Response to TRAI Consultation Paper on Encouraging Telecom Equipment Manufacturing in India - Dated 28th December 2010

Kumar Shakti Singh,

Telecom and VLSI Professional

kumar.shakti.singh@gmail.com
shakti@ieee.org

Dated: January 19, 2011

Respected Sir,

After working for around 2 decades in Telecom VLSI development field based out of India, the consultation paper requesting response to the concerned raised on Telecom Equipment Manufacturing in India provides an opportunity to list down some comments on policy matters which in long term would be beneficial to the betterment of the manufacturing base of Telecom Equipment in India.
The comments on the list of questions raised are attached.
Regards

Kumar Shakti Singh

Research and Development

Research and Development is one of the major component which drives an all inclusive growth for country, industry and society. The networks, their installation and management, the equipment are all focused on maximizing returns and lacks vision for advancement of the country in field of communication and networking.

The overall objective of the R&D in field of Telecom and Networking should be focused on

- Ubiquitous human networking, heterogeneous in nature, merging and evolving with the social behavior
- Defining networks independent of technology, such that they pave way for growth of individual social clusters and country
- Use of technology more suited for each terrain, social pattern and social requirements
- Nodes and Equipment build to satisfy the requirement of these networks
- Not to blindly accept the standards, these are driven by association not fully aware of local problem, but to define standards to address solution required locally

For promoting the development and manufacturing of Telecom Equipment in India the thrust should be on R&D.

3.1 The objective of R&D in Telecom Equipment manufacturing for the year 2020 should be -

- **Development and Manufacturing Eco-System in place**
- **Capable of meeting at least up to 50% of local demand of telecom equipment**
- **Should become player in standardization process of protocols**
- **Should be the driver of new technology in telecommunication**
- **Partner for inclusive and green growth**
- **Set up system to involve local resource**

3.2 Taking a phase approach to R&D process the year 2015 objective and focus would be -

- **Open system for telecom software development in place**
- **High end board manufacturing capacity**
- **System definition and design capabilities**
- **Capable of meeting up to 25% of local demand of telecom equipment**
- **National standards on protocols**
- **Identification of needs for telecom technology, equipment and networks**
  - **collection and analysis of data**

- **improvement required in the process**

The initial R&D objective till 2012:
Identify areas where partnership is more fruitful
- manufacturing of silicon
- development of technology

3.3 Telecom Equipment can be classified as Core, Access and End or Consumer Equipment. The last category is identified with large volumes and low margins, while the first with high investment requirements and defining new technologies for bandwidth availability
Focus would be on the core and access products
- because it controls the end equipment behavior and definition
- high margins
- define the quality and complexity achieved

and then follow it by focusing on CPEs and Consumer Equipment
2020 Indian product should be identified as "Defined, Designed and Build in India" with all intellectual property owned by Indian company
2015 Indianess of product should be identified as "Defined and Designed in India" with most of the intellectual property owned by Indian company

3.4 No Comments

3.5 We already have a premier R&D institution in C-DOT. Its mission needs to be redefined based on the agreed upon objectives of Telecom Manufacturing policies. It should be provided enough scope to provide solutions to local networking and telecom industry. It should have more say in how the network should look like and set the direction of capabilities and qualities of equipment to be used in the network, apart from building the reference equipment

There are incubation centres in IITs, which provide platform for setting up of technology to solving real problems of telecom equipment design and manufacturing. What needs to be provided are the next steps from there on:

productionizing support
marketing and awareness support
spinning them off

3.6 No Comments

The different players who need to be involved in promoting the Research & Development activities in field of Telecom Equipment Manufacturing would necessarily cover at least the following -
- Government Bodies
- Universities and Academic Institutions
- Industry and Industry bodies

3.7 The Government Bodies in their various capacities need to initiate

- **Funding**
- **Mission statement and policy setting**
- **Local involvement**
- **Identification of specific problems to be worked upon**
- **Operations management**

The different Universities and Institutions initiatives must comprise

- **Technology research and development**
- **Push for protocol standardization**
- **Use of technology in practical and simple solutions offerings**
- **Ahead of the production curve**

The Industry body participation should at least covers

- **Setting up and driving research in long term evolution of network across Indian geographical region and globally.**
- **Financing as social responsibility**
- **Not operate on build, operate model as network becomes closed network**
- **Long term approach for evolving network**

Sourcing Inputs

Since the policies defined would effect the upcoming units and would make its effect felt only 5 years or beyond it is important to look at the trends and where value can be added with ease. In any Telecom equipment content wise software component has increased and now dominates. It controls the time and schedule of delivery and also the costing.

