Information & Communication Technologies Authority

Document Ref: ICTA/STD/2014/01

Deployment of Radiocommunication Infrastructure Technical and Administrative Standard for Electromagnetic Field (EMF) Safety

26 February 2014

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 issued a *Deployment of Radiocommunication Infrastructure Technical and Administrative Standard for Electromagnetic Field (EMF) Safety* on 23 March 2011;

3) The Authority has the mandate to revise the document as and when required, on the basis of contributions received through public consultation exercises.

The objectives of this exercise are to seek the views of key stakeholders with respect to the proposed changes:-

(i) General amendments to:- Sections **6.3** & **6.4** of the Standard.
(ii) Inclusion of a set of *Guidelines for compliance with EMF safety standard* as A**nnex C**.
(iii) Modifications to application form for authorisation as **Annex D**.
(iv) Amendments to **Annex E** of the Standard regarding Signage.

The Information and Communication Technologies Authority resolves to:

1) make available for public consultation the Revised Standard Document Ref ICTA/STD/2014/01;

2) invite views, contributions, and comments on the Revised Standard.

Interested parties may send their written views and comments to the **Executive Director, 12th floor, Sir Celicourt Antelme Street, Port Louis** or by email to icta@intnet.mu at latest **by 16:00 on 13 March 2014**.

REVISIONS

Revision No.	Date	Nature of Revision
V1	23 March 2011	Creation of document
V2	30 January 2014	(i) Amendments to Sections **6.3** & **6.4** of the Standard. (ii) Inclusion of *Guidelines for compliance with EMF safety standard* as **Annex C**. (iii) Modifications to application form for authorisation as **Annex D**. (iv) Amendments to **Annex E** - Signage

TECHNICAL STANDARDS FOR TELECOMMUNICATION NETWORK

made under sections 18(1)(n) and 26(e) of the Information and Communication Technologies Act 2001 (as amended)

1 ACKNOWLEDGEMENT

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2 SCOPE AND OBJECTIVES

This Technical Standard for Telecommunication Network shall be known as the ***Deployment of Radiocommunication Infrastructure Technical and Administrative Standard for Electromagnetic Field (EMF) Safety***, 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 (e.g. Base Stations in a Public Land Mobile Network)**.

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

2.3.1 This standard shall come into effect on **23 September 2011** and shall apply to all new radiocommunication infrastructures.

2.4 Transitional Provisions

2.4.1 Licensees are invited to use the time period until this standard comes into effect to elaborate/amend their relevant procedures so as to be in compliance with this standard.

2.4.2 Nothing shall prevent the Licensees to implement this standard before its effective date.

2.5 Interpretation

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

2.5.2 This Standard shall be read so as to be consistent with the Act.

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

3 REVISIONS

Revisions to this document shall be made, as and when required, on the basis of contributions received through public consultation exercises.

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 possibility to co-locate on existing telecommunications infrastructure. Where co-location is not possible, the Licensee shall give the reasons thereof, which may include considerations such as: cumulative emissions, visual obtrusiveness, physical or technical limitations, coverage and potential for interference;

(d) 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);

(e) the objective of avoiding, as far as is technically possible, community sensitive locations and to give preference to industrial or built-up commercial areas;

(f) relevant local government telecommunications planning policies;

(g) the outcomes of consultation processes with Local Authorities and communities as set out in Section 6.3;

(h) the heritage significance (built, cultural and natural);
(i) the physical characteristics of the locality including elevation and terrain;

(j) the availability of land and public utilities;

(k) the availability of transmission to connect the radiocommunications infrastructure with the rest of the network, e.g. line of sight for microwave transmission;

(l) the radiofrequency interference the planned service should cause to other services;

(m) the radiofrequency interference the planned service could experience at that location from other services or sources of radio emissions;

(n) any obligations, and opportunities, to co-locate facilities; and

(o) 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 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, where applicable, as detailed in the guidelines set out by the Local Authority for Building and Land Use Permit.

