WRC-19 Agenda Item 9.1/Issue 9.1.5

IWG-2 members were not able to reach consensus on a proposal for WRC-19 Agenda Item 9.1/Issue 9.1.5 regarding the technical and regulatory impacts of referencing Recommendations ITU-R M.1638-1 and ITU-R M.1849-1 in Nos. **5.447F** and **5.450A** of the Radio Regulations, and, therefore, forwards two views on how the FCC should handle this matter.

View A is supported by: Cisco Systems, Inc., Facebook, Inc., Harris, Wiltshire & Grannis, LLP, Hewlett Packard Enterprise Company, Intel Corporation, Microsoft Corporation, NCTA – The Internet & Television Association, Samsung Electronics America and Wi-Fi Alliance.

View B is supported by: Aerospace Industries Association, Aviation Spectrum Resources, Inc., Lockheed Martin Corp., New Wave Spectrum Partners LLC, The Boeing Company, and Ygomi LLC.

VIEW A

View A:

***Supported by Cisco Systems, Inc., Facebook Inc., Harris, Wiltshire & Grannis, LLP, Hewlett Packard Enterprise Company, Intel Corporation, Microsoft Corporation, NCTA - The Internet & Television Association, Samsung Electronics America and Wi-Fi Alliance.***

Referencing Recommendations ITU R M.1638-1 and ITU R M.1849-1 in Nos. **5.447F** and **5.450A** of the Radio Regulations would result in detrimental impact on existing and future Radio Local Area Networks (RLANs) operations in the 5250-5350 MHz and 5470-5725 MHz frequency bands. For that reason, “No Change” is proposed to Nos. **5.447F** and **5.450A** under WRC-19 Agenda Item 9.1/Issue 9.1.5.

RLANs have become an integral infrastructure component for delivering wireless connectivity to consumers, institutions, and enterprises in the United States and worldwide. The regulations for operation of RLANs were adopted in the U.S. in 1997 and revised as recently as 2014.[[1]](#footnote-1) The **5.447F** and **5.450A** provisions and applicable FCC rules are fully compatible. Billions of RLAN devices have been deployed in the U.S. and worldwide in the subject frequency ranges in conformance with these regulations. Billions more of RLAN devices will be deployed in the next decade.[[2]](#footnote-2)

The 5 GHz band is the only mid-band alternative available for implementation of current and next-generation RLAN devices that enable broadband connectivity. Industry standard such as IEEE 802.11ac, can support higher speeds with a theoretical maximum speed of 3.5 Gbps and actual throughputs for end users of greater than 2 Gbps utilizing four antennas. In the future, IEEE 802.11ax will deliver even more data throughput capabilities to 5 GHz RLAN devices. To support higher data rates, both standards (802.11ac/802.11ax) depend on implementation of wider, 160 MHz channels. The only spectrum available for 802.11ac/802.11ax worldwide implementation of 160 MHz channels overlaps the 5250-5350 MHz and 5470-5725 MHz frequency ranges. Access to this spectrum and stable regulatory environment, therefore, are imperative to the future of Wi-Fi industry.

Over past several years, the U.S., CEPT and ITU carried out a significant amount of work to study coexistence between RLANs and new radar systems (i.e., radar systems referenced in recommendations ITU R M.1638-1 and ITU R M.1849-1 but not in Recommendation ITU-R M.1638-0). These studies concluded that there is no viable regulatory solution that RLAN devices can implement to comply with the requirement to protect these new radar systems.[[3]](#footnote-3) Imposing regulatory requirement on the RLAN systems in the absence of a viable regulatory solutions would result in highly unstable and precarious regulatory environment for the existing and future RLAN deployments and, thereby, impede technological innovation, investment and the U.S. leadership in delivering broadband wireless connectivity solutions.

For these reasons, the organizations and companies listed above urge FCC to adopt the attached proposal for WRC-19 Agenda Item 9.1/Issue 9.1.5 (see Attachment to View A).

