



Position Paper issued by the Telecommunications Regulatory Authority
on Regulating Fixed Point to Point Links and Point to Multi-Points Systems.

Issue date: 30 January 2024

Ref: LAD/0124/004

Purpose: To update the Authority's position in relation to the frequency assignment and licensing
of Fixed Point to Point Links and Point to Multi-Point Systems.

1 INTRODUCTION

- 1.1 The purpose of this Position Paper (the “Paper”) is to update the Telecommunications Regulatory Authority’s (the “**TRA**” or the “**Authority**”) position in relation to the frequency assignment and licencing of **Fixed point to point links (P-P) and point to Multi-point systems (P-MP)** in Telecommunications Networks.
- 1.2 On 1 July 2011, the TRA and the Directorate of Wireless Licensing, Frequency and Monitoring (the “**DWLFM**”) consulted on a policy document with respect to the legal framework and policy pertaining only to fixed link services (point to point) terrestrial links in the Kingdom of Bahrain (the “**Kingdom**”) (the “**2011 Policy**”)ⁱ.
- 1.3 On 25 December 2017, the TRA published a Position Paper (the “**2017 Paper**”) that served to clarify its position in relation to the frequency assignment and licensing of fixed point to point links.
- 1.4 In 2018, a Public Notice (the “**2018 Notice**”) was issued which provided guidance in relation to the assignment of frequency blocks for the operation of FWA systems.
- 1.5 Both the 2017 Paper and the 2018 Notice clarified that pursuant to Articles 24 and 43 of the Telecommunications Law, a Frequency Licence is required to operate any microwave or millimetre-wave fixed terrestrial link (point to point link and point-multi point systems).
- 1.6 This Paper provides guidance for fixed point to point (P-P) and point to multi-point systems (P-MP) only. It is a general statement of the TRA’s current views on this issue based upon the facts available to it.
- 1.7 The TRA may in the future choose to issue a bespoke Regulation that deals with this matter but until such a step is taken this Paper shall act as an indication to licensees and relevant stakeholders as to the TRA’s viewpoint on the application of the Telecommunications Law and existing regulatory framework at this time.

ⁱ The [2011 Policy](#). Fixed Point to Point Links - Licensing And Assignment Policy.

2 DEFINITIONS

Any word, phrase or expression used in this Paper shall, unless the context requires otherwise or it is expressly defined herein, have the same meaning set forth in the Telecommunications Law promulgated by Legislative Decree No. 48 of 2002 and the terms below shall have the following meaning for the purpose of these Guidelines:

Fixed Point to Point Links (P-P): This is the conventional P-P license single specified point and another specified point. whereby each individual link is licensed to use specific spot frequency/ies.

Fixed Point to Multi-point systems (P-MP): Is a system that establishes connections between a single specified point and more than one other specified point.

Fixed Service: means a Radiocommunication Service between specified fixed points.

Fixed Wireless Access (FWA): The Wireless Access application in which the location of the End-User terminal and the network access point to be connected to the End- User are fixed.

ITU: The International Telecommunication Union, a specialized agency of the United Nations responsible for many matters related to Information and Communication Technologies.

Radiocommunication Service: a service involving the transmission, emission and/or reception of radio waves for specific telecommunication purposes.

3 POSITION UNDER THE EXISTING TRA POLICY

3.1 The 2011 Policy and the 2017 Paper state that the use of Radiocommunications Equipment is subject to equipment approval and frequency licencing by the TRA, in compliance with the provisions and requirements of the Telecommunications Law.

3.2 As such a Frequency Licence is required to operate any microwave or millimetre-wave Fixed point to point links (P-P) links and/ or Point to Multi-point systems (P-MP) terrestrial link (as per the requirements of Article 43 of the Telecommunications Law).

3.3 Article 43 of the Telecommunications Law states that:

“No Person shall operate a Telecommunications Network which uses frequency spectrum in the Kingdom, or operate or use any Radiocommunications Equipment without obtaining a Frequency License from the Authority unless that it is operating on a frequency which the Authority, by way of a decision, has exempted from holding a Frequency License whilst operating in accordance with the terms and conditions of such exemption.”

