4. RF exposure statement

According to §1.1307, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to §1.1310 and §2.1091 RF exposure is calculated.
Limits for General Population/Uncontrolled Exposure

Frequency Range [MHz]	Electric Field Strength [V/m]	Magnetic Field Strength [A/m]	Power Density [mW/cm^2]	Averaging Time [minute]
Limits for General Population/Uncontrolled Exposure				
0.3 – 1.34	614	1.63	100	30
1.34 – 30	824/f	2.19/f	180/f^2	30
30 – 300	27.5	0.073	0.2	30
300 – 1500	-	-	f/1500	30
1500 – 100 000	-	-	1.0	30

※ f = frequency in MHz

4.1 Friis transmission formula

$$P_d = (P_{out} \text{ X } G) / (4\pi r^2)$$

P_d = Power density

P_{out} = power input to antenna

G = power gain

r = distance to the center of radiation of the antenna

4.2 Information of Antenna

- **Model Name : PAT-CPWI-M**

Antenna Gain;
- **824 MHz – 894 MHz : 4 dBi**
- **1 750 MHz – 2 400 MHz : 7 dBi**
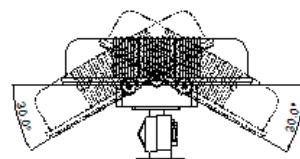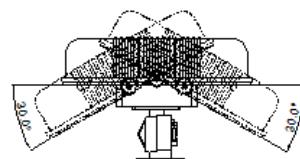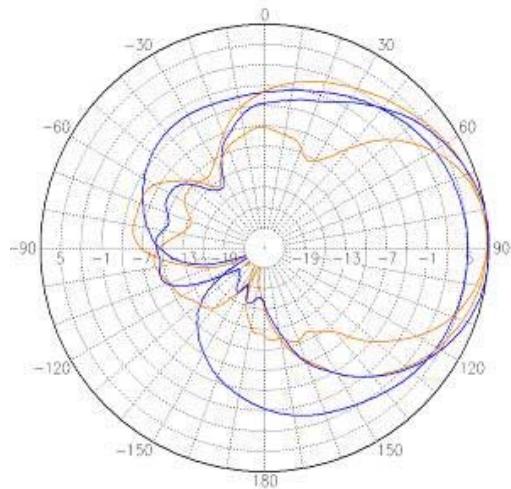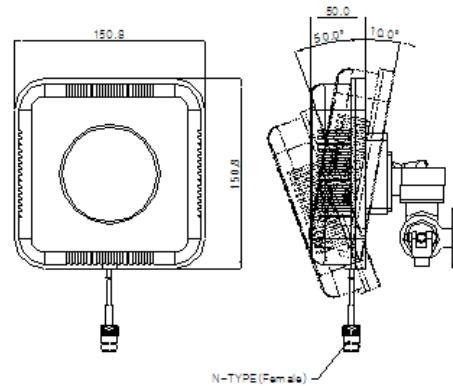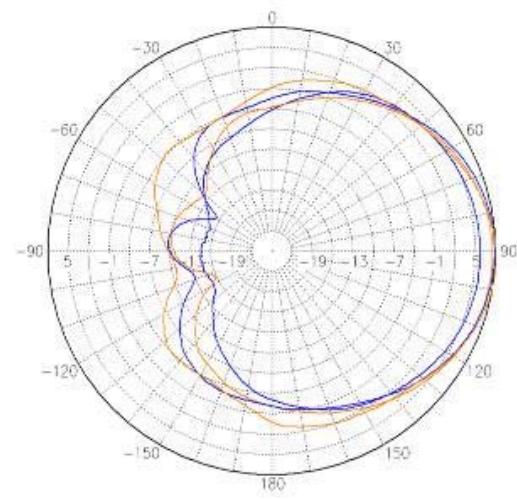
• **Model Name : ALP-15QD-M**