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**ATTACHMENT TO VIEW A:**

**UNITED STATES OF AMERICA**

**PROPOSAL FOR THE WORK OF THE CONFERENCE**

**Agenda Item 9.1/Issue 9.1.5**: *Consideration of the technical and regulatory impacts of referencing Recommendations ITU R M.1638-1 and ITU R M.1849-1 in Nos.* **5.447F** *and* **5.450A** *of the Radio Regulations*

**Background Information:** The global demand for Radio Local Area Networks (e.g. Wi-Fi) is evidenced by widespread adoption of devices, increasing connection speeds, data traffic volumes and other metrics. More than half or the world’s total internet traffic and over 60% of the mobile data traffic will be carried via Wi-Fi. The surging popularity of Wi-Fi means that Wi-Fi is an essential component of the global telecom infrastructure that requires a stable regulatory framework to continue to bring users the benefits of spectrum access and functionality. According to Cisco VNI[[4]](#footnote-4), by the year 2020, up to 3 billion Wi-Fi devices per year will be shipped, with almost all devices equipped with IEEE 802.11ac (i.e., 5 GHz band). The operations of many RLANs in the 5 GHz band are provided under Mobile allocation and consistent with RR Nos. 5.447F and 5.450A.

RR No. 5.447F In the frequency band 5 250-5 350 MHz, stations in the mobile service shall not claim protection from the radiolocation service, the Earth exploration-satellite service (active) and the space research service (active). These services shall not impose on the mobile service more stringent protection criteria, based on system characteristics and interference criteria, than those stated in Recommendations ITU‑R M.1638‑0 and ITU‑R RS.1632‑0.     (WRC-03)

RR No. 5.450A In the frequency band 5 470-5 725 MHz, stations in the mobile service shall not claim protection from radiodetermination services. Radiodetermination services shall not impose on the mobile service more stringent protection criteria, based on system characteristics and interference criteria, than those stated in Recommendation ITU‑R M.1638‑0.     (WRC-03)

During the WRC-15 study cycle, Recommendation ITU-R M.1638-0 was revised. In this revision process, several new radars with different system characteristics were included in Recommendation ITU-R M.1638-1 and M.1849-1.[[5]](#footnote-5) In light of proposals to modify Nos. 5.447F and 5.450A to replace the reference to ITU‑R M.1638‑0 with ITU‑R M.1638-1 and M.1849-1, WRC-15 adopted agenda item 9.1.5 and associated Resolution **764 (WRC-15)** with the objective to investigate the technical and regulatory impacts on RLANs that would result from changing these references. It is important to emphasize that WRC-15 explicitly sought to ensure that no undue constraints are imposed on the Mobile service (i.e., RLANs) as the result of this modification (see Resolution **764 (WRC-15)**, *resolves 1 and 2*).

In preparation for WRC-15 and WRC-19, ITU-R has carried out a significant amount of work to study coexistence between RLANs and new radar systems (not included in Recommendation ITU-R M.1638-0), in particular bi-static radars and fast frequency-hopping radars which operate in 5250-5850 MHz range. The results of these studies indicate that there are no viable mitigation techniques that RLANs can implement to protect some of these new radar systems.[[6]](#footnote-6) In the absence of any identified viable mitigation techniques, the requirement to protect new radar systems specified in ITU-R M.1638-1 can be achieved only by precluding RLAN operations in the 5 GHz band. The aim of the agenda item and the associated Resolution 764 (WRC‑15), however, is to ensure that no undue constraints are imposed on the services referenced in Nos. [5.447F](file:///C:\Users\TRISTANT\Documents\A-TRAVAIL\WRC-19\Agenda\5.447F.docx) and [5.450A](file:///C:\Users\TRISTANT\Documents\A-TRAVAIL\WRC-19\CPG\CPG-PTD\PTD-2%20(Helsinki%20Janv%202017)\Contribution%20EUMETNET\5.450A.docx) footnotes.

Considering that by the year 2020, up to 3 billion 5 GHz enabled RLAN devices will be shipped per year and that functionality of all these devices is entirely dependent on access to 5 GHz, obviously, precluding RLAN operations in the 5 GHz band would be an undue and unacceptable constraint.

Hence, ITU-R studies confirm that the technical and regulatory impacts of requiring the mobile service to protect new radars types such as bi-static radars would impose undue constraints on RLAN operation in the 5250-5350 MHz and 5470-5725 MHz frequency ranges. The reference to ITU‑R M.1638‑0 should not be updated to ITU‑R M.1638‑1 in footnotes RR Nos. **5447F** and **5.450A**.

Recommendation ITU‑R M.1849‑1 provides technical and operational aspects of ground-based meteorological radars. This recommendation clarifies that, “It should be noted that ground meteorological radars can theoretically operate in the whole frequency range 5 250‑5 850 MHz, but their operation is, in general, limited to the frequency range 5 430‑5 725 MHz. Most of these radars operate within the frequency band 5 600-5 650 MHz.”[[7]](#footnote-7) The comparison of the meteorological radar characteristics given in Recommendations ITU-R M.1638-0 and M.1849-1, operating in the frequency band 5 470-5 725 MHz indicates that both Recommendations require essentially the same protection requirements. Adding a new reference to ITU‑R M.1849‑1 in addition to ITU-R M.1638-0 in RR Nos. **5447F** and **5.450A** would be redundant and unnecessary.

