

Functional Area: Network Infrastructure & Operation (Planning & Design)

1. Title	Acquire knowledge on propagation modelling and power budget calculation	
2. Code	ITCSNO511A	
3. Range	Stable power supply is necessary to ensure good quality signals transmitted over the mobile network. This UOC concerns acquiring sufficient information on signal propagation for power budget calculation. Signal propagation modelling will allow determination of required power consumption to be used at antennas by understanding/predicting of SNR (Signal-Noise-Ratio) and signal strength.	
4. Level	5	
5. Credit	5	
6. Competency	<p style="text-align: center;"><u>Performance Requirement</u></p> <p>6.1 Possess the knowledge in the subject area</p> <ul style="list-style-type: none"> • Expert in network capacity planning (current and growth forecast) • Possess extensive knowledge of current and emerging power management technologies • Conversant with antenna and RF (Radio Frequency) operating theories • Possess extensive knowledge of EMF (Electromotive Force) and PD (Potential Difference) principles and relationship of Power, Voltage and Decibel • Possess extensive knowledge of radio propagation effects on network design, such as diffraction effects, line-of sight, ionospheric paths, etc. • Possess extensive knowledge of the power budgeting methodology and calculation formula (such as power conversion of mW to dBm $P_{(dBm)} = 10 \cdot \log_{10}(P_{(mW)})$) and use of power calculation tools • Understand health and safety procedures and government regulations <p>6.2 Acquire knowledge on propagation modelling and power budget calculation</p> <p>Be able to:</p> <ul style="list-style-type: none"> • Lead a team or work with colleagues in network design, resource planning or other departments to determine the need of power budgeting • Acquire the mobile network infrastructure map and other relevant documents which show the location, type and number of antennas used in the mobile network • Determine the antenna details such as model, manufacturer, operating information from vendor or manuals • Calculate the required operating power required of each antenna or transmission power based on knowledge of operating characteristics of each antenna, which also depends on geographical location, surrounding constructions and other supporting equipment, etc. Simulation or calculation tools may be used • Calculate the total power usage of the network • Record the calculating procedure and the calculated power budget of the network. Distribute the report to appropriate stakeholder or network designer/planner <p>6.3 Exhibit professionalism</p> <ul style="list-style-type: none"> • All work must comply with RF standard requirements • Always take into consideration and strike a proper balance among all related technological, political, social, environmental and legal factors • Always strike a proper balance between the organisation and all stakeholders 	
7. Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ol style="list-style-type: none"> i. determine the network size and the type of transmitting equipment being used ii. source the correct operating information relating to the network equipment iii. identify the environmental and operating interference factors, RF transmission factors and use appropriate tools to determine the Power Budget of the network iv. document the calculating procedure and the power budgeting information which should conform to the organisation standards 	
Remark		