

Approval Sheet

Product : Multilayer Chip Antenna

Part No. : ALA321C3

Customer Model : HDX-2958

Cresyn	Plan	Evaluation	Decision
	/	/	/



Approval	Written	Reviewed		Approved
Department	R&D	Manufac. & Technology	Quality	R&D
Name	J.H. Park	TH. Kim	DH. An	HJ. Kwon
Date	06/27	06/27	06/27	06/27

2022. 06. 27

AMOTECH Co., Ltd

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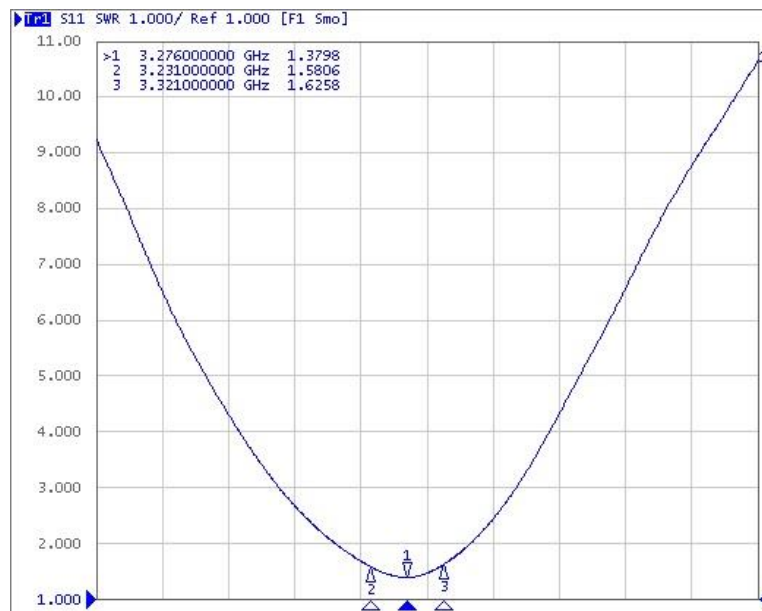
1. Revision history

Rev No	Date	Content	Page
0	2022.06.27	New	

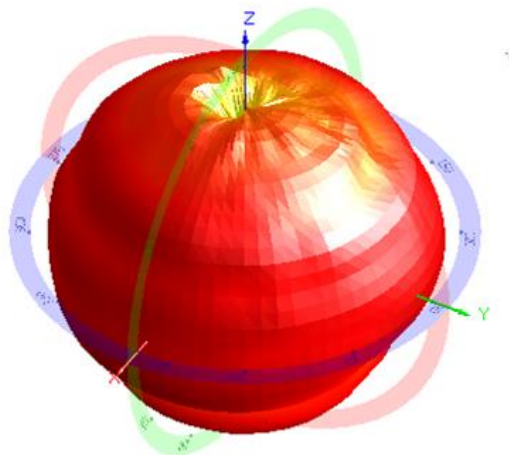
2. Specifications

2.1 Electrical specifications

Division	Item	Specification			Remark
1	Operating frequency	2400~2485 MHz			ISM band
2	VSWR	Max 3.0:1 @3276±45 MHz			On the Manual Jig
3	Radiation Gain	Average [dBi]	2442 MHz	Typical -1.6	On the EVB
		Peak [dBi]	2442 MHz	Typical 2.3	
4	Radiation Pattern	Omni-directional			-
5	Impedance	Nominal 50 Ω			Ω



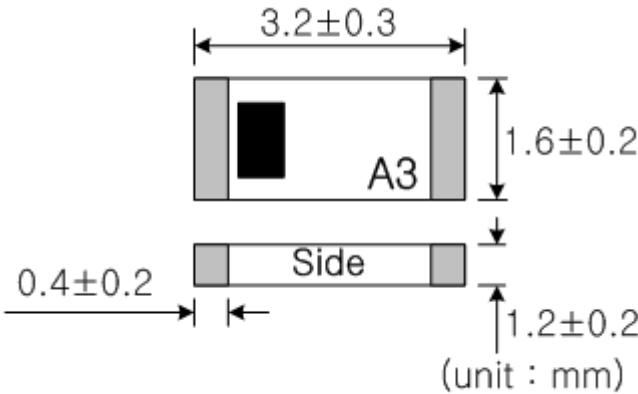
[VSWR : On the manual Jig]



[3D Radiation Pattern : On the EVB @2442 MHz]

