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|  | ASIA-PACIFIC TELECOMMUNITY  |
| **The 21st Meeting of the APT Wireless Group (AWG-21)** |  |
| 3 – 7 April 2017, Bangkok, Thailand |  |

**questionnaire ON CURRENT SPECTRUM USAGE AND FUTURE PLAN OF**

**UNMANNED AIRCRAFT SYSTEM**

**Section 1: Elementary Part**

1. **Introduction:**

Demands for unmanned aircraft system (UAS) usage for various application such as agriculture, disaster monitoring and mitigation, logistics, etc., are increasing rapidly. In many countries, certain practices have already proven their validity thanks to modernized and upcoming technologies. Technology levels for command and control, detect and avoid, and UAS operational monitoring systems are especially the key components for safe UAS operations. Also, the quality and quantity of payload communication affect service levels of those UAS applications. Therefore, the above mentioned wireless communication systems for UAS operations and applications play one of the most important roles in unmanned aircraft systems (UAS).

Spectrum supportability for UAS has been discussed among many APT members. Regulatory issues and international standardization has also been studied within World Radiocommunication Conference (WRC) Agenda in ITU-R since WRC07. Those discussions in ITU-R have been focused on internationally standardized aeronautical systems in scope of aeronautical mobile (R) service, aeronautical mobile satellite (R) service, and fixed satellite service. But, in many countries, we have witnessed an explosion in demand for smaller UAs. Clarifying current and planned UAS application and its spectrum situation are important for better understanding of each market and future possible collaboration among APT member countries. Furthermore, potential situations where small UAs except of those using FSS satellite communication links are operated over the boundaries of nearby countries or where those UAS authorized in one country are used in another country with different spectrum regulatory scheme need further consideration. Thus, sharing current and future situation together with future demands regarding the spectrum issues among APT members will contribute to efficient use of UAS spectrum bands and facilitation of UAS application.

Under Task Group Aeronautical and Maritime (TG-A&M), working document towards preliminary draft new report on service and applications for current and future public usage of unmanned aircraft has been discussed since AWG-19 held in Chiang Mai, Thailand, February 2016. This report contains information on current usage and future plan of unmanned aircraft, with a focus on disaster relief case studies and future challenges.

1. **Objective of the Questionnaire:**

Together with the above study, TG-A&M would like to gather information regarding current status/future plan for spectrum usage and future spectrum demands for UAS applications which do not use FSS satellite communication links, in order to further understanding service and application of these UAS.

1. **Responsible Group:**

Task Group on Aeronautical and Maritime (TG A&M)

1. **Rapporteur of the Questionnaire:**

Dr. Jiaxin Ding, dingjiaxin@srrc.org.cn (Chairman of TG A&M)

1. **Meeting at which the Questionnaire was approved:**

AWG-21 Document: AWG-21/OUT-09

1. **Target Responder:**

APT Members

1. **Deadline for Responses:**

AWG-23

**Section 2: Questionnaire Part**

**Institution/Company Information and Profile:**

Name of organization : <please type your answer here>

Name of contact person : <please type your answer here>

Email Address : <please type your answer here>

My organization is a:

* 1. Regulator [ ]
	2. Operator [ ]
	3. Vender [ ]
	4. Other [ ]  <please describe your answer here>

**NOTE:** You do not necessarily need to respond to all the questions in this Questionnaire. It is greatly appreciated if you could provide any relevant information or considerations as much as possible.

**Questions:**

Note: Please fill in the answers on the answer sheet.

**I. Current spectrum usage in your country**

**Question 1:**

In your country, has any specific frequency range been already allocated to or used for unmanned aircraft systems (UAS) (UAS using FSS satellite communication links is excluded)?

If yes, answer Q2 regarding further details of the current status of those frequencies.

**Question 2:**

Please fill in the information about frequency range, bandwidth, and other following topics, in regard to each frequency allocated to or used for UAS (UAS using FSS satellite communication links is excluded).

1. Allocated to
2. Mobile service
3. Aeronautical mobile (R) service
4. Aeronautical mobile satellite (R) service
5. Mobile satellite service
6. Other service ( )

If f, please fill in the specific service name.

1. Assigned for
2. UAS (exclusively)
3. UAS (shared)
4. Other system (i.e. RLAN, ISM, Short range devices, etc.) including UAS usage

If c, please fill in the specific system name.

1. Utilization (multiple answers allowed)
2. Command and control in Line-of-Sight (LOS)
3. Command and control in beyond Line-of-Sight (BLOS) (except of using FSS satellite communication links)
4. Payload communication (transfer of acquired image, relay communication, sensor data, etc.)
5. Others (i.e. on-board primary radar, positioning acquisition, location broadcasting, etc.)

If d, please fill in the specific utilization.

1. Communication link (multiple answers allowed)
2. Terrestrial link (exclusively)
3. Satellite link (except FSS satellite communication link)
4. Use of cellular phone network
5. Others ( )

If d, please fill in the specific communication link.

1. Is there any threshold of UA type which can be used in each frequency range? If yes, please answer the type of criteria (i.e. weight, flight altitude, speed, etc.) and its specific value.
2. Yes ( )
3. No.
4. Coverage in operation of UAS except of those using FSS satellite communication links (multiple answers allowed)
5. City area
6. Rural area (less-populated area, villages, etc.)
7. Inhabited area (forests, inter-island, etc.)
8. Outside of specific facilities
9. Others ( )
10. None

If e, please fill in the specific location.

1. Licensing
2. Individual licensing
3. Light licensing
4. License free
5. Others ( )

If d, please fill in the specific license regime.

