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**Electromagnetic  
Emission  
Compliance  
Test Report**



**Equipment Under Test  
(EUT)  
Applicant**

Single Channel Power Amplifier HePA850  
Andrew Corporation

**In Accordance With**

FCC Part 22, Subpart H

**Test by**

Advanced Compliance Laboratory, Inc.  
6 Randolph Way  
Hillsborough, New Jersey 08844

**Authorized by**

Wei Li  
Lab Manager

Signature

**Date**

December 5, 2005

**AC Lab Report  
Number**

0048-051121-01-FCC



Lab Code:200101-0

**The test result in this report is supported and  
covered by the NVLAP accreditation.**

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## Section 1. Summary of Test Results

Manufacturer: Andrew Corporation

Model Name: Single Channel Power Amplifier HePA850

Parts No.: RF100306 (NTQA50UA)

General: **All measurements are traceable to national standards**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 22, Subpart H.

☒ New Submission

☒ Production Unit

☐ Class II Permissive Change

☐ Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.

“See Summary of Test Data”



**NVLAP LAB CODE: 200101-0**

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**Summary of Test Data**

| <b>RF Power Output</b>                         | 22.913(a) | 500W ERP            | Complies |
|------------------------------------------------|-----------|---------------------|----------|
|                                                | 24.232(a) | 100W EIRP           | N/A*     |
| <b>Occupied Bandwidth (Voice &amp; SAT)</b>    | 2.1049(i) | Mask                | N/A*     |
| <b>Occupies Bandwidth (Wideband Data)</b>      | 2.1049(i) | Mask                | N/A*     |
| <b>Occupied Bandwidth (Digital)</b>            | 2.1049(i) | Mask                | Complies |
| <b>Spurious Emissions at Antenna Terminals</b> | 22.917    | -13 dBm             | Complies |
|                                                | 24.238    | -13 dBm             | N/A*     |
| <b>Field Strength of Spurious Emissions</b>    | 22.917    | -13 dBm             | Complies |
|                                                | 24.238    | -13 dBm<br>E.I.R.P. | N/A*     |
| <b>Frequency Stability</b>                     | 22.355    | 1.5 ppm             | N/A*     |
|                                                | 24.235    | 0.05 ppm            | N/A*     |

\* These items are NOT applied to the EUT.

The estimated uncertainty of the test result is given as following. The method of uncertainty calculation is provided in Advanced Compliance Lab. Doc. No. 0048-01-01.

|                                 | Prob. Dist. | Uncertainty(dB)<br>30-1000MHz | Uncertainty(dB)<br>1-6.5GHz | Uncertainty(dB)<br>Conducted |
|---------------------------------|-------------|-------------------------------|-----------------------------|------------------------------|
| Combined Std. Uncertainty $u_c$ | norm.       | $\pm 2.36$                    | $\pm 2.99$                  | $\pm 1.83$                   |



Wei Li  
Lab Manager  
Advanced Compliance Lab

Date: December 5, 2005

**Section 2. General Equipment Specification**

|                              |                                              |                                                |                                                              |                                             |                                  |
|------------------------------|----------------------------------------------|------------------------------------------------|--------------------------------------------------------------|---------------------------------------------|----------------------------------|
| <b>Supply Voltage</b>        | 48VDC                                        |                                                |                                                              |                                             |                                  |
| <b>Frequency Range</b>       | Cellular                                     | DL/ 869-894MHz                                 |                                                              |                                             |                                  |
|                              | PCS                                          | N/A                                            |                                                              |                                             |                                  |
| <b>Modulation</b>            | <input type="checkbox"/><br>CDMA<br>2000     | <input type="checkbox"/><br>WCDMA              | <input checked="" type="checkbox"/><br>GSM                   | <input checked="" type="checkbox"/><br>EDGE | <input type="checkbox"/><br>TDMA |
| <b>Type of Emissions</b>     | F9W                                          | F9W                                            | GXW                                                          | G7W                                         | DXW                              |
| <b>Rated Power</b>           | 45W w/Edge and 60W w/GSM average             |                                                |                                                              |                                             |                                  |
| <b>Operating Power</b>       | 45W for Edge<br>60W for GSM                  |                                                |                                                              |                                             |                                  |
| <b>Output Impedance</b>      | 50ohm                                        |                                                |                                                              |                                             |                                  |
| <b>Frequency Translation</b> | F1-F1<br><input checked="" type="checkbox"/> | F1-F2<br><input type="checkbox"/>              | N/A<br><input type="checkbox"/>                              |                                             |                                  |
|                              | Software<br><input type="checkbox"/>         | Duplexer<br>Change<br><input type="checkbox"/> | Full Band<br>Coverage<br><input checked="" type="checkbox"/> |                                             |                                  |

**DC voltages and DC currents per 2.1033(c)(8)**

The input supply to the transmitter was set at 27 Volts DC. The RF power output was measured with the indicated voltage and current applied into the final RF amplifying device(s).

**HEPA850 Amplifier**

RF Output, DC Current and RF Input Power are all average values.

Measured Maximum Overdrive RF output: 50.89dBm

Measured DC voltage: 48.0V

Measured DC current: 5.93A.

Measured Rated RF output: 47.75dBm (60W) w/ GSM and 46.50dBm (45W) w/ EDGE

Measured DC voltage: 48.0V

Measured DC current: 4.20A.(GSM) & 3.53A (EDGE)

Measured Minimum RF output: -2.67dBm

Measured DC voltage: 48.0V

Measured DC current: 1.25A

**Tune-up procedure per 2.1033(c) (9)**

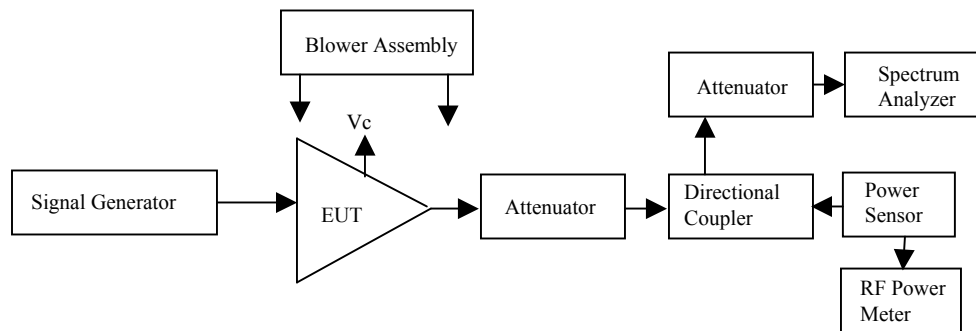
There are no user accessible adjustments or tuning in this amplifier. All necessary adjustments and tuning are performed during manufacture of the product. Any adjustments or tuning after service or repair are done as part of that process as special equipment is required to perform such adjustments.

**Description of Operation**

This device is a Single Channel power amplifier used in BTS in downlink spectrum of 800MHz Cellular band. All measurements shall be made at room temperature and at nominal DC input voltage.

**System Diagram**

See Attachment.

**General EUT Setup**

**Section 3. RF Output Power**

|                      |                               |                       |                                              |
|----------------------|-------------------------------|-----------------------|----------------------------------------------|
| <b>Name of Test:</b> | <b><i>RF Output Power</i></b> | <b>Test Standard:</b> | <b><i>22.913(a)</i><br/><i>24.232(a)</i></b> |
| <b>Tested By:</b>    | <b>WEI LI</b>                 | <b>Test Date:</b>     | <b>11/21/2005-12/05/2005</b>                 |

**Minimum Standard:** Para. No. 22.913(a). The maximum effective radiated power (ERP) of base station transmitters and cellular repeaters must not exceed 500 Watts (57dBm).

Para. No. 24.232(a). The maximum peak output power of base transmitters should not exceed 100 Watts EIRP (50dBm).

**Method of Measurement:** The EUT is a RF amplifier. The manufacturer does not provide an antenna for sale with the product, hence ERP/EIRP is not measured nor calculated.

Per 2.1046: The RF Power Output shall be measured at the output connector of the EUT. The output level shall be +47.75dBm(60W) for GSM and +46.50dBm(45W) for EDGE with  $\pm 0.75$  dB over the Cellular frequency band: 869 to 894 MHz. The tolerance range is per TIA/EIA-97-D, Section 4.3.1.3.

Using power meter, power measurements shall be taken at the low band edge, mid, and high band edge frequencies for all modulations listed on Page 5.

**Test Result:**

**Complies**

**Test Data:**

**Rated Output Power – Normal Condition**

The inputs are set to generate rated average output power for the Single Channel signals intended.

| <b>Cellular Band</b>                           | <b>Channel</b>                                         | <b>Modulation</b> | <b>Power Output (dBm)</b> | <b>Rated Power (dBm)</b> | <b>Tolerance</b> |
|------------------------------------------------|--------------------------------------------------------|-------------------|---------------------------|--------------------------|------------------|
| <b>Downlink</b>                                | Low                                                    | GSM               | 47.17                     | 47.75                    | -0.58            |
|                                                | Mid                                                    | GSM               | 47.75                     | 47.75                    | 0                |
|                                                | High                                                   | GSM               | 47.54                     | 47.75                    | -0.21            |
|                                                | Low                                                    | EDGE              | 46.05                     | 46.50                    | -0.45            |
|                                                | Mid                                                    | EDGE              | 46.50                     | 46.50                    | 0                |
|                                                | High                                                   | EDGE              | 46.36                     | 46.50                    | -0.14            |
| <b>Total Power at Amplifier RF Input (dBm)</b> | -0.48 (GSM) & -1.71(EDGE) (Maximum gain)               |                   |                           |                          |                  |
| <b>Ref Offset</b>                              | Ref offset=Cable&Attenuator&Coupler Attenuation=56.3dB |                   |                           |                          |                  |

**Maximum Output Power – Overdrive Condition**

The intended Single Channel inputs are set to a level that generates maximum limited output power without causing abnormal operation/shutdown of the amplifier output. The output level shall be recorded.

| <b>Cellular Band</b>                           | <b>Channel</b>                                         | <b>Modulation</b> | <b>Power Output (dBm)</b> | <b>Part 22 Limit (dBm)</b> | <b>Margin</b> |
|------------------------------------------------|--------------------------------------------------------|-------------------|---------------------------|----------------------------|---------------|
| <b>Downlink</b>                                | Mid                                                    | GSM               | 50.89                     | 57.00                      | -6.11         |
|                                                | Mid                                                    | EDGE              | 50.15                     | 57.00                      | -6.85         |
| <b>Total Power at Amplifier RF Input (dBm)</b> | 2.94 (GSM) / 2.20 (EDGE)                               |                   |                           |                            |               |
| <b>Ref Offset</b>                              | Ref offset=Cable&Attenuator&Coupler Attenuation=56.3dB |                   |                           |                            |               |

**Section 4. Occupied Bandwidth**

|                      |                                  |                       |                         |
|----------------------|----------------------------------|-----------------------|-------------------------|
| <b>Name of Test:</b> | <b><i>Occupied Bandwidth</i></b> | <b>Test Standard:</b> | <b><i>2.1049(i)</i></b> |
| <b>Tested By:</b>    | WEI LI                           | <b>Test Date:</b>     | 11/21/2005-12/05/2005   |

**Minimum Standard:** Not defined by FCC. Input vs. Output.

**Method of Measurement:** Spectrum Analyzer Settings:  
RBW: CDMA2000 (30 kHz), WCDMA (100KHz), CDMA(30KHz),  
GSM (3 kHz), EDGE (3KHz), NADC (1 kHz) and CDPD (1 kHz)  
VBW:  $\geq$ RBW  
Span: As required  
Sweep: Auto  
Input Signal Characteristics: Generated from Signal Generator  
RF level: Rated, recommended by manufacturer

**Test Result:**

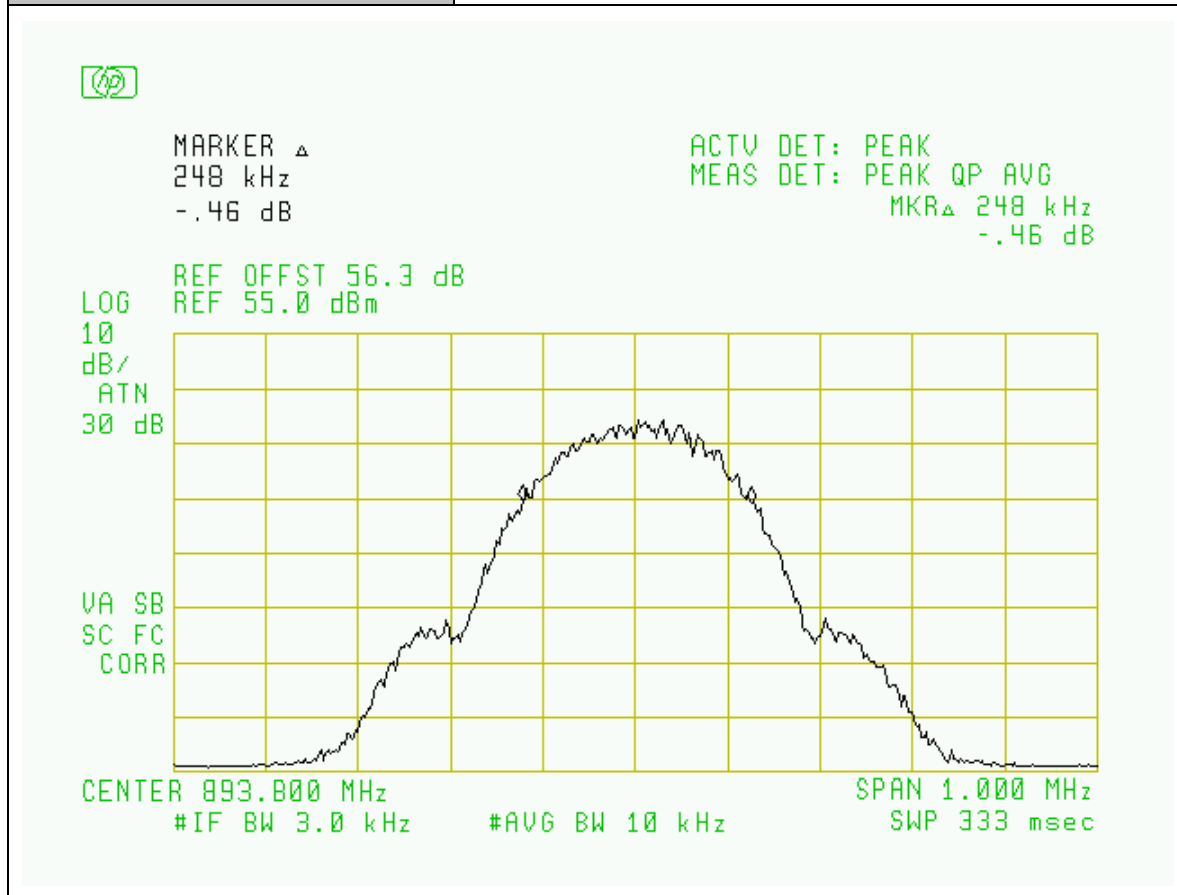
**Complies**

**Test Data:**

Attached Plots

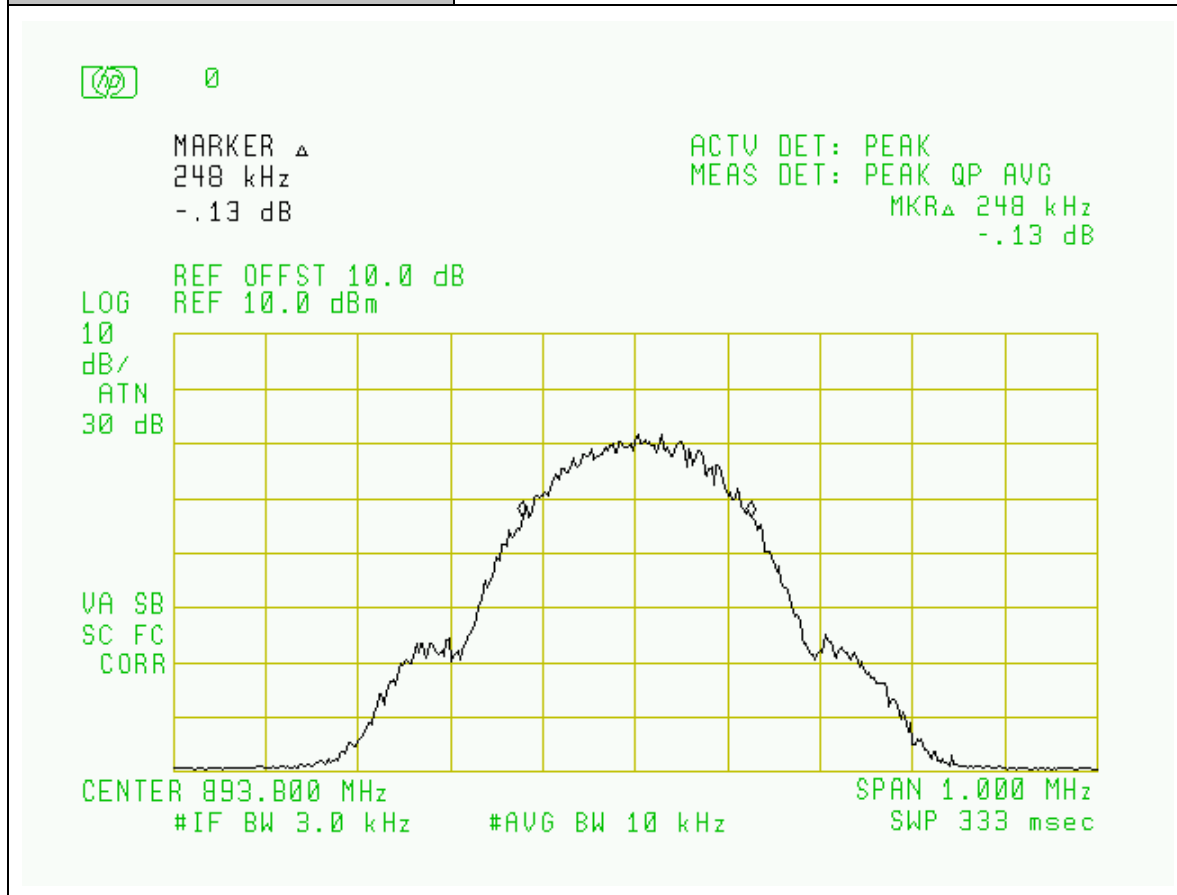
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|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70° F                                            |
| <b>Humidity:</b>       | 30%                                              |

|                       |                                       |
|-----------------------|---------------------------------------|
| <b>Section:</b>       | Occupied Bandwidth: CELLULAR Bands    |
| <b>Plot Name:</b>     | Downlink, Hi-Channel, GSM Modulation  |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT |



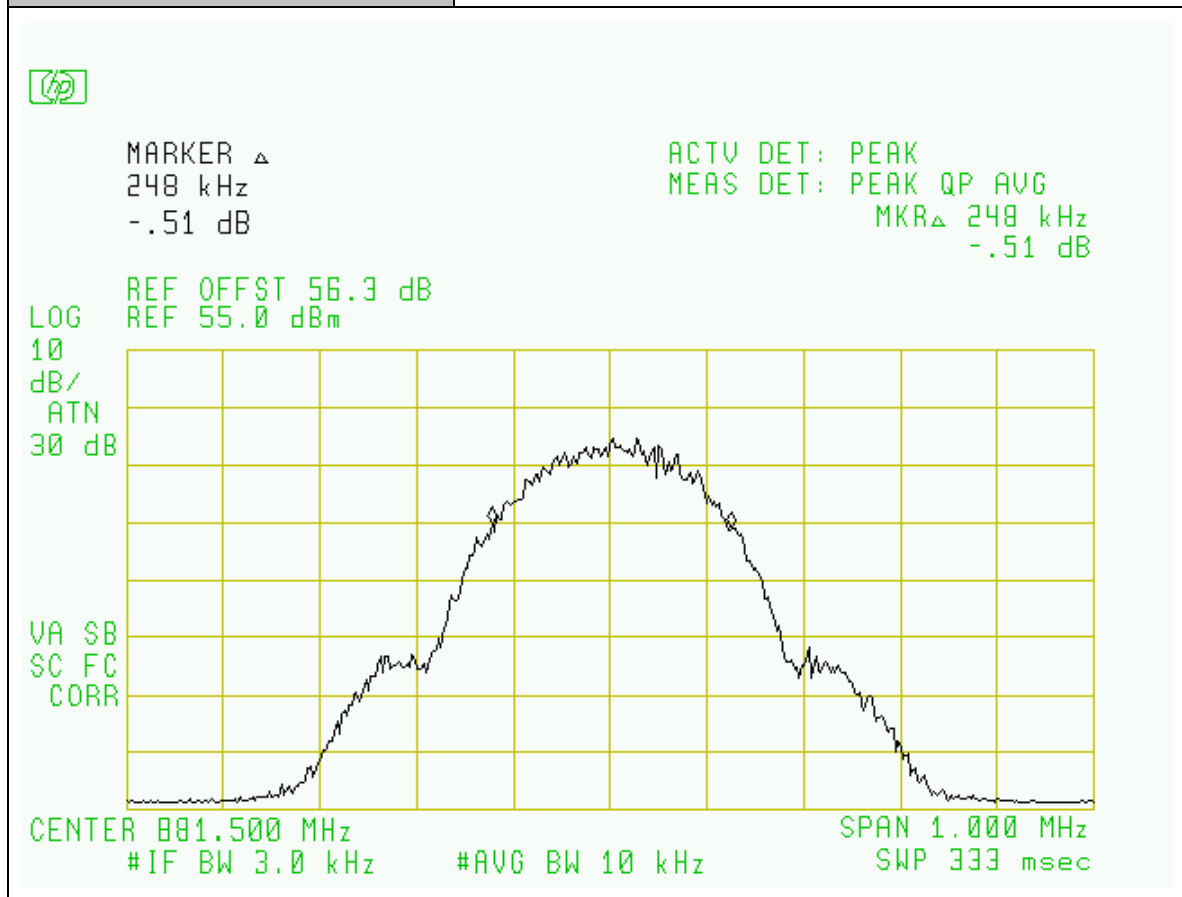
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| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

|                       |                                      |
|-----------------------|--------------------------------------|
| <b>Section:</b>       | Occupied Bandwidth: CELLULAR Bands   |
| <b>Plot Name:</b>     | Downlink, Hi-Channel, GSM Modulation |
| <b>Configuration:</b> | Input: SG                            |



