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Report On

Application for Grant of Equipment Authorization of the
Nextivity Inc.
Cel-Fi DUO RAINIER Smart Cellular Signal Booster

FCC CFR 47 Part 2 and 27
IC RSS-Gen and RSS-130

Report No. SD72116210-0416E

May 2016



REPORT ON EMC Evaluation of the
Nextivity Inc.
Cel-Fi DUO RAINIER Smart Cellular Signal Booster

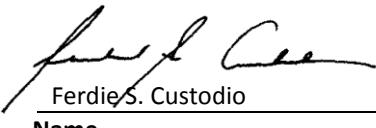
TEST REPORT NUMBER SD72116210-0416E

TEST REPORT DATE May 2016

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DATED May 10, 2016

FCC ID: YETD32-21266NU and YETD32-21266CU
IC: 9298A-D3221266NU and 9298A-D3221266CU
Report No. SD72116210-0416E



Revision History

| SD72116210-0416E Nextivity Inc. M/N D32-2/12/66 Cel-Fi DUO RAINIER Smart Cellular Signal Booster | | | | | |
|-----------------------------------------------------------------------------------------------------------|-----------------|--------------|--------|----------------|-------------|
| DATE | OLD REVISION | NEW REVISION | REASON | PAGES AFFECTED | APPROVED BY |
| 05/10/16 | Initial Release | | | | Chip Fleury |
| | | | | | |
| | | | | | |
| | | | | | |
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SECTION 1

REPORT SUMMARY

Radio Testing of the
Nextivity Inc.
Cel-Fi DUO RAINIER Smart Cellular Signal Booster



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Nextivity Inc. Smart Cellular Signal Booster to the requirements of FCC CFR 47 Part 2 and 27 and IC RSS-Gen and RSS-130.

| | |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Objective | To perform Radio Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out. |
| Manufacturer | Nextivity Inc. |
| Model Number(s) | Cel-Fi DUO RAINIER |
| FCC ID | YETD32-21266NU and YETD32-21266CU |
| IC Number | 9298A-D3221266NU and 9298A-D3221266CU |
| Serial Number(s) | 296546000554 (NU) and 29754000407 (CU) – Conducted Samples 296546000509 (NU) and 297546000285 (CU) – Radiated Samples |
| Number of Samples Tested | 4 |
| Test Specification/Issue/Date | <ul style="list-style-type: none">FCC CFR 47 Part 2 and 27 (October 1, 2015).RSS-130 – Mobile Broadband Services (MBS) Equipment Operating in the Frequency Bands 698-756 MHz and 777-787 MHz (Issue 1, October 2013).RSS-Gen - General Requirements and Information for the Certification of Radio Apparatus (Issue 4, November 2014). |
| Start of Test | May 04, 2016 |
| Finish of Test | May 10, 2016 |
| Name of Engineer(s) | Xiaoying Zhang Ferdinand Custodio |
| Related Document(s) | <ul style="list-style-type: none">ANSI/TIA-603-C-2004 – Land Mobile FM or PM – Communications Equipment – Measurement and Performance Standards.KDB971168 (D01 Power Meas License Digital Systems v02r02) Measurement Guidance For Certification Of Licensed Digital TransmittersKDB412172 D01 Determining ERP and EIRP v0101 (Guidelines for Determining the Effective Radiated Power (ERP) and Equivalent Isotropically Radiated Power (EIRP) of a RF Transmitting System.Supporting documents for EUT certification are separate exhibits. |



1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 2 and 27 with cross-reference to the corresponding IC RSS standard is shown below.

| Section | Spec Clause | | | Test Description | Result |
|---------|-------------|--------------|-------------|--------------------------------------|-----------|
| | FCC Part 2 | FCC Part 27 | RSS-130 | | |
| 3.1 | 2.1046 | 27.50 (c)(9) | 4.4 | Transmitter Conducted Output Power | Compliant |
| 3.2 | | | 4.4 | Equivalent Isotropic Radiated Power | Compliant |
| | 2.1046 | 27.50 (c)(9) | 4.4 | Equivalent Radiated Power | Compliant |
| 3.3 | 2.1049 | 27.53 (h)(3) | RSS-Gen 6.6 | Occupied Bandwidth | Compliant |
| 3.4 | - | 27.50 (d)(5) | 4.4 | Peak-Average Ratio | Compliant |
| 3.5 | 2.1051 | 27.53 (g) | 4.6.1 | Band Edge | Compliant |
| 3.6 | 2.1051 | 27.53 (g) | 4.6.1 | Conducted Spurious Emissions | Compliant |
| 3.7 | 2.1053 | 27.53 (g) | 4.6 | Field Strength Of Spurious Radiation | Compliant |
| 3.8 | 2.1055 | 27.54 | 4.3 | Frequency Stability | Compliant |
| - | - | - | RSS-Gen 7.1 | Receiver Spurious Emissions | N/A |
| 3.9 | - | - | RSS-Gen 8.8 | Power Line Conducted Emission | Compliant |

N/A Not required as per RSS-Gen 5.3. The EUT however already shows compliance to FCC Subpart B/ICES-003.



1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment Under Test (EUT) is a Nextivity Inc. Cel-Fi DUO RAINIER Smart Cellular Signal Booster. The EUT is a WCDMA/LTE Signal Booster to improve voice and data cellular performance for indoor residential, small business and small enterprise environments. RAINER consists of two separate units: the Network Unit (NU), and the Coverage Unit (CU). The NU transmits and receives Cellular signals from the base station and operates similar to a cellular handset. The CU transmits and receives signals with the cellular handset and operates on frequencies similar to the cellular base station. The NU and CU are connected wirelessly over a full-duplex wireless link in the UNII band using a mixed OFDM and muxed cellular signal over a 30 or 40 MHz channel in each direction. The CU also includes Bluetooth LE connectivity. With the use of smart phone application, it allows user to register the product, update software, and capture/display details metrics of the system. NU does not support Bluetooth LE. The LTE Band 12 function of the EUT were verified in this test report.

1.3.2 EUT General Description

| EUT Description | Smart Cellular Signal Booster | | | | | | | | | | |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--|----|----|----------|---------|---------|----------|---------|---------|
| Model Name | Cel-Fi DUO RAINIER | | | | | | | | | | |
| Model Number(s) | D32-2/12/66 | | | | | | | | | | |
| Rated Voltage | 12VDC via external AC/DC adaptor | | | | | | | | | | |
| Mode Verified | LTE Band 12 | | | | | | | | | | |
| Frequency Range | <table border="1"><thead><tr><th></th><th>NU</th><th>CU</th></tr></thead><tbody><tr><td>TX (MHz)</td><td>698-716</td><td>728-746</td></tr><tr><td>RX (MHz)</td><td>728-746</td><td>698-716</td></tr></tbody></table> | | | NU | CU | TX (MHz) | 698-716 | 728-746 | RX (MHz) | 728-746 | 698-716 |
| | NU | CU | | | | | | | | | |
| TX (MHz) | 698-716 | 728-746 | | | | | | | | | |
| RX (MHz) | 728-746 | 698-716 | | | | | | | | | |
| Capability | LTE (Band 2, 12 and 4)/UNII and BT LE | | | | | | | | | | |
| Primary Unit (EUT) | <input type="checkbox"/> Production <input checked="" type="checkbox"/> Pre-Production <input type="checkbox"/> Engineering | | | | | | | | | | |
| Manufacturer Declared Temperature Range | 0°C to 40°C | | | | | | | | | | |
| Antenna Type | PCB PIFA | | | | | | | | | | |
| Manufacturer | Nextivity Inc. | | | | | | | | | | |
| Antenna Model | N/A | | | | | | | | | | |



Maximum Antenna Gain

| NU | CU |
|-------|-------|
| 0 dBi | 0 dBi |

1.3.3 Transmit Frequency Table

| Mode | Channel Bandwidth (MHz) | Tx Frequency (MHz) | Emission Designator | ERP(Part 27) | |
|----------------------|-------------------------|--------------------|---------------------|------------------|----------------|
| | | | | Max. Power (dBm) | Max. Power (W) |
| LTE Band 12 Downlink | 5 | 731.5 - 743.5 | 4M29F9W | 9.21 | 0.0083 |
| | 10 | 737.5 | 8M75F9W | 11.65 | 0.0146 |
| LTE Band 12 Uplink | 5 | 701.5 - 713.5 | 4M34F9W | 21.58 | 0.1439 |
| | 10 | 707.5 | 8M64F9W | 20.95 | 0.1245 |



1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

| Test Configuration | Description |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A | Downlink (CU TX). Input signal is applied to B12 antenna port of NU. Output is monitored from B12 Top antenna port of CU. |
| B | Uplink (NU TX). Input signal is applied to B12 antenna port of CU. Output is monitored from B12 Top antenna port of NU. |
| C | Radiated test setup. Downlink (CU TX). Input signal is applied to B12 antenna port of NU. B12 Top antenna port of CU is terminated with a 50Ω load. |
| D | Radiated test setup. Uplink (NU TX). Input signal is applied to B12 antenna port of CU. B12 Top antenna port of NU is terminated with a 50Ω load. |
| E | Radiated test setup using the radiated samples. Support base station simulator transmitting Band 12 LTE signal. 100 dB gain on CU maintained (Downlink) during testing. |

1.4.2 EUT Exercise Software

Manufacturer provided a configuration software (ConformanceTest.exe) running from a support laptop where both EUT are connected via USB.

1.4.3 Support Equipment and I/O cables

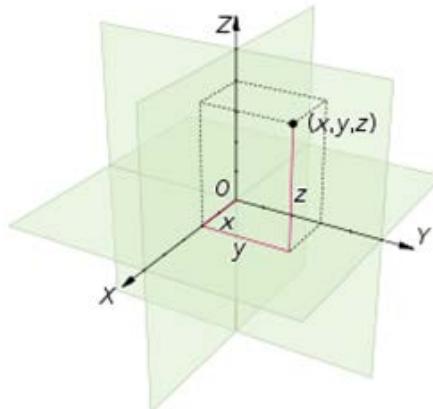
| Manufacturer | Equipment/Cable | Description |
|-----------------|---------------------------------------------|-----------------------------------------------------------------------------|
| Hon-Kwang | I.T.E Power Supply (2X) | Model HK-AX-120A167-US S/N: FB0000101 and FB0000075 |
| - | Support USB cable | 1.75 meters, shielded Type A to Micro B connector |
| Nextivity | Support USB cable | Custom 1.0 meter shielded USB Type A to DB9 for the Shielded Test Enclosure |
| Sony | Support Laptop | M/N PCG-31311L S/N 27545534 3006488 |
| Sony | Support Laptop AC Adapter | M/N PCGA-AC19V9 S/N 147839091 0023259 |
| Rhode & Schwarz | Support Wideband Radio Communication Tester | M/N CMW500 S/N 1201.0002k50/103829 |
| Mini-Circuits | Support Coaxial SMA Fixed Attenuator (x4) | M/N VAT-30W2 30dB DC-6GHz |
| Ramsey | Support Shielded Test Enclosure | M/N STE3300 S/N 3676 with custom USB cable and AC/DC Adapter |

1.4.4 Worst Case Configuration

Worst-case configuration used in this test report per Transmitter Conducted Output Power (Section 2.1 of this test report):

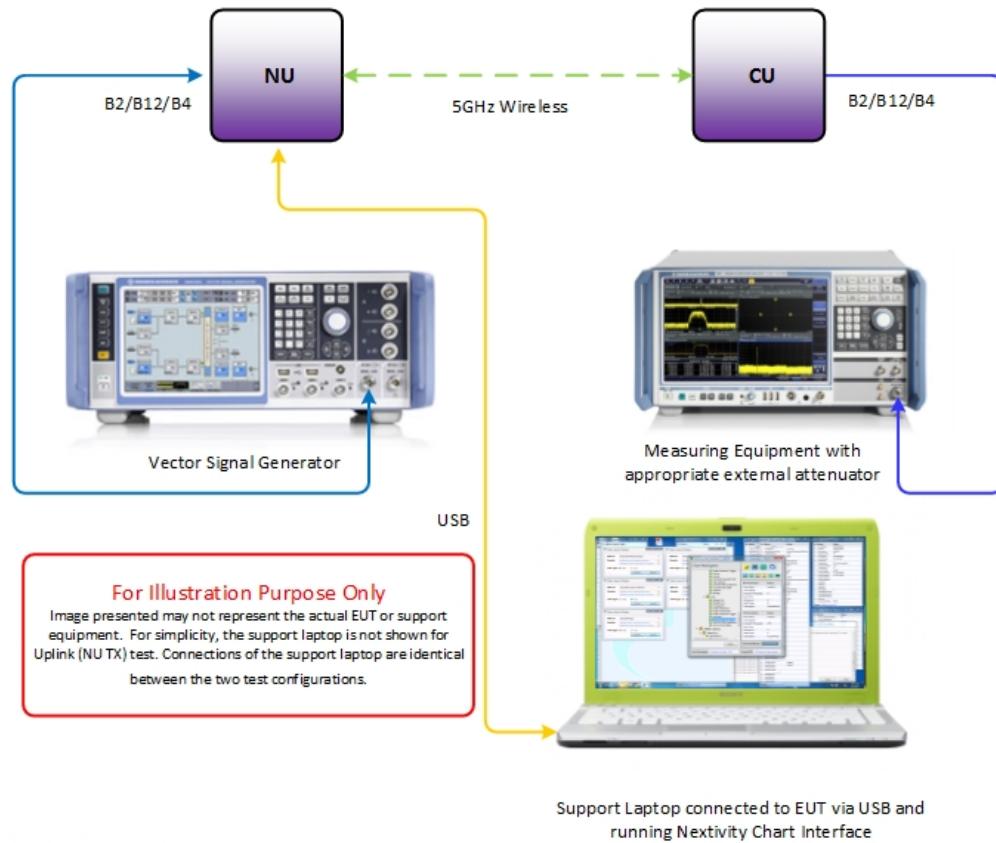
| Mode | Bandwidth | Cellular | Frequency |
|----------------------|-----------|---------------|-----------|
| LTE Band 12 Downlink | 10MHz | Channel 5060 | 734 MHz |
| LTE Band 12 Uplink | 5MHz | Channel 23035 | 701.5 MHz |

EUT is a mobile device. Final installation position is unknown at the time of verification. For radiated measurements X, Y and Z orientations were verified. No major variation in emissions observed between the three (3) orientations. Verifications performed using "Z" configuration.

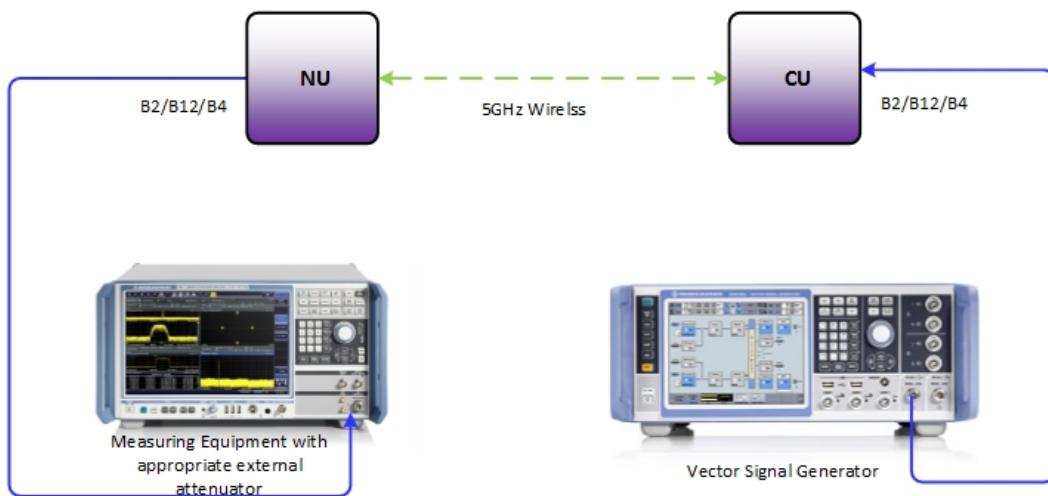


1.4.5 Simplified Test Configuration Diagram

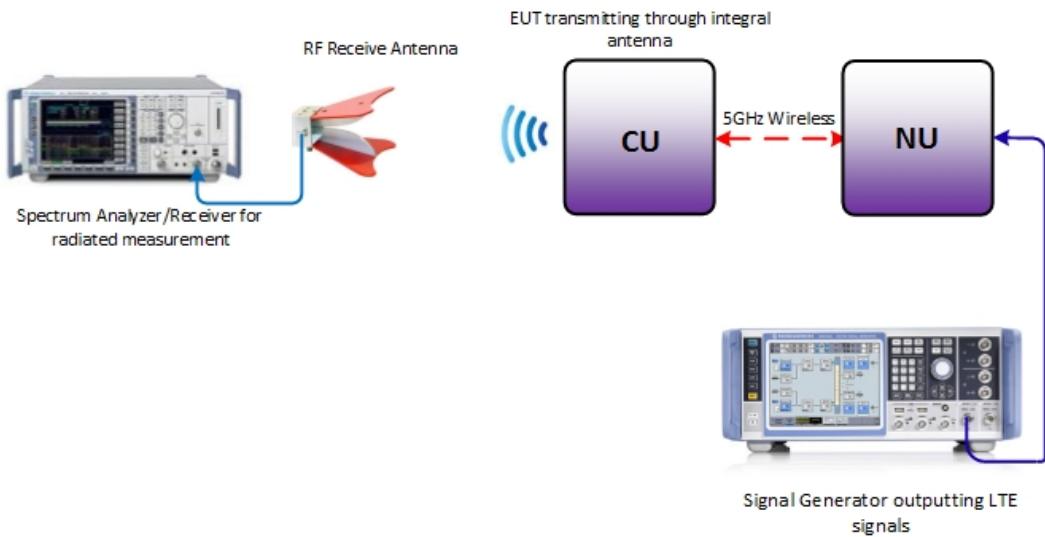
Downlink (CU Tx) Conducted Test



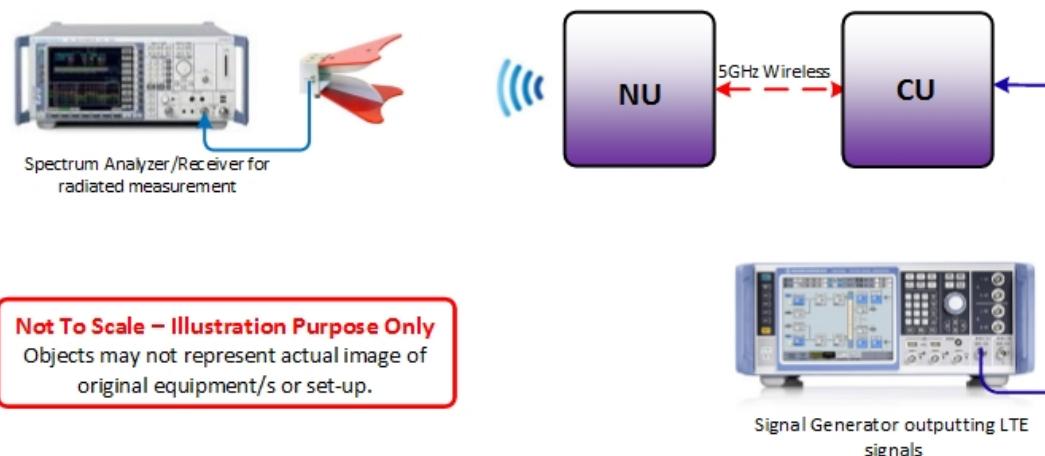
Uplink (NU Tx) Conducted Test



Radiated Testing (Downlink)



Radiated Testing (Uplink)



Not To Scale – Illustration Purpose Only
Objects may not represent actual image of
original equipment/s or set-up.



1.5 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.6 MODIFICATION RECORD

| Description of Modification | Modification Fitted By | Date Modification Fitted |
|------------------------------------------------------------------------------------------------|------------------------|--------------------------|
| Serial Number 296546000554 (NU) and 29754000407 (CU) / 296546000509 (NU) and 297546000285 (CU) | | |
| N/A | - | - |

The table above details modifications made to the EUT during the test programme. The modifications incorporated during each test (if relevant) are recorded on the appropriate test pages.

1.7 TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.26 2015, American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services.

For conducted (if applicable) and radiated emissions the equipment under test (EUT) was configured to measure its highest possible emission level. This level was based on the maximized cable configuration from exploratory testing per ANSI C63.26-2015. The test modes were adapted according to the Operating Instructions provided by the manufacturer/client.

1.8 TEST FACILITY LOCATION

1.8.1 TÜV SÜD America Inc. (Mira Mesa)

10040 Mesa Rim Road, San Diego, CA 92121-2912 (32.901268,-117.177681). Phone: 858 678 1400 FAX: 858-546 0364

1.8.2 TÜV SÜD America Inc. (Rancho Bernardo)

16530 Via Esprillo, San Diego, CA 92127-1708 (33.018644,-117.092409). Phone: 858 942 5542 Fax: 858 546 0364.

1.9 TEST FACILITY REGISTRATION

1.9.1 FCC – Registration No.: US1146

TUV SUD America Inc. (San Diego), is an accredited test facility with the site description report on file and has met all the requirements specified in §2.948 of the FCC rules. The acceptance letter from the FCC is maintained in our files and the Registration is US1146.

FCC ID: YETD32-21266NU and YETD32-21266CU
IC: 9298A-D3221266NU and 9298A-D3221266CU
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1.9.2 Innovation, Science and Economic Development Canada Registration No.: 3067A

The 10m Semi-anechoic chamber of TÜV SÜD America Inc. (San Diego) has been registered by Certification and Engineering Bureau of Innovation, Science and Economic Development Canada for radio equipment testing with Registration No. 3067A.



1.10 SAMPLE CALCULATIONS

1.10.1 LTE Emission Designator

Emission Designator = 4M29F9W
 F = Frequency Modulation

9= Composite Digital Info

W = Combination (Audio/Data)

1.10.2 Spurious Radiated Emission (below 1GHz)

| Measuring equipment raw measurement (dB μ V/m) @ 30 MHz | | | 24.4 |
|-------------------------------------------------------------|----------------------------|-------|-------|
| Correction Factor (dB) | Asset# 1066 (cable) | 0.3 | -12.6 |
| | Asset# 1172 (cable) | 0.3 | |
| | Asset# 1016 (preamplifier) | -30.7 | |
| | Asset# 1175(cable) | 0.3 | |
| | Asset# 1002 (antenna) | 17.2 | |
| Reported QuasiPeak Final Measurement (dB μ V/m) @ 30MHz | | | 11.8 |

1.10.3 Spurious Radiated Emission – Substitution Method

Example = 84dB μ V/m @ 1413 MHz (numerical sample only)

The field strength reading of 84dB μ V/m @ 1413 MHz (2nd Harmonic of 706.5 MHz) is the maximized measurement when the EUT is on the turntable measured at 3 meters. The gain of the substituted antenna is 7.8dBi while the transmit cable loss is 1.0 dB (cable between signal generator and the substituted antenna). The signal generator level is adjusted until the 84dB μ V/m level at the receiving end is replicated (identical test setup, i.e. same antenna, cable/s and preamp). If the adjusted signal generator level is -18dBm, then we have the following for both EIRP and ERP as required:

$$\begin{aligned}
 P_{\text{EIRP}} &= -18 \text{ dBm} + 7.8 \text{ dBi} - 1 \text{ dB} \\
 &= 11.2 \text{ dBm} \\
 P_{\text{ERP}} &= P_{\text{EIRP}} - 2.15 \text{ dB} \\
 &= 11.2 \text{ dBm} - 2.15 \text{ dB} \\
 &= 9.05 \text{ dBm}
 \end{aligned}$$

FCC ID: YETD32-21266NU and YETD32-21266CU
IC: 9298A-D3221266NU and 9298A-D3221266CU
Report No. SD72116210-0416E



SECTION 2

TEST DETAILS

Radio Testing of the
Nextivity Inc.
Cel-Fi DUO RAINIER Smart Cellular Signal Booster



2.1 TRANSMITTER CONDUCTED OUTPUT POWER

2.1.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1046 (a) and (c)
FCC 47 CFR Part 27, Clause 27.50 (c)(9)
RSS-130, Clause 4.4

2.1.2 Standard Applicable

FCC 47 CFR Part 2, Clause 2.1046:

- (a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in §2.1033(c)(8). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.
- (c) For measurements conducted pursuant to paragraphs (a) and (b) of this section, all calculations and methods used by the applicant for determining carrier power or peak envelope power, as appropriate, on the basis of measured power in the radio frequency load attached to the transmitter output terminals shall be shown. Under the test conditions specified, no components of the emission spectrum shall exceed the limits specified in the applicable rule parts as necessary for meeting occupied bandwidth or emission limitations.

FCC 47 CFR Part 27, Clause 27.50 (c)(9):

- (9) Control and mobile stations in the 698-746 MHz band are limited to 30 watts ERP.

2.1.3 Equipment Under Test and Modification State

Serial No: 296546000554 (NU) and 29754000407 (CU) / Test Configuration A and B

2.1.4 Date of Test/Initial of test personnel who performed the test

May 06 and 10, 2016/FSC

2.1.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.6 Environmental Conditions

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility.

| | |
|---------------------|-----------------|
| Ambient Temperature | 25.7 - 26.1 °C |
| Relative Humidity | 42.0 -45.6 % |
| ATM Pressure | 98.8 – 99.1 kPa |



2.1.7 Additional Observations

- This is a conducted test using an average power meter.
- The path loss was measured and entered as a level offset (20.5dB).
- Both Peak and Average measurements presented.

