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Diversity Antenna

Objective / Purpose:

- Studying radiated failures and providing procedure for debugging the failures
- The following tests from RADTEST section of the NTF_Pareto document will be discussed

Here are the Verizon SKU Failure List (Secondary, C3): Verizon Secondary

- QC_LTE_BC7_C1_RX_RAD_RSSI_HCH3400
- QC_LTE_BC13_C1_RX_RAD_RSSI_LCH5184
- QC_CDMA_800_C1_RAD_RSSI_HCH
- QC_CDMA_1900_C1_RAD_RSSI_HCH

Verizon CDMA Primary

For factory radiated test failure on secondary path (Note **C1** in the test code), please do the following:

Step 1: Retest

Step 2: If Step 1 does not resolve issue, check if universal contact (RefDes = M850) on the PCB is damaged. Is it touching the antenna pad? If the universal clip is twisted or not making contact, this needs to be replaced:

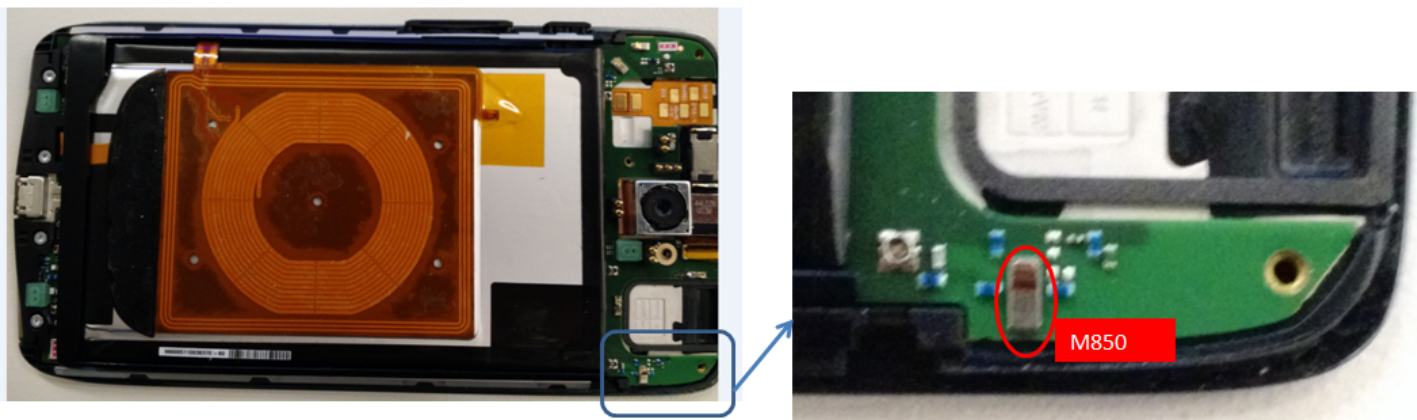


Figure 1: Universal contact for secondary antenna

Step 3: If Step 2 does not resolve the problem check if components RefDes = L850, L899, L852, L854, C856, L855, C855, L857, L858, L898 and C860 are placed correctly on PCB as shown below in figures 2 and 3.

