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1. Safety Precautions

1-1. Repair Precaution

Before attempting any repair or detailed tuning, shield the device from RF noise or static electricity discharges.

Use only demagnetized tools that are specifically designed for small electronic repairs, as most electronic parts are sensitive to electromagnetic forces.

Use only high quality screwdrivers when servicing products. Low quality screwdrivers can easily damage the heads of screws.

Use only conductor wire of the properly gauge and insulation for low resistance, because of the low margin of error of most testing equipment. We recommend 22-gauge twisted copper wire.

Hand-soldering is not recommended, because printed circuit boards (PCBs) can be easily damaged, even with relatively low heat. Never use a soldering iron with a power rating of more than 100 watts and use only lead-free solder with a melting point below 250°C (482°F).

Prior to disassembling the battery charger for repair, ensure that the AC power is disconnected. Always use the replacement parts that are registered in the SEC system. Third-party replacement parts may not function properly.
1-2. ESD(Electrostatically Sensitive Devices) Precaution

Many semiconductors and ESDs in electronic devices are particularly sensitive to static discharge and can be easily damaged by it. We recommend protecting these components with conductive anti-static bags when you store or transport them.

Always use an anti-static strap or wristband and remove electrostatic buildup or dissipate static electricity from your body before repairing ESDs.

Ensure that soldering irons have AC adapter with ground wires and that the ground wires are properly connected.

Use only desoldering tools with plastic tips to prevent static discharge.

Properly shield the work environment from accidental electrostatic discharge before opening packages containing ESDs.

The potential for static electricity discharge may be increased in low humidity environments, such as air-conditioned rooms. Increase the airflow to the working area to decrease the chance of accidental static electricity discharges.
## 2. Specification

### 2-1. GSM General Specification

<table>
<thead>
<tr>
<th></th>
<th>GSM850</th>
<th>EGSM 900</th>
<th>DCS1800</th>
<th>PCS1900</th>
<th>WCDMA 2100</th>
<th>WCDMA 1900</th>
<th>WCDMA 900</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Freq. Band [MHz]</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ARFCN range</strong></td>
<td>128~251</td>
<td>0<del>124 &amp; 975</del>1023</td>
<td>512~885</td>
<td>512~810</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tx/Rx spacing</strong></td>
<td>45MHz</td>
<td>45MHz</td>
<td>95MHz</td>
<td>80MHz</td>
<td>190MHz</td>
<td>80MHz</td>
<td>45MHz</td>
</tr>
<tr>
<td><strong>Mod. Bit rate/Bit Period</strong></td>
<td>270.833kbps, 3.692us</td>
<td>270.833kbps, 3.692us</td>
<td>270.833kbps, 3.692us</td>
<td>270.833kbps, 3.692us</td>
<td>3.84Mcps</td>
<td>3.84Mcps</td>
<td>3.84Mcps</td>
</tr>
<tr>
<td><strong>Time Slot Period/Frame Period</strong></td>
<td>576.9us, 4.615ms</td>
<td>576.9us, 4.615ms</td>
<td>576.9us, 4.615ms</td>
<td>576.9us, 4.615ms</td>
<td>FrameLength: 10ms, Slotlength: 0.667ms</td>
<td>FrameLength: 10ms, Slotlength: 0.667ms</td>
<td>FrameLength: 10ms, Slotlength: 0.667ms</td>
</tr>
<tr>
<td><strong>Modulation</strong></td>
<td>0.3GMSK</td>
<td>0.3GMSK</td>
<td>0.3GMSK</td>
<td>0.3GMSK</td>
<td>QPSK/HQPSK</td>
<td>QPSK/HQPSK</td>
<td>QPSK/HQPSK</td>
</tr>
<tr>
<td><strong>MS Power</strong></td>
<td>33dBm~5dBm</td>
<td>33dBm~5dBm</td>
<td>30dBm~0dBm</td>
<td>30dBm~0dBm</td>
<td>24dBm<del>24dBm</del>50dBm</td>
<td>24dBm<del>24dBm</del>50dBm</td>
<td>24dBm<del>24dBm</del>50dBm</td>
</tr>
<tr>
<td><strong>Power Class</strong></td>
<td>5p~19pcl</td>
<td>5p~19pcl</td>
<td>0p~15pcl</td>
<td>0p~15pcl</td>
<td>3(max+24dBm)</td>
<td>3(max+24dBm)</td>
<td>3(max+24dBm)</td>
</tr>
<tr>
<td><strong>Sensitivity</strong></td>
<td>-102dBm</td>
<td>-102dBm</td>
<td>-100dBm</td>
<td>-100dBm</td>
<td>-106.7dBm</td>
<td>-106.7dBm</td>
<td>-106.7dBm</td>
</tr>
<tr>
<td><strong>TDMA Mux</strong></td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>Cell Radius</strong></td>
<td>35Km</td>
<td>35Km</td>
<td>2Km</td>
<td>2Km</td>
<td>2Km</td>
<td>2Km</td>
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</tr>
</tbody>
</table>