Figure1. Simplified View of HardWare and SoftWare Partition

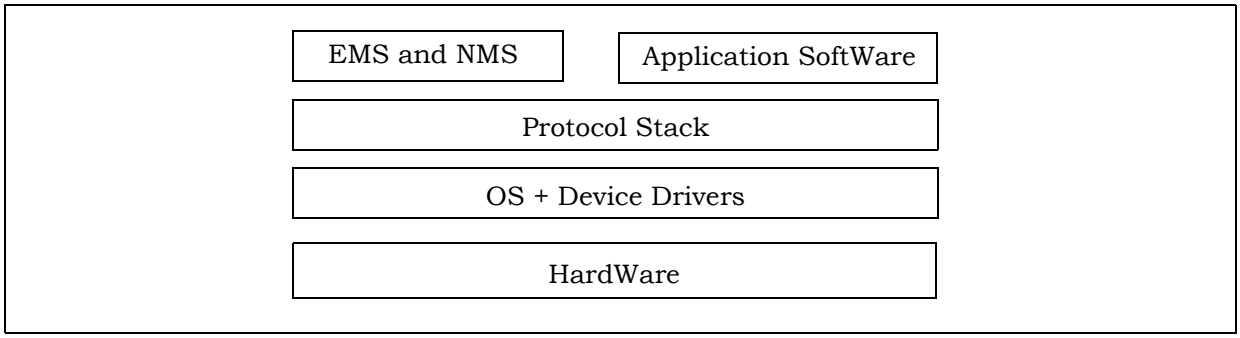
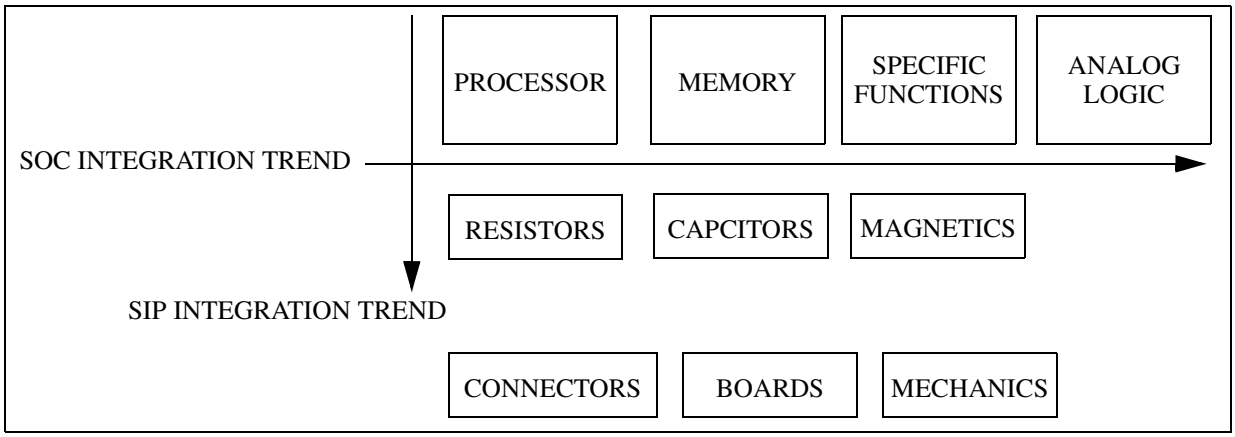


Figure1. provides a very simplified view of the major software components required to complete any Telecom Equipment. Device drivers are either developed inhouse or sourced by the VLSI provider. All other software component either need to be licensed or developed inhouse. Also these are to be developed in modular and scalable architecture keeping in mind the future usability and being agnostic to any underlying hardware or software code. Licensing and use & maintenance of the software provided by third party is one of the most costly items.

3.10 Therefore thrust should be on building eco-system which can provide these software components to end product manufacturer. Paying attention to sourcing of these inputs would be more important at this point of time in Telecom equipment industry.

Manufacturing trend in SoC is continuos enlacement in amount of integration of analog and digital logic and shrinking in technology.
Similarly integration of passive components along with active component die in single package to reduce footprints and board area are also extensively being pursued. Figure2. provides different trends in hardware progression in electronic manufacturing.