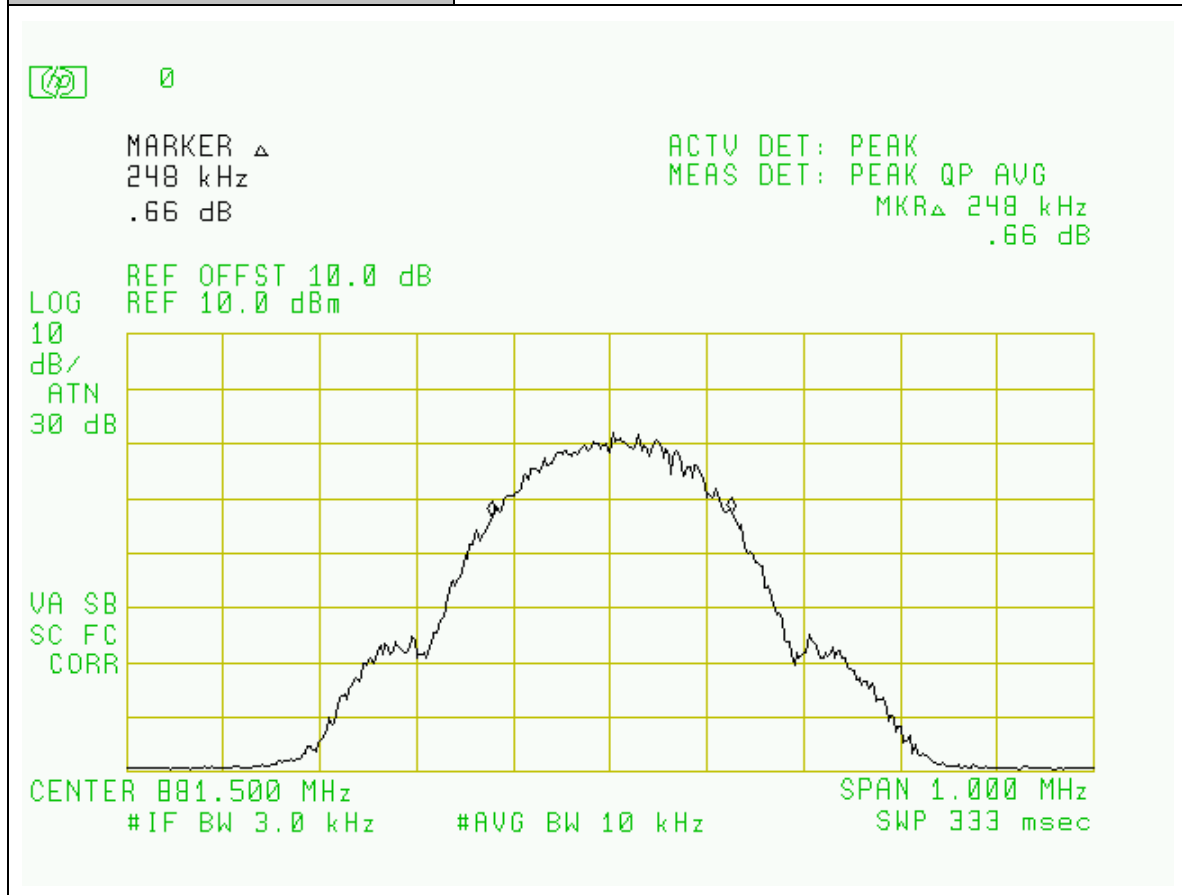
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| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

|                       |                                       |
|-----------------------|---------------------------------------|
| <b>Section:</b>       | Occupied Bandwidth: CELLULAR Bands    |
| <b>Plot Name:</b>     | Downlink, Mid-Channel, GSM Modulation |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT |



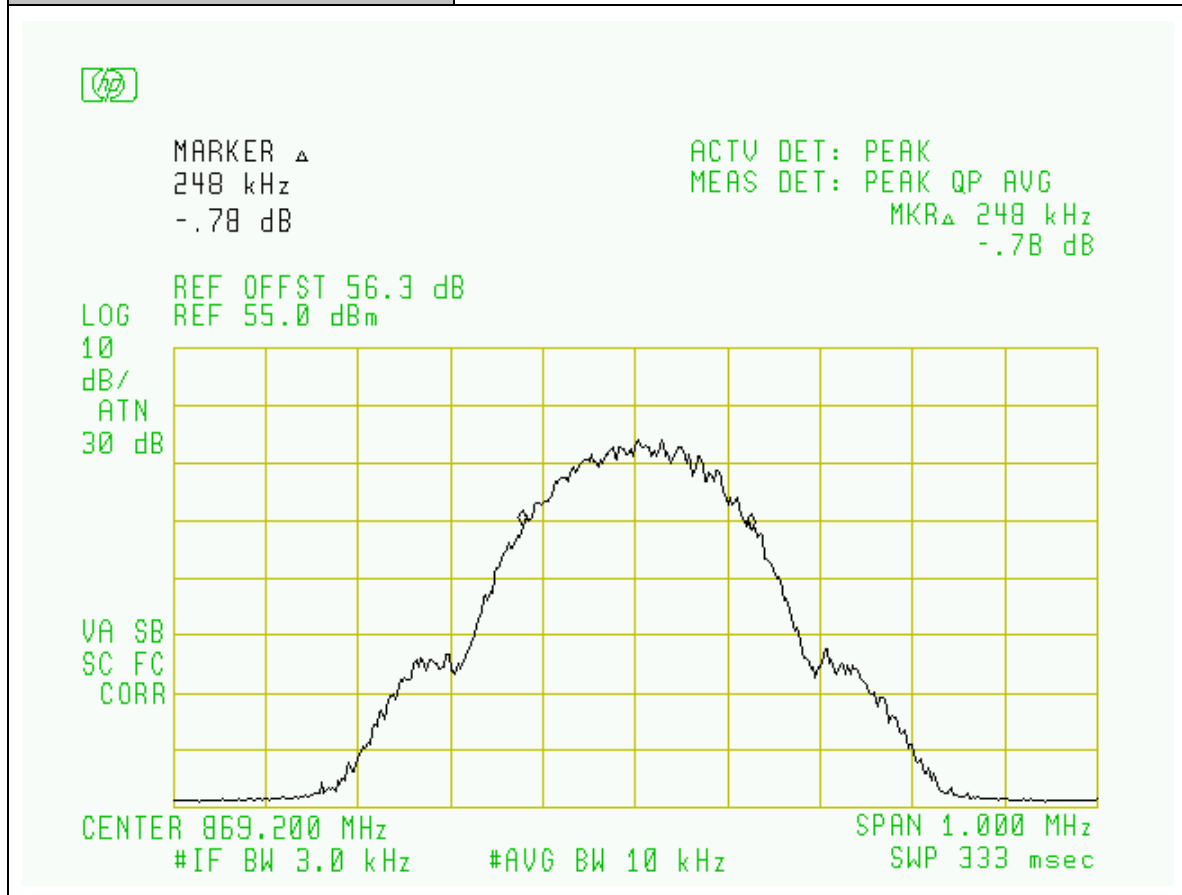
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|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

|                       |                                       |
|-----------------------|---------------------------------------|
| <b>Section:</b>       | Occupied Bandwidth: CELLULAR Bands    |
| <b>Plot Name:</b>     | Downlink, Mid-Channel, GSM Modulation |
| <b>Configuration:</b> | Input: SG                             |



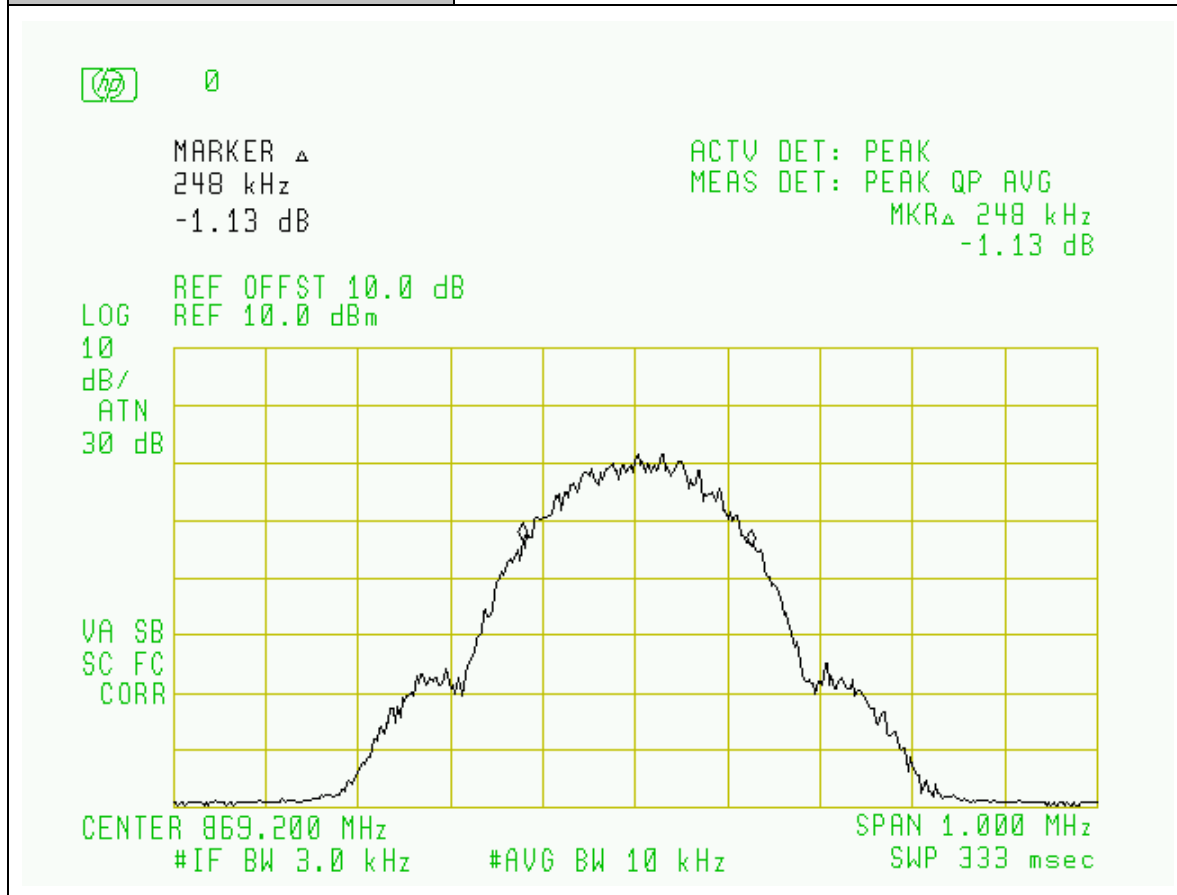
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| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

|                       |                                       |
|-----------------------|---------------------------------------|
| <b>Section:</b>       | Occupied Bandwidth: CELLULAR Bands    |
| <b>Plot Name:</b>     | Downlink, Low-Channel, GSM Modulation |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT |



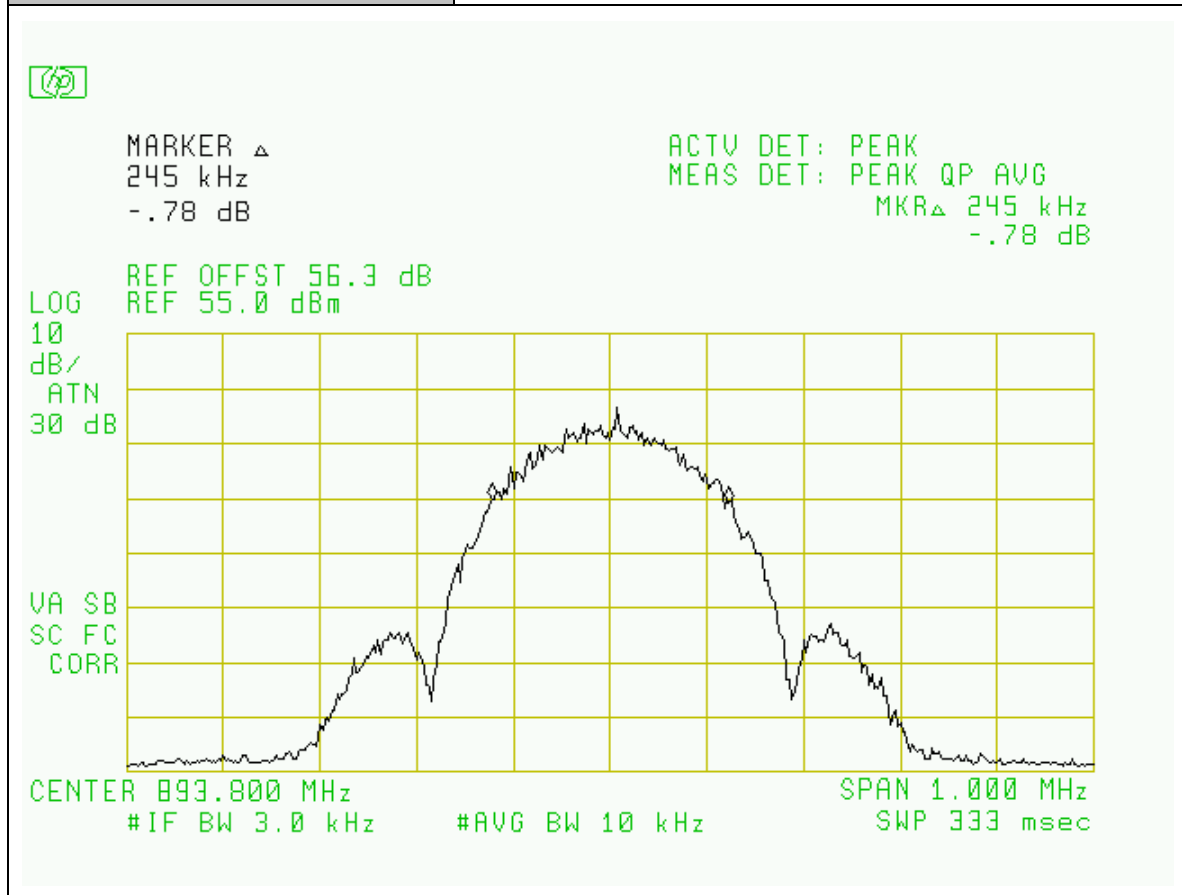
|                        |                                                  |
|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

|                       |                                       |
|-----------------------|---------------------------------------|
| <b>Section:</b>       | Occupied Bandwidth: CELLULAR Bands    |
| <b>Plot Name:</b>     | Downlink, Low-Channel, GSM Modulation |
| <b>Configuration:</b> | Input: SG                             |



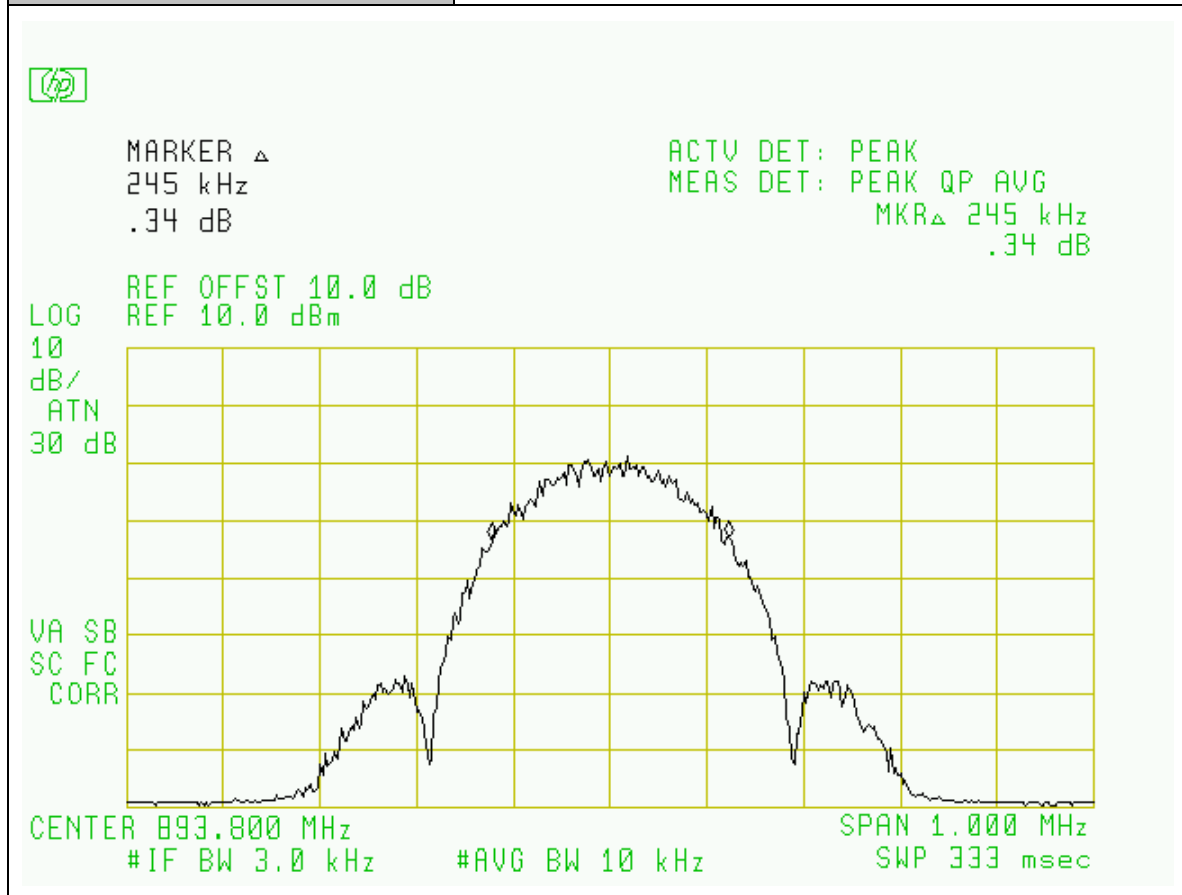
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| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

|                       |                                       |
|-----------------------|---------------------------------------|
| <b>Section:</b>       | Occupied Bandwidth: CELLULAR Bands    |
| <b>Plot Name:</b>     | Downlink, Hi-Channel, EDGE Modulation |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT |



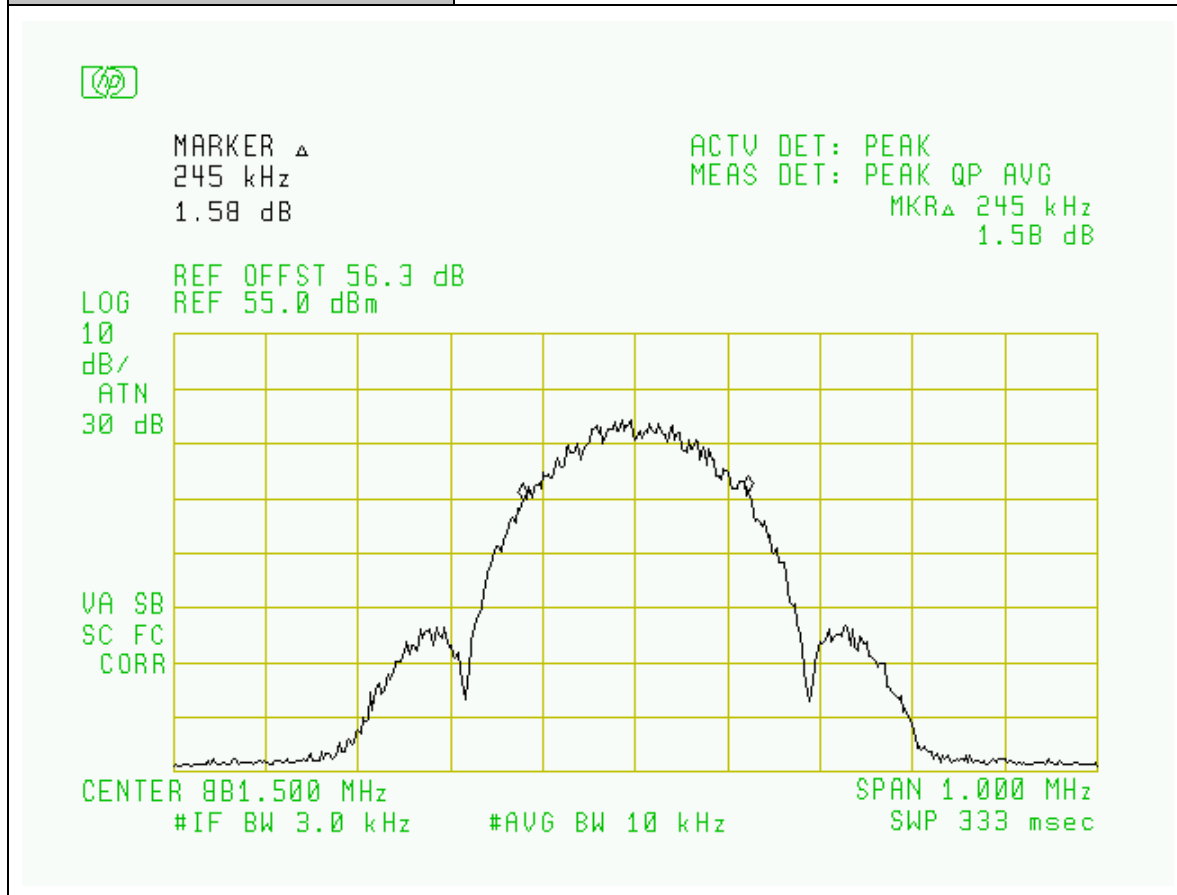
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|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70° F                                            |
| <b>Humidity:</b>       | 30%                                              |

|                       |                                       |
|-----------------------|---------------------------------------|
| <b>Section:</b>       | Occupied Bandwidth: CELLULAR Bands    |
| <b>Plot Name:</b>     | Downlink, Hi-Channel, EDGE Modulation |
| <b>Configuration:</b> | Input: SG                             |



