# SPURIOUS CONDUCTED EMISSIONS

XMit 2017.02.08

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Cal. Due |
|---|---|---|---|---|---|
| Power Supply - DC | Topward | TPS-2000 | TPD | NCR | NCR |
| Meter - Multimeter | Fluke | 8846A | MMZ | 10/22/2015 | 10/22/2018 |
| Meter - Multimeter | Tektronix | DMM912 | MMH | 2/17/2016 | 2/17/2019 |
| Cable | Micro-Coax | UFD150A-1-0720-200200 | EVH | 5/30/2017 | 5/30/2018 |
| Attenuator | Fairview Microwave | SA26B-10 | TWG | 4/15/2017 | 4/15/2018 |
| Attenuator | S.M. Electronics | SA26B-20 | AUY | 5/30/2017 | 5/30/2018 |
| Block - DC | Fairview Microwave | SD3379 | AMW | 6/5/2017 | 6/5/2018 |
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFP | 8/10/2016 | 8/10/2017 |

**TEST DESCRIPTION**

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.

# SPURIOUS CONDUCTED EMISSIONS

TbtTx 2017.04.18 XMit 2017.02.08

| | | | | | |
|---|---|---|---|---|---|
| **EUT:** | 9630-9110 | | | **Work Order:** | SCHW0219 |
| **Serial Number:** | A02654144 | | | **Date:** | 07/24/17 |
| **Customer:** | Schweitzer Engineering Laboratories, Inc. | | | **Temperature:** | 23.8 °C |
| **Attendees:** | Allan Davis | | | **Humidity:** | 44.2% RH |
| **Project:** | None | | | **Barometric Pres.:** | 1016 mbar |
| **Tested by:** | Mark Baytan | **Power:** | 3.5 VDC | **Job Site:** | EV06 |

| **TEST SPECIFICATIONS** | **Test Method** |
|---|---|
| FCC 15.247:2017 | ANSI C63.10:2013 |
| | |

**COMMENTS**

Total reference level offset (DC Block + 20dB Attenuator + 10dB Attenuator + RF Cable) = 30.7 dB. Power level setting: 27 dBm

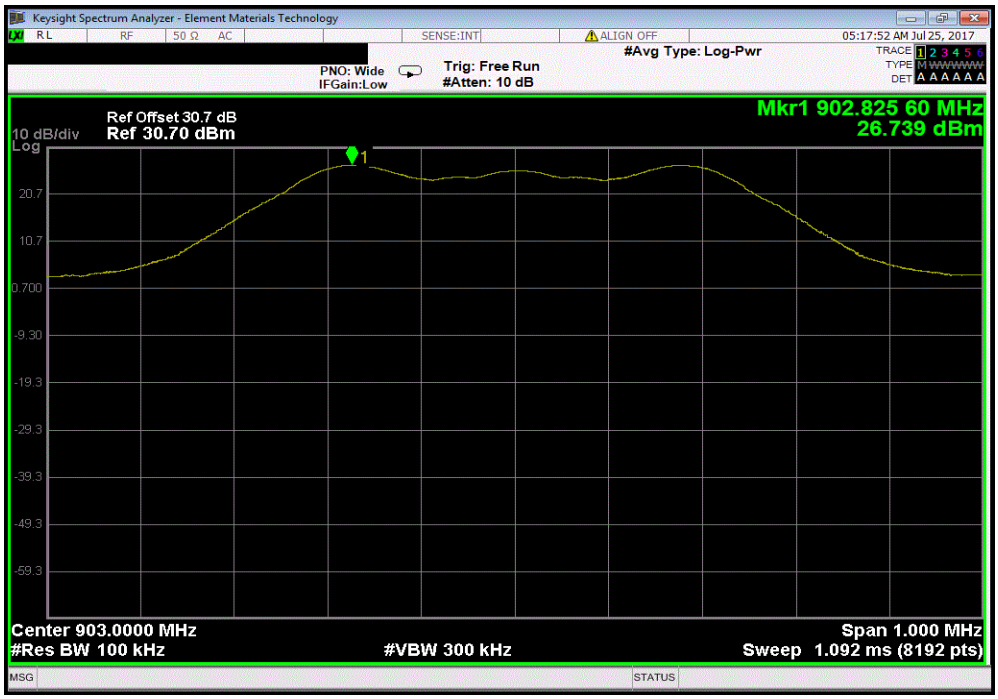
**DEVIATIONS FROM TEST STANDARD**

None

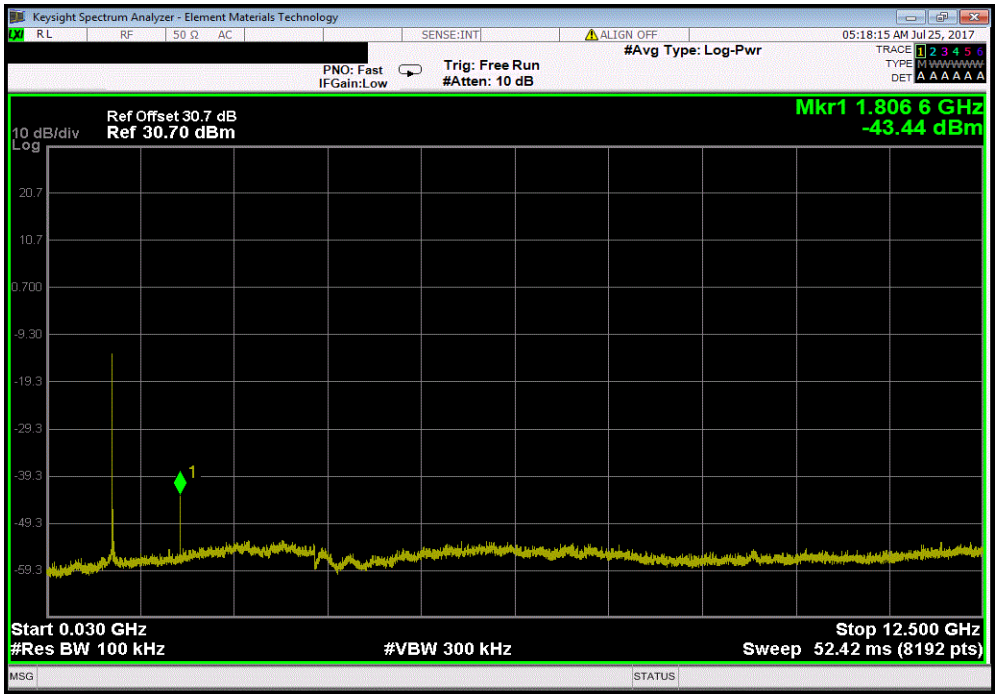
| **Configuration #** | 1 | *Signature* |
|---|---|---|

| | Frequency Range | Max Value (dBc) | Limit ≤ (dBc) | Result |
|---|---|---|---|---|
| Nominal Voltage: 3.5 VDC at Voltage Regulator, 3.0 VDC at RF Module | | | | |
| Low Channel, 903 MHz | Fundamental | N/A | N/A | N/A |
| Low Channel, 903 MHz | 30 MHz - 12.5 GHz | -70.18 | -30 | Pass |
| Low Channel, 903 MHz | 12.5 GHz - 25 GHz | -64.92 | -30 | Pass |
| Mid Channel, 915 MHz | Fundamental | N/A | N/A | N/A |
| Mid Channel, 915 MHz | 30 MHz - 12.5 GHz | -64.75 | -30 | Pass |
| Mid Channel, 915 MHz | 12.5 GHz - 25 GHz | -65.11 | -30 | Pass |
| High Channel, 927 MHz | Fundamental | N/A | N/A | N/A |
| High Channel, 927 MHz | 30 MHz - 12.5 GHz | -60.98 | -30 | Pass |
| High Channel, 927 MHz | 12.5 GHz - 25 GHz | -64.93 | -30 | Pass |
| Extreme Voltage Condition, Low: 2.7 VDC at Voltage Regulator, 2.7 VDC at RF Module | | | | |
| Low Channel, 903 MHz | Fundamental | N/A | N/A | N/A |
| Low Channel, 903 MHz | 30 MHz - 12.5 GHz | -67.59 | -30 | Pass |
| Low Channel, 903 MHz | 12.5 GHz - 25 GHz | -64.44 | -30 | Pass |
| Mid Channel, 915 MHz | Fundamental | N/A | N/A | N/A |
| Mid Channel, 915 MHz | 30 MHz - 12.5 GHz | -61.97 | -30 | Pass |
| Mid Channel, 915 MHz | 12.5 GHz - 25 GHz | -63.51 | -30 | Pass |
| High Channel, 927 MHz | Fundamental | N/A | N/A | N/A |
| High Channel, 927 MHz | 30 MHz - 12.5 GHz | -57.76 | -30 | Pass |
| High Channel, 927 MHz | 12.5 GHz - 25 GHz | -63.48 | -30 | Pass |
| Extreme Voltage Condition, High: 5.025 VDC at Voltage Regulator, 3.465 VDC at RF Module | | | | |
| Low Channel, 903 MHz | Fundamental | N/A | N/A | N/A |
| Low Channel, 903 MHz | 30 MHz - 12.5 GHz | -70.34 | -30 | Pass |
| Low Channel, 903 MHz | 12.5 GHz - 25 GHz | -64.31 | -30 | Pass |
| Mid Channel, 915 MHz | Fundamental | N/A | N/A | N/A |
| Mid Channel, 915 MHz | 30 MHz - 12.5 GHz | -65.68 | -30 | Pass |
| Mid Channel, 915 MHz | 12.5 GHz - 25 GHz | -64.18 | -30 | Pass |
| High Channel, 927 MHz | Fundamental | N/A | N/A | N/A |
| High Channel, 927 MHz | 30 MHz - 12.5 GHz | -61.39 | -30 | Pass |
| High Channel, 927 MHz | 12.5 GHz - 25 GHz | -64.18 | -30 | Pass |

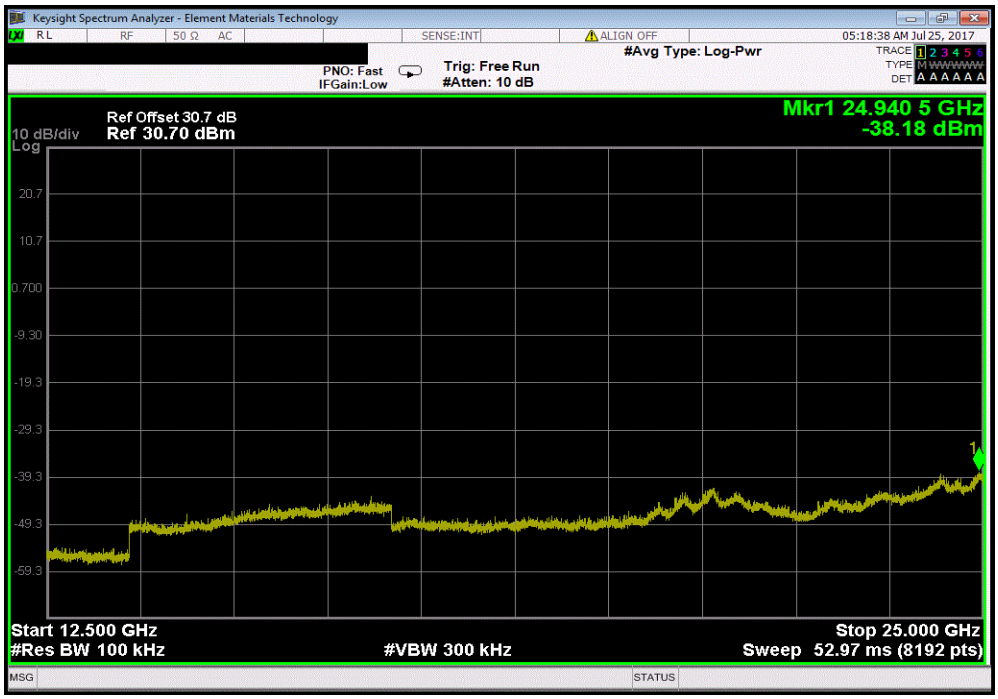
| Nominal Voltage: 3.5 VDC at Voltage Regulator, 3.0 VDC at RF Module at Voltage Regulator, 3.0 VDC at RF Module, Low Channel, 903 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency Range | | | Max Value (dBc) | Limit ≤ (dBc) | Result |
| | Fundamental | | | N/A | N/A | N/A |



