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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, Part 27
IC RSS-Gen and RSS-139

Report No. SD72116210-0416G June 2016

REPORT ON	EMC Evaluation of the Nextivity Inc. Cel-Fi DUO RAINIER Smart Cellular Signal Booster
TEST REPORT NUMBER	SD72116210-0416G
TEST REPORT DATE	June 2016
PREPARED FOR	Nextivity Inc. 12230 World Trade Drive, Suite 250 San Diego, CA 92128
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DATED	June 03, 2016

Revision History

SD72116210-0416G 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
06/03/16	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, Part 27 and IC RSS-Gen and RSS-139.

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 Name	Cel-Fi DUO RAINIER
Model Number(s)	D32-2/12/66
FCC ID	YETD32-21266NU and YETD32-21266CU
IC Number	9298A-D3221266NU and 9298A-D3221266CU
Serial Number(s)	296546000554 (NU) and 29754000407 (CU)
Number of Samples Tested	2
Test Specification/Issue/Date	• FCC CFR 47 Part 2, Part 27 (October 1, 2015). • RSS-139 - Advanced Wireless Services (AWS) Equipment Operating in the bands 1710-1780 MHz and 2110-2180 MHz (Issue 3, July 2015). • 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 04, 2016
Name of Engineer(s)	Xiaoying Zhang Ferdinand Custodio
Related Document(s)	• 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 Transmitters • KDB412172 (D01 Determining ERP and EIRP v01r01) Guidelines for Determining the Effective Radiated Power (ERP) and Equivalent Isotropically Radiated Power (EIRP) of a RF Transmitting System. • SD72112724-0116I Nextivity FCC IC Part 27 B4 Test Report.docx (issued by TÜV SÜD America San Diego June 2016). • 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, Part 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-139		
2.1	2.1046	27.50 (h)(1)	6.5	Transmitter Conducted Output Power	Compliant*
2.2	-	27.50 (h)(1)	6.5	Equivalent Isotropic Radiated Power	Compliant*
2.3	2.1049	27.53 (h)	RSS-Gen 6.6	Occupied Bandwidth	Compliant*
2.4	-	27.50 (d)(5)	6.5	Peak-Average Ratio	Compliant*
2.5	2.1051	27.53 (h)(1),(3)	6.6	Band Edge	Compliant*
2.6	2.1051	27.53 (h)(1),(3)	6.6	Conducted Spurious Emissions	Compliant*
2.7	2.1053	27.53 (h)(1)	6.6	Field Strength of Spurious Radiation	Compliant
2.8	2.1055	27.54	6.4	Frequency Stability	Compliant*
-	-	-	RSS-Gen 7.1	Receiver Spurious Emissions	N/A
2.9	-		RSS-Gen 8.8	Power Line Conducted Emission	Compliant*

*Compliant** *A variant of the EUT was previously approved under FCC IDs YETD32-21366NU and YETD32-21366CU under Model Number D32-2/13/66. The EUT is identical with this model with the exception of LTE Band 12 support. All antenna conducted port measurement for LTE Band 4 were from this variant and covered under test report SD72112724-0116I Nextivity FCC IC Part 27 B4 Test Report.docx.*

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 4 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	12V DC via external AC/DC adapter.
Mode Verified	LTE Band 4
Frequency Bands	NU: 1710 - 1780MHz CU: 2110 - 2180MHz
Channel Bandwidth	5MHz, 10MHz, 15MHz and 20MHz
Capability	LTE Band 2, 12, 4/UNII and BT-LE
Primary Unit (EUT)	☐ Production
	☒ Pre-Production
	☐ Engineering
Manufacturer Declared Temperature Range	0°C to 40°C
Antenna Type	PCB PIFA
Manufacturer	Nextivity Inc.
Antenna Model	N/A

Antenna Gain

NU	CU
2 dBi	2 dBi

1.3.3 Transmit Frequency Table

Mode	Channel Bandwidth (MHz)	Tx Frequency (MHz)	Emission Designator	EIRP(Part 27)	
				Max. Power (dBm)	Max. Power (W)
LTE Band 4 Downlink	5	2112.5 - 2152.5	4M23F9W	11.96	0.016
	10	2115 - 2150	8M80F9W	14.55	0.029
	15	2117.5 - 2147.5	13M4F9W	15.95	0.039
	20	**2120 - 2145**	**17M8F9W**	**17.64**	**0.058**
LTE Band 4 Uplink	5	1712.5 - 1752.5	4M23F9W	23.77	0.238
	10	1715 - 1750	8M80F9W	23.59	0.229
	15	1717.5 - 1747.5	13M4F9W	23.14	0.206
	20	**1720 - 1745**	**17M8F9W**	**23.75**	**0.237**

1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

Test Configuration	Description
A	Downlink (CU TX). Input signal is applied to B4 antenna port of NU. Output is monitored from B4 Top antenna port of CU.
B	Uplink (NU TX). Input signal is applied to B4 antenna port of CU. Output is monitored from B4 Top antenna port of NU.
C	Radiated test setup. Downlink (CU TX). Input signal is applied to B4 antenna port of NU. B4 Top antenna port of CU is terminated with a 50Ω load.
D	Radiated test setup. Uplink (NU TX). Input signal is applied to B4 antenna port of CU. B4 Top antenna port of NU is terminated with a 50Ω load.

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

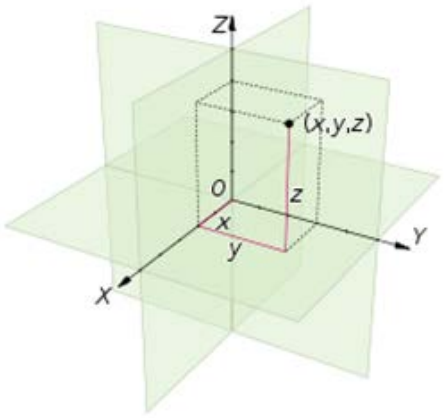
Manufacturer	Equipment/Cable	Description
Hon-Kwang	I.T.E Power Supply (2X)	Model HK-AX-120A167-US S/N: FB0000101 and FB0000075
-	Support USB cable	1.75 meters, shielded Type A to Micro B connector
Nextivity	Support USB cable	Custom 1.0 meter shielded USB Type A to DB9 for the Shielded Test Enclosure
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 3042 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). This is for single channel verification, otherwise all three channels (Low, Mid and High) are verified:

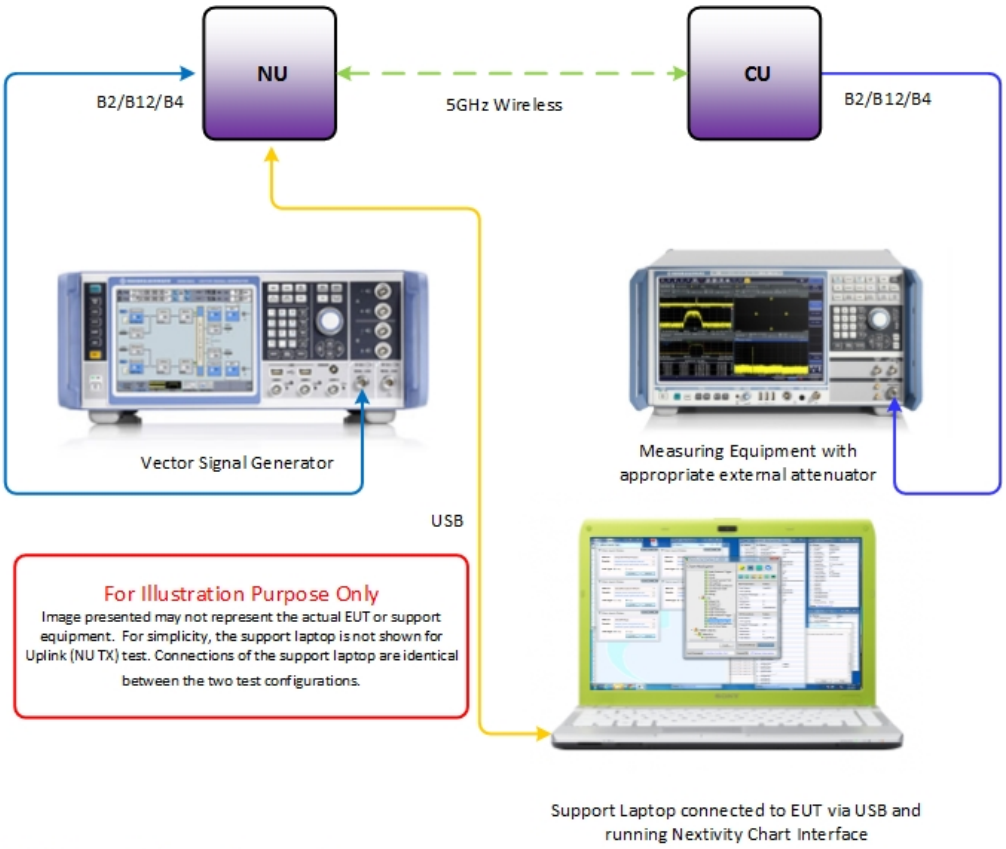
Mode	Bandwidth	Channel No.	Frequency
LTE Band 4 Downlink	20MHz	Top Channel 2300	2145MHz
LTE Band 4 Uplink	20MHz	Top Channel 20300	1745MHz

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.



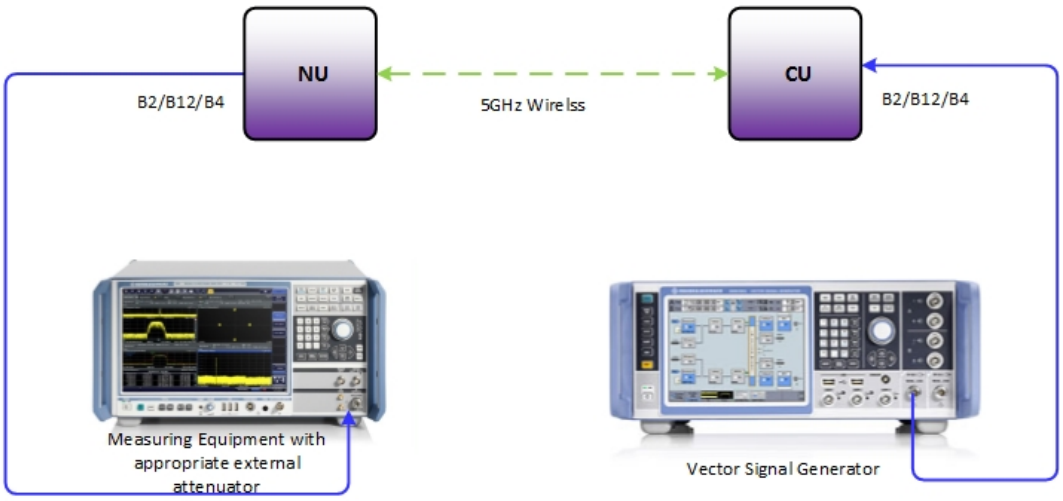
1.4.5 Simplified Test Configuration Diagram

Downlink (CU Tx) Conducted Test

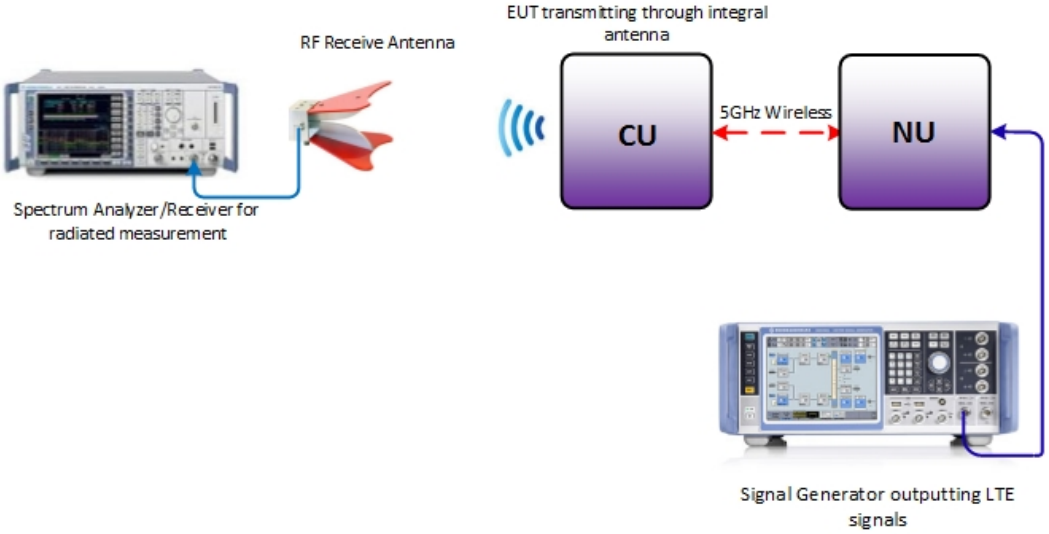


Support Laptop connected to EUT via USB and running Nextivity Chart Interface

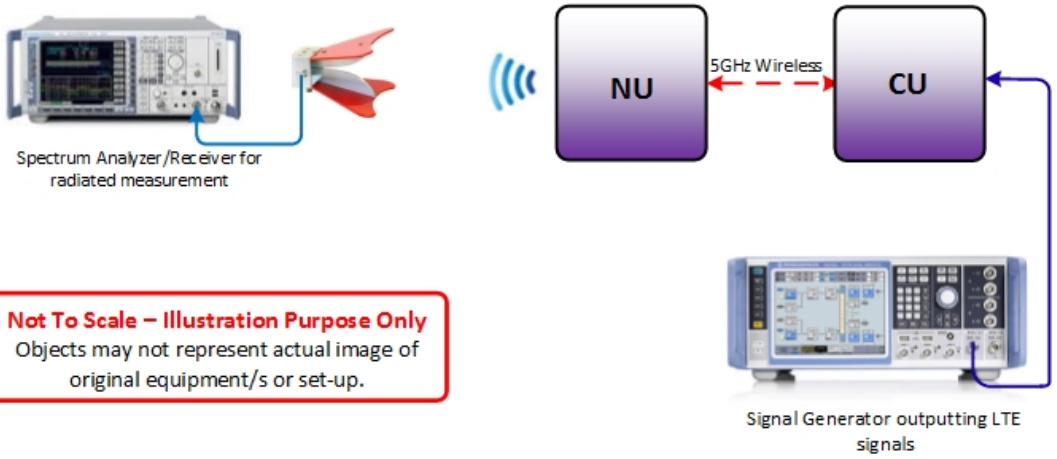
Uplink (NU Tx) Conducted Test



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)		
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.

1.9.2 Innovation, Science and Economic Development Canada Registration No.: 3067A

The 10m Semi-anechoic chamber of TUV SUD 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.

TÜV SÜD AMERICA INC 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone: 858 678 1400 FAX: 858 546 0364

1.10 SAMPLE CALCULATIONS

1.10.1 LTE Emission Designator

Emission Designator = 1M30F9W
F = Frequency Modulation
9= Composite Digital Info
W = Combination (Audio/Data)

1.10.2 Spurious Radiated Emission (below 1GHz)

Measuring equipment raw measurement (dBµV/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 (dBµV/m) @ 30MHz			**11.8**

1.10.3 Spurious Radiated Emission – Substitution Method

Example = 84dBµV/m @ 1413 MHz (numerical sample only)

The field strength reading of 84dBµV/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 84dBµV/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:

P_{EIRP} = -18 dBm + 7.8 dBi – 1dB
= 11.2 dBm
P_{ERP} = P_{EIRP} – 2.15 dB
= 11.2 dBm – 2.15 dB
= 9.05 dBm

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 (d)(2)
FCC 47 CFR Part 27, Clause 27.50 (d)(4)
RSS-139, Clause 6.5

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, Clause27.50(h)(1):
Main, booster and base stations. (i) The maximum EIRP of a main, booster or base station shall not exceed 33 dBW + 10log(X/Y) dBW, where X is the actual channel width in MHz and Y is either 6 MHz if prior to transition or the station is in the MBS following transition or 5.5 MHz if the station is in the LBS and UBS following transition, except as provided in paragraph (h)(1)(ii) of this section.

2.1.3 Equipment Under Test and Modification State

Please refer to test report SD72112724-0116I Nextivity FCC IC Part 27 B4 Test Report.docx for serial number/s and test configuration used.

