**WRC-19 Agenda Item 1.16**

**(5 150 - 5 250 MHz)**

IWG-2 members were not able to reach consensus on a proposal for WRC-19 Agenda Item 1.16, considering issues related to wireless access systems, including radio local area networks (WAS/RLAN), in the frequency band 5150-5250 MHz, in accordance with Resolution 239 (WRC-15). The views on the appropriate regulatory changes the FCC should support are provided.

View A is supported by: Apple, Inc., Cisco Systems, Inc., Comcast, Inc., Facebook Inc., Global Mobile Suppliers Association, Intel Corporation, Microsoft Corporation, NCTA - The Internet & Television Association, and Wi-Fi Alliance

View B is supported by: Globalstar and Omnispace.

VIEW A

**View A:**

**2019 World Radiocommunication Conference Advisory Committee**

**Agenda Item 1.16 (5 150 - 5 250 MHz)**

Reference: IWG-2/076r1

**S**upported by Apple, Inc., Cisco Systems, Inc., Comcast, Inc., Facebook Inc., Global Mobile Suppliers Association, Intel Corporation, Microsoft Corporation, NCTA - The Internet & Television Association, and Wi-Fi Alliance

In 2014, after years of consideration following the Spectrum Act of 2012, the FCC decided to revise the rules governing U-NII (i.e., RLAN) operations in the band 5 150-5 250 MHz. In that decision, proceeded by public notice and numerous comments, the Commission recognized that demand for Wi-Fi connectivity could not be accommodated by the spectrum that was then available for unlicensed operations, under the then-applicable rules,[[1]](#footnote-1)/ and that future (and now current) applications will rely on wider bandwidth channels and outdoor deployments that can be best supported by greater harmonization of the technical parameters permitted across the 5 GHz sub-bands.[[2]](#footnote-2)/ Based on an extensive record and thorough technical analyses, the Commission adopted reasonable changes to its rules allowing outdoor RLAN deployments in the band 5 150- 5 250 MHz, and limiting e.i.r.p. above 30 degrees elevation to protect Globalstar’s (i.e., Mobile Satellite Service (MSS) feeder uplink) operations.[[3]](#footnote-3)/ U-NII operation in the 5 150 – 5 250 MHz band has enabled U-NII devices to pair that spectrum with operation in the 5 725 – 5 850 MHz band to allow for Gigabit Wi-Fi under IEEE 802.11ac and IEEE 802.11ax, which permits pairing of 80 MHz channels for a total of 160 MHz. Following the adoption of the 5 GHz R&O, other countries have recognized the importance of increased and outdoor RLAN spectrum access and moved to revise their national regulations, similar to the FCC.[[4]](#footnote-4)/

Consistent with the FCC rules and market deployment data, the U.S. presented contributions to the ITU-R Working Party 5A (“WP 5A”) preparatory efforts on WRC-19 Agenda Item 1.16, confirming that RLAN outdoor or indoor operations will cause “**no harmful interference to the single MSS system using the 5 150–5 250 MHz band for FSS feeder links”**.[[5]](#footnote-5)/ In fact, the U.S. studies contributed to WP 5A show a negligible long term impact on the MSS system capacity far below the acceptable 1% threshold under ITU-R Recommendation S.1427.

The attached proposal’s only objective is to align the ITU Radio Regulations with the FCC rules governing RLAN operations in the band 5 150-5 250 MHz. A U.S. proposal to WRC-19 other than the attached View A would be inconsistent and contradictory. The organizations and companies listed above urge FCC to adopt the attached recommendation for WRC-19 Agenda Item 1.16 proposal (View A).

