PRODUCT SPECIFICATION

Product Name	**INTERNAL ANTENNA [2Shot Molding Antenna]**		
MFG. Location	**China**		
Model	**Samsung SM-G130HN Main Antenna**		
Tool	**MP Tool Core material : STAVAX**		
SEC Code			
Provider	**Tyco Electronics Corporation**		
Weight Data	**1.25g**		
Part Number	**2108825-1**		
Samsung Electronics	**Originated**	**Confirmed**	**Approved**
Tyco Electronics	**Originated**	**Confirmed**	**Approved**
			
	Engineering	**Engineering**	**Project Manager**
	J.G.Park	**D.Y.Kim**	**S.C. Lee**
	APR 25th , 2014	**APR 25th , 2014**	**APR 25th , 2014**

Tyco Electronics Corporation

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1. CTQ Items (CTF: Critical to Factor/Function)

1.1 Electrical characteristics (VSWR) (Cpk value > 1.33)

Main antenna

CTF Item	Spec.(VSWR)	Sample q'ty	Cpk	Remark
596 MHz	2.5 < VSWR < 3.5	50pcs	1.96	Refer to page 21~28
872 MHz	2.6 < VSWR < 3.6	50pcs	2.02	Refer to page 21~28
1259 MHz	1.6 < VSWR < 2.6	50pcs	2.06	Refer to page 21~28
1458 MHz	1.5 < VSWR < 2.5	50pcs	1.59	Refer to page 21~28

REAR+Main antenna

CTF Item	Spec.(VSWR)	Sample q'ty	Cpk	Remark
628 MHz	3.5 < VSWR < 4.5	40pcs	1.40	Refer to page 29~36
946 MHz	3.5 < VSWR < 4.5	40pcs	1.44	Refer to page 29~36
1345 MHz	3.7 < VSWR < 4.7	40pcs	1.33	Refer to page 29~36
1779 MHz	3.5 < VSWR < 4.5	40pcs	1.80	Refer to page 29~36

1.2 Mechanical characteristics (Cpk value > 1.0)

Main antenna

CTF Item	Spec.	Sample q'ty	Cpk	Remark
Size				
Pattern				

2. Critical issues during development stage

No need

3. Sample manufacturing data and yield data

Molding condition(Supplier : Mobitec)		Plating(Supplier : TE Qingdao)	
PC molding temperature	**245℃**	**Chemical supplier**	**TE's desiginated one**
Actual measured mold Temperature (Upper / Lower mold)	**Upper : 70~80℃** Lower：Normal cooling	**Etching (Dilution/Temperature/ Time)**	**75℃/30min**
Resin drying (Temperatuer/time)	**95~105℃/6hr**	**Cu plating (Dilution/Temperature/ Time)**	**58℃/160min**

◆ **Sample making yield data(수율데이타)**

#1 차 금형

	Molding	Plating	Painting	Assembly/ RF inspection	RTY
NG Q'ty / Input Q'ty (pcs)	971 / 1000	953 / 971	931 / 953	931 / 931	1000
Yield(%)	96.6	98.2	98.0	100..0	93.1
Worst3 NG (NG mode, NG Q'ty)	1. Short shot (29pcs)	1. void plating（18pcs）	1. Bubble (22pcs)		Result : OK

4. Revision Sheet

No.	Date	Rev	Description of Changes	Remarks

5. Part Number List

No.	PART No.	Description	Remarks
1	2108825-1	Internal Antenna – SM-G130H Main	

- Part list

Part Name	Material & Spec	Material supplier	Color	Manufacturing site	Manufacturing method	Remark
Carrier	1st shot : PC (EH-1051)	Cheil	White	MBT, Korea	Injection	
	2nd shot : ABS (AX06437)	Sabic	Gray			
Plating	Electroless plating 1) Cu : 10~14㎛ 2) Ni : 3~5㎛		Gray	TE Qingdao, china	Plating	

6. Product Description

Description

This specification covers the requirements for product performance, test methods and quality assurance provisions of the INTERNAL ANTENNA for the Samsung **SM-G130H** mobile phone hand set. Currently, the product is manufactured using 1-shot molding in conjunction with laser activation of the antenna surface and selective plating techniques. The 2-Shot MID technology will be used to manufacture this part in mass production.

Part Number

Tyco Electronics Part Number : **2108825-1**

Materials

A. Crystalline Polymer
1st shot: Cheil EH-1051
2nd shot: Sabic AX06437

B. Plating: 10.0-14.0µm of Electroless Copper over plated with 3.0-5.0µm of Low Temperature Nickel.

Applicable Documents

The following documents form a part of this specification to the extent specified herein. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

A. AMP Specification 109-5000 - Test Specification, General Requirements for Test Methods
B. Product Drawing number C- **2108825**

7. Electrical Properties

7.1 Frequency Band

Service/ Frequency	GSM850	EGSM	DCS	PCS	WCDMA1
Tx (MHz)	824 – 849	880 – 915	1710 – 1785	1850 - 1915	1920 - 1980
Rx (MHz)	869 - 894	925 - 960	1805 - 1880	1925 - 1990	2110 - 2170

7.2 Impedance

7.2.1 Nominal Impedance

Rx = 50 Ohm

7.2.2 Measuring Method

Using a Network Analyzer, connect the antenna to the reflection point of the analyzer and measure the impedance within the designated frequency band.

7.3 Matching Circuit

Main antenna : Antenna / Shunt : N.C / Series 100pF / Shunt NC /
Series 100pF / RF switch

7.4 V.S.W.R

7.4.1 Free Space Environment

Service/ Mode	GSM850		EGSM		DCS		PCS		WCDMA1	
	Tx	Rx	Tx	Tx	Rx	Rx	Tx	Rx	Tx	Rx
V.S.W.R	7	4	4	3	3	3	3	3	3	3

7.4.2 Main Antenna Test Jig

Service/ Frequency	596 MHz	872 MHz	1259 MHz	1458 MHz
V.S.W.R [MAX]	3.5	3.6	2.6	2.5
Average	3.04	3.14	2.10	2.00
V.S.W.R [MIN]	2.5	2.6	1.6	1.5

7.4.2 REAR + Main Antenna Test Jig

Service/ Frequency	628MHz	946 MHz	1345 MHz	1779 MHz
V.S.W.R [MAX]	4.5	4.5	4.7	4.5
Average	4.00	4.00	4.19	4.01
V.S.W.R [MIN]	3.5	3.5	3.7	3.5

7.5 Directivity

Omni-directional (Horizontal)

7.6 Gain

7.6.1Maximum Gain

Service/ Mode	GSM 850	EGSM	DCS1800	PCS	WCDMA1
Gain (dBi)	-2.4	-1.18	+0.61	+1.90	+1.23

7.6.2Average Gain

Service/ Mode	GSM 850	EGSM	DCS1800	PCS	WCDMA1
Gain (dBi)	-6.11	-4.54	-2.94	-2.51	-3.72

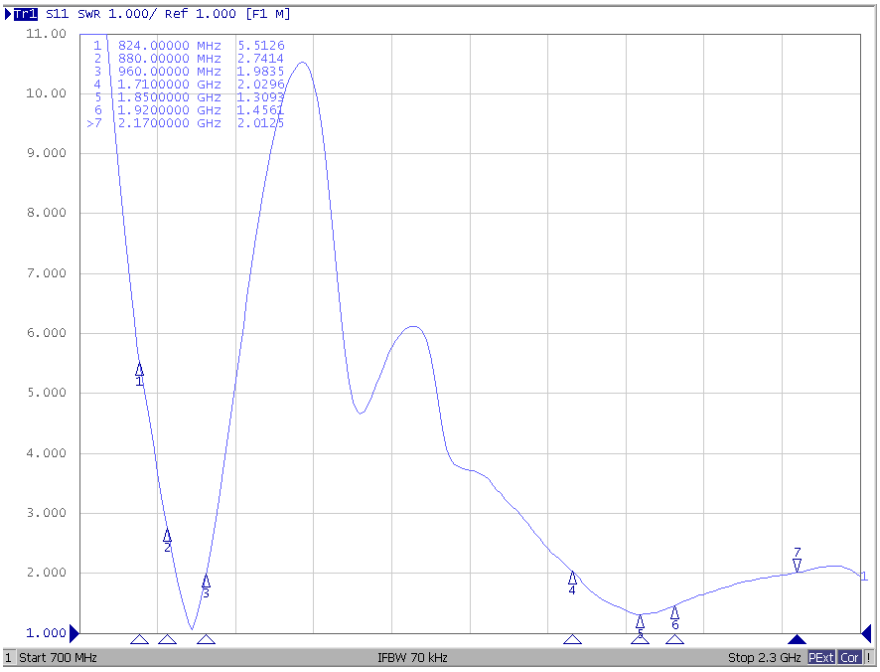
7.7 Maximum Power

P = 5W under

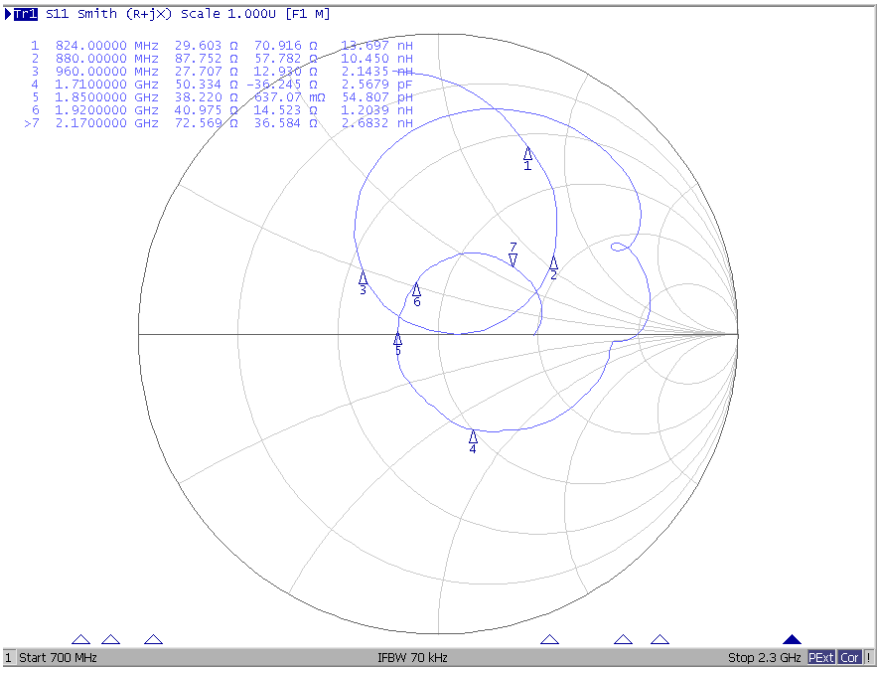
7.8Electrical Performance

7.8.1 Main antenna

7.8.1.1 VSWR

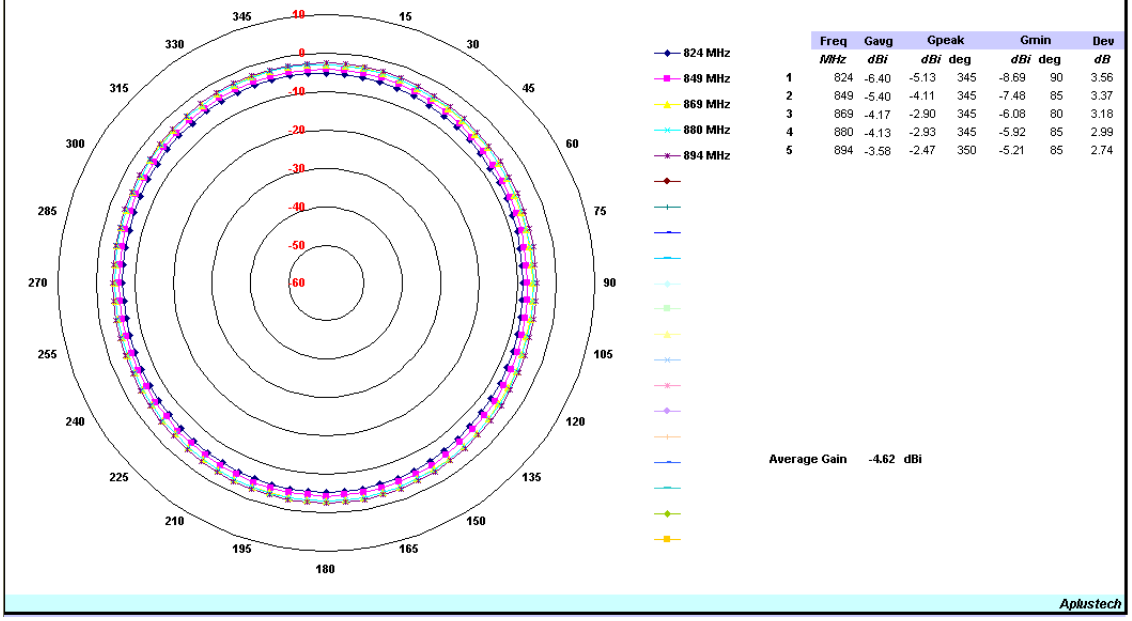


7.8.1.2 SMITH CHART



7.8.1.3 GSM 850 Band Radiation Pattern-H plane

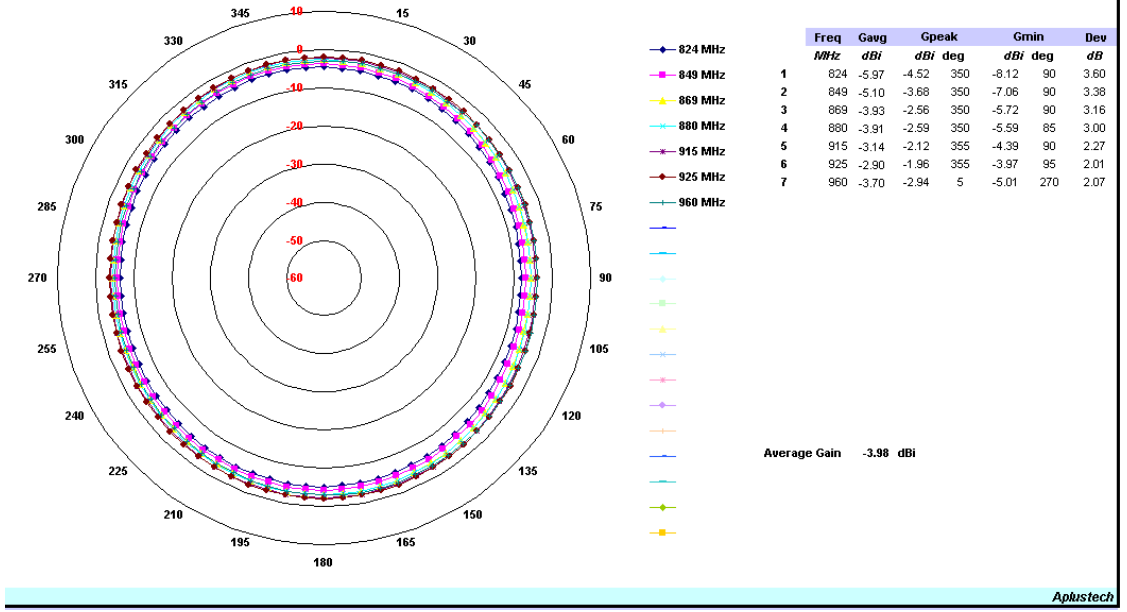
EUT		Antenna Type		Comment	Antenna Matching Circuit				
EUT Version		Antenna Number			Matching Type				
Test Date	Tue 19/Nov/2013 15:58:26	Rotating Axis	Phi		Z1	Z2	Z3	Z4	Z5
Tester		Polarization	Theta Polarization						



