

## FORMATO PARA PARTICIPAR EN LA CONSULTA PÚBLICA

### Instrucciones para su llenado y participación:

- I. Las opiniones, comentarios, propuestas, aportaciones u otros elementos de análisis deberán ser remitidas a la siguiente dirección de correo electrónico: [consultapublica5G@ift.org.mx](mailto:consultapublica5G@ift.org.mx), en donde se deberá considerar que la capacidad límite para la recepción de archivos es de 25 MB.
- II. El interesado deberá proporcionar su nombre completo (nombre y apellidos), razón o denominación social, o bien, el nombre completo (nombre y apellidos) del representante legal. Para este último caso, deberá elegir entre las opciones el tipo de documento con el que acredita su representación, así como adjuntar –a la misma dirección de correo electrónico- copia electrónica legible del mismo.
- III. Leer el **AVISO DE PRIVACIDAD** en materia del cuidado y resguardo de sus datos personales, así como sobre la publicidad que se dará a los comentarios, opiniones, aportaciones u otros elementos de análisis presentados en el presente proceso consultivo.
- IV. Deberá proporcionar sus comentarios, opiniones, aportaciones u otros elementos de análisis en la Sección II del presente formato.
- V. De contar con observaciones generales o alguna aportación adicional, podrá proporcionarlos en el último recuadro.
- VI. En caso de que sea de su interés, podrá adjuntar al correo electrónico indicado en el numeral I del presente formato la documentación que estime conveniente.
- VII. El periodo de consulta pública será del 09 de septiembre al 21 de octubre de 2019 (30 días hábiles). Una vez concluido dicho periodo, se podrán continuar visualizando los comentarios realizados por los interesados, así como los documentos adjuntos en la siguiente dirección electrónica: <http://www.ift.org.mx/industria/consultas-publicas>
- VIII. Para cualquier duda, comentario o inquietud sobre el presente proceso consultivo, el Instituto pone a su disposición el siguiente punto de contacto: Marisol Cuevas Tavera, Subdirectora de Proyectos Regulatorios 2, correo electrónico: [marisol.cuevas@ift.org.mx](mailto:marisol.cuevas@ift.org.mx), y número telefónico 55 5015 4872.

<b>I. Datos del Participante</b>	
<b>Nombre, razón o denominación social:</b>	SISTEMAS SATELITALES DE MÉXICO, S. DE R.L. DE C.V. ("SSM")
<b>En su caso, nombre del representante legal:</b>	María Fernanda Palacios Medina
<b>Documento para la acreditación de la representación:</b> En caso de contar con representante legal, adjuntar copia digitalizada del documento que acredite dicha representación, al correo electrónico indicado en el numeral I de las instrucciones para el llenado y participación.	Instrumento no. 47,743 de fecha 5 enero de 2009 otorgado ante la fe del Lic. Carlos Antonio Morales Montes de Oca.
<p>En cumplimiento a lo dispuesto por los artículos 3, fracción II, 16, 17, 18, 21, 25, 26, 27 y 28 de la Ley General de Protección de Datos Personales en Posesión de los Sujetos Obligados (en lo sucesivo, LGPDPPSO) y numerales 9, fracción II, 11, fracción II, 15 y 26 al 45 de los Lineamientos Generales de Protección de Datos Personales para el Sector Público (en lo sucesivo, Lineamientos), se pone a disposición de los participantes el siguiente Aviso de Privacidad Integral:</p> <ol style="list-style-type: none"> <li>i. <b>Denominación del responsable:</b> Instituto Federal de Telecomunicaciones (en lo sucesivo, IFT).</li> <li>ii. <b>Domicilio del responsable:</b> Insurgentes Sur 1143, Col. Nochebuena, Benito Juárez, C. P. 03720, Ciudad de México, México.</li> <li>iii. <b>Datos personales que serán sometidos a tratamiento y su finalidad:</b> Los comentarios, opiniones, aportaciones u otros elementos de análisis presentadas durante la vigencia de cada consulta pública, <b>serán divulgados íntegramente</b> en el portal electrónico del Instituto de manera asociada con el titular de los mismos y, en ese sentido, serán considerados invariablemente públicos en términos de lo dispuesto en el numeral Octavo de los Lineamientos de Consulta Pública y Análisis de Impacto Regulatorio del Instituto Federal de Telecomunicaciones. Ello, toda vez que la naturaleza de las consultas públicas consiste en un proceso encaminado a promover la participación ciudadana y transparentar la elaboración de nuevas regulaciones, así como de cualquier otro asunto que estime el Pleno del IFT a efecto de generar un espacio de intercambio de información, opiniones y puntos de vista sobre cualquier tema de interés que este órgano constitucional autónomo someta al escrutinio público. En caso de que dentro de los documentos que sean remitidos se advierta información distinta al nombre y opinión, y ésta incluya datos personales que tengan el carácter de confidencial, se procederá a su protección. Con relación al nombre y la opinión de quien participa en este ejercicio, se entiende que otorga su consentimiento para la difusión de dichos datos, cuando menos, en el portal del Instituto, en términos de lo dispuesto en los artículos 20 y 21, segundo y tercer párrafos, de la LGPDPPSO y los numerales 12 y 15 de los Lineamientos.</li> </ol>	

- iv. **Información relativa a las transferencias de datos personales que requieran consentimiento:** Los datos personales recabados con motivo de los procesos de consulta pública no serán objeto de transferencias que requieran el consentimiento del titular.
- v. **Fundamento legal que faculta al responsable para llevar a cabo el tratamiento:** El IFT, convencido de la utilidad e importancia que reviste la transparencia y la participación ciudadana en el proceso de elaboración de nuevas regulaciones, así como de cualquier otro asunto que resulte de interés, realiza consultas públicas, con base en lo señalado en los artículos 15, fracciones XL y XLI, 51 de la Ley Federal de Telecomunicaciones y Radiodifusión, última modificación publicada en el Diario Oficial de la Federación el 15 de junio de 2018, 12, fracción XXII, segundo y tercer párrafos y 138 de la Ley Federal de Competencia Económica, última modificación publicada en el Diario Oficial de la Federación el 27 de enero de 2017, así como el Lineamiento Octavo de los Lineamientos de Consulta Pública y Análisis de Impacto Regulatorio del Instituto Federal de Telecomunicaciones, publicados en el Diario Oficial de la Federación el 8 de noviembre de 2017.
- vi. **Mecanismos y medios disponibles para que el titular, en su caso, pueda manifestar su negativa para el tratamiento de sus datos personales para finalidades y transferencias de datos personales que requieren el consentimiento del titular:** En concordancia con lo señalado en el apartado IV, del presente aviso de privacidad, se informa que los datos personales recabados con motivo de los procesos de consulta pública no serán objeto de transferencias que requieran el consentimiento del titular. No obstante, se pone a disposición el siguiente punto de contacto: Marisol Cuevas Tavera, Subdirectora de Proyectos Regulatorios 2, correo electrónico: [marisol.cuevas@ift.org.mx](mailto:marisol.cuevas@ift.org.mx), y número telefónico 55 5015 4872, con quien el titular de los datos personales podrá comunicarse para cualquier manifestación o inquietud al respecto.
- vii. **Los mecanismos, medios y procedimientos disponibles para ejercer los derechos de acceso, rectificación, cancelación u oposición sobre el tratamiento de sus datos personales (en lo sucesivo, derechos ARCO):** Las solicitudes para el ejercicio de los derechos ARCO deberán presentarse ante la Unidad de Transparencia del IFT, a través de escrito libre, formatos, medios electrónicos o cualquier otro medio que establezca el Instituto Nacional de Transparencia, Acceso a la Información y Protección de Datos Personales (en lo sucesivo, INAI). El procedimiento se regirá por lo dispuesto en los artículos 48 a 56 de la LGPDPPSO, así como en los numerales 73 al 107 de los Lineamientos, de conformidad con lo siguiente:
- a) Los requisitos que debe contener la solicitud para el ejercicio de los derechos ARCO:
- Nombre del titular y su domicilio o cualquier otro medio para recibir notificaciones;
  - Los documentos que acrediten la identidad del titular y, en su caso, la personalidad e identidad de su representante;
  - De ser posible, el área responsable que trata los datos personales y ante la cual se presenta la solicitud;
  - La descripción clara y precisa de los datos personales respecto de los que se busca ejercer alguno de los derechos ARCO, salvo que se trate del derecho de acceso;
  - La descripción del derecho ARCO que se pretende ejercer, o bien, lo que solicita el titular, y
  - Cualquier otro elemento o documento que facilite la localización de los datos personales, en su caso.
- b) Los medios a través de los cuales el titular podrá presentar solicitudes para el ejercicio de los derechos ARCO.
- Los mismos se encuentran establecidos en el párrafo octavo del artículo 52 de la LGPDPPSO, que señala lo siguiente:
- Las solicitudes para el ejercicio de los derechos ARCO deberán presentarse ante la Unidad de Transparencia del responsable, que el titular considere competente, a través de escrito libre, formatos, medios electrónicos o cualquier otro medio que al efecto establezca el INAI.
- c) Los formularios, sistemas y otros medios simplificados que, en su caso, el Instituto hubiere establecido para facilitar al titular el ejercicio de sus derechos ARCO.
- Los formularios que ha desarrollado el INAI para el ejercicio de los derechos ARCO, se encuentran disponibles en su portal de Internet ([www.inai.org.mx](http://www.inai.org.mx)), en la sección Protección de Datos Personales/¿Cómo ejercer el derecho a la protección de datos personales?/Formatos/Sector Público.
- d) Los medios habilitados para dar respuesta a las solicitudes para el ejercicio de los derechos ARCO.
- De conformidad con lo establecido en el numeral 90 de los Lineamientos, la respuesta adoptada por el responsable podrá ser notificada al titular en su Unidad de Transparencia o en las oficinas que tenga habilitadas para tal efecto, previa acreditación de su identidad y, en su caso, de la identidad y personalidad de su representante de manera presencial, o por la Plataforma Nacional de Transparencia o correo certificado en cuyo caso no procederá la notificación a través de representante para estos últimos medios.
- e) La modalidad o medios de reproducción de los datos personales.

Según lo dispuesto en el numeral 92 de los Lineamientos, la modalidad o medios de reproducción de los datos personales será a través de consulta directa, en el sitio donde se encuentren, o mediante la expedición de copias simples, copias certificadas, medios magnéticos, ópticos, sonoros, visuales u holográficos, o cualquier otra tecnología que determine el titular.

- f) Los plazos establecidos dentro del procedimiento -los cuales no deberán contravenir los previsto en los artículos 51, 52, 53 y 54 de la LGPDPPSO- son los siguientes:

El responsable deberá establecer procedimientos sencillos que permitan el ejercicio de los derechos ARCO, cuyo plazo de respuesta no deberá exceder de veinte días contados a partir del día siguiente a la recepción de la solicitud.

El plazo referido en el párrafo anterior podrá ser ampliado por una sola vez hasta por diez días cuando así lo justifiquen las circunstancias, y siempre y cuando se le notifique al titular dentro del plazo de respuesta.

En caso de resultar procedente el ejercicio de los derechos ARCO, el responsable deberá hacerlo efectivo en un plazo que no podrá exceder de quince días contados a partir del día siguiente en que se haya notificado la respuesta al titular.

En caso de que la solicitud de protección de datos no satisfaga alguno de los requisitos a que se refiere el párrafo cuarto del artículo 52 de la LGPDPPSO, y el responsable no cuente con elementos para subsanarla, se prevendrá al titular de los datos dentro de los cinco días siguientes a la presentación de la solicitud de ejercicio de los derechos ARCO, por una sola ocasión, para que subsane las omisiones dentro de un plazo de diez días contados a partir del día siguiente al de la notificación.

Transcurrido el plazo sin desahogar la prevención se tendrá por no presentada la solicitud de ejercicio de los derechos ARCO.

La prevención tendrá el efecto de interrumpir el plazo que tiene el INAI para resolver la solicitud de ejercicio de los derechos ARCO.

Cuando el responsable no sea competente para atender la solicitud para el ejercicio de los derechos ARCO, deberá hacer del conocimiento del titular dicha situación dentro de los tres días siguientes a la presentación de la solicitud, y en caso de poderlo determinar, orientarlo hacia el responsable competente.

Cuando las disposiciones aplicables a determinados tratamientos de datos personales establezcan un trámite o procedimiento específico para solicitar el ejercicio de los derechos ARCO, el responsable deberá informar al titular sobre la existencia del mismo, en un plazo no mayor a cinco días siguientes a la presentación de la solicitud para el ejercicio de los derechos ARCO, a efecto de que este último decida si ejerce sus derechos a través del trámite específico, o bien, por medio del procedimiento que el responsable haya institucionalizado para la atención de solicitudes para el ejercicio de los derechos ARCO conforme a las disposiciones establecidas en los artículos 48 a 56 de la LGPDPPSO.

En el caso en concreto, se informa que no existe/existe un procedimiento específico para solicitar el ejercicio de los derechos ARCO en relación con los datos personales que son recabados con motivo del proceso consultivo que nos ocupa. (Descripción en caso de existir).

- g) El derecho que tiene el titular de presentar un recurso de revisión ante el INAI en caso de estar inconforme con la respuesta.

El referido derecho se encuentra establecido en los artículos 103 al 116 de la LGPDPPSO, los cuales disponen que el titular, por sí mismo o a través de su representante, podrán interponer un recurso de revisión ante el INAI o la Unidad de Transparencia del responsable que haya conocido de la solicitud para el ejercicio de los derechos ARCO, dentro de un plazo que no podrá exceder de quince días contados a partir del siguiente a la fecha de la notificación de la respuesta.

- viii. **El domicilio de la Unidad de Transparencia del IFT:** Insurgentes Sur 1143, colonia Nochebuena, Benito Juárez, C. P. 03720, Ciudad de México, México. Planta Baja, teléfono 55 5015 4000, extensión 4267.

- ix. **Los medios a través de los cuales el responsable comunicará a los titulares los cambios al aviso de privacidad:** Todo cambio al Aviso de Privacidad será comunicado a los titulares de datos personales en el apartado de consultas públicas del portal de internet del IFT.

## II. Cuestionario de la Consulta Pública de Integración

**Nota 1:** El estudio “Panorama del espectro radioeléctrico en México para servicios móviles de quinta generación”, es un Documento de Referencia que ayuda en la comprensión de los cuestionamientos listados en la siguiente tabla. Por sí mismo, dicho documento no se encuentra para consulta pública.

**Nota 2:** Se recomienda responder a todas las preguntas contenidas en la siguiente tabla, acompañado de los argumentos, planteamientos, justificaciones y elementos de análisis que se considere necesario para sustentar la opinión, incluyendo documentos de soporte que se deseen adjuntar.

No. de pregunta	Pregunta	Comentarios, opiniones o aportaciones
1	<p>¿Considera que la cantidad de espectro radioeléctrico para sistemas móviles de quinta generación (5G) prevista en el Documento de Referencia es adecuada para la demanda esperada para los próximos 5, 10 y 20 años en México?</p> <p>Indique las razones técnicas, económicas o estratégicas que justifiquen su respuesta.</p>	<p>El Documento de la UER “<i>Panorama del espectro radioeléctrico en México para servicios móviles de 5G</i>” considera viable poder utilizar “<i>en una primera etapa</i>” 11,44 GHz de espectro para los nuevos sistemas móviles, gran parte del cual se recoge en bandas atribuidas a título co-primario a los Servicios Fijos por Satélites (en adelante “SFS”) por el CNAF en su edición 2018: 3,4-3,6 GHz, 24,75 -25,25 GHz, 27-27,5 GHz y 37,5-40GHz, 42,5-43,5GHz, 47,2-48,2 GHz, y 50,4-51,4GHz.</p> <p>A este caudal, deben sumarse las bandas o segmentos de bandas que los <i>Programas Anuales de Uso y Aprovechamiento de Bandas de Frecuencias de 2019 y 2020</i> (en adelante PAUABF)<sup>1</sup> hacen disponible para el despliegue de servicios de banda ancha móvil y los 222 MHz ya liberados hasta 2014.<sup>2</sup></p> <p>SSM/SES considera que el caudal identificado por el IFT está muy por encima de las necesidades de espectro para el despliegue de los sistemas IMT/5G en el país para las próximas décadas y que su selección responde a una visión comercial de cubrir un supuesto incremento de demanda en</p>

<sup>1</sup> ACUERDO mediante el cual el Pleno del Instituto Federal de Telecomunicaciones modifica el Programa Anual de Uso y Aprovechamiento de Bandas de Frecuencias 2019- Diario Oficial de la Federación -DOF05/03/2019 y ACUERDO mediante el cual el Pleno del Instituto Federal de Telecomunicaciones emite el Programa Anual de Uso y Aprovechamiento de Bandas de Frecuencias 2020- Diario Oficial de la Federación -DOF20/09/2020

<sup>2</sup> En su documento de Febrero 2017 “IMT en Mexico: Mas espectro para aplicaciones en Banda Ancha Movil”, la Unidad de Espectro Radioespectro, indicaba: “Hasta diciembre 2014 la cantidad de espectro asignado para IMT en nuestro país era de aproximadamente 222MHz. En la actualidad, a casi cuatro años de la Reforma Constitucional en materia de Telecomunicaciones y Radiodifusión, dicha cantidad ha aumentado considerablemente(...). Como resultado, en la actualidad se cuenta con una cantidad promedio total de 404MHz.”(...)

