SHARED USE OF HILLTOP RADIOCOMMUNICATIONS SITES
Guidelines and Principles for Cost Sharing among Co-site Users

Purpose of the Guideline

Under Section 36AA of the Telecommunications Ordinance (the "Ordinance"), the Telecommunications Authority (the "TA") is empowered to direct a licensee to coordinate and cooperate with another licensee in the public interest to share the use of any facility owned or used by him. In addition, under section 36AA(6) of the Ordinance, the TA may determine the terms and conditions for the shared use of the facility and the determination shall include terms and conditions providing for fair and reasonable compensation payable in all the circumstances of the case for the shared use of the facility.

2. This set of guidelines and principles (the "Guideline"), which is issued pursuant to section 6D of the Ordinance, provides guidance on the principles relied upon by the TA in making a determination under section 36AA(6) of the Ordinance in respect of the calculation of fees payable by an eligible co-site user for his shared use of a hilltop site and associated facilities ("Hilltop Site and Facilities").

3. The Guideline is not intended to be definitive and exhaustive. In exercise of his powers under section 36AA of the Ordinance, the TA is entitled to take into account all circumstances of the case as appropriate and determine the terms and conditions of the share use of facilities concerned and / or make a direction if the case so warrants. The TA is not bound by the specific terms of the Guideline in every eventuality, but any material departure from the Guideline will be accompanied by the underlying rationale in writing[1] by the TA.

4. The Guideline is confined to certain Hilltop Sites which may be required by the TA for sharing between the existing off-air television broadcasters, the newly licensed mobile television service operator and the operators of the future digital audio broadcasting services. A list of sites where the Guideline is applicable is given in ***Annex 1***.

[1] Section 6A(3)(b)(ii) of the Ordinance.

5. The Guideline will be reviewed and updated from time to time in consultation with the industry, as circumstances so require.

General Cost Sharing Principles

6. The following principles on sharing of Hilltop Sites and Facilities are applicable:

(a) Co-site users are required to share all costs relevant to the establishment, operation and maintenance of the Hilltop Site and Facilities. Relevant costs include capital cost and operating cost. The owner(s) of the site building and / or facilities (the "Owner")[2] should ensure efficient set up, operation and maintenance of the Hilltop Site and Facilities in order to minimise cost.

(b) Capital cost normally includes the cost of superstructure construction, the cost of associated building facilities such as lighting and air-conditioning, the cost of common telecommunications facilities such as antenna towers and backup electricity generators. These facilities usually involve substantial amount of investment from the Owner. Co-site users may either share the capital cost on an upfront lump sum basis or contribute, during the term of their tenancy, periodically to the Owner a portion of the capital cost, including a cost of capital for the assets used, over the expected useful lives of the assets.

(c) Operating cost normally includes the operation and maintenance cost of building facilities and common telecommunications facilities, and the tenancy fee for the Hilltop Site. Co-site users will share the operating cost as and when incurred.

(d) The rental payable by a co-site user should be subject to periodical review so as to reflect any change in sharing conditions during the

[2] The Owner concerned needs a Short Term Tenancy Agreement granted by the Lands Department in respect of the use of Government lands for the establishment and installation of telecommunications facilities on the hilltop site.

lifetime of the Hilltop Site and Facilities.

Cost Apportioning Methodology

Capital Cost

7. Co-site users should strive to make commercial arrangement with the Owner on the share of accommodation areas and other facilities at the Hilltop Site. Where the co-site users choose to contribute to the capital cost on a periodical basis, the capital cost, including the cost of capital for the assets used, will be annualised by using the concept of an annuity. An annuity is the equal annual payment received from an investment. It represents partial repayment of the capital invested and a return on the investment. The annual payment continues until the end of the investment term. The simple annuity formula for an asset item is set out as follows:

$$R = V * \frac{r(1+r)^N}{(1+r)^N - 1}$$

where R = annualized capital cost,
V = asset cost,
r = rate of return, and
N = asset life

After the expiry of the asset life, the annualized capital cost will become zero.

