

# Guidelines for The Use of ISM bands

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Industrial, scientific and medical (ISM) radio bands are internationally reserved for use by industrial, scientific and medical equipment such as process heating, microwave oven, and medical diathermy equipment etc. The reason why these devices were limited to certain bands of frequencies was because they cause electromagnetic interference that may disrupt radio communication. The main feature of the internationally reserved bands for this purpose is that the communications equipment operating in these bands must tolerate any interference generated by ISM equipment, and users have no regulatory protection from ISM device operation.

Over the years, wireless communication standards have been developed and equipment have been manufactured that is capable of operating in these bands. Cordless phones, Bluetooth devices, near field communication (NFC) devices and wireless local area network devices are now easily available in the market.

ISM bands have been used internationally on non-interference and non-protection basis. Hence, users of these bands are usually not being individually licensed by the administrations. These guidelines illustrate the terms and conditions for the use of these bands in the state of Qatar.

## 1. LICENSING OF ISM BANDS

The licensing of ISM spectrum is done based on the indoor or outdoor use of the band. As per the international best practice, class radio frequency licensing option has been adopted for indoor use with the condition that equipment may not cause interference to other devices and may not claim protection from any interference received. Whereas, the outdoor use of the band is light licensed. Both licensing options as adopted by ictQATAR are being explained in detail below:

### 1.1 Indoor Use:

This refers to the use of equipment with power up to 100mW. Currently ictQATAR has issued a class license titled "Class License for Short Range Devices" which lists frequency bands of operation and maximum power limits for different types of SRD equipment including the ones being operated indoor on ISM bands. The parameter limits of these bands are as follows:

Typical Type	Application	Authorised Frequency Bands / Frequencies (channel spacing)	Maximum Field Strength / RF Output power	Harmonised Standard Reference	Remarks (Emission type, duty cycle, other restrictions etc)
ISM		6765.00 kHz – 6795.00 kHz	42 dBµA/m at 10 m	FCC Part 15 EN 300 220 EN 300 330	
ISM		13.5530 MHz – 13.5670 MHz	42 dBµA/m at 10 m	FCC Part 15 EN 300 220 EN 300 330	

ISM, CB	26.9570 MHz – 27.4050 MHz	42 dBµA/m at 10 m e.r.p 10mW	EN 300 220 EN 300 330	
ISM	40.66 MHz – 40.70 MHz	e.r.p 10mW	EN 300 220	
ISM	433.05 MHz – 434.79 MHz	e.r.p 10mW	EN 300 220	
	868.00 MHz – 868.60 MHz	e.r.p 25 mW	EN 300 220	
	868.70 MHz – 869.20 MHz	e.r.p 25 mW	EN 300 220	
	869.40 MHz – 869.65 MHz	e.r.p 100 mW	EN 300 220	
	869.70 MHz – 870.00 MHz	e.r.p 25 mW	EN 300 220	
ISM, WLAN, Bluetooth	2400.00 MHz – 2483.50 MHz	e.i.r.p 10 mW	EN 300 440 EN 300 328	Indoor use only
WLAN	5470.00 MHz – 5725.00 MHz	e.i.r.p 25 mW	EN 300 440	Indoor use only
ISM, WLAN	5725.00 MHz – 5875.00 MHz	e.i.r.p 25 mW	EN 300 440	Indoor use only
ISM	24.00 GHz – 24.2500 GHz	e.i.r.p 100 mW	EN 300 440	
ISM	61.00 GHz – 61.50 GHz	e.i.r.p 100 mW	FCC Part 15	
ISM	122.00 GHz – 123.00 GHz	e.i.r.p 100 mW		
ISM	244.00 GHz – 246.00 GHz	e.i.r.p 100 mW		

ictQATAR has planned to issue class licenses to cover the indoor use of other ISM bands, which are not currently included in the Class License for Short Range Devices, for which the consultation will be done with the stakeholders accordingly.

## 1.2 Outdoor Use:

Among the identified ISM bands, the three bands i.e. 2400.00 MHz – 2483.50 MHz, 5470.00 MHz – 5725.00 MHz and 5725.00 MHz – 5875.00 MHz are being designated for both indoor and outdoor use as these are mostly used for data transmission applications.

In Qatar outdoor use refers to the use of equipment with power more than 100mW.

Light licensing approach is adopted for authorizing the outdoor use of these bands for data transmission applications. The licenses for these bands are non-exclusive national licenses which will allow licensees to deploy outdoor point to point / point to multipoint / multipoint to multipoint wireless links/networks anywhere within the State of Qatar. There will be no individual frequency planning or co-ordination function undertaken by ictQATAR but the licensee is mandated to notify details of the stations using the format provided in the technical schedule (2) of the license 10 working days prior to any new deployment

and ictQATAR holds the right object or reject any new deployment if there is a risk of harmful interference to be caused by the deployment. The objection or rejection will be sent within 10 working days after the date of receipt of the technical details. These licenses are issued on a non-interference non-protection basis.

