



Spectrum Management and Telecommunications

# **Proposed Revisions to the Canadian Table of Frequency Allocations [2017] Edition**

## Contents

<b>1.</b>	<b>Intent .....</b>	<b>1</b>
<b>2.</b>	<b>Background .....</b>	<b>1</b>
<b>3.</b>	<b>Process.....</b>	<b>1</b>
<b>4.</b>	<b>Document structure .....</b>	<b>2</b>
<b>5.</b>	<b>Conventions used .....</b>	<b>2</b>
<b>6.</b>	<b>Definitions.....</b>	<b>3</b>
	6.1 General terms .....	3
	6.2 Radio services .....	4
	6.3 Categories of services .....	8
	6.4 Regions .....	8
<b>7.</b>	<b>Proposed changes to the Canadian Table of Frequency Allocations .....</b>	<b>10</b>
	<b>Part A: Maritime and aeronautical services .....</b>	<b>10</b>
	<b>Part B: Mobile and amateur services.....</b>	<b>19</b>
	<b>Part C: Science services.....</b>	<b>25</b>
	<b>Part D: Satellite services.....</b>	<b>31</b>
	<b>Part E: Modifications to international footnotes in the Canadian Table .....</b>	<b>40</b>
	<b>Part F: Other modifications to the Canadian Table.....</b>	<b>46</b>
	<b>Appendix A: Acronyms used in this document.....</b>	<b>52</b>

## 1. Intent

Through this consultation paper, announced in *Canada Gazette* notice SMSE-005-17, Innovation, Science and Economic Development Canada (ISED) reviews the [Canadian Table of Frequency Allocations](#) (the Canadian Table) and makes proposals for its revision, taking into account the results of the 2015 World Radiocommunication Conference (WRC-15) and domestic requirements. The Canadian Table was modified in 2014, to incorporate the results of WRC-12 and to reflect changes to domestic spectrum policies. Subsequent changes have also been made since then to incorporate more recent spectrum policy decisions.

In the accompanying *Canada Gazette* notice, ISED (referred to hereinafter as the Department) invites public comments on these proposals, as well as any input to ensure the completeness of the Canadian Table.

## 2. Background

The International Telecommunication Union (ITU) adopts an International Table of Frequency Allocations (the International Table) as part of the ITU *Radio Regulations*. This International Table allocates spectrum to various combinations of radio services and may include conditions for the use of the spectrum. The International Table is revised, along with other parts of the ITU *Radio Regulations*, at meetings of the ITU World Radiocommunication Conferences (WRC), which are typically held every three to four years.

The Canadian Table is derived from the International Table and contains those radio services required to meet Canadian needs, among those allocated by the ITU, including the applicable international footnotes. This domestic table also specifies, by allocation and Canadian footnote, any additional provisions for use of those services in Canada.

ISED revises the Canadian Table periodically, normally following a WRC. WRC-15, which met from November 2 to November 27, 2015, in Geneva, Switzerland, adopted a number of changes to the frequency allocations in the International Table. The Conference dealt with issues concerning amateur, fixed, mobile, radiolocation, navigation, science, mobile-satellite, and fixed-satellite services. The resulting changes to the International Table necessitate consideration of several domestic issues. In addition, domestic requirements for other changes to the Canadian Table have emerged, and will also be addressed. This document discusses these issues and makes proposals for revisions to the Canadian Table.

## 3. Process

The accompanying *Canada Gazette* notice (SMSE-005-17) invites public comment on the proposals contained in this consultation paper. Following the review of comments received, allocation decisions will be promulgated by the issuance of a revised Canadian Table. Furthermore, any additional spectrum policy decisions that involve domestic allocation or footnotes changes, and are subject to their own consultation process, will be consequently incorporated in the next revision of the Canadian Table without further consultation.

#### 4. Document structure

Section 7 of this consultation paper is divided into six Parts that address the proposed changes to the Canadian Table consequential to the decisions made at WRC-15. Furthermore, any spectrum policy decisions that deal with domestic allocation or footnotes changes that have been approved through their own consultation process will not be discussed in this consultation paper and will be incorporated in the final edition of the Canadian Table.

#### 5. Conventions used

The proposals contained in this consultation paper are identified as modifications to the current Canadian Table, published in April 2014 and last revised in January 2015. This current version of the Canadian Table may be obtained from ISED's Spectrum Management and Telecommunication's [website](#). For a better understanding of these proposals, refer to the most recent International Table, as found in the ITU *Radio Regulations*, Volume 1 (2016 Edition), Article 5 and the Final Acts of the World Radiocommunication Conference (Geneva, 2015). In section 7, the following conventions are used:

**Underlining** When used in the Canadian Table, underlining proposes the addition of a radio service or footnote. It is also used in the text of Canadian footnotes to identify proposed additional text.

**~~Strikeout~~** When used in the Canadian Table, strikeouts propose the deletion of a radio service or footnote. They are also used in the text of Canadian footnotes to identify proposed deleted text.

**5.XXX** This is the designation format of an international footnote.

**CXX** This identifies a Canadian footnote.

**MOD** This indicates an international footnote modified at WRC-15 or a Canadian footnote proposed for modification. Modifications appear in both the Canadian Table and in the lists of footnotes.

**ADD** This is used in a list of footnotes to indicate an international footnote created at WRC-15 or a proposed new Canadian footnote.

**ADD MOD** This indicates the proposed addition of an international footnote to the Canadian Table as modified at WRC-15.

**SUP** This is used in a list of footnotes to indicate an international footnote suppressed at WRC-15 or a Canadian footnote proposed for suppression.

## 6. Definitions

The following is a list of terms and definitions that are relevant to the Canadian Table. These terms and definitions are extracted from the ITU's *Radio Regulations*. The ITU *Radio Regulations* should be consulted for a more comprehensive listing.

### 6.1 General terms

**Administration:** Any governmental department or service responsible for discharging the obligations undertaken in the Constitution, Convention and Administrative Regulations of the International Telecommunication Union.

**Allocation (of a frequency band):** Entry in the Table of Frequency Allocations of a given frequency band for the purpose of its use by one or more terrestrial or space radiocommunication services or the radio astronomy service under specified conditions. This term also applies to the frequency band concerned.

**Allotment (of a radio frequency or radio frequency channel):** Entry of a designated frequency channel in an agreed plan, adopted by a competent conference, for use by one or more administrations for a terrestrial or space radiocommunication service in one or more identified countries or geographical areas and under specified conditions.

**Assignment (of a radio frequency or radio frequency channel):** Authorization given by an administration for a radio station to use a radio frequency or radio frequency channel under specified conditions.

**Radio:** A general term applied to the use of radio waves.

**Radio waves or hertzian waves:** Electromagnetic waves of frequencies arbitrarily lower than 3 000 GHz, propagated in space without artificial guide.

**Radiocommunication:** Telecommunication by means of radio waves.

**Terrestrial radiocommunication:** Any radiocommunication other than space radiocommunication or radio astronomy.

**Space radiocommunication:** Any radiocommunication involving the use of one or more space stations or the use of one or more reflecting satellites or other objects in space.

**Radiodetermination:** The determination of the position, velocity and/or other characteristics of an object, or the obtaining of information relating to these parameters, by means of the propagation properties of radio waves.

**Radionavigation:** Radiodetermination used for the purposes of navigation, including obstruction warning.

**Radiolocation:** Radiodetermination used for purposes other than those of radionavigation.

**Radio direction-finding:** Radiodetermination using the reception of radio waves for the purpose of determining the direction of a station or object.

**Radio astronomy:** Astronomy based on the reception of radio waves of cosmic origin.

**Coordinated Universal Time (UTC):** Time scale, based on the second (SI), as described in Resolution 655 (WRC-15).

**Industrial, scientific and medical (ISM) applications (of radio frequency energy):** Operation of equipment or appliances designed to generate and use locally radio frequency energy for industrial, scientific, medical, domestic or similar purposes, excluding applications in the field of telecommunications.

## 6.2 Radio services

**Aeronautical mobile service:** A mobile service between aeronautical stations, and aircraft stations, or between aircraft stations, in which survival craft stations may participate; emergency position-indicating radiobeacon stations may also participate in this service on designated distress and emergency frequencies.

**Aeronautical mobile (OR)<sup>1</sup> service:** An aeronautical mobile service intended for communications, including those relating to flight coordination, primarily outside national or international civil air routes.

**Aeronautical mobile (R)<sup>2</sup> service:** An aeronautical mobile service reserved for communications relating to safety and regularity of flight, primarily along national or international civil air routes.

**Aeronautical mobile-satellite service:** A mobile-satellite service in which mobile earth stations are located on board aircraft; survival craft stations and emergency position-indicating radiobeacon stations may also participate in this service.

**Aeronautical mobile-satellite (OR)<sup>1</sup> service:** An aeronautical mobile-satellite service intended for communications, including those relating to flight coordination, primarily outside national and international civil air routes.

**Aeronautical mobile-satellite (R)<sup>2</sup> service:** An aeronautical mobile-satellite service reserved for communications relating to safety and regularity of flights, primarily along national or international civil air routes.

**Aeronautical radionavigation service:** A radionavigation service intended for the benefit and for the safe operation of aircraft.

---

<sup>1</sup> (OR): off-route

<sup>2</sup> (R): route

***Aeronautical radionavigation-satellite service:*** A radionavigation-satellite service in which earth stations are located on board aircraft.

***Amateur service:*** A radiocommunication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest.

***Amateur-satellite service:*** A radiocommunication service using space stations on earth satellites for the same purpose as those of the amateur service.

***Broadcasting service:*** A radiocommunication service in which the transmissions are intended for direct reception by the general public. This service may include sound transmissions, television transmissions or other types of transmission.

***Broadcasting-satellite service:*** A radiocommunication service in which signals transmitted or retransmitted by space stations are intended for direct reception by the general public.

In the broadcasting-satellite service, the term *direct reception* shall encompass both individual reception and community reception.

***Earth exploration-satellite service:*** A radiocommunication service between earth stations and one or more space stations, which may include links between space stations, in which:

- information relating to the characteristics of the Earth and its natural phenomena, including data relating to the state of the environment, is obtained from active sensors or passive sensors on Earth satellites;
- similar information is collected from airborne or Earth-based platforms;
- such information may be distributed to earth stations within the system concerned;
- platform interrogation may be included.

This service may also include feeder links necessary for its operation.

***Fixed service:*** A radiocommunication service between specified fixed points.

***Fixed-satellite service:*** A radiocommunication service between earth stations at given positions, when one or more satellites are used; the given position may be a specified point or any fixed point within specified areas; in some cases, this service includes satellite-to-satellite links, which may also be operated in the inter-satellite service; the fixed-satellite service may also include feeder links for other space radiocommunication services.

***Inter-satellite service:*** A radiocommunication service providing links between artificial satellites.

***Land mobile service:*** A mobile service between base stations and land mobile stations or between land mobile stations.

***Land mobile-satellite service:*** A mobile-satellite service in which mobile earth stations are located on land.

***Maritime mobile service:*** A mobile service between coast stations and ship stations, or between ship stations, or between associated on-board communication stations; survival craft stations and emergency position-indicating radiobeacon stations may also participate in this service.

***Maritime mobile-satellite service:*** A mobile-satellite service in which mobile earth stations are located on board ships; survival craft stations and emergency position-indicating radiobeacon stations may also participate in this service.

***Maritime radionavigation service:*** A radionavigation service intended for the benefit and for the safe operation of ships.

***Maritime radionavigation-satellite service:*** A radionavigation-satellite service in which earth stations are located on board ships.

***Meteorological aids service:*** A radiocommunication service used for meteorological, including hydrological, observations and exploration.

***Meteorological-satellite service:*** An earth exploration-satellite service for meteorological purposes.

***Mobile service:*** A radiocommunication service between mobile and land stations, or between mobile stations.

***Mobile-satellite service:*** A radiocommunication service:

- between mobile earth stations and one or more space stations, or between space stations used by this service; or
- between mobile earth stations by means of one or more space stations.

This service may also include feeder links necessary for its operation.

***Radio astronomy service:*** A service involving the use of radio astronomy.

***Radiocommunication service:*** A service involving the transmission, emission and/or reception of radio waves for specific telecommunication purposes. Unless otherwise stated, any radiocommunication service relates to terrestrial radiocommunication.

**Radiodetermination service:** A radiocommunication service for the purpose of radiodetermination.

**Radiodetermination-satellite service:** A radiocommunication service for the purpose of radiodetermination involving the use of one or more space stations.

This service may also include feeder links necessary for its own operation.

**Radiolocation service:** A radiodetermination service for the purpose of radiolocation.

**Radiolocation-satellite service:** A radiodetermination-satellite service used for the purpose of radiolocation.

This service may also include feeder links necessary for its operation.

**Radionavigation service:** A radiodetermination service for the purpose of radionavigation.

**Radionavigation-satellite service:** A radiodetermination-satellite service used for the purpose of radionavigation.

This service may also include feeder links necessary for its operation.

**Safety service:** Any radiocommunication service used permanently or temporarily for the safeguarding of human life and property.

**Space operation service:** A radiocommunication service concerned exclusively with the operation of spacecraft, in particular space tracking, space telemetry and space telecommand.

