



**FCC CFR47 PART 15 SUBPART E
INDUSTRY CANADA RSS-210 ISSUE 8**

CERTIFICATION TEST REPORT

FOR

802.11a/b/g/n 3X3 W/NO BEAM FORMING MODULE

MODEL NUMBER: AR5BHB112

**FCC ID: WA7-AR5BHB112
IC: 6627C-AR5BHB112**

REPORT NUMBER: 13U14943

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Prepared for
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: FLUKE NETWORKS
6920 SEAWAY BLVD
EVERRET, WA, 98203, USA

EUT DESCRIPTION: 802.11a/b/g/n 3X3 W/NO BEAM FORMING MODULE

MODEL: AR5BHB112

SERIAL NUMBER: NON-SERIALIZED PRODUCTION UNIT

DATE TESTED: 2013-04-03 to 2013-04-20


| APPLICABLE STANDARDS | |
|---|--------------|
| STANDARD | TEST RESULTS |
| CFR 47 Part 15 Subpart E | Pass |
| INDUSTRY CANADA RSS-210 Issue 8 Annex 9 | Pass |
| INDUSTRY CANADA RSS-GEN Issue 3 | Pass |

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards, using test results reported in the test report documents referenced below and/or documentation furnished by the applicant. All indications of Pass/Fail in this report are opinions expressed by UL LLC based on interpretations of these calculations. The results show that the equipment is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation, as described by the referenced documents. This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For UL LLC By:

Tested By:



Bob DeLisi
WiSE Principal Engineer
UL

Mike Antola
WiSE Project Lead
UL

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC 06-96, FCC KDB 789033, ANSI C63.4-2003, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 1285 Walt Whitman Rd. Melville, NY 11747, USA.

UL Melville is accredited by NVLAP, Laboratory Code 100255-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/1002550.htm>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| PARAMETER | UNCERTAINTY |
|---------------------------------------|-------------|
| Conducted Disturbance, 0.15 to 30 MHz | ± 3.3 dB |
| Radiated Disturbance, 30 to 1000 MHz | ± 4.00 dB |

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11a/n 3x3 product with the option of no beam forming module.

The radio module is manufactured Atheros.

5.1. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

The major change filed under this application is adding a new antenna types with lower gain.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum Average conducted output power as follows:

| Frequency Range (MHz) | Mode | Output Power (dBm) | Output Power (mW) |
|-----------------------|--------------|--------------------|-------------------|
| 5180 - 5240 | 802.11a | 13.14 | 20.61 |
| 5180 - 5240 | 802.11n HT20 | 14.5 | 28.18 |
| 5190 - 5230 | 802.11n HT40 | 16.6 | 45.71 |
| 5260 - 5320 | 802.11a | 19.95 | 98.86 |
| 5260 - 5320 | 802.11n HT20 | 19.66 | 92.47 |
| 5270 - 5310 | 802.11n HT40 | 19.34 | 85.90 |
| 5500 - 5700 | 802.11a | 20.27 | 106.41 |
| 5500 - 5700 | 802.11n HT20 | 20.04 | 100.93 |
| 5510 - 5670 | 802.11n HT40 | 19.79 | 95.28 |

In order to pass Band edge measurements, the following frequencies must be reduced from the original average output powers as table shown below:

5.2GHz Band

802.11n HT40, MCS0 Mode

| Channel | Frequency (MHz) | Chain 0 Power (dBm) | Chain 1 Power (dBm) | Chain 2 Power (dBm) | Total Power (dBm) | Notes |
|---------|-----------------|---------------------|---------------------|---------------------|-------------------|------------------------|
| Low | 5190 | 10.23 | 11.62 | 13.05 | 16.56 | Original power setting |
| Low | 5190 | 7.30 | 8.79 | 9.52 | 13.40 | Adjusted power setting |

5.5GHz Band

802.11a, 9Mbps Mode

| Channel | Frequency (MHz) | Chain 0 Power (dBm) | Chain 1 Power (dBm) | Chain 2 Power (dBm) | Total Power (dBm) | Notes |
|---------|--------------------|------------------------------|------------------------------|------------------------------|-------------------------|------------------------|
| Low | 5500 | 16.46 | 14.86 | 14.41 | 20.11 | Original power setting |
| Low | 5500 | 12.09 | 10.25 | 9.19 | 15.45 | Adjusted power setting |
| High | 5700 | 15.43 | 16.45 | 15.70 | 20.65 | Original power setting |
| High | 5700 | 9.00 | 9.20 | 8.60 | 13.71 | Adjusted power setting |

802.11n HT20, MCS0 Mode

| Channel | Frequency (MHz) | Chain 0 Power (dBm) | Chain 1 Power (dBm) | Chain 2 Power (dBm) | Total Power (dBm) | Notes |
|---------|--------------------|------------------------------|------------------------------|------------------------------|-------------------------|------------------------|
| Low | 5500 | 16.02 | 14.36 | 13.71 | 19.58 | Original power setting |
| Low | 5500 | 10.74 | 8.62 | 8.17 | 14.10 | Adjusted power setting |
| High | 5700 | 15.22 | 16.28 | 15.52 | 20.47 | Original power setting |
| High | 5700 | 6.82 | 6.90 | 6.12 | 11.40 | Adjusted power setting |

802.11n HT40, MCS0 Mode

| Channel | Frequency (MHz) | Chain 0 Power (dBm) | Chain 1 Power (dBm) | Chain 2 Power (dBm) | Total Power (dBm) | Notes |
|---------|--------------------|------------------------------|------------------------------|------------------------------|-------------------------|------------------------|
| Low | 5510 | 10.03 | 8.00 | 8.52 | 13.71 | Original power setting |
| Low | 5510 | 7.30 | 5.43 | 5.00 | 10.80 | Adjusted power setting |

Peak power measurements were also re-measured under this mode/frequency and results are contained within this report.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a total of three (3) external Isolated Magnetic Dipole (IMD) connector mount antennas manufactured by Centurion. Part number is MAF94051. Each antenna has a maximum gain of 2.6 dBi in the 5GHz band.

5.4. SOFTWARE AND FIRMWARE

The EUT driver software installed during testing was Atheros AR9300 Anwi Diagnostic Kernel Driver.

The test utility software used during testing was Atheros Radio Test 2 (ART2-GUI), Version 2.3.

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emission was performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in the X orientation.

Based on the baseline scan, the worst-case data rates were:

802.11a mode: 9 Mbps
802.11n HT20mode: MCS0
802.11n HT40mode: MCS0

Radiated emissions for EUT with antenna was performed and passed; therefore, antenna port spurious was not performed.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

| Support Equipment List | | | | |
|------------------------|----------------|-------------|--------------------------|--------|
| Description | Manufacturer | Model | Serial Number | FCC ID |
| Laptop | Dell | PP04X | CN-0HN338-48643-7BO-1010 | DoC |
| Express Card Adapter | Fluke Networks | EC2C | -- | DoC |
| AC Adapter | Dell | PA-1900-02D | CN-09T215-71615-51K-1D89 | DoC |

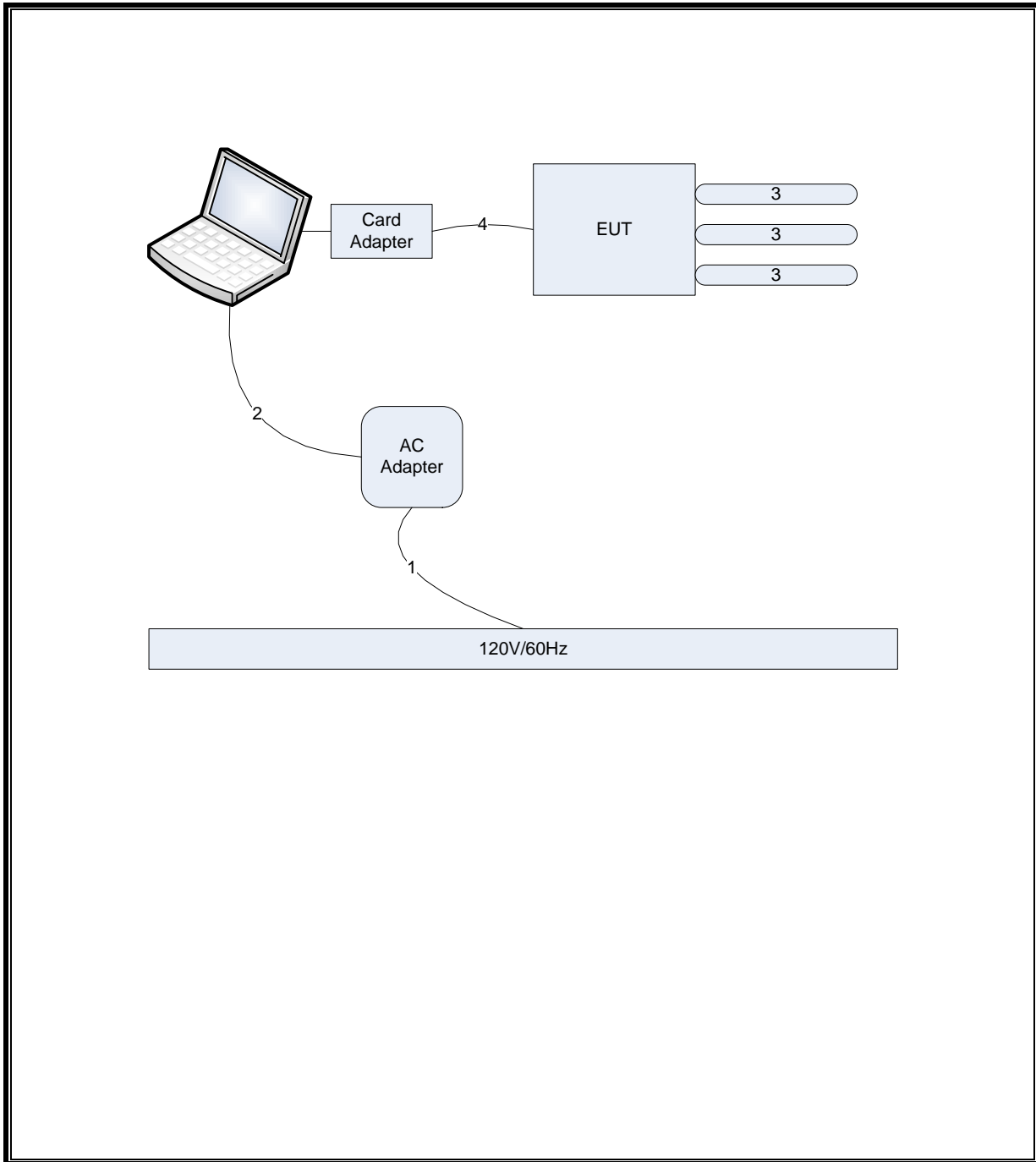
I/O CABLES

| I/O Cable List | | | | | | |
|----------------|----------|----------------------|----------------|------------|------------------|---------|
| Cable No | Port | # of identical ports | Connector Type | Cable Type | Cable Length (m) | Remarks |
| 1 | AC | 1 | US 115V | Unshielded | 1 | None |
| 2 | DC | 1 | DC | Unshielded | 2 | None |
| 3 | Ant Port | 3 | RP-SMA | Unshielded | NA | None |
| 4 | mHDMI | 1 | mHDMI | Shielded | 0.1 | None |

TEST SETUP

The EUT is connected to a host laptop computer via a PCI-E adapter board during the tests. Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

| Radiated Emissions | | | | | |
|--|-----------------|-----------------|------------|------------|--------------|
| Description | Manufacturer | Model | Identifier | Cal Date | Cal Due Date |
| 30-1000MHz | | | | | |
| EMI Receiver | Rohde & Schwarz | ESIB26 | ME5B-081 | 2013-01-29 | 2014-01-31 |
| Log-P Antenna | Schaffner | UPA6109 | 44067 | 2012-05-16 | 2013-05-16 |
| Bicon Antenna | Schaffner | VBA6106A | 43441 | 2012-11-12 | 2013-11-12 |
| Switch Driver | HP | 11713A | ME7A-627 | N/A | N/A |
| System Controller | Sunol Sciences | SC99V | 44396 | N/A | N/A |
| Camera Controller | Panasonic | WV-CU254 | 44395 | N/A | N/A |
| RF Switch Box | UL | 1 | 44398 | N/A | N/A |
| Measurement Software | UL | Version 9.5 | 44740 | N/A | N/A |
| Above 1GHz (Band Optimized System) | | | | | |
| EMI Receiver | Rohde & Schwarz | ESIB40 | 34968 | 2013-01-30 | 2014-01-31 |
| Horn Antenna (1-2 GHz) | ETS | 3161-01 (26°)** | 51442 | 2008-03-28 | See * below |
| Horn Antenna (2-4 GHz) | ETS | 3161-02 (22°)** | 48107 | 2007-09-27 | See * below |
| Horn Antenna (4-8 GHz) | ETS | 3161-03 (22°)** | 48106 | 2007-09-27 | See * below |
| Horn Antenna (8-12 GHz) | ETS | 3160-07 (26°)** | 8933 | 2008-11-24 | See * below |
| Horn Antenna (12-18 GHz) | ETS | 3160-08 (26°)** | 8932 | 2007-09-27 | See * below |
| Horn Antenna (18-26.5 GHz) | ETS | 3160-09 (27°)** | 8947 | 2007-09-26 | See * below |
| Horn Antenna (26.5-40 GHz) | ETS | 3160-10 (27°)** | 73004 | 2007-09-26 | See * below |
| Signal Path Controller | HP | 11713A | 50250 | N/A | N/A |
| Gain Controller | HP | 11713A | 50251 | N/A | N/A |
| RF Switch / Preamp Fixture | UL | BOMS1 | 50249 | N/A | N/A |
| System Controller | UL | BOMS2 | 50252 | N/A | N/A |
| Measurement Software | UL | Version 9.5 | 44740 | N/A | N/A |
| Temp/Humidity/Pressure Meter | Cole Parmer | 99760-00 | 4268 | 2012-12-22 | 2014-12-22 |
| <p>* - Note: As allowed by the calibration standard ANSI C63.4 Section 4.4.2, standard gain horns need only a one-time calibration. Only if physical damage occurs will the horn antenna require re-calibration.</p> <p>Gain standard horn antennas (sometimes called standard gain horn antennas) need not be calibrated beyond that which is provided by the manufacturer unless they are damaged or deterioration is suspected, or they are used at a distance closer than $2D^2/\lambda$. Gain standard horn antennas have gains that are fixed by their dimensions and dimensional tolerances.</p> <p>** - Number in parentheses denotes antenna beam width.</p> | | | | | |

| Bench Tests | | | | | |
|------------------------------|-----------------|----------|------------|------------|--------------|
| Description | Manufacturer | Model | Identifier | Cal Date | Cal Due Date |
| RF Room 1 | | | | | |
| Spectrum Analyzer | Agilent | E4446A | 72823 | 2013-01-29 | 2014-01-31 |
| Power Sensor | Rohde & Schwarz | NRP-Z81 | 73137 | 2013-01-30 | 2014-01-31 |
| Temp/Humidity/Pressure Meter | Cole Parmer | 99760-00 | 4268 | 2012-12-22 | 2014-12-22 |

7. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

LIMITS

None; for reporting purposes only.

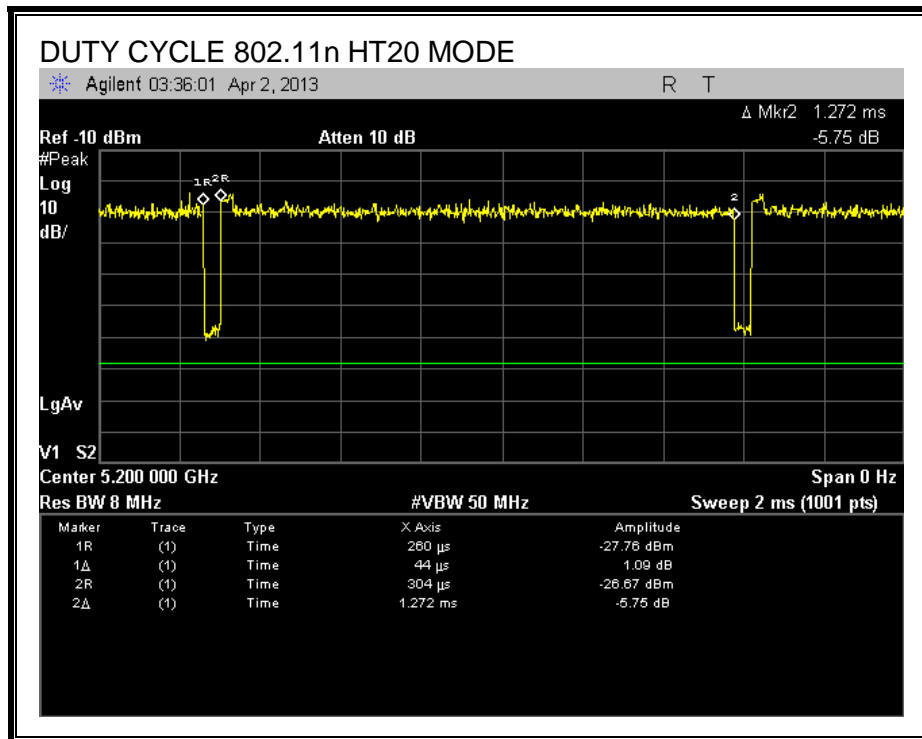
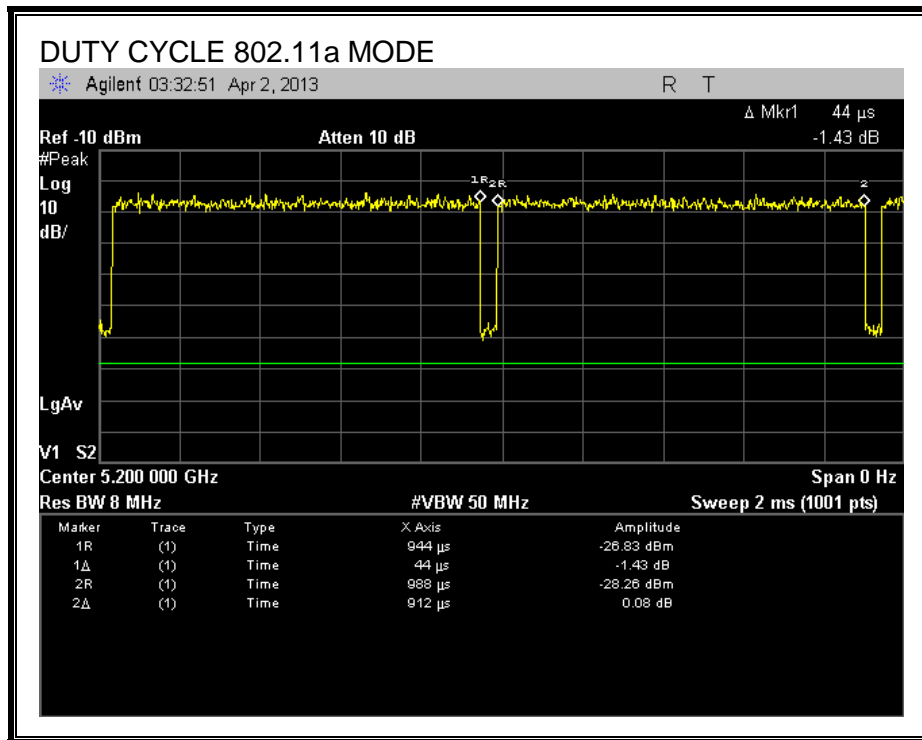
PROCEDURE

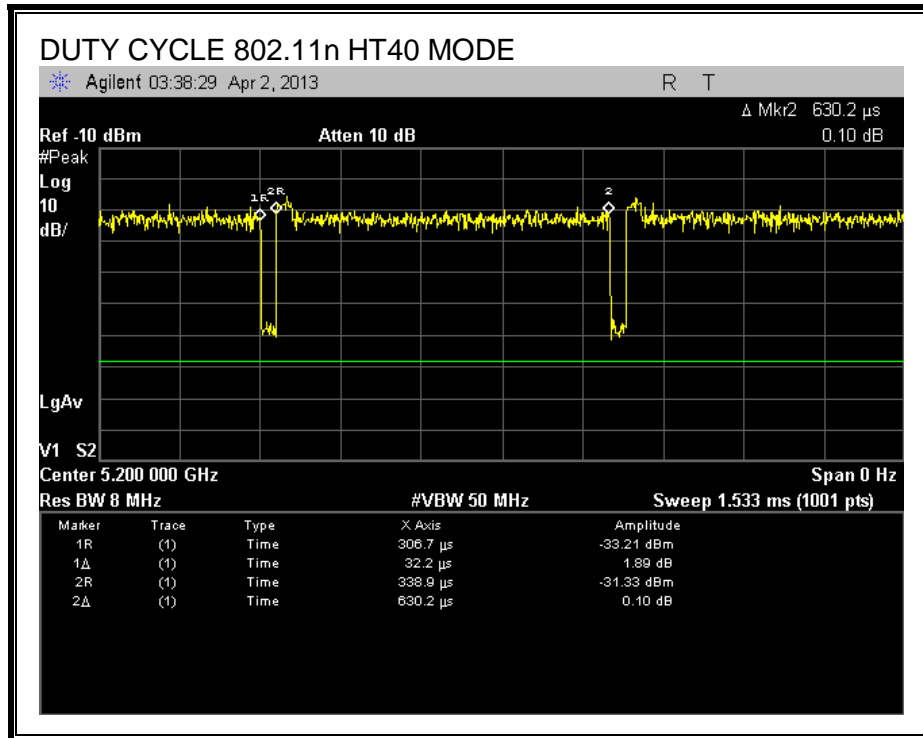
KDB 789033 Zero-Span Spectrum Analyzer Method.

7.1. ON TIME AND DUTY CYCLE RESULTS

| Mode | ON Time B (usec) | OFF Time (usec) | Period (usec) | Duty Cycle x (linear) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) | 1/B Minimum VBW (Hz) |
|----------------|------------------------|-----------------------|------------------|-----------------------------|----------------------|---|----------------------------|
| 802.11a 20 MHz | 912 | 44 | 956 | 0.954 | 95.4% | 0.20 | 1,096 |
| 802.11n HT20 | 1272 | 44 | 1316 | 0.967 | 96.7% | 0.15 | 786 |
| 802.11n HT40 | 630 | 32 | 662 | 0.952 | 95.2% | 0.21 | 1,587 |

7.1.1. DUTY CYCLE PLOTS





8. ANTENNA PORT TEST RESULTS

8.1. 802.11n HT40 MODE IN THE 5.2 GHz BAND

8.1.1. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10 dB was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

| Channel | Frequency (MHz) | Chain 0 Power (dBm) | Chain 1 Power (dBm) | Chain 2 Power (dBm) | Total Power (dBm) |
|---------|--------------------|---------------------------|---------------------------|---------------------------|-------------------------|
| Low | 5190 | 7.30 | 8.79 | 9.52 | 13.40 |

8.1.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or $4 \text{ dBm} + 10 \log B$, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are correlated and the antenna gain is the same for each chain. The directional gain is:

| Antenna Gain (dBi) | 10 * Log (3 chains) (dB) | Correlated Chains Directional Gain (dBi) |
|--------------------|--------------------------|--|
| 2.60 | 4.77 | 7.37 |

RESULTS

Limits

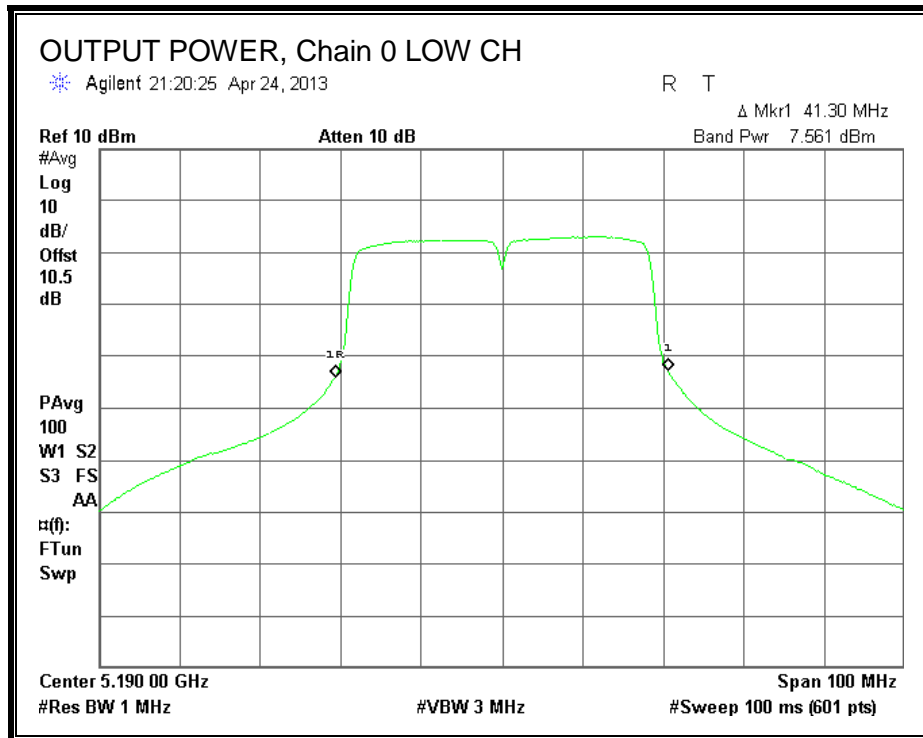
| Channel | Frequency (MHz) | Fixed Limit (dBm) | B (MHz) | 4 + 10 Log B Limit (dBm) | Directional Gain (dBi) | Power Limit (dBm) | PPSD Limit (dBm) |
|---------|--------------------|-------------------------|------------|--------------------------------|------------------------------|-------------------------|------------------------|
| Low | 5190 | 17 | 41.3 | 20.16 | 2.60 | 17.00 | 4.00 |

| | | |
|--------------------|------|---|
| Duty Cycle CF (dB) | 0.20 | Included in Calculations of Corr'd Power & PPSD |
|--------------------|------|---|