	Freq	Gavg	Gpeak		Gmin		Dev
	MHz	dBi	dBi	deg	dBi	deg	dB
1	824	-6.40	-5.13	345	-8.69	90	3.56
2	849	-5.40	-4.11	345	-7.48	85	3.37
3	869	-4.17	-2.90	345	-6.08	80	3.18
4	880	-4.13	-2.93	345	-5.92	85	2.99
5	894	-3.58	-2.47	350	-5.21	85	2.74

7.8.1.4 GSM 900 Band Radiation Pattern-H plane

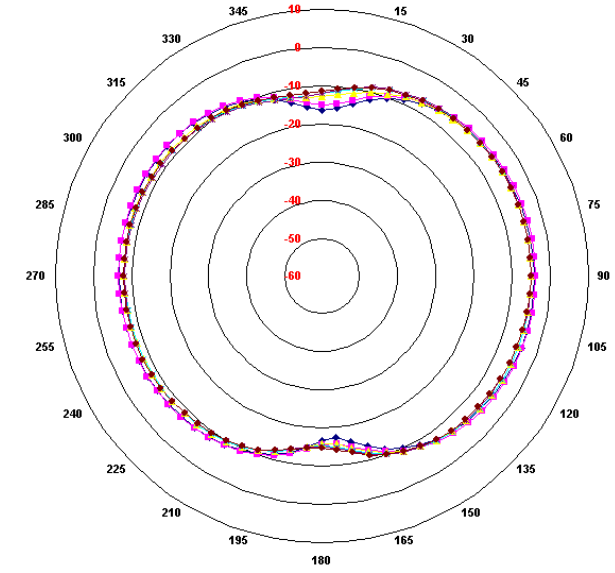
EUT		Antenna Type		Comment	Antenna Matching Circuit				
EUT Version		Antenna Number			Matching Type				
Test Date	Sun 15/Sep/2013 15:45:50	Rotating Axis	Phi		Z1	Z2	Z3	Z4	Z5
Tester		Polarization	Theta Polarization						



	Freq	Gavg	Gpeak		Gmin		Dev
	MHz	dBi	dBi	deg	dBi	deg	dB
1	824	-5.97	-4.52	350	-8.12	90	3.60
2	849	-5.10	-3.68	350	-7.06	90	3.38
3	869	-3.93	-2.56	350	-5.72	90	3.16
4	880	-3.91	-2.59	350	-5.59	85	3.00
5	915	-3.14	-2.12	355	-4.39	90	2.27
6	925	-2.90	-1.96	355	-3.97	95	2.01
7	960	-3.70	-2.94	5	-5.01	270	2.07

7.8.1.5 DCS 1800 Band Radiation Pattern –H plane

EUT		Antenna Type		Comment	Antenna Matching Circuit				
EUT Version		Antenna Number			Matching Type				
Test Date	Sun 15/Sep/2013 15:48:53	Rotating Axis	Phi		Z1	Z2	Z3	Z4	Z5
Tester		Polarization	Theta Polarization						



	Freq	Gavg	Gpeak		Gmin		Dev
	MHz	dBi	dBi	deg	dBi	deg	dB
1	1710	-7.24	-4.09	90	-17.25	175	13.16
2	1740	-6.91	-3.82	90	-15.78	175	11.96
3	1785	-7.83	-4.95	90	-15.98	180	11.03
4	1805	-7.78	-4.96	90	-15.44	180	10.48
5	1850	-7.85	-5.02	80	-15.12	180	10.10
6	1880	-7.83	-5.03	80	-14.88	180	9.85

Average Gain -7.56 dBi

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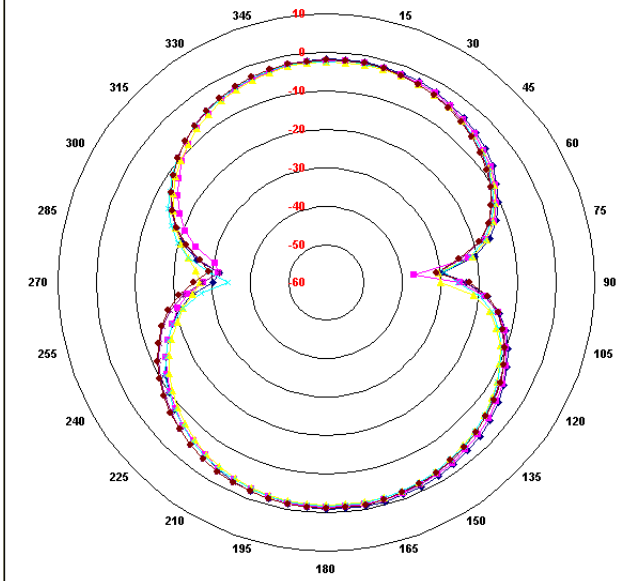
7.8.1.6 DCS1900(PCS)Band Radiation Pattern –H plane

EUT		Antenna Type		Comment	Antenna Matching Circuit				
EUT Version		Antenna Number			Matching Type				
Test Date	Tue 19/Nov/2013 16:06:23	Rotating Axis	Phi		Z1	Z2	Z3	Z4	Z5
Tester		Polarization	Phi Polarization						



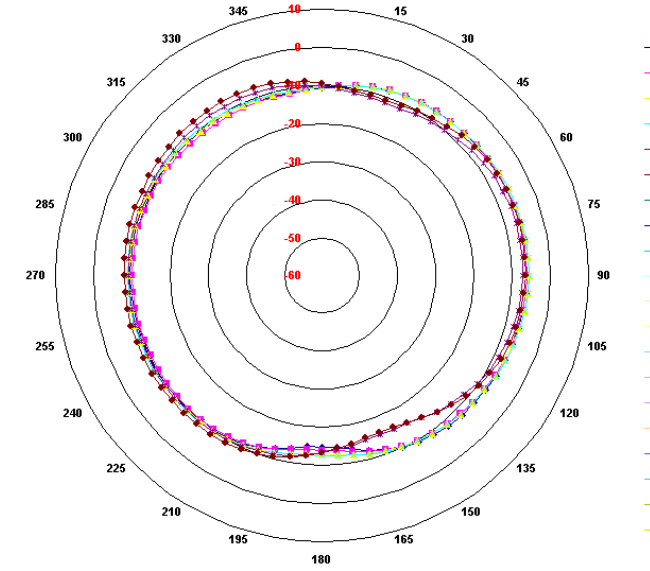
	Freq	Gavg	Gpeak		Gmin		Dev
	MHz	dBi	dBi	deg	dBi	deg	dB
1	1850	-4.83	-0.77	175	-31.98	275	31.21
2	1880	-5.33	-1.30	175	-37.06	85	35.76
3	1920	-5.84	-1.87	175	-30.69	85	28.82
4	1950	-5.56	-1.64	175	-34.35	270	32.71
5	1980	-5.17	-1.16	175	-32.02	275	30.86
6	1990	-5.22	-1.19	175	-31.22	85	30.03

Average Gain -5.31 dBi

Aplustech

7.8.1.7 WCDMA1 Band Radiation Pattern –H plane

EUT		Antenna Type		Comment	Antenna Matching Circuit				
EUT Version		Antenna Number			Matching Type				
Test Date	Sun 15/Sep/2013 15:51:14	Rotating Axis	Phi		Z1	Z2	Z3	Z4	Z5
Tester		Polarization	Theta Polarization						



1920 MHz
1950 MHz
1980 MHz
1990 MHz
2130 MHz
2170 MHz

	Freq	Gavg	Gpeak		Gmin		Dev
	MHz	dBi	dBi	deg	dBi	deg	dB
1	1920	-8.92	-6.16	85	-14.88	180	8.72
2	1950	-9.08	-6.04	85	-14.04	180	8.00
3	1980	-8.68	-5.66	85	-13.07	180	7.41
4	1990	-8.53	-5.51	85	-12.61	180	7.10
5	2130	-9.64	-7.15	85	-15.50	155	8.35
6	2170	-8.67	-6.24	75	-16.25	160	10.01

Average Gain -8.90 dBi

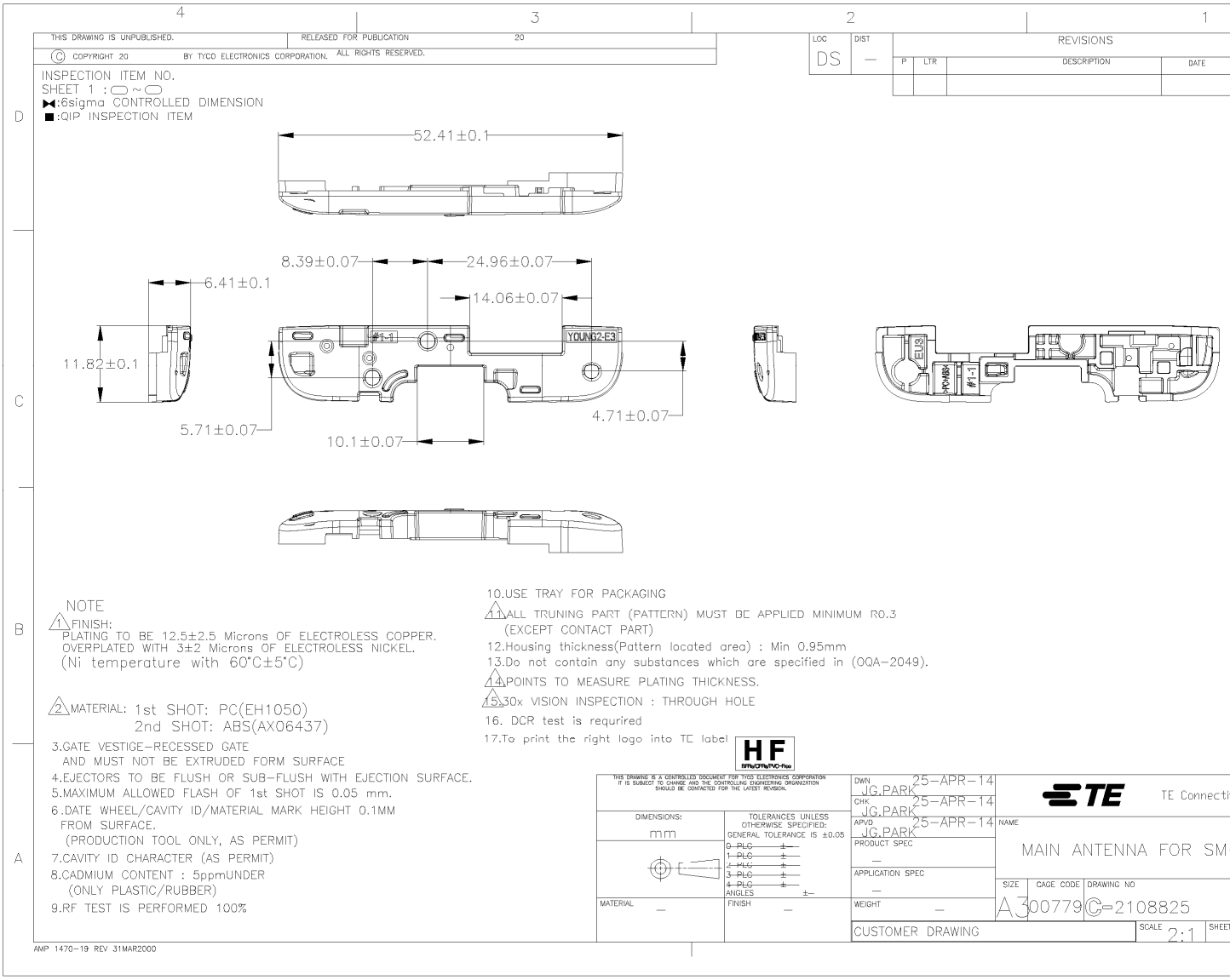
Aplustech

7.8.3 Efficiency & Peak Gain

7.8.3.1 Main antenna

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Frequency [MHz]	**824**	**849**	**869**	**880**	**915**	**925**	**960**	**1710**	**1740**	**1785**	**1805**	**1850**	**1880**	**1920**	**1950**	**1980**	**1990**	**2130**	**2170**
Efficiency [dB]	**-7.67**	**-6.49**	**-5.18**	**-5.11**	**-4.20**	**-3.94**	**-4.92**	**-3.76**	**-3.01**	**-2.82**	**-2.53**	**-2.67**	**-2.86**	**-3.48**	**-3.41**	**-3.10**	**-2.99**	**-4.88**	**-4.46**
Efficiency [%]	**17.10**	**22.44**	**30.32**	**30.80**	**38.04**	**40.33**	**32.24**	**42.03**	**49.96**	**52.28**	**55.82**	**54.07**	**51.81**	**44.88**	**45.62**	**49.03**	**50.21**	**32.48**	**35.80**
TRG [dB]	**-7.67**	**-6.49**	**-5.18**	**-5.11**	**-4.20**	**-3.94**	**-4.92**	**-3.76**	**-3.01**	**-2.82**	**-2.53**	**-2.67**	**-2.86**	**-3.48**	**-3.41**	**-3.10**	**-2.99**	**-4.88**	**-4.46**
TRG_θ [dB]	-7.81	-6.64	-5.35	-5.30	-4.45	-4.24	-5.31	-8.40	-7.80	-7.83	-7.34	-6.91	-6.78	-7.20	-6.89	-6.21	-6.00	-6.83	-6.24
$Gain_{\theta\ Peak}$ [dB]	-4.63	-3.76	-2.56	-2.40	-1.36	-1.20	-2.51	-2.92	-1.71	-0.80	-0.02	0.34	0.11	-0.45	-0.34	-0.12	-0.13	-1.08	0.00
$Gain_{\theta\ Min}$ [dB]	-16.95	-17.23	-18.54	-20.97	-31.92	-36.87	-30.46	-29.38	-31.24	-26.57	-23.91	-19.17	-17.52	-23.04	-25.06	-27.98	-29.45	-21.73	-21.84
TRG_φ [dB]	-22.76	-21.10	-19.31	-18.78	-16.63	-15.75	-15.49	-5.60	-4.77	-4.46	-4.27	-4.73	-5.11	-5.88	-6.00	-6.01	-6.01	-9.30	-9.19
$Gain_{\varphi\ Peak}$ [dB]	-17.19	-14.92	-12.58	-11.82	-9.27	-8.32	-8.01	-0.51	0.12	0.16	0.33	-0.40	-0.67	-0.32	-0.21	-0.07	0.00	-1.75	-1.51
$Gain_{\varphi\ Min}$ [dB]	-43.99	-44.46	-42.13	-43.89	-29.03	-27.94	-33.70	-38.66	-36.80	-30.78	-27.84	-25.24	-22.27	-24.75	-24.46	-24.92	-24.48	-28.78	-27.88
UHRG [dB]	-10.38	-9.07	-7.65	-7.52	-6.49	-6.25	-7.25	-7.37	-6.41	-6.15	-5.88	-5.81	-5.66	-5.90	-5.72	-5.32	-5.17	-6.41	-5.97
UHRG/TRG [%]	53.57	55.20	56.65	57.41	58.95	58.78	58.36	43.56	45.78	46.47	46.24	48.58	52.40	57.25	58.76	59.97	60.62	70.35	70.68
H-Plane	-5.99	-5.10	-3.92	-3.89	-3.16	-2.94	-3.82	-7.32	-6.99	-7.88	-7.82	-7.90	-7.89	-9.02	-9.25	-8.89	-8.76	-10.10	-9.38
E1-Plane, AVG [dB]	-8.07	-6.98	-5.74	-5.71	-4.96	-4.79	-6.00	-16.82	-15.66	-14.52	-13.63	-12.27	-11.36	-10.30	-9.34	-8.26	-7.97	-7.88	-7.55
E2-Plane, AVG [dB]	-9.92	-8.61	-7.21	-7.10	-6.05	-5.76	-6.59	-4.43	-3.87	-4.12	-3.84	-3.90	-4.01	-4.90	-4.94	-4.49	-4.33	-5.74	-4.83
Peak Gain [dB]	-4.60	-3.73	-2.56	-2.40	-1.35	-1.18	-2.44	-0.46	0.13	0.17	0.39	0.54	0.61	0.30	0.58	1.06	1.23	-0.10	0.26
Directivity [dB]	3.07	2.76	2.62	2.71	2.84	2.76	2.48	3.31	3.14	2.99	2.92	3.21	3.46	3.78	3.99	4.16	4.22	4.79	4.72
Minimum Gain [dB]	-16.13	-16.04	-17.06	-18.80	-21.04	-20.04	-19.93	-14.62	-15.56	-16.52	-14.59	-12.08	-14.36	-19.42	-20.25	-20.50	-20.99	-20.54	-19.49

