April 29, 2012

To:
Federal Communications Commission

Subject: Answers to FCC technical questions for devices operating in the 3650-3675 MHz band as per 552295 D01 CBT Guidance for 3650 3700 Band v01r01.

1.1 Restricted Protocol Description

1.1.1 Address the key requirements for operation using restricted contention base protocol

Opportunities for other transmitters to operate. Please note that this requires recognizing

Like systems (similar to yours) that permit operation on a co-channel.

The Compact BS uses a GPS system to synchronize the 5ms framing and uses the same TDD ratio to allow similar systems to operate in the same TDD ratio without interfering one BS receive with other BS transmit. Since transmit and receive of all similar BSs are done in the same synchronized periods without any overlapping between transmit and receive periods of each and other it provides satisfactory sharing of spectrum with similar systems.

Slave subscriber units are managed by the BSs in which their transmission is allocated using maps broadcasted by the BS in which a contention between the slave units is prevented.

In addition to prevent a weak CPE of one sector to be interfered by other sector's strong CPE an ATPC (Automatic Transmit Power Control) mechanism is executed by the CPEs, to allow satisfactory sharing of the spectrum with similar systems in a co-channels.

The CPE is not able to transmit w/o the permission of the BS using a schedule protocol.

The system is a TDD system synchronized by a GPS in which when the BSs transmit they do not receive and when they receive they do not transmit. In addition we use sectorial antennas that decrease the radiation to adjacent sector dramatically that will not interfere adjacent channel served CPEs installed in a distance from the BS. Therefore there will not be interference between the BSs and sector clients.

CPE on one sector can transmit when CPE of other sector transmits since each of them is allocated by a separate BS schedule protocol. Therefore to prevent adjacent channel interference between 2 CPEs received at two BS located in the same location considering strong received CPE versus weak CPE we use ATPC to reduce the interference to adjacent channel received CPEs in which they are not interfered.

1.1.2 Provide any additional manuals and operational descriptions to allow the reviewer to understand the protocol and is operation.

The following GPS synchronized TDD framing diagram is used to allow satisfactory sharing of the spectrum with similar systems.
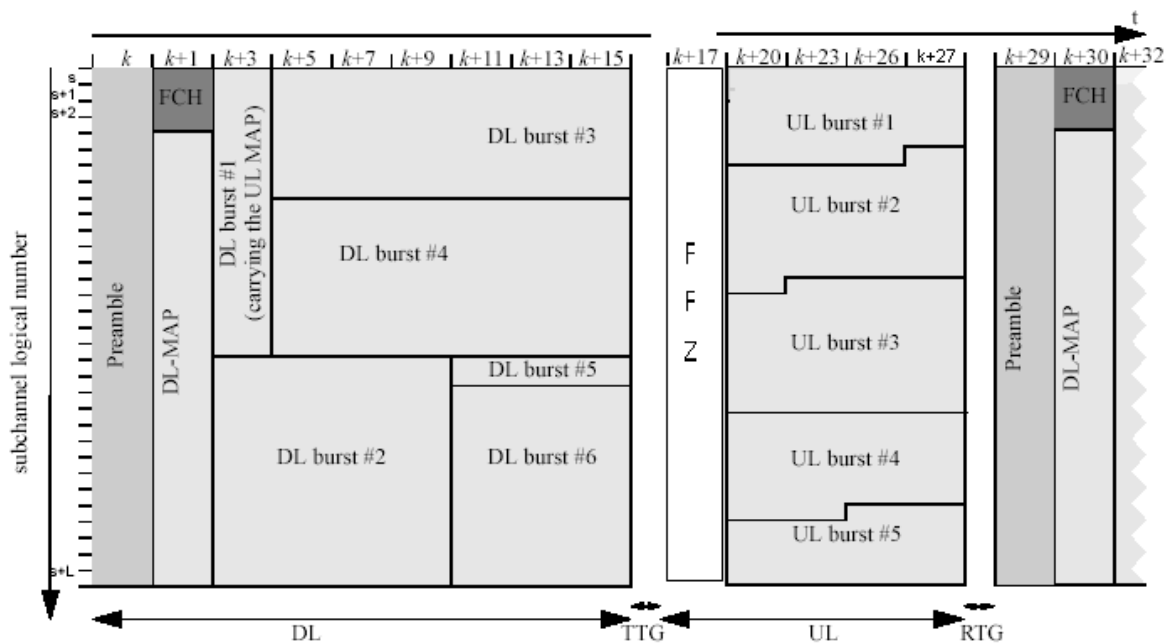
TTG is Transmission switching to Receive Gap in the BS and vice versa in the CPE.
RTG is Receive switching to Transmit Gap in the BS and vice versa in the CPE.

FFZ – Fast Feedback Zone is a zone allocated by the UL maps broadcasted by the BS.
The CPE may lottery a CDMA code for ranging or bandwidth request in pre allocated location for these activities by the BS UL maps broadcasted in DL direction.
There are 256 different CDMA codes that can be used to separate between CPEs requests contentions if appeared. If CPE does not answered to the request it repeats the appropriate request after a random increased back-off time.

In addition the UL map broadcasted by the BS assigns to each CPE how many bursts to use and their allocation for the BW request received.
In which the contention between them is prevented.

CPEs associated to the some BS learn and then recognize the preamble index broadcasted by each BS at each frame start.
There are 114 different applicable preamble indexes to identify BSs working in the same area.

