Design model

- In the TC300 murata version, a single antenna covers both the WiFi bands :
2.4 GHz (2.4 to 2.5 GHz) and 5 GHz (5 to 6 GHz)

Return Loss (RL) of WiFi Antenna

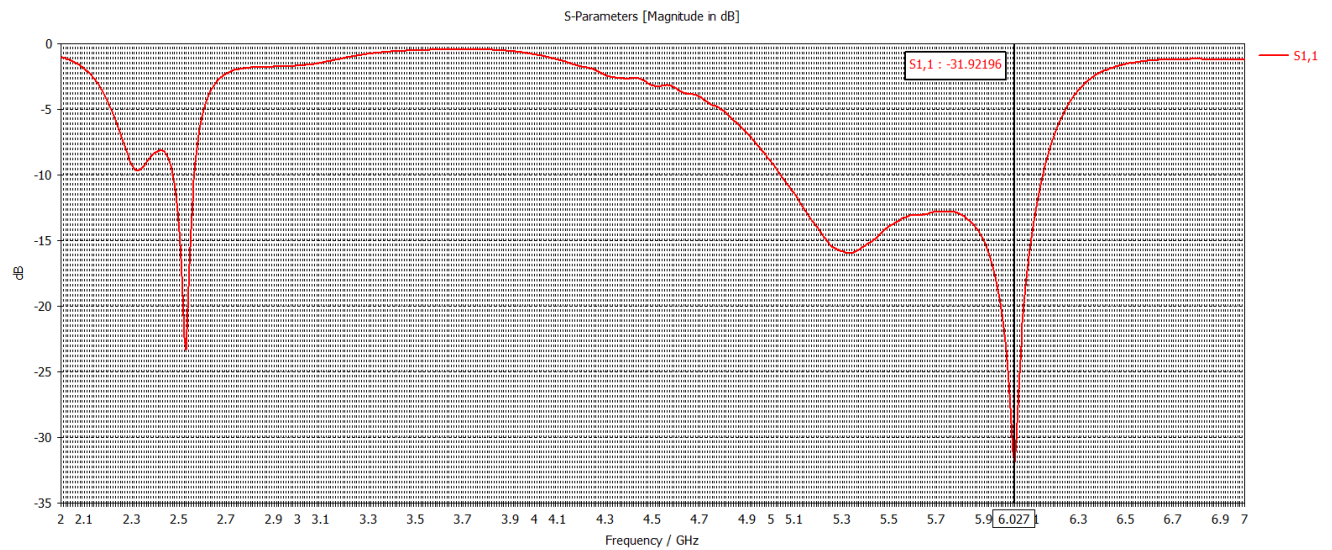


Figure 2 : Return loss plot of WiFi Antenna

- The WiFi Antenna Return loss plot is shown above , which has -10 dB bandwidth of 91.4 MHz & 1.1 GHz at 2.4 GHz & 5 GHz bands respectively
- The max Return loss is -31.92 dB
- The bands under consideration are 2.4 GHz & 5 GHz , with minimum of 100 MHz & 1 GHz respectively .

