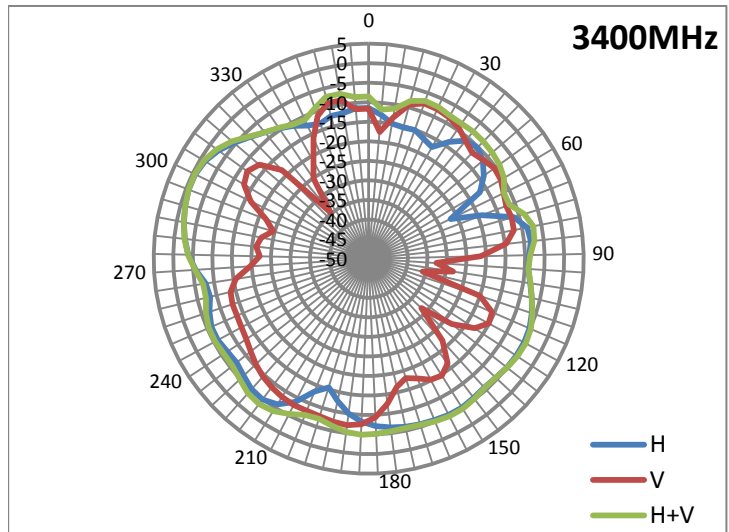


**Radiation characteristic in 3400MHz ~ 3600MHz (FCC Part 96 LTE Band 42)**

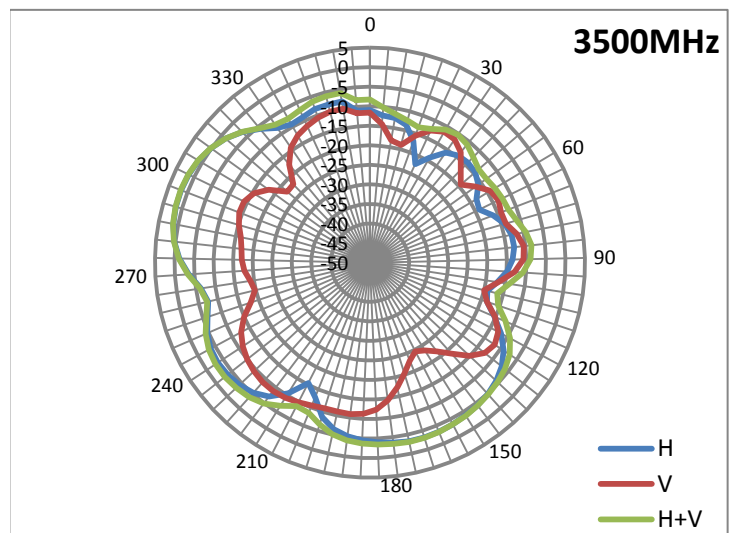
**Main antenna: 3400.00 MHz**

3400.00 MHz		
Horizontal Peak (dBi)	-0.7	290deg
Vertical Peak(dBi)	-7.1	290deg



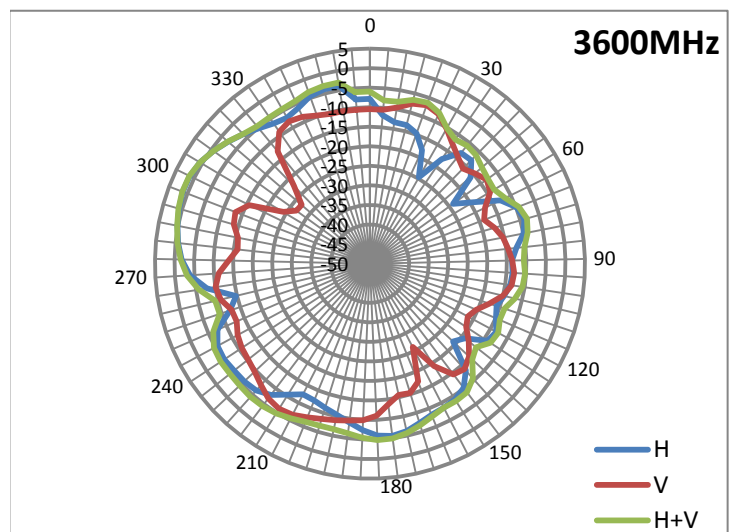
**Main antenna: 3500.00 MHz**

3500.00 MHz		
Horizontal Peak (dBi)	0.8	290deg
Vertical Peak(dBi)	-8.9	225deg



**Main antenna: 3600.00 MHz**

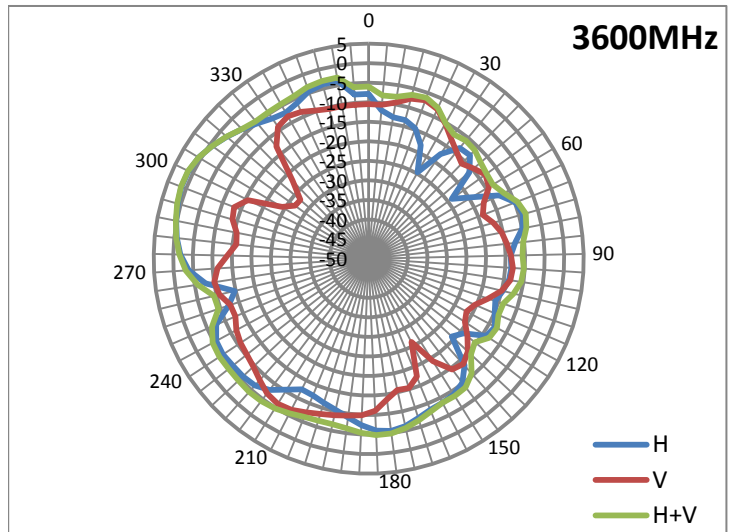
3600.00 MHz		
Horizontal Peak (dBi)	0.3	290deg
Vertical Peak(dBi)	-6.2	225deg



**Radiation characteristic in 3600MHz ~ 3800MHz (LTE Band 43)**

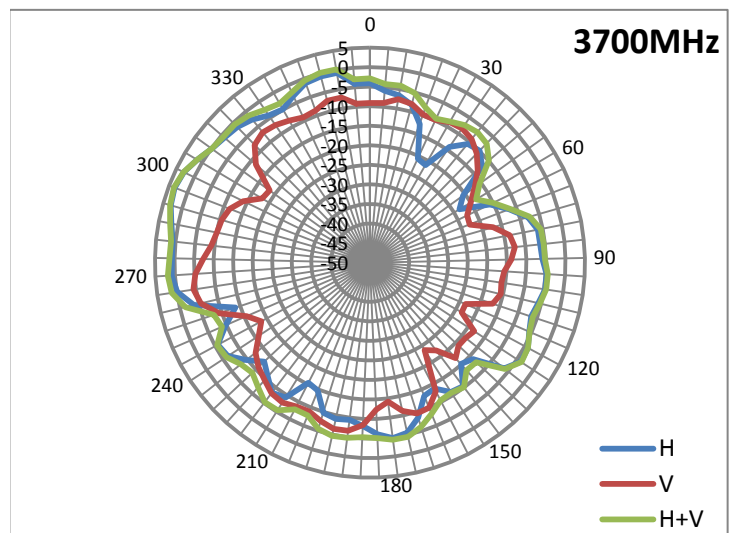
**Main antenna: 3600.00 MHz**

3600.00 MHz		
Horizontal Peak (dBi)	0.3	290deg
Vertical Peak(dBi)	-6.2	225deg



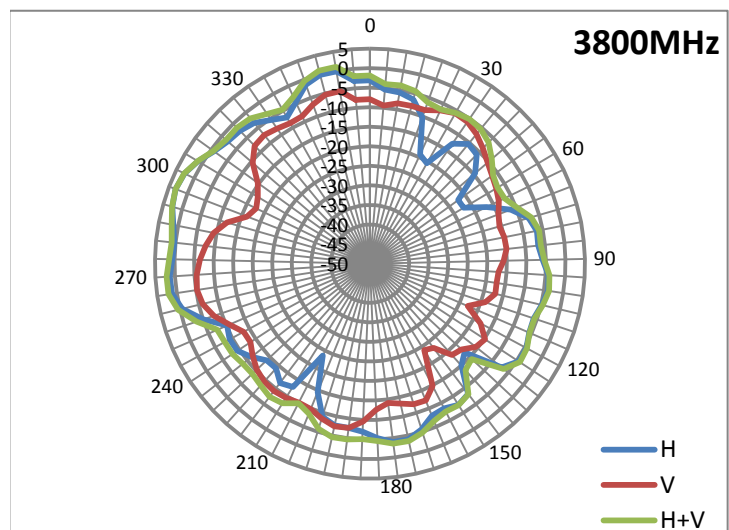
**Main antenna: 3700.00 MHz**

3700.00 MHz		
Horizontal Peak (dBi)	0.5	295deg
Vertical Peak(dBi)	-4.3	225deg



**Main antenna: 3800.00 MHz**

3800.00 MHz		
Horizontal Peak (dBi)	0.2	290deg
Vertical Peak(dBi)	-5.3	220deg

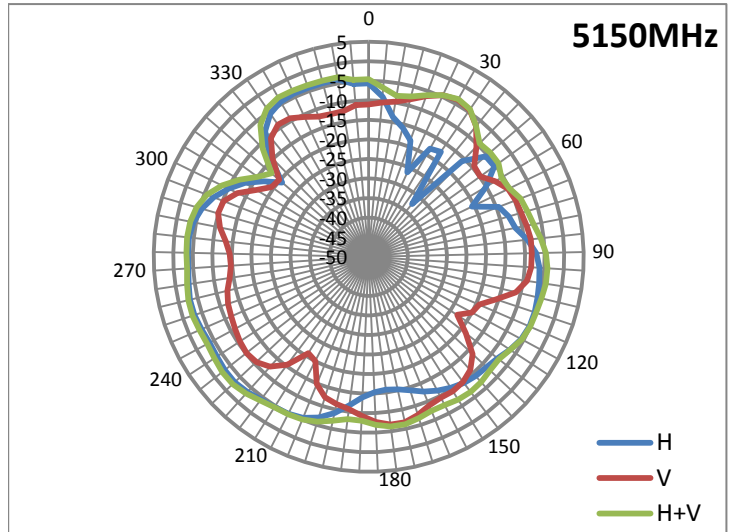


**Radiation characteristic in 5150MHz ~ 5925MHz (FCC Part 15, 90, 95 LTE Band 46)**

\* TD Unlicensed, LAA RCV only

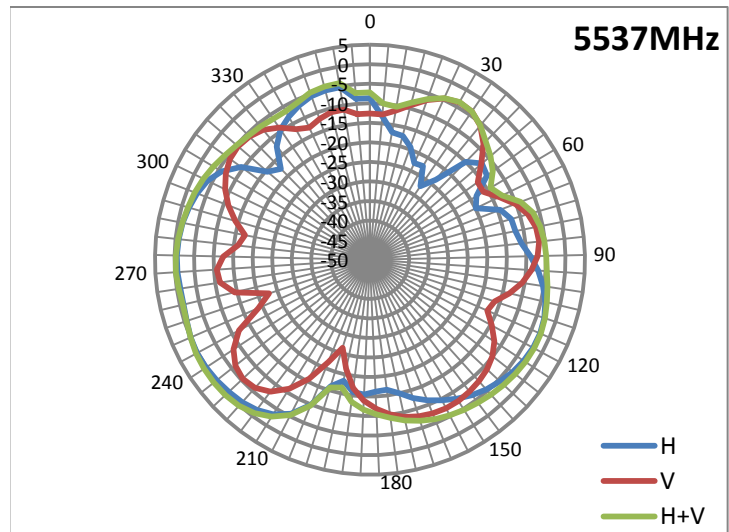
**Main antenna: 5150.00 MHz**

5150.00 MHz		
Horizontal Peak (dBi)	-3.0	15deg
Vertical Peak(dBi)	-3.8	200deg



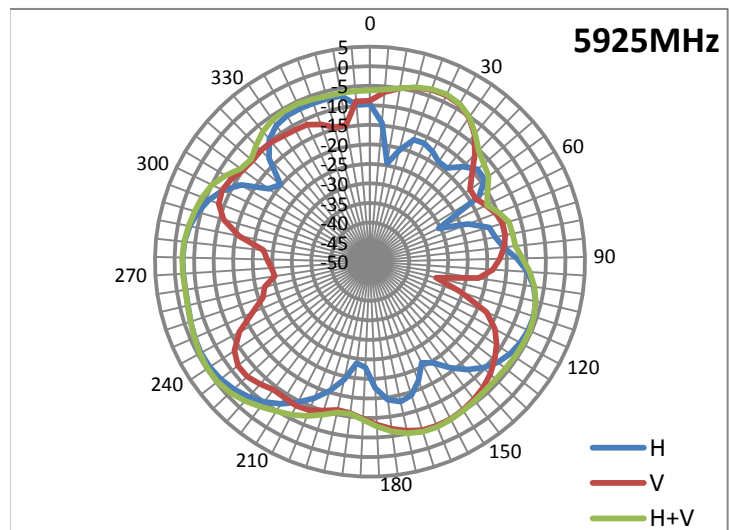
**Main antenna: 5537.00 MHz**

5537.00 MHz		
Horizontal Peak (dBi)	0.3	15deg
Vertical Peak(dBi)	-3.7	195deg



**Main antenna: 5925.00 MHz**

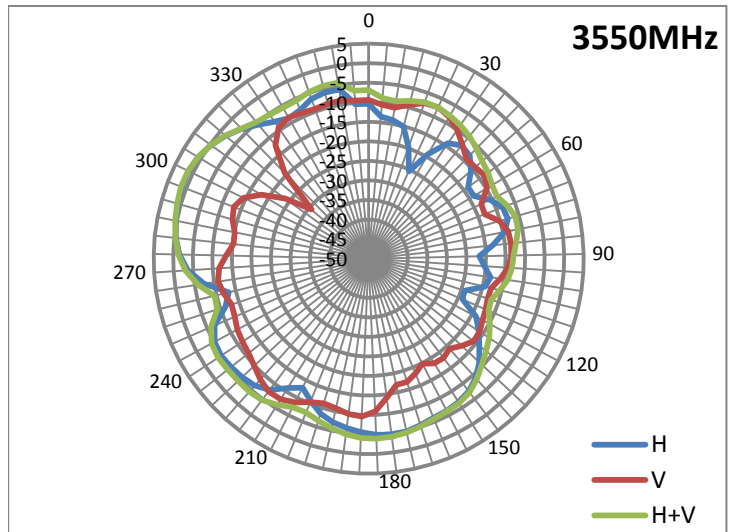
5925.00 MHz		
Horizontal Peak (dBi)	-0.9	295deg
Vertical Peak(dBi)	-3.1	180deg



**Radiation characteristic in 5150MHz ~ 5925MHz (FCC Part 96, LTE Band 48)**

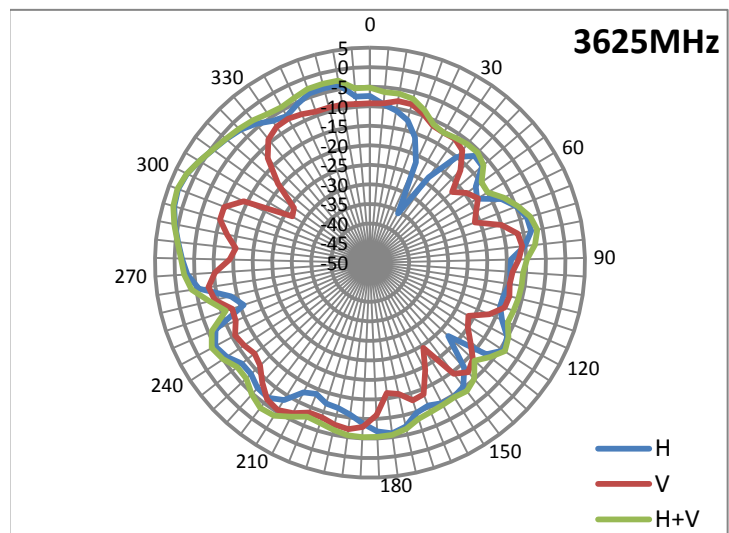
**Main antenna: 3550.00 MHz**

3550.00 MHz		
Horizontal Peak (dBi)	0.2	290deg
Vertical Peak(dBi)	-7.4	225deg



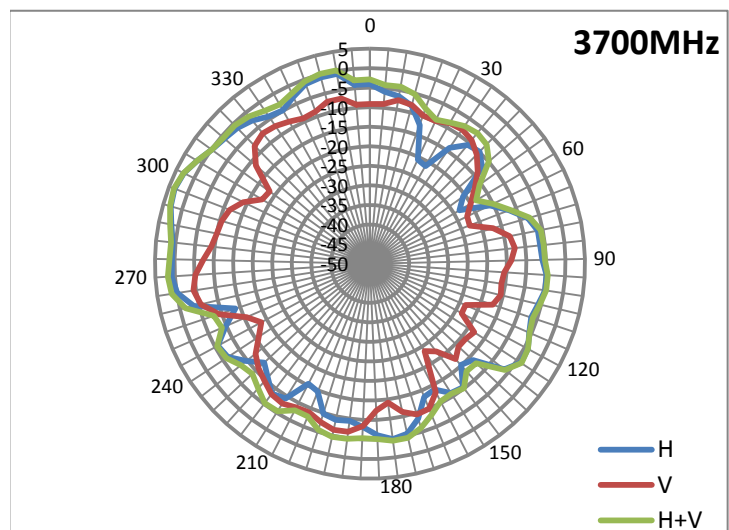
**Main antenna: 3625.00 MHz**

3625.00 MHz		
Horizontal Peak (dBi)	0.5	290deg
Vertical Peak(dBi)	-5.5	215deg



**Main antenna: 3700.00 MHz**

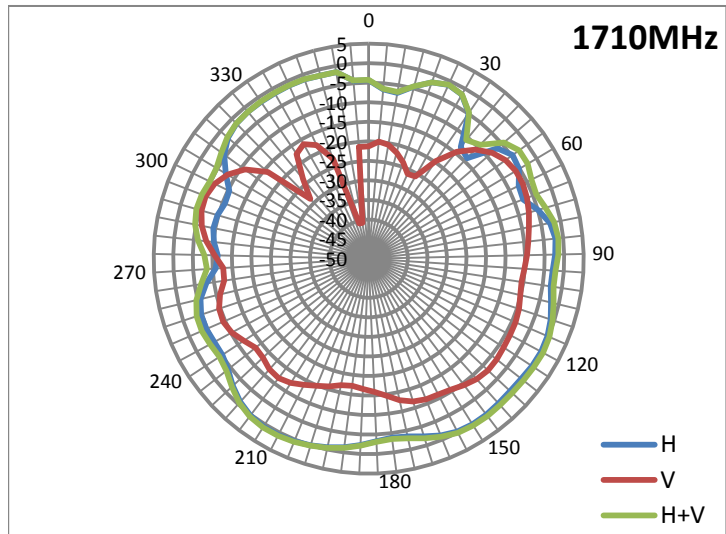
3700.00 MHz		
Horizontal Peak (dBi)	0.5	290deg
Vertical Peak(dBi)	-4.3	225deg



