Reliability Test Report

(MG210)

Revision	Date	Change History
0	2020. 10. 22	Write the initial document
1	2021. 02. 26	Change model name
2	2021. 07. 16	Change mating/un-mating force acceptance criteria

Contents

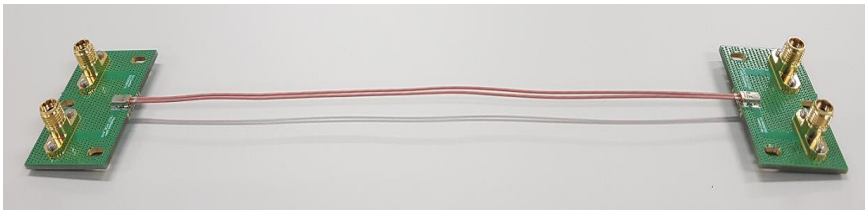
Series Name	MG210	Revision	2
Model Name	MG210RE02(Receptacle) MGC10216(Plug cable assembly)	Date	2021-07-16
Part No	-	Prepared by	JK. Choi

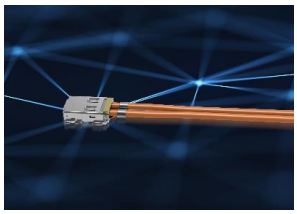
1. Product Specification

1-1. Summary

This document is reliability testing result of MG210 produced in Sensorview.

1-2. Product Structure (Picture, Drawing)





1-3. Mechanical

No	Item	Description
1	Connector Material	Housing : Zn(Au-Plated) Signal Pin : BeCu(Au-Plated) Insulator : LCP Shell : STS(Ni-Plated)
2	Cable Material	Conductor : Silver Plated Copper Insulator : LDPFA Outer Conductor : Tin Plated Copper Wire Copper Polyester Tape
3	Receptacle Material	Housing : Zn(Ni-Plated) Shell : STS(Ni-Plated)

1-4. Electrical

No	Item	Unit	Spec. Value
1	Impedance	Ω	50 ± 2
2	VSWR	-	Max 1.5 : 1 @ 10GHz
3	Insertion Loss (L=200mm)	dB	Min -1.7 @ 10GHz
4	Crosstalk (Isolation)	dB	Max -40 @ 10GHz

2. Reliability Test Specification

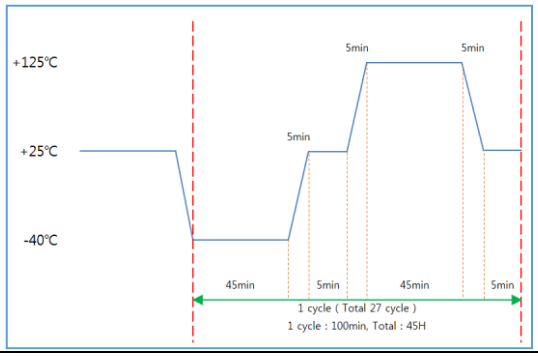
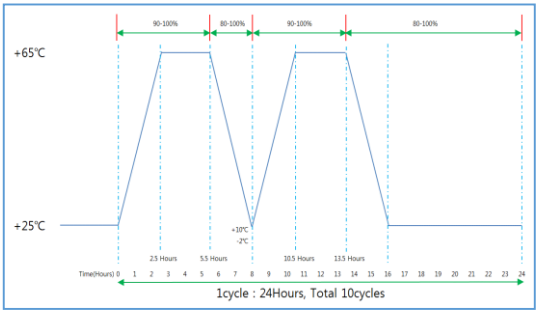
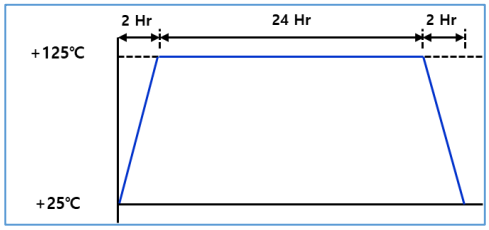
2-1. Electrical Performance

