

Telemetry Spectrum Encroachment at WRC27

Review of Related WRC-27 Agenda Items and Domestic Threats

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Abstract: A review of international and domestic spectrum issues that present challenges for the future use of radio frequency telemetry being prepared for the 2027 World Radiocommunications Conference (WRC-27). Several agenda items addressed there have a potential for telemetry spectrum encroachment and are presented in this paper. Agenda topics of telemetry interest in future World Radiocommunications Conferences (WRCs), in particular several agenda items that will be considered at the 2031 World Radiocommunications Conference (WRC-31), are a particular focus. International telemetry vendors, suppliers, and users need to be aware of, and potentially engage with, their national administrations on these items to protect and preserve spectrum for the future of aeronautical mobile telemetry.

Key words: Telemetry spectrum, frequency spectrum encroachment, Aeronautical Mobile Telemetry.

Telemetry Spectrum at Risk

AMT Band (MHz)			ITU Region			Remarks
			1	2	3	
L	1429	1535	x	x	x	In Region 1, primary in several countries in 1429-1535. In the US exclusive for AMT in 1435-1525. In Australia- 1429-1492 co- primary w/IMT
	1780	1850		x		US Only (Domestic allocation)
S	2200	2290		x		US Only (Domestic allocation)
	2310	2360	x	x		France- primary. US- AMT secondary.
	2360	2400		x		US- 2360-2395. Canada- 2360-2400.
C	4400	4940		x	x	In ITU Region 2, with the exception of a few countries for FT purposes. In Australia, AMT use is co-primary basis with FSS. The 5091-5150 MHz band is used for aeronautical telemetry transmissions from aircraft for all regions
	5091	5150	x	x	x	
	5150	5250	x	x		ITU Region 1 (with some exceptions) and Brazil
	5925	6425		x		This C-band range has been allocated for AMT in the US but is not licensed by the FCC.

Fig 1 AMT Bands

Telemetry users around the world are facing a critical challenge -- how to address an increase in telemetry needs with greater global competition from many industry sectors for increased access to the same range of spectrum bands. Several factors have revolutionized demand for electromagnetic spectrum. These factors include:

- Very congested RF spectrum, especially in the communications bands below 7 GHz.
- Increasing demands by providers for more cellular and mobile broadband spectrum globally.
- Increasing real-time data needs to support the safe and effective flight testing of the global commercial aeronautical industry.

Telemetry users are caught between a proverbial rock (telemetry demand is increasing) and a hard place (telemetry spectrum (Figure 1) is increasingly being considered for repurposing combined with a lack of feasible alternatives for flight test telemetry utilization.

As an example, CTIA [1] (originally known as the cellular communications industry association) several years ago filed a chart with the U.S. Federal Communications Commission (FCC) presenting a list of target bands for future cellular use (4G/5G). (Figure 2) Several of these bands are currently allocated for telemetry or adjacent to existing global telemetry bands. CTIA members still prefer high-powered exclusive licenses. Clearing a band of incumbents to auction those frequencies becomes difficult due to spectrum congestion, i.e., the lack of a suitable spectrum for existing users to migrate.

Low-Band				
406.1-608 MHz	960-1164 MHz	1300-1350 MHz	1427-1518 MHz	1780-1850 MHz
Mid-Band				
3100-3550 MHz	4400-5000 MHz	5925-7125 MHz	7125-8400 MHz	10-10.5 GHz
High-Band				
25.25-27.5 GHz	28.35-31.3 GHz	31.8-36 GHz	42.5-47.2 GHz	50.4-52.6 GHz
Over 95 GHz				

Figure 2. Desired Cellular Bands (CTIA)

Hence a “battle for the bands” is the resultant where economic impacts and spectrum utilization becomes a battlefield between several competing services. As telemetry bands become targeted for repurposing, telemetry operations become further

cramped and congested, and flight test and other scientific missions are impacted.