**ATTACHMENT TO VIEW A:**

**UNITED STATES OF AMERICA**

**DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE**

**Agenda Item 1.16**: *to consider issues related to wireless access systems, including radio local area networks (WAS/RLAN), in the frequency bands between 5 150 MHz and 5 925 MHz, and take the appropriate regulatory actions, including additional spectrum allocations to the mobile service, in accordance with Resolution* ***239 (WRC-15)***

**Background Information**:

Radio Local Area Networks (RLANs) have proven to be a tremendous success in providing affordable and ubiquitous broadband connectivity. Introduced by some administrations in limited spectrum in the 2.4 GHz band and subsequently expanded into the 5 GHz band, RLANs, specifically Wi-Fi devices, now are an integral component of the world’s connectivity infrastructure. According to the latest statistics, more than 50% of all global IP traffic will be delivered over Wi-Fi[[6]](#footnote-6), and forecasts suggest that with the introduction of 5G and gigabit wireless technologies, the demand will continue to grow rapidly in the coming years. In spite of the growing demand, however, the spectrum available globally for RLAN access has remained unchanged since World Radiocommunication Conference 2003 (WRC-03). This lack of adequate spectrum threatens to degrade RLAN performace and limit conectivity for billions of consumers worldwide. This problem is particularly acute for RLAN outdoor deployments. Since WRC-03, requirements for RLAN outdoor deployments have evolved, for example:

* Smart cities and communities;[[7]](#footnote-7)
* Mobile Data – volume of mobile data traffic offloaded to Wi-Fi significantly exceeds traffic carried (remaining) on cellular networks;[[8]](#footnote-8)
* Locations which are increasingly expected to offer ubiquitous Wi-Fi access including outdoor areas such as sports arenas, municipal/private networks, parks, and other high traffic areas as well as indoor areas such as shopping malls, airports, hotels, restaurants office buildings and schools;
* Sensors and connectivity for public transport, automotive, utilities, etc. rely on Wi-Fi connectivity;
* Internet of Things (IoT) technologies entail both indoor and outdoor deployments;
* Connected wearables and other consumer applications rely on Wi-Fi to support various use cases.

The problem of inadequate spectrum access for RLANs is exacerbated further by the fact that except for the band 5 150-5 250 MHz, other spectrum in the 5 GHz range harmonized for RLANs on a world-wide basis is subject to the dynamic frequency selection (DFS) constraint. The DFS constraint, albeit necessary, reduces spectrum access and raises equipment cost and complexity for RLAN implementation. Thus, the 5 150 **–** 5 250 MHz band offers unique advantages in addressing the growing need for RLAN outdoor access. Recognizing this fact, in 2014, the United States adopted regulations that protect other operations while allowing limited RLAN operations outdoors in the 5 150 **–** 5 250 MHz band. In particular, the United States regulations have promoted RLAN use of this band in co-existence with mobile-satellite-service (MSS) operations through E.I.R.P. limitations at higher antenna elevation angles. The United States rules generally permit indoor and outdoor RLAN operations in the 5 150 **–** 5 250 MHz band at up to 1 Watt conducted or 4 Watt E.I.R.P., except that operations with antenna elevation angles in excess of 30 degrees from the horizon must not exceed 125 mW E.I.R.P.[[9]](#footnote-9) These rules are intended to prevent harmful interference to MSS Earth-to-space communications by limiting the aggregate noise received by the satellite. U.S. RLAN interests and MSS operators agreed to this approach to sharing.[[10]](#footnote-10)

Since the United States adoption of these more permissive regulations for 5 150 – 5 250 MHz, other countries authorized similar outdoor RLAN deployments. The proposal below establishes an international regulatory framework that will enable much-needed RLAN outdoor deployments while ensuring protection of other operations in the 5 150-5 250 MHz band.

**Proposal**:

**MOD** **USA/1.16/1**

RESOLUTION 229 (Rev.WRC‑19)

**Use of the bands 5 150-5 250 MHz, 5 250-5 350 MHz and 5 470-5 725 MHz   
by the mobile service for the implementation of wireless access systems   
including radio local area networks**

The World Radiocommunication Conference ( Sharm El Sheikh, 2019)

*Considering*

*a)* that WRC‑03 allocated the bands 5 150-5 350 MHz and 5 470-5 725 MHz on a primary basis to the mobile service for the implementation of wireless access systems (WAS), including radio local area networks (RLANs);