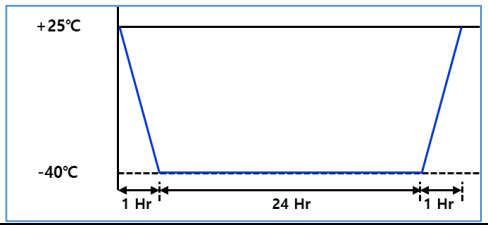
Test Item	Acceptance Criteria	Procedure
Function Examination	1. No disconnection or short 2. Max 1.5 : 1 @ 10GHz 3. Min -1.7 @ 10GHz 4. Max -40 @ 10GHz	1. DC Current, Resistance 2. VNA (S11) VSWR 3. VNA 2 Port Test (S21) Insertion Loss 4. VNA Crosstalk
Low Level Contact Resistance	1. Micro ohm meter measuring - Signal(Inner) Contact : 40mΩ Max. - Ground(Out) Contact : 40mΩ Max.	MIL-STD-202 Method 307 1. Test Equipment : Milliohm Meter 2. Test Method : ~6V DC, Current 10mA
Insulation Resistance	1. Connector insulation resistance after test. - Initial : 500MΩ Min	MIL-STD-202 Method 302 1. Test Equipment : Insulation Resistance Tester 2. Test Method : 200V DC / 60 sec
Withstanding Voltage	1. Insulation should not show breakdown or flashover. 2. Satisfy the electrical characteristics.	MIL-STD-202 Method 301 1. Test Equipment : Withstanding Voltage Tester 2. Test Method : 100V AC / 60 sec / 0.5mA

2-2. Mechanical Performance

Mating & Un-mating Force	1. Mating & Un-mating Force after test. - Mating : 35N•m Max. - Un-mating : 10N•m Min.	EIA-364-13 1. Test Equipment : Universal Testing Machine 2. Test Method : Receptacle(Connector) & Plug Cable Mating & Un-mating. - Speed : 25±3mm/min - Measure : After 20 times
Durability	1. Mating & Un-mating Force after test. - Mating : 35N•m Max. - Un-mating : 10N•m Min.	EIA-364-09 1. Test Equipment : Universal Testing Machine 2. Test Method : Receptacle(Connector) & Plug Cable Mating & Un-mating. - Speed : 25±3mm/min - Measure : After 30 times Min
Cable Retention Force	1. No disconnection (0.1s Max) 2. No mechanical deformation or damage.	1. Test Equipment : Push-Pull Gauge Power Supply 2. Test Method : 100mA DC power supply at insertion state. - Measure : at 0degree 10N•m

2-3. Environmental Performance

Thermal Shock	1. Satisfy the electrical characteristics. 2. No mechanical deformation or damage.	UL 83 & UL 12771. 1. Test Equipment : Thermal Shock Chamber 2. Test Method : -40℃ ~ +125℃ - 1 cycle : -40℃ (45 min) → 25 ℃ (5 min) → 125℃ (45 min) → 25℃ (5min) - Total 27cycles (45hours) - Measure : After leaving at room temperature for 1hour 
Moisture Resistance	1. Satisfy the electrical characteristics. 2. No mechanical deformation or damage.	MIL-STD-202G Method 10 1. Test Equipment : Temperature & Humidity Chamber 2. Test Method : +25℃ ~ +65℃ / 80% ~ 100% RH - Total 10 cycles (1 cycle : 24 hours) - Measure : After removing moisture and leaving it at room temperature for 1 hour. 
High Temperature	1. Satisfy the electrical characteristics. 2. No mechanical deformation or damage.	1. Test Equipment : Temperature & Humidity Chamber 2. Test Method : +125 ℃, 24 hours - Measure : After leaving at room temperature for 1 hour 