These functions will normally be provided within the service in which the space station is operating.

**Space research service:** A radiocommunication service in which spacecraft or other objects in space are used for scientific or technological research purposes.

**Standard frequency and time signal service:** A radiocommunication service for scientific, technical and other purposes, providing the transmission of specified frequencies, time signals, or both, of stated high precision, intended for general reception.

**Standard frequency and time signal-satellite service:** A radiocommunication service using space stations on earth satellites for the same purposes as those of the standard frequency and time signal service.

This service may also include feeder links necessary for its operation.

### 6.3 Categories of services

#### *Primary and secondary services:*

In the Canadian Table, where a band is indicated as allocated to more than one service, services are listed in the following order:

- (a) primary services are printed in “all capital letters” (example: FIXED), and
- (b) secondary services are printed in “normal characters” (example: Amateur).

Additional remarks are printed in “normal characters” (example: MOBILE except aeronautical mobile).

For each category, services are listed in alphabetical order but that order does not indicate relative priority.

#### *Stations of a secondary service:*

- (a) shall not cause harmful interference to stations of primary service to which frequencies are already assigned or to which frequencies may be assigned at a later date,
- (b) cannot claim protection from harmful interference from stations of a primary service to which frequencies are already assigned or may be assigned at a later date, and
- (c) can claim protection, however, from harmful interference from stations of the same or other secondary service(s) to which frequencies may be assigned at a later date.

The frequency band referred to in each allocation is indicated in the left-hand top corner of the part of the Table concerned.

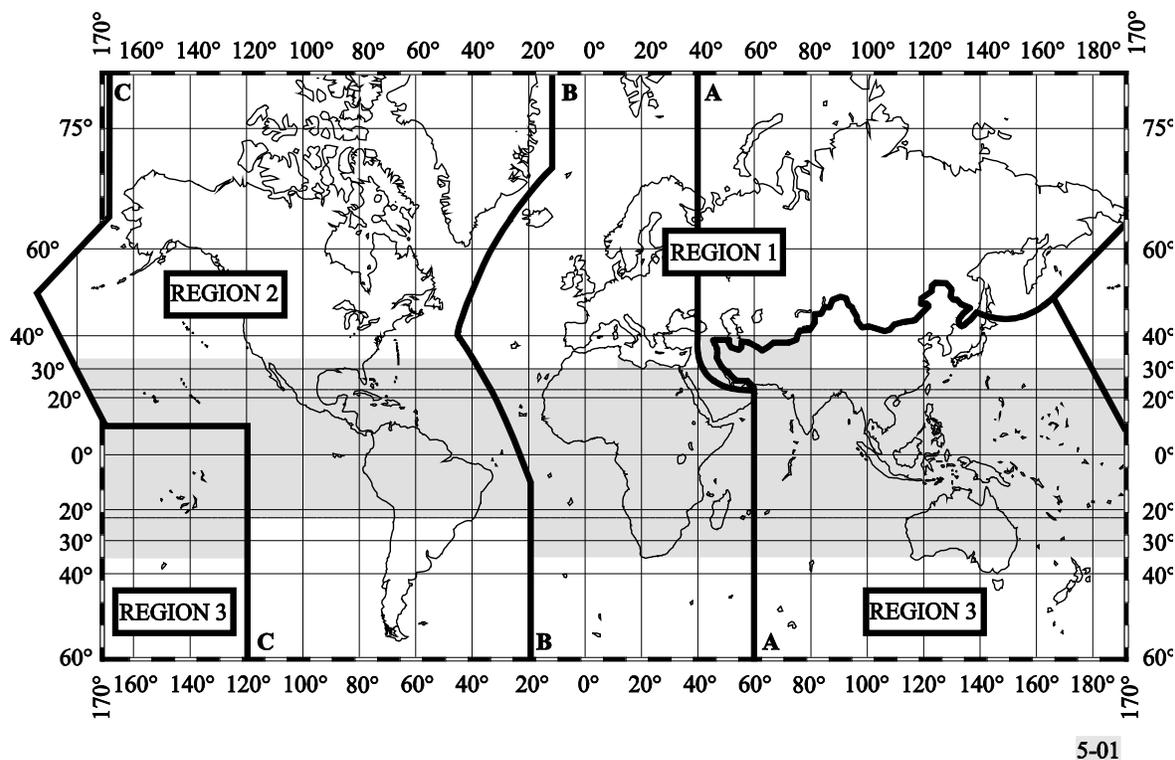
The footnote references which appear in the Table below the allocated service or services apply to more than one of the allocated services, or the whole of the allocation concerned.

The footnote references which appear to the right of the name of a service are applicable only to that particular service.

### 6.4 Regions

These definitions and provisions are extracted from the ITU *Radio Regulations*.

**5.2** For the allocation of frequencies, the world has been divided into three Regions as shown on the following map and described in Nos. **5.3** to **5.5**:



- 5.3** *Region 1:* Region 1 includes the area limited on the east by line A (lines A, B and C are defined below) and on the west by line B, excluding any of the territory of the Islamic Republic of Iran which lies between these limits. It also includes the whole of the territory of Armenia, Azerbaijan, the Russian Federation, Georgia, Kazakhstan, Mongolia, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan, Turkey and Ukraine and the area to the north of Russian Federation which lies between lines A and C.
- 5.4** *Region 2:* Region 2 includes the area limited on the east by line B and on the west by line C.
- 5.5** *Region 3:* Region 3 includes the area limited on the east by line C and on the west by line A, except any of the territory of Armenia, Azerbaijan, the Russian Federation, Georgia, Kazakhstan, Mongolia, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan, Turkey and Ukraine and the area to the north of Russian Federation. It also includes that part of the territory of the Islamic Republic of Iran lying outside of those limits.

## 7. Proposed changes to the Canadian Table of Frequency Allocations

### Part A: Maritime and aeronautical services

#### **A1 (WRC-15, Agenda Item 1.5) – Identification of frequency bands allocated to the fixed-satellite service not subject to Appendices 30, 30A and 30B, for the control and non-payload communications of unmanned aircraft systems (UAS)**

##### **Background**

UAS consist of an unmanned aircraft (UA) and an associated unmanned aircraft control station (UACS). UA are aircraft that do not carry a human pilot and may fly autonomously or be piloted remotely.

The development of UAS is based on recent technological advances in aviation, electronics and structural materials, making the economics of UAS operations more favorable, particularly for more repetitive, routine and long-haul duration applications. The current state of the art in UAS design and operation is leading to the rapid development of UAS applications to fill many diverse requirements. There is a large variety of existing and envisioned applications of UAS such as cargo transportation, fire-fighting, flood monitoring, search and rescue, disaster operations management, oceanographic and atmospheric observations, weather forecasting, geological survey, monitoring of gas pipelines and electricity distribution systems, city and highway traffic, border patrol, law enforcement, counter drug operations, crop and harvest monitoring, broadcast and airborne relay-type services, etc. The operation of UA requires addressing the same issues as manned aircraft, namely safe and efficient integration into the air traffic control system.

WRC-12 made a global allocation for the control and non-payload communications of UAS for the terrestrial component in 5 030-5 091 MHz, which is reflected in the current version of the Canadian Table. WRC-15 considered the satellite component through the use of existing fixed-satellite service (FSS) allocations.

##### **Discussion**

WRC-15 successfully designated the FSS frequency bands 10.95-11.2 GHz (space-to-Earth), 11.45-11.7 GHz (space-to-Earth), 11.7-12.2 GHz (space-to-Earth) in Region 2, 12.2-12.5 GHz (space-to-Earth) in Region 3, 12.5-12.75 GHz (space-to-Earth) in Regions 1 and 3, 19.7-20.2 GHz (space-to-Earth), 14-14.47 GHz (Earth-to-space) and 29.5-30.0 GHz (Earth-to-space), for control and non-payload communications of UAS, through Resolution **155 (WRC-15)**. This designation will allow the International Civil Aviation Organization (ICAO) to develop the appropriate standards and recommended practices for UAS control and non-payload communications via FSS.

In addition, WRC-15 decided to further study and review the regulatory provisions related to the use of FSS for control and non-payload communications of UAS as per Resolution **155 (WRC-15)**, which is satisfactory to Canada. This approach will enable ICAO to move forward, given their mandate to ensure that the safety aspect of UAS operation using FSS is fully studied.

The Department proposes to reflect the WRC-15 decisions in the Canadian Table.

**Summary of proposed changes to the Canadian Table**

10.7 – 12.2 GHz

<p>10.7 - <del>11.7</del><u>10.95</u></p>	<p>FIXED                  FIXED-SATELLITE (space-to-Earth) 5.441 5.484A C16C C16I                   C16 C16H C16J</p>
<p>10.<del>795</del> - 11.<del>72</del></p>	<p>FIXED                  FIXED-SATELLITE (space-to-Earth) 5.441 5.484A <u>ADD 5.484B</u>                  C16C C16I                   C16 C16H C16J</p>
<p><del>10.711.2</del>- 11.<del>745</del></p>	<p>FIXED                  FIXED-SATELLITE (space-to-Earth) 5.441 5.484A C16C C16I                   C16 C16H C16J</p>
<p><u>11.45</u> - 11.7</p>	<p>FIXED                  FIXED-SATELLITE (space-to-Earth) 5.441 5.484A <u>ADD 5.484B</u>                  C16C C16I                   C16 C16H C16J</p>
<p>11.7 - 12.2</p>	<p>FIXED-SATELLITE (space-to-Earth) 5.484A <u>ADD 5.484B</u> C16I                  C16J                   5.485 5.488</p>

14 – 14.47 GHz

14 - 14.47	FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A <u>ADD 5.484B</u> 5.506 C16I Mobile-Satellite (Earth-to-space) 5.506A C41A  5.504A C16J C39D
------------	---

19.7 – 20.2 GHz

19.7 - 20.2	FIXED-SATELLITE (space-to-Earth) 5.484A <u>ADD 5.484B</u> 5.516B C16I MOBILE-SATELLITE (space-to-Earth)  5.525 5.526 5.527 5.528 5.529 C16J
-------------	---

29.5 – 30 GHz

29.5 - 29.9	FIXED-SATELLITE (Earth-to-space) 5.484A <u>ADD 5.484B</u> 5.516B 5.539 C16I MOBILE-SATELLITE (Earth-to-space)  5.525 5.526 5.527 5.529 5.540 C16J
29.9 - 30	FIXED-SATELLITE (Earth-to-space) 5.484A <u>ADD 5.484B</u> 5.516B 5.539 C16I MOBILE-SATELLITE (Earth-to-space)  5.525 5.526 5.527 5.538 5.540 C16J

**ADD**

**5.484B** Resolution **155 (WRC-15)** shall apply. (WRC-15)

**A2 (WRC-15, Agenda item 1.15) – Spectrum demands for on-board communication stations in the maritime mobile service**

**Background**

In various parts of the world, there are congestion issues for on-board communication stations in maritime mobile systems, given that there are currently only six identified frequencies in the ultra-high frequency (UHF) band to be used for these systems. These systems are used for internal communications on-board ships and between ships, as well as in a group of ships that are being towed or pushed, engaged in line handling operations or passing mooring instructions.

**Discussion**

WRC-15 decided that new spectrum for use by on-board communication stations is not necessary. However, to facilitate more efficient spectrum use, channel spacings of 6.25 kHz and 12.5 kHz will be permitted in the 457.5125-457.5875 MHz and 467.5125-467.5875 MHz bands, which can provide up to four times the capacity of traditional 25 kHz systems. Footnote **5.287** was modified to reflect this decision.

In Canada, the maritime community utilizes the existing channels dedicated for on-board communications. The Department proposes to incorporate the new version of footnote **5.287** to permit additional channel spacing in the same frequency band, as well as the use of digital technology.

**Summary of Proposed Changes to the Canadian Table**

456 – 470 MHz

456 - 459	MOBILE 5.286AA MOD 5.287 C23 Fixed
459 - 460	FIXED MOBILE 5.286AA C23 MOBILE-SATELLITE (Earth-to-space) 5.209 5.286A 5.286B 5.286C  C26A C26B
460 - 470	MOBILE 5.286AA MOD 5.287 C23 Fixed  5.289

## MOD

**5.287** Use of the frequency bands 457.5125-457.5875 MHz and 467.5125-467.5875 MHz by ~~In the maritime mobile service, is limited to the frequencies 457.525 MHz, 457.550 MHz, 457.575 MHz, 467.525 MHz, 467.550 MHz and 467.575 MHz may be used by on-board communication stations. The characteristics of the equipment and the channelling arrangement shall be in accordance with Recommendation ITU-R M.1174-3. Where needed, equipment designed for 12.5 kHz channel spacing using also the additional frequencies 457.5375 MHz, 457.5625 MHz, 467.5375 MHz and 467.5625 MHz may be introduced for on-board communications.~~ The use of these frequency bands in territorial waters may be ~~is~~ subject to the national regulations of the administration concerned. ~~The characteristics of the equipment used shall conform to those specified in Recommendation ITU-R M.1174-2. (WRC-07) (WRC-15)~~

### **A3 (WRC-15, Agenda item 1.16) – Regulatory provisions and spectrum allocations to enable new automatic identification system (AIS) technology applications and new applications to improve maritime radiocommunication**

#### **Background**

During the WRC-15 cycle, studies were carried out to determine whether channels AIS1 and AIS2 could be used for other applications, such as application specific messages (ASM), in conjunction with the intended purpose of collision avoidance. Administrations tested the loading of AIS1 and AIS2 and found the loading of the two channels to be excessive, especially in congested areas. Therefore, studies were carried out to find additional channels within the frequency band found in Appendix 18 of the ITU *Radio Regulations*, to alleviate the loading of AIS1 and AIS2.