**Proposals:**

ARTICLE 5

Frequency allocations

**Section IV – Table of Frequency Allocations**

**NOC** **USA/9.1.5/1**

5.447F In the frequency band 5 250-5 350 MHz, stations in the mobile service shall not claim protection from the radiolocation service, the Earth exploration-satellite service (active) and the space research service (active). These services shall not impose on the mobile service more stringent protection criteria, based on system characteristics and interference criteria, than those stated in Recommendations ITU‑R M.1638‑0 and ITU‑R RS.1632‑0.     (WRC-03)

**Reason**: Referencing ITU R M.1638-1 instead of ITU‑R M.1638‑0 would preclude RLAN operations in the 5 GHz band resulting in undue and unacceptable constraint on the Mobile service. Given that both ITU-R M.1638-0 and M.1849-1 recommendations require essentially the same protection requirements, adding a new reference to ITU‑R M.1849‑1 is redundant and unnecessary.

**NOC** **USA/9.1.5/2**

5.450A In the frequency band 5 470-5 725 MHz, stations in the mobile service shall not claim protection from radiodetermination services. Radiodetermination services shall not impose on the mobile service more stringent protection criteria, based on system characteristics and interference criteria, than those stated in Recommendation ITU‑R M.1638‑0.     (WRC-03)

**Reason**: Referencing ITU R M.1638-1 instead of ITU‑R M.1638‑0 would preclude RLAN operations in the 5 GHz band resulting in undue and unacceptable constraint on the Mobile service. Given that both ITU-R M.1638-0 and M.1849-1 Recommendations require essentially the same protection requirements, adding a new reference to ITU‑R M.1849‑1 is redundant and unnecessary.

**SUP** **USA/9.1.5/3**

RESOLUTION 764 (WRC-15)

**Consideration of the technical and regulatory impacts of referencing Recommendations ITU-R M.1638-1 and ITU-R M.1849-1 in Nos. 5.447F and 5.450A of the Radio Regulations**

**Reason**: Consequential: consideration of the subject issues has been completed.

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VIEW B

VIEW B:

**Modifications to Nos. 5.447F and 5.450A to incorporate by reference Recommendation ITU-R M.1849-1 and non-mandatory treatment of Recommendation ITU-R M.1638-1**

Issue 9.1.5 of WRC-19 Agenda Item 9.1 was specifically established to address the unusual case at the conclusion of WRC-15 where an ITU-R Recommendation was revised during the past study cycle but an earlier version of that Recommendation continued to be incorporated by reference. The potential draft proposal in View A would perpetuate this unusual situation and each time Recommendation ITU-R M.1638 is revised would result in the need at future WRC’s to address it under agenda item 9.1 or some other specific agenda item.

In the frequency bands, 5250-5350 MHz and 5470-5725 MHz, to which footnotes **5.447F** and **5.450A** respectively apply, the Mobile Service (within which RLANs operate), the Radiolocation Service, and (in the case of 5470-5725 MHz) other radiodetermination services have primary allocations. Spectrum sharing is addressed through an interference mitigation technique called Dynamic Frequency Selection (DFS), from Annex 1 to Recommendation ITU-R M.1652-1, that RLANs employ (pursuant to *resolves 8* of Resolution **229 (Rev.WRC-12)**). Through DFS implementation, RLANs are to detect radar signals above a minimum detection threshold described in Annex 1 to Recommendation ITU-R M.1652-1 and avoid co-frequency operations intended to protect radars that have characteristics in Recommendation ITU-R M.1638-0. Resolution **229 (Rev.WRC-12)** is mandatorily applied in the Radio Regulations by No. **5.446A** for bands including 5250-5350 MHz and 5470-5725 MHz.

The main objective of issue 9.1.5 from the RLAN industry has been indicated as ensuring that no undue constraints are imposed on RLANs referenced in RR Nos. **5.447F** and **5.450A** as a result of any action under this agenda item. This objective led to View A.

