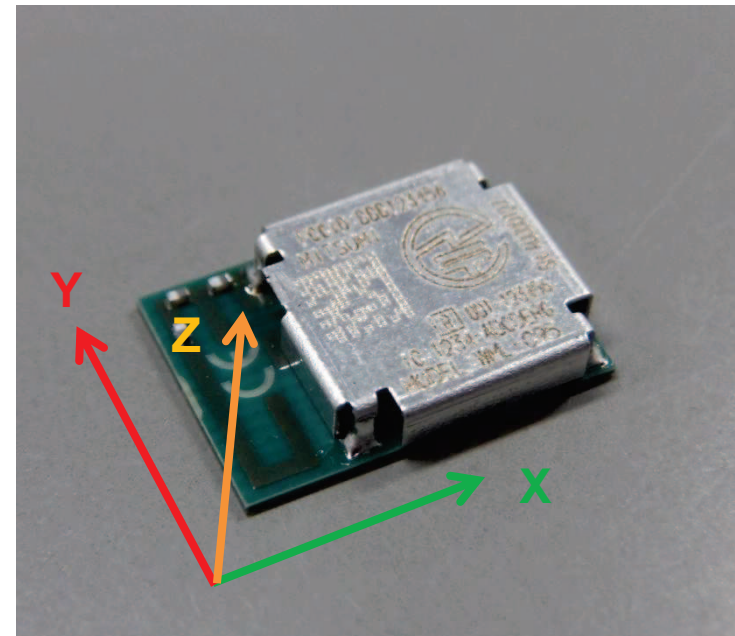


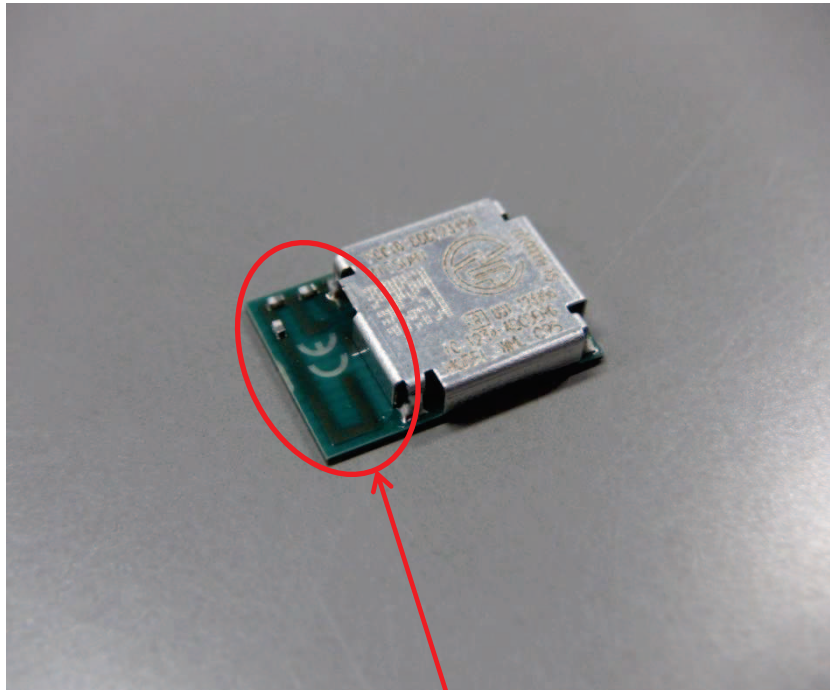
# Specification

| Item            | Characteristics                 |
|-----------------|---------------------------------|
| Frequency Range | 2402MHz~2480MHz                 |
| Input Impedance | 50Ω                             |
| VSWR            | <2.5                            |
| Polarization    | Linearly Polarization           |
| Peak Gain       | -5.68dBi<br>(Z-X plane 2484MHz) |