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 D 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 compliance by means of calculations, in accordance with ITU-T Recommendations K.52 and K.70 (as relevant) 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, wherever applicable, 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, in line with all relevant ITU-T Recommendations.

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, a copy of which may be communicated to the Authority.

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 peen 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.

4. 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.

Consultation Tools
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

5. 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 – GUIDELINES FOR COMPLIANCE WITH EMF SAFETY STANDARD

Any Licensee operating radiocommunications infrastructures which emit Electromagnetic Fields ("EMF") for the purpose of communications shall apply for authorisation for setting up/modification of its installations. These communications infrastructures shall include base stations transmitters (BTS), repeaters and broadcast transmitters.

1. ICNIRP Reference Levels

The limit of EMF emission from a radiocommunications infrastructure site at accessible areas shall not exceed any one of the parameters below for the public and occupational workers respectively.

	Frequency range	E-field strength (A/m)	H-field strength (μT)	B-field (W/m^2)	Equivalent plane wave power density S_{eq} (V/m^2)
General Public	1 MHz–10 MHz	$87/f^{1/2}$	$0.73/f$	$0.92/f$	—
	10 MHz–400 MHz	28	0.073	0.092	2
	400 MHz–2 GHz	$1.375f^{1/2}$	$0.0037f^{1/2}$	$0.0046f^{1/2}$	$f/200$
	2 GHz–300 GHz	61	0.16	0.20	10
Occupational Workers	1 MHz–10 MHz	$610/f$	$1.6/f$	2.0/f	—
	10 MHz–400 MHz	61	0.16	0.2	10
	400 MHz–2 GHz	$3f^{1/2}$	$0.008f^{1/2}$	$0.01f^{1/2}$	$f/40$
	2 GHz–300 GHz	137	0.36	0.45	50

Note:
1. f as indicated in the frequency range column.
2. Provided that basic restrictions are met and adverse indirect effects can be excluded, field strength values can be exceeded.
3. For frequencies between 100 kHz and 10 GHz, S_{eq}, E^2, H^2, and B^2 are averaged over any 6-minutes period.

Table C.1: Reference levels for (1) general public and (2) occupational workers exposure to time-varying electric and magnetic fields (unperturbed rms values).

2. Compliance evaluation

Compliance with the exposure limit as stipulated above shall be evaluated in accordance with the methods below.

It is to be noted that transmitters with a maximum EIRP of 2W or less are classified as ***inherently compliant*** and no further action is deemed necessary.

2.1 Compliance by EIRP calculation

For single transmitter sites, assessment of the value of ($EIRP/EIRP_{th}$) is to be made at various publicly accessible points in the environment surrounding the Base Transceiver Station (BTS) site (for example on rooftop, on ground or at adjacent buildings). The assessment is based on the formula:

$$\sum \frac{EIRP_i}{EIRP_{th,i}} \leq 1$$

where

$EIRP_i$ is the temporal averaged radiated power of the antenna at a particular frequency i, and

$EIRP_{th,i}$ is the EIRP threshold relevant to the particular antenna parameters and accessibility conditions.

Annex B of ITU-T Recommendation K.52 sets out the criteria for accessibility conditions and directivity categories for a set of reference antenna parameter or types depending on accessibility of various areas in the proximity of the transmitter to person are as set out in ITU-T Recommendation K.52 Annex B.

The method of calculation is detailed in ITU-T Recommendation K.52 Annex B Appendix II and Ill.

If the value of ($EIRP/EIRP_{th}$) is found to be less than one at all points in the environment, the site is declared compliant.

At a given point or location, marginal contribution of EMF radiation from BTS located further than 100 metres can be excluded for the purpose of the estimation of the overall EMF exposure.