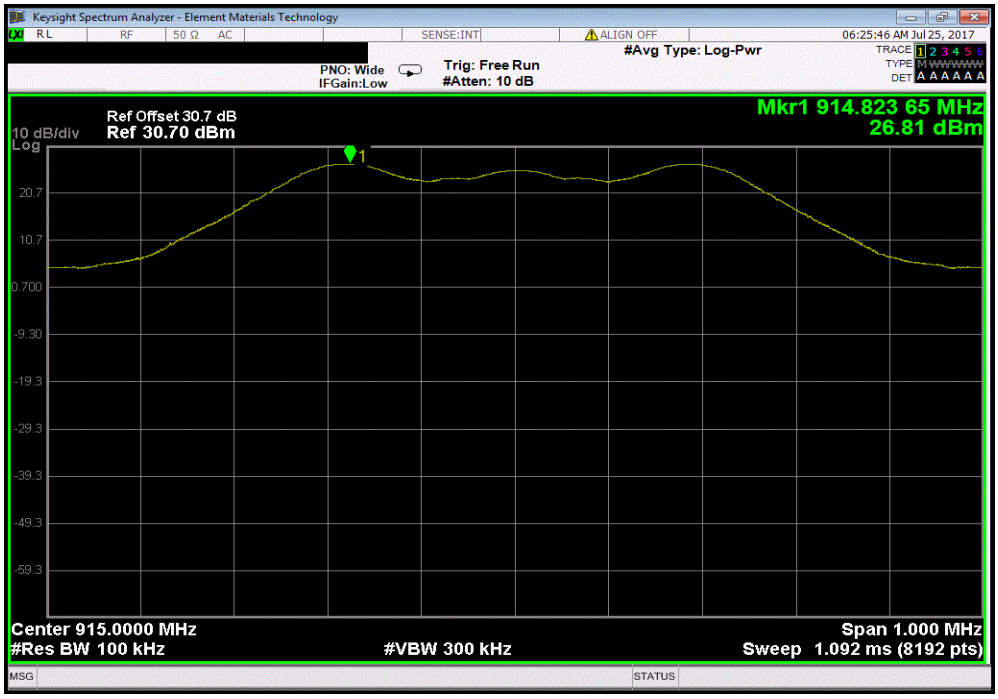

| Nominal Voltage: 3.5 VDC at Voltage Regulator, 3.0 VDC at RF Module at Voltage Regulator, 3.0 VDC at RF Module, Low Channel, 903 MHz | | | | | |
|---|---|---|---|---|---|
| Frequency Range | | | Max Value (dBc) | Limit ≤ (dBc) | Result |
| 30 MHz - 12.5 GHz | | | -70.18 | -30 | Pass |



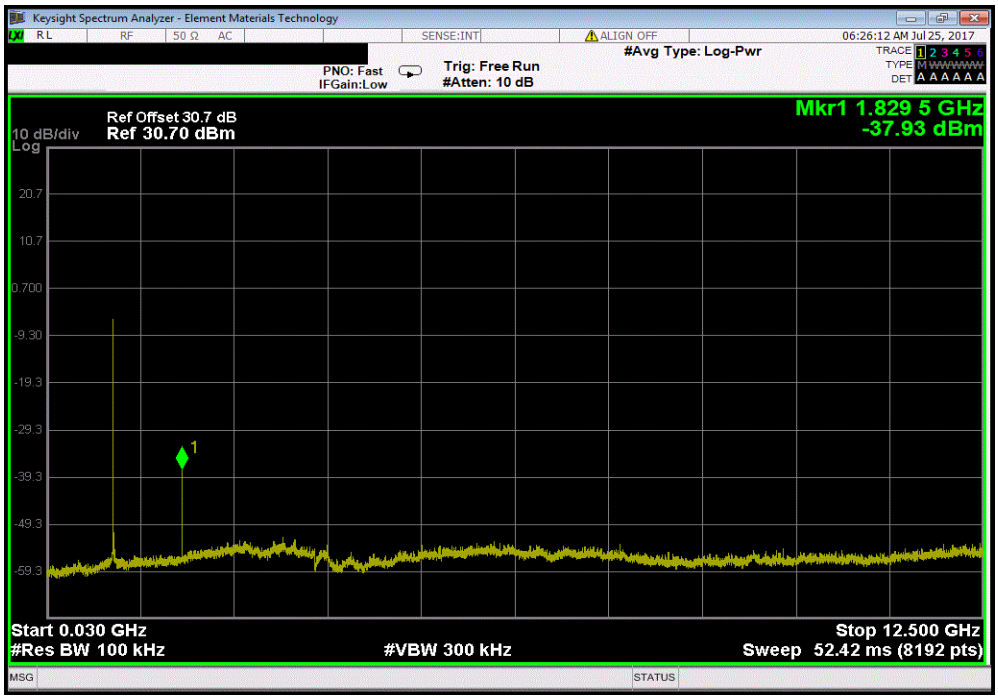
| Nominal Voltage: 3.5 VDC at Voltage Regulator, 3.0 VDC at RF Module at Voltage Regulator, 3.0 VDC at RF Module, Low Channel, 903 MHz | | | | |
|---|---|---|---|---|
| Frequency Range | | Max Value (dBc) | Limit ≤ (dBc) | Result |
| 12.5 GHz - 25 GHz | | -64.92 | -30 | Pass |



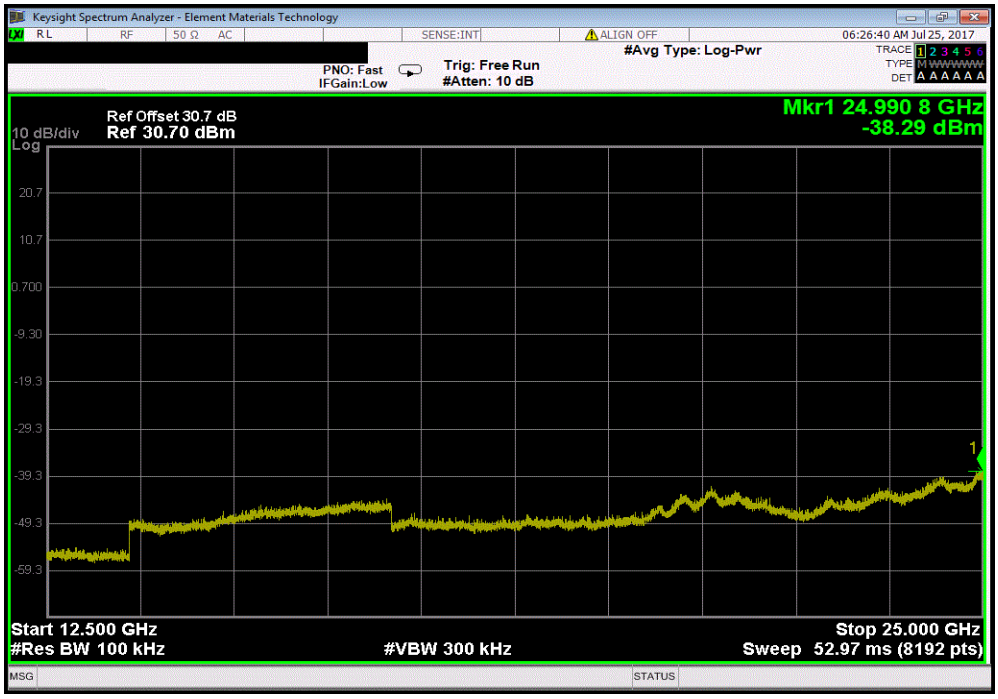

| Nominal Voltage: 3.5 VDC at Voltage Regulator, 3.0 VDC at RF Module at Voltage Regulator, 3.0 VDC at RF Module, Mid Channel, 915 MHz | | | | | | |
|---|---|---|---|---|---|---|
| Frequency Range | | | | Max Value (dBc) | Limit ≤ (dBc) | Result |
| | Fundamental | | | N/A | N/A | N/A |



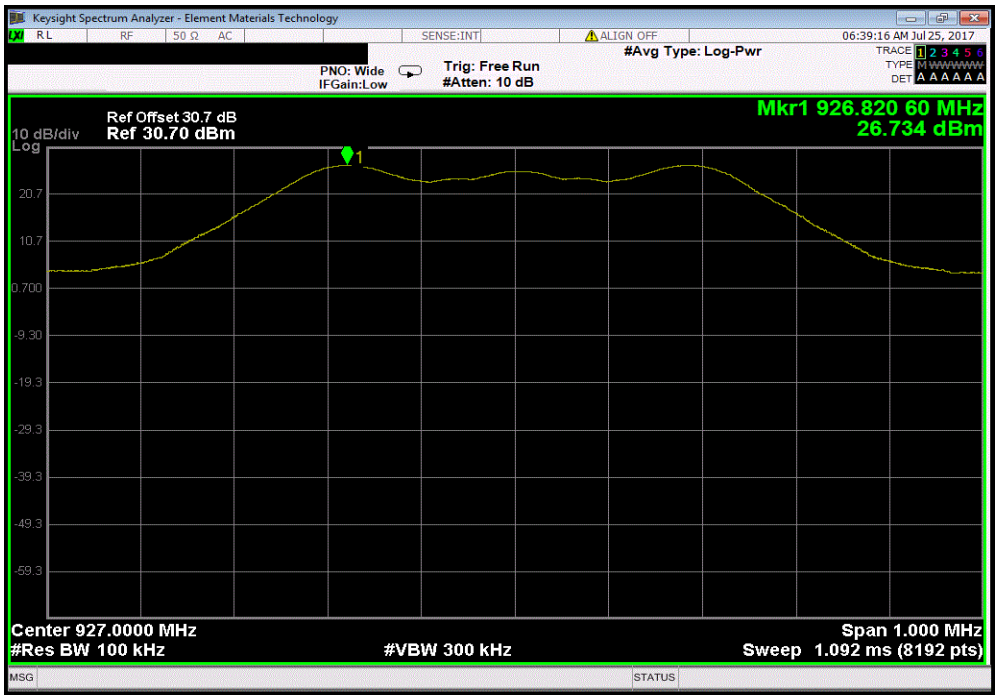
| Nominal Voltage: 3.5 VDC at Voltage Regulator, 3.0 VDC at RF Module at Voltage Regulator, 3.0 VDC at RF Module, Mid Channel, 915 MHz | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Max Value (dBc)** | **Limit ≤ (dBc)** | **Result** |
| 30 MHz - 12.5 GHz | | -64.75 | -30 | Pass |



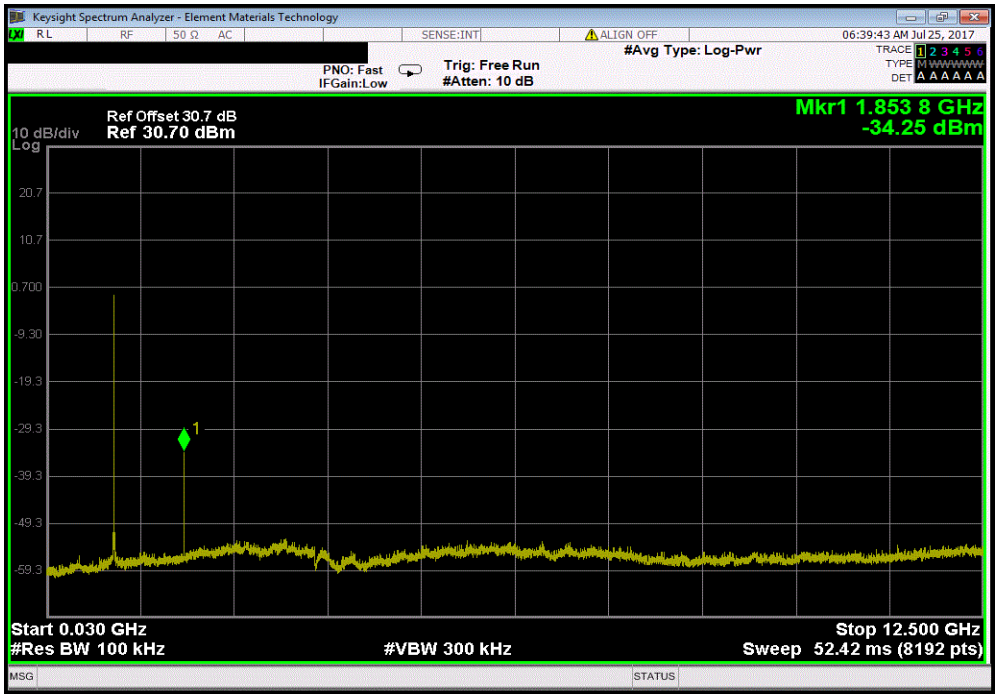

| Nominal Voltage: 3.5 VDC at Voltage Regulator, 3.0 VDC at RF Module, Mid Channel, 915 MHz | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Max Value (dBc)** | **Limit ≤ (dBc)** | **Result** |
| 12.5 GHz - 25 GHz | | -65.11 | -30 | Pass |