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### 2-2. GSM Tx Power Class

<table>
<thead>
<tr>
<th>TX Power control level</th>
<th>GSM850</th>
<th>TX Power control level</th>
<th>EGSM900</th>
<th>TX Power control level</th>
<th>DCS1800</th>
<th>TX Power control level</th>
<th>PCS1900</th>
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</thead>
<tbody>
<tr>
<td>5</td>
<td>33±2 dBm</td>
<td>5</td>
<td>33±2 dBm</td>
<td>0</td>
<td>30±3 dBm</td>
<td>0</td>
<td>30±3 dBm</td>
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<tr>
<td>6</td>
<td>31±2 dBm</td>
<td>6</td>
<td>31±2 dBm</td>
<td>1</td>
<td>28±3 dBm</td>
<td>1</td>
<td>28±3 dBm</td>
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<tr>
<td>7</td>
<td>29±2 dBm</td>
<td>7</td>
<td>29±2 dBm</td>
<td>2</td>
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<tr>
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<td>27±2 dBm</td>
<td>8</td>
<td>27±2 dBm</td>
<td>3</td>
<td>24±3 dBm</td>
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<td>25±2 dBm</td>
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<tr>
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<td>6</td>
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<tr>
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<td>19±2 dBm</td>
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<td>16±3 dBm</td>
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<tr>
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<tr>
<td>14</td>
<td>15±2 dBm</td>
<td>14</td>
<td>15±2 dBm</td>
<td>9</td>
<td>12±4 dBm</td>
<td>9</td>
<td>12±4 dBm</td>
</tr>
<tr>
<td>15</td>
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<td>10±4 dBm</td>
</tr>
<tr>
<td>16</td>
<td>11±3 dBm</td>
<td>16</td>
<td>11±3 dBm</td>
<td>11</td>
<td>8±4 dBm</td>
<td>11</td>
<td>8±4 dBm</td>
</tr>
<tr>
<td>17</td>
<td>9±3dBm</td>
<td>17</td>
<td>9±3dBm</td>
<td>12</td>
<td>6±4 dBm</td>
<td>12</td>
<td>6±4 dBm</td>
</tr>
<tr>
<td>18</td>
<td>7±3 dBm</td>
<td>18</td>
<td>7±3 dBm</td>
<td>13</td>
<td>4±4 dBm</td>
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<tr>
<td>19</td>
<td>5±3 dBm</td>
<td>19</td>
<td>5±3 dBm</td>
<td>14</td>
<td>2±5 dBm</td>
<td>14</td>
<td>2±5 dBm</td>
</tr>
</tbody>
</table>

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3. Operation Instruction and Installation

Main Function

- Android OS: Jelly Bean
- HSDPA 14.4Mbps / HSUPA 5.76Mbps
- 5MP AF with LED Flash
- 3.97" S-AMOLED OCTA (C-Type)
- A-GPS / BT v4.0 USB v2.0 / WiFi (802.11 a/b/g/n)
- Recording definition: 1080p / Playback at 1080p resolution
- Sensors: Accelerometer, Electromagnetic, Gyro, Proximity
- Additional:
  - 1GHz Dual Core CPU
  - Application store / Precise Motion UI
  - Seamless Sharing Experience.
4. Exploded View and Parts List