3.4 The 2017 Paper has provided a helpful guidance on key issues, namely:

3.4.1 The Authority’s policy towards spectrum pricing;

3.4.2 The Authority’s policy towards developing national regulations and standards;

3.4.3 The Authority’s policy towards Minimum Path Lengths for Fixed point to point links (P-P) Frequency Bands;

3.4.4 The Authority’s policy related to other measures designed to facilitate spectrum efficiency;

3.4.5 The Authority’s policy towards the ongoing obligations of licensees/applicants; and

3.4.6 The Authority’s policy towards the authority’s position on its responsibilities.

3.5 The Authority confirms that unless otherwise stated in this Paper, the Authority’s views as set out in the 2011 Policy remain relevant to its current position vis a vis fixed (point to point) terrestrial links in the Kingdom.

4 CURRENT POSITION STATEMENT

- 4.1 The Authority has set out below its position in relation to applications for frequency licences for Fixed Point to Point (P-P) Links and Point-to-multipoint system (P-MP).
- 4.2 The content of this Paper is intended to assist licence applicants, and relevant stakeholders in understanding:
- (a) The scope of the TRA's jurisdiction in relation to these issues;
 - (b) The approach the TRA will take with regards to approvals;
 - (c) The approach the TRA intends to take with regards to the non-payment or late payment of invoices as well as missing or incorrect information;
 - (d) The information that will be required of applicants when applying under the current regime;
 - (e) Fixed Wireless Access systems associated with the Point-to-Multipoint systems.

5 THE APPLICATION OF THIS PAPER

- 5.1 The TRA believes that it is important, that it clearly articulates its current position with regards to the issuance of Fixed Point to Point Links and Point to Multi-point systems frequency licence(s) in the territory of the Kingdom of Bahrain.

6 FREQUENCY ASSIGNMENT AND LICENCE PROCEDURE.

It is TRA's priority to ensure that all licence applications are processed efficiently and promptly. Each application will be considered on its own merits, on a first come first served basis assigned as follows:

- 6.1 For Fixed Point to Point Links (P-P)
- 6.1.1. The applicant should submit the relevant application form to operate P-P Links or to modify or delete an existing point-to-point assignment. The relevant application form is downloadable from the Authority's website www.tra.org.bh
 - 6.1.2. The Authority reserves the right to update or amend the application form from time to time.

- 6.1.3. The applicant should submit the application to the Authority with full details of the proposed link, including site details, equipment, and antenna details as per the requirements of the application form(s).
- 6.1.4. Once the technical evaluation is complete, the Authority will, in so far as is possible and in compliance with the timeframes set out in this Paper:
 - 6.1.4.1. Request any additional and/or missing information from the applicant; and
 - 6.1.4.2. Request that any overdue amounts be paid by the applicant.
- 6.1.5. The Applicant may be required to provide additional details by the Authority for frequency assignments and must be received within five (5) working days of the receipt of required information.
- 6.1.6. In order to ensure the requisite continuity of the application process, each licensee shall appoint not more than five (5) duly authorised representatives to follow up on the status of the application with the TRA and to receive any updates relating to the approval/rejection of the application, and/or any financial matters associated with the application.
- 6.1.7. The Authority will validate all received applications for completeness, to ensure integrity of the data and in compliance with technical and non-technical requirements.
- 6.1.8. The Authority will endeavour to process a valid application within ten (10) working days if it does not require international coordination.
- 6.1.9. The Authority position to the receives multiple applications, the Authority may be unable to maintain this turnaround target but will provide applicants with an estimated delivery target.

6.2 For Point to Multi-Point systems (P-MP).

- 6.2.1. The Applicant should submit the application to the Authority, a formal request should be received by the Authority either in written format or electronically.
- 6.2.2. The Authority would assess the spectrum license application of the applicant/ licensee and take the appropriate decision (i.e., approve, reject, or request further information/ documentation), and to take into account the national and public interest when deciding whether to grant spectrum licenses to a licensee to establish and operate its FWA.
- 6.2.3. The Authority will endeavour to process a valid application within ten (10)

working days if it does not require international coordination and/or with other existing services.

