IN THE SUPREME COURT OF BANGLADESH
HIGH COURT DIVISION
SPECIAL ORIGINAL JURISDICTION

WRIT PETITION NO. 14258 OF 2012

IN THE MATTER OF:

An Application under Article 102 of the Constitution of the People's Republic of Bangladesh.

AND
IN THE MATTER OF:

Human Rights and Peace for Bangladesh and another

..... Petitioners

VERSUS

Bangladesh and others

..... Respondents

Mr. Manzill Murshid, Advocate with
Mr. Ripan Barai, Advocate and
Mr. Sanjoy Mandal, Advocate
… For the Petitioner

Ms. Kazi Zinat Hoque, DAG
… For the Respondent No. 2

Mr. Khandaker Reza-E-Raquib with
Mr. Reja-E-Rabbi Khandaker,
Mr. Sayed Mahsib Hossain,
Ms. Meherunnesa and
Ms. Nadeya Nazneen, Advocates
… For the Respondent No. 4

Mr. Momtazuddin Ahmed (Mehedi), Advocate
… For the Respondent No. 5

Heard on: 10.10.2018, 11.10.2018, 5.11.2018, 2.1.2019, 31.1.2019, 26.2.2019 and 10.3.2019.

Judgment on: 25.4.2019

Present :

Mr. Justice Syed Refaat Ahmed
And
Mr. Justice Md. Iqbal Kabir

SYED REFAAT AHMED, J:-

The Petitioner No. 1, Human Rights and Peace for Bangladesh (HRPB) is a non-profit registered organization with objects to uphold, promote and defend human rights and to work for and to provide legal support to the marginalized. Within that general ambit HRPB also works to protect the environment and public health. The Petitioner No. 2 is a practising lawyer. Both Petitioners now seek directions to prevent radiation from Mobile Phone Towers ("MPTs") set up in different places of the country, which, the Petitioners contend pose imminent and grave danger to public health. This Application brought by invoking article 102 of the Constitution is in the nature of a public interest litigation in order that necessary steps may be taken to stop radiation from MPTs and adopt sufficient precautionary methods to protect public health.

The Petitioners were first alerted to the danger posed by MPTs to public health through an investigative report broadcast on a local television channel (Ekushey Television) on 18.10.2012. The report raised issue with the apparently indiscriminate installation of MPTs in residential areas and other densely populated areas by various telecommunication companies without the benefit of regulatory guidelines and adequate oversight, thereby, posing an imminent threat to public health. The report is stated to have identified radiation emissions from the MPTs to pose a grave danger to humans, fauna and natural life as these promote carcinogenesis, i.e., the formation of cancer. The Petitioners now seek this Court's intervention with a view to a systemic overhaul and upgradation of regulatory frameworks to ensure the installation and functioning of MPTs in a sustainable manner eliminating risks of undue exposure to the harmful effects of their operation.

Relying on studies generally available, the Petitioners' primary concern is with the risk of cancer as a result of cell ionization and mutation. These cancers may manifest months and years, even generations, after exposure has occurred. The Petitioners also cite immediate manifestations like birth defects as a cause for major concern.

The overriding public health dimension to this Application, the Petitioners stress, is one which must be at the forefront of governmental and regulatory function in the general area of telecommunication aided by requisite policy formation as anticipated in article 18(1) read with article 8 of the Constitution. Such policy and regulatory framework informed further by this Court's directions as sought on this Writ Petition, the Petitioners argue, provide further content and expression to the guarantee to life entrenched under article 32 of the Constitution.

Predicated on this general scenario this Court on 30.10.2012 issued a Rule Nisi calling upon the Respondents to show cause as to why a direction should not be given upon them to take effective steps to stop radiation from MPTs which were set up in different places of the country as these pose a danger to the health of the citizens and to protect health and the environment. This Court also directed the Respondent No. 5, Chairman, Atomic Energy Commission ("AEC") to inspect some of the MPTs and submit a report about their direct and indirect health effect as well as submit a report about radiation from MPTs within four weeks. Further, this Court also directed the Respondent No. 2, Secretary, Ministry of Health to form a seven-member expert committee comprising of scientists, academics and representatives of the Respondent Nos. 2 and 3, Ministry of Health and Ministry of Environment respectively, and the AEC to examine the health risk and environmental effect of radiation form MPTs and submit the expert committee report within three months.

The Petitioners draw on various sources to drive home the point that the direct and indirect effect of radiation from Mobile Towers (Non-Ionizing Radiation) has been a global concern from different aspects. They, accordingly, cite the works of Mr. Md. Abdur Rouf Khan, Assistant Programmer, Department of Environment, Government of Bangladesh on *"Mobile Tower and Cell Phone Radiation Impact on Human Health, Birds, Animals, Environments and as well as Ecosystems in Prospect of Bangladesh",* Prof. Girish Kumar, Electrical Engineering Department, IIT Bombay, India on *"Cell Tower Radiation"* and an Information Paper of the Telecom Regularity Authority of India on *"Effects of Electromagnetic Field Radiation from Mobile Towers and Handsets"*.

On the global plane, the World Health Organization ("WHO") and International Commission for Non-Ionizing Radiation Protection ("ICNIRP") and the Institute of Electrical and Electronics Engineers ("IEEE") have also expressed concern over the radiation impact though admittedly none has confirmed the existence of any health hazard from exposure to low-level electromagnetic field. The following WHO opinion expressed by is representative of the generally held view in this regard:

> *"All reviews conducted so far have indicated that exposures below the limits recommended in the International Commission for Non Ionizing Radiation Protection (ICNIRP) 1998 EMF guidelines, covering the full frequency range from 0-300 GHz, do not produce any known adverse health effect. However, there are gaps in knowledge still needing to be filled before better health risk assessments can be made."*

The Petitioners additionally cite the case of India as has revised its Radiation Norms limiting reference level of Electromagnetic Radiation from Mobile Towers by reducing it to 1/10th of the limit prescribed by the ICNIRP with effect from 1.9.2012. On the other hand, Bangladesh reportedly still follows the ICNIRP prescriptions.

It is here that an account is necessary to be provided of the Court-driven concerted exercise at preparing draft guidelines for limiting exposure to radiation of Electromagnetic Fields ("EMF"). This Court's initiatives are best exemplified by a series of Orders issued carrying the initiative forward through detailed directions and constant monitoring and review of progress made at material intervention points. These crucial Orders issued by this Court from 2017 and well into 2019 are reproduced hereinbelow with dates of issue provided:

8.3.2017

An application for direction on behalf of the Petitioner placed today is ostensibly predicated on a Report that was commissioned of the Respondent No. 5 Chairman, Atomic Energy Commission by this Court's Order of 30.10.2012. That Report as was directed to be filed by end-November, 2012 appears not to have been done so. The learned Advocate for the Respondent No. 5 is also not found present in Court today to explain such non-compliance.

It is also evident that a direction addressed to the Respondent No. 2, Secretary Ministry of Health Bangladesh to form an Expert Committee by the first week of November, 2012 to examine the health risk and environmental effect of radiation from Mobile Towers and report back to this Court by January, 2013 has also not been forthcoming.

The learned Advocate for the Petitioner is unable to apprise us of any developments with regard to compliance measures as ordered in October, 2012.

Accordingly, let notices issue urgently upon the Respondent No. 2, The Secretary Ministry of Health Bangladesh Secretariat, P.S. Shahbagh, Dhaka, Bangladesh and the Respondent No. 5, the Chairman, Atomic Energy Commission, 1/12-Agargaon, Sher E Bangla Nagar, Dhaka-1207, Bangladesh by Special Messenger at the Petitioner's cost requiring compliance of the Order of 30.10.2012 within a period of 2 (two) weeks from date.

Let this matter be placed in the list again on 22.3.2017 for Order(s).

The Petitioner's Application for direction is kept in the file for the time being.

22.3.2017

Pursuant to this Court's Order of 8.3.2017, the learned Advocate for the Respondent No. 5 has drawn this Court's attention to a copy of the Affidavit-in-

Compliance dating back to March, 2013. The learned Advocate for the Petitioner Mr. Manzil Murshid acknowledges receipt in 2013 of a copy of the said Affidavit. There is, however, no evidence in the Court Record of the filing of such Affidavit in 2013.

Be that as it may, and proceeding on the acknowledgement of the earlier receipt by the learned Advocate for the Petitioner, a copy of the Affidavit-in-Compliance is accepted for filing today.

The Atomic Energy Commission (AEC) Report annexed in such Affidavit, Mr. Manzil Murshid submits, proves to be somewhat inconclusive on the health risks associated with exposure to non-ionizing electromagnetic radiation emitted from Mobile Towers Base Transceiver Stations (BTS). The AEC, however, recommends further extensive research covering a large number of sites and drawing on modern equipment and adequate skilled manpower to further gauge the incidences of such health hazards.

Furthermore, the learned DAG apprises this Court that pursuant to its Order of 8.3.2017 the Respondent No. 2, Ministry of Health has made available to the Attorney General's Office a Report of an Expert Committee incorporating certain recommendations. These recommendations, on a cursory glance, establish from the Ministry's perspective a firmer connection between non-ionizing radiations and health hazards than is evident in the AEC's findings. The Expert Committee notably further requires all stakeholders, including but not limited to the Respondent No. 4, BTRC, to contribute inter alia to the reduction of radiation levels. The learned DAG, now prays for time to place the said Report on record.

Accordingly, let this matter appear in the list for Order(s) again on Tuesday, 28.3.2017. The BTRC shall on that date apprise this Court of its stand on and projected course of action in keeping with the Expert Committee's recommendations.

28.3.2017

The learned DAG has today placed the Report dated 30.7.2013 of the Expert Committee formed under the aegis of the Respondent No. 2, Ministry of Health in compliance with this Court's earlier Order of 30.10.2012. The Report is in turn based on the findings and recommendations of a Sub-committee set up by the Expert Committee to measure the level of radiation from Mobile Tower Base Transceiver Stations (BTS). The observations, limitations and recommendations of the Sub-committee reveal that the investigation conducted on a limited scale led to a detection of at least one site emitting radiation in excess of the Radiation Level Safely Limits issued by the World Health Organization (WHO). In that regard, the power density, SAR values and the electric field values at that particular site were all found to exceed the safety limits and hence

unacceptable. It is also noted that data was taken only for 900 MHz carriers although there are carriers within the values of 890-960 MHz as well as 1710-1890 MHz. The Sub-committee strongly recommended future measurements to be carried out of this broad range of bands to arrive at a comprehensive finding of BTS radiation levels.