Globally, Aeronautical Mobile Telemetry (AMT) capability (real time data, imaging, command and control, time-space-position information) is covered by three bands: L-Band, S-Band, and C-Band (see Figure 1). These bands reside in an RF spectrum “sweet spot” in terms of the physics of these frequencies and the needs of flight test operators. This Region below 7 GHz is ideal for flight test (and other) AMT, where the transmission of data using small low-power transmitters on maneuvering test articles to large, high-gain dish antennas over long distances, up to approximately 320 kilometers, is typical. This Region is also well-suited for a variety of other communications applications, e.g., cellular data services, due to its RF propagation characteristics (penetration of atmospherics, buildings, terrain) [2].

This paper presents a review of international and domestic spectrum issues on the Agenda for WRC-27. International telemetry vendors, suppliers, and users need to be aware of, and potentially engage with their national administrations on these items.

International Encroachment

Governance; The WRC and the ITU

WRCs are held every three to four years. The primary goal of WRCs is to review and maintain the international Radio Regulations (RR) in accordance with the United Nations International Telecommunications Union (ITU) [3] treaty governing the use of the radiofrequency spectrum with the specific objective of protecting against cross-border interference. Local administrations remain free to regulate spectrum as they wish within their own borders consistent with their sovereignty. The agenda of each WRC is established four years in advance, with the final agenda confirmed by the ITU Council about two years before the conference.

A WRC typically will

- 1) ...revise the Radio Regulations , allocations, and requirements
- 2) ...address global radio matters
- 3) ... determine questions for study by the Radio Assembly and Study Groups.

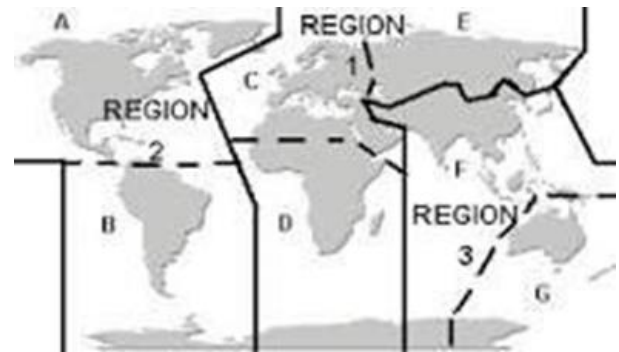


Figure 3. ITU Regions

The ITU’s Radiocommunications Sector (ITU-R) manages these Regulations within three geographic Regions (Figure 3). Each Region has its own regional groups that comprised of the administrations (countries) and commercial interests in that Region which work to develop Regional positions to be pursued at the WRCs.

WRC Agenda Items

WRC27 Agenda Item	Competing Service	Aeronautical Mobile Telemetry Bands (MHz)							
		L-Band		S-Band		C-Band			
		1435 1525	1780 1850	2200 2290	2360 2395	4400 4940	5091 5150	5150 5250	5925 6700
1.7	IMT					X			
1.11	SS	X							
1.12	IoT	X							
1.13	IMT	X	X	X	X				
1.19	ESSS	X							
31-2.4	ISS								X
31-2.9	FNSS						X	X	
tbd	IMT	X							

Figure 4 ICTS “Telemetry Watch” Agenda Items

Seven adopted Resolutions invited studies or data to support future discussions on spectrum allocation decisions which could impact use of existing AMT allocations. Figure 4 denotes those items identified by the International Consortium for Telemetry Spectrum (ICTS) as “Telemetry Watch” items that should be monitored for potential detrimental encroachment on spectrum used by telemetry users. Five are Agenda Items to be resolved at WRC-27. Three are Preliminary Agenda Items that may become part of the Agenda for WRC-31.

The ICTS recommends the global AMT community become aware and track the progress of these future WRC agenda items, especially those pertaining to WRC-27, as they are considered in their relative administrations, ITU-R Working Parties, Regional organizations, and eventually at the WRC.

