A proposed Spectrum Charging Regime for Pakistan 2011

Pakistan Legislative Framework for spectrum pricing:

The section 5-2(a) of Pakistan Telecommunication (re-organization) Act 1996 empowers the Authority to review the fee structure associated with any telecommunication service. Under Powers of the Authority it states:

"Grant and renew licenses for any telecommunication system and any telecommunication service on payment of such fees as it may, from time to time specify"

Section 5-2(c) of the above Act empowers the Authority to:

"Receive applications for the use of radio frequency spectrum and subject, where applicable, to grant of licenses under clause (a), refer such applications to the Board for assignment of spectrum within a period of thirty days"

Based on above references of the Act, PTA has been empowered to modify the fee associated with use of radio spectrum to promote its efficient use as the same is a scarce resource and simultaneously only proceed for allocation if the usage is deemed fit by passing on the 'deemed fit' application to FAB. This is in line with international trend set by various regulators and standardization bodies around the world.

The purpose of this document is to rationalize the radio spectrum and fee for services requiring use of frequency spectrum. A drastic change in spectrum demand has been observed in Pakistan which needs associated price change like any other commodity in the world.

A periodic review of spectrum prices should have been carried out to introduce efficient utilization of spectrum, bringing technological innovation and tackle any distortions observed after implementation of proposed charges. The same was recommended in the Cellular 2004 policy, vis-à-vis microwave usage of cellular operators.

1. In absence of Spectrum Policy a "Transmitter License" regime is introduced. Spectrum allocation which are as a result of spectrum auction and awarded to either an LDI, LL or class licensee or otherwise exempted through a specific PTA directive, may be exempted from this "Transmitter License" regime and corresponding fees.

All wireless communication, outside the premise may be issued a Transmitter License for each individual transmitter.

2. ***No One May Transmit***: frequencies reserved for radio astronomy to avoid interference at radio telescopes.
3. ***Only the Licensed User, of that band, May Transmit***: The licensing body may give the same frequency to several users, as a form of frequency reuse, such that they do not interfere provided their coverage map areas never overlap.

Salient Features of Spectrum Charging Regulations, 2011

a. For all **VHF,** **UHF** and **HF** based 'Private Radio services' and corresponding 'Wireless Stations' the proposed rates are based on a 'weighted linear' formula keeping in view the present spectrum demand.
Rates for **VHF,** **UHF** and **HF** point-to-point fixed links are also linked to same formula.
More so, the same formula is proposed for Walkie Talkies as well as Paging Services.

b. Rates Proposed related to fixed Microwave links in all frequency bands (2- 40 GHz) have been discussed in 'fixed point-to-point' (P2P) charging regime through a single formula. This is a major shift, as in all earlier charging versions these were discrete values placed on the basis of an undocumented rationalization. The new rates have been rationalized to discounted DPLC rates.

c. Rates for FM and AM (Short Wave and Medium Wave radio) broadcasting services are proposed through one single formula.

d. In case of ground to Air Communication in Aeronautical Navigation Service, the base station fee proposals are based on the new VHF wireless station formula, same as defined in 'a' above. However, mobile stations proposed are not formula based but fixed.

e. New charging regime for Maritime Communication Service has been formulated in light of the fact that PTA has planned to introduce the licensing for this service in near future. The same formula and approach have been used as in Aeronautical Navigation services.

f. New charging methodology is adopted for Earth Satellite TV, MMDS TV services and Earth stations through a single formula.

g. A uniform initial license application processing fee has been proposed to keep it simple for PTA and operators.

h. All proposed charges are for commercial application. For non-commercial applications 50% of the proposed rates shall apply except for HF Point-to-Point applications where chargers are irrespective of commercial or non commercial. However for GOP own use 50% of HF Point-to-Point proposed rates apply.

Annual Spectrum Fee Proposal:

All proposed charges are for commercial application. For non-commercial applications 50% of the proposed rates shall apply except for HF Point-to-Point applications where chargers are irrespective of commercial or non commercial. However for GOP own use 50% of HF Point-to-Point proposed rates apply.

Sample of the proposed charges are given in annexes.

Multiple formula based earlier proposed charging has further been made simpler and limited to three formulas. Only the 'weighting factors' make the difference.

Yearly review by the Authority is suggested.

Auction able spectrum takes a separate course of action and is beyond the scope of this document.

Channel efficiency has been compared to a channel of 12.5 KHZ Band Width.

Chapter # 2

Private Land Mobile Wireless Services

Point-to-Point Fixed Links HF, VHF and UHF Spectrum Charging Mechanism

A Single Newly Suggested Formula for HF, VHF and UHF Bands, applicable for a networked environment consisting of both, the Base Station and End terminals is as follows:

$$A.F = W_F * (P_F * TL/T + \exp(CEF)))$$

Also, the above proposed formula applies for both, Point-to-Point as well as Point-to-Multi-point Links. The only difference is in their Weighting Factors which are also dependent on the type of band.

The spectrum cost of an application shall be: Link Cost + Terminal cost

Parameter Definitions:
AF: Annual Fee

Weighting Factor (W_f) for Private Wireless Networks (HF, VHF, UHF)

Link Type	Base Station		Mobile Station	
	Weighting Factor	W_f	Weighting Factor	W_f
Point-To-Multipoint	UHF	1200	UHF	250
	VHF	1400	VHF	325
	HF	1600	HF	375
Point-Point	UHF	3000		
	VHF	3600		
	HF	4500		
Walkie Talkie	UHF	400	UHF	150
	VHF	500	VHF	250
Pager	UHF	1200	UHF	50
	VHF	1400	VHF	25

Power Factor (P_F) for Private Wireless Networks
(HF, VHF, UHF)

Base Station		Mobile/ Pager Terminals		Walkie Talkie	
Power(Watts)	**P_F**	**Power(Watt)**	**P_F**	**Power(Watt)**	**P_F**
0< P <= 10W	2	0< P <=5W	2	Up To 1 W	1
10 < P <=25 W	3	5< P <=25W	3	1< P <=5W	2
25< P <=50W	4	P >25W	4	5< P <=10W	3
P >50W	5			P > 10W	4

TL/T: Total links/ Terminals

In case of:

Base Station: Links: No. of channels (transmit + receive)

Mobile Station: Terminals: No. of Terminals/ Mobile stations/ Walkie Talkies/ Pagers

CEF: Channel Efficiency Factor (1 for 12.5 KHz, 2 for 25 KHz, ½ for 6.25 KHz, etc)

Exception: For private Mobile Wireless, Aeronautical and Maritime Spectrum allocations, CEF shall not exceed "1", in the formula CEF shall remains "1" but AF shall be multiplied with the actual CEF factor (for 25 KHz, CEF=1 in formula but at the end AF will be multiplied by 2 as of actual CEF).