Antenna Gain;
• **824 MHz – 894 MHz : 5 dBi**
• **1 750 MHz – 2 400 MHz : 11 dBi**
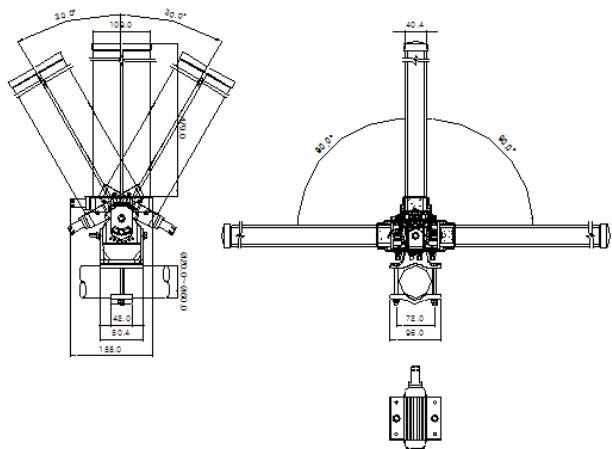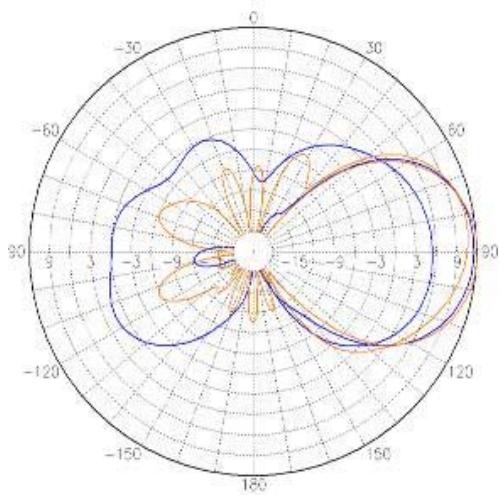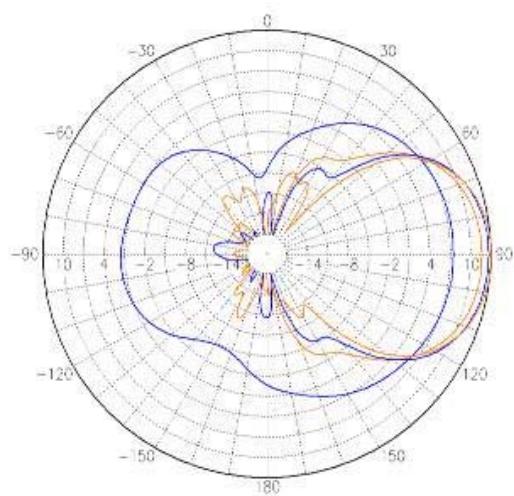
4.3 Calculation of MPE at 20 cm

Band	Link	Frequency [MHz]	Output power [dBm]	Antenna gain [dBi]	EIRP		Power density [mW/cm²]	Limit [mW/cm²]
					[dBm]	[mW]		
Cellular 800	Up Link	824.20	15.03	5.00	20.03	100.69	0.020 042	0.549 467
		836.60	15.01	5.00	20.01	100.23	0.019 950	0.557 733
		848.80	15.04	5.00	20.04	100.93	0.020 089	0.565 867
	Down Link	869.20	12.03	5.00	17.03	50.47	0.010 045	0.579 467
		881.60	12.03	5.00	17.03	50.47	0.010 045	0.587 733
		893.80	12.01	5.00	17.01	50.23	0.009 999	0.595 867
PCS 1900	Up Link	1 850.20	15.01	11.00	26.01	399.02	0.079 424	1.000 000
		1 880.00	15.01	11.00	26.01	399.02	0.079 424	1.000 000
		1 909.80	15.01	11.00	26.01	399.02	0.079 424	1.000 000
	Down Link	1 930.20	12.02	11.00	23.02	200.45	0.039 806	1.000 000
		1 960.00	12.01	11.00	23.01	199.99	0.039 806	1.000 000
		1 989.80	12.03	11.00	23.03	200.91	0.039 990	1.000 000

- **Celluar 800**

The maximum conducted power is 15.0 dBm; antenna is fix-mounted with a maximum gain of 5 dBi gain.
Therefore, to comply with RF Exposure Requirement, the MPE is calculated.
The maximum Peak EIRP calculated is 20.0 dBm.
The Power Density can be calculated using the formula

It is considered that 20 cm is the minimum distance that a user can go closer to the EUT.
At 0.2 m, S = 0.02 mW/cm^2, which is below the MPE Limit of 0.55 mW/cm^2

- **PCS Band**

The maximum conducted power is 15.0 dBm; antenna is fix-mounted with a maximum gain of 11 dBi gain.
Therefore, to comply with RF Exposure Requirement, the MPE is calculated.
The maximum Peak EIRP calculated is 26 dBm.

It is considered that 20 cm is the minimum distance that a user can go closer to the EUT.
At 0.2 m, S = 0.08 mW/cm^2, which is below the MPE Limit of 1.00 mW/cm^2