		<p>velocidad, en vez de propiciar una cobertura universal que favorezca la inclusión social.</p> <p>Del análisis de las últimas licitaciones del IFT (IFT-3 y IFT-7), resulta notorio el escaso interés de los operadores móviles en pujar en bandas que son, según la industria móvil mundial, las más adecuadas para sus futuras redes en 5G.</p> <p><b>La banda 1710-1780 MHz y 2110-2180MHz (AWS)</b> licitada (IFT-3) en 2016 no despertó interés de ningún operador extranjero y tan solo participaron 2 operadores nacionales, los que no tuvieron que pujar por encima del precio de referencia y quedó desierto un bloque de 10 MHz. O sea, sobró espectro asignado a IMT en las bandas bajas más preciadas por la industria móvil donde cuenta con todos los estándares y equipos.</p> <p><b>La banda 2500-2690 MHz:</b> La licitación IFT-7 en la que participaron sólo 2 operadores (ATT y Pegaso/Telefónica) adjudicó en agosto de 2018, 120 MHz en 4 bloques FDD y 2 bloques TDD, sin que tampoco en este caso se incrementara el precio de referencia.<sup>3</sup> Los bloques 2 x 30 MHz habían sido previamente concesionados a Telcel. No se tienen datos de cuanto espectro y con qué cobertura, estos 3 operadores han implementado en 4G ni cuándo estarán en condiciones de migrar a sistemas 5G.</p> <p><i>Para IMT, el IFT ha liberado las siguientes bandas como viable para 5G:</i></p> <p><b>La banda de 700 MHz</b> (“Primer Dividendo Digital”) de mayor interés para los operadores móviles a nivel mundial, no pasó por un proceso de licitación de los 90 MHz de espectro, sino que se adjudicó a la Red Compartida Mayorista. Aun no supera el 50% de ocupación, por lo que tiene capacidad disponible.</p> <p><b>La banda de 600 MHz</b> (“Segundo Dividendo Digital”) pone a partir del próximo año, espectro a disposición de servicios móviles 5G, con dos bloques de 35 MHz, liberados en 2018 <i>“gracias a un proceso de reordenamiento del espectro con el cual se optimizó el uso directo de este recurso anteriormente usado por los canales de TV 38 a 51”</i>.<sup>4</sup></p>
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<sup>3</sup> <http://www.ift.org.mx/industria/espectro-radioelectrico/telecomunicaciones/2018/licitacion-no-ift-7-servicio-de-acceso-inalambrico>

<sup>4</sup> Comunicado de Prensa N° 49/2019 del IFT de 20 de septiembre 2019

		<p><b>La banda 814-824/859-869 MHz</b>, una vez concluido el proceso de reordenamiento liberará diversos segmentos de espectro para el servicio de acceso inalámbrico para una futura licitación de bandas IMT.<sup>5</sup></p> <p><b>La banda 1850-1910/1930-1990 MHz</b> (“banda PCS”) está actualmente concesionada a nivel nacional para sistemas IMT. El IFT en su PAUABF de 2020 considera posible contar con un segmento adicional de 5+5 MHz que favorecerá la provisión de banda ancha móvil. Así, los segmentos disponibles en la banda PCS - 1910-1915/1990-1995 MHz- <i>“pueden ser concesionados para servicios de acceso inalámbrico para uso comercial.”</i><sup>6</sup></p> <p><b>La banda 3300-3400 MHz</b> incluida en el PAUABF de 2020 cuenta con una asignación para instalar y operar una red de telecomunicaciones en el segmento 3.3-3.35 GHz, quedando disponible el segmento 3.35-3.4 GHz para IMT.</p> <p><b>La banda 10.15-10.65 GHz</b> se encuentra listada en el PAUABF 2019 para la prestación de servicios inalámbricos en bandas centimétricas. El IFT considera viable que esta banda se somete a un proceso de licitación en el corto plazo.</p> <p><b>La banda 37 -38.6 GHz:</b> El PAUABF 2019 contempla la inclusión de diversas porciones del espectro radioeléctrico que se encuentran disponibles dentro de los segmentos 37.058-37.226 GHz y 38.318-38.486 GHz para la prestación de servicios inalámbricos en banda milimétricas, por lo que la IFT considera que se sometan a un proceso de licitación.<sup>7</sup></p> <p>El IFT ha dedicado muchos esfuerzos en el proceso de liberación de espectro en favor de IMT en el pasado sexenio, dando cabida a la implementación de nuevas tecnologías. Sin embargo, es tiempo de hacer</p>
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<sup>5</sup> ACUERDO mediante el cual el Pleno del Instituto Federal de Telecomunicaciones emite el Programa Anual de Uso y Aprovechamiento de Bandas de Frecuencias 2020- Diario Oficial de la Federación -DOF 20/09/2020

<sup>6</sup> ACUERDO mediante el cual el Pleno del Instituto Federal de Telecomunicaciones emite el Programa Anual de Uso y Aprovechamiento de Bandas de Frecuencias 2020- Diario Oficial de la Federación -DOF 20/09/2020

<sup>7</sup> ACUERDO mediante el cual el Pleno del Instituto Federal de Telecomunicaciones modifica el Programa Anual de Uso y Aprovechamiento de Bandas de Frecuencias 2019- Diario Oficial de la Federación -DOF05/03/2019

		<p>una evaluación del espectro liberado para IMT/5G -tecnología aún en fase de pruebas- para asegurar que la selección corresponde a las bandas adecuadas y no va en detrimento de la misión de “<i>garantizar el espectro necesario para los fines y funciones del Ejecutivo Federal</i>”. De estas decisiones estratégicas depende el futuro de las posiciones orbitales de México y la continuidad de los planes sociales destinados a reducir la brecha digital.</p> <p>Por mandato constitucional y legal “<i>le corresponde al Estado la rectoría en materia de telecomunicaciones, a cuyo efecto protegerá la seguridad y la soberanía de la Nación. Asimismo, en todo momento el Estado mantendrá el dominio sobre el espectro radioeléctrico y las posiciones orbitales asignadas al país.</i>”<sup>8</sup> Si el IFT abandonara las bandas de frecuencias incluidas en los expedientes presentados ante la UIT correspondientes a las posiciones orbitales 113°L.O., 114.9° L.O, 116.8° L.O. para favorecer sistemas no compatibles, podría incumplir su misión de garante de dichas posiciones.</p> <p>La banda C-extendida (3400-3600 MHz) es parte esencial del satélite mexicano Bicentenario (114.9° L.O.) con vida útil nominal de hasta 2034. Este cumple funciones irremplazables para la seguridad nacional y la implementación de programas dedicados a la promoción de la cohesión social, regional y territorial. Este satélite está configurado para que sus enlaces de alimentación en banda C-Extendida se apareen con sus enlaces de servicio en banda Ku-Extendida. Otorgar la banda 3400-3600 MHz a los sistemas IMT/5G causaría varios efectos en cadena: inhabilitar parte de la red de estaciones remotas que operan en la banda Ku-Extendida, deshabilitar las redes de seguridad nacional y de cobertura social y entorpecer el remplazo del satélite en caso de falla irreparable.</p> <p>Si bien no se contesta que la “<i>banda en cuestión se encuentra dentro del segmento de frecuencias que más se ha usado para pruebas de 5G a nivel mundial</i>”, resulta justo recordar que con esta banda México ya dispone de una <i>efectiva</i> cobertura de todo su territorio, incluyendo su mar territorial y zona económica exclusiva (p.e. islas de Revillagigedo). Este esfuerzo en</p>
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<sup>8</sup> Acuerdo por el que el Pleno del IFT aprueba el Programa sobre Posiciones Orbitales Geoestacionarias para el uso Comercial, cuyo Procedimiento de Licitación Publica se realizara durante el año 2014- Diario Oficial de la Federación -DOF 30/12/2013

		infraestructura, sufragado por el erario publico mexicano debería protegerse ya que sigue cumpliendo funciones esenciales, mientras que los futuros sistemas móviles 5G no son una realidad perceptible, desconociéndose cuanta inversión la industria móvil está dispuesta aportar en México en el corto y mediano plazo para transformar una infraestructura apenas insipiente en 4G/ LTE a una que responda a los criterios de 5G.
2	<p>Con relación a las bandas de frecuencias identificadas en el Documento de Referencia para sistemas móviles de quinta generación (5G) en México, ¿qué otra(s) banda(s) de frecuencia estima que debería(n) considerarse para dicho fin?</p> <p>Indique las razones técnicas (casos prácticos, experiencias internacionales, etc.), económicas o estratégicas, que justifiquen su respuesta.</p>	Sin comentarios
3	<p>Con relación a las bandas de frecuencias identificadas en el Documento de Referencia para sistemas móviles de quinta generación (5G) en México, ¿cuál(es) banda(s) de frecuencia(s) estima usted viables/inviables o apropiadas/no apropiadas, para la compartición o coexistencia con otros servicios?</p> <p>¿Considera que alguna(s) de las bandas de frecuencias identificadas o segmento(s) de ella(s) no deberían de utilizarse para sistemas móviles de quinta generación (5G) en México?</p> <p>En ambos casos, indique las razones técnicas (estudios de compatibilidad/coexistencia, casos prácticos, experiencias internacionales, etc.), económicas o estratégicas que justifiquen su respuesta.</p>	<p>SSM/SES es de la opinión de que el IFT debería priorizar la plena implementación de las bandas ya liberadas para IMT antes de identificar más espectro en bandas que se encuentran utilizadas por otros servicios y en las cuales ya existen enormes inversiones públicas y privadas. Además, las bandas de frecuencias asociadas a recursos orbitales de México, así como aquellas que son parte de concesiones y autorizaciones para redes satelitales extranjeras, otorgadas por el IFT, no deberían ser consideradas viables <u>hasta</u> que finalice la vida útil del satélite, sin que se haya remplazado y <u>después</u> de caducada la concesión o autorización, sin haberse solicitado su prórroga. Para SSM/SES la preservación de las bandas de frecuencias asociadas a los recursos orbitales de México no puede dissociarse de la protección de la industria satelital en su conjunto por lo que apoya las políticas públicas que den prioridad a una cobertura universal, con inclusión social.</p> <p>Aun cuando la banda <b>3400-3600 MHz</b> haya sido identificada para IMT para la Región2 – y no como “banda armonizada a nivel mundial” como menciona incorrectamente el documento en análisis – ello no implica bajo ningún criterio que México deba abandonar sus posiciones orbitales, dismantelar su infraestructura satelital e interrumpir sus redes de seguridad nacional y programas sociales operando en 3.4-3.6 GHz. Dicha identificación regional no prima sobre la decisión soberana de México de dotarse y mantener una red satelital en la banda C extendida concebida</p>



		<p>para fines prioritarios para su desarrollo nacional, en el sentido del Art.27 de la Constitución Política. Los más de US\$1,200 millones del proyecto inicial que costó el lanzamiento, implementación y puesta en operación del Sistema de Satélites Mexicanos del cual forma parte el satélite Bicentenario, fue financiado por los contribuyentes mexicanos, con enormes esfuerzos del IFT ante la UIT. Las funciones esenciales e irremplazables que cumple la red de Bicentenario para el Estado no pueden verse esterilizadas por la circunstancia de que la CITELE decidió, a la vigilia de la CMR15, identificar esta banda para IMT con un puñado de votos a favor. Cabe recordar que la Nota 5.431B del RR claramente estipula que dicha identificación sólo atañe a aquella Administración que “desee” implementar IMT y no da preferencia ni prioridad en la utilización del IMT en estas bandas sobre otros servicios existentes.</p> <p>La <b>banda 24.24-27.5 GHz</b> que la industria satelital, en aras de encontrar una solución junto con el IFT, está aceptando compartir con los proponentes de IMT, también se utiliza para estaciones terrenas de gran diámetro del SFS en localizaciones fijas y conocidas (Gateway). SSM/SES seguirá colaborando con el IFT para lograr medidas de consenso que permitan a la vez el despliegue de las nuevas tecnologías y la protección de sus futuros gateways en México que comunicaran con sus satélites HTS. Implementar IMT en esta banda requerirá identificar las áreas en las cuales las estaciones bases de IMT podrían recibir interferencias de parte de estas estaciones terrenas y la adopción de medidas por el IFT para asegurar su coexistencia con las estaciones terrenas del SFS. Ello requiere atender 2 escenarios: 1) proteger la recepción del satélite de interferencias agregadas provocadas por las transmisiones de estaciones bases de IMT desplegadas masivamente en la zona de cobertura del satélite, y 2) preservar el acceso continuo del espectro para las estaciones terrenas del SFS (Gateway) que debería ser coordinado con las estaciones IMT. Debido a que las interferencias perjudiciales causadas por las redes de estaciones de IMT desplegadas a lo largo de una zona fronteriza podrían afectar los receptores del satélite con cobertura en Mexico, esta situación podría además requerir nuevos acuerdos bilaterales. SSM/SES insiste en la necesidad de proteger las estaciones espaciales del SFS, ello sin restringir el despliegue de IMT por lo que apoya: 1) la Condición A2e-Opción3 del Informe de la RPC con un límite de Total Radiated Power (TPR) de la estación IMT de 37 dBm/200MHz a fin de proteger los receptores del satélite. Este límite es</p>
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		<p>mayor al de los proponentes de IMT (12 db) por lo que no implicaría restricciones al despliegue de sus estaciones bases y 2) la Condición A2d-Opcion1 que permite el despliegue de futuras estaciones terrenas del SFS como lo establece el Método A2. <i>(ver Anexo 2, contribución de ESOA para el POD 1.13 de octubre 2019)</i></p> <p>La banda <b>37-40 GHz</b> podría resultar viable para IMT siempre y cuando se adopten medidas regulatorias destinadas a proteger su uso continuo y pacífico para el SFS. El Informe de la RPC propone el Método C2 -Opción 1 para la identificación de IMT con varias condiciones, que SES apoya. Esta banda se usará para antenas de gran diámetro en localización conocida y fija (Gateways). Por tanto las zonas en las cuales las estaciones IMT podrían recibir interferencia pueden ser predeterminadas y, por tanto, quedar asegurada su coexistencia.</p> <p>En la banda <b>42-43,5 GHz</b>, SSM/SES considera que no existe razón fundada para una identificación de IMT y abogará, junto al resto de la industria satelital por un No Cambio en todo en rango 40-43.5 GHz, en las discusiones del Punto de Orden del Dia (POD) 1.13 durante la próxima CMR-19. Algunos fabricantes de equipos han justificado el deseo de armonizar bandas de frecuencias únicamente por los beneficios de la economía de escala. Sin embargo, no parece un argumento suficiente, para un país que no fabrica estos equipos, tener que renunciar a una banda de Alta Densidad del SFS (HDFSS) que permitirá un despliegue masivo de pequeños terminales a los usuarios. <i>(ver Anexo 2, posición de SES que coincide con el documento ESOA mencionado en el párrafo anterior)</i></p> <p>En las bandas <b>47.2-48.2 GHz y 50.4-52.6 GHz</b>, los operadores móviles han mostrado muy poco interés por lo que no se considera prioritaria para IMT. SES apoya en las discusiones del POD 1.13, respectivamente los Métodos H1 y I1 (No Cambio) establecidos en el Informe de la RPC. Además, durante la próxima Conferencia, SES seguirá buscando consensos respecto al POD 9.1.9 para lograr una nueva atribución en la banda 51.4-52.4 GHz para sistemas geoestacionarios del SFS (Tierra-espacio), tal como lo hizo en la CTER. Gracias al apoyo de Mexico, esta contribución se convirtió en una IAP en la última CITELE. Esta banda permitirá acomodar la demanda para enlaces de ida ("forward links"). Los sistemas satelitales</p>
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		<p>de nueva generación tendrán la capacidad de proveer a los usuarios, cualquiera sea su localización geográfica, una velocidad de datos mayor a 1 Gbit/s por canal. Con la perspectiva de incrementar la capacidad de los sistemas HTS y mejorar los servicios a usuarios finales, se propone expandir la atribución del SFS (T-e) en esta nueva banda para enlaces ascendentes de gateways (de Gateway hacia el satélite) a fin de liberar capacidad en la banda Ka (e-T) para enlaces ascendentes de usuarios (desde terminales de usuarios hacia la estación satelital). El Informe de la RPC, tras analizar las necesidades de espectro, concluye que esta atribución adicional en la banda 51,4-52,4 GHz (T-e) mejorará las conexiones de banda ancha de los satélites HTS. El IFT y la industria satelital en Mexico deberían coordinarse a la brevedad para solventar la ambigüedad entre, por una parte, considerar viable para IMT la banda 50.4 -52.6 GHz como lo hace el documento “<i>Panorama del IFT</i>” y por otra, apoyar la nueva atribución para el SFS en atribución en la banda 51.4-52.4 GHz para sistemas geoestacionarios, que Mexico endosa para la CMR-19 (POD 9.1.9).</p> <p>Aunque la banda de <b>28 GHz</b> no esté específicamente listada como viable en el <i>Panorama del IFT</i>, SES/SSM considera preciso reiterar inequívocamente en este comentario que, junto a toda la industria satelital presente en México, se ha constantemente opuesto en las reuniones del CTER a su identificación para IMT/5G debido a su uso actual y planeado en Mexico en base a su atribución exclusiva al SFS en carácter primario y por ser una banda que permite el despliegue masivo de terminales de usuarios. A estas consideraciones, se suma la necesidad de proteger los enlaces de conexión (<i>feeder links</i>) de sistemas NGSO de Servicio Móvil por Satélite y responder al incremento de la demanda de ESIMs. Algunas de las futuras redes satelitales en Región 2 tienen ya su capacidad comprometida para aprovisionar la conectividad a bordo de aeronaves y de embarcaciones marítimas con antenas operando en las bandas 27,5 a 30 GHz. Por otra parte, la banda de 28 GHz cumple ya funciones cruciales en México, conectando comunidades rurales, sucursales de cadenas nacionales, bancos, estaciones gasolineras, farmacias, etc., y representa la columna vertebral de México Conectado para garantizar los programas de inclusión social, operados por Telecom de México.</p>
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4	<p>Respecto de aquella(s) banda(s) de frecuencia que considera apropiada(s) para implementar sistemas móviles de última generación (5G) en México, ¿qué mecanismos y/o esquemas de compartición, coexistencia de servicios, aislamiento, separación geográfica, o cualquier otro, estima usted que pudieran ser aplicables para hacer un uso más eficiente del espectro radioeléctrico?</p>	<p>La industria satelital esta muy familiarizada con la compartición del espectro, siendo todo su espectro “compartido” con otros sistemas satelitales o/y en las atribuciones co-primarias con otros servicios. En órbita, múltiples operadores satelitales comparten el mismo espectro en satélites distantes de 2 a 3 grados a lo largo del arco geoestacionario y cada vez mas con satélites no geoestacionarios. En el segmento terrestre, las soluciones logradas a lo largo de cinco décadas, en la coordinación entre el Servicio Fijo (“SF”) y el SFS muestra eficacia y sentido práctico por parte de los operadores. Aun cuando los enlaces del SF y las estaciones terrenas del SFS están a proximidad, como ocurre en la zona urbanas, esta coordinación logra ser exitosa y la compartición es factible. La compartición entre IMT y el SFS en cambio, es mucho más compleja: hacer coexistir pacíficamente sistemas nómadas y masivos, en la misma banda y área de geográfica, no puede llevarse a cabo sin imponer restricciones a uno en detrimento del otro servicio.</p> <p>Los metodos varian según las bandas de frecuencia y deben ser cuidadosamente analizados para cada situación, geografía, topográfica, de población, densidad de enlaces existentes, costo de los equipos o componentes de protección.</p> <p>El <i>Dynamic spectrum sharing</i> ha sido propuesto como una posible solución. Sin embargo, no existen aún indicadores suficientemente fiables para determinar como la base de datos SAS adoptada por la FCC funcionará en la banda C, ni si es replicable en otras bandas. La FCC ha tardado 4 años para dar su aprobación (septiembre 2019), a los primeros administradores de esta BD para el CBRS en la banda 3,4-3,7 GHz. La fiabilidad técnica en áreas con alta densidad de estaciones móviles y terrenas tardará varios meses. La implementación de este BD levanta fuera de los EE. UU. algunas preguntas en cuanto a la sostenibilidad del modelo de negocios, la gestión privada (por grandes consorcios de big data) y su implicación para la seguridad nacional y el tratamiento de información sensible para la soberanía nacional.<sup>9</sup></p>
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<sup>9</sup> <https://www.fcc.gov/wireless/bureau-divisions/mobility-division/35-ghz-band/35-ghz-band-overview> : “(...)Access and operations will be managed by an automated frequency coordinator, known as a Spectrum Access System (SAS). When managing spectrum access, SASs may incorporate information from an Environmental Sensing Capability (ESC), a sensor network that detects transmissions from Department of Defense radar systems and transmits that information to the SAS. Both SASs and ESCs must be approved by the