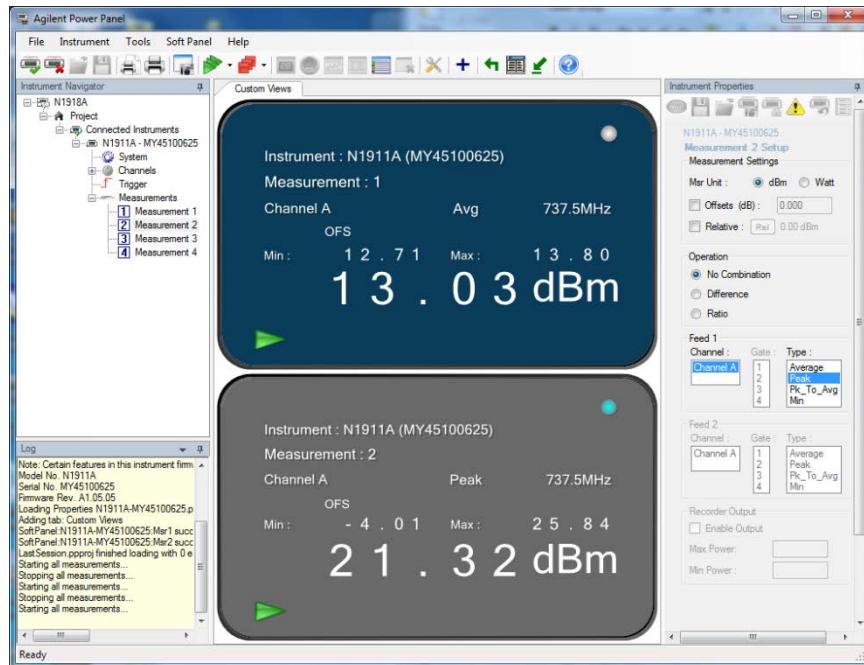
2.1.8 Test Results

| Downlink (CU B12 Output) | | | | | |
|--------------------------|-----------|---------|-----------------|---------------------|------------------|
| Band | Bandwidth | Channel | Frequency (MHz) | Average Power (dBm) | Peak Power (dBm) |
| LTE Band 12 | 5MHz | 5035 | 731.50 | 11.00 | 21.71 |
| | | 5095 | 737.50 | 11.36 | 21.46 |
| | | 5155 | 743.50 | 11.16 | 21.76 |
| | 10MHz | 5060 | 734.00 | 13.80 | 25.84 |
| | | 5095 | 737.50 | 13.36 | 21.77 |
| | | 5130 | 741.00 | 13.20 | 21.81 |

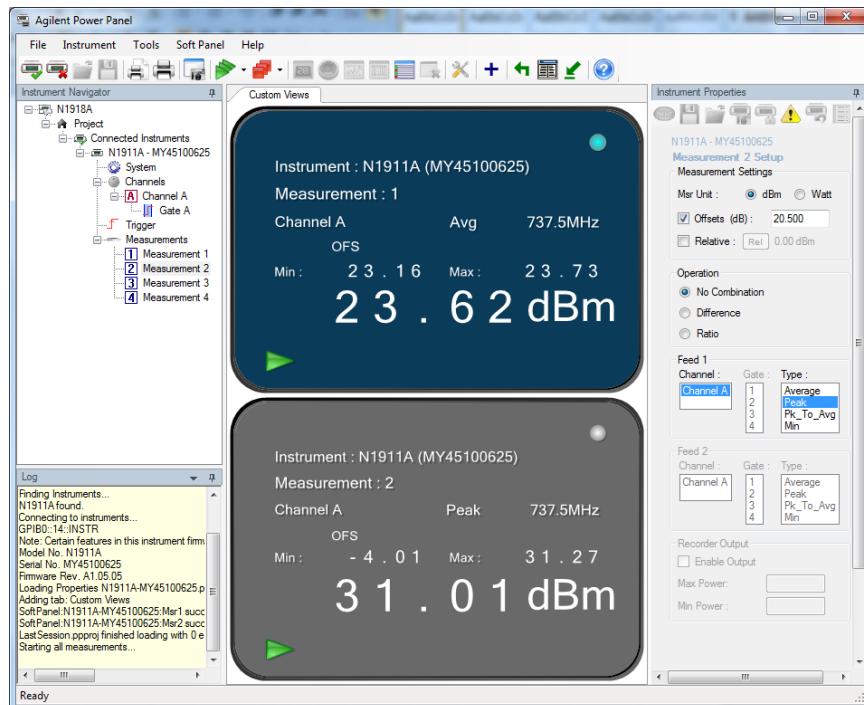
| Uplink (NU B12 Output) | | | | | |
|------------------------|-----------|---------|-----------------|---------------------|------------------|
| Band | Bandwidth | Channel | Frequency (MHz) | Average Power (dBm) | Peak Power (dBm) |
| LTE Band 12 | 5MHz | 23035 | 701.50 | 23.73 | 31.27 |
| | | 23095 | 707.50 | 23.14 | 31.25 |
| | | 23155 | 713.50 | 21.86 | 29.08 |
| | 10MHz | 23060 | 704.00 | 23.10 | 30.15 |
| | | 23095 | 707.50 | 22.67 | 29.49 |
| | | 23130 | 711.00 | 21.80 | 29.49 |



2.1.9 Sample Test Plot



LTE Band 12 DL 10MHz Bandwidth Low Channel



LTE Band 12 UL 5MHz Bandwidth Low Channel



2.2 EFFECTIVE RADIATED POWER

2.2.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1046 (a) and (c)
FCC 47 CFR Part 27, Clause 27.50 (c)(9)
RSS-130, Clause 4.4

2.2.2 Standard Applicable

FCC 47 CFR Part 27, Clause 27.50 (c)(9):
(9) Control and mobile stations in the 698-746 MHz band are limited to 30 watts ERP

RSS-130, Clause 4.4:
The e.i.r.p. shall not exceed 50 watts for mobile equipment or for outdoor fixed subscriber equipment, nor shall it exceed 5 watts for portable equipment or for indoor fixed subscriber equipment.

2.2.3 Equipment Under Test and Modification State

Serial No: 296546000554 (NU) and 29754000407 (CU)

2.2.4 Date of Test/Initial of test personnel who performed the calculation

May 06, 2016/FSC

2.2.5 Additional Observations

- ERP was calculated as per Section 1.3.2 of KDB412172 D01 (Determining ERP and EIRP v01).
- Calculation formula in logarithmic terms:

$$\text{ERP} = P_T + G_T - L_C - 2.15 \text{dB}$$

Where:

- P_T = transmitter conducted output power dBm (Section 3.1 of this test report)
 G_T = gain of the transmitting antenna, in dBi (EIRP: the -2.15 in the formula is to convert EIRP to ERP);
 L_C = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

2.2.6 Sample Computation

$$\begin{aligned}\text{ERP} &= P_T + G_T - L_C - 2.15 \text{dB} \\ &= 13.80 \text{ (Conducted Power)} + 0 \text{ dBi (max. gain)} - 0 \text{ (cable loss negligible @ 734MHz)} - 2.15 \\ &= 11.65 \text{ dBm}\end{aligned}$$



2.2.7 Test Results

| Band 12 Downlink | | | | | | | |
|------------------|---------|-----------------|-----------------------|--------------------|-----------|------------|-------------|
| Bandwidth | Channel | Frequency (MHz) | Conducted Power (dBm) | Antenna Gain (dBi) | ERP (dBm) | EIRP (dBm) | Limit (dBm) |
| 5.0MHz | 5035 | 731.50 | 11.00 | 0 | 8.85 | 11.00 | 44.78 |
| | 5095 | 737.50 | 11.36 | 0 | 9.21 | 11.36 | 44.78 |
| | 5155 | 743.50 | 11.16 | 0 | 9.01 | 11.16 | 44.78 |
| 10MHz | 5060 | 734.00 | 13.80 | 0 | 11.65 | 13.80 | 44.78 |
| | 5095 | 737.50 | 13.36 | 0 | 11.21 | 13.36 | 44.78 |
| | 5130 | 741.00 | 13.20 | 0 | 11.05 | 13.20 | 44.78 |

| Band 12 Uplink | | | | | | | |
|----------------|---------|-----------------|-----------------------|--------------------|-----------|------------|-------------|
| Bandwidth | Channel | Frequency (MHz) | Conducted Power (dBm) | Antenna Gain (dBi) | ERP (dBm) | EIRP (dBm) | Limit (dBm) |
| 5.0MHz | 23035 | 701.50 | 23.73 | 0 | 21.58 | 23.73 | 44.78 |
| | 23095 | 707.50 | 23.14 | 0 | 20.99 | 23.14 | 44.78 |
| | 23155 | 713.50 | 21.86 | 0 | 19.71 | 21.86 | 44.78 |
| 10MHz | 23060 | 704.00 | 23.10 | 0 | 20.95 | 23.10 | 44.78 |
| | 23095 | 707.50 | 22.67 | 0 | 20.52 | 22.67 | 44.78 |
| | 23130 | 711.00 | 21.80 | 0 | 19.65 | 21.80 | 44.78 |



2.3 OCCUPIED BANDWIDTH

2.3.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1049
FCC 47 CFR Part 27, Clause 27.53(h)(3)
RSS-GEN Issue 4, Clause 6.6

2.3.2 Standard Applicable

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

2.3.3 Equipment Under Test and Modification State

Serial No: 296546000554 (NU) and 29754000407 (CU) / Test Configuration A and B

2.3.4 Date of Test/Initial of test personnel who performed the test

May 06 and 10, 2016/FSC

2.3.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.3.6 Environmental Conditions

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility.

| | |
|---------------------|-----------------|
| Ambient Temperature | 25.7 - 26.1 °C |
| Relative Humidity | 42.0 -45.6 % |
| ATM Pressure | 98.8 – 99.1 kPa |

2.3.7 Additional Observations

- This is a conducted test. Both 26dB bandwidth and 99% bandwidth presented.
- All channels for emission bandwidth verified.
- The span is between two and five times the anticipated OBW.
- The RBW is set to 1% of the OBW while the VBW is ≥3X RBW.
- The detector is peak and the trace mode is max hold.
- All low, middle and high channels were verified. Only test plots for middle channel presented in this test report as the representative configuration.
- The SA built-in emission bandwidth measurement feature is utilized. The power level setting is set to 99% for OBW measurements while “n dB down” was set to -26 for 26dB BW measurements.



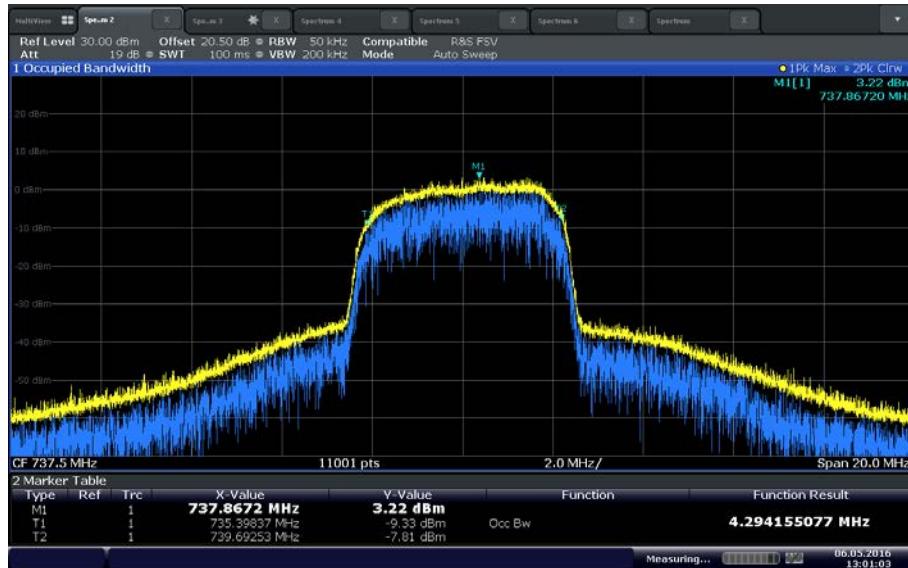
2.3.8 Test Results

| Downlink | | | | | |
|-------------|-----------|---------|-----------------|-----------|----------------|
| Band | Bandwidth | Channel | Frequency (MHz) | OBW (MHz) | -26dB BW (MHz) |
| LTE Band 12 | 5MHz | 5035 | 731.50 | 4.34 | 4.89 |
| | | 5095 | 737.50 | 4.29 | 4.83 |
| | | 5155 | 743.50 | 4.25 | 4.74 |
| | 10MHz | 5060 | 734.00 | 8.75 | 9.32 |
| | | 5095 | 737.50 | 8.70 | 9.27 |
| | | 5130 | 741.00 | 8.61 | 9.17 |

| Uplink | | | | | |
|-------------|-----------|---------|-----------------|-----------|----------------|
| Band | Bandwidth | Channel | Frequency (MHz) | OBW (MHz) | -26dB BW (MHz) |
| LTE Band 12 | 5MHz | 23035 | 701.50 | 4.34 | 4.65 |
| | | 23095 | 707.50 | 4.24 | 4.70 |
| | | 23155 | 713.50 | 4.23 | 4.63 |
| | 10MHz | 23060 | 704.00 | 8.64 | 9.24 |
| | | 23095 | 707.50 | 8.70 | 9.22 |
| | | 23130 | 711.00 | 8.78 | 9.23 |



LTE Band 12 Downlink 5MHz Bandwidth Mid Channel 99% OBW

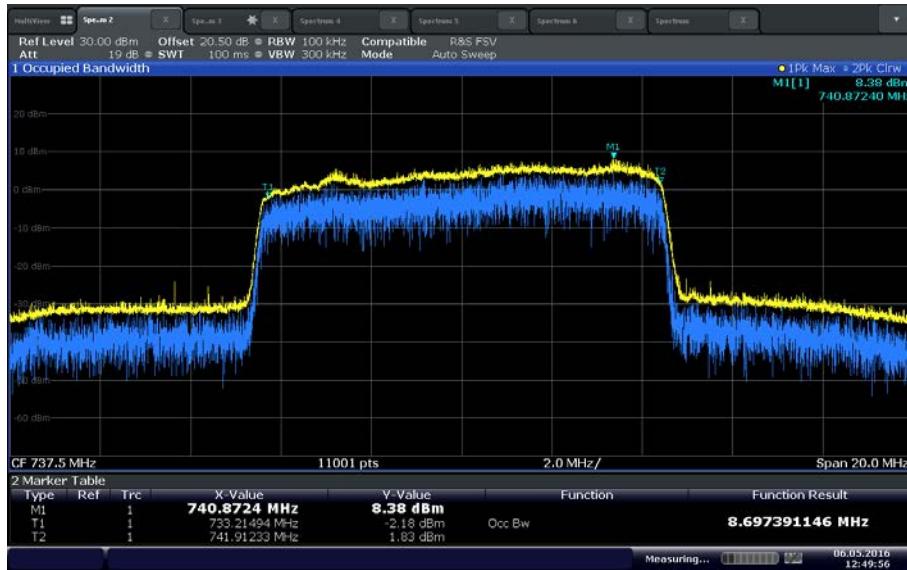


LTE Band 12 Downlink 5MHz Bandwidth Mid Channel -26dB BW

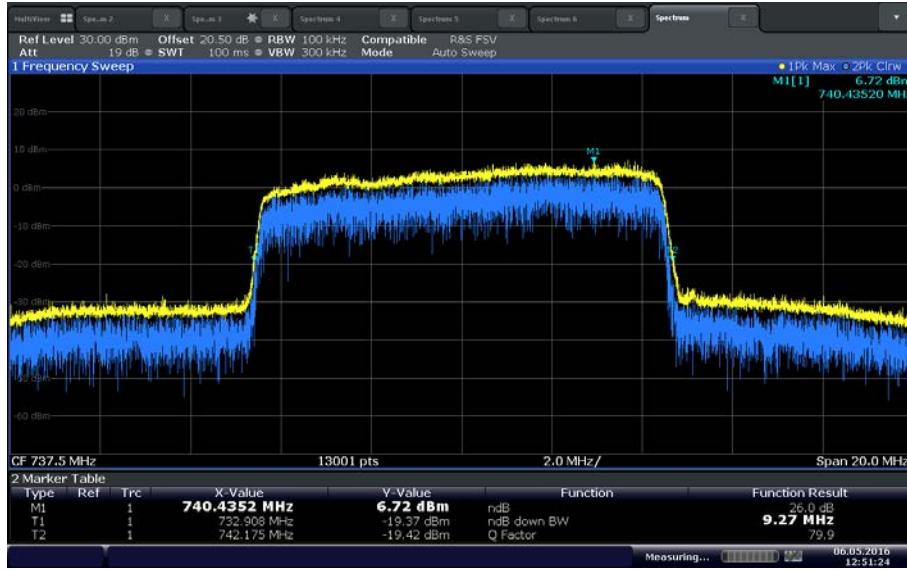


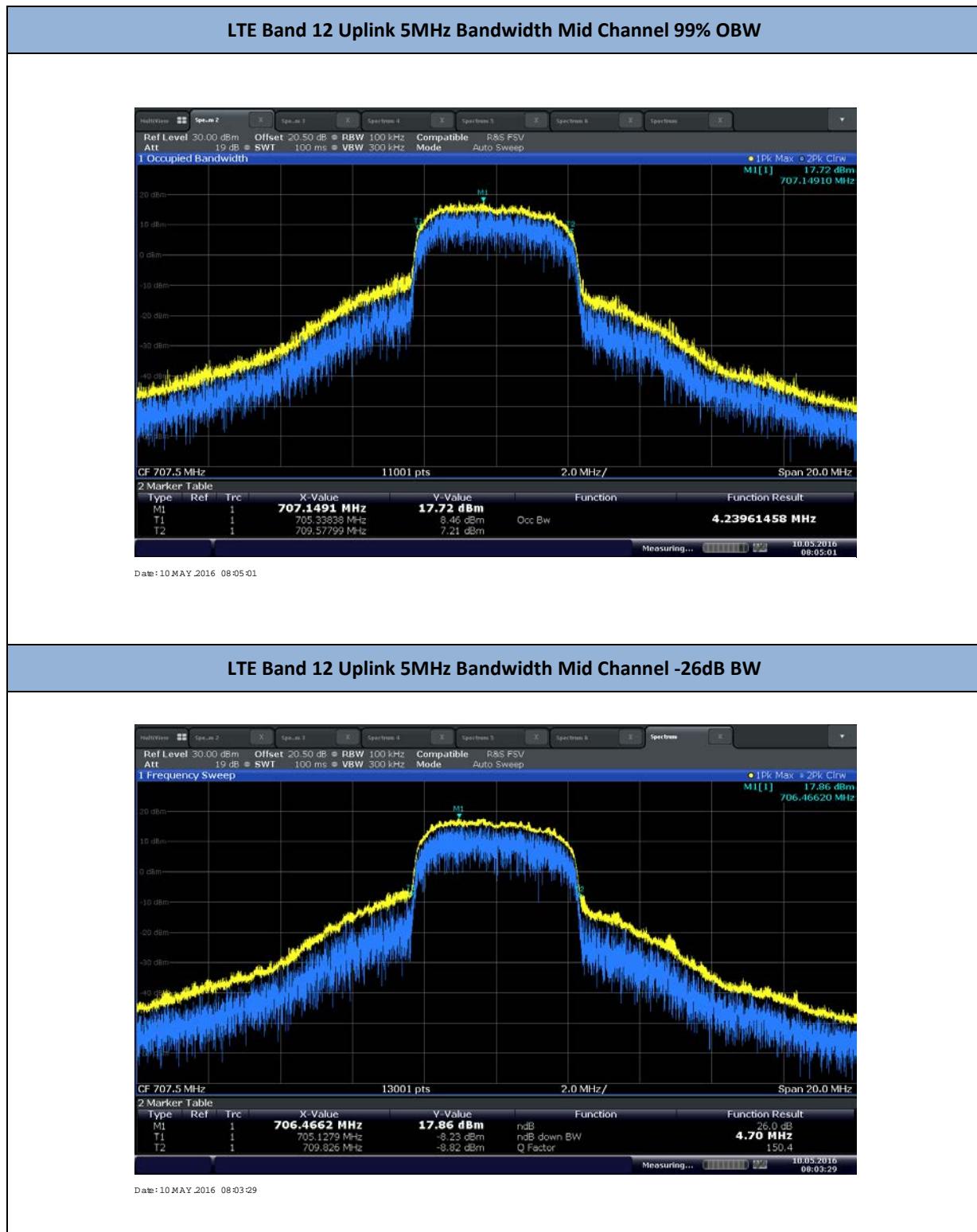


LTE Band 12 Downlink 10MHz Bandwidth Mid Channel 99% OBW



LTE Band 12 Downlink 10MHz Bandwidth Mid Channel -26dB BW





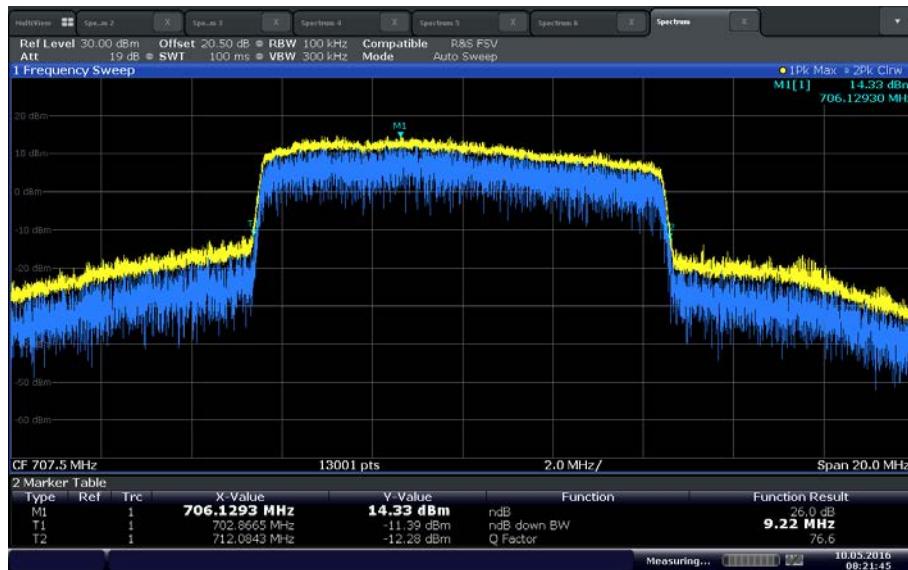


LTE Band 12 Uplink 10MHz Bandwidth Mid Channel 99% OBW



Date: 10 MAY 2016 08:17:17

LTE Band 12 Uplink 10MHz Bandwidth Mid Channel -26dB BW



Date: 10 MAY 2016 08:21:46



2.4 PEAK-AVERAGE RATIO

2.4.1 Specification Reference

RSS-130, Clause 4.4

2.4.2 Standard Applicable

The peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

2.4.3 Equipment Under Test and Modification State

Serial No: 296546000554 (NU) and 29754000407 (CU) / Test Configuration A and B

2.4.4 Date of Test/Initial of test personnel who performed the test

May 06 and 10, 2016/FSC

2.4.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.4.6 Environmental Conditions

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility.

| | |
|---------------------|-----------------|
| Ambient Temperature | 25.7 - 26.1 °C |
| Relative Humidity | 42.0 - 45.6 % |
| ATM Pressure | 98.8 – 99.1 kPa |

2.4.7 Additional Observations

- This is a conducted test. Test procedure is per Section 5.7 of KDB971168 (D01 Power Meas License Digital Systems v02r02). Appropriate offset (line loses) applied.
- Measurement was done using the Spectrum Analyzer's Complementary Cumulative Distribution Function (CCDF) measurement profile. The built-in function is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth (crest factor or peak-to-average ratio) The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signals spends at or above the level defines the probability for that particular power level.
- RBW was set to maximum the SA can support.
- The maximum PAPR level associated with a probability of 0.1% was recorded.
- All low, middle and high channels were verified. Only test plots for middle channel presented in this test report as the representative configuration.
- There were no measured PAR levels greater than 13dB. EUT complies.