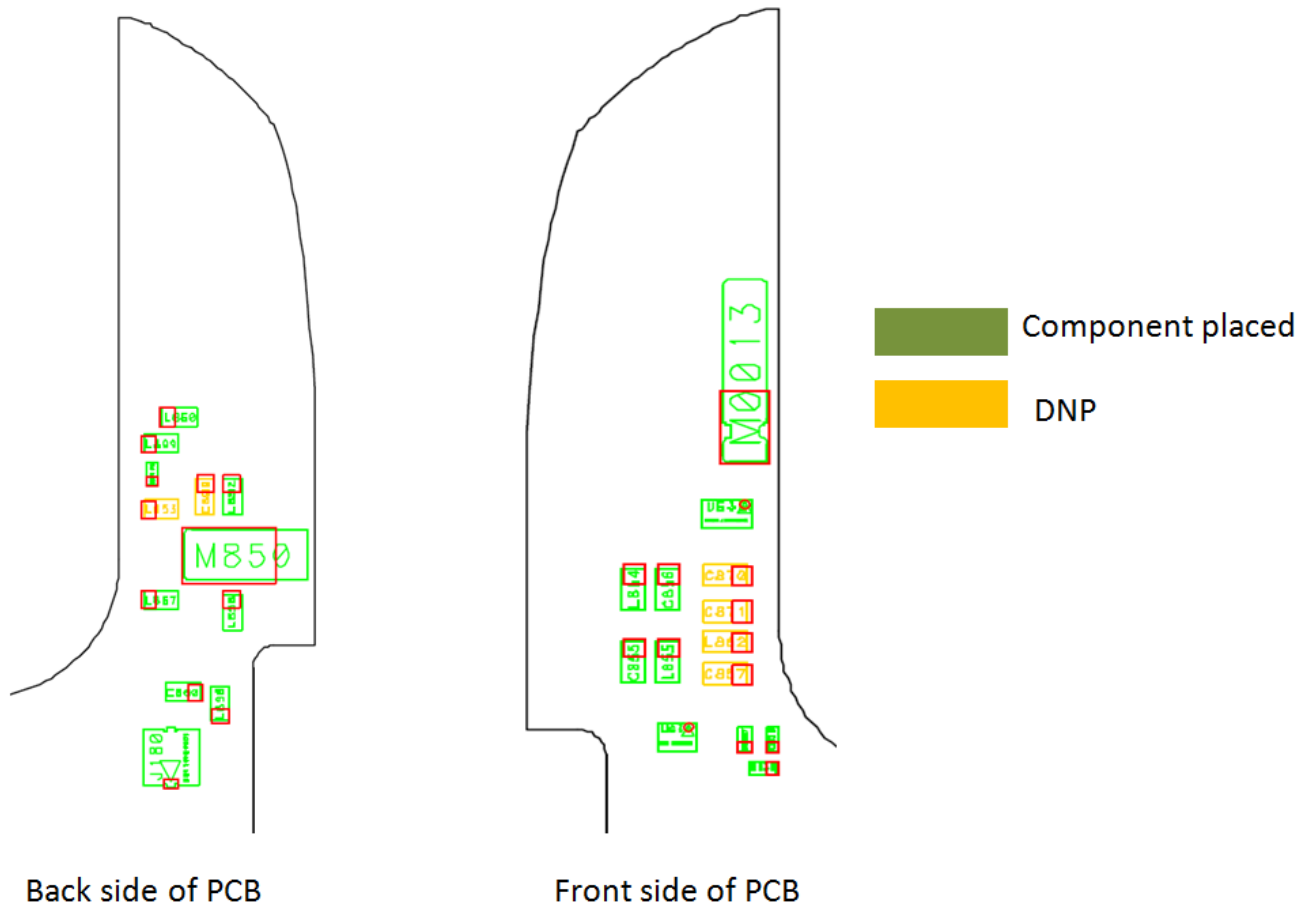


Figure 2: Antenna matching components, universal clip, & RF connector for secondary antenna

ROOM=DRX_ANT_MATCH
REF: 850 - 899

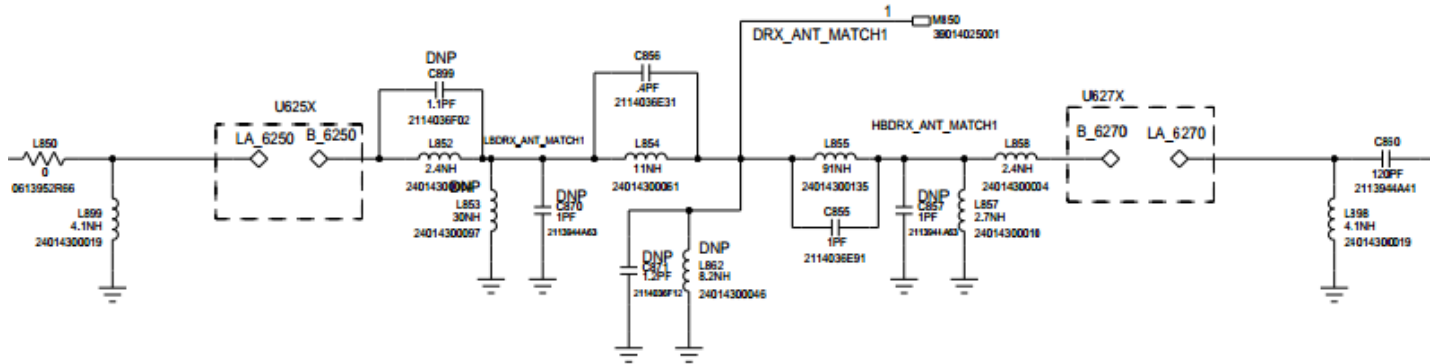


Figure 3: Secondary antenna matching components schematic

Step 4: If Step 3 does not resolve the problem, check if the ground clips M013 are placed on the board and making contact as shown in Figure 4.

