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Report On

Application for Grant of Equipment Authorization of the
Nextivity Inc.

Cel-Fi Quatra Cellphone Signal Repeater

FCC CFR 47 Part 2, Part 22 and Part 24
RSS-Gen, RSS-132 and RSS-133

Report No. SD72121022-1016E

January 2017

FCC ID: NU: YETQ34-251366NU
CU: YETQ34-251366CU
IC: NU: 9298A-Q34251366NU
CU: 9298A-Q34251366CU
Report No. SD72121022-1016E



REPORT ON	Radio Testing of the Nextivity Inc. Cel-Fi Quatra Cellphone Signal Repeater
TEST REPORT NUMBER	SD72121022-1016E
PREPARED FOR	Nextivity Inc. 16550 West Bernardo Drive, Bldg 5, Suite 550, San Diego, CA 92127, USA
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APPROVED BY	 Juan M. Gonzalez Name Authorized Signatory Title: Commercial Wireless EMC Lab Manager
DATED	January 03, 2017

FCC ID: NU: YETQ34-251366NU
CU: YETQ34-251366CU
IC: NU: 9298A-Q34251366NU
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Report No. SD72121022-1016E



Revision History

SD72121022-1016E Nextivity Inc. Cel-Fi Quatra Cellphone Signal Repeater					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
01/03/17	Initial Release				Juan M Gonzalez

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SECTION 1

1REPORT SUMMARY

Radio Testing of the
Nextivity Inc.
Cel-Fi Quatra Cellphone Signal Repeater



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Nextivity Inc. Cellphone Signal Repeater to the requirements of the following:

- FCC CFR 47 Part 2, Part 22 and Part 24
- RSS-Gen, RSS-132 and RSS-133.

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)	NU: Q34-2/5/13/66NU CU: Q34-2/5/13/66CU
FCC ID	NU: YETQ34-251366NU CU: YETQ34-251366CU
IC Number	NU: 9298A-Q34251366NU CU: 9298A-Q34251366CU
Serial Number(s)	258602000335 (NU) and 25955100346 (CU)
Number of Samples Tested	2
Test Specification/Issue/Date	• FCC CFR 47 Part 2, Part 22 and Part 24 (October 1, 2016). • RSS-132 – Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894MHz (Issue 3, January 2013). • RSS-133 – 2 GHz Personal Communications Services (Issue 6, January 2013). • RSS-Gen - General Requirements and Information for the Certification of Radio Apparatus (Issue 4, November 2014).
Start of Test	April 11, 2016
Finish of Test	May 05, 2016
Name of Engineer(s)	Xiaoying Zhang
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. • 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 22 and Part 24 with cross-reference to the corresponding ISSED RSS standard is shown below.

Section	Spec Clause					Test Description	Result
	FCC Part 2	FCC Part 22	FCC Part 24	RSS-132	RSS-133		
2.1	2.1046	-	-	5.4	6.4	Transmitter Conducted Output Power	Compliant*
2.2	2.1046	22.913 (a)	-	-	-	Effective Radiated Power	Compliant*
2.3	2.1046	-	24.232 (c)	5.4	6.4	Equivalent Isotropic Radiated Power	Compliant*
2.4	2.1049	22.917 (b)	24.238 (b)	RSS-Gen 6.6		Occupied Bandwidth	Compliant*
2.5	-	-	24.232 (d)	5.4	6.4	Peak-Average Ratio	Compliant*
2.6	2.1051	22.917 (a)	24.238 (a)	5.5	6.5	Band Edge	Compliant*
2.7	2.1051	22.917 (a)	24.238 (a)	5.5	6.5	Conducted Spurious Emissions	Compliant*
2.8	2.1053	22.917 (a)	24.238 (a)	5.5	6.5	Field Strength of Spurious Radiation	Compliant*
2.9	2.1055	22.355	24.235	5.3	6.3	Frequency Stability	Compliant*
-	-	-	-	5.6	6.6	Receiver Spurious Emissions	N/A*
2.10	-	-	-	RSS-Gen 8.8		Power Line Conducted Emission	Compliant*

Compliant* A variant of the EUT was previously approved under FCC IDs YETQ34-251266NU and YETQ34-251266CU under Model Numbers Q34-2/5/12/66NU and Q34-2/5/12/66CU. The EUT is identical with this model with the exception of LTE Band 12 support. The testing were from this variant and covered under test report SD72113545-0216C Nextivity Quatra FCC IC Part 22&24 Test Report.

N/A* Not applicable. EUT has no Stand-Alone receiver port

1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment Under Test (EUT) was a Nextivity Inc. Cel-Fi Quatra Cellphone Signal Repeater. The EUT is a WCDMA/LTE Signal Booster to improve voice and data cellular performance in large enterprise environments. The EUT consists of two separate units: the Network Unit (NU) and the Coverage Unit (CU). The NU comprises a transmitter and receiver which communicate with the cell tower and the CU. Users place the NU in an area with the strongest signal from the carrier network. The CU is then placed in the center of the home or office, or in the area where the best signal quality is best needed. The NU and CU are placed at varying distances apart and are communicated via Ethernet cables. The WCDMA Band 2 and Band 5 function of the EUT were verified in this test report.

