



Product Specification

Drone 5G FPCB Antenna (ARTS-TDWS-197)

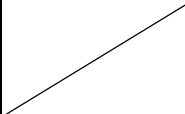
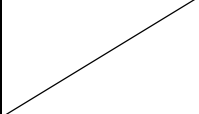
Confidential

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 Antenna Total Solution	Description			
	Drone 5G FPCB Antenna Product Specification			
Specification No.	Customer.	Rev.	Date	
ARTS-TDWS-197	디스이즈엔지니어링(주)	1.0	Jun. 24, 2019	

ANTENNA APPROVAL

Product Name	5G FPCB Antenna
Model Name / Freq.	Drone 5G / 5100~5200 MHz
Antenna PART No.	ARTS-TDWS-197
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 5G FPCB Ant		ARTS-TDWS-197	
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

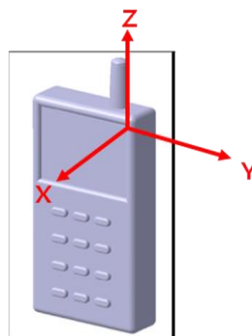


Figure 3.4.1 Coordinate within the Handset

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4 Electrical Properties

4.1 Specification

Item		Specifications
Antenna	Center Frequency	5100~5200 $\pm$ 1MHz
	Band Width	100 MHz
	Polarization	Vertical
	Dimension	13.60*7.85 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

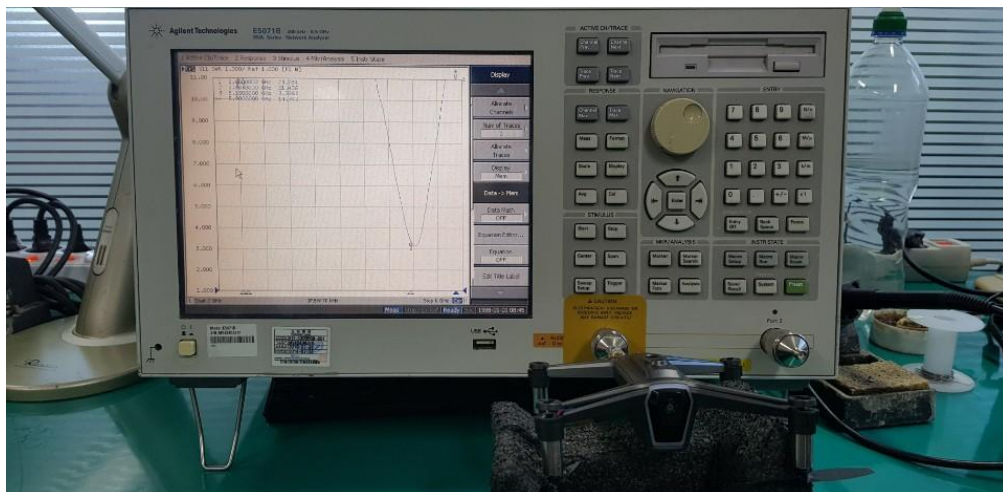


Figure 4.2.1 Test by network analyzer

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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)		5100	5150	5200
Mode				
VSWR	TEST DATA	3.20	2.97	2.89
	SPEC	3.70	3.47	3.29