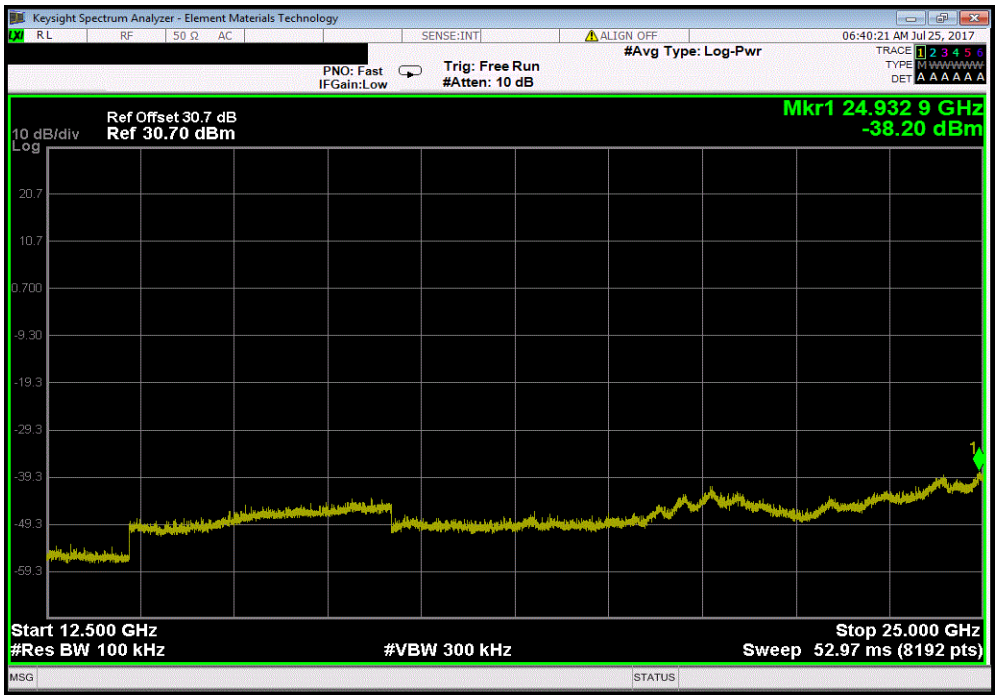
| Nominal Voltage: 3.5 VDC at Voltage Regulator, 3.0 VDC at RF Module, High Channel, 927 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency Range | | | Max Value (dBc) | Limit ≤ (dBc) | Result |
| | Fundamental | | | N/A | N/A | N/A |



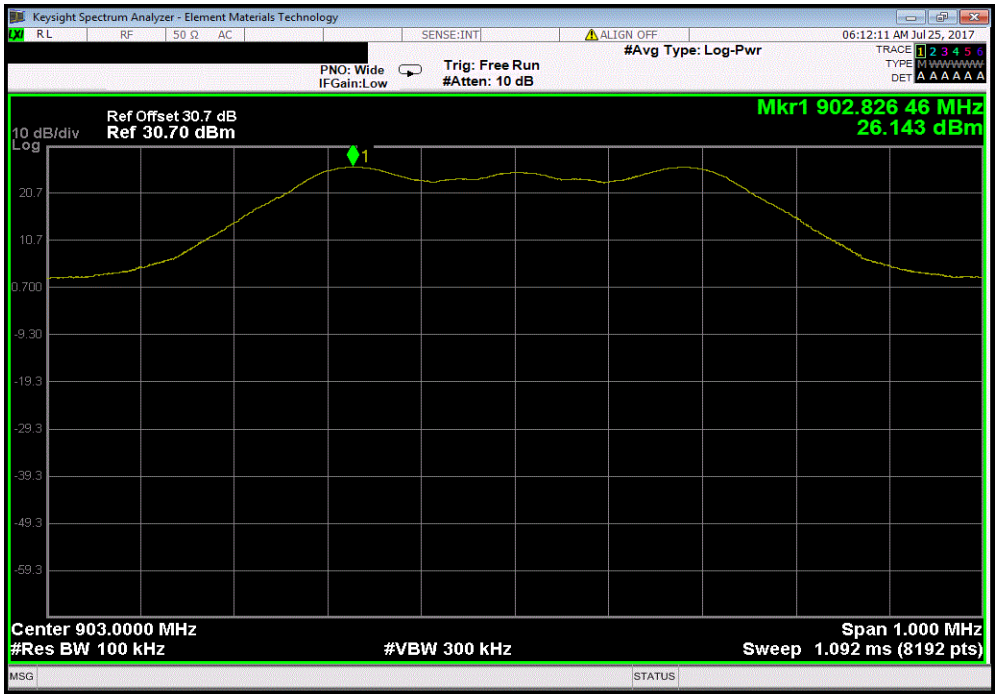

| Nominal Voltage: 3.5 VDC at Voltage Regulator, 3.0 VDC at RF Module, High Channel, 927 MHz | | | | | |
|---|---|---|---|---|---|
| Frequency Range | | | Max Value (dBc) | Limit ≤ (dBc) | Result |
| 30 MHz - 12.5 GHz | | | -60.98 | -30 | Pass |



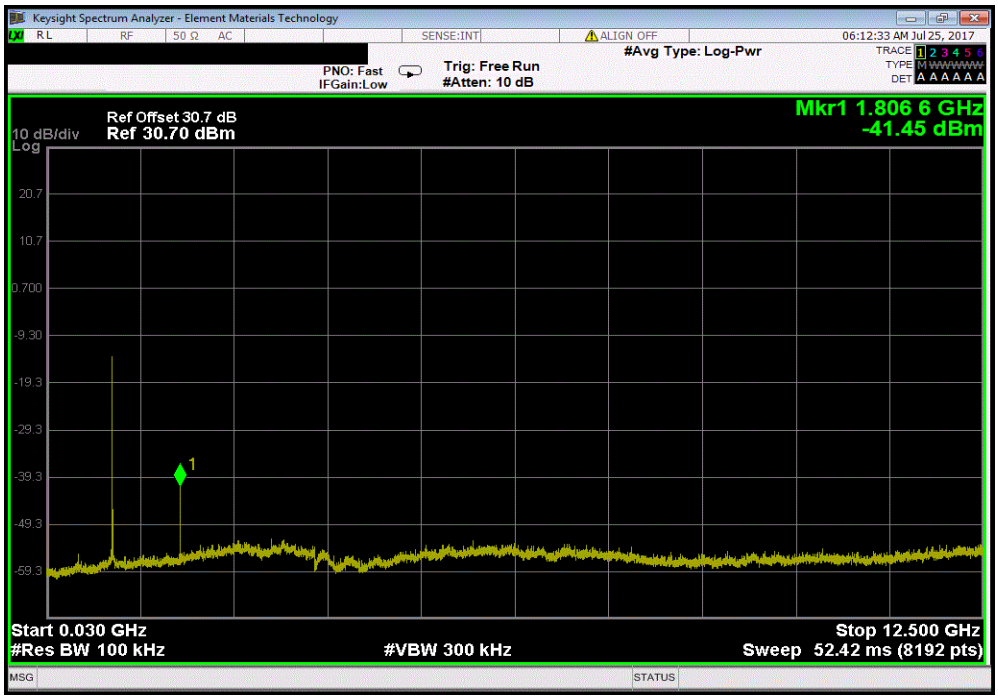
| Nominal Voltage: 3.5 VDC at Voltage Regulator, 3.0 VDC at RF Module, High Channel, 927 MHz | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Max Value (dBc)** | **Limit ≤ (dBc)** | **Result** |
| 12.5 GHz - 25 GHz | | -64.93 | -30 | Pass |



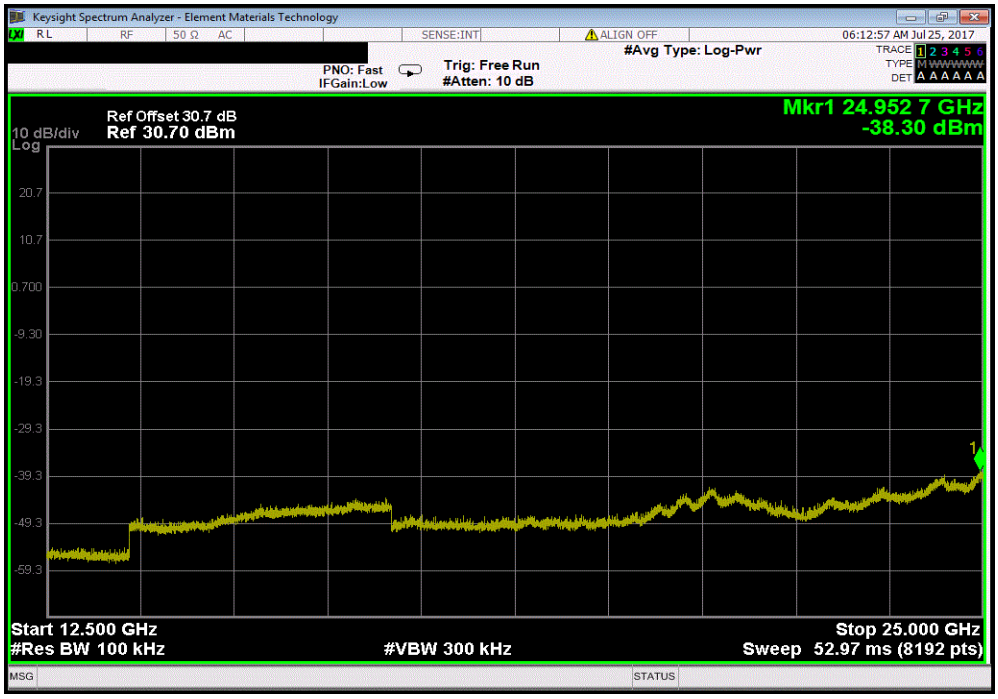

| Extreme Voltage Condition, Low: 2.7 VDC at Voltage Regulator, 2.7 VDC at RF Module, Low Channel, 903 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | **Frequency Range** | | | **Max Value (dBc)** | **Limit ≤ (dBc)** | **Result** |
| | Fundamental | | | N/A | N/A | N/A |



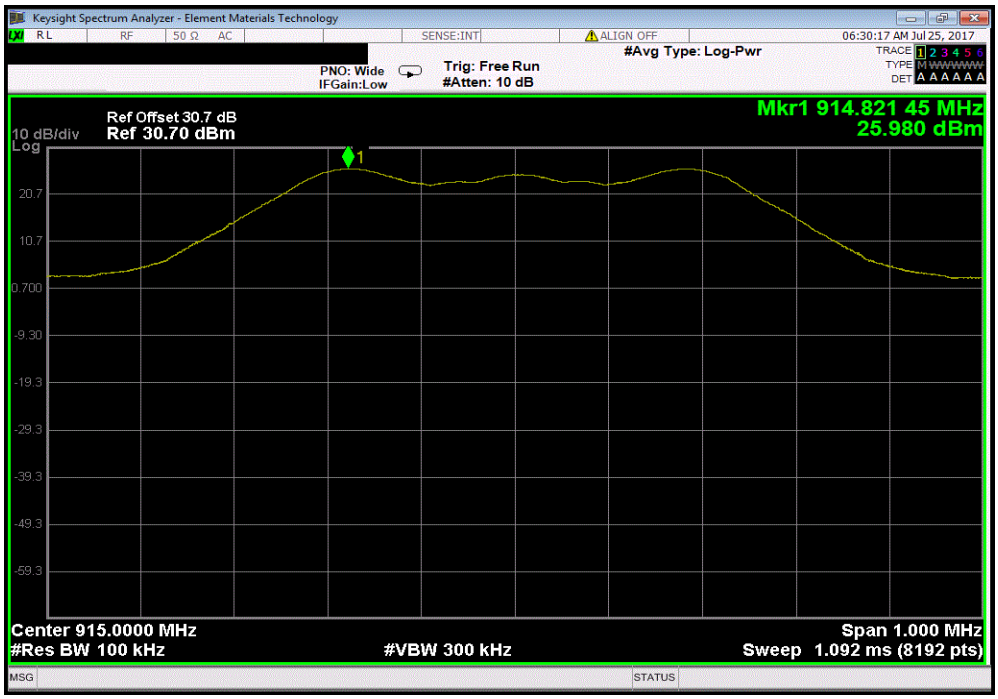
| Extreme Voltage Condition, Low: 2.7 VDC at Voltage Regulator, 2.7 VDC at RF Module, Low Channel, 903 MHz | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Max Value (dBc)** | **Limit ≤ (dBc)** | **Result** |
| 30 MHz - 12.5 GHz | | -67.59 | -30 | Pass |