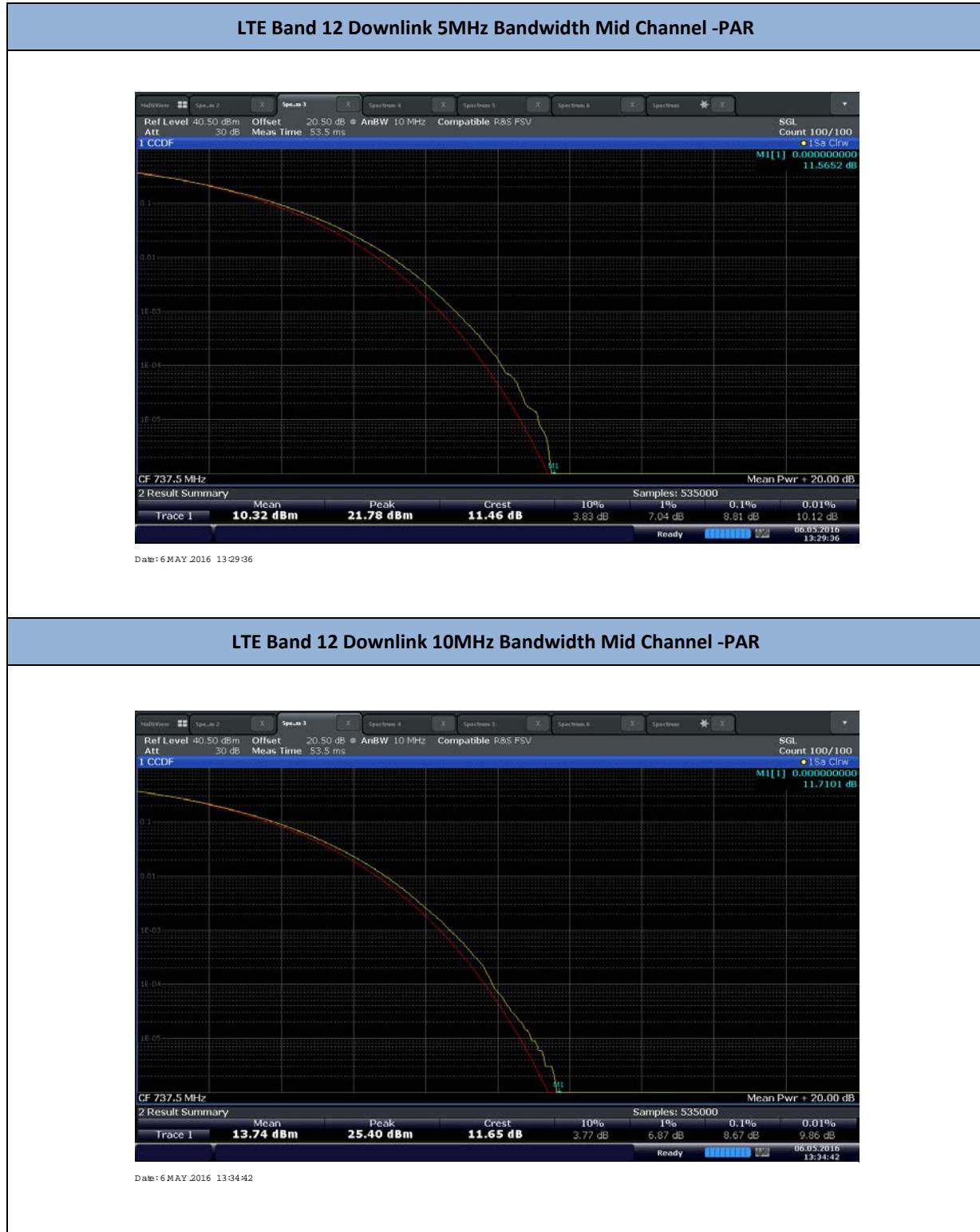
2.4.8 Test Results

| <i>Downlink</i> | | | | |
|-----------------|-----------|---------|-----------------|----------|
| Band | Bandwidth | Channel | Frequency (MHz) | PAR (dB) |
| LTE Band 12 | 5MHz | 5035 | 731.50 | 9.01 |
| | | 5095 | 737.50 | 8.81 |
| | | 5155 | 743.50 | 9.30 |
| | 10MHz | 5060 | 734.00 | 8.81 |
| | | 5095 | 737.50 | 8.67 |
| | | 5130 | 741.00 | 8.84 |

| <i>Uplink</i> | | | | |
|---------------|-----------|---------|-----------------|----------|
| Band | Bandwidth | Channel | Frequency (MHz) | PAR (dB) |
| LTE Band 12 | 5MHz | 23035 | 701.50 | 6.75 |
| | | 23095 | 707.50 | 6.26 |
| | | 23155 | 713.50 | 6.84 |
| | 10MHz | 23060 | 704.00 | 7.28 |
| | | 23095 | 707.50 | 7.22 |
| | | 23130 | 711.00 | 7.22 |



2.4.9 Sample Test Plot

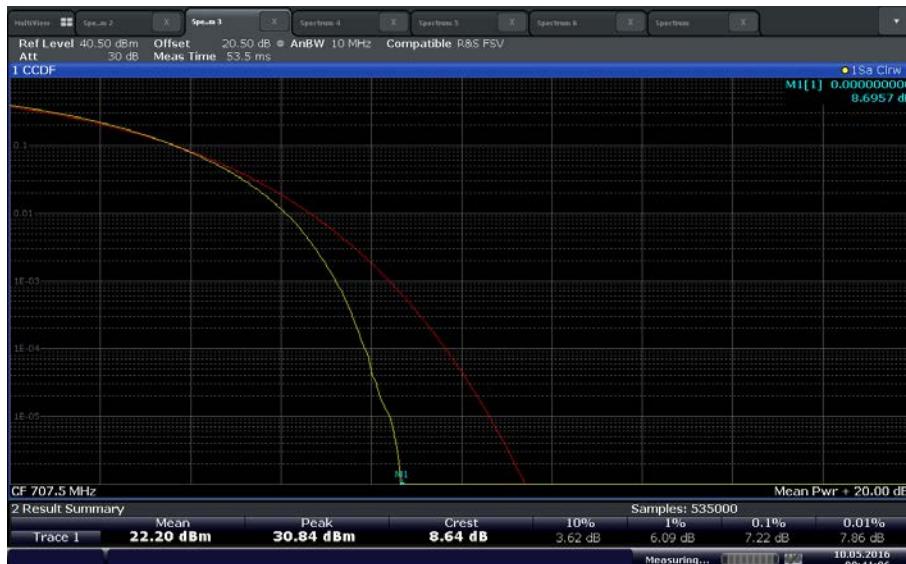




LTE Band 12 Uplink 5MHz Bandwidth Mid Channel -PAR



LTE Band 12 Uplink 10MHz Bandwidth Mid Channel -PAR





2.5 BAND EDGE

2.5.1 Specification Reference

FCC 47 CFR Part 27, Clause 27.53(g)
RSS-130, Clause 4.6.

2.5.2 Standard Applicable

(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

The power of any unwanted emissions in any 100 kHz bandwidth on any frequency outside the frequency range(s) within which the equipment is designed to operate shall be attenuated below the transmitter power, P (dBW), by at least $43 + 10 \log_{10} p$ (watts), dB. However, in the 100 kHz band immediately outside the equipment's operating frequency range, a resolution bandwidth of 30 kHz may be employed.

2.5.3 Equipment Under Test and Modification State

Serial No: 296546000554 (NU) and 29754000407 (CU) / Test Configuration A and B

2.5.4 Date of Test/Initial of test personnel who performed the test

May 06 and 10, 2016/FSC

2.5.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.5.6 Environmental Conditions

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility.

| | |
|---------------------|-----------------|
| Ambient Temperature | 25.7 - 26.1 °C |
| Relative Humidity | 42.0 -45.6 % |
| ATM Pressure | 98.8 – 99.1 kPa |

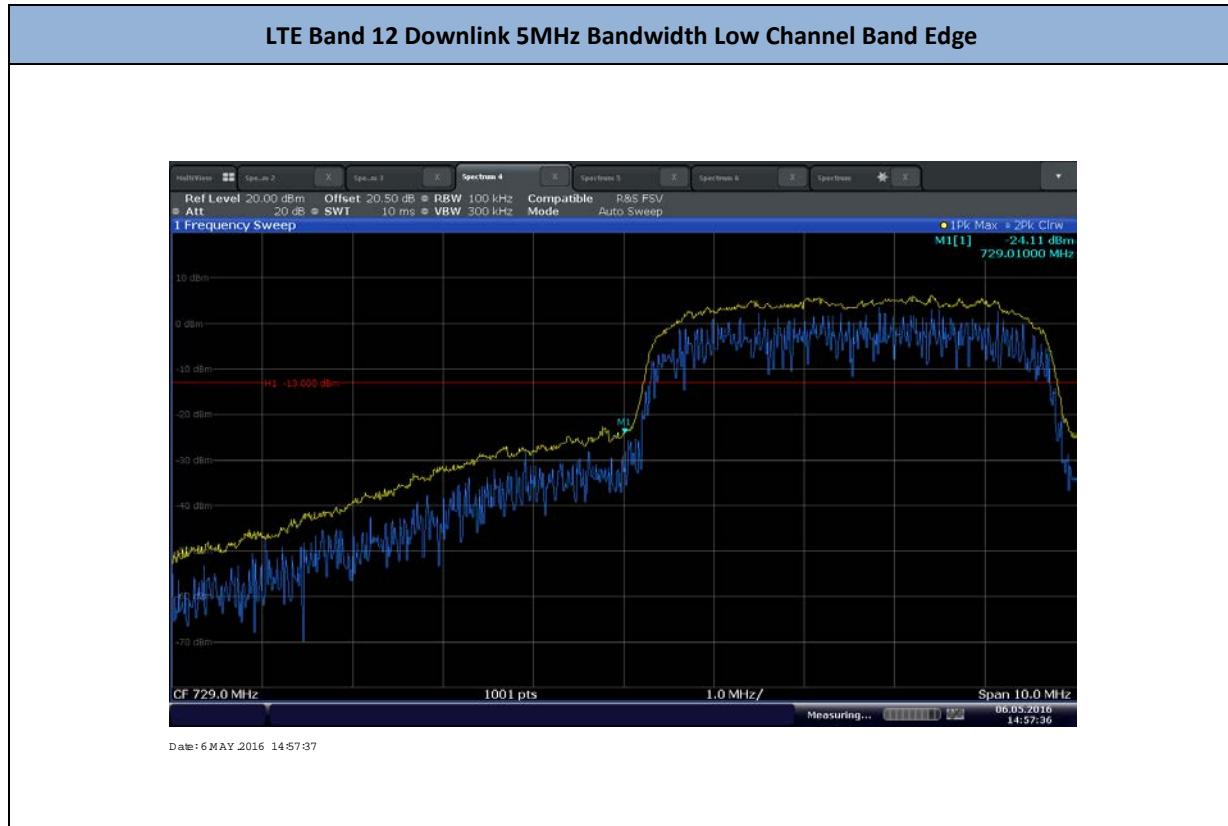
2.5.7 Additional Observations

- This is a conducted test. Test guidance is per Section 6.0 of KDB971168 (D01 Power Meas License Digital Systems v02r01).



- The path loss was measured and entered as a level offset.
- The center frequency of the spectrum is the band edge frequency (729-746 MHz and 698-716 MHz).
- Using a span of 10MHz for Band 12, RBW is set to 100 kHz (minimum of 30kHz limited to 1% of EBW) and VBW is set to 3x RBW.

2.5.8 Test Results



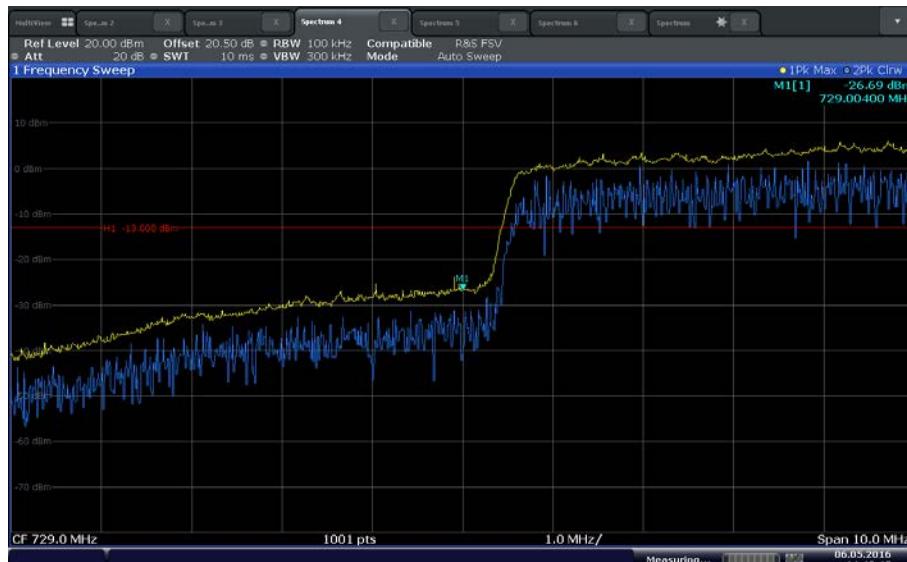


LTE Band 12 Downlink 5MHz Bandwidth High Channel Band Edge



Date: 6 MAY 2016 14:55:47

LTE Band 12 Downlink 10MHz Bandwidth Low Channel Band Edge



Date: 6 MAY 2016 14:49:45



LTE Band 12 Downlink 10MHz Bandwidth High Channel Band Edge



Date: 6 MAY 2016 14:53:06

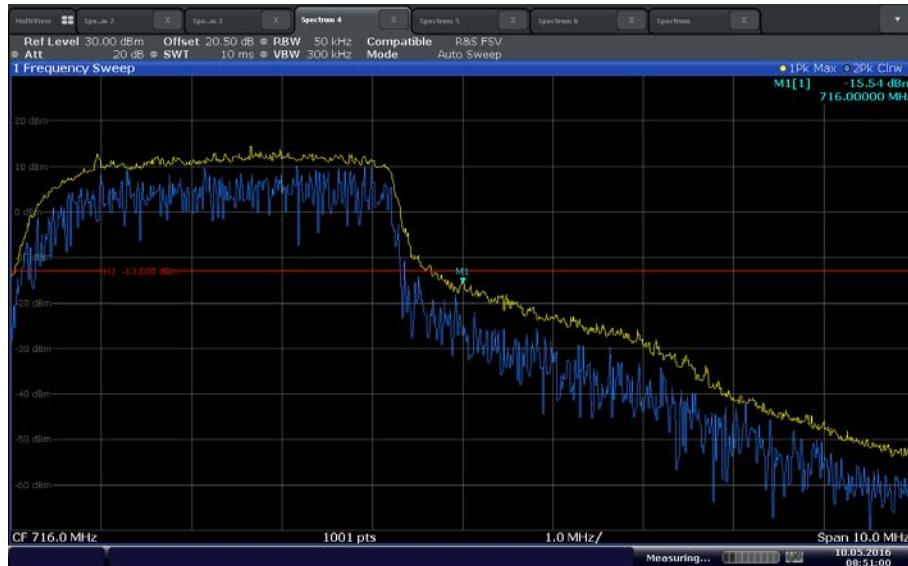
LTE Band 12 Uplink 5MHz Bandwidth Low Channel Band Edge



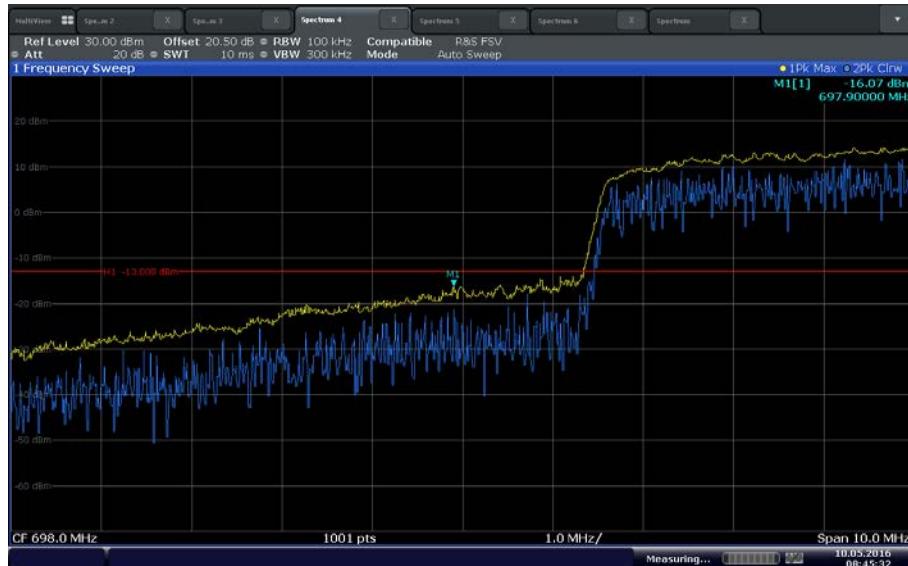
Date: 10 MAY 2016 09:00:47



LTE Band 12 Uplink 5MHz Bandwidth High Channel Band Edge

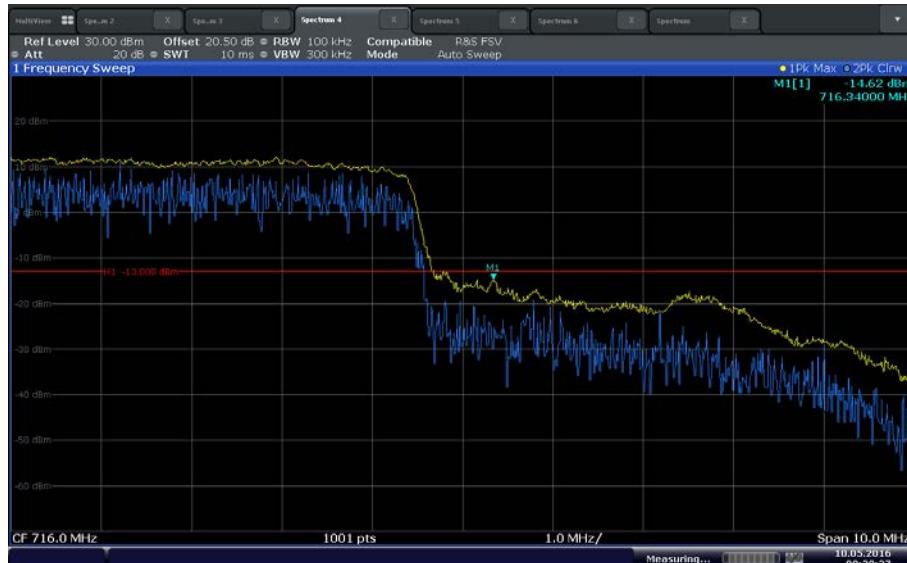


LTE Band 12 Uplink 10MHz Bandwidth Low Channel Band Edge





LTE Band 12 Uplink 10MHz Bandwidth High Channel Band Edge



Date: 10 MAY 2016 08:30:28



2.6 CONDUCTED SPURIOUS EMISSIONS

2.6.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1051
FCC 47 CFR Part 27, Clause 27.53(g)
RSS-130, Clause 4.6.1

2.6.2 Standard Applicable

(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

4.6.1 The power of any unwanted emissions in any 100 kHz bandwidth on any frequency outside the frequency range(s) within which the equipment is designed to operate shall be attenuated below the transmitter power, P (dBW), by at least $43 + 10 \log_{10} p$ (watts), dB. However, in the 100 kHz band immediately outside the equipment's operating frequency range, a resolution bandwidth of 30 kHz may be employed.

2.6.3 Equipment Under Test and Modification State

Serial No: 296546000554 (NU) and 29754000407 (CU) / Test Configuration A and B

2.6.4 Date of Test/Initial of test personnel who performed the test

May 06 and 10, 2016/FSC

2.6.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.6.6 Environmental Conditions

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility.

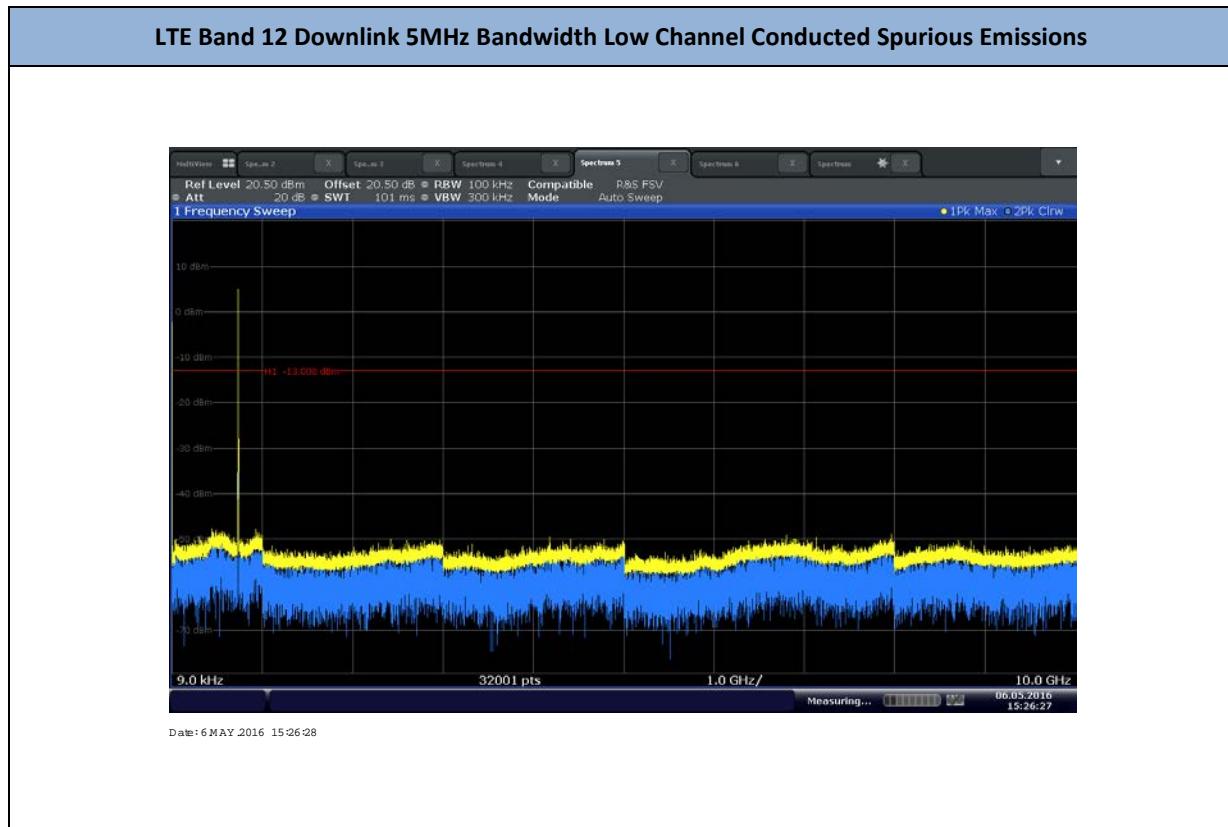
| | |
|---------------------|-----------------|
| Ambient Temperature | 25.7 - 26.1 °C |
| Relative Humidity | 42.0 -45.6 % |
| ATM Pressure | 98.8 – 99.1 kPa |



2.6.7 Additional Observations

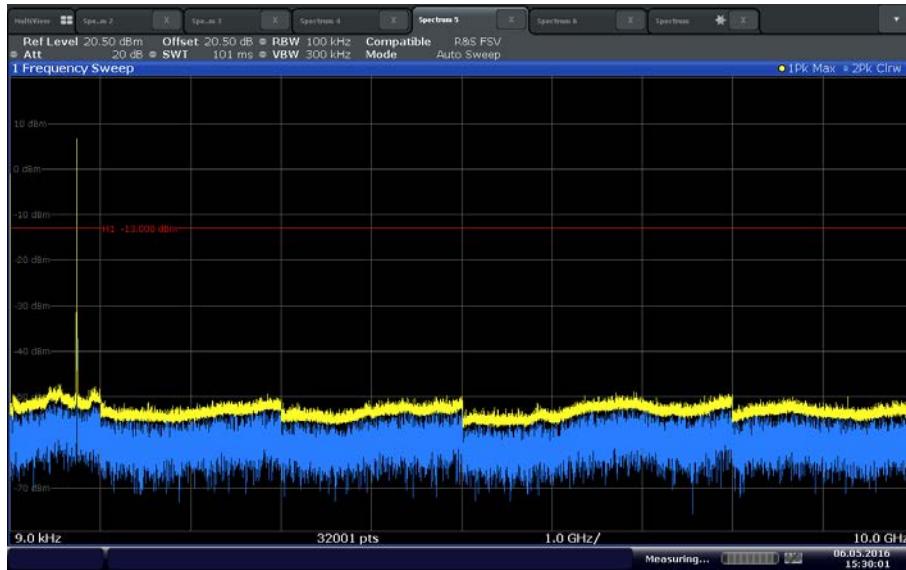
- This is a conducted test.
- The transducer factor (TDF) used is from the external attenuators and cables used.
- Sweep points set to maximum the SA can support.
- Sweep time set to auto.
- The spectrum was searched from 9 kHz to 10GHz (requirement is up to the 10th harmonic ($\leq 8\text{GHz}$)).

