Antenna Datasheet

Product OC: YFVP001WWA
Version: 1.0
Date: 2024-06-27
Status: Released

Product Name: UWB SMT Mount PCB Chip Monopole Antenna
Key Features:
Frequency Band: 3000–8000 MHz
Dimensions: 8 × 6 × 1 mm
Efficiency: Up to 84.5 %
RoHS and REACH Compliant

Overview

Quectel YFVP001WWA is a compact form factor SMT mount PCB Chip antenna for UWB applications. Due to the dimensions of 8 × 6 × 1 mm, it is designed for very small space requirements for precision surveying and high data rate applications. YFVP001WWA is a ground-depended monopole antenna, uses main PCB as its ground plane. It is delivered on tape and reel.

YFVP001WWA is a PCB chip antenna, which can be mounted on super compact space requirement terminals. Despite of this small factor, it has up to 84.5 % efficiency in working bands. This antenna is developed on a 50 × 25 mm evaluation board. If the devices have different ground sizes, matching circuit can be used to tune the resonant frequency correctly. We also offer gerber file, 2D & 3D documents for PCB layout.

YFVP001WWA allows high efficiency, stable signal transmission and reception for UWB working bands in 3000–8000 MHz. This product is RoHS & REACH compliant.

Typical applications include:

- Vehicle-mounted Radar System
- High Data Rate Applications
- Digital Wireless Communication Technology

Quectel provides comprehensive antenna design support such as simulation, testing and manufacturing for custom antenna solutions to meet your specific application needs. We have regional R & D centers to offer quick response to meet your requirements. Please contact our sales & FAEs if you have any requests.

Contents

1 Specification

Test Condition: On 50 × 25 mm EVB

1.1. Electrical

Electrical	
Frequency Range	3000–8000 MHz
Impedance	50 Ω
Polarization	Linear
Radiation Pattern	Omni-directional

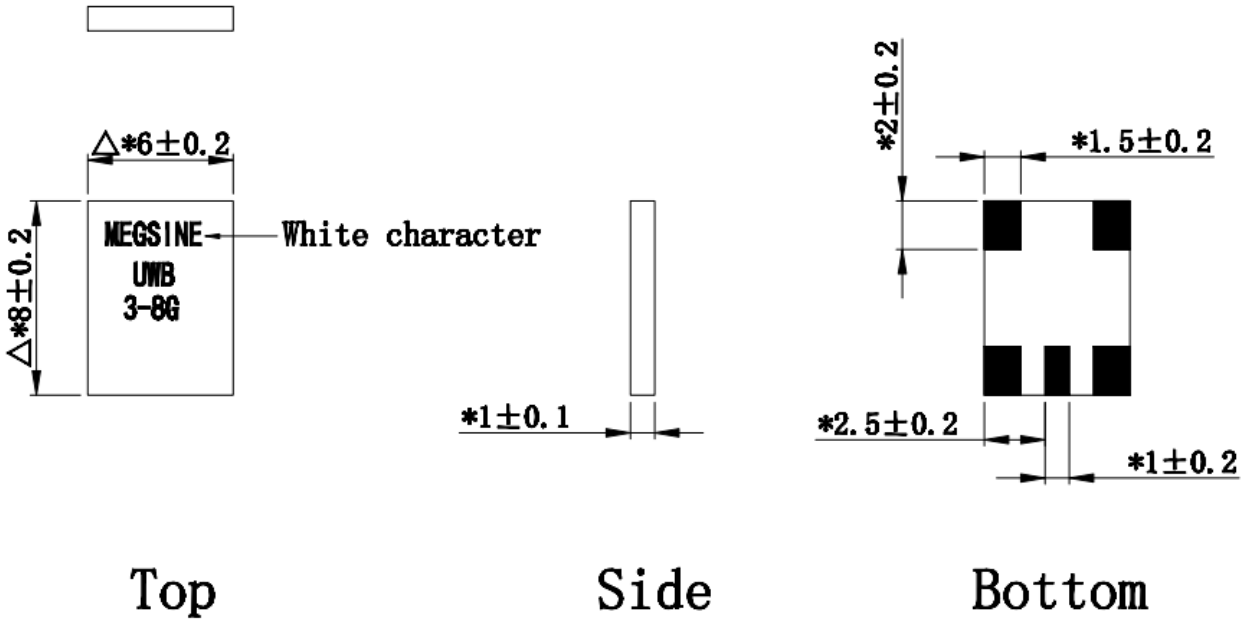
Electrical - Detail									
Band / **SPEC**	**Band**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**B8**
	Freq. (MHz)	**3224.8–3744**	**3744–4243.2**	**4232.2–4742.4**	**3328–4659.2**	**6240–6739.2**	**6739.2–7238.4**	**5980.3–6998.9**	**7238.4–7737.6**
Max. VSWR		2.8	3.3	3.2	3.3	2.0	2.3	2.1	2.6
Max. Return Loss (dB)		-6.4	-5.5	-5.6	-5.5	-9.8	-8.2	-9.1	-7.0
AVG Eff. (%)		55.6	56.7	56.7	56.1	71.4	58.4	70.7	44.2
AVG AVG Gain (dB)		-2.6	-2.5	-2.5	-2.5	-1.5	-2.4	-1.5	-3.6
Max. Peak Gain (dBi)		0.9	1.4	1.6	1.6	2.5	2.5	2.5	1.1
VSWR		≤ 3.3							
Return Loss		≤ -5.5 dB							
Peak Gain		≤ 2.5 dBi							