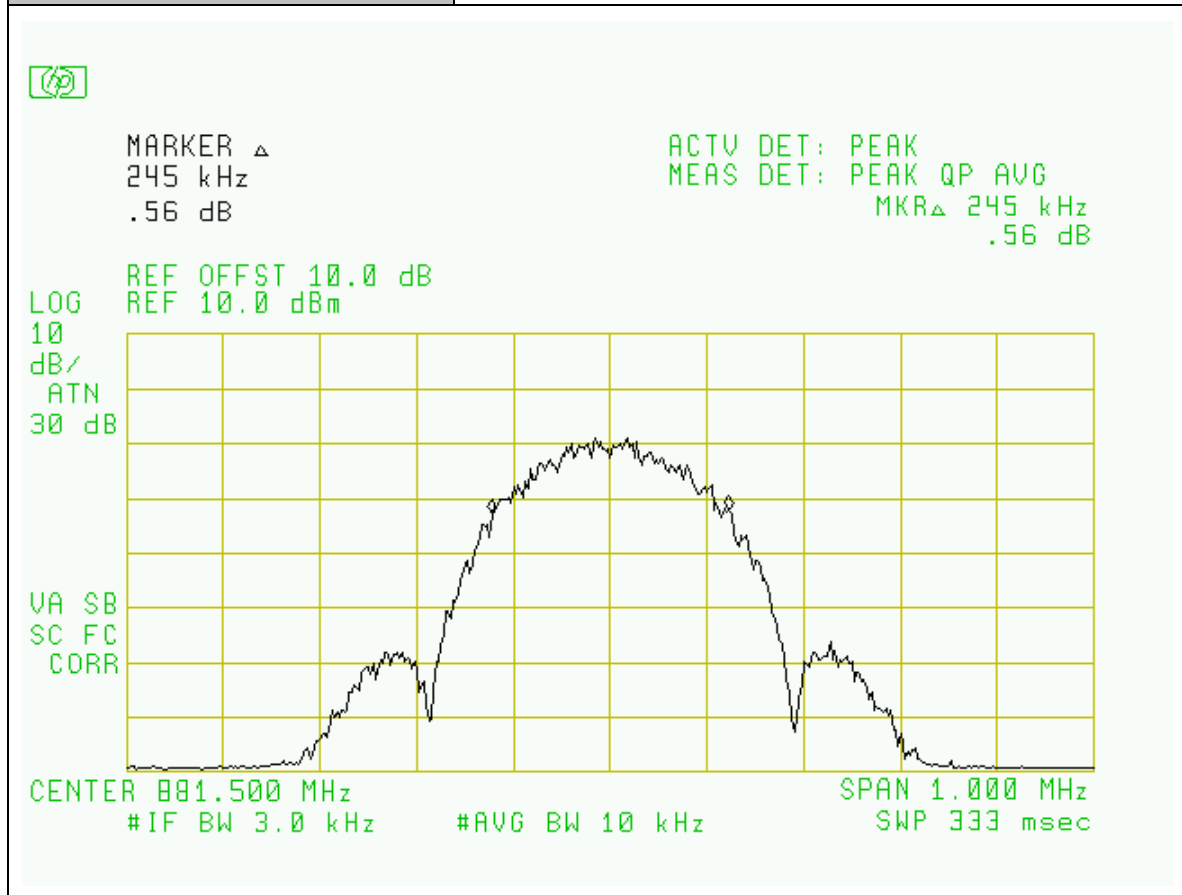
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|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70° F                                            |
| <b>Humidity:</b>       | 30%                                              |

|                       |                                        |
|-----------------------|----------------------------------------|
| <b>Section:</b>       | Occupied Bandwidth: CELLULAR Bands     |
| <b>Plot Name:</b>     | Downlink, Mid-Channel, EDGE Modulation |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT  |



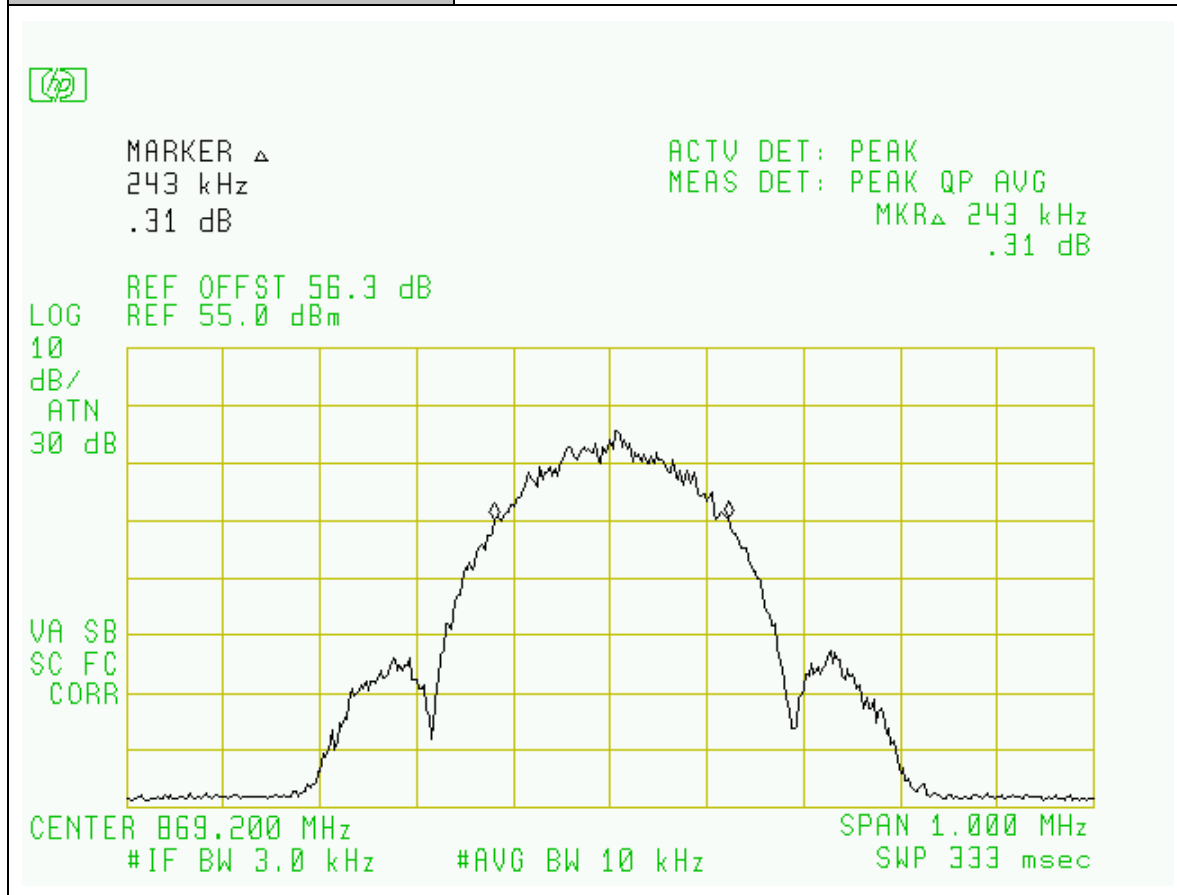
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|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70° F                                            |
| <b>Humidity:</b>       | 30%                                              |

|                       |                                        |
|-----------------------|----------------------------------------|
| <b>Section:</b>       | Occupied Bandwidth: CELLULAR Bands     |
| <b>Plot Name:</b>     | Downlink, Mid-Channel, EDGE Modulation |
| <b>Configuration:</b> | Input: SG                              |



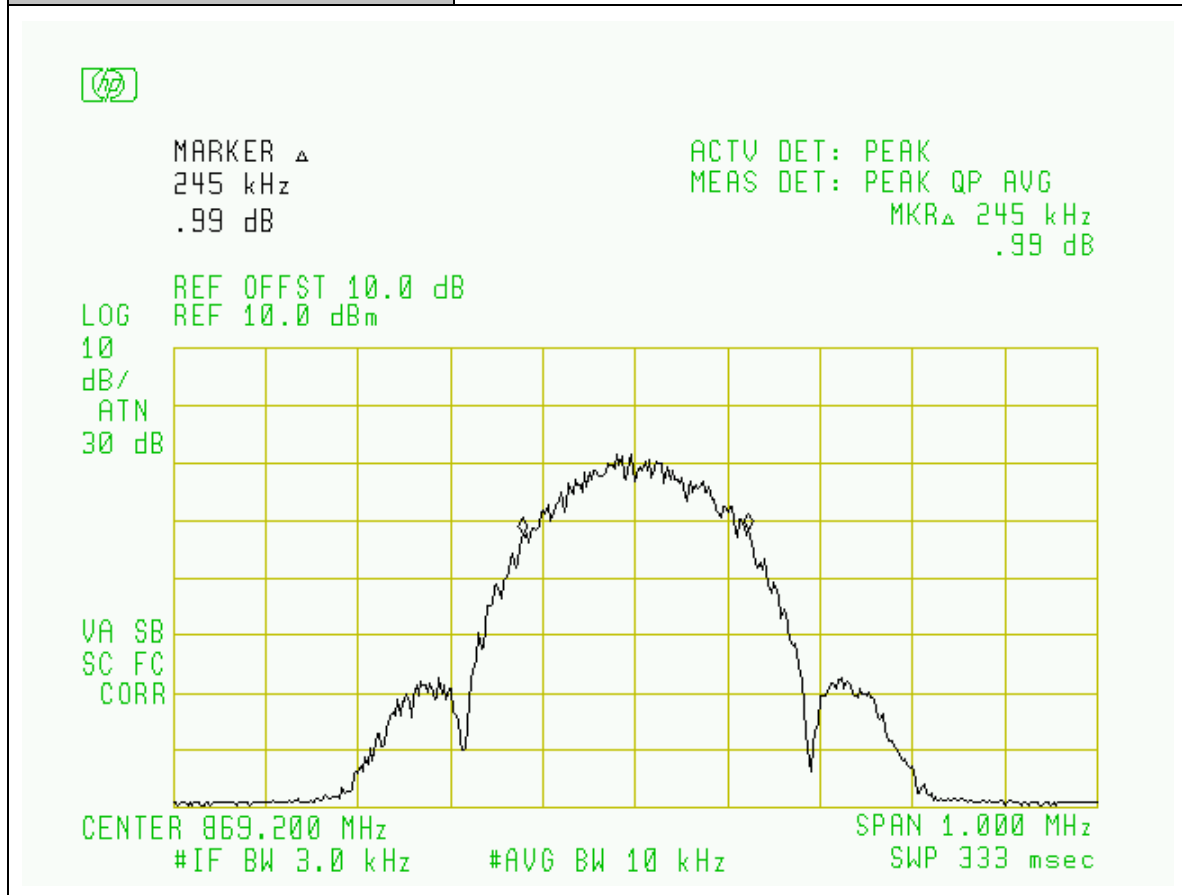
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| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

|                       |                                        |
|-----------------------|----------------------------------------|
| <b>Section:</b>       | Occupied Bandwidth: CELLULAR Bands     |
| <b>Plot Name:</b>     | Downlink, Low-Channel, EDGE Modulation |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT  |



|                        |                                                  |
|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70° F                                            |
| <b>Humidity:</b>       | 30%                                              |

|                       |                                        |
|-----------------------|----------------------------------------|
| <b>Section:</b>       | Occupied Bandwidth: CELLULAR Bands     |
| <b>Plot Name:</b>     | Downlink, Low-Channel, EDGE Modulation |
| <b>Configuration:</b> | Input: SG                              |



**Section 5. Spurious Emissions at Antenna Terminals**

|                      |                                                |                       |                       |
|----------------------|------------------------------------------------|-----------------------|-----------------------|
| <b>Name of Test:</b> | <i>Spurious Emissions at Antenna Terminals</i> | <b>Test Standard:</b> | 22.917<br>24.238(a)   |
| <b>Tested By:</b>    | WEI LI<br>EDWARD LEE                           | <b>Test Date:</b>     | 11/21/2005-12/05/2005 |

**Minimum Standard:** Para. No. 22.917(e). The mean power of emissions must be attenuated below the mean power of the unmodulated carrier on any frequency twice or more than twice the fundamental emission by at least  $43 + 10 \log P$ . This is equivalent to -13 dBm absolute power.

Para. No. 24.238(a). The magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under conditions specified in the instruction manual and/or alignment procedure, shall not less than  $43+10 \log$  (mean output power in watts) dBc below the mean power output outside a licensee's frequency block (-13dBm).

**Method of Measurement:** Spectrum Analyzer Settings:  
 RBW: 100 kHz. As required for digital modulations.  
 RBW: 1MHz. When frequency is located above 1GHz.  
 VBW:  $\geq$ RBW  
 Alternative RBW Setting: 100kHz (Cellular), 1MHz (PCS)  
 Start Frequency: 9KHz or Lowest Clock Frequency  
 Stop Frequency: 10 GHz (Cellular), 20GHz (PCS)  
 Sweep: Auto  
 Using in-band filter if needed.  
 For Inter-modulation measurement if applicable: Three RF signals set as inputs. The frequencies of RF signals shall be within the repeater's operating band: two signals will close to each other at the lower band edge; the third will be close to upper band edge. The level of both RF input signals shall be increased, until the maximum rated output power per channel, as declared by the manufacturer, is reached.

**Test Result:**

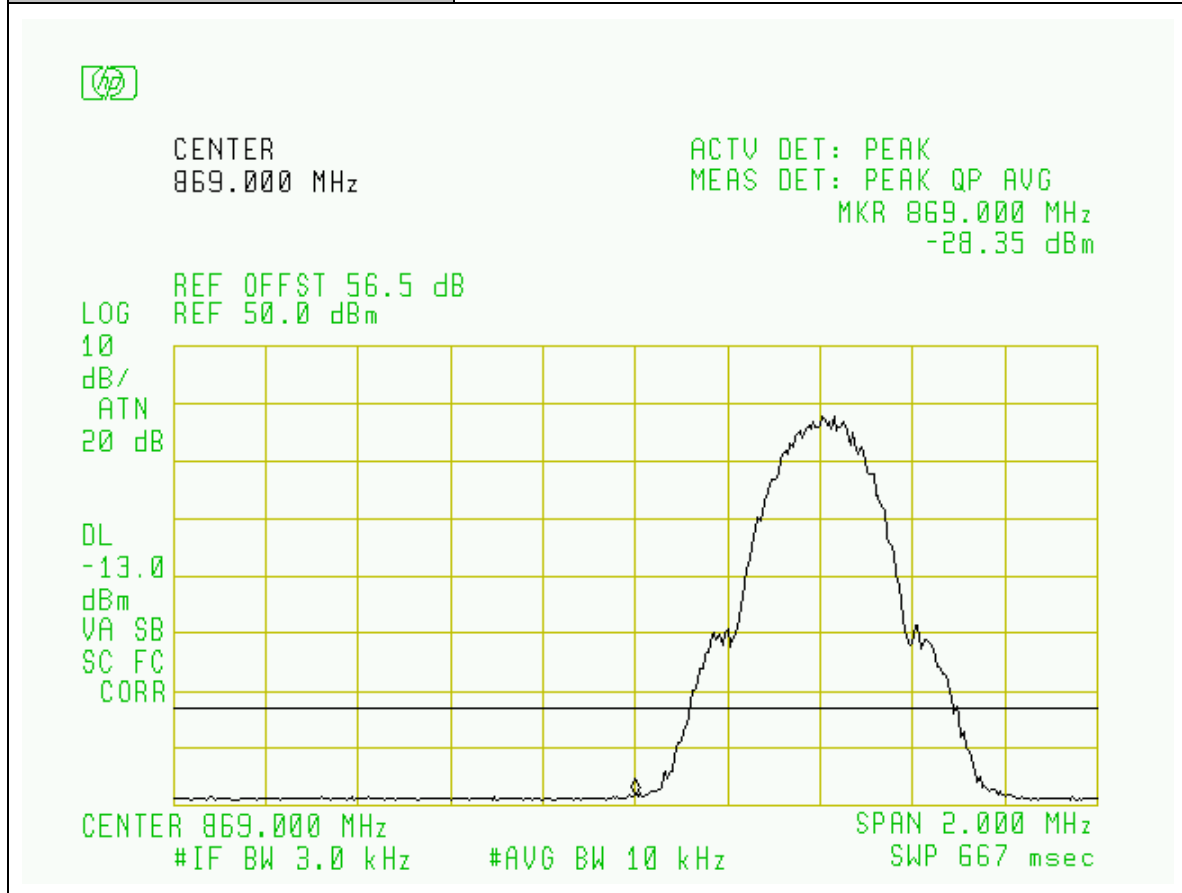
**Complies**

**Test Data:**

Attached Plots

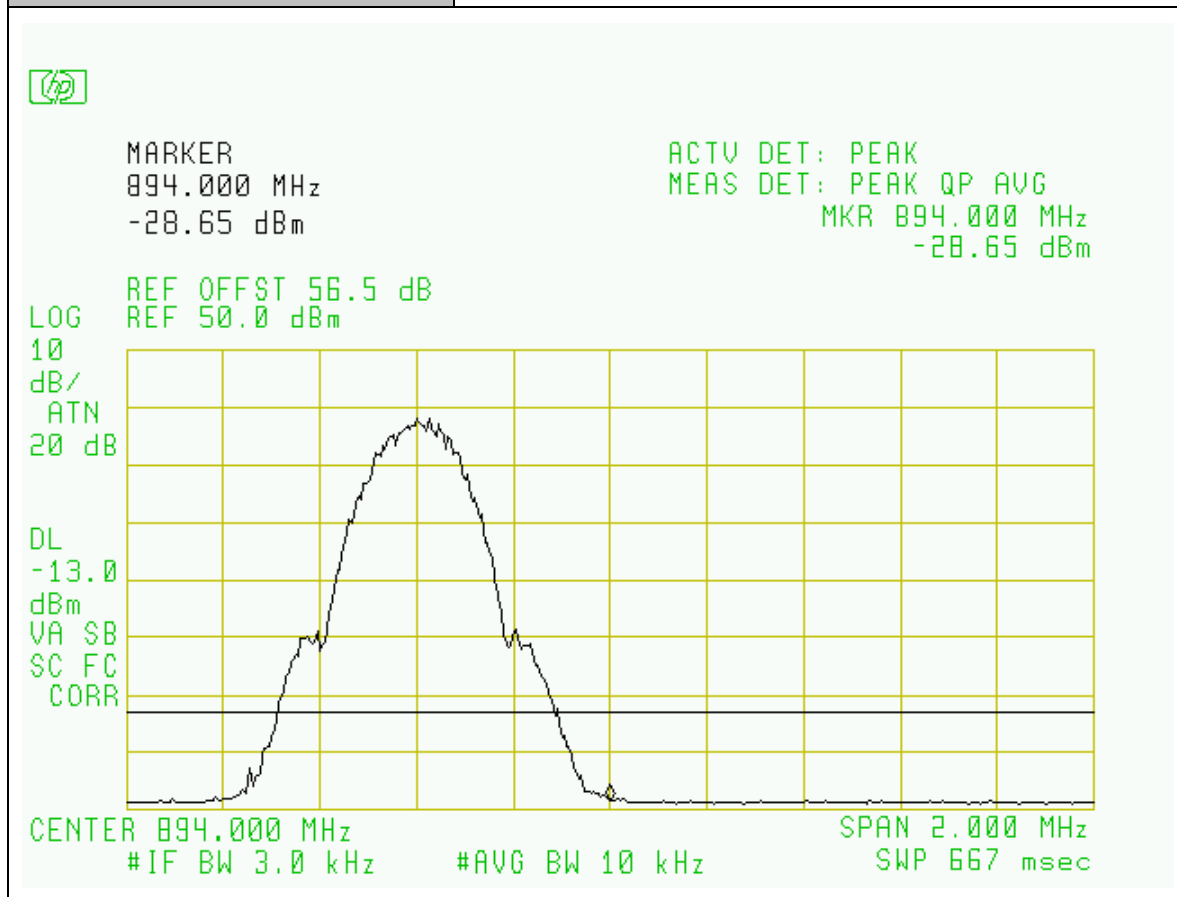
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|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Edward Lee                                       |
| <b>Temperature:</b>    | 70° F                                            |
| <b>Humidity:</b>       | 30%                                              |

|                       |                                                                          |
|-----------------------|--------------------------------------------------------------------------|
| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / GSM Modulation |
| <b>Plot Name:</b>     | Downlink, Low-Chn, Lower Bandedge                                        |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                    |



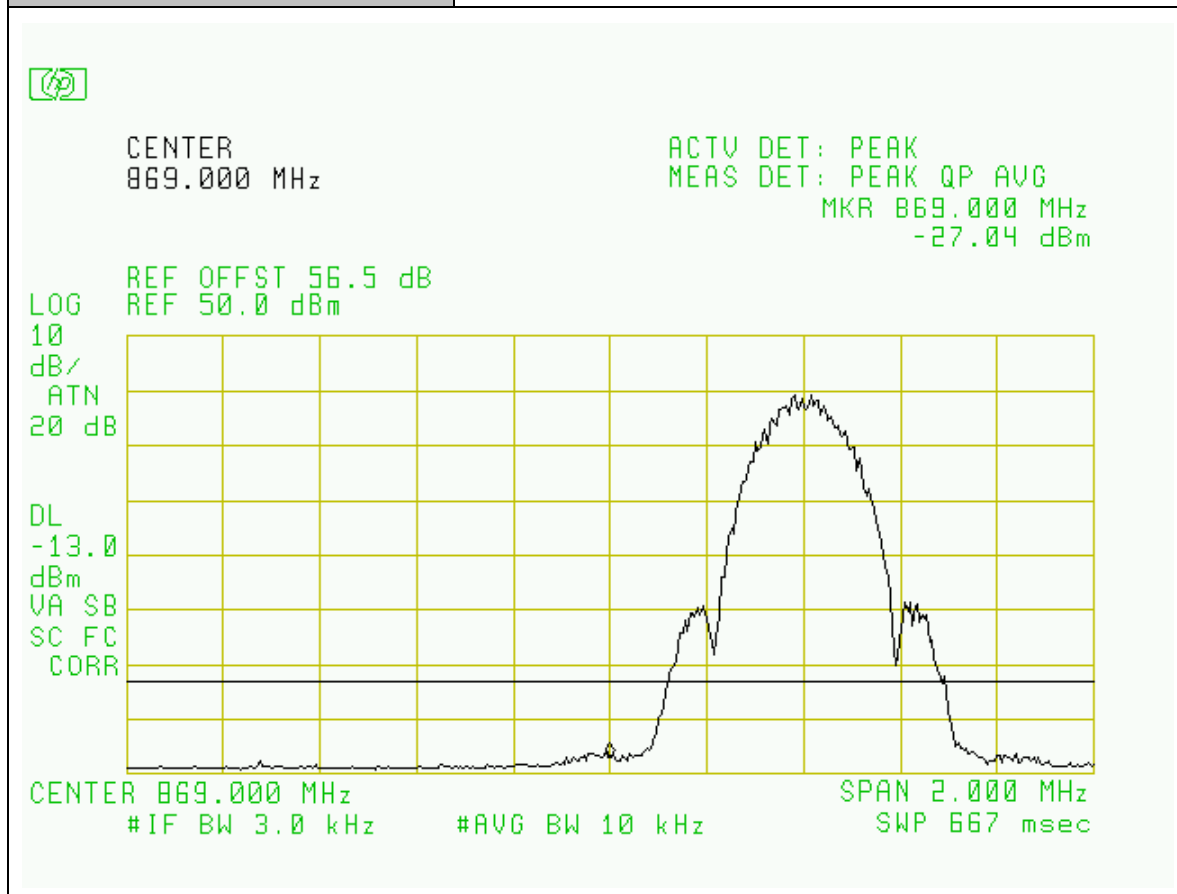
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|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Edward Lee                                       |
| <b>Temperature:</b>    | 70° F                                            |
| <b>Humidity:</b>       | 30%                                              |