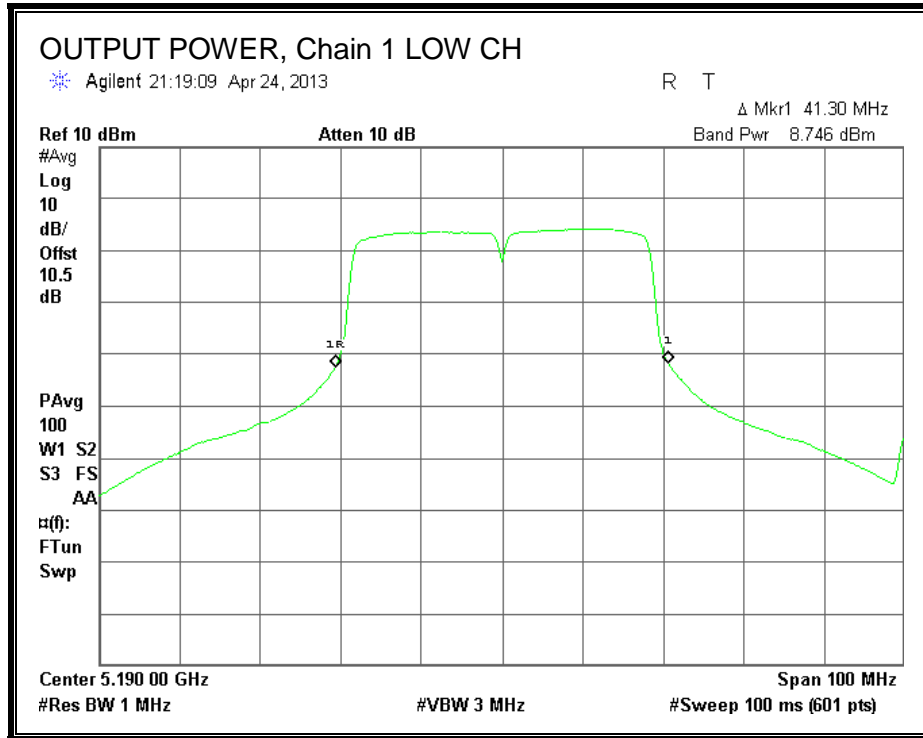
Output Power Results

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Chain 2 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low | 5190 | 7.56 | 8.75 | 10.08 | 13.89 | 17.00 | -3.11 |

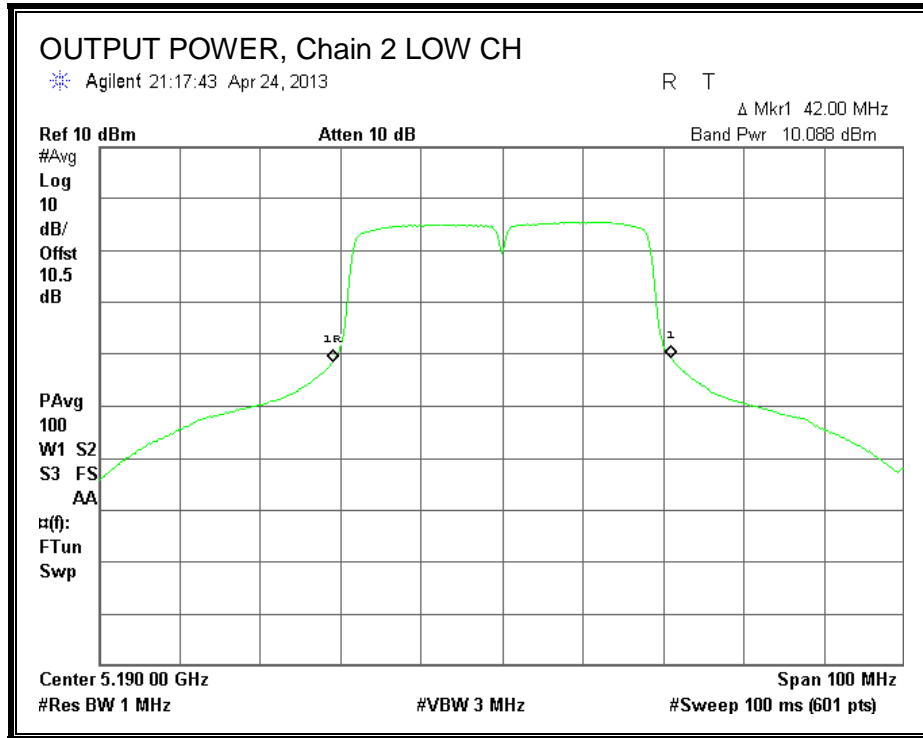
OUTPUT POWER, Chain 0



OUTPUT POWER, Chain 1



OUTPUT POWER, Chain 2



8.2. 802.11a MODE IN THE 5.6 GHz BAND

8.2.1. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10 dB was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

| Channel | Frequency (MHz) | Chain 0 Power (dBm) | Chain 1 Power (dBm) | Chain 2 Power (dBm) | Total Power (dBm) |
|---------|--------------------|---------------------------|---------------------------|---------------------------|-------------------------|
| Low | 5500 | 12.09 | 10.25 | 9.19 | 15.45 |
| High | 5700 | 9.00 | 9.20 | 8.60 | 13.71 |

8.2.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (3)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are correlated and the antenna gain is the same for each chain. The directional gain is:

| Antenna Gain (dBi) | 10 * Log (3 chains) (dB) | Correlated Chains Directional Gain (dBi) |
|--------------------|--------------------------|--|
| 2.60 | 4.77 | 7.37 |

RESULTS

Limits

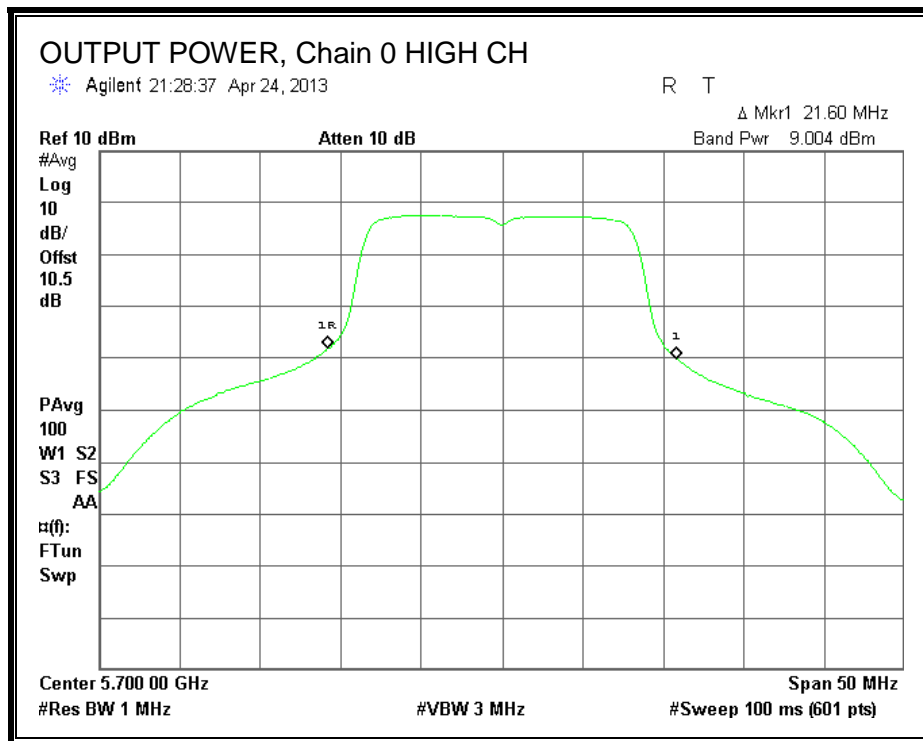
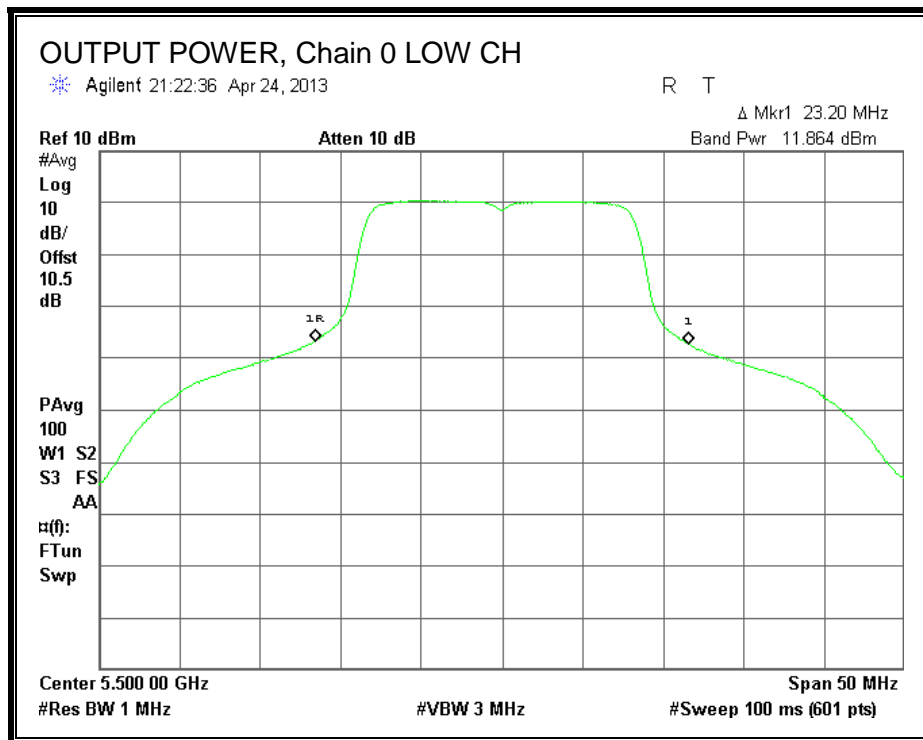
| Channel | Frequency (MHz) | Fixed Limit (dBm) | B (MHz) | 11 + 10 Log B Limit (dBm) | Directional Gain (dBi) | Power Limit (dBm) | PPSD Limit (dBm) |
|---------|--------------------|-------------------------|------------|---------------------------------|------------------------------|-------------------------|------------------------|
| Low | 5500 | 24 | 21.4 | 24.31 | 2.60 | 24.00 | 11.00 |
| High | 5700 | 24 | 20.7 | 24.15 | 2.60 | 24.00 | 11.00 |

| | | |
|---------------------------|------|--|
| Duty Cycle CF (dB) | 0.20 | Included in Calculations of Corr'd Power & PPSD |
|---------------------------|------|--|

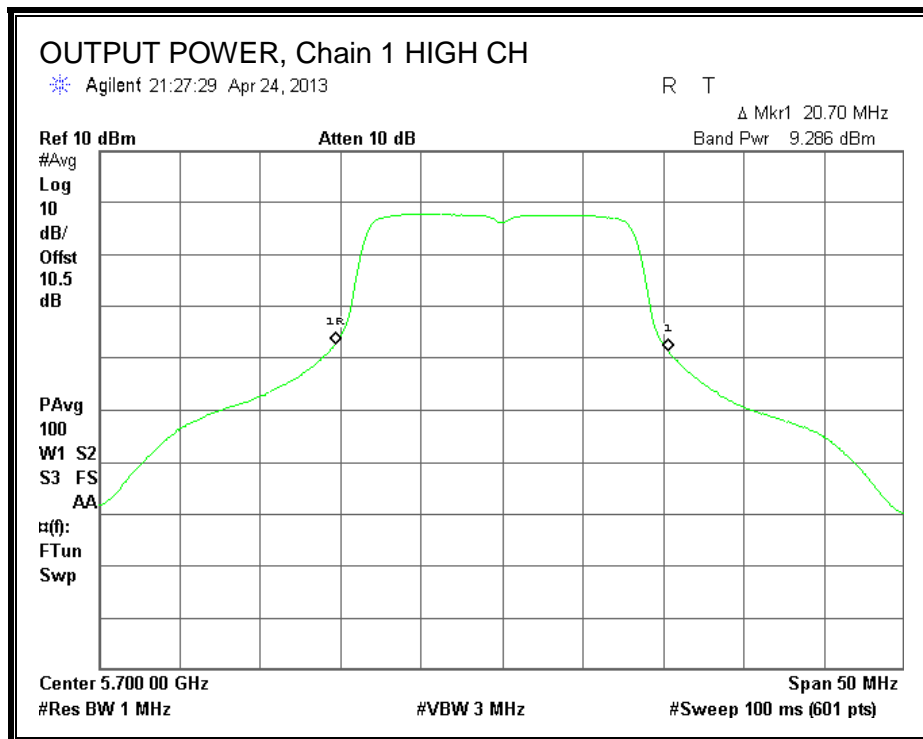
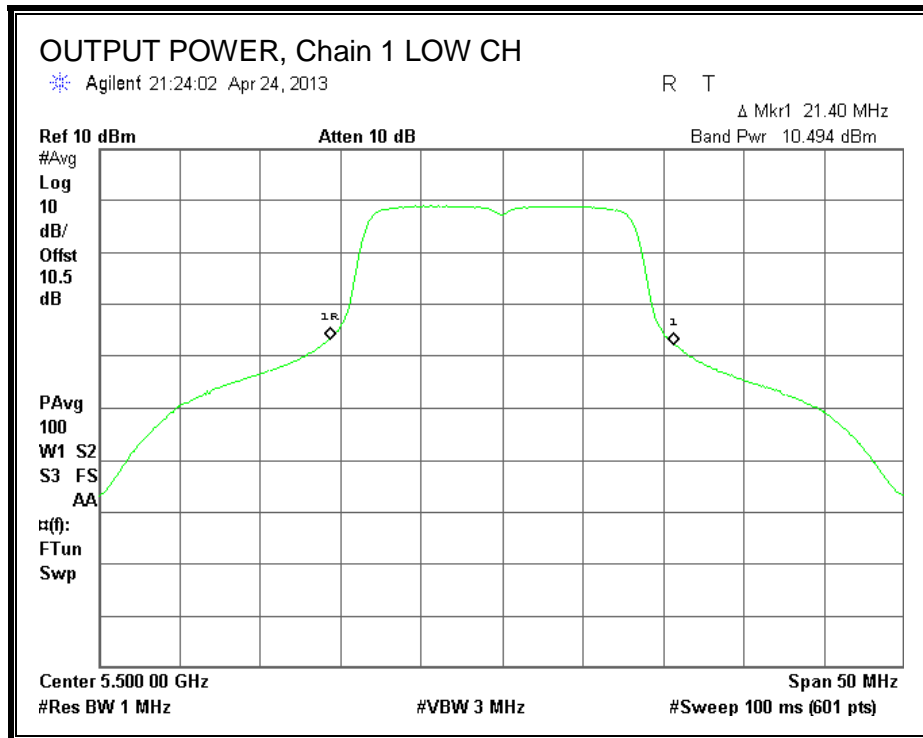
Output Power Results

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Chain 2 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low | 5500 | 11.86 | 10.49 | 10.54 | 15.98 | 24.00 | -8.02 |
| High | 5700 | 9.00 | 9.29 | 9.78 | 14.34 | 24.00 | -9.66 |

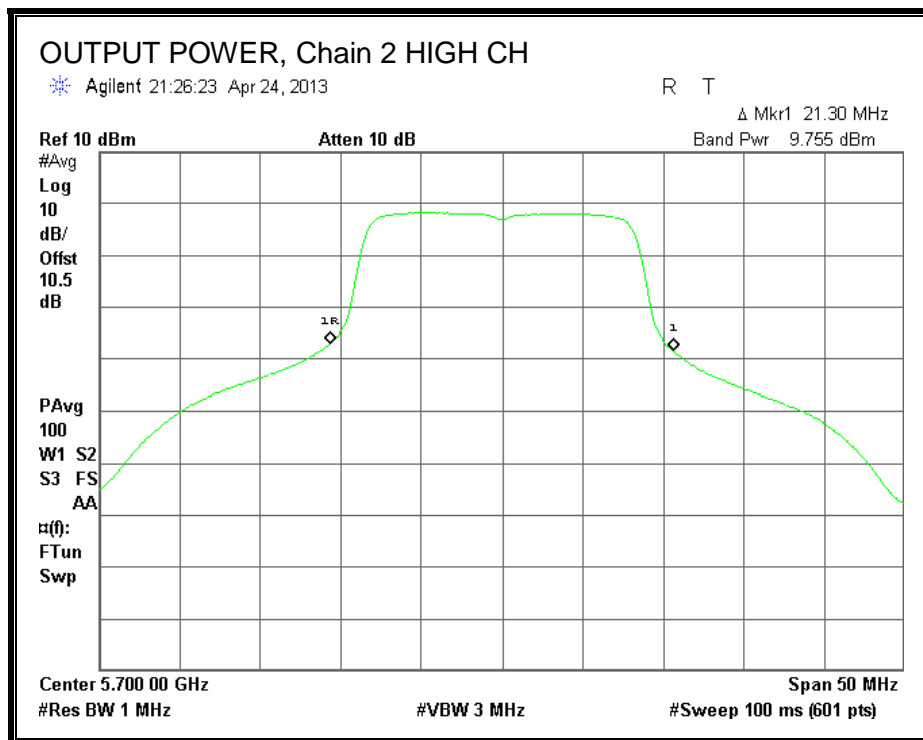
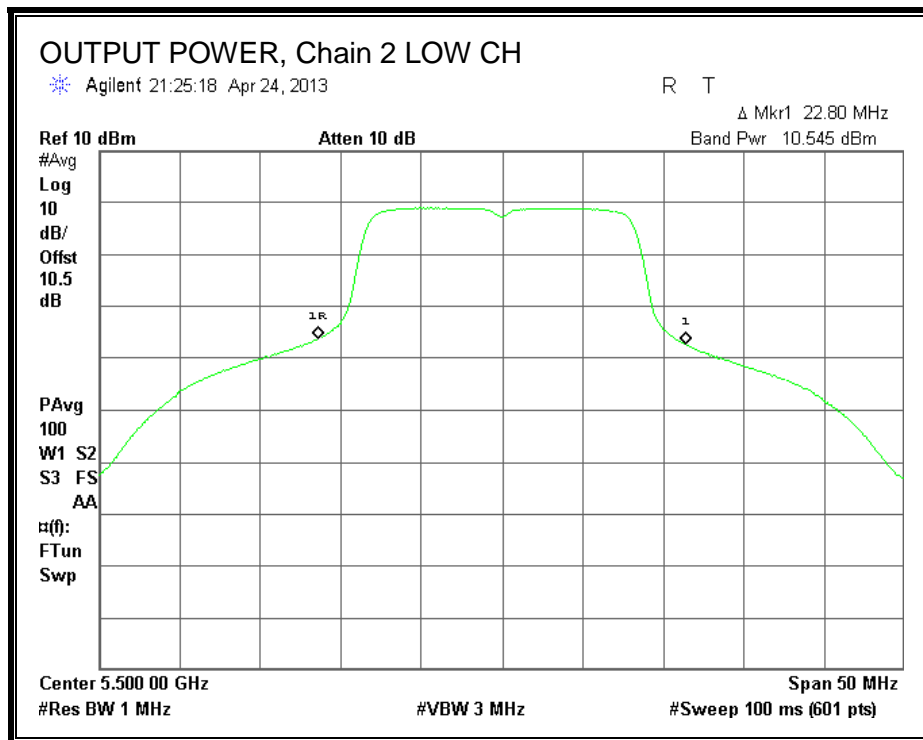
OUTPUT POWER, Chain 0



OUTPUT POWER, Chain 1



OUTPUT POWER, Chain 2



8.3. 802.11n HT20 MODE IN THE 5.6 GHz BAND

8.3.1. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10 dB was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

| | (MHz) | (dBm) | (dBm) | (dBm) | (dBm) |
|------|-------|-------|-------|-------|-------|
| Low | 5500 | 10.74 | 8.62 | 8.17 | 14.10 |
| High | 5700 | 6.82 | 6.90 | 6.12 | 11.40 |

8.3.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (3)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are correlated and the antenna gain is the same for each chain. The directional gain is:

| Antenna Gain (dBi) | 10 * Log (3 chains) (dB) | Correlated Chains Directional Gain (dBi) |
|--------------------|--------------------------|--|
| 2.60 | 4.77 | 7.37 |

RESULTS

Limits

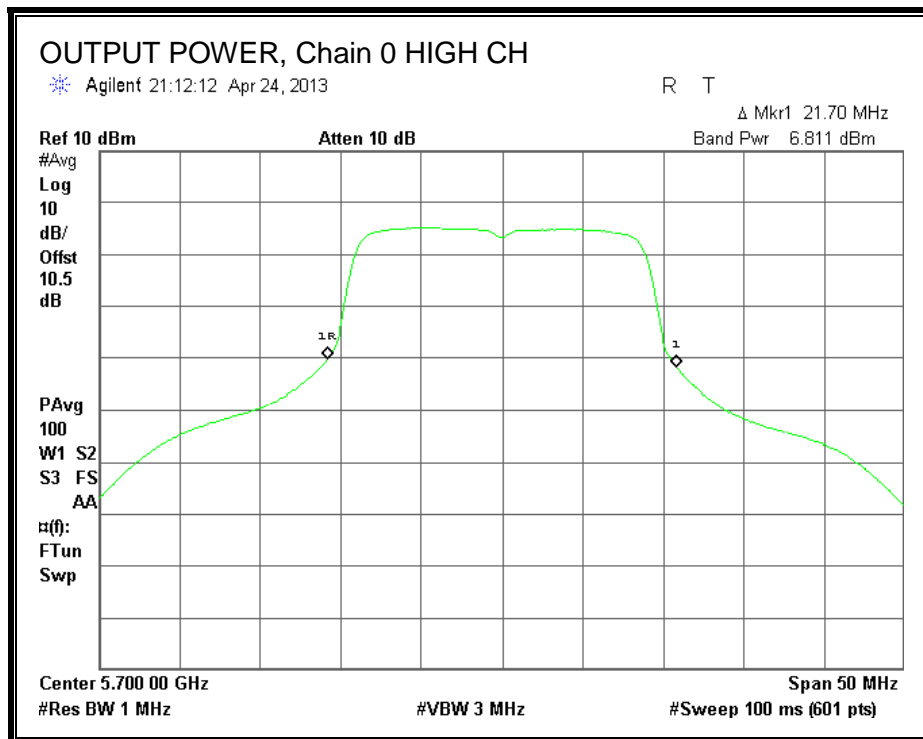
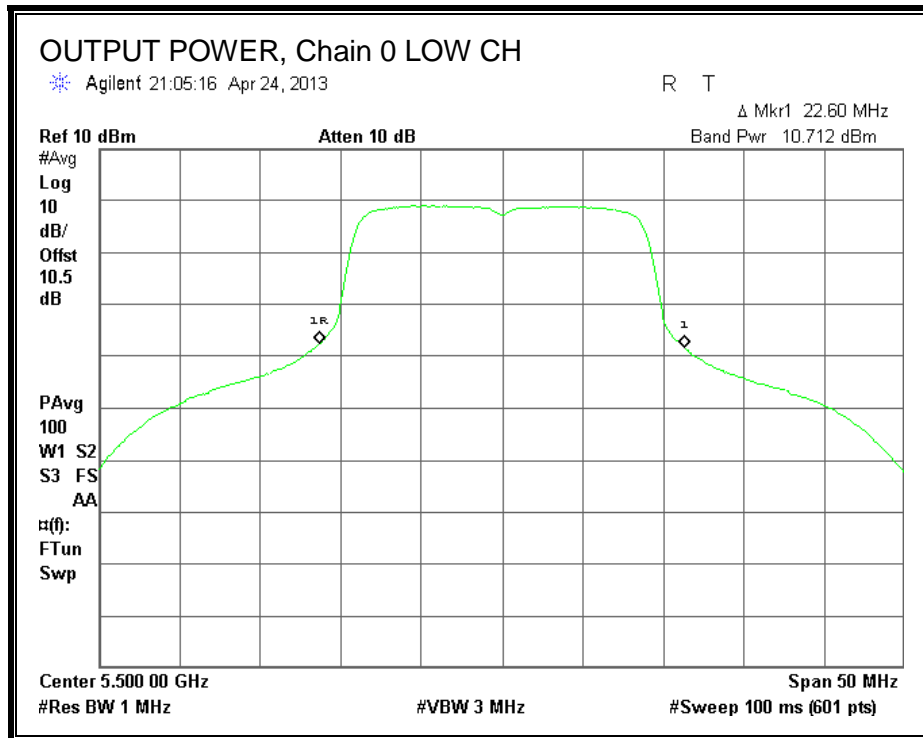
| Channel | Frequency (MHz) | Fixed Limit (dBm) | B (MHz) | 11 + 10 Log B Limit (dBm) | Directional Gain (dBi) | Power Limit (dBm) | PPSD Limit (dBm) |
|---------|--------------------|-------------------------|------------|---------------------------------|------------------------------|-------------------------|------------------------|
| Low | 5500 | 24 | 21.3 | 24.28 | 2.60 | 24.00 | 11.00 |
| High | 5700 | 24 | 21.5 | 24.32 | 2.60 | 24.00 | 11.00 |

| | | |
|---------------------------|------|--|
| Duty Cycle CF (dB) | 0.15 | Included in Calculations of Corr'd Power & PPSD |
|---------------------------|------|--|

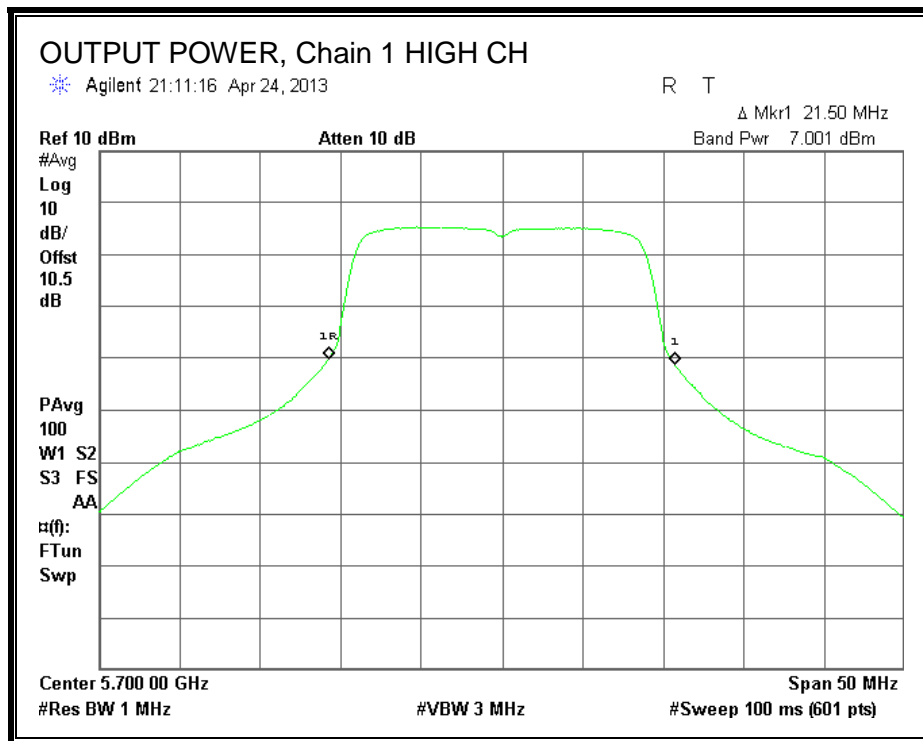
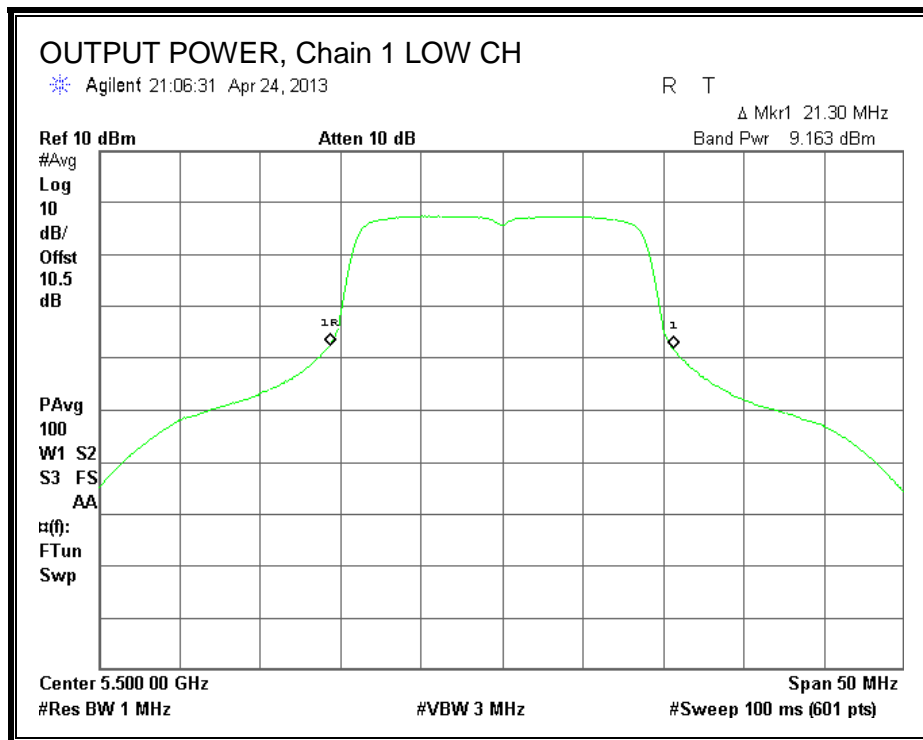
Output Power Results