1.2. Mechanical & Environmental

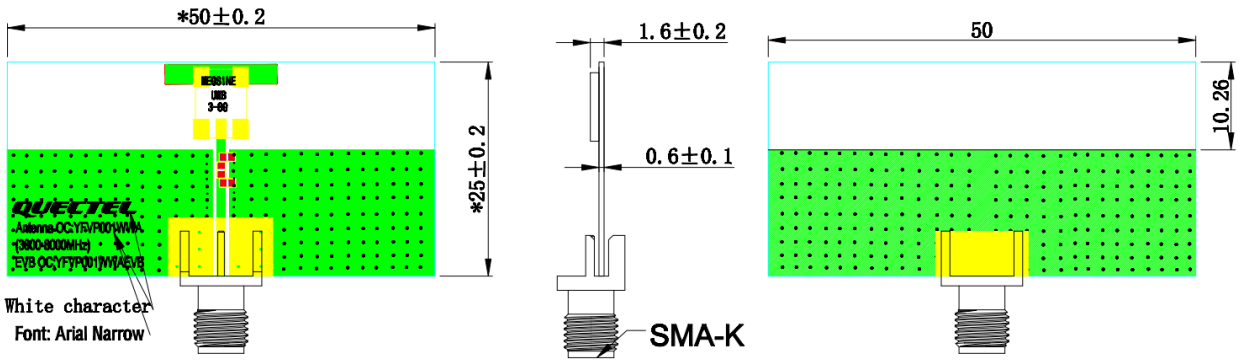
Mechanical	
Antenna Dimensions	8 × 6 × 1 mm
Material & Color	PCB & Black
Mounting Type	SMD
Weight	Typ. 0.5 g
Recommended EVB Size	50 × 25 × 0.6 mm
Environmental	
Operation Temperature	-40 °C to +85 °C
Storage Temperature	-40 °C to +85 °C
RoHS and REACH Compliant	Yes

2 Drawing

2.1 Antenna



2.2 EVB



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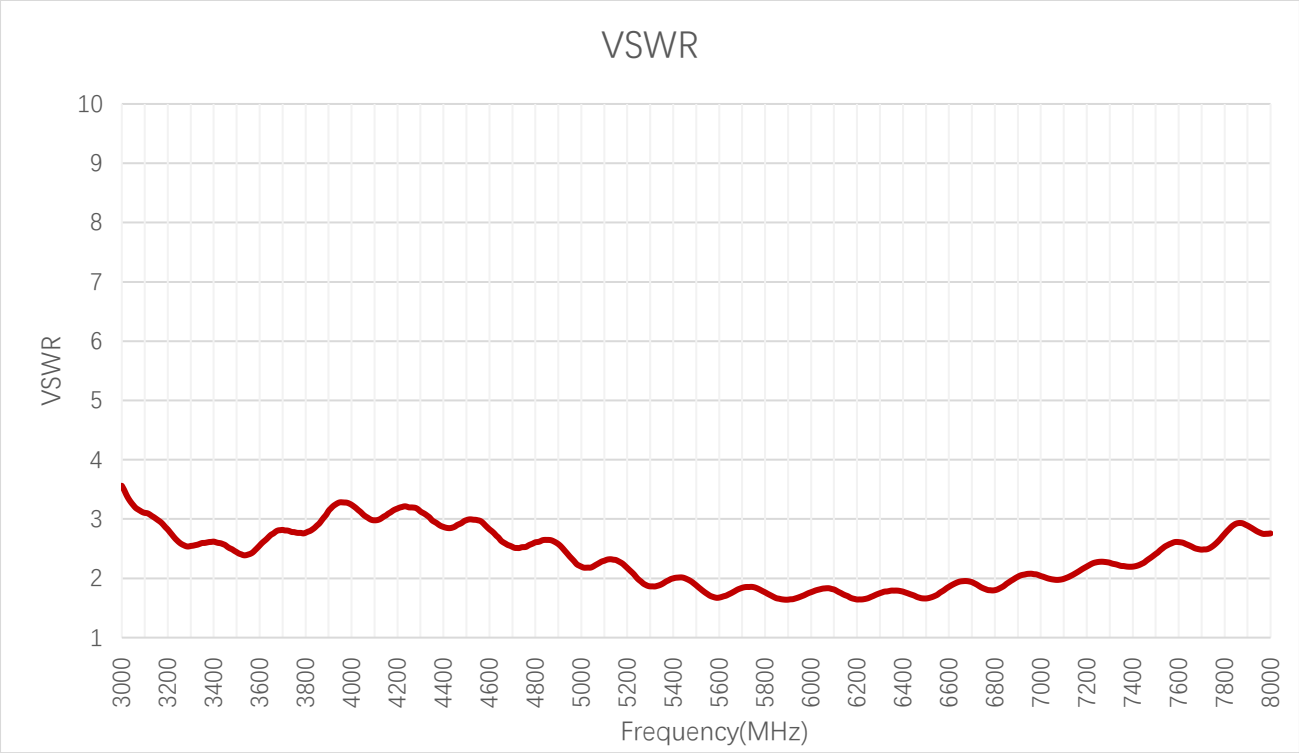
3 Detailed Performance

