CISCO SUBMISSION TO INFO-COMMUNICATIONS DEVELOPMENT AUTHORITY OF SINGAPORE CONSULTATION ON THE "PROPOSED REGULATORY FRAMEWORK AND STANDARDS FOR INTELLIGENT TRANSPORT SYSTEMS IN THE 5.9 GHZ FREQUENCY BAND"

Cisco Statement of Interest

Cisco Systems (www.cisco.com) is a US-based manufacturer of Internet Protocol (IP)-based equipment and solutions, including IEEE 802.11 "Wi-Fi" equipment, and transportation solutions utilizing Dedicated Short Range Communications (DSRC) radios. Cisco is a strong proponent of the Internet of Things, and believes the traveling public will experience significant benefits from connecting transportation systems with IP. Cisco is pleased to present its comments on this important consultation that will impact the future of surface transportation in Singapore.

Cisco responds to the questions posed in the above captioned consultation as follows:

Question 1

IDA seeks views and comments on the proposed RF emission specifications for ITS deployments in Singapore.

The consultation document appears to propose a general use short range device (SRD) band plan for channels 172 and 174. The proposed power level for the SRDs is 20 dBm. According to the consultation document, the goal is to have both transportation and license-exempt uses sharing Channels 172 and 174.

In Cisco's view, the proposal is unworkable. The SRD power level at 20 dBm will cause significant energy to spill into the adjacent Vehicle-to-Vehicle (V2V) Channel 176, disrupting the ability of V2V technology to successfully warn drivers of impending collisions.

Cisco notes that in Europe, SRDs operate at 14 dBm, and even that may be too much to place adjacent to a V2V channel. Because V2V operations involve safety of life, require low latency, and could easily be overpowered by adjacent license-exempt transmitters, Cisco has advocated that license-exempt uses of the Intelligent Transport Systems (ITS) band be required to mitigate using a "detect and vacate" approach[1] – when V2V or other ITS channels are detected, the license-exempt use would instantly vacate. Moreover, the "detect and vacate" proposal extends non-operation down to 5815 MHz in the license-exempt spectrum adjacent to the V2V channel in the United States – to further protect this safety of life use.

In the Singapore band plan, it is possible to have up to 14 dBm for SRD up to 5850 MHz. Above that, a mitigation such as "detect and vacate" is necessary.

In addition, the SRD power levels proposed in the consultation will do little to promote Wi-Fi use, which is the pre-dominant form of license-exempt use at 5 GHz. For Wi-Fi, a minimum

[1] See http://apps.fcc.gov/ecfs/comment/view?id=60001362140

transmit power must be at 200 mW or 23 dBm EIRP for indoor use due to attenuation in buildings. At these levels, Wi-Fi would need to have mitigation on board to overlay this kind of power without harming V2V. As proposed, the 20 dBm power level for SRDs would fall short of a meaningful power level for Wi-Fi. In Cisco's view, it is better to proceed toward a sharing mechanism in which Wi-Fi detects and avoids transportation. While Wi-Fi would not be able to be in use in this spectrum when transportation uses are present, there are many opportunities for Wi-Fi to use the band in places where surface transportation is not in use – such as indoor uses, high rises, quiet residential areas in the evening, and corporate campuses.

Question 2

IDA seeks views and comments on the proposed 5.875 – 5.925 GHz (5.9 GHz) ITS service band plan in Table 2 above.

See the answer to Question 1, above.

Question 3

IDA seeks views and comments on the proposed plans for:

(i) co-existence between ITS and other short range devices, such as WLAN, broadband access devices, etc. in the 5.850 – 5.875 GHz band; and

(ii) operation of ITS in the 5.850 – 5.875 GHz band, which needs to comply with the existing 5.8 GHz SRD technical specifications, and to operate without spectrum fees, under non-protection and shared-use basis should the existing local 5.8 GHz SRD band be extended to 5.725 – 5.875 GHz.

See the answer to Question 1 above. SRD operations in Channels 172 and 174 will cause harmful interference to adjacent ITS uses. In Cisco's view, the SRD band should not be extended to 5875 in the absence of a "detect and vacate" mitigation requirement to ensure that the ITS uses – and especially V2V – are protected.

Question 4

IDA seeks views and comments on the frequency reassignment for existing service(s), such as fixed services and fixed satellite services, that are residing within the 5.875 – 5.925 GHz band, to facilitate the introduction of ITS; or alternatively, whether the existing services could operate on a non-protection basis.

Cisco has no comments on this question.

Question 5

IDA seeks views and comments on the allocation of interim guard bands, i.e. 5830 MHz – 5855 MHz and 5925 – 5945 MHz, to promote better harmonised spectrum usage between the initial emerging ITS applications and other existing service(s); or alternatively, whether these existing services in the mentioned guard bands could operate on a non-protection and non-interference basis.

Guard bands do not cure the interference problem if SRDs such as Wi-Fi are intended as a use case. Rather, as stated above, the best approach is a "detect and vacate" mechanism to help ensure that ITS transmissions can be received as intended and allow SRDs to use the ITS spectrum when ITS is not present.

Question 6

IDA seeks views and comments on IDA's proposal to exempt Vehicular OBUs from spectrum licensing and adopt a full licensing approach for RSUs and non-vehicular installations.

Cisco agrees with IDA's proposal, which is consistent with that of other jurisdictions.

Question 7

IDA seeks any other views and comments on IDA's proposed ITS licensing framework.

Cisco has no comments on this question.

Question 8

IDA seeks views and comments on the proposed "Technical Specification of Dedicated Short-Range Communications (DSRC) standards for Intelligent Transport Systems (ITS)".

The technical specifications reference the IEEE standard. This is the correct standard to reference.

Looking Ahead

Cisco, as a global leader in networking and Internet technology, would welcome further opportunities to work closely with IDA on the regulatory framework and standards related to ITS.

We look forward to be further engaged in future consultations of the Singapore government. Queries regarding this submission may be directed to the following contact person:

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