Apprehending the possibility of more sites emitting radiation beyond the WHO safety limits, the Sub-committee recommends inter alia instructions to be given to all mobile operators to bring radiation levels within acceptable limits. Indeed, the concerned regulatory authority being BTRC is assigned the prime responsibility in this regard in the Sub-Committee's report. It is envisaged that BTRC shall establish an effective and objective constant monitoring mechanism of radiation emission and ensure strict adherence to directives issued by it to all mobile operators. BUET is also assigned a role of oversight by the Sub-Committee in that all mobile operators may be required to obtain "Clearance Certificates" from BUET for operating within safety limits with regard to BTS already installed or to be installed in the future.

Furthermore, the Sub-committee anticipated that such initiatives and course of action shall be reflected in a set of guidelines prepared by BTRC, preferably upon consultation in BUET, concerning the installation of BTS and monitoring and regulating radiation emission therefrom.

Predicated on such recommendations of the Sub-committee the Expert Committee itself makes specific recommendations in its Report of 30.7.2013 assigning the lion's share of monitoring responsibility on BTRC. It is noted in this regard that the Director General, Engineering and Operations, BTRC was co-opted as a member of the Expert Committee by its decision of 24.3.2013.

The Expert Committee notes pertinently that the findings of the Sub-committee were expressly based and gauged against WHO guidelines given that Bangladesh presently has no relevant regulations or guidelines of its own. It is in that context that it recommends that all operators shall be brought under the purview of a BTRC monitoring mechanism to test BTS radiation limits against WHO guidelines carried out on a regular basis. As an aid to such activity the Expert Committee stresses on the immediate need for a set of BTRC regulations or guidelines regarding BTS installation and radiation emission within permissible limits.

The learned Advocate for BTRC, Mr. Khandaker Reza-E- Raquib informs this Court that over the period of four years since the preparation of the Expert Committee's Report a set of draft guidelines has indeed already been prepared by BTRC which presently awaits a firm decision at finalization. He informs this Court that BTRC is in fact meeting today to decide upon the necessary future

course of action in this regard and that he hopes to revert to this Court in due course on the finalization of the draft guidelines and BTRC's projected consequential course of action.

The Expert Committee's Report has received this Court's due consideration further in light of an Application for direction filed by the Petitioner No. 1, HRPB seeking this Court's intervention in securing expert reports from WHO, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and the International Atomic Energy Agency (IAEA) regarding the impact of radiation emitted from BTS on human health. The learned Advocate for HRPB, Mr. Manzil Murshid submits that the Expert Committee's Report of 30.7.2013 validates and substantiates HRPB's concern about unregulated radiation emission presently posing a serious health hazard and the need for reports as that of the Expert Committee to be supplemented by those of relevant international organizations drawing inter alia on the latter's advanced measurement tools and the necessary expertise. In that regard, Mr. Manzil Murshid submits that the Respondent No. 2, Ministry of Health may be directed to approach these three international organizations and obtain expert reports consequentially as a necessary follow-up to the Report of 30.7.2013.

Given this Court's understanding of the limitations and constraints under which the Sub-committee presented its report in 2013 and the apprehensions expressed of the level of danger posed to public health should BTS transmissions and emissions continue unregulated, this Court finds merit in the prayer so made.

Consequentially, the Respondent No. 2, Ministry of Health is, hereby, directed to take necessary steps to communicate forthwith with WHO, ICNIRP and IAEA to secure their expert assessments and evaluations on the situation on the ground in Bangladesh within a reasonable period. In this regard the Ministry of Health shall revert to this Court on 10.4.2017 with an update on preliminary steps positively taken by that date in that regard along with the projected date(s) of the availability of such reports.

In the meantime the Respondent No. 4, BTRC is, hereby, directed to take active and positive steps in the imminent formulation of a final set of regulations or guidelines as above discussed and revert to this Court on 10.4.2017 on the progress made in that regard.

HRPB's Application is allowed in the terms above.

Let this matter come up for Order(s) again on 10.4.2017.

Communicate this Order at once.

11.4.2017

The learned DAG Ms. Kazi Zinat Haque has reverted to this Court pursuant to the Order of 28.3.2017 seeking time on behalf of the Respondent No. 2, Ministry of Health to provide a full update on steps taken to secure expert assessment and evaluation from WHO, INCIRP and IAEA on the issue of possible unregulated BTS radiation emission. She has instructions to seek time for a period of 3 (three) months to allow time for responses from these international agencies further to preliminary steps already taken in that direction by the Ministry of Health through its Public Health Department.

The prayer is allowed.

The Respondent No. 4, BTRC on the other hand has reverted with an Affidavit highlighting terms and conditions attached to the issuance of 2G and 3G licenses to various telecommunication operators aimed at controlling spurious emissions and to confine these within certain internationally standardized emission limits. Furthermore, this Court's Order of 28.3.2017 appears to have led the BTRC to issue a memo on 6.4.2017 seeking an update from such operators on relevant compliance measures adopted. There is also an assertion that prospective 4G/LTE licenses shall stipulate all licensees inter alia to ensure the use of green technology, stopping all types radiation harmful to public health and installation of equipment to measure harmful radiation from installed radio equipments.

The learned Advocate for the Petitioner, HRPB Mr. Manzil Murshid points out that the BTRC in its Affidavit has confused the distinction between terms and conditions operating within a licensing regime and those which are intended to be a part of a monitoring mechanism to test BTS radiation limits envisaging an enhanced capacity of the BTRC as the monitoring agency. That, Mr. Murshid satisfactorily submits, was indeed the intent of the recommendations of the Expert Committee concerning a set of BTRC regulations or guidelines to ensure radiation emission within permissible limits. In other words, the guidelines anticipated in the Expert Committee's recommendation are intended to operate over and above the licensing terms and conditions issued to operators necessarily specifying the regulatory regime under which the BTRC itself assumes monitoring responsibility over and above and independently of individual telecommunication operators.

It is in that light that the BTRC is now directed to revisit this Court's order of 28.3.2017 and revert to this Court within a period of 8(eight) weeks from date as to steps taken to formulate such guidelines as recommended by the Expert Committee.

Accordingly, let this matter be placed for Order(s) again upon the expiration of such 8(eight) week period.

8.6.2017

Given the tenor of this Court's Orders of 28.3.2017 and 11.4.2017 the Respondent No. 4, BTRC has reverted with an Affidavit-in-Compliance of 7.6.2017 bringing on record the relevant Resolution adopted at the 204th Meeting of the BTRC held on 24.4.2017. It is evident that premised on this Court's Orders as above noted the BTRC has set in motion a process of procurement, installation and commissioning of Radiation Measurement Tools to evaluate Electro Magnetic Fields created from High Frequency use of Base Transceiver Station (BTS). The BTRC appears to have appreciated the urgency reflected in the earlier Court Orders and the significance of such Measurement Tools being brought into operation at the earliest.

Upon a consideration of the discussion reflected in the Minutes of the 204th BTRC meeting and appreciation of the logistical work to be done prior to full commissioning of all measurement mechanisms, this Court, hereby, directs the BTRC to immediately embark upon the procurement and installation exercise with a projected commissioning date of December, 2017.

The BTRC's learned Advocate Mr. Reza-E-Rabbi Khandaker submits further that given the significance attached by this Court to an independent set of guidelines formulated by the BTRC as envisaged in this Court's Order of 11.4.2017, the BTRC now awaits the expert assessment and evaluation report on the issue of possible unregulated BTS radiation emissions from various International Agencies as specified in the earlier Orders. It is in that context the that learned DAG is reminded to submit such reports to this Court positively by 16.7.2017 on which date this matter shall next appear for Order(s). This Court shall, accordingly, consider on that date the issuance of specific further directions on the BTRC as to the course of action is must pursue to consequentially formulate its own set of independent guidelines.

Let this Matter appear in the list again 16.7.2017 for Order(s).

16.7.2017

The learned DAG has placed an Affidavit as appears to be in evidence of the Respondent No. 2, the Ministry of Health finally gearing up its activities in line with this Court's set of Orders issued until 8.6.2017. It is noted, in particular, that direct communication has finally been established by the Respondent No. 2, albeit somewhat belatedly, on 11.6.2017 with the Dhaka Representative of the WHO with a view to procuring the Reports initially required by this Court under its Order of 28.3.2017. The learned DAG also submits satisfactorily that the Respondent No. 2 is presently pursuing the matter in all earnest.

Upon a consideration of the above, this Court, hereby, directs the Respondent No. 2 to report back to this Court on 26.10.2017, preferably, with the full set of reports submitted by the WHO, ICNIRP and IAEA.

Let this Matter appear in the list again on 30.10.2017 for Order(s).

21.11.2017

An Affidavit of Compliance pursuant to this Court's Order of 16.7.2017 on behalf of the Respondent No. 2, Ministry of Health has been filed and placed along with extensive sets of Reports produced by and secured from inter alia WHO, ICNIRP, IAEA and indeed the Respondent No. 5, BAEC.

A cursory glance at the material so produced leads to the impression that research generally undertaken on the global plane on both the acute and long-term effects from HF exposure typical of base stations provide no conclusive evidence of any related adverse health effects (particularly as per ICNIRP quoted in BAEC's Report on the ***Effect of Non-Ionizing Radiation produced as Annexure- "10A").***

Predicated on that finding, it would now be for Mr. Manzil Murshid, as learned Advocate for the Petitioner, to sift through the wealth of information so forwarded by the Respondent No. 2 in the form of the above referred Reports and evaluate and chart out the Petitioner's next course of action in terms of-

(a) the bearing and applicability of these general findings to the Bangladeshi context; and

(b) proper and expert evaluation of these Reports facilitating the due disposal of the Rule.

Mr. Murshid intends to revert to this Court in January 2018 with a detailed plan of action in that reagrd and prays for time accordingly.

Mr. Murshid is also put on notice that the IAEA, in particular, may henceforth not be further pursued in this matter given the IAEA's note of 14.7.2017 to the Chairman, BAEC declaring that radiation from BTS falls outside of the mandate of the IAEA and it is, therefore, unable to provide any expert opinion in that regard.

As per Mr. Murshid's prayer, let this Matter appear in the list again on 8.1.2018 for Order(s).

