



**FCC Part 90.203  
Industry Canada, RSS-119  
Test Report**

**On**

**411 to 470 MHz Transceiver Module  
FCC ID: TNE-400LIC1  
IC: 6145A-400LIC1**

**Customer Name:** Magnetek

**Customer P.O.:** 145756, 146371, 147367

**Revised Test Report No:** R-2148P, Rev. C

**Test Report Revision Date:** August 28, 2014

**Test Technician:** B. Willhauer, D. Fiore, S. MacDonald

**EMC Test Engineer:** Dean F. Landers

**Approved By:** Richard C. Gaynor

**Report Rev. Prepared By:** C. Reitz

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## Technical Information

|                              |                                                         |
|------------------------------|---------------------------------------------------------|
| <b>Report Number:</b>        | R-2148P, Rev C                                          |
| <b>Customer:</b>             | Magnetek                                                |
| <b>Address:</b>              | N49 W13650 Campbell Drive                               |
|                              | Menomonee Falls, WI 53051                               |
| <b>Manufacturer:</b>         | Magnetek                                                |
| <b>Manufacturer Address:</b> | N49 W13650 Campbell Drive                               |
|                              | Menomonee Falls, WI 53051                               |
| <b>Test Sample:</b>          | 411 to 470 MHz Transceiver Module                       |
| <b>Model Number:</b>         | 71000-20400                                             |
| <b>FCC ID:</b>               | TNE-400LIC1                                             |
| <b>IC:</b>                   | 6145A-400LIC1                                           |
| <b>Type (IC):</b>            | Land-Mobile Transmitter and Receiver (27.41 to 960 MHz) |
| <b>Power Requirements:</b>   | 3.3 VDC derived from Host                               |
| <b>Equipment Class:</b>      | TNB                                                     |
| <b>Equipment Use:</b>        | Mobile >20cm                                            |

### Test Specification:

FCC Rules and Regulations Part 90.203

Radio Standards Specification, RSS-119, Issue 11, June 2011

### Test Procedure:

FCC Part 2

ANSI/TIA-603-C-2004

RSS-GEN, Issue 3, December 2010

### Test Facility:

Retlif Testing Laboratories

3131 Detwiler Road

Harleysville, PA 19438

The test methods performed on the 411 to 470 MHz Transceiver Module are shown below:

| FCC Section     | Industry<br>Canada<br>RSS-119 | Industry<br>Canada<br>RSS-GEN | Test Method                             |
|-----------------|-------------------------------|-------------------------------|-----------------------------------------|
| 90.205 / 2.1046 | 5.4                           | N/A                           | RF Power Output                         |
| 90.209 / 2.1049 | 5.5                           | N/A                           | Occupied Bandwidth                      |
| 90.210 / 2.1051 | 5.8                           | N/A                           | Spurious Emissions at Antenna Terminals |
| 90.210 / 2.1053 | 5.8                           | N/A                           | Field Strength of Spurious Radiation    |
| 90.213 / 2.1055 | 5.3                           | N/A                           | Frequency Stability                     |
| N/A             | 5.9                           | N/A                           | Transient Frequency Behavior            |

### **GENERAL REQUIREMENTS**

1. All user accessible controls were adjusted to produce maximum emissions.
2. The unit operates at the following frequencies:

#### **FCC Part 90.203:**

- 411 to 454 MHz
- 456 to 462.5375 MHz
- 462.7375 to 467.5375 MHz
- 467.7375 to 470 MHz

#### **IC RSS-119:**

- 411 to 430 MHz
- 450 to 470 MHz

3. The unit was tested at the following frequencies:

#### **FCC Part 90.203:**

- Channel 0: 411 MHz
- Channel 3: 433 MHz
- Channel 10: 470 MHz

#### **IC RSS-119:**

- Channel 0: 411 MHz
- Channel 5: 450 MHz
- Channel 10: 470 MHz

4. The frequency range was scanned from 9 kHz to 5 GHz. All emissions not reported were more than 20 dB below the specified limit.

\*Note: In accordance with RSS-119, Paragraph 3.2, the Transceiver Module did not contain a data port in the radio terminal.

## Certification and Signatures

We certify that this report is a true representation of the results obtained from the tests of the equipment stated. We further certify that the measurements shown in this report were made in accordance with the procedures indicated and vouch for the qualifications of all Retlif Testing Laboratories personnel taking them.



Dean F. Landers  
EMC Test Engineer  
NVLAP Approved Signatory



Richard C. Gaynor  
Assistant Laboratory Supervisor  
INARTE Certified Engineer EMC-000214-NE  
NVLAP Approved Signatory

### Non-Warranty Provision

The testing services have been performed, findings obtained and reports prepared in accordance with generally accepted laboratory principles and practices. This warranty is in lieu of all others, either expressed or implied.

### Non-Endorsement

This test report contains only findings and results arrived at after employing the specific test procedures and standards listed herein. It is not intended to constitute a recommendation, endorsement or certification of the product or material tested. This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

## **Requirements and Test Results**

### **Requirement:**

#### **FCC Sections 90.205 and 2.1046 RF Power Output**

The RF Power Output of the EUT was measured with the transmitter adjusted for maximum power output. The highest observed power output was measured to be 26.0 dBm (398.1 mW), 11.0 dBm below the limit of 37.0 dBm (5 Watts). The measured power output is in compliance with the requirements specified in section 90.205(o) of the FCC Rules.

#### **RSS-119 Section 5.4 - RF Power Output**

The RF Power Output of the EUT was measured with the transmitter adjusted for maximum power output. The highest observed power output was measured to be 26.0 dBm (398.1 mW), 11.0 dBm below the limit of 37.0 dBm (5 Watts). The measured power output is in compliance with the requirements specified in Section 5.4 of RSS-119.

### **Requirement:**

#### **FCC Sections 90.209 and 2.1049 Occupied Bandwidth**

The Occupied Bandwidth of the transmitter was measured and found to be 10.7 kHz. Utilizing this Bandwidth, the transmitter complied with the requirements for Emissions Mask D contained in section 90.210(b) and the Bandwidth Limitations of section 90.209(b)(5). The Occupied Bandwidth was measured utilizing a 300 Hz resolution bandwidth.

#### **RSS-119 Section 5.5 – Authorized Bandwidth**

The Authorized Bandwidth of the transmitter was measured and found to be 10.7 kHz. Utilizing this Bandwidth, the transmitter complied with the requirements for Emissions Mask D as specified in Table 4, Section 5.8.1 of RSS-119. The Occupied Bandwidth was measured utilizing a 300 Hz resolution bandwidth.

### **Requirement:**

#### **FCC Sections 90.210 and 2.1051 Spurious Emissions at Antenna Terminals**

The Spurious Emissions present at the antenna terminals were measured over the frequency range of 9 kHz to 5 GHz (ten times the operating frequency) in accordance with section 2.1057. Spurious emissions were attenuated at least  $43 + 10 \log P$  (5 Watts), 49.9897 dBm from the carrier as required by sections 90.209 and 90.210.

#### **RSS-119 Section 5.8 – Transmitter – Unwanted Emissions, Conducted**

The Unwanted Emissions present at the antenna terminals were measured over the frequency range of 400 MHz to 5 GHz (ten times the operating frequency). Spurious emissions were attenuated at least  $43 + 10 \log P$  (92.5 mWatts), 19.66 dBm from the carrier as required by RSS-119.

## **Requirements and Test Results (con't)**

### **Requirement:**

#### **FCC Sections 90.210 and 2.1053 Field Strength of Spurious Radiation**

The Field Strength of Spurious Radiation was measured over the frequency range of 9 kHz to 760 MHz. All spurious emissions complied with the requirements of sections 90.209 and 90.210. In addition, spurious digital emissions in the frequency range of 30 to 1000 MHz were found to be in compliance with the requirements for a Class B Digital Device as contained in section 2.1053.

#### **RSS-119 Section 5.8 - Field Strength of Spurious Radiation, Transmitter – Unwanted Emissions, Radiated**

The Field Strength of Spurious Radiation was measured over the frequency range of 9 kHz to 760 MHz. All spurious emissions complied with the requirements of RSS-119. In addition, spurious digital emissions in the frequency range of 30 to 1000 MHz were found to be in compliance with the requirements for an emission Mask B device.

### **Requirement:**

#### **FCC Sections 90.213 and 2.1055 Frequency Stability**

The frequency stability of the transmitter was measured over temperature extremes of - 30° to + 50° C. For varying of the DC power input, the voltage was reduced to the operating end point, which was 3.25 VDC. The EUT carrier frequency was found to remain within the  $\pm 0.05\%$  tolerance as specified in section 90.213(a).

#### **RSS-119 Section 5.3 – Transmitter Frequency Stability**

The frequency stability of the transmitter was measured over temperature extremes of - 30° to + 50° C. For varying of the DC power input, the voltage was reduced to the operating end point, which was 3.25 VDC. The EUT carrier frequency was found to remain within the 5 ppm tolerance as specified in Table 1 of RSS-119.

### **Requirement:**

#### **IC RSS-119, 5.9 – Transient Frequency Behavior**

The frequency error or frequency difference (ie: between the instantaneous and the steady state frequencies) shall not exceed the limits specified in Table 17 of RSS-119. The test was performed in accordance with TIA-603-C.

## **Requirements and Test Results (con't)**

### **FCC Part 2.1091 - RF Exposure Limits**

Transmitters operating under Part 2.1091 are categorically excluded from routine environmental evaluation for demonstrating RF exposure compliance with respect to MPE or SAR limits however per 2.1091(b) must be operated in a manner that ensures the public is not exposed to RF energy levels in excess of the commission's guidelines. The user/installation manual contains the proper cautionary statements and specifies that the device be installed and operated so that a minimum separation distance of 20 cm will be maintained. Based on the transmitter power and maximum antenna gain (see calculation below) the 20 cm separation distance exceeds the calculated distance for acceptable MPE power density levels to meet both the Occupational/Controlled Exposure and the General Population/Uncontrolled Exposure requirements of FCC Part 1.1310. The calculation below uses the more stringent General Population MPE Limits.

### **RF Exposure Limits**

#### **RSS-102, Section 2.5**

This device is exempt from routine evaluation because the separation distance between the user and the device is greater than 20 cm and the e.i.r.p is less than 2.5 watts.

$$S = \frac{PG}{4\pi Dsq}$$

D = Minimum Separation Distance in cm

S = Max allowed Power Density in mW/cmsq =  $f/1500 = 411/1500 = 0.274$

Per 1.1310 For the Frequency of 411-470 MHz S = 0.274 mW/cmsq

Power = Max Power Input to Antenna = 398 mW

Gain = Max Power Gain of Antenna = 2.15 dBi = 1.64 numeric

$$0.274 \text{ mW/cmsq} = \frac{398 \times 1.64}{4 \times (3.14) \times D^2} = \frac{652.72}{12.56 \times D^2}$$

$$D^2 = \frac{398}{12.56 \times 0.274}$$

$$D = \sqrt{115.65} = 10.75 \text{ cm}$$

## Equipment List

### FCC Section 90.205 and 2.1046, RF Power Output

| EN   | Manufacturer         | Description         | Range                | Model No.      | Cal Date             | Due Date  |
|------|----------------------|---------------------|----------------------|----------------|----------------------|-----------|
| 713  | ROHDE & SCHWARZ      | EMI TEST RECEIVER   | 20 Hz - 26.5 GHz     | ESIB26         | 7/10/2013            | 7/31/2014 |
| 713E | MICRO-COAX<br>50U50U | CABLE ASSEMBLY      | 6 FEET               | UFB311A1-0720- | 9/5/2013             | 9/30/2014 |
| 8376 | POWER DESIGNS        | DC POWER SUPPLY     | 0 - 20 VDC, 1.5 Amps | 2015R          | Calibrate Before Use |           |
| 8457 | GENERAL TECHNICS     | Control Computer    |                      |                |                      |           |
| 8559 | NARDA                | Attenuator, Coaxial | 20 dB; DC - 11 GHz   | 768-20         | 6/21/2013            | 6/30/2014 |
| R603 | AGILENT / HP         | SPECTRUM ANALYZER   | 100 Hz - 26.5 GHz    | E7405A;B       | 6/19/2013            | 6/30/2014 |

### RSS-119 Section 5.4 - RF Power Output

| EN   | Manufacturer    | Description         | Range                | Model No. | Cal Date             | Due Date  |
|------|-----------------|---------------------|----------------------|-----------|----------------------|-----------|
| 8054 | FLUKE           | TRUE RMS MULTIMETER |                      | 115       | 8/13/2013            | 8/31/2014 |
| 8376 | POWER DESIGNS   | DC POWER SUPPLY     | 0 - 20 VDC, 1.5 Amps | 2015R     | Calibrate Before Use |           |
| 8556 | NARDA MICROWAVE | Attenuator, Coaxial | 10 dB; DC - 11 GHz   | 768-10    | 6/3/2014             | 6/30/2015 |
| R650 | AGILENT / HP    | SPECTRUM ANALYZER   | 100 Hz - 26.5 GHz    | E7405A    | 3/27/2014            | 3/31/2015 |

### FCC Section 90.2095 and 2.1049, Occupied Bandwidth

| EN   | Manufacturer       | Description         | Range                | Model No. | Cal Date             | Due Date  |
|------|--------------------|---------------------|----------------------|-----------|----------------------|-----------|
| 8054 | FLUKE              | TRUE RMS MULTIMETER |                      | 115       | 8/13/2013            | 8/31/2014 |
| 8376 | POWER DESIGNS      | DC POWER SUPPLY     | 0 - 20 VDC, 1.5 Amps | 2015R     | Calibrate Before Use |           |
| 8556 | NARDA<br>MICROWAVE | Attenuator, Coaxial | 10 dB; DC - 11 GHz   | 768-10    | 6/21/2013            | 6/30/2014 |
| R603 | AGILENT / HP       | SPECTRUM ANALYZER   | 100 Hz - 26.5 GHz    | E7405A;B  | 6/19/2013            | 6/30/2014 |

### RSS-119 Section 5.5 – Authorized Bandwidth

| EN   | Manufacturer    | Description         | Range                | Model No. | Cal Date             | Due Date  |
|------|-----------------|---------------------|----------------------|-----------|----------------------|-----------|
| 8054 | FLUKE           | TRUE RMS MULTIMETER |                      | 115       | 8/13/2013            | 8/31/2014 |
| 8376 | POWER DESIGNS   | DC POWER SUPPLY     | 0 - 20 VDC, 1.5 Amps | 2015R     | Calibrate Before Use |           |
| 8556 | NARDA MICROWAVE | Attenuator, Coaxial | 10 dB; DC - 11 GHz   | 768-10    | 6/3/2014             | 6/30/2015 |
| R650 | AGILENT / HP    | SPECTRUM ANALYZER   | 100 Hz - 26.5 GHz    | E7405A    | 3/27/2014            | 3/31/2015 |

### FCC Section 90.210 and 2.1051, Spurious Emissions at Antenna Terminals

| EN   | Manufacturer       | Description         | Range                | Model No. | Cal Date             | Due Date  |
|------|--------------------|---------------------|----------------------|-----------|----------------------|-----------|
| 8054 | FLUKE              | TRUE RMS MULTIMETER |                      | 115       | 8/13/2013            | 8/31/2014 |
| 8376 | POWER DESIGNS      | DC POWER SUPPLY     | 0 - 20 VDC, 1.5 Amps | 2015R     | Calibrate Before Use |           |
| 8556 | NARDA<br>MICROWAVE | Attenuator, Coaxial | 10 dB; DC - 11 GHz   | 768-10    | 6/21/2013            | 6/30/2014 |
| R603 | AGILENT / HP       | SPECTRUM ANALYZER   | 100 Hz - 26.5 GHz    | E7405A;B  | 6/19/2013            | 6/30/2014 |

## Equipment List

### RSS-119 Section 5.8 – Transmitter – Unwanted Emissions, Conducted

| EN   | Manufacturer       | Description         | Range                | Model No. | Cal Date             | Due Date  |
|------|--------------------|---------------------|----------------------|-----------|----------------------|-----------|
| 8054 | FLUKE              | TRUE RMS MULTIMETER |                      | 115       | 8/13/2013            | 8/31/2014 |
| 8376 | POWER DESIGNS      | DC POWER SUPPLY     | 0 - 20 VDC, 1.5 Amps | 2015R     | Calibrate Before Use |           |
| 8556 | NARDA<br>MICROWAVE | Attenuator, Coaxial | 10 dB; DC - 11 GHz   | 768-10    | 6/21/2013            | 6/30/2014 |
| R603 | AGILENT / HP       | SPECTRUM ANALYZER   | 100 Hz - 26.5 GHz    | E7405A;B  | 6/19/2013            | 6/30/2014 |

### FCC Section 90.210 and 2.1053, Field Strength of Spurious Radiation

| EN    | Manufacturer   | Description           | Range                | Model No.     | Cal Date             | Due Date  |
|-------|----------------|-----------------------|----------------------|---------------|----------------------|-----------|
| 8016  | EMCO           | ANTENNA               |                      | 3146          | 7/29/2013            | 1/31/2015 |
| 8300  | RETLIF         | TEST SITE ATTENUATION | 3/10 Meter OATS      | RPA           | 8/27/2013            | 8/31/2014 |
| 8300C | UNKNOWN        | 3/10 METER CABLE      | 3/10 METER           | 3 METER CABLE | 9/4/2013             | 9/30/2014 |
| 8376  | POWER DESIGNS  | DC POWER SUPPLY       | 0 - 20 VDC, 1.5 Amps | 2015R         | Calibrate Before Use |           |
| 8392  | IFR / AEROFLEX | SIGNAL GENERATOR      | 9 kHz - 2.5 GHz      | 2025          | 1/27/2014            | 1/31/2015 |
| 8433  | ETS LINDGREN   | BICONILOG             | 20 - 6000 MHz        | 3142D         | 3/10/2014            | 9/30/2015 |
| R603  | AGILENT / HP   | SPECTRUM ANALYZER     | 100 Hz - 26.5 GHz    | E7405A;B      | 6/19/2013            | 6/30/2014 |

### RSS-119 Section 5.8 - Field Strength of Spurious Radiation, Transmitter – Unwanted Emissions, Radiated

**May 27-28, 2014**

| EN    | Manufacturer   | Description           | Range                | Model No.     | Cal Date             | Due Date  |
|-------|----------------|-----------------------|----------------------|---------------|----------------------|-----------|
| 8016  | EMCO           | ANTENNA               |                      | 3146          | 7/29/2013            | 1/31/2015 |
| 8300  | RETLIF         | TEST SITE ATTENUATION | 3/10 Meter OATS      | RPA           | 8/27/2013            | 8/31/2014 |
| 8300C | UNKNOWN        | 3/10 METER CABLE      | 3/10 METER           | 3 METER CABLE | 9/4/2013             | 9/30/2014 |
| 8376  | POWER DESIGNS  | DC POWER SUPPLY       | 0 - 20 VDC, 1.5 Amps | 2015R         | Calibrate Before Use |           |
| 8392  | IFR / AEROFLEX | SIGNAL GENERATOR      | 9 kHz - 2.5 GHz      | 2025          | 1/27/2014            | 1/31/2015 |
| 8433  | ETS LINDGREN   | BICONILOG             | 20 - 6000 MHz        | 3142D         | 3/10/2014            | 9/30/2015 |
| R603  | AGILENT / HP   | SPECTRUM ANALYZER     | 100 Hz - 26.5 GHz    | E7405A;B      | 6/19/2013            | 6/30/2014 |

**August 5, 2014**

| EN    | Manufacturer   | Description           | Range                | Model No.     | Cal Date             | Due Date  |
|-------|----------------|-----------------------|----------------------|---------------|----------------------|-----------|
| 8016  | EMCO           | ANTENNA               |                      | 3146          | 7/29/2013            | 1/31/2015 |
| 8300  | RETLIF         | TEST SITE ATTENUATION | 3/10 Meter OATS      | RPA           | 8/27/2013            | 8/31/2014 |
| 8300C | UNKNOWN        | 3/10 METER CABLE      | 3/10 METER           | 3 METER CABLE | 9/4/2013             | 9/30/2014 |
| 8376  | POWER DESIGNS  | DC POWER SUPPLY       | 0 - 20 VDC, 1.5 Amps | 2015R         | Calibrate Before Use |           |
| 8392  | IFR / AEROFLEX | SIGNAL GENERATOR      | 9 kHz - 2.5 GHz      | 2025          | 1/27/2014            | 1/31/2015 |
| 8433  | ETS LINDGREN   | BICONILOG             | 20 - 6000 MHz        | 3142D         | 3/10/2014            | 9/30/2015 |
| R650  | AGILENT / HP   | SPECTRUM ANALYZER     | 100 Hz - 26.5 GHz    | E7405A        | 3/27/2014            | 3/31/2015 |

## Equipment List

### FCC Section 90.213 and 2.1055, Frequency Stability - Temperature Variation

| EN   | Manufacturer            | Description             | Range             | Model No.       | Cal Date             | Due Date   |
|------|-------------------------|-------------------------|-------------------|-----------------|----------------------|------------|
| 1565 | OMEGA                   | Indicator, Thermocouple | -150 - 400 deg. C | DP41-TC-GN-MDSS | 11/20/2013           | 11/30/2014 |
| 8320 | ASSOCD ENVIRON<br>SYS   | TEMPERATURE CHAMBER     | -50 to 150°C      | ZFD-531         | 9/16/2013            | 9/30/2014  |
| 8525 | POWER DESIGNS<br>SUPPLY | TRANSISTORIZED POWER    | 1-32VDC, 0-600ma  | 3206            | Calibrate Before Use |            |
| 8590 | EDI                     | Counter, Frequency      | 10 Hz - 18 GHz    | 545CCN1402      | 4/16/2014            | 4/30/2015  |

