

## ABSTRACT

Multi carrier system is expected to be able to offer high data rate, to support a large number of users and to ensure the fulfillment of quality of service (QOS) requirements. The demand of subscribers on data services with the explosive development of traffic such as Internet, video interactive, email, gaming, and so forth from users, and additional future in 4G LTE technology.

To support these subscriber demands and promising QOS, in multi carrier system, scheduling algorithm priority scheme which consists of three main processes of scheduling, radio resources management, packet scheduling and priority schemes is implemented. The combination of User Order algorithm and QoS Class Identifier (QCI) Order using weighting factor for user priority with Promethee method to group and evaluate the users will be done for all user in each Time Trigger Interval (TTI).

Measurements of total average spectral efficiency and fairness for each number of users in the normal and overload condition resulted in the improvement of fairness index has more 8 percents than previous algorithm. When cell radius become wider, the sum average of spectral efficiency and average fairness becomes lower. The sum average of spectral efficiency decreasing very fast on deviation lognormal shadowing below than 3 dB, and going slowly after 3 dB. It has same time complexity  $O(KC)$  with previous algorithm, using asymptotic time complexity approach. This test is done for bandwidth system 5 MHz and 300 Subcarriers and distance of user to e-NodeB distributed in 1 km cell radius.

**Keywords: Scheduling Priority, Multi Carrier system, QCI, Promethee**

## DEDICATION

I always say grace and thanks to Allah, gratitude.

It cannot be denied that many people who contribute in this thesis, therefore I would like to take this opportunity to express my utmost gratitude and sincere appreciation to:

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In this thesis, still has weakness and needs for a lot of improvement to makes this algorithm usable. Therefore good suggestions and recommendations are needed for better result in the future.

Hopefully with all humility, this thesis could be useful for improvement ICT in developing scheduling of multicarrier systems. Especially it can be useful for all the students of Telkom University who needed reference.

Bandung

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Writer

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## GLOSSARY

<b>CSI</b>	Channel State Information	Information about channel condition and radio propagation
<b>OFDM</b>	Orthogonal Freq Div Multiplexing	Multi carrier technique to freq allocated
<b>QCI</b>	QoS Class Identifier	QoS based on services
<b>SE</b>	Spectral efficiency	Defines data rate per unit channel bandwidth for specified average transmitted power and a fixed bit-error rate (BER) value
<b>RB</b>	Resource Block	Grouping resource element consists of 12 consecutive sub carriers
<b>Chunk</b>	Chunk	Another term of the RB
<b>TTI</b>	Time trigger Interval	Time to trigger for 2 slots / 1 ms
<b>Promethee</b>	Promethee	sorting method which is generally used in a variety of research disciplines to evaluate function
<b>CQI</b>	Channel Quality Indicator	Parameter to inform about channel condition to e-nodeB
<b>OFDMA</b>	Orthogonal Freq Div Multiple Access	Multiple Access Technology to serve multi user using OFDM Multiplexing. It registered trademark by Runcom Ltd.
<b>UO</b>	User Order	Consider Negative Outranking among users
<b>QO</b>	QCI Order	Consider Negative Outranking and QCI user weighing
<b>GBR</b>	Guaranteed Bit Rate	Type of applications that need real time
<b>Non-GBR</b>	Non-Guaranteed Bit Rate	Type of applications that don't need real time
<b>LTE</b>	Long Term Evolution	Introduced in 3GPP Rel8, is the access part of the Evolved Packet System (EPS).
<b>e-nodeB</b>	Evolved Node B	Similarity with BTS
<b>ICT</b>	Information and Communication Technology	Which stresses the role of unified communications and the integration of telecommunications, computer, as well as necessary enterprise software, middleware, storage, and audio-visual systems.



## APPENDIX LIST

Appendix – 1                      Formulas Function