

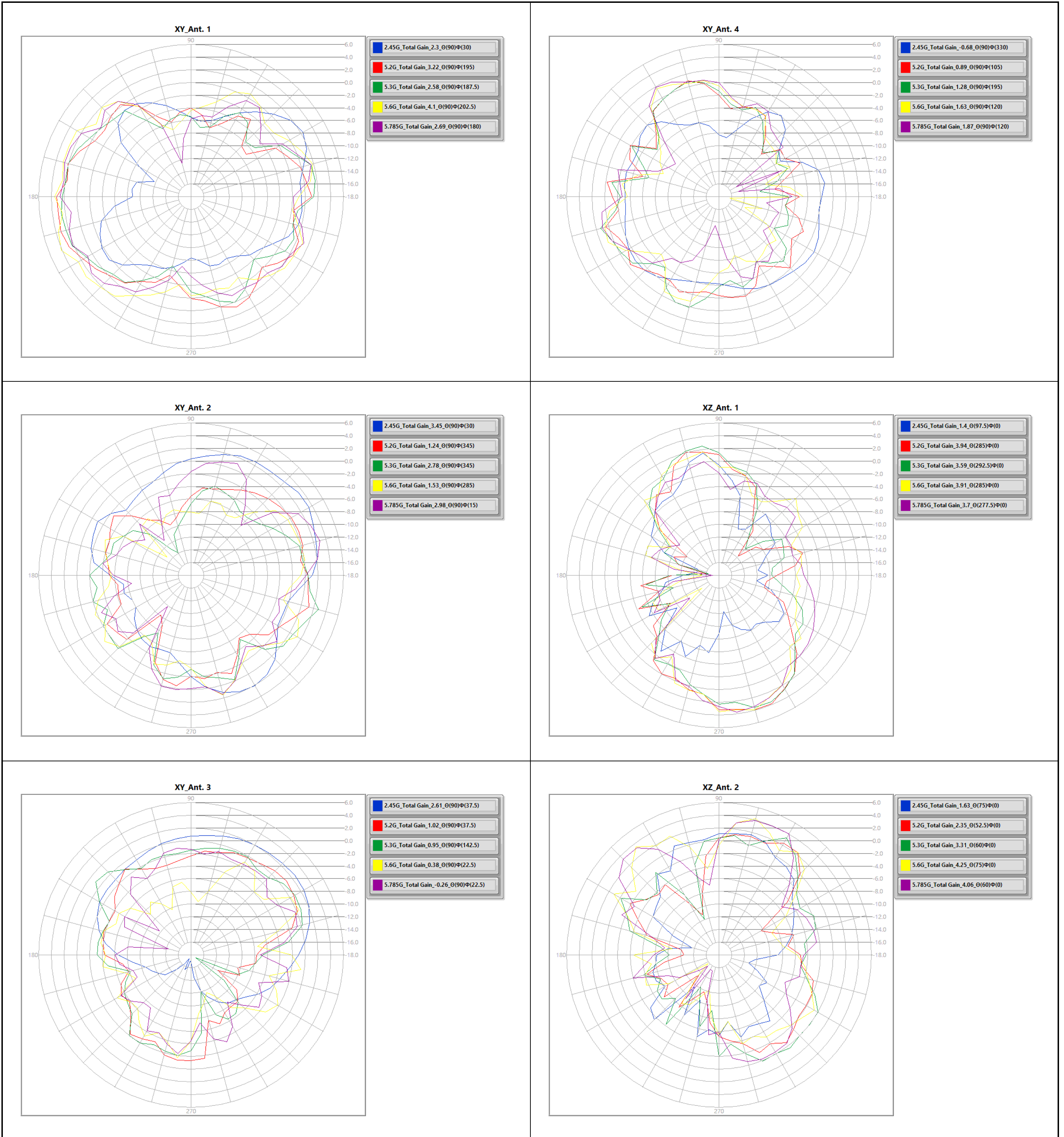


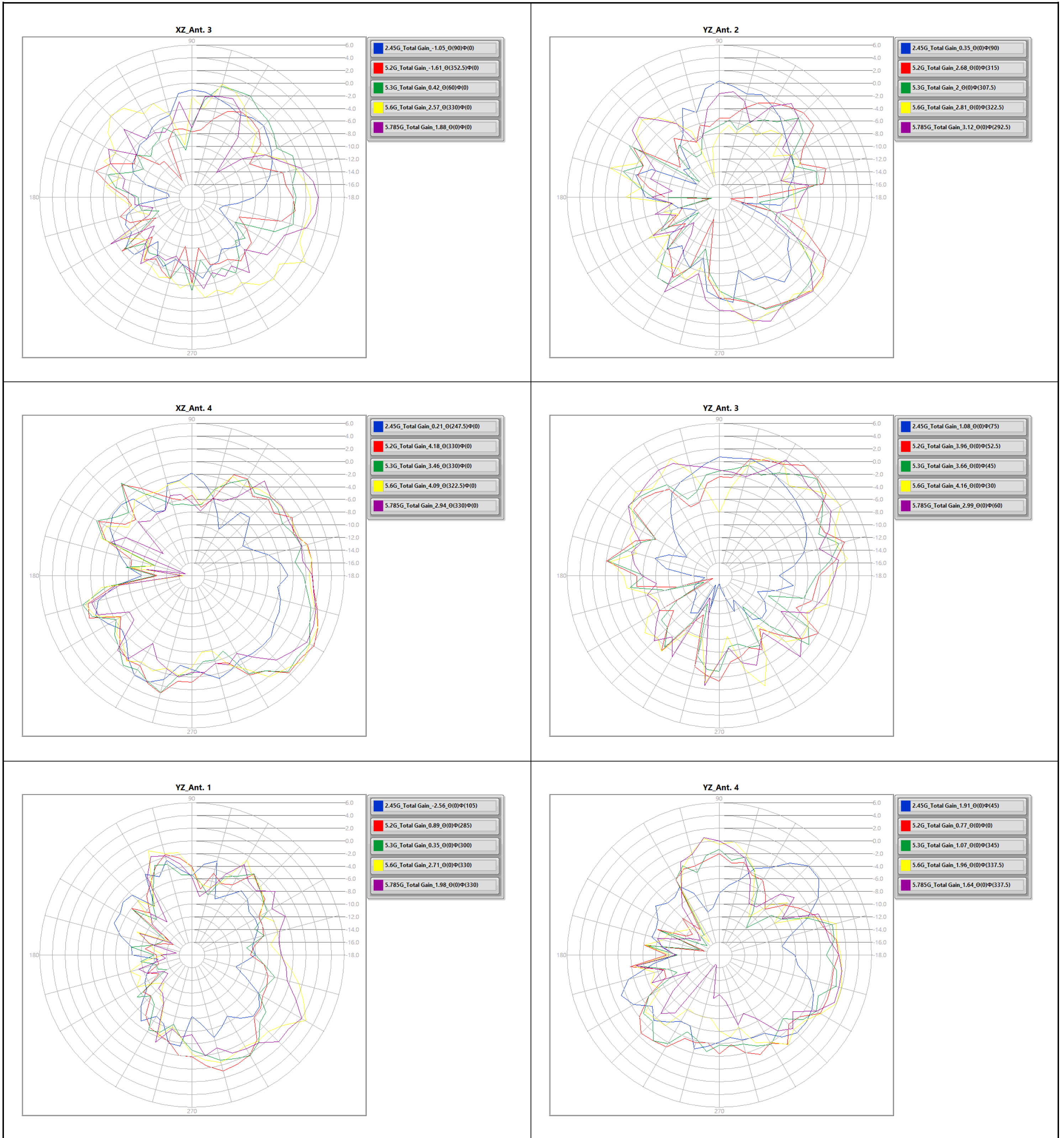
Antenna Pattern of 2.4G,5G

Appendix C

| θ (180°) | -12.57/-12.99 | -13.76/-15.32 | -15.75/-13.25 | -10.92/-10.65 | -11.58/-12.53 | -11.71/-10.63 | -9.72/-8.81 | -8.48/-8.52 | -8.67/-8.66 | -8.54/-8.61 | -8.68/-9.09 | -9.60/-10.39 | -11.43/-11.86 | -11.27/-9.71 | -7.85/-6.37 | -5.59/-6.25 | -5.19/-5.21 | -5.14/-4.80 | -4.93/-5.49 | -5.97/-5.95 | -5.99/-6.24 | -6.69/-7.33 | -8.32/-9.43 | -11.49/-13.39 |
|-----------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Freq(Hz) | 5.3GPol | TotalAnt.4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Gain | Φ(0°)Φ(7.5°) | Φ(15°)Φ(22.5°) | Φ(30°)Φ(37.5°) | Φ(45°)Φ(52.5°) | Φ(60°)Φ(67.5°) | Φ(75°)Φ(82.5°) | Φ(90°)Φ(97.5°) | Φ(105°)Φ(112.5°) | Φ(120°)Φ(127.5°) | Φ(135°)Φ(142.5°) | Φ(150°)Φ(157.5°) | Φ(165°)Φ(172.5°) | Φ(180°)Φ(187.5°) | Φ(195°)Φ(202.5°) | Φ(210°)Φ(217.5°) | Φ(225°)Φ(232.5°) | Φ(240°)Φ(247.5°) | Φ(255°)Φ(262.5°) | Φ(270°)Φ(277.5°) | Φ(285°)Φ(292.5°) | Φ(300°)Φ(307.5°) | Φ(315°)Φ(322.5°) | Φ(330°)Φ(337.5°) | Φ(345°)Φ(352.5°) |
| θ(0°) | -0.40/-0.43 | -0.30/-0.65 | -0.96/-1.28 | -1.47/-1.68 | -1.60/-1.55 | -1.43/-1.42 | -1.15/-0.62 | -0.45/-0.56 | -0.75/-0.55 | -0.41/-0.57 | -1.04/-1.36 | -1.53/-1.78 | -1.74/-2.07 | -2.13/-2.02 | -1.93/-1.81 | -1.73/-1.84 | -1.84/-1.38 | -0.94/-0.25 | 0.09/0.30 | 0.13/0.04 | -0.03/0.41 | 0.89/0.77 | 0.57/0.19 | -0.27/-0.49 |