3D Farfield Radiation Pattern

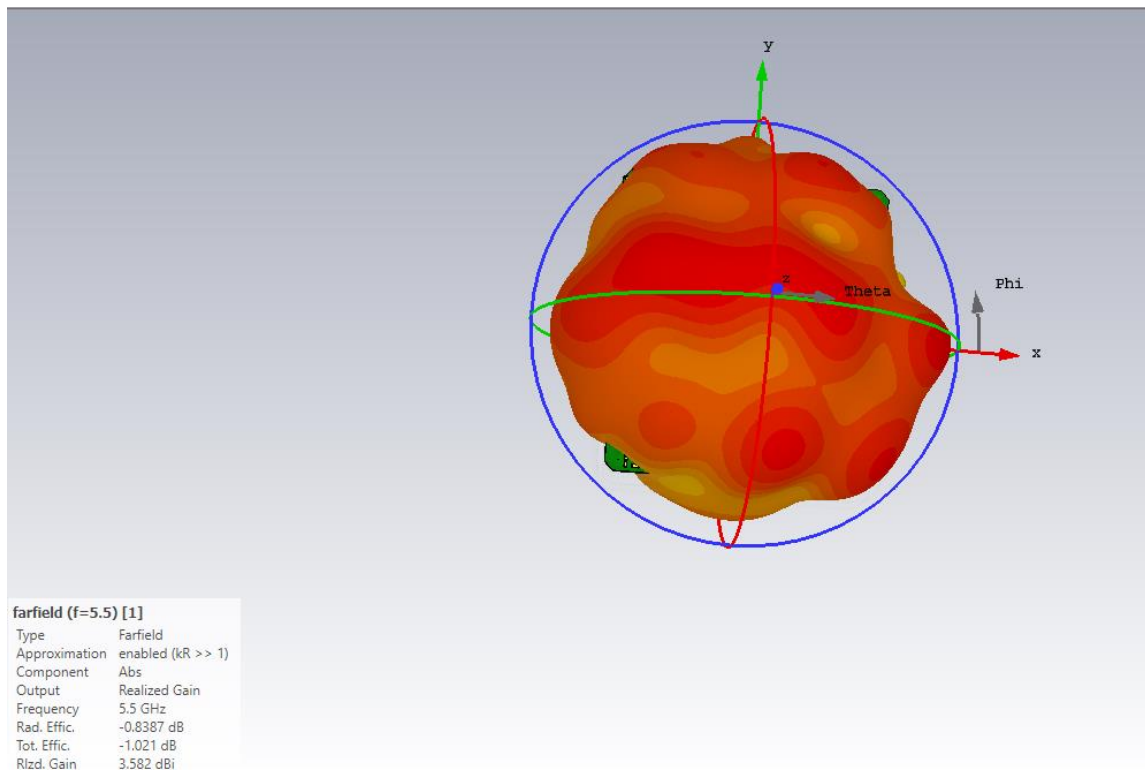
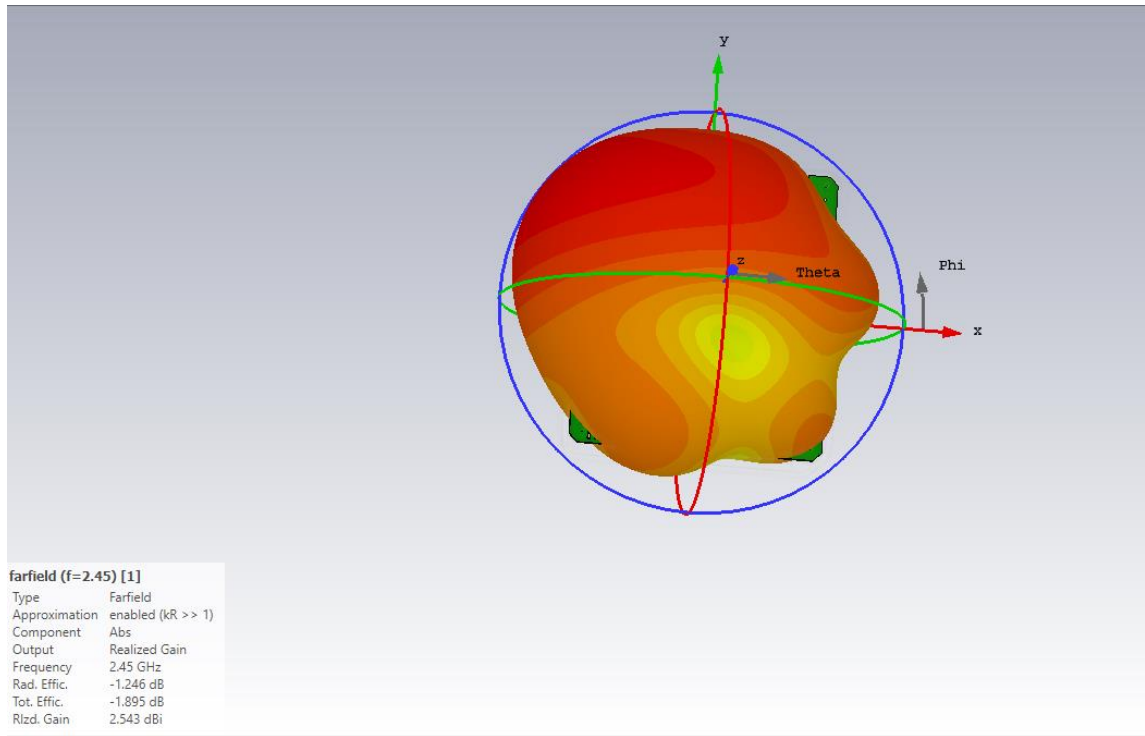


Figure 3 : 3D Radiation Pattern Plots of WiFi Antenna at the center frequencies of 2 bands

- In the 3D Radiation Pattern shown in Figure 3 , the Realized Gain is 2.543 dBi & 3.582 dBi at 2.4 GHz & 5 GHz respectively with a Quasi Omni directional pattern coverage
- The average Antenna efficiency is over 71 %