8.5.2018

Heard-in-Part

The learned DAG apprises this Court of a BTRC notice on "Public Consultation on Guidelines for Limiting Exposure to Radiation of Electromagnetic Fields (Up to 300 GHz)". A copy of the Draft Guidelines also provided for this Court's perusal reveals that the BTRC had opened up the same for consultation seeking the opinion and feedback from stakeholders, experts, researchers and any other interested parties signifying February 28, 2018 as the last date for submission of the same. The learned Advocate for the Petitioner, Mr. Manzil Murshid is also apprised through this Court of such a development.

In light of the above, the learned Advocate for the BTRC, Mr. Sayed Mahsib Hossain is, hereby, directed to seek instructions from his client as to:

(a) the kind of response elicited in the Public Consultation process thus far;

(b) the identity of the stakeholders, experts etc. who have actively provided opinion and feedback;

(c) the next stage towards the finalization of the Guidelines and the projected time frame for the same; and

(d) the scope, if any, for an extension of the deadline for submission of opinion/feedback beyond February 28, 2018.

The last point above is one of some interest to this Court in order that the Petitioner, HRPB may have an opportunity to provide its own opinion and views on the Draft Guidelines having admittedly missed the February 28, 2018 deadline to do so.

The Respondent No. 4, BRTC, is hereby, directed to respond to the queries above through an Affidavit filed no later than 20.5.2018.

20.5.2018

Heard-in-Part

An Affidavit-in-Compliance, fairly comprehensive in its scope, has been filed and placed on behalf of the BTRC today providing this Court a first glimpse into the consultative process leading to a probable finalization of the ***"Guidelines for Limiting Exposure to Radiation of Electromagnetic Fields (Up to 300 GHz)".***

It is evident further from the Affidavit itself that the concerned Committee entrusted with responsibility to prepare the said Guidelines has in the course of this very morning met to finalize the same (a working draft of which has been appended as Annexure- 20 to the Affidavit-in-Compliance).

It is now deemed imperative to direct the BTRC to furnish and bring on record the minutes of the meeting held today, i.e., on 20.5.2018 within a period of 3(three) weeks from date.

This matter is, accordingly, adjourned till 25.6.2018.

11.10.2018

Heard-in-part.

To facilitate the Petitioner's filing of a Supplementary Affidavit reflecting on the sufficiency or otherwise of the Draft Guidelines presently being vetted by the concerned Ministries, let this matter appear again as a part- heard matter on 22.10.2018.

2.1.2019

Heard-in-part.

The Petitioner's ***Reply to the 4th Affidavit-in-Compliance of the Respondent No. 4 and the 5th Affidavit-in-Compliance on behalf of the Respondent No. 4***

have been extensively placed today. It is evident that a process is presently underway for the MoPT to give its final seal of approval on the Draft Guidelines produced by the Respondent No. 4, BTRC. This Court shall the await the MoPT's input for further consideration along with the extensive recommendations of the Petitioner placed by Mr. Manzil Murshid today to formulate a comprehensive set of Guidelines eventually.
The Respondent No. 4, BTRC is, in the meantime, directed to peruse the Petitioner's recommendations in the latter's Reply of 11.11.2018 to further assist the Court in approving such comprehensive set of Guidelines.
Let this matter appear in the list again on 23.1.2019.

The Petitioners' interest has been to see to the preparation of guidelines considering the general public interest, geographical characteristic of Bangladesh, the demography and density of its population, the temperature and human body fat standard of the Bangladeshi population etc.. In this the perceived reliance by BTRC on, e.g., the dated ICNIRP Guidelines, 1998, which incidentally is subject presently to a process of review, is seen by the Petitioners to be ill-advised. It is here that the Petitioners argue for examining the Indian experience, in particular, in this regulatory area given the similarities on physical, demographic, health and infrastructural variables with Bangladesh. In this context, this Court is alerted to the fact that in India, and based on the recommendations by the Inter-Ministerial Committee (IMC) formed in 2010, the norms for exposure limit for the Radio Frequency Field (Base Station Emissions) have been reduced to better suit India's own requirements to $1/10^{th}$ of the existing limits prescribed by ICNIRP according as provided below:

Frequency	**ICNIRP Radiation Norms**	**Revised DoT Radiation Norms efft. from 01.09.12**
900 MHz	4.5 Watt/Sqm	0.45 Watt/Sqm
1800 MHz	9.0 Watt/Sqm	0.90 Watt/Sqm
2100 MHz	10.5 Watt/Sqm	1.05 Watt/Sqm

Under these circumstances the Petitioners have accordingly prayed for a direction upon the Respondents to fix the EMF limit up to $1/10^{th}$ of the limits as prescribed by ICNIRP.

Furthermore, the Petitioners cite the judgment of the High Court of Rajasthan of 27.11.2012 in *Justice I.S. Israni (Retd.) and another v Union of India* and others (PIL Petition No-2774 of 2012) that related *inter alia* to the erection of mobile towers in certain high-risk areas (susceptible to possible harmful effects of electro-magnetic radiation) like schools, hospitals and high-density

residential areas and the validity of bye-laws which prohibited the erection of mobile towers in such areas. The Rajasthan High Court held to be valid the bye-laws of the State Government made on the recommendation of the Central Government. In the case of the densely populated residential areas, the Court directed the State Government and the local authorities to decide each individual case in accordance with law. The prayer before us, accordingly, is to issue directions on similar lines upon the Respondents to include provisions in the proposed guidelines guarding against the setting up of any mobile towers/BTS on rooftop of or in the vicinity of schools, colleges, hospitals, jail premises, court premises, ancient monuments and archeological sites (as frequented by visitors and tourists) or in any other densely populated or residential areas.

The Petitioners also plead for a cautions and strict approach to regulatory control and to guard against complacency in the face of inconclusive studies and data on health hazards caused by electro-magnetic radiation. Here the Petitioners have referred to a 2016 judgment in *Asha Mishra v State of UP*, (PIL No. 48084 of 2015) where it has been observed that

> *"the absence of determinative scientific data does not lead us to hold that the technology and its perceived effect on health and wellbeing does not require a continuous monitoring or sustained scientific study or research. It is evident from the body of material placed before us that internationally a close watch is being maintained on the effects of EMF radiation. All studies indicate that presently there appears to be no definitive scientific material or data which may warrant EMF radiation being classified as endangering health. However the state of the research can at present, as we have noted above, be best described as being still nebulous and tenuous. This is perhaps the reason for research in the field being continued and ongoing. The standards adopted in our country are stated to be more stringent than those suggested by the WHO. However the fixation of a standard is but one aspect of the oversight mechanism which must necessarily be put in place. The more important and fundamental issue appears to be the requirement of a system which ensures the adherence to the standards fixed. This aspect, in our opinion, cannot be left to depend solely upon a 10% random annual check carried out by TERM Cells."*

"TERM Cells", the Petitioners explain to be an acronym for "Telecom Enforcement, Resource and Monitoring" Cells.

It is also stated that in the *Asha Mishra Case* the Court also addressed directions primarily to the Indian Department of Telecommunication (DOT) with a view to making the monitoring and regulatory system more robust and responsive. These directions included the following:

> *i) DOT will expeditiously and not later than within 2 months from the date of this judgment frame guidelines for the TERM Cells carrying out periodical inspection of mobile towers and BTS stations falling within their respective jurisdictions;*
> *ii) DOT while framing the guidelines shall also consider and if thought feasible incorporate appropriate provisions for inspection of all or such percentage of cell towers as may be deemed appropriately by the TERM Cells;*
> *iii) DOT shall also consider and implement a mechanism where the testing of cell sites is not left to depend upon the self-certification procedure of the service provider solely;*
> *iv) The directions issued shall mandate the TERM Cells to disclose their findings of compliant and non-compliant mobile towers and BTS's for the information of the general public;*
> *v) The TERM Cells shall also make known to the general public the action taken against erring and non-compliant mobile towers and BTS establishments;*
> *vi) DOT shall ensure that the particulars of TERM Cells including the particulars of its Nodal Officer for different regions are made known to the members of the general public;*
> *vii) DOT shall establish a complaint cell in the various regions details of which are given wide publicity in the area concerned, to receive and address public complaints relating to mobile towers and BTS;*
> *viii) DOT shall also issue necessary directions to ensure that the complaint cell duly looks into, enquires and disposes of such complaints within a reasonable period of time.*
> *Subject to the aforesaid directions, this writ petition stands disposed of."*
> *Copy of the Judgment will be filed at the time of hearing.*

Given the Indian experience above, the Petitioners now pray that similar directions may issue from this Court.

It is necessary at this juncture to chart the process through which the Guidelines (as later more specifically identified) came to be formulated in draft as part of a continuous concerted exercise under this Court's guidance and crucial interventions. That process is charted in BTRC's Affidavit-in-Opposition of

29.1.2019 affirmed by the BTRC's Deputy Director, Engineering & Operations Division.

Harkening back to this Court's Rule issuing Order dated 30.10.2012 and the directions issued with it, the genesis of the Guidelines is first traced to efforts by the Respondent No. 2, Ministry of Health. The Respondent No. 2 filed an Affidavit-in-Compliance on 23.3.2017 stating the following:

a) That in pursuant to the Court's Order an Expert Committee was formed on 30.12.2012 to examine the health risks and environmental effects of radiation from MPTs which were set up in different places of the country by various mobile companies.

b) Subsequently, a sub-Committee was also formed in this regard to carry out the necessary tests and to submit reports to the Expert Committee. Consequently, the said sub-Committee carried out measurement of Electromagnetic radiation level on multiple cell-phone tower sites in Dhaka city.

c) The sub-Committee visited multiple sites of all the GSM and CDMA service providers i.e. GrameenPhone, Teletalk, Robi, Airtel, Banglalink and Citycell. Multiple sites at Dhanmondi R/A and Motijheel C/A were also visited. Furthermore, measurements were carried out in Udayan School area.

d) During the aforesaid visit, data about radiation power density and electric field strength were measured in sites of all the GSM and CDMA service providers of Bangladesh. From the data, SAR (Specific Absorption Rate) was calculated. All the data were analyzed and compared against safety standards to find out potential health hazards.

e) Accordingly on 16.6.2013, the said sub-committee submitted a detailed report along with its findings to the Expert Committee on the BTS radiation emission. In the said report, the sub-committee made the following recommendations –

i) BTRC is to ensure that emission of harmful radiations by the all BTS of all the six telecom operators be brought down and/or maintained within the limit as prescribed by WHO guidelines;

ii) BTRC shall regularly monitor radiation emissions from all the BTS established within the territory of Bangladesh;

iii) BTRC shall, upon consultation with the concerned ministry i.e. MoPTIT, make regulations and/or guidelines for installation of the BTS and the effective monitoring and controlling of harmful emissions from the BTS;

f) That accordingly, on the basis of the findings and recommendations of the sub-Committee, the Expert Committee of the

Ministry of Health submitted its Report dated 30.7.2013 to the concerned Ministry.