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

June 01, 2016/XYZ

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	26.6°C
Relative Humidity	50.4%
ATM Pressure	98.9kPa

2.1.7 Additional Observations

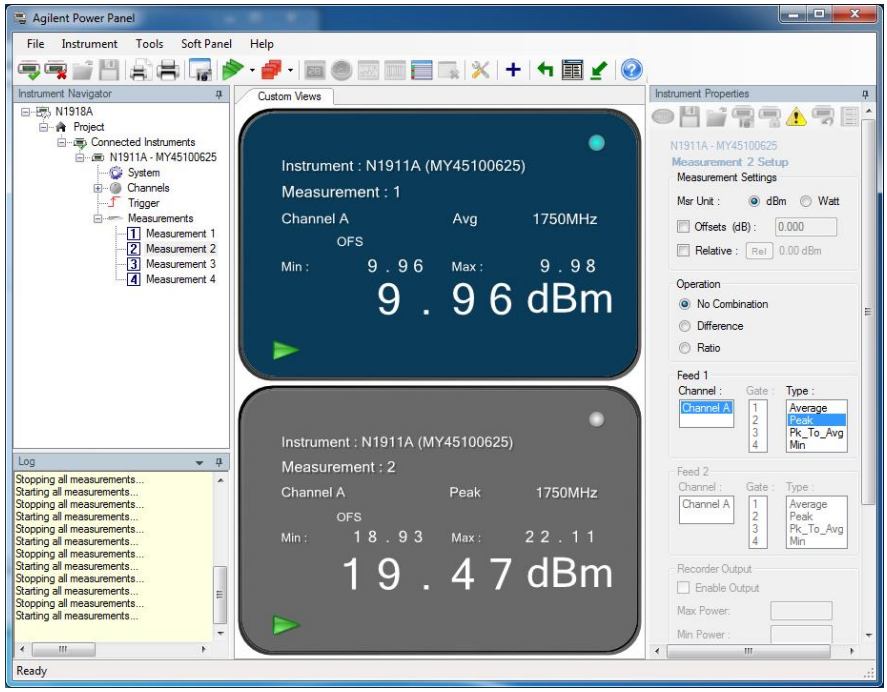
- This is a conducted test using an average power meter.
- The path loss was measured and entered as a level offset.
- Both Peak and Average measurements presented.

2.1.8 Test Results

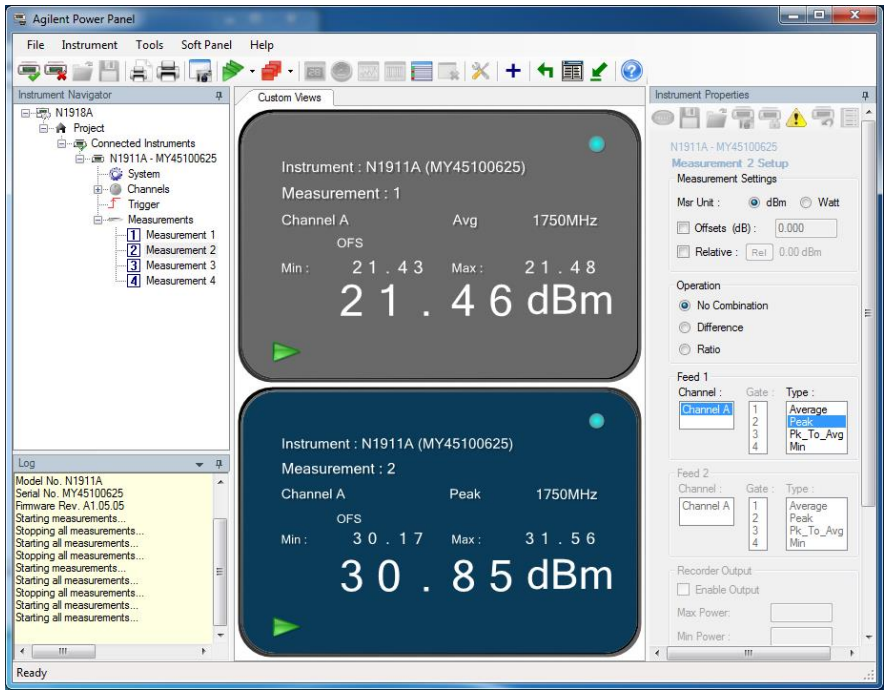
Downlink					
Band	**Bandwidth**	**Channel**	***Frequency (MHz)***	***Average Power (dBm)***	***Peak Power (dBm)***
LTE Band 4	5MHz	1975	2112.5	9.47	19.53
		2175	2132.5	9.96	19.47
		2375	2152.5	9.84	19.78
	10MHz	2000	2115	12.19	22.86
		2175	2132.5	12.55	22.74
		2350	2150	12.51	22.80
	15MHz	2025	2117.5	13.53	24.95
		2175	2132.5	13.95	25.89
		2325	2147.5	13.63	25.56
	20MHz	2050	2120	15.17	24.77
		2175	2132.5	15.63	24.82
		2300	**2145**	**15.64**	**25.83**

Uplink					
Band	**Bandwidth**	**Channel**	***Frequency (MHz)***	***Average Power (dBm)***	***Peak Power (dBm)***
LTE Band 4	5MHz	19975	1712.5	21.61	30.35
		20175	1732.5	21.46	30.85
		20375	1752.5	21.77	31.06
	10MHz	20000	1715	21.59	30.65
		20175	1732.5	21.34	30.66
		20350	1750	21.62	30.75
	15MHz	20025	1717.5	21.14	31.88
		20175	1732.5	20.85	30.80
		20325	1747.5	21.02	30.80
	20MHz	20050	1720	21.73	31.41
		20175	1732.5	21.44	31.23
		20300	**1745**	**21.75**	**30.91**

2.1.9 Sample Test Plot



LTE Band 4 DL 5MHz Bandwidth Mid Channel



LTE Band 4 UL 5MHz Bandwidth Mid Channel

2.2 EQUIVALENT ISOTROPIC RADIATED POWER

2.2.1 Specification Reference

FCC 47 CFR Part 27, Clause27.50(h)(1)
RSS-139, Clause 6.5

2.2.2 Standard Applicable

FCC 47 CFR Part 27, Clause27.50(h)(1):
Main, booster and base stations. (i) The maximum EIRP of a main, booster or base station shall not exceed 33 dBW + 10log(X/Y) dBW, where X is the actual channel width in MHz and Y is either 6 MHz if prior to transition or the station is in the MBS following transition or 5.5 MHz if the station is in the LBS and UBS following transition, except as provided in paragraph (h)(1)(ii) of this section.

2.2.3 Equipment Under Test and Modification State

Please refer to test report SD72112724-0116I Nextivity FCC IC Part 27 B4 Test Report.docx for serial number/s and test configuration used.

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

June 01, 2016/XYZ

2.2.5 Additional Observations

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

$$\mathbf{EIRP = P_T + G_T - L_C}$$

Where:

$\mathbf{P_T}$ = transmitter conducted output power dBm (Section 2.1 of this test report)
$\mathbf{G_T}$ = gain of the transmitting antenna, in dBi (EIRP);
$\mathbf{L_C}$ = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

2.2.6 Sample Computation

ERP $= P_T + G_T - L_C$
$= 23.19$ (Average) $+ 0.13$ (max. gain) $– 5.28$ (cable loss)
$= 18.04$ dBm

2.2.7 Additional Observations

Test results presented here is from SD72112724-0116I Nextivity FCC IC Part 27 B4 Test Report.docx (issued by TÜV SÜD America San Diego June 2016). See Section 1.2 for more details.

2.2.8 Test Results

Band 4 Downlink						
Bandwidth	**Channel**	**Frequency (MHz)**	**Conducted Power (dBm)**	**Antenna Gain (dBi)**	**EIRP (dBm)**	**Limit (dBm)**
5.0MHz	1975	2112.5	9.47	2	11.47	33
	2175	2132.5	9.96	2	11.96	33
	2375	2152.5	9.84	2	11.84	33
10MHz	2000	2115	12.19	2	14.19	33
	2175	2132.5	12.55	2	14.55	33
	2350	2150	12.51	2	14.51	33
15MHz	2025	2117.5	13.53	2	15.53	33
	2175	2132.5	13.95	2	15.95	33
	2325	2147.5	13.63	2	15.63	33
20.0MHz	2050	2120	15.17	2	17.17	33
	2175	2132.5	15.63	2	17.63	33
	2300	2145	15.64	2	17.64	33

Band 4 Uplink						
Bandwidth	**Channel**	**Frequency (MHz)**	**Conducted Power (dBm)**	**Antenna Gain (dBi)**	**EIRP (dBm)**	**Limit (dBm)**
5.0MHz	19975	1712.5	21.61	2	23.61	33
	20175	1732.5	21.46	2	23.46	33
	20375	1752.5	21.77	2	23.77	33
10MHz	20000	1715	21.59	2	23.59	33
	20175	1732.5	21.34	2	23.34	33
	20350	1750	21.62	2	23.62	33
15MHz	20025	1717.5	21.14	2	23.14	33
	20175	1732.5	20.85	2	22.85	33
	20325	1747.5	21.02	2	23.02	33
20.0MHz	20050	1720	21.73	2	23.73	33
	20175	1732.5	21.44	2	23.44	33
	20300	1745	21.75	2	23.75	33

2.3 OCCUPIED BANDWIDTH

2.3.1 Specification Reference

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

2.3.2 Standard Applicable

FCC 47 CFR Part 27, Clause 27.53(h)(3)
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.

2.3.1 Equipment Under Test and Modification State

Please refer to test report SD72112724-0116I Nextivity FCC IC Part 27 B4 Test Report.docx for serial number/s and test configuration used.

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

January 12, 13, and June 01, 2016/XYZ

2.3.3 Test Equipment Used

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

2.3.4 Environmental Conditions

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

Ambient Temperature	21.5 - 26.8°C
Relative Humidity	21.4 - 34.4%
ATM Pressure	99.1 - 100.0kPa

2.3.5 Additional Observations

- Test results presented here is from SD72112724-0116I Nextivity FCC IC Part 27 B4 Test Report.docx (issued by TÜV SÜD America San Diego June 2016). See Section 1.2 for more details.
- This is a conducted test. Both 26dB bandwidth and 99% bandwidth presented.
- All channels for emission bandwidth verification 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.
- Only test plots for middle channel were presented as the representative configuration.

- The SA built-in emission bandwidth measurement feature is utilized. The power level setting is set to 99% while "x dB" is set to -26.

2.3.6 Test Results

Downlink					
Band	**Bandwidth**	**Channel**	**Frequency (MHz)**	**OBW (MHz)**	**-26dB BW (MHz)**
LTE Band 4	5MHz	1975	2112.5	4.23	4.69
		2175	2132.5	4.23	4.66
		2375	2152.5	4.23	4.66
	10MHz	2000	2115	8.80	9.32
		2175	2132.5	8.80	9.32
		2350	2150	8.80	9.32
	15MHz	2025	2117.5	13.29	14.24
		2175	2132.5	13.29	14.15
		2325	2147.5	13.37	14.15
	20MHz	2050	2120	17.83	18.64
		2175	2132.5	17.83	19.33
		2300	2145	17.83	18.64

Uplink					
Band	**Bandwidth**	**Channel**	**Frequency (MHz)**	**OBW (MHz)**	**-26dB BW (MHz)**
LTE Band 4	5MHz	19975	1712.5	4.23	4.69
		20175	1732.5	4.23	4.66
		20375	1752.5	4.23	4.66
	10MHz	20000	1715	8.80	9.32
		20175	1732.5	8.74	9.32
		20350	1750	8.74	9.32
	15MHz	20025	1717.5	13.29	14.15
		20175	1732.5	13.29	14.15
		20325	1747.5	13.37	14.15
	20MHz	20050	1720	17.83	18.52
		20175	1732.5	17.83	18.64
		20300	1745	17.83	18.64

LTE Band 4 Downlink 5MHz Bandwidth Mid Channel 99% OBW

Date: 1.JUN.2016 16:20:22

LTE Band 4 Downlink 5MHz Bandwidth Mid Channel -26dB BW

Date: 1.JUN.2016 16:20:47

LTE Band 4 Downlink 10MHz Bandwidth Mid Channel 99% OBW

Date: 1.JUN.2016 16:14:27

LTE Band 4 Downlink 10MHz Bandwidth Mid Channel -26dB BW

Date: 1.JUN.2016 16:14:53

LTE Band 4 Downlink 15MHz Bandwidth Mid Channel 99% OBW

Date: 1.JUN.2016 16:07:32

LTE Band 4 Downlink 15MHz Bandwidth Mid Channel -26dB BW

Date: 1.JUN.2016 16:08:01

LTE Band 4 Downlink 20MHz Bandwidth Mid Channel 99% OBW

Date: 1.JUN.2016 15:57:07

LTE Band 4 Downlink 20MHz Bandwidth Mid Channel -26dB BW

Date: 1.JUN.2016 15:57:40

LTE Band 4 Uplink 5MHz Bandwidth Mid Channel 99% OBW

Date: 1.JUN.2016 13:57:44

LTE Band 4 Uplink 5MHz Bandwidth Mid Channel -26dB BW

Date: 1.JUN.2016 13:58:14

LTE Band 4 Uplink 10MHz Bandwidth Mid Channel 99% OBW

Date: 1.JUN.2016 13:33:55

LTE Band 4 Uplink 10MHz Bandwidth Mid Channel -26dB BW

Date: 1.JUN.2016 13:34:31

LTE Band 4 Uplink 15MHz Bandwidth Mid Channel 99% OBW

Date: 1.JUN.2016 13:23:06

LTE Band 4 Uplink 15MHz Bandwidth Mid Channel -26dB BW

Date: 1.JUN.2016 13:23:41

LTE Band 4 Uplink 20MHz Bandwidth Mid Channel 99% OBW

Date: 1.JUN.2016 13:15:59

LTE Band 4 Uplink 20MHz Bandwidth Mid Channel -26dB BW

Date: 1.JUN.2016 13:16:39

2.4 PEAK-AVERAGE RATIO

2.4.1 Specification Reference

FCC 47 CFR Part 27, Clause 27.50(d)(5)
RSS-139, Clause 6.5

2.4.2 Standard Applicable

(5) Equipment employed must be authorized in accordance with the provisions of § 24.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission approved average power technique or in compliance with paragraph (d)(6) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

2.4.1 Equipment Under Test and Modification State

Please refer to test report SD72112724-0116I Nextivity FCC IC Part 27 B4 Test Report.docx for serial number/s and test configuration used.

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

January 08, February 12, and June 01, 2016/XYZ

2.4.3 Test Equipment Used

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

2.4.4 Environmental Conditions

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

Ambient Temperature	21.9 - 26.8°C
Relative Humidity	21.4 - 43.3%
ATM Pressure	99.1 - 99.5kPa

2.4.5 Additional Observations

- Test results presented here is from SD72112724-0116I Nextivity FCC IC Part 27 B4 Test Report.docx (issued by TÜV SÜD America San Diego June 2016). See Section 1.2 for more details.
- This is a conducted test.
- Test procedure is per Section 5.7 of KDB971168 (D01 Power Meas License Digital Systems v02r02).
- The path loss was measured and entered as a level offset.

- 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.
- There are no measured PAR levels greater than 13dB. EUT complies.