5	Respecto de aquella(s) banda(s) de frecuencias que considera apropiada(s) para implementar sistemas móviles de quinta generación (5G) en México, indique el año o periodo en el que estime pertinente que el Instituto ponga a disposición del mercado dicha(s) banda(s) o algún segmento de ella(s), así como las razones técnicas (casos prácticos, experiencias internacionales, etc.), económicas o estratégicas que justifiquen su respuesta.	<p>SSM/SES urge respetuosamente al IFT no poner en ningún caso a disposición del mercado las bandas del SFS que el documento <i>Panorama</i> identifica como viable para IMT/5G sino <u>después</u> del vencimiento del plazo de las concesiones y autorizaciones de los satélites extranjeros otorgadas por la IFT y <u>después</u> del final de la vida útil de Bicentenario y del vencimiento de las pociones orbitales mexicanas. En el esperado caso de que el Gobierno de México considere mantener estos recursos, el IFT debería dar prioridad a las bandas notificadas ante la UIT asociadas a dichas posiciones orbitales y buscar arreglos de frecuencias para acomodar IMT/5G en otras.<sup>10</sup></p> <p>El estado de avance en el diseño, la construcción y los lanzamientos previstos de nuevos sistemas satelitales Ku y Ka (SES-17, VIASAT 3, Júpiter X, Inmarsat FLEX, mPower(O3b), Telesat LEO, Space X, OneWeb, Hispasat, etc..) cada vez mas eficientes en cuanto al uso del espectro y con antenas cada vez menores en costo y diámetro, indica que decenas de ellos estarán operacionales en el próximo quinquenio en la Región 2, para responder al incremento de la demanda en banda ancha y acceso al Internet ultra rápido. Considerando que la vida útil de estos sistemas será de entre 15 y 20 años, los operadores satelitales que han realizado estas inversiones multimillonaria (billonarias en algunos casos), pretenderán asegurar el acceso al espectro y el funcionamiento libre de interferencias en las bandas de frecuencias que se seleccionaron para diseñar dichas redes, en base a lo establecido en los planes de frecuencia y entre los cuales el CNAF por atribuir la banda 27,5-29,5 GHz, al SFS a título exclusivo y primario.</p>
6	Respecto de la(s) banda(s) que considera apropiadas para implementar los sistemas móviles de quinta generación (5G) en México, ¿estima oportuno que dos o más bandas de frecuencias	No se visualiza a corto ni mediano plazo, que la demanda de espectro en 5G en Mexico requiera poner a disposición del mercado dos o mas bandas de frecuencia simultáneamente. Cuando el espectro identificado para IMT

*Commission. SASs will coordinate operations between and among users in three tiers of authorization in the 3.5 GHz band: Incumbent Access, Priority Access, and General Authorized Access...*

<sup>10</sup> 2015-07-24-DOF: Acuerdo Pleno IFT : Transitorios": SEGUNDO.- Las **concesiones** para explotar los derechos de emisión y recepción de señales de bandas de frecuencias asociadas a sistemas satelitales extranjeros que cubran y puedan prestar servicios en el territorio nacional, así como los **permisos para la comercialización** de servicios de telecomunicaciones o de telefonía pública otorgados con anterioridad a la publicación de las presentes Reglas, se respetarán en sus términos hasta que concluya su vigencia, en el entendido que su operación, explotación y prórroga, en su caso, deberá ajustarse.

	<p>debieran ponerse a disposición del mercado de manera simultánea?</p> <p>En caso de que su respuesta sea afirmativa, ¿cuáles serían las bandas de frecuencia o, de ser el caso, segmentos de banda de frecuencias que deberían licitarse?</p> <p>Indique las razones técnicas (casos prácticos, experiencias internacionales, etc.), económicas o estratégicas que justifiquen su respuesta.</p>	<p>en los PAUABF de 2019 y 2020 ya sido efectivamente licitado y tras evaluar el interés de los operadores nacionales e internacionales, se podrá determinar si esta necesidad existe. Al tiempo de esta Consulta Pública, nada indica que la industria móvil esté en condiciones de precipitarse para pujar en las licitaciones, aun en las bandas bajas, consideradas prioritarias para el despliegue de 5G y la mejora de su infraestructura nacional.</p> <p>La elección de las bandas identificadas para IMT debe asegurar que el espectro asignado es suficiente para garantizar el despliegue, pero también seleccionado en las bandas adecuadas. Resulta indispensable proteger los servicios que cumplen funciones esenciales (radionavegación, seguridad nacional, policía/guardia nacional, salvataje marítimo, programas de inclusión social ...) y preservar las bandas de frecuencias que proporcionan conectividad a la población a fin de que no puedan verse afectados por migraciones que afectarían directamente a los usuarios e implicarían una compensación exorbitante a cargo del Estado.</p> <p>En este sentido, preocupa a SSM/SES la expresión del documento en análisis "<i>bandas de frecuencias del espectro radioeléctrico que se pudieran utilizar para el desarrollo de 5G en nuestro país en una primera etapa...</i>" ya que deja entrever que el IFT pretende continuar seleccionando aun mas espectro para esta tecnología. SSM/SES considera que debe evitarse seguir erosionando la banda C. Esta sigue siendo en México, la que cuenta con mas demanda por parte de las televisiones estatales y de las empresas de cable en consideración a su disponibilidad y amplia cobertura. La mayoría de estas TV sigue manteniendo el estándar MPEG, sin embargo, se estima que, en las próximas décadas, el paso progresivo al estándar HEBC, les permitirá una utilización mas eficiente del espectro y ofrecer aun mas canales por MHz.</p>
7	<p>Respecto de la(s) banda(s) que considera apropiada(s) que deben incluirse para implementar los sistemas móviles de quinta generación (5G) en México, ¿cuáles son los potenciales usos y beneficios en los próximos 5, 10 y 20 años de dicha(s) banda(s) de frecuencia(s) para el uso de sistemas móviles de quinta generación (5G) en México?</p> <p>Indique las razones técnicas (estudios de compatibilidad/coexistencia, casos prácticos, experiencias</p>	N/A

	internacionales, etc.), económicas o estratégicas que justifiquen su respuesta.	
8	<p>Respecto de la(s) banda(s) que considera apropiadas para implementar los sistemas móviles de quinta generación (5G) en México, ¿qué cantidad de espectro contiguo y, en su caso, qué segmentación y/o canalización considera adecuada para cada una de la(s) banda(s)?</p> <p>Indique las razones técnicas (casos prácticos, experiencias internacionales, etc.), económicas o estratégicas que justifiquen su respuesta.</p>	N/A
9	<p>Respecto de la(s) banda(s) que considera apropiada(s) para implementar 5G en México, ¿cuál(es) considera que debe(n) ser utilizada(s) exclusivamente para interiores? ¿cuál(es) considera que debe(n) ser utilizada(s) exclusivamente para exteriores? ¿cuál(es) considera que podría(n) ser utilizada(s) para interiores y exteriores?</p> <p>Indique las razones técnicas (estudios de compatibilidad/coexistencia, casos prácticos, experiencias internacionales, etc.), económicas o estratégicas que justifiquen su respuesta.</p>	
10	<p>¿Qué consideraciones adicionales en materia de espectro radioeléctrico estima que el Instituto debería tomar en cuenta para satisfacer la demanda de espectro radioeléctrico para sistemas de quinta generación (5G) en México?</p> <p>Indique las razones técnicas (estudios de compatibilidad/coexistencia, casos prácticos, experiencias internacionales, etc.), económicas o estratégicas que justifiquen su respuesta.</p>	Se acompaña a modo de ejemplo como Anexo 1 la última decisión del Regulador de Australia ACMA (Sept.2019) tras un largo y exhaustivo proceso de estudio y rondas de consultas públicas, sobre 28GHz.
11	De las bandas de frecuencia propuestas en el Documento de Referencia, ¿tiene usted identificado potenciales servicios específicos para ser implementados en la(s) banda(s) de	Las bandas <b>26 GHz y 28GHz</b> se han vuelto vitales para las nuevas redes satelitales ya que por las decisiones regulatorias que han afectado la disponibilidad de la banda C en la última década, la capacidad se ha movido

	<p>frecuencias (IoT, aplicaciones de dispositivos de corto alcance, <i>backhaul</i>, WiFi <i>evolution</i>, servicios satelitales, u otros)?</p> <p>Motive su respuesta y especifique la(s) banda(s) de frecuencias.</p>	<p>hacia la banda Ku cuyos transpondedores se encuentran saturados en toda la Región 2. En estas bandas, además de la provisión de Internet satelital, se esta dando capacidad a los operadores móviles para backhaul celular en 4G/LTE. Este representa en algunas partes de la Región 2 mas del 70% del trafico. México tiene autorizados en estas bandas a casi una decena de sistemas satelitales (GSO y NGSO), algunos de los cuales ya tiene sus gateways operando en las bandas de 26 GHZ y 28GHZ, otros (como es el caso de SES) están en vías de implementación y operaran con enlaces de alimentación en 26 GHz y 28 GHz y enlaces a usuario en 27,5-29,5 GHz.</p> <p>En las bandas <b>37,5-42,5 GHz, 47,2-50,2 GHz y 50,4-51,4 GHz</b>, SES junto a otros operadores satelitales tienen planificado en el diseño en nuevas constelaciones NGSO para Internet Ultra rápido y para ESIMs, como ya se informó al CTER.</p> <p>En la banda <b>51.4-52.4 GHz</b>, los operadores satelitales tienen contemplado nuevas redes satelitales que operando en esta banda podrán expandir su capacidad en la banda Ka. SSM/SES valora muy positivamente la posición de apoyo de Mexico, que contribuyó a una IAP en la CITEL en agosto 2019, la que aboga por una nueva atribución de esta banda al SFS para uso por sistemas geoestacionarios (Ref. respuesta a la Pregunta 3).</p>
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### III. Comentarios, opiniones, aportaciones generales u otros elementos de análisis formulados por el participante

**Nota 3:** En la presente sección se podrá realizar comentarios, opiniones, aportaciones u otros elementos de análisis de carácter libre relacionadas con bandas de frecuencias del espectro radioeléctrico para sistemas móviles de quinta generación (5G). En caso de realizar aportaciones relacionadas con el Documento de Referencia “Panorama del espectro radioeléctrico en México para servicios móviles de quinta generación”, colocar la página correspondiente en la primera columna; de lo contrario, colocar la leyenda “N/A” (No Aplica).

**Nota 4:** El interesado deberá añadir las filas que considere necesarias para formular los comentarios, opiniones, aportaciones u otros elementos de análisis que considere pertinentes.



Número de página del estudio/documento de referencia	Comentario(s), opinión(es), aportación(es) u otros elementos de análisis
Anexo 1 p.39	<p>ANEXO 1 - Respecto de la referencia a Australia, se acompaña en Anexo la posición del Regulador ACMA (SEPT2019), que se decidió por la protección del SFS en la banda de 28GHz después de un largo proceso con varias consultas publica.</p> <p>ANEXO 2 - <i>Contribución de ESOA para el POD 1.13 de octubre 2019</i></p> <p>NOTA. En cuanto a la situación de la banda de 28 GHz en la India, las discusiones entre el operador satelital estatal ISRO, -que se opone a su identificación y esta construyendo un satélite Ka-HTS que operara en esta banda- y el TRAI (equivalente al IFT) que propicia el uso de las bandas milimétricas para 5G, no esta finalizada y no se puede predecir en esta fase el desenlace de este debate.</p>

# Future use of the 28 GHz band

## Planning decisions and preliminary views

SEPTEMBER 2019

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# Executive summary

The 28 GHz band (27.5–29.5 GHz) is at the forefront globally for the delivery of new generation satellite services, along with the delivery of millimetre wave (mmWave<sup>1</sup>) fifth generation (5G) wireless broadband services. It is one of a number of mmWave bands the Australian Communications and Media Authority (ACMA) has identified in its [Five-year spectrum outlook 2019–23 \(FYSO 2019–23\)](#) where there is evidence of competing demands for spectrum access.

Completing the replanning of the 28 GHz band is a significant priority for the ACMA and important in providing certainty to stakeholders interested in using this spectrum.

When reviewing arrangements in a band, the ACMA is guided by its [Principles for Spectrum Management](#) and the existing legislative framework. This includes having regard to the objects of the *Radiocommunications Act 1992*, such as maximising the overall public benefit derived from using the radiofrequency spectrum.

This planning decision is informed by an extended review and consultation process. This commenced with the release of the [28 GHz spectrum planning discussion paper](#) in September 2018 (the 2018 Discussion paper). The 2018 Discussion paper detailed international developments and existing arrangements in the band as well as drivers for change. It also sought information from stakeholders to assist in the formation of possible planning options.

This was followed by the [Replanning of the 28 GHz band: Options paper](#) (the Options paper) released in April 2019. The Options paper identified a range of planning options, provided the ACMA's preliminary assessment on the public benefits of each and sought feedback from stakeholders on the most appropriate approach. When developing and assessing planning options, the outcomes of the [26 GHz band review process](#) were also considered, particularly in light of potential use across both bands for terrestrial wireless broadband.

This current paper concludes the ACMA's review of planning arrangements for the 28 GHz band. It details planning decisions made for the 28 GHz band as well as preliminary views the ACMA has formed on the associated licensing and technical conditions that will subsequently be developed.

Key planning decisions made for the 28 GHz band include:

- > An increase in the amount of spectrum available for ubiquitous fixed satellite services (FSS)<sup>2</sup> use, including the availability of at least 1.9 GHz<sup>3</sup> of contiguous

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<sup>1</sup> mmWaves span 30 to 300 GHz (that is, a wavelength of 1 cm to 1 mm). However, in the current 5G context, mmWave bands are considered to span from 24 GHz up to 86 GHz.

<sup>2</sup> In the context of this paper the term 'ubiquitous FSS' refers to fixed earth stations at unknown locations (typically end user terminals) and earth stations in motion (ESIM). Due to the nature of these devices they are typically not coordinated with other services to manage interference.

<sup>3</sup> This includes spectrum in the adjacent 29.5–30 GHz frequency range where arrangements for ubiquitous FSS are already in place. This band was outside of the scope of the 28 GHz band review.

uplink spectrum Australia-wide. This expands to 2.5 GHz of spectrum outside of large population centres. The ACMA will also investigate approaches that may allow uncoordinated FSS use in an additional 600 MHz of spectrum within large population centres, potentially with some constraints—this would enable access to a total of 2.5 GHz of spectrum Australia-wide.<sup>4</sup>

- > Continuation of apparatus licensed arrangements for FSS earth stations across the entire 28 GHz band Australia-wide, providing access to 2.5 GHz of spectrum on a coordinated, first in-time basis.<sup>3</sup>
- > The introduction of arrangements for fixed wireless access (FWA) services across the entire 28 GHz band. This will be on a co-primary basis with apparatus licensed FSS earth stations in large population centres in the 27.5–28.1 GHz frequency range, and on a secondary (no protection) basis to the FSS in other areas and frequencies. Similar to the 26 GHz band, the ACMA will investigate using the proposed new area-wide apparatus licence type to enable this use.<sup>5</sup>
- > Removal of arrangements for new fixed point to point (PTP) services in the 28 GHz band and grandfathering existing services for a minimum seven years. It is noted that if area-wide apparatus licence arrangements are implemented in the band, new PTP services could be deployed within individual licence areas. The ACMA will also revise PTP arrangements in the 38 GHz band to provide an alternative option for new wide-channel systems.

