Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
Application of Deere & Co.	)	IBFS File No. SES-MOD-20141030-00835
For Authority to Receive Transmissions from Non-U.S.-licensed Spacecraft	)	Call Sign E010011

PETITION TO DENY

LightSquared Inc., Debtor-in-Possession, together with its affiliates (collectively, "LightSquared"), petitions to deny the above-captioned application filed by Deere & Company ("Deere") on October 30, 2014 (the "Deere Application"). Although Deere styles this application as a license "modification" application, there are significant and unresolved questions as to whether Deere's underlying license (the "Deere License") remains in effect and was properly renewed by the International Bureau in 2011, as specifically set forth in LightSquared's Petition for Reconsideration of that renewal filed October 14, 2011. More generally, there are significant and unresolved questions regarding: (i) Deere's compliance with the Commission's rules and qualifications to serve as a Commission licensee and (ii) whether Deere's operations (licensed or not) have served the public interest. Accordingly, the Bureau should deny the application or designate it for a hearing.

BACKGROUND

LightSquared provides mobile satellite services using allocated and licensed spectrum in the L Band and also plans to use its licensed spectrum for terrestrial services. LightSquared is a party in interest in this proceeding because Deere previously has objected to LightSquared's planned terrestrial services based on concerns about the incompatibility of Deere's own operations in the L band.

On September 8, 2011, Deere filed an application seeking renewal of the Deere License that underlies the modification application that is the subject of the instant proceeding. That renewal application was granted a mere five days later, on September 13, 2011, with no prior public notice. LightSquared thus had no meaningful opportunity to oppose Deere's license renewal application on its merits prior to grant. On October 14, 2011 LightSquared filed a Petition for Reconsideration demonstrating that renewal of the Deere License had been inappropriate and contrary to the public interest.[1]

First, LightSquared established that the Deere License had terminated automatically, by operation of law, over nine years earlier because Deere had provided no evidence that it had brought its licensed facilities into use as required by the Commission's rules. Consequently, there was no license that remained in effect for the Commission to renew.

Second, LightSquared established that Deere's operations had been manifestly inconsistent with the parameters of the Deere license and the Commission's rules more generally, calling into question Deere's qualifications to serve as a Commission licensee. Among other things, record evidence strongly suggested that Deere was:

- Operating outside of authorized frequencies;
- Operating unauthorized antenna/receiver types;
- Receiving transmissions from unauthorized points of communication—including non-U.S.-licensed GNSS systems;
- Operating more than the 10,000 terminals it was authorized to deploy;
- Operating receivers that did not conform to the MSS allocation in the 1525-1559 MHz band, without having first obtained a required waiver of the U.S. Table of Allocations;

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[1] A copy of that Petition is attached as Exhibit A hereto.

- Operating transmit/receive devices that were outside the scope of its authority; and
- Failing to maintain adequate "control" of radiocommunication devices.

Third, LightSquared established that any authority that Deere did possess had been granted on a non-interference basis, and as such Deere had no legally cognizable expectation that its operations would be protected. Consequently, renewal of the Deere License would be contrary to the public interest.

DISCUSSION

Under Section 309(d) of the Communications Act, as amended, the Commission may not grant any application where "a substantial and material question of fact is presented or if the Commission for any reason is unable to find that grant of the application would be consistent" with the public interest.[2] Applying this standard, the Deere Application should be denied. The arguments set forth in LightSquared's Petition for Reconsideration (which remains pending) remain valid and apply with equal force to demonstrate that the proposed *modification* of the Deere License would be as improper as *renewal* of that license. If anything, Deere's continuing record of non-compliance since 2011—and failure to redress its operational deficiencies after LightSquared identified them on the record—underscores that granting *any* authority to Deere at this time would be contrary to the public interest. LightSquared therefore incorporates by reference the entirety of its Petition for Reconsideration as a basis for denying or designating for hearing the Deere Application.

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[2] 47 U.S.C. § 309(d); *see also* 47 C.F.R. § 25.154.

Moreover, it is clear today that the Commission must specifically authorize the reception of signals from non-U.S. spacecraft[3] and that, to the extent the Bureau does grant such authority, the Bureau must ensure that the applicant: (i) accepts the limitations that may result from licensed operations in adjacent frequencies and (ii) cannot seek to foreclose such licensed operations through attempts to claim "protection" from alleged interference. Indeed, since LightSquared's Petition for Reconsideration was filed in 2011, the Commission has explicitly acknowledged that the use of "technologies used to augment GPS may increase the potential exposure of devices to interference by increasing the number of unwanted signals and the number of signals that can introduce data integrity problems" and found that "devices that are augmented to receive signals from multiple satellite constellations may be more susceptible to radio frequency interference than devices that receive signals from GPS alone."[4] Accordingly, the Commission has directed licensees seeking to utilize such augmentation technologies to "conduct testing to ensure that operation with these signals does not inadvertently introduce vulnerabilities to the devices that could impair . . . performance or compromise data integrity."[5] There is no evidence that such testing has occurred here. Nor is there any evidence that Deere

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3 *See National Telecommunications and Information Administration Provides Information Concerning Executive Branch Recommendations for Waiver of Part 25 Rules Concerning Licensing of Receive-Only Earth Stations Operating with Non-U.S. Radionavigation Satellites*, Public Notice, DA 11-498 (Mar. 14, 2011) ("The Federal Communications Commission's (FCC) rules require licensing of non-Federal receive-only equipment operating with foreign satellite systems, including receive-only earth stations operating with non-U.S. licensed radionavigation-satellite service (RNSS) satellites."); *Satellite Communications Services Information re: Actions Taken*, Public Notice, Report No. SES-01735, at 6 (Mar. 25, 2015) (confirming that such authority is required and explicitly authorizing RNSS receive-only terminals to receive transmissions from the GPS augmentation payload on the Inmarsat 4F3 spacecraft at 98° W.L. in the 1573.42-1577.42 MHz (L1) and the 1166.45-1186.45 MHz (L5) frequency bands—but not in the L Band).

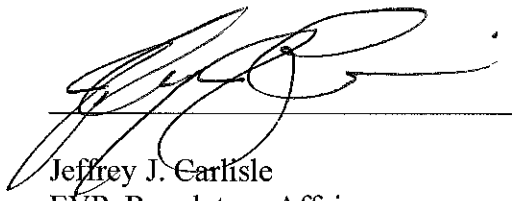
4 *Wireless E911 Location Accuracy Requirements*, Fourth Report and Order, FCC 15-9, PS Docket No. 07-114, at ¶ 40 (Feb. 3, 2015).

5 *Id.*

has obtained authority to receive transmissions from all of the non-U.S.-licensed GNSS systems with which its equipment appears designed to operate.

For these reasons, the Bureau should deny the Deere Application or designate it for a hearing. If the Bureau nevertheless decides to grant that application, it should do so only with clear and unambiguous conditions requiring Deere to operate on a strict non-interference basis while satisfying minimum standards to ensure compatibility with other users of the L Band.

Respectfully submitted,



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703-390-2001

Dated: April 3, 2015

Exhibit A

OCTOBER 14, 2011 PETITION TO DENY

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	IBFS File No. SES-RWL-20110908-01047
Application of Deere & Co.	)	
	)	Call Sign E010011
For Renewal of Earth Station License	)	

PETITION FOR RECONSIDERATION

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October 14, 2011

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Application of Deere & Co.	)	
	)	Call Sign E010011
For Renewal of Earth Station License	)	

PETITION FOR RECONSIDERATION

LightSquared Inc., together with its affiliates (collectively, "LightSquared"), petitions for reconsideration[1] of the L-Band receive-only license renewal application filed by Deere & Company ("Deere") on September 8, 2011, and granted on September 13, 2011, with no public notice of the application prior to grant.[2] As explained herein, renewal was and is inappropriate because: (i) Deere apparently holds no license to renew; (ii) Deere has been improperly attempting to use its L-Band receive-only operations to undermine the implementation of LightSquared's 4G LTE wireless network in the L Band, contrary to the public interest; and (iii) publicly available information calls into serious question whether Deere's operations and representations have been consistent with the terms of its authorization, the Communications Act, and the Commission's rules and policies. Accordingly, Deere's renewal application should be denied on reconsideration, or, at a minimum, renewed with significant limiting conditions.

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1 *See* 47 U.S.C. § 405(a); 47 C.F.R. § 1.106.

2 *See* IBFS File No. SES-RWL-20110908-01047. Because the grant was placed on public notice on September 14, 2011, *see* Report No. SES-01380 (Sep. 14, 2011), this petition is timely filed, *see* 47 C.F.R. § 1.106(f). Critically, LightSquared had no meaningful opportunity to oppose Deere's license renewal application, which was granted without public notice *five days* after it was filed. The renewal also was issued on the same day that LightSquared was apprised by the Commission that the deployment of its integrated satellite and terrestrial network would be delayed to accommodate the concerns of Deere and other members of the global positioning device industry, *see Status of Testing in Connection with LightSquared's Request for ATC Commercial Operating Authority*, DA 11-1537, (Sep. 13, 2011), exacerbating the consequences of Deere's renewal grant. Accordingly, good cause exists for LightSquared to participate in this proceeding now. *See* 47 C.F.R. § 1.106(b)(1).

I. INTRODUCTION AND SUMMARY

The Commission's rules provide that an earth station renewal application can be granted *only* if the Commission finds that: (i) the applicant is legally, technically, and otherwise qualified; (ii) the proposed facilities and operations comply with all applicable rules, regulations, and policies; and (iii) grant of the application will serve the public interest, convenience and necessity.[3] Implicit in the rules is a fourth requirement: the applicant must hold an existing license that can be renewed.

As an initial matter, it appears that Deere's L-Band receive-only license terminated by operation of law over nine years ago. Accordingly, there is no license for the Commission to renew, and no basis for sustaining the Commission's "renewal" grant. Furthermore, Commission rules preclude Deere from attempting to reinstate, at this late date, a license that became automatically null and void in 2002.[4]

Even if Deere did hold a valid L-Band receive-only license, Deere still would not satisfy the applicable renewal standard for earth stations because, *inter alia*, Deere has been using its L-Band operations in a manner contrary to the public interest, convenience, and necessity. Although Deere's license allowed it to receive Inmarsat mobile-satellite service ("MSS") signals in a mere 2.5 kHz of L-Band spectrum, Deere has attempted to wield that authority as a weapon to foreclose: (i) the implementation of LightSquared's nationwide 4G LTE wireless network in any part of the 66 MHz of L-Band spectrum available for that express purpose; (ii) the delivery of a competitive wireless broadband alternative to hundreds of millions of Americans; and (iii) the delivery of an effective broadband solution to parts of America that have no broadband service today.[5] Stated another way, Deere is impermissibly attempting to leverage a license it once held in a small sliver of spectrum to block the use of a

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3 47 C.F.R. § 25.156(a).

4 *See* 47 C.F.R. § 25.163.

5 *See, e.g.,* Comments of Deere & Company, IB Docket No. 11-109, at 5 (Aug. 1, 2011) (urging the Commission to "focus its efforts on identifying other spectrum" to support LightSquared's broadband operations). Deere seeks to foreclose LightSquared's use of any part of the 1525-1544/1545-1559 MHz downlink band for ATC. The inability to use that downlink band for ATC could effectively foreclose use of the corresponding channels at 1626.5-1645.5/1646.5-1660.5 MHz.

spectrum band that is approximately *twenty-six thousand times as large* and that would be used to advance the goals of the *National Broadband Plan*[6] and otherwise provide significant public interest benefits.

Because Deere's license was sought and granted on a non-interference basis, Deere had and has no legally cognizable expectation that its operations would be protected in any event. And to the extent that Deere is now operating on an unauthorized basis (which appears to be the case, as explained below), Deere clearly has no right to interference protection. Even if Deere asserts the right to operate on an unlicensed basis, Commission precedent is clear that such users are unprotected and have no basis to complain about licensed uses of spectrum, like LightSquared's.[7]

Deere's operations also appear to be inconsistent with its licensed parameters. Specifically, based on evidence reviewed to date, Deere is likely:

(i) Operating outside of the specific frequencies once authorized;

(ii) Operating unauthorized antenna/receiver types;

(iii) Receiving transmissions from unauthorized points of communication;

(iv) Operating more than the 10,000 terminals it was authorized to deploy;

(v) Operating receivers that do not conform to the MSS allocation in the 1525-1559 MHz band, without having first obtained a required waiver of the U.S. Table of Allocations;

(vi) Operating transmit/receive devices that are outside the scope of its authority; and

(vii) Failing to maintain adequate "control" of radiocommunication devices.

This noncompliance would call into question Deere's qualifications to serve as a Commission licensee. At a minimum, the Commission should ask the Enforcement Bureau to conduct a

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6 *See* CONNECTING AMERICA: THE NATIONAL BROADBAND PLAN, at 9, *available at* http://www.broadband.gov/plan/ ("*National Broadband Plan*").

7 *See Regulation of Domestic Receive-Only Satellite Earth Stations*, 74 FCC 2d 205, at ¶ 28 (1979) (unlicensed receive-only earth stations have "no assurances" of interference-free reception, and must forgo the right to file petitions or "other forms of complaint or relief . . . on the basis of experienced or anticipated interference"); 47 C.F.R. § 15.5(b) (unlicensed Part 15 devices must cause "no harmful interference" and accept interference from authorized radio stations and other Part 15 devices).

thorough inquiry into the nature of Deere's activities and its representations to the Commission to determine whether Deere has acted in accordance with the terms of its existing license, the requirements of the Communications Act, and the Commission's rules and policies. Any findings that Deere has not done so would warrant denying the renewal application and potentially imposing other sanctions.

If, after completing such an inquiry, the Commission nevertheless decides to grant renewal, it should do so only with clear and unambiguous conditions requiring Deere to operate on a strict noninterference basis, while satisfying minimum standards to ensure the compatibility of its equipment with other users of the 1525-1559 MHz band.

II. BACKGROUND

LightSquared. LightSquared's predecessors were first authorized in 1989 to provide MSS in the L Band.[8] Since the mid-1990s, the company has operated across North America using the capacity of two satellites—MSAT-1 and MSAT-2. More recently, LightSquared has procured replacements that are some of the most sophisticated commercial communications spacecraft ever built. The first, SkyTerra 1, was placed into service earlier this year. The construction of the second, SkyTerra 2, is substantially complete; the satellite is undergoing testing and otherwise being readied for launch. The advanced design of the new LightSquared satellites enables communication with smartphones that have the same form factor as the wireless devices that consumers use today.

LightSquared's new spacecraft are part of the Commission-authorized integrated satellite and terrestrial network that LightSquared is building to provide broadband to 260 million Americans by the end of 2015. Specifically, a 2004 Commission decision authorizes LightSquared to deploy a complementary terrestrial infrastructure in any part of

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[8] *Amendment of Parts 2, 22 and 25 of the Commission's Rules to Allocate Spectrum for and to Establish Other Rules and Policies Pertaining to the Use of Radio Frequencies in a Land Mobile Satellite Service*, 4 FCC Rcd 6041 (1989); *remanded by Aeronautical Radio, Inc. v. FCC*, 928 F.2d 428 (D.C. Cir. 1991); *on remand*, 7 FCC Rcd 266 (1992); *aff'd, Aeronautical Radio, Inc. v. FCC*, 983 F.2d 275 (D.C. Cir. 1993); *see also AMSC Subsidiary Corporation*, 8 FCC Rcd 4040 (1993).

the 66 MHz of the L Band where its satellites may operate.[9] LightSquared has made significant strides in constructing this terrestrial network, which, coupled with its satellite network, will enable the provision of seamless broadband connectivity across the United States. The deployment of this ancillary terrestrial component ("ATC") network has been fully coordinated with Inmarsat, which is Deere's satellite service provider.

Thus, LightSquared's 4G LTE network promises to be a competitive alternative to the wireless networks of companies like AT&T and Verizon, and will continue the long tradition of LightSquared and its predecessors as a positive competitive force in the MSS industry.[10] LightSquared's network also will advance the Commission's goals in the areas of access, spectrum efficiency, and public safety. At present, however, LightSquared is not able to actually commence operating the terrestrial component of this 4G LTE network because of the objections of companies such as Deere.

