# Technical Bulletin

| Model(s) | Year | Eng. Code | Trans. Code | VIN Range From | VIN Range To |
|---|---|---|---|---|---|
| **Beetle, Eos, Jetta Wagon, Passat, Tiguan, Touareg** | **2005-2010** | **All** | **All** | **All** | **All** |
| **All except Routan** | **2011-2013** | **All** | **All** | **All** | **All** |

## Condition

**91 13 13** May 31, 2013 **2023490** Supersedes T.B. V911130 dated October 6, 2011 to include additional model year applicability.

**Antenna Diagnosis Overview**

## Technical Background

To provide an overview of:

- Antenna Connector Colors
- Coaxial Cable Information
- Model / Radio Antenna Locations
- AM/FM Diagnosis
- Satellite Radio Diagnosis
- Navigation (GPS) Diagnosis
- Diagnostic checks with Digital Volt Meter (DVOM)

**Tip:**

For older vehicles, see Technical Bulletin 2010411 Radio, Reception Diagnosis.

## Production Solution

Not applicable.

## Service

**Tip:**

Roof mounted antenna that contain satellite radio or satellite radio / GPS functionality are referred to as **"shark fin"** antennas compared to a standard roof mount antenna base & mast.

**Antenna Connector Colors**

The connectors of antenna cables are color coded for easy reference.

**Tip:**

Antenna module coaxial cable connectors may not use standard color coding.

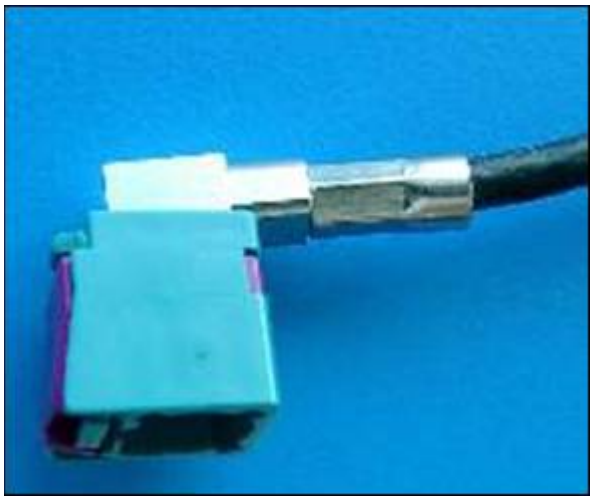
| Color | Description |
|---|---|
| White | AM / FM Functionality |
| Tan | FM Functionality |
| Green | • Satellite Radio Functionality<br>• Service Replacement Coaxial Cable |
| Dark Brown | • 2nd antenna lead for external satellite module. Only applies to MY 2005/2006 vehicles with two lead system |
| Blue | GPS / Navigation Functionality |
| Grey | Remote Control Central Locking (Touareg option only) |
| Red | Phone Functionality - Not used in U.S. / Canada |

**Coaxial Cable Information**

- Service replacement coaxial cables are universally keyed, meaning you can use them on any type of antenna connector MY 2005.5 and newer (except NB/NBC).

**Tip:**

Certain models will need a 90 degree adapter to clear the back of the dash.



- Use PN 000098710 when GPS, Satellite or single lead antenna system coaxial cable is being replaced.

**PN 000098710**

- Use PN 000098713 when a dual lead AM/FM1/FM2 coaxial cable is being replaced at the radio side. Radios that use this cable style include RNS 510, RNS 315, RCD 510 and RCD 310.