The proponents of View B seek the following objectives:

(1) To address the objective of the RLAN industry to ensure that no undue constraints are imposed on RLANs and the other services as stated above;

(2) To protect additional Radiolocation and Radiodetermination radars in these frequency bands that are able to be protected without imposing any additional constraints on RLANs and thus continue to satisfy objective (1);

(3) To ensure that the Radio Regulations reflect how to treat radars that are not able to be protected to the extent necessary and continue to satisfy objective (1); and

(4) To ensure that the routine regulatory path available at WRCs to update the Radio Regulations to reflect revisions to ITU-R Recommendations incorporated by reference is made possible for these two footnotes by making particular and necessary modifications to these footnotes at WRC-19 under the scope of this agenda item to maximize regulatory certainty for both radars and RLANS.

While View B would enable satisfaction of the proponents of View A, View A would create regulatory uncertainty for RLANs and radars alike. The regulatory uncertainty in these bands would be as a result of certain radars having system characteristics and interference criteria that are in the revised version of Recommendation ITU-R M.1638 (M.1638-1) that can be protected without any additional constraints on RLANs without stating what the regulatory status of these radars are going forward from WRC-19. Similarly, with regard to new ground-based meteorological radars and other ground-based meteorological radars, some of which are in Recommendation ITU-R M.1638-0 and but now all contained in Recommendation ITU-R M.1849-1, the existing DFS mitigation technique in M.1652-1 continues to apply and protection can be achieved without imposing any new constraints on RLANs.

View A would also leave unanswered the substantive question of how to treat some of the new radar systems (specifically, the fast frequency-hopping and bi-static radars) included in Recommendation ITU‑R M.1638-1 (but not in M.1638-0). The proponents of View B recognize and acknowledge that obligating RLANs to protect these fast frequency-hopping and bi-static radars without a viable mitigation technique would preclude or substantially constrain RLAN operations in geographical areas of where these radars operate and are not proposing to do so under this agenda item.

To address the objectives of *both* the RLAN and radar communities under Issue 9.1.5, the proponents of View B propose to retain the incorporation by reference of Recommendation M.1638-0, add an incorporation by reference of Recommendation M.1849-1 to protect new ground-based meteorological radars which are protectable through DFS and therefore would not cause any additional RLAN constraints, and add a non-mandatory reference to Recommendation M.1638-1 that sets forth the regulatory treatment of radars new to M.1638-1 through a revision of Resolution **764**.

As a result, the proposal under View B ensures that no undue constraints are imposed on the services, including RLANs, provides protection to the protectable radars, makes clear as to how to treat radars that are in M.1638-1 that are not in M.1638-0, and provides a regulatory path using standing WRC agenda items for future revisions of the recommendations without having to seek a specific WRC agenda item. Although there are more provisions in View B than the straight “no change” proposal in View A, View B represents maintenance of the status quo much more effectively than View A (including provisions to ensure no change to No. **5.446A**, which makes Resolution **229 (Rev.WRC-12)** mandatory, and to *resolves 8* of Res. **229** itself).

The proposal put forth by View B is also fully consistent with the scope of issue 9.1.5 of agenda item 9.1 as WRC-19 is to consider any regulatory action in response to the ITU-R’s investigation of the technical and regulatory impacts of referencing M.1638-1 and M.1849-1.

\* \* \*

For all of these reasons, the only alternative for the United States at WRC-19 is to propose the modifications to Nos. **5.447F**, **5.450A**, and Resolution **764**, and make no changes to Resolution **229** orNo. **5.446A** under issue 9.1.5 of agenda item 9.1, as reflected in the Attachment hereto.

**ATTACHMENT TO VIEW B:**

**UNITED STATES OF AMERICA**

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

**Agenda Item 9.1/Issue 9.1.5**: *Consideration of the technical and regulatory impacts of referencing Recommendations ITU-R M.1638-1 and ITU-R M.1849-1 in Nos.* **5.447F** *and* **5.450A** *of the Radio Regulations*

**Background Information**: Radio Local Area Networks (RLANs) and radars in the 5 250-5 350 MHz and 5 470-5 725 MHz bands provide valuable services as part of national infrastructures, and sharing between RLANs and radars in these bands has been proven feasible for some applications. The sharing of spectrum by RLANs under the mobile service and radars under the radiolocation service in these bands is pursuant to RR Nos. 5.447F and 5.450A. The challenge of WRC-19 Agenda Item 9.1/Issue 9.1.5 is to determine what, if any, are the technical and regulatory impacts of referencing Recommendations ITU-R M.1638-1 and ITU-R M.1849-1 in Nos. 5.447F and 5.450A of the Radio Regulations while ensuring that no undue constraints are imposed on any of the services referenced in Nos. 5.447F and 5.450A.