| θ(7.5°) | -1.55/-1.33 | -1.03/-1.28 | -1.33/-1.29 | -1.59/-1.66 | -1.42/-1.10 | -0.64/-0.18 | 0.31/0.84 | 0.07/1.02 | 0.91/1.19 | 1.41/1.22 | 0.88/0.54 | 0.28/0.33 | 0.27/0.05 | -0.37/-0.77 | -0.96/-0.93 | -0.78/-0.41 | -0.12/-0.20 | -0.44/-0.04 | 0.65/1.04 | 0.97/0.05 | -0.53/-0.64 | -0.71/0.85 | -1.01/-1.17 | -1.46/-1.67 |
| θ(15°) | -0.04/0.27 | -0.63/0.86 | -0.56/-0.04 | -0.06/-0.26 | -0.43/-0.46 | -0.40/0.01 | 0.47/0.52 | 0.62/0.76 | 1.12/1.69 | 2.18/2.29 | 2.12/1.91 | 1.68/1.55 | 1.36/1.13 | 0.89/0.92 | 1.10/1.21 | 1.35/1.42 | 1.37/1.02 | 0.69/0.63 | 1.07/1.55 | 1.47/1.08 | 0.89/0.96 | 1.06/1.08 | 0.70/0.53 | 0.28/0.30 |
| θ(22.5°) | -0.68/-1.30 | -1.52/-1.32 | -1.35/-1.37 | -2.21/-2.65 | -2.70/-3.02 | -3.02/-2.86 | -2.86/-3.31 | -3.57/-3.74 | -3.08/-1.47 | 0.25/1.50 | 2.20/2.48 | 2.44/2.35 | 2.12/1.90 | 2.01/2.29 | 2.48/2.40 | 2.11/1.68 | 0.98/0.24 | -0.63/-1.35 | -1.12/-0.30 | 0.50/0.65 | 0.89/1.09 | 1.00/0.95 | 0.36/-0.02 | -0.22/-0.25 |
| θ(30°) | -1.53/-1.66 | -1.80/-2.99 | -4.82/-5.21 | -5.54/-6.08 | -6.35/-7.14 | -7.18/-7.20 | -6.65/-5.68 | -4.60/-3.78 | -3.46/-2.93 | -1.73/-0.01 | 1.56/2.55 | 3.03/3.38 | 3.46/3.35 | 3.56/3.84 | 3.84/3.70 | 3.33/2.71 | 1.69/0.82 | 0.08/-0.20 | -0.36/-0.40 | -0.88/-1.73 | -1.68/-0.73 | 0.11/0.49 | 0.50/0.09 | -0.47/-0.98 |
| θ(37.5°) | -0.85/-0.83 | -1.41/-2.48 | -4.89/-6.89 | -6.44/-5.98 | -6.96/-8.17 | -8.53/-8.17 | -7.70/-6.64 | -4.48/-2.56 | -1.40/-1.04 | 0.59/1.61 | 2.34/3.01 | 3.01/2.99 | 3.10/3.49 | 3.10/3.49 | 3.10/3.49 | 3.10/3.49 | 3.10/3.49 | 0.21/-0.63 | -1.29/-1.89 | -2.40/-2.75 | -2.67/-1.94 | -1.11/-0.75 | -0.47/-0.51 | -0.56/-0.65 |