2.2 Compliance by software simulation

There are cases of installations, with two or more transmitters/antennas (especially in populated areas) which are affected by reflections from buildings or variations in earth elevations, etc. Such installations include:-

- Rooftop poles
- Rooftop having multiple towers (shared BTS sites)
- Multiple antennas mounted on a single tower (shared BTS sites)

In the above cases, where the environment is complex, the EIRP methods of ITU-T Recommendation K.52 may be insufficient to determine zone boundaries for EMF exposure. Licensees need therefore use appropriate software, as proposed in ITU-T Recommendation K.52 and ITU-T Recommendation K.61, to refine those zone boundaries obtained using ITU-T Recommendation K.52 and map out the electromagnetic field around the BTS.

The test results of software simulation are to be presented in the form of the power density, calculated in a plane of interest, expressed as a percentage of the exposure limit with logarithmic legend. Various positions two (2) meters above the roof top level of the BTS site, ground level and roof top or floors of adjacent buildings in the vicinity of 30 meters radius from the BTS should be considered.

Based on these simulated results, it is required that EMF measurements be performed if the electromagnetic exposure is found to exceed the stipulated exposure limit.

2.3 Compliance of Shared sites

2.3.1 Sites categorised as 'shared sites' are as follows:

(a) A ground based tower site with transmitters from multiple licensees;

(b) A roof top, with transmitters from multiple licensees; and

(c) Other infrastructures with transmitters from multiple service providers (examples include advertisement boards, utilities, etc.).

2.3.2 For the purpose of compliance with the Standard, every shared site shall be assigned a Host Operator. The responsibilities of the Host Operator shall be as follows:

(a) To conduct simulation to ensure compliance of the site to the exposure limits;

(b) To implement remedial measures in the event of non compliance, if required; and

(c) To ensure future compliance assessment in the event there is a change or addition to the particular site.

2.3.3 The Host Operator for each site shall be the incumbent operator on site.

2.4 Remedial actions for non-compliant shared sites

2.4.1 In cases of non compliance, where public access cannot be restricted to exclusion zones (like adjacent building with over exposure), the rectification of non compliance shall be the joint responsibility of the Host Operator as well as all the licensees operating antennas at the said site.

2.4.2 The cause of non compliance can be due to single licensee or combined effect. Where exposure limits are exceeded, the following rules shall apply to reach site compliance:

(a) All licensees have to individually prove their compliance with regards to the non compliant point or area. The single or multiple licensee(s) which fail to prove their individual compliance will be requested to use mitigation techniques either by reducing transmitted power, increasing antenna height, changing antenna direction (azimuth), or if required, relocating antenna.

(b) In the case of all licensees individually proving compliance but where the combined effect of many antennas have shown non compliance, the problem

can be remedied with simulation or frequency selective measurements with either of the following two processes being applicable:

(i) Simulate individual exclusion zones for every antenna and rectify or move the antenna whose exclusion zone is crossing non compliant area(s) or point(s).

(ii) If no individual antenna's exclusion zone is crossing non compliant area, then remove the antenna whose exclusion zone is nearest to the non compliant area or point.

(iii) Repeat the process until the site is compliant.

or

(i) Do frequency selective measurement with worst case extrapolation and if any individual operator found to exceed exposure limit, rectify or move the non-complying antenna(s).

(ii) If no individual antenna or licensee exceeds the threshold independently in frequency selective measurement, rectify or move the antenna or licensee with maximum value of power density.

(iii) Repeat the process until the site is compliant.

2.4.3 All licensees have to individually and jointly comply with the restriction prescribed for EMF exposure limits for general public. Hence, responsibility of EMF compliance of shared sites lies with all service providers on site. In the case of overall non-compliance of shared site, any authorisation issued for that site will be rescinded.

