

## Type2LL\_Antenna

# FCC/ISED Radio Act Application Antenna Information



## Type2EL\_Antenna Antenna Application information

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Target module part number:  
LBES0ZZ2LL / LBEE0ZZ2KL

Application Antenna Name: Type2LL\_Antenna  
Application Antenna Type : Monopole antenna( Trace Antenna )  
Application Antenna Gain : 3.6dBi @ 2.4GHz band  
4.6dBi @ 5GHz band

# Type2LL\_Antenna

## Antenna Under Test Report





- 1. Test method for antenna gain measurement**
- 2. Test Equipment (Details of SG32)**
- 3. DUT placement status**
- 4. DUT Appearance**
- 5. Measurement direction**
- 6. Measurement result**

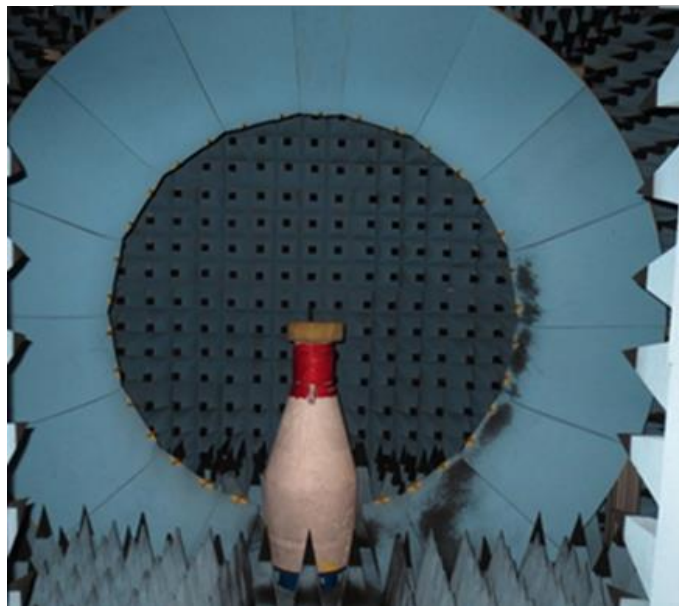
# 1. Test method for antenna gain measurement

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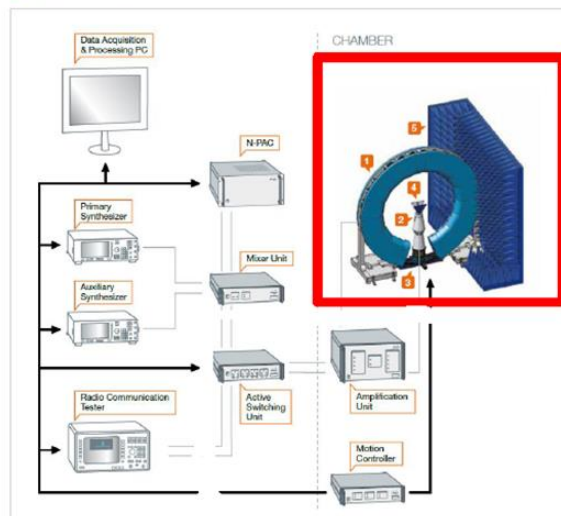
- Test method for antenna gain measurement:  
Standard antenna method (comparative method)
  - \* Comparing a measured antenna to a standard antenna with a known gain factor
- Equipment used for antenna gain measurement (model name, serial number, calibration date, etc.);
  - Measurement system  
Microwave Vision Group (former SATIMO) SG32 (details next page)
  - Equipment  
PAC (MW 000021H-0068)  
E4428C (MY45280451, MY45280466)
  - Calibration date  
September 12, 2018
  - Antenna gain measurement date / Measurement person  
July 31, 2020 / Rie Ichimura