- 6.2.4. The Effective date of the frequency licence may valid/ approve for a term up to twelve (12) months, considering the date of the submission.
- 6.3. For applications requiring international coordination, the Authority may be unable to process valid applications within the timeframes referred to in 6.1.8 and 6.2.3 above due to the fact that this procedure is regulated by the Radio Regulations of the International Telecommunication Union and/or bi-lateral agreements.
- 6.4. In exceptional circumstances, when a justifiable occasion arises, an application not requiring international coordination can be given priority by the Authority over queued applications in order to achieve a very fast turnaround. Such cases might include restoration of telecommunications services in the case of a catastrophic network or service failure, or where telecommunications services are required in response to a national emergency or natural disaster, or in any other circumstance where there is a legitimate national interest served in the expedited approval of the relevant application. The Authority confirms that it will, at all times, have regard to its duties under Article 3 of the Telecommunications Law duties when deciding upon whether such prioritization is justified.
- 6.5. The Authority confirms that in order for an application to be processed, any and all overdue amounts payable to the Authority by the applicant must have been satisfied. For the avoidance of doubt, the “overdue amounts” referred to in this clause cover any amounts that the Authority charges pursuant to the Schedule of Fees and any fines or penalties that the Authority may have imposed on a Licensee that become payable following the lapse of the payment terms stipulated in the accompanying invoices(s).
- 6.6. The Authority may either issue an annual or temporary frequency licence at its discretion (having at all times regards to the terms of the application received).
- 6.7. If a licensee requires a copy of the original licence, a formal written request should be received by the Authority from the authorized person stating the licensee’s name, licence reference and version that is requested.

7. RENEWAL OF ANNUAL FREQUENCY LICENCE.

- 7.1. **For Fixed point to point links (P-P)**, any Frequency Licence, renewable on an annual basis, will be invoiced for a further term of one (1) year unless that Frequency Licence has been cancelled or modified. Therefore, the Authority

must be formally notified by 30th November of each calendar year of any cancellation or modification of existing Frequency Licences. Only notifications submitted after 1st of January will be considered.

- 7.2. **For Point to Multi-point (P-MP) systems**, TRA may renew the frequency licence at its sole discretion and upon request by the licensee for an additional term of up to twelve (12) months upon expiration of the current licence term, subject to such terms and conditions as may be specified by the Authority in its sole discretion provided that the underlying operating licence has not been revoked.

8. TEMPORARY FREQUENCY LICENCE.

- 8.1. A temporary frequency licence may be issued for fixed point to point links, for a period of up to eleven (11) months subject to a minimum duration of one (1) calendar month.
- 8.2. Considering the date of the submission, Frequency licence fees will be charged according to the relevant Schedule of Fees as may be amended from time to time.
- 8.3. Temporary licences are not renewable and will terminate automatically upon the expiry of their term.

9. DELETION OF ASSIGNMENTS

- 9.1. The Authority's position is that the deletion will be effective within five (5) working days from date of receipt of a valid deletion request of Fixed Point to Point Links (P-P) and all rights and obligations stemming from such an assignment will cease as of the effective date.
- 9.2. A Point to Multi-Point (P-MP) Frequency licence will terminate automatically, upon the expiry of their term, subject to such terms and conditions as may be specified by the Authority in its sole discretion provided that the underlying operating licence has not been revoked.

10. FREQUENCY MANAGEMENT

- 10.1. Frequency assignments require strict controls in order to maximise the utilisation of this critical resource and to optimise the re-farming process in certain bands (if such re-farming process is deemed necessary).

- 10.2. As such, the Authority has set out below those frequency bands in which frequency assignments will be limited or in which no new assignments will be permitted.
- 10.3. The Authority expects that there will be a substantial growth in International Mobile Telecommunications (“**IMT**”) demand over the coming years, is of the current opinion that it will assess the future demand for IMT spectrum every 3-4 years (*although the Authority reserves its right to review the situation with regards to frequency assignments and to update the below in accordance with the powers conferred on it by the Telecommunications Law*).
- 10.4. The Authority confirms that the following frequency bands (*namely 24.5-27.5 GHz, 37-39.5 GHz, 40.5-43.5 GHz and 74-76/84-86 GHz*) are identified for IMT, a migration plan could be established for Fixed Point to Point Links (P-P) to vacate one or more of the afore-mentioned bands.
- 10.5. In addition, the Authority states that no new assignments will be permitted in the following frequency bands: 6.425-7.125 GHz, 39.5 – 40.5 GHz, 48.5-50.2 GHz, and 51.4 -52.6 GHz.
- 10.6. Frequency users are encouraged to make use of alternative frequency bands and apply in the manner indicated above.