| θ(45°) | -0.62/-1.96 | -2.83/-2.81 | -3.89/-6.57 | -8.42/-8.24 | -8.39/-9.32 | -9.71/-9.83 | -11.99/-11.43 | -8.08/-4.89 | -2.70/-1.92 | -2.04/-1.51 | -0.08/-1.22 | 1.92/2.97 | 3.40/2.94 | 2.36/2.97 | 3.81/3.95 | 3.44/2.69 | 1.96/0.87 | -0.93/-2.49 | -3.78/-5.83 | -7.51/-6.74 | -4.18/-3.22 | -1.95/-0.89 | -0.10/0.31 | 0.35/0.09 |
| θ(52.5°) | -1.61/-1.09 | -2.07/-3.49 | -5.67/-8.33 | -8.08/-8.51 | -10.76/-10.50 | -8.25/-7.98 | -9.20/-10.80 | -8.72/-4.39 | -1.30/0.32 | 0.66/-0.12 | -1.58/-1.54 | -0.34/0.94 | 0.95/0.51 | 1.16/2.26 | 2.74/2.86 | 2.32/1.77 | 1.03/0.60 | -0.15/-1.78 | -2.84/-3.25 | -4.64/-6.65 | -6.25/-4.43 | -3.13/-2.04 | -0.79/-0.67 | -1.57/-2.19 |
| θ(60°) | -0.49/-1.68 | -3.29/-6.58 | -6.21/-5.19 | -7.09/-13.37 | -10.17/-6.35 | -5.33/-4.81 | -5.74/-5.37 | -4.47/-4.61 | -4.89/-4.18 | -3.07/-2.12 | -2.51/-3.48 | -2.09/0.15 | -0.12/-1.42 | -0.96/-0.05 | 0.71/0.60 | 0.13/-0.14 | -0.08/-0.50 | -1.06/-1.31 | -1.66/-2.46 | -4.04/-7.51 | -10.00/-6.80 | -3.69/-1.44 | -0.46/-0.48 | -1.28/-0.73 |
| θ(67.5°) | -2.19/-2.75 | -3.39/-3.30 | -4.62/-5.98 | -7.55/-9.36 | -5.75/-3.48 | -3.23/-3.99 | -3.59/-2.76 | -2.47/-2.14 | -2.84/-3.38 | -3.19/-3.70 | -6.17/-8.74 | -5.74/-4.05 | -5.13/-5.50 | -2.45/-0.14 | 0.46/-0.23 | -0.25/0.17 | -0.62/-0.17 | -0.98/-2.06 | -2.50/-3.67 | -5.99/-7.86 | -9.76/-9.29 | -8.30/-6.32 | -2.63/-0.77 | -1.74/-2.41 |
