



Guidelines issued by the Telecommunications Regulatory Authority
on Calculation of Frequency Licence Fees

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Purpose: The purpose of these guidelines is to explain how the Authority calculates the Frequency Licence Fees stipulated in the Schedule of Fees Regulation.

1 INTRODUCTION

1.1 These guidelines have been developed to provide clear and consistent direction for all frequency users.

2 FREQUENCY LICENCE FEES CALCULATION

2.1 The Schedule of Fees Regulation sets out the following Application Fees for the use of Frequencies:

2.1.1 *BHD 30* for Application Fees per Transmitting or Receiving Frequency Assignment.

2.1.2 *BHD 30* for Application Fee of fixed point-to-point links (per link).

2.1.3 *BHD 30* Application Fee for Temporary Frequency Assignments or Allotments for Special Events regardless of the number of the requested frequency assignments.

2.2 **The Annual Frequency Licence Fee is calculated using the following formula:**

$$\text{Annual Frequency Licence Fee} = \text{Unit Price} \times \text{BW} \times \text{FREQ} \times \text{DF} \times \text{ACF}$$

2.2.1 Unit Price is set at *BHD 7,000* per *MHz* of bandwidth per year.

2.2.2 Bandwidth ("*BW*") is the size of the frequency Assignment/Allotment expressed in MHz.

2.2.3 The frequency factor ("*FREQ*") differs according to the frequency band in which the frequency Assignment/Allotment is requested. (Refer to **Table 1**).

Table 1: Frequency Factors

No.	From frequency (in MHz)	To frequency (in MHz)	Value of Frequency Factor (" <i>FREQ</i> ")
1	0.003	3	1.20
2	3	30	1.00
3	30	300	0.80

4	300	1,000	0.50
5	1,000	3,000	0.40
6	3,000	5,000	0.30
7	5,000	10,000	0.25
8	10,000	20,000	0.18
9	20,000	30,000	0.10
10	30,000	60,000	0.05
11	60,000	Above 60,000	0.01

If the Frequency Range requested would result in two ("**FREQ**") factors, being applicable the higher ("**FREQ**") will be applied to the entire bandwidth requested.

2.2.4 The Demand Factor ("**DF**") is determined according to the frequency band in which the frequency Assignment/Allotment is requested. (Refer to **Table 2**).

Table 2: Demand Factors

No.	From frequency (MHz)	To frequency (MHz)	Value of Demand Factor (" DF ")
1	137.000	144.000	1.50
2	146.000	149.900	1.50
3	150.050	156.490	1.50
4	156.560	156.760	1.50
5	156.840	174.000	1.50
6	230.000	312.000	1.50
7	312.000	328.600	2.00
8	335.400	470.000	2.00
9	21,200.000	23,600.000	1.50
10	24,500.000	26,500.000	1.50

11	37,000.000	39,500.000	2.90
12	40,500.000	43,500.000	2.90
13	71,000.000	76,000.000	0.33
14	81,000.000	86,000.000	0.33
15	Other Frequency Bands except the above		1.00

If the Frequency Range requested would result in two (“**DF**”) factors being applicable, the higher (“**DF**”) will be applied to the entire bandwidth requested.

2.2.5 The Area Coverage Factor (“**ACF**”) is determined according to the type of service. (Refer to **Table 3**).

Table 3: Area Coverage Factors

No.	Description of ACF	ACF Values (“ ACF ”)
1	Fixed point-to-point links	0.05
2	Transmitting Earth Stations (nGSO)	0.35
3	Transmitting Earth Stations (GSO)	0.07
4	Transmitting Earth Stations (nGSO) in Low Opportunity Cost Band ⁱ	0.07
5	Transmitting user terminals and ESIMs in Low Opportunity Cost Band	0.07
6	Receiving Earth Stations (GSO)	0.035
7	Receiving Earth Stations (nGSO)	0.175
8	Satellite Receiving frequencies with no protection	0
9	All other cases except the above	1

ⁱ Low Opportunity Cost Band: bands that would be used, for example but not limited to, for satellite control or for scientific use as defined in the ITU Radio Regulations and/or Bahrain’s National Frequency Plan or as may be otherwise defined by the Authority. The use of Low Opportunity Cost Bands would be on the basis of the user not causing harmful interference.

Point (9) of the above table includes satellite user terminals and ESIMs. Satellite user terminal or ESIM is an Earth Station whose transmission is monitored and controlled by a network control facility of a Licensed Operator.