2.6.8 Test Results

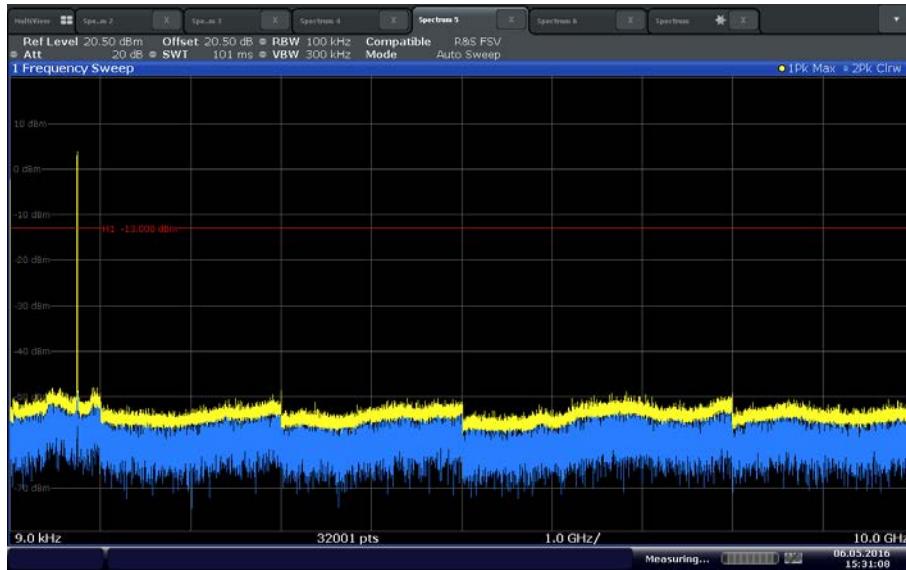




LTE Band 12 Downlink 5MHz Bandwidth Mid Channel Conducted Spurious Emissions

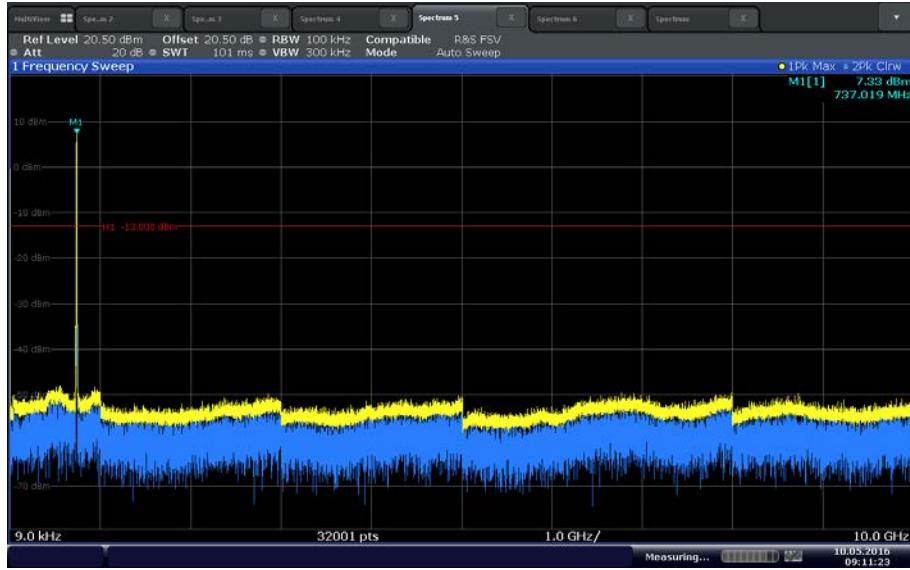


LTE Band 12 Downlink 5MHz Bandwidth High Channel Conducted Spurious Emissions

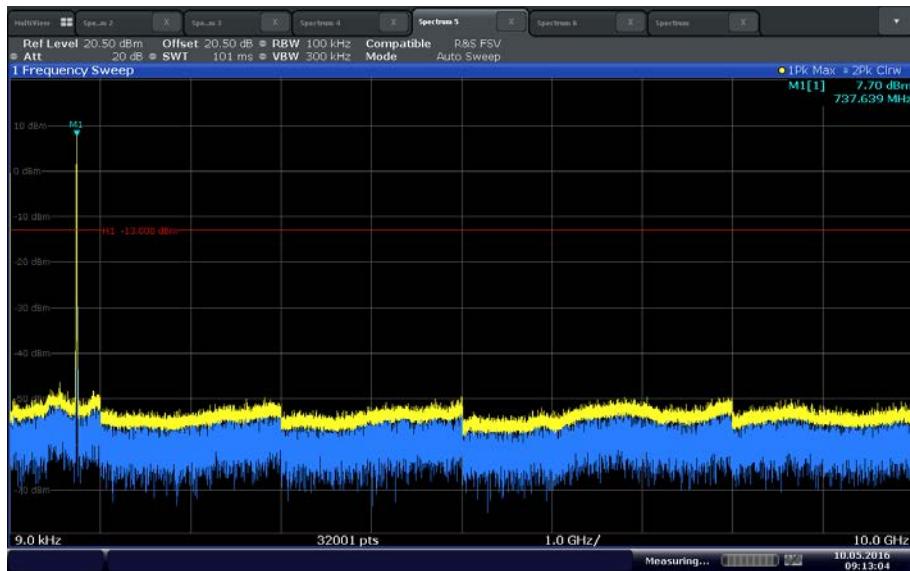




LTE Band 12 Downlink 10MHz Bandwidth Low Channel Conducted Spurious Emissions

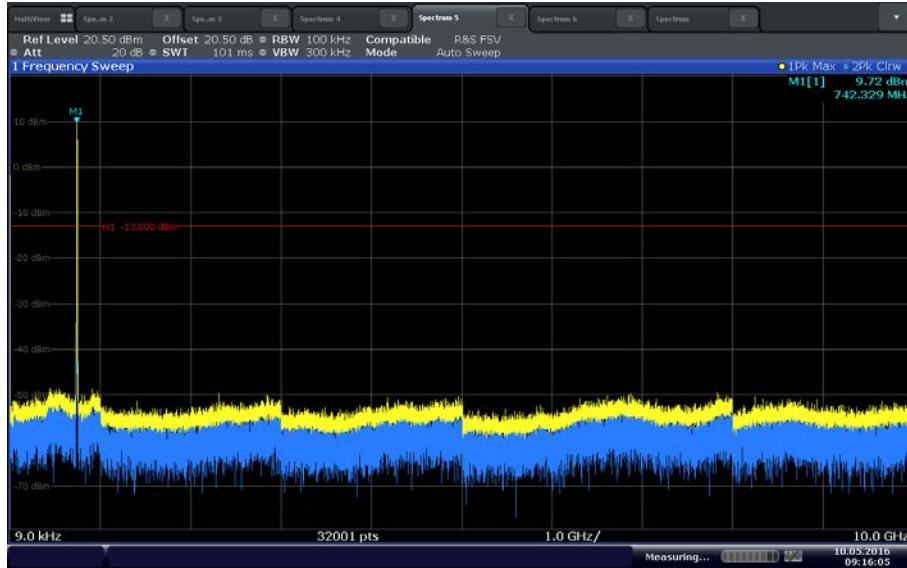


LTE Band 12 Downlink 10MHz Bandwidth Mid Channel Conducted Spurious Emissions



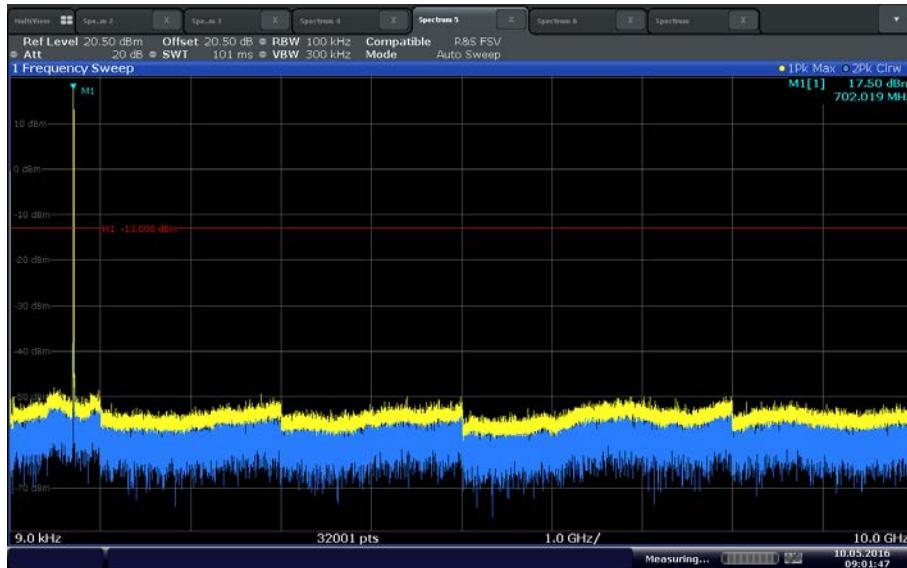


LTE Band 12 Downlink 10MHz Bandwidth High Channel Conducted Spurious Emissions

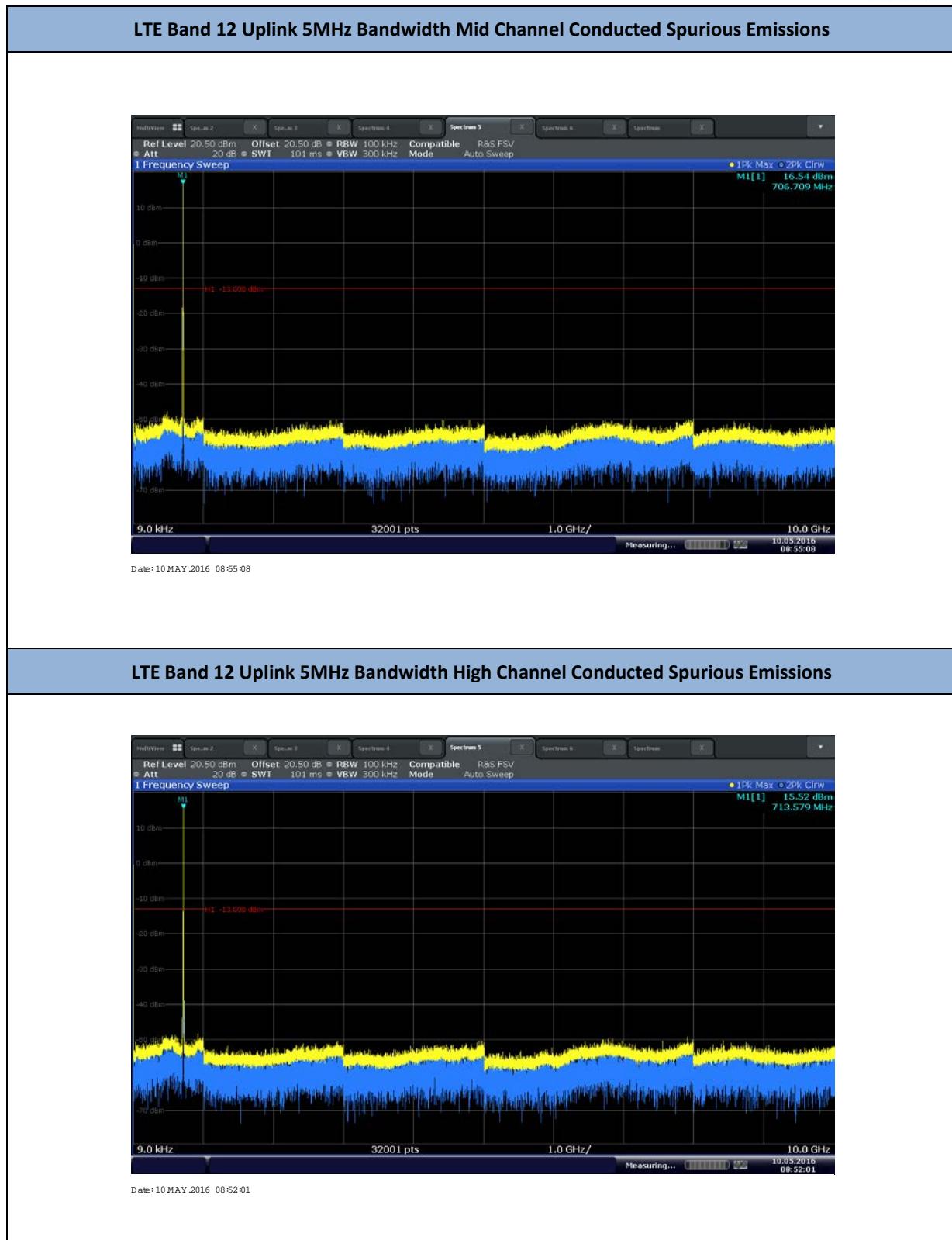


Date: 10 MAY 2016 09:16:06

LTE Band 12 Uplink 5MHz Bandwidth Low Channel Conducted Spurious Emissions

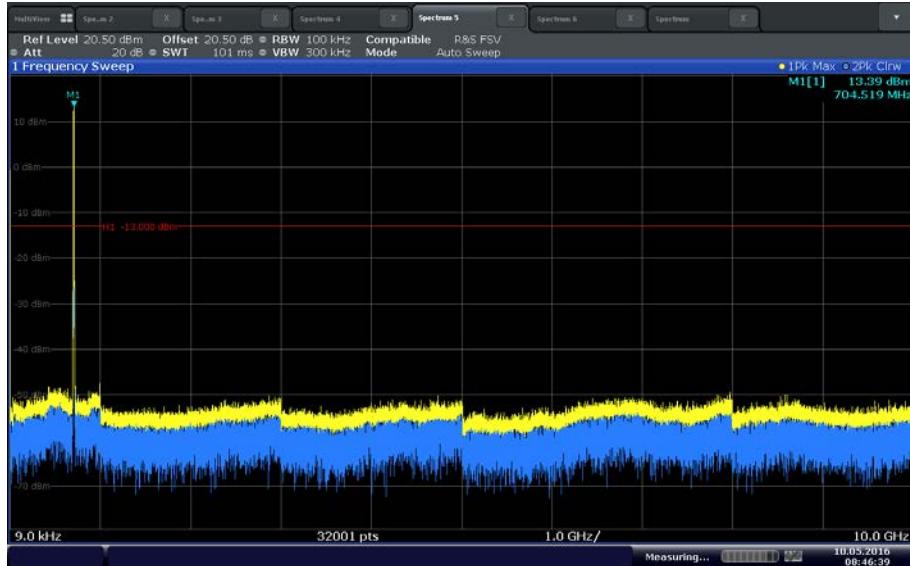


Date: 10 MAY 2016 09:01:47

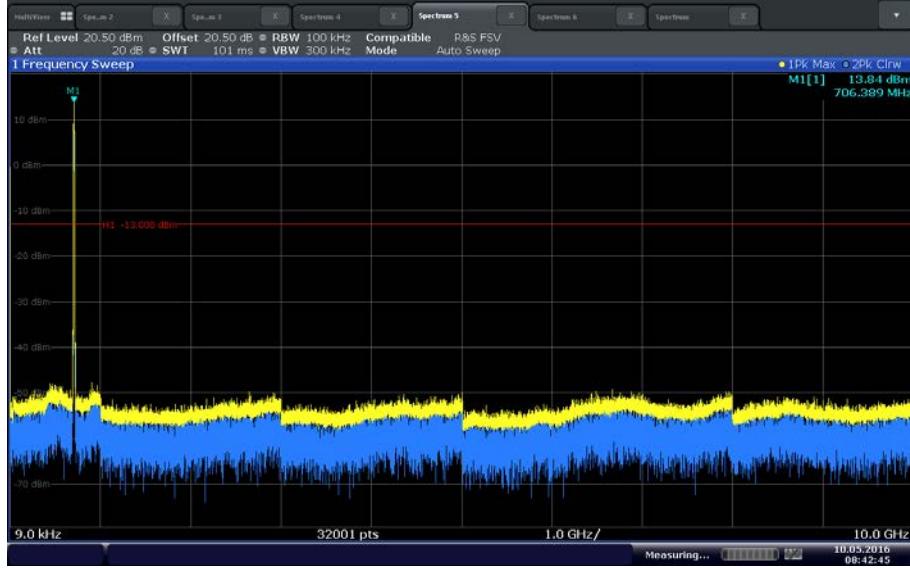




LTE Band 12 Uplink 10MHz Bandwidth Low Channel Conducted Spurious Emissions



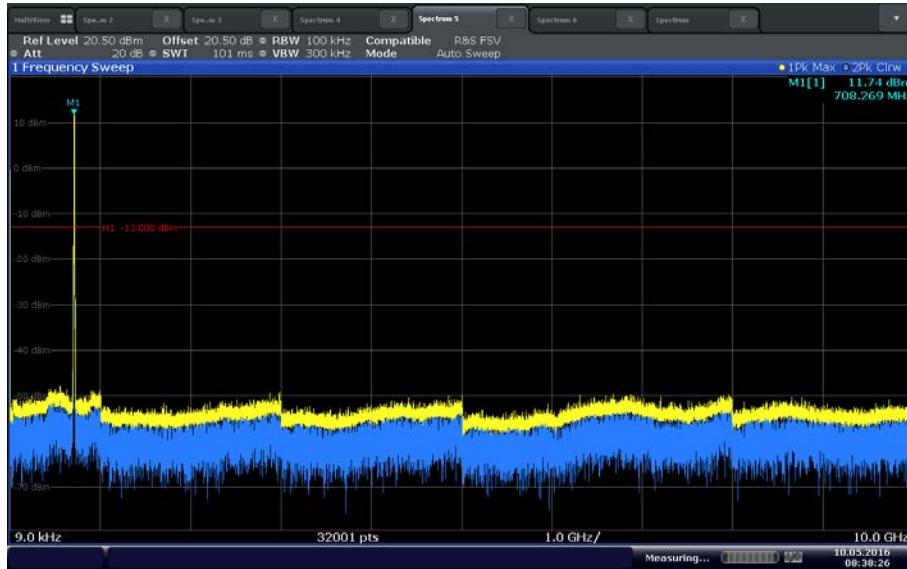
LTE Band 12 Uplink 10MHz Bandwidth Mid Channel Conducted Spurious Emissions



FCC ID: YETD32-21266NU and YETD32-21266CU
IC: 9298A-D3221266NU and 9298A-D3221266CU
Report No. SD72116210-0416E



LTE Band 12 Uplink 10MHz Bandwidth High Channel Conducted Spurious Emissions





2.7 FIELD STRENGTH OF SPURIOUS RADIATION

2.7.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1053
FCC 47 CFR Part 27, Clause 27.53(g)
RSS-130, Clause 4.6

2.7.2 Standard Applicable

Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

2.7.3 Equipment Under Test and Modification State

Serial No: 296546000554 (NU) and 29754000407 (CU) / Test Configuration C and D

2.7.1 Date of Test/Initial of test personnel who performed the test

May 09, 2016/FSC

2.7.2 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.7.3 Environmental Conditions

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility.

| | |
|---------------------|----------|
| Ambient Temperature | 27.4 °C |
| Relative Humidity | 42.4 % |
| ATM Pressure | 99.0 kPa |

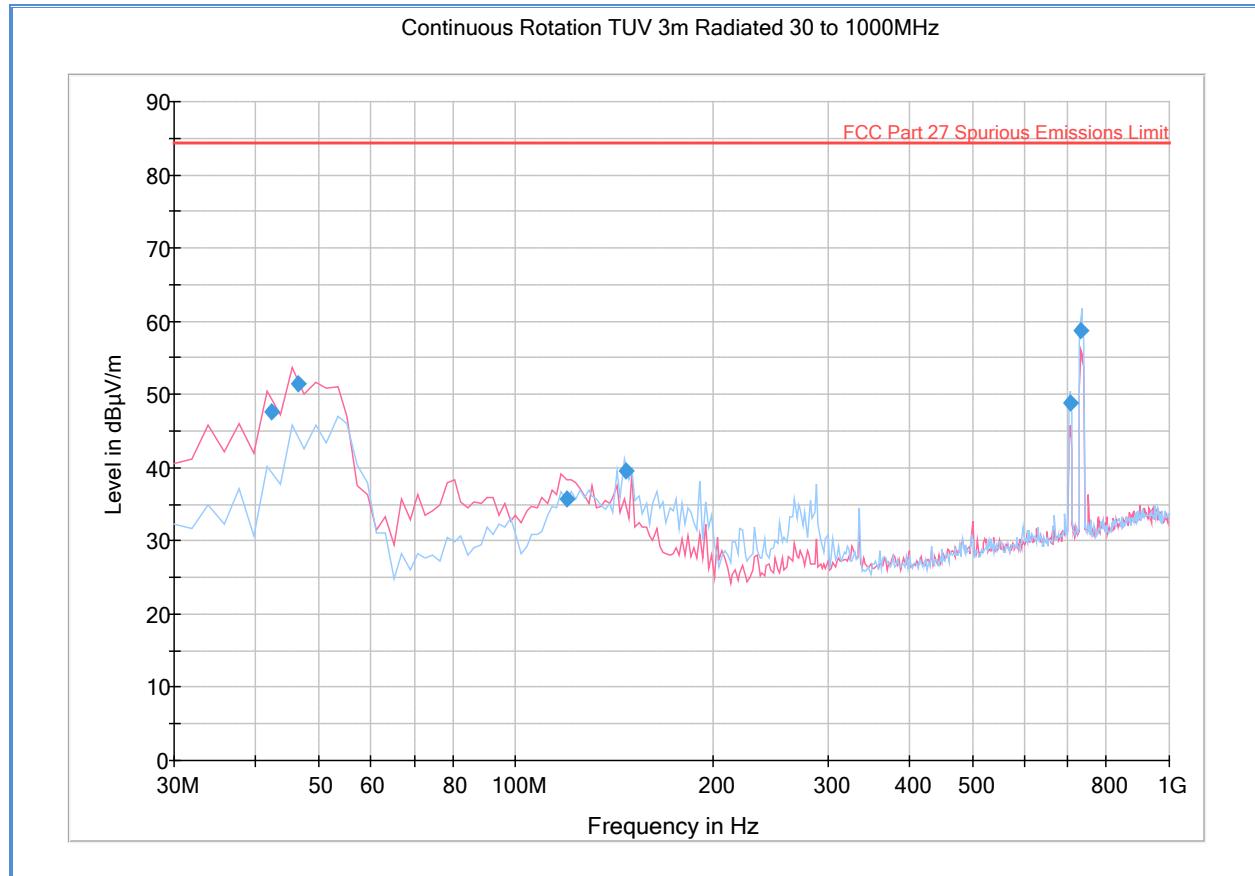
2.7.4 Additional Observations

- This is a radiated test using substitution method as per Unwanted Emissions: Radiated Spurious method of measurement of ANSI/TIA/EIA-603-C 2004, August 17, 2004.
- Only the worst case configuration presented in this test report.
- Measurement was done using EMC32 V8.53 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only.

2.7.5 Test Results

See attached plots.

2.7.6 Test Results Below 1GHz (Downlink Worst Case Configuration)

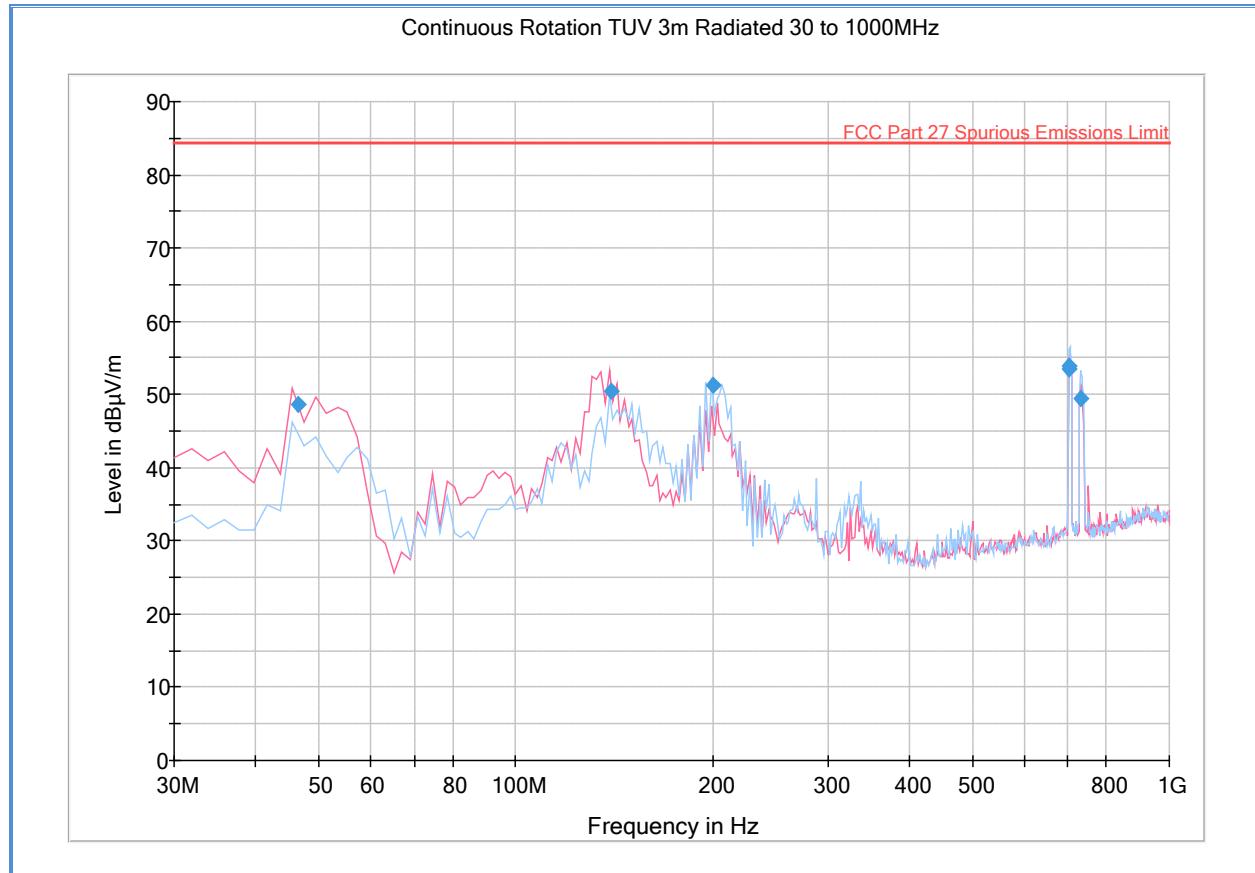


Quasi Peak Data

| Frequency (MHz) | QuasiPeak (dB μ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB μ V/m) |
|-----------------|--------------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------------|
| 42.383327 | 47.7 | 1000.0 | 120.000 | 105.0 | V | 49.0 | -12.0 | 34.5 | 82.2 |
| 46.391102 | 51.4 | 1000.0 | 120.000 | 100.0 | V | 67.0 | -13.4 | 30.8 | 82.2 |
| 119.954950 | 35.7 | 1000.0 | 120.000 | 109.0 | V | 263.0 | -15.2 | 46.5 | 82.2 |
| 147.593267 | 39.5 | 1000.0 | 120.000 | 150.0 | H | 304.0 | -13.5 | 42.7 | 82.2 |
| 705.465170 | 48.8 | 1000.0 | 120.000 | 100.0 | H | 10.0 | 3.0 | 33.4 | 82.2 |
| 733.711263 | 58.6 | 1000.0 | 120.000 | 100.0 | H | 198.0 | 2.8 | 23.6 | 82.2 |

Test Notes: Only worst case channel presented for spurious emissions below 1GHz. Only case spurious emissions within 20dB of the calculated limit will be proven by substitution method.