Agenda Item 1.7 Terrestrial IMT

Description. WRC-27 Agenda Item 1.7 is focused on studies for International Mobile Telecommunications (IMT) in the 4400–4800 MHz, 7125–8400 MHz, and 14.8–15.35 GHz bands. These ranges are adjacent to or overlap with frequencies used for aeronautical telemetry and radar altimeters, raising concerns about potential interference. The outcome of WRC-27 will depend on ITU-R compatibility studies and aviation safety positions, particularly from ICAO..

AMT Bands Impacted. The 4400–4940 MHz range is widely used for aeronautical mobile telemetry (AMT) especially in flight testing. IMT expansion into 4400–4800 MHz could directly interfere with flight test telemetry operations. Telemetry is safety-critical - this interference could pose a significant risk to aeronautical telemetry spectrum.

Current Status. ICAO and aviation stakeholders are pushing for strong protection of incumbent services while IMT proponents seek new spectrum for 5G/6G expansion. The final decision in 2027 will hinge on ITU-R studies and political negotiations between protecting aviation safety and expanding mobile broadband. ICAO strongly opposes any IMT allocations that would compromise flight safety and calls for no change in allocations. They state that safety-critical aviation systems must be protected with absolute priority over commercial IMT expansion [4]

While the current US/FCC position does not specifically address telemetry- it does request that the ITU ensures the protection of those services to which the frequency band is allocated on a primary basis without imposing additional constraints on those services. [5]

AMT Issues/Concerns This agenda item is sourced in WRC-23 Resolution 256 which seeks to complete studies of issues for sharing and compatibility of these bands with IMT terrestrial operations. It includes much of the 4 400- 4 940 MHz band that was adopted at WRC-07 for AMT in Region 2 and Australia. The current Resolution seeks to use this band for IMT in Regions 1 and 3. While the Resolution does not include considering this band for IMT in Region 2, this could change in the working party discussions over next two years and, ultimately, at WRC-27.

The appetite for new spectrum designations to support International Mobile Telecommunications (IMT) efforts (like cell phones, wireless, broadband) is insatiable. It is driven by the ITU vision of global mobile access – providing telecommunication services on a worldwide scale regardless of location, network, or terminal used. A primary goal is to

facilitate the continued rollout of fifth generation (5G) mobile networks – and support the anticipated future development of sixth generation (6G) services. Much of the past focus for IMT was on frequency bands previously allocated to the mobile services below 4 GHz. There has been such growth in mobile communications that it is driving an increasing demand for spectrum above 4 GHz.

The key word in this agenda item is “Sharing”. It is critical that relevant information to protect AMT operations in the band be presented and referenced, especially information included in previous sharing studies, including ITU-R M.2116, and criteria that are used to provide protection for AMT (like ITU-R M.1459). WRC-23 made no change (i.e., no relaxation) to the power flux density protection criteria for aeronautical mobile systems (which include AMT), but critical questions were left unresolved in those discussions that could challenge the relevance of existing protection criteria in the future.

Adequate criteria to protect incumbent AMT users in 4 400-4 800 MHz must be maintained if the proposed IMT designations in the band move forward. AMT stakeholders in Region 2 should watch this agenda item for any indication that the 4 400-4 800 MHz band will come into play for Region 2 at WRC-27.

Agenda Item 1.11 MSS Space-to-Space Links.

Description. WRC-27 Agenda Item 1.11 is set to consider the technical and operational issues, and regulatory provisions, for space-to-space links among non-geostationary and geostationary satellites. The goal is to establish rules for satellites to communicate directly with each other, which is becoming increasingly necessary with the rise of large satellite constellations.

AMT Bands Impacted. A portion of a primary AMT frequency in the L band, also allocated to the mobile-satellite services, is being studied under this agenda item. The introduction of new space-to-space links in the 1518-1525 MHz band could cause harmful interference to AMT operators that rely on this spectrum for critical flight test data. 1435-1525 MHz is allocated to the aeronautical mobile service specifically for telemetry in all ITU Regions and is critical for flight testing of aircraft, missiles, and space vehicles.