Details explained through Type of Services

Private Land Mobile Wireless Services:

"A mobile service between base station and land mobile stations or, between land mobile stations".

Bands of frequencies, especially in the VHF and UHF parts of the spectrum, are allocated for communication between fixed base stations and land mobile vehicle-mounted or portable transceivers. It is also known as "Closed Communication Group" or VHF wireless license. Police radio and other public safety services such as fire departments and ambulances are generally found in the VHF and more so the UHF parts of the spectrum. Trunking systems are often used to make most efficient use of the limited number of frequencies available. More often, trunking may also employ linking of two or more base stations, separated by greater geographical distances, for instances base stations located in two or more cities.

Some other typical examples are radio systems used by law enforcement agencies, Airlines, Oil exploration companies, industrial setups and radio cabs service.

The frequency band used for this category of RBS license is the most congested one and its demand is very high. Keeping in view this aspect, the rates for this license are being revised to promote the efficient utilization of spectrum. The new rates for HF (not commonly used for this application), VHF and UHF stations (Base and Mobile/ Walkie Talkie) are based on a linear weighted formula which is as follows:

$$A.F = W_f * (P.F * TL/T + \exp(CEF))$$

Where,

AF: Annual Spectrum Fee = ***Link Cost + Terminal cost***

W_f: 'Weighting Factor' applied to differentiate effective and affordable usage through fee structure.

For UHF Base Station	W_f =1200
For UHF Mobile	W_f = 250,
For VHF Base Station	W_f =1400,
For VHF Mobile	W_f = 325,
For HF Base Station	W_f =1600, applicable only if it becomes available
For HF Mobile	W_f = 375.

TL/T: Total links/ Terminals

In case of:

Base Station: Links: No. of channels (transmit + receive)

Mobile Station: Terminals: No. of Terminals/ Mobile stations/ Walkie Talkies

P_F: Power Factor (Explained in **Table-1 Annex A**)

CEF: Channel Efficiency Factor (1 for 12.5 KHz, ½ for 6.25 KHz, etc)

For CEF>1 in the formula CEF shall remains "1" but AF shall be multiplied with the actual CEF factor (for 25 KHz, CEF=1 in formula but at the end AF will multiplied by 2 as of actual CEF).

Base Station: Base station/ Radio Station/ Repeater/ Multi Repeater

Rates for this category are given in **Table-2 to Table5 of Annex-A.**

Note:

1) If only one Mobile Station/ Walkie Talkie talks only to one base station then the calculation shall be made for '1' Base Station and '1'Mobile Station. Number of channel links needs to be further identified.

2) Base station with integrated relay facility shall be considered as '1' Base Station with two or multiple channels, as the case maybe, as long as it remains an integrated relay.

3) Each integrated Repeater Station will be considered as a separate base station.

4) A Point-to-Point channel within a Point-to-Multi point system shall be considered a channel within Point-to-Multi Point system.

Point-to-Point Fixed Links within HF, VHF and UHF bands:

For HF, VHF and UHF fixed links the same linear weighted formula is suggested as above.

$$A.F = W_f * (P_F * TL/T + \exp(CEF)))$$

With:

Weighting factor for UHF fix links: 3000
Weighting factor for VHF fix links: 3600
Weighting factor for HF fix links: 4500

Sample Rates for HF, VHF and UHF fix links are given in **Table-6 to Table-7 of Annex A.**

Similarly in case of Walkie Talkie and Paging services, again same formula is suggested and rates are defined in **Table-8 to Table-10 of Annex A**. If communication is limited to only two walkie talkies communicating with each other, then 'walkie talkie Base station' weighting factor shall be used. This is merely to embed the cost of the inherent link (channel) into the walkie talkie terminal. The pricing sequence is: Existing, Previously suggested, New Proposed.

With:

Wf for UHF Walkie Talkie Terminal:	150
Wf for VHF Walkie Talkie Terminal:	250
Wf for UHF Walkie Talkie Base Station:	400
Wf for VHF Walkie Talkie Base Station:	500
P_F for Walkie Talkie Up to 1W:	1
P_F for Walkie Talkie at 1< P <= 5W:	2
P_F for Walkie Talkie at 5< P <=10W:	3
Wf for Paging Transmitter:	1200

Note: It is suggested that Walkie Talkie annual Fee (Terminal/ Station) for non Commercial user (Home, Toys etc) at less then 100 mw and range up to 500m is free.

ANNEX-A

Table 1: Power Factor for New Proposed Formula

Base Station		Mobile/ Pager Terminals		Walkie Talkie	
Power(Watts)	**P_F**	**Power(Watt)**	**P_F**	**Power(Watt)**	**P_F**
0< P <= 10W	2	0< P <=5W	2	Up To 1 W	1
10 < P <=25 W	3	5< P <=25W	3	1< P <=5W	2
25< P <=50W	4	P >25W	4	5< P <=10W	3
P >50W	5			P > 10W	4

Table 5: Sample New Proposed Rates for Private Wireless Services

Sample Rates for HF, VHF, UHF Private Wireless Access-link Services

Sr. No	Category	Band	Power Brackets (W)	Wf	P_F	Channel eff Factor	Total Links Tx+Rx/ Terminals	New Proposed Annual Fee
1	Mobile Station	UHF	5< P <=25w	250	3	1	1	PKR 1,430
2	Base Station		10< P <=25W	1200	3	1	1	PKR 6,862
3	Base Station		10< P <=25W	1200	3	1	5	PKR 21,262
4	Base Station		10< P <=25W	1200	3	1	10	PKR 39,262
5	Mobile Station	VHF	5< P <=25w	325	3	1	1	PKR 1,858
6	Mobile Station		P <=5w	325	2	1	1	PKR 1,533
7	Base Station		10< P <=25W	1400	3	1	1	PKR 8,006
8	Base Station		25< P <=45W	1400	4	1	5	PKR 31,806
9	Base Station		10< P <=25W	1400	3	1	10	PKR 45,806
10	Base Station		0 < P <= 10W	1400	2	1	1	PKR 6,606
11	Base Station		0 < P <= 10W	1400	2	1	2	PKR 9,406
12	Base Station		0 < P <= 10W	1400	2	1	4	PKR 15,006
13	Mobile Station	HF	5< P <=25w	375	3	1	2	PKR 3,269
14	Base Station		10< P <=25W	1600	3	1	1	PKR 9,149
15	Base Station		10< P <=25W	1600	3	1	5	PKR 28,349
16	Base Station		10< P <=25W	1600	3	1	10	PKR 52,349
17	Walkie Talkie	UHF	Up to 1w	150	1	1	1	PKR 558
18	Walkie Talkie	VHF	Up to 1w	250	1	1	1	PKR 930
19	Walkie Talkie	UHF	1< P <= 5W	150	2	1	5	PKR 1,908
20	Walkie Talkie	VHF	1< P <= 5W	250	2	1	5	PKR 3,180
21	Walkie Talkie	UHF	5< P <=10W	150	3	1	10	PKR 4,908
22	Walkie Talkie	VHF	5< P <=10W	250	3	1	10	PKR 8,180