| θ(75°) | -3.83/-4.27 | -5.28/-5.80 | -4.09/-4.58 | -6.06/-6.82 | -4.03/-1.59 | -1.54/-1.77 | -2.02/-0.52 | 0.01/0.64 | -2.41/-5.62 | -10.12/-7.63 | -5.73/-9.38 | -8.67/-4.09 | -4.24/-3.47 | -1.71/-1.20 | -0.55/-0.62 | -1.20/-3.00 | -2.23/-1.84 | -2.26/-2.34 | -3.48/-4.27 | -5.81/-7.50 | -9.99/-9.10 | -6.17/-4.51 | -4.47/-4.31 | -5.94/-6.47 |
| θ(82.5°) | -6.65/0.62 | -5.12/9.67 | -8.90/8.97 | -10.49/7.98 | -5.49/4.67 | -4.01/-3.79 | -2.96/-2.02 | -0.69/0.11 | -0.46/-2.40 | -7.07/-8.87 | -6.21/-11.06 | -6.92/-2.31 | -4.39/-1.87 | 0.48/0.27 | -1.32/-1.35 | -2.15/-2.27 | -0.34/0.17 | -0.80/-2.67 | -3.57/-5.48 | -9.08/-10.16 | -7.69/-6.16 | -4.88/-5.28 | -4.61/-5.94 | -8.88/-5.94 |
| θ(90°) | -6.96/-11.48 | -8.47/-6.30 | -7.53/-6.15 | -8.22/-6.58 | -4.25/-2.79 | -3.83/-3.34 | -1.33/0.15 | 0.79/0.26 | -0.35/-0.97 | -4.68/-5.75 | -2.13/-4.99 | -6.64/-1.00 | -2.44/-1.56 | 1.28/0.16 | -0.25/-0.82 | -3.03/-3.99 | -1.41/-0.02 | 0.04/-1.83 | -3.78/-4.69 | -3.25/-4.08 | -6.28/-4.84 | -3.56/-4.61 | -7.99/-6.23 | -6.67/-7.45 |
| θ(97.5°) | -6.60/-12.25 | -11.00/-9.39 | -11.39/-6.05 | -7.16/-7.16 | -3.39/-3.15 | -4.69/-4.01 | -2.18/-0.62 | -0.17/-0.34 | -0.08/-0.36 | -4.06/-8.97 | -3.25/-4.29 | -8.33/-1.06 | -2.22/-0.23 | 2.75/0.79 | -1.27/-1.55 | -4.16/-3.12 | -1.42/-0.09 | -0.51/-0.85 | -2.66/-3.77 | -3.78/-3.09 | -1.91/-2.06 | -4.10/-4.58 | -8.79/-9.39 | -7.14/-11.21 |
| θ(105°) | -6.45/-10.07 | -6.42/-5.85 | -10.24/-4.05 | -5.57/-9.04 | -4.47/-4.50 | -4.52/-4.82 | -1.47/-3.31 | -3.43/-1.07 | -0.48/-3.31 | -3.83/-2.90 | -5.80/-2.66 | 1.08/0.46 | 3.12/1.85 | -1.01/-2.49 | -2.88/-6.03 | -4.61/-2.31 | -2.56/-3.22 | -2.99/-2.56 | -2.52/-2.68 | -0.92/-1.60 | -3.88/-5.15 | -1.16/-3.31 | -4.31/-2.92 | 0.41/-3.00 |
