

Zhejiang Haitong Communication Electronic Co. , Ltd.

Acknowledgment

(LDS class)

Customer name: Hytera

Project name: W45HM650

Material code: 5121000091558A

Product name: HM650 BT antenna BT antenna LDS (RoHS) (REACH)

texture of mater

Date: 8/15/2022

Haitong confirmation column

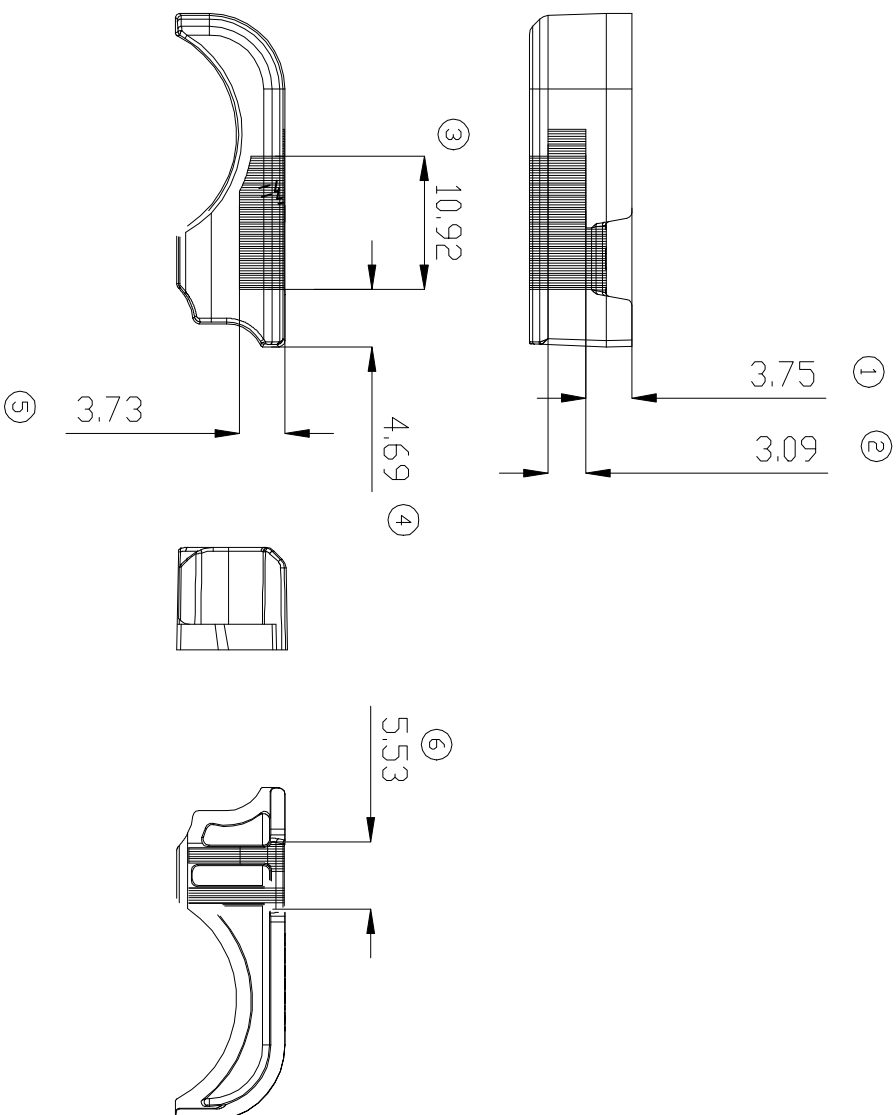
make	to examine	approval
Ran Guangkang	He Jurong	Hou Lijun

Customer confirmation column

Undertaker	to examine	approval

st of acknowledgmen

- I, cover
- II, catalogue
- III, Component drawing
- IV, Component size
- V, Component CPK
- VI, Baige Report
- VII, Constant temperature and humidity report
- VIII, Salt spray test report
- IX, QC Engineering Drawing
- X, packing
- XI, Material certificate
- XII, Restricted substance composition questionnaire
- XIII, Electrical performance report



