**Please note that this is a provisional programme and speakers are not yet invited unless stated otherwise.**

**The 5th Annual Asia Pacific Spectrum Management Conference**

*Enabling DIGITAL futures through SMART Spectrum Management*

**12 - 14 March 2019**

**Kuala Lumpur, Malaysia**

**DAY 1**

09:00 – 09:40 **Morning Coffee and Registration**

**Session 1: Opening Ceremony and Keynote Presentations**

09:40 – 10:20 **Opening Ceremony**

10:20 – 10:40 **Keynote Presentation and Introduction**

10:40 – 11:00 **Morning Coffee Break**

**Session 2: An update on progress in preparing for WRC-19 around the world**

All around the world, regions are now reaching their final stages of preparation for WRC-19, and positions are being finalised on key agenda items. In February, key representatives came together for the Conference Preparatory Meeting (CPM), which was an opportunity to present positions, explore solutions, and where necessary, look to reconcile any differences. With regional groups now having had the opportunity to digest the outcomes from CPM, this session will provide the opportunity to receive an update on positions and opinions.

* What positions are now known on the key agenda items in the APAC region and elsewhere around the world?
* What issues still remain to be decided?
* Where are there signs of agreement and where is there disagreement (both between countries within the region; and also inter-regionally between APT and other regional bodies around the world)?
* What work remains to be done in the build up to Sharm-el-Sheik?

**Moderator:** To be confirmed

11:00 – 11:15 **Presentation: Preparation for WRC-19 in the APAC region**

10:55 – 11:10 **Presentation: Preparation for WRC-19 in the European region**

11:30 – 11:45 **Presentation: Preparation for WRC-19 in the Americas / MENA region**

 11:45 – 12:00 **Presentation: Preparation for WRC-19 in the RCC region**

12:00 – 12:15 **Questions to the floor on the key priorities ahead of WRC-19**

*To set the scene for this session, audience members will be asked questions regarding the key agenda items for WRC-19, and then be given the chance to respond via online voting pads.*

12:15 – 12:40 **Interactive Room Wide Discussion**

12:40 – 13:40 **Lunch**

**Session 3: Connecting the Unconnected**

**Session 3i: Delivering mobile services to connect rural areas**

In order to deliver mobile broadband services to rural areas, there is a need for spectrum to be made available to mobile in the lower frequency ‘coverage’ bands. The 700MHz band is of course as central part of this, but alongside this, other bands (for example 600Mhz, 800Mhz and 900Mhz) can also play a part in the solution. This session will look at the options in these bands, and the tools available to regulators to ensure that the required spectrum is made available in a timely fashion and utilised as efficiently as possible.

* What challenges still remain in the region when it comes to the allocation of the 700MHz band?
* Alongside the 700Mhz band, what other bands offer good options to provide the required capacity in ‘coverage’ bands? Where do we currently lie across these regions in the allocation of these bands?
* What tools are available to regulators to ensure that this spectrum is allocated as quickly and efficiently as possible?
* To what extent can universal service obligations and other regulatory measures help to speed up the delivery of services to rural areas?
* How can it be ensured that the spectrum needs of all users in these lower frequency bands can be met?

13:40 – 14:00 **Challenges of allocating the 700MHz band and ways to overcome these**

14:00 – 14:20  **The role of Universal Service Obligations** **in connecting the most remote areas**

14:20 – 14:40 **Country Case Study: Philippines**

14:40 – 15:00 **Country Case Study: India**

15:00 – 15:20 **Country Case Study: Myanmar**

15:20 – 15:45 **Afternoon Coffee Break**

**Session 3ii: Exploring the technology options to deliver last mile connectivity**

Connecting the unconnected, especially in those most remote areas, will require a mix of different technologies and solutions in additional to mobile broadband. This session will look at some of these options in more detail, and at the role that different connectivity providers will play alongside mobile to deliver last mile connectivity.

* What innovative new technologies and solutions are emerging that are going to help meet the challenge of delivering the last mile of connectivity?
* How can it be ensured that the right technology mix is put in place in each case to meet the needs of specific communities and regions?
* What examples are being seen across the region of connectivity providers working together to connect these outlying communities?

