

March 22, 2002

VIA ELECTRONIC FILING

William F. Caton
Acting Secretary
Federal Communications Commission
455 12th Street, SW
Washington, DC 20554

RE: *Flexibility for Delivery of Communications By MSS Providers*
IB Docket No. 01-185; ET Docket No. 95-18

Dear Mr. Caton:

Verizon Wireless is submitting this letter in response to the International Bureau and the Office of Engineering and Technology March 6, 2002, *Public Notice*.¹ The *Notice* seeks comment on whether mobile satellite service (“MSS”) operations technically can be severed from terrestrial operations in the in the 2 GHz band, L-band and big LEO band.² Specifically, the *Notice* asks whether it is “technically feasible for one operator to provide terrestrial services and another operator to provide satellite services in the same MSS band.”³

MSS operations can be severed from terrestrial operations simply by segmenting the spectrum into separate frequency bands. One of the most vocal MSS proponents, ICO Communications (Holdings) Limited (“ICO”), makes this very point, noting that “[i]f the spectrum is split into separate frequency bands (segmented), *severing will*

¹ *Public Notice*, “Commission Staff Invites Technical Comment on Certain Proposals to Permit Flexibility in the Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Band,” IB Docket No. 01-185, DA 02-554 (Mar. 6, 2002) (“*Notice*”). On March 13, the Commission extended the comment deadline in response to the *Notice* to March 22, 2002. *See Order Extending Comment Period*, IB Docket No. 01-185, DA 02-601 (rel. Mar. 13, 2002). Pursuant to the *Notice* and Section 1.1206(b)(1) of the Commission’s rules, a copy of this letter is being submitted electronically.

² *Notice* at 2.

³ *Notice* at 2.

technically work, quite easily.”⁴ Even if spectrum is not segmented, ICO admits that “from a purely theoretical technical view it would appear that *yes, having the spectrum and associated services operated by separate companies may be possible.*”⁵

The *Notice* also asks what are the practical considerations involving an integrated MSS/terrestrial network or a freestanding terrestrial network.⁶ At this time, the technical analysis in the record presented to substantiate the viability of an integrated MSS/terrestrial network lacks the detail, consistency and accuracy necessary to recreate and fully evaluate the integration benefits claimed by MSS proponents. As a result, Verizon Wireless looks forward to reviewing the technical data that MSS providers must place in the record in order for the FCC to consider permitting terrestrial use of the MSS band.⁷ They should provide, at a minimum:

- Detailed analysis of all possible interference scenarios for uplink and downlink sharing (*e.g.*, ATC base to satellite mobile, satellite mobile to ATC base, ATC mobile to satellite, satellite to ATC mobile and others) describing all the technical assumptions.
- Analysis of such interference scenarios based on accepted propagation models, “noisy” estimates of user location (radiolocation is assumed to avoid interference), higher ATC base station antenna heights (up to 75 m) and other satellite user antenna heights (higher than 2 m), use of realistic base station antenna patterns and emissions, and random user distribution for satellite and terrestrial components.

⁴ *See Ex Parte* of ICO Communications (Holdings) Limited at Ex. B (Mar. 8, 2002) (emphasis added).

⁵ *Id.* (emphasis added). Constellation Communications Holdings, Inc. (“Constellation”) also appears to acknowledge that sharing is technically possible. *See Further Comments of Constellation Communications Holdings, Inc.* at 8 (Mar. 15, 2002) (noting that “[t]he licensing of independently operated terrestrial systems in MSS bands would require the establishment of a complex set of sharing criteria to define the interface between the two services.”).

⁶ *See Notice* at 2.

⁷ Before terrestrial service can be authorized on such spectrum, Section 309(j) of the Communications Act requires that the Commission conduct an auction so that the Federal Government can recapture a portion of the value of the spectrum. *See* 47 U.S.C. § 309(j); *see* Joint Comments of Cingular Wireless and Verizon Wireless at 7-16 (Oct. 22, 2001); Joint Reply Comments of Cingular Wireless and Verizon Wireless at 3-11 (Nov. 13, 2001); *see also, e.g.*, Comments of AT&T Wireless Services, Inc. at 13-19 (Oct. 22, 2001); Comments of the Cellular Telecommunications & Internet Association at 7-10 (Oct. 22, 2001).