DIMENSION TEXT REPORT

Part name:	HT1863-BT antenna	DWG. No.:	B. 1. 03. L. 0173				TYPE:	LDS					
Quantity:	5	Client DWG. No.:	/				Machine:	/					
Drawing Rev.:	A	Dept/Vendor:	/				Page:	1 of 1					
Environment:	Temp 22 °C	Humidity:	55 %RH				Test date:	2022. 08. 13					
Subject to be evaluated: Full dimension							Item class: SC=Significant Char KCC=Key Control Char KC=Key Control Item NOR=Reference Item						
No.	Spec.	Control tolerance		Class	Instr. measuring tool	1#	2#	3#	4#	5#	Result	Remark	Engineering Comments
		upper	lower								OK/NG		
1	3. 75	0. 10	0. 10	NOR	c	3. 70	3. 68	3. 69	3. 67	3. 68	OK		
2	3. 09	0. 10	0. 10	KC	c	3. 07	3. 06	3. 05	3. 09	3. 08	OK		
3	10. 92	0. 10	0. 10	NOR	c	10. 91	10. 90	10. 92	10. 93	10. 91	OK		
4	4. 69	0. 10	0. 10	NOR	c	4. 65	4. 67	4. 66	4. 68	4. 67	OK		
5	3. 73	0. 10	0. 10	NOR	c	3. 74	3. 72	3. 73	3. 72	3. 71	OK		
6	5. 53	0. 10	0. 10	NOR	c	5. 48	5. 50	5. 51	5. 49	5. 50	OK		
appearance		1. Plastic parts: no appearance shrinkage, air lines, weld lines, scratches, deformation, flash and other defects; 2. FPC: no appearance impurities, discoloration spots, scratches, crushing, creases, gold finger oxidation, surface damage and other defects; 3. LDS: no defects such as missing engraving, pinhole, laser engraving fracture, laser engraving deformation, scratch, oil stain, etc; 4. Electroplating: no defects such as missing plating, over plating, scratches, dents, deformation, etc.									OK	/	
Instruments: C													
A: Handy push pull gauge (meter card)				B: Digital caliper				C: Video measuring system				D: Salt spray tester	
E: Temperature and humidity				F: Toolmaker's microscope				G: Network analyzer				H: Pin gauge	
I: Knife Tool				J: Flat plate				K: Soldering spot					

CPK Report


Form No. : HZHT-FM-PZ051 Version No. : A/0

Product name	HT1863-BT antenna		supplier	Haitong Communication	
Item No	B. 1. 03. L. 0173		Confirmed by	He Jurong	
Module No	/		Inches/mm	mm	
Acupoint number	/		Material name	/	
edition	A		date	2022.08.13	
Dimension No	7				
Nominal size	3.09				
Positive tolerance	0.10				
Negative tolerance	-0.10				
Upper specification limit	3.19				
Lower specification limit	2.99				
1	3.07				
2	3.06				
3	3.09				
4	3.08				
5	3.06				
6	3.07				
7	3.08				
8	3.06				
9	3.09				
10	3.10				
11	3.08				
12	3.09				
13	3.07				
14	3.05				
15	3.09				
16	3.08				
17	3.06				
18	3.09				
19	3.08				
20	3.06				
21	3.07				
22	3.08				
23	3.05				
24	3.09				
25	3.10				
26	3.08				
27	3.09				
28	3.07				
29	3.06				
30	3.09				
31	3.08				
32	3.10				
33	3.09				
34	3.08				
35	3.06				
MAX.	3.10				
MIN.	3.05				
AVERAGE	3.08				
STDEV	0.01				
CP	2.34				
Cpk	2.04				
Measuring tools	pixiv				