2.4.6 Test Results

Downlink				
Band	**Bandwidth**	**Channel**	***Frequency (MHz)***	**PAR (dB)**
LTE Band 4	5MHz	1975	2112.5	7.61
		2175	2132.5	10.58
		2375	2152.5	12.16
	10MHz	2000	2115	7.65
		2175	2132.5	10.32
		2350	2150	10.77
	15MHz	2025	2117.5	8.35
		2175	2132.5	12.07
		2325	2147.5	12.00
	20MHz	2050	2120	7.81
		2175	2132.5	10.71
		2300	2145	10.44

Uplink				
Band	**Bandwidth**	**Channel**	***Frequency (MHz)***	**PAR (dB)**
LTE Band 4	5MHz	19975	1712.5	8.76
		20175	1732.5	9.44
		20375	1752.5	9.98
	10MHz	20000	1715	9.76
		20175	1732.5	9.70
		20350	1750	9.38
	15MHz	20025	1717.5	10.59
		20175	1732.5	9.99
		20325	1747.5	10.52
	20MHz	20050	1720	9.55
		20175	1732.5	10.18
		20300	1745	9.78

2.4.7 Sample Test Plot

LTE Band 4 Downlink 5MHz Bandwidth Mid Channel -PAR

Date: 1.JUN.2016 16:21:07

LTE Band 4 Downlink 10MHz Bandwidth Mid Channel -PAR

Date: 1.JUN.2016 16:15:15

LTE Band 4 Downlink 15MHz Bandwidth Mid Channel -PAR

Date: 1.JUN.2016 16:08:26

LTE Band 4 Downlink 20MHz Bandwidth Mid Channel -PAR

Date: 1.JUN.2016 15:58:04

LTE Band 4 Uplink 5MHz Bandwidth Mid Channel -PAR

Date: 1.JUN.2016 13:58:38

LTE Band 4 Uplink 10MHz Bandwidth Mid Channel -PAR

Date: 1.JUN.2016 13:35:06

LTE Band 4 Uplink 15MHz Bandwidth Mid Channel -PAR

Date: 1.JUN.2016 13:25:00

LTE Band 4 Uplink 20MHz Bandwidth Mid Channel -PAR

Date: 1.JUN.2016 13:18:01

2.5 BAND EDGE

2.5.1 Specification Reference

FCC 47 CFR Part 27, Clause 27.53 (h)(1),(3)
RSS-139, Clause 6.6

2.5.2 Standard Applicable

(h) AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695–1710 MHz, 1710–1755 MHz, 1755–1780 MHz, 1915–1920 MHz, 1995–2000 MHz, 2000–2020 MHz, 2110–2155 MHz, 2155–2180 MHz, and 2180–2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}$ (P) dB.

2.5.1 Equipment Under Test and Modification State

Please refer to test report SD72112724-0116I Nextivity FCC IC Part 27 B4 Test Report.docx for serial number/s and test configuration used.

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

January 12, 13 and June 01, 2016/XYZ

2.5.3 Test Equipment Used

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

2.5.4 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	21.5 - 26.8°C
Relative Humidity	21.4 - 34.4%
ATM Pressure	99.1 - 100.0kPa

2.5.5 Additional Observations

- Test results presented here is from SD72112724-0116I Nextivity FCC IC Part 27 B4 Test Report.docx (issued by TÜV SÜD America San Diego June 2016). See Section 1.2 for more details.
- This is a conducted test.
- Test guidance is per Section 6 of KDB971168 (D01 Power Meas License Digital Systems v02r02).
- The path loss was measured and entered as a level offset.
- For band edge measurements, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter was employed.
- The limit is set to -13dBm.

2.5.6 Test Results

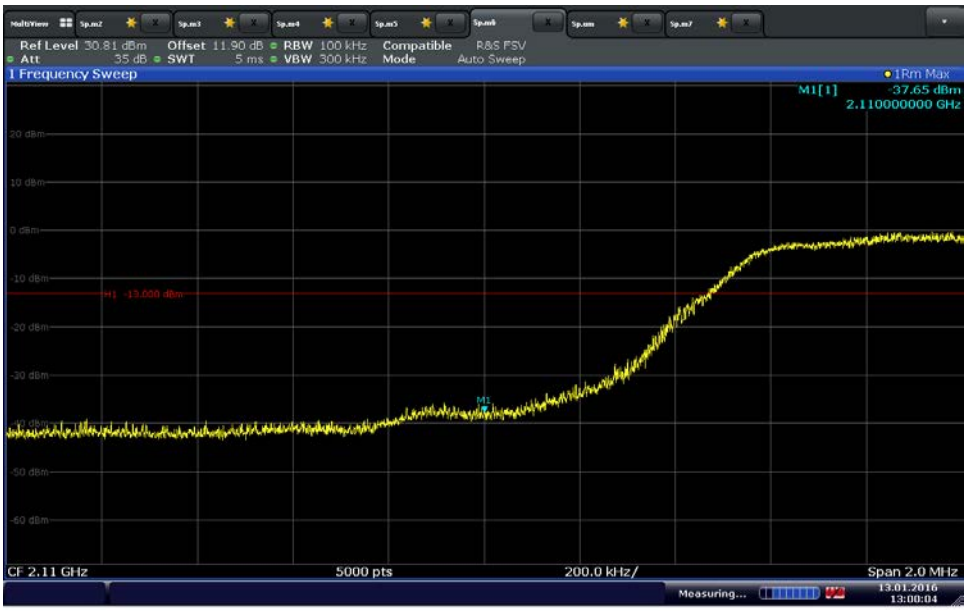
LTE Band 4 Downlink 5MHz Bandwidth Low Channel Band Edge

Date: 13.JAN.2016 13:20:39

LTE Band 4 Downlink 5MHz Bandwidth High Channel Band Edge

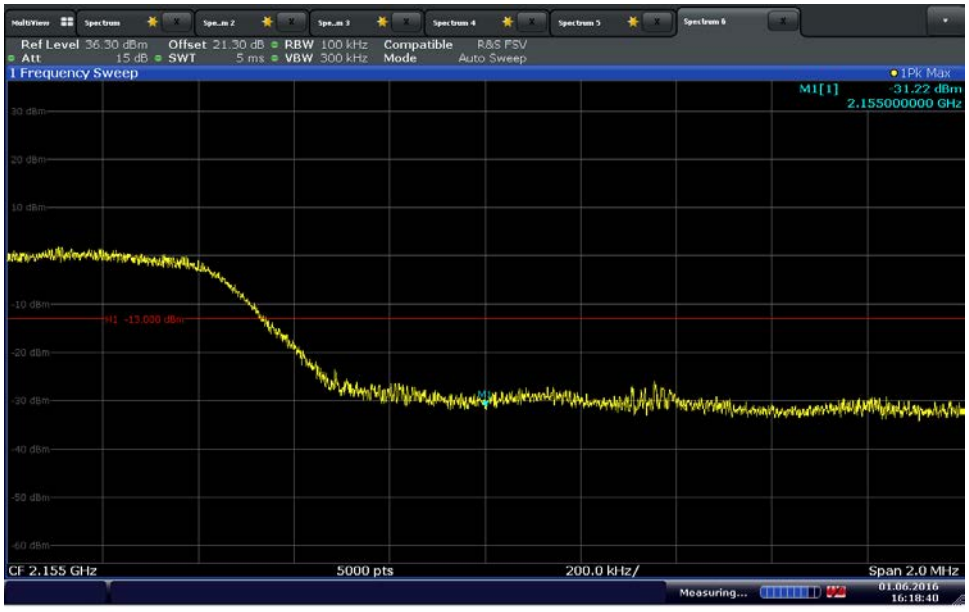
Date: 1.JUN.2016 16:25:00

LTE Band 4 Downlink 10MHz Bandwidth Low Channel Band Edge



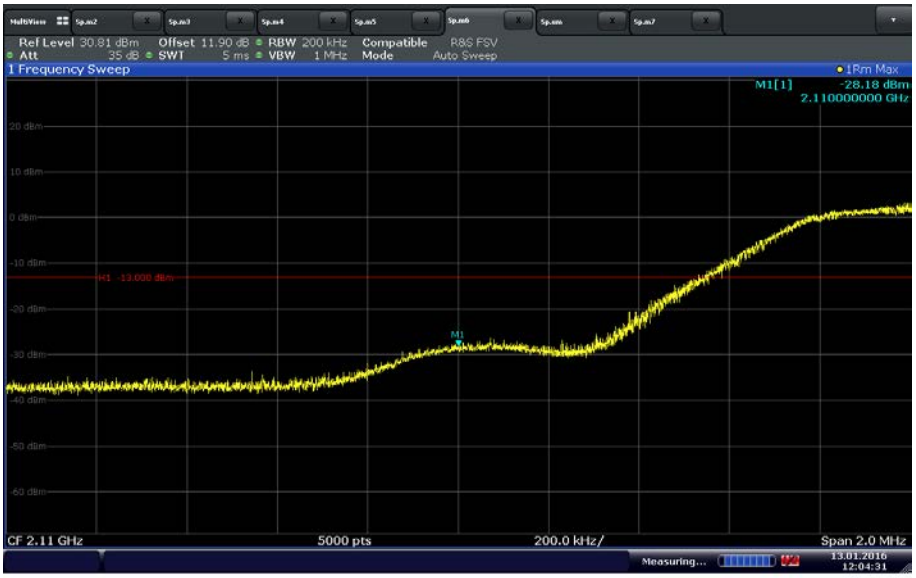
Date: 13.JAN.2016 13:00:04

LTE Band 4 Downlink 10MHz Bandwidth High Channel Band Edge



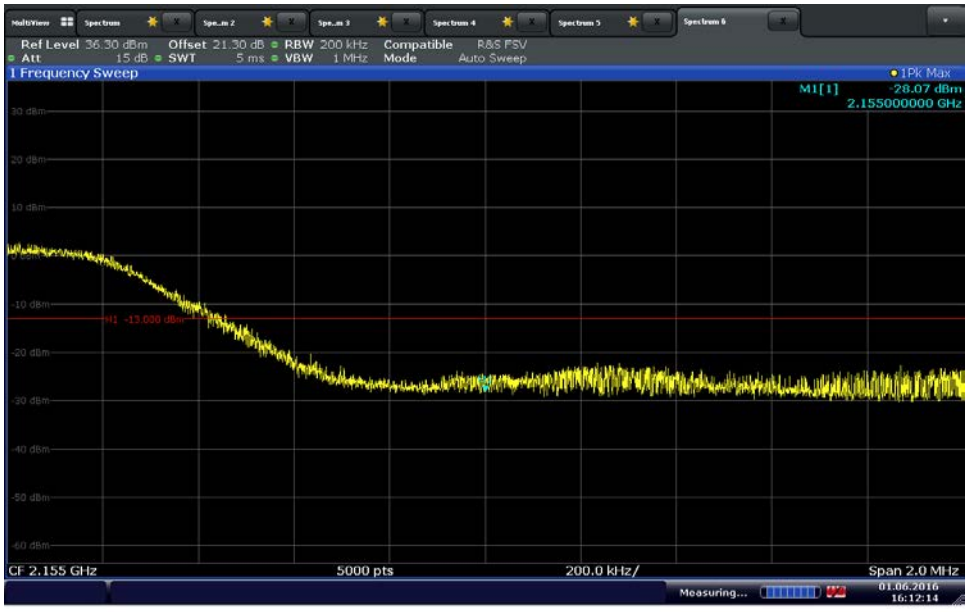
Date: 1.JUN.2016 16:18:39

LTE Band 4 Downlink 15MHz Bandwidth Low Channel Band Edge



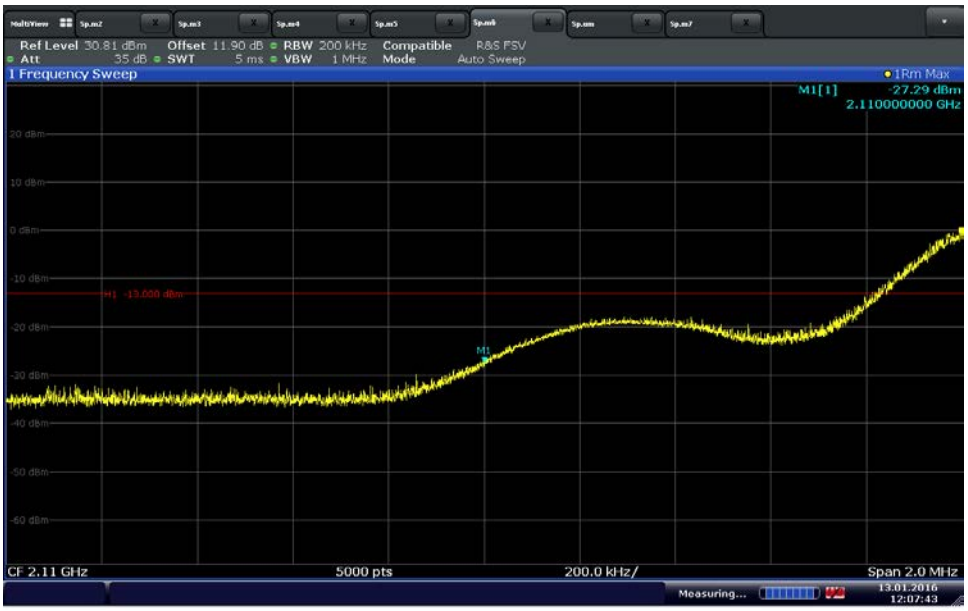
Date: 13.JAN.2016 12:04:32

LTE Band 4 Downlink 15MHz Bandwidth High Channel Band Edge



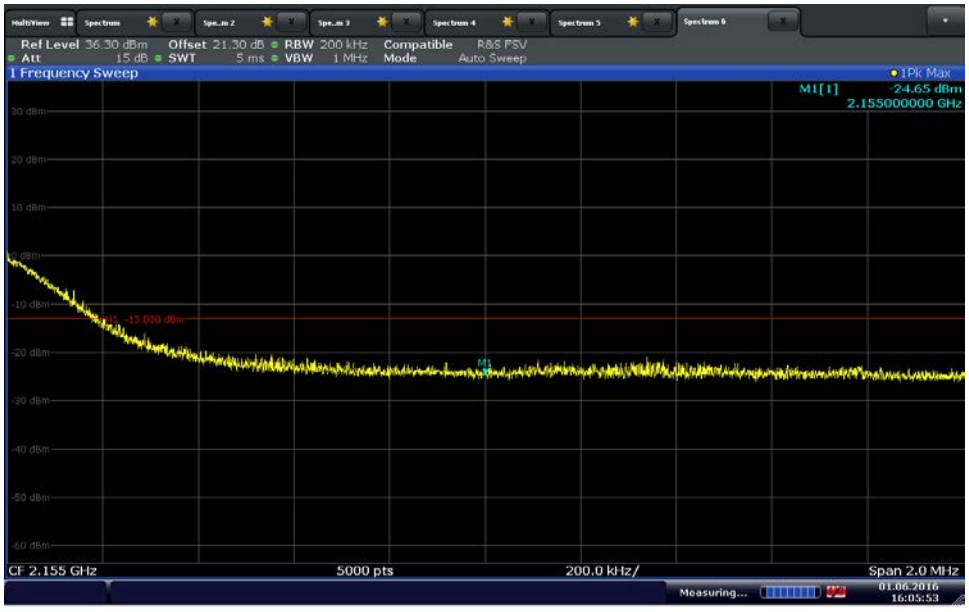
Date: 1.JUN.2016 16:12:14

LTE Band 4 Downlink 20MHz Bandwidth Low Channel Band Edge



Date: 13.JAN.2016 12:07:43

LTE Band 4 Downlink 20MHz Bandwidth High Channel Band Edge



Date: 1.JUN.2016 16:05:54

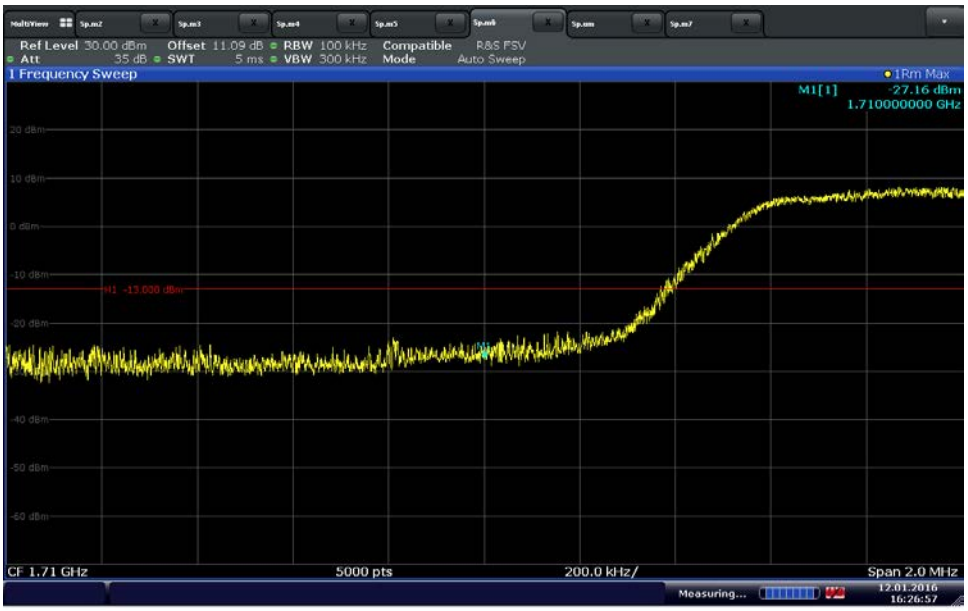
LTE Band 4 Uplink 5MHz Bandwidth Low Channel Band Edge