Figure2. Trend in Hardware Development



3.11 To begin with fabrication of components, the second trend involving integration, manufacturing and testing of components in single package is less sensitive to change in device manufacturing technology, should be adopted. Already there are companies which are trying to set up such facilities in India. Promoting same along with providing subsidies would greatly help in lowering the cost of end products.
Along with same manufacturing of mechanical parts like PCB substrates, connectors are the important steps which can help in cost reduction of source materials.
At same time efforts should be spend on research in productionization and cost reduction in manufacturing. This research should be done under aegis of multi-disciplinary team. Focus should be on

- **reduction of time requirement for productionizing of design**
- **reduction of time requirement for manufacturing (lead time)**
- **increase of yield**

3.12 Manufacturing of ICs can not be driven by Telecom Equipment Industry alone. The volume required to make fabrication unit operate profitability can not be provided by Telecom Equipment manufactured in India

alone. The numbers can only come from consolidated electronic requirement across industry and globally. This question begs response and debate over wider audience and any view here would be skewed.

3.13 No comments

3.14 No comments

Manufacturing of Equipment

A situation or environment is to be created where it is win-win for service providers, consumers, government agencies and Indian equipment manufacturers. With current business model of built and operate with profit sharing it would be difficult for any Indian Telecom Equipment manufacturer to penetrate the market with large market share even in long term. Incentives which are indirect in nature and help the eco-system as whole would be very desirable as they would establish the credential of manufacturers in global market and have long term benefit for the society.

3.17 Some of the direct and indirect incentive which can be provided to Telecom Equipment Manufacturer can be

- **Tie up with government offices for providing free subscription or reimbursement to employees for connections from Service provider using "Indian product".**
- **Indian products with intellectual properties first patented/registered in India should be exempted from all duties and taxes**
- **Any financing being provided to Service Providers should include mandate for procuring "Indian Products"**

3.18 For imported and "non-Indian" products additional tax like education cess or allocation to USOF be made compulsory. This additional money then can be used for funding of the Test and Certification Laboratories and specific R&D project for Indian products
For imported goods it would be appropriate and interesting if the equipment architecture is made mandatory to be shared with security agencies before clearance. This should include -
Hardware details

- **devices used off shelf (ASICs)**
- **List of components**
- **Logic design in programmable devices (FPGAs, CPLDs.)**
- **Hardware and software interaction details**

Software architecture

- **Protocol stack used**
- **EMS and NMS architecture**
- **APIs used**

- **Operating system**

Promoting Domestic Manufacture

3.20 & 3.21 Reservation brings mediocrity and pulls down the standard in any given field. Indian equipment manufacturer, therefore should be provided with all incentive possible, but their end products should compete fairly with the best in class. They should strive to be among the leaders in their product class and make the best use of the resources available at their disposal. The government and promoters should ensure that they have the requisite resource to pull it off.

Setting up of Special Zones or Telecom Circles

No Comments

Testing, Standardization and Accreditation

Quality of products needs to be competitive with global players. This in turn demands investment in Quality process in manufacturing, production and testing. A world class evolving lab infrastructure is a must. Multidisciplinary test facility, which is used for testing for all Telecom end products. It then paves the way for having certificate mandatory for all products to be used in the networks.

3.28 The testing lab would be an ever evolving facility, working at the technological frontier of telecom industry. Some of the capabilities and testing service which would be important to provide include

a. Blind Testing facility where the intent is to keep the test team personnel far from the influence of Equipment manufacturer. It requires
   - **to have test personnel separate from sales / over the counter person**
   - **all documents to be submitted along with the equipment to be tested**

b. Hosting of Interoperability testing which would require
   - **Selection of network models in which different vendors equipment would be promoted**
   - **Definition of test scenarios and cases**
   - **Preparation of report and certificates**

c. Certification Lab for different protocols being standardized by different bodies which would mean to keep abreast of the R&D activities across the globe and even defining the protocol development from ease of test and maintenance perspective

d. Test facility of equipment under development. It provides basic and extensive model for user of this facility

To provide above services the facility would require at least these at minimum

- **Test equipment for different networks and types**
- **Equipment and Consumer items for testing**
- **Working network models and prototypes**
- **Different service termination from different service providers**
- **Uninterrupted power supply**
- **Good IT infrastructure**

It is important that the test labs facility generates all or most of its finances.

3.29 Some of the financing model possible for different scenarios are mentioned.

a. Certification Business Model

- **Fee Based testing**
- **Each iteration requires same fee structure. No history maintained**
- **Correspondence during each test requires extra fee to be paid**
- **Over run of schedule to be fee based**

b. Testing of Equipment

- **Fixed time duration, each of the above**
- **Fee structure based on the time schedule for different test**
- **No certificate awarded**
- **Useful for companies which do not have test facility and**
- **Common test facility which can be shared across multiple entities**

c. Interoperability and Plug-fest events

- **Registration fee based event**
- **Sponsored events**

Funding / FDI

No Comments

Duties and Levies

No Comments