2.2 Mechanical specification

Division	Item	Specification	Unit
1	Size	3.2 x 1.6 x 1.2	mm
2	Unit weight	typical 20	mg
3	Operating Temperature	-40 ~ +85	°C

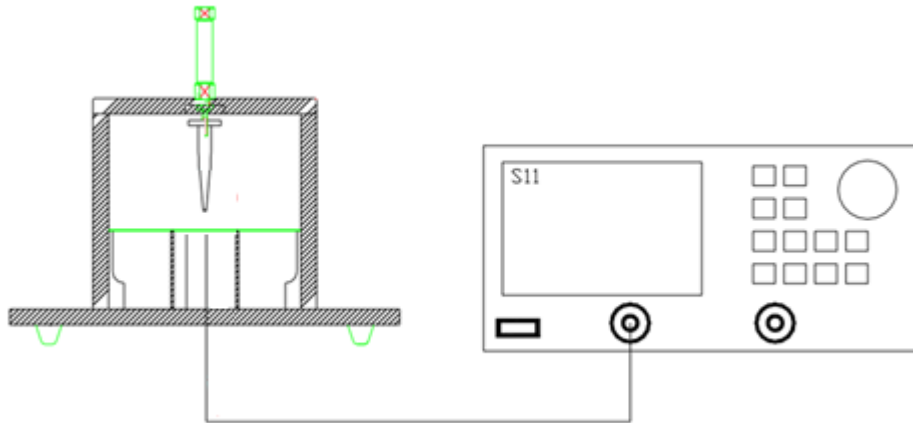


2.3 Part No. & lot No.

Part No.	<u>ALA</u>	<u>321</u>	<u>C3</u>
	(1)	(2)	(3)
(1) : Amotech Antenna			
(2) : Chip size			
(3) : Version & Frequency			

Lot No.	<u>MA</u>	<u>03</u>	<u>A3</u>	<u>0506</u>	<u>01</u>
	(1)	(2)	(3)	(4)	(5)
(1) : Mass product Antenna					
(2) : Chip size					
(3) : Version & Frequency					
(4) : Date					
(5) : Product code					

3. Test method (VSWR measure)



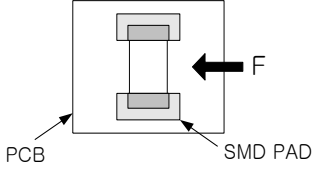
3.1 VSWR

- See Electrical Characteristics

3.2 Measurement methods

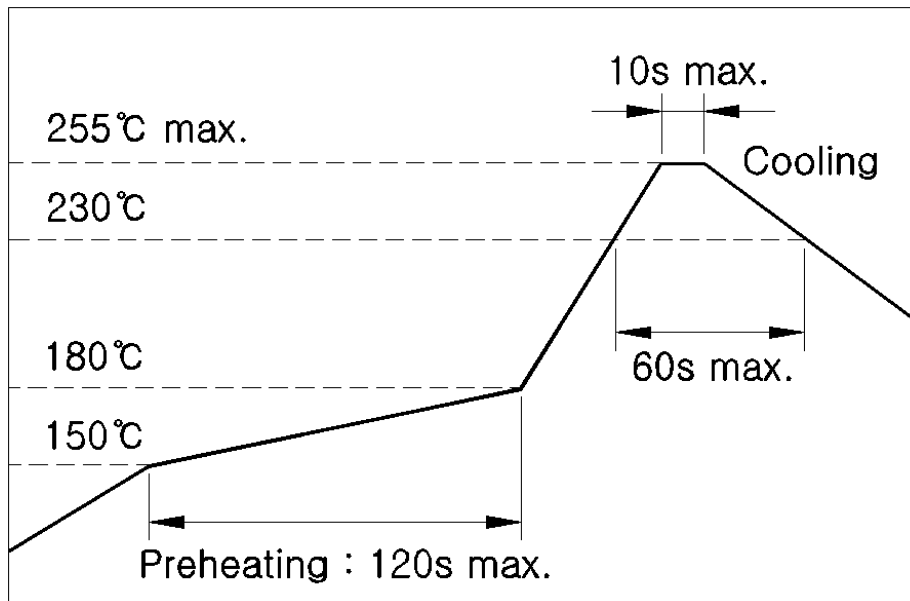
- Calibration network analyzer and RF cable
 - Refer to electrical specification
 - Set center frequency 3276 MHz, span 800 MHz
- Connect RF cable to test jig
- Set "FORMAT" to VSWR (SWR)
- Read the value of VSWR
- Verify the value of VSWR within specification

