

MPE Estimates

Only the following combinations of radios are permitted in the Extended Temperature Multinode:
A. DSSS Radio (FCC ID: S57 – 51306343) and TWO 802.11a/b/g Radio (FCC ID: S57 - DCMA-82)
B. FHSS Radio (FCC ID: S57 – WNMNFHSS) and TWO 802.11a/b/g Radio (FCC ID: S57 - DCMA-82)

NOTE:

*The DSSS Radio (FCC ID: S57 – 51306343) and the FHSS Radio (FCC ID: S57 – WNMNFHSS) are never permitted to be co-located.

Multinode FHSS Radio FCC ID: S57 – WNMNFHSS
Multinode FHSS Radio Industry Canada ID: 5731 – WNMNFHSS

$$P_{\text{dss}} = (P_{\text{m}} \times G_{\text{m}}) / (4\pi r^2)$$

$$G_{\text{m}} = \text{antilog}(G_{\text{dss}}/10)$$

Multinode 2.4GHz FHSS Radio

Application	Antenna Type	Antenna Part No.	Transmit Frequency (MHz)	Max Peak Conducted Output Power (mW)	Antenna Gain (dBi)	Minimum Antenna Cable Loss (dB)	Power Density @ 20 cm (mW/cm²)	General Population Exposure Limit from 1.1319 (mW/cm²)	Ratio of Power Density to the Exposure Limit
Integral Co-located	Omni	HS2214F120	2.402 - 2.482	96.101	5	0	0.060	1.00	0.060496
Remote Not Co-located	Omni	Hyperlink HS2214F-120	2.402 - 2.482	96.101	5	0	0.060	1.00	0.060496
Remote Not Co-located	Sector 120 deg	Hyperlink HS2214F-120	2.402 - 2.482	96.101	14	0	0.071	1.00	0.071083

Overall Worst Case Ratio of Power Density to the Exposure Limit: 0.071083
Worst Case Co-located Antenna Ratio of Power Density to the Exposure Limit: 0.060496

Multinode DSSS Radio FCC ID: S57 - 51306343
Multinode DSSS Radio Industry Canada ID: 5731 - 51306343

Multinode 2.4GHz DSSS Radio, has the worst case output power density as compared to the FHSS radio.

Application	Antenna Type	Antenna Part No.	Transmit Frequency (MHz)	Max Peak Conducted Output Power (mW)	Antenna Gain (dBi)	Minimum Antenna Cable Loss (dB)	Power Density @ 20 cm (mW/cm²)	General Population Exposure Limit from 1.1319 (mW/cm²)	Ratio of Power Density to the Exposure Limit
Integral Co-located	Omni	FA501000-000000-5	2.402 - 2.482	99.08	5	0	0.062	1.00	0.062333
Integral Co-located	Omni	Hyperlink HS2214F-120	2.402 - 2.482	99.08	5	0	0.062	1.00	0.062333
Integral Co-located	Omni	Hyperlink HS2214F-120	2.402 - 2.482	99.08	5	0	0.062	1.00	0.062333
Remote Not Co-located	Omni	Hyperlink HS2214F-120	2.402 - 2.482	99.08	5	0	0.062	1.00	0.062333
Remote Not Co-located	Sector 120 deg	Hyperlink HS2214F-120	2.402 - 2.482	99.08	14	0	0.067	1.00	0.067034

Overall Worst Case Ratio of Power Density to the Exposure Limit: 0.367034
Worst Case Co-located Antenna Ratio of Power Density to the Exposure Limit: 0.062333

