



Spec Number:	ECS-QA-12
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# **ECX-1637 Reliability Testing Report**

**Product type:** ECX-1637 SMD Crystal

**Product name:** SMD Crystal

**Manufactory:** ECS Inc., International

**Test type:**Annual Test



# Test Report

Product type	ECX-1637 SMD Crystal				
Test type	Annual test	Intention	Performance of the test product		
Manufacture date	2015.07.22	Product code	ECX-1637	QTY	220
Test specification	ECS-QA-12 Specification (Reliability test ,Appendix 2 , reliability test standard)				
Main test equipment	250B Network Analyzer	Equipment measurement validity	2016.3.24-2017.3.23		
	High Temperature Test box		2016.3.24-2017.3.23		
	Low Temperature Test box		2016.3.24-2017.3.23		
	Mechanical Shock Test System		2016.3.24-2017.3.23		
	Vibration Test System		2016.3.24-2017.3.23		
	Technical term for all hot air reflow soldering machine		2016.3.24-2017.3.23		
	Height Temperature Humidity Chamber		2016.3.24-2017.3.23		
	Thermal Shock Chamber		2016.3.24-2017.3.23		
Test date	2016.04-2016.07				
Result	PASS				
Remark					
Created By: LiWei					
Reviewed By: ZhengBaoqi					
Approved By: IK Lee			Approved date: 2016.8.4		

# Test Report

## Testing Items and Results

NO	Item	Industry Standard	Test condition	Criterion	Result
1	High Temperature Exposure (Storage)	MIL-STD-202 Method 108	85°C for 1000 hrs, Unpowered Measurement at 24±2 hours after test conclusion	$\Delta Fr = \pm 10 \text{ ppm MAX}$ $\Delta Rs = \pm 5 \text{ ohm MAX}$	PASS
2	Moisture Resistance	MIL-STD-202 Method 106	10/cycle, 24 hours, with each cycle, 2 sub-cycles each cycle, Heating and a total of 10 hours of high-temperature preservation process, Cooling and Cryogenic insulation process Total 2 hours, Constant humidity of 90%. Pretreatment: 120 degree drying 24 hours, 8 hours for testing, not live Measurement at 24±2 hours after test conclusion	$\Delta Fr = \pm 10 \text{ ppm MAX}$ $\Delta Rs = \pm 5 \text{ ohm MAX}$	PASS
3	Biased Humidity	MIL-STD-202 Method 103	85°C with relative humidity of 85% for 1000 hrs Measurement at 24±2 hours after test conclusion	$\Delta Fr = \pm 10 \text{ ppm MAX}$ $\Delta Rs = \pm 5 \text{ ohm MAX}$	PASS
4	Low Temperature Storage	MIL-STD-883E	-40°C for 1000 hrs, Unpowered Measurement at 24±2 hours after test conclusion	$\Delta Fr = \pm 10 \text{ ppm MAX}$ $\Delta Rs = \pm 5 \text{ ohm MAX}$	PASS
5	Thermal Shock	MIL-STD-202 Method 107	-55°C/+125°C. Note: Number of Cycles: 1000; Max. transfer time: 5 minuter; Dwell time: 5 minuter. Air-Air	$\Delta Fr = \pm 10 \text{ ppm MAX}$ $\Delta Rs = \pm 5 \text{ ohm MAX}$	PASS
6	Drop	IEC-68-2-32	3 Times Free Fall from the height 100cm onto 3cm thickniss hard wood board.	$\Delta Fr = \pm 5 \text{ ppm MAX}$ $\Delta Rs = \pm 2 \text{ ohm MAX}$	PASS
7	Mechanical Shock	MIL-STD-202 Method 213	In three mutual axial (total 6 directions) every direction three pulse (Total 18 pulse) after Electric Properties Testing. (Peak: 100g / s, the waveform: half sine, the rate of change: 12.3 ft / sec)	$\Delta Fr = \pm 5 \text{ ppm MAX}$ $\Delta Rs = \pm 2 \text{ ohm MAX}$	PASS
8	Vibration	MIL-STD-202 Method 204	5g's for 20 minutes 12 cycles each of 3 orientations. Note: Use 8"X5" PCB. 031" thick with 7 secure points on one 8" side and 2 secure points on corners of opposite sides. Parts mounted within 2" from any secure point. Test from 10-2000Hz.	$\Delta Fr = \pm 5 \text{ ppm MAX}$ $\Delta Rs = \pm 2 \text{ ohm MAX}$	PASS
9	Resistance to Soldering Heat	J-STD-020C	Keep the devices in 150°C±5°C for 120s, then rise to 260°C±5°C, lasting for 10s, the time of rising and lasting procedure should be less than 200s.	$\Delta Fr = \pm 5 \text{ ppm MAX}$ $\Delta Rs = \pm 2 \text{ ohm MAX}$ Visual good, No rusty	PASS
10	Solderability	J-STD-002	lead-based products and for products, does not require electrical performance testing. Microscopy 50 X; Conditions: Lead products: A: 235 °C, steam aging 8H	More than 95% coverage	PASS
11	Terminal Strength (SMD)	JISC60068-2-21	1.8kg, respectively, as required to provide the tangential thrust (60 seconds) and 1.8kg of the vertical tension (60 seconds)	electrode no rupture	PASS



