Mr Viresh Goel is Deputy Wireless Adviser at WPC Wing, Ministry of Communications & IT, Government of India since July 2011. He did his Bachelor of Engineering in Electronics from M.M.M. Engineering College, Gorakhpur, Uttar Pradesh, India and has got Post Graduate Diploma in Communication Engineering from University of Roorkee, Utter Pradesh, India.

He joined the Government Service in February, 1993 and has got experience of more than 20 years in the field of Spectrum Management and Wireless Monitoring.

During February, 1993 – January 2010 he worked in the Wireless Monitoring organisation and WPC Wing in different capacities, out of which during the period 2000-2005 he was associated with the WPC Wing’s project “National Radio Spectrum Management and Monitoring System (NRSMMS)” which under the World Bank Assisted, Telecom Sector reform TA Project of India.

During January 2010 to June 2011, he was on deputation to TRAI wherein he was associated with the on-going activities in TRAI in respect of Telecom Sector, in general and Spectrum Management, IMT-Advanced / Mobile Wireless Broadband Services in particular.

He has attended various National / International study/ training programs, attended ITU Study Groups meetings.

He is presently, Group head of Terrestrial Group of WPC Wing, New Delhi
PRESENTATION

ON

ITU TOWARDS

“IMT FOR 2020 AND BEYOND”-5G

BY

VIRESH GOEL

DEPUTY WIRELESS ADVISER
Mobile Broadband is Not Optional in today's Society;

Technology Evolution and Additional Spectrum are a Must If the Societal Benefits are to Continue;

ITU has a rich history in the development of radio interface standards for mobile communications: IMT standards will expand to incorporate “IMT for 2020 and beyond”- ”5G”
The buzz in the industry on “5G” has seen a sharp increase;

Attention now focused on enabling a seamlessly connected society in the 2020 timeframe and beyond;

To brings together people along with things, data, applications, transport systems and cities in a smart networked communications environment.
In early 2012, ITU-R embarked on a programme to develop “IMT for 2020 and beyond”, setting the stage for “5G” research activities that are emerging around the world.

leading role is played by ITU-R’s WP-5D, which is finalizing its view on timeline towards “IMT for 2020 and beyond”
WP-5D STUDY AREAS AND/OR DELIVERABLES TOWARDS “IMT FOR 2020 AND BEYOND”

WP-5D is engaged in a wide range of activities for IMT and the work is organized in these broad categories:

- **VISION & TECHNOLOGY TRENDS**
- **MARKET, TRAFFIC, AND FUTURE SPECTRUM REQUIREMENTS**
- **FREQUENCY BAND CHANNELING ARRANGEMENTS & SPECTRUM SHARING AND COMPATABILITY STUDIES**
- **IMT SPECIFICATIONS AND OTHER TECHNOLOGY RELATED WORK**
- **SUPPORT FOR IMT APPLICATIONS & DEPLOYMENTS**
VISION & TECHNOLOGY TRENDS

- **Draft new Report ITU-R M.[FUTURE TECHNOLOGY TRENDS] (October 2014):** This activity is to address the terrestrial IMT technology aspects and enablers considering the approximate timeframe 2015-2020 and beyond for system deployment, including aspects of terrestrial IMT systems related to WRC-15 studies as part of its scope.

- **Draft new Recommendation ITU-R M.[IMT.VISION] (June 2015):** This activity is to address the longer term vision for 2020 and beyond and will provide a framework and overall objectives of the future developments of IMT.

- **Draft new Report ITU-R M.[IMT.ABOVE 6 GHz] (June 2015):** The purpose of this report is to provide information on the study of technical feasibility of IMT in the bands above 6 GHz.
MARKET, TRAFFIC, AND FUTURE SPECTRUM REQUIREMENTS


- Report ITU-R M.2243 - Assessment of the global mobile broadband deployments and forecasts for International Mobile Telecommunications (March 2011): This Report reviews both the market and traffic forecasts for IMT that were developed in previous study periods and assesses the current perspectives and future needs of mobile broadband that would be supported by IMT over the next decade (2012-2022).


