



Product Specification

Drone 2.4G FPCB Antenna (ARTS-TDWM-196)

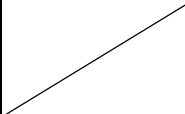
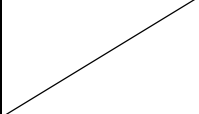
Confidential

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 Antenna Total Solution	Description			
	Drone 2.4G FPCB Antenna Product Specification			
Specification No.	Customer.	Rev.	Date	
ARTS-TDWM-196	디스이즈엔지니어링(주)	1.0	Jun. 24, 2019	

ANTENNA APPROVAL

Product Name	Wi-Fi FPCB Antenna
Model Name / Freq.	Drone 2.4G / 2400~2485 MHz
Antenna PART No.	ARTS-TDWM-196
Customer PART No.	
Customer	(주)디스이즈엔지니어링
Supplier	(주)아트시그널

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



이 문서는 (주)아트시그널에서 대외비로 발행 되었으며, (주)아트시그널의 사전 허가 없이 이 서류의 일부분 또는 전체를 재 발행 하지 않는다. 여기서 포함하고 있는 정보는 (주)아트시그널의 소유이며, 제출된 목적 이외의 용도나 (주)아트시그널의 사전 허가 없이 일부 또는 전체가 공개되지 않는다.

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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 2.4G FPCB Ant		ARTS-TDWM-196	
2				
3				
4				
5				
6				

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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-TDWM-196**

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°C
CW	Clock Wise
g	Acceleration of gravity 9.82 m/s ²
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

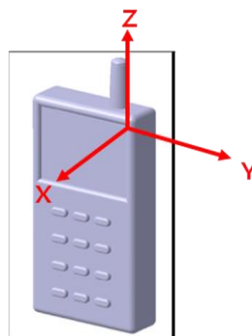


Figure 3.4.1 Coordinate within the Handset

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4 Electrical Properties

4.1 Specification

Item		Specifications
Antenna	Center Frequency	2400~2485 $\pm$ 1MHz
	Band Width	85 MHz
	Polarization	Vertical
	Dimension	30.47*12.74 mm
	Working Temperature	-40~60°C
	Storage Temperature	-20~40°C

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

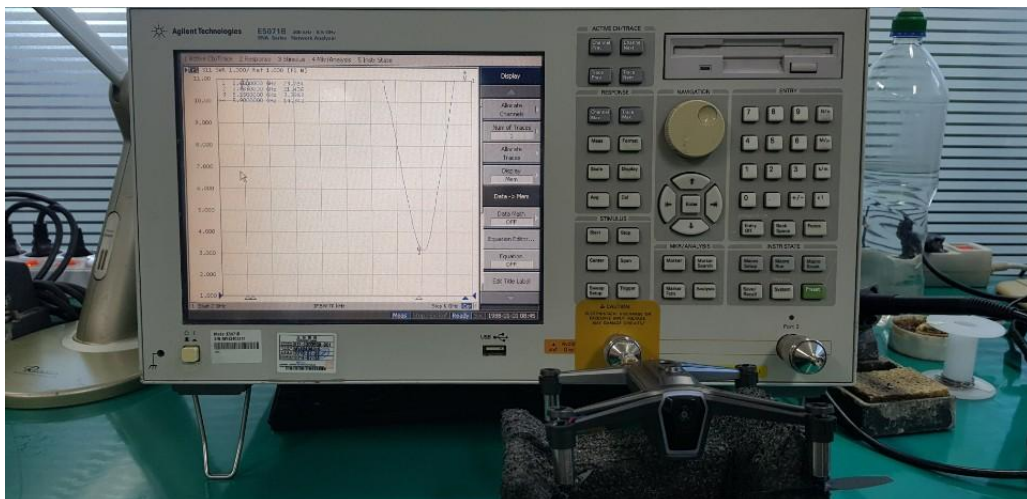


Figure 4.2.1 Test by network analyzer

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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

Service(MHz)		2400	2485
Mode			
VSWR	TEST DATA	1.92	1.17
	SPEC	2.42	1.67

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.