4. Reliability test condition

No	Item	Test Condition	Test Requirements
1	Adhesive Strength of Termination	Apply force on SMT chip till detached from PCB. 	1. No mechanical damage on chip within applied force (F). 2. Force (F) $\geq$ 3 kgf
2	Thermal Shock (Cycle)	1. Step 1 : -40°C, 30 min Step 2 : $+85^{\circ}\text{C}$, 30 min 2. Number of cycle : 30	1. No visual damage 2. Within electric specification (VSWR)
3	High Temperature Resistance	1. Temperature : $+85 \pm 5^{\circ}\text{C}$ 2. Time : 96 hrs.	1. No visual damage 2. Within electric specification (VSWR)
4	Low Temperature Resistance	1. Temperature : $-40 \pm 3^{\circ}\text{C}$ 2. Time : 96 hrs.	1. No visual damage 2. Within electric specification (VSWR)
5	Humidity	1. Humidity : 85 % RH Temperature : $+85 \pm 3^{\circ}\text{C}$ 2. Time : 120 hrs.	1. No visual damage 2. Within electric specification (VSWR)

5. Recommendations soldering conditions

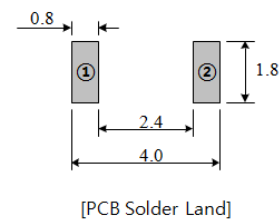
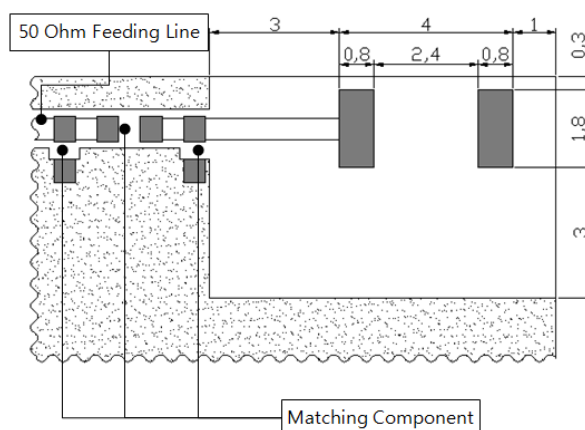
5.1 PB free soldering profile (recommendations)



※ In order to prevent degradation of antenna characteristics, the following soldering conditions must be observed.

- 1) This product is designed for reflow soldering only. Do not use flow (wave) soldering.
- 2) Use non-activated flux (CL content 0.2% max.)
- 3) Reflow-cycle could be up to 3 times.

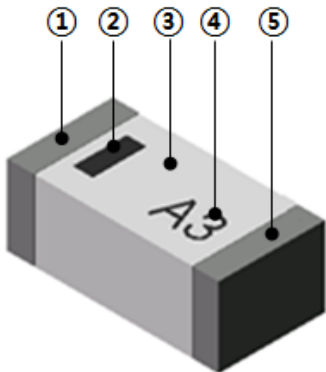
5.2 PCB Pattern design guide



No	Pin Assignment
①	Feeding
②	N.C

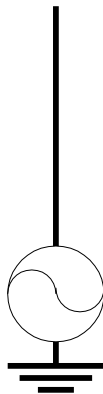
[unit : mm]

6. Structure and material



Division	Title	Features	Material
①	external electrode	soldering, input port	Ag/Ni/Sn
②	direction Index	Indication of	Ceramic
③	Ceramic body	-	Ceramic
④	model number index	-	Ceramic
⑤	external electrode	soldering	Ag/Ni/Sn

7. Equivalent circuit

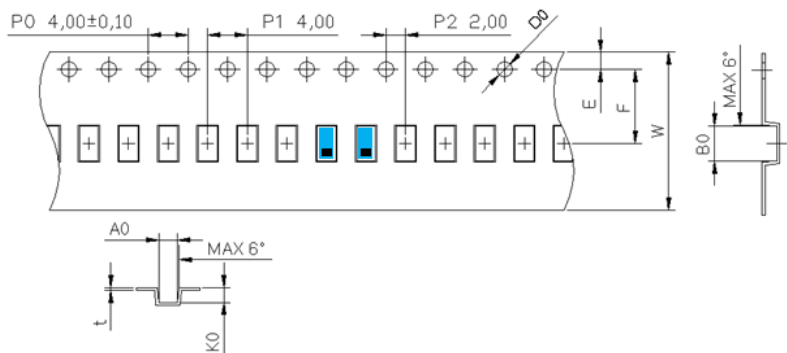


8. Notice

- 1. Storage environment of parts must be at ambient temperatures of 5 to 40°C and maximum 60%RH humidity
- 2. The parts should be used within 6 months from the time of delivery. If stored for over 6 months, check for solderability before use.

