

DRAFT

**REGULATORY FRAMEWORK ON INTERNET OF
THINGS (IoT)**

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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 service provisioning, device licenses and spectrum. One of the most important services that CITC works to ensure its availability in the Kingdom is Internet of Things (IoT) services.

Internet of Things (IoT) refers to enabling large number of virtual and physical things to connect to the internet as well as to collect and exchange data with each other. IoT services can be used in various sectors such as education, health, agriculture, utility and transportation. The International Telecommunication Union (ITU) defines IoT as: "A global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies". "Things" can be any virtual or physical objects that can be identified and communicate with each other.

Machine- to- Machine (M2M) enables the communications between two or more machines without human interactions. Examples of M2M includes point of sales and ATM machines. For the purpose of this document, IoT will be used to cover M2M.

Based on its role in enabling ICT technologies and in order to achieve the Kingdom Vision 2030, CITC is targeting 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. Thus, the CITC published this document to regulate all IoT services and use cases.

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): Global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies ¹.

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

¹ As per the ITU definition.

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.

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

IoT Mission Critical Services: IoT services that if fail, may result in serious impact on health, public safety, resources or national security.

Indoor: Areas located within personal premises (Houses, private compounds, etc).

Outdoor: Areas located outside of personal premises, where the radio waves of these wireless networks are propagating (streets, public areas, parks, etc).

CITC: Communications and Information Technology Commission.

3. IoT Service Provisioning

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 satellite and 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 using satellite can be provided through service providers licensed by CITC to provide satellite communications services.
- C. For IoT services using license- exempt frequencies:
 - IoT services using license- exempt frequencies can be provided commercially by service providers that have "providing IoT services using license- exempt frequencies" license from CITC. This Class B license and the Regulatory Framework on Internet of Things include all the commitments and requirements that the licensed service providers must commit with.
 - Service providers having the Facilities Based Unified 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.

- 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. However, the requirements related to data security and privacy that are included in this document as well as the condition of complying the equipment with the CITC Technical Specifications must be met.
- 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.

4. Spectrum

Frequency bands for mobile networks and satellite communications are included in the related Technical Specifications published on the CITC website (www.citc.gov.sa). These frequency bands are assigned according to the procedures defined by the CITC.

Frequency bands that can be used for license- exempt LPWANs are shown in Annex 1 of this document . The CITC Technical Specifications numbered (RI114) includes all the technical details for the equipment used in these networks.

It is important to note here that the license- exempt LPWANs use shared spectrum with other users, and accordingly the CITC does not protect the users of these networks from the interference that might result from any other source. Additionally, the users of the license- exempt LPWANs do not have the rights to ask for protection from interference resulted from the main users.

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. For license- exempt LPWAN equipment, they must comply with the Technical Specifications numbered (RI114).
- In case an IoT equipment is restricted, then it must be approved by CITC and has 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 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 reset to the factory settings.

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 space.

7. Data Management

IoT service providers and Indoor IoT network implementers must:

- 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 customers data. These laws, regulations and requirements include the cloud computing regulatory framework published by CITC.

8. IoT Mission Critical Services

IoT Mission Critical services are services that if fail, may result in serious impact on health, public safety, resources or national security. Therefore, this type of services require higher level of security and protection. This document cover all IoT services and use cases including the critical ones. In case of IoT mission critical services, there will be additional requirements and conditions specified by the CITC or any of the concerned Authorities. All IoT mission critical service providers must comply with any additional requirements and conditions published.

To ensure providing highly quality, secured and protected IoT critical services, the CITC in coordination with the concerned authorities will specify the additional requirements to enable this type of services in the Kingdom.

9. GENERAL REGULATIONS

- IoT service providers should educate and make end users aware of how to effectively use IoT networks and solutions, the characteristics of each technology and their advantages and disadvantages. They also should make users aware prior to deploying and activating license exempt IoT network equipment about the risk of interference from other users of shared bands, with possible detrimental effect on quality of service.
- Must Comply with the Wireless Local Area Networks Regulations (WLAN/WiFi).
- IoT service providers must provide the CITC with any information and data related to the services provided by them once requested.
- The CITC may update this document when it deems appropriate.
- Service providers must adhere to all CITC regulations, decisions, and guidelines, and all procedures and instructions issued by the CITC for the regulation of usage of these technologies and networks. For further information, reference should be made to the CITC website (www.citc.gov.sa) for information on new regulations, bylaws or other instructions in this regard.

Annex 1: The following frequency bands can be used by license exempt LPWAN equipment. The Technical Specification numbered (RI114) includes more details.

No.	Frequency	Output Power
*1	863 - 870MHz	25 mW e.r.p.
*2	865-868 MHz	500 mW e.r.p.
*3	868-868.6 MHz	25 mW e.r.p.
*4	868.7-869.2 MHz	25 mW e.r.p.
5	869.4-869.65 MHz	500 mW e.r.p.
6	869.7-870 MHz	5 mW e.r.p.
7	869.7-870 MHz	25 mW e.r.p.
8	870-875.8 MHz	25 mW e.r.p.
9	870-874.4MHz	500 mW e.r.p.
10	915 – 921 MHz	25 mW e.r.p.
11	915.2 – 920.8 MHz	25 mW e.r.p.
12	917.3 – 918.9 MHz	500 mW e.r.p.

* These bands are currently assigned to a mobile service on a primary basis.

** All these frequency bands use a shared frequency spectrum with other users, and therefore CITC does not protect the users of these networks from interference that may arise from any other source.