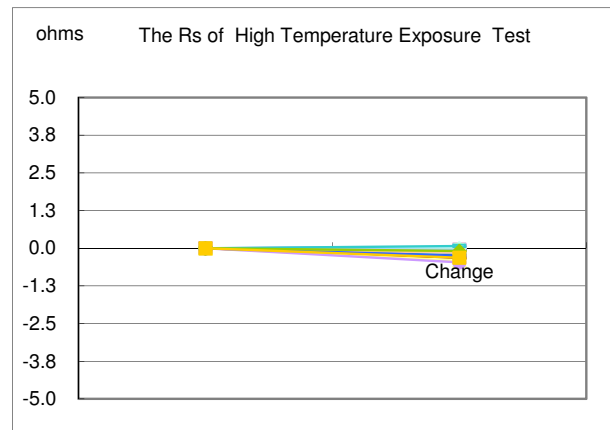
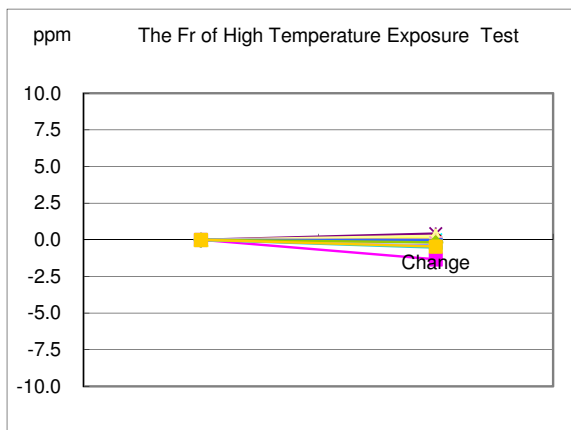
# Test Report

## NO.1 High Temperature Exposure Test

Product Type:	ECX-1637 SMD Crystal	Test Specification:	ECS-QA-12
Product Frequency:	32MHZ/16PF	Test Condition:	85°C for 1000 hrs, Unpowered Measurement at 24±2 hours after test conclusion
Test Equipment:	High Temperature Test box (CS101-2AB)	Test Criterion :	ΔFr=±10ppm MAX ΔRs=±5ohm MAX
Measure Equipment:	250B Network Analyzer	Result:	PASS
Test Date:	2016.4.11-2016.5.23		
Created By:	Li Wei		

NO.	Before	After	Change
1	-72.7	-72.8	-0.2
2	-73.7	-75.0	-1.3
3	-69.2	-69.0	0.2
4	-70.3	-70.3	0.0
5	-69.9	-69.4	0.4
6	-73.0	-73.0	0.0
7	-71.2	-71.4	-0.1
8	-75.0	-75.3	-0.3
9	-71.1	-71.3	-0.2
10	-63.0	-63.3	-0.2
11	-71.1	-71.3	-0.2
12	-66.6	-66.3	0.3
13	-66.0	-66.4	-0.4
14	-69.7	-69.9	-0.2
15	-69.3	-69.7	-0.4
16	-68.7	-68.7	0.0
17	-70.5	-70.5	0.0
18	-75.6	-76.1	-0.5
19	-66.5	-66.7	-0.2
20	-73.1	-73.6	-0.5

NO.	Before	After	Change
1	27.7	27.6	-0.1
2	16.5	16.4	0.0
3	19.7	19.5	-0.1
4	18.0	17.9	-0.1
5	16.6	16.3	-0.3
6	13.7	13.3	-0.3
7	15.3	15.0	-0.2
8	22.5	22.5	0.0
9	18.6	18.5	-0.2
10	17.0	17.0	0.0
11	16.0	16.0	0.0
12	20.2	19.8	-0.4
13	16.9	16.9	-0.1
14	20.0	19.9	-0.1
15	24.6	24.2	-0.5
16	22.9	22.7	-0.1
17	16.5	16.3	-0.3
18	24.4	24.5	0.1
19	18.4	18.3	-0.1
20	22.3	22.0	-0.3





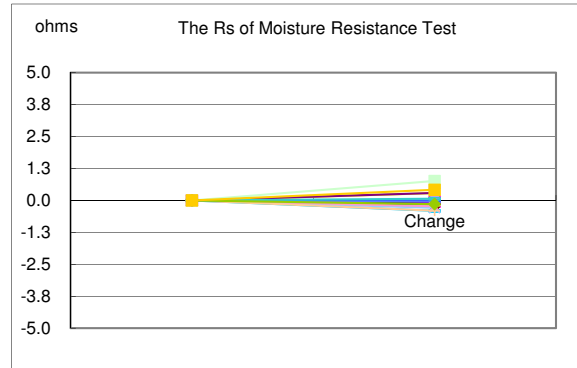
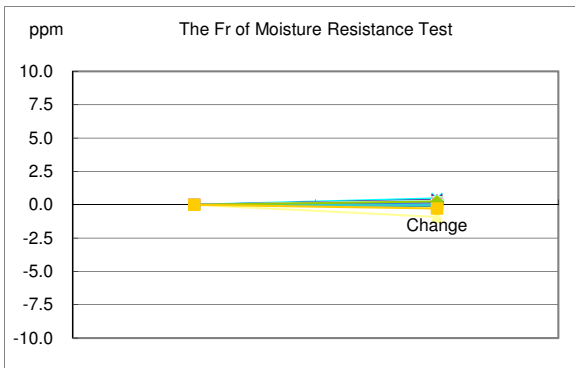
# Test Report