Date: 12.JAN.2016 16:17:33

LTE Band 4 Uplink 5MHz Bandwidth High Channel Band Edge

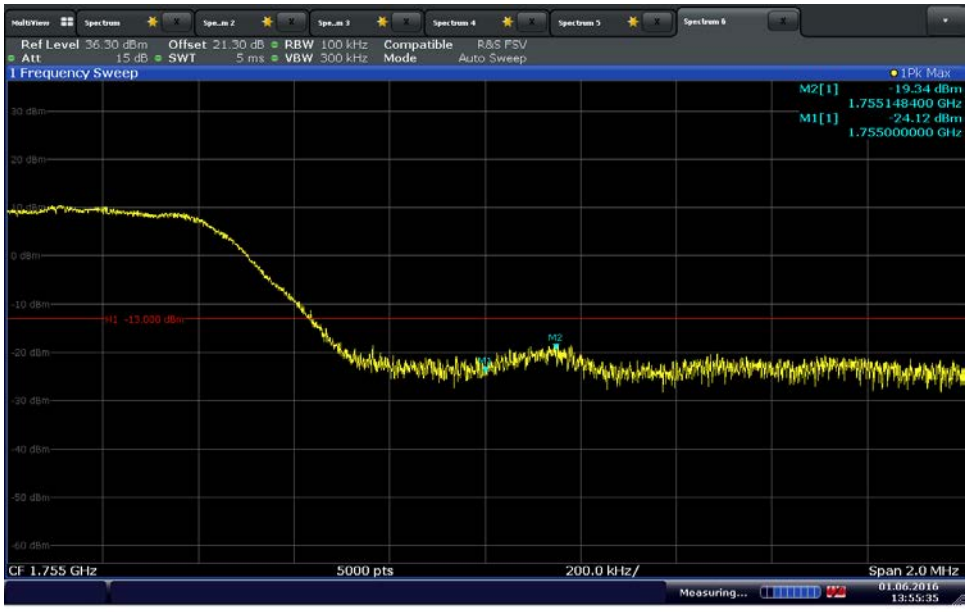
Date: 1.JUN.2016 14:06:22

LTE Band 4 Uplink 10MHz Bandwidth Low Channel Band Edge



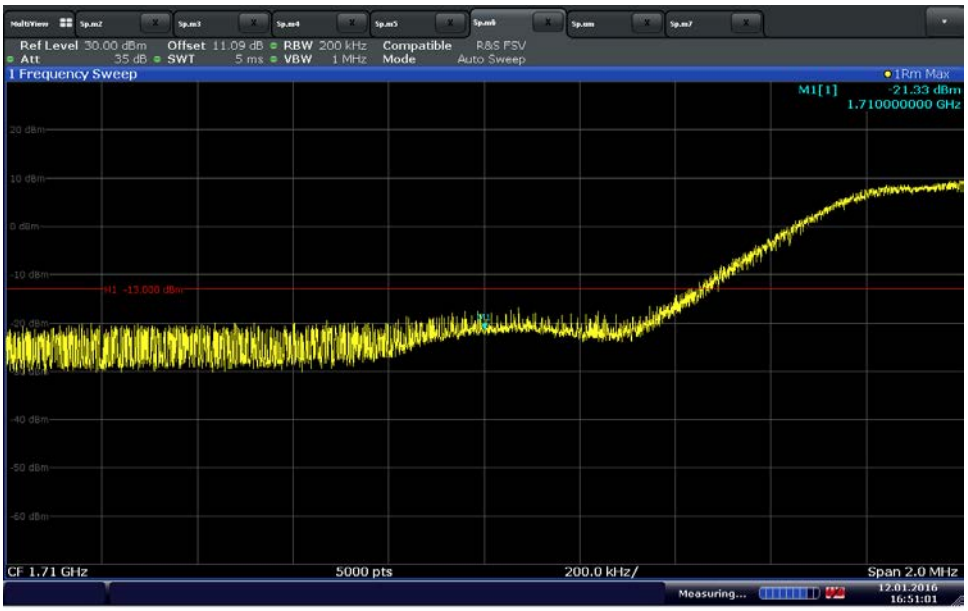
Date: 12.JAN.2016 16:26:58

LTE Band 4 Uplink 10MHz Bandwidth High Channel Band Edge



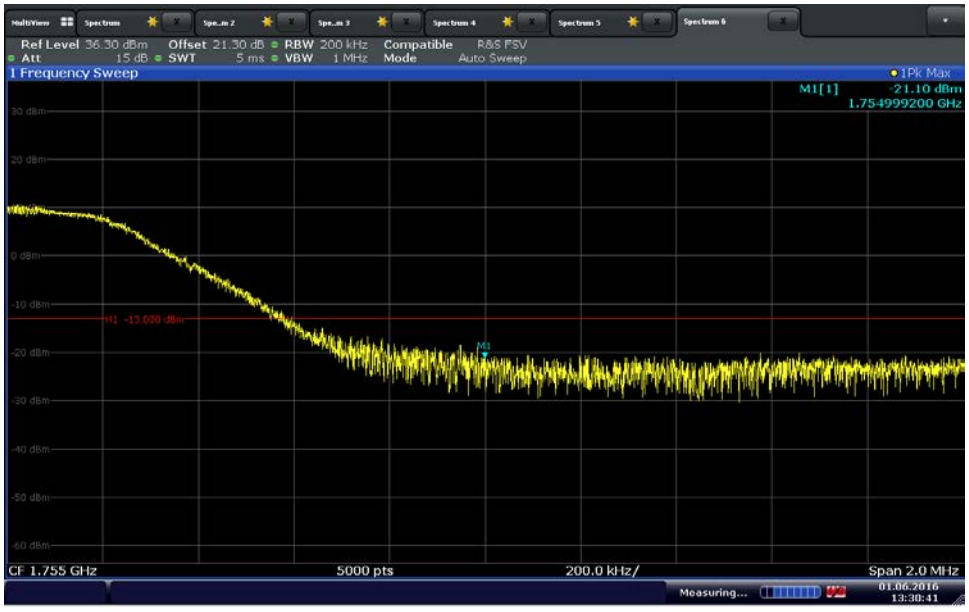
Date: 1.JUN.2016 13:55:35

LTE Band 4 Uplink 15MHz Bandwidth Low Channel Band Edge



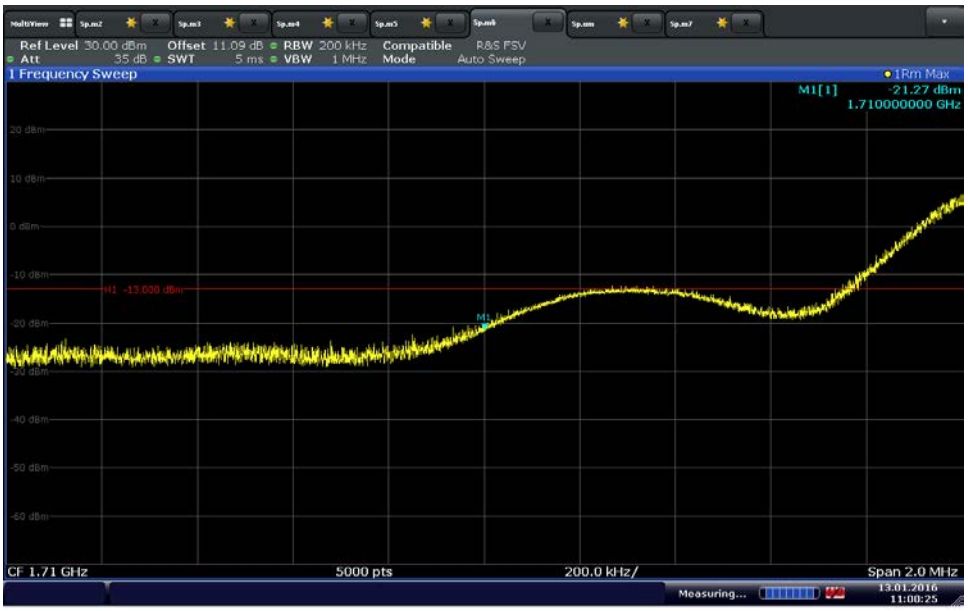
Date: 12.JAN.2016 16:51:01

LTE Band 4 Uplink 15MHz Bandwidth High Channel Band Edge



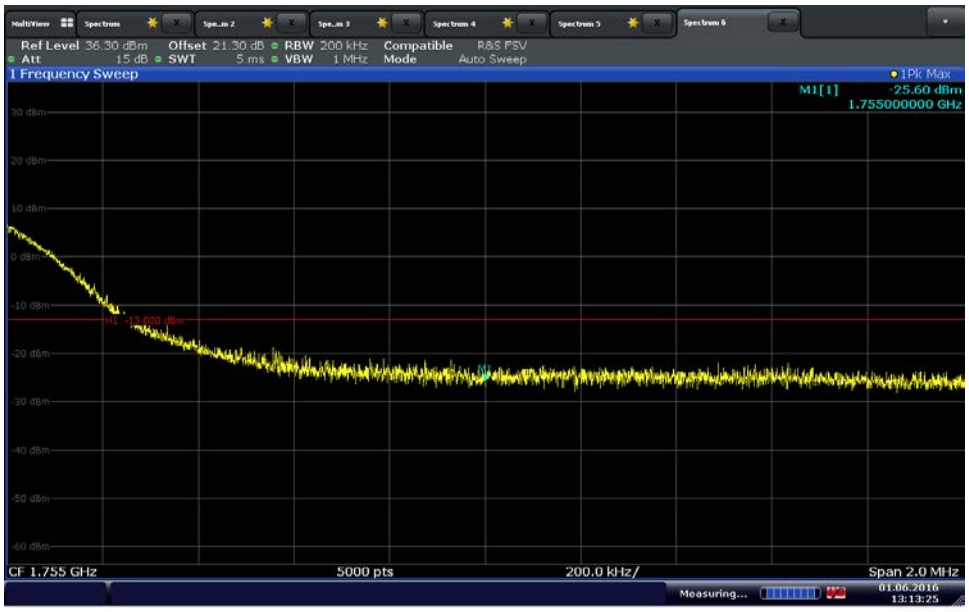
Date: 1.JUN.2016 13:30:42

LTE Band 4 Uplink 20MHz Bandwidth Low Channel Band Edge



Date: 13.JAN.2016 11:00:25

LTE Band 4 Uplink 20MHz Bandwidth High Channel Band Edge



Date: 1.JUN.2016 13:13:26

2.6 CONDUCTED SPURIOUS EMISSIONS

2.6.1 Specification Reference

FCC 47 CFR Part 27, Clause 27.53 (h)(1),(3)
RSS-139, Clause 6.6

2.6.2 Standard Applicable

(h) AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695–1710 MHz, 1710–1755 MHz, 1755–1780 MHz, 1915–1920 MHz, 1995–2000 MHz, 2000–2020 MHz, 2110–2155 MHz, 2155–2180 MHz, and 2180–2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}$ (P) dB.

2.6.1 Equipment Under Test and Modification State

Please refer to test report SD72112724-0116I Nextivity FCC IC Part 27 B4 Test Report.docx for serial number/s and test configuration used.

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

January 12, 13 and June 01, 2016/XYZ

2.6.3 Test Equipment Used

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

2.6.4 Environmental Conditions

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

Ambient Temperature	21.5 - 26.8°C
Relative Humidity	21.4 - 34.4%
ATM Pressure	99.1 - 100.0kPa

2.6.5 Additional Observations

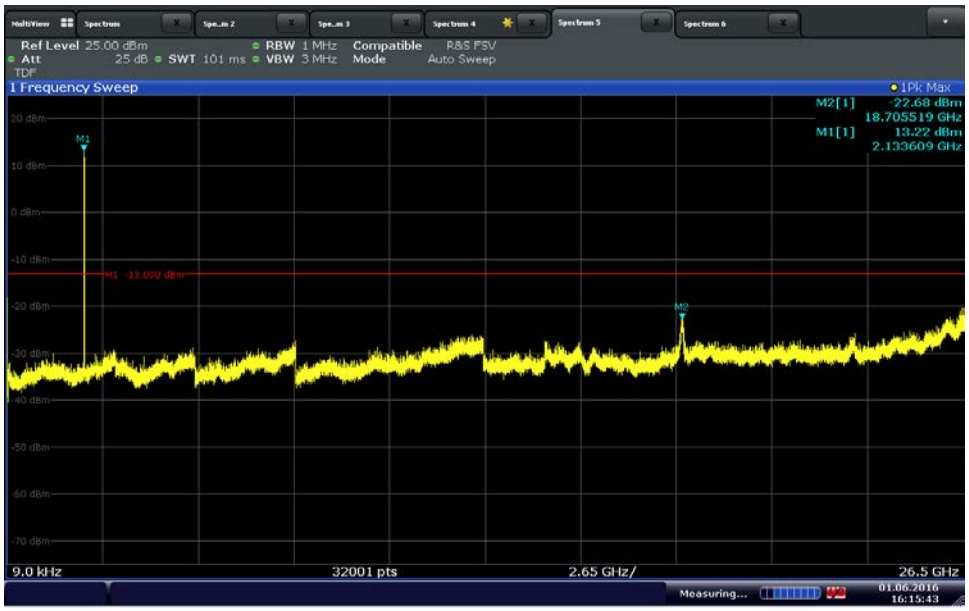
- Test results presented here is from SD72112724-0116I Nextivity FCC IC Part 27 B4 Test Report.docx (issued by TÜV SÜD America San Diego June 2016). See Section 1.2 for more details.
- This is a conducted test.
- The transducer factor (TDF) used is from the external attenuators and cables used.
- The spectrum was searched from 9 kHz to 26.5GHz (requirement is up to the 10th harmonic).
- Low, Middle and High Channels were verified. Only Middle Channel presented in this test report as the representative configuration.