8. Product Drawing



9. Standard Test Data

9.1 MID 4+4 SHOT RF Data with JIG mold #1 (Main antenna Only)

TEST BAND & TEST ITEM	VSWR PROPERTY			
Frequency	596 MHz	872 MHz	1259 MHz	1458 MHz
VSWR MAX	3.5	3.6	2.6	2.5
VSWR MIN	2.5	2.6	1.6	1.5
#1-1	3.02	3.10	2.00	2.06
	3.32	3.19	1.92	2.14
	3.10	3.11	2.00	1.93
	2.98	3.21	2.05	2.10
	3.22	3.20	2.09	2.14
#1-2	3.08	3.15	2.12	2.00
	3.03	3.05	2.09	1.81
	2.92	3.21	2.19	2.14
	3.21	3.30	2.11	1.96
	3.12	3.18	1.94	1.87
#1-3	3.05	3.00	1.93	1.91
	2.98	2.95	2.00	2.00
	3.03	3.30	2.17	1.93
	3.22	3.14	2.05	1.94
	3.03	3.08	2.12	2.21
#1-4	3.18	3.18	1.90	1.95
	3.10	3.30	2.08	1.92
	3.00	3.01	2.05	2.02
	3.15	3.07	1.91	2.00
	3.05	3.19	2.04	2.00
#1-5	2.91	3.22	2.06	1.85
	3.10	3.24	2.14	2.00
	3.14	3.09	1.99	2.31
	3.12	3.19	1.87	1.90
	3.03	3.22	2.04	1.95

#1-6	3.27	3.18	2.10	2.01
	3.25	3.17	2.13	2.00
	3.22	3.27	1.99	2.02
	3.15	3.18	1.99	1.85
	3.25	3.21	2.13	1.94
#1-7	3.12	3.11	2.22	1.90
	3.10	3.14	2.02	1.95
	3.05	3.13	2.22	2.14
	3.18	3.25	2.17	2.02
	2.98	3.18	2.02	2.02
#1-8	3.19	3.20	2.03	1.89
	3.18	3.24	2.02	1.81
	3.19	3.20	2.03	1.90
	3.03	3.18	2.00	1.90
	3.10	3.19	2.13	1.94
	3.15	3.30	2.04	1.89
	3.19	3.06	1.90	1.81
	3.02	3.11	2.05	2.14
	2.98	3.24	2.16	1.91
	3.16	3.03	2.11	1.95
	3.20	3.26	2.09	1.84
	3.02	3.21	2.14	2.01
	3.10	3.11	2.13	1.92
	3.10	3.01	1.90	2.11
	3.10	3.16	1.83	2.10
X	3.11	3.16	2.05	1.98
σ	0.09	0.08	0.09	0.11
Cpk	1.75	1.95	1.88	1.54

9.2 MID 4+4 SHOT RF Data with JIG mold #2 (Main antenna Only)

TEST BAND & TEST ITEM	VSWR PROPERTY			
Frequency	596 MHz	872 MHz	1259 MHz	1458 MHz
VSWR MAX	3.5	3.6	2.6	2.5
VSWR MIN	2.5	2.6	1.6	1.5
#2-1	3.02	3.00	2.06	2.05
	3.22	3.09	2.07	2.13
	3.00	3.01	2.06	1.92
	2.88	3.11	2.11	2.09
	3.12	3.12	2.15	2.13
#2-2	3.11	3.16	2.18	1.99
	2.93	2.95	2.15	2.10
	3.11	3.11	2.25	2.13
	3.11	3.03	2.17	1.95
	3.02	3.16	2.12	1.86
#2-3	2.95	2.90	1.99	1.90
	2.88	2.85	2.06	1.99
	2.93	3.20	2.23	1.92
	3.12	3.04	2.11	1.93
	2.93	2.98	2.18	2.20
#2-4	3.08	3.08	1.96	1.94
	3.00	3.20	2.14	1.91
	2.90	2.91	2.11	2.01
	3.05	2.97	1.97	1.99
	2.95	3.09	2.10	1.99
#2-5	2.81	3.12	2.12	2.09
	3.11	3.14	2.20	1.99
	3.04	2.99	2.12	2.30
	3.02	3.09	1.93	2.09
	2.93	3.12	2.10	1.94

#2-6	3.17	3.08	2.16	2.00
	3.15	3.07	2.19	1.99
	3.12	3.17	2.05	2.01
	3.05	3.08	2.05	2.05
	3.15	3.11	2.19	1.93
#2-7	3.02	3.16	2.28	2.05
	3.00	3.04	2.08	1.94
	3.11	3.03	2.28	2.13
	3.08	3.15	1.97	2.01
	2.88	3.08	1.97	2.01
#2-8	3.09	3.10	2.09	2.13
	3.08	3.09	2.12	2.13
	3.09	3.10	2.09	2.00
	2.93	3.08	2.06	1.89
	3.00	3.09	2.19	1.93
	3.05	3.03	1.97	2.00
	3.09	2.96	1.96	1.80
	2.92	3.01	2.11	2.13
	2.88	3.14	2.22	2.10
	3.06	2.93	2.17	1.94
	3.10	3.16	2.15	2.13
	2.92	3.16	2.20	2.00
	3.10	3.01	2.19	1.91
	3.00	2.91	2.12	2.10
	3.10	3.06	2.07	2.09
X	3.03	3.06	2.11	2.02
σ	0.09	0.08	0.09	0.10
Cpk	1.78	1.97	1.89	1.71

9.3 MID 4+4 SHOT RF Data with JIG mold #3 (Main antenna Only)

TEST BAND & TEST ITEM	VSWR PROPERTY			
Frequency	596 MHz	872 MHz	1259 MHz	1458 MHz
VSWR MAX	3.5	3.6	2.6	2.5
VSWR MIN	2.5	2.6	1.6	1.5
#3-1	3.22	3.02	2.06	2.15
	3.42	3.11	2.07	2.23
	3.20	3.03	2.06	2.02
	3.08	3.13	2.11	2.19
	3.32	3.14	2.15	2.23
#3-2	3.31	3.18	2.18	2.09
	3.13	2.97	2.15	2.20
	3.31	3.13	2.25	2.23
	3.31	3.05	2.17	2.05
	3.22	3.18	2.12	1.96
#3-3	3.15	2.92	1.99	2.00
	3.08	2.87	2.06	2.09
	3.13	3.22	2.23	2.02
	3.32	3.06	2.11	2.03
	3.13	3.00	2.18	2.30
#3-4	3.28	3.10	1.96	2.04
	3.20	3.22	2.14	2.01
	3.10	2.93	2.11	2.11
	3.25	2.99	1.97	2.09
	3.15	3.11	2.10	2.09
#3-5	3.01	3.14	2.12	2.19
	3.31	3.16	2.20	2.09
	3.24	3.01	2.12	2.40
	3.22	3.11	1.93	2.19
	3.13	3.14	2.10	2.04

#3-6	3.37	3.10	2.16	2.10
	3.35	3.09	2.19	2.09
	3.32	3.19	2.05	2.11
	3.25	3.10	2.05	2.15
	3.35	3.13	2.19	2.03
#3-7	3.22	3.18	2.28	2.15
	3.20	3.06	2.08	2.04
	3.31	3.05	2.28	2.23
	3.28	3.17	1.97	2.11
	3.08	3.10	1.97	2.11
#3-8	3.29	3.12	2.09	2.23
	3.28	3.11	2.12	2.23
	3.29	3.12	2.09	2.10
	3.13	3.10	2.06	1.99
	3.20	3.11	2.19	2.03
	3.25	3.05	1.97	2.10
	3.29	2.98	1.96	1.90
	3.12	3.03	2.11	2.23
	3.08	3.16	2.22	2.20
	3.26	2.95	2.17	2.04
	3.30	3.18	2.15	2.23
	3.12	3.18	2.20	2.10
	3.30	3.03	2.19	2.01
	3.20	2.93	2.12	2.20
	3.30	3.08	2.07	2.19
X	3.23	3.08	2.11	2.12
σ	0.09	0.08	0.09	0.10
Cpk	**1.78**	**1.97**	**1.91**	**1.71**

9.4 MID 4+4 SHOT RF Data with JIG mold #4 (Main antenna Only)

TEST BAND & TEST ITEM	VSWR PROPERTY			
Frequency	596 MHz	872 MHz	1259 MHz	1458 MHz
VSWR MAX	3.5	3.6	2.6	2.5
VSWR MIN	2.5	2.6	1.6	1.5
#4-1	3.03	3.12	2.14	2.02
	3.10	3.21	2.13	1.90
	3.14	3.13	2.06	1.89
	3.08	3.23	2.05	2.06
	3.06	3.24	2.09	2.10
#4-2	2.94	3.28	2.12	1.96
	3.00	3.07	2.01	1.88
	3.01	3.23	2.22	2.00
	2.98	3.15	2.14	1.84
	2.91	3.07	2.13	2.00
#4-3	2.94	3.02	2.06	1.87
	3.08	3.15	2.20	2.17
	3.08	3.04	2.19	2.10
	3.09	3.16	2.11	1.80
	2.93	3.10	2.06	1.90
#4-4	3.00	3.03	2.14	1.91
	2.98	3.03	2.08	2.16
	3.00	3.13	2.05	1.98
	3.10	3.25	1.91	2.14
	3.15	3.18	2.23	1.96
#4-5	3.01	3.00	2.06	2.06
	3.31	3.10	2.14	1.96
	2.94	3.20	2.06	1.94
	3.14	3.18	1.87	2.10
	3.00	3.04	2.04	1.91

#4-6	3.16	3.20	2.10	1.97
	3.01	3.19	2.13	1.96
	2.97	3.04	2.22	2.11
	2.94	3.20	1.99	2.02
	2.94	3.10	2.13	1.90
#4-7	3.09	3.28	2.22	2.02
	2.93	3.16	2.02	1.91
	3.00	3.15	2.22	2.04
	3.11	3.15	2.06	1.98
	3.08	3.20	2.23	2.04
#4-8	3.07	3.20	2.04	2.12
	3.06	3.11	2.03	2.10
	3.05	3.24	2.13	2.04
	2.94	3.34	1.99	1.78
	3.15	3.21	1.99	2.10
	3.00	3.15	2.13	2.10
	2.91	3.08	2.22	2.21
	3.12	3.13	2.05	1.81
	3.08	3.03	2.16	2.00
	3.04	3.05	2.11	1.87
	3.10	3.15	2.09	2.09
	3.12	3.28	2.14	1.97
	2.94	3.10	2.13	2.09
	2.91	3.03	2.06	1.90
	3.08	3.07	2.13	2.06
X	3.04	3.14	2.10	2.00
σ	0.08	0.08	0.08	0.10
Cpk	1.96	2.02	2.06	1.59

9.5 MID 4+4 SHOT RF Data with JIG mold #1 (Rear Case + Main antenna)

TEST BAND & TEST ITEM	VSWR PROPERTY			
Frequency	628MHz	946 MHz	1345 MHz	1779 MHz
VSWR MAX	4.5	4.5	4.7	4.5
VSWR MIN	3.5	3.5	3.7	3.5
#1-1	4.02	4.00	4.15	4.00
	3.86	4.07	4.24	3.96
	3.96	4.15	4.38	3.87
	4.07	3.91	4.15	4.03
	4.09	4.07	4.15	3.95
#1-2	4.24	4.01	4.41	3.89
	4.17	4.14	4.17	3.80
	3.91	4.09	4.09	3.88
	3.94	3.90	4.26	3.98
	4.03	4.05	4.29	3.81
#1-3	3.89	3.89	4.26	3.89
	4.07	4.01	4.07	3.94
	4.08	4.04	4.53	4.11
	3.88	4.12	4.53	4.05
	4.11	4.05	4.37	4.01
#1-4	4.06	4.11	4.53	4.00
	4.01	4.12	4.37	3.79
	3.89	4.04	4.31	3.94
	4.07	4.04	4.15	4.01
	3.90	4.04	4.27	3.89
#1-5	4.25	4.11	4.17	3.95
	3.98	4.04	4.38	3.80
	3.89	4.04	4.32	4.01
	4.11	3.89	4.38	4.00
	4.05	3.99	4.37	3.95

#1-6	4.01	4.10	4.25	3.87
	4.09	4.12	4.36	3.77
	4.08	4.27	4.27	3.89
	4.08	4.20	4.21	4.00
	4.14	3.94	4.36	3.69
#1-7	4.08	3.90	4.15	3.92
	3.88	4.05	4.31	3.89
	4.11	3.89	4.15	3.70
	4.06	3.99	4.42	4.16
	4.01	4.10	4.40	4.16
#1-8	3.98	3.89	4.32	4.01
	4.11	3.99	4.09	4.01
	4.06	4.10	4.09	4.05
	3.87	4.01	4.25	4.00
	4.02	3.92	4.31	3.89
X	4.03	4.03	4.28	3.94
σ	0.10	0.09	0.12	0.11
Cpk	**1.69**	**1.81**	**1.34**	**1.53**