## NO.2 Moisture Resistance Test

Product Type:	ECX-1637 SMD Crystal	Test Specification:	ECS-QA-12
Product Frequency:	32MHZ/16PF	Test condition:	10/cycle, 24 hours, with each cycle, 2 sub-cycles each cycle, Heating and a total of 10 hours of high-temperature preservation process. Cooling and Cryogenic insulation process Total 2 hours, Constant humidity of 90%. Pretreatment: 120 degree drying 24 hours, 8 hours for testing, not live Measurement at 24±2 hours after test conclusion
Test Equipment:	Height Temperature Humidity Chamber (GR-10KA)		
Measure Equipment:	250B Network Analyzer		
Test Date:	2016.6.12-2016.6.23	Test Criterion:	ΔFr=±10ppm MAX ΔRs=±5ohm MAX
Created By:	Li Wei		
Result:	PASS		

NO.	Before	After	Change
1	-68.6	-68.4	0.2
2	-69.2	-69.1	0.0
3	-71.7	-71.7	0.0
4	-70.4	-70.0	0.5
5	-75.5	-75.2	0.4
6	-70.0	-69.9	0.1
7	-68.4	-68.5	-0.1
8	-68.5	-68.4	0.2
9	-69.2	-68.9	0.3
10	-67.2	-66.9	0.3
11	-69.4	-69.3	0.2
12	-72.7	-73.6	-0.9
13	-73.1	-72.9	0.2
14	-70.4	-70.3	0.1
15	-67.7	-67.6	0.0
16	-71.6	-71.4	0.1
17	-71.4	-71.2	0.2
18	-74.8	-74.8	0.0
19	-62.4	-62.1	0.2
20	-71.4	-71.7	-0.3

NO.	Before	After	Change
1	18.2	18.0	-0.2
2	18.8	18.8	0.0
3	15.4	15.7	0.3
4	28.2	28.0	-0.2
5	21.2	21.5	0.3
6	16.9	16.8	-0.1
7	19.4	19.2	-0.1
8	15.1	15.0	0.0
9	22.8	22.4	-0.4
10	13.5	13.5	0.0
11	18.2	19.0	0.8
12	18.5	18.5	0.0
13	23.7	23.5	-0.3
14	20.7	20.5	-0.2
15	13.5	13.5	0.0
16	25.3	24.9	-0.4
17	16.1	16.1	0.0
18	20.8	20.9	0.1
19	27.2	27.1	-0.1
20	15.6	16.0	0.4





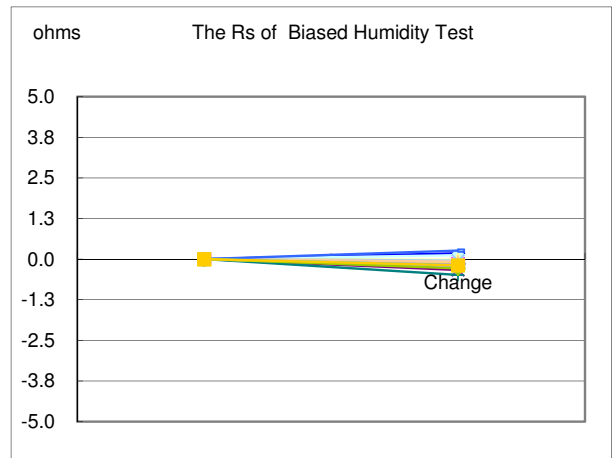
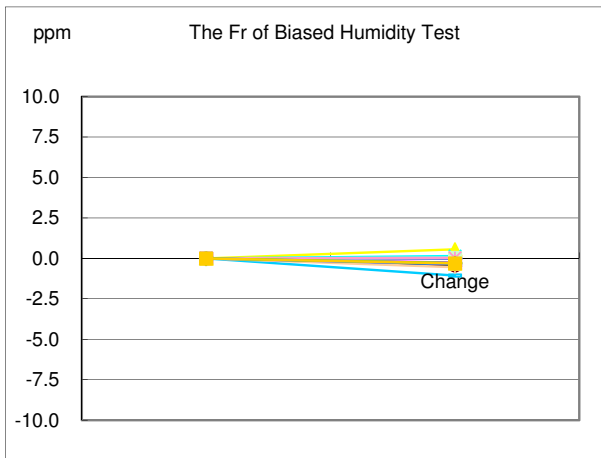
# Test Report

## NO.3 Biased Humidity Test

Product Type:	ECX-1637 SMD Crystal	Test Specification:	ECS-QA-12
Product Frequency:	32MHZ/16PF	Test condition:	85°C with relative humidity of 85% for 1000 hrs Measurement at 24±2 hours after test conclusion
Test Equipment:	Height Temperature Humidity Chamber (GR-10KA)	Test Criterion :	$\Delta Fr = \pm 10 \text{ ppm MAX}$ $\Delta Rs = \pm 5 \text{ ohm MAX}$
Measure Equipment:	250B Network Analyzer	Result:	PASS
Test Date:	2016.4.8-2016.5.20		
Created By:	Li Wei		

The Fr of Biased Humidity Test			
NO.	Before	After	Change
1	-69.7	-69.7	0.0
2	-74.9	-75.1	-0.3
3	-72.5	-72.0	0.6
4	-66.7	-66.5	0.1
5	-68.4	-68.7	-0.3
6	-68.0	-68.4	-0.4
7	-70.3	-70.7	-0.4
8	-75.0	-75.0	0.0
9	-70.8	-71.9	-1.1
10	-78.6	-78.6	0.0
11	-64.8	-64.8	0.0
12	-72.3	-72.6	-0.3
13	-72.9	-73.3	-0.3
14	-61.5	-61.5	0.0
15	-65.1	-65.4	-0.3
16	-71.8	-72.3	-0.5
17	-63.7	-64.0	-0.3
18	-65.5	-65.8	-0.3
19	-72.8	-73.1	-0.3
20	-67.6	-67.9	-0.3