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Chain 2 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low | 5500 | 10.71 | 9.16 | 9.24 | 14.69 | 24.00 | -9.31 |
| High | 5700 | 6.81 | 7.00 | 7.19 | 11.92 | 24.00 | -12.08 |

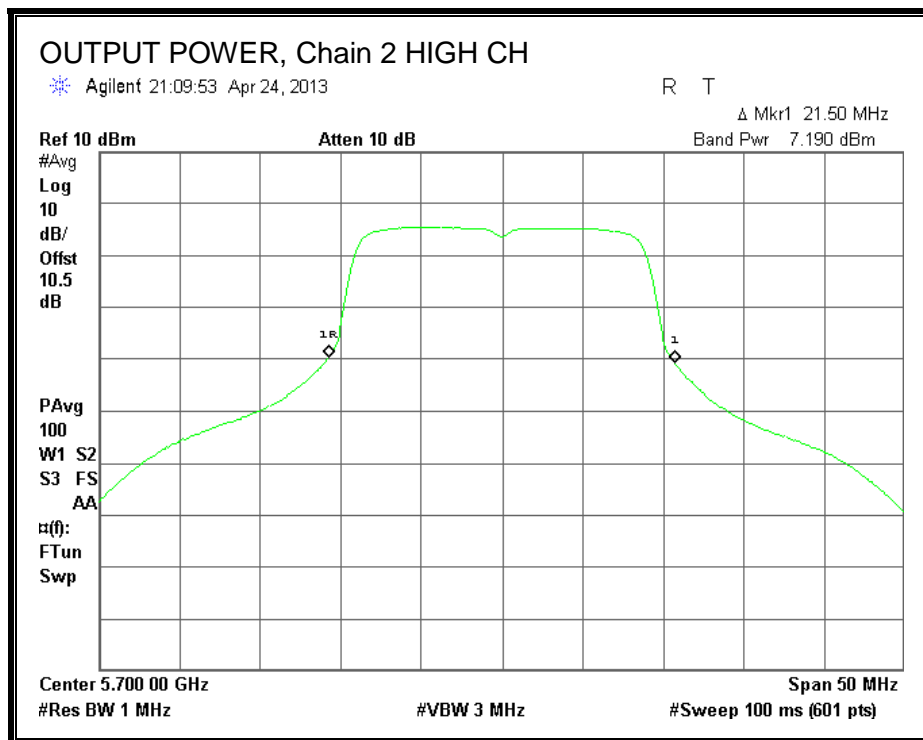
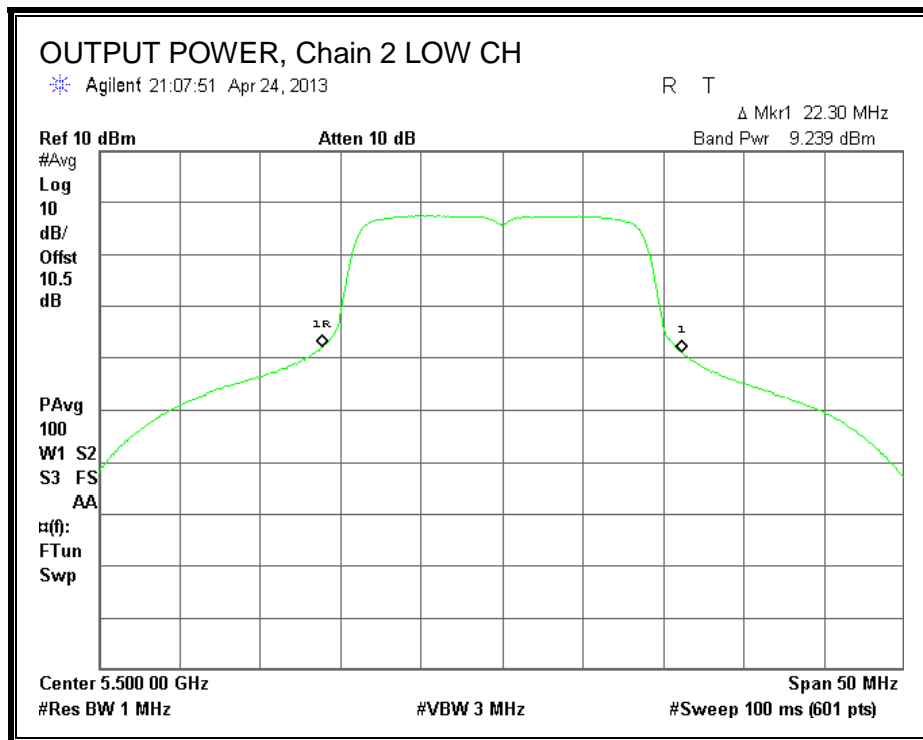
OUTPUT POWER, Chain 0



OUTPUT POWER, Chain 1



OUTPUT POWER, Chain 2



8.4. 802.11n HT40 MODE IN THE 5.6 GHz BAND

8.4.1. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10 dB was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

| Channel | Frequency (MHz) | Chain 0 Power (dBm) | Chain 1 Power (dBm) | Chain 2 Power (dBm) | Total Power (dBm) |
|---------|--------------------|---------------------------|---------------------------|---------------------------|-------------------------|
| Low | 5510 | 7.30 | 5.43 | 5.00 | 10.80 |

8.4.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (3)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are correlated and the antenna gain is the same for each chain. The directional gain is:

| Antenna Gain (dBi) | 10 * Log (3 chains) (dB) | Correlated Chains Directional Gain (dBi) |
|---------------------------|---------------------------------|---|
| 2.60 | 4.77 | 7.37 |

RESULTS

Limits

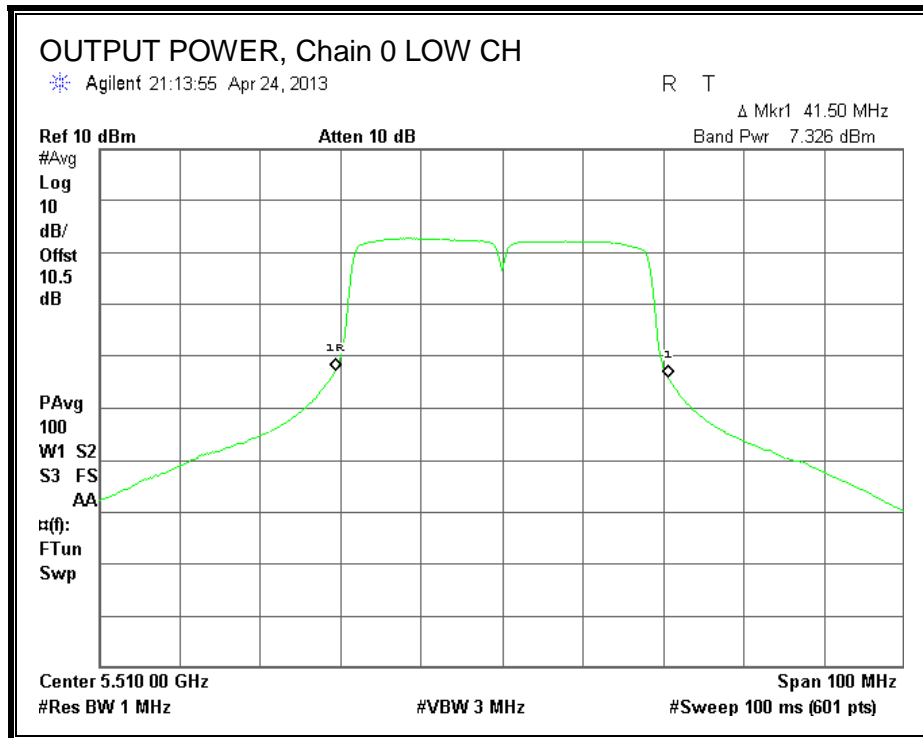
| Channel | Frequency (MHz) | Fixed Limit (dBm) | B (MHz) | 11 + 10 Log B Limit (dBm) | Directional Gain (dBi) | Power Limit (dBm) | PPSD Limit (dBm) |
|---------|--------------------|-------------------------|------------|---------------------------------|------------------------------|-------------------------|------------------------|
| Low | 5510 | 24 | 41.5 | 27.18 | 2.60 | 24.00 | 11.00 |

| | | |
|--------------------|------|---|
| Duty Cycle CF (dB) | 0.20 | Included in Calculations of Corr'd Power & PPSD |
|--------------------|------|---|

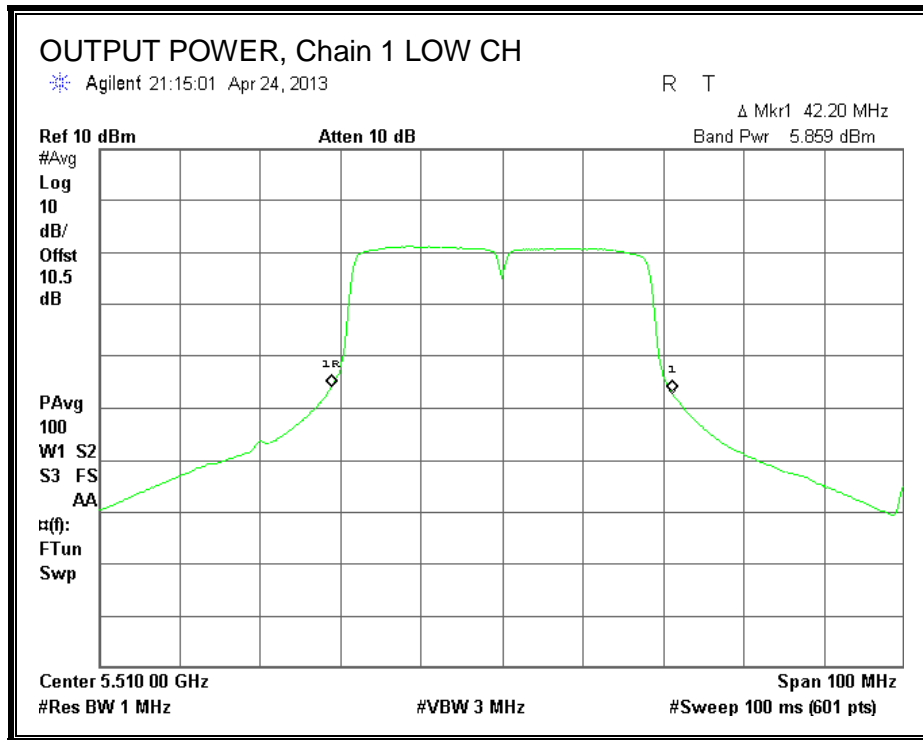
Output Power Results

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Chain 2 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low | 5510 | 7.33 | 5.86 | 5.99 | 11.42 | 24.00 | -12.58 |

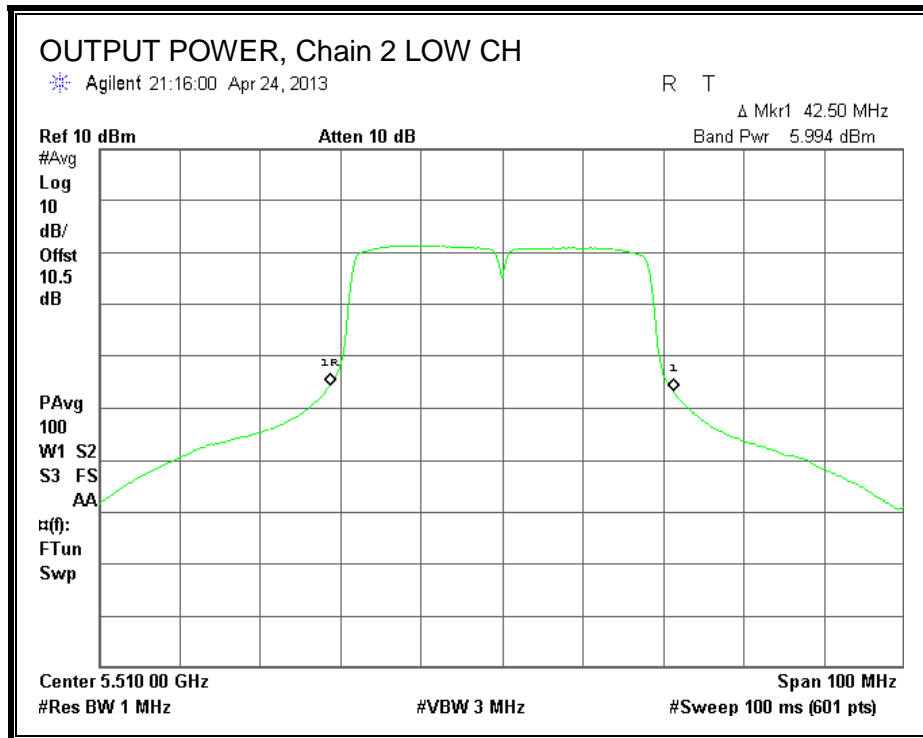
OUTPUT POWER, Chain 0



OUTPUT POWER, Chain 1



OUTPUT POWER, Chain 2



9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

| Frequency Range (MHz) | Field Strength Limit (uV/m) at 3 m | Field Strength Limit (dBuV/m) at 3 m |
|-----------------------|------------------------------------|--------------------------------------|
| 30 - 88 | 100 | 40 |
| 88 - 216 | 150 | 43.5 |
| 216 - 960 | 200 | 46 |
| Above 960 | 500 | 54 |

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 1 MHz for peak measurements and as applicable for average measurements.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

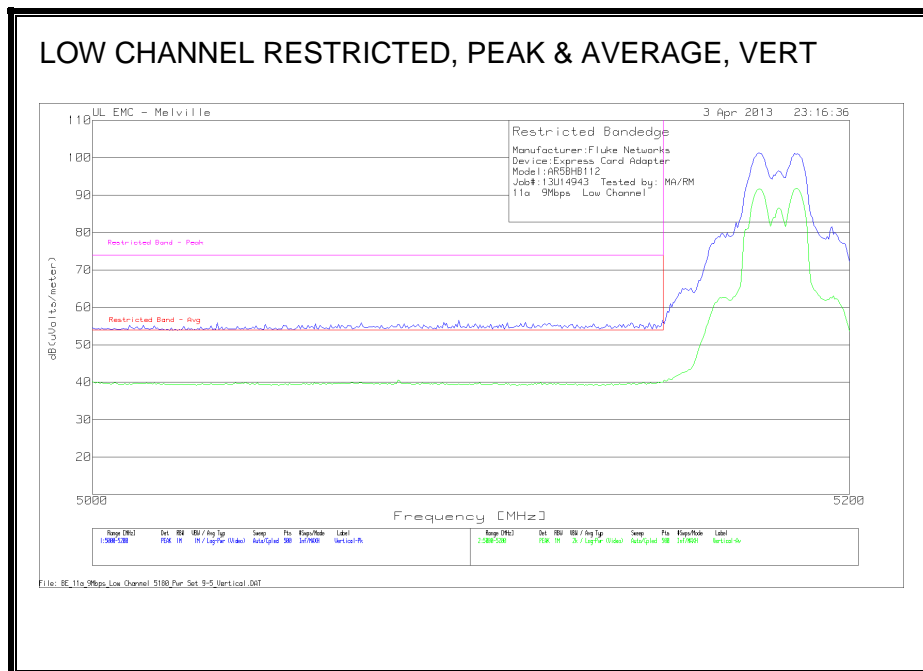
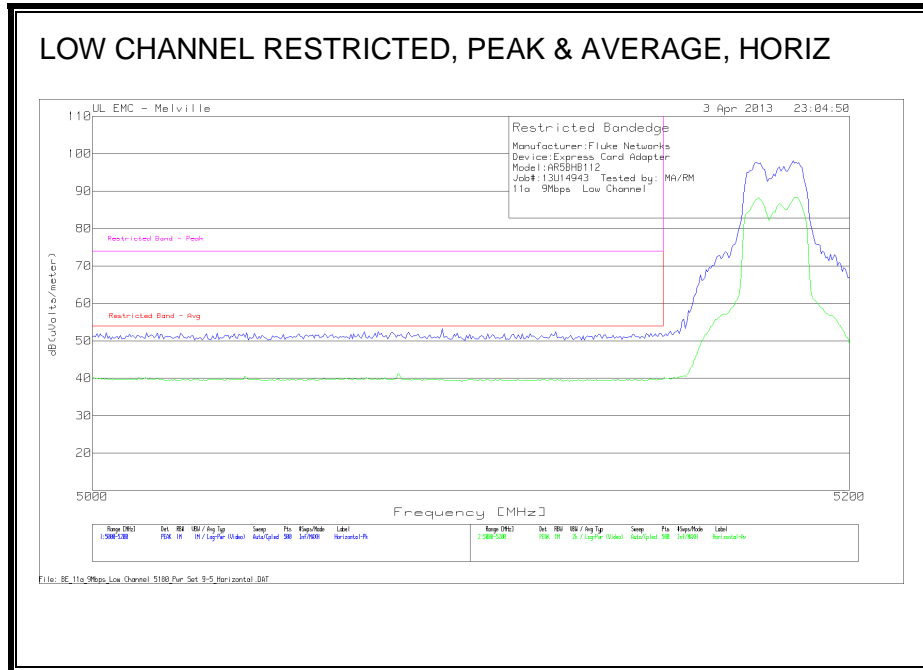
For 802.11a and 802.11n HT40 modes, all final average measurements were made with a 2 kHz VBW based on the measured duty cycle of the product.

For 802.11n HT20 mode, all final average measurements were made with a 1 kHz VBW based on the measured duty cycle of the product.

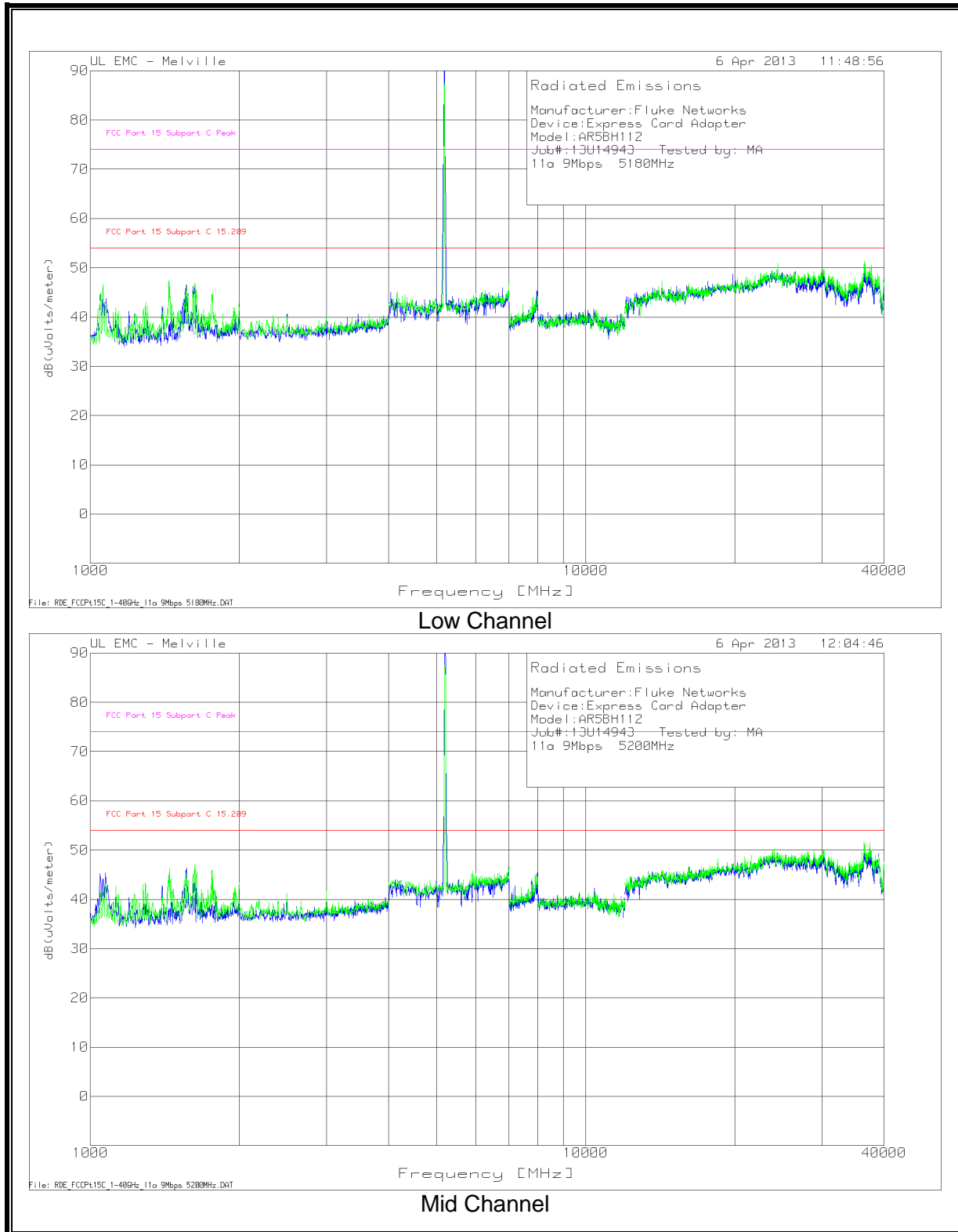
9.2. TRANSMITTER ABOVE 1 GHz

9.2.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.2 GHz BAND

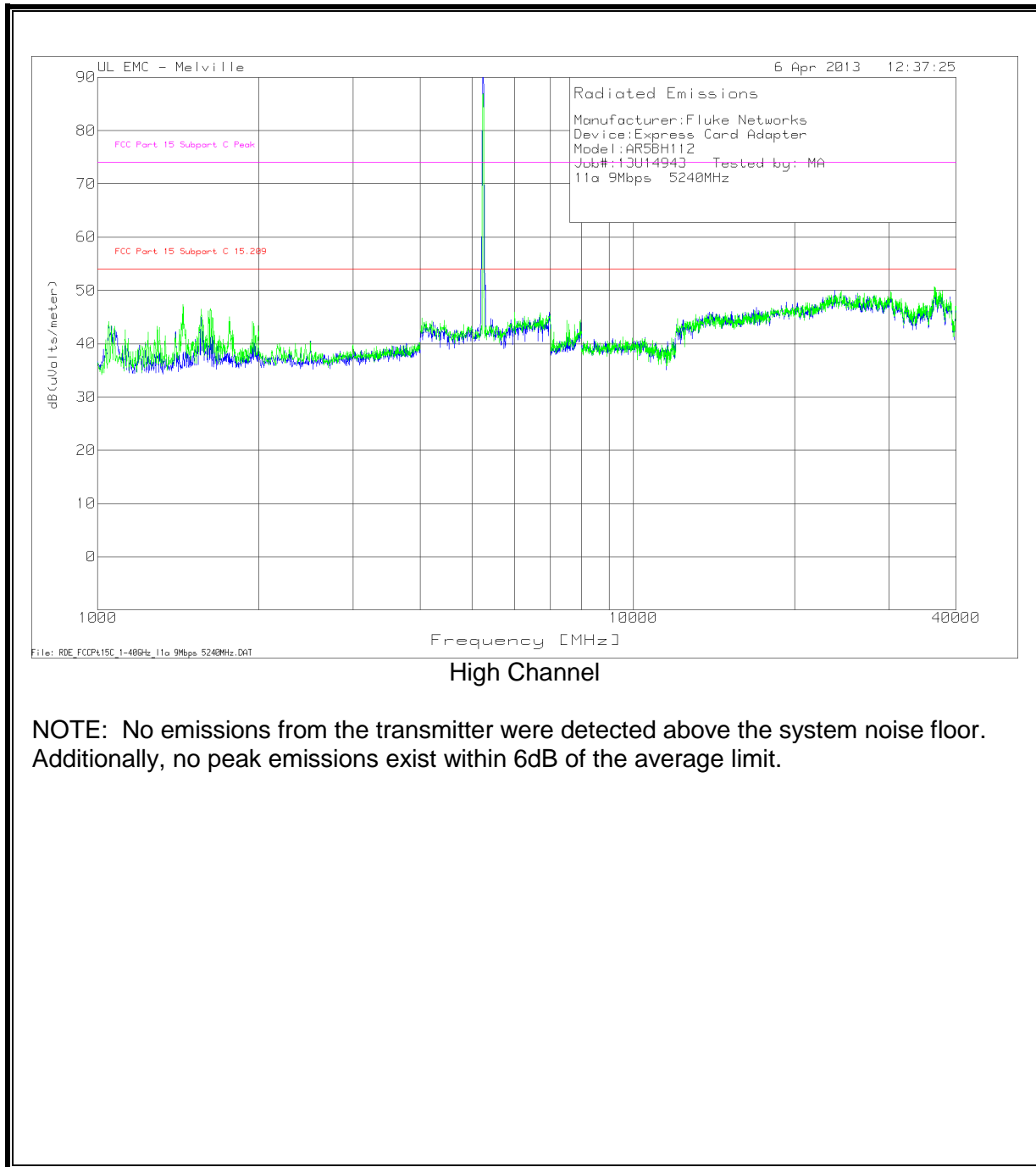
RESTRICTED BANDEDGE (LOW CHANNEL)



