

# Nextivity, Inc.

## ADDENDUM TO TEST REPORT 95395-16

### Provider Specific Consumer Signal Booster Model: Cel-Fi D32-2/4

#### Tested To The Following Standards:

FCC Part 20.21

Report No.: 95395-16A

Date of issue: July 9, 2014



This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

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## ADMINISTRATIVE INFORMATION

### Test Report Information

**REPORT PREPARED FOR:**

Nextivity, Inc.  
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San Diego, CA 92128

**REPORT PREPARED BY:**

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CKC Laboratories, Inc.  
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Mariposa, CA 95338

REPRESENTATIVE: Michiel Lotter  
Customer Reference Number: 001889

Project Number: 95395

**DATE OF EQUIPMENT RECEIPT:**

March 10, 2014

**DATE(S) OF TESTING:**

March 10 - April 10, 2014

### Revision History

**Original:** Testing of the Provider Specific Consumer Signal Booster, Cel-Fi D32-2/4 to FCC Part 20.21.

**Addendum A:** To correct the KDB and Wideband Consumer Signal Booster Measurement Guidance title in the Standard and Specification table. To correct the Noise Limit references in the Standard and Specification table. To correct the Noise Limit frequency tables UL 1850-1915MHz and UL 1710-1755MHz by removing the 20.21e.9.A.2.i column which applies to downlink noise power and shouldn't be in the uplink table.

### Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.



**Steve Behm**  
*Director of Quality Assurance & Engineering Services*  
*CKC Laboratories, Inc.*

## Test Facility Information



Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):  
CKC Laboratories, Inc.  
110 Olinda Place  
Brea, CA 92823

## Software Versions

| CKC Laboratories Proprietary Software | Version |
|---------------------------------------|---------|
| EMITest Emissions                     | 5.00.14 |

## Site Registration & Accreditation Information

| Location | CB #   | TAIWAN         | CANADA  | FCC   | JAPAN  |
|----------|--------|----------------|---------|-------|--------|
| Brea A   | US0060 | SL2-IN-E-1146R | 3082D-1 | 90473 | A-0147 |

## SUMMARY OF RESULTS

### Standard / Specification: FCC Part 20.21

| KDB publication 935210 D04 Provider-Specific<br>Booster Measurements DR06-41704 |                                                                     | FCC Part 20.21 Section Correlation             |                                             | Results         |
|---------------------------------------------------------------------------------|---------------------------------------------------------------------|------------------------------------------------|---------------------------------------------|-----------------|
| Guidance Sec #                                                                  | Guidance Description                                                | FCC Sec #                                      | FCC Rule Description                        |                 |
| 7.1                                                                             | Authorized Frequency Band Verification and authorized CMRS Provider | 20.21(a)(4) and 20.21(e)(3)                    | Self-Monitoring Frequency Bands             | Pass            |
| 7.2                                                                             | Maximum Power Measurement                                           | 20.21(e)(9)(i)(B) and 20.21(e)(9)(i)(D)        | Bidirectional Capabilities Power Limit      | Pass            |
| 7.3                                                                             | Maximum Booster Gain Computation                                    | 20.21(e)(9)(i)(B) and 20.21(e)(9)(i)(C)(1)     | Bidirectional Capabilities                  | Pass            |
| 7.4                                                                             | Intermodulation Product                                             | 20.21(e)(9)(i)(G)                              | Intermodulation Limit                       | Pass            |
| 7.5                                                                             | Out of Band Emissions                                               | 20.21(e)(9)(i)(F)                              | Out of Band Emission                        | Pass            |
| 7.6 <sup>1</sup>                                                                | Conducted Spurious Emission <sup>1</sup>                            | Part 22/24/27 <sup>1</sup>                     | Conducted Spurious Emission <sup>1</sup>    | NA <sup>1</sup> |
| 7.7a) to g)<br>7.7h) to m)<br>7.7n) to t)                                       | Noise Limit procedure<br>Variable Noise<br>Variable Noise Timing    | 20.21(e)(9)(i)(A)<br>20.21(e)(9)(i)(I)         | Noise Limits<br><br>Transmit power off Mode | Pass            |
| 7.8.                                                                            | Uplink inactivity                                                   | 20.21(e)(9)(i)(J)                              | Uplink inactivity                           | Pass            |
| 7.9a) to l)<br>7.9m) to s)                                                      | Variable Booster gain<br>Variable Uplink Gain Timing                | 20.21(e)(8)(i)(C) (1),(2)<br>20.21(e)(8)(i)(H) | Booster Gain<br>Transmit Power Off Mode     | Pass            |
| 7.10                                                                            | Occupied Band Width                                                 | 2.1049 Part 22/24/27 <sup>1</sup>              | Occupied Bandwidth <sup>1</sup>             | NA <sup>1</sup> |
| 7.11                                                                            | Oscillation Detection                                               | 20.21(e)(8)(ii)(A)                             | Anti-oscillation                            | Pass            |
| 7.12                                                                            | Radiated Spurious Emission <sup>1</sup>                             | Part 22/24/27 <sup>1</sup>                     | Radiated Spurious Emission <sup>1</sup>     | NA <sup>1</sup> |
| 7.13                                                                            | Spectrum Block Filter                                               | 20.21(e)(9)(i)(B)                              | Spectrum block filtering                    | NA <sup>2</sup> |
| 7.14                                                                            | Out of Band Gain Limits                                             | 20.21(e)(9)(i)(E)                              | Out of Band Gain Limits                     | Pass            |
| 7.15                                                                            | Frequency Stability <sup>1</sup>                                    | 2.1055 / 22/24/27 <sup>1</sup>                 | Frequency Stability                         | NA <sup>1</sup> |

NA<sup>1</sup> = A different standard applies; see applicable test report.

NA<sup>2</sup> = Not applicable. See the section in the report for the reason.

## Conditions During Testing

This list is a summary of the conditions noted for or modifications made to the equipment during testing.

| Summary of Conditions |
|-----------------------|
| None                  |

## EQUIPMENT UNDER TEST (EUT)

### EQUIPMENT UNDER TEST

#### Provider Specific Consumer Signal Booster

Manuf: Nextivity, Inc.  
Model: Cel-Fi D32-2/4 CU  
Serial: 175406000036

#### Provider Specific Consumer Signal Booster

Manuf: Nextivity, Inc.  
Model: Cel-Fi D32-2/4 NU  
Serial: 174406000145

### PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

#### Signal Generator

Manuf: Anritsu  
Model: MT8820A  
Serial: 620025036

#### Signal Generator

Manuf: Agilent  
Model: E4438C  
Serial: MY42082260

#### Power Supply

Manuf: Hon-Kwang  
Model: HK-AX-120A150-US  
Serial: None

#### Signal Generator

Manuf: Agilent  
Model: E4433B  
Serial: US40052164

#### Combiner

Manuf: Anaren  
Model: 44000  
Serial: C00087

## FCC PART 20.21

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) CFR 47 Clause 20.21.(e)(8) requirements for Wideband Consumer Signal Boosters.

### Clause 7.1.1 Authorized Frequency Band Verification / 7.1.2 Authorized CMRS Provider

#### Test Conditions / Setup

Test Location: CKC Laboratories • 110 Olinda Place • Brea, CA 92823 • 714-993-6112

Customer: **Nextivity, Inc.**

Specification: **7.1.1 Authorized Frequency Band Verification**

Work Order #: **95395** Date: 3/12/2014

Test Type: **Conducted Emissions** Time: 09:37:42

Equipment: **Provider Specific Consumer Signal Booster** Sequence#: 1

Manufacturer: Nextivity, Inc. Tested By: E. Wong

Model: Cel-Fi D32-2/4 110V 60Hz

S/N: 175406000036, 174406000145

#### Test Equipment:

| ID | Asset #  | Description       | Model                    | Calibration Date | Cal Due Date |
|----|----------|-------------------|--------------------------|------------------|--------------|
| T1 | AN02672  | Spectrum Analyzer | E4446A                   | 9/4/2012         | 9/4/2014     |
| T2 | AN03430  | Attenuator        | 75A-10-12                | 9/5/2013         | 9/5/2015     |
| T3 | ANP06543 | Cable             | 32022-29094K-29094K-24TC | 11/20/2013       | 11/20/2015   |

#### Equipment Under Test (\* = EUT):

| Function                                   | Manufacturer    | Model #           | S/N          |
|--------------------------------------------|-----------------|-------------------|--------------|
| Provider Specific Consumer Signal Booster* | Nextivity, Inc. | Cel-Fi D32-2/4 CU | 175406000036 |
| Provider Specific Consumer Signal Booster  | Nextivity, Inc. | Cel-Fi D32-2/4 NU | 174406000145 |

#### Support Devices:

| Function         | Manufacturer | Model #          | S/N        |
|------------------|--------------|------------------|------------|
| Signal Generator | Anritsu      | MT8820A          | 6200250367 |
| Signal Generator | Agilent      | E4438C           | MY42082260 |
| Power Supply     | Hon-Kwang    | HK-AX-120A150-US | NA         |
| Power Supply     | Hon-Kwang    | HK-AX-120A150-US | NA         |

**Test Conditions / Notes:**

The EUT is provider specific signal booster pair consisted of a Network unit (NU) and a Coverage unit (CU) using proprietary 5.8GHz Wireless interface.

The EUT is manufacturer configurable to operate in relay bandwidth of 5MHz, 10MHz, 15MHz and 20MHz within the CMRS band by setting the bandwidth and center frequency of programmable Spectrum Block Filter, Gain and other operational parameter based on received public land mobile network (PLMN) ID. For testing purposes, only spectrum block filter of 5MHz will be evaluated.

The two EUT are placed on the test bench, connected via coax cable, combiner and 50 dB attenuators. The unit not under evaluation is placed in shielded enclosure to improve RF isolation.

UNII Tx /RX port of NU is connected to UNII TX/RX port of CU.

Evaluation are conducted at Donor power Port band 2 and band 4, Server port band 2 and band 4.

Signal: 4.1MHz AWGN

UL = 1850-1915MHz, 1710-1755MHz

DL = 1930-1990MHz, 2110-2155MHz

Test environment conditions:

Temperature - 24°C

Relative Humidity - 21%

Pressure - 100kPa

Testing is performed in accordance with Provider Specific Booster test procedure 935210 D04 Provider Specific Booster Measurement DR06-41704, dated 03/06/14.

## Summary of Results

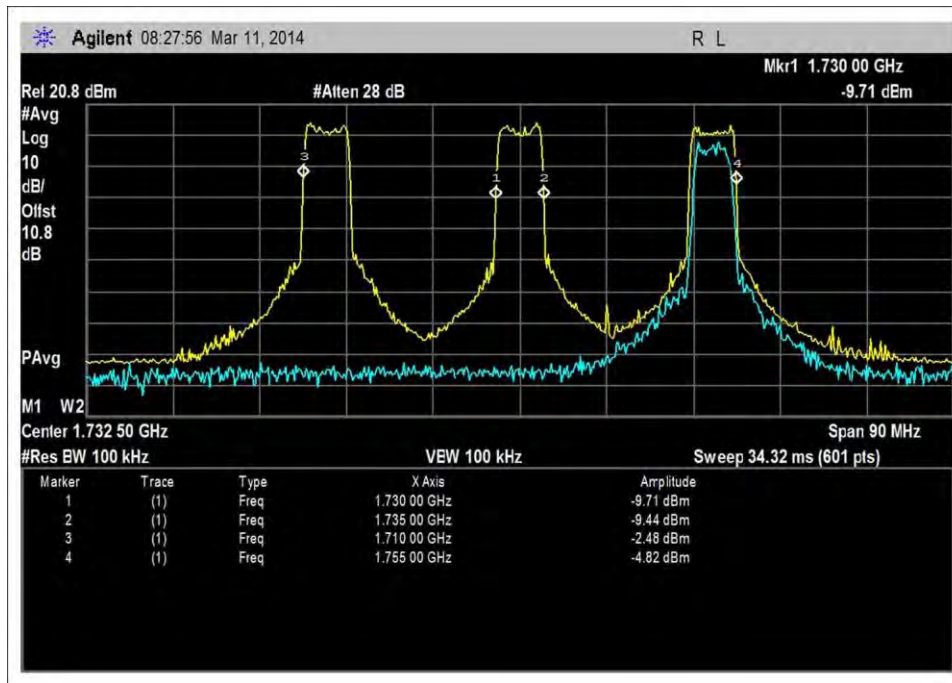
Summary:

Pass, the following plots demonstrate compliance to the following requirement

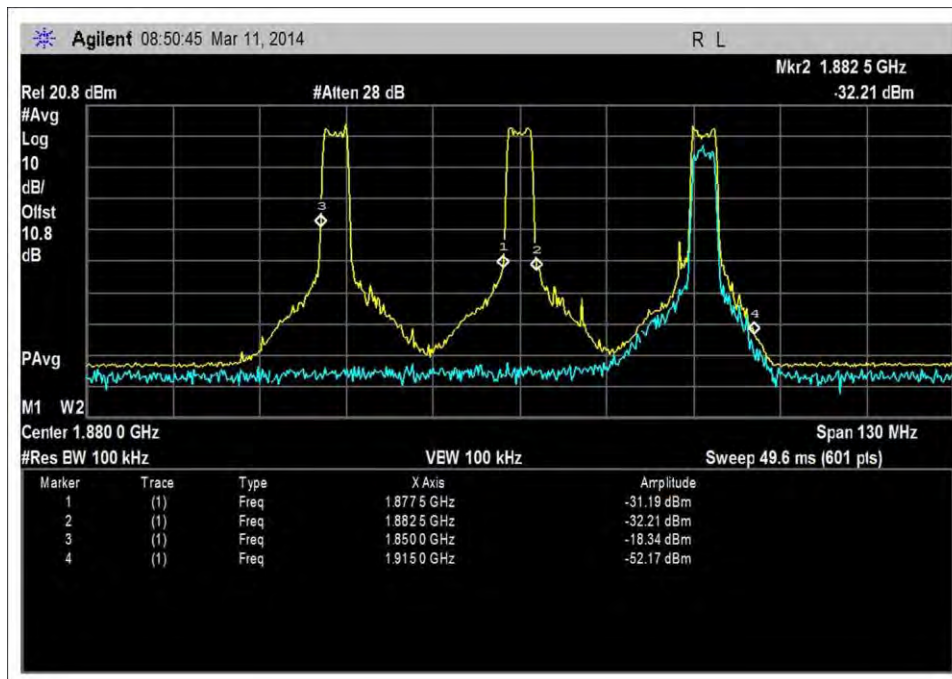
| Procedure Sec # | Guidance Description                                                | FCC Sec #                   | FCC Rule Description            |
|-----------------|---------------------------------------------------------------------|-----------------------------|---------------------------------|
| 7.1             | Authorized Frequency Band Verification and authorized CMRS Provider | 20.21(a)(4) and 20.21(e)(3) | Self-Monitoring Frequency Bands |

The plots below demonstrated the relay frequency /channel stays within the authorized operational band of the booster.

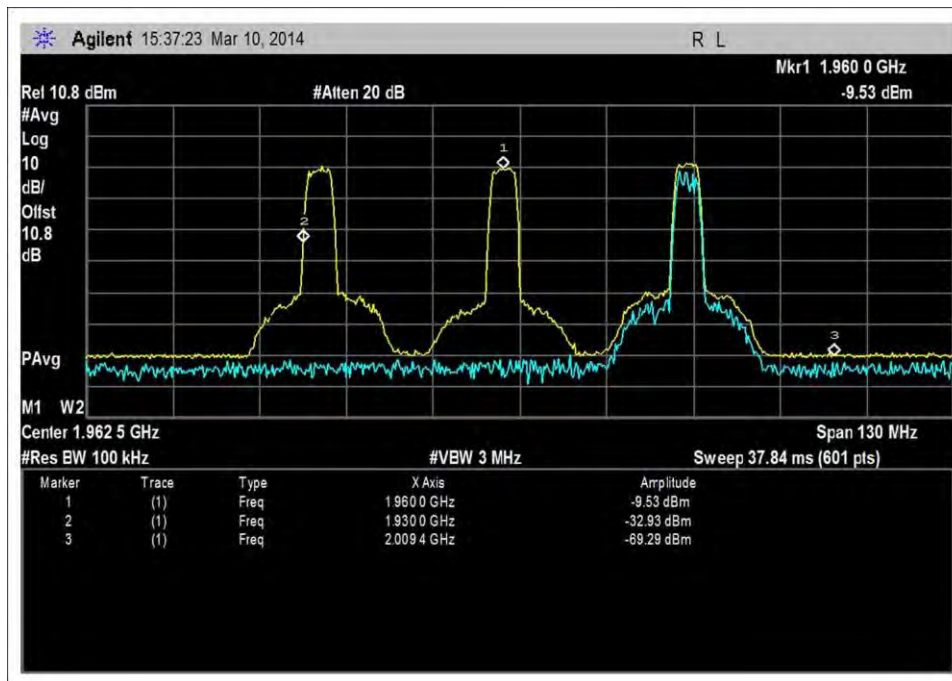
## Test Data



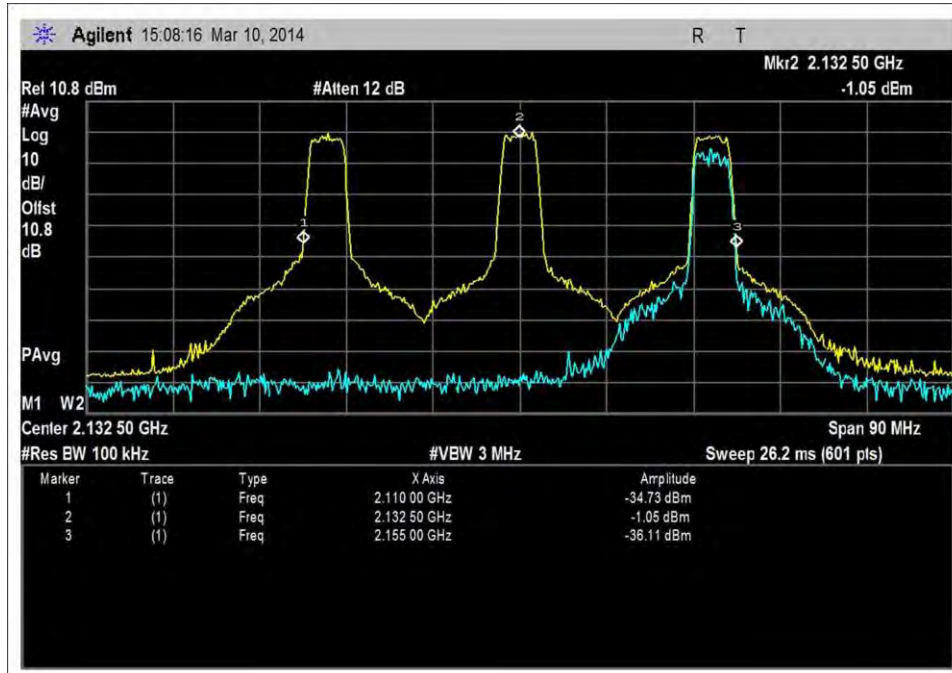
UL\_1710-1755MHz



UL\_1830-1915MHz\_run2



DL\_1930-1995MHz



DL\_2110-2155MHz

## Clause 7.1.2 Authorized CMRS Provider

### Test Conditions / Setup

Test Location: CKC Laboratories • 110 Olinda Place • Brea, CA 92823 • 714-993-6112

Customer: **Nextivity, Inc.**

Specification: **7.1.2 authorized CMRS Provider**

Work Order #: **95395** Date: 3/12/2014

Test Type: **Conducted Emissions** Time: 09:37:42

Equipment: **Provider Specific Consumer Signal Booster** Sequence#: 1

Manufacturer: Nextivity, Inc. Tested By: E. Wong

Model: Cel-Fi D32-2/4 110V 60Hz

S/N: 175406000036, 174406000145

#### Test Equipment:

| ID | Asset #  | Description       | Model                    | Calibration Date | Cal Due Date |
|----|----------|-------------------|--------------------------|------------------|--------------|
| T1 | AN02672  | Spectrum Analyzer | E4446A                   | 9/4/2012         | 9/4/2014     |
| T2 | AN03430  | Attenuator        | 75A-10-12                | 9/5/2013         | 9/5/2015     |
| T3 | ANP06543 | Cable             | 32022-29094K-29094K-24TC | 11/20/2013       | 11/20/2015   |

#### Equipment Under Test (\* = EUT):

| Function                                   | Manufacturer    | Model #           | S/N          |
|--------------------------------------------|-----------------|-------------------|--------------|
| Provider Specific Consumer Signal Booster* | Nextivity, Inc. | Cel-Fi D32-2/4 CU | 175406000036 |
| Provider Specific Consumer Signal Booster  | Nextivity, Inc. | Cel-Fi D32-2/4 NU | 174406000145 |

#### Support Devices:

| Function         | Manufacturer | Model #          | S/N        |
|------------------|--------------|------------------|------------|
| Signal Generator | Anritsu      | MT8820A          | 6200250367 |
| Signal Generator | Agilent      | E4438C           | MY42082260 |
| Power Supply     | Hon-Kwang    | HK-AX-120A150-US | NA         |
| Power Supply     | Hon-Kwang    | HK-AX-120A150-US | NA         |

**Test Conditions / Notes:**

The EUT is provider specific signal booster pair consisted of a Network unit (NU) and a Coverage unit (CU) using proprietary 5.8GHz Wireless interface.

The EUT is manufacturer configurable to operate in relay bandwidth of 5MHz, 10MHz, 15MHz and 20MHz within the CMRS band by setting the bandwidth and center frequency of programmable Spectrum Block Filter, Gain and other operational parameter based on received public land mobile network (PLMN) ID. For testing purposes, only spectrum block filter of 5MHz will be evaluated.

The two EUT are placed on the test bench, connected via coax cable, combiner and 50 dB attenuators. The unit not under evaluation is placed in shielded enclosure to improve RF isolation.

UNII Tx /RX port of NU is connected to UNII TX/RX port of CU.

Evaluation are conducted at Donor power Port band 2 and band 4, Server port band 2 and band 4.

Signal: 4.1MHz AWGN

UL = 1850-1915MHz, 1710-1755MHz

DL = 1930-1990MHz, 2110-2155MHz

Test environment conditions:

Temperature - 24°C

Relative Humidity - 21%

Pressure - 100kPa

Testing is performed in accordance with Provider Specific Booster test procedure 935210 D04 Provider Specific Booster Measurement DR06-41704, dated 03/06/14.

The authorized PLMN ID for this device is 260.

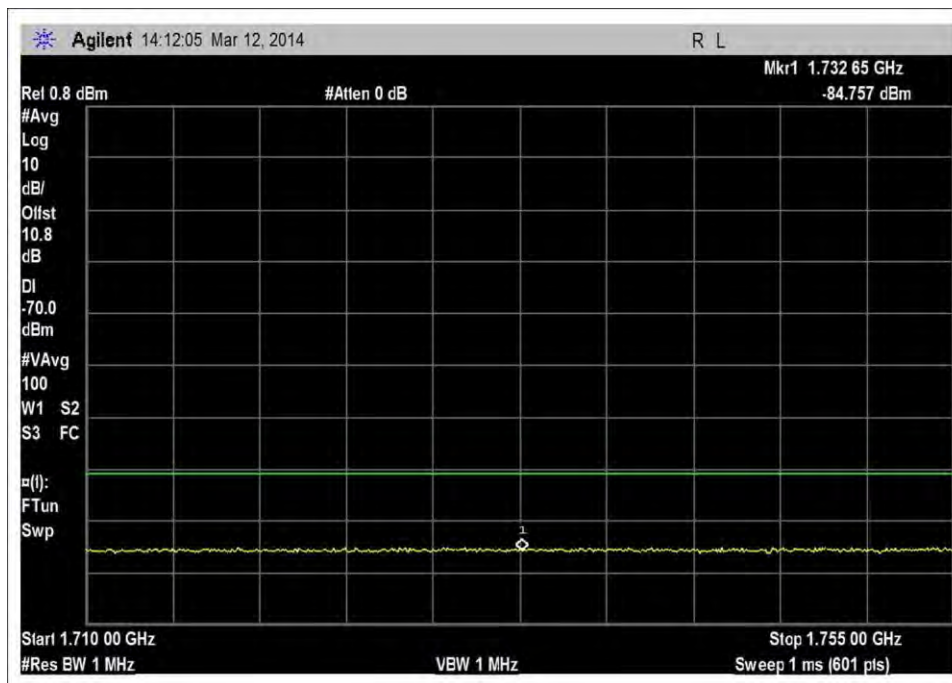
## Summary of Results

**Summary:**

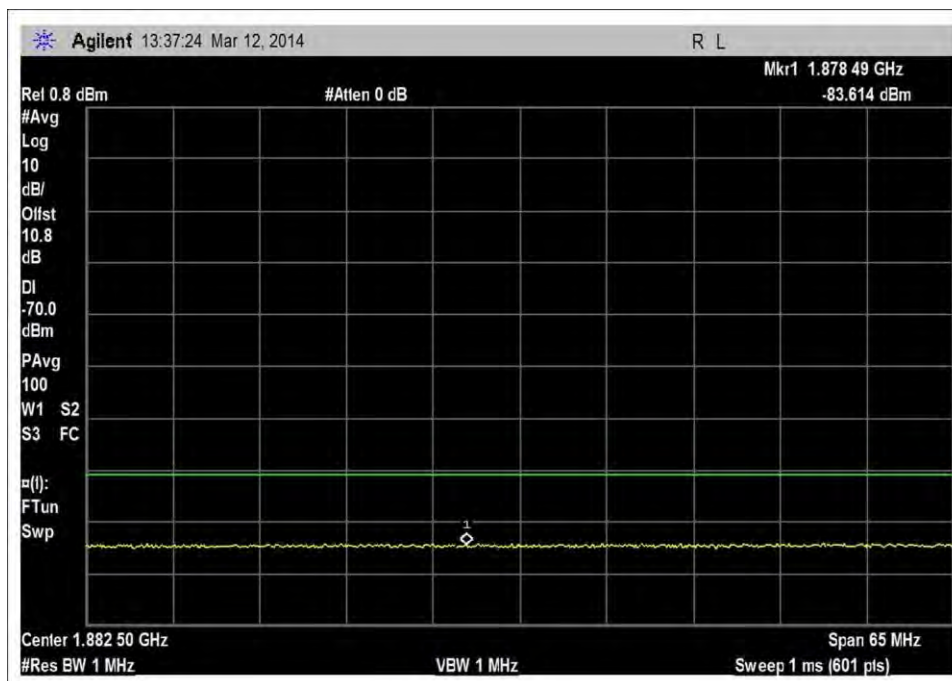
Pass, the following plots demonstrated the device activates the relay channel upon receiving the authorized PLMNID Of 260 while rejected 005 and 410, hence meeting the following requirement.

| Procedure Sec # | Guidance Description                                                | FCC Sec #                   | FCC Rule Description            |
|-----------------|---------------------------------------------------------------------|-----------------------------|---------------------------------|
| 7.1             | Authorized Frequency Band Verification and authorized CMRS Provider | 20.21(a)(4) and 20.21(e)(3) | Self-Monitoring Frequency Bands |