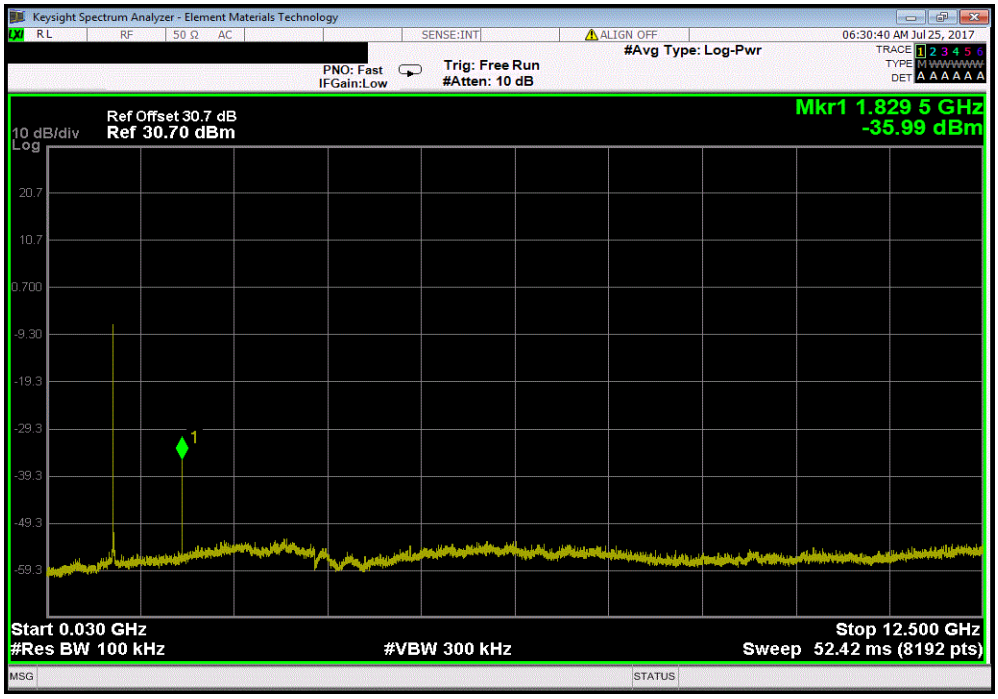

| Extreme Voltage Condition, Low: 2.7 VDC at Voltage Regulator, 2.7 VDC at RF Module, Low Channel, 903 MHz | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Max Value (dBc)** | **Limit ≤ (dBc)** | **Result** |
| 12.5 GHz - 25 GHz | | -64.44 | -30 | Pass |



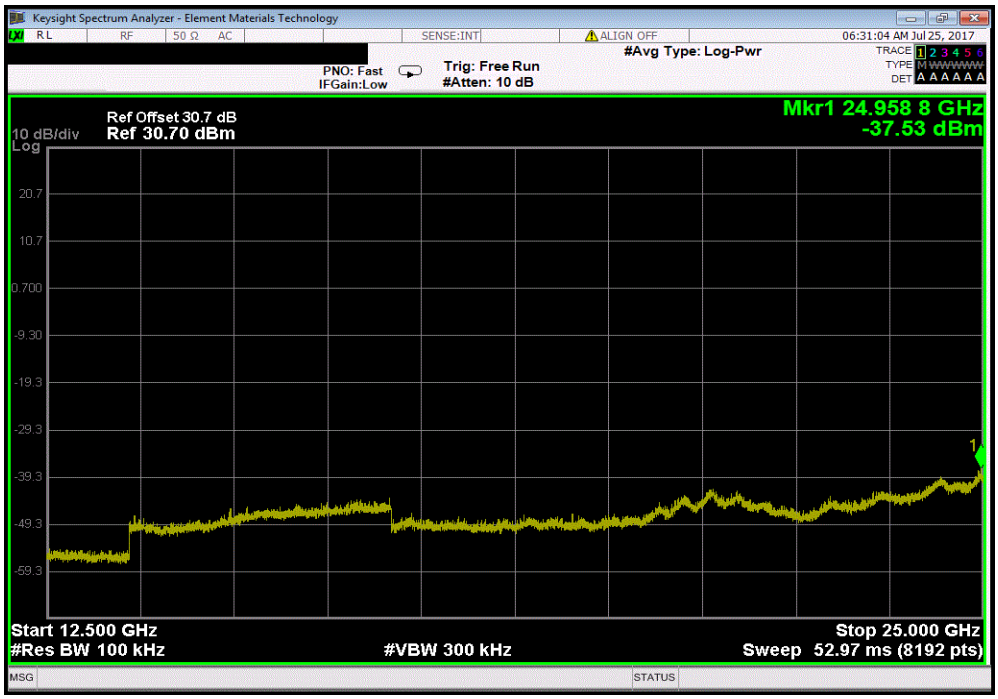
| Extreme Voltage Condition, Low: 2.7 VDC at Voltage Regulator, 2.7 VDC at RF Module, Mid Channel, 915 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency Range | | | Max Value (dBc) | Limit ≤ (dBc) | Result |
| | Fundamental | | | N/A | N/A | N/A |



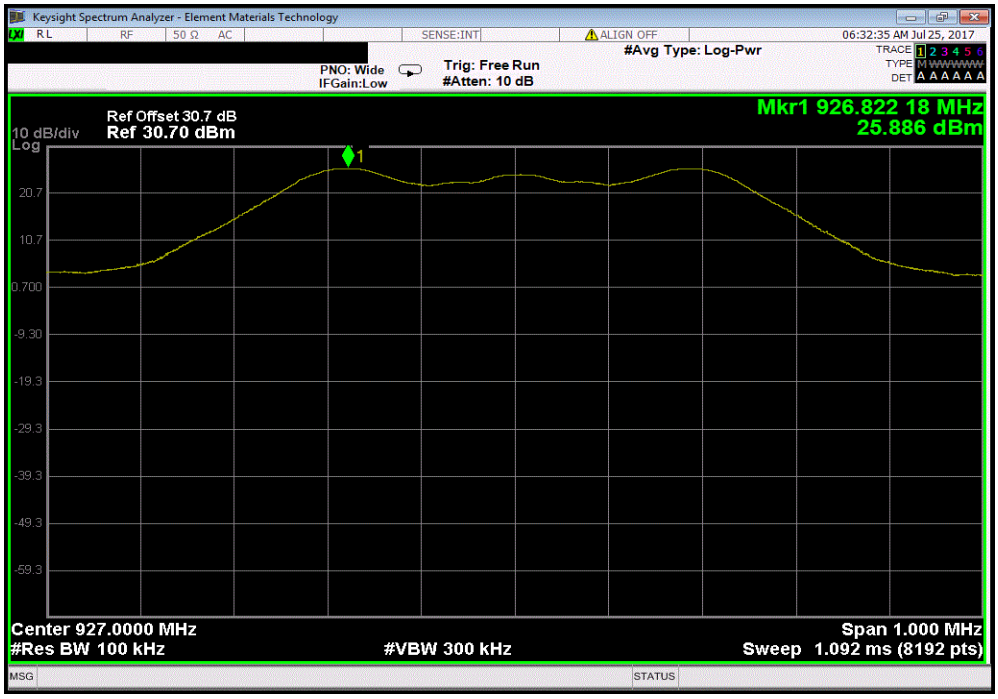

| Extreme Voltage Condition, Low: 2.7 VDC at Voltage Regulator, 2.7 VDC at RF Module, Mid Channel, 915 MHz | | | | | |
|---|---|---|---|---|---|
| Frequency Range | | | Max Value (dBc) | Limit ≤ (dBc) | Result |
| 30 MHz - 12.5 GHz | | | -61.97 | -30 | Pass |



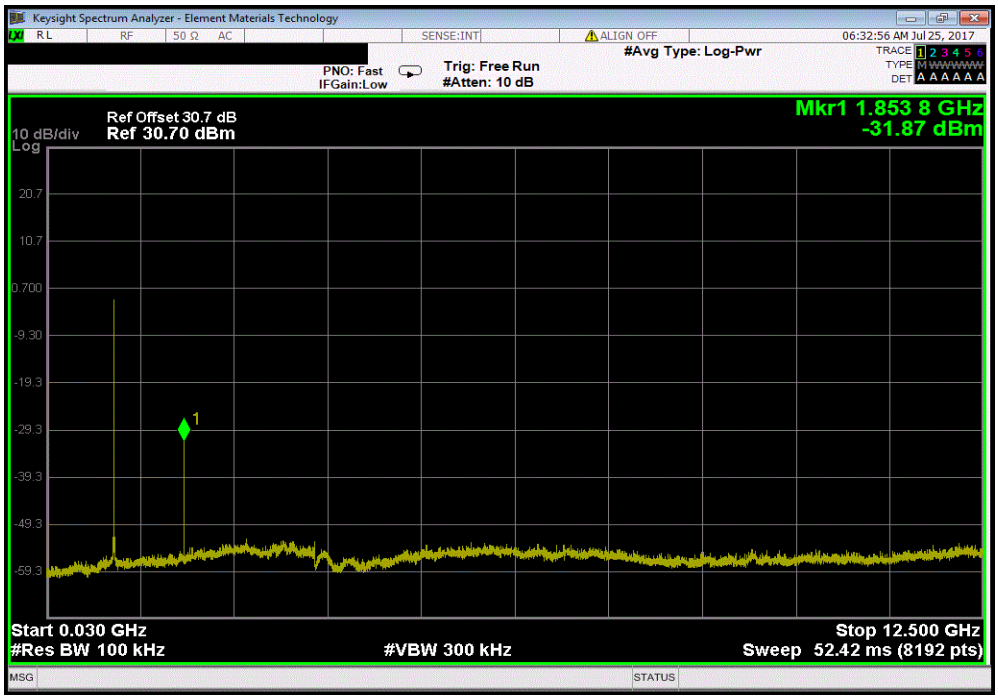
| Extreme Voltage Condition, Low: 2.7 VDC at Voltage Regulator, 2.7 VDC at RF Module, Mid Channel, 915 MHz | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Max Value (dBc)** | **Limit ≤ (dBc)** | **Result** |
| 12.5 GHz - 25 GHz | | -63.51 | -30 | Pass |



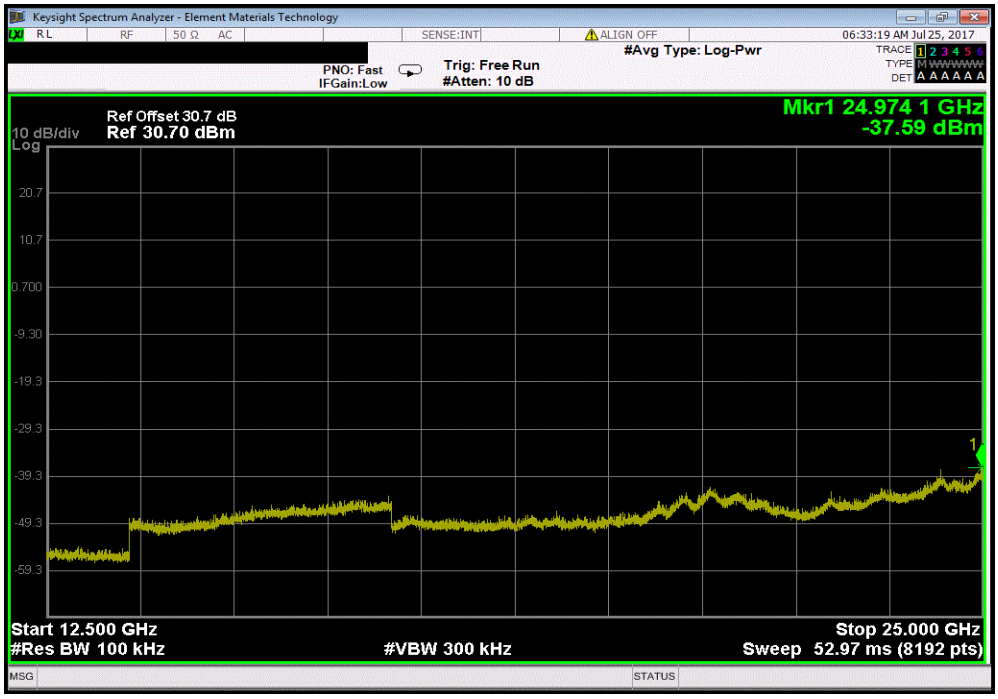

| Extreme Voltage Condition, Low: 2.7 VDC at Voltage Regulator, 2.7 VDC at RF Module, High Channel, 927 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | **Frequency Range** | | | **Max Value (dBc)** | **Limit ≤ (dBc)** | **Result** |
| | Fundamental | | | N/A | N/A | N/A |