Deere License. In 2001, Deere sought and the Commission granted a receive-only license to permit Deere to receive "differential correction data" from Inmarsat MSS satellites in a small, discrete portion of the L Band.[11] In its license application, Deere expressly represented: "*Deere accepts license condition [sic] that its receivers accept interference.*"[12] This statement was not qualified in any way, and has never been altered through a subsequent license modification. Deere's original license grant limited its receive-only operations to one narrow 2.5 kHz channel in one polarization centered at one specific frequency—authorizing Deere to use the equivalent of about 1/26,000th of the L Band.[13] In

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9 *See Mobile Satellite Ventures Subsidiary LLC*, 19 FCC Rcd 22144, at ¶¶ 18-26 (2004).

10 *See, e.g., FCC Report to Congress as Required by the ORBIT Act*, Eighth Annual Report, 22 FCC Rcd 11347 (2007) (noting that LightSquared's predecessor-in-interest, MSV, contributes to "substantial competition" in the MSS industry).

11 *See* IBFS File No. SES-LIC-20010112-00051, Application, at Att. B.

12 *See* IBFS File No. SES-LIC-20010112-00051, Application, at Att. A n.1 (emphasis added).

13 Deere's "license" subsequently was modified to include an additional channel—after the date on which it would have terminated automatically by operation of law. *See* IBFS File No. SES-MFS-20071107-01535 (granted Mar. 27, 2008); *see also infra* Section III.

addition, Deere's license was conditioned on its compliance with the *Comsat Order*,[14] which specifically imposed a noninterference condition on Deere's operations.[15] As explained herein, it is unclear whether Deere's actual operations are consistent with the terms of this license, which appears to have terminated automatically in 2002 in any event.

Deere Statements. In recent months, Deere has made numerous public statements asserting (wrongly) that: (i) it is entitled to interference protection throughout the 1525-1559 MHz downlink portion of the L Band; and (ii) the Commission must curtail the deployment of LightSquared's 4G LTE network—contrary to the objectives set forth in the *National Broadband Plan*—in order to protect Deere's receive-only operations. For example:

- In Reply Comments filed in mid-August, Deere asserted that "[r]eceivers that are intentionally designed to downlink signals across the full range of space-to-earth L-Band frequencies"—*i.e.*, the 1525-1559 MHz band—"including Deere's StarFire system, are . . . entitled to interference protection from all other L-Band spectrum users, including LightSquared's proposed terrestrial network."[16]

- In Comments filed in early August, Deere suggested that the Commission must protect Deere's receive-only operations in the 1525-1559 MHz band and should "focus its efforts on identifying other spectrum" to support LightSquared's broadband operations.[17]

- In a recent *ex parte* presentation, Deere asserted that "StarFire frequencies can be assigned anywhere in [the 1525-1559 MHz] band," and suggested that the Commission should prevent "harmful interference" into these operations.[18]

- Deere has asserted that "[s]upport of all these signals requires the antenna and first-stage amplifier/filters of [Deere's] high-precision receivers to be responsive to frequencies between 1525 MHz and 1610 MHz. In addition,

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14 *Comsat Mobile Communications*, 16 FCC Rcd 21661 (2001) ("*Comsat Order*").

15 *See* IBFS File No. SES-LIC-20010112-00051, License, at Section H.a., Condition 5830.

16 *See* Reply Comments of Deere & Company, IB Docket No. 11-109, at 23 (Aug. 15, 2011).

17 *See* Comments of Deere & Company, IB Docket No. 11-109, at 5 (Aug. 1, 2011).

18 *See* Letter from Counsel for Deere & Company, to Secretary, FCC, IB Docket No. 11-109, Att. at 3, 19 (Aug. 22, 2011) (page 19 of which is attached as Exhibit A hereto).

> at least 10% (9 MHz) additional margin must be provided at each end of the pass band to accommodate manufacturing process variability."[19]

As explained below, these statements are fundamentally inconsistent with the nature and scope of Deere's *actual* rights to operate in the 1525-1559 MHz band.

III. COMMISSION RECORDS REFLECT THAT DEERE'S LICENSE TERMINATED AUTOMATICALLY IN 2002, LEAVING NO AUTHORITY TO RENEW

Deere's L-Band receive-only license was granted initially in 2001. Under the then-applicable version of Section 25.133 of the Commission's rules, and the terms of Deere's license, Deere was required to bring its facilities into use within 12 months of the date of grant (*i.e.,* by October 9, 2002).[20] Under Section 25.161(a) of the Commission's rules as it existed in 2001 (and until late 2003), Deere's license was subject *to automatic termination without further notice* upon the "expiration of the required date of completion of construction or other required action specified in the authorization . . . *if a certification of completion of the required action has not been filed with the Commission* . . . ."[21] Notably, Deere's license also included conditions providing for such automatic termination.[22]

In preparing this petition, LightSquared, through counsel, conducted a thorough review of the Commission's electronic databases and the Commission's Public Reference Room regarding Call Sign E010011, and made informal inquiries of Commission staff. LightSquared has found no evidence that Deere filed the requisite certificate of completion.

Unless Deere submitted its certificate of completion in a timely fashion, Deere's license *automatically became null and void on October 9, 2002*, pursuant to Section

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19 Petition for Reconsideration of Deere & Company, SAT-MOD-20101118-00239, Exh. B, at 1 (Feb. 25, 2011).

20 *See* 47 C.F.R. § 25.133(a) (2001).

21 *See* 47 C.F.R. § 25.161(a) (2002) (emphasis added).

22 *See* IBFS File No. SES-LIC-20010112-00051, License, at Section A; Section H.a, Conditions 5018 & 5779; Section H.b. (requiring Deere to file a certificate of completion, and providing for automatic license termination if facilities are not operational, by October 9, 2002).

25.161(a) (as in effect at the time).[23] Thus, any use by Deere of the L Band to receive communications from Inmarsat spacecraft since then would have been unauthorized. Moreover, Deere should not have submitted a renewal application, and the Commission should not have granted a renewal, as Deere held no continuing authority for the Commission to renew.[24]

IV. RENEWAL WAS AND IS CONTRARY TO THE PUBLIC INTEREST

Even if Deere did hold a valid L-Band receive-only license, Deere did not satisfy the applicable renewal standard for earth stations. Therefore, the renewal application should be denied on reconsideration.

A. LightSquared's Next-Generation 4G LTE Wireless Network Will Deliver Significant Public Interest Benefits

As the *National Broadband Plan* recognizes, "[m]obile broadband is the next great challenge and opportunity for the United States. It is a nascent market in which the United States should lead."[25] In order to realize the numerous public interest benefits of mobile broadband services, the *Plan* recommends that the Commission make additional spectrum available for mobile broadband use,[26] and specifically urges the acceleration of the terrestrial deployment in MSS spectrum, including in the L Band.[27] By granting additional flexibility to conduct terrestrial operations using L-Band spectrum, the Commission advanced this goal, making more than 60 MHz of additional spectrum readily available for mobile broadband applications.

LightSquared's business model will ensure that the benefits of this decision are realized by consumers throughout the United States. LightSquared is implementing the

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23 *See, e.g., PanAmSat Licensee Corp.*, 16 FCC Rcd 11534, at ¶¶ 10-11 (2001).

24 Section 25.163 of the Commission's rules precludes the reinstatement of Deere's license nine years later. *See* 47 C.F.R. § 25.163(a) (petitions for reinstatement of authorizations terminated under Section 25.161 must: (i) be filed within 30 days of termination; (ii) explain the failure to submit the required filing in a timely manner; and (iii) detail the procedures established to ensure timely filings in the future).

25 *See National Broadband Plan*, at 9.

26 *Id.* at 10.

27 *Id.* at 87-88.

world's first wholesale-only integrated wireless broadband and satellite network, capable of providing connectivity throughout the United States. This network will provide a tremendous benefit to rural America, which has been routinely underserved by advanced technology, and will promote economic development. Because the network integrates satellite and ground-based wireless coverage, LightSquared will provide uninterrupted service even during power outages and other emergencies—a major benefit to first responders and public safety agencies.

LightSquared plans to invest $14 billion in network infrastructure, deployment, and operations over the next eight years. LightSquared's investment will create economic opportunities and job growth. In fact, LightSquared's system will support 15,000 jobs over the course of its five-year buildout.

LightSquared's innovative network also will strengthen and invigorate competition in the wireless broadband industry. Among other things, LightSquared's unique wholesale model will allow new wireless operators to provide services that otherwise might not have been possible. LightSquared will provide wholesale services using an open architecture that is intended to offer access to an affordable nationwide 4G LTE network for wireless operators that otherwise would not be in a position to offer competitively-priced and nationally-available mobile broadband service to their own retail customers. This will facilitate the ability of these operators to compete against Verizon, AT&T, and T-Mobile. In addition, LightSquared's deployment will increase the amount of valuable wireless spectrum in the market, place downward pressure on the cost of wireless capacity, and improve quality of service and lower prices for consumers.

These are but a few of the many public interest benefits that will flow from the significant investment LightSquared is making to provide for more intensive use of the L Band and further the other goals of the *National Broadband Plan*.[28]

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[28] *See also LightSquared Subsidiary LLC*, 26 FCC Rcd 566, at ¶¶ 29-35 (2011) (noting numerous public interest benefits stemming from LightSquared's 4G LTE wireless network).

B. Deere Is Leveraging Its Expired License in Order To Undermine LightSquared's 4G Network, and Broader Commission Policy

As noted above, in recent months Deere has made numerous public statements asserting that the Commission should curtail the deployment of LightSquared's terrestrial broadband network in the L Band in order to preserve Deere's ability to manufacture, market and operate receivers across the entire 1525-1559 MHz downlink portion of this band (even though Deere held a license to operate in only a very small segment of this band). In other words, Deere has made clear its plans to use any authority granted through renewal as part of an effort to foreclose LightSquared from implementing its nationwide 4G LTE wireless network. On this basis alone, the Commission should deny Deere's renewal application on reconsideration.

It bears emphasis that Deere's statements reflect a fundamental misunderstanding of the nature and scope of the rights Deere once held under its L-Band receive-only license—a misunderstanding that would be perpetuated if the renewal grant is allowed to stand as is. Moreover, Deere's assertions are inconsistent with Commission policy that end users of a satellite operator's service may not leverage that derivative right in order to prevent the satellite operator from coordinating use of the radio spectrum in the way it deems most appropriate. And they also are inconsistent with Commission policy that users of a small sliver of spectrum should not be allowed to use their authorizations to block others from deploying service to the public in a much larger spectrum band.[29]

As discussed in greater detail below: (i) Deere's license compelled it to operate on a non-interference basis and limited those operations to one narrow 2.5 kHz channel in one polarization; (ii) Deere was and is required to operate in a manner consistent with the existing coordination agreement between MSS operators in the L Band, which provides the basis on which LightSquared is building its 4G LTE wireless network in the L Band; and (iii) even if Deere's license were valid, Deere would have lost any interference protection it may have once enjoyed by operating at variance with its license. More broadly,

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[29] *Cf. FWCC Request for Declaratory Ruling*, 16 FCC Rcd 11511, at ¶ 17 (2001) (limiting spectrum available for blanket-licensed CSATs in order to avoid affecting the ability of terrestrial services to use spectrum for advanced telecommunications).

Deere's apparently unauthorized operations provide an independent basis for denying its renewal application, and therefore should be investigated thoroughly by the Commission. (*See* Section V, *infra*).

1. Deere's License Always Was Subject to a Non-Interference Condition

As an initial matter, Deere's operations always were to be conducted on a non-interference basis because: (i) that is the basis upon which Deere sought authority, and (ii) that is the basis on which Deere's operations were licensed. As noted above, Deere's initial license application included an explicit representation that "Deere accepts license condition [sic] that its receivers accept interference."[30] This representation was not qualified in any way, and has never been altered through a subsequent license modification. Deere's license necessarily was limited by the scope of the authority sought in its application.[31] Thus, even in the absence of any explicit licensing condition, Deere was bound to operate on a non-interference basis.[32] Moreover, Deere was limited to operating on one narrow 2.5 kHz channel in one polarization in the 1525-1559 MHz downlink segment of the L Band; while Deere subsequently modified its license to add an additional 2.5 kHz channel in the same polarization,[33] Deere's license apparently had terminated by operation of law by this point, for the reasons provided above.

2. Deere's Use of the L Band Is Derivative of the Rights of Its L-Band MSS Space Segment Provider Following Coordination

As an end-user of an L-Band MSS satellite system, Deere's rights to operate in the L Band are derivative of the rights of the satellite network from which it receives service.

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30 *See* IBFS File No. SES-LIC-20010112-00051, Application, at Att. A n.1.

31 *Cf. Graphnet Systems, Inc.*, 67 FCC 2d 1043, at ¶ 6 (1978) (authority limited to that sought in application).

32 This is consistent with the manuals for Deere's receivers, which assert that they are Part 15 devices that must be operated on a non-interference basis. *See, e.g., See* StarFire RTK 900 and 450 MHz Radios Operator Manual, *available at* http://manuals.deere.com/omview/OMPFP10776_19/?tM= (last visited Oct. 13, 2011) ("These devices comply with Part 15 of the FCC Rules.").

33 *See* IBFS File No. SES-MFS-20071107-01535 (granted Mar. 27, 2008).

Deere can have no greater rights than the rights of its satellite service provider, which is Inmarsat. Inmarsat, in turn, is required to coordinate its MSS system with other MSS operators, such as LightSquared.[34] Most recently, that coordination was effectuated in a 2007 agreement with LightSquared's predecessor which (i) resolved an eight-year-old coordination deadlock that previously existed, and (ii) after ratification of the United States, Canadian, and United Kingdom Administrations, facilitated the resolution of dozens of controversies before the Commission over the previously uncoordinated use of the L Band by end users like Deere itself.[35]

A multinational agreement entered into in 1996 provided for the L Band to be shared among satellite networks, including those operated by Inmarsat and LightSquared, through a spectrum sharing arrangement providing for each operator to use distinct band segments while serving the same geographic area (but providing for spectrum reuse across different geographic areas), and while ensuring that adjacent spectrum uses remain compatible with each other.[36] A few years later, however, difficulties in the annual review of that arrangement led to a deadlock among the affected satellite operators, leaving great uncertainty about the services that could be provided in the L Band—whether by new, state-of-the-art spacecraft, or by complementary ATC facilities. In December 2007, Inmarsat and LightSquared entered into a comprehensive international coordination agreement with respect to their current and future satellite networks, as well as with respect to any ATC that either party might deploy. Among other things, and consistent with the encouragement of the Commission,[37] that coordination agreement also allows for the deployment of an ATC network at different parameters than the "default" ATC rules. Thus, operations by one party

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34 *See generally SatCom Systems, Inc. and TMI Communications and Company, L.P.*, 14 FCC Rcd 20798, at ¶ 8 (1999).

35 *See Press Release: SkyTerra, Mobile Satellite Ventures and Inmarsat Sign Spectrum Coordination and Cooperation Agreement* (Dec. 21, 2007), *available at* http://www.skyterra.com/media/press-releases-view.cfm?id=158&yr=2007.

36 *See International Action: FCC Hails Historic Agreement on International Satellite Coordination*, News Release, Report No. IN 96-16 (Jun. 25, 1996).

37 *Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands*, 20 FCC Rcd 4616, at ¶¶ 43-47 (2005).

to that agreement that are consistent with that coordination agreement cannot be deemed to constitute "harmful interference" into the network of the other party. The ATC deployment that LightSquared has planned and is authorized to deploy is fully consistent with that agreement with Inmarsat.

In summary, then, Deere's operations are subject to the terms of the existing coordination agreement between LightSquared and Inmarsat, as MSS system operators in the L Band. Conceptually, this coordination agreement is no different than the coordination agreements in the fixed-satellite service ("FSS") industry that separated potentially "incompatible" single carrier per channel ("SCPC") VSAT traffic from higher-powered analog video traffic—agreements on which the Commission relied for decades. Longstanding precedent makes clear that the Commission: (i) relies on this coordination process to facilitate efficient use of the limited spectrum resource; (ii) allows satellite operators to make a variety of tradeoffs—including tradeoffs based on business considerations—in the course of coordination; and (iii) relies on satellite operators and their customers to honor those agreements.[38] Therefore, an earth station operator has no basis upon which to claim the existence of "harmful interference" from any operations that are consistent with the terms of a coordination agreement to which its space segment provider is bound. For this reason, the Commission routinely has required earth station licensees in the L Band to operate subject to the results of coordination, and on a non-interference basis in the absence of a coordination agreement.[39] Deere has been subject to these very conditions.