1.3.2 EUT General Description

EUT Description Cellphone Signal Repeater

Model Name Cel-Fi Quatra

Model Number(s) NU: Q34-2/5/13/66NU
CU: Q34-2/5/13/66CU

Rated Voltage NU: 54V DC via external AC/DC adapter
CU: 54V DC via POE

Mode Verified WCDMA Band 2 and Band 5

Frequency Bands B2: NU: 1850 - 1910MHz
CU: 1930 -1990MHz
B5: NU: 824 - 849MHz
CU: 869 - 894MHz

Rated Power

Signal Bandwidth (MHz)	Band 2		Band 5	
	DL (dB)	UL (dB)	DL (dB)	UL (dB)
5	10.0	22	10.0	20
10	13.0		13.0	
15	14.8		14.8	
20	16.0		-	

Capability WCDMA (Band 2 and 5), LTE (Band 13 and 4) 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

Maximum Antenna Gain

NU		CU	
Band 2	Band 5	Band 2	Band 5
2 dBi	0	2 dBi	0

1.3.3 Transmit Frequency Table

Mode	Signal Bandwidth (MHz)	Tx Frequency (MHz)	Emission Designator	EPR (Part 22)		EIRP (Part 24, RSS-132, RSS-133)	
				Max. Power Avg (dBm)	Max. Power Avg (W)	Max. Power Avg (dBm)	Max. Power Avg (W)
WCDMA Band 5 Downlink	5	871.4 – 891.6	4M14F9W	7.96	0.006	10.11	0.010
	15	871.4 – 891.6	4M14F9W	13.49	0.022	15.64	0.037
WCDMA Band 5 Uplink	5	826.4 – 846.6	4M14F9W	15.19	0.033	17.34	0.054
WCDMA Band 2 Downlink	5	1932.4 – 1987.6	4M14F9W	-	-	11.89	0.015
	20	1932.4 – 1987.6	4M14F9W	-	-	17.64	0.058
WCDMA Band 2 Uplink	5	1852.4 – 1909.6	4M14F9W	-	-	23.87	0.244

1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

Test Configuration	Description
A	Downlink (CU TX). Input signal is applied to B2 or B5 antenna port of NU. Output is monitored from B2 or B5 Top antenna port of CU.
B	Uplink (NU TX). Input signal is applied to B2 or B5 antenna port of CU. Output is monitored from B2 or B5 Top antenna port of NU.
C	Radiated test setup. Downlink (CU TX). Input signal is applied to B2 or B5 antenna port of NU. B2 or B5 Top antenna port of CU is terminated with a 50Ω load.
D	Radiated test setup. Uplink (NU TX). Input signal is applied to B2 or B5 antenna port of CU. B2 or B5 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

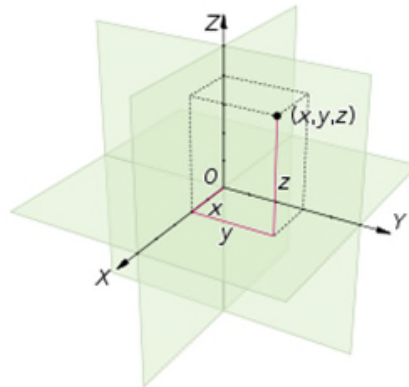
Manufacturer	Equipment/Cable	Description
Phihong	AC/DC Adapter (EUT)	M/N: PSA120u-540I6nt-r Rev 02 No. 026, IP: 100-240VAC, 1.6A, 50-60Hz OP: 54VDC, 2.22A
Netgear	Network patch Cable (1x NU to CU)	4.0m, unshielded, Cat5e 24AWG UTP
-	Support USB cable	1.75 meters, shielded Type A to Micro B connector
-	Support USB cable	Custom 1.0 meter shielded USB Type A to Type B for the Shielded Test Enclosure
Lenovo	Support Laptop	M/N: 2912-3VU, S/N: R9-92MH0 10/11
Lenovo	Support Laptop AC Adapter	M/N: 42T4430 S/N: 11S42T4430Z1ZGWE27AA9X
Rhode & Schwarz	Support Radio Communication Tester	M/N: CMU200, S/N: 114536
Aeroflex international LTD.	DFS Radar Simulator and Analyzer*	M/N: Aeroflex 3005, S/N: 30050A/09L
Agilent	ESG Vector Signal Generator	M/N: E4438C, S/N: MY47271033
Ramsey	Support Shielded Test Enclosure	With custom USB cable

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:

