



National positions and developments in the 26GHz band

Report for the Australian
Communications and Media Authority
(ACMA)

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1 Report summary

This report has been prepared by Aetha Consulting Limited (Aetha) to inform the Australian Communications and Media Authority (ACMA) about the progress made at international level with respect to awarding the 26GHz band for 5G.

The 26GHz band ranges from 24.25-27.5GHz and has been designated band number ‘n258’ for New Radio (NR) technology. The band is expected to play a key role in the deployment of 5G technology, alongside low-frequency bands such as the 700MHz band and so-called ‘mid-band’ spectrum from 3.4-3.8GHz.

In this context, the 26GHz band has, for example, been earmarked as a pioneer band for 5G by the European Commission. In February 2018, the RSPG recommended that member states make around 1GHz of the 26GHz band available for 5G by 2020. The CEPT is working on a harmonised set of technical conditions for mobile/fixed communication networks in the 26GHz band – however, concerns have been voiced that the currently proposed regulations are too restrictive and may limit usability of the band¹.

Within this report, we outline our best understanding of the current plans of national regulators and government authorities in making the 26GHz band available over the coming years. All work in this report is based on information available in the public domain. The scope of this report is to look at the developments across OECD countries as well as any non-OECD countries, for which relevant information is available. In countries that will not make the 26GHz band available for mobile use, we have provided information on bands for which we expect there to be a similar long-term use case, such as the 24GHz² or 28GHz³ bands. A high-level summary of our findings is shown in Figure 1-1.

Figure 1-1: Status of 26GHz band (or substitute bands) by country

Already auctioned	Due in 2018	Due in 2019/20	Due in 2020	After 2020	No 26GHz plans	
Greece ⁴	Italy	France	Norway	Canada ⁵	Austria	Latvia
Ireland ⁴	United States ⁵	Germany	Spain	Finland	Belgium	Luxembourg
South Korea ⁵		Portugal ⁴	Sweden	Japan ⁵	Chile	Mexico
			United Kingdom	New Zealand	Czech Republic	Netherlands
			Hong Kong	Poland	Denmark	Slovenia
				Slovakia	Estonia	Switzerland
				India	Hungary	Turkey
				China	Iceland	
				Singapore ⁵	Israel	

¹ For example, the mobile operator’s industry association GSMA has recently published an open letter, voicing its concerns about the resulting usability of the 26GHz band for 5G services. This letter is available at: <https://www.gsma.com/gsmaeurope/wp-content/uploads/2018/06/CTO-high-level-letter-26-GHz-technical-conditions.pdf>

² The spectrum considered for auction in the 24GHz band in the United States contains 700MHz within the range 24.25GHz to 25.25GHz. The band has not yet received a New Radio (NR) band designation (in contrast to the 26GHz and 28GHz bands).

³ The 28GHz band ranges from 26.5-29.5GHz and has been designated band number ‘n257’ for New Radio (NR) technology. It is expected to be one of the first bands to be used for 5G technology, deployed for example by Verizon in the United States.

⁴ Not awarded under conditions that allow for a use by 5G mobile services.

⁵ Awards are for the 28GHz band as opposed to the 26GHz band. The United States will award both the 24GHz and 28GHz bands.

As can be seen from the above table, the progress made with respect to awarding the 26GHz band varies widely between the countries that have formed part of our research.

Some countries have recently auctioned the 26GHz band – however, this has mostly been for use by backhaul, which in turn may make it more difficult to make the entire 26GHz band available for 5G services in the coming years.

Within Europe, Italy is the country that has the most advanced plans to award parts of the 26GHz for 5G later this year. In a number of other countries (e.g. France, Germany), consultations have been launched on a possible award of the band for use by mobile for 5G in 2019 or 2020.

For those countries where information is already available, Figure 1-2 summarises the likely amount of spectrum that will be awarded and the corresponding frequency range. It highlights that, for the 26GHz band, the current focus is very much on 1GHz of spectrum, from 26.5–27.5GHz (where plans have been published).