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|-----------------------|--------------------------------------------------------------------------|
| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / GSM Modulation |
| <b>Plot Name:</b>     | Downlink, Hi-Chn, Upper Bandedge                                         |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                    |



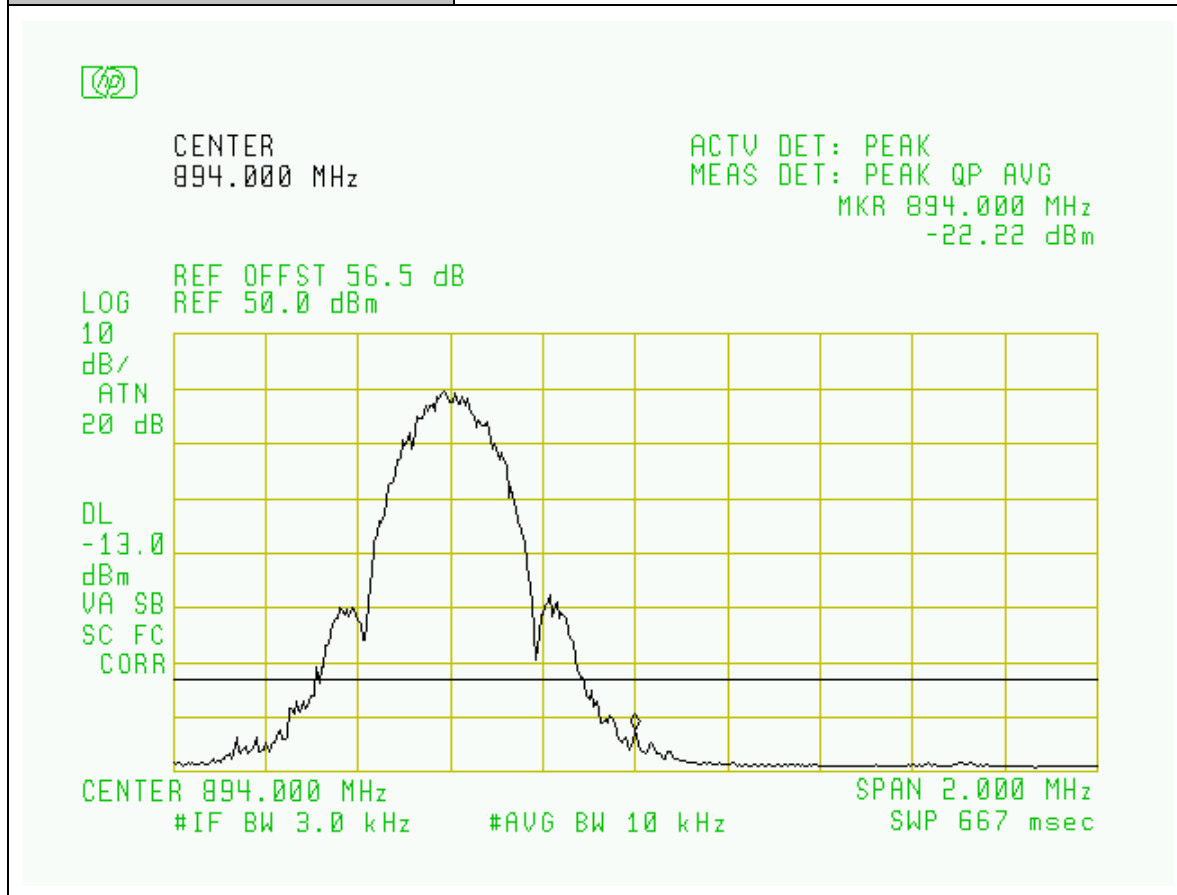
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|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Edward Lee                                       |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

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| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / EDGE Modulation |
| <b>Plot Name:</b>     | Downlink, Low-Chn, Lower Bandedge                                         |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                     |



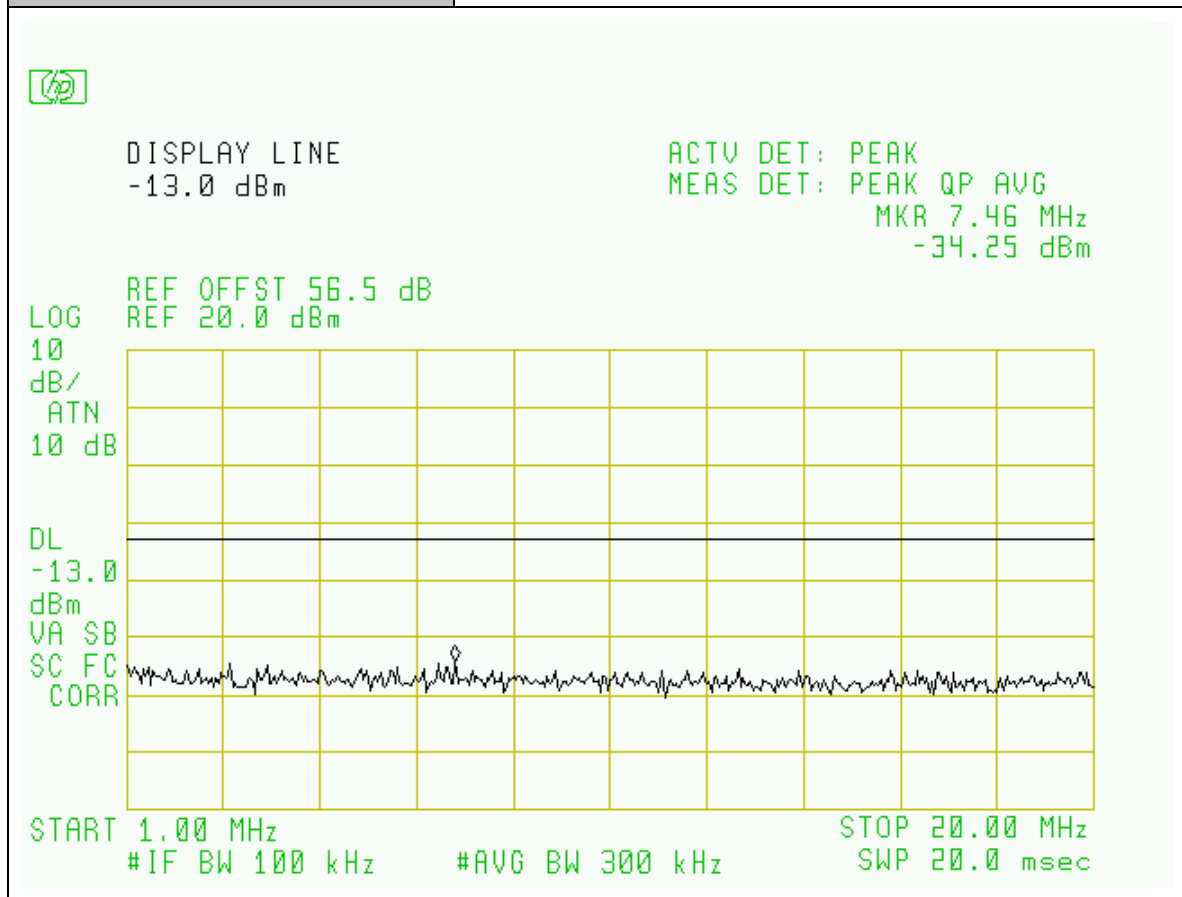
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|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Edward Lee                                       |
| <b>Temperature:</b>    | 70° F                                            |
| <b>Humidity:</b>       | 30%                                              |

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| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / EDGE Modulation |
| <b>Plot Name:</b>     | Downlink, Hi-Chn, Upper Bandedge                                          |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                     |



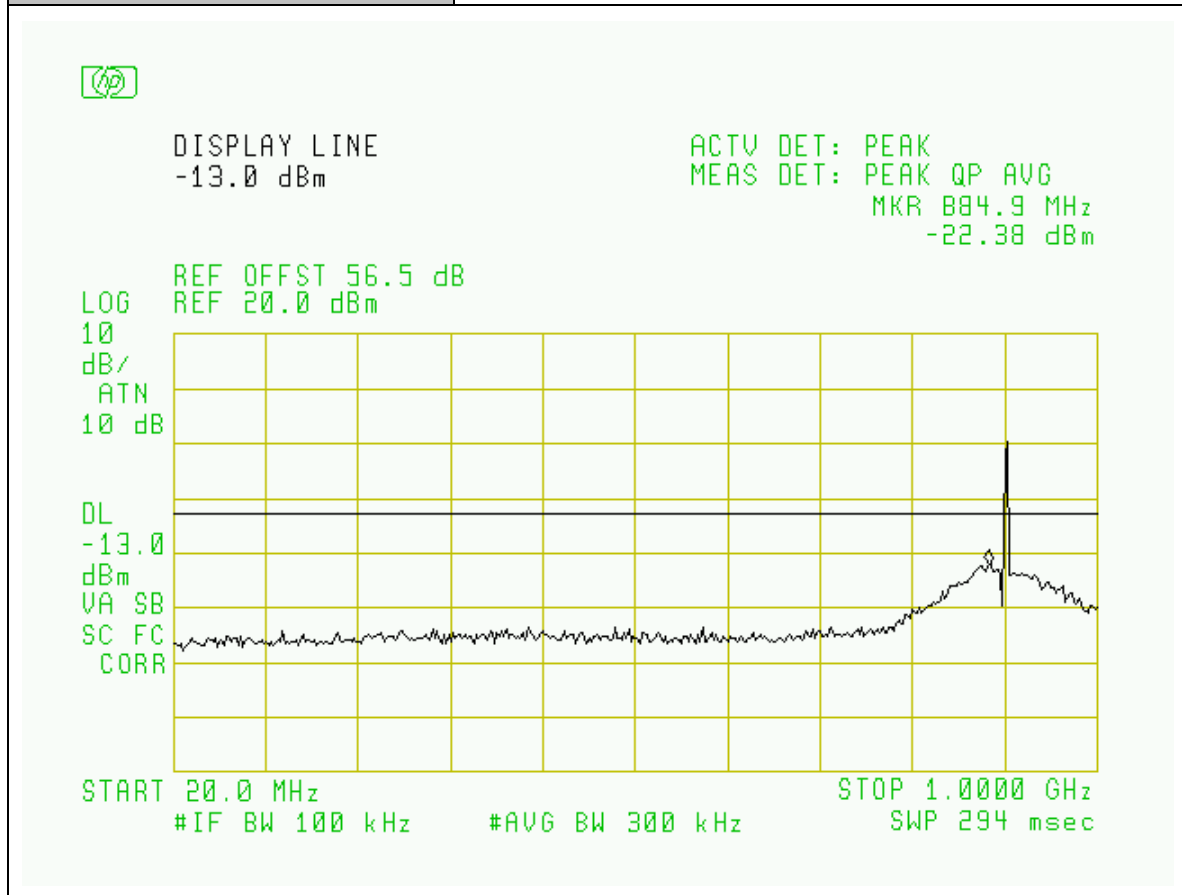
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|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

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| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / GSM Modulation |
| <b>Plot Name:</b>     | Downlink, Hi-Channel                                                     |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                    |



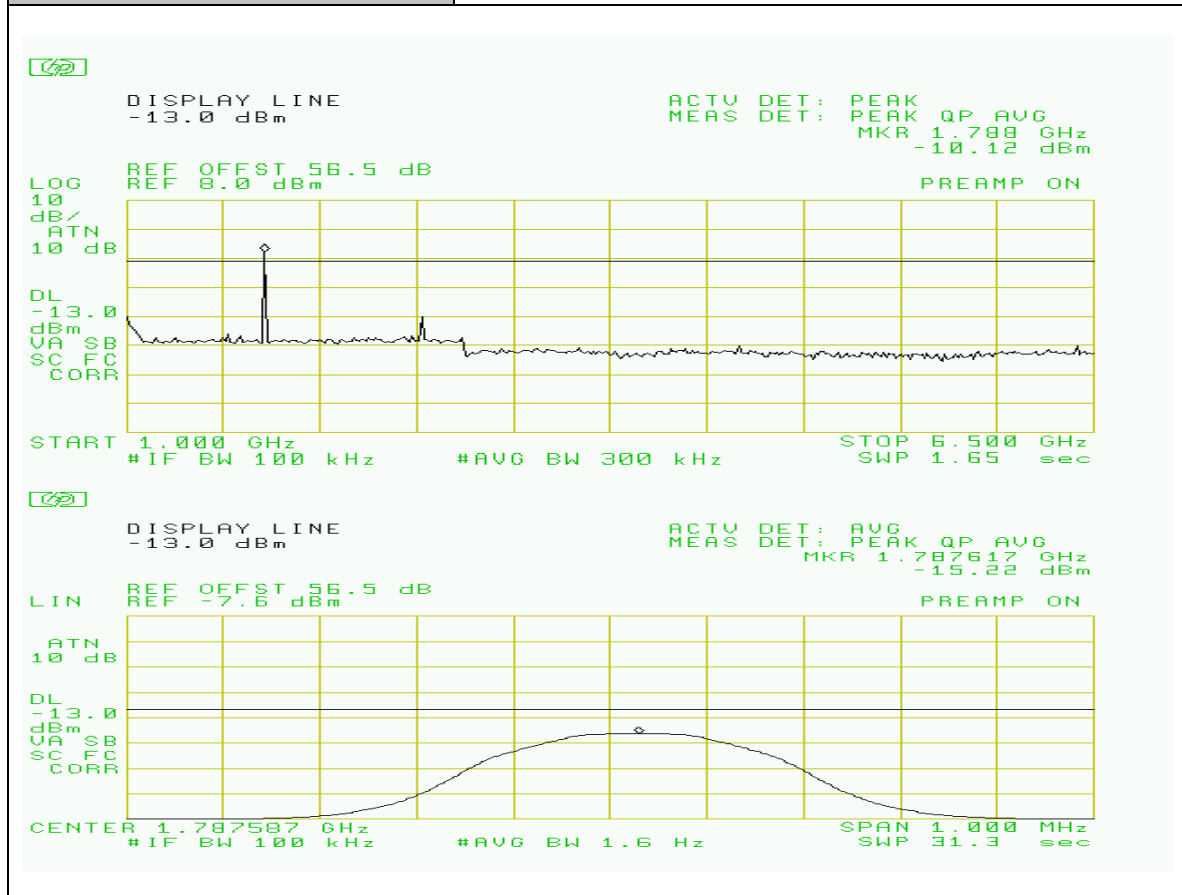
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|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

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| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / GSM Modulation |
| <b>Plot Name:</b>     | Downlink, Hi-Channel                                                     |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                    |



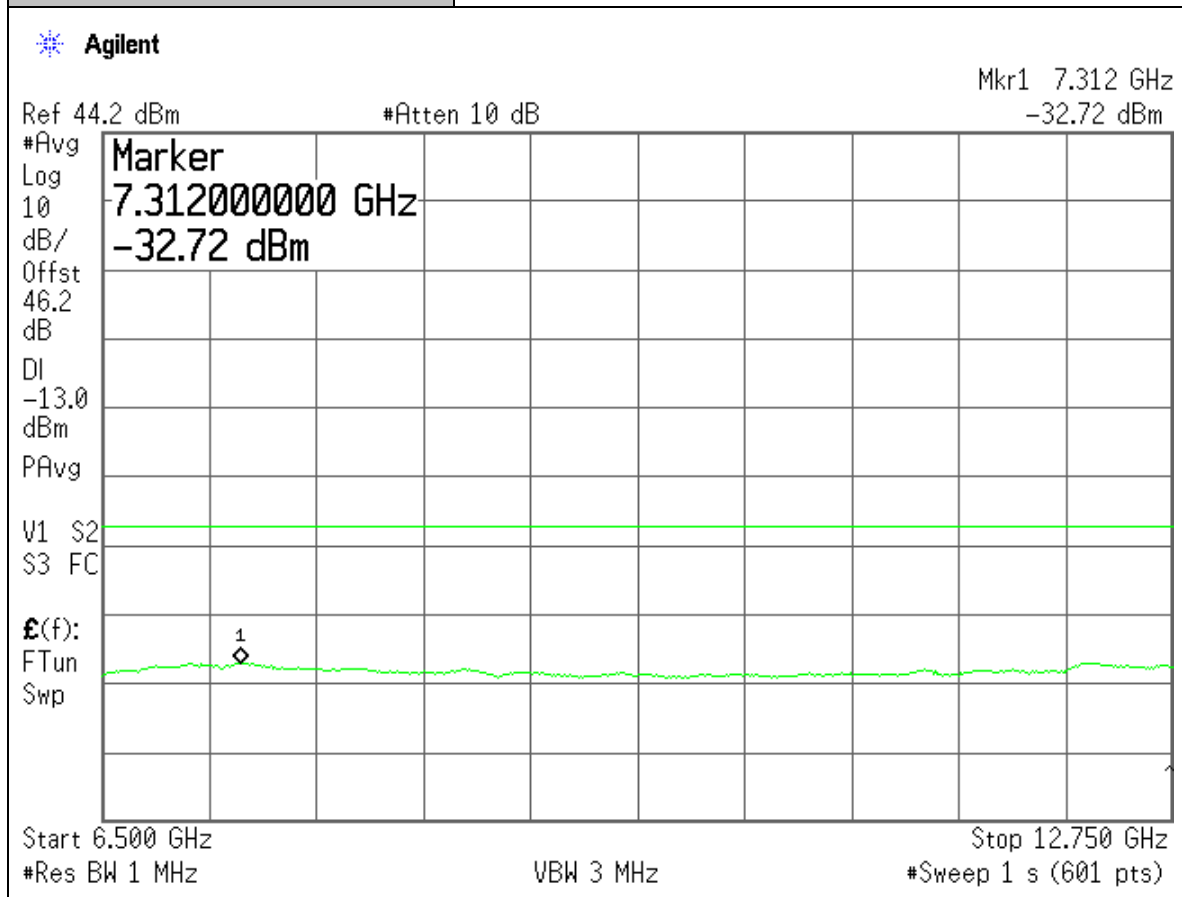
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|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

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| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / GSM Modulation |
| <b>Plot Name:</b>     | Downlink, Hi-Channel                                                     |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                    |



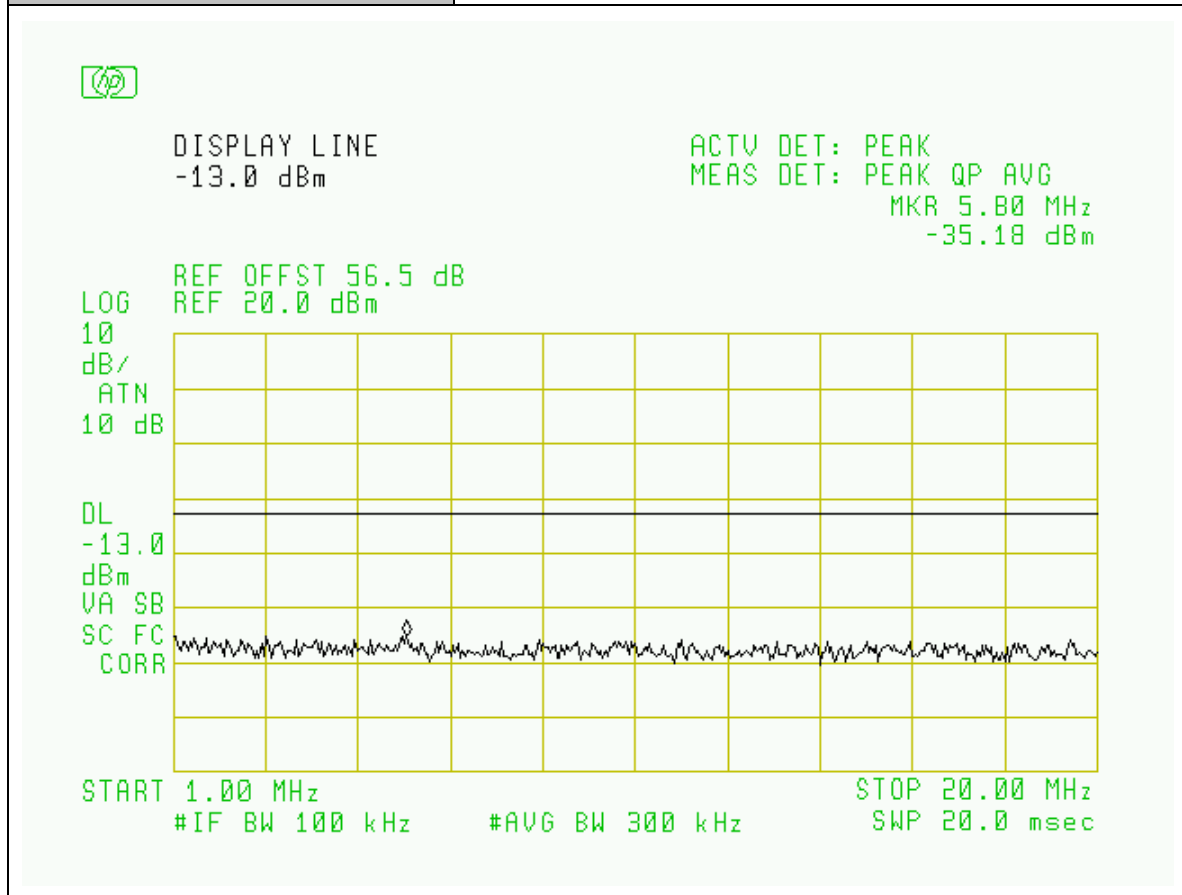
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|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70° F                                            |
| <b>Humidity:</b>       | 30%                                              |