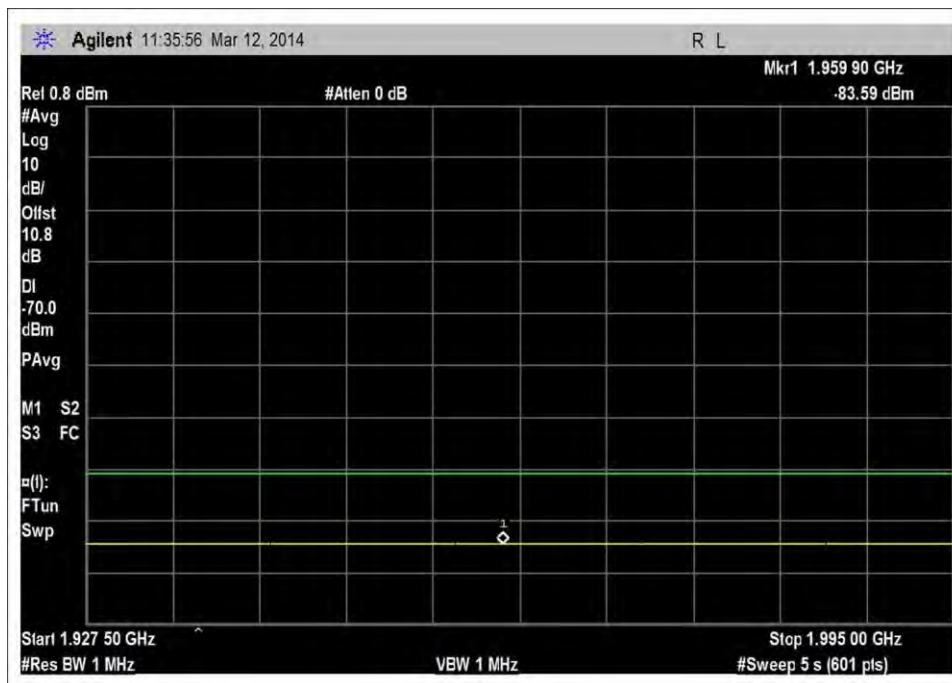
## Test Data



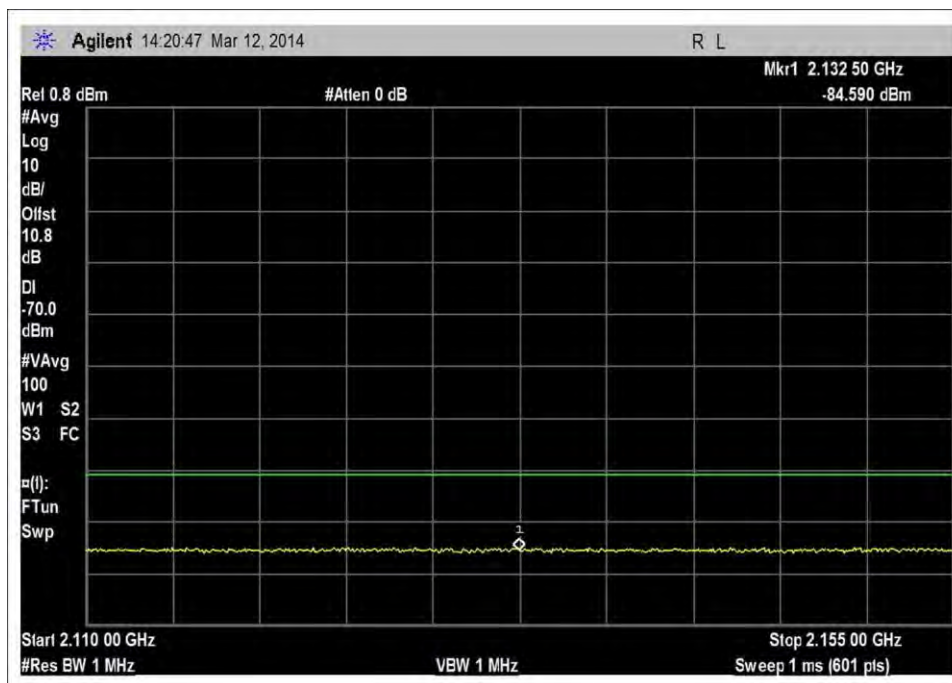
UL\_1710-1755MHz\_005



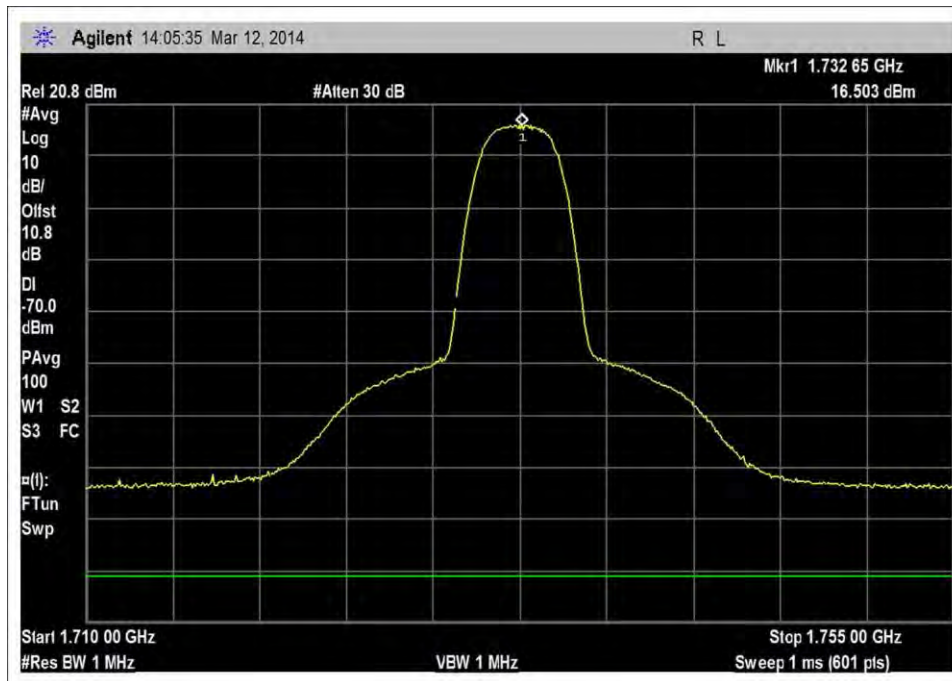
UL\_1850-1915MHz\_005



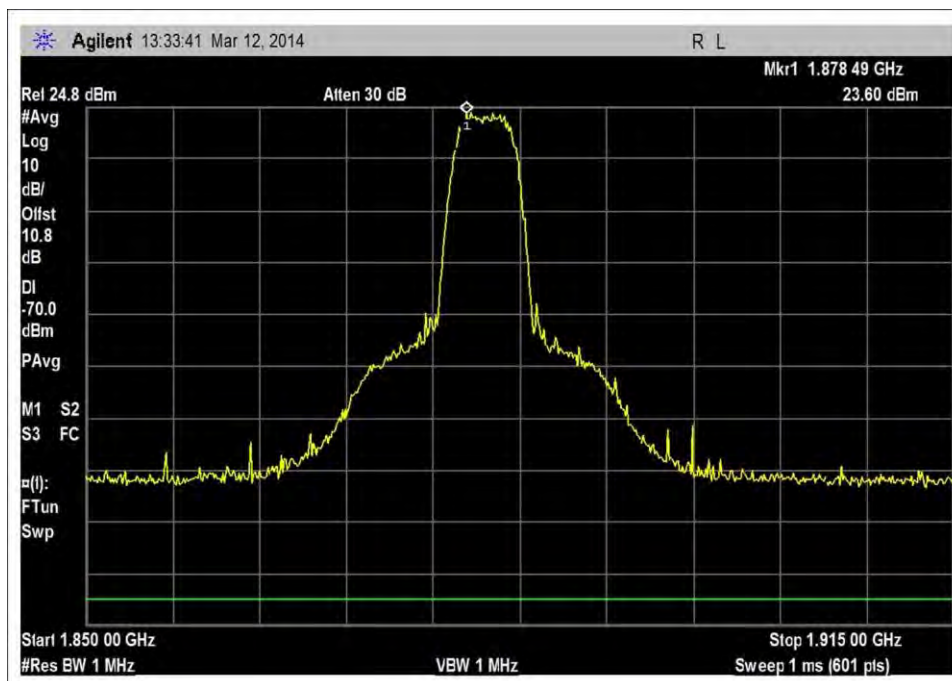
DL\_1930-1995MHz\_005



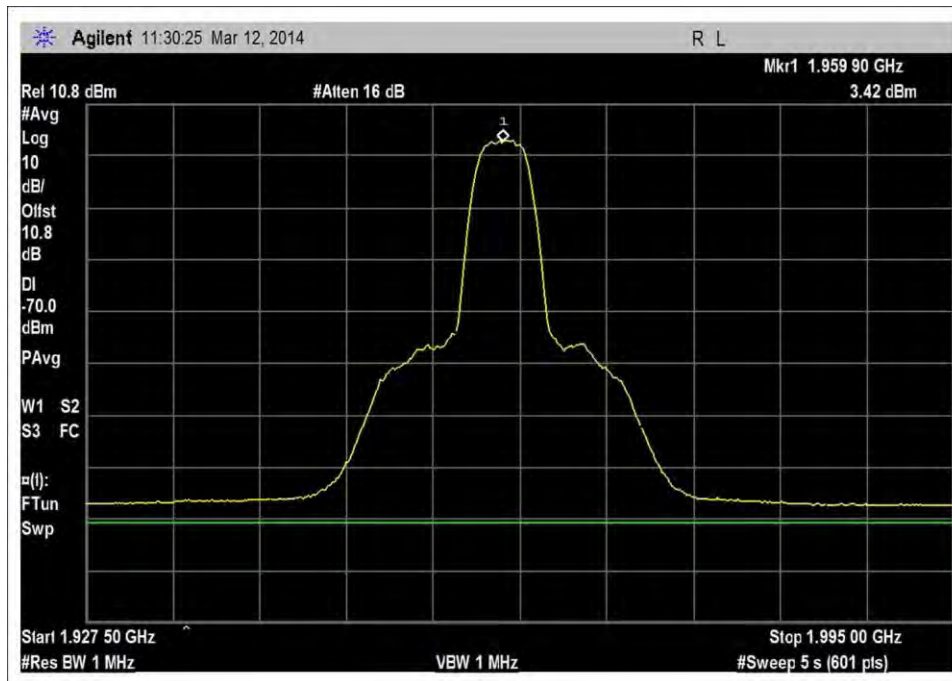
DL\_2110-2155MHz\_005



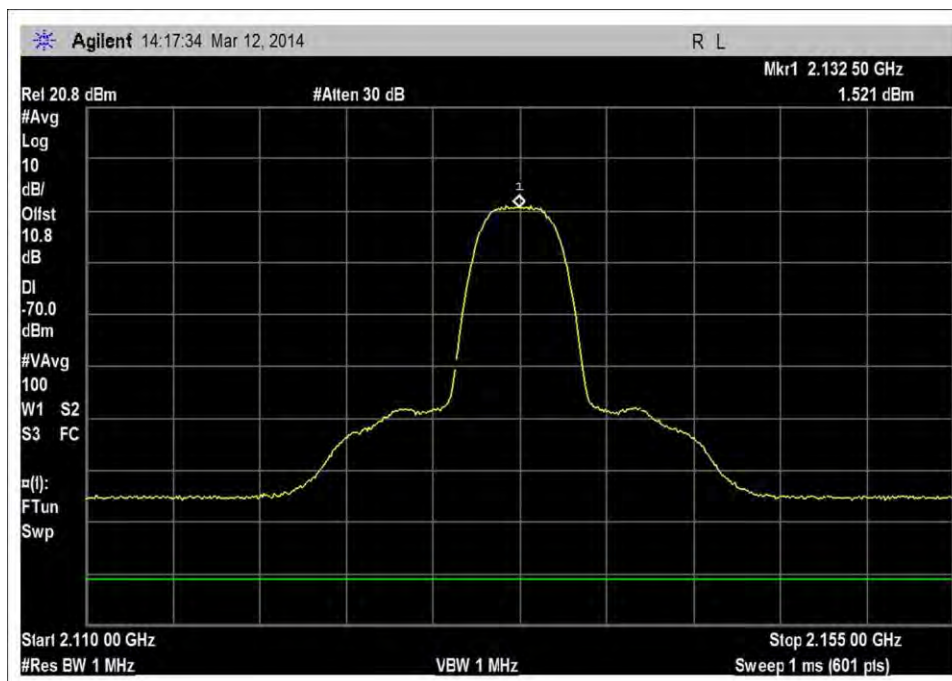
UL\_1710-1755MHz\_260



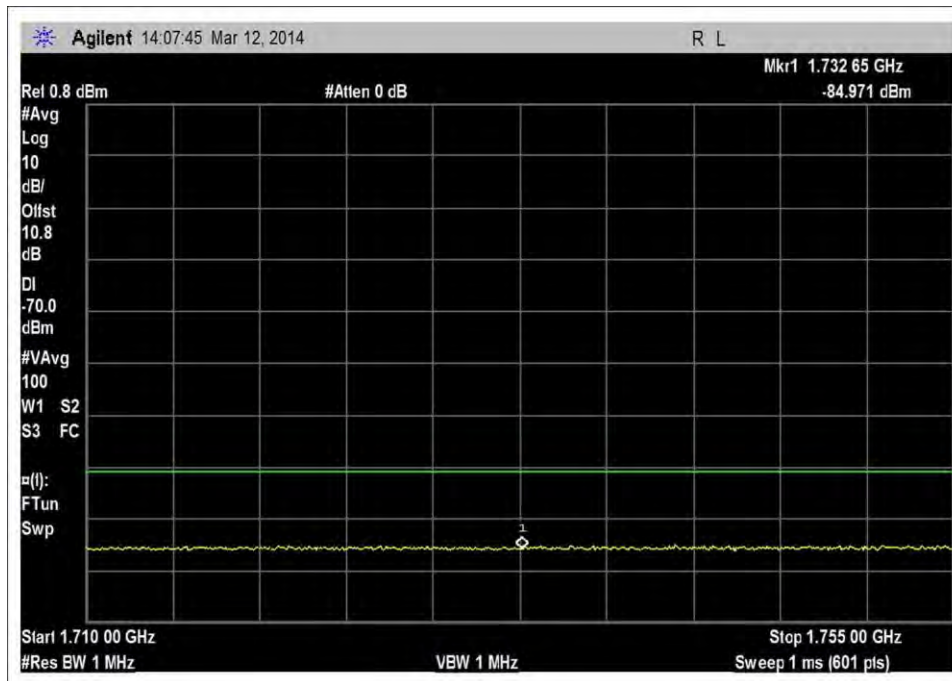
UL\_1850-1915MHz\_260



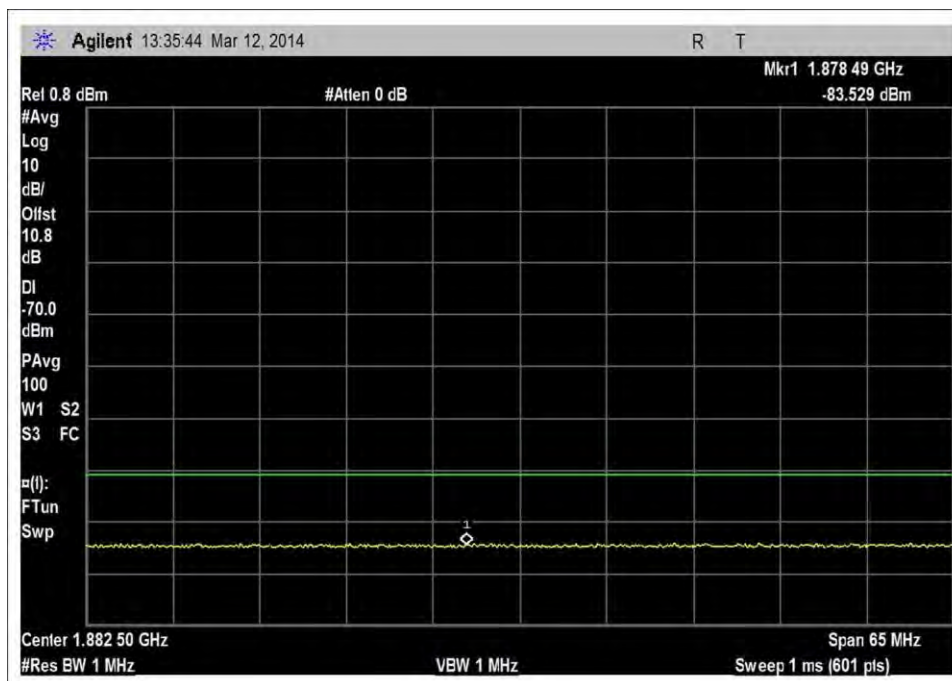
DL\_1930-1995MHz\_260



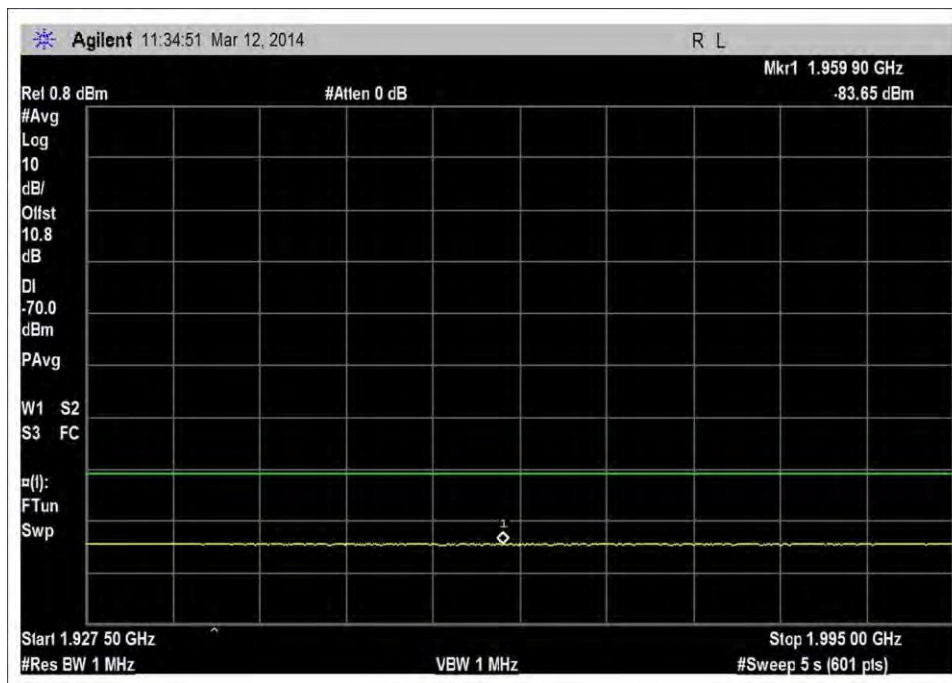
DL\_2110-2155MHz\_260



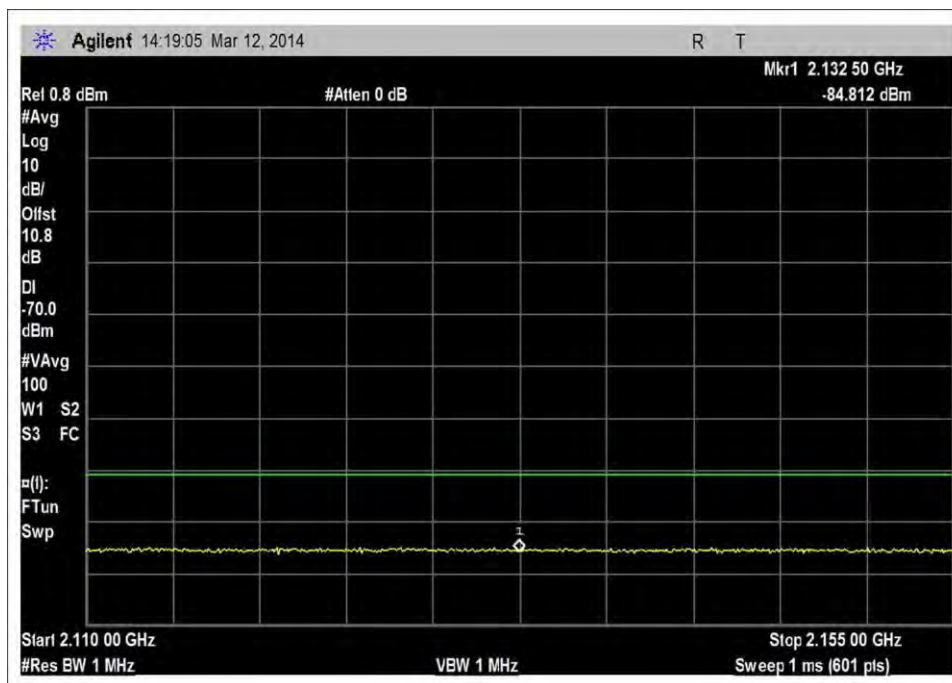
UL\_1710-1755MHz\_410



UL\_1850-1915MHz\_410



DL\_1930-1995MHz\_410



DL\_2110-2155MHz\_410

## Clause 7.2 Maximum Power / 7.3 Maximum Booster Gain Computation

### Test Conditions / Setup

Test Location: CKC Laboratories • 110 Olinda Place • Brea, CA 92823 • 714-993-6112

Customer: **Nextivity, Inc.**

Specification: 7.2.2. Maximum Power Measurement  
7.2.3 Maximum Booster Gain Computation

Work Order #: **95395** Date: 3/12/2014

Test Type: **Conducted Emissions** Time: 09:37:42

Equipment: **Provider Specific Consumer Signal  
Booster** Sequence#: 1

Manufacturer: Nextivity, Inc. Tested By: E. Wong

Model: Cel-Fi D32-2/4 110V 60Hz

S/N: 175406000036, 174406000145

#### **Test Equipment:**

| ID | Asset #  | Description       | Model                        | Calibration Date | Cal Due Date |
|----|----------|-------------------|------------------------------|------------------|--------------|
| T1 | AN02672  | Spectrum Analyzer | E4446A                       | 9/4/2012         | 9/4/2014     |
| T2 | AN03430  | Attenuator        | 75A-10-12                    | 9/5/2013         | 9/5/2015     |
| T3 | ANP06543 | Cable             | 32022-29094K-<br>29094K-24TC | 11/20/2013       | 11/20/2015   |

#### **Equipment Under Test (\* = EUT):**

| Function                                      | Manufacturer    | Model #           | S/N          |
|-----------------------------------------------|-----------------|-------------------|--------------|
| Provider Specific Consumer<br>Signal Booster* | Nextivity, Inc. | Cel-Fi D32-2/4 CU | 175406000036 |
| Provider Specific Consumer<br>Signal Booster  | Nextivity, Inc. | Cel-Fi D32-2/4 NU | 174406000145 |

#### **Support Devices:**

| Function         | Manufacturer | Model #          | S/N        |
|------------------|--------------|------------------|------------|
| Signal Generator | Agilent      | E4433B           | US40052164 |
| Signal Generator | Agilent      | E4438C           | MY42082260 |
| Power Supply     | Hon-Kwang    | HK-AX-120A150-US | NA         |
| Power Supply     | Hon-Kwang    | HK-AX-120A150-US | NA         |

**Test Conditions / Notes:**

The EUT is provider specific signal booster pair consisted of a Network unit (NU) and a Coverage unit (CU) using proprietary 5.8GHz Wireless interface.

The EUT is manufacturer configurable to operate in relay bandwidth of 5MHz, 10MHz, 15MHz and 20MHz within the CMRS band by setting the bandwidth and center frequency of programmable Spectrum Block Filter, Gain and other operational parameter based on received public land mobile network (PLMN) ID. For testing purposes, only spectrum block filter of 5MHz will be evaluated.

The two EUT are placed on the test bench, connected via coax cable, combiner and 50 dB attenuators. The unit not under evaluation is placed in shielded enclosure to improve RF isolation.

UNII Tx /RX port of NU is connected to UNII TX/RX port of CU.

Evaluation are conducted at Donor power Port band 2 and band 4, Server port band 2 and band 4.

Signal: 4.1MHz AWGN

UL = 1850-1915MHz, 1710-1755MHz

DL = 1930-1990MHz, 2110-2155MHz

Test environment conditions:

Temperature - 24°C

Relative Humidity - 21%

Pressure - 100kPa

Testing is performed in accordance with Provider Specific Booster test procedure 935210 D04 Provider Specific Booster Measurement DR06-41704, dated 03/06/14.

Note: The EUT shuts down when DL RF input power exceed -42.7 / -41.6dBm.