*b)* that WRC‑03 decided to make an additional primary allocation for the Earth exploration-satellite service (EESS) (active) in the band 5 460-5 570 MHz and space research service (SRS) (active) in the band 5 350-5 570 MHz;

*c)* that WRC‑03 decided to upgrade the radiolocation service to a primary status in the 5 350-5 650 MHz band;

*d)* that the band 5 150-5 250 MHz is allocated worldwide on a primary basis to the fixed‑satellite service (FSS) (Earth-to-space), this allocation being limited to feeder links of non‑geostationary-satellite systems in the mobile-satellite service (No. **5.447A**);

*e)* that the band 5 150-5 250 MHz is also allocated to the mobile service, on a primary basis, in some countries (No. **5.447**) subject to agreement obtained under No. **9.21**;

*f)* that the band 5 250-5 460 MHz is allocated to the EESS (active) and the band 5 250‑5 350 MHz to the SRS (active) on a primary basis;

*g)* that the band 5 250-5 725 MHz is allocated on a primary basis to the radiodetermination service;

*h)* that there is a need to protect the existing primary services in the 5 150-5 350 MHz and 5 470-5 725 MHz bands;

*i)* that results of studies in ITU‑R indicate that sharing in the band 5 150-5 250 MHz between WAS, including RLANs, and the FSS is feasible under specified conditions;

*j)* that studies have shown that sharing between the radiodetermination and mobile services in the bands 5 250-5 350 MHz and 5 470-5 725 MHz is only possible with the application of mitigation techniques such as dynamic frequency selection;

*k)* that there is a need to specify an appropriate e.i.r.p. limit and, where necessary, operational restrictions for WAS, including RLANs, in the mobile service in the bands 5 250‑5 350 MHz and 5 470-5 570 MHz in order to protect systems in the EESS (active) and SRS (active);

*l)* that the deployment density of WAS, including RLANs, will depend on a number of factors including intrasystem interference and the availability of other competing technologies and services;

*m)* that the means to measure or calculate the aggregate pfd level at FSS satellite receivers specified in Recommendation ITU‑R S.1426 are currently under study;

*n)* that certain parameters contained in Recommendation ITU‑R M.1454 related to the calculation of the number of RLANs tolerable by FSS satellite receivers operating in the band 5 150-5 250 MHz require further study;

*p)* that an aggregate pfd level has been developed in Recommendation ITU‑R S.1426 for the protection of FSS satellite receivers in the 5 150-5 250 MHz band,

*further considering*

*a)* that the interference from a single WAS, including RLANs, complying with the operational restrictions under *resolves*2 will not on its own cause any unacceptable interference to FSS receivers on board satellites in the band 5 150-5 250 MHz;

*b)* that such FSS satellite receivers may experience an unacceptable effect due to the aggregate interference from these WAS, including RLANs, especially in the case of a prolific growth in the number of these systems;

*c)* that the aggregate effect on FSS satellite receivers will be due to the global deployment of WAS, including RLANs, and it may not be possible for administrations to determine the location of the source of the interference and the number of WAS, including RLANs, in operation simultaneously,

*noting*

*a)* that, prior to WRC‑03, a number of administrations have developed regulations to permit indoor and outdoor WAS, including RLANs, to operate in the various bands under consideration in this Resolution;

*b)* that, in response to Resolution **229 (WRC‑03)**, ITU‑R developed Report ITU‑R M.2115, which provides testing procedures for implementation of dynamic frequency selection,

*recognizing*

*a)* that in the band 5 600-5 650 MHz, ground-based meteorological radars are extensively deployed and support critical national weather services, according to footnote No. **5.452**;

*b)* that the performance and interference criteria of spaceborne active sensors in the EESS (active) are given in Recommendation ITU‑R RS.1166;

*c)* that a mitigation technique to protect radiodetermination systems is given in Recommendation ITU‑R M.1652;

*f*

*d)* that Recommendation ITU‑R RS.1632 identifies a suitable set of constraints for WAS, including RLANs, in order to protect the EESS (active) in the 5 250-5 350 MHz band;