#### **Discussion**

WRC-15 decided that channels adjacent to AIS1 and AIS2 can be used for ASM. As a result, a new secondary allocation for the maritime mobile-satellite service (Earth-to-space) was identified for frequency band 161.9375-161.9625 MHz (channel 2027) and frequency band 161.9875-162.0125 MHz (channel 2028) for improved ASM communications capacity and coverage. This was accomplished by splitting channels 27 and 28 in Appendix 18 using the upper frequency portions for ASM1 and ASM2. WRC-15 also adopted a transitional period, until January 2019, for the permanent implementation of ASM1 and ASM2. However, until January 2019, the use of these channels for possible testing of AIS applications is permitted through a note in Appendix 18.

This is in line with Canadian interests.

**Summary of proposed changes to the Canadian Table**

156.8375 - 162.0125 MHz

156.8375 - 161.9625	MOBILE Fixed <u>Maritime mobile-satellite (Earth-to-space) ADD 5.228AA</u>
	5.226
161.9625 - 161.9875	AERONAUTICAL MOBILE (OR) MARITIME MOBILE MOBILE-SATELLITE (Earth-to-space)
	5.228C 5.228D C53
161.9875 - 162.0125	MOBILE Fixed <u>Maritime mobile-satellite (Earth-to-space) ADD 5.228AA</u>
	5.226

**ADD**

**5.228AA** The use of the frequency bands 161.9375-161.9625 MHz and 161.9875-162.0125 MHz by the maritime mobile-satellite (Earth-to-space) service is limited to the systems which operate in accordance with Appendix 18. (WRC-15)

**A4 (WRC-15, Agenda item 1.17) – New primary allocation to the aeronautical mobile (route) service for wireless avionics intra-communications**

**Background**

The civil aviation industry is developing the future generation of aircraft. This next generation is being designed to enhance efficiency and reliability while maintaining current required levels of safety as a minimum. The use of wireless technologies in the aircraft may reduce the overall weight of systems, reducing the amount of fuel required to fly and thus benefiting the environment.

Wireless avionics intra-communications (WAIC) systems provide a way to derive these benefits. WAIC systems provide for radiocommunication between two or more points on a single aircraft and constitute exclusive closed on board networks required for the operation of an aircraft. WAIC systems do not provide air-to-ground, air-to-satellite or air-to-air communications. WAIC systems will only be used for safety-related aircraft applications.

**Discussion**

There was unanimous consensus going into the Conference for a global primary allocation in the frequency band 4 200-4 400 MHz to the aeronautical mobile (route) service (AM(R)S), reserved exclusively for WAIC systems that operate in accordance with recognized international aeronautical standards.

The WRC-15 decision to allocate the frequency band 4 200-4 400 MHz to AM(R)S for WAIC is a successful outcome for Canada. It will enable aviation manufacturers such as Boeing Canada and Bombardier to use the technology to replace some wired systems in aviation design with wireless systems, once international standards have been developed. The Department proposes to reflect this decision in the Canadian Table.

**Summary of proposed changes to the Canadian Table**

4 200-4 400 MHz

4 200 - 4 400	<p><u>AERONAUTICAL MOBILE (R) ADD 5.436</u>                  AERONAUTICAL RADIONAVIGATION MOD 5.438</p> <p><u>ADD 5.437 5.440</u></p>
---------------	---

**ADD**

**5.436** Use of the frequency band 4 200-4 400 MHz by stations in the aeronautical mobile (R) service is reserved exclusively for wireless avionics intra-communication systems that operate in accordance with recognized international aeronautical standards. Such use shall be in accordance with Resolution **424 (WRC-15)**. (WRC-15)

**ADD**

**5.437** Passive sensing in the Earth exploration-satellite and space research services may be authorized in the frequency band 4 200-4 400 MHz on a secondary basis. (WRC-15)

**MOD**

**5.438** Use of the frequency band 4 200-4 400 MHz by the aeronautical radionavigation service is reserved exclusively for radio altimeters installed on board aircraft and for the associated transponders on the ground. ~~However, passive sensing in the Earth exploration-satellite and space research services may be authorized in this band on a secondary basis (no protection is provided by the radio altimeters).~~ (WRC-15)

## **A5 (WRC-15, Agenda item 1.18) – New primary allocation to the radiolocation service in the frequency band 77.5-78 GHz for automotive applications**

### **Background**

The use of automotive short-range high-resolution radars (SRR), may significantly contribute to the improvement of road safety. SRRs are employed today in many automotive active safety applications ranging from parking aid and blind spot detection, to more advanced applications such as crash mitigation and collision avoidance.

The first applications of the SRR technology have been using the 24 GHz band. SRR systems are only allowed to use this band, subject to detailed regulatory restrictions to protect other users in the 24 GHz frequency range such as radio astronomy stations, Earth exploration satellites and other satellite services. In many countries, these regulatory restrictions have been more stringent since 2013-2014, and SRR systems are being encouraged to migrate to the 79 GHz band.

Additional spectrum in the 76-81 GHz frequency band for automotive radar applications would contribute to the goal of improving road safety, in areas such as distracted driving, transport efficiency and the quality of the environment. The frequency band 77-81 GHz is already designated for SRR systems in many countries. A global harmonization of this frequency band would be beneficial in terms of efficient use of the spectrum and economies of scale.

### **Discussion**

At WRC-15, the frequency band 77.5-78 GHz was allocated to the radiolocation service on a primary basis. This outcome results in 5 GHz of contiguous spectrum between 76 and 81 GHz for short range radar for ground based applications such as those in automobiles. Automotive high-resolution radars can be used to enhance safety such as improved detection of pedestrians and cyclists. Since the allocation is not limited to automotive applications, it may also be used by the aviation industry for aircraft wing-tip radars to facilitate tarmac and airport manoeuvres. Technical studies will continue within the ITU-R, under Resolution **759 (WRC-15)**, to further identify any additional protection measures around radio astronomy sites, such as exclusion zones that could be applied at the domestic level.

The Department proposes to reflect these WRC-15 decisions in the Canadian Table.

**Summary of proposed changes to the Canadian Table**

77.5 – 78 GHz

77.5 - 78	AMATEUR AMATEUR-SATELLITE <u>RADIOLOCATION ADD 5.559B</u> Radio Astronomy Space Research (space-to-Earth)
	5.149

**ADD**

**5.559B** The use of the frequency band 77.5-78 GHz by the radiolocation service shall be limited to short-range radar for ground-based applications, including automotive radars. The technical characteristics of these radars are provided in the most recent version of Recommendation ITU-RM.2057. The provisions of No. **4.10** do not apply. (WRC-15)

**A6 (WRC-15, Agenda item GFT) – New primary allocation to the aeronautical mobile satellite (route) service in the frequency band 1 087.7-1 092.3 MHz to facilitate global flight tracking (GFT)**

**Background**

Automatic dependent surveillance - broadcast (ADS-B) is a terrestrial aeronautical monitoring system that broadcasts (twice per second) position, altitude, velocity, aircraft ID, and other related avionics information. This information enables accurate position determination and monitoring of aircraft and the safe airspace separation of aircraft by air traffic control management. The system is presently in use, as well as being implemented in a number of countries.

ADS-B information availability directly influences many factors such as the minimum separation distances between aircraft, resulting in efficient use of airspace, optimization of air routes and altitude availability due to events such as changes in weather conditions, and safe operation of airspace with a higher density of aircraft, as well as contributing to having shorter flight times. Shorter flight times and altitude optimization contribute to fuel efficiencies and cost savings on aircraft maintenance requirements. The use of ADS-B also enables improved safety by providing additional information for search and rescue response.

ADS-B signals are received by other aircraft and terrestrial stations within line-of-sight. In oceanic, polar regions, remote areas or other areas where deployment of ground-based surveillance systems is not feasible, ADS-B signals are not being utilized to track aircraft. A number of satellite systems have been in development to place ADS-B receivers on board low-earth orbiting satellites, permitting the existing aircraft signals to be received and relayed to

appropriate air traffic management (ATM) centres and airlines. However, prior to WRC-15, there was no allocation in the ITU *Radio Regulations* to allow reception of these signals. A new allocation would make it possible to monitor ADS-B equipped aircraft in remote, oceanic and polar regions, augmenting the current ground-based surveillance systems to provide monitoring capability anywhere on the globe. This represents an innovative use of currently available technology to enhance the safety of aviation operations on a global scale and reduce the carbon footprint of commercial aviation through the improvement of fuel efficiencies.

**Discussion**

WRC-15 allocated the frequency band 1 087.7-1 092.3 MHz to the aeronautical mobile-satellite (route) service (AMS(R)S) to facilitate global flight tracking. This allocation enables the satellite reception of existing aircraft transmissions, leveraging the equipment that is currently installed on aircraft to track aircraft in real time over oceans, the poles and remote areas. Stations operating in the new AMS(R)S allocation cannot claim protection from stations in the aeronautical radionavigation service or the aeronautical mobile (route) service, which is an accepted practice of hierarchical services in the ITU *Radio Regulations* and within ICAO. This result is fully in line with Canada’s objectives for WRC-15. The Department proposes to reflect the WRC-15 decisions in the Canadian Table.

**Summary of proposed changes to the Canadian Table**

960 – 1 164 MHz

960 - 1 164	AERONAUTICAL MOBILE (R) 5.327A AERONAUTICAL RADIONAVIGATION 5.328  <u>ADD 5.328AA</u>
-------------	--

**ADD**

**5.328AA** The frequency band 1 087.7-1 092.3 MHz is also allocated to the aeronautical mobile-satellite (R) service (Earth-to-space) on a primary basis, limited to the space station reception of Automatic Dependent Surveillance - Broadcast (ADS-B) emissions from aircraft transmitters that operate in accordance with recognized international aeronautical standards. Stations operating in the aeronautical mobile-satellite (R) service shall not claim protection from stations operating in the aeronautical radionavigation service. Resolution **425 (WRC-15)** shall apply. (WRC-15)

**Part B: Mobile and amateur services**

**B1 (WRC-15, Agenda item 1.1) – Spectrum for mobile broadband**

## Background

International Mobile Telecommunications (IMT) systems are mobile systems that provide access to a wide range of telecommunication services, including advanced mobile services, supported by mobile and fixed networks. A number of frequency bands have already been identified for IMT.

In Resolution **233 (WRC-12)**, the ITU-R was asked to study additional spectrum requirements for IMT, taking into account:

- technical and operational characteristics of IMT systems, including the evolution of IMT through advances in technology and spectrally-efficient techniques, and their deployment;
- the bands currently identified for IMT, the technical conditions of their use, and the possibility of optimizing the use of these bands with a view to increasing spectrum efficiency;
- the evolving needs, including user demand for IMT and other terrestrial mobile broadband applications;
- the needs of developing countries; and
- the time-frame in which spectrum would be needed.

Also, the ITU-R was invited to study potential candidate bands, taking into account the results of the studies on additional spectrum requirements, as well as protection of existing services and the need for harmonization.

The following 19 bands were considered as potential candidate bands:

1) 470-694/698 MHz, 2) 1 350-1 400 MHz, 3) 1 427-1 452 MHz, 4) 1 452-1 492 MHz, 5) 1 492-1 518 MHz, 6) 1 518-1 525 MHz, 7) 1 695-1 710 MHz, 8) 2 700-2 900 MHz, 9) 3 300-3 400 MHz, 10) 3 400-3 600 MHz, 11) 3 600-3 700 MHz, 12) 3 700-3 800 MHz, 13) 3 800-4 200 MHz, 14) 4 400-4 500 MHz, 15) 4 500-4 800 MHz, 16) 4 800-4 990 MHz, 17) 5 350-5 470 MHz, 18) 5 725-5 850 MHz, and 19) 5 925-6 425 MHz.

Regulatory and technical studies were carried out to address the feasibility of identifying specific frequency bands for IMT. These studies addressed sharing and compatibility considerations with services that already have allocations in candidate spectrum for IMT identification, taking into account the needs of other services.

## Discussion

The following bands were identified for IMT at WRC-15:

- parts of 470-698 MHz in some countries of Regions 2 (including Canada) and 3;
- 1 427-1 452 MHz and 1 492-1 518 MHz globally;
- 1 452-1 492 MHz in Regions 2 and 3, and over 50 countries in Region 1;
- 3 300-3 400 MHz in some countries from all three Regions;
- 3 400-3 600 MHz in Regions 1 and 2, and some countries in Region 3;

- 3 600-3 700 MHz in some countries in Region 2 (including Canada); and
- 4 800-4 990 MHz in some countries in Regions 2 and 3.