**PN 000098713**


**Tip:**

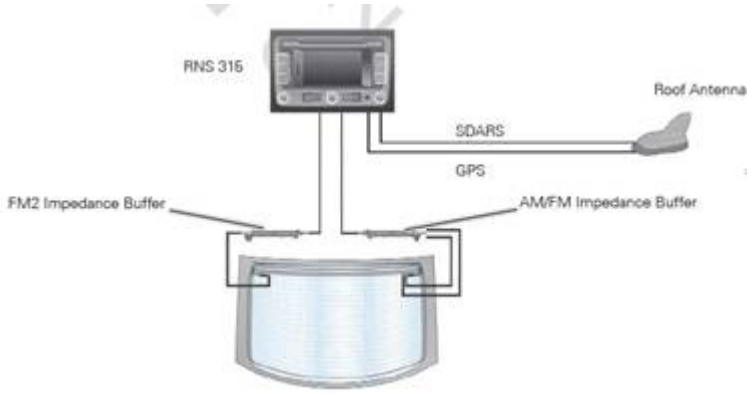
Clicking on the camera icon -arrow- in EKTA shows pictures of the various antenna adapters.

- Coaxial cables must be ordered by length.
- Always install from the rear of the vehicle to the front of the vehicle. This allows extra length to be tucked away behind the radio.
- In ETKA, replacement cables are found in the general section, illustration 035-20. As seen below.

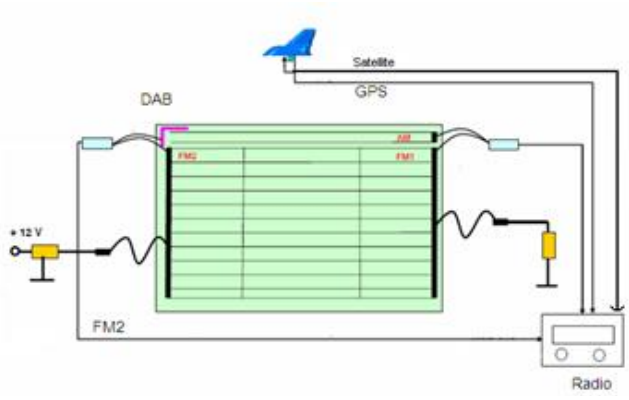

- In vehicles equipped with an external satellite module, the coaxial cable runs from the antenna to the module.

**Model / Radio Antenna Locations**

**Beetle (2013) / Passat Sedan (2012 - 2013)**

| Radio Antenna System Components | |
|---|---|
|  | • Antenna – Rear Glass<br>• Right Side Antenna Booster (AM/FM1)<br>• Left Side Antenna Booster (FM2) |
| • Shark Fin Antenna | • Satellite (if equipped)<br>• GPS (if equipped) |

**Jetta Sedan (2011-2013)**

| Radio Antenna System Components | |
|---|---|
| •  | • Antenna – Rear Glass<br>• Right Side Antenna Booster (AM/FM1)<br>• Left Side Antenna Booster (FM2)<br>**Tip:**<br>For complaints of complete loss of AM or AM/FM, verify the cold solder joints on the rear glass are good. |
| • Shark Fin Antenna | • Satellite (if equipped)<br>• GPS (if equipped) |

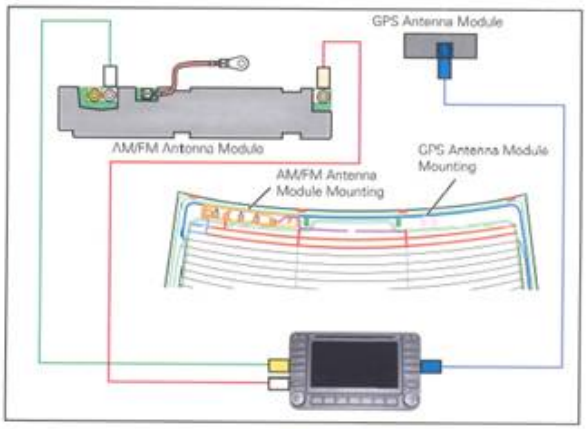
**Touareg (2011-2013)**

| RCD 550 / RNS 850 Radio Antenna System Components | |
|---|---|
| Shark Fin Antenna | Satellite Radio / GPS (if equipped) |
| Rear Left Side Glass | AM/FM1 |
| Rear Right Side Glass | FM2 |
| Left Side Antenna Booster | AM/FM1 |
| Right Side Antenna Booster | FM2 |