*e)* that Recommendation ITU‑R M.1653 identifies the conditions for sharing between WAS, including RLANs, and the EESS (active) in the 5 470-5 570 MHz band;

*f)* that the stations in the mobile service should also be designed to provide, on average, a near-uniform spread of the loading of the spectrum used by stations across the band or bands in use to improve sharing with satellite services;

*g)* that WAS, including RLANs, provide effective broadband solutions, and that the demand has increased since the frequency range was first identified for this application;

*h)* that there is a need for administrations to ensure that WAS, including RLANs, meet the required mitigation techniques, for example, through equipment or standards compliance procedures,

*resolves*

1 that the use of these bands by the mobile service is for the implementation of WAS, including RLANs, as described in the most recent version of Recommendation ITU-R M.1450;

2 that in the band 5 150-5 250 MHz, stations in the mobile service shall be restricted to maximum conducted output of 1 W provided the maximum antenna gain does not exceed 6 dBi (i.e., a total maximum mean e.i.r.p. of 36 dBm)[[11]](#footnote-11)1, and, in addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band, and, for the outdoor operation of stations in the mobile service the maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon shall not exceed 125 mW (21 dBm), and finally, for WAS/RLAN transmitters operating in the 5 150-5 250 MHz band, all unwanted emissions outside of the 5 150-5 350 MHz band shall not exceed an e.i.r.p. of -27 dBm/MHz;

43 that in the band 5 250-5 350 MHz, stations in the mobile service shall be limited to a maximum mean e.i.r.p. of 200 mW and a maximum mean e.i.r.p. density of 10 mW/MHz in any 1 MHz band. Administrations are requested to take appropriate measures that will result in the predominant number of stations in the mobile service being operated in an indoor environment. Furthermore, stations in the mobile service that are permitted to be used either indoors or outdoors may operate up to a maximum mean e.i.r.p. of 1 W and a maximum mean e.i.r.p. density of 50 mW/MHz in any 1 MHz band, and, when operating above a mean e.i.r.p. of 200 mW, these stations shall comply with the following e.i.r.p. elevation angle mask where θ is the angle above the local horizontal plane (of the Earth):

−13 dB(W/MHz) for 0° ≤ θ < 8°

[[12]](#footnote-13) −13 − 0.716(θ − 8) dB(W/MHz) for 8° ≤ θ < 40°

−35.9 − 1.22(θ − 40) dB(W/MHz) for 40° ≤ θ ≤ 45°

[[13]](#footnote-14) −42 dB(W/MHz) for 45° < θ;

54 that administrations may exercise some flexibility in adopting other mitigation techniques, provided that they develop national regulations to meet their obligations to achieve an equivalent level of protection to the EESS (active) and the SRS (active) based on their system characteristics and interference criteria as stated in Recommendation ITU‑R RS.1632;

65 that in the band 5 470-5 725 MHz, stations in the mobile service shall be restricted to a maximum transmitter power of 250 mW2 with a maximum mean e.i.r.p. of 1 W and a maximum mean e.i.r.p. density of 50 mW/MHz in any 1 MHz band;

76 that in the bands 5 250-5 350 MHz and 5 470-5 725 MHz, systems in the mobile service shall either employ transmitter power control to provide, on average, a mitigation factor of at least 3 dB on the maximum average output power of the systems, or, if transmitter power control is not in use, then the maximum mean e.i.r.p. shall be reduced by 3 dB;

87 that, in the bands 5 250-5 350 MHz and 5 470-5 725 MHz, the mitigation measures found in Annex 1 to Recommendation ITU‑R M.1652‑1 shall be implemented by systems in the mobile service to ensure compatible operation with radiodetermination systems,

*invites administrations*

to consider appropriate measures when allowing the operation of stations in the mobile service using the e.i.r.p. elevation angle mask referred to in *resolves*3 above, to ensure the equipment is operated in compliance with this mask,

*[[14]](#footnote-15)invites ITU‑R*

2 to continue studies on mitigation techniques to provide protection of EESS from stations in the mobile service;

32 to continue studies on suitable test methods and procedures for the implementation of dynamic frequency selection, taking into account practical experience.