9.6 MID 4+4 SHOT RF Data with JIG mold #2 (Rear Case + Main antenna)

TEST BAND & TEST ITEM	VSWR PROPERTY			
Frequency	628MHz	946 MHz	1345 MHz	1779 MHz
VSWR MAX	4.5	4.5	4.7	4.5
VSWR MIN	3.5	3.5	3.7	3.5
#2-1	4.00	3.98	4.08	4.02
	3.84	4.05	4.17	3.98
	3.94	4.13	4.31	3.89
	4.05	3.89	4.08	4.05
	4.07	4.05	4.08	3.97
#2-2	4.22	3.99	4.34	3.91
	4.15	4.12	4.10	3.82
	3.89	4.07	4.02	3.90
	3.92	3.88	4.19	4.00
	4.01	4.03	4.22	3.83
#2-3	3.87	3.87	4.19	3.91
	4.05	3.99	4.00	3.96
	4.06	4.02	4.46	4.13
	3.86	4.10	4.46	4.07
	4.09	4.03	4.30	4.03
#2-4	4.04	4.09	4.46	4.02
	3.99	4.10	4.30	3.81
	3.87	4.02	4.24	3.96
	4.05	4.02	4.08	4.03
	3.88	4.02	4.20	3.91
#2-5	4.23	4.09	4.10	3.97
	3.96	4.02	4.31	3.82
	3.87	4.02	4.25	4.03
	4.09	3.87	4.31	4.02
	4.03	3.97	4.30	3.97

#2-6	3.99	4.08	4.18	3.89
	4.07	4.10	4.29	3.79
	4.06	4.25	4.20	3.91
	4.06	4.18	4.14	4.02
	4.12	3.92	4.29	3.71
#2-7	4.06	3.88	4.08	3.94
	3.86	4.03	4.24	3.91
	4.09	3.87	4.08	3.72
	4.04	3.97	4.35	4.18
	3.99	4.08	4.33	4.18
#2-8	3.96	3.87	4.25	4.03
	4.09	3.97	4.02	4.03
	4.04	4.08	4.02	4.07
	3.85	3.99	4.18	4.02
	4.00	3.90	4.24	3.91
X	4.01	4.01	4.21	3.96
σ	0.10	0.09	0.12	0.11
Cpk	1.67	1.81	1.34	1.53

9.7 MID 4+4 SHOT RF Data with JIG mold #3 (Rear Case + Main antenna)

TEST BAND & TEST ITEM	VSWR PROPERTY			
Frequency	628MHz	946 MHz	1345 MHz	1779 MHz
VSWR MAX	4.5	4.5	4.7	4.5
VSWR MIN	3.5	3.5	3.7	3.5
#3-1	4.00	3.96	3.93	4.01
	3.84	4.03	4.02	3.97
	3.94	4.11	4.16	3.88
	4.05	3.87	3.93	4.04
	4.07	4.03	3.93	3.96
#3-2	4.22	3.97	4.19	3.90
	4.15	4.10	3.95	3.81
	3.89	4.05	3.87	3.89
	3.92	3.86	4.04	3.99
	4.01	4.01	4.07	3.82
#3-3	3.87	3.85	4.04	3.90
	4.05	3.97	3.85	3.95
	4.06	4.00	4.31	4.12
	3.86	4.08	4.31	4.06
	4.09	4.01	4.15	4.02
#3-4	4.04	4.07	4.31	4.01
	3.99	4.08	4.15	3.80
	3.87	4.00	4.09	3.95
	4.05	4.00	3.93	4.02
	3.88	4.00	4.05	3.90
#3-5	4.23	4.07	3.95	3.96
	3.96	4.00	4.16	3.81
	3.87	4.00	4.10	4.02
	4.09	3.85	4.16	4.01
	4.03	3.95	4.15	3.96

#3-6	3.99	4.06	4.03	3.88
	4.07	4.08	4.14	3.78
	4.06	4.23	4.05	3.90
	4.06	4.16	3.99	4.01
	4.12	3.90	4.14	3.70
#3-7	4.06	3.86	3.93	3.93
	3.86	4.01	4.09	3.90
	4.09	3.85	3.93	3.71
	4.04	3.95	4.20	4.17
	3.99	4.06	4.18	4.17
#3-8	3.96	3.85	4.10	4.02
	4.09	3.95	3.87	4.02
	4.04	4.06	3.87	4.06
	3.85	3.97	4.03	4.01
	4.00	3.88	4.09	3.90
X	4.01	3.99	4.06	3.95
σ	0.10	0.09	0.12	0.11
Cpk	**1.67**	**1.81**	**1.34**	**1.53**

9.8 MID 4+4 SHOT RF Data with JIG mold #4 (Rear Case + Main antenna)

TEST BAND & TEST ITEM	VSWR PROPERTY			
Frequency	628MHz	946 MHz	1345 MHz	1779 MHz
VSWR MAX	4.5	4.5	4.7	4.5
VSWR MIN	3.5	3.5	3.7	3.5
#4-1	3.96	4.02	4.10	4.03
	4.02	3.89	4.30	4.03
	3.96	3.97	4.28	4.11
	3.94	4.00	4.39	4.10
	3.99	3.89	4.30	4.02
#4-2	4.20	4.13	4.24	4.19
	4.05	3.89	4.39	3.87
	3.79	4.21	4.01	3.89
	4.20	4.00	4.14	3.97
	3.91	4.02	4.17	4.08
#4-3	3.77	3.88	4.14	3.96
	3.95	4.12	3.95	4.12
	4.02	4.19	4.31	3.97
	3.90	3.94	4.41	4.12
	4.21	4.17	4.25	4.08
#4-4	3.94	3.93	4.31	3.94
	4.12	4.06	4.25	3.91
	4.20	3.86	4.19	4.01
	3.95	4.08	4.03	3.92
	3.78	3.98	4.15	3.96
#4-5	4.13	3.93	4.05	4.02
	3.86	4.24	4.10	4.02
	3.77	3.86	4.33	4.19
	3.99	3.71	4.33	4.00
	3.93	4.00	4.40	3.81

#4-6	4.10	3.92	4.13	3.94
	3.97	4.16	4.24	4.13
	4.13	4.02	4.15	3.96
	3.96	3.95	4.09	4.07
	3.96	4.04	4.24	3.76
#4-7	4.02	4.21	4.03	3.99
	3.96	3.88	4.19	4.13
	4.12	3.98	4.10	4.00
	3.99	4.00	4.30	3.95
	4.00	3.92	4.28	4.23
#4-8	4.12	3.71	4.20	4.08
	3.99	3.81	3.97	3.97
	3.94	3.92	3.97	3.97
	4.12	4.26	4.13	4.02
	3.90	4.23	4.19	3.97
X	4.00	4.00	4.19	4.01
σ	0.12	0.14	0.13	0.10
Cpk	1.40	1.44	1.33	1.80

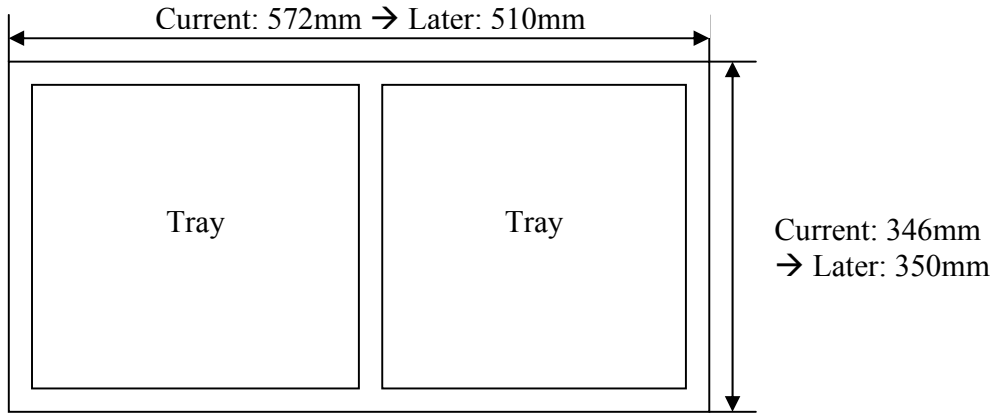
9.7 Mechanical Data(MID Antenna)

Test Sample	Measuring No.						
	Antenna Size					Pattern	
A1							
A2							
A3							
A4							
A5							
B1							
B2							
B3							
B4							
B5							
C1							
C2							
C3							
C4							
C5							
D1							
D2							
D3							
D4							
D5							
E1							
E2							
E3							
E4							
E5							
F1							
F2							
F3							
F4							
F5							
X							
σ							
Cpk							
Decision							

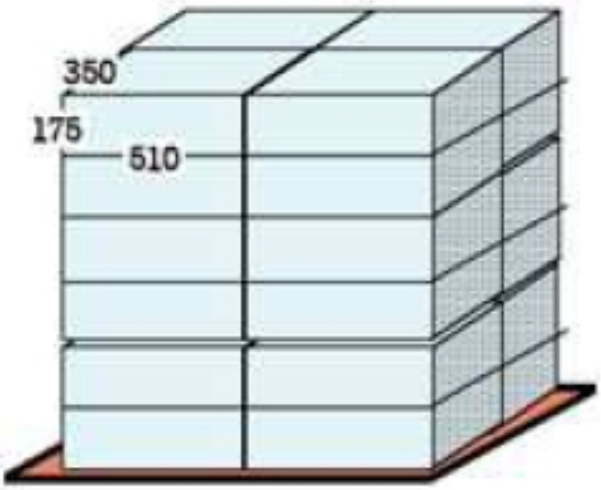
10. Packaging (Estimated)

Parts to be packaged in vacuum formed trays and packed into boxes per below concept:

10.1 Box inside

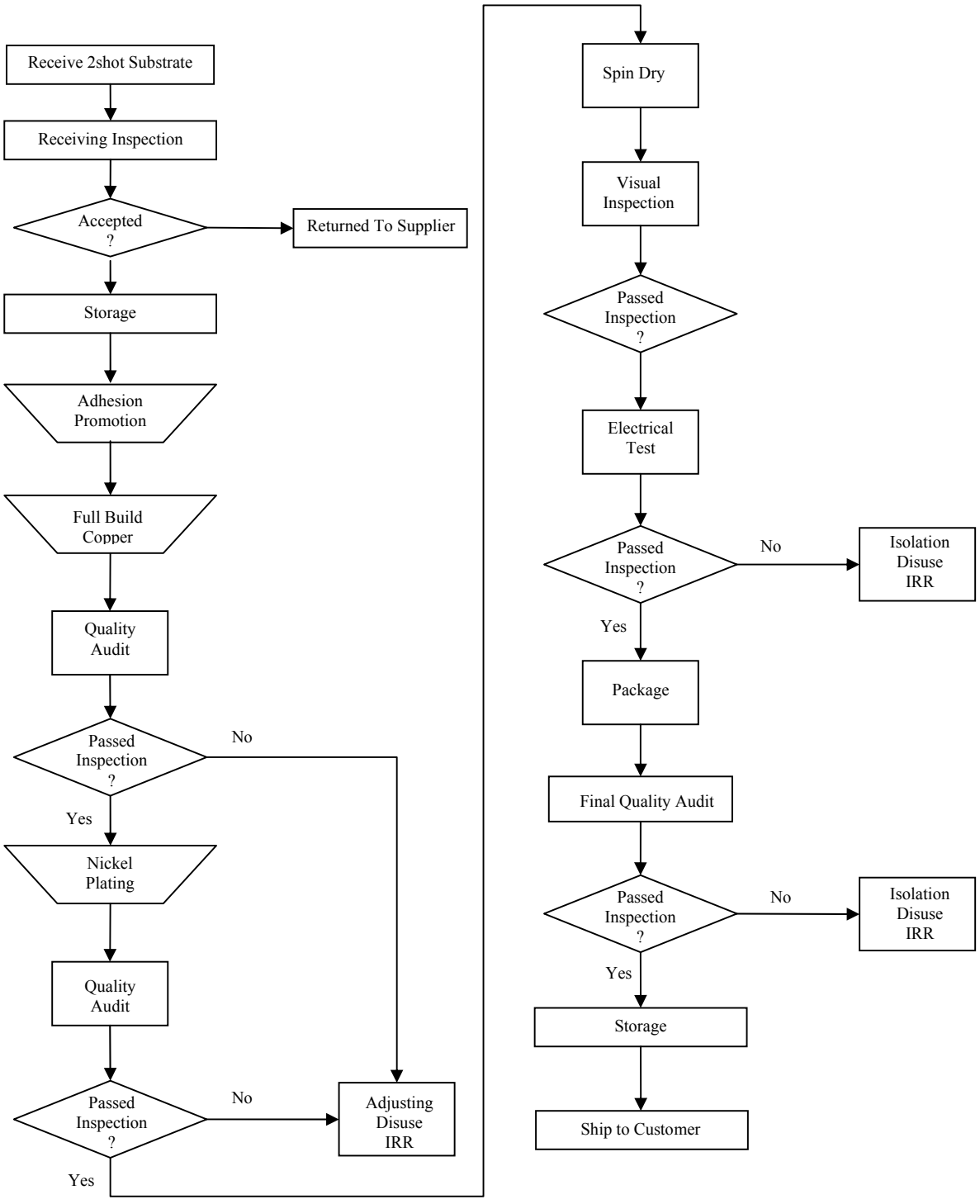


10.2 Box stacking method



11. Manufacturing Process / Quality Assurance

11.1 Process Flow



11.2 Process Control Plan

AMP-Q QC019 REV:B

QC FLOW CHART

QFC-4-Q266A

Part：							Control Place/Time	Brachylogy
MID ANTENNA FOR SM-G350							A. Receiving Inspection Place	RI-Receiving Inspection
P/N:							B. Manufacture Process Place	FAA First Article Approval Request
2108670-1	0	2013.11.20	Original	Xie Dongping	Wang Xu	Li Fugang	C. Plating Analysis Place	PI –Process Inspection
	Rev	Date	Modify Reason/Content	Prepared By	Checked By	Approved By	D. QC Inspection Place E. Warehouse	1X/2H –1Time/2Hours 1X/L –1Time/LOT