**Jetta Sedan (2005.5-2010)**, **Passat Sedan (2006-2010), Rabbit / GTI (2006-2009)**

**Note:**

**Excludes entry level radio with antenna mast. See section RCD-210 (Premium 7 Low) MY 2005.5-2010.**

| **Radio Antenna System Components** | |
|---|---|
| •  | • Antenna - Rear glass<br>• Antenna Module<br>• GPS Antenna (if equipped)<br>**Tip**:<br>Antenna module must make good contact with rear window or diminished reception will occur. |
| Shark Fin Antenna | • Satellite radio only |
| External Satellite Module | • Jetta sedan - Located under rear shelf<br>• Passat sedan - Located in right rear of hatch compartment behind trim panel.<br>• Rabbit/GTI - Located under passenger front seat |

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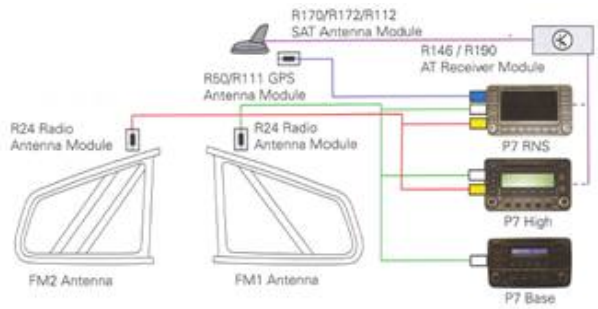
**Passat Wagon (2007-2010)**

| Radio Antenna System Components | |
|---|---|
| •  | • Left Side Glass Antenna (FM2)<br>• Left Side Antenna Booster (FM1)<br>• Right Side Glass Antenna (AM/FM1)<br>• Right Side Antenna Booster (AM/FM1) |
| Shark Fin Antenna | Satellite - RCD-510, Premium 7<br>Satellite / GPS RNS-510, MFD2<br>**Note:**<br>RCD-510, RNS-510 satellite coaxial cable routes directly from shark fin antenna to radio. |
| External Satellite Module | Located in right rear of hatch compartment behind trim panel. |

**Jetta SportWagen (2009-2013), Golf Wagon (2010-2013)**

**Note:**

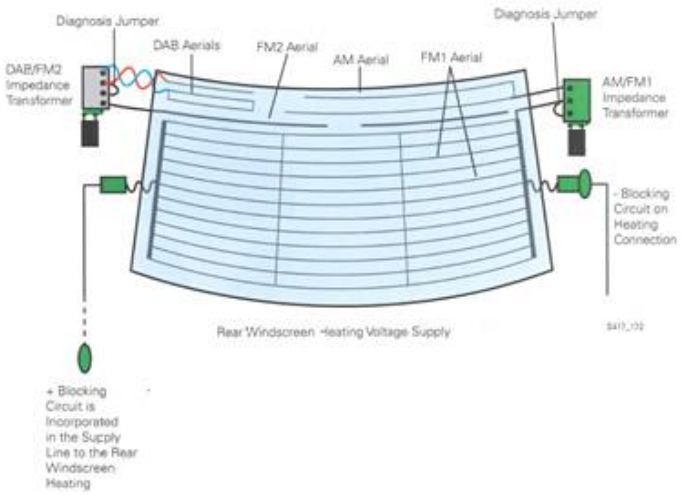
**Excludes entry level radio with antenna mast. See section RCD-210 (Premium 7 Low) MY 2005.5-2010.**

| Antenna System Components | 2009 | 2010+ |
|---|---|---|
| Shark Fin Antenna | AM/FM1/Sat/GPS - RNS-510<br>AM/FM1/Sat - Premium 7 | Sat/GPS - RNS-510<br>Sat - RCD-510 |
| Antenna Mast | Attaches to shark fin | Not applicable |
| Left Side Glass Antenna | No reception functionality | FM2 |
| Left Side Glass Booster | Not applicable | FM2 |
| Right Side Glass Antenna | FM2 | AM/FM1 |
| Right Side Glass Booster | FM2 | AM/FM1 |
| External Satellite Module | Located under passenger front seat (Premium 7 only) | |

