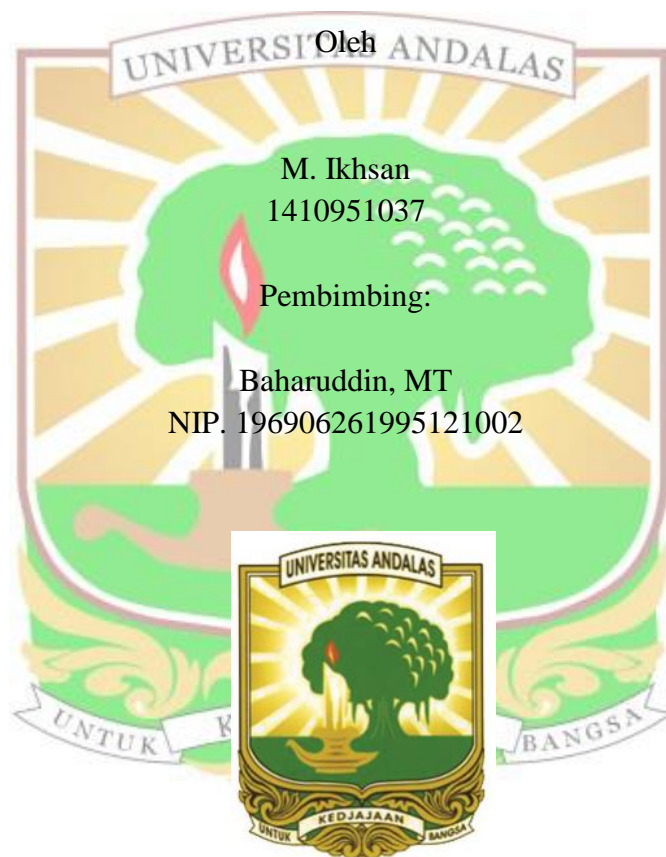


**OPTIMASI KINERJA ANTENA MIKROSTRIP *DUAL-SUBSTRATE*
CIRCULAR PATCH DENGAN PENAMBAHAN *SHORTING PIN* PADA
PITA FREKUENSI 4G LTE (BAND 3)**

TUGAS AKHIR

Karya Ilmiah sebagai salah satu syarat untuk menyelesaikan jenjang strata satu (S-1) di Jurusan Teknik Elektro, Fakultas Teknik, Universitas Andalas



**Program Studi Sarjana Teknik Elektro
Fakultas Teknik
Universitas Andalas
Padang
2019**

Judul	OPTIMASI KINERJA ANTENA MIKROSTRIP <i>DUAL-SUBSTRATE CIRCULAR PATCH</i> DENGAN PENAMBAHAN <i>SHORTING PIN</i> PADA PITA FREKUENSI 4G LTE (BAND 3)	M.IKHSAN
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ABSTRAK

Pada tugas akhir ini dirancang antena mikrostrip *circular patch* yang dapat beroperasi pada frekuensi LTE *band 3* (1710-1880 MHz). Antena Mikrostrip memiliki ukuran yang kecil, ringan, biaya murah, dan fabrikasi yang mudah. Antena Mikrostrip juga memiliki kekurangan seperti *bandwidth* yang sempit (*narrowband*). Untuk itu diperlukan suatu metode untuk dapat meningkatkan *bandwidth*.

Teknik yang digunakan untuk mengatasi *narrowband* ini adalah menghubungkan bagian *patch* ke *ground plane* antena *dual-substrate* dengan menggunakan konduktor logam berupa *pin*. Teknik pencatuan yang digunakan adalah *coaxial probe*. *Substrate* antena yang digunakan adalah FR4 Epoxy ($\epsilon_r = 4.4$) dengan ketebalan 3,27 mm. Antena disimulasikan menggunakan perangkat lunak Ansoft HFSS (*High Frequency Structural Simulator*) versi 13.0 untuk menilai kinerja antena yang ditinjau dari parameter *return loss*, VSWR, *Gain*, dan pola radiasi antena.

Ukuran dimensi antena yang diperoleh yaitu 56 x 56 x 3,27 mm. Hasil simulasi yang diperoleh yaitu nilai *return loss* -20,0216 dB, VSWR 1.7387, rentang frekuensi untuk *return loss* ≤ -10 dB berkisar 1711,8 MHz – 1887,4 MHz. Terjadi peningkatan *bandwidth* sebesar (72,6 MHz) pada antena *dual-substrate*. Hasil fabrikasi antena yaitu *return loss* -14.6443 dB, VSWR 1.8358, rentang frekuensi untuk *return loss* ≤ -10 dB berkisar 1707,5 – 1890 MHz, dan *bandwidth* 182,5 MHz. Dari hasil pengujian simulasi dan fabrikasi, disimpulkan bahwa penggunaan *shorting pin pada antena dual substrate* memiliki kinerja yang baik dalam meningkatkan *bandwidth*.

Kata Kunci : LTE *Band 3*, Antena Mikrostrip, *Dual-Substrate*, *Shorting Pin*, *Coaxial Probe*

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Mayor	Electrical Engineering	1410951037
Engineering Faculty Andalas University		
<p style="text-align: center;">ABSTRACT</p> <p>In this final project, a circular Microstrip Patch Antenna has been designed which operates on LTE frequency (1710-1880 MHz) Band 3. The Microstrip Antenna is small, light, inexpensive, and easy to be fabricated. Microstrip Antenna also has some disadvantages such as Narrowband. For that reason, the project proposed a bandwidth enhancement to overcome the narrowband.</p> <p>The technique is applied by connecting the patch part to the dual-substrate antenna ground plane by using Metal Conductor in form pin. The designed antenna used a FR-4 Epoxy ($\epsilon_r = 4.4$) and 3.27 mm thickness substrate and is feed by a coaxial probe. The antenna is simulated by using Ansoft HFSS (High Frequency Structural Simulator) version 13.0 to evaluate the performance of the antenna based on Return Loss, VSWR, Gain, and antenna radiation pattern parameter.</p> <p>The dimension of the antenna is : 56 x 56 x 3,27 mm. The simulation result show that antenna has return loss -20,0216 dB, VSWR 1.7387, frequency band for return loss ≤ -10 dB about 1711,8 MHz – 1887,4 MHz. The bandwidth has increased about (72,6 MHz). The fabricated antenna result show that return loss -14,6443 dB, VSWR 1.8358, frequency gap for return loss ≤ -10 dB about 1707.5 – 1890 MHz, and bandwidth 182,5 MHz. From the result of simulation and fabrication test, it can be concluded that applying the shorting pin technique on dual substrate antennas turned out well for increasing the bandwidth.</p> <p>Keyword : LTE Band 3, Microstrip Antenna, Dual Substrate, Shorting Pin, Coaxial Probe</p>		

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