



## PLANNING POLICY GUIDANCE 7



### SITING AND DESIGN OF RADIO TELECOMMUNICATIONS EQUIPMENT

June 2011



## DESIGN GUIDANCE

### SITING AND DESIGN OF RADIO TELECOMMUNICATIONS EQUIPMENT

This document is issued as

*PPG 7: Design Guidance on Siting and Design of Telecommunications Equipment.*

#### **Application of the Guidance**

This Planning Policy Guidance is meant for the operators in the radio communication sector to assist them in the location, siting and design of telecommunications equipment and for the local authorities to determine development applications.

Planning policy Guidance is prepared and issued to Local Authorities under Section 13 of the Planning and Development Act 2004.

Service providers should ensure that they have followed the design process and standards. The aim of this guidance is to provide a set of performance criteria which should be broadly followed as each site is different and the design solutions may be varied and unique. Nevertheless, developers should strive to comply as far as possible with the design principles enunciated in this document. It has to be used together with **Planning Policy Guidance 1: Design Guidance –first issued in November 2004, revised in September 2006, regarding the Technical Sheets for provision of Infrastructure.**

**They should also be required to have followed the precautionary approach in their site selection and abided by all the guidelines and requirements under Information and Communication Technologies Act 2001(as amended).**

For additional information, queries may be addressed to:

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**Effective Date  
June 2011.**

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## 1.0 INTRODUCTION

In recent years the demand for a more diverse and comprehensive range of telecommunication services has increased. Associated with this growth in demand is the requirement for telecommunication equipment, such as antennas and towers, to facilitate an effective communication system.

The Government considers that modern telecommunications systems have a key role to play in peoples' lives, bringing significant economic and social benefits. In recent years the rapid growth in the Information and Communication Technology (ICT) sector has made it a major component of the national economy. However there have been concerns as to the siting, appearance and health issues relating to telecommunication installations. It is understood that a precautionary approach will be applied to the deployment of radio telecommunication equipment as far as possible.

### 1.1 APPLICATION

This PPG applies to all masts, structures, and antenna system for telecommunication system in Mauritius under the control of the Information and Communication Technology Authority (ICTA).

### 1.2 OBJECTIVES OF THE PPG

- To ensure that the location and siting of telecommunication facilities are selected in a manner which minimizes the effects on residents, lessens visual impact, respects natural and human heritage features and sensitive land uses to the greatest extent possible;
- To encourage consultation by telecommunication service providers with the local authorities early in the permitting process as practical and feasible;
- To remove disused telecommunication structures when they cease to be operational.
- To promote a consistent approach in the preparation, assessment and determination of applications for planning approval of telecommunication infrastructure;



### 1.3 SCOPE

This document is for the use of the local authorities, members of the public and telecommunication service providers seeking approval for the erection or modification of telecommunications equipment.

A **Glossary of Terms** including additional terminology and language used in the telecommunications sector is provided at **Appendix 1** to assist in the understanding of the PPG.



#### **1.4 STATUS OF THE PLANNING POLICY GUIDANCE**

Planning Policy Guidance is a National Planning Instrument under the Planning and Development Act 2004. Section 13 provides for the preparation of guidance on a wide range of land development. Planning Policy Guidance prevails over other planning instruments except the National Development Strategy. All Local Authorities to whom this guidance is issued should comply with it.

The service providers and operators should nevertheless also comply with all other relevant legislations namely the Information and Communication Technologies Act 2001 (as amended), the Local Government Act 2003 (as amended), the Business Facilitation and (Miscellaneous Provisions) Act 2006, the Town and Country Planning Act 1954, Plaisance Airport (Building Restrictions) Act 1964, Civil Air Navigation Requirements of Mauritius (Section 3 Series A Part 1); and the relevant Outline Planning Schemes.

#### **1.5 LIST OF MAJOR RADIO COMMUNICATION INFRASTRUCTURE OWNERS/OPERATORS**

**Cellplus Communications Ltd**  
**Central Electricity Board**  
**Emtel Ltd**  
**Mauritius Telecom**  
**Mahanagar Telephone (Mauritius) Ltd**  
**Africa Digital Bridges Network**  
**Department of Civil Aviation**  
**National Coast Guard**  
**Mauritius Police Force**  
**Les Relais Ltd**  
**Multicarrier (Mauritius) Ltd**



## 2.0 DESIGN GUIDANCE

### 2.1 SITE LOCATION

Built up areas are often the locations for the highest concentration of telecommunications equipment as this is where demand is highest. The key aims of the guidance are to promote development in suitable locations, minimize any adverse effects and prevent insensitive development.

There are basically three categories of coverage for a particular territory. Base stations which provide the main radio coverage infrastructure are sometimes referred to as **Macrocell**. Within an area covered by a macrocell the main network can be improved where there is a high volume of calls through **microcells** which have a limited range of coverage. **Picocells** are the smallest unit of coverage and are used inside buildings such as airports, shopping centres. A telecommunication network is therefore made up of a number of macrocells within which are found cells of lower magnitude.

Thus the requirement for a base station varies with locations taking into consideration topography, obstacle, population density and should generally be located:

- every 500 metres in dense urban areas such as Port Louis and Plaines Wilhems
- every 1km in suburban and rural areas
- every 3 km for road coverage
- in places with very high number of users and;
- in other remote or environmentally sensitive /historically sensitive locations.

### 2.2 TYPES OF TELECOMMUNICATION EQUIPMENT

The most common types of equipment used depend on the location of the facility as well as on the expected coverage.

- ground-based mast
- roof-based mast
- Dish antennas
- Satellite earth stations
- Wall fixtures
- Monopole antenna



### 2.3 DESIGN TYPES OF TELECOMMUNICATION EQUIPMENT

- Dish antennas ranging 60cm and above on roof tops and antennas supports
- Palm trees or lamp posts designs.
- Slim-line monopole
- Others such as self supporting lattice steel structures

### 2.4 SITE SELECTION

Sites are selected on the basis of expected coverage for that particular location which then determines the type of equipment required. In determining an appropriate site for a new installation, the service provider shall adhere to the following principles:

- Sites should be selected to minimize the total number of telecommunication sites required.
- Locations on existing structures or buildings or co-locations on existing tower sites could be encouraged.
- Opportunities to incorporate an antenna into the design of a new building or structure should be explored by the proponent.
- Distance from community sensitive locations should be maximized to comply with the exclusion area (radius or rectangle: refer to page 48) surrounding antenna and along lines of radiation propagation;
- Avoid sites that would obscure public views, *vistas*, and the scenic landscape areas; and,
- Consider nature of uses on adjacent and nearby properties to ensure compatibility

### 2.5 SETBACK

New telecommunication base stations are to be located as far as possible of any sensitive locations, unless required for reasons of engineering or network objectives. If a new tower/antenna is proposed to be located close to sensitive locations, a detailed rationale for the necessity of the proposed location must be provided to the relevant authority and consultation held with the public through a formal consultation process.

The setback requirements for the installation of standalone lattice steel structure supporting telecommunication equipment or equipment placed on roof tops will be similar to those applicable for building development.





Figure 1: Standalone lattice steel structure

Service providers should ensure that the requirements under the ICTA with respect to compliance with the exclusion area (radius or rectangle) surrounding antenna and along lines of radiation propagation are met. In addition, the following minimum setback distance from boundary limits or whichever is the more stringent must be adhered to:

**Indicative Building Setbacks to boundary limits.**

Height of Building in metres	Height of Building in number of floors	Setback		
		Front in m	Rear in m	Sides in m
7.5	2	3 -20	2	2
15	4	3 -20	3	3
25 metres	8	6-20	5	5
30-40	10- 13	*	*	*

**\*For heights beyond 25 metres, the setback should be increased by 0.5 metre for each additional floor or every 3m.**

For roof top installations where equipment is not visible from eye level, the setback requirement will be determined in accordance with the existing height of the building on which the installation is to be made. However, the service provider must see to it that there is no overlooking on to adjoining premises from the roof top. **The equipment**



should be installed to observe a staggered setback at the roof top level to safeguard the privacy of adjoining properties. Moreover, the setback provision around existing building should not be used for access on to the roof top.