### RSS-119 Section 5.3 – Transmitters with Output Power not Exceeding 120 mW

| EN   | Manufacturer            | Description             | Range             | Model No.       | Cal Date             | Due Date   |
|------|-------------------------|-------------------------|-------------------|-----------------|----------------------|------------|
| 1565 | OMEGA                   | Indicator, Thermocouple | -150 - 400 deg. C | DP41-TC-GN-MDSS | 11/20/2013           | 11/30/2014 |
| 8320 | ASSOCD ENVIRON<br>SYS   | TEMPERATURE CHAMBER     | -50 to 150°C      | ZFD-531         | 9/16/2013            | 9/30/2014  |
| 8525 | POWER DESIGNS<br>SUPPLY | TRANSISTORIZED POWER    | 1-32VDC, 0-600ma  | 3206            | Calibrate Before Use |            |
| 8590 | EDI                     | Counter, Frequency      | 10 Hz - 18 GHz    | 545CCN1402      | 4/16/2014            | 4/30/2015  |

### IC RSS-119, 5.9, Transient Frequency Behavior

| EN    | Manufacturer    | Description                  | Range                | Model No. | Cal Date             | Due Date  |
|-------|-----------------|------------------------------|----------------------|-----------|----------------------|-----------|
| 1033  | MARCONI         | SIGNAL GENERATOR             | 9 kHz - 2.4 GHz      | 2024      | 8/23/2013            | 8/31/2014 |
| 8306  | BOONTON         | POWER METER                  | 10 kHz - 100 GHz     | 4232A     | 7/21/2014            | 7/31/2015 |
| 8376  | POWER DESIGNS   | DC POWER SUPPLY              | 0 - 20 VDC, 1.5 Amps | 2015R     | Calibrate Before Use |           |
| 8381A | BOONTON         | POWER SENSOR                 | 10 kHz - 8 GHz       | 51011-EMC | 4/30/2014            | 4/30/2015 |
| 8388  | TEKTRONIX       | OSCILLOSCOPE                 | 350 MHz              | DPO 4032  | 7/15/2014            | 7/31/2015 |
| 8404  | MINI CIRCUITS   | POWER SPLITTER               | 0.2-1000 MHz         | ZFSC-2-4  | 7/18/2014            | 7/31/2015 |
| 8493  | NARDA           | MED PWR ATTEN                | DC-4.0 GHZ, 20W      | 766-10    | 6/3/2014             | 6/30/2015 |
| 8558  | NARDA MICROWAVE | Attenuator, Coaxial          | 20 dB; DC - 11 GHz   | 768-20    | 6/3/2014             | 6/30/2015 |
| 8591  | AR              | Directional Coupler, Coaxial | 80 MHz - 1 GHz       | DC6180A   | 5/13/2014            | 5/31/2015 |
| R650  | AGILENT / HP    | SPECTRUM ANALYZER            | 100 Hz - 26.5 GHz    | E7405A    | 3/27/2014            | 3/31/2015 |

### FCC Section 15.107/15.207(a) - Conducted Limits

| EN   | Manufacturer      | Description                             | Range           | Model No.       | Cal Date   | Due Date   |
|------|-------------------|-----------------------------------------|-----------------|-----------------|------------|------------|
| 8079 | ROHDE & SCHWARZ   | EMI TEST RECEIVER                       |                 | ESH3            | 6/18/2013  | 6/30/2014  |
| 8100 | NARDA             | 20DB ATTENUATOR                         | 10 kHz-11 GHz   | 768-20          | 6/10/2013  | 6/30/2014  |
| 8194 | SOLAR ELECTRONICS | LINE IMPEDANCE<br>STABILIZATION NETWORK | 10 kHz - 30 MHz | 8028-50-TS-24-B | 2/5/2014   | 2/28/2015  |
| 8195 | SOLAR ELECTRONICS | LINE IMPEDANCE<br>STABILIZATION NETWORK | 10 kHz - 30 MHz | 8028-50-TS-24-B | 2/5/2014   | 2/28/2015  |
| 8575 | RIGOL             | Analyzer, Spectrum                      | 9 kHz - 1.5 GHz | DSA815-TG       | 12/16/2013 | 12/31/2014 |

## Equipment List

### IC RSS-GEN, 7.2.2 - Transmitter and Receiver AC Power Lines Conducted Emission Limits

| EN   | Manufacturer      | Description                          | Range           | Model No.       | Cal Date   | Due Date   |
|------|-------------------|--------------------------------------|-----------------|-----------------|------------|------------|
| 8079 | ROHDE & SCHWARZ   | EMI TEST RECEIVER                    |                 | ESH3            | 6/18/2013  | 6/30/2014  |
| 8100 | NARDA             | 20DB ATTENUATOR                      | 10 kHz-11 GHz   | 768-20          | 6/10/2013  | 6/30/2014  |
| 8194 | SOLAR ELECTRONICS | LINE IMPEDANCE STABILIZATION NETWORK | 10 kHz - 30 MHz | 8028-50-TS-24-B | 2/5/2014   | 2/28/2015  |
| 8195 | SOLAR ELECTRONICS | LINE IMPEDANCE STABILIZATION NETWORK | 10 kHz - 30 MHz | 8028-50-TS-24-B | 2/5/2014   | 2/28/2015  |
| 8575 | RIGOL             | Analyzer, Spectrum                   | 9 kHz - 1.5 GHz | DSA815-TG       | 12/16/2013 | 12/31/2014 |

### FCC Section 15.109(a) - Receiver Radiated Emissions

| EN                 | Manufacturer      | Description           | Range                | Model No.       | Cal Date             | Due Date  |
|--------------------|-------------------|-----------------------|----------------------|-----------------|----------------------|-----------|
| 8080<br>12/31/2014 | ROHDE & SCHWARZ   | EMI TEST RECEIVER     | 20-1300 MHz          | 354-3000.56ESVP | 12/16/2013           |           |
| 8300               | RETLIF            | TEST SITE ATTENUATION | 3/10 Meter OATS      | RPA             | 8/27/2013            | 8/31/2014 |
| 8300C              | UNKNOWN           | 3/10 METER CABLE      | 3/10 METER           | 3 METER CABLE   | 9/4/2013             | 9/30/2014 |
| 8376               | POWER DESIGNS     | DC POWER SUPPLY       | 0 - 20 VDC, 1.5 Amps | 2015R           | Calibrate Before Use |           |
| 8411               | SONOMA INSTRUMENT | PRE-AMPLIFIER         | 9 kHz - 1 GHz        | 310N            | 9/4/2013             | 9/30/2014 |
| 8433               | ETS LINDGREN      | BICONILOG             | 20 - 6000 MHz        | 3142D           | 3/10/2014            | 9/30/2015 |
| R603               | AGILENT / HP      | SPECTRUM ANALYZER     | 100 Hz - 26.5 GHz    | E7405A;B        | 6/19/2013            | 6/30/2014 |

### IC RSS-GEN, 7.2.3 - Receiver Spurious Emission Limits

| EN    | Manufacturer      | Description           | Range                | Model No.       | Cal Date             | Due Date   |
|-------|-------------------|-----------------------|----------------------|-----------------|----------------------|------------|
| 8080  | ROHDE & SCHWARZ   | EMI TEST RECEIVER     | 20-1300 MHz          | 354-3000.56ESVP | 12/16/2013           | 12/31/2014 |
| 8300  | RETLIF            | TEST SITE ATTENUATION | 3/10 Meter OATS      | RPA             | 8/27/2013            | 8/31/2014  |
| 8300C | UNKNOWN           | 3/10 METER CABLE      | 3/10 METER           | 3 METER CABLE   | 9/4/2013             | 9/30/2014  |
| 8376  | POWER DESIGNS     | DC POWER SUPPLY       | 0 - 20 VDC, 1.5 Amps | 2015R           | Calibrate Before Use |            |
| 8411  | SONOMA INSTRUMENT | PRE-AMPLIFIER         | 9 kHz - 1 GHz        | 310N            | 9/4/2013             | 9/30/2014  |
| 8433  | ETS LINDGREN      | BICONILOG             | 20 - 6000 MHz        | 3142D           | 3/10/2014            | 9/30/2015  |
| R650  | AGILENT / HP      | SPECTRUM ANALYZER     | 100 Hz - 26.5 GHz    | E7405A;B        | 3/27/2014            | 3/31/2015  |

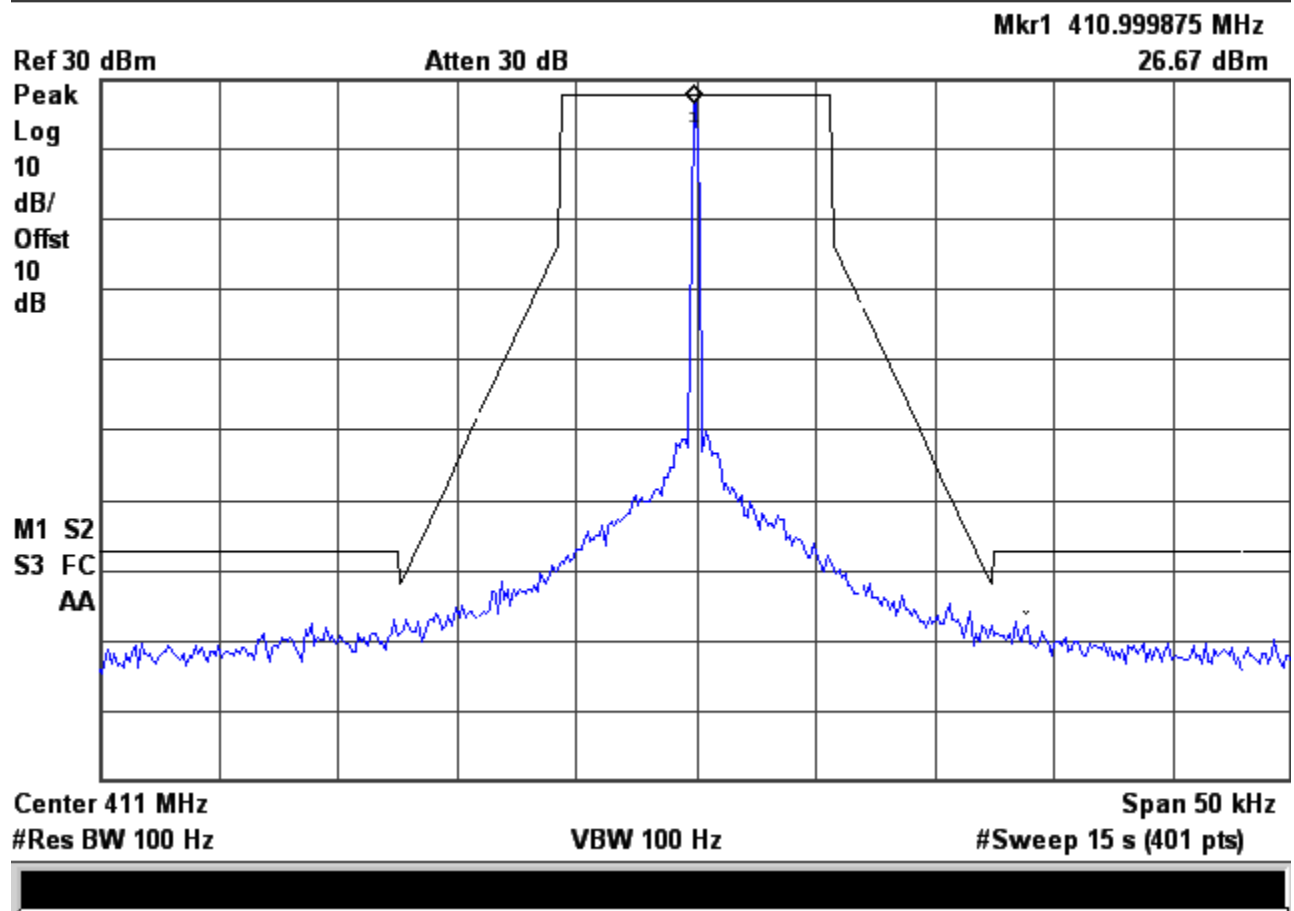
**FCC Sections 90.205 and 2.1046, RF Power Output  
Test Data**

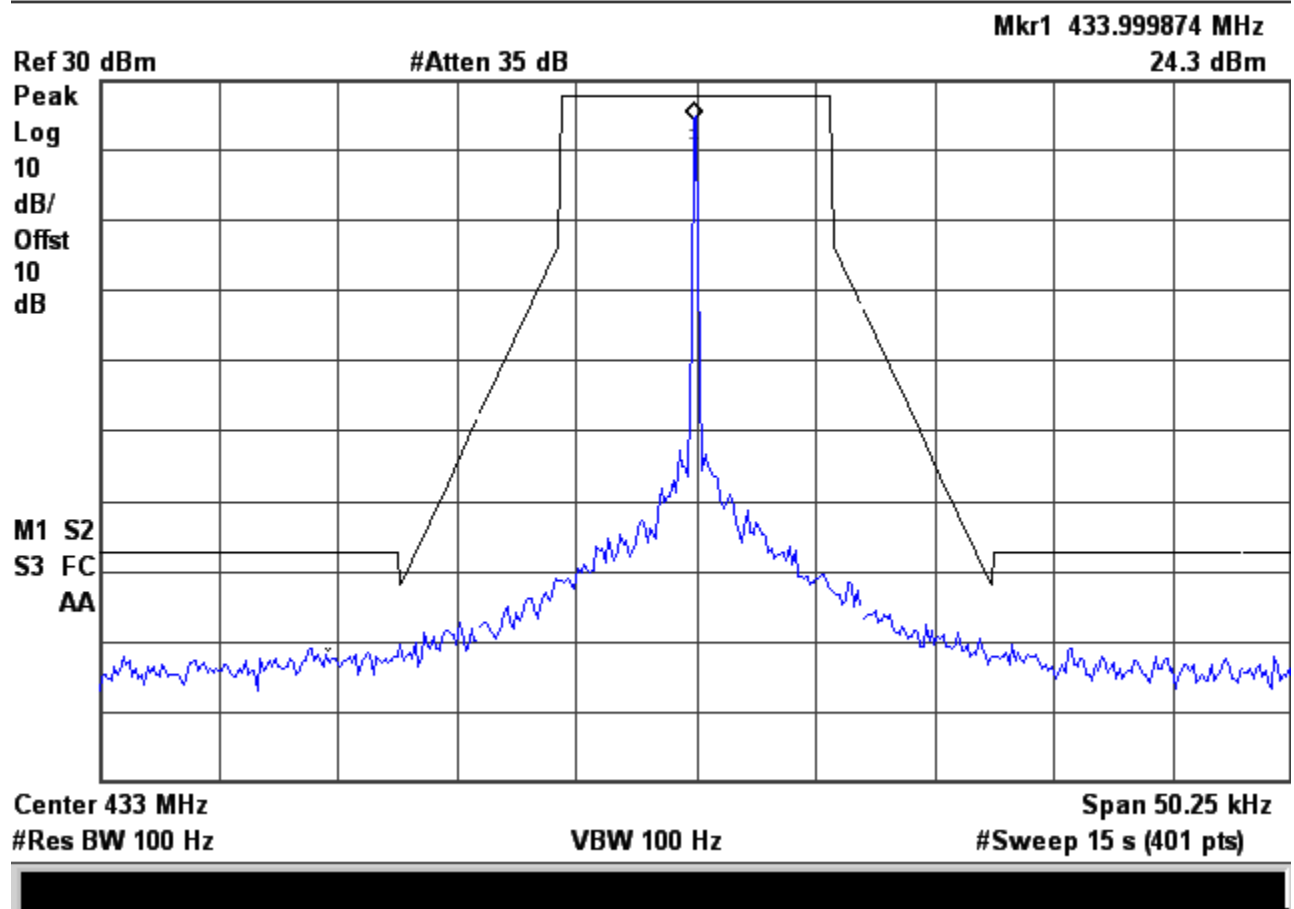


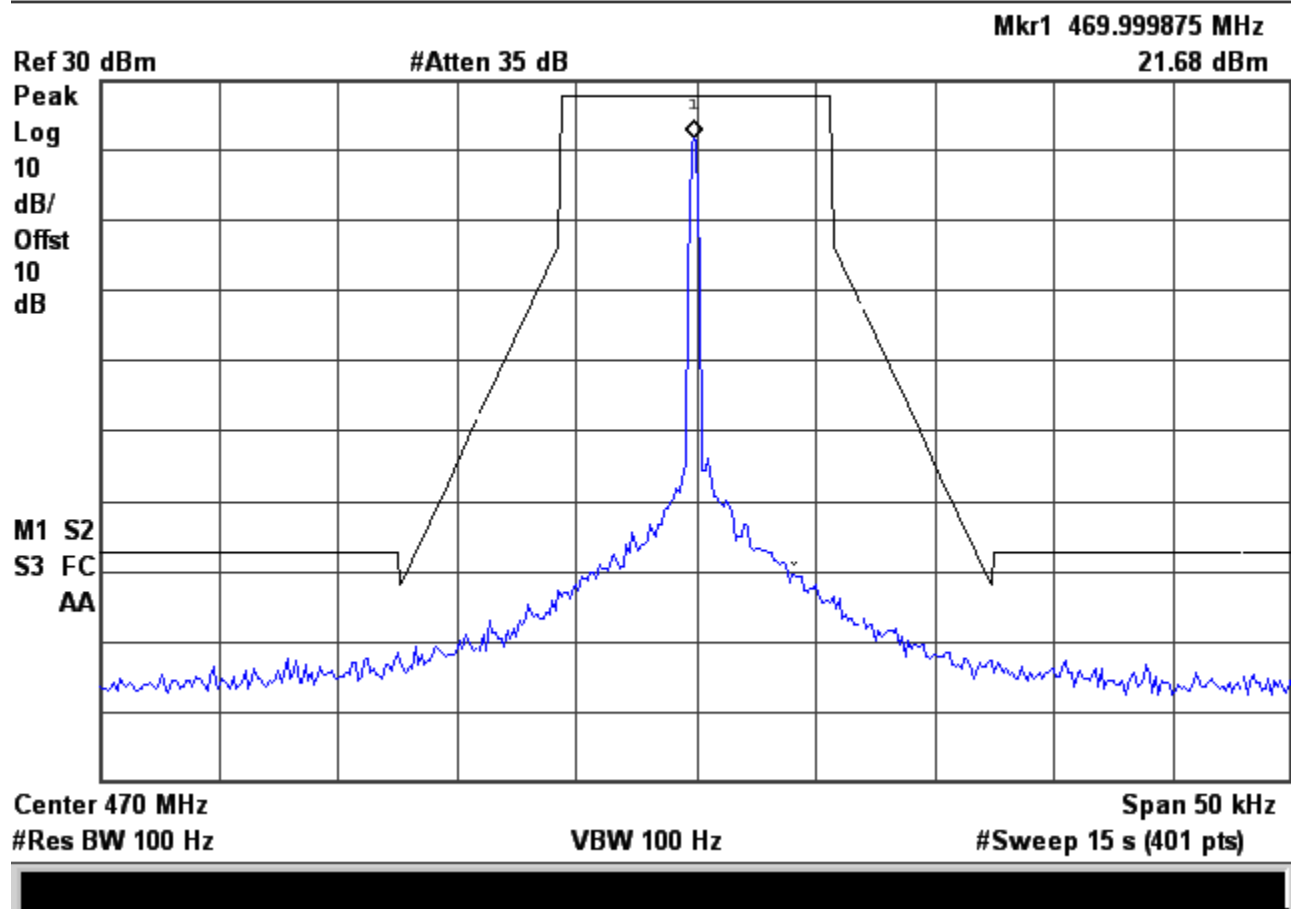
**RSS-119 Section 5.4 - RF Power Output  
Test Data**

[illegible]

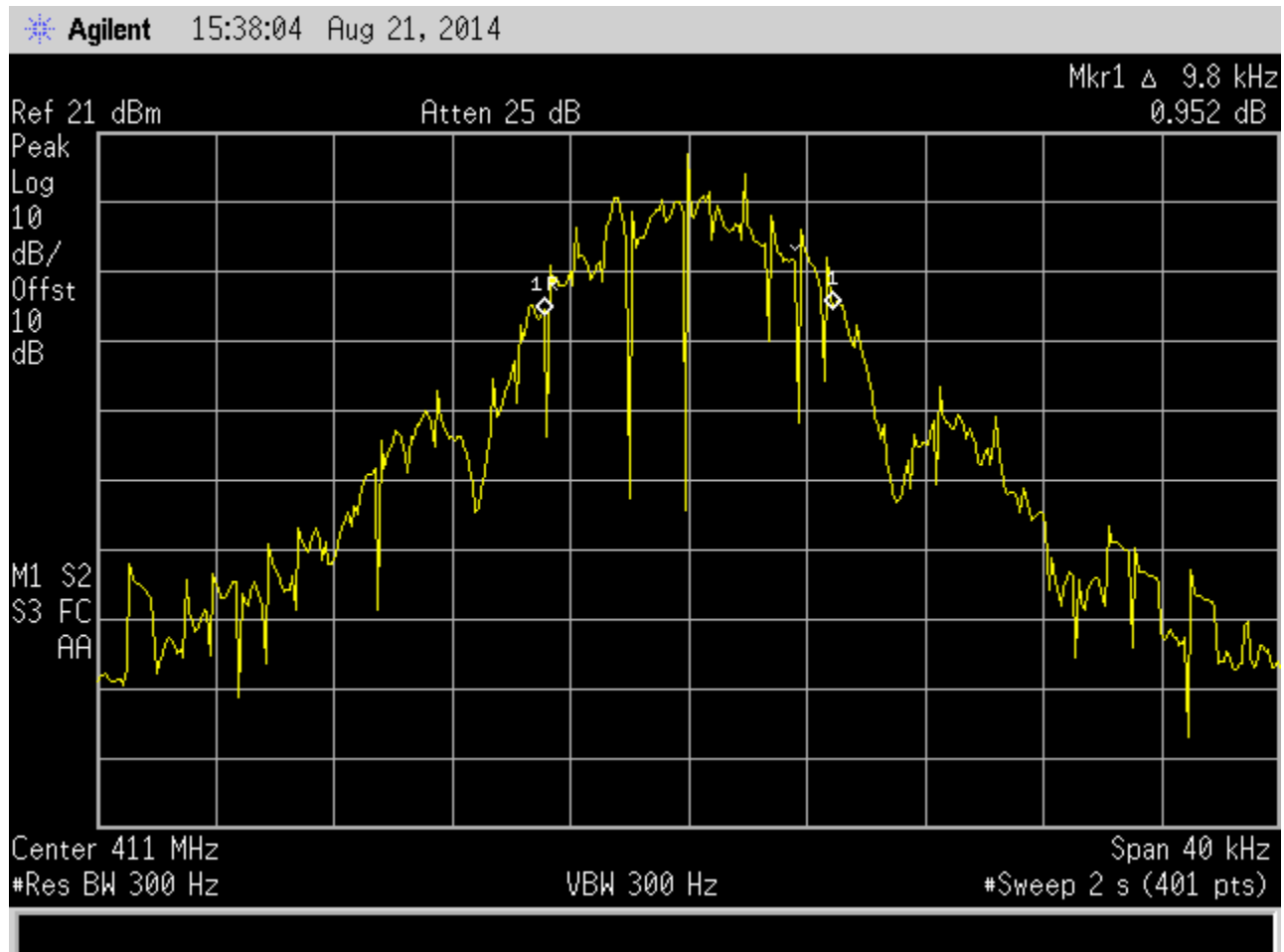
**FCC Part 90 Section 2.1049 Occupied Bandwidth  
Test Data**