**Radiation characteristic in 1710MHz ~ 1780MHz (FCC Part 27 LTE, Band 66, n66)**

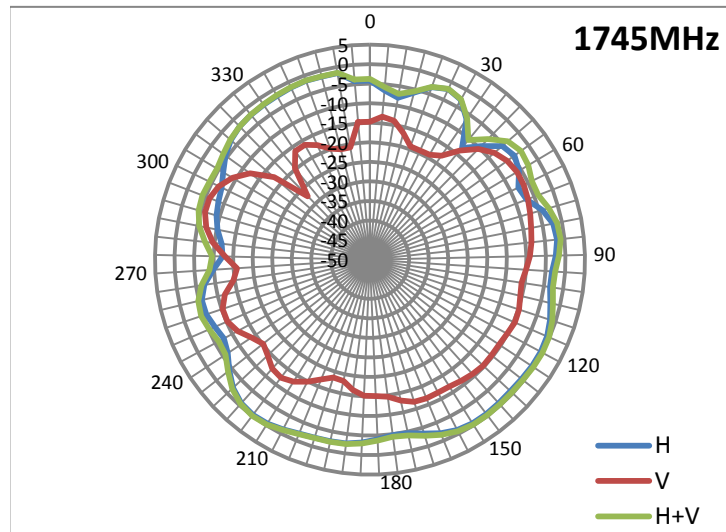
**Main antenna: 1710.00 MHz**

1710.00 MHz		
Horizontal Peak (dBi)	-0.7	300deg
Vertical Peak(dBi)	-5.4	130deg



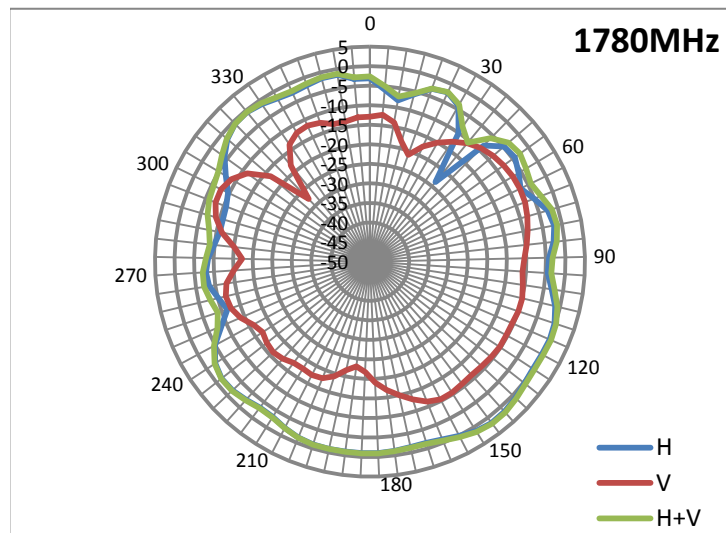
**Main antenna: 1745.00 MHz**

1745.00 MHz		
Horizontal Peak (dBi)	-0.8	300deg
Vertical Peak(dBi)	-6	150deg



**Main antenna: 1780.00 MHz**

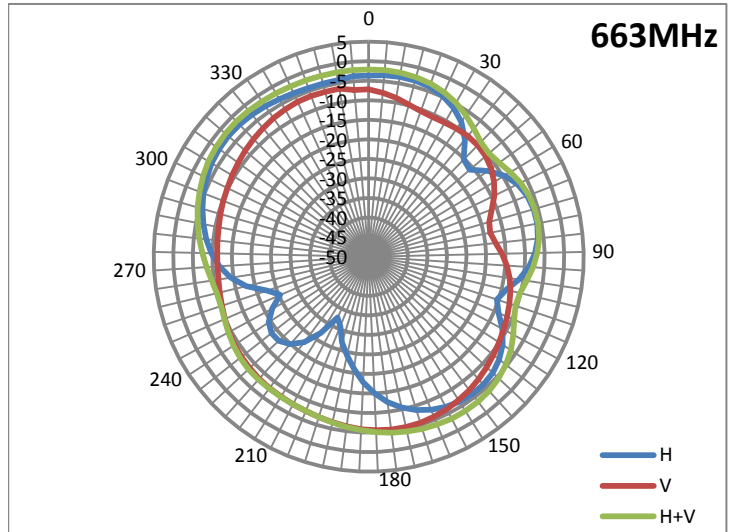
1780.00 MHz		
Horizontal Peak (dBi)	-0.7	295deg
Vertical Peak(dBi)	-7.3	145deg



**Radiation characteristic in 663MHz ~ 698MHz (FCC Part 24, 27 LTE, Band 71, n71)**

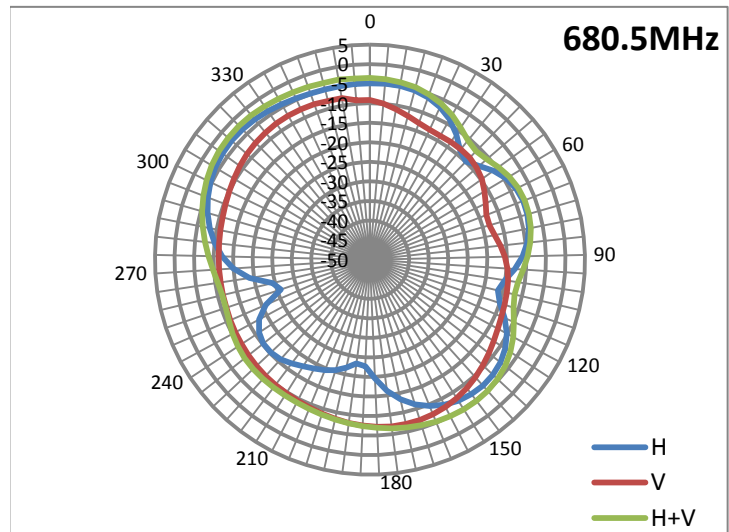
**Main antenna: 663.00 MHz**

663.00 MHz		
Horizontal Peak (dBi)	-2.7	130deg
Vertical Peak(dBi)	-5.4	345deg



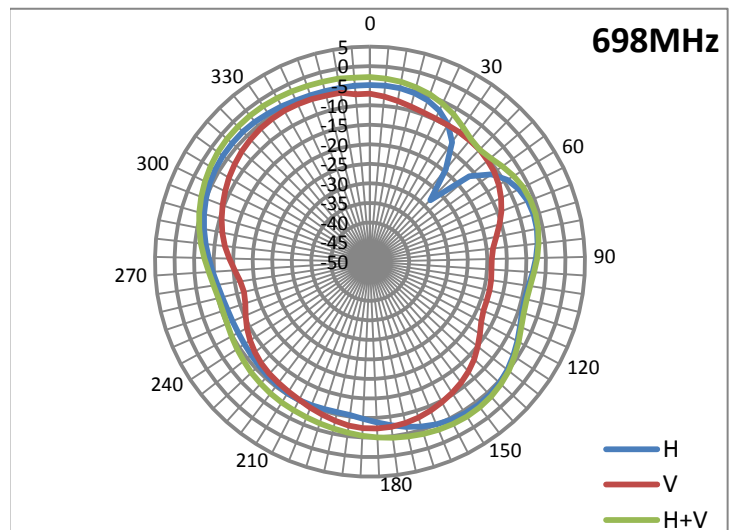
**Main antenna: 680.50 MHz**

680.50 MHz		
Horizontal Peak (dBi)	-3.3	130deg
Vertical Peak(dBi)	-7.0	310deg



**Main antenna: 698.00 MHz**

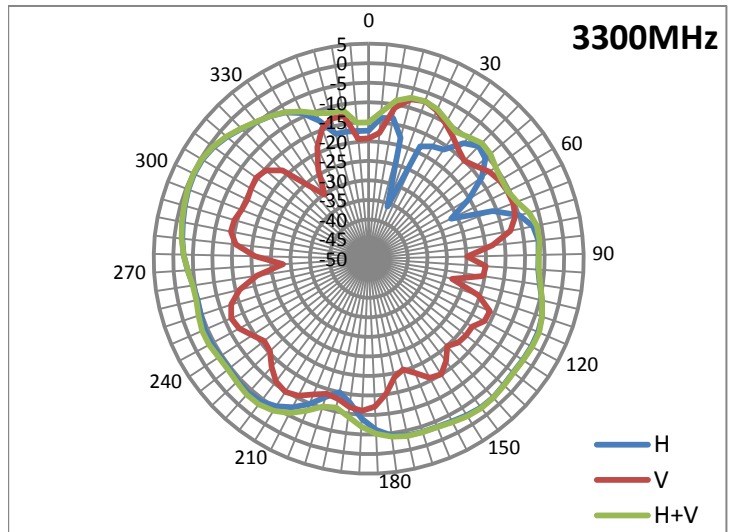
698.00 MHz		
Horizontal Peak (dBi)	-3.5	270deg
Vertical Peak(dBi)	-5.6	315deg



**Radiation characteristic in 3300MHz ~ 4200MHz (FCC/EU/CN/JP 5G NR Band 77)**

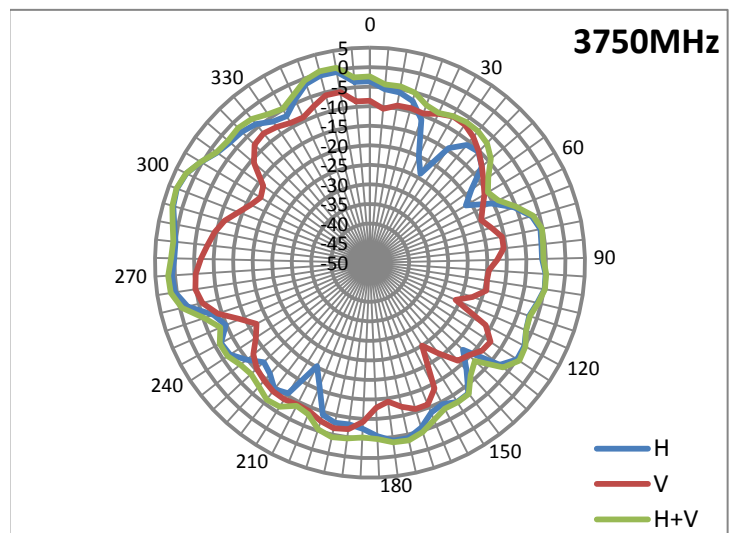
**Main antenna: 3300.00 MHz**

3300.00 MHz		
Horizontal Peak (dBi)	-0.3	290deg
Vertical Peak(dBi)	-7.3	250deg



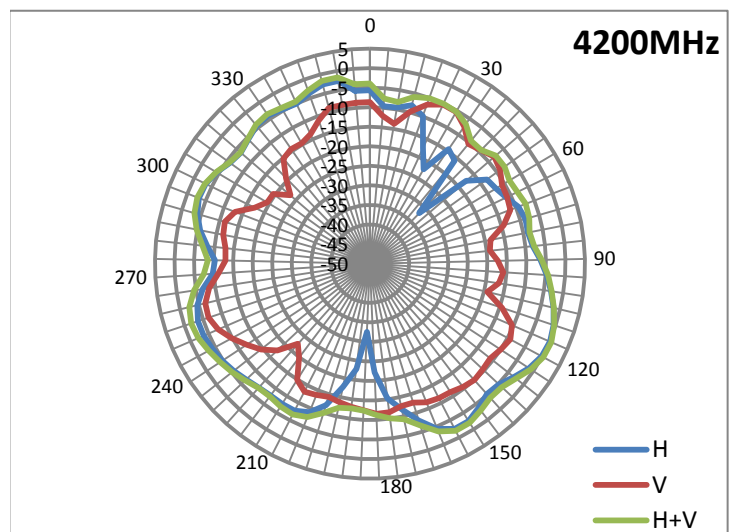
**Main antenna: 3750.00 MHz**

3750.00 MHz		
Horizontal Peak (dBi)	0.9	290deg
Vertical Peak(dBi)	-4.8	215deg



**Main antenna: 4200.00 MHz**

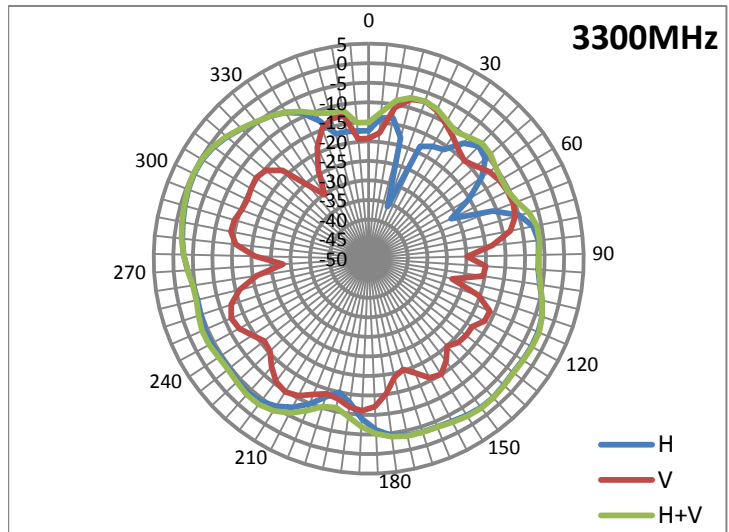
4200.00 MHz		
Horizontal Peak (dBi)	0.2	295deg
Vertical Peak(dBi)	-5.2	180deg