Figure 1-2: Overview of potential amount of 24/26/28GHz spectrum made available for 5G

Country	Band	Year	Total MHz ⁶	From...	To...
South Korea	28GHz	2018	2,400	26.5GHz	28.9GHz
Italy	26GHz	2018	1,000	26.5GHz	27.5GHz
United States	28GHz	2018	850	27.5GHz	28.35GHz
United States	24GHz	2018	700 ⁷	24.25GHz	25.25GHz
France	26GHz	2019	1,000	26.5GHz	27.5GHz
Germany	26GHz	2019	1,000	26.5GHz	27.5GHz
Norway	26GHz	2020	Unknown ⁸	-	-
Spain	26GHz	2020	1,400	-	-
Sweden	26GHz	2020	1,000	26.5GHz	27.5GHz
United Kingdom	26GHz	2020	1,000	26.5GHz	27.5GHz
Canada	28GHz	2020+	850	27.5GHz	28.35GHz
Finland	26GHz	2020+	1000	26.5GHz	27.5GHz
Japan	28GHz	2020+	850	27.5GHz	28.35GHz
New Zealand	26GHz	2020+	Unknown ⁸	-	-
Poland	26GHz	2020+	1,000	26.5GHz	27.5GHz
Slovakia	26GHz	2020+	1,000	26.5GHz	27.5GHz
India	26GHz	2020+	Unknown ⁸	-	-
China	26GHz	2020+	Unknown ⁸	-	-
Hong Kong	26GHz	2020+	Unknown ⁸	-	-
Singapore	28GHz	2020+	Unknown ⁸	-	-

For the majority of countries, little or no information is yet available on their plans to award the 26GHz band. However, we expect that more information will soon become available for European countries through the

⁶ Estimate based on information currently available in the public domain.

⁷ The spectrum available in the US 24GHz auction is not contiguous.

⁸ It is unclear at this time how much spectrum will be awarded in this country.

activities resulting from the European Communications Code (ECC)⁹. The ECC includes, amongst other things, a commitment to accelerate the rollout of 5G across Europe – one of the identified measures to achieve this is a more co-ordinated approach to making available the 5G pioneer bands (including the 26GHz band) by 2020.

In the following section, we provide further information on those countries from the above table where information is available – either as a result of recently concluded auctions or due to public consultations being available.

2 Detailed country information

Within this section, we provide more granular information on the progress made with respect to awarding the 26GHz band (or closely linked bands, such as the 28GHz band). We first discuss the findings for OECD countries (Section 2.1) and then provide additional information for some non-OECD countries (Section 2.2).

Within Section 2.1, we have ordered countries based on the relevance / amount of information being available, meaning that we first discuss countries where auctions have taken place or are most likely to take place in the coming years.

2.1 OECD countries

2.1.1 Countries where spectrum has already been awarded

Ireland

Irish regulator ComReg awarded the 26GHz spectrum for fixed backhaul links in April 2018¹⁰. 15 lots of 2×28MHz were sold at EUR70 000 each (AUD0.00041/MHz/Pop). The licences span the frequency range 24.829 – 25.249GHz, paired with 25.837 – 26.257GHz. The licences were awarded for a period of 10 years¹¹, implying that these parts of the band are unlikely to be made available for 5G services in the near future.

ComReg has not yet launched any consultations on the possibility of making the remainder of the band, which includes the range 26.5-27.5GHz, available for 5G services.

Greece

Greek regulator EETT awarded the 26GHz spectrum for fixed backhaul links in February 2017. Four lots of 2×56MHz were sold at the reserve price of EUR1 million each (AUD0.00083/MHz/Pop)¹². The licences spanned the frequency range 24.549 – 25.109GHz paired with 25.557 – 26.117GHz and were awarded for a

⁹ The ECC is a wide-ranging set of measures to update the rules and regulations governing the European telecommunications market, which has been adopted in June 2018. Further information on the ECC is available here: http://europa.eu/rapid/press-release_IP-18-4070_en.htm

¹⁰ https://www.comreg.ie/?dln_download=results-of-the-26-ghz-spectrum-award-2018

¹¹ <https://www.comreg.ie/publication/26-ghz-spectrum-award-information-memorandum/>

¹² https://www.eett.gr/opencms/opencms/admin_EN/News/news_0431.html

period of 15 years¹³, implying that these parts of the band are unlikely to be made available for 5G services in the near future.