4-1. Cellular phone Exploded View

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>QFR01</td>
<td>Faceplate</td>
</tr>
<tr>
<td>QMO01</td>
<td>Middle Case</td>
</tr>
<tr>
<td>QCA01</td>
<td>Camera Lens</td>
</tr>
<tr>
<td>QCA02</td>
<td>Camera Lens</td>
</tr>
<tr>
<td>QCR72</td>
<td>Charger Port</td>
</tr>
<tr>
<td>QAR01</td>
<td>Antenna Cover</td>
</tr>
<tr>
<td>QSP01</td>
<td>Power Button</td>
</tr>
<tr>
<td>QRE01</td>
<td>Earpiece Cover</td>
</tr>
<tr>
<td>QCR104</td>
<td>Rear Case</td>
</tr>
<tr>
<td>QBA01</td>
<td>Battery</td>
</tr>
<tr>
<td>QBC00</td>
<td>Base Cover</td>
</tr>
</tbody>
</table>

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6. Level 6 Repair

6-1. S/W installation

6-1-1. Required items in order to install S/W

- Installation program: Downloader Program (Odin3 v3.03.exe)
- GT-I8190 Mobile Phone
- Data Cable
- JIG BOX (GH99-36900B)
- JIG Cable (GH39-01339A)
- Adapter (GH99-38251A)
- Serial Cable
- Mobile device specific S/W: Binary files

※ Settings

Connect ANYWAY JIG BOX with JIG CABLE (Phone to JIG) or PC to Phone Using Data Cable
6-1-2. S/W Installation Program (Downloader program)

- Open up the S/W Installation Program by executing the "Odin3 v3.03.exe"

1. Enable the check mark by click on the following options,
   - Check Re-Partition, Auto Reboot
   - Check PIT
   - Check PDA, and CSC Files
2. Enter into Download Mode
   - Enter into Download Mode by pressing Volume Down button, OK button, and ON/OFF Button simultaneously.

3. Connect the device to PC via Data Cable.
   Make sure that the one of communication port [ID:COM] box is highlighted in yellow. The device is now connected with the PC and ready to download the binary file into the device.
4. Start downloading binary file into the device by clicking Start Button on the screen. the green colored "PASS!" sign will appear on the upper-left box if the binary file has been successfully downloaded into the device.

5. Disconnect the device from the Data cable.

6. Once the device boots up, you can check the version of the binary file or name by pressing the following code in sequence;
   *
   #1234#

   You can perform factory reset by pressing the following code in sequence;
   *
   #87976633#
### 7. Level 2 Repair

#### 7-1. Disassembly

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><img src="image1.png" alt="Image" /></td>
</tr>
</tbody>
</table>
|   | 1. Unscrew the screw in Rear (10 points)  
   - SEC CODE: 6001-002667, 1.4X4  
   2. Disassemble Rear |
| 2 | ![Image](image2.png) |
|   | 1. Separate the connectors (2 Points) |
| 3 | ![Image](image3.png) |
|   | 1. Disassemble PBA (Right → Left)  
   2. Separate the LCD connector (1 Point) |
| 4 | ![Image](image4.png) |
|   | 1. Bracket+LCD module  
   (LCD, Bracket can not be separated in normal condition) |
| 5 | ![Image](image5.png) |
|   | 1. Separate the Camera connectors (2 Points)  
   2. Unscrew the screw in PBA (1 point)  
   - SEC CODE: 6001-002051, 1.4X2.5 |
## 7-2. Assembly