Process	No.	Process	Equipment、Jig etc		Specification				Control Method						Actions	Control Place
			Equipment、Jig etc	No	Key Parameter of Process	Attribute		Key Parameter of Parts	Measurement Technique	Sample		Records	Cpk	Current Controls		
						Tag	Type			Sample Size	Frequency					
▲	1	Receiving Parts	Transport、Rack	/	P/N、Quantity、Package etc	/	Appearance	P/N、Quantity、Package etc	Visual	WI.102－77216	Each Shipment	SAP	/	WI 102-77239	Return、CCR	E
◆	2	Receiving Inspection	MSP×20	/	Dimension、Appearance etc	/	Appearance Dimension	/	/	WI.102－77216	Each Shipment	AMP-Q QC004	/	WI 102-77217	Return、CCR	A
▼	3	Storage	Transport、Rack	/	P/N、Quantity、Package etc	/	Appearance	P/N、Quantity、Package etc	Visual	/	Each Shipment	SAP	/	WI 102-77239	Verify	E
◇	4	Etching	Etching Bath	1	Chemical concentration	/	Data	/	Chemical analysis	/	Auto	AMP-Q PT278	/	WI 131-3.7.8.7 WI 131-9.2.2.2 WI 131-3.8.0.6	Re-analyze Addition/New Bath	C
					Temperature	/	Data	/	Visual	/	1X/2H	AMP-Q PT159	/		Verify	B
					Time	/	Data	/	Visual	/	Auto	/	/		Verify	B
◇	5	Rinse	Rinse Bath	2	Temperature	/	Data	/	Visual	/	1X/2H	AMP-Q PT159	/		Verify	B
					Time	/	Data	/	Visual	/	Auto	/	/		Verify	B
◇	6	Neutralizer	Neutralizer bath	3	Chemical concentration	/	Data	/	Chemical analysis	/	Auto	AMP-Q PT278	/		Re-analyze Addition/New Bath	C
					Temperature	/	Data	/	Visual	/	1X/2H	AMP-Q PT159	/		Verify	B
					Time	/	Data	/	Visual	/	Auto	/	/		Verify	B
◇	7	Rinse	Rinse Bath	4	Temperature	/	Data	/	Visual	/	1X/2H	AMP-Q PT159	/		Verify	B
					Time	/	Data	/	Visual	/	Auto	/	/		Verify	B
◇	8	Full build copper	Full build copper bath	5	Chemical concentration	/	Data	/	Chemical analysis	/	Auto	AMP-Q PT278	/	WI 131-3.7.8.7 WI 131-9.2.2.2 WI 131-3.8.0.6	Re-analyze Addition/New Bath	C
					Temperature	/	Data	/	Visual	/	1X/2H	AMP-Q PT159	/		Verify	B
					Time	/	Data	/	Visual	/	Auto	/	/		Verify	B
◇	9	Rinse	Rinse Bath	6	Temperature	/	Data	/	Visual	/	1X/2H	AMP-Q PT159	/		Verify	B
					Time	/	Data	/	Visual	/	Auto	/	/		Verify	B

Process	No.	Process	Equipment、Jig etc		Specification				Control Method								Actions	Control Place
			Equipment、Jig etc	No	Key Parameter of Process	Attribute Tag	Attribute Tag	Key Parameter of Parts	Measurement Technique	Sample	Sample Size	取样频次	Records	Cpk	Current Controls			
◆	10	FAA	X-ray;MSP;3M-Tape	/	·Analysis file Cu-MID-0.2mm.ana ·3M Tape ·MSP×20	Items of IP-6-Q148	Appearance Thickness	Cu Spec:15.0±2um	For IP-6-Q148	Cu Thickness	N=3	FAA	IP-6-Q148	CPK ≥1.33	WI 118-77203 QCQ-3-430	①IRR ②Adjusting ③Disuse		D
										Peeling Test	N=3							
										Appearance	N=3							
◆	11	PI	X-ray;MSP;3M-Tape	/	·Analysis file Cu-MID-0.2mm.ana ·3M Tape ·MSP×20	Items of IP-6-Q148	Appearance Thickness	Cu SPEC:15.0±2um	For IP-6-Q148	Cu Thickness	N=3	1X/L	IP-6-Q148	/	WI 118-77203 QCQ-3-430	①IRR ②Adjusting ③Disuse		D
										Peeling Test	N=3							
										Appearance	N=3							
◇	12	Pd Initiator	Initiator bath	7	Chemical concentration	/	Data	/	Chemical analysis	/		Auto	AMP-Q PT278	/	WI 131-3.7.8.7 WI 131-9.2.2.2 WI 131-3.8.0.6	Re-analyze Addition/New Bath		C
					Temperature	/	Data	/	Visual	/		1X/2H	AMP-Q PT159	/		Verify		B
					Time	/	Data	/	Visual	/		Auto	/	/		Verify		B
◇	13	Ni Plating	Nickel plating bath	8	Chemical concentration	/	Data	/	Chemical analysis	/		Auto	AMP-Q PT278	/	WI 131-3.7.8.7 WI 131-9.2.2.2 WI 131-3.8.0.6	Re-analyze Addition/New Bath		C
					Temperature	/	Data	/	Visual	/		1X/2H	AMP-Q PT159	/		Verify		B
					Time	/	Data	/	Visual	/		Auto	/	/		Verify		B
◇	14	Sealing	Sealing bath	9	Chemical concentration	/	Data	/	Chemical analysis	/		Auto	AMP-Q PT278	/	WI 131-3.7.8.7 WI 131-9.2.2.2 WI 131-3.8.0.6	Re-analyze Addition/New Bath		C
					Temperature	/	Data	/	Visual	/		1X/2H	AMP-Q PT159	/		Verify		B
					Time	/	Data	/	Visual	/		Auto	/	/		Verify		B
◇	15	Rinse	Rinse Bath	10	Temperature	/	Data	/	Visual	/		1X/2H	AMP-Q PT159		WI 131-3.7.8.7 WI 131-9.2.2.2 WI 131-3.8.0.6	Verify		B
					Time	/	Data	/	Visual	/		Auto	/			Verify		B
◇	16	Drying	Dryer	/	Temperature	/	Data	/	Visual	/		/	/	/	WI 131-3.7.8.7 WI 131-9.2.2.2 WI 131-3.8.0.6	Verify		B
					Time	/	Data	/	Visual	/		/	/	/		Verify		B
◆	17	FAA	X-ray;MSP;3M-Tape	/	·Analysis file Cu-MID-0.2mm.ana ·3M Tape ·MSP×20	Items of IP-6-Q148	Appearance Thickness	Ni Spec:3.0±1.5um	For IP-6-Q148	Ni Thickness	N=3	FAA	IP-6-Q148	CPK ≥1.33	WI 118-77203 QCQ-3-430	①IRR ②Adjusting ③Disuse		D
										Peeling Test	N=3							
										Appearance	N=3							
◆	18	PI	X-ray;MSP;3M-Tape	/	·Analysis file Cu-MID-0.2mm.ana ·3M Tape ·MSP×20	Items of IP-6-Q148	Appearance Thickness	Ni Spec:3.0±1.5um	For IP-6-Q148	Ni Thickness	N=3	1X/L	IP-6-Q148	/	WI 118-77203	①IRR ②Adjusting ③Disuse		D
										Peeling Test	N=3							
										Appearance	N=3							
◆	19	Visual Inspection	R×5	/	/	Items of QCQ-3-430	Appearance	Visual Inspection Criterion	Visual	100%		Every Lot	AMP-Q PT157	/	WI 118-77203 QCQ-3-430	IRR、Isolation、Disuse		B

◆	20	Electrical Test	Agilent RF Network Analyzers	/	/	/	Data	RF Performance	Specific RF Setup	100%	Each shipment	AMP-Q PT156	/	WI 131-0136J	IRR、Isolation、Disuse	B
◆	21	Visual Inspection	R×5	/	/	Items of QCQ-3-430	Appearance	Visual Inspection Criterion	Visual	100%	Each shipment	AMP-Q PT157	/	WI 118-77203 QCQ-3-430	IRR、Isolation、Disuse	B
◇	22	Packing	By hand	/	Apperance、P/N、Quantity、Package etc	/	Appearance	P/N、Quantity、Package etc	Visual	Every Lot	Each shipment	/	/	S8500 Package criteria	IRR、Verify	B
◆	23	Final quality audit	V	/	All conformance	/	Appearance	P/N、Quantity、Package etc	Visual	Every Lot	Each shipment	AMP-Q QC003	/	WI 118-77203 WI 102-77216	IRR、Rework	E
▼	24	Storage	Transport、Rack	/	Temperature Humidity	/	Appearance	P/N、Quantity、Package etc	Visual	Every Lot	Each shipment	SAP	/	WI 102-77239	IRR、Verify	E

▲:Substrate ◆:Inspection ◇：Operation and Self-Inspection ▼:Storage

Remark：Plating line—MID

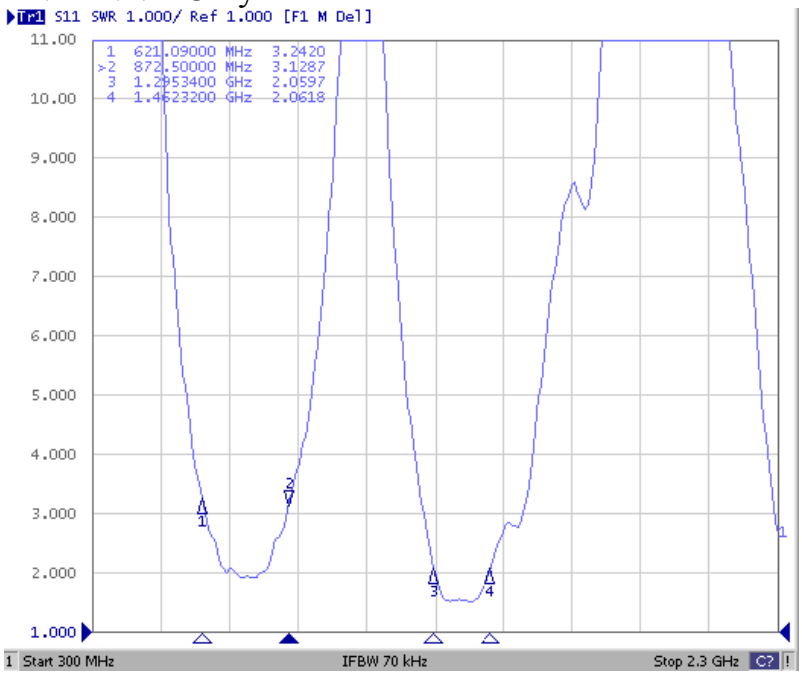
12. Picture of Testing with SET and Test JIG

