

# ANTENNA UNDER TEST REPORT

## Test Place

Company Name	UL Japan, Inc. Ise EMC Lab.
Address	4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 Japan
Telephone Number	+81-596-24-8999

## Equipment Under Test (EUT)

Description	RF Tag Handy scanner
Manufacturer	Denso Wave Incorporated
Model Number	SE1-BUB-C
Frequency of Operation	915.25 MHz to 927.50 MHz
Antenna Type	linear polarization/inverted-F antenna

For the shape of the antenna is refer to Internal Photo.

## Test Procedure

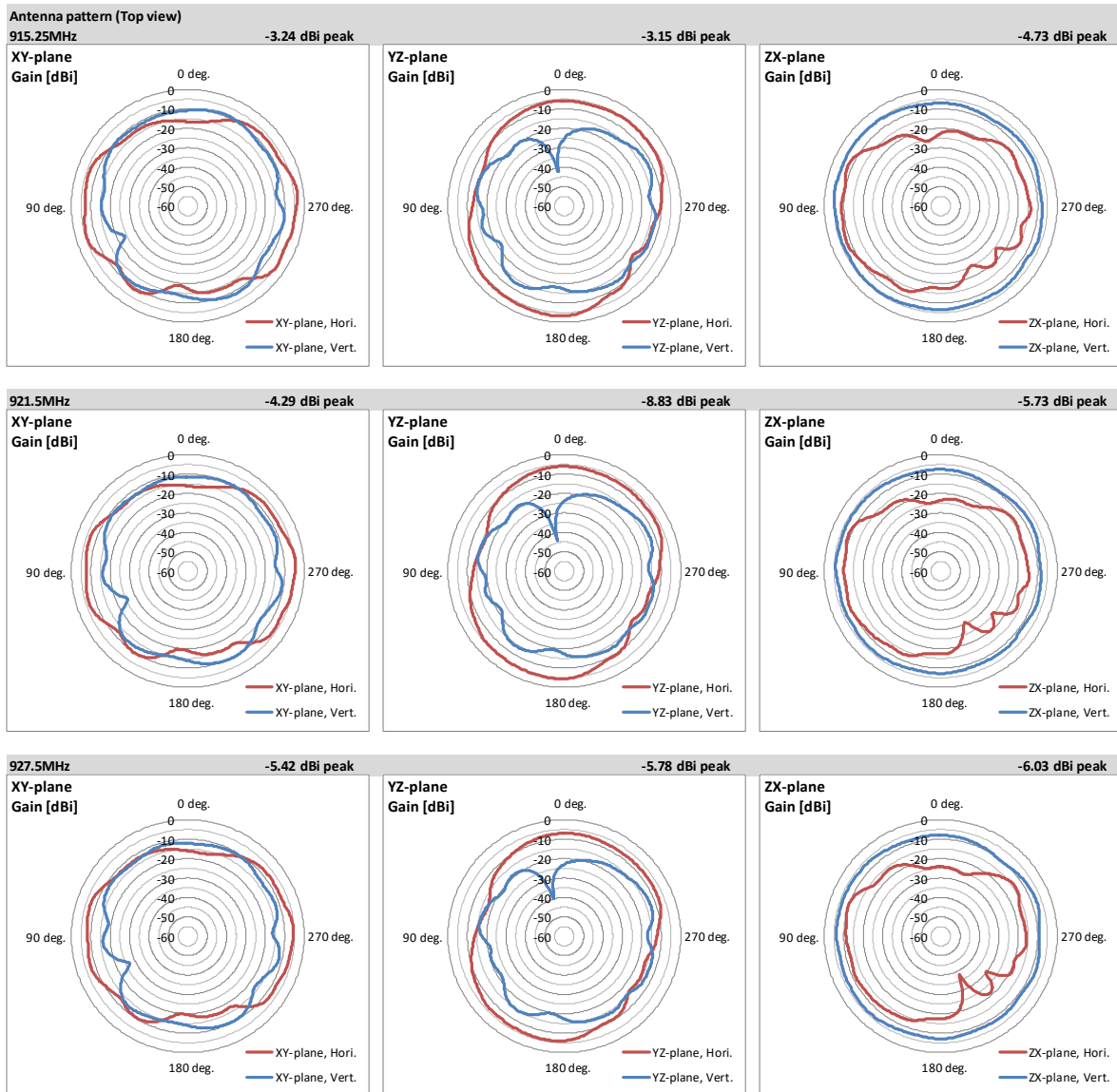
Test configuration	EUT was placed on a platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane. The measurements were performed for both vertical and horizontal antenna polarization with the Spectrum Analyzer.
Test procedure	<p>Step 1 The tests have been measured in semi anechoic chamber at the distance of 3 m between the Substitution Antenna and the measuring Antenna, both Antennas were placed for the height 1.5 m. The Substitution Antenna has been connected to the Signal Generator.</p> <p>Step 2 The output power of the Signal Generator was setting value calculated by compensating the finite difference in the Antenna gain of Substitution Antenna.</p> <p>Step 3 The electric field strength at the distance of 3 m is received via the measurement antenna, and the reference value at that time is measured with a spectrum analyzer.</p> <p>Step 4 The measurements were performed for both vertical and horizontal antenna polarization.</p> <p>Step 5 Exchanged the Substitution Antenna to the EUT, the output power of the Signal Generator was setting value calculated by 0 dBm at the input of EUT.</p> <p>Step 6 The EUT was rotated a full revolution and recorded the electric field strength for each degree.</p> <p>Step 7 Calculate and record the difference from the value recorded in Step 6 to the value recorded in Step 3.</p> <p>Step 8 The measurement in steps 5 to 7 repeated with both vertical and horizontal antenna polarization, each position of XY, YZ and ZY-plane of EUT.</p> <p>Step 9 Then the results of Step 8 were recorded.</p> <p>Step 10 Calculate the difference between step 9 and the Output Power of EUT, and recorded the calculated results.</p>