The Rs of Biased Humidity Test			
NO.	Before	After	Change
1	20.7	20.5	-0.1
2	14.3	14.1	-0.2
3	17.1	17.0	-0.1
4	13.4	13.2	-0.2
5	24.8	24.5	-0.3
6	17.2	16.9	-0.2
7	18.6	18.1	-0.5
8	20.2	20.4	0.2
9	16.7	16.7	0.0
10	26.0	26.1	0.1
11	15.3	15.1	-0.2
12	13.8	13.8	0.0
13	17.0	16.9	0.0
14	16.0	15.8	-0.2
15	15.9	15.6	-0.2
16	20.5	20.4	-0.1
17	16.2	16.4	0.3
18	14.4	14.2	-0.2
19	16.6	16.3	-0.3
20	13.3	13.1	-0.2





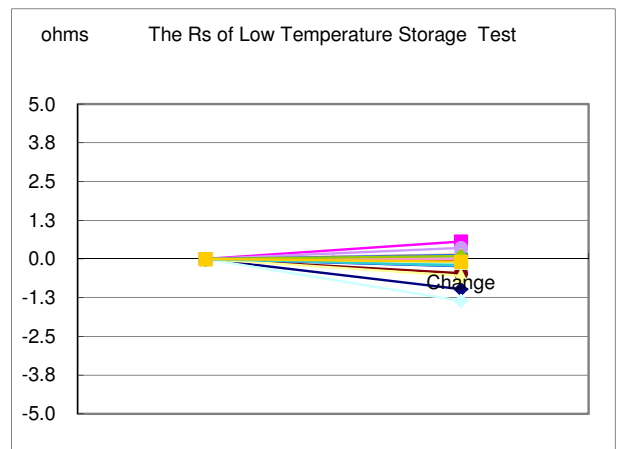
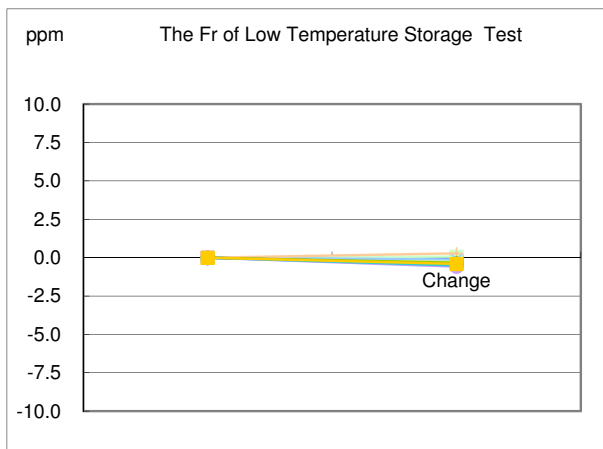
# Test Report

## NO.4 Low Temperature Storage Test

Product Type:	ECX-1637 SMD Crystal	Test Specification:	ECS-QA-12
Product Frequency:	32MHZ/16PF	Test condition:	-40°Cfor 1000 hrs, Unpowered Measurement at24±2 hours after test conclusion
Test Equipment:	Low Temperature Test box(BC/BD-102SFA)	Test Criterion :	ΔFr=±10ppm MAX ΔRs=±5ohm MAX
Measure Equipment:	250B Network Analyzer	Result:	PASS
Test Date:	2016.5.19-2016.6.30		
Created By:	Li Wei		

NO.	Before	After	Change
1	-69.5	-69.5	0.0
2	-74.2	-74.4	-0.3
3	-75.3	-75.5	-0.2
4	-73.0	-73.4	-0.4
5	-72.0	-72.1	-0.2
6	-70.6	-70.6	0.0
7	-71.6	-71.6	0.0
8	-74.3	-74.4	-0.1
9	-72.7	-73.2	-0.5
10	-59.4	-60.0	-0.6
11	-69.6	-69.5	0.1
12	-70.2	-70.4	-0.2
13	-71.8	-71.9	-0.1
14	-67.9	-68.3	-0.4
15	-71.2	-71.8	-0.6
16	-75.2	-74.9	0.3
17	-72.9	-73.3	-0.4
18	-70.8	-71.3	-0.5
19	-70.6	-70.9	-0.3
20	-74.7	-75.1	-0.4

NO.	Before	After	Change
1	16.2	15.2	-1.0
2	23.6	24.1	0.6
3	14.5	14.5	0.1
4	21.7	21.8	0.1
5	16.6	16.6	-0.1
6	23.8	23.4	-0.5
7	17.9	17.7	-0.2
8	22.6	22.4	-0.2
9	18.1	17.9	-0.2
10	26.5	25.1	-1.4
11	22.1	22.0	-0.1
12	27.2	26.7	-0.5
13	12.7	12.7	0.1
14	14.5	14.5	0.0
15	17.1	17.4	0.4
16	18.7	18.8	0.1
17	14.9	15.0	0.1
18	18.5	18.2	-0.2
19	20.8	20.9	0.1
20	14.4	14.3	-0.1