For the bands 470-608 MHz and 614-698 MHz, the Department published its decision<sup>3</sup> to repurpose the 600 MHz band through a joint spectrum repacking exercise with the United States, following a public consultation.<sup>4</sup> The Department had sought comments on adding co-primary fixed and mobile service allocations to the Canadian Table in frequency ranges 512-608 MHz and 614-698 MHz. The Department concluded in its decision that the required updates to the Canadian Table are dependent on the determination of precise frequency ranges where the co-primary allocations should be added.

Accordingly, the Department has determined that fixed and mobile co-primary allocations will be added to the band 614-698 MHz. In addition, the Department proposes that international footnotes with regards to the identification of the bands for IMT be adopted as shown below.

For the bands 1 427-1 518 MHz and 3 400-3 700 MHz, the Department intends to address any changes to the Canadian Table and spectrum utilization policies in these bands through future separate public consultations.

For the bands 3 300-3 400 MHz, and 4 800-4 990 MHz, Canada did not identify these bands for IMT. Therefore, no changes to the Canadian Table are proposed.

**Summary of proposed changes to the Canadian Table**

470 - 806 MHz

470 - 608	BROADCASTING	MOD 5.293 <u>ADD 5.295</u> MOD 5.297 MOD C24 <u>ADD CXYZ</u>
608 - 614	RADIO ASTRONOMY Mobile-Satellite except aeronautical mobile-satellite (Earth-to-space)	
614 - 698	BROADCASTING <u>FIXED</u> <u>MOBILE</u>	MOD 5.293 <u>ADD 5.308A</u> MOD C24 <u>ADD CXYZ</u>

<sup>3</sup> [Decision on Repurposing the 600 MHz Band](#), SLPB-004-15, August 2015.  
<sup>4</sup> [Consultation on Repurposing the 600 MHz Band](#), SLPB-005-14, December 2014.

698 – 806

BROADCASTING  
FIXED  
MOBILE 5.317A C7

MOD 5.293

**MOD**

**5.293** *Different category of service:* in Canada, Chile, Cuba, the United States, Guyana, ~~Honduras, Jamaica, Mexico, and Panama and Peru~~, the allocation of the frequency bands 470-512 MHz and 614-806 MHz to the fixed service is on a primary basis (see No. **5.33**), subject to agreement obtained under No. **9.21**. In the Bahamas, Barbados, Canada, Chile, Cuba, the United States, Guyana, Honduras, Jamaica, Mexico, and Panama and Peru, the allocation of the frequency bands 470-512 MHz and 614-698 MHz to the mobile service is on a primary basis (see No. **5.33**), subject to agreement obtained under No. **9.21**. In Argentina and Ecuador, the allocation of the frequency band 470-512 MHz to the fixed and mobile services is on a primary basis (see No. **5.33**), subject to agreement obtained under No. **9.21**. (WRC-~~15~~15)

**ADD**

**5.295** In the Bahamas, Barbados, Canada, the United States and Mexico, the frequency band 470-608 MHz, or portions thereof, is identified for International Mobile Telecommunications (IMT) – see Resolution **224 (Rev.WRC-15)**. This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the ITU Radio Regulations. Mobile service stations of the IMT system within the frequency band are subject to agreement obtained under No. **9.21** and shall not cause harmful interference to, or claim protection from, the broadcasting service of neighbouring countries. Nos. **5.43** and **5.43A** apply. In Mexico, the use of IMT in this frequency band will not start before 31 December 2018 and may be extended if agreed by the neighbouring countries. (WRC-15)

**MOD**

**5.297** *Additional allocation:* in Canada, Costa Rica, Cuba, El Salvador, the United States, Guatemala, Guyana, ~~Honduras, and Jamaica and Mexico~~, the frequency band 512-608 MHz is also allocated to the fixed and mobile services on a primary basis, subject to agreement obtained under No. **9.21**. In the Bahamas, Barbados and Mexico, the frequency band 512-608 MHz is also allocated to the mobile service on a primary basis, subject to agreement obtained under No. **9.21**. (WRC-~~07~~15)

**ADD**

**5.308A** In the Bahamas, Barbados, Belize, Canada, Colombia, the United States and Mexico, the frequency band 614-698 MHz, or portions thereof, is identified for International Mobile Telecommunications (IMT) – see Resolution **224 (Rev.WRC-15)**. This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. Mobile service stations of the

IMT system within the frequency band are subject to agreement obtained under No. **9.21** and shall not cause harmful interference to or claim protection from the broadcasting service of neighbouring countries. Nos. **5.43** and **5.43A** apply. In Belize and Mexico, the use of IMT in this frequency band will not start before 31 December 2018 and may be extended if agreed by the neighbouring countries. (WRC-15)

## MOD

**C24 (CAN-1215)** In the frequency bands 470-608 MHz and 614-806 MHz, through international allocations or international footnotes 5.293 and 5.297, have raised the fixed and mobile services have to a co-primary status with the broadcasting service. In Canada, the fixed and mobile services have primary allocations only in the 614-698-806 MHz range. Industry Canada will carry out public consultation in the future in order to consider adopting the other service allocation provisions of international footnotes 5.293 and 5.297 in the frequency bands 470-608 MHz and 614-698 MHz.

## ADD

**CXYZ (CAN-15)** In Canada, the frequency band 614-698 MHz is identified for International Mobile Telecommunications (IMT).

## **B2 (WRC-15, Agenda item 1.4) – Secondary allocation to the amateur service in the frequency band 5 351.5-5 366.5 kHz**

### **Background**

Allocations to amateur services in the high frequency (HF) band are interleaved in frequency to provide the capability of communicating during different propagation conditions. The amateur radio service has access to allocations in the vicinity of 3 500 kHz and 7 000 kHz. However, ionospheric conditions may render either or both of these allocations unsatisfactory for communications over the distances often required for responding to emergencies and disaster conditions. Depending upon the nature of the emergency or disaster-relief traffic, amateurs may be requested to carry communications over relatively-short (less than 1 000 km) or relatively-long (greater than 1 000 km) distances. Accordingly, access to spectrum in the vicinity of 5 300 kHz would be required by amateur stations to carry out reliable emergency and disaster-relief communications.

ITU-R studies were undertaken to ensure that a secondary allocation in the frequency range under study would not adversely impact the primary fixed and mobile services, some of which showed that observance by the amateur service of listen-before-transmit protocols would not cause harmful interference to the primary fixed and mobile services in the 5 275-5 450 kHz range. A spectrum occupancy survey also identified available spectrum for amateur use in the frequency range 5 250 kHz to 5 450 kHz.

Prior to WRC-15, the Department released the [Policy and Technical Framework for Amateur Service Use in the 5 MHz Band](#) (SMSE-004-14). This allowed amateur radio operators to use the 5 332 kHz, 5 348 kHz, 5 358.5 kHz, 5 373 kHz and 5 405 kHz frequencies on a no-interference,

no-protection basis, aligning with the U.S. technical rules for these channels. A new footnote C21 was added to the Canadian Table for the band 5 250-5 450 kHz.

**Discussion**

At WRC-15, Canada proposed a secondary allocation to the amateur service in the frequency ranges 5 330-5 355 kHz and 5 405-5 430 kHz. Although there were several other proposals supporting a secondary allocation to the amateur service ranging from 15 kHz to 175 kHz of spectrum, these were challenged by a number of administrations who proposed no change. It was argued by these latter administrations that a secondary allocation to the amateur service within parts of the frequency range 5 250-5 450 kHz would impinge on the already crowded spectrum and cause unacceptable interference to existing primary services. A number of administrations<sup>5</sup> have authorized, subject to various restrictions in addition to the provisions of ITU *Radio Regulations*, Section II, Article 4.4, operation by amateur radio licensees within the 5 250-5 450 kHz frequency range. To date, no interference has been reported.

Ultimately, a worldwide secondary allocation of 15 kHz in the frequency band 5 351.5-5 366.5 kHz was made to the amateur service. A footnote was added to Article 5 of the International Table to ensure the protection of the fixed and mobile services from amateur service operations, which imposes an effective isotropic radiated power (e.i.r.p.) limit of 15 watts on operations of stations in the amateur service in all Regions (except in Mexico which has an e.i.r.p. limit of 20 watts and some countries in Region 2 with an e.i.r.p. limit of 25 watts).

The Department proposes to reflect the WRC-15 decisions in the Canadian Table, as well as to maintain the Canadian footnote C21 (CAN-14). The proposed changes to the Canadian Table will allow Canadian amateur radio operators to assist in domestic and international emergency or disaster-relief situations.

**Summary of proposed changes to the Canadian Table**

5 275 – 5 450 kHz

<u>5 275 - 5 450</u> <u>5 351.5</u>	FIXED MOBILE except aeronautical mobile
	C21
<u>5 351.5 - 5 366.5</u>	FIXED MOBILE except aeronautical mobile <u>Amateur ADD 5.133B</u>
	C21

<sup>5</sup> These include Bahrain, Bangladesh, Canada, the Czech Republic, Cayman Islands, the Dominican Republic, Finland, Ireland, Norway, Sweden, the United Kingdom, the United States and others.

<p><del>5-2755</del> <u>366.5</u> - 5 450</p> <p>FIXED MOBILE except aeronautical mobile</p> <p>C21</p>
---

**NOC**

**C21 (CAN-14)** Amateur service operators may transmit on the following five centre frequencies: 5 332 kHz, 5 348 kHz, 5 358.5 kHz, 5 373 kHz, and 5 405 kHz. Amateur stations are allowed to operate with a maximum effective radiated power of 100 W PEP and are restricted to the following emission modes and designators: telephony (2K80J3E), data (2K80J2D), RTTY (60H0J2B) and CW (150HA1A). Transmissions may not occupy more than 2.8 kHz centered on these five frequencies. Such use is not in accordance with international frequency allocations. Canadian amateur operations shall not cause interference to fixed and mobile operations in Canada or in other countries and, if such interference occurs, the amateur service may be required to cease operations. The amateur service in Canada may not claim protection from interference by the fixed and mobile operations of other countries.

**ADD**

**5.133B** Stations in the amateur service using the frequency band 5 351.5-5 366.5 kHz shall not exceed a maximum radiated power of 15 W (e.i.r.p.). However, in Region 2 in Mexico, stations in the amateur service using the frequency band 5 351.5-5 366.5 kHz shall not exceed a maximum radiated power of 20 W (e.i.r.p.). In the following Region 2 countries: Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Dominica, El Salvador, Ecuador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, Saint Lucia, Saint Kitts and Nevis, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Uruguay, Venezuela, as well as the overseas territories of the Netherlands in Region 2, stations in the amateur service using the frequency band 5 351.5-5 366.5 kHz shall not exceed a maximum radiated power of 25 W (e.i.r.p.). (WRC-15)

**Part C: Science services****C1 (WRC-15, Agenda item 1.11) – New primary allocation for Earth exploration-satellite service (Earth-to-space) in the 7-8 GHz range****Background**

The purpose of this agenda item was to seek additional spectrum in the 7 GHz range for telecommand, tracking and control of space science satellites. Congestion in the bands

2 025-2 110 MHz and 2 200-2 290 MHz, which currently support several hundred satellites, makes coordination extremely difficult.

Prior to WRC-15, no suitable Earth-to-space allocations were available for tracking, telemetry and control (TT&C) of Earth exploration-satellite service (EESS) satellites at frequencies higher than the 2 025-2 110 MHz global allocation. Additionally, the frequency band 2 200-2 290 MHz can support payload data downlinks for only a few EESS satellites. These factors require current EESS satellites to be equipped with two transponders: one operating near 2 GHz for TT&C, and the other operating at the higher frequencies required for medium- and high-rate payload data downlinks, typically in the band 8 025-8 400 MHz. With a suitable EESS Earth-to-space allocation near the 8 025-8 400 MHz band, a single transponder could accommodate both satellite control and payload data downlink requirements, which translate into cost reduction.

**Discussion**

At WRC-15, discussions mainly focussed on the protection of the space operation service (SOS), which is only allocated in Russia, and the protection of the space research service (SRS). WRC-15 agreed to a new primary allocation to the EESS (E-s) in the frequency band 7 190-7 250 MHz for satellite tracking and command purposes, with additional regulatory measures to protect the SOS, the SRS and the incumbent terrestrial services. In particular, with No. **5.460A**, EESS space station using the band cannot claim protection from existing or future stations in the fixed and mobile services and EESS earth station must maintain a separation distance from the border of neighboring countries.

The Department proposes to reflect the WRC-15 decisions in the Canadian Table. The proposed changes will allow the Canadian Space Agency (CSA) and Environment and Climate Change Canada (ECCC) to plan their future space missions using this new allocation, instead of the already crowded 2 GHz frequency bands.

