BAB V

KESIMPULAN

1. Perancangan di.hasilkan jarak optimal resonansi antar *patch* 0,82λg atau 72 mm ,lebar saluran *transformer* ¼ λg didapat sebesar 4,8 mm dan panjang saluran didapat 22,18 mm.
2. *Bandwidth* terhadap penambahan *patch* tetap di frekuensi operasi yang sama, yaitu pada 2,4 - 2,5 GHz. Hasil analisa *bandwidth return loss* ≤ 10 dB, hasil pengukuran dibandingkan hasil simulasi mencapai daerah frekuensi *Wi-Fi* dengan pergeseran 76,8 %.
3. *Gain* hasil simulasi pada satu elemen dibandingkan dua elemen terjadi peningkatan. Hasil simulasi memperoleh peningkatan untuk *gain* antena sebesar 55,6 %, dimana dengan intensitas 9,43 dB. Sedangkan sudut *beamwidth* terjadi penyempitan sebesar 10,44 % dibanding satu elemen.

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LAMPIRAN 1

Spesifikasi Substrate

ROGERS CORPORATION

Advanced Circuit Materials Division
480-961-1382 FAX: 480-961-4533
www.rogerscorporation.com

gh Frequency Laminates: Standard Thickness, Tolerance and Panel Sizes

Grade	Dielectric Constant	Standard Dielectric Thickness	Standard Panel Sizes
RT/duroid® 5870 RT/duroid 5880	2.33 2.20	0.005" (0.127 mm) ±0.0005" 0.010" (0.254mm) ±0.0007" 0.015" (0.381mm) ± 0.001" 0.020" (0.508mm) ±0.001" 0.031" (0.787mm) ± 0.001" 0.062" (1.570mm) ± 0.002" 0.125" (3.170mm) ± 0.004"	18" X 12" (457 X 305mm) 18" X 24" (457 X 305mm) 18" X 36" (457 X 914mm) 18" X 48" (457 X 1.219m)
RT/duroid 5880LZ	1.96	0.010" (0.256mm) ± 0.001 0.020" (0.508mm) ± 0.001 0.025" (0.625mm) ± 0.001 0.030" (0.762mm) ± 0.002 0.040" (1.026mm) ± 0.002 0.050" (1.270mm) ± 0.003 0.100" (2.540mm) ± 0.004 Other thicknesses available in 10 mil increments.	12" X 18" (305 X 457mm) 24" X 18" (610 X 457mm) 24"X 54" (610X 1.37m)
RT/duroid 6002 RT/duroid 6202	2.94 *2.90 (0.005") *2.98 (0.010") *3.00 (0.015") *2.90 (0.020/0.030)	0.005" (0.127mm) ± 0.0005" 0.010" (0.254mm) ± 0.0007" 0.020" (0.508mm) ± 0.001" 0.030" (0.762mm) ± 0.0015" 0.060" (1.524 mm) ± 0.002" 0.120" (3.048mm) ± 0.004"	12" X 18" (305 X 457mm) 24" X 18" (610 X 457mm) 24"X 54" (610X 1.37m)
RT/duroid 6006	6.15	0.010" (0.254mm) ±0.001" 0.025" (0.625mm) ± 0.001" 0.050" (1.270mm) ± 0.002" 0.075" (1.905mm) ±0.004" 0.100" (2.540mm) ±0.005"	10" X 10"(254 X 254mm) 10" X 20" (254 X 508mm) 20" X 20" (508 X 508 mm) 18" X 12" (457.2 X 305mm) 18" X 24" (457 X 305mm)
RT/duroid 6010LM	10.2 10.5 10.8		
duroid material available claddings: 1/4 oz. (9µm), 1/2 oz (17µm), 1 oz (35µm), 2 oz (70µm) electrodeposited copper foil, 1/2 oz (17µm), (35µm), 2 oz (70µm) rolled copper foil. Thick metal cladding on aluminum, brass and copper are available.			
AMM®3	327	0.015" (0.381mm) ± 0.0015" 0.020" (0.508mm) ± 0.0015" 0.030" (0.762mm) ± 0.0015" 0.060" (1.524mm) ± 0.0015" 0.125" (3.175mm) ± 0.0015	18" X 12" (457 X 305mm) 18" X 24" (457 x 610mm)
AMM4	4.50		
AMM6	6.00	0.015" (0.381mm) ± 0.0015" 0.025" (0.635mm) ± 0.0015" 0.050" (1.270mm) ± 0.0015" 0.075" *1.905 mm) ± 0.0015" 0.100" (2.540 mm) ± 0.0015"	
AMM10	9.20		
AMM10i	9.80		
AMM13i	12.80		
material available claddings: 1/4 oz. (9µm), 1/2 oz (17µm), 1 oz (35µm), 2 oz (70µm) electrodeposited copper foil. Thick metal clad-on aluminum and brass are available.-			
ULTRALAM® 2000	2.40 2.45 2.48 2.50 2.55	0.004 " (102 mm) ± 0.0004 0.0101" (0.257mm) ± 0.009 0.0147" (0.373mm) ±0.001 0.0190" (0.483mm) ±0.001 0.0300" (0.762mm) ±0.001	18"X 12" (457 X 305mm) 18" X 24" (457 X 610mm) 18" X36" (457 X 915mm) 18" X 48" (457 X 1.219m)
ULTRALAM 2000 material available claddings: 1/4 oz. (9µm), 1/2 oz (17µm), 1 oz (35µm), 2 oz (70µm)electrode posited copper foil, 1/2 oz, 1 and 2oz rolled copper foil. Thick metal cladding on aluminum, brass and copper are available.			