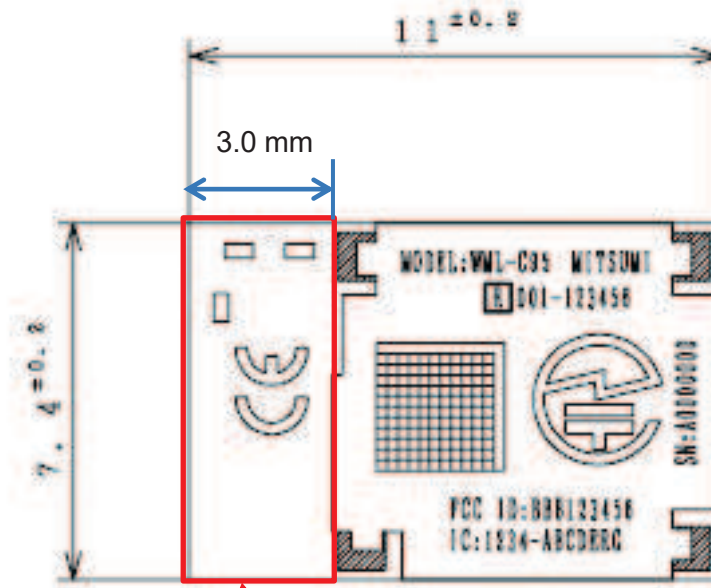


## WML-C95 Antenna Placement

**MITSUMI**



Antenna (printed antenna)



Antenna area (7.4 mm x 3.0 mm)

# Measurement of Antenna Radiation Characteristics

**MITSUMI**

## Calibrated Equipment:

Network Analyzer: Agilent E5071C (9kHz~8.5GHz)

Horn Antenna

Reference Dipole Antenna

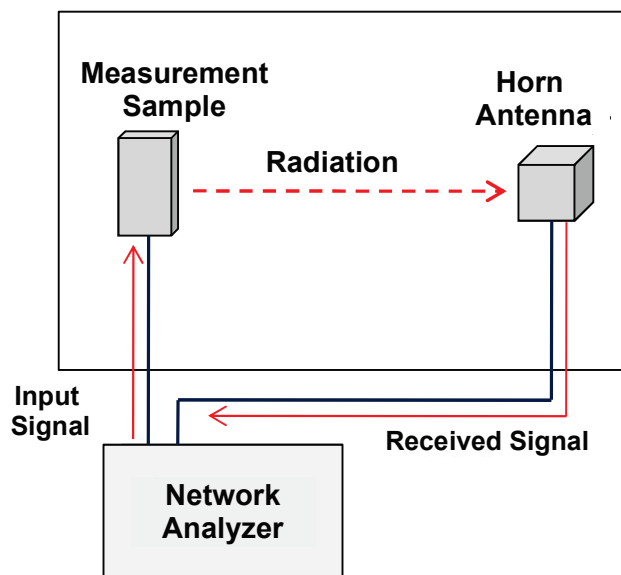
Anechoic Chamber (turn table, radio wave absorber and wooden box)

Test dates: 2015/04/09

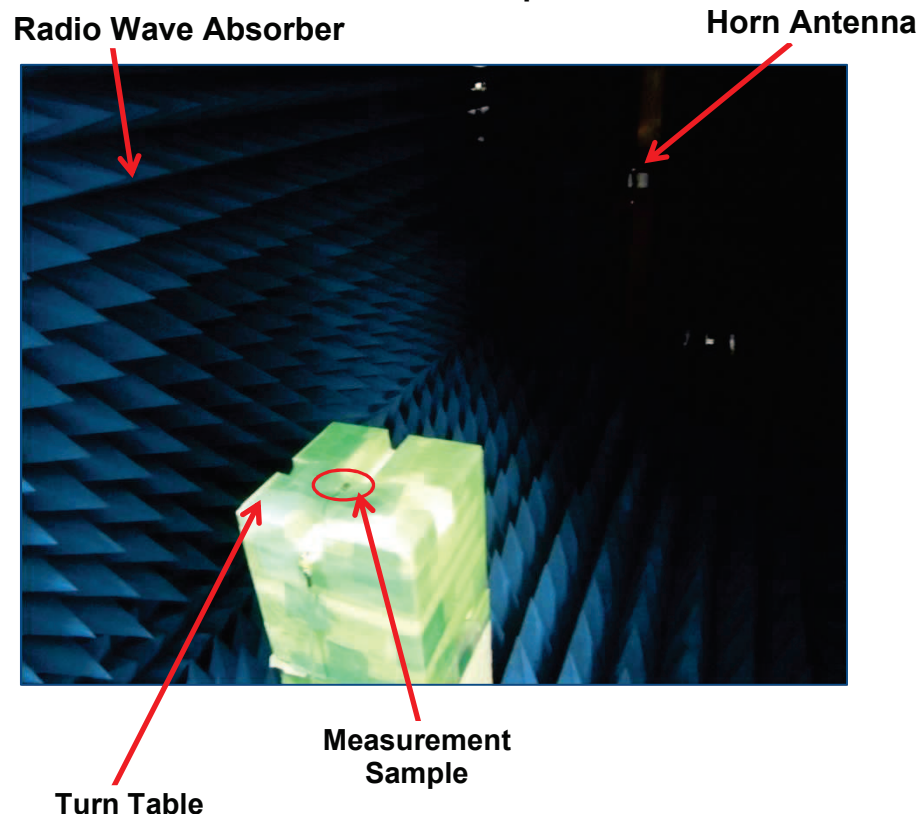
Names of test personnel: Watanabe Koichi