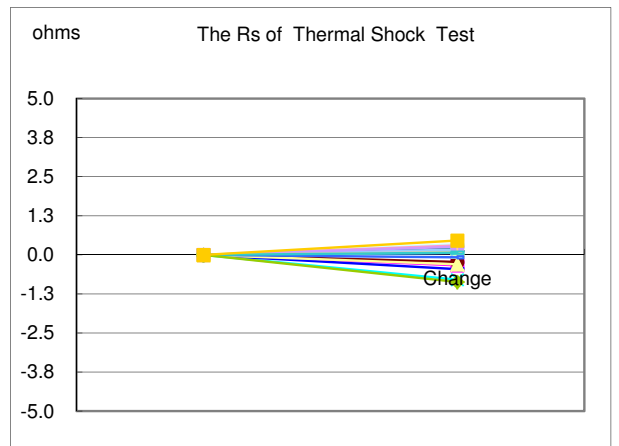
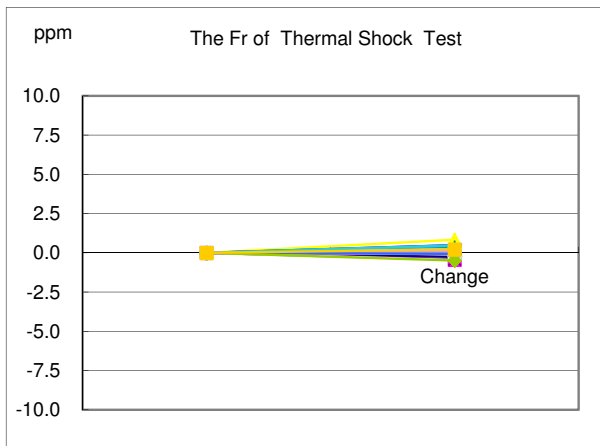
# Test Report

## NO.5 Thermal Shock Test

Product Type:	ECX-1637 SMD Crystal	Test Specification:	ECS-QA-12
Product Frequency:	32MHZ/16PF	Test condition:	-55°C/+125°C. Note: Number of Cycles: 1000; Max.transfer time:5 minuter;Dwell time:5 minuter.Air-Air
Test Equipment:	Thermal Shock Chamber(TSG-200-55W)	Test Criterion :	$\Delta Fr = \pm 10 \text{ppm MAX}$ $\Delta Rs = \pm 5 \text{ohm MAX}$
Measure Equipment:	250B Network Analyzer	Result:	PASS
Test Date:	2016.4.8-2016.6.2		
Created By:	Li Wei		

The Fr of Thermal Shock Test			
NO.	Before	After	Change
1	-69.8	-70.1	-0.3
2	-72.1	-72.6	-0.4
3	-72.9	-72.1	0.8
4	-65.3	-65.2	0.1
5	-72.2	-72.6	-0.4
6	-62.2	-62.1	0.0
7	-70.5	-70.2	0.4
8	-74.4	-73.9	0.5
9	-73.8	-73.4	0.5
10	-74.1	-74.6	-0.5
11	-68.4	-68.4	0.1
12	-66.1	-65.9	0.2
13	-69.1	-68.8	0.2
14	-68.8	-68.7	0.1
15	-72.0	-72.0	0.0
16	-69.0	-69.1	-0.1
17	-73.8	-73.8	-0.1
18	-70.3	-69.8	0.5
19	-66.8	-67.3	-0.5
20	-74.4	-74.2	0.2

The Rs of Thermal Shock Test			
NO.	Before	After	Change
1	19.0	19.1	0.1
2	25.2	24.9	-0.3
3	20.0	20.2	0.1
4	19.2	18.5	-0.8
5	14.1	14.2	0.1
6	18.3	18.0	-0.2
7	19.5	19.7	0.2
8	20.1	19.7	-0.5
9	16.5	16.6	0.1
10	14.9	15.2	0.3
11	16.1	16.2	0.1
12	17.0	16.7	-0.3
13	19.6	19.8	0.2
14	17.1	17.4	0.3
15	23.2	23.5	0.3
16	14.9	15.0	0.1
17	24.6	24.5	-0.1
18	24.5	24.6	0.1
19	20.8	20.0	-0.9
20	23.8	24.3	0.5







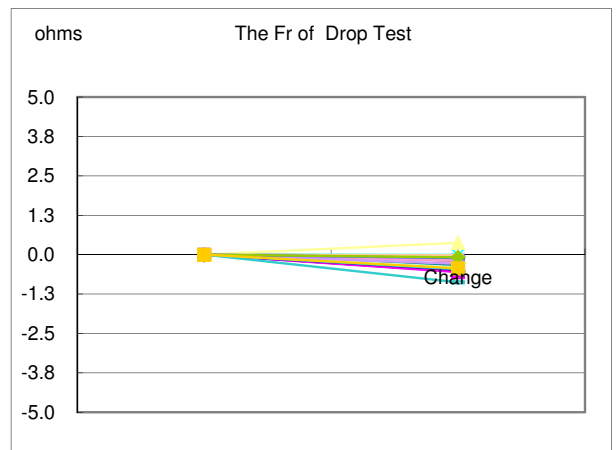
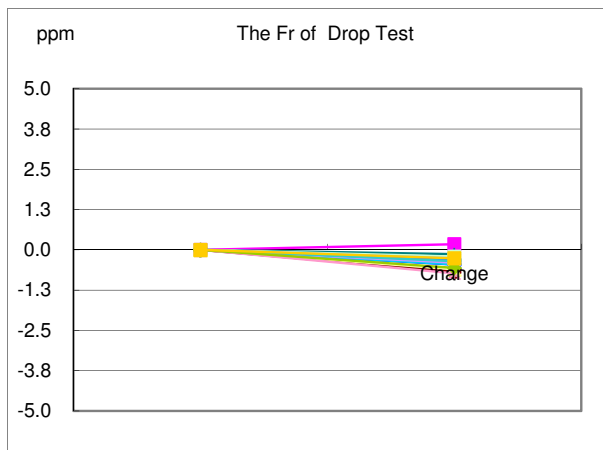
# Test Report