HARMONICS AND SPURIOUS EMISSIONS

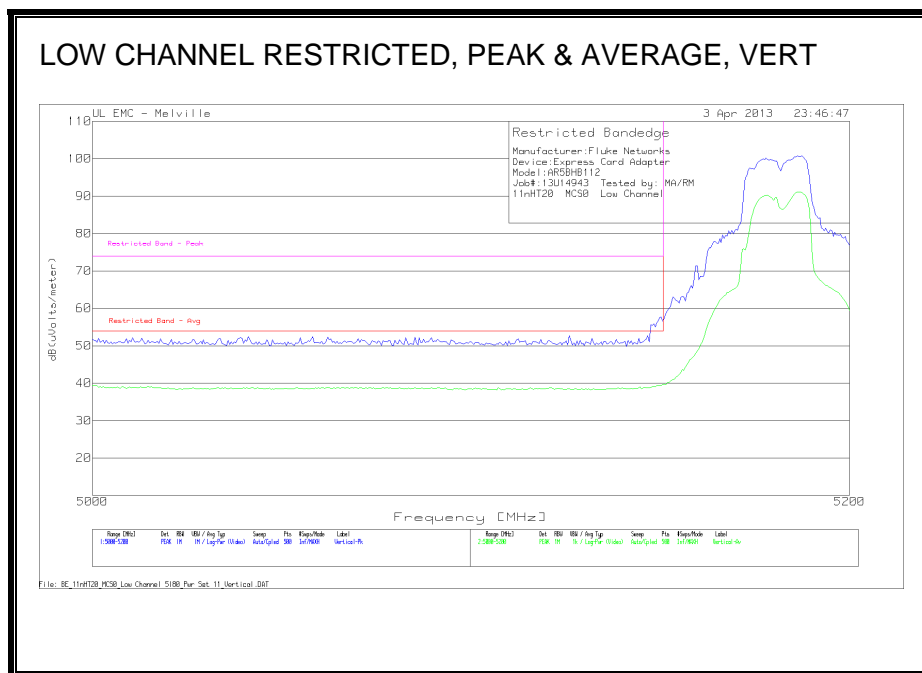
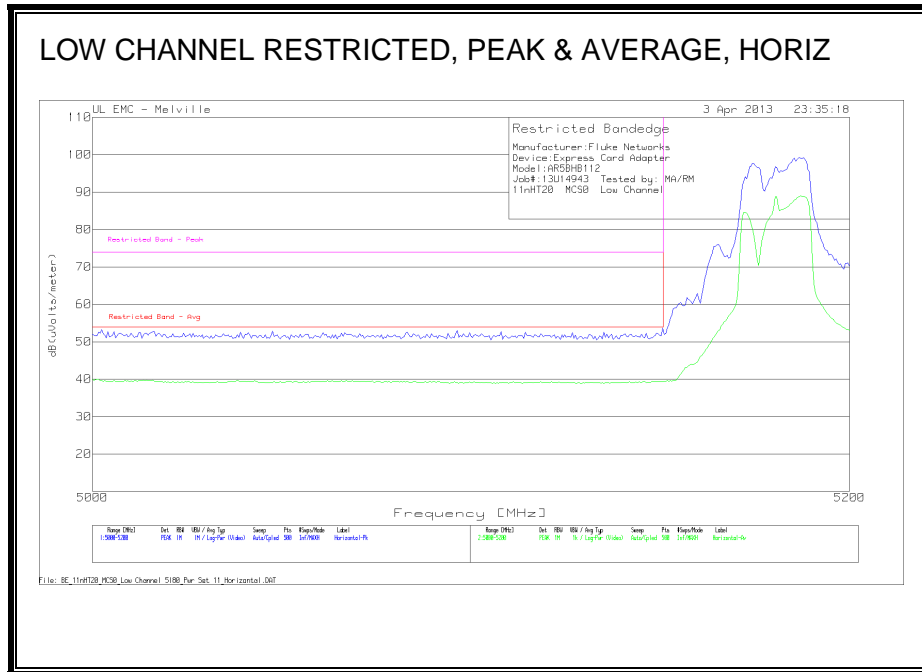


HARMONICS AND SPURIOUS EMISSIONS (CONT)

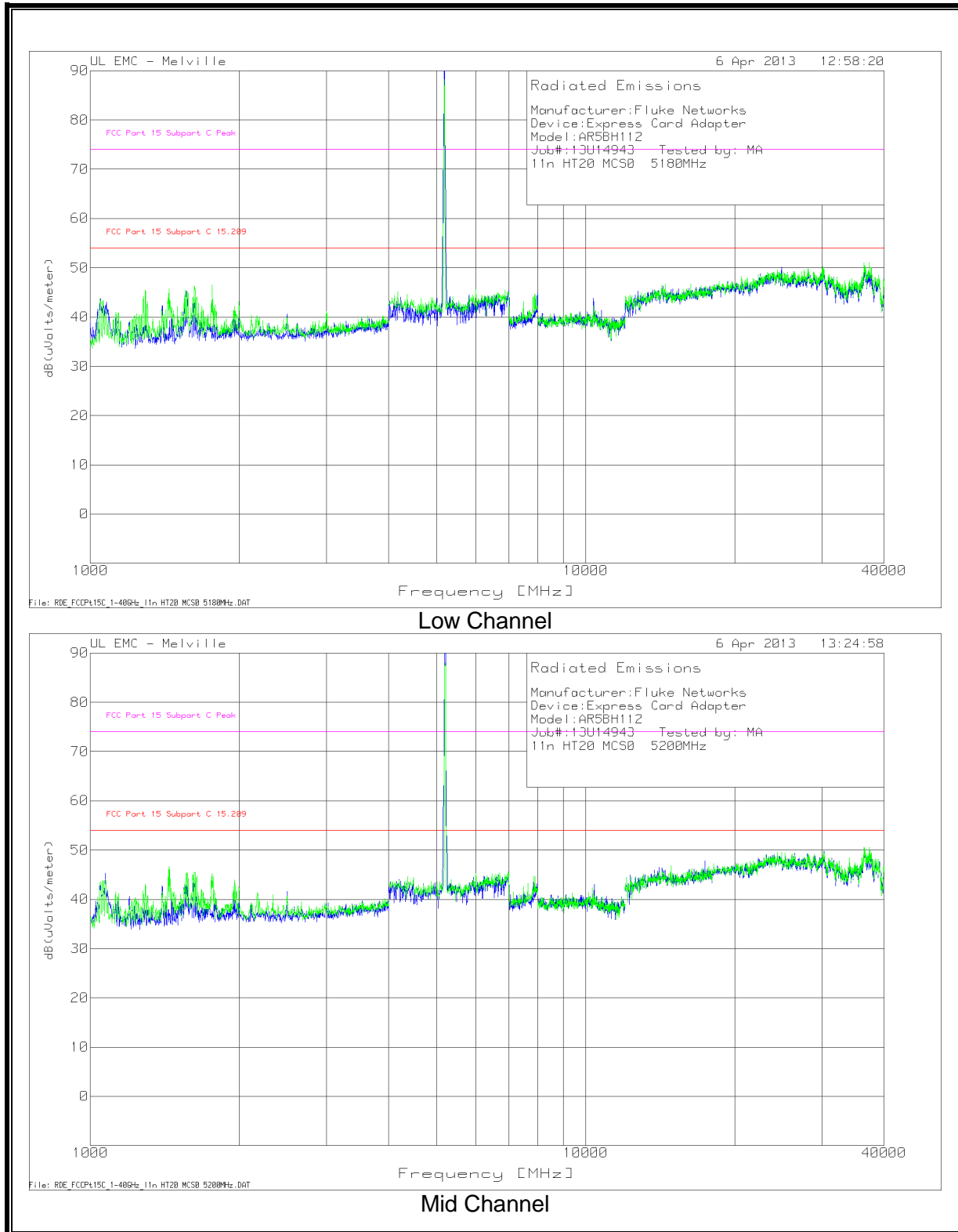


9.2.2. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND

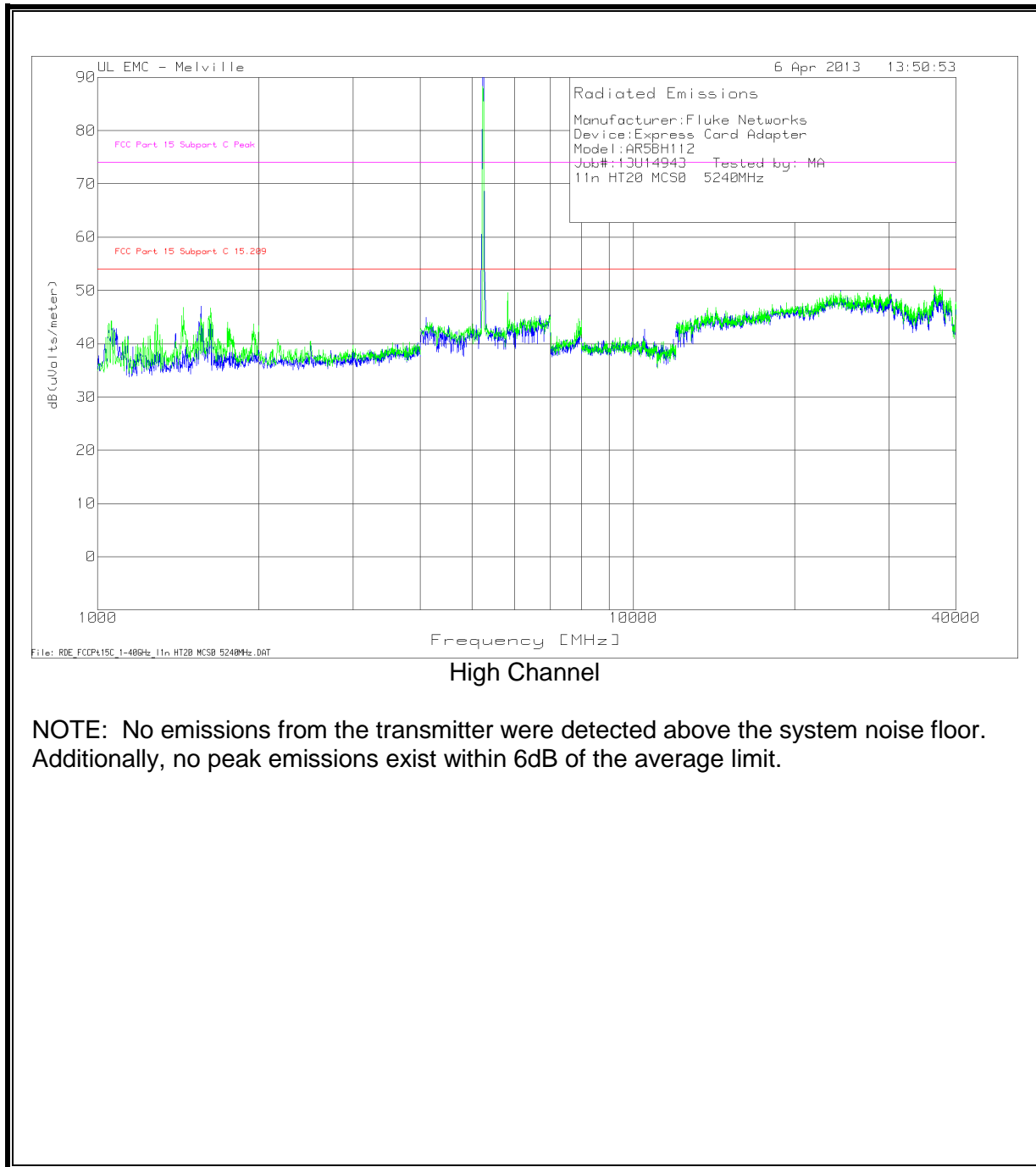
RESTRICTED BANDEDGE (LOW CHANNEL)



HARMONICS AND SPURIOUS EMISSIONS

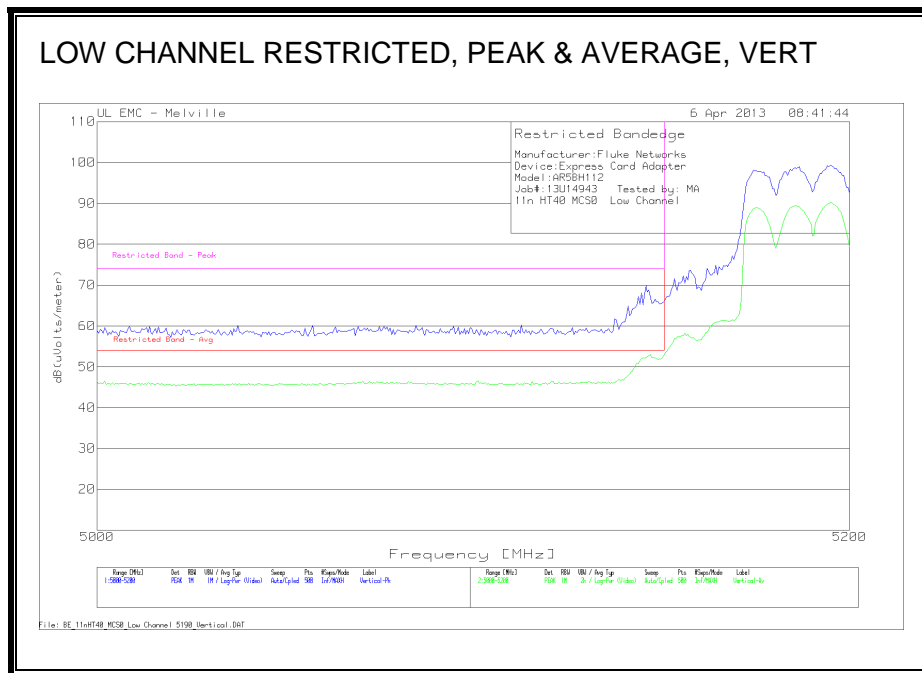
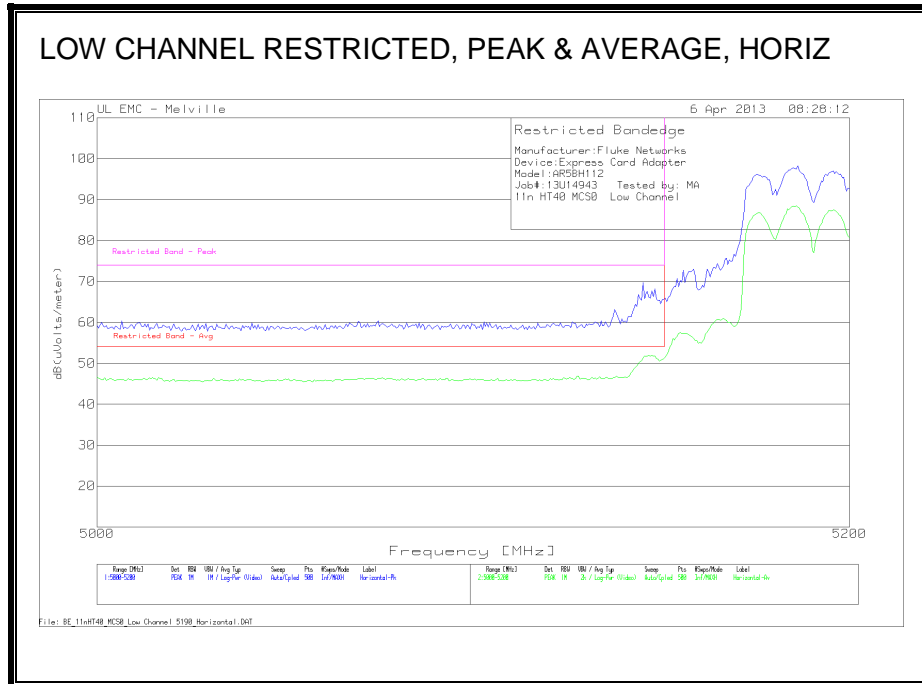


HARMONICS AND SPURIOUS EMISSIONS (CONT)

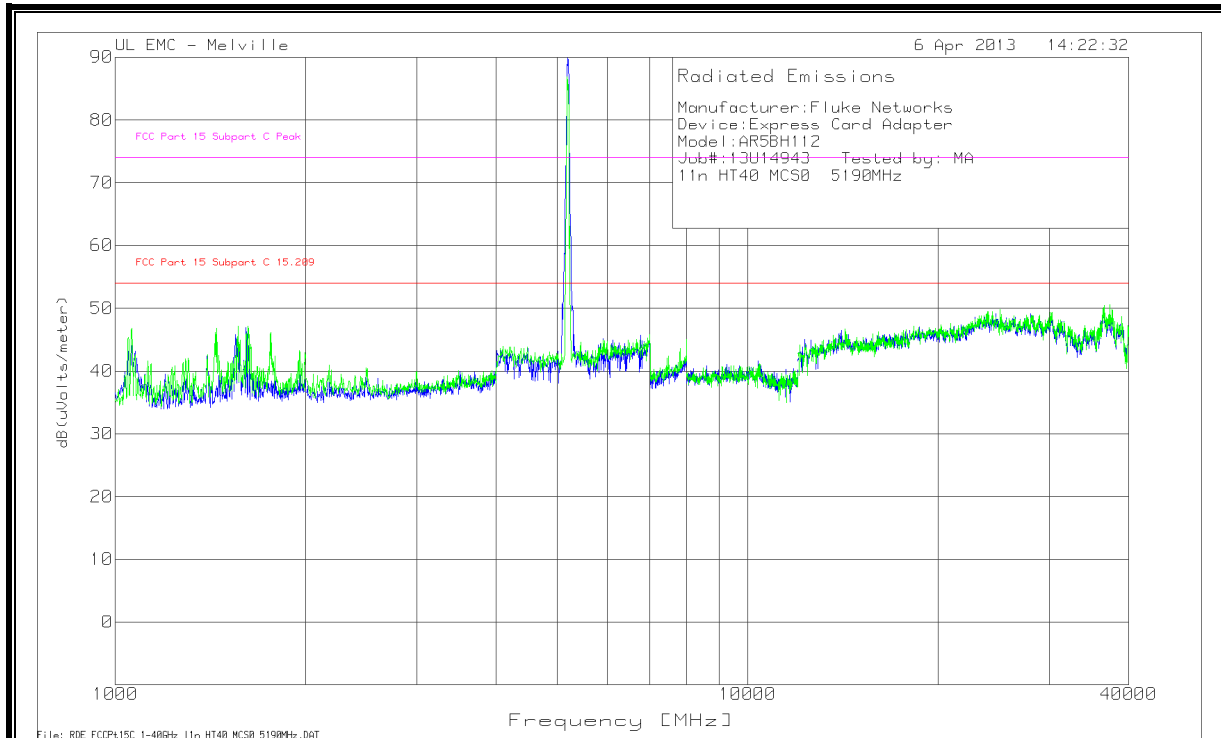


9.2.3. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.2 GHz BAND

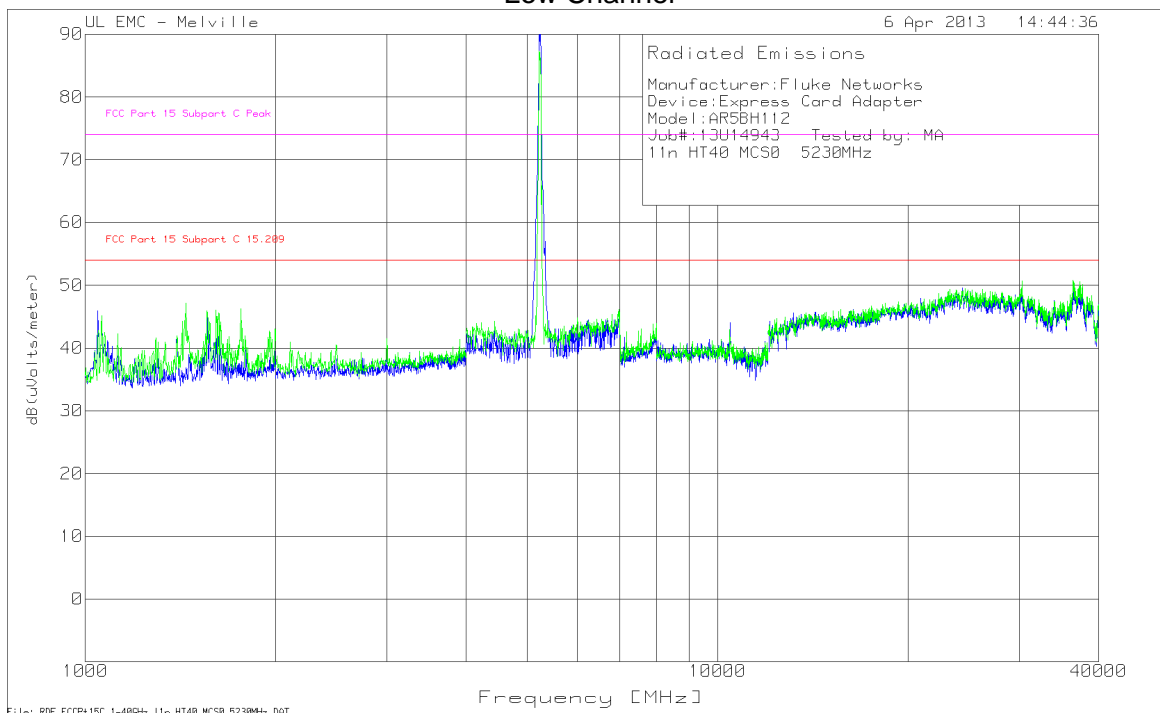
RESTRICTED BANDEDGE (LOW CHANNEL)



HARMONICS AND SPURIOUS EMISSIONS



Low Channel

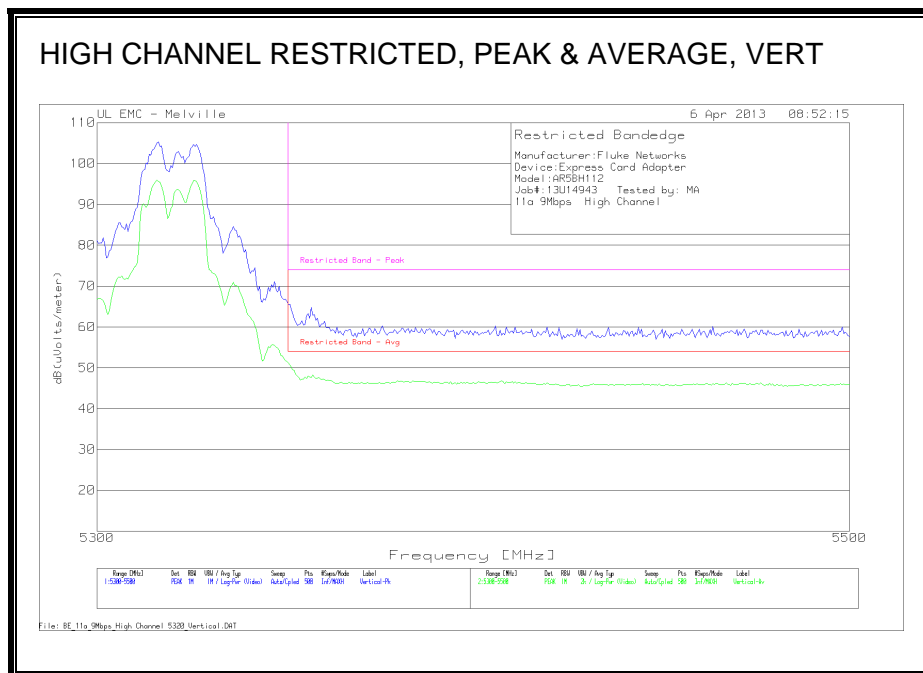
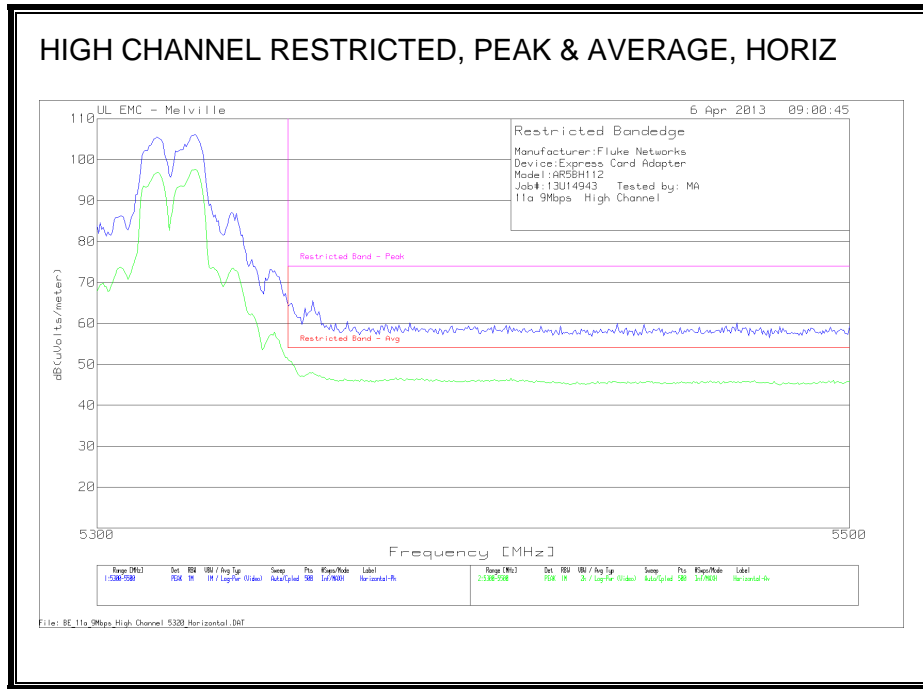


High Channel

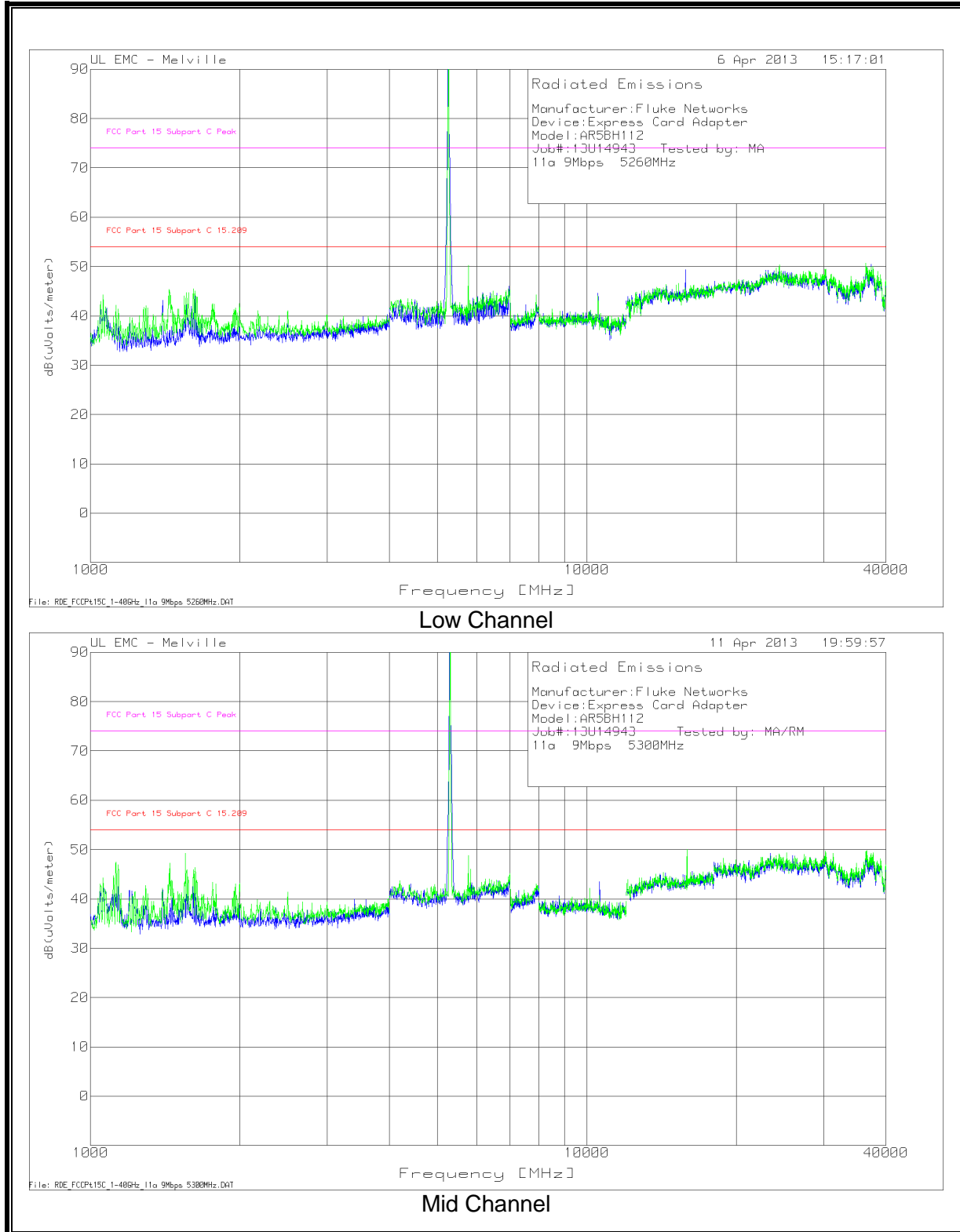
NOTE: No emissions from the transmitter were detected above the system noise floor. Additionally, no peak emissions exist within 6dB of the average limit.