## 2. Test Equipment (Details of SG32)



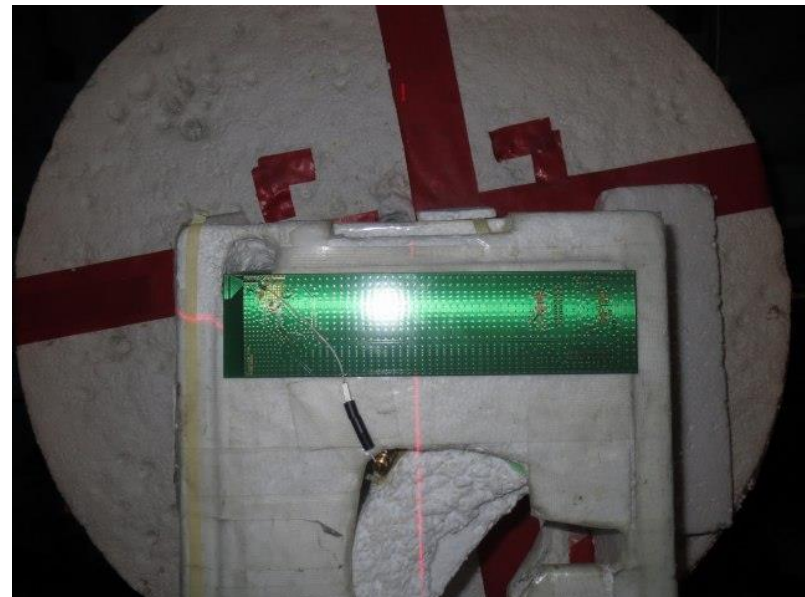
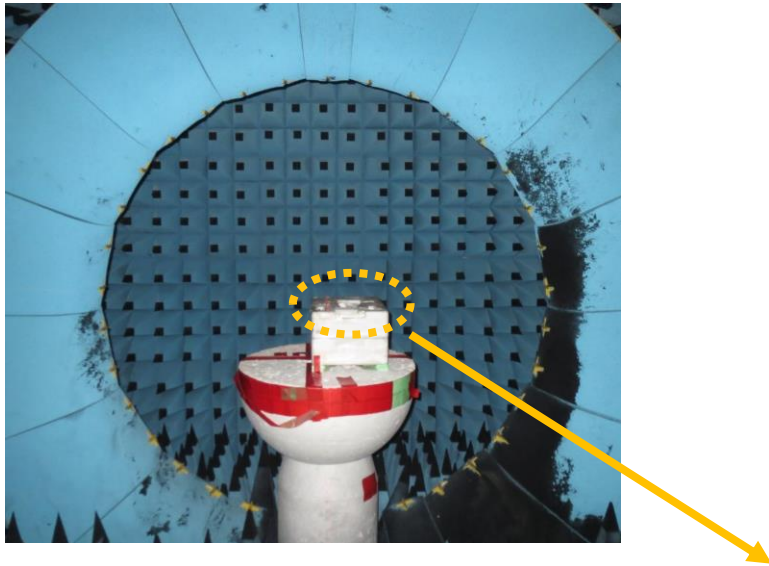
|                         |                            |                                                         |         |       |  |
|-------------------------|----------------------------|---------------------------------------------------------|---------|-------|--|
| Anechoic chamber size   |                            | Approximately 3.5m x 3.5m x 3m (H)                      |         |       |  |
| Frequency band          |                            | 800~6000MHz<br>(18~40GHz compatible with Option)        |         |       |  |
| Measurement time        | Elevation 1 cut            | Real time                                               |         |       |  |
|                         | Global surface measurement | < Approx. 20 seconds<br>(when measuring 10 frequencies) |         |       |  |
| Measurement uncertainty | Peak gain                  | < +/-0.75dB (1.0~6.0GHz)                                |         |       |  |
|                         | Low gain                   | < +/-1.0dB (0.8~1.0GHz)                                 |         |       |  |
| Dynamic range           |                            | 70dB                                                    |         |       |  |
| Cross Polar Isolation   |                            | > 45dB                                                  |         |       |  |
| DUT size                | 0.8 GHz                    | 1.8 GHz                                                 | 2.5 GHz | 6 GHz |  |
|                         | 75 cm                      | 75 cm                                                   | 65 cm   | 30 cm |  |

