

INTERNET OF THINGS (IoT) REGULATORY FRAMEWORK

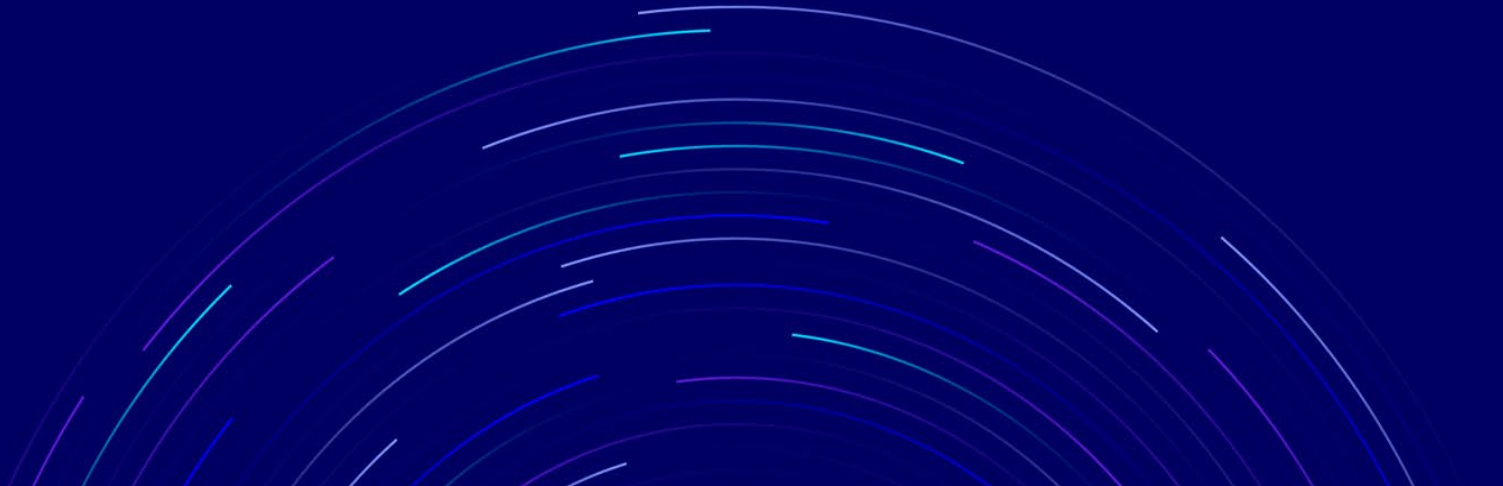
September 2019

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1. INTRODUCTION

The Communications and Information Technology Commission (CITC) is mandated, in accordance with the Telecommunications Act, Telecom Act Bylaw and CITC Ordinance; to regulate the telecommunications and IT sector in the Kingdom, this includes Internet of Things (IoT) services provisioning in the Kingdom.

Based on its role in enabling ICT technologies and enabling IoT implementations in the Kingdom on a wide range with the envision of making the Kingdom a leading country in developing of IoT services, the CITC published this document to regulate all IoT services and use cases.

Internet of Things (IoT) refers to enabling virtual and physical things to exchange data with each other in order to accomplish specific tasks through the internet. IoT applications has wide range usages such as smart homes, smart cities, tracking, smart metering and connected cars, etc. IoT can be used in different sectors such as health, agriculture, utility and transportation.

Machine- to- Machine (M2M) applications enables the communications between two or more machines without human interactions. They can use Public Mobile Networks, Public Fixed Networks and satellites. Examples of M2M includes point of sales and ATM machines. And for the purpose of this document, IoT will be used to cover M2M.

2. DEFINITIONS

The words and expressions defined in the CITC regulations shall have the same meaning when used in this regulatory framework. The following words and expressions shall have the meaning assigned to them below.

Internet of Things (IoT): Communication of multiple devices and machines connected to the internet through multiple networks.

License- Exempt Frequency: frequency or frequency bands that can be used on shared basis without a frequency license from the CITC, and in accordance with the conditions, it defines for such usage.

Things: Physical and virtual objects that are capable of being identified and communicated with each other.

License- Exempt IoT Services: IoT services provided through LPWAN using license- exempt frequencies.

Low Power Wide Area Networks (LPWAN): wireless wide area network technologies that interconnect low bandwidth, battery powered devices with low bit rates.

Indoor: Areas located within personal premises that are used for noncommercial purposes (Houses, private compounds, universities, etc.).

Outdoor: Areas located outside of personal premises (streets, public areas, parks, etc.).

3. IoT Service Provisioning Requirements

IoT services can be provided using wired and wireless networks. They can be classified according to the networks used into:

- IoT services provided through mobile networks.
- IoT services provided through fixed networks
- IoT services provided using license- exempt frequencies.

