

## Is Globalstar Telling The Full Story?

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**Disclosure:** The author is short GSAT. The author wrote this article themselves, and it expresses their own opinions. The author is not receiving compensation for it. The author has no business relationship with any company whose stock is mentioned in this article.

### Summary

- Globalstar (allegedly) stated that coexistence filters haven't been a problem "in any of our testing".
- In a 2014 field trial run by the "inventor of TLPS", Globalstar used Ruckus 7372 Access Points which FCC test results indicate have a coexistence filter.
- Analysis suggests this trial would have impaired TLPS results – unless Globalstar (or Ruckus) removed the coexistence filter.

### Is Globalstar Telling The Full Story?

Globalstar (NYSEMKT:[GSAT](#)) (allegedly) stated that coexistence filters haven't been a problem "in any of our testing." But in their 2014 TLPS field trial they used Ruckus (NYSE:[RKUS](#)) Access Points which FCC test results indicate have a coexistence filter. Analysis suggests this filter impairs TLPS performance - or Globalstar removed the filter. If either is true, the company is not telling the full story.

"So these filters were not designed with the idea of ch 14 or TLPS in mind, but they don't really preclude its operation ***and it hasn't been something in any of our testing has been of impact to the actual usability of the service with the existing ecosystem***"

- Alleged quote attributed to John Dooley on Globalstar's 2/12/15 conference call hosted by Odeon Capital Group, LLC. Mr. Dooley is the self-described "Inventor of TLPS" and the person named on the Globalstar trial that used Ruckus Wireless Access Points

Please refer to earlier articles for background ([here](#), [here](#), and [here](#)).

I believe the public, the FCC, and the SEC deserve to hear answers to the following questions:

1. **Does the Ruckus 7372 AP have a coexistence filter designed in?**
2. **Was the Ruckus 7372 AP used in the TLPS trial with the call sign WH2XBC?**
3. **Was the coexistence filter removed from the Ruckus 7372 AP used in the TLPS trial?**
4. **If the answer to Question #3 is "Yes", then why did John Dooley claim this filter had no impact on any tests? Having to remove the filter is a material impact.**
5. **If the answer to Question #3 is "No", then the claim of "no impact" on TLPS operations is obviously in question. Data should be provided to all interested parties to back-up this claim, because Ruckus 7372 FCC test data implies this is not true.**

These answers should be provided by John Dooley, Globalstar management, and/or Ruckus Wireless management. If there were any modifications made to the coexistence filter, Ruckus Wireless would very likely be aware of this. The author notified Ruckus IR of the comment from Mr. Dooley along with certain

test data presented below. The IR person said it was forwarded to their CFO and he replied that Ruckus will not comment.

### Why Are These Questions Material?

- Ruckus Access Points use the same coexistence filter technology as those used in LTE-enabled client devices. Virtually all LTE-enabled devices produced in the past few years contain coexistence filters.
- A technical analysis of BOTH publicly-available filter specifications and publicly-filed FCC test reports show coexistence filters will materially impair TLPS performance, and in some cases prevent operation altogether (iPhone 6/6+).
- This is not a US-only problem. This filter technology requires a guard band on the order of 17-20MHz, while the guard band available to TLPS is 1MHz (Band 41 in the US) or 5MHz (Band 7 Uplink used in Europe, Asia, South America, Australia, and Canada). Any device supporting either Band 41 or Band 7 will, at minimum, materially impair the performance of TLPS.
- If TLPS is truly impaired by coexistence filters, then the company's claims about TLPS' "ecosystem" and TLPS being a "carrier grade" alternative to free Wi-Fi are materially false and misleading.
- **Globalstar equity is worthless without the TLPS story.** Globalstar has a business model nearly identical to Iridium's. Using Iridium's forward EV/EBITDA multiple, Globalstar's implied equity value is NEGATIVE \$430M.

Odeon would not grant me access to the Globalstar call held on 2/12/15, nor would they confirm or deny whether specific quotes are accurate. Fortunately, alleged quotes from the call have appeared on various message boards in the past week. Figure 1 shows a snapshot of two posts to the GSAT Yahoo message board. Though not the most reliable source of information, the specificity of the quotes leads me to believe they may be credible. However, [caveat lector!](#) These should be considered "alleged quotes" at this point.

## ODEON response to APPLE issue part 1

- Another post today challenging the Company. Its from the same author behind last Thursdays SeekingAlpha post regarding the iPhone 6 and filter issues.

-We addressed these issues last Thursday at the beginning of our call with the Company. The company debunked these claims:

"transceiver compatibility with TLPS is universal for all 802.11 compliant devices, so the actual transmitter and receiver in any device that has wifi capability has TLPS capability from the get go, there is nothing has to be done to the chip"

"For a lot of devices that have EBS capability there are broad filters that are put on the RF passes of the wifi transceiver to protect it from EBS radios, the Sprint radios 2.5Ghz and vice versa , and some of these filters are designed to end at around 2495Mhz to end comfortably before the EBS spectrum."

"We looked at this with Sprint in great detail, and essentially in most cases the filter is quite wide and has no impact on ch 14 whatsoever...and in a few cases the filter may clip part of the 22Mhz of ch 14, because we use only about 17Mhz or slightly less of the 22Mhz channel for the actual signal that clipping is really not material to the functionality of ch 14 and in fact generates super compliance with the out of band emission rule effectively cuts off any of the waste product ch 14 emits, creating additional protection not only for EBS radio but for the commercial service in general."

