

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)
)
Recommendations Approved by the) IB Docket No. 04-286
Advisory Committee for the)
2015 World Radiocommunication Conference)

To: The Commission

COMMENTS OF LOCKHEED MARTIN CORPORATION

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Lockheed Martin Corporation (“Lockheed Martin”) hereby submits these comments in response to the Commission’s May 21, 2015 Public Notice on recommendations approved by the World Radiocommunication Conference Advisory Committee (“WAC”).¹ Lockheed Martin was an active participant in the WAC informal working groups that developed the recommendations included in Attachment A to the *Public Notice*.

Lockheed Martin’s comments specifically address several of the recommendations attached to the *Public Notice* that originated in Informal Working Group 2, and which the WAC forwarded to the Commission with multiple views. In particular, Lockheed Martin provides comments supporting the position in View A on the draft U.S. proposal for a global “no change” for the 5925-6425 MHz band under Agenda Item 1.1 for the 2015 World Radiocommunication Conference (“WRC-15”).² Lockheed Martin also provides comments supporting the position in View B regarding a potential U.S. proposal under WRC-15 Agenda Item 10 for a future agenda item regarding the prospect of spectrum allocations, identifications,

¹ See Public Notice, *FCC Seeks Comments on Recommendations Approved by the Advisory Committee for the 2015 World Radiocommunication Conference*, IB Docket No. 04-286, DA 15-604 (released May 21, 2015) (“*Public Notice*”).

² *Public Notice*, Attachment A, at 58-61.

and associated regulatory provisions for mobile broadband in frequency bands above 6 GHz.³ For the reasons provided below, Lockheed Martin urges the Commission to adopt and endorse these two views, and to reject the alternative views for each item.

I. Introduction and Summary

Lockheed Martin is a manufacturer of, and provider of commercial launch services to, satellite systems operating around the world in a variety of services and frequency ranges. Lockheed Martin has built and/or operated systems that utilize the C-band Earth-to-space fixed-satellite service (“FSS”) frequencies in the 5925-6425 MHz frequency band in all three ITU regions. Lockheed Martin is also the licensee of an earth station that uses spectrum in the 5925-6425 MHz frequency band to support satellite launch and early operation (“LEOp”) telemetry functions as part of a global network of earth stations. As a result, Lockheed Martin has a direct and substantial interest in the development of the U.S. proposal to WRC-15 for this frequency band under Agenda Item 1.1. In this respect, Lockheed Martin supports the call in View A to Document No. WAC/116 for a global “no change” proposal from the United States to WRC-15 for the 5925-6425 MHz band.

As a manufacturer of satellite systems in all satellite service allocations in frequency bands above 6 GHz, as a manufacturer of equipment and systems that operate in non-satellite service frequency bands above 6 GHz, and based on its active participation in the ITU-R studies under WRC-15 Agenda Item 1.1 in the post-WRC-12 study cycle, Lockheed Martin is convinced that an unbounded agenda item for the 2019 World Radiocommunication Conference (“WRC-19”), as contemplated in the View A portion of Document No. WAC/118(Rev.1),⁴ is inimical to the public interest. Lockheed Martin instead helped develop

³ *Id.*, Attachment A, at 93-97.

⁴ *Id.*, Attachment A, at 84-85.

and fully supports View B to this Agenda Item 10 proposal.⁵ View B offers a rational and forward-looking approach to the consideration of spectrum above 6 GHz for potential future use of mobile broadband operations – and promotes meaningful future studies using real parameters of mobile-broadband systems while taking appropriate account of the nature of existing and planned use of the relevant frequency bands by other services.

II. Discussion

A. The Commission Should Support a “No Change” Proposal Worldwide for the 5925-6425 MHz band under WRC-15 Agenda Item 1.1.

Lockheed Martin joined with nearly a dozen organizations engaged in the satellite manufacturing and operating industries, the broadcasting industry, and aviation industries to develop and support a proposal for “no change” globally to Article 5 of the ITU Radio Regulations for the 5925-6425 MHz frequency band under WRC-15 Agenda Item 1.1. As the proponents of this proposal argue in View A to Document No. WAC/116, a U.S. proposal of this type: ensures continued satellite network access to this vital FSS uplink band worldwide; is needed to protect existing U.S. FSS satellite receive operations worldwide; addresses two-way compatibility issues with mobile-broadband devices/operations; and ensures that there are no undue constraints on future growth for FSS networks and operations in this frequency band.

