Rancang bangun dual band lna pada penerima automatic picture transmission dan high resolution picture transmission satelit cuaca noaa 15, 18, 19 = Design and fabrication of dual band lna for automatic picture transmission and high resolution picture transmission receiver from noaa weather satellites 15, 18, 19

Farid Tito Andarto, author

Abstrak

[ABSTRAK
APT dan HRPT merupakan layanan yang paling popular dari satelit cuaca NOAA POES, untuk mendapatkan data pada saat yang bersamaan diperlukan penerima satelit yang beroperasi pada kedua band tersebut. Salah satu bagian dari penerima satelit cuaca adalah dual band low noise amplifier (LNA) dengan performansi yang baik pada kedua frekuensi kerjanya. Dalam penelitian ini, dual band LNA
penerima APT dan HRPT satelit cuaca NOAA 15,18, dan 19 dirancang, disimulasikan dan difabrikasi. APT memiliki frekuensi kerja 137,1-137,9 MHz dan HRPT dengan frekuensi kerja 1698-1707. MMIC MGA-62563 dipilih sebagai
komponen aktif LNA karena memiliki sifatnya yang low power dan linieritas yang tinggi. Pada penelitian ini juga dilakukan ekstraksi parameter S (teknik deembedding)
untuk mendapatkan nilai-nilai komponen small-signal MMIC
menggunakan model small-signal Dambrine. Dual band BPF dan dual band penyesuai impedansi didesain dengan menggunakan transformasi BPF dan penyesuai impedansi band tunggal dengan frekuensi tengah band tunggal
merupakan frekuensi tengah antara band APT dan HRPT. Untuk mengurangi jumlah komponen dan disipasi daya komponen pasif, dilakukan co-design antara
dual band BPF dengan penyesuai impedansi dual band. Simulasi cascade LNA menunjukkan pada band frekuensi APT noise figure sebesar 0,737 dB, gain sebesar 44,37 dB, input return loss sebesar -27,78 dB. Pada band frekuensi HRPT didapatkan noise figure sebesar 1,148 dB, gain sebesar 34,41 dB, input return loss sebesar -19,73 dB. Hasil simulasi menunjukkan rancangan sesuai dengan kriteria desain dengan spesifikasi yaitu input return loss <-10dB, gain minimal 15 dB untuk APT dan 32 dB untuk HRPT, noise figure 0,8 dB untuk APT dan 1 dB untuk HRPT. Sedangkan hasil fabrikasi menunjukkan pergeseran frekuensi kerja untuk band HRPT dari 1,7 GHz menjadi 1,6 GHz. Dari hasil fabrikasi juga menunjukkan input return loss untuk band APT sebesar -17,6 dB dan gain sebersar 12,74 dB sedangkan untuk band HRPT yang bergeser menjadi 1,6 GHz memiliki input return loss sebesar -9,39 dB dan gain sebesar 11,94 dB yang belum sesuai dengan spesifikasi desain.;
<hr>
ABSTRACT
APT and HRPT is the most popular service of NOAA weather satellites POES, to get the data simultaneously need a satellite receiver that operates on both the band.
One part of a weather satellite receiver is a dual-band low noise amplifier (LNA) with good performance on both frequencies. In this study, a dual band LNA for

APT and HRPT receiver from NOAA weather satellites 15,18, and 19 are
designed, simulated and fabricated. APT has 137.1 to 137.9 MHz working frequency and HRPT has 1698-1707 MHz working frequency. MGA-62563 MMIC selected as the active component of its LNA because it has low power and
high linearity. This study was also conducted on the S parameter extraction (deembedding techniques) to get the values of small-signal MMIC components using small-signal model of Dambrine. Dual-band BPF and dual band impedance matching is designed by using transformation of a single band BPF and matching impedance with center frequency is the center frequency between APT and HRPT
band. To reduce component count and power dissipation of passive components, conducted co-design between the dual-band BPF with dual-band impedance matching. From the results of tuning the input and output as well as the use of cascade LNA simulation show that on APT frequency band noise figure of 0.737 dB, a gain of 44.37 dB, input return loss of -27.78 dB. While the HRPT frequency band has noise figure at 1.148 dB, a gain of 34.41 dB, input return loss of -19.73 dB. The simulation results show that design is comply with the specification with input return loss <-dB, minimal gain 15 dB for APT and 32 ddB for HRPT, minimum noise figer 0.8 dB for APT and 1 dB for HRPT. While the fabrication
results show a shift working frequency for HRPT band from 1.7 GHz to 1.6 GHz.
From fabrication results also show that input return loss of -17.6 dB for the APT band and gain of 12.74 dB whereas for HRPT band is shifted to 1.6 GHz has an
input return loss of -9.39 dB and a gain of 11.94 dB which is not comply yet with design spesification.;APT and HRPT is the most popular service of NOAA weather satellites POES, to get the data simultaneously need a satellite receiver that operates on both the band.
One part of a weather satellite receiver is a dual-band low noise amplifier (LNA) with good performance on both frequencies. In this study, a dual band LNA for
APT and HRPT receiver from NOAA weather satellites 15,18, and 19 are
designed, simulated and fabricated. APT has 137.1 to 137.9 MHz working frequency and HRPT has 1698-1707 MHz working frequency. MGA-62563 MMIC selected as the active component of its LNA because it has low power and
high linearity. This study was also conducted on the S parameter extraction (deembedding techniques) to get the values of small-signal MMIC components using small-signal model of Dambrine. Dual-band BPF and dual band impedance matching is designed by using transformation of a single band BPF and matching impedance with center frequency is the center frequency between APT and HRPT
band. To reduce component count and power dissipation of passive components, conducted co-design between the dual-band BPF with dual-band impedance matching. From the results of tuning the input and output as well as the use of cascade LNA simulation show that on APT frequency band noise figure of 0.737 dB, a gain of 44.37 dB, input return loss of -27.78 dB. While the HRPT frequency band has noise figure at 1.148 dB, a gain of 34.41 dB, input return loss of -19.73 dB. The simulation results show that design is comply with the specification with input return loss <-dB, minimal gain 15 dB for APT and 32 ddB for HRPT, minimum noise figer 0.8 dB for APT and 1 dB for HRPT. While the fabrication
results show a shift working frequency for HRPT band from 1.7 GHz to 1.6 GHz.
From fabrication results also show that input return loss of -17.6 dB for the APT band and gain of 12.74 dB whereas for HRPT band is shifted to 1.6 GHz has an
input return loss of -9.39 dB and a gain of 11.94 dB which is not comply yet with design spesification.;APT