Figure 2: Roof-based mast



Figure 3: Roof-based mast



## 2.6 HEIGHT

Antennas and other transmitting equipment are generally placed on tall structures to avoid signal loss through shadowing, attenuation, diffraction and reflection.

- The height of towers and equipment in urban areas will normally be 25m to 30m high. This is equivalent to an 8 – 10 storey building.
- For suburban and rural areas the tower height shall normally be 30m to 40m. The type and design of support structures should be compatible with the character of the area.

A wide range of buildings and other structures can be used for siting equipment. However, the visual impact of the increased roof line and building form should be carefully assessed. The authorities should also check the structural limitations of existing buildings and wind loading of telecommunications equipment.

## 2.7 ACCESS AND PARKING

Road access to the telecommunication facility shall be the minimum size necessary to allow safe access and egress. One parking space must be provided at each new telecommunication tower site with access from a public road. However, for rooftop sites, occasional parking should be provided for maintenance visits and during set-up of sites. Access to telecommunication fixtures on walls under eaves of buildings or in awkward locations should be provided with safe access for maintenance.

Access tracks in rural or environmentally sensitive areas can become visually prominent in the landscape and may even become a threat to wildlife and habitat especially during construction and maintenance of installations. After construction the vegetation should be reinstated to leave enough space for occasional maintenance vehicles only.

The **Planning Policy Guidance -Design Guidance November 2004 Revised September 2006** should be consulted for additional guidance regarding provision of access and standards.

## 2.8 DESIGN PRINCIPLES AND LANDSCAPING

The use of design features, colour, and landscaping can be used to screen telecommunication facilities from view and should be encouraged, whenever possible.



The following design guidelines should be taken into consideration when designing a new facility:

- (a) The design of the tower or antenna should be sympathetic to the surrounding architectural and built form.
- (b) New telecommunication towers which are located outside settlement boundary shall be designed with co-location capacity to avoid a proliferation of base stations.
- (c) A new telecommunication tower, which is located within a residential area or near any other sensitive uses for reasons of engineering or network objectives, is not required to be designed for future co-location capacity. In this situation, a monopole design or other stealth design technique may be considered.



Figure 4: Stealth design techniques

- (d) Where appropriate, stealth design techniques, including, but not limited to, camouflaging towers within church steeples, clock towers, or flagpoles, should be used in the design of a new telecommunication tower. If stealth design techniques are employed in the design of a new tower, co-location capacity will not be required.
- (e) Efforts should be made to decrease the size and visibility of telecommunication towers so that they blend in with the surroundings to the greatest extent possible. To reduce the scale and visual impact of towers, mitigation measures should



include consideration of design features, structure type, materials, landscaping, screening, and decorative fencing. Where equipment shelters are located on the ground, the visual impact of the built form shall be mitigated through the use of colour, decorative fencing, screening, and/or landscaping.

- (f) Where appropriate, the planting of trees and shrubs at the tower site should be encouraged to enhance the character of the surroundings. Wherever possible, the local topography and vegetation should be used to integrate the installations into the local environment. Masts located on prominent ridges and hilltops or on flat plateaus which break the skyline, are not likely to be considered as desirable. Consideration should be given to locating equipment on lower slopes so that the ridge lines are not disturbed. The existing tree cover should be used to minimize impact and in the absence of an appropriate tree cover, the long term screening should form part of proposals along with maintenance of the facility.
- (g) Telecommunication towers will only accommodate telecommunication antennas. Only signage directly related to the equipment shall be permitted on the site. A small plate must be placed at the base of the structure identifying the owner/operator and contact information. No third party advertising or promotion shall be permitted.
- (h) Telecommunications development must be undertaken in a manner to minimize environmental and visual intrusion. Sensitive siting and design can assist in reducing the visual intrusion and minimize public concerns. Operators are therefore advised to consider the following series of options for small scale equipment and antennas:
- Placing them in areas of shadow on elevations such as under eaves or plinths
  - Avoiding ill-fitting shapes
  - Installation in inconspicuous areas
  - Hiding cables
  - Blending and disguising techniques by replicating a type of tree common in the area, are sited within or next to a group of real trees
  - Incorporate them in public works of art such as the Eiffel tower.



### 3.0 SECURITY AND SAFETY

- (a) The towers/masts are an attraction for lightning discharge and an area on ground is required to ensure proper electrical energy discharge.
- (b) Depending on their locations the towers may affect the safety of aircraft operations. All towers to be located within the obstacle limitation surfaces and helipads/heliports will require a no objection certificate from the Civil Aviation Department. Towers outside this zone that will extend 150ft or 50 metres into the air above ground level will also require clearance from the Director of Civil Aviation.
- (c) Safety zones should be determined based on setback requirements from surrounding property lines as concerns exist in respect to the possibility of towers collapsing. These zones should be defined by acceptable physical barriers such as walls or chain link fencing and appropriate gating. The physical barrier shall be a minimum of 2-3m in height within the site to prevent intrusion from anyone not authorized to access the site. Landscaping to the surroundings will also be encouraged.
- (d) Easily identifiable signage with a size of 60cm-80cm warning the public to 'keep out', along with information as to the network operators and their emergency contact numbers shall be posted at a conspicuous position at the site.
- (e) Where installations are on rooftops, if the building occupants have access to the roof for utility, maintenance or other purposes, then access to the installation should be restricted by an appropriate means. If equipment is kept in a room that houses rooftop antennas, access to such rooms must be strictly controlled by means of locked doors or gate. Warning signs and information pertaining to safety should be posted for the education of site workers and the use of radiation exposure monitors is to be encouraged.

### 4.0 AGREEMENT

The proponent shall be required, if requested by the local authority, to enter into an agreement, which shall include the following requirements:

- (i) The removal of the telecommunication tower if the telecommunication tower is deactivated and left unused (abandoned) for a continuous period of more than 2 years;
- (ii) A commitment to accommodate, as far as practicable, other



telecommunication providers on site or on their telecommunication tower, where feasible, subject to financial compensation arrangements between the land owner and the service providers.

## 5.0 CONSULTATION

- (i) Where necessary pre-application discussions and site inspections should be carried out between the operators and concerned Local Authority, the Information and Communication Technologies Authority (ICTA) and any other relevant body.
- (ii) At the pre-submission consultation stage, operators should provide basic information for proposal sites including site maps, outline plans, photographs and details of the type of installation.
- (iii) In addition to any statutory consultation, proponents are strongly encouraged to undertake any additional publicity that they consider necessary to give people likely to be affected by the proposed development an opportunity to make their views known.
- (iv) The local authority shall be bound to carry formal consultation with the public by requesting the service provider to carry out:
  - Site notification of the proposed development in line with current practice
  - Press notice with publication in three dailies on three successive days; and legal notice to be served on all contiguous neighbours and properties facing development on other side of access/road.  
The public will have 15 days from the date of last publication to make representations to the permit authority.
- (v) In case the applicant has to install an electric motor on site, he must comply with section 40 of the Building Act and publicize his intention in two (2) dailies and served a legal notice through Court Usher upon contiguous neighbours. Moreover, the noise level generated by the electric motor must be within the prescribed noise level as per Standard for Noise under the Environment Protection Act.

## 6.0 PLANNING APPLICATION SUBMISSION.

- A. Installation of very small equipment known as De Minimis within a building or where the effect on the external appearance is not likely to be significant will not require a Building and Land Use Permit. They will



nevertheless require clearance from ICTA regarding compliance to public exposure guidelines.