3.1. S-Parameter Test

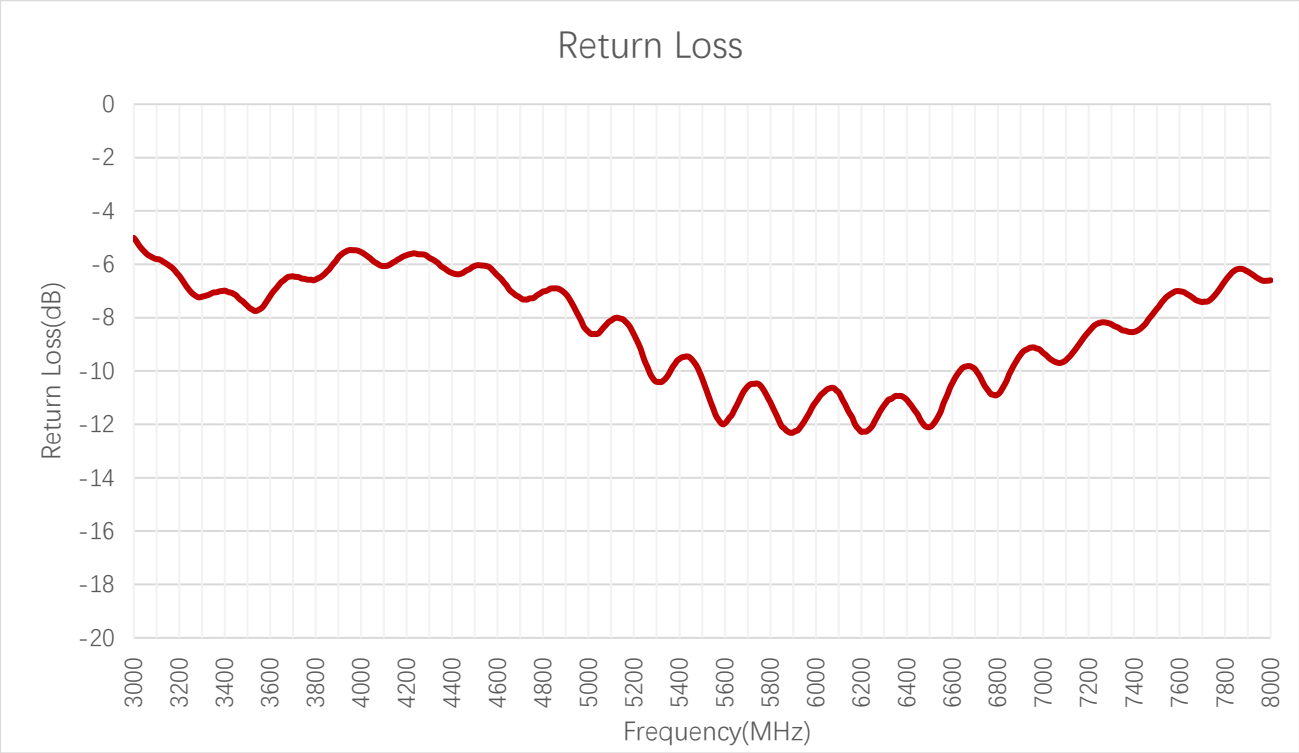
3.1.1. VSWR



VSWR

Frequency (MHz)	3200	3590	3980	4370	4760	5150	5540	5930	6320	6710
VSWR	2.8	2.5	3.3	2.9	2.5	2.3	1.8	1.7	1.8	1.9
Frequency (MHz)	7100	7490	7880	8270	8660	9050	9440	9830	10220	10610
VSWR	2.0	2.4	2.9	-	-	-	-	-	-	-

3.1.2. Return Loss

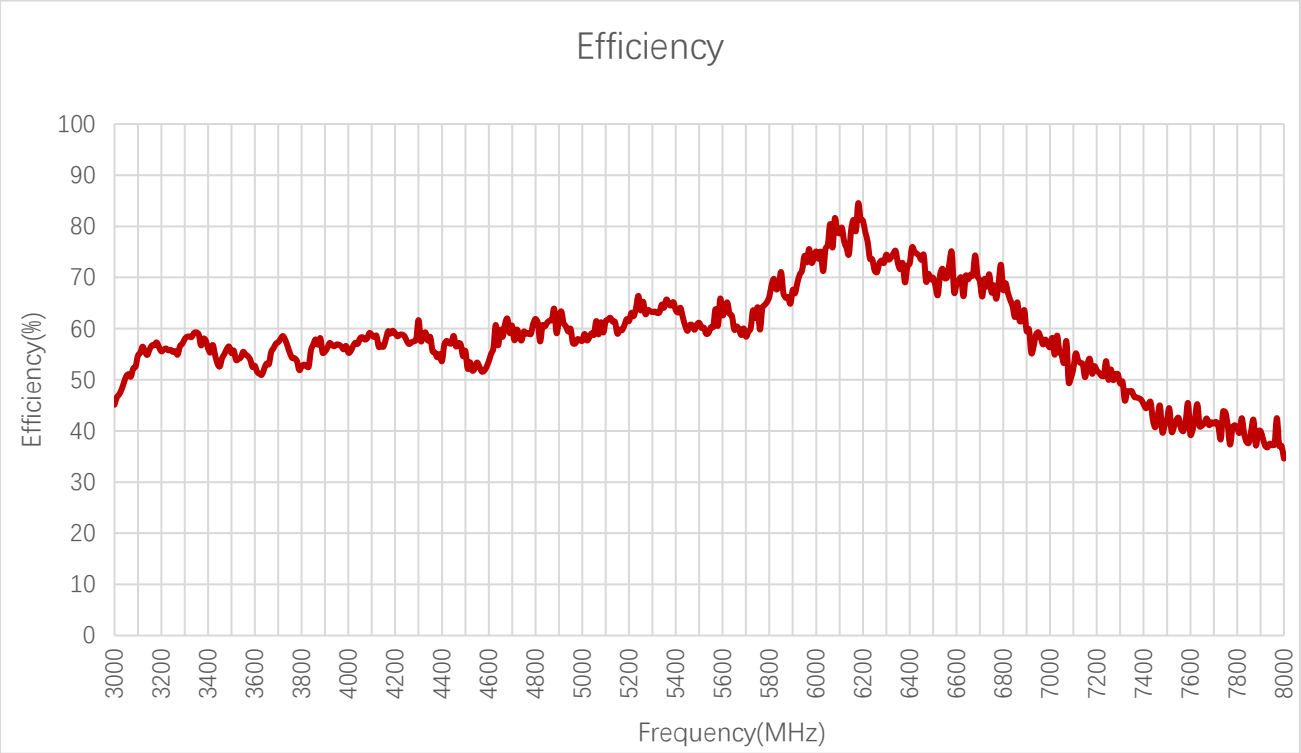


Return Loss (dB)

Frequency (MHz)	**3200**	**3590**	**3980**	**4370**	**4760**	**5150**	**5540**	**5930**	**6320**	**6710**
Return Loss (dB)	-6.4	-7.3	-5.5	-6.2	-7.3	-8.1	-11.2	-12.1	-11.1	-10.1
Frequency (MHz)	**7100**	**7490**	**7880**	**8270**	**8660**	**9050**	**9440**	**9830**	**10220**	**10610**
Return Loss (dB)	-9.6	-7.8	-6.2	-	-	-	-	-	-	-