12. 1 Set condition

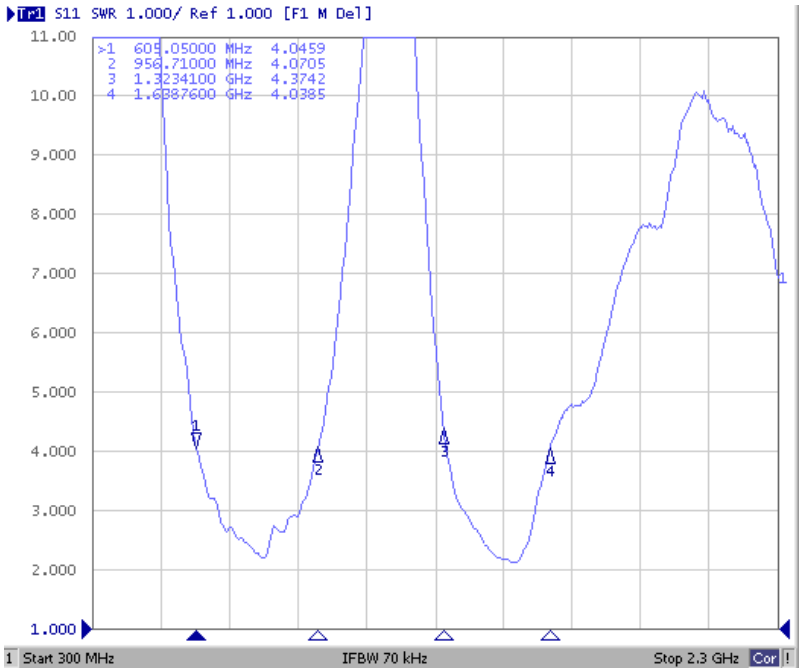
12. 2 Test Jig condition

12. 3 TEST JIG VSWR

MAIN ANTENNA Only



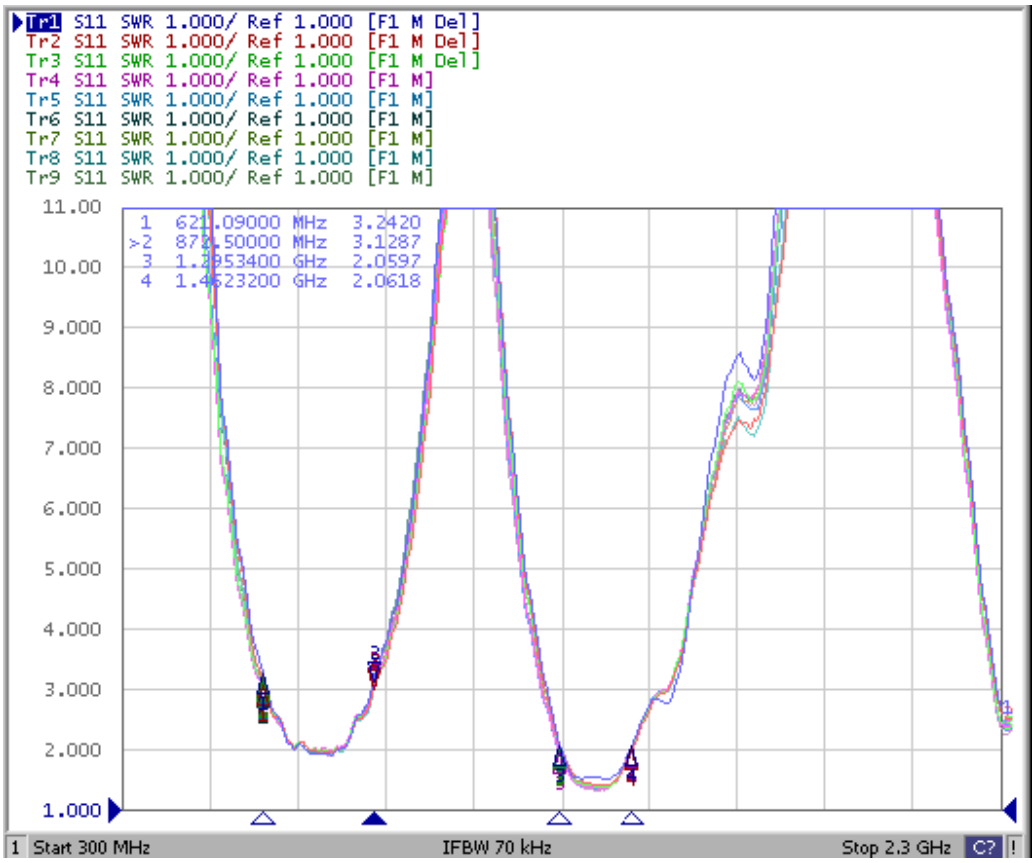
Rear + ANTENNA



13. VSWR Comparison

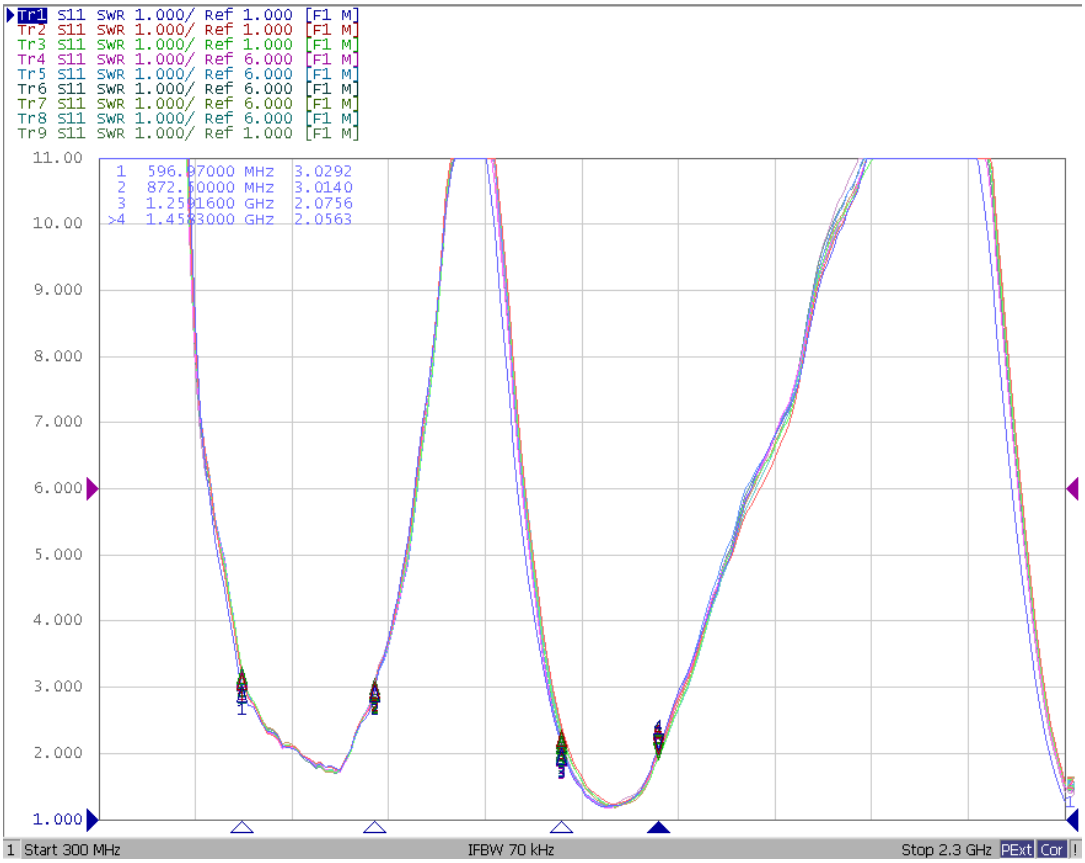
13.1.1. VSWR Comparison between #1-1 Cav. & #1-8 Cav. (Main Antenna only)

- Tr1 1+1 금형 안테나
- Tr2~Tr9: 4+4 #1차금형 Cav.1-1~1-8



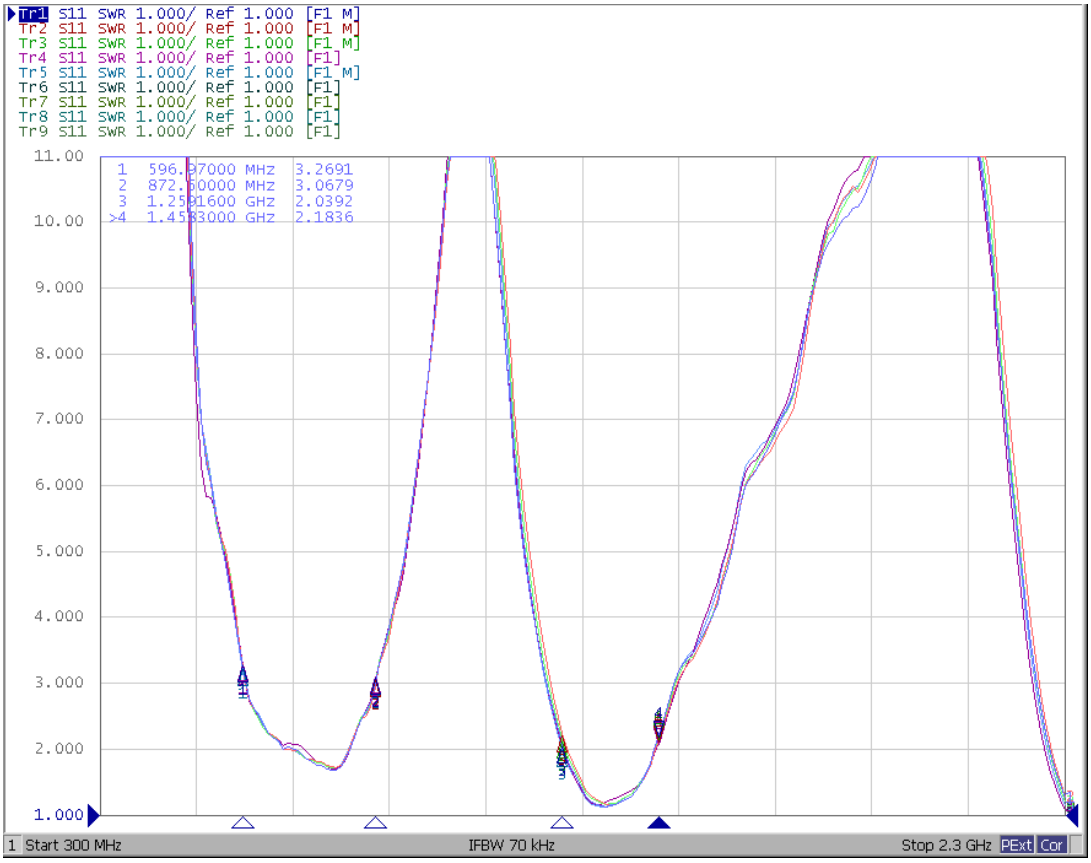
13.1.2. VSWR Comparison between #2-1 Cav. & #2-8 Cav. (Main Antenna only)

- Tr1 4+4 #1차금형 안테나
- Tr2~Tr9: 4+4 #2차금형 Cav.2-1~2-8



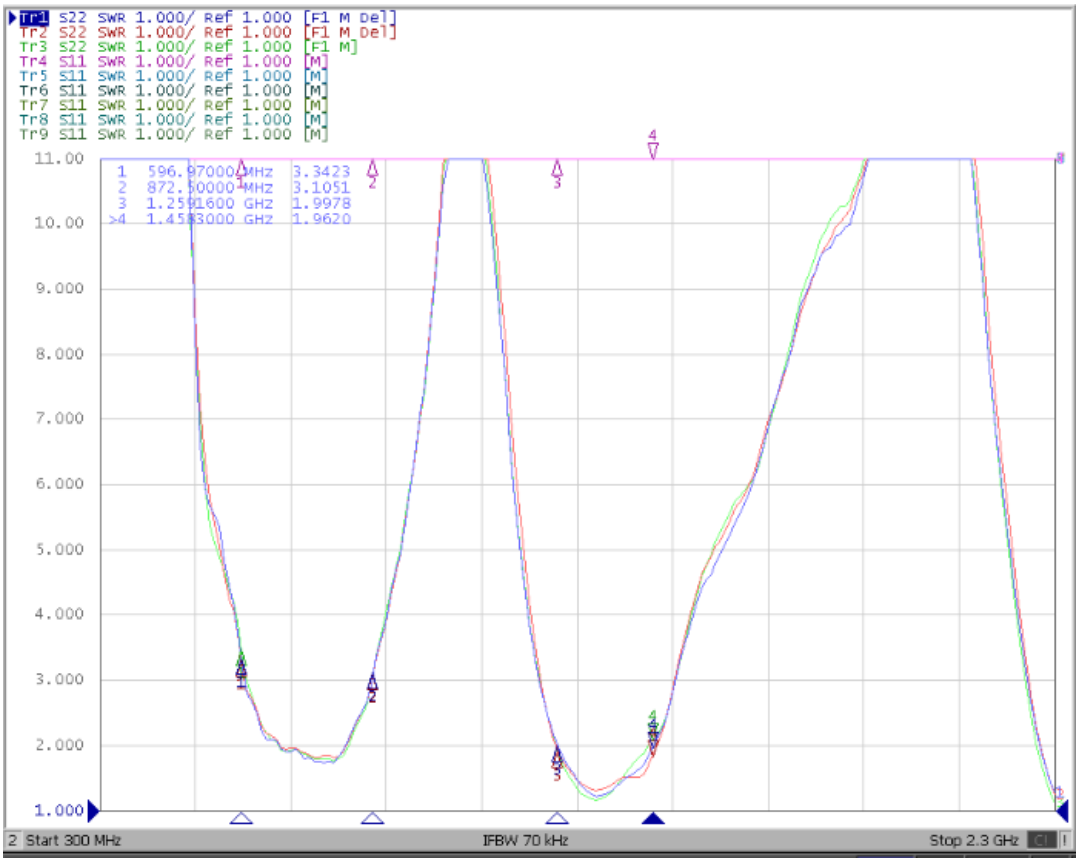
13.1.3. VSWR Comparison between #3-1 Cav. & #3-8 Cav. (Main Antenna only)

- Tr1 4+4 #1차금형 안테나
- Tr2~Tr9: 4+4 #3차금형 Cav.3-1~3-8



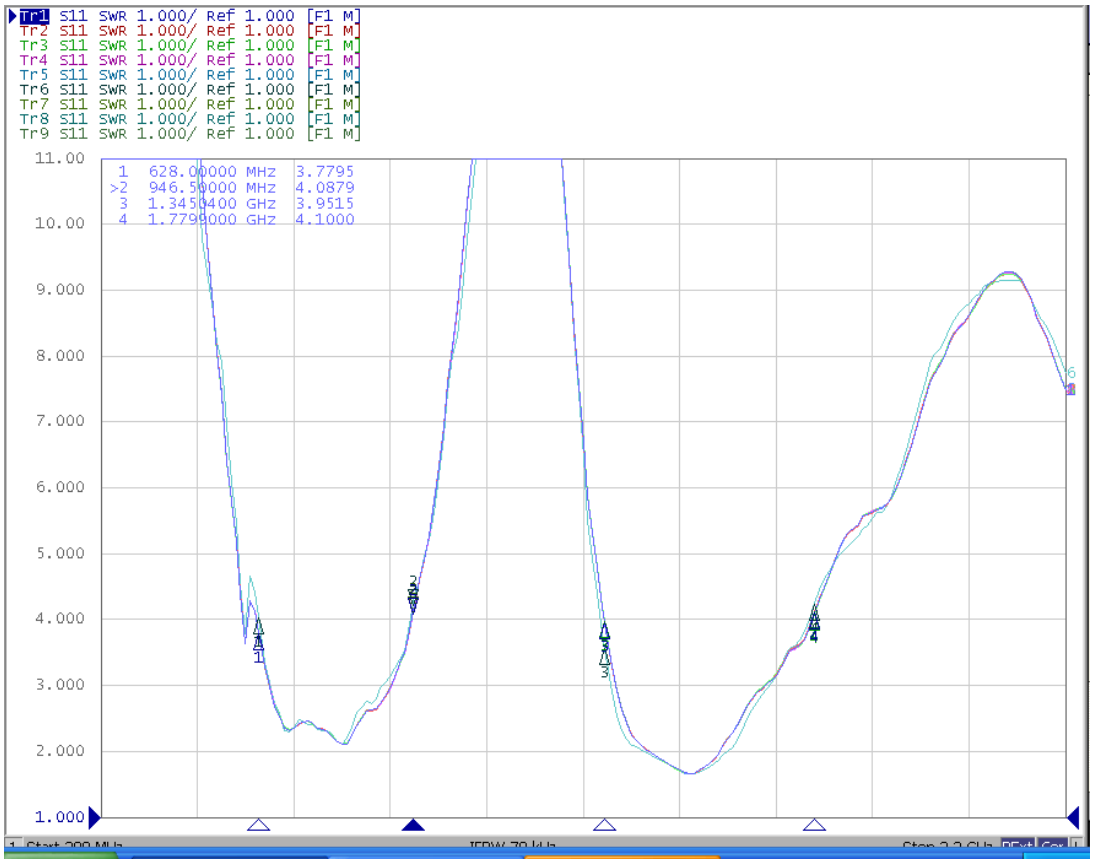
13.1.4. VSWR Comparison between #4-1 Cav. & #4-8 Cav. (Main Antenna only)

- Tr1 4+4 #1차금형 안테나
- Tr2~Tr9: 4+4 #4차금형 Cav.4-1~4-8



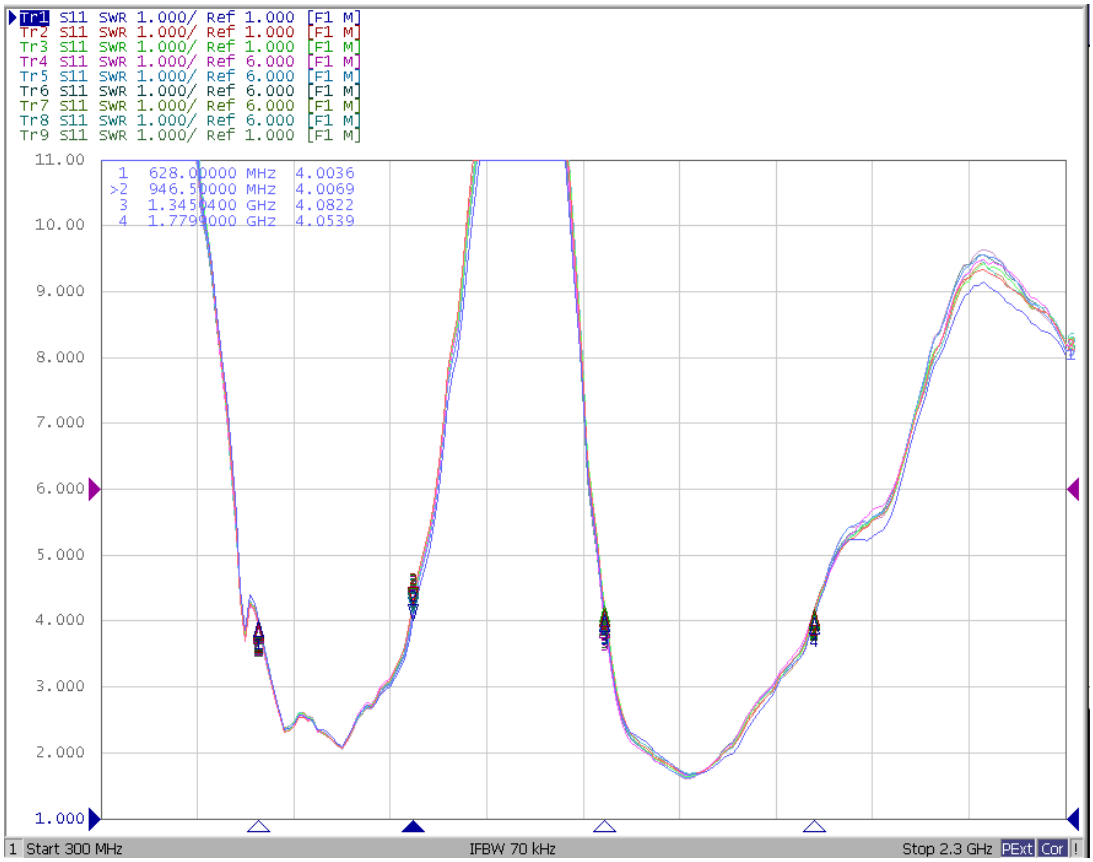
13.1.5. VSWR Comparison between #1-1 Cav. & #1-8 Cav. (Main Antenna + Rear Ass'y)