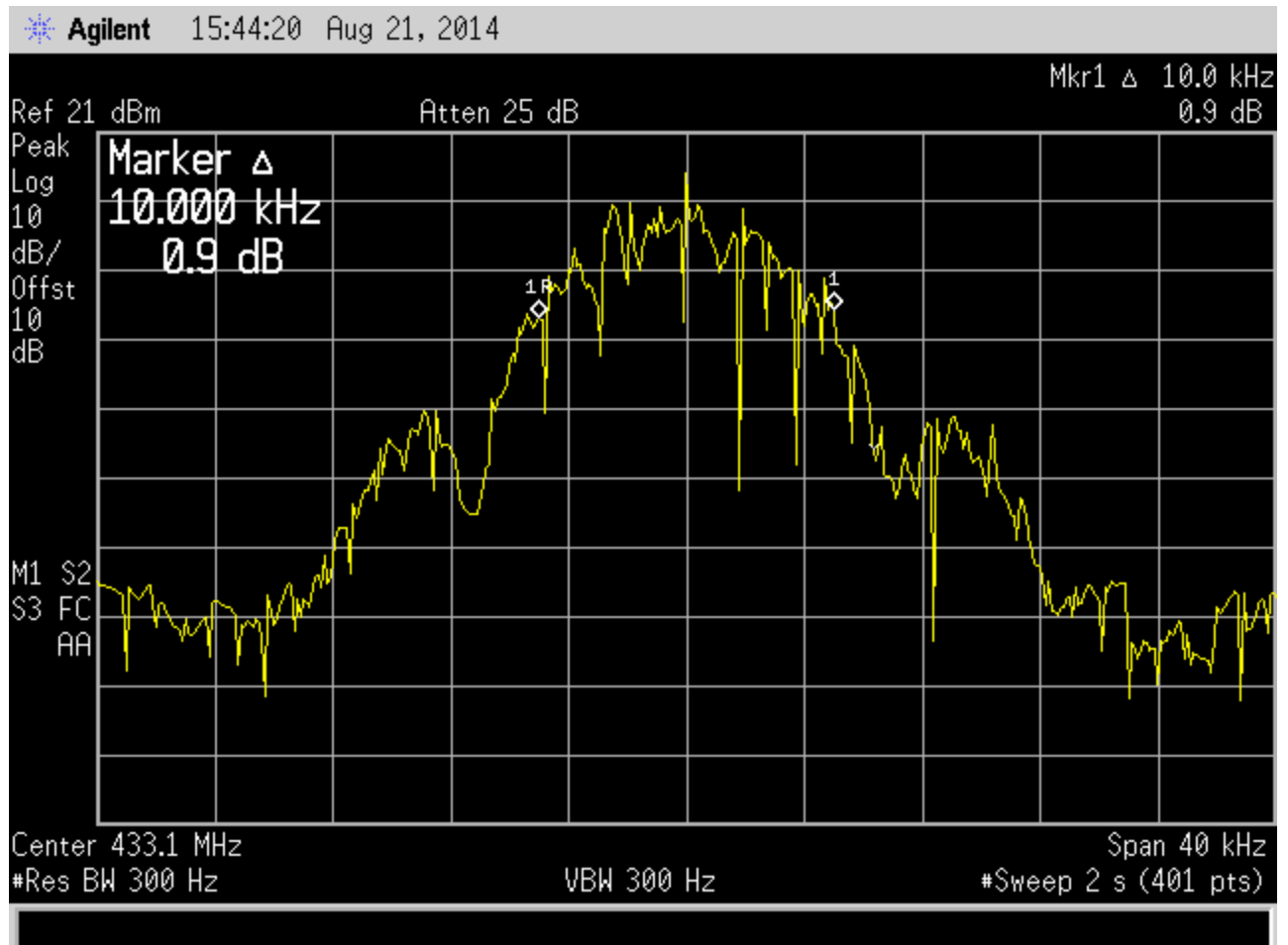


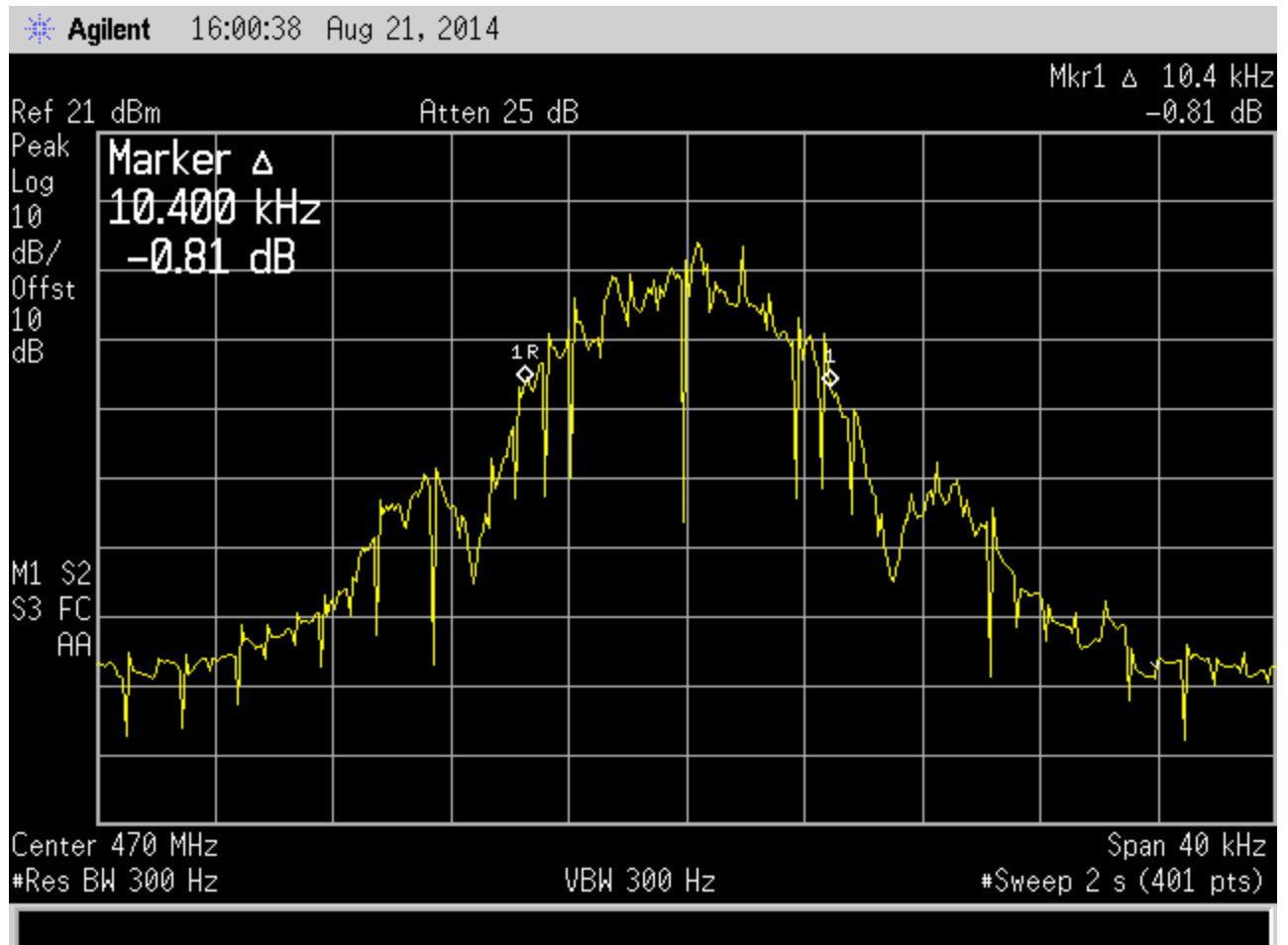




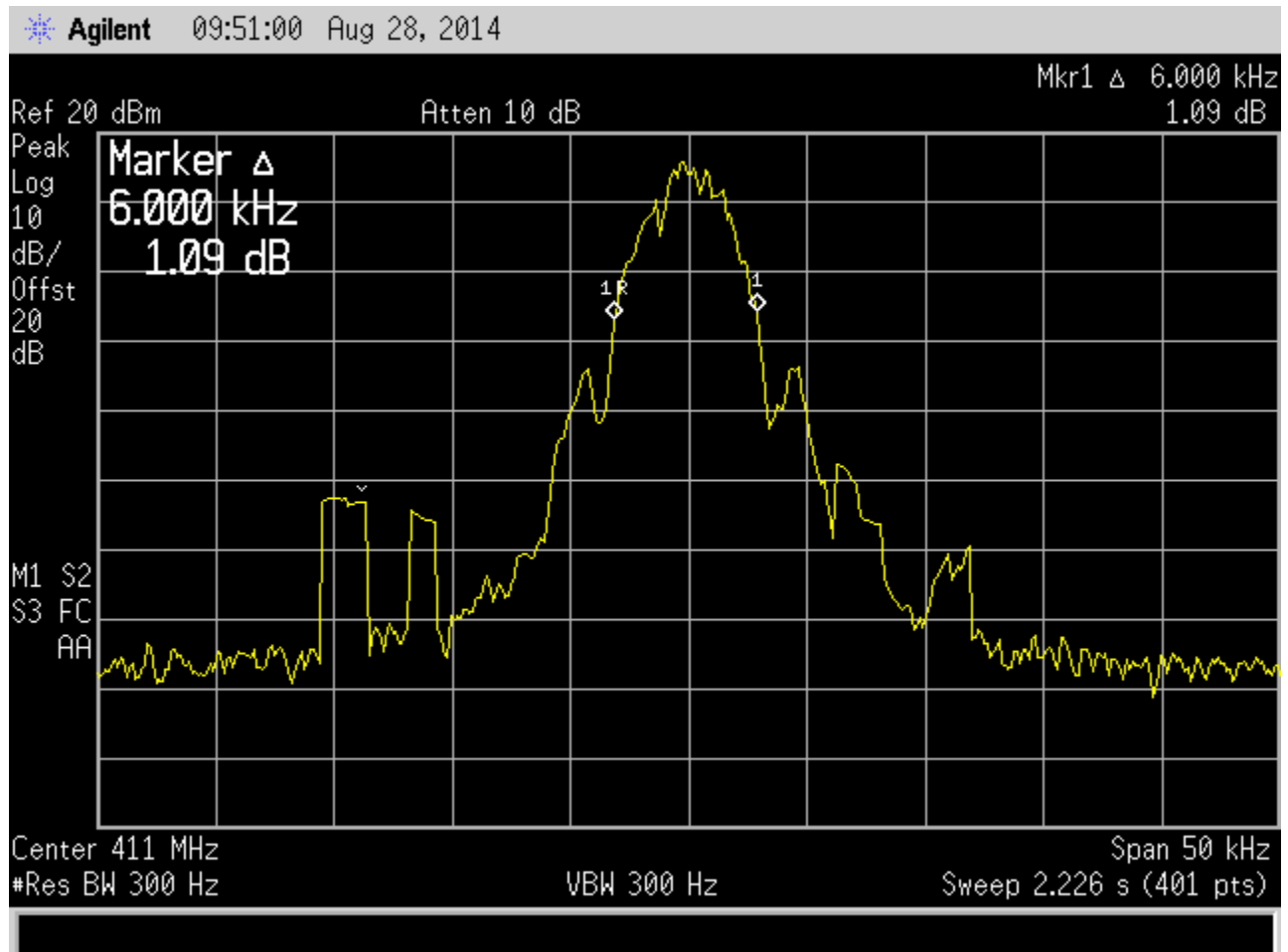
**FCC Part 90 Section 2.1049 Occupied Bandwidth  
12.5 kHz Bandwidth Test Data**

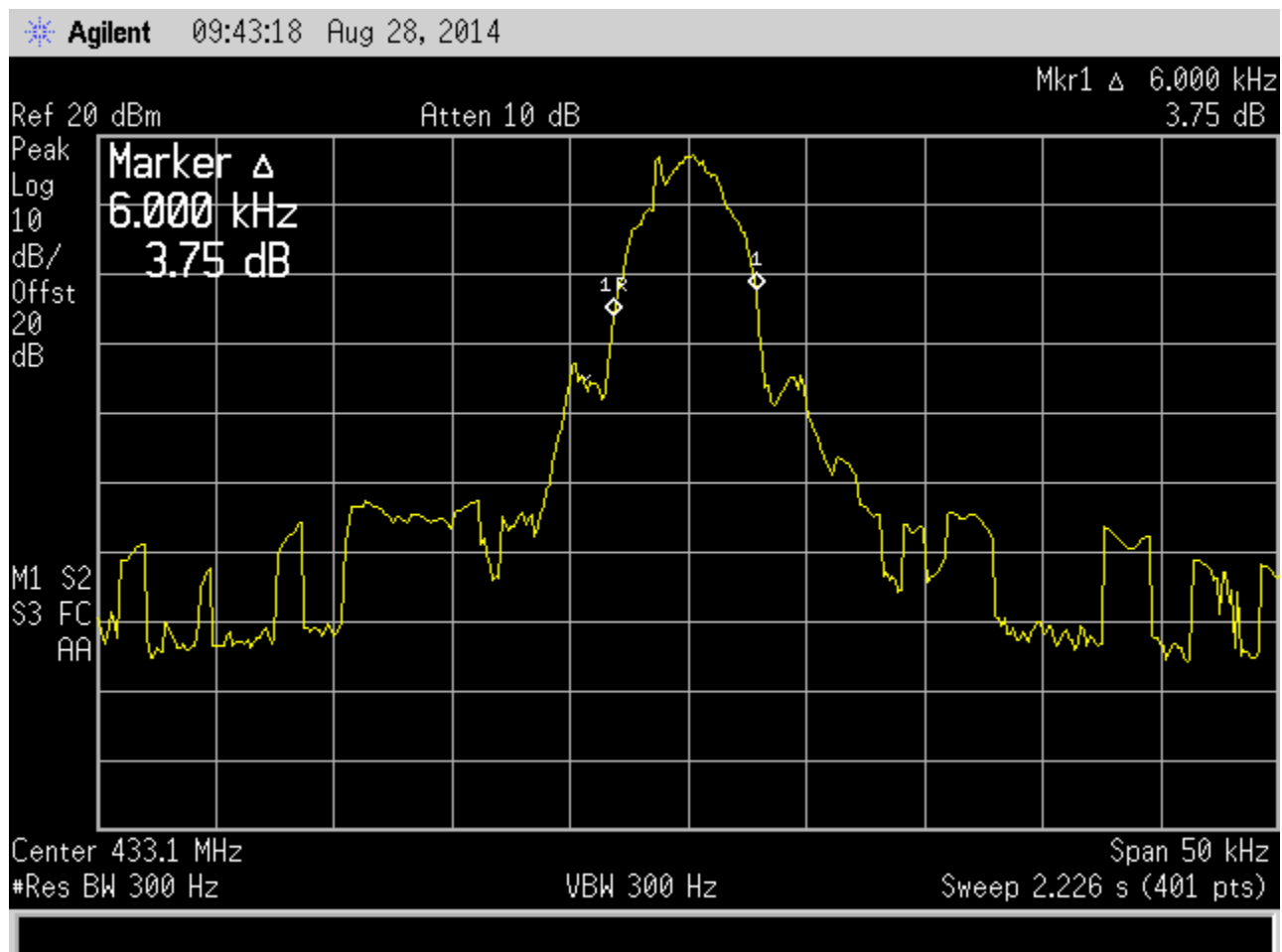


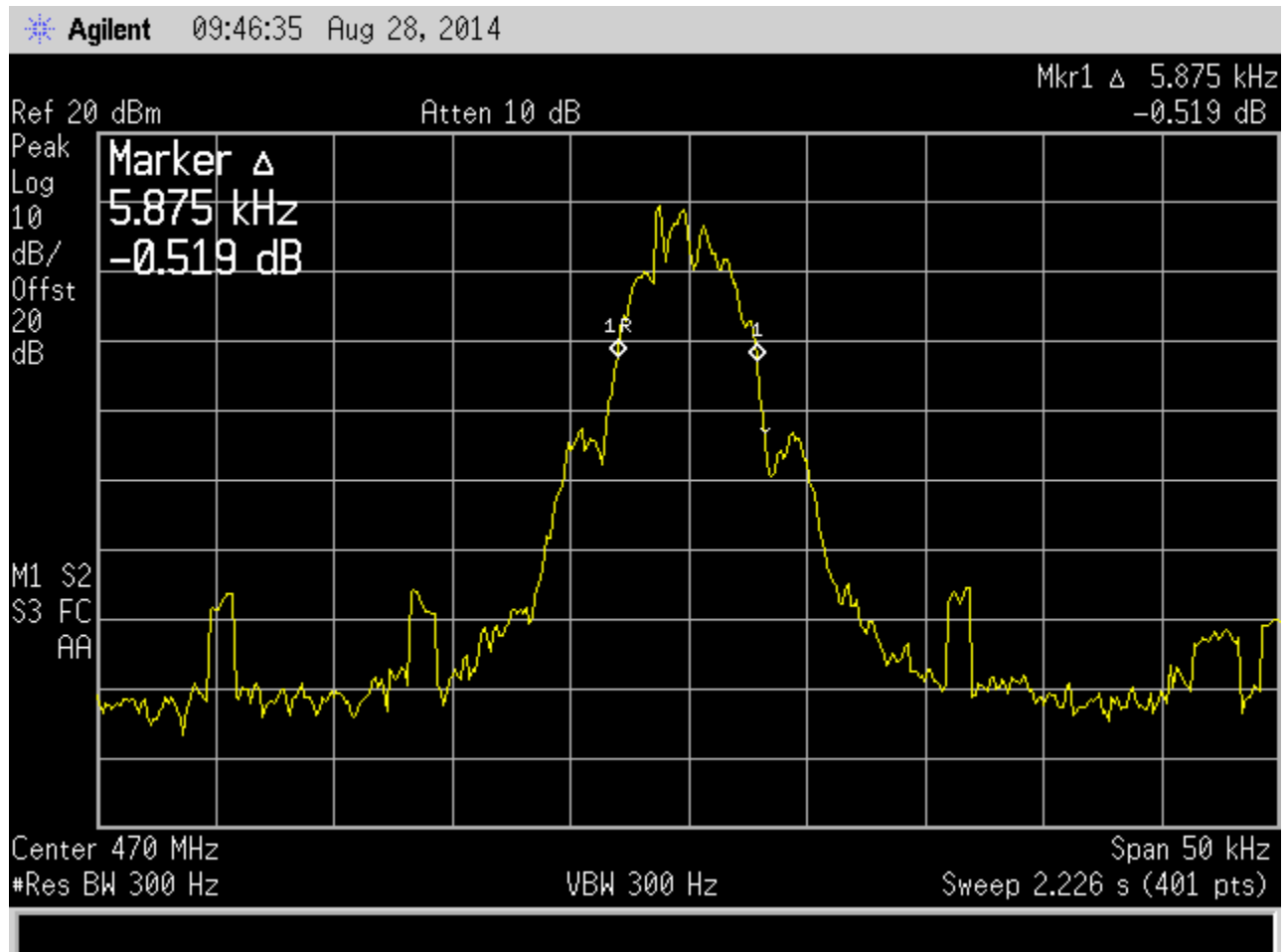




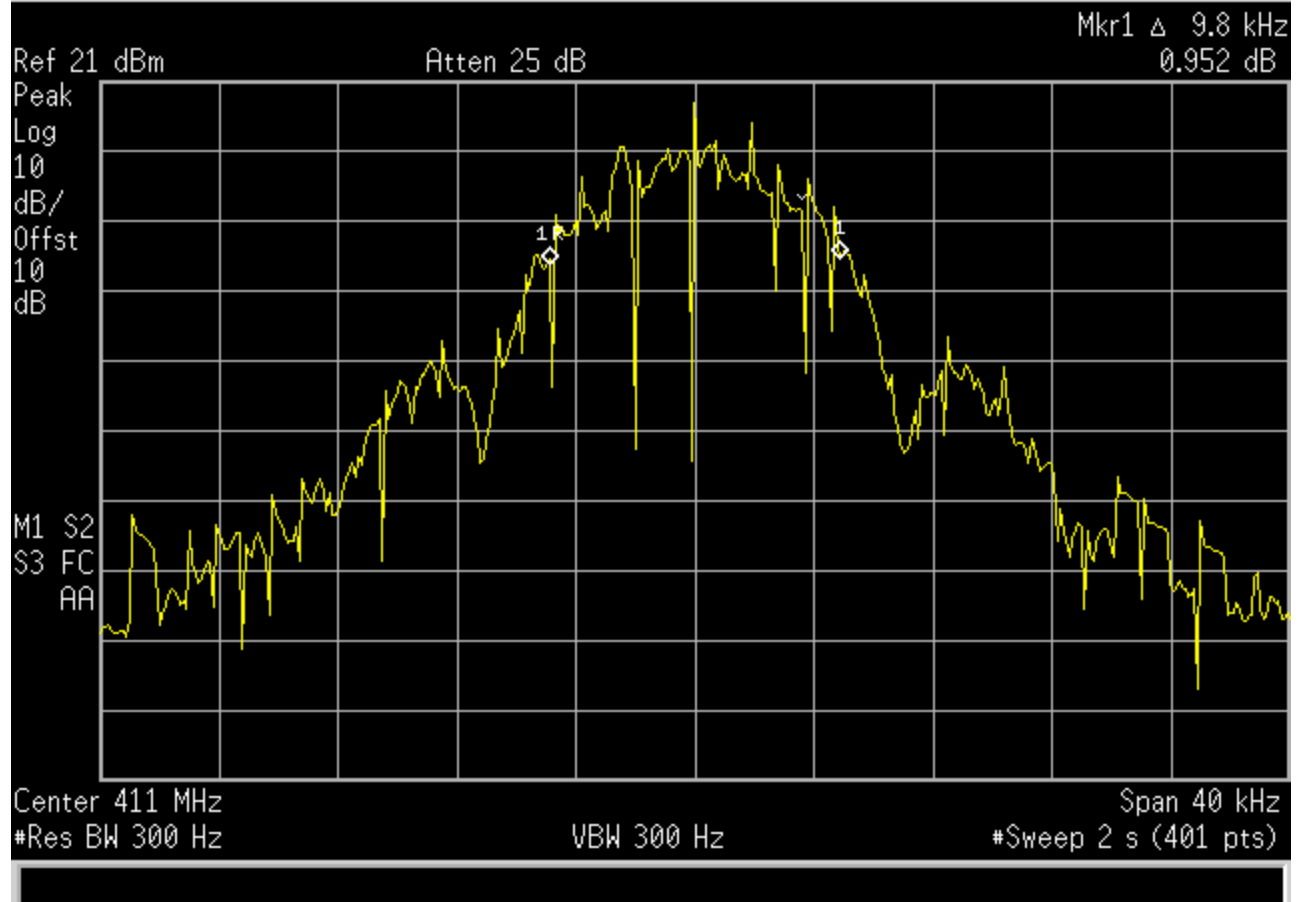
**FCC Part 90 Section 2.1049 Occupied Bandwidth  
6.25 kHz Test Data**