## Summary of Results

**Summary**

The provided test result demonstrates compliance with the requirement listed below

| Procedure Sec # | Guidance Description             | FCC Sec #                                                       | FCC Rule Description                   |
|-----------------|----------------------------------|-----------------------------------------------------------------|----------------------------------------|
| 7.2             | Maximum Power Measurement        | 20.21(e)(9)(i)(B) and 20.21(e)(9)(i)(D)                         | Bidirectional Capabilities Power Limit |
| 7.3             | Maximum Booster Gain Computation | 20.21(e)(9)(i)(B) and 20.21(e)(9)(i)(C)(1) 20.21(e)(9)(i)(C)(2) | Bidirectional Capabilities             |

## Results

| Maximum gain, Maximum power |            |              |          |
|-----------------------------|------------|--------------|----------|
| 4.1 MHz AWGN                |            |              |          |
| Frequency                   | Input(dBm) | Output (dBm) | Gain(dB) |
| UL 1710-1755                | -80.0      | 20.0         | 100.0    |
| UL 1850-1915                | -80.0      | 20.0         | 100.0    |
| DL 2110-2155                | -90.0      | 10.0         | 100.0    |
| DL 1930-1995                | -90.0      | 10.0         | 100.0    |

|                              |     | Limit |
|------------------------------|-----|-------|
| UL gain vs DL gain 1700/2100 | 0.0 | 9.0   |
| UL gain vs DL gain 1800/1900 | 0.0 | 9.0   |

| 4.1MHz AWGN  |              |          |            |           |              |
|--------------|--------------|----------|------------|-----------|--------------|
| Frequency    | Output Power | Ant Gain | Cable Loss | EIRP(dBm) | Limit(dBm)   |
| UL 1710-1755 | 20.0         | 2.0      | 0.0        | 22.0      | 17 min/30max |
| UL 1850-1915 | 20.0         | 3.0      | 0.0        | 23.0      | 17min/30Max  |
| DL 2110-2155 | 10.0         | 0.0      | 0.0        | 10.0      | 17 max       |
| DL 1930-1995 | 10.0         | 0.0      | 0.0        | 10.0      | 17 max       |

Maximum Input Level IAW section 5.5

| Frequency    | Input(dBm) | Output (dBm) | Gain(dB) |
|--------------|------------|--------------|----------|
| UL 1710-1755 | 0.0        | 20.3         | 20.3     |
| UL 1850-1915 | 0.0        | 20.1         | 20.1     |
| DL 2110-2155 | -43.7      | 11.8         | 55.5     |
| DL 1930-1995 | -42.6      | 11.2         | 53.8     |

Note : The booster ceased operation at DL input power of exceeding -42.7, -41.6dBm. Gain ratio requirement is not applicable when operating in Maximum input power level.

| 4.1MHz AWGN  |              |          |            |           |              |
|--------------|--------------|----------|------------|-----------|--------------|
| Frequency    | Output Power | Ant Gain | Cable Loss | EIRP(dBm) | Limit(dBm)   |
| UL 1710-1755 | 20.3         | 2.0      | 0.0        | 22.3      | 17 min/30max |
| UL 1850-1915 | 20.1         | 3.0      | 0.0        | 23.1      | 17min/30Max  |
| DL 2110-2155 | 11.8         | 0.0      | 0.0        | 11.8      | 17 max       |
| DL 1930-1995 | 11.2         | 0.0      | 0.0        | 11.2      | 17 max       |

## Clause 7.4 Intermodulation Product

### Test Conditions / Setup

Test Location: CKC Laboratories • 110 Olinda Place • Brea, CA 92823 • 714-993-6112

Customer: **Nextivity, Inc.**

Specification: 7.4 Intermodulation

Work Order #: **95395** Date: 3/12/2014

Test Type: **Conducted Emissions** Time: 09:37:42

Equipment: **Provider Specific Consumer Signal Booster** Sequence#: 1

Manufacturer: Nextivity, Inc. Tested By: E. Wong

Model: Cel-Fi D32-2/4 110V 60Hz

S/N: 175406000036, 174406000145

#### Test Equipment:

| ID | Asset #  | Description       | Model                    | Calibration Date | Cal Due Date |
|----|----------|-------------------|--------------------------|------------------|--------------|
| T1 | AN02672  | Spectrum Analyzer | E4446A                   | 9/4/2012         | 9/4/2014     |
| T2 | AN03430  | Attenuator        | 75A-10-12                | 9/5/2013         | 9/5/2015     |
| T3 | ANP06543 | Cable             | 32022-29094K-29094K-24TC | 11/20/2013       | 11/20/2015   |

#### Equipment Under Test (\* = EUT):

| Function                                   | Manufacturer    | Model #           | S/N          |
|--------------------------------------------|-----------------|-------------------|--------------|
| Provider Specific Consumer Signal Booster* | Nextivity, Inc. | Cel-Fi D32-2/4 CU | 175406000036 |
| Provider Specific Consumer Signal Booster  | Nextivity, Inc. | Cel-Fi D32-2/4 NU | 174406000145 |

#### Support Devices:

| Function         | Manufacturer | Model #          | S/N        |
|------------------|--------------|------------------|------------|
| Signal Generator | Agilent      | E4433B           | US40052164 |
| Signal Generator | Agilent      | E4438C           | MY42082260 |
| Combiner         | Anaren       | 44000            | C00087     |
| Power Supply     | Hon-Kwang    | HK-AX-120A150-US | NA         |
| Power Supply     | Hon-Kwang    | HK-AX-120A150-US | NA         |

### Test Conditions / Notes:

The EUT is provider specific signal booster pair consisted of a Network unit (NU) and a Coverage unit (CU) using proprietary 5.8GHz Wireless interface.

The EUT is manufacturer configurable to operate in relay bandwidth of 5MHz, 10MHz, 15MHz and 20MHz within the CMRS band by setting the bandwidth and center frequency of programmable Spectrum Block Filter, Gain and other operational parameter based on received public land mobile network (PLMN) ID. For testing purposes, only spectrum block filter of 5MHz will be evaluated.

The two EUT are placed on the test bench, connected via coax cable, combiner and 50 dB attenuators. The unit not under evaluation is placed in shielded enclosure to improve RF isolation.

UNII Tx /RX port of NU is connected to UNII TX/RX port of CU.

Evaluation are conducted at Donor power Port band 2 and band 4, Server port band 2 and band 4.

Signal : 4.1MHz AWGN.

UL = 1850-1915MHz, 1710-1755MHz

DL = 1930-1990MHz, 2110-2155MHz

Test environment conditions:

Temperature - 24°C

Relative Humidity - 21%

Pressure - 100kPa

Testing is performed in accordance with Provider Specific Booster test procedure 935210 D04 Provider Specific Booster Measurement DR06-41704, dated 03/06/14.

Note: The EUT shuts down when DL RF input power exceed -43dBm.

Note: Spike in the middle is an artifact from the DC carrier leakage and is NOT an intermodulation product.

## Summary of Results

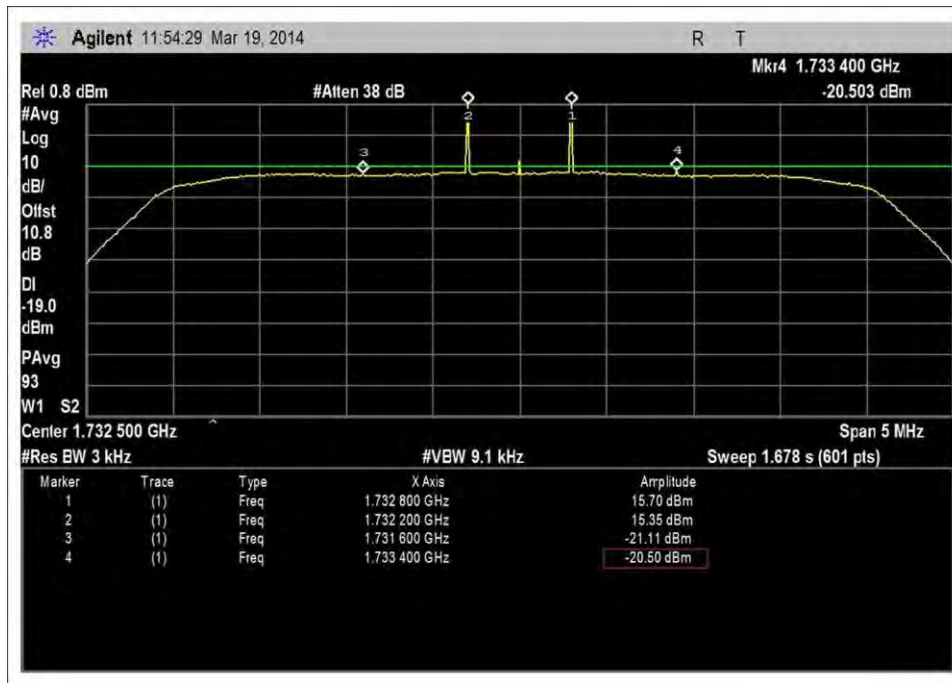
Summary:

The test result demonstrates compliance with the requirement listed.

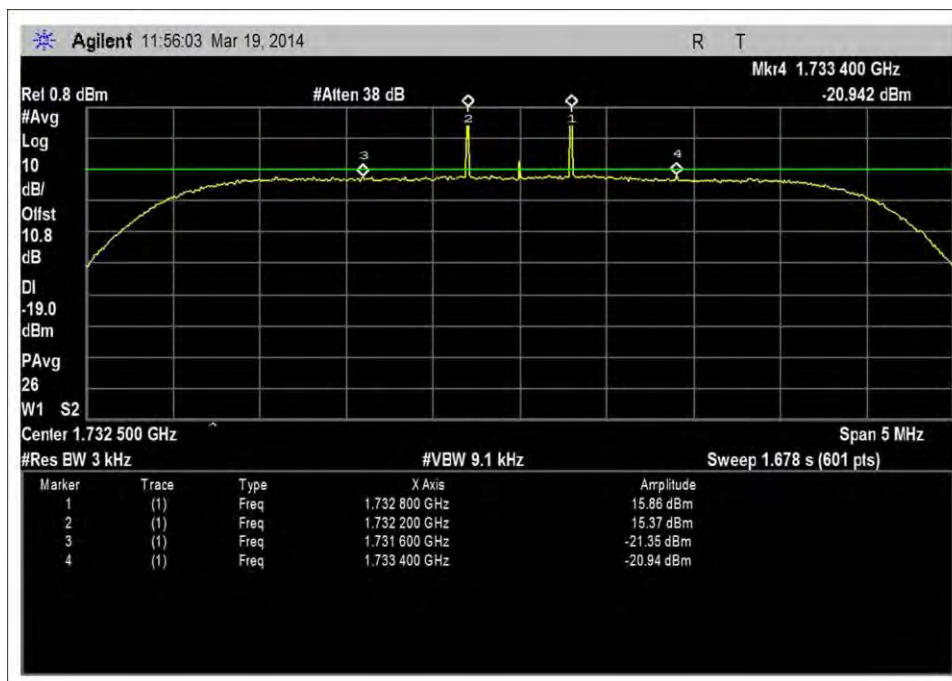
| Procedure Sec # | Guidance Description    | FCC Sec #         | FCC Rule Description  |
|-----------------|-------------------------|-------------------|-----------------------|
| 7.4             | Intermodulation Product | 20.21(e)(9)(i)(G) | Intermodulation Limit |

| Frequency    | Max Intermod<br>dBm/3kHz | Limit<br>dBm/3KHz | Margin<br>dB |
|--------------|--------------------------|-------------------|--------------|
| UL 1710-1755 | -20.5                    | -19               | -1.5         |
| UL 1850-1915 | -27.2                    | -19               | -8.2         |
| DL 2110-2155 | -31.7                    | -19               | -12.7        |
| DL 1930-1995 | -31.9                    | -19               | -12.9        |

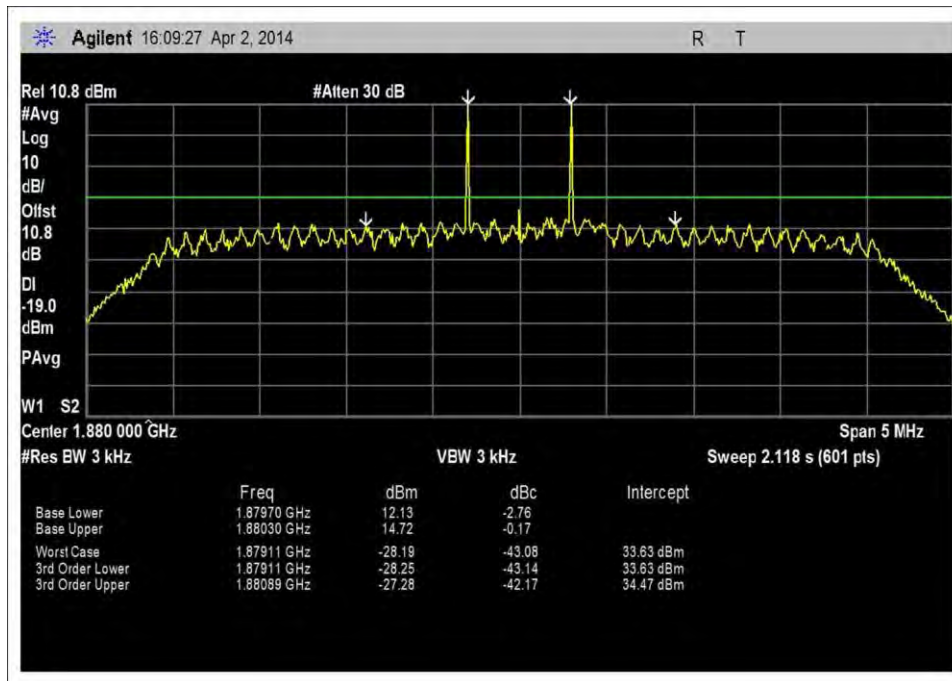
## Test Data



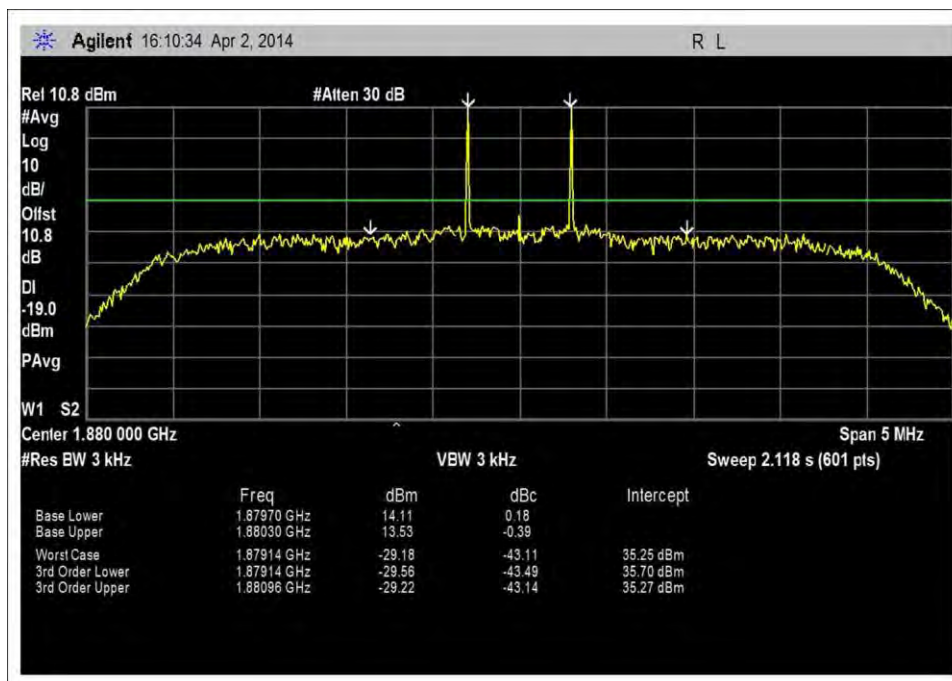
UL\_1710-1755MHz



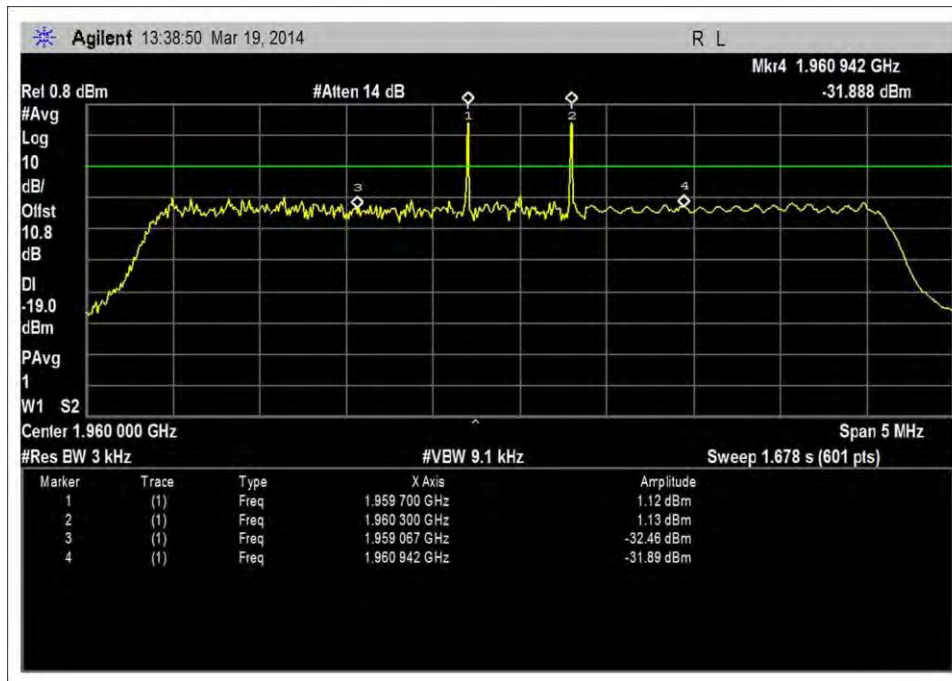
UL\_1710-1755MHz\_AGC+10dB



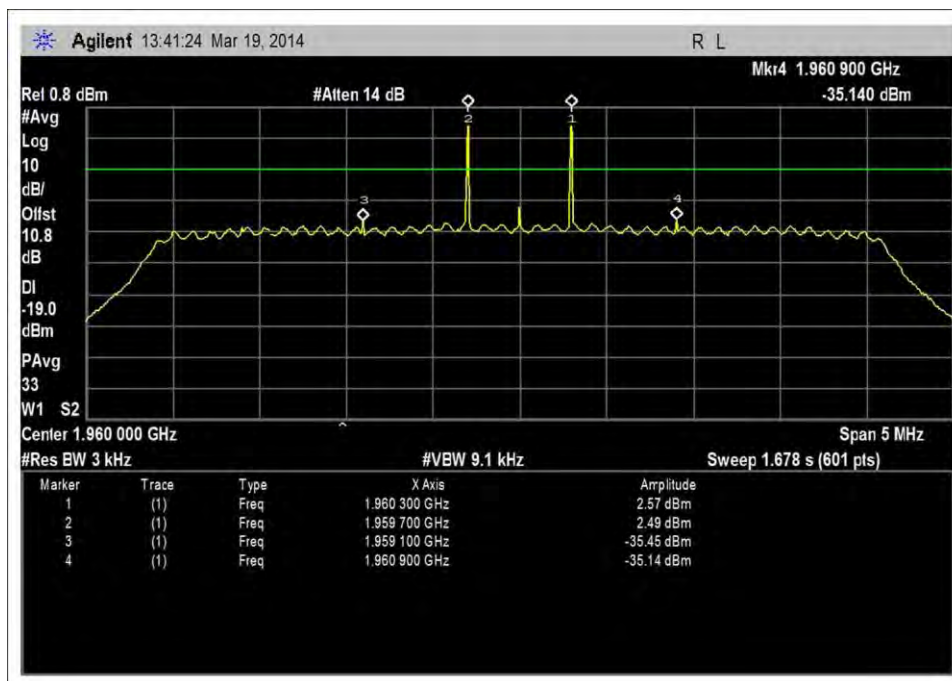
UL\_1850-1915MHz



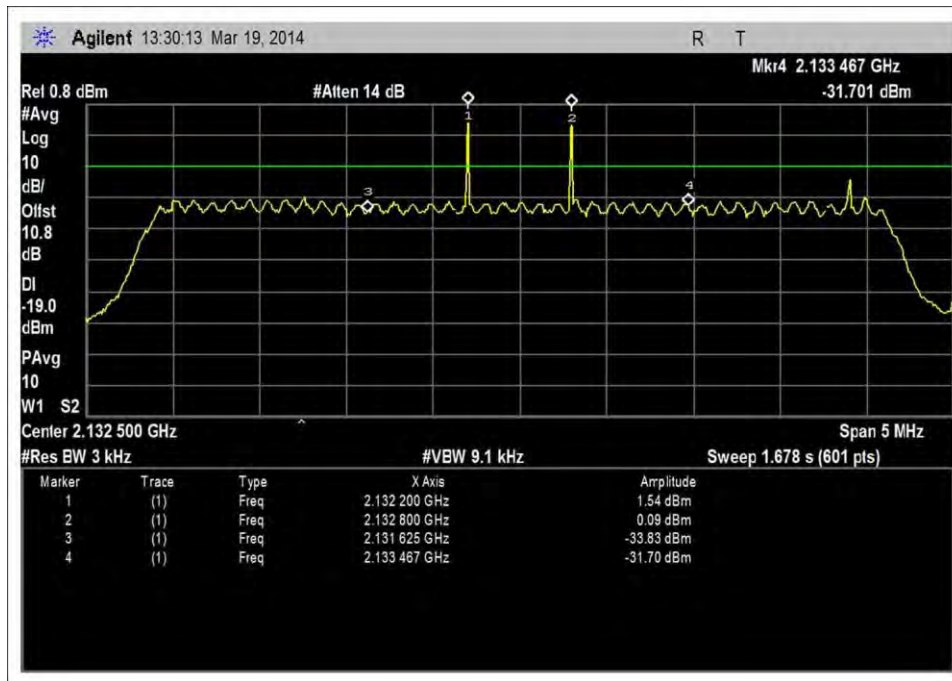
UL\_1850-1915MHz\_AGC+10dB.



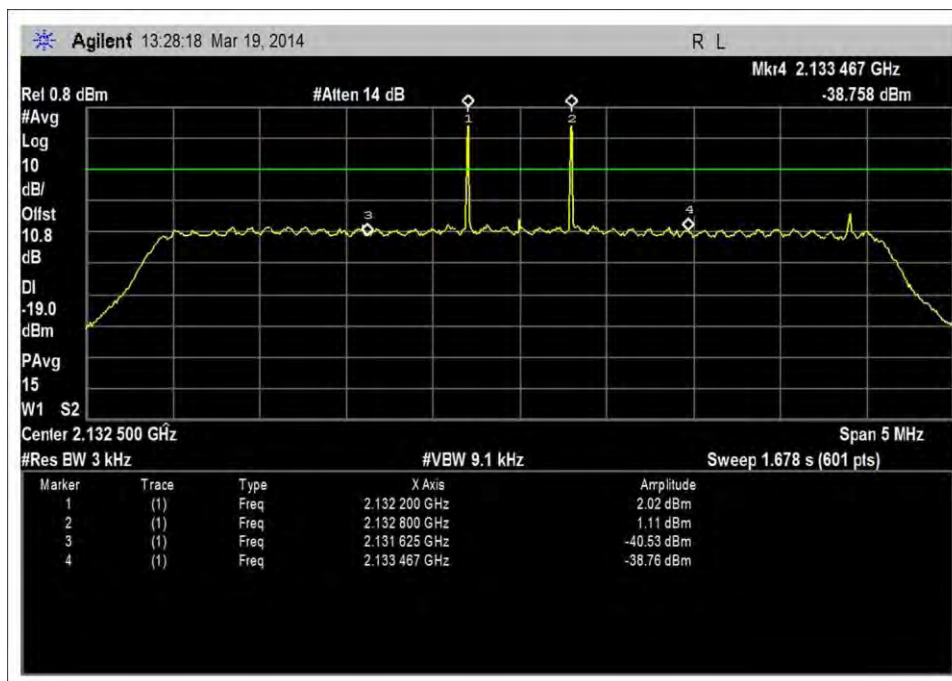
DL\_1930-1995MHz



DL\_1930-1995MHz\_AGC+10dB



DL\_2110-2155MHz



DL\_2110-2155MHz\_AGC+10dB

## Clause 7.5 Out of Band Emissions

### Test Conditions / Setup

Test Location: CKC Laboratories • 110 Olinda Place • Brea, CA 92823 • 714-993-6112

Customer: **Nextivity, Inc.**  
Specification: 7.5 Out of Band Emissions

Work Order #: **95395** Date: 3/12/2014  
Test Type: **Conducted Emissions** Time: 09:37:42  
Equipment: **Provider Specific Consumer Signal Booster** Sequence#: 1

Manufacturer: Nextivity, Inc. Tested By: E. Wong  
Model: Cel-Fi D32-2/4 110V 60Hz  
S/N: 175406000036, 174406000145

#### Test Equipment:

| ID | Asset #  | Description       | Model                    | Calibration Date | Cal Due Date |
|----|----------|-------------------|--------------------------|------------------|--------------|
| T1 | AN02672  | Spectrum Analyzer | E4446A                   | 9/4/2012         | 9/4/2014     |
| T2 | AN03430  | Attenuator        | 75A-10-12                | 9/5/2013         | 9/5/2015     |
| T3 | ANP06543 | Cable             | 32022-29094K-29094K-24TC | 11/20/2013       | 11/20/2015   |

#### Equipment Under Test (\* = EUT):

| Function                                   | Manufacturer    | Model #           | S/N          |
|--------------------------------------------|-----------------|-------------------|--------------|
| Provider Specific Consumer Signal Booster* | Nextivity, Inc. | Cel-Fi D32-2/4 CU | 175406000036 |
| Provider Specific Consumer Signal Booster  | Nextivity, Inc. | Cel-Fi D32-2/4 NU | 174406000145 |

#### Support Devices:

| Function         | Manufacturer | Model #          | S/N        |
|------------------|--------------|------------------|------------|
| Signal Generator | Agilent      | E4433B           | US40052164 |
| Signal Generator | Agilent      | E4438C           | MY42082260 |
| Power Supply     | Hon-Kwang    | HK-AX-120A150-US | NA         |
| Power Supply     | Hon-Kwang    | HK-AX-120A150-US | NA         |

**Test Conditions / Notes:**

The EUT is provider specific signal booster pair consisted of a Network unit (NU) and a Coverage unit (CU) using proprietary 5.8GHz Wireless interface.

The EUT is manufacturer configurable to operate in relay bandwidth of 5MHz, 10MHz, 15MHz and 20MHz within the CMRS band by setting the bandwidth and center frequency of programmable Spectrum Block Filter, Gain and other operational parameter based on received public land mobile network (PLMN) ID. For testing purposes, only spectrum block filter of 5MHz will be evaluated.

The two EUT are placed on the test bench, connected via coax cable, combiner and 50 dB attenuators. The unit not under evaluation is placed in shielded enclosure to improve RF isolation.

UNII Tx /RX port of NU is connected to UNII TX/RX port of CU.

Evaluation are conducted at Donor power Port band 2 and band 4, Server port band 2 and band 4.

Signal: 4.1MHz AWGN

UL = 1850-1915MHz, 1710-1755MHz

DL = 1930-1990MHz, 2110-2155MHz

Test environment conditions:

Temperature - 24°C

Relative Humidity - 21%

Pressure - 100kPa

Testing is performed in accordance with Provider Specific Booster test procedure 935210 D04 Provider Specific Booster Measurement DR06-41704, dated 03/06/14 with slight variation.

To Improved accuracy, the OBE was measured with Adjacent Channel Power function of the spectrum analyzer where RBW of 1% of the EBW of the signal was used and integrated into 1 MHz measurement bandwidth. The cursor on the plot indicated the upper or lower band edges as appropriate.

In the 1850 – 1915MHz and 1930-1995MHz band the center frequency is set IAW 3GPP frequency assignment.