2.5 Exclusion Zones Calculation

2.5.1 Single Antennas or Sectoral Antennas at Single Pole

The exclusion zone distance for general public and occupational exposure can be calculated using the formulas in below table (Refer to ITU-T Recommendation K.70, Annex C):

Radio Frequency range	General public exposure	Occupational exposure
1 MHz–10 MHz	$r = 0.1 \times (eirp \times f)^{1/2}$ or $r = 0.129 \times (erp \times f)^{1/2}$	$r = 0.0144 \times f \times eirp^{1/2}$ or $r = 0.0184 \times f \times eirp^{1/2}$
10 MHz–400 MHz	$r = 0.319 \times (eirp)^{1/2}$ or $r = 0.409 \times (erp)^{1/2}$	$r = 0.143 \times (eirp)^{1/2}$ or $r = 0.184 \times (erp)^{1/2}$
400 MHz–2 GHz	$r = 6.38 \times (eirp/ f)^{1/2}$ or $r = 8.16 \times (erp/ f)^{1/2}$	$r = 2.92 \times (eirp/ f)^{1/2}$ or $r = 3.74 \times (erp/ f)^{1/2}$
2 GHz–300 GHz	$r = 0.143 \times (eirp)^{1/2}$ or $r = 0.184 \times (erp)^{1/2}$	$r = 0.0638 \times (eirp)^{1/2}$ or $r = 0.0819 \times (erp)^{1/2}$

Where

r is the minimum antenna distance, in metres.

f is the frequency in MHz

erp is the effective radiated power in the direction of the largest antenna gain, in Watts.

eirp is the equivalent isotropic radiated power in the direction of the largest antenna gain, in Watts.

Table C.2: Calculation for exclusion zone for (1) the general public & (2) occupational workers

2.5.2 Multiple antennas site

Analytical formulas are sufficient for calculations of exclusion zone parameters for single antennas or multiple antennas at single location. However, on many sites numerous antennas are installed in close proximity to each other and the calculation of exclusion zones through analytical formulas become impractically conservative or difficult to interpret due to the complexity of the environment.

For complex scattering environments, exclusion zones/compliance distances for multiple antennas in close proximity are drawn by software simulation based on methodologies as prescribed in ITU-T Recommendation K.52 and ITU- T Recommendation K.61 documents.

The 3D exclusion zones results after electromagnetic mapping is used for prediction of exact exclusion zones distances.

INFORMATION AND COMMUNICATION TECHNOLOGIES AUTHORITY (ICTA)

Level 12, The Celicourt 6, Sir Celicourt Antelme Street Port Louis Mauritius
Tel.: (230) 211 5333/4 Fax: (230) 211 9444 email: icta@intnet.mu

APPENDIX D – APPLICATION FOR AUTHORISATION IN RESPECT OF SETTING UP/MODIFICATION OF STATION

Note: Please provide ALL of the information requested in application form.
Please ensure that all information submitted has been verified to be true and accurate.
Please SEE instructions/definitions, as appropriate.
You are advised to refer to the ITU-T Recommendations ITU-T K.52 & ITU-T K.70 prior to filling out the application forms and performing compliance evaluations.

SECTION 1 SITE OPERATOR DETAILS		
1.1 Name of Site/Host Operator:-		
1.2 Correspondence Address:-		
1.3 Contact Person	Designation	
1.4 Telephone No:-	Fax No:-	Email:-
1.5 Engineering Licences held: ☐ SPL(1/2/3/4)	☐ RA ( )	

SECTION 2 SITE DETAILS		
2.1 Specify if ☐ NEW	☐ AMENDMENT	
2.2 Station ID:-		
2.3 Location Address:-		
2.4 Geographical Coordinates:-		
2.5 Height above sea level (m):-		
2.6 CO-LOCATION OF INSTALLATION		
Specify if this is a co-located installation ☐ Yes	☐ No	
If Yes, provide information requested in the following Sub-section for EACH co-located/hosted operator:- 2.6.1 Name of Sharer:-		
2.6.2 Correspondence Address:-		
2.6.3 Contact Person	Designation	
2.6.4 Telephone No:-	Fax No:-	Email:-
2.6.5 Engineering Licences held: ☐ SPL(1/2/3/4)	☐ RA ( )	

2.7 Provide a clearly marked site plan (Annex A) to identify:-

- Type of infrastructure
- sector directions for each antenna on site (identifying the antenna of each operator)
- buildings (distance and height) along the direction of propagation of each sector

Note: Site plan must be given with respect to Grid North.