When the Commission established its rules for L-Band ATC operations, it anticipated that MSS operators would enter into arrangements like the LightSquared-Inmarsat coordination agreement to facilitate the "efficient and intensive use" of the L Band and "bring

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38 *See, e.g., Satellite Network Earth Stations*, 20 FCC Rcd 5666, at ¶ 51 (2005); *Fixed-Satellite Service (Reconsideration of 1988 Orbital Assignment Plan)*, 5 FCC Rcd 179, at ¶ 32 (1990); *Orion Satellite Corp.*, 5 FCC Rcd 4937, at ¶ 14 (1990); *GE American Communications*, 3 FCC Rcd 6871, at ¶ 2 (1988).

39 *See, e.g., Comsat Order* ¶ 115(d).

more options for high-quality communications at reasonable cost to all Americans."[40] Thus, while the Commission established certain "default" technical rules, the Commission expressly encouraged and empowered L-Band MSS satellite operators to negotiate and agree to less restrictive L-Band ATC operational limits in order to promote more efficient use of the spectrum.[41] Two years later, when the Commission modified its ATC rules on reconsideration, it made clear that satellite coordination agreements would *automatically supersede* the default limits specified in its rules.[42] By way of example, Section 25.253(a)(2) provides that "[a]ny future coordination agreement between the [MSS operators] governing ATC operation will supersede" the "default" in-band and out-of-band emissions limitations specified in the rule.[43]

Thus, the Commission clearly intended that such negotiated coordination agreements could be used to define the rights of MSS operators vis-à-vis each other as well as the derivative rights of their respective customers (in this case, Deere). Allowing a single receive-only operator, such as Deere, to "veto" such an arrangement would undermine the value of such agreements, and moreover would be inconsistent with the framework set forth in the ITU Radio Regulations.

The Commission already has concluded as much in its 2010 *SkyTerra Order*, which rejected claims that L-Band earth station licensees (such as Deere) are entitled to protection from "overload" above and beyond that provided under the LightSquared-Inmarsat coordination agreement. In the underlying pleadings, Amtech and Skywave made precisely

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40 *Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands*, 20 FCC Rcd 4616, at ¶¶ 43-47, 95 (2005) ("*Second ATC Reconsideration Order*").

41 *Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands*, 18 FCC Rcd 1962, at ¶ 143 (2003).

42 *Second ATC Reconsideration Order* ¶¶ 43-47.

43 47 C.F.R. § 25.253(a).

those arguments now being advanced by Deere at the Commission.[44] In rejecting these arguments, the Commission noted that "[r]eliance on satellite-operator coordination agreements is an important aspect of a longstanding Commission policy of reliance on marketplace mechanisms to develop solutions to interference concerns, and of refraining from interfering unnecessarily with licensees' business negotiations,"[45] and that such agreements "serve[] the public interest by promoting overall spectrum efficiency and facilitating provision of valuable new services . . . ."[46]

Critically, the Commission acknowledged that giving effect to such agreements could "present challenges to earth station operators using the satellites involved, and *may require modification of operations, deployment of new equipment, or other adjustments.*"[47] The Commission found that giving effect to such agreements would serve the public interest notwithstanding these challenges, and that "it would not serve the public interest for the Commission to assume the role of an arbiter of disputes between a satellite operator and its customers . . . ."[48] The Commission should reach the same result here as in the *SkyTerra Order,* and make clear that Deere has no greater rights in the L Band than the right Inmarsat has to provide Deere service under the LightSquared-Inmarsat coordination agreement.

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44 *See* Petition to Deny of Amtech Systems, LLC, IBFS File Nos. SAT-MOD-20090429-00047, SAT-MOD-20090429-00046, SES-MOD-20090429-00536 (filed Jul. 10, 2009); Comments of SkyWave Mobile Communications, Corp., IBFS File Nos. SAT-MOD-20090429-00047, SAT-MOD-20090429-00046, SES-MOD-20090429-00536 (filed Jul. 10, 2009).

45 *SkyTerra Subsidiary LLC*, DA 10-534, at ¶ 29 (Mar. 26, 2010) ("*SkyTerra Order*"); *see also Principles for Promoting Efficient Use of Spectrum by Encouraging the Development of Secondary Markets*, 15 FCC Rcd 24178, at ¶ 8 (2000) ("[I]n general, the best way to realize the maximum benefits from the spectrum is to permit and promote the operation of market forces in determining how spectrum is used").

46 *SkyTerra Order* ¶ 30.

47 *Id.* (emphasis added).

48 *Id.*

3. Even if Deere Still Held a License, Deere's Right to Interference Protection Would Have Terminated By Virtue of Its Apparently Unauthorized Operations

As discussed in greater detail in Section V below, publicly available information strongly suggests that Deere's operations in the 1525-1559 MHz band have been at variance with the terms of its receive-only license—both prior to and following automatic termination of that license in 2002.[49] To the extent this in fact is the case, any remaining interference protection would have terminated automatically by operation of law.

Specifically, Section 25.162 of the Commission's rules provides that the interference protection otherwise enjoyed by a receive-only earth station "*shall be automatically terminated*" where the Commission finds that the actual use of the facility is inconsistent with the Communications Act, the Commission's rules or policies, or the terms and conditions of the underlying authorization.[50] The Commission has explained that Section 25.162 "provide[s] for eliminating protection from interference in cases where a *licensee*" does not utilize its receive-only earth station in the expected manner.[51] Section 25.162 reflects the Commission's policy determination that parties that fail to comply with applicable regulations or license terms should not be rewarded through the perpetuation of

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49 Namely: (i) Deere may be operating outside of the specific frequencies once authorized; (ii) Deere may be operating unauthorized antenna/receiver types; (iii) Deere may be receiving transmissions from unauthorized points of communication; (iv) Deere may be operating more than the 10,000 terminals it was authorized to deploy; (v) Deere may be operating receivers that do not conform to the MSS allocation in the 1525-1559 MHz band, without having first obtained a required waiver of the U.S. Table of Allocations; (vi) Deere may be operating transmit/receive devices that are outside the scope of its authority; and (vii) Deere may have failed to maintain adequate "control" of radiocommunication devices.

50 *See* 47 C.F.R. § 25.162 (emphasis added).

51 *See Satellite Network Earth Stations*, 20 FCC Rcd 5666, at ¶ 115 (2005) (emphasis added); *Maritime Telecommunications Network, Inc.*, 16 FCC Rcd 11615, at ¶ 32 (2001). This is consistent with the fact that Deere would be an earth station registrant but for the fact that it is communicating with non-U.S.-licensed, L-Band Inmarsat spacecraft. *See* 47 C.F.R. § 25.131(j). *See also Earth Station Application Procedures*, 6 FCC Rcd 2806, at ¶ 7 (1991) ("[W]e emphasize that a registration program will afford the *same protection from interference* as would a license issued under our former procedure.") (emphasis added).

their rights to interference protection (*e.g.*, through license renewal)—to the extent that those rights otherwise would exist.

V. THE COMMISSION SHOULD ADDRESS CRITICAL QUESTIONS WITH RESPECT TO DEERE'S UNAUTHORIZED OPERATIONS

Even if the Commission were to determine that Deere's license did *not* terminate automatically in 2002, significant outstanding questions would remain about whether Deere's operations have been consistent with the terms of that license. As explained below, it appears that they have not been. The Commission should conduct a thorough inquiry of these matters to determine whether Deere has in fact operated outside of the terms of its authorization, the Communications Act, and Commission rules and policies.

A. Deere's Actual Operations Appear Inconsistent with the Operating Authority Granted by the Commission

Because Deere's equipment communicates with non-U.S.-licensed spacecraft, Deere must obtain a Commission license prior to commencing operations with any given receiver.[52] Based on publicly available information—including information provided by Deere itself—it appears that Deere has not obtained or maintained sufficient authority to cover its actual operations. Because Deere did not disclose these changes in its renewal application, it also appears that Deere may have certified falsely in that application that the information on file with the Commission at the time remained accurate and truthful without exception.[53] Such behavior calls into question whether Deere is qualified to serve as a Commission licensee. More specifically:

Deere may be operating outside of its authorized frequencies. Deere is *not* licensed to operate throughout the 1525-1559 MHz band, and thus *cannot* operate—and certainly cannot claim interference protection—throughout that band.[54] Rather, Deere has

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52 47 C.F.R. § 25.131(j).

53 *See* FCC Form 312-R, Question 8.

54 The Part 25 earth station registration mechanism is not available for Deere receivers, which communicate with non-U.S.-licensed, non-Permitted List Inmarsat spacecraft in the L Band. *See* 47 C.F.R. § 25.131(j). The Permitted List applies only to standard C- and Ku- and certain Ka-band spacecraft, such that Inmarsat's L-Band spacecraft are categorically excluded.

been licensed to conduct receive operations in, at most, two narrow 2.5 kHz channels, centered at 1545.5440 MHz and 1535.1525 MHz under its last license modification. Nevertheless, Deere asserts that it is entitled to interference protection "across the full range of space-to-earth L-Band frequencies"—*i.e.*, throughout the entire 1525-1559 MHz band.[55] In addition, Deere's recent *ex parte* presentations indicate that Deere is operating in at least *three* channels (and perhaps six)—including at least one channel that does not correspond to frequencies listed on Deere's license.[56] Exhibit A contains an excerpt from one such presentation, depicting what Deere calls its "[c]urrent assignments" at 1535, 1537, and 1545 MHz.[57] There is no indication that Deere ever was licensed at 1537 MHz.

Deere may be operating unauthorized antenna/receiver types. An applicant for an earth station license must specify, with precision, the antenna model(s) to be covered by the requested authorization. Deere's license specified only a single device—the John Deere Model PF80385, which appears to be an early-generation StarFire receiver. Consistent with that application, Deere's license authorized Deere to operate only a single receiver type—the John Deere Model PF80385. Yet, Deere's website indicates that it is manufacturing and marketing for use in the United States a number of additional receiver configurations. These include: (i) the StarFire 3000 Receiver; (ii) the StarFire 300 Receiver; (iii) a number of StarFire ITC Receivers; and (iv) a number of integrated combinations of StarFire receivers and RTK radios. As shown on Exhibit B, these other devices appear physically different than the John Deere Model PF80385, and may be different from an electromagnetic perspective as well—an issue that warrants examination.

Deere may have deployed equipment intended for the reception of communications from foreign radio stations. Under the Commission's rules, an earth station may receive communications from a foreign spacecraft only if it is specifically

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55 *See* Reply Comments of Deere & Company, IB Docket No. 11-109, at 23 (Aug. 15, 2011).

56 *See* Letter from Counsel for Deere & Company, to Secretary, FCC, IB Docket No. 11-109, Att. at 19 (Aug. 22, 2011) (page 19 of which is attached as Exhibit A hereto).

57 *Id.*

authorized to do so in the relevant license.[58] The only non-U.S. spacecraft with which Deere was authorized to communicate under the terms of its license were Inmarsat spacecraft. The Commission has been clear that its rules require Deere to obtain a license prior to receiving signals from other foreign spacecraft: "The Federal Communications Commission's (FCC) rules require licensing of non-Federal receive-only equipment operating with foreign satellite systems, including receive-only earth stations operating with non-U.S. licensed radionavigation-satellite service (RNSS) satellites."[59] Contrary to this express requirement, it appears that Deere's newest receivers—and potentially older receivers with wideband "listening" capabilities—are capable of receiving, and are used to receive, transmissions from the GLONASS RNSS system, which is operated under authority of Russia. For example, Deere's product brochures note that the StarFire 3000 receiver offers "increased satellite availability through GLONASS, the Russian satellite constellation," beginning in 2011.[60] The website of NavCom—the Deere subsidiary that manufactures StarFire devices—confirms as much and notes that "[i]n 2011, NavCom launched StarFire™ GNSS, which supports GPS + GLONASS corrections and also provides improved real-time accuracy of five centimeters."[61] The website of a North Carolina-based provider of GPS-based farming equipment suggests that Deere receivers used in the United States are in fact receiving GLONASS signals.[62]

Deere may have deployed more than 10,000 StarFire terminals. Deere's license permitted it to operate no more than 10,000 John Deere Model PF80385 terminals. A

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58 *See* 47 C.F.R. § 25.131(j). This rule also allows communication with certain foreign-licensed C, Ku, or Ka band spacecraft that are on the Commission's "Permitted List" (which does not apply to the L Band).

59 *NTIA Provides Information Concerning Executive Branch Recommendations for Waiver of Part 25 Rules Concerning Licensing of Receive-Only Earth Stations Operating with Non-U.S. Radionavigation Satellites*, DA 11-498 (rel. Mar. 15, 2011).

60 *See* John Deere, GreenStar Product Brochure at 8, *available at* http://www.deere.com/en_US/docs/zmags/agriculture/online_brochures/greenstar/static/greenstar_zmags.html (last visited Oct. 6, 2011).

61 *See* StarFire Product Description, *at* http://www.navcomtech.com/StarFire/ (last visited Oct. 6, 2011) ("History" tab).

62 *See* http://vauseequipment.com/vause%E2%80%99s-news.aspx (last visited Oct. 10, 2011).

2007 NavCom white paper explains that far many more have been deployed so far: "[t]here are more than 40,000 StarFire receivers deployed worldwide for use in an increasingly diverse set of applications."[63] Because Deere's net sales revenues for the U.S. and Canada historically have been 2-3 times those for the rest of the world combined,[64] it is reasonable to expect that more than 10,000 StarFire receivers have been deployed in the United States.

Deere may have deployed nonconforming fixed-satellite service devices without requisite authority. The United States Table of Allocations contains a primary allocation for MSS in the 1525-1559 MHz band.[65] MSS is defined as a "radiocommunication service: (1) Between mobile earth stations and one or more space stations, or between space stations used by this service; or (2) Between mobile earth stations by means of one or more space stations."[66] "Mobile earth station," in turn, is defined as: "An earth station in the mobile-satellite service intended to be used while in motion or during halts at unspecified points."[67]

It appears that Deere is marketing a number of integrated combinations of StarFire receivers and RTK radios that can operate as fixed (or temporary-fixed) earth stations that receive a StarFire signal (either through an "RTK" receiver or another StarFire receiver type incorporated into the unit), and use that signal to produce localized GPS correction factors. Notably, the product manual for the StarFire iTC and RTK configuration (an excerpt from which is attached as Exhibit C) provides guidance for users wishing to permanently attach StarFire receivers to barns, towers, and other fixed structures.[68] If so,

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63 *See* Kevin Dixon, *StarFire: A Global SBAS for Sub-Decimeter Precise Point Positioning*, at 7, *available at* http://www.navcomtech.com/Support/DownloadCenter.cfm?category=whitepapers (Jan. 2007).

64 *See* Deere & Company, *Historical Income Statement*, *available at* http://www.deere.com/en_US/docs/Corporate/investor_relations/pdf/factbook/historical.pdf (Dec. 22, 2010).

65 47 C.F.R. § 2.106.

66 47 C.F.R. § 2.1(c). Under the United States Table of Allocations (US380), this includes ATC operations. 47 C.F.R. § 2.106 n.US380.

67 47 C.F.R. § 2.1(c).

68 *See* StarFire and RTK Operator's Manual (2009), *available at* http://stellarsupport.deere.com/en_US/support/pdf/om/en/OMPC21514_StafireiTC_RTK.pdf.

when communicating with spacecraft, these terminals actually are operating in the FSS, and not the MSS—and thus represent a nonconforming use of the 1525-1559 MHz band. Such operations would require a waiver of the United States Table of Allocations, which Deere has neither sought nor obtained, and would not be entitled to interference protection.[69]

Deere may have deployed transmit-receive facilities. At most, Deere's Part 25 receive-only license once authorized Deere to conduct its StarFire service through receive-only terminals. Yet, it appears that Deere is marketing "RTK" implementations that receive the StarFire signal, use that signal to produce localized GPS correction factors, and then *transmit* this information to nearby mobile terminals using frequencies in the 450 or 900 MHz bands. In other words, at least some implementations of the Deere StarFire RTK radio operate effectively as two-way devices that take a communication link *from* Inmarsat (and apparently foreign RNSS) spacecraft and retransmit that communication *to* StarFire mobile receivers. These StarFire RTK implementations thus are more than "receive-only" earth stations, and do not fall squarely within the terms of Deere's prior authority. None of this was disclosed in Deere's 2001 receive-only application, nor was it disclosed in the subsequent modification applications or Deere's 2011 renewal application. This provides yet another reason to conclude that Deere is operating in the L Band at variance from the Part 25, receive-only license it once held.

