13-Sep-2013

Ms Aileen Chia
Deputy Director General (Telecoms and Post)
Infocomm Development Authority of Singapore
10 Pasir Panjang Road
#10-01 Mapletree Business City
Singapore 117438

Dear Ms.Chia,

Motorola Solutions welcomes the opportunity to comment on the public consultation paper PROPOSED REGULATORY FRAMEWORK FOR TV WHITE SPACE OPERATIONS IN THE VHF/UHF BANDS.

We fully support the use of TVWS technology employing geolocation database to enable opportunistic sharing of 'White Space' spectrum in the VHF and UHF broadcast bands that is unassigned to in Singapore.

We further recommend that any regulations for use by WSDs should be harmonized on a regional/global basis so as not to have unique products and geolocation databases.

With respect to questions posed in the public consultation paper we are pleased to provide comments in the following pages.

If you have any clarifications. Please do not hesitate to contact us.

Yours Sincerely,

Yip Yew Seng

Asia Lead, Regulatory Compliance and Standards, Chief Technology Office

Motorola Solutions

Email: yip@motorolasolutions.com

CC:

Bharat Bhatia, Asia-Pacific Middle East Regional Director, International Government Affairs, Motorola Solutions

Question 1:
IDA invites views on adopting a licence-exempt approach for WSDs in Singapore, subject to the devices meeting the conditions set by IDA.

We support the license-exempt approach for WSD in spectrum that remains available after the digital dividend spectrum has been identified and allocated for IMT and Public safety services. We further recommend that the technical conditions be harmonised as much as possible regionally/globally.

Question 2:
IDA invites views on designating a restricted number of TVWS channels to support the deployment of services that require certainty of spectrum access.

Certainty of spectrum access will improve the market for TVWS devices. Some amount of spectrum should be set aside for certain pre-defined classes of services on an urgent ad-hoc basis. For example, emergency services (e.g., Police, Civil defense, etc) may require urgency and certainty of services.

We propose a priority access mechanism supported by the database structure, to allow high priority users (e.g., Public Safety, Critical Infrastructure, etc.) to access at least a portion of the spectrum quickly on an urgent ad-hoc basis.

In the US, the FCC has a similar proposal for the 3.5GHz band

Question 3:
In the event where IDA designates channels to support such services, IDA invites views on the appropriate regulatory approach in designating and managing these TVWS channels and the regulatory framework for the operations of prioritised WSDs.

Please refer to response in Question 2.

Question 4:
IDA invites views on allowing operation of WSDs in the 694 MHz – 806 MHz band until IDA allocates these frequencies for IMT deployment.

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This band has been designated for IMT and therefore should not be allowed for WSD.

Question 5:
IDA invites views on adopting a database approach as the mandated method to access white space spectrum.

We support the geolocation database approach as the primary and mandated method for managing access to white space spectrum.

Question 6:
IDA invites views on the proposed general requirements for the database query and Registration

We agree with the proposal that all WSDs that operate at a higher power level (above 100mW) to register its location and contact information within the database

Question 7:
IDA invites views on the three situations in which a WSD must query the database. In particular, IDA invites views on defining 50m as the maximum distance that WSDs are allowed to move from its original location, without contacting the geolocation database

We propose that 100-500 meters be the maximum distance that WSDs are allow to move from its registered position in the geolocation database.

Question 8:
IDA invites views on the output power transmission of WSDs as shown in Table 2

We support the use of high power levels, as long as interference is not caused to incumbents.

Question 9:
IDA invites views on allowing the Fixed Devices to have tuneable output power that is capped at a maximum of 4Watts EIRP.

We propose that IDA explore the possibility of permitting WSD with tuneable output to operate at higher than 4 Watts EIRP.
Higher power levels are useful for wide area networks, such as those utilized by broadband wireless internet service providers (e.g., utilizing the IEEE 802.22 standard), and to improve building penetration for certain incident scene emergency communications.

Higher power may be required for point-to-point communications over longer distances.

Question 10:
IDA invites views on the requirement of a Unique WSD Identifier and for this identifier to be based on standards developed by recognised standards organisations.

We support the use of unique identifier to faciliate tracking of devices that transmit radio signals.

Question 11:
IDA invites views on the proposed maximum transmission level of 100mW EIRP for WSDs operating in channels adjacent to a local broadcast channel.

For certain classes of WSD equipment that is nomadic or relatively stationary (e.g., at incident scenes), high power levels may be warranted. Transmission at higher power levels should be allowed as long as adjacent channel interference is not caused to incumbents.

Question 12:
IDA invites views on the proposed OOB emission limit of -56.8dBm, which will be imposed on WSDs operating in channels that are directly adjacent to a local broadcast service.

We also support varying classes of transmit spectral masks in WSD equipment, to allow WSD equipment to be economically competitive with other solutions. WSDs with poor spectral masks will not generally be able to transmit as much power as WSDs with better spectral masks. Many popular communications standards, such as WiFi, have relatively relaxed OOB levels (e.g., the first shelf of the spectral mask being at -20dBc for 802.11 systems). We strongly suggest accommodating these popular communications standards to encourage the market for WSDs.

While we support the relaxed out of band limits for adjacent broadcast service, we would encourage IDA to consider suitable out of band limits for protecting the LTE base stations operating in the uplink band of the APT 700 MHz band, particularly if this band is used for broadband public safety, in which case the cell size maybe larger than in a typical LTE commercial environment.