The alternative position propounded by representatives of the mobile broadband community in their View B is that the U.S. “no change” (“NOC”) proposal for the 5925-6425 MHz band under WRC-15 Agenda Item 1.1 should be limited to ITU Region 2. They assert that “[g]iven the importance of mobile broadband in providing connectivity to users and the results of ITU-R studies that show that sharing is feasible under certain conditions, . . . the

⁵ *Id.*, Attachment A, at 93-97.

United States should not oppose identification to IMT in the 5 925- 6 425 MHz band by other administrations or other Regions.”⁶

The argument for a Region 2-only NOC proposal for the 5925-6425 MHz band is fundamentally flawed in several respects. At the outset, it would have the United States send a misleading, and even potentially undermining, message to WRC-15. If, as the View B proponents argue, there is basis for concluding from ITU-R studies that some sharing of the band by satellite networks and mobile broadband operations “is feasible under certain conditions,” why would the United States propose to exclude ITU Region 2 from sharing? This would place the proposal entirely within the realm of the political, and rob it of any credibility. The reality is that sharing between FSS uplinks and ubiquitously-deployed mobile broadband systems has not been shown to be feasible. Lockheed Martin notes specifically that there are no expressions of interest before the Commission regarding use of the 5925-6425 MHz band for mobile broadband – as contrasted with heavy U.S. licensure of the band for satellite uplinks. Moreover, in other frequency bands where the United States is proposing NOC under Agenda Item 1.1 to protect U.S. satellite systems operating globally (e.g., the NOC proposal for the radionavigation-satellite service frequency bands at 1164-1300 MHz and 1559-1610 MHz), the United States proposal is not limited to ITU Region 2, but is for “no change” in all three regions.

In fact, there are multiple technical reasons why the United States’ NOC proposal to WRC-15 for the 5925-6425 MHz band should cover all three ITU regions. First, while the ITU-R Report containing the conditional feasibility language cited in View B exists, the View B proponents gloss over several critical facts. The Report was referred to in the Conference Preparatory Meeting Report (“CPM Report”) to WRC-15, with the unqualified statement that

⁶ *Id.*, Attachment A, at 63.

ITU-R “studies showed that GSO FSS space networks would be subjected to excessive levels of interference from the aggregate operation of IMT-Advanced (small cell) base stations, irrespective of whether they are deployed outdoors or indoors.”⁷ The language from View B regarding conditional feasibility in the same ITU-R studies refers to one specific case involving interference from FSS to mobile broadband station that was in one of several studies summarized in the ITU-R Report. The study, however, does not cover the case where the bandwidth of the FSS carrier is larger than the bandwidth of the IMT-Advanced channel or larger than the aggregate bandwidth of the combined IMT-Advanced channels.⁸ The study also does not override the Report’s conclusion that “for the protection of a single receiving IMT-Advanced base station, separation distances up to many tens of km would be required between a single transmitting FSS earth station and a single outdoor IMT-Advanced receiving base station, in order to protect the IMT-Advanced station from co-frequency interference.”⁹ The “conditions” that would supposedly assure feasibility even in the one case identified are referred to generally as a requirement for indoor deployment of the mobile broadband systems and a limit on maximum e.i.r.p. for mobile broadband stations.¹⁰ These concepts are absent from View B. Moreover, other cases of interference to mobile broadband operations from FSS earth station transmissions – including, as noted in View A, the operational FSS transmission case associated with most FSS networks today – remain unresolved.

⁷ See CPM Report to WRC-15, Section 1/1.1/4.1.13.2. See also Draft New Report ITU-R [FSS-IMT CBAND UPLINK], Document 4/77 and 5/123, at 12.

⁸ Draft New Report ITU-R [FSS-IMT CBAND UPLINK], Document 4/77 and 5/123, at 8 & n.4.