Low Temperature	1. Satisfy the electrical characteristics. 2. No mechanical deformation or damage.	1. Test Equipment : Temperature & Humidity Chamber 2. Test Method : -40 ℃, 24 hours - Measure : After leaving at room temperature for 1 hour 
Vibration	1. No disconnection (0.1s Max) 2. No mechanical deformation or damage.	MIL-STD-202G Method 204, Condition A 1. Test Equipment : Vibration Testing Machine, Power Supply 2. Test Method : 100mA DC power supply at insertion state. - Frequency : 10-50-10Hz/min - Amplitude, acceleration : 0.76 ~ 1.52mm/S2 (6G) - Test Time : 2 hours for each X, Y, Z axis (Total 6 hours)
Salt Spray (Corrosion)	1. No corrosion, red rust, defect	1. Test Equipment : Salt Spray Chamber 2. Test Method : - Salinity : NaCl 5% Spray - Chamber Temperature : 35°C - Test Time : 72 Hours - Remove all salt water with water, dry it for 12 hours and check.

3. Reliability Test Result

<table>
<tr><th>Test Item</th><th>Acceptance Criteria</th><th>Result Data</th><th>Pass / Fail</th></tr>
<tr><td>Low Level Contact Resistance</td><td>- Signal(Inner) Contact : 40mΩ Max.
- Ground(Out) Contact : 40mΩ Max.</td><td>Sample : #1~#10
(Unit : mΩ)
<table>
<tr><th>Index</th><th>Port1 Signal Contact</th><th>Port2 Signal Contact</th><th>Ground Contact</th></tr>
<tr><td>Max</td><td>28.5</td><td>27.3</td><td>13.9</td></tr>
<tr><td>Min</td><td>21.2</td><td>21.2</td><td>10.4</td></tr>
<tr><td>Avg</td><td>25.8</td><td>24.7</td><td>12.4</td></tr>
</table></td><td>Pass</td></tr>
<tr><td>Insulation Resistance</td><td>1. Min 500MΩ</td><td>Sample : #1~#10
(Unit : MΩ)
<table>
<tr><th>Index</th><th>After Test</th></tr>
<tr><td>Max</td><td>9999</td></tr>
<tr><td>Min</td><td>9999</td></tr>
<tr><td>Avg</td><td>9999</td></tr>
<tr><td colspan="2">9999MΩ = ∞</td></tr>
</table></td><td>Pass</td></tr>
</table>

<table>
<tr>
<td>Withstanding Voltage</td>
<td>1. No breakdown or flashover.
2. VSWR : Max 1.5:1@10GHz
3. I/L : Min -1.7@10GHz
4. C/T : Max -40@10GHz</td>
<td>Sample : #1~#10
(Unit : dB)
<table>
<tr><td rowspan="3">Index</td><td colspan="2">After test</td></tr>
<tr><td>Port1 VSWR (S11)</td><td>Port2 VSWR (S11)</td></tr>
<tr><td>Port1 I/L (S21, dB)</td><td>Port2 I/L (S21, dB)</td></tr>
<tr><td colspan="3">Crosstalk (dB)</td></tr>
<tr><td rowspan="3">Max</td><td>1.40</td><td>1.38</td></tr>
<tr><td>-1.37</td><td>-1.36</td></tr>
<tr><td colspan="2">-45.15</td></tr>
<tr><td rowspan="3">Min</td><td>1.23</td><td>1.29</td></tr>
<tr><td>-1.46</td><td>-1.46</td></tr>
<tr><td colspan="2">-50.79</td></tr>
<tr><td rowspan="3">Avg</td><td>1.33</td><td>1.33</td></tr>
<tr><td>-1.41</td><td>-1.42</td></tr>
<tr><td colspan="2">-47.91</td></tr>
</table>
</td>
<td>Pass</td>
</tr>
<tr>
<td>Mating & Un-mating Force</td>
<td>1. Mating : Max 35N•m.
2. Un-mating : Min 10N•m.</td>
<td>Sample : #1~#10
(Unit : N•m)
<table>
<tr><td rowspan="2">Item</td><td colspan="2">After 20 times</td></tr>
<tr><td>Mating</td><td>Un-mating</td></tr>
<tr><td>Max</td><td>26.2</td><td>27.3</td></tr>
<tr><td>Min</td><td>18.5</td><td>16.9</td></tr>
<tr><td>Avg</td><td>25.7</td><td>21.2</td></tr>
</table>
</td>
<td>Pass</td>
</tr>
<tr>
<td>Durability</td>
<td>1. Mating : Max 35N•m.
2. Un-mating : Min 10N•m.</td>
<td>Sample : #1~#10
(Unit : N•m)
<table>
<tr><td rowspan="2">Item</td><td colspan="2">After 30 times</td></tr>
<tr><td>Mating</td><td>Un-mating</td></tr>
<tr><td>Max</td><td>28.6</td><td>27.9</td></tr>
<tr><td>Min</td><td>19.2</td><td>15.1</td></tr>
<tr><td>Avg</td><td>26.2</td><td>22.3</td></tr>
</table>
</td>
<td>Pass</td>
</tr>
<tr>
<td>Cable Retention Force</td>
<td>1. No mechanical deformation or damage.
2. No disconnection (Max 0.1s)</td>
<td>Sample : #1~#5
(Unit : N•m)
<table>
<tr><td>Sample</td><td>After Test</td></tr>
<tr><td>#1
(Cable 1, 2)</td><td>No damage & No disconnection</td></tr>
<tr><td>#2
(Cable 1, 2)</td><td>No damage & No disconnection</td></tr>
<tr><td>#3
(Cable 1, 2)</td><td>No damage & No disconnection</td></tr>
<tr><td>#4
(Cable 1, 2)</td><td>No damage & No disconnection</td></tr>
<tr><td>#5
(Cable 1, 2)</td><td>No damage & No disconnection</td></tr>
</table>
</td>
<td>Pass</td>
</tr>
</table>