## Summary of Results

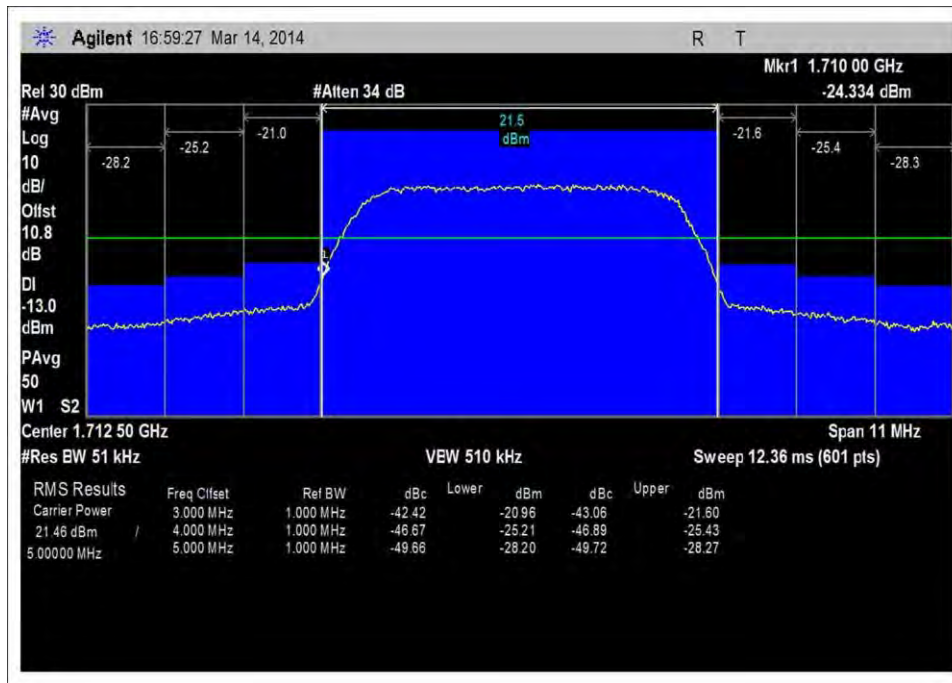
**Summary**

The maximum measured OBE demonstrates compliance with following :

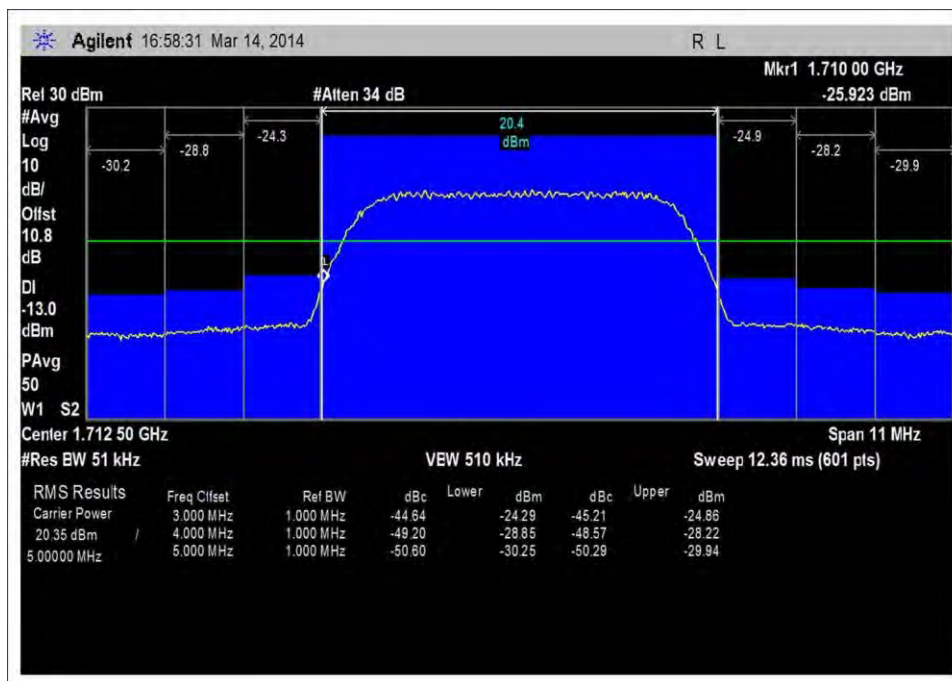
| Procedure Sec # | Guidance Description  | FCC Sec #         | FCC Rule Description |
|-----------------|-----------------------|-------------------|----------------------|
| 7.5             | Out of Band Emissions | 20.21(e)(9)(i)(F) | Out of Band Emission |

| Frequency    | Max OBE<br>dBm | Limit<br>dBm | Margin<br>dB |
|--------------|----------------|--------------|--------------|
| UL 1710-1755 | -21.0          | -13.0        | -8.0         |
| UL 1850-1915 | -18.2          | -13.0        | -5.2         |
| DL 2110-2155 | -27.2          | -13.0        | -14.2        |
| DL 1930-1995 | -27.1          | -13.0        | -14.1        |

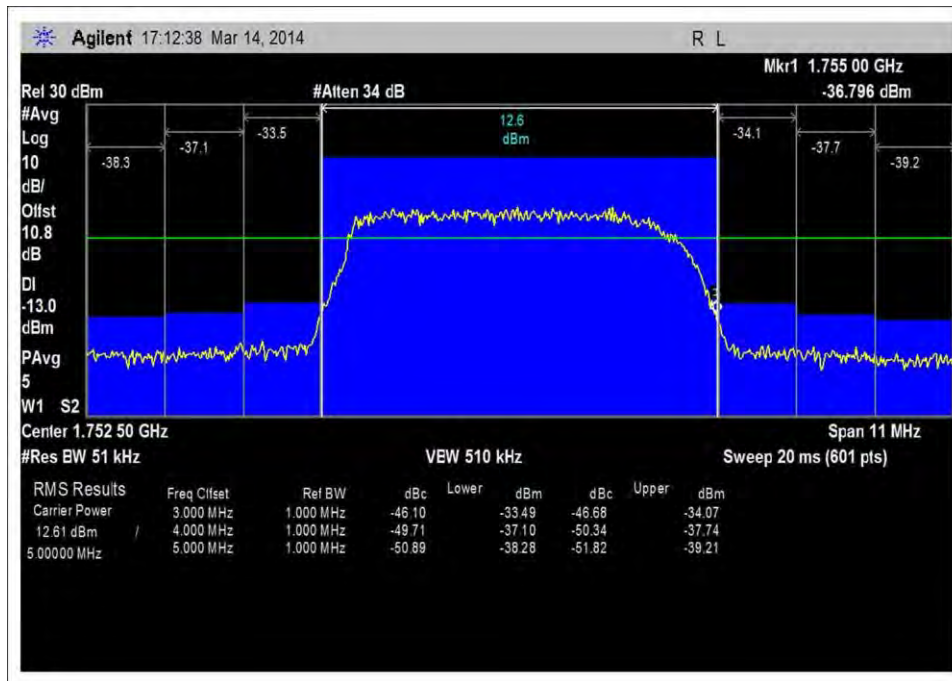
## Test Data



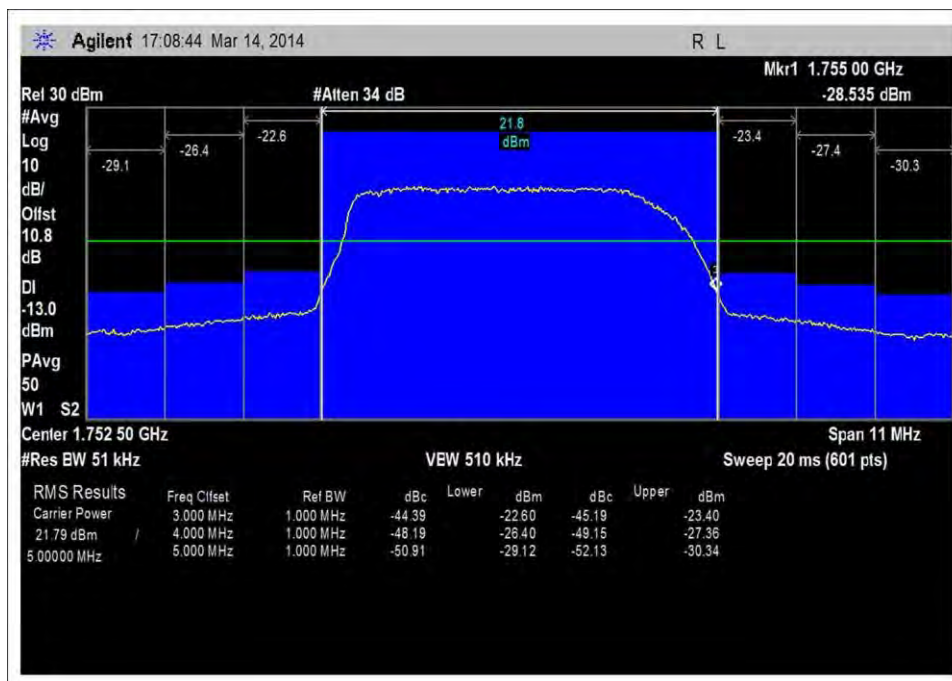
UL\_1710-1755MHz\_L\_0dBm\_ACP



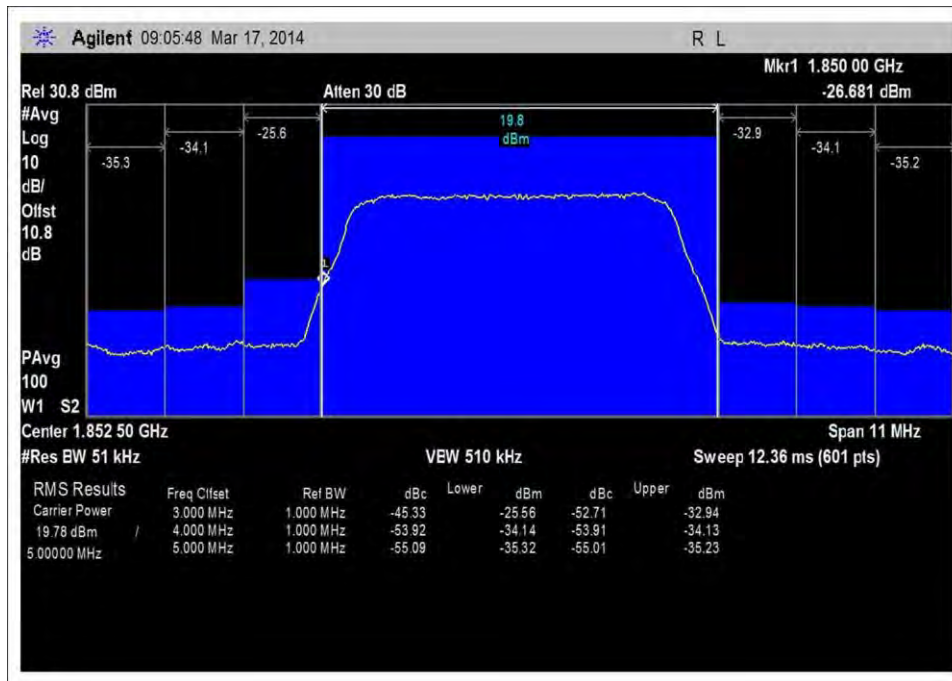
UL\_1710-1755MHz\_L\_-80dBm\_ACP



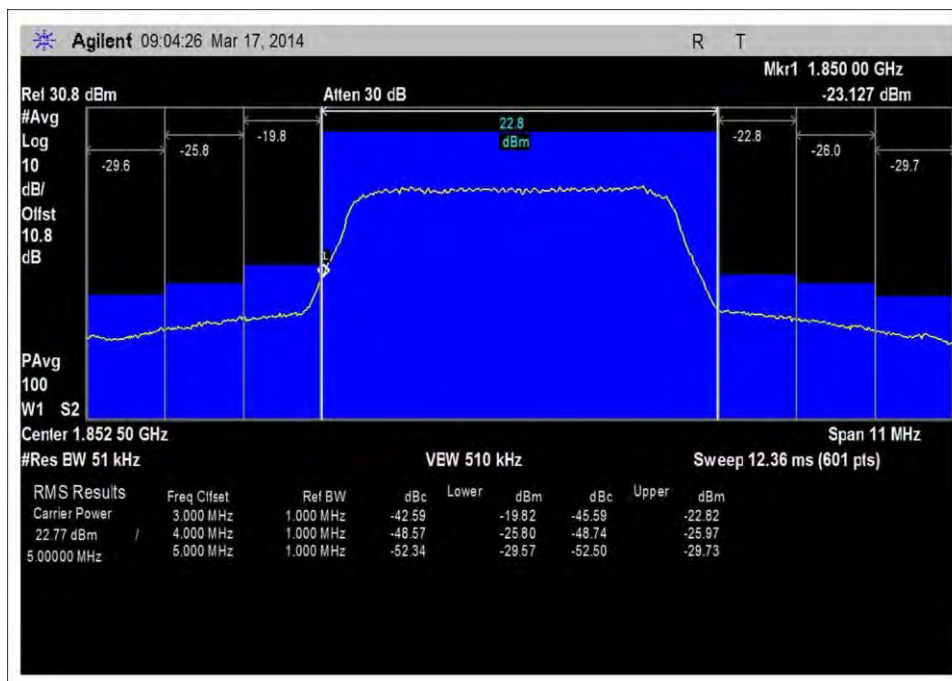
UL\_1710-1755MHz\_H\_0dBm\_ACP



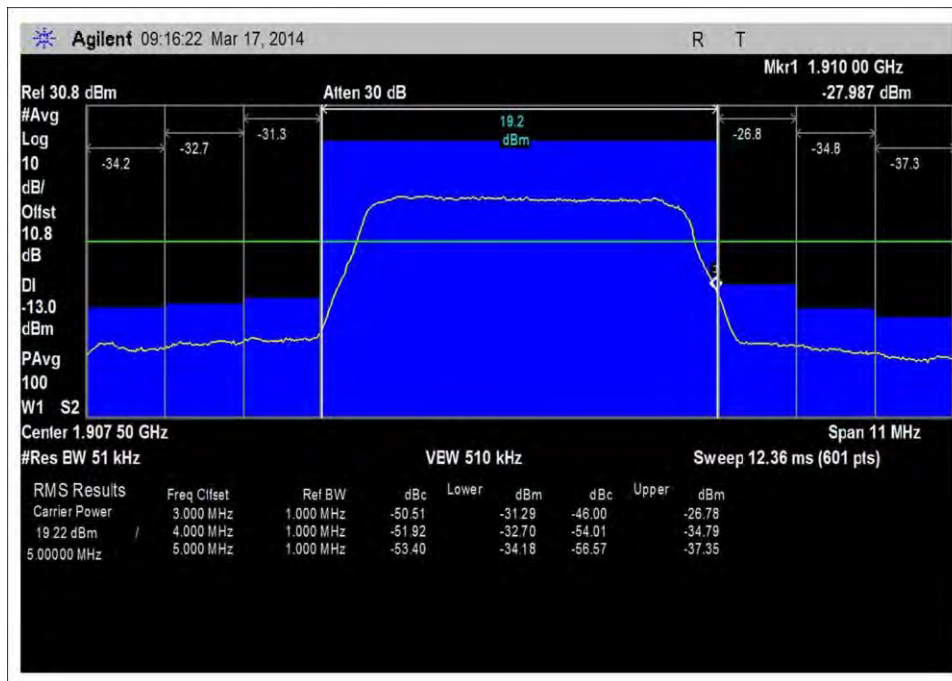
UL\_1710-1755MHz\_H\_-80dBm\_ACP



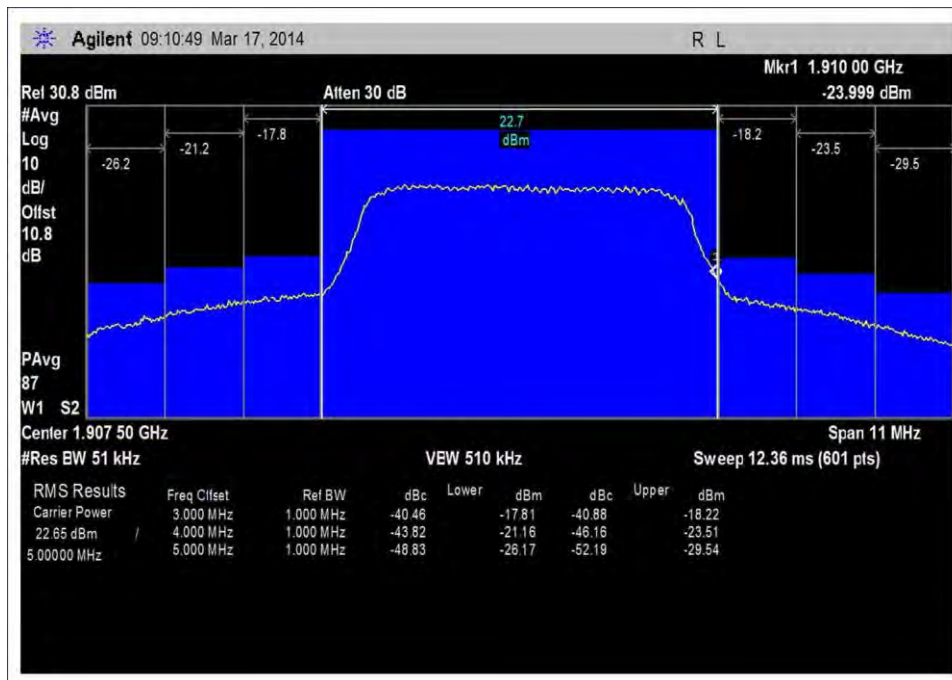
UL\_1850-1915MHz\_L\_0dBm\_ACP



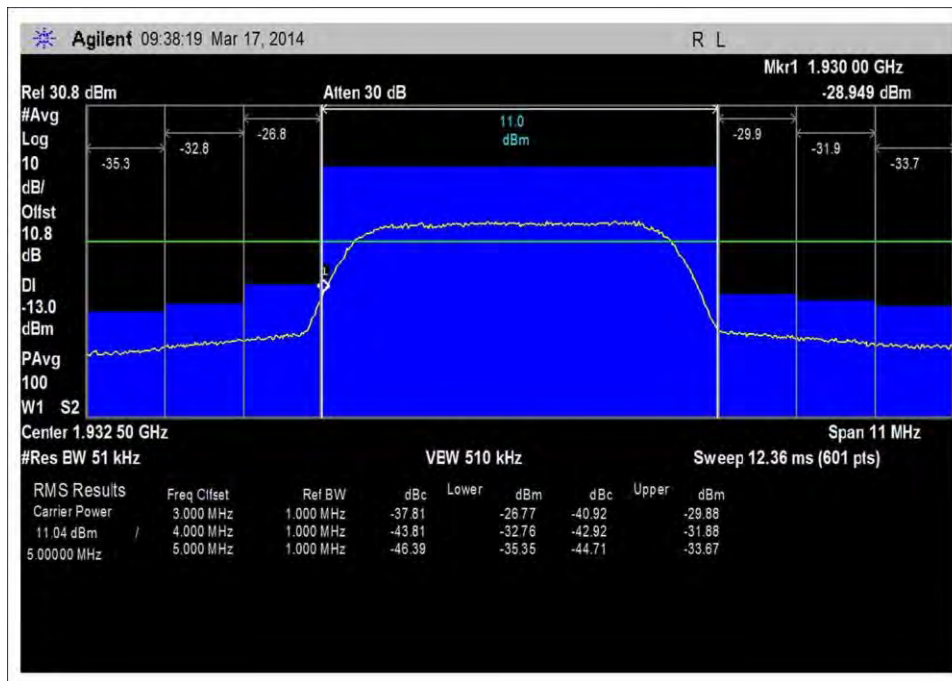
UL\_1850-1915MHz\_L\_-80dBm\_ACP



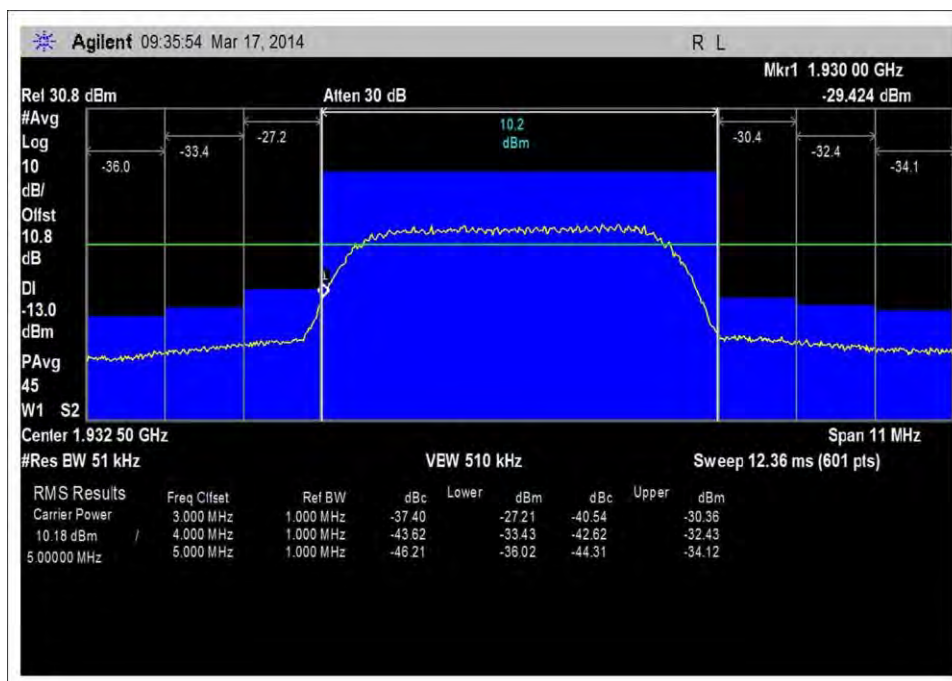
UL\_1850-1915MHz\_H\_0dBm\_ACP



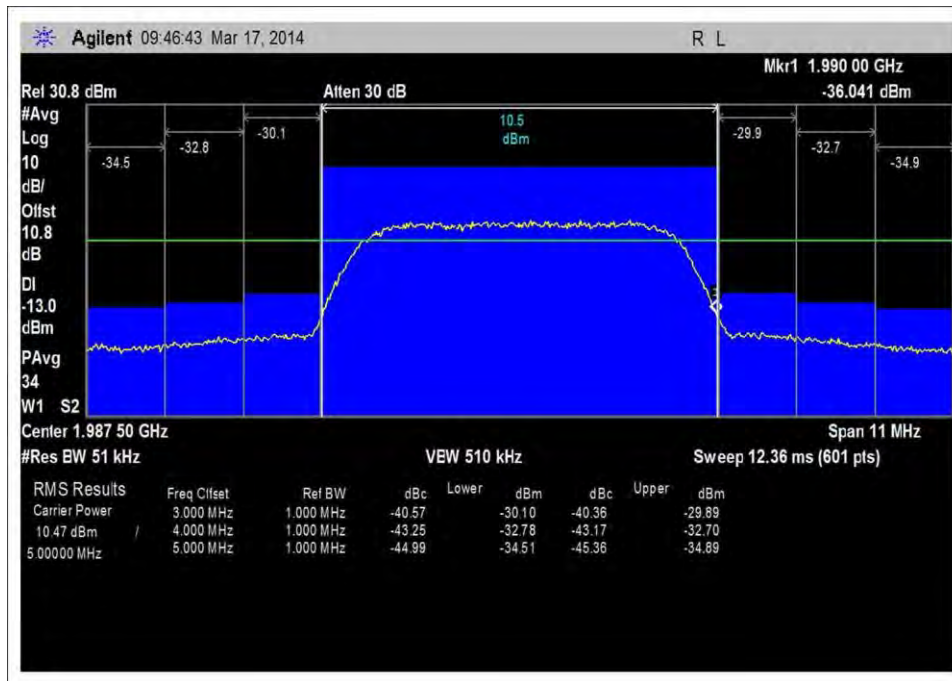
UL\_1850-1915MHz\_H\_-80dBm\_ACP



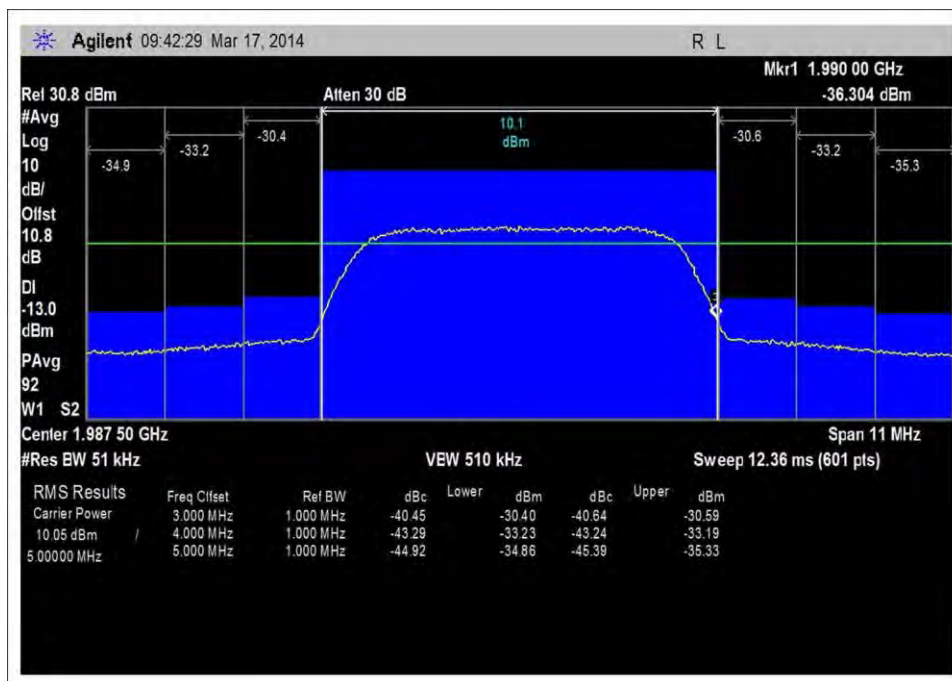
DL\_1930-1995MHz\_L\_-43dBm\_ACP



DL\_1930-1995MHz\_L\_-90dBm\_ACP



DL\_1930-1995MHz\_H\_-43dBm\_ACP



DL\_1930-1995MHz\_H\_-90dBm\_ACP

## Clause 7.7 Noise limit

### Test Conditions / Setup

Test Location: CKC Laboratories • 110 Olinda Place • Brea, CA 92823 • 714-993-6112

Customer: **Nextivity, Inc.**  
 Specification: 7.7 Noise limit  
 Work Order #: **95395** Date: 3/12/2014  
 Test Type: **Conducted Emissions** Time: 09:37:42  
 Equipment: **Provider Specific Consumer Signal Booster** Sequence#: 1

Manufacturer: Nextivity, Inc. Tested By: E. Wong  
 Model: Cel-Fi D32-2/4 110V 60Hz  
 S/N: 175406000036, 174406000145

#### Test Equipment:

| ID | Asset #  | Description       | Model                    | Calibration Date | Cal Due Date |
|----|----------|-------------------|--------------------------|------------------|--------------|
| T1 | AN02672  | Spectrum Analyzer | E4446A                   | 9/4/2012         | 9/4/2014     |
| T2 | AN03430  | Attenuator        | 75A-10-12                | 9/5/2013         | 9/5/2015     |
| T3 | ANP06543 | Cable             | 32022-29094K-29094K-24TC | 11/20/2013       | 11/20/2015   |

#### Equipment Under Test (\* = EUT):

| Function                                   | Manufacturer    | Model #           | S/N          |
|--------------------------------------------|-----------------|-------------------|--------------|
| Provider Specific Consumer Signal Booster* | Nextivity, Inc. | Cel-Fi D32-2/4 CU | 175406000036 |
| Provider Specific Consumer Signal Booster  | Nextivity, Inc. | Cel-Fi D32-2/4 NU | 174406000145 |

#### Support Devices:

| Function         | Manufacturer | Model #          | S/N        |
|------------------|--------------|------------------|------------|
| Signal Generator | Anritsu      | MT8820A          | 6200250367 |
| Signal Generator | Agilent      | E4438C           | MY42082260 |
| Power Supply     | Hon-Kwang    | HK-AX-120A150-US | NA         |
| Power Supply     | Hon-Kwang    | HK-AX-120A150-US | NA         |

#### Test Conditions / Notes:

The EUT is provider specific signal booster pair consisted of a Network unit (NU) and a Coverage unit (CU) using proprietary 5.8GHz Wireless interface.