Draft new Report ITU-R M.[IMT.BEYOND 2020 TRAFFIC] (October 2014): This activity is in support of the future views of the marketplace for IMT and for WRC-15 agenda item 1.1 and addresses the traffic and related market demand and users needs towards the years 2020 focusing on terrestrial IMT.
FREQUENCY BAND CHANNELING ARRANGEMENTS & SPECTRUM SHARING AND COMPATABILITY STUDIES (1)

- Draft revision of Recommendation ITU-R M.1036-4 - Frequency arrangements for implementation of the terrestrial component of IMT in the bands identified for IMT in the Radio Regulations (RR) (October 2014): This activity is to address a draft revision of Recommendation ITU-R M.1036-4 to incorporate new amendments related to frequency bands already identified for IMT.

- Working document ITU-R M.[IMT.ARRANGEMENTS] (October 2014): This activity is to develop channeling arrangements for IMT adapted to the frequency band below 790 MHz, as indicated in Resolution 232 (WRC-12) “invites 2”. The work will focus on the harmonized channeling arrangements for IMT adapted to the frequency band below 790 MHz down to around 694 MHz for Region 1.

- Report ITU-R M.2292 - Characteristics of terrestrial IMT-Advanced systems for frequency sharing/interference analyses (to be published March 2014): This Report provides the baseline characteristics of terrestrial IMT-Advanced systems for use of sharing and compatibility studies between IMT-Advanced systems and other systems and services.
Draft revision of Report ITU-R M.2039-2 - Characteristics of terrestrial IMT-2000 systems for frequency sharing/interference analyses *(February 2014)*: This activity is the updating of the existing “Characteristics of terrestrial IMT-2000 systems for frequency sharing/interference analysis”. It has a role in support of information supplied in this topic to JTG 4-5-6-7 particularly for studies on WRC-15 agenda items 1.1 and 1.2.

Draft new Report ITU-R M.[IMT.SMALL] *(June 2014)*: This activity is in support of compatibility studies between FSS and small cell deployment IMT systems in the frequency band 3 400-3 600 MHz.

Draft new Report ITU-R M.[TDD.COEXISTANCE] *(October 2014)*: This activity is in support of compatibility studies of co-located, adjacent TDD blocks in the 2 300-2 400 MHz frequency band.

Draft new Report ITU-R M.[IMT vs. IMT-UHF] *(October 2014)*: This activity is in support of compatibility studies IMT systems operating in the UHF band.


Draft new Recommendations ITU-R M.[IMT.OOBE] (June 2014): This activity is in support of the development of new Recommendations on the specific “unwanted emission characteristics” related to IMT-Advanced base stations and terminals and relates to the technologies in Recommendation ITU-R M.2012.

Draft new Report ITU-R M.[IMT.ANTENNA] (October 2014): This work address the technical and operational aspects of passive and active base station antennas for IMT systems based on Question ITU-R 251/5.

Draft new Report ITU-R M.[IMT.ARCH] (October 2014): This activity is to address the Architecture and Topology of IMT Networks.

Further studies on cognitive radio systems (October 2014): This activity relates to the development of studies on cognitive radio systems implementation in IMT in relation to Resolution ITU-R 58.
SUPPORT FOR IMT APPLICATIONS & DEPLOYMENTS

- Report ITU-R M.2291 - The use of International Mobile Telecommunications (IMT) for broadband public protection and disaster relief (PPDR) applications *(to be published March 2014)*: This Report addresses the current and possible future use of IMT including the use of LTE in support of broadband public protection and disaster relief (PPDR) communications.

- ITU-R M. [IMT.HANDBOOK] - Handbook on “Global trends in IMT” *(October 2014)*: This Handbook is to provide general guidance to ITU Members, network operators and other relevant parties on issues related to the deployment of IMT systems to facilitate decisions on selection of options and strategies for introduction of their IMT-2000 and IMT-Advanced networks. It also provides the general information such as service requirements, application trends, system characteristics, and substantive information on spectrum, regulatory issues, guideline for the evolution and migration, and core network evolution on IMT.
Thank You