11. NATIONAL REGULATIONS AND STANDARDS

- 11.1. All equipment that is planned to be deployed must be type approved in accordance with the Type Approval regulations of the Kingdom. Users are encouraged to use equipment supporting spectrally efficient high order digital modulation techniques, especially for higher capacity systems.
- 11.2. The Authority has provided, at Annex1 to this paper, details of the Radio-Frequency channel arrangements for fixed point to point links that applicants should have regard to, with reference to the relevant ITU recommendations and standards or other channel arrangements applicable in the Kingdom.
- 11.3. TRA will undertake frequency assignment for all point-to-point and Point to Multi-Point systems based on the technical parameters, preferred channels or sub-bands by applicants and with regard to the compatibility with other existing frequency assignments.

- 11.4. All Fixed Point to Point Links and Point to Multi-Points Systems equipment shall comply with the Technical Specificationsⁱⁱ and standardsⁱⁱⁱ issued by the Authority.

12. MINIMUM PATH LENGTH (MPL).

- 12.1. The choice of frequency bands for Fixed Point to Point Links (P-P) depends principally on path length and traffic capacity. Preserving spectrum in the lower frequency bands for longer path length, high-capacity links (*which can be accommodated only in these bands*), the Kingdom operates a Minimum Path Length (“**MPL**”) for fixed point to point links within the Kingdom to select the appropriate frequency band for a given link.
- 12.2. The MPL permitted in each frequency band is listed in Annex 2. Any applicant wishing to install a link shorter than the MPL will need to provide more detailed justification in writing. Permission to deviate from the MPL will be at the discretion of the Authority. In the interest of fairness, it is considered necessary to apply these limits to all users.
- 12.3. The MPL requirements set out at Annex 2 will apply to both new assignments and existing assignments. Licensees are advised to have regard to the MPL requirements set out in Annex 2 should there be any change to an existing fixed point to point link (*for example in case of any changes to stations at either end of the link, e.g. - a change in modulation technique, data rate or channel bandwidth, or a change in the height of antenna, type of antenna, etc.*)

13. OTHER MEASURES TO FACILITATE SPECTRUM EFFICIENCY FOR THE FIXED POINT TO POINT LINKS (P-P).

- 13.1. High gain antennas should be utilised wherever possible in order to minimise radiation in directions other than in the bore-sight of the antenna. The use of antennas with poor performance is discouraged.
- 13.2. In the assignment process cross polar discrimination is also taken into account; a link is therefore licenced with a specific linear (horizontal (H) or vertical (V)) antenna polarisation, unless the applicant requests a specific linear polarisation.

ⁱⁱ [Technical Specification](#)

ⁱⁱⁱ [Applicable Technical Standards](#).

- 13.3. Service availability is the mean propagation availability used to determine the overall link budget. In general, permitted levels are 99.9%, 99.95%, 99.99%, 99.995% and 99.999%. The use of protected (duplicated) equipment is generally a requirement for availability levels greater than 99.99%.
- 13.4. Space diversity or “hot standby” facilities may be required in certain circumstances to achieve the required service availability level.

