



Lee Hinsz &lt;lhinsz@appareo.com&gt;

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**Re: Hirschmann / AGCO antenna**

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**Alan Miller** <amiller@hirschmann-mi.com>

Fri, Aug 7, 2015 at 10:48 AM

To: Lee Hinsz &lt;lhinsz@appareo.com&gt;

Cc: Patrick Egan &lt;pegan@hirschmann-mi.com&gt;, Bassel Elshaar &lt;belshaar@hirschmann-mi.com&gt;, "Runck, Michael" &lt;Michael.Runck@agcocorp.com&gt;, Chris Giese &lt;cgiese@appareo.com&gt;, Mike Reich &lt;mreich@appareo.com&gt;

Hello Lee,

Nice to hear from you. The antenna performance has been pretty much finalized. We are into the environmental validation testing now. The information for the antennas is below by frequency band. The data is the same for the two 4G Cell antennas even though they are in different housings.

**Iridium**

- Antenna Type: Patch antenna, hemispherical pattern, circular polarization
- Antenna Gain: 3.5 dBic

**GNSS**

- Antenna Type: Patch antenna, hemispherical pattern, circular polarization
- Antenna Gain: 2.5 dBic

**4G Cell**

- Antenna Type: Vertically polarized monopole, circular pattern in azimuth
- Antenna Gain: Average Gain 2 dBi, Peak Gain 5.5 dBi

**2.4/5.8 GHz WLAN**

- Antenna Type: Vertically polarized PIFA, circular pattern in azimuth
- Antenna Gain: 2.4 GHz Average Gain 3 dBi and Peak Gain 6.5 dBi; 5.8 GHz Average Gain 0 dBi and Peak Gain 4.5 dBi

433 MHz

- Antenna Type: Vertically polarized monopole, circular pattern in azimuth
- Antenna Gain: 1-2 dBi (this value is estimated. This is the only one that we don't have final measurements for.)

For mounting the antenna, we recommend a spacing of 75mm minimum between the antennas. None of the antennas require a ground plane except the 433 MHz antenna. The recommended minimum ground plane size for that is 300mm x 300mm.

Let me know if you need more information. Have a great weekend.

Best regards,

Alan Miller

Engineering Manager

Business Unit Solutions

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**Hirschmann Solutions**

**Hirschmann Car Communication Inc.**

1183 Centre Road

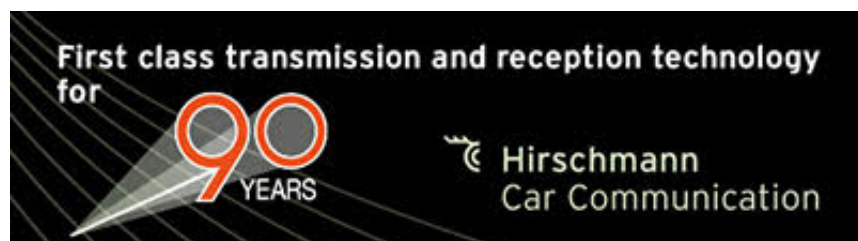
Auburn Hills, MI 48326

Phone: +1 248 373-7150 x208

Fax: +1 248 276-2350

E-mail: [amiller@hirschmann-mi.com](mailto:amiller@hirschmann-mi.com)

Web: [www.hirschmann-car.com/en](http://www.hirschmann-car.com/en), [www.hirschmann-solutions.com](http://www.hirschmann-solutions.com)



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**From:** Lee Hinsz [mailto:[lhinsz@appareo.com](mailto:lhinsz@appareo.com)]

**Sent:** Thursday, August 06, 2015 12:10 PM

**To:** Alan Miller

**Cc:** Patrick Egan; Bassel Elshaar; Runck, Michael; Chris Giese; Mike Reich

**Subject:** Re: Hirschmann / AGCO antenna

Hello Alan,

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