2.6.6 Test Results

LTE Band 4 Downlink 5MHz Bandwidth Mid Channel Conducted Spurious Emissions

Date: 1.JUN.2016 16:21:42

LTE Band 4 Downlink 10MHz Bandwidth Mid Channel Conducted Spurious Emissions

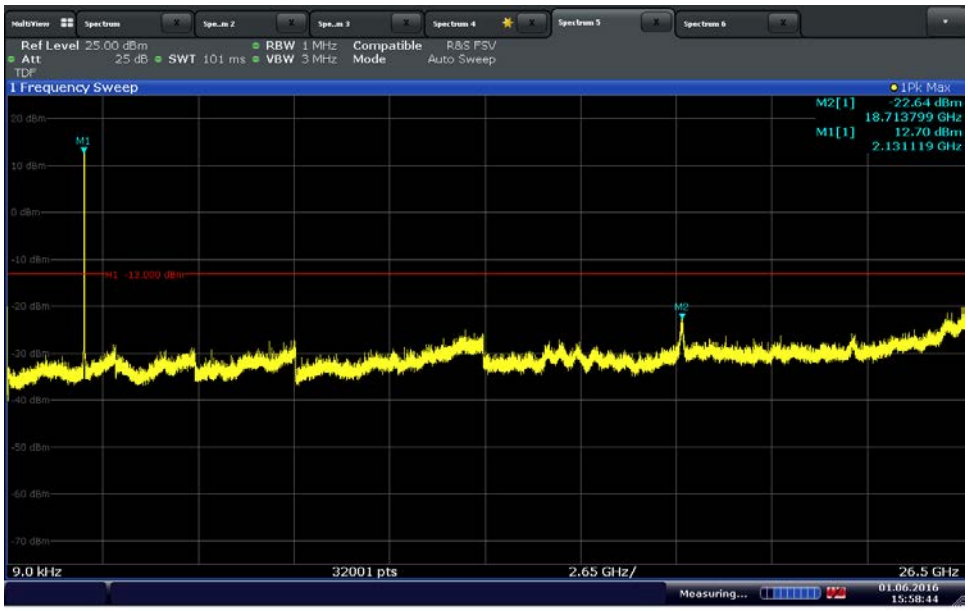


Date: 1.JUN.2016 16:15:43

LTE Band 4 Downlink 15MHz Bandwidth Mid Channel Conducted Spurious Emissions

Date: 1.JUN.2016 16:09:01

LTE Band 4 Downlink 20MHz Bandwidth Mid Channel Conducted Spurious Emissions

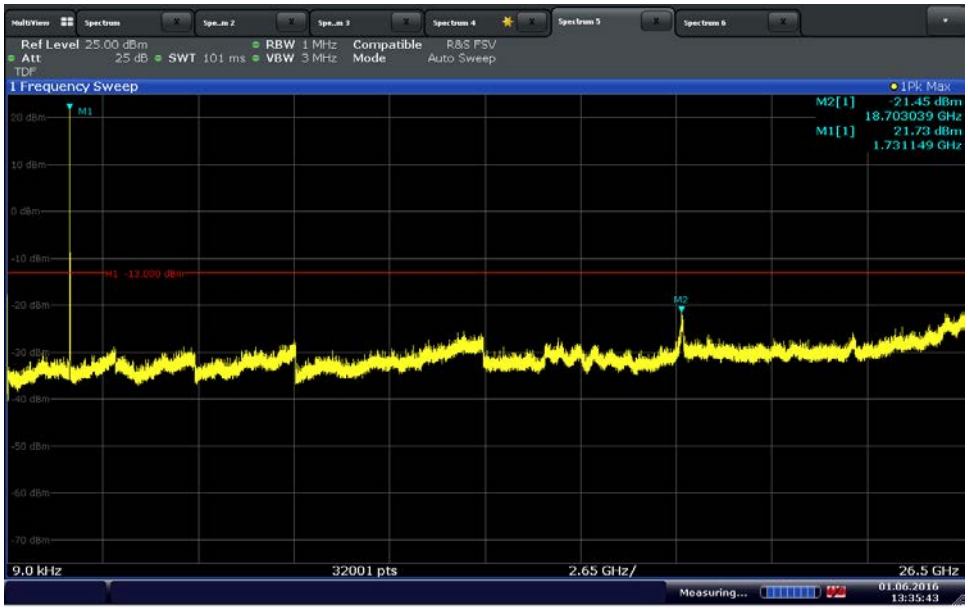


Date: 1.JUN.2016 15:58:44

LTE Band 4 Uplink 5MHz Bandwidth Mid Channel Conducted Spurious Emissions

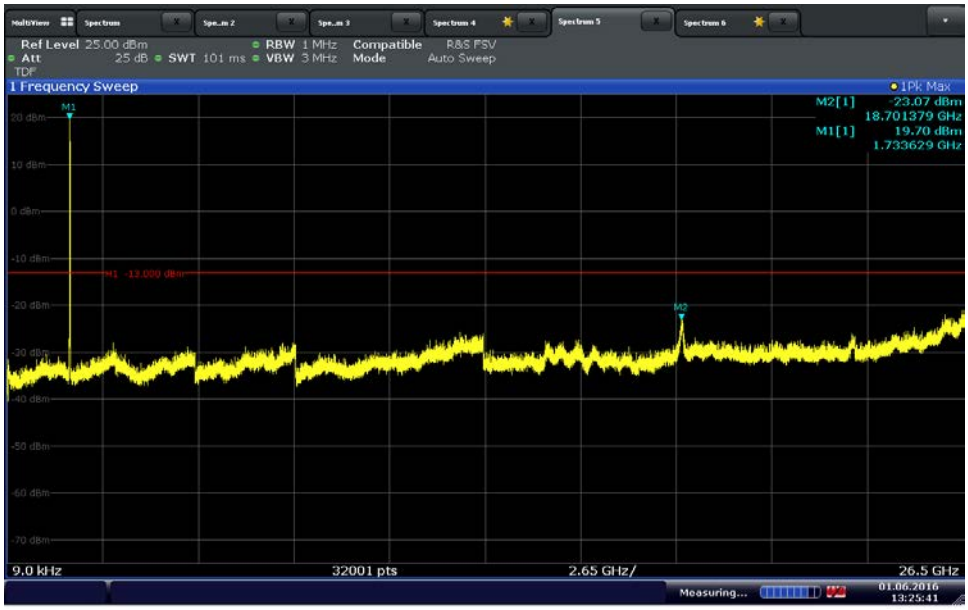
Date: 1.JUN.2016 13:59:12

LTE Band 4 Uplink 10MHz Bandwidth Mid Channel Conducted Spurious Emissions



Date: 1.JUN.2016 13:35:43

LTE Band 4 Uplink 15MHz Bandwidth Mid Channel Conducted Spurious Emissions



Date: 1.JUN.2016 13:25:42

LTE Band 4 Uplink 20MHz Bandwidth Mid Channel Conducted Spurious Emissions

Date: 1.JUN.2016 13:19:10

2.7 FIELD STRENGTH OF SPURIOUS RADIATION

2.7.1 Specification Reference

FCC 47 CRF Part 22, Clause 24.238(a)
RSS-139, Clause 6.6

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

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

May 04, 2016 / FSC

2.7.5 Test Equipment Used

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

2.7.6 Environmental Conditions

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

Ambient Temperature	26.7 °C
Relative Humidity	38.3 %
ATM Pressure	98.9 kPa

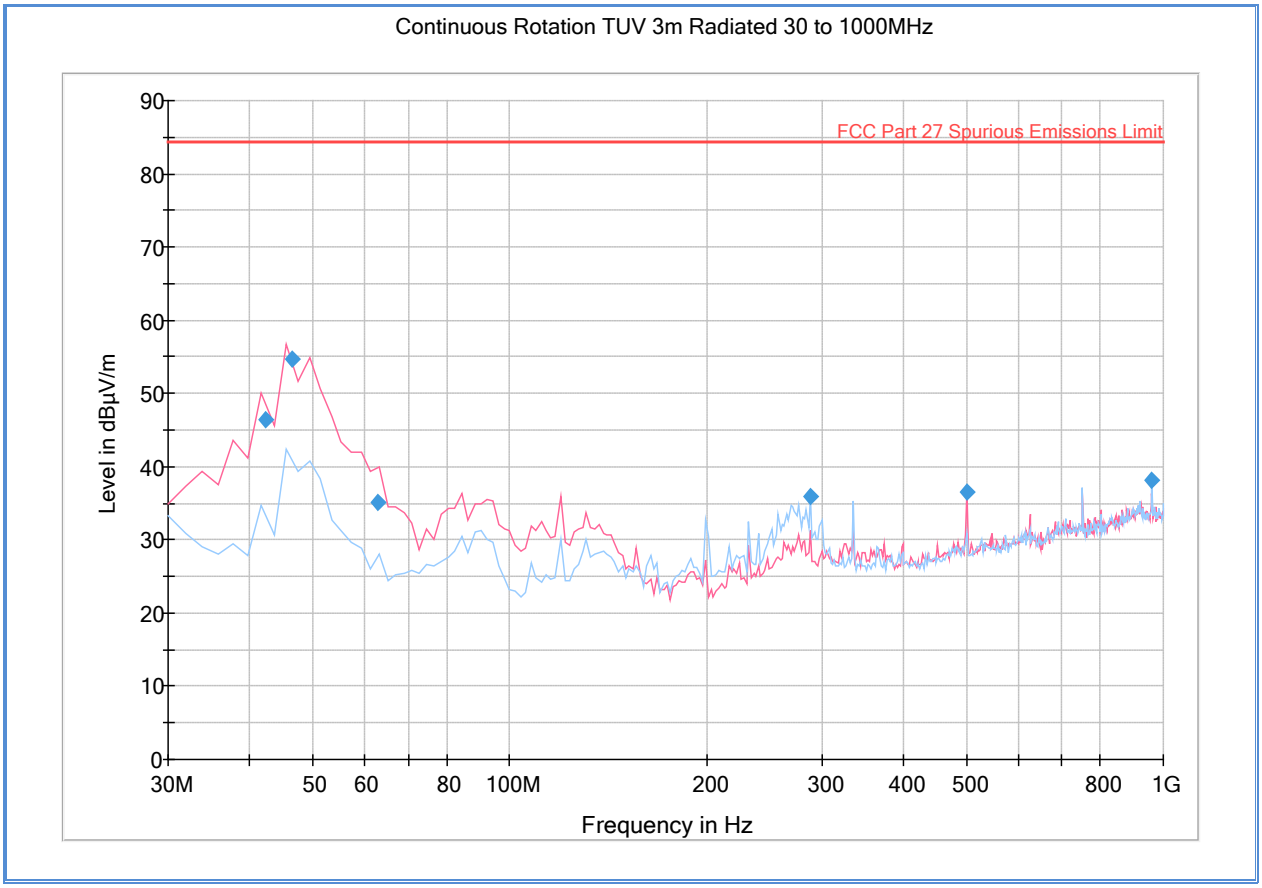
2.7.7 Additional Observations

- 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.

2.7.8 Test Results

See attached plots.

2.7.9 Test Results Below 1GHz (Downlink Worst Case Configuration) - 20MHz Bandwidth High Channel

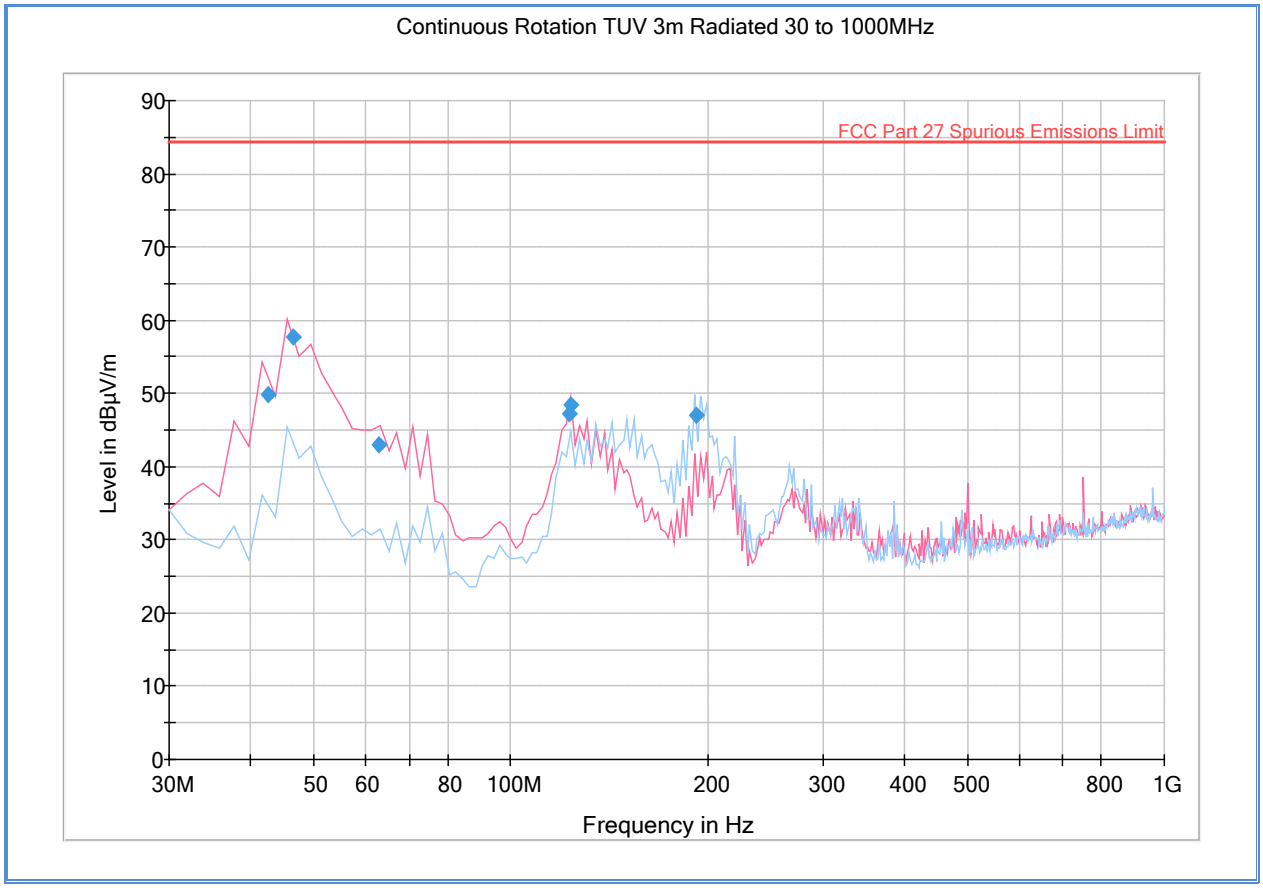


Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
42.383327	46.4	1000.0	120.000	100.0	V	144.0	-12.0	38.0	84.4
46.391102	54.6	1000.0	120.000	100.0	V	221.0	-13.4	29.8	84.4
62.806092	35.1	1000.0	120.000	100.0	V	18.0	-16.4	49.3	84.4
287.977074	35.9	1000.0	120.000	100.0	H	240.0	-7.9	48.5	84.4
500.020842	36.5	1000.0	120.000	129.0	V	1.0	-1.8	47.9	84.4
960.082244	38.2	1000.0	120.000	100.0	H	84.0	6.2	46.2	84.4

Test Notes: Only the 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.

2.7.10 Test Results Below 1GHz (Uplink Worst Case Configuration) - 20MHz Bandwidth High Channel

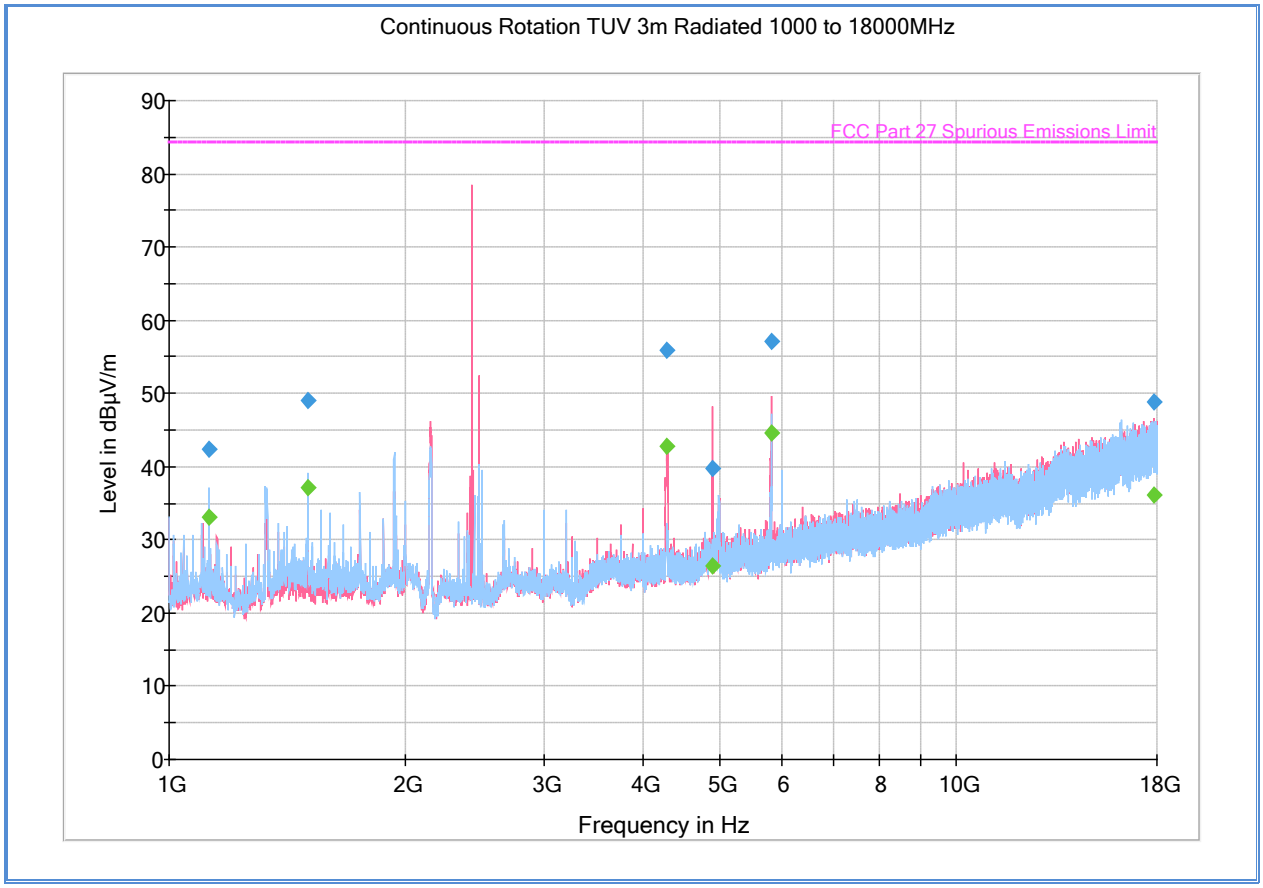


Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
42.423327	49.8	1000.0	120.000	100.0	V	184.0	-12.0	34.6	84.4
46.391102	57.6	1000.0	120.000	100.0	V	148.0	-13.4	26.8	84.4
62.806092	43.1	1000.0	120.000	100.0	V	117.0	-16.4	41.3	84.4
123.186613	47.2	1000.0	120.000	100.0	V	24.0	-15.4	37.2	84.4
123.202725	48.4	1000.0	120.000	100.0	V	151.0	-15.4	36.0	84.4
191.982685	47.0	1000.0	120.000	134.0	H	307.0	-11.1	37.4	84.4

Test Notes: Only the 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.