For Walkie Talkie power factor is different as in this case for P_F =1, for P (power) ≤ 1W

For Walkie Talkie power factor is different as in this case for P_F =2, for 1W < P (power) ≤ 5W

For Walkie Talkie power factor is different as in this case for P_F = 3, for 5W < P (power) ≤ 10W

Table 7: Sample New Proposed Rates for HF, VHF and UHF '1-1 Network" links.

Sample Annual Rates for HF, VHF, UHF "1-1 Network" Link at (12.5 KHz)								
Sr. No	**Category**	**Band**	**Power Brackets (W)**	**W.f**	**P_F**	**Channel eff Factor**	**Total Links Tx+Rx/ Terminals**	**New Proposed Annual Fee Charges**
1	Fixed link	UHF	1< P <=10W	3000	2	1	1	PKR 14,155
2	Fixed link	UHF	10-25.	3000	3	1	1	PKR 17,155
3	Fixed link	VHF	1< P <=10W	3600	2	1	1	PKR 16,986
4	Fixed link	VHF	10-25.	3600	3	1	1	PKR 20,586
5	Fixed link	HF	1< P <=10W	4500	2	1	1	PKR 21,232
6	Fixed link	HF	10-25.	4500	3	1	1	PKR 25,732

Power Factors definition for New Proposed Rates Walkie Talkie

Specially for Walkie Talkie power factor is different as in this case for up to 1W P_F is 1
Specially for Walkie Talkie power factor is different as in this case for 1 < P <= 5 W P_F is 2
Specially for Walkie Talkie power factor is different as in this case for 5 < P < = 10 W P_F is 3

Table 10: New Sample Proposed Rates for Walkie Talkie and Paging Services

Sr. No	Category	Band	Power Brackets (W)	Wf	P_F	Channel eff Factor	Total Links Tx+Rx/ Terminals	New Proposed Annual Fee Charges
1	Walkie Talkie terminal	UHF	Up to 1w	150	1	1	1	PKR 558
2	Walkie Talkie terminal	VHF	Up to 1w	250	1	1	1	PKR 930
3	Walkie Talkie terminal	UHF	1< P <= 5W	150	2	1	1	PKR 708
4	Walkie Talkie terminal	VHF	1< P <= 5W	250	2	1	1	PKR 1,180
5	Walkie Talkie terminal	UHF	5< P <=10W	150	3	1	1	PKR 858
6	Walkie Talkie terminal	VHF	5< P <=10W	250	3	1	1	PKR 1,430
7	Walkie Talkie Station	UHF	1< P <= 5W	400	2	1	1	PKR 1,887
8	Walkie Talkie Station	VHF	1< P <= 5W	500	2	1	1	PKR 2,359
9	Walkie Talkie Station	UHF	5< P <=10W	400	3	1	1	PKR 2,287
10	Walkie Talkie Station	VHF	5< P <=10W	500	3	1	1	PKR 2,859
Sample Proposed Annual Rates for Pagers (Transmitters only not for User Terminal)								
1	Paging Terminal for 12.5 Khz	UHF	1< P <=10W	50	2	1	1	PKR 236
2	Paging Station for 12.5 Khz	UHF	1< P <=10W	1200	2	1	1	PKR 5,662
3	Paging Terminal for 12.5 Khz	VHF	1< P <=10W	25	2	1	1	PKR 118
4	Paging Station for 12.5 Khz	VHF	1< P <=10W	1400	2	1	1	PKR 6,606

Chapter # 3

A Generic Fixed Point to Point (P2P) Microwave Spectrum Charging Mechanism (Above 2 Ghz)

A Single Newly Suggested Formula for fixed Point to Point Microwave which starts above 2 GHz spectrum up to so on, the formula is as follows:

$$AF = W_F * (P_F * TL/T + CEF) * (4/ GHZ)$$

Also, the above proposed formula applies for all microwave bands used in Pakistan. The only difference is in their Weighting Factors which are independent to the band but dependent to the Bandwidth required.

Parameter Definitions:
AF: Annual Fee

Weighting Factor (W_f) for Microwave Point-To-Point

Weighting Factor	W_F
3.5 MHz	80
7 MHz	70
14 MHz	60
28 MHz	60
56 MHz	50

Power Factor (P_F) for Microwave Fixed Point-To-Point

Power (Watts)	P_F
0< P <=10W	2
10 < P <=25 W	3
25< P <=50W	4
P >50W	5

TL/T: Total links/ Terminals

In case of:

Links: No. of channels (Transmit + Receive)

CEF: Channel Efficiency Factor (Total Required BW/ 12.5 KHz)

GHZ: Represents the Spectrum Spot (For e.g. for 13 GHz use 13 in formula)

After carrying out a thorough analysis, a linear weighted formula has been usedto determine these charges. The new annual charges are 'Link Specific', i.e. the charges would be payable according to number of microwave links. The technical parameters include Bandwidth Factor, Power Factor, Links/ Terminals and weighting factor. The proposed formula for Microwave links is:

AF = Wf* (P.f* TL/T + CEF) * (4/ GHZ)

Where:

AF: Annual Spectrum Fee = ***Link Cost + Terminal cost***

W_f: Weighting Factor

P_F: Power Factor (Define in **Table 2: Annex-B**)

TL/T: Total links/ Terminals

In case of:

Links: No. of channels (Transmit + Receive)

CEF: Channel Efficiency Factor (Total Required BW/ 12.5 KHz)

GHZ: Represents the Spectrum Spot (For e.g. for 13 GHz use 13 in formula)

For all Frequency spots and Bandwidths same formula will give results automatically; only by changing parameters (CEF and W_F according to BW required).