Subsequently, on 28.3.2017, a Report dated 30.7.2013 was placed before this Court. During the hearing of the same, the Respondent No. 4, BTRC detailed the progress that took place in previous years in pursuance to the aforesaid Expert Committee Report dated 30.7.2013 and duly informed this Court that over the period of four years since the submission of the Expert Committee's Report, a set of draft guidelines had already been prepared by BTRC awaiting a firm decision at finalization. As a result, this Court being satisfied, directed the Respondent No. 4, BTRC to take active and positive steps in the imminent formulation of a final set of regulations or guidelines and revert to this Court in due course on the progress made in this regard. Additionally, the Ministry of Health was also directed to take necessary steps to communicate forthwith with the WHO, ICNIRP and IAEA to secure their expert assessments and evaluation on the issues concerned.

In compliance to the aforesaid Order dated 28.3.2017 of this Court, the Respondent No. 4, BTRC duly filed an Affidavit-in-Compliance (1st Affidavit-in-Compliance dated 11.4.2017). The said 1st Affidavit-in-Compliance was considered by this Court on 11.4.2017 with the Court consequentially further directing the Respondent No. 4, BTRC to place additional updates in due course on the steps taken to formulate guidelines as recommended by the Expert Committee.

Accordingly, BTRC filed an Affidavit-in-Compliance (2nd Affidavit-in-Compliance dated 7.6.2017) providing updates of relevant resolutions adopted at the 204th Meeting of BTRC as held on 24.4.2017. Accordingly, at the time of hearing on 8.5.2018, this Court was duly informed by BTRC that it had set in motion a process of procurement, installation and commissioning of radiation measurement tools to evaluate EMF created from high frequency use of BTS. Additionally, BTRC also informed this Court that given the significance of an independent set of guidelines formulated by BTRC, it was then awaiting the experts' assessments and evaluation reports on the issue of possible unregulated BTS radiation emissions from various international agencies. This Court, therefore, directed BTRC to place further updates on the next date.

Accordingly, on 17.5.2018, BTRC in compliance to the Court's Order dated 8.5.2018 filed an Affidavit-in-Compliance (3rd Affidavit-in-Compliance dated 17.5.2018). In the said Affidavit-in-Compliance, BTRC provided the latest updates to this Court regarding the consultative process leading to finalization of the "*Guideline for Limiting Exposure to Radiation of Electromagnetic Fields(up to 300GHz)*". Updates were also provided on the following issues in the terms hereunder:

a) That vide an office order dated 18.1.2018, BTRC reconstituted the Committee entrusted with the responsibility to prepare the *Guidelines for Limiting Exposure Radiation of Electromagnetic Fields (up to 300GHz)*.

b) That in response to the BTRC's notices on the Public Consultation, written feedbacks were given by various national and international stakeholders including Wifi Alliance, MWF Mobile & Wireless Forum, GSMA as well as the Mobile Phone Operators vide separate letters in relation to the proposed Guidelines for limiting Exposure Radiation of Electromagnetic Fields (up to 300 GHz).

c) That accordingly on 6.5.2018, the Committee in its 6th meeting presented the draft Guidelines along with the feedbacks/opinions as received from the stakeholders in pursuance to the public consultation notice. In the said meeting, the members of the Committee entrusted with the responsibility to prepare the Guidelines gave their valuable opinions on the Draft Guidelines. Moreover, during the said meeting it was also decided that *Guidelines for Limiting Exposure Radiation of Electromagnetic Fields (up to 300 GHz)* shall be finalized at its 7th and final meeting of the Committee scheduled to take place on 20.5.2018.

d) Apart from the above, updates were also provided in respect of the procurement of the Radiation Measurement Equipments on urgent basis. It was stated that following the rules of PPR – 2008, the Notification of Award dated 12.12.2017 had already been issued in favour of the selected entity i.e. Fastech Telecommunication (I) Pvt. Limited to proceed with the execution of supply of goods and services along with monitoring vehicles.

Accordingly, on 20.5.2018, upon the aforesaid 3rd Affidavit-in-Compliance being placed before this Court, a further direction issued upon the BTRC to furnish and bring on record the minutes of the final Committee meeting was scheduled to be held on 20.5.2018.

Accordingly further, the Respondent No. 4, BTRC filed an Affidavit-in-Compliance (4th Affidavit-in-Compliance dated 9.7.2018) attaching the Meeting minutes dated 20.5.2018 of the Committee entrusted with the responsibility to prepare the "*Guideline for Limiting Exposure to Radiation of Electromagnetic Fields (up to 300GHz)*". Additional updates were also provided on the following issues in the terms as hereunder:

a) That on 20.5.2018, the Committee entrusted with the responsibility to prepare the Guidelines, thoroughly scrutinized the recommendations feedbacks received from various international organizations and relevant stakeholders. Upon due consideration of the same, the said Committee incorporated the relevant provisions and finalized the "*Guideline for Limiting Exposure To time-varying Electric, Magnetic Fields (up to 300*

GHz)." Accordingly the said Committee submitted its Final Report dated 20.5.2018 before the Chairman, BTRC.

b) That subsequently on 30.5.2018, BTRC forwarded the said Guidelines as finalized by the aforesaid Committee to the Respondent No. 1, Ministry of Posts, Telecommunications and Information Technology ("MoPTIT") for its review and approval.

c) That apart from the above, updates were also provided in terms of the procurement of Radiation Measurement Equipments. It was stated that on 20.5.2018 a contract for procuring the Radiation Measurement Equipments was executed between the selected entity i.e. Fastech Telecommunication (I) Pvt. Limited and BTRC in accordance with PPR 2008 to procure Radiation Measurement Equipment.

Accordingly, on 5.11.2018, upon hearing the 4th Affidavit-in-Compliance as filed on behalf of the Respondent No. 4, BTRC this Court further directed BTRC to place the updates and developments i.e. latest status of approval by the concerned Ministry i.e., MoPTIT in respect of the "*Guideline for Limiting Exposure to Radiation of Electromagnetic Fields(up to 300GHz)*".

This was achieved through BTRC's filing of an Affidavit-in-Compliance (5th Affidavit-in-Compliance dated 13.11.2018) incorporating updates on the following terms:

a) That earlier on 30.5.2018, BTRC forwarded the final draft of the *"Guidelines for Limiting Exposure to Radiation of Electromagnetic Fields"* to the MoPTIT. Accordingly, the MoPTIT arranged a meeting on 29.8.2018 in presence of the representatives from relevant Ministries. During the aforesaid meeting, the MoPTIT duly analyzed and reviewed the draft Guidelines in details. Upon thorough analysis, the MoPTIT identified few specific clauses and thereby recommended and/or proposed to the BTRC to make necessary changes. Accordingly, the aforesaid recommendations/observations/proposals of MoPTIT was duly communicated to BTRC vide a letter dated 9.9.2018 for necessary actions.

b) That in response to the above, BTRC on 24.9.2018 arranged a Commission meeting and duly placed and addressed the above mentioned recommendations/observations/findings of MoPTIT. Accordingly, upon careful examination and due consideration of the same, BTRC made necessary changes and incorporated the same in the said Guidelines. Subsequently on 4.10.2018, BTRC again sent the revised Guidelines along with its clarification to the MoPTIT for its approval.

c) That apart from the above, updates were also provided in terms of the procurement of Radiation Measurement Equipments. It was stated that earlier on 20.5.2018, a contract for procuring the Radiation

Measurement Equipments was executed between the selected entity i.e. Fastech Telecommunication (I) Pvt. Limited and BTRC in accordance with PPR 2008. Accordingly, Fastech Telecommunication (I) Pvt. Limited supplied two sets of Radiation Measurement Equipments and simulation software with related accessories. Consequently on 26.9.2018, a committee of BTRC duly inspected all the equipments and received them as per the packing list in good order and condition**.**

d) That in the meantime, the bulk of the work had already been completed by BTRC for calibration and configuration of the said equipments. Additionally, trainings and necessary instructions have also been given to the expert team of BTRC for using the aforesaid apparatus.

e) That it was also stated that using the aforesaid Radiation Measurement equipments, BTRC, in a limited range, has already carried out few tests on various antennae of different operators situated in selected areas i.e. at Ramna, IEB Bhaban, BUET, and TSC. As per the Radiation Measurement Test reports, it was found that the average rate of EMF as assessed from the said towers are within the accepted and defined range i.e. 4.5 W/m² as per the ICNIRP guidelines.

Subsequently, on 2.1.2019, the said 5th Affidavit-in-Compliance dated 13.11.2018 along with Petitioner's Reply to the 4th Affidavit-in-Compliance of the Respondent No. 4, BTRC were placed before this Court extensively. In course of hearing of the same, this Court expressed a number of observations/views in respect of the revised '*Guidelines for Limiting Exposure to Radiation of Electromagnetic Fields'* as prepared by BTRC. Accordingly, BTRC was directed to peruse the Petitioners' recommendations in its Reply dated 11.11.2018 to further assist the Court in approving such comprehensive set of Guidelines.

Consequently, on 24.1.2019, BTRC in compliance to the aforesaid Order dated 2.1.2019 filed an Affidavit-in-Compliance (6th Affidavit-in-Compliance dated 24.1.2019) providing BTRC's reply along with detailed explanations/comments in respect of the proposals and suggestions as put forward by the Petitioners.