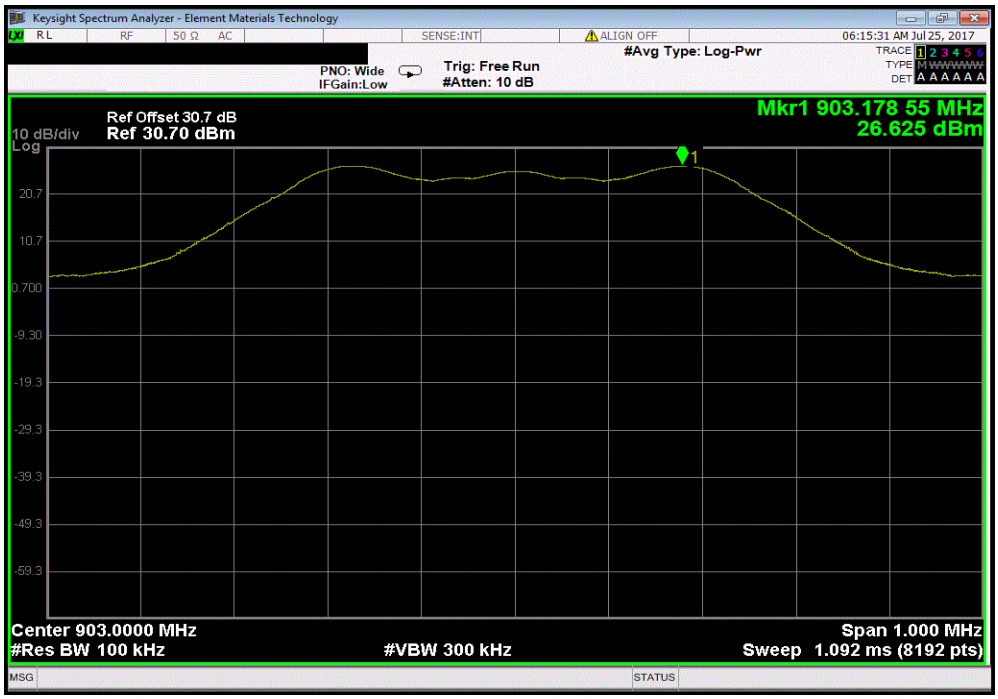
| Extreme Voltage Condition, Low: 2.7 VDC at Voltage Regulator, 2.7 VDC at RF Module, High Channel, 927 MHz | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Max Value (dBc)** | **Limit ≤ (dBc)** | **Result** |
| 30 MHz - 12.5 GHz | | -57.76 | -30 | Pass |



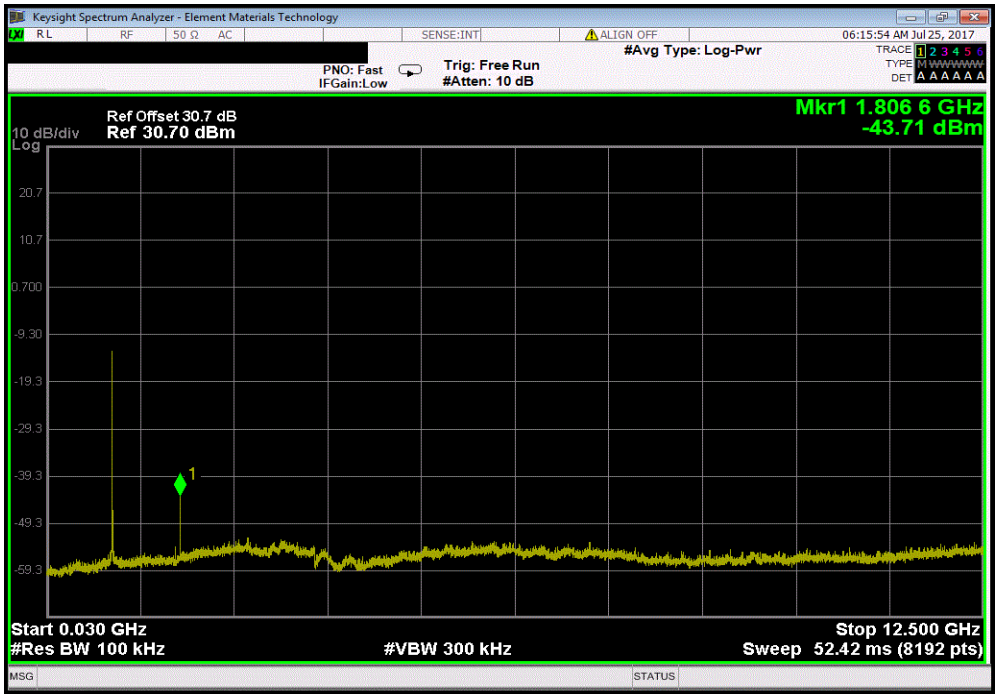

| Extreme Voltage Condition, Low: 2.7 VDC at Voltage Regulator, 2.7 VDC at RF Module, High Channel, 927 MHz | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Max Value (dBc)** | **Limit ≤ (dBc)** | **Result** |
| 12.5 GHz - 25 GHz | | -63.48 | -30 | Pass |



| Extreme Voltage Condition, High: 5.025 VDC at Voltage Regulator, 3.465 VDC at RF Module, Low Channel, 903 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | Frequency Range | | | Max Value (dBc) | Limit ≤ (dBc) | Result |
| | Fundamental | | | N/A | N/A | N/A |




| Extreme Voltage Condition, High: 5.025 VDC at Voltage Regulator, 3.465 VDC at RF Module, Low Channel, 903 MHz | | | | | |
|---|---|---|---|---|---|
| Frequency Range | | | Max Value (dBc) | Limit ≤ (dBc) | Result |
| 30 MHz - 12.5 GHz | | | -70.34 | -30 | Pass |



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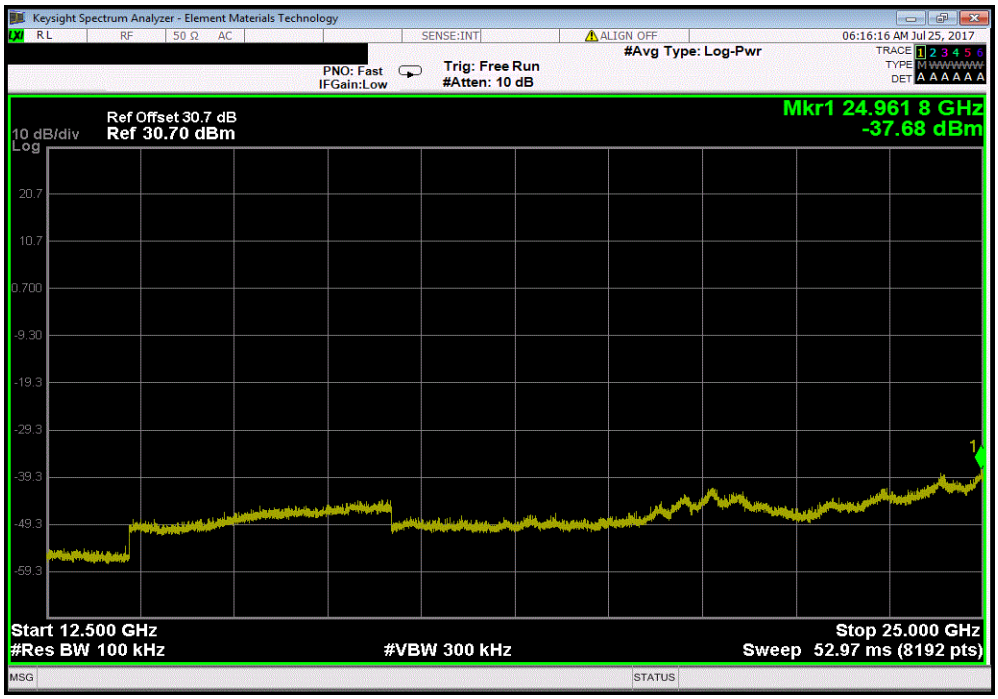
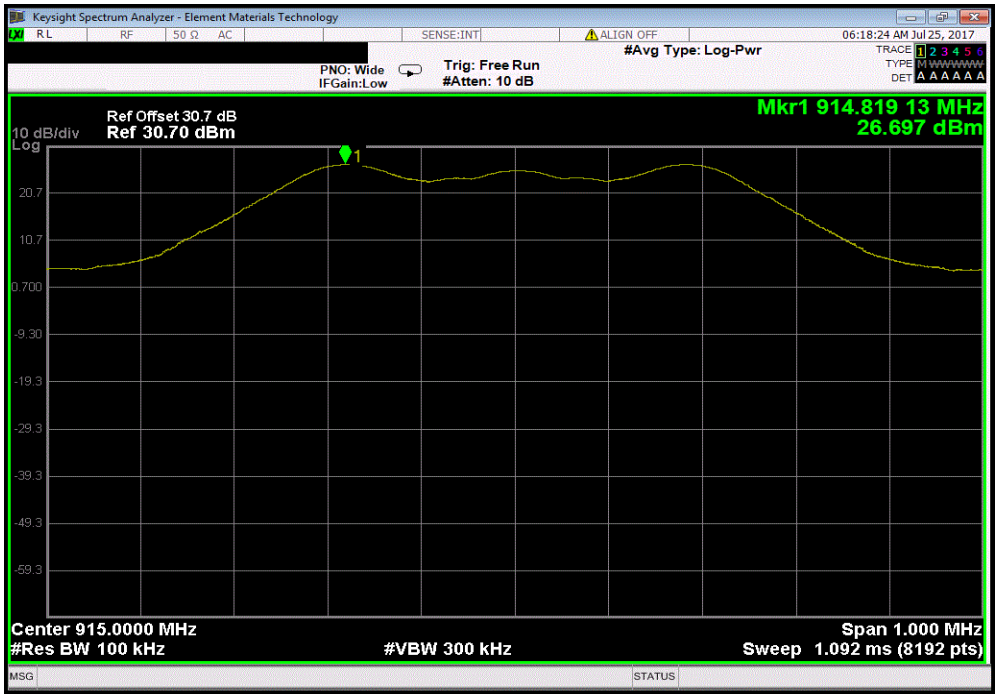
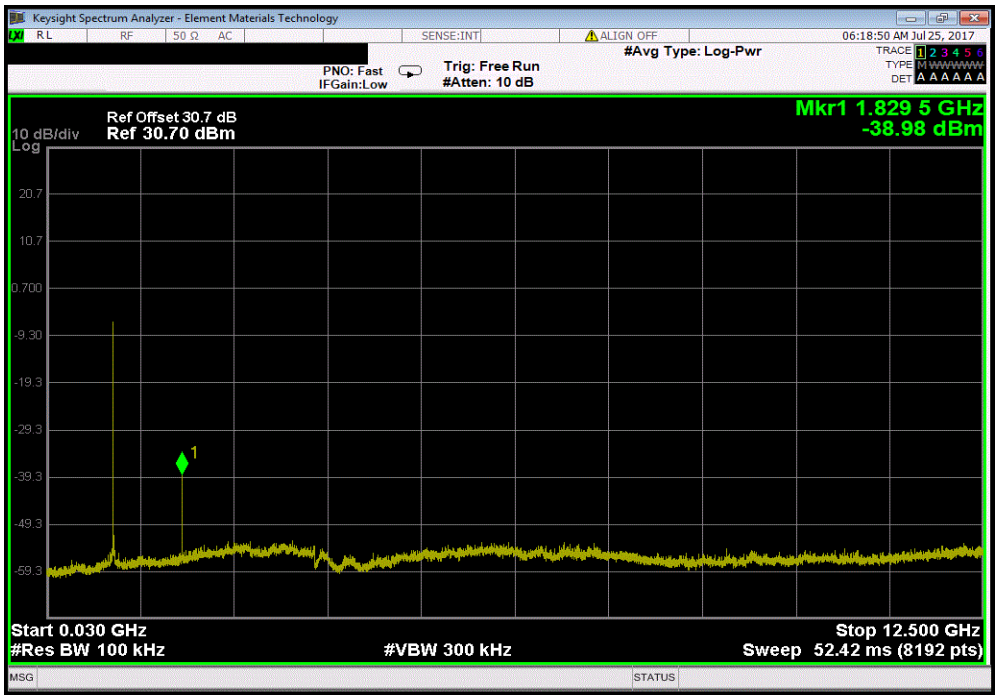
| Extreme Voltage Condition, High: 5.025 VDC at Voltage Regulator, 3.465 VDC at RF Module, Low Channel, 903 MHz | | | | |
|---|---|---|---|---|
| Frequency Range | | Max Value (dBc) | Limit ≤ (dBc) | Result |
| 12.5 GHz - 25 GHz | | -64.31 | -30 | Pass |