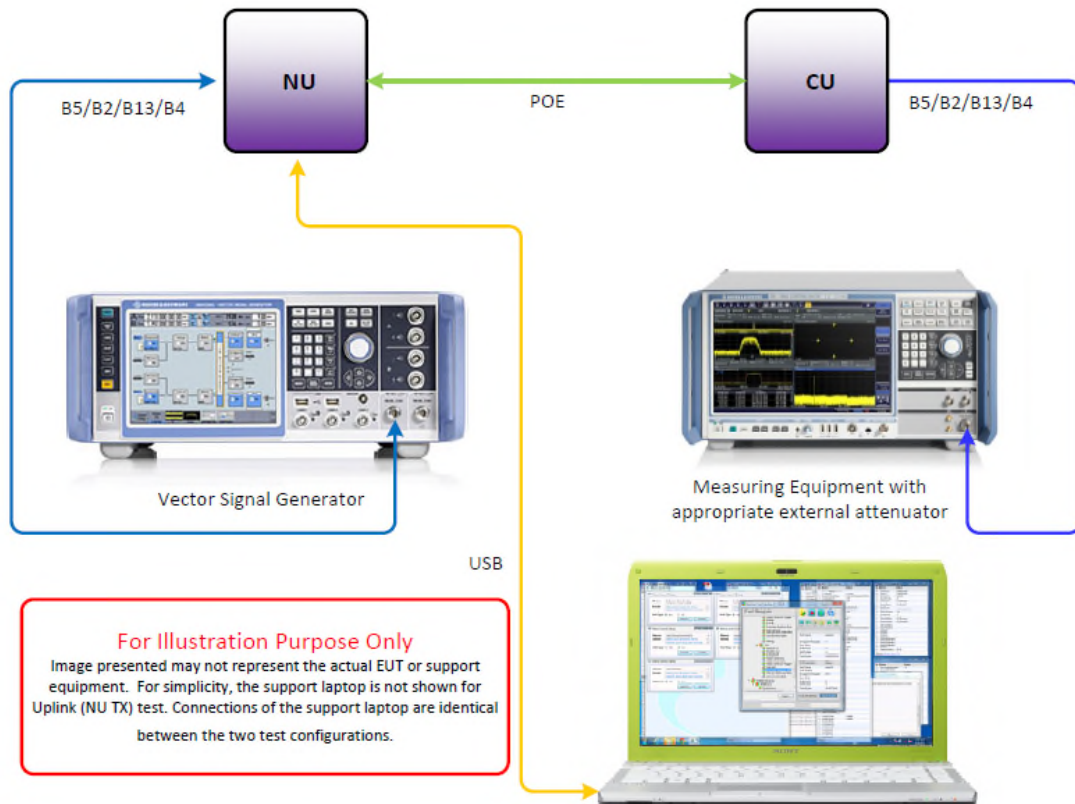
Mode	Signal Bandwidth	Channel No.	Frequency
WCDMA Band 2 Downlink	20MHz	Low Channel 9662+9687+9712+9737	1932.4MHz+1937.4MHz+ 1942.4MHz+1947.4MHz
WCDMA Band 2 Uplink	5MHz	Mid Channel 9400	1880MHz
WCDMA Band 5 Downlink	15MHz	Mid Channel 4383+4408+4433	876.6MHz+881.6MHz+886.6MHz
WCDMA Band 5 Uplink	5MHz	Low Channel 4132	826.4MHz

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.



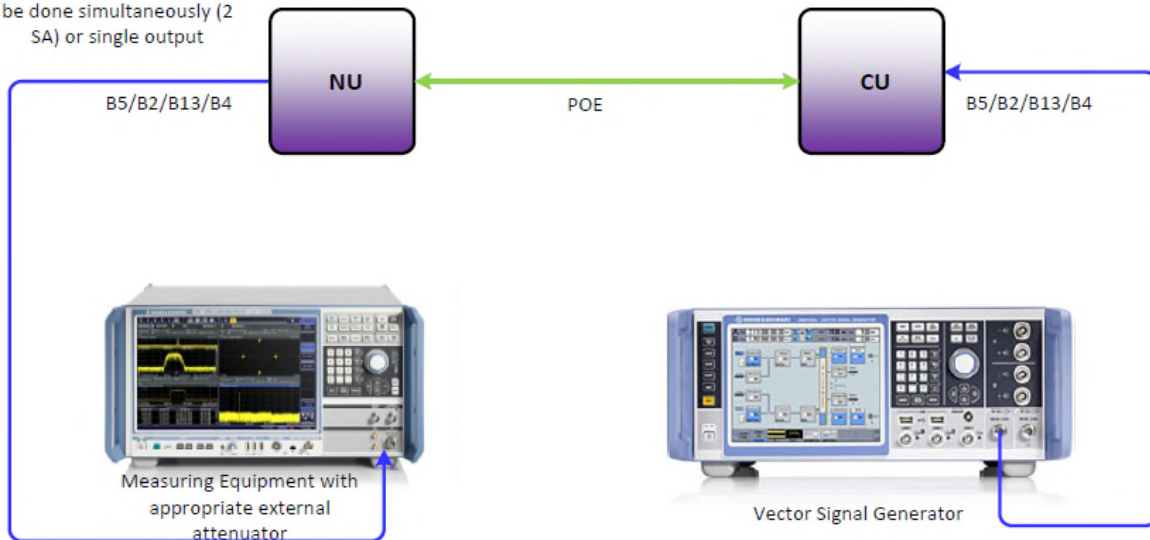
1.4.5 Simplified Test Configuration Diagram