The global demand for RLANs (e.g., Wi-Fi devices) is evidenced by widespread adoption of devices, increasing connection speeds, data traffic volumes and other metrics. The surging popularity of Wi-Fi for internet traffic and mobile data traffic means that Wi-Fi is an essential component of the global telecommunications infrastructure that requires a stable regulatory framework to continue to bring users the benefits of spectrum access and functionality.

Radiolocation radars in the bands 5 250-5 350 MHz and 5 470-5 725 MHz perform a variety of functions, such as tracking space launch vehicles and aeronautical vehicles, sea and air surveillance, environmental measurements in the study of ocean water cycles and weather phenomena such as hurricanes, and Earth imaging. Airborne meteorological radars are used for both hurricane research and reconnaissance. New radar technologies for ground, ship, and airborne platforms are deploying and being developed in support of the above functions as part of the critical infrastructure.

During the ITU-R study cycle leading up to WRC-15, Recommendation ITU-R M.1638‑0, which is incorporated by reference into both Nos. **5.447F** and **5.450A**, was revised. In this revision process, several new radars with different system characteristics were included in Recommendations ITU-R M.1638-1 and M.1849-1.[[8]](#footnote-8) The revisions also included placing ground-based meteorological radars that were initially included in Recommendation ITU-R M.1638-0 into the revision of Recommendation ITU-R M.1849-0. In light of proposals to modify Nos. 5.447F and 5.450A to replace the reference to Recommendation ITU‑R M.1638‑0 with Recommendations ITU‑R M.1638-1 and M.1849-1, WRC-15 adopted agenda item 9.1/Issue 9.1.5 and associated Resolution **764 (WRC-15)** with the objective to investigate the technical and regulatory impacts on RLANs and radiolocation and radiodetermination services that would result from changing these references. It is important to emphasize that WRC-15 explicitly sought to ensure that no undue constraints are imposed on any of the services referenced in Nos. 5.447F and 5.450A as the result of the updating of references to ITU-R recommendations (see Resolution **764 (WRC-15)**, *resolves* 1 and 2).

The Dynamic Frequency Selection (DFS) mitigation technique from Annex 1 to Recommendation ITU-R M.1652-1 is required to be implemented by systems in the mobile service in the bands 5 250-5 350 MHz and 5 470-5 725 MHz to ensure compatible operation with radiodetermination systems and is incorporated by reference in *resolves* 8of Resolution **229 (Rev.WRC-12)** through No. **5.446A**. Taking this into account, the ITU-R has carried out a significant amount of work to study coexistence between RLANs and new types of radar systems (not included in Recommendation ITU‑R M.1638-0), in particular bi-static radars and fast frequency-hopping radars which operate in the 5250-5850 MHz frequency range. These studies sought to identify mitigation techniques that RLANs can implement to protect some of these new radar systems that is not yet possible under the mitigation technique of DFS. However, some of the new radar system characteristics included in the revision to Recommendation ITU‑R M.1638-0 are able to be protected with the DFS mitigation technique from Annex 1 to Recommendation ITU-R M.1652-1.

Recommendation ITU‑R M.1849‑1 provides technical and operational aspects of ground-based meteorological radars. Ground-based meteorological radars were initially included in Recommendation ITU-R M.1638-0, but were removed from the revision ITU-R M.1638-1 and placed in ITU-R M.1849-0, including additional radars. The comparison of the meteorological radar characteristics given in Recommendations ITU‑R M.1638-0 and M.1849-1, operating in the frequency ranges 5 250-5 350 MHz and 5 470-5 725 MHz, indicates that the protection requirements are similar, and that no undue constraints would thus be required for RLANs in the mobile service to protect the additional ground-based meteorological radars in Recommendation ITU-R M.1849-1 that were not also in Recommendation ITU-R M.1638-0. The required protection of all of the ground-based meteorological radars operating in the frequency ranges 5 250-5 350 MHz and 5 470-5 725 MHz is thus not assured without reference to Recommendation ITU-R M.1849-1 in Nos. 5.447F and 5.450A.

In summary, radars that can be protected using existing protection criteria and mitigation techniques (i.e., without any additional constraints to RLAN mobile operation), should be covered and protected through appropriate revisions to Nos. 5.447F and 5.450A. This includes all radars that were included in Recommendation ITU-R M.1638-0 (some of which are now in Recommendation ITU-R M.1638-1, and others of which are now in Recommendation ITU-R M.1849-1), as well as all of the new ground-based meteorological radars in Recommendation ITU-R M.1849-1, but only some of the new radars in Recommendation ITU-R M.1638-1.