SECTION 3 STATION DETAILS

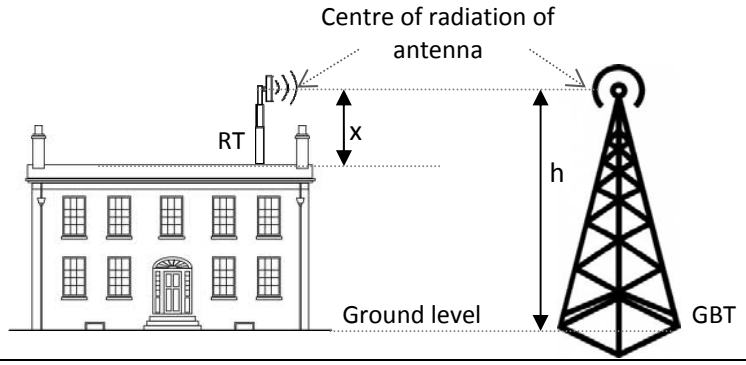
3.1 Type of installation:-

☐ Ground Based Tower (GBT) ☐ Palmtree

☐ Rooftop Tower (RT) ☐ Pole ☐ Other (Specify)

3.2 For **any** type of installation above, specify height of installation h (m), from centre of antenna to ground:-

3.3 For **RT/Pole/Other** installations also specify height of installation x (m), from centre of antenna to rooftop level:-



Note: h is the height from ground level to centre of radiation for any type of antenna installation

3.4 For **RT/Pole/Other installations** kindly also provide:-

(a) Picture (Annex B) of the proposed site, to clearly identify location

(b) Legible and clearly marked design plans to include:-

- (Annex C & D) Front elevation & side elevation of installation.

They must serve to identify, for rooftop mounted infrastructure, the height of the different levels of the building on which installation is to be implemented.

- (Annex E) Top view of installation.

It must serve to identify the different sectors and buildings (distance and height) in the direction of propagation of each sector.

Note:

1. *The dimensions of the building on which structure is to be implemented must be specified in all drawings.*

2. *All plans should indicate any physical delimitation to be implemented to prevent persons other than qualified personnel to have access to installation, as applicable.*

SECTION 4 CONSULTATION

Note: This section is applicable ONLY for new applications

4.1 Consultation performed on: (date)

4.2 Duration:

4.3 Type of Consultation:

4.4 Outcome of consultation process:

4.5 **Attach** Consultation Report (Annex F)

For EACH operator & for EACH type of service/frequency band of operation, fill in Sections 5-8. Should the details in Sections 5-8 be DIFFERENT for EACH sector, please fill in the APPROPRIATE sections accordingly for EACH sector on a separate page.

SECTION 5 FREQUENCY/SERVICE DETAILS	
NAME OF OPERATOR:	
5.1 Class of station:-	☐ AT Amateur Station ☐ BC Broadcasting Station, sound ☐ BT Broadcasting Station, television ☐ FA Aeronautical Station (TX stn in the aeronautical mobile service) ☐ FB Base station (transmitting station in the land mobile service) ☐ FC Coast Station (TX stn in the maritime mobile service) ☐ FL Land station (transmitting station in the mobile service) ☐ FP Port Station (TX stn in the maritime mobile service, for port operation) ☐ FX Fixed station (transmitting station in the fixed service) ☐ LR Radiolocation Land Station (TX stn in the radiolocation service) ☐ NL Maritime radionavigation land station (TX in the maritime radionavigation service) ☐ SM Meteorological aids base station (TX stn in the meteorological aids service)
5.2 Frequency band of operation	
5.3 Class of emission:-	
5.4 Necessary bandwidth(MHz):-	
5.5 Channel separation(MHz):-	

