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.

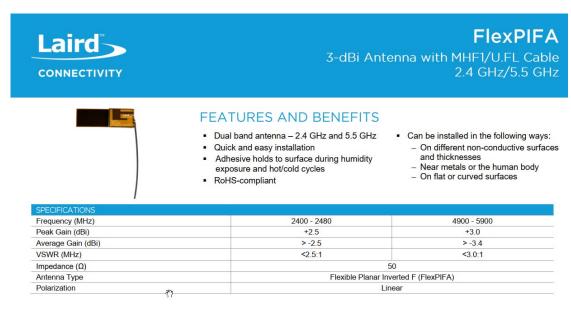
Power density calculation for the WiFi Module

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.



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.



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CIRCULAR ANTENNAS



MT-242043/TRH/A/K 865 - 956 MHZ 8 5 DBIC RHCP READER ANTENNA



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	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			