**Summary of proposed changes to the Canadian Table**

7 145 – 7 250 MHz

7 145 - <del>7</del> 2357 190	FIXED SPACE RESEARCH ( <u>deep space</u> ) (Earth-to-space) <del>5.460</del> 5.458
<del>7</del> 1457 190 - 7 235	<u>EARTH EXPLORATION-SATELLITE (Earth-to-space) ADD 5.460A</u> <u>ADD 5.460B</u> FIXED SPACE RESEARCH (Earth-to-space) MOD 5.460  5.458 <u>ADD MOD 5.459</u>

7 235 - 7 250

EARTH EXPLORATION-SATELLITE (Earth-to-space) ADD 5.460A  
FIXED

5.458

**ADD MOD**

**5.459** *Additional allocation:* in the Russian Federation, the frequency bands 7 100-7 155 MHz and 7 190-7 235 MHz are also allocated to the space operation service (Earth-to-space) on a primary basis, subject to agreement obtained under No. **9.21**. In the frequency band 7 190-7 235 MHz, with respect to the Earth exploration-satellite service (Earth-to-space), No. **9.21** does not apply. (WRC-9715)

**MOD**

**5.460** ~~The use of the band 7 145-7 190 MHz by the space research service (Earth-to-space) is restricted to deep space; no~~ No emissions from space research service (Earth-to-space) systems intended for ~~to~~ deep space shall be effected in the frequency band 7 190-7 235 MHz. Geostationary satellites in the space research service operating in the frequency band 7 190-7 235 MHz shall not claim protection from existing and future stations of the fixed and mobile services and No. **5.43A** does not apply. (WRC-0315)

**ADD**

**5.460A** The use of the frequency band 7 190-7 250 MHz (Earth-to-space) by the Earth exploration-satellite service shall be limited to tracking, telemetry and command for the operation of spacecraft. Space stations operating in the Earth exploration-satellite service (Earth-to-space) in the frequency band 7 190-7 250 MHz shall not claim protection from existing and future stations in the fixed and mobile services, and No. **5.43A** does not apply. No. **9.17** applies. Additionally, to ensure protection of the existing and future deployment of fixed and mobile services, the location of earth stations supporting spacecraft in the Earth exploration-satellite service in non-geostationary orbits or geostationary orbit shall maintain a separation distance of at least 10 km and 50 km, respectively, from the respective border(s) of neighbouring countries, unless a shorter distance is otherwise agreed between the corresponding administrations. (WRC-15)

**ADD**

**5.460B** Space stations on the geostationary orbit operating in the Earth exploration-satellite service (Earth-to-space) in the frequency band 7 190-7 235 MHz shall not claim protection from existing and future stations of the space research service, and No. **5.43A** does not apply. (WRC-15)

**C2 (WRC-15, Agenda item 1.12) – Extension of Earth exploration-satellite (active) service band by 600 MHz in the range 8 700-10 500 MHz****Background**

This agenda item sought to extend an existing Earth exploration-satellite service (EESS) (active) allocation in the range 9 300-9 900 MHz by an additional 600 MHz, within portions of the range 8 700-10 500 MHz.

Space-borne EESS (active) radars operating in this band have demonstrated their importance by contributing to the gathering of large amounts of scientific and geographic information in areas such as disaster relief and humanitarian aid, land use and large area coastal surveillance. For such applications, there is growing demand for increased radar image resolution that would require an increase in bandwidth by another 600 MHz, for a total of 1 200 MHz of contiguous bandwidth.

**Discussion**

The main difficulty encountered for this agenda item was how to reconcile the need for high-resolution radar images for Earth observation purposes, such as disaster relief and climate monitoring, while addressing the concern that these high-resolution images could be used for military purposes. WRC-15 decided to extend the EESS allocation to the bands 9 200-9 300 and 9 900-10 400 MHz, but the use of this new 600 MHz is subject to obtaining the prior agreement of eight countries, most of which are located in the Persian Gulf region. While this imposes additional coordination requirements for Earth exploration satellite system proponents, this additional burden was deemed acceptable.

The Department proposes to reflect the WRC-15 decisions in the Canadian Table. The proposed changes will satisfy the needs of ECCC, CSA and National Defence and the Canadian Armed Forces for high-resolution images. Existing services (mainly radiolocation and aeronautical radionavigation) operating in the same band, or in the vicinity of the newly allocated band, would be protected from potential interference.

**Summary of proposed changes to the Canadian Table**

9.2 – 9.3 GHz

9.2 - 9.3	<u>EARTH EXPLORATION-SATELLITE (active) ADD 5.474A ADD 5.474B</u> <u>ADD 5.474C</u> MARITIME RADIONAVIGATION 5.472 RADIOLOCATION  5.474 <u>ADD 5.474D</u>
-----------	--

9.9 – 10.45 GHz

9.9 - 10	<u>EARTH EXPLORATION-SATELLITE (active) ADD 5.474A ADD 5.474B</u> <u>ADD 5.474C</u> RADIOLOCATION Fixed  <u>ADD 5.474D 5.479</u>
10 - 10.45	<u>EARTH EXPLORATION-SATELLITE (active) ADD 5.474A ADD 5.474B</u> <u>ADD 5.474C</u> RADIOLOCATION Amateur  <u>ADD 5.474D 5.479</u>
10.45 - 10.45	RADIOLOCATION Amateur  <u>5.479</u>

**ADD**

**5.474A** The use of the frequency bands 9 200-9 300 MHz and 9 900-10 400 MHz by the Earth exploration-satellite service (active) is limited to systems requiring necessary bandwidth greater than 600 MHz that cannot be fully accommodated within the frequency band 9 300-9 900 MHz. Such use is subject to agreement to be obtained under No. **9.21** from Algeria, Saudi Arabia, Bahrain, Egypt, Indonesia, Iran (Islamic Republic of), Lebanon and Tunisia. An administration that has not replied under No. **9.52** is considered as not having agreed to the coordination request. In this case, the notifying administration of the satellite system operating in the Earth

exploration-satellite service (active) may request the assistance of the Bureau under Sub-Section IID of Article 9. (WRC-15)

#### **ADD**

**5.474B** Stations operating in the Earth exploration-satellite (active) service shall comply with Recommendation ITU-R RS.2066-0. (WRC-15)

#### **ADD**

**5.474C** Stations operating in the Earth exploration-satellite (active) service shall comply with Recommendation ITU-R RS.2065-0. (WRC-15)

#### **ADD**

**5.474D** Stations in the Earth exploration-satellite service (active) shall not cause harmful interference to, nor claim protection from, stations of the maritime radionavigation and radiolocation services in the frequency band 9 200-9 300 MHz, the radionavigation and radiolocation services in frequency band 9 900-10 000 MHz, and the radiolocation service in the frequency band 10.0-10.4 GHz. (WRC-15)

### **C3 (WRC-15, Agenda item 1.13) – Revision to No. 5.268**

#### **Background**

World Administrative Radiocommunication Conference - 1992 (WARC-92) allocated the band 410-420 MHz to the space research service (SRS) on a secondary basis to allow for extra-vehicular communications in the vicinity of Earth orbiting manned space vehicles. In addition, a new footnote was added to limit the use of SRS to within 5 km of orbiting manned space vehicles. The SRS allocation was subsequently upgraded to primary status at WRC-97, with conditions given in No. 5.268, including a set of power flux-density (pfd) limits to assure the protection of the fixed and mobile services in addition to the previously agreed distance limitation.

The purpose of this agenda item was to consider removing the distance restriction contained in No. 5.268, while keeping the pfd limits unchanged and removing their applicability to only extra-vehicular activities (EVA).

#### **Discussion**

WRC-15 agreed to remove the distance limitation, as requested by several administrations to meet the requirement of the space agencies. The Department proposes to reflect this WRC-15 decision in the Canadian Table. The modification is important to the space agencies (including CSA), as it removes the restriction imposed on astronauts for EVA, or on space shuttles approaching the International Space Station.

**Summary of proposed changes to the Canadian Table**

## 410 – 420 MHz

410 - 414	MOBILE except aeronautical mobile SPACE RESEARCH (space-to-space) MOD 5.268 Fixed
414 - 415	FIXED SPACE RESEARCH (space-to-space) MOD 5.268 Mobile except aeronautical mobile
415 - 419	MOBILE except aeronautical mobile SPACE RESEARCH (space-to-space) MOD 5.268 Fixed
419 - 420	FIXED SPACE RESEARCH (space-to-space) MOD 5.268 Mobile except aeronautical mobile

**MOD**

**5.268** Use of the frequency band 410-420 MHz by the space research service is limited to space-to-space communications within 5 km of with an orbiting, manned space vehicle. The power flux-density at the surface of the Earth produced by emissions from extra-vehicular activities transmitting stations of the space research service (space-to-space) in the frequency band 410-420 MHz shall not exceed  $-153 \text{ dB(W/m}^2\text{)}$  for  $0^\circ \leq \delta \leq 5^\circ$ ,  $-153 + 0.077 (\delta - 5) \text{ dB(W/m}^2\text{)}$  for  $5^\circ \leq \delta \leq 70^\circ$  and  $-148 \text{ dB(W/m}^2\text{)}$  for  $70^\circ \leq \delta \leq 90^\circ$ , where  $\delta$  is the angle of arrival of the radio-frequency wave and the reference bandwidth is 4 kHz. ~~No. 4.10 does not apply to extra-vehicular activities.~~ In this frequency band, stations of the space research service (space-to-space) service shall not claim protection from, nor constrain the use and development of, stations of the fixed and mobile services. No. 4.10 does not apply. (WRC-9715)

**Part D: Satellite services****D1 (WRC-15, Agenda item 1.6.1) – Additional allocation to FSS (Earth-to-space) of 250 MHz in the range between 10 GHz and 17 GHz in Region 1****Background**

There is currently 750 MHz of unplanned FSS spectrum allocated in each of the Earth-to-space and space-to-Earth directions in the range 10-15 GHz in Region 1. Regions 2 and 3 both have

750 MHz of unplanned FSS spectrum allocated in the Earth-to-space direction, but for the space-to-Earth direction, the allocations are 1.0 GHz and 1.05 GHz, respectively. This agenda item sought new primary unplanned FSS Earth-to-space and space-to-Earth allocations of 250 MHz in Region 1 in the frequency range 10-17 GHz – with a particular focus on bands that are contiguous (or near contiguous) with existing unplanned FSS allocations.

**Discussion**

WRC-15 decided to adopt a downlink allocation in the 13.4-13.65 GHz band in Region 1. This allocation is subject to not claiming protection from EESS and agreement under No. **9.21** with respect to current space research systems.

As this is a Region 1 issue only, no action is required for the Canadian Table with respect to the allocation for FSS. However, there were some consequential changes to SRS that affect Region 2. We propose to adopt those changes to protect SRS in Region 2 from FSS in Region 1.

**Summary of proposed changes to the Canadian Table**

13.4 – 13.75 GHz

13.4 - <del>13.75</del> 65	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH( <del>active</del> ) <del>5.501A</del> <u>ADD 5.499C</u> <u>ADD 5.499D</u> Standard frequency and time signal-satellite (Earth-to-space)  5.501B
<del>13.4</del> <u>13.65</u> - 13.75	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH ( <del>active</del> ) MOD 5.501A Standard frequency and time signal-satellite (Earth-to-space)  5.501B

**ADD**

**5.499C** The allocation of the frequency band 13.4-13.65 GHz to the space research service on a primary basis is limited to:

- satellite systems operating in the space research service (space-to-space) to relay data from space stations in the geostationary-satellite orbit to associated space stations in non-geostationary satellite orbits for which advance publication information has been received by the Bureau by 27 November 2015,
- active spaceborne sensors,

- satellite systems operating in the space research service (space-to-Earth) to relay data from space stations in the geostationary-satellite orbit to associated earth stations.

Other uses of the frequency band by the space research service are on a secondary basis. (WRC-15)

### **ADD**

**5.499D** In the frequency band 13.4-13.65 GHz, satellite systems in the space research service (space-to-Earth) and/or the space research service (space-to-space) shall not cause harmful interference to, nor claim protection from, stations in the fixed, mobile, radiolocation and Earth exploration-satellite (active) services. (WRC-15)

### **MOD**

**5.501A** The allocation of the frequency band 13.4~~65~~-13.75 GHz to the space research service on a primary basis is limited to active spaceborne sensors. Other uses of the frequency band by the space research service are on a secondary basis. (WRC-97~~15~~)

**D2 (WRC-15, Agenda item 1.6.2) – Additional primary allocations to the fixed-satellite service (Earth-to-space) of 250 MHz in Region 2 and 300 MHz in Region 3 within the range 13-17 GHz**

### **Background**

In the range 10-15 GHz in Regions 2 and 3, there is currently 800 MHz and 750 MHz, respectively, of unplanned FSS spectrum allocated in the Earth-to-space direction, while there is 1.0 GHz and 1.05 GHz in the space-to-Earth direction, respectively. This asymmetry between unplanned FSS Earth-to-space and space-to-Earth allocations is seen to create bandwidth limitations that could impose restrictions on FSS operators, preventing them from making the most effective use of the allocated spectrum to meet growing demand from FSS users. This agenda item sought possible bands for new primary unplanned FSS Earth-to-space allocations of 250 MHz in Regions 2 and 300 MHz in Region 3, in the frequency range 13-17 GHz – with a particular focus on bands that are contiguous (or near contiguous) with existing unplanned FSS allocations.

### **Discussion**

WRC-15 focussed on the 14.5-14.8 GHz band, which already has an FSS allocation but is limited to feeder links of the broadcasting-satellite service (BSS). The issue was quite controversial with a sharp division of views even within the regional groups. Canada did not support an allocation in order to protect the aeronautical mobile service use by National Defence and the Canadian Armed Forces (DND), and others.