Current Status. While the potential for interference has not gone unnoticed (other safety-related aeronautical satellite communications in these bands are a major concern) very little discussion on the potential for AMT interference is apparent in these discussions. Key aviation and telecommunications

bodies are actively engaged to safeguard their existing services, just not necessarily AMT specifically. As an example, the International Civil Aviation Organization (ICAO) has stated its position is to ensure that they are protected and that no additional regulatory or technical constraints are placed upon them. ICAO main concerns are protecting aeronautical satellite communications and radionavigation-satellite services (RNSS) [6].

AMT Issues/Concerns. The ongoing ITU-R studies are considered critical for establishing a technical framework and boundaries to prevent such harmful interference. The discussions of this Agenda Item will need to be closely monitored by AMT users to ensure that appropriate protection criteria remain in effect.

Agenda Item 1.12 MSS Low Data Rate (IoT).

Description. WRC-27 Agenda Item 1.12 focuses on possible allocations and regulatory actions for low-data-rate non-geostationary mobile-satellite service (MSS) systems, such as IoT, sensor networks, telemetry, and M2M communications. Agenda Item 1.12 and its corresponding WRC-23 Resolution 252 invite studies of possible solutions to implement low-data rate MSS IoT satellites, noting that there is insufficient spectrum for non-voice/low-data-rate non-GSO MSS systems to operate in existing MSS frequency bands below 5 000 MHz.

AMT Bands Impacted. One of the candidates MSS bands under study (1427–1432 MHz) overlaps with frequencies historically used for aeronautical mobile telemetry (AMT). Compatibility studies are underway to assess whether low-data-rate NGSO MSS (IoT, M2M) can coexist with incumbent aeronautical telemetry operations. The outcome may determine if MSS allocations are possible or if stronger protection for AMT will be required.

Current Status. Regional and ITU-R Working Parties are conducting studies on sharing and compatibility between the non-GSO low-data-rate MSS systems and the existing primary services operating in the frequency bands 1 427-1 432 MHz for space-to-earth data bursts. Study groups (notably WP 4A) are tasked with compatibility and sharing analyses.

Many discussions with the regional and ITU working parties address the balance between high IoT demand vs. incumbent (like AMT) protection. Many administrations are leaning toward a conservative approach, prioritizing incumbent protection over new MSS allocations. Preliminary positions seem supportive of continued studies on candidate bands (1427–1432, 1645.5–1646.5, 1880–1920, 2010–2025 MHz) but not yet endorsing any specific allocations.

Agenda Item 1.12 could be one of the most

contentious debates at WRC-27, with regional blocs divided between innovation vs. protection. There is significant commercial and political interest for additional spectrum for these low-data-rate MSS systems to further develop IoT capabilities globally.

AMT Issues/Concerns. While the Resolution includes protection of primary incumbents, 1 427-1 432 MHz is near adjacent to a primary AMT Band in several regions.

While space to earth power flux density (PFD) values may be low, so are the signal strengths of AMT signals. Preliminary analysis indicate there is low risk of harmful adjacent-band interference to airborne AMT radio relays from the proposed systems operating under current ITU out of band emissions (OOBE) limits. The proposed regulatory framework appears adequate, and all modeled scenarios result in acceptable protection margins. This will need to be verified in the WP4C discussions that precede the WRC.

Agenda Item 1.13 MSS-terrestrial IMT

Description. The demand for mobile communications in remote and rural areas is not adequately covered by terrestrial IMT systems. Agenda Item 1.13 focuses on possible new allocations to the mobile-satellite service (MSS) for direct connectivity between space stations and International Mobile Telecommunications (IMT) user equipment, complementing terrestrial IMT networks. WRC-23 adopted this Agenda Item to address the connectivity needed directly from satellites to unmodified cellular service user equipment through an application now-called Direct-to-Cell MSS IMT (DC MSS IMT). Resolution 253 resolves to study possible allocations to enable DC MSS IMT over the entire range of frequencies between 694 MHz and 2.7 GHz.