Asset Cost (V)

8. Asset cost (also known as capital cost) refers to the expenditure on the constructions / acquisitions of or improvements to an asset which has an expected asset life of more than one year. The cost standard will be based on historical cost which reflects the actual cost incurred by the Owner. It is more objective than other cost standards (such as current cost[3]) and it does

[3] Although current cost tends to give the proper pricing signals to the co-site users on whether to build their own Hilltop Site and Facilities or to buy the existing services from the Owner, the "build or buy"

not depend on assumptions made on a forward-looking basis. The Owner shall present audit certificate to certify the actual amount spent on the asset.

The Rate of Return (r)

9. The rate of return (also known as cost of capital) refers to the level of return on investment that compensates the risk involved in such investment. The Owner should be entitled to a fair return to compensate the risk of investment in Hilltop Site and Facilities. Given that the Owner is effectively letting the building space and facilities to the other co-site users, the average return to owners of private flatted factories in Hong Kong provides a good proxy on the level of fair return to the Owner. According to the statistics provided by the Rating and Valuation Department, the average rate of return on flatted factories was about 6% p.a. between 2007 and 2009[4]. The same rate of return shall also apply to all assets items.

Asset Life (N)

10. Asset life refers to the period over which an asset is expected to be available for use. It may be different among the different categories of assets and should be mutually agreed by the Owner and co-site users. For the purpose of rental calculation, the following figures on assets lives of the different categories of assets should be used:

Assets	**Assets Lives**
1. Buildings and fixed infrastructure, including antenna tower	50 years
2. Passive equipment (e.g. antenna combiner)	15 years
3. Active electronic equipment (e.g. transmitter, multiplexer)	10 years
4. Electrical equipment (e.g. backup	10 years

decision is not applicable for the purpose of this Guideline. This is because as a matter of government policy, co-site users are encouraged to share the use of existing Hilltop Sites to ensure optimal use of such scarce resources.

[4] See Table 49 of the 2010 Hong Kong Property Review issued by Rating and Valuation Department. (http://www.rvd.gov.hk/en/doc/hkpr10/PR2010_full.pdf)

electricity generator)	
5. Antennae	8 years

The Owner shall present audit certificate to certify the remaining useful lives of the assets used.

Annualised Capital Cost (R)

11. Annualised capital cost refers to the average annual costs which are converted from the capital cost of an asset based on its asset life and a rate of return based on the formula discussed in paragraph 7 above.

12. Some examples of major capital items involving the use of Hilltop Site and Facilities are given below:

(a) Building;
e.g. Equipment Hall, Generator Room, common areas in the building, common lighting facilities, common air-conditioning facilities.
(b) Antenna Tower;
(c) Equipment.
e.g. Backup electricity generator, antenna, transmitter, multiplexer, combiner

13. For certain assets, the capacity reserved for or occupied by a particular co-site user can be clearly identified. These include floor area in the Equipment Hall occupied by a particular co-site user, reservation on capacity of the backup electricity generator by a co-site user and use of the antenna mounted on a common antenna tower. In general, the rental payable by a co-site user for such cost items should be calculated based on the capacity reserved / occupied by that co-site user.

14. On the other hand, some costs are fixed irrespective of the number of co-site users. These include common areas in the building staircase and doorways. In general, the rental covering the capital cost to be shared by a particular co-site user should be apportioned using the percentage of rental area in the Equipment Hall occupied by that co-site user.

Operating Cost

15. Operating cost refers to the cost associated with the operation of the Hilltop Sites and Facilities, including maintenance cost of building and common facilities and the tenancy fee for lease of Government land but does not include assets depreciation and cost of financing. It can be broadly divided into the following two categories:

(i) Category A - Cost that can be directly or unambiguously allocated to a co-site user. For example, electricity cost in the Equipment Hall can be directly shared by co-site users based on actual consumption as recorded by individual electricity meters. Co-site users should be held responsible for defraying their own cost; and

(ii) Category B - Cost that cannot be directly allocated to a co-site user. For example, tenancy fee for Government land lease, watchman's salary and gardening work. Co-site users should share such cost based on the total area occupied in the Equipment Hall taking into account the expected occupancy factor (see paragraph 16 below).