Rates for microwave fixed point to point links are given in **Table-9 and Table-10(A to E) Annex B.**

Examples:

P_F = 3	**B.W = 3.5 MHz**	**B.W Factor= 3.5**
TL/Terminals = 2	**Channel Width 12.5 KHz**	**CEF= 280**

P_F = 3	**B.W = 7 MHz**	**BW Factor = 7**
TL/Terminals = 2	**Channel Width 12.5 KHz**	**CEF = 560**

P_F = 3	**B.W = 14 MHz**	**BW Factor = 14**
TL/Terminals = 2	**Channel Width 12.5 KHz**	**CEF = 1120**

P_F = 3	**B.W = 28 MHz**	**BW Factor = 28**
TL/Terminals = 2	**Channel Width 12.5 KHz**	**CEF = 2240**

P_F = 3	**B.W = 56 MHz**	**BW Factor = 56**
TL/Terminals = 2	**Channel Width 12.5 KHz**	**CEF = 4480**

Annex-B

Table 2: Power Factor for New proposed microwave rates

Power (Watts)	P_F
0< P <=10W	2
10 < P <=25 W	3
25< P <=50W	4
P >50W	5

Table: 10(A) Calculated New Proposed samples for Microwave Rates (3.5 MHz Bandwidth)

Deduced Rates Based on Linear weighting Formula and Spectrum Distance Analysis Bit Error Rate = 10 ^-5 or Better BW = 3.5 MHz, V.S DPLC at P_F: 3				
Spectrum Range (GHZ)	**Dist (KM)**	**New Proposed Rates (PKR)**	**New Proposed Rates 1 (PKR)**	**New Proposed Rates 2 (PKR)**
2	50	**45760**	**57200**	**68640**
3	49	**30507**	**38133**	**45760**
4	48	**22880**	**28600**	**34320**
5	46	**18304**	**22880**	**27456**
6	45.5	**15253**	**19067**	**22880**
7	45	**13074**	**16343**	**19611**
8	44.083	**11440**	**14300**	**17160**
9	43.167	**10169**	**12711**	**15253**
10	42.25	**9152**	**11440**	**13728**
11	41.333	**8320**	**10400**	**12480**
12	40.417	**7627**	**9533**	**11440**
13	39.5	**7040**	**8800**	**10560**
14	33.86	**6537**	**8171**	**9806**
15	28.22	**6101**	**7627**	**9152**
16	22.58	**5720**	**7150**	**8580**
17	16.94	**5384**	**6729**	**8075**
18	11.3	**5084**	**6356**	**7627**
19	10.53	**4817**	**6021**	**7225**
20	9.76	**4576**	**5720**	**6864**
21	8.99	**4358**	**5448**	**6537**
22	8.22	**4160**	**5200**	**6240**
23	7.45	**3979**	**4974**	**5969**
24	6.667	**3813**	**4767**	**5720**
25	5.883	**3661**	**4576**	**5491**
26	5.1	**3520**	**4400**	**5280**
27	4.8917	**3390**	**4237**	**5084**
28	4.68	**3269**	**4086**	**4903**
29	4.475	**3156**	**3945**	**4734**
30	4.2667	**3051**	**3813**	**4576**
31	4.0583	**2952**	**3690**	**4428**
32	3.85	**2860**	**3575**	**4290**
33	3.6416	**2773**	**3467**	**4160**
34	3.433	**2692**	**3365**	**4038**
35	3.225	**2615**	**3269**	**3922**
36	3.0166	**2542**	**3178**	**3813**
37	2.828	**2474**	**3092**	**3710**
38	2.6	**2408**	**3011**	**3613**

1. Consider New Proposed Rates (PKR) as Spectrum Fee for Licensees of PSTN/ PSMN with WF OF 80.
2. Consider New Proposed Rates 1, 2 (PKR) as spectrum Fee for non-PSTN/ PSMN License with and WF of 120/100.
3. Access Spectrum Fee for PSTN/PSMN (Auctioning Price).
4. Access Spectrum Fee for Non PSTN/PSMN (VHF/UHF Trunk Radio).

Table: 10(B) New Proposed samples for Microwave Rates **(7.0 MHz Bandwidth)**

Deduced Rates Based on Linear weighting Formula and Spectrum Distance Analysis Bit Error Rate = 10 ^-5 or Better BW = 7 MHz, V.S DPLC at P_F: 3				
Spectrum Spot (GHZ)	**Dist (KM)**	**New Proposed Rates (PKR)**	**New Proposed Rates 1 (PKR)**	**New Proposed Rates 2 (PKR)**
2	49	79,240	96,220	118,860
3	48	52,827	64,147	79,240
4	47	39,620	48,110	59,430
5	46	31,696	38,488	47,544
6	45	26,413	32,073	39,620
7	45	22,640	27,491	33,960
8	45	19,810	24,055	29,715
9	45	17,609	21,382	26,413
10	45	15,848	19,244	23,772
11	44.6667	14,407	17,495	21,611
12	44.3333	13,207	16,037	19,810
13	44	12,191	14,803	18,286
14	37.6	11,320	13,746	16,980
15	31.2	10,565	12,829	15,848
16	24.8	9,905	12,028	14,858
17	18.4	9,322	11,320	13,984
18	12	8,804	10,691	13,207
19	11.22	8,341	10,128	12,512
20	10.44	7,924	9,622	11,886
21	9.66	7,547	9,164	11,320
22	8.88	7,204	8,747	10,805
23	8.1	6,890	8,367	10,336
24	7.16667	6,603	8,018	9,905
25	6.23333	6,339	7,698	9,509
26	5.3	6,095	7,402	9,143
27	5.09167	5,870	7,127	8,804
28	4.88333	5,660	6,873	8,490
29	4.675	5,465	6,636	8,197
30	4.46667	5,283	6,415	7,924
31	4.25833	5,112	6,208	7,668
32	4.05	4,953	6,014	7,429
33	3.84167	4,802	5,832	7,204
34	3.63333	4,661	5,660	6,992
35	3.425	4,528	5,498	6,792
36	3.21667	4,402	5,346	6,603
37	3.00833	4,283	5,201	6,425
38	2.8	4,171	5,064	6,256

1. Consider New Proposed Rates (PKR) as Spectrum Fee for Licensees of PSTN/ PSMN with WF OF 70.
2. Consider New Proposed Rates 1, 2 (PKR) as spectrum Fee for non-PSTN/ PSMN License with and WF of 105/85.
3. Access Spectrum Fee for PSTN/PSMN (Auctioning Price).
4. Access Spectrum Fee for Non PSTN/PSMN (VHF/UHF Trunk Radio).