14. PAYMENT OF FEES AND INVOICES.

- 14.1. Application fees are payable upon the submission of an application for a Frequency Licence and shall not be refunded irrespective of whether the application was successful or not. Any Invoice issued with regards to new applications or in respect of a request for a modification of an existing frequency licence.
- 14.2. Credit note will be calculated in accordance with the Schedule of Fees in force at the time of the application in the event of the Frequency License for fixed point to point links upon their request of a Licensee.
- 14.3. Upon receipt of an application, the Authority will prepare and process the required invoice, whereupon the Fixed Point to Point Link(s) invoice will be sent to the applicant for payment thereof.
- 14.4. Frequency Licence fees associated with Fixed Point to Point Links and Point to Multi-Point systems (P-MP) are payable in accordance with the Schedule of Fees, for the period from the effective date until the end of the year in which the licence is issued, on pro rata basis for such period.
- 14.5. Once the invoice is issued, the applicant has Fifteen (15) working days to make the payment. If payment is not made, any new application made by the applicant will be subject to the provisions of paragraph 14.7 below.
- 14.6. As set out above at paragraph 6.5 the authority position is that in order for new applications to be approved, all overdue amounts owed by the applicant must be paid in full.
- 14.7. The Authority’s position in relation to new applications is that upon receiving a valid application, the applicant will be allowed five (5) working days to pay any overdue amounts owing to the Authority, which is to be paid in cleared funds into the Authority’s nominated account (bearing in mind that some payments need

three (3) working days to be cleared in the bank). Should the aforementioned amounts remain unpaid within that timeframe, then the new application will be rejected by the Authority.

- 14.8. Whilst the Authority will endeavour to issue all invoices and/or credit notes expeditiously (*in accordance with the applicable timeframes*), issuance may be delayed in certain months due to financial closings.

15. THE ONGOING OBLIGATIONS OF LICENSEES.

- 15.1. It is also important that the Authority has access to all Radiocommunications Equipment (*in the case of the Authority in accordance with the provisions set out at Article 77 of the Telecommunications Law*).
- 15.2. It is the licensee's responsibility to provide access to Radiocommunications Stations or Radiocommunications Equipment in case of an emergency immediately or without any delay if access is required for inspection or other related aspects.
- 15.3. It is the licensee's responsibility to provide, upon request, a copy of the frequency licence(s) with all technical details for the Radiocommunications Station(s).
- 15.4. In order to facilitate the identification of frequencies deployed at Radiocommunications Stations, the site identity number provided by the licensee shall be clearly visible at all stations. In the case of a shared installation, the site identity numbers of all licensees shall be clearly visible.
- 15.5. Licensees shall ensure that electromagnetic radiations from Radiocommunications Stations or Radiocommunications Equipment are within the limits set by the International Commission on Non-Ionizing Radiation Protection ("**ICNIRP**") and shall ensure that it complies with any future radiation emission standards which may be set by the ICNIRP, or have been or will be adopted in the Kingdom.
- 15.6. With regards to the technical performance of its Radiocommunications Equipment or Radiocommunications Stations, the Authority confirms that its position is that it is incumbent upon licensees to inform the Authority as soon as it is aware of any and all alterations in circumstance that may cause a licensee to be in breach of the terms of any of its licences (*including any individual, class of frequency licence*) or the Telecommunications Law and wider regulatory framework.

16. THE AUTHORITY'S POSITION ON ITS RESPONSIBILITIES.

- 16.1. The Authority wishes to ensure that the Kingdom's policy with regards to frequency assignments is held to the highest standards of international best practice. As such and when necessary, the Authority will notify and register radio frequencies into the Master International Frequency Register ("**MIFR**") of the ITU. Licensees may be required to assist the Authority in this process.
- 16.2. The Authority confirms that it will take all appropriate measures to ensure that all used frequencies in the Kingdom are registered and licenced and will take the appropriate legal actions set out under the Telecommunications Law and wider regulatory framework against any licensee not following the requirements set out by law.

17. APPEAL OF ANY DECISION OF THE AUTHORITY.

- 17.1. Where a party feels aggrieved by any decision or action of the Authority in relation to the matters covered within this paper, the Authority's position is that the aggrieved party may appeal to the Authority in writing stating the grounds for the appeal. This appeal process is without prejudice to a party's rights to appeal under the Telecommunications Law or the other laws of the Kingdom.
- 17.2. The Authority's current position is that for such an appeal to be valid, it should be made within 30 days of the decision.
- 17.3. The Authority will review the basis on which it arrived at its decision to determine whether or not the decision was made in accordance with the applicable laws and the duties of the Authority.
- 17.4. The Authority will endeavour to communicate the outcome of the review to the aggrieved party in writing within 20 working days of receipt of the appeal.