⁹ *Id.* at 13.

¹⁰ *Id.* In this last regard, the Report contains language criticizing the indoor limitation as imprecise and not regulatorily enforceable (*see id.* at 24, 25), and the value of the maximum e.i.r.p. limit is dependent on mobile broadband deployment assumptions that are not agreed.

Finally, the conditional feasibility language relied upon in View B was not developed in connection with the case of aggregate interference to FSS satellite receive operations from mobile broadband stations. This omission is significant, as the draft new Report states without disagreement that “[i]f deployed in these bands, it is expected IMT stations would be deployed in large numbers as part of dense mobile communication networks.”¹¹ Although the one incomplete study in the ITU-R Report gave rise to the view (referred to in View B) that there is some potential for mobile broadband within the 5925-6425 MHz band, pragmatic review of the report requires that much more weight be given to the view in the CPM Report from some administrations, including many administrations operating FSS satellites in geostationary orbit in the 5925-6425 MHz band, “that, considering the extent of the FSS deployment worldwide in the band 5 925-6 425 MHz, there is no potential for harmonization of that band, either regionally or globally, for IMT or other mobile broadband.”¹²

FSS satellites licensed by the Commission operate in all three ITU Regions. Lockheed Martin constructs C-band satellites for use outside of the United States under foreign authorizations – including developing countries – and its interests on the manufacturing side would be jeopardized by a U.S. NOC proposal that is limited to Region 2. Given the inherently international, even intercontinental, scope of satellite networks and systems, this is not just a Region 2 issue. For the United States to assure protection of these duly-authorized satellite operations from aggregate mobile-broadband emissions, the U.S. proposal for the 5925-6425 MHz band under Agenda Item 1.1 must be for NOC in all three ITU Regions.

¹¹ See Introduction to draft New Report ITU-R [FSS-IMT CBAND UPLINK], Document 4/77 and 5/123.

¹² CPM Report, Section 1/1.1/4.1.13.2.

B. The WRC-19 Agenda Item for Mobile Broadband Spectrum Above 6 GHz Sought by the Mobile Broadband Interests is Both Unacceptably Open-Ended and Premature.

The mobile broadband community's approach to future ITU-R study of allocations and regulatory conditions to facilitate the use of spectrum above 6 GHz for mobile broadband appears simple: allow the industry to look wherever it wants, without regard to current users and other services, in order to enable WRC-19 to fully accommodate its stated requirements. This is essentially the proposition advanced in View A to the WRC-15 Agenda Item 10 document looking at a future agenda item for WRC-19.¹³ Lockheed Martin is one of ten WAC members that believe that approach is contrary to the U.S. public and national interests, and would stymie the ITU-R in the post-WRC-15 study cycle. Lockheed Martin and other WAC colleagues developed View B to explain why the View A draft proposal for a future agenda item is deficient, and to introduce an alternative approach that is designed to balance the interests of the mobile broadband community in continuing to expand into more and more spectrum, the compelling interests of the users of existing satellite services, and the limited resources of the ITU-R and member administrations. Lockheed Martin urges the Commission to embrace the alternative approach in View B as the superior and more efficient approach.

The first problem with the View A draft proposal is the fact that it is too expansive. Although the proposal claims to limit itself by targeting bands with allocations to the mobile service, this is illusory. There are almost 60 GHz of mobile service allocations (most to all three ITU regions) on a primary basis between 6425 MHz and 100 GHz. Anticipating that even 60 GHz of mobile allocations may not be sufficient to accommodate demand for mobile broadband services, the View A proponents contemplate that their intended studies could

¹³ See *Public Notice*, Attachment, at 84-92.

extend to all remaining spectrum above 6 GHz as needed. Putting aside for the moment the fact that most satellite service allocations are co-primary with the mobile service today, the reality is that it will be impossible for the ITU-R to conduct meaningful compatibility and sharing studies in all frequency bands in a three-year cycle. Under no circumstances should the United States consider proposing any new-allocation agenda item that does not concentrate on a narrow range of frequency bands that is capable of practical study.