"so these filters were not designed with the idea of ch 14 or TLPS in mind, but they don't really preclude its operation and it hasn't been something in any of our testing has been of impact to the actual usability of the service with the existing ecosystem"

- John Dooley, 2/12/15 (begins 1:37 Odeon call)

It actually makes use of ch 14 better from a regulatory perspective not worse. – CEO James Monroe 2/12/15 (at 19:37 Odeon call) [Less](#)

## Response part 2

-The Company has invited the opposition to a demonstration at the FCC, which has been scheduled for early March. We think this demonstrates their confidence that TLPS works. As to whether the iPhone 6 will be one of the devices used in the test:

"They don't have the device list finalized yet so I can't say until the device this is completed – you would need Apple's permission to adjust the firmware for Ch. 14 (we have Microsoft devices approved via experimental license). As we can only use approved devices, if used at all, the iPhone 6 would only be used on Channel 1/6/11 to test interference but the issue with iOS is that, unlike Android and Microsoft devices, the throughput data is not readily available to the user so any interference data is difficult to obtain without Apple's significant involvement." – Tim Taylor 2/18/15

-Related to devices, CEO James Monroe stated on our call that a senior executive at a large tech company had code released to update their devices to work with ch14, which debunks prior assertions in SeekingAlpha and elsewhere that devices cant be upgraded via software.

"I can assure you the device Im describing is a major consumer mass retail distributed device, literally gave us a code we can enter into the device to see ch 14"

- CEO James Monroe (begins 28:30 Odeon call) [Less](#)

**Figure 1: Alleged Quotes from Globalstar Call Hosted by Odeon Capital Group, LLC on February 12, 2015. (links [here](#) and [here](#) ...NOTE: "Response part 2" was deleted sometime in the past few days)**

At the end of this article, I provide a brief commentary on anything relevant to the issue at hand. The following analysis will focus only on the quote highlighted in red above.

I interpret the highlighted quote to mean John Dooley, speaking on behalf of Globalstar management as a paid consultant and the self-described "[inventor of TLPS](#)", means:

- Globalstar has conducted tests/trials that would identify whether coexistence filters negatively impact the operation of TLPS/Channel 14.
- During the course of these tests/trials, Globalstar has found no evidence coexistence filters will materially impair the operation of TLPS/Channel 14.

### Is John Dooley, Speaking on Behalf of Globalstar Management, Telling the Full Truth?

The FCC makes almost all trial information available through the "[Experimental Licensing System Generic Search Engine](#)". With knowledge of the trial's "Applicant Name" (ex: "Jarvinian Wireless Innovation Fund"), or other desired parameters, it is trivial to download the details of any experimental trial approved by the FCC.

The following are links to all documents relevant to a trial whose purpose was "[To determine the device performance requirements of carrier grade terrestrial low power service](#)." The trial's call sign is WH2XBC.

1. [Form 442 Trial Application Filing \(Initial\)](#)
2. [Form 442 Trial Application Filing \(Current\)](#)
3. [Technical Exhibit for Experimental License Application](#) (link to [attachment](#))
4. [Public Notes](#) (description of trial's purpose, also linked above)
5. [Correspondence](#) (between the FCC and Applicant)
6. [Trial Grant](#) (link to [attachment](#))

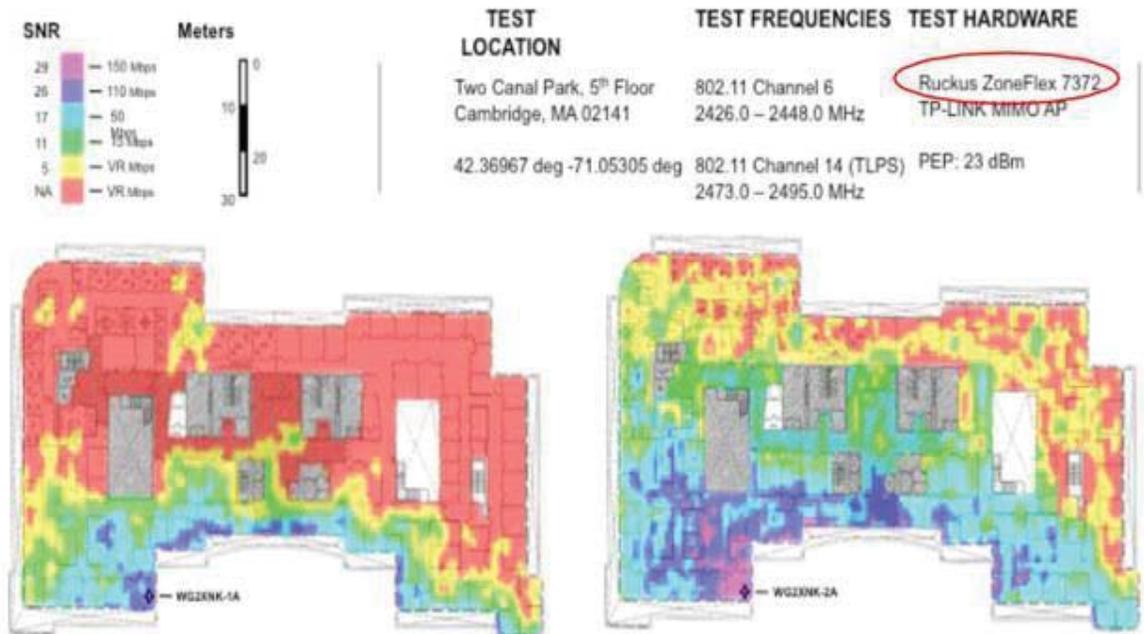
The Form 442 application details the equipment list as follows:

<b>Manufacturer</b>			
<b>List below transmitting equipment to be installed (if experimental, so state) if additional rows are required, please submit equipment list as an exhibit :</b>			
<b>Manufacturer</b>	<b>Model Number</b>	<b>No. Of Units</b>	<b>Experimental</b>
Ruckus	ZoneFlex 7781CM	3	No
Ruckus	ZoneFlex 7982	5	No
Ruckus	ZoneFlex 7782-n	5	No
Ruckus	ZoneFlex 7372	3	No

**Figure 2: Equipment List for the trial "To determine the device performance requirements of carrier grade terrestrial low power service" (i.e.: Carrier Grade TLPS). Trial Call Sign: WH2XBC**

On page 9 of the "Technical Exhibit for Experimental License Application", we find the following diagram.

(click to enlarge)



**Figure 8:** SNR Comparison in Enterprise Environment – Even in semi-urban settings, the significantly lower noise floor and interference levels associated with TLPS spectrum yield much higher sustained SNRs relative to 802.11 operations on public 2.4 GHz ISM channels. Higher SNRs mean significantly higher data throughput speeds in environments that are compromised by uncoordinated Wi-Fi and other unlicensed utilization.

**Figure 3:** From Page 9 of WH2XBC trial "Technical Exhibit for Experimental Trial License" (Directly Specifies Use of Ruckus 7372 Access Point)

The Ruckus 7372 Access Point actually has two FCC IDs:

- S9GZF7372 (FCC Wi-Fi Test Report Date 11/2/2012)
- S9GZF7372E (FCC Wi-Fi Test Report Date 4/23/2013)

It appears the main difference in the "E Version" vs. the original is a change in the antennas used. With many of the test plots being identical between the two reports, I believe my analysis of one version is equally valid for the other. (Please see earlier article for instructions on retrieving FCC test reports, or contact me and I will forward directly. As mentioned before, the FCC site isn't that easy to navigate.)

Before highlighting "High Band Edge" tests that clearly show the 7372 has coexistence filter for the 2.4GHz ISM band, let's look at the 5.8GHz "High Band Edge" test results where a coexistence filter is not needed.

(click to enlarge)

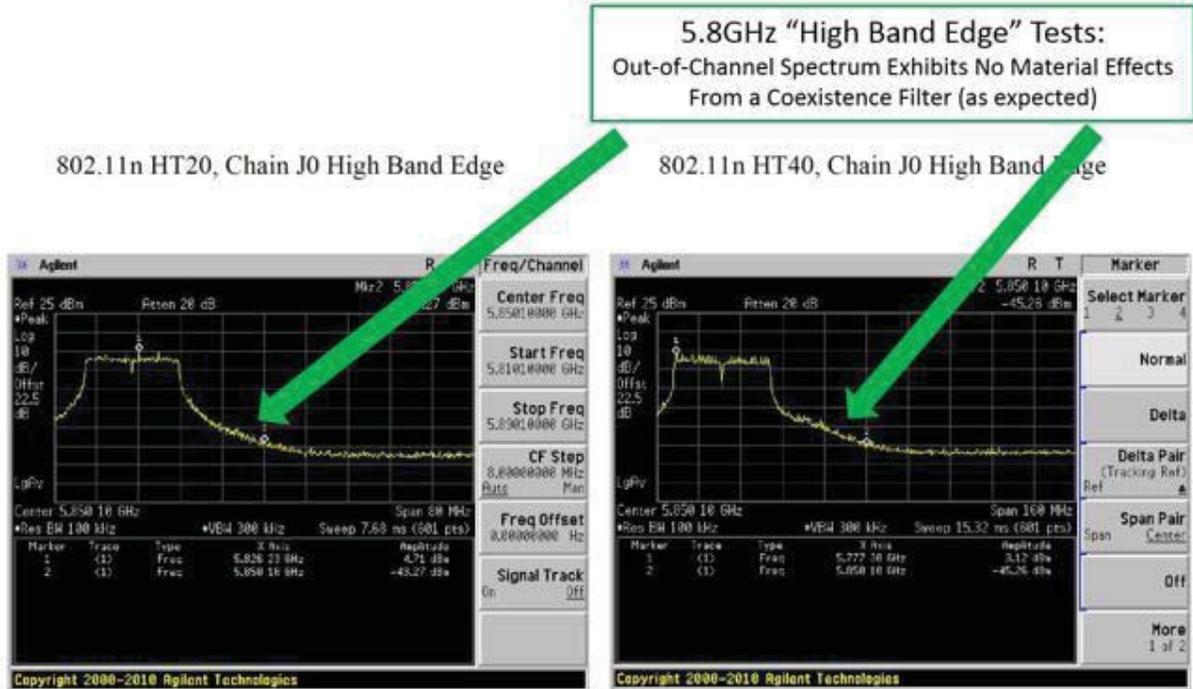


Figure 4: Ruckus 7372 AP FCC Test Report for 20MHz & 40Mhz "High Band Edge" Test in 5.8GHz Band (As expected, the out-of-channel spectrum shows no material impact from coexistence filter)

The following shows the same test conducted in the 2.4GHz band.