**Golf / GTI (2010-2013)**

| Radio Antenna System Components | |
|---|---|
| •  | • Antenna - Rear Glass (R11)<br>• AM/FM1 Module - R109<br>• FM2 Module - R108<br>**Note:**<br>MY 2010 RCD-210 radio does not have a FM2 module.<br>• AM Filter - R177<br>• FM Filter - R178<br>• FM Filter - R179<br>**Tip:**<br>R178 & R179 are used for rear window heating |
| Shark Fin Antenna | • Satellite<br>• GPS (if equipped) |

**CC (2009-2013)**

| Radio Antenna System Components | |
|---|---|
|  | • AM/FM1 Module - R109<br>• FM2 Module - R108<br>• FM Filter - R178<br>• FM Filter - R179<br>**Note:**<br>There is no AM Filter (R177) on this antenna system. |
| Shark Fin Antenna | • Satellite<br>• GPS (if equipped) |
| External Satellite Module | • Located under passenger front seat (Premium 7 only) Antenna - Rear Glass (R11) |

**Tiguan (2009-2013)**

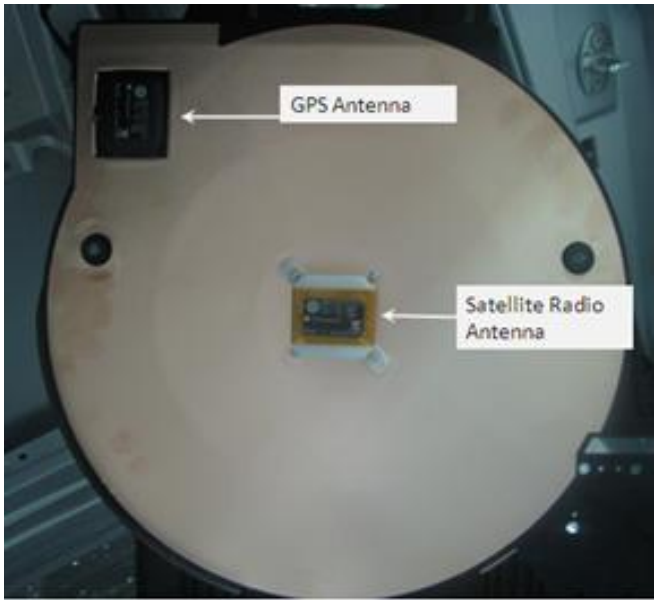
**Note:**

**Excludes entry level radio with antenna mast. See section RCD-210 (Premium 7 Low) MY 2005.5-2010**

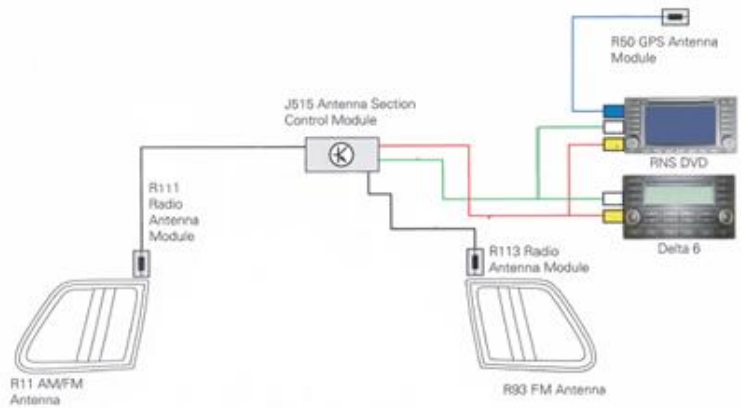
| Radio Antenna System Components | |
|---|---|
|  | • FM2 Antenna - Rear Glass (R11) Not shown<br>• FM2 Amplifier - R108 |
| Shark Fin Antenna | • AM/FM1/Satellite<br>• GPS (if equipped) |
| Antenna Mast | Screws into shark fin. |
| Antenna Amplifier | RNS-510, RCD-510<br>Located under rear hatch trim panel |
| External Satellite Module | Located under passenger front seat (Premium 7 only) |

