

Winmate Inc.

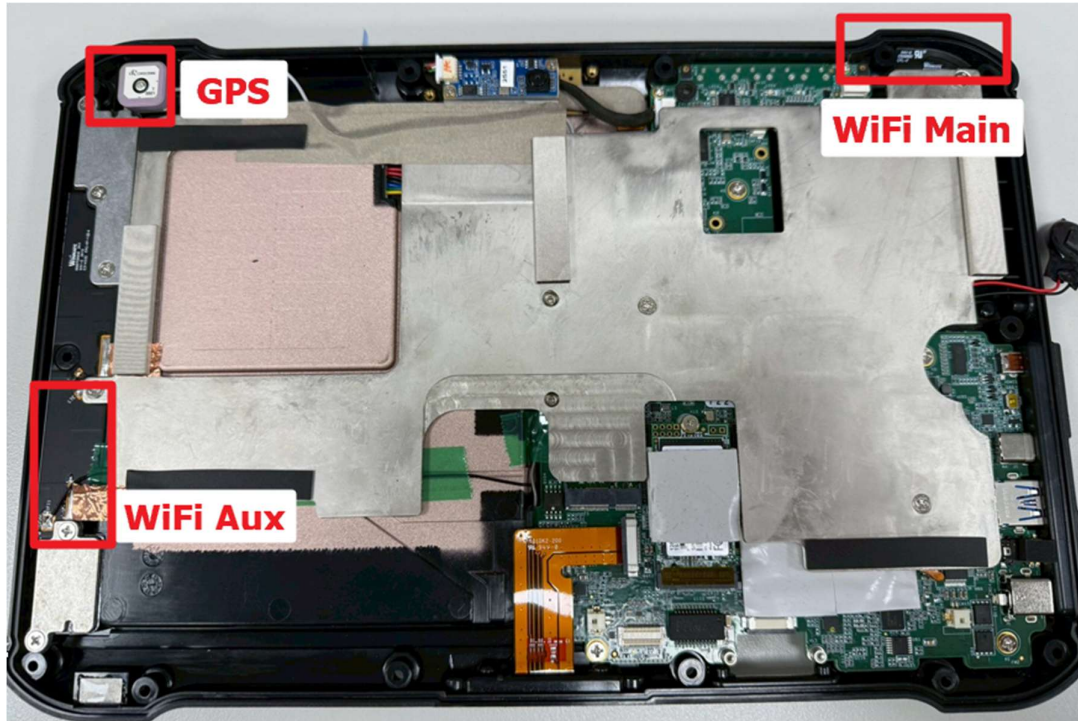
AntennaSpecification

Project :M116AN
Version :20260811
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1. Antenna Placement



2. Wi-Fi Aux Antenna Specification

Winmate Part Number: 90RF09000025

2.1. Electrical Characteristics

Frequency(MHz): 2400-2500 / 5150-5850

SWR:

$\leq 1.59 @ 2400-2500\text{MHz}$

$\leq 1.41 @ 5150-5850\text{MHz}$

Return Loss:

$\leq -12.7\text{dB} @ 2400-2500\text{MHz}$

$\leq -15.2\text{dB} @ 5150-5850\text{MHz}$

Peak Gain:

$0.42\text{dBi} @ 2400-2500\text{MHz}$

$2.80\text{dBi} @ 5150-5850\text{MHz}$

Impedance: 50ohm

Polarization: Linear

2.2. Mechanical Characteristics

Cable: 50 Ω ϕ 0.81 RF cable

Connector: MHF4

PCB: FPCB /Thickness 1.0mm

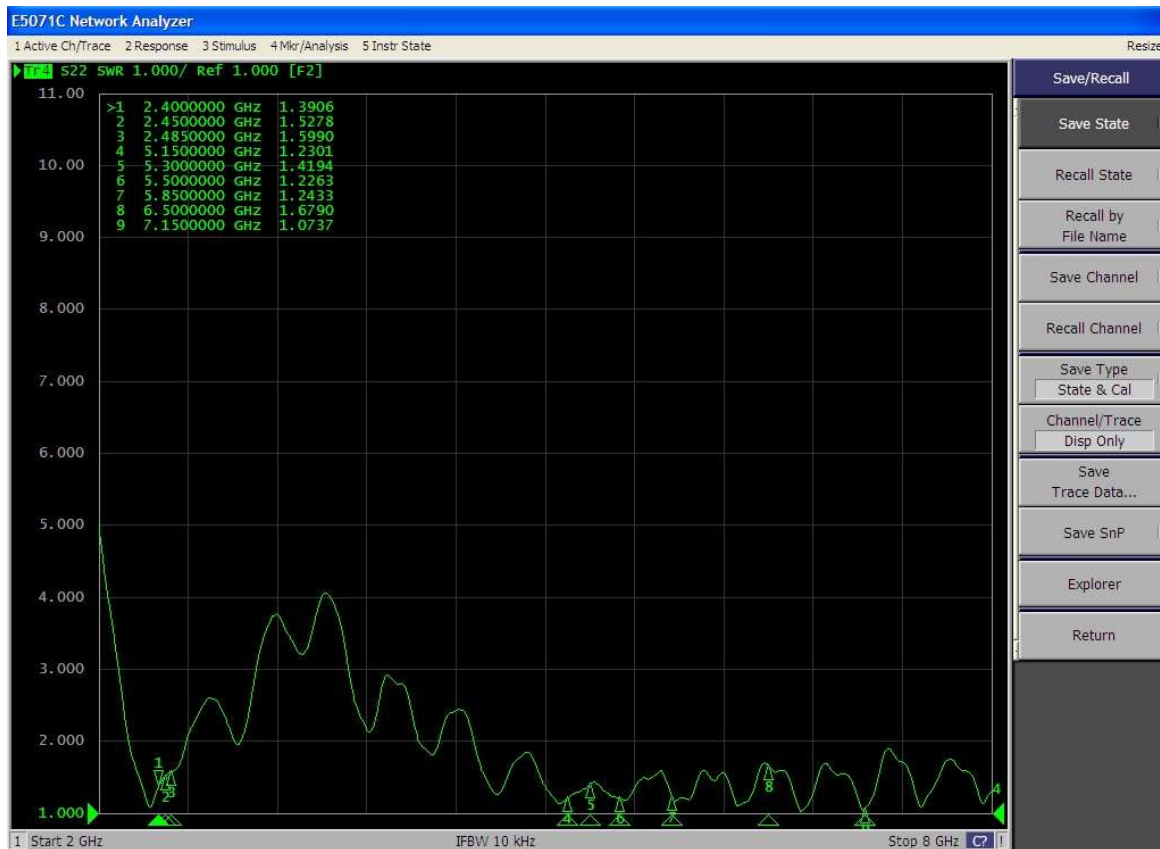
Type:PIFA

2.3. Environmental Characteristics

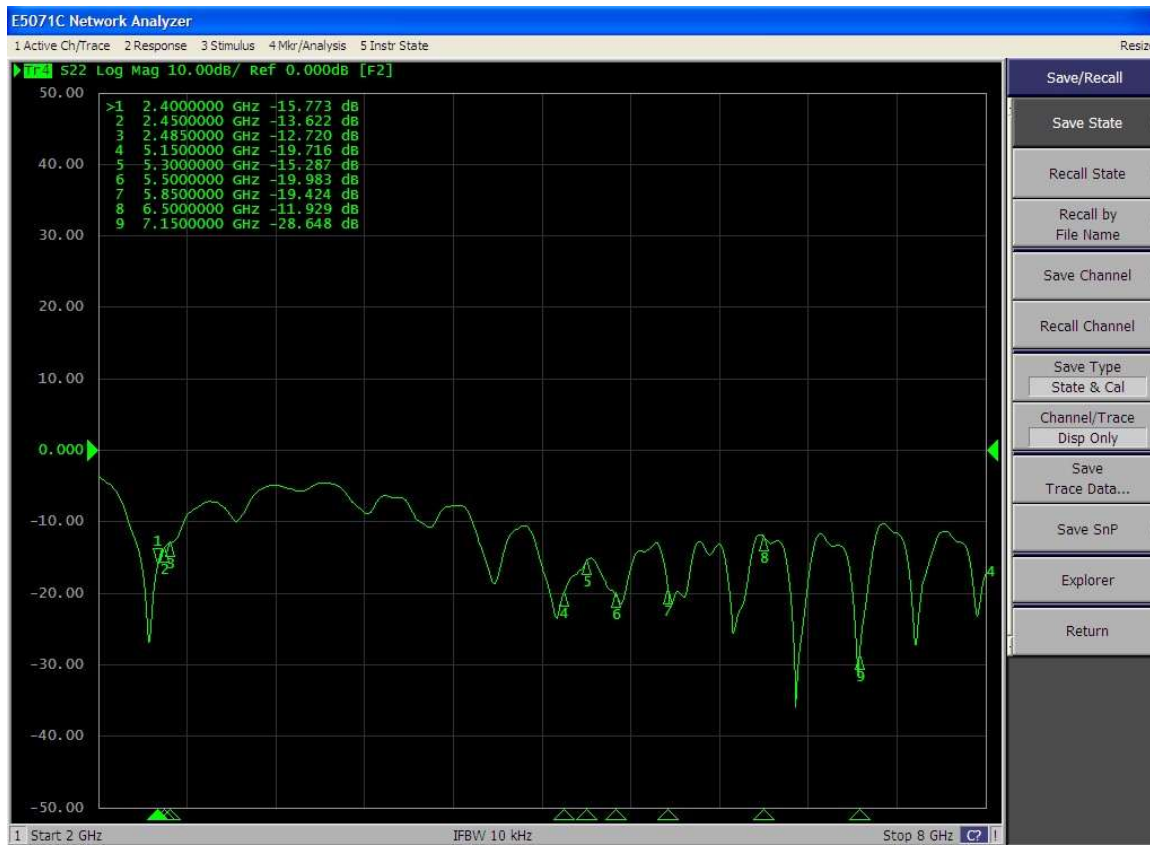
Operating Temperature: -30°C to 80°C

2.4. RF Performance Characteristics

2.4.1. SWR



2.4.2. Return Loss



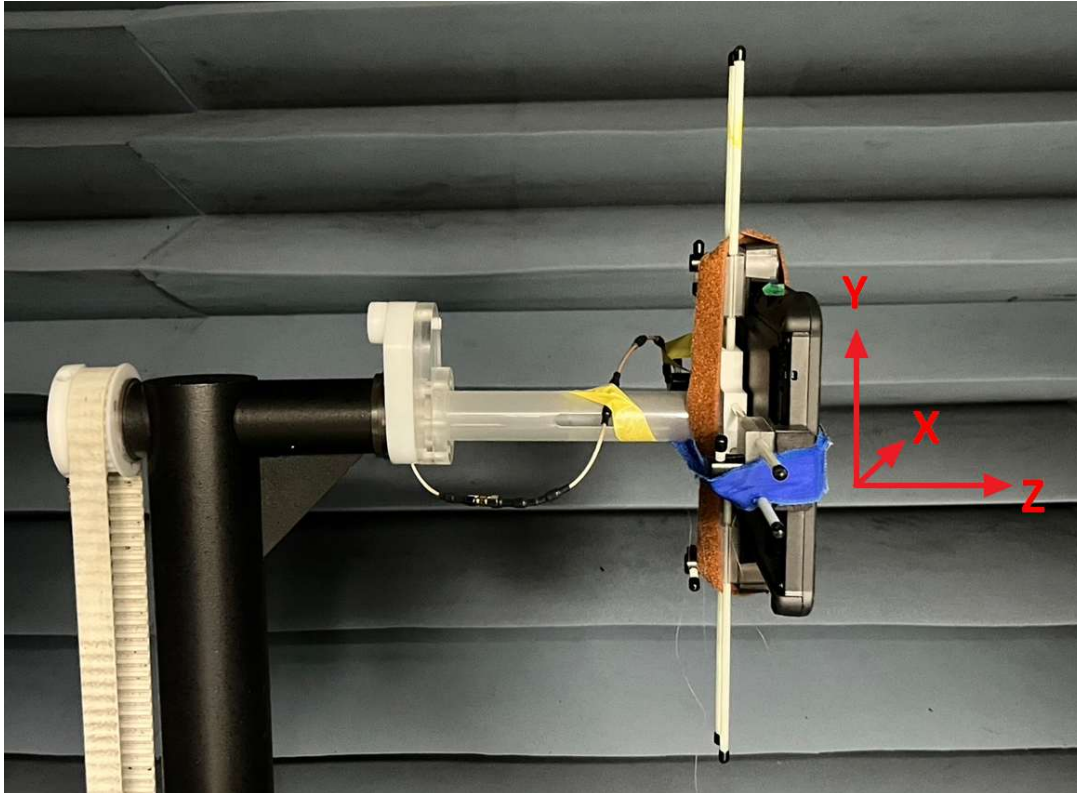
2.4.3. Gain / Efficiency

Frequency	2400	2450	2484	2500	5150	5250	5350	5470	5600	5725
Directivity (dBi)	5.65	6.34	6.47	5.99	6.71	6.60	6.02	6.05	6.42	7.64