2.7.11 Test Results Above 1GHz (Downlink Worst Case Configuration) - 20MHz Bandwidth High Channel



Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1125.066667	42.3	1000.0	1000.000	132.7	H	79.0	-10.6	42.1	84.4
1500.000000	49.0	1000.0	1000.000	102.7	H	-9.0	-8.9	35.4	84.4
4289.866667	55.9	1000.0	1000.000	116.7	V	-16.0	-2.4	28.5	84.4
4904.900000	39.7	1000.0	1000.000	397.6	V	341.0	-0.7	44.7	84.4
5829.333333	57.1	1000.0	1000.000	201.5	V	57.0	1.3	27.3	84.4
17831.100000	48.8	1000.0	1000.000	397.6	V	20.0	16.7	35.6	84.4

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1125.066667	33.1	1000.0	1000.000	132.7	H	79.0	-10.6	51.3	84.4
1500.000000	37.1	1000.0	1000.000	102.7	H	-9.0	-8.9	47.3	84.4
4289.866667	42.7	1000.0	1000.000	116.7	V	-16.0	-2.4	41.7	84.4
4904.900000	26.3	1000.0	1000.000	397.6	V	341.0	-0.7	58.1	84.4
5829.333333	44.6	1000.0	1000.000	201.5	V	57.0	1.3	39.8	84.4
17831.100000	36.1	1000.0	1000.000	397.6	V	20.0	16.7	48.3	84.4

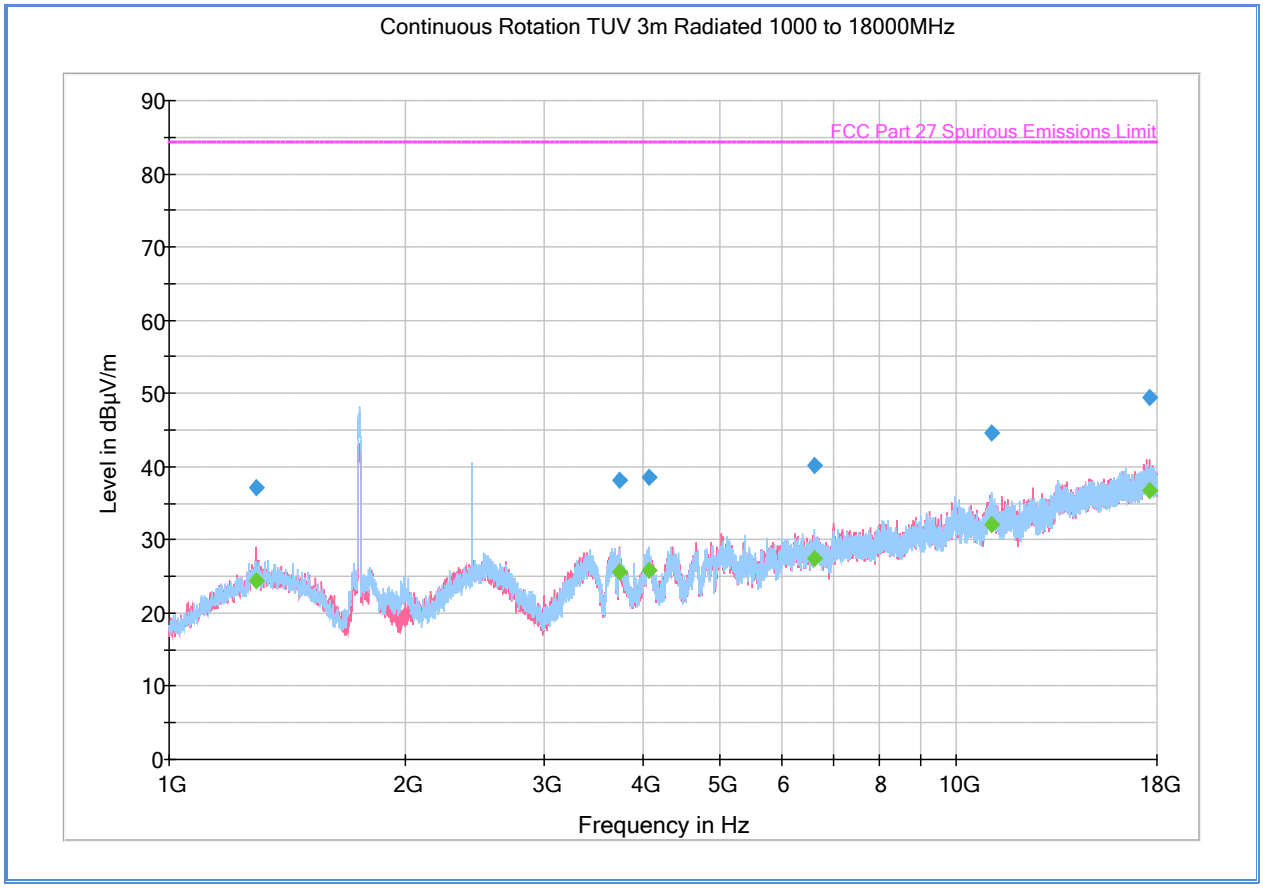
Test Notes: Emissions within 2.4GHz band (CU Bluetooth LE) will be ignored.

Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dbµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG-CL (dBm)	Limit (dBm)	Compliance

Test Notes: 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 Worst Case Configuration) - 20MHz Bandwidth High Channel



Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1287.866667	37.1	1000.0	1000.000	386.0	V	315.0	-8.7	47.3	84.4
3737.566667	38.2	1000.0	1000.000	397.6	V	281.0	-3.6	46.2	84.4
4072.866667	38.6	1000.0	1000.000	103.7	H	189.0	-2.5	45.8	84.4
6616.266667	40.1	1000.0	1000.000	328.2	H	2.0	2.8	44.3	84.4
11097.966667	44.6	1000.0	1000.000	120.7	H	1.0	9.4	39.9	84.4
17612.366667	49.4	1000.0	1000.000	304.2	V	-3.0	16.1	35.0	84.4

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1287.866667	24.5	1000.0	1000.000	386.0	V	315.0	-8.7	59.9	84.4
3737.566667	25.6	1000.0	1000.000	397.6	V	281.0	-3.6	58.8	84.4
4072.866667	25.8	1000.0	1000.000	103.7	H	189.0	-2.5	58.6	84.4
6616.266667	27.4	1000.0	1000.000	328.2	H	2.0	2.8	57.0	84.4
11097.966667	32.1	1000.0	1000.000	120.7	H	1.0	9.4	52.3	84.4
17612.366667	36.7	1000.0	1000.000	304.2	V	-3.0	16.1	47.7	84.4

Test Notes: Emissions within the assigned frequency band and 2.4GHz band (CU Bluetooth LE) will be ignored
.

Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dbµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG-CL (dBm)	Limit (dBm)	Compliance

Test Notes: 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-139, Clause 6.4

2.8.2 Standard Applicable

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

2.8.1 Equipment Under Test and Modification State

Please refer to test report SD72112724-0116I Nextivity FCC IC Part 27 B4 Test Report.docx for serial number/s and test configuration used.

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

February 01 and 02, 2016/XYZ

2.8.3 Test Equipment Used

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

2.8.4 Environmental Conditions

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

Ambient Temperature	21.3 - 22.8°C
Relative Humidity	26.6 - 29.0%
ATM Pressure	99.2 – 99.7kPa

2.8.5 Additional Observations

- Test results presented here is from SD72112724-0116I Nextivity FCC IC Part 27 B4 Test Report.docx (issued by TÜV SÜD America San Diego June 2016). See Section 1.2 for more details.
- 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.
- Input Type "Tones" was selected and the EUT was injected a CW signal from a Signal Generator and maximum frequency error was monitored using the spectrum analyzer.

- 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 them 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.
- Top Channel was tested as the representative configuration.

2.8.6 Test Results Summary

LTE B4 Downlink		
Voltage (VAC)	***Temperature (°C)***	***Frequency Deviation (Hz/ppm)***
120	-30	0 / 0
	-20	0 / 0
	-10	0 / 0
	0	0 / 0
	+10	0 / 0
	+20	0 / 0
	+30	0 / 0
	+40	0 / 0
	+50	0 / 0

LTE B4 Downlink		
Temperature (°C)	***Voltage (VAC)***	***Frequency Deviation (Hz/ppm)***
20	102	0 / 0
	138	0 / 0

2.8.7 Sample Test Plots

LTE B4 Uplink (Middle Channel 1013) 120VDC @ 20°C

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 (dBµV)	
	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.*

2.9.1 Equipment Under Test and Modification State

Please refer to test report SD72112724-0116I Nextivity FCC IC Part 27 B4 Test Report.docx for serial number/s and test configuration used.

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

January 18, 2016/XYZ

2.9.3 Test Equipment Used

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

2.9.4 Environmental Conditions

Ambient Temperature	22.5 °C
Relative Humidity	52.6.%
ATM Pressure	99.9 kPa

2.9.5 Additional Observations

- Test results presented here is from SD72112724-0116I Nextivity FCC IC Part 27 B4 Test Report.docx (issued by TÜV SÜD America San Diego June 2016). See Section 1.2 for more details.
- The EUT was verified using AC adapter supplied by the manufacturer..
- EUT verified using input voltage of 120VAC 60Hz.
- There are no significant variations in test results between each operating modes. Only the normal operation mode observed is presented.
- 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 2.9.6 for sample computation.

2.9.6 Sample Computation (Conducted Emission – Quasi Peak)

Measuring equipment raw measurement (dbµV) @ 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 (dbµV) @ 150kHz			**26.2**

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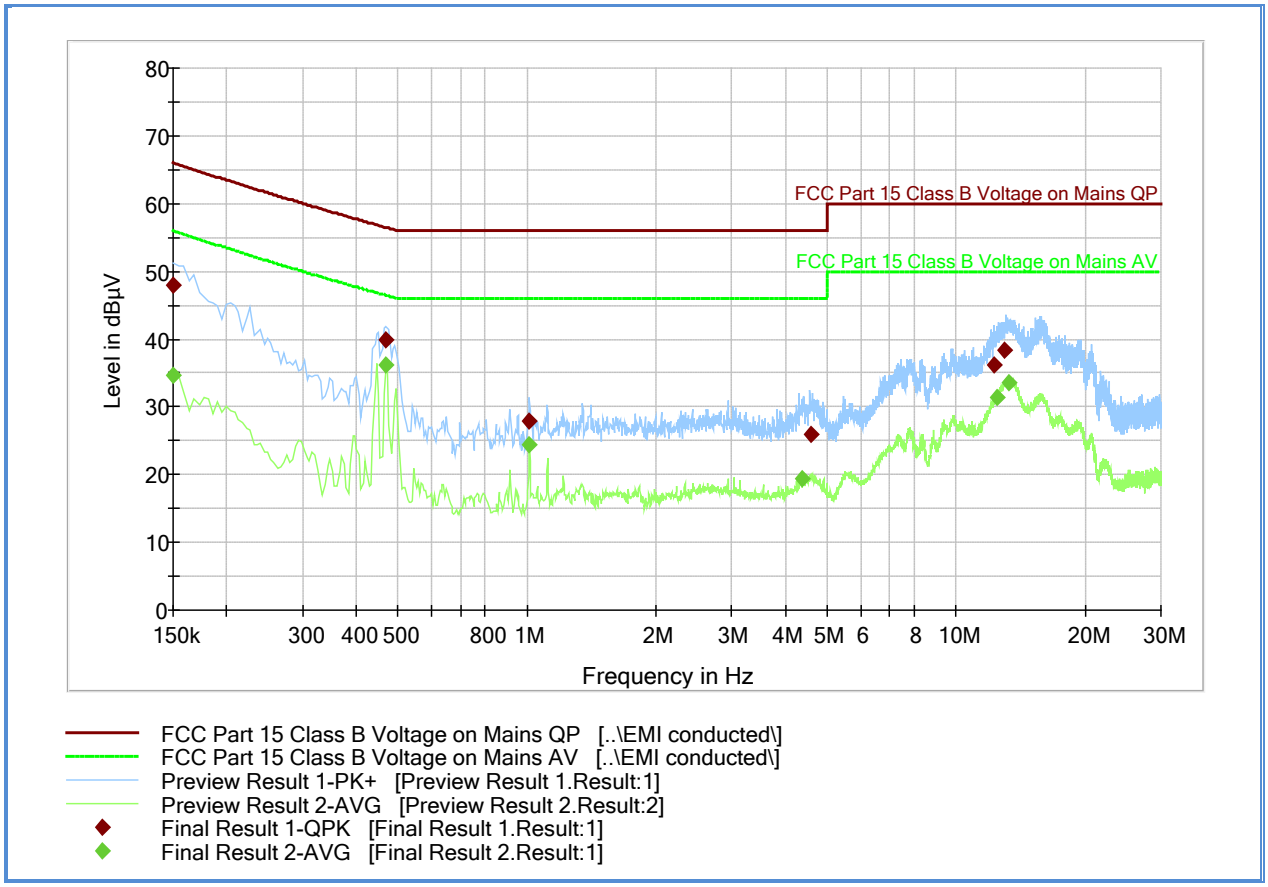
2.9.7 Test Results - Conducted Emissions Line 1 – Hot (NU)