Deere may not be exercising appropriate "control" over the StarFire receivers it has deployed. Section 25.119 of the Commission's rules provides that prior approval is required for any transfer of control of a Commission licensee.[70] Accordingly, Deere is required to exercise "control" over each of the StarFire terminals that it operates. Moreover, Deere's "blanket" authority was premised on Deere's ability to ensure that its receivers are technically identical to each other, which assumes that Deere can exert sufficient "control" to prevent an end user from modifying a StarFire terminal or using it in a way that does not conform to Deere's authority.

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69 *See, e.g., QUALCOMM, Inc.*, Memorandum Opinion, Order and Authorization, 4 FCC Rcd 1543, at ¶ 11 (1989); *see also id.* ¶ 8 n.14 ("Operations from a fixed earth station to a satellite constitute a fixed-satellite service.").

70 47 C.F.R. § 25.119.

However, the manual for the StarFire RTK 450 Radio allocates these responsibilities to Deere's customers. Namely, Deere requires that each end user of that radio must obtain an individual license from the Commission in order to transmit with that radio in the 450 MHz band.[71] The terms of such a license necessarily require the *end user* to exercise "control" over the device.[72] There is no indication in the Commission's electronic databases that applications seeking authority for any such transfers with respect to Deere's L Band license have been filed. Ambiguities about who actually controls the use of these Deere devices make it even more critical that the Commission clarify that use of these devices is on a strict non-interference basis, and that their use provides no basis to complain about the operation of any authorized radio service.

B. The Commission Should Conduct a Thorough Investigation of Deere's Apparently Unauthorized Operations

As noted above, Section 25.156(a) of the Commission's rules provides that renewal applications may be granted if the Commission finds that: (i) the applicant is legally, technically, and otherwise qualified; (ii) the proposed facilities and operations comply with all applicable rules, regulations, and policies; and (iii) grant of the application will serve the public interest, convenience and necessity.[73] In light of the issues noted above, there are significant reasons to believe that Deere's activities do not comply, and have not complied, with all applicable rules, regulations, and policies, and that grant of Deere's renewal application would not advance the public interest, convenience, and necessity. In addition, Deere's unauthorized operations, which appear to be willful and repeated, call into question whether Deere has the requisite character qualifications to serve as a Commission licensee, and whether it has made false certifications to the Commission.

Accordingly, and as discussed above, the Commission should conduct a thorough inquiry into the nature of Deere's activities and its representations to the

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71 *See* StarFire RTK 900 and 450 MHz Radios Operator Manual, *available at* http://manuals.deere.com/omview/OMPFP10776_19/?tM= (last visited Oct. 13, 2011).

72 *See* 47 C.F.R. § 1.948.

73 47 C.F.R. § 25.156(a).

Commission. At a minimum, the Commission should require Deere to provide specific information with respect to:

1. The exact frequency bands in which it has conducted receive-only operations;
2. The exact antenna/receiver types that it has deployed, the dates of deployment, and the exact number of each type deployed;
3. The exact spacecraft with which its devices communicate with now and have communicated in the past;
4. The specifics of all two-way Deere communications devices; and
5. How Deere exercises the requisite level of control over its devices.

In light of the information presented above, it is appropriate for the Enforcement Bureau to issue such an inquiry and conduct a comprehensive evaluation of information received in response, and determine whether Deere has acted in accordance with the terms of its existing license, as well as the requirements of the Communications Act and the Commission's rules and policies. Any findings that Deere has not done so would warrant denying the renewal application and potentially imposing other sanctions.

VI. ANY RENEWAL OF DEERE'S LICENSE WITHOUT APPROPRIATE LIMITING CONDITIONS WOULD BE CONTRARY TO THE PUBLIC INTEREST, CONVENIENCE, AND NECESSITY

Deere's public statements clearly indicate that it wishes to use the 1525-1559 MHz band in a manner that would undermine the implementation of LightSquared's next-generation 4G LTE wireless network, and the delivery of the benefits of mobile broadband to hundreds of millions of users—including in rural areas—consistent with the *National Broadband Plan.* In order to mitigate the potential for harm that would result if Deere were allowed to foreclose LightSquared's use of the L Band for that purpose, the Commission should impose the following conditions on Deere's license, if it decides to renew the Deere license after concluding, following an investigation, that: (i) Deere's license was not automatically terminated in 2002 and is not now null and void; and (ii) Deere has not in fact engaged in unauthorized operations that warrant declining to renew Deere's authority:

First, the Commission should make clear that all operations under Deere's license are subject to the condition that Deere accept all interference that may be caused by the operation of any other authorized radio station (including those operated by LightSquared or its wholesale customers). An unambiguous condition of this type is needed to disabuse Deere of the notion that it is entitled to interference protection throughout the 1525-1559 MHz band.

Second, the Commission should require Deere receivers to meet minimum standards to ensure compatibility with other users of the 1525-1559 MHz band. Such standards would help to guard against the possibility that Deere would experience actual interference, or that Deere would seek to curtail operations of the LightSquared network or compromise the intended use of the 1525-1559 MHz band at a later date.[74] Notably, in 2003 the Commission imposed similar standards on aircraft-based devices operating in the 108-117.975 MHz band and providing "differential GPS"—a term that encompasses the satellite-based augmentation provided by the StarFire system.[75] More specifically, the Commission required such receivers to meet International Civil Aviation Organization ("ICAO") standards to ensure that their operation was compatible with FM broadcasting systems, and that entities operating those receivers could not seek to foreclose broadcasting operations in the band.[76] Imposing such a condition is also appropriate because the Commission already has noted the need to "look closely at . . . establishing receiver standards relative to the ability [of receivers like Deere's StarFire devices] to reject interference from signals outside [RNSS] allocated spectrum [in the 1559-1610 MHz band]."[77] Deere's license also should be subject to an

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74 LightSquared already has demonstrated that it is possible to design receivers that are compatible with LightSquared's intended MSS/ATC operations. *See, e.g., LightSquared Announces Simple, Affordable Solution to GPS Interference Issues* (Sep. 21, 2011), *available at* http://www.lightsquared.com/press-room/press-releases/.

75 *See Review of Part 87 of the Commission's Rules Concerning the Aviation Radio Service*, 18 FCC Rcd 21432, at ¶ 55 (2003).

76 *Id.* at ¶¶ 53, 55.

77 *See Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5-1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz*, 26 FCC Rcd 5710, at ¶ 28 (2011), *recon. pending.*

explicit condition requiring Deere to comply with any standards that are adopted in such a rulemaking.

VII. CONCLUSION

For the foregoing reasons, LightSquared urges the Commission to reconsider its grant of Deere's renewal application and deny that application. It appears that Deere's license terminated automatically in 2002, such that Deere holds no license to renew. Even if Deere did continue to hold a license, renewal would be contrary to the public interest, convenience, and necessity given: (i) Deere's intent to claim spectrum rights it does not have and foreclose the implementation of LightSquared's 4G LTE wireless network; and (ii) the significant outstanding questions as to whether Deere's operations have been consistent with the Commission's rules and the terms and conditions of Deere's long-expired license—questions that the Commission should resolve by conducting a thorough inquiry. If, after completing such an inquiry, the Commission nevertheless decides to grant renewal, it should do so only with clear and unambiguous conditions requiring Deere to operate on a strict noninterference basis, while satisfying minimum standards to ensure compatibility with other users of the 1525-1559 MHz band.

Respectfully submitted,

/s/ Jeffrey J. Carlisle

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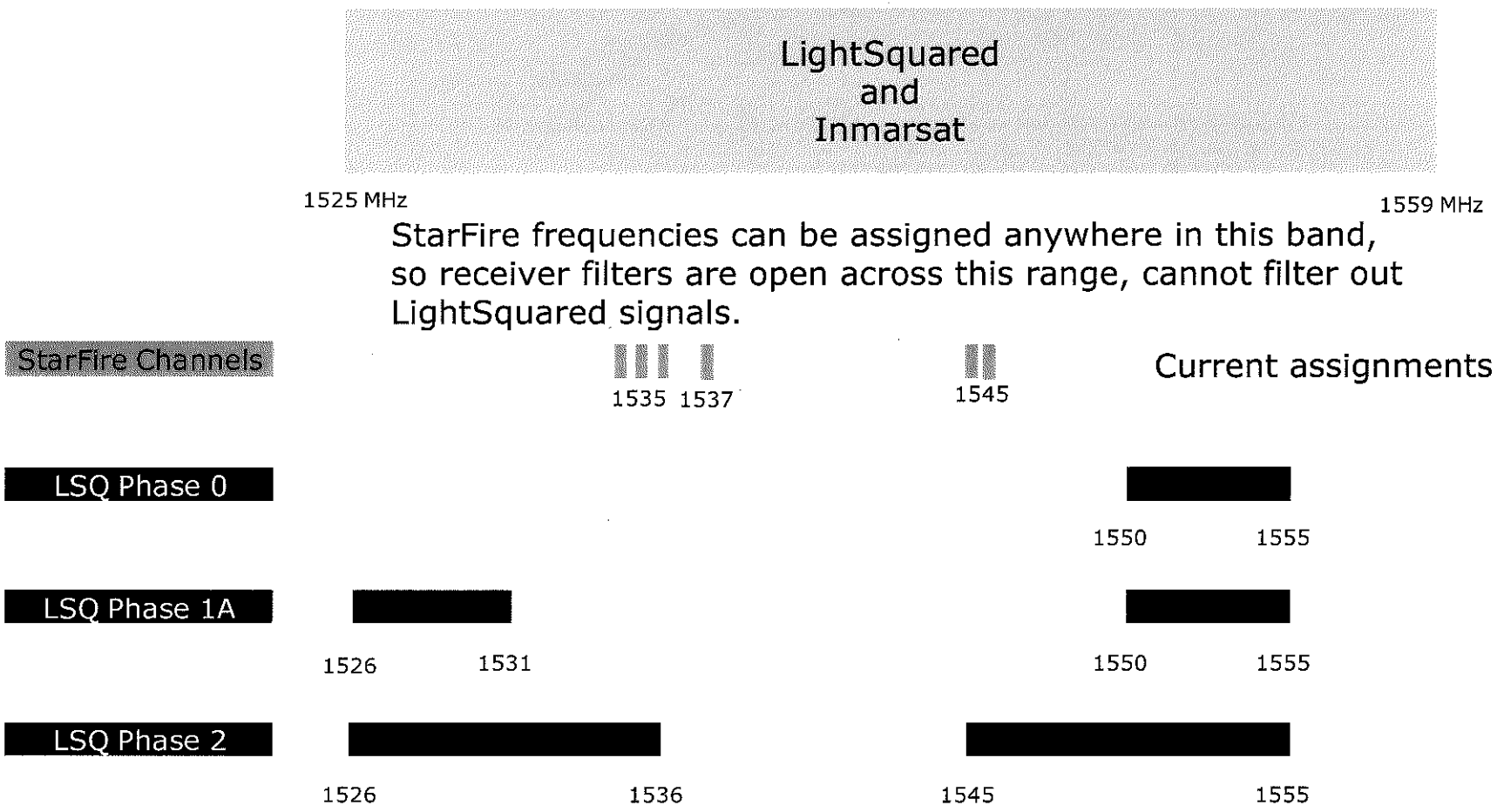
Exhibit A

Deere "Current Operations"

LightSquared Rollout and StarFire Frequencies



JOHN DEERE

Exhibit B

Selected StarFire Receiver Types

StarFire Model PF80385

Source: http://dozerdeals.com/jd-starfire-receiver-gen2-greenstar-gps/

StarFire 300 Receiver

Source: GreenStar Product Brochure, Page 22

StarFire 3000 Receiver

Source: GreenStar Product Brochure, Page 22

StarFire ITC

Source: http://www.fastline.com/v100/listings.aspx?keywords=starfire

StarFire 450 RTK Radio

Source: http://www.deere.com/en_US/media/corporate_images/2010_press_releases/march/itc_deluxe_450.jpg

StarFire RTK 900 Radio

Source: http://www.deere.com/wps/dcom/en_US/products/equipment/ag_management_solutions/displays_and_receivers/starfire_900_rtk_radio/starfire_900_rtk_radio.page

Exhibit C

StarFire iTC and RTK Manual Excerpt

StarFire iTC and RTK

OPERATOR'S MANUAL

StarFire iTC and RTK

OMPC21514 ISSUE E9 (ENGLISH)

CALIFORNIA

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

If this product contains a gasoline engine:

⚠ WARNING

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

The State of California requires the above two warnings.

John Deere Ag Management Solutions
(This manual replaces OMPC20960)
North American Version
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Introduction

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NOTE: Product functionality may not be fully represented in this document due to product changes occurring after the time of printing. Read the latest Operator's Manual and Quick Reference Guide prior to operation. To obtain a copy, see your dealer or visit www.StellarSupport.com

OUO6050,0000FB1 -19-12MAY09-1/1

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Original Instructions. All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

RTK Base Station Setup

System Overview

The StarFire™ RTK system consists of a local base station placed in a field or mounted on a structure that transmits high accuracy corrections to the vehicle StarFire™ receiver using RTK radios. The StarFire™ receiver on the RTK-equipped vehicle must have a direct line of sight with the base station in order to receive the RTK signal.

Performance of the RTK system is related to the operating distance from the base station. When operating beyond 20 km (12 miles), degraded accuracy will occur and it may take longer to initially acquire the RTK signal.

A repeater, which is simply an RTK radio supplied with 12 volts of power, can be used to receive the base station signal and establish a new line of sight point. However, performance limitations can still be expected if trying to use the repeater to transmit the RTK signal to a vehicle that is farther than 20 km (12 miles) away from the base station.

Receiver—On Vehicle

Position receiver with integrated RTK radio module is located on top of machine. Position receiver receives global positioning and differential correction signal through a single receiver and integrates signal for use with system.

The receiver has a dedicated operating mode (Vehicle Mode). Refer to "Operating Mode—RTK" in "StarFire iTC" Section for setup of the receiver on vehicle.

IMPORTANT: The antenna must be installed before the radio module is powered ON.

Avoid water intrusion by keeping the antenna attached whenever possible.

ZX1038873

ZX1038873 —UN—06FEB06

Removing the antenna while transmitting may damage the radio module.

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Receiver—On Base Station

The base station is the most critical part of an RTK system. During installation, care must be taken to ensure the base has problem-free operation. There are two issues that are responsible for most problems with a base station: **Shading and Multipathing**. If a base station experiences one of these problems, it could be detrimental to your RTK operation. Although it may not be possible to locate a base station in an ideal location, this guide is aimed at helping to define the best option available.

Base station operating mode can be either Absolute Survey Base Mode or Quick survey Base Mode. Refer to "Operating Mode—RTK" in "StarFire iTC" Section for setup of the receiver on base station.

Refer to "Base Station Operation and Setup" in "StarFire iTC" Section for proper use and setup of the base station.

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Repeater Radio

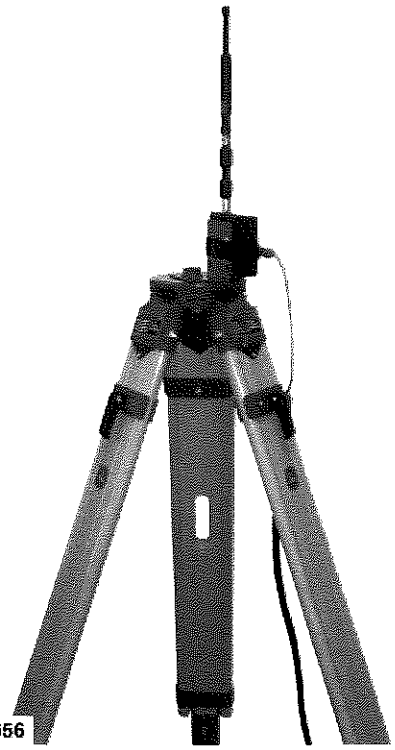
The radio can be configured to act separately as a repeater. A repeater is required if obstructions (i.e. trees, hills, etc.) exist between the base station and vehicle(s) or if base station is too far away from the vehicles.