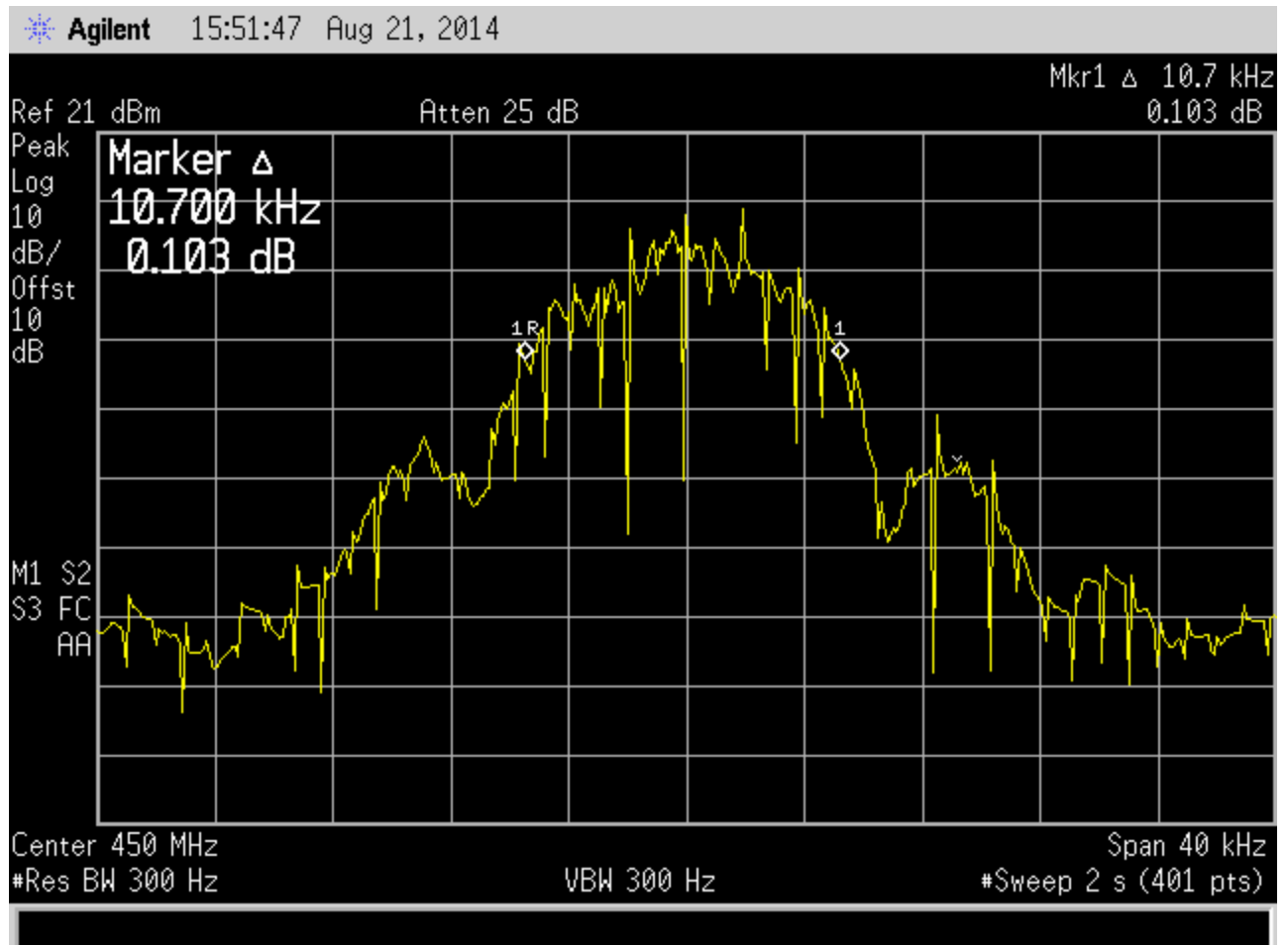


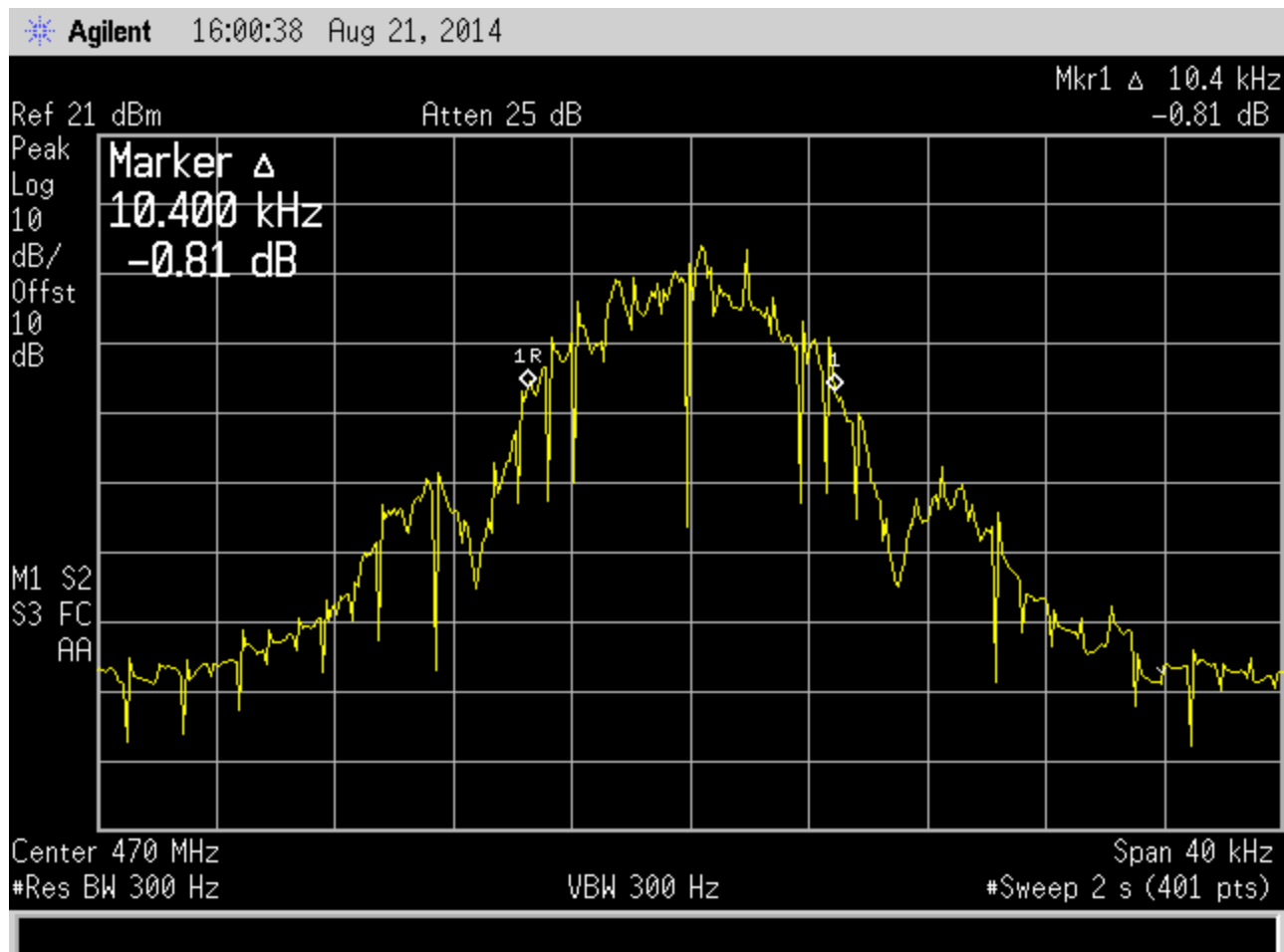




**RSS-119, Section 5.5, Authorized Bandwidth  
Test Data**

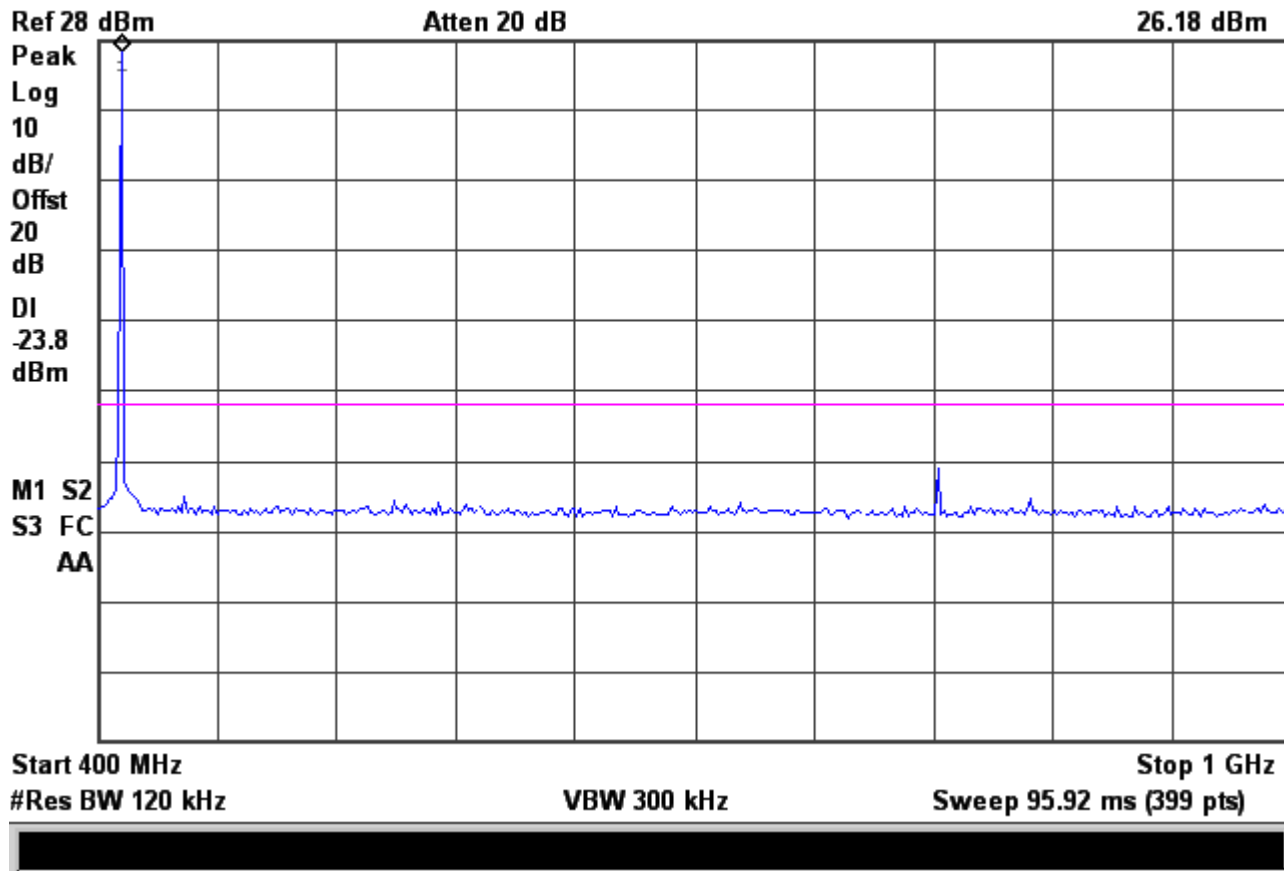


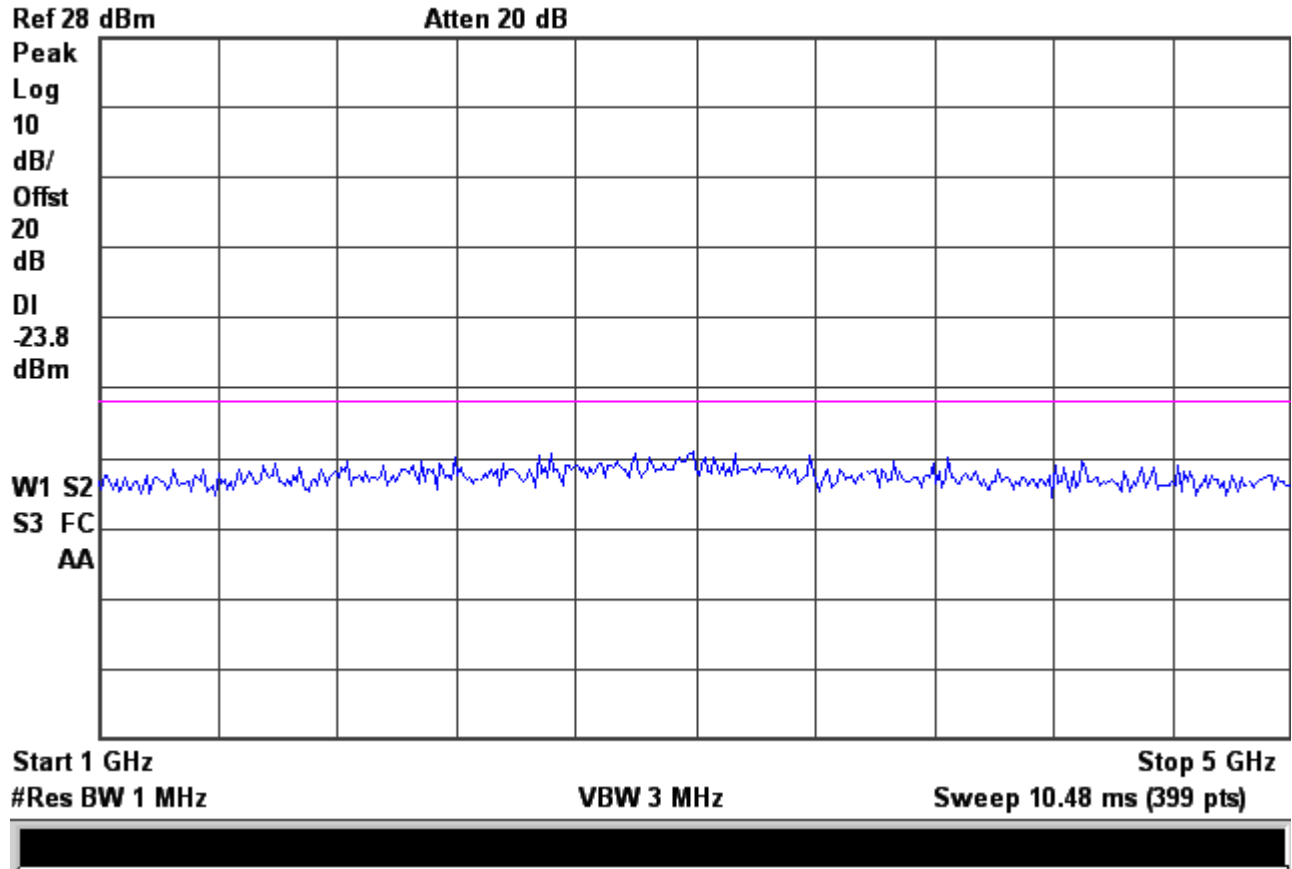


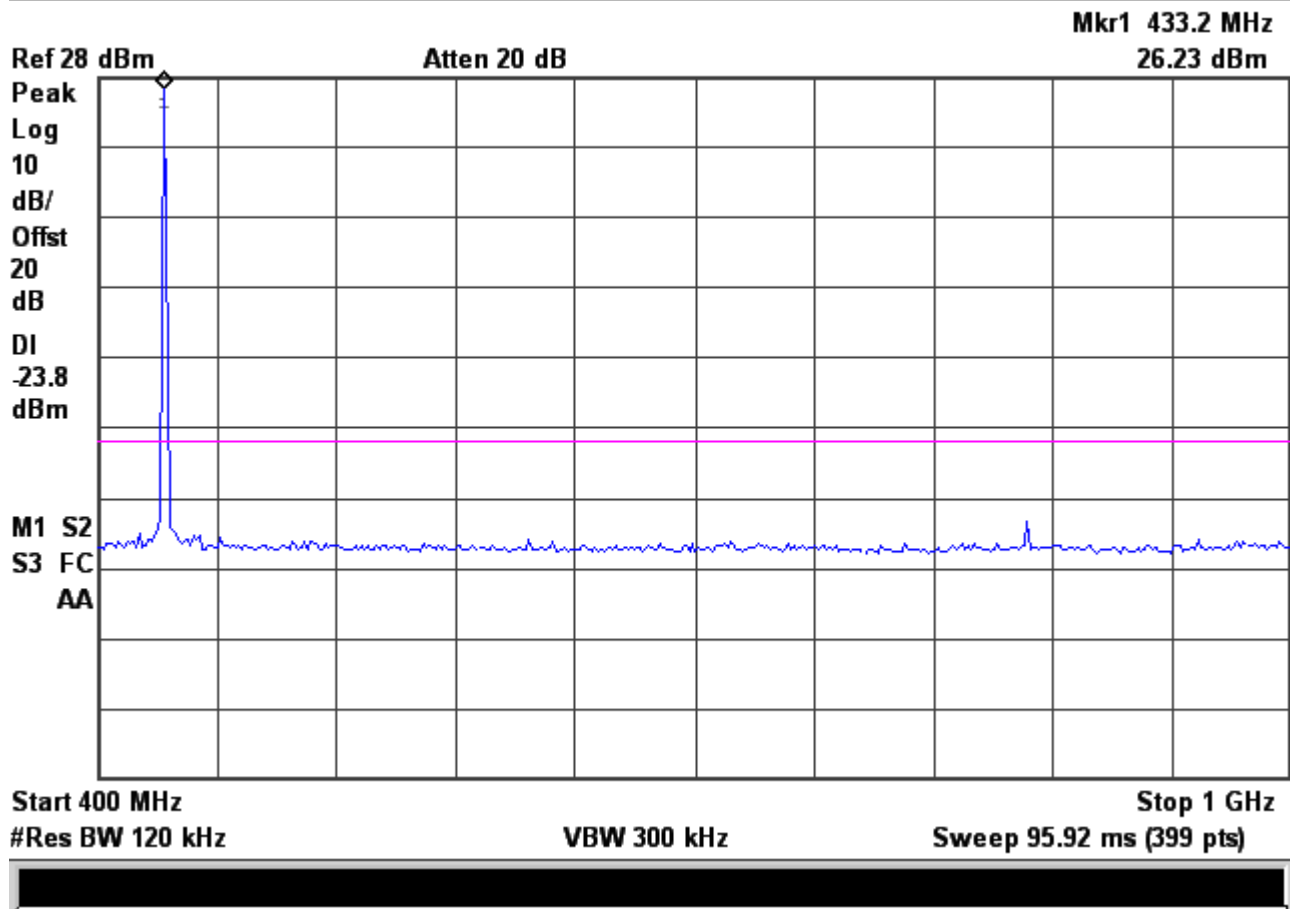


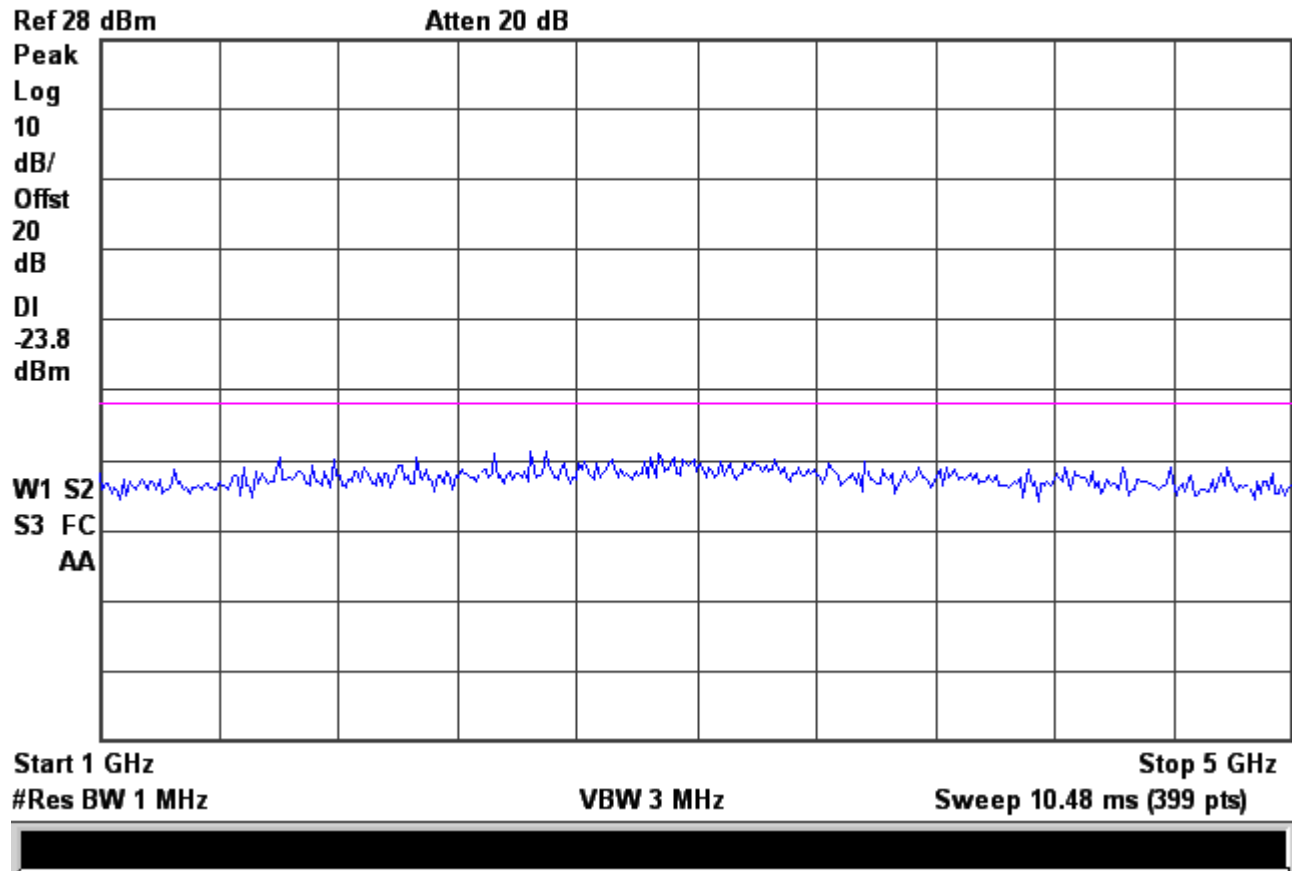
**FCC Sections 90.210 and 2.1051, Spurious Emissions at Antenna Terminal  
400 MHz to 5 GHz  
Test Data**