Expected Occupancy

16. In general, certain assets may not be utilised at full capacity during their assets lives. For instance, the Equipment Hall may not be fully occupied for the whole period as co-site users may move into and out of the Equipment Hall during the asset life of the building (some 50 years). In principle, co-site users should only share the capital cost of an asset concerned (say, the Equipment Hall) based on the actual occupation or consumption. In order to balance the risk where the Owner may have to absorb the cost of any unoccupied capacity of an asset throughout its asset life, an Expected Occupancy Factor (F%) is introduced such that the Owner will be allowed for full cost recovery at F% utilisation of the asset concerned. Accordingly, the total areas used for determining the unit rental of Equipment Hall should be multiplied by F%. With such an arrangement, a co-site user will settle his rent for his equity share of the asset under concern irrespective of the sharing arrangement of that asset by other co-site users. On the other hand, Owners' capital expenses will be recouped in the long

term.

17. The Expected Occupancy Factor (i.e. F%), which may be different for different asset item, is to be mutually agreed by the Owner and other co-site users. The following figures on F% should be used for the rental calculation;

Assets Items	**Expected Occupancy F%**
1. Equipment Hall, Common Areas, Government Rent, Common Lighting Facilities and Air-Conditioning (Note)	80%[5]
2. Generator Room	80%[6]
3. Equipment	50%[8]
4. Antenna (including the antenna tower)	85%[7]

Note: The operating cost (Category B) will be apportioned to individual co-site users based on the ratio of their occupation in the Equipment Hall (i.e. rental area / useful floor area multiplied by F%)

18. ***Annexes 2 to 5*** give some examples on the calculation of rental for building, antenna, lighting and air-conditioning facilities and operating cost. These examples are used for illustration purpose only and they may need fine-tuning to better reflect the actual situation at a particular Hilltop Site.

Review on the Rental

[5] Adequate space, say 20% (or an expected occupancy factor of 80%), should be reserved to cater for short to medium term requirement since there should not be frequent building development on hilltop sites which would give rise to concerns from an environmental protection perspective. The same expected occupancy factor may be applied to other building facilities.

[6] The capacity of a backup electricity generator is usually determined by its design rather than user's free choice. It is not uncommon to assume a reserved power margin of some, say 20% (or an expected occupancy factor of 80%), which will also cater for possible future requirements whereas a margin of 50% (or an expected occupancy factor of 50%) for other equipment may be more appropriate.

[7] For a common antenna system, it is reasonable to expect a high capacity utilisation of, say 60 - 70%, initially and to attain full capacity (i.e. 100%) eventually. For the purpose of rental calculation, the expected occupancy factor for common antenna system may therefore be set at 85%.

19. All co-site users and the Owner should review the respective rental elements (including annualized capital cost, asset cost, rate of return and asset life) triennially using the formula as set out in the Guideline so as to cater for any change in sharing conditions. A review may also be conducted in case of any significant changes to the rental elements. Sample spread sheets for the calculation of building and equipment rental are given in ***Annex 6***.

Scope of the Guideline

20. For the avoidance of doubt, the Guideline is not applicable to the rental of buildings and facilities owned by the Government since such matters fall under the purview of the Government Property Agency following the established procedure and arrangement.

Office of the Telecommunications Authority
7 March 2011

Annex 1

List of Applicable Hilltop Sites

No	Hilltop Site [8]
1	Beacon Hill
2	Brick Hill
3	Castle Peak
4	Chiu Keng Wan Shan
5	Cloudy Hill
6	Golden Hill
7	Hill 141 (Tai Lam Chung)
8	Hill 275 (Lantau)
9	Hill 297 (Yuen Long)
10	Hill 374 (Yuen Long)[9]
11	Kowloon Peak
12	Lamma Island
13	Mount Nicholson
14	Piper's Hill
15	Pottinger Peak
16	Robin's Nest
17	Sai Wan Shan (Chai Wan)
18	Shek Kong
19	Sheung Yeung Shan
20	Stanley
21	Tai O (Lantau)
22	Tai Po Tsai
23	Temple Hill
24	Ying Pun

[8] There may be more than one building at the respective hilltop sites.
[9] New building structure to be established.

Annex 2

Example on the Calculation of Building Rental

A building at a Hilltop Site is usually divided into a number of functional units including, but not necessary limited to:

(a) Equipment Hall where the telecommunications and radiocommunications equipment are housed;
(b) Generator Room for accommodating backup power supply system e.g. a diesel electricity generator or batteries / inverter for uninterrupted operation of the essential equipment; and
(c) Common Areas such as staircase and doorways.