Reviewed by: He Jurong

Prepared by: Yang Du



Baige test report

Test date: August 11, 2022			Test code: 20220811001		
Real sample	Product Name	HT1863-BT antenna	Plating	Cu	Ni
	Item No	B.1.03. L.0173	thickness	8-12um	2-4um
ASTM grade: 4B and above			ISO Grade: Grade 1		
Inspection tools	Art knife/Baige knife, brush, eraser, 3M610 tape				
Inspection method	1. Draw 10x10 (100) 1mm × 1mm small grids on the surface of the test sample with a grid knife, and each line shall be deep enough to reach the bottom layer of the coating; 2. Clean the debris in the test area with a brush; 3. Firmly stick the small grid to be tested with 3M610 tape, and wipe the tape with an eraser to increase the contact area and strength between the tape and the tested area; 4. Grasp one end of the tape by hand and quickly pull it down in the vertical direction (90 °); 5. Observe the damaged area of the coating for judgment.				
Criteria	1. If there is a small piece of peeling at the intersection of the cut, it is qualified if the actual damage (peeling) area in the grid area is $\leq 5\%$, and it is unqualified if it is $> 5\%$. 2. Refer to the evaluation standard of coating adhesion cross cut test (GB/T9286-88)				
experiment Description	After the product test, the surface coating shall not fall off.				
Pictures or samples after test					
conclusion	<input checked="" type="checkbox"/> Qualified <input type="checkbox"/> Unqualified				

Approved by: Zeng Qingping Reviewed by: He Jurong Tested by: Yang Du


Experiment Report

Form No. : HZHT-FM-PZ046 Version No. : A/0

Product name		HT1863-BT antenna		Part number		B. 1. 03. L. 0173		Laboratory temperature		22℃		Report No	20220811001
												Batch No. of product to be	new product
Date		2022.08.11		Documentation		Product Design Specification		Laboratory humidity		55%		Client Dept	engineering department
Experiment reasons				<input checked="" type="checkbox"/> New product <input type="checkbox"/> ECN later <input type="checkbox"/> Product to be out spec <input type="checkbox"/> Daily Experience				Housing tool cavity		/		Metal tool	/
Quantity		5PCS		Sample Description		LDS laser plated products		Plastic material		/		Metal material	/
Test Order	Experiment project	Samples Qty	Experiment equipment	Experiment method		Experience note of product		Test result		Conclusion			
1	Constant temperature and humidity	5	Constant temperature and humidity box	1. Put the sample in a constant temperature and humidity environment with temperature of $55 \pm 2^{\circ}\text{C}$ and relative humidity of $95\% \pm 3\%$ for 48h, and then restore it to 2h at room temperature for inspection. Start time: 13:30, August 11, 2022 to 13:30, August 13, 2022, 48 hours in total		LDS product surface has no obvious discoloration, blistering and other appearance abnormalities, and it is qualified when the adhesion test is $\geq 3B$. The RF test is qualified.		After the experiment, the appearance electroplating of the product shall be checked to ensure that there is no abnormal appearance such as discoloration and bubble. Adhesion test $>3B$, RF meets the requirements of the specification.		OK			
Photos after the experiment		<div>   </div>											
Remarks: 1. The above time is described in 24-hour format. 2. When an experiment fails, other relevant similar experiments will not continue. 3. During the experiment, observe whether the product is abnormal through the detection window for 4 hours each time, and stop the experiment if there is.													
Approved by: Zeng Qingping Checked by: He Jurong Name of operator: Yang Du													

Salt spray test report

Test date: August 11, 2022			Batch No. of materials to be tested: new products		
			Test code: 20220811001		
Test method: NSS (neutral salt spray test)			Test standard: EIA-364-26B		
Real sample	Product Name	HT1863-BT antenna	Item No	B.1.03. L.0173	
	texture of material	PC+electrolytic copper	Plating thickness	Ni	Cu
	Specifications	/		2-4um	8-12um
	Appearance before experiment	The line surface is dark silver	quantity	5PCS	
experiment Conditions	Test time: 13:30 on the 11th to 13:30 on the 13th				
	Spray time: 48H		Moisturizing time: 48H		
	Temperature of test chamber: 35 ° C ± 2 ° C		Pressure barrel temperature: 47 oC ± 1 oC		
	Relative humidity of test chamber: > 85%		Atmospheric pressure: 200~400KPA		
	NACL concentration: 5% ± 1%		PH value: 6.5-7.2 (neutral)		
experiment Description	Appearance after experiment	The product surface shall be free of corrosion, blistering, delamination and other undesirable phenomena.			

on	Appearance after removing corrosion products	The product surface shall be free of corrosion, blistering, delamination and other undesirable phenomena.
experimental result	OK	
Pictures after experiment		