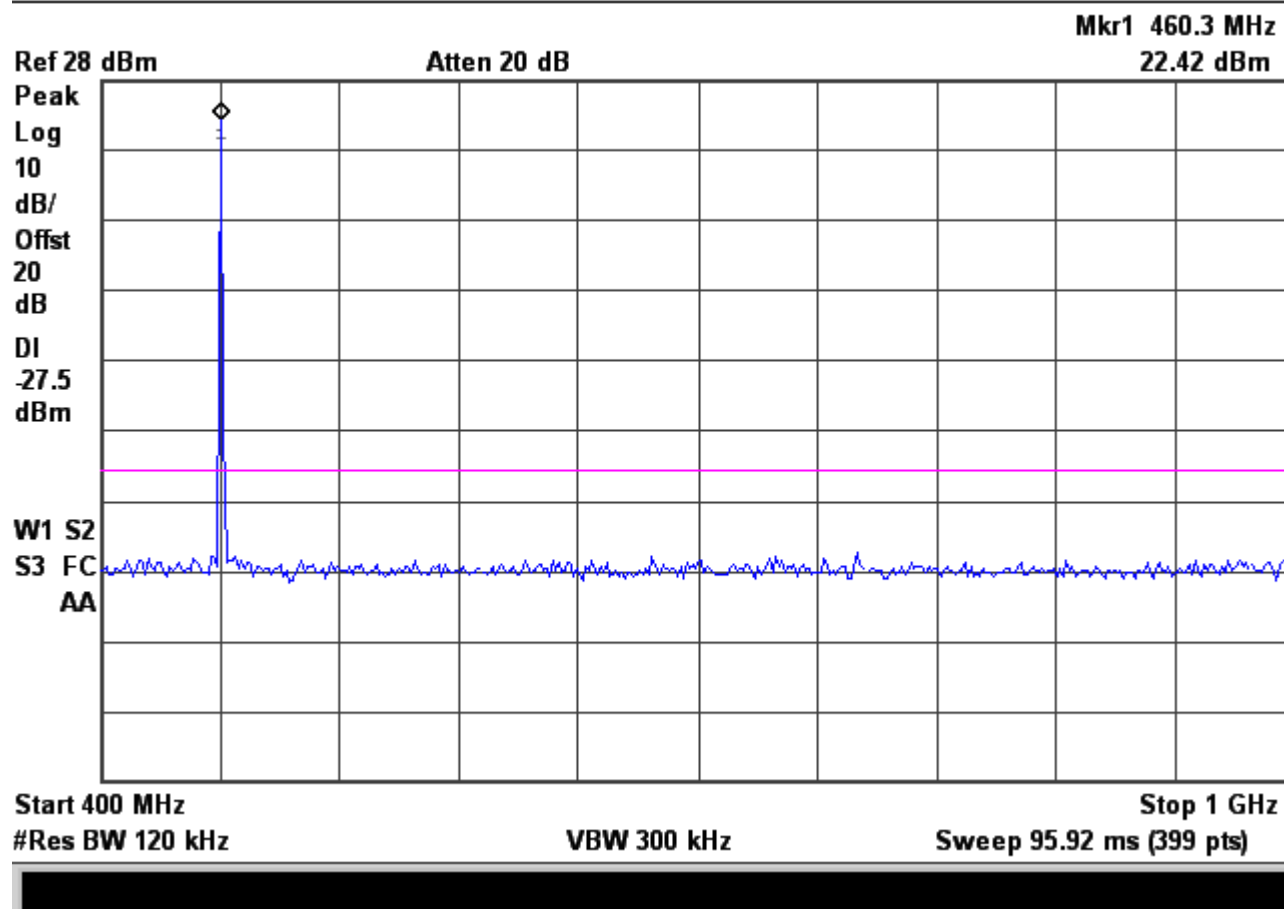
Mkr1 412.1 MHz  
26.18 dBm

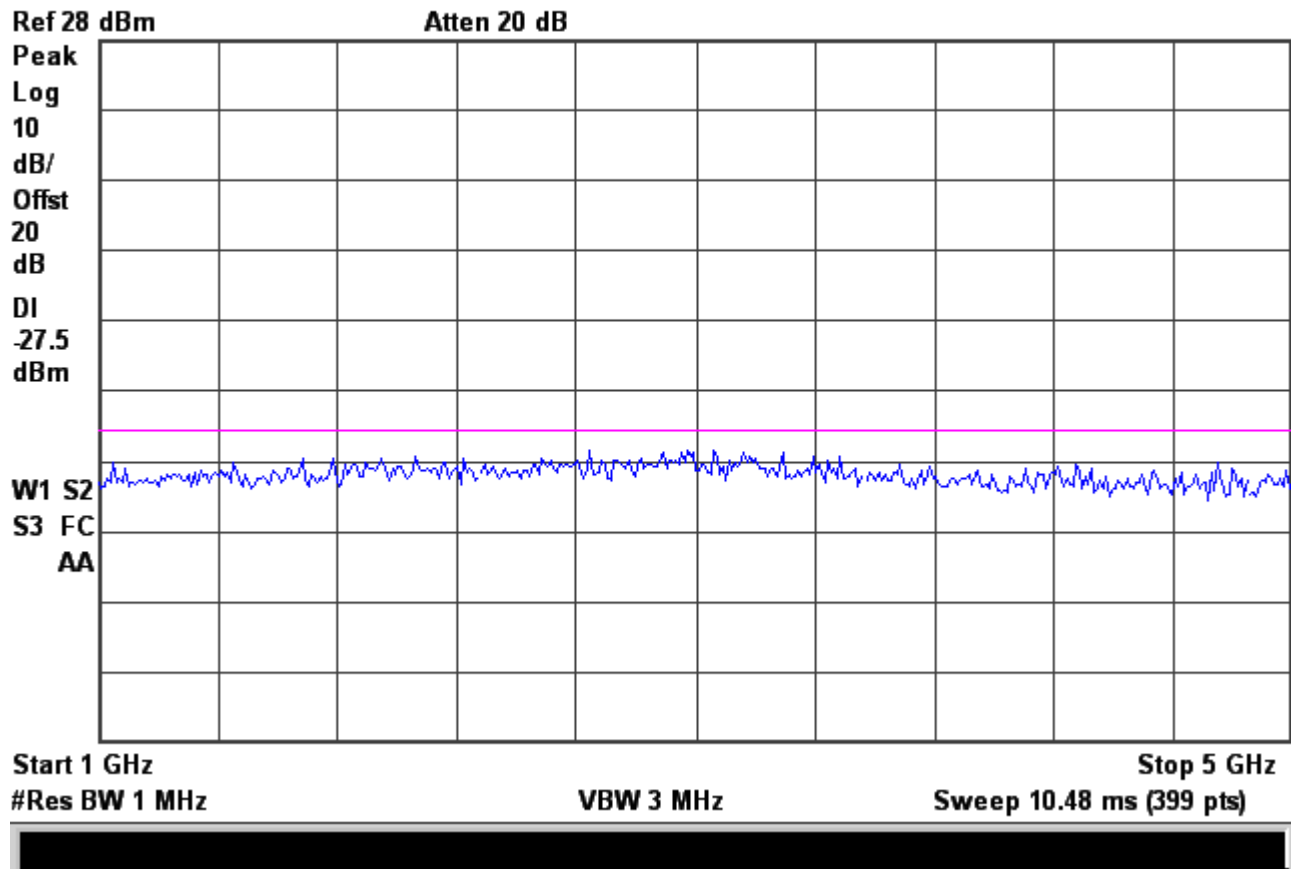












**RSS-119 Section 5.8 – Transmitter – Unwanted Emissions, Conducted  
400 MHz to 5 GHz  
Test Data**

Mkr1 412.1 MHz

26.18 dBm

Ref 28 dBm

Atten 20 dB

Peak

Log

10

dB/

Offst

20

dB

D1

-23.8

dBm

M1 S2

S3 FC

AA

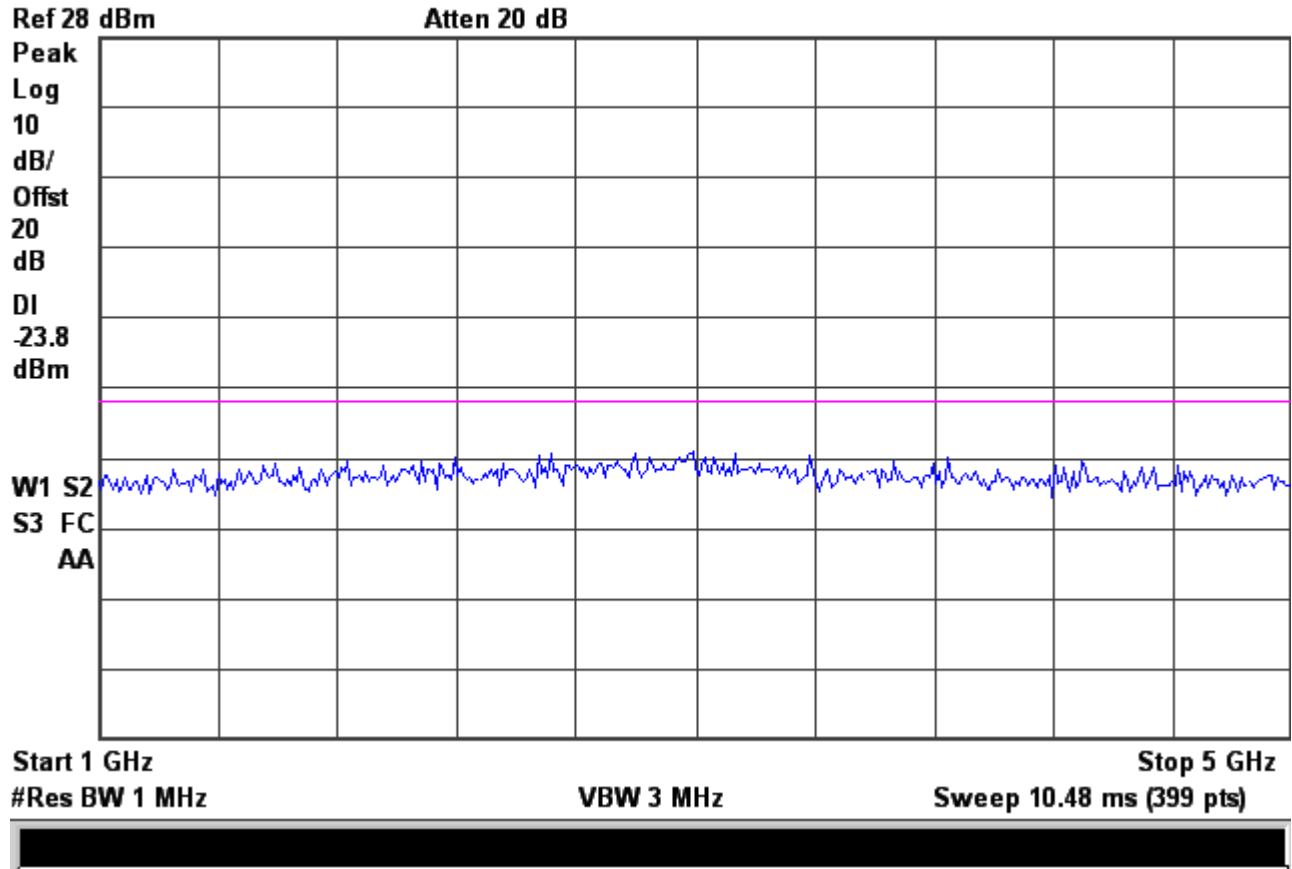
Start 400 MHz

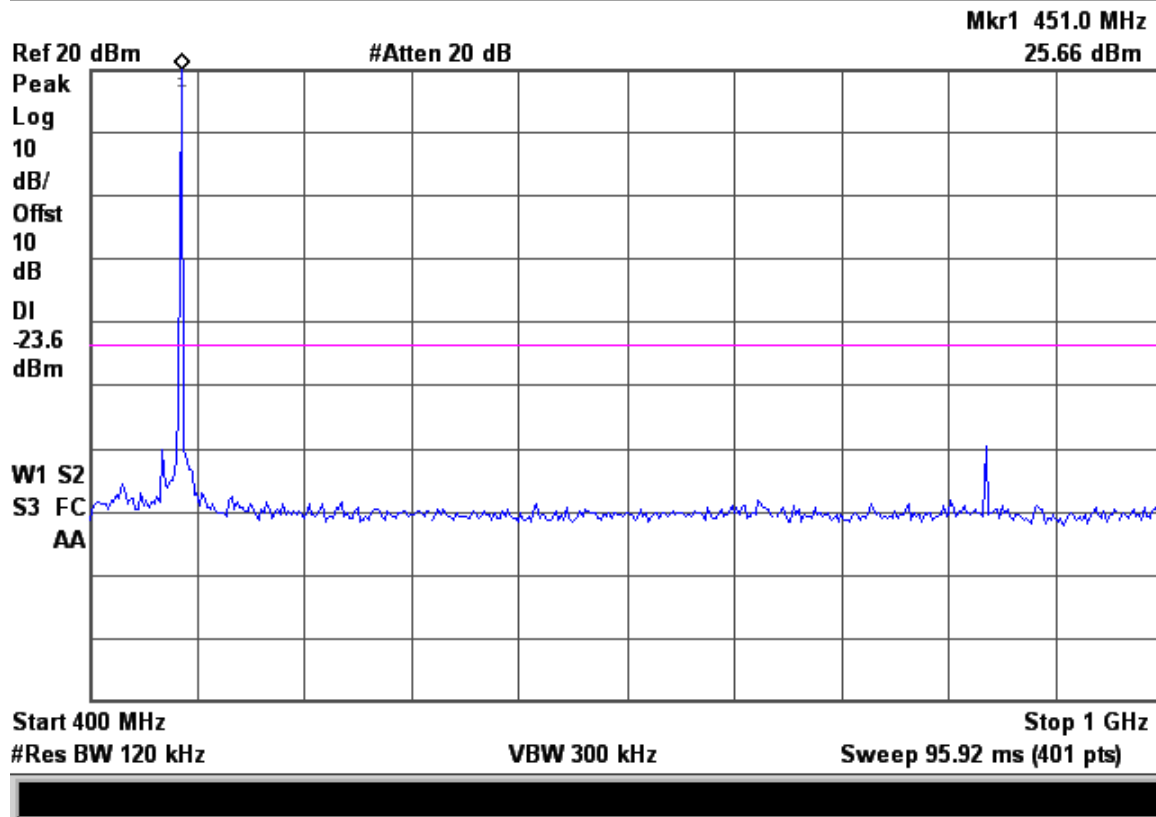
#Res BW 120 kHz

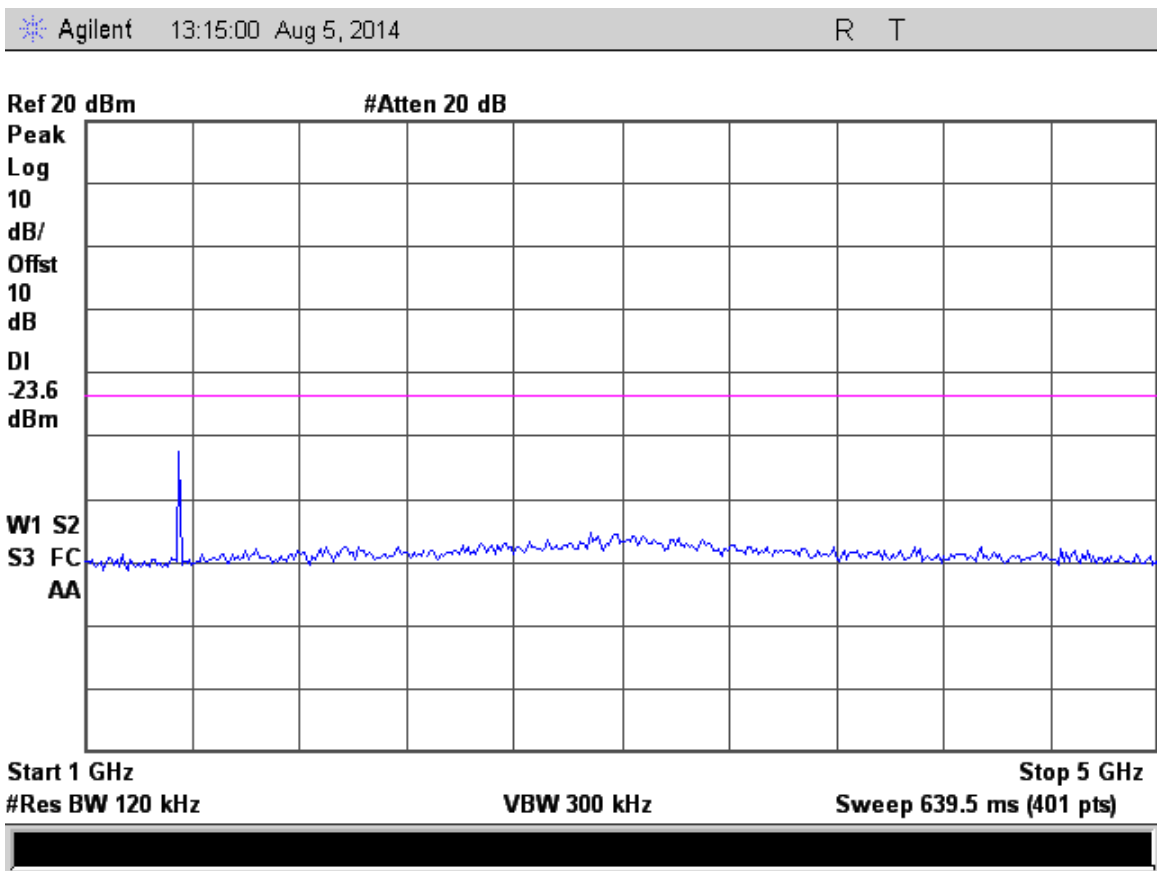
VBW 300 kHz

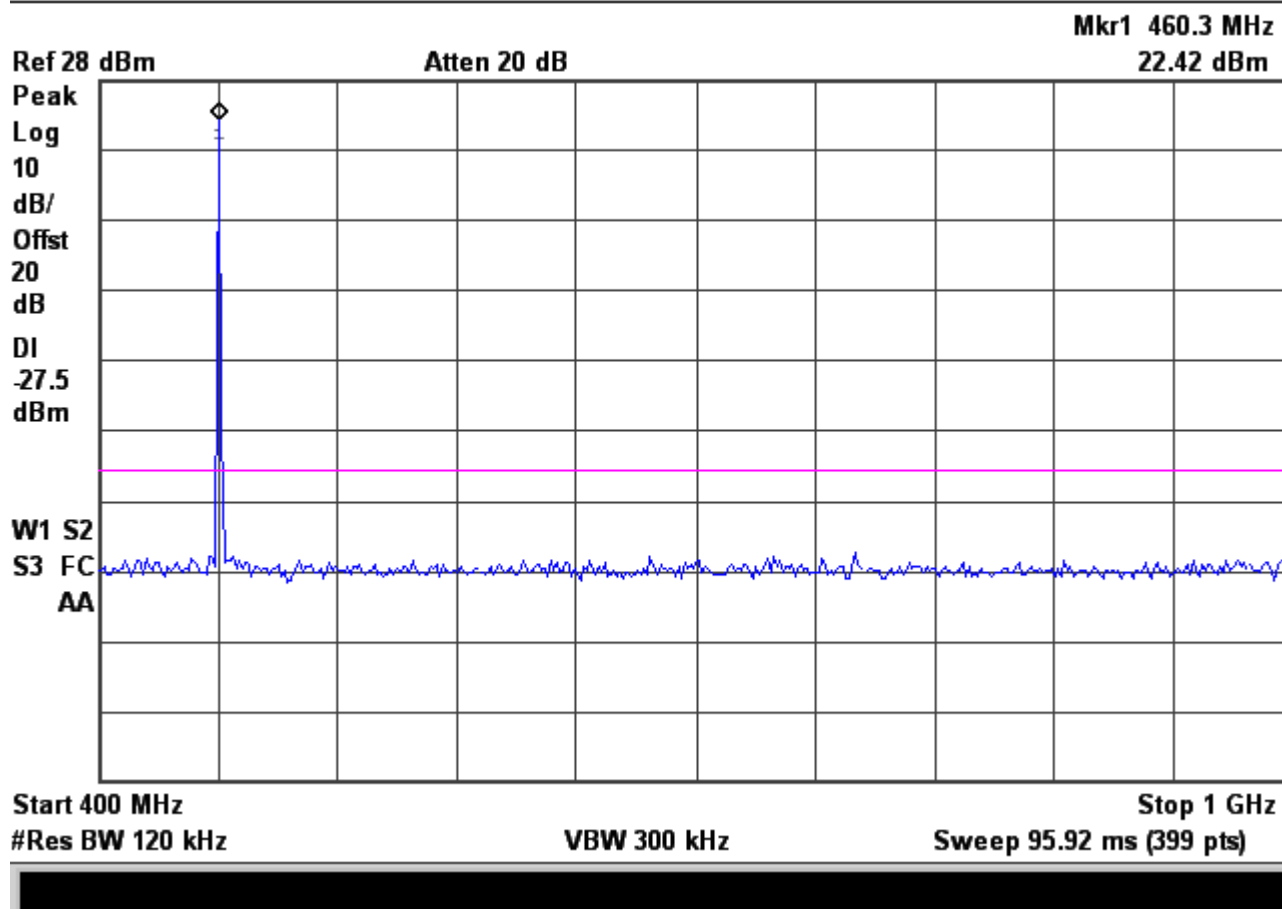
Stop 1 GHz

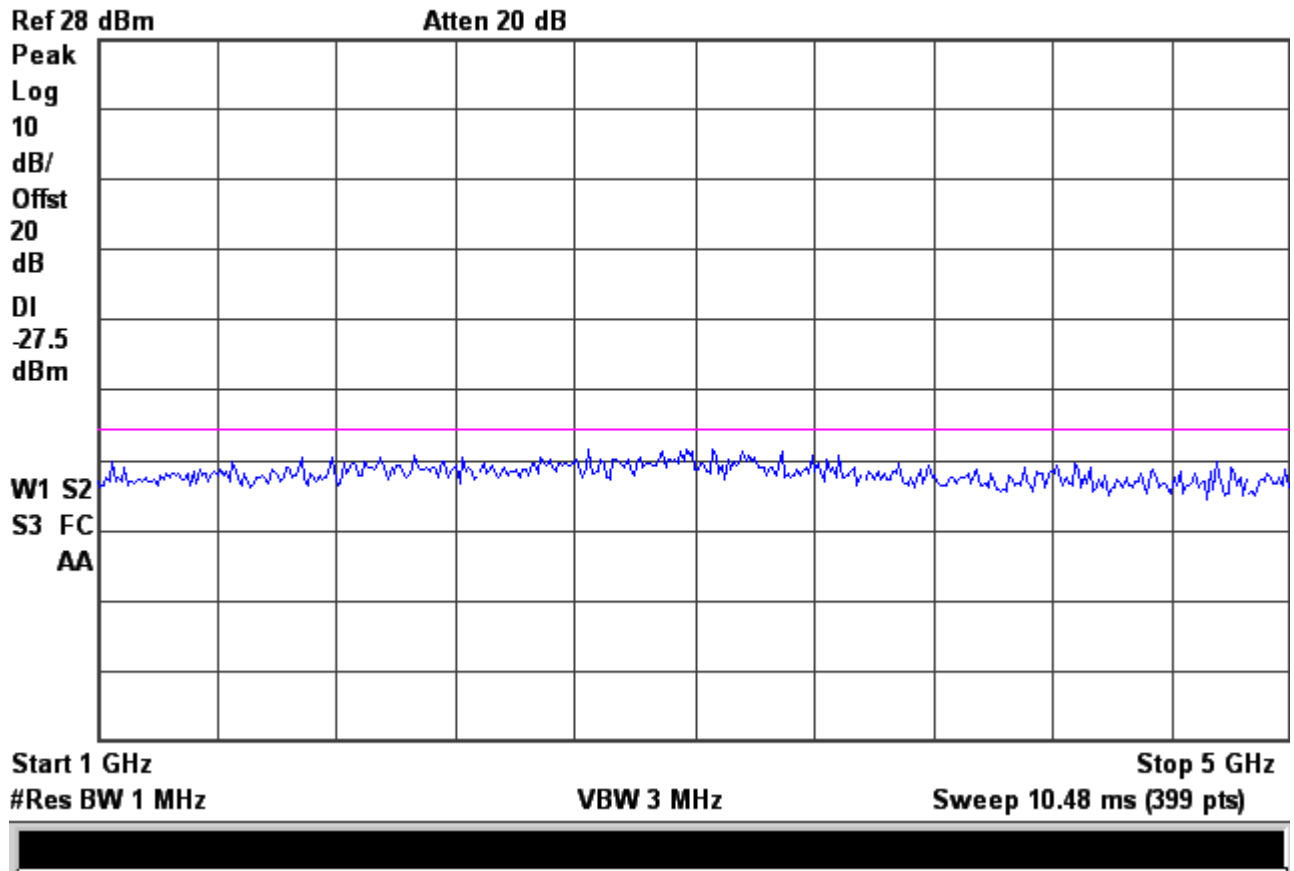
Sweep 95.92 ms (399 pts)











**FCC Sections 90.210 and 2.1053, Field Strength of Spurious Radiation  
400 MHz to 5 GHz  
Test Data**

|                                                           |                 |                                                                  |                            |                 |                      |                      |                   |        |  |
|-----------------------------------------------------------|-----------------|------------------------------------------------------------------|----------------------------|-----------------|----------------------|----------------------|-------------------|--------|--|
| Test Method:                                              |                 | FCC Part 90 Section 2.1053, Field Strength of Spurious Emissions |                            |                 |                      |                      |                   |        |  |
| Customer:                                                 |                 | Magnetek Inc.                                                    |                            |                 |                      | Job No.              | R-2148P           |        |  |
| Test Sample:                                              |                 | 411 to 470 MHz Transceiver Module                                |                            |                 |                      |                      |                   |        |  |
| Part No.:                                                 |                 | 198-71000-A0418                                                  |                            |                 |                      | S/N :                | 0003              |        |  |
| Operating Mode:                                           |                 | Continuous Transmission at 411.00 MHz                            |                            |                 |                      |                      |                   |        |  |
| Technician:                                               |                 | D.Fiore                                                          |                            |                 |                      | Date:                | 5/27/14           |        |  |
| Notes:                                                    |                 | Test Distance: 3 Meters<br>Detector: Peak                        |                            |                 |                      |                      |                   |        |  |
| Test Freq.<br>Ant.<br>Pol.V/H<br>Test Freq.               | Ref.<br>Reading | Signal<br>Generator<br>Reading                                   | Ant.<br>Gain<br>Re: dipole | Cable<br>Factor | Corrected<br>Reading | Fundamental<br>Power | Spurious<br>level | Limit  |  |
| MHz                                                       | dBuV            | dBm                                                              | dBd                        | dB              | Pd (dBm)             | dbm                  | dBc               | dBc    |  |
| 400.00                                                    |                 |                                                                  |                            |                 |                      |                      |                   |        |  |
| V 433.05                                                  | 24.28           | -59.80                                                           | 5.10                       | 2.20            | -56.90               | 26.00                | -82.90            | -34.00 |  |
| H 433.05                                                  | 19.84           | -54.60                                                           | 5.10                       | 2.20            | -57.50               |                      | -83.50            |        |  |
| V 468.40                                                  | 19.35           | -65.70                                                           | 5.10                       | 2.25            | -62.85               |                      | -88.85            |        |  |
| H 468.40                                                  | 15.73           | -60.10                                                           | 5.10                       | 2.25            | -57.25               |                      | -83.25            |        |  |
| V 479.55                                                  | 25.74           | -57.10                                                           | 5.20                       | 2.31            | -54.21               |                      | -80.21            |        |  |
| H 479.55                                                  | 15.12           | -63.10                                                           | 5.20                       | 2.31            | -60.21               |                      | -86.21            |        |  |
| V 822.05                                                  | 55.95           | -17.00                                                           | 5.30                       | 3.02            | -14.72               |                      | -40.72            |        |  |
| H 822.05                                                  | 50.76           | -15.60                                                           | 5.30                       | 3.02            | -13.31               |                      | -39.32            |        |  |
| V 1233.00                                                 | 43.74           | -17.70                                                           | 2.50                       | 3.95            | -19.15               |                      | -45.15            |        |  |
| H 1233.00                                                 | 31.03           | -33.20                                                           | 2.50                       | 3.95            | -34.65               |                      | -60.65            |        |  |
| 5000.00                                                   |                 |                                                                  |                            |                 |                      | 26.00                |                   | -34.00 |  |
|                                                           |                 |                                                                  |                            |                 |                      |                      |                   |        |  |
|                                                           |                 |                                                                  |                            |                 |                      |                      |                   |        |  |
|                                                           |                 |                                                                  |                            |                 |                      |                      |                   |        |  |
|                                                           |                 |                                                                  |                            |                 |                      |                      |                   |        |  |
|                                                           |                 |                                                                  |                            |                 |                      |                      |                   |        |  |
|                                                           |                 |                                                                  |                            |                 |                      |                      |                   |        |  |
|                                                           |                 |                                                                  |                            |                 |                      |                      |                   |        |  |
|                                                           |                 |                                                                  |                            |                 |                      |                      |                   |        |  |
|                                                           |                 |                                                                  |                            |                 |                      |                      |                   |        |  |
|                                                           |                 |                                                                  |                            |                 |                      |                      |                   |        |  |
|                                                           |                 |                                                                  |                            |                 |                      |                      |                   |        |  |
| The frequency range was scanned from 400 MHz to 5000 MHz. |                 |                                                                  |                            |                 |                      |                      |                   |        |  |
| Pd (dBm) = Pg dBm – cable loss (dB) + antenna gain (dB)   |                 |                                                                  |                            |                 |                      |                      |                   |        |  |

|                                                                                                                      |                                                                  |                                |                            |                 |                      |                      |                   |        |
|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|--------------------------------|----------------------------|-----------------|----------------------|----------------------|-------------------|--------|
| <b>Test Method:</b>                                                                                                  | FCC Part 90 Section 2.1053, Field Strength of Spurious Emissions |                                |                            |                 |                      |                      |                   |        |
| <b>Customer:</b>                                                                                                     | Magnetek Inc.                                                    |                                |                            | <b>Job No.</b>  |                      | R-2148P              |                   |        |
| <b>Test Sample:</b>                                                                                                  | 411 to 470 MHz Transceiver Module                                |                                |                            |                 |                      |                      |                   |        |
| <b>Part No.:</b>                                                                                                     | 198-71000-A0418                                                  |                                |                            | <b>S/N :</b>    |                      | 0003                 |                   |        |
| <b>Operating Mode:</b>                                                                                               | Continuous Transmission at 433.05 MHz                            |                                |                            |                 |                      |                      |                   |        |
| <b>Technician:</b>                                                                                                   | D.Fiore                                                          |                                |                            | <b>Date:</b>    |                      | 5/28/14              |                   |        |
| <b>Notes:</b>                                                                                                        | Test Distance: 3 Meters<br>Detector: Peak                        |                                |                            |                 |                      |                      |                   |        |
| Test Freq.<br>Ant.<br>Pol.V/H<br>Test Freq.                                                                          | Ref.<br>Reading                                                  | Signal<br>Generator<br>Reading | Ant.<br>Gain<br>Re: dipole | Cable<br>Factor | Corrected<br>Reading | Fundamental<br>Power | Spurious<br>level | Limit  |
| MHz                                                                                                                  | dBuV                                                             | dBm                            | dBd                        | dB              | Pd (dBm)             | dbm                  | dBc               | dBc    |
| 400.00                                                                                                               |                                                                  |                                |                            |                 |                      |                      |                   |        |
| V 457.54                                                                                                             | 26.13                                                            | -58.50                         | 5.10                       | 2.23            | -55.63               | 25.60                | -81.23            | -34.40 |
| H 457.54                                                                                                             | 16.25                                                            | -64.12                         | 5.10                       | 2.23            | -61.25               |                      | -86.85            |        |
| V 523.93                                                                                                             | 16.75                                                            | -65.30                         | 5.10                       | 2.45            | -62.65               |                      | -88.25            |        |
| H 523.93                                                                                                             | 9.65                                                             | -78.40                         | 5.10                       | 2.45            | -75.75               |                      | -101.35           |        |
| V 533.77                                                                                                             | 16.94                                                            | -64.60                         | 5.10                       | 2.46            | -61.96               |                      | -87.56            |        |
| H 533.77                                                                                                             | 11.22                                                            | -72.90                         | 5.10                       | 2.46            | -70.26               |                      | -95.86            |        |
| V 866.10                                                                                                             | 51.85                                                            | -20.40                         | 5.20                       | 3.10            | -18.30               |                      | -43.90            |        |
| H 866.10                                                                                                             | 46.25                                                            | -24.20                         | 5.20                       | 3.10            | -22.10               |                      | -47.70            |        |
| V 1299.00                                                                                                            | 34.60                                                            | -26.80                         | 4.90                       | 4.27            | -26.17               |                      | -51.77            |        |
| H 1299.00                                                                                                            | 27.23                                                            | -36.00                         | 4.90                       | 4.27            | -35.37               |                      | -60.97            |        |
| 5000.00                                                                                                              |                                                                  |                                |                            |                 |                      | 25.60                |                   | -34.40 |
|                                                                                                                      |                                                                  |                                |                            |                 |                      |                      |                   |        |
|                                                                                                                      |                                                                  |                                |                            |                 |                      |                      |                   |        |
|                                                                                                                      |                                                                  |                                |                            |                 |                      |                      |                   |        |
|                                                                                                                      |                                                                  |                                |                            |                 |                      |                      |                   |        |