Downlink (CU Tx) Conducted Test

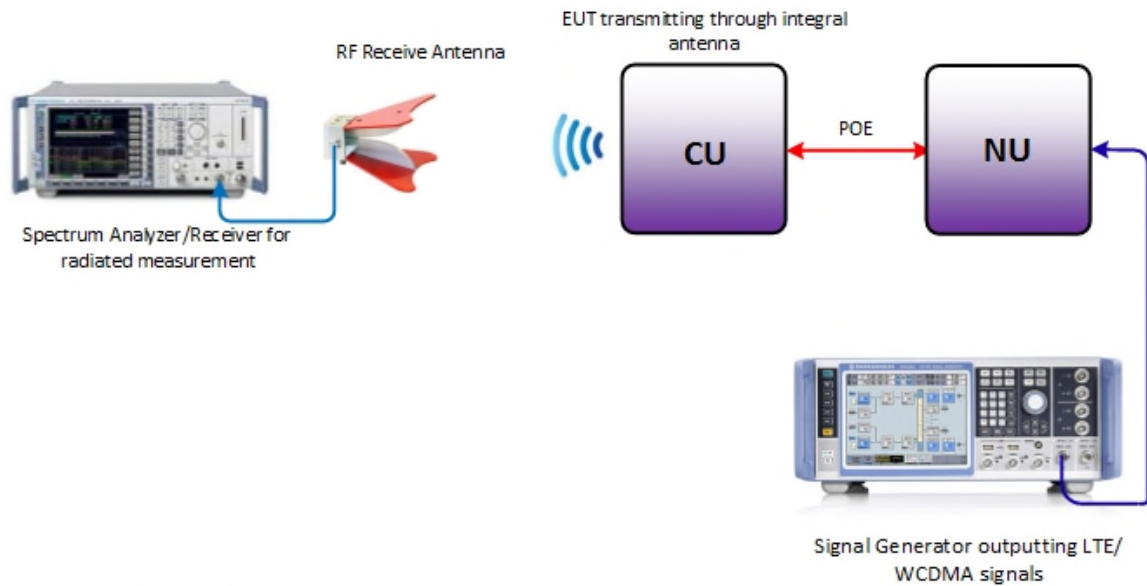


Uplink (NU Tx) Conducted Test

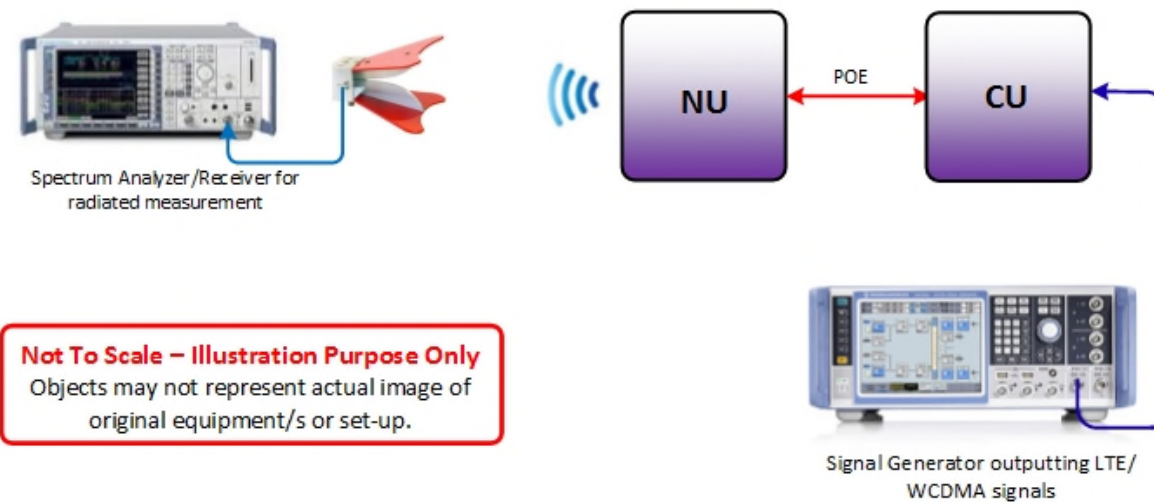
Monitoring the output can
be done simultaneously (2
SA) or single output



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 258602000335 (NU), 25955100346 (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)