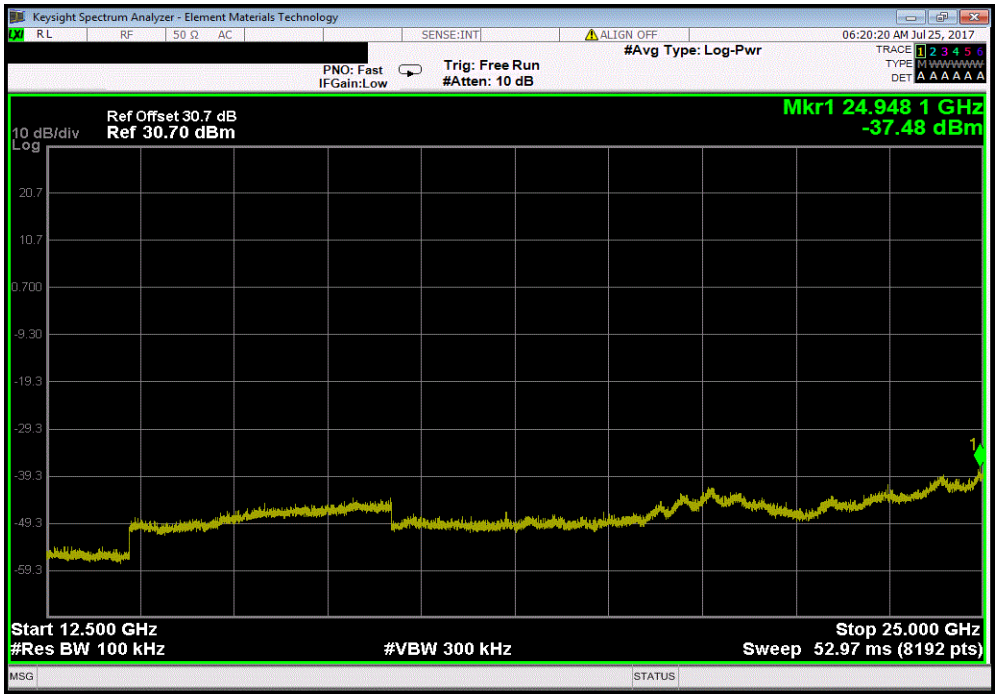

| Extreme Voltage Condition, High: 5.025 VDC at Voltage Regulator, 3.465 VDC at RF Module, Mid Channel, 915 MHz | | | | | | |
|---|---|---|---|---|---|---|
| Frequency Range | | | | Max Value (dBc) | Limit ≤ (dBc) | Result |
| | Fundamental | | | N/A | N/A | N/A |



| Extreme Voltage Condition, High: 5.025 VDC at Voltage Regulator, 3.465 VDC at RF Module, Mid Channel, 915 MHz | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Max Value (dBc)** | **Limit ≤ (dBc)** | **Result** |
| 30 MHz - 12.5 GHz | | -65.68 | -30 | Pass |



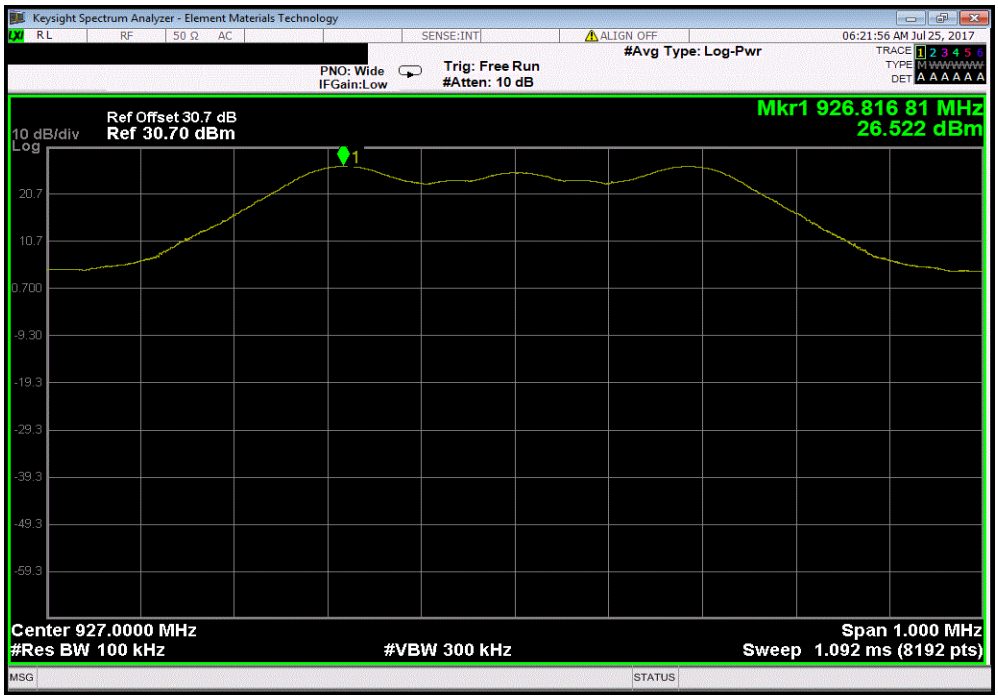

| Extreme Voltage Condition, High: 5.025 VDC at Voltage Regulator, 3.465 VDC at RF Module, Mid Channel, 915 MHz | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Max Value (dBc)** | **Limit ≤ (dBc)** | **Result** |
| 12.5 GHz - 25 GHz | | -64.18 | -30 | Pass |



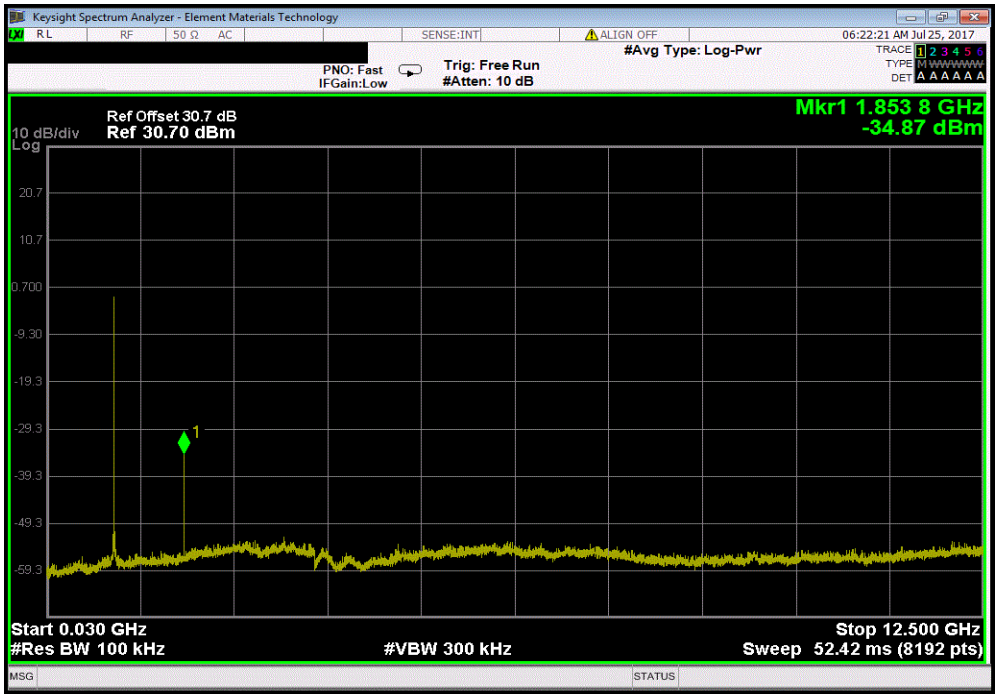
# SPURIOUS CONDUCTED EMISSIONS

TbtTx 2017.04.18 XMit 2017.02.08

| Extreme Voltage Condition, High: 5.025 VDC at Voltage Regulator, 3.465 VDC at RF Module, High Channel, 927 MHz | | | | | | |
|---|---|---|---|---|---|---|
| Frequency Range | | | | Max Value (dBc) | Limit ≤ (dBc) | Result |
| | Fundamental | | | N/A | N/A | N/A |



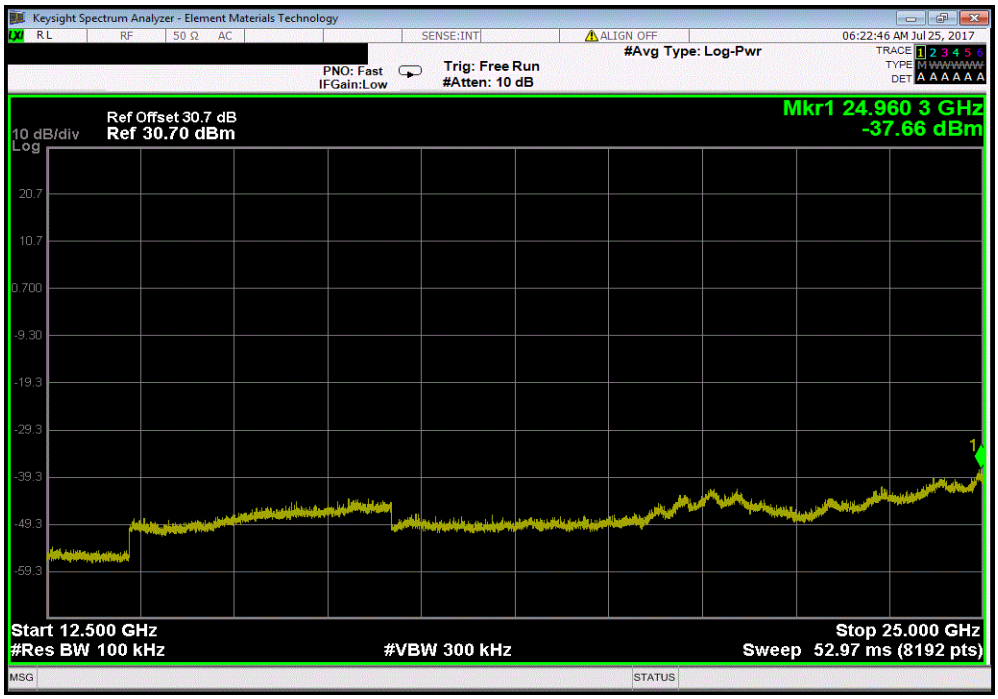

| Extreme Voltage Condition, High: 5.025 VDC at Voltage Regulator, 3.465 VDC at RF Module, High Channel, 927 MHz | | | | |
|---|---|---|---|---|
| Frequency Range | | Max Value (dBc) | Limit ≤ (dBc) | Result |
| 30 MHz - 12.5 GHz | | -61.39 | -30 | Pass |



# SPURIOUS CONDUCTED EMISSIONS



| Extreme Voltage Condition, High: 5.025 VDC at Voltage Regulator, 3.465 VDC at RF Module, High Channel, 927 MHz | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Max Value (dBc)** | **Limit ≤ (dBc)** | **Result** |
| 12.5 GHz - 25 GHz | | -64.18 | -30 | Pass |



# POWER SPECTRAL DENSITY

XMit 2017.02.08

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Cal. Due |
|---|---|---|---|---|---|
| Power Supply - DC | Topward | TPS-2000 | TPD | NCR | NCR |
| Meter - Multimeter | Fluke | 8846A | MMZ | 10/22/2015 | 10/22/2018 |
| Meter - Multimeter | Tektronix | DMM912 | MMH | 2/17/2016 | 2/17/2019 |
| Cable | Micro-Coax | UFD150A-1-0720-200200 | EVH | 5/30/2017 | 5/30/2018 |
| Attenuator | Fairview Microwave | SA26B-10 | TWG | 4/15/2017 | 4/15/2018 |
| Attenuator | S.M. Electronics | SA26B-20 | AUY | 5/30/2017 | 5/30/2018 |
| Block - DC | Fairview Microwave | SD3379 | AMW | 6/5/2017 | 6/5/2018 |
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFP | 8/10/2016 | 8/10/2017 |

**TEST DESCRIPTION**

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The power spectral density was measured using the channels as called out on the following data sheets. The transmit power was set to its default maximum.