**Radiation characteristic in 3300MHz ~ 3800MHz (EU/CN/JP 5G NR Band 78)**

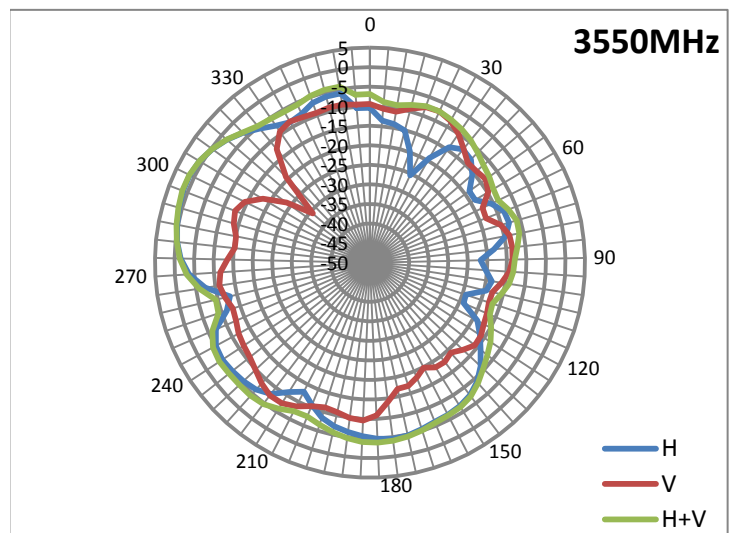
**Main antenna: 3300.00 MHz**

3300.00 MHz		
Horizontal Peak (dBi)	-0.3	290deg
Vertical Peak(dBi)	-7.3	250deg



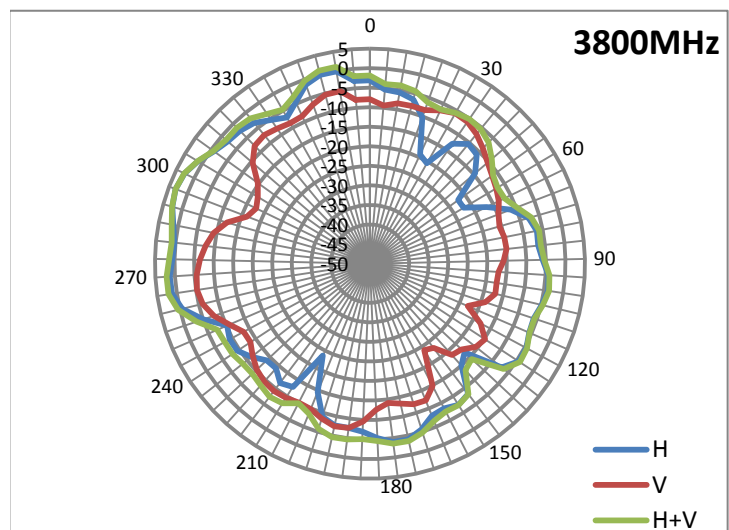
**Main antenna: 3550.00 MHz**

3550.00 MHz		
Horizontal Peak (dBi)	0.2	290deg
Vertical Peak(dBi)	-7.4	225deg



**Main antenna: 3800.00 MHz**

3800.00 MHz		
Horizontal Peak (dBi)	0.2	290deg
Vertical Peak(dBi)	-5.3	220deg

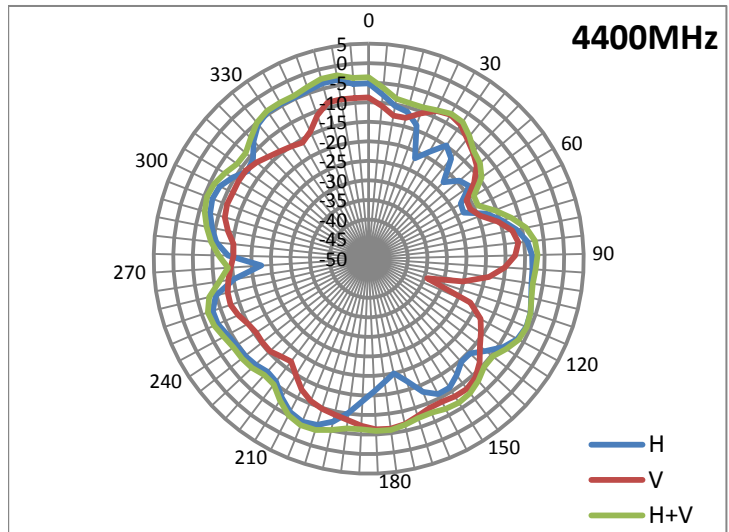




**Radiation characteristic in 4400MHz ~ 5000MHz (CN/JP 5G NR Band 79)**

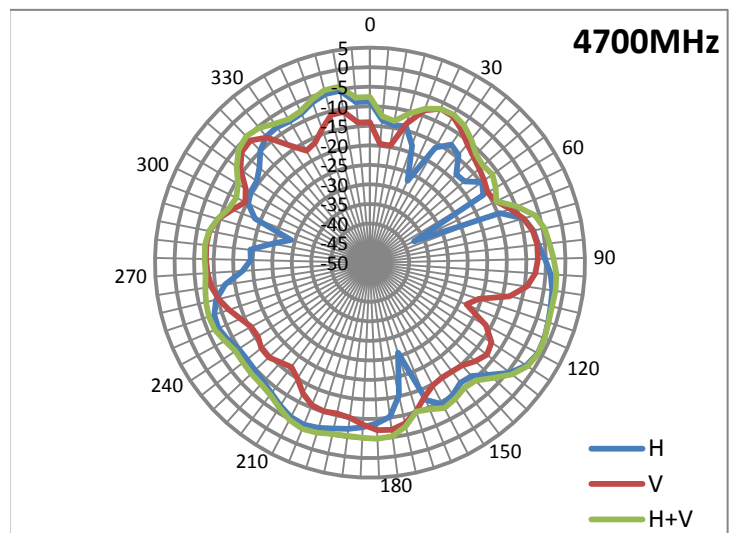
**Main antenna: 4400.00 MHz**

4400.00 MHz		
Horizontal Peak (dBi)	-3.6	15deg
Vertical Peak(dBi)	-6.1	180deg



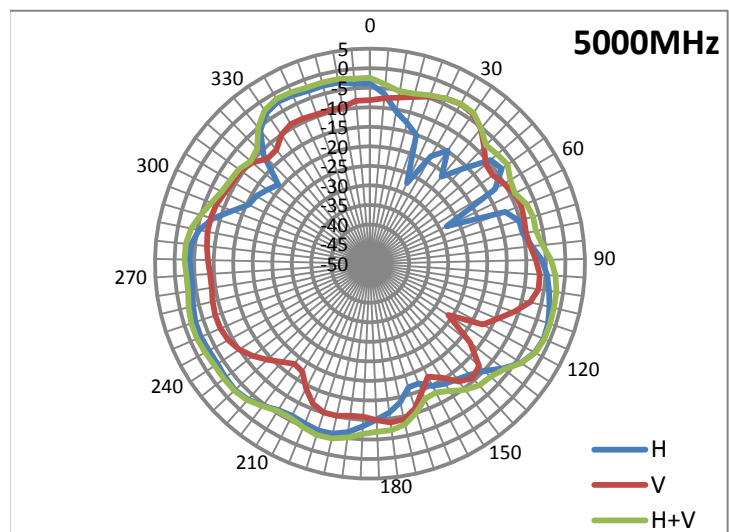
**Main antenna: 4700.00 MHz**

4700.00 MHz		
Horizontal Peak (dBi)	-1.2	20deg
Vertical Peak(dBi)	-6.3	180deg



**Main antenna: 5000.00 MHz**

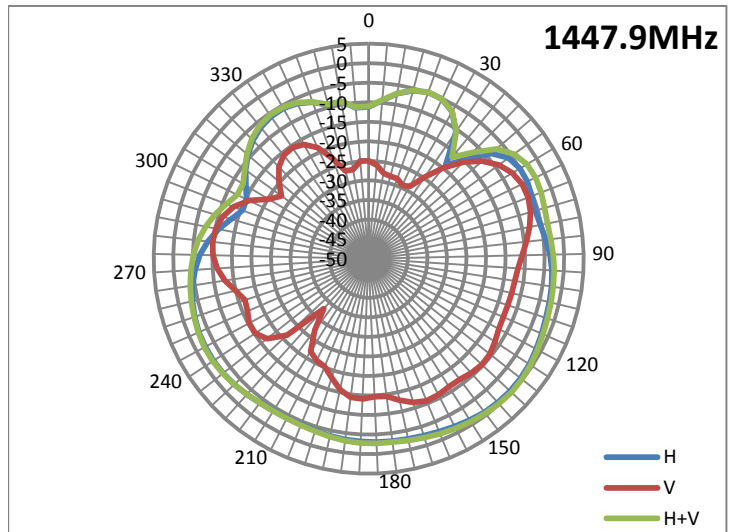
5000.00 MHz		
Horizontal Peak (dBi)	-1.6	15deg
Vertical Peak(dBi)	-3.0	180deg



**Radiation characteristic in 1447.9MHz ~ 1462.9MHz (Japan, Band 21)**

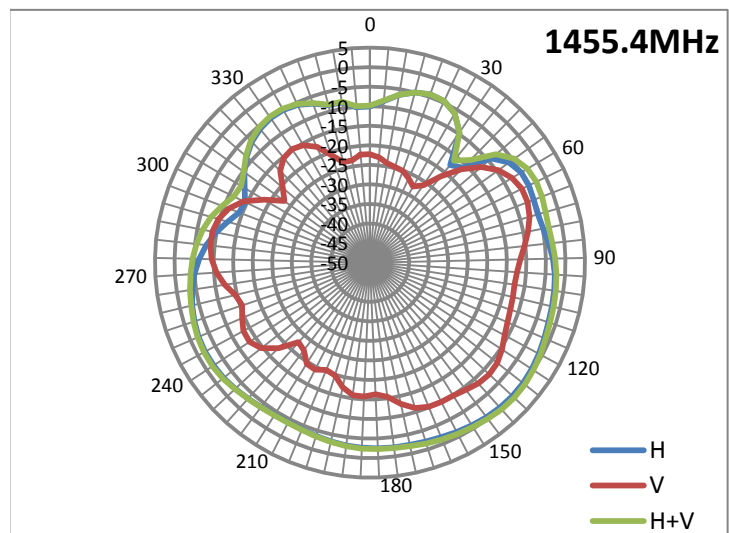
**Main antenna: 1447.90 MHz**

1447.90 MHz		
Horizontal Peak (dBi)	-0.4	300deg
Vertical Peak(dBi)	-6.3	135deg



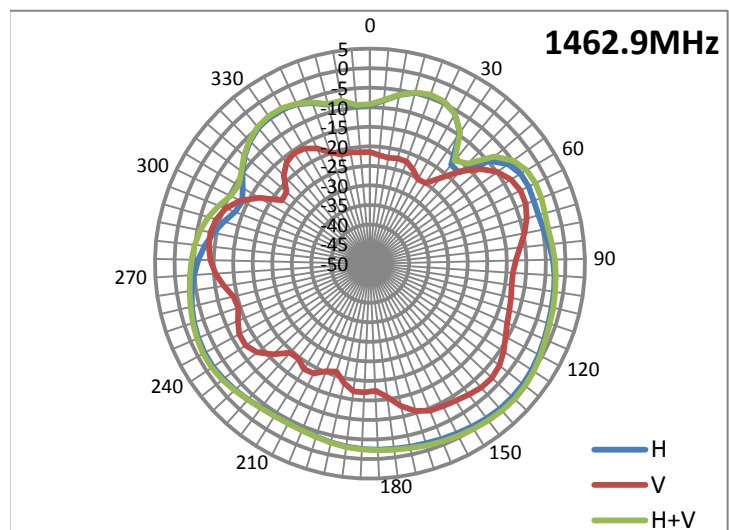
**Main antenna: 1455.40 MHz**

1455.40 MHz		
Horizontal Peak (dBi)	-0.1	295deg
Vertical Peak(dBi)	-6.8	135deg



**Main antenna: 1462.90 MHz**

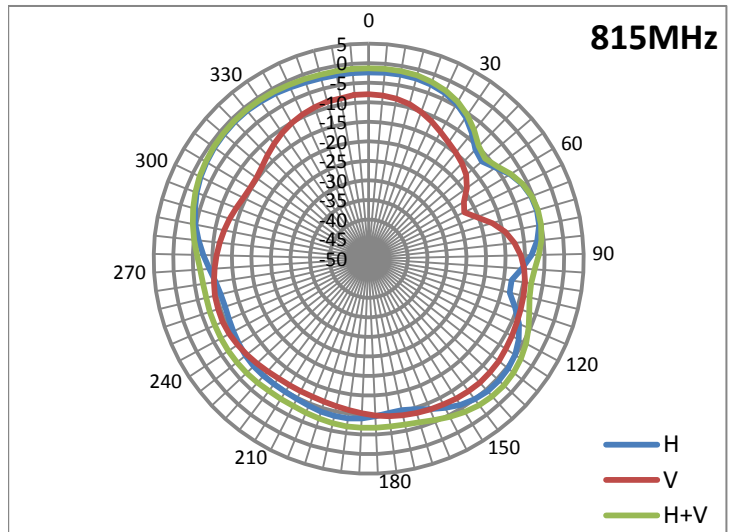
1462.90 MHz		
Horizontal Peak (dBi)	-0.1	295deg
Vertical Peak(dBi)	-7.2	135deg