2.7.7 Test Results Below 1GHz (Uplink Worst Case Configuration)



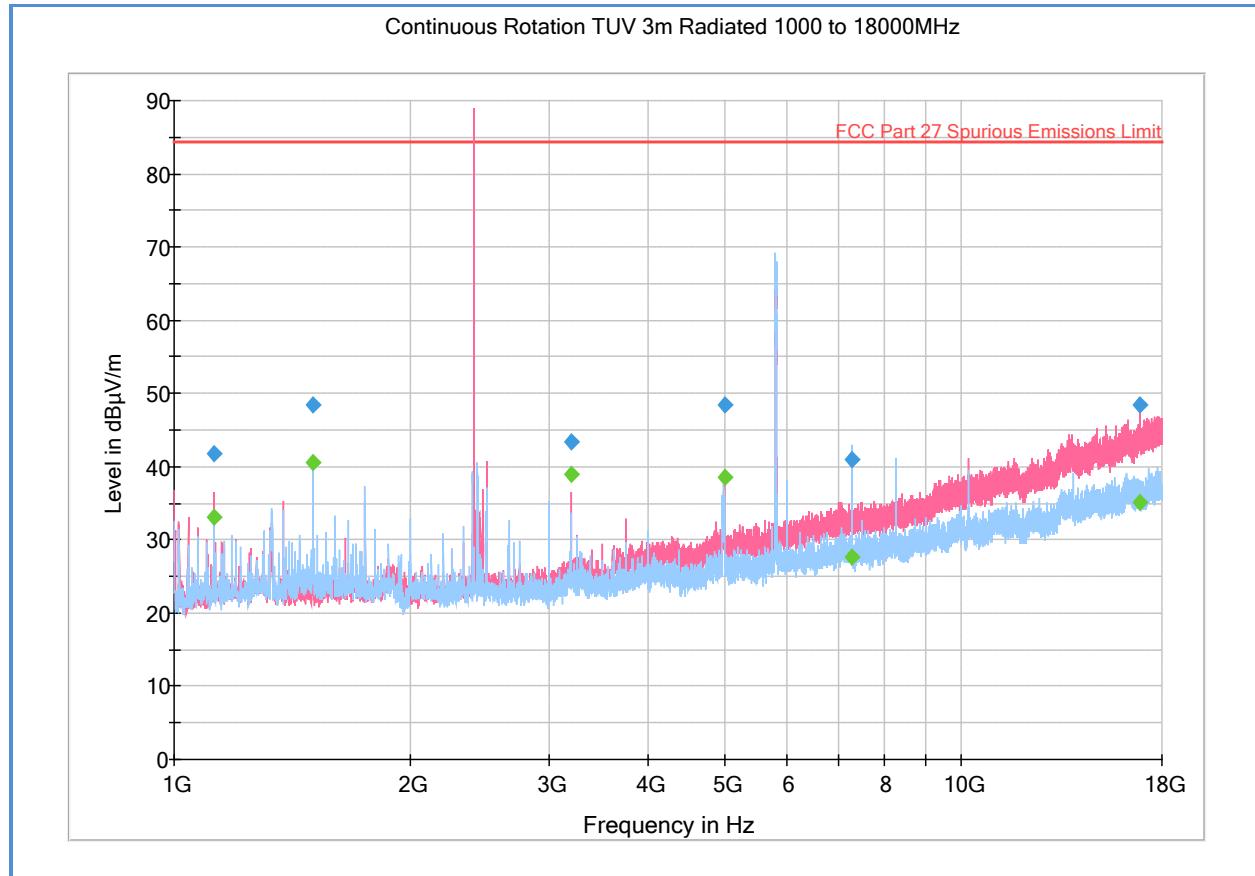
Quasi Peak Data

| Frequency (MHz) | QuasiPeak (dB μ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB μ V/m) |
|-----------------|--------------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------------|
| 46.391102 | 48.6 | 1000.0 | 120.000 | 100.0 | V | 118.0 | -13.4 | 33.6 | 82.2 |
| 139.617715 | 50.5 | 1000.0 | 120.000 | 100.0 | V | 32.0 | -14.6 | 31.7 | 82.2 |
| 199.998236 | 51.3 | 1000.0 | 120.000 | 105.0 | H | 312.0 | -11.5 | 30.9 | 82.2 |
| 703.705170 | 53.5 | 1000.0 | 120.000 | 100.0 | H | 334.0 | 3.0 | 28.8 | 82.2 |
| 703.729058 | 53.8 | 1000.0 | 120.000 | 100.0 | H | 336.0 | 3.0 | 28.4 | 82.2 |
| 730.463487 | 49.5 | 1000.0 | 120.000 | 100.0 | H | 156.0 | 2.9 | 32.7 | 82.2 |

Test Notes: Only worst case channel presented for spurious emissions below 1GHz. Only case spurious emissions within 20dB of the calculated limit will be proven by substitution method.



2.7.8 Test Results Above 1GHz - Downlink 10MHz Low Channel



Peak Data

| Frequency (MHz) | MaxPeak (dB μ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB μ V/m) |
|-----------------|------------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------------|
| 1124.866667 | 41.8 | 1000.0 | 1000.000 | 163.6 | V | 270.0 | -10.6 | 40.4 | 82.2 |
| 1500.000000 | 48.3 | 1000.0 | 1000.000 | 189.5 | H | -20.0 | -8.9 | 33.9 | 82.2 |
| 3200.000000 | 43.3 | 1000.0 | 1000.000 | 216.4 | V | 105.0 | -4.3 | 38.9 | 82.2 |
| 4999.900000 | 48.4 | 1000.0 | 1000.000 | 190.5 | V | 247.0 | -0.7 | 33.8 | 82.2 |
| 7268.033333 | 40.9 | 1000.0 | 1000.000 | 114.7 | H | 317.0 | 3.9 | 41.3 | 82.2 |
| 16879.833333 | 48.4 | 1000.0 | 1000.000 | 148.7 | V | 150.0 | 15.5 | 33.9 | 82.2 |

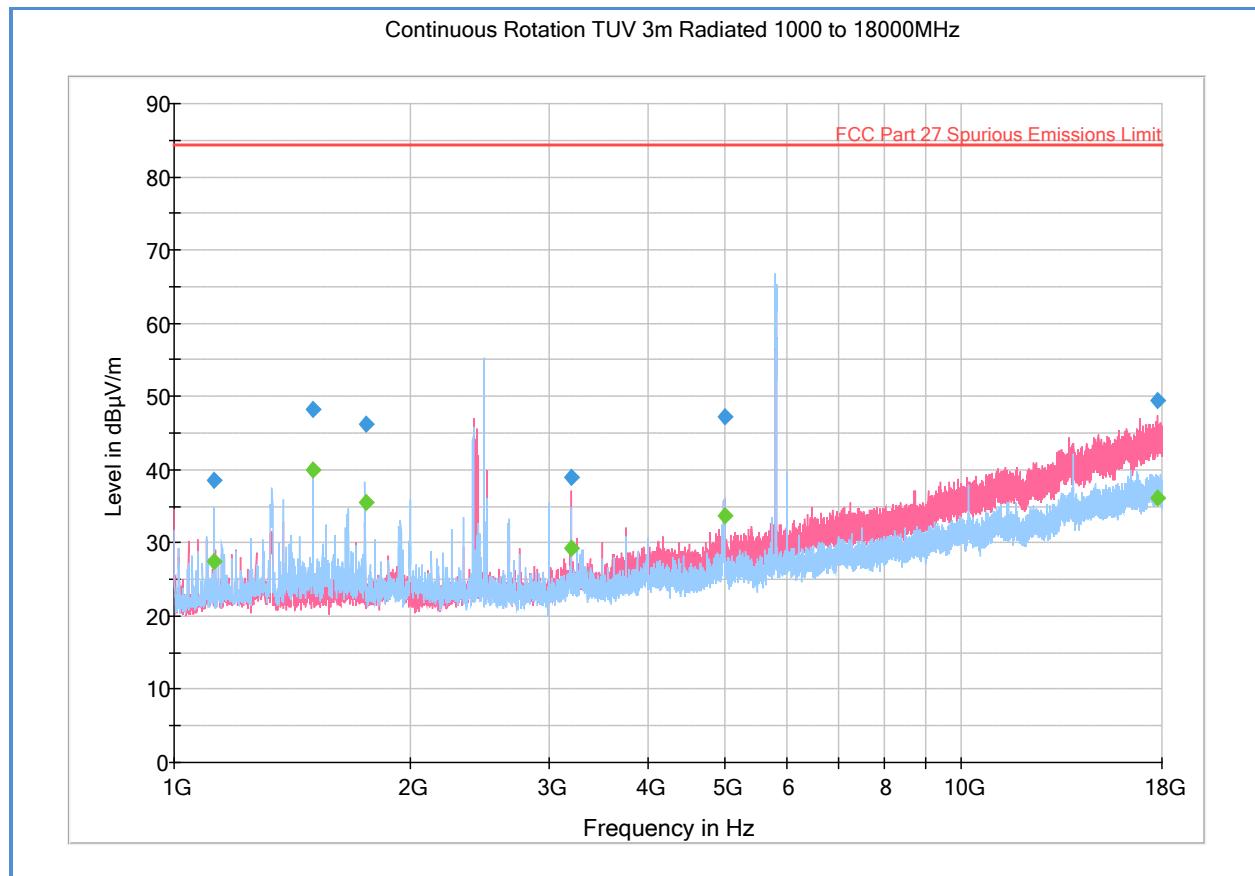
Average Data

| Frequency (MHz) | Average (dB μ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB μ V/m) |
|-----------------|------------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------------|
| 1124.866667 | 33.1 | 1000.0 | 1000.000 | 163.6 | V | 270.0 | -10.6 | 49.2 | 82.2 |
| 1500.000000 | 40.6 | 1000.0 | 1000.000 | 189.5 | H | -20.0 | -8.9 | 41.6 | 82.2 |
| 3200.000000 | 38.8 | 1000.0 | 1000.000 | 216.4 | V | 105.0 | -4.3 | 43.4 | 82.2 |
| 4999.900000 | 38.5 | 1000.0 | 1000.000 | 190.5 | V | 247.0 | -0.7 | 43.7 | 82.2 |
| 7268.033333 | 27.7 | 1000.0 | 1000.000 | 114.7 | H | 317.0 | 3.9 | 54.6 | 82.2 |
| 16879.833333 | 35.2 | 1000.0 | 1000.000 | 148.7 | V | 150.0 | 15.5 | 47.1 | 82.2 |

Test Notes: Emissions within the U-NII band (NU/CU link) and 2.4GHz band (CU Bluetooth LE) will be ignored. Substitution data not required since margin is >20dB compared to the -13dBm limit (converted to field strength @ 3 meters).



2.7.9 Test Results Above 1GHz - Downlink 10MHz Mid Channel



Peak Data

| Frequency (MHz) | MaxPeak (dB μ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB μ V/m) |
|-----------------|------------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------------|
| 1124.466667 | 38.5 | 1000.0 | 1000.000 | 146.7 | H | 4.0 | -10.6 | 43.8 | 82.2 |
| 1500.000000 | 48.3 | 1000.0 | 1000.000 | 189.5 | H | -16.0 | -8.9 | 33.9 | 82.2 |
| 1749.900000 | 46.2 | 1000.0 | 1000.000 | 198.5 | H | 223.0 | -7.9 | 36.0 | 82.2 |
| 3200.000000 | 39.0 | 1000.0 | 1000.000 | 163.6 | V | 105.0 | -4.3 | 43.2 | 82.2 |
| 4999.733333 | 47.1 | 1000.0 | 1000.000 | 198.5 | V | 87.0 | -0.7 | 35.1 | 82.2 |
| 17748.600000 | 49.4 | 1000.0 | 1000.000 | 209.4 | V | 177.0 | 16.5 | 32.8 | 82.2 |

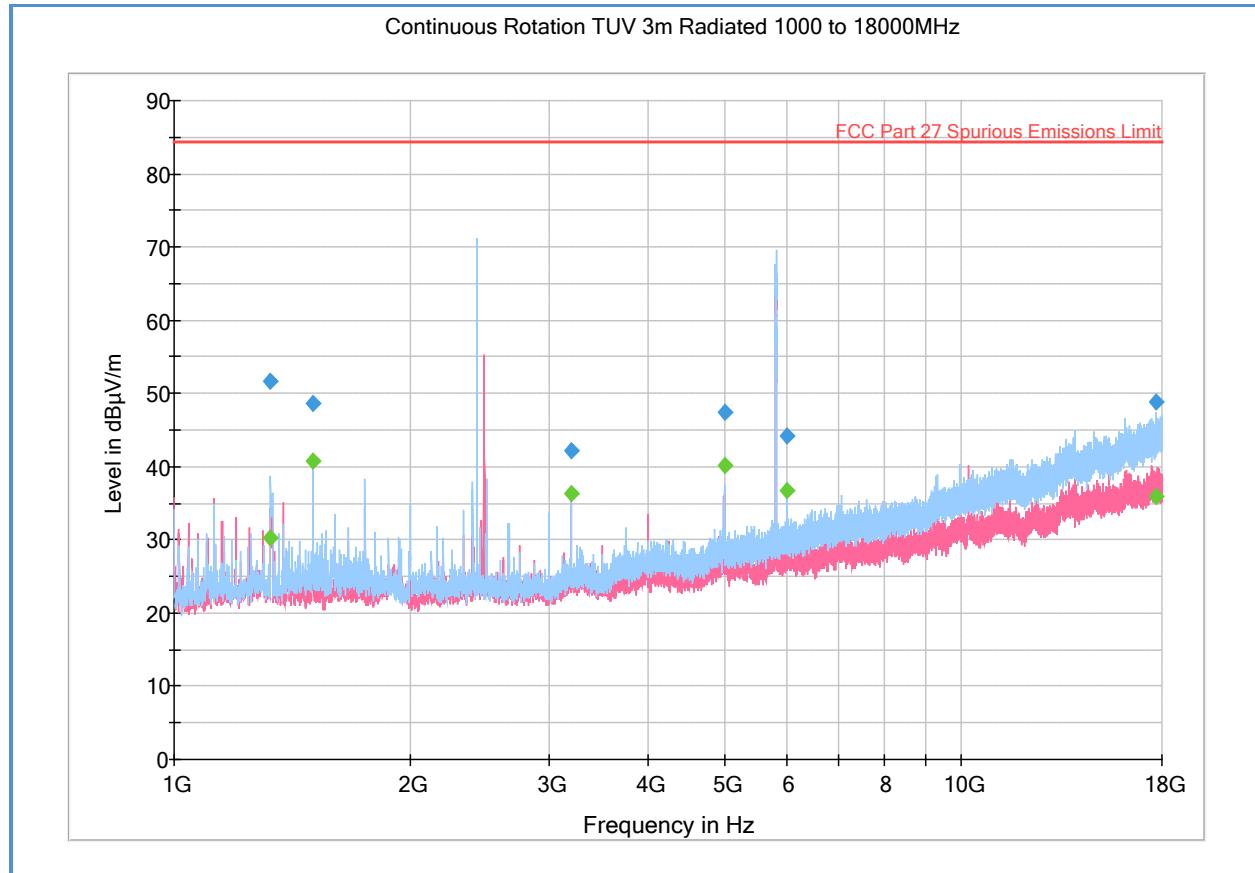
Average Data

| Frequency (MHz) | Average (dB μ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB μ V/m) |
|-----------------|------------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------------|
| 1124.466667 | 27.5 | 1000.0 | 1000.000 | 146.7 | H | 4.0 | -10.6 | 54.7 | 82.2 |
| 1500.000000 | 40.0 | 1000.0 | 1000.000 | 189.5 | H | -16.0 | -8.9 | 42.2 | 82.2 |
| 1749.900000 | 35.5 | 1000.0 | 1000.000 | 198.5 | H | 223.0 | -7.9 | 46.7 | 82.2 |
| 3200.000000 | 29.2 | 1000.0 | 1000.000 | 163.6 | V | 105.0 | -4.3 | 53.0 | 82.2 |
| 4999.733333 | 33.6 | 1000.0 | 1000.000 | 198.5 | V | 87.0 | -0.7 | 48.6 | 82.2 |
| 17748.600000 | 36.2 | 1000.0 | 1000.000 | 209.4 | V | 177.0 | 16.5 | 46.0 | 82.2 |

Test Notes: Emissions within the U-NII band (NU/CU link) and 2.4GHz band (CU Bluetooth LE) will be ignored. Substitution data not required since margin is >20dB compared to the -13dBm limit (converted to field strength @ 3 meters).



2.7.10 Test Results Above 1GHz - Downlink 10MHz High Channel



Peak Data

| Frequency (MHz) | MaxPeak (dB μ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB μ V/m) |
|-----------------|------------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------------|
| 1326.766667 | 51.6 | 1000.0 | 1000.000 | 200.5 | H | 196.0 | -8.9 | 30.7 | 82.2 |
| 1500.000000 | 48.5 | 1000.0 | 1000.000 | 181.6 | H | -20.0 | -8.9 | 33.7 | 82.2 |
| 3200.000000 | 42.1 | 1000.0 | 1000.000 | 103.7 | V | 264.0 | -4.3 | 40.1 | 82.2 |
| 4999.900000 | 47.5 | 1000.0 | 1000.000 | 200.5 | H | 277.0 | -0.7 | 34.7 | 82.2 |
| 6000.100000 | 44.2 | 1000.0 | 1000.000 | 257.3 | H | 122.0 | 1.3 | 38.0 | 82.2 |
| 17699.300000 | 48.7 | 1000.0 | 1000.000 | 117.7 | H | 178.0 | 16.4 | 33.5 | 82.2 |

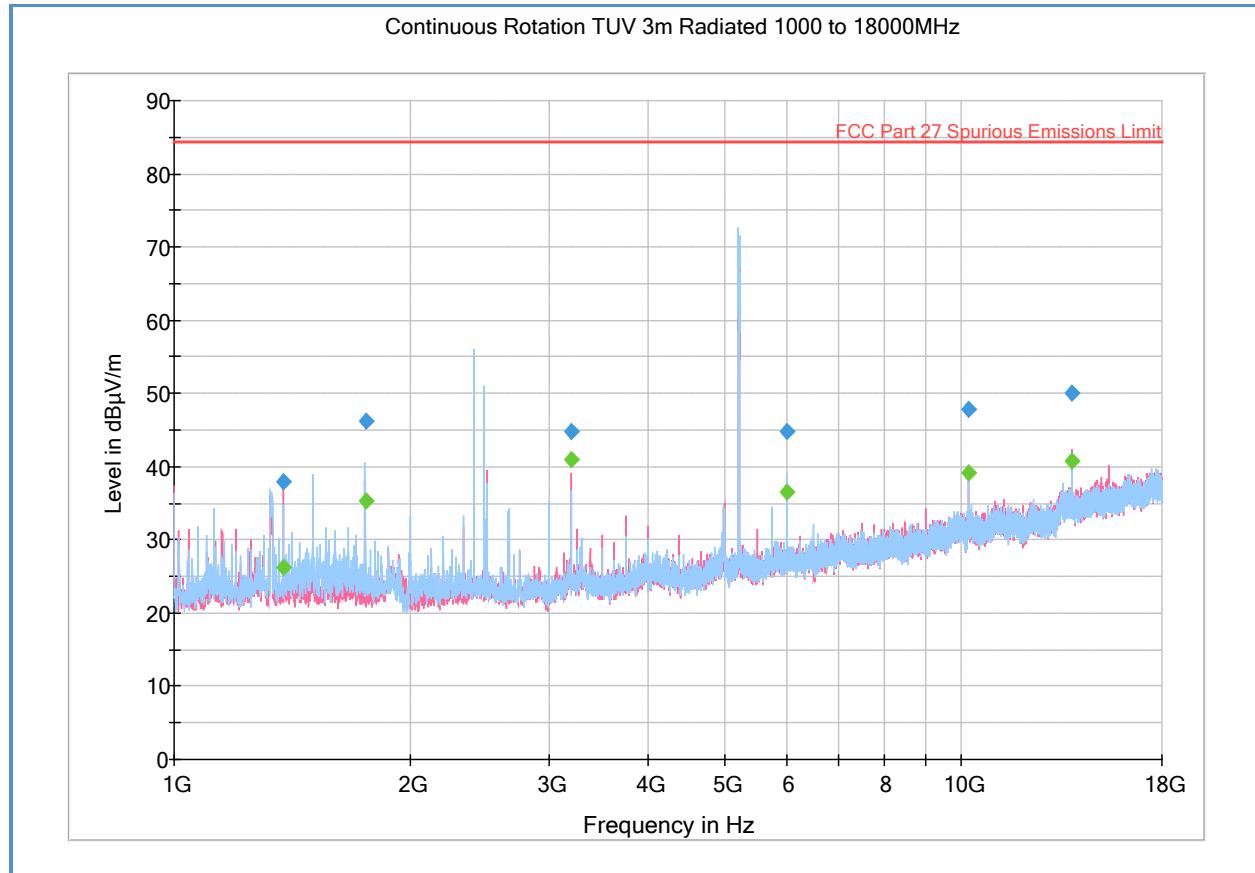
Average Data

| Frequency (MHz) | Average (dB μ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB μ V/m) |
|-----------------|------------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------------|
| 1326.766667 | 30.2 | 1000.0 | 1000.000 | 200.5 | H | 196.0 | -8.9 | 52.1 | 82.2 |
| 1500.000000 | 40.8 | 1000.0 | 1000.000 | 181.6 | H | -20.0 | -8.9 | 41.4 | 82.2 |
| 3200.000000 | 36.3 | 1000.0 | 1000.000 | 103.7 | V | 264.0 | -4.3 | 45.9 | 82.2 |
| 4999.900000 | 40.1 | 1000.0 | 1000.000 | 200.5 | H | 277.0 | -0.7 | 42.1 | 82.2 |
| 6000.100000 | 36.8 | 1000.0 | 1000.000 | 257.3 | H | 122.0 | 1.3 | 45.5 | 82.2 |
| 17699.300000 | 36.0 | 1000.0 | 1000.000 | 117.7 | H | 178.0 | 16.4 | 46.2 | 82.2 |

Test Notes: Emissions within the U-NII band (NU/CU link) and 2.4GHz band (CU Bluetooth LE) will be ignored. Substitution data not required since margin is >20dB compared to the -13dBm limit (converted to field strength @ 3 meters).