The annualized capital cost for the building will be apportioned to the respective functional units based on the total floor area occupied by the respective functional units, i.e. R(Equipment Hall), R(Generator Room) and R(Common Areas).

(A) Equipment Hall

♦ Unit Rent for the Equipment Hall should be calculated for full cost recovery at F_E% occupancy.

$$\text{Unit Rent (Equipment Hall)} = \frac{\text{R(Equipment Hall)}}{\text{Usable Floor Area in Equipment Hall} * F_E\%}$$

♦ Usable Floor Area in Equipment Hall includes any area derived from the Equipment Hall for equipment accommodation, e.g. wall-mounting of facilities, and building extensions wherever applicable

♦ Areas used for rental calculation of a particular co-site user (i.e. Rental Area) should include (a) actual floor area occupied by the equipment and (b) an equity share of floor area for work access. Rental to be paid by a co-site user for his use of the Equipment Hall will be calculated as follows:

Rental (Equipment Hall) = Unit Rent (Equipment Hall) * Rental Area

(B) Generator Room

- Rental of the Generator Room should be apportioned to all co-site users of the generator capacity for electricity power backup. A co-site user will not need to share the rental for Generator Room if he does not request for or make reservation on backup power capacity.

- Unit Rent for the Generator Room should be calculated for full cost recovery at F_B% loading.

$$\text{Unit Rent (Generator)} = \frac{\text{R(Generator Room)}}{\text{Rated Power of the Generator} * F_B\%}$$

- The share of rental on Generator Room payable by an eligible co-site user would be calculated based on the power capacity that he requested (Requested Capacity) as follows:

Rental (Generator Room) = Unit Rent (Generator) * Requested Capacity

(C) Common Areas

- Rental of the Common Areas should be apportioned to all co-site users based on their share of the Equipment Hall as follows:

$$\text{Rental (Common Areas)} = \frac{\text{R(Common Areas)*Rental Area}}{\text{Usable Floor Area in Equipment Hall} * F_E\%}$$

(D) Building Rental

Building Rental = Rental (Equipment Hall) + Rental (Common Areas) + Rental (Generator Room)

Annex 3

Example on Calculation of Antenna Rental

- As an antenna is mounted on the antenna tower, the capital cost for the antenna tower should also be apportioned to the respective antenna based on the physical weight of the antenna (Antenna Weight, weighting factor 50%) and winding loading of the antenna (Antenna Wind Loading, weighting factor 50%) . The Rental for Antenna should be calculated for full cost recovery at F_A% loading as follow:

$$\text{Rental (Antenna)} = \frac{\text{R (Antenna)}}{F_A\%} + \frac{\text{R (Antenna Tower)}}{F_A\%} * \left\{ \frac{0.5*\text{Antenna Weight}}{\text{Sum of Antenna Weight}} + \frac{0.5*\text{Antenna Wind Loading}}{\text{Sum of Antenna Wind Loading}} \right\}$$

- A co-site user should pay 100% rental for the antenna for sole use.

- If an antenna is designed to be shared with other co-site users, a co-site user of the antenna would share the antenna rental based on the occupied capacity of the antenna (Occupied Capacity) as follows:

$$\text{Rental (Shared Antenna)} = \text{Rental (Antenna)} * \frac{\text{Occupied Capacity}}{\text{Designed Capacity}}$$

Annex 4

Example on the Calculation of Rental for Lighting and Air-conditioning Facilities

(A) Common Lighting Facilities

♦ The share of capital cost of common lighting facilities to be borne by a co-site user will be calculated based on the Rental Area occupied in Equipment Hall by that co-site user:

$$\text{Rental (Lighting Facilities)} = R\,(\text{Lighting Facilities}) * \frac{\text{Rental Area}}{\text{Usable Floor Area in Equipment Hall} * F_E\%}$$

(B) Air-Conditioning Facilities

♦ The share of capital cost on the air-conditioning facilities inside Equipment Hall of the Hilltop Site will be calculated based on the power consumption in Equipment Hall by that co-site user.

$$\text{Rental (Air Conditioning)} = R\,(\text{Air Conditioning, Equipment Hall}) * \frac{\text{Actual Power Consumption}}{\text{Sum of Actual Power Consumption by All Co-site Users} * F_E\%}$$