Resolution 253 further resolved that administrations should "conduct studies on sharing and compatibility between incumbent services, including in adjacent frequency bands, ensuring the protection of incumbent services in accordance with the Radio Regulations; [and should] study possible technical and operational measures to ensure that the stations in the MSS do not cause harmful interference to, or claim protection from, stations operating in the mobile service..." [3]

AMT Bands Impacted. Targeted Frequency bands include AMT stations in the L- and S-Band aeronautical mobile service allocations. Specific AMT bands include 1 427 – 1 432 MHz (L-Band). This AI also shares some common AMT bands with AI 1.12 and 1.13.

Current Status. Regional groups (CEPT, CITEL, APT, ATU, RCC, ASMG) and ITU-R Working Parties 4C, 5B, and 5D are conducting technical, operational, and regulatory studies, with preliminary views already being drafted.

Based on inputs from WP 5D (in accordance with the most recent version of Recommendation ITU-R M.1036) WP 4C agreed to the following list of bands with AMT impacts to be studied at its October 2024 meeting;

<u>Up-Link</u>	<u>Down-Link</u>
1 427 – 1 470 MHz	1 475 - 1 518 MHz
1 710 – 1 785 MHz	1 805 – 1 880 MHz

CEPT, in their preliminary position, has stated that any consideration on possible MSS allocations in frequency bands being examined must ensure the protection of incumbent services allocated on a primary basis, as well as in adjacent frequency bands. They also note the overlapping frequency between Agenda Items 1.12, 1.13, and 1.14.[7]

AMT Issues/Concerns. While Working Party 5B has stated that Rec. ITU-R M.1459 may be used to conduct the compatibility studies called for by the Resolution, there are significant administrations and stakeholders that would be pleased to have this AMT protection criteria revisited. This is very concerning to the international AMT community.

The interest in DC MSS IMT seems to be considerable based on Working Party 5B, 4C, and regional meetings to date. Consequently, this will be a critical watch-item for the global AMT community to ensure adequate AMT protection is provided as sharing and compatibility studies proceed culminating in a WRC-27 decision.

Agenda Item 1.19 Earth Exploratory Satellite Services

Description. This agenda item proposes a new primary allocation for the Earth Exploration-Satellite Service (EESS), which uses sensors to monitor the Earth, in the 4200-4400 MHz band.

AMT Bands Impacted. 4200-4400 MHz is directly adjacent to 4400-4940 MHz. While Agenda Item 1.19 does not target aeronautical mobile telemetry (AMT) bands directly, it could have a significant indirect impact by increasing the potential for adjacent band interference in an already very contested part of the spectrum.

Current Status. Working Party 7C (Remote Sensing Systems) is discussing this agenda item as part of the broader ITU-R Study Group 7 (SG 7), which is responsible for "Science Services."

While ICAO is very engaged, its primary concern is the potential radio altimeters issues, not AMT.

AMT Issues/Concerns. While the primary technical studies for AI 1.19 focus on whether EESS can operate without interfering with radio altimeters, AMT users should pay close attention to these studies. If studies show that altimeters are highly vulnerable, it could lead to stricter regulations (e.g., power limits, guard bands) that could potentially constrain both future and even existing operations, including AMT, in the 4400-4940 MHz band. While Agenda Item 1.19's focus is on EESS and radio altimeters, its outcome could have a direct ripple effect on the adjacent 4400-4940 MHz telemetry band.

The technical findings and regulatory decisions made to protect radio altimeters will set a precedent that influences the future rules governing the AMT band, especially in the context of the even greater threat posed by IMT under Agenda Item 1.7. AMT users of this band need to follow this discussion for potential AMT impacts and adequate protection from, and for, EESS services in this adjacent band.

WRC-31 Preliminary Agenda Item 2.4 Inter-Satellite Services (ISS).

Description WRC-23 adopted a Preliminary Agenda Item slated to be taken up in the four-year cycle following WRC-27 which addresses the growing interest in utilizing ISS (inter-satellite service) links between space stations. ISS links are being considered in the frequency band 5 925-6 425 MHz. These studies will be discussed at WRC-27 and, if approved, presented as an Agenda Item for consideration at the WRC in 2031.