All transmitting frequencies for the satellite services including satellite user terminals and ESIMs will have an ACF of 0.07 if the **Low Opportunity Cost Band** is applied.

When a ACF of 1 is applicable this relates to nationwide coverage. For Local Licence that are only licenced for a defined geographic area the coverage factor will be set appropriately.

2.3 The Temporary Frequency Licence Fee = $[(\text{Unit Price} \times \text{BW} \times \text{FREQ} \times \text{DF} \times \text{ACF})/12]$
x [Duration of temporary Frequency Licence (in number of months, rounded up to a whole month)]

2.3.1 The Temporary Frequency Licence Fee will also be applied in the first year of the new requests depending on which month did the user apply for a Frequency License.

3 WE SET OUT BELOW SOME EXAMPLES ON FREQUENCY LICENCE FEES CALCULATION

NGSO satellite as a standard band with no protection for receiving frequencies.

3.1 Assume a Satellite user with a **NGSO satellite network** requested **3 transmitting frequencies** and **2 receiving frequencies** in the **Ka-band** in **May**. The first transmitting frequency has a **bandwidth of 2 MHz**, the second transmitting frequency has a **bandwidth of 1 MHz**, and the third transmitting frequency has a **bandwidth of 5 MHz**. The first receiving frequency has a **bandwidth of 10 MHz**, and the second receiving frequency has a **bandwidth of 20 MHz**. In addition, the user does **not want any protection** for their **receiving frequency**. (The no protection option can only be applied for the satellite services).

3.1.1 Application Fees (For new requests only)

- (a) **Application Fees for each frequency = BHD 30.000**
- (b) The request is **3 transmitting frequencies** and **2 receiving frequencies**, total of **5 frequencies** = $5 \times 30 =$ **BHD 150.000**

3.1.2 Transmit Frequencies

- (a) 27500 MHz, BW 2 MHz
- (b) 28500 MHz, BW 1 MHz
- (c) 29000 MHz, BW 5 MHz

3.1.3 Receive Frequencies

- (a) 18720 MHz, BW 10 MHz
- (b) 19000 MHz, BW 20 MHz

3.1.4 Fees for the first year: **$[(\text{Unit Price} \times \text{BW} \times \text{FREQ} \times \text{DF} \times \text{ACF})/12] \times [\text{Duration of temporary Frequency Licence (in number of months, rounded up to a whole month)}]$**

- (a) First Transmitting Frequency Calculation: $[(7000 \times 2 \times 0.1 \times 1 \times 0.35)/12] \times 8 =$ **BHD 326.667**

- (b) Second Transmitting Frequency Calculation: $[(7000 \times 1 \times 0.1 \times 1 \times 0.35)/12] \times 8 = \text{BHD } 163.333$
- (c) Third Transmitting Frequency Calculation: $[(7000 \times 5 \times 0.1 \times 1 \times 0.35)/12] \times 8 = \text{BHD } 816.667$
- (d) For receiving frequency, since the user **does not want to claim any protection**, there will be **no fees** for the requested receiving frequencies.
- (e) Total Frequency Fees for the first year = $326.667 + 163.333 + 816.667 = \text{BHD } 1306.667$
- (f) Total Frequency Fees including Application Fees = $1306.667 + 150 = \text{BHD } 1456.667$

3.1.5 Annual Frequency Licence Fee Formula: ***Unit Price x BW x FREQ x DF x ACF***

- (a) First Transmitting Frequency Calculation: $7000 \times 2 \times 0.1 \times 1 \times 0.35 = \text{BHD } 490.000$
- (b) Second Transmitting Frequency Calculation: $7000 \times 1 \times 0.1 \times 1 \times 0.35 = \text{BHD } 245.000$
- (c) Third Transmitting Frequency Calculation: $7000 \times 5 \times 0.1 \times 1 \times 0.35 = \text{BHD } 1225.000$
- (d) For receiving frequency, since the user **does not want to claim any protection**, there will be **no fees** for the requested receiving frequencies.
- (e) Total Annual Frequency Fees = $490 + 245 + 1225 = \text{BHD } 1960.000$

GSO satellite as Standard with protection on receiving frequencies.

3.2 Assume a Satellite user with a **GSO satellite network** requested **2 transmitting frequencies** and **1 receiving frequency** in the **Ku-band** in **November**. The first transmitting frequency has a **bandwidth of 1 MHz**, and the second transmitting frequency has a **bandwidth of 1.2 MHz**. The receiving frequency has a **bandwidth of 15 MHz**. In addition, the user **wants protection** for their **receiving frequency**.