Table: 10(C) New Proposed samples for Microwave Rates **(14 MHz Bandwidth)**

Deduced Rates Based on Linear weighting Formula and Spectrum Distance Analysis Bit Error Rate = 10 ^-5 or Better BW = 14 MHz, V.S DPLC at P_F: 3				
Spectrum Range (GHZ)	**Dist (KM)**	**New Proposed Rates (PKR)**	**New Proposed Rates 1 (PKR)**	**New Proposed Rates 2 (PKR)**
2	49	135,120	168,900	202,680
3	48	90,080	112,600	135,120
4	47	67,560	84,450	101,340
5	46	54,048	67,560	81,072
6	45	45,040	56,300	67,560
7	44.75	38,606	48,257	57,909
8	44.5	33,780	42,225	50,670
9	44.25	30,027	37,533	45,040
10	44	27,024	33,780	40,536
11	42.6667	24,567	30,709	36,851
12	41.3333	22,520	28,150	33,780
13	40	20,788	25,985	31,182
14	34.1	19,303	24,129	28,954
15	28.2	18,016	22,520	27,024
16	22.3	16,890	21,113	25,335
17	16.4	15,896	19,871	23,845
18	10.5	15,013	18,767	22,520
19	9.8	14,223	17,779	21,335
20	9.1	13,512	16,890	20,268
21	8.4	12,869	16,086	19,303
22	7.7	12,284	15,355	18,425
23	7	11,750	14,687	17,624
24	6.23333	11,260	14,075	16,890
25	5.46667	10,810	13,512	16,214
26	4.7	10,394	12,992	15,591
27	4.51667	10,009	12,511	15,013
28	4.33333	9,651	12,064	14,477
29	4.15	9,319	11,648	13,978
30	3.96667	9,008	11,260	13,512
31	3.78333	8,717	10,897	13,076
32	3.6	8,445	10,556	12,668
33	3.41667	8,189	10,236	12,284
34	3.23333	7,948	9,935	11,922
35	3.05	7,721	9,651	11,582
36	2.86667	7,507	9,383	11,260
37	2.68333	7,304	9,130	10,956
38	2.5	7,112	8,889	10,667

1. Consider New Proposed Rates (PKR) as Spectrum Fee for Licensees of PSTN/ PSMN with WF OF 60.
2. Consider New Proposed Rates 1, 2 (PKR) as spectrum Fee for non-PSTN/ PSMN License with and WF of 90/75.
3. Access Spectrum Fee for PSTN/PSMN (Auctioning Price).
4. Access Spectrum Fee for Non PSTN/PSMN (VHF/UHF Trunk Radio).

Table: 10(D) New Proposed samples for Microwave Rates **(28 MHz Bandwidth)**

Deduced Rates Based on Linear weighting Formula and Spectrum Distance Analysis Bit Error Rate = 10 ^-5 or Better BW = 28 MHz, V.S DPLC at P_F: 3				
Spectrum Range (GHZ)	**Dist (KM)**	**New Proposed Rates (PKR)**	**New Proposed Rates 1 (PKR)**	**New Proposed Rates 2 (PKR)**
2	45	269,520	336,900	404,280
3	42.5	179,680	224,600	269,520
4	40	134,760	168,450	202,140
5	38.5	107,808	134,760	161,712
6	35.5	89,840	112,300	134,760
7	33.375	77,006	96,257	115,509
8	31.25	67,380	84,225	101,070
9	29.125	59,893	74,867	89,840
10	27	53,904	67,380	80,856
11	25	49,004	61,255	73,505
12	23	44,920	56,150	67,380
13	21	41,465	51,831	62,197
14	18.2	38,503	48,129	57,754
15	15.4	35,936	44,920	53,904
16	12.6	33,690	42,113	50,535
17	9.8	31,708	39,635	47,562
18	7	29,947	37,433	44,920
19	6.6	28,371	35,463	42,556
20	6.2	26,952	33,690	40,428
21	5.8	25,669	32,086	38,503
22	5.4	24,502	30,627	36,753
23	5	23,437	29,296	35,155
24	4.5	22,460	28,075	33,690
25	4	21,562	26,952	32,342
26	3.5	20,732	25,915	31,098
27	3.375	19,964	24,956	29,947
28	3.25	19,251	24,064	28,877
29	3.125	18,588	23,234	27,881
30	3	17,968	22,460	26,952
31	2.875	17,388	21,735	26,083
32	2.75	16,845	21,056	25,268
33	2.625	16,335	20,418	24,502
34	2.5	15,854	19,818	23,781
35	2.375	15,401	19,251	23,102
36	2.25	14,973	18,717	22,460
37	2.125	14,569	18,211	21,853
38	2	14,185	17,732	21,278

1. Consider New Proposed Rates (PKR) as Spectrum Fee for Licensees of PSTN/ PSMN with WF OF 60.
2. Consider New Proposed Rates 1, 2 (PKR) as spectrum Fee for non-PSTN/ PSMN License with and WF of 90/75.
3. Access Spectrum Fee for PSTN/PSMN (Auctioning Price).
4. Access Spectrum Fee for Non PSTN/PSMN (VHF/UHF Trunk Radio).

Table: 10(E) New Proposed samples for Microwave Rates **(56 MHz Bandwidth)**

Deduced Rates Based on WR Formula and Spectrum Distance Analysis Bit Error Rate = 10 ^-5 or Better BW = 56 MHz, V.S DPLC at P_F: 3				
Spectrum Range (GHZ)	**Dist (KM)**	**New Proposed Rates (PKR)**	**New Proposed Rates 1 (PKR)**	**New Proposed Rates 2 (PKR)**
2	45	448,600	583,180	672,900
3	44	299,067	388,787	448,600
4	43	224,300	291,590	336,450
5	42	179,440	233,272	269,160
6	41	149,533	194,393	224,300
7	39.25	128,171	166,623	192,257
8	37.5	112,150	145,795	168,225
9	35.75	99,689	129,596	149,533
10	34	89,720	116,636	134,580
11	31.6667	81,564	106,033	122,345
12	29.3333	74,767	97,197	112,150
13	27	69,015	89,720	103,523
14	23.3	64,086	83,311	96,129
15	19.6	59,813	77,757	89,720
16	15.9	56,075	72,898	84,113
17	12.2	52,776	68,609	79,165
18	8.5	49,844	64,798	74,767
19	8	47,221	61,387	70,832
20	7.5	44,860	58,318	67,290
21	7	42,724	55,541	64,086
22	6.5	40,782	53,016	61,173
23	6	39,009	50,711	58,513
24	5.33333	37,383	48,598	56,075
25	4.66667	35,888	46,654	53,832
26	4	34,508	44,860	51,762
27	3.85833	33,230	43,199	49,844
28	3.71667	32,043	41,656	48,064
29	3.575	30,938	40,219	46,407
30	3.43333	29,907	38,879	44,860
31	3.29167	28,942	37,625	43,413
32	3.15	28,038	36,449	42,056
33	3.00833	27,188	35,344	40,782
34	2.86667	26,388	34,305	39,582
35	2.725	25,634	33,325	38,451
36	2.58333	24,922	32,399	37,383
37	2.44167	24,249	31,523	36,373
38	2.3	23,611	30,694	35,416