Efficiency (dB)	-6.54	-6.05	-6.05	-5.75	-5.12	-4.67	-4.48	-4.71	-4.76	-4.84
Efficiency (%)	22.20	24.81	24.82	26.59	30.77	34.08	35.63	33.81	33.38	32.82
Peak Gain (dBi)	-0.88	0.29	0.42	0.24	1.59	1.92	1.54	1.34	1.66	2.80

Frequency	5785	5850
Directivity (dBi)	7.50	7.71
Efficiency (dB)	-5.10	-5.07
Efficiency (%)	30.92	31.10
Peak Gain (dBi)	2.40	2.64

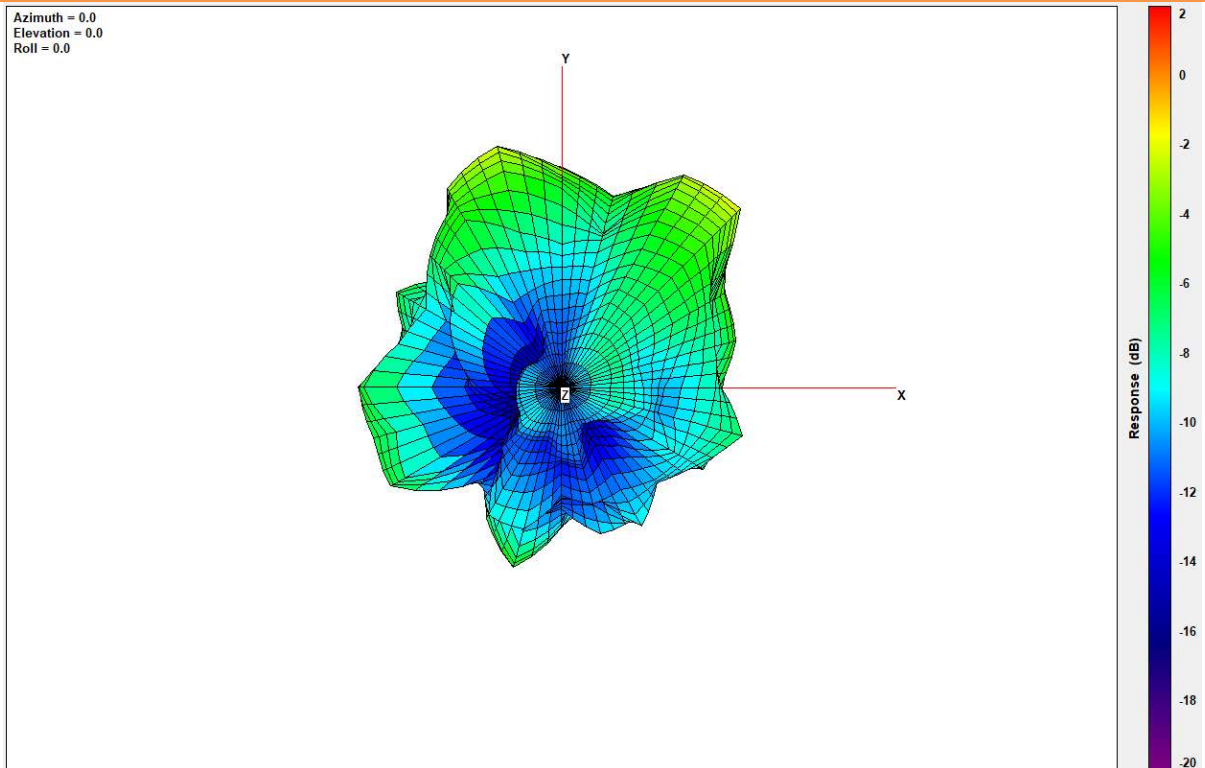
2.4.4. Radiation Patterns

2.4.4.1. Test Setup



2.4.4.2. Straight 2D & 3D Radiation Patterns

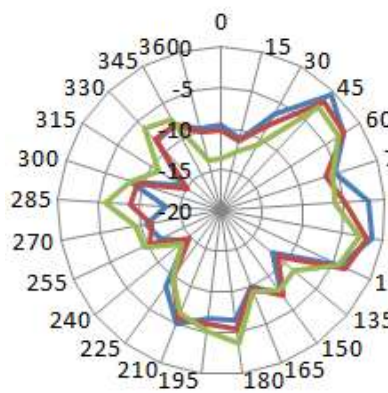
2450MHz



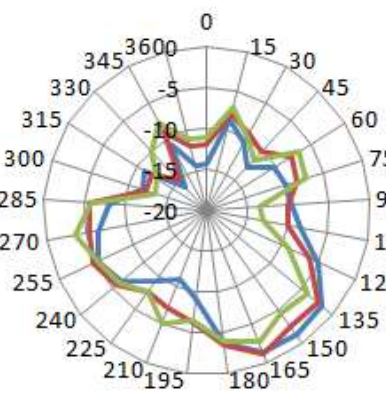
XY Plane

XZ Plane

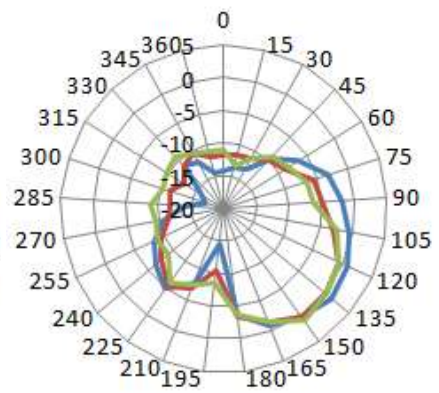
YZ Plane



— 2400 MHz;
— 2450 MHz;
— 2500 MHz;