## NO.6 Drop Test

Product Type:	ECX-1637 SMD Crystal	Test Specification:	ECS-QA-12
Product Frequency:	32MHZ/16PF	Test condition:	3 Times Free Fall from the height 100cm onto 3cm thickniss hard wood board.
Test Equipment:	Drop Test Table	Test Criterion :	$\Delta Fr = \pm 5\text{ppm MAX}$ $\Delta Rs = \pm 2\text{ohm MAX}$
Measure Equipment:	250B Network Analyzer	Result:	PASS
Test Date:	2016.7.8-2016.7.9		
Created By:	Li Wei		

NO.	Before	After	Change
1	-70.7	-71.3	-0.6
2	-70.8	-70.7	0.2
3	-77.2	-77.4	-0.2
4	-64.5	-64.9	-0.4
5	-70.7	-71.0	-0.3
6	-72.1	-72.8	-0.7
7	-73.9	-74.0	-0.1
8	-66.4	-66.8	-0.5
9	-70.3	-70.7	-0.4
10	-68.1	-68.4	-0.3
11	-67.9	-68.1	-0.2
12	-74.6	-75.2	-0.6
13	-75.1	-75.3	-0.3
14	-70.0	-70.7	-0.7
15	-71.6	-72.0	-0.4
16	-72.5	-72.8	-0.3
17	-67.8	-68.1	-0.3
18	-67.6	-68.0	-0.3
19	-66.5	-67.1	-0.6
20	-75.7	-75.9	-0.3

NO.	Before	After	Change
1	26.8	26.3	-0.5
2	16.0	15.5	-0.6
3	21.1	21.1	-0.1
4	21.9	21.8	0.0
5	25.0	24.5	-0.5
6	17.8	17.6	-0.2
7	22.5	22.2	-0.3
8	22.9	22.8	0.0
9	21.7	21.3	-0.5
10	20.2	19.9	-0.3
11	26.1	25.7	-0.4
12	18.0	18.4	0.4
13	18.8	18.7	-0.1
14	18.0	17.8	-0.2
15	16.1	15.8	-0.3
16	19.6	19.6	0.0
17	22.2	22.0	-0.1
18	20.8	19.9	-0.9
19	20.2	20.1	-0.1
20	28.0	27.6	-0.4





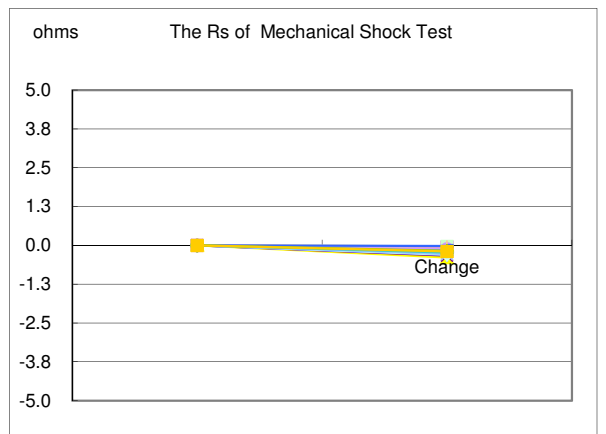
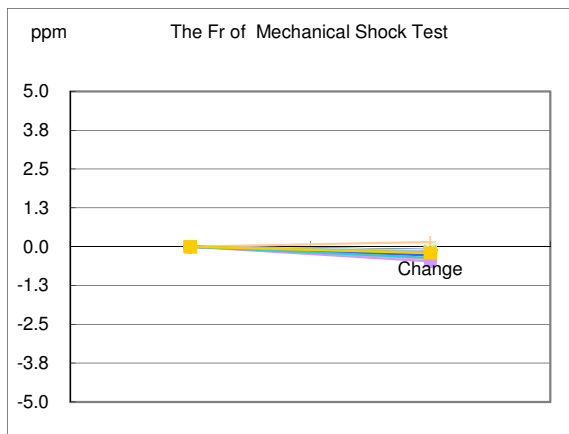
# Test Report

## NO.7 Mechanical Shock Test

Product Type:	ECX-1637 SMD Crystal	Test Specification:	ECS-QA-12
Product Frequency:	32MHZ/16PF	Test condition:	In three mutual axial (total 6 directions) every direction three pulse (Total 18 pulse) after Electric Properties Testing. (Peak: 100g / s, the waveform: half sine, the rate of change: 12.3 ft / sec)
Test Equipment:	Mechanical Shock Test System(SY11-10H)		
Measure Equipment:	250B Network Analyzer		
Test Date:	2016.5.25-2016.5.26	Test Criterion:	$\Delta Fr = \pm 5\text{ppm MAX}$ $\Delta Rs = \pm 2\text{ohm MAX}$
Created By:	Li Wei		
Result:	PASS		