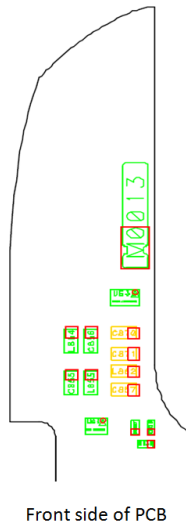


Figure 4: Bottom Ground Clip On the PCB



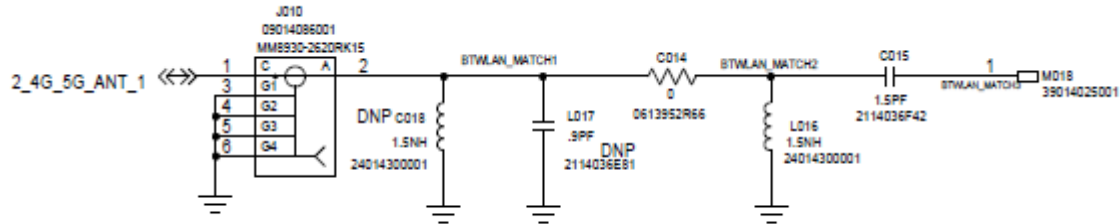
BT/WiFi

Objective / Purpose:

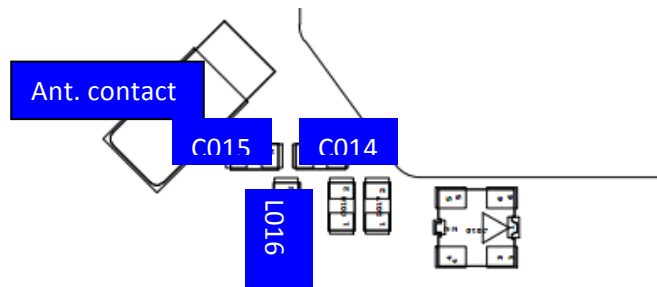
- This document helps debug Bluetooth and 2.4 GHz / 5 GHz WIFI factory radiated test failures.

Setup:

- Schematic



- PCB Layout



- The following list are the tests from RADTEST section of the NTF_Pareto document
 - WLAN_5.0GHZ_RAD_MEAS_CW_POW_LCH165
 - WLAN_5.0GHZ_RAD_MEAS_CW_POW_LCH149
 - WLAN_5.0GHZ_RAD_MEAS_CW_POW_LCH165_CL
 - WLAN_5.0GHZ_RAD_MEAS_POW_STATUS_LCH149
 - WLAN_5.0GHZ_RAD_MEAS_CW_POW_LCH149_CL
 - WLAN_2.4GHZ_RAD_MEAS_CW_POW_LCH01
 - WLAN_2.4GHZ_RAD_MEAS_CW_POW_HCH13
 - WLAN_5.0GHZ_RAD_MEAS_CW_POW_LCH036_CL
 - WLAN_2.4GHZ_RAD_MEAS_CW_POW_MCH06
 - WLAN_5.0GHZ_RAD_MEAS_CW_POW_LCH036_MID

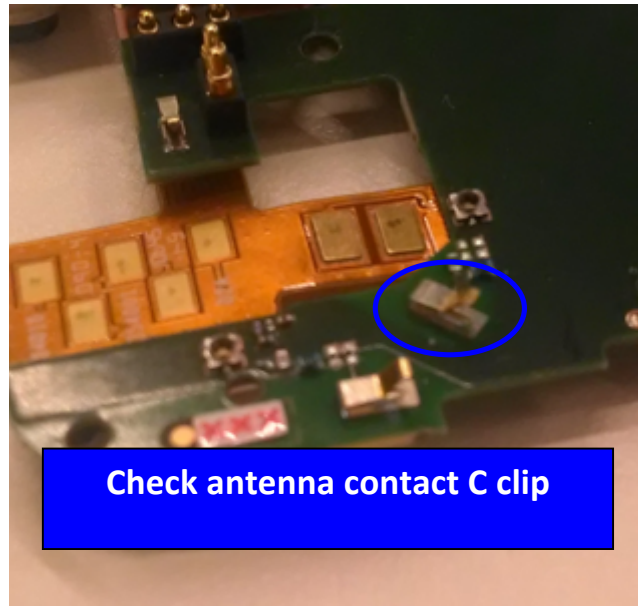
Analysis:

- Bluetooth / WiFi 2.4GHz
 - BT_RAD_MEAS_CW_POW_CH_00
 - WLAN_2.4GHZ_RAD_MEAS_CW_POW_LCH01
 - WLAN_2.4GHZ_RAD_MEAS_CW_POW_HCH13
 - WLAN_2.4GHZ_RAD_MEAS_CW_POW_MCH06

