

**William Bell**

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**From:** Sankar Persaud  
**Sent:** Thursday, April 14, 2011 11:11 AM  
**To:** William Bell  
**Subject:** RE: Certification of LightSquared ATC Base Stations

Thanks, Bill.

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**From:** William Bell  
**Sent:** Thursday, April 14, 2011 10:49 AM  
**To:** Sankar Persaud  
**Subject:** FW: Certification of LightSquared ATC Base Stations

fyi

b) (5)

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**From:** Karl Kensinger  
**Sent:** Thursday, April 14, 2011 10:28 AM  
**To:** William Bell  
**Subject:** FW: Certification of LightSquared ATC Base Stations

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**From:** Lin, Tony [mailto:tony.lin@pillsburylaw.com]  
**Sent:** Friday, April 08, 2011 2:30 PM  
**To:** Robert Nelson; Karl Kensinger  
**Subject:** FW: Certification of LightSquared ATC Base Stations

Bob, Karl:

As I mentioned on the voice message (to Bob), LightSquared is working with OET to obtain equipment certifications for its ATC base stations. An issue has come up that OET has stated needs to be cleared with IB. Specifically, we have a discrepancy between what LightSquared believes is the proper OOCE/OOBE limit and what OET has stated is the limit.

As explained in more detail below, in April 2009 LightSquared requested a number of waivers of the ATC rules, including a waiver of Section 25.253(b), which is the specific OOCE/OOBE limit applicable to the L-band spectrum. Thus, it is not clear to us why OET maintains that our base stations must comply with that limit for OOBE.

I know you folks are probably very busy with the looming potential shutdown. But, we were hoping we could get some clarification on this as soon as possible. The equipment certification discussions with OET have been ongoing for approximately two months now in one form or the other.

Attached are the OET's proposed equipment certification guidelines (the PDF file) and our response to OET's question regarding applicable OOCE/OOBE limits (Excel file).

Thanks.

Tony

Tony Lin | Pillsbury Winthrop Shaw Pittman LLP

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4/14/2011

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**From:** Khlopin, Derek (NSN - US/Washington DC) [mailto:[derek.khlopin@nsn.com](mailto:derek.khlopin@nsn.com)]  
**Sent:** Friday, April 08, 2011 2:07 PM  
**To:** Lin, Tony  
**Subject:** FW: Certification of LightSquared ATC Base Stations

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**From:** Khlopin, Derek (NSN - US/Washington DC)  
**Sent:** Monday, April 04, 2011 3:32 PM  
**To:** 'ext Rashmi Doshi'  
**Cc:** Joe Dichoso; Ronald Repasi  
**Subject:** Certification of LightSquared ATC Base Stations

Dr. Doshi,

I am following up on the conversation that we had on March 18th. Hopefully what we have prepared is responsive to your requests.

Please find attached a chart detailing the OOCE/OOBE limits that we believe are applicable to LightSquared ATC base stations. As a preliminary matter, we note that while section 25.253(b) expressly specifies only an OOCE limit, the 2003 ATC Order treats this as both an OOCE and OOBE limit. See FCC 03-15, at paras. 155, 157, 177 and Appendix C2 Sections 1.5, 2.2.1.2, 2.2.2.2 n. 122, and 3.3. As indicated in the chart, LightSquared believes that the FCC's general OOBE limit rule, codified in Section 25.202(f), applies to ATC base stations because the company specifically requested waiver of Section 25.253(b) without qualification in its 2009 mod. application. See Application Narrative, File No. SAT-MOD-20090429-00047, at 13-14.

Please let me know of any questions. We look forward to hearing back from you at your earliest convenience.

Best regards,  
Derek

Derek Khlopin  
Nokia Siemens Networks  
Head of Government Relations  
1401 K Street NW, Suite 450  
Washington, DC 20005  
202 316 9953  
[derek.khlopin@nsn.com](mailto:derek.khlopin@nsn.com)

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**From:** ext Rashmi Doshi [mailto:[Rashmi.Doshi@fcc.gov](mailto:Rashmi.Doshi@fcc.gov)]  
**Sent:** Friday, March 18, 2011 9:47 AM  
**To:** Khlopin, Derek (NSN - US/Washington DC)  
**Cc:** Joe Dichoso; Ronald Repasi  
**Subject:** RE: Call with Nokia Siemens/LightSquared, Friday 3/18 10:00 AM

Derek,

4/14/2011

attachments to Tony Lin's 4/8 email

ATC Limits				
Limits	EIRP	Antenna Gain	MIMO Gain	PA Emission Limit
Within Channel	32.0 dBW/MHz	16 dBi	3 dB	13.0 dBW/MHz
Within L-Band @ between 1 to 2 MHz offset from channel edge	-32.4 dBW/MHz	16 dBi	3 dB	-51.4 dBW/MHz
Within L-Band @ $\geq 2$ MHz offset from channel edge	-39.4 dBW/MHz	16 dBi	3 dB	-58.4 dBW/MHz
in RNSS Band (1559-1610MHz)	-100.0 dBW/MHz	16 dBi	3 dB	-119.0 dBW/MHz
Others: (<1525MHz, >1610MHz)	per 47 CFR 25.202(f).			
Frequency offset ( $f_{\text{offset}}$ ) from the FCC authorized bandwidth (B)	Attenuation (dB) below the mean output power in watts (P) of the transmitter	Measurement bandwidth		
$B/2 \leq f_{\text{offset}} < B$	25	4 kHz		
$B \leq f_{\text{offset}} < 5B/2$	35	4 kHz		
$5B/2 \leq f_{\text{offset}}$	$43 + 10\log(P)$	4 kHz		