NO.	Before	After	Change
1	-67.7	-67.8	-0.1
2	-70.2	-70.4	-0.2
3	-73.4	-73.6	-0.2
4	-76.0	-76.2	-0.2
5	-67.7	-67.9	-0.2
6	-64.0	-64.3	-0.3
7	-67.2	-67.5	-0.3
8	-71.6	-71.8	-0.2
9	-70.0	-70.3	-0.3
10	-68.2	-68.6	-0.4
11	-74.3	-74.5	-0.1
12	-70.7	-71.0	-0.3
13	-74.0	-74.1	-0.1
14	-68.8	-69.2	-0.4
15	-71.8	-72.3	-0.5
16	-69.3	-69.1	0.1
17	-72.0	-72.2	-0.3
18	-70.4	-70.8	-0.4
19	-64.0	-64.2	-0.2
20	-72.3	-72.5	-0.2

NO.	Before	After	Change
1	19.5	19.3	-0.2
2	19.0	18.9	-0.1
3	26.6	26.2	-0.4
4	25.1	24.9	-0.2
5	22.4	22.0	-0.3
6	13.3	13.1	-0.2
7	19.5	19.3	-0.2
8	19.9	19.6	-0.3
9	15.7	15.5	-0.2
10	13.9	13.6	-0.3
11	23.7	23.7	0.0
12	15.9	15.7	-0.2
13	29.6	29.3	-0.3
14	20.0	19.7	-0.2
15	17.4	17.3	-0.1
16	19.8	19.8	0.0
17	21.1	21.1	0.0
18	20.0	19.8	-0.2
19	16.8	16.7	-0.2
20	19.7	19.5	-0.2





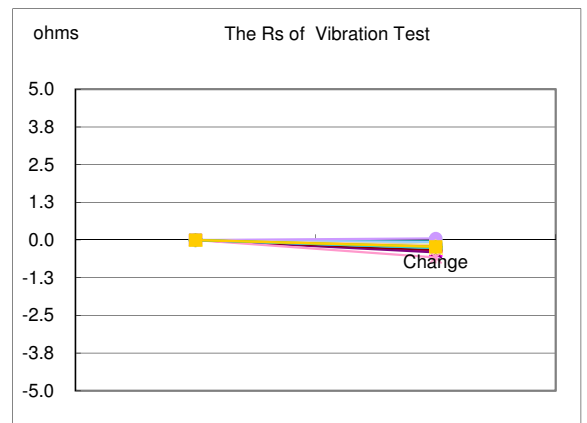
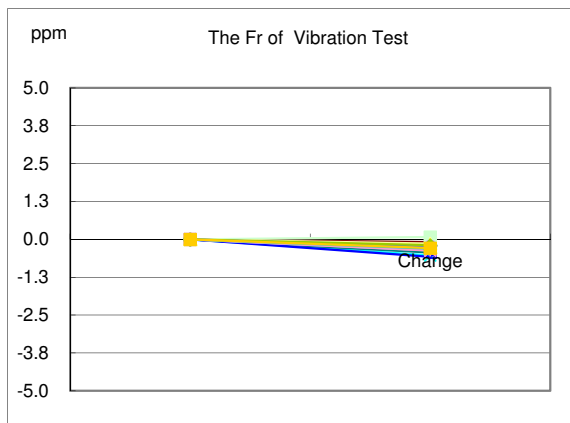
# Test Report

## NO.8 Vibration Test

Product Type:	ECX-1637 SMD Crystal	Test Specification:	ECS-QA-12
Product Frequency:	32MHZ/16PF	Test condition:	5g's for 20 minutes 12 cycles each of 3 orientations. Note:Use 8"X5" PCB. 031" thick with 7 secure points on one 8" side and 2 secure points on corners of opposite sides. Parts mounted within 2" from any secure point. Test from 10-2000Hz.
Test Equipment:	Vibration Test System(2940N)		
Measure Equipment:	250B Network Analyzer		
Test Date:	2016.6.2-2016.6.3	Test Criterion:	$\Delta Fr = \pm 5 \text{ppm MAX}$ $\Delta Rs = \pm 2 \text{ohm MAX}$
Created By:	Li Wei		
Result:	PASS		

The Fr of Vibration Test			
NO.	Before	After	Change
1	-70.9	-71.1	-0.2
2	-69.2	-69.5	-0.3
3	-69.5	-69.8	-0.3
4	-66.9	-67.5	-0.5
5	-70.1	-70.5	-0.4
6	-71.9	-72.0	-0.1
7	-68.4	-68.9	-0.4
8	-74.5	-75.1	-0.6
9	-68.2	-68.4	-0.2
10	-68.2	-68.5	-0.3
11	-70.0	-69.9	0.1
12	-71.4	-71.5	-0.1
13	-71.9	-72.3	-0.4
14	-67.7	-68.0	-0.4
15	-69.5	-69.7	-0.2
16	-75.0	-75.3	-0.3
17	-73.9	-74.2	-0.3
18	-76.8	-77.1	-0.3
19	-71.5	-71.7	-0.2
20	-70.8	-71.0	-0.3

The Rs of Vibration Test			
NO.	Before	After	Change
1	18.7	18.5	-0.2
2	19.7	19.3	-0.4
3	20.3	20.0	-0.3
4	27.5	27.5	-0.1
5	14.8	14.3	-0.4
6	21.9	21.5	-0.3
7	28.5	28.4	0.0
8	19.2	19.0	-0.1
9	26.8	26.6	-0.2
10	14.5	14.2	-0.2
11	21.4	21.3	-0.1
12	16.3	16.0	-0.3
13	21.0	20.9	-0.1
14	22.3	21.7	-0.6
15	23.8	23.8	0.1
16	16.3	16.2	-0.2
17	18.3	18.0	-0.3
18	14.3	14.0	-0.3
19	14.6	14.3	-0.2
20	15.8	15.5	-0.2