The EUT is manufacturer configurable to operate in relay bandwidth of 5MHz, 10MHz, 15MHz and 20MHz within the CMRS band by setting the bandwidth and center frequency of programmable Spectrum Block Filter, Gain and other operational parameter based on received public land mobile network (PLMN) ID. For testing purposes, only spectrum block filter of 5 MHz will be evaluated.

The two EUT are placed on the test bench, connected via coax cable, combiner and 50 dB attenuators. The unit not under evaluation is placed in shielded enclosure to improve RF isolation.

UNII Tx /RX port of NU is connected to UNII TX/RX port of CU.

Evaluation are conducted at Donor power Port band 2 and band 4, Server port band 2 and band 4.

Signal: 4.1MHz AWGN

UL = 1850-1915 MHz, 1710-1755MHz

DL = 1930-1990 MHz, 2110-2155MHz

Test environment conditions:

Temperature - 24°C

Relative Humidity - 21%

Pressure - 100kPa

Testing is performed in accordance with Provider Specific Booster test procedure 935210 D04 Provider Specific Booster Measurement DR06-41704, dated 03/06/14.

## Summary of Results

Summary:

The result demonstrate compliance to

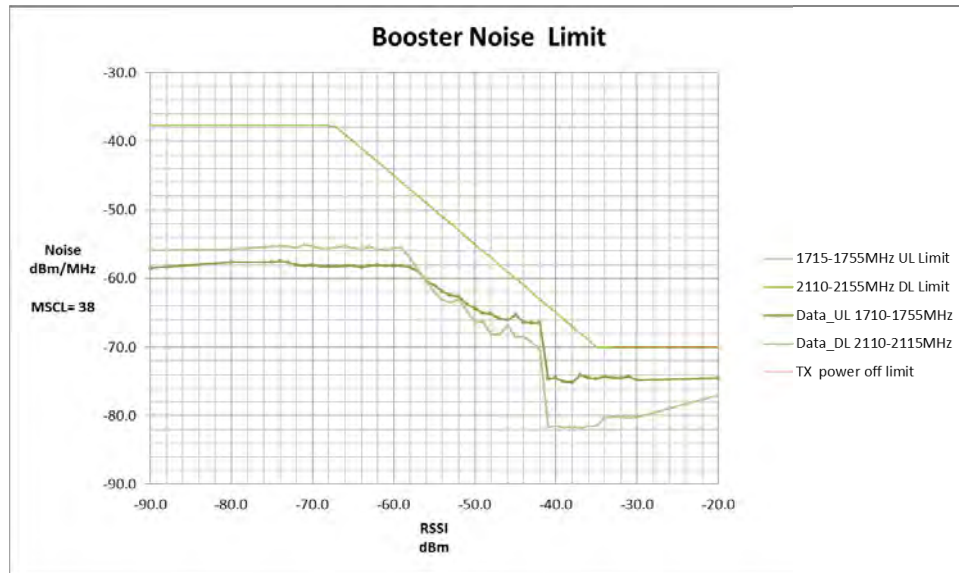
| Procedure Sec # | Guidance Description | FCC Sec #                                 | FCC Rule Description                    |
|-----------------|----------------------|-------------------------------------------|-----------------------------------------|
| 7.7             | Noise Limits         | 20.21(e)(9)(i)(A)(2)<br>20.21(e)(9)(i)(I) | Noise Limits<br>Transmit Power Off Mode |

Maximum noise

| Frequency    | Max Noise<br>dBm/MHz | Limit<br>dBm/MHz | Margin<br>dB |
|--------------|----------------------|------------------|--------------|
| UL 1710-1755 | -57.3                | -37.7            | -19.6        |
| UL 1850-1915 | -54.0                | -37.0            | -17.0        |
| DL 2110-2155 | -56.0                | -37.7            | -18.3        |
| DL 1930-1995 | -58.4                | -37.0            | -21.4        |

Noise Timing

| Frequency    | Noise timing<br>Sec | Limit<br>Sec | Margin<br>Sec |
|--------------|---------------------|--------------|---------------|
| UL 1710-1755 | 0.7                 | 3.0          | -2.3          |
| UL 1850-1915 | 0.4                 | 3.0          | -2.6          |
| DL 2110-2155 | 1.7                 | 3.0          | -1.3          |
| DL 1930-1995 | 1.8                 | 3.0          | -1.2          |

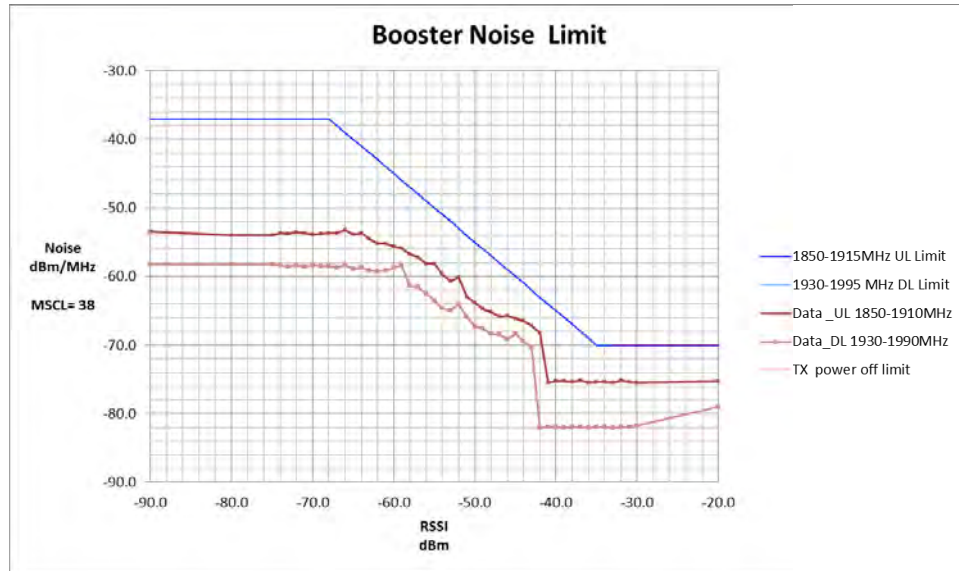


| RSSI  | Noise level | Limit                          |  |                   |             | Margin |
|-------|-------------|--------------------------------|--|-------------------|-------------|--------|
| dBm   | dBm/MHz     | 20.21(e)(9)(i)(A)(1) (i) &(ii) |  | 20.21(e)(9)(i)(I) | Conditional | dB     |
| -42.0 | -66.5       | -63.0                          |  | -70.0             | -63.0       | -3.5   |
| -34.0 | -74.3       | -71.0                          |  | -70.0             | -70.0       | -4.3   |
| -43.0 | -66.5       | -62.0                          |  | -70.0             | -62.0       | -4.5   |
| -45.0 | -65.3       | -60.0                          |  | -70.0             | -60.0       | -5.3   |
| -44.0 | -66.4       | -61.0                          |  | -70.0             | -61.0       | -5.4   |
| -74.0 | -57.5       | -31.0                          |  | -70.0             | -37.7       | -26.5  |

UL 1710-1755MHz

| RSSI  | Noise level | Limit                          |                      |                   |             | Margin |
|-------|-------------|--------------------------------|----------------------|-------------------|-------------|--------|
| dBm   | dBm/MHz     | 20.21(e)(9)(i)(A)(1) (i) &(ii) | 20.21(e)(9)(i)(A)(2) | 20.21(e)(9)(i)(I) | Conditional | dB     |
| -20.0 | -77.0       | -85.0                          | -37.7                | -70               | -70.0       | -7.0   |
| -43.0 | -69.2       | -62.0                          | -37.7                | -70               | -62.0       | -7.2   |
| -42.0 | -70.4       | -63.0                          | -37.7                | -70               | -63.0       | -7.4   |
| -44.0 | -68.5       | -61.0                          | -37.7                | -70               | -61.0       | -7.5   |
| -46.0 | -66.8       | -59.0                          | -37.7                | -70               | -59.0       | -7.8   |
| -71.0 | -55.1       | -34.0                          | -37.7                | -70               | -37.7       | -17.4  |

DL 2110-2155MHz



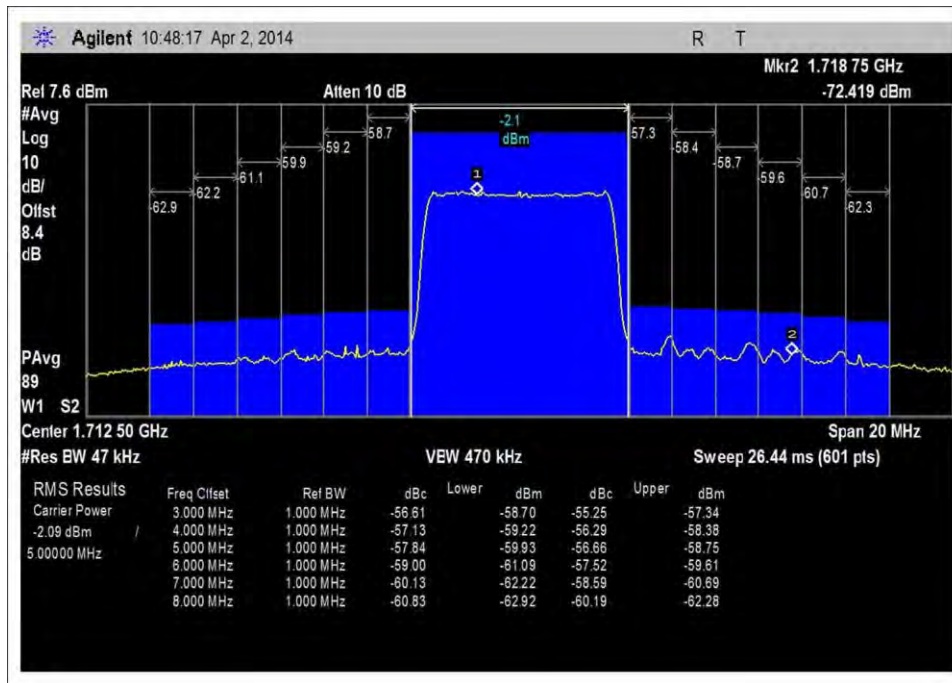
| RSSI  | Noise level | Limit                          |  |                   |             | Margin |
|-------|-------------|--------------------------------|--|-------------------|-------------|--------|
| dBm   | dBm/MHz     | 20.21(e)(9)(A)(i)(1) (i) &(ii) |  | 20.21(e)(9)(i)(I) | Conditional | dB     |
| -43.0 | -67.2       | -62.0                          |  | -70               | -62.0       | -5.2   |
| -42.0 | -68.2       | -63.0                          |  | -70               | -63.0       | -5.2   |
| -32.0 | -75.2       | -73.0                          |  | -70               | -70.0       | -5.2   |
| -44.0 | -66.5       | -61.0                          |  | -70               | -61.0       | -5.5   |
| -45.0 | -66.2       | -60.0                          |  | -70               | -60.0       | -6.2   |
| -90.0 | -53.4       | -15.0                          |  | -70               | -37.0       | -16.4  |

UL 1850-1915MHz

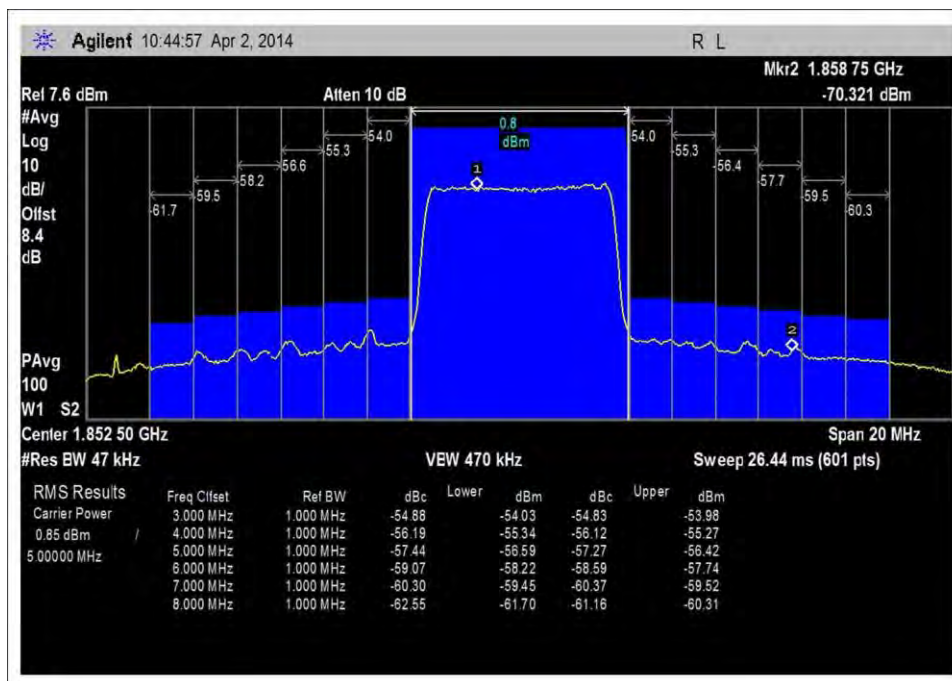
| RSSI  | Noise level | Limit                          |                      |                   |             | Margin |
|-------|-------------|--------------------------------|----------------------|-------------------|-------------|--------|
| dBm   | dBm/MHz     | 20.21(e)(9)(A)(i)(1) (i) &(ii) | 20.21(e)(9)(A)(i)(2) | 20.21(e)(9)(i)(I) | Conditional | dB     |
| -43.0 | -70.3       | -62.0                          | -37.0                | -70               | -62.0       | -8.3   |
| -45.0 | -68.4       | -60.0                          | -37.0                | -70               | -60.0       | -8.4   |
| -44.0 | -69.4       | -61.0                          | -37.0                | -70               | -61.0       | -8.4   |
| -20.0 | -79.0       | -85.0                          | -37.0                | -70               | -70.0       | -9.0   |
| -46.0 | -69.1       | -59.0                          | -37.0                | -70               | -59.0       | -10.1  |
| -90.0 | -58.3       | -15.0                          | -37.0                | -70               | -37.0       | -21.3  |

DL 1930-1955MHz

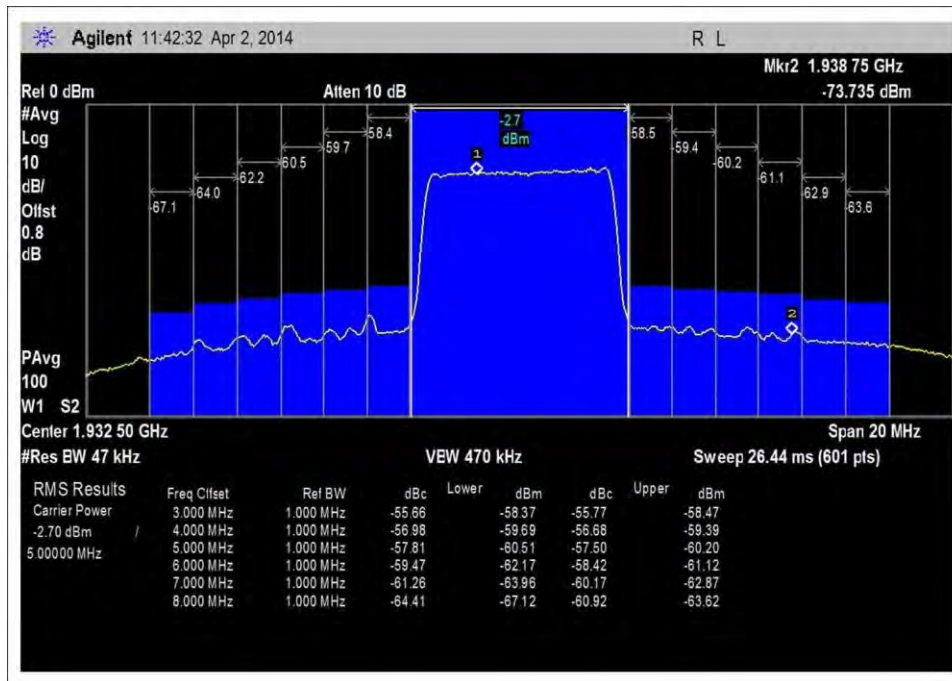
## Test Data



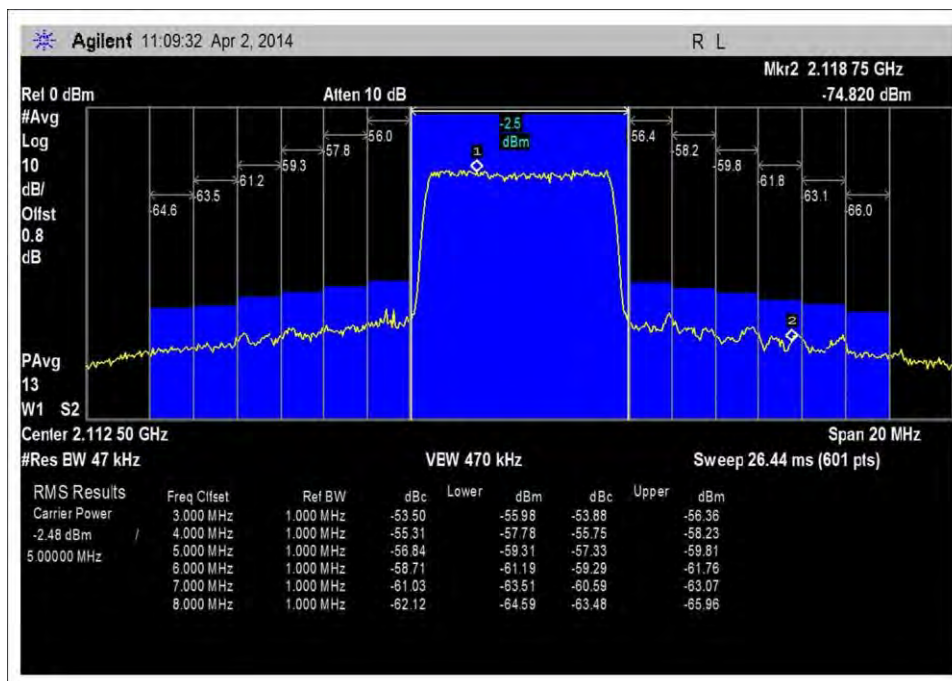
UL\_1710-1755MHz\_ACP



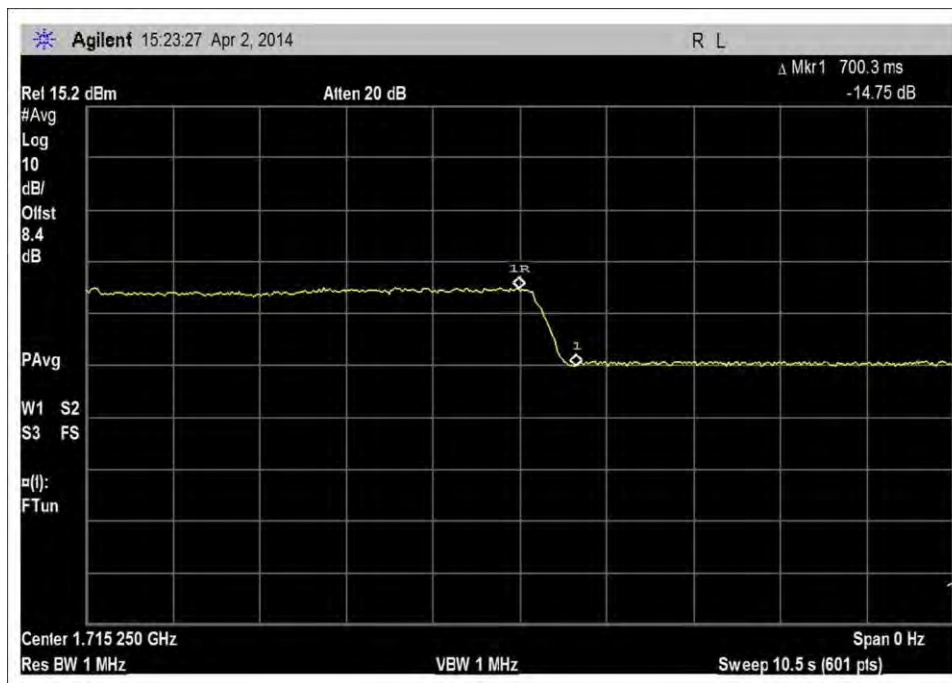
UL\_1850-1915MHz\_ACP



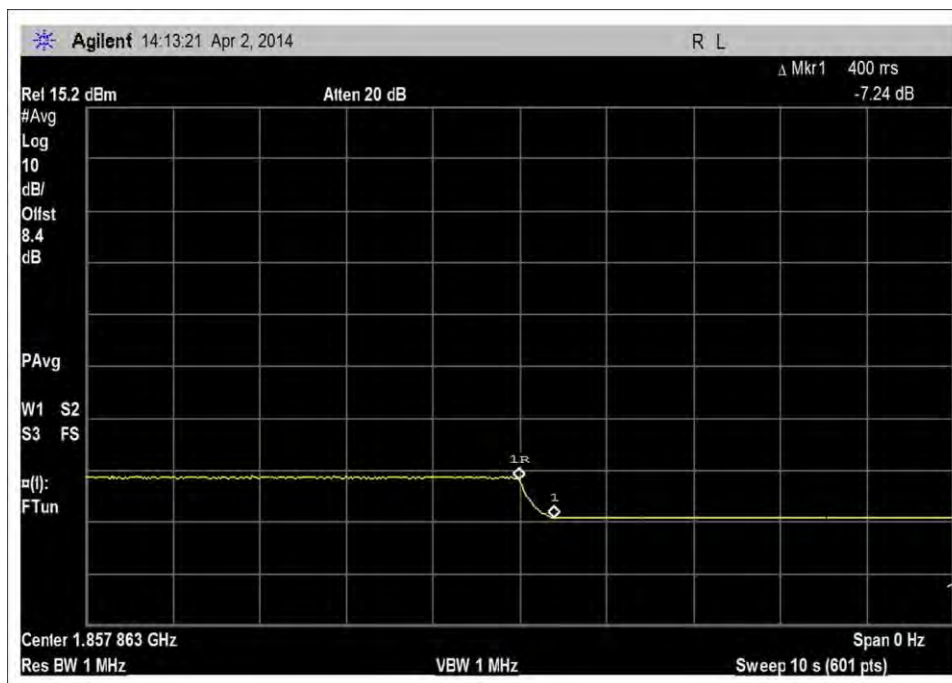
DL\_1930-1995MHz\_ACP



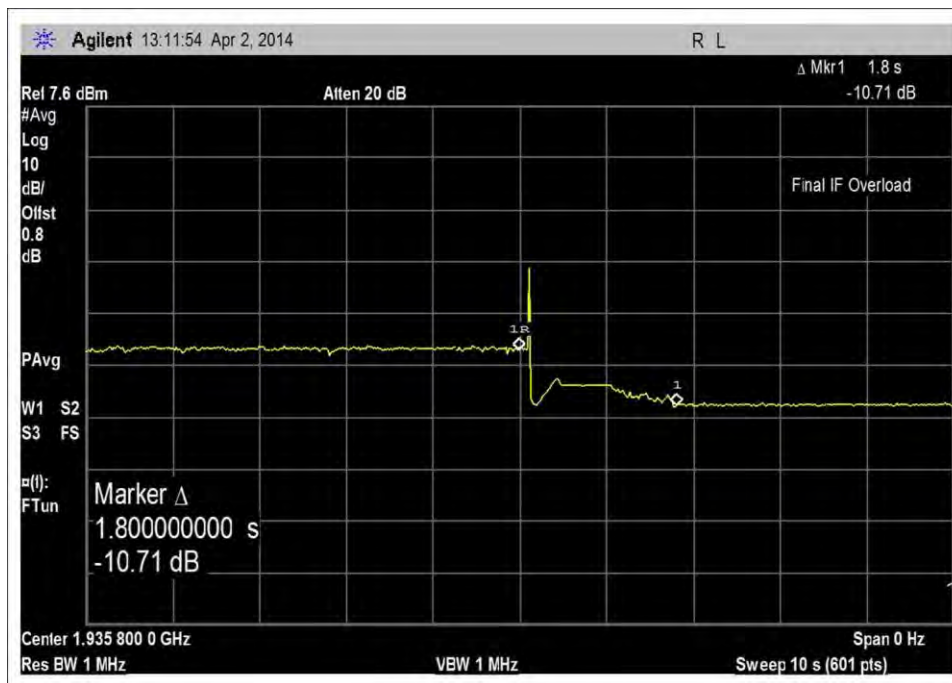
DL\_2110-2155MHz\_ACP



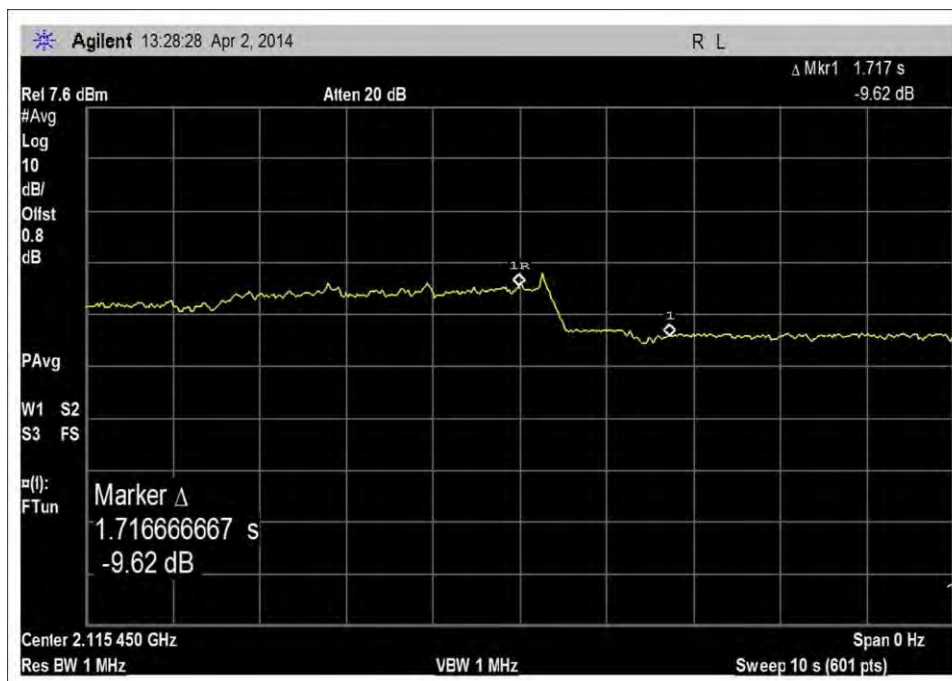
UL\_1710-1755MHz\_noise timing



UL\_1850-1915MHz\_noise timing



DL\_1930-1995MHz\_noise timing



DL\_2110-2155MHz\_noise timing

## Clause 7.8 Uplink Inactivity

### Test Conditions / Setup

Test Location: CKC Laboratories • 110 Olinda Place • Brea, CA 92823 • 714-993-6112

Customer: **Nextivity, Inc.**

Specification: 7.8 Uplink Inactivity

Work Order #: **95395** Date: 3/12/2014

Test Type: **Conducted Emissions** Time: 09:37:42

Equipment: **Provider Specific Consumer Signal Booster** Sequence#: 1

Manufacturer: Nextivity, Inc. Tested By: E. Wong

Model: Cel-Fi D32-2/4 110V 60Hz

S/N: 175406000036, 174406000145

#### Test Equipment:

| ID | Asset #  | Description       | Model                    | Calibration Date | Cal Due Date |
|----|----------|-------------------|--------------------------|------------------|--------------|
| T1 | AN02672  | Spectrum Analyzer | E4446A                   | 9/4/2012         | 9/4/2014     |
| T2 | AN03430  | Attenuator        | 75A-10-12                | 9/5/2013         | 9/5/2015     |
| T3 | ANP06543 | Cable             | 32022-29094K-29094K-24TC | 11/20/2013       | 11/20/2015   |

#### Equipment Under Test (\* = EUT):

| Function                                   | Manufacturer    | Model #           | S/N          |
|--------------------------------------------|-----------------|-------------------|--------------|
| Provider Specific Consumer Signal Booster* | Nextivity, Inc. | Cel-Fi D32-2/4 CU | 175406000036 |
| Provider Specific Consumer Signal Booster  | Nextivity, Inc. | Cel-Fi D32-2/4 NU | 174406000145 |

#### Support Devices:

| Function         | Manufacturer | Model #          | S/N        |
|------------------|--------------|------------------|------------|
| Signal Generator | Agilent      | E4433B           | US40052164 |
| Signal Generator | Agilent      | E4438C           | MY42082260 |
| Power Supply     | Hon-Kwang    | HK-AX-120A150-US | NA         |
| Power Supply     | Hon-Kwang    | HK-AX-120A150-US | NA         |

### Test Conditions / Notes:

The EUT is provider specific signal booster pair consisted of a Network unit (NU) and a Coverage unit (CU) using proprietary 5.8GHz Wireless interface.