|                                                                                                                      |                                                                  |                                |                            |                 |                      |                      |                   |        |
|                                                                                                                      |                                                                  |                                |                            |                 |                      |                      |                   |        |
|                                                                                                                      |                                                                  |                                |                            |                 |                      |                      |                   |        |
|                                                                                                                      |                                                                  |                                |                            |                 |                      |                      |                   |        |
|                                                                                                                      |                                                                  |                                |                            |                 |                      |                      |                   |        |
|                                                                                                                      |                                                                  |                                |                            |                 |                      |                      |                   |        |
|                                                                                                                      |                                                                  |                                |                            |                 |                      |                      |                   |        |
|                                                                                                                      |                                                                  |                                |                            |                 |                      |                      |                   |        |
|                                                                                                                      |                                                                  |                                |                            |                 |                      |                      |                   |        |
|                                                                                                                      |                                                                  |                                |                            |                 |                      |                      |                   |        |
|                                                                                                                      |                                                                  |                                |                            |                 |                      |                      |                   |        |
|                                                                                                                      |                                                                  |                                |                            |                 |                      |                      |                   |        |
|                                                                                                                      |                                                                  |                                |                            |                 |                      |                      |                   |        |
| The frequency range was scanned from 400 MHz to 5000 MHz.<br>Pd (dBm) = Pg dBm – cable loss (dB) + antenna gain (dB) |                                                                  |                                |                            |                 |                      |                      |                   |        |

[illegible]

**RSS-119 Section 5.8 - Field Strength of Spurious Radiation, Transmitter –  
Unwanted Emissions, Radiated  
400 MHz to 5 GHz  
Test Data**

|                                                           |                 |                                                      |                            |                 |                      |                      |                   |        |
|-----------------------------------------------------------|-----------------|------------------------------------------------------|----------------------------|-----------------|----------------------|----------------------|-------------------|--------|
| Test Method:                                              |                 | IC RSS-119, Issue 11, Transmitter Unwanted Emissions |                            |                 |                      |                      |                   |        |
| Customer:                                                 |                 | Magnetek Inc.                                        | Job No.                    |                 | R-2148P              |                      |                   |        |
| Test Sample:                                              |                 | 411 to 470 MHz Transceiver Module                    |                            |                 |                      |                      |                   |        |
| Part No.:                                                 |                 | 198-71000-A0418                                      | S/N :                      |                 | 0003                 |                      |                   |        |
| Operating Mode:                                           |                 | Continuous Transmission at 411.00 MHz                |                            |                 |                      |                      |                   |        |
| Technician:                                               |                 | D.Fiore                                              | Date:                      |                 | 5/27/14              |                      |                   |        |
| Notes: Test Distance: 3 Meters<br>Detector: Peak          |                 |                                                      |                            |                 |                      |                      |                   |        |
| Test Freq.<br>Ant.<br>Pol.V/H<br>Test Freq.               | Ref.<br>Reading | Signal<br>Generator<br>Reading                       | Ant.<br>Gain<br>Re: dipole | Cable<br>Factor | Corrected<br>Reading | Fundamental<br>Power | Spurious<br>level | Limit  |
| MHz                                                       | dBuV            | dBm                                                  | dBd                        | dB              | Pd (dBm)             | dbm                  | dBc               | dBc    |
| 400.00                                                    |                 |                                                      |                            |                 |                      |                      |                   |        |
| V 433.05                                                  | 24.28           | -59.80                                               | 5.10                       | 2.20            | -56.90               | 26.00                | -82.90            | -34.00 |
| H 433.05                                                  | 19.84           | -54.60                                               | 5.10                       | 2.20            | -57.50               |                      | -83.50            |        |
| V 468.40                                                  | 19.35           | -65.70                                               | 5.10                       | 2.25            | -62.85               |                      | -88.85            |        |
| H 468.40                                                  | 15.73           | -60.10                                               | 5.10                       | 2.25            | -57.25               |                      | -83.25            |        |
| V 479.55                                                  | 25.74           | -57.10                                               | 5.20                       | 2.31            | -54.21               |                      | -80.21            |        |
| H 479.55                                                  | 15.12           | -63.10                                               | 5.20                       | 2.31            | -60.21               |                      | -86.21            |        |
| V 822.05                                                  | 55.95           | -17.00                                               | 5.30                       | 3.02            | -14.72               |                      | -40.72            |        |
| H 822.05                                                  | 50.76           | -15.60                                               | 5.30                       | 3.02            | -13.31               |                      | -39.32            |        |
| V 1233.00                                                 | 43.74           | -17.70                                               | 2.50                       | 3.95            | -19.15               |                      | -45.15            |        |
| H 1233.00                                                 | 31.03           | -33.20                                               | 2.50                       | 3.95            | -34.65               |                      | -60.65            |        |
| 5000.00                                                   |                 |                                                      |                            |                 |                      | 26.00                |                   | -34.00 |
|                                                           |                 |                                                      |                            |                 |                      |                      |                   |        |
|                                                           |                 |                                                      |                            |                 |                      |                      |                   |        |
|                                                           |                 |                                                      |                            |                 |                      |                      |                   |        |
|                                                           |                 |                                                      |                            |                 |                      |                      |                   |        |
|                                                           |                 |                                                      |                            |                 |                      |                      |                   |        |
|                                                           |                 |                                                      |                            |                 |                      |                      |                   |        |
|                                                           |                 |                                                      |                            |                 |                      |                      |                   |        |
|                                                           |                 |                                                      |                            |                 |                      |                      |                   |        |
|                                                           |                 |                                                      |                            |                 |                      |                      |                   |        |
|                                                           |                 |                                                      |                            |                 |                      |                      |                   |        |
|                                                           |                 |                                                      |                            |                 |                      |                      |                   |        |
| The frequency range was scanned from 400 MHz to 5000 MHz. |                 |                                                      |                            |                 |                      |                      |                   |        |
| Pd (dBm) = Pg dBm – cable loss (dB) + antenna gain (dB)   |                 |                                                      |                            |                 |                      |                      |                   |        |
|                                                           |                 |                                                      |                            |                 |                      |                      |                   |        |

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**FCC Sections 90.213 and 2.1055, Frequency Stability - Temperature Variation**

## SUSCEPTIBILITY TEST DATA SHEET

|                       |                                                        |
|-----------------------|--------------------------------------------------------|
| <b>Test Method</b>    | <b>FCC Part 90 Section 2.1055, Frequency Stability</b> |
| <b>Customer</b>       | Magnetek Inc.                                          |
| <b>Job Number</b>     | R-2148P-2                                              |
| <b>Test Sample</b>    | 411 to 470 MHz Transceiver Module                      |
| <b>Model</b>          | 198-71000-10433                                        |
| <b>Serial Number</b>  | 0008                                                   |
| <b>Operating Mode</b> | Tx Normal                                              |
| <b>Technician</b>     | S. Macdonald                                           |
| <b>Date</b>           | 5/28/14                                                |

**Notes:** Nominal frequencies were measured with a room ambient temperature of 22.0°C and a relative humidity reading of 51%. Nominal voltage was set to 3.3 VDC

Nominal readings→ 411 MHz = 410.999900; 433.05 MHz = 433.049889; 470 MHz = 469.999874

| Frequency MHz    | Temperature | Lower Limit | Measured   | Upper Limit | Pass/Fail |
|------------------|-------------|-------------|------------|-------------|-----------|
| 411 (3.3 Vdc)    | -20°C       | 410.997845  | 410.999981 | 411.001955  | Pass      |
|                  | -10°C       | 410.997845  | 410.999963 | 411.001955  | Pass      |
|                  | 0°C         | 410.997845  | 411.000051 | 411.001955  | Pass      |
|                  | 10°C        | 410.997845  | 411.000048 | 411.001955  | Pass      |
|                  | 20°C        | 410.997845  | 411.000023 | 411.001955  | Pass      |
|                  | 30°C        | 410.997845  | 410.999956 | 411.001955  | Pass      |
|                  | 40°C        | 410.997845  | 410.999992 | 411.001955  | Pass      |
|                  | 50°C        | 410.997845  | 410.999960 | 411.001955  | Pass      |
| 433.05 (3.3 Vdc) | -20°C       | 433.047724  | 433.050050 | 433.052054  | Pass      |
|                  | -10°C       | 433.047724  | 433.049932 | 433.052054  | Pass      |
|                  | 0°C         | 433.047724  | 433.050081 | 433.052054  | Pass      |
|                  | 10°C        | 433.047724  | 433.050026 | 433.052054  | Pass      |
|                  | 20°C        | 433.047724  | 433.049974 | 433.052054  | Pass      |
|                  | 30°C        | 433.047724  | 433.050038 | 433.052054  | Pass      |
|                  | 40°C        | 433.047724  | 433.059955 | 433.052054  | Pass      |
|                  | 50°C        | 433.047724  | 433.049988 | 433.052054  | Pass      |
| 470 (3.3 Vdc)    | -20°C       | 469.997574  | 470.000050 | 470.002173  | Pass      |
|                  | -10°C       | 469.997574  | 470.000012 | 470.002173  | Pass      |
|                  | 0°C         | 469.997574  | 470.000002 | 470.002173  | Pass      |
|                  | 10°C        | 469.997574  | 470.000031 | 470.002173  | Pass      |
|                  | 20°C        | 469.997574  | 470.000005 | 470.002173  | Pass      |
|                  | 30°C        | 469.997574  | 469.999986 | 470.002173  | Pass      |
|                  | 40°C        | 469.997574  | 470.000023 | 470.002173  | Pass      |
|                  | 50°C        | 469.997574  | 470.000014 | 470.002173  | Pass      |
|                  |             |             |            |             |           |
|                  |             |             |            |             |           |
|                  |             |             |            |             |           |
|                  |             |             |            |             |           |

## SUSCEPTIBILITY TEST DATA SHEET

|                            |                                                        |
|----------------------------|--------------------------------------------------------|
| <b>Test Method</b>         | <b>FCC Part 90 Section 2.1055, Frequency Stability</b> |
| <b>Customer</b>            | Magnetek Inc.                                          |
| <b>Job Number</b>          | R-2148P-2                                              |
| <b>Test Sample</b>         | 411 to 470 MHz Transceiver Module                      |
| <b>Model / Part Number</b> | 198-71000-10433                                        |
| <b>Serial Number</b>       | 0008                                                   |
| <b>Operating Mode</b>      | Tx Normal                                              |
| <b>Technician</b>          | S. Macdonald                                           |
| <b>Date</b>                | 5/28/14                                                |

**Notes:** Nominal frequencies were measured with a room ambient temperature of 22.0°C and a relative humidity reading of 5137%. Nominal voltage was set to 3.3 VDC.