1. Consider New Proposed Rates (PKR) as Spectrum Fee for Licensees of PSTN/ PSMN with WF OF 60.
2. Consider New Proposed Rates 1, 2 (PKR) as spectrum Fee for non-PSTN/ PSMN License with and WF of 90/75.
3. Access Spectrum Fee for PSTN/PSMN (Auctioning Price).
4. Access Spectrum Fee for Non PSTN/PSMN (VHF/UHF Trunk Radio).

Chapter # 4

A Generic Proposed AM and FM Broadcasting Spectrum Charging Mechanism

A Single Newly Suggested Formula for Short Wave (SW), Medium Wave (MW) and FM Radio services consisting of Radio Station and End terminals

Normally the frequencies used for broad casting are:

Long wave AM Radio = (148.5 – 283.5) kHz (LF)
Medium wave AM Radio = (530 – 1710) kHz (MF)
Shortwave AM Radio = (3 – 30) MHz (HF)
FM Radio= (88-108) MHz (VHF)
Television broadcasting in North America = (54-806 MHz) (VHF/UHF)

The above proposed formula applies for both, AM as well as FM Broadcasting transmitters (Boosters) services. The only difference is in their Weighting Factors and Power Factor which is also dependent on the type of band utilizes and Power requirements to Broadcast.

$$A.F = W_F * (P.F * TL/T * \exp Sq\ (CEF)))$$

Where:

AF: Annual Spectrum Fee = ***Link Cost***

Weighting Factor (W_F) for FM and AM Broadcasting Transmitters (boosters)

Category	Weighting Factor	W_F
FM	Low Power	20
	High Power	40
AM	Fixed	500

Power Factor (P_F) for FM Radio

Power (W)	P_F
0W < P < = 100mW	0
100mW < P < = 10W	1
10W < P < = 50W	2
50W < P < = 100W	3
100W < P < = 250W	4
250W < P < = 500W	5
500W< P < = 1KW	6
1KW< P < = 2KW	7
2KW < P < = 3KW	8
3KW < P < = 4KW	9
4KW < P < = 5KW	10

CEF: Required BW/ 12.5 KHz (In this case suppose 30 KHz for Each Channels/ transmitters)

Similarly same above mentioned formula is suggested for AM radio broadcast transmitters (boosters) with.

W_F: 500

Power Factor (P_F) for AM Radio

.

Power (W)	P_F
0 < P < = 10 KW	10
10 < P < = 50 KW	15
50 < P < = 100 KW	25
100 < P < = 200 KW	30
200 < P < = 300 KW	35
300 < P < = 400 KW	40
400< P < = 500 KW	45
P> 500KW	50

TL/T: Total links/ Terminals

In case of Broadcasting Station: Links= No. of channels

Broadcasting Service

"A radio communication service in which the transmissions are intended for direct reception by the general public. This service may include sound transmissions, television transmissions or other types of transmission".

OR

"A broadcasting service is a point to multipoint service which is provided using various frequency bands like low frequency (LF), Medium frequency (MF), High frequency (HF), Very high frequency (VHF) and Ultra high frequency (UHF) as per the ITU allocations".

Normally the frequencies used for broad casting are:

Long wave AM Radio = (148.5 – 283.5) kHz (LF)
Medium wave AM Radio = (530 – 1710) kHz (MF)
Shortwave AM Radio = (3 – 30) MHz (HF)
FM Radio= (88-108) MHz (VHF)
Television broadcasting in North America = (54-806 MHz) (VHF/UHF)

The proposed formula for broad casting (AM & FM) service is given as:

A.F = Wf *(P.F * TL/T * exp Sq (CEF)))

Where:

AF: Annual Spectrum Fee = ***Link Cost***

Wf for FM low Power: 20

Wf for FM High Power: 40

P_F for FM: define in **Table 2 Annex B.**

CEF: Required BW/ 12.5 KHz (In this case suppose 30 KHz)

The proposed rates for broad casting services are given in **Table-3-4 Annex C.**

Similarly same above mentioned formula is suggested for AM radio broadcast services with.

W_F: 500
P_F: Defined in **Table-5 Annex C.**
Proposed rates for AM radio broadcast are given in **Table-6 Annex C.**

Annex C

Table: 2 Power Factor (FM) for new proposed Rates.

Power (W)	P_F
0W < P < = 100mW	0
100mW < P < = 10W	1
10W < P < = 50W	2
50W < P < = 100W	3
100W < P < = 250W	4
250W < P < = 500W	5
500W< P < = 1KW	6
1KW< P < = 2KW	7
2KW < P < = 3KW	8
3KW < P < = 4KW	9
4KW < P < = 5KW	10

Table: 4 New Proposed samples Rates for FM Broadcasting per transmitter (booster).

FM Radio 87-108 MHz New Proposed Rates B.W 30Khz									
Sr. No	**Category**	**Band**	**Power (W)**	**W_f**	**P_F**	**Channel eff Factor**	**Total Links Tx+Rx/ Terminals**	**New Proposed Annual Fee Charges**	**Comments**
1	Low Power FM	FM 87-108 MHz	0W < P < = 100mW	20	0	2.4	1	PKR 0	**>)** No Advertisement income and **>)** No Profit earned from Service
2	Low Power FM	FM 87-108 MHz	100mW < P < = 10W	20	1	2.4	1	PKR 6,347	
3	Low Power FM	FM 87-108 MHz	10W < P < = 50W	20	2	2.4	1	PKR 12,694	
4	Low Power FM	FM 87-108 MHz	50W < P < = 100W	20	3	2.4	1	PKR 19,041	
5	FM	FM 87-108 MHz	100W < P < = 250W	40	4	2.4	1	PKR 50,776	> Profit making Stations
6	FM	FM 87-108 MHz	250W < P < = 500W	40	5	2.4	1	PKR 63,470	
7	FM	FM 87-108 MHz	500W < P < = 1KW	40	6	2.4	1	PKR 76,164	
8	FM	FM 87-108 MHz	1KW < P < = 2KW	40	7	2.4	1	PKR 88,858	
9	FM	FM 87-108 MHz	2KW < P < = 3KW	40	8	2.4	1	PKR 101,551	
10	FM	FM 87-108 MHz	3KW < P < = 4KW	40	9	2.4	1	PKR 114,245	
11	FM	FM 87-108 MHz	4KW < P < = 5KW	40	10	2.4	1	PKR 126,939	