After lengthy regular and informal meetings, the WRC arrived at a compromise with only in-country allocations permitted, with very strict conditions such as coordination requirements for earth stations within 500 km of the border of another country, minimum 6 metre antennas to limit the number of earth stations, and limits on earth station power flux density levels at 22 km from the coasts to protect the aeronautical mobile service in international waters. Conditions were also imposed to protect BSS feeder links listed in Appendix **30A**. In addition, it was agreed

that countries in the footnote allocations would be limited to only those identified during negotiations (30 in Regions 1 and 2 and 9 in Region 3).

The WRC-15 decisions were in line with Canada’s objective of limiting FSS allocations that may impact the use of aeronautical mobile service in Canada and overseas for military operations and humanitarian and UN peace-keeping missions. Also, protection was maintained for the bands allocated to EESS, which was in line with Canada’s position. The Department therefore proposes to adopt the outcome of the Conference. No changes are needed to the allocations in the table for the band 14.5-14.8 GHz. However, footnote C41 should be updated to remove obsolete text.

**Summary of proposed changes to the Canadian Table**

14.5 – 14.82 GHz

14.5 - 14.66	FIXED Mobile C5
14.66 - 14.82	FIXED MOBILE C5  MOD C41

**MOD**

**C41 (CAN-0916)** The use of the frequency bands 14.66-14.82 GHz and 15.135-15.295 GHz is designated for government-exclusive aeronautical mobile applications in the mobile service. ~~Prior to October 1, 2013, government-exclusive aeronautical mobile applications shall not cause harmful interference into fixed service systems.~~ Beginning ~~on~~ October 1, 2013, fixed service systems may continue to operate, but shall not claim protection from government systems operating in the aeronautical mobile service. Beginning ~~on~~ October 1, 2017, fixed service systems may continue to operate in these bands, but shall not cause harmful interference to government systems operating in the aeronautical mobile service.

**D3 (WRC-15, Agenda item 1.7) – Review the use of the band 5 091-5 150 MHz by FSS (E-s) (limited to non-GSO MSS feeder links)**

**Background**

At WRC-95, an allocation was made to the FSS in the 5 091-5 150 MHz frequency band for feeder links of non-geostationary (non-GSO) mobile-satellite service (MSS) systems, in the Earth-to-space (E-s) direction, on a primary basis under certain conditions included in No. **5.444A**. The conditions were intended to protect international standard microwave landing systems (MLS) (which had priority over other uses in the band) and included a sunset date for assignments to the FSS in this band (a date after which no new assignments were to be made to the FSS). They also stipulated a date after which the FSS would become secondary to the aeronautical radionavigation service (ARNS). Resolution **114** requested the review of the

allocation to ARNS and the FSS in the frequency band 5 091-5 150 MHz at a future competent conference.

At WRC-07, the priority to MLS was removed in the 5 091-5 150 MHz frequency band and the sunset date for assignments to the FSS was extended to 1 January 2016. The FSS allocation was also to be downgraded to secondary with respect to ARNS after 1 January 2018.

The FSS allocation is currently used by Globalstar for feeder links of their non-GSO MSS system and the system has been coordinated with systems of other services since 1998. The Globalstar satellite system is expected to remain in service beyond the year 2025.

In addition, leading to WRC-12, ICAO had determined that not all of this band may be required for MLS but new ARNS systems may be planned. This agenda item sought to assess the compatibility of any "new" ARNS systems with feeder links of non-GSO MSS systems in the frequency band 5 091-5 150 MHz and review the allocations for FSS and ARNS in the band with a view to removing the restrictions on FSS if possible.

**Discussion**

WRC-15 upgraded the FSS allocation in the band 5 091-5 150 MHz to primary status, subject to coordination under No. **9.11A**, and removed the limitation that made non-GSO feeder links secondary with regards to ARNS in MOD **5.444A**. Coordination was imposed for non-GSO MSS feeder-link earth stations which are less than 450 km from the territory of an administration operating ARNS ground stations. Further, this new status of FSS was made effective immediately at the end of WRC-15, i.e. from November 28, 2015, rather than January 1, 2017 like the rest of the provisions of the Conference.

This WRC-15 decision aligns with the Canadian position. Therefore, the Department proposes to reflect the WRC-15 decision in the Canadian Table. This will ensure that Globalstar Canada’s gateway earth stations in Canada, which connect satellite phones and Wi-Fi enabled devices to the public switched telephone network via satellite, will continue to operate with regulatory certainty after 2018.

**Summary of proposed changes to the Canadian Table**

5 091 - 5 150 MHz

5 091 - 5 150	<p><u>FIXED-SATELLITE (Earth-to-space) MOD 5.444A</u>                  AERONAUTICAL MOBILE MOD 5.444B                  AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA                  AERONAUTICAL RADIONAVIGATION</p> <p>MOD 5.444 <del>5.444A</del></p>
---------------	---

**MOD**

**5.444** The frequency band 5 030-5 150 MHz is to be used for the operation of the international standard system (microwave landing system) for precision approach and landing. In the frequency band 5 030-5 091 MHz, the requirements of this system shall have priority over other

uses of this band. For the use of the frequency band 5 091-5 150 MHz, No. **5.444A** and Resolution **114 (Rev.WRC-1215)** apply. (WRC-1215)

## MOD

**5.444A** *Additional allocation:* ~~the band 5 091-5 150 MHz is also allocated to the fixed-satellite service (Earth-to-space) on a primary basis. This~~ The use of the allocation to the fixed-satellite service (Earth-to-space) in the frequency band 5 091-5 150 MHz is limited to feeder links of non-geostationary satellite systems in the mobile-satellite service and is subject to coordination under No. **9.11A**. The use of the frequency band 5 091-5 150 MHz by feeder links of non-geostationary satellite systems in the mobile-satellite service shall be subject to application of Resolution **114 (Rev.WRC-15)**. Moreover, to ensure that the aeronautical radionavigation service is protected from harmful interference, coordination is required for feeder-link earth stations of the non-geostationary satellite systems in the mobile-satellite service which are separated by less than 450 km from the territory of an administration operating ground stations in the aeronautical radionavigation service.

~~In the band 5 091-5 150 MHz, the following conditions also apply:~~

- ~~— prior to 1 January 2018, the use of the band 5 091-5 150 MHz by feeder links of non-geostationary satellite systems in the mobile-satellite service shall be made in accordance with Resolution **114 (Rev.WRC-03)**;~~
- ~~— after 1 January 2016, no new assignments shall be made to earth stations providing feeder links of non-geostationary mobile-satellite systems;~~
- ~~— after 1 January 2018, the fixed-satellite service will become secondary to the aeronautical radionavigation service. (WRC-0715)~~

## MOD

**5.444B** The use of the frequency band 5 091-5 150 MHz by the aeronautical mobile service is limited to:

- systems operating in the aeronautical mobile (R) service and in accordance with international aeronautical standards, limited to surface applications at airports. Such use shall be in accordance with Resolution **748 (Rev.WRC-1215)**;
- aeronautical telemetry transmissions from aircraft stations (see No. **1.83**) in accordance with Resolution **418 (Rev.WRC-1215)**. (WRC-1215)

## D4 (WRC-15, Agenda item 1.8) – Earth stations located on board vessels (ESVs)

### Background

Agenda item 1.8 was adopted to review the provisions relating to earth stations located on board vessels (ESVs), which operate in the FSS in the uplink bands 5 925-6 425 MHz and 14-14.5 GHz. WRC-15 was tasked to consider possible modification to Resolution **902 (WRC-03)**

in order to reflect current ESV technologies and technical characteristics that are being used or planned to be used, while protecting allocated services. Resolution **902 (WRC-03)** specifies minimum distances from the low-water mark as officially recognized by the coastal State, beyond which ESVs can operate without prior agreement of any administration.

Since Resolution **902 (WRC-03)** was first adopted in 2003, there have been many successful deployments of ESV systems. Technological developments allow ESVs to operate today with much lower transmit equivalent isotropically radiated power (e.i.r.p.) densities towards terrestrial stations than those derived from the technical limitations described in Resolution **902 (WRC-03)**. These reduced e.i.r.p. densities result in much lower interference potential into other co-frequency terrestrial services. In some cases, the current rules require that an agreement be obtained from concerned administrations, even in situations where there is no potential for unacceptable interference.

**Discussion**

WRC-15 decided to allow ESVs with a minimum antenna diameter of 1.2 m to operate in the frequency band 5925-6425 MHz, without prior agreement from any administration, when the ESV is located at least 330 km away from the low-water mark. This represents a relaxation of the restrictions that are specified in Resolution **902 (WRC-03)**, which were a minimum diameter of 2.4 m with a distance of 300 km for this band. These changes will be implemented by the modification of footnote **5.457A**. WRC-15 did not permit changes to the e.i.r.p. densities, nor were changes made with respect to ESVs operation in the frequency band 14-14.5 GHz, nor Resolution **902 (WRC-03)** because no agreement could be reached.

Although Canada held a neutral position at the WRC-15 on this issue, Canada had no objection to the proposed changes because ESVs are still subject to the e.i.r.p. density limits in Resolution **902 (WRC-03)**.

The Department is proposing to reflect the decisions of WRC-15 by updating footnote **5.457A** in the Canadian Table of Frequency Allocations. The Department believes that the proposed changes will not have a negative effect on the existing terrestrial environment because the e.i.r.p. densities toward the horizon were not changed, yet the changes will allow ESV operators to use earth stations with smaller antennas.

**Summary of proposed changes to the Canadian Table**

5 925 – 6 700 MHz

5 925 - 6 700	FIXED FIXED-SATELLITE (Earth-to-space) MOD 5.457A C39D
	5.149 5.440 5.458

14 – 14.5 GHz

14 - 14.47	FIXED-SATELLITE (Earth-to-space) MOD 5.457A 5.484A 5.506 C16I Mobile-Satellite (Earth-to-space) 5.506A C41A  5.504A C16J C39D
14.47 - 14.5	FIXED-SATELLITE (Earth-to-space) MOD 5.457A 5.484A 5.506 C16I Mobile-Satellite (Earth-to-space) 5.506A C41A Radio Astronomy  5.149 5.504A C16J C39D

## MOD

**5.457A** In the frequency bands 5 925-6 425 MHz and 14-14.5 GHz, earth stations located on board vessels may communicate with space stations of the fixed-satellite service. Such use shall be in accordance with Resolution **902 (WRC-03)**. In the frequency band 5 925-6 425 MHz, earth stations located on board vessels and communicating with space stations of the fixed-satellite service may employ transmit antennas with minimum diameter of 1.2 m and operate without prior agreement of any administration if located at least 330 km away from the low-water mark as officially recognized by the coastal State. All other provisions of Resolution **902 (WRC-03)** shall apply. (WRC-0315)

## D5 (WRC-15, Agenda item 1.9.2) – Possible allocation of maritime mobile-satellite service in the 7/8 GHz band

### Background

WRC-15 agenda item 1.9.2 called for studies on the possibility of allocating the frequency bands 7 375-7 750 MHz and 8 025-8 400 MHz to the maritime mobile-satellite service (MMSS) and on additional regulatory measures necessary to ensure compatibility with existing services.

The frequency band 7 375-7 750 MHz is allocated on a primary basis to the fixed service (FS), mobile service (MS) (except aeronautical mobile) and FSS (space-to-Earth (s-E)). The frequency band 7 450-7 550 MHz is also allocated on a primary basis to the meteorological-satellite service (MetSat) (s-E). Similarly, the frequency band 8 025-8 400 MHz is currently allocated on a primary basis to the EESS (s-E), FS, MS and FSS (E-s). The frequency band 8 175-8 215 MHz is also allocated to the MetSat (E-s).

### Discussion

WRC-15 decided to allocate the MMSS only in the frequency band 7 375-7 750 MHz, in the downlink direction, and add a new footnote to protect the fixed and mobile services. The conditions of operation for the MMSS downlink specified in the footnote will ensure the protection of the incumbent terrestrial services. There was no change to the frequency band

8 025-8 400 MHz. The Department proposes not to reflect the WRC-15 decisions in the Canadian Table, given that

- the Canadian position on this agenda item was no change;
- only one administration was seeking the allocation at WRC-15; and
- there is no foreseeable demand of MMSS spectrum within Canada in this frequency band.

**Summary of proposed changes to the Canadian Table**

7 300 – 8 400 MHz

**NOC**

7 300 - 7 450	FIXED FIXED-SATELLITE (space-to-Earth) C49  5.461 C50
:	:
8 215 - 8 400	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) C49

**D6 (WRC-15 Agenda item 9.1.1) – Protection of satellite-based search-and-rescue systems in the 406-406.1 MHz band**

**Background**

The objective of this agenda item was to study measures to ensure adequate protection of MSS systems operating in the frequency band 406-406.1 MHz, taking into account the current and future services operating in the lower adjacent frequency bands (390-406 MHz) and upper adjacent frequency bands (406.1-420 MHz), or in separate parts of these frequency bands.