AMT Band Impacted. This band was allocated for aeronautical mobile telemetry in the United States but, as of yet, it has not been allocated nor licensed for AMT by the FCC.

Current Status. While research studies have been accomplished on AMT usage in this band, no allocation or AMT licenses have been issued. Its future utilization for AMT remains undetermined at this time.

AMT Issues/Concerns. While this band's AMT utilization is undetermined, this agenda item could affect any current or future AMT usage plans. The development of this future agenda item will need to be monitored by the AMT community if this Preliminary Agenda Item 2.4 is confirmed for WRC-31..

WRC-31 Preliminary Agenda Item 2.9 RNSS

Description WRC-31 Preliminary Agenda Item 2.9, and its accompanying WRC-23 Resolution 684, call for studies on possible new allocations to the radionavigation-satellite service (space-to-Earth).

AMT Bands Impacted. The bands tentatively targeted by the studies (5 030–5 150 MHz and 5 150–5 250 MHz) include spectrum that is key for AMT globally and the upper portion within Region 1. 5 091 – 5 150 MHz the only globally harmonized AMT Band, i.e., it is allocated for AMT in all Regions. RR Footnote 5.444B limits this band to aeronautical mobile (R) service, and AMT in all three Regions

Current Status. Discussions currently are preliminary. Little information is available at this time.

AMT Issues/Concerns. While Resolution 684 notes the presence of the AMT allocation, any subsequent Working Party studies on sharing and compatibility with incumbent services should be monitored to ensure adequate AMT protection from RNSS encroachment is provided in the event this Preliminary Agenda Item is confirmed at WRC-27 for WRC-31 action.

There is an apparent point of confusion in this resolution about who could be affected. The second AMT band potentially affected by this Item (5 150- 5 250 MHz), while considered a “primary” allocation, is not mentioned by name in the Resolution. Resolution 684 does prescribe that it shall ensure protection of incumbent services in the same and adjacent bands.

This could pose an issue for Region 1 AMT users and is a matter which should be clarified in the event this Preliminary Agenda Item 2.9 is ultimately approved at WRC-27 for a WRC-31 decision.

Domestic Encroachment

Governance

While ITU Radio Regulations are determined at the WRC governing the regulation of cross-border interference, each administration (country) maintains sovereignty over the use of the electromagnetic spectrum within its border and adopts national regulations for domestic use apart from, and which may differ from, ITU Regulations. This section addresses a few regulatory issues related to AMT in specific administration as reported to ICTS members.

All Administrations

Middle C-Band The band 5 091-5 150 MHz was allocated to AMT at WRC-07. This is the globally harmonized AMT band across all three Regions and is available to all administrations.

AMT is co-primary in this band with aeronautical mobile route service (AM(R)S) and the aeronautical radionavigation service (ARNS) which use this band for ground and traffic control at some major airports (see ITU-R RR 5.444B). These services (AMT, AM(R)S, ARNS) are typically geographically separated for mutual protection. Few airports (at least in the U.S) have implemented MLS or ANLE/AeroMACS. AMT users seeking to use 5 091-5 150 MHz near major airports should monitor the ARNS and ANLE usage and ensure geographical separation. While utilization of the 5 GHz band for AMT is slowly growing, its full potential has not been realized in several administrations, and this band could face encroachment from other commercial services if it appears underutilized.

United States

Commercial Space Launch in S-Band. The U.S. Congress required the Federal Communications Commission (FCC) three bands between 2 025 and 2 395 MHz for commercial space launch on a secondary basis – including 2 360- 2 395 MHz. These is a critical AMT band for flight testing in the US and protection issues are currently being considered as the FCC implements per-launch coordination procedures and selects a third-party coordinator who will be the facilitator of coordination requests and function as an intermediary between space launch operators and incumbent users and incumbent coordinators.