<table>
<thead>
<tr>
<th></th>
<th><img src="#" alt="Image 1" /></th>
<th><img src="#" alt="Image 2" /></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>1. Place on Bracket+LCD Module</strong>&lt;br&gt;(LCD, Bracket can not be separated in normal condition)</td>
<td><strong>1. Assemble Cameras (5Mega &amp; VGA)</strong>&lt;br&gt;2. Screw the speaker module screw (1 POINT)&lt;br&gt;- SEC CODE: 6001-002051, 1.4X2.5&lt;br&gt;- Torque: 1.1 ± 0.1 Kgf·cm</td>
</tr>
<tr>
<td>2</td>
<td><img src="#" alt="Image 3" /></td>
<td><img src="#" alt="Image 4" /></td>
</tr>
<tr>
<td>3</td>
<td><strong>1. Assemble LCD Connector (1 POINT)</strong>&lt;br&gt;2. Assemble PBA (Left → Right)</td>
<td><img src="#" alt="Image 5" /></td>
</tr>
<tr>
<td>4</td>
<td><img src="#" alt="Image 6" /></td>
<td><img src="#" alt="Image 7" /></td>
</tr>
<tr>
<td>5</td>
<td><strong>1. Assemble Rear</strong>&lt;br&gt;2. Screw 10 points in Rear&lt;br&gt;- SEC CODE: 6001-002667, 1.4X4&lt;br&gt;- Torque: 1.1 ± 0.1 Kgf·cm</td>
<td></td>
</tr>
</tbody>
</table>
8-2. PCB Diagrams
8-2-1. Top
8-2-2. Bottom
8-3. Flow Chart of Troubleshooting

Equipments

- Oscilloscope
- Digital Multi-meter
- Power Supply
- + driver, ESD Safe Tweezer
- 8960 & Spectrum Analyzer
- Soldering iron
8-3-1. Power On

Mobile phone does not power on.

Check the Battery Voltage. Is it more than 3.8V?

Yes

Power-on the phone and check the power-on sound or motor vibration.

No

Check the TACT500 (soldering crack, open, etc)

Abnormal

Check the TACT500(Power-key switch) And retry to the power-on operation.

Yes

Check the U403 output voltage (C416 > 1.8V, C418 > 1.2V)

Yes

Check the Clock OSC400 Is that frequency 32.768Khz?

No

Check the initial operation

Yes

END

No

Charging the battery by TA.
If its voltage level is extremely low (under 3.0V), Change the battery.

If the output voltage is not satisfied with normal condition, Change the U406.
※ Each voltage level has ±10% margin.

Change the OSC400.
If OSC400 does not still work, Change the U406
This problem is internal oscillator of U406.

※ Test condition (Oscilloscope setting)
: 20.0us.div (time division)
8-3-2. Initial

Initial Failure

Yes

Re-download latest SW on the mobile phone.

Abnormal

Check the oscillator clock waveform.
32.768KHz : OSC400,
37.4MHz : OSC200

Normal

Check the output clock waveforms and frequency.
※ Test condition (Oscilloscope setting)
: 20.0us.div (time division)

Abnormal

Check the OSC400, OSC200.
(Crack, open etc.)

Abnormal

Change UCP300, U406

Abnormal

Change PBA

END
8-3-3. No Service

Check menu setting
Menu → applications → setting → wireless and network → mobile networks → network mode → setting is auto mode?

PHONE: I8190XXX
Menu → Phone → Keypad → *#1234# → check Phone version → PHONE: I8190XXX
Check the Main Antenna exists or not

Check the C108,L109,L143,C181,L127,F101 is well soldered

Check VREF
VREF (C129) = 2.5V
Abnormal
Change the Main Antenna
Abnormal
Change the PBA
Yes
END

No service
Yes

Replace the U101
8-3-4. Sim Part

Insert SIM card

Yes

Is SIM/SD assy well connected to main board?

Yes

No

Reassemble SIM/SD assy and still SIM does not work, replace SIM/SD assy

Check the SIM Voltage. (C519) >= 1.8 or 3.0?

Yes

No

Change to the new SIM card.

If it doesn’t still work SIM card after changing the SIM card, Check the UCP300 (Crack etc)

END
8-3-5. Charging Part

TA / USB Insert

Yes

Charging Sequence Start
C510 = 5V

No

Reconnect TA or USB

Yes

Battery is Charging?