To achieve these results, the following approach is proposed:

* Modify Nos. 5.447F and 5.450A to incorporate by reference Recommendation ITU-R M.1849-1 and provide a non-mandatory reference, in accordance with Resolution **27**, to Recommendation ITU-R M.1638-1 by applying a revised version of Resolution **764**. The incorporation by reference of Recommendation ITU-R M.1638-0 is retained.
* Modify Resolution **764** so that it does three things:
  + Specify that for radars that are in Recommendation ITU-R M.1638-1 but that were not in Recommendation ITU-R M.1638-0, mobile systems implementing WAS including RLANs in the subject bands protect radars having characteristics in Recommendation ITU-R M.1638-1 only to the extent provided by Annex 1 to Recommendation ITU-R M.1652-1;
  + Continue ITU-R studies to develop mitigation measures for mobile systems that would enable compatible operation with bi-static and fast frequency hopping radiodetermination systems in the 5 250-5 350 MHz and 5 470-5 725 MHz bands if implemented;
  + Continue the approach of current Resolution **764**, which requires that there be no undue constraints on the services mentioned in Nos. **5.447F** and **5.450A**.
* Propose firm no change to No. **5.446A**, which makes Resolution **229** **(Rev.WRC-12)** mandatory, and to Resolution **229** itself.

Under this proposal, through the adoption of the revised Resolution **764**, new bi-static and fast frequency hopping radars are protected only to the extent available via Annex 1 to Recommendation ITU-R M.1652-1.

Proposals to effect these provisions follow.

**Proposals:**

**MOD USA/9.1.5/1**

ARTICLE 5

Frequency allocations

**Section IV – Table of Frequency Allocations**

|  |  |  |
| --- | --- | --- |
| 5 250-5 570 MHz | | |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 5 250-5 255 EARTH EXPLORATION-SATELLITE (active)  MOBILE except aeronautical mobile 5.446A MOD 5.447F  RADIOLOCATION  SPACE RESEARCH 5.447D  5.447E 5.448 5.448A | | |
| 5 255-5 350 EARTH EXPLORATION-SATELLITE (active)  MOBILE except aeronautical mobile 5.446A MOD 5.447F  RADIOLOCATION  SPACE RESEARCH (active)  5.447E 5.448 5.448A | | |
| . . . | | |
| . . . | | |
| 5 470-5 570 EARTH EXPLORATION-SATELLITE (active)  MOBILE except aeronautical mobile 5.446A MOD 5.450A  RADIOLOCATION 5.450B  MARITIME RADIONAVIGATION  SPACE RESEARCH (active)  5.448B 5.450 5.451 | | |
| 5 570-5 650 MOBILE except aeronautical mobile 5.446A MOD 5.450A  RADIOLOCATION 5.450B  MARITIME RADIONAVIGATION  5.450 5.451 5.452 | | |
| 5 650-5 725 MOBILE except aeronautical mobile 5.446A MOD 5.450A  RADIOLOCATION  Amateur  Space research (deep space)  5.282 5.451 5.453 5.454 5.455 | | |

MOD **USA/9.1.5/2**

5.447F In the frequency band 5 250-5 350 MHz, stations in the mobile service shall not claim protection from the radiolocation service, the Earth exploration-satellite service (active) and the space research service (active). These services shall not impose on the mobile service more stringent protection criteria, based on system characteristics and interference criteria, than those stated in Recommendations ITU‑R M.1638‑0, ITU-R M.1849-1, and ITU‑R RS.1632‑0. With respect to radiolocation radars included in Recommendation ITU-R M.1638‑1, but not in Recommendation ITU‑R M.1638-0, see Resolution **764** **(Rev.WRC-19)**.      (WRC-19)

**Reason**: Modifying the footnote to incorporate Recommendation ITU-R M.1849-1, would ensure that all meteorological radar types currently protected from harmful interference by RLAN and any other mobile service operations in the 5 250-5 350 MHz band continue to be protected. The inclusion of new radars in Recommendation ITU-R M.1638-1 is addressed by the citation of revised Resolution **764** (see Proposal USA/9.1.5/6) using non-mandatory language.