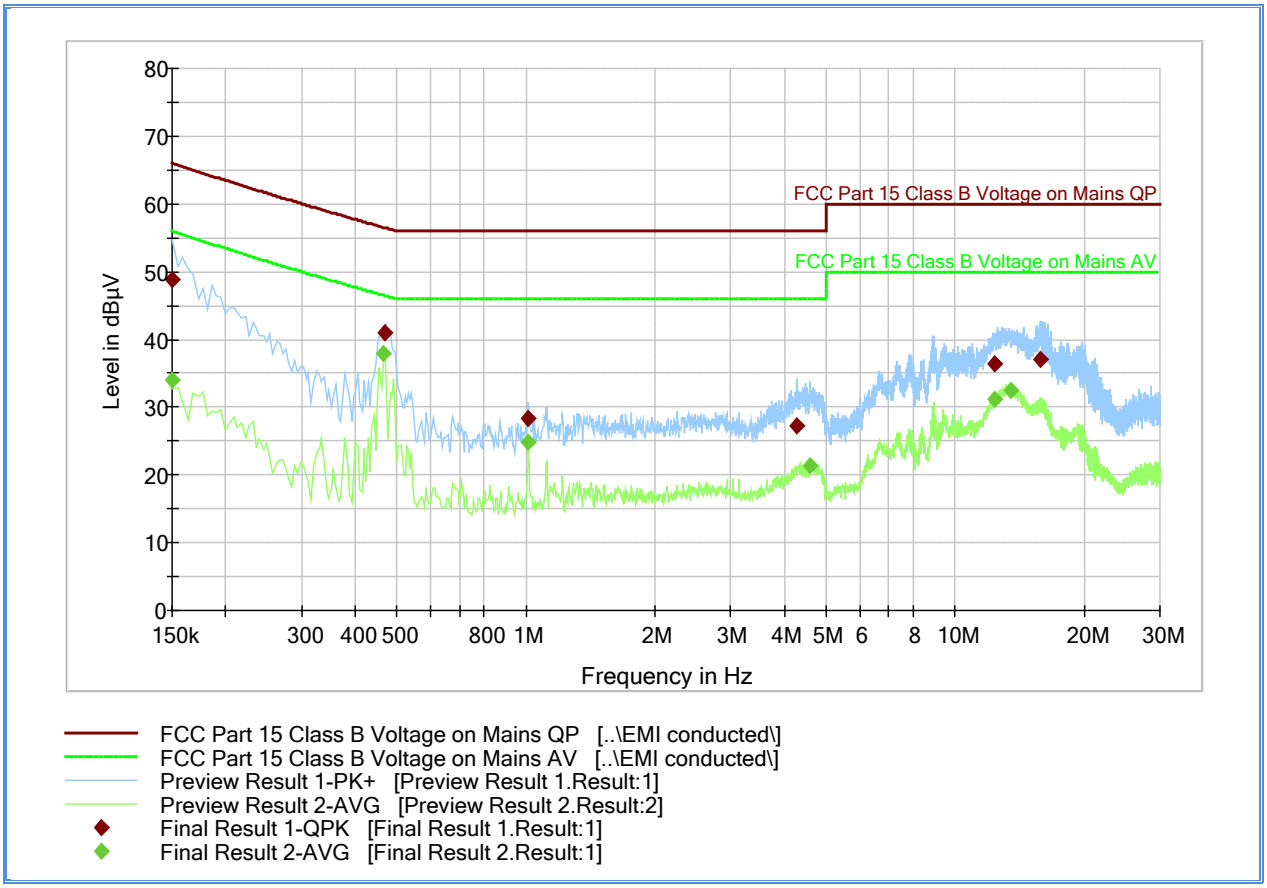
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.150000	47.9	1000.0	9.000	Off	L1	20.1	18.1	66.0
0.469500	40.0	1000.0	9.000	Off	L1	20.1	16.5	56.5
1.014000	28.0	1000.0	9.000	Off	L1	20.2	28.0	56.0
4.609500	25.9	1000.0	9.000	Off	L1	20.5	30.1	56.0
12.246000	36.2	1000.0	9.000	Off	L1	20.6	23.8	60.0
12.997500	38.4	1000.0	9.000	Off	L1	20.6	21.6	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.150000	34.6	1000.0	9.000	Off	L1	20.1	21.4	56.0
0.469500	36.3	1000.0	9.000	Off	L1	20.1	10.2	46.5
1.014000	24.4	1000.0	9.000	Off	L1	20.2	21.6	46.0
4.366500	19.5	1000.0	9.000	Off	L1	20.4	26.5	46.0
12.408000	31.4	1000.0	9.000	Off	L1	20.6	18.6	50.0
13.263000	33.7	1000.0	9.000	Off	L1	20.6	16.3	50.0

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



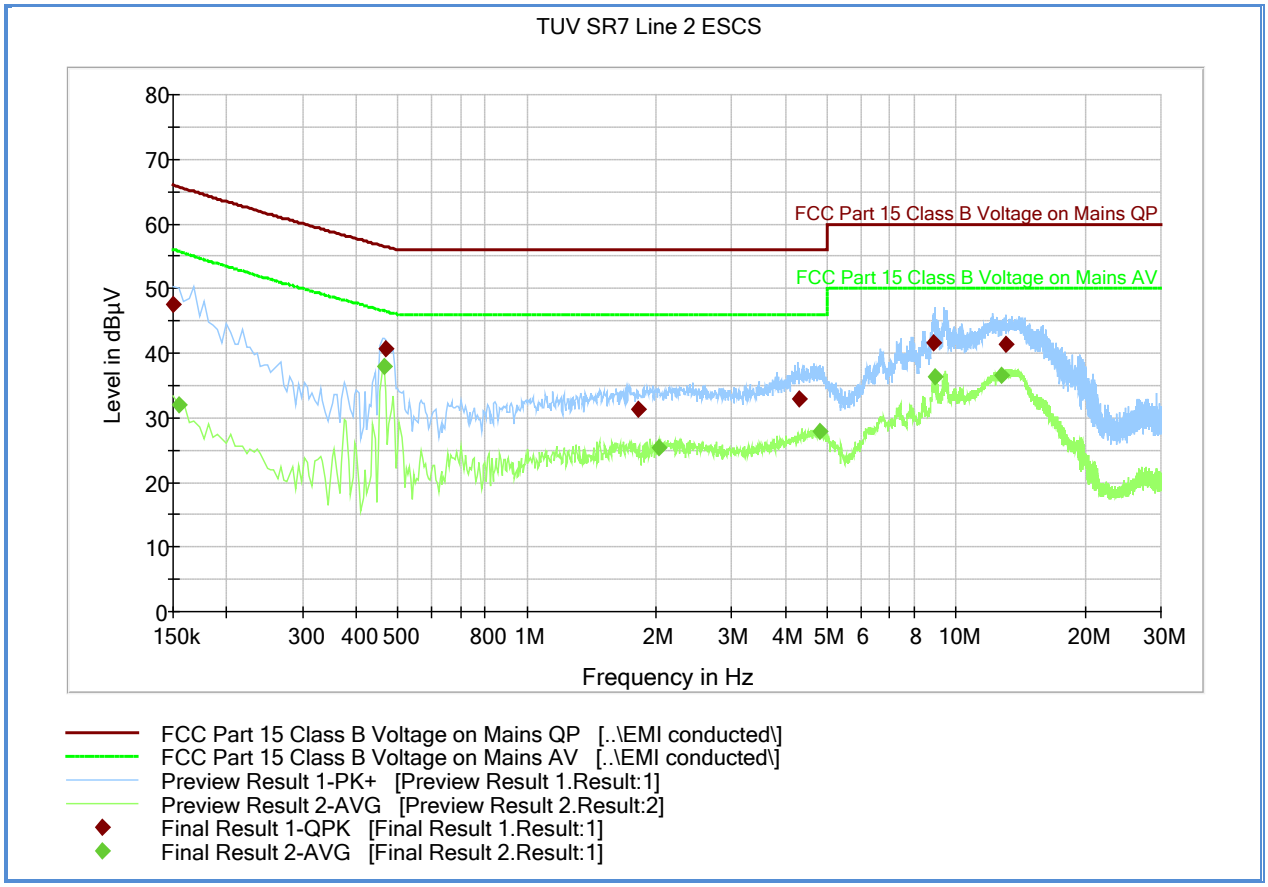
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.150000	48.9	1000.0	9.000	Off	L1	20.1	17.1	66.0
0.469500	40.9	1000.0	9.000	Off	L1	20.1	15.6	56.5
1.014000	28.3	1000.0	9.000	Off	L1	20.2	27.7	56.0
4.285500	27.2	1000.0	9.000	Off	L1	20.4	28.8	56.0
12.363000	36.4	1000.0	9.000	Off	L1	20.6	23.6	60.0
15.841500	37.1	1000.0	9.000	Off	L1	20.6	22.9	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.150000	33.9	1000.0	9.000	Off	L1	20.1	22.1	56.0
0.465000	37.8	1000.0	9.000	Off	L1	20.1	8.7	46.5
1.014000	24.9	1000.0	9.000	Off	L1	20.2	21.1	46.0
4.582500	21.3	1000.0	9.000	Off	L1	20.4	24.7	46.0
12.403500	31.3	1000.0	9.000	Off	L1	20.6	18.7	50.0
13.452000	32.4	1000.0	9.000	Off	L1	20.6	17.6	50.0

2.9.9 FCC Conducted Emissions Line 2 – Neutral (CU)



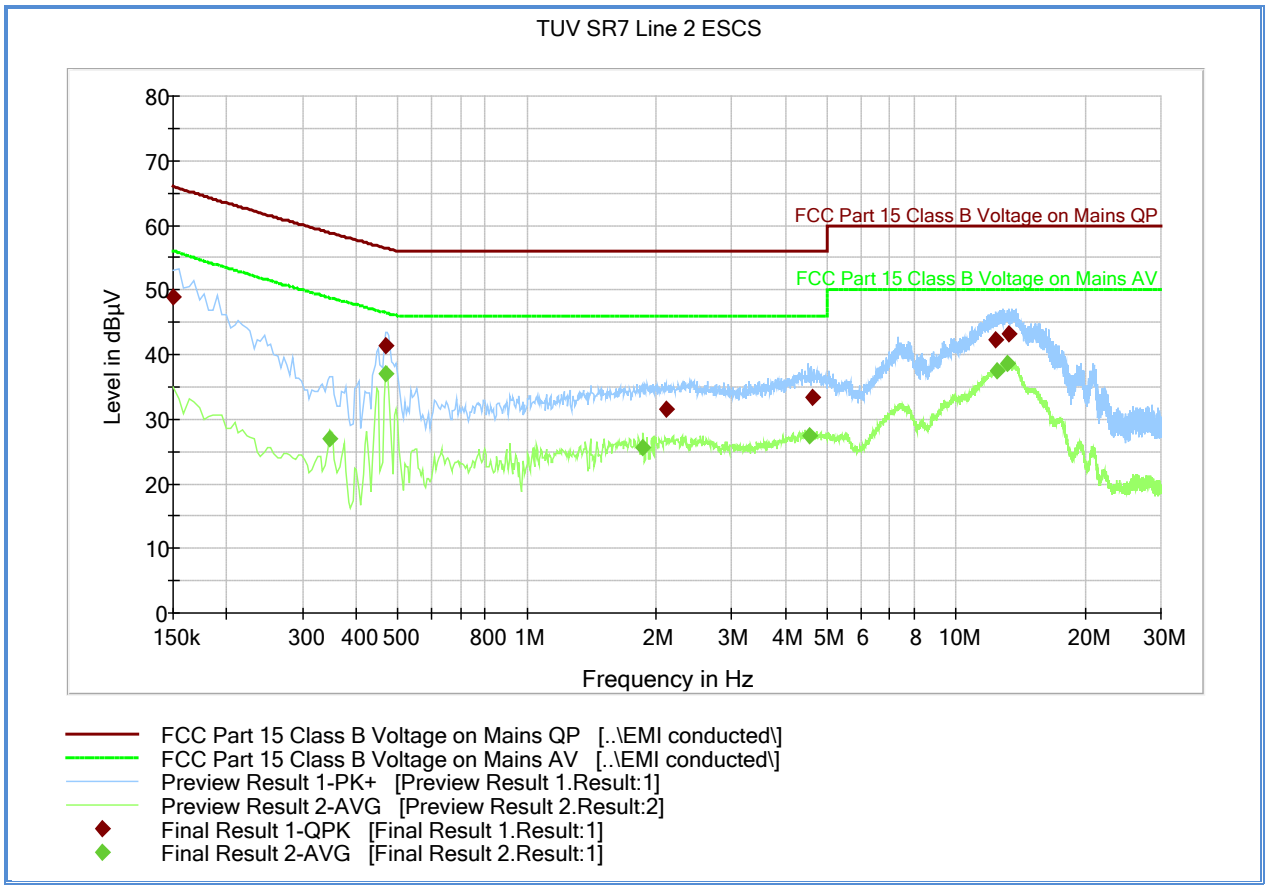
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.150000	47.4	1000.0	9.000	Off	N	20.1	18.6	66.0
0.469500	40.8	1000.0	9.000	Off	N	20.1	15.7	56.5
1.819500	31.2	1000.0	9.000	Off	N	20.2	24.8	56.0
4.312500	32.9	1000.0	9.000	Off	N	20.4	23.1	56.0
8.875500	41.6	1000.0	9.000	Off	N	20.5	18.4	60.0
13.101000	41.4	1000.0	9.000	Off	N	20.6	18.6	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.154500	32.0	1000.0	9.000	Off	N	20.0	23.7	55.7
0.465000	37.8	1000.0	9.000	Off	N	20.1	8.7	46.5
2.031000	25.4	1000.0	9.000	Off	N	20.1	20.6	46.0
4.803000	27.8	1000.0	9.000	Off	N	20.5	18.2	46.0
8.938500	36.2	1000.0	9.000	Off	N	20.5	13.8	50.0
12.741000	36.6	1000.0	9.000	Off	N	20.7	13.4	50.0

2.9.10 FCC 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)
0.150000	49.0	1000.0	9.000	Off	N	20.1	17.0	66.0
0.469500	41.5	1000.0	9.000	Off	N	20.1	15.0	56.5
2.107500	31.5	1000.0	9.000	Off	N	20.3	24.5	56.0
4.623000	33.4	1000.0	9.000	Off	N	20.4	22.6	56.0
12.358500	42.4	1000.0	9.000	Off	N	20.7	17.6	60.0
13.281000	43.2	1000.0	9.000	Off	N	20.6	16.8	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.348000	26.9	1000.0	9.000	Off	N	20.2	21.9	48.8
0.469500	37.1	1000.0	9.000	Off	N	20.1	9.4	46.5
1.860000	25.7	1000.0	9.000	Off	N	20.2	20.3	46.0
4.537500	27.5	1000.0	9.000	Off	N	20.4	18.5	46.0
12.435000	37.5	1000.0	9.000	Off	N	20.7	12.5	50.0
13.177500	38.5	1000.0	9.000	Off	N	20.6	11.5	50.0

SECTION 3

TEST EQUIPMENT USED

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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	06/19/15	06/19/16
7605	50MHz-18GHz Wideband Power Sensor	N1921A	MY51100054	Agilent	04/19/16	04/19/17
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
Nextivity	Tunable Bandpass Filter	5BT-00015	776	K&L Microwave	Verified by 7582 and 7608	
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						
1024	EMI Test Receiver	ESCS 30	847793/001	Rhode & Schwarz	04/10/15	04/10/16
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	02/20/15	02/20/16
8824	20dB Attenuator	34-20-34	N/A	MCE / Weinschel	02/20/15	02/20/16
7562	Wideband Radio Communication Tester	CMW 500	1201.0002k50 /103829	Rhode & Schwarz	For signalling	

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
	DC Power Supply	35010M	D102007S	Protek	Verified by 6792	
	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