**Reason:** The band 5 150-5 250 MHz is the only worldwide harmonized spectrum for RLANs in the 5 GHz range that is not subject to the dynamic frequency selection constraint. Studies confirm that RLAN operations outdoors in the band 5 150-5 250 MHz will not cause harmful interference to other operations in the band. The results of these studies are further confirmed by the real-world operational experience with some countries allowing RLAN operations outdoors in the 5 150-5 250 MHz with appropriate constraints. Allowing RLAN access to outdoor use in the band 5 150-5 250 MHz would address the growing demand for continuous and ubiquitous connectivity.

**MOD USA/1.16/2**

**5.446A** The use of the bands 5 150-5 350 MHz and 5 470-5 725 MHz by the stations in the mobile, except aeronautical mobile, service shall be in accordance with Resolution **229** **(Rev.WRC‑19~~12~~)**

**Reasons:** Consequential change to update reference to the revised Resolution **229 (Rev.WRC‑19)**.

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VIEW B

**VIEW B:**

WAC members Globalstar and Omnispace support the objective of WRC-19 agenda item 1.16, in accordance with Resolution **239 (WRC-15)** which,  *invites the ITU-R:* to conduct and complete in time for WRC-19: “… studies with a view to identify potential WAS/RLAN mitigation techniques to facilitate sharing with incumbent systems in the frequency bands 5 150-5 350 MHz, 5 350-5 470 MHz, 5 725-5 850 MHz and 5 850-5 925 MHz, while ensuring the protection of incumbent services including their current and planned use;” This agenda item calls for the protection of the current and planned uses of incumbent services in bands between 5150- 5925 MHz. The proposal contained in this view deals with only the 5150-5250 MHz portion of that frequency range.

Globalstar and Omnispace operate global satellite systems in non-geostationary orbit that use the 5150-5250 MHz band for feeder links from gateways in a number of countries, including the United States, and interference from outdoor RLANs could impact Globalstar and Omnispace operations. Globalstar feeder links extend down to 5091 MHz and telecommand operations are transmitted in the range between 5091 - 5096 MHz. Omnispace has telecommand operations in the 5150-5250 MHz band. Globalstar and Omnispace support View B.

**Background**

The band 5150-5250 MHz is allocated on a primary basis to the fixed-satellite service (Earth-to-space), which is limited to feeder links of non-geostationary-satellite systems in the mobile-satellite service (MSS). Globalstar, Omnispace, and other MSS operators use this band for feeder links from gateways in a number of countries, including the United States. Omnispace also uses this band for telecommand, the essential function of sending instructions to control a satellite.

The Globalstar MSS system has provided reliable connections to under-developed and underserved areas since 1998. In 2007, Globalstar introduced the SPOT line of products which provide personal location and emergency services. Since its inception, SPOT terminals, as well as Globalstar’s other duplex products, have been responsible for initiating thousands of rescues of persons in distress around the world. Just within the 30 days preceding 21 September, Globalstar’s customers have initiated approximately twenty rescues requiring helicopter evacuations in various regions of the world. Further, the newly released SPOT-X terminal now provides two-way communications for areas that are beyond the range of more conventional terrestrial networks.