The above illustrated frame is synchronized by GPS global 1PPS signal in which all BSs uses the same synchronized frames and the same TDD ratio as mentioned above.
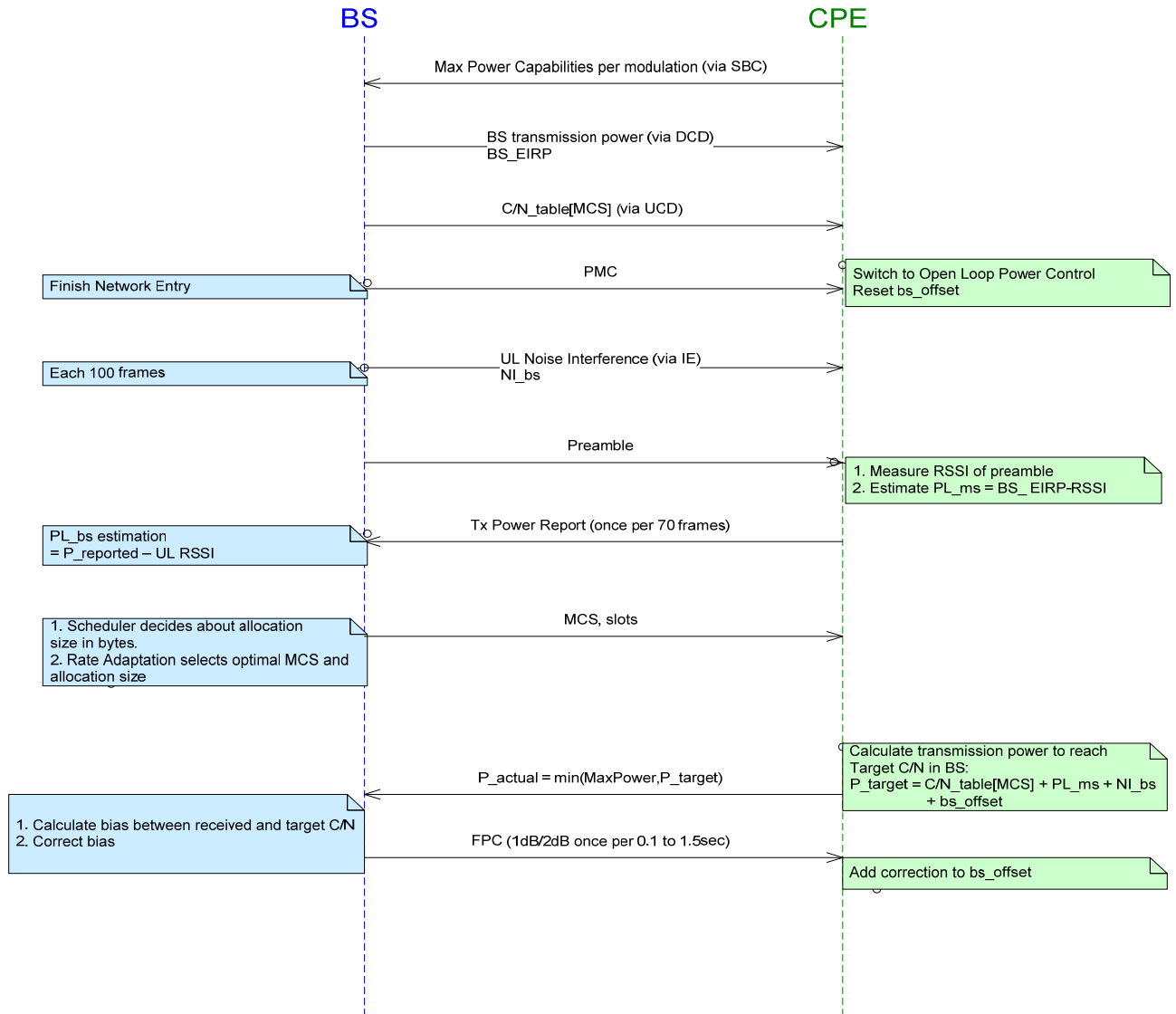
In addition the protocol allows permutation of OFDM subcarriers to prevent contentions and interference.

The system uses ATPC that calculates the link loss and limits the CPE transmission power to prevent contention with neighbor sectors CPEs.

Both the CPE and the BS uses directional antennas to reduce inter / intra site interference.

The ATPC is done in open loop by the CPE and corrected in close loop by the BS as described in the following flow chart:

BS   **CPE**

Max Power Capabilities per modulation (via SBC)

BS transmission power (via DCD)
BS_EIRP

C/N_table[MCS] (via UCD)

PMC

Finish Network Entry

Switch to Open Loop Power Control
Reset bs_offset

UL Noise Interference (via IE)
NI_bs

Each 100 frames

Preamble

1. Measure RSSI of preamble
2. Estimate $PL\_ms = BS\_EIRP - RSSI$

Tx Power Report (once per 70 frames)

PL_bs estimation
= P_reported – UL RSSI

MCS, slots

1. Scheduler decides about allocation size in bytes.
2. Rate Adaptation selects optimal MCS and allocation size

Calculate transmission power to reach Target C/N in BS:
$P\_target = C/N\_table[MCS] + PL\_ms + NI\_bs + bs\_offset$

$P\_actual = min(MaxPower, P\_target)$

1. Calculate bias between received and target C/N
2. Correct bias

FPC (1dB/2dB once per 0.1 to 1.5sec)

Add correction to bs_offset

1.2 Describe the method to permit occupancy

The method to permit occupancy is synchronized schedule protocol that prevents contentions.

1.3 Describe the action taken if two or more transmitters simultaneously access the same channel by the master and the client devices.

See paragraph 1.1.2 above.

1.4 Describe opportunities for other similar systems to operate-address how, or if a different system operator using the same technology can operate in the same band.

Considering the above mentioned similar systems can definitely use and share the same band for continues and simultaneous operation.