3.2. Radiation Performance Test

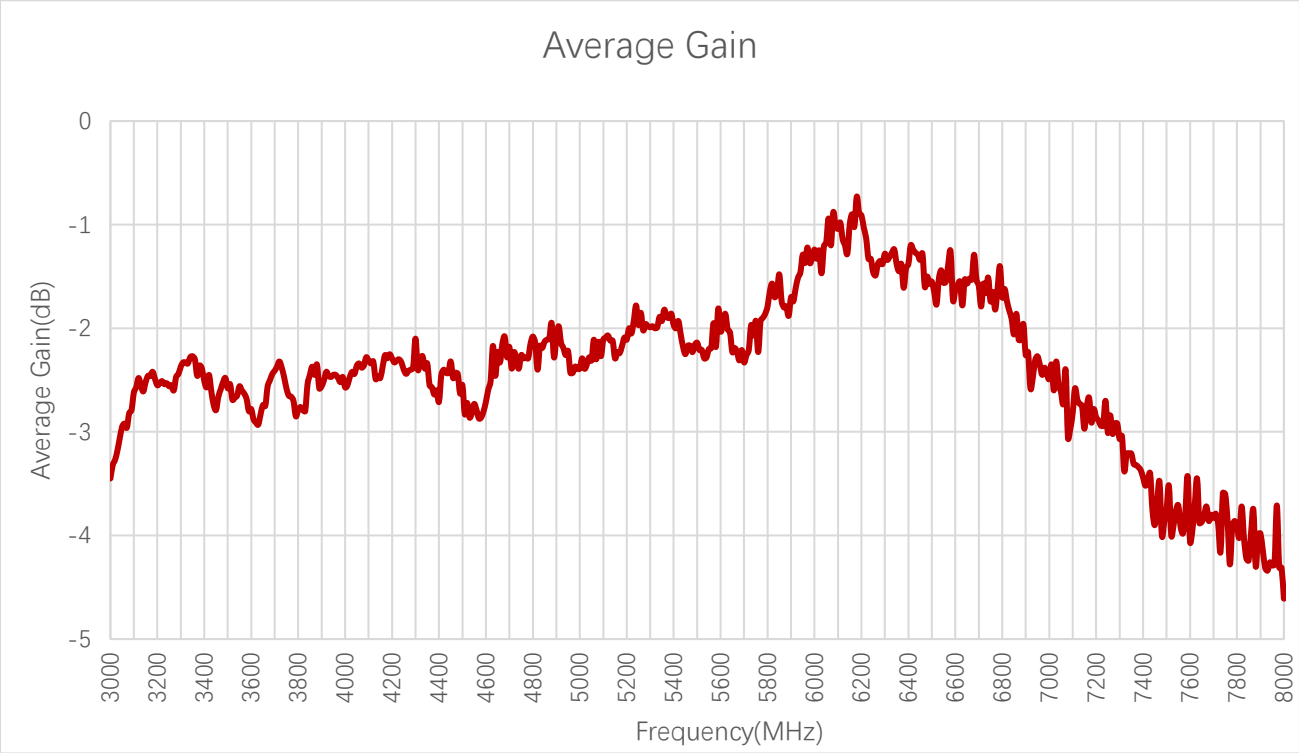
3.2.1. Efficiency



Efficiency (%)

Frequency (MHz)	**3200**	**3590**	**3980**	**4370**	**4760**	**5150**	**5540**	**5930**	**6320**	**6710**
Efficiency (%)	55.6	52.5	56.0	55.4	59.0	59.0	59.2	70.6	73.9	66.3
Frequency (MHz)	**7100**	**7490**	**7880**	**8270**	**8660**	**9050**	**9440**	**9830**	**10220**	**10610**
Efficiency (%)	52.3	41.1	37.2	-	-	-	-	-	-	-

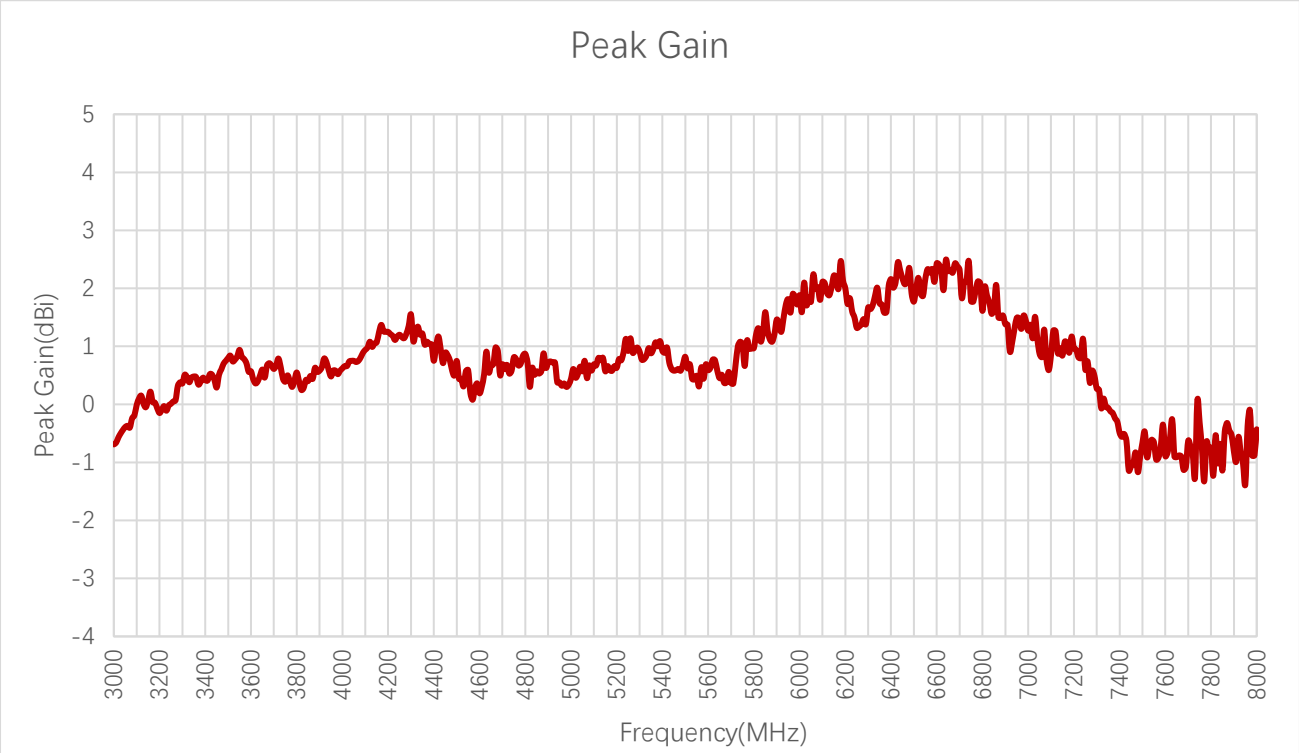
3.2.2. Average Gain



Average Gain (dB)

Frequency (MHz)	3200	3590	3980	4370	4760	5150	5540	5930	6320	6710
Average Gain (dB)	-2.6	-2.8	-2.5	-2.6	-2.3	-2.3	-2.3	-1.5	-1.3	-1.8
Frequency (MHz)	**7100**	**7490**	**7880**	**8270**	**8660**	**9050**	**9440**	**9830**	**10220**	**10610**
Average Gain (dB)	-2.8	-3.9	-4.3	-	-	-	-	-	-	-