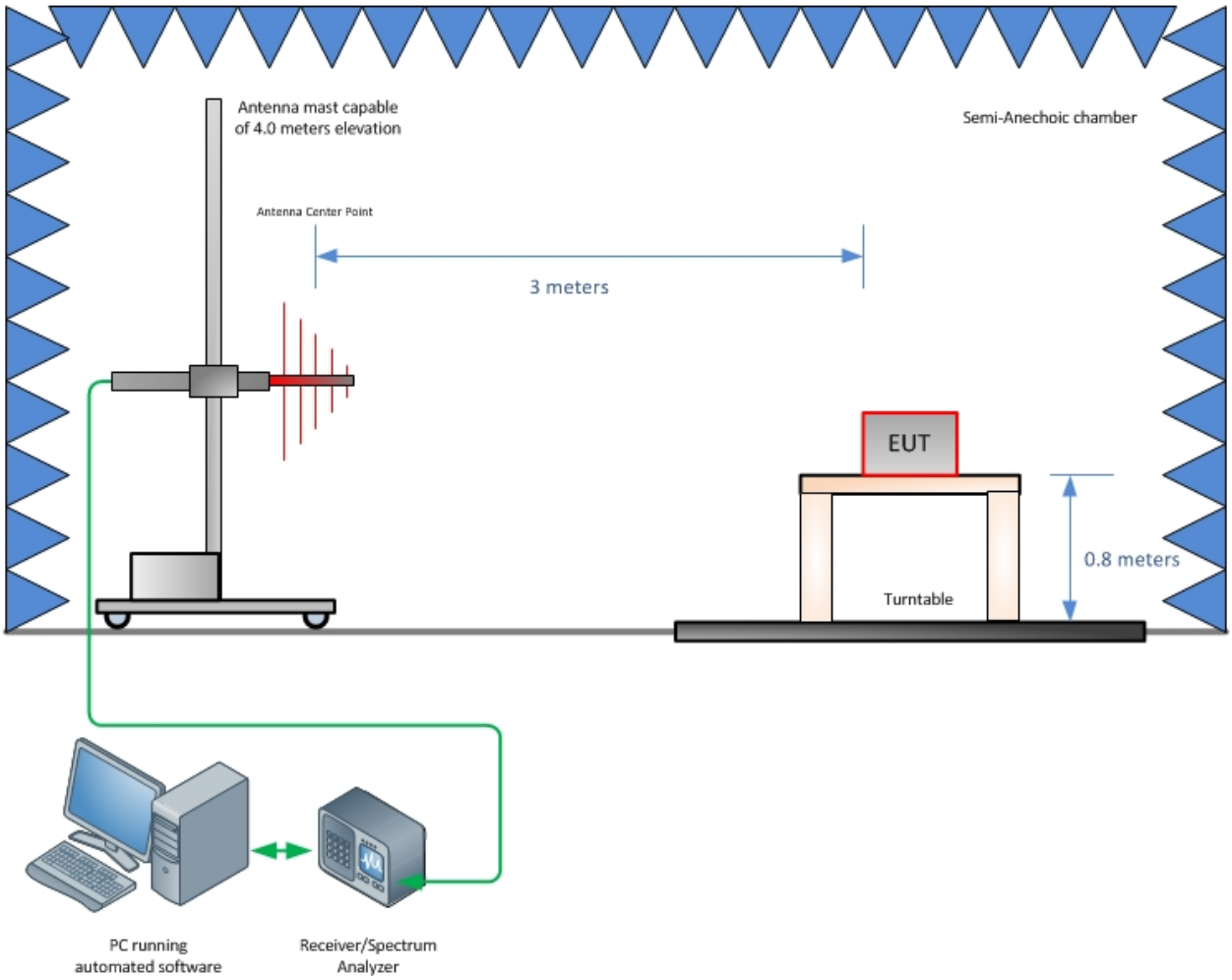
3.2.4 Conducted Antenna Port Measurement

	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

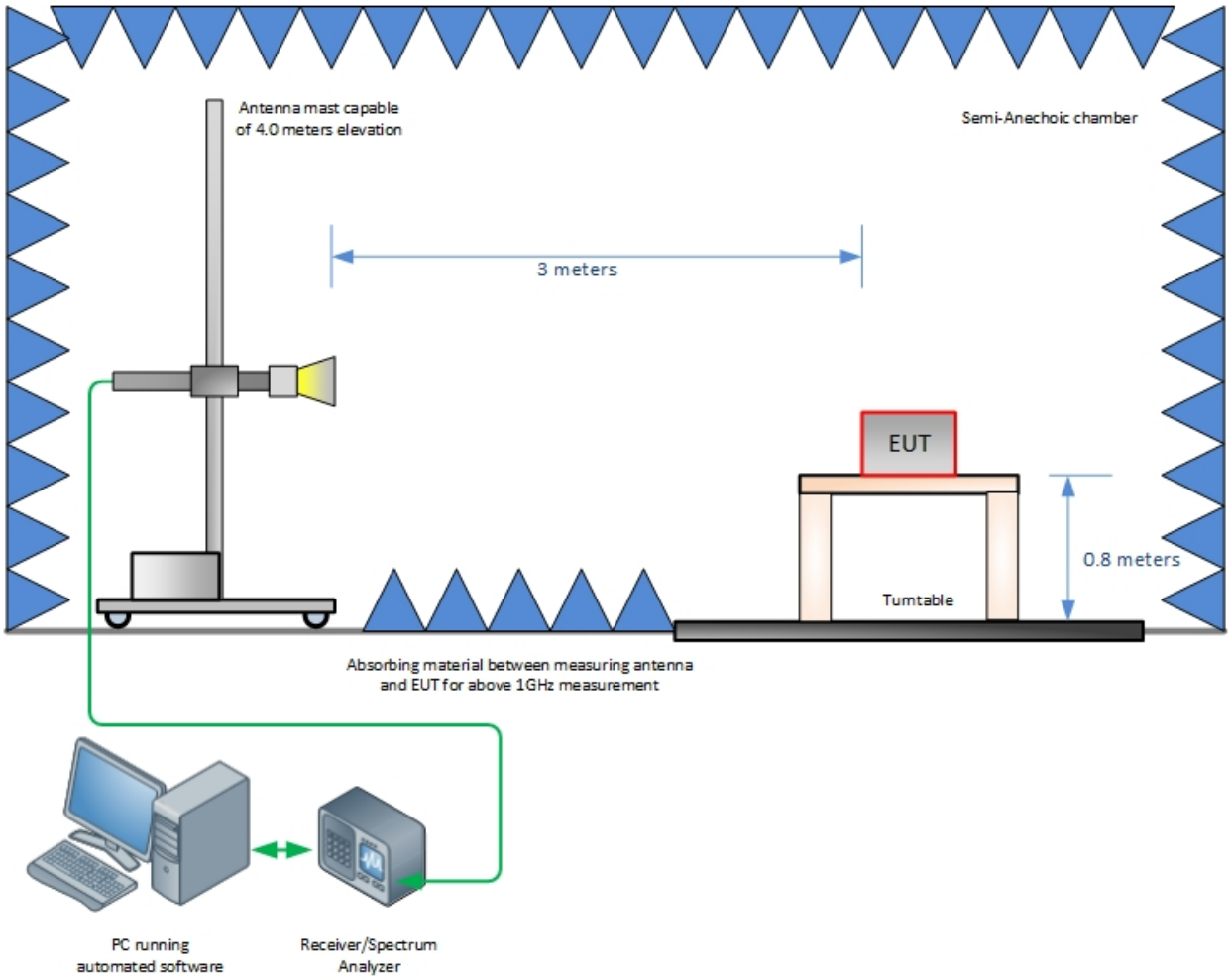
SECTION 4

DIAGRAM OF TEST SETUP

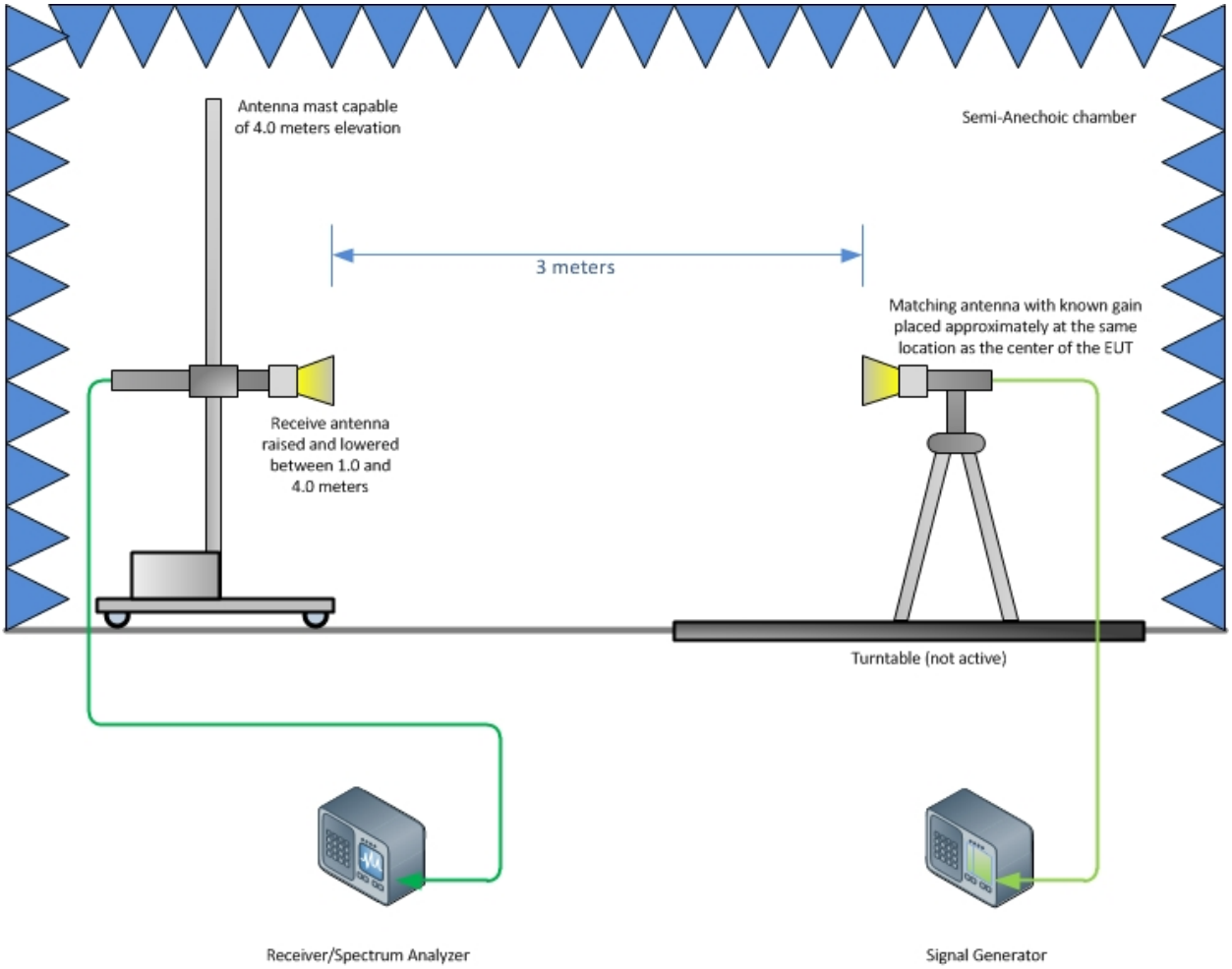
4.1 TEST SETUP DIAGRAM



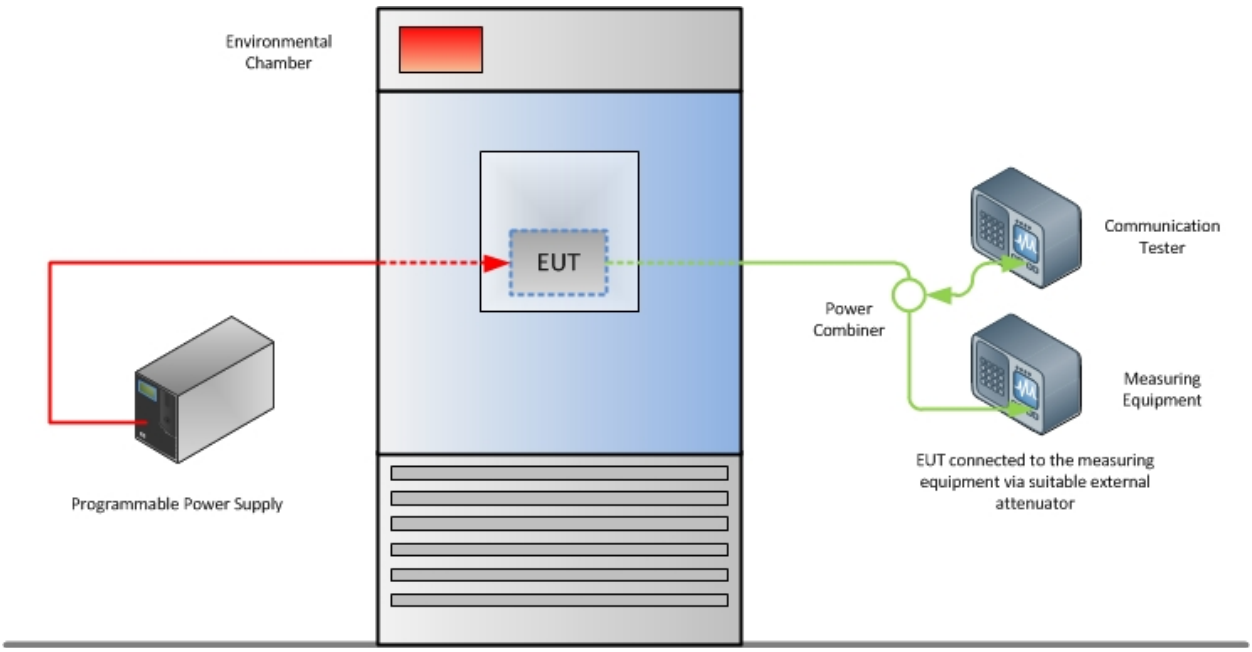
Radiated Emission Test Setup (Below 1GHz)



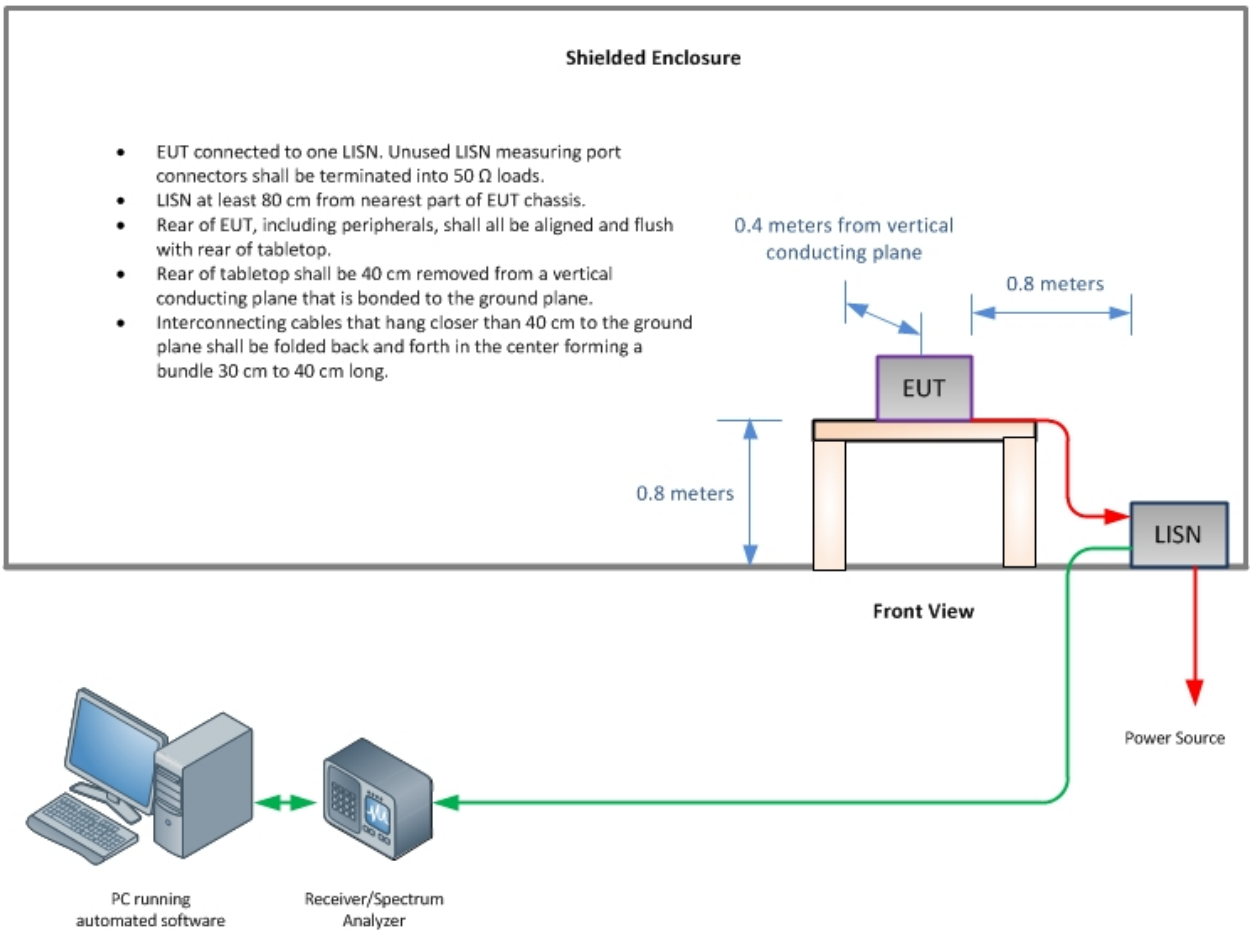
Radiated Emission Test Setup (Above 1GHz)



Substitution Test Method (Above 1GHz, if applicable)



Frequency Stability Test Comfiguration



Conducted Emissions Test Configuration (if applicable)

SECTION 5

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5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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