The EUT is manufacturer configurable to operate in relay bandwidth of 5MHz, 10MHz, 15MHz and 20MHz within the CMRS band by setting the bandwidth and center frequency of programmable Spectrum Block Filter, Gain and other operational parameter based on received public land mobile network (PLMN) ID. For testing purposes, only spectrum block filter of 5 MHz will be evaluated.

The two EUT are placed on the test bench, connected via coax cable, combiner and 50 dB attenuators. The unit not under evaluation is placed in shielded enclosure to improve RF isolation.

UNII Tx /RX port of NU is connected to UNII TX/RX port of CU.

Evaluation are conducted at Donor power Port band 2 and band 4, Server port band 2 and band 4.

Signal: 4.1MHz AWGN.

UL = 1850-1915MHz, 1710-1755MHz

DL = 1930-1990MHz, 2110-2155MHz

Test environment conditions:

Temperature - 24°C

Relative Humidity - 21%

Pressure - 100kPa

Testing is performed in accordance with Provider Specific Booster test procedure 935210 D04 Provider Specific Booster Measurement DR06-41704, dated 03/06/14.

## Summary of Results

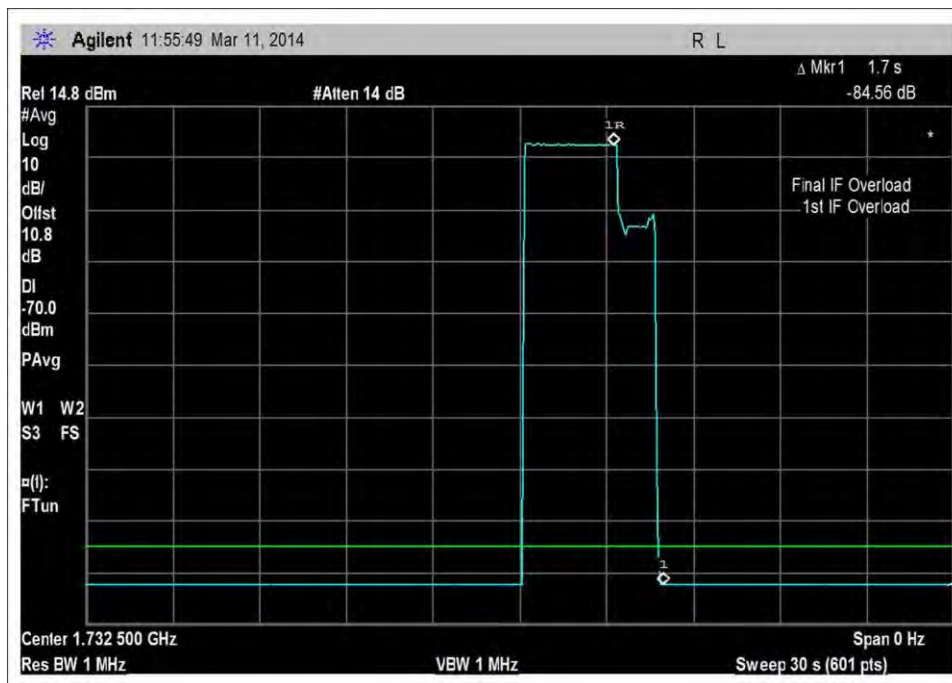
Summary:

Pass, The measured uplink inactive timing was measured, both band show the noise level is below -70dBm/MHz in the inactive stage, meeting the limit of 5 sec and -70dBm/MHz IAW the following requirement.

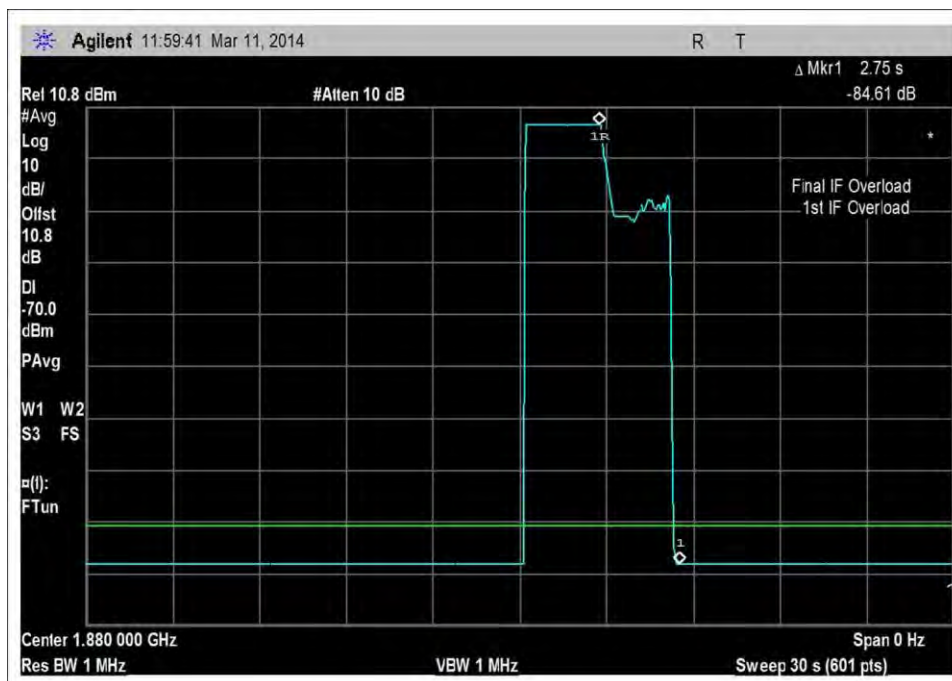
| Procedure Sec # | Guidance Description | FCC Sec #         | FCC Rule Description |
|-----------------|----------------------|-------------------|----------------------|
| 7.8             | Uplink Inactivity    | 20.21(e)(9)(i)(J) | Uplink Inactivity    |

| Frequency    | UL Inactive time<br>Sec | Limit<br>Sec | Margin<br>Sec |
|--------------|-------------------------|--------------|---------------|
| UL 1710-1755 | 1.7                     | 5.0          | -3.3          |
| UL 1850-1915 | 2.8                     | 5.0          | -2.3          |

## Test Data



UL\_inactive\_1710-1755MHz



UL\_inactive\_1850-1915MHz

## Clause 7.9 Booster Gain Limit

### Test Conditions / Setup

Test Location: CKC Laboratories • 110 Olinda Place • Brea, CA 92823 • 714-993-6112

Customer: **Nextivity, Inc.**

Specification: 7.9 Variable Booster Gain

Work Order #: **95395** Date: 3/12/2014

Test Type: **Conducted Emissions** Time: 09:37:42

Equipment: **Provider Specific Consumer Signal Booster** Sequence#: 1

Manufacturer: Nextivity, Inc. Tested By: E. Wong

Model: Cel-Fi D32-2/4 110V 60Hz

S/N: 175406000036, 174406000145

#### Test Equipment:

| ID | Asset #  | Description       | Model                    | Calibration Date | Cal Due Date |
|----|----------|-------------------|--------------------------|------------------|--------------|
| T1 | AN02672  | Spectrum Analyzer | E4446A                   | 9/4/2012         | 9/4/2014     |
| T2 | AN03430  | Attenuator        | 75A-10-12                | 9/5/2013         | 9/5/2015     |
| T3 | ANP06543 | Cable             | 32022-29094K-29094K-24TC | 11/20/2013       | 11/20/2015   |

#### Equipment Under Test (\* = EUT):

| Function                                   | Manufacturer    | Model #           | S/N          |
|--------------------------------------------|-----------------|-------------------|--------------|
| Provider Specific Consumer Signal Booster* | Nextivity, Inc. | Cel-Fi D32-2/4 CU | 175406000036 |
| Provider Specific Consumer Signal Booster  | Nextivity, Inc. | Cel-Fi D32-2/4 NU | 174406000145 |

#### Support Devices:

| Function         | Manufacturer | Model #          | S/N        |
|------------------|--------------|------------------|------------|
| Signal Generator | Anritsu      | MT8820A          | 6200250367 |
| Signal Generator | Agilent      | E4438C           | MY42082260 |
| Power Supply     | Hon-Kwang    | HK-AX-120A150-US | NA         |
| Power Supply     | Hon-Kwang    | HK-AX-120A150-US | NA         |

**Test Conditions / Notes:**

The EUT is provider specific signal booster pair consisted of a Network unit (NU) and a Coverage unit (CU) using proprietary 5.8GHz Wireless interface.

The EUT is manufacturer configurable to operate in relay bandwidth of 5MHz, 10MHz, 15MHz and 20MHz within the CMRS band by setting the bandwidth and center frequency of programmable Spectrum Block Filter, Gain and other operational parameter based on received public land mobile network (PLMN) ID. For testing purposes, only spectrum block filter of 5MHz will be evaluated.

The two EUT are placed on the test bench, connected via coax cable, combiner and 50 dB attenuators. The unit not under evaluation is placed in shielded enclosure to improve RF isolation.

UNII Tx /RX port of NU is connected to UNII TX/RX port of CU.

Evaluation are conducted at Donor power Port band 2 and band 4, Server port band 2 and band 4.

Signal: 4.1MHz AWGN

UL = 1850-1915MHz, 1710-1755MHz

DL = 1930-1990MHz, 2110-2155MHz

Test environment conditions:

Temperature - 24°C

Relative Humidity - 21%

Pressure - 100kPa

Testing is performed in accordance with Provider Specific Booster test procedure 935210 D04 Provider Specific Booster Measurement DR06-41704, dated 03/06/14.

The Base station simulator was set up with the following parameter:

Total Output Power = -20dBm

CPICH Tx power = +30dBm.

Atten = 70

CPICH Power (CPICH-EC/IOR) = -10dB

$BSCL = +70 + 30 - (-20 + (-10)) = 130\text{dB}$

$RSCP = -30 = \text{accrual transmission level } -20\text{ dBm (RSSI)} + -10\text{ (ECIO)}$

ECIO = Signal power to noise power.

$BSCL = \text{Max attenuator setting} + \text{CPICH Tx Power level setting} - \text{Total output power} - \text{Pilot Channel (CPICH)}$

$RSSI = \text{Total output power} - \text{Max attenuator setting}$

Note: In intended operation, the booster shuts off and ceased relaying at RSSL of exceeding -40dBm. UL gain was evaluated only up to RSSI/BSCL of -40dBm / 80dB.

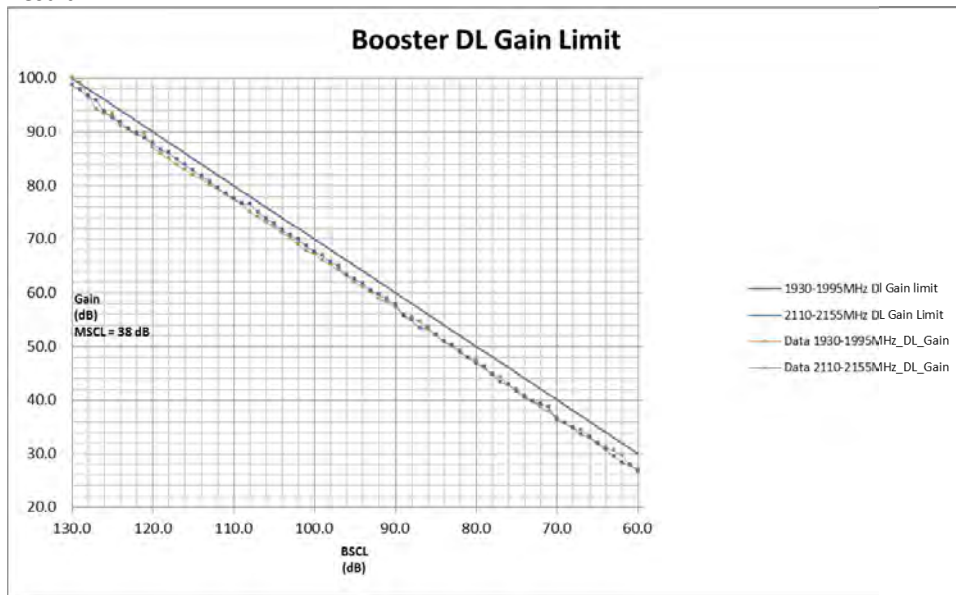
## Summary of Results

### Summary

Pass, the device complies with the following requirement.

| Procedure Sec # | Guidance Description  | FCC Sec #                                     | FCC Rule Description                    |
|-----------------|-----------------------|-----------------------------------------------|-----------------------------------------|
| 7.9             | Variable Booster Gain | 20.21(e)(9)(i)(C)(1)/(2)<br>20.21(e)(9)(i)(I) | Booster Gain<br>Transmit Power Off Mode |

### Result

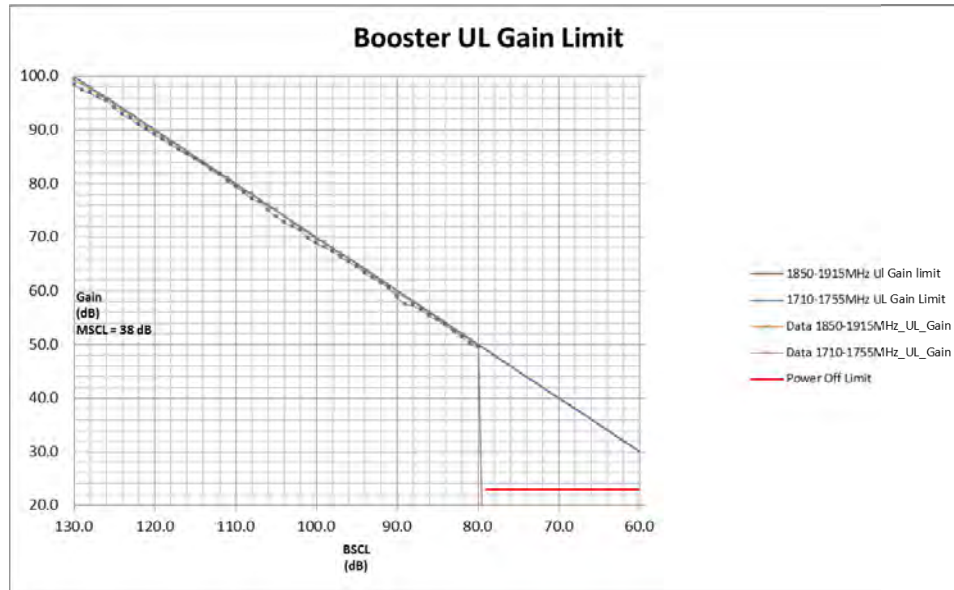


### DL

| RPCH Power<br>Ant port<br>(dBm) | BSCL  | CH power | Gain | Limit | Margin |
|---------------------------------|-------|----------|------|-------|--------|
| -87.0                           | 127.0 | 8.8      | 95.8 | 97.0  | -1.2   |
| -89.0                           | 129.0 | 8.7      | 97.7 | 99.0  | -1.3   |
| -90.0                           | 130.0 | 8.6      | 98.6 | 100.0 | -1.4   |
| -88.0                           | 128.0 | 8.5      | 96.5 | 98.0  | -1.5   |
| -68.0                           | 108.0 | 8.4      | 76.4 | 78.0  | -1.6   |
| -78.0                           | 118.0 | 8.0      | 86.0 | 88.0  | -2.0   |

# DL

| RPCH Power<br>Ant port<br>(dBm) | BSCL  | Ch power | Gain  | Limit | Margin |
|---------------------------------|-------|----------|-------|-------|--------|
| -90.0                           | 130.0 | 10.0     | 100.0 | 100.0 | 0.0    |
| -88.0                           | 128.0 | 8.7      | 96.7  | 98.0  | -1.3   |
| -81.0                           | 121.0 | 8.6      | 89.6  | 91.0  | -1.4   |
| -85.0                           | 125.0 | 8.2      | 93.2  | 95.0  | -1.8   |
| -83.0                           | 123.0 | 7.6      | 90.6  | 93.0  | -2.4   |
| -47.0                           | 87.0  | 7.6      | 54.6  | 57.0  | -2.4   |



# UL

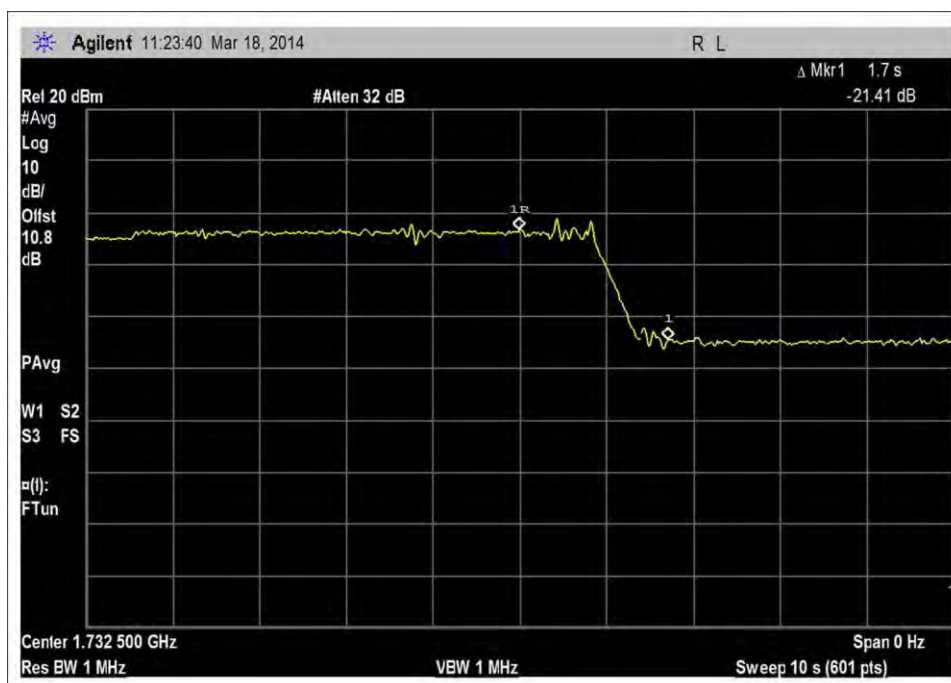
| RPCH Power<br>at Ant port<br>(dBm) | BSCL  | Ch Power | Gain | Limit | Margin |
|------------------------------------|-------|----------|------|-------|--------|
| -44.0                              | 84.0  | -24.3    | 53.7 | 54.0  | -0.3   |
| -51.0                              | 91.0  | -17.4    | 60.6 | 61.0  | -0.4   |
| -75.0                              | 115.0 | 6.6      | 84.6 | 85.0  | -0.4   |
| -74.0                              | 114.0 | 5.6      | 83.6 | 84.0  | -0.4   |
| -72.0                              | 112.0 | 3.6      | 81.6 | 82.0  | -0.4   |
| -76.0                              | 116.0 | 7.5      | 85.5 | 86.0  | -0.5   |

UL

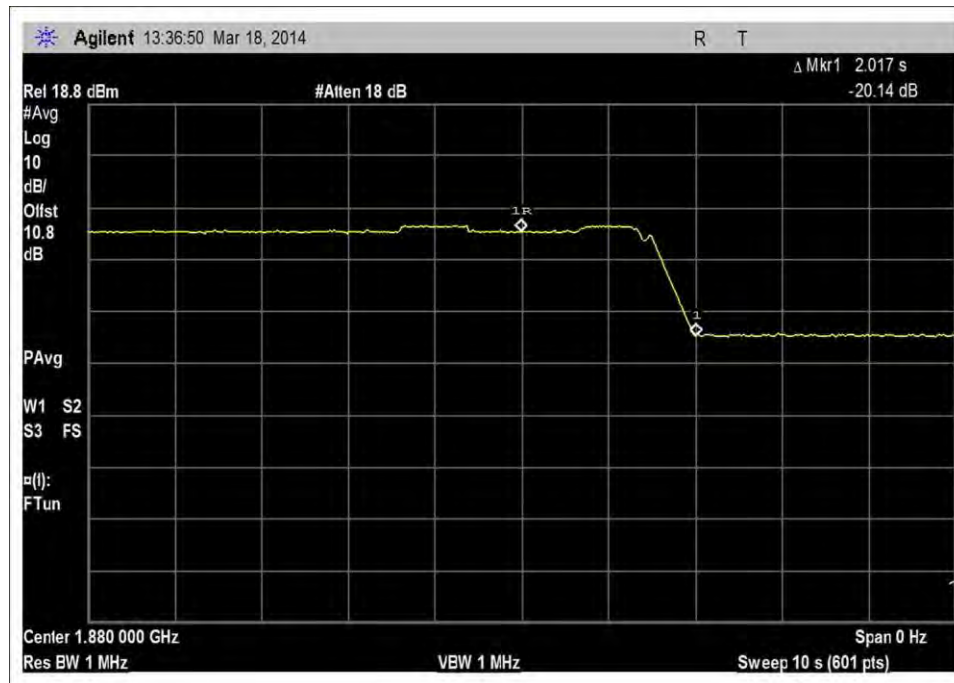
| RPCH Power<br>at Ant port<br>(dBm) | BSCL  | Ch Power | Gain | Limit | Margin |
|------------------------------------|-------|----------|------|-------|--------|
| -68.0                              | 108.0 | -0.1     | 77.9 | 78.0  | -0.1   |
| -65.0                              | 105.0 | -3.1     | 74.9 | 75.0  | -0.1   |
| -59.0                              | 99.0  | -9.1     | 68.9 | 69.0  | -0.1   |
| -58.0                              | 98.0  | -10.1    | 67.9 | 68.0  | -0.1   |
| -46.0                              | 86.0  | -22.1    | 55.9 | 56.0  | -0.1   |
| -45.0                              | 85.0  | -23.1    | 54.9 | 55.0  | -0.1   |

| Frequency    | UL Gain timing<br>Sec | Limit<br>Sec | Margin<br>Sec |
|--------------|-----------------------|--------------|---------------|
| UL 1710-1755 | 1.7                   | 3.0          | -1.3          |
| UL 1850-1915 | 2.0                   | 3.0          | -1.0          |

## Test Data



UL\_1710-1755MHz.



UL\_1850-1995MHz

## Clause 7.11 Oscillation Detection

### Test Conditions / Setup

Test Location: CKC Laboratories • 110 Olinda Place • Brea, CA 92823 • 714-993-6112

Customer: **Nextivity, Inc.**

Specification: 7.11 Oscillation Detection.

Work Order #: **95395** Date: 3/12/2014

Test Type: **Conducted Emissions** Time: 09:37:42

Equipment: **Provider Specific Consumer Signal Booster** Sequence#: 1

Manufacturer: Nextivity, Inc. Tested By: E. Wong

Model: Cel-Fi D32-2/4 110V 60Hz

S/N: 175406000036, 174406000145

#### Test Equipment:

| ID | Asset #  | Description       | Model                    | Calibration Date | Cal Due Date |
|----|----------|-------------------|--------------------------|------------------|--------------|
| T1 | AN02672  | Spectrum Analyzer | E4446A                   | 9/4/2012         | 9/4/2014     |
| T2 | AN03430  | Attenuator        | 75A-10-12                | 9/5/2013         | 9/5/2015     |
| T3 | ANP06543 | Cable             | 32022-29094K-29094K-24TC | 11/20/2013       | 11/20/2015   |

#### Equipment Under Test (\* = EUT):

| Function                                   | Manufacturer    | Model #           | S/N          |
|--------------------------------------------|-----------------|-------------------|--------------|
| Provider Specific Consumer Signal Booster* | Nextivity, Inc. | Cel-Fi D32-2/4 CU | 175406000036 |
| Provider Specific Consumer Signal Booster  | Nextivity, Inc. | Cel-Fi D32-2/4 NU | 174406000145 |

#### Support Devices:

| Function         | Manufacturer | Model #          | S/N        |
|------------------|--------------|------------------|------------|
| Signal Generator | Agilent      | E4433B           | US40052164 |
| Signal Generator | Agilent      | E4438C           | MY42082260 |
| Power Supply     | Hon-Kwang    | HK-AX-120A150-US | NA         |
| Power Supply     | Hon-Kwang    | HK-AX-120A150-US | NA         |

#### Test Conditions / Notes:

The EUT is provider specific signal booster pair consisted of a Network unit (NU) and a Coverage unit (CU) using proprietary 5.8GHz Wireless interface.

The EUT is manufacturer configurable to operate in relay bandwidth of 5MHz, 10MHz, 15MHz and 20MHz within the CMRS band by setting the bandwidth and center frequency of programmable Spectrum Block Filter, Gain and other operational parameter based on received public land mobile network (PLMN) ID. For testing purposes, only spectrum block filter of 5MHz will be evaluated.

The two EUT are placed on the test bench, connected via coax cable, combiner and 50 dB attenuators. The unit not under evaluation is placed in shielded enclosure to improve RF isolation.

UNII Tx /RX port of NU is connected to UNII TX/RX port of CU.

Evaluation are conducted at Donor power Port band 2 and band 4, Server port band 2 and band 4.