2.7.11 Test Results Above 1GHz - Uplink 10MHz Low Channel



Peak Data

| Frequency (MHz) | MaxPeak (dB μ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB μ V/m) |
|-----------------|------------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------------|
| 1374.766667 | 38.0 | 1000.0 | 1000.000 | 178.6 | V | 276.0 | -9.4 | 44.2 | 82.2 |
| 1749.900000 | 46.3 | 1000.0 | 1000.000 | 140.6 | H | 227.0 | -7.9 | 35.9 | 82.2 |
| 3200.000000 | 44.8 | 1000.0 | 1000.000 | 199.4 | V | 110.0 | -4.3 | 37.4 | 82.2 |
| 6000.300000 | 44.8 | 1000.0 | 1000.000 | 227.4 | H | 122.0 | 1.3 | 37.4 | 82.2 |
| 10200.033333 | 47.8 | 1000.0 | 1000.000 | 208.4 | V | 231.0 | 8.0 | 34.5 | 82.2 |
| 13812.133333 | 50.0 | 1000.0 | 1000.000 | 200.5 | V | 3.0 | 13.2 | 32.2 | 82.2 |

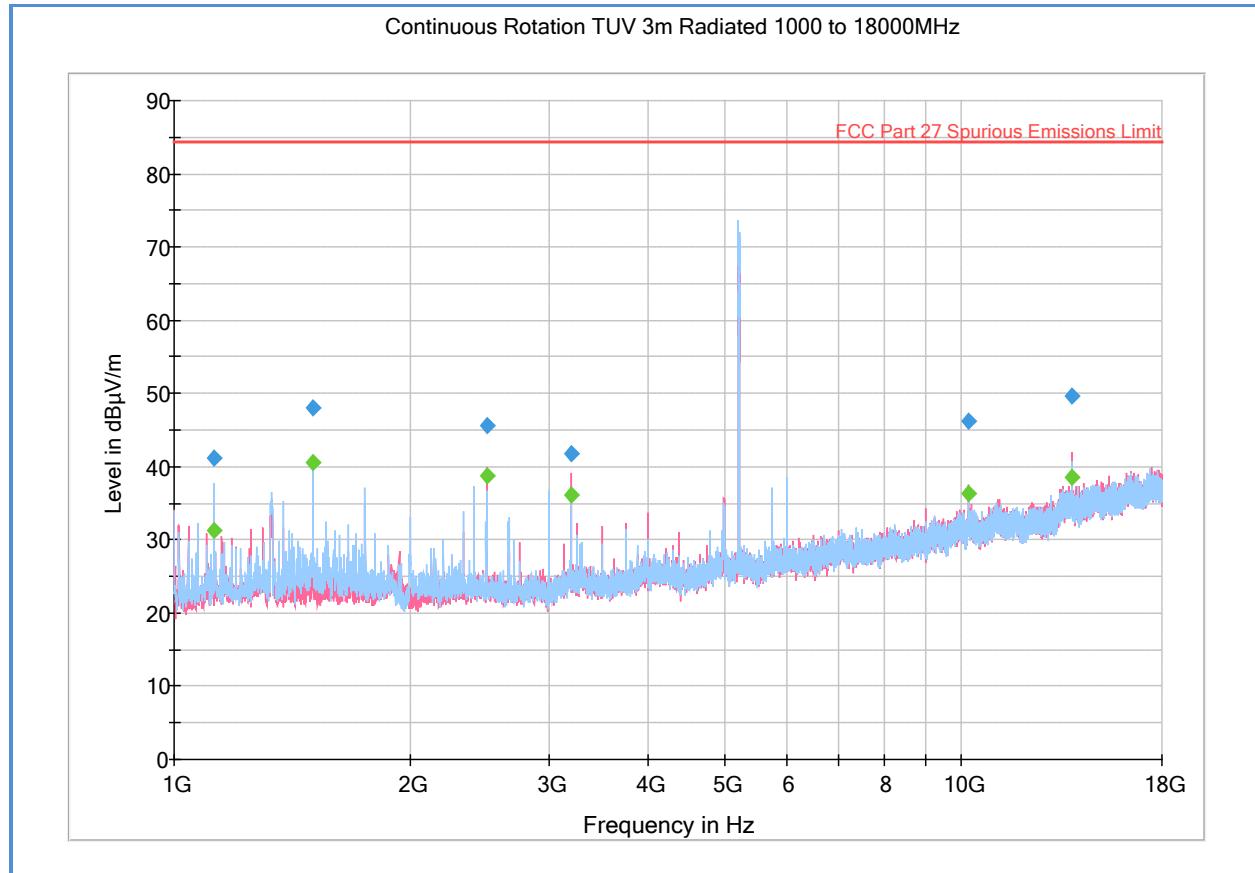
Average Data

| Frequency (MHz) | Average (dB μ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB μ V/m) |
|-----------------|------------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------------|
| 1374.766667 | 26.3 | 1000.0 | 1000.000 | 178.6 | V | 276.0 | -9.4 | 55.9 | 82.2 |
| 1749.900000 | 35.3 | 1000.0 | 1000.000 | 140.6 | H | 227.0 | -7.9 | 46.9 | 82.2 |
| 3200.000000 | 40.9 | 1000.0 | 1000.000 | 199.4 | V | 110.0 | -4.3 | 41.3 | 82.2 |
| 6000.300000 | 36.6 | 1000.0 | 1000.000 | 227.4 | H | 122.0 | 1.3 | 45.6 | 82.2 |
| 10200.033333 | 39.2 | 1000.0 | 1000.000 | 208.4 | V | 231.0 | 8.0 | 43.0 | 82.2 |
| 13812.133333 | 40.8 | 1000.0 | 1000.000 | 200.5 | V | 3.0 | 13.2 | 41.4 | 82.2 |

Test Notes: Emissions within the U-NII band (NU/CU link) and 2.4GHz band (CU Bluetooth LE) will be ignored. Substitution data not required since margin is >20dB compared to the -13dBm limit (converted to field strength @ 3 meters).



2.7.12 Test Results Above 1GHz - Uplink 10MHz Mid Channel



Peak Data

| Frequency (MHz) | MaxPeak (dB μ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB μ V/m) |
|-----------------|------------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------------|
| 1124.866667 | 41.2 | 1000.0 | 1000.000 | 139.7 | H | 314.0 | -10.6 | 41.0 | 82.2 |
| 1500.200000 | 48.0 | 1000.0 | 1000.000 | 190.5 | H | -20.0 | -8.9 | 34.2 | 82.2 |
| 2499.766667 | 45.6 | 1000.0 | 1000.000 | 103.7 | V | 324.0 | -6.4 | 36.6 | 82.2 |
| 3200.000000 | 41.9 | 1000.0 | 1000.000 | 173.6 | V | 110.0 | -4.3 | 40.4 | 82.2 |
| 10199.633333 | 46.2 | 1000.0 | 1000.000 | 200.5 | V | 256.0 | 8.0 | 36.0 | 82.2 |
| 13822.333333 | 49.6 | 1000.0 | 1000.000 | 199.5 | V | 4.0 | 13.1 | 32.7 | 82.2 |

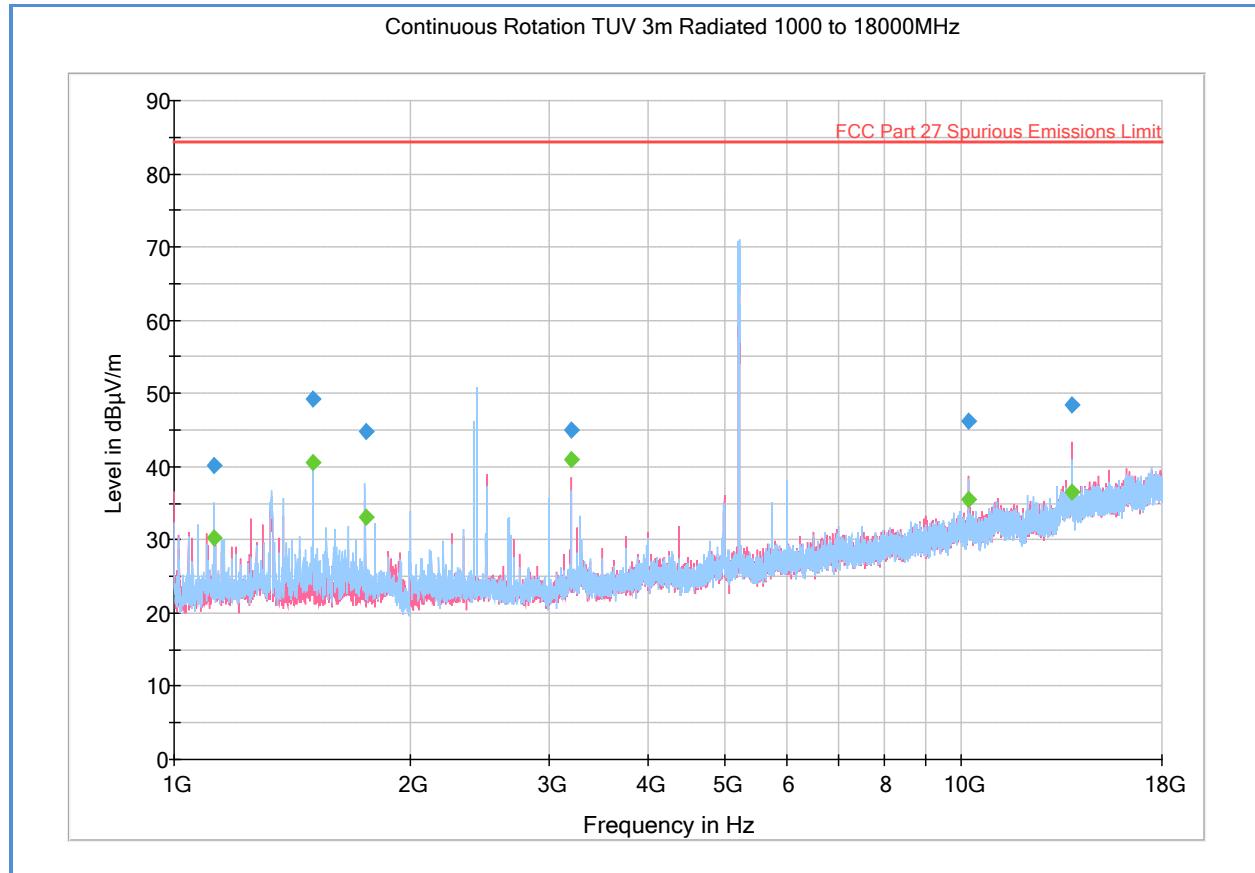
Average Data

| Frequency (MHz) | Average (dB μ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB μ V/m) |
|-----------------|------------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------------|
| 1124.866667 | 31.3 | 1000.0 | 1000.000 | 139.7 | H | 314.0 | -10.6 | 51.0 | 82.2 |
| 1500.200000 | 40.6 | 1000.0 | 1000.000 | 190.5 | H | -20.0 | -8.9 | 41.6 | 82.2 |
| 2499.766667 | 38.8 | 1000.0 | 1000.000 | 103.7 | V | 324.0 | -6.4 | 43.5 | 82.2 |
| 3200.000000 | 36.2 | 1000.0 | 1000.000 | 173.6 | V | 110.0 | -4.3 | 46.0 | 82.2 |
| 10199.633333 | 36.3 | 1000.0 | 1000.000 | 200.5 | V | 256.0 | 8.0 | 45.9 | 82.2 |
| 13822.333333 | 38.5 | 1000.0 | 1000.000 | 199.5 | V | 4.0 | 13.1 | 43.7 | 82.2 |

Test Notes: Emissions within the U-NII band (NU/CU link) and 2.4GHz band (CU Bluetooth LE) will be ignored. Substitution data not required since margin is >20dB compared to the -13dBm limit (converted to field strength @ 3 meters).



2.7.13 Test Results Above 1GHz - Uplink 10MHz High Channel



Peak Data

| Frequency (MHz) | MaxPeak (dB μ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB μ V/m) |
|-----------------|------------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------------|
| 1125.066667 | 40.1 | 1000.0 | 1000.000 | 236.4 | H | 325.0 | -10.6 | 42.1 | 82.2 |
| 1500.000000 | 49.1 | 1000.0 | 1000.000 | 191.5 | H | -20.0 | -8.9 | 33.1 | 82.2 |
| 1750.300000 | 44.9 | 1000.0 | 1000.000 | 139.7 | H | 226.0 | -7.9 | 37.4 | 82.2 |
| 3200.000000 | 44.9 | 1000.0 | 1000.000 | 200.5 | V | 110.0 | -4.3 | 37.3 | 82.2 |
| 10200.033333 | 46.2 | 1000.0 | 1000.000 | 163.6 | V | 248.0 | 8.0 | 36.0 | 82.2 |
| 13832.700000 | 48.4 | 1000.0 | 1000.000 | 288.2 | V | 4.0 | 13.1 | 33.8 | 82.2 |

Average Data

| Frequency (MHz) | Average (dB μ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB μ V/m) |
|-----------------|------------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------------|
| 1125.066667 | 30.3 | 1000.0 | 1000.000 | 236.4 | H | 325.0 | -10.6 | 51.9 | 82.2 |
| 1500.000000 | 40.6 | 1000.0 | 1000.000 | 191.5 | H | -20.0 | -8.9 | 41.6 | 82.2 |
| 1750.300000 | 33.1 | 1000.0 | 1000.000 | 139.7 | H | 226.0 | -7.9 | 49.1 | 82.2 |
| 3200.000000 | 40.9 | 1000.0 | 1000.000 | 200.5 | V | 110.0 | -4.3 | 41.3 | 82.2 |
| 10200.033333 | 35.5 | 1000.0 | 1000.000 | 163.6 | V | 248.0 | 8.0 | 46.7 | 82.2 |
| 13832.700000 | 36.5 | 1000.0 | 1000.000 | 288.2 | V | 4.0 | 13.1 | 45.8 | 82.2 |

Test Notes: Emissions within the U-NII band (NU/CU link) and 2.4GHz band (CU Bluetooth LE) will be ignored. Substitution data not required since margin is >20dB compared to the -13dBm limit (converted to field strength @ 3 meters).



2.8 FREQUENCY STABILITY

2.8.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1055
FCC 47 CFR Part 27, Clause 27.54
RSS-130, Clause 4.3

2.8.2 Standard Applicable

(§27.54) The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

2.8.3 Equipment Under Test and Modification State

Serial No: 296546000554 (NU) and 29754000407 (CU) / Test Configuration A and B

2.8.4 Date of Test/Initial of test personnel who performed the test

May 09 and 10, 2016/FSC

2.8.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.8.6 Environmental Conditions

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility.

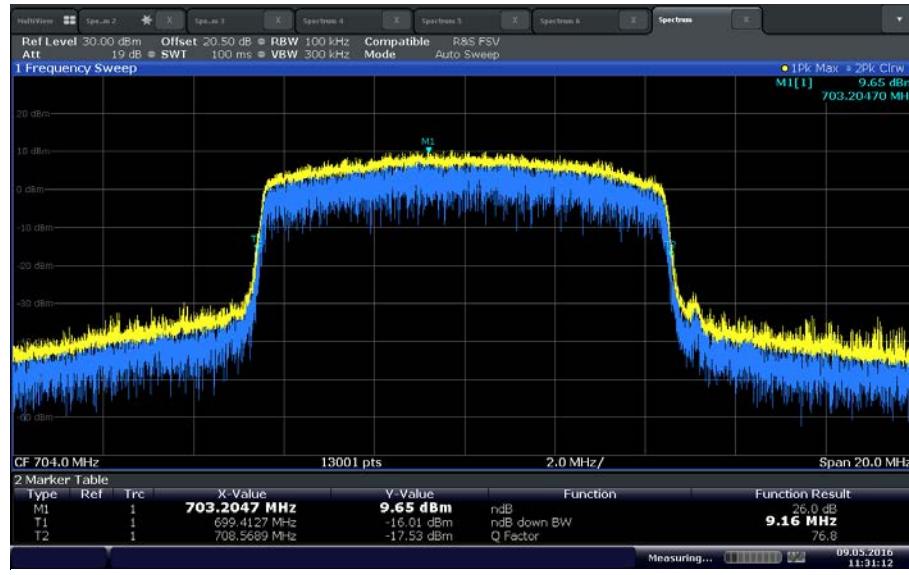
| | |
|---------------------|-----------------|
| Ambient Temperature | 24.6 - 26.1 °C |
| Relative Humidity | 42.0 -48.2 % |
| ATM Pressure | 98.8 – 99.2 kPa |

2.8.7 Additional Observations

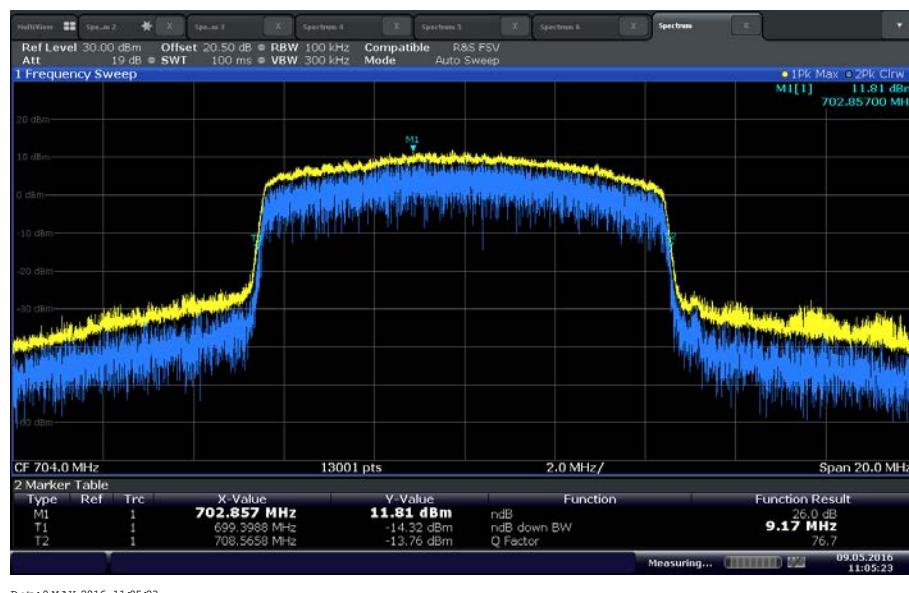
- This is a conducted test.
- The EUT was operated at 120.0VAC nominal voltage and was placed in the temperature chamber for the series of evaluations performed.
- The Temperature was reduced to -30°C and allowed to sit for 1 hour to allow the equipment and chamber temperature to stabilize. The measurements on both downlink and uplink were then performed. The temperature was then increased by 10°C steps and allowed to settle before taking the next set of measurements.
- Voltage variation was also performed at 85% and 115% of the nominal voltage.
- Test procedure as per RSS-130 was also performed.
- 10MHz BW was used for Uplink while 5MHz for Downlink.



2.8.8 Sample Computation and Sample Plots for Uplink



LTE B12 Uplink Low Channel @ 20°C Nominal Voltage



LTE B12 Uplink Low Channel @ 50°C Nominal Voltage



Computation of Center Frequency (@ 50°C):

Since T1 = 699.3988MHz and T2 = 708.5658 MHz, therefore $((T_2 - T_1)/2) + T_1$ = center frequency (703.9823 MHz)

Calculation of Frequency Deviation (ppm @ 50°C):

Comparing center frequency @ 50°C to center frequency @ 20°C, then calculate ppm.

$$((703.9908 \text{ MHz} - 703.9823 \text{ MHz}) / 703.9908 \text{ MHz}) \times 1000000 = 12.07 \text{ ppm}$$

2.8.9 Test Results Summary

| LTE B12 Uplink | | |
|----------------|------------------|---------------------------|
| Voltage (VAC) | Temperature (°C) | Frequency Deviation (ppm) |
| 120 | -30 | -17.47 |
| | -20 | -20.67 |
| | -10 | -9.80 |
| | 0 | -2.13 |
| | +10 | -0.99 |
| | +20 | 0 |
| | +30 | 1.140 |
| | +40 | 9.870 |
| | +50 | 12.07 |

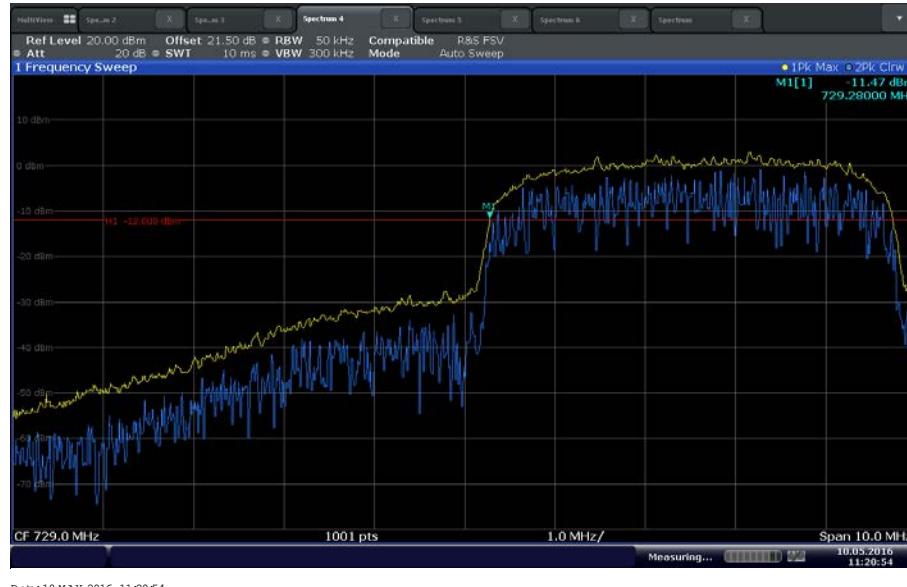
| LTE B12 Uplink | | |
|------------------|---------------|---------------------------|
| Temperature (°C) | Voltage (VAC) | Frequency Deviation (ppm) |
| 20 | 102 | 13.4 |
| | 138 | 0 |

Given a center frequency of 704 MHz (10MHz BW Low Channel Uplink) and with a BW of 9.24 MHz (Section 3.3.8 of this test report), therefore the -26dB BW low edge of this channel is 699.38 MHz. Since the lower edge of this frequency band is 698 MHz, therefore the theoretical frequency deviation limit would be > 50ppm. **EUT complies.**

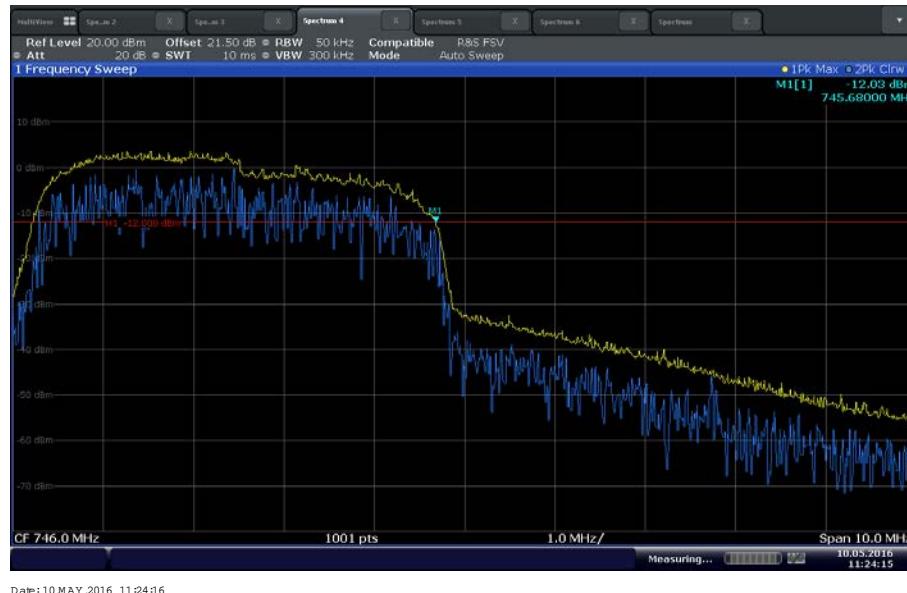


| LTE B12 Downlink | | | | |
|------------------|------------------|--------|--------|-----------------------------------------------------------------------------|
| Voltage (VAC) | Temperature (°C) | fL | fH | Compliance |
| 120 | 50 | 729.28 | 745.68 | Within frequency the range of 729- 746 MHz band. EUT complies. |
| 102 | 20 | 729.27 | 745.65 | |
| 120 | 20 | 729.27 | 745.65 | |
| 138 | 20 | 729.27 | 745.65 | |
| 120 | -30 | 729.26 | 745.70 | |

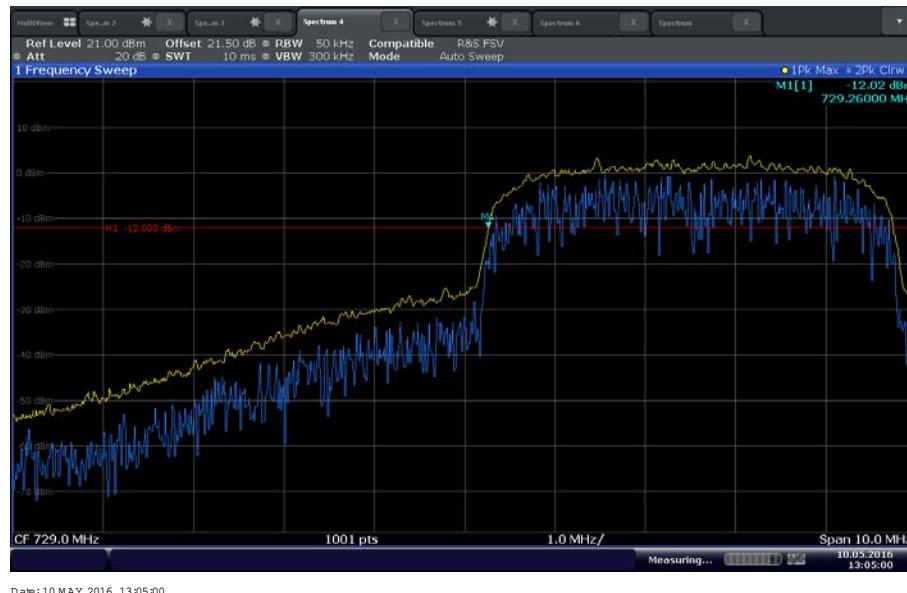
2.8.10 Sample Test Plots for Downlink



LTE B12 Downlink Low Channel @ 50°C Nominal Voltage

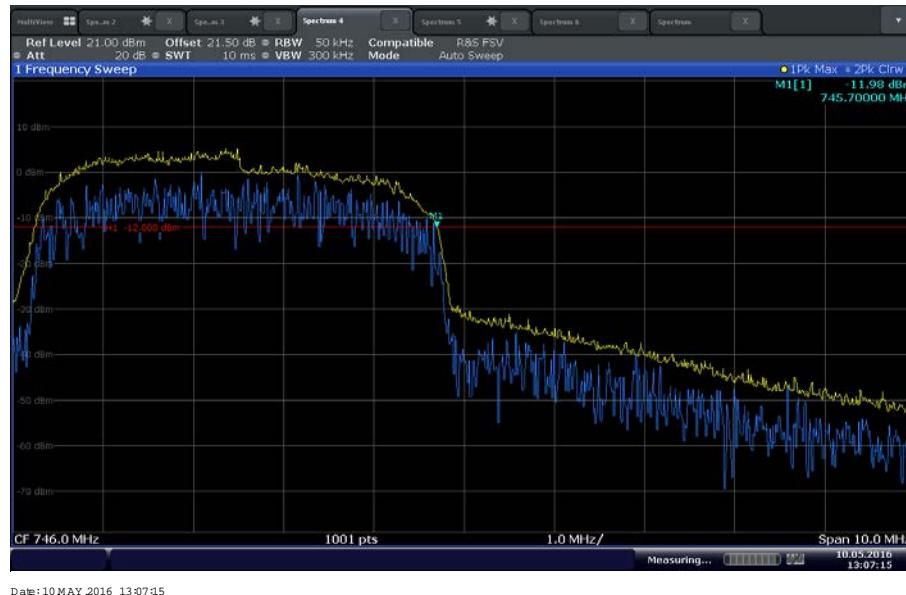


LTE B12 Downlink High Channel @ 50°C Nominal Voltage



LTE B12 Downlink Low Channel @ -30°C Nominal Voltage

FCC ID: YETD32-21266NU and YETD32-21266CU
IC: 9298A-D3221266NU and 9298A-D3221266CU
Report No. SD72116210-0416E



LTE B12 Downlink High Channel @ -30°C Nominal Voltage



2.9 POWER LINE CONDUCTED EMISSIONS

2.9.1 Specification Reference

RSS-Gen 8.8

2.9.2 Standard Applicable

A radio apparatus that is designed to be connected to the public utility (AC) power line shall ensure that the radio frequency voltage, which is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz-30 MHz, shall not exceed the limits in table below.