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

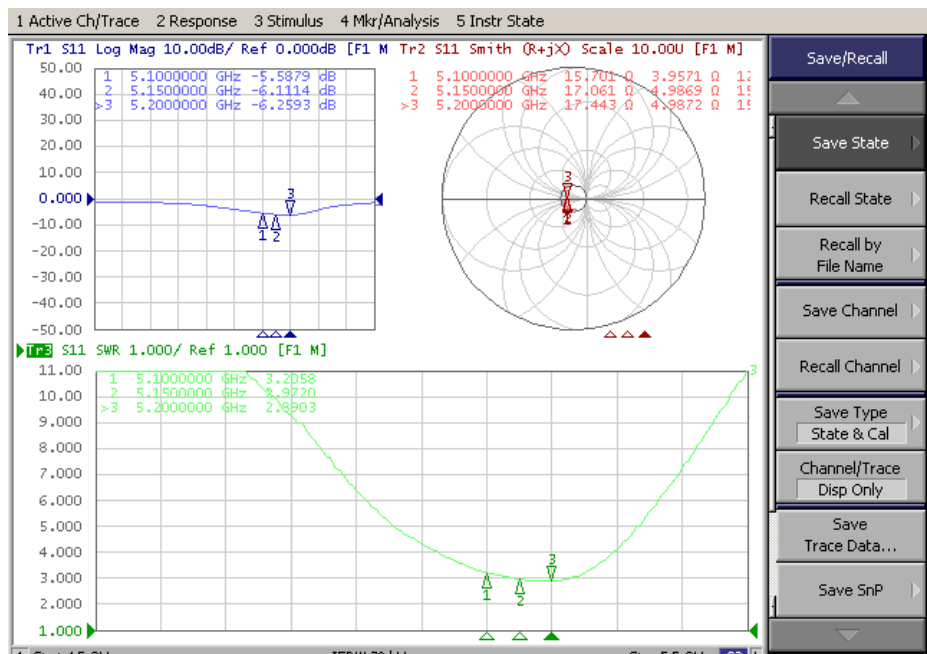
4.6 Gain

Free Space

Service(MHz)	Main Antenna		
Mode(dBi)			
Freq.(MHz)	5100	5150	5200
PEAK	1.15	2.07	-0.17
AVG	-2.93	-2.33	-4.84
SPEC	-3.43	-2.83	-5.34

5 Electric Efficiency

5.1 ANT- VSWR, Return loss, Smith Chart

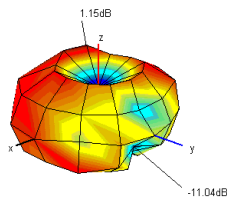


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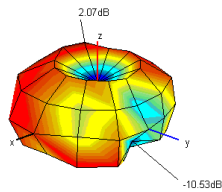
5.2 Radiation Pattern (XY-Plane)

	1	2	3
Frequency [MHz]	5100	5150	5200
Efficiency [dB]	-2.93	-2.33	-4.84
Efficiency [%]	50.9	58.5	32.8
TRG _θ [dB]	-6.57	-6.82	-8.99
Gain _{θ Peak} [dB]	-1.97	-2.25	-2.12
Gain _{θ Min} [dB]	-16.36	-19.96	-30.24
TRG _φ [dB]	-5.39	-4.23	-6.95
Gain _{φ Peak} [dB]	1.07	1.86	-0.32
Gain _{φ Min} [dB]	-18.61	-20.48	-23.34
UHRG [dB]	-5.31	-4.67	-7.72
UHRG/TRG [%]	57.8	58.3	51.5
H-Plane	-7.26	-7.73	-13.84
E1-Plane, AVG [dB]	-5.25	-5.27	-7.48
E2-Plane, AVG [dB]	-8.23	-9.16	-11.02
Peak Gain [dB]	1.15	2.07	-0.17
Directivity [dB]	4.08	4.39	4.67
Minimum Gain [dB]	-11.04	-10.53	-16.97

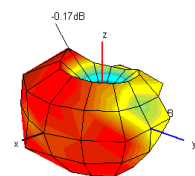
5100



5150



5200



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

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6. Mechanical Drawing

No.	Date	Revision notes	Approval
1	2018.12.13	1st sample	H.C.JUNG
2	2019.02.18	2nd sample Pattern Change	H.C.JUNG
3	2019.05.17	3rd sample Pattern Change	H.C.JUNG
4	2019.06.13	4th sample Pattern Change	H.C.JUNG

ASS'Y	COVERLAY (무광 BLACK INK)	PATTERN
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7.85	13.6	
E+가이드 (OSP)		
SILKPRINT (WHITE)		
OUTLINE	TAPE	RELEASE PAPER

No.	Part Name	Material	Q'ty	Finish	Remark
4	RELEASE PAPER	-	1		
3	TAPE	-	1		3M 83710
2	BASE	POLYIMIDE	1	OSP	1/2 oz, 1/2 mil
1	COVERLAY	INK	1		무광 BLACK

ART SIGNAL		Q'ty		Part Name		Model Name	
Drawn	Scale	1	EA/SET	Material	Part No.	Part No.	
Y.S. CHOI	1/1	1	EA/SET	SEE PART LIST	ARTS-TDWS-197		
2019.06.13				SEE PART LIST			