1. Max. transmitter power and/or EIRP (please fill in the specific value)
2. Max. transmitter power ( dBm)
3. Max. EIRP ( dBm)
4. Others ( )

If c, please fill in the specific requirement.

1. Application
2. Commercial use
3. Public use
4. R&D
5. Hobby
6. Others ( )

If e, please fill in the specific application.

1. Regulation and Standard

Please fill in information about the name and reference information of the related regulation/standards.

1. Name
2. URL or any reference information (English is preferable. As an alternative for URL, please attach information document if possible)

**Question 3:**

What are the concerns in terms of spectrum assignment and sharing within or adjacent to assigned frequency bands? Please write your concerns for each of the relative bands.

**II. Future plan**

**Question 4:**

Do you have any plans (or possibilities) to assign new frequency ranges or to make available existing frequency ranges for UAS excluding those using FSS satellite communication links in the future? Please answer yes or no.

If yes, answer Q5 regarding further details of the current status of each planned frequency range.

If no, proceed to Q6.

**Question 5:**

Please fill in the information about the planned frequency range, bandwidth, and other following topics, in regard to each frequency allocated to or used for UAS (UAS using FSS satellite communication links is excluded).

1. Allocated to
2. Mobile service
3. Aeronautical mobile (R) service
4. Aeronautical mobile satellite (R) service
5. Mobile satellite service
6. Other service ( )

If f, please fill in the specific service name.

1. Assigned for
2. UAS (exclusively)
3. UAS (shared)
4. Other system (i.e. RLAN, ISM, Short range devices, etc.) including UAS usage

If c, please fill in the specific system name.

1. Utilization (multiple answers allowed)
2. Command and control in Line-of-Sight (LOS)
3. Command and control in beyond Line-of-Sight (BLOS) (except of using FSS satellite communication links)
4. Payload communication (transfer of acquired image, relay communication, sensor data, etc.)
5. Others (i.e. on-board primary radar, positioning acquisition, location broadcasting, etc.)

If d, please fill in the specific utilization.

1. Communication link
2. Terrestrial link (exclusively)
3. Satellite link (except FSS satellite communication link)
4. Use of cellular phone network
5. Others ( )

If d, please fill in the communication link.

1. Is there any threshold of UA type which can be used in each frequency range? If yes, please answer the type of criteria (i.e. weight, flight altitude, speed, etc.) and its specific value.
2. Yes ( )
3. No.
4. Coverage in operation of UAS except of those using FSS satellite communication links (multiple answers allowed)
5. City area
6. Rural area (less-populated area, villages, etc.)
7. Inhabited area (forests, inter-island, etc.)
8. Outside of specific facilities
9. Others ( )
10. None

If e, please fill in the specific location.

1. Licensing
2. Individual licensing
3. Light licensing
4. License free
5. Others ( )

If d, please fill in the specific license regime.

1. Max. transmitter power and/or EIRP (please fill in the specific value)
2. Max. transmitter power ( dBm)
3. Max. EIRP ( dBm)
4. Others ( )

If c, please fill in the specific requirement.

1. Plan or possibility
2. Plan
3. Possibility

**Question 6:**

If there are any preferable frequency ranges for UAS except of those using FSS satellite communication links that are mentioned beyond concrete plan or consideration, please write it down. Also, tell us the reason for it being preferable.

**III. Others**

**Question 7:**

Do you have any additional issue to be addressed in any frequency bands? What is the issue?

**Question 8:**

Are there any information or technology trends regarding UAS communication that you would

like to share with the other APT members? If yes, please write it down on the answer sheet.

ANSWER SHEET

**I. Current situation in your country**

Q1

Mark yes or no.

|  |
| --- |
| Yes / No |

Q2

Please use the letters provided in the Question sheet. An example is provided for reference.

(Note: Insert more lines as needed)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Freq. range | Bandwidth[MHz] | Allocated as(1) | Allocated as(2) | Utilization(3) | Comm. link(4) | Threshold of UA type(5) | Coverage(6) | Licensing(7) | Max trans.power[dBm](8) | Application(9) |
| Example5.25-5.75 [GHz] | 5.0 | a | b | c | b | a. Weight, 25kg | e (sea) | b | a (40) | a |
|  |  |  |  |  |  |  |  |  |  |  |
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|  |  |  |
| --- | --- | --- |
| Freq. range | Regulation name (10-i) | Reference info (10-ii) |
| Example5.25-5.75 [GHz] | Radio Act | http://xxxxxxx  |
|  |  |  |
|  |  |  |
|  |  |  |

Q3

(Note: Insert more lines as needed)

|  |  |
| --- | --- |
| Freq. range | Concerns |
| Example5.25-5.75 [GHz] | xxxxxx |
|  |  |

**III. Future plan**

Q4

Mark yes or no.

|  |
| --- |
| Yes / No |

Q5

Please use the letters provided in the Question sheet. An example is provided for reference.

(Note: Insert more lines as needed)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Freq. range | Bandwidth[MHz] | Allocated as(1) | Assigned as(2) | Utilization(3) | Comm. link(4) | Threshold of UA type(5) | Coverage(6) | Licensing(7) | Max trans.power[dBm](8) | Plan or possibility(9) |
| Example5.25-5.75 [GHz] | 5.0 | b | b | d (positioning acquisition) | a | b. | a | b | a (40) | A |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |

Q6

(Note: Insert more lines as needed)

|  |  |
| --- | --- |
| Freq. range | Reason |
| Example5.030-5.091[GHz] | xxxxxx |
|  |  |

**III. Others**

Q7

(Note: Insert more lines as needed)

|  |  |
| --- | --- |
| Freq. range | Issue |
| Example5.030-5.091 [GHz] | xxxxxx |
|  |  |

Q8

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