FCC ID: S57-DCMA-82
Industry Canada ID: 5731-DCMA-82

802.11 (a,b,g) BridgeMesh Radio

Application	Antenna Type	Antenna Part No.	Transmit Frequency (MHz)	Max Peak Conducted Output Power (mW)	Antenna Gain (dBi)	Minimum Antenna Cable Loss (dB)	Power Density @ 20 cm (mW/cm²)	General Population Exposure Limit from 1.1319 (mW/cm²)	Ratio of Power Density to the Exposure Limit
Integral Co-located	Omni	AR802 ANXND-450M	2.412 - 2.482	147	3.5	0	0.065	1.00	0.065471
Integral Co-located	Omni	AR802 ANXND-450M	2.412 - 2.482	147	3.5	0	0.065	1.00	0.065471
Integral Co-located	Omni	SmartAnt SAAS-220920	2.412 - 2.482	147	5.5	0	0.104	1.00	0.103764
Integral Co-located	Omni	SmartAnt SAAS-220920	2.412 - 2.482	147	5.5	0	0.104	1.00	0.103764
Remote Not Co-located	Omni	Hyperlink HS2214F-120	2.412 - 2.482	147	3.5	0	0.065	1.00	0.065471
Remote Not Co-located	Sector 120 deg	Hyperlink HS2214F-120	2.412 - 2.482	147	14	0	0.082	1.00	0.082333
Remote Not Co-located	Sector 90 deg	Hyperlink HS2214F-120	2.412 - 2.482	147	14	0	0.082	1.00	0.082333
Remote Not Co-located	Yagi 19 deg	Teleflex S816AB	2.412 - 2.482	147	15.5	0	0.085	1.00	0.085393

NOTE: The max peak conducted output power has been reduced from what was tested, in order to comply with MPE limits. This has been accounted for in the professional installation guide EIRP limits.
Also, the SmartAnt SAAS-220920 was originally tested assuming a worst case gain of 5.5dBi @ 2.4GHz and 8.5 dBi @ 5GHz. The actual gain values are 4dBi @ 2.4GHz and 7dBi @ 5GHz. Refer to Honeywell document 51906534.
This has also been accounted for in the professional installation guide. However, for the MPE calculations the

Application	Antenna Type	Antenna Part No.	Transmit Frequency (MHz)	Max Peak Conducted Output Power (mW)	Antenna Gain (dBi)	Minimum Antenna Cable Loss (dB)	Power Density @ 100 cm (mW/cm²)	General Population Exposure Limit from 1.1319 (mW/cm²)	Ratio of Power Density to the Exposure Limit
Remote Not Co-located	Dish 9 deg	Hyperlink HS2214F-120	2.412 - 2.482	147	14	0	0.082	1.00	0.082333

Overall Worst Case Ratio of Power Density to the Exposure Limit: 0.589911
Worst Case Co-located Antenna Ratio of Power Density to the Exposure Limit: 0.464776

FCC ID: S57-DCMA-82
Industry Canada ID: 5731-DCMA-82

802.11 (a,b,g) Access Point

Application	Antenna Type	Antenna Part No.	Transmit Frequency (MHz)	Max Peak Conducted Output Power (mW)	Antenna Gain (dBi)	Minimum Antenna Cable Loss (dB)	Power Density @ 20 cm (mW/cm²)	General Population Exposure Limit from 1.1319 (mW/cm²)	Ratio of Power Density to the Exposure Limit
Integral Co-located	Omni	AR802 ANXND-450M	2.412 - 2.482	147	3.5	0	0.065	1.00	0.065471
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MPE Estimates for Self Co-located Device

DSSS Radio Worst Case Ratio of Power Density to the Exposure Limit	802.11 (a,b,g) BridgeMesh Radio Worst Case Ratio of Power Density to the Exposure Limit	802.11 (a,b,g) Access Point/Client Radio Worst Case Ratio of Power Density to the Exposure Limit	Sum of Worst Case Ratios (Power Density to the Exposure Limit)	FCC Limit for Sum of Worst Case Ratios
0.062333	0.464776	0.464776	0.99189	1.0 PASS

The results shown in the above table are equivalent to the Sum of the EIRP of the Two Co-located Transmitters (EIRP TX1 + EIRP TX2) compared to the exposure limit. The benefit of this method, is that accounts for transmitters operating at different frequencies against different exposure limits.

RF Safety Statement:

To comply with FCC's and Industry Canada's RF exposure requirements, the following antenna installation and device operating configurations must be satisfied:

- > Remote Point-to-Multi-Point antenna(s) for this unit must be fixed and mounted on outdoor permanent structures with a separation distance between the
- > Remote Fixed Point-to-Point antenna(s) for this unit must be fixed and mounted on outdoor permanent structures with a separation distance between the antenna(s) of greater than 20cm and a separation distance of at least 100cm from all persons.

> Furthermore, when using integral antenna(s) the Multinode unit must not be co-located with any other antenna or transmitter device and have a separation distance of at least 20cm from all persons.