EETT has not yet launched any consultations on the possibility of making the remainder of the band, which includes the range 26.5-27.5GHz, available for 5G services.

South Korea

South Korea held a multiband auction containing the 3.6GHz band and 28GHz band on 19 June 2018. The 28GHz band was auctioned in 24 contiguous lots of 100MHz, within the range 26.5 – 28.9GHz. This is part of NR Band ‘n257’. The band partly overlaps with the 26GHz NR band, Band ‘n258’, and there is an ongoing discussion about so-called ‘tuning ranges’ for handsets, implying that handsets that cover Band ‘n257’ may also be able to tune over Band ‘n258’. If both bands were commonly supported in end-user devices, this would represent a significant boost to the value that operators can attach to both of these bands. However, it is not clear at present whether this will ultimately be the case and will depend on standardisation developments as well as demand from mobile operators over the coming years.

The reserve price for each block of 28GHz spectrum was KRW25 900 million (AUD0.0066/MHz/Pop), for a 5-year licence. There were no spectrum reservations, but a cap of 1GHz per operator was in place, effectively ensuring that at least three operators would gain access to the band. Each of the three main mobile operators (KT, LG-U and SK Telecom) acquired 800MHz of contiguous spectrum in the 28GHz band, with all blocks being sold at reserve price¹⁴.

SK Telecom and LG-U have both conducted 5G network trials which included sites using the 28GHz band¹⁵, and KT plans to launch a 5G network in March 2019¹⁶, though the latter may not yet include the 28GHz band.

2.1.2 Countries with auctions planned in 2018

Italy

Italian regulator AGCOM released a public consultation regarding its plans for a 5G multi-band auction including the 700MHz, 3.6GHz and 26GHz bands in December 2017¹⁷. In May 2018, AGCOM published further comments regarding the upcoming auction¹⁸. As early as September 2018¹⁹, AGCOM plans to hold a Simultaneous Multi Round Ascending (SMRA) auction²⁰, including 5 lots of 200MHz from 26.5-27.5GHz. The licenses will be valid until 2037, with an option to being extended for a further 8 years. The 26GHz

¹³ https://www.eett.gr/opencms/export/sites/default/admin/downloads/Consultations/RadioCommunications/PC24_5-26_5Results.pdf

¹⁴ <https://www.fiercewireless.com/wireless/south-korea-wraps-5g-auction-for-3-5-28-ghz>

¹⁵ <https://www.rcrwireless.com/20180504/5g/south-korea-set-award-5g-spectrum-next-month-tag23>

¹⁶ <http://techblog.comsoc.org/2018/03/23/korea-telecom-to-launch-5g-service-in-march-2019-with-what-endpoints/>

¹⁷ <https://www.agcom.it/documents/10179/9509516/Delibera+89-18-CONS/0fe3921f-4905-49ef-a07f-a8c358053e8e?version=1.0>

¹⁸ <https://www.agcom.it/documents/10179/10517165/Delibera+231-18-CONS/ce5f9340-2b1f-49ba-9cd0-8984d9c56d85?version=1.0>

¹⁹ <https://www.reuters.com/article/us-italy-telecoms-5g-auction/italy-to-auction-5g-frequencies-by-end-september- idUSKCN1IO2OO>

²⁰ Ibid. 18, §182

licenses will be awarded on a nationwide basis but will not have exclusive usage rights. Instead, the licences are based on a so-called “Club Use” model²¹.

This “Club Use” model means that each successful bidder can use up to the entire 1 GHz of available spectrum in areas where the other licensees are not present. Once several licensees have deployed their networks, the individual rights of use on the acquired spectrum will prevail. This mechanism is intended to increase the economic efficiency of use in the 26 GHz band.