9.2.4. TX ABOVE 1 GHz 802.11a MODE IN THE 5.3 GHz BAND

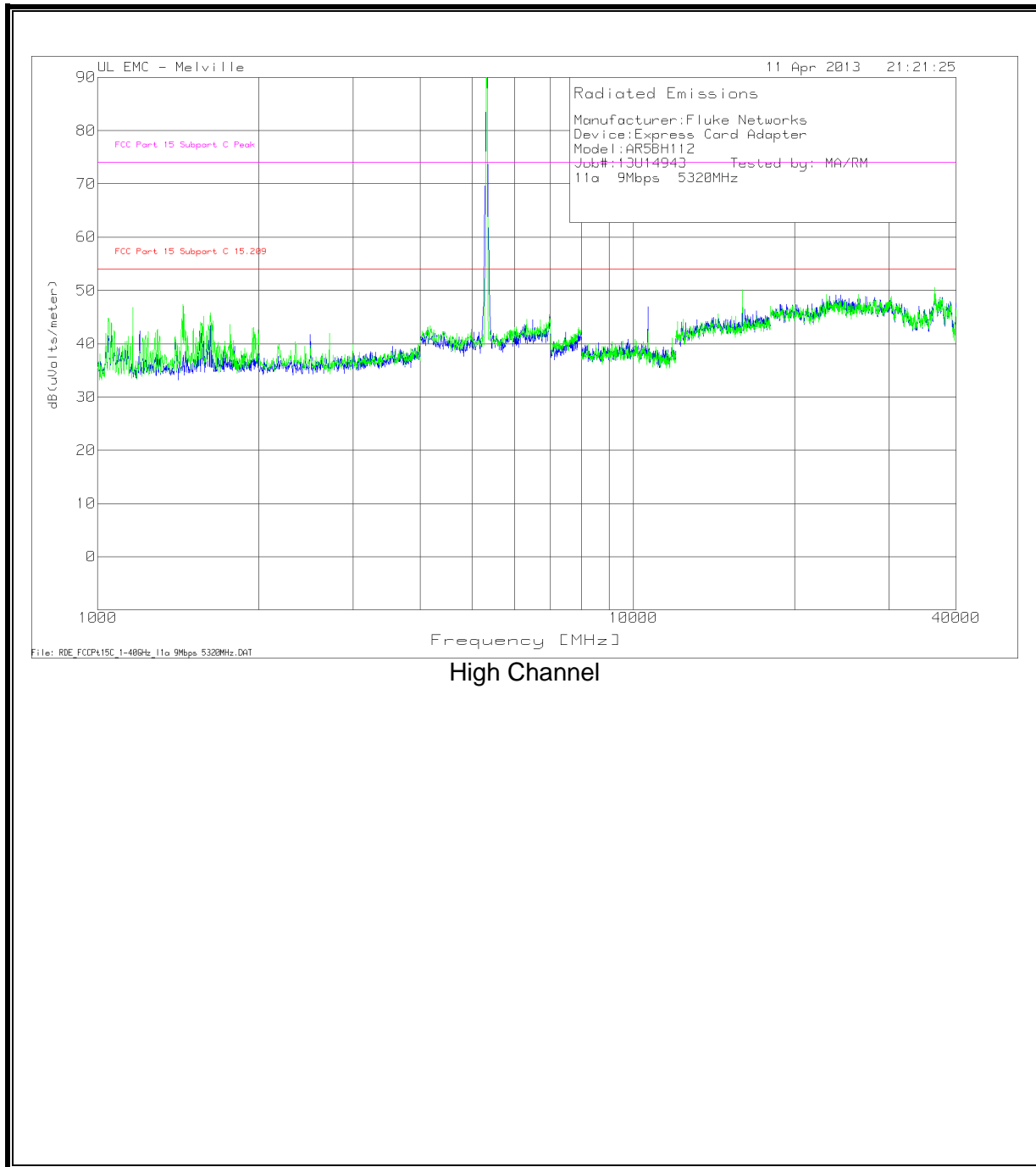
RESTRICTED BANDEDGE (HIGH CHANNEL)



HARMONICS AND SPURIOUS EMISSIONS



HARMONICS AND SPURIOUS EMISSIONS (CONT)



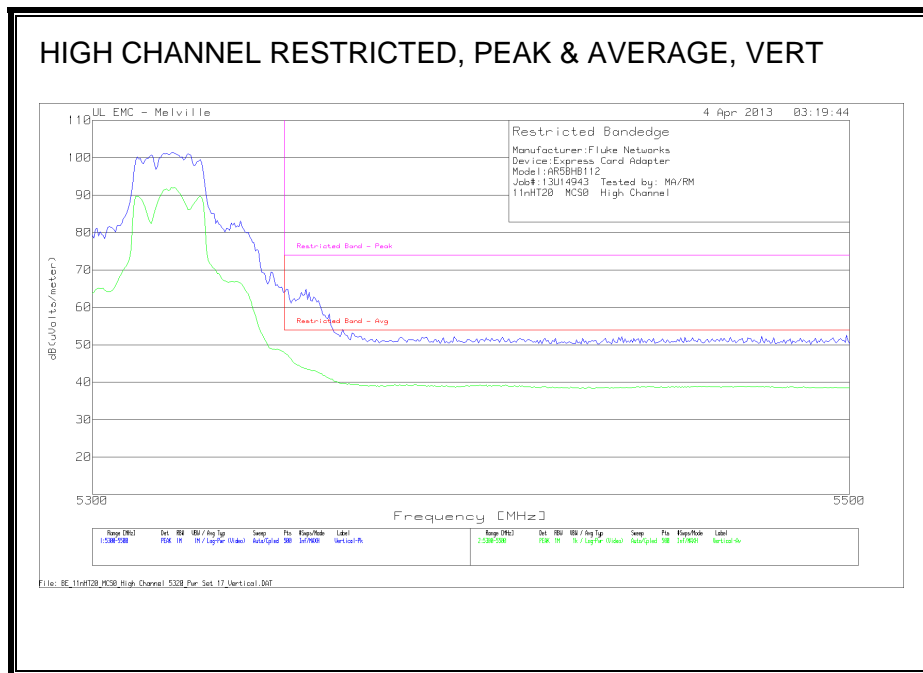
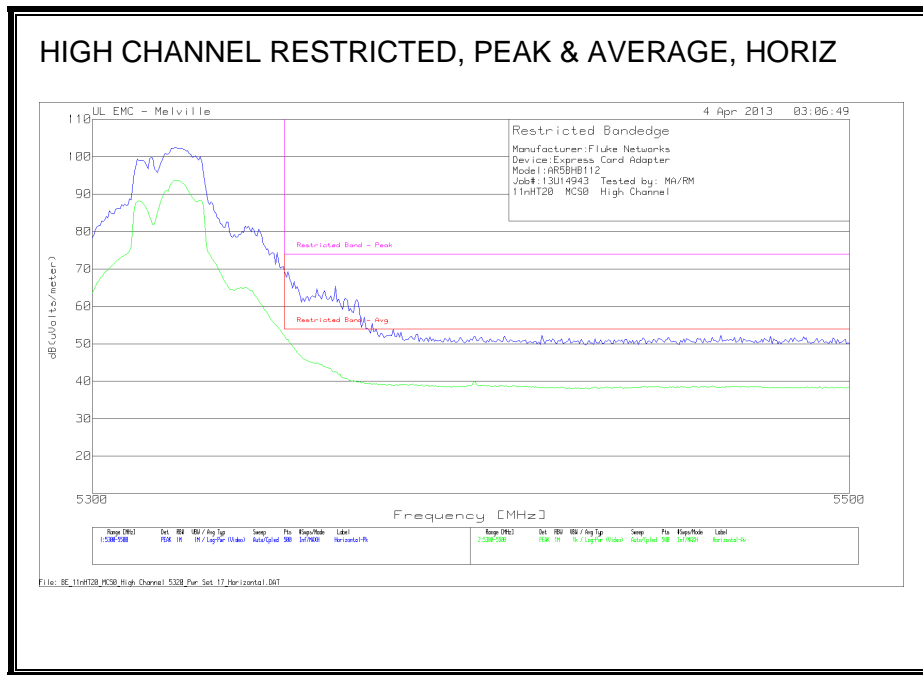
HARMONICS AND SPURIOUS EMISSIONS (CONT)

| | | | | | | | | | | | | |
|-------------------------------|---------|----------|---------|-------------|------------------|------------------|-------------|----------------|-------------|---------|--------|----------|
| Manufacturer:Fluke Networks | | | | | | | | | | | | |
| Device:Express Card Adapter | | | | | | | | | | | | |
| Model:AR5BH112 | | | | | | | | | | | | |
| Job#:13U14943 Tested by: MA | | | | | | | | | | | | |
| 11a 9Mbps Mode 5300MHz Band | | | | | | | | | | | | |
| Low Channel - 5260MHz | | | | | | | | | | | | |
| | Meter | | AF-8932 | BOMS | | FCC Part 15 | | FCC Part 15 | | Azimuth | Height | |
| Test Frequency | Reading | Detector | [dB/m] | Factor [dB] | dB(uVolts/meter) | Subpart C 15.209 | Margin (dB) | Subpart C Peak | Margin (dB) | [Degs] | [cm] | Polarity |
| 15783.307 | 62.01 | PK | 37.3 | -48.14 | 51.17 | - | - | 74 | -22.83 | 217 | 184 | Horz |
| 15781.944 | 67.44 | PK | 37.3 | -48.15 | 56.59 | - | - | 74 | -17.41 | 360 | 378 | Vert |
| 15783.307 | 48.94 | LnAv | 37.3 | -48.14 | 38.1 | 54 | -15.9 | - | - | 217 | 184 | Horz |
| 15781.944 | 54.96 | LnAv | 37.3 | -48.15 | 44.11 | 54 | -9.89 | - | - | 360 | 378 | Vert |
| Mid Channel - 5300MHz | | | | | | | | | | | | |
| | Meter | | AF-8932 | BOMS | | FCC Part 15 | | FCC Part 15 | | Azimuth | Height | |
| Test Frequency | Reading | Detector | [dB/m] | Factor [dB] | dB(uVolts/meter) | Subpart C 15.209 | Margin (dB) | Subpart C Peak | Margin (dB) | [Degs] | [cm] | Polarity |
| 10603.427 | 65.87 | PK | 33.2 | -48.45 | 50.62 | - | - | 74 | -23.38 | 116 | 101 | Horz |
| 10603.938 | 59.6 | PK | 33.2 | -48.47 | 44.33 | - | - | 74 | -29.67 | 155 | 354 | Vert |
| 10603.427 | 51.31 | LnAv | 33.2 | -48.45 | 36.06 | 54 | -17.94 | - | - | 116 | 101 | Horz |
| 10603.938 | 47.54 | LnAv | 33.2 | -48.47 | 32.27 | 54 | -21.73 | - | - | 155 | 354 | Vert |
| | Meter | | AF-8932 | BOMS | | FCC Part 15 | | FCC Part 15 | | Azimuth | Height | |
| Test Frequency | Reading | Detector | [dB/m] | Factor [dB] | dB(uVolts/meter) | Subpart C 15.209 | Margin (dB) | Subpart C Peak | Margin (dB) | [Degs] | [cm] | Polarity |
| 15901.533 | 61.93 | PK | 37.3 | -48.29 | 50.94 | - | - | 74 | -23.06 | 339 | 383 | Vert |
| 15901.984 | 64.42 | PK | 37.3 | -48.27 | 53.45 | - | - | 74 | -20.55 | 47 | 134 | Horz |
| 15901.533 | 49.71 | LnAv | 37.3 | -48.29 | 38.72 | 54 | -15.28 | - | - | 339 | 383 | Vert |
| 15901.984 | 51.32 | LnAv | 37.3 | -48.27 | 40.35 | 54 | -13.65 | - | - | 47 | 134 | Horz |
| High Channel - 5320MHz | | | | | | | | | | | | |
| | Meter | | AF-8932 | BOMS | | FCC Part 15 | | FCC Part 15 | | Azimuth | Height | |
| Test Frequency | Reading | Detector | [dB/m] | Factor [dB] | dB(uVolts/meter) | Subpart C 15.209 | Margin (dB) | Subpart C Peak | Margin (dB) | [Degs] | [cm] | Polarity |
| 10642.224 | 71.04 | PK | 33.2 | -48.26 | 55.98 | - | - | 74 | -18.02 | 128 | 240 | Horz |
| 10642.224 | 68.09 | PK | 33.2 | -48.26 | 53.03 | - | - | 74 | -20.97 | 8 | 396 | Vert |
| 10642.224 | 57.16 | LnAv | 33.2 | -48.26 | 42.1 | 54 | -11.9 | - | - | 128 | 240 | Horz |
| 10642.224 | 54.25 | LnAv | 33.2 | -48.26 | 39.19 | 54 | -14.81 | - | - | 8 | 396 | Vert |
| | Meter | | AF-8932 | BOMS | | FCC Part 15 | | FCC Part 15 | | Azimuth | Height | |
| Test Frequency | Reading | Detector | [dB/m] | Factor [dB] | dB(uVolts/meter) | Subpart C 15.209 | Margin (dB) | Subpart C Peak | Margin (dB) | [Degs] | [cm] | Polarity |
| 15955.311 | 67.96 | PK | 37.3 | -48.09 | 57.17 | - | - | 74 | -16.83 | 30 | 307 | Horz |
| 15957.535 | 64.37 | PK | 37.3 | -48.07 | 53.6 | - | - | 74 | -20.4 | 30 | 307 | Vert |
| 15955.311 | 55.13 | LnAv | 37.3 | -48.09 | 44.34 | 54 | -9.66 | - | - | 30 | 307 | Horz |
| 15957.535 | 51.85 | LnAv | 37.3 | -48.07 | 41.08 | 54 | -12.92 | - | - | 30 | 307 | Vert |
| PK - Peak detector | | | | | | | | | | | | |
| LgAv - Log Average detector | | | | | | | | | | | | |

NOTE: No emissions from the transmitter were detected above the system noise floor. Additionally, no peak emissions exist within 6dB of the average limit.

9.2.5. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.3 GHz BAND

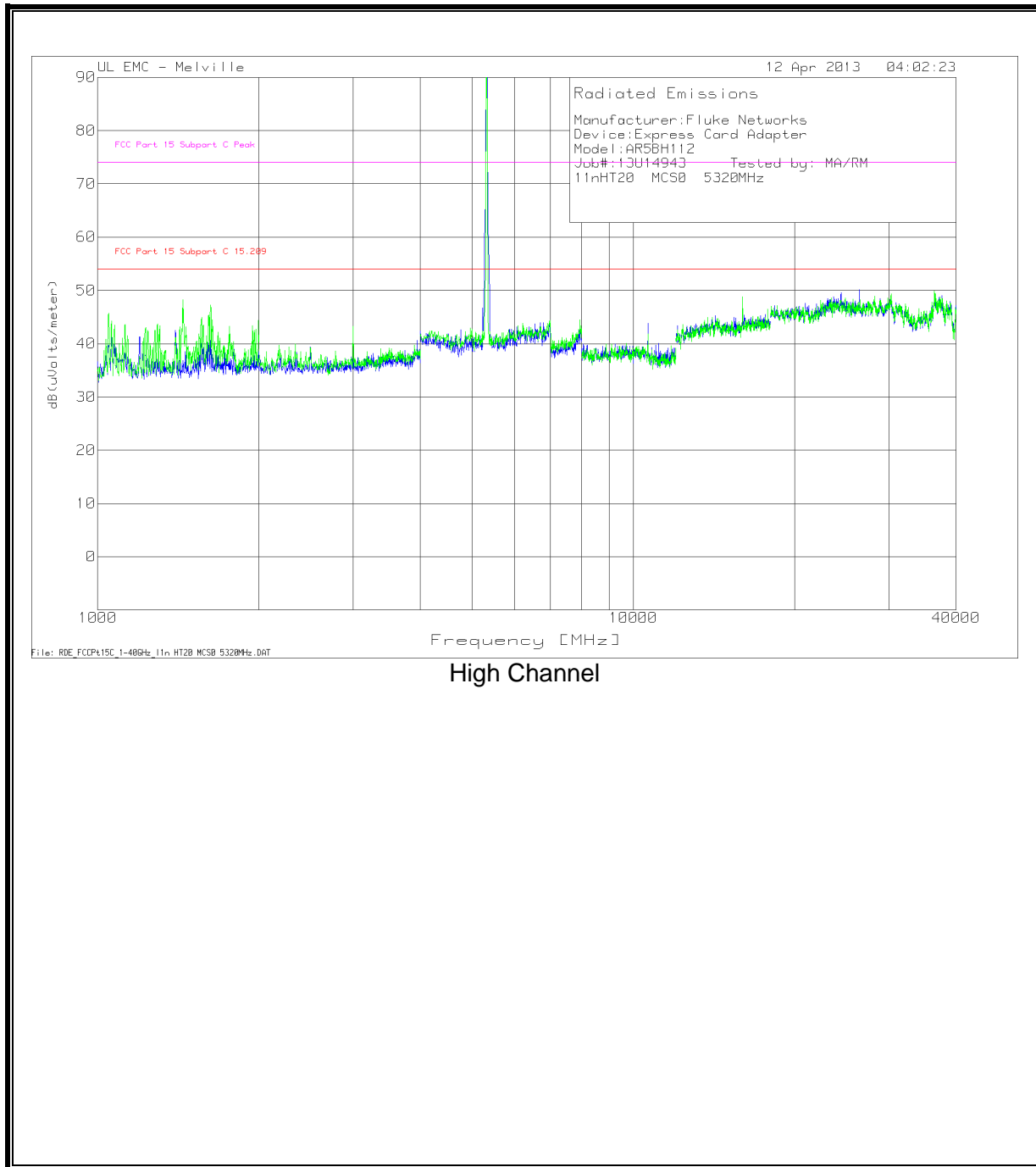
RESTRICTED BANDEDGE (HIGH CHANNEL)



HARMONICS AND SPURIOUS EMISSIONS



HARMONICS AND SPURIOUS EMISSIONS (CONT)



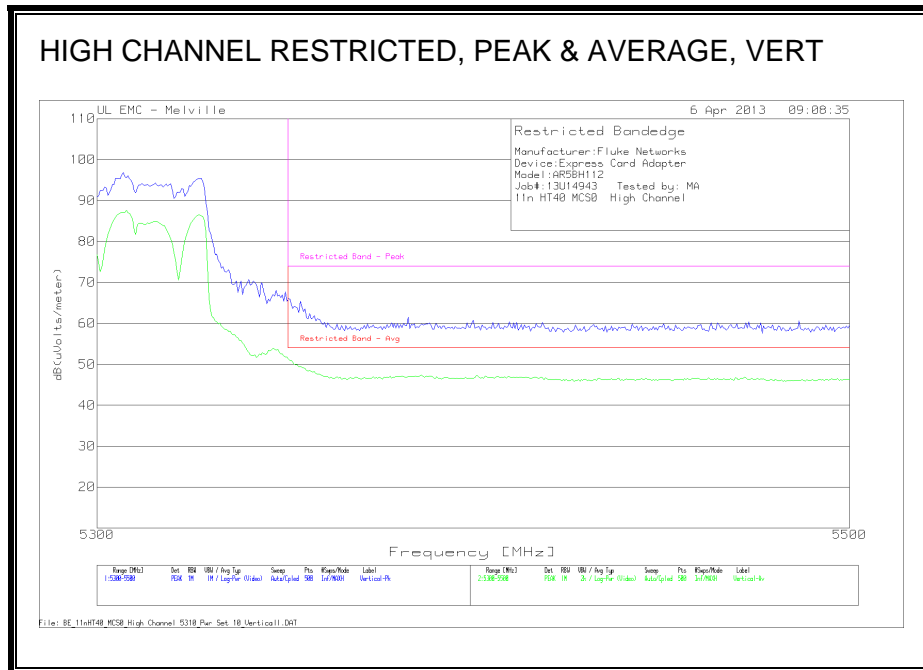
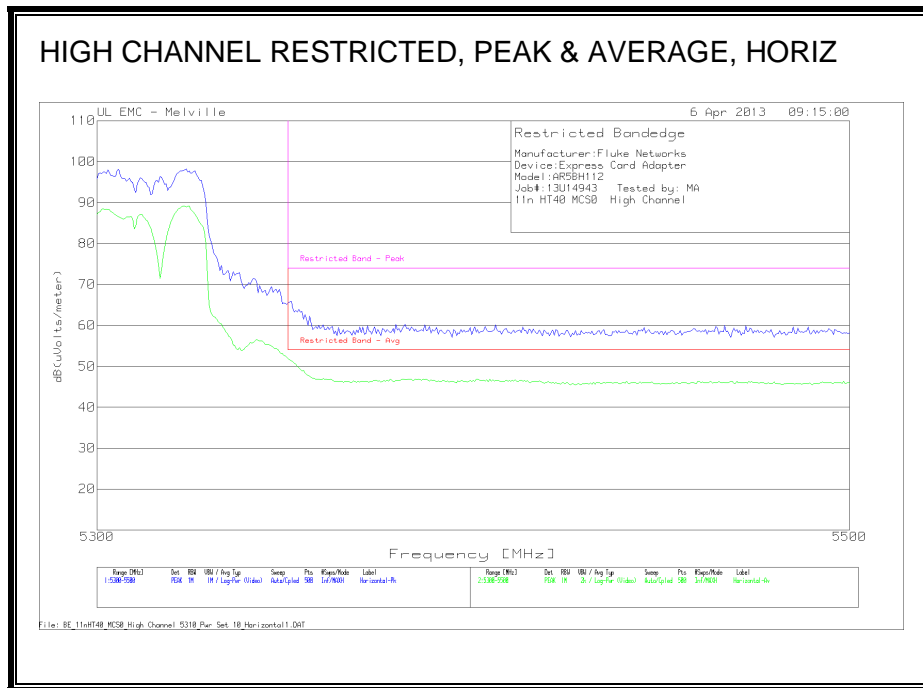
HARMONICS AND SPURIOUS EMISSIONS (CONT)

| | | | | | | | | | | | | |
|--------------------------------|---------|----------|---------|-------------|------------------|------------------|-------------|----------------|-------------|---------|--------|----------|
| Manufacturer:Fluke Networks | | | | | | | | | | | | |
| Device:Express Card Adapter | | | | | | | | | | | | |
| Model:AR5BH112 | | | | | | | | | | | | |
| Job#:13U14943 Tested by: MA/RM | | | | | | | | | | | | |
| 11nHT20 MCS0 5300MHz Band | | | | | | | | | | | | |
| Low Channel - 5260MHz | | | | | | | | | | | | |
| | Meter | | AF-8932 | BOMS | | FCC Part 15 | | FCC Part 15 | | Azimuth | Height | |
| Test Frequency | Reading | Detector | [dB/m] | Factor [dB] | dB(uVolts/meter) | Subpart C 15.209 | Margin (dB) | Subpart C Peak | Margin (dB) | [Degs] | [cm] | Polarity |
| 15784.569 | 64.63 | PK | 37.3 | -48.12 | 53.81 | - | - | 74 | -20.19 | 32 | 131 | Horz |
| 15784.569 | 56.97 | PK | 37.3 | -48.12 | 46.15 | - | - | 74 | -27.85 | 286 | 115 | Vert |
| 15784.569 | 49.41 | LnAv | 37.3 | -48.12 | 38.59 | 54 | -15.41 | - | - | 32 | 131 | Horz |
| 15784.569 | 45.42 | LnAv | 37.3 | -48.12 | 34.6 | 54 | -19.4 | - | - | 286 | 115 | Vert |
| Mid Channel - 5300MHz | | | | | | | | | | | | |
| | Meter | | AF-8932 | BOMS | | FCC Part 15 | | FCC Part 15 | | Azimuth | Height | |
| Test Frequency | Reading | Detector | [dB/m] | Factor [dB] | dB(uVolts/meter) | Subpart C 15.209 | Margin (dB) | Subpart C Peak | Margin (dB) | [Degs] | [cm] | Polarity |
| 10605.351 | 65.34 | PK | 33.2 | -48.5 | 50.04 | - | - | 74 | -23.96 | 40 | 368 | Horz |
| 10607.034 | 64.25 | PK | 33.2 | -48.47 | 48.98 | - | - | 74 | -25.02 | 198 | 388 | Vert |
| 10605.351 | 50.46 | LnAv | 33.2 | -48.5 | 35.16 | 54 | -18.84 | - | - | 40 | 368 | Horz |
| 10607.034 | 48.99 | LnAv | 33.2 | -48.47 | 33.72 | 54 | -20.28 | - | - | 198 | 388 | Vert |
| | Meter | | AF-8932 | BOMS | | FCC Part 15 | | FCC Part 15 | | Azimuth | Height | |
| Test Frequency | Reading | Detector | [dB/m] | Factor [dB] | dB(uVolts/meter) | Subpart C 15.209 | Margin (dB) | Subpart C Peak | Margin (dB) | [Degs] | [cm] | Polarity |
| 15903.788 | 62.6 | PK | 37.3 | -48.19 | 51.71 | - | - | 74 | -22.29 | 95 | 294 | Horz |
| 15903.337 | 58.4 | PK | 37.3 | -48.21 | 47.49 | - | - | 74 | -26.51 | 313 | 192 | Vert |
| 15903.788 | 50.24 | LnAv | 37.3 | -48.19 | 39.35 | 54 | -14.65 | - | - | 95 | 294 | Horz |
| 15903.337 | 46.66 | LnAv | 37.3 | -48.21 | 35.75 | 54 | -18.25 | - | - | 313 | 192 | Vert |
| High Channel - 5320MHz | | | | | | | | | | | | |
| | Meter | | AF-8932 | BOMS | | FCC Part 15 | | FCC Part 15 | | Azimuth | Height | |
| Test Frequency | Reading | Detector | [dB/m] | Factor [dB] | dB(uVolts/meter) | Subpart C 15.209 | Margin (dB) | Subpart C Peak | Margin (dB) | [Degs] | [cm] | Polarity |
| 10643.307 | 66.91 | PK | 33.2 | -48.22 | 51.89 | - | - | 74 | -22.11 | 141 | 152 | Horz |
| 10641.563 | 64.06 | PK | 33.2 | -48.29 | 48.97 | - | - | 74 | -25.03 | 9 | 360 | Vert |
| 10643.307 | 52.7 | LnAv | 33.2 | -48.22 | 37.68 | 54 | -16.32 | - | - | 141 | 152 | Horz |
| 10641.563 | 50.97 | LnAv | 33.2 | -48.29 | 35.88 | 54 | -18.12 | - | - | 9 | 360 | Vert |
| | Meter | | AF-8932 | BOMS | | FCC Part 15 | | FCC Part 15 | | Azimuth | Height | |
| Test Frequency | Reading | Detector | [dB/m] | Factor [dB] | dB(uVolts/meter) | Subpart C 15.209 | Margin (dB) | Subpart C Peak | Margin (dB) | [Degs] | [cm] | Polarity |
| 15960.782 | 61.2 | PK | 37.3 | -48.1 | 50.4 | - | - | 74 | -23.6 | 9 | 360 | Horz |
| 15967.174 | 66.31 | PK | 37.3 | -48.49 | 55.12 | - | - | 74 | -18.88 | 6 | 308 | Vert |
| 15960.782 | 49.04 | LnAv | 37.3 | -48.1 | 38.24 | 54 | -15.76 | - | - | 9 | 360 | Horz |
| 15967.174 | 52.74 | LnAv | 37.3 | -48.49 | 41.55 | 54 | -12.45 | - | - | 6 | 308 | Vert |
| PK - Peak detector | | | | | | | | | | | | |
| LnAv - Linear Average detector | | | | | | | | | | | | |