18. CONCLUSION.

- 18.1. The Authority believes that in due course it may benefit from the promulgation of a bespoke Regulation that confirms the position of the current policies and position adopted by the Authority.
- 18.2. Until such time, the Authority confirms that the content of this paper is to be treated by licensees as setting out the Authority's confirmed position with regards to its current Fixed Link Policy.

ANNEX 1. Radio-Frequency Channel Arrangements for Fixed Point to Point Links.

Frequency Sub-Band	Frequency Range	ITU-Radio Recommendation (F-Series)/Others	Relevant Regulation and remarks	Channel Separations (MHz)	T/R Spacing (MHz)
6 GHz	Lower 6 5925-6425	F.383 Annex 3	--	5	260
				10	260
				20	260
				40	260
	Upper 6 6425 - 7125	F.383	See Clause (10.5)	10	340
				20	340
				30	340
7GHz	Lower 7 7425-7125	F.385 (Annex1) ECC/REC/ (02)06	--	40	340
				60	340
				80	340
				1.75	161
				3.5	161
	Upper 7 7425-7900	F.385 Annex 4	--	7	161
				14	161
				28	161
				56	161
				7	245
8 GHz	Lower 8 7900-8400	F.386 Annex 3	--	14	245
				28	245
				56	245
	Upper 8 8400-8500	F.386 Annex 2	Uni-Directional, shared with MOBILE	7	266
				14	266
11GHz	10700-11700	F.387 CEPT/ERC/DEC/ (00)08	--	28	266
				56	266
				112	266
				7	530
				14	530
13 GHz	12750-13250	F.497 CEPT/ERC/REC 12-02 E	--	28	530
				56	530
				1.75	266
				3.5	266
				7	266
				14	266

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Frequency Sub-Band	Frequency Range	ITU-Radio Recommendation (F-Series)/Others	Relevant Regulation and remarks	Channel Separations (MHz)	T/R Spacing (MHz)
15 GHz	14400-15350	F.636	--	3.5	490
				7	490
				14	490
				28	490
				56	490
18 GHz	17700-19700	F.595 Annex 4	See Note (1a)	1.75	1010
				3.5	1010
				7	1010
				13.75	1010
				27.5	1010
				55	1010
				110	1010
23 GHz	22000-22600	F. 637 Annex 2	See Note (1b)	3.5	1008
	Paired with			7	1008
				14	1008
				28	1008
	23000-23600			56	1008
				112	1008
				224	1008
	21200-23600	F. 637 Annex 1		3.5	1232
				7	1232
				14	1232
				28	1232
				56	1232
				112	1232
				224	1232
26 GHz	24500-26500	R.748	--	3.5	1008
				7	1008
				14	1008
				28	1008
				56	1008
				112	1008

ANNEX 1. Radio-Frequency Channel Arrangements for Fixed Point to Point Links.

Frequency Sub-Band	Frequency Range	ITU-Radio Recommendation (F-Series)/Others	Relevant Regulation and remarks	Channel Separations (MHz)	T/R Spacing (MHz)
31 GHz	31000-31300	F.746 Annex 6 ECC/REC/ (02)02	TDD/FDD	3.5 7 14 28	140 140 140 140
	31500-31800	F.746		3.5 7 14 28	140 140 140 140
32 GHz	31800-33400	F.1520	TDD/FDD	3.5 7 14 28 56 112 224	812 812 812 812 812 812 812
36 GHz	36000-37000	F.749 Annex 2	See Note (1c)	3.5 7 14 28 56 112	462 462 462 462 462 462
38 GHz	37000-39500	F.749 Annex 1	See Clause (10.4)	3.5 7 14 28 56 112 224	1260 1260 1260 1260 1260 1260 1260
40 GHz	39500-40500	F.749 Annex 2	See Clause (10.5)	3.5 7 14 28 56 112	462 462 462 462 462 462
42 GHz	40500 - 43500	F.2005	See Clause (10.4)	7 14 28 56 112	1500 1500 1500 1500 1500