Unless the requirements applicable to a given device state otherwise, for any radio apparatus equipped to operate from the public utility AC power supply either directly or indirectly (such as with a battery charger), the radio frequency voltage of emissions conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in table below. The more stringent limit applies at the frequency range boundaries.

| Frequency of emission (MHz) | Conducted limit (dB μ V) | |
|-----------------------------|------------------------------|-----------|
| | Quasi-peak | Average |
| 0.15–0.5 | 66 to 56* | 56 to 46* |
| 0.5–5 | 56 | 46 |
| 5–30 | 60 | 50 |

*Decreases with the logarithm of the frequency.

2.9.3 Equipment Under Test and Modification State

Serial No: 296546000554 (NU) and 29754000407 (CU) / Test Configuration E

2.9.4 Date of Test/Initial of test personnel who performed the test

April 27, 2016/FSC

2.9.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.9.6 Environmental Conditions

| | |
|---------------------|----------|
| Ambient Temperature | 23.6 °C |
| Relative Humidity | 43.76.% |
| ATM Pressure | 99.7 kPa |



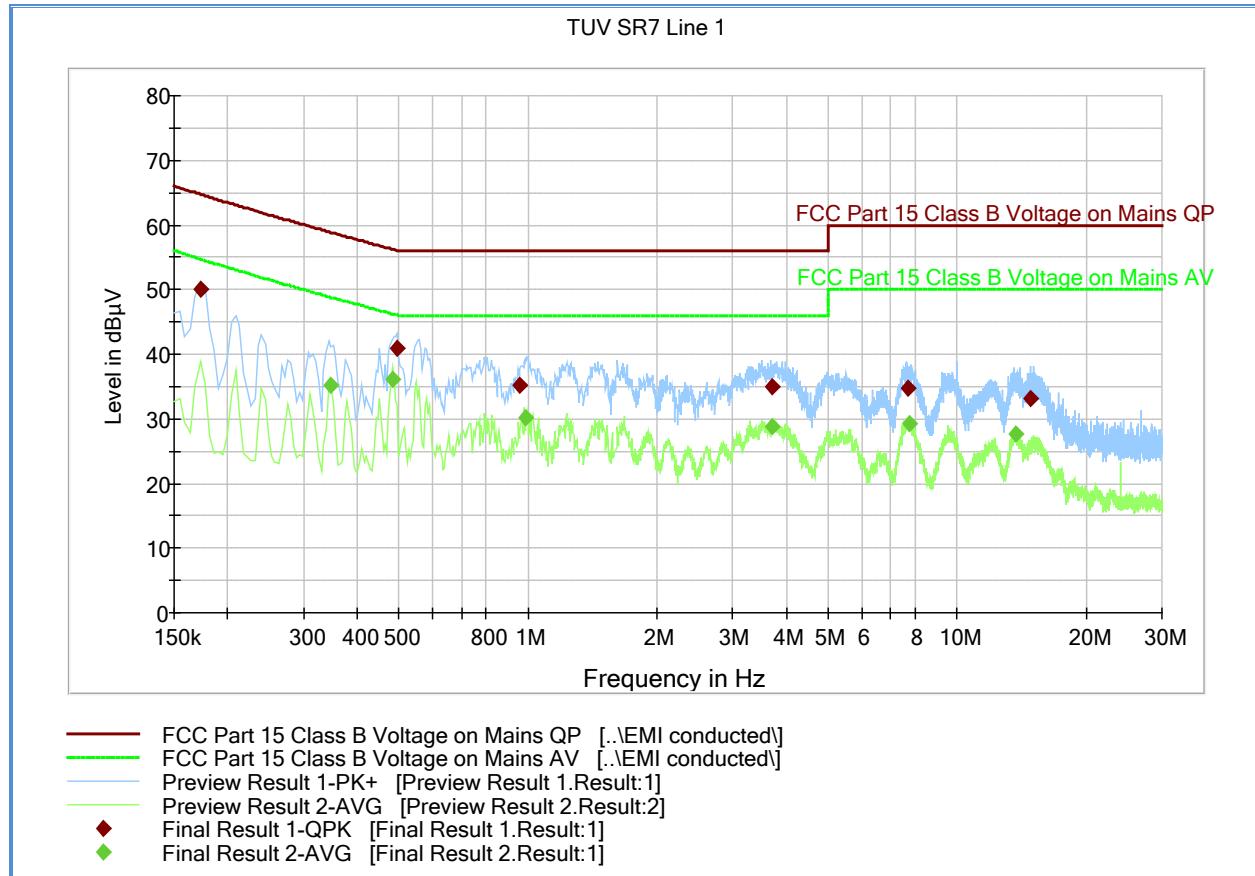
2.9.7 Additional Observations

- The EUT was verified using AC adapter supplied by the manufacturer.
- EUT verified using input voltage of 120VAC 60Hz.
- NU and CU verified separately.
- Measurement was done using EMC32 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only. See Section 2.9.8 for sample computation.

2.9.8 Sample Computation (Conducted Emission – Quasi Peak)

| Measuring equipment raw measurement (db μ V) @ 150kHz | | | 5.5 |
|------------------------------------------------------------|--------------------------------|------|------|
| Correction Factor (dB) | Asset# 8607 (20 dB attenuator) | 19.9 | 20.7 |
| | Asset# 1177 (cable) | 0.15 | |
| | Asset# 1176 (cable) | 0.35 | |
| | Asset# 7567 (LISN) | 0.30 | |
| Reported QuasiPeak Final Measurement (db μ V) @ 150kHz | | | 26.2 |

2.9.9 Test Results - Conducted Emissions Line 1 – Hot (NU)



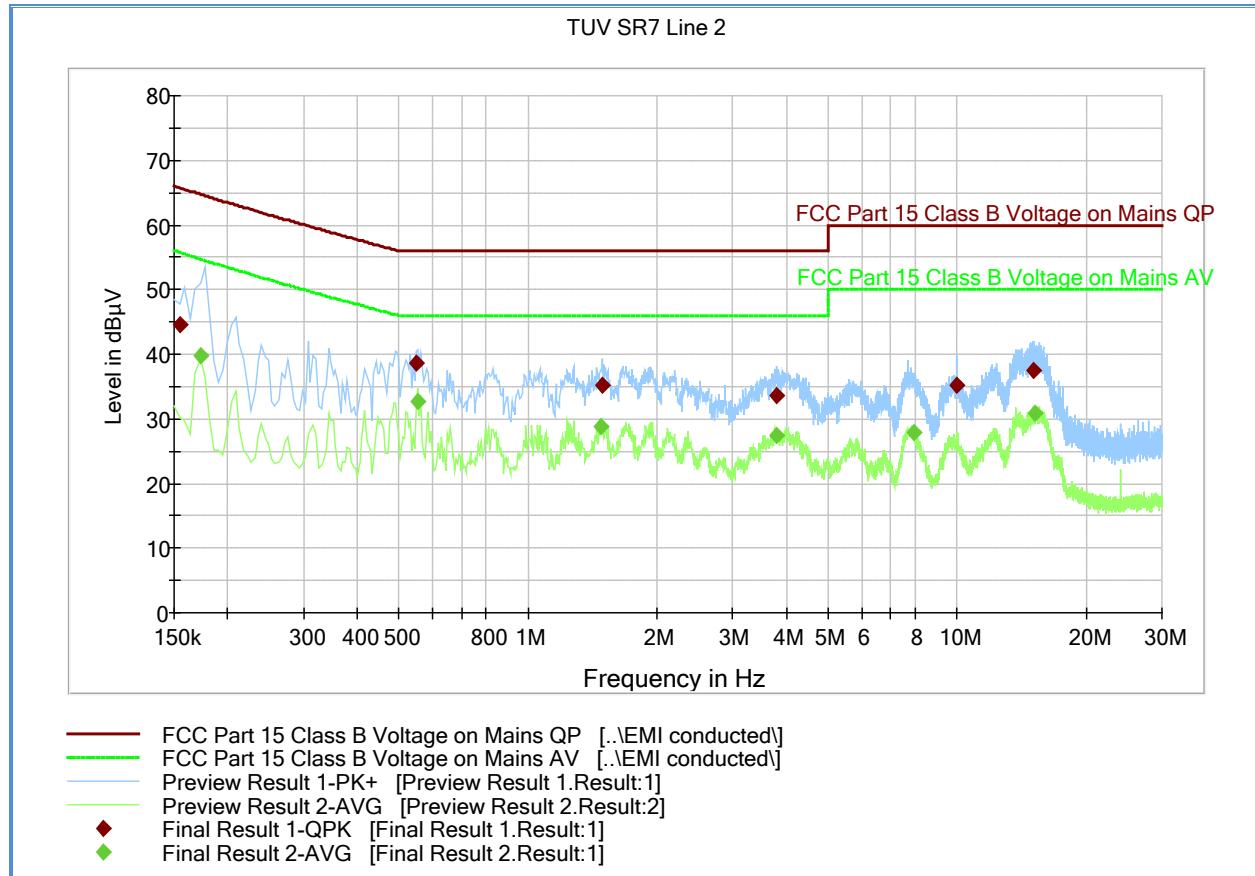
Quasi Peak

| Frequency (MHz) | QuasiPeak (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin - QPK (dB) | Limit - QPK (dBµV) |
|-----------------|------------------|-----------------|-----------------|--------|------|------------|-------------------|--------------------|
| 0.172500 | 50.0 | 1000.0 | 9.000 | Off | L1 | 20.1 | 14.7 | 64.8 |
| 0.496500 | 40.9 | 1000.0 | 9.000 | Off | L1 | 20.0 | 15.2 | 56.1 |
| 0.960000 | 35.2 | 1000.0 | 9.000 | Off | L1 | 20.0 | 20.8 | 56.0 |
| 3.696000 | 35.0 | 1000.0 | 9.000 | Off | L1 | 20.1 | 21.0 | 56.0 |
| 7.692000 | 34.8 | 1000.0 | 9.000 | Off | L1 | 20.1 | 25.2 | 60.0 |
| 14.802000 | 33.2 | 1000.0 | 9.000 | Off | L1 | 20.3 | 26.8 | 60.0 |

Average

| Frequency (MHz) | Average (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin - Ave (dB) | Limit - Ave (dBµV) |
|-----------------|----------------|-----------------|-----------------|--------|------|------------|-------------------|--------------------|
| 0.348000 | 35.3 | 1000.0 | 9.000 | Off | L1 | 20.0 | 13.5 | 48.8 |
| 0.483000 | 36.0 | 1000.0 | 9.000 | Off | L1 | 20.0 | 10.2 | 46.3 |
| 0.991500 | 30.1 | 1000.0 | 9.000 | Off | L1 | 20.0 | 15.9 | 46.0 |
| 3.714000 | 28.7 | 1000.0 | 9.000 | Off | L1 | 20.1 | 17.3 | 46.0 |
| 7.714500 | 29.3 | 1000.0 | 9.000 | Off | L1 | 20.1 | 20.7 | 50.0 |
| 13.731000 | 27.6 | 1000.0 | 9.000 | Off | L1 | 20.2 | 22.4 | 50.0 |

2.9.10 Test Results - Conducted Emissions Line 2 –Neutral (NU)



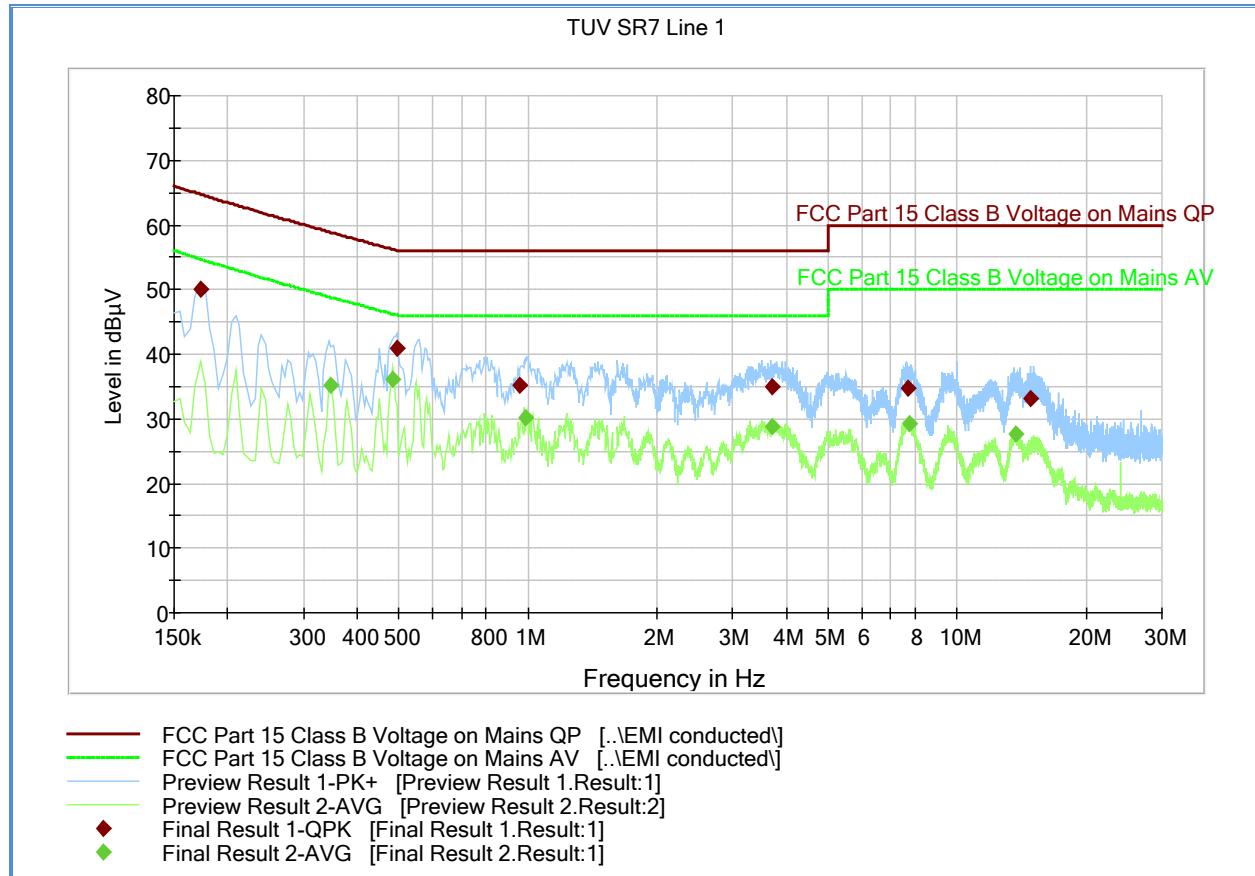
Quasi Peak

| Frequency (MHz) | QuasiPeak (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin - QPK (dB) | Limit - QPK (dBμV) |
|-----------------|------------------|-----------------|-----------------|--------|------|------------|-------------------|--------------------|
| 0.154500 | 44.6 | 1000.0 | 9.000 | Off | N | 20.2 | 21.1 | 65.7 |
| 0.550500 | 38.6 | 1000.0 | 9.000 | Off | N | 20.0 | 17.4 | 56.0 |
| 1.491000 | 35.1 | 1000.0 | 9.000 | Off | N | 20.0 | 20.9 | 56.0 |
| 3.804000 | 33.5 | 1000.0 | 9.000 | Off | N | 20.1 | 22.5 | 56.0 |
| 10.000500 | 35.1 | 1000.0 | 9.000 | Off | N | 20.2 | 24.9 | 60.0 |
| 15.112500 | 37.4 | 1000.0 | 9.000 | Off | N | 20.3 | 22.6 | 60.0 |

Average

| Frequency (MHz) | Average (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin - Ave (dB) | Limit - Ave (dBμV) |
|-----------------|----------------|-----------------|-----------------|--------|------|------------|-------------------|--------------------|
| 0.172500 | 39.8 | 1000.0 | 9.000 | Off | N | 20.1 | 14.9 | 54.7 |
| 0.555000 | 32.7 | 1000.0 | 9.000 | Off | N | 20.0 | 13.3 | 46.0 |
| 1.477500 | 28.7 | 1000.0 | 9.000 | Off | N | 20.0 | 17.3 | 46.0 |
| 3.799500 | 27.4 | 1000.0 | 9.000 | Off | N | 20.1 | 18.6 | 46.0 |
| 7.935000 | 27.8 | 1000.0 | 9.000 | Off | N | 20.1 | 22.2 | 50.0 |
| 15.144000 | 30.9 | 1000.0 | 9.000 | Off | N | 20.3 | 19.1 | 50.0 |

2.9.11 Test Results - Conducted Emissions Line 1 – Hot (CU)



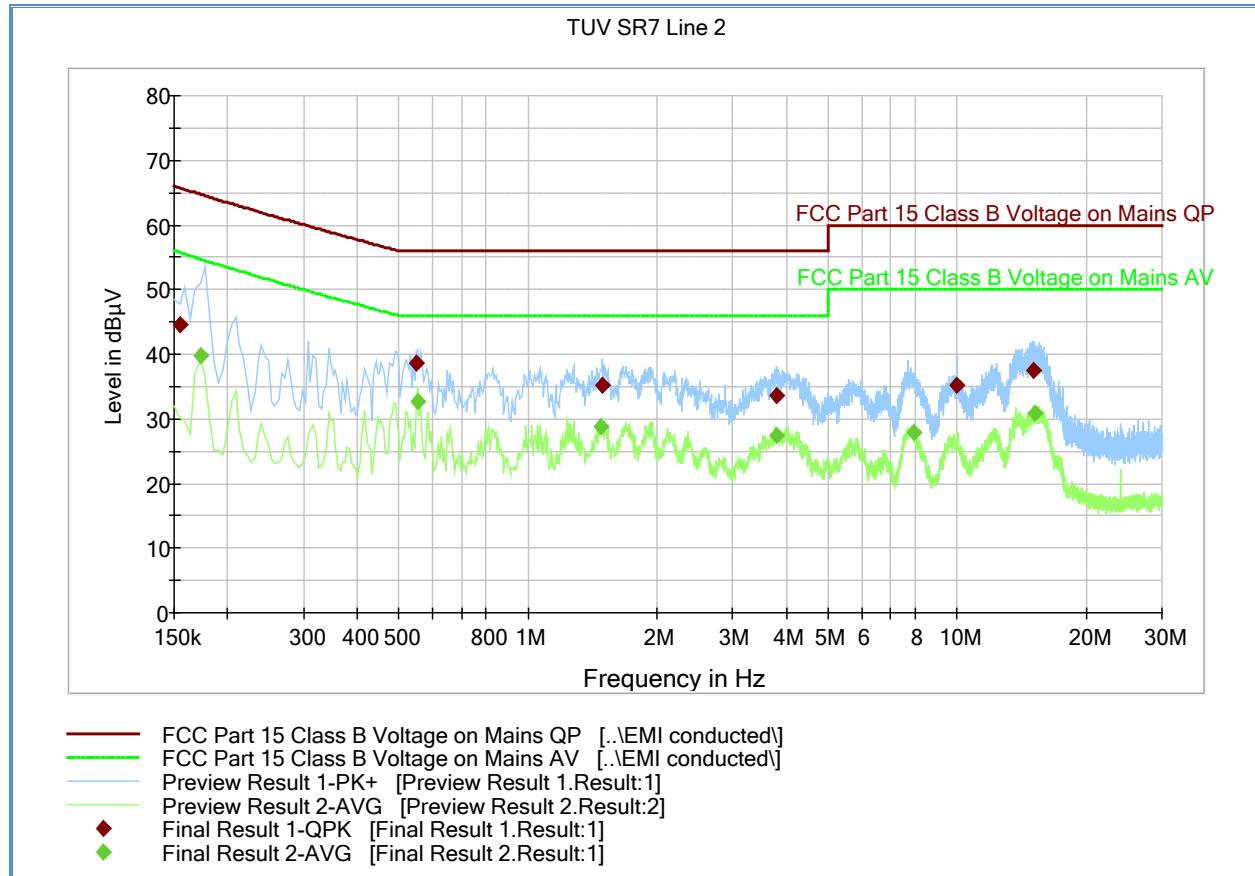
Quasi Peak

| Frequency (MHz) | QuasiPeak (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin - QPK (dB) | Limit - QPK (dBμV) |
|-----------------|------------------|-----------------|-----------------|--------|------|------------|-------------------|--------------------|
| 0.172500 | 50.0 | 1000.0 | 9.000 | Off | L1 | 20.1 | 14.7 | 64.8 |
| 0.496500 | 40.9 | 1000.0 | 9.000 | Off | L1 | 20.0 | 15.2 | 56.1 |
| 0.960000 | 35.2 | 1000.0 | 9.000 | Off | L1 | 20.0 | 20.8 | 56.0 |
| 3.696000 | 35.0 | 1000.0 | 9.000 | Off | L1 | 20.1 | 21.0 | 56.0 |
| 7.692000 | 34.8 | 1000.0 | 9.000 | Off | L1 | 20.1 | 25.2 | 60.0 |
| 14.802000 | 33.2 | 1000.0 | 9.000 | Off | L1 | 20.3 | 26.8 | 60.0 |

Average

| Frequency (MHz) | Average (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin - Ave (dB) | Limit - Ave (dBμV) |
|-----------------|----------------|-----------------|-----------------|--------|------|------------|-------------------|--------------------|
| 0.348000 | 35.3 | 1000.0 | 9.000 | Off | L1 | 20.0 | 13.5 | 48.8 |
| 0.483000 | 36.0 | 1000.0 | 9.000 | Off | L1 | 20.0 | 10.2 | 46.3 |
| 0.991500 | 30.1 | 1000.0 | 9.000 | Off | L1 | 20.0 | 15.9 | 46.0 |
| 3.714000 | 28.7 | 1000.0 | 9.000 | Off | L1 | 20.1 | 17.3 | 46.0 |
| 7.714500 | 29.3 | 1000.0 | 9.000 | Off | L1 | 20.1 | 20.7 | 50.0 |
| 13.731000 | 27.6 | 1000.0 | 9.000 | Off | L1 | 20.2 | 22.4 | 50.0 |

2.9.12 Test Results - Conducted Emissions Line 2 –Neutral (CU)



Quasi Peak

| Frequency (MHz) | QuasiPeak (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin - QPK (dB) | Limit - QPK (dBμV) |
|-----------------|------------------|-----------------|-----------------|--------|------|------------|-------------------|--------------------|
| 0.154500 | 44.6 | 1000.0 | 9.000 | Off | N | 20.2 | 21.1 | 65.7 |
| 0.550500 | 38.6 | 1000.0 | 9.000 | Off | N | 20.0 | 17.4 | 56.0 |
| 1.491000 | 35.1 | 1000.0 | 9.000 | Off | N | 20.0 | 20.9 | 56.0 |
| 3.804000 | 33.5 | 1000.0 | 9.000 | Off | N | 20.1 | 22.5 | 56.0 |
| 10.000500 | 35.1 | 1000.0 | 9.000 | Off | N | 20.2 | 24.9 | 60.0 |
| 15.112500 | 37.4 | 1000.0 | 9.000 | Off | N | 20.3 | 22.6 | 60.0 |

Average

| Frequency (MHz) | Average (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin - Ave (dB) | Limit - Ave (dBμV) |
|-----------------|----------------|-----------------|-----------------|--------|------|------------|-------------------|--------------------|
| 0.172500 | 39.8 | 1000.0 | 9.000 | Off | N | 20.1 | 14.9 | 54.7 |
| 0.555000 | 32.7 | 1000.0 | 9.000 | Off | N | 20.0 | 13.3 | 46.0 |
| 1.477500 | 28.7 | 1000.0 | 9.000 | Off | N | 20.0 | 17.3 | 46.0 |
| 3.799500 | 27.4 | 1000.0 | 9.000 | Off | N | 20.1 | 18.6 | 46.0 |
| 7.935000 | 27.8 | 1000.0 | 9.000 | Off | N | 20.1 | 22.2 | 50.0 |
| 15.144000 | 30.9 | 1000.0 | 9.000 | Off | N | 20.3 | 19.1 | 50.0 |

