Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Steps or procedures in the Link Budget calculation**
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Re:	IEEE 802.16m-07/080r3– Call for Comments on Draft 802.16m Evaluation Methodology Document
Abstract	This document contains proposed text for the draft evaluation methodology for IEEE 802.16m technical proposals.
Purpose	For discussion and approval by TGm
Notice	
Release	
Patent Policy	

Steps or procedures in the Link Budget calculation

1. Steps or procedures in the Downlink Link Budget calculation (Base Station → Mobile Station (Handset))

Step 1: Base Station EIRP (dBm) = Maximum Base Station Transmit Power Per Sector/Carrier (dBm) + 10 log10 (OFDM Symbol Duration with Cyclic Prefix (μ s)/OFDM Symbol Duration(μ s)) + Base Station Antenna Gain (dB)

Step 2: Power per Sub-carrier Transmitted from the Base Station (dBm) = Base Station EIRP (dBm) – 10 log10 (Number of Allocated PUSC Downlink Sub-carriers per Base Station Sector/Carrier)

Step 3: Receiver Sensitivity per Sub-carrier (dBm) = -174 (dBm/Hz) + 10 log10 (Sub-carrier Spacing (Hz)) + Required Received SNR (dB) +Mobile Station Noise Figure (dB)

Step 4: Total Margin (dB) = Log-normal Shadowing Loss (dB) + Fast Fading Loss (dB) + Interference Loss (dB) + Penetration Loss (dB) + Hardware Loss (dB)

Step 5: Mobile Station Receiver Antenna Diversity Gain (dB) = 10 log10 (Number of Mobile Station Receiver Antennas)

Step 6: System Gain (dB) = Power per Sub-carrier Transmitted from the Base Station (dBm) +Mobile Station Antenna Gain (dB) + Mobile Station Receiver Antenna Diversity Gain (dB) - Mobile Receiver Sensitivity per Sub-carrier (dBm)

Step 7: Maximum Allowable Path Loss (dB) = System Gain (dB) – Total Margin (dB)

2. Steps or procedures in the Uplink Link Budget calculation (Mobile Station Handset → Mobile Station Handset)

Step 1: Mobile Station EIRP (dBm) = Mobile Station Transmit Power (dBm) + Mobile Station Transmit Antenna Gain (dB)

Step 2: Power per Sub-carrier Transmitted from the Mobile Station (dBm) = Mobile Station EIRP (dBm) – 10log10 (Number of Allocated PUSC Uplink Sub-carriers per Mobile Station)

Step 3: Receiver Sensitivity per Sub-carrier (dBm) = -174 (dBm/Hz) + 10 log10 (Sub-carrier Spacing (Hz)) + Required Received SNR (dB) +Mobile Station Noise Figure (dB)

Step 4: Total Margin (dB) = Log-normal Shadowing Loss (dB) + Fast Fading Loss (dB) + Interference Loss (dB) + Penetration Loss (dB) + Hardware Loss (dB)

Step 5: Mobile Station Receiver Antenna Diversity Gain (dB) = 10 log10 (Number of Mobile Station Receiver Antennas)

Step 6: System Gain (dB) = Power per Sub-carrier Transmitted from the Mobile Station (dBm) +Mobile Station Antenna Gain (dB) + Mobile Station Receiver Antenna Diversity Gain (dB) - Mobile Receiver Sensitivity per Sub-carrier (dBm)

Step 7: Maximum Allowable Path Loss (dB) = System Gain (dB) – Total Margin (dB)