The second major flaw in the View A draft proposal is the fact that there is no proposal to suppress Resolution 233 from WRC-12, which was the basis for Agenda Item 1.1 for WRC-15. The ITU-R and member administrations expended considerable efforts over the last three years on compatibility and sharing studies. These studies, conducted in Joint Task Group 4-5-6-7, must be considered to be complete, and it would be both a disservice to existing users and a detraction from future studies in bands above 6 GHz to exit WRC-15 with the prospect of further studies in bands below 6425 MHz.¹⁴ Lockheed Martin urges the Commission to accept the recommendation in View B that any future agenda item proposal from the United States for additional allocations or identification of spectrum for mobile broadband include a proposal to suppress Resolution 233 (WRC-12).

The most glaring deficiency in the View A draft proposal arises from the fact that there is no effort made to take the interests and requirements of existing services into account. Not one word in the draft proposal in View A refers to the need to protect the existing services, the protection of adjacent-band allocations and services, current and planned usage of spectrum by existing services, or sharing and compatibility studies already published in the ITU-R.

¹⁴ The only potential exception to a ban on revisiting spectrum studied within Joint Task Group 4-5-6-7 in the current cycle would be if WRC-15 were to conclude that one or two specific bands addressed in the CPM Report for Agenda Item 1.1 required further study. This determination, however, can only be made as a result of deliberations at WRC-15 itself, and thus should not be part of any proposal made prior to the start of this year's conference.

Resolution 233 from WRC-12 was very explicit in these respects,¹⁵ and while the requirements of the resolution led to protracted debates in Joint Task Group 4-5-6-7 over the course of the current study cycle, they were essential to helping focus the difficult deliberations to come at WRC-15.

The United States has multiple stakeholders on both the industry and Federal sides that have spent – and are continuing to spend – billions of dollars investing in systems and networks that operate in spectrum above 6 GHz that the View A proponents would, by not making the preliminary effort to propose specific bands for consideration by the United States, put at risk in an undefined and unfocused process. The current users of these frequency bands also generate billions of dollars in economic productivity and indirect benefits across a broad range of industries and services that would be placed in jeopardy by ITU-R studies that were not required to include compatibility and sharing elements. Lockheed Martin emphasizes that it would be irresponsible for the Commission to accept any future agenda item for mobile broadband that neither limits the breadth of the scope nor places protection of existing users as one of the highest priorities.

With all of these deficiencies, it is clear that any U.S. proposal for a future agenda item to accommodate mobile broadband interests’ desire to begin the examination of spectrum above 6 GHz for potential mobile broadband use cannot look anything like the draft proposal in View A. Lockheed Martin does not suggest that the proposal be scrapped in its entirety and replaced with nothing. A prerequisite to any studies that address the compatibility and sharing

¹⁵ *Resolves to invite ITU-R 2* from Resolution 233 (WRC-12) calls upon the ITU-R to conduct studies of potential frequency bands identified for mobile broadband based on spectrum requirements and operating characteristics, taking into account “the protection of existing services” The resolution includes a “further resolves” that the ITU-R studies “include sharing and compatibility studies with services already having allocations in the potential candidate bands and in adjacent bands, as appropriate, taking into account the current and planned use of these bands by the existing services[.]” *Id.* at *further resolves* 1.

potential of mobile broadband systems above 6 GHz with existing services is the identification and articulation of broadband system and station characteristics that can be used in band-specific studies.

The inability of the mobile broadband community to input definitive and stable technical characteristics and parameters into Joint Task Group 4-5-6-7 for bands below 6425 MHz was a real hindrance to progress on the studies undertaken in the current cycle, and led to technical results that were considerably less definitive than would have been ideal for WRC-15 deliberations. Significantly, this situation emerged in frequency ranges where characteristics for mobile broadband systems have been under development for a long time. For bands above 6 GHz, the situation for mobile broadband characteristics and parameters is far more tenuous. Even the proponents of View A recognize in their own proposed resolution that they are still studying the feasibility of utilizing higher frequencies for mobile broadband, and appear unready to input stable parameters and characteristics into ITU-R studies.¹⁶ Without parameters and characteristics for mobile broadband systems and stations, study of allocations and regulatory constraints that properly take the requirements of existing services into account simply cannot be meaningfully undertaken in the ITU-R. Lockheed Martin thus concurs with the assessment in View B that a WRC-19 agenda item looking to the allocation of spectrum above 6 GHz is premature.