The proposed cap is 400MHz per operator (i.e. 40% of the available spectrum)²². Reserve prices are still subject to being finalised.

United States

The FCC has scheduled an auction for spectrum in the 28GHz band for 14 November 2018 (Auction 101)²³. The auction will use the SMRA format with the spectrum on sale being 27.5 – 28.35GHz (850MHz TDD total), split into two lots of 425MHz each: 27.5 – 27.925GHz and 27.925 – 28.35GHz.

The licenses will be made available at the county level and will be available in 1537 counties (within the other 1695 counties, there are already active licenses in the 28GHz band). Licenses will have an indefinite duration, with reserve prices set at about AUD0.0027/MHz/Pop. Licenses will not be exclusive and must be shared with up to three transmitting FSS earth stations in each county.

Immediately after this auction, the FCC proposes to auction an additional 700MHz in the 24GHz band by means of a clock auction (Auction 102)²⁴. The spectrum will be made available in seven lots of 100MHz each. These licenses will also be of indefinite duration, with a reserve price of approximately AUD0.0027/MHz/Pop. The licences will be awarded on a shared basis with incumbent broadcast satellite service (BSS) feeder link stations. The licenses will be awarded at the so-called “partial economic area” (PEA) level (licenses will be available in all 416 PEAs across the United States).

Finally, the FCC is considering making available additional spectrum in the 26GHz band, to align with the international harmonisation efforts that it recognises to be ongoing in the band. Its focus is on the range 25.25 – 27.5GHz. The FCC is currently seeking comments on whether / how much of this spectrum could be made available for use, keeping in mind the requirements of current incumbent federal uses. Different models for sharing the spectrum in the future are mentioned by the FCC and are open for comment – depending also on the likely requirements of the incumbent users. The FCC currently considers making 26GHz spectrum available in lots of 100MHz, at the PEA level. The current proposed notice of rulemaking that covers this topic is open for comment until September 2018²⁵.

²¹ Ibid. 18, §179

²² Ibid. 18, §165, §184

²³ <https://www.fcc.gov/auction/101>

²⁴ <https://www.fcc.gov/auction/102>

²⁵ <https://docs.fcc.gov/public/attachments/FCC-18-73A1.pdf>

2.1.3 Countries with awards planned for 2019/20

France

French regulator ARCEP held a public consultation in May/June 2018 concerning an award of the 26GHz band for 5G. In this consultation, ARCEP expressed the view that 5G services will be made available by 2020 and that it views the 26GHz band as a key 5G band to assist in providing such services.

In order to facilitate the deployment of 5G, ARCEP plans to award the 26GHz band around 2020. A complicating factor in France is that ARCEP does not have full authority over managing the 26GHz band as some of the spectrum is controlled by the Ministry of Armed Forces, which would require ARCEP to negotiate a release of the band prior to an auction²⁶. The band is thus unlikely to be licenced on an exclusive basis, but may have to be shared with existing users, not dissimilar to the situation proposed in the United States.

Germany

German regulator Bundesnetzagentur (BNetzA) released a first consultation on awarding the 26GHz band in March 2018²⁷. The 26GHz band is largely unused in Germany, except for some military use. BNetzA has stated that this military spectrum would need to be vacated prior to the band being suitable for an auction.

With respect to auctions for 5G spectrum, BNetzA is considering a two-tiered approach. Its current focus is on organising an auction for the 2.1GHz and 3.4-3.8GHz bands, planned for early 2019. The 26GHz band will initially be allocated for regional and local use, before potentially being awarded on a national basis for 5G in 2019/2020²⁸. BNetzA is yet to announce what spectrum from the 26GHz band will be made available, however given its overlap with the 28GHz band and that it is in line with EU advice, it is likely to be the 26.5GHz-27.5GHz range.

Portugal

In March 2018, Portuguese regulator Anacom issued a public consultation discussing several bands, including 26GHz²⁹. However, Anacom has stated that it not possible to define a specific timetable for the auction at this point in time. A total of 672MHz of spectrum in the 24.5-26.5GHz range will be awarded in six blocks of 2×56MHz, along with 700MHz of spectrum in the 27.5-29.5GHz range in two blocks of 2×175MHz. The spectrum awarded at this auction will not be for use by 5G.