Approved by: Zeng Qingping Reviewed by: He Jurong Tested by: Yang Du






Zhejiang Haitong Communication Electronics Co., Ltd. Huizhou Branch

QC Engineering Drawing and Quality Control Schedule

Product range	HT1863			Document No	220726-001		primary contact	He Jurong		Telephone	0752-5319982			make	to examine	Approved	
Process	LDS, chemical plating,			Date of preparation		8/12/2022		Core group	Zeng Qingping, He Jurong, Chen Xiwang, Hou Lijun, Wang								
Process	<input type="checkbox"/> Sample <input type="checkbox"/> Trial			Date of preparation		8/12/2022		Revision Date	edition			A1			He Jurong	Zeng Qingping	Zhu Siyu
flow chart	Product name	Measuring machine, fixture and tool	number	Management (process) characteristics	Quality (product) characteristics	is a process	Management specifications (product/process)	Confirmation method	Confirmation frequency	Control method	Person in charge	Responsible person	Disposal	record	Connection regulation	remarks	
<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	01	Temporary receipt of materials	Electronic balance	01-1	Product name and quantity	Appearance and weight	The packaging of raw materials shall be free from damage and moisture. Packaging requirements shall conform to specifications. The weight conforms to the delivery note.	visual	Times/batch	Spot check	Raw material warehouse	executive director	return goods	Delivery Note Inspection Sheet	Warehouse management system		
	02	Incoming inspection	Caliper image measuring instrument, thermostat test chamber	02-1	Appearance, function and size	Appearance, material, high temperature and humidity resistance	Relevant quality characteristics meet the requirements of inspection specifications	Visual measurement	Times/batch	Spot check	IQC	Quality Manager	Return Special Purchase	Inspection Sheet Incoming Material Inspection Record Nonconformity Review Sheet	Incoming inspection specification		
	03	Warehousing	Temperature and humidity meter	03-1	Product name and quantity	Appearance, weight, temperature and humidity	The packaging of raw materials shall be free from damage and moisture. Packaging requirements shall conform to specifications.	Visual measurement	Minimum package	Full inspection	Raw material warehouse	executive director	correct	Temperature and Humidity Record of Warehousing Sheet			
	04	Collect	visual	04-1	Product name and quantity	Product name and quantity	The collected materials are consistent with the BOM and order requirements.	visual	Minimum package	Full inspection	Material clerk	executive director	correct	Material requisition			
	05	IPQC inspection	visual	05-1	Appearance, function and size	appearance	The appearance meets the requirements of the inspection specification for the enclosure series products	visual	2H/first article	Spot check	IPQC	Quality Department	Special mining and discarding	First inspection record Patrol inspection record	Patrol inspection specification		
			Caliper projector	05-2		size	★	Dimensions meet the requirements of product part drawings	measure	2H/first article						Spot check	
			/	05-3		function	Functions meet the requirements of product drawings	measure	2H/first article	Spot check							
	06	LDS	CCD	06-1	Appearance and size	Appearance and size	The size shall meet the requirements of the product part drawing.	Visual measurement	2H/first article	Spot check	IPQC	Quality Department	Special mining and discarding	First inspection record Patrol inspection record	Patrol inspection specification		
	07	Chemical plating	CCD	07-1	Appearance, film thickness, size and function	Appearance, film thickness, size and function	The size and film thickness shall meet the requirements of product part drawings, and there shall be no defects.	Visual measurement	IQC	Spot check	IQC	Quality Department	Special mining and discarding	Inspection Sheet Incoming Material Inspection Record Nonconformity Review Sheet	Incoming inspection specification	Outbound: Zhongrui	
	09	RF test	Network analyzer	09-1	RF function	RF waveform	★ RF waveform must conform to the required parameters	Automatic judgment	100%	Total	operator	Production Department	Scrap	SOP	Finished product inspection specification		
	10	Full inspection	visual	10-1	appearance	appearance	The appearance meets the requirements of inspection specifications for antenna assembly series products	visual	100%	Total	Full inspection QC	Production Department	Special mining and discarding	SOP	Finished product inspection specification		
11	packing	visual	11-1	Quantity and identification	Quantity and identification	Packaging specification	visual	100%	Total	Packaging Department	Production Department	correct		Packaging specification			