In 1997, the FCC authorized unlicensed Radio Local Area Networks (RLANs) known as “Unlicensed National Information Infrastructure” (U-NII). The FCC established the “U-NII-1” band at 5150-5250 MHz. In order to protect other radio services, a maximum equivalent isotropic radiated power (E.I.R.P.) of 200 milliwatts (mW) was adopted and operations in the U-NII-1 band were restricted to indoor use. These 1997 Rules were consistent with Resolution **229 (WRC-12)** of the Radio Regulations. In 2014 the FCC adopted revised rules in the U-NII-1 band permitting outdoor RLAN operations at up to 1 Watt conducted or 4 Watt E.I.R.P., except that operations with antenna elevation angles in excess of 30 degrees from the horizon must not exceed 125 mW E.I.R.P. U.S. RLAN interests and Globalstar, participating in the FCC’s regulatory proceeding, agreed to this approach to sharing, with Globalstar’s agreement conditioned on the existence of a remedial mechanism to limit any interference to MSS to an acceptable level. In the Report and Order[[15]](#footnote-16), the FCC stated that licensed MSS operations are protected from harmful interference from unlicensed terrestrial wireless operations. The FCC also recognized the ability of Globalstar to measure interference in the feeder uplink band and stated that remedial action would be taken to reduce or eliminate any harmful interference to licensed MSS operations.

**Discussion**

Globalstar’s measurement of the noise level over the United States in the 5091-5250 MHz band began in 2014 and is continuing. These measurements have shown a significant increase in interference to its feeder uplinks since early 2017, resulting in reduced MSS capacity, a reduction of the MSS coverage area, and an increased burden on the spacecraft bus power of Globalstar’s satellites. These negative effects are expected to become greater over time as outdoor RLAN operations expand and the noise level in the 5091-5250 MHz band over the United States. continues to rise. In addition, Globalstar has conducted similar measurements of the noise level at 5091-5250 MHz over Europe, Central and South America, and Australia, and these measurements have shown no similar increase in interference.

Studies are currently being conducted in the ITU-R to determine whether it is feasible to permit co-channel operation of outdoor RLAN transmitters and MSS feeder uplink operations at 5150-5250 MHz without causing unacceptable interference to MSS satellite receivers. Five out of six of these studies predict harmful interference to MSS feeder links from outdoor RLANs. Globalstar presented its interference measurement results to the ITU-R, providing empirical evidence substantiating the predicted interference. Further, Globalstar has petitioned the FCC to open an inquiry seeking comment on the feasibility of continued sharing of the 5150-5250 MHz band between the MSS and outdoor RLAN transmitters.

Prior to the 2014 Rule change in the USA that allowed outdoor deployment and increased transmitter power, RLANs and MSS feeder links successfully shared the 5150-5250 MHz band for nearly 16 years.

**Recommendation**

Based on the studies in the ITU-R predicting interference from RLAN transmitters deployed outdoors at increased power levels coupled with the interference measurements performed by Globalstar, the supporters of View B recommend that the United States propose no change (NOC) to the Radio Regulations for the 5150-5250 MHz band and the 5150-5250 MHz portions of Resolution **229 (WRC-12)** as reflected in the View B proposal below.

**ATTACHMENT TO VIEW B:**

**UNITED STATES OF AMERICA**

**DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE**

**Agenda Item 1.16**: *to consider issues related to wireless access systems, including radio local area networks (WAS/RLAN), in the frequency bands between 5 150 MHz and 5 925 MHz, and take the appropriate regulatory actions, including additional spectrum allocations to the mobile service, in accordance with Resolution* ***239 (WRC-15)***

**Background Information**:

In the early-to-mid 1990s, the ITU authorized non-geostationary satellite systems in the Mobile-Satellite Service (MSS) under revisions to the ITU-R Radio Regulations. Specifically, in 1992 the ITU adopted allocations for user links in the L and S bands, and in 1995 it adopted allocations for the feeder links between gateway earth stations and the NGSO satellites. The international feeder uplink allocations were made in the 5.1 and 29.2 GHz ranges, while the feeder downlink allocations were made in the 7 and 19 .5 GHz ranges. MSS operators have been licensed by different Administrations to use the 5150-5250 MHz range for feeder uplinks from earth stations to MSS satellites. These feeder uplinks at 5150-5250 MHz have been in continuous use globally since 1998. Two MSS operator currently use the 5150-5250 MHz band for this purpose. These MSS systems provide vital communication links to underserved areas and are often the only communication link available in these remote areas.