Norway

Norwegian regulator Nkom auctioned 2×56MHz of the 26GHz band for backhaul links in September 2016 in a first-price sealed-bid auction. The spectrum was awarded for a period of 3 years³⁰. A new auction is planned to be held in 2020³¹, where the 26GHz band is auctioned together with 2.3GHz, 2.6GHz and 3.4-

²⁶ https://www.arcep.fr/uploads/tx_gspublication/consultation-publique-bande-26GHz_5G-mai2018.pdf

²⁷ For more information, please follow this [link](#)

²⁸ https://www.bundesnetzagentur.de/DE/Sachgebiete/Telekommunikation/Unternehmen_Institutionen/Frequenzen/OeffentlicheNetze/Mobilfunknetze/mobilfunknetze-node.html

²⁹ https://www.anacom.pt/streaming/1marco2018auscultacMercado.pdf?contentId=1430578&field= ATTACHED_FILE

³⁰ <https://www.nkom.no/teknisk/frekvensauksjoner/auksjoner/planlagte-avsluttede/auksjon-26-26-ghz>

³¹ <https://www.nkom.no/teknisk/frekvens/frekvensstrategi/frekvenskompass/attachment/34516?ts=163d3b267b2>

3.8GHz, however further details on which parts of the 26GHz band will be up for award are not yet public knowledge.

Nkom has stated that it will deliberately delay the auction until after WRC-19, to align its process with decisions taken at international level. The delay also allows Nkom to coordinate the award with other bands (that are expiring around 2020), such that all spectrum can be included in a single, larger process.

Spain

Spanish regulator CNMC has issued a first public consultation on the 26GHz band and is planning to align itself with the decisions made in other EU countries³². At least 1.4GHz of the 26GHz band is to be made available for release in time for significant 5G deployments throughout 2020. However, details of which exact frequency range will be included in the process are not yet public knowledge. High speed trials of the 26GHz band are being carried out in Madrid³³ by Orange and Ericsson.

Sweden

In February 2018, Swedish telecoms regulator PTS published a public consultation on the future assignment of the 3.4-3.8GHz and 24.25-27.5GHz bands for 5G wireless networks³⁴. The 26.5-27.5GHz range will be auctioned first in 2020, with the 24.5-26.5GHz range to be assigned at a later stage.

Ericsson is currently using a trial licence for 26.5-27.5GHz band. This licence expires at the end of 2019, at which point the spectrum will be considered for auction³⁵.

United Kingdom

In July 2017, UK regulator Ofcom published a call for inputs (CFI) regarding the 26GHz band and its potential with regards to 5G wireless networks³⁶. Ofcom took comments until September 2017 when the CFI was closed. Since then, Ofcom has established that it views the 26GHz band as the next band to be harmonised for 5G and has made it a key point to establish this formally at WRC-19³⁷, as well as inquiring as to the relevance of other higher frequency bands in a 5G context, namely the 37-43.5GHz and the 66-71GHz bands.

It looks highly likely that, once further recognition and agreement is reached at WRC-19, Ofcom will begin the process of awarding this band in 2020³⁸. In the meantime, Ofcom have expressed an interest in short-term 5G trials using the 26GHz band.

³² http://www.mincotur.gob.es/telecomunicaciones/5G/Documents/plan_nacional_5G_en.pdf

³³ <https://advanced-television.com/2017/09/25/spain-orange-and-ericsson-first-5g-trials/>

³⁴ <https://pts.se/en/news/radio/2018/preliminary-study-of-future-assignment-of-frequencies-for-5g-deployment2>

³⁵ <https://pts.se/sv/nyheter/radio/2018/pts-har-beviljat-ericsson-tillstand-for-5g-tester-i-26-ghz-bandet/>

³⁶ <https://www.ofcom.org.uk/consultations-and-statements/category-2/5g-access-at-26-ghz>

³⁷ https://www.ofcom.org.uk/data/assets/pdf_file/0017/114524/consultation-wrc-19.pdf

³⁸ <https://5g.co.uk/guides/5g-uk-auction/>

Canada

In June 2017, Innovation, Science and Economic Development Canada (ISED) published a consultation on releasing millimetre-wave spectrum to support 5G. Its initial focus is on the 27.5 – 28.35GHz, with the 37 – 40GHz and 64 – 71GHz bands also being considered for award at a later stage³⁹. In June 2018, an addendum to the initial consultation was released, which also considered the 26.5-27.5GHz band for 5G.