Scenario 1				
Two 10 MHz Channel				
	Channel Start	Channel End	Bandwidth	
ATC 1	1526.0 MHz	1536.0 MHz	10 MHz	
ATC 2	1545.2 MHz	1555.2 MHz	10 MHz	
PA Channel Power	20 W	13 dBW		
Limits	EIRP	Antenna Gain	MIMO Gain	PA Emission Limit
Within Channel (1526-1536 MHz and 1545.2-1555.2MHz)	32.0 dBW/MHz	16 dBi	3 dB	13.0 dBW/MHz
Within L-band: between 1 to 2 MHz offset i.e @ 1537-1538MHz, @ 1543.2-1544.2MHz, @ 1556.2-1557.2MHz	-32.4 dBW/MHz	16 dBi	3 dB	-51.4 dBW/MHz
Within L-band: $\geq 2$ MHz offset i.e @ 1538-1543.2MHz, @ 1557.2-1559MHz	-39.4 dBW/MHz	16 dBi	3 dB	-58.4 dBW/MHz
in RNSS Band (1559-1610MHz)	-100.0 dBW/MHz	16 dBi	3 dB	-119.0 dBW/MHz
Others: (<1525MHz, >1610MHz)	per 47 CFR 25.202(f).			
@ 1521-1525MHz				-12.0 dBW/4kHz
@ 1506-1521MHz				-22.0 dBW/4kHz
@ <1506 MHz, >1610MHz				-43.0 dBW/4kHz
				12.0 dBW/MHz
				2.0 dBW/MHz
				-19.0 dBW/MHz

Scenario 2				
Two 5MHz Channel				
	Channel Start	Channel End	Bandwidth	
ATC 1	1526.3 MHz	1531.3 MHz	5 MHz	
ATC 2	1550.2 MHz	1555.2 MHz	5 MHz	
PA Channel Power	20 W	13 dBW		
Frequencies	EIRP	Antenna Gain	MIMO Gain	PA Emission Limit
Within Channel (1526.3-1531.3 MHz and 1550.2-1555.2MHz)	32.0 dBW/MHz	16 dBi	3 dB	13.0 dBW/MHz
Within L-band: between 1 to 2 MHz i.e @ 1525-1525.3MHz, @ 1532.3-1533.3MHz, @ 1548.2-1549.2MHz, @ 1556.2-1557.2MHz	-32.4 dBW/MHz	16 dBi	3 dB	-51.4 dBW/MHz
Within L-band: $\geq 2$ MHz offset i.e @ 1533.3-1548.2MHz, @ 1557.2-1559MHz	-39.4 dBW/MHz	16 dBi	3 dB	-58.4 dBW/MHz
in RNSS Band (1559-1610MHz)	-100.0 dBW/MHz	16 dBi	3 dB	-119.0 dBW/MHz
Others: (<1525MHz, >1610MHz)	per 47 CFR 25.202(f).			
@ 1523.8-1525MHz				-12.0 dBW/4kHz
@ 1516.3-1523.8MHz				-22.0 dBW/4kHz
@ <1516.3 MHz, >1610MHz				-43.0 dBW/4kHz
				12.0 dBW/MHz
				2.0 dBW/MHz
				-19.0 dBW/MHz

## DRAFT

Summary of technical requirements for Base Station approval as a result of Section 25.253 Waiver to LightSquared (previously Skyterra). This summary is for the purposes of equipment authorization of a base station only and does not address licensing requirements or other technical requirements for microcells, femtocells or mobile terminals.

Overall: All equipment are subject to 25.202 limits (e.g. frequency tolerance and general OOB requirements). In addition the equipment must show compliance with appropriate Subpart 2 equipment test requirements in 2.1046-2.1057.

Base Station PSD Limits. (Section 25.253 (d)1-4 replaced with the following)

Base station operations of 32 dBW/MHz on radiated power spectral density (PSD), averaged over: i) an azimuth angle of 120 degrees centered on the antenna axis, ii) a vertical angle of 9 degrees, iii) carrier bandwidth, and iv) a one-second time interval.

Base Station EIRP Limit

Base stations will restrict aggregate sector Equivalent Isotropically Radiated Power (EIRP) to 42 dBW.

Out-of-Band Emissions. (Section 25.253(b) replaced with the following for Base Station)

PSD limits of -32.4 dBW/MHz on emissions at 1 MHz beyond the edges of assigned spectrum and -39.4 dBW/MHz on emissions at 2 MHz beyond.