The main requirements for providing IoT services are as follow:

- A. IoT services through mobile networks can be provided by licensed service providers from the CITC, such as Facilities Based Unified Licensees, MVNOs, IoT- VNOs, or any other licenses defined by CITC. The conditions and commitments for the above licenses are available through the CITC website (www.citc.gov.sa).
- B. IoT services through fixed networks can be provided by Fixed Facilities Based Licensees provided that the offered services comply with the licenses scope.
- C. IoT services can be provided using license- exempt frequencies according to the following:
 - IoT services using license- exempt frequencies can be provided commercially by service providers who have "providing IoT services using license- exempt frequencies" license from CITC. The Guidelines and Rules for class licenses Type (B) to provide Internet of Things (IoT) can be found in CITC's website.
 - Service providers having the Facilities Based Unified License and Fixed Facility Based license from the CITC can provide this type of services without the condition of having "providing IoT services using license- exempt frequencies" license from CITC, provided the compliance with the technical security requirements.
 - IoT networks that use license- exempt frequencies can be built and used indoor for non-commercial purposes without the condition of having "providing IoT services using license- exempt frequencies" license from CITC provided the compliance with the following conditions:
 - i. Comply with the data security, privacy and protection requirements.
 - ii. Comply with the Technical Specification numbered (RI114), which is available through CITC website (www.citc.gov.sa).

- iii. The importation of the equipment and implementation of the IoT networks must be done by the owners of those buildings and properties.
- o IoT networks that use license- exempt frequencies can only be built outdoor by licensees having "providing IoT services using license- exempt frequencies" license from CITC, or service providers that have the Facilities Based Unified License from the CITC, or licensed fixed facility based service providers.

4. Spectrum

IoT can be provided using the mobile networks or fixed networks through the licensed facility based operator using their allocated frequency bands to offer their fixed and mobile services.

The CITC Technical Specifications numbered (RI114) includes all the frequency bands that can be used for license- exempt LPWANs .

It is important to note here that the license- exempt LPWANs use shared spectrum with other users, thus, there is no frequency license required from the CITC, however, it is important to comply with the following:

1. The frequency bands can only be used as a secondary use, thus, the networks operating in these bands must not cause any interference to the current or future primary users. The users of these networks must not ask any protection from interference caused by the current or future primary users.
2. The user of these bands shall stop using them upon CITC request, and within the time frame the CITC specifies.
3. Comply with any future updates to the frequency national plan and the related technical specifications.

5. IoT Equipment

The following requirements must be complied with regarding IoT equipment:

- All equipment must comply with the Technical Specifications published on the CITC website (www.citc.gov.sa) with regard to radio, EMC and safety.
- The IoT equipment must be approved by CITC and obtain Certificate of Conformity before applying for Customs Clearance permission. The Equipment Approval and Customs Clearance requirements and procedures are detailed in the "Regulations for Importation and Licensing of Telecommunications and Information Technology Equipment" document which is published on the CITC website (www.citc.gov.sa).
- Since there are different IoT technologies and standards, the interoperability between IoT networks and equipment must be considered by the user and the service provider so that any user, if required, can transfer and use his equipment among service providers using the same type of technologies and frequency bands.
- The IoT equipment shall have the capability of modifying the credentials by the user and reset to the factory settings.
- All SIM cards used with the IoT devices, that are imported to the Kingdom, must be issued by one of the local licensed providers.

6. IoT Identifiers

An identifier is a group of numbers or symbols that uniquely identify an object to simplify the communications with. Communication identifiers are used to identify end points (source, destination). Currently, the most common communication identifiers used in IoT are numbers and IP addresses. Among the promising identifiers in this area is the Digital Object Architecture (DOA).

With regard to numbers, IoT will be assigned numbers from the machine- to- machine (M2M) numbering range as per the National Numbering Plan. For IP addresses, IPv4 and IPv6 can be used, however, it is very recommended to use IPv6 as it provides many technical benefits in addition to the larger addressing capacity.

7. Data Management

IoT service licensed providers and Indoor IoT network implementers must comply with the following:

- Host all servers used in providing IoT services, and store all data inside KSA.
- Comply with all the existing or future published laws, regulations and requirements issued by CITC or other authorities in the Kingdom concerning data management including security, privacy and protection of IoT users data.

Additionally, the IoT service providers must provide the technical capabilities in the IoT devices and machines to save and maintain the data to make it possible to be reviewed for a duration not less than 12 months or any other duration specified by CITC.

8. GENERAL REGULATIONS

In addition to the above requirements, IoT service providers must comply with the following:

- IoT service providers should make end users aware of:
 - The importance of the network and data security and provide the user with recommendation to protect the data.
 - How to effectively use IoT networks and solutions, explaining the characteristics and the quality of service of each technology.
 - The risk of interference from other users of shared bands, with possible detrimental effect on quality of service.
- All IoT network components, devices and host of the data shall be maintained inside the kingdom.
- Must Comply with the Wireless Local Area Networks Regulations (WLAN/WiFi).
- IoT service providers must provide CITC with reports in regular basis including any information and data related to the services provided by them once

requested. CITC will define the nature of those reports and the data required and the time line to provide these reports.

- Service providers must adhere to all CITC regulations. For further information, reference should be made to the CITC website (www.citc.gov.sa)