Annex 5

Example on the Calculation of Rental for Operating Cost

(A) Category A

- A co-site user should share Category A operating cost based on the actual use. For instance, the air conditioning system is used to provide an optimal working environment for equipment. The operating cost on air conditioning should therefore be apportioned to the respective co-site users based on the actual power consumption (by electricity meter) of that co-site user as follows:

$$\text{Fee (Air Conditioning)} = \text{Operating Expense (Air Conditioning)} * \frac{\text{Actual Power Consumption}}{\text{Sum of Actual Power Consumption by All Co-site Users}}$$

(B) Category B

- A co-site user should share Category B operating cost based on the total area occupied by that co-site user in the Equipment Hall. For instance, the share by a co-site user on annual Government rent for land lease under a short term tenancy for the Hilltop Site and Facilities should be apportioned as follows:

$$\text{Fee (Government Rent)} = \text{Government Rent} * \frac{\text{Rental Area}}{\text{Usable Floor Space in Equipment Hall} * F_E\%}$$

Annex 6

Part 1
Spread Sheet for Building Rental Calculation
(For Illustration Only)

Assumptions:

(1) Firm A is both the owner and co-site user of a particular Hilltop Site and Facilities at the beginning of year 1. Firms B, C and D become co-site users at the start of year 4, year 5 and year 6 respectively.

(2) Firm A constructs the building for HK$20 million. The building has a usable floor area of 2,000 sq. ft. and about 70%, 20% and 10% of which is apportioned to Equipment Hall, Generator Room and Common Areas respectively. Firm A estimates that the building will have a 50-year useful life.

   (a) Equipment Hall: Firms A, B, C and D will occupy 30%, 25%, 20% and 15% of the area respectively. F_E% is agreed at 80%.

   (b) Generator Room: Only Firms A, B, and C will require backup power capacity of 35%, 30%, and 25% respectively. F_B% is agreed at 70%.

   (c) Common Areas: Firms A, B, C and D to share the cost based on the same proportion adopted for the Equipment Hall.

(3) Firm A's required rate of return for investment in the Hilltop Site and Facilities is 6% p.a.

Annuity – Building Cost

Formula

$$R = V * \frac{r(1+r)^N}{(1+r)^N - 1}$$

V	20,000,000	cost of building
r	6%	required rate of return
N	50	asset life
F	2,000	usable floor area
E	70%	% of area apportioned to Equipment Hall
G	20%	% of area apportioned to Generator Room
C	10%	% of area apportioned to Common Areas
F_E	80%	% of average occupancy of Equipment Hall
F_B	80%	% of average loading of Generator

Annualised Building Cost and Unit Rentals

Period (t)	Annualised Building Cost HK$ R	Unit Rent (Equipment Hall) HK$ $X = R/(F*F_E)*E$	Unit Rent (Generator Room) HK$ $Y = R/(F*F_B)*G$	Unit Rent (Common Areas) HK$ $Z = R/(F*F_E)*C$
1	1,268,886	555	159	79
2	1,268,886	555	159	79
3	1,268,886	555	159	79
4	1,268,886	555	159	79
5	1,268,886	555	159	79
6	1,268,886	555	159	79
7	1,268,886	555	159	79
8	1,268,886	555	159	79
9	1,268,886	555	159	79
10	1,268,886	555	159	79
11	1,268,886	555	159	79
12	1,268,886	555	159	79
13	1,268,886	555	159	79
14	1,268,886	555	159	79
15	1,268,886	555	159	79
16	1,268,886	555	159	79
17	1,268,886	555	159	79
18	1,268,886	555	159	79
19	1,268,886	555	159	79
20	1,268,886	555	159	79
21	1,268,886	555	159	79
22	1,268,886	555	159	79
23	1,268,886	555	159	79
24	1,268,886	555	159	79
25	1,268,886	555	159	79
26	1,268,886	555	159	79
27	1,268,886	555	159	79
28	1,268,886	555	159	79
29	1,268,886	555	159	79
30	1,268,886	555	159	79
31	1,268,886	555	159	79