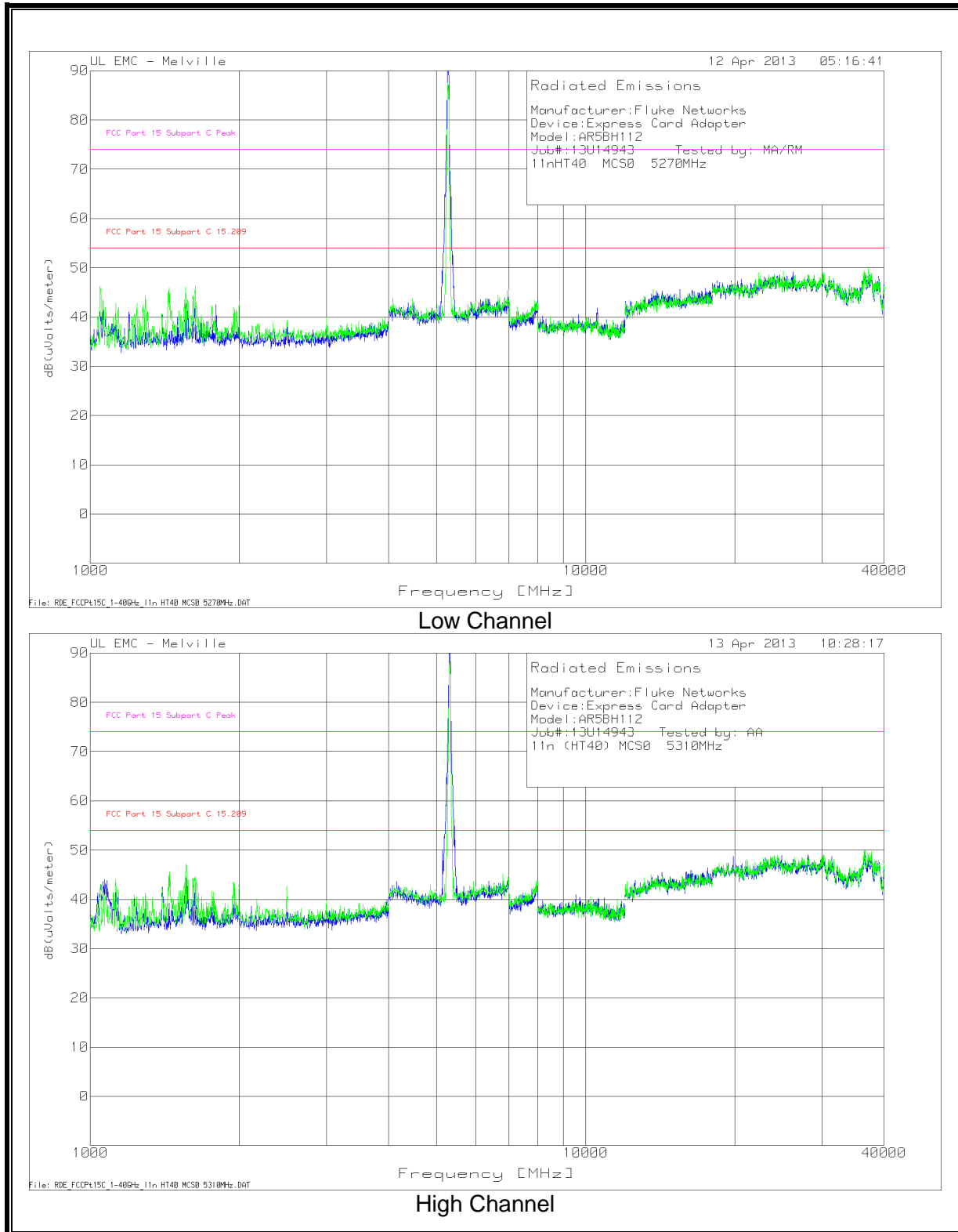
NOTE: No emissions from the transmitter were detected above the system noise floor. Additionally, no peak emissions exist within 6dB of the average limit.

9.2.6. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL)



HARMONICS AND SPURIOUS EMISSIONS



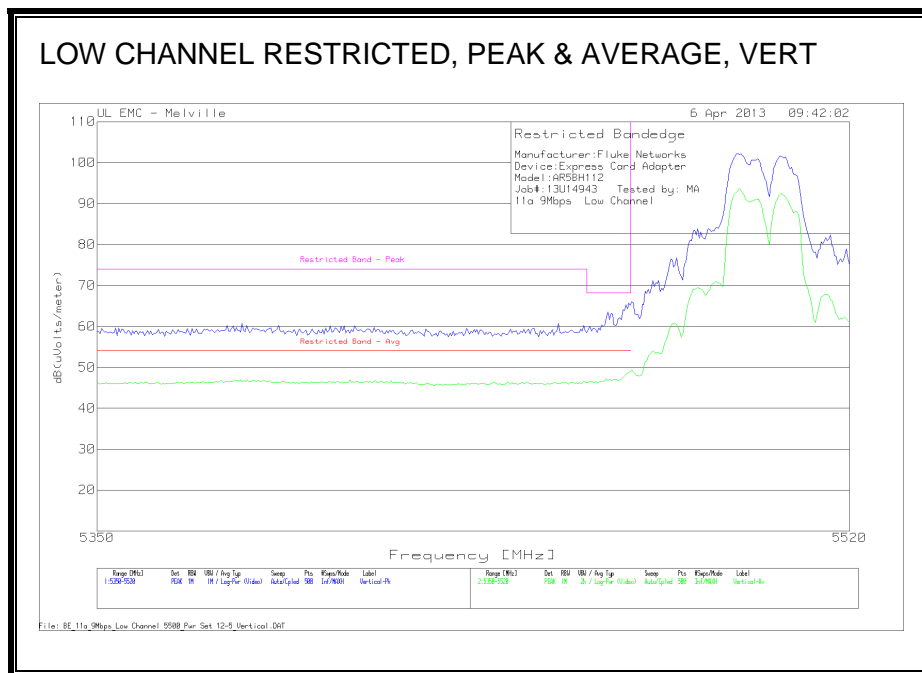
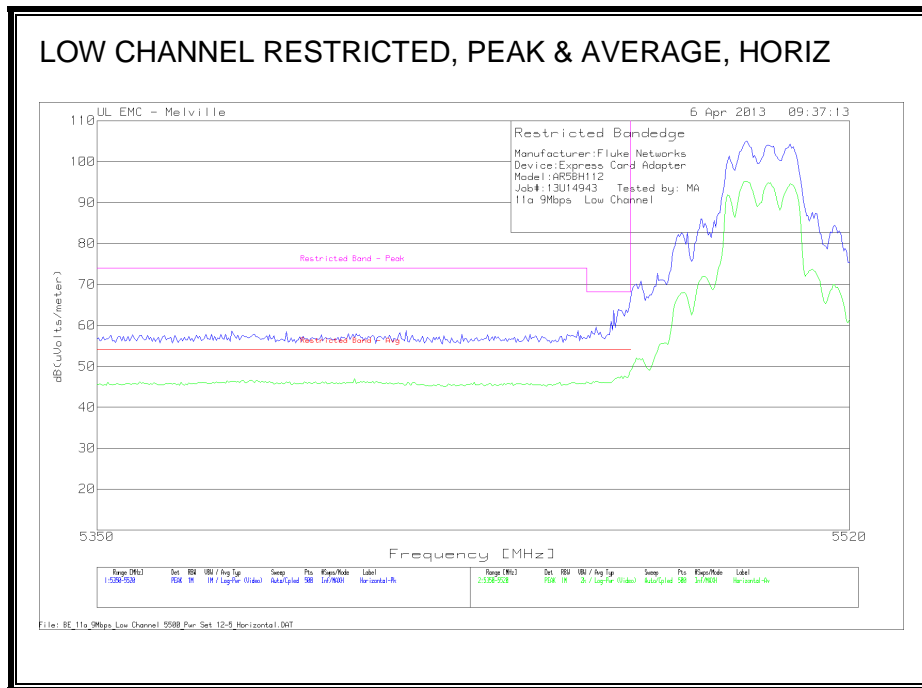
HARMONICS AND SPURIOUS EMISSIONS (CONT)

| Manufacturer:Fluke Networks | | | | | | | | | | | | |
|--------------------------------|---------|----------|-------------------|---------------------|------------------|------------------|-------------|----------------|-------------|-------------------|----------------|----------|
| Device:Express Card Adapter | | | | | | | | | | | | |
| Model:AR5BH112 | | | | | | | | | | | | |
| Job#:13U14943 Tested by: MA/RM | | | | | | | | | | | | |
| 11nHT40 MCS0 5300MHz Band | | | | | | | | | | | | |
| Low Channel - 5270MHz | | | | | | | | | | | | |
| Test Frequency | Meter | | AF-8932 [dB/m] | BOMS Factor [dB] | dB(uVolts/meter) | FCC Part 15 | | FCC Part 15 | | Azimuth [Degs] | Height [cm] | Polarity |
| | Reading | Detector | | | | Subpart C 15.209 | Margin (dB) | Subpart C Peak | Margin (dB) | | | |
| 15803.617 | 59.76 | PK | 37.3 | -47.83 | 49.23 | - | - | 74 | -24.77 | 3 | 277 | Vert |
| 15801.032 | 61.52 | PK | 37.3 | -47.82 | 51 | - | - | 74 | -23 | 44 | 270 | Horz |
| 15803.617 | 48.34 | LnAv | 37.3 | -47.83 | 37.81 | 54 | -16.19 | - | - | 3 | 277 | Vert |
| 15801.032 | 48.94 | LnAv | 37.3 | -47.82 | 38.42 | 54 | -15.58 | - | - | 44 | 270 | Horz |
| High Channel - 5310MHz | | | | | | | | | | | | |
| Test Frequency | Meter | | AF-8932 [dB/m] | BOMS Factor [dB] | dB(uVolts/meter) | FCC Part 15 | | FCC Part 15 | | Azimuth [Degs] | Height [cm] | Polarity |
| | Reading | Detector | | | | Subpart C 15.209 | Margin (dB) | Subpart C Peak | Margin (dB) | | | |
| 15803.617 | 59.76 | PK | 37.3 | -47.83 | 49.23 | - | - | 74 | -24.77 | 3 | 277 | Vert |
| 15801.032 | 61.52 | PK | 37.3 | -47.82 | 51 | - | - | 74 | -23 | 44 | 270 | Horz |
| 15803.617 | 48.34 | LnAv | 37.3 | -47.83 | 37.81 | 54 | -16.19 | - | - | 3 | 277 | Vert |
| 15801.032 | 48.94 | LnAv | 37.3 | -47.82 | 38.42 | 54 | -15.58 | - | - | 44 | 270 | Horz |
| PK - Peak detector | | | | | | | | | | | | |
| LnAv - Linear Average detector | | | | | | | | | | | | |

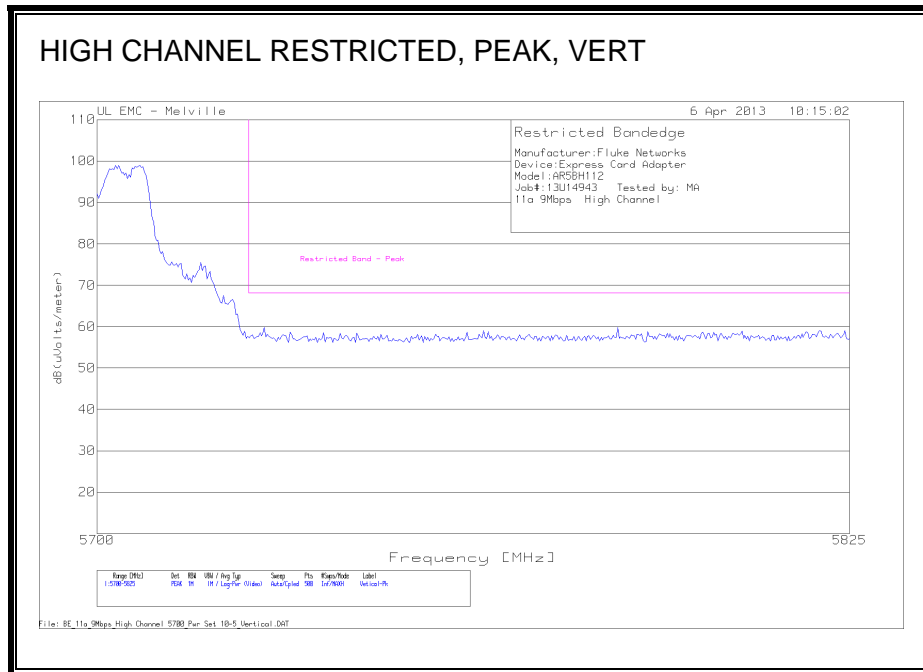
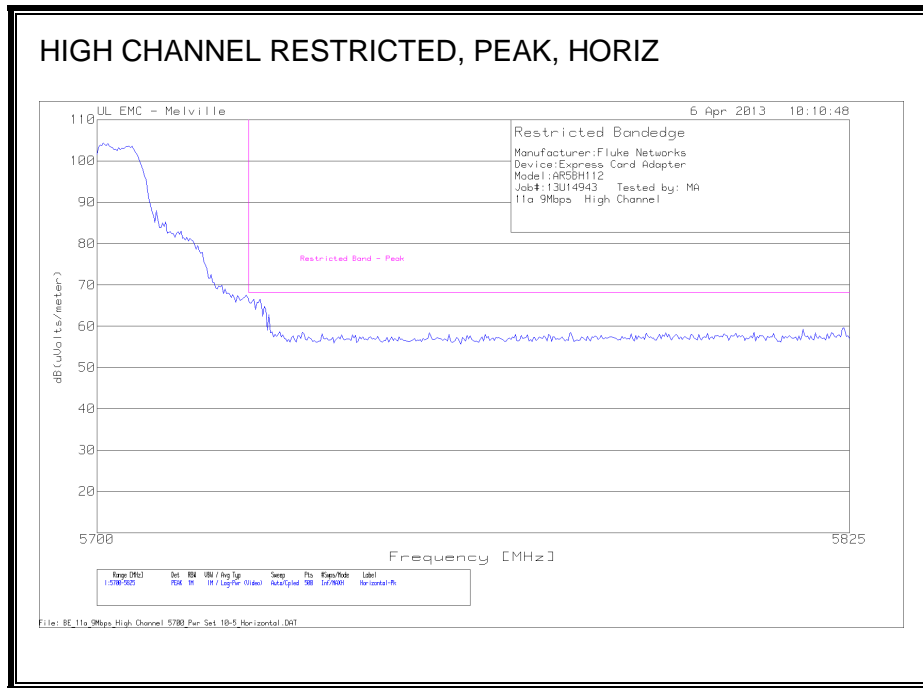
NOTE: No emissions from the transmitter were detected above the system noise floor. Additionally, no peak emissions exist within 6dB of the average limit.

9.2.7. TX ABOVE 1 GHz 802.11a MODE IN THE 5.6 GHz BAND

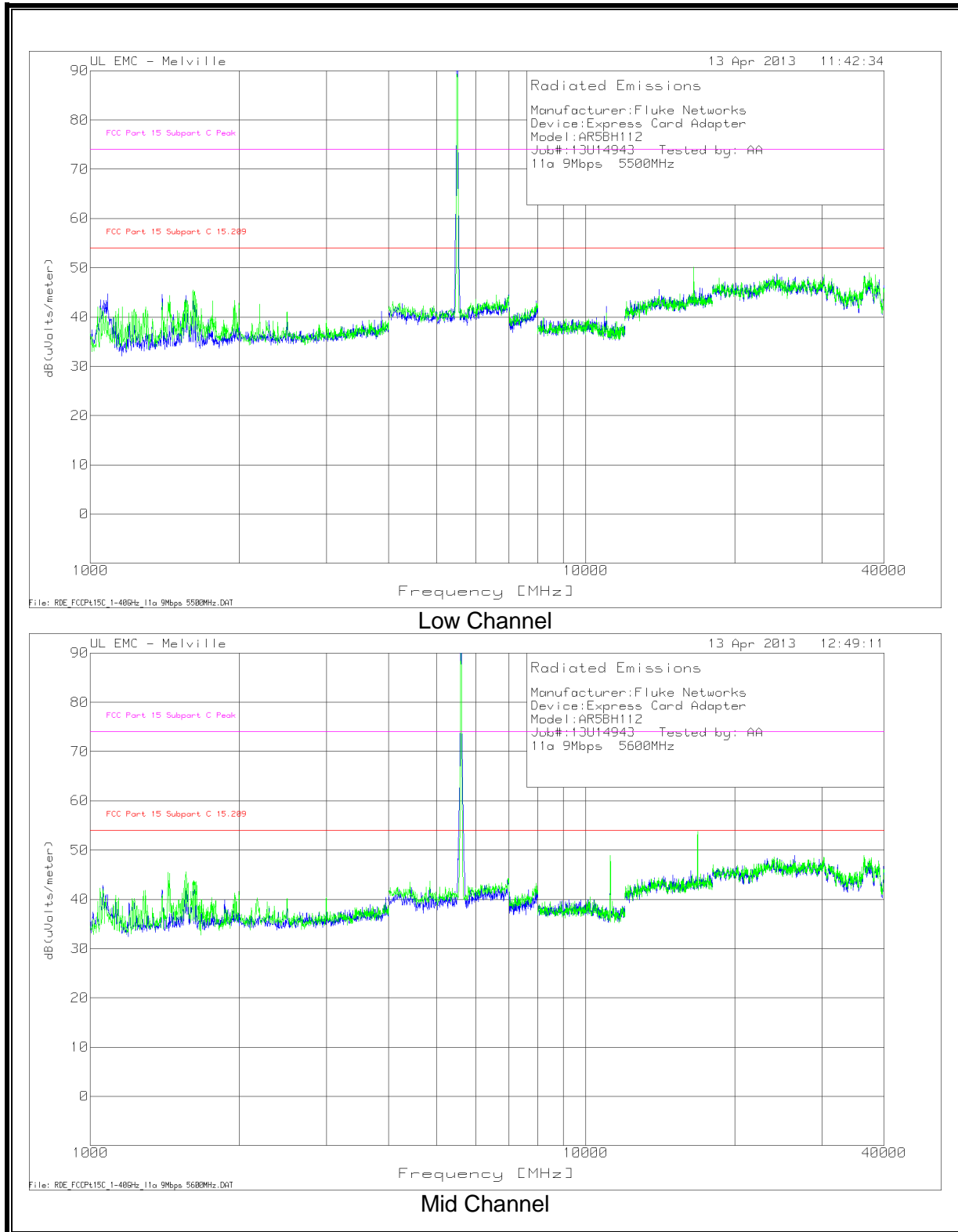
RESTRICTED BANDEDGE (LOW CHANNEL)



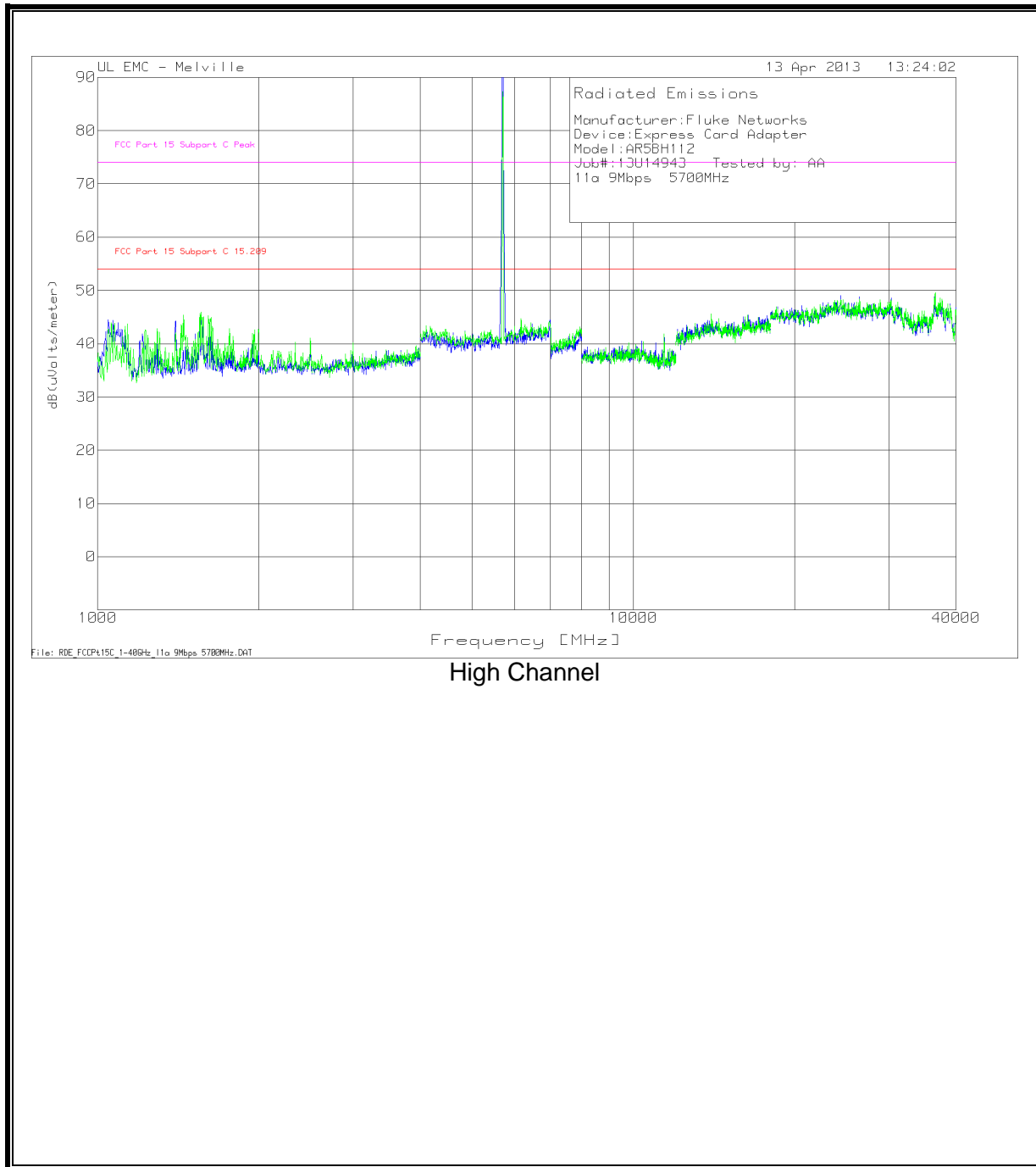
AUTHORIZED BANDEDGE (HIGH CHANNEL)



HARMONICS AND SPURIOUS EMISSIONS



HARMONICS AND SPURIOUS EMISSIONS (CONT)