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| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / GSM Modulation |
| <b>Plot Name:</b>     | Downlink, Hi-Channel                                                     |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                    |



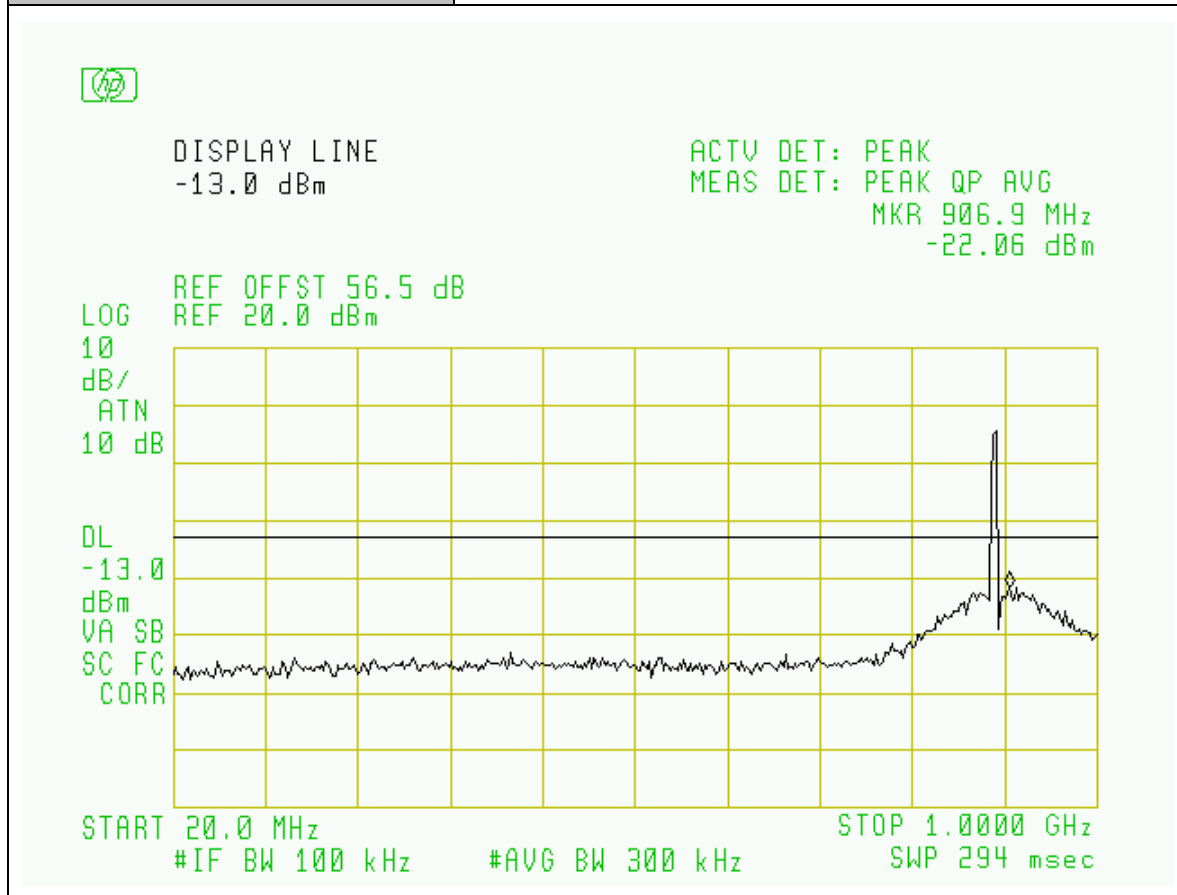
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|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70° F                                            |
| <b>Humidity:</b>       | 30%                                              |

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| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / GSM Modulation |
| <b>Plot Name:</b>     | Downlink, Mid-Channel                                                    |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                    |



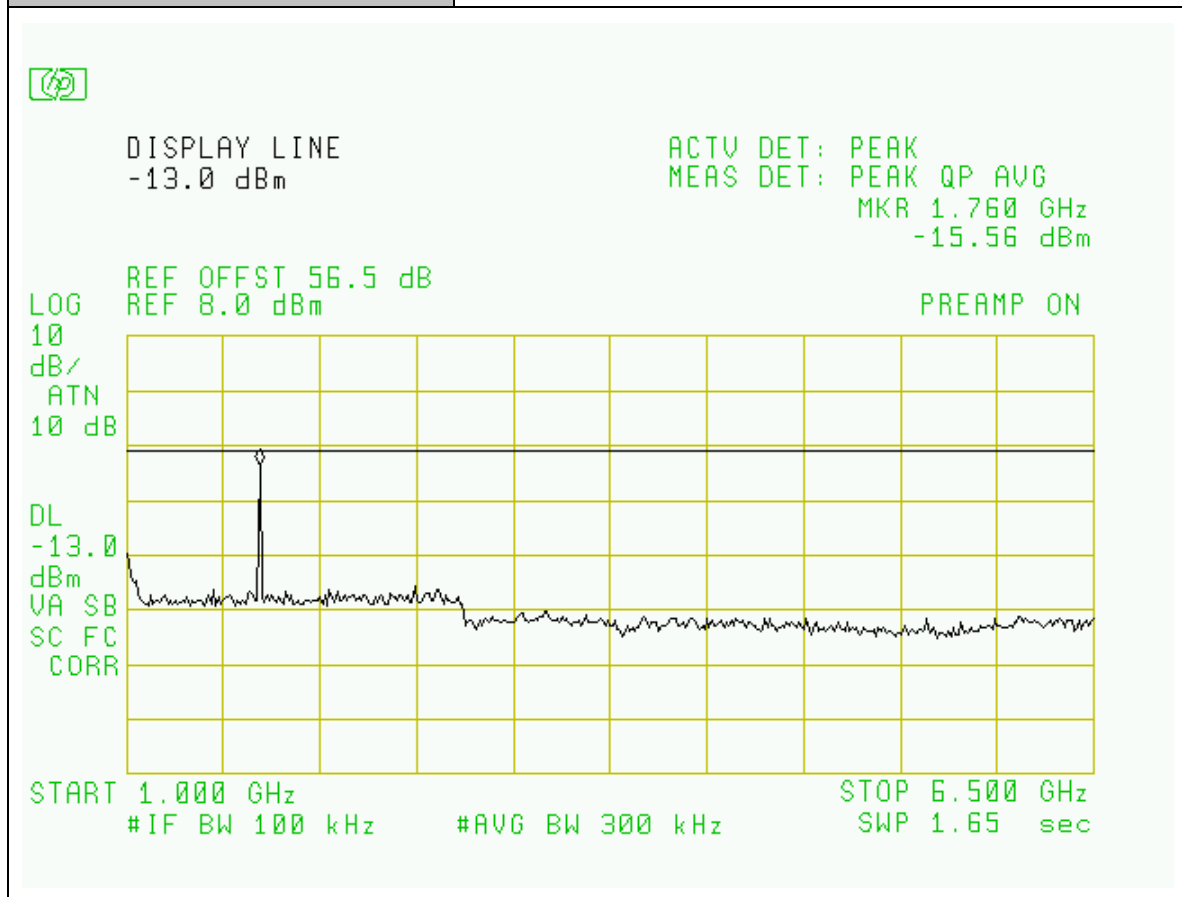
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|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

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| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / GSM Modulation |
| <b>Plot Name:</b>     | Downlink, Mid-Channel                                                    |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                    |



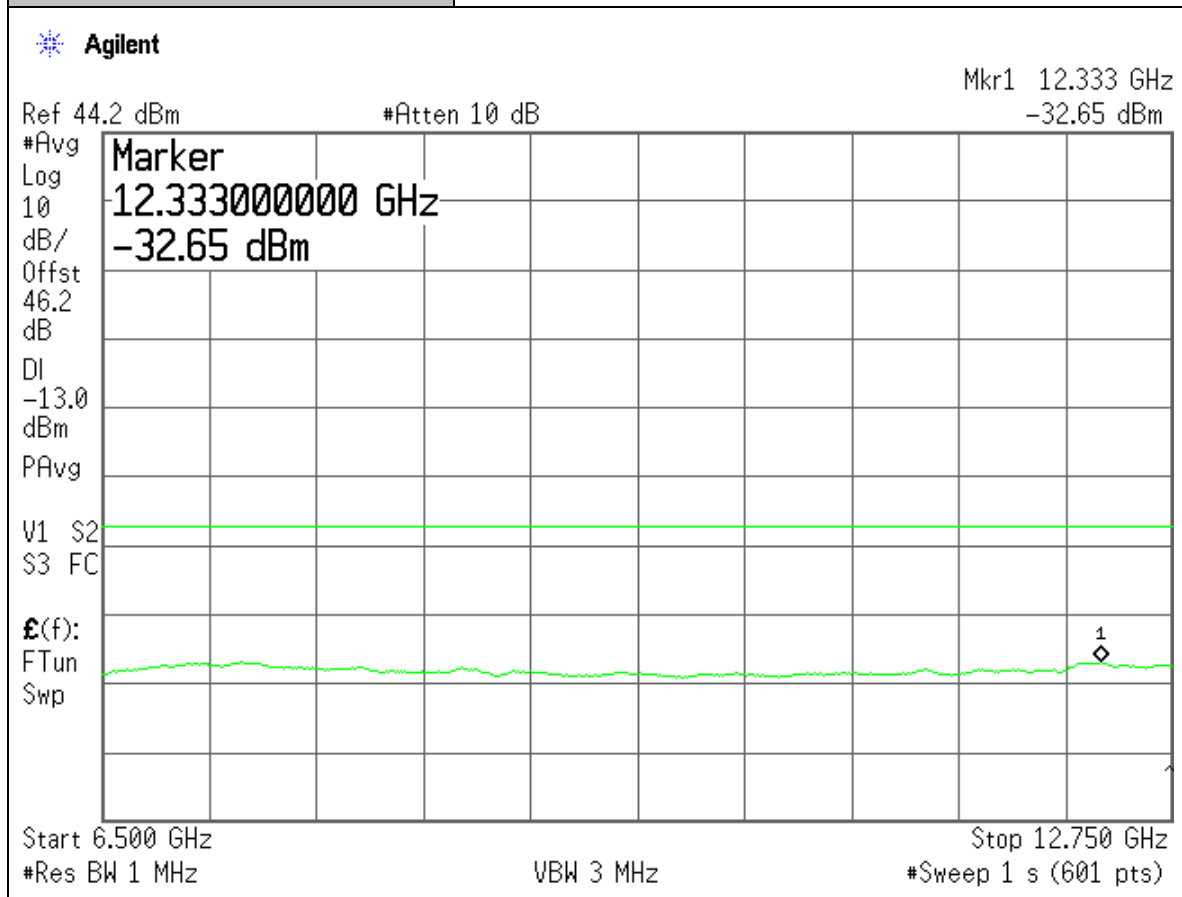
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|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

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| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / GSM Modulation |
| <b>Plot Name:</b>     | Downlink, Mid-Channel                                                    |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                    |



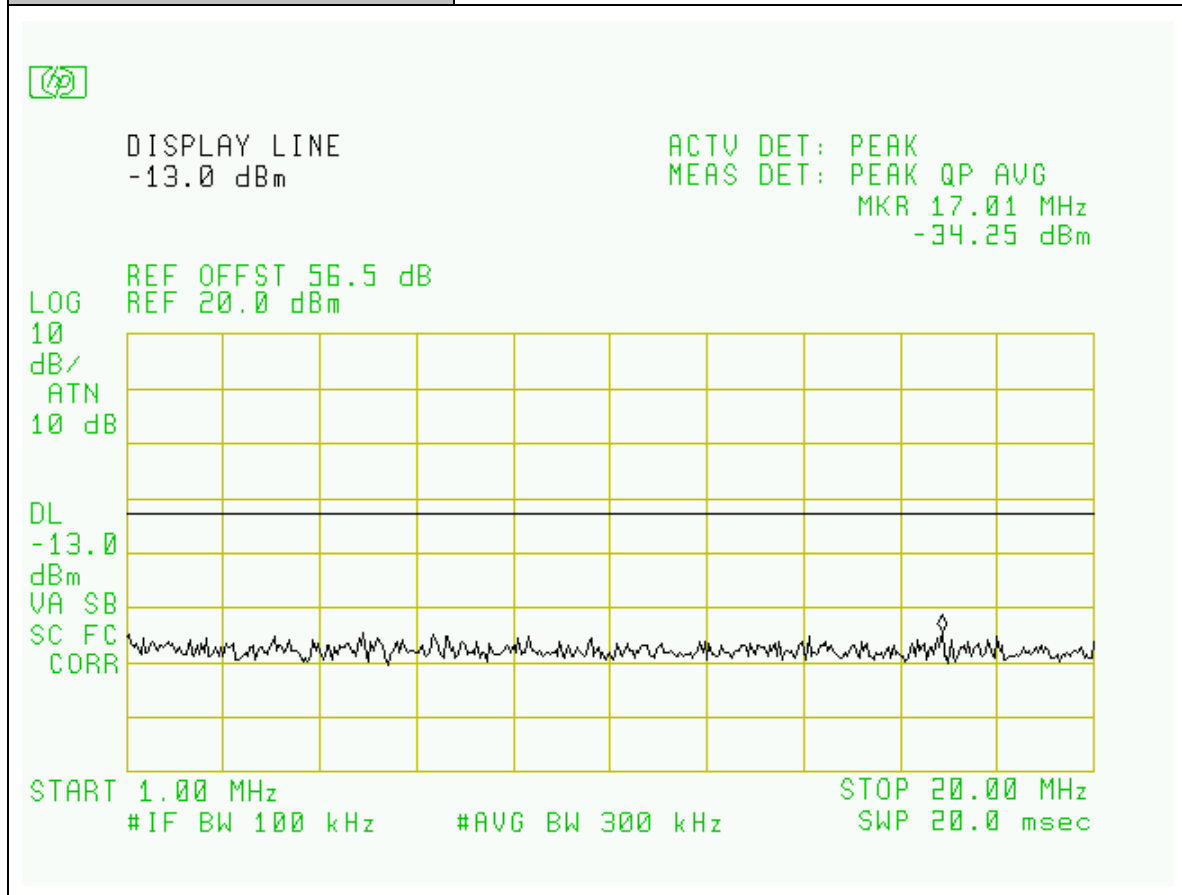
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|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70° F                                            |
| <b>Humidity:</b>       | 30%                                              |

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| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / GSM Modulation |
| <b>Plot Name:</b>     | Downlink, Mid-Channel                                                    |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                    |



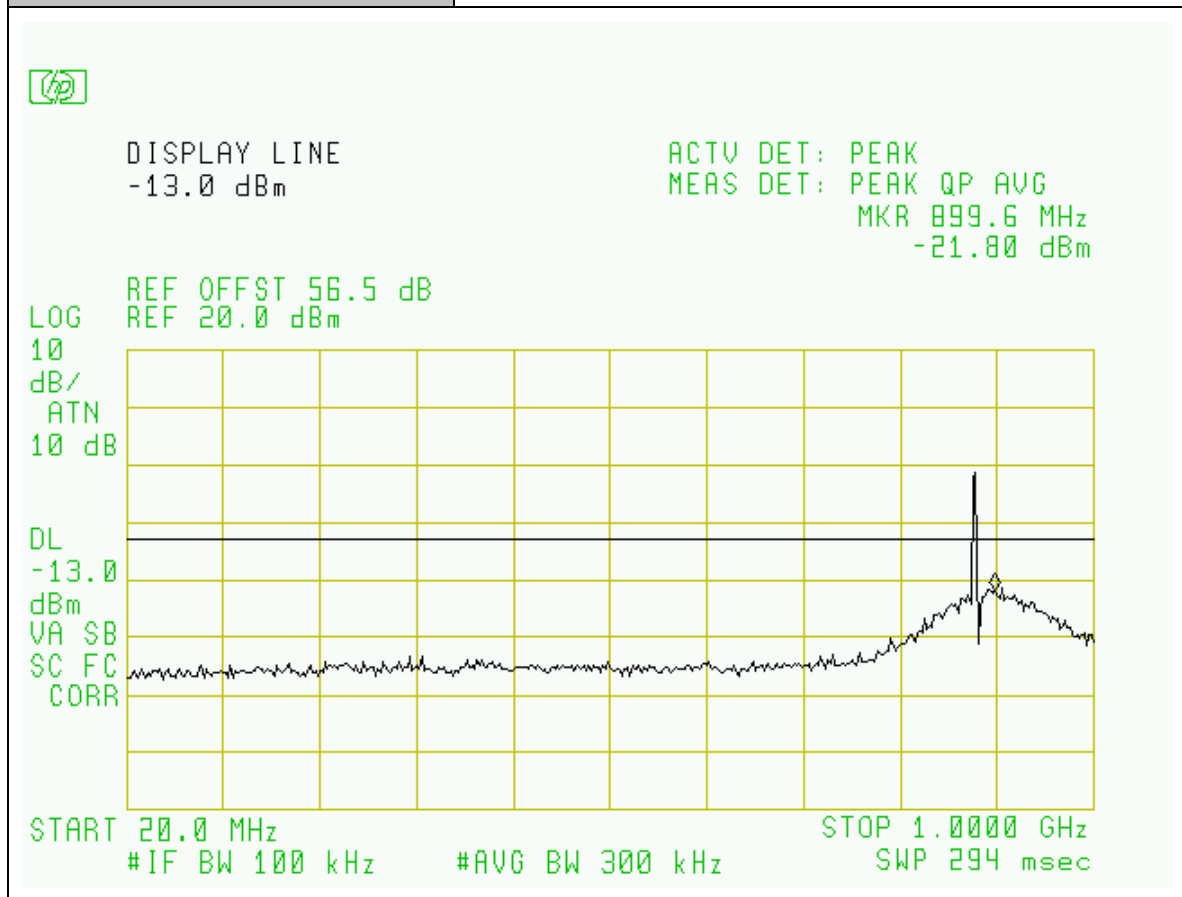
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|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

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| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / GSM Modulation |
| <b>Plot Name:</b>     | Downlink, Low-Channel                                                    |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                    |



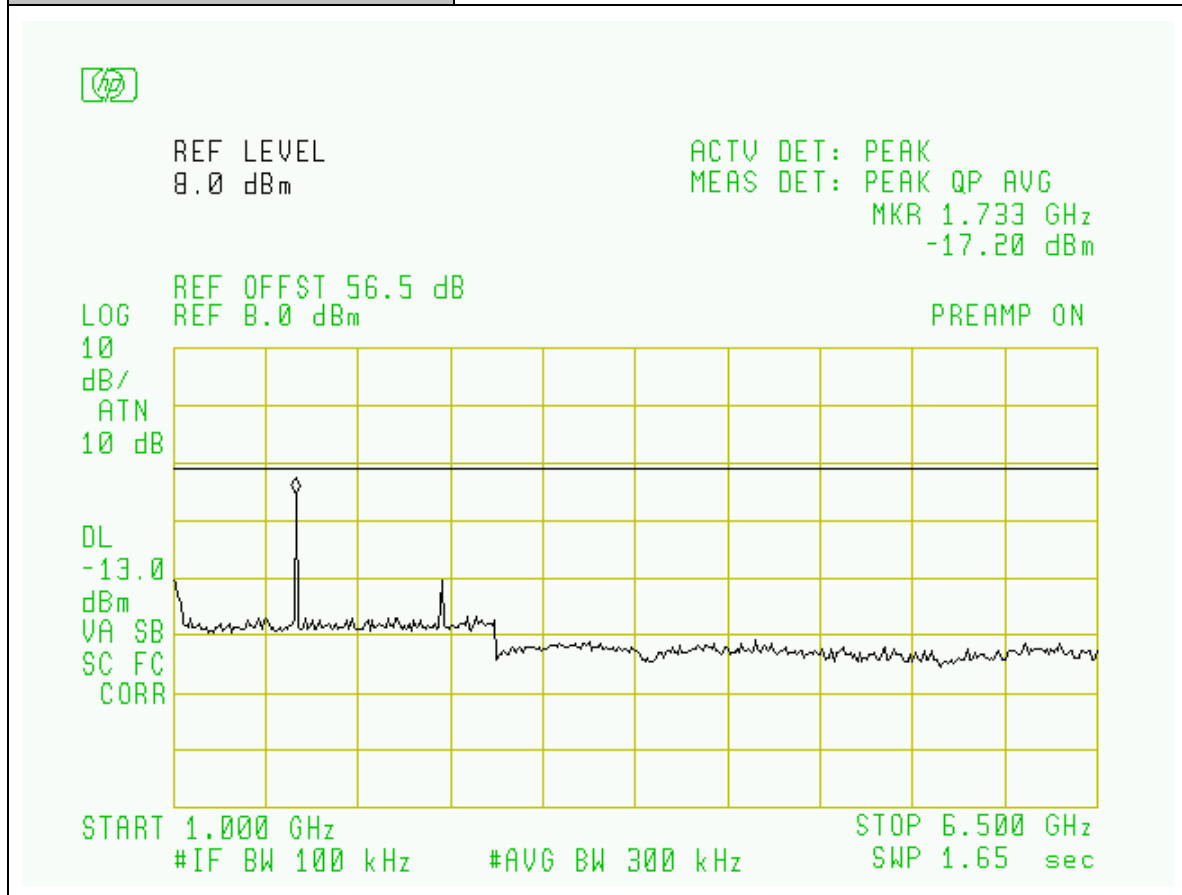
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|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