Period (t)	**Annualised Building Cost** HK$ R	**Unit Rent (Equipment Hall)** HK$ $X = R/(F*F_E)*E$	**Unit Rent (Generator Room)** HK$ $Y = R/(F*F_B)*G$	**Unit Rent (Common Areas)** HK$ $Z = R/(F*F_E)*C$
32	1,268,886	555	159	79
33	1,268,886	555	159	79
34	1,268,886	555	159	79
35	1,268,886	555	159	79
36	1,268,886	555	159	79
37	1,268,886	555	159	79
38	1,268,886	555	159	79
39	1,268,886	555	159	79
40	1,268,886	555	159	79
41	1,268,886	555	159	79
42	1,268,886	555	159	79
43	1,268,886	555	159	79
44	1,268,886	555	159	79
45	1,268,886	555	159	79
46	1,268,886	555	159	79
47	1,268,886	555	159	79
48	1,268,886	555	159	79
49	1,268,886	555	159	79
50	1,268,886	555	159	79

Building Cost Shared by Firm A – Year 1 to Year 10

Period (t)	Equipment Hall HK$ X*F*30%	Generator Room HK$ Y*F*35%	Common Areas HK$ Z*F*30%	Total HK$
1	333,083	111,028	47,583	491,693
2	333,083	111,028	47,583	491,693
3	333,083	111,028	47,583	491,693
4	333,083	111,028	47,583	491,693
5	333,083	111,028	47,583	491,693
6	333,083	111,028	47,583	491,693
7	333,083	111,028	47,583	491,693
8	333,083	111,028	47,583	491,693
9	333,083	111,028	47,583	491,693
10	333,083	111,028	47,583	491,693

Building Cost Shared by Firm B – Year 1 to Year 10

Period (t)	Equipment Hall HK$ X*F*25%	Generator Room HK$ Y*F*30%	Common Areas HK$ Z*F*25%	Total HK$
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	277,569	95,166	39,653	412,388
5	277,569	95,166	39,653	412,388
6	277,569	95,166	39,653	412,388
7	277,569	95,166	39,653	412,388
8	277,569	95,166	39,653	412,388
9	277,569	95,166	39,653	412,388
10	277,569	95,166	39,653	412,388

Building Cost Shared by Firm C-Year 1 to Year 10

Period (t)	Equipment Hall HK$ X*F*20%	Generator Room HK$ Y*F*25%	Common Areas HK$ Z*F*20%	Total HK$
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-
5	222,055	79,305	31,722	333,083
6	222,055	79,305	31,722	333,083
7	222,055	79,305	31,722	333,083
8	222,055	79,305	31,722	333,083
9	222,055	79,305	31,722	333,083
10	222,055	79,305	31,722	333,083

Building Cost Shared by Firm D – Year 1 to Year 10

Period (t)	Equipment Hall HK$ X*F*15%	Generator Room HK$ Y*F*0%	Common Areas HK$ Z*F*15%	Total HK$
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
6	166,541	-	23,792	190,333
7	166,541	-	23,792	190,333
8	166,541	-	23,792	190,333
9	166,541	-	23,792	190,333
10	166,541	-	23,792	190,333

Part 2
Spread Sheet for Antenna Rental Calculation
(For Illustration Only)

Assumptions:

(1) Firm A constructs an antenna tower for HK$2 million on which nine microwave antennae and nine panel antennae will be mounted. Each microwave antenna and panel antenna costs HK$111,000 and HK$37,000 respectively. Firm A estimates that the antenna tower and the antennae will have a useful life of 50 years and 8 years respectively and each antenna will be replaced at the end of its operational life. Each antenna will carry 5 radio channels (i.e. the designed capacity). Firms A, B, C and D will occupy 1.5, 1.5, 1 and 1 channel respectively. F_A% is agreed at 85%.

(2) Firm A's required rate of return for investment in the Hilltop Site and Facilities is 6% p.a.

(3) The cost of microwave antenna and panel antenna remain unchanged after the expiry of their assets lives.