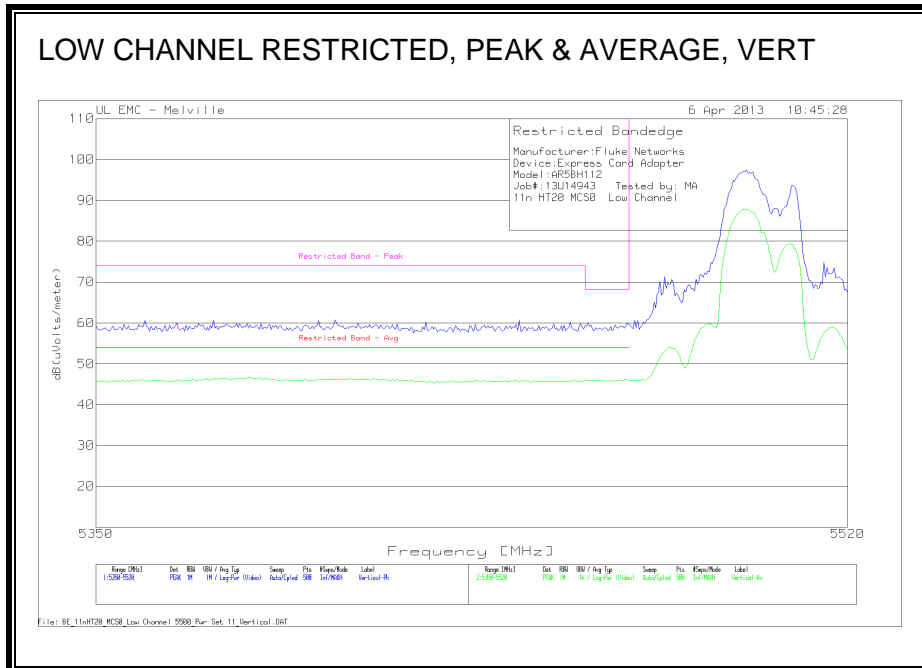
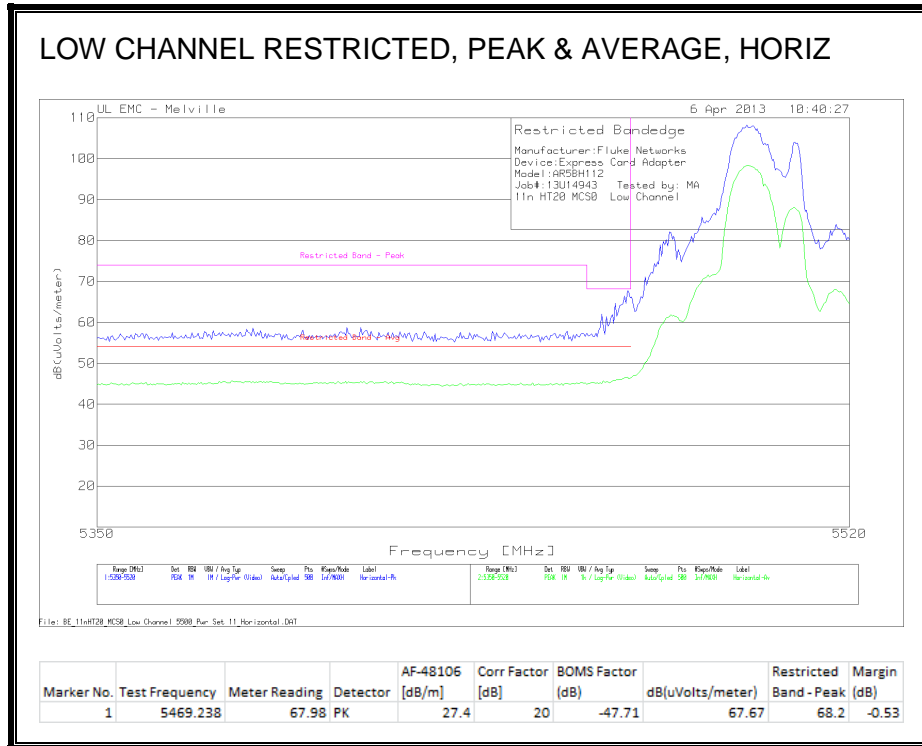
HARMONICS AND SPURIOUS EMISSIONS (CONT)

| | | | | | | | | | | | | |
|--------------------------------|---------|----------|---------|-------------|------------------|------------------|-------------|----------------|-------------|---------|--------|----------|
| Manufacturer:Fluke Networks | | | | | | | | | | | | |
| Device:Express Card Adapter | | | | | | | | | | | | |
| Model:AR5BH112 | | | | | | | | | | | | |
| Job#:13U14943 Tested by: MA/RM | | | | | | | | | | | | |
| 11a 9Mbps Mode 5500MHz Band | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| Low Channel - 5500MHz | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | Meter | | AF-8933 | BOMS | | FCC Part 15 | | FCC Part 15 | | Azimuth | Height | |
| Test Frequency | Reading | Detector | [dB/m] | Factor [dB] | dB(uVolts/meter) | Subpart C 15.209 | Margin (dB) | Subpart C Peak | Margin (dB) | [Degs] | [cm] | Polarity |
| 10999.781 | 66.97 | PK | 33.4 | -47.99 | 52.38 | - | - | 74 | -21.62 | 0 | 343 | Vert |
| 10997.585 | 59.28 | PK | 33.4 | -48.04 | 44.64 | - | - | 74 | -29.36 | 24 | 281 | Horz |
| 10999.198 | 55.23 | LnAv | 33.4 | -48 | 40.63 | 54 | -13.37 | - | - | 0 | 343 | Vert |
| 10997.585 | 45.77 | LnAv | 33.4 | -48.04 | 31.13 | 54 | -22.87 | - | - | 24 | 281 | Horz |
| | | | | | | | | | | | | |
| Mid Channel - 5600MHz | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| No emissions detected. | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| High Channel - 5700MHz | | | | | | | | | | | | |
| | Meter | | AF-8933 | BOMS | | FCC Part 15 | | FCC Part 15 | | Azimuth | Height | |
| Test Frequency | Reading | Detector | [dB/m] | Factor [dB] | dB(uVolts/meter) | Subpart C 15.209 | Margin (dB) | Subpart C Peak | Margin (dB) | [Degs] | [cm] | Polarity |
| 11399.9 | 60.59 | PK | 33.3 | -48.29 | 45.6 | - | - | 74 | -28.4 | 3 | 254 | Vert |
| 11399.9 | 63.58 | PK | 33.3 | -48.33 | 48.55 | - | - | 74 | -25.45 | 57 | 183 | Horz |
| 11399.9 | 50.89 | LnAv | 33.3 | -48.29 | 35.9 | 54 | -18.1 | - | - | 3 | 254 | Vert |
| 11398.621 | 52.06 | LnAv | 33.3 | -48.33 | 37.03 | 54 | -16.97 | - | - | 57 | 183 | Horz |
| 11398.653 | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| PK - Peak detector | | | | | | | | | | | | |
| LnAv - Linear Average detector | | | | | | | | | | | | |

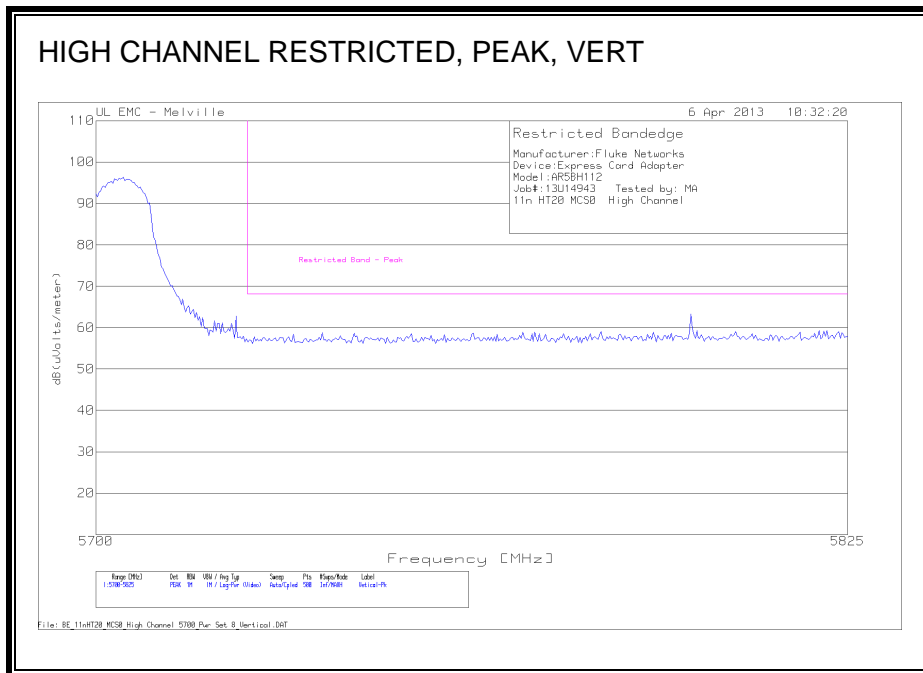
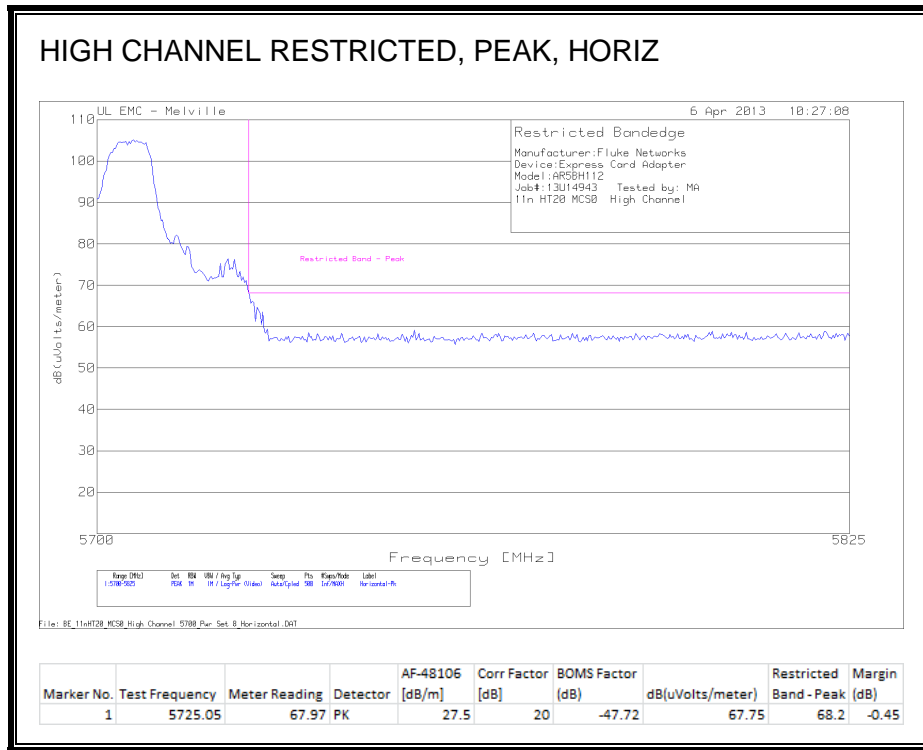
NOTE: No emissions from the transmitter were detected above the system noise floor. Additionally, no peak emissions exist within 6dB of the average limit.

9.2.8. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.6 GHz BAND

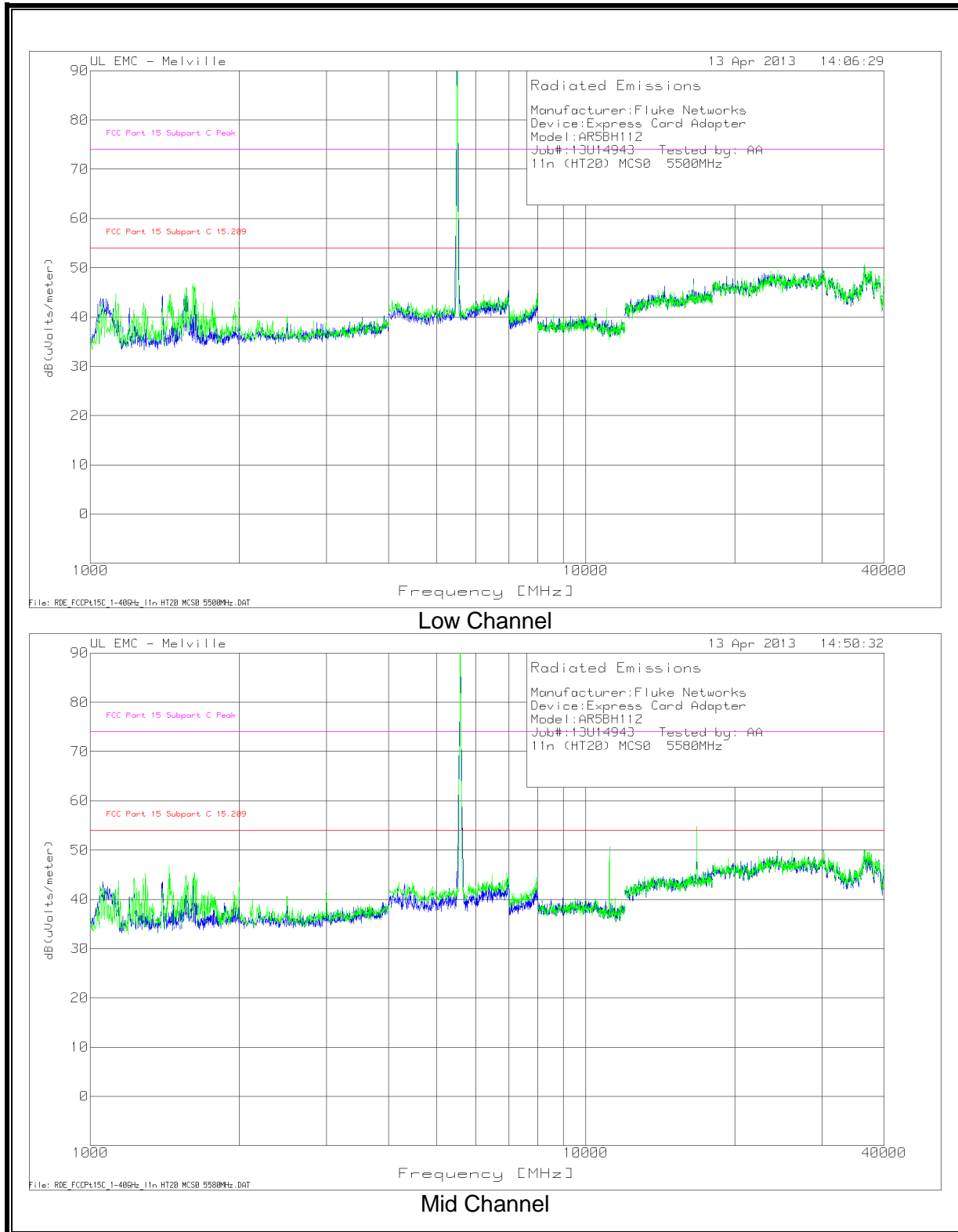
RESTRICTED BANDEDGE (LOW CHANNEL)



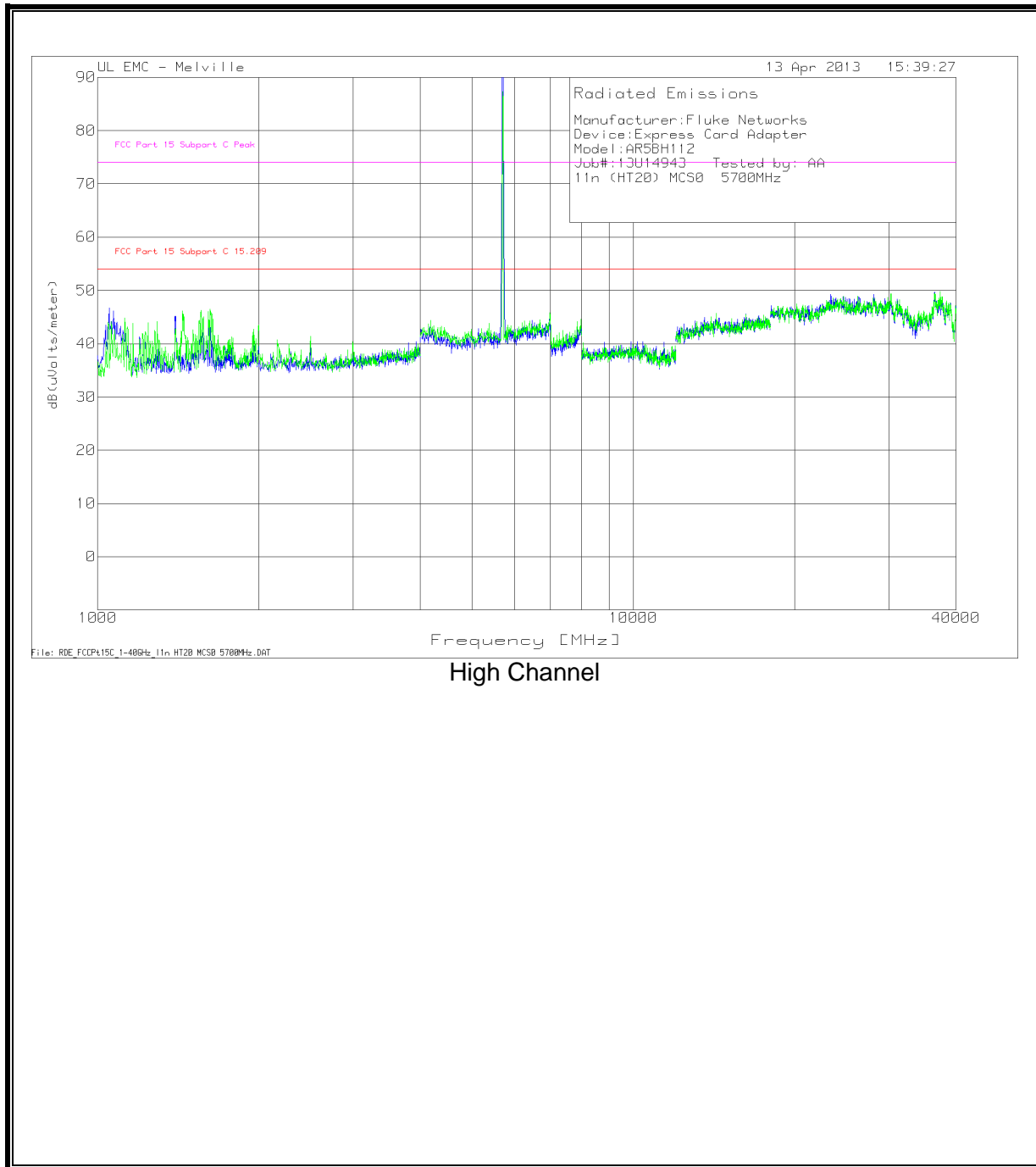
AUTHORIZED BANDEGE (HIGH CHANNEL)



HARMONICS AND SPURIOUS EMISSIONS



HARMONICS AND SPURIOUS EMISSIONS (CONT)



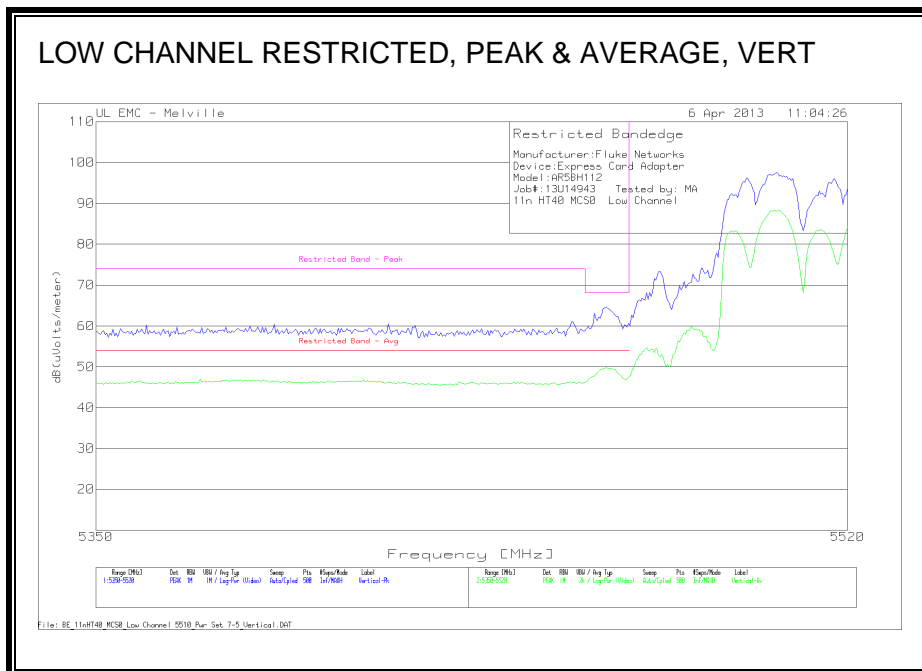
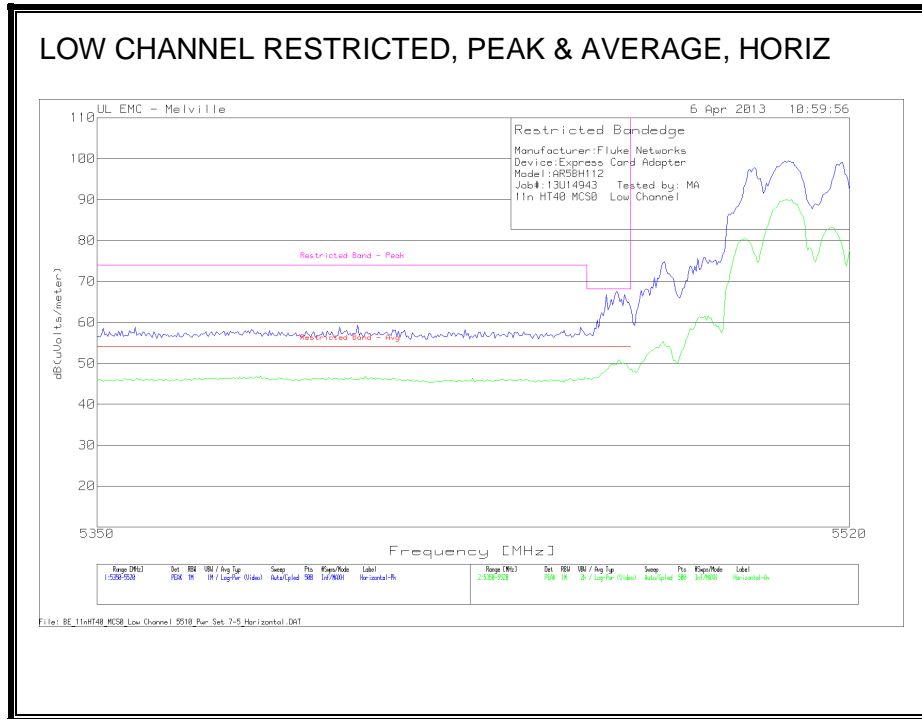
HARMONICS AND SPURIOUS EMISSIONS (CONT)

| | | | | | | | | | | | | |
|--------------------------------|---------|----------|---------|-------------|------------------|------------------|-------------|----------------|-------------|---------|--------|----------|
| Manufacturer:Fluke Networks | | | | | | | | | | | | |
| Device:Express Card Adapter | | | | | | | | | | | | |
| Model:AR5BH112 | | | | | | | | | | | | |
| Job#:13U14943 Tested by: MA/RM | | | | | | | | | | | | |
| 11nHT20 MCS0 5600MHz Band | | | | | | | | | | | | |
| Low Channel - 5500MHz | | | | | | | | | | | | |
| | Meter | | AF-8933 | BOMS | | FCC Part 15 | | FCC Part 15 | | Azimuth | Height | |
| Test Frequency | Reading | Detector | [dB/m] | Factor [dB] | dB(uVolts/meter) | Subpart C 15.209 | Margin (dB) | Subpart C Peak | Margin (dB) | [Degs] | [cm] | Polarity |
| 11004.248 | 56.57 | PK | 33.4 | -47.86 | 42.11 | - | - | 74 | -31.89 | 158 | 155 | Horz |
| 11001.102 | 57.25 | PK | 33.4 | -47.95 | 42.7 | - | - | 74 | -31.3 | 14 | 372 | Vert |
| 11003.447 | 46.43 | LnAv | 33.4 | -47.88 | 31.95 | 54 | -22.05 | - | - | 158 | 155 | Horz |
| 11001.102 | 45.33 | LnAv | 33.4 | -47.95 | 30.78 | 54 | -23.22 | - | - | 14 | 372 | Vert |
| Mid Channel - 5580MHz | | | | | | | | | | | | |
| | Meter | | AF-8933 | BOMS | | FCC Part 15 | | FCC Part 15 | | Azimuth | Height | |
| Test Frequency | Reading | Detector | [dB/m] | Factor [dB] | dB(uVolts/meter) | Subpart C 15.209 | Margin (dB) | Subpart C Peak | Margin (dB) | [Degs] | [cm] | Polarity |
| 11162.285 | 68.49 | PK | 33.2 | -48.15 | 53.54 | - | - | 74 | -20.46 | 173 | 267 | Vert |
| 11160.641 | 68.3 | PK | 33.2 | -48.11 | 53.39 | - | - | 74 | -20.61 | 151 | 123 | Horz |
| 11161.924 | 56.32 | LnAv | 33.2 | -48.14 | 41.38 | 54 | -12.62 | - | - | 173 | 267 | Vert |
| 11160.641 | 56.02 | LnAv | 33.2 | -48.11 | 41.11 | 54 | -12.89 | - | - | 151 | 123 | Horz |
| High Channel - 5700MHz | | | | | | | | | | | | |
| | Meter | | AF-8933 | BOMS | | FCC Part 15 | | FCC Part 15 | | Azimuth | Height | |
| Test Frequency | Reading | Detector | [dB/m] | Factor [dB] | dB(uVolts/meter) | Subpart C 15.209 | Margin (dB) | Subpart C Peak | Margin (dB) | [Degs] | [cm] | Polarity |
| 11400.2 | 59.32 | PK | 33.3 | -48.29 | 44.33 | - | - | 74 | -29.67 | 17 | 380 | Vert |
| 11399.87 | 61.6 | PK | 33.3 | -48.29 | 46.61 | - | - | 74 | -27.39 | 290 | 309 | Horz |
| 11399.619 | 47.49 | LnAv | 33.3 | -48.3 | 32.49 | 54 | -21.51 | - | - | 17 | 380 | Vert |
| 11401.092 | 48.19 | LnAv | 33.3 | -48.27 | 33.22 | 54 | -20.78 | - | - | 290 | 309 | Horz |
| PK - Peak detector | | | | | | | | | | | | |
| LnAv - Linear Average detector | | | | | | | | | | | | |

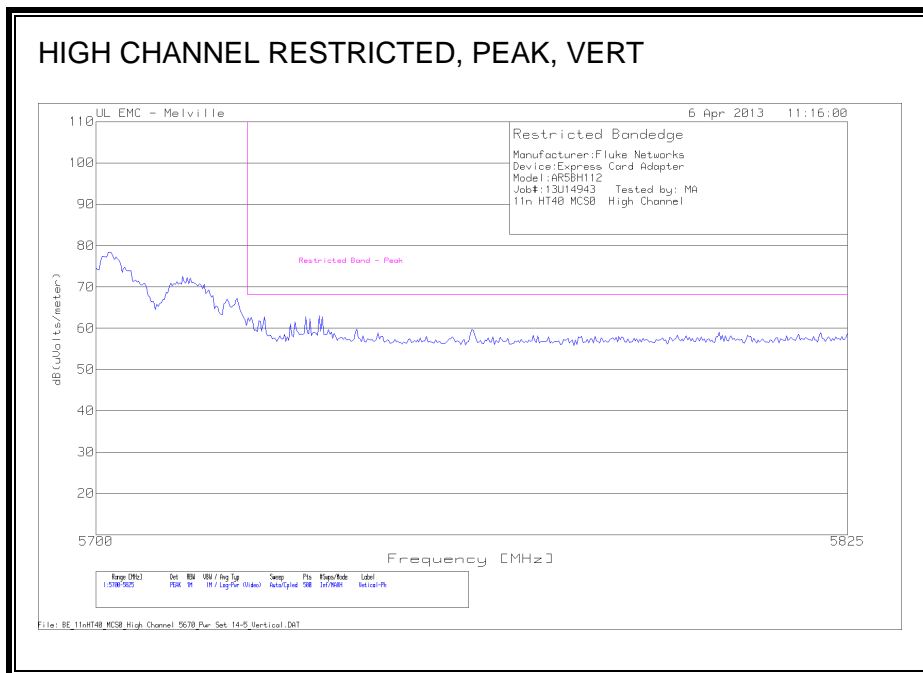
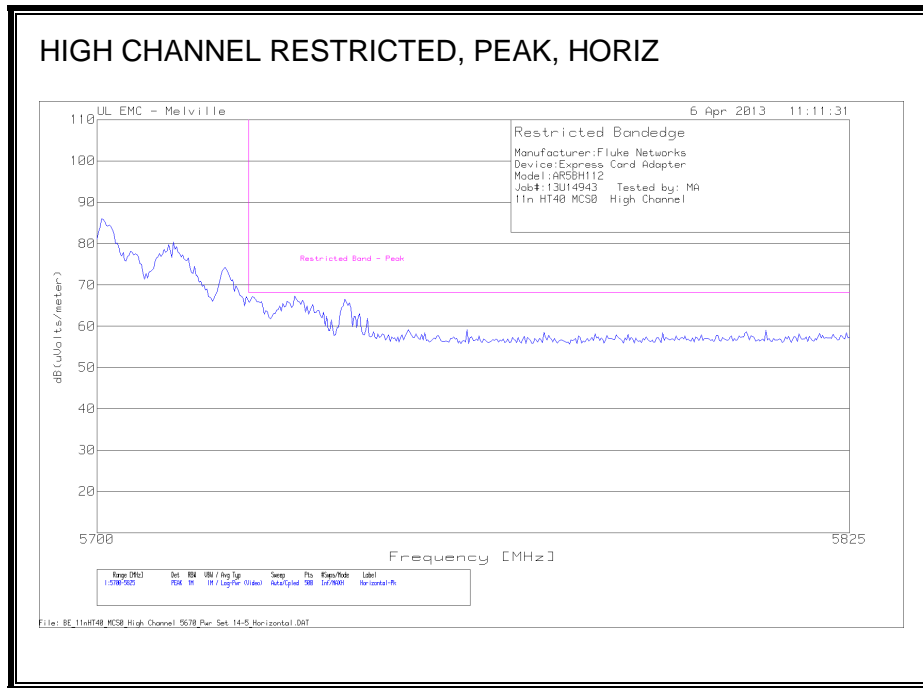
NOTE: No emissions from the transmitter were detected above the system noise floor. Additionally, no peak emissions exist within 6dB of the average limit.