Grade	Dielectric Constant	Standard Dielectric Thickness	Standard Panel Sizes
)3003™	3.00	0.005 " (0.13mm) ± 0.0005 0.010" (0.25mm) ± 0.0007 0.020" (0.50mm) ± 0.001 0.030" (0.75mm) ± 0.0015 0.060" (1.52mm) ± 0.003	12" X 18" (305 x 457mm) 24" X 18" (610 X 457mm) 24" X36" (610 X 915mm)
)3035™	3.5		
)3006™	6.15	0.005" (0.13mm) ± 0.0005 0.010" (0.25mm) ± 0.0007 0.025" (0.64mm) ± 0.001 0.050" (1.27mm) ± 0.002	
)3010™	10.2		
)3203™	3.02	0.010" (0.25mm) ± 0.0007 0.020" (0.50mm) ± 0.001 0.030" (0.75mm) ± 0.0015 0.060" (1.52mm) ± 0.003	
)3206™	6.15	0.025" (0.64mm) ± 0.001 0.050" (1.27mm) ± 0.002	
)3210™	10.2		
RO3000 series material available cladd ings: 1/2 oz (17µm)1 (35µm) oz, 2 oz (70µm) electrodeposited copper foil.			
RO4003C™ RO4360™	3.38 6.15	0.008" (0.203mm) ± 0.0010 0.012" (0.305mm) ± 0.0010 0.016" (0.406mm) ± 0.0015 0.020" (0.508mm) ± 0.0015 0.032" (0.813mm) ± 0.0020 0.060" (1.524mm) ± 0.0040	12" X 18" (305 X 457mm) 24" X 18" (610X 457mm) 24" X36" (610 X 915mm) 48" X 36" (1.244m X 915mm)
RO4350B™	3.48	0.0066" (0.168mm) ± 0.0007 0.010" (0.25 mm) ± 0.0010 0.0133" (0.338mm) ± 0.0015 0.0166" (0.422mm) ± 0.0015 0.020" (0.51mm) ± 0.0015 0.030" (0.76mm) ± 0.0020 0.060" (1.52mm) ± 0.0040	
RO4450B PREPREG	3.30	0.0036"(0.091 mm)	24" X18" (610X 457mm)
	3.54	0.004" (0.102mm)	
RO4450F PREPREG	3.52	0.004" (0.102mm)	24" X 18" (610 X 457mm)