| θ(112.5°) | -4.97/-10.30 | -5.53/-6.19 | -8.95/-2.18 | -4.50/-11.52 | -1.49/-0.10 | -1.60/-3.82 | -2.78/-0.92 | -0.25/-0.82 | -1.91/-2.40 | -2.35/-3.68 | -2.55/-1.95 | -2.75/0.86 | 0.13/0.19 | 1.91/0.21 | -2.79/-4.17 | -4.90/-7.16 | -6.52/-6.20 | -3.84/-3.61 | -4.89/-2.72 | -3.29/-3.83 | -2.41/-1.01 | -1.05/-2.69 | -5.51/-4.18 | -1.33/-6.51 |
| θ(120°) | -3.04/-6.99 | -14.40/-9.01 | -13.23/-6.81 | -7.10/-8.40 | -3.98/-0.94 | -1.65/-3.92 | -4.29/-3.02 | -2.74/-2.99 | -3.04/-2.83 | -3.97/-5.66 | -2.75/-0.82 | -1.68/-1.49 | -0.85/-0.90 | -0.26/-1.07 | -4.46/-7.16 | -6.70/-7.83 | -6.29/-6.61 | -3.80/-3.86 | -1.83/-0.89 | -3.12/-3.64 | -3.88/-5.15 | -1.16/-3.31 | -4.31/-2.92 | 0.41/-3.00 |
| θ(127.5°) | 0.34/-5.02 | -10.05/-3.91 | -5.10/-7.60 | -1.12/-8.88 | -4.12/-2.43 | -5.71/-10.28 | -14.06/-11.68 | -6.37/-3.33 | -2.26/-3.19 | -5.74/-10.20 | -5.72/-6.11 | -1.59/-1.15 | -0.21/-0.05 | 0.60/-2.04 | -3.57/-8.63 | -8.68/-5.58 | -5.95/-5.96 | -3.59/-4.71 | -6.94/-6.17 | -5.19/-3.73 | -3.23/-4.50 | -1.89/-12.78 | -10.80/-5.94 | -3.82/-3.76 |
| θ(135°) | -3.96/-10.20 | -9.99/-3.99 | -5.24/-11.26 | -8.80/-5.81 | -5.59/-6.17 | -8.31/-10.25 | -13.79/-11.31 | -9.68/-9.04 | -8.78/-7.90 | -7.72/-6.75 | -6.31/-5.97 | -5.32/-4.64 | -1.85/-2.57 | -5.03/-2.34 | -1.23/-3.06 | -4.66/-3.83 | -7.24/-2.58 | -4.67/-9.30 | -3.16/-0.35 | -1.23/-2.95 | -2.96/-3.27 | -4.13/-4.78 | -2.80/-2.88 | -4.85/-5.16 |
