TE08

Ni-Zn-Cu ferrite DVB-H antenna

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The DVB-H digital mobile broadcasting solution was commercialized by Nokia at the last year. Its operation frequency was assigned from 475 MHz to 750 MHz, which are pretty lower than the ranges of GSM and CDMA. Thus the miniaturization of antennas in DVB-H handsets become a big problem because the antenna size is inversely proportional to the frequency.

In this work, two kinds of approaches were tried to miniaturize the broadband antenna. The first approach is design controlling of radiator pattern. The tapered slot and double tapered slot pattern were employed. Several hundreds MHz wide bandwidth was those design's own characteristicsas shown in Fig. 1(a). Antenna block is fixed at 40×10×2.5 mm. The second approach is permittivity and permeability controlling of substrate materials. So far the most of cases have been concentrated on dielectric materials for the antenna miniaturization [1], due to a difficulty of magnetic material selections in such high frequency ranges. Ni-Zn-Cu ferrite was selected because of suitable permittivity and permeability characteristics. The antenna block was prepared by 900℃ sintering of commercial ferrite powder of TFG972 by Toda kogyo Corp. Its permeability is 5 and permittivity is 10. The FMR frequency is around 1 GHz. The values of the antenna gains are -7.67 ~-7.57 dBi as shown in Fig. 1(b). According to the design guidelines of a DVB-H, the recommended antenna gain was -10 ~ -7 dBi [2]. Consequently, Ni-Zn-Cuferrite antennas can be applicable to DVB-H handsets.

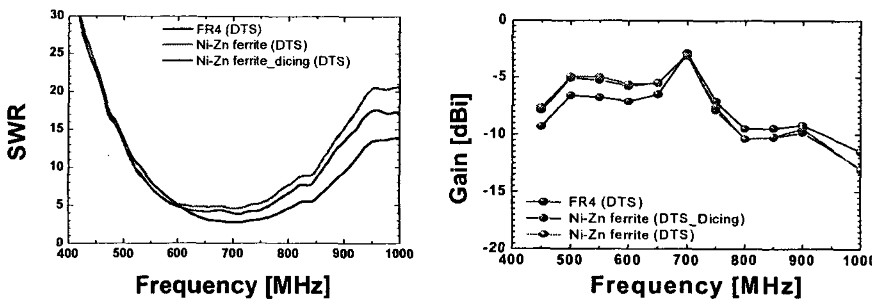

Fig. 1. *(a) SWR data, (b) gain data of fabricated antenna*

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TE09

Magneto-optical properties and crystallization of Bi:YIG film fabricated by RF-magnetron sputtering

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Garnet materials, which show high magnetic and magneto-optical properties, have been intensively studied for optical applications such as optical correlators and holographic data storage devices due to their advantages of high switching speed above 15ns.[1] Especially, Bi-substituted yttrium iron garnet (Bi:YIG) among the modified garnet materials has excellent magnetic and magneto-optical properties. For instance, fully-substituted bismuth iron garnet (BIG) can make a Faraday rotation as high as -7.8°μm^{-1} at 633nm, compared to 0.0835°μm^{-1} for pure YIG. However, in order to get maximum properties of the garnet materials, it is inevitable to find optimal fabrication conditions. Above all, an annealing temperature is very important to make garnet film crystallize, and the crystallization of garnet film has an effect on the magnetic and magneto-optical properties of it. In this study, a relation between a crystallization and magneto-optical properties of Bi:YIG films fabricated by RF magnetron sputtering was investigated dependent on annealing temperature. Bi:YIG films were deposited onto glass substrates by RF magnetron sputtering with the Ar pressure of 3mTorr using $Bi_{0.5}Y_{2.5}Fe_5O_{12}$ target. The deposition was performed under the condition of RF power of 100W for 1h. The fabricated films were annealed by RTA method under the temperature of 850~1000℃ for 10min in an electric furnace. Fig. 1 shows a relation between a crystallization and magneto-optical properties of Bi:YIG films as a function of annealing temperature. Faraday rotation increased with an increase of annealing temperature and showed a maximum value at 950℃, where a diffraction angle of (4,2,0) showed the nearest value to a standard XRD peak. Therefore, we can think that a magneto-optical property might be affected by the crystallization of film dependent on annealing temperature.

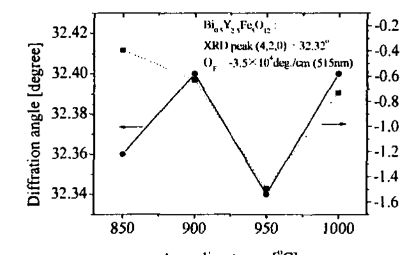

Fig. 1. Crystallization and magneto-optical propertydependent *on annealing temperature.*

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