15:45 – 16:00 **Presentation: The role of Satellites in delivering last mile connectivity**

16:00 – 16:15 **Presentation: HAPS**

16:15 – 16:30 **Presentation: Powering last mile connectivity**

16:30 – 16:45 **Presentation: Fixed Wireless Access**

16:45 – 17:00 **Presentation: Fixed Wireless Access**

17:00 – 17:30 **Room Wide Discussion**

**Day 2**

**Session 4: Continuing the path to 5G rollout in Asia-Pacific - what do policymakers and industry need to do to ensure its success?**

The success of 5G is reliant on the combined efforts of a number of different stakeholders. Alongside industry representatives, academic institutions and standards-making bodies who are all working hard to deliver technologies that will underpin our 5G future, Governments and regulators are focussing on ensuring that the correct regulatory environment is in place. This session will focus on the key role of the different stakeholders, at the progress that has been made to date, and at the challenges that still lie ahead.

* What national strategies and 5G plans are being seen across the region and what progress has been made over the past 12 months?
* To what extent is the region on track to meet its goals and objectives for 5G and ensure the region is leading the way globally in deployment?
* How important is it that a harmonised and co-ordinated approach is achieved, and to what extent is this being seen?
* What are the key spectrum bands for 5G roll-out, and how can it be ensured that the necessary bandwidth is made available in a timely and efficient fashion?
* How important will tools and technologies such as massive MIMO and carrier aggregation be in delivering the 5G future?

09:00 – 09:20 **Presentation**

09:20 – 09:40 **Presentation**

09:40 – 10:00 **MIMO, Smart antennas and beamforming - an update on key technologies for 5G and what they will mean for regulation**

10:00 – 10:20 **Country Case Study – China**

10:20 – 10:40 **Country Case Study** – **Thailand**

10:40 – 11:00 **Morning Coffee Break**

**Session 5: Satisfying the 5G requirements of vertical industries – delivering a spectrum environment that meets the needs of all**

5G Is going to bring with it a wide range of new use cases, with some very varied spectrum requirements. The challenge for regulators is to develop a spectrum regime that meets the (sometimes complex) requirements of all these cases, and of all existing and new users. This session will look at the extent to which current 4G licencing models will still be valid in a 5G world, or whether different approaches to licencing and assignment may be necessary. Exploring the requirements that are likely to be seen and some of the models that are being put forward to meet these, it will discuss the best way forward to ensure an efficient and flexible spectrum framework that satisfies the requirements of all.

* What new and emerging use cases are going to be enabled by 5G, and what spectrum requirements are likely to be seen?
* What spectrum bands can be used to meet the requirements and what mix of licenced, unlicensed and shared spectrum will be required?
* Can a similar licensing model as has been used for 4G still be relevant in the emerging 5G world, or is there a need for a rethink?
* Can traditional mobile operators provide all the connectivity requirements for 5G and IoT or is there an argument to allow industry stakeholders to build/own/operate their own locally self-controlled wireless networks?

11:00 – 11:15 **Presentation – Digital Transformation and meeting the needs of vertical sectors**

11:15 – 11:30 **Presentation – GSA representative**

11:30 – 11:45 **Presentation**

11:45 – 12:00 **Case Study: Meeting the needs for Industrial IoT in Vietnam**

12:00 – 12:15 **Presentation –** **Another vertical sector**

12:15 – 12:45 **Roomwide Discussion**

12:45 – 13:45 **Lunch**

**Session 6: What immediate market demand is there for mmWave spectrum for 5G?**

mmWave spectrum is seen as one of the crucial frequency ranges to deliver the ultra-high-capacity connectivity that is required for 5G in the long term. However, in the shorter term, some feel that the extensive infrastructure necessary for the mass adoption of mmWave as a 5G standard simply is not yet in place, and that the priorities at least in the early stage of commercial roll-out should be focussed around other bands (for example the C-band). This session will look at this question in more detail, and the extent to which there is immediate market demand for the spectrum in mmWave frequencies. It will look to assess the optimal timing of award for the different mmWave bands to help deliver the full benefits of 5G.

* How important a role is mmWave spectrum going to play in the initial commercial launch of 5G?
* To what extent is there a need for the immediate release of mmWave bands, or should the focus be prioritising other lower and mid range frequencies?
* Where are we in terms of the adoption and installation of the massive MIMO technologies that will be crucial for commercial roll-out of 5G in the mmWave frequencies?
* Which countries across Asia have already started awarding licences in the mmWave frequencies?
* Should operators be looking to release the spectrum in specific bands all at once or be looking to do this more progressively?
* How important is it that spectrum is released in large contiguous blocks, or can techniques such as carrier aggregation offer an alternative to this?
* What is the situation related to the mmWave frequencies in other regions around the world, and specifically in the US, where bandwidth in the 24Ghz and 28GHz band has now been allocated?
* How can the needs of mobile and satellite services in the mmWave bands best be met, and to what extent is co-existence a viable option?