¹⁶ See, e.g., *Public Notice*, Attachment A at 90 (*recognizings* i) and j) of the View A draft resolution refer to as-yet preliminary ITU-R documents within Working Party 5D that are poised to address “the technical feasibility of [mobile broadband] in bands above 6 GHz,” and describe “the framework and overall objectives of the future development of [mobile broadband] for 2020 and beyond,” respectively). Time clearly is not of the essence here. In the United States, the Commission has recently issued a notice of inquiry that focuses on the feasibility of mobile broadband use of spectrum above 24 GHz, so identification of characteristics of mobile broadband systems clearly remains on the distant horizon here as well.

Lockheed Martin and the other proponents of View B have attempted to work around the undeniable prematurity of a WRC-19 agenda item of the type envisioned by the mobile broadband interests on View A. What the View B proponents offer instead is to have the United States divide the prospect of spectrum above 6 GHz for mobile broadband use into two WRC cycles – with the ITU-R study cycle leading to WRC-19 to be used by the mobile community to develop focused spectrum requirements and reliable and stable mobile broadband system and station characteristics and parameters, and with the preliminary agenda item proposal for WRC-23 that will call for sharing and compatibility studies utilizing those characteristics and parameters in specific frequency bands (and adjacent bands) as appropriate.

In Lockheed Martin's view, which is reflected in View B, the interval between WRC-15 and WRC-19 would be used exclusively for the development of materials relating to mobile broadband in spectrum above 6 GHz such as studies of mobile broadband spectrum requirements; articulation of the technical and operational characteristics (including evolving needs) for terrestrial mobile broadband applications; the unique or special needs of developing countries; and establishment of a realistic timetable for development and deployment of systems and related equipment. There would be no interservice elements to these studies, so the work on this agenda item could be performed entirely within the relevant Study Group 5 working parties (specifically Working Parties 5D and/or 5A) without the need for joint task groups or other interservice accommodations. A WRC-19 agenda item, which may not otherwise be needed to undertake or continue ITU-R work within Study Group 5 on these tasks, would nevertheless be useful here to the mobile broadband community as a specific tie in to the development of the interservice agenda item for an expressly-established set of frequency bands that would presumably be adopted at WRC-19 for the following ITU-R study cycle. The item the U.S. proposes for the preliminary WRC-23 agenda would necessarily include the

balanced approach to study of sharing and compatibility with existing services in the specific frequency ranges selected or to be selected as a result of the studies leading up to WRC-19.

Lockheed Martin agrees with the View B position that this two-cycle approach is fair, constructive, and an efficient use of limited ITU-R and administration resources. The approach takes an accurate but completely uncritical account of the currently undeveloped state of mobile broadband interests in the higher frequency ranges and allows those interests to be more fully fleshed out by the mobile broadband industry unilaterally within the ITU-R. It also affords all interests – mobile broadband and existing services alike – time to consider what mechanism or mechanisms would best accommodate the interservice studies that will follow WRC-19. Lockheed Martin strongly encourages the Commission to see the flaws in proceeding in the over-expansive manner presented in View A, and to endorse the two-cycle approach outlined here. Lockheed Martin is committed to helping flesh out this approach into a formal Agenda Item 10 proposal to WRC-15.

III. Conclusion

On the basis of the foregoing, Lockheed Martin urges the Commission to support the finalization of a global “NOC” proposal for the frequency band 5925-6425 MHz under WRC-15 Agenda Item 1.1. Lockheed Martin also urges the Commission to conclude that the U.S. national interest in mobile broadband services in frequency bands above 6 GHz would best be

served by bringing to WRC-15 proposals to divide studies on the subject between the following two conferences in the manner outlined in View B from Document WAC/118 (Rev. 1) in Attachment A to the *Public Notice*.

Respectfully submitted,

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