No

Resolder or Replace L400

Yes

END
8-3-6. Microphone Part

Check microphone function in voice call receiver mode or in Voice Recording mode

Yes

Check the main MIC is placed for any damage

Yes

Check the voltage at C551 = 2.1V

No

Resolder or replace C551

Yes

Check component soldering statuses of C549,C550,L510,L511

No

Resolder or replace C549,C550,L510,L511

Yes

END
8-3-7. Speaker Part

Check speaker function.
Play MP3 with maximum volume level.

Check the connection of Speaker module

Check the signals on L522, L521

Reconnect speaker or replace speaker module

Resolder or replace L522, L521

END
8-3-8 Receiver Part

Check receiver function in voice call receiver mode.

Yes

Check the receiver module for any damage (tear in FPCB, crack, etc)

Yes

Replace receiver module

No

Check the signals on C578, C579, L519, L520

Yes

Replace and resolder C578, C579, L519, L520

No

Replace TSP, LCD front Ass'y

END
8-3-9. BT/WIFI

BT/Wifi is not working

Check BT or WiFi function ON

No

Enable BT or WiFi Function

Yes

Check 37.4MHz Clock at R205

No

Check the OSC201 (crack, open, etc.)

Yes

Check the Status of C216, C214, ANT201

No

Resolder or Replace C216, C214, ANT201

Yes

Replace BT/WIFI Antenna

Yes

END
8-3-10. FM RADIO

FM Radio is not working

Check the Connection of E/P Jack FPCB

Yes

Check the HDC501 connector

Yes

Check the Status of C574, L513, L509

Yes

Resolder or Replace U206

Yes

END

No

Yes

No

Reassemble or replace E/P Jack FPCB

No

Repalce the board

No

Resolder or Replace C574, L513, L509
8-3-11. LCD

LCD is still off after PWR ON

- Yes
  - Check the connection of HDC500
    - Yes
      - Check the soldering status of EMI Filters
        - Yes
          - Check C479=3.0V, C480=1.8V
            - Yes
              - Replace LCD Module
                - Yes
                  - END
            - No
          - Resolder or Replace the U402, U403
        - No
      - Resoldering EMI Filters (F505, F506, F507)
    - No
  - No
    - Reassemble FRONT assy

END
8-3-12. TSP

Touch Screen does not work

Yes

Check the connection of HDC500

Yes

Check C535=3.3V, C536=1.8V

Yes

Replace LCD Module

Yes

END

No

Reconnect the Connector of HDC500

No

Resolder C535, C536
8-3-13. 5M CAM

"Camera" function does not work

Check the Camera connector on Main PBA

Abnormal

Check the voltage
C512 = 2.8V
C515 = 1.2V
C513 = 1.8V
C514 = 2.8V

Replace U401

Yes

Check the F500, F502, F504 for any damage (crack, open, etc)

Replace F500, F502, F504

Replace the camera module

No

Yes

No

Change main board

END
8-3-14. 1.3M CAM

*Front Camera* function does not work

- **Yes**
  - Check the Camera connector on Main PBA
  - Abnormal
- **No**
  - Reconnect the SLC500

Check the voltage
- C516 = 1.8V
- C517 = 1.8V
- C518 = 2.8V

- **No**
  - Resolder or replace U500
- **Yes**
  - Check F501, F503 for any damage (crack, open,

- **No**
  - Resolder F501, F503
- **Yes**
  - Replace front camera module

- **Yes**
  - END
8-3-15. GSM850 RX

NORMAL CONDITION

catch the channel?

No

Trouble occurs only in GSM1800 band?

Yes

Check C137, C139, L128 soldering condition for any damage (crack, open, etc)

No

Check F101 for any damage (crack, open, etc)

Yes

Resolder or change F101

No

Check U100 for any damage (crack, open, etc)

Yes

Resolder or change U100

No

Change the board

END
8-3-15. GSM1800 RX

NORMAL CONDITION 
catch the channel?