Table 5: Power Factor for new Proposed AM Rates

Power (W)	P_F
0 < P < = 10 KW	10
10 < P < = 50 KW	15
50 < P < = 100 KW	25
100 < P < = 200 KW	30
200 < P < = 300 KW	35
300 < P < = 400 KW	40
400< P < = 500 KW	45
P> 500KW	50

Table 6: New Proposed samples Rates for AM Broadcasting per transmitter

AM Radio (SW 1800–30,000 kHz MW 526.5 kHz to 1606.5 kHz) B.W 9Khz								
Sr. No	Category	Band KHZ	Power (W)	W_F	P_F	Channel eff Factor	Total Links Tx+Rx/ Terminals	New Proposed Annual Fee Charges
1	SW & MW AM	1800 - 30,000, 526.5 - 1606.5	0 < P < = 10 KW	500	10	0.72	1	PKR 8,397
2	SW & MW AM	1800 - 30,000, 526.5 - 1606.5	10 < P < = 50 KW	500	15	0.72	1	PKR 12,595
3	SW & MW AM	1800 - 30,000, 526.5 - 1606.5	50 < P < = 100 KW	500	25	0.72	1	PKR 20,992
4	SW & MW AM	1800 - 30,000, 526.5 - 1606.5	100 < P < = 200 KW	500	30	0.72	1	PKR 25,190
5	SW & MW AM	1800 - 30,000, 526.5 - 1606.5	200 < P < = 300 KW	500	35	0.72	1	PKR 29,388
6	SW & MW AM	1800 - 30,000, 526.5 - 1606.5	300 < P < = 400 KW	500	40	0.72	1	PKR 33,587
7	SW & MW AM	1800 - 30,000, 526.5 - 1606.5	400< P < = 500 KW	500	45	0.72	1	PKR 37,785
8	SW & MW AM	1800 - 30,000, 526.5 - 1606.5	P> 500KW	500	50	0.72	1	PKR 41,983

Chapter # 5

A Generic Proposed Aeronautical and Maritime Radio Navigation Spectrum Charging Mechanism

A Single Newly Suggested Formula for Aeronautical and Maritime services consisting of Radio Station and End Terminals/ Equipments

The above proposed formula for Private Wireless land Mobile wireless Station is again proposed for Maritime (Ship to Shore) and Aeronautical (Ground to Air) Radio communication services.

$$A.F = W_F * (P.F * TL/T + \exp(CEF)))$$

Also, the above proposed formula applies for both, Point-to-Point as well as Point-to-Multi-point Links use either in Maritime or Aeronautical Communications. The only difference is in their Weighting Factors which are also dependent on the type of band.

The spectrum cost of an application shall be: Link Cost + Terminal cost

Parameter Definitions:

AF: Annual Fee

Weighting Factor (W_f) for Aeronautical and Maritime Base Station

Link Type	Base Station	
	Weighting Factor	W_f
Point-To-Multipoint	UHF	1200
	VHF	1400
	HF	1600
Point-Point	UHF	3000
	VHF	3600
	HF	4500

Power Factor (P_F) for Aeronautical and Maritime Services

Base Station	
Power(Watts)	**P_F**
0< P <= 10W	2
10 < P <=25 W	3
25< P <=50W	4
P >50W	5

TL/T: Total links/ Terminals

In case of:

Base Station: Links: No. of channels (transmit + receive)

Mobile Station: Terminals: No. of Terminals/ Mobile stations/ Walkie Talkies/ Pagers

CEF: Channel Efficiency Factor (1 for 12.5 KHz, ½ for 6.25 KHz)

For CEF>1 in the formula CEF shall remains "1" but AF shall be multiplied with the actual CEF factor (for 25 KHz, CEF=1 in formula but at the end AF will multiplied by 2 as of actual CEF).

The only difference is in their equipment fee (Different for Aeronautical and Maritime equipment defined as).

Annual Aircraft equipment Fee will be charged Rs. 15,000 Per Terminal

Annual Ship equipment Fee will be charged Rs. 500 for GT < 300
Annual Ship equipment Fee will be charged Rs. 10,000 for GT > 300

GT: Gross Tonnage use to express unit less volume of ship

Aeronautical/ Maritime / Radio Navigation Services

Aeronautical services are used to provide services for aircraft communication. It is further subdivided into

"Aeronautical mobile service: A mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate; emergency position-indicating radio beacon stations may also participate in this service on designated distress and emergency frequencies".

"Maritime services are used to provide ship to ship & ship to Coastal station communication."

For spectrum fee of Aeronautical and Maritime Services we divide it in two categories.

- **Aircraft/ Ship equipment**
- **Ground/ Shore to Air/ Ship communication.**

The proposed formula for ground to air communication and Shore to ship communication is same as define for VHF wireless services in previous sections and rates are given in **Table-1 Annex D**

Proposed Fee for aircraft equipment (Terminal) is constant which 15000 Rs per terminal per year and for ship equipment.

Based on Gross Tonnage (GT), ships are proposed to be divided into two categories. A very low annual charge is proposed for small ships used by the fishermen. While for large volume ships, a high charge has been proposed.

Ship Fee:	500 Rs	for GT<300	*GT: Gross Tonnage use to express unit less volume of ship*
	10,000 Rs	for GT>300	

Annex D

Table: 1 New Proposed samples Rates for Ground to Air communication.