Figure 5: Example of a De Minimis structure

- B.** Prior to making a full application for a Building and Land Use Permit, the service provider may wish to submit an application for an Outline Planning Permission (OPP) under section 6A of the Town and Country Planning Act 1954 (as amended). An OPP allows a decision on the general principles of how a site can be developed prior to preparing detailed proposals and substantial costs are incurred in project feasibility.
- C.** For site which is found within the agricultural land, a Land Conversion Permit from the Ministry of Agro-industry and Food Security must be sought and this must be attached together with the BLUP application.
- D.** Planning application submission for a Building and Land Use Permit should be supported by additional information so that their full context may be presented and understood. It is desirable that the following information accompany any such application:





- A plan showing the location of the proposal in relation to surrounding development and natural features;
- Structural drawings should be certified by a Registered Professional Civil Engineer;
- A description of how the proposed equipment fits into the wider framework;
- The alternative sites and designs that have been explored, and the reason for rejecting these;
- Details of the design, site dimensions including height, materials and all the components of the proposal;
- Details of any proposed landscaping and tree planting to mitigate landscape and visual impacts and from key viewpoints;
- Information on the method and timing of construction, particularly in sensitive rural areas; and
- How the cumulative effects involving equipment already on the site or nearby were considered;

**E. Declaration of Service provider**

Each application for a Building and Land Use Permit should be accompanied by a signed declaration that the equipment and installation are designed to be in full compliance with the appropriate guidelines for public exposure to radio frequency radiation and certified by The Information and Communication Technologies Authority. Moreover, the service provider must also state the maximum cyclonic wind the proposed structure can withstand.

**F. Extension of Onsite Facility**

Any planned increase in tower height to an existing telecommunication tower, constitutes the necessity for a new Building and Land Use Permit, requiring the proponent to apply for a Building and Land Use Permit from the Local Authorities. Normal maintenance and repair of the structure can be completed without the issuance of a new permit at the discretion of the Local Authorities.



### **G. Right of Appeal**

Right of appeal for refusal/approval of an application for a telecommunication base station is provided under the Town and Country Planning Act 1954.

Any interested party for lease of a site to accommodate a base station may not avail of the right of appeal if it is found that the party had shown an interest in leasing his site to the service provider.

### **7.0 NO OBJECTION CERTIFICATE FROM THE DIRECTOR OF CIVIL AVIATION**

For all structures within the Obstacle Limitation surfaces; outside the obstacle limitation surfaces and 150 feet above ground level and near helipads/heliports, a No Objection Clearance is required from the Director of Civil Aviation. The application for the No Objection Certificate should include the following:

- (a) detailed site plan of the proposed structure;
- (b) location plan of the proposed structure;
- (c) height of structure above ground level;
- (d) height of terrain above mean sea level;
- (e) X-Y distance of the site as shown in **Appendix 5**;
- (f) WGS 84 coordinates of site

### **8.0 EFFECTIVE DATE**

The Planning Policy Guidance on Location, Siting and Design of Telecommunication equipment becomes effective on the date it is issued to Local Authorities.

## Glossary of Terms

### **Act**

Means the Information and Communication Technologies Act 2001 (as amended).

### **Antenna**

An exterior transmitting device used in telecommunications designed for transmitting and receiving radio waves. There are different designs in operation including Omni-directional antennas, sectored antennas and dual/tri-band antennas.

### **Base Station**

A fixed radio communications transmitter/receiver which electronically relays signals and generally taken to include all the component of the development – the antenna, mast or supporting structure, equipment housing, cable runs, fencing, planting, landscaping, access, power supply and land lines.

### **Broadband Services**

Services in which the bandwidth is sufficient to carry large volumes of data.

### **Building and Land Use Permit**

Has the same meaning as in the Local Government Act 2003 (as amended).

### **Business Day**

Means a day that is not a Saturday, Sunday or a public holiday.

### **Cabin**

A structure which protects transmitters and receivers from damage. They can be in the form of large cabins or smaller cabins.

### **Cell**

A geographic area of coverage that a radio base station covers.

### **Character**

Character of an area is defined as the distinctive features such as architectural form, type of development, landscaping traits displayed within the area which distinguishes it from other areas and which contributes to its appearance as a whole.

### **Co-location**

The installation of multiple telecommunication antenna systems on a building or tower structure by two or more Proponents.

### **Community sensitive location**

Examples of community sensitive location as mentioned in the “Technical Standards for Telecommunication Networks” issued by the ICTA include residential areas, childcare centres, schools, aged care centres, hospitals and regional icons.

**Consultation**

Means a process whereby Radio telecommunications licensees or service providers seek to inform other parties about a project at particular premises with the intention of giving those parties an opportunity to respond to the proposal and to have their responses considered. The local authority is also bound statutorily to carry out a formal consultation with the public.

**De Minimis**

This term covers minor works which, in relative terms, may not have a material effect on the external appearance of the building or structure on which they are installed. As a result they may not come within the legal definition of development and hence not require a Building and Land Use Permit.

**Directional Antenna**

Any antenna which picks up or radiates antenna signals better in one direction than another

**Emergency Service Organization**

Includes, but is not limited to:

- (a) Police force or services;
- (b) Fire services (urban and rural); and
- (c) Ambulance services.

**EMF**

In this standard refers to the radiofrequency portion of the electromagnetic spectrum

**Fixed radio Links**

Comprises Point-to-Point and Point-to-multipoint Services, fixed at both ends.

**Ground-Based Mast**

A ground-based structure that supports antennas at a height where they can satisfactorily send and receive radio waves. A typical ground-based mast is 15mhigh, and of steel lattice structure or tubular steel construction. New slimmer versions of such masts are now available which can be painted to blend with in with their surroundings, disguised as trees or used in conjunction with street lighting

**ICNIRP**

The International Commission on Non-Ionizing radiation Protection (ICNIRP) is an independent scientific body which has produced an international set of guidelines for public exposure to radio frequency waves, limiting the exposure of the general public to electromagnetic fields between 0HZ to 300HZ. All mobile operators have accepted these guidelines and work with them.

**Installation**

In relation to radio telecommunications infrastructure, includes:

- (a) The construction of the telecommunications infrastructure, on, over or under any land;

- (b) The attachment of the radio telecommunications infrastructure to any building or other structure; and
- (c) Any activity that is ancillary or incidental to the installation of the radio telecommunications infrastructure (for this purpose, installation includes an activity covered by paragraphs (a) or (b) above).

**Interested and Affected Parties**

Includes persons who reside within the immediate vicinity of the facility and should have a direct interest, economic, physical or social in the proposed facility.

**Local Authority**

Has the same meaning as in the Local Government Act 2003

**Low RF Power Infrastructure**

Means one or more transmitters operating at a total maximum power into the antenna of not greater than 2 Watts.

*Note: examples should include microcells and picocells.*

**Macrocell**

A Macrocell provides the largest area of coverage within a mobile network. The antennas for macrocell can be mounted on ground-based masts, rooftops or other existing structures. They must be positioned at a height that is not obstructed by terrain or buildings. Macrocells provide radio coverage over varying distances depending on the frequency used, the number of calls made and the physical terrain. Macrocell base stations have a typical power output in tens of watts.

**Microcell**

Microcells provide additional coverage and capacity where there are high numbers of users within urban and suburban macrocells. The antennas for microcells are mounted at street level, typically on the external walls of existing structures and on street furniture. Microcell antennas are usually smaller than macrocell antennas and when mounted on existing structures can often blend into building structures. Microcells provide radio coverage over distances, typically between 100m to 1000m and operate at power levels substantially below those of macrocells.

**Picocell**

A picocell provides more localized coverage than a microcell. These are normally found inside buildings where coverage is poor or there is a high number of users such as airport terminals, train stations or shopping centres.

**Point –to-point service**

Means a carriage service which allows a person to transmit a communication to an end-user(s).

**Precautionary approach**

Is as per Appendix A

**Public land Mobile Network service**

Has the same meaning as in the PLMN license document.

**RF Hazard Area**

Mean an area where the emission level exceeds the reference levels adopted by the ICTA for general public exposure to RF EMF

**Roof-Based Mast**

A roof-mounted structure which supports multiple antennas at heights where it can satisfactorily send and receive radio waves. Often in the form of a stub mast, it is typically 4m – 6m high and of steel lattice construction. Stub masts themselves play no part in the transmission of radio waves.