16936 Via Del Campo, San Diego, CA 92127-1708 (33.018644,-117.092409). Phone: 858 678-1400 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: NU: YETQ34-251366NU
CU: YETQ34-251366CU
IC: NU: 9298A-Q34251366NU
CU: 9298A-Q34251366CU
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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 = 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:

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

FCC ID: NU: YETQ34-251366NU
CU: YETQ34-251366CU
IC: NU: 9298A-Q34251366NU
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SECTION 2

2TEST DETAILS

Radio Testing of the
Nextivity Inc.
Cel-Fi Quatra Cellphone Signal Repeater



2.1 TRANSMITTER CONDUCTED OUTPUT POWER

2.1.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1046
RSS-132, Clause 5.4
RSS-133, Clause 6.4

2.1.2 Standard Applicable

The conducted power measurements were made in accordance to FCC Part 2 Clause 2.1046 and RSS-132 Clause 5.4 and RSS-133 Clause 6.4.

2.1.3 Equipment Under Test and Modification State

Serial No: 258602000335 (NU) and 25955100346 (CU) / Test Configuration A and B

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

April 11, 13, 14, 29 and May 2 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	23.5 - 26.9°C
Relative Humidity	37.4 - 49.8%
ATM Pressure	98.7 - 99.3kPa

2.1.7 Additional Observations

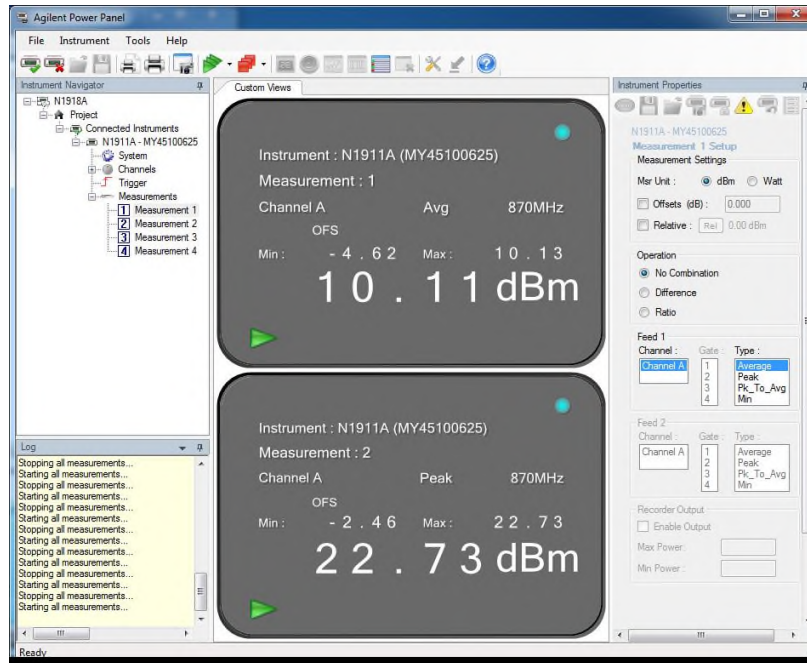
- This is a conducted test using an average power meter.
- The path loss was measured and entered as a level offset.
- Both Peak and Average measurements presented.

2.1.8 Test Results

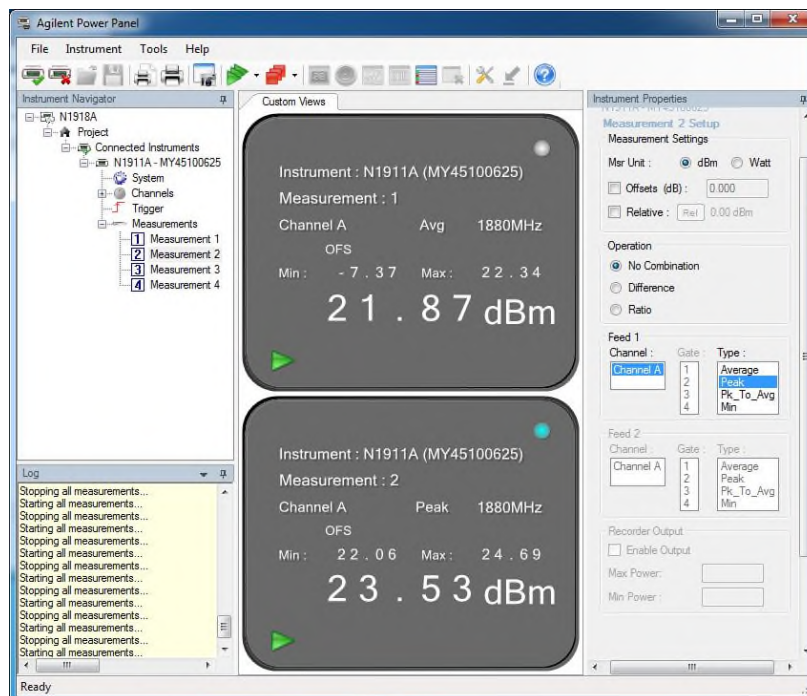
WCDMA Downlink					
Band	Bandwidth (MHz)	Channel	Frequency (MHz)	Average Power (dBm)	Peak Power (dBm)
Band 5	5	4357	871.4	10.02	20.03
		4408	881.6	10.11	22.73
		4458	891.6	10.04	20.22
	15	4357+4382+4407	871.4+876.4+881.4	15.07	24.27
		4383+4408+4433	876.6+881.6+886.6	15.64	25.09
		4408+4433+4458	881.6+886.6+891.6	15.11	24.05
Band 2	5	9662	1932.4	9.78	20.56
		9800	1960.0	9.89	21.04
		9938	1987.6	9.83	20.10
	20	9662+9687+9712+9737	1932.4+1937.4+1942.4+1947.4	15.64	26.00
		9775+9800+9825+9850	1955+1960+1965+1970	15.62	26.14
		9863+9888+9913+9938	1972.6+1977.6+1982.6+1987.6	15.51	25.06