Following the feedback received, ISED will consult further on a technical, policy and licensing framework for the 26GHz band⁴⁰. ISED consider it a priority that the 1.85GHz of spectrum in the band can be made available for release between now and 2022.

It is worthwhile noting that ISED also intends publishing a spectrum release plan for the coming 5 years in the near future. However, the date for publishing this plan is unknown at present.

Japan

The Japanese telecoms regulator, MIC, has identified the 28GHz band (in particular 27.5GHz-28.35GHz) as the first 5G band above 24GHz that they plan to allocate to mobile communications, with the regulator's road map indicating the spectrum will be awarded around 2020/2021⁴¹.

In parallel to these plans, intensive testing of the 28GHz range is going on in Japan. Since August 2016, Softbank has been trialling potential high-frequency 5G bands in the Daiba District of Tokyo. In March 2017, Softbank was granted 732MHz in the 28GHz band for 5G trials in this district.⁴² Two other operator/vendor consortia, namely KDDI/Samsung⁴³ and Huawei Technologies/NTT DOCOMO⁴⁴ have also successfully completed various 28GHz 5G tests throughout 2017.

Finland

Finnish regulator FICORA has issued a call for responses to the ECC's report assigning the 26GHz band to 5G⁴⁵. The deadline for responses was 26 June 2018. No information on the outcome of the process is yet available.

New Zealand

The Ministry of Business, Innovation and Employment (MBIE) recently launched a wide-ranging consultation on the country's preparations for 5G⁴⁶, which included a detailed outline of the current situation and planned actions in the 26GHz band:

³⁹ [https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/slpb-001-17-5G.pdf/\\$file/slpb-001-17-5G.pdf](https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/slpb-001-17-5G.pdf/$file/slpb-001-17-5G.pdf)

⁴⁰ <https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11399.html#s3>

⁴¹ https://5gmf.jp/wp/wp-content/uploads/2017/06/02-Opening-Session-1_Isao-Sugino.pdf

⁴² https://www.softbank.jp/en/corp/group/sbm/news/press/2017/20170323_02/

⁴³ <https://www.telegeography.com/products/commsupdate/articles/2017/02/24/kddi-samsung-demonstrate-28ghz-5g-handover-in-tokyo/>

⁴⁴ <https://www.telegeography.com/products/commsupdate/articles/2017/12/07/huawei-docomo-claim-milestone-in-successful-28ghz-mmwave-trail/>

⁴⁵ For more information, please follow this [link](#)

⁴⁶ <https://www.rsm.govt.nz/projects-auctions/current-projects/preparing-for-5g-in-new-zealand/technical-consultation/5g-spectrum-road-map-discussion-document.pdf>

- At present, 24.55-25.39GHz is allocated to operators Vodafone and Kordia. However, these licenses do not allow for 5G use and will expire in 2022.
- Above 27GHz, the band is currently used for satellite gateway licenses, which will expire in January 2020.
- 22-26.25GHz is currently used for vehicular radar technology, however this will be migrated out of the 26GHz band by 2022.

Once decisions have been made at WRC-19, more work will be done in terms of awarding the 26GHz band through national licenses for 5G networks. MBIE has made it clear that although short-term trials using the 26GHz band for 5G before 2020 are a possibility, exclusive long-term usage rights will not be granted before 2022.