The planning decisions made are based on one of the ACMA's preferred options identified in the Options paper (Option 3), with some modifications based on feedback received. These modifications include:

- > Developing arrangements for FWA use across the entire 28 GHz band Australia-wide. Use outside the 27.5–28.1 GHz band in large population centres will be on a secondary basis to the FSS. Given there are no interference concerns from FWA into FSS earth stations, the ACMA is of the view that FWA use can coexist with FSS satellite receivers on a 'no protection' basis. This approach increases the flexibility available for FWA deployments. It will require FWA operators to be aware of the possibility of interference from FSS to their operations. However, given the amount of spectrum available and that dedicated primary FWA spectrum is available in both the 26 GHz band and elsewhere in the 28 GHz band, the ACMA sees opportunities for wider spectrum use by adopting this approach to managing coexistence.
- > Further investigating approaches that would allow ubiquitous FSS to operate in those areas and parts of the band where FWA operates on a primary basis. This could include constraints on how ubiquitous FSS use the spectrum in these areas to enable coexistence.
- > Investigating options to support the aggregation of multiple PTP channels in one or more bands below 28 GHz.

The ACMA has formed the view that this combination of measures will best maximise the overall public benefit derived from use of the band. This is on the basis that establishing these arrangements will support new and existing uses of the spectrum

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<sup>4</sup> The ACMA notes that the decisions and preliminary views in this paper are focused on arrangements for the FSS uplink segment (27.5–29.5 GHz band). Specific proposals for the associated FSS downlink segment (17.7–20.2 GHz band) are not included. The ACMA recognises that further work on the associated downlink segment, based on the scope of changes required for the uplink segment identified in this paper, will be required.

<sup>5</sup> See [IFC 19/2019](#) Proposed area-wide apparatus licence.

under flexible access arrangements. Industry will also have the benefit of increased access to spectrum suitable for current and evolving satellite services such as very high throughput broadband both to the home and to moving platforms.

Similarly, new arrangements will significantly increase opportunities for terrestrial fixed wireless broadband, including 5G. In both cases these opportunities will deliver flow-on benefits to consumers in terms of quality and range of services available.

Importantly, these changes come at little or no detriment to existing users of the spectrum, with explicit support for PTP use being the only arrangements ceasing in the band. However, individual users will continue to be able to operate for an extended period time (up to seven years) reducing the impact of changes on their existing systems.

In coming to its view on the 28 GHz band, the ACMA had regard to planning decisions and intentions already made for the 26 GHz band—specifically regarding spectrum proposed for spectrum licensing optimised for wide-area wireless broadband (that is, the 2.4 GHz within the 26 GHz band proposed by the ACMA for spectrum licensing in populated areas).

Overall, the ACMA's recent decisions on the 26 GHz and 28 GHz bands have established new planning arrangements for over 5 GHz of mmWave spectrum of great interest for both terrestrial and satellite broadband services. This is in addition to shared access to mmWave spectrum under class licensing arrangements in the 60 GHz band which the ACMA made available in August 2019.

Together with the 26 GHz and 28 GHz bands, these planned arrangements are intended to support a wide range of spectrum interests under a variety of licensing arrangements. These arrangements will enhance competition both between different spectrum uses and provide an opportunity for new entrants in the band. This competition at the use and user levels is expected to offer significant consumer benefits.

Based on planning decisions made in this paper, a summary of the overall proposed configuration of the broader 26 GHz and 28 GHz bands is shown in Figure 1.

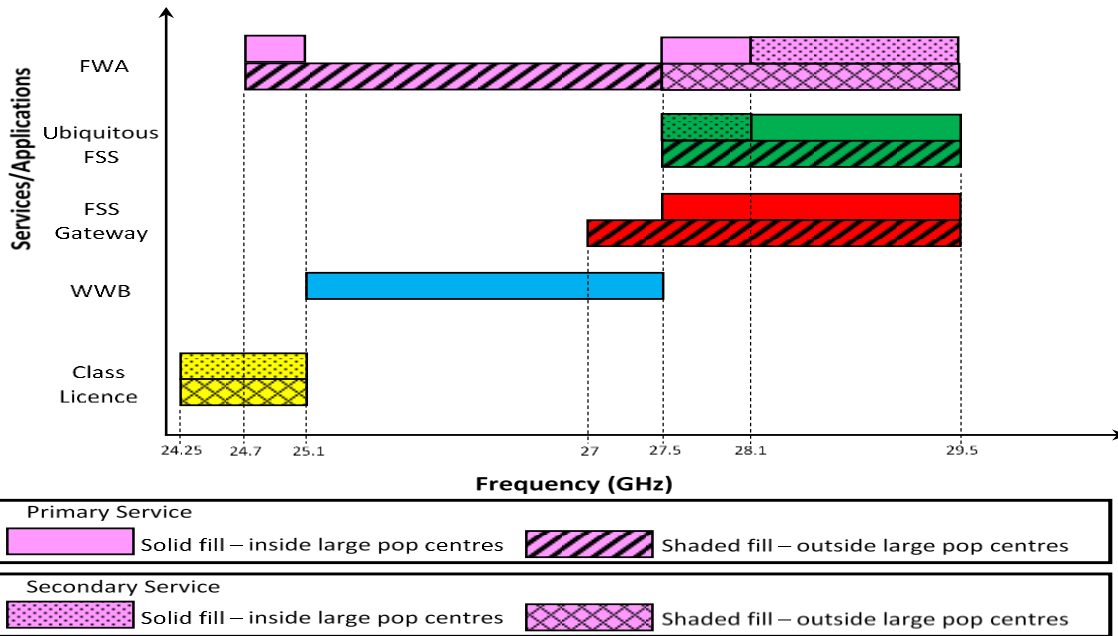
### **Next steps**

To give effect to the decisions and preliminary views detailed in this paper, the ACMA will:

- > Review the [Radiocommunications \(Communication with Space Object\) Class Licence 2015](#) to investigate and implement the changes proposed for ubiquitous FSS in the 28 GHz band. This will also consider possible arrangements for ubiquitous FSS in the associated FSS downlink band (17.7–20.2 GHz).
- > Develop and consult on apparatus licence arrangements to support FWA use in the 28 GHz band. This includes investigating the use of the proposed new area-wide apparatus licences. Work on this issue will be combined with the development of spectrum and apparatus licence arrangements in the 26 GHz band.
- > Investigate options to support the aggregation of multiple PTP channels in one or more bands below 28 GHz.



Figure 1: Summary of planning arrangements for the 26 GHz and 28 GHz bands



# Introduction

In April 2019, the ACMA released [the Options paper](#). The Options paper identified the different services currently using, as well as parties interested in gaining access to, the 27.5–29.5 GHz (28 GHz) band. It outlined relevant international trends, domestic developments, drivers for change as well as coexistence issues between the identified services. Most critically, it considered a range of planning options for the future use of the band.

The Options paper discussed and assessed the following planning options for the 28 GHz band:

- > Option 1—arrangements for wide-area wireless broadband (WWB) suitable for both fixed and mobile 5G, PTP, FWA and FSS (both gateway<sup>6</sup> and ubiquitous).
- > Option 2—arrangements for PTP, FWA and FSS (both gateway and ubiquitous).
- > Option 3—arrangements for FWA and FSS (both gateway and ubiquitous).
- > Option 4—arrangements for FSS (both gateway and ubiquitous) only.

Stakeholders were asked a series of questions about the suitability of the proposed options, as well as potential grandfathering arrangements for PTP services. Much of this information has not been reproduced here so this paper should be read in conjunction with the Options paper.

The ACMA identified Options 2 and 3 as its preferred planning approach for the 28 GHz band. Both options provide additional spectrum for FWA and ubiquitous FSS use, with the key difference being whether future PTP services are accommodated in the band or can be adequately catered for in alternative bands. To help inform its decision making, the ACMA ran a separate consultation process on the [viability of wide channel PTP arrangements in the 38 GHz band](#).

This paper considers issues raised in submissions to the Options paper which have informed planning decisions the ACMA has made for the 28 GHz band. It also details preliminary views the ACMA has formed on the associated licensing and technical conditions that will subsequently be developed.

## Legislative and policy environment

The Options paper identified the relevant considerations in the ACMA's legislative and policy environment which inform its spectrum planning decisions. This included descriptions of:

- > the primary legislation under which the ACMA currently manages spectrum, being the *Radiocommunications Act 1992* (the Act)
- > the [Principles for Spectrum Management](#), which provide guidance when making decisions on spectrum use
- > the three licence types under which spectrum access can be authorised, being apparatus, spectrum and class licensing
- > key ACMA tools which provide transparency to industry and the public on spectrum management and allocation programs, including:

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<sup>6</sup> In this paper FSS gateway is intended to refer to all coordinated apparatus licensed earth station uses.

- > the [Mobile broadband \(MBB\) strategy](#), which provides a framework for the consideration and, where deemed appropriate, progression of frequency bands to allocation for provision of mobile (and other wireless) broadband services
- > the [FYSO 2019–23](#), which sets out the ACMA's forward work program over a five-year period.

# ACMA planning decisions and preliminary views

## Consideration of planning options

When determining whether and how to progress re-planning activities in the 28 GHz band, the ACMA considered a variety of issues. This included current uses of the band, international trends, issues raised in submissions to both the 2018 Discussion paper and the Options paper, the effect each option would have on incumbent services and the relative incremental benefits and costs for each replanning option.

The ACMA also considered the outcomes of the 26 GHz band review process when assessing options and making planning decisions for the 28 GHz band. This has allowed for a more holistic assessment of the spectrum needs of the services and applications seeking access to the bands than would have been the case if they were considered in isolation.

In the Options paper, the ACMA identified Options 2 and 3 as its preferred options for the 28 GHz band. Both of these provide additional spectrum for FWA and FSS use, with the key difference being whether new PTP services continue to be accommodated in the band.

A summary of responses to the Options paper is provided at Appendix A. After considering responses and taking into account the discussion of issues below for each incumbent and prospective new services in the band, the ACMA has determined that adopting Option 3, with some modifications based on feedback received, is considered the most appropriate outcome.

For the purposes of this paper the term 'large population centres' is defined in Appendix B. This term is intended to refer to the same areas that the Minister for Communications, Cyber Safety and the Arts (the minister) may decide to re-allocate for the issue of spectrum licences in the 26 GHz band. In June 2019 the ACMA consulted on proposed re-allocation areas as part of a [draft recommendation to the minister](#). Pending final decisions, it is noted that the definition of large population centres may be varied to ensure they match the actual areas that are re-allocated.

## WWB arrangements

The Options paper stated the ACMA's view that a suitable amount of spectrum for WWB use (including mobile 5G) had already been identified in the 26 GHz band. This included 2.4 GHz of spectrum in large population centres for the issue of spectrum licences (generally preferred for WWB deployments) and 2.8 GHz of spectrum outside these areas for apparatus licensed deployments suitable for WWB and local area FWA. As such, neither sub-Option 1a or 1b were expected to maximise public benefit and therefore these options were not considered to be the most appropriate use of the band.

The ACMA has reviewed its assessment of sub-Option 1a or 1b taking into account responses to the Options paper. While the responses provided arguments for allocating spectrum to WWB, they did not provide any new information which the ACMA had not already considered in forming its original view. Considering all the competing demands for access to the 26 GHz and 28 GHz bands, the ACMA does not propose to develop arrangements for WWB in the 28 GHz band. It makes this

decision, noting the 2.4 GHz of spectrum identified for WWB in the 26 GHz band and the fact there are numerous other mmWave bands under active consideration for WWB.

### **PTP arrangements**

The Options paper indicated the ACMA's intention to investigate the viability of accommodating the existing 28 GHz band PTP arrangements, including wide channel arrangements, in the 38 GHz band. To help inform its decision, the ACMA conducted a separate consultation process regarding the implementation of [wide channel PTP arrangements in the 37.0–39.5 GHz \(38 GHz\) band](#). After considering submissions to this process, a decision was made to introduce the proposed arrangements.

The ACMA considers that in most circumstances the 38 GHz band would be a suitable alternative for PTP services that would otherwise have used the 28 GHz band. However, it is acknowledged that it may not be suitable in cases where the additional propagation losses in the 38 GHz band cannot be addressed through other link engineering approaches. In this case lower frequency bands are generally preferred. While there are such arrangements for fixed links requiring bandwidths less than or equal to 80 MHz, there are currently no channel arrangements in bands below 28 GHz for bandwidths greater than 80 MHz.

Based on responses to the 28 GHz options paper and the outcome of the 38 GHz consultation process, the ACMA will take the following actions regarding PTP in the 28 GHz band:

- > Remove current 28 GHz PTP arrangements. This action will allow other services to access spectrum in the band that may otherwise have been occupied by PTP services.
- > Further investigate options to support the aggregation of multiple PTP channels in one or more band below 28 GHz.
- > Implement grandfathering arrangements for all existing 28 GHz PTP licences.

In the event an option was adopted that no longer supported new PTP licences in the 28 GHz band, the Options paper sought comment on arrangements to allow incumbent PTP licences to continue operating under the current arrangements for a defined period of time (that is, be 'grandfathered'). All responses supported such an approach. It was generally felt that the length of any grandfathering period should be long enough for PTP licensees to recoup their investment.

The ACMA will grandfather PTP services for a minimum seven-year period. The grandfathering period has been adopted because the ACMA considers that the continued operation of existing PTP services will have a minor impact on spectrum availability for other services Australia-wide. This is due to the small number of PTP licences, their location in regional areas and highly directional nature. Pending any coexistence issues with new services experienced over this period, the ACMA may choose to allow incumbent PTP licences to continue operating in the band beyond this time on a 'no interference and no protection' basis.

The ACMA is also open to considering case-by-case changes to existing PTP licences within the grandfathering period. The primary consideration in such cases will be the potential increase to spectrum efficiency and changes to the interference environment.

It is noted that as part of the arrangements proposed for the 28 GHz band, the ACMA will investigate the use of area-wide apparatus licences. If implemented, it would be possible for new PTP services to be deployed within individual licence areas.

## FSS arrangements

The Options paper highlighted the increasing capacity requirements of new satellite services and the resulting desire by operators for access to more spectrum, particularly in the 28 GHz band. This is reflected by the increasing number of high-throughput satellite (HTS) and very high-throughput satellite (VHTS) systems being deployed. To support such use, all options proposed by the ACMA increased the amount of spectrum available for uncoordinated, ubiquitous FSS earth stations. Options 2, 3 and 4 also maintained existing arrangements for coordinated FSS earth stations at fixed and known locations (referred to in this paper as 'FSS gateways') across the entire band Australia-wide. However, Option 1 proposed removing these arrangements in a portion of the band in large population centres to support WWB.

The majority of responses to the consultation acknowledged the need to provide additional spectrum for ubiquitous FSS use and the value of ensuring there are ongoing arrangements for coordinated FSS gateways. The satellite industry also expressed their preference for exclusive access to the entire band Australia-wide especially for the purposes of ubiquitous FSS use.

After reviewing responses, the ACMA is of the view that additional spectrum should be made available for ubiquitous FSS use in the 28 GHz band to meet rising demand.

However, this needs to be balanced with the needs of other services in the band such as FWA (noting the decision to move arrangements for new PTP services to the 38 GHz band). Since the ACMA considers that the current spectrum needs of WWB will be adequately covered by decision made in the 26 GHz band review process, Option 1 will not be adopted. This reasoning supports Option 3 being the most appropriate approach to meet future FSS needs.

Option 3 maintains existing arrangements for FSS gateways across the entire band Australia-wide. It also increases the existing provisions for ubiquitous FSS from 600 MHz to 1.4 GHz Australia-wide, from 28.1–29.5 GHz. In addition, ubiquitous FSS will also gain access to an additional 600 MHz of spectrum outside of large population centres in the 27.5–28.1 GHz frequency range (refer to Figure 2). When this is included with the existing 500 MHz available in the adjacent 29.5–30 GHz frequency range, the ACMA considers there will be a suitable amount of spectrum to support the growing demand for FSS.

As part of Option 3, the ACMA also proposed investigating the possibility of permitting ubiquitous FSS use on a 'no interference basis' in areas and frequencies identified for FWA on a primary basis (refer to 'FWA arrangements'). The Options paper noted that this may require ubiquitous FSS devices to be subject to deployment restrictions to reduce the risk of interference. While the majority of submissions to the Options paper took a position that coexistence between FWA and ubiquitous FSS was untenable, some responses indicated that coexistence could be achieved by imposing deployment restrictions.

After considering responses, the ACMA has decided to further investigate the possibility of arrangements to support ubiquitous FSS use in areas and frequencies identified for FWA on a primary basis. This presents an opportunity to enable greater use of the spectrum provided suitable measures to manage interference can be identified.

The ACMA notes that this paper is limited to considering options and arrangements for the FSS uplink in the 27.5–29.5 GHz band. Options for the associated FSS downlink segment (17.7–20.2 GHz band) are not included. The ACMA expects to undertake further work on the associated downlink segment, based on the scope of changes required for the uplink segment identified in this paper.

In summary, the ACMA will take the following actions regarding the FSS in the 28 GHz band:

- > maintain existing apparatus licence arrangements for coordinated FSS earth stations (that is, gateways) across the band Australia-wide
- > work with industry to identify possible arrangements to support ubiquitous FSS use in areas and frequencies identified for FWA on a primary basis (that is, inside the 27.5–28.1 GHz frequency range in large population centres—refer to Figure 2
- > extend existing arrangements for uncoordinated ubiquitous FSS use to cover all areas and frequencies not identified for FWA use on a primary basis
- > undertake further assessment on options for the extension of existing ubiquitous FSS use in the associated downlink segment in the 17.7–20.2 GHz band.