Taking stock of all the developments above charted, it is noted that this matter was in a virtual state of dormancy for five years until it was revived through the Orders of this Court issued from March, 2017 onwards. And two years on, we presently find ourselves in a position to provide our initial sets of opinions and recommendations while at the same time signifying a disposal of the Rule Nisi as issued on 30.10.2012. The revival of this case five years after 2012 is evident in our Order of 8.3.2017 followed by a series of several Orders all through 2017 and beyond as reproduced above. The parties are now alerted to the fact at the outset that this matter necessarily shall henceforth be treated as one in

continuing mandamus. A continuing mandamus is a relief given by a court of law through a series of ongoing orders over a long period of time, directing an authority to do its duty or fulfill an obligation in general public interest, as and when a need arises over the duration a case lies with the court, with the court choosing not to dispose the case off in finality. This Court notes that the series of its Orders as reproduced hereinabove are all indicative of this case assuming the character of one in continuing mandamus. This is so because the matter at hand is typical of a situation which cannot be remedied instantaneously but requires a solution over an extended period of time, and at times going on for years. The parties, therefore, shall prepare themselves for a monitoring by this Court of its Orders as will emanate through this Judgment and Order of today's date reflecting a practice that has effectively evolved through the issuance of its Orders at least from 8.3.2017 onwards. The mode of treatment of this case shall, therefore, quintessentially involve *inter alia* judicial consideration of periodic progress reports filed by the concerned authorities in implementing the guidelines, recommendations and directions as shall emanate from this Court either today or on any date in the future.

We now proceed with a comparative examination of the *Guidelines for Limiting Exposure to Radiation of Electromagnetic Fields 9khz to 300 GHZQ ("Guidelines")* as appears as Annexure-36 to the 8th Affidavit-of-Compliance filed on behalf of the Respondent No. 4, Chairman BTRC on 7.3.2019 and the full set of additional recommendations and suggestions incorporated in the Petitioners' Reply of 11.11.2018 to the 4th Affidavit-of-Compliance of the Respondent No. 4. The Guidelines are reproduced in their entirety hereinbelow:

BANGLADESH TELECOMMUNICATION
REGULATORY COMMISSION
IEB Bhaban, Ramna, Dhaka-1000

No.: **Date:**

GUIDELINES
FOR
LIMITING EXPOSURE TO RADIATION OF ELECTROMAGNETIC FIELDS (9 kHz TO 300 GHz)

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BANGLADESH TELECOMMUNICATION REGULATORY COMMISSION

GUIDELINES FOR LIMITING EXPOSURE TO RADIATION OF ELECTROMAGNETIC FIELDS (9 kHz TO 300 GHz)

1. INTRODUCTION

1.1 Bangladesh Telecommunication Regulatory Commission (BTRC) has the authority to issue necessary direction to any person (natural or legal whatsoever) in order to regulate the harmful effect of all kinds of electromagnetic radiation in the frequency range from 9 kHz to 300 GHz in Bangladesh under Section 58 read with Sections 30(1)(g), 30(2)(j), 30(2)(k), 30(2)(l) and 31 of the Bangladesh Telecommunication Regulation Act, 2001 (as amended) with prior approval from the Government. The Hon'ble High Court Division vide the order dated 28.03.2017 passed in Writ Petition No. 14258 of 2012 has been pleased to direct BTRC to take active and positive steps in the imminent formulation of a final set of regulations/guidelines for limiting radiation from BTS towers. The Government of Bangladesh has the authority under Section 34(c) of the Act to make guidelines for any matter of telecommunication service and take proper initiatives, unless there is no sufficient rules in the Act and as such government has consequently empowered BTRC to formulate regulations/guidelines on Electromagnetic Field (EMF) radiation.

1.2 There is a public concern over possible health and environment effects from radio waves e.g. Electromagnetic Field Radiation (EMR) exposure from telecom transmitters and its associated equipment, especially Base Transceiver Station (BTS), Mobile Phone handset and antenna.

1.3 The radio waves currently used for telecommunication or broadcasting are electromagnetic waves which do not have enough energy to ionize atoms from materials. Although some of the electromagnetic waves, such as ionizing radiation including X-ray or gamma-ray, have high frequencies and strong energy that ionize atoms, those are different from the radio waves dealt herewith.

1.4 The exposure limits adopted in these guidelines are based on the values released by International Commission on Non-Ionizing Radiation Protection (ICNIRP), and the compliance with these limits ensures protection of human health and environment from the harmful influence of electromagnetic fields according to the World Health Organization (WHO) and ICNIRP [1], [2].

1.5 These guidelines may be withdrawn, revised, updated or amended from time to time taking into consideration various factors including but not limited to any threat to public health, national security and of court orders.

1.6 These guidelines are approved by the Government and shall come into effect from the date of their issuance by Bangladesh Telecommunication Regulatory Commission (BTRC).

2. DEFINITIONS AND ABBREVIATIONS

In these guidelines, unless the context otherwise requires the following terms and definitions apply:

2.1 **'Act'** means the Bangladesh Telecommunication Regulation Act, 2001 (as amended).

2.2 **'Adverse Health Effect'** means a biological effect characterized by a harmful change in health.

2.3 **'Antenna'** means a device that serves as a transducer between a guided wave (e.g. coaxial cable) and a free space wave, or vice versa. It can be used to emit or receive a radio signal.

2.4 **'Averaging Time'** means the appropriate time period over which exposure is averaged for purposes of determining compliance with basic restrictions or reference level.

2.5 **'Basic Restrictions (BRs)'** means restrictions on exposure to time-varying electric, magnetic and electromagnetic fields that are based directly on established health effects. Depending upon the frequency of the field, the physical quantities used to specify these restrictions are: internal electric field (V/m), specific absorption rate (SAR) and power density (W/m^2)

2.6 **'Biological Effect'** means an effect caused by, or in response to, exposure to a biological, chemical, or physical agent, including electromagnetic energy.

2.7 **'Base Station (BS)'** means fixed equipment for radio transmission used in cellular communication and/or wireless installation for local area networks. For the purpose of these guidelines, the term base station includes all radio transmitter(s) and associated antenna(s).

2.8 **'Central Nervous System (CNS)'** means the portion of the vertebrate nervous system consisting of the brain and spinal cord, but not including the peripheral nerves.

2.9 **'Commission'** means the Bangladesh Telecommunication Regulatory Commission (BTRC).

2.10 **'Compliance'** means conformity with the requirements of these guidelines.

2.11 **'Controlled/Occupational Exposure'** means Controlled/occupational exposure applies to situations where the persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Controlled/occupational exposure also applies to the cases where the exposure is of transient nature as a result of incidental passage through a location where the exposure limits may be above the general population/uncontrolled environment limits, as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

2.12 **'Electric Field'** means a fundamental component of electromagnetic waves, which exists when there is a voltage difference between two points in space.

2.13 **'Electric Field Strength (E)'** means force exerted by an electric field on an electric point charge, divided by the electric charge. Electric field strength is expressed in newton per coulomb (N/C) or volt per meter (V/m).

2.14 **'EMF'** means electric, magnetic or electromagnetic field.

2.15 **'Exposure'** Exposure occurs wherever a person is subjected to electric, magnetic or electromagnetic fields or to contact currents other than those originating from physiological processes in the body or other natural phenomena.

2.16 **'Exposure Limits'** means values of the basic restrictions or reference levels acknowledged, according to these guidelines, as the limits for the permissible maximum level of the human exposure to the electromagnetic fields.

2.17 **'Far-field Region'** means that region of the field of an antenna where the angular field distribution is essentially independent of the distance from the antenna. In the far-field region, the field has predominantly plane-wave character, i.e., locally uniform distribution of electric field strength and magnetic field strength in planes transverse to the direction of propagation.

2.18 **'General Public'** means all non-workers.

2.19 **'General Public/Uncontrolled Exposure'** general public/uncontrolled exposure applies to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure.

2.20 **'Hand-held Device'** means a portable device containing a wireless transmitter or transceiver which may be located in a user's hand during its intended use or operation of its radio functions

2.21 **'Ionizing Radiation'** means any electromagnetic or particulate radiation capable of producing ions directly or indirectly in its passage through matter. Examples are X-rays and gamma rays.

2.22 **'Licensee'** means any entity licensed under the provisions of the Act.

2.23 **'Limbs'** means the entire leg or arm.

2.24 **'Magnetic Field'** means a fundamental component of electromagnetic waves produced by a moving electric charge.

2.25 **'Magnetic Field Strength (H)'** means the magnitude of the magnetic field vector; expressed in units of ampere per meter (A/m).

2.26 **'Near-Field Region'** means a region which exists in the proximity to an antenna or other radiating structure in which the electric and magnetic fields do not have a substantially plane-wave character but vary considerably from point to point.

2.27 **'Non-ionizing Radiation'** means any type of electromagnetic radiation that does not carry enough energy per quantum (photon energy) to ionize atoms or molecules that is, to completely remove an electron from an atom or molecule.

2.28 **'Plane Wave'** means an electromagnetic wave characterized by mutually orthogonal electric and magnetic fields that are related by the impedance of free space (377 ohms).

2.29 **'Power Density'** means the rate of flow of electromagnetic energy per unit surface area usually expressed in W/m^2 or mW/cm^2 or $\mu W/cm^2$.

2.30 **'Reference Level'** means limits for the exposure field strength and power density values derived or estimated from the BRs. The reference levels associated with direct effects are electric field strength (E), magnetic field strength (H), magnetic flux density (B) and power density (S).

2.31 **'Site'** means an installation emitting EMF into the environment or workplace.

2.32 **'Specific Absorption Rate (SAR)'** means the rate at which RF energy is absorbed in body tissues, in watts per kilogram (W/kg).

2.33 **'Telecommunication'** would refer to the 'telecommunication' as defined in section 2(11) of the Act;

2.34 **'Transmitter'** means an electronic device used to intentionally generate radio frequency electromagnetic energy for the purpose of communication.

2.35 **'Transmitter-owner'** means the person or company who owns, or is responsible for, the operation of an installation emitting EMF into the environment or workplace.

2.36 **'Risk'** means the probability of a specific adverse outcome associated with an acute (short term) or chronic (long term) exposure scenario.

2.37 **'Unperturbed Field'** means the electric or magnetic field, generated by a source that has no reflected or re-radiated field components.

2.38 **'Worker'** means an employee, including trainees and apprentices, who is subjected to EMF exposure at work.

