

Compact Asymmetric Coplanar Waveguide Fed Monopole Antenna for DVB-H Applications

Hoang The Duy、吳俊德

E-mail: 363573@mail.dyu.edu.tw

ABSTRACT

The purpose of this thesis is to design and manufacture the miniaturized antenna for digital video broadcasting-handheld (DVB-H) application. The miniaturized DVB-H antenna has become very attractive for applications in mobile communication devices such as laptop computers, mobile phones and automobiles. Because the volume reserved for an antenna inside these devices is limited, a DVB-H antenna should be electrically small, and broadband operation has the challenging. In this thesis, the printed monopole antenna which utilizes the coplanar waveguide line is designed. The proposed antenna comprises a P-shape patch and a L-shaped ground plane. By the use of the different length of asymmetric ground plane, an additional resonant mode (0.75-wavelength) adjacent to the antenna's fundamental (0.25-wavelength) resonant mode can be excited. In addition, the use of coplanar waveguide fed structure has advantages like single metallic layer structure, lightweight, low cost and easy integration to monolithic microwave integrated circuits (MMICs). Based on the simulations of radiation patterns, return loss, and other antenna parameters from Ansoft High Frequency Structure Simulator (HFSS), the prototype antenna is designed. The proposed antenna can operate in the 439 – 937 MHz frequency range below -6 dB and cover the DVB-H operating bandwidth (470 - 862 MHz). The antenna has an approximately omni-directional radiation pattern in XZ-plane over the entire frequency band.

Keywords : digital video broadcasting-handheld (DVB-H)、 printed monopole antenna、 coplanar waveguide

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ABBREVIATIONS	
CENELEC	European Committee for Electro-technical Standardization
COFDM	Coded Orthogonal Frequency Division Multiplexing
CPW	Coplanar Waveguide
DTV	Digital Television
DVB	Digital Video Broadcasting
DVB-C	Digital Video Broadcasting Cable
DVB-H	Digital Video Broadcasting Handheld
DVB-S	Digital Video Broadcasting Satellite
DVB-T	Digital Video Broadcasting Terrestrial
ETSI	European Telecommunications Standards Institute
FEC	Forward error correction
GSM	Global System for Mobile Communications
MMIC	Monolithic Microwave Integrated Circuit
MPE	Multi-Protocol Encapsulation
MPEG-2	Moving Picture Experts Group-2
MPEG-4	Moving Picture Experts Group-4
OFDM	Orthogonal Frequency Division Multiplexing
PIFA	Planar Inverted-F Antenna
QAM	Quadrature amplitude modulation
QPSK	Quadrature Phase-shift keying
SFN	Single-frequency network
SNR	Signal to noise ratio
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