**Sensitive Uses:**

Means sensitive locations as mentioned in the “Technical Standards for Telecommunication Networks” issued by the ICTA such as residential areas, childcare centres, schools, aged care centres, hospitals and historical and national icons.

**Telecommunication Facility –**

the components required for the operation of a wireless communication network, which includes cell sites, transmitters, receivers (antennae), and an unoccupied equipment shelter.

**Telecommunication Tower**

a structure used to support one or more antenna systems for the purpose of radio telecommunications, and which may include, but is not limited to, a guyed tower, a self-support tower or monopole tower, and which may be located at ground level or on the roof of a building.

**Tower Height. –**

The vertical distance measured from ground to the upper most point of the tower, not including the antenna(s).

**APPLICATION FOR AUTHORIZATION IN RESPECT OF SETTING  
/MODIFICATION OF STATION**



**Information & Communication Technologies Authority**

Consultation Ref: ICTA/2010/03

*Draft Deployment of Radiocommunication Infrastructure  
Technical and Administrative Standard*

1 September 2010

## **Explanatory memorandum**

### *Considering that:*

- 1) the ICT Authority has as function under section 18(1) (n) of the ICT Act 2001 “*to ensure the safety and quality of every information and communication services including telecommunication services, and for that purpose, determine technical standards for telecommunication network, the connection of customer equipment to telecommunication networks*”;
- 2) the ICT Authority launched a consultation on Radio Frequency Safety on 3 September 2009 following the increasing concerns expressed by different stakeholders regarding the potential hazards of RF emissions from radio base stations on human beings.
- 3) the objectives of this exercise was to:-
  - a. Explain to stakeholders the technical concepts behind RF safety and present the current regulatory framework in Mauritius regarding same;
  - b. To seek the views of key stakeholders in order to ensure that the issues regarding the installation of base stations are dealt with in a consensual manner.

### *The Information and Communication Technologies Authority resolves to:*

- 1) make available for public consultation the Consultation Document Ref ICTA/03/2010;
- 2) invite views, contributions, and comments on the Consultation Document.



#### **GUIDELINES ON RESPONDING TO THIS CONSULTATION**

G.1 All views/comments/proposed amendments that you may have to improve this document are welcomed.

G.2 You are invited to send your written views, comments and proposed amendments on this document to the **Executive Director, ICT Authority, 12th Floor The Celicourt, Celicourt Antelme Street, Port Louis**, or by email to [icta@intnet.mu](mailto:icta@intnet.mu) at latest by 16h00 on 4 October 2010.

G.3 Should you be including confidential information as part of your responses, you are requested to clearly identify the said confidential materials and to place same in a separate annex to your response.

**DRAFT TECHNICAL STANDARDS FOR TELECOMMUNICATION NETWORK  
made under section 18(1)(n) of the Information and Communication  
Technologies Act 2001 (as amended)**

**1 ACKNOWLEDGEMENT**

Some sections of this document have been reproduced/adapted from the Industry Code C564:2004 with permission from the Communications Alliance Ltd., Australia

**2 SCOPE AND OBJECTIVES**

This Technical Standard for Telecommunication Network shall be known as the ***Deployment of Radiocommunication Infrastructure Technical and Administrative Standard***, hereinafter referred to as the Standard.

**2.1 Scope**

2.1.1 The Standard applies to all licensees holding a valid licence to operate a **fixed radiocommunications infrastructure**.

2.1.2 The licensees shall be solely responsible for the compliance of the Standard by any contractor, agent or person working on behalf of the licensees for the purpose of:

- a) installing;
- b) intending to install;
- c) operating; or
- d) contracting or arranging for the installation of fixed radiocommunications infrastructure used, intended to be used, or capable of being used to supply Information and Communication Services including Telecommunication Services.

**2.2 Objectives**

The objectives of this Standard are:

- a) to apply a Precautionary Approach to the deployment of radiocommunications infrastructure;
- b) to provide best practice processes for demonstrating compliance with relevant exposure limits and the protection of the public;
- c) to ensure relevant stakeholders are informed and consulted before radiocommunications infrastructure is constructed;

- d) to specify standards for consultation, information availability and presentation;
- e) to consider the impact on the well being of the community, physical or otherwise, of radiocommunications infrastructure; and
- f) to ensure the views of Local Authorities and the Community are considered and incorporated, if need be, into the radiocommunications infrastructure site selection.

### **2.3 Commencement and Application of Standard**

...  
...

### **2.4 Interpretation**

1.4.1 The provisions of the Interpretation and General Clauses Act (IGCA) shall be applicable for the interpretation of the Standard.

1.4.2 A record is deemed to include an electronic document such as an e-mail or facsimile.

## **3 PARTICIPANTS**

The Working Committee responsible for the revisions made to the Standard consisted of the following organisations and their representatives: **Organisation Membership Representative:-**

- 1.
- 2.
- ...

#### **4 DEFINITIONS AND ABBREVIATIONS**

For the purposes of this Standard, the following definitions and abbreviations shall apply:

**Act**

means the *Information and Communication Technologies Act 2001 (as amended)*

**Base Station**

means a radiocommunications transmitter and its associated infrastructure including any antennas, housings and other equipment.

**Building and Land Use Permit**

*has the same meaning as in the Local Government Act 2003( as amended).*

**Business Day**

means a day that is not a Saturday, Sunday or a public holiday.

**Consultation**

means a process whereby Licensees seek to inform other parties about a proposed project at particular premises with the intention of giving those parties an opportunity to respond to the proposal and to have their responses considered.

**Emergency Service Organisation**

includes, but is not limited to:

- (a) police forces or services;
- (b) fire services (urban and rural); and
- (c) ambulance services.

**EMF**

in this Standard refers to the radiofrequency portion of the electromagnetic spectrum.

**Fixed Radio Links**

comprises Point-to-point and Point-to-multipoint Services, fixed at both ends.

**Installation**

in relation to radiocommunications infrastructure, includes:

- (a) the construction of the radiocommunications infrastructure, on, over or under any land;
- (b) the attachment of the radiocommunications infrastructure to any building or other structure; and

(c) any activity that is ancillary or incidental to the installation of the radiocommunications infrastructure (*for this purpose, installation includes an activity covered by paragraphs (a) or (b) above*).

***Interested and Affected Parties***

include persons who reside within the immediate vicinity of the facility and should have a direct interest, economic, physical or social in the proposed facility.

***Local Authority***

*has the same meaning as in the Local Government Act 2003*

***Low RF Power Infrastructure***

means one or more transmitters operating at a total maximum power into the antenna of no greater than 2 Watts.

*NOTE: Examples should include micro-cells and pico-cells.*

***Point-to-point Service***

means a carriage service which allows a person to transmit a communication to an end-user(s).

***Precautionary Approach***

means the approach discussed in Appendix A.

***Public Land Mobile Network Service***

has the same meaning as in the PLMN Licence document.

***RF Hazard Area***

means an area where the emission level exceeds the reference levels adopted by the ICT Authority for general public exposure to RF EMF.

***Radiocommunications Infrastructure***

means a base station used for communications.

***RF***

means radiofrequency.

## **5 GENERAL OBLIGATIONS ON LICENSEES**

### **5.1 Telecommunications Network Forward Planning**

A Licensee shall provide assistance, where is not unreasonable to do so, to the Local Authority in the Local Authority's forward planning for the deployment of radiocommunications infrastructure, where so requested by a Local Authority, including the following:

- (a) responding to reasonable requests for information that is to assist the Local Authority to develop forward plans;
- (b) providing the Local Authority with the Licensee's plans concerning the deployment of radiocommunications infrastructure;
- (c) providing the Local Authority with the Licensee's plans concerning service level targets for planned radiocommunications infrastructure;
- (d) providing the Local Authority with an assessment of the opportunities for co-location of radiocommunications infrastructure with the facilities of other Licensees; and
- (e) engaging in discussions with other Licensees to explore opportunities for co-location and to investigate opportunities for the coordinated, strategic and efficient deployment of radiocommunications infrastructure.