9. Packing

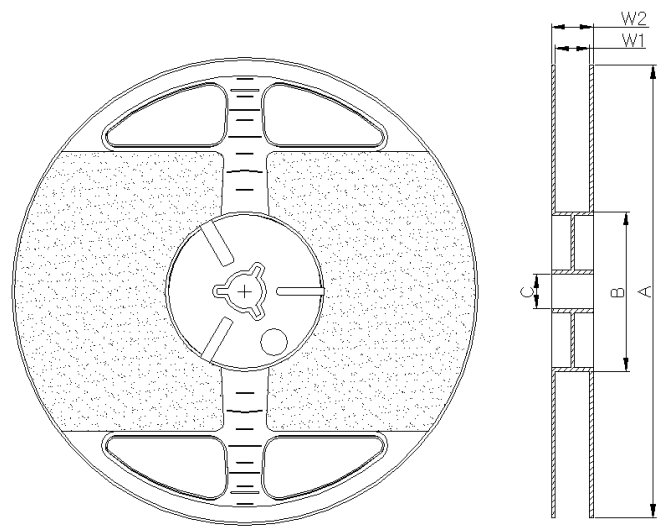
9.1 Carrier tape



[unit : mm]

Item	Spec.	Item	Spec.	Item	Spec.
A0	1.90±0.10	P0	4.00 ±0.10	E	1.75±0.10
B0	3.50±0.10	P1	4.00 ±0.10	F	7.50±0.10
K0	1.50±0.10	P2	2.00 ±0.10	W	16.00±0.30
D0	1.55±0.05	-	-	t	0.30±0.05

9.2 Reel



Item	Spec	Item	Spec
A	180 ± 0.3	W1	17 ± 0.3
B	60 ± 1.0	W2	19.4 ± 1.0
C	13.0 ± 0.2	-	-

9.3 Box packaging specification

9.3.1 Inner Box

Size : 183 (W) x 68 (D) x 185 (H) (mm)

Quantities : 3 reel (2,000 ea/reel × 3 reel = 6,000 ea)



9.3.2 Outer Box 1

Size : 375 (W) x 200 (D) x 205 (H) (mm)

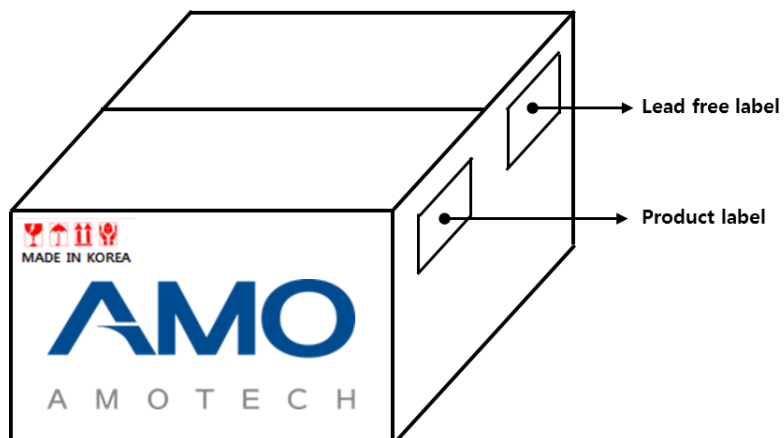
Quantities : 5 Inner Box (6,000 ea/ Inner Box × 5 Inner Box = 30,000 ea)



9.3.3 Outer Box 2

Size : 390 (W) x 375 (D) x 205 (H) (mm)

Quantities : 10 Inner Box (6,000 ea/ Inner Box × 14 Inner Box = 60,000 ea)