**Eos (2007-2013)**

| Radio Antenna System Components | |
|---|---|
|  | AM/FM1/FM2 Antenna Booster<br>**Tip:**<br>Antenna is integrated into trunk lid.<br>Located to the right side of the trunk lid under the trim |
|  | Antenna holder<br>Located under the rear trunk lid trim |

| | |
|---|---|
|  | Satellite / GPS Antenna<br>**Tip:**<br>Shown with antenna holder unbolted. |

**Touareg 2 (2008-2010) Delta 6, RNS2**

| Radio Antenna System Components | |
|---|---|
|  | |
| AM/FM1 Antenna (R11) | Right side glass |
| AM/FM1 Module (R111) | Attached by right side glass |
| FM2 Antenna (R93) | Left side glass |
| FM2 Module (R113) | Attached by left side glass |
| Antenna Control Module (J515) | Located rear center under headliner |
| GPS Antenna (if equipped) | Located in right fender wall above headlamp. |
| Shark Fin Antenna | Satellite functionality only |
| External Satellite Module | Located in right rear of hatch compartment behind trim panel |

**Touareg 2 (2009-2010) RNS-510**

| Radio Antenna System Components | |
|---|---|
| AM/FM1 antenna (R11) | Right side glass |
| AM/FM1 module (R111) | Attached by right side glass |
| FM2 antenna (R93) | Left side glass |
| FM2 module (R113) | Attached by left side glass |
| GPS Antenna (R50) | Located in right fender wall above headlamp |
| Shark Fin Antenna | Satellite Radio only |
| **Tip:**<br>J515 Antenna control module is not used with RNS-510. | |

**New Beetle (2005-2010)**

| Radio Antenna System Components | |
|---|---|
| Shark Fin Antenna | • AM/FM<br>• Satellite (if equipped) |
| Antenna Mast | Screws into shark fin. |
| External Satellite Module | Located under passenger side dash (if equipped) |

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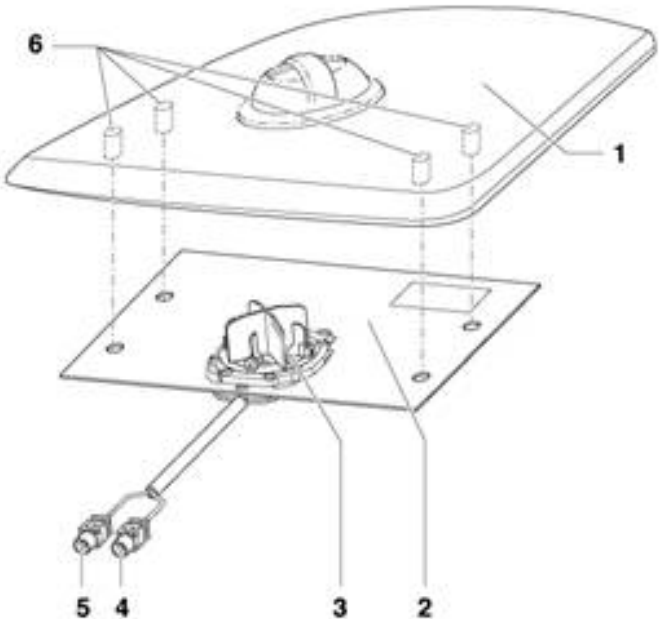
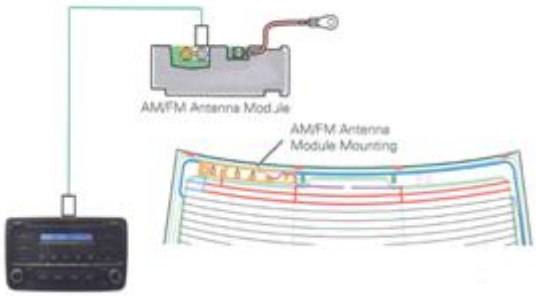
**New Beetle Convertible (2005-2010)**

| Radio Antenna System Components | |
|---|---|
| Antenna (AM/FM) | Integrated in to windshield |
| Impedance Converter | Located on upper right of windshield frame under sun visor cables. |
|  | Satellite Antenna (if equipped)<br>**Tip:**<br>Connection 5 only used on MY 2005-2006 vehicles. |
| External Satellite Module | Located under passenger side dash (if equipped) |