A repeater consists of:

- Radio (configured as a repeater)
- Harness
- Mounting Bracket
- 12 Volt Power Source
- Tripod or wall mount cradle

IMPORTANT: A repeater can only be used to repeat a signal from a base station to a vehicle. Therefore, a repeater cannot be used in a "daisy chain," repeating the signal from one repeater to another.

Refer to "Repeater—RTK" in "StarFire iTC" Section to properly configure radio as repeater.



ZX1038656

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Installation of the RTK radio and antenna

Once you have installed the base station receiver, installing the radio in a location to best maximize the output, can be a challenge. Below are four options currently available through John Deere.

- Leave the RTK radio in its original configuration attached directly behind the base station receiver.
- Use a repeater as part of the base station. Install a radio with the base station receiver. Then install a Repeater radio, available through whole goods or parts, in an elevated location. The base station will then send the RTK data to the repeater and the repeater will then transmit that data out to the vehicle on the network. This will eliminate other repeaters in the system.

  NOTE: It is important to remember that additional repeaters can not be run off of the central repeater. In areas with heavy foliage or uneven terrain, this setup method is not advived

- Use PF80821 extension harness (92 m; 300 foot in length), moving the radio from the back of the base station receiver to an elevated position, and running the harness in between.

  NOTE: It is important to use the PF80821 harness and grounding wire properly according to the installation instructions. This harness has built in protection for both your radio and receiver for unwanted static electricity developed on the harness.

- Attach the RTK radio in a secured location and run coaxial cable between the radio and the antenna.

  IMPORTANT: The antenna must be installed before the radio module is powered ON.

  Avoid water intrusion by keeping the antenna attached whenever possible.

  Removing the antenna while transmitting may damage the radio module.

  IMPORTANT: If using a coaxial cable between the radio and the antenna, you need to use the lowest-loss cable available or you may suffer RTK radio link range issues.

  NOTE: When using this option, it may be necessary to install a higher-gain antenna to compensate for loss.

Always mount the radio antenna vertically to make sure that the RTK signal is radiating outwards. If the antenna is at an angle, it may cause the data received at the vehicle to be lower than expected.

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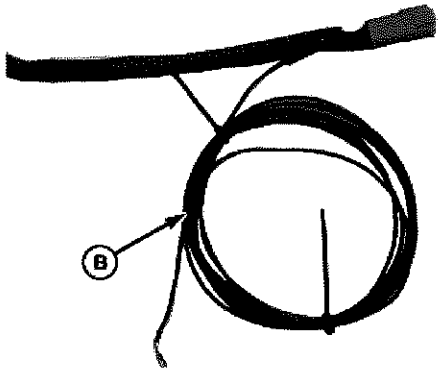
Attaching RTK Harness



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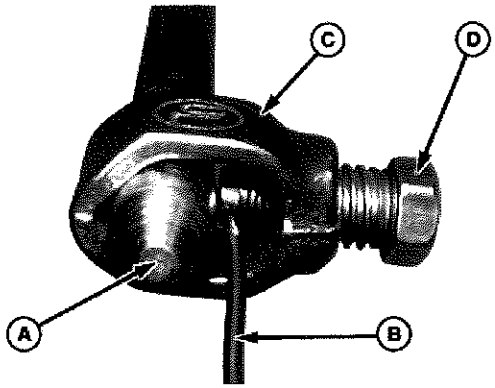
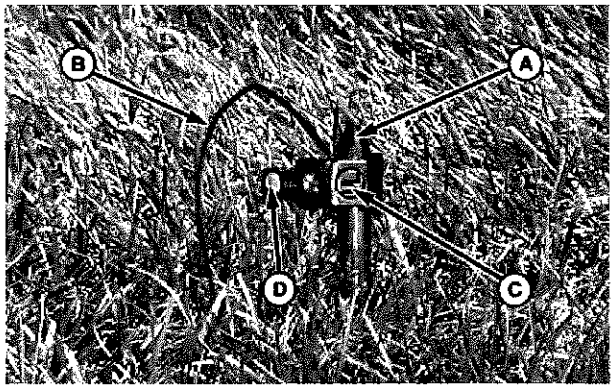
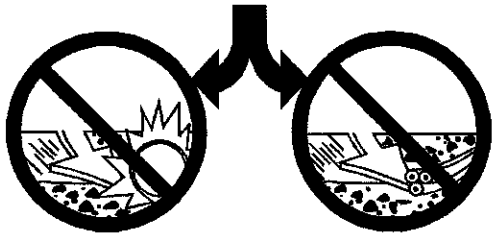


PC8568 —UN—14JUL05



PC8571 —UN—14JUL05



PC8569 —UN—14JUL05

A—Rod B—Grounding Wire C—Collar D—Screw

CAUTION: Avoid serious injury or death to you or others. Contact your local utility companies to determine the location of gas, electric, or water lines. Placement of grounding rod must be a safe distance away from pipelines and cables.

IMPORTANT: Carefully choose location of rod so that it is away from paths where it could damage equipment or be damaged by equipment.

DO NOT route RTK Extension harness along any other power sources. Keep harness at least 2m (6 ft) away from any other AC power lines.

1. Attach harness between radio and receiver.
2. Carefully determine placement of rod (A) a safe distance away from pipelines and cables. Drive into ground leaving one end above surface.
3. Route grounding wire (B) from harness to rod. Grounding wire may be extended if necessary to reach rod.
4. Remove insulation from end of grounding wire.
5. Place collar (C) over end of rod.
6. Place grounding wire between rod and screw (D).
7. Tighten screw.
8. Restrain harness to supporting structures as necessary to keep them away from equipment, damage, and to reduce wire strain.

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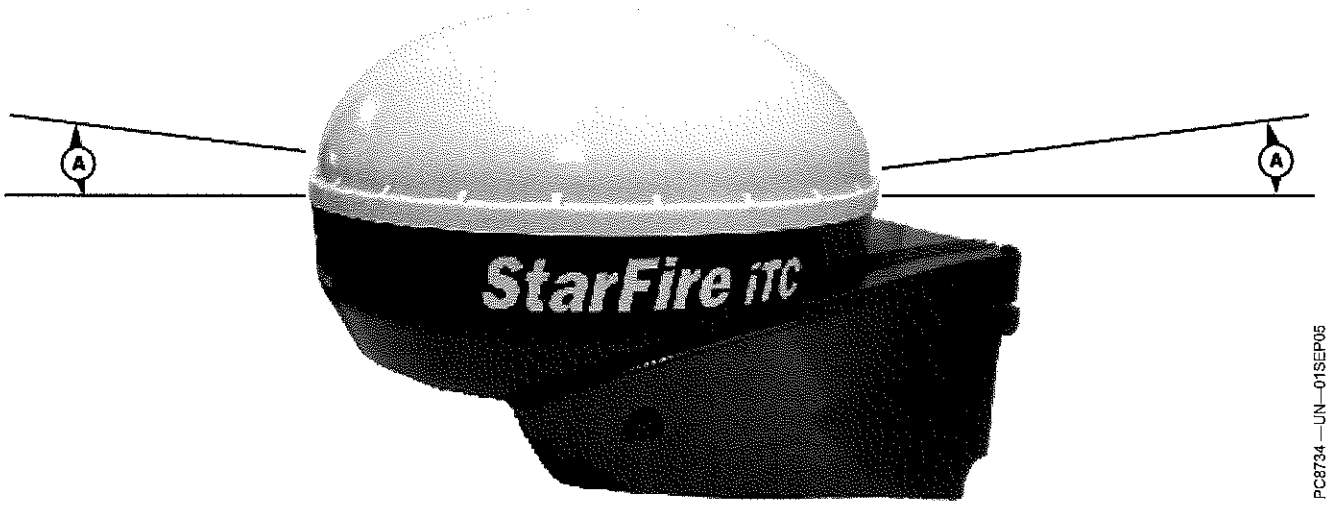
RTK Network Base Station Setup



PC8734 —UN—01SEP05

A—7° Off the Horizon (Mask)

Installing and operation of the Base Station Receiver.

The base station is the most critical part of the RTK operation, so setting up a base station correctly is vital to the operation of the RTK system. If the Base Station Receiver is setup in a questionable location, the receiver could have two separate issues; Shading and Multipathing

Shading:

In order to insure proper operation of a RTK base station, the GPS Receiver must have a clear view of the sky in all directions above 7 degrees off the horizon. Both the base receiver and the vehicle receiver will use any satellites that are above 7 degrees off the horizon. If a base station receiver can't use a satellite above 7 degrees, then all vehicles operating on that base station also can't use that blocked satellite. This is call "Shading" of the base station. If enough of this occurs your RTK system could be inaccurate. Many things can cause shading such as buildings, towers, poles and grain legs.

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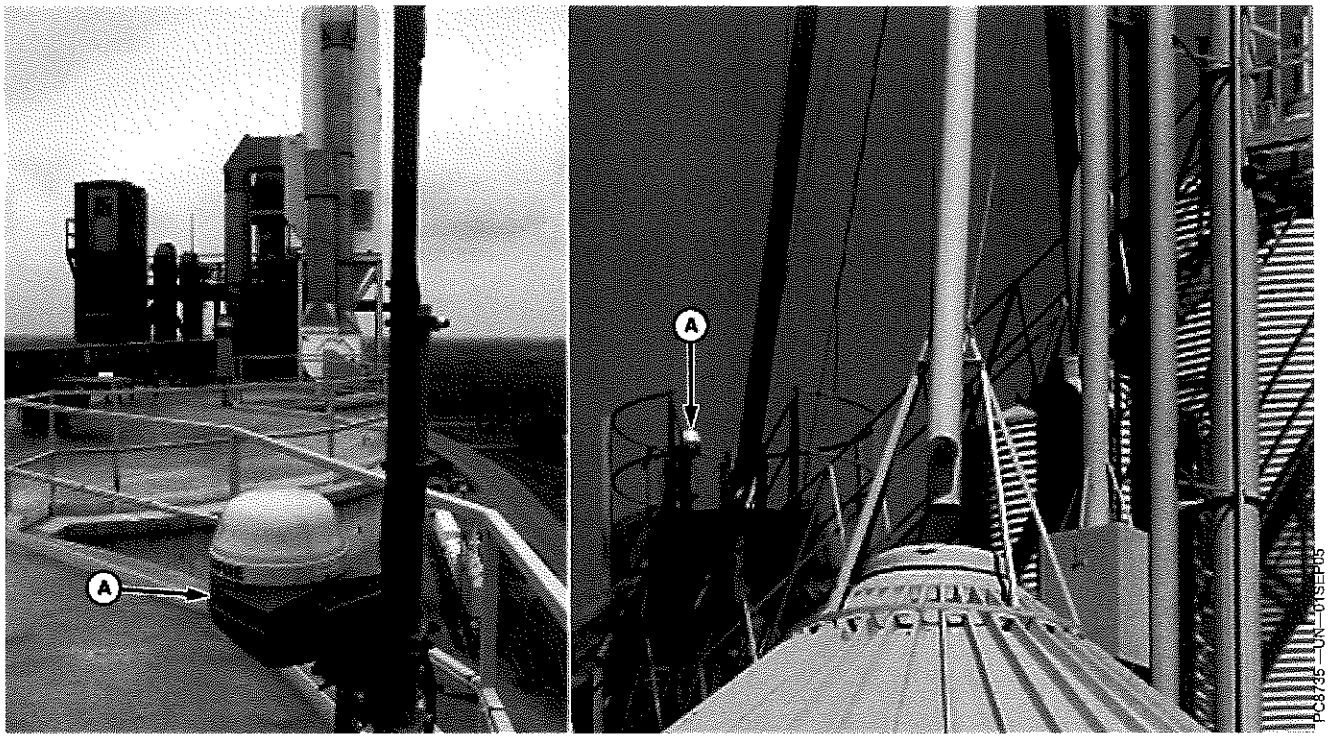

A—Receiver

NOTE: The closer the receiver is to the tower, the more it will be shaded.

In the pictures above, the base stations are shaded by the surrounding objects.

Picture on the left—the towers in the background and the pole behind the receiver will block GPS satellites as they pass behind it.

Picture on the right—the base station will be shaded by both the grain tubes and bins on the right.

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JS56696,00005D9 -19-13MAY09-2/4

PC8736 —UN—01SEP05

A—Receiver

This receiver could be affected by both Multipathing and by shading. All the grain legs in the picture will shade the receiver from satellites.

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JS56696,00005D9 -19-13MAY09-3/4

A—Receiver

In the pictures above, both receivers will experience shading.

Picture on the left—Shaded by the tower

Picture on the right—Shaded by the pole.

The receiver on the right will have more shading issues than the receiver on the left because the pole is right up against the receiver shading a large portion of the sky. The receiver on the left has been moved further away from the tower to reduce shading issues.

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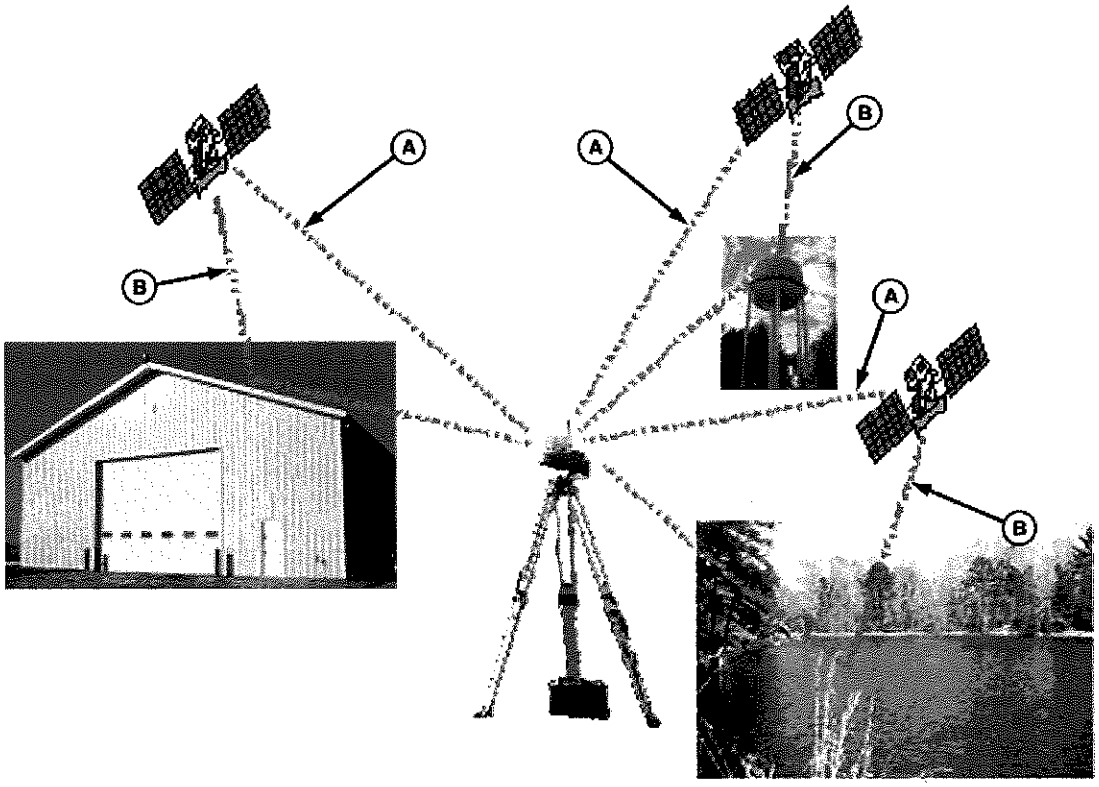
Multipathing



PC8738 —UN—13SEP05

A—Good Sources **B—Multipath Sources**

Before explaining how to protect against Multipathing, let's discuss exactly what Multipathing is: Each satellite sends down time coded messages for any receiver to pick up. If a receiver sees multiple time coded messages from the same satellite, it determines there is a problem with the satellite and discontinues using that satellite until it determines the problem is corrected. This could take up to minutes before the situation corrects itself. The following are some examples of what causes multipath.