| θ(142.5°) | -2.86/-7.47 | -12.42/-7.55 | -6.42/-11.31 | -10.46/-5.52 | -5.63/-6.50 | -8.14/-12.34 | -15.52/-12.61 | -8.76/-6.37 | -5.72/-5.80 | -3.96/-2.25 | -3.14/-3.73 | -2.61/-3.13 | -4.44/-5.00 | -3.29/-2.02 | -14.26/-14.36 | -12.15/-9.87 | -8.57/-8.42 | -9.50/-10.16 | -9.99/-8.89 | -8.57/-8.47 | -8.30/-7.85 | -7.48/-7.00 | -7.22/-9.19 | -5.84/-5.42 |
| θ(150°) | -0.71/-2.34 | -5.59/-7.04 | -6.51/-7.62 | -10.93/-10.58 | -9.28/-9.88 | -11.65/-14.44 | -14.58/-13.25 | -12.71/-13.29 | -13.62/-11.82 | -8.61/-4.95 | -2.18/-1.71 | -3.24/-4.97 | -4.17/-2.89 | -2.40/-2.45 | -3.08/-4.66 | -6.27/-6.41 | -7.98/-8.87 | -6.94/-6.17 | -5.19/-3.73 | -3.23/-4.50 | -1.89/-12.78 | -10.80/-5.94 | -3.82/-3.76 | -3.99/-4.17 |
| θ(157.5°) | -2.90/-6.03 | -10.57/-11.10 | -9.05/-8.43 | -9.42/-9.86 | -9.60/-7.99 | -7.05/-7.20 | -7.84/-8.17 | -9.65/-10.22 | -7.92/-4.85 | -2.22/-0.63 | -0.03/-0.42 | -0.89/-1.00 | -1.05/-1.66 | -3.16/-4.90 | -6.05/-5.66 | -4.59/-4.63 | -6.72/-10.58 | -14.49/-14.65 | -10.80/-9.11 | -9.31/-11.28 | -10.22/-7.99 | -6.64/-5.15 | -3.79/-3.22 | -2.04/-1.72 |
| θ(165°) | -12.03/-12.65 | -10.27/-8.64 | -9.20/-9.70 | -10.06/-11.13 | -12.59/-15.01 | -14.89/-14.33 | -14.89/-13.63 | -11.56/-9.32 | -7.49/-6.34 | -4.92/-3.67 | -2.75/-1.80 | -0.90/-3.01 | -0.15/-0.39 | -1.35/-3.20 | -6.20/-10.20 | -14.26/-14.36 | -12.15/-9.87 | -8.57/-8.42 | -9.50/-10.16 | -9.99/-8.89 | -8.57/-8.47 | -8.30/-7.85 | -7.48/-7.00 | -7.22/-9.19 |