### **FWA arrangements**

As outlined in the Options paper, one of the outcomes from the [Future use of the 3.6 GHz band](#) process was that the ACMA committed to investigating the possibility of apparatus licensed arrangements in part of the 28 GHz band for localised FWA services. The intention was to provide additional spectrum options for wireless internet service providers (WISPs), local councils, mining companies and other industry verticals.

The ACMA identified two preferred options for additional FWA spectrum in the 28 GHz band, one if PTP arrangements in the band were retained and one if they were not.

Many submissions supported identifying more spectrum for FWA. However, a number of responses from the satellite industry indicated a preference for exclusive FSS use of the 28 GHz band Australia-wide. This was due to a coexistence issue between ubiquitous FSS and other services and a preference to not have different arrangements for the FSS in different geographic areas. There were also some concerns raised about potential aggregate interference from FWA deployments into satellite receivers.

After reviewing responses, the ACMA still considers that additional spectrum should be made available for FWA use in the 28 GHz band. Since arrangements for WWB will not be implemented in the band, and arrangements for new PTP services will not be retained, this points to Option 3 being the most appropriate way forward. It is further considered that 600 MHz of spectrum (from 27.5–28.1 GHz) should be made available on a primary basis (that is, provided protection from other services) in large population centres in the 28 GHz band. When combined with arrangements in the 26 GHz band, this provides a total of 1000 MHz for FWA use on primary basis in large population centres. The ACMA considers this a suitable amount of spectrum to support multiple FWA operators in an area and allow each to provide a competitive service.

In the remaining areas and parts of the 28 GHz band the ACMA will develop apparatus licence arrangements for FWA use on a ‘no protection’ basis from the FSS (that is, on a secondary basis to the FSS), this approach:

- > Provides interference management between FWA operators.
- > Acknowledges that the 28 GHz band is a satellite uplink band (that is, an earth station transmit band) and there is no risk of interference to FSS earth stations.
- > Allows unconstrained FSS use in the relevant frequencies and areas.
- > Allows FWA operators to opportunistically use more of the 28 GHz band, thereby maximising utility of the spectrum. This could be used by operators to complement (or instead of) other primary FWA allocations across the 26 GHz and 28 GHz bands. These primary allocations also provide operators with options to fall back on in the event interference is experienced.

This outcome provides a total of 1.4 GHz of spectrum in large population centres and 2 GHz of spectrum outside large population centres for FWA use on a secondary basis (refer to Figure 2).

As detailed in the Options paper and the [Future use of the 26 GHz band: Planning decisions and preliminary views](#) paper, the ACMA is of the view that FWA can coexist with FSS satellite receivers. To safeguard against any potential interference issues and, in line with the outcomes of the 26 GHz band review, the ACMA will work with industry to identify and implement appropriate licence conditions for FWA use of the 28 GHz band. These additional conditions will be developed within a broader technical liaison group (TLG) that will be formed to develop spectrum and apparatus licensing arrangements for access to the 26 and 28 GHz bands.

The allocation for FWA is primarily to support the provision of localised wireless broadband services by WISPs, utility companies, the mining industry and other industry verticals. Noting that, in the 28 GHz band, such use is expected to primarily be for fixed applications, and that there is a significant amount of spectrum already identified for fixed and/or mobile use in the 26 GHz band, the ACMA considers it appropriate that 28 GHz arrangements be limited to fixed wireless only.

Similar to the 26 GHz band, the ACMA will also investigate the use of the new area wide apparatus licence approach for FWA in 28 GHz band. This new approach to apparatus licensing was recently [consulted on by the ACMA](#). It is intended that the relevant arrangements be developed simultaneously with those created for the 26 GHz band.

In summary, the ACMA will take the following actions regarding FWA in the 28 GHz band:

- > Create apparatus licence arrangements for FWA in large population centres on a primary basis in the 27.5–28.1 GHz frequency range. Create apparatus licence arrangements for FWA on a secondary basis to the FSS in other areas and frequencies across the band.
- > Limit use to fixed user terminals only.
- > Investigate the use of area-wide licensing in the band.

### **Class licence arrangements for body scanners**

The [Radiocommunications \(Body Scanning – Aviation Security\) Class Licence 2018](#) supports arrangements for the use of body scanners across the 24.25–30 GHz frequency range. Such use is limited to Australian airports for security screening purposes. In the Options paper the ACMA stated it did not intend to change these arrangements. The ACMA will consider services operating under this class licence when formalising the licensing arrangements for the band. However, the ACMA does not foresee the need to amend the class licence based on the outcome of this consultation.

### **High altitude platform systems (HAPS) arrangements**

While HAPS have been identified as a possible application in 28 GHz band, the Options paper stated that the ACMA was not contemplating use of the band by HAPS at this time. The ACMA acknowledges that internationally there is evolving interest for HAPS use of the 28 GHz. However, this is yet to evolve into the deployment of fully-fledged commercial systems and there is currently limited interest domestically in using the band for HAPS. Furthermore, WRC-19 agenda item 1.14 is still investigating additional identifications for HAPS in a variety of bands. The ACMA will continue to monitor international and domestic developments for HAPS, including the outcomes of WRC-19, in the 28 GHz and other bands. Consideration of possible arrangements for



HAPS will be progressed under a separate consultation process as demand and spectrum options become more certain.

## **Coexistence of planned services and applications**

The Options paper provided a preliminary examination of the ability for proposed and incumbent services and applications to coexist in the 28 GHz band. Following analysis of submissions to the Options paper and subsequent identification of a planning approach for the band, the ACMA has further assessed what conditions and/or further work is required to ensure arrangement implemented effectively manage interference and facilitate coexistence between different services. This section summarises the outcomes of this work.

### **FWA and FSS earth stations at fixed and known locations**

International and domestic analysis indicates that FWA and FSS earth stations operating at fixed and known locations (referred to in this paper as FSS gateways) are able to coexist in the 28 GHz band—provided appropriate coordination procedures and protection criteria are defined. Such use could be supported by the requirement to take out apparatus licences for both FWA and FSS gateways. This means that, before a licence is issued, prospective licensees would be required to satisfy defined coordination procedures and protection criteria in order to manage interference between the two services.

The ACMA will work with industry to develop the relevant apparatus licence arrangements to support sharing between FWA and FSS Gateways. This will take into account:

- > the fact that the 28 GHz band is a satellite uplink band (that is, an earth station transmit band) and there is no risk of interference to FSS earth stations
- > areas and frequencies where FWA use will be on a co-primary and secondary basis to the FSS
- > options to improve sharing by taking advantage of terrain, local clutter and other measures to improve site shielding.

It is noted that the use of deployment restrictions may also be considered to help maximise frequency re-use and manage potential interference. Such criteria may include, maximum in-band radiated power limits, unwanted emission limits, restrictions on antenna tilt angles and power flux density limits.

### **FWA and uncoordinated, ubiquitous FSS**

#### ***Fixed terminals***

While fixed and uncoordinated ubiquitous FSS terminals may be deployed anywhere, once deployed these stations do not move. This could allow for a more controlled interference environment when sharing spectrum with other services. It would also make it easier to identify the source should interference occur.

The ACMA's preliminary view is that there is a possibility for FWA and fixed ubiquitous FSS terminals to coexist under certain conditions without the need to coordinate. These conditions include different combinations of geographical separation/isolation, taking a more detailed account of environmental factors (for example, terrain and clutter) and/or defining deployment restrictions on ubiquitous FSS use (for example, limiting minimum elevation angle, of-axis radiated power limits, site shielding). Following the release of this paper, the ACMA will further investigate the possibility of sharing between these services with industry members. This will be done as part of the review of the [Radiocommunications \(Communication with Space Object\) Class](#)

[Licence 2015](#) to expand existing arrangements for ubiquitous FSS use in the 28 GHz band.

### ***Earth stations in motion (ESIM)***

The mobile/nomadic nature of ESIM makes it difficult for them to share spectrum with other services in the same geographical area. This presents a coexistence issue in parts of the 28 GHz band where ESIM would be required to not cause interference to FWA services. However, the ACMA considers there may be options to support ESIM use in such scenarios provided appropriate deployment restrictions on their use are applied. The most practical means to currently do this is by ensuring a minimum separation between ESIM and other services.

For land ESIM, the ACMA considers the only practical way to ensure a minimum separation distance with other services is by defining areas where devices can and cannot be used. Given FWA use of the 27.5–28.1 GHz frequency range will be on a primary basis in large population centres, to manage interference, the ACMA does not propose developing arrangements for land ESIM use in these frequencies and areas.

For aeronautical ESIM, the ACMA is aware of draft ITU-R studies that have identified altitude limits or power flux density limits on the ground as methods to manage interference with other services. For maritime ESIM, the same studies have indicated a nominal separation distance from other terrestrial based service as methods to manage interference. It is noted these studies have not yet been finalised and different methods and results could apply for an Australian specific FWA scenario. The ACMA has also identified restricting the deployment of FWA services (or make them secondary) in and around airports and major maritime ports as another technique to manage interference.

Following the release of this paper, the ACMA will further investigate options to support aeronautical and maritime ESIM use in areas where FWA is allocated on a primary basis. The work will be conducted as part of the review of the [Radiocommunications \(Communication with Space Object\) Class Licence 2015](#) to expand existing arrangements for ubiquitous FSS use in the 28 GHz band.

It is noted that where FWA use is on a ‘no protection’ basis to ubiquitous FSS, the ACMA does not intend to apply restrictions on ESIM use. Instead it would be up to the FWA operator to assess the risk of interference to their business model.

### **Protection of FSS satellite receivers operating in the 27.5–29.5 GHz band**

As detailed in the Options paper and the [Future use of the 26 GHz band: Planning decisions and preliminary views](#) paper, the ACMA is satisfied that FWA systems can coexist with FSS satellite receivers. To safeguard against any potential interference issues, the ACMA will adopt the same restrictions on fixed transmitters as implemented in the 26 GHz band. The ACMA will work with industry to identify and implement appropriate licence conditions for FWA use of the 28 GHz band. These additional conditions will be developed within the TLG formed to develop arrangements for apparatus licensed FWA use of the 28 GHz band.

In line with the outcomes of the 26 GHz band review, the ACMA’s preliminary view is that the following licence conditions should apply to all FWA services operating in the 27.5–29.5 GHz frequency range:

- > outdoor base stations must have mechanical down tilt equal to or greater than 0 degrees
- > outdoor base stations must not direct antenna beams (via electrical steering) to elevation angles greater than 5 degrees above the horizon for more than 5 per cent of time

- > outdoor fixed UEs must not direct their antenna beam (via electrical steering) to within 1.5 degrees of the geostationary orbit (GSO) arc
- > reduced base station total radiated power (TRP) limit of 25 dBm/200 MHz.

The aim of these additional conditions is to ensure that FWA networks are designed and optimised to serve user equipment below the base station. This way they will act as a safeguard to ensure that FSS satellite receivers are protected from FWA operations. Unlike the 26 GHz band, it is intended these conditions be applied to FWA use Australia-wide. This ensures all potential new FSS in the 28 GHz band will be provided with this additional interference safeguard.

### **Coexistence with body scanners**

The [Radiocommunications \(Body Scanning – Aviation Security\) Class Licence 2018](#) supports arrangements for the use of body scanners across the 24.25–30 GHz frequency range. These services are subject to restriction on radiated power and operation within airports for security screening purposes. This confines their use to security screening areas which are typically within controlled premises with significant shielding to the external environment.

The ACMA considers this to be a low risk interference environment that can efficiently be site-managed at airports. To avoid the need for changes in operation to body scanners, in the event there is interference it will be the responsibility of FWA licensees to make change to resolve the issue.

### **Coexistence with services in the 26 GHz band**

As part of the outcomes detailed in the [Future use of the 26 GHz band: Planning decisions and preliminary views](#) paper, the ACMA announced its intentions to recommend that the minister reallocate the 25.1–27.5 GHz frequency range for the issue of spectrum licences in large population areas. In May 2019 the ACMA consulted on the [draft recommendation to the minister](#). If the Minister accepts the ACMA's recommendation and makes a re-allocation determination, the ACMA will progress work to develop arrangements for apparatus and spectrum licensed use of the 26 GHz band by wireless broadband services. This work will initially be undertaken by a TLG and later publicly consulted on. As part of this work, the boundary conditions between services operating in the 26 GHz and 28 GHz will need to be considered. This will include consideration of criteria such as unwanted emission limits and a potential synchronisation requirement. The ACMA will commence the TLG process in Q4 2019.

## **Planning decisions and preliminary views**

This section summarises planning decisions made for the 28 GHz band; these are illustrated in Figure 2. It also details preliminary views the ACMA has formed on the associated licensing and technical conditions that will subsequently be developed.

The full suite of licensing provisions and conditions that will apply are not included in this paper, these will be developed with any additional consultation processes on relevant licensing frameworks and instructions as required, in accordance with normal practice. However, preliminary views on which licence conditions might be appropriate—particularly those conditions which are fundamental for coexistence with existing services—are included. Indicative timeframes for the subsequent work required to implement planning decisions are defined under 'Next steps' of this paper.

This paper is limited to considering options and arrangements for the FSS uplink in the 27.5–29.5 GHz band. Options for the associated FSS downlink segment (17.7–20.2 GHz band) will be considered as part of further work on the associated downlink

segment, based on the scope of changes required for the uplink segment identified in this paper. This work will be conducted as part of the update to arrangements in the [Radiocommunications \(Communication with Space Object\) Class Licence 2015](#) work item arising from the decisions made in this paper.

**Figure 2: Proposed allocation for the 28 GHz band**

27.5–28.1 GHz (600 MHz) INSIDE POP. CENTRES Primary: FWA/FSS gateway Secondary: ubiquitous FSS*	28.1–30 GHz (1900 MHz) AUSTRALIA WIDE Primary: All FSS Secondary: FWA
27.5–28.1 GHz (600 MHz) OUTSIDE POP. CENTRES Primary: All FSS Secondary: FWA	

\* The possibility of this, including any restrictions on use, will be further investigated

## Planning decisions

The ACMA has decided to:

- > Remove arrangements for new PTP licences in the paired frequency range 28.1085–28.4445 GHz and 29.1165–29.45 GHz.
- > Implement grandfathering arrangements for existing PTP licences. The period for the grandfathering arrangements will be set at a minimum period of seven years. Grandfathered fixed PTP services will be allowed to amend their services during the grandfathering period. However, the ACMA will consider these requests on a case by case basis, with the primary consideration being that any amendment should either maintain or enhance the overall spectrum utility for all services.
- > Implement apparatus licensing arrangements for FWA services, limited to communications with fixed terminals only, across the entire 28 GHz band Australia-wide as follows:
  - > FWA services will operate on a no protection basis from FSS services (both apparatus licensed FSS earth stations and ubiquitous FSS) Australia-wide except within the frequency range 27.5–28.1 GHz inside large population centres
  - > In the frequency range 27.5–28.1 GHz and inside large population centres, FWA services will operate on a co-primary basis with apparatus licensed FSS earth stations and will be afforded protection from ubiquitous FSS
  - > FWA services will operate on a first-in-time coordinated basis with respect to other FWA stations in all areas and frequencies.
- > Extend existing arrangements in the [Radiocommunications \(Communication with Space Object\) Class Licence 2015](#) for ubiquitous FSS in the 28 GHz band as follows:
  - > Extend existing arrangements to cover all areas and frequencies not identified for FWA use on a primary basis (that is, outside the frequency range 27.5–28.1 GHz and large population centres).
  - > Work with industry to identify possible arrangements to support ubiquitous FSS use in areas and frequencies identified for FWA on a primary basis (that is, inside the 27.5–28.1 GHz frequency range and in large population centres).

- > All ubiquitous FSS use will be on a 'no interference' basis to primary FWA services.
- > Maintain current apparatus licensing arrangements for fixed satellite services in the frequency range 27.5–29.5 GHz. Develop and consult on frequency assignment procedures for first-in-time coordination of FSS earth stations with FWA operating in the 27.5–28.1 GHz frequency range in large population centres
- > Maintain existing arrangements for body scanners in the [Radiocommunications \(Body Scanning – Aviation Security\) Class Licence 2018](#).

### **Preliminary views**

To implement the planning decision detailed in this paper, the ACMA will need to develop a range of licensing and technical conditions. These would be applied to new and updated class and apparatus licence arrangements in the 28 GHz band. All conditions developed will be subject to the standard consultative processes before being finalised. Refer to 'Next steps' for indicative timing on these processes.

The ACMA has formed preliminary views on a number of the key licensing and technical conditions that are required. These are detailed below. As formal consultation processes have not yet been conducted, they may still be subject to variation.

### ***Conditions on ubiquitous FSS use—preliminary views***

Arrangements for ubiquitous FSS will be developed and consulted on as part of a revision to the [Radiocommunications \(Communication with Space Object\) Class Licence 2015](#). The ACMA's preliminary views on some of the key conditions that could apply to ubiquitous FSS use of the 28 GHz band follow:

- > All ubiquitous use to be on a no interference basis to other licensed services with the exception of secondary FWA services. This is not expected to constrain ubiquitous FSS use as in most frequencies and areas there are will be no other in-band services to manage interference with.
- > Possible conditions for ESIM use in the 27.5–28.1 GHz frequency range inside large population centres:
  - > Limit aeronautical operation to being above a define altitude. While other methods are possible and could be considered during the formal development of criteria, this is the currently preferred approach.
  - > Limit maritime use to a minimum distance from the coastal low water mark.
  - > Prohibit all land-based use.
- > Possible conditions for fixed terminal ubiquitous FSS use in the 27.5–28.1 GHz frequency range inside large population centres:
  - > Restricting use below a defined minimum elevation angle.
  - > Defining off-axis EIRP or power flux-density (PFD) limits.
  - > Requiring the use of man-made or natural site shielding to limit the potential for interference to other services.
- > Possible conditions on ubiquitous FSS use in the 28.1–29.5 GHz frequency range to manage adjacent band interference to FWA use of the 27.5–28.1 GHz frequency range in large population centres:
  - > Extending restrictions on ubiquitous FSS use in the 27.5–28.1 GHz frequency range inside population centres to encompass a suitable portion of the adjacent band.