- Metal roofs
- Center pivots
- Water towers
- Pickup trucks
- Grain bins
- Bodies of water

In the following pictures, we have provided illustrations to help show how Multipathing occurs. The time coded signal from the GPS satellite is being beamed down in all directions, so if the same time coded signal is reflected off of an object back towards a receiver, the receiver will see the same message many times. If this occurs, you could see A/B line jumps while operating in the field

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PC8743 —UN—01SEP05

Even though the multipath signal may be reflected in below the 7 degree elevation mask, the receiver may still use this message because the time coded message tell the receiver that the satellite position is above 7 degrees (i.e. Sat 1; Elev. 35 degrees, Azimuth 255 degrees).


PC8744 —UN—01SEP05

Both the roof of the car and the building are causing multipath to occur at the base station receiver. The signals is bounce along the car or building and enter the receiver at a slight delay from when the direct satellite message is received.

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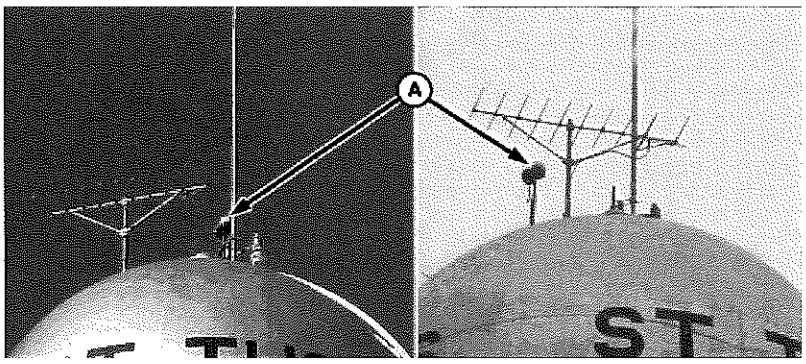

PC8745 —UN—01SEP05

A—Receiver

Picture on the Left: The base station, with receiver attached 1 foot off the top of the tower, was being affected by multipath from the dome of the water tower. The vehicle receiver running off this base station experienced different symptoms:

- Two vehicles would be operating at the same time. One vehicle would go from RTK into RTK-X and see a line jump of up to 6 inches for a couple of minutes, while the other vehicle would be operating without incident.
- At a later time, the situation would reverse, and the vehicle without incident earlier would go into RTK-X and experience a line jump, while the other vehicle wouldn't.

The reason the vehicles behaved differently was because each vehicle may have been using a different set of satellites at a given time due to shading and vehicle location.

Picture on the Right: Base station was elevated 5 feet off the top of the tower. Raising the receiver greatly reduced the multipath effects observed on this RTK system.

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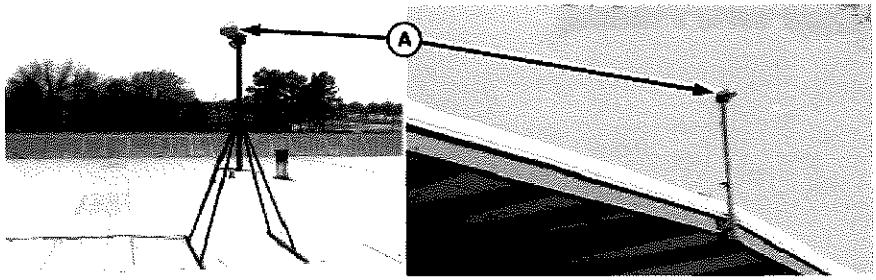


PC8746 —UN—01SEP05

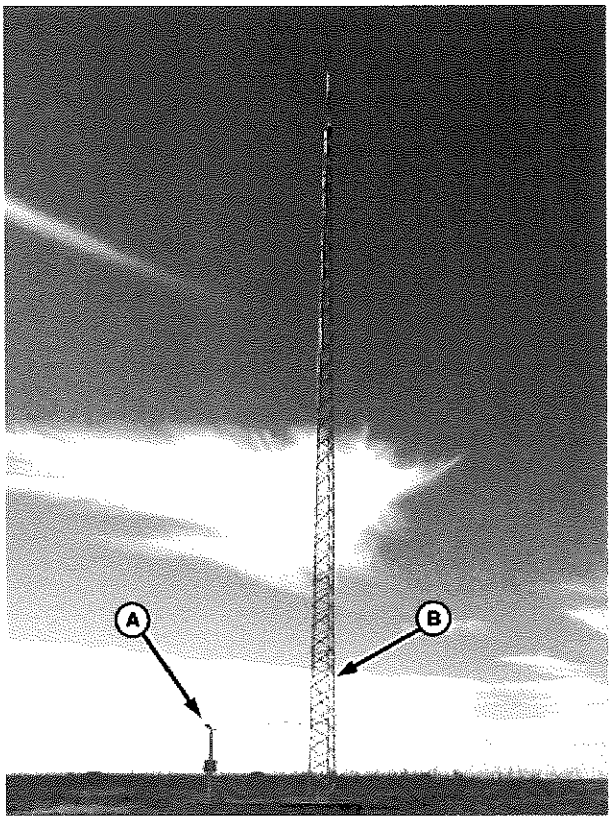
A—Receiver

To reduce both multipathing and shading, elevate the base station receiver above any structure to which it is attached. For best results, two meters or more from the highest point of the structure is recommended. The higher the better, but you must also ensure that the base station receiver is attached solidly so there is no movement of the receiver. Movement of the base station receiver will result in the same movement in your vehicle. The two base stations shown above are examples of good base station locations, because the trees are below the 7 degrees elevation mask and the roof is not made of metal which helps to reduce multipathing.

JS56696,00005DA -19-13MAY09-4/6

When setting up a tower network, ensure that the receiver (A) is 9.1 m (30 ft) away from the base of the tower (B) to protect your system from multipath.

A—Receiver **B—Tower**



PC9391 —UN—23OCT06

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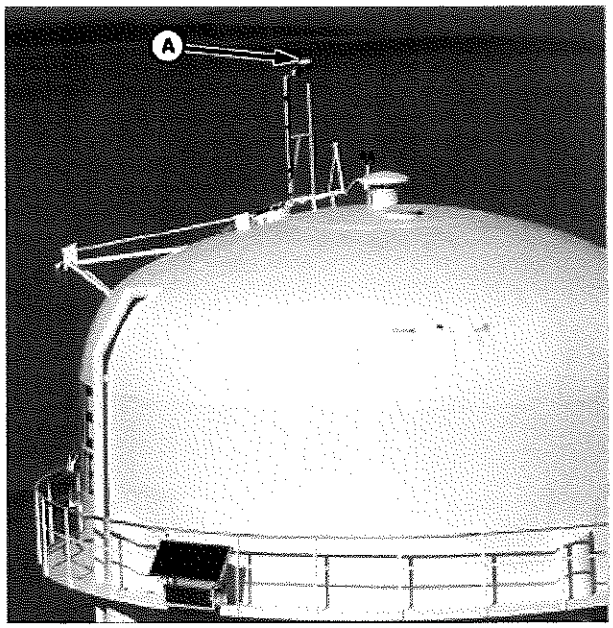
JS56696,00005DA -19-13MAY09-5/6

When installing a receiver (A) on a shed, grain leg, water tower, or other tall structure, ensure the receiver is 2 m (6 ft) above the peak of the structure. This placement will help prevent multipathing of the receiver.

A—Receiver



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RTK using Straight, Curves or Circle

RTK Base Station Network Areas Utilizing Straight, Curves or Circle AutoTrac

Symptoms:

- Customer changes base stations and/or fields and the vehicle does not align to the previous track or bed.
- Customer utilizes multiple base stations for the same field and does not see the desired AB line repeatability among vehicles or field passes.

NOTE: When the term AB line is used, it also encompasses Circle track and Curve track lines.

Solution:

RTK is designed to provide repeatability pass after pass and from season to season. This repeatability is a function of the Base Station location and it's correlation to a field specific AB line driven by the vehicle.

AB lines and field operations must be linked to the specific base station that they were originally created with. Every AB line in the field is created while utilizing a specific RTK base station. Every pass in that field for a particular season or set of beds must utilize the same original base station and location that was used to create that specific AB line(s).

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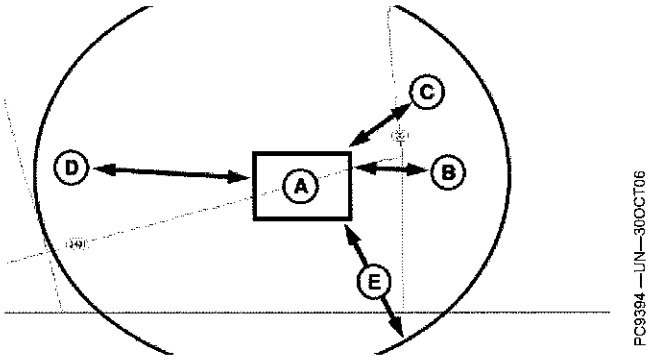
Example A

As you see in the picture, Field A (A) has 3 base stations located within a 9.7 km (6 miles) radius of the field. Although 3 base stations could be used to operate vehicles within this field, one base station must be selected to perform all field operations for that season and assigned/created AB lines. In this instance, the customer selected base station # 1 as it was centrally located to other farms.

This means that when AB lines are being created, all vehicles and operations for that cropping season MUST use the same base station and location. Also, if AB lines were set up during subsequent seasons, the same original base station that was utilized in subsequent seasons must be used again at the same base location.

AB lines must be assigned and associated to a specific base station in order to achieve absolute accuracy and repeatability. This absolute accuracy and repeatability is obtained during the base stations 24 hour absolute survey.

Any time a base station is used to perform a field operation and it IS NOT the base station that was used to create that original AB line, errors will exist in the AB line position. These errors will vary from location to location, but may be as much as 3 to 5 inches off.



A—Field A
B—Base Station 1 — 6.4 km (4 miles)
C—Base Station 2 — 4.8 km (3 miles)
D—Base Station 3 — 4.8 km (3 miles)
E—9.7 km (6 miles) radius

A recommended practice is to assign every field to a specific base station. This will ensure that every operation performed in that field, including AB line creation, is utilizing the most accurate and repeatable correction signal possible.

JS56696,00005DC -19-13MAY09-1/1

Operating Parameters

StarFire iTC or Gen II Receiver Operating Parameters for ALL AutoTrac, SF1, SF2, and RTK

Several factors can attribute to a less than optimal performance of the GPS receiver, whether it is operating in SF1, SF2 or RTK mode. Any lack of performance while operating in RTK mode will display symptoms sooner then operating with SF1 and SF2. RTK operations require higher precision and many applications are in preexisting tracks, so the operator will notice unsatisfactory performance sooner by visually comparing against the previous tracks.

When operating with RTK, there are always 2 critical components that come into play:

1. Base Station Setup and any possible obstructions
2. Vehicle Setup and any possible obstructions

RTK vehicle operation is directly affected by the quality of the base station location and setup, not just vehicle GPS receiver interferences. The base station is feeding satellite correction information to the vehicle (rovers) at all times. If any of the GPS signals being received at the base station are distorted or corrupted in any way, that incorrect information will in turn be fed directly to the vehicle (rover) leading to a loss in accuracy and repeatability.

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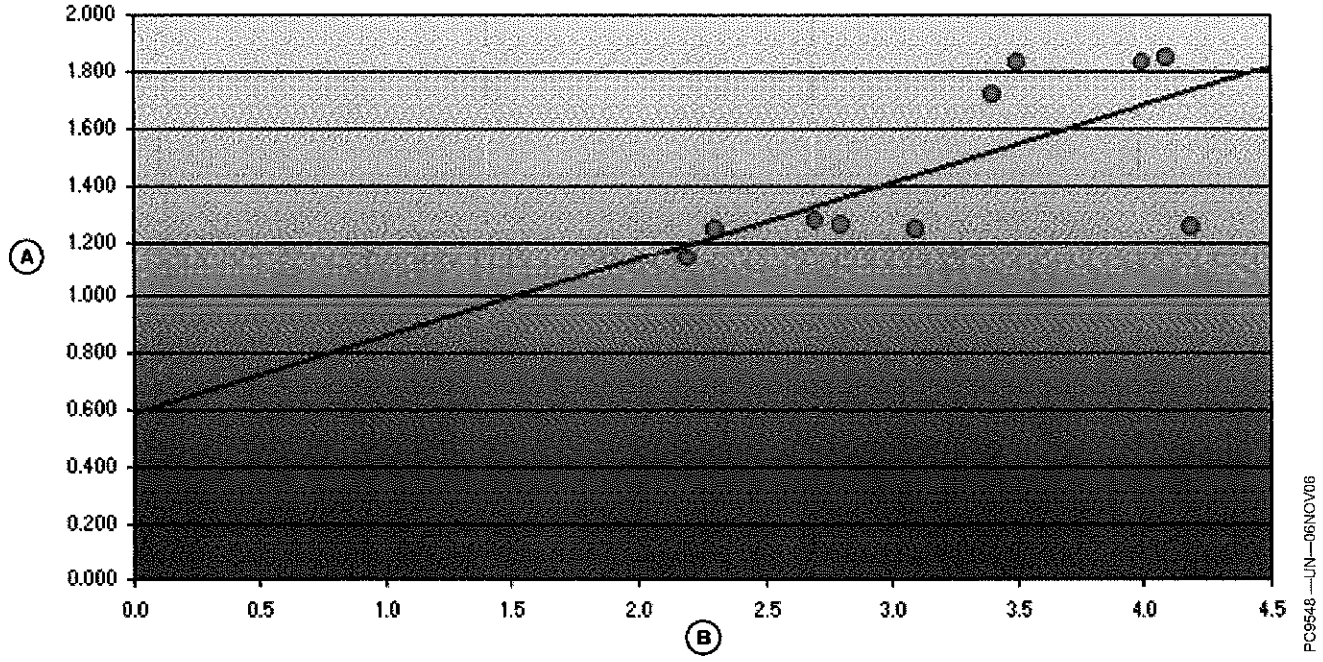
PDOP Definition



A—Horizontal Precision (m) **B—Maximum PDOP Value**

The Position Dilution of Precision (PDOP) is likely one of the most critical GPS AutoTrac values to monitor. As the PDOP value increases, both the horizontal and vertical precision (guidance accuracy) of your data points decreases.

To help illustrate this relationship, please review the graph, which plots the PDOP value against the horizontal precision points collected on and around the University of Montana campus. Ten locations were collected to serve as ground control points to register an April 4, 1999 aerial photograph of the University area. You can see that as the PDOP value climbs from a minimum of 1.15 to a maximum of approximately 4.5, the horizontal precision and accuracy decreases from about 1.15 meters to about 1.9 meters. PDOP values below 7 are generally required to collect data at a 1 meter accuracy range (as determined by the PDOP mask set on your data logger) and any value below 3.5 is considered in-range for AutoTrac applications.

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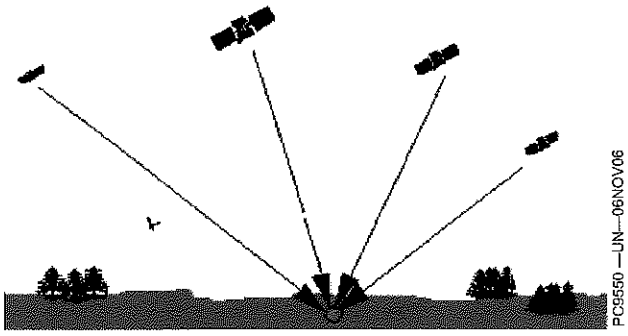
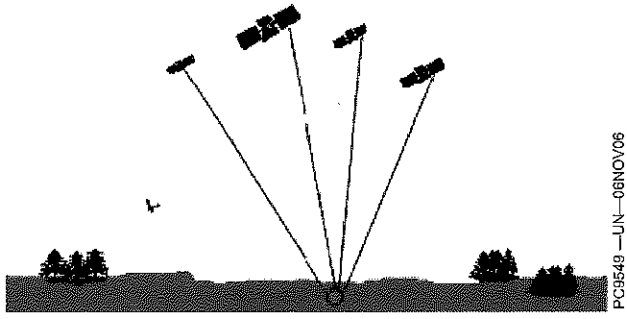


GOOD

Keep in mind that PDOP (Position Dilution of Precision) is the measure of the geometrical strength of the GPS satellite configuration. As a general rule, any PDOP value below 3.5 is acceptable to use while operating AutoTrac but, the lower the number, the more precise the steering accuracy will be.