The method AVGPSD-1 in section 11.10.3 of ANSI C63.10:2013 was used to make the measurement. This method uses trace averaging and RMS detection across the full power of the burst. This method is allowed as the same method has been used to determine the conducted output power.

# POWER SPECTRAL DENSITY

TbtTx 2017.04.18 XMit 2017.02.08

| | | | | | |
|---|---|---|---|---|---|
| **EUT:** | **9630-9110** | | | **Work Order:** | **SCHW0219** |
| **Serial Number:** | **A02654144** | | | **Date:** | **07/24/17** |
| **Customer:** | **Schweitzer Engineering Laboratories, Inc.** | | | **Temperature:** | **23.8 °C** |
| **Attendees:** | **Allan Davis** | | | **Humidity:** | **44.2% RH** |
| **Project:** | **None** | | | **Barometric Pres.:** | **1016 mbar** |
| **Tested by:** | **Mark Baytan** | **Power:** | **3.5 VDC** | **Job Site:** | **EV06** |

| **TEST SPECIFICATIONS** | **Test Method** |
|---|---|
| **FCC 15.247:2017** | ANSI C63.10:2013 |
| | |

**COMMENTS**

**Total reference level offset (DC Block + 20dB Attenuator + 10dB Attenuator + RF Cable) = 30.7 dB. Power level setting: 27 dBm**

**DEVIATIONS FROM TEST STANDARD**

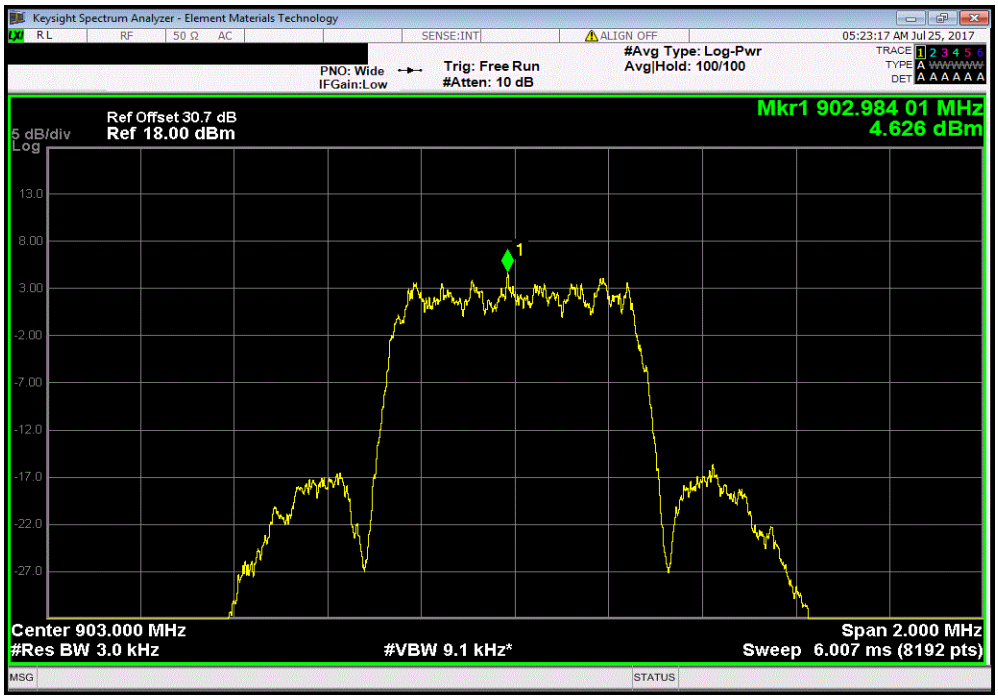
**None**

| **Configuration #** | **1** | *Signature* |
|---|---|---|

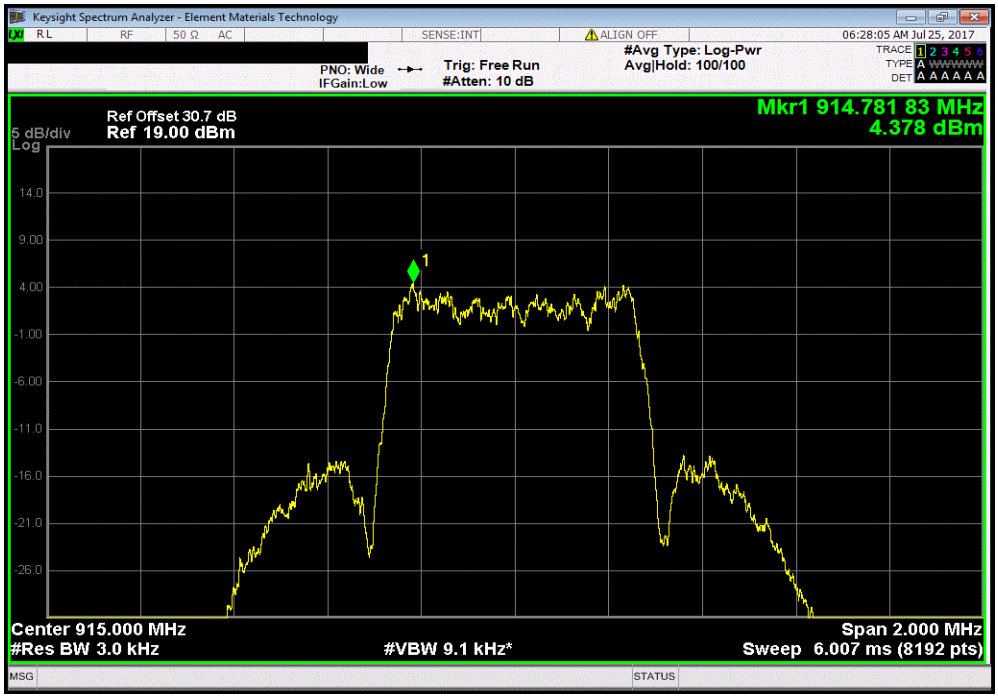
| | **Value dBm/3kHz** | **Limit < dBm/3kHz** | **Results** |
|---|---|---|---|
| Nominal Voltage: 3.5 VDC | | | |
| Low Channel, 903 MHz | 4.626 | 8 | Pass |
| Mid Channel, 915 MHz | 4.378 | 8 | Pass |
| High Channel, 927 MHz | 4.051 | 8 | Pass |

# POWER SPECTRAL DENSITY

| Nominal Voltage: 3.5 VDC, Low Channel, 903 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | | | | Value dBm/3kHz | Limit < dBm/3kHz | Results |
| | | | | 4.626 | 8 | Pass |



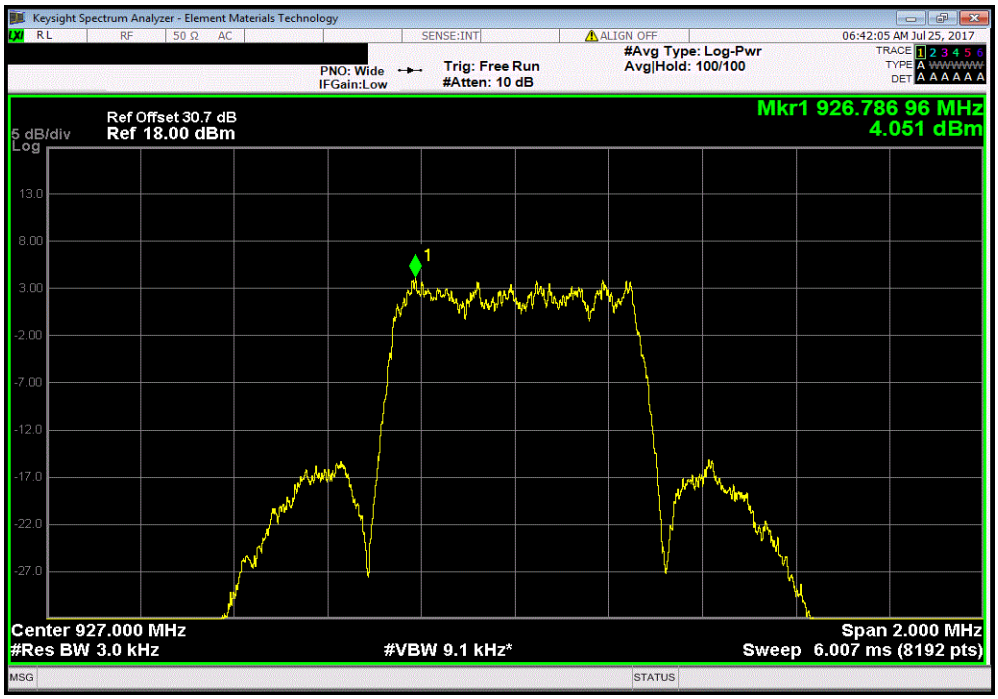

| Nominal Voltage: 3.5 VDC, Mid Channel, 915 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | | | | Value dBm/3kHz | Limit < dBm/3kHz | Results |
| | | | | 4.378 | 8 | Pass |



# POWER SPECTRAL DENSITY

TbtTx 2017.04.18 XMit 2017.02.08

| Nominal Voltage: 3.5 VDC, High Channel, 927 MHz | | | | | | |
|---|---|---|---|---|---|---|
| | | | | Value dBm/3kHz | Limit < dBm/3kHz | Results |
| | | | | 4.051 | 8 | Pass |



# RADIATED EMISSIONS FOR RECEIVER

PSA-ESCI 2017.06.01

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

**MODES OF OPERATION**

Continuous Rx

**POWER SETTINGS INVESTIGATED**

3.5 VDC

**CONFIGURATIONS INVESTIGATED**

SCHW0228 - 2

SCHW0228 - 3

**FREQUENCY RANGE INVESTIGATED**

| Start Frequency | 30 MHz | Stop Frequency | 12.4 GHz |
|---|---|---|---|

**SAMPLE CALCULATIONS**

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Interval |
|---|---|---|---|---|---|
| Cable | None | Standard Gain Horns Cable | EVF | 2/6/2017 | 12 mo |
| Amplifier - Pre-Amplifier | L-3 Narda-MITEQ | AMF-6F-08001200-30-10P | PAO | 2/7/2017 | 12 mo |
| Antenna - Standard Gain | ETS Lindgren | 3160-07 | AHU | NCR | 0 mo |
| Cable | N/A | Double Ridge Horn Cables | EVB | 7/20/2017 | 12 mo |
| Amplifier - Pre-Amplifier | Miteq | AMF-3D-00100800-32-13P | PAG | 7/20/2017 | 12 mo |
| Antenna - Double Ridge | ETS Lindgren | 3115 | AIZ | 2/3/2016 | 24 mo |
| Cable | N/A | Bilog Cables | EVA | 2/6/2017 | 12 mo |
| Amplifier - Pre-Amplifier | Miteq | AM-1616-1000 | AOL | 2/6/2017 | 12 mo |
| Antenna - Biconilog | Teseq | CBL 6141B | AXR | 6/30/2016 | 24 mo |
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFN | 4/13/2017 | 12 mo |

**TEST DESCRIPTION**

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies and the modes as showed in the data sheets.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

Measurements at the edges of the allowable band may be presented in an alternative method as provided for in the ANSI C63.10 Marker-Delta method. This method involves performing an in-band fundamental measurement followed by a screen capture of the fundamental and out-of-band emission using reduced measurement instrumentation bandwidths. The amplitude delta measured on this screen capture is applied to the fundamental emission value to show the out-of-band emission level as applied to the limit.