2D Farfield Radiation Pattern

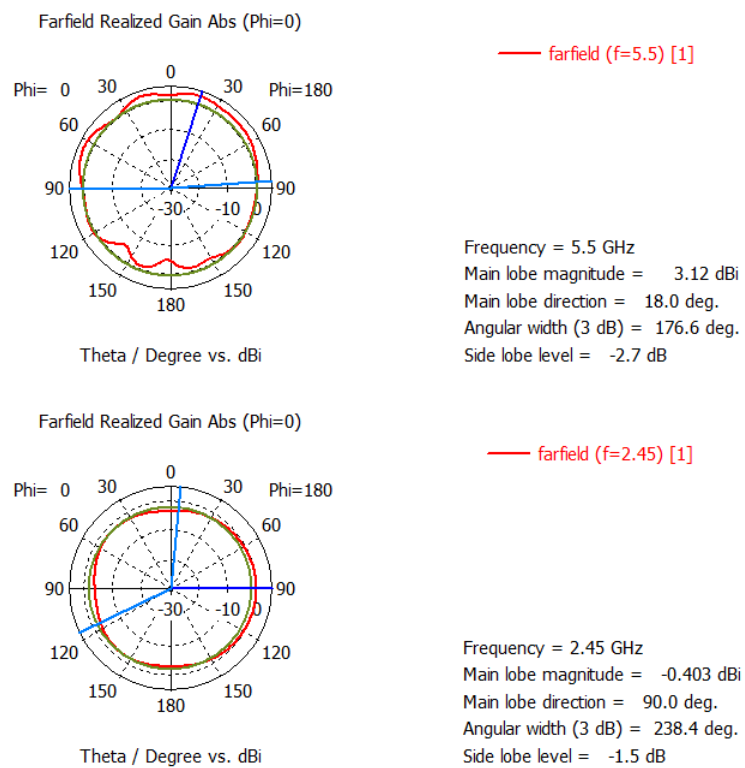
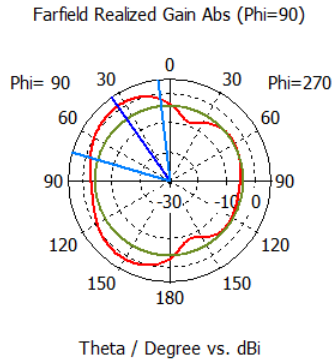
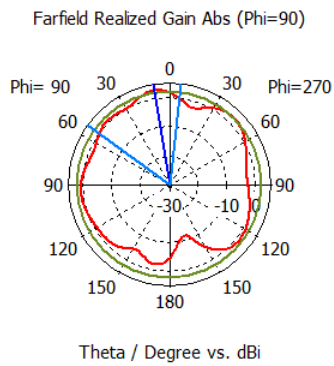


Figure 4 : 2D Radiation Pattern Plot of WiFi Antenna (Phi = 0 degree)



— farfield (f=2.45) [1]

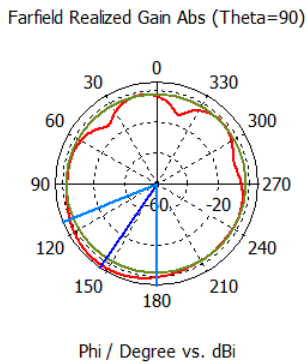
Frequency = 2.45 GHz
 Main lobe magnitude = 1.21 dBi
 Main lobe direction = 35.0 deg.
 Angular width (3 dB) = 67.1 deg.
 Side lobe level = -5.3 dB



— farfield (f=5.5) [1]

Frequency = 5.5 GHz
 Main lobe magnitude = 2.81 dBi
 Main lobe direction = 9.0 deg.
 Angular width (3 dB) = 60.4 deg.
 Side lobe level = -0.8 dB

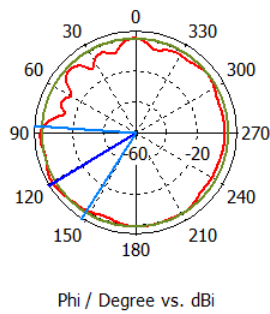
Figure 5 : 2D Radiation Pattern Plot of WiFi Antenna (Phi = 90 degree)



— farfield (f=2.45) [1]

Frequency = 2.45 GHz
 Main lobe magnitude = 2.54 dBi
 Main lobe direction = 146.0 deg.
 Angular width (3 dB) = 68.1 deg.
 Side lobe level = -5.1 dB

Farfield Realized Gain Abs (Theta=90)



— farfield (f=5.5) [1]

Frequency = 5.5 GHz
Main lobe magnitude = 1.7 dBi
Main lobe direction = 121.0 deg.
Angular width (3 dB) = 61.6 deg.
Side lobe level = -1.5 dB

Figure 6 : 2D Radiation Pattern Plot of WiFi Antenna (Theta = 90 degree)

- The 2D Radiation Pattern plots are shown in Fig 4 to 6 , in 3 different cut planes : Phi = 0 degree , Phi = 90 degree and Theta = 90 degree
- The frequency of reference used is 2.45 GHz and 5.5 GHz (WiFi dual band Center Frequencies)

Design Summary

- The WiFi Antenna used is a PCB Printed , special case of Inverted F type antenna 15.75 x 6.28 mm
- It has a Partial Omni directional pattern
- It uses a single antenna without diversity with a bandwidth of 91.4 MHz and 1.1 GHz .