Names of commercial test software being used: ANT\_TEST\_V1

## Description of how measurements



## Test Setup Photo

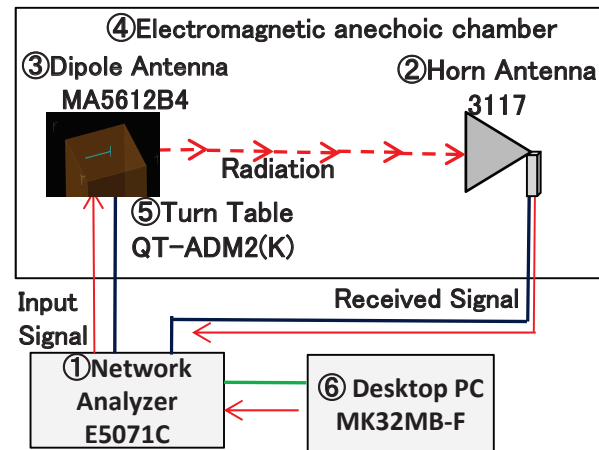


# Antenna Gain Measurement Principle

**MITSUMI**

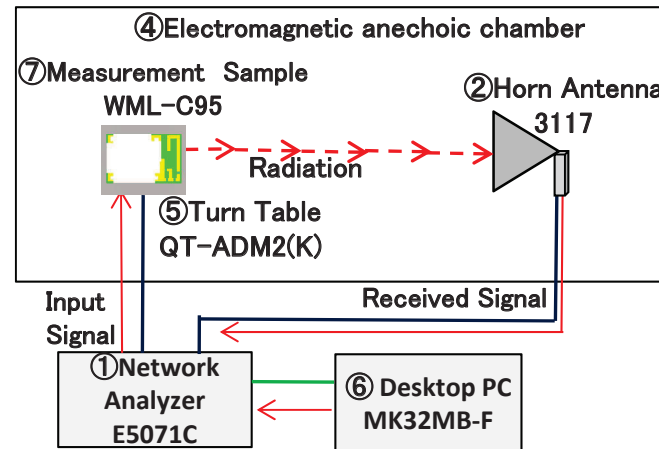
Based on reference dipole antenna (MA5612B) with a known gain, configure it and find the gain of the measurement sample (EUT).

