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AWG-11/INP-89

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RESPONSE TO THE AWG QUESTIONNAIRES

by

Republic of Singapore

Source Document: AWF-9/OUT-08 (Attachment 1)

**REPOSE TO THE QUESTIONNAIRE FOR THE REGULATORY
STATUS FOR THE FREQUENCY BANDS SPECIFIED IN THE
PRELIMINARY DRAFT NEW RECOMMENDATION ITU-R SM.[SRD]**

AWG-11/INP-89

Name of the Administration: Infocomm Development Authority of Singapore

Contact Person:

Question:

What is your regulatory status for the frequency bands specified in the Preliminary draft new Recommendation ITU-R SM.[SRD]?

Preliminary draft new Recommendation ITU-R SM.[SRD]			[Regulatory Status]
Frequency band	Typical Applications	ITU-R Recommendation and Notes	APT Members' Notes
9-148.5 kHz	Inductive applications e.g. RFID for <ul style="list-style-type: none"> • Automotive • Livestock, animal ID and rare species • Item management • Data carrier tooling • Manufacturing automation • Access control, parking • Electronic article surveillance EAS • Moving object detection Active medical implants		Available <ul style="list-style-type: none"> • Induction loop system / RFID (16 – 150 kHz)
148.5-315 kHz	Active medical implants		Not available
3 155-3 400 kHz	Inductive applications e.g.: <ul style="list-style-type: none"> • EAS • Hearing aids (see note) 	ITU-R M.1076 RR No. 5.116	Not available
6 765-6 795 kHz	Inductive applications e.g.: <ul style="list-style-type: none"> • RFID, ticketing, public transport 	ISM band (RR No. 5.138) Centre frequency 6 780 kHz	Not available
7 400-8 800 kHz	Inductive applications e.g.: <ul style="list-style-type: none"> • EAS 	[This band may not be completely available in some countries. See national regulations.]	Not available

AWG-11/INP-89

Preliminary draft new Recommendation ITU-R SM.[SRD]			[Regulatory Status]
Frequency band	Typical Applications	ITU-R Recommendation and Notes	APT Members' Notes
13.553-13.567 MHz	Inductive applications e.g. RFID for <ul style="list-style-type: none"> • Passports and ID cards • Public transportation ticket readers • Blood or medicines tracking • Library systems (digital ISBN number) • Access control • Item labelling, management 	ISM band (RR No. 5.150) Centre frequency 13.560 MHz Level of sideband suppression is dependent on national regulations	Available <ul style="list-style-type: none"> • Radio detection, alarm system
26.957-27.283 MHz	Non-specific SRDs e.g. <ul style="list-style-type: none"> • Remote control 	ISM band (RR No. 5.150) Centre frequency 27 120 kHz	Available <ul style="list-style-type: none"> • Remote controls of garage door, cameras, toys and miscellaneous devices
40.66-40.7 MHz	Non-specific SRDs e.g.: <ul style="list-style-type: none"> • Remote control • Medical telemetry 	ISM band (RR No. 5.150) Centre frequency 40.68 MHz	Available <ul style="list-style-type: none"> • Wireless microphone • Remote controls of garage door, cameras, toys and miscellaneous devices (40.665-40.695 MHz)
312-315 MHz	Non-specific SRDs e.g.: <ul style="list-style-type: none"> • Automotive applications • Keyless car entry • Fleet / Freight container management (RFID) 	The whole of these bands can be considered as a tuning range. These bands are exchangeable in terms of applications but not always available at the same time in one country However, they may not be completely available in some countries. See national regulations.	Available <ul style="list-style-type: none"> • Radio detection, alarm system (312-316 MHz)

AWG-11/INP-89

Preliminary draft new Recommendation ITU-R SM.[SRD]			[Regulatory Status]
Frequency band	Typical Applications	ITU-R Recommendation and Notes	APT Members' Notes
433.05-434.79 MHz		433.05-434.79 MHz is a ISM band (RR No. 5.138 in Region 1) except for countries mentioned in RR No. 5.280 Centre frequency 433.92 MHz	Available <ul style="list-style-type: none"> Radio Telemetry, Telecommand system
401-402 MHz	Active medical implants and associated peripherals	ITU-R RS.1346	Not available
402-405 MHz			Not available
405-406 MHz			Not available
862-875 MHz	<ul style="list-style-type: none"> Non-specific SRDs RFID in logistics, supply chain, air-line luggage control, pallets, returnable transport items, product itemization, freight container management RFID for retail stores such as: inventory taking, RFID enabled checkout or self checkout, customer interaction applications, intelligent shelves and mirrors, EAS systems 	This band is not available for SRDs in a number of countries due to the use by commercial mobile systems	Available <ul style="list-style-type: none"> Radio Telemetry, Telecommand, RFID system (866 – 869 MHz)
875-960 MHz	<ul style="list-style-type: none"> Non-specific SRDs RFID in logistics, supply chain, air-line luggage control, pallets, returnable transport items, product itemization, freight container management RFID for retail stores such as: inventory taking, RFID enabled checkout or self checkout, customer interaction applications, intelligent shelves and mirrors, EAS systems 	902-928 MHz is an ISM band in Region 2 (RR No. 5.150) Centre frequency 915 MHz The whole band can be considered as a tuning range. However, it may not be completely available in some countries. See national regulations. The band 880-960 MHz is not available for SRDs in a number of countries due to the use by commercial mobile systems	Available <ul style="list-style-type: none"> Radio Telemetry, Telecommand, RFID system (920 – 925 MHz)

