

**GOVERNMENT OF INDIA  
MINISTRY OF COMMUNICATIONS  
DEPARTMENT OF TELECOMMUNICATIONS**

**LOK SABHA  
UNSTARRED QUESTION NO.1683  
TO BE ANSWERED ON 26<sup>TH</sup> JULY, 2017**

**RESEARCH AND DEVELOPMENT IN TELECOM TECHNOLOGIES**

1683. DR. NARAMALLI SIVA PRASAD:

Will the Minister of COMMUNICATIONS be pleased to state:

- (a) the steps taken by the Government to promote research studies in the area of telecom and relevant technology and the details thereof;
- (b) the steps taken by the Government to encourage research and innovation in the area of telecom and relevant technologies through educational institutions and other research institutes in the country and the details thereof; and
- (c) the achievement of the aforementioned steps taken by the Government so far?

ANSWER

**THE MINISTER OF STATE (IC) OF THE MINISTRY OF COMMUNICATIONS &  
MINISTER OF STATE IN THE MINISTRY OF RAILWAYS  
(SHRI MANOJ SINHA)**

(a) Madam, apart from Center for Development of Telematics (C-DoT) which is the Telecom Technology Development Centre of DoT under Government of India, eight Telecom Centers of Excellence (TCOEs) are established in Public Private Partnership (PPP) mode bringing together Academic Institutions, Telecom Industry (Service providers) and Government with the objective of creating an eco-system for sustainable growth of telecom sector in the country and promoting development of new technologies, to generate Intellectual Property Rights (IPRs), incubate innovations and promote entrepreneurship to position India as a global leader in telecom innovation and making India a hub of telecom equipment manufacturing. Telecom Engineering Centre (TEC) an attached office of DoT has been entrusted with the functions of preparing fundamental technical plans, study papers and specification of common standards with regard to Telecom network equipment, services & interoperability.

National Telecommunications Institute for Policy Research, Innovation and Training (NTIPRIT), DoT has also been envisaged to do research in Policy and Implementation related activities in Telecom Sector. Moreover, Telecom Standards Development Society of India (TSDSI) has also been formed to contribute to development of next generation telecom standards and drive IPR creation.

Contd...2/-

(b) C-DOT constantly interacts with user industry sectors like Defence, IT, Telecom etc. to understand their emerging technology requirements and also interfaces / engages with research institutions, premier academic institutions for joint development. The detail of C-DoT interfaces/engagement with such institutions is **annexed**. TCOEs has a leading telecom service provider as industry partner and receives support from the Department of Telecommunications to focus on specific areas of research, technology development and incubation. These TCOEs have been co-located at IITs (Mumbai, Delhi, Madras, Kanpur, Kharagpur and Roorkee), IISc Bangalore and IIM Ahmadabad to facilitate constant interaction with the Educational Institutes.

(c) C-DoT has developed and transferred the technology for the products like Terabit Router, Giga-bit Passive Optical Network (GPON) and 100 Gbps Optical Transport Network (OTN) to be manufactured in the country. TCOEs have produced 87 technologies out of which 4 technologies have been commercialized. Telecom Engineering Center (TEC) has prepared 27 study papers in 2016-17 which includes topics like physical security of telecom network, Li-Fi (Light Fidelity) and its applications, M2M/IoT (Machine to Machine/Internet of Things) in automotive sector , CCS7 security etc.

**Contd....3/-**

C-DOT interfaces with premier academic institutions and other research institutions to explore the possibilities of collaboration for joint working in some of the following cutting-edge technology areas. The details of such institutions is as follows:

Institutions	Technology Research Areas
IIT Madras	High frequency RF Modules, Air interface Layer 1 algorithms and optimization, Massive MIMO baseband algorithms, Optimal usage of spectrum - multi-disciplinary approaches, Joint development of 5G Test Bed, Standardization in TSDSI/3GPP/oneM2M
IIT Hyderabad	LTE Base Station side - Layer 1, LTE User Equipment (UE) Layer 1 module, Layer 1 and open Air protocol stack integration, Narrow Band IOT (NB-IOT) - Base station and UE – collaboration, mmWave upto 1GHz Bandwidth, CloudRAN and Massive MIMO – algorithms, 5G NR (New Radio), Joint development of 5G Test Bed, Standardization in TSDSI/3GPP/oneM2M,
IISc, Bangalore	Sensor for IOT - Calibration and integration of sensors with oneM2M platform, Design and development of custom indigenous sensors, 5G Layer 1 algorithm optimization, Joint development of 5G Test Bed, Standardization in TSDSI/3GPP/oneM2M
CeWiT (Centre of Excellence in Wireless Technology)	Licensing and usage of Simulator developed by CeWiT for 4G/5G, Usage of IP (patents) in air interface by C-DOT equipment and solutions, Joint development of 5G Test Bed, Training on advanced wireless technologies, Training on Layer 1 algorithms, Standardization in TSDSI/3GPP/oneM2M
IIT (Bombay)	5G Test Bed
IIT (Delhi)	Image and video analytics

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