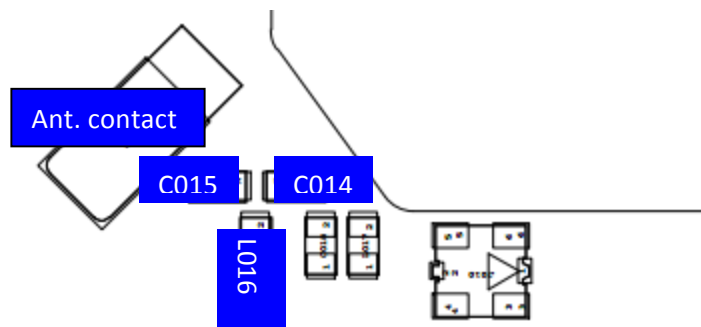
Step 1: Retest**Step 2:** Check for cracks in the WiFi antenna pattern

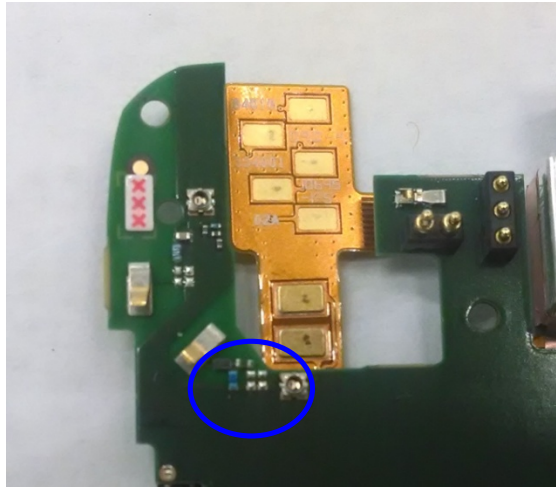
Cracks will only be visible under a microscope. A known “good” top carrier should be placed and the phone should be re-tested.

Step 3: Check if antenna C clip contact on PCB is missing, damaged or not making good contact with antenna. The contact should look like this picture below:

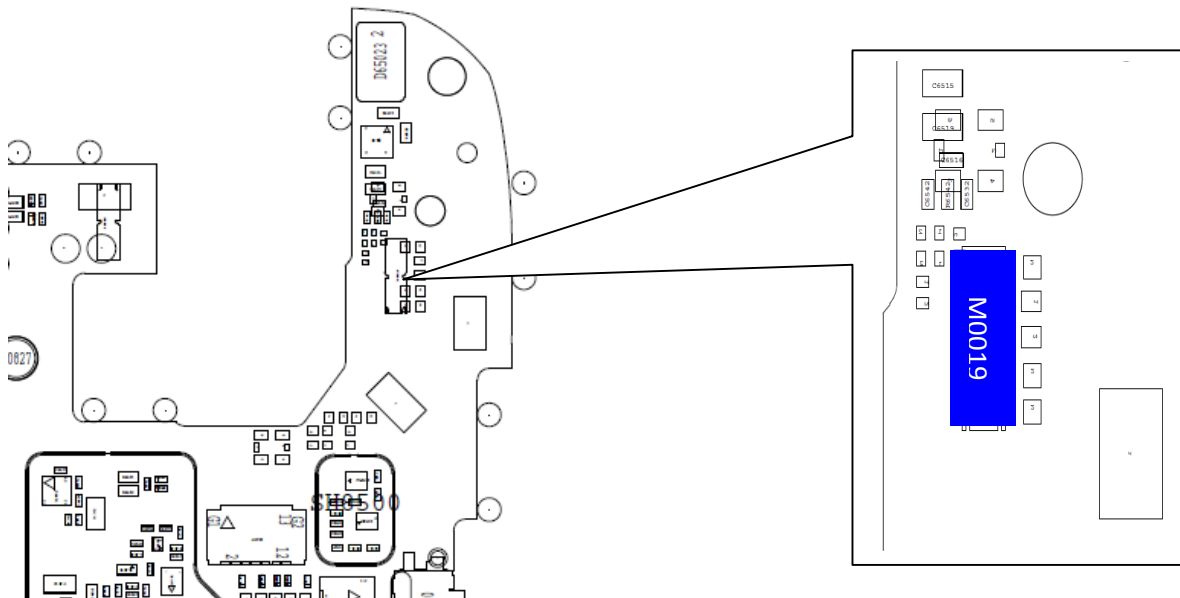


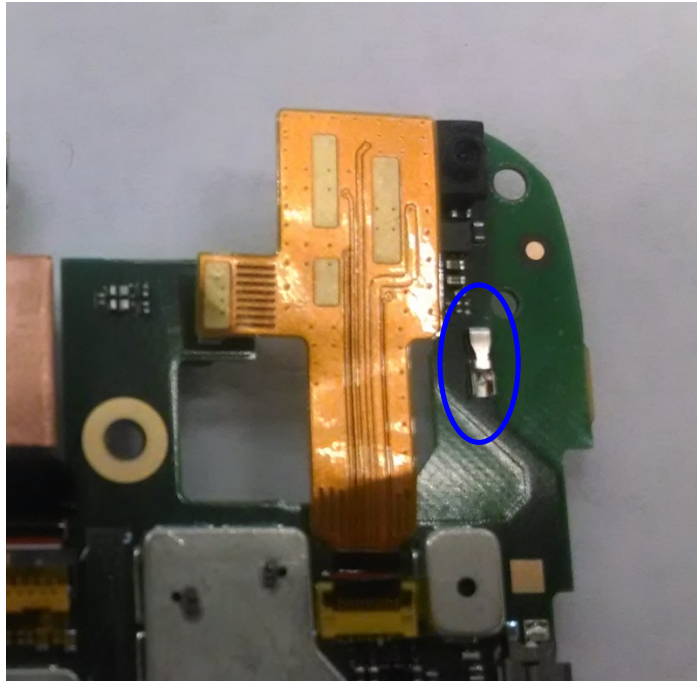
Step 4: Check if antenna is matching components RefDes C014 (0 ohm), C015 and L016 are intact.





Step 5: Check if PCB to chassis grounding M0019 intact and making good contact.





- WiFi 5GHz

- WLAN_5.0GHZ_RAD_MEAS_CW_POW_

- LCH165
 - LCH149
 - LCH165_CL
 - STATUS_LCH149
 - LCH149_CL
 - LCH036_MID
 - LCH036_CL

When 5 GHz radiated Wi-Fi test failed, most likely it is conducted problem, if conducted circuit was confirmed to be good, please follow the same steps as Wi-Fi 2.4G to debug.

GPS

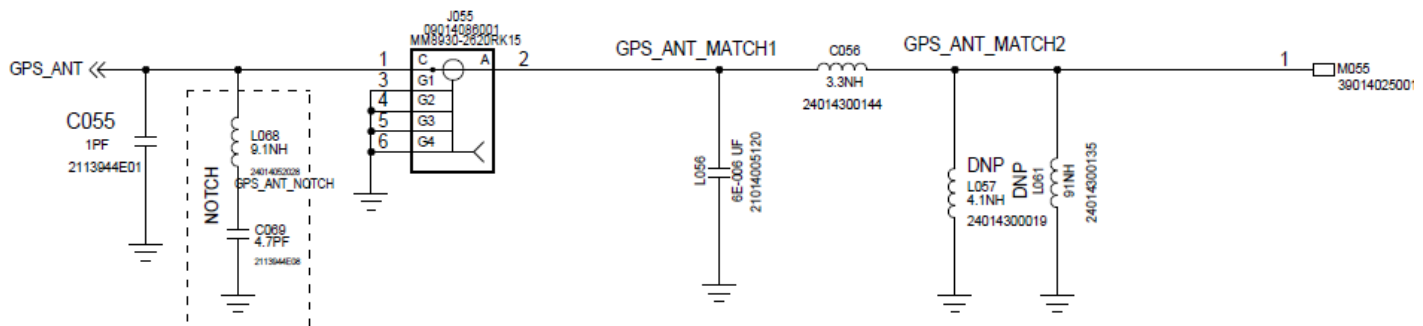
Objective / Purpose:

This document helps debug GPS factory radiated test failures

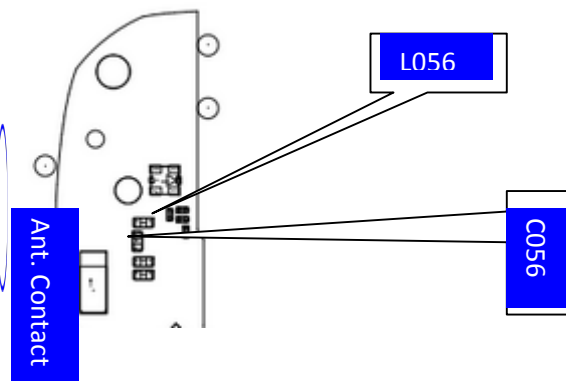
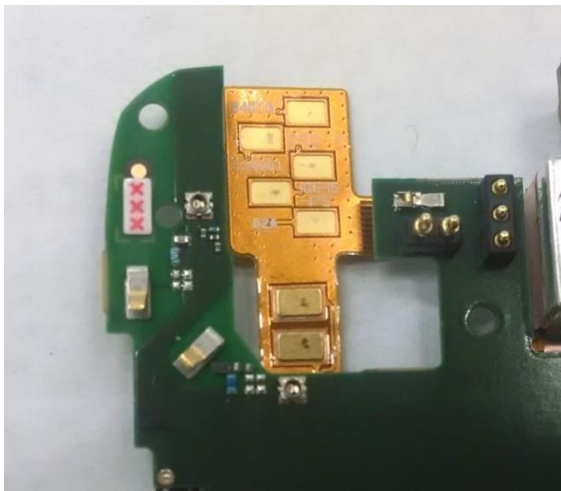
- GPS_CARRIER_TO_NOISE