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SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

| ID Number (SDGE/SDRB) | Test Equipment | Type | Serial Number | Manufacturer | Cal Date | Cal Due Date |
|------------------------------|--------------------------------------|---------------------|----------------------|----------------------------|---------------------------|--------------|
| Antenna Conducted Port Setup | | | | | | |
| 7604 | P-Series Power Meter | N1912A | SG45100273 | Agilent | 05/27/15 | 05/27/16 |
| 7605 | 50MHz-18GHz Wideband Power Sensor | N1921A | MY51100054 | Agilent | 04/10/15 | 04/10/16 |
| 7582 | Signal/Spectrum Analyzer | FSW26 | 101614 | Rhode & Schwarz | 10/05/15 | 10/05/16 |
| 7608 | Vector Signal Generator | SMBV100A | 259021 | Rhode & Schwarz | 07/29/15 | 07/29/16 |
| 7562 | Wideband Radio Communication Tester | CMW 500 | 1201.0002k50 /103829 | Rhode & Schwarz | For signalling | |
| 8772 | 10dB Attenuator | 606-10-1F4/DR | - | MECA | Verified by 7582 and 7608 | |
| Radiated Emissions | | | | | | |
| 1033 | Bilog Antenna | 3142C | 00044556 | EMCO | 09/25/15 | 09/25/16 |
| 1051 | Double-ridged waveguide horn antenna | 3115 | 9408-4329 | EMCO | 03/21/16 | 03/21/17 |
| 8628 | Pre-amplifier | QLJ 01182835-JO | 8986002 | QuinStar Technologies Inc. | 01/11/16 | 01/11/17 |
| 1040 | EMI Test Receiver | ESIB40 | 100292 | Rhode & Schwarz | 09/29/15 | 09/29/16 |
| 1049 | EMI Test Receiver | ESU | 100133 | Rhode & Schwarz | 03/17/16 | 03/17/17 |
| 1016 | Pre-amplifier | PAM-0202 | 187 | PAM | 12/15/15 | 12/15/16 |
| 1153 | High-frequency cable | SucoFlex 100 SX | N/A | Suhner | Verified by 7582 and 7608 | |
| 8543 | High-frequency cable | Micropore 19057793 | N/A | United Microwave Products | 09/03/15 | 09/03/16 |
| 1151 | Pre-amplifier | TS-PR26 | 100026 | Rhode & Schwarz | 05/08/15 | 05/08/16 |
| Conducted Emissions | | | | | | |
| 7620 | EMI Test Receiver | ESU40 | 100399 | Rhode & Schwarz | 09/03/15 | 09/03/16 |
| 7567 | LISN | FCC-LISN-50-25-2-10 | 120304 | Fischer Custom Comm. | 07/14/15 | 07/14/16 |
| 7568 | LISN | FCC-LISN-50-25-2-10 | 120305 | Fischer Custom Comm. | 10/28/15 | 10/28/16 |
| 8822 | 20dB Attenuator | 34-20-34 | N/A | MCE / Weinschel | 02/29/16 | 02/28/17 |
| 8824 | 20dB Attenuator | 34-20-34 | N/A | MCE / Weinschel | 02/29/16 | 02/28/17 |
| 7562 | Wideband Radio Communication Tester | CMW 500 | 1201.0002k50 /103829 | Rhode & Schwarz | For signalling | |

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| Miscellaneous | | | | | | |
|---------------|---------------------------------------------|---------|------------|-----------------|----------|----------|
| 6792 | Multimeter | 3478A | 2911A70964 | Hewlett Packard | 08/14/15 | 08/14/16 |
| 7560 | Barometer/Temperature /Humidity Transmitter | iBTHX-W | 1240476 | Omega | 10/19/15 | 10/19/16 |
| | Test Software | EMC32 | V8.53 | Rhode & Schwarz | N/A | |



3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:

3.2.1 Conducted Measurements

| Contribution | | Probability Distribution Type | Probability Distribution x_i | Standard Uncertainty $u(x_i)$ | $[u(x_i)]^2$ |
|--------------|----------------------------|-------------------------------|--------------------------------|---------------------------------|--------------|
| 1 | Receiver/Spectrum Analyzer | Rectangular | 0.36 | 0.21 | 0.04 |
| 2 | Cables | Rectangular | 0.50 | 0.29 | 0.08 |
| 3 | LISN | Rectangular | 0.66 | 0.38 | 0.15 |
| 4 | Attenuator | Rectangular | 0.30 | 0.17 | 0.03 |
| 5 | EUT Setup | Rectangular | 1.00 | 0.58 | 0.33 |
| | | | | Combined Uncertainty (u_c): | 0.80 |
| | | | | Coverage Factor (k): | 2 |
| | | | | Expanded Uncertainty: | 1.59 |

3.2.2 Radiated Measurements (Below 1GHz)

| Contribution | | Probability Distribution Type | Probability Distribution x_i | Standard Uncertainty $u(x_i)$ | $[u(x_i)]^2$ |
|--------------|----------------------------|-------------------------------|--------------------------------|---------------------------------|--------------|
| 1 | Receiver/Spectrum Analyzer | Rectangular | 0.45 | 0.26 | 0.07 |
| 2 | Cables | Rectangular | 0.50 | 0.29 | 0.08 |
| 3 | Preamp | Rectangular | 0.50 | 0.29 | 0.08 |
| 4 | Antenna | Rectangular | 0.75 | 0.43 | 0.19 |
| 5 | Site | Rectangular | 2.70 | 1.56 | 2.43 |
| 6 | EUT Setup | Rectangular | 1.00 | 0.58 | 0.33 |
| | | | | Combined Uncertainty (u_c): | 1.78 |
| | | | | Coverage Factor (k): | 2 |
| | | | | Expanded Uncertainty: | 3.57 |

3.2.3 Radiated Emission Measurements (Above 1GHz)

| Contribution | | Probability Distribution Type | Probability Distribution x_i | Standard Uncertainty $u(x_i)$ | $[u(x_i)]^2$ |
|--------------|----------------------------|-------------------------------|--------------------------------|---------------------------------|--------------|
| 1 | Receiver/Spectrum Analyzer | Rectangular | 0.57 | 0.33 | 0.11 |
| 2 | Cables | Rectangular | 0.70 | 0.40 | 0.16 |
| 3 | Preamp | Rectangular | 0.50 | 0.29 | 0.08 |
| 4 | Antenna | Rectangular | 0.37 | 0.21 | 0.05 |
| 5 | Site | Rectangular | 2.70 | 1.56 | 2.43 |
| 6 | EUT Setup | Rectangular | 1.00 | 0.58 | 0.33 |
| | | | | Combined Uncertainty (u_c): | 1.78 |
| | | | | Coverage Factor (k): | 2 |
| | | | | Expanded Uncertainty: | 3.56 |

3.2.4 Conducted Antenna Port Measurement

| Contribution | | Probability Distribution Type | Probability Distribution x_i | Standard Uncertainty $u(x_i)$ | $[u(x_i)]^2$ |
|---------------------------------|----------------------------|-------------------------------|--------------------------------|-------------------------------|--------------|
| 1 | Receiver/Spectrum Analyzer | Rectangular | 0.57 | 0.33 | 0.11 |
| 2 | Cables | Rectangular | 0.50 | 0.29 | 0.08 |
| 3 | EUT Setup | Rectangular | 1.00 | 0.58 | 0.33 |
| Combined Uncertainty (u_c): | | | | 0.72 | |
| Coverage Factor (k): | | | | 2 | |
| Expanded Uncertainty: | | | | 1.45 | |

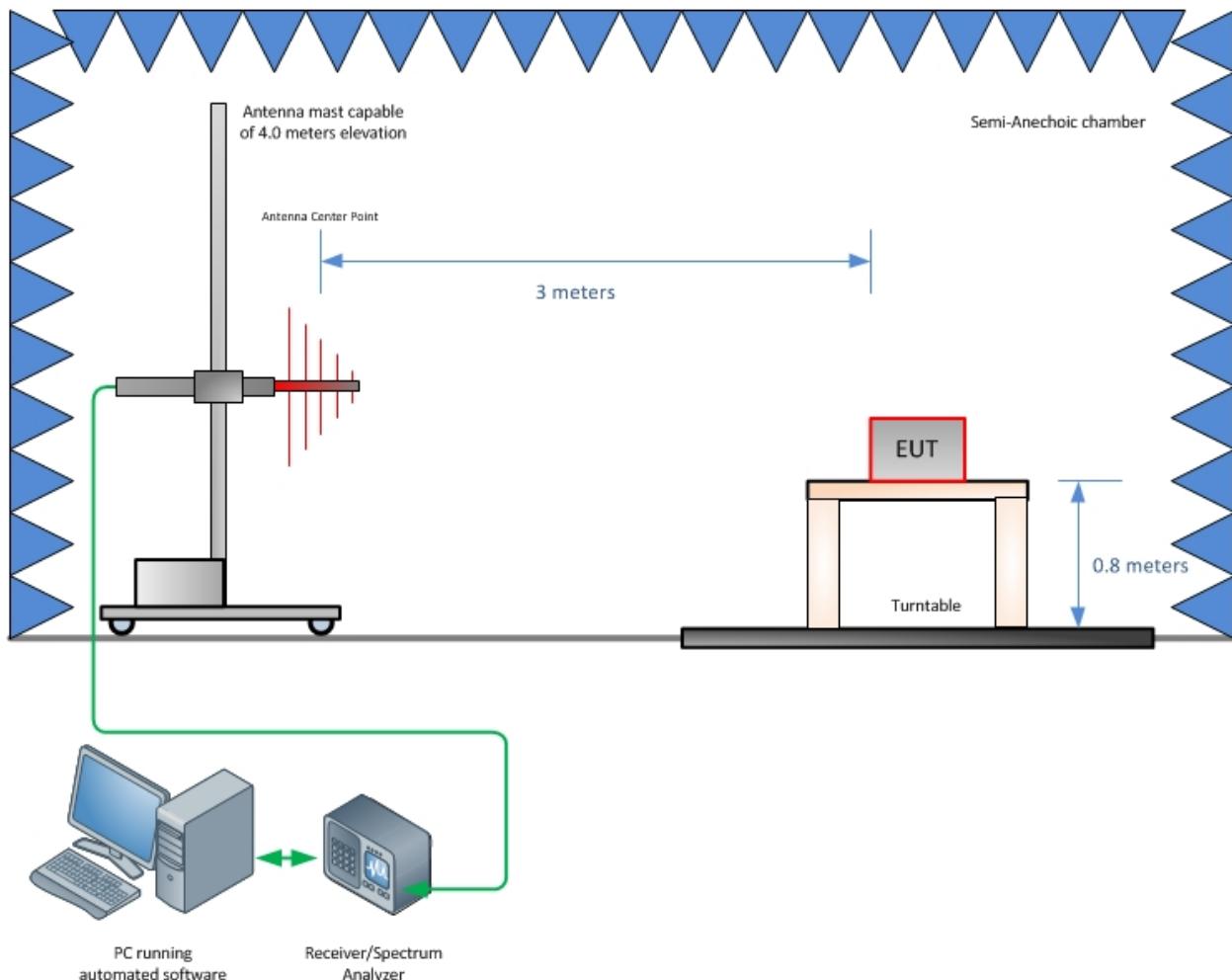
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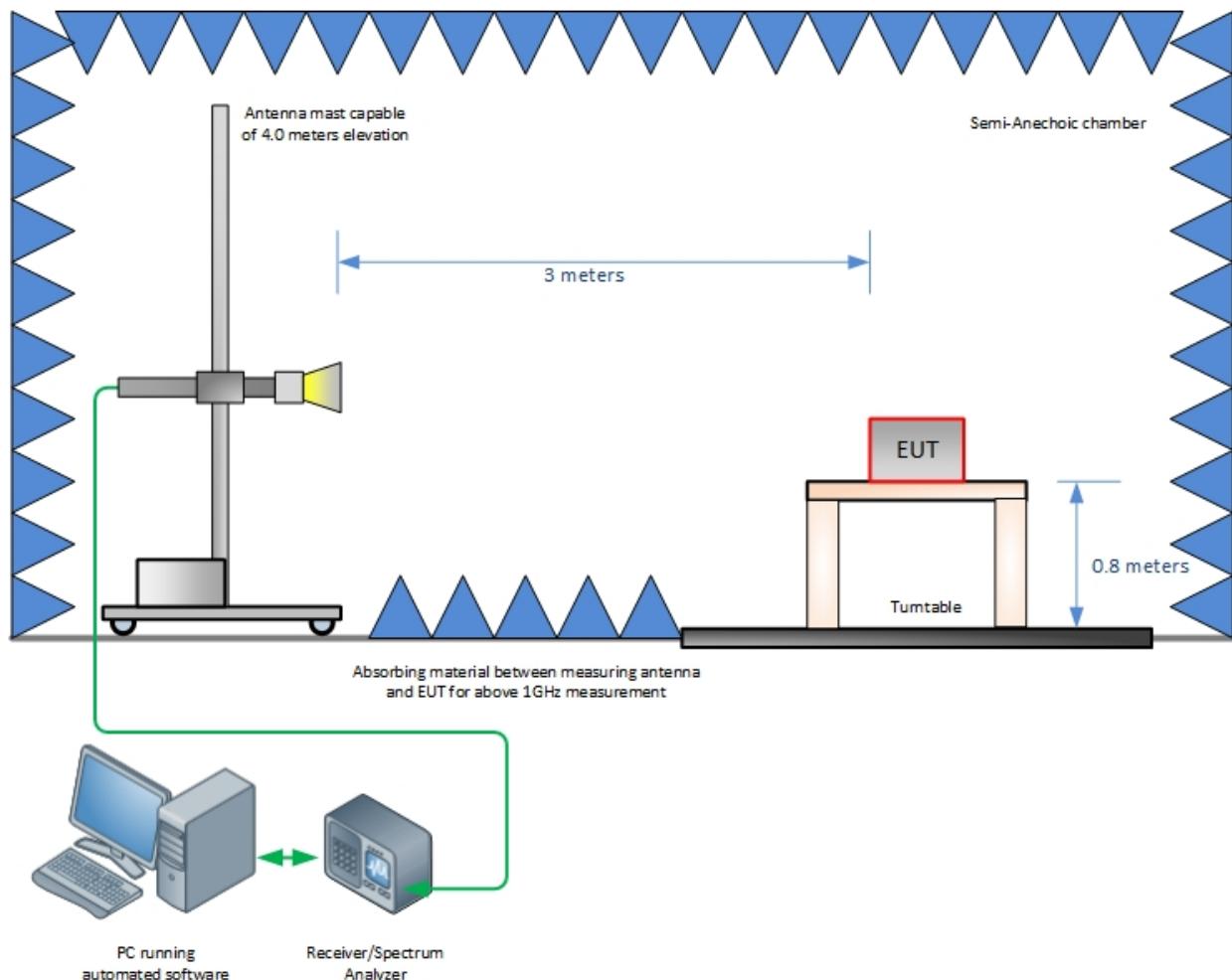
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DIAGRAM OF TEST SETUP

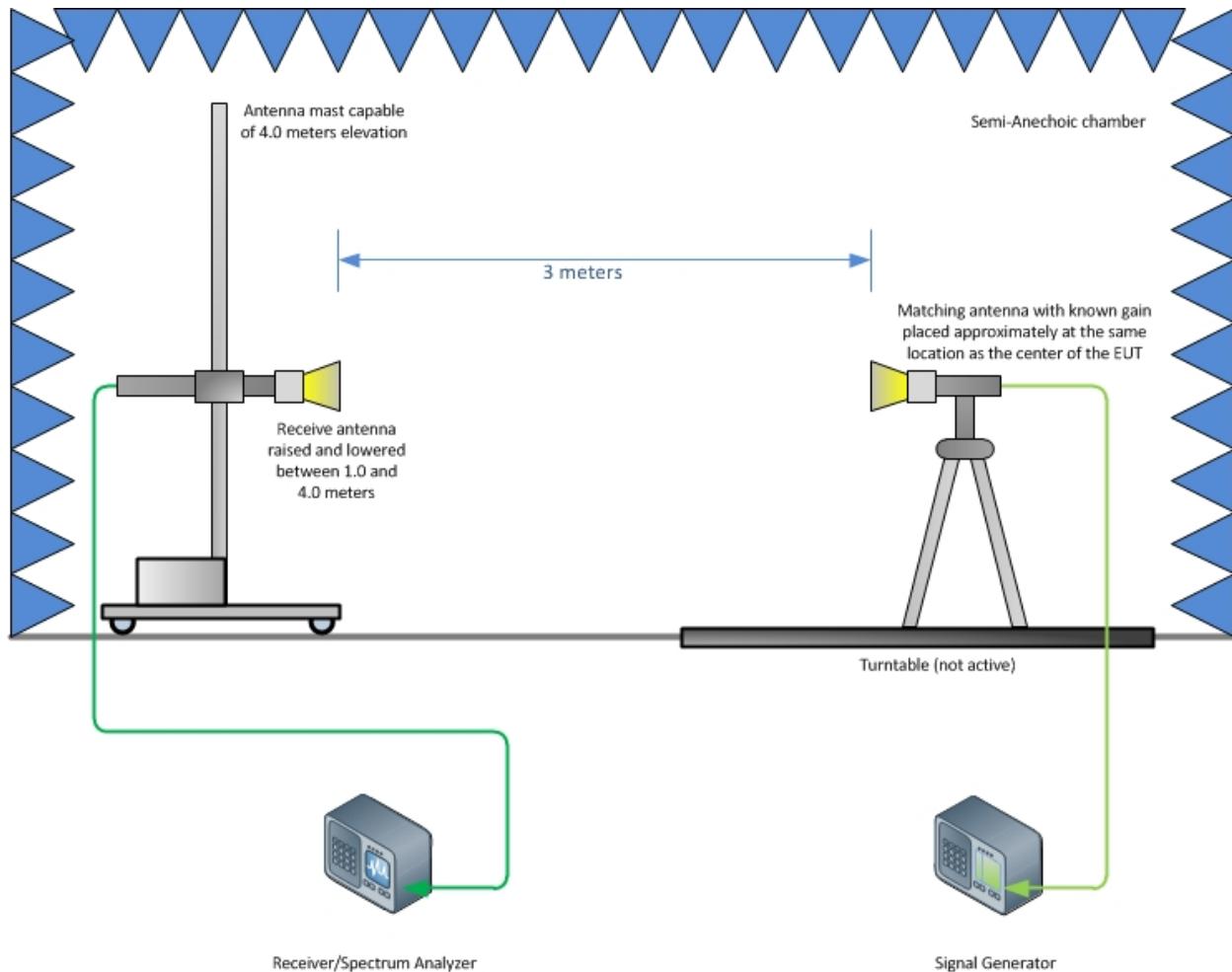
4.1 TEST SETUP DIAGRAM



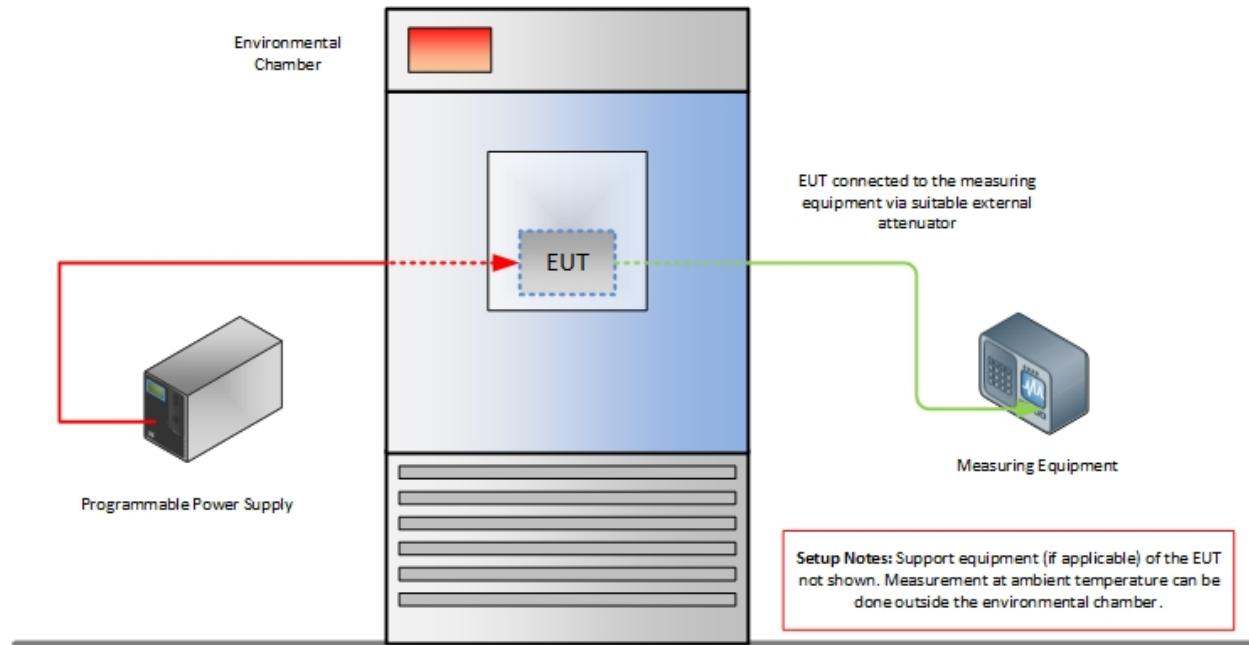
Radiated Emission Test Setup (Below 1GHz)



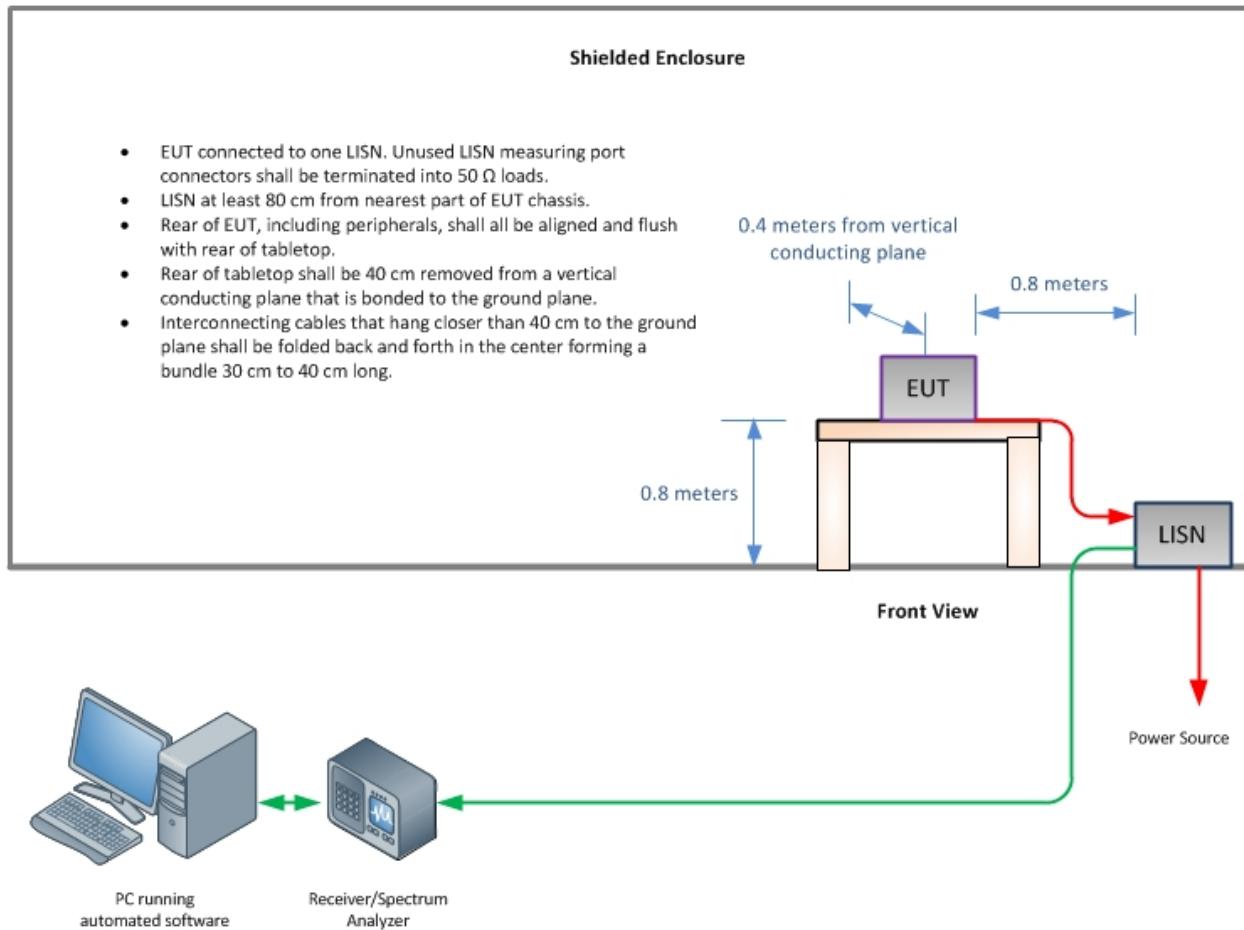
Radiated Emission Test Setup (Above 1GHz)



Substitution Test Method (Above 1GHz, if applicable)



Frequency Stability Test Configuration



Conducted Emissions Test Configuration (if applicable)

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ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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