**Radiation characteristic in 815MHz ~ 940MHz (Japan: J-CDMA)**

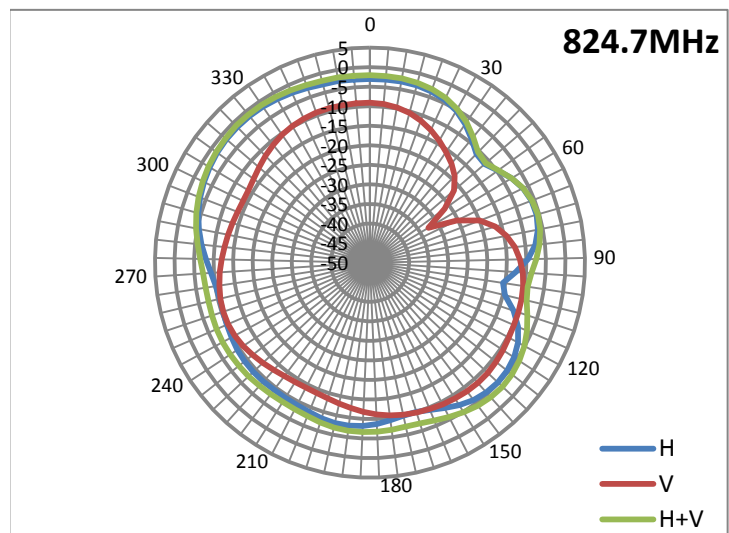
**Main antenna: 815 MHz**

815 MHz		
Horizontal Peak (dBi)	-1.0	270deg
Vertical Peak(dBi)	-7.4	345deg



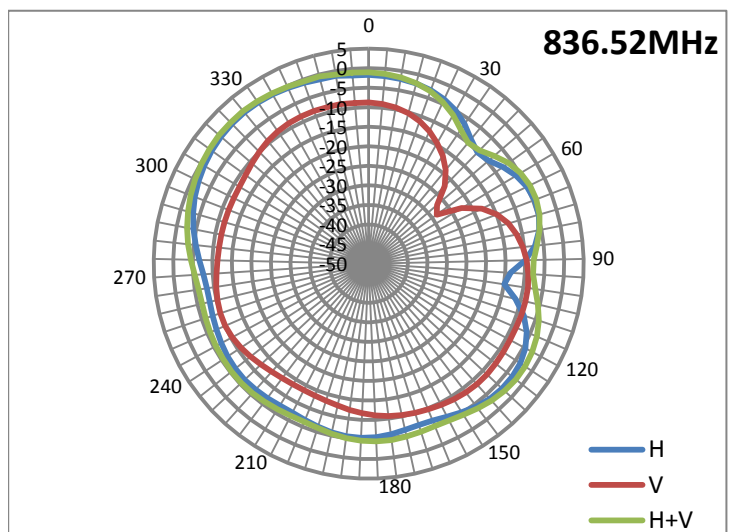
**Main antenna: 824.70 MHz**

824.70 MHz		
Horizontal Peak (dBi)	-1.4	275deg
Vertical Peak(dBi)	-8.7	345deg



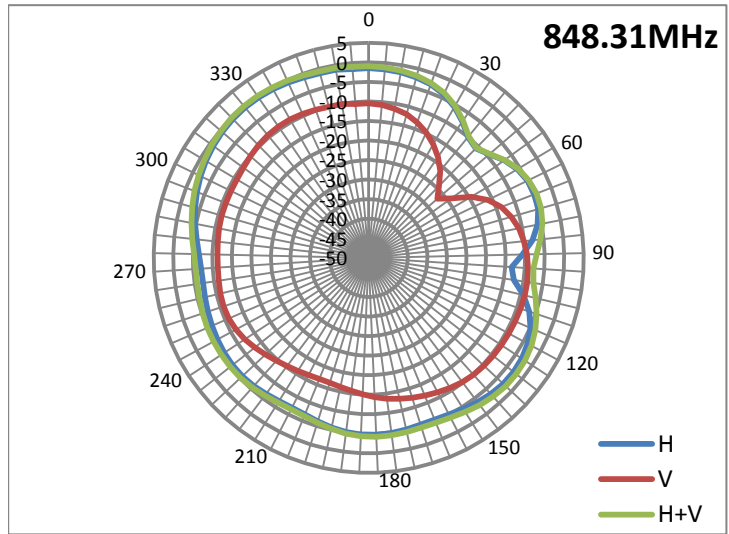
**Main antenna: 836.52 MHz**

836.52 MHz		
Horizontal Peak (dBi)	0.1	280deg
Vertical Peak(dBi)	-8.5	185deg



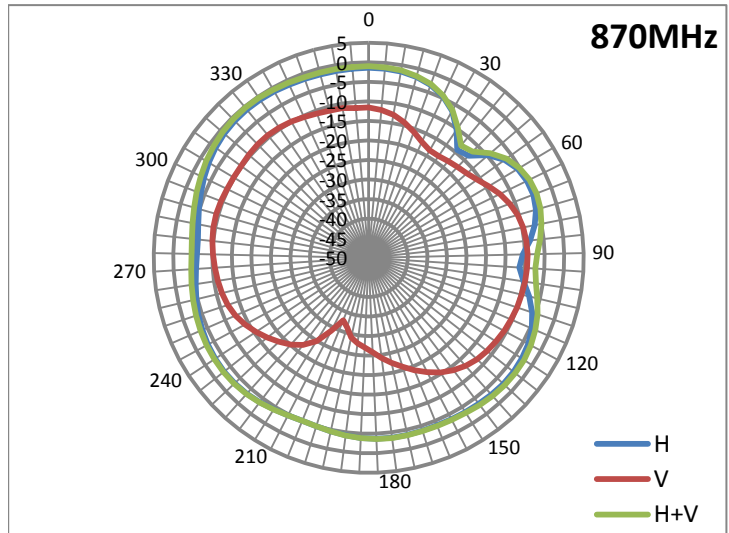
**Main antenna: 848.31 MHz**

848.31 MHz		
Horizontal Peak (dBi)	-0.2	285deg
Vertical Peak(dBi)	-9.0	240deg



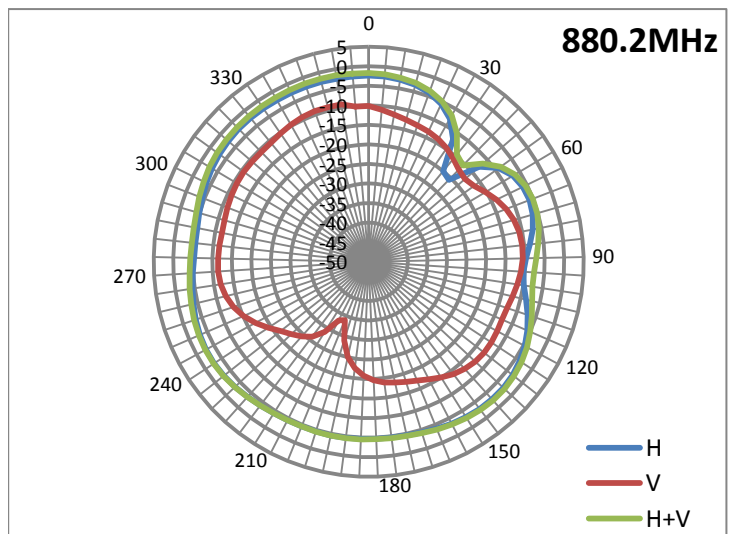
**Main antenna: 870 MHz**

870 MHz		
Horizontal Peak (dBi)	-0.9	345deg
Vertical Peak(dBi)	-9.4	290deg



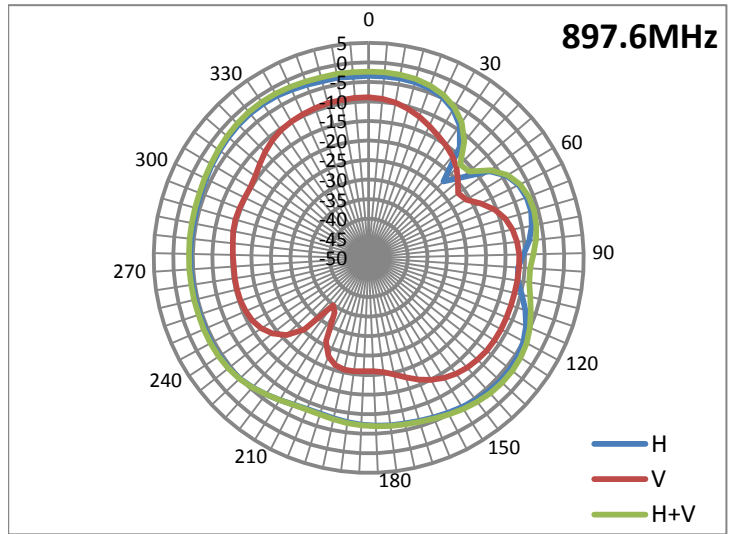
**Main antenna: 880.2 MHz**

880.2 MHz		
Horizontal Peak (dBi)	-2.4	275deg
Vertical Peak(dBi)	-9.1	295deg



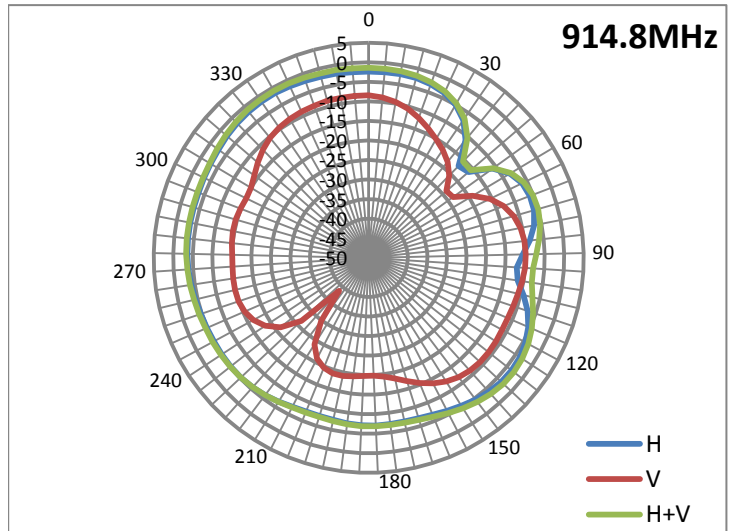
**Main antenna: 897.6 MHz**

897.6 MHz		
Horizontal Peak (dBi)	-2.2	290deg
Vertical Peak(dBi)	-8.9	295deg



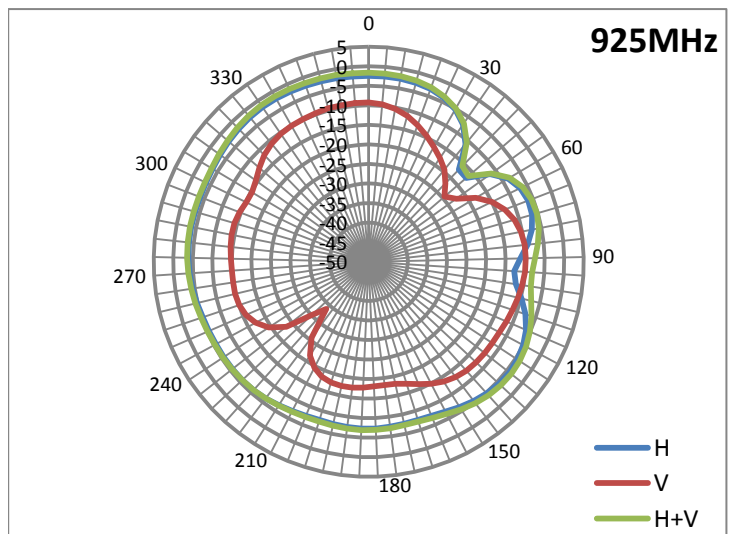
**Main antenna: 914.8 MHz**

914.8 MHz		
Horizontal Peak (dBi)	-1.5	320deg
Vertical Peak(dBi)	-8.5	295deg



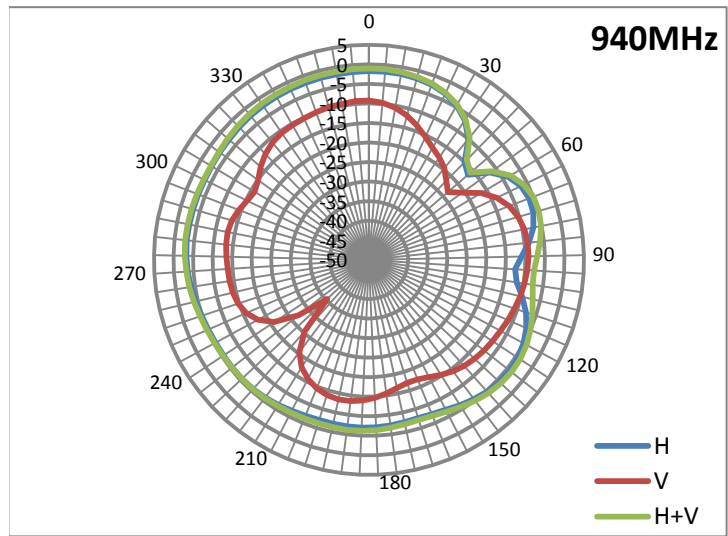
**Main antenna: 925 MHz**

925 MHz		
Horizontal Peak (dBi)	-2.0	315deg
Vertical Peak(dBi)	-9.3	290deg



**Main antenna: 940 MHz**

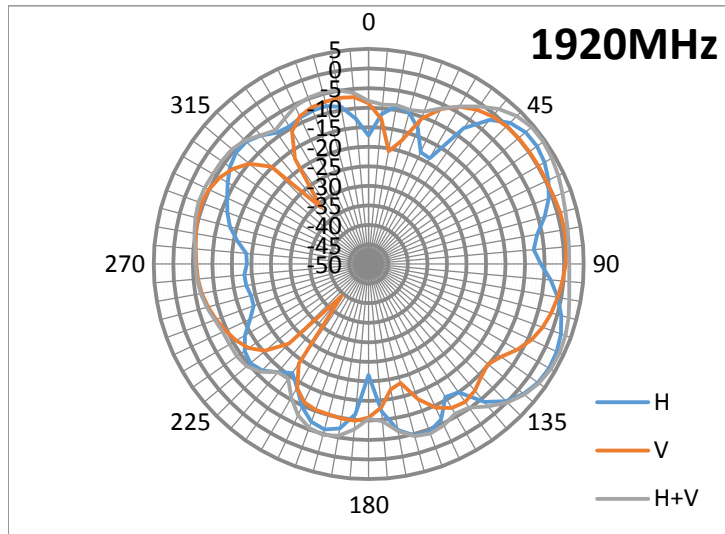
940 MHz		
Horizontal Peak (dBi)	-1.7	305deg
Vertical Peak(dBi)	-9.2	275deg



**Radiation characteristic in 1920MHz ~ 1980MHz (EU/ANZ/CN/JP: UMTS/HSDPA, Band 1, n1)**

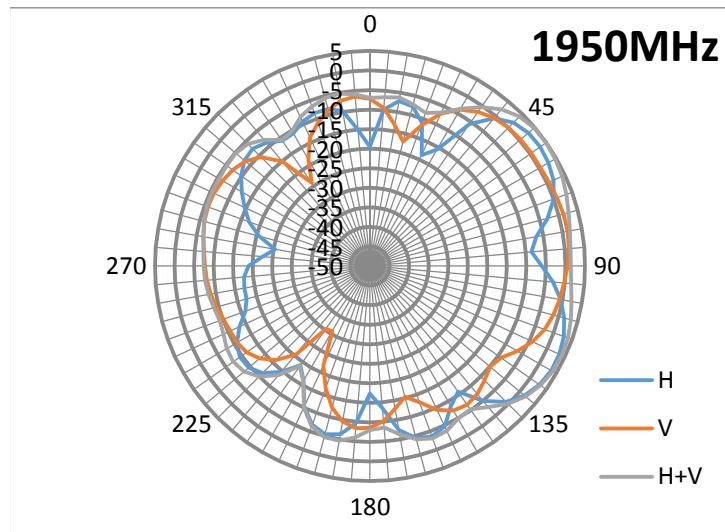
**MIMO antenna: 1920.00 MHz**

1920.00 MHz		
Horizontal Peak (dBi)	-2.1	330deg
Vertical Peak(dBi)	-2.2	125deg



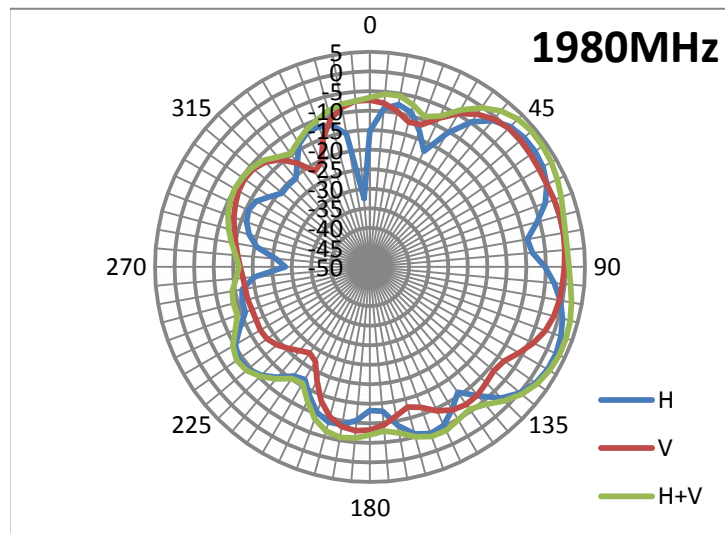
**MIMO antenna: 1950.00 MHz**

1950.00 MHz		
Horizontal Peak (dBi)	-2.4	330deg
Vertical Peak(dBi)	-2.2	125deg



**MIMO antenna: 1980.00 MHz**

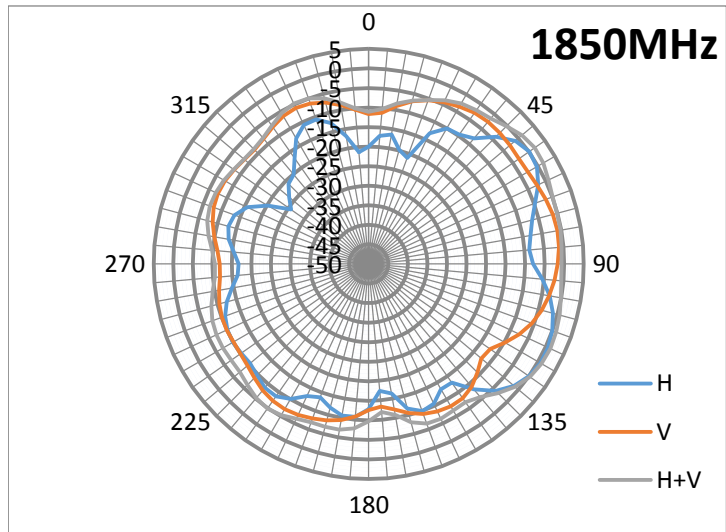
1980.00 MHz		
Horizontal Peak (dBi)	-2.6	335deg
Vertical Peak(dBi)	-1.7	125deg