The frequency band 406-406.1 MHz is exclusively allocated to the MSS, which is currently used by the Cospas-Sarsat system for search and rescue (SAR) space segment instruments for the reception of distress radio beacon signals in the frequency band 406-406.1 MHz. Many administrations have deployed commercial land mobile systems operating near the frequency band 406-406.1 MHz, and other terrestrial operators are expected to request additional capacity near this frequency band in the future. The emissions in adjacent frequency bands, if not adequately controlled, could raise the level of noise captured by the Cospas-Sarsat systems and hinder their abilities to detect and/or relay signal, from beacons and/or degrade the accuracy of the positions reported for the distress signals.

**Discussion**

WRC-15 agreed to request administrations to stop making new frequency assignments within the frequency bands 405.9-406 MHz and 406.1-406.2 MHz, and to take into account frequency drift characteristics of radiosondes when selecting their operating frequencies above 405 MHz. The Department proposes to adopt the decision at WRC-15. This decision is reflected by adding footnote **5.265** to the Canadian Table. The decision is important for search-and-rescue missions in Canada, given that Canada actively participates in the Cospas-Sarsat project and has one of the largest search-and-rescue areas in the world.

**Summary of proposed changes to the Canadian Table**

403 – 410 MHz

403 - 406	METEOROLOGICAL AIDS Fixed Mobile except aeronautical mobile <u>ADD 5.265</u>
406 - 406.1	MOBILE-SATELLITE (Earth-to-space)  <u>ADD 5.265 5.266 5.267</u>
406.1 - 410	MOBILE except aeronautical mobile RADIO ASTRONOMY Fixed  5.149 <u>ADD 5.265</u>

**ADD**

**5.265** In the frequency band 403-410 MHz, Resolution **205 (Rev.WRC-15)** applies. (WRC-15)

**Part E: Modifications to international footnotes in the Canadian Table**

**E1 (WRC-15 Agenda item 8) – Requests from administrations to delete their country name from footnotes**

Resolution **26 (Rev. WRC-97)** urges administrations to review footnotes periodically and to propose the deletion of their country footnotes or of their country names from footnotes, as appropriate. In exceptional cases, Resolution **26** provides that proposals for new footnotes or modifications of existing footnotes can be considered if they concern corrections of obvious

omissions, inconsistencies, ambiguities or editorial error. ‘*Resolves 2*’ to Resolution **26** states that the International Table should include those footnotes that have international implications for the use of radio frequency spectrum.

Based on the above, a number of international footnotes, also included in the Canadian Table, were modified at WRC-15 based upon proposals from administrations. The Department proposes to adopt the modifications to these footnotes as follows:

#### **MOD**

**5.317** *Additional allocation:* in Region 2 (except Brazil ~~and~~ the United States and Mexico), the frequency band 806-890 MHz is also allocated to the mobile-satellite service on a primary basis, subject to agreement obtained under No. **9.21**. The use of this service is intended for operation within national boundaries. (WRC-15)

#### **MOD**

**5.386** *Additional allocation:* the frequency band 1 750-1 850 MHz is also allocated to the space operation (Earth- to-space) and space research (Earth-to-space) services in Region 2, (except in Mexico), in Australia, Guam, India, Indonesia and Japan on a primary basis, subject to agreement obtained under No. **9.21**, having particular regard to troposcatter systems. (WRC-0315)

#### **MOD**

**5.393** *Additional allocation:* in Canada, the United States, and India ~~and Mexico~~, the frequency band 2 310-2 360 MHz is also allocated to the broadcasting-satellite service (sound) and complementary terrestrial sound broadcasting service on a primary basis. Such use is limited to digital audio broadcasting and is subject to the provisions of Resolution **528 (Rev.WRC-0315)**, with the exception of *resolves 3* in regard to the limitation on broadcasting-satellite systems in the upper 25 MHz. (WRC-0715)

#### **MOD**

**5.442** In the frequency bands 4 825-4 835 MHz and 4 950-4 990 MHz, the allocation to the mobile service is restricted to the mobile, except aeronautical mobile, service. In Region 2 (except Brazil, Cuba, Guatemala, Mexico, Paraguay, Uruguay and Venezuela), and in Australia, the frequency band 4 825-4 835 MHz is also allocated to the aeronautical mobile service, limited to aeronautical mobile telemetry for flight testing by aircraft stations. Such use shall be in accordance with Resolution **416 (WRC-07)** and shall not cause harmful interference to the fixed service. (WRC-0715)

#### **MOD**

**5.446** *Additional allocation:* in the countries listed in No. **5.369**, the frequency band 5 150-5 216 MHz is also allocated to the radiodetermination-satellite service (space-to-Earth) on a primary basis, subject to agreement obtained under No. **9.21**. In Region 2 (except in Mexico), the frequency band is also allocated to the radiodetermination-satellite service (space-to-Earth) on a primary basis. In Regions 1 and 3, except those countries listed in No. **5.369** and Bangladesh, the frequency band is also allocated to the radiodetermination-satellite service (space-to-Earth) on a secondary basis. The use by the radiodetermination-satellite service is limited to feeder links in conjunction with the radiodetermination-satellite service operating in the frequency bands 1 610-1 626.5 MHz and/or 2 483.5-2 500 MHz. The

total power flux-density at the Earth's surface shall in no case exceed  $-159$  dB(W/m<sup>2</sup>) in any 4 kHz band for all angles of arrival. (WRC-~~12~~15)

## E2 - Other footnotes modified at WRC-15 and relevant to the Canadian Table

WRC-15 also modified numerous footnotes, as well as certain entries in the International Table of Article 5 to correct editorial errors, inconsistencies or outdated provisions under Agenda item 9.2<sup>6</sup>. It also updated references to ITU-R Recommendations incorporated by reference under Agenda item 2, and updated references to resolutions and recommendations reviewed under Agenda item 4.

The Department proposes to adopt all these modifications that are applicable to Canada in this edition of the Canadian Table. The following international footnotes are proposed, either for modification or suppression:

### MOD

**5.208B\*** In the frequency bands:

137-138 MHz,  
387-390 MHz,  
400.15-401 MHz,  
1 452-1 492 MHz,  
1 525-1 610 MHz,  
1 613.8-1 626.5 MHz,  
2 655-2 690 MHz,  
21.4-22 GHz,

Resolution **739 (Rev.WRC-~~07~~15)** applies. (WRC-~~07~~15)

### MOD

**5.220** The use of the frequency bands 149.9-150.05 MHz and 399.9-400.05 MHz by the mobile-satellite service is subject to coordination under No. **9.11A**. ~~The mobile-satellite service shall not constrain the development and use of the radionavigation-satellite service in the bands 149.9-150.05 MHz and 399.9-400.05 MHz.~~—(WRC-~~97~~15)

### SUP

**5.222**

### SUP

**5.223**

<sup>6</sup> WRC-15 Agenda item 9.2 addressed, among other things, difficulties or inconsistencies encountered in the application of the ITU *Radio Regulations*, as reported by the Director of the Radiocommunication Bureau to the Conference.

**SUP**  
**5.224A****SUP**  
**5.224B****SUP**  
**5.260****MOD**

**5.327A** The use of the frequency band 960-1 164 MHz by the aeronautical mobile (R) service is limited to systems that operate in accordance with recognized international aeronautical standards. Such use shall be in accordance with Resolution **417 (Rev. WRC-~~12~~15)**. (WRC-~~12~~15)

**MOD**

**5.388** The frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz are intended for use, on a worldwide basis, by administrations wishing to implement International Mobile Telecommunications (IMT). Such use does not preclude the use of these frequency bands by other services to which they are allocated. The frequency bands should be made available for IMT in accordance with Resolution **212 (Rev. WRC-~~07~~15)** (See also Resolution **223 (Rev. WRC-~~07~~15)**).<sup>\*</sup> (WRC-~~12~~15)

**MOD**

**5.391** In making assignments to the mobile service in the frequency bands 2 025-2 110 MHz and 2 200-2 290 MHz, administrations shall not introduce high-density mobile systems, as described in Recommendation ITU-R SA.1154-0, and shall take that Recommendation into account for the introduction of any other type of mobile system. (WRC-9715)

**MOD**

**5.443B** In order not to cause harmful interference to the microwave landing system operating above 5 030 MHz, the aggregate power flux-density produced at the Earth's surface in the frequency band 5 030-5 150 MHz by all the space stations within any radionavigation-satellite service system (space-to-Earth) operating in the frequency band 5 010-5 030 MHz shall not exceed -124.5 dB (W/m<sup>2</sup>) in a 150 kHz band. In order not to cause harmful interference to the radio astronomy service in the frequency band 4 990-5 000 MHz, radionavigation-satellite service systems operating in the frequency band 5 010-5 030 MHz shall comply with the limits in the frequency band 4 990-5 000 MHz defined in Resolution **741 (Rev. WRC-~~12~~15)**. (WRC-~~12~~15)

**MOD**

**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-0315)

### MOD

**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-0315)

### SUP

#### 5.458C

### MOD

~~**5.511A** ————— The band 15.43-15.63 GHz is also allocated to the fixed-satellite service (space-to-Earth) on a primary basis. Use of the frequency band 15.43-15.63 GHz by the fixed-satellite service (space-to-Earth and Earth-to-space) is limited to feeder links of non-geostationary systems in the mobile-satellite service, subject to coordination under No. 9.11A. The use of the frequency band 15.43-15.63 GHz by the fixed-satellite service (space-to-Earth) is limited to feeder links of non-geostationary systems in the mobile-satellite service for which advance publication information has been received by the Bureau prior to 2 June 2000. In the space-to-Earth direction, the minimum earth station elevation angle above and gain towards the local horizontal plane and the minimum coordination distances to protect an earth station from harmful interference shall be in accordance with Recommendation ITU-R S.1341. In order to protect the radio astronomy service in the band 15.35-15.4 GHz, the aggregate power flux-density radiated in the 15.35-15.4 GHz band by all the space stations within any feeder link of a non-geostationary system in the mobile-satellite service (space-to-Earth) operating in the 15.43-15.63 GHz band shall not exceed the level of  $-156$  dB(W/m<sup>2</sup>) in a 50 MHz bandwidth, into any radio astronomy observatory site for more than 2% of the time. (WRC-200015)~~

### MOD

**5.511C** Stations operating in the aeronautical radionavigation service shall limit the effective e.i.r.p. in accordance with Recommendation ITU-R S.1340-0. The minimum coordination distance required to protect the aeronautical radionavigation stations (No. 4.10 applies) from harmful interference from feeder-link earth stations and the maximum e.i.r.p. transmitted towards the local horizontal plane by a feeder-link earth station shall be in accordance with Recommendation ITU-R S.1340-0. (WRC-9715)

### ADD

**5.527A** The operation of earth stations in motion communicating with the FSS is subject to Resolution 156 (WRC-15). (WRC-15)

### SUP

#### 5.530C

**MOD**

**5.551H** The equivalent power flux-density (epfd) produced in the frequency band 42.5-43.5 GHz by all space stations in any non-geostationary-satellite system in the fixed-satellite service (space-to-Earth), or in the broadcasting-satellite service operating in the frequency band 42-42.5 GHz ~~band~~, shall not exceed the following values at the site of any radio astronomy station for more than 2% of the time:

–230 dB(W/m<sup>2</sup>) in 1 GHz and –246 dB(W/m<sup>2</sup>) in any 500 kHz of the frequency band 42.5-43.5 GHz ~~band~~ at the site of any radio astronomy station registered as a single-dish telescope; and

–209 dB(W/m<sup>2</sup>) in any 500 kHz of the frequency band 42.5-43.5 GHz ~~band~~ at the site of any radio astronomy station registered as a very long baseline interferometry station.

These epfd values shall be evaluated using the methodology given in Recommendation ITU-R S.1586-1 and the reference antenna pattern and the maximum gain of an antenna in the radio astronomy service given in Recommendation ITU-R RA.1631-0 and shall apply over the whole sky and for elevation angles higher than the minimum operating angle  $\theta_{min}$  of the radiotelescope (for which a default value of 5° should be adopted in the absence of notified information).

These values shall apply at any radio astronomy station that either:

- was in operation prior to 5 July 2003 and has been notified to the Bureau before 4 January 2004; or
- was notified before the date of receipt of the complete Appendix 4 information for coordination or notification, as appropriate, for the space station to which the limits apply.

Other radio astronomy stations notified after these dates may seek an agreement with administrations that have authorized the space stations. In Region 2, Resolution **743 (WRC-03)** shall apply. The limits in this footnote may be exceeded at the site of a radio astronomy station of any country whose administration so agreed. (WRC-0715)

## Part F: Other modifications to the Canadian Table

This section proposes revisions to the Canadian Table to include the results of any applicable domestic spectrum policy decisions where no proposal was provided with respect to the modification of the Canadian Table to implement the decision, as well as revisions needed as a result of any inconsistencies found during the review of the previous CTFA.