AWG-11/INP-89

Preliminary draft new Recommendation ITU-R SM.[SRD]			[Regulatory Status]
Frequency band	Typical Applications	ITU-R Recommendation and Notes	APT Members' Notes
[2 400-2 483.5 MHz]	<ul style="list-style-type: none"> • RFID • Real-time locating systems (RTLS) • Tracking of freight containers • Wideband data transmission • Non-specific SRDs 	2 400-2 500 is a ISM band (RR No. 5.150) Centre frequency 2 450 MHz One of the main bands for wideband data transmission	Available <ul style="list-style-type: none"> • Wireless video transmitter and other SRD applications (2400 – 24835 MHz)
[5 150-5 350 MHz 5 470-5 725 MHz]	[• Wideband data transmission]	[ITU-R M.1652] [These two bands are allocated to mobile service and can only be used by RLANs with the conditions set forth in [Resolution 229 (WRC-03)] Any SRD is not allowed to use these bands.]	Available <ul style="list-style-type: none"> • Wireless LAN (5.150 – 5.350 GHz) • Wireless LAN and broadband access (5.470 – 5.725 GHz)
5 725-5 875 MHz	<ul style="list-style-type: none"> • Non-specific SRDs • Wideband data transmission 	ISM band (RR No. 5.150) Centre frequency 5 800 MHz One of the main bands for wideband data transmission	Available <ul style="list-style-type: none"> • Wireless LAN and broadband access (5.725 – 5.850 GHz)
24.00-24.25 GHz	Non-specific SRDs	ISM band (RR No. 5.150) Centre frequency 24.125 GHz	Available <ul style="list-style-type: none"> • Wireless video transmitter and other SRD applications
61.0-61.5 GHz	Non-specific SRDs	ISM band (RR No. 5.138) Centre frequency 61.25 GHz	Available <ul style="list-style-type: none"> • Wireless LAN and broadband access (57 – 66 GHz)
76-77 GHz	<ul style="list-style-type: none"> • For pulsed radar only 		Available <ul style="list-style-type: none"> • Short range radar systems
122-123 GHz	Non-specific SRDs	ISM band (RR No. 5.138) Centre frequency 122.5 GHz This band may not be completely available in some countries. See national regulations.	Not available

AWG-11/INP-89

Preliminary draft new Recommendation ITU-R SM.[SRD]			[Regulatory Status]
Frequency band	Typical Applications	ITU-R Recommendation and Notes	APT Members' Notes
244-246 GHz	Non-specific SRDs	ISM band (RR No. 5.138) Centre frequency 245 GHz This band may not be completely available in some countries. See national regulations.	Not available

Source Document: AWF-9/OUT-08 (Attachment 2)

**REPONSE TO THE QUESTIONNAIRE FOR APT REPORT ON
STATUS OF INTRODUCTION, APPLICATION, ISSUES AND
TECHNOLOGY FOR SHORT RANGE DE VICES (SRDS)**

Name of the Administration: Infocomm Development Authority of Singapore

Contact Person:

Question:

1. Introduction

Which devices with SRD connectivity have been already introduced in your country?

No	Device name	Situation ¹			
		3. very popular	2. popular	1. rare	0. no
1	Desktop PC with wireless connection	3	2	1	0
2	Notebook PC with wireless connection	3	2	1	0
3	Smartphone with short range radiocommunication system	3	2	1	0
4	Tablet computers	3	2	1	0
5	Game	3	2	1	0
6	e-book	3	2	1	0
7	Digital Device (camera, camcorder etc.)	3	2	1	0
8	Audio-Visual for home (video transmission etc.)	3	2	1	0
9	Portable audio	3	2	1	0
10	Mobile router (3G to WiFi etc.)	3	2	1	0
11	Wireless Access Point for home usage	3	2	1	0
12	Wireless peripheral devices (headphone, keyboard, mouse)	3	2	1	0
13	Cordless phone (2.4GHz, others)	3	2	1	0
14	Wireless sensor network	3	2	1	0
15	Medical equipment with short range wireless connection	3	2	1	0
16	Healthcare	3	2	1	0
17	Security camera	3	2	1	0
18	POS (Point Of Sales) system with wireless connection	3	2	1	0
19	Femtocell	3	2	1	0
20	Wireless microphone	3	2	1	0
21	Others (please specify the detail below)	3	2	1	0

¹ “very popular”: most of people are using or rely on the devices/services.