Nominal readings → 411 MHz = 410.999900; 433.05 MHz = 433.049889; 470 MHz = 469.999874

| Frequency MHz     | Temperature | Lower Limit | Measured   | Upper Limit | Pass/Fail |
|-------------------|-------------|-------------|------------|-------------|-----------|
| 411 (3.25 Vdc)    | -20°C       | 410.997845  | 410.999961 | 411.001955  | Pass      |
|                   | -10°C       | 410.997845  | 410.999990 | 411.001955  | Pass      |
|                   | 0°C         | 410.997845  | 411.000082 | 411.001955  | Pass      |
|                   | 10°C        | 410.997845  | 411.000064 | 411.001955  | Pass      |
|                   | 20°C        | 410.997845  | 410.999991 | 411.001955  | Pass      |
|                   | 30°C        | 410.997845  | 410.999974 | 411.001955  | Pass      |
|                   | 40°C        | 410.997845  | 410.999960 | 411.001955  | Pass      |
|                   | 50°C        | 410.997845  | 410.999976 | 411.001955  | Pass      |
| 433.05 (3.25 Vdc) | -20°C       | 433.047724  | 433.050410 | 433.052054  | Pass      |
|                   | -10°C       | 433.047724  | 433.050022 | 433.052054  | Pass      |
|                   | 0°C         | 433.047724  | 433.050606 | 433.052054  | Pass      |
|                   | 10°C        | 433.047724  | 433.050006 | 433.052054  | Pass      |
|                   | 20°C        | 433.047724  | 433.049980 | 433.052054  | Pass      |
|                   | 30°C        | 433.047724  | 433.050002 | 433.052054  | Pass      |
|                   | 40°C        | 433.047724  | 433.049966 | 433.052054  | Pass      |
|                   | 50°C        | 433.047724  | 433.049979 | 433.052054  | Pass      |
| 470 (3.25 Vdc)    | -20°C       | 469.997574  | 470.000050 | 470.002173  | Pass      |
|                   | -10°C       | 469.997574  | 470.000012 | 470.002173  | Pass      |
|                   | 0°C         | 469.997574  | 470.000002 | 470.002173  | Pass      |
|                   | 10°C        | 469.997574  | 470.000031 | 470.002173  | Pass      |
|                   | 20°C        | 469.997574  | 470.000005 | 470.002173  | Pass      |
|                   | 30°C        | 469.997574  | 469.999986 | 470.002173  | Pass      |
|                   | 40°C        | 469.997574  | 470.000023 | 470.002173  | Pass      |
|                   | 50°C        | 469.997574  | 470.000014 | 470.002173  | Pass      |

The test sample did not exhibit any malfunction, degradation of performance or deviation from specified indication beyond the tolerances given in the individual equipment specifications or approved test plan when tested in accordance with the above stated test method.

## SUSCEPTIBILITY TEST DATA SHEET

|                            |                                                        |
|----------------------------|--------------------------------------------------------|
| <b>Test Method</b>         | <b>FCC Part 90 Section 2.1055, Frequency Stability</b> |
| <b>Customer</b>            | Magnetek Inc.                                          |
| <b>Job Number</b>          | R-2148P-2                                              |
| <b>Test Sample</b>         | 411 to 470 MHz Transceiver Module                      |
| <b>Model / Part Number</b> | 198-71000-10433                                        |
| <b>Serial Number</b>       | 0008                                                   |
| <b>Operating Mode</b>      | Tx Normal                                              |
| <b>Technician</b>          | S. Macdonald                                           |
| <b>Date</b>                | 5/28/14                                                |

**Notes:** Nominal frequencies were measured with a room ambient temperature of 22.0°C and a relative humidity reading of 5137%. Nominal voltage was set to 3.3 VDC  
Nominal readings→ 411 MHz = 410.999900; 433.05 MHz = 433.049889; 470 MHz = 469.999874

| Frequency MHz                                                                                                                                                                                                                                                                | Temperature | Lower Limit | Measured   | Upper Limit | Pass/Fail |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|------------|-------------|-----------|
| 411 (3.6 Vdc)                                                                                                                                                                                                                                                                | -20°C       | 410.997845  | 410.999999 | 411.001955  | Pass      |
|                                                                                                                                                                                                                                                                              | -10°C       | 410.997845  | 411.000030 | 411.001955  | Pass      |
|                                                                                                                                                                                                                                                                              | 0°C         | 410.997845  | 411.000010 | 411.001955  | Pass      |
|                                                                                                                                                                                                                                                                              | 10°C        | 410.997845  | 411.000046 | 411.001955  | Pass      |
|                                                                                                                                                                                                                                                                              | 20°C        | 410.997845  | 411.000007 | 411.001955  | Pass      |
|                                                                                                                                                                                                                                                                              | 30°C        | 410.997845  | 410.999990 | 411.001955  | Pass      |
|                                                                                                                                                                                                                                                                              | 40°C        | 410.997845  | 410.999941 | 411.001955  | Pass      |
|                                                                                                                                                                                                                                                                              | 50°C        | 410.997845  | 410.999991 | 411.001955  | Pass      |
| 433.05 (3.6 Vdc)                                                                                                                                                                                                                                                             | -20°C       | 433.047724  | 433.050041 | 433.052054  | Pass      |
|                                                                                                                                                                                                                                                                              | -10°C       | 433.047724  | 433.050040 | 433.052054  | Pass      |
|                                                                                                                                                                                                                                                                              | 0°C         | 433.047724  | 433.050022 | 433.052054  | Pass      |
|                                                                                                                                                                                                                                                                              | 10°C        | 433.047724  | 433.050012 | 433.052054  | Pass      |
|                                                                                                                                                                                                                                                                              | 20°C        | 433.047724  | 433.049971 | 433.052054  | Pass      |
|                                                                                                                                                                                                                                                                              | 30°C        | 433.047724  | 433.049932 | 433.052054  | Pass      |
|                                                                                                                                                                                                                                                                              | 40°C        | 433.047724  | 433.049977 | 433.052054  | Pass      |
|                                                                                                                                                                                                                                                                              | 50°C        | 433.047724  | 433.049954 | 433.052054  | Pass      |
| 470 (3.6 Vdc)                                                                                                                                                                                                                                                                | -20°C       | 469.997574  | 470.000050 | 470.002173  | Pass      |
|                                                                                                                                                                                                                                                                              | -10°C       | 469.997574  | 470.000012 | 470.002173  | Pass      |
|                                                                                                                                                                                                                                                                              | 0°C         | 469.997574  | 470.000002 | 470.002173  | Pass      |
|                                                                                                                                                                                                                                                                              | 10°C        | 469.997574  | 470.000031 | 470.002173  | Pass      |
|                                                                                                                                                                                                                                                                              | 20°C        | 469.997574  | 470.000005 | 470.002173  | Pass      |
|                                                                                                                                                                                                                                                                              | 30°C        | 469.997574  | 469.999986 | 470.002173  | Pass      |
|                                                                                                                                                                                                                                                                              | 40°C        | 469.997574  | 470.000023 | 470.002173  | Pass      |
|                                                                                                                                                                                                                                                                              | 50°C        | 469.997574  | 470.000014 | 470.002173  | Pass      |
| The test sample did not exhibit any malfunction, degradation of performance or deviation from specified indication beyond the tolerances given in the individual equipment specifications or approved test plan when tested in accordance with the above stated test method. |             |             |            |             |           |

**RSS-119 Section 5.3 – Transmitters with Output Power not Exceeding 120 mW  
Test Data**

## SUSCEPTIBILITY TEST DATA SHEET

|                       |                                                                    |
|-----------------------|--------------------------------------------------------------------|
| <b>Test Method</b>    | IC RSS-119, Issue 11, Section 5.3, Transmitter Frequency Stability |
| <b>Customer</b>       | Magnetek Inc.                                                      |
| <b>Job Number</b>     | R-2148P-4                                                          |
| <b>Test Sample</b>    | 411 to 470 MHz Transceiver Module                                  |
| <b>Model</b>          | 198-71000-10433                                                    |
| <b>Serial Number</b>  | 0008                                                               |
| <b>Operating Mode</b> | Tx Normal                                                          |
| <b>Technician</b>     | S. Macdonald                                                       |
| <b>Date</b>           | 5/28/14                                                            |

**Notes:** Nominal frequencies were measured with a room ambient temperature of 22.0°C and a relative humidity reading of 51%. Nominal voltage was set to 3.3 VDC  
Nominal readings→ 411 MHz = 410.999900; 450 MHz = 450.000001; 470 MHz = 469.999874

| Frequency MHz | Temperature | Lower Limit | Measured   | Upper Limit | Pass/Fail |
|---------------|-------------|-------------|------------|-------------|-----------|
| 411 (3.3 Vdc) | -20°C       | 410.997845  | 410.999981 | 411.001955  | Pass      |
|               | -10°C       | 410.997845  | 410.999963 | 411.001955  | Pass      |
|               | 0°C         | 410.997845  | 411.000051 | 411.001955  | Pass      |
|               | 10°C        | 410.997845  | 411.000048 | 411.001955  | Pass      |
|               | 20°C        | 410.997845  | 411.000023 | 411.001955  | Pass      |
|               | 30°C        | 410.997845  | 410.999956 | 411.001955  | Pass      |
|               | 40°C        | 410.997845  | 410.999992 | 411.001955  | Pass      |
|               | 50°C        | 410.997845  | 410.999960 | 411.001955  | Pass      |
| 450 (3.3 Vdc) | -20°C       | 449.99955   | 450.000020 | 450.00045   | Pass      |
|               | -10°C       | 449.99955   | 450.000023 | 450.00045   | Pass      |
|               | 0°C         | 449.99955   | 450.000021 | 450.00045   | Pass      |
|               | 10°C        | 449.99955   | 450.000025 | 450.00045   | Pass      |
|               | 20°C        | 449.99955   | 450.000210 | 450.00045   | Pass      |
|               | 30°C        | 449.99955   | 450.000045 | 450.00045   | Pass      |
|               | 40°C        | 449.99955   | 450.000072 | 450.00045   | Pass      |
|               | 50°C        | 449.99955   | 450.000314 | 450.00045   | Pass      |
| 470 (3.3 Vdc) | -20°C       | 469.997574  | 470.000050 | 470.002173  | Pass      |
|               | -10°C       | 469.997574  | 470.000012 | 470.002173  | Pass      |
|               | 0°C         | 469.997574  | 470.000002 | 470.002173  | Pass      |
|               | 10°C        | 469.997574  | 470.000031 | 470.002173  | Pass      |
|               | 20°C        | 469.997574  | 470.000005 | 470.002173  | Pass      |
|               | 30°C        | 469.997574  | 469.999986 | 470.002173  | Pass      |
|               | 40°C        | 469.997574  | 470.000023 | 470.002173  | Pass      |
|               | 50°C        | 469.997574  | 470.000014 | 470.002173  | Pass      |
|               |             |             |            |             |           |
|               |             |             |            |             |           |
|               |             |             |            |             |           |
|               |             |             |            |             |           |

The test sample did not exhibit any malfunction, degradation of performance or deviation from specified indication beyond the tolerances given in the individual equipment specifications or approved test plan when tested in accordance with the above stated test method.

## SUSCEPTIBILITY TEST DATA SHEET

|                            |                                                                           |
|----------------------------|---------------------------------------------------------------------------|
| <b>Test Method</b>         | <b>IC RSS-119, Issue 11, Section 5.3, Transmitter Frequency Stability</b> |
| <b>Customer</b>            | Magnetek Inc.                                                             |
| <b>Job Number</b>          | R-2148P-4                                                                 |
| <b>Test Sample</b>         | 411 to 470 MHz Transceiver Module                                         |
| <b>Model / Part Number</b> | 198-71000-10433                                                           |
| <b>Serial Number</b>       | 0008                                                                      |
| <b>Operating Mode</b>      | Tx Normal                                                                 |
| <b>Technician</b>          | S. Macdonald                                                              |
| <b>Date</b>                | 5/28/14                                                                   |

**Notes:** Nominal frequencies were measured with a room ambient temperature of 22.0°C and a relative humidity reading of 5137%. Nominal voltage was set to 3.3 VDC.

Nominal readings→ 411 MHz = 410.999900; 450 MHz = 450.000001; 470 MHz = 469.999874

| Frequency MHz  | Temperature | Lower Limit | Measured   | Upper Limit | Pass/Fail |
|----------------|-------------|-------------|------------|-------------|-----------|
| 411 (3.25 Vdc) | -20°C       | 410.997845  | 410.999961 | 411.001955  | Pass      |
|                | -10°C       | 410.997845  | 410.999990 | 411.001955  | Pass      |
|                | 0°C         | 410.997845  | 411.000082 | 411.001955  | Pass      |
|                | 10°C        | 410.997845  | 411.000064 | 411.001955  | Pass      |
|                | 20°C        | 410.997845  | 410.999991 | 411.001955  | Pass      |
|                | 30°C        | 410.997845  | 410.999974 | 411.001955  | Pass      |
|                | 40°C        | 410.997845  | 410.999960 | 411.001955  | Pass      |
|                | 50°C        | 410.997845  | 410.999976 | 411.001955  | Pass      |
| 450 (3.25 Vdc) | -20°C       | 449.99955   | 450.000310 | 450.00045   | Pass      |
|                | -10°C       | 449.99955   | 450.000023 | 450.00045   | Pass      |
|                | 0°C         | 449.99955   | 450.000056 | 450.00045   | Pass      |
|                | 10°C        | 449.99955   | 450.000091 | 450.00045   | Pass      |
|                | 20°C        | 449.99955   | 450.000054 | 450.00045   | Pass      |
|                | 30°C        | 449.99955   | 450.000064 | 450.00045   | Pass      |
|                | 40°C        | 449.99955   | 450.000012 | 450.00045   | Pass      |
|                | 50°C        | 449.99955   | 450.000410 | 450.00045   | Pass      |
| 470 (3.25 Vdc) | -20°C       | 469.997574  | 470.000050 | 470.002173  | Pass      |
|                | -10°C       | 469.997574  | 470.000012 | 470.002173  | Pass      |
|                | 0°C         | 469.997574  | 470.000002 | 470.002173  | Pass      |
|                | 10°C        | 469.997574  | 470.000031 | 470.002173  | Pass      |
|                | 20°C        | 469.997574  | 470.000005 | 470.002173  | Pass      |
|                | 30°C        | 469.997574  | 469.999986 | 470.002173  | Pass      |
|                | 40°C        | 469.997574  | 470.000023 | 470.002173  | Pass      |
|                | 50°C        | 469.997574  | 470.000014 | 470.002173  | Pass      |
|                |             |             |            |             |           |
|                |             |             |            |             |           |
|                |             |             |            |             |           |

The test sample did not exhibit any malfunction, degradation of performance or deviation from specified indication beyond the tolerances given in the individual equipment specifications or approved test plan when tested in accordance with the above stated test method.

## SUSCEPTIBILITY TEST DATA SHEET

|                            |                                                                    |
|----------------------------|--------------------------------------------------------------------|
| <b>Test Method</b>         | IC RSS-119, Issue 11, Section 5.3, Transmitter Frequency Stability |
| <b>Customer</b>            | Magnetek Inc.                                                      |
| <b>Job Number</b>          | R-2148P-4                                                          |
| <b>Test Sample</b>         | 411 to 470 MHz Transceiver Module                                  |
| <b>Model / Part Number</b> | 198-71000-10433                                                    |
| <b>Serial Number</b>       | 0008                                                               |
| <b>Operating Mode</b>      | Tx Normal                                                          |
| <b>Technician</b>          | S. Macdonald                                                       |
| <b>Date</b>                | 5/28/14                                                            |

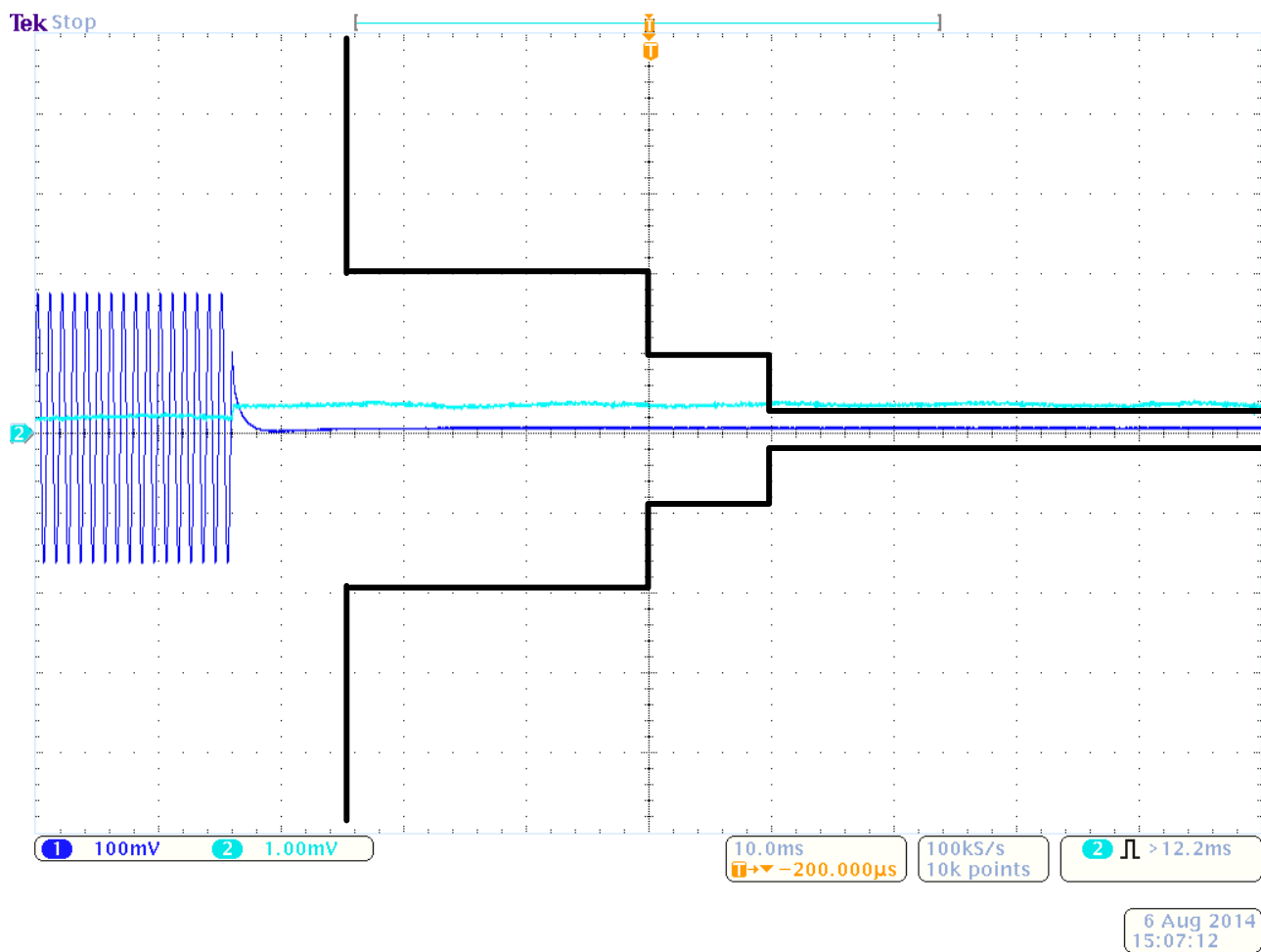
**Notes:** Nominal frequencies were measured with a room ambient temperature of 22.0°C and a relative humidity reading of 5137%. Nominal voltage was set to 3.3 VDC

