INTEL RESPONSE TO INFO-COMMUNICATIONS DEVELOPMENT AUTHORITY OF SINGAPORE PUBLIC CONSULTATION PAPER REGULATORY FRAMEWORK FOR DEVICES USING ULTRA-WIDEBAND TECHNOLOGY

RESPONSE OF INTEL CORPORATION

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I. Introduction and Summary

Intel commends IDA for being one of the leading nations in the promotion and fostering of Ultra-Wideband technology. We note Singapore's world leading Ultra-Wideband (UWB) Program launched by Mr. Lam Chuan Leong, Chairman of IDA, on 25 February 2003.

Intel also commends Singapore's important role in providing critical technical data and submissions to the ITU-R Task Group 1/8 and Singapore's contribution in developing the suite of ITU-R Recommendations on UWB.

However we feel in one key area the current proposal fails to take into consideration rules and recommendations established in the USA, Europe, Japan, and Korea. As a result, if adopted in their current form the rules would disadvantage Singapore by denying access to first generation UWB devices.

Accordingly Intel respectfully proposes a slight modification to the proposal, which will harmonize Singapore's approach with regulations adopted in the rest of the world.

II. Views and comments on the proposal to allow UWB devices to operate in frequency bands which are used for other radiocommunication services such as the fixed-satellite (FSS), fixed services (FS) and radionavigation.

Intel believes that ITU-R SG1 Recommendation SM.1757; IMPACT OF DEVICES USING ULTRA-WIDEBAND TECHNOLOGY ON SYSTEMS OPERATING WITHIN RADIOCOMMUNICATION SERVICES, and Report SM.2057: STUDIES RELATED TO THE IMPACT OF DEVICES USING ULTRA-WIDEBAND TECHNOLOGY ON RADIOCOMMUNICATION SERVICES, as well as numerous other studies, clearly demonstrated that except for the single interferer, close-proximity, case, -70dbm/MHz is more than adequate to protect the other radiocommunication services such as the fixed-satellite (FSS), fixed services (FS) and radionavigation.

And so the technical record strongly supports the view that Singapore's well considered proposal protects incumbent services.

III. Views and comments on the possible scenarios of harmful interference from UWB devices to other licensed band and the possible measures to reduce the risk of interference.

Intel feels that in the overwhelming number of cases, UWB devices will not interfere with any other services.

We agree with IDA that with a relatively ubiquitous deployment of devices there is little risk of interference from aggregate devices to services operating in the 3.1 - 10.6 GHz band.

Do to the natural mitigation affects of UWB communication devices which result in coordination among devices that minimize aggregate effects, Intel believes that there is minimal risk of aggregate interference to licensed services.

Intel has done detailed analysis that demonstrates that that the -41.3 dBm/MHz power spectral density limit meets even the strict protection criteria (I/N = -20 dB) for the 60 meter antenna

height, and is only a few dBs from meeting this criteria for the 45 meter antenna height. Moreover, the parameters and models used to derive the above results are still base on very conservative assumptions, so we believe even the above interference levels have a very small probability of occurring in reality.

Intel believes that technical studies suggest that there is the potential for interference with some indoor services. Currently this appears limited to indoor broadband fixed wireless access, and similar services expected to be operating in close proximity to UWB devices, and the proposed rules completely comprehend this potential risk and protect these services.

IV. Views and comments on the proposal to adopt a licence-exemption approach for UWB consumer and business data communication systems which comply with the UWB technical specification and operate with peak emission within the 3400 MHz and 10600 MHz band.

Intel agrees with IDA that "As the global consumer market is expected to bring about trans-border circulation of these portable UWB consumer devices, it may be impractical to license each device." Moreover as ITU-R Recommendation SM.1756: FRAMEWORK FOR THE INTRODUCTION OF DEVICES USING ULTRA-WIDEBAND TECHNOLOGY states at 2.3.2:

> "Foreseen short-range indoor and outdoor UWB communication applications are best suited for deployment under a licence-exempt or class authorization or a general licence regime, as the case may be. This is due to their low power, limited outdoor usage and expected large number."

Accordingly IDA's proposal is completely aligned with the ITU and regulations adopted in the rest of the world.

V. Views and comments on the proposal to allow unlicensed UWB devices implemented with mitigation techniques to operate at a higher peak emission

level within the 3400 to 4800 MHz band as compared to generic UWB devices without mitigation techniques.

Intel agrees with IDA that “varying degrees of risk of interference to other services could be observed under close proximity distance.” This assessment agrees with the studies in the ITU-R that showed that the only substantial potential for interference occurs with indoor mobile services where a UWB devices and a potential victim may be in close proximity.

Therefore Intel supports IDA’s proposed limit of -70dbm within the 3400 to 4200 MHz band unless mitigation techniques are deployed and Intel is currently actively engaged in the on-going studies in CEPT TG3 to develop such mitigation techniques and believes that only after such techniques have been agreed to should they be adopted into rules.

However, as noted in the regulatory proceedings in the EU, Japan and Korea, there are no “close proximity” services currently deployed in the 4.2 to 4.8 band.

Based on this, and as UWB devices will not be available for operation in the higher bands for some time, proposals were made and subsequently adopted as rules in the EU, Japan and Korea, to allow UWB devices that operated in the 4.2GHz to 4.8GHz band to be sold for a limited time; generally until December 2010.

It was the European Commissions belief that this approach would enable European consumers to benefit from UWB-enabled products without undue delay compared to their North American counterparts by closing the "development gap" between the readiness of product launch for UWB devices operating below 5 GHz according to US rules with respect to equipment either operating above 6 GHz or with additional mitigation techniques.

The Commission further beleived that allowing the time-limited use of the 4.2 – 4.8 GHz band for UWB devices would give a strong and clear message that Europe as a whole was able and willing to provide a supporting environment for technological innovation in wireless products.

Similarly Intel believes that use of the 4.2 – 4.8 GHz band for UWB devices is critical for Singapore to maintain its leading position in this innovative technology.

Accordingly Intel believes that Singapore should add an additional note to the proposed rules to state:

> **UWB devices implemented without mitigation techniques that operate at a level of -41.3 dBm/MHz in the frequency band from 4.2 to 4.8 GHz may be sold until December 31st, 2010.**

VI. Conclusion

Singapore has been at the forefront in the promotion and fostering of Ultra-Wideband technology for over four years.

However we respectfully propose that in order to maintain its leading position in this innovative technology, and to prevent and disadvantage to Singapore by denying access to first generation UWB devices, the above mentioned slight modification to the proposal, which will harmonize Singapore's approach with regulations adopted in the rest of the world.

Respectfully submitted,

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