Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Link budget template for 802.16m EVM**
Date	**2007-11-05**
Source(s)	Fan Wang fanw@motorola.com Motorola Inc.
Re:	Call for Comments on 802.16m Evaluation Methodology 802.16m-07/037r1
Abstract	Propose template for link budget in 802.16m EVM
Purpose	Propose template for link budget in 802.16m EVM
Notice	This document has been prepared to assist IEEE 802.16. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein.
Release	The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE's sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.16.
Patent Policy and Procedures	The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures <http://ieee802.org/16/ipr/patents/policy.html>, including the statement "IEEE standards may include the known use of patent(s), including patent applications, provided the IEEE receives assurance from the patent holder or applicant with respect to patents essential for compliance with both mandatory and optional portions of the standard." Early disclosure to the Working Group of patent information that might be relevant to the standard is essential to reduce the possibility for delays in the development process and increase the likelihood that the draft publication will be approved for publication. Please notify the Chair <mailto:chair@wirelessman.org> as early as possible, in written or electronic form, if patented technology (or technology under patent application) might be incorporated into a draft standard being developed within the IEEE 802.16 Working Group. The Chair will disclose this notification via the IEEE 802.16 web site <http://ieee802.org/16/ipr/patents/notices>.

Link budget template for 802.16m EVM

Fan Wang
Motorola Inc.

Propose adding following two tables to replace the "TBD" for link budget on page 116, line 32 of IEEE 802.16m-07/037r1

1.0   Downlink link budget template

Downlink					
BS EIRP	**Preamble**	**FCH**	**MAP**	**Traffic**	**Units**
BS transmitter RMS P_{out} per antenna port					dBm
Number of BS Tx antenna elements					----
Feeder cable loss, and other losses					dB
Cyclic combining gain					
BS Antenna gain					dBi
DL adaptive array gain					dB
Preamble boost					dB
Data carrier power loss due to pilot boosting					
BS RMS EIRP					**dBm**
Permutation zone					---
Number of occupied subcarriers					---
BS RMS EIRP per occupied sub-carrier					**dBm**
System Margin					
Log normal fading margin					dB
Fast fading margin					dB
Interference margin					dB
Penetration loss					dB
Body loss					dB
Total system margin					**dB**
Subscriber Sensitivity					
SS antenna gain					dBi
HARQ gain					dB
Handover gain					dB
SS diversity gain (2 antenna)					dB
SS noise figure					dB
Thermal noise (kT)					dBm/Hz
Sub-carrier spacing					kHz
Modulation, coding rate					---
1-branch Rx AWGN SNR required for MCS level					dB
Traffic data rate					kbps
AWGN 1-branch sensitivity - per sub-carrier					dBm
AWGN sensitivity w/diversity - per sub-carrier					**dBm**
System Gain & Cell Radius					

Max path loss w/o margin - includes div gain					dB
Max path loss including margins					**dB**
Path loss exponent					---
PL (do = 1000 m)					dB
DL maximum cell radius					**km**

2.0   Uplink link budget template

Mobile Uplink					
Subscriber EIRP	**CQICH**	**Ranging**	**ACK/NACK**	**Traffic**	**Units**
SS transmitter RMS P_{out}					dBm
Number of SS Tx antenna elements					----
Antenna gain					dBi
UL Tx array gain					dB
SS RMS EIRP					dBm
Permutation zone					----
Data subcarrier power loss due to pilot boosting					----
Number of occupied subcarriers					----
SS RMS EIRP per occupied sub-carrier					**dBm**
System Margin					
Log normal fading margin					dB
Fast fading margin					dB
Interference margin					dB
Penetration loss					dB
Body loss					dB
Total system margin					**dB**
BS Sensitivity					
BS antenna gain					dBi
HARQ gain					dB
Handover gain					dB
BS diversity gain (2 antenna)					dB
Noise figure					dB
Thermal noise (kT)					dBm/Hz
Sub-carrier spacing					kHz
Modulation, coding rate					---
1-branch Rx AWGN SNR required for MCS level					dB
Traffic data rate					kbps
AWGN 1-branch sensitivity - per sub-carrier					dBm
AWGN sensitivity w/diversity - per sub-carrier					**dBm**
System Gain & Cell Radius					
Max path loss w/o margin - includes div gain					dB
Max path loss including margins					**dB**
Path loss exponent					---
PL (do = 1000 m)					dB
UL maximum cell radius					**km**