- > Possible conditions on ubiquitous FSS use in the 27.5–28.1 GHz frequency range outside large population centres to manage co-channel interference to FWA use of the 27.5–28.1 GHz frequency range in large population centres:
  - > Extending restrictions on ubiquitous FSS use in the 27.5–28.1 GHz frequency range inside population centres to encompass a suitable portion of the adjacent area.

***Conditions on apparatus licensed FSS earth station use—preliminary views***

Any updates required to the existing arrangements for apparatus licensed FSS earth stations will be developed and consulted on as part of a TLG process. The TLG will be charged with developing arrangements for spectrum<sup>7</sup> and apparatus licenced use of the 26 GHz and 28 GHz bands by wireless broadband services—including coexistence with other services. The ACMA’s preliminary views on some of the key conditions that could apply to apparatus licensed FSS earth station use of the 28 GHz band follow:

- > arrangements only apply to fixed satellite earth stations (that is, gateways) operating at a known location
- > access permitted on a primary basis to the entire band Australia-wide
- > new apparatus licensed FSS earth stations must be coordinated on a first-in-time basis with:
  - > FWA services operating in the 27.5–28.1 GHz band inside large population centres
  - > grandfathered PTP services in the 28 GHz band
  - > apparatus licensed wireless broadband services operating in the 26 GHz band
  - > registered devices operating under a spectrum licences in the 26 GHz band.

***Conditions on FWA use—preliminary views***

Arrangements for FWA will be developed and consulted on as part of a revision to a TLG process. The TLG will be charged with developing arrangements for spectrum and apparatus licenced use of the 26 GHz and 28 GHz bands by wireless broadband services. The ACMA’s preliminary views on some of the key conditions that could apply to FWA use of the 28 GHz band follow:

- > Use will be limited to fixed terminal deployments only (that is, base station with fixed subscriber terminals).
- > Proposed FWA services in the 27.5–28.1 GHz frequency range inside large population centres will need to be coordinated with existing in-band and adjacent band apparatus licenced FSS earth stations and FWA services on a first-in-time basis.
- > Proposed FWA services outside the 27.5–28.1 GHz frequency range and large population centres will need to be coordinated with existing in-band and adjacent band apparatus licenced FWA services on a first-in-time basis. They will not be afforded protection from existing or future apparatus licensed FSS earth stations or ubiquitous FSS.
- > All FWA use will need to coordinate with grandfathered PTP services.
- > To avoid the need for changes in operation to body scanners all FWA use will be on a ‘no interference and no protection’ basis to body scanners operating in

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<sup>7</sup> The development of arrangements for spectrum licences is subject to the minister issuing a reallocation declaration for 26 GHz band spectrum.

accordance with the [Radiocommunications \(Body Scanning – Aviation Security\) Class Licence 2018](#). This ensures it is the responsibility of FWA licensees to resolve any interference issues.

- > The same conditions and access arrangements developed for fixed wireless broadband services in the 26 GHz will be applied to FWA use of the 28 GHz band:
  - > Authorise use under a potential new area-wide apparatus licence type. The ACMA is currently [exploring the design for this potential new licence type](#) and associated conditions. It could include conditions limiting the PFD at area boundaries to ensure coexistence between adjacent service areas.
  - > Conditions to ensure the protection of FSS satellite receivers may include:
    - > outdoor base stations must have mechanical down tilt equal to or greater than 0 degrees
    - > outdoor base stations must not direct antenna beams (via electrical steering) to elevation angles greater than 5° above the horizon for more than 5 per cent of time
    - > outdoor fixed UEs must not direct their antenna beam (via electrical steering) to within 1.5 degrees of the GSO arc
    - > reduced base station TRP limit of 25 dBm/200 MHz.
  - > Conditions to manage adjacent band interference between wireless broadband services in the 26 GHz and 28 GHz bands may include:
    - > limits on unwanted emissions
    - > a requirement to synchronise services in the event there is interference and agreement cannot be reached on how to manage it.

## Next steps

To give effect to the planning decisions and preliminary views outlined in this paper, the ACMA intends to proceed in accordance with the timetable set out in Table 1. Due to the similarity of apparatus licence services and associated interference issues that need to be considered between the 26 GHz and 28 GHz band, the ACMA intends to progress the development of arrangements in both bands together.

**Table 1: Indicative timetable for development and implementation of 26 GHz and 28 GHz band arrangements**

Action	Date
<p>Commence development of allocation arrangements for wireless broadband apparatus licensed spectrum (24.7–25.1 GHz Australia-wide, 25.1–27.5 GHz outside of large population centres and 27.5–29.5 GHz band Australia-wide).</p> <p>Commence development of technical arrangements for 26 GHz spectrum licences* and 26/28 GHz wireless broadband apparatus licences. This will be done via a TLG process.</p> <p>Commence work to consult on an update to the <a href="#">Radiocommunications (Communication with Space Object) Class Licence 2015</a> and expand arrangements for ubiquitous FSS to encompass the entire 28 GHz band. This will also consider possible arrangements for ubiquitous FSS in the associated FSS downlink band (17.7–20.2 GHz).</p> <p>Commence work investigating options to support the aggregation of multiple PTP channels in one or more bands below 28 GHz.</p>	Q4 2019
Consult on any arrangements identified to support aggregation of multiple PTP channels	Q1 2020
<p>Finalise any arrangements identified to support aggregation of multiple PTP channels</p> <p>Publicly consult on technical arrangement for 26/28 GHz wireless broadband apparatus licences.</p> <p>Finalise updates to the <a href="#">Radiocommunications (Communication with Space Object) Class Licence 2015</a>.</p>	Q2 2020
Finalise technical arrangements for 26 GHz spectrum licences* and 26/28 GHz wireless broadband apparatus licences.	Q3 2020
Allocation of wireless broadband apparatus licences. Release spectrum (24.7–25.1 GHz Australia-wide, 25.1–27.5 GHz outside of large population centres and 27.5–29.5 GHz band Australia-wide).	TBD

\* Please note, this step is subject to the minister making a reallocation declaration for 26 GHz band spectrum.



# Appendix A: Responses to the options paper

The Options paper invited comment on the following:

1. Do stakeholders have comments or further views on the services and planning issues discussed for the 28 GHz band?
2. What is the minimum appropriate length of time for PTP grandfathering arrangements to apply?
3. Are there any other conditions that should be considered for PTP grandfathering?
4. Are there any other technical issues the ACMA should consider regarding the ability for WWB, FWA, PTP and FSS to share or coexist in the 28 GHz band?
5. Do stakeholders have comments on any of the options proposed in this section or other options to propose?
6. Is the definition of 'large population centres' (as described in Appendix B), suitable for application in Options 1a, 1b, 2 and 3?
7. Do stakeholders have any comments on the assessment of each option against the Spectrum Management Principles?
8. Is there any relevant evidence that provides an indication of the value the WWB sector places on additional spectrum in the 28GHz band?
9. Is there any relevant evidence that provides an indication of the value the FWA sector places on additional spectrum in this band?
10. What value do PTP operators place on having access to 112 MHz channels? If similar arrangements could be implemented in the 38 GHz band, would they be a suitable replacement for the 28 GHz band?
11. Is there any evidence that provides an indication of the value the PTP sector places on maintaining access to this band?
12. Is there any evidence that provides an indication of the value the FSS sector places on access to this band?
13. The ACMA invites comment on its currently preferred options. Should other options be considered?

## Summary of submissions

Consultation on the 28 GHz options paper closed on 14 May 2019. Twenty-five submissions<sup>8</sup> were received. Responses by proponents of a prospective service have been grouped together to allow for easier comparison. The ACMA acknowledges that some responses address multiple services. In such cases the comments from these responses were only included within the proponent's prospective section.

### Wireless broadband industry

Responses were received from the Australian Mobile Telecommunications Association (AMTA), Ericsson, Global Mobile Suppliers Association (GSA), Huawei, Qualcomm, Samsung and Telstra. It is noted that Optus also expressed interest in using the 28 GHz band for wide-area wireless broadband services. Key points arising from these respondents on each of the issues for comment are summarised below:

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<sup>8</sup> Submissions can be viewed on the [ACMA website](#).

1. Submitters wanted to preserve the option for a 600 MHz allocation at the bottom of the 28 GHz band for WWB. Four responses cited the desire to obtain 3 GHz of spectrum for WWB use across the 26/28 GHz bands—enabling three Mobile Network Operators (MNOs) to obtain access to 1 GHz of spectrum each. 1 GHz of spectrum per operator was considered ideal for initial 5G deployments to reach their full potential. Two responses proposed the consideration of further allocations across the band for WWB.
2. Only one respondent commented on possible grandfathering arrangements for incumbent PTP licences. They noted the potential usefulness of the 28 GHz band arrangements for short distance high capacity PTP links, and that they may be of interest to them in the future.
3. No comments were received.
4. The four responses to this question supported the ability for WWB to coexist with other services as indicated in international studies. One submission suggested restricting ESIM to above 28.1 GHz to help mitigate any potential interference issues with proposed WWB use of the 27.5-28.1 GHz band. It was also noted that coexistence with body scanners which are already licensed in the band will need to be considered.
5. The three responses to this question proposed ACMA consider identifying more spectrum for WWB use in addition to the allocation proposed in Option 1.
6. The two responses to this question supported the proposed geographic definition. One response stated the need to align the geographic areas with any areas identified for spectrum licensing in the 26 GHz band.
7. The two responses to this question generally supported the assessment of the options against the spectrum management principles. However, one disagreed with the ACMA's assessment of principle 1 against Option 1. The response indicated that they believe there is a correlation between an incremental increase in spectrum allocation and an increase in Gross Domestic Product (GDP).
8. All responses provided reasoning for identifying more spectrum for WWB in the 28 GHz band, this included:
  - > identification of the band for WWB use in other countries, including the US, Korea, Hong Kong and Japan
  - > the existence of established 3GPP standards
  - > the desire for each operator to gain access to 1 GHz of spectrum across the 26/28 GHz bands
  - > economic and social benefits that could be realised for Australia.
9. The two responses to this question highlighted that FWA services can use 5G technology to deploy a network as has been done in the US.
10. The one response to this question supported consideration of alternative bands for larger bandwidth channel arrangements for PTP.
11. No comments were received.
12. Two responses commented onto the value the FSS sector places on access to the 28 GHz band. One response indicated the need to support existing and future satellite service operations in the band. The other response highlighted international studies that demonstrate the ability of WWB to share with FSS in the band.
13. Respondents position on the four options identified in the Options paper are summarised below:
  - > Option 1: Preferred by all (two specifically supported Option 1b)
  - > Option 2: One supported

- > Option 3: One supported, one did not support
- > Option 4: One did not support.

### **Satellite industry**

Responses were received from the Boeing, Communications Alliance, Global VSAT Forum, iPStar, Lockheed Martin, NBN Co, Oneweb, Optus, Qantas, SES, Telesat, Viasat. It is noted that Telstra also expressed interest in using the 28 GHz band for future satellite services. Key points arising from these respondents on each of the issues for comment are summarised below:

1. All responses expressed a desire to have contiguous spectrum Australia-wide for the deployment of FSS with a preference for access to the entire band. One response acknowledged the eventual planning option is dependent on the outcomes of the 38 GHz consultation process.
2. The three responses to this question agreed that incumbent PTP services should be grandfathered for an appropriate period that enables licensees to recoup their investments. Two of these responses suggested a minimum period of two to three years.
3. No comments were received.
4. Ten responses were received on this question. The following issues were raised:
  - > There was concern regarding the potential interference between FSS and other services, and the inherent potential for this to restrict the use of the spectrum by FSS.
  - > Any coordination procedures involving the FSS must consider the requirements of earth stations operating at Lockheed-Martin's Uralla facility including lower antenna pointing angle requirements.
  - > PTP and FWA are fundamentally different meaning sharing scenarios should be considered separately.
  - > Planning decisions for the 28 GHz band should be finalised before progressing too far with the development of the technical framework for the 26 GHz band.
  - > Earth Station Protection Zones (ESPZ) should be considered in any coordination procedures developed.
  - > If Option 3 is adopted, FWA should be made as a secondary service to the FSS (that is, operating on a no protection basis from FSS use).
5. Respondents provided two variations to Option 3 for the ACMA to consider:
  - > Variation 1: Make ubiquitous FSS co-primary with FWA in major population centres within 27.5 GHz–28.1 GHz, with access on a first-in-time basis. Detail on how this would work in practice and whether there would be support for some form of registration of areas or devices for ubiquitous FSS use was not provided.
  - > Variation 2: FSS (gateway and ubiquitous use) primary across whole band Australia- wide and FWA secondary across whole band Australia-wide.

One response proposed to discard any distinction between gateways and ubiquitous FSS and suggested they both be class licensed. Another submission raised concern over the international consideration of the frequency range of 37–43.5 GHz for future 5G allocations and the potential for conflict in establishing new PTP arrangements in this band.

6. The five responses to this question raised concerns regarding sharing between the FSS and FWA. There was concern that a secondary service allocation to the FSS in large population centres would diminish their ability to provide a service.

7. Five responses were received to this question. One was satisfied with the ACMA's assessment. One indicated that the assessment should be undertaken across the both 26 GHz and 28 GHz bands. The remaining three responses disagreed with the assessment and indicated that the highest value use would be to allocate the entire band to the FSS.
8. The three responses to this question disputed the option of allocating spectrum to WWB. They stated there was no evidence to support the claim that WWB requires additional spectrum and believed the spectrum provided in 26 GHz was sufficient.
9. The one response to this question suggested that FWA would be more efficiently accommodated in other bands such as 38 GHz band.
10. The one response to this question indicated that the 38 GHz band is a suitable alternative and supported the creation of alternative bands for high bandwidth PTP channels.
11. The one response to this question stated that due to the low number of PTP assignments in the 28 GHz band, there is low value in this spectrum for PTP.
12. Respondents provided the following justification for the value the FSS sector places on access the 28 GHz band:
  - > The FSS industry have spent over \$3 billion globally on creating infrastructure to support networks in this band
  - > FSS can provide a cheaper more efficient broadband service than WWB
  - > FSS can provide nationwide coverage with the ability to provide a high quality of service
  - > Experience in the North America indicates there is high demand for satellite services.
13. Respondents position on the four options identified in the Options paper are summarised below:
  - > Option 1: None supported
  - > Option 2: Three supported, two did not support
  - > Option 3: Five supported (one with variation), one did not support
  - > Option 4: Preferred by all.

### **Fixed wireless and point to point interests**

Responses were received from the Australian Small Business and Family Enterprise Ombudsman, DB Telecommunications, Intracom Telecom and the Wireless Internet Service Providers Association of Australia (WISPAU). It is noted that NBN Co also expressed interest in using the 28 GHz band for fixed wireless broadband. Key points arising from these respondents on each of the issues for comment are summarised below:

1. All respondents highlighted the importance of both FWA and PTP within Australia. While all supported making spectrum available for FWA, there was a range of differing views regarding the proposed planning options involving other services in the band. One submission did not support the inclusion of WWB in the band, while another submission fully supported its inclusion. Two submissions proposed maintaining the PTP allocation within the 28 GHz band, on the basis that PTP has already been displaced in numerous other bands to make way for wireless broadband use and co-existence with other services is possible. One submission supported removing arrangements for PTP if alternative options were made available in other bands with similar or better propagation characteristic and large channel bandwidths.
2. There were four responses to this question. One did not foresee the need to remove current arrangements for PTP. The other three responses all indicated a

minimum of five to seven years would be preferable for grandfathering arrangements.

3. The two responses to this question proposed the following conditions to be considered as part of any grandfathering arrangements developed:
  - > reduction in licensing fees for PTP licences in other bands to help incentivise faster migration
  - > allowing channel amalgamation in other bands, for example to allow two 55 MHz channels to be used for a single 110 MHz carrier
  - > allow incumbent PTP licensees in the 28 GHz band to make limited changes to their existing PTP within the grandfathering period.
4. The three responses to this question made the following suggestions:
  - > PTP and FWA can coexist with FSS if appropriate coordination methodologies are implemented
  - > arrangements for PTP and FWA should be developed to facilitate use of both TDD and FDD technologies
  - > additional licence conditions may need to be applied for WWB or FWA deployments within satellite footprint areas
  - > a dynamic spectrum licensing management (DSLIM) system should be implemented to control tiered access to spectrum in areas where multiple users wish to coexist.
5. There were two responses to this question. One recommended that any arrangement that shifts spectrum allocations needs to consider the effect on regional and rural small business WISP. Another suggested an increase to the spectrum allocation for FWA to 27.5 GHz–28.35 GHz to align with arrangements in the US. The third response suggested that implementing a DSLIM system would facilitate the most efficient allocation of the spectrum.
6. There were three responses to this question. Two responses supported the proposed definition of ‘large population centres’ (as described in Appendix B). One of the supporting responses also proposed to include Kalgoorlie. The third response stated that the proposal resembled a ‘land grab’ for MNOs compared to the well-established apparatus licence density areas used in past policies.
7. There were two responses to this question. One stated that they supported the view that the highest value use of spectrum should not simply relate to the use which delivers the highest contribution to Treasury. The other reiterated concerns that the proposed concept of ‘large population centres’ resembled a ‘land grab’ for MNOs compared to the well-established apparatus licence density areas used in past policies.
8. One response commented that the needs of WWB sector can probably be adequately catered for by the proposed arrangements in the 26 GHz band.
9. Three responses indicated demand for access to the 28 GHz band for the delivery of FWA services, especially after the decision to re-allocate the 3.6 GHz band. The 28 GHz band provides an option for the provision of high capacity FWA services and suitable equipment is being developed by numerous vendors. Arrangements in the US were cited as an example of current FWA use. However, it was noted that due to the propagation characteristics of the 28 GHz band it could never truly be a replacement for the 3.6 GHz band.
10. The two responses to this question highlighted the value of the 28 GHz band by PTP operators for the provision of short distance high capacity links. The availability of 112 MHz channel sizes was of particular interest as they are not available in other bands. One of the respondents believed the 38 GHz band was not a suitable alternative due to its inferior propagation characteristics. They instead preferred migration to lower frequency bands and a change to existing

policies to allow the aggregation of multiple channels on a single carrier frequency. The other respondent indicated that the 38 GHz band would be a viable option for many of the existing PTP services that operate over short distance (1–2km).