Setup:

- Schematic



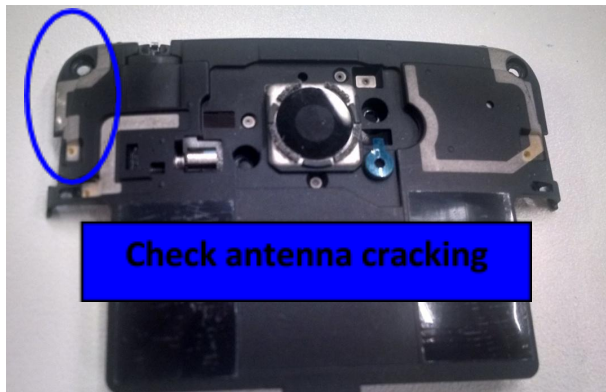
- PCB Layout



Analysis:

Step 1: Retest

Step 2: check for cracks in the GPS antenna pattern



Cracks will only be visible under a microscope. A known “good” top carrier should be placed and the phone should be re-tested.

Step 3: Check if antenna C clip contact on PCB is missing, damaged or not making good contact with antenna. The contact should look like this picture below:

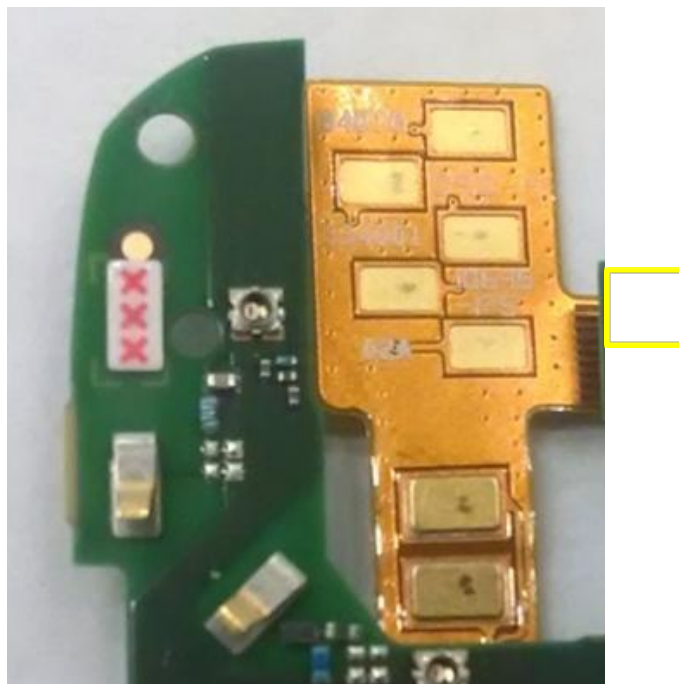


Step 4: Check if antenna matching components RefDes C056 and L056 are intact.



Step 5: If the Carrier-to-noise is several dB lower than the spec, check if the PCB around the hole has crack or not.

Step 6: If the C/N is more than 15dB lower than spec, check if the RF connector is aligned with solder pads and if the center pin soldered well. The resistance between 2 center pins of RF connector should be 0 ohm.





Main Antenna

Objective / Purpose:

- Studying radiated main antenna failures and providing procedure for debugging the failures
- The following tests from AUDIORAD station

Here are the various test cases for the Verizon SKU Failure List (Primary, C2): Verizon Primary

- QC_LTE_BC13_C0_TX_RAD_POW_23230
- QC_LTE_BC4_C0_RX_RAD_RSSI_HCH2350
- QC_LTE_BC04_C0_TX_RAD_POW_20000
- QC_LTE_BC07_C0_TX_RAD_POW_20800
- QC_CDMA_800_C0_RAD_RSSI_HCH
- QC_CDMA_1900_C0_RAD_RSSI_HCH
- QC_WCDMA_1900_C0_TX_RAD_POW_9671

Verizon CDMA Primary

For factory radiated test failure, please do the following:

Step 1: Retest

Step 2: If retest does not pass, check if the unit has the bottom antenna carrier assembled correctly. The Quantum bottom antenna carrier should look like Figure 1. Make sure all the screws to hold the bottom carrier are placed.