3.2.1 Application Fees (For new requests only)

(a) **Application Fees for each frequency = BHD 30.000**

(b) The request is **2 transmitting frequencies** and **1 receiving frequency**, total of **3 frequencies** = $3 \times 30 =$ **BHD 90.000**

3.2.2 Transmit Frequencies

(a) 14255 MHz, BW 1 MHz

(b) 14150 MHz, BW 1.2 MHz

3.2.3 Receive Frequencies

(a) 10500 MHz, BW 15 MHz

3.2.4 Fees for the first year: **[(Unit Price × BW × FREQ × DF × ACF)/12] × [Duration of temporary Frequency Licence (in number of months, rounded up to a whole month)]**

(a) First Transmitting Frequency Calculation: $[(7000 \times 1 \times 0.18 \times 1 \times 0.07)/12] \times 2 =$ **BHD 14.700**, Minimum Fees will be applied, Fees = **BHD 70.000**

(b) Second Transmitting Frequency Calculation: $[(7000 \times 1.2 \times 0.18 \times 1 \times 0.07)/12] \times 2 =$ **BHD 17.640**, Minimum Fees will be applied, Fees = **BHD 70.000**

(c) Receiving Frequency Calculation: $[(7000 \times 15 \times 0.18 \times 1 \times 0.035)/12] \times 2 =$ **BHD 110.250**

(d) Total Frequency Fees for the first year = $70 + 70 + 110.250 =$ **BHD 250.250**

(e) Total Frequency Fees including Application Fees = $250.250 + 90 = \text{BHD } 340.250$

3.2.5 Annual Frequency Licence Fee Formula: $\text{Unit Price} \times \text{BW} \times \text{FREQ} \times \text{DF} \times \text{ACF}$

(a) First Transmitting Frequency Calculation: $7000 \times 1 \times 0.18 \times 1 \times 0.07 = \text{BHD } 88.200$

(b) Second Transmitting Frequency Calculation: $7000 \times 1.2 \times 0.18 \times 1 \times 0.07 = \text{BHD } 105.840$

(c) Receiving Frequency Calculation: $7000 \times 15 \times 0.18 \times 1 \times 0.035 = \text{BHD } 661.500$

(d) Total Annual Frequency Fees = $88.200 + 105.840 + 661.500 = \text{BHD } 855.540$

Private Mobile Radio Request

3.3 Assume a Private Mobile Radio (PMR) user requested **1 transmitting frequency** and **1 receiving frequency** in the **UHF band** in **January**. The transmitting frequency has a **bandwidth of 0.0125 MHz**. The receiving frequency has a **bandwidth of 0.0125 MHz**.

3.3.1 Application Fees (For new requests only)

(a) **Application Fees for each frequency = BHD 30.000**

(b) The request is **1 transmitting frequency** and **1 receiving frequency**, total of **2 frequencies** = $2 \times 30 = \text{BHD } 60.000$

3.3.2 Transmit Frequencies

(a) 445.5 MHz, BW 0.0125 MHz

3.3.3 Receive Frequencies

(a) 448.6 MHz, BW 0.0125 MHz

3.3.4 Since the request is applied in January, the Annual Frequency Licence Fee Formula will be applied for the first year.

3.3.5 Annual Frequency Licence Fee Formula: **$Unit\ Price \times BW \times FREQ \times DF \times ACF$**

(a) Transmitting Frequency Calculation: **$7000 \times 0.0125 \times 0.5 \times 2 \times 1 = BHD\ 87.500$**

(b) Receiving Frequency Calculation: **$7000 \times 0.0125 \times 0.5 \times 2 \times 1 = BHD\ 87.500$**

(c) Total Annual Frequency Fees = **$87.500 + 87.500 = BHD\ 175.000$**

(d) Total Fees including Application Fees = **$175.000 + 60 = BHD\ 235.000$**

Fixed Link Request

3.4 Assume a mobile operator requested **1 transmitting frequency** and **1 receiving frequency** for fixed point-to-point link in **July**. The transmitting frequency has a **bandwidth of 250 MHz**. The receiving frequency has a **bandwidth of 250 MHz**.