11. The two responses to this question indicated that the availability of 112 MHz channel sizes was of value to PTP operators as they are not available in other bands. One respondent indicated that current use, including investment by operators, is evidence of the value some operators place on PTP services in the band. The other respondent suggested the current low uptake of PTP licences was likely due to the time it takes for a viable equipment ecosystem to develop and the current review process is holding back the demand for further licences being taken out.
12. Current use is evidence of the high demand for the band.
13. No comments were received
14. Respondents position on the four options identified in the Options paper are summarised below:
  - > Option 1: One preferred (specifically Option 1a), one supported
  - > Option 2: Two supported
  - > Option 3: One preferred, one supported
  - > Option 4: One did not support.

### **Department of Defence**

A response was received from the Department of Defence (DoD). The DoD indicated that a number of future capabilities may require the use of FSS, including for ESIM, in the 28 GHz band. Given the nature of their deployments, the DoD indicated that this would likely involve Australia-wide operation and cannot necessarily be excluded from population centres. As such, the DoD encouraged the ACMA to consider the potential undesirable impacts of any Australia-unique frequency arrangements on satellite-system design and operation. The DoD indicated their preference for the ACMA to adopt Option 4.

### **HAPS interests**

A response was received from Facebook that supported the consideration of HAPS in the 28 GHz band. While it acknowledged that there are no current provisions for such use in Australia, it proposed the ACMA consider future planning options for HAPS in the 27.9–29.2 GHz frequency range. Facebook also noted work being conducted under World Radiocommunications Conference 2019 (WRC-19) agenda item 1.14 which includes a proposal to make a global identification for HAPS in the 27.9–28.2 GHz frequency range.

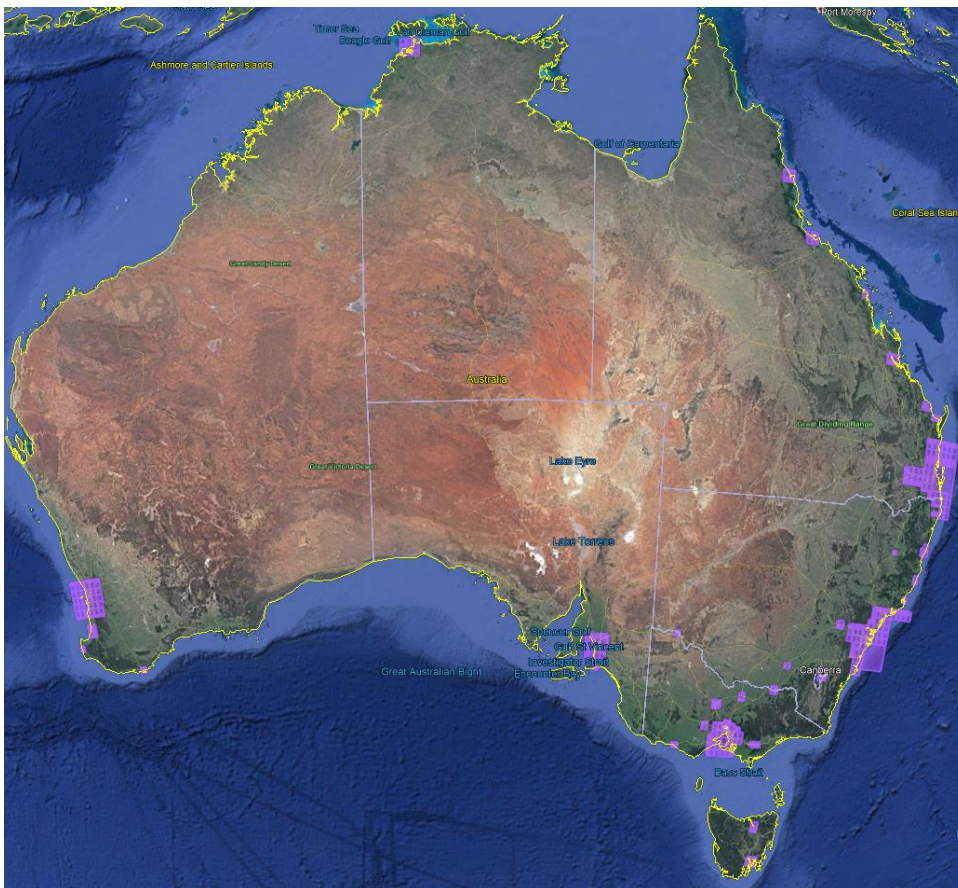
# Appendix B: Geographical area descriptions

Throughout this paper the term ‘large population centres’ is frequently used. For the purposes of this paper the term ‘large population centres’ is defined in this Appendix B. This term is intended to refer to the same areas that the minister may decide to re-allocate for the issue of spectrum licences in the 26 GHz band. In June 2019 the ACMA consulted on proposed re-allocation areas as part of a [draft recommendation to the Minister](#). For convenience these areas are reproduced in Table 2 of this Appendix and illustrated in Figure 3. Pending final decisions, it is noted that the definition of large population centres may be varied to ensure they match the actual areas that are subject to any re-allocation declaration.

The Australian Spectrum Map Grid (ASMG) is used to define geographical areas over which spectrum licences are issued. The Hierarchical Cell Identification Scheme (HCIS) is a naming convention developed by the ACMA that applies unique ‘names’ to each of the cells that make up the ASMG. The ASMG and HCIS are described in detail in the document, [The Australian spectrum map grid 2012](#).

The HCIS coordinates in Table 2 can be converted into a Placemark file (viewable in Google Earth) through a facility on the [ACMA website](#).

**Figure 3: Illustration of the areas encompassed by the term ‘large population centres’**



**Table 2: HCIS description of 'large population centre'**

City name	HCIS
Adelaide	IW3J, IW3K, IW3L, IW3N, IW3O, IW3P, IW6B, IW6C, IW6D, IW6F, IW6G, IW6H, IW3E5, IW3E6, IW3E8, IW3E9, IW3F4, IW3F5, IW3F6, IW3F7, IW3F8, IW3F9, IW3G4, IW3G5, IW3G6, IW3G7, IW3G8, IW3G9, IW3H4, IW3H5, IW3H6, IW3H7, IW3H8, IW3H9, IW3I2, IW3I3, IW3I5, IW3I6, IW3I8, IW3I9, IW3M2, IW3M3, IW3M5, IW3M6, IW3M8, IW3M9, IW6A2, IW6A3, IW6A5, IW6A6, IW6A8, IW6A9, IW6E2, IW6E3, IW6E5, IW6E6, IW6E8, IW6E9, IW6K1, IW6K2, IW6K3, IW6K4, IW6K5, IW6K6, IW6L1, JW1E4, JW1E7, JW1I1, JW1I4, JW1I7, JW1M1, JW1M4
Albany	BW3P7, BW3P8, BW3P9, BW6D1, BW6D2, BW6D3, BW6D4, BW6D5, BW6D6, CW1M7, CW4A1, CW4A4
Albury	LW8D, LW5P7, LW5P8, LW5P9, LW6M7, LW9A1, LW9A4, LW9A7
Armidale	NU7G8, NU7G9, NU7K2, NU7K3
Ballarat	KX2L, KX2G9, KX2H7, KX2H8, KX2H9, KX2K3, KX2K6, KX2K9
Bathurst	MV8G, MV8F3, MV8F6, MV8F9, MV8J3, MV8K1, MV8K2, MV8K3
Bendigo	KW9I5, KW9I6, KW9I8, KW9I9, KW9J4, KW9J5, KW9J6, KW9J7, KW9J8, KW9J9, KW9M2, KW9M3, KW9M5, KW9M6, KW9N1, KW9N2, KW9N3, KW9N4, KW9N5, KW9N6
Brisbane	NT9, NT8C, NT8D, NT8G, NT8H, NT8K, NT8L, NT8O, NT8P, NU3A, NU3B, NU3C, NU3D, NU3F, NU3G, NU3H, NU3K, NU3L, NU3O, NU3P, NT5O4, NT5O5, NT5O6, NT5O7, NT5O8, NT5O9, NT5P4, NT5P5, NT5P6, NT5P7, NT5P8, NT5P9, NT6M4, NT6M5, NT6M6, NT6M7, NT6M8, NT6M9, NT6N4, NT6N5, NT6N6, NT6N7, NT6N8, NT6N9, NT6O4, NT6O5, NT6O6, NT6O7, NT6O8, NT6O9, NT6P4, NT6P5, NT6P6, NT6P7, NT6P8, NT6P9, NU2C1, NU2C2, NU2C3, NU2D1, NU2D2, NU2D3, NU2D5, NU2D6, NU2D8, NU2D9, NU2H2, NU2H3, NU3E1, NU3E2, NU3E3, NU3E5, NU3E6, NU3E8, NU3E9, NU3I2, NU3I3, NU3J1, NU3J2, NU3J3, NU3N3, NU3N6
Bunbury	BV7G, BV7C4, BV7C5, BV7C6, BV7C7, BV7C8, BV7C9, BV7D4, BV7D5, BV7D7, BV7D8, BV7H1, BV7H2, BV7H4, BV7H5, BV7H7, BV7H8, BV7K1, BV7K2, BV7K3, BV7L1, BV7L2
Bundaberg	NS8N, NS8M2, NS8M3, NS8M5, NS8M6, NS8M8, NS8M9, NT2A2, NT2A3, NT2B1, NT2B2, NT2B3
Cairns	LQ1O, LQ1P, LQ1K7, LQ1K8, LQ1K9, LQ1L7, LQ1L8, LQ1L9, LQ4C1, LQ4C2, LQ4C3, LQ4C4, LQ4C5, LQ4C6, LQ4D1, LQ4D2, LQ4D3, LQ4D4, LQ4D5, LQ4D6
Canberra	MW5E, MW4D6, MW4D9, MW4H3, MW4H9, MW4L3, MW5A4, MW5A5, MW5A6, MW5A7, MW5A8, MW5A9, MW5B4, MW5B7, MW5F1, MW5F4, MW5F7, MW5I1, MW5I2, MW5I3, MW5J1
Coffs Harbour	NU9A, NU9E, NU8D9, NU8H3, NU8H6, NU8H9
Darwin	GO7C, GO7D, GO7G, GO7H, GO7K, GO7L, GO8A, GO8E, GO8I



City name	HCIS
Hervey Bay	NT2C8, NT2C9, NT2D7, NT2D8, NT2D9, NT2G2, NT2G3, NT2G5, NT2G6, NT2H1, NT2H2, NT2H3, NT2H4, NT2H5, NT2H6
Hobart	LY9N, LY9I8, LY9I9, LY9J7, LY9J8, LY9J9, LY9K7, LY9K8, LY9M2, LY9M3, LY9M5, LY9M6, LY9M8, LY9M9, LY9O1, LY9O2, LY9O4, LY9O5, LY9O7, LY9O8, LZ3A2, LZ3A3, LZ3B1, LZ3B2, LZ3B3, LZ3C1, LZ3C2
Launceston	LY6E, LY5H3, LY5H6, LY5H9, LY5L3, LY5L6, LY6F1, LY6F4, LY6F7, LY6I1, LY6I2, LY6I3, LY6I4, LY6I5, LY6I6, LY6J1, LY6J4
Lismore	NU3M3, NU3M6, NU3N1, NU3N2, NU3N4, NU3N5
Mackay	MR8A, MR5M7, MR5M8, MR5M9
Margaret River	AV9P6, AV9P9, AW3D3, BV7M4, BV7M5, BV7M7, BV7M8, BW1A1, BW1A2
Melbourne	KX3J, KX3K, KX3L, KX3N, KX3O, KX3P, KX6B, KX6C, KX6D, KX6F, KX6G, KX6H, KX6J, KX6K, KX6L, LX1I, LX1M, LX1N, LX1O, LX4A, LX4B, LX4C, LX4E, LX4I, KX3F7, KX3F8, KX3F9, KX3G7, KX3G8, KX3G9, KX3H4, KX3H5, KX3H6, KX3H7, KX3H8, KX3H9, KX3M6, KX3M8, KX3M9, KX6A2, KX6A3, KX6A5, KX6A6, KX6A8, KX6A9, KX6E2, KX6E3, KX6E5, KX6E6, KX6E8, KX6E9, KX6I2, KX6I3, KX6I5, KX6I6, KX6I8, KX6I9, LX1E4, LX1E7, LX1E8, LX1E9, LX1J1, LX1J4, LX1J5, LX1J6, LX1J7, LX1J8, LX1J9, LX1K4, LX1K7, LX4F1, LX4F2, LX4F4, LX4F5, LX4F7, LX4F8, LX4J1, LX4J2, LX4J4, LX4J5, LX4J7, LX4J8
Mildura	KW1A4, KW1A5, KW1A6, KW1A7, KW1A8, KW1A9, KW1E1, KW1E2, KW1E3
Perth	BV1I, BV1J, BV1K, BV1L, BV1M, BV1N, BV1O, BV1P, BV2I, BV2J, BV2M, BV2N, BV4A, BV4B, BV4C, BV4D, BV4E, BV4F, BV4G, BV4H, BV4I, BV4J, BV4K, BV4L, BV5A, BV5B, BV5E, BV5F, BV5I, BV5J, BV1E7, BV1E8, BV1E9, BV1F7, BV1F8, BV1F9, BV1G7, BV1G8, BV1G9, BV1H7, BV1H8, BV1H9, BV2E7, BV2E8, BV2E9, BV2F7, BV2F8, BV2F9, BV4M1, BV4M2, BV4M3, BV4N1, BV4N2, BV4N3, BV4O1, BV4O2, BV4O3, BV4P1, BV4P2, BV4P3, BV5M1, BV5M2, BV5M3, BV5N1, BV5N2, BV5N3
Port Macquarie	NV2H, NV2L1, NV2L2, NV2L3
Rockhampton	MS6F, MS6G, MS6B7, MS6B8, MS6B9, MS6C7, MS6C8, MS6C9, MS6J1, MS6J2, MS6J3, MS6K1, MS6K2, MS6K3
Shepparton-Mooroopna	LW7F, LW7G1, LW7G4, LW7G7, LW7J1, LW7J2, LW7J3, LW7K1
Sunshine Coast	NT5G, NT5H, NT5K, NT5L, NT6E, NT6F, NT6G, NT6H, NT6I, NT6J, NT6K, NT6L, NT5C4, NT5C5, NT5C6, NT5C7, NT5C8, NT5C9, NT5D4, NT5D5, NT5D6, NT5D7, NT5D8, NT5D9, NT5O1, NT5O2, NT5O3, NT5P1, NT5P2, NT5P3, NT6A4, NT6A5, NT6A6, NT6A7, NT6A8, NT6A9, NT6B4, NT6B5, NT6B6, NT6B7, NT6B8, NT6B9, NT6C4, NT6C5, NT6C6, NT6C7, NT6C8, NT6C9, NT6D4, NT6D5, NT6D6, NT6D7, NT6D8, NT6D9, NT6M1, NT6M2, NT6M3, NT6N1, NT6N2, NT6N3, NT6O1, NT6O2, NT6O3, NT6P1, NT6P2, NT6P3

City name	HCIS
Sydney	NW1, MV9I, MV9J, MV9K, MV9L, MV9M, MV9N, MV9O, MV9P, MW3C, MW3D, MW3G, MW3H, MW3K, MW3L, MW3O, MW3P, MW6C, MW6D, NV4N, NV4O, NV4P, NV5M, NV5N, NV5O, NV5P, NV7B, NV7C, NV7D, NV7E, NV7F, NV7G, NV7H, NV7I, NV7J, NV7K, NV7L, NV7M, NV7N, NV7O, NV7P, MV9D6, MV9D9, MV9E4, MV9E5, MV9E6, MV9E7, MV9E8, MV9E9, MV9F4, MV9F5, MV9F6, MV9F7, MV9F8, MV9F9, MV9G4, MV9G5, MV9G6, MV9G7, MV9G8, MV9G9, MV9H3, MV9H4, MV9H5, MV9H6, MV9H7, MV9H8, MV9H9, MW3B2, MW3B3, MW3B5, MW3B6, MW3B8, MW3B9, MW3F2, MW3F3, MW3F5, MW3F6, MW3F8, MW3F9, MW3J2, MW3J3, NV4I5, NV4I6, NV4I8, NV4I9, NV4J4, NV4J5, NV4J6, NV4J7, NV4J8, NV4J9, NV4K4, NV4K5, NV4K6, NV4K7, NV4K8, NV4K9, NV4L4, NV4L5, NV4L6, NV4L7, NV4L8, NV4L9, NV4M2, NV4M3, NV4M5, NV4M6, NV4M8, NV4M9, NV5I4, NV5I5, NV5I6, NV5I7, NV5I8, NV5I9, NV5J4, NV5J5, NV5J6, NV5J7, NV5J8, NV5J9, NV5K4, NV5K5, NV5K6, NV5K7, NV5K8, NV5K9, NV5L4, NV5L5, NV5L6, NV5L7, NV5L8, NV5L9, NV7A2, NV7A3, NV7A4, NV7A5, NV7A6, NV7A7, NV7A8, NV7A9
Toowoomba	NT7H, NT7L, NT8E, NT8F, NT8I, NT8J, NT7G2, NT7G3, NT7G5, NT7G6, NT7G8, NT7G9, NT7K2, NT7K3, NT7K5, NT7K6, NT7K8, NT7K9, NT7O2, NT7O3, NT7O5, NT7O6, NT7P1, NT7P2, NT7P3, NT7P4, NT7P5, NT7P6, NT8M1, NT8M2, NT8M3, NT8M4, NT8M5, NT8M6, NT8N1, NT8N2, NT8N3, NT8N4, NT8N5, NT8N6
Townsville	LR2C, LR2D, LR2G, LR2H
Traralgon-Morwell	LX5A6, LX5A8, LX5A9, LX5B4, LX5B5, LX5B6, LX5B7, LX5B8, LX5B9, LX5C4, LX5C5, LX5C7, LX5C8, LX5F1, LX5F2, LX5F3, LX5G1, LX5G2
Tuncurry-Forster	NV5B6, NV5B9, NV5C4, NV5C5, NV5C7, NV5C8, NV5F3, NV5G1, NV5G2
Wagga Wagga	LW6B
Warrnambool	KX4F2, KX4F3, KX4F5, KX4F6, KX4F8, KX4F9, KX4G1, KX4G2, KX4G4, KX4G5, KX4G7, KX4G8