“popular”: many people are using the devices/services and it is easy to find them.

“rare”: some people are using or the devices/services do exist but it is not easy to find them.

“no”: No such devices/services are used or exist in your country.

2. Applications

Which applications have been used in your country? Are they popular in your country?

2-1 Hotspot service

	Device name	Situation 3. very popular 2. popular 1. rare 0. no			
1	Train station	3	2	1	0
2	Airport	3	2	1	0
3	On the train	3	2	1	0
4	Airplane	3	2	1	0
5	Vehicle (Taxi, bus etc.)	3	2	1	0
6	Café	3	2	1	0
7	Bookstore	3	2	1	0
8	Shopping Center	3	2	1	0
9	Museum	3	2	1	0
10	Hospital	3	2	1	0
11	School (primary school, high school, university etc.)	3	2	1	0
12	Public Office	3	2	1	0
13	Outdoor (town etc.)	3	2	1	0
14	Other (please specify the detail below)	3	2	1	0

2-2 Content download service via SRD connection

	Content	Situation 3. very popular 2. popular 1. rare 0. no			
1	Music	3	2	1	0
2	Movie	3	2	1	0
3	Game	3	2	1	0
4	Book	3	2	1	0
5	Picture	3	2	1	0
6	Shopping Coupon	3	2	1	0
7	Others (please specify the detail below)	3	2	1	0

3. Issues

Is there any issues related to SRD radiocommunication system?

	Issues	Situation 3. very popular 2. popular 1. rare 0. no			
1	Congestion of frequency band	3	2	1	0
2	Security	3	2	1	0
3	Performance (data rate, latency)	3	2	1	0
4	Interference between SRD and other system	3	2	1	0
5	Others (please specify the detail below)	3	2	1	0

4. New Technologies

In your country, do you have any R&D activities of SRD related technologies?

Yes No e.g. Multi-Gigabit technologies for last inch research by various Research & Development Institutions and local Universities.

If yes, please put the summary of the activities.

R&D institution and University carry out research on SDR and White space technology.

Source Document: AWF-9/OUT-08 (Attachment 3)

**REPONSE TO THE QUESTIONNAIRE FOR CONSIDERATION OF
THE FUTURE IMT NETWORK**

Name of the Administration: Infocomm Development Authority of Singapore

Contact Person:

Question1: Fact data on the recent usage of mobile communication system, that is the total number of subscription per year, estimated voice traffic volume per year and estimated data traffic volume per year in the unit of Giga Bytes during past five years with the name of system deployed, in order to see the change of total volume of mobile communication traffic in each country towards the future. (Note: Your responses do not necessarily require all the information indicated above. Any other relevant information is also useful for the work in the AWG.)

Table 1 Total mobile subscription for 2G and 3G (Year 2006 to 2010)

Year 2006	Year 2007	Year 2008	Year 2009	Year 2010
4,090,633	4,391,733	5,073,833	5,606,117	6,576,875

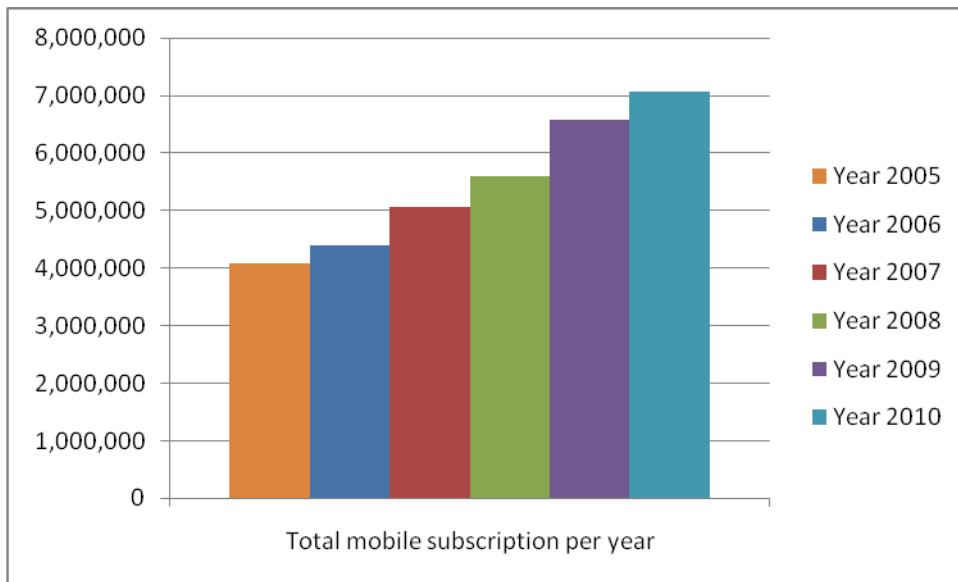


Figure 1 Total mobile subscription for 2G and 3G (Year 2006 to 2010)