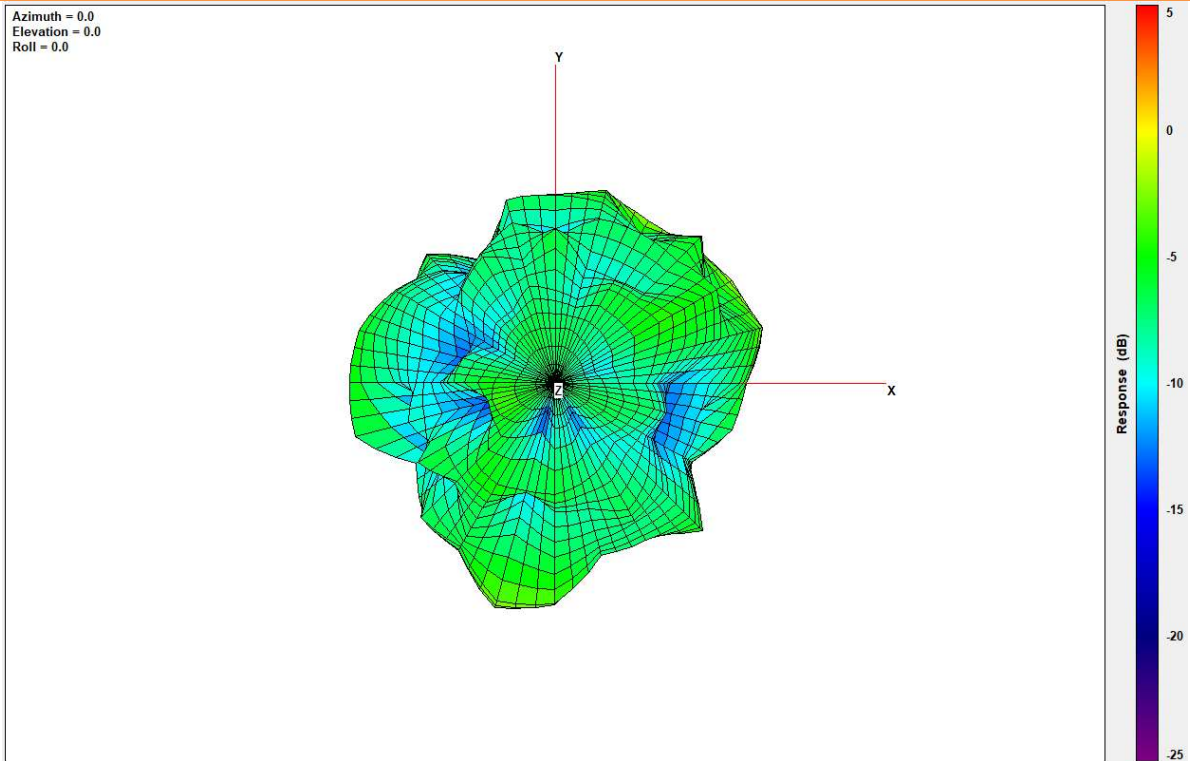


— 2400 MHz;
— 2450 MHz;
— 2500 MHz;

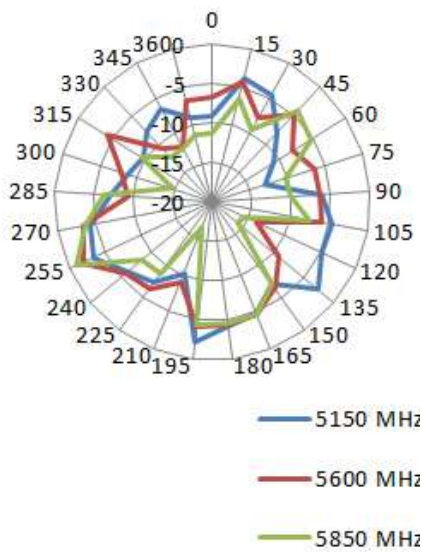


— 2400 MHz;
— 2450 MHz;
— 2500 MHz;