3.2.3. Peak Gain



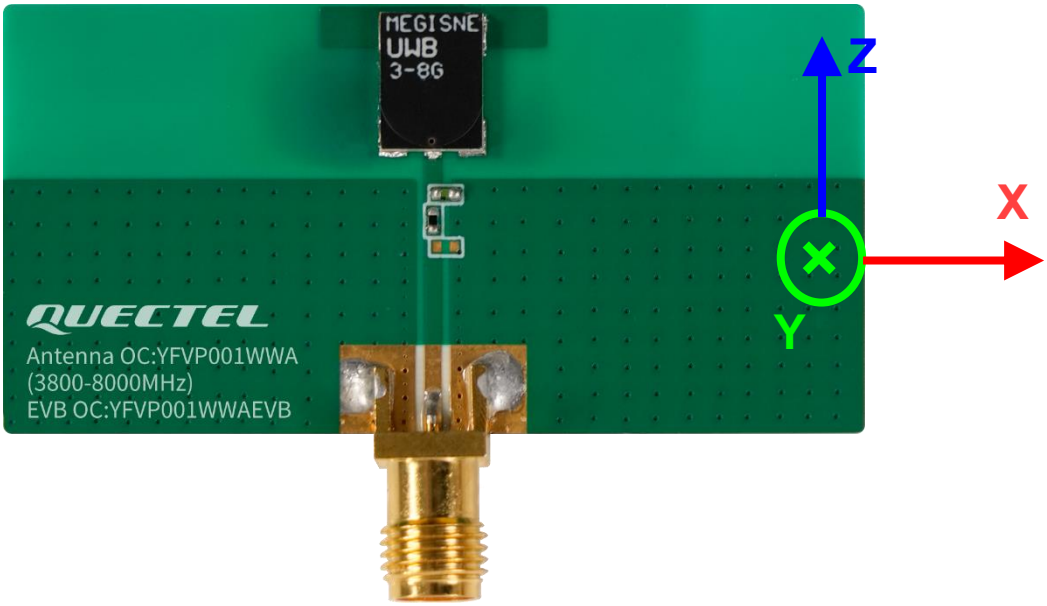
Peak Gain (dBi)

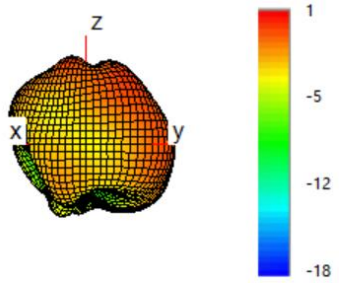
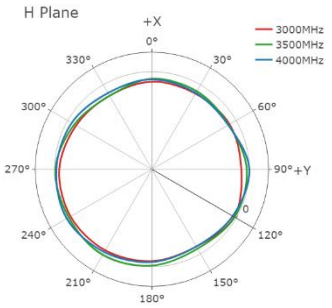
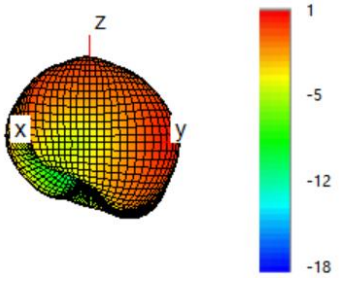
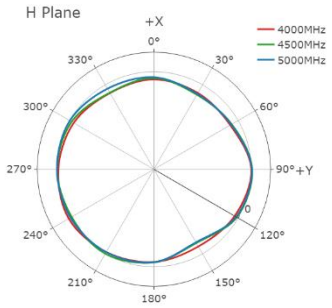
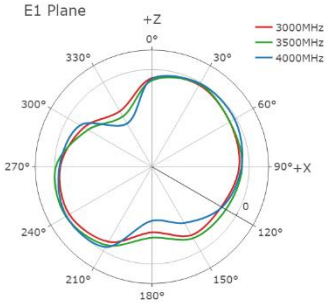
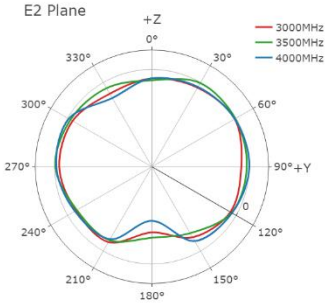
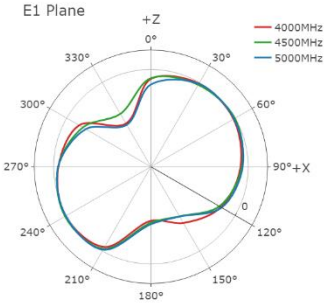
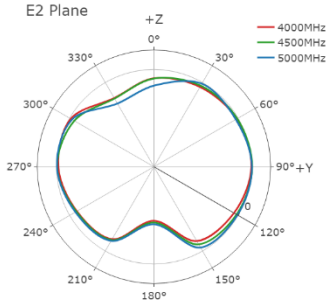
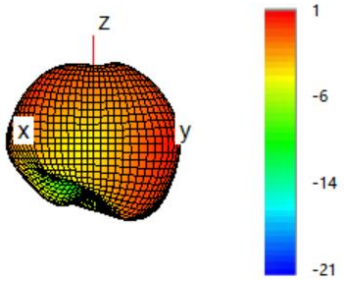
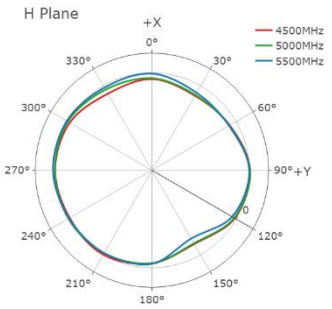
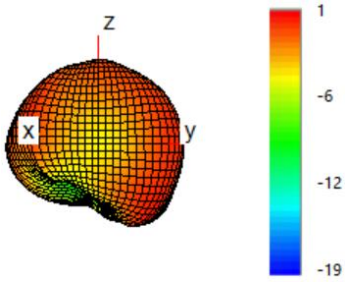
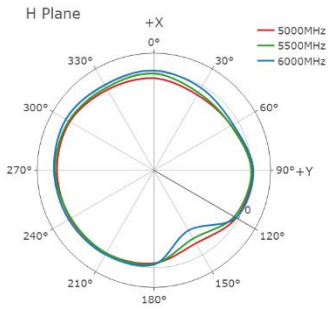
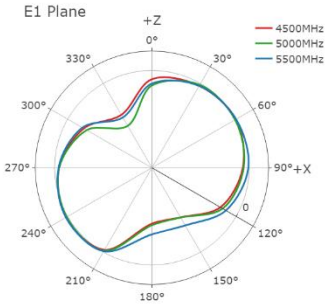
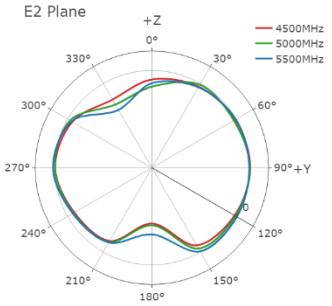
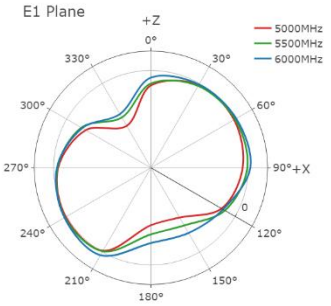
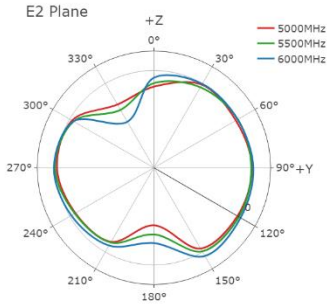
Frequency (MHz)	**3200**	**3590**	**3980**	**4370**	**4760**	**5150**	**5540**	**5930**	**6320**	**6710**
Peak Gain (dBi)	-0.2	0.6	0.5	1.1	0.8	0.6	0.4	1.5	1.7	1.8
Frequency (MHz)	**7100**	**7490**	**7880**	**8270**	**8660**	**9050**	**9440**	**9830**	**10220**	**10610**
Peak Gain (dBi)	0.9	-0.9	-0.5	-	-	-	-	-	-	-