3.4.1 Application Fees (For new requests only)

(a) **Application Fees for Fixed Point-to-Point per link (2 frequencies) = BHD 30.000**

3.4.2 Transmit Frequencies

(a) 71250, BW 250 MHz

3.4.3 Receive Frequencies

(a) 81250 MHz, BW 250 MHz

3.4.4 Fees for the first year: **$[(Unit\ Price \times BW \times FREQ \times DF \times ACF)/12] \times [Duration\ of\ temporary\ Frequency\ Licence\ (in\ number\ of\ months,\ rounded\ up\ to\ a\ whole\ month)]$**

(a) Transmitting Frequency Calculation: **$[(7000 \times 250 \times 0.01 \times 0.33 \times 0.05)/12] \times 6 = BHD\ 144.375$**

- (b) Receiving Frequency Calculation: $[(7000 \times 250 \times 0.01 \times 0.33 \times 0.05)/12] \times 6 = \text{BHD } 144.375$
- (c) Total Frequency Fees for the first year = $144.375 + 144.375 = \text{BHD } 288.750$
- (d) Total Frequency Fees including Application Fees = $288.750 + 30 = \text{BHD } 318.750$

3.4.5 Annual Frequency Licence Fee Formula: ***Unit Price x BW x FREQ x DF x ACF***

- (a) Transmitting Frequency Calculation: $7000 \times 250 \times 0.01 \times 0.33 \times 0.05 = \text{BHD } 288.750$
- (b) Receiving Frequency Calculation: $7000 \times 250 \times 0.01 \times 0.33 \times 0.05 = \text{BHD } 288.750$
- (c) Total Annual Frequency Fees = $288.750 + 288.750 = \text{BHD } 577.500$

NGSO satellite as a Low Opportunity Cost Band with no protection for receiving frequencies.

3.5 Assume a Satellite user with a **NGSO satellite network** requested **3 transmitting frequencies** and **3 receiving frequencies** in the **S-band** in **March**. The first transmitting frequency has a **bandwidth of 0.5 MHz**, the second transmitting frequency has a **bandwidth of 0.75 MHz**, and the third transmitting frequency has a **bandwidth of 1 MHz**. The first receiving frequency has a **bandwidth of 5 MHz**, the second receiving frequency has a **bandwidth of 20 MHz**, and the third receiving frequency has a **bandwidth of 200 MHz**. In addition, the transmitting frequencies will be used as **Low Opportunity Cost Band** and **no protection** for their **receiving frequency**. (The **Low Opportunity Cost Band** and **no protection** options can only be applied for the satellite services).

3.5.1 Application Fees (For new requests only)

- (a) **Application Fees for each frequency = BHD 30.000**
- (b) The request is **3 transmitting frequencies** and **3 receiving frequencies**, total of **6 frequencies** = $6 \times 30 = \text{BHD } 180.000$

3.5.2 Transmit Frequencies

- (a) 2055 MHz, BW 0.5 MHz

(b) 2065 MHz, BW 0.75 MHz

(c) 2093 MHz, BW 1 MHz

3.5.3 Receive Frequencies

(a) 8044 MHz, BW 5 MHz

(b) 8050 MHz, BW 20 MHz

(c) 8250 MHz, BW 200 MHz

3.5.4 Fees for the first year: $[(\text{Unit Price} \times \text{BW} \times \text{FREQ} \times \text{DF} \times \text{ACF})/12] \times [\text{Duration of temporary Frequency Licence (in number of months, rounded up to a whole month)}]$

(a) First Transmitting Frequency Calculation: $[(7000 \times 0.5 \times 0.4 \times 1 \times 0.07)/12] \times 10 = \text{BHD } 49.000$, Minimum Fees will be applied, Fees = **BHD 70.000**

(b) Second Transmitting Frequency Calculation: $[(7000 \times 0.75 \times 0.4 \times 1 \times 0.07)/12] \times 10 = \text{BHD } 73.500$

(c) Third Transmitting Frequency Calculation: $[(7000 \times 1 \times 0.4 \times 1 \times 0.07)/12] \times 10 = \text{BHD } 98.000$

(d) For receiving frequency, since the user **does not want to claim any protection**, there will be **no fees** for the requested receiving frequencies.