## 1) Measuring Dipole Antenna of Known Gain

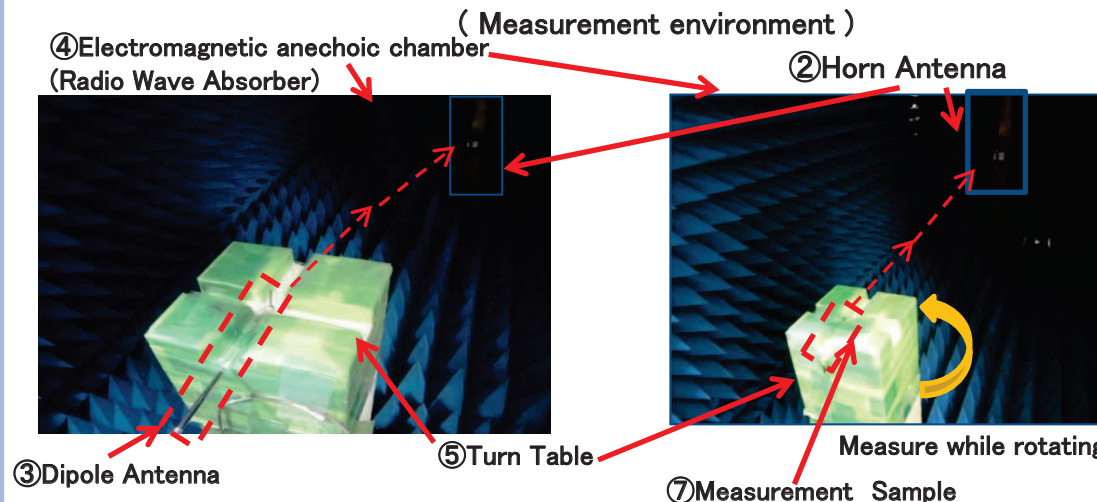


Program Control : Software\_ANT\_TEST\_V1

## 2) Measuring EUT Gain



Program Control : Software\_ANT\_TEST\_V1



Measure while rotating Turn Table

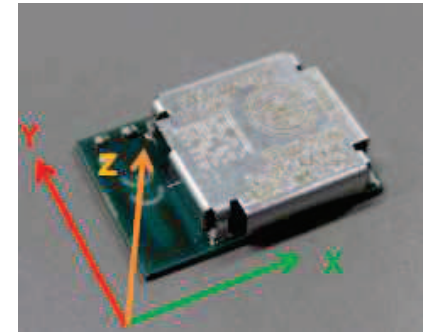
## Equipment List

|   | Description & Manufacturer                                                      | Model No.  | Serial No. | Date of Calibration | Due Date of Calibration |
|---|---------------------------------------------------------------------------------|------------|------------|---------------------|-------------------------|
| ① | Network Analyzer<br>Agilent                                                     | E5071C     | MY46100567 | Mar. 2015           | Mar. 2016               |
| ② | Horn Antenna<br>ETS-Lindgren                                                    | 3117       | 00140386   | N / A               | N / A                   |
| ③ | Dipole Antenna<br>Anritsu                                                       | MA5612B4   | M72980     | N / A               | N / A                   |
| ④ | Electromagnetic anechoic chamber<br>TDK, ECE, TSS-JAPAN, MWF, TOKIN Corporation | N / A      | N / A      | N / A               | N / A                   |
| ⑤ | Turn Table<br>CENTRAL MOTOR WHEEL Co., LTD.                                     | QT-ADM2(K) | N02048B    | N / A               | N / A                   |
| ⑥ | Desktop PC<br>NEC                                                               | MK32MB-F   | 37003791A  | N / A               | N / A                   |
| ⑦ | Measurement Sample<br>Mitsumi                                                   | WML-C95    | A0000127   | N / A               | N / A                   |