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Frequency Sub-Band	Frequency Range	ITU-Radio Recommendation (F-Series)/Others	Relevant Regulation and remarks	Channel Separations (MHz)	T/R Spacing (MHz)
49 GHz	48500 - 50200	ERC/REC 12-11 Annex 2	See Clause (10.5)	3.5 7 14 28 56 112	884 884 884 884 884 884
52 GHz	51400 - 52600	F.1496 Annex 1	--	3.5 7 14 28 56	616 616 616 616 616
56 GHz	55780 57000	F.1497 Annex 1	--	3.5 7 14 28 56	616 616 616 616 616
60 GHz	57000-66000	F.1497 Annex 2	Point-to-Point	50, 100 - - - - - 2450 - 2500	----
70/80 GHz	71000 - 76000	F.2006	See Note (10.4)	250, 500 - - - - - 2000 - 2250	10000
	Paired With				
	81000 - 86000				
94 GHz	92000-94000 94100-95000	F.2006	Point-to-Point	50 100 200 300	1500 1500 1500 1500

Note (1): In accordance with ITU Radio Regulations the following limits shall be taken into account when deploying fixed point to point links and ensure that it complies with any future revisions or have been or will be adopted in the Kingdom of Bahrain.

- a-** In the frequency band 18.6-18.8 GHz the carrier power to the input of antenna shall not exceed -3dBW.
- b-** In the frequency band 21.4-22 GHz stations shall not exceed a power flux-density of -120.4 dB (W/(m² · MHz)) at 3 m above the ground of any point of the territory of neighbouring countries for more than 20% of the time. In calculations, the most recent version of Recommendation ITU-R P.452 should be used.
- c-** In the frequency band 36-37 GHz, the maximum elevation angle is 20 degrees, the maximum transmitter power at the input of antenna is -10 dBW or -7 dBW if ATPC is used.
- d-** In the band 55.78-56.26 GHz, the maximum power density delivered by a transmitter to the antenna is limited to – 26 dB(W/MHz).

Note (2): In accordance with annex1 of the ECC Recommendation (09)01 Edition January 2009, the use of fixed wireless point to point systems in the band 57 - 64 GHz may be provided within the technical parameters stated below to provide coexistence with other services (e.g. Intelligent Transport System);

- Maximum EIRP +55 dBm
- Minimum antenna gain +30 dBi
- Maximum transmitter output power +10 dBm

An additional limit on the transmit output power density (-10dBm/MHz) in the 59 - 64 GHz can be implemented to support the deployment of wideband systems (i.e. bandwidth higher than 100 MHz) by consequently limiting the maximum transmitter output power for narrow band systems (i.e. bandwidth lower than 100 MHz) below that of the maximum (+10dBm) allowed in the 59 - 64 GHz band. This limit will not apply for implement narrowband systems in the band.

For Fixed Point to Multipoint (P-MP)

- a-** The maximum equivalent isotopically radiated power (e.i.r.p.) of a station in the fixed or mobile service shall not exceed +55 dBW.
- b-** The power delivered by a transmitter to the antenna of the station in the fixed or mobile service shall not exceed +10dBw.
- c-** the bands are also allocated to the fixed-satellite service (space-to-Earth) on a primary basis for the beacon transmissions intended for up-link power control. Such space-to-Earth transmissions shall not exceed an equivalent isotopically radiated power (e.i.r.p.) of +10 dBw in the direction of adjacent satellites on the geostationary-satellite orbit.

ANNEX 2: Minimum Path Lengths (MPL) for Point-to-Point Fixed Link.

Generally¹, the request for a frequency in any band should satisfy the minimum path length as stipulated in Table below:

Band (GHz)	Capacity Minimum Bit Rate (Mbit/s)		MPL (km) ³
L6 & U6	Low	<140	16
	High	>140	
L7 & U7	Low	<140	15.5
	High	>140	9.5
L8 & U8	Low	<140	15.5
	High	>140	9
11	High	<140	11
	Low	>140	7
13	Low	<140	9.5
	High	>140	5.5
15	Low	<140	9.5
	High	>140	5.5
18	Low	<140	4
	High	>140	2
23	Low	<140	4
	High	>140	2
26	Low	<140	3
	High	>140	2
28	Low	<140	2
	High	>140	1.5
L31 & U31	Low	<140	2
	High	>140	1.5
32	Low	<140	2
	High	>140	1.5
36	Low	<140	1
	High	>140	1
38	Low	<140	1
	High	>140	1

¹ MPL rule does not apply in frequency bands above 39.5 GHz.