WCDMA Uplink					
Band	Bandwidth (MHz)	Channel	Frequency (MHz)	Average Power (dBm)	Peak Power (dBm)
Band 5	5	4132	826.4	17.34	27.81
		4183	836.6	17.33	28.31
		4233	846.6	17.20	27.87
Band 2	5	9262	1852.4	21.69	23.59
		9400	1880.0	21.87	23.53
		9538	1907.6	21.02	22.86

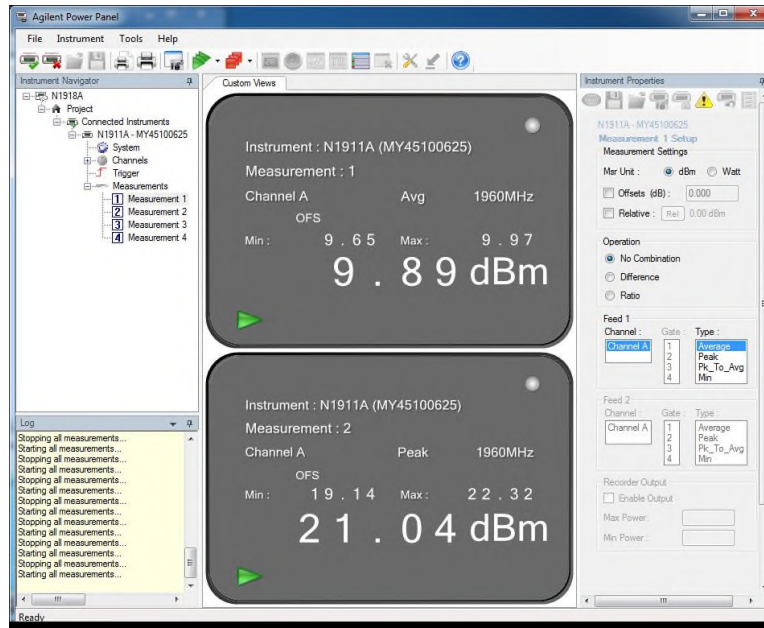
2.1.9 Sample Test Plot



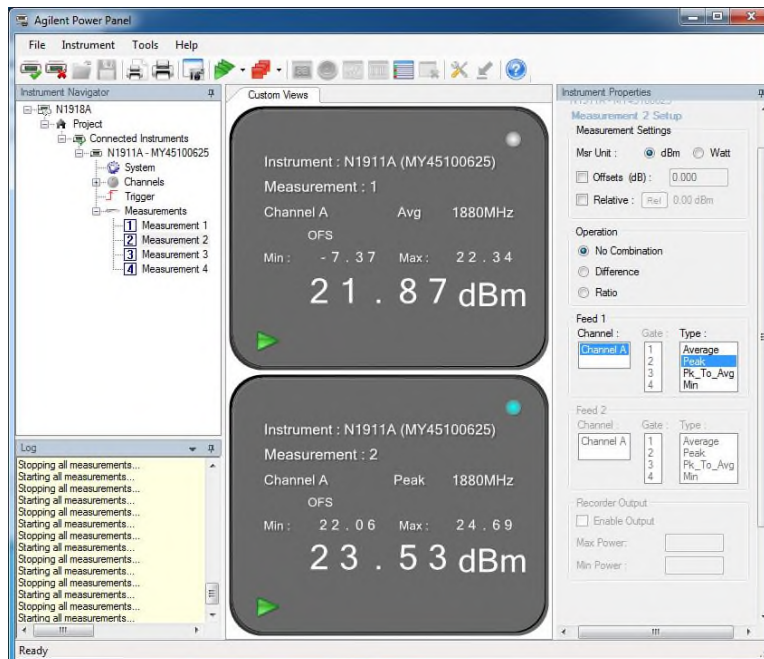
WCDMA Band 5_DownLink_5MHz Bandwidth_Mid Channel