No

Trouble occurs only in 
GSM1800 band?

Yes

Check C143, C148, L133 
soldering condition for 
any damage (crack, open, 
etc)

Yes

CHECK soldered components 
C143, C148, L133

No

Check F101 for any 
damage (crack, open, 
etc)

Yes

Resolder or change 
F101

No

Check U100 for any 
damage (crack, open, 
etc)

Yes

Resolder or change 
U100

No

Change the board

Try 8-3-3 Repair procedure

END
8-3-16. GSM1900 RX

NORMAL CONDITION

catch the channel?

No

Trouble occurs only in GSM1900 band?

No

Try 8-3-3 Repair procedure

Yes

Check C131, C133, L106

soldering condition for any damage (crack, open, etc)

No

Yes

CHECK soldered components C131, C133, L106

No

Check F100 for any damage (crack, open, etc)

No

Yes

Resolder or change F100

No

Check U508 for any damage (crack, open, etc)

No

Yes

Resolder or change U508

Change the board

END
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8-3-15. GSM900, Band8 RX

NORMAL CONDITION catch the channel?

No

Trouble occurs only in GSM1800 band?

No

Try 8-3-3 Repair procedure

Yes

Check C102, C104, L122 soldering condition for any damage (crack, open, etc)

Yes

CHECK soldered components C102, C104, L122

No

Check F101 for any damage (crack, open, etc)

Yes

Resolder or change F101

No

Check U100 for any damage (crack, open, etc)

Yes

Resolder or change U100

No

Change the board

END
8-3-17. WCDMA Band1 RX

NORMAL CONDITION catch the channel?

No

Trouble occurs only in WCDMA band1?

NO Try 8-3-3 Repair procedure

Yes

Check C134, C136, L110 soldering condition for any damage (crack, open, etc)

Yes CHECK soldered components C134, C136, L110

No

Check F101 for any damage (crack, open, etc)

Yes Resolder or change F101

No

Check U100 for any damage (crack, open, etc)

Yes Resolder or change U100

No

Change the board

END
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8-3-20. WCDMA BAND8/GSM850/GSM900 TX

NORMAL CONDITION

catch the channel?

No

Trouble occurs only in GSM1800 band?

No

Try 8-3-3 Repair procedure

Yes

Check L109, C150, C152 soldering condition for any damage (crack, open, etc)

Yes

CHECK soldered components L109, C150, C152

No

Resolder or change F100

Check F100 for any damage (crack, open, etc)

Yes

No

Resolder or change U508

Check U508 for any damage (crack, open, etc)

Yes

No

Change the board

END
8-3-21. WCDMA BAND1,BAND2/DCS/PCS TX

NORMAL CONDITION

catch the channel?

No

Trouble occurs only in GSM1800 band?

No

Try 8-3-3 Repair procedure

Yes

Check C158, C161, L138, L141, C157 soldering condition for any damage (crack, open, etc)

Yes

CHECK soldered components C158, C161, L138, L141, C157

No

Check F100 for any damage (crack, open, etc)

Yes

Resolder or change F100

No

Check U508 for any damage (crack, open, etc)

Yes

Resolder or change U508

No

Change the board

END
9. Reference Abbreviate

Reference Abbreviate

— AAC: AdvancedAudioCoding.
— AVC: AdvancedVideoCoding.
— BER: BitErrorRate
— BPSK: BinaryPhaseShiftKeying
— CA: ConditionalAccess
— CDM: CodeDivisionMultiplexing
— C/I: CarrierToInterference
— DMB: DigitalMultimediaBroadcasting
— EU: EuropeanStandard
— ES: ElementaryStream
— ETSI: EuropeanTelecommunicationsStandardsInstitute
— MPEG: MovingPictureExpertsGroup
— PN: Pseudo-randomNoise
— PS: PilotSymbol
— QPSK: QuadraturePhaseShiftKeying
— RS: Reed-Solomon
— SI: ServiceInformation
— TDM: TimeDivisionMultiplexing
— TS: TransportStream
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