Signal: 4.1MHz AWGN

UL = 1850-1915MHz, 1710-1755MHz

DL = 1930-1990MHz, 2110-2155MHz

Test environment conditions:

Temperature - 24°C

Relative Humidity - 21%

Pressure - 100kPa

Testing is performed in accordance with Provider Specific Booster test procedure 935210 D04 Provider Specific Booster Measurement DR06-41704, dated 03/06/14.

## Summary of Results

### Summary

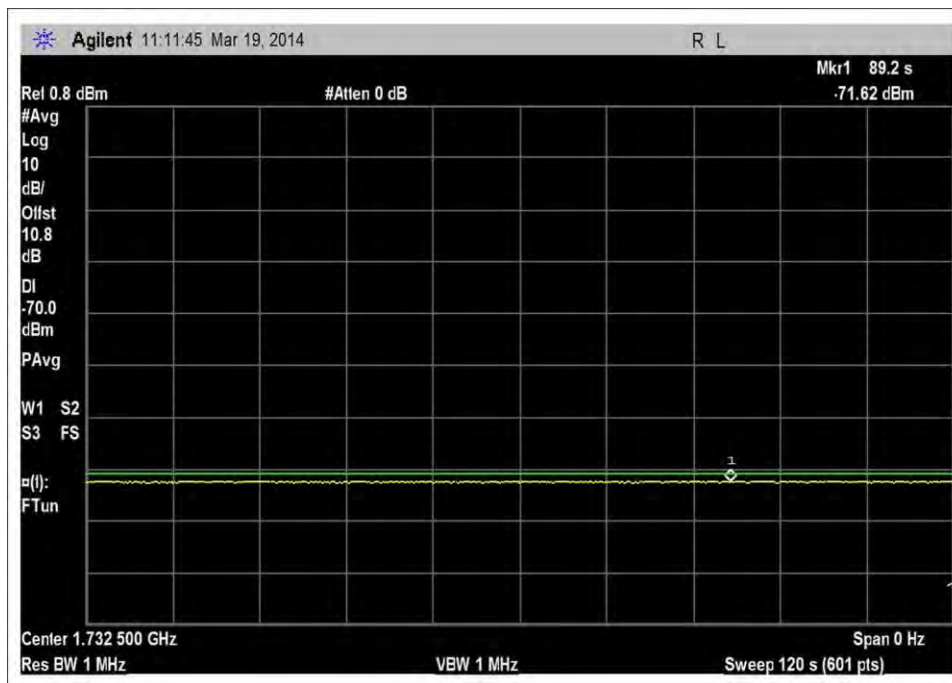
Pass, the device complies with the following requirement.

| Procedure Sec # | Guidance Description  | FCC Sec #          | FCC Rule Description |
|-----------------|-----------------------|--------------------|----------------------|
| 7.11            | Oscillation Detection | 20.21(e)(9)(ii)(A) | Anti-Oscillation     |

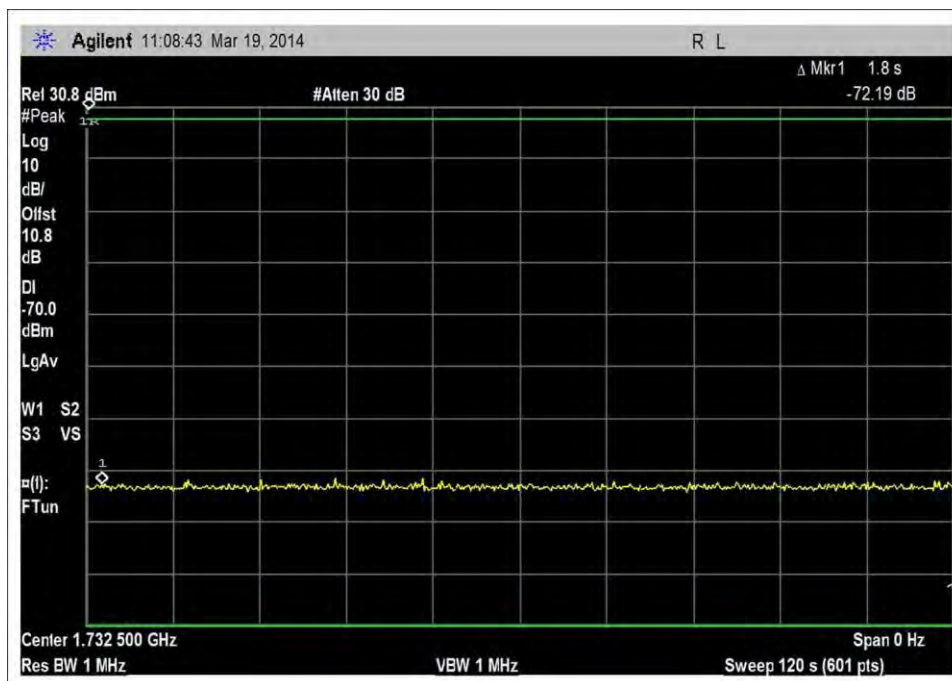
| Frequency    | Mitigation time<br>Sec | Limit<br>Sec | Margin<br>Sec |
|--------------|------------------------|--------------|---------------|
| UL 1710-1755 | 0.2083                 | 0.3          | -0.1          |
| UL 1850-1915 | 0.1333                 | 0.3          | -0.2          |
| DL 2110-2155 | 0.1410                 | 1.0          | -0.9          |
| DL 1930-1995 | 0.1000                 | 1.0          | -0.9          |

| Frequency    | Re-try<br>event | Limit<br>Event | Margin<br>dB |
|--------------|-----------------|----------------|--------------|
| UL 1710-1755 | 0.0             | 5.0            | -5.0         |
| UL 1850-1915 | 0.0             | 5.0            | -5.0         |
| DL 2110-2155 | 0.0             | 5.0            | -5.0         |
| DL 1930-1995 | 0.0             | 5.0            | -5.0         |

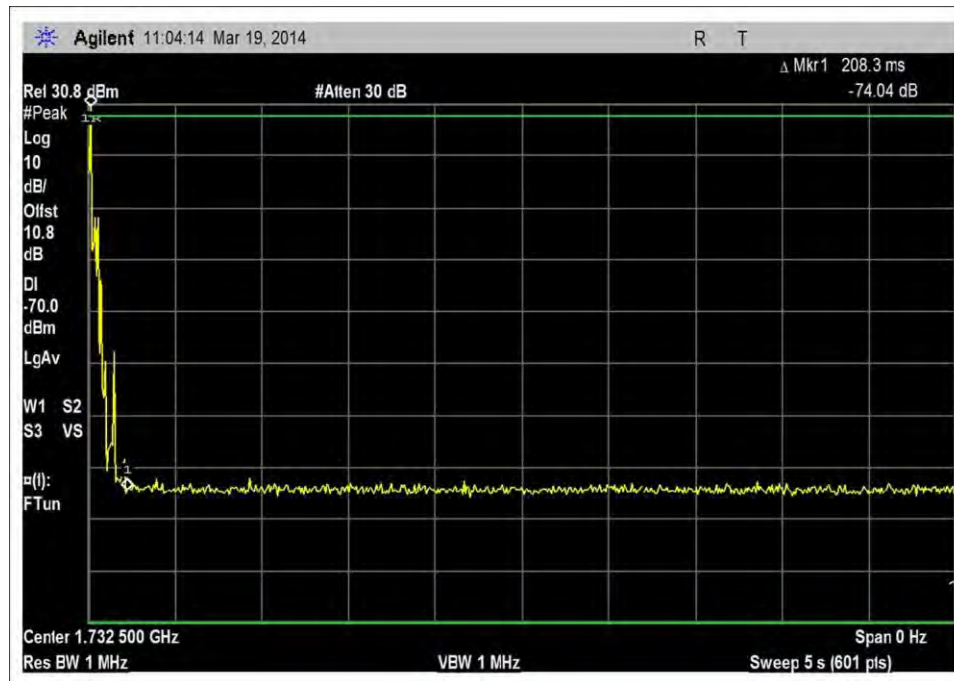
## Test Data



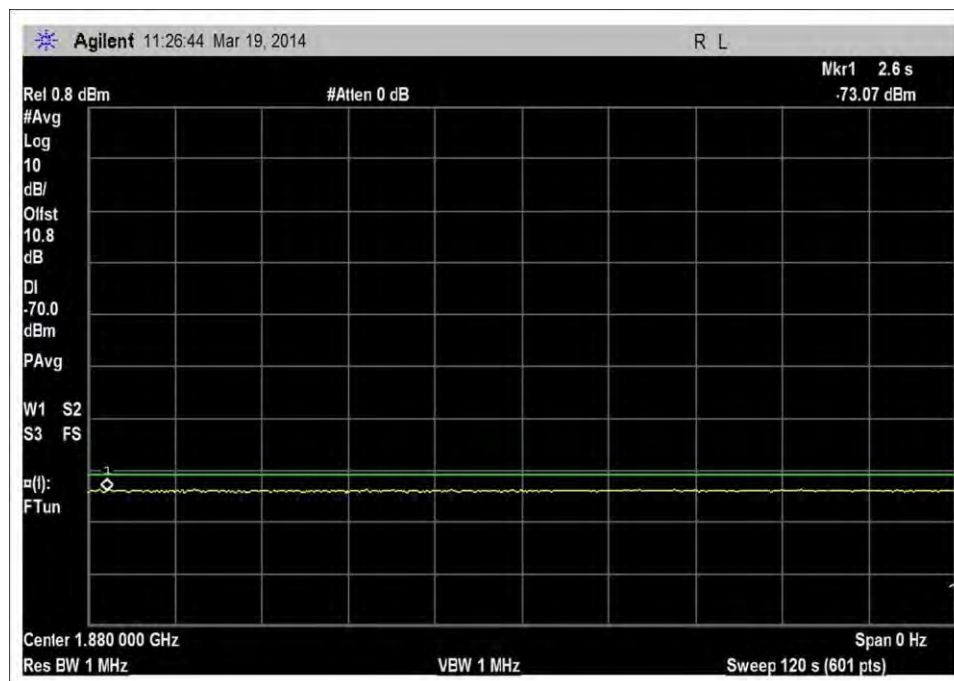
UL-1710-1755MHz\_-70dBm



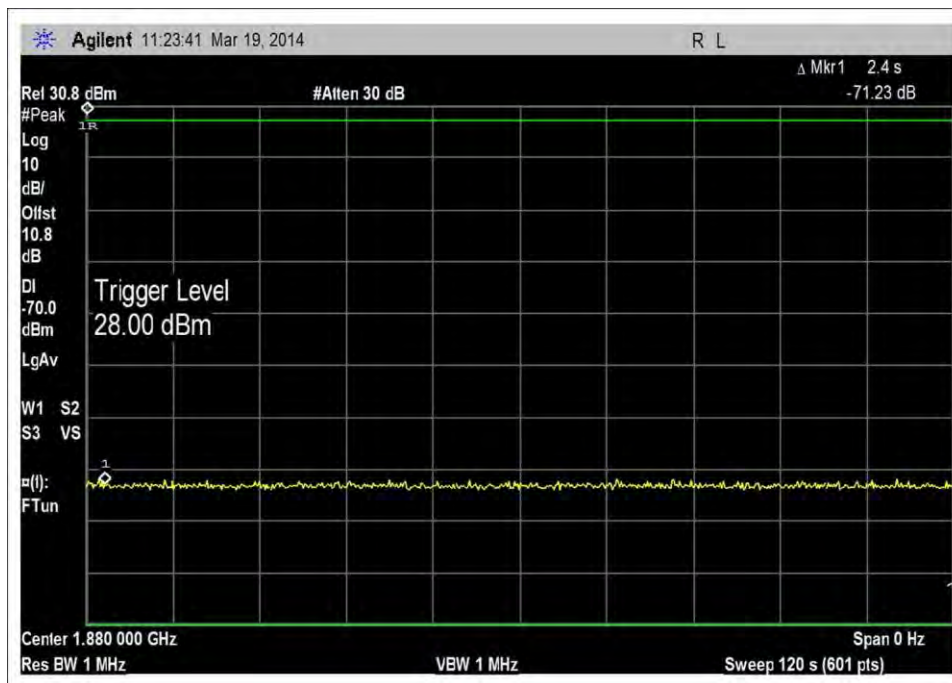
UL-1710-1755MHz\_120sec



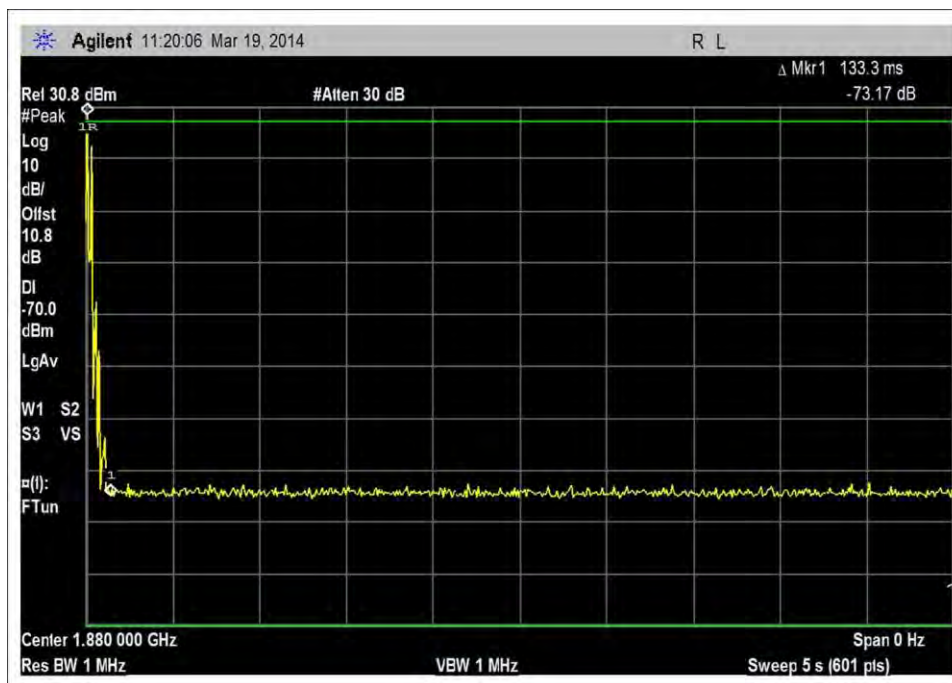
UL-1710-1755MHz\_time



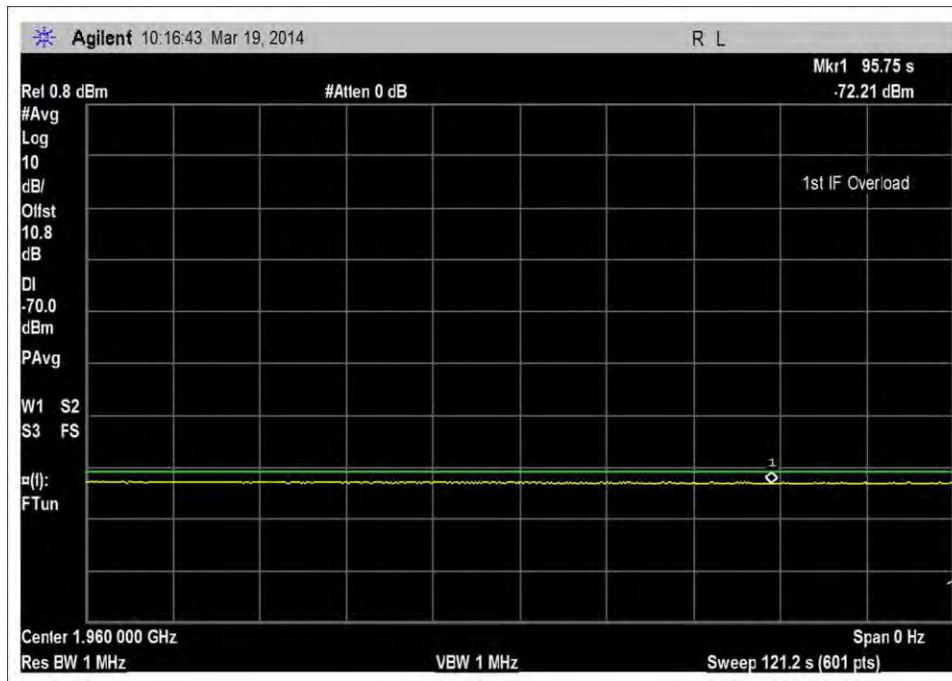
UL-1850-1915MHz\_-70dBm



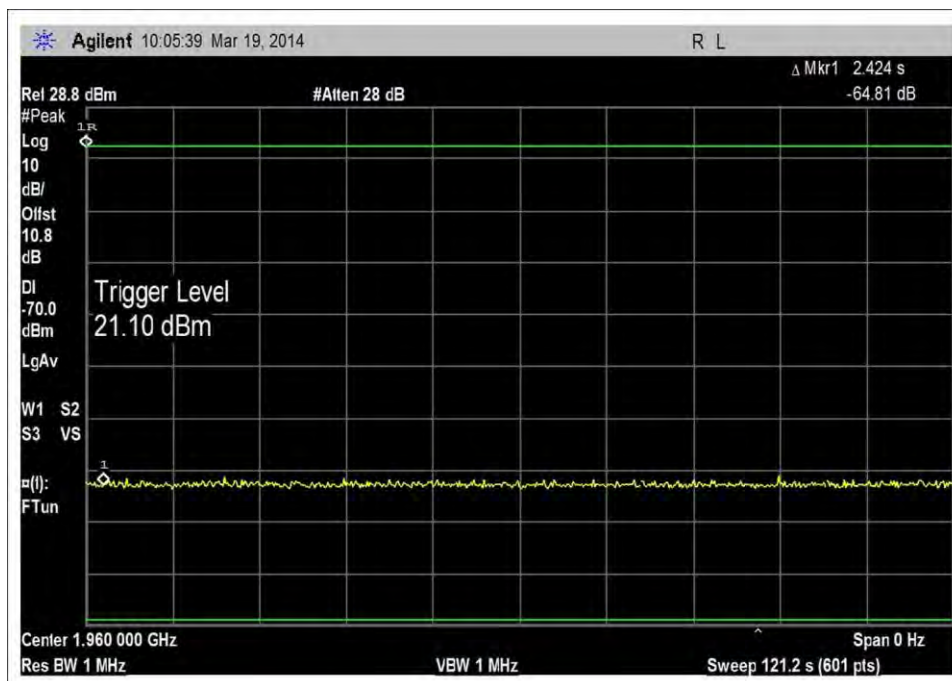
UL-1850-1915MHz\_120sec



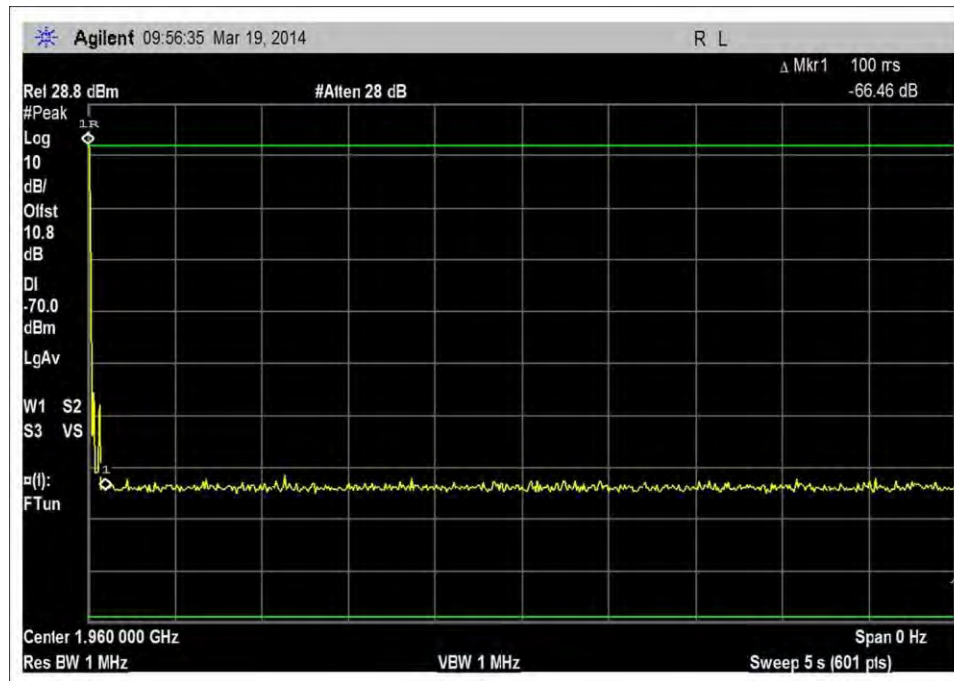
UL-1850-1915MHz\_time



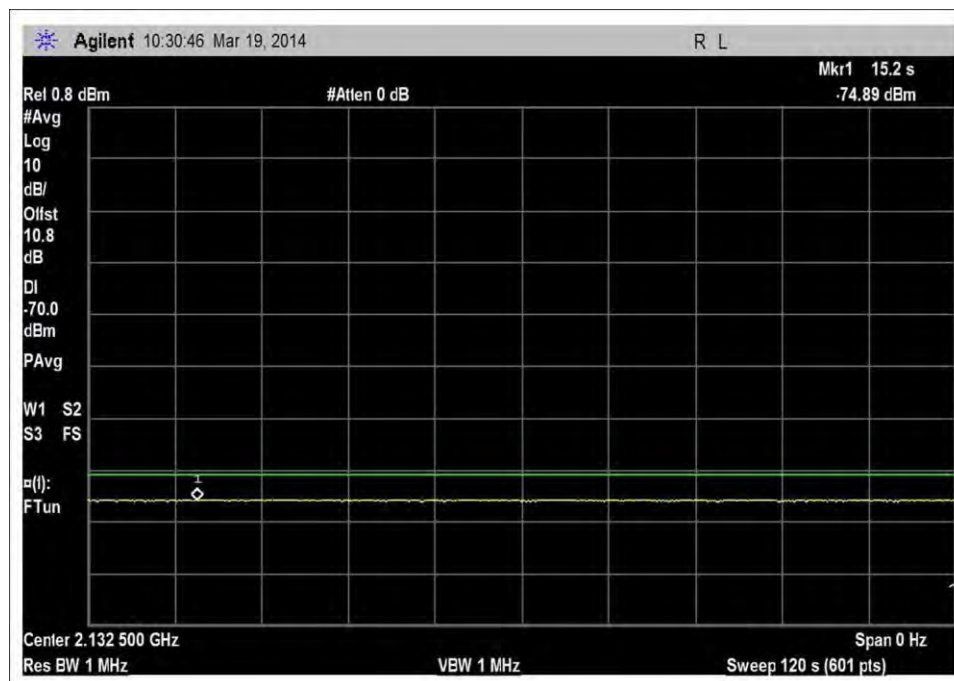
DL-1930-1995MHz\_time\_-70dBm



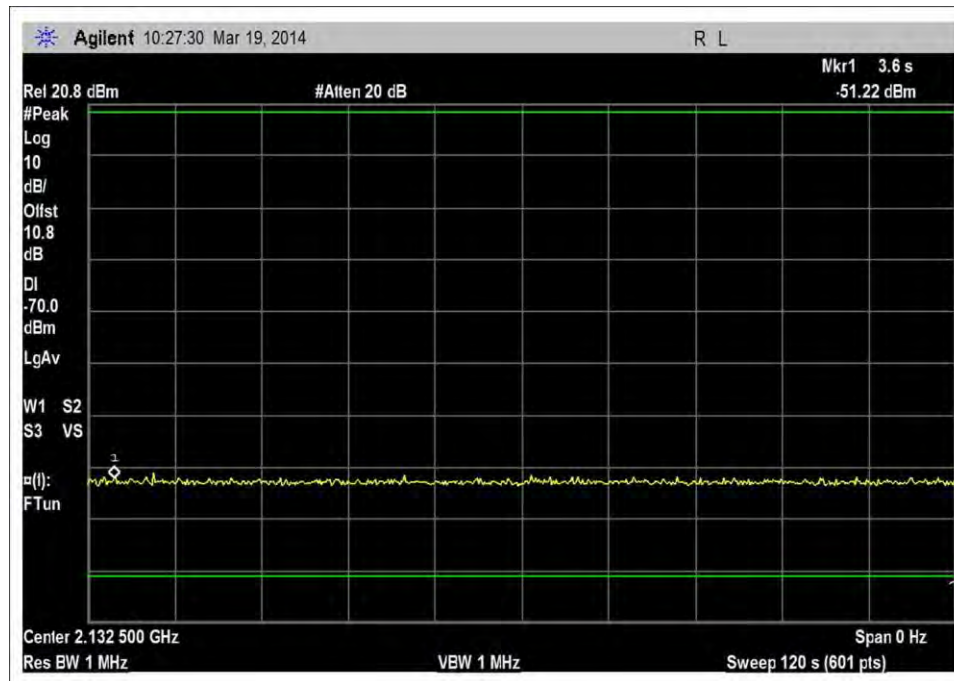
DL-1930-1995MHz\_time\_120sec



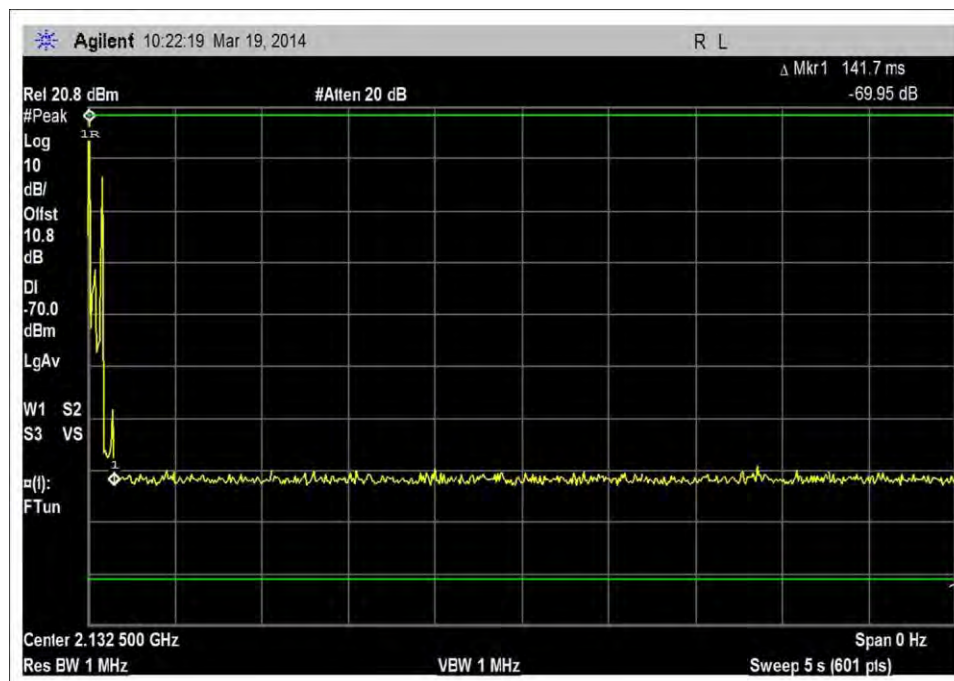
DL-1930-1995MHz\_time



DL-2110-2155MHz\_time\_-70dBm



DL-2110-2155MHz\_time\_120sec



DL-2110-2155MHz\_time

### **Clause 7.13 Spectrum Block Filter**

Section 7.13 not applicable because the EUT does not utilize spectrum block filtering.