In Report and Order FCC 97-5 in 1997, the FCC authorized unlicensed Radio Local Area Networks (RLANs) known as “Unlicensed National Information Infrastructure” (U-NII).[[16]](#footnote-17) In this Report and Order, the FCC established the “U-NII-1” band at 5150-5250 MHz. In order to protect other radio services at 5150-5250 MHz, including fixed-satellite service (FSS) transmissions used to provide feeder uplinks for non-geostationary MSS systems, the FCC adopted a maximum equivalent isotropic radiated power (EIRP) of 200 milliwatts (mW) and restricted RLAN operations in the U-NII-1 band to indoor use.

Following a year-long rulemaking proceeding, the FCC in 2014 adopted revised rules in the U-NII-1 band that permit outdoor RLAN operations at increased power levels. The rules adopted in FCC Report and Order FCC 14-30[[17]](#footnote-18) generally permit indoor and outdoor RLAN operations in the 5150 **–** 5250 MHz band at up to 1 Watt conducted or 4 Watt E.I.R.P., except that operations with antenna elevation angles in excess of 30 degrees from the horizon must not exceed 125 mW E.I.R.P.[[18]](#footnote-19) These rules were intended to prevent harmful interference to MSS Earth-to-space communications by limiting the aggregate noise received by the satellite. U.S. RLAN interests and the MSS operator participating in the FCC’s regulatory proceeding agreed to this approach to sharing, with the MSS operator’s agreement conditioned on the existence of a remedial mechanism to limit any interference to MSS to an acceptable level.[[19]](#footnote-20) In this Report and Order, the FCC stated that licensed MSS operations are protected from harmful interference from unlicensed terrestrial wireless operations. The U.S. Administration also recognized the ability of the participating MSS operator to measure interference in the feeder uplink band, and stated that remedial action would be taken to reduce or eliminate any harmful interference to licensed MSS operations.

The MSS operator’s measurement of the noise level over the USA in the 5091-5250 MHz band began in 2014 and is currently ongoing. This MSS operator’s measurements have shown a significant increase in interference to its feeder uplinks and MSS system since early 2017. This interference to the MSS operator’s satellite service has resulted in reduced MSS capacity, reduction of MSS coverage area, and an increased burden on the spacecraft bus power of the MSS satellites. These negative effects are expected to become greater over time as outdoor RLAN operations expand and the noise level in the 5091-5250 MHz band over the U.S. continues to rise. Although the MSS operator’s measurements cover spectrum outside the 5150-5250 MHz frequency range (at 5091-5150 MHz), exhaustive research has not revealed any material interference sources at 5091-5150 MHz. In addition, the MSS operator has conducted similar measurements of the noise level at 5091-5250 MHz over Europe, Central and South America, and Australia, and these measurements have shown no similar increase in interference. The MSS operator has provided the results of its interference measurements to the FCC.

Since the FCC’s adoption of these more permissive regulations for outdoor RLAN operations at 5150–5250 MHz, other countries have authorized similar outdoor RLAN deployments, but only with regulatory constraints such as temporary, provisional licenses and registration of RLAN transmitter locations.

Studies are currently ongoing in the ITU-R to determine whether it is feasible to permit co-channel operation of outdoor RLAN transmitters and MSS feeder uplink operations at 5150-5250 MHz without causing unacceptable interference to MSS satellite receivers. The MSS operator conducting interference measurements has presented its measurement results to the ITU-R. Further, it has petitioned the FCC to open an inquiry seeking comment on the feasibility of continued sharing of the 5150-5250 MHz band between the MSS and outdoor RLAN transmitters. Prior to the 2014 Rule change, in the USA, that allowed outdoor deployment and increased transmitter power, RLANs and MSS feeder links successfully shared the 5150-5250 MHz band for nearly 16 years.

In light of these facts, incorporation of the revisions to the Radio Regulations that permit outdoor deployment and increased transmitter power is not consistent with the protection of incumbent services from unacceptable interference.