13:30 – 13:45 **Presentation – Operator or GSA**

13:45 – 14:00 **Satellite Perspective**

14:00 – 14:15 **Country case study – South Korea**

14:15 – 14:30 **Case Study – 5G rollout in the mmWave bands in the US**

14:30 – 14:55 **Room Wide Discussion**

**Thinking Point: The importance of the mmWave and microwave spectrum for**

**delivering backhaul solutions**

14:55 – 15:15 **Presentation**

15:15 – 15:35 **Presentation**

15:35 – 15:55 **Afternoon Coffee Break**

**Session 7: Delivering a co-ordinated and efficient approach for the 3.3GHz – 4.2GHz C-Band**

The 3.3GHz - 4.2GHz C-Band spectrum has been identified worldwide as a pioneer band for 5G services. It offers a compromise between the wide coverage of lower frequencies and the higher capacity of millimetre waves, and is seen as an ideal band both for this initial launch of 5G and also to deliver additional 4G capacity. However, in Asia Pacific (as in many other parts of the world) it is already intensively used for other services, in particular by the satellite industry, where C-band's higher resistance to rain fade makes it crucial in the region for services requiring high availability. It is hugely important for TV distribution across the continent and is also heavily used to provide telecommunication services such as cellular backhaul to support terrestrial mobile deployment in remote areas. This session will address the optimal allocation of spectrum between these important uses and how this might evolve over time.

* What role will the C-Band play in the roll-out of 5G services in the Asia-Pacific region?
* How much C-band spectrum will mobile operators need in the next ten years? To what extent, can other 5G mobile bands, both at lower frequencies and in mmWave spectrum substitute for C-band?
* What is the current situation in the band across Asia, and what frequencies are likely to be made available for mobile services in the near future?
* What examples have already been seen across the region of clearing and reallocating the band, and what lessons can be taken?
* How can it be ensured that any realignment of the band can deliver a solution that balances the needs of all users in the band in the most efficient way possible?
* What measures are required to protect and preserve satellite users and other incumbents in the band? How important is C-Band to satellite in the region for the foreseeable future?

15:55 – 16:10 **Presentation – GSA representative**

16:10 – 16:25 **Presentation – Satellite representative**

16:25 – 16:40 **Country Case Study – Hong Kong**

16:40 – 16:55 **Country** **Case Study – Delivering the new 3.5GHz band in Thailand or Singapore**

16:55 – 17:10 **Country Case Study - USA**

17:10 – 17:40 **Room Wide Discussion**

**Day 3**

**Session 8: A focus on the 2.3GHz and the 2.6GHz mobile extension bands**

The 2.3GHz and 2.6GHz ‘mobile extension bands’ are both considered important for delivering the required spectrum for both 4G and 5G. However this is an area in which the APAC region is somewhat lagging behind the rest of the world, with a number of delays having been seen in allocating the bands to mobile. This session will look at the reasons for these delays and what can be done to accelerate their release and ensure the most efficient use.

* What is the current situation in the 2.3GHz and 2.6GHz bands across the region?
* Where are delays being seen in allocating these to mobile broadband, and what can be done to accelerate the process?
* How important is it that a co-ordinated approach is seen both in terms of timing and the approach to allocation, and what work is being done in this area?

09:00 – 09:15 **Presentation – The importance of the 2.3GHz and 2.6GHz bands**

09:15 – 09:30 **Presentation – Eco-system development in the 2.3GHz and 2.6GHz bands**

09:30 – 09:45 **Country Case Study – Indonesia**

09:45 – 10:00 **Country Case Study – Sri Lanka**

10:00 – 10:15 **Country Case Study - Myanmar**

10:15 – 10:35 **Room Wide Discussion**

10:35 – 10:50 **Morning Coffee Break**

**Session 9: Developing 5G Indoor Network – how to get well prepared for 5G?**

5G is going to bring with it a wide range of new use cases. Approximately 70% of these cases will occur indoors, and an indoor network is required that supports big traffic, low latency, high peak data rate, positioning, etc. Traditional DAS (distributed antenna systems) will struggle to meet these 5G era service requirements, and would be unable to even provide the coverage on 3.5GHz and above spectrum. The challenge for operators & tower companies is to ensure that the capabilities of 5G spectrum are fully utilised in indoor scenarios, and to develop a unified indoor network architecture to meet the many different use cases that exist indoors. In this session, the enterprises requirements will be put forward; the indoor challenges in 5G era will be discussed and the regulators will share their country policies to support 5G indoor network development.