2.39 **'Abbreviations'**

BRs	-	Basic Restrictions
BS	-	Base Station
BTRC	-	Bangladesh Telecommunication Regulatory Commission
BTS	-	Base Transceiver Station
CNS	-	Central Nervous System
CW	-	Continuous Wave
EMF	-	Electromagnetic Field
RF	-	Radio Frequency
rms	-	Root Mean Square

SAR - Specific Absorption Rate
ICNIRP - International Commission on Non-Ionizing Radiation Protection
IEC - International Electrotechnical Commission
ITU - International Telecommunication Union
WHO - World Health Organization

3. OBJECTIVES

The objectives of these guidelines are:

3.1 to specify exposure limits to protect against adverse effects to health and environment induced by exposure to Radio Frequency (RF), electric, magnetic and electromagnetic fields over the frequency range from 9 kHz to 300 GHz.

3.2 to provide guidance for evaluating RF exposure levels.

3.3 to ensure that personnel in controlled and uncontrolled environments are not exposed at levels greater than the limits specified in these guidelines.

4. SCOPE

These guidelines shall be applicable:

4.1 wherever the general public may be exposed to RF fields and whenever employees may be exposed in the course of their work, but not be applicable to patients undergoing diagnosis or treatment under medical supervision.

4.2 to Continuous Wave (CW), pulsed and modulated electromagnetic fields at single or multiple frequencies from 9 kHz to 300 GHz.

4.3 where RF fields are produced or radiated, either deliberately or incidentally, by the operation of equipment or devices.

4.4 to telecommunication installations or devices operating in frequency range from 9 kHz to 300 GHz including, but not limited to, base stations used in cellular mobile network, broadband wireless access network, public switched telephone network and wireless handsets, mobile phones etc.

It is the responsibility of the licensee/transmitter-owner, manufacturer and importer to ensure that all devices and installations are operated in such a way as to achieve compliance with the requirements of these guidelines.

5. MAXIMUM EXPOSURE LIMITS

Maximum limits of human exposure to radiofrequency fields in the frequency range from 9 kHz to 300 GHz are laid down below in Table 1, Table 2 and Table 3 [3], [4]:

Table 1: Basic restrictions limits*

Type of Exposure	Frequency Range (f)	Internal Electric Field (V/m) for CNS Tissue of the Head	Internal Electric Field (V/m) for all Tissues of Head and Body	Whole-body Average SAR (W/kg)	Localized SAR (head and trunk) (W/kg)	Localized SAR (limbs) (W/kg)
Occupational Exposure	9 kHz – 100 kHz	$2.7 \times 10^{-4} f$	$2.7 \times 10^{-4} f$			
	100 kHz – 10 MHz	$2.7 \times 10^{-4} f$	$2.7 \times 10^{-4} f$	0.4	10	20
	10 MHz – 10 GHz			0.4	10	20
General Public Exposure	9 kHz – 100 kHz	$1.35 \times 10^{-4} f$	$1.35 \times 10^{-4} f$			
	100 kHz – 10 MHz	$1.35 \times 10^{-4} f$	$1.35 \times 10^{-4} f$	0.08	2	4
	10 MHz – 10 GHz			0.08	2	4

***Note:**

i. f is the frequency in hertz.

ii. All internal electric field values are rms.

iii. In the frequency range above 100 kHz, RF specific basic restrictions need to be considered additionally.

iv. All SAR values are to be averaged over any 6-minute period.

v. The localized SAR averaging mass is any 10 g of contiguous tissue; the maximum SAR so obtained should be the value used for the estimation of exposure.

Table 2: Basic restrictions for power density for frequencies between 10 GHz and 300 GHz*

Exposure Characteristics	Power Density (W/m^2)
Occupational Exposure	50
General Public Exposure	10

***Note:**

i. Power densities are to be averaged over any 20 cm^2 of exposed area and any $68/f^{1.05}$ min period (where f is in GHz) to compensate for progressively shorter penetration depth as the frequency increases.

ii. Spatial maximum power densities, averaged over 1 cm^2, should not exceed 20 times the values above.

Table 3: Reference Levels (unperturbed rms values) limits*

Type of Exposure	Frequency Range (f)	Low Freq. Reference Levels		RF Specific Reference Levels		
		Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Equivalent Plane Wave Power Density Seq (W/m^2)
Occupational Exposure	9 kHz – 100 kHz	170	80			
	0.1 MHz – 1 MHz	170	80	610	1.6/f	
	1 MHz – 10 MHz	170	80	610/f	1.6/f	
	10 MHz – 400 MHz			61	0.16	10
	400 MHz– 2000MHz			$3f^{1/2}$	$0.008\, f^{1/2}$	$f/40$
	2 GHz – 300 GHz			137	0.36	50

Type of Exposure	Frequency Range (f)	Low Freq. Reference Levels		RF Specific Reference Levels		
		Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Equivalent Plane Wave Power Density Seq (W/m^2)
General Public Exposure	9 kHz – 100 kHz	83	21			
	0.1 MHz – 1 MHz	83	21	87	0.73/f	
	1 MHz – 10 MHz	83	21	$87/f^{1/2}$	0.73/f	
	10 MHz – 400 MHz			28	0.073	2
	400 MHz –2000 MHz			$1.375\ f^{1/2}$	$0.0037\ f^{1/2}$	$f/200$
	2 GHz – 300 GHz			61	0.16	10

***Note:**

i. *f* as indicated in the frequency range column.

ii. For frequencies between 100 kHz and 10 GHz, the averaging time for RF specific reference levels is 6-min. For frequencies exceeding 10 GHz, the averaging time is $68/f^{1.05}$ minutes (f in GHz).

iii. Low Freq. Reference Levels are regarded as instantaneous values which are not to be time averaged.

iv. For frequencies up to 100 kHz, peak values can be obtained by multiplying the rms value by √2 (~1.414). For pulses of duration tp the equivalent frequency to apply in the basic restrictions should be calculated as f =1/(2tp).

v. Between 100 kHz and 10 MHz, peak values for the RF specific reference levels field strengths are obtained by interpolation from the 1.5-fold peak at 100 MHz to the 32-fold peak at 10 MHz. For frequencies exceeding 10 MHz, it is suggested that the peak equivalent plane-wave power density, as averaged over the pulse width, does not exceed 1,000 times the Seq limit, or that the field strength does not exceed the 32 times field strength exposure levels given in the table.

vi. For frequencies between 100 kHz and 10 MHz protection from both low frequency effect as well as RF specific effect need to be considered.

N.B: The exposure limits adopted in these guidelines are based on the values released by ICNIRP. However, based on ground survey and continuous research these limits can be revised by the Commission from time to time.

6. ASSESSING COMPLIANCE WITH THE EXPOSURE LIMITS

6.1 The basic restrictions are specified through quantities that are often difficult and, in many cases, impractical to measure. Therefore, reference levels of exposure, which are simpler to measure, are provided as an alternative means of showing compliance with the basic restrictions. The Electric and Magnetic Field reference levels have been derived by ICNIRP from the basic restrictions through mathematical modelling and laboratory investigations.

6.2 In the far-field zone, electric field strength, magnetic field strength and power density are interrelated by simple mathematical expressions, where any one of these parameters defines

the remaining two. In the near-field zone, both the unperturbed electric and magnetic field strengths shall have to be measured, since there is no simple relationship between these two quantities. Instrumentation for the measurement of magnetic fields at certain frequencies may not be commercially available. In this case, the electric field strength shall have to be measured and used for assessing compliance with the basic restrictions in these guidelines.

6.3 Specific Absorption Rate (SAR) evaluation is required when transmitting devices used with the radiating part of the device in close proximity to the human head and positioned against the ear, for example mobile phones, cordless phones, and handsets operating in the frequency range between 300 MHz to 10 GHz.

6.4 Assessment of exposure to RF fields will be accomplished using appropriate instrumentation and measurement methods as recommended by the International Telecommunication Union (ITU) and/or the International Electrotechnical Commission (IEC).

6.5 In areas that are reasonably accessible to the general public, measurements or evaluations of exposure shall have to be undertaken by the licensee/transmitter-owner to ensure compliance with the maximum exposure limits of these guidelines.

6.6 Every concerned manufacturer, importer, licensee/transmitter-owner shall meet the limits of Human Exposure to RF Fields specified in these guidelines.

6.7 In case of high RF level created in an area which is not likely to be visited by the public or not used regularly by station employees and, if the tower is marked by appropriate warning signs, it can be assumed that there is no significant effect on the human and environment with regard to exposure of the human. But in high RF areas where intermittent maintenance and repair should be performed by station employees, legal releases signed by employees willing to accept high exposure levels are not acceptable and may not be used in lieu of corrective measure, if exposure exceeds occupational exposure limits.

6.8 In case of shared sites/multiple transmitter sites, on the same or different plots, to keep the area into compliance, all licensees/transmitter-owners contributing exposures that exceed 5% of the relevant limits shall share responsibility based on contribution.

6.9 BTRC may verify the compliance of the licensee/transmitter-owner, importer and manufacturer of the maximum exposure limits specified in these guidelines. It would include any transmitter and address public concern about excessive radiation, through appropriate software tool and/or field measurement approach based on standard procedure and tools recommended by ITU or IEC conducted either by its own officers or employees or through an agency appointed by it, or through joint monitoring with transmitter-owner.

6.10 All concerned parties shall follow related documents issued by ITU (including, but not limited to, K.52, K.61, K.70, K.83, K.91, K.100 etc. or any further developments) and IEC (including, but not limited to, IEC 62232 or any further developments) to comply with the limits for human exposure to EMF.

6.11 Verification of compliance should be based on conditions leading to the highest RF field levels emitted under maximum expected duty factor. Further assessment should be made after any modification that may increase the level of human exposure.

7. INFORMATION, INSPECTION AND REPORTING

7.1 The Licensee/Transmitter-owner shall furnish necessary information and other related matters as may be sought by the Commission from time to time.

7.2 The Commission or its authorized representatives shall have free access to the installations/transmitters of the licensee/transmitter-owner and shall have each and every right and authority to inspect such installations at any time and the licensee/transmitter-owner shall always provide all sorts of cooperation and assistance including but not limited to use of suitable office accommodation for the purpose of inspection, measurement and monitoring.

7.3 All licensee/transmitter-owner shall submit compliance report to the Commission within the following time line in the format and measurement modality specified by the Commission through administrative order from time to time:

a. For existing sites, defined as sites in operation before these guidelines are published, submission shall have to be within 01(one) year calculated from date of publication of these guidelines.

b. For new sites on-aired in any reference month, the monthly compliance report shall have to be submitted within first 10(ten) days of the month following the next month of the reference month.

c. Revised compliance report shall have to be submitted within first 10 (ten) days of the month following the next month of the reference month where a physical or logical parameter or hardware modification performed in any reference month, if such modification increases exposure levels.