Annuity – Antenna Cost

Formula

$$R = V * \frac{r(1+r)^N}{(1+r)^N - 1}$$

V_T	2,000,000	cost of antenna tower
r	6%	required rate of return
Nt	50	asset life of antenna tower
Na	8	asset life of antenna
Q_A	9	number of Group A antenna
Q_B	9	number of Group B antenna
w_a	260	weight of each microwave antenna in Group A (kg)
w_b	70	weight of each panel antenna in Group B (kg)
wl_a	18,000	wind loading of each microwave antenna in Group A (N)
wl_b	3,200	wind loading of each panel antenna in Group B (N)
W	2,970	sum of antenna weight (kg)
WL	190,800	sum of antenna wind loading (N)
V_A	111,000	cost of each microwave antenna in Group A
V_B	37,000	cost of each panel antenna in Group B
C	5	designed capacity of the each antenna (channel)
F_A	85%	% of average occupancy of Antenna Tower / Antenna

Annualised Antenna Cost and Rentals – Year 1 to Year 10

		Apportioned Antenna Tower Cost (50% of weight, 50% of wind loading)		Annualised Antenna Cost		Antenna Rental	
Period (t)	**Annualised Antenna Tower Cost** HK$ $R_{(Antenna\ Tower)}$	**Group A** HK$	**Group B** HK$	**Group A** HK$ $R_{(Antenna\_GpA)}$	**Group B** HK$ $R_{(Antenna\_GpB)}$	**Group A** HK$ Rental(Ant_A)	**Group B** HK$ Rental(Ant_B)
1	126,889	103,854	23,034	160,875	53,625	311,446	90,187
2	126,889	103,854	23,034	160,875	53,625	311,446	90,187
3	126,889	103,854	23,034	160,875	53,625	311,446	90,187
4	126,889	103,854	23,034	160,875	53,625	311,446	90,187
5	126,889	103,854	23,034	160,875	53,625	311,446	90,187
6	126,889	103,854	23,034	160,875	53,625	311,446	90,187
7	126,889	103,854	23,034	160,875	53,625	311,446	90,187
8	126,889	103,854	23,034	160,875	53,625	311,446	90,187
9	126,889	103,854	23,034	160,875	53,625	311,446	90,187
10	126,889	103,854	23,034	160,875	53,625	311,446	90,187

Antenna Cost Shared by Firm A – Year 1 to Year 10

Subtotal of Rental on Share Antenna

Period (t)	**Group A** HK$ Rental(Ant_A)*1.5/C	**Group B** HK$ Rental(Ant_B)*1.5/C	**Total** HK$
1	93,434	27,056	120,490
2	93,434	27,056	120,490
3	93,434	27,056	120,490
4	93,434	27,056	120,490
5	93,434	27,056	120,490
6	93,434	27,056	120,490
7	93,434	27,056	120,490
8	93,434	27,056	120,490
9	93,434	27,056	120,490
10	93,434	27,056	120,490

Antenna Cost Shared by Firm B – Year 1 to Year 10

Sub total of Rental on Share Antenna

Period (t)	**Group A** HK$ Rental(Ant_A)*1.5/C	**Group B** HK$ Rental(Ant_B)*1.5/C	**Total** HK$
1	-	-	-
2	-	-	-
3	-	-	-
4	93,434	27,056	120,490
5	93,434	27,056	120,490
6	93,434	27,056	120,490
7	93,434	27,056	120,490
8	93,434	27,056	120,490
9	93,434	27,056	120,490
10	93,434	27,056	120,490

Antenna Cost Shared by Firm C – Year 1 to Year 10

Sub total of Rental on Share Antenna

Period (t)	Group A HK$ Rental(Ant_A)*1/C	Group B HK$ Rental(Ant_B)*1/C	Total HK$
1	-	-	-
2	-	-	-
3	-	-	-
4	-	-	-
5	62,289	18,037	80,327
6	62,289	18,037	80,327
7	62,289	18,037	80,327
8	62,289	18,037	80,327
9	62,289	18,037	80,327
10	62,289	18,037	80,327

Antenna Cost Shared by Firm D – Year 1 to Year 10

Subtotal of Rental on Share Antenna

Period (t)	Group A HK$ Rental(Ant_A)*1/C	Group B HK$ Rental(Ant_B)*1/C	Total HK$
1	-	-	-
2	-	-	-
3	-	-	-
4	-	-	-
5	-	-	-
6	62,289	18,037	80,327
7	62,289	18,037	80,327
8	62,289	18,037	80,327
9	62,289	18,037	80,327
10	62,289	18,037	80,327

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