### System overview



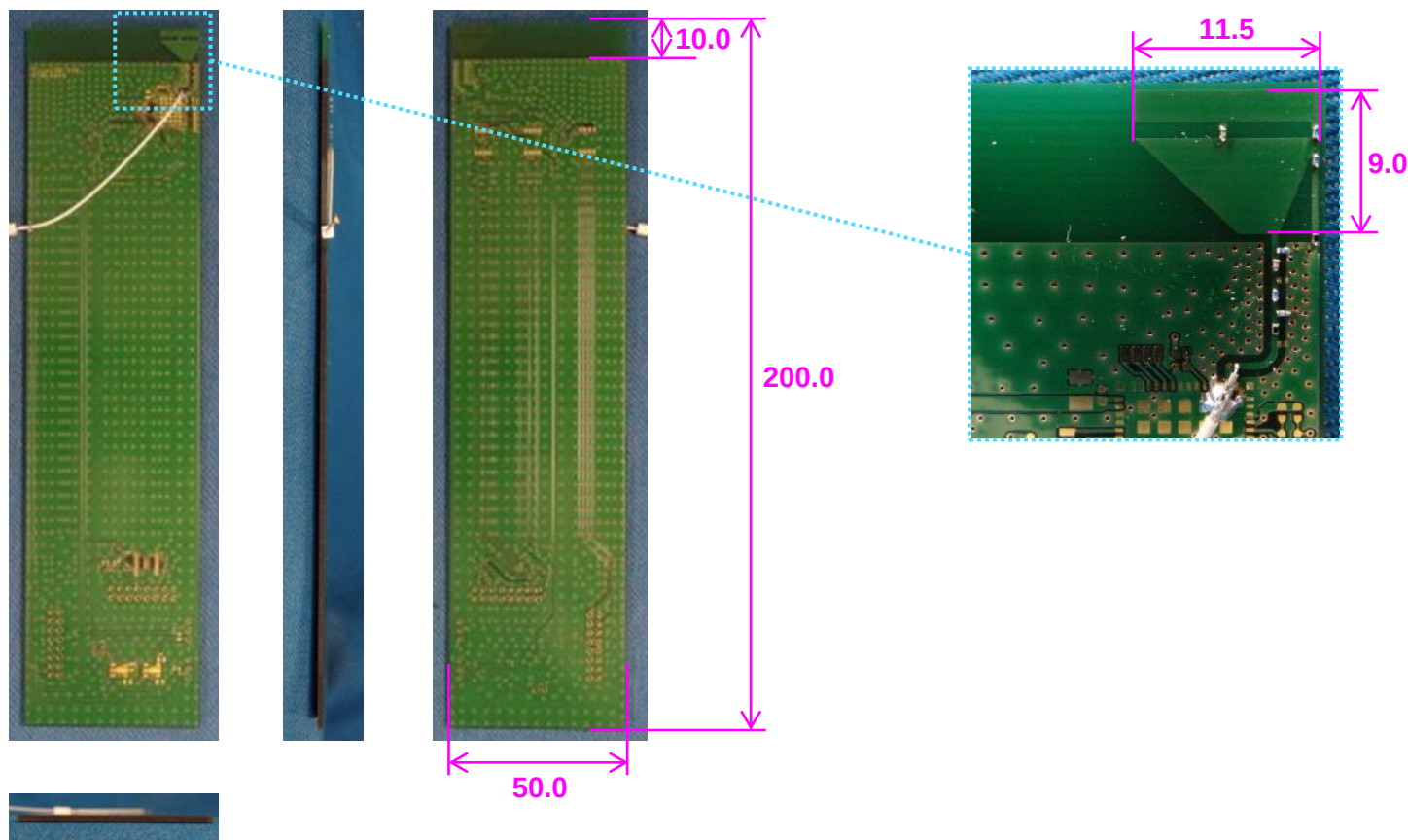
Peak gain variation is secured within  $\pm 0.75$  dB by system calibration.