• What new and emerging ‘indoor’ use cases are going to be enabled by 5G, and what indoor network requirements are likely to be seen?

• What network architecture can be used to meet the requirements and what challenges will the transition to this likely raise?

• What can regulators do to accelerate the delivery of digital indoor systems？

• How can it be ensured that the 5G indoor user experience is consistent with that received outdoors？

10:50 – 11:05 **Presentation – Delivering Digital Indoor Systems in Malaysia**

11:05 – 11:20 **Presentation – Delivering Digital Indoor Systems in China**

11:20 – 11:35 **Case Study: Requirements for a 5G Indoor Network for transportation hubs and systems**

11:35 – 11:50 **Case Study: Requirements for a 5G Indoor Network in an indoor mall**

11:50 – 12:05 **Case Study: Requirements for a 5G Indoor Network for transportation hubs and systems**

12:05 – 12:30 **Panel Discussion**

12:30 – 13:20 **Lunch**

**Session 10: Spectrum license assignment in the Asia-Pacific region – options and recent examples**

One of the biggest ongoing challenges for regulators in the APAC region (and elsewhere in the world) is to design a process for assigning spectrum licences that ensures an efficient allocation of the available bandwidth at a fair price; and ultimately delivers a competitive market and encourages innovation. There are a number of different approaches that can be taken here, and the first decision is whether to look towards using an auction or a beauty contest approach. This session will look at some recent examples that have been seen in the region of both these approaches, and at the considerations that regulators need to take into account when both picking a method of assigning spectrum and ensuring a successful outcome.

* What awards have been seen in the APAC region over the past 12 months, and which countries will be allocating bands in the near future?
* What methods have been seen and how has this impacted outcomes?
* What are the relative advantages and disadvantages of auctions and beauty contests respectively?
* In which circumstances may each of these be appropriate and how important is it that regulators consider national differences and the specific situation in their own country when both setting a method for allocation and designing the award process?
* For regulators who are expected to realize reasonable revenues, what is the appropriate approach for setting reserve prices?
* What role can the refarming of spectrum play as an alternative to issuing new licences?

13:20– 13:30 **Introduction from the moderator – An overview of recent auctions and awards in APAC and around the world**

13:30 – 13:45 **Operator Perspective**

13:45 – 14:00 **Case Study: Vietnam**

14:00 – 14:15 **Case Study: Philippines**

14:15 – 14:40 **Room Wide Discussion**

14:40 – 15:00 **Afternoon Coffee Break**

**Session 11: Planning for the future - Developing roadmaps to prepare for the connected world of tomorrow**

One of the key factors that mobile operators will point to when looking at justifying investment in new technologies and networks is the need for regulatory certainty and planning ahead. With 5G just around the corner, now more than ever, there is a need for regulators and governments to prepare for the future and have a roadmap for future spectrum release is in place to ensure that they don’t get left behind. This session will explore the importance of regulatory certainty, and at how countries can best ensure that they are fully prepared for 5G.

* What examples of spectrum roadmaps best practice are currently being seen in countries across the region, and what impact are these likely to have in encouraging operators to invest in next generation networks?
* What impact does it have on mobile operators and markets more generally when a plan for future release of spectrum is not readily available or understood?
* How can regulators plan ahead to ensure that they are not left behind when it comes to 5G rollout?
* What impact should the forthcoming WRC-19 have on regulators and Government plans for the future, and what work can they be doing ahead of that to start preparing for the connected world of tomorrow?

15:00 – 15:15 **Presentation: The importance of creating national and regional roadmaps for spectrum release**

15:15 - 15:30 **Country Case Study: Malaysia**

15:30 – 15:45 **Country Case Study: Laos**

15:45 – 16:00 **Country Case Study: Bangladesh**

16:00 – 16:20 **Room Wide Discussion**

16:20 – 16:30 **Summing up and final conclusions**

16:30 **End of Conference**