Proposed Charges for Aeronautics (108-137 & 230-380 MHz) and Maritime (156-162.025 & 162.025-174 MHz) for BW 12.5, 25 KHz							
Sr. No	**Category**	**Power Brackets (W)**	**W_F**	**P_F**	**Channel eff Factor**	**Total Links/ Terminals**	**Proposed Annual Fee Charges**
1	Base Station For 12.5Khz	10-25.	3000	3	1	1	PKR 17,155
2		25-50.	3000	4	1	1	PKR 20,155
3	Base Station For 25Khz *	10-25.	3000	3	1	1	PKR 34,310
4		25-50.	3000	4	1	1	PKR 40,310
5		25-50.	3000	4	1	5	PKR 136,310
6		25-50.	3000	4	1	10	PKR 256,310

Annual Aircraft equipment Fee will be charged 15,000 Rs/ Per Terminal

Annual Ship equipment Fee will be charged 500 Rs/ for GT < 300
Annual Ship equipment Fee will be charged 10,000 Rs/ for GT > 300

***** *For CEF>1 in the formula CEF shall remains "1" but AF shall be multiplied with the actual CEF factor (for 25 KHz, CEF=1 in formula but at the end AF will multiplied by 2 as of actual CEF).*

Chapter # 6

Earth station and TV/ MMDS Satellite Communication services

For various reasons, it is vital for the regulator to maintain record of all types of earth stations. This is a common practice all over the world. For better management of this record, the earth stations are proposed to be divided into three (3) worldwide recognized categories. These categories along with the proposed annual registration fee are given below.

Satellite service TV Services

"Satellite television is television programming delivered by the means of communications satellite and received by an outdoor antenna, usually a parabolic mirror generally referred to as a satellite dish, and as far as household usage is concerned, a satellite receiver either in the form of an external set-top box or a satellite tuner module built into a TV set. Satellite TV tuners are also available as a card or a USB stick to be attached to a personal computer. In many areas of the world satellite television provides a wide range of channels and services, often to areas that are not serviced by terrestrial or cable providers".

For Satellite TV Broadcasting communication services (Down Link Head End, Free to Air Services and Subscription Based Services) the new suggested rates are given in **Table-1 Annex E.**

Power Factors define in **Table-2 Annex E.**

NOTE: Satellite TV communication Bandwidth Has Not Been Addressed

Proposed formula for TV (Terrestrial and MMDS) is given as

$$AF = W_F * (P_F * TL/T + CEF)$$

Where:

W_F for Analog, Terrestrial and MMDS TV = 60

W_F for Digital, Terrestrial and MMDS TV = 80

New, previously proposed and Existing Rates for TV broadcasting services (Terrestrial, MMDS TV) are given in **Table-3-4 Annex E.**

Fixed-Satellite service (FSS):

"***A radio communication service between earth stations at given positions, when one or more satellites are used; the given position may be a specified fixed point or any fixed point within specified areas; in some cases this service includes satellite to-satellite links, which may also be operated in the inter-satellite service***";

The proposed annual registration fee is Rs.5, 000/- per earth station using frequencies other than C/Extended-C bands.

For permanent earth stations using C/ Extended-C bands, annual registration of Rs. 10,000/- is proposed because of interference management with other terrestrial services.

Mobile Satellite service (MSS):

"A radio communication service between mobile earth stations and one or more space stations, or between space station used by this service".

The service may also include feeder links for its operation.

Present license for 'Inmarsat Terminal' falls under this category because it is also semi-fixed/portable terminal and its weight & size allows portability. It is charged @ 25000/- per terminal. No changes are proposed for this category.

'Earth station networks' also known as **VSAT networks** generally consist of a hub terminal through which a number of smaller terminals (the VSATs) communicate. It is also possible to implement mesh networks in which the VSAT terminals communicate with each other without the support of a hub terminal. In Pakistan, VSAT communication is allowed to existing LDI/ LL licensees. Keeping in view the significance of this type of communication, new charges are being proposed. It is a flat charging structure. Initially an operator having small number of terminals is charged more with gradual decrease in charges as the network grows. But still an undue pressure on the operators has been avoided. The proposed rates are given in **Table-5 Annex E.**

Annex E

Table 1: New Proposed samples Rates for Satellite TV Services

Rates for Satellite TV Broadcasting
New Proposed Rates for Free To air satellite TV communication is 1300$/year/ Channel
New Proposed Rates for Subscribed satellite TV communication(DTH) is 10 Rs/year/ Channel/ Subscriber
New Proposed Rates for satellite TV communication Down Link Head end is 1300$/year/ Channel

Table 2: Power Factor for Terrestrial and MMDS TV Broadcasting

Power (W)	P_F
0 < P < = 10 KW	1
10 < P < = 20 KW	2
20 < P < = 30 KW	3
P> 30KW	4

Table 4: New Proposed sample Rates for Analog, Terrestrial and MMDS TV Broadcasting.

New Proposed Rates for Terrestrial TV Broadcasting services per booster per channel; channel =7Mhz						
Sr. No	Power (W)	W_F	P_F	Channel eff Factor	Total Links Tx+Rx/ Terminals	New Proposed Annual Fee Charges
1	0 < P < = 10 KW	60	1	560	1	PKR 33,600
2	10 < P < = 20 KW	60	2	560	1	PKR 67,200
3	20 < P < = 30 KW	60	3	560	1	PKR 100,800

New Proposed Rates for Digital, Terrestrial and MMDS TV Broadcasting services per booster per channel; Channel = 4.5 MHz						
Sr. No	**Power (W)**	**W_F**	**P_F**	**Channel eff Factor**	**Total Links Tx+Rx/ Terminals**	**New Proposed Annual Fee Charges**
1	0 < P < = 10 KW	80	1	360	1	PKR 28,800
2	10 < P < = 20 KW	80	2	360	1	PKR 57,600
3	20 < P < = 30 KW	80	3	360	1	PKR 86,400

Table: 5 New Proposed sample Rates for Earth Stations

Earth Station (Mobile, Permanent other Than C/ Extended C-Bands, Permanent C/ Extended C- Bands), VSAT			
Sr. No	**Category**	**Proposed Rates**	
1	Mobile Satellite Earth Stations	PKR 25,000	
2	Permanent Earth Stations other than C/ Extended C- Bands	PKR 5,000	
3	Permanent Earth Stations C/ Extended C-Bands	PKR 10,000	
4	VSAT Network	Hub Terminal	PKR 25,000
		1-5 Terminals	PKR 9,000
		6-10 Terminals	PKR 7,000
		Terminal > 15	PKR 5,000

Chapter # 7

Application Processing Fee:

Present application processing fee is license category dependant which should not be the case as the application processing fee is charged one time.

New Proposed Application Fee

Application Processing Fee		
Sr. No	**Category**	**Proposed Application Fee**
1	Amateur	PKR 3,000 for 10 Years; annual charge = 3000/10= Rs 300
2	Site Registration	PKR 3,000
3	Broadcasting(BC)	
4	Aeronautical	
5	Ship > 300GT	
6	Wireless(HF,VHF,UHF)	
7	Fixed Microwave Link	
8	Inmarsat	
9	Satellite Earth Station	
10	Ship > 300GT	PKR 500