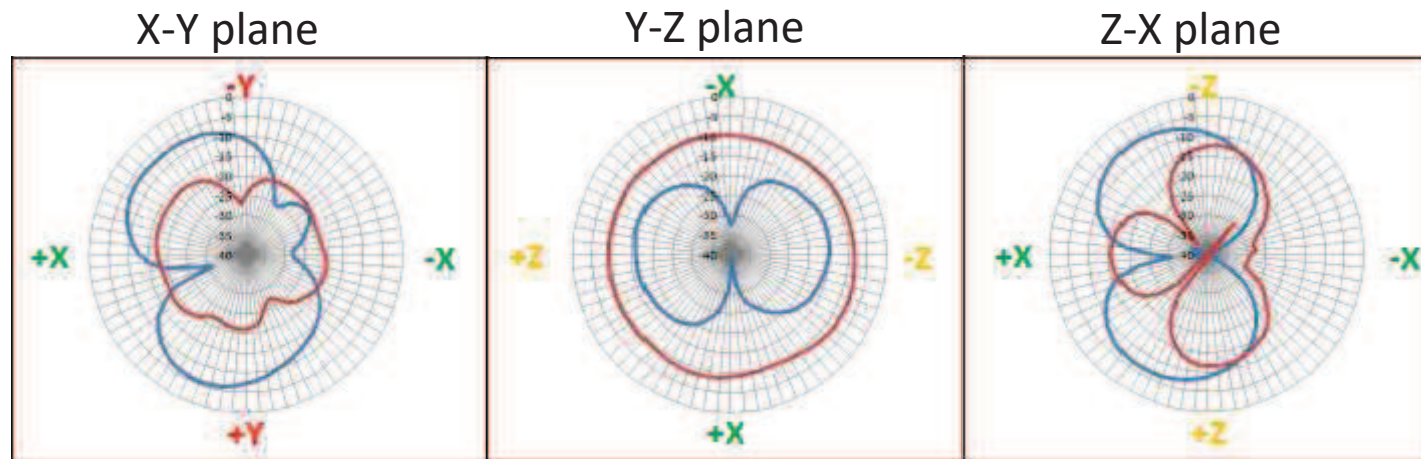
# Antenna gain measurement method

**MITSUMI**

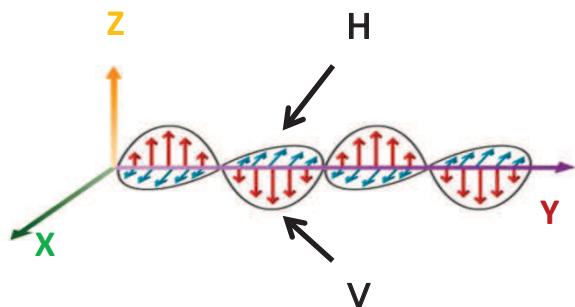
- 1) Calibration of the measurement environment using dipole antenna.  
(result : "X")
- 2) Object measurement.  
Measurement is performed in three directions of the X-Y plane, Y-Z plane, and Z-X plane of the measurement sample.  
(result : "Y")
- 3) Calculate based on the results of A and B  
(Result : **Gain EUT = Y - X + 2.14**)
- 4) Plot based on the results of 3).