and HRPT is the most popular service of NOAA weather satellites POES, to get the data simultaneously need a satellite receiver that operates on both the band.
One part of a weather satellite receiver is a dual-band low noise amplifier (LNA) with good performance on both frequencies. In this study, a dual band LNA for
APT and HRPT receiver from NOAA weather satellites 15,18, and 19 are
designed, simulated and fabricated. APT has 137.1 to 137.9 MHz working frequency and HRPT has 1698-1707 MHz working frequency. MGA-62563 MMIC selected as the active component of its LNA because it has low power and
high linearity. This study was also conducted on the S parameter extraction (deembedding techniques) to get the values of small-signal MMIC components using small-signal model of Dambrine. Dual-band BPF and dual band impedance matching is designed by using transformation of a single band BPF and matching impedance with center frequency is the center frequency between APT and HRPT
band. To reduce component count and power dissipation of passive components, conducted co-design between the dual-band BPF with dual-band impedance matching. From the results of tuning the input and output as well as the use of cascade LNA simulation show that on APT frequency band noise figure of 0.737 dB, a gain of 44.37 dB, input return loss of -27.78 dB. While the HRPT frequency band has noise figure at 1.148 dB, a gain of 34.41 dB, input return loss of -19.73 dB. The simulation results show that design is comply with the specification with input return loss <-dB, minimal gain 15 dB for APT and 32 ddB for HRPT, minimum noise figer 0.8 dB for APT and 1 dB for HRPT. While the fabrication
results show a shift working frequency for HRPT band from 1.7 GHz to 1.6 GHz.
From fabrication results also show that input return loss of -17.6 dB for the APT band and gain of 12.74 dB whereas for HRPT band is shifted to 1.6 GHz has an
input return loss of -9.39 dB and a gain of 11.94 dB which is not comply yet with design spesification., APT and HRPT is the most popular service of NOAA weather satellites POES, to get the data simultaneously need a satellite receiver that operates on both the band.
One part of a weather satellite receiver is a dual-band low noise amplifier (LNA) with good performance on both frequencies. In this study, a dual band LNA for
APT and HRPT receiver from NOAA weather satellites 15,18, and 19 are
designed, simulated and fabricated. APT has 137.1 to 137.9 MHz working frequency and HRPT has 1698-1707 MHz working frequency. MGA-62563 MMIC selected as the active component of its LNA because it has low power and
high linearity. This study was also conducted on the S parameter extraction (deembedding techniques) to get the values of small-signal MMIC components using small-signal model of Dambrine. Dual-band BPF and dual band impedance matching is designed by using transformation of a single band BPF and matching impedance with center frequency is the center frequency between APT and HRPT
band. To reduce component count and power dissipation of passive components, conducted co-design between the dual-band BPF with dual-band impedance matching. From the results of tuning the input and output as well as the use of cascade LNA simulation show that on APT frequency band noise figure of 0.737 dB, a gain of 44.37 dB, input return loss of -27.78 dB. While the HRPT frequency band has noise figure at 1.148 dB, a gain of 34.41 dB, input return loss of -19.73 dB. The simulation results show that design is comply with the specification with input return loss <-dB, minimal gain 15 dB for APT and 32 ddB for HRPT, minimum noise figer 0.8 dB for APT and 1 dB for HRPT. While the fabrication

results show a shift working frequency for HRPT band from 1.7 GHz to 1.6 GHz.
From fabrication results also show that input return loss of -17.6 dB for the APT band and gain of 12.74 dB whereas for HRPT band is shifted to 1.6 GHz has an
input return loss of -9.39 dB and a gain of 11.94 dB which is not comply yet with design spesification.]