Level 8, VIBGYOR Towers,
Bandra Kurla Complex,
Bandra (E),
Mumbai – 400 051
Maharashtra,
India
Tel: +91-22-4090 7040
Fax: +91-22-4090 7070
info@quintelsolutions.com
www.quintelsolutions.com

Dear Sir,

Response to TRAI Pre-consultation paper on "IMT Advanced Mobile Wireless Broadband Systems" dated 19th August 2011.

We welcome and approve of TRAI's wishes to canvass industry stakeholder opinions and views regarding the following:

a. Identification of frequency bands, harmonization aspect at International and Regional level;

b. Requirements of large chunk of contiguous spectrum bandwidths, respective band plans and FDD & TDD modes;

c. Re-farming of spectrum from the Government agencies for the newer technologies in the internationally identified spectrum bands;

d. Candidate technologies for the IMT-Advanced and convergence of different technologies and services;

e. Issues & challenges in extending the broadband access to the rural India;

f. Licensing, Pricing and assignment mechanism;

g. Backward compatibility aspects;

h. Issues pertaining to VoIP

i. Need to migrate from IPv4 to IPv6;

j. Capacity requirements of backhaul and core networks

k. Spectrum usage charges for operators holding only IMT- Advance or holding a combination of spectrum bands

l. Making voice mandatory for new technologies or fall back option

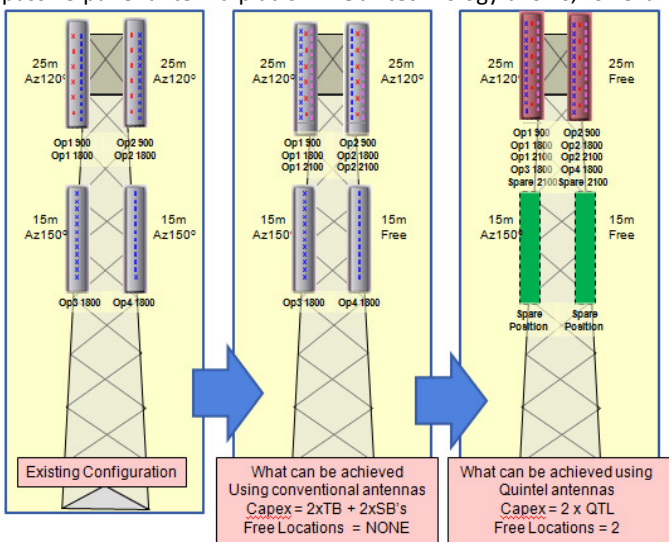
m. Active Infrastructure Sharing.

Quintel previously responded to the pre-consultation regarding IMT-Advanced technologies issued by TRAI, and we have also responded to TRAI's active sharing consultation. We wish to take the opportunity to respond to this consultation, where we **recommend a potential solution and enabling technology to Q15 of the consultation paper i.e. address infrastructure issues pertaining to roll out of MIMO technology.**

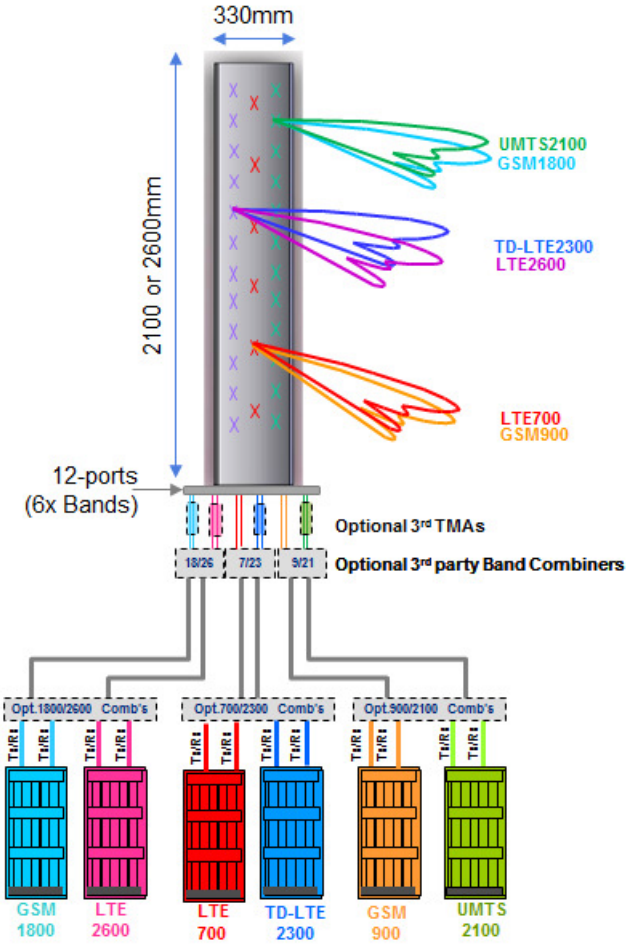
We are entering a world where more bands (more spectrum bands being issued), more operators (i.e. for competition), more technologies (such as LTE) and more antenna arrays (i.e. higher order MIMO) will be required; all of these place pressure on limited antenna positions and sites. We hope TRAI finds that our enabling technology in the eco-system can help speed up roll-out of new technologies and spectrum, whilst being responsible to costs, tower loading and zoning requirements.