AMT’s primary status in this band may face some challenges. Secondary status may not be satisfactory for commercial space launch when a launch countdown is underway, or a launch has commenced. It is unclear what would happen if an AMT user requested that a coordinated launch be scrubbed for a subsequently scheduled AMT flight test. The politics of such a prioritization decision may require a different approach to managing prioritization.

Supplemental Coverage from Space (SCS) in S-Band. AT&T, the nationwide licensee in the 2 345- 2 360 MHz band for Wireless Communications Service (WCS), and its satellite partner, AST SpaceMobile, are implementing a direct-to-cell type service in AT&T’s spectrum, referred to in the U.S. as Supplemental Coverage from Space (SCS). While AT&T’s use of this band for base stations as part of its terrestrial WCS deployment is

coordinated with Federal and non-Federal coordinators, a deployment of SCS in this band would present novel coordination challenges.

One Big Beautiful Bill (OBBB) in lower C-Band

This new law known can have significant for aeronautical mobile telemetry (AMT) users in the USA; one adjacent-band allocation, one in-band allocation.

This act directs the Federal Communications Commission (FCC) to auction at least 100 megahertz of spectrum in the Upper C-band for new wireless services, which has raised concerns within the Range community about potential interference with AMT. Under this law, the FCC is directed to auction a portion of the Upper C-band for high-power wireless services in an adjacent frequency band. High-power transmissions from the new wireless services in the adjacent band could overload the sensitive receivers used in AMT systems. The FCC will also discuss power limits and out-of-band emission limits, to minimize the potential for interference with adjacent band users (like AMT).

The OBBB also provides \$50 million for the NTIA to conduct assessments of three key bands, including a primary AMT band – at 4.4-4.9 GHz, to identify spectrum that can be repurposed for commercial use, particularly for 5G and future 6G services. This funding is intended to help meet the aggressive goal of identifying and auctioning a total of at least 800 megahertz of spectrum to establish a new pipeline for 5G and future wireless services. NTIA leads the 4.4-4.9 GHz Study in consultation with other federal agencies. This analysis is in its early stages. While AMT is not the only users in this band any sharing or reallocation must ensure there is no harmful interference.

The threat to this band will be significant and continuous. Many other nations have already allocated this band (as known as the cellular n79 Band outside of the US) for wireless carriers, and reallocation would support global harmonization.

In a speech in October 2025, NTIA Assistant Secretary Arielle Roth expressed strong interest in the 4 GHz range detailing the opportunity to clear a large portion—potentially up to 400 MHz—for IMT. He stated that “I am laser focused on getting this band studied and cleared as quickly as possible. If not during this Administration, then teeing it up for the next one.”[8]

The extent of the impact will depend on the final rules adopted by the FCC and the effectiveness of the mitigation measures put in place to protect AMT and the other critical aviation services.

Germany

C-Band. The German administration has granted AMT allocations only in the C- Band range (typically) 5 091-5 150 MHz. Currently not in the range 5 150-5 250 MHz (as allocated by the ITU-R).

While the C-band allocation is available for Germany, it may not be allocated in adjacent countries. Due to the typical flight range and altitude of flight test missions, many test organizations may need to request C-Band allocation for the countries on their borders. Regional coordination can be bureaucratic and complex and needs to be completed well before the test can be scheduled.

Being prepared for bi-directional AMT link usage, the AMT C-band license has been issued for duplex operation.

S-Band. A major user used to have frequency assignments in the S-Band (2 300 – 2 360 MHz) for AMT within Germany. In 2024, the German administration refused to extend these assignments. This year 2026 the approval was given till January 2027. Which is an example of the volatility of frequency approvals from year to year.

Spain

C-Band. The Spain administration has granted AMT allocations only in the C- Band range (typically) 5 091-5 150 MHz. Currently no AMT licenses in the range 5 150-5 250 MHz (as allocated by the ITU-R) are issued in Spain too.

The limited bandwidth (59 MHz) available is considered as not sufficient to cover the increasing bandwidth-per-platform demands in near future flight test activities.

Currently consultations are taking place for C-Band AMT duplex usage.