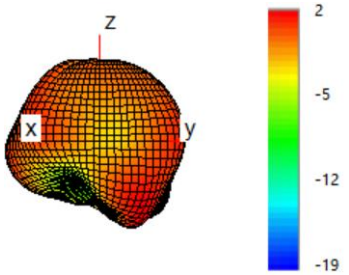
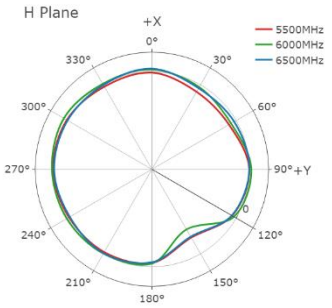
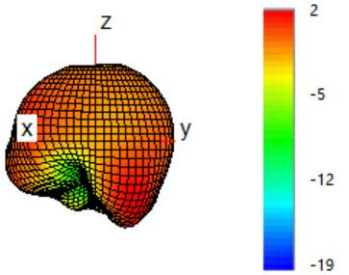
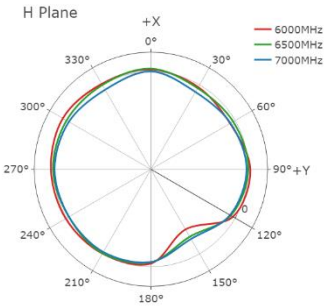
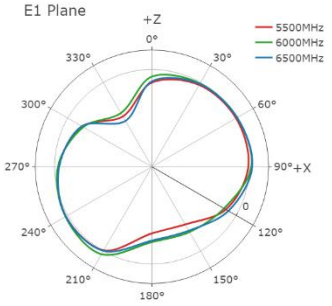
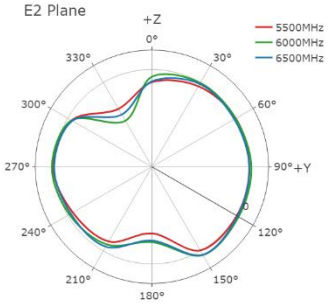
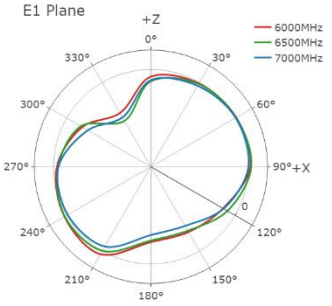
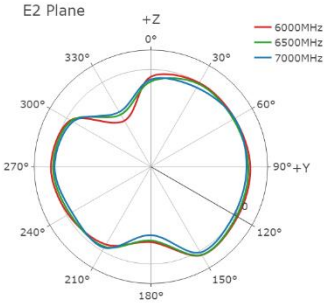
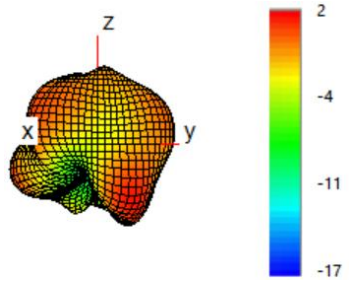
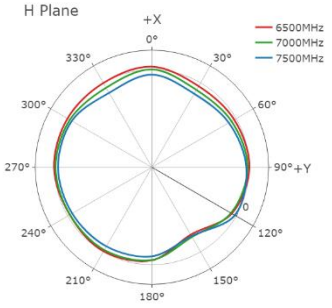
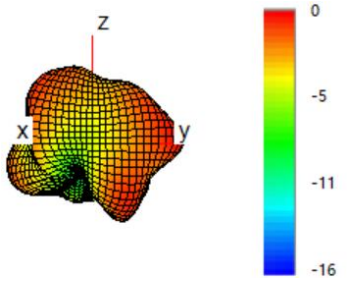
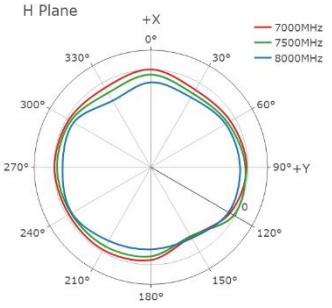
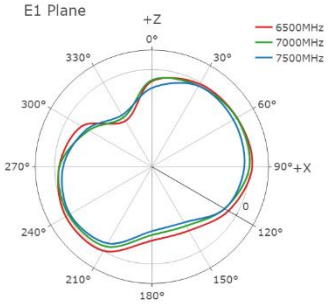
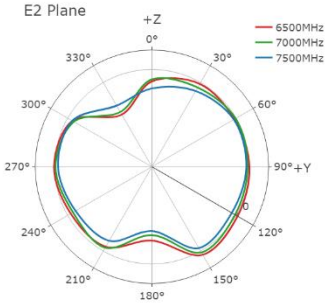
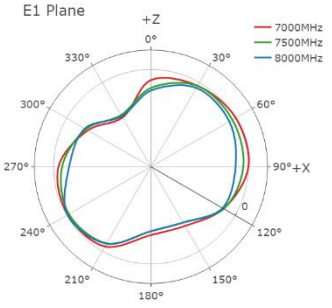
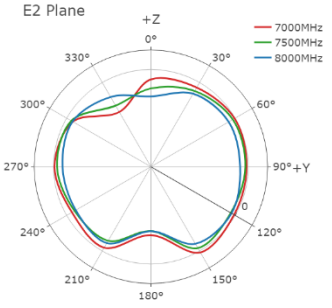
3.2.4. 3D & 2D Radiation Pattern