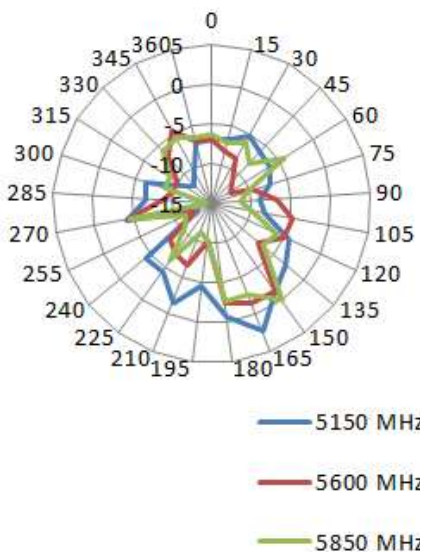
5600MHz



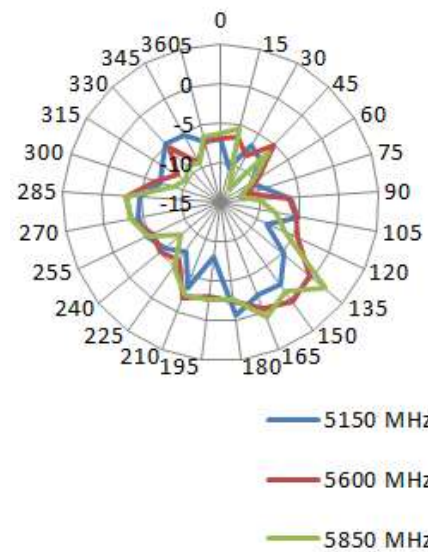
XY Plane



XZ Plane

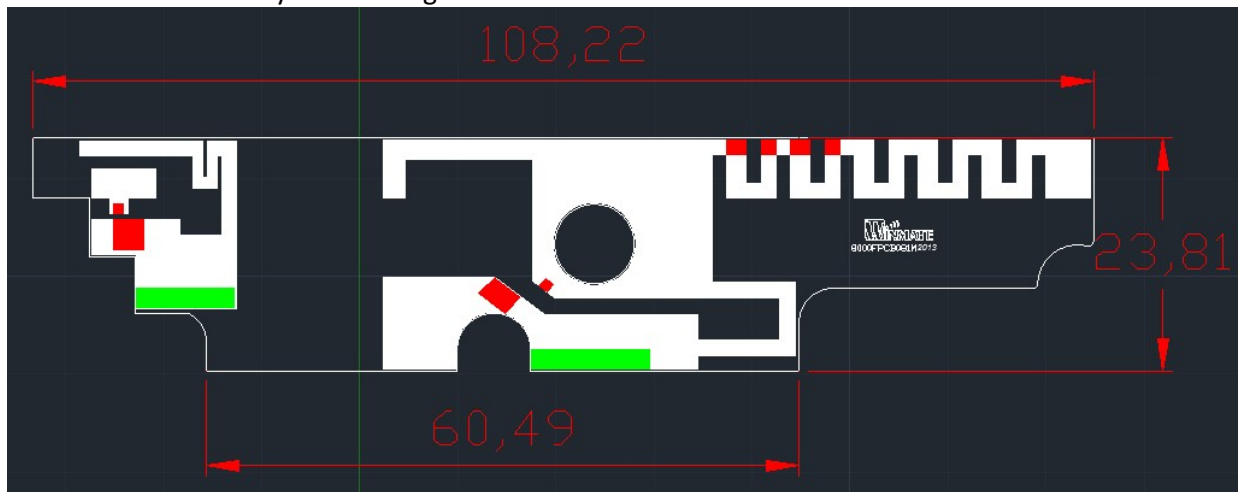


YZ Plane



2.5. Drawing

WiFi Main Antenna Layout Drawing



RF cable Drawing



Antenna Assembly



Winmate Part Number: 90RF09000025

3. WiFi Main Antenna Specification

Winmate Part Number: 90RF0600000W

3.1. Electrical Characteristics

Frequency(MHz): 2400-2500 / 5150-5850

SWR:

$\leq 1.93 @ 2400-2500\text{MHz}$

$\leq 2.24 @ 5150-5850\text{MHz}$

Return Loss:

$\leq -9.6\text{dB} @ 2400-2500\text{MHz}$

$\leq -8.5\text{dB} @ 5150-5850\text{MHz}$

Peak Gain:

$3.50\text{dBi} @ 2400-2500\text{MHz}$

$4.90\text{dBi} @ 5150-5850\text{MHz}$

Impedance: 50ohm

Polarization: Linear

3.2. Mechanical Characteristics

Cable: 50 Ω $\phi 0.81$ RF cable

Connector: MHF4

PCB: FR4 /Thickness 0.2mm

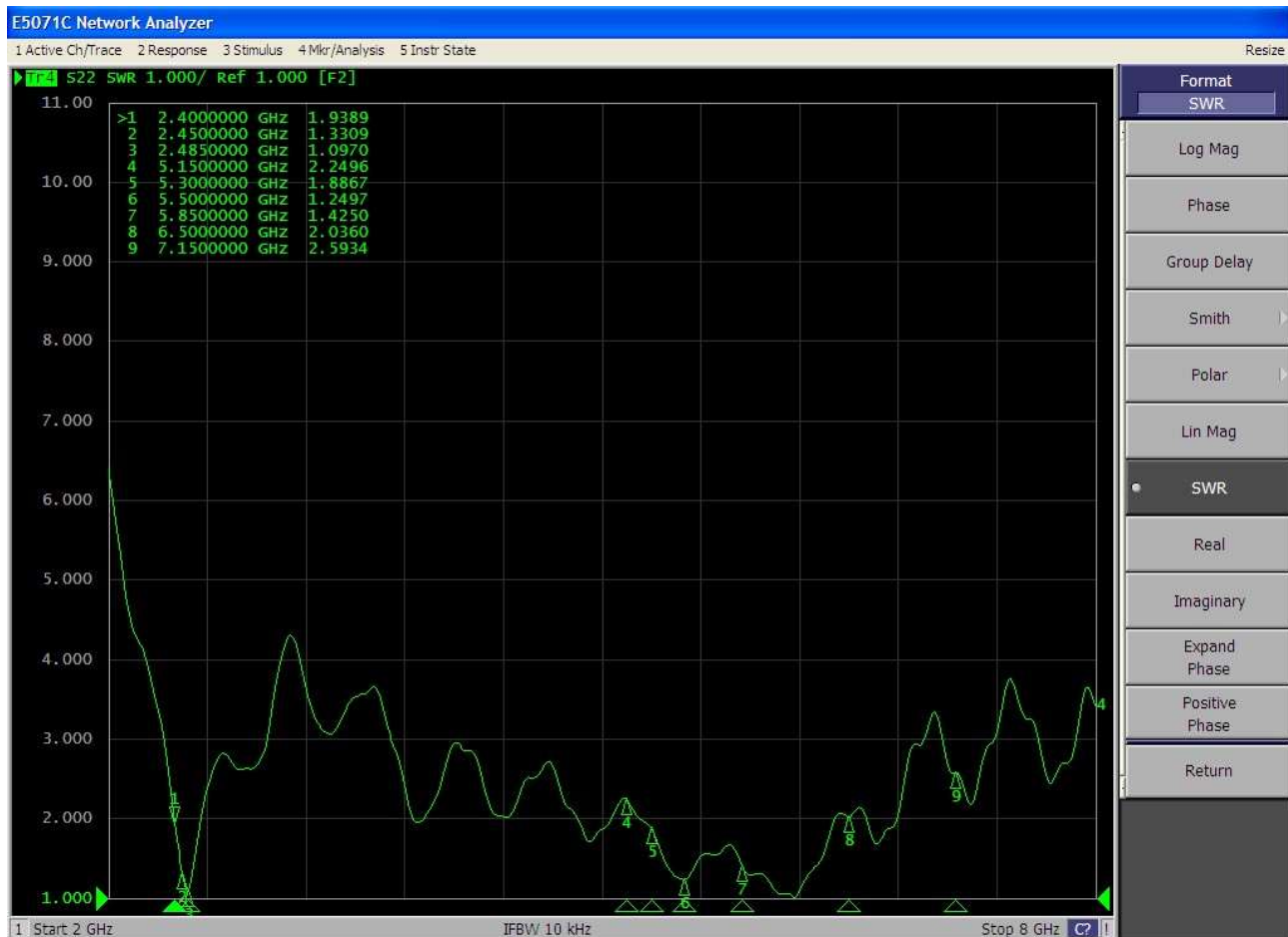
Type:PIFA

3.3. Environmental Characteristics

Operating Temperature: -30°C to 80°C

3.4. RF Performance Characteristics

3.4.1 SWR



3.4.2 Return Loss



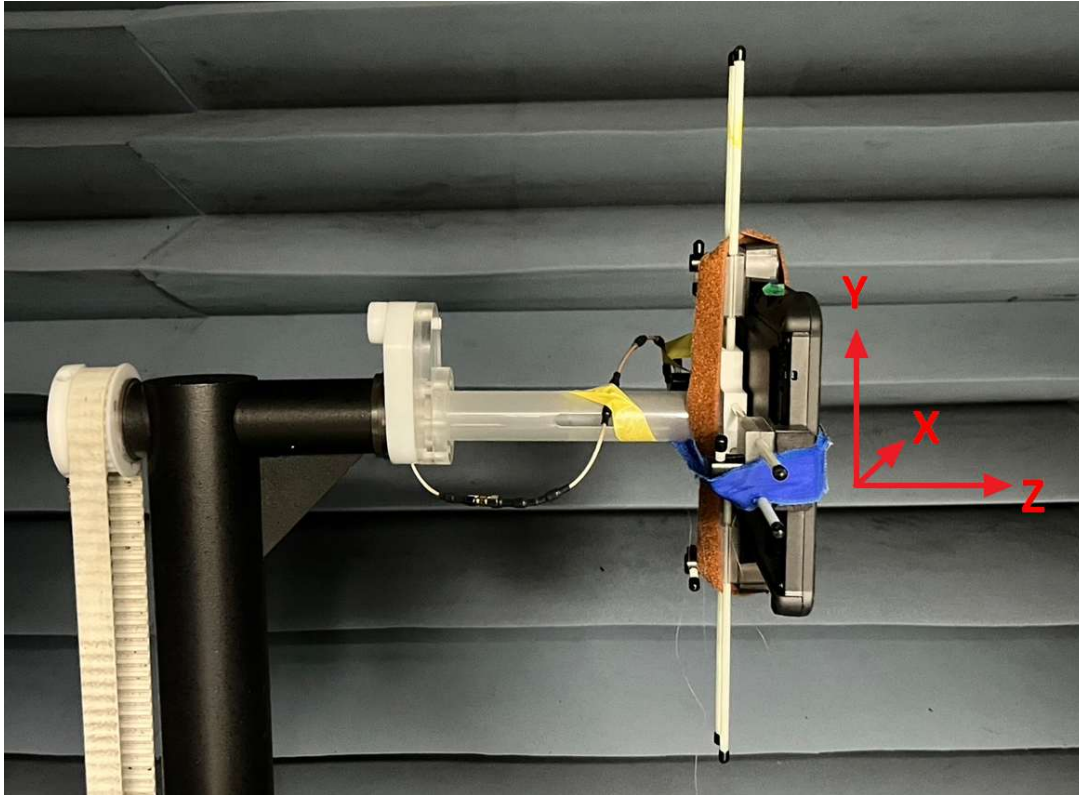
3.4.3. Gain / Efficiency

Frequency	2400	2450	2484	2500	5150	5250	5350	5470	5600	5725
Directivity (dBi)	5.13	5.70	6.30	6.24	8.03	8.26	8.27	8.83	8.91	8.24
Efficiency (dB)	-3.48	-3.17	-3.04	-2.75	-4.20	-4.14	-3.91	-3.93	-4.01	-4.27
Efficiency (%)	44.89	48.20	49.71	53.14	38.01	38.53	40.60	40.46	39.71	37.39
Peak Gain (dBi)	1.65	2.53	3.27	3.50	3.83	4.12	4.36	4.90	4.90	3.97

Frequency	5785	5850
Directivity (dBi)	8.06	8.00
Efficiency (dB)	-4.16	-4.24
Efficiency (%)	38.37	37.71
Peak Gain (dBi)	3.90	3.76