**Radiation characteristic in 1850MHz ~ 1910MHz (FCC Part 24 PCS, Band 2, n2)**

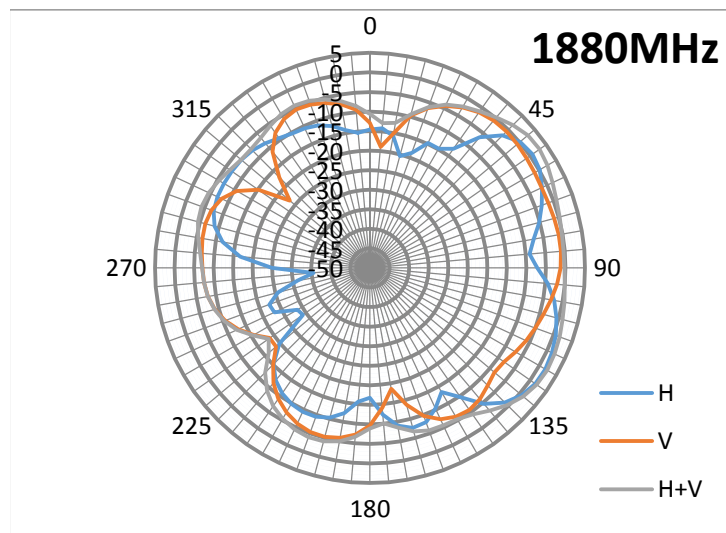
**MIMO antenna: 1850.00 MHz**

1850.00 MHz		
Horizontal Peak (dBi)	-1.8	330deg
Vertical Peak(dBi)	-0.9	140deg



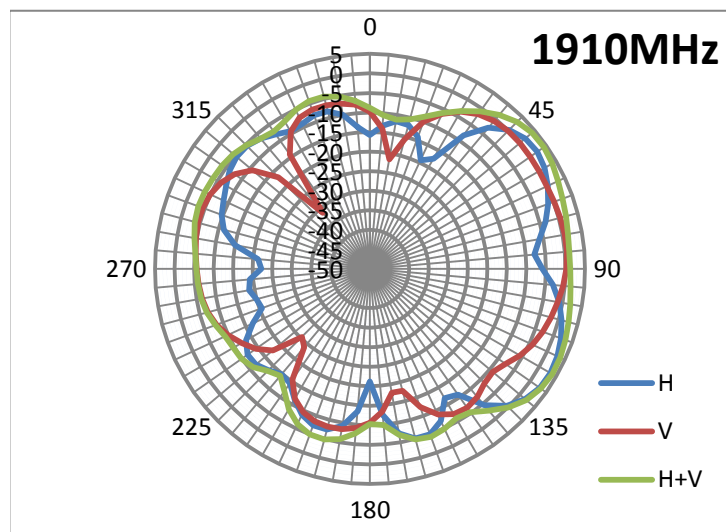
**MIMO antenna: 1880.00 MHz**

1880.00 MHz		
Horizontal Peak (dBi)	-0.2	330deg
Vertical Peak(dBi)	-1.0	135deg



**MIMO antenna: 1910.00 MHz**

1910.00 MHz		
Horizontal Peak (dBi)	-0.9	330deg
Vertical Peak(dBi)	-1.1	125deg

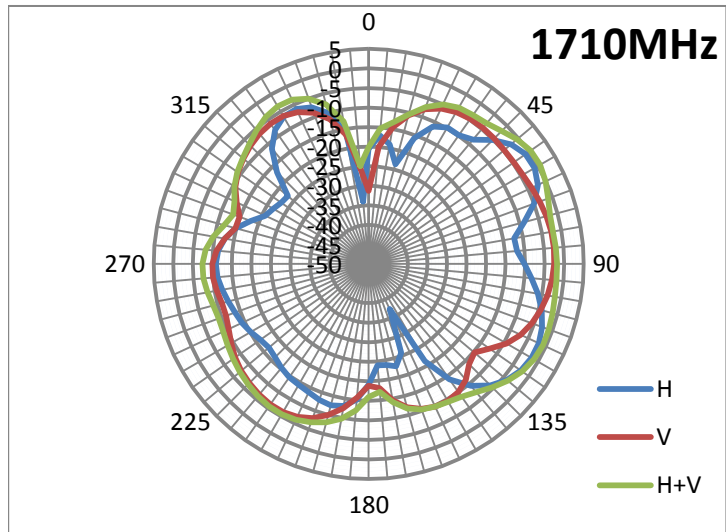




**Radiation characteristic in 1710MHz ~ 1785MHz (EU/ANZ/CN/JP: UE-UTRA, Band 3, n3)**

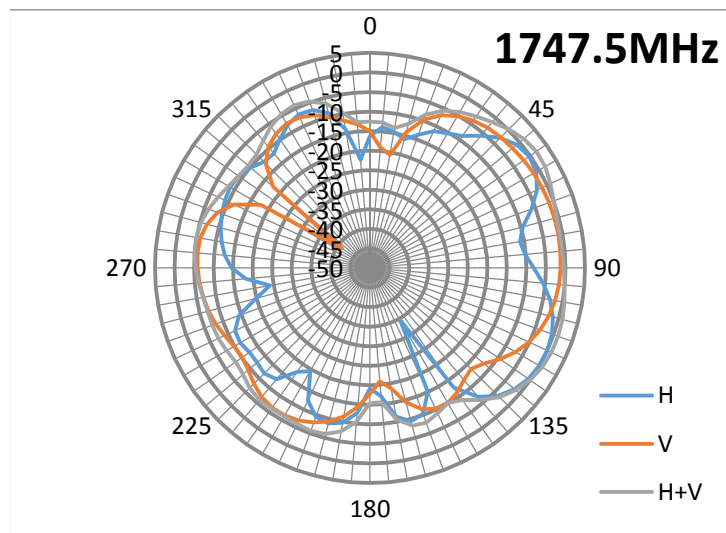
**MIMO antenna: 1710.00 MHz**

1710.00 MHz		
Horizontal Peak (dBi)	-1.0	60deg
Vertical Peak(dBi)	-2.4	85deg



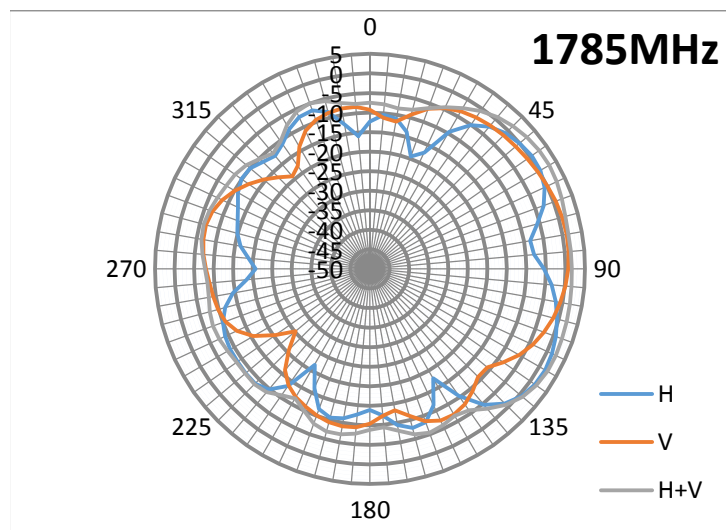
**MIMO antenna: 1747.50 MHz**

1747.50 MHz		
Horizontal Peak (dBi)	-0.4	120deg
Vertical Peak(dBi)	-1.2	80deg



**MIMO antenna: 1785.00 MHz**

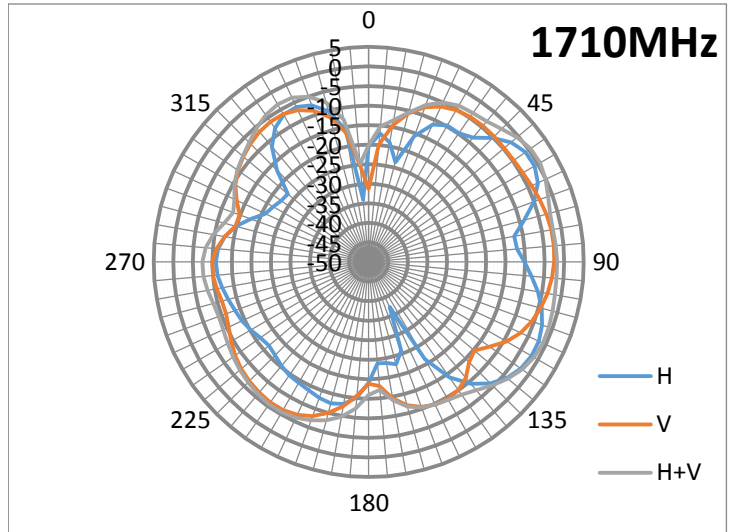
1785.00 MHz		
Horizontal Peak (dBi)	1.7	120deg
Vertical Peak(dBi)	1.1	80deg



**Radiation characteristic in 1710MHz ~ 1755MHz (FCC Part 27 UMTS(AWS), Band 4)**

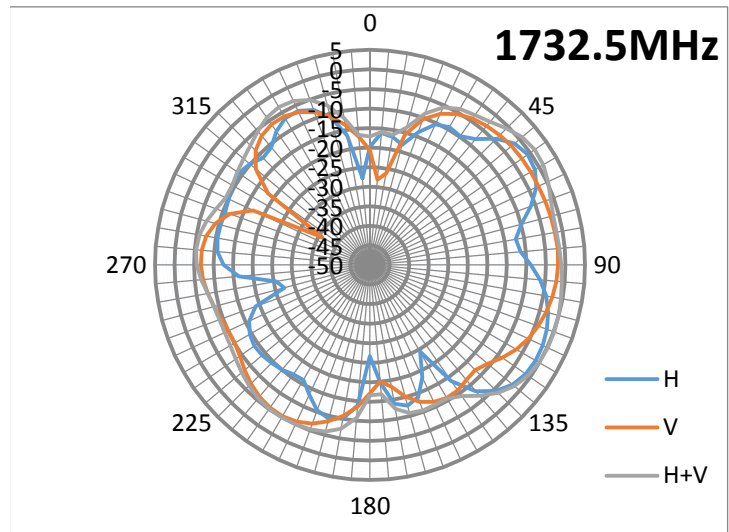
**MIMO antenna: 1710.00 MHz**

1710.00 MHz		
Horizontal Peak (dBi)	-1.0	60deg
Vertical Peak(dBi)	-2.4	85deg



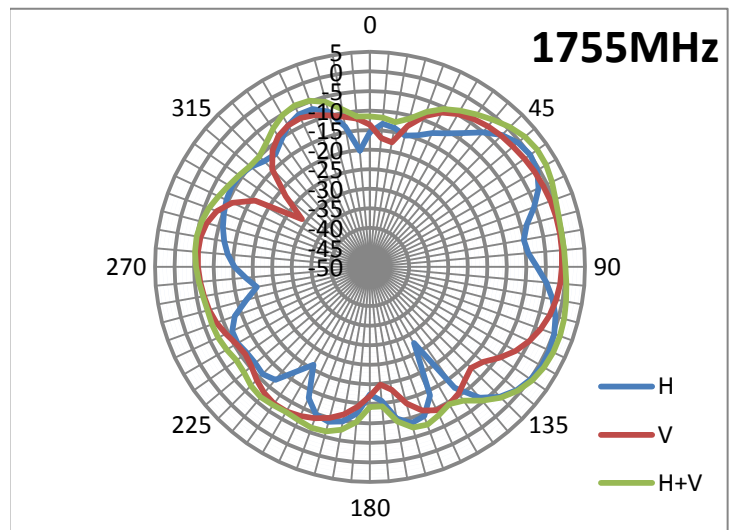
**MIMO antenna: 1732.50 MHz**

1732.50 MHz		
Horizontal Peak (dBi)	-0.8	55deg
Vertical Peak(dBi)	-1.8	85deg



**MIMO antenna: 1755.00 MHz**

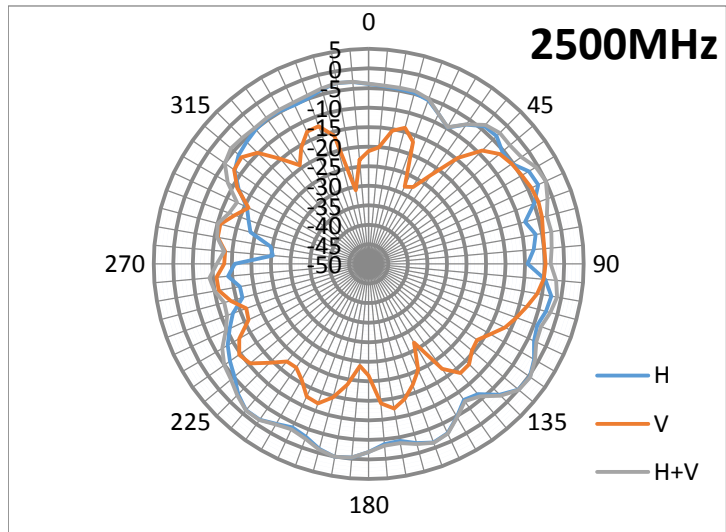
1755.00 MHz		
Horizontal Peak (dBi)	0.7	120deg
Vertical Peak(dBi)	-0.7	80deg



**Radiation characteristic in 2500MHz ~ 2570MHz (CA/EU/ANZ UE-UTRA, Band 7, n7)**

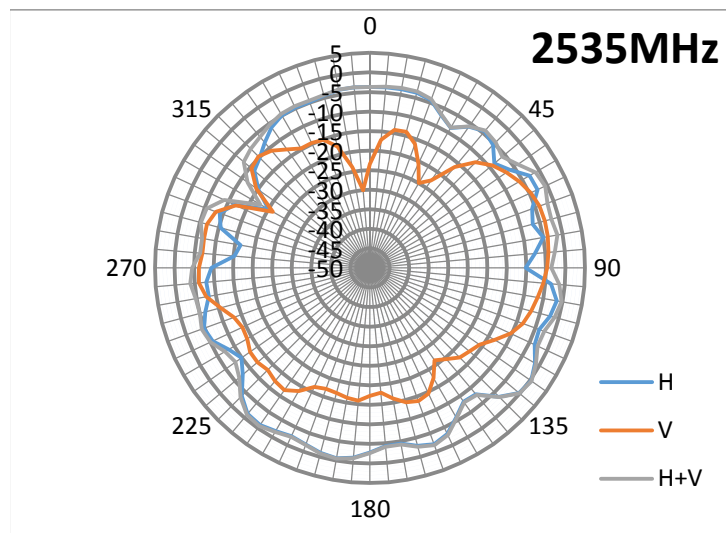
**MIMO antenna: 2500.00 MHz**

2500.00 MHz		
Horizontal Peak (dBi)	0.4	125deg
Vertical Peak(dBi)	-3.8	70deg



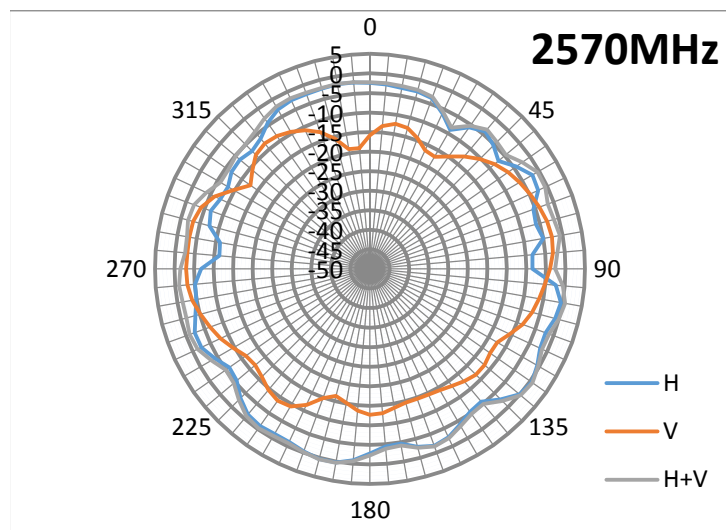
**MIMO antenna: 2535.00 MHz**

2535.00 MHz		
Horizontal Peak (dBi)	0.3	125deg
Vertical Peak(dBi)	-3.7	75deg



**MIMO antenna: 2570.00 MHz**

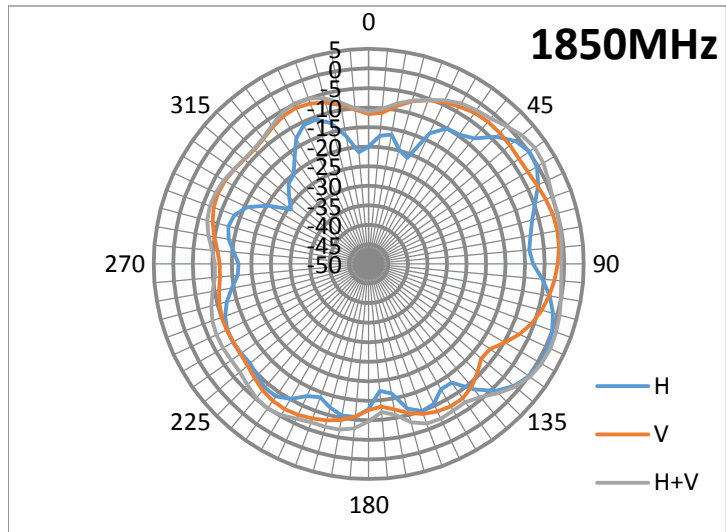
2570.00 MHz		
Horizontal Peak (dBi)	0.5	125deg
Vertical Peak(dBi)	-2.7	80deg



**Radiation characteristic in 1850MHz ~ 1915MHz (FCC Part 24 UE-UTRA, Band 25)**

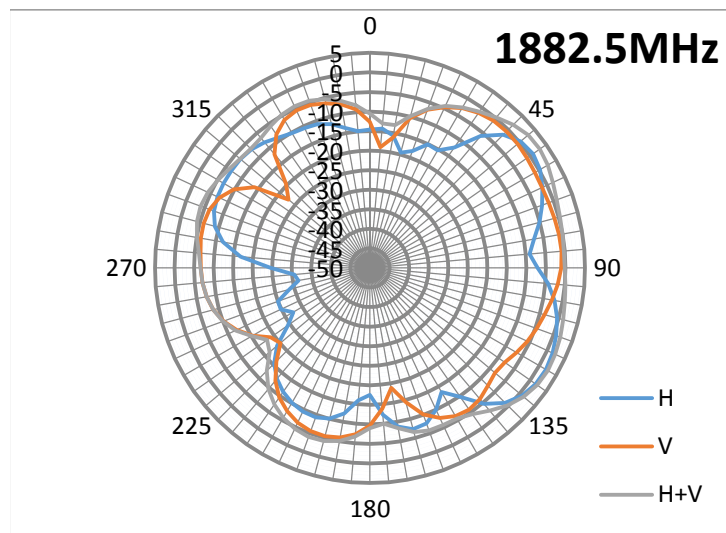
**MIMO antenna: 1850.00 MHz**

1850.00 MHz		
Horizontal Peak (dBi)	0.7	120deg
Vertical Peak(dBi)	-1.0	80deg



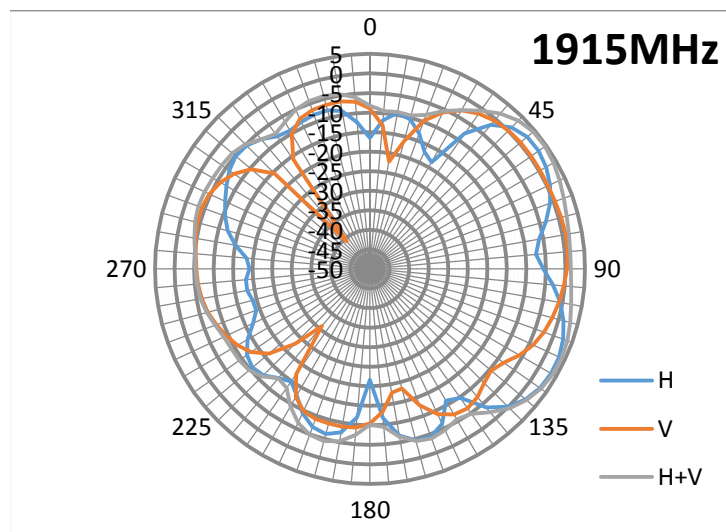
**MIMO antenna: 1882.50 MHz**

1882.50 MHz		
Horizontal Peak (dBi)	1.9	120deg
Vertical Peak(dBi)	-0.6	45deg



**MIMO antenna: 1915.00 MHz**

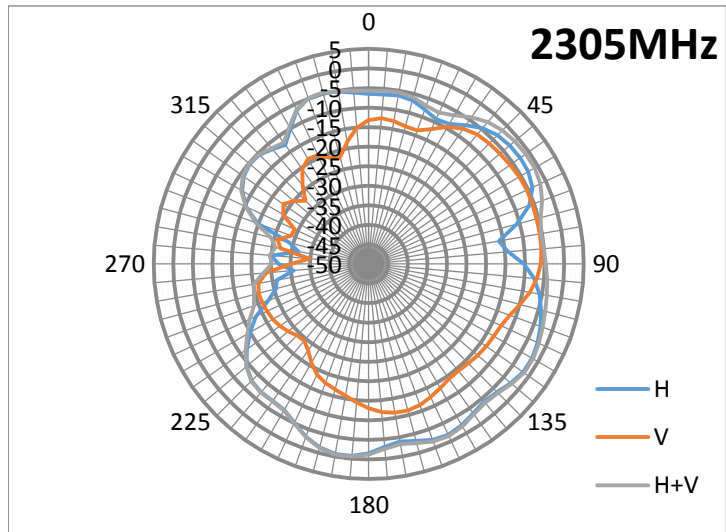
1915.00 MHz		
Horizontal Peak (dBi)	1.5	120deg
Vertical Peak(dBi)	0.2	80deg