Quintel Technology - Briefing

Quintel has recently established Indian operation based out of Delhi and Mumbai. Quintel offers base station antenna solutions which allow multiple independently controlled beams from a single, conventionally sized, passive panel antenna platform. Our technology allows, for example, multiple operators to share/consolidate on the same antenna, yet provide each operator and each band the ability to tilt-optimize their own coverage footprints and frequency planning, thus reducing the required number of antennas at existing sites and reducing the required number of future sites through freeing up valuable tower space on existing sites, in particular at load limited and zoning limited tower and rooftop sites. We have been engaged in deployments with a number of Indian operators, and Indian Tower Companies with our initial Indian 10-port antenna (delivering 5x services as 1x800/900 + 2x1800 + 2x2100 independent services). The image left depicts a typical value case in using our current 10-port antennas in India.



As stated above, the use of Quintel's 10-port antenna allows operator sharing and hence allows antenna positions to be freed up at congested sites; this enables new antennas, for example to support new technologies such as LTE and LTE-Advanced in new spectrum bands to be deployed. Therefore, use of Quintel's current product could be viewed as indirectly assisting or easing the introduction of new services.



However, we wish to also communicate to TRAI and all stakeholders that Quintel have recently launched an antenna product for the US market, aimed at single operator applications to support 1x700, 1x850, 1x1900 and 1xAWS bands (8x ports), each with independent tilt, aimed at introducing LTE/LTE-Advanced services in the 700 and AWS bands on top of existing 2G and 3G services in the US legacy bands 850 and 1900. Our development roadmap for Europe proposes a similar antenna supporting 1x800, 1x900, 1x1800, 1x2100 and 1x2600 (10x ports) bands, and hence designed for the European digital dividend (790-862MHz) and 2500-2690MHz bands for LTE deployment. It is entirely possible for our antenna roadmap to leverage these existing and planned products to deliver a compelling single operator solution for the Indian market, which may support for instance: 1x700, 1x900, 1x1800, 1x2100, 1x2300 and 1x2600 bands (thus 12x ports), and each band having independent tilt, on a conventionally sized panel antenna platform. We show an illustration left.

Regarding TRAI's question 15, MIMO applications for IMT-Advanced services such as LTE and LTE-Advanced will ultimately requires even more antennas at sites in order to deliver the very high spectral efficiencies and throughput data rates promised by these technologies. As clearly stated in the TRAI consultation documents, MIMO can encompass a wide range of antenna configurations including spatial multiplexing, Beamforming and transmit diversity. In our opinion, allowing tower companies to purchase and install shared antenna system shall help them leverage existing infrastructure available across the country for future roll-out.

We wish to further communicate that Quintel's fundamental enabling technology also allows MIMO to be configured on a single antenna array to deliver Adaptive Beamforming in the Elevation plane on each orthogonal polarized array (+45 and -45 degs arrays). This can be viewed as tilting a beam in the elevation plane on a per user resolution whilst still delivering 2x2 spatial multiplexing; various studies have shown that elevation Beamforming can significantly enhance spectral efficiencies. Azimuth Beamforming has been in place for technologies such as TD-SCDMA for a number of years, but ultimately require large multi-column antenna arrays which do not lend themselves to supporting multiple bands.

Such adaptive Beamforming in elevation is the subject of research for many vendors' Active Antenna programmes, but Quintel is able to offer the same benefits using a passive platform plus support for independently tilting multiple other legacy (non-IMT-Advanced) bands. Quintel are in the process of performing tests and trials of our Elevation Beamforming applications, and we would be delighted to share these with appropriate Stakeholders in India.

Quintel would appreciate the opportunity to engage direction with TRAI on our perspective we have gained from markets outside India on this important opportunity for the people of India. We look forward to engaging with Indian operators, trade associations and TRAI, as necessary to help bring re-define the skyline and quality of mobile coverage.

Yours sincerely,

Sachin K Purswani
Technical Marketing
(M) + 91 9702050757
20th Sep 2010