- Supporting material to justify satellite C/I requirements for both uplink and downlink and corresponding impact on fade margin and service outage probability.
- Calculation of spectrum efficiency loss, if any, if the terrestrial service is segregated from satellite service. This should include quantification of spectrum requirements for satellite-only carriers, terrestrial-only carriers and shared pool.⁸

To the extent any conclusion can be drawn from the information submitted to date, it is that the integration of terrestrial and satellite operations under a single MSS operator is unlikely to be technically viable without some band segmentation or without significantly sacrificing spectrum efficiency or system performance (*i.e.*, the satellite or terrestrial system would have significant limitations). Without band segmentation, these technical difficulties exist regardless of whether there is an integrated MSS/terrestrial network or separate operators, with one operator providing terrestrial service and another providing satellite services in the same MSS band.⁹ There are several reasons why the claims of efficiency achieved from a single MSS/terrestrial system are exaggerated:¹⁰

- First, cdma2000 interference to the satellite network was underestimated. ICO relies upon a worst-case analysis to determine the number of terrestrial handsets that can be simultaneously used within 1.25 MHz of an MSS beam without causing excessive interference to the satellite network.¹¹ In its analysis, ICO assumed that handsets are outdoors and operating at full power. The EIRP characteristics for cdma2000 were underestimated by 3 dB (mobile EIRP should be typically 0.2 W instead of 0.1 W).¹² This resulted in an unrealistic and

⁸ Some of these issues were raised by the comments of the Wireless Communications Division of the Telecommunications Industry Association in this proceeding. ICO's response failed to provide the requisite detail to fully assess its proposed system. *Compare* Comments of the Wireless Communications Division of the Telecommunications Industry Association (Oct. 22, 2001) *with* Reply Comments of New ICO Global Communications, App. D (Nov. 13, 2001).

⁹ For example, Constellation has acknowledged that "[t]he technical requirements required to prevent harmful interference by the terrestrial component of integrated MSS ATC systems licensed to the MSS operators are similar to those that would be required for freestanding terrestrial facilities." Further Comments of Constellation Communications Holdings, Inc. at 9 (Mar. 15, 2002).

¹⁰ The integrated satellite/terrestrial network proposed by ICO for the 2 GHz band is used as an example, but the conclusion and concerns apply equally to other possible technology combinations of satellite and terrestrial technologies, *e.g.*, Globalstar, L.P.'s system.

¹¹ *See* Comments of New ICO Global Communications at App. A (Oct. 22, 2001).

¹² *See* Ex Parte of New ICO Global Communications (Holdings) Ltd. in IB Docket No. 99-81 at App. B, p. 11, Table 4 (Mar. 8, 2001).

optimistic number of 18 simultaneous users. When the correct EIRP levels are used, the number of simultaneous users per beam in 1.25 MHz drops to 9 users (other factors being equal). Assuming a lower EIRP, compared to current cdma2000 practices, translates into loss of coverage and deployment of smaller cell sizes with a corresponding additional financial burden, reducing the feasibility of an integrated network.

- Second, ICO assumes unrealistic satellite user and base station antenna heights. In its March 2001 filing, ICO assumed a 40 m high terrestrial base antenna in combination with a 2 m high satellite uplink terminal and used a propagation model typical of a rural area.¹³ At the edge of a terrestrial coverage area that would be generated by the propagation model ICO uses, base station antenna heights would be typically in the range 60 to 75 meters. This leads to propagation conditions resulting in significantly larger exclusion zones around terrestrial base stations (adversely affecting satellite transmissions) than those ICO calculates.
- Third, ICO has used inconsistent satellite C/I requirements throughout this proceeding. For example, ICO initially specified an uplink C/I requirement of 18 dB.¹⁴ Subsequently, it dropped the C/I requirement to 12.8 dB.¹⁵ This drop may be at the expense of ICO's link margin, potentially increasing satellite outage probability and decreasing satellite system performance. There is nothing on the record indicating how the system could support such a drop in the uplink C/I requirement.
- Fourth, the MSS applicants propose a very inefficient use of spectrum to support an integrated satellite/terrestrial network. For example, ICO has provided estimates of the number of terrestrial handsets that can be simultaneously in use within 1.25 MHz of an MSS beam without causing excessive interference to the satellite network to be 452 simultaneous users.¹⁶ Extending the results, and assuming 30 MHz of spectrum, ICO estimated that the proposed integrated network would be able to serve approximately 1.1 million subscribers in the continental United States. This represents an extremely inefficient use of scarce spectrum resources. A dedicated terrestrial operator could utilize this spectrum much more efficiently. For example, Verizon Wireless, with approximately 25 MHz average nationwide spectrum, supports approximately 29.4 million subscribers today.

¹³ *See id.*

¹⁴ *See id.* at App. B, p. 10, Table 3.

¹⁵ *See* Comments of New ICO Global Communications at App. A, p. A-1 (Oct. 22, 2001).

¹⁶ *See id.* at App. A, p. A-4.

In sum, severing the spectrum between satellite and terrestrial operations, related or unrelated, is technically feasible if MSS spectrum is segmented. A single provider of integrated satellite and terrestrial services would face the same difficulties that unrelated providers would face. As a result, the integration of terrestrial and satellite operations, even under a single MSS operator, is unlikely to be technically viable without some band segmentation or without significantly sacrificing spectrum efficiency or system performance (*i.e.*, the satellite or ATC system would have significant limitations).

Respectfully Submitted,

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Certificate of Service

I hereby certify that on this 22nd day of March copies of the foregoing comments of Verizon Wireless in IB Docket 01-185 and ET Docket 95-18 were sent by hand delivery to the following parties:

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