**Radiation characteristic in 2305MHz ~ 2315MHz (FCC Part 27 UE-UTRA, Band 30)**

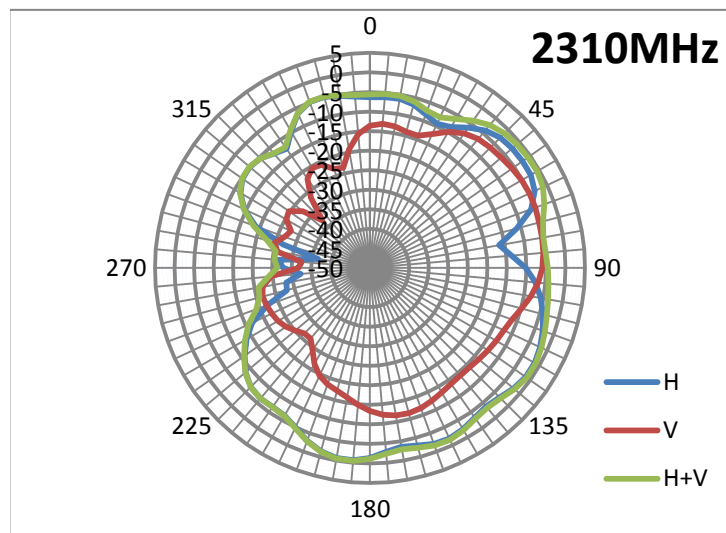
**MIMO antenna: 2305.00 MHz**

2305.00 MHz		
Horizontal Peak (dBi)	-0.7	190deg
Vertical Peak(dBi)	-5.4	65deg



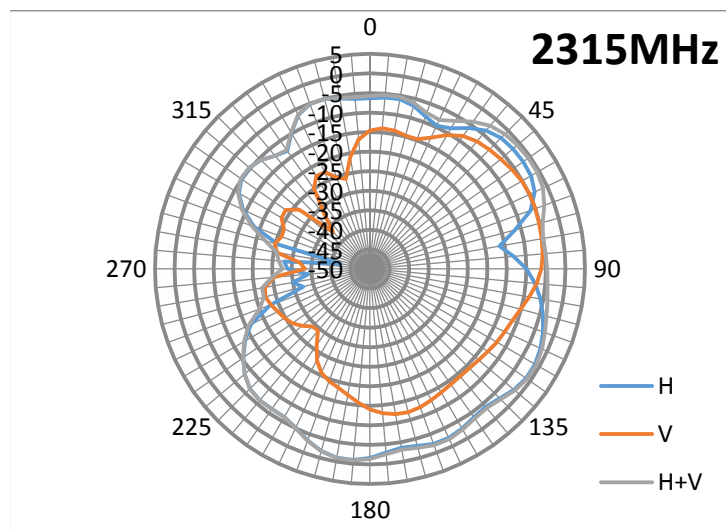
**MIMO antenna: 2310.00 MHz**

2310.00 MHz		
Horizontal Peak (dBi)	-0.6	190deg
Vertical Peak(dBi)	-5.0	65deg



**MIMO antenna: 2315.00 MHz**

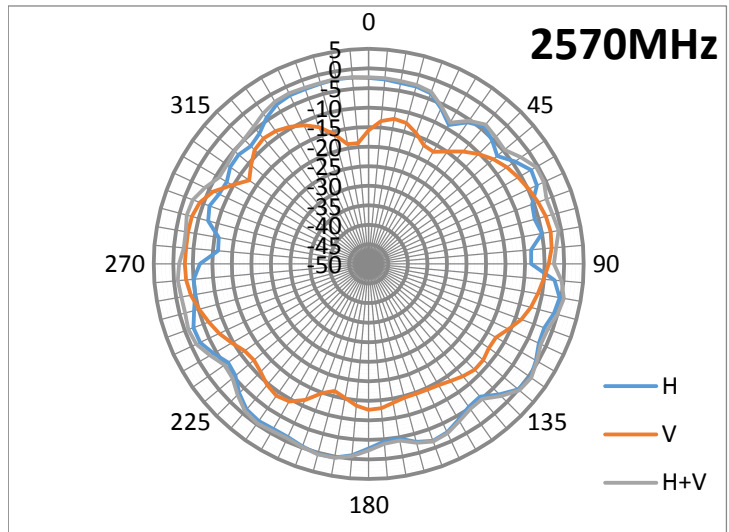
2315.00 MHz		
Horizontal Peak (dBi)	-1.0	185deg
Vertical Peak(dBi)	-4.9	65deg



**Radiation characteristic in 2570MHz ~ 2620MHz (EU/CN UE-UTRA, Band 38, n38)**

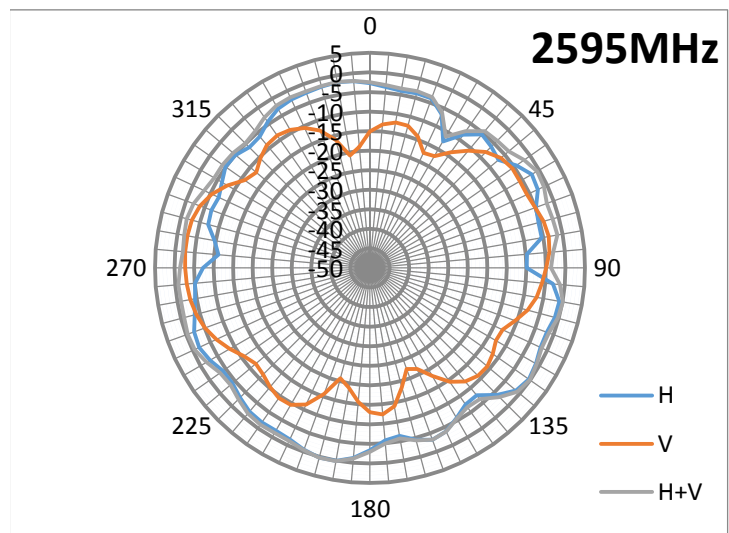
**MIMO antenna: 2570.00 MHz**

2570.00 MHz		
Horizontal Peak (dBi)	0.5	125deg
Vertical Peak(dBi)	-2.7	80deg



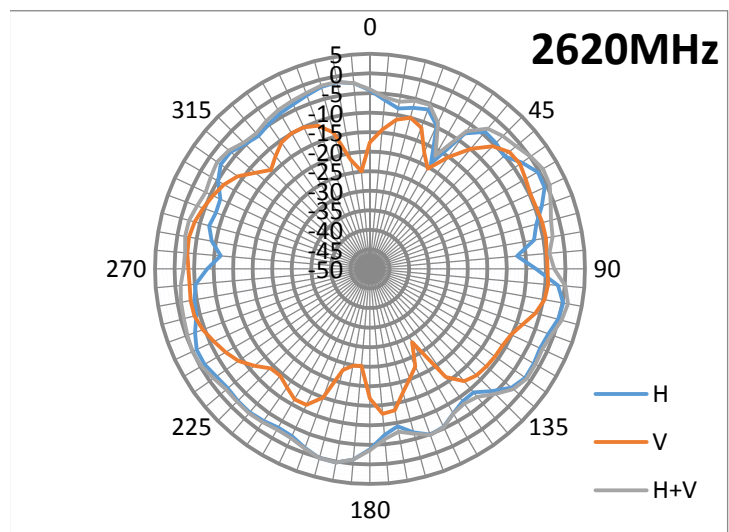
**MIMO antenna: 2595.00 MHz**

2595.00 MHz		
Horizontal Peak (dBi)	0.2	195deg
Vertical Peak(dBi)	-2.6	280deg



**MIMO antenna: 2620.00 MHz**

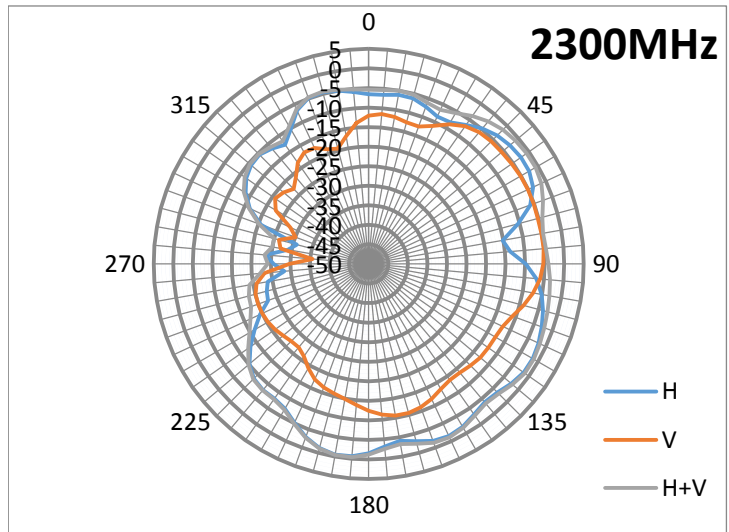
2620.00 MHz		
Horizontal Peak (dBi)	0.3	190deg
Vertical Peak(dBi)	-3.0	280deg



**Radiation characteristic in 2300MHz ~ 2400MHz (EU/ANZ/CN UE-UTRA, Band 40)**

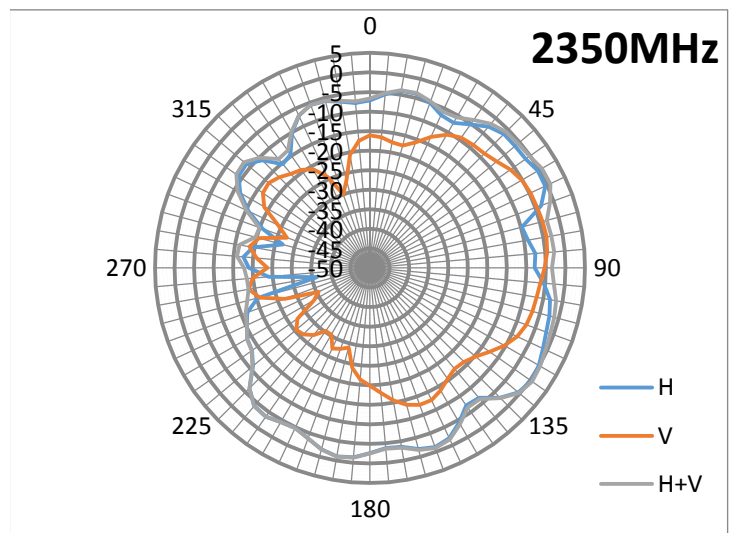
**MIMO antenna: 2300.00 MHz**

2300.00 MHz		
Horizontal Peak (dBi)	-0.5	190deg
Vertical Peak(dBi)	-5.0	65deg



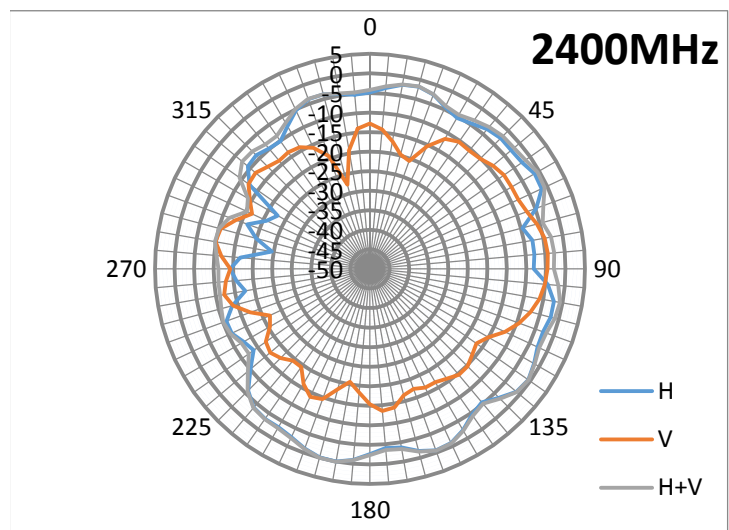
**MIMO antenna: 2350.00 MHz**

2350.00 MHz		
Horizontal Peak (dBi)	0.4	125deg
Vertical Peak(dBi)	-4.1	80deg



**MIMO antenna: 2400.00 MHz**

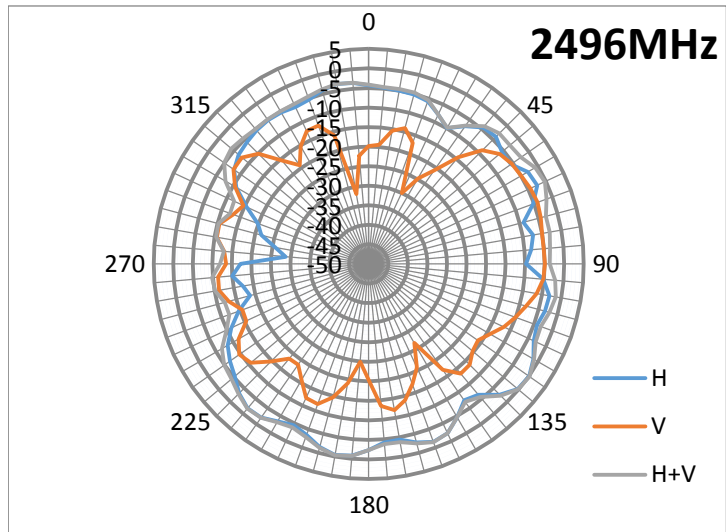
2400.00 MHz		
Horizontal Peak (dBi)	0.0	190deg
Vertical Peak(dBi)	-4.4	85deg



