NETWORK PLANNING GUIDELINES FOR DVB-T NETWORK ROLLOUT IN SRI LANKA

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DECLARATION

I certify that this dissertation does not incorporate without acknowledgement, any material previously submitted for a degree or diploma in any University to the best of my knowledge and belief it does not contain any material previously published, written or orally communicated by another person or myself except where due reference is made in the text.

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ABSTRACT

There has been a clear prospect internationally for some years that existing analogue television broadcasting will be replaced by digital transmissions. Terrestrial digital broadcasting offers a range of benefits in comparison to terrestrial analogue broadcasting such as efficient spectrum utilization, improved audio & video quality, portable & mobile reception capability etc. Sri Lanka being a developing country it is high time to make timely entry to digital broadcast era, through establishment of requisite infrastructure with a view to future dividends derivable from an advanced digital infrastructure.

Therefore the first section of this research discuss the inherent technical strengths of digital terrestrial broadcasting and analyse candidate technology standards in digital video broadcasting. Further it propose the most suitable technology standard for DTT rollout in Sri Lanka by analysing technical capabilities as well as degree of compatibility with existing analog broadcast technology deployed in Sri Lanka.

The second section discuss the methodology for network planning, by proposing a set of guidelines for efficient planning of digital video broadcast networks to achieve nationwide coverage & thereby full access to viewers without any interruption during DVB-T rollout by specifically analysing Sri Lankan deployment scenarios. Further it has discussed various propagation models suitable for DVB-T network planning & step by step guidelines for in-depth coverage estimations & network simulations by optimizing DVB-T system parameters.

The final section of this research has in detail discussed DVB-T network implementation issues in practical point of view by critically analysing factors such as co-location of analog & digital transmission infrastructures, interference issues & primary distribution architectures. Finally it provides set of recommendations, where broadcast network operators can follow when deploying DVB-T networks in Sri Lanka.

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Finally I would like to dedicate this dissertation to my parents who have dedicated their entire life for my education.

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ACRONYMS

ARIB	Association of Radio Industries and Businesses
ATSC	Advanced Television System Committee
AWGN	Additive White Gaussian Noise
C- OFDM	Coded Orthogonal Frequency Division Multiplexing
CENELEC	European Committee for Electro technical Standardization
CIR	Carrier to Interference Ratio
CNR	Carrier to Noise Ratio
DAC	Digital to Analog Converter
DMB-T	Digital Multimedia Broadcast-Terrestrial
DQPSK	Differential Quadrature Phase Shift Keying
DRM	Digital Rights Management
DTMB	Digital Terrestrial Multimedia Broadcast
DTT	Digital Terrestrial Television
DVB	Digital Video Broadcasting
DVB-T	Digital Video Broadcasting – Terrestrial
DVD	Digital Versatile Disc
EBU	European Broadcasting Union
ERP	Effective Radiated Power
ETSI	European Telecommunications Standards Institute
FEC	Forward Error Correction
GPS	Global Positioning System
HDTV	High Definition Television
ISDB-T	Integrated Services Digital Broadcasting for Terrestrial
ISI	Inter Symbol Interference
ITU-R	International Telecommunication Union, Radio Communications Sector
JTC	Joint Technical Committee
MFN	Multi Frequency Network
MIP	Mega-frame Initialization Packet
MPEG	Motion Picture Experts Group
MUX	Multiplexing
NTSC	National Television System Committee

OFDM	Orthogonal Frequency Division Multiplexing
PS	Programme Streams
QAM	Quadrature Amplitude Modulation
QPSK	Quadrature Phase Shift Keying
SDTV	Standard Definition Television
SI	Service Information
SFN	Single Frequency Networks
STB	Set Top Boxes
STS	Synchronization Time Stamp
TDS-OFDM	Time Domain Synchronuous - Orthogonal Frequency Division Multiplexing
TPS	Transmission Parameters Signalling
TS	Transport Stream
UHF	Ultra High Frequency
VHF	Very High Frequency
VSB	Vestigial Side Band