**MOD USA/9.1.5/3**

5.450A In the frequency band 5 470-5 725 MHz, stations in the mobile service shall not claim protection from radiodetermination services. Radiodetermination services shall not impose on the mobile service more stringent protection criteria, based on system characteristics and interference criteria, than those stated in Recommendations ITU‑R M.1638‑0 and ITU-R M.1849-1. With respect to radiodetermination radars included in Recommendation ITU-R M.1638‑1, but not in Recommendation ITU‑R M.1638‑0, see Resolution **764** **(Rev.WRC-19)**. (WRC-19)

**Reason**: Modifying the footnote to incorporate Recommendation ITU-R M.1849-1, would ensure that all meteorological radar types currently protected from harmful interference by RLAN and any other mobile service operations in the 5 470-5 725 MHz band continue to be protected. The inclusion of new radars in Recommendation ITU-R M.1638-1 is addressed by the citation of revised Resolution **764** (see Proposal USA/9.1.5/6) using non-mandatory language.

**NOC USA/9.1.5/4**

**5.446A**

**Reason**: Retaining the mandatory reference to Resolution **229 (Rev.WRC-12)** in No. **5.446A**, which leads to the incorporation by reference of Recommendation ITU-R M.1652-1, is essential.

**NOC USA/9.1.5/5**

RESOLUTION 229 (Rev.WRC‑12)

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

**Reason**: For the bands 5 250-5 350 MHz and 5 470-5 725 MHz, Resolution **229 (Rev.WRC-12)**, *resolves* 8 provides that Annex 1 to Recommendation ITU-R M.1652-1 contains mitigation measures that “shall be implemented by systems in the mobile service to ensure compatible operation with radiodetermination systems.” No. **5.446A** and Resolution **229 (Rev.WRC-12)** must remain in place for the approach proposed here to be effective.

**MOD USA/9.1.5/6**

RESOLUTION 764 (Rev.WRC‑19)

Technical and regulatory treatment of Recommendation ITU‑R M.1638‑1, as referenced in Nos. 5.447F and 5.450A of the Radio Regulations

The World Radiocommunication Conference (TBD, 2019),

considering

*a)* that the frequency bands 5 250-5 350 MHz and 5 470-5 725 MHz are allocated worldwide on a primary basis to the radiolocation service;

*b)* that WRC‑03 allocated the frequency 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);

*c)* that Resolution **229 (Rev.WRC‑12)** defines the conditions for the use of the frequency 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 WAS including RLANs while protecting existing primary services;

*cbis)* that one of the conditions in Resolution **229 (Rev.WRC-12)** for mobile service use of the bands 5 520-5 350 MHz and 5 470-5 725 MHz is that the mitigation measures 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;

*d)* that No. **5.447F**, as revised by WRC-19, states that in the frequency band 5 250-5 350 MHz, stations in the mobile service shall not claim protection from the radiolocation service, the Earth exploration-satellite service (active) and the space research service (active) and that these services shall not impose on the mobile service more stringent protection criteria, based on system characteristics and interference criteria, than those stated in Recommendations ITU‑R M.1638‑0, ITU-R M.1849-1, and ITU‑R RS.1632‑0;

*e)* that No. **5.450A**, as revised by WRC-19, states that in the frequency band 5 470-5 725 MHz, stations in the mobile service shall not claim protection from radiodetermination services and that radiodetermination services shall not impose on the mobile service more stringent protection criteria, based on system characteristics and interference criteria, than those stated in Recommendations ITU‑R M.1638‑0 and ITU-R M.1849-1;

*f)* that Nos. **5.447F** and **5.450A**, as revised by WRC-19, also state with respect to Recommendation ITU-R M.1638-1 that Resolution **764 (Rev.WRC-19)** applies,

noting

*a)* that Recommendation ITU‑R M.1638‑0 identifies the characteristics of, and protection criteria for sharing studies for, radiolocation, aeronautical radionavigation and meteorological radars operating in the frequency range 5 250-5 850 MHz;

*b)* that Recommendation ITU‑R M.1638‑1 identifies the characteristics of, and protection criteria for sharing studies for, radiolocation (except ground-based meteorological radars) and aeronautical radionavigation radars operating in the frequency bands between 5 250 and 5 850 MHz;

*c)* that Recommendation ITU-R M.1638-1 contains characteristics for radar systems that were contained in Recommendation ITU‑R M.1638‑0 as well as characteristics for radar systems that were not contained in Recommendation ITU-R M.1638-0;

*d)* that Annex 1 of Recommendation ITU‑R M.1652‑1 provides mitigation measures that must be used by systems in the mobile service for the implementation of wireless access systems (WAS) including radio local area networks (RLANs) to ensure compatible operation with radiodetermination systems in the 5250-5350 MHz and 5470-5725 MHz band, including radars having characteristics contained in Recommendation ITU‑R M.1638‑0,

further noting

*a)* that the references to Resolution **764 (Rev.WRC-19)** and Recommendation ITU‑R M.1638-1 in Nos. **5.447F** and **5.450A** of the Radio Regulations are not made using mandatory language;