| θ(172.5°) | -7.53/-7.27 | -10.71/-7.39 | -8.23/-8.45 | -7.87/-8.41 | -7.84/-6.71 | -6.37/-6.49 | -4.55/-3.77 | -4.74/-6.84 | -2.70/-2.65 | -3.13/-3.49 | -3.71/-4.58 | -4.71/-4.86 | -5.12/-5.29 | -5.69/-6.08 | -6.59/-6.64 | -6.05/-5.35 | -4.77/-4.23 | -3.83/-2.71 | -2.01/-1.87 | -2.44/-3.15 | -3.65/-4.03 | -5.15/-6.43 | -5.15/-6.43 | -5.15/-6.43 |
| θ(180°) | -12.27/-13.06 | -13.27/-13.13 | -14.01/-12.99 | -12.03/-11.93 | -12.03/-11.70 | -11.08/-11.58 | -11.45/-10.59 | -9.86/-9.48 | -8.77/-8.06 | -7.97/-8.37 | -9.19/-9.25 | -8.71/-7.81 | -7.10/-6.84 | -6.75/-6.41 | -6.18/-5.92 | -6.06/-6.10 | -5.84/-5.79 | -5.99/-5.94 | -5.68/-5.78 | -5.94/-5.84 | -6.47/-7.29 | -8.34/-9.25 | -9.66/-10.10 | -11.71/-12.67 |
| Freq(Hz) | 5.6GPol | TotalAnt.4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Gain | Φ(0°)Φ(7.5°) | Φ(15°)Φ(22.5°) | Φ(30°)Φ(37.5°) | Φ(45°)Φ(52.5°) | Φ(60°)Φ(67.5°) | Φ(75°)Φ(82.5°) | Φ(90°)Φ(97.5°) | Φ(105°)Φ(112.5°) | Φ(120°)Φ(127.5°) | Φ(135°)Φ(142.5°) | Φ(150°)Φ(157.5°) | Φ(165°)Φ(172.5°) | Φ(180°)Φ(187.5°) | Φ(195°)Φ(202.5°) | Φ(210°)Φ(217.5°) | Φ(225°)Φ(232.5°) | Φ(240°)Φ(247.5°) | Φ(255°)Φ(262.5°) | Φ(270°)Φ(277.5°) | Φ(285°)Φ(292.5°) | Φ(300°)Φ(307.5°) | Φ(315°)Φ(322.5°) | Φ(330°)Φ(337.5°) | Φ(345°)Φ(352.5°) |
| θ(0°) | 0.50/0.79 | 1.10/1.20 | 1.14/1.11 | 1.15/1.06 | 1.13/1.36 | 1.17/1.26 | 1.18/1.26 | 1.39/1.41 | 1.38/1.32 | 1.31/1.38 | 1.39/1.32 | 1.18/1.27 | 1.40/1.34 | 1.00/0.82 | 0.60/0.32 | 0.26/0.22 | 0.24/0.58 | 0.67/0.71 | 0.83/0.87 | 0.92/0.77 | 0.71/0.57 | 0.62/0.92 | 1.17/1.01 | 0.74/0.28 |