Question 13:
IDA invites views on defining the OOB emission limits for WSD to WSD operations.

We believe an emission limit is required for WSD to WSD operation in adjacent channels and that a local working group can be tasked to study the matter.

Question 14:
IDA invites views on the proposed approach to manage coexistence between a WSD and the other secondary services within the TVWS channels.

We recognise that not all WSD application require the maximum output power of 4 Watts and we support the approach of using the database to return information on spectrum availability and permissible power level to a WSD, based on the location of the WSD. This approach is only feasible for WSD adjustable output power and for the WSD to register its minimum output power requirement in the database.

Question 15:
IDA invites views on the proposed propagation model and parameters used to determine the maximum transmission power level of a WSD.

Detailed propagation modelling (e.g., Longley-Rice incorporating terrain data, if available) should be utilized to accurately model propagation. Two-ray propagation models may suffice in many cases for modelling WSD signal propagation. As long as the tolerable interference limits (e.g., co- and adjacent channel desired-to-undesired

interference ratios) of incumbent systems are satisfied, WSDs should be able to transmit with high power levels.

Question 16:
IDA invites views on its proposal for the protection of licence-exempt and licensed wireless microphones. IDA also invites views and comments on the optimal number of safe harbour channels required to ensure that licence-exempt wireless microphones can continue to be used once WSDs are deployed.

We support minimizing the number of channels set aside for licence-exempt wireless microphone use. Such microphones can operate under the WSD rules once available.

Question 17:
IDA invites views on the need to develop a registration process for users of licence-exempt wireless microphones that require additional channels beyond the safe harbour channels.

We support IDA's view on registering and tracking all relevant parties using the WSD spectrum.

Question 18:
IDA invites views on whether the proposed demarcation zone approach is sufficient in terms of managing cross border interference issue and if there are any other factors IDA should consider.

We support IDA's view as long as the boundaries of this zone is clearly defined.

Question 19:
IDA invites views on the aggregate interference effect of WSD and whether any adjustment in terms of technical requirement is needed.

In general, WSDs will not attempt to use the same channels in similar geographic areas to avoid co-channel interference among the systems. Therefore, we do not believe that special means are generally necessary to limit aggregate interference levels.

Question 20:
IDA invites views on using GPS as the method to determine location accuracy, and on whether 50m is a sufficient location accuracy requirement for the operation of WSDs.

While GPS is a popular locating means, we believe that a range of locating means should be supported, in order to promote the use of a wide range of WSDs. The Database is readily capable of assigning available channels based on the actual equipment location accuracy, while protecting incumbents to the same high standard. In general, the less accurate the WSD locating means, the less channel availability is available to WSDs while maintaining protection.

Question 21:
IDA invites views on allowing the manual input and internal storage of geographic coordinates for indoor Fixed Devices.

We support the manual entry and internal storage of geographic coordinates for fixed devices.

Question 22:
IDA invites views on the requirement of an approval process for the installer of indoor Fixed Devices and the necessary conditions for approval.

No comment.

Question 23:
IDA invites views on the possible types of TVWS network topologies and use case Scenarios.

We support the Master and Client Network, as well as other network topologies.

Question 24:
IDA invites views on the payment of fees for the use of database services.

If there will be government-managed databases, we propose that the fees be waived to jumpstart the WSD industry. If there will be industry-managed databases, the database operators will need to operate on revenue-generating basis, so modest fees may be appropriate, in a competitive marketplace.

Question 25:
IDA invites views on both approaches in managing the database (i.e. industry-managed or government-managed database).

We propose a 2 phase approach:
1st phase: government-managed database to jumpstart the industry and to gather experience.
2nd phase: industry-managed approach database to facilitate innovation and competitiveness.

Question 26:
To better gauge the level of interest from the industry, IDA invites companies that are interested in developing and managing the database for Singapore to register its interest with us and share the following details:
i) Funding for database development and management (i.e. self-funded, cost recovery, etc)
ii) Business models considered when providing database services
iii) Possible fees involved for TVWS users

Please see response to Question 25 above.

Question 27:
IDA invites views on the proposed preliminary conditions for the operation and administration of the databases

We support IDA's conditions.

Question 28:
IDA invites views on the proposed approach and communications protocols between the following:
i) WSD and IDA website containing the list of authorised database administrators

ii) WSD and the database

We recommend that such protocols should be harmonized on a regional/global basis so as not to have unique solutions.

Question 29:
IDA invites views on the proposed frequency of update for Time A validity and Time B Validity.

A shorter time-frame will allow more dynamic services to be established, possibly increasing overall spectrum utilization.

Question 30:
IDA invites views on requiring the adjustment of the value for Time A validity and Time B validity, and for this to be within the range of 6 to 24 hours.

Shorter time frames for time validity will allow more services to utilize the bands. The database structure can readily accommodate shorter time frames as well. Required update rates in the range of 15 minutes to 1 hour can be accommodated to improve spectrum utilization.

Question 31:
IDA invites views on the benefits and costs of a requirement for WSD to report its operational parameters to the database

We believe that these are necessary to better understand the operating environment and to optimise resources to maximise benefits for all.

Question 32:
IDA invites views on the benefits of including within the TVWS regulations a requirement for WSD to register its contact parameters to the database.

We believe that these are necessary to better understand the operating environment and to optimise resources to maximise benefits for all.