ART SIGNAL
Antenna Total Solution

Product Specification

Drone Controller 2.4G

FPCB Antenna

(ARTS-TCWM-198)

Confidential

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ANTENNA APPROVAL

Product Name	**Wi-Fi FPCB Antenna**
Model Name / Freq.	**Drone Controller 2.4G / 2400~2485 MHz**
Antenna PART No.	**ARTS-TCWM-198**
Customer PART No.	
Customer	**(주)디스이즈엔지니어링**
Supplier	**(주)아트시그널**

RF PART		ME PART		QA PART	
Submitted	**Approval**	**Submitted**	**Approval**	**Submitted**	**Approval**
					

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1 Log of Changes

NO	Date	Mark	Changes	Remark	Rev.
1	2019.06.24				1.0
2					
3					
4					
5					
6					
7					

2 PART NUMBER LIST

No.	PART NO.	Color & Appearance	ART-SIGNAL Antenna Product Number	Remark
1	Drone Controller FPCB Ant		ARTS-TCWM-198	
2				
3				
4				
5				
6				

3 Product Description & Terminology

3.1 Description

This is the product specification of Internal Antenna applied to Set.

3.2 Product Number

ART SIGNAL Antenna Part Number **ARTS-TCWM-198**

3.3 Unit, Definitions & Abbreviations

SI unit will be used, unless any specialties are announced

Tx	Transmit Band
Rx	Receive Band
PCB	Printed Circuit Board
VSWR	Voltage Standing Wave Ratio
dBi	Antenna gain in dB relative to a isotropic antenna
Room Temperature	+20 ± 3℃
CW	Clock Wise
g	Acceleration of gravity 9.82 m/s²
RH	Relative Humidity
gf / kgf	Gram weight (1gf=980.665dyn) / Kilogram weight (1kgf=9.80665N)
Ph	Potential of hydrogen
F	Force
T	Torque

3.4 Co-ordinates System

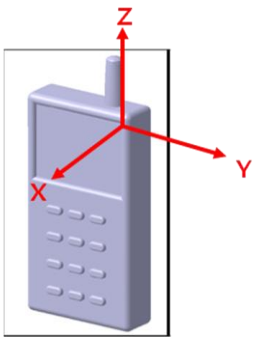


Figure 3.4.1 Coordinate within the Handset

4 Electrical Properties

4.1 Specification

Item		Specifications
Antenna	Center Frequency	2400~2485 ±1MHz
	Band Width	85 MHz
	Polarization	Vertical
	Dimension	30.60 * 28.35 mm
	Working Temperature	-40~60℃
	Storage Temperature	-20~40℃

4.2 Impedance`

4.2.1 Nominal Impedance

- R = 50Ω

4.2.2 Measuring Method

By using Network analyzer , connect the antenna-installed handset to the reflection Point of Analyzer and measure the impedance value within the designated frequency band. Testing is corresponded to the figure 4.2.1

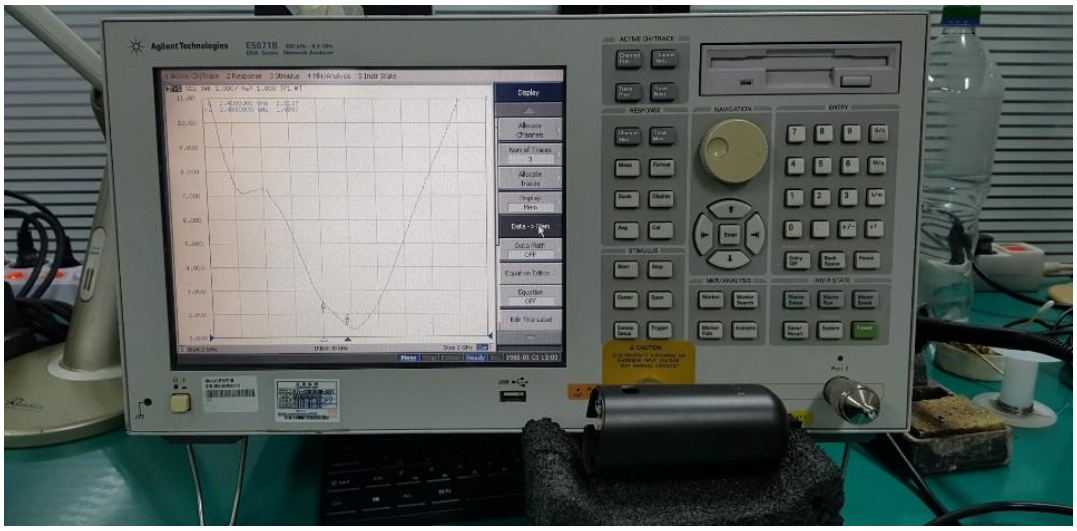


Figure 4.2.1 Test by network analyzer

4.3 Matching Circuit

Matching Circuit is composed in free space of 4.1 frequency band while satisfying customer's Requirements. Matching Circuit is corresponded to the figure 4.3.1

No Matching

4.4 V.S.W.R

Impedance Matching optimization is performed under the below mentioned environment.