3.2.4.1. Test Condition: On 50 × 25 mm EVB

- Test Chamber: GL-G-1



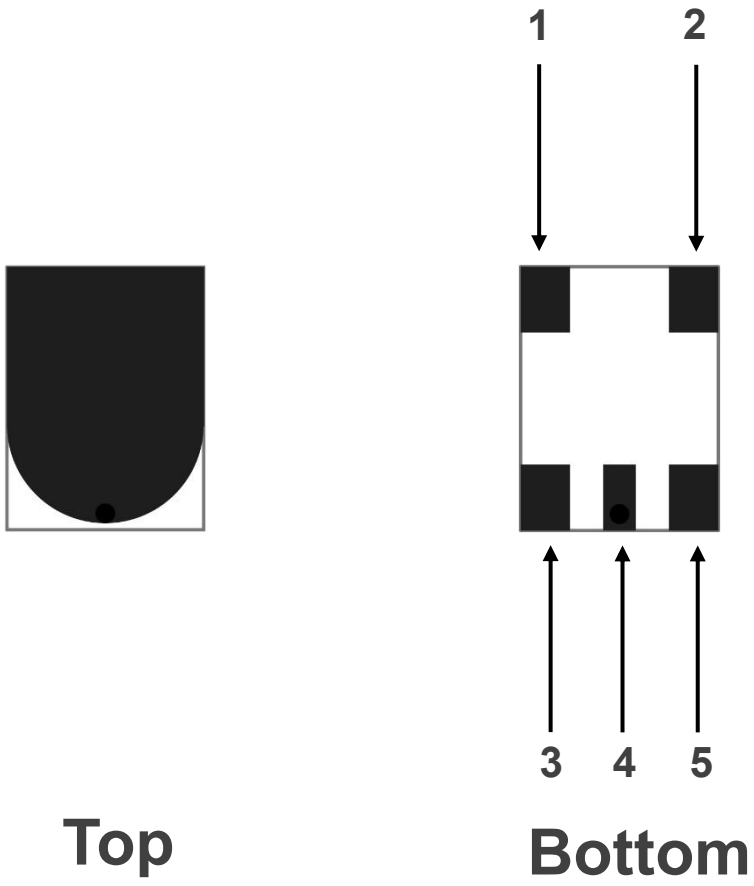
3500 MHz		4500 MHz	
			
			
5000 MHz		5500 MHz	
			
			

6000 MHz		6500 MHz	
			
			
7000 MHz		7500 MHz	
			
			

4 Schematic Symbol and Pin Definition

- The pin assignment for the antenna is as follows.
- The circuit symbol for the antenna is shown below. The antenna has 6 pins, six of which work. All other pins are for mechanical strength.

Pin	Description
1, 2, 3, 5	Fixed
4	Feed



5 Transmission Line

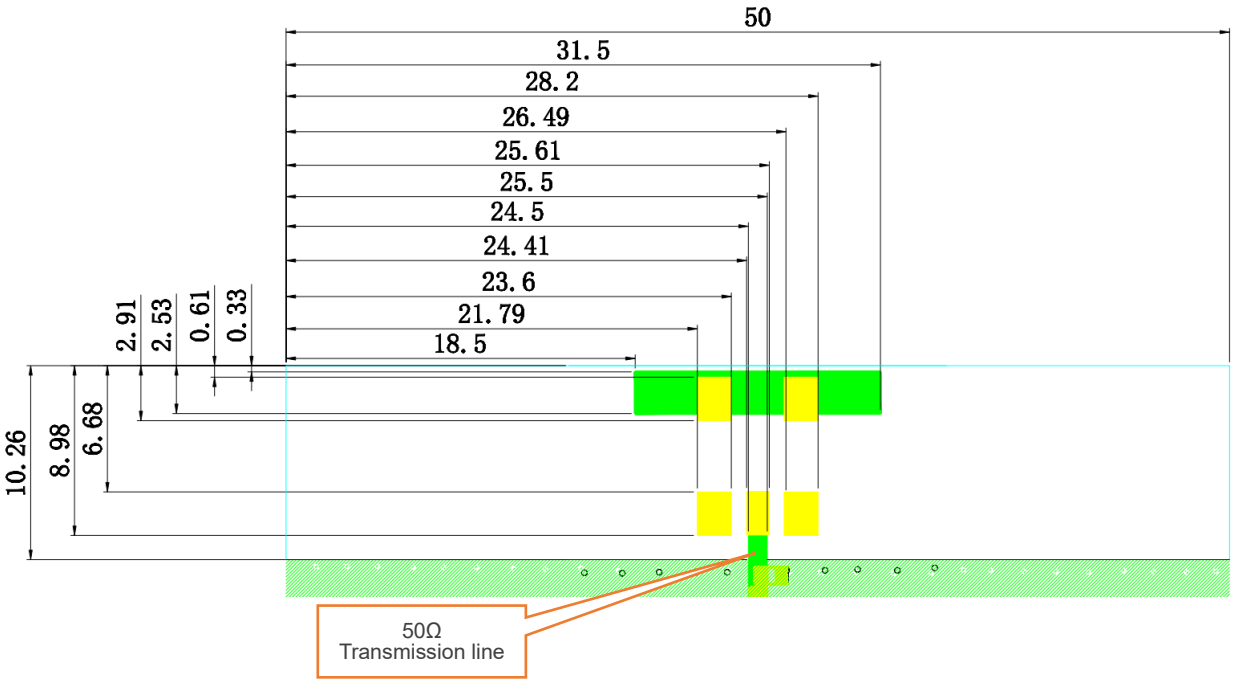
The characteristic impedance of all transmission lines shall be designed as 50 Ω.