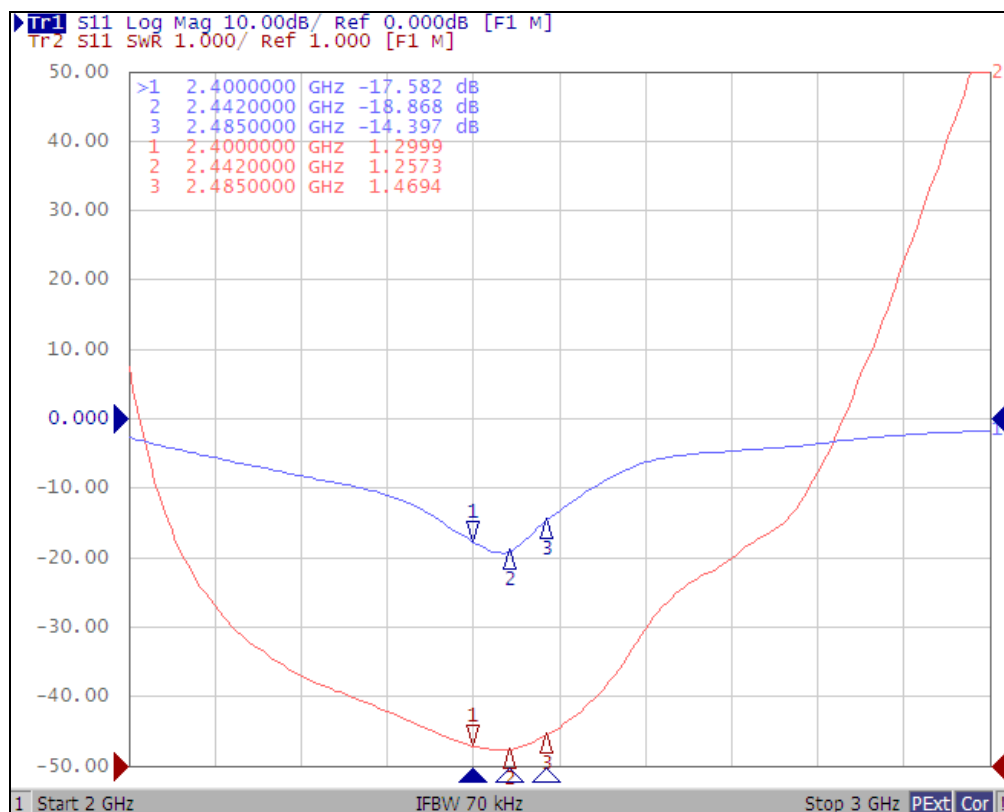


10. Inspection flow chart

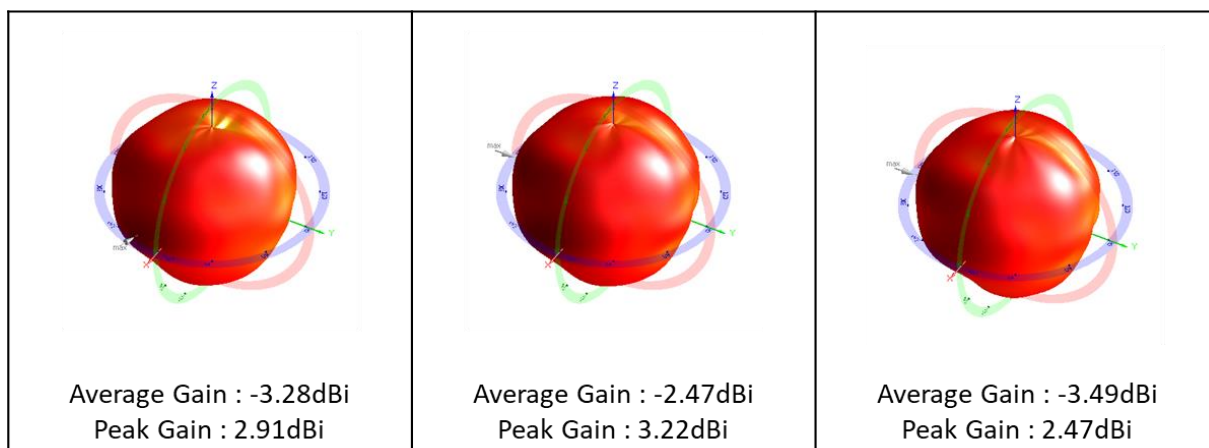
Process number	Diagram	Process	Material	Machine/Device	Process controls	Control method	Control frequency
1		Incoming Inspection	Powder	Particle size analyzer	Powder Particle size	Incoming inspection report	Lot
			Screen	3D measuring instrument, Tension gauge	Dimension, Tension	Product outgoing inspection report	
			Ag Paste	measuring instrument of Viscosimeter, Electronic Scale, Belt Firing Furnace	Viscosity, Inorganic contents	Incoming inspection report	
			Carrier Tape	3D measuring instrument	Dimension	Incoming inspection report	
2		Batch CTQ	Powder / Solvent / Binder / Plasticize / Dispersant	Electronic Scale, Ball Mill M/C, Zr Ball, Viscosimeter	- CTQ - Slurry Viscosity combination percentage RPM, Time,	IMR-Chart, Lot card,	Lot
3		Casting CTQ	Slurry, PET Film	Casting M/C, Hopper Height gauge, Sheet cutting M/C	- CTQ - Sheet thickness Speed, Temperature	Xbar-R chart, Sheet thickness C/S, Lot card	Lot
4		Punching	Ceramic Sheet	Punching M/C, Punching Pin/Die	Main Air, Z-Air Pin/Die life, Burr	Pin/Die check sheet, Equipment check list	Lot
5		Printing	Ceramic Sheet, Ag Paste, Screen	Printing M/C, Screen Pattern, Squeeze, Height gauge	Speed, Pressure, Snap Off, Printing thickness	Lot card	Lot
6		Stack	Ceramic Sheet	Stacking M/C	Temperature, Pressure, Time, stack order	Lot card, Equipment check list	Lot
7		WIP	Stack Bar, Vacuum pack	Vacuum Packing M/C, Aluminum Plate, Isostatic Press M/C	Vacuum time, Vacuum pressure, WIP time, WIP pressure, WIP Temperature	Lot card, Equipment check list	Lot
8		Cutting	WIP Bar, Release tape	Cutting M/C, Hot Plate, Release tape, Height gafe, Vernier calipers	Preheating Temperature, Working Temperature, Detach Temperature, Dimension	Lot card, Equipment check list	Lot
9		BBO	Cutting Chip	BBO M/C, Segger	Peak Temperature, Heatup Temperature, Holding time, Air volume, Chip Damage	Lot card, Equipment check list	Lot