*b)* that, according to *Principle 4* of Annex 1 to Resolution **27** **(Rev.WRC‑12)**, texts which are of a non-mandatory nature shall not be considered for incorporation by reference,

recognizing

*a)* that the mitigation measures provided in Annex 1 of Recommendation ITU-R M.1652-1 will assure protection of only some of the radars having characteristics in Recommendation ITU-R M.1638-1 that are not contained in Recommendation ITU-R M.1638-0;

b) that other mitigation measures have yet to be developed to protect bi-static and fast frequency hopping radars having characteristics included in Recommendation ITU-R M.1638-1 from RLAN interference in the 5 250-5 350 MHz and 5 470-5 725 MHz bands,

resolves

that radiolocation radars in the 5 250-5 350 MHz band and radiodetermination radars in the 5 470-5 725 MHz band with system characteristics and interference criteria included in Recommendation ITU-R M.1638-1, but not in Recommendation ITU-R M.1638-0, shall not claim more interference protection from systems in the mobile service than what is provided by the application of the mitigation measures in Annex 1 of Recommendation ITU-R M.1652-1;

resolves to invite the ITU Radiocommunication Sector

to continue efforts to develop a new or revised recommendation containing mitigation measures that, if implemented by systems in the mobile service, would provide the protection of all other radiolocation systems in the 5 250 -5 350 MHz band and radiodetermination systems in the 5 470-5 725 MHz band referred to in *recognizing* b) and would not impose undue constraints on either the mobile service or the radiodetermination services.

**Reason**: Addresses the need to develop mitigation techniques to protect newer radars that are not adequately protected by the mitigation measures in Annex 1 of Recommendation ITU-R M.1652-1, while assuring no undue constraints on systems in the mobile service for the implementation of wireless access systems (WAS) including radio local area networks (RLANs).

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1. *See* Amendment of the Commission’s Rules to Provide for Operation of Unlicensed NII Devices in the 5 GHz Frequency Range, *Report and Order*, ET Docket No. 96-102, 12 FCC Rcd 1576 (1997). *(U-NII Report and Order)*. *See* 47 C.F.R. Part 15 Subpart E and ET Docket No. 13-49. [↑](#footnote-ref-1)
2. According to [Cisco VNI](http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/mobile-white-paper-c11-520862.html), by the year 2020, up to 3 billion RLAN (Wi-F) devices will be shipped per year with almost all devices equipped with 802.11ac (i.e., functionality dependent on access to 5 GHz band). S*ee also*: <https://www.abiresearch.com/press/abi-research-anticipates-more-20-billion-cumulativ/> [↑](#footnote-ref-2)
3. *See for example*: Lawrence E. Strickling, Assistant Secretary of Commerce for Communications and Infrastructure, Remarks on the 5G Wireless Future and the Role of the Federal Government at the Hudson Institute (Dec.)<https://www.ntia.doc.gov/speechtestimony/2016/remarks-assistant-secretary-strickling-5g-wireless-future-and-rolefederal>. S*ee also* CEPT Report [57](http://spectrum.welter.fr/international/cept/cept-reports/cept-report-057-5-GHz.pdf) and Report [64](http://spectrum.welter.fr/international/cept/cept-reports/cept-report-064-5-GHz-WAS-RLAN.pdf). S*ee also* ITU-R Doc. 5a/298, Annex 24 and Annex 27; *also see* Report of CPM to WRC-15, section 1/1.1/4.1.11.2 [↑](#footnote-ref-3)
4. https://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/mobile-white-paper-c11-520862.html [↑](#footnote-ref-4)
5. Consistent with the provisions of Resolution **27 (**Rev. **WRC-12)**, the reference in the Radio Regulations shall continue to apply to the earlier version incorporated by reference until such time as a competent WRC agrees to incorporate the new version. [↑](#footnote-ref-5)
6. ITU-R Doc. 5a/298, Annex 24 and Annex 27; *also see* Report of CPM to WRC-15, section 1/1.1/4.1.11.2 [↑](#footnote-ref-6)
7. ITU-R M. 1849-1, Annex 2, Section 2 [↑](#footnote-ref-7)
8. Consistent with the provisions of Resolution **27 (Rev.WRC-12)**, the reference in the Radio Regulations shall continue to apply to the earlier version incorporated by reference until such time as a competent WRC agrees to incorporate the new version. [↑](#footnote-ref-8)