## **6 SITE SPECIFIC OBLIGATIONS ON LICENSEES**

### **6.1 Application of the Precautionary Approach to Site Selection**

6.1.1 Section 6.1 applies where a Licensee proposes to select a site for the deployment of radiocommunications infrastructure.

6.1.2 A Licensee shall have written procedures for site selection for radiocommunications infrastructure in relation to factors contained in clause 6.1.4 and make them available to the public on request.

6.1.3 The Licensee shall comply with those written procedures.

6.1.4 The procedures shall require, as a minimum that for each site the Licensee have regard to:

- (a) the reasonable service objectives of the Licensee including:
  - (i) the area the planned service shall cover;
  - (ii) power levels needed to provide quality of service;
  - (iii) the amount of usage the planned service shall handle;
- (b) minimization of EMF exposure to the public;
- (c) the likelihood of an area being a community sensitive location. (Examples of sites which sometimes have been considered to be sensitive include

- residential areas, childcare centres, schools, aged care centres, hospitals and regional icons);
- (d) the objective of avoiding community sensitive locations;
- (e) relevant local government telecommunications planning policies;
- (f) the outcomes of consultation processes with Local Authorities and communities as set out in Section 6.3;
- (g) the heritage significance (built, cultural and natural);
- (h) the physical characteristics of the locality including elevation and terrain;
- (i) the availability of land and public utilities;
- (j) the availability of transmission to connect the radiocommunications infrastructure with the rest of the network, e.g. line of sight for microwave transmission;
- (k) the radiofrequency interference the planned service should cause to other services;
- (l) the radiofrequency interference the planned service could experience at that location from other services or sources of radio emissions;
- (m) any obligations, and opportunities, to co-locate facilities; and
- (n) cost factors.

## **6.2 Application of Precautionary Approach to Infrastructure Design**

- 6.2.1 Section 6.2 applies if a Licensee proposes to design radiocommunications infrastructure.
- 6.2.2 A Licensee shall have written procedures for designing radiocommunications infrastructure.
- 6.2.3 With the objective of minimising unnecessary or incidental RF emissions and exposure, the procedures shall require that in designing infrastructure the Licensee have regard to:
  - (a) the reason for the installation of the infrastructure considering – coverage, capacity and quality;
  - (b) the positioning of antennas to minimise obstruction of radio signals;
  - (c) the objective of restricting access to areas where RF exposure should exceed limits of the EMF reference levels adopted by the ICT Authority;
  - (d) the type and features of the infrastructure that are required to meet service needs including:
    - i. the need for macro, micro or pico cells; and
    - ii. the need for directional or non-directional antennas.
  - (e) the objective of minimising power whilst meeting service objectives; and
  - (f) whether the costs of achieving this objective are reasonable.

- 6.2.4 A Licensee shall comply with those written procedures.
- 6.2.5 Site EMF assessments shall be made in accordance with the ITU-T Recommendation K.52 prediction methodology.
- 6.2.6 The ICTA should request a copy of the site EMF estimate, and the Licensee shall provide the estimate to the ICTA within two weeks of the request being made.

**6.3 Application to the ICTA for Authorisation in connection to applications to Local Authorities for Building and Land Use Permit for Installation at a New Site or for Modification of an Existing Site**

- 6.3.1 Prior to applying to the ICTA for authorisation, a Licensee should have followed procedures related to notification as detailed in the guidelines set out by the Local Authority.
- 6.3.2 The Licensee shall also undertake consultations with the neighbourhood of a proposed site in accordance with a consultation plan drawn in conformity to the guidelines set out under Appendix B of this document
- 6.3.3 A Licensee shall submit its application for authorisation to the ICTA on the form at Appendix C once consultations with the neighbourhood have been completed.
- 6.3.4 While applying to the ICTA a Licensee shall additionally provide to the ICTA:-
  - (a) the results of the site EMF assessment in terms of installation classification in accordance with ITU-T Recommendation K.52 in its application for authorisation.
  - (b) the report about the responses received from notified persons and the results of any other consultation conducted under the consultation plan.



6.3.5 The Report shall include:

- (a) Summary of comments received during the consultation process;
- (b) The Licensee's consideration of these comments; and
- (c) A statement about the Licensee's intended actions regarding the proposed work;

6.3.6 A copy of the report shall also be made available to any member of the public on written request;

6.3.7 The Local Authority may consult the ICT Authority prior to determining the application for BLP

6.3.8 The Licensee shall not commence the work until after it has received the authorisation of the Authority and of other relevant Authorities.

#### **6.4 Application of Precautionary Approach to Site Operation**

6.4.1 Licensees shall operate their infrastructure in a manner consistent with the objectives in clause 6.2.3.

6.4.2 Licensees shall be able to demonstrate compliance with the ICTA regulations regarding maximum human exposure limits for radiofrequency fields.

6.4.3 Licensees shall take appropriate measures to restrict general public access to RF hazard areas.

6.4.4 For each RF hazard area, a Licensee shall ensure warning signs are in place in a location and in a manner that is appropriate so that they are clearly visible.

*NOTE: Refer to examples of standard signage in Appendix D – RF Warning Signs.*

6.4.5 In assessing whether measures are appropriate, the Licensee shall have regard to:

- (a) the category of persons who shall have access to the area;
- (b) the need for physical barriers;
- (c) relevant occupational health and safety requirements;
- (d) the views of the property owner;
- (e) any site changes that have been made; and
- (f) any other matter which should be relevant to ensure site safety with regards to EMF.

- 6.4.6 Licensees shall ensure that technical staff of the Licensee who should be involved in activities on or adjacent to radiocommunications infrastructure are sufficiently trained in radio frequency exposure safety.
- 6.4.7 Licensees shall ensure that transmission equipment no longer in service does not transmit.

**6.5 Requirement to keep Documentary Evidence of Compliance with Procedures**

Licensees shall keep documentary evidence of their compliance with the Standard for a period of three years.

**7 RADIO EMISSIONS AND HEALTH AND SAFETY INFORMATION**

**7.1 Requirement for Licensees to keep informed about EMF Research**

- 7.1.1 Licensees should be informed and updated of the significance of the results of scientific investigations or studies on EMF via relevant scientific bodies .

**7.2 RF EMR Health and Safety Information**

- 7.2.1 A Licensee shall make available to the public, free on demand provided it not unreasonable to do so:
- (a) information regarding how they address RF EMF health and safety issues in relation to their networks; and
  - (b) information about where research reports on the health and safety impacts of radiofrequency infrastructure should be obtained, by referring members of the public to the World Health Organisation (WHO) or to an industry body or Government agency where the Licensee has entered into a specific agreement for this purpose.
- 7.2.2 For a specific site, a Licensee shall provide free, as soon as practicable, the following information to members of the public on request:
- (a) a description of their radiofrequency infrastructure on the site;
  - (b) the operating frequency of the radiofrequency transmitter;
  - (c) a declaration that their infrastructure is in compliance with the ICTA adopted limits for general public exposure to RF EMF;
  - (d) details of any RF hazard areas associated with their infrastructure and management practices to restrict access to RF hazard areas;
  - (e) coverage information of the area.

7.2.3 This section does not apply where in the reasonable opinion of the Licensee the information is being sought for commercial purposes.

### **7.3 Additional Information Supplied by Licensee**

7.3.1 A Licensee shall provide information about the health and safety aspects of RF transmitters in addition to that set out in Section 7.2.

7.3.2 The Licensee shall not assert anything to the effect that the absence of scientific proof means that there is no possibility of risk arising from the operation of radiocommunications infrastructure.

7.3.3 Where a Licensee provides or quotes summaries of scientific information, the Licensee shall reference the source of information.

## **8 COMPLAINT HANDLING**

### **8.1 Meaning of Complaint**

8.1.1 In this section a complaint means any expression of dissatisfaction or grievance made in writing to a Licensee in relation to its performance of any mandatory obligation in this Standard.