S-Band. S-Band (2 300 – 2 400 MHz) is still in use by state operators for AMT within Spain. But migration towards C-Band AMT has started.

Conclusions

Challenges Ahead

Significant encroachment challenges to telemetry spectrum exist both domestically (within individual administrations or Regions) and internationally (ITU/WRC). The encroachment of incompatible services in-band and adjacent to bands used for AMT can degrade telemetry data and result in test failure, loss of test articles, and risks to pilots', crews', and others. Adequate RF spectrum for telemetry operations is critical for safe flight tests and other scientific applications.

Data for Decision Makers

The ability to defend telemetry spectrum is critical to preserve critical flight test capabilities. The calculation of cost and benefits of telemetry spectrum is difficult to articulate quantitatively when compared to other commercial uses. Telemetry users must be prepared to provide convincing data on the need for real-time and error-free

receipt of telemetry streams to support flight testing to effectively defend the spectrum used for flight test (and other) telemetry services. Data on spectrum utilization by telemetry and impacts to flight test must be understandable and available for response to domestic and ITU data calls.

Flight test telemetry is a critical link in the test and evaluation chain of events that is required to safely complete a test program in a timely fashion and within budget. Flight test telemetry can be a significant cost driver where a failure (mission cancellation) could cause expensive down-chain impact (cost/schedule) in a test program (targets, test environments, test assets, ranges).

To adequately defend telemetry spectrum, capturing and articulating these costs must be accomplished, and telemetry operators must be prepared to act on guidance on how to provide data on cost impacts to domestic and ITU decision makers.

Protecting A Global AMT Band

AMT users also must take better advantage of the spectrum to which we have access. The ITU has recognized the critical international character of AMT and at WRC-07 provided us a Global AMT Band (Fig 4). This band (5 091- 5 150 MHz) is globally harmonized and ready to be allocated for aeronautical telemetry world-wide. All telemetry users are encouraged to make use of this dedicated AMT band.

Next Steps - Taking Action

The information in this paper is presented so that telemetry practitioners are aware of many of the primary developments that could affect the business of telemetry and can take the necessary action to preserve and protect this vital capability for safe and timely aeronautical flight tests.

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The ICTS is dedicated to serving the professional and technical interests of those in the telemetry community and welcomes your involvement.

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Glossary

AM(R)S:	Aeronautical Mobile Route Service
AMT:	Aeronautical Mobile Telemetry
ARNS:	Aeronautical Radio Navigation Service
ANLE:	Airport Location and Network Equipment
CTIA:	Cellular Trade Industry Association
e.i.r.p.:	equivalent isotopically radiated power
FAA:	Federal Aviation Administration
FCC:	Federal Communications Commission (USA)
ICTS:	Int'l Consortium for Telemetry Spectrum
IFT:	Int'l Foundation for Telemetry
IMT:	International Mobile Telecommunications
IoT:	Internet of Things
ISS:	Inter-Satellite Service
ITU:	International Telecommunications Union (UN)
ITU-R:	ITU's Radiocommunications Sector
GHz:	Gigahertz (10^9 hertz)
GPS:	Global Positioning System
GSO:	Geostationary Satellites
HAPS:	High-altitude platform station
HIBS:	HAPS as base stations for IMT
kHz:	Kilohertz (10^3 hertz)
MHz:	Megahertz (10^6 hertz)
MLS:	Microwave Landing System
MSS:	Mobile Satellite Services
OBE:	Out Of Band Emissions
pfd:	power flux-density
RF:	Radio Frequency
RNSS:	Radionavigation-Satellite Service
RR:	Radio Regulations (ITU-R)
SCS:	Supplemental Coverage from Space
S-S:	satellite to satellite
TSPI:	time-space positioning information
WAS:	Wireless Access Systems
WCS:	Wireless Communications Service
WiFi:	Wireless Fidelity (IEEE 802.11)
WPxx:	ITU Working Party
WRC:	World Radiocommunications Conference
5G	fifth generation mobile networks
6G	sixth generation mobile networks