**Radiation characteristic in 2496MHz ~ 2690MHz (FCC Part 27 UE-UTRA, Band 41, n41)**

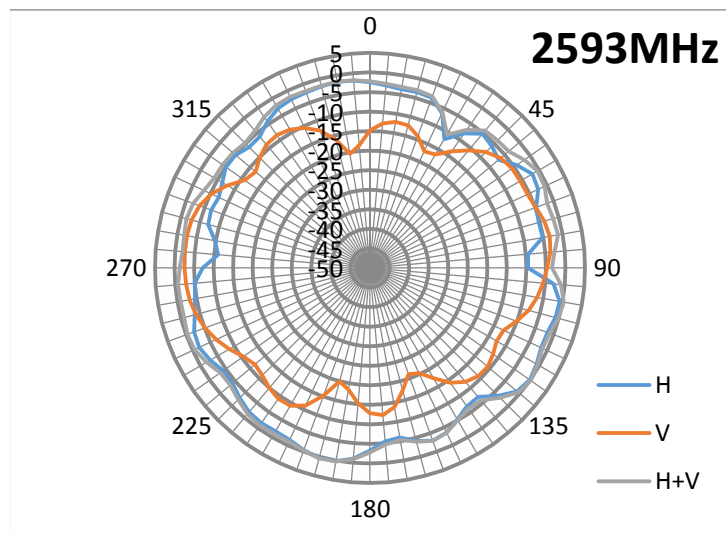
**MIMO antenna: 2496.00 MHz**

2496.00 MHz		
Horizontal Peak (dBi)	0.1	125deg
Vertical Peak(dBi)	-4.1	70deg



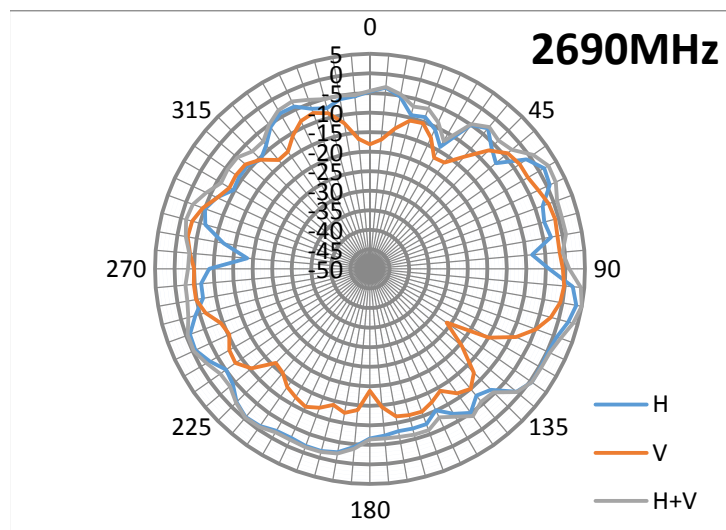
**MIMO antenna: 2593.00 MHz**

2593.00 MHz		
Horizontal Peak (dBi)	0.3	195deg
Vertical Peak(dBi)	-2.5	280deg



**MIMO antenna: 2690.00 MHz**

2690.00 MHz		
Horizontal Peak (dBi)	0.3	190deg
Vertical Peak(dBi)	-3.0	280deg

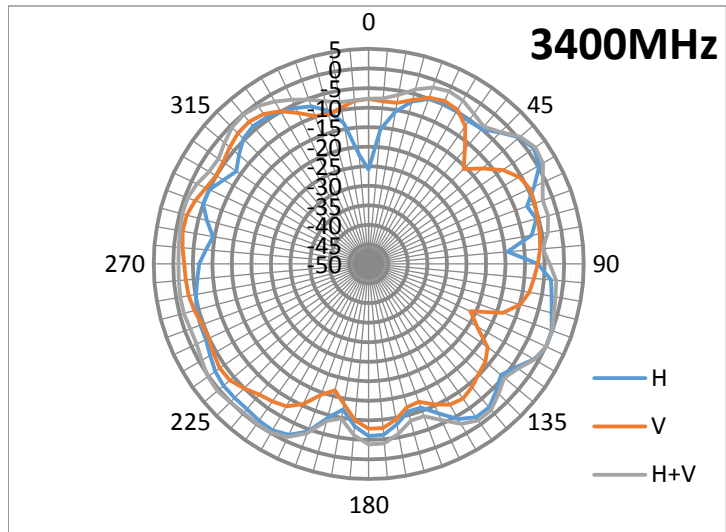




**Radiation characteristic in 3400MHz ~ 3600MHz (FCC Part 96 LTE Band 42)**

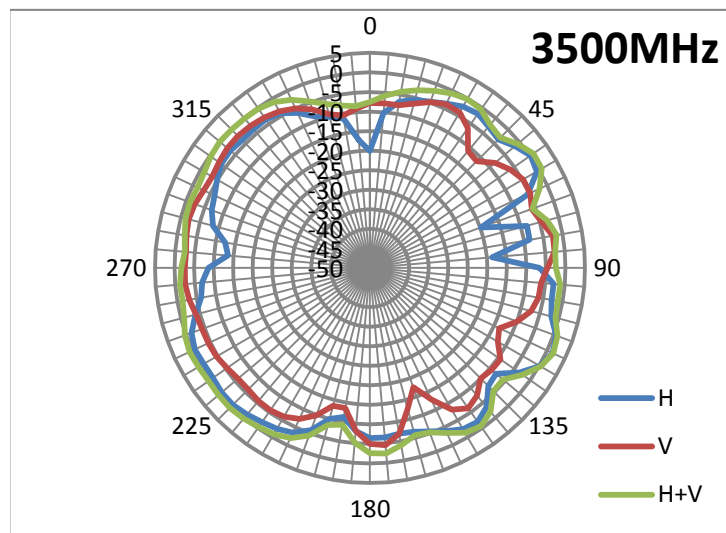
**MIMO antenna: 3400.00 MHz**

3400.00 MHz		
Horizontal Peak (dBi)	0.7	55deg
Vertical Peak(dBi)	-1.0	265deg



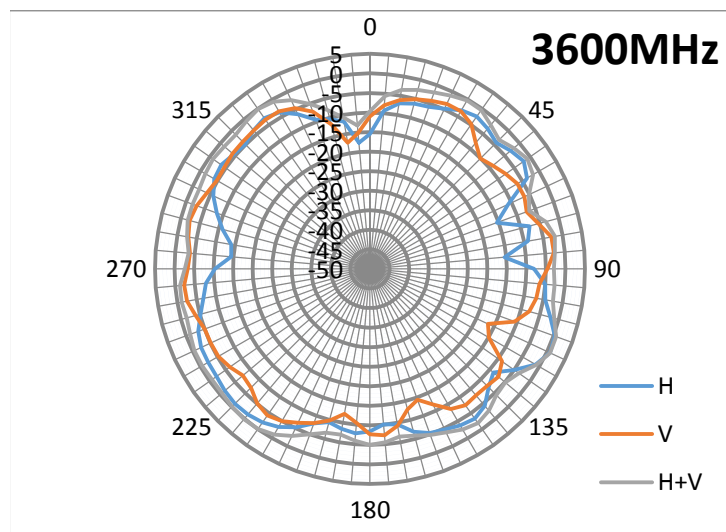
**MIMO antenna: 3500.00 MHz**

3500.00 MHz		
Horizontal Peak (dBi)	0.6	55deg
Vertical Peak(dBi)	-1.7	280deg



**MIMO antenna: 3600.00 MHz**

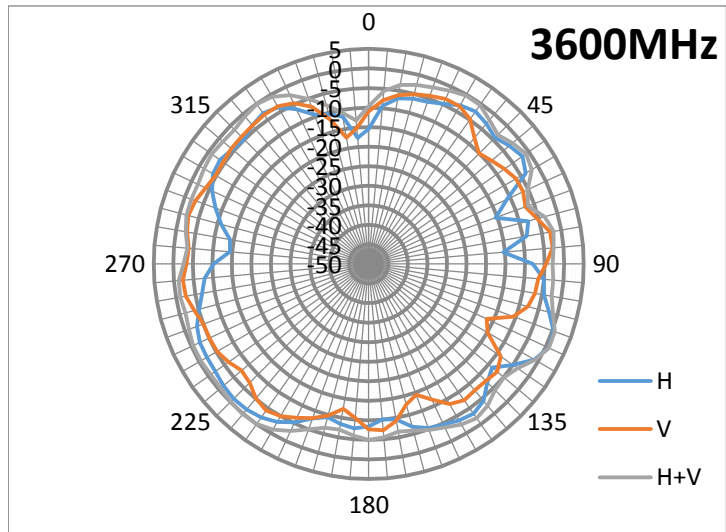
3600.00 MHz		
Horizontal Peak (dBi)	0.4	115deg
Vertical Peak(dBi)	-2.0	280deg



**Radiation characteristic in 3400MHz ~ 3600MHz (LTE Band 43)**

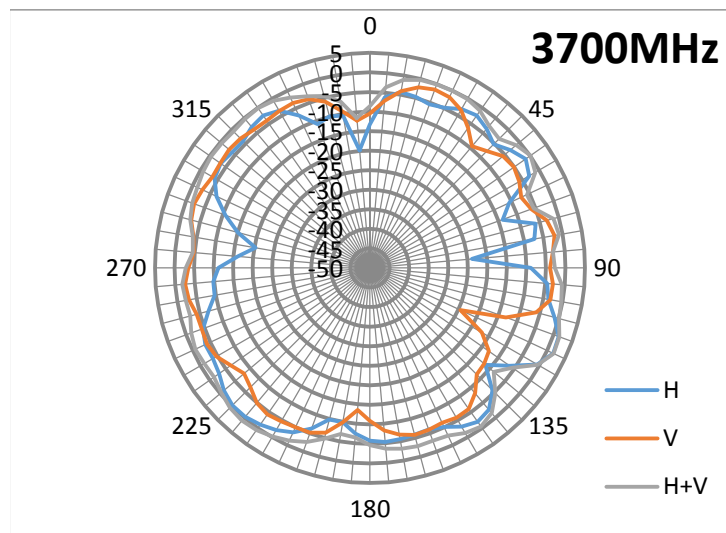
**MIMO antenna: 3600.00 MHz**

3600.00 MHz		
Horizontal Peak (dBi)	0.4	115deg
Vertical Peak(dBi)	-2.0	280deg



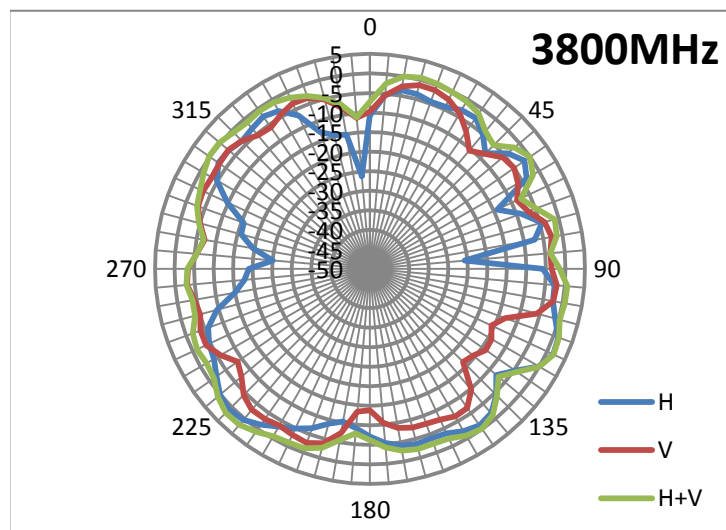
**MIMO antenna: 3700.00 MHz**

3700.00 MHz		
Horizontal Peak (dBi)	0.8	115deg
Vertical Peak(dBi)	-2.6	80deg



**MIMO antenna: 3800.00 MHz**

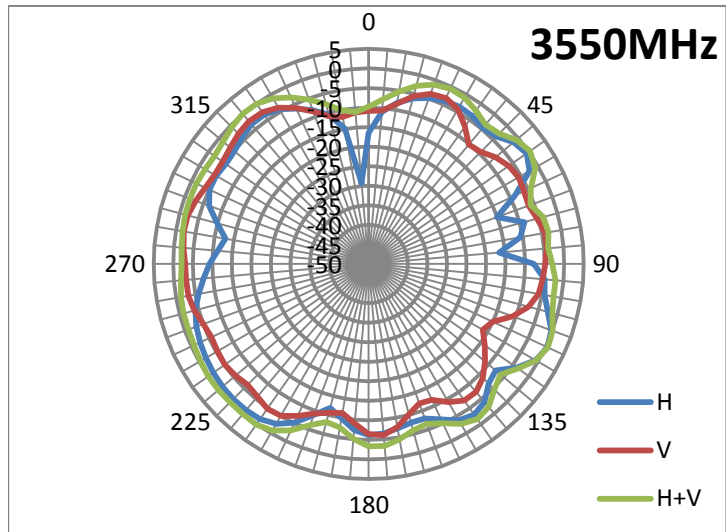
3800.00 MHz		
Horizontal Peak (dBi)	0.3	115deg
Vertical Peak(dBi)	-1.2	20deg



**Radiation characteristic in 5150MHz ~ 5925MHz (FCC Part 96, LTE Band 48)**

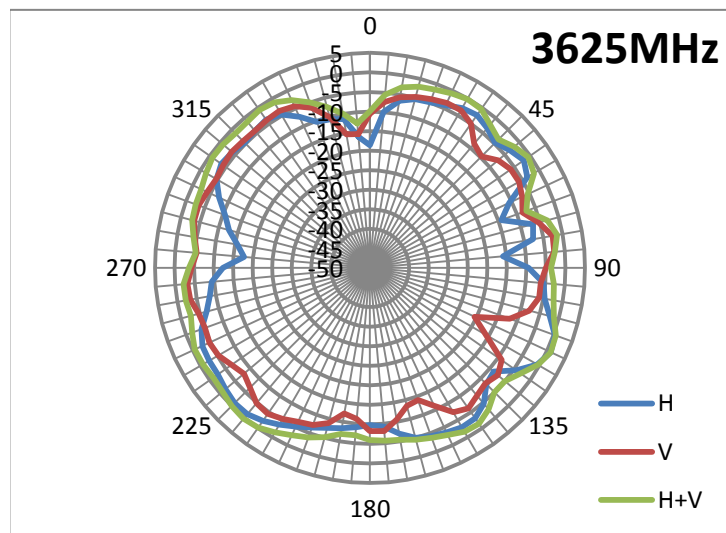
**MIMO antenna: 3550.00 MHz**

3550.00 MHz		
Horizontal Peak (dBi)	0.6	115deg
Vertical Peak(dBi)	-2.0	285deg



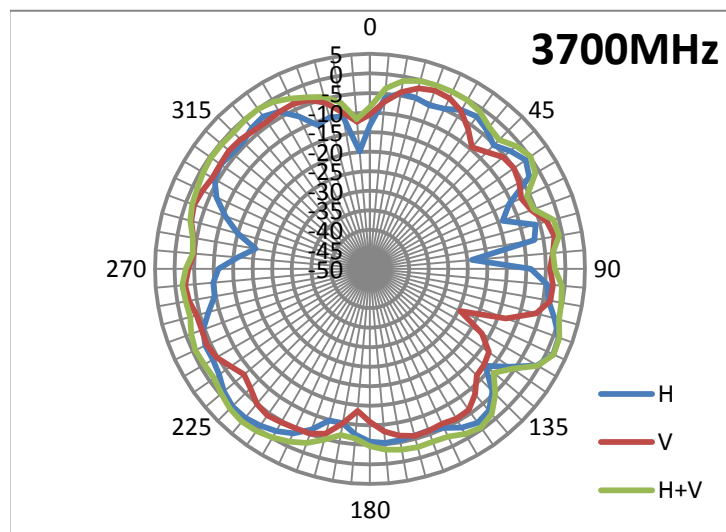
**MIMO antenna: 3625.00 MHz**

3625.00 MHz		
Horizontal Peak (dBi)	0.8	115deg
Vertical Peak(dBi)	-2.3	285deg



**MIMO antenna: 3700.00 MHz**

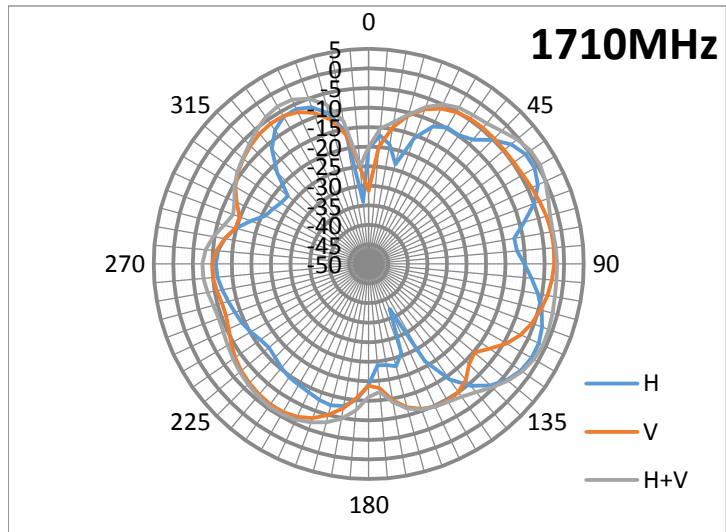
3700.00 MHz		
Horizontal Peak (dBi)	0.8	115deg
Vertical Peak(dBi)	-2.6	80deg



**Radiation characteristic in 1710MHz ~ 1780MHz (FCC Part 27 LTE, Band 66, n66)**

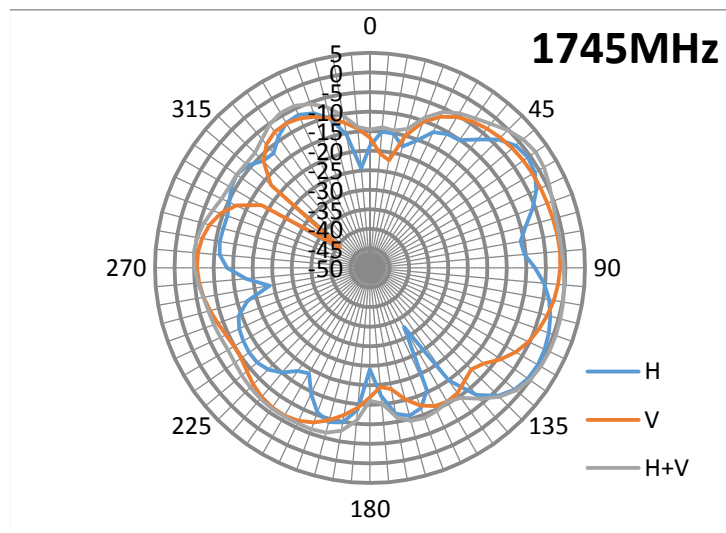
**MIMO antenna: 1710.00 MHz**

1710.00 MHz		
Horizontal Peak (dBi)	-1.0	60deg
Vertical Peak(dBi)	-2.4	85deg



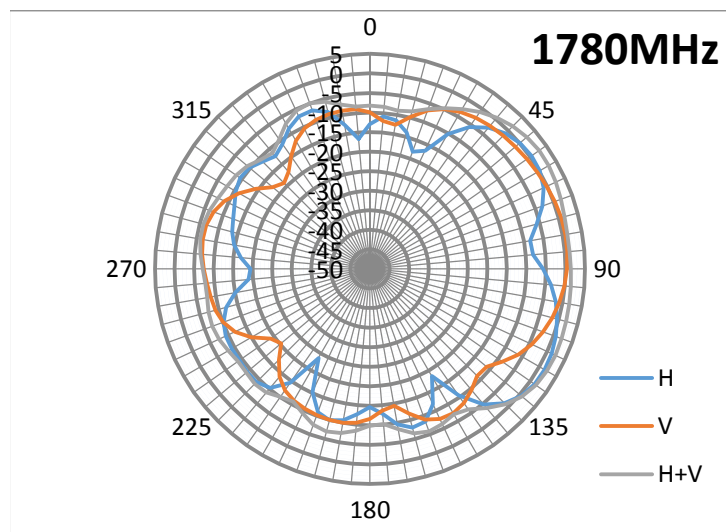
**MIMO antenna: 1745.00 MHz**

1745.00 MHz		
Horizontal Peak (dBi)	-0.4	120deg
Vertical Peak(dBi)	-1.2	85deg



**MIMO antenna: 1780.00 MHz**

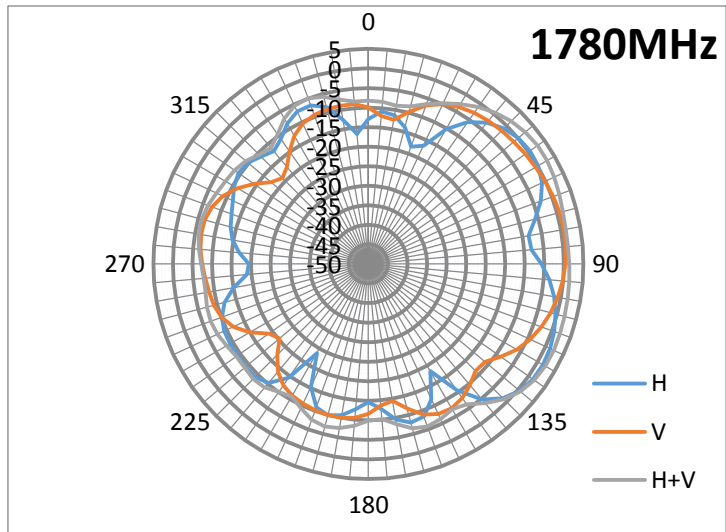
1780.00 MHz		
Horizontal Peak (dBi)	1.6	120deg
Vertical Peak(dBi)	0.7	80deg