10		Firing	Cutting Chip	Belt Furnace, Segger, Vernier calipers	Temperature, Belt speed, Air volume, Dimension	Lot card, Equipment check list	Lot

Process number	Diagram	Process	Material	Machine/Device	Process controls	Control method	Control frequency
11		Tumbling	Firing chip	Tumbling Barrel, Dry oven	Tumbling time, Tumbling speed, Inserting volume, Dry temperature, Dry time	Lot card, Equipment check list	Lot
12		Termination	Firing chip, Ag Paste	Termination M/C, Vacuum chamber, Belt dry furnace, Dry oven Belt Furnace	Program No, Defoam time, Box dry temperature, Box dry time, Belt speed, Dry zone temperature	Lot card	Lot
13		Plating CTQ	Firing chip, Plating solution	Plating M/C, Oven, Barrel, pH Meter, Electronic Scale	- CTQ - Ni Plating pH concentration Sn Plating pH concentration Chip/Ball input, Cleaning time, Plating Current, Plating temperature, Plating time, Plating PH concentration, Anti-Tarnishing Method temperature, Anti-Tarnishing Method time, Dry temperature, Dry time,	Lot card, Check list	Lot
14		Visual inspection	Plating chip	Visual sorting M/C, , Jig	Product Visual	Lot card	Lot
15		Measurement & Reel packing	Plating chip, Carrier Tape Cover Tape, Reel	Sorting M/C, Network Analyzer	Main Air pressure, Taping temperature, Tape strength, Network analyzer Setting, Frequency, Resistance	Lot card, Equipment check list	Lot
16		Reel Inspection	Finished ANT	Visual	Carrier tape condition, Taping condition, Fault insertion, Marking direction, Mixing	Lot card	Lot
17		Outgoing inspection	Finished ANT	Network Analyzer, Solder Paste Dipping Plate, Reflow M/C, Push Pull gauge, Vernier calipers, 3D measuring instrument Plating thickness measuring instrument	- CTF - VSWR Size Solderability Taping strength Plating thickness	Outgoing inspection report	Lot

11. VSWR & 3D radiation pattern on the set [HDX-2958]



[VSWR : On the Set_Head Phantom]



[3D Radiation pattern : On the Set_Head Phantom]