# Test Data

## Antenna Pattern and Gain

Test place  
Semi Anechoic Chamber  
Date  
Temperature / Humidity  
Engineer

Ise EMC Lab.  
No.4  
November 27, 2023  
20 deg. C / 40 % RH  
Junki Nagatomi



Antenna gain [UNIT: dBi]

Peak			
Frequency [MHz]	915.3	921.5	927.5
Peak gain	-3.15	-4.29	-5.42

Hori. : Horizontal  
Vert. : Vertical

Yellow highlighted area: Maximum Antenna Gain [dBi]

## Test Instruments

### Test Equipment

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
APG	142011	AC4_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	2022/05/22	24
APG	141562	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	0010	2023/01/13	12
APG	141545	DIGITAL HiTESTER	HIOKI E.E. CORPORATION	3805	51201148	2023/01/18	12
APG	142230	Measure, Tape, Steel	KOMELON	KMC-36	-	-	-
APG	220646	Attenuator	Huber+Suhner	6806_N-50-1	-	2023/03/17	12
APG	141397	Coaxial Cable	UL Japan	-	-	2023/11/22	12
APG	141267	Logperiodic Antenna(200-1000MHz)	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	9111B-192	2023/09/21	12
APG	141583	Pre Amplifier	SONOMA INSTRUMENT	310	260833	2023/04/05	12
APG	141899	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY46180655	2023/02/20	12
APG	141454	Dipole Antenna	Schwarzbeck Mess-Elektronik OHG	UHAP	991	2022/12/26	12
APG	141327	Coaxial Cable	UL Japan	-	-	2023/02/01	12
APG	158264	Signal Generator	Keysight Technologies Inc	N5182A	MY50142539	2023/09/13	12

\*Hyphens for Last Calibration Date and Cal Int (month) are instruments that Calibration is not required (e.g. software), or instruments checked in advance before use.

The expiration date of the calibration is the end of the expired month.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

Test item:      **APG: Antenna Pattern and Gain**