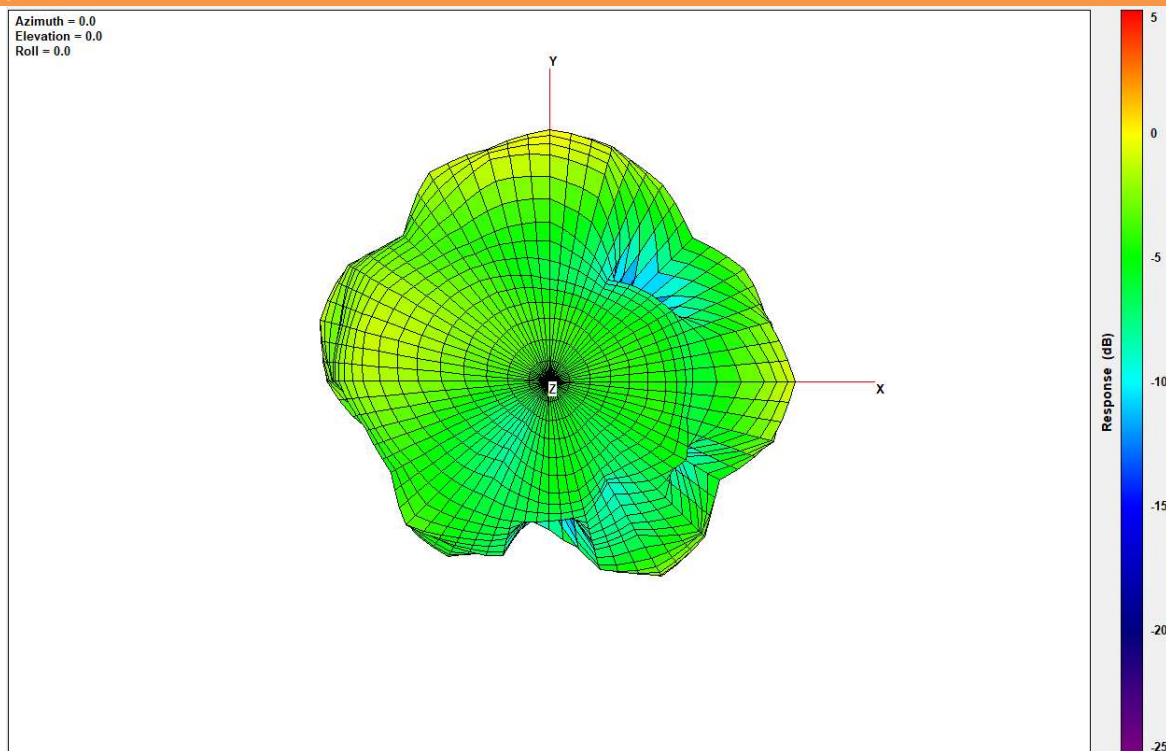
3.4.4. Radiation Patterns

3.4.4.1. Test Setup



3.4.4.2. Straight 2D & 3D Radiation Patterns

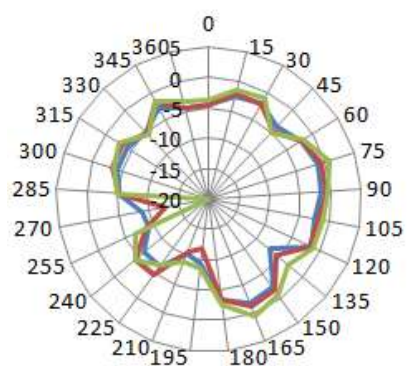
2450MHz



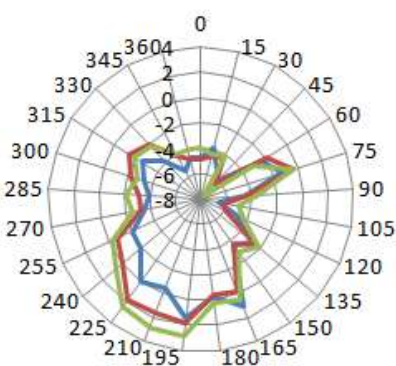
XY Plane

XZ Plane

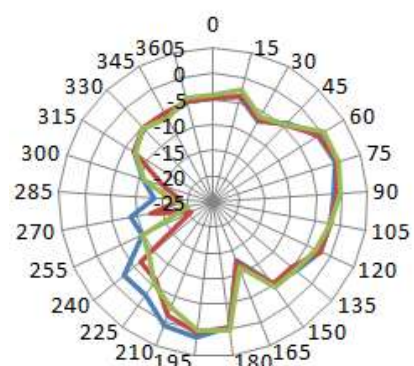
YZ Plane



— 2400 MHz
— 2450 MHz
— 2500 MHz

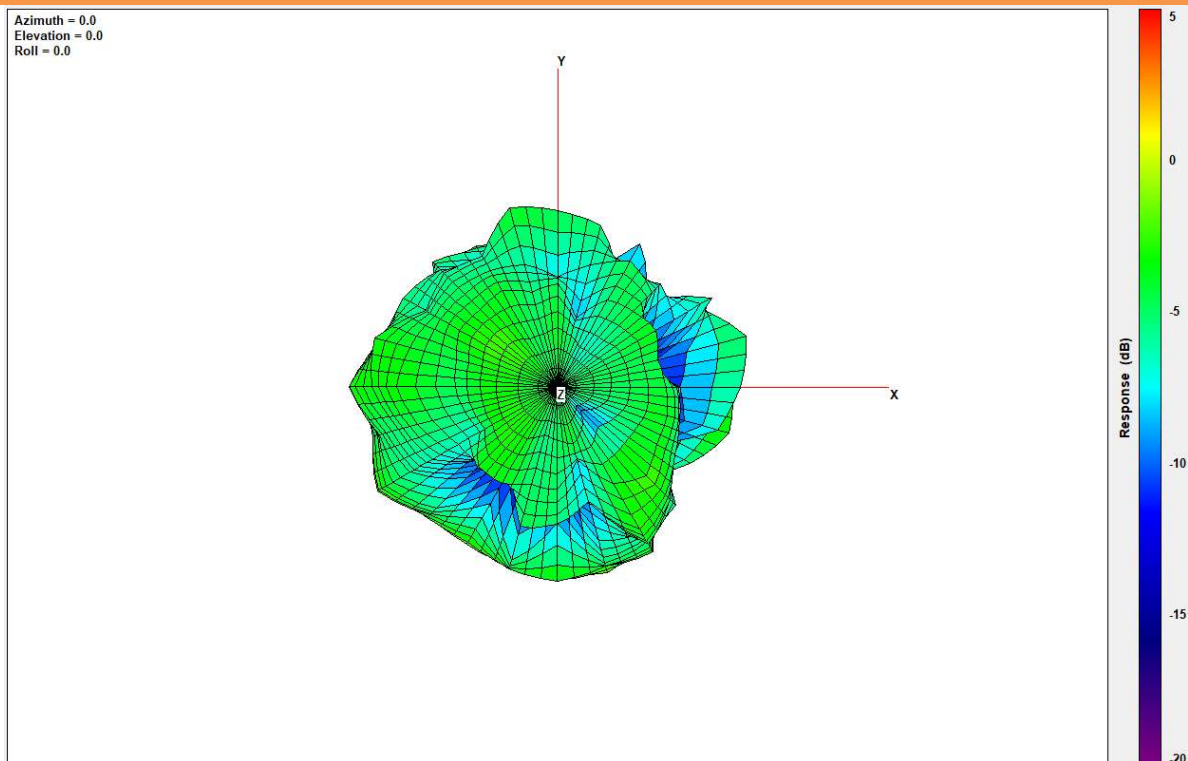


— 2400 MHz
— 2450 MHz
— 2500 MHz



— 2400 MHz
— 2450 MHz
— 2500 MHz