7.4 Mobile Handset manufacturer/importer shall submit or disclose SAR value in the format ~~if and when~~ as shall be required by the Commission.

8. RECORD KEEPING

8.1 Every licensee/transmitter-owner shall preserve an up-to-date log of measurements or evaluations of exposure of the transmitter/site and make available for inspection by the Commission. The duration of the record keeping shall be in accordance to their respective licensing provision.

8.2 The personal exposure records of workers who are occupationally exposed to RF fields shall have to be maintained and copied to the concerned workers annually so that retrospective health enquiries can be made. The owner of an installation shall ensure that workers who are exposed to EMF at work receive necessary information and training relating to their exposure and are made aware of mitigating measures needed to comply with EMF exposure limits.

9. DISPUTE RESOLUTION

In the event of any disputes among telecommunication licensees/transmitter-owner for shared sites/multiple transmitter sites, the Licensee(s)/Transmitter-owner(s) may refer the matter as per law(s) of Bangladesh to the Commission for resolution of the same. The Commission

may resolve the dispute in accordance with the Bangladesh Telecommunication Regulation Act, 2001 (as amended) and the same shall be binding on the concerned parties.

10. INTERPRETATION

In case of any doubt regarding interpretation of any of the provisions of these guidelines, the clarification of the Commission shall be final and binding.

11. LEGAL ACTION

This Guideline would be an integral part of all licenses (who uses radio frequency) issued by BTRC. In case, any person (natural or legal including licensee/transmitter-owner, importer, manufacturer etc.) violates any provisions of these guidelines, the Commission shall take action under sections 46(d) and/or 63(1) and/or 64(1) and/or 65 and/or 73/74 of the Bangladesh Telecommunication Regulation Act, 2001 (as amended).

12. REFERENCES

[1] Icnirp.org. (1998). USE OF THE ICNIRP EMF GUIDELINES. [online] Available at: https://www.icnirp.org/cms/upload/publications/ICNIRPUseEMFgdl.pdf [Accessed 13 May 2018].

[2] http://www.who.int. (2018). WHO EMF project. [online] Available at: http://www.who.int/peh-emf/about/en/ [Accessed 13 May 2018].

[3] Icnirp.org. (1998). ICNIRP GUIDELINES FOR LIMITING EXPOSURE TO TIME-VARYING ELECTRIC, MAGNETIC AND ELECTROMAGNETIC FIELDS (UP TO 300 GHZ). [online] Available at: https://www.icnirp.org/cms/upload/publications/ICNIRPemfgdl.pdf [Accessed 6 Apr. 2018].

[4] Icnirp.org. (2010). ICNIRP GUIDELINES FOR LIMITING EXPOSURE TO TIME-VARYING ELECTRIC AND MAGNETIC FIELDS (1HZ – 100 kHZ). [online] Available at: https://www.icnirp.org/cms/upload/publications/ICNIRPLFgdl.pdf [Accessed 6 Apr. 2018].

As already indicated, the Guidelines are the product of a concerted exercise. The completeness of record, therefore, requires the detailing of the Petitioners' input in the process. That input is best reflected in the Petitioners' recommendations and proposed interventions itemized specifically in their Reply dated 11.11.2018 to BTRC's 4th Affidavit-in-Compliance incorporating the draft Guidelines. These recommendations predicated on an early draft produced by the BTRC have for the most part been reflected in the Guidelines as above recorded and, therefore, merit being reproduced below:

i. the Respondents may be directed to frame guidelines for limiting exposure to radiation of EMF reducing reference level to 1/10th of the existing limits of radiation as prescribed by the ICNIRP, the example of which is *inter alia* as follows (frequency: only up to 21 MHz as example)

Frequency	**ICNIRP Radiation Norms**	**Radiation Norms For Bangladesh**

900 MHz	4.5 Watt/Sqm	0.45 Watt/Sqm
1800 MHz	9.0 Watt/Sqm	0.90 Watt/Sqm
2100 MHz	10.5 Watt/Sqm	1.05 Watt/Sqm

And the present limits/levels for antenna (Base Station) EMF emissions for general public exposure in Bangladesh may be as follows:

Frequency Range	E-Field Strength (Volt/Meter (V/m))	H-Field Strength (Amp/Meter (A/m))	Power Density (Watt/Sq.Meter (W/Sq.m))
400MHz to 2000MHz	0.434f ½	0.0011f ½	f/2000
2GHz to 300GHz	19.29	0.05	1

ii. the Respondents may be directed to include some provisions in the draft Guidelines not to set up any mobile towers /telecommunication towers/BTS on rooftop of or near schools, colleges, hospitals, clinics, educational institutions, jail premises, court premises, play grounds, heritage buildings /ancient monuments, archaeological sites, places of worship or in any residential or densely populated areas and also to remove non-compliant BTS/Towers as well as existing mobile phone towers /masts /antennae/BTS located/installed near or at or on the above mentioned buildings/places/premises within two months;
iii) the Respondents may also be directed to modify/add some provisions of the draft Guidelines to the effect that:

a) in clause 6.1 whenever a reference level is exceeded, it is necessary to test compliance with the relevant basic restrictions and to determine whether any additional protective measures are necessary;
b) in clause 6.2 both electric and magnetic fields in the near-field zone shall have to be measured separately by instruments and standard as prescribed by ITU and IEC;
c) in clauses 6.4 and 6.5 respectively the assessment of exposure to RF fields has to be measured by the Respondent No. 4, BTRC and the licensees/transmitter owners independently by the instrumentation and measurement recommended both by the ITU and IEC;
d) with the present provision of clause 6.8, there should be more obligation upon the licensees/transmitter owners to the effect that in case of exceeding 5% of relevant exposure limits, the concerned

licensees/transmitter owners shall install new equipment to evaluate and ensure overall that sites remain in compliance;

e) in clause 6.9, the phrase *'may verify'* shall have to be replaced with *'shall verify'* for the purpose of verification of compliances and strict observance of the Guidelines. Accordingly, directions may be given for i) formation of a Monitoring Cell comprising of eight members i.e., one from Ministry of Post and Telecommunication, two from BTRC, one from Bangladesh Atomic Energy Commission, one radiation expert, one cancer specialist, one professor/expert from BUET and one from the civil society for ensuring observance of this Guidelines by the licenses/transmitter owners; ii) the said Monitoring Cell shall have power to recommend the closing down of non-compliant BTS and imposition of fine upon the licensees/transmitter owners; iii) verification of compliance has to be conducted under the control of the Respondent No. 4, BTRC with the assistance of a national verification agency comprising of representatives of relevant areas i.e., BTRC technical personnel, radiation experts, cancer specialist, professors/experts from EEE departments of local universities and representative of Department of Environment and Bangladesh Atomic Energy Commission and others as relevant; iv) addressing public concern and punishment to offenders as well as giving compensation to injured persons in case of any incident of injury caused by radiation from BTS;

f) in clause 7.3 time limit as regards submission of compliance reports for existing sites has to be reduced to 6 months from one year. However the Guidelines, shall allow for penal provision the for failure of submission of compliance reports. In case of non-compliant BTS, the licensees /transmitter owners shall take responsibility for removing the same and installing new complaint BTS at such places;

g) along with the present provision of clause 7.4 these shall have to be a requirement for Specific Absorption Rate (SAR) value of mobile sets/ handsets to be written down on mobile sets for customers' notice and understanding;

h) clause 8.1, shall have to provide for a five-year specific time frame for preservation of log of measurements and evaluation of exposures of the transmitters /BTS /sites for verification by the Respondent No. 4, BTRC;

i) in clause 9 there shall be a Dispute Resolution Committee under the Commission/Respondent No. 4, BTRC. Accordingly, provision shall have to be made for a dispute resolution committee comprising of five members i.e., one representative from each party, two from BTRC and one legal expert which will act in accordance with the Arbitration Act, 2001 and where applicable the Bangladesh Telecommunication

Regulation Act, 2001. The decision of said Dispute Resolution Committee will be binding upon the parties;

j) in clause 11, the Petitioners, submit that in case of any violation of any provisions of the Guidelines necessary legal action will have to be taken against the licensees/transmitter owners under sections 46, 63, 73, 76 and relevant other sections of the Bangladesh Telecommunication Regulation Act, 2001 by way of cancellation of license, punishment of offenders, imposition of fine and compensation to injured persons;

iv. the Respondents may also be directed to procure required number of equipments by the Respondent No. 4, BTRC as well as by the licensees /transmitter owners for measurement/assessment of exposure to RF fields/EMFs and rely on methods as recommended by the ITU and the IEC; and

v. further directions may also be given upon the Respondents for specific Guidelines for installation of MPTs in compliance with international standards introduced, for example, in India as well as for clearances granted for installation of MPTs.

Predicated on the material above, the comparative study is informed by certain deductions made by this Court preliminarily on the basis of case law as well as expert reports initially made available to this Court in 2017. It is to be noted that consequent upon the direction featuring in the Rule issuing Order of 30.10.2012, this Court benefited, albeit belatedly, from the production of a report of the AEC as well as that of the Expert Committee set up by the Respondent No. 2, Ministry of Health.

As noted in this Court's Order of 22.3.2017, the AEC report did not provide a definitive finding on the health risk associated with exposure to non-ionizing electromagnetic radiation emitted from BTS. The Expert Committee's report commissioned by the Respondent No. 2, Ministry of Health, as on a couple of occasions extensively placed for this Court's consideration by the learned Deputy Attorney General, Ms. Kazi Zinat Hoque, establishes, however, a firmer link between non-ionizing radiations and health hazards relative to the AEC's findings. The Expert Committee's Report further endorses a concerted effort on the part of all stakeholders including the Respondent No. 4, BTRC to contribute *inter alia* to the reduction of radiation levels. That Report dated 30.7.2013 is in turn based on the findings an recommendations of the sub-Committee set up by the Expert Committee to measure the level of radiation from BTS.