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| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / GSM Modulation |
| <b>Plot Name:</b>     | Downlink, Low-Channel                                                    |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                    |



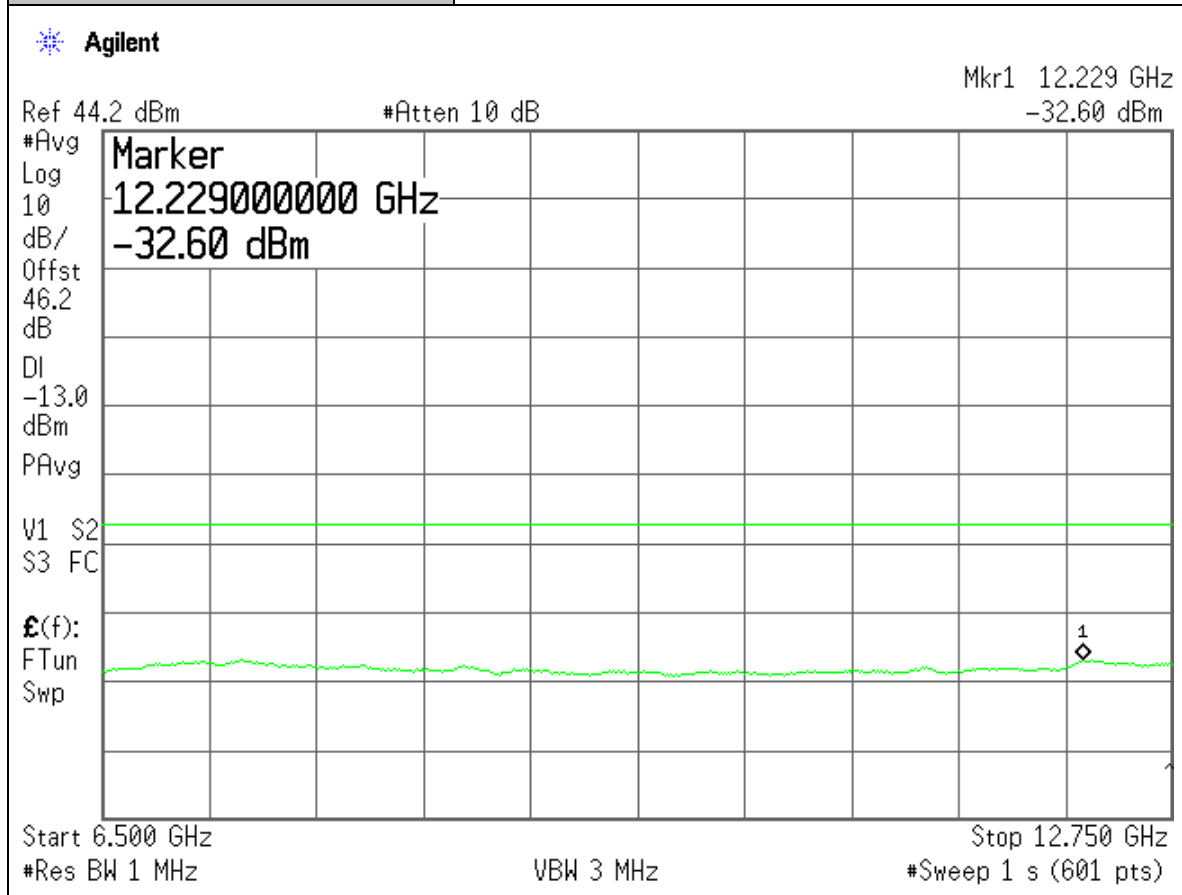
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| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

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|-----------------------|--------------------------------------------------------------------------|
| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / GSM Modulation |
| <b>Plot Name:</b>     | Downlink, Low-Channel                                                    |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                    |



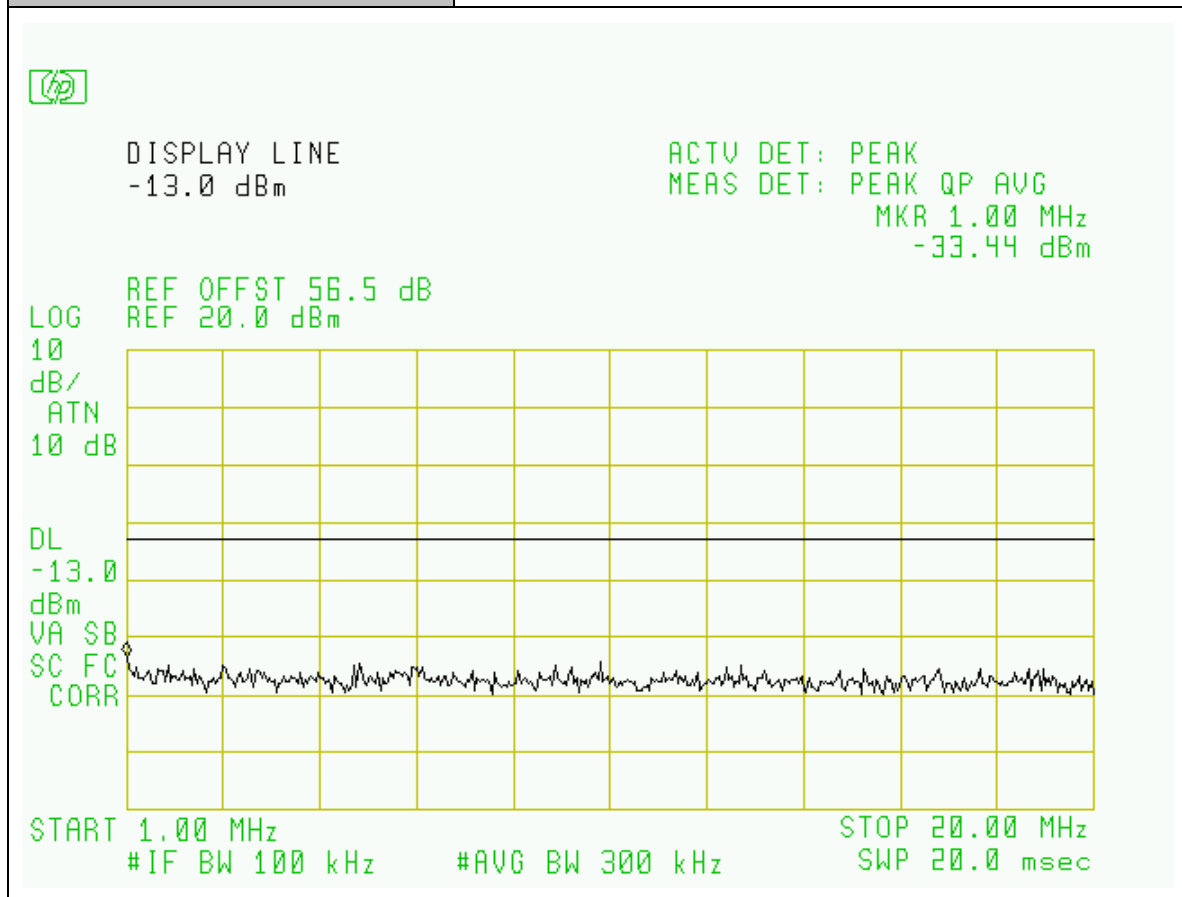
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| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70° F                                            |
| <b>Humidity:</b>       | 30%                                              |

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|-----------------------|--------------------------------------------------------------------------|
| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / GSM Modulation |
| <b>Plot Name:</b>     | Downlink, Low-Channel                                                    |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                    |



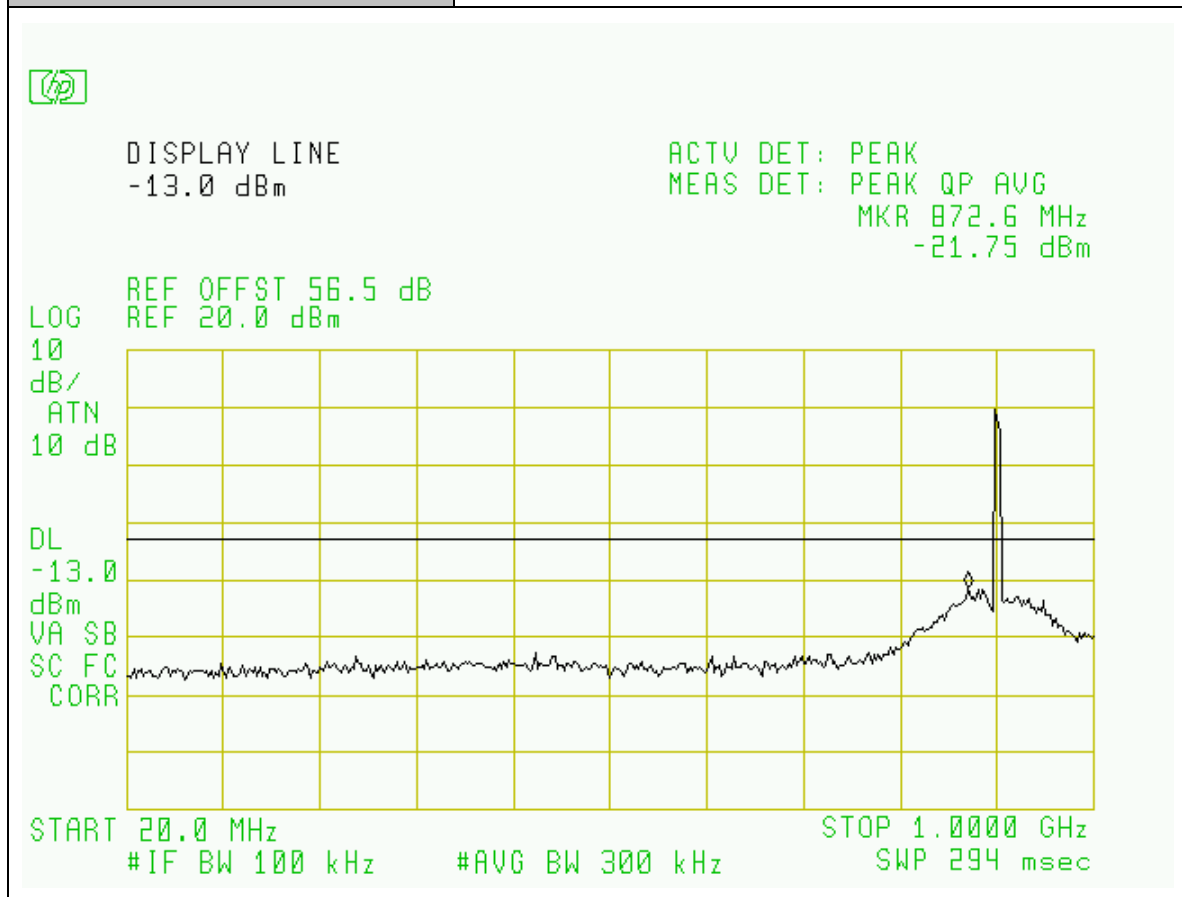
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| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

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|-----------------------|---------------------------------------------------------------------------|
| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / EDGE Modulation |
| <b>Plot Name:</b>     | Downlink, Hi-Channel                                                      |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                     |



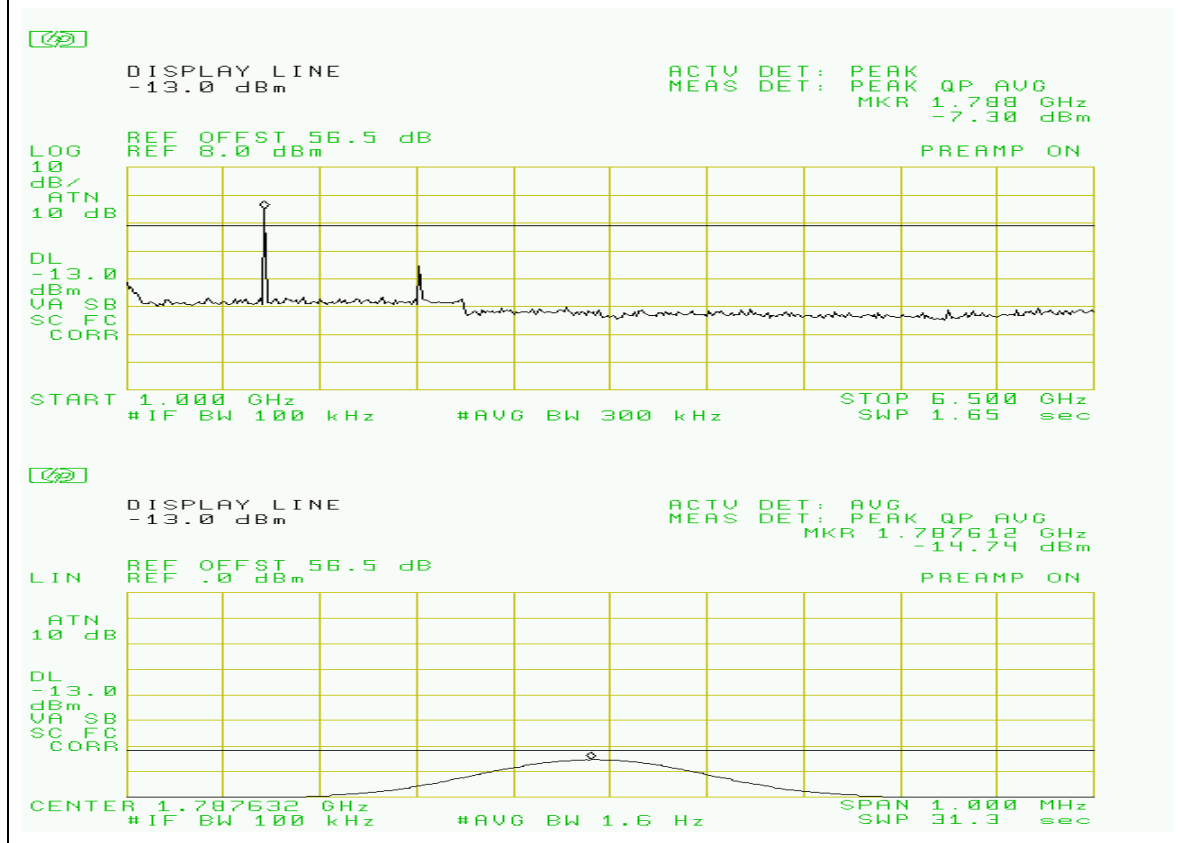
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| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

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|-----------------------|---------------------------------------------------------------------------|
| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / EDGE Modulation |
| <b>Plot Name:</b>     | Downlink, Hi-Channel                                                      |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                     |



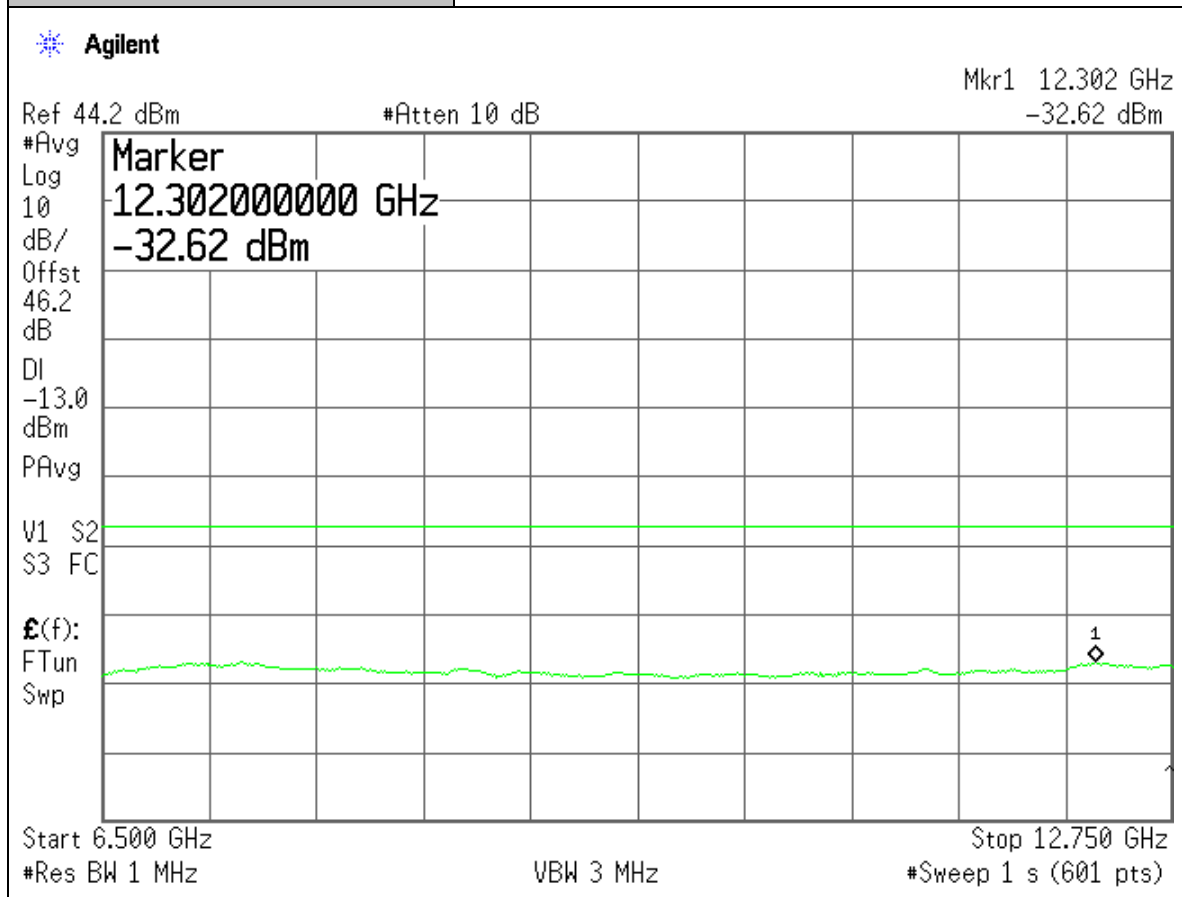
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| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

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|-----------------------|---------------------------------------------------------------------------|
| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / EDGE Modulation |
| <b>Plot Name:</b>     | Downlink, Hi-Channel                                                      |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                     |



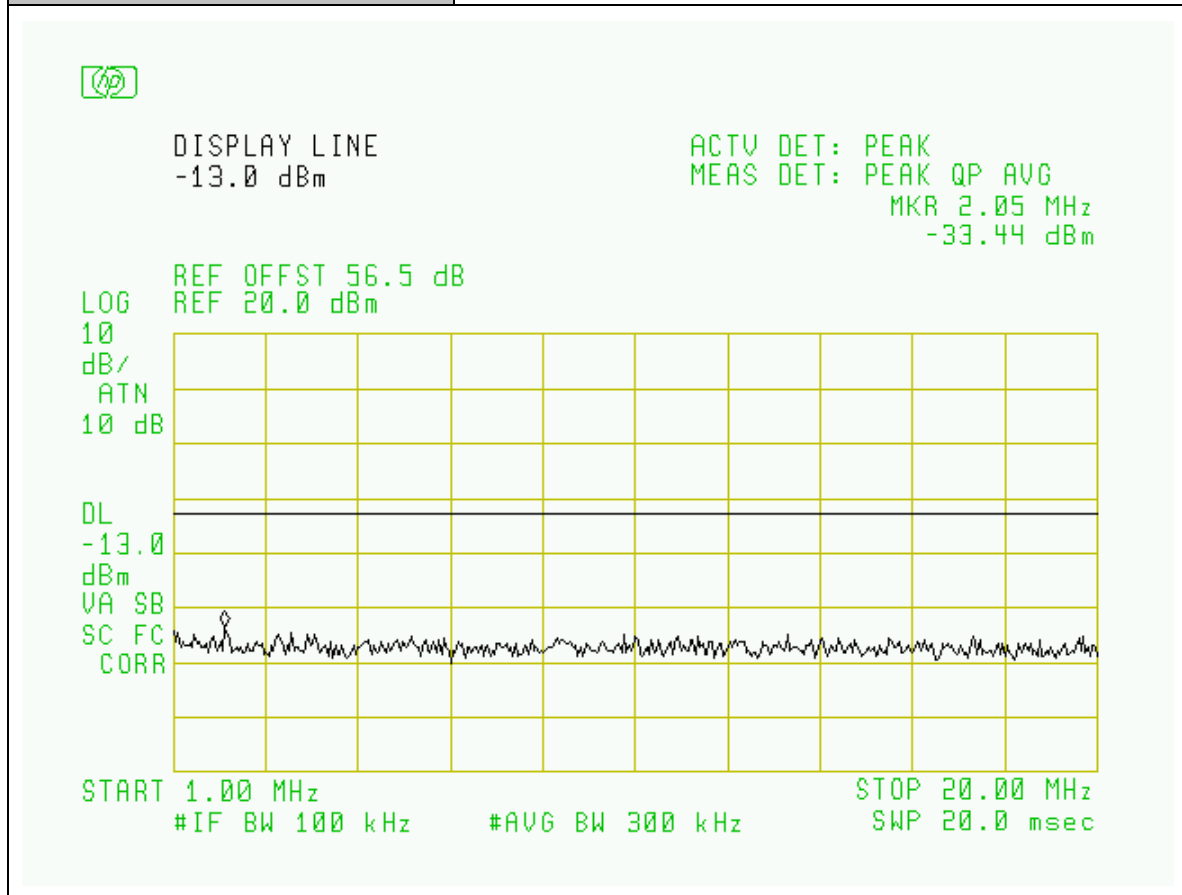
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| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70° F                                            |
| <b>Humidity:</b>       | 30%                                              |

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|-----------------------|---------------------------------------------------------------------------|
| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / EDGE Modulation |
| <b>Plot Name:</b>     | Downlink, Hi-Channel                                                      |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                     |