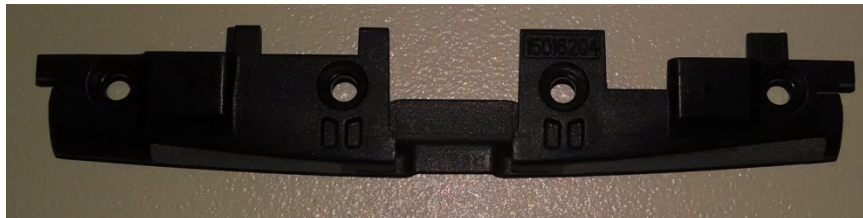


Figure 1: Quantum Bottom Antenna Carrier



Step 3: if Step 2 does not resolve issue, check if universal contact (RefDes = M650) on the PCB is damaged. Is it touching the antenna pad? If the universal clip is twisted or not making contact, this needs to be replaced:

Step 4: If Step 3 does not resolve the problem check the following components for each test failure (component placement shown in figures 2 and 3):

- QC_LTE_BC13_C0_TX_RAD_POW_23230
 - First check: C107, U651, L663, C656, C654
 - If all intact and soldered well, check: C651, L655, C670, C653, L652, L651, U630, R9008, and R9009
 - If all intact and soldered well, check: L656, L658, L660, C127, U653, U655, R9010, and R9011

- QC_LTE_BC4_C0_RX_RAD_RSSI_HCH2350
 - First Check: C656, C654, U653, C127, R9010, and R9011
 - If all intact and soldered well, check: L663, L656, L658, L660, and U655
 - If all intact and soldered well, check: C651, L655, C670, C653, L652, L651, C107, U630, U651, R9008, and R9009

- QC_LTE_BC04_C0_TX_RAD_POW_20000
 - First Check: C656, C654, U653, U655, C127, R9010, R9011
 - If all intact and soldered well, check: L663, L656, L658, L660, and C127
 - If all intact and soldered well, check: C651, L655, C670, C653, L652, L651, C107, U630, U651, R9008, and R9009

- QC_LTE_BC07_C0_TX_RAD_POW_20800
 - First Check: C656, C654, U653, U655, C127, R9011
 - If all intact and soldered well, check: L663, L656, L658, L660, C127, and R9010

- If all intact and soldered well, check: C651, L655, C670, C653, L652, L651, C107, U630, U651, R9008, and R9009

- QC_CDMA_800_C0_RAD_RSSI_HCH
 - First check: C107, U651, R9009, L652, L655, L663, C656, L656, C654
 - If all intact and soldered well, check: C651, C670, C653, L651, U630, and R9008
 - If all intact and soldered well, check: L658, L660, C127, U653, U655, R9010, and R9011

- QC_CDMA_1900_C0_RAD_RSSI_HCH
 - First Check: C651, C656, C654, U653, U655, C127, R9011
 - If all intact and soldered well, check: L663, L656, L658, L660, and R9010
 - If all intact and soldered well, check: L655, C670, C653, L652, L651, C107, U630, U651, R9008, and R9009

- QC_WCDMA_1900_C0_TX_RAD_POW_9671
 - First Check: C651, C656, C654, U653, U655, C127, R9011
 - If all intact and soldered well, check: L663, L656, L658, L660, and R9010
 - If all intact and soldered well, check: L655, C670, C653, L652, L651, C107, U630, U651, R9008, and R9009