**RCD-210 (Premium 7 Low) MY 2005.5-2010**

| Radio Antenna System Components | |
|---|---|
| Single-Tuner Radios without Navigation   | Jetta Sedan (2005.5–2010)<br>Passat Sedan (2006-2009)<br>Rabbit (2006-2009)<br>• Antenna module<br>• Antenna is integrated into rear glass |
| Tiguan (2008-2010)<br>Jetta Wagon (2009-2010) | • Antenna base<br>• Antenna mast |

## Reception Diagnostics

**Note:**

All radio reception concerns must be validated outside, away from building overhangs, electrical signs, and/or heavy canopy of trees overhead.

## AM / FM Diagnostics

- Are antenna fault codes stored in the radio/navigation unit related to the customer complaint? Use GFF test plans to narrow down the concern.
- Is the station out of range? www.radio-locator.com is a good way to determine the range of a desired radio station. Comparing to a vehicle that has the same antenna configuration can help as well.
- Is there window tinting on the vehicle? If the vehicle antenna is integrated in to the glass, window tinting will decrease/eliminate reception.
- Does static occur on AM when certain vehicle functions are switched on? AM is more susceptible to feedback that is considered normal.
- Does the static only occur when the rear window defroster is on? The rear window including filters (if applicable) will need to be diagnosed to find the problem.

**Note:**

Only for vehicles with rear window integrated antenna.

- MVB 7.3 (antenna 1) & 10.3 (antenna 2) are available to determine if a short or open fault is on the antenna circuit.
- MVB 8.2 (antenna 1) & 8.4 (antenna 2) displays signal strength. A value of 0 indicates no reception & over 25+ indicates good to excellent reception. This applies to RNS-510, RNS-315. RCD-510, RCD-310, & Delta 6 radios.
- MVB 9.1, 9.2 can be used to see antenna power consumption. This is applicable to RNS-315, RCD-510, & RCD-310. If no power is consumed, proceed to **Diagnostic Checks with Digital Volt Meter.**
- Swap a known good radio. Does the concern still happen? If so, the radio can be ruled out as the problem.
- Go to **Diagnostic Checks with Digital Volt Meter** to narrow down customer complaints that are considered to be antenna or coaxial cable related.

**Satellite Radio Diagnosis**

- Does the customer have an active satellite radio subscription? MY 2011 (except Routan) vehicles have a three month free subscription. Routan has a one year free subscription.
- Does the radio display "Linking" sporadically? Reception will not be available when vehicle parked under a building overhang such as gas station, heavy canopy of trees etc.
- Are certain channels missing? If so, Sirius needs to be contacted. Use the satellite radio overview technical bulletin HST 2020627 in ElsaWeb to find Sirius contact information or the phone number displayed on the screen. Depending on radio, filtering of station is available to allow channels to be skipped over.
- Are antenna fault codes stored in the radio/navigation unit related to the customer complaint? Use GFF test plans to narrow down the concern.
- MVB 9.3 can be used to see antenna power consumption. This is applicable to RNS-315, RCD-510, & RCD-310. If no power is consumed, proceed to **Diagnostic Checks with Digital Volt Meter.**
- Radios with internal satellite receiver: Is a message displayed on screen stating "Satellite radio not available"? This indicates a radio concern. Swapping a known good similar radio is an easy check to confirm the radio is the problem. Applies to RNS-510, RNS-315, RCD-510, RCD-310 (with sat).
- Go to **Diagnostic Checks with Digital Volt Meter** to narrow down customer complaints that are considered to be antenna or coaxial cable related.