- The length of the transmission lines should be kept as short as possible.
- Any other part of the RF system, such as transceiver, power amplifiers, etc., shall also be designed with an impedance of 50 Ω.

Once the material for the PCB has been chosen (PCB thickness and dielectric constant), a coplanar transmission line can easily be designed using any of the commercial software packages for transmission line design. For the chosen PCB thickness, copper thickness and substrate dielectric constant, the program will calculate the appropriate transmission line width and gaps on either side of the track so the characteristic impedance of the coplanar transmission is 50 Ω.

6 Recommended PCB Layout

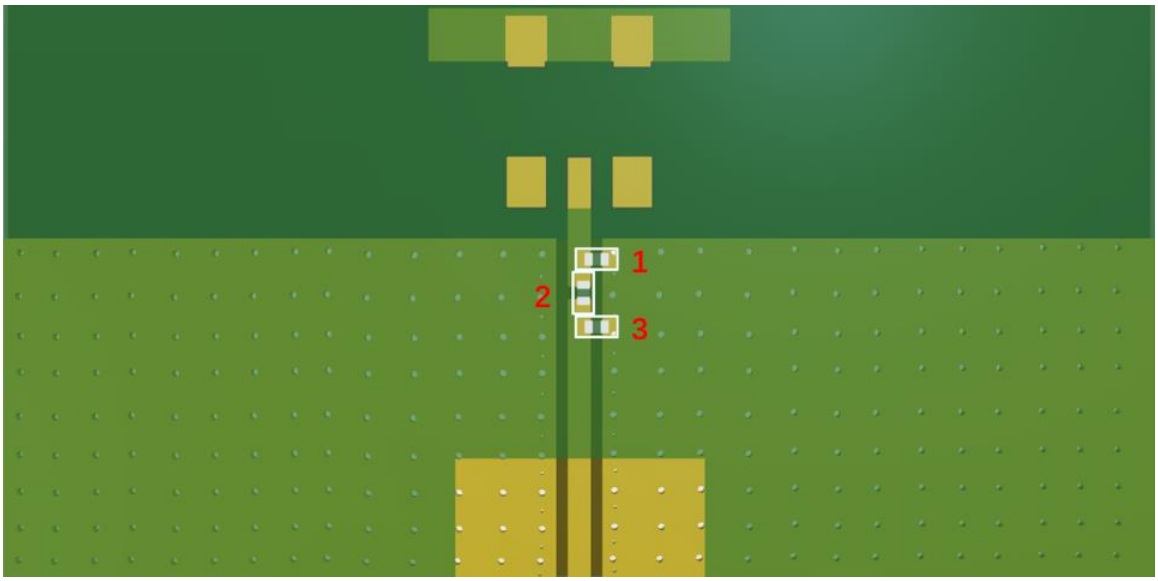
The host PCB must be designed using the PCB footprint shown with the correct clearances. An example of the PCB layout shows the antenna footprint. Please note this clearance area is critical to the performance of the antenna and must be applied through all layers of the PCB.



All dimensions in (mm)

7 Matching Circuit

Demo Board Top View



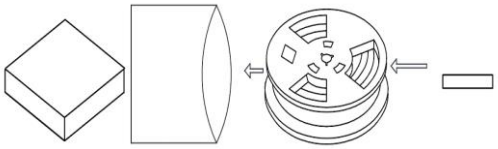
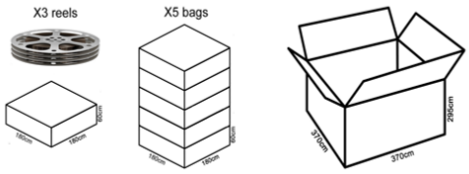
	1	2	3
Default Matching	4.3 nH	0 Ω	N/C
Vender	MURATA	MURATA	N/C

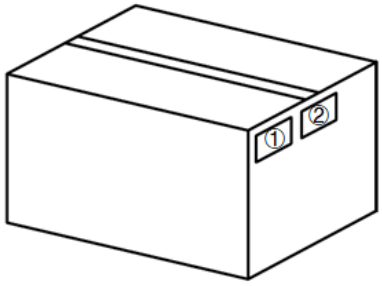
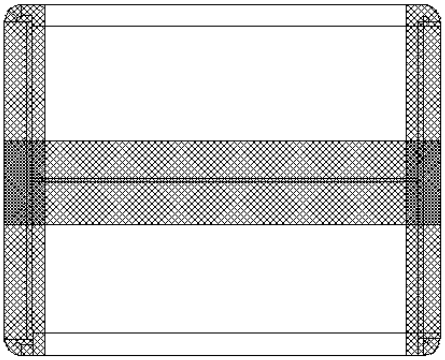
8 Soldering Temperature

Channels	Name	Heating time 150.0-200.0°C	Above temp 217.0°C	Top temp	Heating slope 150.0-180.0°C	Cooling slope 180.0-150.0°C
1	Pin1	73"	82"	248.7	0.97	-2.92
Refrence value		70.0-95.0s	70.0-90.0s	240.0-250.0°C	0.0-3.0°C/s	-4.0--1.0°C/s

9 Reflow Profile

10 Packaging

Step	Packaging Picture / 2D Picture	Description
1		Reel
2		(3000 PCS Antenna Products / Reel) 3 reel tapes are vacuumed into the inner box.
3		(5 Inner Boxes / Carton Box) (45000 PCS Antennas / Carton Box) Estimated quantity Products that cannot fill the entire carton box are packed in a suitable size carton box. Carton Size: L × W × H= 370 × 370 × 295 mm

4		**Position for Attaching Labels** ① Carton Label ② Quality Label
5		**Sealing Cartons** "工" type sealing cartons
Note	The initial packaging method described above is for reference only, and the final actual packaging method shall be subject to the actual shipping packaging.	

Contact Us

At Quectel, our aim is to provide timely and comprehensive services to our customers. If you require any assistance, please contact our headquarters:

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Or our local offices. For more information, please visit:
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Revision History

Version	Date	Author	Note
-	2024-06-27	Black LI/ Hart HU/ David LIU/ Rainey LIAO	Creation of the document
1.0	2024-06-27	Black LI/ Hart HU/ David LIU/ Rainey LIAO	First official release

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