9.2.9. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.6 GHz BAND

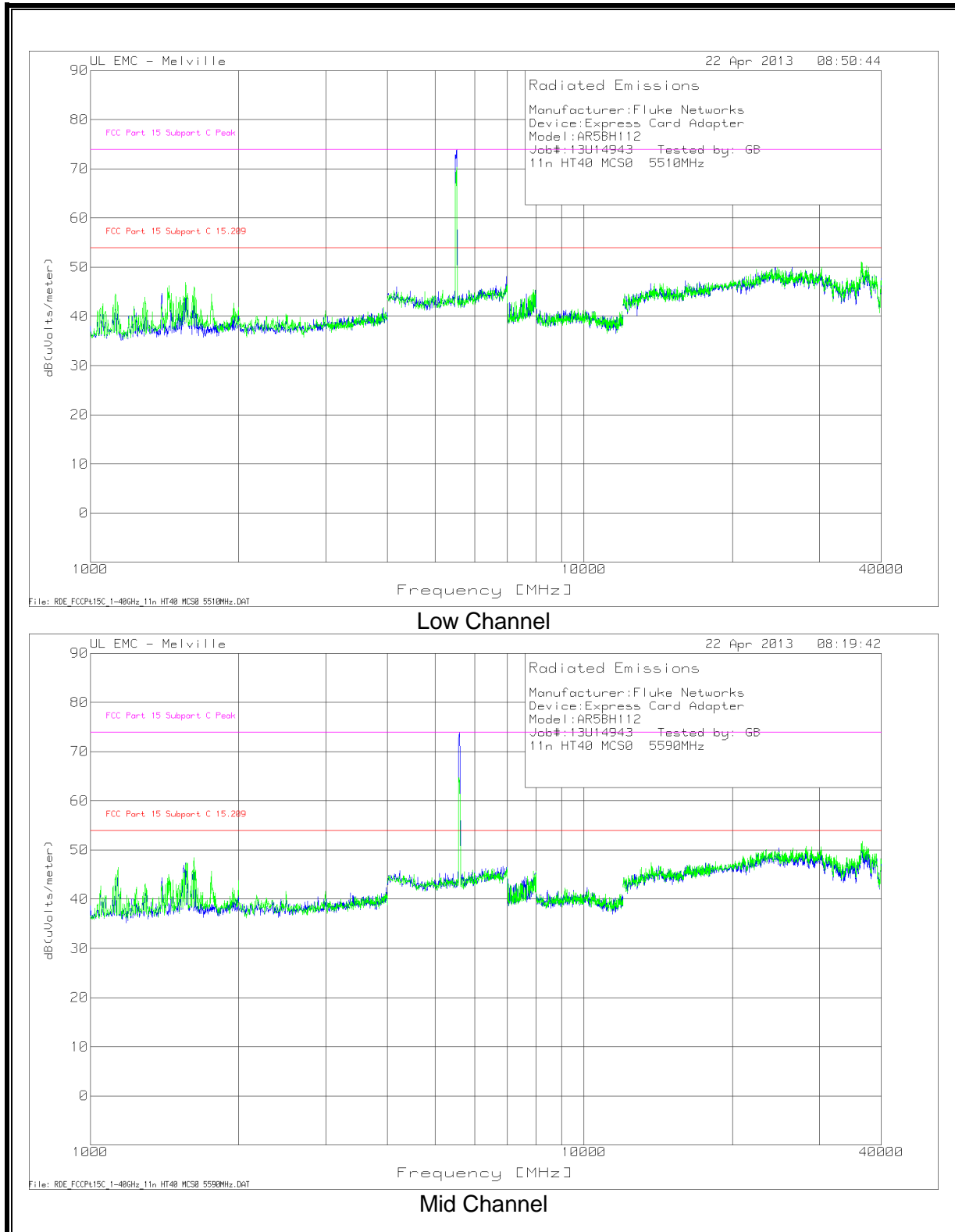
RESTRICTED BANDEDGE (LOW CHANNEL)



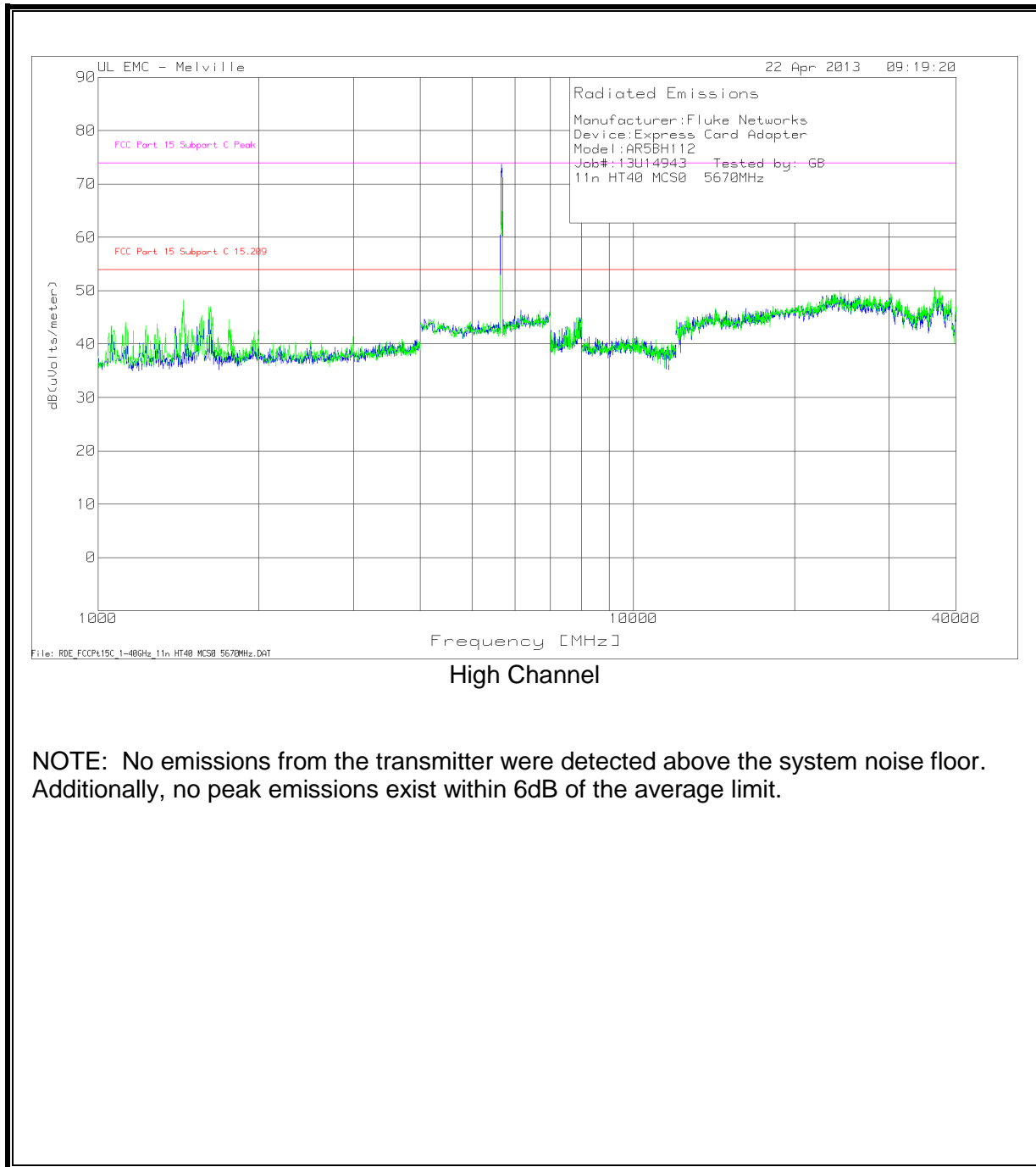
AUTHORIZED BANDEDGE (HIGH CHANNEL)



HARMONICS AND SPURIOUS EMISSIONS

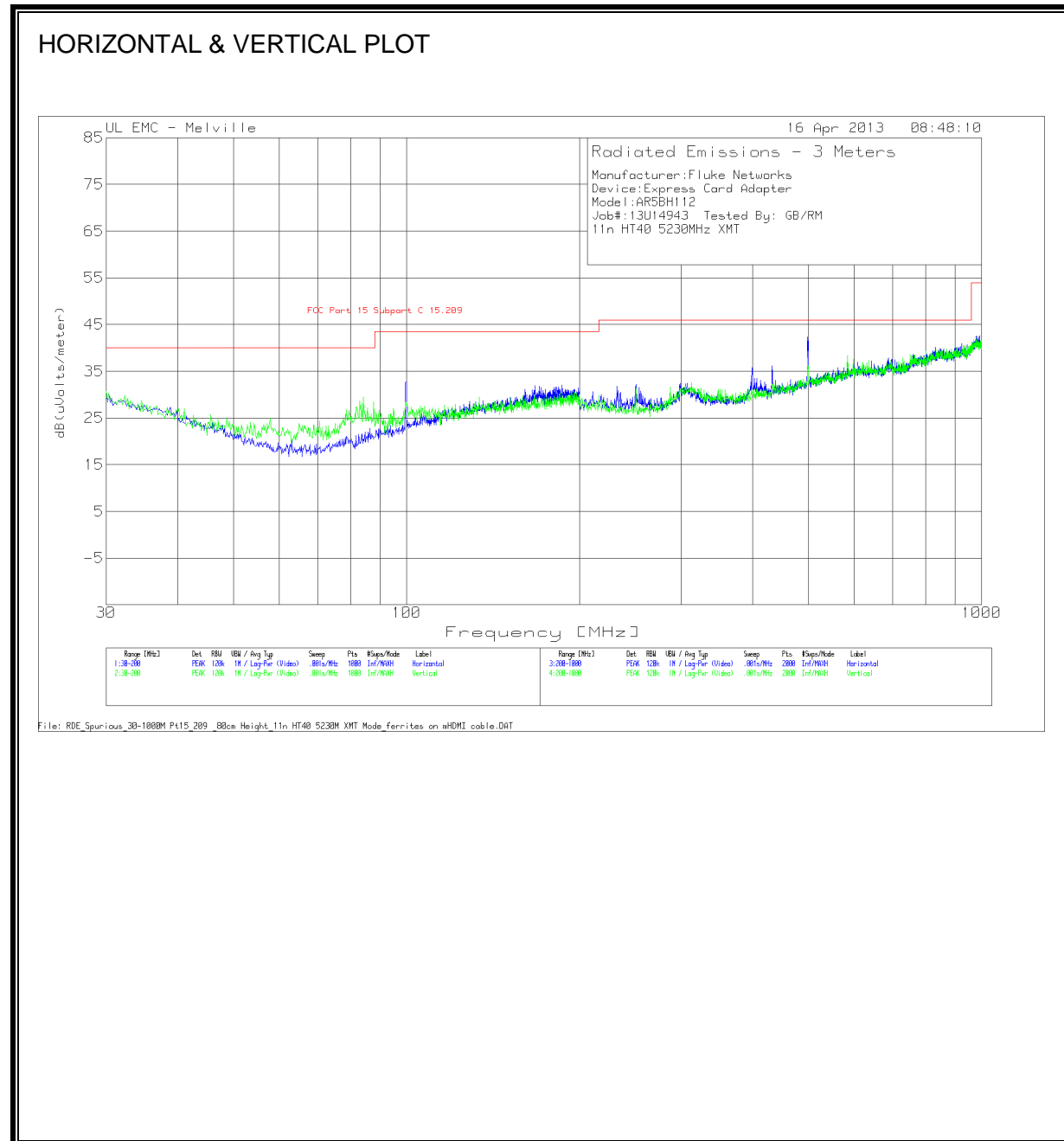


HARMONICS AND SPURIOUS EMISSIONS (CONT)



9.3. WORST-CASE BELOW 1 GHz

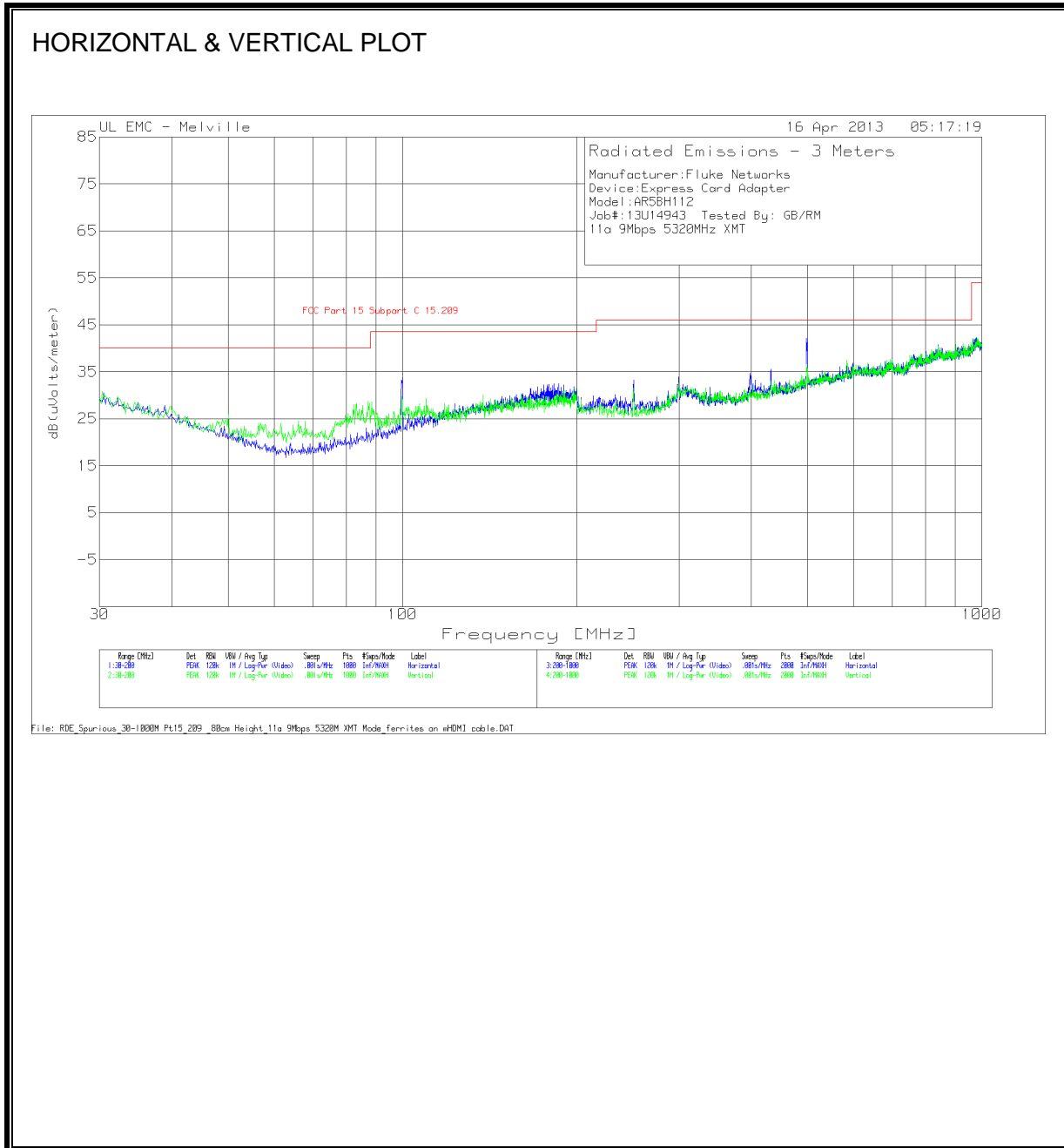
SPURIOUS EMISSIONS 30 TO 1000 MHz (5.2GHZ BAND WORST-CASE CONFIGURATION)



HORIZONTAL & VERTICAL DATA

| | | | | | | | | | | |
|--------------------------------|---------------|----------|----------|-------|------------------|------------------|-------------|--------|---------|----------|
| Manufacturer:Fluke Networks | | | | | | | | | | |
| Device:Express Card Adapter | | | | | | | | | | |
| Model:AR5BH112 | | | | | | | | | | |
| Job#:13U14943 Tested By: GB/RM | | | | | | | | | | |
| 11n HT40 5230MHz XMT | | | | | | | | | | |
| | | | AF-43441 | GL-3M | | FCC Part 15 | | | Azimuth | Height |
| Test Frequency | Meter Reading | Detector | [dB/m] | [dB] | dB(uVolts/meter) | Subpart C 15.209 | Margin (dB) | [Degs] | [cm] | Polarity |
| 99.5792 | 21.27 | QP | 10.7 | 0.4 | 32.37 | 43.5 | -11.13 | 161 | 321 | Horz |
| 84.6313 | 11.59 | QP | 8.6 | 0.3 | 20.49 | 40 | -19.51 | 309 | 143 | Vert |
| | | | AF-44067 | GL-3M | | FCC Part 15 | | | Azimuth | Height |
| Test Frequency | Meter Reading | Detector | [dB/m] | [dB] | dB(uVolts/meter) | Subpart C 15.209 | Margin (dB) | [Degs] | [cm] | Polarity |
| 497.8497 | 20.76 | QP | 17.7 | 1.5 | 39.96 | 46 | -6.04 | 271 | 204 | Horz |
| 432.0106 | 16.43 | QP | 16.4 | 1.5 | 34.33 | 46 | -11.67 | 138 | 222 | Horz |
| 399.7102 | 15.63 | QP | 15.7 | 1.3 | 32.63 | 46 | -13.37 | 143 | 100 | Horz |
| 497.8 | 11.74 | QP | 17.7 | 1.5 | 30.94 | 46 | -15.06 | 4 | 241 | Vert |
| QP - Quasi-Peak detector | | | | | | | | | | |

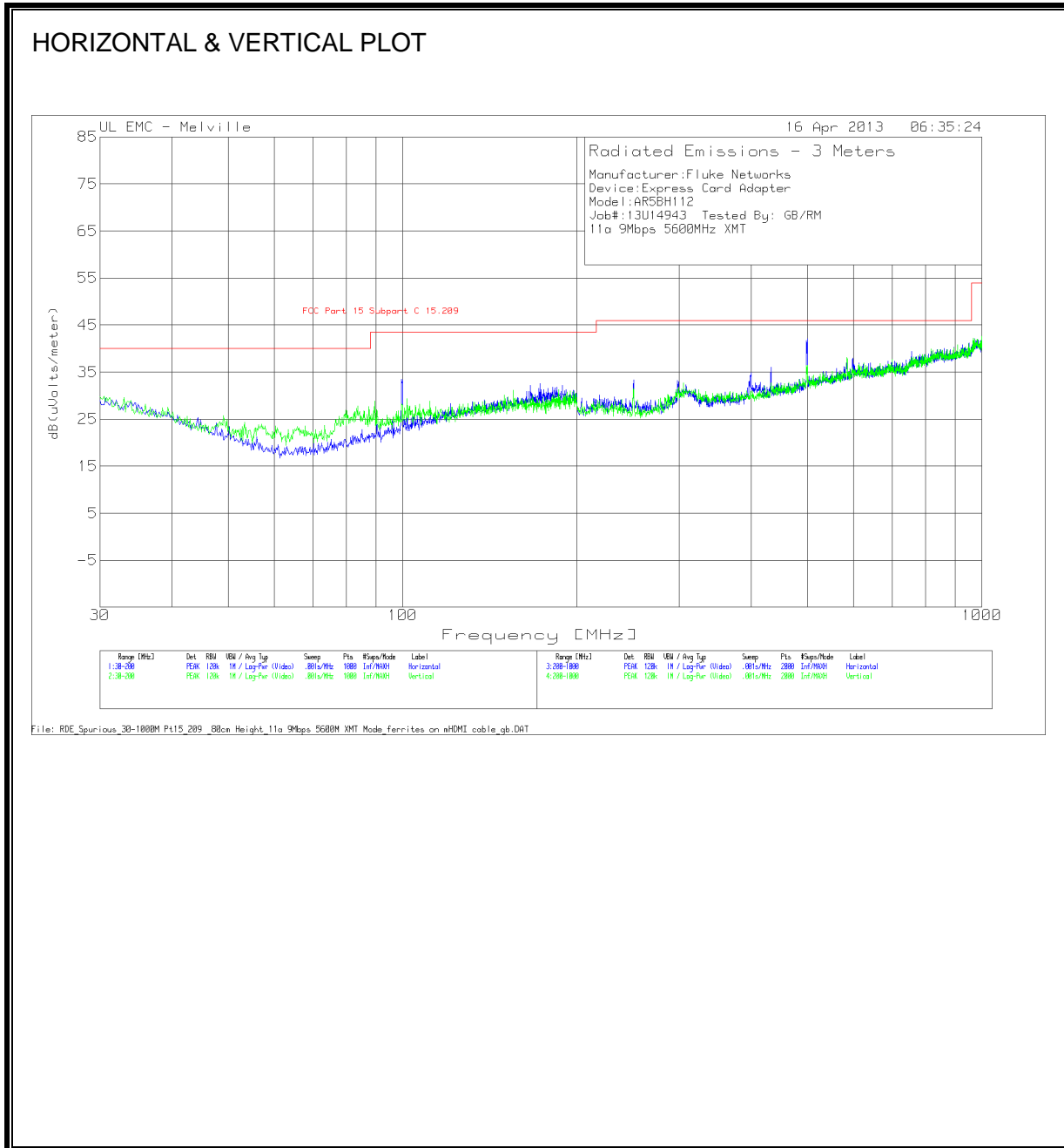
SPURIOUS EMISSIONS 30 TO 1000 MHz (5.3GHZ BAND WORST-CASE CONFIGURATION)



HORIZONTAL & VERTICAL DATA

| | | | | | | | | | | |
|--------------------------------|---------------|----------|----------|-------|------------------|------------------|-------------|----------------|-------------|----------|
| Manufacturer:Fluke Networks | | | | | | | | | | |
| Device:Express Card Adapter | | | | | | | | | | |
| Model:AR5BH112 | | | | | | | | | | |
| Job#:13U14943 Tested By: GB/RM | | | | | | | | | | |
| 11a 9Mbps 5320MHz XMT | | | | | | | | | | |
| | | | AF-43441 | GL-3M | | FCC Part 15 | | | | |
| Test Frequency | Meter Reading | Detector | [dB/m] | [dB] | dB(uVolts/meter) | Subpart C 15.209 | Margin (dB) | Azimuth [Degs] | Height [cm] | Polarity |
| 99.9119 | 21.72 | QP | 10.8 | 0.4 | 32.92 | 43.5 | -10.58 | 156 | 177 | Horz |
| 99.5987 | 18.2 | QP | 10.7 | 0.4 | 29.3 | 43.5 | -14.2 | 241 | 269 | Vert |
| | | | AF-44067 | GL-3M | | FCC Part 15 | | | | |
| Test Frequency | Meter Reading | Detector | [dB/m] | [dB] | dB(uVolts/meter) | Subpart C 15.209 | Margin (dB) | Azimuth [Degs] | Height [cm] | Polarity |
| 398.2804 | 16.39 | QP | 15.6 | 1.4 | 33.39 | 46 | -12.61 | 149 | 100 | Horz |
| 431.9982 | 16.45 | QP | 16.4 | 1.5 | 34.35 | 46 | -11.65 | 148 | 228 | Horz |
| 497.8322 | 20.81 | QP | 17.7 | 1.5 | 40.01 | 46 | -5.99 | 278 | 206 | Horz |
| 497.8186 | 16.05 | QP | 17.7 | 1.5 | 35.25 | 46 | -10.75 | 218 | 203 | Vert |
| QP - Quasi-Peak detector | | | | | | | | | | |

SPURIOUS EMISSIONS 30 TO 1000 MHz (5.6GHZ BAND WORST-CASE CONFIGURATION)



HORIZONTAL & VERTICAL DATA

| | | | | | | | | | | | |
|--------------------------------|---------------|----------|----------|-------|------------------|------------------|-------------|----------------|-------------|----------|--|
| Manufacturer:Fluke Networks | | | | | | | | | | | |
| Device:Express Card Adapter | | | | | | | | | | | |
| Model:AR5BH112 | | | | | | | | | | | |
| Job#:13U14943 Tested By: GB/RM | | | | | | | | | | | |
| 11a 9Mbps 5600MHz XMT | | | | | | | | | | | |
| | | | AF-43441 | GL-3M | | FCC Part 15 | | | | | |
| Test Frequency | Meter Reading | Detector | [dB/m] | [dB] | dB(uVolts/meter) | Subpart C 15.209 | Margin (dB) | Azimuth [Degs] | Height [cm] | Polarity | |
| 99.6202 | 19.69 | QP | 10.7 | 0.4 | 30.79 | 43.5 | -12.71 | 28 | 345 | Horz | |
| 99.8661 | 15.63 | QP | 10.8 | 0.4 | 26.83 | 43.5 | -16.67 | 258 | 111 | Vert | |
| | | | AF-44067 | GL-3M | | FCC Part 15 | | | | | |
| Test Frequency | Meter Reading | Detector | [dB/m] | [dB] | dB(uVolts/meter) | Subpart C 15.209 | Margin (dB) | Azimuth [Degs] | Height [cm] | Polarity | |
| 497.9098 | 20.17 | QP | 17.7 | 1.5 | 39.37 | 46 | -6.63 | 280 | 198 | Horz | |
| 433.01 | 15.61 | QP | 16.4 | 1.5 | 33.51 | 46 | -12.49 | 18 | 198 | Horz | |
| 398.5677 | 11.82 | QP | 15.6 | 1.4 | 28.82 | 46 | -17.18 | 34 | 107 | Horz | |
| 250.41 | 17.84 | QP | 11.9 | 0.9 | 30.64 | 46 | -15.36 | 101 | 110 | Horz | |
| QP - Quasi-Peak detector | | | | | | | | | | | |