## Clause 7.14 Out of Band Gain Limits

### Test Conditions / Setup

Test Location: CKC Laboratories • 110 Olinda Place • Brea, CA 92823 • 714-993-6112

Customer: **Nextivity, Inc.**

Specification: 7.14 Out of Band Gain Limits

Work Order #: **95395** Date: 3/12/2014

Test Type: **Conducted Emissions** Time: 09:37:42

Equipment: **Provider Specific Consumer Signal Booster** Sequence#: 1

Manufacturer: Nextivity, Inc. Tested By: E. Wong

Model: Cel-Fi D32-2/4 110V 60Hz

S/N: 175406000036, 174406000145

#### Test Equipment:

| ID | Asset #  | Description       | Model                    | Calibration Date | Cal Due Date |
|----|----------|-------------------|--------------------------|------------------|--------------|
| T1 | AN02672  | Spectrum Analyzer | E4446A                   | 9/4/2012         | 9/4/2014     |
| T2 | AN03430  | Attenuator        | 75A-10-12                | 9/5/2013         | 9/5/2015     |
| T3 | ANP06543 | Cable             | 32022-29094K-29094K-24TC | 11/20/2013       | 11/20/2015   |

#### Equipment Under Test (\* = EUT):

| Function                                   | Manufacturer    | Model #           | S/N          |
|--------------------------------------------|-----------------|-------------------|--------------|
| Provider Specific Consumer Signal Booster* | Nextivity, Inc. | Cel-Fi D32-2/4 CU | 175406000036 |
| Provider Specific Consumer Signal Booster  | Nextivity, Inc. | Cel-Fi D32-2/4 NU | 174406000145 |

#### Support Devices:

| Function         | Manufacturer | Model #          | S/N        |
|------------------|--------------|------------------|------------|
| Signal Generator | Agilent      | E4433B           | US40052164 |
| Signal Generator | Agilent      | E4438C           | MY42082260 |
| Power Supply     | Hon-Kwang    | HK-AX-120A150-US | NA         |
| Power Supply     | Hon-Kwang    | HK-AX-120A150-US | NA         |

**Test Conditions / Notes:**

The EUT is provider specific signal booster pair consisted of a Network unit (NU) and a Coverage unit (CU) using proprietary 5.8GHz Wireless interface.

The EUT is manufacturer configurable to operate in relay bandwidth of 5MHz, 10MHz, 15MHz and 20MHz within the CMRS band by setting the bandwidth and center frequency of programmable Spectrum Block Filter, Gain and other operational parameter based on received public land mobile network (PLMN) ID. For testing purposes, only spectrum block filter of 5MHz will be evaluated.

The two EUT are placed on the test bench, connected via coax cable, combiner and 50 dB attenuators. The unit not under evaluation is placed in shielded enclosure to improve RF isolation.

UNII Tx /RX port of NU is connected to UNII TX/RX port of CU.

Evaluation are conducted at Donor power Port band 2 and band 4, Server port band 2 and band 4.

Signal: 4.1MHz AWGN

UL = 1850-1915MHz, 1710-1755MHz

DL = 1930-1990MHz, 2110-2155MHz

Test environment conditions:

Temperature - 24°C

Relative Humidity 21%

Pressure - 100kPa

Testing is performed in accordance with Provider Specific Booster test procedure 935210 D04 Provider Specific Booster Measurement DR06-41704, dated 03/06/14. With slight deviation.

Due to the intended 100dB of s system gain, in order to accurately measure the out of band without introducing measurement artifact. The device was tested in the following manner.

Two signals were injected into the RF input port via a combiner. The 4.1MHz AWGN was set at the center of the band, while the booster establishes the maximum system gain. A 200kHz AWGN with frequency set at frequency offset IAW the specification was established with signal level at 20dB above the PAGC level, while maintaining the stability of the system. The spectrum analyzer trace was placed in max hold. Which the 200kHz AWGN signal was set to the other three Frequency offset. The captured level of the 200kHz AWGN signal was recorded.

The EUT was then removed from the set up and the measurement was repeated, capturing the signal of the 200kHz AWGN at the frequency offset.

The Gain at the frequency offset was then computed.

## Summary of Results

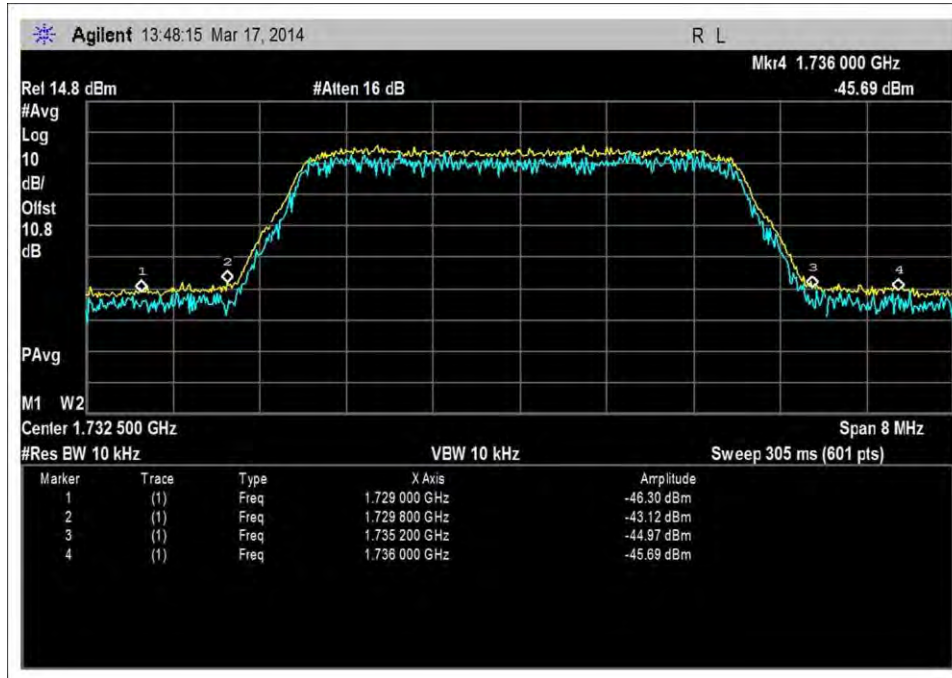
Summary:

Pass, the computed gain at the frequency offsets meet the requirement

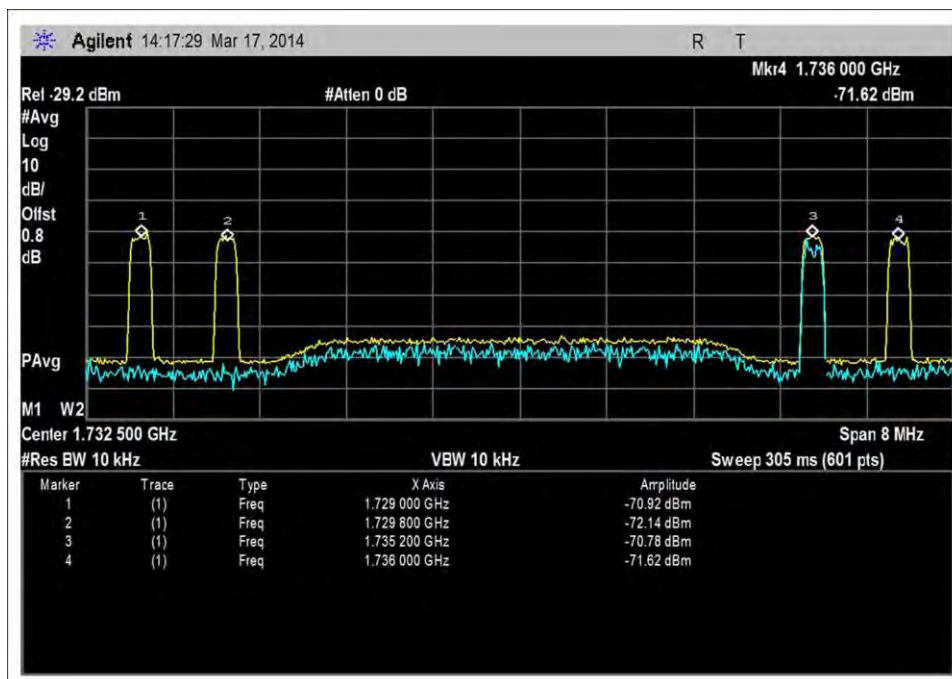
| Procedure Sec # | Guidance Description    | FCC Sec #         | FCC Rule Description    |
|-----------------|-------------------------|-------------------|-------------------------|
| 7.14            | Out of Band Gain Limits | 20.21(e)(9)(i)(E) | Out of Band Gain Limits |

|                  |             |             |             |             |
|------------------|-------------|-------------|-------------|-------------|
| Input            |             |             |             |             |
|                  | -1 MHz      | -0.2 MHz    | 0.2MHz      | 1MHz        |
| UL: 1710-1755MHz | -70.9       | -72.1       | -70.8       | -71.6       |
| UL: 1850-1915MHz | -70.7       | -70.0       | -69.7       | -70.4       |
| DL: 2110-2155MHz | -79.9       | -80.0       | -81.8       | -80.7       |
| DL: 1930-1995MHz | -78.7       | -78.7       | -80.1       | -80.3       |
| Output           |             |             |             |             |
|                  | -1MHz       | -0.2 MHz    | 0.2MHz      | 1MHz        |
| UL: 1710-1755MHz | -46.3       | -43.1       | -45.0       | -45.7       |
| UL: 1850-1915MHz | -42.0       | -40.8       | -38.5       | -42.5       |
| DL: 2110-2155MHz | -48.5       | -46.6       | -47.5       | -47.9       |
| DL: 1930-1995MHz | -54.8       | -52.8       | -53.7       | -54.6       |
| Gain             |             |             |             |             |
|                  | -1 MHz      | -0.2 MHz    | 0.2MHz      | 1MHz        |
| UL: 1710-1755MHz | 24.6        | 29.0        | 25.8        | 25.9        |
| UL: 1850-1915MHz | 28.7        | 29.2        | 31.2        | 27.9        |
| DL: 2110-2155MHz | 31.4        | 33.4        | 34.3        | 32.8        |
| DL: 1930-1995MHz | 23.9        | 25.9        | 26.4        | 25.7        |
| <b>Limit</b>     | <b>45.0</b> | <b>60.0</b> | <b>60.0</b> | <b>45.0</b> |
| Margin           |             |             |             |             |
| UL: 1710-1755MHz | -20.4       | -31.0       | -34.2       | -19.1       |
| UL: 1850-1915MHz | -16.3       | -30.8       | -28.9       | -17.1       |
| DL: 2110-2155MHz | -13.6       | -26.6       | -25.7       | -12.2       |
| DL: 1930-1995MHz | -21.1       | -34.1       | -33.6       | -19.3       |

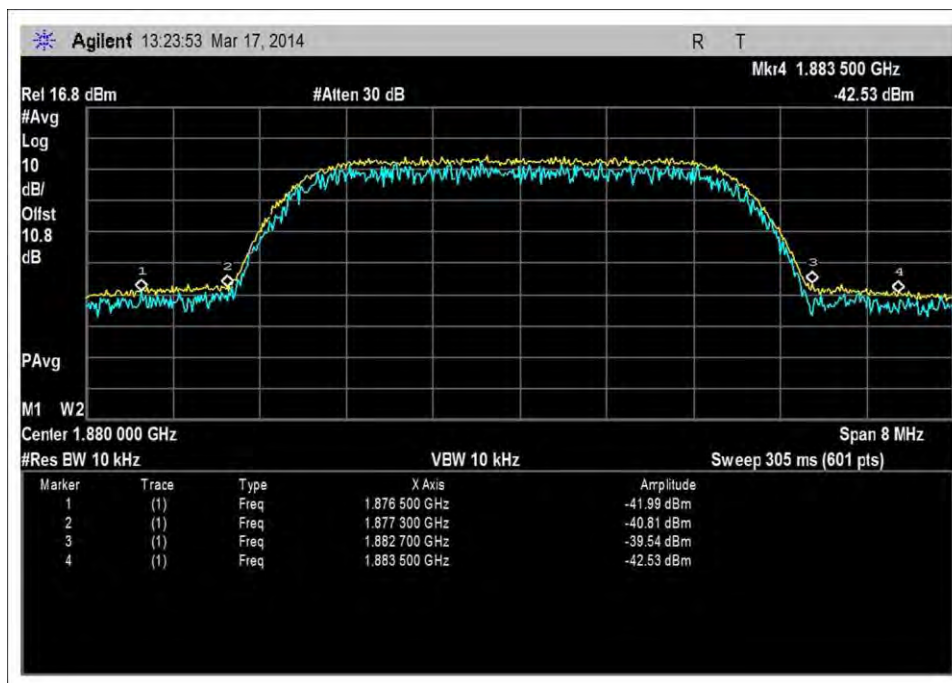
## Test Data



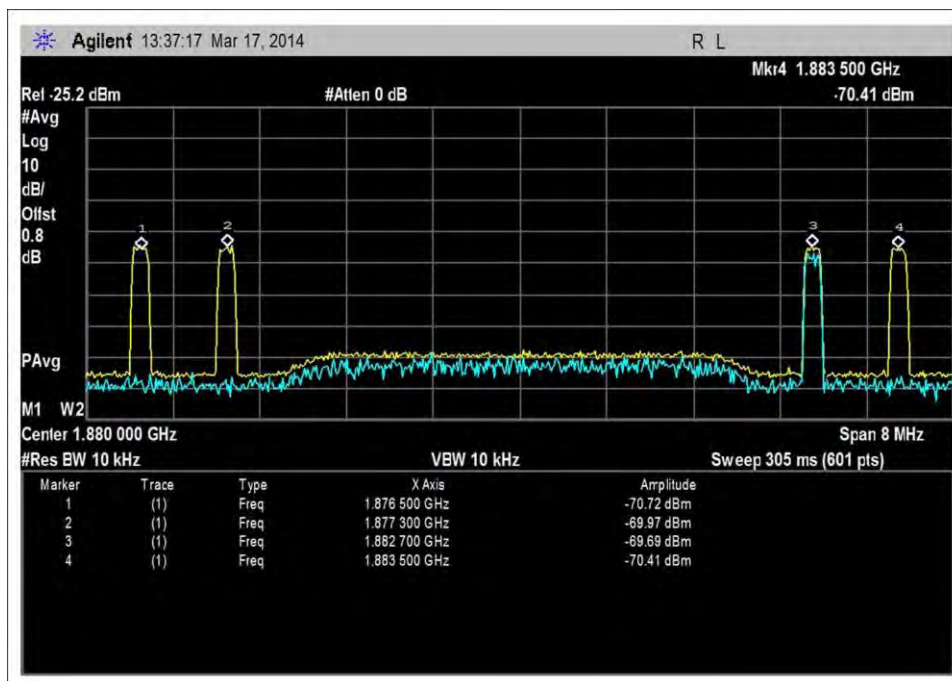
UL\_1710-1755MHz



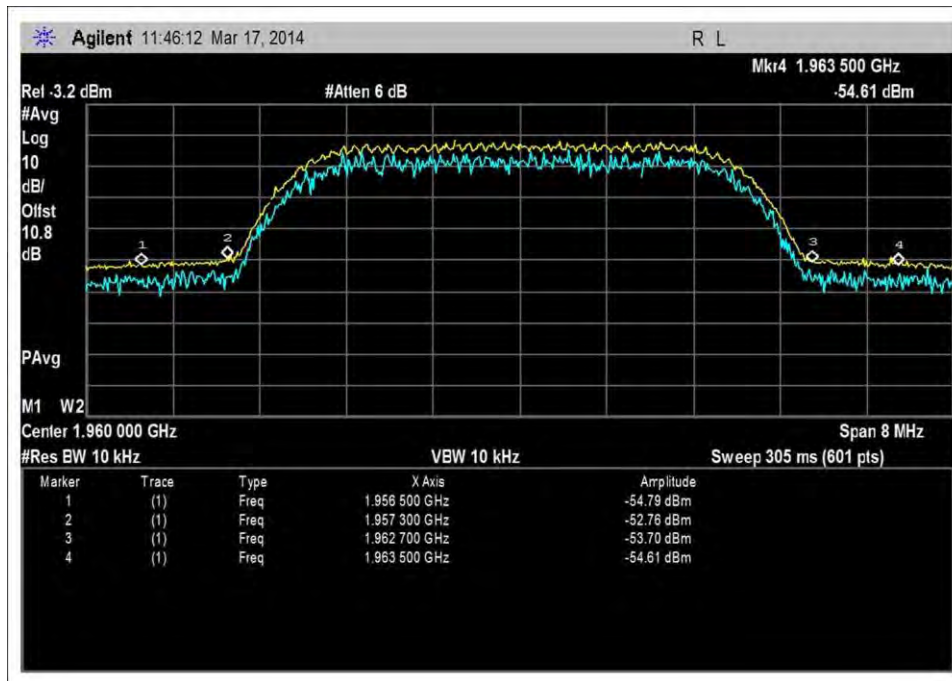
UL\_1710-1755MHz\_reference



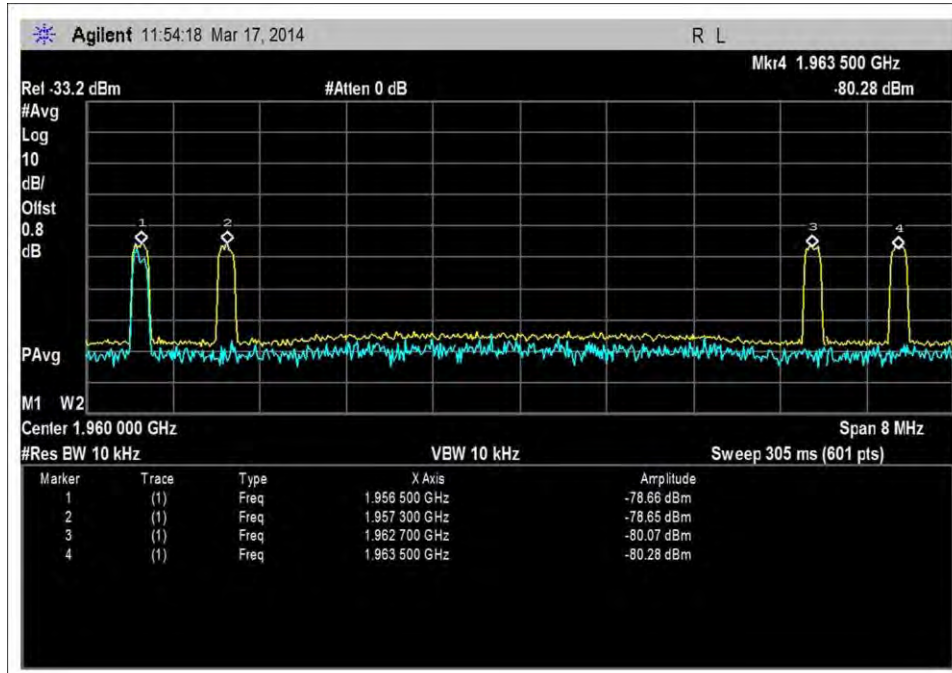
UL\_1850-1915MHz



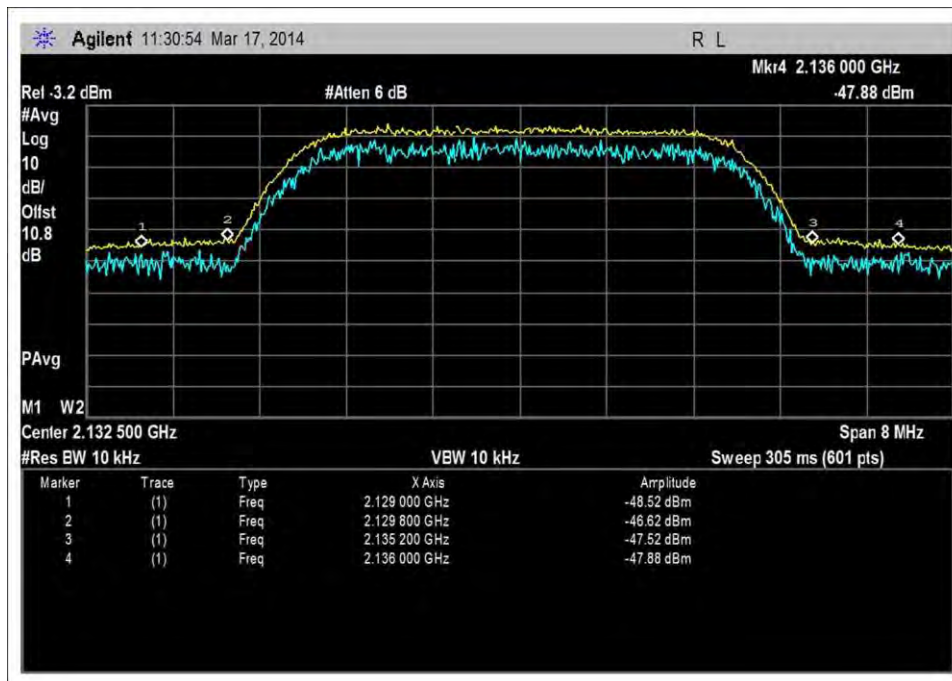
UL\_1850-1915MHz\_reference



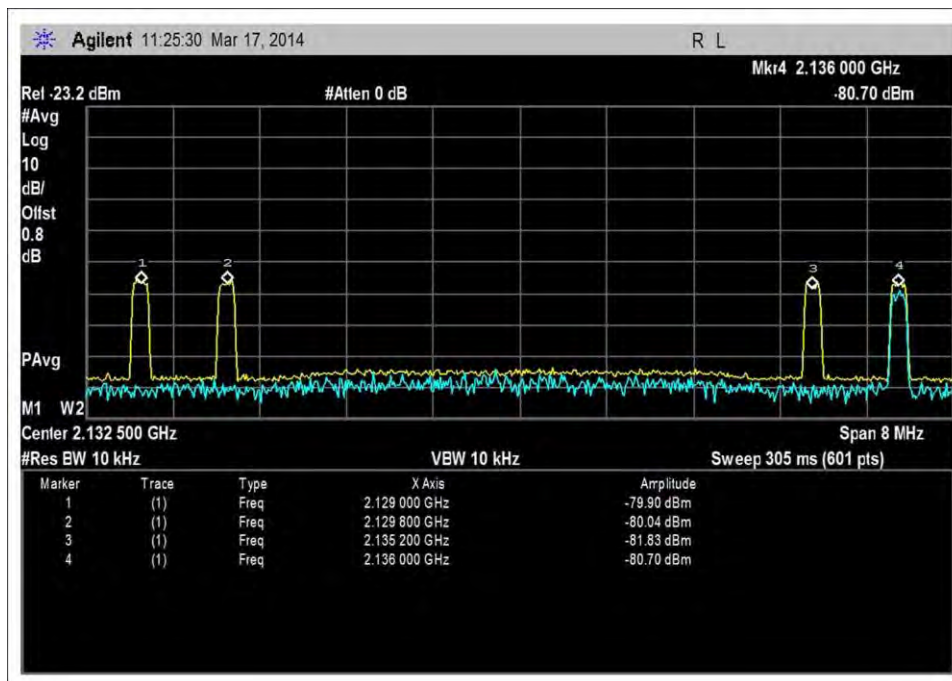
DL\_1930-1995MHz



DL\_1930-1995MHz\_reference



DL\_2110-215MHz

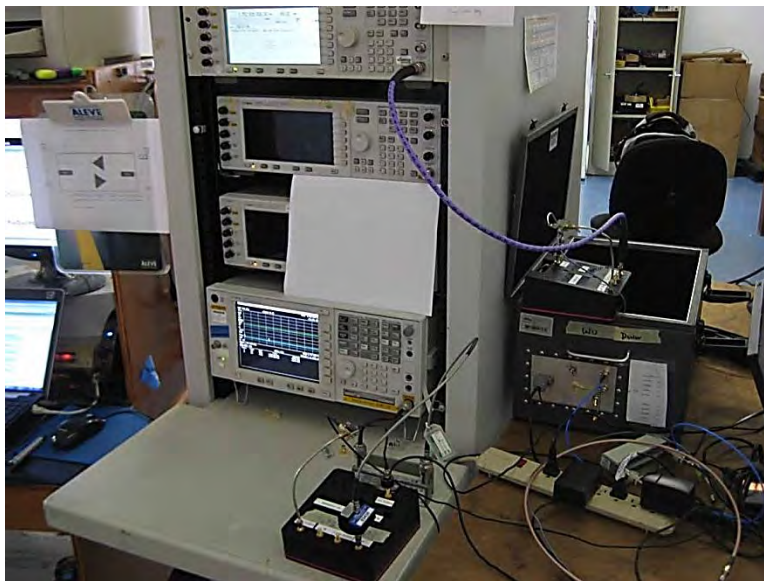


DL\_2110-215MHz\_reference

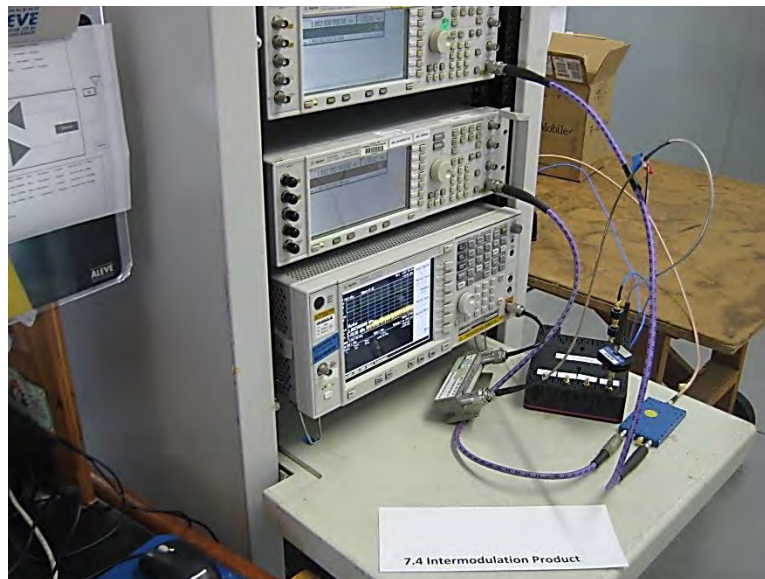
## Test Setup Photos



**Note: The above test setup photo applies to section 7.1**



**Note: The above test setup photo applies to Sections 7.1, 7.2, 7.3, 7.5, 7.7, and 7.8.**



**Note: The above test setup photo applies to section 7.4**



**Note: The above test setup photo applies to section 7.9**



**Note: The above test setup photo applies to section 7.11**



**Note: The above test setup photo applies to section 7.14.**