- Tr1 1+1 금형 안테나
- Tr2~Tr9: 4+4 #1차금형 Cav.1-1~1-8



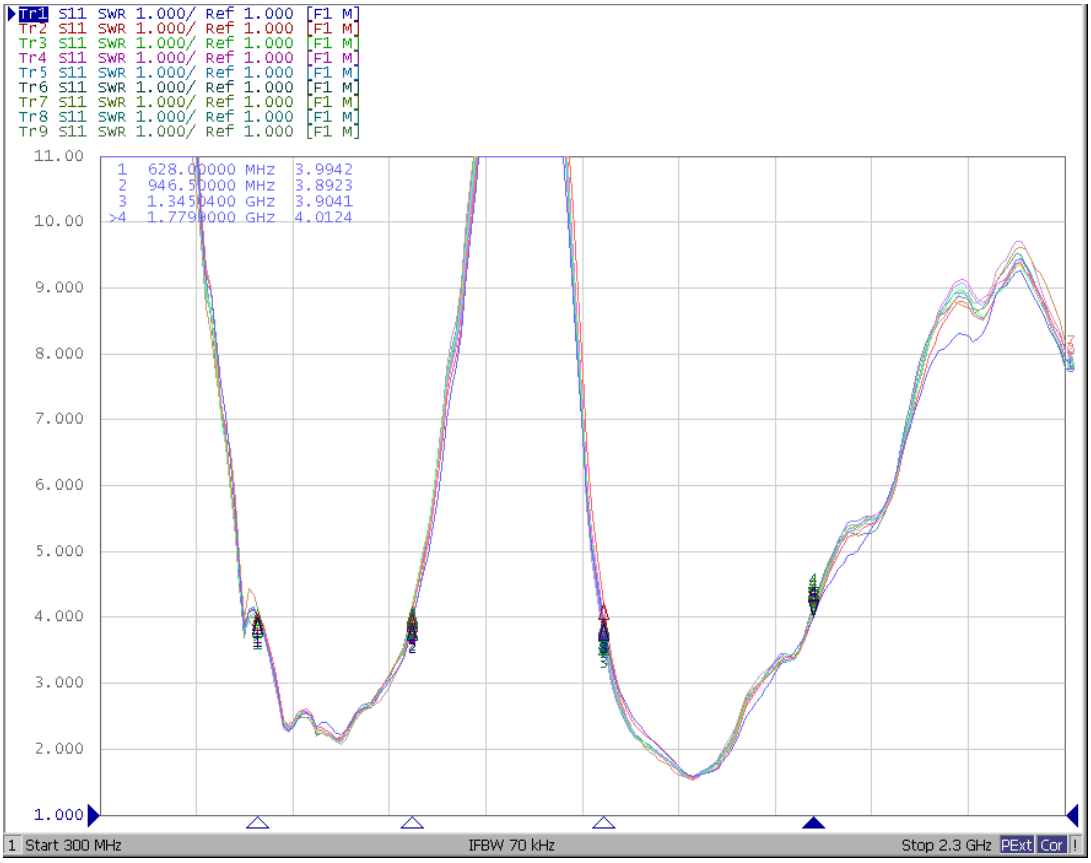
13.1.6. VSWR Comparison between #2-1 Cav. & #2-8 Cav. (Main Antenna + Rear Ass'y)

- Tr1 4+4 #1차금형 안테나
- Tr2~Tr9: 4+4 #2차금형 Cav.2-1~2-8



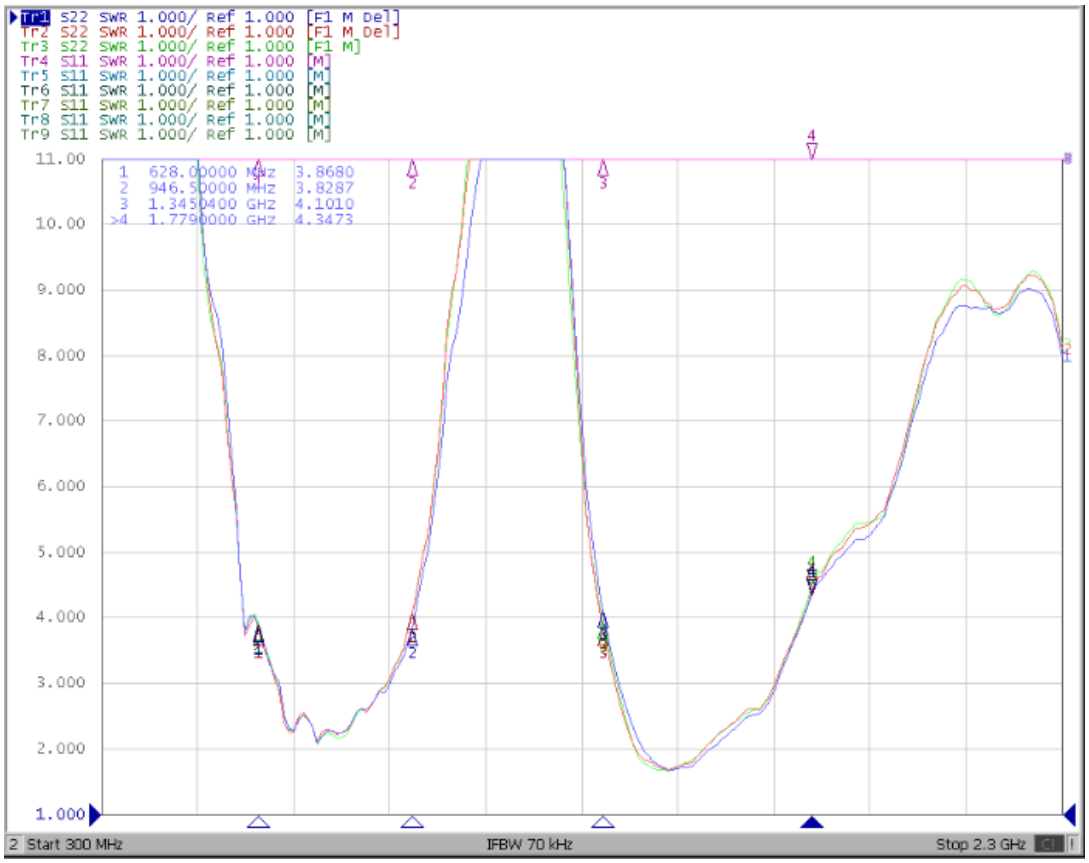
13.1.7. VSWR Comparison between #3-1 Cav. & #3-8 Cav. (Main Antenna + Rear Ass'y)

- Tr1 4+4 #1차금형 안테나
- Tr2~Tr9: 4+4 #3차금형 Cav.3-1~3-8



13.1.8. VSWR Comparison between #4-1 Cav. & #4-8 Cav. (Main Antenna + Rear Ass'y)

- Tr1 4+4 #1차금형 안테나
- Tr2~Tr9: 4+4 #4차금형 Cav.4-1~4-8



14. 안테나 Edge 시료 VSWR 3점 정합성 측정 DATA

안테나 Edge시료 VSWR 3점 정합성 측정 DATA

	구분		단품특성				조립특성 (SPK/사출)				Set특성 Gain(dBm)	
Cavity #1-1	측정주파수(MHz)		621	872	1295	1462	605	957	1323	1638	EGSM	WCDMA1
	측정값	1	3.05	3.21	2.15	1.87	3.02	3.05	4.26	3.92	29.02	19.16
		2	3.11	3.19	2.09	1.94	3.06	2.94	4.32	3.84	28.78	19.17
	Average		3.08	3.20	2.12	1.91	3.04	3.00	4.29	3.88	29.03	19.69

	구분		단품특성				조립특성 (SPK/사출)				Set특성 Gain(dBm)	
Cavity #1-2	측정주파수(MHz)		621	872	1295	1462	605	957	1323	1638	EGSM	WCDMA1
	측정값	1	3.05	3.21	2.15	1.87	3.02	3.05	4.26	3.92	29.02	19.16
		2	3.11	3.19	2.09	1.94	3.06	2.94	4.32	3.84	28.78	19.17
	Average		3.08	3.20	2.12	1.91	3.04	3.00	4.29	3.88	28.90	19.17

	구분		단품특성				조립특성 (SPK/사출)				Set특성 Gain(dBm)	
Cavity #1-3	측정주파수(MHz)		621	872	1295	1462	605	957	1323	1638	EGSM	WCDMA1
	측정값	1	3.03	3.23	2.12	1.82	3.05	3.04	4.29	3.97	29.10	19.12
		2	3.07	3.23	2.11	1.97	3.02	2.98	4.31	3.85	28.85	19.19
	Average		3.05	3.23	2.12	1.90	3.04	3.01	4.30	3.91	28.98	19.16

	구분		단품특성				조립특성 (SPK/사출)				Set특성 Gain(dBm)	
Cavity #1-4	측정주파수(MHz)		621	872	1295	1462	605	957	1323	1638	EGSM	WCDMA1
	측정값	1	3.07	3.23	2.19	1.85	3.00	3.07	4.21	3.98	29.14	19.13
		2	3.10	3.24	2.11	1.90	3.05	2.98	4.30	3.82	28.74	19.12
	Average		3.09	3.24	2.15	1.88	3.03	3.03	4.26	3.90	28.94	19.13

Cavity #1-5	구분		단품특성				조립특성 (SPK/사출)				Set특성 Gain(dBm)	
	측정주파수(MHz)		621	872	1295	1462	605	957	1323	1638	EGSM	WCDMA1
	측정값	1	3.08	3.19	2.17	1.85	3.05	3.08	4.23	3.90	29.10	19.22
		2	3.10	3.16	2.06	1.91	3.04	2.96	4.27	3.83	28.86	19.26
	Average		3.09	3.18	2.12	1.88	3.05	3.02	4.25	3.87	28.98	19.24

Cavity #1-6	구분		단품특성				조립특성 (SPK/사출)				Set특성 Gain(dBm)	
	측정주파수(MHz)		621	872	1295	1462	605	957	1323	1638	EGSM	WCDMA1
	측정값	1	3.04	3.25	2.12	1.84	3.06	3.02	4.28	3.94	29.11	19.13
		2	3.07	3.21	2.08	1.97	3.04	2.96	4.30	3.82	28.90	19.21
	Average		3.06	3.23	2.10	1.91	3.05	2.99	4.29	3.88	29.01	19.17

Cavity #1-7	구분		단품특성				조립특성 (SPK/사출)				Set특성 Gain(dBm)	
	측정주파수(MHz)		621	872	1295	1462	605	957	1323	1638	EGSM	WCDMA1
	측정값	1	3.08	3.19	2.13	1.81	2.99	3.03	4.24	3.88	29.07	19.14
		2	3.12	3.15	2.13	1.92	3.07	2.96	4.35	3.86	28.72	19.13
	Average		3.10	3.17	2.13	1.87	3.03	3.00	4.30	3.87	28.90	19.14

Cavity #1-8	구분		단품특성				조립특성 (SPK/사출)				Set특성 Gain(dBm)	
	측정주파수(MHz)		621	872	1295	1462	605	957	1323	1638	EGSM	WCDMA1
	측정값	1	3.08	3.19	2.22	1.91	2.97	3.11	4.30	3.86	29.11	19.11
		2	3.13	3.21	2.04	1.92	3.13	2.90	4.34	3.89	28.86	19.08
	Average		3.11	3.20	2.13	1.92	3.05	3.01	4.32	3.88	28.99	19.10

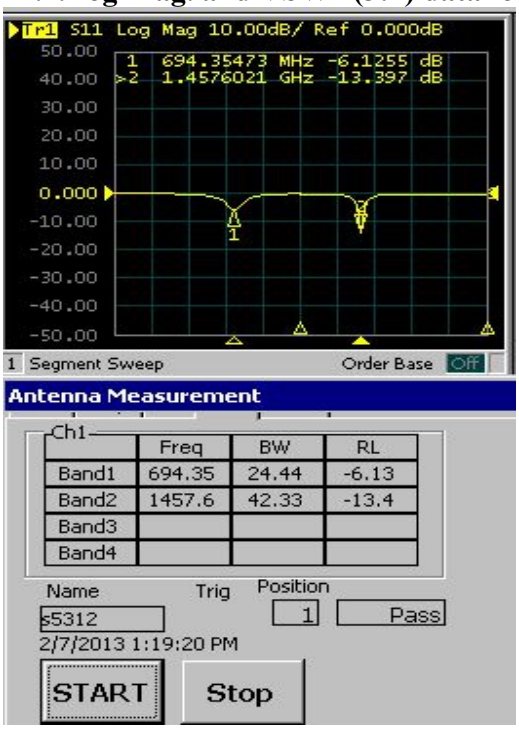
상한 샘플	구분		단품특성				조립특성 (SPK/사출)				Set특성 Gain(dBm)	
	측정주파수(MHz)		621	872	1295	1462	605	957	1323	1638	EGSM	WCDMA1
	측정값	1	2.75	3.64	1.86	2.09	2.72	3.35	3.95	4.26	29.35	19.42
		2	2.80	3.49	1.76	2.24	2.81	3.22	4.06	4.01	29.05	19.44
	Average		2.78	3.57	1.81	2.17	2.77	3.29	4.01	4.14	29.20	19.43

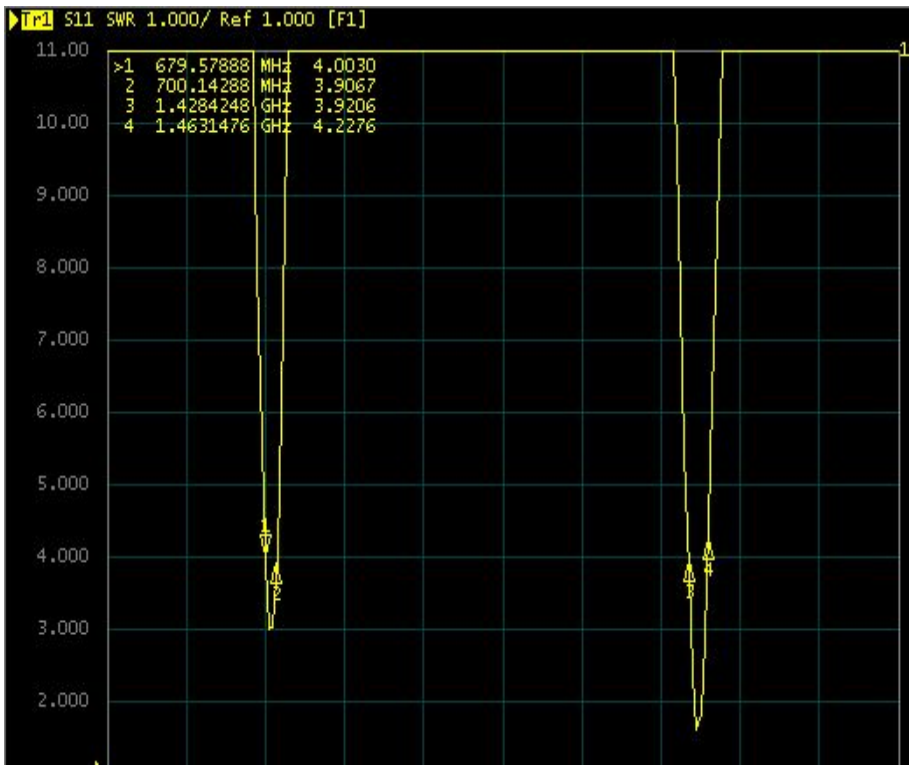
하한 샘플	구분		단품특성				조립특성 (SPK/사출)				Set특성 Gain(dBm)	
	측정주파수(MHz)		621	872	1295	1462	605	957	1323	1638	EGSM	WCDMA1
	측정값	1	3.29	3.08	2.38	1.53	3.33	2.56	4.48	3.68	28.78	18.94
		2	3.35	2.81	2.34	1.84	3.36	2.76	4.56	3.51	28.52	18.88
	Average		3.32	2.95	2.36	1.69	3.35	2.66	4.52	3.60	28.65	18.91