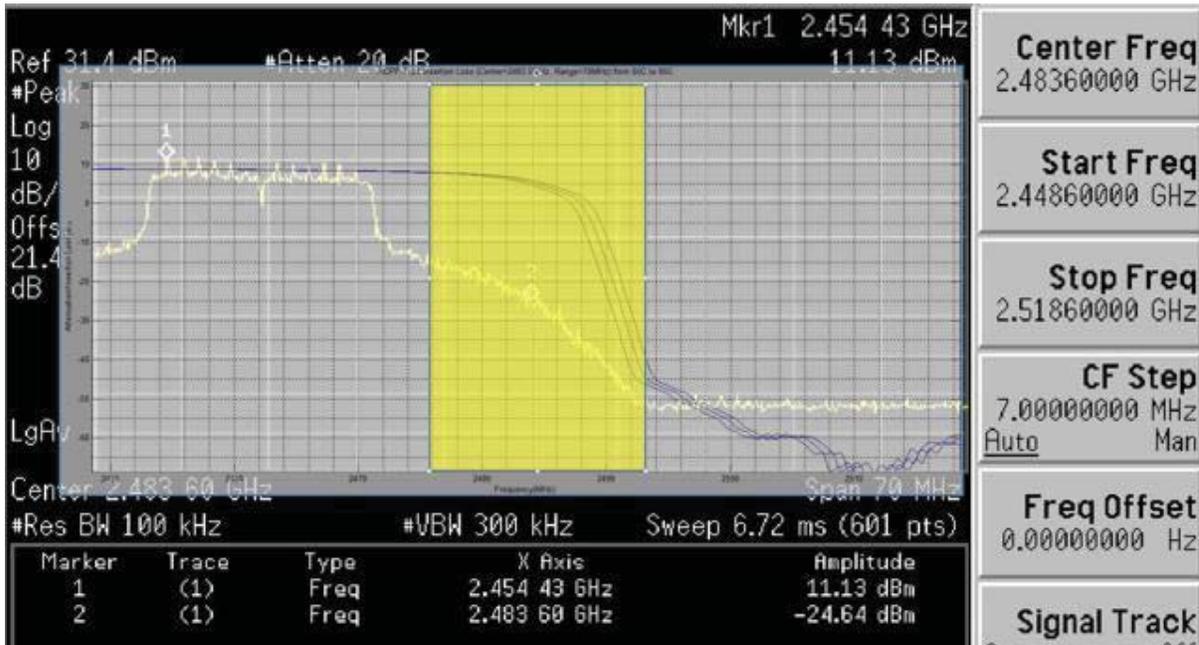
(click to enlarge)



**Figure 5: Ruckus 7372 AP FCC Test Report for 20MHz & 40MHz "High Band Edge" Test in 2.4GHz Band (Out-of-channel spectrum clearly indicates the presence of a coexistence filter)**

While the Ruckus 7372 surely has an RF filter at the 5.8GHz band, the cut-off frequency can't be derived from the test data. In contrast, we can use the 7372 "High Band Edge" test results to estimate the region where the FBAR (or BAW) filter begins to materially attenuation the signal.

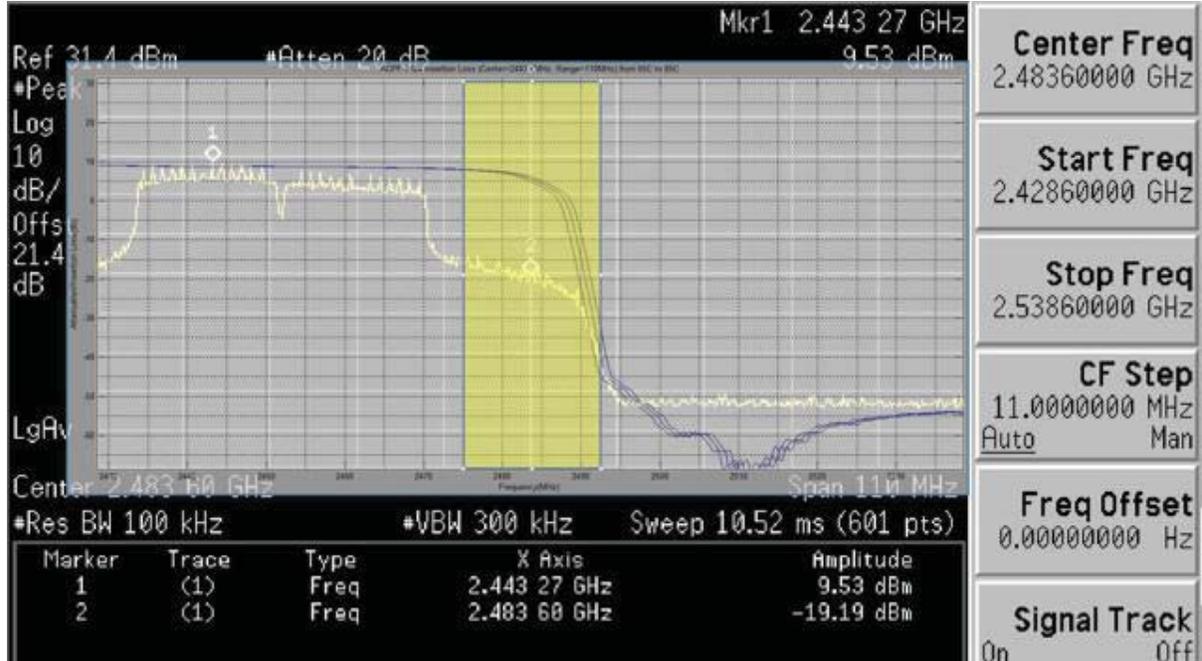
(click to enlarge)