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4.5 Directive ness

Omni-directional

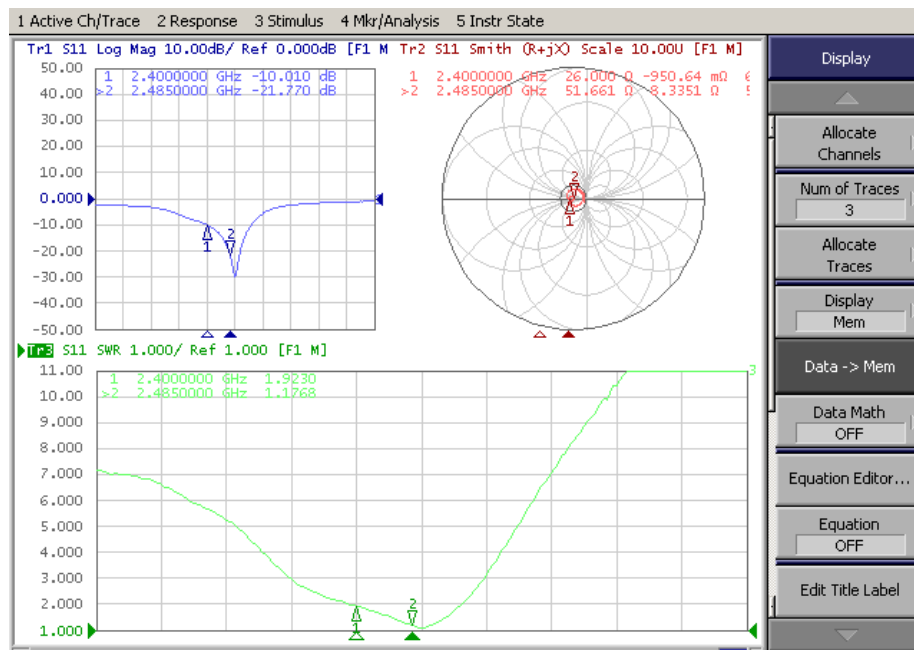
4.6 Gain

Free Space

Service(MHz)	Main Antenna				
Mode(dBi)					
Freq.(MHz)	2400	2420	2440	2460	2485
PEAK	-0.33	0.33	1.02	1.49	1.44
AVG	-4.86	-4.56	-4.21	-4.07	-4.31
SPEC	-5.36	-5.06	-4.71	-4.57	-4.81

5 Electric Efficiency

5.1 ANT- VSWR, Return loss, Smith Chart

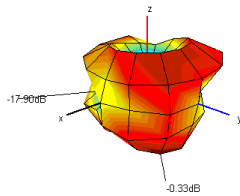


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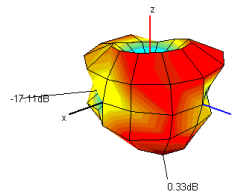
5.2 Radiation Pattern (XY-Plane)

	1	2	3	4	5
Frequency [MHz]	2400	2420	2440	2460	2485
Efficiency [dB]	-4.86	-4.56	-4.21	-4.07	-4.31
Efficiency [%]	32.7	35.0	37.9	39.1	37.0
TRG_θ [dB]	-8.30	-7.95	-7.56	-7.35	-7.44
Gain_{θ Peak} [dB]	-2.14	-2.55	-1.83	-0.69	-0.05
Gain_{θ Min} [dB]	-18.92	-19.17	-22.27	-26.92	-27.22
TRG_φ [dB]	-7.47	-7.23	-6.90	-6.84	-7.21
Gain_{φ Peak} [dB]	-1.37	-0.80	-0.19	0.12	-0.05
Gain_{φ Min} [dB]	-31.20	-30.10	-29.05	-27.26	-23.45
UHRG [dB]	-7.87	-7.70	-7.57	-7.67	-8.12
UHRG/TRG [%]	50.0	48.6	46.1	43.7	41.6
H-Plane	-11.63	-11.25	-11.00	-10.88	-10.78
E1-Plane, AVG [dB]	-8.30	-8.04	-7.83	-7.70	-7.76
E2-Plane, AVG [dB]	-8.41	-8.11	-7.75	-7.41	-7.30
Peak Gain [dB]	-0.33	0.33	1.02	1.49	1.44
Directivity [dB]	4.53	4.89	5.23	5.56	5.75
Minimum Gain [dB]	-17.90	-17.11	-14.77	-12.35	-12.00

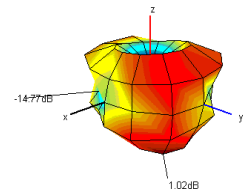
2400



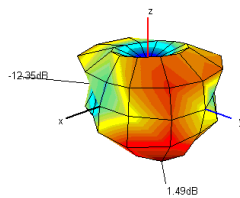
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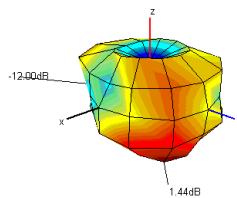
2440



2460



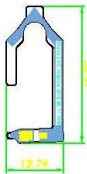
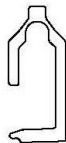
2485



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

No.		Date		Revision notes		Approver	
1		2018.12.13		1 st sample		H.C.JUNG	
2		2019.01.29		2 nd sample		H.C.JUNG	
3		2019.05.17		3 rd Pattern change sample		H.C.JUNG	

ART SIGNAL Antenna Total Solution				Part Name		Model Name	
 Scale 1/1 Checked H.C.JUNG Drawn G.H.NOH 2019.05.17 2019.05.17				FPCB ANT		Drone 2.4GHz	
				Material		Part No.	
				SEE PART LIST		ARTS-TDWM-196	

ASS'Y				COVERLAY (부품 BLACK INK)				PATTERN			
											
SILKPRINT (WHITE) 부품 OSP											
OUTLINE 				TAPE 				RELEASE PAPER 			
RELEASE PAPER 3M 83710 1 OSP 1/2 oz, 1/2 mil 부품 BLACK Remark											