불량 MASTER 표준시료	구분		단품특성				조립특성 (SPK/사출)				Set특성 Gain(dBm)	
	측정주파수(MHz)		621	872	1295	1462	605	957	1323	1638	EGSM	WCDMA1
	측정값	1	3.64	2.61	2.91	1.46	3.31	2.44	4.81	3.66	28.30	18.52
		2	3.83	2.72	2.79	1.37	3.68	2.41	5.10	3.22	28.17	18.46
	Average		3.74	2.67	2.85	1.42	3.50	2.43	4.96	3.44	28.24	18.49

15. TE Qingdao RF Jig

14.1.Log Mag. and VSWR(3:1) data for reference sample





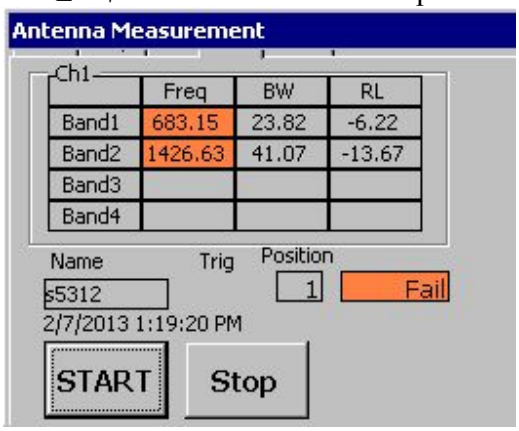
15.2 Spec. with tolerance

G3812						
BAND1	REF		SPEC	BAND2	REF		SPEC
	Fc	694.35MHz	+/-7MHz		Fc	1457.6MHz	+/-15MHz
	BW	24.44MHz	+/-3MHz		BW	42.33MHz	+/-3MHz
	RL	-6.13dB	+/-0.05		RL	-13.4dB	+/-0.05

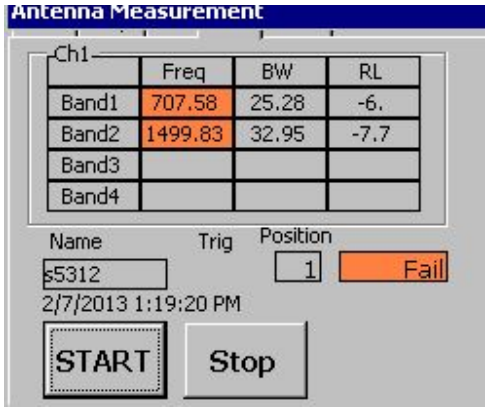
상기 세가지 Spec (Fc, BW, RL) 중 한가지라도 fail 항목이면 fail 로 분류
1. 표준 지그 Ref Sample : 승인용 샘플과 동일한 표준시료
2. 표준 지그 Low shift Limit Sample:표준지그에서 VSWR 0.5 미만의 Low shift limit 샘플
3. 표준 지그 high shift Limit Sample:표준지그에서 VSWR 0.5 미만의 high shift limit 샘플

15.3 Limit Sample TE Qingdao Jig 확인 test

<표준 지그 Low shift Limit Sample >



<표준 지그 high shift Limit Sample >

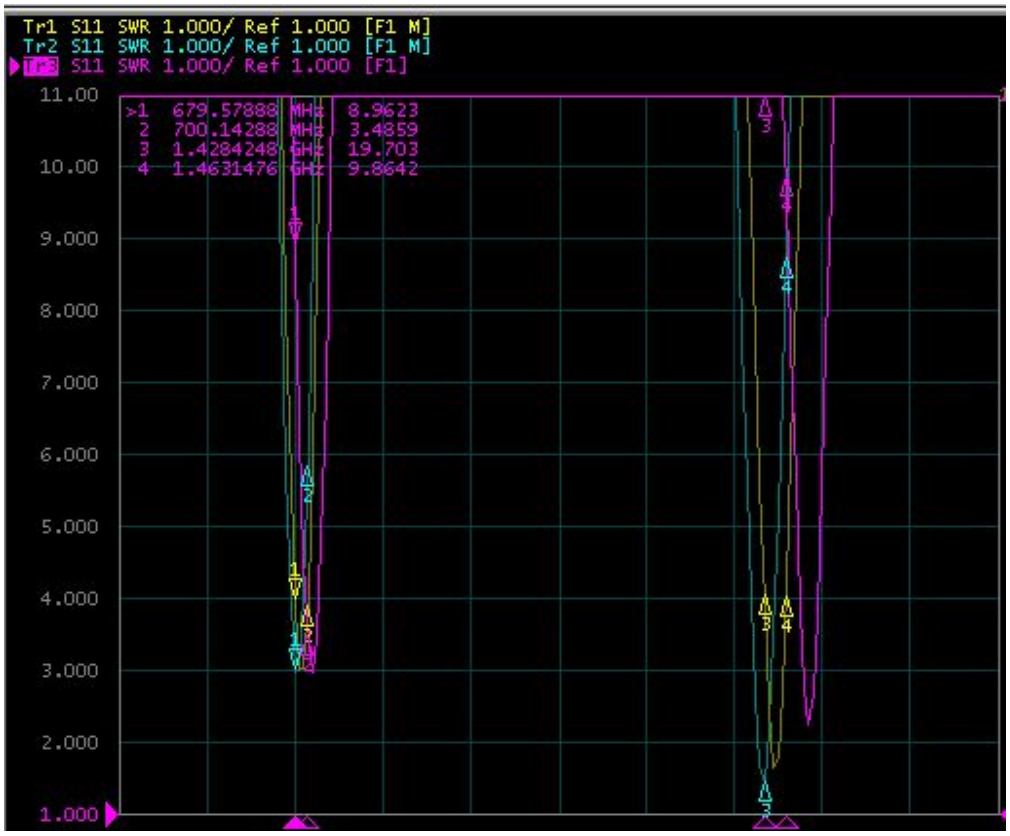


15.4 표준지그 Reference sample, high/low Limit sample VSWR 비교

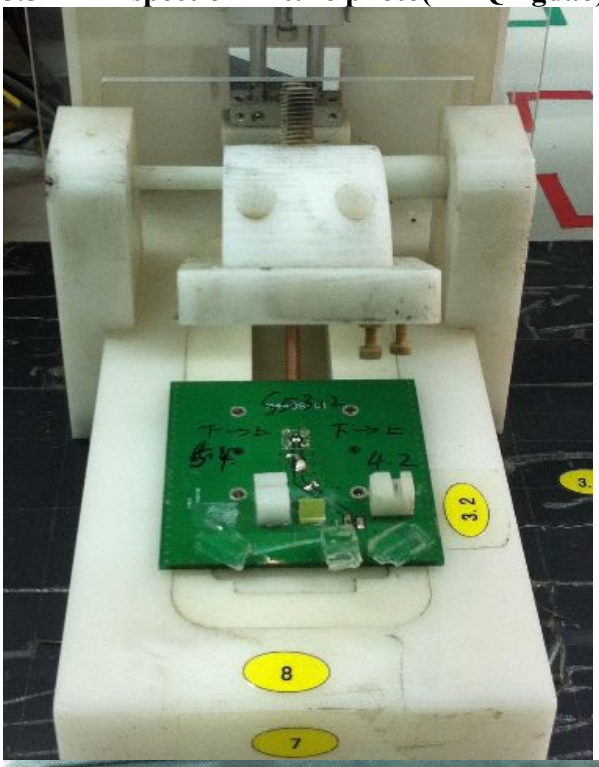
Tr1 : Ref Sample VSWR on TE Qingdao RF JIG

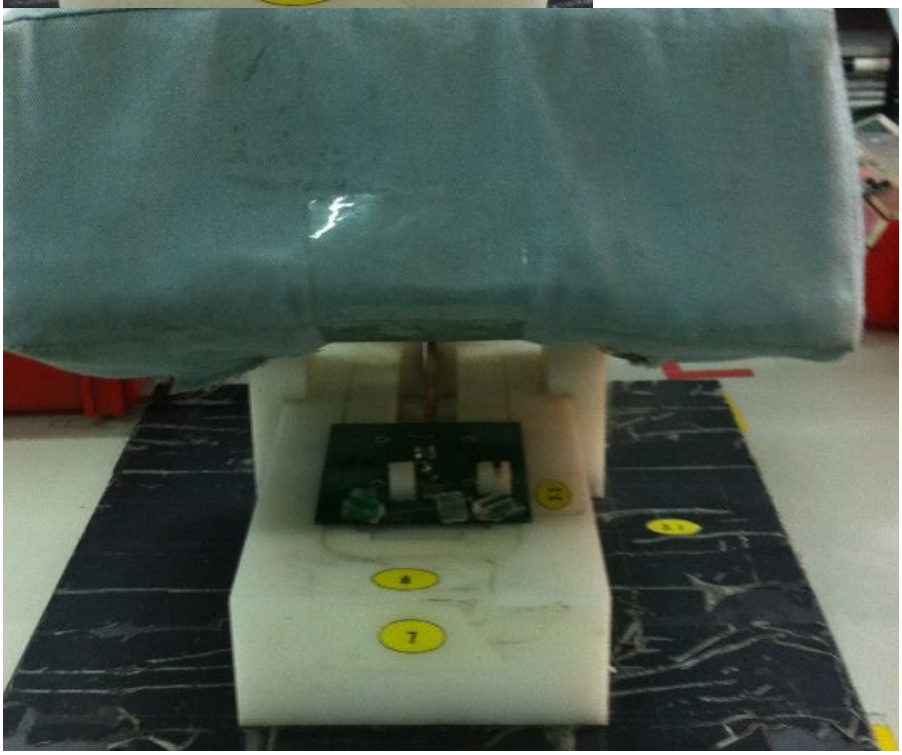
Tr2 : 표준지그 Low shift Limit Sample VSWR on TE Qingdao RF JIG

Tr3 : 표준지그 High shift Limit Sample VSWR on TE Qingdao RF JIG



15.5 RF inspection fixture photo(TE Qingdao)





16. Molding parameters

작업표준서

결재	작성	검토	승인
	정		

호기	금형번호	크림번호	거래처	모델	품명	품번	CAVITY	C/T	일생산 SHOT (24hr기준)	일일생산수량 EA (24hr기준)
6호기	DIP-I-WB-136	-	타이코	GT-6650	ANTENNA	2108870-1	1+1	25.19	9,439	18,752

원재료	구분	원자재명	GRADE NO.	색상	제품(NET)(g)	SHOT중량 SPRUE(g)	총중량(g)	EA당중량 (g)	건조온도	건조시간	GATE
	1 차	PC	EH-1050	BLACK	5.92	18.65	24.57	6.14	100 ℃	4 H/R	PIN POINT
	2 차	ABS	AX08437	NT	0.28	14.62	14.90	3.73	80 ℃	4 H/R	PIN POINT

온도	구분	NH	1H	2H	3H	크림온도	상측	하측
	1차실린더	305/305±5%	300±5℃	295±5℃	285±5℃	1차부	75±5℃	70±5℃
	2차실린더	270/285±5%	255±5℃	245±5℃	225±5℃	2차부	75±5℃	70±5℃

사출조건	구분	사출압력	사출속도	배압	사출시간(초)	충전시간(초)	냉각시간(초)	CYCLE TIME (초)
	1차실린더	57±5%	88/53±mm/s	10±5%	3.0	9.19	13	25.19
	2차실린더	98±5%	46±mm/s	15±5%	2.0			

계량부	구분	보압	SM	회전수	계량쉬치	클램프력(TON)	크림보호	스크류ø
	1차실린더	57/53±5%	52mm	130RPM	57mm	140TON	0.8mm	28ø
	2차실린더	98±5%	80mm	120RPM	55mm			32ø

일개폐	구분	일폐		일개		거리
		고속	저속	고속	저속	330mm
		50%	20%	45%	20%	

비고	Rev	개정일	개정내용	확인
	1			
	2			
	3			
	4			
	5			

포장규격		일사용량		
1	트 레이(15홀_신)	250mm×300mm	94.4장	1
2	포장당 수량	400EA	-	
3	PAD(규격)	3포(475*320)	6장	2
4	BOX번호(규격)	3포(485*330*330)	2.1장	
5	BOX당 수량	6,400EA	-	

포장방법	
1	제품을 이용하여 400개씩 지퍼백에 포장한다.
2	3포BOX 맨 밑에 3포PAD를 깔고 에어빅을 한줄 두 16홀지를 넣는다.
3	상단에 3포PAD를 덮은 후 테이프로 해한다.

작업순서 및 방법	
1	M18 I-VOLT를 이용 크림을 수부 한다.(외산사용금지)
2	작업표준서에 준하여 성형조건을 설정한다.
3	초물 10~20 SHOT는 폐합처리 한다.
4	이물송기 제품을 0.00에게 품질의뢰한다.(송의)
5	합격판정 시 양산 개시한다.(초물보관)
6	유해물질 사용현우 협정지침에 준하며, 사용중 폐제품실시 MSDS조치사항에 따라 조치하며, 폐기물은 지정된 장소에 폐기.
7	작업도중 기계 및 제품에 이상이 생길경우 관리자에게 의뢰한다.

원재료일사용량(kg)	1차	2차
	85kg	52kg

17. Outgoing inspection report

Supplier	prepared	checked	approved	INSPECTION REPORT													
Tyco	郭娜娜	刘福强	王旭														
Delivery date		2013-11-20		Customer P/N													
Supplier		Tyco Electronics		Part Name.			ANTENNA for SM-G350										
inspection level		VL=IV		Part No.			2108670-1										
Inspection date		2013-11-20		Inspector			郭娜娜										
Inspection Item	Sampling Q'ty	Requirement		Inspection result													
				Lot no:	13325-1												
Appearance	40pcs	To meet VQD(Visual Quality Document)		All are acceptable.													
Plating thickness	3pcs/lot	Cu: 12±2um		11.972	11.988	11.971											
		Ni: 4±1um		3.991	3.972	3.888											
Peeling-off	3pcs/lot	Adhesion test standard		OK	OK	OK											
RF Test	40pcs	Set-up RF parameters		All are acceptable according to set up standard.													
RoHS	3pcs	customer requirement		Acceptable level													