**Figure 6: Ruckus 7372 20MHz "High Band Edge" Test in 2.4GHz Band with Avago ACPF-7124 Insertion Loss Overlay AND 17.5MHz "In-Channel" TLPS Bandwidth Highlighted in Yellow**

For further verification, we can overlay the same filter on the 40MHz "High Band Edge" test showing the accelerating attenuation in the same frequency band.

(click to enlarge)



**Figure 7: Ruckus 7372 40MHz "High Band Edge" Test in 2.4GHz Band with Avago ACPF-7124 Insertion Loss Overlay AND 17.5MHz "In-Channel" TLPS Bandwidth Highlighted in Yellow**

The wider spectrum analyzer frequency span in Figure 7 illustrates the effect more clearly (110MHz span for 40MHz test vs. 70MHz for 20MHz test).

The important conclusions from Figures 6 & 7 are:

- While the tests are conducted transmitting an 802.11n signal on Wi-Fi Channel 11, the "out-of-channel" spectral profile clearly show a coexistence filter is beginning to materially attenuate the signal at 2484MHz. *In other words, the coexistence filter is beginning to impair the RF signal by the center of Wi-Fi Channel 14, or TLPS.*
- Overlaying the same filter on the 802.11n 20MHz & 40MHz tests show consistent results.
- Looking at the TLPS frequency range (Yellow Region in Figures 6&7), it is clear the coexistence filter will severely impair performance.

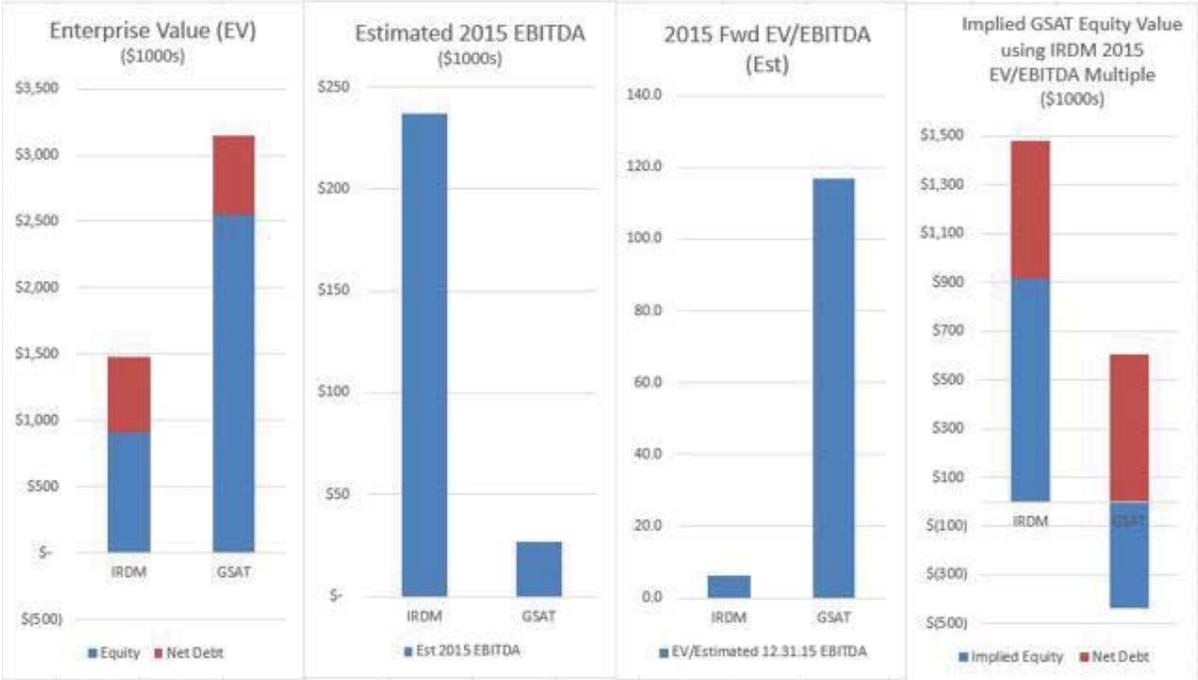
Beyond the question of which AP is used, and whether it requires a coexistence filter, my analysis highlights the following critical issue:

**Given the state of filter technology, the presence of adjacent LTE bands (namely Band 7 uplink, and Band 41), can TLPS ever reasonably operate given the necessity of a reasonable guard band between the 2.4GHz ISM band and adjacent LTE bands?**

To understand the importance of the "TLPS Story" to Globalstar's overall market valuation, we can do a comparative financial analysis with Iridium (NASDAQ: [IRDM](#)). Iridium and Globalstar have virtually identical business models, provide mobile satellite service to customers around the world. Given their core businesses and capital structures, an "EV/EBITDA" multiple comparison is warranted. Boiled down to the simplest form, the Enterprise Value of a company is computed by adding the current market capitalization value to the most recently available net debt (total debt minus total cash).