## 2. TECHNICAL DETAILS FOR OUTDOOR USE

The channel plans with 20 MHz channel bandwidths are applicable for all the following bands. Additionally following parameters limits are to be followed while transmitting in the bands:

### a) 2400–2483.5 MHz:

This band is identified for the provision of Radio Local Area Networks (RLANs) and Wireless Access Services (WAS)<sup>1</sup>. The following requirements apply to outdoor deployments in this band:

- i. Maximum mean e.i.r.p. for FHSS:
  - 1 Watt (For systems employing at least 75 non-overlapping hopping channels)
  - 125 mW (For all other systems)
- ii. Maximum mean e.i.r.p for DSSS: 1 watts
- iii. For point-to-point operations, transmitting antennas with directional gain greater than 6 dBi may be deployed provided the maximum peak output power and the maximum conducted output power is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

### b) 5470 – 5725 MHz:

This band is identified for the provision of Radio Local Area Networks (RLANs) and Wireless Access Services (WAS)<sup>1</sup>. The following requirements apply to outdoor deployments in this band:

- i. Maximum mean e.i.r.p. of 1 W
- ii. Maximum mean density of 50 mW/MHz in any 1 MHz band.
- iii. WAS and RLANs operating in the band 5470 – 5725 MHz shall either deploy transmitter power control of at least 3dB on the maximum power or if transmitter control is not used then the maximum e.i.r.p. and mean power density shall be reduced by 3 dB.
- iv. WAS and RLANs operating in the 5470 – 5725 MHz band shall use dynamic frequency selection (DFS).
- v. Equipment must be type approved against a suitable specifications such as EN 301 893.

### c) 5725 – 5875 MHz:

This band is identified for the provision of Radio Local Area Networks (RLANs) and Wireless Access Services (WAS)<sup>1</sup>. The following requirements apply to outdoor deployments in this band:

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<sup>1</sup> The provision of Wireless Access Services directly to end users is prohibited unless and until an individual or a class license is issued for the same. Economics and Licensing Department (Regulatory Authority) of ictQATAR may be consulted for further details regarding individual or class licenses.

- i. Maximum mean e.i.r.p. of 2 W Maximum mean density of 23 dB/MHz.
- ii. Both DFS and TPC (12 dB range) should be implemented.
- iii. The frequency range 5795 – 5815 MHz should not be used and should be notched out to protect RTTT devices.
- iv. Equipment must be type approved against a suitable specifications such as EN 302 502.

Additionally the e.i.r.p. spectral density of the transmitter emissions should not exceed the following values for the elevation angle  $\theta$  (degrees) above the local horizontal plane (of the Earth) to protect FSS GSO satellite receivers.

For sectorised (e.g. P-MP Central or Base Station) and Omni-directional deployments:

- i.  $-7 \text{ dB(W/MHz)}$  for  $0^\circ \leq \theta < 4^\circ$
- ii.  $-2.2 - (1.2 * \theta) \text{ dB(W/MHz)}$  for  $4^\circ \leq \theta \leq 15^\circ$
- iii.  $-18.4 - (0.15 * \theta) \text{ dB(W/MHz)}$  for  $\theta > 15^\circ$

For P-MP Customer Terminal Station and P-P deployments:

- i.  $-7 \text{ dB(W/MHz)}$  for  $0^\circ \leq \theta < 8^\circ$
- ii.  $-2.68 - (0.54 * \theta) \text{ dB(W/MHz)}$  for  $8^\circ \leq \theta < 32^\circ$
- iii.  $-20 \text{ dB(W/MHz)}$  for  $32^\circ \leq \theta \leq 50^\circ$
- iv.  $-10 - (0.2 * \theta) \text{ dB(W/MHz)}$  for  $\theta > 50^\circ$

### 3. USE OF ISM BANDS ON-BOARD AIRCRAFTS

The use of ISM bands on-board the Qatari registered aircrafts is authorized under the Aircraft radio Station License. Operation of both 2400–2483.5 MHz and 5725 – 5875 MHz bands is allowed provided that all transmissions remain strictly within the aircraft and are carried out at above 3000 meters altitude. The same restrictions apply to use of ISM bands on-board foreign registered aircrafts while flying over the territory of Qatar, however, no license is required from ictQATAR in this regard.

### 4. CONTACT DETAILS

For further queries, please contact:

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