8.1.2 However, a complaint does not include:

- (a) a request for information; or
- (b) any comment on proposed work received by a Licensee during the consultation process under section 6.3.

8.1.3 If it appears to a Licensee that a person making a complaint requires assistance to express the complaint in writing, it is the duty of the Licensee to take reasonable steps to provide appropriate assistance to the person.

## **8.2 Licensee to Develop Complaints Handling Procedure**

- 8.2.1 A Licensee shall establish a formal procedure for dealing with complaints.
- 8.2.2 The Licensee shall disseminate information about the established procedure to the public including the means which a person should make a complaint to the Licensee.
- 8.2.3 The Licensee shall ensure that its staff is sufficiently trained in entertaining and dealing with complaints from the public or any other person.

## **8.3 Complaint Handling Procedure**

- 8.3.1 A Licensee shall acknowledge complaints, in writing, within ten working days of the receipt of the complaint.
- 8.3.2 The Licensee shall investigate the matters raised in a complaint unless the Licensee believes that the complaint is frivolous or vexatious, or is not made in good faith.
- 8.3.3 Where a Licensee decides not to investigate a matter, the Licensee shall give the complainant written notice of the decision, and of the reasons for the decision.
- 8.3.4 The Licensee shall advise the complainant of the outcome of the investigation of their Complaint in writing and any action to be taken.
- 8.3.5 Where a complainant is dissatisfied with the Licensee's response, the Licensee shall inform the complainant of the availability of alternative complaint mechanisms, for example, the one existing at the ICTA.
- 8.3.6 Licensees shall keep a written record of all complaints received and dealt by it as well as the outcome of each complaint.
- 8.3.7 Where the Licensee considers a complaint to be frivolous or vexatious the Licensee shall:
  - (a) record its decision not to proceed further with the complaint;
  - (b) inform the complainant of the availability of alternative complaint mechanisms, for example, the one existing at the ICTA.

## **APPENDIX A THE PRECAUTIONARY PRINCIPLE**

Terms used in the context of risk assessment are the Precautionary Principle, the Precautionary Approach, Prudent Avoidance and ALARA (As Low As Reasonably Achievable).

For the purpose of this document the Precautionary Principle may be seen as the fundamental precepts upon which a practical precautionary approach could be based.

The issue of risk assessment can be summarised as the weighing up of likely harm based on all available scientific evidence, with the cost of commercial adjustment by the Licensee.

The fundamental concept of the Precautionary Principle was summed up in 1992 at the UN Conference on Environment and Development (UNCED) in Rio de Janeiro.

Here, the Precautionary Principle was explicitly recognised and included in the Rio Declaration. It is listed as Principle 15 among the principle of general rights and obligations of national authorities.

*"In order to protect the environment, the precautionary approach should be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."*

The application of the Precautionary Principle requires commitment to the idea that scientific proof of a causal link between human activities and its effect is not required.

The application of the Precautionary Principle to the siting of radiocommunications infrastructure should include a consideration of the uncertainty of the science on a-thermal effects.

There is a need to balance the requirement for the telecommunications industry to provide adequate service with the need of the community to be ensured of living in an environment that will not be a potential threat to health.

The World Health Organisation's advice on electromagnetic fields and public health with respect to mobile telephones and their base stations (fact sheet 193 June 2000) includes the following precautionary measures.

**Precautionary measures**

• **Government:** *If regulatory authorities have adopted health-based guidelines but, because of public concerns, would like to introduce additional precautionary measures to reduce exposure to RF fields, they should not undermine the science base of the guidelines by incorporating arbitrary additional safety factors into the exposure limits. Precautionary measures should be introduced as a separate policy that encourages, through voluntary means, the reduction of RF fields by equipment manufacturers and the public. Details of such measures are given in a separate WHO Background document.*

• **Individuals:** *Present scientific information does not indicate the need for any special precautions for use of mobile phones. If individuals are concerned, they might choose to limit their own or their children's RF exposure by limiting the length of calls, or using "hands-free" devices to keep mobile phones away from the head and body.*

## APPENDIX B

### CONSULTATION GUIDELINES

This guideline is designed to assist Licensees in developing and implementing appropriate consultation plans for individual infrastructure.

#### 1. Desired Outcomes

In the design and installation of radiocommunications infrastructure the objectives of Local Authority and community consultations are to:

- (a) inform and receive input from Interested and Affected Parties of the proposed project;
- (b) provide adequate time for Interested and Affected Parties to consider and engage in meaningful dialogue on the project;
- (c) maximize the level of accurate and accessible information about the project to affected communities;
- (d) identify and attempt to resolve potential issues early in the planning process; and
- (e) obtain mutually acceptable outcomes on individual projects.

When considering the desired outcomes it is to be recognised that a consultation program will not always:

- satisfy all participants; or
- resolve all differences of opinion or values.

#### 2. Determining Size and Scope of Consultation Plan

A Licensee's consultation plan for each site should be open and transparent. The size and scope of the consultation plan should be weighted against the likely impact the proposal will have on directly affected parties, relevant stakeholders and community sensitive locations.

#### 3. Stakeholder Analysis

At an early stage in the planning process, a stakeholder analysis should be undertaken to identify who the interested parties may be and the potential for concerns to be raised about a particular proposed facility.

The greater the likelihood for concern, the greater the extent and nature of the consultation with stakeholders that is required.

Factors that should be considered in the stakeholder analysis include:

- (a) Clear identification of the proposal including consideration of the nature and siting of the facility.

*Some examples of facilities which previously have been shown to be sensitive are large visually prominent facilities located very close to where people live.*

- (b) Adjacent land uses and any sensitive land uses nearby.

*Some examples of sites which previously have been shown to be sensitive are residential areas, child care centres, schools, aged care centres and hospitals.*

(c) Identification of potentially Interested and Affected Parties at or near the proposed facility.

*It is critical that a thorough search is undertaken to identify both individuals, organisations or stakeholder groups in a locality who are potentially affected. Progress Associations, Parent Groups, Sporting Groups, tenants, Occupational Health & Safety Committees and residents in adjacent Local Authority areas but living in proximity to a proposal have previously identified themselves as affected parties. Local Authority is a good source of information about potentially affected parties in a locality.*

(d) Possible concerns of those individuals or groups.

*Some examples of concerns that have been previously raised include health, visual amenity, potential noise and property values.*

(e) The community history of the locality.

*Examples of sites which have previously shown to be sensitive include localities where inadequate community consultation was undertaken in the past or where the community may have been required to deal with previous trauma, loss and controversial development such as a road proposal.*

(f) Any regulatory controls at the locality.

*Examples of sites which previously have been shown to be sensitive include heritage areas, scenic protection areas and national parks. The Licensee should make every effort to integrate the consultation strategy with the requirements of local planning controls and Country Planning and Environmental legislation. Engagement in seeking views of Local Authority and engaging in meaningful dialogue will facilitate the development of an appropriately scoped consultation strategy.*

## **2.2 Consultation Tools**

The following table summarises a number of consultation tools that can be selected to appropriately communicate with identified individuals and stakeholder(s). The number and type of tools to be used for any one proposal is dependent on the nature of the proposal and the potential level of concern and the stakeholders identified.

In all instances it is important that both verbal and written communications are clear, easy to understand and that opportunities for input and feedback are clearly stated. Further these communications should include ways the community can get additional information from a variety of sources.

<b>Consultation Tools</b>
Notify immediate residential neighbours



Advertising in local paper
Community newsletters
Door knock
Posted letters to individual residents/landowners
Consult Local Authorities
Consult Tenant stakeholders
Notify community representatives
Consult with community representatives
Notify representatives of sensitive activities
Local Authority presentations
Consult precinct committees
Open House
Consult with Members of Parliament
Forming Community Representative Committee
Public Meeting

### 3. The Consultation Plan

Once the stakeholder analysis has been completed, the proposed consultation plan can be developed. Key areas that need to be addressed in the plan that is to be submitted to Local Authority include:

- (a) Background to the proposal including description of the current preferred proposal and the history and evaluation of alternative sites so far investigated.
- (b) Informal consultations so far undertaken (if any).
- (c) Consultation Plan Outline including who will be consulted, what consultation tools/methods will be used, stakeholder feedback opportunities and timeframe of consultation.
- (d) Licensee response to community feedback i.e. how the Licensee proposes to address concerns, evaluate the community response.
- (e) How the Licensee will report to Local Authority on consultation.