The following figure provides a quick visual comparison of GSAT and IRDM. If we make the simplifying assumption the core business of each company deserves an identical EV/EBITDA multiple, we can derive how much of Globalstar's current equity value is due to the TLPS story.

*(click to enlarge)*



**Figure 8: Comparative EV/EBITDA Multiple Valuation for IRDM and GSAT**  
**Assuming Identical 2015 Multiple for Core-Business, Mr. Market is assigning an incremental \$2.98B of value to Globalstar's "TLPS Story"**

Here are the numbers:

<b>Enterprise Value &amp; Multiples (per Bloomberg)</b>	<b>IRDM</b>	<b>GSAT</b>
Equity (at 2/25/15)	\$ 913	\$ 2,548
Net Debt	\$ 566	\$ 604
Est 2015 EBITDA (BB Consensus)	\$ 237	\$ 27
EV/ Trailing 12M EBITDA (at 9.30.14)	7.6	10,506.7
EV/Estimated 12.31.14 EBITDA (BB Consensus)	7.0	197.0
EV/Estimated 12.31.15 EBITDA (BB Consensus)	6.2	116.7
EV/Estimated 12.31.16 EBITDA (BB Consensus)	5.6	Not Avail.
Net Debt/Fwd 2015 EBITDA	2.4	22.4

\*NOTE: Equity Market Cap uses basic share count from latest 10Q

<b>Implied Equity Value at Equiv. EBITDA Multiple</b>	<b>IRDM</b>	<b>GSAT</b>
Assumed EV/EBITDA	6.2	6.2
Estimated 2015 EBITDA	\$ 237	\$ 27
EV ( Multiple times Estimated EBITDA)	\$ 1,480	\$ 169
Net Debt (remains fixed)	\$ 566	\$ 604
Implied Equity ( = EV minus Net Debt)	\$ 913	\$ (435)
Actual Equity minus Implied Equity ("TLPS market value"?)	\$ -	\$ 2,983

**NOTE: Author Edited Article on March 10, 2015 to include the following changes:**

1. The Net Debt is adjusted to include the "Purchase/Payment Obligations" over the next five years. This increases IRDM's net debt by ~\$1.3B and GSAT's by ~\$37M. For GSAT, this should also include their "Contract termination charge" of ~\$21M due to Thales, but I chose to leave this out.
2. The share counts for each company were updated to reflect share counts in their most recent 10k's. GSAT's share count includes ~869M voting shares plus ~134M non-voting shares.
3. Updated share price for about 12:30pm PT on 3/10/15.

As shown below, adding projected CapEx plans "improves" Globalstar's implied equity value from -\$435M to -\$327M.

(click to enlarge)