<table>
<tr>
<td>Thermal Shock</td>
<td>1. No mechanical deformation or damage.
2. VSWR : Max 1.5:1@10GHz
3. I/L : Min -1.7@10GHz
4. C/T : Max -40@10GHz</td>
<td>Sample : #1~#10
(Unit : dB)
<table>
<tr><td rowspan="4">Index</td><td colspan="2">After test</td></tr>
<tr><td>Port1 VSWR (S11)</td><td>Port2 VSWR (S11)</td></tr>
<tr><td>Port1 I/L (S21, dB)</td><td>Port2 I/L (S21, dB)</td></tr>
<tr><td colspan="2">Crosstalk (dB)</td></tr>
<tr><td rowspan="3">Max</td><td>1.34</td><td>1.33</td></tr>
<tr><td>-1.40</td><td>-1.38</td></tr>
<tr><td colspan="2">-45.08</td></tr>
<tr><td rowspan="3">Min</td><td>1.26</td><td>1.28</td></tr>
<tr><td>-1.62</td><td>-1.47</td></tr>
<tr><td colspan="2">-48.34</td></tr>
<tr><td rowspan="3">Avg</td><td>1.31</td><td>1.31</td></tr>
<tr><td>-1.46</td><td>-1.45</td></tr>
<tr><td colspan="2">-46.61</td></tr>
</table>
</td>
<td>Pass</td>
</tr>
<tr>
<td>Moisture Resistance</td>
<td>1. No mechanical deformation or damage.
2. VSWR : Max 1.5:1@10GHz
3. I/L : Min -1.7@10GHz
4. C/T : Max -40@10GHz</td>
<td>Sample : #1~#10
(Unit : dB)
<table>
<tr><td rowspan="4">Index</td><td colspan="2">After test</td></tr>
<tr><td>Port1 VSWR (S11)</td><td>Port2 VSWR (S11)</td></tr>
<tr><td>Port1 I/L (S21, dB)</td><td>Port2 I/L (S21, dB)</td></tr>
<tr><td colspan="2">Crosstalk (dB)</td></tr>
<tr><td rowspan="3">Max</td><td>1.35</td><td>1.33</td></tr>
<tr><td>-1.29</td><td>-1.25</td></tr>
<tr><td colspan="2">-45.06</td></tr>
<tr><td rowspan="3">Min</td><td>1.27</td><td>1.27</td></tr>
<tr><td>-1.48</td><td>-1.52</td></tr>
<tr><td colspan="2">-52.71</td></tr>
<tr><td rowspan="3">Avg</td><td>1.30</td><td>1.30</td></tr>
<tr><td>-1.36</td><td>-1.34</td></tr>
<tr><td colspan="2">-48.02</td></tr>
</table>
</td>
<td></td>
</tr>
<tr>
<td>High Temperature</td>
<td>1. No mechanical deformation or damage.
2. VSWR : Max 1.5:1@10GHz
3. I/L : Min -1.7@10GHz
4. C/T : Max -40@10GHz</td>
<td>Sample : #1~#10
(Unit : dB)
<table>
<tr><td rowspan="4">Index</td><td colspan="2">After test</td></tr>
<tr><td>Port1 VSWR (S11)</td><td>Port2 VSWR (S11)</td></tr>
<tr><td>Port1 I/L (S21, dB)</td><td>Port2 I/L (S21, dB)</td></tr>
<tr><td colspan="2">Crosstalk (dB)</td></tr>
<tr><td rowspan="3">Max</td><td>1.40</td><td>1.36</td></tr>
<tr><td>-1.32</td><td>-1.38</td></tr>
<tr><td colspan="2">-45.22</td></tr>
<tr><td rowspan="3">Min</td><td>1.31</td><td>1.29</td></tr>
<tr><td>-1.48</td><td>-1.46</td></tr>
<tr><td colspan="2">-48.03</td></tr>
<tr><td rowspan="3">Avg</td><td>1.34</td><td>1.32</td></tr>
<tr><td>-1.41</td><td>-1.41</td></tr>
<tr><td colspan="2">-46.47</td></tr>
</table>
</td>
<td>Pass</td>
</tr>
</table>