WCDMA Band 5_Uplink_5MHz Bandwidth_Mid Channel



WCDMA Band 2_Downlink_5MHz Bandwidth_Mid Channel



WCDMA Band 2_Uplink_5MHz Bandwidth_Mid Channel

2.2 EFFECTIVE RADIATED POWER

2.2.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1046
FCC 47 CFR Part 22, Clause 22.913(a)(2)

2.2.2 Standard Applicable

FCC Part 22:
The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

2.2.3 Equipment Under Test and Modification State

Serial No: 258602000335 (NU) and 25955100346 (CU) / Test Configuration (N/A, calculation only)

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

April 11, 13, 14 and 29, 2016 / XYZ

2.2.5 Test Equipment Used

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

2.2.6 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 2.1 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 (EUT configuration during verification is mounted on an interface board with short direct connection to the antenna port. The loss between the EUT and the antenna port is considered negligible).

2.2.7 Test Results

<i>WCDMA Downlink</i>						
Band	Bandwidth (MHz)	Frequency (MHz)	Max Power Average (dBm)	Antenna Gain (dBi)	ERP (dBm)	Limit (dBm)
5	5	871.4	10.02	0	7.87	38.45
		881.6	10.11	0	7.96	38.45
		891.6	10.04	0	7.89	38.45
	15	871.4+876.4+881.4	15.07	0	12.92	38.45
		876.6+881.6+886.6	15.64	0	13.49	38.45
		881.6+886.6+891.6	15.11	0	12.96	38.45

<i>WCDMA Uplink</i>						
Band	Bandwidth (MHz)	Frequency (MHz)	Max Power Average (dBm)	Antenna Gain (dBi)	ERP (dBm)	Limit (dBm)
5	5	826.4	17.34	0	15.19	38.45
		836.6	17.33	0	15.18	38.45
		846.6	17.20	0	15.05	38.45

2.3 EQUIVALENT ISOTROPIC RADIATED POWER

2.3.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1046
RSS-132, Clause 5.4
FCC 47 CFR Part 24, Clause 24.232 (c)
RSS-133, Clause 6.4

2.3.2 Standard Applicable

RSS-132:
The EIRP for mobile equipment shall not exceed 11.5 watts
FCC Part 24:
Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.
RSS-133:
The equivalent isotropically radiated power (e.i.r.p.) for Mobile stations and hand-held portables are limited to 2 watts maximum e.i.r.p.

2.3.3 Equipment Under Test and Modification State

Serial No: 258602000335 (NU) and 25955100346 (CU) / Test Configuration (N/A, calculation only)

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

April 11, 13, 14, 29 and May 2, 2016/XYZ

2.3.5 Additional Observations

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

$$\text{EIRP} = P_T + G_T - L_c$$

Where:

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

2.3.6 Sample Computation

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

2.3.7 Test Results

<i>WCDMA B5 and B2 Downlink</i>						
Band	Bandwidth (MHz)	Frequency (MHz)	Max Power Average (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)
5	5	871.4	10.02	0	10.02	40.6
		881.6	10.11	0	10.11	40.6
		891.6	10.04	0	10.04	40.6
	15	871.4+876.4+881.4	15.07	0	15.07	40.6
		876.6+881.6+886.6	15.64	0	15.64	40.6
		881.6+886.6+891.6	15.11	0	15.11	40.6
2	5	1932.4	9.78	2.0	11.78	33
		1960.0	9.89	2.0	11.89	33
		1987.6	9.83	2.0	11.83	33
	20	1932.4+1937.4+1942.4+1947.4	15.64	2.0	17.64	33
		1955+1960+1965+1970	15.62	2.0	17.62	33
		1972.6+1977.6+1982.6+1987.6	15.51	2.0	17.51	33

<i>WCDMA B5 and B2 Uplink</i>						
Band	Bandwidth (MHz)	Frequency (MHz)	Max Power Average (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)
5	5	826.4	17.34	0	17.34	40.6
		836.6	17.33	0	17.33	40.6
		846.6	17.20	0	17.20	40.6
2	5	1852.4	21.69	2.0	23.69	33
		1880.0	21.87	2.0	23.87	33
		1907.6	21.02	2.0	23.02	33

2.4 OCCUPIED BANDWIDTH

2.4.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1049
FCC 47 CFR Part 22, Clause 22.917(b)
FCC 47 CFR Part 24, Clause 24.238(b)
RSS-Gen, Clause 6.6

2.4.2 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.

2.4.3 Equipment Under Test and Modification State

Serial No: 258602000335 (NU) and 25955100346 (CU) / Test Configuration A and B

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

April 11, 13 and 17, 2016/XYZ

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	23.5 - 27.4°C
Relative Humidity	24.8 - 49.8 - %
ATM Pressure	99.0 - 99.3kPa

2.4.7 Additional Observations

- This is a conducted test. Both 26dB bandwidth and 99% bandwidth presented.
- The transducer factor (TDF) used is from the external attenuators and cables used.
- 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 $\geq 3X$ 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.