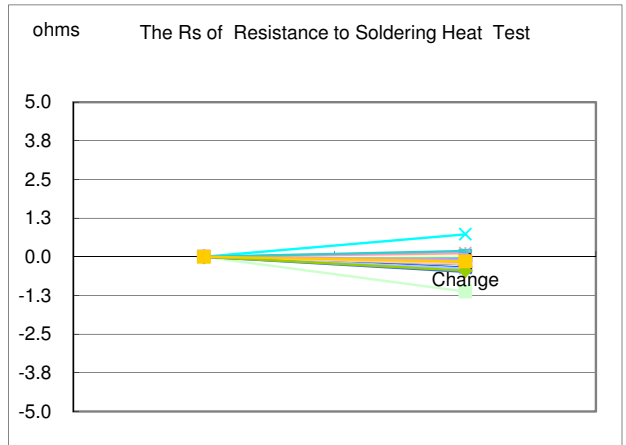
# Test Report

## NO.9 Resistance to Soldering Heat Test

Product Type:	ECX-1637 SMD Crystal	Test Specification:	ECS-QA-12
Product Frequency:	32MHZ/16PF	Test condition:	Keep the devices in 150°C±5°C for 120s, then rise to 260°C±5°C, lasting for 10s, the time of rising and lasting procedure should be less than 200s.
Test Equipment:	Technical term for all hot air reflow soldering machine(KRF2504)		
Measure Equipment:	250B Network Analyzer	Test Criterion:	ΔFr=±5ppm MAX ΔRs=±2ohm MAX Visual good, No rusty
Test Date:	2016.7.9-2016.7.10		
Created By:	Li Wei		
Result:	PASS		

The Fr of Resistance to Soldering Heat Test			
NO.	Before	After	Change
1	-69.2	-68.5	0.8
2	-68.6	-67.5	1.0
3	-71.8	-70.3	1.5
4	-68.5	-67.3	1.1
5	-71.1	-70.1	1.0
6	-72.4	-70.9	1.5
7	-69.9	-68.4	1.5
8	-67.1	-66.3	0.8
9	-68.3	-67.0	1.3
10	-66.9	-65.5	1.4
11	-72.7	-71.7	1.0
12	-68.8	-67.0	1.8
13	-72.9	-71.4	1.5
14	-77.6	-76.7	0.9
15	-73.8	-72.6	1.2
16	-70.3	-68.9	1.5
17	-70.1	-69.4	0.8
18	-68.3	-67.1	1.2
19	-73.5	-72.4	1.2
20	-68.0	-66.6	1.4

The Rs of Resistance to Soldering Heat Test			
NO.	Before	After	Change
1	23.9	23.7	-0.2
2	22.5	22.3	-0.1
3	27.0	26.8	-0.2
4	25.9	26.7	0.7
5	16.1	16.0	-0.1
6	17.5	17.4	-0.1
7	25.5	25.2	-0.2
8	22.8	22.5	-0.4
9	19.7	19.6	0.0
10	20.6	20.5	-0.1
11	23.3	22.1	-1.1
12	17.0	17.1	0.0
13	28.2	27.8	-0.4
14	18.4	18.5	0.1
15	14.9	14.8	-0.1
16	19.2	19.0	-0.2
17	20.3	19.8	-0.5
18	25.7	25.9	0.2
19	19.2	18.8	-0.4
20	19.8	19.6	-0.1





# Test Report

## NO.10 Solderability Test

Product Type:	ECX-1637 SMD Crystal	Test Specification:	ECS-QA-12
Product Frequency:	32MHZ/16PF	Test condition:	lead-based products and for products, does not require electrical performance testing. Microscopy 50 X;Conditions : Lead products: A: 235 °C, steam aging 8H
Test Equipment:	Soldering tin Furnace(DS-97A)		
Test Date:	2016.7.19-2016.7.20	Test Criterion:	More than 95% coverage
Created By:	Li Wei	Result:	PASS

Item	referenced criterion	Test condition	Criterion	Result				
				1	2	3	4	5
Solderability	J-STD-002	lead-based products and for products, does not require electrical performance testing. Microscopy 50 X;Conditions : Lead products: A: 235 °C, steam aging 8H	More than 95% coverage	✓	✓	✓	✓	✓
				6	7	8	9	10
				✓	✓	✓	✓	✓
				11	12	13	14	15
				✓	✓	✓	✓	✓
				16	17	18	19	20
				✓	✓	✓	✓	✓

# Test Report

## NO.11 Terminal Strength Test

Product Type:	ECX-1637 SMD Crystal	Test Specification:	ECS-QA-12
Product Frequency:	32MHZ/16PF	Test condition:	1.8kg, respectively, as required to provide the tangential thrust (60 seconds) and 1.8kg of the vertical tension (60 seconds)
Test Equipment:	Pull Meter(SN-20)		
Test Date:	2016.7.21-2016.7.22	Test Criterion:	electrode no rupture
Created By:	Li Wei	Result:	PASS

Item	referenced criterion	Test condition	Criterion	Result				
				1	2	3	4	5
Terminal Strength (SMD)	JISC60068-2-21	1.8kg, respectively, as required to provide the tangential thrust (60 seconds) and 1.8kg of the vertical tension (60 seconds)	electrode no rupture	✓	✓	✓	✓	✓
				6	7	8	9	10
				✓	✓	✓	✓	✓
				11	12	13	14	15
				✓	✓	✓	✓	✓
				16	17	18	19	20
				✓	✓	✓	✓	✓