**Radiation characteristic in 3300MHz ~ 4200MHz (FCC/EU/CN/JP 5G NR Band 77)**

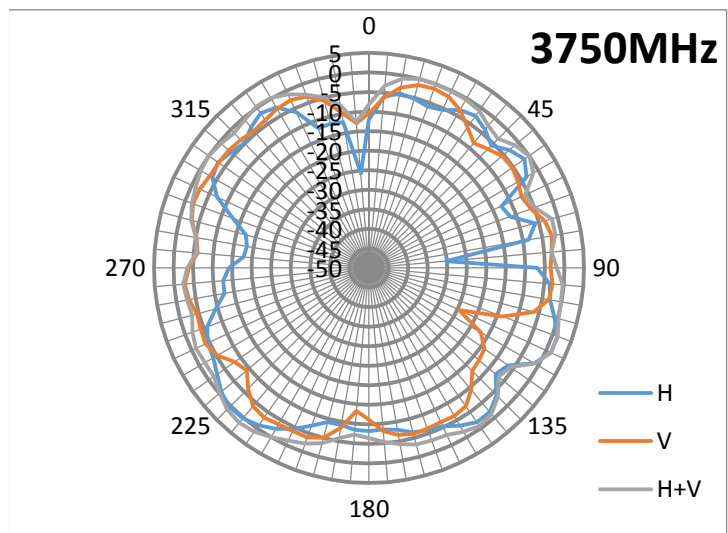
**MIMO antenna: 3300.00 MHz**

3300.00 MHz		
Horizontal Peak (dBi)	0.6	100deg
Vertical Peak(dBi)	-0.1	95deg



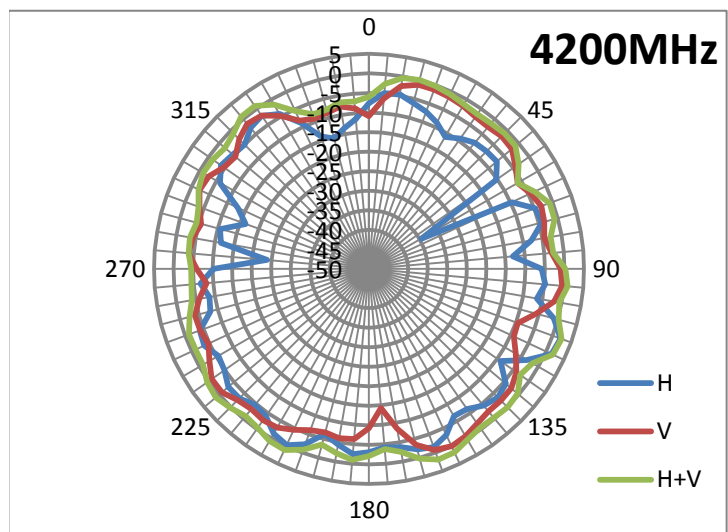
**MIMO antenna: 3750.00 MHz**

3750.00 MHz		
Horizontal Peak (dBi)	0.5	115deg
Vertical Peak(dBi)	-1.5	20deg



**MIMO antenna: 4200.00 MHz**

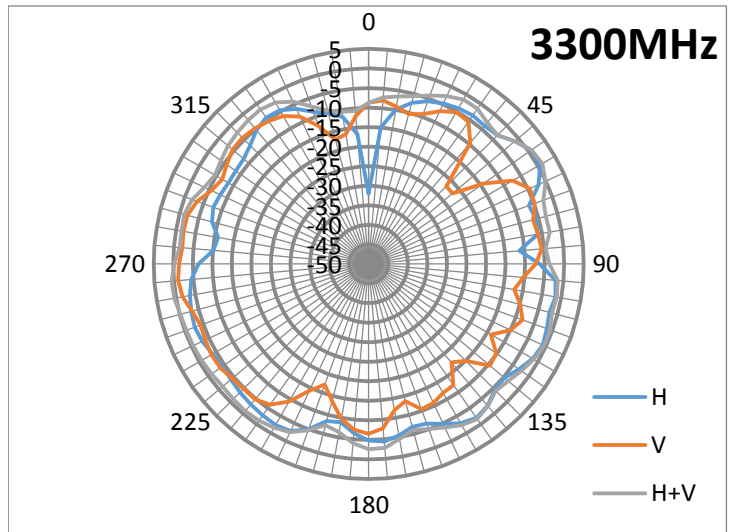
4200.00 MHz		
Horizontal Peak (dBi)	0.7	115deg
Vertical Peak(dBi)	-1.3	15deg



**Radiation characteristic in 3300MHz ~ 3800MHz (EU/CN/JP 5G NR Band 78)**

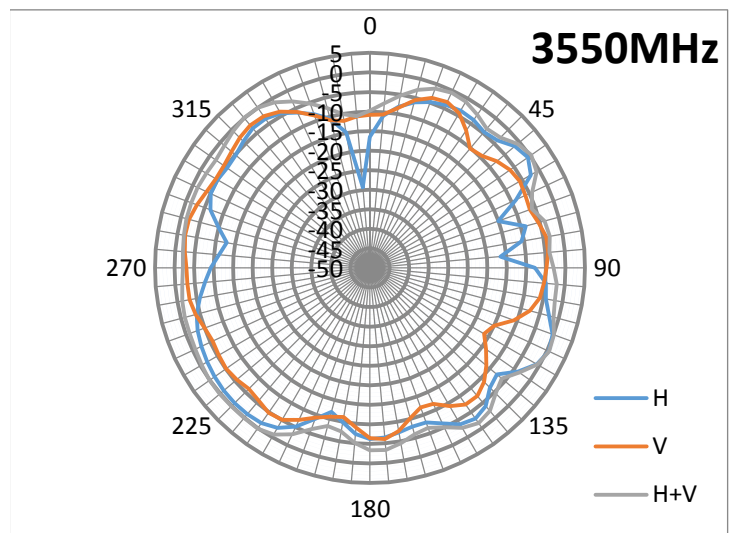
**MIMO antenna: 3300.00 MHz**

3300.00 MHz		
Horizontal Peak (dBi)	0.6	100deg
Vertical Peak(dBi)	-0.1	95deg



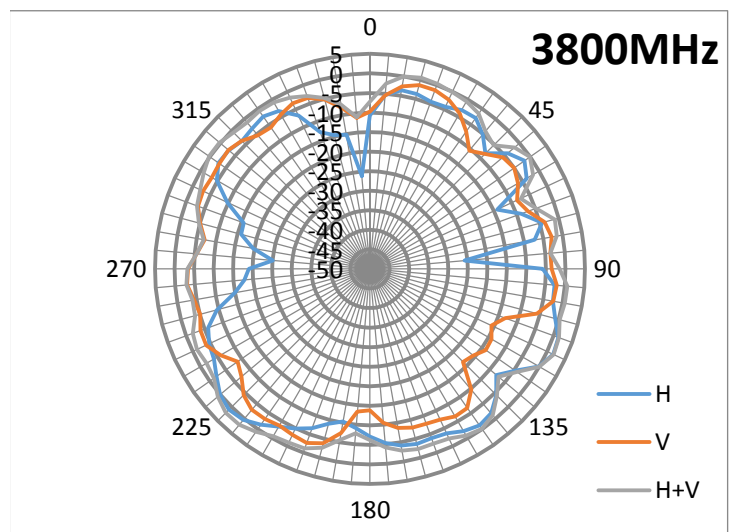
**MIMO antenna: 3550.00 MHz**

3550.00 MHz		
Horizontal Peak (dBi)	0.6	115deg
Vertical Peak(dBi)	-2.0	285deg



**MIMO antenna: 3800.00 MHz**

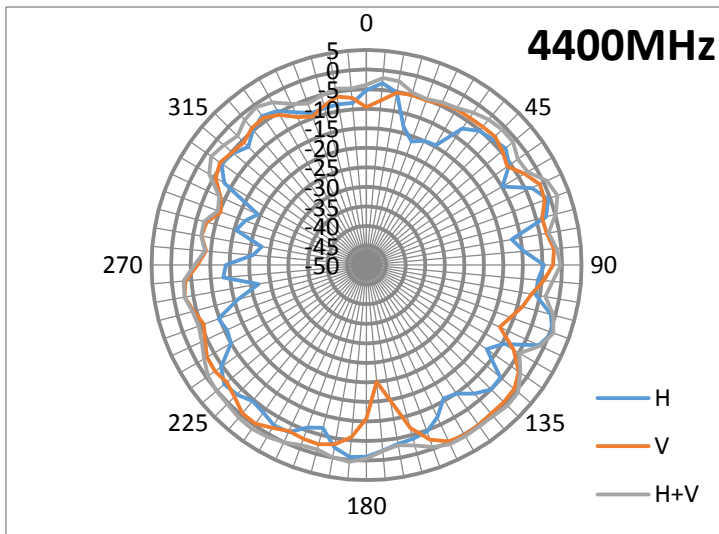
3800.00 MHz		
Horizontal Peak (dBi)	0.3	115deg
Vertical Peak(dBi)	-1.2	20deg



**Radiation characteristic in 4400MHz ~ 5000MHz (CN/JP 5G NR Band 79)**

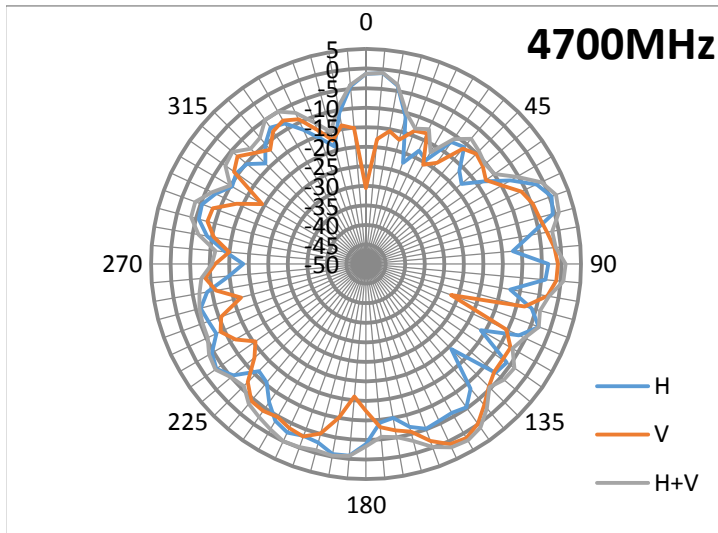
**MIMO antenna: 4400.00 MHz**

4400.00 MHz		
Horizontal Peak (dBi)	0.8	110deg
Vertical Peak(dBi)	0.0	155deg



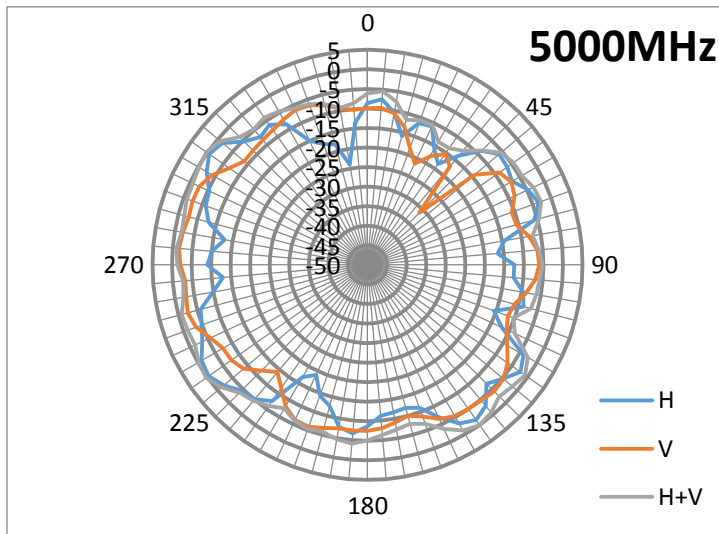
**MIMO antenna: 4700.00 MHz**

4700.00 MHz		
Horizontal Peak (dBi)	0.5	110deg
Vertical Peak(dBi)	0.2	150deg



**MIMO antenna: 5000.00 MHz**

5000.00 MHz		
Horizontal Peak (dBi)	-0.5	70deg
Vertical Peak(dBi)	0.4	150deg

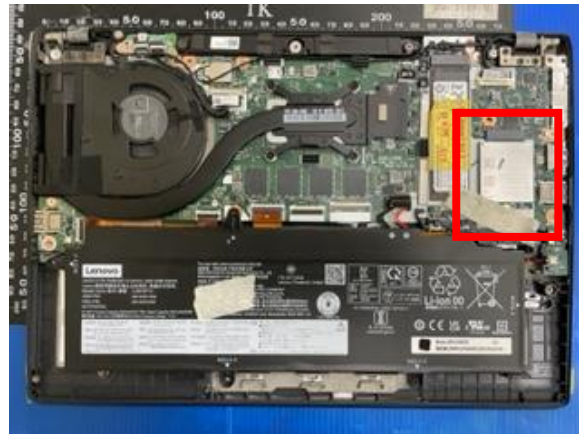


## Section 4. Host Platform Information

### WWAN Antenna Location

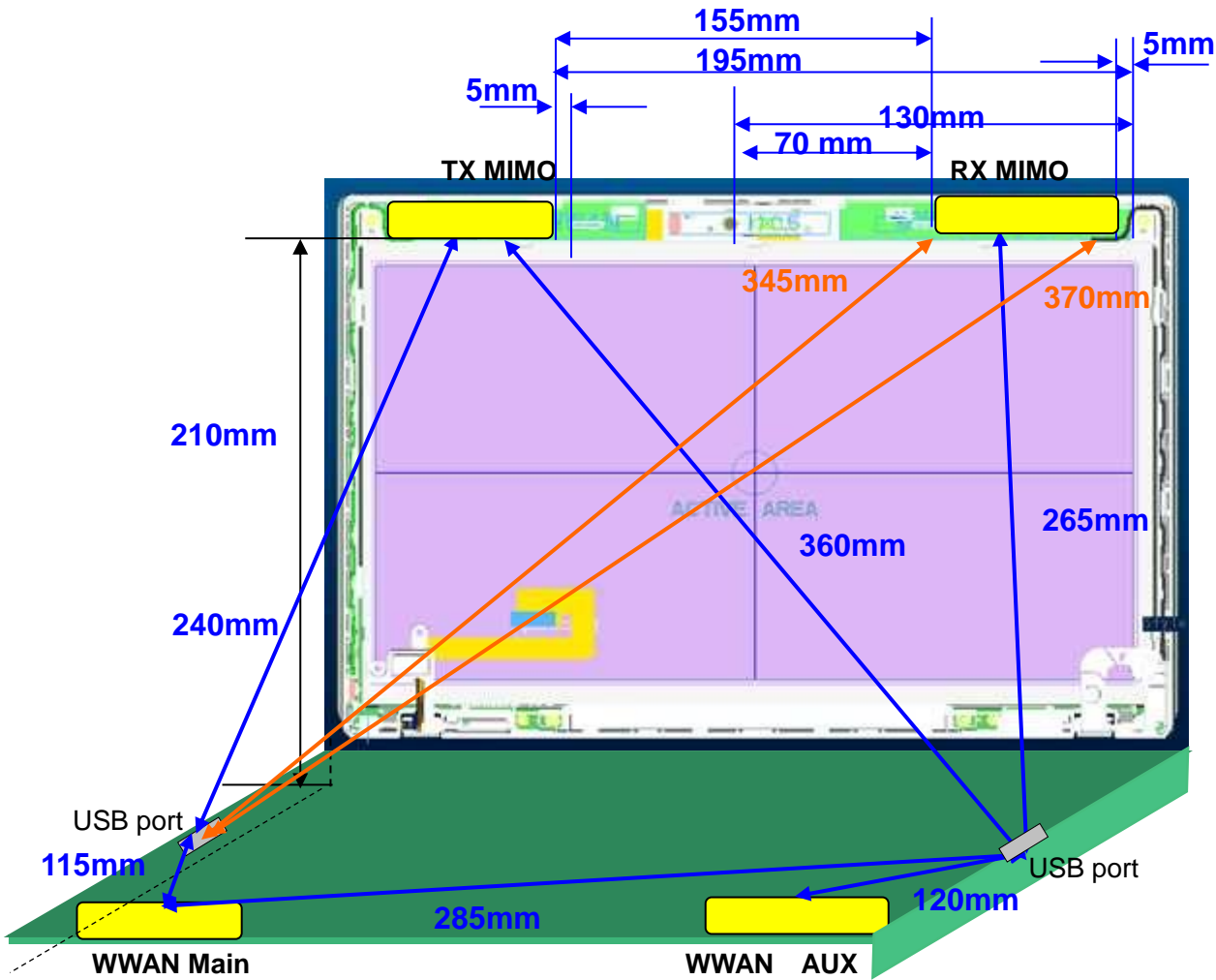


### WWAN card Location





## Section 5. Antenna Host Platform Location Information



## Section 6. Antenna dimensional information for SAR evaluation

### Section 7. Co-Location Antenna Separation

#### WWAN - Bluetooth:

The output power of Bluetooth device is 3.06mW ( $\leq 60/f(\text{GHz})$ ) and the antenna-to-antenna distance is  $\geq 5$  cm, so the Bluetooth device is not required SAR evaluation in accordance with Table-2 of KDB616217.

#### WWAN - USB:

The USB ports are located with more than 5cm of separation distance from the all WLAN/WiMAX and WWAN Tx antennas. Therefore these are compliant with the section 2) of "Supplement to FCC KDB 616217".

#### WWAN - WLAN:

The WWAN main (Tx) antenna and WLAN (or WiMAX) antennas co-locate with at least 5.0 mm of separation distance, and both devices transmit RF simultaneously. Any WWAN features (antenna and transmitter module) won't be incorporated in the host PC system nor shipped associated with the applying WLAN transmitter device, unless the relevant certification process completes for the simultaneous transmission.

## Section 8. Host PC labeling