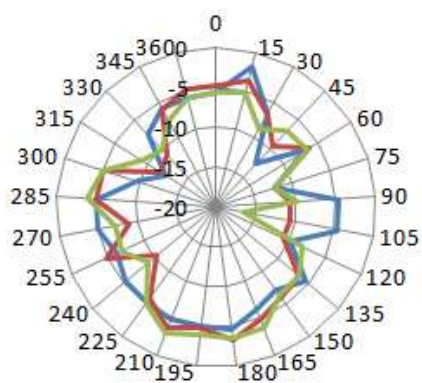
5600MHz



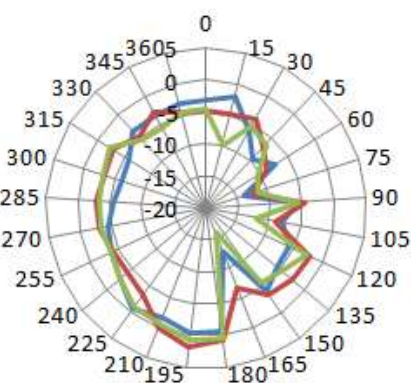
XY Plane

XZ Plane

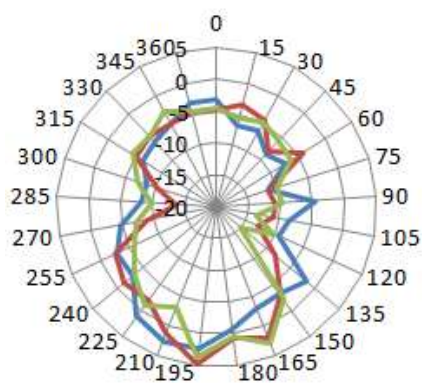
YZ Plane



— 5150 MHz;
— 5600 MHz;
— 5850 MHz;



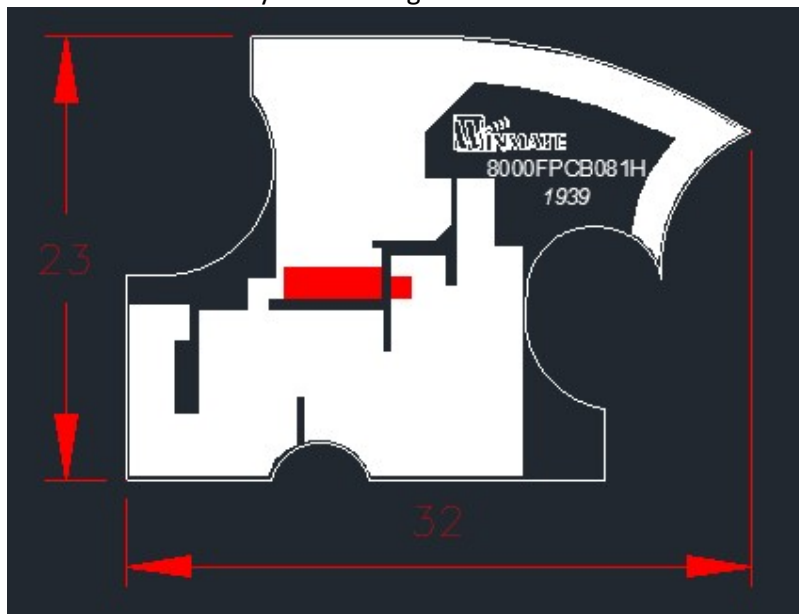
— 5150 MHz;
— 5600 MHz;
— 5850 MHz;



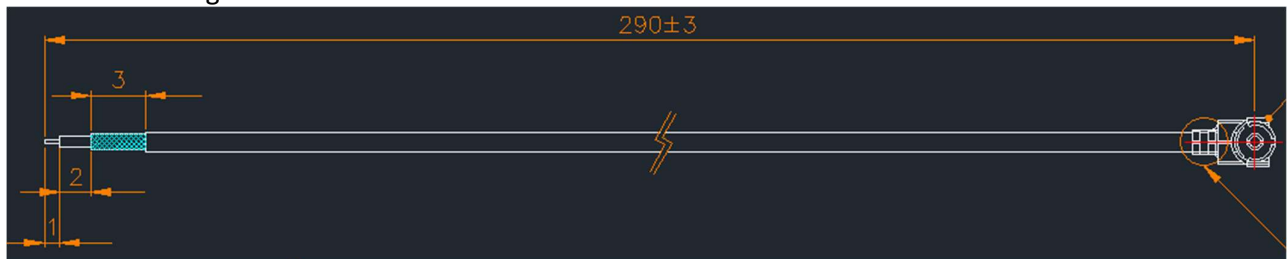
— 5150 MHz;
— 5600 MHz;
— 5850 MHz;

3.5. Drawing

WiFi Aux Antenna Layout Drawing



RF Cable Drawing



Antenna Assembly



Winmate Part Number: 90RF0600000W