### 3. DUT placement status



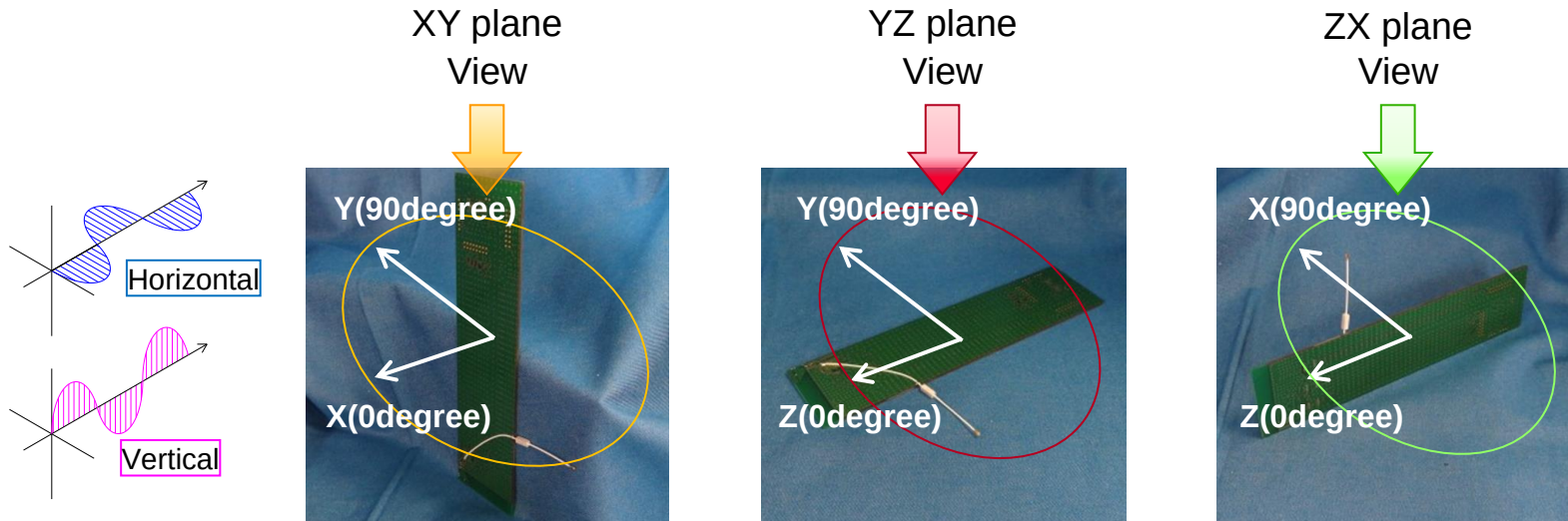
## 4. DUT Appearance

UNIT : mm

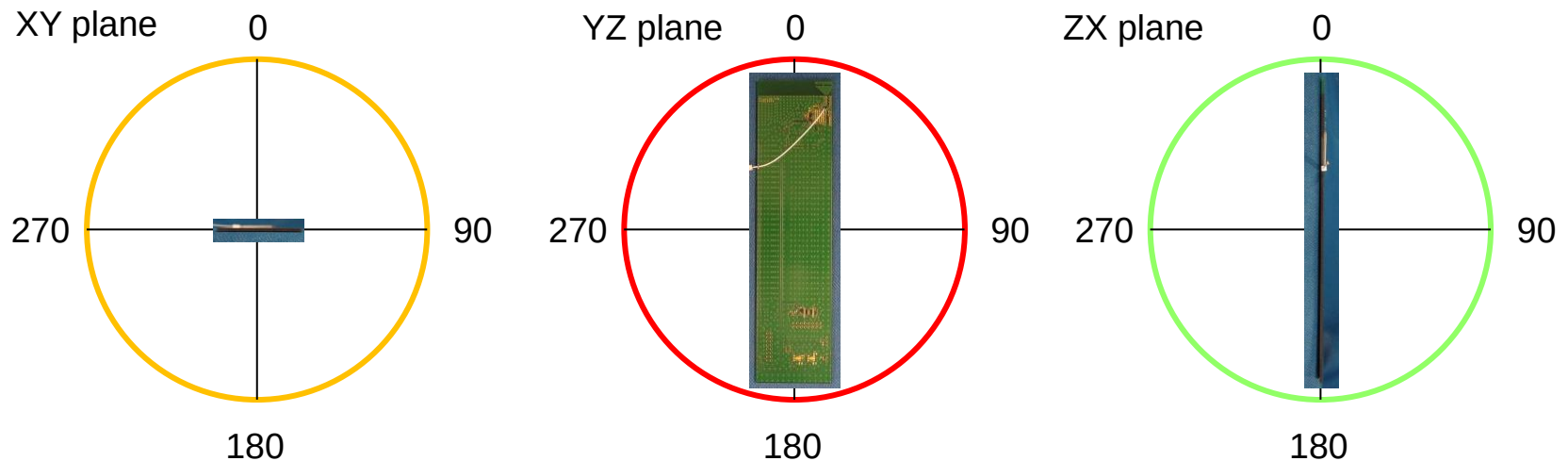




## 5. Measurement direction



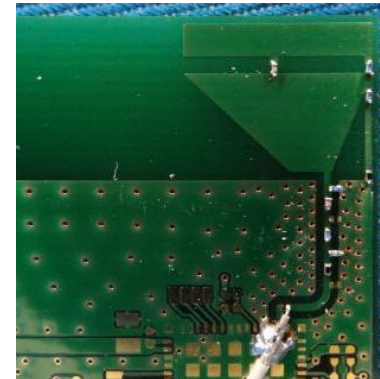
### 2D Directional indication



## 6. Measurement result

### Chain1 : Pattern Antenna

Part number: Type2LL\_Antenna

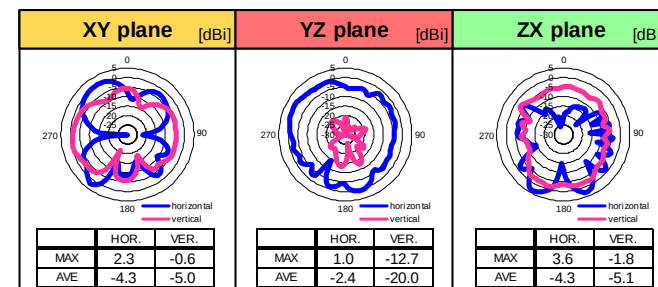
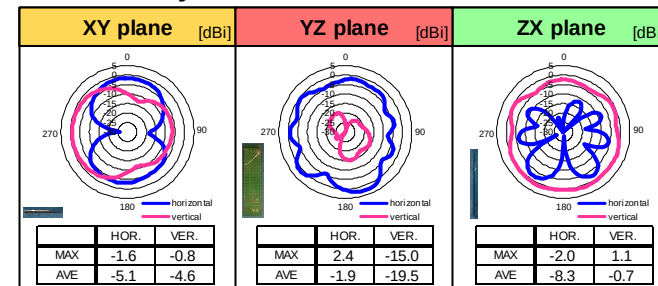


#### <Efficiency>

| LINEAR POLARIZATION |      | XY-plane |      | YZ-plane |       | ZX-plane |      | Total Efficiency |
|---------------------|------|----------|------|----------|-------|----------|------|------------------|
|                     |      | hor.     | ver. | hor.     | ver.  | hor.     | ver. | [dB]             |
| 2400 MHz            | MAX. | -1.6     | -0.9 | 2.6      | -16.3 | -2.2     | 1.0  | -1.0             |
|                     | AVE. | -4.9     | -4.6 | -2.0     | -20.4 | -8.3     | -0.9 |                  |
| 2442 MHz            | MAX. | -1.6     | -0.8 | 2.4      | -15.0 | -2.0     | 1.1  | -1.0             |
|                     | AVE. | -5.1     | -4.6 | -1.9     | -19.5 | -8.3     | -0.7 |                  |