SECTION 6 TRANSCEIVER DETAILS
NAME OF OPERATOR:
6.1 Make & model:-
6.2 Type approval reference:-
6.3 Max mean power to antenna (dBm):-
6.4 EIRP (dBm):-
6.5 Sensitivity (dBm):-
6.6 Noise figure (dB):-

SECTION 7 ANTENNA CHARACTERISTICS
NAME OF OPERATOR:
7.1 Make & model:-
7.2 Antenna Gain (dBi):-
7.3 Antenna Directivity :-
7.4 Polarization:-
7.5 Horizontal Beamwidth (deg):-
7.6 Vertical Beamwidth (deg):-
7.7 Cross Polar Discrimination (dB):-
7.8 A_{sl} (dB):- (*A_{sl} is the maximum side-lobe amplitude with respect to the maximum)*
7.9 Insertion loss (dB):- *(Insertion loss is 10log(P_r/P_t) where is P_r power input at antenna port and P_t is power at transmitter output port)*
7.10 Antenna radiation pattern diagrams Ref: ☐ H ☐ V Provide antenna pattern radiation diagram (dB values for 0° - 360° **in increments of 1°**) for **each frequency band** of operation and **tilt** relevant to this installation. (Annex G)

SECTION 8	FOR EACH SECTOR WITHIN EACH TYPE OF SERVICE / FREQUENCY BAND OF OPERATION, FILL IN SECTION 8		
NAME OF OPERATOR			
FREQUENCY DETAILS	**Sector 1**	**Sector 2**	**Sector N**
8.1 TX frequency(ies) or ARFCN (as appropriate) (MHz):- *(ARFCN: Absolute Radio Frequency Channel No)*			
8.2 BCCH (as applicable)			
8.3 RX frequency(ies) (MHz):-			
ANTENNA DETAILS			
8.4 Azimuth of maximum radiation from Grid North (deg):-			
8.5 Electrical tilt (deg):-			
8.6 Mechanical tilt (deg):-			
8.7 Total tilt α (deg):-			
8.8 Antenna height (m) from ground/rooftop[(1)] to centre of radiation:- *(1) Kindly delete as applicable*			
SITE DETAILS			
8.9 Adjacent Building Description			
8.10 Height of adjacent building above ground level (m)			
8.11 Distance from antenna along direction of propagation (m)			
8.12 Exclusion area details applicable for Accessibility Category 4 :- ☐ N/A ☐ Circular ☐ Rectangular Size:			
COMPLIANCE BY SECTOR			
8.13 Sector compliance , with respect to accessibility *(tick as applicable)*			
☐ Accessibility Category 1	☐ Normal ☐ Provisional	☐ Normal ☐ Provisional	☐ Normal ☐ Provisional
☐ Accessibility Category 2	☐ Normal ☐ Provisional	☐ Normal ☐ Provisional	☐ Normal ☐ Provisional
☐ Accessibility Category 3	☐ Normal ☐ Provisional	☐ Normal ☐ Provisional	☐ Normal ☐ Provisional
☐ Accessibility Category 4	☐ Normal ☐ Provisional	☐ Normal ☐ Provisional	☐ Normal ☐ Provisional
8.14 In case ***provisionally compliant***, please specify the mitigation techniques to be implemented			
8.15 Attach Compliance evaluation (soft copy) Annex H			

SECTION 9 SITE OPERATOR'S DECLARATION

I hereby declare that:-

1. All information contained herein has been verified to be correct and accurate.

2. Additional information requested has been provided as attachment:-

   - ☐ Annex A – Site plan
   - ☐ Annex B – Picture of site (for rooftop Installation)
   - ☐ Annex C – Front Elevation (for rooftop Installation)
   - ☐ Annex D – Side Elevation Diagram (for rooftop Installation)
   - ☐ Annex E – Top View (for rooftop Installation)
   - ☐ Annex F – Consultation Report with neighborhood of proposed installation (*as applicable*)
   - ☐ Annex G – Antenna Radiation Pattern Diagrams for relevant frequency(ies) & tilt(s) for this site
   - ☐ Annex H - Compliance Evaluation of proposed installation - Soft Copy

3. All the principles stated in the Deployment of Radiocommunication Infrastructure Technical and Administrative Standard for Electromagnetic Field (EMF) Safety have been observed.