<div>◇</div> <div>○</div> <div>◇</div> <div>△</div>	12	IPQC inspection	Caliper visual projector	12-1	Appearance, function and size	Appearance and size	★	The appearance meets the requirements of the inspection specification for antenna assembly series products. The dimensions shall meet the requirements of product part drawings. The functions meet the functional standards of antenna assembly series. The packaging direction, product structure and material number conform to the customer's sealed samples.	Measurement visual inspection	2H/time for the first article	Spot check	IPQC	Quality Department	Special mining and discarding	IPQC Inspection Record	Finished product inspection specification	
	13	Warehousing	visual	13-1	Product name and quantity	Appearance, temperature and humidity		The package shall be free from damage and moisture, and the packaging requirements shall meet the specifications. Temperature: 15℃~30℃	Visual measurement	Per box	Full inspection	Finished product warehouse	executive director	correct	Temperature and Humidity Record of Warehousing Sheet	Finished product warehouse management specification	
	14	OQC spot check	visual	14-1	Appearance and mark	Product name, material number, quantity, identification and appearance		The appearance meets the requirements of the inspection specification for antenna assembly series products. The packaging method and material identification shall meet the requirements of the delivery note and order.	visual	Sampling according to GB/T2828.1-2012 one-time sampling standard	Spot check	OQC	Quality Department	Special mining and discarding	Shipping report	Outgoing inspection specification	
	15	Shipment	visual	15-1	Product name and quantity	Product name, quantity and mark		The product name, quantity and mark are consistent with the requirements of the delivery note and the order.	visual	Per box	Full inspection	Finished product warehouse	executive director	correct	Delivery note		
Ⓢ H i s	propose		confirm		specific date		edition	Revision									
	He Jiarong		Zeng Qingping		8/12/2022		A1	Draft of first edition									

Symbol description: ▽: Receiving △: Shipping ○: Operation ◇: Inspection

Packing (Samples)				
General Requirements:				
1,Description of customer name, project name, model				
2. Picture description of the inner and outer boxes, shipping packaging, number of bags, number of single bags, etc.				
3.In the remarks column, fill in the name, quantity, etc. of the material used for packing				
4. Signed by the head of quality, date				
				
Figure 1: Single Tray Packaging * PCS products		Figure 2: * Layer Bundle		
				
Figure 3: A box of * Bundles of total * CS products, each stack of lower left-hand corner affixed certificate of compliance		Figure 4: Top left-hand Corner with inner box label		
				
Figure 5: The upper right-hand corner affixed with ready-made tickets, the upper left-hand corner affixed with Rohs and month labels, the lower left-hand corner affixed with status label model number, etc. .				
Product No. :	5121000091558A			
Product name:	HM650 BT antenna BT antenna LDS (RoHS) (REACH)			
Product version:	A1			
Packing:	Outer box of release film base plate (packing according to customer requirements)			
The way	规格Specifications	Quantity	Quantity of product	
Pallets	/	xPCS/layer	-	
Bottom plate	/	X layer/stack	-	
Bottom box	xcm*xcm*xcm	X bundles/boxes	-	
Remarks: The mantissa must be labeled with the mantissa.				
Temperature: 18-30° C Humidity: 35%-75%RH				
Store in a low temperature, low humidity, and non-corrosive gas environment.				
Use period: 6 months (desiccant is required for storage)				
Note: The picture is for reference only, because there is no official mass-produced product and Pallet, picture is not true picture, packing process is the same.				

Materials in Product	
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1. Basic Information of Supplier

*Supplier name: Zhejiang Haitong Communication Electronics Co., Ltd. Huizhou Branch

Date: August 13, 2022

Department: Quality Department

Completed by: Huang Xiaoting

E-MAIL : pz04-hz@haitongele.com

Tel:+86 752-7833129-805

Fax: +86 752-7833319

II. Materials in Product	
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[illegible]

Questionnaire

Supplier (agent):