| 2484 MHz            | MAX. | -1.7     | -0.7 | 2.5      | -13.6 | -1.7     | 1.6  | -0.9             |
|                     | AVE. | -5.2     | -4.5 | -1.6     | -18.7 | -8.2     | -0.5 |                  |

| LINEAR POLARIZATION |      | XY-plane |      | YZ-plane |       | ZX-plane |      | Total Efficiency |
|---------------------|------|----------|------|----------|-------|----------|------|------------------|
|                     |      | hor.     | ver. | hor.     | ver.  | hor.     | ver. | [dB]             |
| 5150 MHz            | MAX. | 2.3      | 0.1  | 2.2      | -11.4 | 3.5      | -0.2 | -1.3             |
|                     | AVE. | -4.1     | -4.5 | -2.0     | -19.2 | -3.9     | -3.9 |                  |
| 5500 MHz            | MAX. | 2.3      | -0.6 | 1.0      | -12.7 | 3.6      | -1.8 | -1.6             |
|                     | AVE. | -4.3     | -5.0 | -2.4     | -20.0 | -4.3     | -5.1 |                  |
| 5850 MHz            | MAX. | 2.3      | -0.7 | 1.0      | -12.9 | 3.5      | -1.6 | -1.5             |
|                     | AVE. | -4.1     | -5.4 | -2.4     | -19.8 | -4.2     | -5.5 |                  |

#### <Directivity>





end