Antennas Specifications PQG-XREADER

The co-location MPE should be done for the highest permitted antenna gains for worst case condition.

In our actual implementation we are using these WiFi and RFID antennas with gains equal or less than the maximum permitted. Below you can see one example for the WiFi antenna and three examples for the RFID antennas.

Power density calculation for the WiFi Module

5.1. ***Power Density Calculation***

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm^2)	Limit (mW/cm^2)
Bluetooth	2402.0	3.2	12.5	15.700	0.037	37.154	0.007	1.000
2.4GHz WLAN	2412.0	3.2	17.5	20.700	0.117	117.490	0.023	1.000
5GHz WLAN	5180.0	4.5	19.5	24.000	0.251	251.189	0.050	1.000

Note: For conservativeness, the lowest uplink frequency of each band is used to determine the MPE limit of that band

The actual antenna used with the WiFi module has a slightly lower gain in all bands, which meets our requirements.

Laird™
CONNECTIVITY

FlexPIFA

3-dBi Antenna with MHF1/U.FL Cable
2.4 GHz/5.5 GHz

FEATURES AND BENEFITS

- Dual band antenna – 2.4 GHz and 5.5 GHz
- Quick and easy installation
- Adhesive holds to surface during humidity exposure and hot/cold cycles
- RoHS-compliant
- Can be installed in the following ways:
  - On different non-conductive surfaces and thicknesses
  - Near metals or the human body
  - On flat or curved surfaces

SPECIFICATIONS		
Frequency (MHz)	2400 - 2480	4900 - 5900
Peak Gain (dBi)	+2.5	+3.0
Average Gain (dBi)	> -2.5	> -3.4
VSWR (MHz)	<2.5:1	<3.0:1
Impedance (Ω)	50	
Antenna Type	Flexible Planar Inverted F (FlexPIFA)	
Polarization	Linear	

Power density calculation for the RFID Reader Module

The co-location MPE should be done for the highest permitted antenna gains for worst case condition.

In our actual implementation we are using these RFID antennas with gains equal or less than the maximum permitted (other antenna(s) of a similar type and with equal or lower gain might be used later):

A. The MTI Wireless MT-242043/TRH/A/K 9.5dBic gain, existing C2PC that is OK
B. The TE (Laird) PAL86518H & PAR86518H 8.5dBic gain, 1dB axial ratio => 6dBi gain => OK
C. The Times-7 A5020 5dBic typical gain, 2dB axial ratio => 2.9dBi typical gain <6dBi => OK

A) Gain Specification for the MTI Wireless MT-242043/TRH/A/K antennas.

MTI WIRELESS EDGE LTD.

Homepage > Products > RFID Antennas > 865-956MHz (WB UHF) Reader Antennas > Circular Antennas

CIRCULAR ANTENNAS

MT-242043/TRH/A/K
865 - 956 MHZ, 8.5 DBIC RHCP READER ANTENNA

ELECTRICAL	
REGULATORY COMPLIANCE	RoHS, CE 0682
FREQUENCY RANGE	865 - 956 MHz
GAIN	7.5 dBic (min) , 8.5 dBic (max) @ 865-870 MHz 8.5 dBic (min) , 9.5 dBic (max) @ 902-928 MHz 7.5dBic (min) , 9.0 dBic (max) @ 950-956 MHz
VSWR	1.2:1 (typ) 1.35 : 1(max)
POLARIZATION	RHCP
3dB ELEVATION BEAMWIDTH	65° (typ)
3dB AZIMUTH BEAMWIDTH	65° (typ)
F/B RATIO	-18 dB (max)
POWER	6W (max)
INPUT IMPEDANCE	50 (ohm)

As per the FCC IC Test Report No.: FCC_IC_RF_SL20061501-JAD-006, this antenna passes the emission limits when paired with the RFID module we intend to use (FCC ID: QV5MERCURY6E-M IC: 5407A-MERCURY6EM).

B) Gain Specification for the TE (Laird) PAL86518H & PAR86518H antennas.

Note: from the chart we see that the antenna gain is specified 8.5dBiC, which means 5.5dBi

SPECIFICATIONS	
Antenna Part Number	PAL86518H/PAR86518H
Frequency Range	865 - 956 MHz
Gain	8.5 dBic
Maxium VSWR	1.5:1
3 dB Beamwidth - Azimuth	65°
Front to Bank Ratio	20dB
Polarization	Circular Right-hand or circular Left-hand
Maxium Input Power	3 Watts
Input Impedence	50 Ohms
Axial Ratio	1dB

DATA AND DEVICES / PAL86518H-FNF/PAR86518H-FNF

C) Gain Specification for the Times-7 A5020 antennas.

Note: from the chart we see that the antenna gain is specified 5dBiC, which means 2dBi

Electrical Specifications

Frequency Range	865-868 MHz (ETSI) / 902-928 MHz (FCC)
Polarization	RHCP (Right Hand Circular Polarized)
Far-field Gain	5 dBiC typical
Far-field 3dB beamwidth	105° in both planes typical
VSWR	1.4 typical
Front to back	-10 dB typical
Axial Ratio	2 dB typical
Nominal Impedance	50 Ω
Anti-static Protection	Yes, DC Grounded
Antenna Detection	10K Ω resistance
Maximum Input Power	3 W