Poland

The Ministry of Digitization published a consultation on 5 January 2018, in which it expressed an interest in making available the 700MHz, 3.6GHz and 26GHz bands for 5G in a timely fashion. Within the consultation, it presented a timeline for awarding 5G licenses for these bands, with the 26GHz band being made available around 2020/2021 (after WRC-19, when it expects the 26GHz band to have been formally recognised as a globally harmonised 5G band)⁴⁷.

Slovakia

In April 2017, the Slovakian telecoms regulator (RU) launched a public consultation on how to assign the 26GHz band. The consultation was closed in May 2017. Two duplex frequency blocks in the 26GHz band were awarded in January 2018 (one being 56MHz, the other 112MHz), but these cannot be used for 5G. Given the coordination efforts ongoing at a European level, the RU announced that the 26GHz band will not be made available for 5G before 7 July 2021⁴⁸.

Other OECD countries

The following countries have not announced specific plans for awarding the 26GHz band: Austria, Belgium, Chile, Czech Republic, Denmark, Estonia, Hungary, Iceland, Israel, Latvia, Luxembourg, Mexico, Netherlands, Slovenia, Switzerland, Turkey.

2.2 Non-OECD Countries

China

Between June and August 2017, China's Ministry of Industry and Information Technology (MIIT) held a public consultation regarding the planning and use of the 26GHz band (24.75-27.5GHz) and other millimetre-wave bands such as the 37-42.5GHz band⁴⁹. More specific information regarding when the 26GHz band will be awarded or which frequencies will form part of the award are currently unavailable.

In addition to the consultation, there has been significant activity in the Chinese market with respect to testing 5G in millimetre-wave bands. Chinese telecoms vendor ZTE has been conducting 5G trials in the 26GHz

⁴⁷ <https://www.gov.pl/cyfryzacja/strategia-5g-dla-polski>

⁴⁸ <https://www.teleoff.gov.sk/konzultacia-k-pridelovaniu-frekvencii-v-pasmach-26-ghz-a-29-ghz/>

⁴⁹ http://zmhd.miit.gov.cn:8080/opinion/noticedetail.do?method=notice_detail_show¬iceid=1781

band in the Huairou district of Beijing. These 5G tests in China are being led by MIIT and the National development and reform commission (NDRC) as well as the Ministry of Science and Technology (MOST). All three major Chinese mobile operators are involved in the test group, namely China Mobile, China Telecom and China Unicom⁵⁰.

India

India's telecoms regulator has yet to launch any public consultations or commence testing with the 26GHz band for 5G networks, however the government has declared its support for the 26GHz band as one of the initial high-frequency bands for 5G, in line with China and Europe⁵¹.

Hong Kong

In March 2017, national regulator OFCA announced its plans to clear 4.1GHz of spectrum in the 26GHz and 28GHz bands, making them available for 5G networks in 2019⁵². In May 2018, operator 3 HK was awarded trial licences to test 5G indoor and outdoor performance for the 26GHz and 28GHz bands.⁵³ It is currently unknown how much of the 26GHz band will be made available. However, it is likely that the 26GHz band will be part of the first batch of spectrum that is being released for the provision of 5G services in Hong Kong⁵⁴.

Singapore

From May to June 2018, national telecoms regulator Infocomm Media Development Authority (IMDA) conducted a public consultation on 5G spectrum, including requesting comments regarding the potential of the 28GHz band (27.5-29.5GHz) as a 5G ultra-high frequency band⁵⁵, identifying it as a band that has had the most extensive testing in Singapore as well as being a currently under-utilised band.

On 18 June 2018, mobile operator M1 announced that it would be conducting 5G trials using the 28GHz band in Jurong, partnering with Huawei⁵⁶. It is unknown when Singapore will hold an award process at this point in time.

⁵⁰ <https://www.telegeography.com/products/commsupdate/articles/2017/06/14/zte-completes-26ghz-high-frequency-field-test-in-beijing/>

⁵¹ <https://telecom.economicstimes.indiatimes.com/news/india-to-seek-26-ghz-spectrum-band-for-5g-rollout/63628094>

⁵² <https://www.mobileworldlive.com/featured-content/top-three/hong-kong-to-release-spectrum-for-5g-services-in-2019/>

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