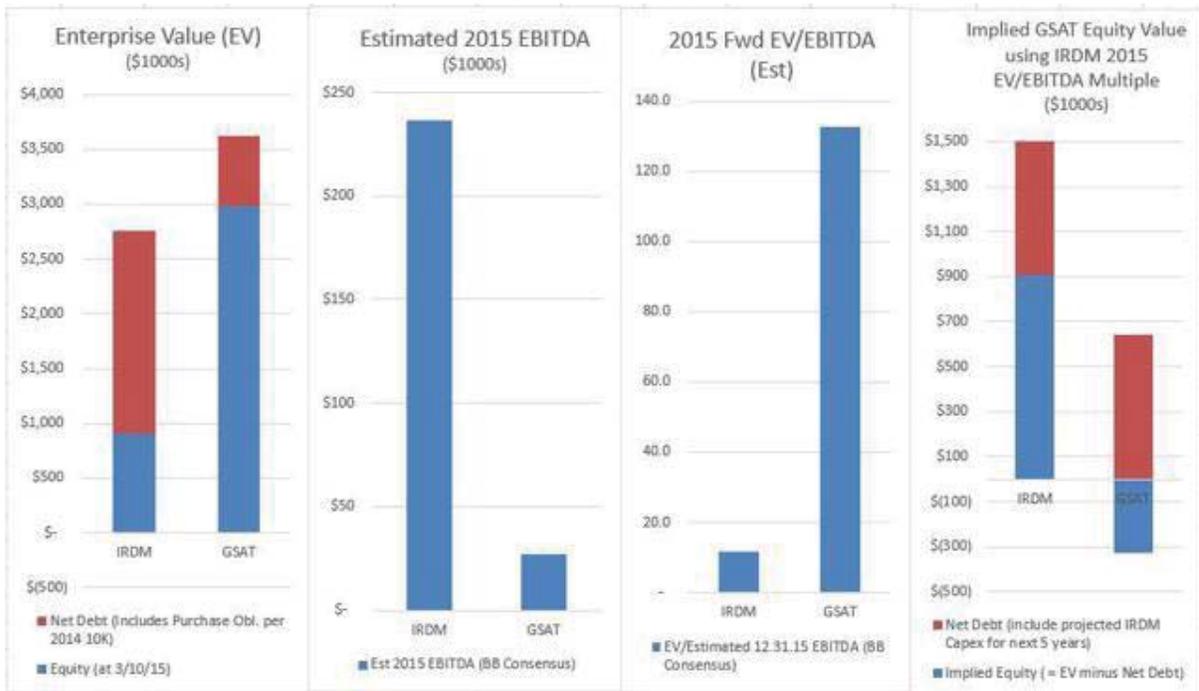


Figure 9: Comparative EV/EBITDA Multiple Valuation for IRDM and GSAT (Net Debt adjusted to include 5-year CapEx projections for each company, per latest 10k)

And the numbers:

Enterprise Value & Multiples (per Bloomberg)	IRDM	GSAT
Equity (at 3/10/15)	\$ 907	\$ 2,980
Net Debt (Includes Purchase Obl. per 2014 10K)	\$ 1,845	\$ 641
Est 2015 EBITDA (BB Consensus)	\$ 237	\$ 27
EV/ Trailing 12M EBITDA (at 9.30.14)	14.1	11,946.6
EV/Estimated 12.31.14 EBITDA (BB Consensus)	13.0	224.0
EV/Estimated 12.31.15 EBITDA (BB Consensus)	11.6	132.7
EV/Estimated 12.31.16 EBITDA (BB Consensus)	10.5	Not Avail.
Net Debt/Fwd 2015 EBITDA	7.8	23.7
*NOTE: Equity Market Cap uses share count from latest 10k (voting+non-voting)		
Implied Equity Value at Equiv. EBITDA Multiple	IRDM	GSAT
Assumed EV/EBITDA	11.6	11.6
Estimated 2015 EBITDA	\$ 237	\$ 27
EV ( Multiple times Estimated EBITDA)	\$ 2,752	\$ 314
Net Debt (include projected IRDM Capex for next 5 years)	\$ 1,845	\$ 641
Implied Equity (= EV minus Net Debt)	\$ 907	\$ (327)
Actual Equity minus Implied Equity ("TLPS market value"?)	\$ -	\$ 3,307

## **Addendum: Gerst Capital Commentary on select alleged quotes from 2.12.15 Odeon conference call with Globalstar Management.**

**"transceiver compatibility with TLPS is universal for all 802.11 compliant devices, so the actual transmitter and receiver in any device that has wifi capability has TLPS capability from the get go, there is nothing has to be done to the chip"**

**GC:** If he is referring to the digital transceiver "chip" (an ASIC with supporting peripheral digital and analog components), then he is exactly correct that "nothing has to be done" to "see" channel 14. Unfortunately for Globalstar, nothing can be done by the chip to recover an incoming signal that's been severely impaired by the coexistence filter. The "baseband" Wi-Fi transceiver cannot recover portions of the frequency band were "filtered out" (i.e.: severely attenuated) by upstream analog RF components.

**"For a lot of devices that have EBS capability there are broad filters that are put on the RF passes of the wifi transceiver to protect it from EBS radios, the Sprint radios 2.5Ghz and vice versa , and some of these filters are designed to end at around 2495Mhz to end comfortably before the EBS spectrum."**

**GC:** Portions of this may be mis-quoted ("put on the RF passes"??), but I believe he is just saying devices that support Sprint's LTE Band 41 service have coexistence filters. The phrase "end at around 2495MHz" tells us nothing. Of course the RF filters are "designed to end around 2495MHz" because Sprint's Band 41 service starts at 2496MHz. However, you must look at the technology limitations of practical component-based filters that can be used in consumer electronics devices and/or Access Points. The most advanced filter technology (those giving the "sharpest cutoff") today is based on Bulk-Acoustic Wave (BAW) or Thin-film Bulk Acoustic Resonator (FBAR) technology.

To determine whether a problem exists, we first need to translate "designed to end around 2495MHz" into a numerical technical requirement (i.e.: at 2495MHz, what level of attenuation is required relative to the signal's passband power level). To determine how much of TLPS/Channel 14 will be materially impaired, take an existing BAW/FBAR filter specification (need the "s2p file" to be precise) and align required attenuation level (of upper filter edge) with 2495MHz. From there, you can "walk back" in frequency and determine how much of the channel is impaired. See my first article for a detailed analysis of exactly this issue.

Furthermore, due to "temperature drift" and device-to-device manufacturing variability, it is impossible to predict the filter's "transition band" (the frequency range where the filter transitions from minimum attenuation to maximum attenuation) across devices, even those of the same make/model. In fact, within the same device, the cutoff is going to move around as the temperature changes. Free free Wi-Fi channels, this is a non-issue since they have enough of a guard band. For TLPS/Channel 14, this is a huge issue. Small downward shifts in frequency have a dramatic impact on what percentage of TLPS/Channel 14 is impaired. A shift of even 1-2MHz (< 0.1% of TLPS/Channel 14's center frequency!!!) could mean the difference between (barely) working TLPS and non-working.