A perusal of the Report led this Court on 28.3.2017 to record the fact that the observations, limitations and recommendations of the sub-Committee revealed that the investigation conducted on a limited scale did indeed lead to a detection of at least one site emitting radiation in excess of the radiation level set limits

issued by the WHO. Indeed, further the power density, SAR values and the electric filed values at that particular site were all found to exceed the safety limits and hence unacceptable. Notably further, the Expert Committee's Report was based on data taken only from 900 MHz carving although, according to the Report, there are carriers within the values of 890-960 MHz going upto the level of 1710-1890 MHz. It is in that context that the sub-Committee endorsed future measurements to be carried out within such entire spectrum of a broad range of bands to ensure comprehensive findings of BTS radiation levels. Not discounting the possibility of more sites possibly emitting radiation beyond WHO safety limits, the sub-Committee recommended *inter alia* instructions to be given to all mobile operators to bring radiation levels within acceptable limits.

It is in that context, that the Expert Committee anticipated that the BTRC, the key player and regulatory authority in this anticipated standard setting régime of control and management, shall establish an effective mechanism of monitoring radiation emission through a strict compliance framework. This and other sets of recommendations of the Expert Committee, this Court finds, were in fact the genesis of the exercise at formulating the Guidelines in a manner and with an objective going beyond the terms of the Rule Nisi strictly construed. The sub-Committee advising the Expert Committee indeed anticipated that all regulatory functions in this regard shall be reflected in a set of BTRC prepared guidelines through a consultative process with input from other important stakeholders and expert bodies to define the regulatory mechanism in this régime. It is pertinent to note further that the sub-Committee's findings were expressly based upon WHO guidelines given the absence of any regulatory mechanism presently in Bangladesh. It is in that context that the recommendation was for all operators to be brought under the purview of a BTRC-monitored mechanism to adjust BTS radiation limits against WHO guidelines.

The learned Advocate for the Petitioner No. 1 HRPB, Mr. Manzill Murshid has always maintained that the Expert Committee's Report of 30.7.2013 validates and substantiates the Petitioners' concern about unregulated radiation emission presently posing a serious health hazard and a need for recourse to corrective measures recommended by the Expert Committee to be supplemented by those of relevant international organizations drawing *inter alia* on the latter's advanced measurement tools and necessary expertise. This Court's Order of 28.3.2017, therefore, marks the initiation of a two-year long exercise in which the key players being chiefly the Petitioners, the BTRC, the Ministry of Health and this Court have concertedly striven to identify, sift through and highlight all tools of measurement in the form of either internationally sanctioned standards or technical equipment and infrastructure that has eventually led to this stage of a draft set of Guidelines being finally placed for this Court's consideration. The

Orders of this Court as above incorporated in the text of this Judgment amply attest to that objective being achieved through a collective commitment and goodwill on everyone's part.

Judicial interventions as this have taken place in other jurisdictions which share certain commonalities with ours in terms of population density, physical topography (both natural and architectural), health issues and vulnerability to radiation exposure and indeed on nascent but evolving regulatory mechanisms. Both the learned DAG, Ms. Hoque and the Petitioner's Counsel Mr. Murshid have kept us abreast of significant developments in this regard. Certain commonalities have been detected, for example, both on a philosophical plane and from the public health and public interest perspective in the judgment and ratio in *Justice I S Israni (Retd) Anr vs. U O I (Dep Of Teleco) Ors* as decided upon by the Rajasthan High Court on 27.11.2012 somewhat contemporaneously with our Rule issuing Order of 30.10.2012.

The wealth of information produced - scientific, technological and judicial - leads this Court to deduce at a fundamental level that there is no firm evidence or scientific proof that BTS electromagnetic radiation has any adverse health impact. But of course, the plethora of material placed before us is also in attestation of that assertion varying in degree according to which authority is making an argument for or against an aggressive stand on the issue. If one is to speak to members of any given establishment or the executive of any jurisdiction the approach is understandably conservative with a tendency to maintain the status quo and accept the lack of firm evidence and scientific proof to be an absolute given and refrain from sending out any signals otherwise to the public at large. That is true also of the attitude and findings of international bodies like the WHO or the ICNIRP, for example. But to be fair to the last named institutions, their focus is also on adopting a pre-cautionary approach in attending to issues of risk from electromagnetic radiation. It is that approach that has come to define this Court's initiative at ensuring formulation of a set of guidelines that strike a balance between scientific dictates, public health imperatives and the availability of technological measurement tools and equipment to bolster and make feasible a regulatory régime in this field.

It suffices to note here, therefore, that we are looking into the Rule Nisi as issued with a far broader prospective through a precautionary prism given the context of the reality of supervening developments causing all concerned, including this Court, to proceed by way of abundant caution. And that caution pertains to the possibility, however minimal, of the vulnerability of the very poor and infirm, the very old and the very young in our society to the health hazards from electromagnetic radiation.

It is predicated on that understanding that this Court while appreciating the considerable progress made in drafting the Guidelines deems it necessary

nevertheless through the mechanism of continuing mandamus to engage with all stakeholders further and put together a sustainable regulatory mechanism rooted in the standards and mechanisms presently found in the Guidelines. It is understandable, therefore, that the precautionary approach must inform our comparative analysis of the sufficiency of the Guidelines and the feasibility of their implementation to attain a desired objective as insisted upon particularly by the Petitioner No. 1, HRPB.

It is with that perspective that this Court recommends for further consideration by the Respondent No. 4, BTRC the addition of following features, elaborations and clarifications in the Guidelines (considered in draft for the purposes of this Judgment and future supplemental Orders, if any) that better represent our views on protection of wider public interest and public health:

(i) Limit exposure to radiation of EMF reducing reference to 1/10th of the existing limits of radiation prescribed by the ICNIRP and following the value configurations set out in the Petitioner's Reply to the 4th Affidavit-in-Compliance:

Frequency	ICNIRP Radiation Norms	Radiation Norms For Bangladesh
900 MHz	4.5 Watt/Sqm	0.45 Watt/Sqm
1800 MHz	9.0 Watt/Sqm	0.90 Watt/Sqm
2100 MHz	10.5 Watt/Sqm	1.05 Watt/Sqm

And the present limits/levels for antenna (Base Station) EMF emissions for general public exposure in Bangladesh may be as follows:

Frequency Range	E-Field Strength (Volt/Meter(V/m))	H-Field Strength (Amp/Meter (A/M))	Power Density (Watt/Sq.Meter (W/Sq.m))
400 MHz to 2000 MHz	0.434f ½	0.0011f ½	f/2000
2GHz to 300 GHz	19.29	0.05	1

In this, the concerned authority may well scrutinize the Indian experience and the sustainability of measures so adopted in that country;

(ii) Actively consider a moratorium on the installation of any mobile towers/ telecommunication towers/ BTS on any residential rooftops, on or near schools, colleges, hospitals, clinics, jail premises, playgrounds, places of worship and other places inclusive of heritage buildings and archeological sites frequented in great numbers by the public at large. This shall also include the removal of all existing installations from such potentially high-risk areas also marked by high density of population;

(iii) By reference to clause 6.1 of the Guidelines, engage in a further study of any additional protective measures that may be put into place to test compliance with the relevant basic restriction if a reference level is exceeded;

(iv) Explain to this Court any impediments and constraints on the availability, acquisition and installation of instrumentation for the measurement of the magnetic fields at certain frequencies and the various alternative routes that may feasible be pursued in this regard;

(v) In relation to clauses 6.4 and 6.5 the implementation of parallel and independent measurement and assessment of exposure to RF fields with responsibilities assumed both by the BTRC and the licensees/ transmitter owners;

(vi) A further elaboration and specification by reference to clause 6.8 of the shared responsibility envisaged to be imposed upon all licensees, transmitter owners contributing to exposures that exceed 5% of the relevant limit;

(vii) The responsibility undertaken by BTRC by reference to clause 6.9 to verify compliance shall be one that is undertaken mandatorily and not be a mere optional one at its discretion. In other words the phraseology in clause 6.9 shall read *"shall verify"* in lieu of *"may verify"*. In that context a feasibility study may indeed be undertaken under BTRC's aegis for the formation of a monitoring cell with regards to its composition, terms of reference, logistical strength and its internal hierarchical structure of management and decision making as indeed reflected in the Petitioner's reply of 11.11.2018 and as already referred to hereinabove;

(viii) The Respondent No. 4, BTRC is alerted to the fact that the reporting mechanism envisaged in clause 7.3 by particular reference to the frequency of reporting shall for the time being remain undisturbed with the qualification that this shall be taken up for further review by the Court at a point in time more propitious. In this regard, this Court has taken particular note of the Petitioner's recommendation for reduction of time for submission of compliance reports to six months from one year. As indicated earlier all parties concerned including this Court may revisit this issue at a point in time more appropriate;

(ix) By reference to clause 7.4 mandatorily require the writing down or inscription of the SAR value on all mobile sets/ handsets for customer's notice and clear understanding;

(x) Undertake a feasibility study with regard to the record keeping period by reference to clause 8.1 and see if the preservation log of measurements and evaluation of exposures can be set at a five year period;

(xi) By reference to clause 9 and the dispute resolution mechanism prescribed therein undertake a feasibility study of establishing a dispute resolution committee and its composition in a manner representative of both the

BTRC and other experts, legal and technical, to better serve the purpose of effective resolution of disputes; and

(xii) Having revisited this Court's Orders, in particular of 22.3.2017 and 28.3.2017, it is deemed imperative that the Respondent No. 4, BTRC and the other concerned Respondents further study with greater care the Expert Committee's Report dated 30.7.2013 and allay generally the concerns as reflected in our very Orders and those stressed upon by Mr. Manzil Murshid in the course of these proceedings.

As explained earlier, the entire exercise as embarked upon by this Court specifically from March, 2017 has been one indicative of a continuing mandamus concerning a matter in which this Court by way of abundant caution, and necessarily so, has desisted from readily sanctioning a quick fix to a complex scenario. The objective henceforth is for progressive developments and a greater holistic approach towards the finalizing of the Guidelines with the dominant and overarching objective of serving the public interest and safeguarding public health.

The Respondent No. 4, BTRC in particular shall revert with a feasibility report as above directed within a period of 4 (four) months computed from the receipt of a certified copy of this Judgment and Order.

Going by the drift, tenor and purport of our reasons, findings and decisions as above, the Rule is made absolute without detracting from the continuing exercise of jurisdiction by this Court over the matter in terms initially of filing and receipt of compliances, and issuing supplementary Orders and directions as necessary.

Communicate this Order at once.

MD. IQBAL KABIR, J:
I agree.