### F1 – Proposed modification to footnote C36 following the AWS-4 decision in the 2 GHz band.

Spectrum policy decisions dealing with domestic allocation or footnotes changes that have been approved through their own consultation process are generally not discussed again in this consultation paper before being incorporated in the final edition of the Canadian Table. However in the case of decision paper Spectrum Licensing Policy Branch SLPB-008-14, [\*Decision on a Policy, Technical and Licensing Framework for Mobile Satellite Service and Advanced Wireless Service \(AWS-4\) in the Bands 2 000-2 020 MHz and 2 180-2 200 MHz\*](#) on the MSS/ancillary terrestrial component (ATC), which was released in December 2014, after publication of the 2014 version of the Canadian Table, no concrete text was provided with respect to modification of the Canadian Table to implement the decision. The Department proposes to modify Canadian footnote C36, taking into account the [SLPB-008-14](#) decision. The proposal is intended to clarify which type of fixed systems would be allowed to operate in these frequency bands, and under what conditions.

In the [SLPB-008-14 decision](#), in response to Xplornet's proposal to allow the 2 GHz licensee the flexibility to deploy fixed terrestrial systems in addition to mobile ones, the Department noted that Spectrum Utilization Policy SP 1-3 GHz, [\*Amendments to the Microwave Spectrum Utilization Policies in the 1-3 GHz Frequency Range\*](#) indicates that coordination between the fixed point-to-point backhaul operations and the MSS would be impractical. In the past, fixed systems were displaced to other bands. However, the Department noted that fixed wireless access systems, given their technical similarities to mobile terrestrial systems, could potentially coexist with MSS in the 2 GHz band and would be unlikely to cause any additional interference to the MSS, if they were operated by the same licensee or closely coordinated with the MSS/ATC licensee. Allowing additional flexibility for the 2 GHz licensee to use fixed systems, as well as mobile ATC, would depend on the specifics of the proposed fixed systems.

The Department indicated that given its objectives for the 2 GHz band as stated in the [SLPB-008-14](#) decision, fixed systems that support the MSS or ATC systems of the existing licensee may be permitted as long as they adhere to the technical requirements set out for ATC in this band. Fixed systems that are separate from the MSS or ATC systems would require an application from the MSS/ATC licensee. Upon receipt, the Department would assess the application and make a determination based on the specifics of the application.

We therefore propose to modify footnote C36 in the bands 2 000-2 020 and 2 180-2 200 MHz to align with the decision to allow such fixed systems in the band.

2 000 – 2 200 MHz

2 000 – 2 020	<del>FIXED</del> MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A
:	
2 180 – 2 200	<del>FIXED</del> MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A
	5.388 5.389A MOD C36

**MOD**

**C36 (CAN-0616)** In the frequency bands 2 000-2 020 MHz and 2 180-2 200 MHz, ~~the mobile-satellite service has priority over the fixed service. A moratorium is placed on the licensing of new systems in the fixed service. Specific fixed service stations will be displaced, according to the transition policy, to enable the implementation of mobile-satellite service systems in certain sub-bands fixed systems that adhere to the technical requirements set out for ATC in these bands may be permitted if operated by the MSS/ATC system licensee or by other operators with agreement from the relevant MSS/ATC system licensee. All applications for fixed systems licences must be made via the relevant MSS/ATC licensee.~~

**F2 – Inconsistencies in the Canadian Table**

During the review of the Canadian Table, we found the following three inconsistencies for the frequency bands 216-220 MHz, 17.3-17.7 GHz, 17.7 -17.8 GHz, 24.75-25.05 GHz and 25.25-25.5 GHz.

- A- The Department proposes to segment the frequency band 216-220 MHz in the Canadian Table to be consistent with Canadian footnote C11. Note that there is no amateur service allocated internationally in the frequency band 216-220 MHz.

## 216 – 222 MHz

216 – <u>220</u> 19	FIXED LAND MOBILE 5.242 MARITIME MOBILE <del>Amateur C11</del>
21 <u>6</u> 9 - 220	FIXED

	LAND MOBILE 5.242 MARITIME MOBILE Amateur MOD C11
220 - 222	FIXED MOBILE Amateur MOD C11

**MOD**

**C11 (CAN-0916)** In the frequency band 219-220 MHz, the amateur service is permitted on a secondary basis. In the frequency band 220-222 MHz, the amateur service may be permitted in exceptional circumstances on a secondary basis to assist in disaster relief efforts.

**Reason:** To align the Canadian Table with footnote C11 and to improve the language.

- B-** Footnote C44 is no longer applicable to the frequency bands 17.3-17.7 GHz, 17.7-17.8 GHz and 24.75-25.05 GHz following the decision SMSE-003-14, [Decision on the Use of the Frequency Band 25.05-25.25 GHz](#). Although Decision SMSE-003-14 revised the text of footnote C44 to remove reference to the bands 17.3-17.7 GHz, 17.7-17.8 GHz and 24.75-25.05 GHz, there was no proposal at that time to remove footnote C44 from the relevant parts in the Canadian Table. The Department proposes the following for this consultation.

17.3 – 17.8 GHz

17.3 - 17.7	BROADCASTING-SATELLITE FIXED-SATELLITE (Earth-to-space) 5.516 C43 Radiolocation  5.515 C44
17.7 - 17.8	BROADCASTING-SATELLITE C46 FIXED C45 FIXED-SATELLITE (space-to-Earth) (Earth-to-space) 5.516 5.517 C43  5.515 C44

24.75 – 25.05 GHz

24.75 - 25.05	FIXED-SATELLITE (Earth-to-space) 5.535
---------------	--

C44

**Reason:** To align with the SMSE-003-14 decision. Footnote C44 is no longer applicable to the frequency bands 17.3-17.7 GHz, 17.7-17.8 GHz and 24.75-25.05 GHz.

C- For the frequency band 25.25-25.5 GHz, there is no Earth exploration-satellite service allocation internationally, but the Canadian Table includes a secondary allocation. We propose to remove this secondary allocation from the Canadian Table, as shown below.

25.25 – 25.5 GHz

25.25 - 25.5	FIXED INTER-SATELLITE 5.536 MOBILE <del>Earth Exploration-Satellite (space-to-Earth)</del> Standard Frequency and Time Signal-Satellite (Earth-to-space)
	C47B

**Reason:** To align with the International Table. There is also no EESS use in Canada.

**F3 – Other modifications to Canadian footnotes**

This section proposes revisions to some Canadian footnotes in order to align with updated spectrum policies/information or to clarify the language. In addition, any footnote that is indicated as suppressed in the Canadian Table (Edition 2014) will be permanently removed from the new 2017 Edition. As such, the following Canadian footnotes will be permanently removed: C8, C16B, C18, C22, C28, C29, C30, C31 and C38A. Moreover, in line with the current practice at ITU-R, the Department proposes to add “frequency” in front of “band” where appropriate for all Canadian footnotes.

The following modifications to footnotes are proposed to clarify the language:

**C3** (CAN-16) *Additional allocation:* In the frequency band 2 065-2 107 kHz, the fixed service is also allocated on a primary basis provided that no harmful interference is caused to the maritime mobile service, sStations of the fixed service are restricted to communication ~~only~~ within Canada='s national borders, and ~~they employ a~~ their mean power shall not exceeding 50 watts.

**C4 (CAN-16)** *Additional allocation:* In the frequency bands 6 200-213.5 kHz and 6 220.5-6 525 kHz, the fixed service is allocated on a primary basis and its use is permitted ~~can be used~~ on an exceptional basis provided that no harmful interference is caused to the maritime mobile service, stations of the fixed service are restricted to communication ~~only~~ within Canada's national borders, and ~~they employ a~~ their mean power shall not exceed 50 watts.

**C12 (CAN-0316)** The frequency band 2 360-2 400 MHz is designated for ~~A~~ Mobile Telemetry\*\*\* (AMT) applications. The Government of Canada has priority on the use of this band. Access to ~~spectrum~~ this band by other entities for AMT may be permitted subject to coordination with the Government of Canada systems.

**C16D (CAN-0516)** In the frequency bands 17.8-18.3 GHz and 19.3-19.7 GHz, the use of ~~spectrum for~~ these bands by the fixed service has priority over the use ~~of~~ by the fixed-satellite service. Use of ~~these spectrum for~~ bands by the fixed-satellite service shall be limited to applications that pose minimal constraints on the deployment of fixed services. Earth stations that comply with these requirements will be coordinated and may be granted radio authorization on a case-by-case basis.

**C16H (CAN-1416)** The frequency bands 11.075-11.2 GHz and 11.575-11.7 GHz are available to provide direct-to-home satellite broadcasting services in Canada until January 1, 2028. ~~Industry Canada~~ The Department will not license new fixed service systems in these bands until January 1, 2026. See *Canada Gazette* notice DGTP-013-09 for complete details of the spectrum policy decision.

**C44 (CAN-1416)** The use of the frequency band 25.05-25.25 GHz ~~spectrum for~~ by the fixed service has priority over the use ~~of~~ by the fixed-satellite service ~~in the band 25.05-25.25 GHz~~. Fixed-satellite service implementation in the band 25.05-25.25 GHz will be limited to applications which will impose minimal constraints upon the deployment of fixed service systems, such as those using a small number of large antennas for feeder links to the broadcasting-satellite service and/or for gateway applications in the fixed-satellite service.

**C49 (CAN-16)** In the frequency bands 7 250-7 750 MHz and 7 900-8 400 MHz, 20.2-21.2 GHz, 30-31 GHz and 39.5-40.5 GHz ~~and, in all or a portion of, the bands 20.2-21.2 GHz, 30-31 GHz and 39.5-40.5 GHz as required~~, the use of the fixed-satellite service is limited to the Government of Canada.

**C50 (CAN-16)** In the frequency bands 7 250-7 375 MHz, 7 975-8 025 MHz, 20.2-21.2 GHz, 30-31 GHz, 39.5-40.5 GHz and 43.5-45.5 GHz ~~and, in all or a portion of, the bands 20.2-21.2 GHz, 30-31 GHz and 39.5-40.5 GHz as required~~, the use of the mobile-satellite service is limited to the Government of Canada.

The following footnotes are proposed either for update with the latest information or for deletion:

---

\*\*\* Formerly known as mobile aeronautical telemetry systems (MATS)

**C35 (CAN-0416)** In the frequency band 1 850-1 990 MHz, stations of the mobile service have priority over those of the fixed service ~~with displacement of fixed assignments governed by the appropriate spectrum utilization policy.~~

**Reason:** The last sentence is no longer necessary.

**SUP**

**C39D (CAN-04)** In the bands 5 925-6 425 MHz and 14-14.5 GHz, a technical and operational procedure will be developed in accordance with Resolution **902 (WRC-03)** in order to facilitate the operation of earth stations located on board vessels in Canada.

**Reason:** Does not belong in the CTFA. Not an allocation issue.

**C46 (CAN-1416)** In the frequency band 17.7-17.8 GHz, Canadian broadcasting-satellite space stations shall not radiate into the territory of the United States a power flux-density greater than that specified in the ITU *Radio Regulations*, Article **21**, Table **21-4**, for geostationary-satellite space stations in the fixed-satellite service operating within this same band. ~~Similarly, to protect Canadian fixed systems, transmissions from broadcasting satellite space stations of United States operators can be expected to be limited in the same way in Canadian territory.~~

**Reason:** No longer required since the U.S. has adopted national footnote US334.

**SUP**

**47B (CAN-04)** Recommendations are under development within the ITU-R on sharing between fixed service systems and the inter-satellite service in the band 25.35-27.5 GHz.

**Reason:** Already served its purpose to inform the readers about the development of an ITU-R Recommendation. Not an allocation issue.

## Appendix A: Acronyms used in this document

ADS-B	Automatic dependent surveillance-broadcast
AIS	Automatic identification system
AM(R)S	Aeronautical mobile (route) service
AMS(R)S	Aeronautical mobile-satellite(route) service
ANSP	Air navigation service provider
ARNS	Aeronautical radionavigation service
ASM	Application specific messages
ASMG	Arab Spectrum Management Group
ATC	Ancillary terrestrial component
ATM	Air traffic management
AWS	Advanced wireless services
BSS	Broadcasting-satellite service
CEPT	European Conference of Postal and Telecommunications Administrations
CITEL	Inter-American Telecommunications Commission
CSA	Canadian Space Agency
CTFA	Canadian Table of Frequency Allocation
ECCC	Environment and Climate Change Canada
EESS	Earth exploration-satellite service
e.i.r.p.	Equivalent isotropically radiated power
epfd	Equivalent power flux-density
ESV	Earth station on board vessel
EVA	Extra-vehicular activity
FS	Fixed service
FSS	Fixed-satellite service
GFT	Global flight tracking
GSO	Geostationary-satellite orbit
HF	High frequency
ICAO	International Civil Aviation Organization
IMT	International mobile telecommunications
ITU	International Telecommunication Union
ITU-R	International Telecommunication Union – Radiocommunication Sector
MetSat	Meteorological satellite service
MLS	Microwave landing systems
MMSS	Maritime mobile-satellite service
MS	Mobile service
MSS	Mobile-satellite service
PFD	Power flux-density
RCC	Regional Commonwealth in the Field of Communications
SAR	Search and rescue
SOS	Space operation service
SRR	Short-range high-resolution radar
SRS	Space research service

TT&C	Tracking, telemetry and control
UHF	Ultra high frequency
UTC	Coordinated universal time
WAIC	Wireless avionics intra-communications
WARC-mm	World Administrative Radiocommunication Conference (mm = year of conference)
WRC-nn	World Radiocommunication Conference (nn = year of conference)

---