4. SITE COMPLIANCE: Calculations for this site have been performed in accordance with relevant applicable standard(s) and *this station/the cumulative EMF level** (*delete as applicable*) has been evaluated as:-

   ☐ normally compliant ☐ provisionally compliant

Signature:- .....
Signatory's Name:- .....
Designation:- .....
Date:- .....

SECTION 10 OFFICE USE

☐ All fields duly filled & correct
☐ All annexes provided

-Date of inspection/survey:
-Inspection/survey Remarks:
-Inspection performed by:

-Date Evaluation performed:
-Evaluation ref:
-Evaluation outcome:
-Evaluation performed by:

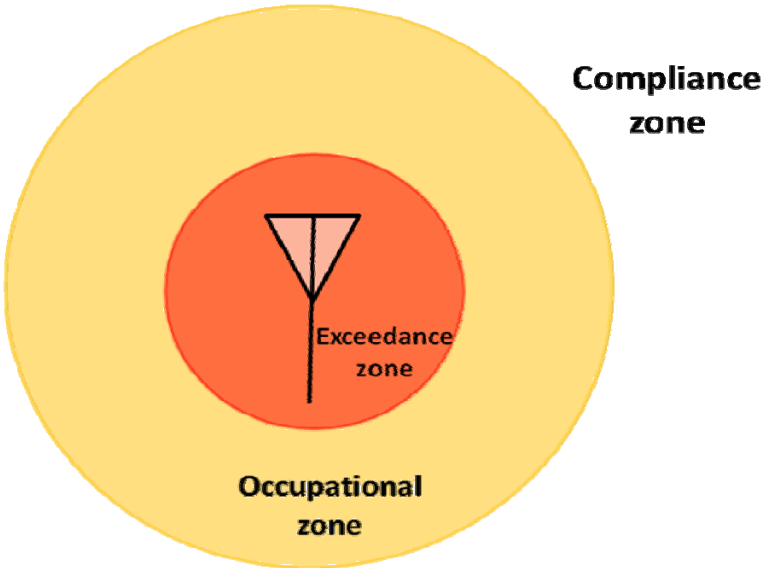
-Complaint received:
-Other remarks:

-Date Authorisation issued:

APPENDIX E - SIGNAGE

1. Exclusion Zones and implementation of Signage

EMF exposure assessment is made if the transmitters are present and conducted for all locations where people might be exposed to EMF in their normal activities. All such exposures to EMF relates to one of these three zones:



(a) Compliance zone

In the compliance zone, potential exposure to EMF is below the applicable limits for both controlled/occupational exposure and uncontrolled/general public exposure.

(b) Occupational zone

In the occupational zone, potential exposure to EMF is below the applicable limits for controlled/occupational exposure but exceeds the applicable limits for uncontrolled/general public exposure.

(c) Exceedance zone

In the exceedance zone, potential exposure to EMF exceeds the applicable limits for both controlled/occupational exposure and uncontrolled/general public exposure.

2. RF Warning Signs

RF EMF warning signs are used to identify areas that should exceed the general public exposure limits.

The Licensee will ensure provision of proper signage at the entrance of site (roof top or tower).

The Licensee will ensure provision of proper signage on the boundary of occupational exclusion zones by way of fencing/yellow coloured lines and the proper sign at point of access restriction.

The following is a typical example of sign used to inform and warn of RF radiation hazards at transmitter sites.

EMF warning sign