4.4.1 Free Space Environment

Mode \ Service(MHz)		2400	2485
VSWR	**TEST DATA**	**2.50**	**1.49**
	SPEC	**3.00**	**1.99**

4.4.2 Measuring Method

Connect(soldering) 50Ω copper cable to the 50Ω spot in handset. To minimize the loss of transmission, copper cable is used.
Including PCB, the handset shouldn't be different from the one, which will be used for mass production.
Specification should be the same for all frequency bands. Free space means that handset is put on the surface of no conducting plastic.

4.5 Directive ness

Omni-directional

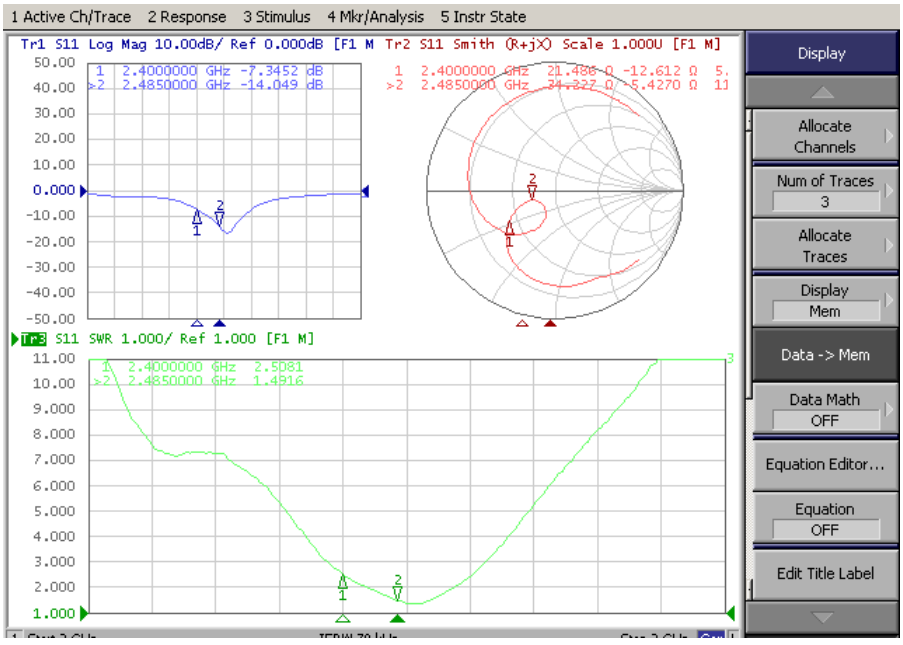
4.6 Gain

Free Space

Service(MHz) / Mode(dBi)	Main Antenna				
Freq.(MHz)	2400	2420	2440	2460	2485
PEAK	1.09	1.77	2.41	2.50	1.57
AVG	**-2.97**	**-2.29**	**-1.57**	**-1.51**	**-2.40**
SPEC	**-3.47**	**-2.79**	**-2.07**	**-2.01**	**-2.90**

5 Electric Efficiency

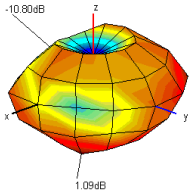
5.1 ANT- VSWR, Return loss, Smith Chart



5.2 Radiation Pattern (XY-Plane)

	1	2	3	4	5
Frequency [MHz]	**2400**	**2420**	**2440**	**2460**	**2485**
Efficiency [dB]	**-2.97**	**-2.29**	**-1.57**	**-1.51**	**-2.40**
Efficiency [%]	**50.4**	**59.1**	**69.6**	**70.6**	**57.5**
TRG$_{\theta}$ [dB]	-5.94	-5.30	-4.67	-4.67	-5.62
Gain$_{\theta\ Peak}$ [dB]	1.00	1.68	2.30	2.39	1.45
Gain$_{\theta\ Min}$ [dB]	-27.12	-27.91	-25.79	-25.35	-24.52
TRG$_{\varphi}$ [dB]	-6.03	-5.29	-4.50	-4.38	-5.21
Gain$_{\varphi\ Peak}$ [dB]	-0.16	0.49	1.26	1.32	0.45
Gain$_{\varphi\ Min}$ [dB]	-20.88	-18.97	-16.56	-16.09	-17.69
UHRG [dB]	-6.50	-5.78	-5.05	-4.94	-5.77
UHRG/TRG [%]	44.4	44.7	44.9	45.4	46.1
H-Plane	-5.34	-4.89	-4.49	-4.80	-6.00
E1-Plane, AVG [dB]	-5.18	-4.54	-3.85	-3.71	-4.52
E2-Plane, AVG [dB]	-5.72	-4.98	-4.22	-4.07	-4.91
Peak Gain [dB]	1.09	1.77	2.41	2.50	1.57
Directivity [dB]	4.06	4.06	3.98	4.01	3.97
Minimum Gain [dB]	-10.80	-10.23	-9.30	-9.16	-10.05

2400



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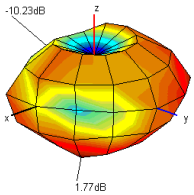

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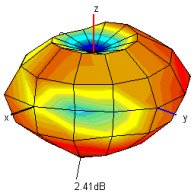

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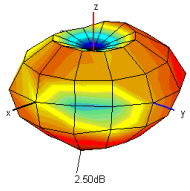

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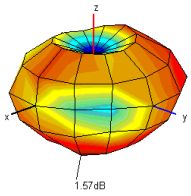

3D GAIN (H/E1/E2-plane)

6. Mechanical Drawing

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