**PLENARY MEETING**

**Document INFO/ESOA**  
**October 2019**  
**Original: English**

## **ESOA<sup>1</sup>**

### **ESOA POSITION ON WRC-19 AGENDA ITEM 1.13**

#### **WRC-19 Agenda Item 1.13:**

*“To consider identification of frequency bands for the future development of International Mobile Telecommunications (IMT), including possible additional allocations to the mobile service on a primary basis, in accordance with Resolution 238 (WRC-15)”*

#### **Introduction**

ESOA supports the development of IMT-2020/5G in mmWave bands and is supportive of IMT identification of frequency bands under WRC-19 A11.13. In order to maintain a stable long-term solution that allows incumbent services to thrive as well, ESOA considers that some sharing conditions are needed in bands that would be identified for IMT, which would however not constrain the use of these bands by IMT. This document provides background on the need for conditions on IMT base stations (such as power and pointing conditions) to protect the FSS, and for an appropriate balance in the range 37-43.5 GHz between IMT and other services (such as FSS and FS) thereby showing the irrelevance of a “tuning range approach” in the Radio Regulations.

#### **1. Band 24.25-27.5 GHz: need for conditions to protect FSS space stations, which will not constrain the development of IMT**

Sharing and compatibility studies between IMT and FSS have been performed in ITU-R TG5/1, and baseline cases were agreed upon, based on IMT parameters as provided by the expert group ITU-R WP 5D. Based on these parameters, the baseline Total Radiated Power (TRP) to be assumed for an IMT base station is 25 dBm/200 MHz. Further, it was stated that all types of IMT base stations have a mechanical downtilt of *at least* 10 degrees.

Based on these (and other) assumptions, the baseline case studies showed positive margins with respect to the FSS protection criteria. In the 26 GHz band, the amount of margin varies based on the details of the studies performed, but from ESOA’s perspective it is reasonable to conclude that 12 dB is a valid margin to assume.

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<sup>1</sup> Europe Middle-East Africa Satellite Operators Association (ESOA)

Indeed the conclusion of ITU-R studies, as reflected in the CPM Report, indicate that "In the case of aggregate long-term interference from IMT stations into FSS space stations in a geostationary orbit, results showed that the calculated I/N ranged from  $-40.62$  dB to  $-19$  dB for the baseline case." Based on the agreed protection criteria of  $I/N = -10.5$  dB, this leads to a minimum margin of 8.5 dB when considering no apportionment for FS (the margin would be 5.5 dB when considering 3 dB apportionment for FS).

Normal practice in ITU-R studies is that (a) assumptions are made to do the studies (b) results (margins) are calculated based on these assumptions and (c) assumptions are adjusted to ensure that there is no negative margin. Based on this, the IMT base station TRP in the 26 GHz band is increased by 12 dB (the margin from the studies), from its baseline level of 25 dBm/200 MHz, to 37 dBm/200MHz.

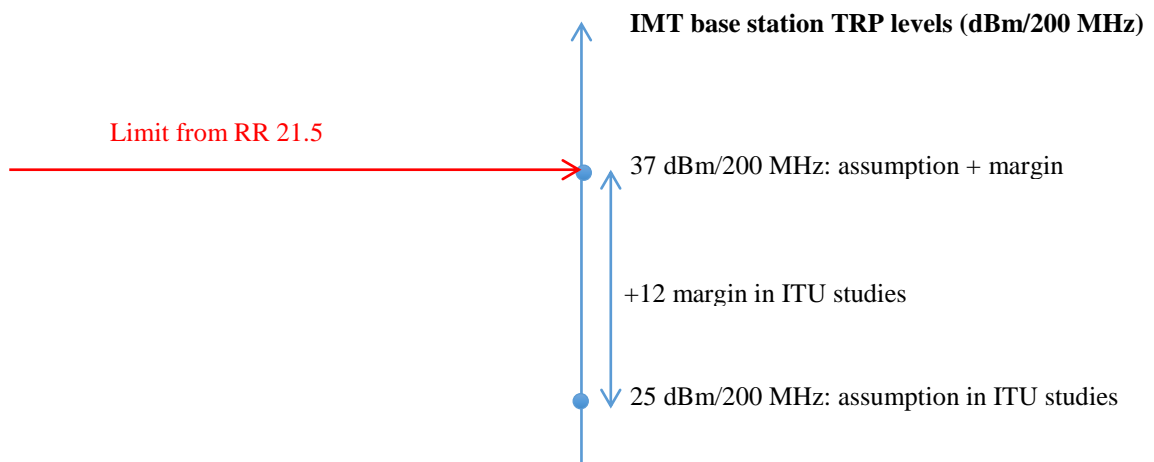
ESOA believes that this is a technical sound approach, and provides the IMT base stations with extra flexibility for their TRP levels, as compared to the baseline parameters, as were provided by ITU-R WP 5D. There is no technical justification for proposing "no conditions" to protect the FSS. Indeed the margin obtained in studies is positive, but it is a finite number, which shows that a limit is required.

The concern of not proposing any conditions on the IMT base station TRP is that effectively they could operate a TRP far above the 37 dBm/200 MHz, and hence risk interference to the FSS space stations. Boundary conditions are needed to provide the FSS with a known and stable interference environment to operate and develop in.

In addition, provision RR 21.5 applies to all stations of the mobile service, including IMT stations. A TRP limit of 37 dBm/200 MHz is in line with the power limit of provision RR 21.5 (see Figure 1).

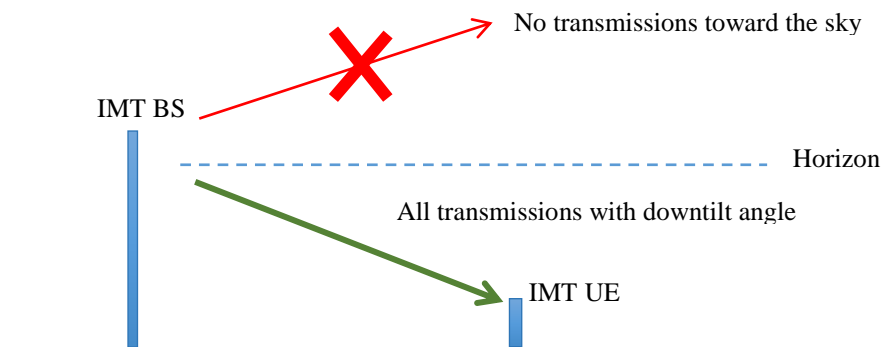
**“21.5 3) The power delivered by a transmitter to the antenna of a station in the fixed or mobile services shall not exceed +13 dBW in frequency bands between 1 GHz and 10 GHz, or +10 dBW in frequency bands above 10 GHz, except as cited in No. 21.5A. (WRC-2000)”**

Figure 1: TRP limit required in the band 24.25-27.5 GHz and RR21.5



A downtilt of the IMT base stations antenna has been assumed in the studies (even when considering both mechanical and electrical tilt), and was one of the bases for the positive margins that were calculated (See Figure 2). If no condition is placed on the pointing of the IMT base stations, there can be no guarantee that the FSS will be protected, and the interference environment will be uncertain. This condition should not pose any restriction on the development of IMT, as the downtilt information, as assumed in the studies, was proposed by the expert group ITU-R WP 5D.

*Figure 2: In ITU-R studies IMT base stations all transmit with a downtilt angle (combined mechanical and electrical tilt)*



**In the band 24.25-27.5 GHz ESOA supports a TRP limit of 37 dBm/200MHz on IMT base stations and that their main beam should not point above the horizon, as reflected in the CPM report in Condition A2e (FSS space stations) - Option 3 (with a value of TRP of 37 dBm/200 MHz).**

Also, a monitoring process of the 5G characteristics and their evolution, including deployment, would help to ensure, via corrective measures if necessary, that the aggregate IMT interference into FSS space receivers does not exceed levels calculated. This is reflected in the CPM report in Condition A2g (Multiple services) - Option 3 or 4 (Monitoring of 5G characteristics).

## **2. Band 24.25-27.5 GHz: need for access to sustainable spectrum for FSS earth stations**

The band is predominantly used for large FSS Earth stations at known locations (i.e. gateways), therefore appropriate zones around FSS Earth stations where IMT base stations could potentially receive interference can be determined. Provided the location of IMT base stations is known, it would be possible to achieve compatibility and ensure interference-free co-existence of IMT and FSS Earth stations via geographical based sharing and other methods.

As in Condition A2d (FSS earth stations) - Option 1 of the CPM Report, a Draft New Resolution (WRC-19) associated to the IMT identification of this frequency band would specify that:

- a) invites ITU-R to develop an ITU-R Recommendation to assist administrations in ensuring the coexistence between existing and future FSS earth stations and IMT operating within the frequency band 24.25-27.5 GHz;
- b) in addition, administrations should be invited to adopt provisions to ensure the possibility of deploying future FSS earth stations.

### 3. Importance of availability of HDFSS spectrum within 37 - 43.5 GHz

Under RR footnote No 5.516B, a number of frequency bands has been identified for use by high-density applications in the fixed-satellite service (HDFSS). These bands are important for the FSS for future systems that are currently under development, in particular to deploy small ubiquitous terminals. Figure 3 below provides an overview of the HDFSS bands within the 37-43.5 GHz range. It can be noted that these bands are different in different regions.

*Figure 3: Current HDFSS (s-E) identifications within 37-43.5 GHz*

	37-39.5 GHz	39.5-40	40-40.5	40.5-42 GHz	42-43.5 GHz
Region 1		HDFSS			
Region 2			HDFSS		
Region 3			HDFSS		

Other bands allocated to the FSS in the 37 – 43.5 GHz range will mainly be used for gateway/feeder links, which generally is done with larger earth stations that will be at known locations. Sharing between IMT and coordinated gateway earth stations is feasible.

However, by the nature of its type of usage, HDFSS cannot share with IMT in the same frequency band, and for this reason ESOA is not in favour of any IMT identification in bands that are identified for HDFSS.

There is no need for a global IMT identification in the entire 37-43.5 GHz band, as the different regional needs can be fulfilled by regional allocations. Economies of scale for IMT equipment will be achieved as manufacturers will make sure that their devices can work in different bands in different regions, in a similar manner as IMT devices today can operate in multiple frequency bands.

The ESOA position for the frequency band 37-43.5 GHz is as follows:

- **It is necessary to preserve access for FSS and FS in each ITU-R Region within the range 37-43.5 GHz.**
- **There is no need to identify IMT globally in the range 37-43.5 GHz in the Radio Regulations to support a tuning range for IMT equipment.**
- **Bands identified for IMT should be feasible for its use in many countries and conversely bands that are not suitable in the majority of countries should not be identified for IMT to ensure a harmonised and efficient use of spectrum.**

Global economies of scale for IMT equipment, as well as preservation of FS and FSS, can be achieved through identification of 3 GHz of spectrum for IMT in each ITU Region (see figure 4), with the RF equipment tuning across the whole 37-43.5 GHz range.

*Figure 4: IMT identifications supported by ESOA in the range 37-43.5 GHz*

	37-39.5 GHz	39.5-40	40-40.5	40.5-43.5 GHz
Region 1	No change	No change		<b>IMT</b>
Region 2	<b>IMT</b>			No change
Region 3	No change	No change		<b>IMT</b>

Region 1: IMT identification in 40.5-43.5 GHz on the basis of sharing with FSS gateways, that preserves current HDFSS identifications in 39.5-40.5 GHz and protection for satellite terminal use.

Region 2: IMT identification on the basis of sharing with FSS gateways, that preserves current HDFSS identifications in 40-42 GHz and protection for satellite terminal use.

Region 3: IMT identification on the basis of sharing with FSS gateways, that preserves current HDFSS identifications in 40-40.5 GHz and protection for satellite terminal use.

This would provide 3 GHz of spectrum for IMT in all ITU-R Regions and would allow common IMT equipment to be used, provided the RF equipment can tune across the whole 37-43.5 GHz range.

Similarly to the 26 GHz band, to facilitate co-existence between IMT and the FSS it is proposed to include in the Radio Regulations a limit on the Total Radiated Power (TRP) of IMT base stations of 37 dBm/200MHz.

#### **4. ESOA positions for bands above 43.5 GHz**

##### **Frequency band 45.5-47.0 GHz:**

In the band 45.5 –47.0 GHz (band F) for which no studies were conducted in ITU-R TG5/1, no change to the RR is recommended (Method F1).

##### **Frequency bands 47.2-50.2 GHz and 50.4-52.6 GHz:**

Already large amounts of spectrum are supported for IMT identification in the bands 24.25-27.5 GHz, 40.5-43.5 GHz and 66-71 GHz and there is limited interest for IMT at 50 GHz. Therefore, no change to the RR in the bands 47.2 – 50.2 GHz and 50.4-52.6 GHz is recommended.

Regarding the CPM Report and its Methods, ESOA supports Method H1 and I1 (NOC) for the bands 47.2-50.2 GHz and 50.4-52.6 GHz respectively.

##### **Frequency band 66-71 GHz band**

ESOA supports identification for IMT in the band 66 - 71 GHz, which has potential for global harmonisation for future 5G and IMT-2020 use.

Regarding the CPM Report and its Methods, IMT identification is supported through Method J2 (either alternative 1 or 2) with the conditions of Draft New Resolution [C113-IMT 66/71 GHz] (WRC-19).

**Annex:**

**Methods and Options supported by ESOA under WRC-19 Agenda Item 1.13**

24.25-27.5 GHz (Band A)	Yes	Method A2 (Alternative 1 or 2), subject to: <ul style="list-style-type: none"> <li>• Condition A2d Option 1</li> <li>• Condition A2e Option 3 (with 37 dBm/200 MHz)</li> <li>• Condition A2g Option 3 or 4</li> </ul> Draft New Resolution [A113-IMT 26 GHz] (WRC-19)
31.8-33.4 GHz (Band B)	No	Method B1 (No Change)
37.0-40.5 GHz (Band C)	Yes in Region 2 except in 40-40.5 GHz No in Regions 1 and 3	<ul style="list-style-type: none"> <li>• In Region 1: Method C1 (NOC).</li> <li>• In Region 2, Method C2, Conditions C2b Option 1 for the band 37-40 GHz and C1 (NOC) for the band 40-40.5 GHz.</li> <li>• In Region 3: Method C1 (NOC).</li> </ul> Draft New Resolution [B113-IMT 40/50GHz] (WRC-19)
40.5-42.5 GHz (Band D)	Yes in Regions 1 and 3 No in Region 2	<ul style="list-style-type: none"> <li>• In Region 1: Method D2, Conditions D2a Option 1.</li> <li>• In Region 2: Method D1 (NOC),</li> <li>• In Region 3: Method D2, Conditions D2a Option 1.</li> </ul> Draft New Resolution [B113-IMT 40/50GHz] (WRC-19)
42.5-43.5 GHz (Band E)	Yes in Regions 1 and 3 No in Region 2	<ul style="list-style-type: none"> <li>• In Region 1: Method E2, with same conditions as Region 3 below.</li> <li>• In Region 2: Method E1 (NOC),</li> <li>• In Region 3: Method E2, with conditions below: <ul style="list-style-type: none"> <li>○ Condition E2a Option 2 (with 37 dBm/200 MHz)</li> <li>○ Condition E2c Option 3 or 4</li> <li>○ Condition E2d Option 1</li> </ul> </li> </ul> Draft New Resolution [B113-IMT 40/50GHz] (WRC-19)
45.5-47.2 GHz (Bands F and G)	No	Methods F1 and G1 (No Change)
47.2-50.2 GHz (Band H)	No	Method H1 (No Change)
50.4-52.6 GHz (Band I)	No	Method I1 (No Change)
66-71 GHz (Band J)	Yes	Method J2 (either alternative 1 or 2) with the conditions of Draft New Resolution [C113-IMT 66/71GHz-J2] (WRC-19)
71-76 GHz (Band K)	Yes	Method K2 (either alternative 1 or 2) with the conditions of Draft New Resolution [E113-IMT 70/80GHz] (WRC-19)
81-86 GHz (Band L)	Yes	Method L2 (either alternative 1 or 2) with the conditions of Draft New Resolution [E113-IMT 70/80GHz] (WRC-19)