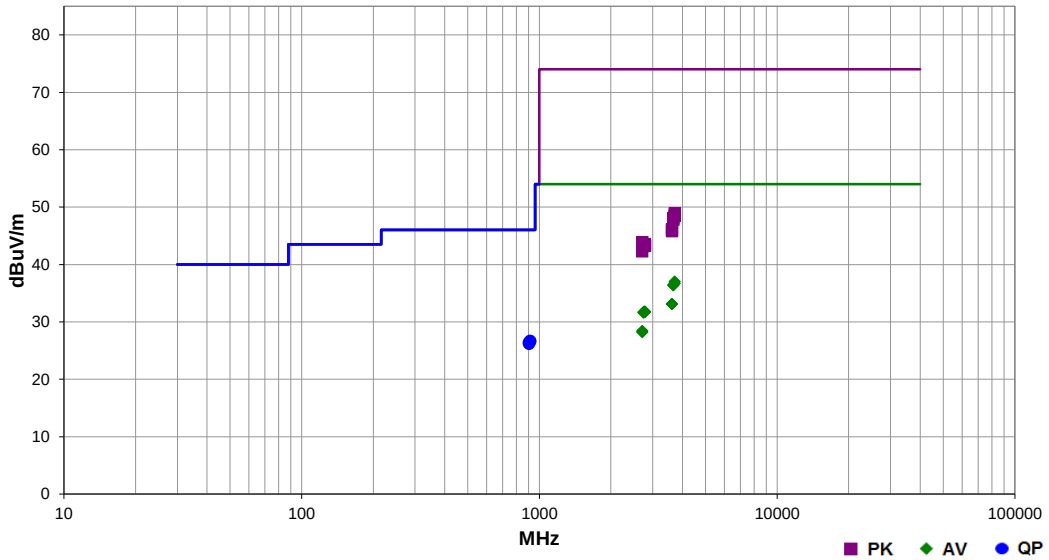
# RADIATED EMISSIONS FOR RECEIVER

EmiR5 2017.07.11 PSA-ESCI 2017.06.01

| | | | | | |
|---|---|---|---|---|---|
| **Work Order:** | SCHW0228 | **Date:** | 10/20/17 | | |
| **Project:** | None | **Temperature:** | 23.8 °C | | |
| **Job Site:** | EV01 | **Humidity:** | 40.3% RH | | |
| **Serial Number:** | See Config | **Barometric Pres.:** | 1012 mbar | **Tested by:** | Jeff Alcoke and Rod Peloquin |
| **EUT:** | 9630-9110 | | | | |
| **Configuration:** | 2 | | | | |
| **Customer:** | Schweitzer Engineering Laboratories, Inc. | | | | |
| **Attendees:** | Allan Davis | | | | |
| **EUT Power:** | 3.5 VDC | | | | |
| **Operating Mode:** | Continuous Rx | | | | |
| **Deviations:** | None | | | | |
| **Comments:** | See comments below for Channel, Frequency, and EUT orientation. | | | | |

| **Test Specifications** | **Class B** | **Test Method** |
|---|---|---|
| FCC 15.109:2017 | | ANSI C63.4:2014 |

| **Run #** | 17 | **Test Distance (m)** | 3 | **Antenna Height(s)** | 1 to 4(m) | **Results** | Pass |
|---|---|---|---|---|---|---|---|




| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Antenna Height (meters) | Azimuth (degrees) | Test Distance (meters) | External Attenuation (dB) | Polarity/ Transducer Type | Detector | Distance Adjustment (dB) | Adjusted (dBuV/m) | Spec. Limit (dBuV/m) | Compared to Spec. (dB) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3710.283 | 29.8 | 7.2 | 1.0 | 143.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 37.0 | 54.0 | -17.0 | High Ch. EUT Horizontal |
| 3707.367 | 29.6 | 7.1 | 1.0 | 156.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 36.7 | 54.0 | -17.3 | High Ch. EUT on Side |
| 3662.183 | 29.5 | 6.9 | 1.0 | 34.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 36.4 | 54.0 | -17.6 | Mid Ch. EUT on Side |
| 3662.150 | 29.5 | 6.9 | 3.9 | 142.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 36.4 | 54.0 | -17.6 | Mid Ch. EUT Horizontal |
| 913.858 | 16.4 | 10.3 | 1.0 | 205.0 | 3.0 | 0.0 | Vert | QP | 0.0 | 26.7 | 46.0 | -19.3 | Mid CH. EUT on Side |
| 915.478 | 16.3 | 10.3 | 3.5 | 280.0 | 3.0 | 0.0 | Horz | QP | 0.0 | 26.6 | 46.0 | -19.4 | Mid CH. EUT Horizontal |
| 902.340 | 16.4 | 10.0 | 1.2 | 130.0 | 3.0 | 0.0 | Vert | QP | 0.0 | 26.4 | 46.0 | -19.6 | Low CH, EUT on Side |
| 903.818 | 16.3 | 9.9 | 3.0 | 333.0 | 3.0 | 0.0 | Horz | QP | 0.0 | 26.2 | 46.0 | -19.8 | Low CH, EUT Horizontal |
| 3610.425 | 26.2 | 6.9 | 2.5 | 81.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 33.1 | 54.0 | -20.9 | Low CH, EUT Horizontal |
| 3610.275 | 26.2 | 6.9 | 1.0 | 201.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 33.1 | 54.0 | -20.9 | Low CH, EUT on Side |
| 2778.525 | 30.2 | 1.6 | 1.0 | 296.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 31.8 | 54.0 | -22.2 | High Ch. EUT Horizontal |
| 2782.392 | 30.1 | 1.6 | 1.0 | 260.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 31.7 | 54.0 | -22.3 | High Ch. EUT on Side |
| 2743.058 | 30.4 | 1.3 | 1.0 | 39.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 31.7 | 54.0 | -22.3 | Mid Ch. EUT on Side |
| 2743.225 | 30.3 | 1.3 | 2.7 | 2.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 31.6 | 54.0 | -22.4 | Mid Ch. EUT Horizontal |
| 3707.100 | 41.8 | 7.1 | 1.0 | 156.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 48.9 | 74.0 | -25.1 | High Ch. EUT on Side |
| 3706.592 | 41.4 | 7.1 | 1.0 | 143.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 48.5 | 74.0 | -25.5 | High Ch. EUT Horizontal |
| 2709.192 | 27.3 | 1.1 | 1.0 | 149.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 28.4 | 54.0 | -25.6 | Low CH, EUT Horizontal |
| 2707.858 | 27.2 | 1.0 | 1.0 | 329.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 28.2 | 54.0 | -25.8 | Low CH, EUT on Side |
| 3659.400 | 41.2 | 6.9 | 1.0 | 34.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 48.1 | 74.0 | -25.9 | Mid Ch. EUT on Side |
| 3659.858 | 40.9 | 6.9 | 3.9 | 142.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 47.8 | 74.0 | -26.2 | Mid Ch. EUT Horizontal |
| 3612.642 | 39.2 | 6.9 | 1.0 | 201.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 46.1 | 74.0 | -27.9 | Low CH, EUT on Side |
| 3610.383 | 38.9 | 6.9 | 2.5 | 81.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 45.8 | 74.0 | -28.2 | Low CH, EUT Horizontal |
| 2710.233 | 42.7 | 1.2 | 1.0 | 149.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 43.9 | 74.0 | -30.1 | Low CH, EUT Horizontal |
| 2779.775 | 41.9 | 1.6 | 1.0 | 296.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 43.5 | 74.0 | -30.5 | High Ch. EUT Horizontal |
| 2781.608 | 41.7 | 1.6 | 1.0 | 260.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 43.3 | 74.0 | -30.7 | High Ch. EUT on Side |
| 2745.158 | 42.0 | 1.3 | 1.0 | 39.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 43.3 | 74.0 | -30.7 | Mid Ch. EUT on Side |
| 2744.267 | 41.9 | 1.3 | 2.7 | 2.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 43.2 | 74.0 | -30.8 | Mid Ch. EUT Horizontal |
| 2707.200 | 41.3 | 1.0 | 1.0 | 329.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 42.3 | 74.0 | -31.7 | Low CH, EUT on Side |

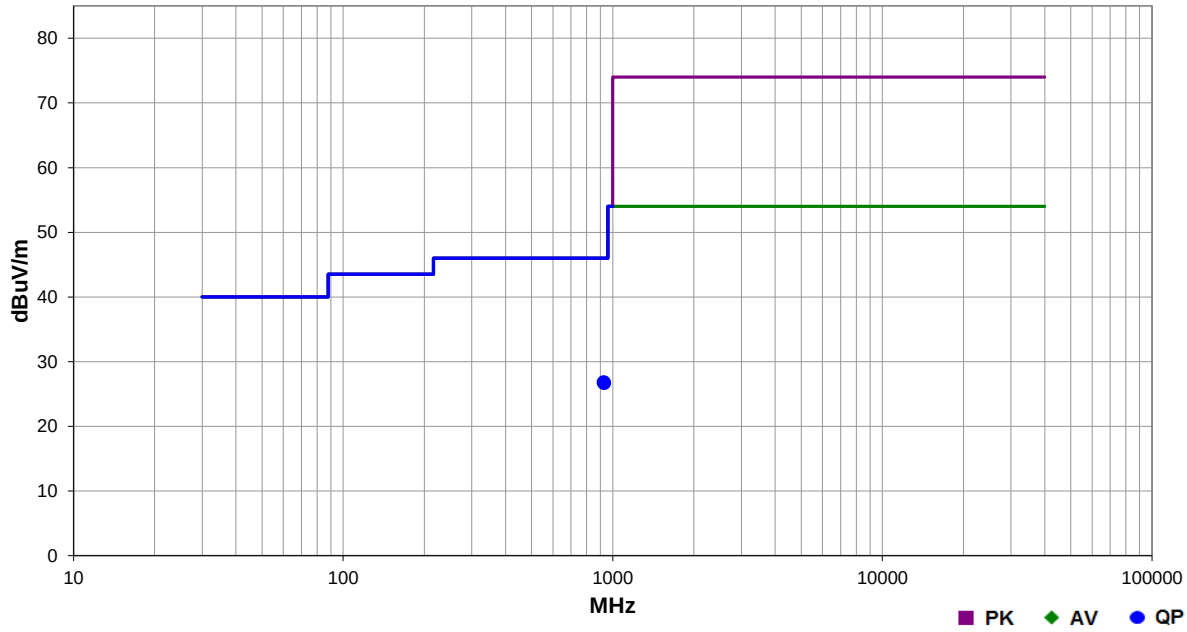
# RADIATED EMISSIONS FOR RECEIVER

EmiR5 2017.07.11 PSA-ESCI 2017.06.01

| | | | | | |
|---|---|---|---|---|---|
| **Work Order:** | SCHW0228 | **Date:** | 10/20/17 | | |
| **Project:** | None | **Temperature:** | 23.7 °C | | |
| **Job Site:** | EV01 | **Humidity:** | 40.2% RH | | |
| **Serial Number:** | See Config | **Barometric Pres.:** | 1015 mbar | **Tested by:** | Jeff Alcoke and Rod Peloquin |
| **EUT:** | 9630-9110 | | | | |
| **Configuration:** | 3 | | | | |
| **Customer:** | Schweitzer Engineering Laboratories, Inc. | | | | |
| **Attendees:** | Allan Davis | | | | |
| **EUT Power:** | 3.5 VDC | | | | |
| **Operating Mode:** | Continuous Rx | | | | |
| **Deviations:** | None | | | | |
| **Comments:** | See comments below for Channel, Frequency, and EUT orientation. | | | | |

| **Test Specifications** | **Class B** | **Test Method** | |
|---|---|---|---|
| FCC 15.109:2017 | | ANSI C63.4:2014 | |

| **Run #** | 20 | **Test Distance (m)** | 3 | **Antenna Height(s)** | 1 to 4(m) | **Results** | Pass |
|---|---|---|---|---|---|---|---|




| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Antenna Height (meters) | Azimuth (degrees) | Test Distance (meters) | External Attenuation (dB) | Polarity/ Transducer Type | Detector | Distance Adjustment (dB) | Adjusted (dBuV/m) | Spec. Limit (dBuV/m) | Compared to Spec. (dB) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 925.328 | 16.7 | 10.1 | 1.0 | 347.0 | 3.0 | 0.0 | Horz | QP | 0.0 | 26.8 | 46.0 | -19.2 | High Ch. EUT Horizontal |
| 928.102 | 16.6 | 10.1 | 1.0 | 347.0 | 3.0 | 0.0 | Vert | QP | 0.0 | 26.7 | 46.0 | -19.3 | High Ch. EUT on Side |