AWG-11/INP-89

Question2: Forecasts of the traffic volume of mobile communication including voice and data towards 2020 beyond, if there is in each administration. If separation on voice and data is possible, please provide the data of each one. (Note: Your responses do not necessarily require all the information indicated above. Any other relevant information is also useful for the work in the AWG.)

Question3: Supposed or expected market or usage scenes on the application of broadband mobile communication. (Country / regional / operator specific information) On this topic description in free hand is expected.

1. Online streaming – Viewing behaviour is changing with the use of internet, especially amongst younger audiences. Viewers use internet to view movies and TV programmes. MediaCorp Singapore will introduce interactive mobile TV service in the second half of 2011, offering MediaCorp’s TV and radio over broadband mobile as well as fixed broadband.
2. Mobile VoIP – Due to the increase in number of smart-phone users, voice over IP has become popular. There is a number of VoIP applications (e.g. Viber, Skype) are made available, with low data price package and free Wi-Fi services in Singapore, users are moving towards VoIP.
3. Mobile communication for education – Advancement in mobile computing and handheld device (iPad, smart phones, PDA, notebooks, netbook, etc) with intelligent user interfaces, and networking technologies (Wi-Fi, Blue Tooth, GSM, 3G and LTE) have precipitated mobile learning.
4. Mobile payment – An alternative payment method other than cash, cheque, credit cards. Starhub Singapore starts a Near Field Communications (NFC) based mobile payments trial for 1,000 of its subscribers who are also customers of DBS Bank in December 2010. With NFC technology, consumers can use their phones to make variety of payments simply tapping the phone on the FlashPay and ez-link card readers.
5. Social Networking – an increase in popularity of social networking (e.g. Facebook, twitter, flickr, myspace). Estimated 40% population penetration access facebook on mobile and non-mobile device in year 2010.
6. Emailing – There is an increase of mobile users especially enterprise users to access email on their mobile device as increase in usage of blackberry phone and VPN function in some mobile device (e.g. iPhone)

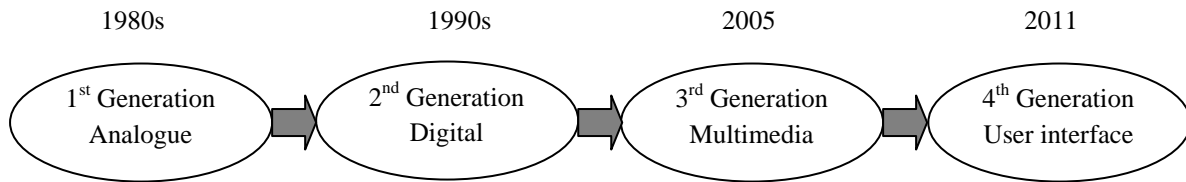
AWG-11/INP-89

Question4: Relationship between each mobile communication usage and the volume of their typical required transmission data to estimate the speed and duration of transmission required for each application of mobile communication with taking account of features of each county, expected new market and usage scene of mobile communication media in the concerned future.

Application of Mobile communication	Estimated required speed	Estimated required duration of transmission
Online streaming (e.g. Youtube)	512 kbps	< 40 second
Mobile VoIP (e.g. skype)	30 kbps – 4 Mbps	< 30 second
Social Network (e.g. Facebook)	15.2 kbps for upload 4 kbps for download	< 30 second
Social Network (e.g. Twitter)	3 to 4 kbps	< 30 second

Question5: Please describe a picture on the usage image of mobile communication application. It is desirable to describe what would be improved or overcome by introducing the mobile communication media and what could be newly realized by the introduction. (When replying to this inquiry, reference information attached below could be helpful.)

In general, the mobile network has been evaluate from first generation which is mainly for telephone usage to current third generation, mobile multimedia, and toward the near future of forth generation, user interface application usage.



In Singapore, usage of mobile has drifted from mainly for communication a telephone with text messaging to internet surfing, online gaming, online music and social networking. For example, the young users like to take photos with their mobiles and upload to social network, or chart online with friends using communicator and social network.

Mobile operator, M1 has deployed LTE at Singapore central business district in June 2011, while StarHub and SingTel have also announced deployment of LTE by end of 2011.