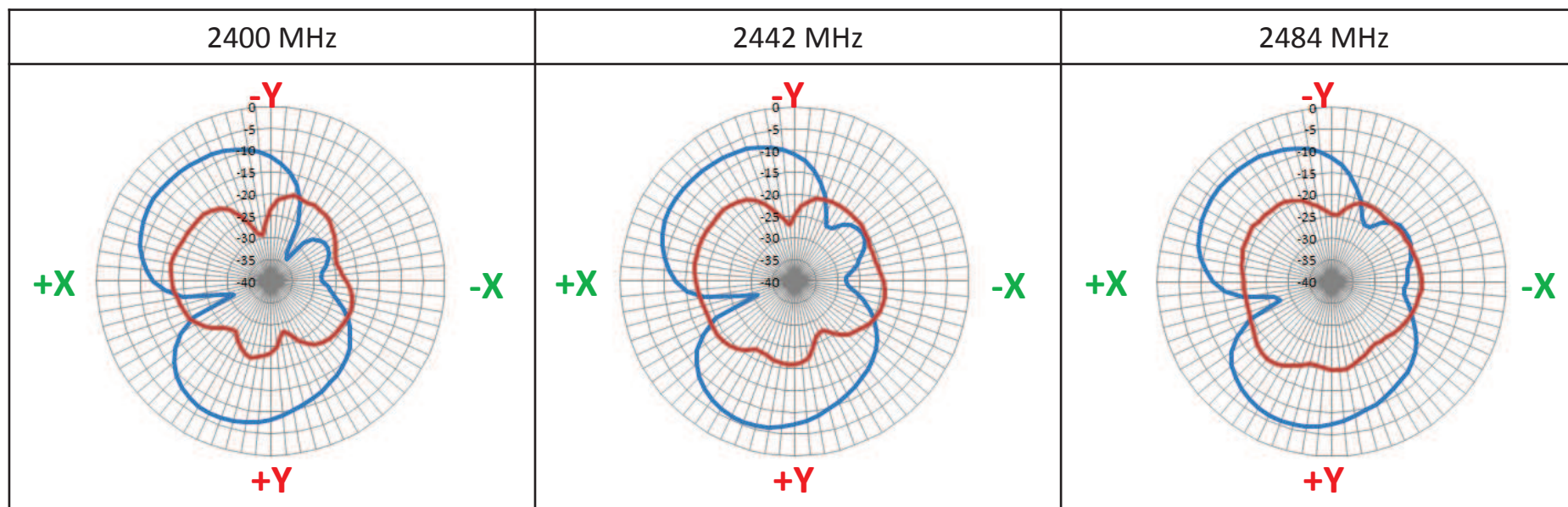
Gain EUT



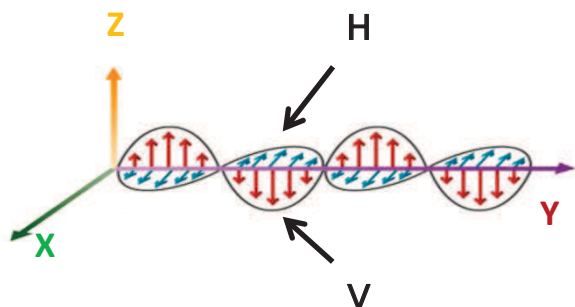
# X-Y Plane



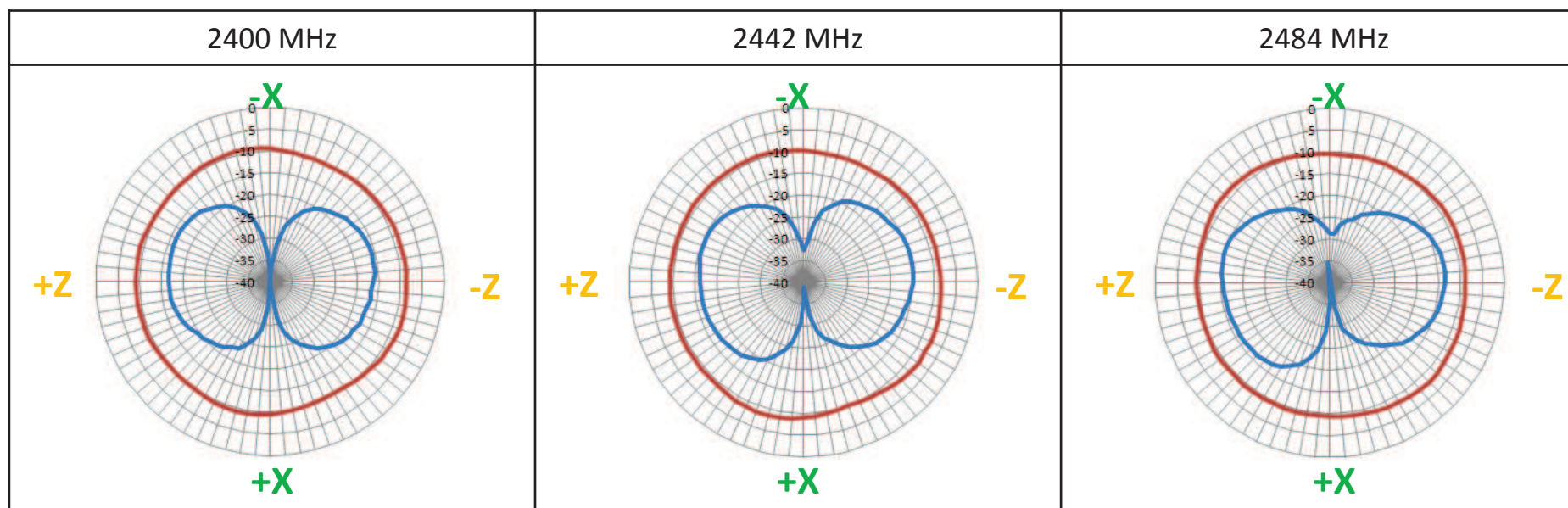
| Freq.(MHz) | Peak Gain (dBi) |        | Average Gain (dBi) |        |
|------------|-----------------|--------|--------------------|--------|
|            | H               | V      | H                  | V      |
| 2400       | -6.57           | -16.77 | -11.15             | -20.84 |
| 2442       | <b>-5.70</b>    | -16.54 | -10.48             | -19.69 |
| 2484       | -6.00           | -16.82 | -10.42             | -19.80 |