Customer Code: customerSubpart No		Material name/model Subpart Name/model		Supplier Subpart No			Manufacturer																				Green logo						
5121000091558A		HT1863_BT antenna		B.1.03.L0173			Zhejiang Haitong Communication Electronics Co., Ltd. Huizhou Branch																				HSF2.0 (RoHS+HF)						
Item	Material Name	Material No	Raw Material Manufactur er Name	RoHS Third Party Test Report		Restricted Substances Concentration in Homogeneous Material (UoM: ppm)									HF Third Party Test Report						Third LAB. Test Report												Exemptions
				Test Date (YY-MM-DD)	No. Test Report No	Lead (Pb)	Cadmium (Cd)	Mercury (Hg)	Hexavalent chromium (Cr6+)	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)	Di (2-ethylhexyl) phthalate (DEHP)	Tolyl butyl phthalate (BBP)	Dibutyl phthalate (DBP)	Diisobutyl phthalate (DIBP)	Test Date (YY-MM-DD)	No. Test Report No	Bromine (Br)	Chlorine (Cl)	Test Date (YY-MM-DD)	No. Test Report No	Phosphorus	Phthalates 7P (Phthalates)	Polyvinyl chloride (PVC)	Antimony (Sb)	Beryllium (Be)	Polycyclic aromatic hydrocarbons (PAHs)	Nickel	Arsenic (As)	SCCP			
1	PC	/	Helida	2021/12/6	A2210506755101001E	ND	ND	ND	ND	ND	ND	ND	ND	ND	2021/12/6	A2210506755101002E	ND	ND															
2	Copper nickel coating	/	Nomogram	2022/1/21	A2220004798101001E	ND	ND	ND	ND	ND	ND	ND	ND	ND	2022/1/21	A2220004798101002E	ND	ND	2022/1/21	A2220004798101003E				ND									
3																																	
4																																	
5																																	
6																																	
7																																	
8																																	

Filled by: Huang Xiaoting

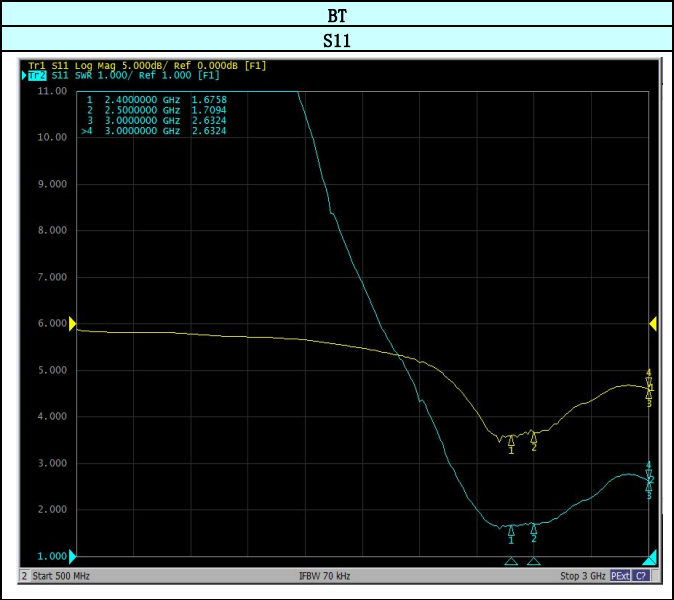
Filled by Company/Department: Quality Department

Seal:

RF Engineer	Zheng Youqiang			
Structural Engineer	Zhang Youyuan			
Test Engineer	Ma Xiqin			
Review	Zhou Zhenbang			
Customer Engineer	Weng Lingpeng			
testing environment	temperature	22℃	humidity	65%
Machine status	Mainboard version			
	PA match	ANT switch-matching-PA		
	Antenna version	HM680-A1		
	Antenna matching	ANT-matching-ANT switch		
	Software version			
	other	BT:2.4-2.5GHz		

Reflection loss test results

Test equipment	VNA (Aglient E5071C)
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Efficiency test results

Test equipment	Satimo SG24
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BT			
F (MHz)	E (%)	E (dB)	Gain (dBi)
2400	47%	-3.3	2.6
2410	48%	-3.1	2.6
2420	51%	-3.0	2.7
2430	52%	-2.8	2.9
2440	54%	-2.7	3.2
2450	57%	-2.5	3.5
2460	59%	-2.3	3.7
2470	59%	-2.3	3.8
2480	58%	-2.3	3.6
2490	58%	-2.3	3.3
2500	59%	-2.3	3.4

Pattern

