Lesson 4 – Lab 2

VSWR and Distance to Fault \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| **Objective** | Perform VSWR and Distance to Fault Measurement to determine if cable is good or bad. |

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| **References** | * VSAT Technical Instruction Book (TIB)(Work in progress) |

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| **Equipment, Tools, etc. Needed** | * Keysight N9342C * RF Test cable * Open-Short-Load (OSL) |

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| **Safety** | * Maintenance personnel must observe all safety precautions when performing duties on the ASTI equipment. |

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| **Time Allotted** | * 30 min per group as assigned by instructor |

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| **Coordination** |  |

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| **Instructor Notes** | Need 2 Instructors. Instructor 1 cover Part A. Instructor 2 cover Part B  Verify that lab transit case (Cape Blanco) is operating properly. |

Discussion:

VSWR test can be used to determine if RF cable is faulty. The Distance to Fault (DTF) measurement can then be used to approximate where the fault is located.



Figure ‑ BUC/SSPA to Antenna Tx Cable Test Setup

| BUC to OSPA Tx Cable Test | | |
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| **STEP** | **SITE/LOCATION** | **OPERATOR ACTION** |
|  | VSAT  ZAN | Disconnect the RF Cable from the BUC/SSPA J2 RF Out Port to drop the RF carrier at the VSAT site  **Note:** The RF transmit will remain disconnected for all following sections that test cable performance to ensure the testing is done in isolation. |
|  | VSAT | Configure the Keysight N9342C Spectrum Analyzer for the cable test   * Navigate to: Mode -> Cable & Antenna test -> Distance To Fault * Configure the following parameters:   + Start Distance: 0 ft   + Stop Distance: Use approximate length of cable   + IIM: On   + Cable Atten (More -> Cable Specifications): 0.06 dB/ft for TX test   + Vel Factor (More -> Cable Specifications): 88%   **Note:** The attenuation and velocity factor values used to test the transmit cables are the nominal values for LDF4-50 at 6175 MHz, which is the middle of the C-Band transmit frequency range.     * Navigate to Freq (Frequency) and configure the following parameters:   + Start Freq: 5925 MHz (Tx Test)   + Stop Freq: 6425 MHZ (Tx Test)   + Cal Type: Selected * Attach a RF jumper Test to the spectrum analyzer RF Output port and press the Calibrate button   + Follow the on-screen instructions for terminating the far end of the cable. Include the RF Test Cable during calibration but NOT the cable under test. Note that the on-screen instruction does not show the test cable. Include it. |

| **2.2 BUC to OSPA Tx Cable Test** | | |
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| **STEP** | **SITE/LOCATION** | **OPERATOR ACTION** |
|  | VSAT | **Tx 50 Ohm Peak VSWR Frequency**  Measure the peak VSWR and Frequency of the cabling between the BUC/SSPA and antenna with a 50 Ohm termination load   * Connect the 50 Ohm load to terminate the end of the cable under test. * Note: Use the load connection on the Open-Short-Load tee for the 50 Ohm load * Configure the N9342C as follows:   + Navigate to: Mode -> Cable & Antenna Test -> Reflection Measurement   + Set IIM to On   + Set Disp mode to VSWR   + Select Amptd -> Auto Scale * Record the Peak Tx VSWR and Freq values Peak VSWR: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Peak Frequency: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * VSWR should be less than or equal to 1.5. |
|  | VSAT | **Distance to Fault**  Determine distance to fault.   * Disconnect 50 Ohm load so that end of cable is open. * Configure the Keysight N9342C as follows:   + Navigate to: Mode -> Cable & Antenna Test -> Distance To Fault   + Set IIM to Off   + Set Disp Mode to VSWR   + Select Amptd -> Auto Scale * Select Marker -> (F2) Normal * Use the rotary dial to place the Marker 1 (M1) pointer on the peak VSWR. * Record the M1 value displayed.   + Distance to Fault: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Disconnect the TX Cable from OSPA so that only one section is connected to Keysight N9342C. * Record the M1 value displayed.   + Distance to Fault: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
|  |  | **Question:**   1. To test RX path, what parameter needs to be changed? 2. Does the N9342C need to be recalibrated? |