**Proposal:**

**NOC USA/1.16/1**

RESOLUTION 229 (Rev.WRC‑19)

**Use of the bands 5 150-5 250 MHz, 5 250-5 350 MHz and 5 470-5 725 MHz   
by the mobile service for the implementation of wireless access systems   
including radio local area networks**

**NOC USA/1.16/2**

**5.446A** The use of the bands 5 150-5 350 MHz and 5 470-5 725 MHz by the stations in the mobile, except aeronautical mobile, service shall be in accordance with Resolution **229** **(Rev.WRC‑12)**

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1. / *2014 5 GHz Order, ¶* 9. [↑](#footnote-ref-1)
2. / *2014 5 GHz Order*,¶¶ 1, 9. [↑](#footnote-ref-2)
3. / *2014 5 GHz Order,* ¶¶ 25-37. [↑](#footnote-ref-3)
4. / *See* [Canada](https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/SMSE-013-17-decision-5150-eng.pdf/$file/SMSE-013-17-decision-5150-eng.pdf), [Indonesia](file:///C:\Users\aroytblat\Desktop\WFA%20Work\WAC\2017-10-WAC\Indonesia), [Japan](http://www.soumu.go.jp/menu_news/s-news/01kiban12_02000083.html) , [South Korea](https://www.productcompliancespecialists.eu/uploadedFiles/Press_and_Publications/Regulatory_Updates/2018/Regulatory_Update_South_Korea_03-May-18_r1.pdf). [↑](#footnote-ref-4)
5. / Radiocommunication Study Groups, Preliminary Draft CPM Text for WRC-19 Agenda Item 1.16, at 5 (May 8, 2018); Sharing and Compatibility Study Between WAS/RLAN Applications and NGSO Systems in the Mobile Satellite Service with FSS Feeder Links Operating in the 5091-5250 MHz Band, Document 5A/727-E, at 35 (May 9, 2018). [↑](#footnote-ref-5)
6. <https://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/vni-hyperconnectivity-wp.html> [↑](#footnote-ref-6)
7. <https://www.itu.int/en/ITU-T/ssc/Pages/default.aspx> [↑](#footnote-ref-7)
8. <https://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/vni-hyperconnectivity-wp.html> [↑](#footnote-ref-8)
9. 47 C.F.R. § 15.407(a)(1)(i). [↑](#footnote-ref-9)
10. *Revision of Part 15 of the Commission’s Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band*,First Report and Order, FCC 14-30, 29 FCC Rcd. 4127 ¶ 37 (rel. Apr. 1, 2014). [↑](#footnote-ref-10)
11. 1 In the context of this Resolution, “mean e.i.r.p.” refers to the e.i.r.p. during the transmission burst which corresponds to the highest power, if power control is implemented. [↑](#footnote-ref-11)
12. [↑](#footnote-ref-13)
13. [↑](#footnote-ref-14)
14. 2 Administrations with existing regulations prior to WRC‑03 may exercise some flexibility in determining transmitter power limits. [↑](#footnote-ref-15)
15. *Revision of Part 15 of the Commission’s Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band*,First Report and Order, FCC 14-30, 29 FCC Rcd. 4127 (2014). [↑](#footnote-ref-16)
16. *Amendment of the Commission’s Rules to Provide for Operation of Unlicensed NII Devices in the 5 GHz Frequency Range*, Report and Order, 12 FCC Rcd 1576, FCC 97-5 (1997) (“*1997 U-NII Order*”). [↑](#footnote-ref-17)
17. *Revision of Part 15 of the Commission’s Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band*,First Report and Order, FCC 14-30, 29 FCC Rcd. 4127 (2014). [↑](#footnote-ref-18)
18. 47 C.F.R. § 15.407(a)(1)(i). [↑](#footnote-ref-19)
19. MSS interests feared that such a drastic change in operating conditions - outdoor deployment and an 80 times increase in power level - would result in disruptive interference to feeder uplink operations. This EIRP coupled with the loss due to indoor deployment of the U-NII devices, standardized at 50 times, would result in an overall EIRP increase of 4000 times or 36 dB. [↑](#footnote-ref-20)