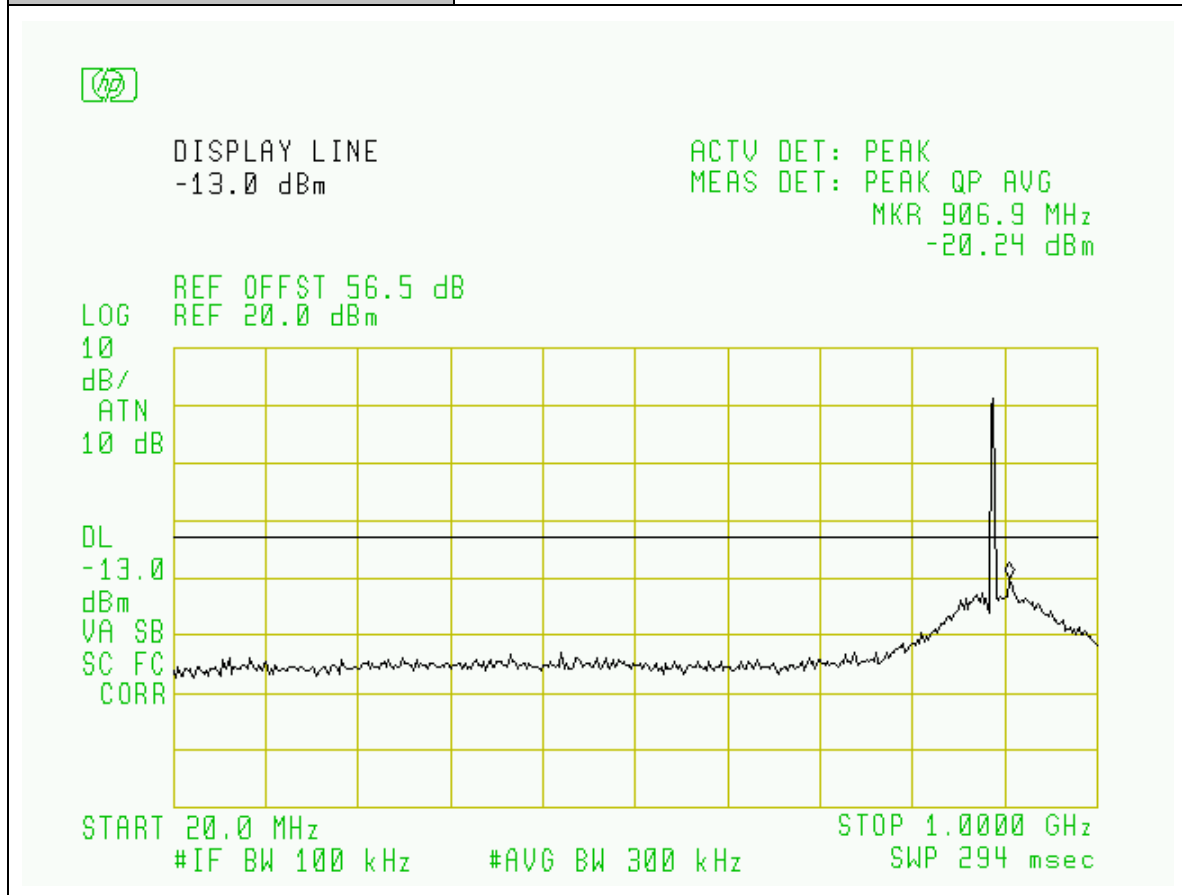
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| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70° F                                            |
| <b>Humidity:</b>       | 30%                                              |

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|-----------------------|---------------------------------------------------------------------------|
| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / EDGE Modulation |
| <b>Plot Name:</b>     | Downlink, Mid-Channel                                                     |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                     |



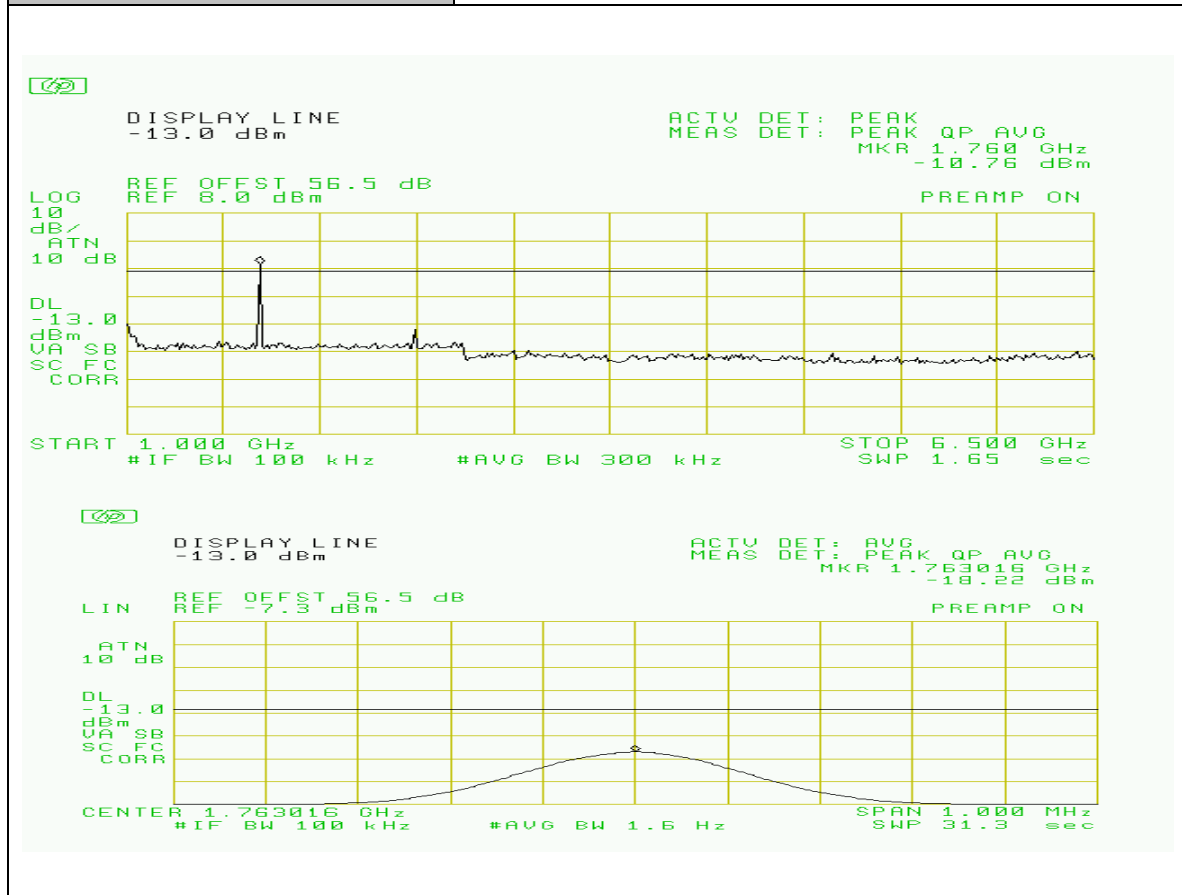
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| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

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|-----------------------|---------------------------------------------------------------------------|
| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / EDGE Modulation |
| <b>Plot Name:</b>     | Downlink, Mid-Channel                                                     |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                     |



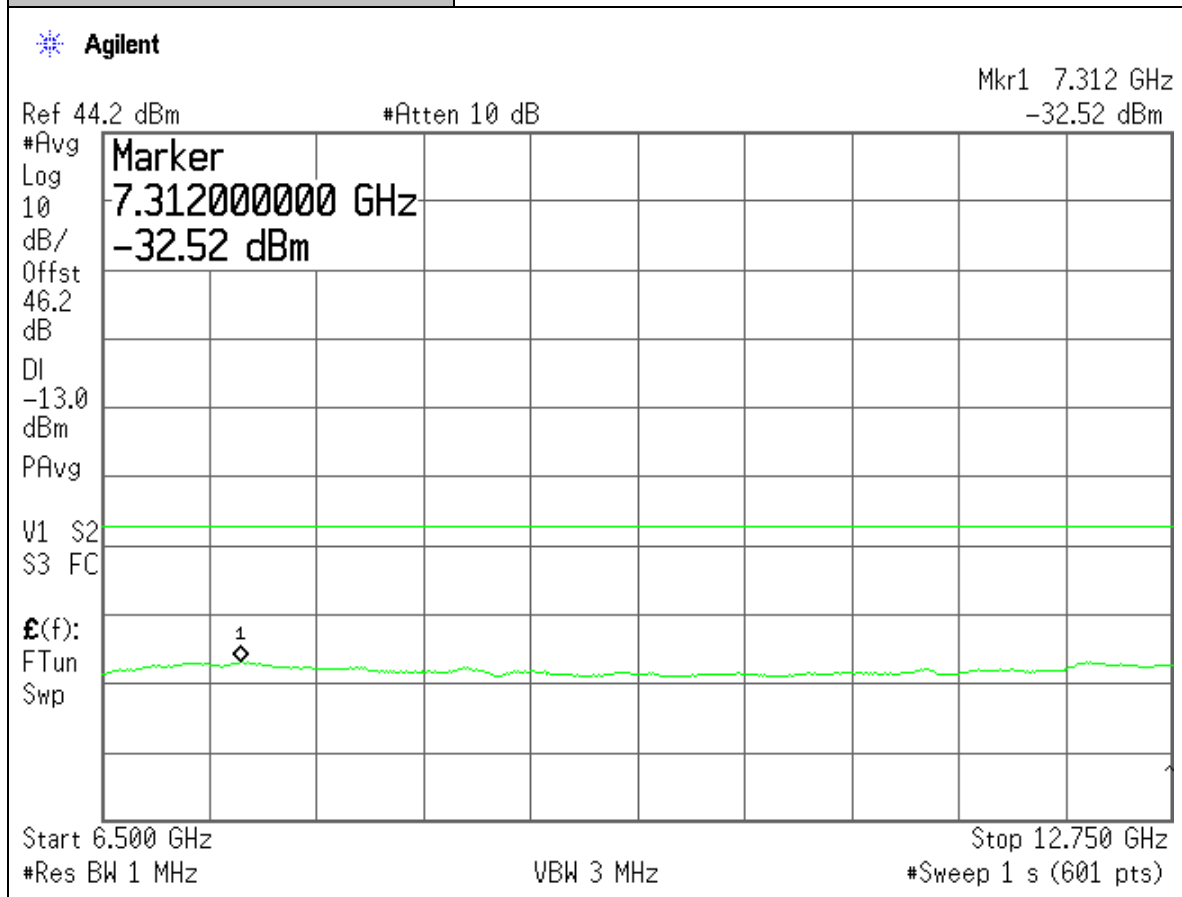
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|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

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|-----------------------|---------------------------------------------------------------------------|
| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / EDGE Modulation |
| <b>Plot Name:</b>     | Downlink, Mid-Channel                                                     |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                     |



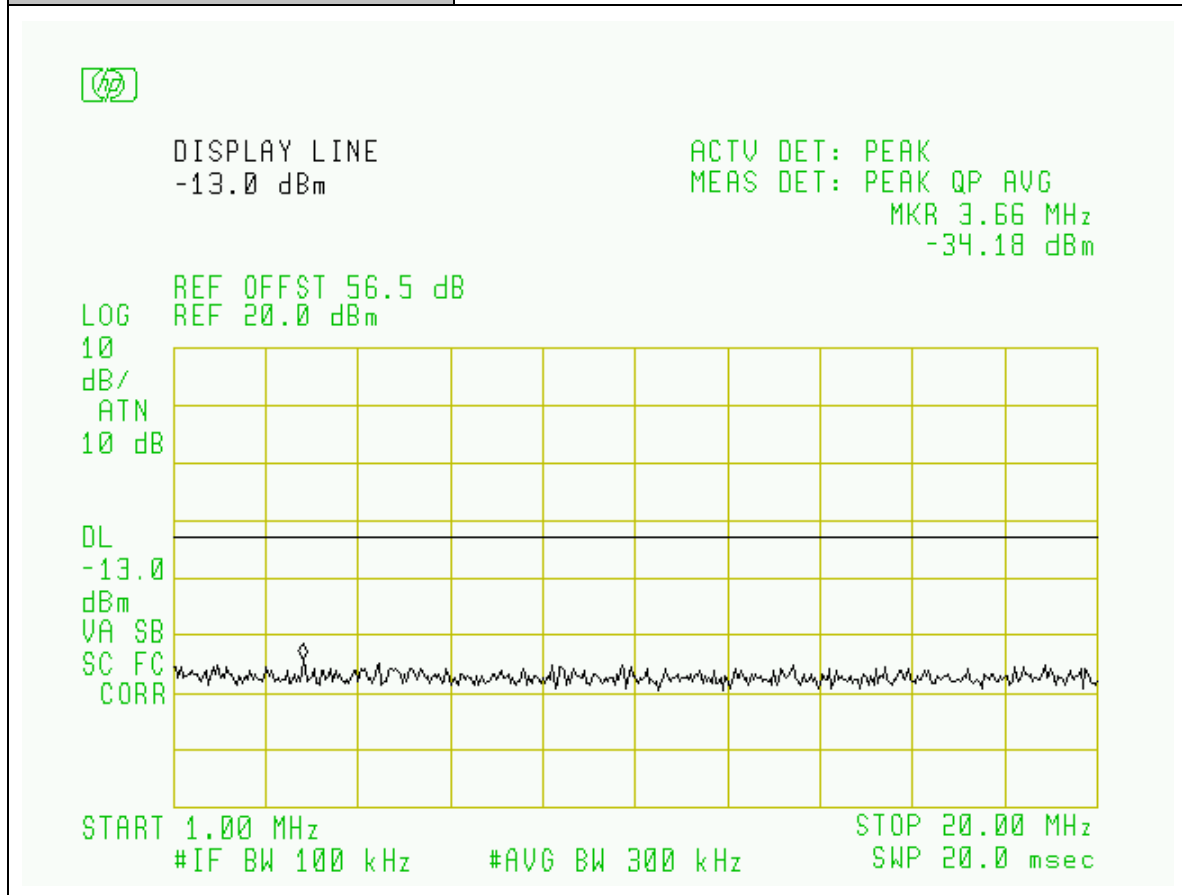
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|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70° F                                            |
| <b>Humidity:</b>       | 30%                                              |

|                       |                                                                           |
|-----------------------|---------------------------------------------------------------------------|
| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / EDGE Modulation |
| <b>Plot Name:</b>     | Downlink, Mid-Channel                                                     |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                     |



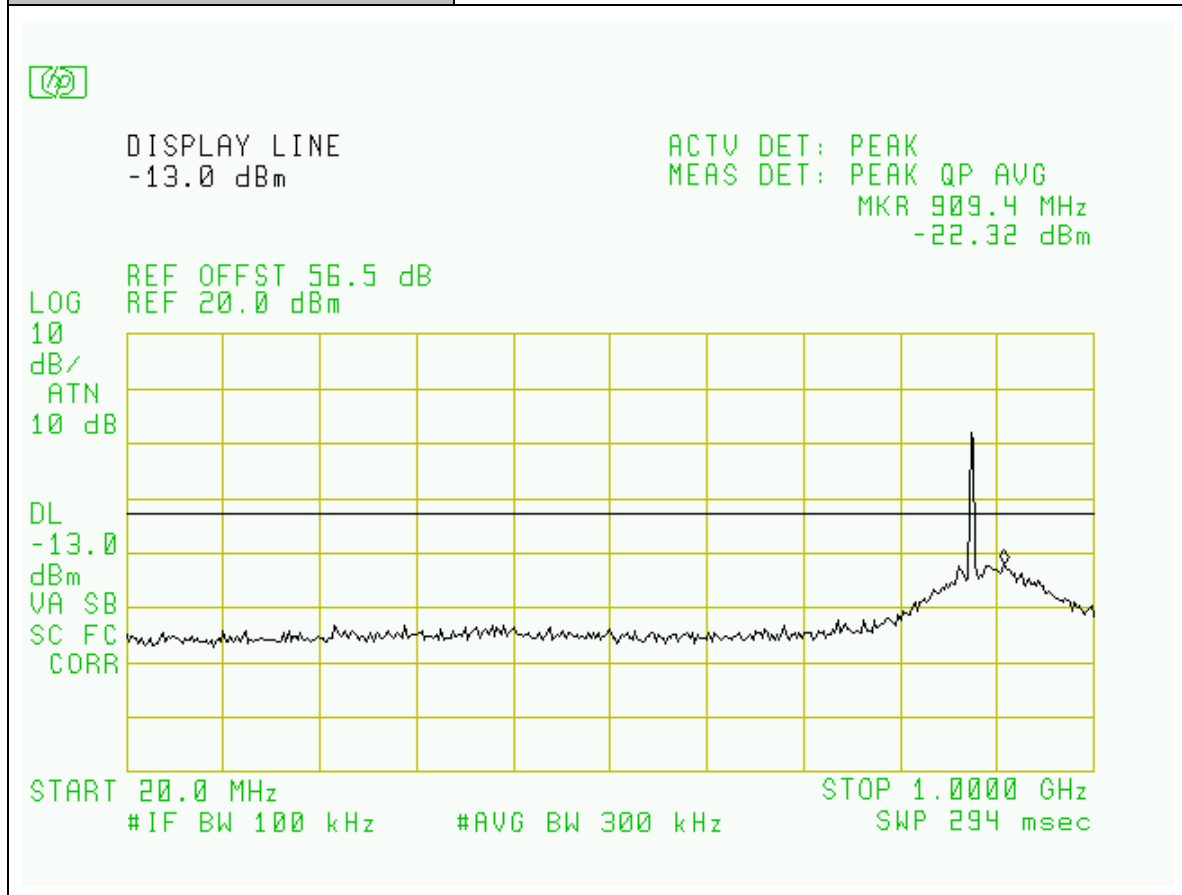
|                        |                                                  |
|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

|                       |                                                                           |
|-----------------------|---------------------------------------------------------------------------|
| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / EDGE Modulation |
| <b>Plot Name:</b>     | Downlink, Low-Channel                                                     |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                     |



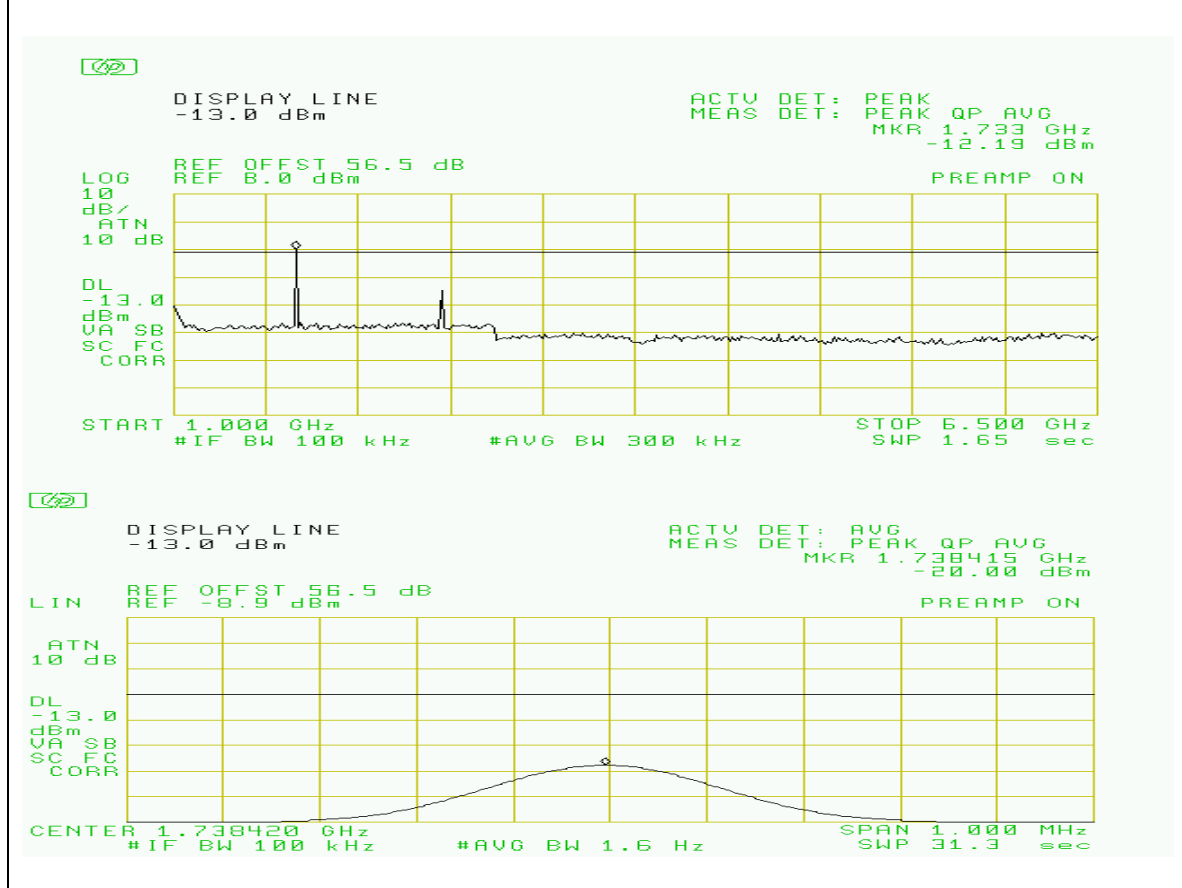
|                        |                                                  |
|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

|                       |                                                                           |
|-----------------------|---------------------------------------------------------------------------|
| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / EDGE Modulation |
| <b>Plot Name:</b>     | Downlink, Low-Channel                                                     |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                     |