BAD

During vehicle operation, the PDOP can be viewed under the StarFire information pages in both the Original GreenStar Display and GS2 Display

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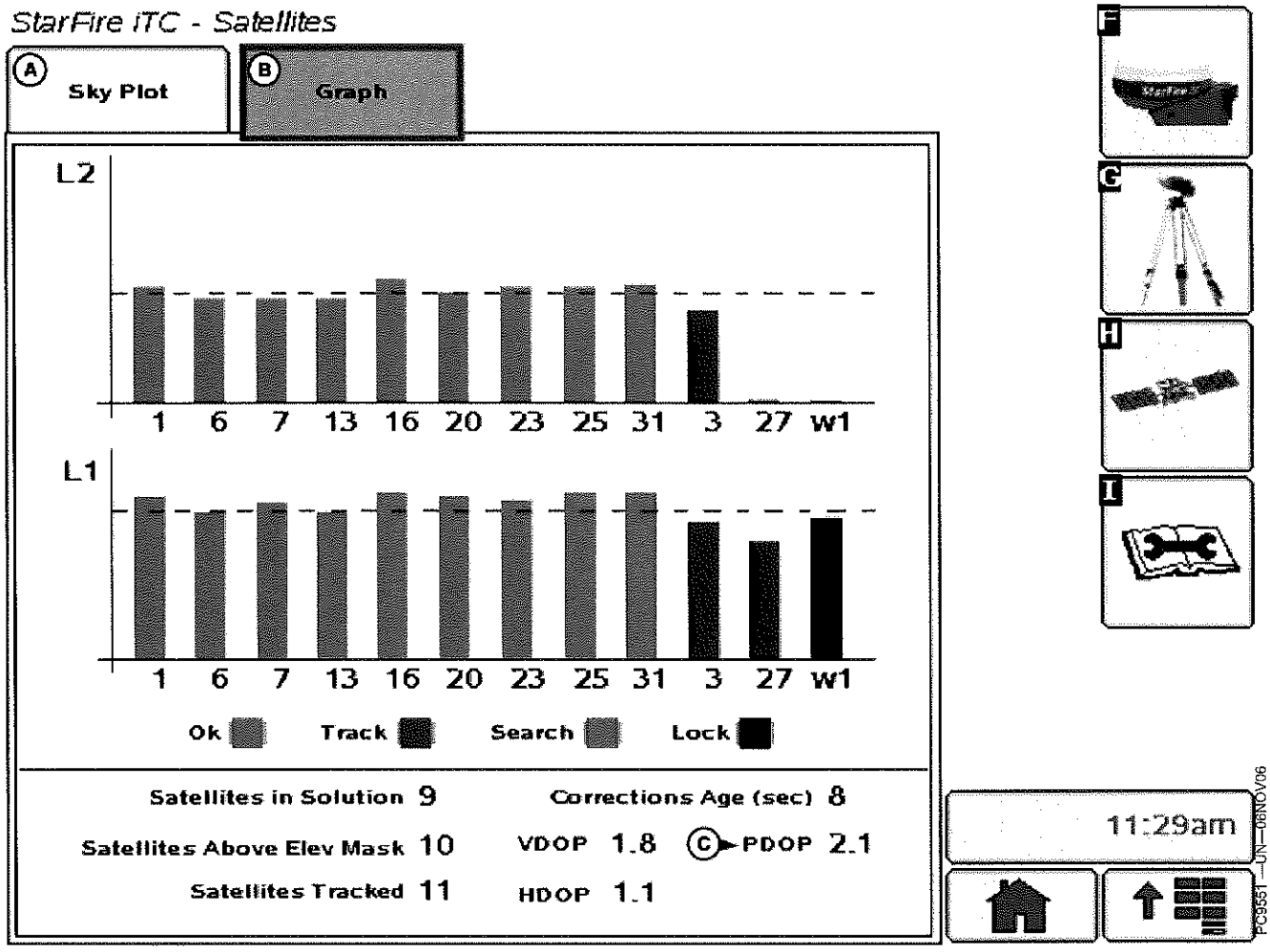
PDOP Operating Values



StarFire iTC - Satellites

A—SkyPlot B—Graph C—PDOP

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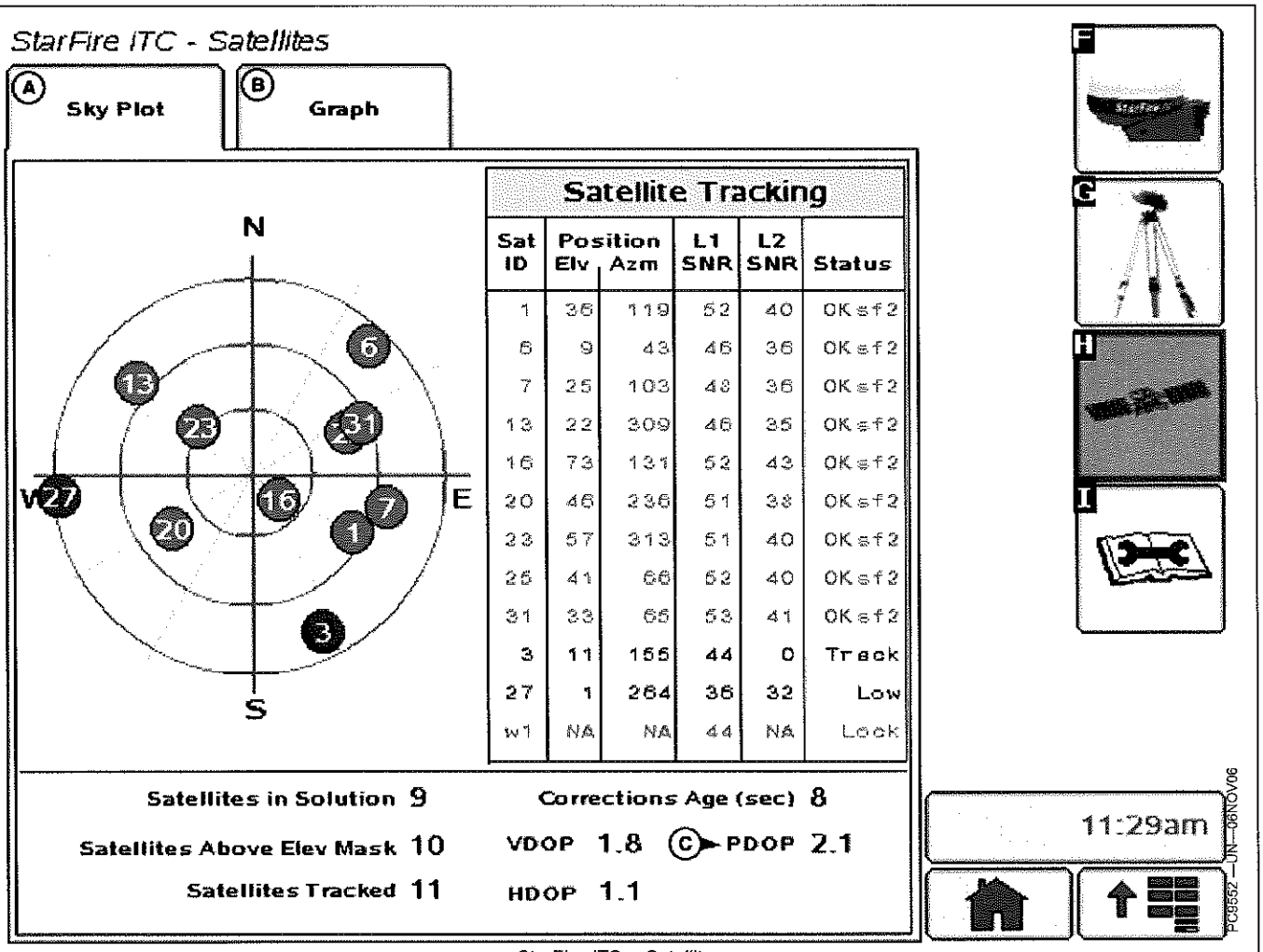

StarFire iTC - Satellites

A—SkyPlot **B—Graph** **C—PDOP**

PDOP operating values should remain BELOW 3.5 DURING ALL AUTOTRAC OPERATIONS, especially RTK high precision operations. As the value of PDOP rises above 3.5, position accuracy will be compromised.

As a rule, when the GPS receiver is warming up from being in a powered off state and gathering satellite signals high PDOP values (4 to 20+) will be experienced for upwards of 15 minutes (under normal conditions).

It is important to monitor PDOP along with GPS signal quality while performing field operations.

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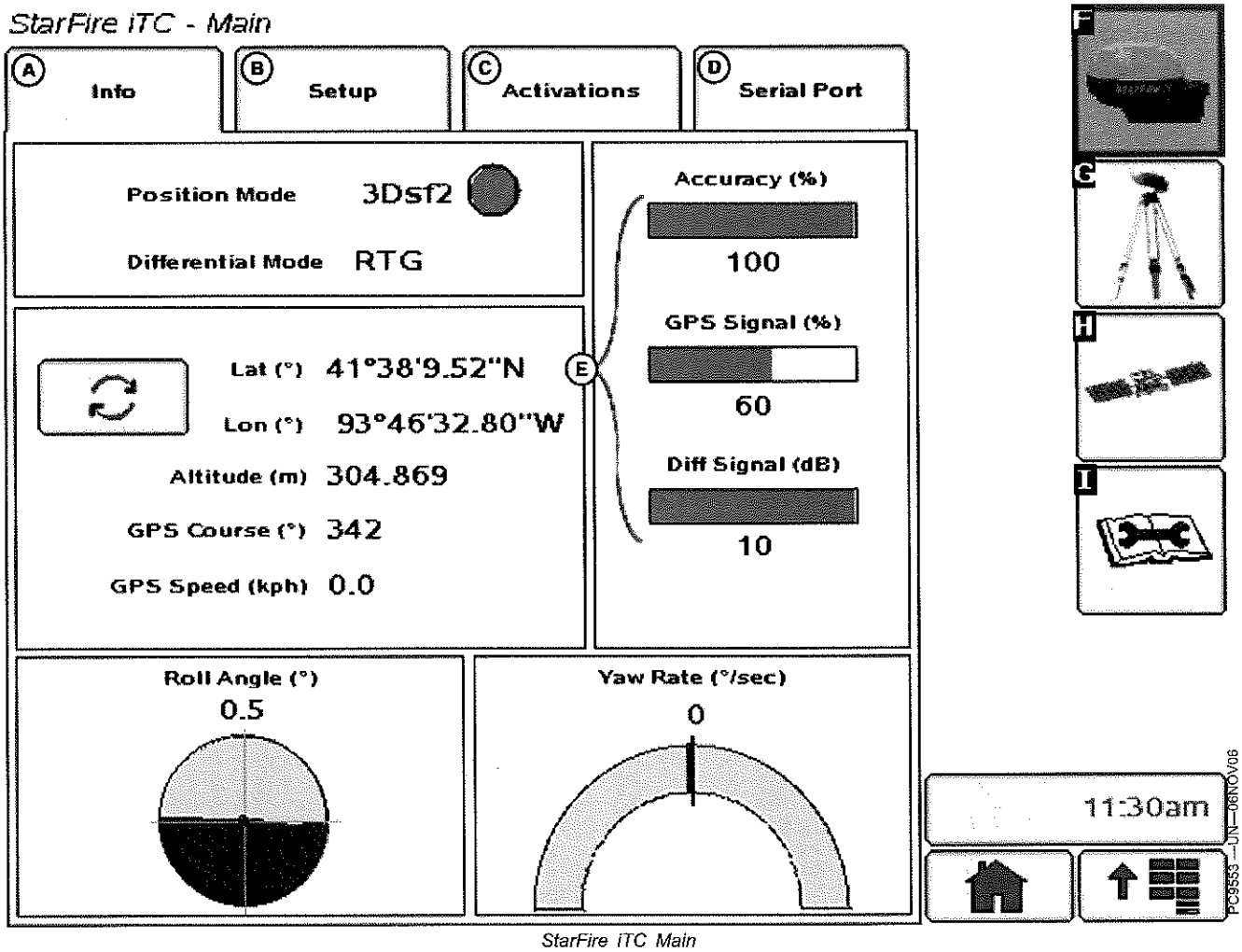
StarFire Signal Monitoring System

StarFire iTC - Main



StarFire iTC Main

A—Info
B—Setup
C—Activations
D—Serial Port
E—Accuracy (%), GPS Signal (%), Diff Signal (dB)

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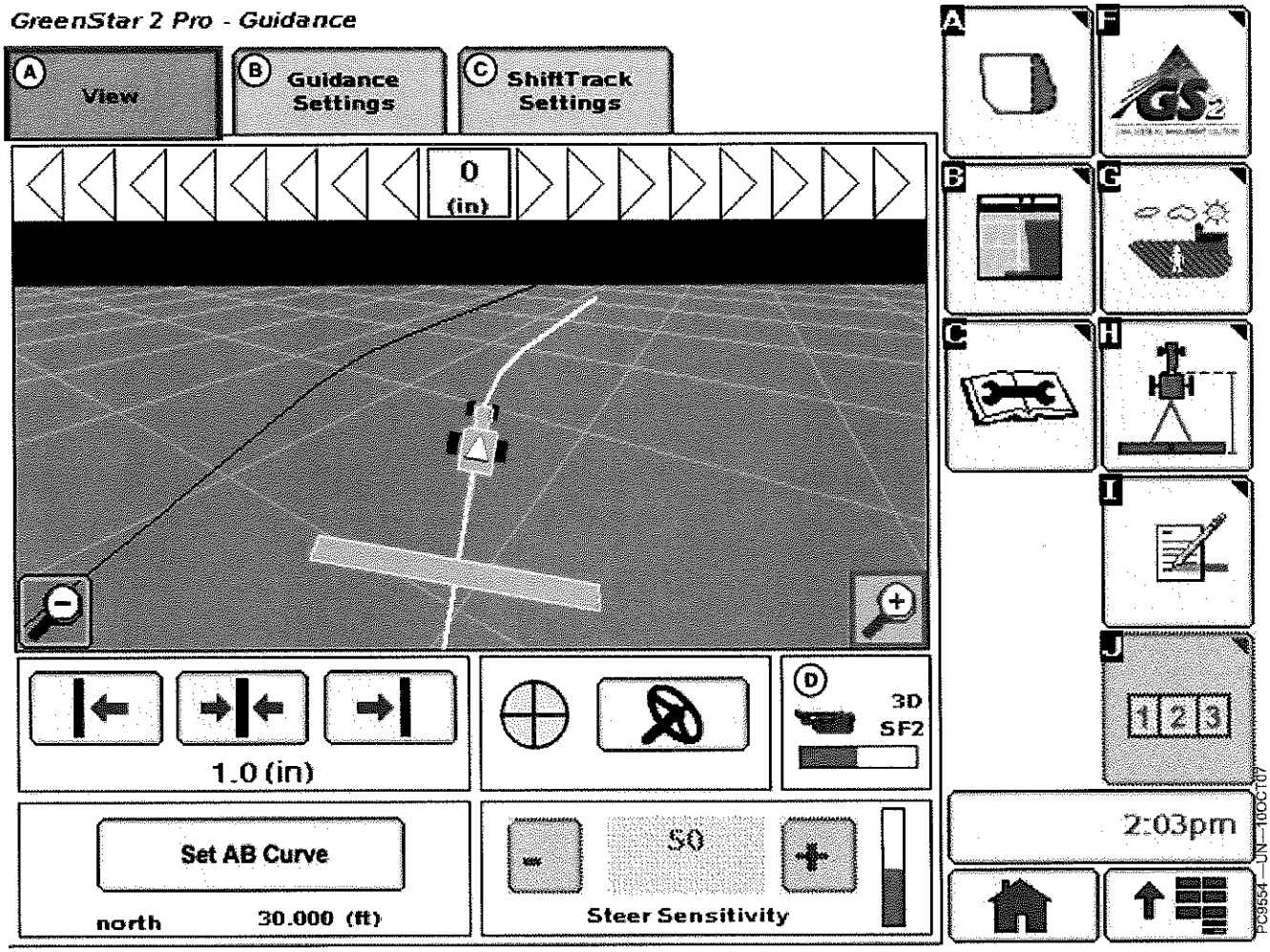

GreenStar2 Pro - Guidance

A—View **B—Guidance Settings** **C—ShiftTrack Settings** **D—Signal Quality**

The GS2 alerts the operator when the current StarFire signal is not accurate. There are three levels of this warning system (Normal, Marginal, and Poor). The levels are determined both by the StarFire Receiver's PDOP value and the number of satellites being tracked. It is recommend that if the StarFire receiver is being used in high accuracy operations that care be taken when the StarFire Signal Monitoring system indicates that the current status is Marginal or Poor, as accuracy degradation may occur.