# Y-Z Plane



| Freq.(MHz) | Peak Gain (dBi) |              | Average Gain (dBi) |       |
|------------|-----------------|--------------|--------------------|-------|
|            | H               | V            | H                  | V     |
| 2400       | -15.79          | -8.47        | -18.99             | -9.40 |
| 2442       | -14.62          | <b>-7.73</b> | -17.92             | -9.03 |
| 2484       | -13.54          | -7.75        | -17.54             | -9.12 |

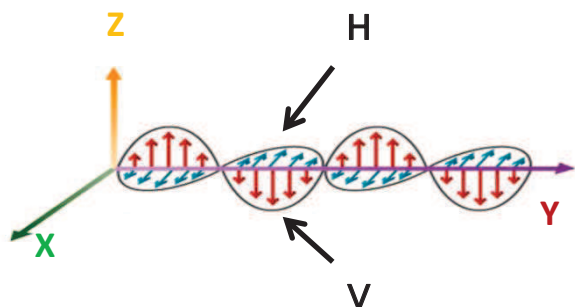


H

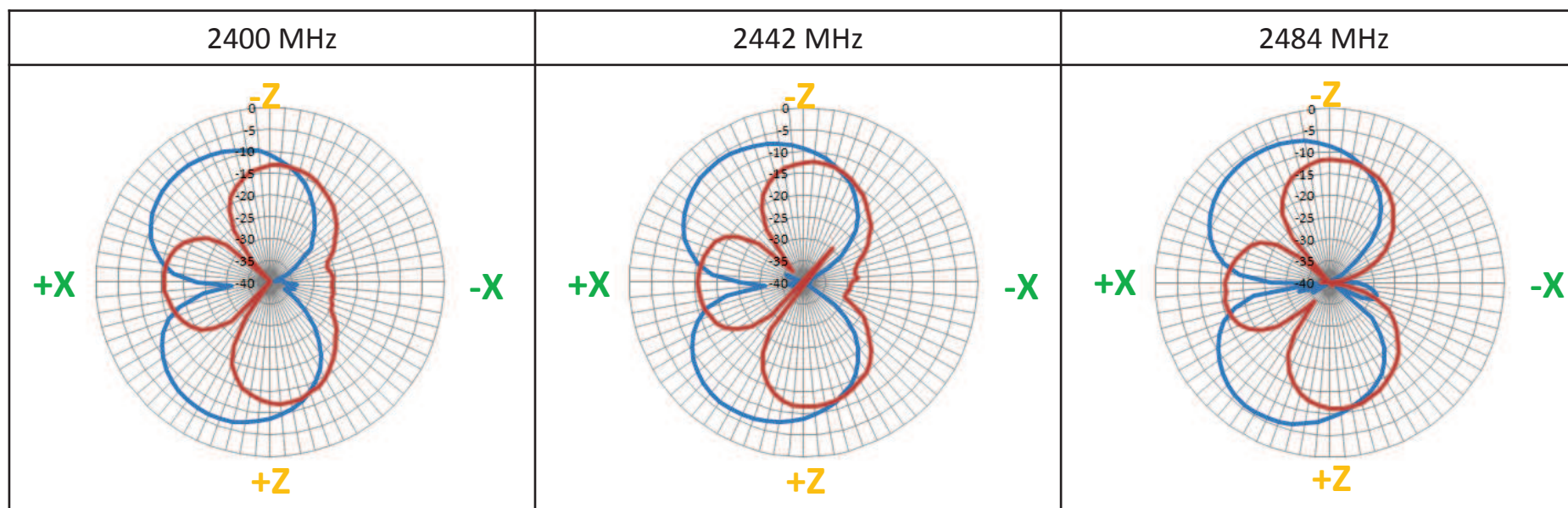


V

# Z-X Plane



| Freq.(MHz) | Peak Gain (dBi) |        | Average Gain (dBi) |        |
|------------|-----------------|--------|--------------------|--------|
|            | H               | V      | H                  | V      |
| 2400       | -6.57           | -11.96 | -11.48             | -16.95 |
| 2442       | -5.99           | -11.44 | -10.75             | -16.41 |
| 2484       | <b>-5.68</b>    | -10.96 | -10.44             | -16.16 |



H



V