(e) Total Frequency Fees for the first year = $49 + 73.5 + 98 = \text{BHD } 220.500$

(f) Total Frequency Fees including Application Fees = $220.5 + 180 = \text{BHD } 400.500$

3.5.5 Annual Frequency Licence Fee Formula: $\text{Unit Price} \times \text{BW} \times \text{FREQ} \times \text{DF} \times \text{ACF}$

(a) First Transmitting Frequency Calculation: $7000 \times 0.5 \times 0.4 \times 1 \times 0.07 = \text{BHD } 98.000$

- (b) Second Transmitting Frequency Calculation: $7000 \times 0.75 \times 0.4 \times 1 \times 0.07 = \text{BHD } 147.000$
- (c) Third Transmitting Frequency Calculation: $7000 \times 1 \times 0.4 \times 1 \times 0.07 = \text{BHD } 196.000$
- (d) For receiving frequency, since the user **does not want to claim any protection**, there will be **no fees** for the requested receiving frequencies.
- (e) Total Annual Frequency Fees = $98 + 147 + 196 = \text{BHD } 441.000$

NGSO as a Low Opportunity Cost Band except one channel of Tx as a Standard Band and no protection for receiving frequencies.

3.6 Assume a Satellite user with a **NGSO satellite network** requested **3 transmitting frequencies** and **3 receiving frequencies** in the **Ka-band** in **February**. The first transmitting frequency has a **bandwidth of 50 MHz**, the second transmitting frequency has a **bandwidth of 12 MHz**, and the third transmitting frequency has a **bandwidth of 12 MHz**. The first receiving frequency has a **bandwidth of 10 MHz**, the second receiving frequency has a **bandwidth of 20 MHz**, and the third receiving frequency has a **bandwidth of 200 MHz**. In addition, the transmitting frequencies will be used as **Low Opportunity Cost Band** and **no protection** for their **receiving frequency**. (The **Low Opportunity Cost Band** and **no protection** options can only be applied for the satellite services).

Note: We found out that the **third transmitting frequency** is in a high demanding band with heavy usage, therefore, the **Low Opportunity Cost Band** will not be applied.

3.6.1 Application Fees (For new requests only)

- (a) **Application Fees for each frequency = BHD 30.000**
- (b) The request is **3 transmitting frequencies** and **3 receiving frequencies**, total of **6 frequencies** = $6 \times 30 = \text{BHD } 180.000$

3.6.2 Transmit Frequencies

- (a) 27500 MHz, BW 50 MHz
- (b) 28500 MHz, BW 12 MHz

(c) 29000 MHz, BW 10 MHz

3.6.3 Receive Frequencies

(a) 18720 MHz, BW 10 MHz

(b) 19000 MHz, BW 20 MHz

(c) 19200 MHz, BW 200 MHz

3.6.4 Fees for the first year: $[(\text{Unit Price} \times \text{BW} \times \text{FREQ} \times \text{DF} \times \text{ACF})/12] \times [\text{Duration of temporary Frequency Licence (in number of months, rounded up to a whole month)}]$

(a) First Transmitting Frequency Calculation: $[(7000 \times 50 \times 0.1 \times 1 \times 0.07)/12] \times 11 = \text{BHD } 2245.833$

(b) Second Transmitting Frequency Calculation: $[(7000 \times 12 \times 0.1 \times 1 \times 0.07)/12] \times 11 = \text{BHD } 539.000$

(c) Third Transmitting Frequency Calculation: $[(7000 \times 10 \times 0.1 \times 1 \times 0.35)/12] \times 11 = \text{BHD } 2245.833$

(d) For receiving frequency, since the user **does not want to claim any protection**, there will be **no fees** for the requested receiving frequencies.

(e) Total Frequency Fees for the first year = $2245.833 + 539 + 2245.833 = \text{BHD } 5030.666$

(f) Total Frequency Fees including Application Fees = $5030.666 + 180 = \text{BHD } 5210.666$

3.6.5 Annual Frequency Licence Fee Formula: $\text{Unit Price} \times \text{BW} \times \text{FREQ} \times \text{DF} \times \text{ACF}$

(a) First Transmitting Frequency Calculation: $7000 \times 50 \times 0.1 \times 1 \times 0.07 = \text{BHD } 2450.000$

(b) Second Transmitting Frequency Calculation: $7000 \times 12 \times 0.1 \times 1 \times 0.07 = \text{BHD } 588.000$

(c) Third Transmitting Frequency Calculation: $7000 \times 10 \times 0.1 \times 1 \times 0.35 = \text{BHD } 2450.000$

- (d) For receiving frequency, since the user **does not want to claim any protection**, there will be **no fees** for the requested receiving frequencies.
- (e) Total Annual Frequency Fees = $2450 + 588 + 2450 = \text{BHD } 5488.000$