<table>
<tr>
<td>Low Temperature</td>
<td>1. No mechanical deformation or damage.
2. VSWR : Max 1.5:1@10GHz
3. I/L : Min -1.7@10GHz
4. C/T : Max -40@10GHz</td>
<td>Sample : #1~#10
(Unit : dB)
<table>
<tr><td rowspan="3">Index</td><td colspan="2">After test</td></tr>
<tr><td>Port1 VSWR (S11)</td><td>Port2 VSWR (S11)</td></tr>
<tr><td>Port1 I/L (S21, dB)</td><td>Port2 I/L (S21, dB)</td></tr>
<tr><td colspan="3">Crosstalk (dB)</td></tr>
<tr><td rowspan="3">Max</td><td>1.41</td><td>1.38</td></tr>
<tr><td>-1.35</td><td>-1.37</td></tr>
<tr><td colspan="2">-45.14</td></tr>
<tr><td rowspan="3">Min</td><td>1.30</td><td>1.30</td></tr>
<tr><td>-1.47</td><td>-1.45</td></tr>
<tr><td colspan="2">-49.86</td></tr>
<tr><td rowspan="3">Avg</td><td>1.34</td><td>1.33</td></tr>
<tr><td>-1.41</td><td>-1.41</td></tr>
<tr><td colspan="2">-47.26</td></tr>
</table>
</td>
<td>Pass</td>
</tr>
<tr>
<td>Vibration</td>
<td>1. No mechanical deformation or damage.
2. No disconnection (Max 0.1s)</td>
<td>Sample : #1~#2
<table>
<tr><td>Sample</td><td>After Test</td></tr>
<tr><td>#1
(Cable1, 2)</td><td>No damage & No disconnection</td></tr>
<tr><td>#2
(Cable1, 2)</td><td>No damage & No disconnection</td></tr>
</table>
</td>
<td></td>
</tr>
<tr>
<td>Salt Spray (Corrosion)</td>
<td>1. No corrosion, red rust, defect</td>
<td>Sample : #1~#10
<table>
<tr><td>Sample</td><td>After Test</td></tr>
<tr><td>Receptacle
#1~#10</td><td>No corrosion, red rust, defect</td></tr>
<tr><td>Plug Cable
#1~#10</td><td>No corrosion, red rust, defect</td></tr>
</table>
</td>
<td></td>
</tr>
</table>