**"We looked at this with Sprint in great detail, and essentially in most cases the filter is quite wide and has no impact on ch 14 whatsoever...and in a few cases the filter may clip part of the 22Mhz of ch 14, because we use only about 17Mhz or slightly less of the 22Mhz channel for the actual signal that clipping is really not material to the functionality of ch 14 and in fact generates super compliance with the out of**

**band emission rule effectively cuts off any of the waste product ch 14 emits, creating additional protection not only for EBS radio but for the commercial service in general."**

**GC:** The phrase "the filter is quite wide and has no impact on ch 14 whatsoever" followed by "the filter may clip part of the 22MHz of ch14" might seem to be contradictory at first sight. However, they're simply implying the filter may "clip part of" the channel 14 frequency band that doesn't contain "bits". This is simply not true and can be validated using the method I briefly describe above, and thoroughly examine in my first article. In the best case scenario where the required 2495MHz attenuation level is perfectly aligned with a typical Avago FBAR filter, approximately 35-40% of the 17MHz "information-carrying" bandwidth of TLPS will be attenuated by greater than 3dB. Please review my first article for much more detail. The net effect will be AT LEAST a 30% reduction in range. An issue not explored in my first article is the [as-yet-unquantified impact](#) of severely impairing the top two pilot tones, and whether that will prevent the system from operating at all. For 20MHz 802.11n, each OFDM "packet" (the proper term is "OFDM symbol") contains 56 sub-carriers. As detailed in my December 21, 2014 article, four of these are "pilot tones" used for frequency synchronization. Given the lack of technical due diligence that has gone into the TLPS concept, I doubt Globalstar engaged anyone to do a full 802.11n system simulation using Matlab to model the possible effects in this area. In fact, if the "Inventor of TLPS" really understood the end-to-end system engineering problems involved with his proposal, he would have started with [the freely available sample 802.11n system simulation](#) that can be download from the Matlab website. In early discussions, Matlab support volunteered to help me get this setup. I decided against it because the model likely required "tweaking" and could have resulted in weeks of work for little payoff.

**"It actually makes use of ch 14 better from a regulatory perspective not worse." - CEO James Monroe 2/12/15 (at 19:37 Odeon call)**

**GC:** I have no idea what he is referring to, or what this means from a technical viewpoint. If he is referring to the coexistence filter helping the case with regulators, then for sure he is correct. The problem is that these filters will materially impair channel 14 operations. The FCC test data clearly shows it will prevent operations on the iPhone 6. Among other questions, how many "Tier 1" smartphones exist today (or will soon) have proprietary coexistence filters that will prevent TLPS from operating at all? Without actually testing these devices in an anechoic chamber, Globalstar has no way of knowing the answer.

**"They don't have the device list finalized yet so I can't say until the device this is completed - you would need Apple's permission to adjust the firmware for Ch. 14 (we have Microsoft devices approved via experimental license). As we can only use approved devices, if used at all, the iPhone 6 would only be used on Channel 1/6/11 to test interference but the issue with iOS is that, unlike Android and Microsoft devices, the throughput data is not readily available to the user so any interference data is difficult to obtain without Apple's significant involvement." - Tim Taylor 2/18/15**

**GC:** It is interesting a person [recently cited as Globalstar s VP, Finance, Operations and Strategy](#)" is commenting on a relatively complex technical issue. "As we only used approved devices" seems to imply the company is somehow prevented from testing the iPhone 6 (or any other smartphone device). This is simply not true. The company is free to test any device of their choosing inside a controlled RF environment (i.e.: an anechoic chamber). If they don't have the expertise or facilities to conduct such a test, they can hire any number of FCC accredited test labs to do it for them. The only requirement is obtaining the software modification. Given the technical risks inherent in the TLPS proposal, it is inconceivable from an engineering management point of view, that Globalstar has not already conducted simple FCC-mandated tests across any device they view as important to their "ecosystem". And as mentioned above, Globalstar

could have implemented a full 802.11n Matlab system simulation model, inserted a variety of FBAR filter specification models, and answered most questions without touching any hardware. And I'm willing to bet the cost would have been a fraction of any single trial run by Mr. Dooley.

**-Related to devices, CEO James Monroe stated on our call that a senior executive at a large tech company had code released to update their devices to work with ch14, which debunks prior assertions in SeekingAlpha and elsewhere that devices can't be upgraded via software.**

**GC:** I never claimed that devices can't be upgraded via software. To the contrary, I stated this fact at multiple points during my analysis. I'm certain any Wi-Fi transceiver in any device can be programmed to transmit/receive on channel 14. The change would involve a few lines of code (instead of restricting channels only to 1-11, add the ability to program for 14). There is nothing to debunk here.

**"I can assure you the device I'm describing is a major consumer mass retail distributed device, literally gave us a code we can enter into the device to see ch 14"**

**- CEO James Monroe (begins 28:30 Odeon call)**

**GC:** I'll make a bold prediction: The device they are talking about is "Wi-Fi-only". It will not be a LTE-capable smartphone, tablet, or laptop.

**Additional disclosure:** The author is receiving no compensation for writing this article.