**Navigation (GPS) Diagnosis**

- Is the street newer than the map data the system is using? Several factors play a role when new streets are created. This includes data provided by city/state/province etc, compilation time by the map supplier etc.
- RNS-510: Is the map download incomplete leaving blank spots. You can verify this by moving the screen image to see if areas are incomplete. See ElsaWeb for the latest TB's to correct **this** concern.
- Are a minimum of three satellites being seen? This can be easily checked on the RNS-510 & RNS-315.

**RNS-510:**

1. Press the **Nav** button
2. Select **Positio**n on the screen

**RNS-315:**

1. Press the **Nav** button.
2. Select **Map** on the screen.
3. Select **View** on the screen.
4. Select **Route Info** on the screen.
5. Turn the center knob clockwise to scroll down to see how many satellites are received.

- Are no satellites being seen? Is the vehicle in a building or other overhang to cause lack of signal? If no, swap the radio with a known good unit to see if the concern is corrected. If not, proceed to the "**Diagnostic Checks with Digital Volt Meter**" section.
- MVB 9.4 can be used to see antenna power consumption. This is applicable to RNS-315, RCD-510, & RCD-310. If no power is consumed, proceed to **Diagnostic Checks with Digital Volt Meter.**

**Diagnostic Checks with Digital Volt Meter**

**Prerequisites**

- Spare part coaxial cable 280cm (9 ft) or longer
- AM/FM adapter (000098713) for AM/FM complaints on RNS-510, RCD-510, RNS-315, RCD-310

**Test 1: Ruling out the radio as the problem**

1. Disconnect the antenna from the radio that is related to the customer complaint. Keep the radio quad lock connector plugged in. Verify the inner pin on the antenna connection at the radio is not bent or missing. If damaged, the radio must be replaced.
2. Plug in the known good coaxial cable. Use adapter 000098713, if necessary.
3. With the DVOM set on DC voltage, find out the voltage output from the radio. To do this, place the ground side on the outer portion of the coaxial cable and the positive side on the inner tip.
4. If no voltage is being seen, swap in a known good radio to verify findings. If confirmed, replace radio.

| Antenna | AM/FM (Antenna1) | FM (Antenna2) | Satellite | Navigation |
|---|---|---|---|---|
| **Voltage Range** | 12.0 - 12.6 | 12.0 - 12.6 | 5.0 - 7.5 | 5.0 - 5.2 |

**Note:**

Do not attempt voltage output on the radio or the antenna as the inner pin is easily bent /broken.

**Test 2: Ruling out the coaxial cable to the antenna as the problem (AM/FM)**

1. Disconnect the test coaxial cable and reconnect the factory cable.

2. Disconnect the coaxial cable at the antenna side. Use ElsaWeb for directions how to access connection.

3. Carefully ground center wire of coaxial cable to chassis. If reception returns, coaxial is good. Proceed to **Test 3**. If reception is weak proceed to next step.

4. Perform the same test checking voltage at the coaxial cable of the antenna connection.

**Note:**

Do not use the DVOM to measure resistance at the antenna side of the connection. The inner pin is easily bent /broken.

5. If the voltage is not within the range, the coaxial cable needs to be replaced. Otherwise proceed to **Test 3**.

**Test 3: Confirming the antenna is the problem**

Plug the factory coaxial cable, for the appropriate system that is inoperative, in to antenna base (5N0035501B or equivalent) using the appropriate color code for the antenna reference. If the problem is resolved then the antenna system from the coaxial cable back needs to be diagnosed. This can include antenna amplifiers, boosters, and / or actual antenna. If further assistance is needed, start a VTA ticket for assistance.

## Warranty

Information only.

## Required Parts and Tools

No special parts required.

| Tool Description | Tool No: |
|---|---|
| **Digital Volt Meter** | -- |
| **VAS Diagnostic Tool** | **VAS 5051B, VAS 5052A, VAS 6150/X & VAS 6160/-VPC with:**<br>**VAS-PC Base V19.01.01 and current version Brand disc**<br>**ODIS Service V1.1.3 or higher** |

## Additional Information

**All part and service references provided in this Technical Bulletin are subject to change and/or removal. Always check with your Parts Dept. and Repair Manuals for the latest information.**