Also, -57.9 dBW/MHz still applies on all other frequencies outside of assigned spectrum except as noted above and in the GPS bands. The -57.9 dBW/MHz limit includes frequencies within the L band but outside the assigned spectrum. Because assigned spectrum does not apply to equipment manufacturers, for equipment authorization purposes, a low, middle and high channel for typical signal(s) will be tested. Authorization for use of the equipment on other signals will need to be retested and authorized through a Class II permissive change filing. Signals will be given proper emission designator on the equipment authorization.

Out-of-Band Emissions in the 1559-1610 MHz Band. (Section 25.253(d)(9) replaced with the following for Base Stations)

PSD to -100 dBW/MHz or less in the 1559-1610 MHz band and limit the EIRP of discrete emissions of less than 800 Hz bandwidth in that band to -110 dBW or less.

Other General Requirements:

Measurement	FCC Rule
RF Power Output	§ 2.1046, § 25.253
Modulation Characteristics	§ 2.1047, § 2.201
Occupied Bandwidth	§ 2.1049
Spurious Emissions at Antenna Terminals	§ 2.1051, § 2.1057, § 25.253
Field Strength of Spurious Radiation	§ 2.1053, § 2.1057, § 25.253
Frequency Stability	§ 2.1055, § 25.202

**William Bell**

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**From:** Stephen Duall  
**Sent:** Thursday, February 17, 2011 4:40 PM  
**To:** William Bell; Cassandra Thomas; Fern Jarmulnek  
**Cc:** CurTrisha Banks  
**Subject:** RE: LightSquared Milestone Certification

(b) (5)



Best Regards,  
Steve Duall  
(202) 418-1103

Non-Public Information -  
For Internal FCC Use Only

-----Original Message-----

**From:** Stephen Duall  
**Sent:** Thursday, February 17, 2011 4:08 PM  
**To:** William Bell; Cassandra Thomas; Fern Jarmulnek  
**Cc:** CurTrisha Banks  
**Subject:** RE: LightSquared Milestone Certification

(b) (5)



Best Regards,  
Steve Duall  
(202) 418-1103

Non-Public Information -  
For Internal FCC Use Only

-----Original Message-----

**From:** William Bell

Sent: Thursday, February 17, 2011 3:53 PM  
To: Stephen Duall; Cassandra Thomas; Fern Jarmulnek  
Cc: CurTrisha Banks  
Subject: RE: LightSquared Milestone Certification

(b) (5)

-----Original Message-----

From: Stephen Duall  
Sent: Thursday, February 17, 2011 3:43 PM  
To: William Bell; Cassandra Thomas; Fern Jarmulnek  
Cc: CurTrisha Banks  
Subject: RE: LightSquared Milestone Certification

(b) (5)

Best Regards,  
Steve Duall  
(202) 418-1103

Non-Public Information -  
For Internal FCC Use Only

-----Original Message-----

From: William Bell  
Sent: Thursday, February 17, 2011 3:38 PM  
To: CurTrisha Banks; Stephen Duall; Cassandra Thomas; Fern Jarmulnek  
Subject: RE: LightSquared Milestone Certification

(b) (5)

-----Original Message-----

From: CurTrisha Banks  
Sent: Thursday, February 17, 2011 2:55 PM  
To: Stephen Duall; William Bell; Cassandra Thomas; Fern Jarmulnek  
Subject: RE: LightSquared Milestone Certification

(b) (5)

CurTrisha Banks  
Federal Communications Commission  
Satellite Division, International Bureau  
(202) 418-0749

-----Original Message-----

From: Stephen Duall  
Sent: Thursday, February 17, 2011 2:32 PM  
To: William Bell; Cassandra Thomas; Fern Jarmulnek  
Cc: CurTrisha Banks  
Subject: RE: LightSquared Milestone Certification  
Importance: High

(b) (5)



Best Regards,  
Steve Duall  
(202) 418-1103

Non-Public Information -  
For Internal FCC Use Only

-----Original Message-----

From: William Bell  
Sent: Thursday, February 17, 2011 2:23 PM  
To: Stephen Duall  
Cc: Cassandra Thomas; Fern Jarmulnek  
Subject: RE: LightSquared Milestone Certification

(b) (5)



-----Original Message-----

From: Stephen Duall  
Sent: Thursday, February 17, 2011 1:39 PM  
To: William Bell  
Cc: Cassandra Thomas; Fern Jarmulnek  
Subject: FW: LightSquared Milestone Certification

(b) (5)



(b) (5)

Best Regards,  
Steve Duall  
(202) 418-1103

Non-Public Information -  
For Internal FCC Use Only

-----Original Message-----

From: Lin, Tony [mailto:tony.lin@pillsburylaw.com]  
Sent: Friday, January 21, 2011 3:44 PM  
To: Robert Nelson; Stephen Duall; William Bell  
Subject: LightSquared Milestone Certification

All,

Attached is a courtesy copy of the launch and operate milestone certification submitted today by LightSquared via IBFS. Please let me know if you have any questions.

Tony

Tony Lin | Pillsbury Winthrop Shaw Pittman LLP

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Washington, DC 20037-1122

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Bio: www.pillsburylaw.com/tony.lin  
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