

# CDMA Advanced Channel Emulator

## Feature Description

**Dyaptive** SYSTEMS

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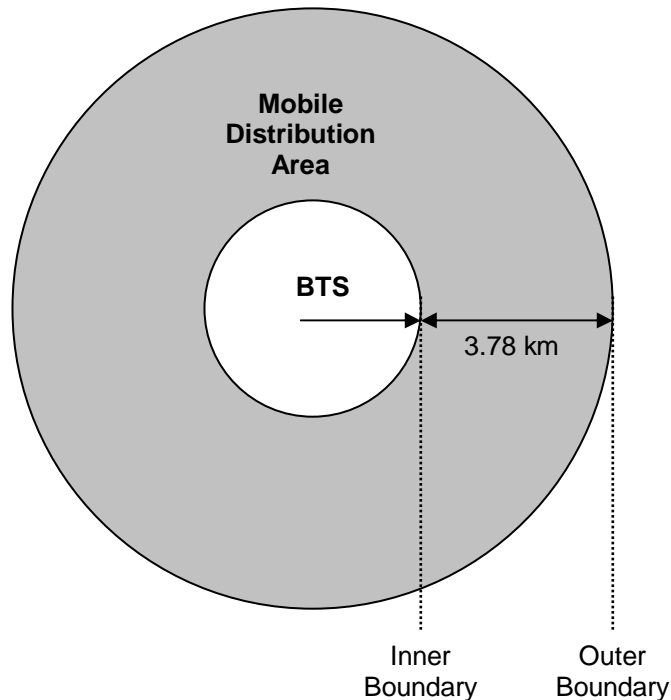
## 1 Introduction

Thorough performance analysis of today's complex radio transmission schemes requires extensive emulation of radio channels under load conditions. The DMTS-8000 allows simulation of real world conditions under load, far beyond what is possible on a captive network using discrete components. RF verification and qualification needs to be performed for simple and diversity receivers under different multipath and fading environments .

Dyaptive's Advanced Channel Emulator software package is intended to emulate radio channel characteristics such as path loss, time delays, multipaths, reverse-link diversity and slow and fast fading models. The user can dynamically change path delays and path loss for each individual virtual mobile of the DMTS-8000.

## 2 Extended Cell Support

The Extended Cell Support feature allows a user to expose the Base Station (BTS) receiver to various round trip delay times. It simulates mobiles with different timing offsets which is equivalent to different distances from a BTS. Mobiles can effectively be adjacent to a BTS or over 300 km away. All mobiles of a given Processing Element are placed into a so called "Mobile Distribution Area". The inner boundary of this area can be shifted to any value from 0 to 300km (1228 chips) in 30.5m (1/8 chip) increments away from the BTS. The actual area is defined between the inner and outer boundary and can be up to 3.78km (15.875 chips) wide. The granularity for mobile placement is 61m (¼ chip).



The distance parameters are used to model mobile distributions around a BTS. Mobiles that have similar propagation delay characteristics, such as mobiles located very far from a BTS or mobiles close to a BTS, can be grouped and included in any traffic mix.

If multiple Mobile Distribution Areas are to be tested in one or multiple sectors, then every Mobile Distribution Area of 3.78km needs its own Processing Element.

### 3 Signal Amplitude and Phase Shift Simulation

Radio channel conditions are the direct cause of soft and softer handoffs. The DMTS-8000 normally controls the radio channel simulation automatically to allow soft and softer handoff performance testing. With the Advanced Channel Emulator package, the user can directly set and control the reverse link path attenuation, phase shift, and delay per virtual mobile. Further these settings can be preconfigured and automatically reloaded for different soft and softer handoff configurations.

### 4 Reverse-link Fast Fading Model - Future

Standard performance tests (e.g. 3GPP2 C.S0010 / TIA-97) include measuring BTS receiver capabilities under a specific set of multipath and Doppler effects. With the DMTS-8000 Advanced Channel Emulator package, the user will be able to reproduce these environments easily and in conjunction with load. Further, user-specified configurations will also be possible for up to three paths per mobile. Simple and diversity BTS receiver configurations will also be supported.

Configuration	1	2	3	4	Remark
Vehicle Speed (km/h)	3	8	30	100	
Number of Paths	1	2	1	3	
Path 2 Power (dB)	-	0	-	0	Relative to Path 1
Path 3 Power (dB)	-	-	-	-3	Relative to Path 1
Path 2 Delay (chips)	-	2.5	-	2.3	Relative to Path 1
Path 3 Delay (chips)	-	-	-	17.75	Relative to Path 1