NOTE: Operating in RTK or RTK-X, both PDOP and "Number of Satellites" are used to determine the level of warning.

Operating at a signal level less than RTK (SF2, SF1, WAAS, ect.) only PDOP will be used to determine the level of warning.

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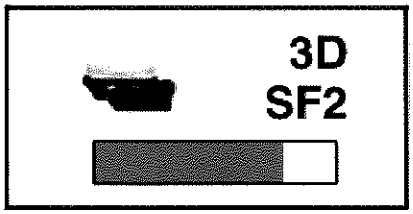
Normal

- Green Bar
- Normal Operating Range
- Acceptable range for high accuracy operations
- PDOP value: 0 - 3.5
- 6 or more satellites in solution

PC9387 —UN—17OCT06



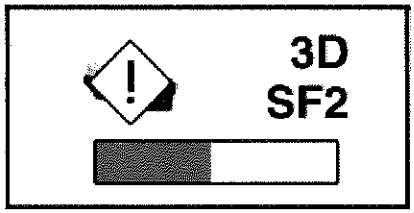
Normal

JS56696,00005E0 -19-13MAY09-3/5

Marginal

- Orange Bar with Permanent Caution Sign
- Marginal Operating Range
- Moderate risk of accuracy degradation - caution is advised
- PDOP value: 3.5 - 4.5
- 5 satellites in solution

PC9388 —UN—17OCT07



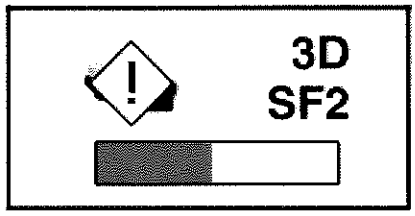
Marginal

JS56696,00005E0 -19-13MAY09-4/5

Poor

- Red Bar and Flashing Caution Sign
- Poor Operating Range
- Significant risk of accuracy degradation - high accuracy operations are not advised
- PDOP value greater than 4.6
- 4 satellites or less in solution

PC9388 —UN—17OCT07



Poor

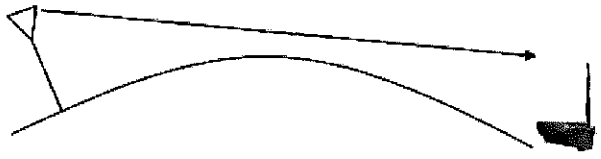
JS56696,00005E0 -19-13MAY09-5/5

Antenna Height

RTK Shared Base Station: Antenna Height

In order to maintain a good RTK Radio link, the antenna must be mounted high enough to radiate over the earth's curvature and any obstacles. As shown in the figure, the curve of the earth can block the signal from the RTK link. If the radiating base station radio antenna is mounted too low, the broadcasting range will be drastically reduced.

PC9393 —UN—23OCT06



JS56696,00005E1 -19-13MAY09-1/1

Specific Tower Setup Information

It is recommended that the receiver be, at minimum, 9.1 m (30 ft) away from the tower to prevent both Shading and Multipathing. This distance may vary depending on the frame design of the tower or structure that you are mounting it around.

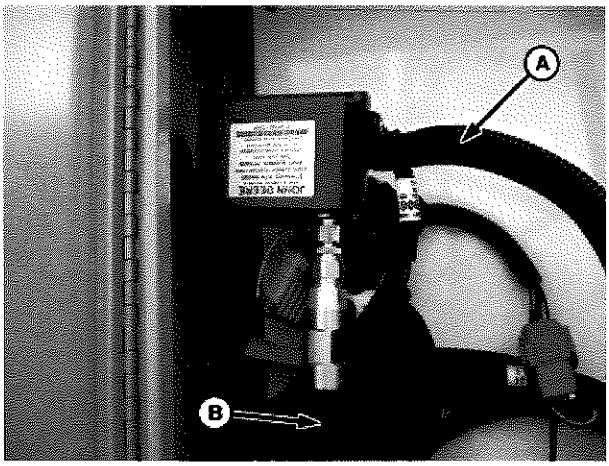
When using the 91 m (300 ft) extension harness, do not cut the harness to the length needed. This harness has built in voltage protection and is shielded. Cutting the harness will limit the effectiveness of the harness and will cause failures of either the radio or the receiver due to static electricity build up on the harness. This harness was built to be buried underground, so it is suggested to bury all extra harness underground to protect the harness.

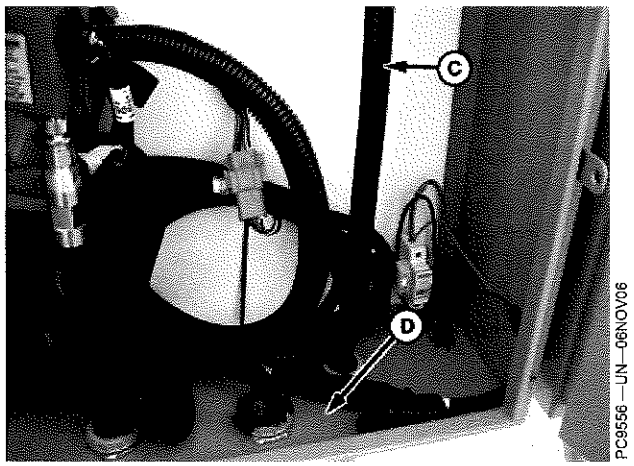
After deciding what structure that you will be mounting your base station on, there are five different ways to set up your base station.

- Utilizing Both The 91 m (300 ft) RTK Extension Harness And Low Loss Coax Cable
- Utilizing The RTK Extension Harness
- Utilizing A Repeater
- Utilizing Just Low Loss Coax Cable
- Leaving The Radio And Receiver As A Single Unit

JS56696,00005E2 -19-13MAY09-1/1

Utilizing Both The 91 m (300 ft) RTK Extension Harness And Low Loss Coax Cable





A—91.4 m (300 ft) RS232 Cable from receiver

B—Coax cable connection from antenna

C—Coax running up tower to antenna

D—Coax looped under electrical box

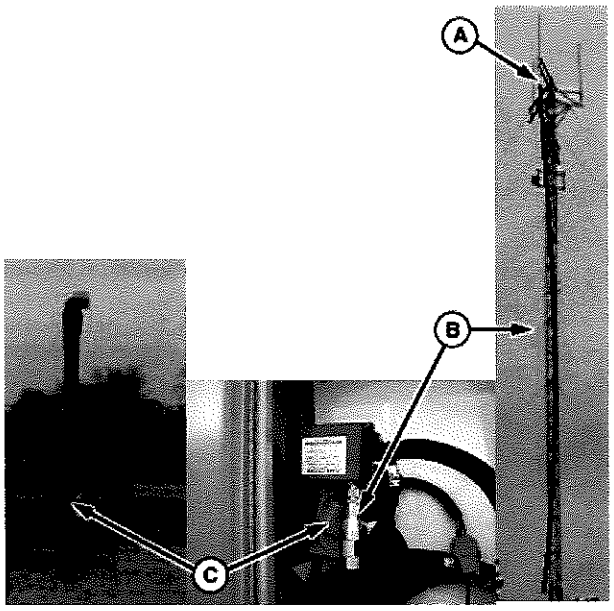
This base station setup allows the placement of the receiver to be up to 91.4 m (300 ft) away from the radio, giving the base station an absolute clear view of the sky.

Continued on next page

JS56696,00005E3 -19-13MAY09-1/2

The radio, usually installed in a secure location at the bottom of a tower, is then connected to low loss coax that is ran up the tower to the antenna.

A—Antenna
B—Low-Loss Coax Cable
C—91.4 m (300 ft) RS232 Cable



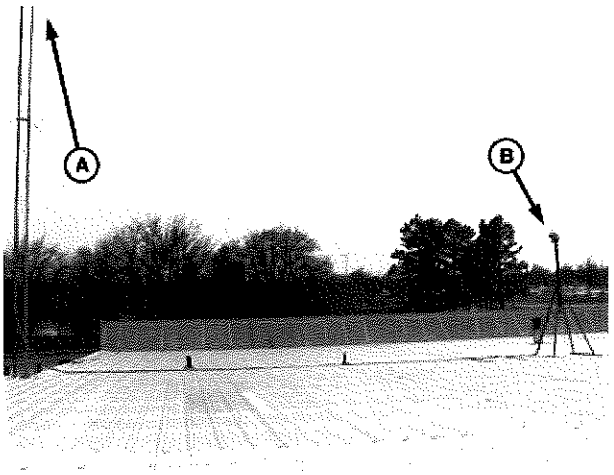
PC9557 —UN—06NOV06

JS56696,00005E3 -19-13MAY09-2/2

Utilizing The RTK Extension Harness

This base station setup allows you to mount the receiver at a secure location and mounting the radio, with antenna, to an elevated position, and utilizing 91 m (300 ft) of RS232 cable between the receiver and radio.

A—Radio mounted on tower
B—Base Station Receiver



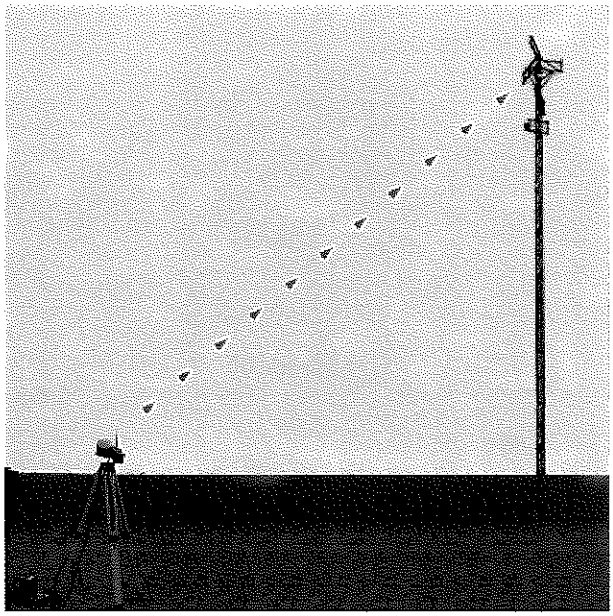
PC8762 —UN—16SEP05

JS56696,00005E4 -19-13MAY09-1/1

Utilizing A Repeater

This base station setup allows the placement of the receiver and radio in a location with no obstructions. A repeater, with its own power source, is placed at an elevated location. The base station radio sends its signal up to the repeater and the repeater then sends out the signal.

NOTE: With this type of base station setup, no other repeaters can be used with the base station.



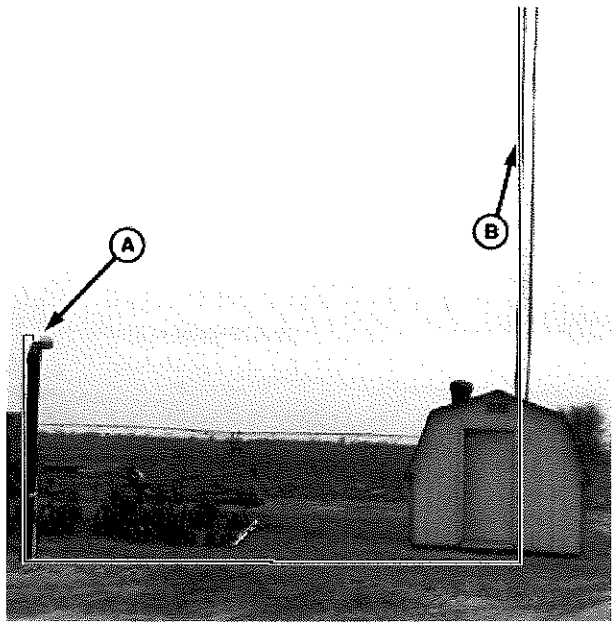
PC8761 —UN—16SEP05

JS56696,00005E5 -19-13MAY09-1/1

Utilizing Just Low Loss Coax Cable

This base station set up leaves the receiver and radio in a secure location and using low loss coax cable running to the antenna at an elevated position.

A—Receiver and Radio **B—Coax Cable**



PC8763 —UN—16SEP05

JS56696,00005E6 -19-13MAY09-1/1

Leaving The Radio And Receiver As A Single Unit

This base station setup keeps the receiver and radio as a single unit usually mounted in an elevated location.

IMPORTANT: Receiver must have a clear view of the sky and must be free of Multipathing.

The receiver must not move. Any movement of the receiver will result in movement of the vehicle receivers.

PC9558—UN—06NOV06

JS56696,00005E7 -19-13MAY09-1/1

Accessing GREENSTAR 2 Diagnostic Addresses

PC8664 —UN—05AUG05

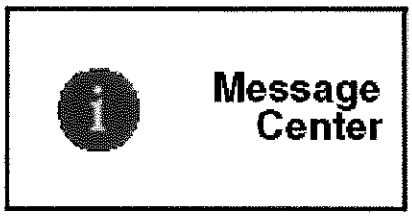
MESSAGE CENTER button (showing time)

PC8663 —UN—05AUG05

MENU button

Message Center screen can be reached by pressing MESSAGE CENTER button (showing time) or MENU button then MESSAGE CENTER button (With Info Icon).

PC8655 —UN—05AUG05



MESSAGE CENTER button (With Info Icon)

JS56696,00005E8 -19-13MAY09-1/3

Select Diagnostic Address icon (softkey G)

Message center will display all active warning, alert messages and icons.

PC8668 —UN—05AUG05

DIAGNOSTIC ADDRESSES softkey (G)

Continued on next page

JS56696,00005E8 -19-13MAY09-2/3

DECLARATION OF JEFFREY J. CARLISLE

I, Jeffrey J. Carlisle, hereby make the following declarations under penalty of perjury.

1. I am Executive Vice President, Regulatory Affairs and Public Policy of LightSquared Inc. ("LightSquared"). In that capacity, I am responsible for all domestic and international regulatory and policy matters on behalf of LightSquared, including those at the FCC.

2. I have reviewed the foregoing Petition for Reconsideration, and certify that, to the best of my knowledge and belief, the factual assertions in the Petition are truthful and accurate.

/s/ Jeffrey J. Carlisle
Jeffrey J. Carlisle

Executed: October 14, 2011

CERTIFICATE OF SERVICE

I, Curleen Brothers, hereby certify that on this 14th day of October, 2011, I caused a true copy of the foregoing "Petition for Reconsideration" to be served by first class mail, postage pre-paid, upon the following:

Jonathan Esche
Deere & Company
20780 Madrona Avenue
Torrance, CA 90503

Catherine Wang
Bingham McCutchen LLP
2020 K Street, NW
Washington, DC 20006

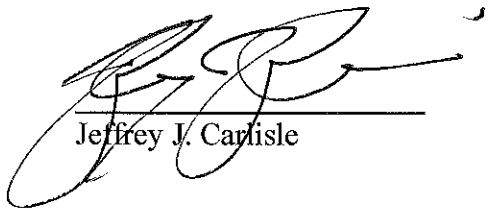
/s/ Curleen Brothers
Curleen Brothers

DECLARATION OF JEFFREY J. CARLISLE

I, Jeffrey J. Carlisle, hereby make the following declarations under penalty of perjury.

1. I am Executive Vice President, Regulatory Affairs and Public Policy of LightSquared Inc. ("LightSquared"). In that capacity, I am responsible for all domestic and international regulatory and policy matters on behalf of LightSquared, including those at the FCC.

2. I have reviewed the foregoing Petition to Deny and certify that, to the best of my knowledge and belief, the factual assertions in the Petition are truthful and accurate.



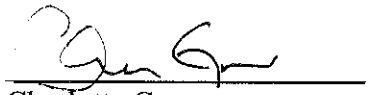
Jeffrey J. Carlisle

Executed: April 3, 2015

CERTIFICATE OF SERVICE

I, Charlotte Grove, hereby certify that on this 3rd day of April, 2015, I caused a true copy of the foregoing "Petition to Deny" to be served by first class mail, postage pre-paid, upon the following:

Catherine Wang
Morgan Lewis and Bockius LLP
2020 K Street, NW
Washington, DC 20006



Charlotte Grove