## APPENDIX C

### APPLICATION FOR AUTHORISATION IN RESPECT OF SETTING UP/MODIFICATION OF STATION.

Please provide ALL of the following information

SECTION 1	OPERATOR DETAILS
	1.1 Name of Operator:-
	1.2 Correspondence Address:-
	1.3 Telephone No:-
	1.4 Fax No:-
	1.5 Email:-

Note I: Please fill hereunder sections for EACH antenna on the site.

Note II: For bracketed numbers please SEE instructions/definitions below, as appropriate

Note III: Please ATTACH a copy of the antenna radiation patterns (horizontal & vertical) in the format provided at Annex 1

Note IV: Please check only one of the boxes, where applicable

SECTION 2	APPLICATION DETAILS
2.1 Specify whether:-	<input type="checkbox"/> set-up of new station <input type="checkbox"/> modification of existing station

2.2 Specify licence number under which station is being set up or modified:-

### SECTION 3 STATION CHARACTERISTICS

3.1 Station ID:-

3.2 Class of station:-  
 FB Base station (transmitting station in the land mobile service)  
 FL Land station (transmitting station in the mobile service)  
 FX Fixed station (transmitting station in the fixed service)

3.3 Location Address:-

3.4 Geographical Coordinates:-

3.5 Height above sea level (m):-

3.6 Sector No. (where applicable):-

3.7 Type of installation:-  
 Ground mounted       Tower mounted       Rooftop\*  
\*Specify height (m) of building if installation is rooftop mounted:-

### SECTION 4 EQUIPMENT DETAILS

4.1 Make & model:-						
4.2 Type approval reference:-						
4.2 Max mean power to antenna (dBm):-						
4.3 EIRP (dBm):-						
4.4 Sensitivity (dBm):-						
4.5 Noise figure (dB):-						
SECTION 5      FREQUENCY <sup>(1)</sup>						
5.1 Assigned frequency(ies) or ARFCN <sup>(2)</sup> (as appropriate)(MHz):-						
5.2 Receive frequency(ies)(MHz):-						
5.3 Class of emission:-						

5.4 Necessary bandwidth(MHz):-						
5.5 Channel separation(MHz):-						
5.6 Nature of service:-	<input type="checkbox"/> CO Station open to official correspondence exclusively <input type="checkbox"/> CP Station open to public correspondence <input type="checkbox"/> CR Station open to limited public correspondence <input type="checkbox"/> CV Station open exclusively to correspondence of a private agency <input type="checkbox"/> OT Station open exclusively to operational traffic of the service concerned					
5.7 Operation hours:-	from            to					

- (1) Please provide information, in the same format, on a separate sheet, if space not adequate.  
(2) ARFCN is the Absolute Radio Frequency Channel Number.

SECTION 6      ANTENNA CHARACTERISTICS
6.1 Azimuth of maximum radiation from Grid North (deg):-
6.2 Electrical tilt (deg):-
6.3 Mechanical tilt (deg):-
6.4 Total tilt $\alpha$ (deg):-

6.5 Antenna height from ground/rooftop <sup>(3)</sup> to centre of radiation (m):-
6.6 Make & model:-
6.7 Class of antenna:-
6.8 Polarization:-
6.9 Antenna Gain (dBi):-
6.10 Antenna Directivity :-
6.11 Horizontal Beamwidth (deg):-
6.12 Vertical Beamwidth (deg):-
6.13 Frequency range:- from        MHz to        MHz

6.14 Cross Polar Discrimination (dB):-
6.15 $A_{sl}^{(4)}$ (dB):-
6.16 Insertion loss <sup>(5)</sup> (dB):-

(3) Please **delete** as applicable.

(4)  $A_{sl}$  is the maximum side-lobe amplitude with respect to the maximum.

(5) Insertion loss is  $10\log(P_r/P_t)$  where  $P_r$  is power input at antenna port and  $P_t$  is power at transmitter output port.

SECTION 7 OTHER SITE DETAILS		
7.1 Adjacent Building #	Distance from site along direction of propagation (m)	Height of adjacent building above ground level (m)

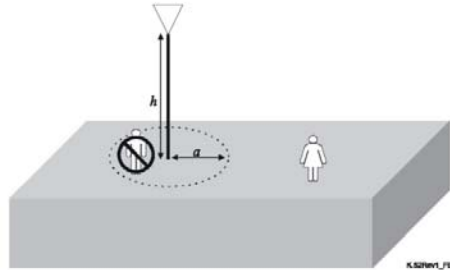


Figure 7A – Illustration of circular exclusion area

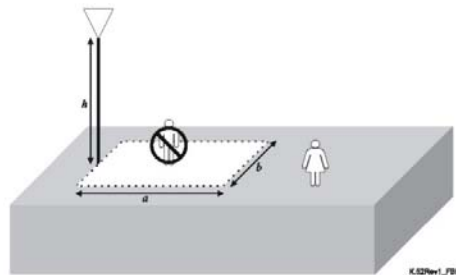


Figure 7B – Illustration of rectangular exclusion area

7.2 Please refer to Figure 7A and Figure 7B, as applicable.

Is there an exclusion area associated with the antenna?  Yes  No

7.3 If yes, indicate whether exclusion area is:  Circular  Rectangular

7.4 For circular area, state radius  $a$  (m) surrounding antenna:-

7.5 For rectangular area, state dimensions of rectangle in front of antenna in terms of



$a$  (m) x  $b$  (m) :-                      x

**SECTION 8 - DECLARATION OF OPERATOR**

8.1 I hereby declare that the station has been evaluated to comply with limits for human exposure to electromagnetic fields in accordance with ITU-T Recommendation K.52 and has been found to be

*inherently compliant*     *normally compliant*     *provisionally compliant*.\*

8.2\* In case *provisionally compliant*, please specify the mitigation techniques to be implemented

.....

.....

.....

8.3 I hereby declare that all information contained herein is correct and accurate.

Signature:- .....

Signatory's Name:- .....

Designation:- .....

Date:- .....

**Annex 1: Antenna Radiation Pattern E-plane and H-plane**

$\psi/\theta$	Attn_E( $\Psi$ )	Attn_H( $\theta$ )	$\psi/\theta$	Attn_E( $\Psi$ )	Attn_H( $\theta$ )	$\psi/\theta$	Attn_E( $\Psi$ )	Attn_H( $\theta$ )
0			120			240		
1			121			241		
2			122			242		
3			123			243		
4			124			244		
5			125			245		
6			126			246		
7			127			247		
8			128			248		
9			129			249		
10			130			250		
11			131			251		
12			132			252		
13			133			253		
14			134			254		
15			135			255		
16			136			256		
17			137			257		
18			138			258		
19			139			259		
20			140			260		
21			141			261		
22			142			262		
23			143			263		
24			144			264		
25			145			265		
26			146			266		
27			147			267		
28			148			268		
29			149			269		
30			150			270		
31			151			271		
32			152			272		
33			153			273		
34			154			274		
35			155			275		
36			156			276		
37			157			277		
38			158			278		
39			159			279		
40			160			280		
41			161			281		
42			162			282		
43			163			283		
44			164			284		