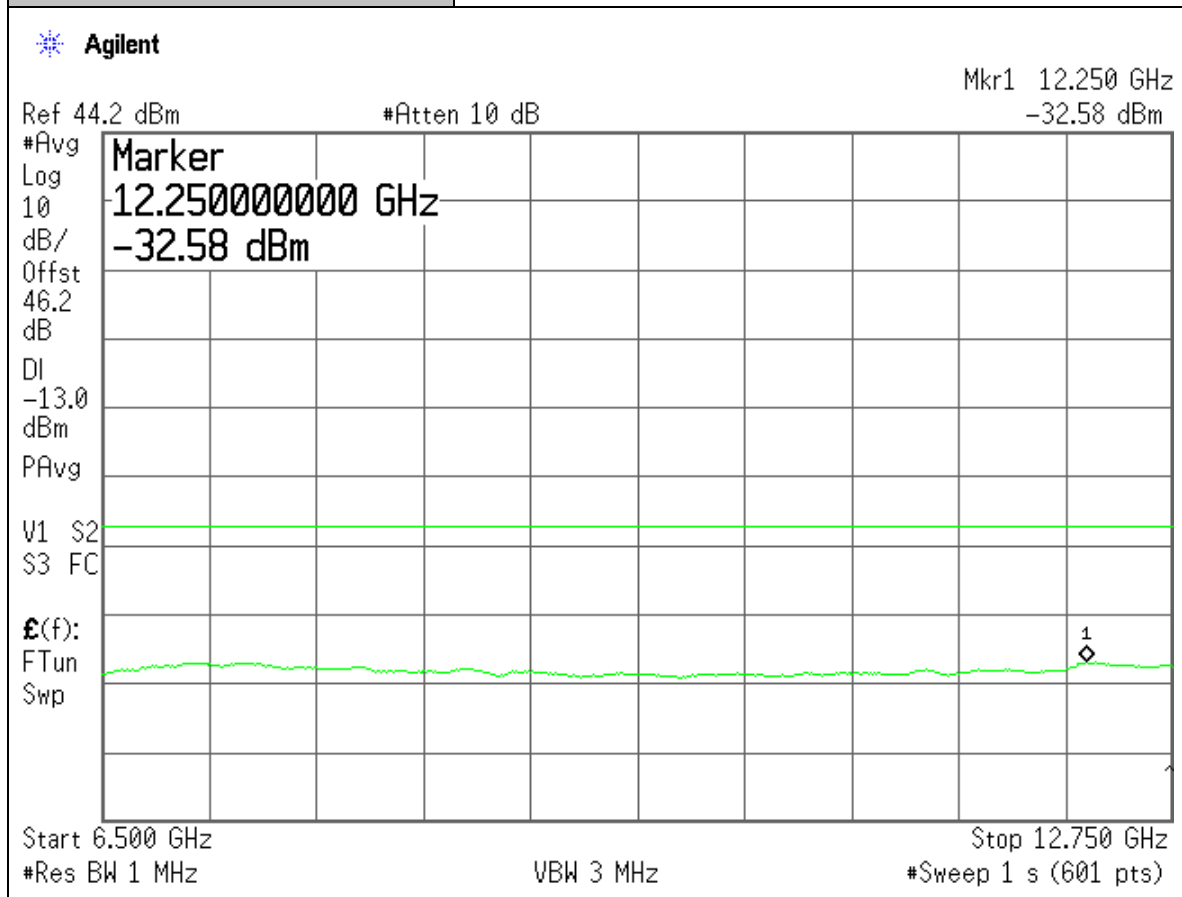
|                        |                                                  |
|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70°F                                             |
| <b>Humidity:</b>       | 30%                                              |

|                       |                                                                           |
|-----------------------|---------------------------------------------------------------------------|
| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / EDGE Modulation |
| <b>Plot Name:</b>     | Downlink, Low-Channel                                                     |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                     |



|                        |                                                  |
|------------------------|--------------------------------------------------|
| <b>Project Number:</b> | 0048-051121-01-FCC                               |
| <b>EUT:</b>            | ANDREW Single Channel Power Amplifier<br>HePA850 |
| <b>PARTS NO.:</b>      | RF100306                                         |
| <b>Tested By:</b>      | Wei Li                                           |
| <b>Temperature:</b>    | 70° F                                            |
| <b>Humidity:</b>       | 30%                                              |

|                       |                                                                           |
|-----------------------|---------------------------------------------------------------------------|
| <b>Section:</b>       | Spurious Emissions at RF Output Port:<br>CELLULAR Bands / EDGE Modulation |
| <b>Plot Name:</b>     | Downlink, Low-Channel                                                     |
| <b>Configuration:</b> | Input: SG, Output Port: EUT RF OUTPUT                                     |



**Section 6. Field Strength of Spurious**

|                      |                                   |                       |                       |
|----------------------|-----------------------------------|-----------------------|-----------------------|
| <b>Name of Test:</b> | <i>Field Strength of Spurious</i> | <b>Test Standard:</b> | 22.917<br>24.238      |
| <b>Tested By:</b>    | EDWARD LEE                        | <b>Test Date:</b>     | 11/21/2005-12/05/2005 |

**Minimum Standard:** Para. No. 22.917(e). The mean power of emissions must be attenuated below the mean power of the unmodulated carrier on any frequency twice or more than twice the fundamental emission by at least  $43 + 10 \log P$ . This is equivalent to -13 dBm absolute power.  
Para. No. 24.238(a). The magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under conditions specified in the instruction manual and/or alignment procedure, shall not less than  $43 + 10 \log$  (mean output power in watts) dBc below the mean power output outside a licensee's frequency block (-13dBm).

**Method of Measurement:** TIA/EIA-603-1992, Section 2.2.12  
The antenna substitution method was used to determine the equivalent radiated power at spurious frequencies. The spurious emissions were measured at a distance of 3 meters. The EUT was then replaced with a reference substitution antenna with a known gain referenced to a dipole. This antenna was fed with a signal at the spurious frequency. The level of the signal was adjusted to repeat the previously measured level. The resulting ERP is the signal level fed to the reference antenna corrected for gain referenced to a dipole.

Per FCC Requirements, the antenna substitution method can be replaced by using following calculation to yield the required limit criteria WHEN the max. level of measured spurious emissions is far below the limit.

### Calculation for Required Emission Limit Per 2.1053

With the amplifier RF output level set to rated output power, Radiated Emissions between 10 MHz and 10 GHz (Cellular) or 20GHz (PCS) shall be observed. The “Low, Mid, and High” frequencies shall be used for this test.

The Emission Limits and measuring instrumentation settings established in FCC Part 22.917 shall be followed. Emissions shall be less than  $43 + 10 \log (P)$  dBc. Per FCC Part 2.1053(a), “Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter (*amplifier*), assuming all emissions are radiated from half-wave dipole antennas.” The following relationships yield the required limit criteria.

For a half-wave dipole antenna in free space:

$$E = (49.2 * P)^{1/2} / R \quad [\text{V/m}]$$

Where:

E = Field intensity in Volts/meter of carrier

P = transmitted power in Watts (rated W)

R = Distance from antenna to UUT in meters (3 meters)

Conversion of E, Volts/meter to dBuV/m:

$$20 \log (E * 10^6) \quad [\text{dBuV/m}]$$

Attenuation requirement (Atten):  $43 + 10 \log P$  [dBc]

Thus, the required limit:

$$E_{\text{lim}} = E - \text{Atten} \quad \text{dBuV/m}$$

For HEPA: P(GSM)=60W and P(EDGE)=45W

Then,  **$E_{\text{lim}} = 84.38 \text{ dBuV/m}$**

Note: Emissions less than 54.38 dBuV/m (84.38 - 30 dB) may not be reported.

**Test Result:**

**Complies**

**Test Data:**

See Attached Table(s)

|                      |                                       |
|----------------------|---------------------------------------|
| <b>Configuration</b> | CELLULAR w/ RF Output Port Terminated |
| <b>Band</b>          | CELLULAR Downlink                     |
| <b>Channel</b>       | Low                                   |

| Freq. (MHz) | H,V | SA Reading (dBuV) | Height (m) | Angle (degree) | Calculated 3m Limit (dBuV) | Margin (dB) | Absolute Limit (dBm) | Margin (dB) |
|-------------|-----|-------------------|------------|----------------|----------------------------|-------------|----------------------|-------------|
| GSM 60W     |     |                   |            |                |                            |             |                      |             |
| 1738.4      | H   | 53.0              | 1.4        | 10             | 84.38                      | -31.38      | -13                  | -41         |
| 2607.6      | H   | 63.6              | 1.5        | 30             | 84.38                      | -20.78      | -13                  | -30.4       |
| 3476.8      | H   |                   |            |                | 84.38                      |             | -13                  |             |
| 4346.0      | H   | 51.1              | 1.2        | 0              | 84.38                      | -33.28      | -13                  | -42.9       |
| 5215.2      | H   |                   |            |                | 84.38                      |             | -13                  |             |
| 1738.4      | V   | 52.5              | 1.2        | 10             | 84.38                      | -31.88      | -13                  | -41.5       |
| 2607.6      | V   | 65.1              | 1.2        | 20             | 84.38                      | -19.28      | -13                  | -28.9       |
| 3476.8      | V   |                   |            |                | 84.38                      |             | -13                  |             |
| 4346.0      | V   | 50.2              | 1.2        | 0              | 84.38                      | -34.18      | -13                  | -43.8       |
| 5215.2      | V   |                   |            |                | 84.38                      |             | -13                  |             |
| EDGE 45W    |     |                   |            |                |                            |             |                      |             |
| 1738.4      | H   | 54.1              | 1.4        | 10             | 84.38                      | -30.28      | -13                  | -39.9       |
| 2607.6      | H   | 67.0              | 1.3        | 20             | 84.38                      | -17.38      | -13                  | -27         |
| 3476.8      | H   |                   |            |                | 84.38                      |             | -13                  |             |
| 4346.0      | H   | 54.4              | 1.2        | 0              | 84.38                      | -29.98      | -13                  | -39.6       |
| 5215.2      | H   | 51.0              | 1.2        | 0              | 84.38                      | -33.38      | -13                  | -43         |
| 1738.4      | V   | 55.0              | 1.2        | 10             | 84.38                      | -29.38      | -13                  | -39         |
| 2607.6      | V   | 68.6              | 1.2        | 30             | 84.38                      | -15.78      | -13                  | -25.4       |
| 3476.8      | V   | 55.3              | 1.2        | 10             | 84.38                      | -29.08      | -13                  | -38.7       |
| 4346.0      | V   | 52.5              | 1.2        | 0              | 84.38                      | -31.88      | -13                  | -41.5       |
| 5215.2      | V   |                   |            |                | 84.38                      |             | -13                  |             |

**NOTE:**

\* Measured with Average Detector

SA: Spectrum Analyzer

EUT's input.: GSM &amp; EDGE with rated P

H=horizontal and V=vertical

SA Reading: Peak Reading unless otherwise specified

|                      |                                       |
|----------------------|---------------------------------------|
| <b>Configuration</b> | CELLULAR w/ RF Output Port Terminated |
| <b>Band</b>          | CELLULAR Downlink                     |
| <b>Channel</b>       | Mid                                   |

| Freq. (MHz) | H,V | SA Reading (dBuV) | Height (m) | Angle (degree) | Calculated 3m Limit (dBuV) | Margin (dB) | Absolute Limit (dBm) | Margin (dB) |
|-------------|-----|-------------------|------------|----------------|----------------------------|-------------|----------------------|-------------|
| GSM 60W     |     |                   |            |                |                            |             |                      |             |
| 1763.0      | H   | 55.0              | 1.4        | 10             | 84.38                      | -29.38      | -13                  | -39         |
| 2644.5      | H   | 65.0              | 1.3        | 30             | 84.38                      | -19.38      | -13                  | -29         |
| 3526.0      | H   | 54.2              | 1.2        | 0              | 84.38                      | -30.18      | -13                  | -39.8       |
| 4407.5      | H   | 58.1              | 1.2        | 0              | 84.38                      | -26.28      | -13                  | -35.9       |
| 5289.0      | H   |                   |            |                | 84.38                      |             | -13                  |             |
| 1763.0      | V   | 57.2              | 1.2        | 10             | 84.38                      | -27.18      | -13                  | -36.8       |
| 2644.5      | V   | 67.8              | 1.2        | 20             | 84.38                      | -16.58      | -13                  | -26.2       |
| 3526.0      | V   | 54.6              | 1.1        | 10             | 84.38                      | -29.78      | -13                  | -39.4       |
| 4407.5      | V   | 58.6              | 1.2        | 10             | 84.38                      | -25.78      | -13                  | -35.4       |
| 5289.0      | V   | 49.9              | 1.1        | 0              | 84.38                      | -34.48      | -13                  | -44.1       |
| EDGE 45W    |     |                   |            |                |                            |             |                      |             |
| 1763.0      | H   | 56.7              | 1.3        | 0              | 84.38                      | -27.68      | -13                  | -37.3       |
| 2644.5      | H   | 64.3*             | 1.3        | 30             | 84.38                      | -20.08      | -13                  | -29.7       |
| 3526.0      | H   | 56.4              | 1.2        | 10             | 84.38                      | -27.98      | -13                  | -37.6       |
| 4407.5      | H   | 59.8              | 1.2        | 0              | 84.38                      | -24.58      | -13                  | -34.2       |
| 5289.0      | H   |                   |            |                | 84.38                      |             | -13                  |             |
| 1763.0      | V   | 52.7              | 1.2        | 10             | 84.38                      | -31.68      | -13                  | -41.3       |
| 2644.5      | V   | 66.4*             | 1.2        | 20             | 84.38                      | -17.98      | -13                  | -27.6       |
| 3526.0      | V   | 51.8              | 1.1        | 0              | 84.38                      | -32.58      | -13                  | -42.2       |
| 4407.5      | V   | 58.8              | 1.2        | 0              | 84.38                      | -25.58      | -13                  | -35.2       |
| 5289.0      | V   | 52.1              | 1.2        | 0              | 84.38                      | -32.28      | -13                  | -41.9       |

**NOTE:**

\* Measured with Average Detector

SA: Spectrum Analyzer

EUT's input.: GSM &amp; EDGE with rated P

H=horizontal and V=vertical

SA Reading: Peak Reading unless otherwise specified

|                      |                                       |
|----------------------|---------------------------------------|
| <b>Configuration</b> | CELLULAR w/ RF Output Port Terminated |
| <b>Band</b>          | CELLULAR Downlink                     |
| <b>Channel</b>       | High                                  |

| Freq. (MHz) | H,V | SA Reading (dBuV) | Height (m) | Angle (degree) | Calculated 3m Limit (dBuV) | Margin (dB) | Absolute Limit (dBm) | Margin (dB) |
|-------------|-----|-------------------|------------|----------------|----------------------------|-------------|----------------------|-------------|
| GSM 60W     |     |                   |            |                |                            |             |                      |             |
| 1787.6      | H   | 54.6              | 1.3        | 0              | 84.38                      | -29.78      | -13                  | -39.4       |
| 2681.4      | H   | 66.8              | 1.4        | 10             | 84.38                      | -17.58      | -13                  | -27.2       |
| 3575.2      | H   | 52.0              | 1.2        | 10             | 84.38                      | -32.38      | -13                  | -42         |
| 4469.0      | H   | 51.4              | 1.2        | 10             | 84.38                      | -32.98      | -13                  | -42.6       |
| 5362.8      | H   |                   |            |                | 84.38                      |             | -13                  |             |
| 1787.6      | V   | 53.5              | 1.2        | 10             | 84.38                      | -30.88      | -13                  | -40.5       |
| 2681.4      | V   | 67.7              | 1.2        | 20             | 84.38                      | -16.68      | -13                  | -26.3       |
| 3575.2      | V   |                   |            |                | 84.38                      |             | -13                  |             |
| 4469.0      | V   | 54.6              | 1.1        | 0              | 84.38                      | -29.78      | -13                  | -39.4       |
| 5362.8      | V   | 54.0              | 1.2        | 10             | 84.38                      | -30.38      | -13                  | -40         |
| EDGE 45W    |     |                   |            |                |                            |             |                      |             |
| 1787.6      | H   | 55.5              | 1.3        | 0              | 84.38                      | -28.88      | -13                  | -38.5       |
| 2681.4      | H   | 65.0*             | 1.4        | 330            | 84.38                      | -19.38      | -13                  | -29         |
| 3575.2      | H   | 54.1              | 1.2        | 10             | 84.38                      | -30.28      | -13                  | -39.9       |
| 4469.0      | H   | 54.6              | 1.3        | 0              | 84.38                      | -29.78      | -13                  | -39.4       |
| 5362.8      | H   |                   |            |                | 84.38                      |             | -13                  |             |
| 1787.6      | V   | 56.7              | 1.2        | 10             | 84.38                      | -27.68      | -13                  | -37.3       |
| 2681.4      | V   | 67.6*             | 1.3        | 20             | 84.38                      | -16.78      | -13                  | -26.4       |
| 3575.2      | V   |                   |            |                | 84.38                      |             | -13                  |             |
| 4469.0      | V   | 55.3              | 1.2        | 0              | 84.38                      | -29.08      | -13                  | -38.7       |
| 5362.8      | V   | 54.2              | 1.2        | 10             | 84.38                      | -30.18      | -13                  | -39.8       |

**NOTE:**

\* Measured with Average Detector

SA: Spectrum Analyzer

EUT's input.: GSM &amp; EDGE with rated P

H=horizontal and V=vertical

SA Reading: Peak Reading unless otherwise specified

**Section 7. Frequency Stability**

|                      |                                   |                       |                                            |
|----------------------|-----------------------------------|-----------------------|--------------------------------------------|
| <b>Name of Test:</b> | <b><i>Frequency Stability</i></b> | <b>Test Standard:</b> | <b><i>2.1055<br/>22.355&amp;24.235</i></b> |
| <b>Tested By:</b>    | <b>WEI LI</b>                     | <b>Test Date:</b>     | <b>06/02-06/14/2005</b>                    |

**Minimum Standard:** Para. No. 22.355. The transmitter carrier frequency shall remain within the tolerances given in Table C-1.

TABLE C-1.—FREQUENCY TOLERANCE FOR TRANSMITTERS IN THE PUBLIC MOBILE SERVICES

| Frequency range (MHz) | Base, fixed (ppm) | Mobile ≤3 watts (ppm) | Mobile ≤3 watts (ppm) |
|-----------------------|-------------------|-----------------------|-----------------------|
| 25 to 50 .....        | 20.0              | 20.0                  | 50.0                  |
| 50 to 450 .....       | 5.0               | 5.0                   | 50.0                  |
| 450 to 512 .....      | 2.5               | 5.0                   | 5.0                   |
| 821 to 896 .....      | 1.5               | 2.5                   | 2.5                   |
| 928 to 929 .....      | 5.0               | n/a                   | n/a                   |
| 929 to 960 .....      | 1.5               | n/a                   | n/a                   |
| 2110 to 2220 .....    | 10.0              | n/a                   | n/a                   |

Para No. 24.235. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

**Method of Measurement:** Frequency Stability With Voltage Variation:  
The E.U.T. is placed in an environmental chamber and allowed to stabilize at +25 degrees Celsius for at least 15 minutes. Set SA resolution bandwidth low enough (30Hz) to obtain the desired frequency resolution. (Using frequency counter method: The frequency counter and signal generator are phase locked with the same 10 MHz reference frequency by connecting the 10 MHz ref. out of the counter to the 10MHz ref, in of the signal generator). With the voltage input to the E.U.T. set to 85% S.T.V., the frequency is measured in 30 second intervals for a period of 5 minutes. This procedure is repeated at 100% S.T.V. and 115% S.T.V.

Frequency Stability With Temperature Variation:  
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

**Test Result:**

**Complies**

---

**Test Data:**

See Attached Table(s)

***Not Applicable***

**Section 8. Test Equipment List**

| <b>Manufacture</b> | <b>Model</b>       | <b>Serial No.</b> | <b>Description</b>                    | <b>Last Cal<br/>dd/mm/<br/>yy</b> | <b>Cal Due<br/>dd/mm/<br/>yy</b> |
|--------------------|--------------------|-------------------|---------------------------------------|-----------------------------------|----------------------------------|
| HP                 | HP8546A            | 3448A00290        | EMI Receiver                          | 12/01/05                          | 12/01/06                         |
| HP                 | E4432B             | US38220355        | 250K-3GHz Signal Generator            | 17/09/05                          | 17/09/07                         |
| EMCO               | 3104C              | 9307-4396         | 20-300MHz Biconical Antenna           | 12/02/05                          | 12/02/06                         |
| EMCO               | 3146               | 9008-2860         | 200-1000MHz Log-Periodic Antenna      | 09/02/05                          | 09/02/06                         |
| Fischer Custom     | LIPARTS<br>NO.-2   | 900-4-0008        | Line Impedance Stabilization Networks | 15/09/05                          | 15/09/06                         |
| Fischer Custom     | LIPARTS<br>NO.-2   | 900-4-0009        | Line Impedance Stabilization Networks | 23/08/05                          | 23/08/06                         |
| EMCO               | 6502               | 2665              | 10KHz-30MHz Active Loop Antenna       | 27/02/05                          | 27/02/06                         |
| EMCO               | 3115               | 4945              | Double Ridge Guide Horn Antenna       | 15/09/05                          | 15/09/06                         |
| HP                 | 8569B              | 2607A02802        | 1GHz-22GHz Spectrum Analyzer          | 10/02/05                          | 10/02/06                         |
| Delta Design       | 5900C              | 0-67-26           | Temperature Chamber                   | 24/03/05                          | 24/03/06                         |
| HP                 | E8254A             | US42110367        | Signal Generator                      | 23/03/05                          | 23/03/06                         |
| Electro-Metrics    | RGA-15             | 8-95              | Double Ridge Guide Horn Antenna       | 10/02/05                          | 10/02/06                         |
| EMCO               | 3116               | 4943              | Double Ridge Guide Horn Antenna       | 11/01/05                          | 11/01/06                         |
| Scientific-Atlanta | 12A-18             | 441               | Wave Guide Horn Antenna               | 13/09/05                          | 13/09/06                         |
| HP                 | 4419A              | US37292112        | RF Power Meter w/ Sensor Probe        | 20/07/05                          | 20/07/07                         |
| HP                 | 6032A              | 3323A-09526       | System Power Supply                   | 07/01/05                          | 07/01/06                         |
| Agilent            | E4438C             | US41460731        | ESG Vector Signal Generator           | 07/01/05                          | 07/01/07                         |
| Agilent            | E4438C             | US41460771        | ESG Vector Signal Generator           | 07/01/05                          | 07/01/07                         |
| Agilent            | E4438C             | US41460400        | ESG Vector Signal Generator           | 07/01/05                          | 07/01/07                         |
| Lorch<br>Microwave | 5NF-<br>800/1000-S | AC3               | Notch Filter                          |                                   |                                  |
| RES-NET            | RFA500NFF<br>30    | 0108              | 30dB in-line Power Attenuator         |                                   |                                  |
| Narda              | 3022               | 80986             | Directional Coupler                   |                                   |                                  |
| General Purpose    |                    |                   | 0-60V, 50A DC Power Supply            |                                   |                                  |