Grade	Dielectric Constant	Standard Dielectric Thickness	Standard Panel Sizes
O3730 Antenna Grade	3.00	0.030 (0.762mm)± 0.0015 0.060 (1.524mm) ± 0.003	24"X18" (601mm X 477 24X54" (610mm X 1.37m)
O4730 Antenna Grade	3.00	0.0307 (0.780mm) ± 0.015 0.0407 (1.034mm) ± 0.002 0.0607 (1.542mm) ± 0.003	24X18 (610 X 457mm) 48 X 36" (1.224m X 0.915mm)

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LAMPIRAN 2

Wifi Standar

Introduction to Wi-Fi (802.11)

The IEEE 802.11 specification (ISO/IEC 8802-11) is an international standard describing the characteristics of a wireless local area network (WLAN). The name **Wi-Fi** (short for "Wireless Fidelity", sometimes incorrectly shortened to WiFi) corresponds to the name of the certification given by the Wi-Fi Alliance, formerly WECA (Wireless Ethernet Compatibility Alliance), the group which ensures compatibility between hardware devices that use the 802.11 standard. Today, due to misuse of the terms (and for marketing purposes), the name of the standard is often confused with the name of the certification. A Wi-Fi network, in reality, is a network that complies with the 802.11 standard. Hardware devices certified by the Wi-Fi Alliance are allowed to use this logo:

Wi Fi™

With Wi-Fi, it is possible to create high-speed wireless local area networks, provided that the computer to be connected is not too far from the access point. In practice, Wi-Fi can be used to provide high-speed connections (11 Mbps or greater) to laptop computers, desktop computers, personal digital assistants (PDAs) and any other devices located within a radius of several dozen metres indoors (in general 20m-50m away) or within several hundred metres outdoors.

Wi-Fi providers are starting to blanket areas that have a high concentration of users (like train stations, airports, and hotels) with wireless networks. These access areas are called "**hot spots**"

Introduction to Wi-Fi (802.11)

The 802.11 standard reserves the low levels of the OSI model for a wireless connection that uses

50m away) or within several hundred metres outdoors.

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Introduction to Wi-Fi (802.11)

The 802.11 standard reserves the low levels of the OSI model for a wireless connection that uses electromagnetic waves, i.e.:

- The physical layer (sometimes shortened to the "PHY" layer), which offers three types of information encoding.
- The data link layer, comprised of two sub-layers: **Logical Link Control** (or **LLC**) and **Media Access Control** (or **MAC**).

The physical layer defines the radio wave modulation and signalling characteristics for data transmission, while the data link layer defines the interface between the machine's bus and the physical layer, in particular an access method close to the one used in the Ethernet standard and rules for communication between the stations of the network. The 802.11 standard actually has three physical layers, which define alternative modes of transmission:

Data Link Layer (MAC)	802.2		
	802.11		
Physical Layer (PHY)	DSSS	FHSS	Infrared

Any high-level protocol can be used on a Wi-Fi wireless network the same way it can be used on an Ethernet network.

The various Wi-Fi standards

The IEEE 802.11 standard is actually only the earliest standard, allowing 1-2 Mbps of bandwidth. Amendments have be made to the original standard in order to optimise bandwidth (these include the 802.11a, 802.11b and 802.11n standards, which are called 802.11 physical standards) or to better specify

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Name of standard	Name	Description
802.11a	Wifi5	The 802.11a standard (called WiFi 5) allows higher bandwidth (54 Mbps maximum throughput, 30 Mbps in practice). The 802.11a standard provides 8 radio channels in the 5 GHz frequency band.
802.11b	WiFi	The 802.11b standard is currently the most widely used one. It offers a maximum thoroughput of 11 Mbps (6 Mbps in practice) and a reach of up to 300 metres in an open environment. It uses the 2.4 GHz frequency range, with 3 radio channels available.
802.11c	Bridging 802.11 and 802.1d	The 802.11c bridging standard is of no interest to the general public. It is only an amended version of the 802.1d standard that lets 802.1d bridge with 802.11-compatible devices (on the data link level).
802.11d	Internationalisation	The 802.11d standard is a supplement to the 802.11 standard which is meant to allow international use of local 802.11 networks. It lets different devices trade information on frequency ranges depending on what is permitted in the country where the device is from.

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