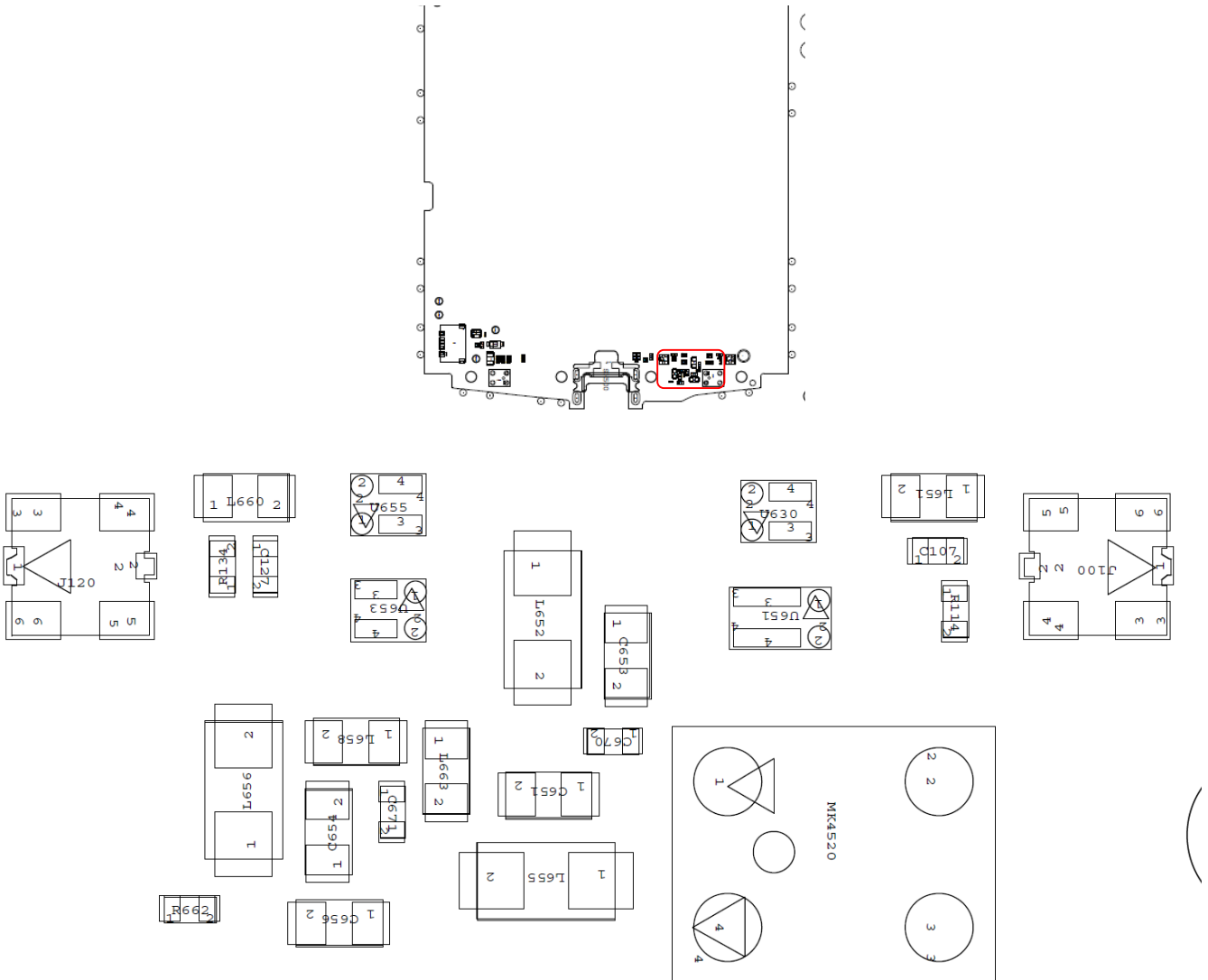


Figure 2: Main Antenna matching components overlay – Rear components

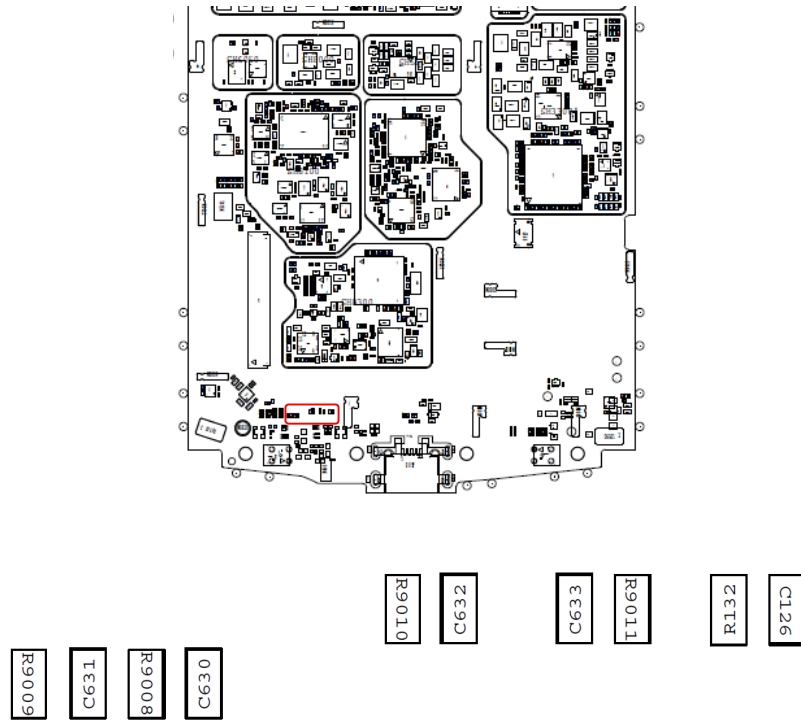


Figure 3: Main Antenna matching components overlay – Front components