| θ(7.5°) | 1.05/1.02 | 1.02/0.47 | 0.38/0.49 | 0.24/-0.01 | 0.14/0.23 | 0.17/0.86 | 0.67/0.48 | 0.26/0.13 | 0.29/0.22 | 0.19/0.09 | 0.45/0.96 | 1.45/1.40 | 0.99/0.71 | 0.82/1.05 | 1.19/1.27 | 1.20/1.11 | 1.14/1.30 | 1.44/1.35 | 1.39/1.50 | 1.71/2.00 | 2.06/2.04 | 1.94/1.89 | 1.64/1.36 | 1.26/0.83 |
| θ(15°) | 0.69/0.41 | 0.10/0.61 | -0.62/0.05 | 0.24/0.32 | 0.61/0.88 | 1.04/1.14 | 1.05/0.91 | 0.79/0.70 | 0.70/0.84 | 0.92/0.75 | 0.84/1.16 | 1.51/1.78 | 2.06/2.28 | 2.42/2.45 | 2.29/2.13 | 1.91/1.67 | 1.47/1.38 | 1.51/1.73 | 1.93/2.06 | 2.06/1.90 | 1.70/1.48 | 1.43/1.45 | 1.06/0.66 | 0.56/0.73 |
| θ(22.5°) | -0.27/-1.59 | -2.01/-1.85 | -1.65/-0.87 | -0.71/-1.24 | -1.76/-2.72 | -3.26/-2.99 | -2.25/-1.46 | -0.54/0.38 | 1.25/2.06 | 2.56/2.80 | 2.92/2.90 | 2.86/3.06 | 3.48/4.08 | 4.44/4.68 | 4.60/4.24 | 3.84/3.15 | 2.53/2.35 | 2.38/2.21 | 1.96/1.65 | 1.31/0.81 | 0.39/0.28 | 0.35/0.93 | 1.19/1.17 | 0.70/0.37 |
| θ(30°) | 0.01/-1.57 | -1.93/-0.98 | -0.23/-0.91 | -3.16/-5.96 | -9.62/-12.27 | -12.40/-10.24 | -8.09/-6.03 | -4.60/-3.46 | -1.23/-0.98 | 0.22/1.37 | 2.37/3.00 | 3.29/3.41 | 3.47/3.74 | | | | | | | | | | | |

E1 (XY plane) – $\Theta(90)\Phi(0-360)$
 E2 (XZ plane) – $\Theta(0-180)\Phi(0)$ and $\Theta(0-180)\Phi(180)$
 E3 (YZ plane) – $\Theta(0-180)\Phi(90)$ and $\Theta(0-180)\Phi(270)$





E1 (XY plane) – $\Theta(90)\Phi(0-360)$
 E2 (XZ plane) – $\Theta(0-180)\Phi(0)$ and $\Theta(0-180)\Phi(180)$
 E3 (YZ plane) – $\Theta(0-180)\Phi(90)$ and $\Theta(0-180)\Phi(270)$