Nominal readings → 411 MHz = 410.999900; 450 MHz = 450.000001; 470 MHz = 469.999874

| Frequency MHz | Temperature | Lower Limit | Measured   | Upper Limit | Pass/Fail |
|---------------|-------------|-------------|------------|-------------|-----------|
| 411 (3.6 Vdc) | -20°C       | 410.997845  | 410.999999 | 411.001955  | Pass      |
|               | -10°C       | 410.997845  | 411.000030 | 411.001955  | Pass      |
|               | 0°C         | 410.997845  | 411.000010 | 411.001955  | Pass      |
|               | 10°C        | 410.997845  | 411.000046 | 411.001955  | Pass      |
|               | 20°C        | 410.997845  | 411.000007 | 411.001955  | Pass      |
|               | 30°C        | 410.997845  | 410.999990 | 411.001955  | Pass      |
|               | 40°C        | 410.997845  | 410.999941 | 411.001955  | Pass      |
|               | 50°C        | 410.997845  | 410.999991 | 411.001955  | Pass      |
| 450 (3.6 Vdc) | -20°C       | 449.99955   | 449.000054 | 450.00045   | Pass      |
|               | -10°C       | 449.99955   | 450.000021 | 450.00045   | Pass      |
|               | 0°C         | 449.99955   | 450.000128 | 450.00045   | Pass      |
|               | 10°C        | 449.99955   | 450.000351 | 450.00045   | Pass      |
|               | 20°C        | 449.99955   | 450.000014 | 450.00045   | Pass      |
|               | 30°C        | 449.99955   | 450.000025 | 450.00045   | Pass      |
|               | 40°C        | 449.99955   | 450.000029 | 450.00045   | Pass      |
|               | 50°C        | 449.99955   | 450.000024 | 450.00045   | Pass      |
| 470 (3.6 Vdc) | -20°C       | 469.997574  | 470.000050 | 470.002173  | Pass      |
|               | -10°C       | 469.997574  | 470.000012 | 470.002173  | Pass      |
|               | 0°C         | 469.997574  | 470.000002 | 470.002173  | Pass      |
|               | 10°C        | 469.997574  | 470.000031 | 470.002173  | Pass      |
|               | 20°C        | 469.997574  | 470.000005 | 470.002173  | Pass      |
|               | 30°C        | 469.997574  | 469.999986 | 470.002173  | Pass      |
|               | 40°C        | 469.997574  | 470.000023 | 470.002173  | Pass      |
|               | 50°C        | 469.997574  | 470.000014 | 470.002173  | Pass      |

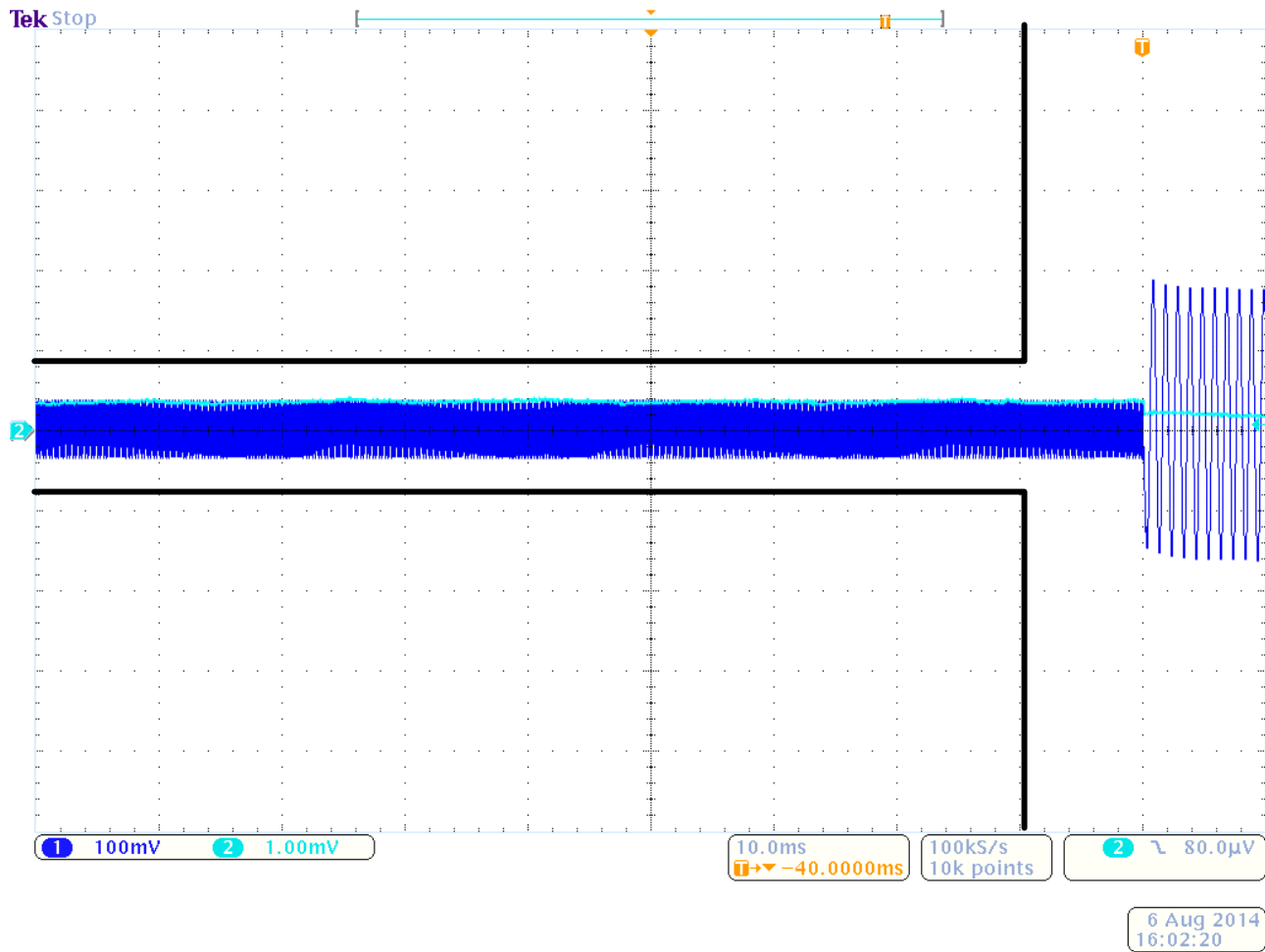
The test sample did not exhibit any malfunction, degradation of performance or deviation from specified indication beyond the tolerances given in the individual equipment specifications or approved test plan when tested in accordance with the above stated test method.

**IC RSS-119, 5.9, Transient Frequency Behavior  
Test Data**



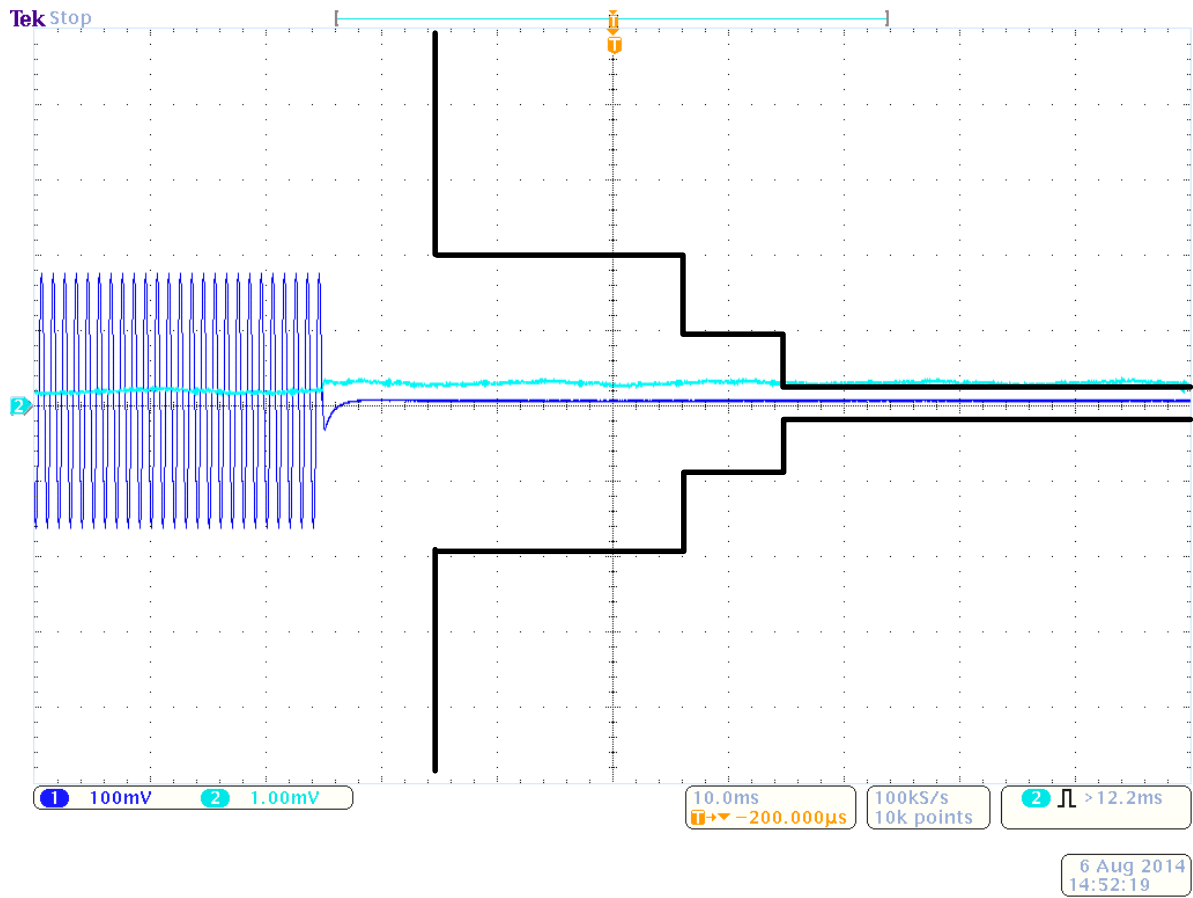
**Test Method:** 5.9 Transient Frequency Behavior

**Notes:** 411MHz, Powered On



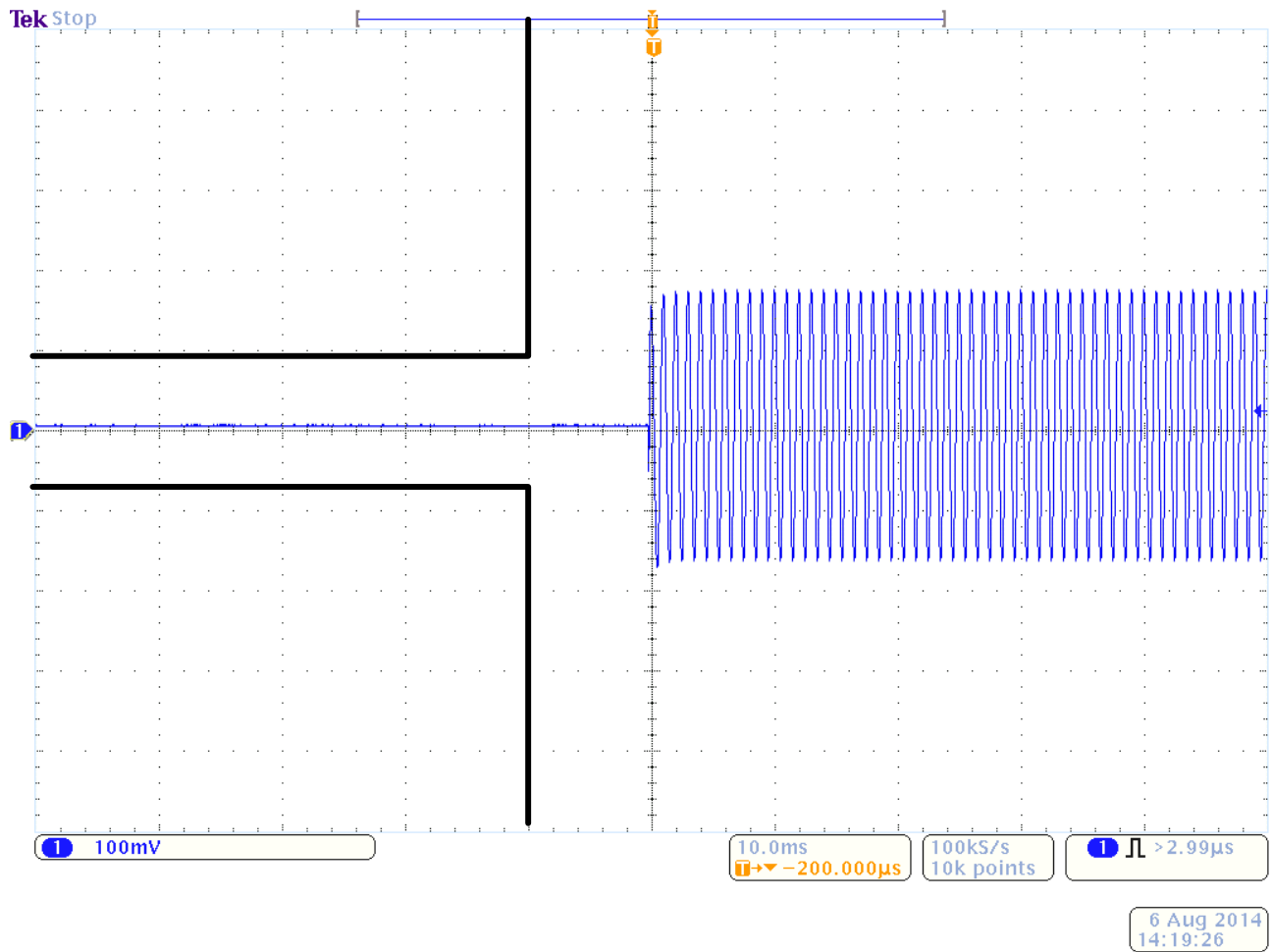
**Test Method:** 5.9 Transient Frequency Behavior

**Notes:** 411MHz, Powered Off



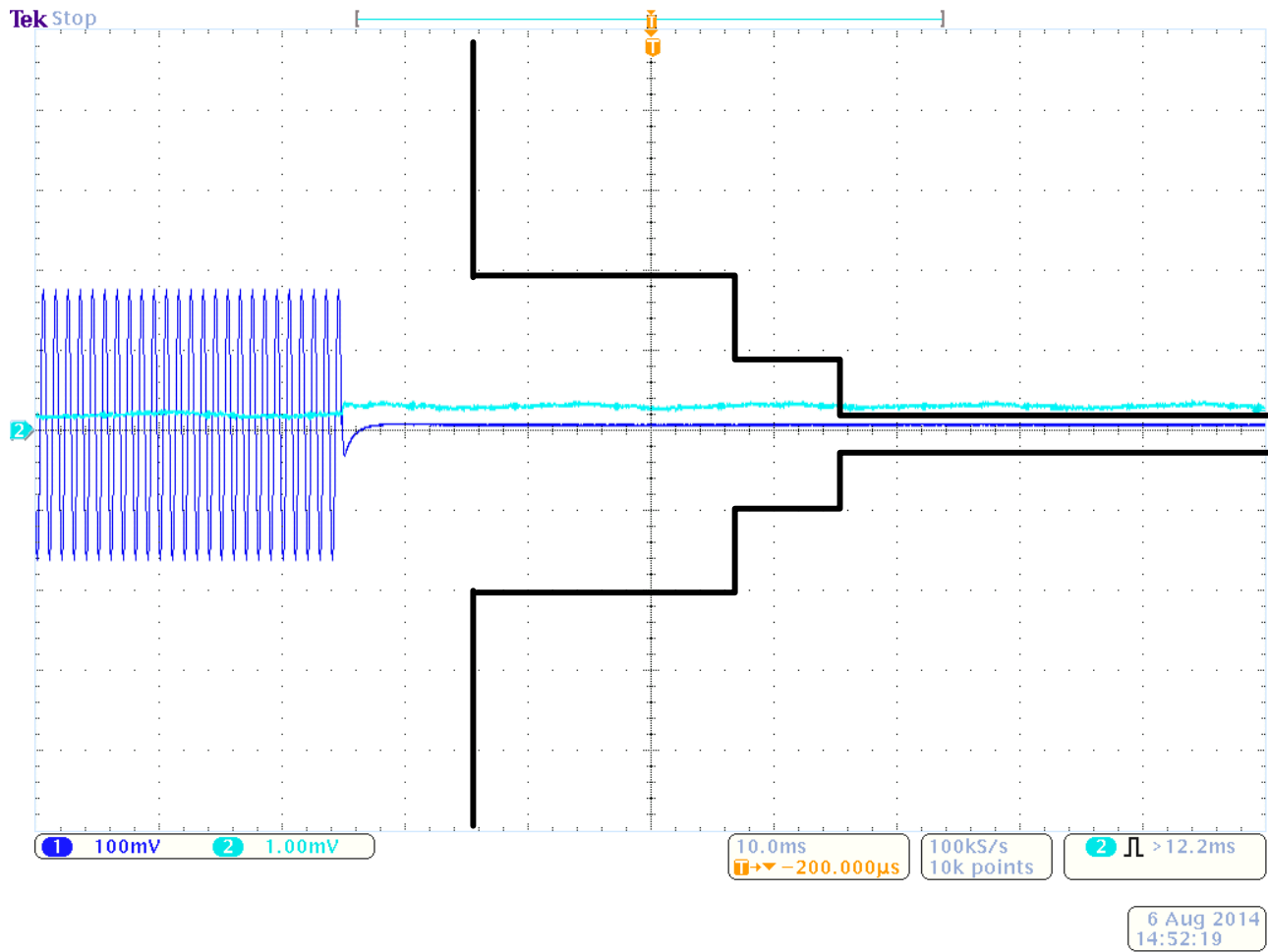
**Test Method:** 5.9 Transient Frequency Behavior

**Notes:** 450MHz, Powered On



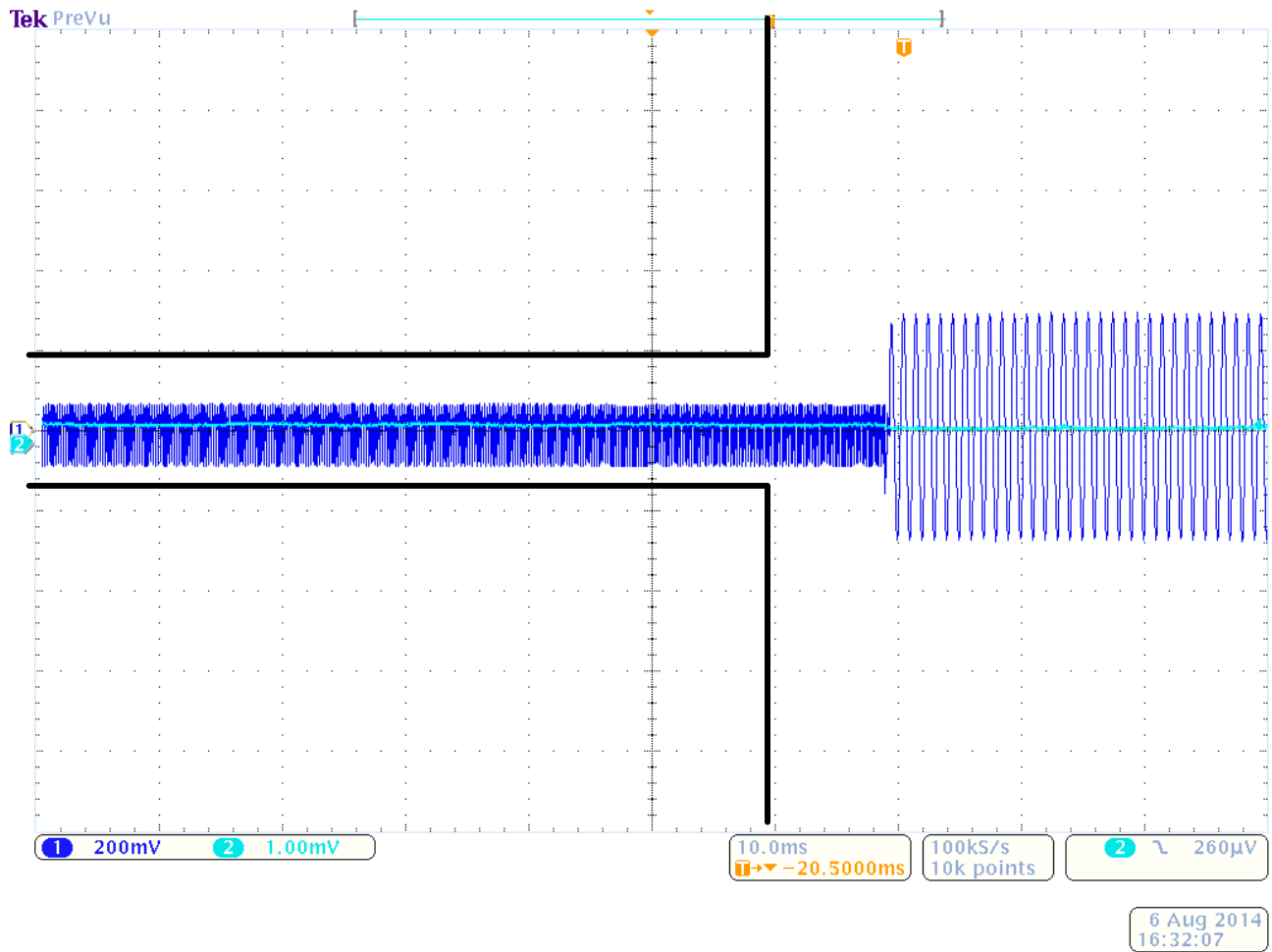
**Test Method:** 5.9 Transient Frequency Behavior

**Notes:** 450MHz, Powered Off



**Test Method:** 5.9 Transient Frequency Behavior

**Notes:** 470MHz, Powered On



**Test Method:** 5.9 Transient Frequency Behavior

**Notes:** 470MHz, Powered Off