$\psi/\theta$	Attn_E( $\Psi$ )	Attn_H( $\theta$ )	$\psi/\theta$	Attn_E( $\Psi$ )	Attn_H( $\theta$ )	$\psi/\theta$	Attn_E( $\Psi$ )	Attn_H( $\theta$ )
45			165			285		
46			166			286		
47			167			287		
48			168			288		
49			169			289		
50			170			290		
51			171			291		
52			172			292		
53			173			293		
54			174			294		
55			175			295		
56			176			296		
57			177			297		
58			178			298		
59			179			299		
60			180			300		
61			181			301		
62			182			302		
63			183			303		
64			184			304		
65			185			305		
66			186			306		
67			187			307		
68			188			308		
69			189			309		
70			190			310		
71			191			311		
72			192			312		
73			193			313		
74			194			314		
75			195			315		
76			196			316		
77			197			317		
78			198			318		
79			199			319		
80			200			320		
81			201			321		
82			202			322		
83			203			323		
84			204			324		
85			205			325		
86			206			326		
87			207			327		
88			208			328		
89			209			329		
90			210			330		

$\psi/\theta$	Attn_E( $\Psi$ )	Attn_H( $\theta$ )	$\psi/\theta$	Attn_E( $\Psi$ )	Attn_H( $\theta$ )	$\psi/\theta$	Attn_E( $\Psi$ )	Attn_H( $\theta$ )
91			211			331		
92			212			332		
93			213			333		
94			214			334		
95			215			335		
96			216			336		
97			217			337		
98			218			338		
99			219			339		
100			220			340		
101			221			341		
102			222			342		
103			223			343		
104			224			344		
105			225			345		
106			226			346		
107			227			347		
108			228			348		
109			229			349		
110			230			350		
111			231			351		
112			232			352		
113			233			353		
114			234			354		
115			235			355		
116			236			356		
117			237			357		
118			238			358		
119			239			359		

**APPENDIX D**

**RF WARNING SIGNS**

The following are typical examples of signs used to inform and warn of RF radiation hazards at transmitter sites.

**RF EMF Warning Signs**

RF EMF warning signs are used to identify areas that should exceed the general public exposure limits. To be installed at Point of access restriction.



EMF warning sign

### **Contents of a Planning Application for a Building and Land Use Permit**

An application to develop a telecommunication base station or installation of equipment should be as thorough as possible and will involve a two –stage processing.

- (i) Application to ICTA for a license
- (ii) Application to the Local Authority for a Building and Land Use Permit.

#### **A. Application to ICTA for a license**

The prospective licensee should comply with the requirements of section 18(1) (n) of the Information and Communication Technologies Act 2001 (as amended).The ICTA certificate should accompany the application for a BLP.

#### **B. Application to the Local Authority for a Building and Land Use Permit**

Checklist of details to be included in an application for BLP. The Building and land Use guide published by the Ministry of Local Government should be consulted for additional guiding procedures.

- (a) Context plan at the appropriate scale showing the proposed base station and existing sites within the coverage area and location of adjoining cells and sites
- (b) Location and means of access where applicable
- (c) Site layout plan showing
  - boundaries of site
  - position of existing and proposed equipment including antennas, and radio equipment housing
  - position of adjoining buildings and trees
  - any landscaping proposals, including boundary proposals
  - existing site features
  - any heritage or landmark building in line of sight of proposed building
- (d) details of height, width and appearance of equipment and colour proposals

- (e) details of proposed structure and/or buildings to which the equipment will be attached
  - (f) height of adjacent buildings, trees
  - (g) roof plan if equipment to be placed thereon and details of existing and proposed equipment , access
  - (h) details of public consultation carried and accompanying report drafted in line with requirements of ICTA
  - (i) statement explaining reasons of choice of design and measures taken to mitigate visual and environmental impact of proposal
  - (j) Details of alternative sites rejected with a justification for rejecting them.
- C.** Declaration of conformity with ICNIRP Public Exposure Guidelines.



**Factors affecting Radio Signals**

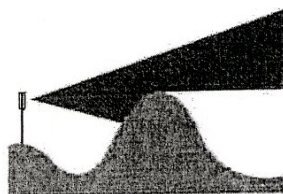
1. Radio waves travel in straight lines and are affected by obstructions which can alter the radio signal. The main factors that affect radio signals are:

Shadowing – Terrain or Buildings partially reducing signal.

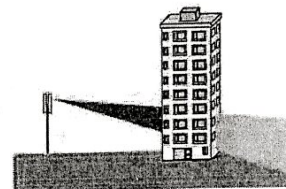
Attenuation – Strength of signal is reduced when passing through a building.

Diffraction – A signal can bend around an object to a limited extent.

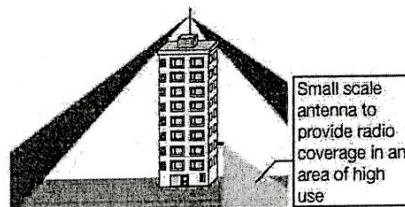
Reflection – This reduces signal strength but may also aid coverage.



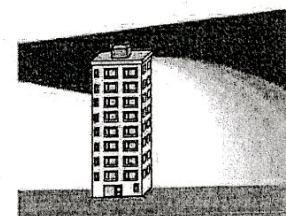
Signal loss due to shadowing from terrain



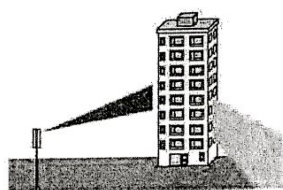
Signal strength reduced by attenuation when passing through a building



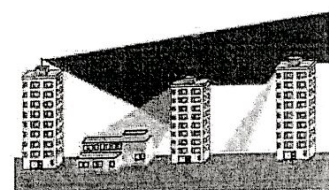
Signal loss due to shadowing from buildings



Signals can 'bend' round obstructions to some extent (diffraction)

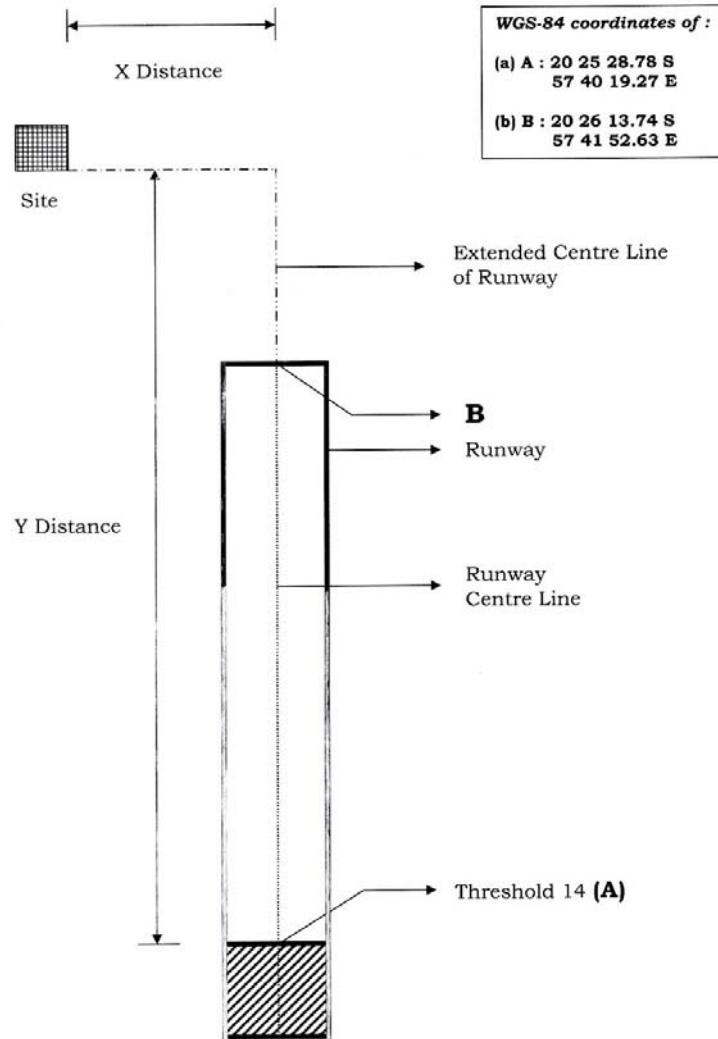


Signal strength reduced by reflection from walls and other objects



Reflection can be used to achieve radio coverage in urban areas

*X and Y Distances of Site from Centre of Threshold 14(A)*



cmo/ky

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