2.4.8 Test Results

<i>WCDMA Downlink</i>					
Band	Bandwidth (MHz)	Channel	Frequency (MHz)	OBW (MHz)	-26dB BW (MHz)
Band 5	5	4357	871.4	4.11	4.54
		4408	881.6	4.14	4.54
		4458	891.6	4.11	4.54
Band 2	5	9662	1852.4	4.11	4.57
		9800	1960	4.11	4.54
		9938	1987.6	4.14	4.51

<i>WCDMA Uplink</i>					
Band	Bandwidth (MHz)	Channel	Frequency (MHz)	OBW (MHz)	-26dB BW (MHz)
Band 5	5	4132	826.4	4.11	4.78
		4183	836.6	4.11	4.78
		4233	846.6	4.14	4.78
Band 2	5	9262	1932.4	4.11	4.57
		9400	1880	4.14	4.54
		9538	1907.6	4.11	4.54

WCDMA Band 5 Downlink Mid Channel 99% OBW



Date: 17.APR.2016 14:14:00

WCDMA Band 5 Downlink Mid Channel -26dB BW



Date: 17.APR.2016 14:14:31

WCDMA Band 2 Downlink Mid Channel 99% OBW



Date: 17 APR.2016 13:53:05

WCDMA Band 2 Downlink Mid Channel -26dB BW



Date: 17 APR.2016 13:53:37

WCDMA Band 5 Uplink Mid Channel 99% OBW



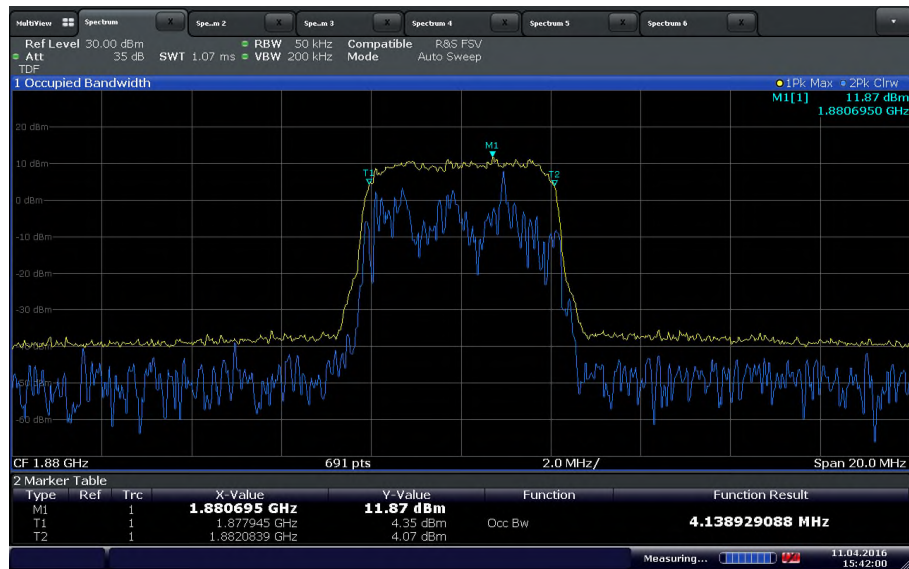
Date: 13 APR.2016 14:35:50

WCDMA Band 5 Uplink Mid Channel -26dB BW



Date: 13 APR.2016 14:36:49

WCDMA Band 2 Uplink Mid Channel 99% OBW



Date: 11.APR.2016 15:41:59

WCDMA Band 2 Uplink Mid Channel -26dB BW



Date: 11.APR.2016 15:42:45

2.5 PEAK-AVERAGE RATIO

2.5.1 Specification Reference

FCC 47 CFR Part 24, Clause 24.232 (d)
RSS-132, Clause 5.4
RSS-133, Clause 6.4

2.5.2 Standard Applicable

FCC Part 24:

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 (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13dB

RSS-132 and RSS-133:

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

2.5.3 Equipment Under Test and Modification State

Serial No: 258602000335 (NU) and 25955100346 (CU) / Test Configuration A and B

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

April 11,13, 14 and May 04, 2016/XYZ

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	23.5 - 27.0°C
Relative Humidity	41.8 - 49.8%
ATM Pressure	98.7 - 99.3kPa



2.5.7 Additional Observations

- This is a conducted test. Test procedure is per Section 5.7 of KDB971168 (D01 Power Meas License Digital Systems v02r02).
- The transducer factor (TDF) used is from the external attenuators and cables used.
- 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.
- Procedure is per Section 5.7.1 of KDB971168.
- RBW was set to maximum the SA can support.
- The maximum PAR level associated with a probability of 0.1% was recorded.
- There are no measured PAR levels greater than 13dB. EUT complies.
- Only test plots for middle channel were presented as the representative configuration.

2.5.8 Test Results

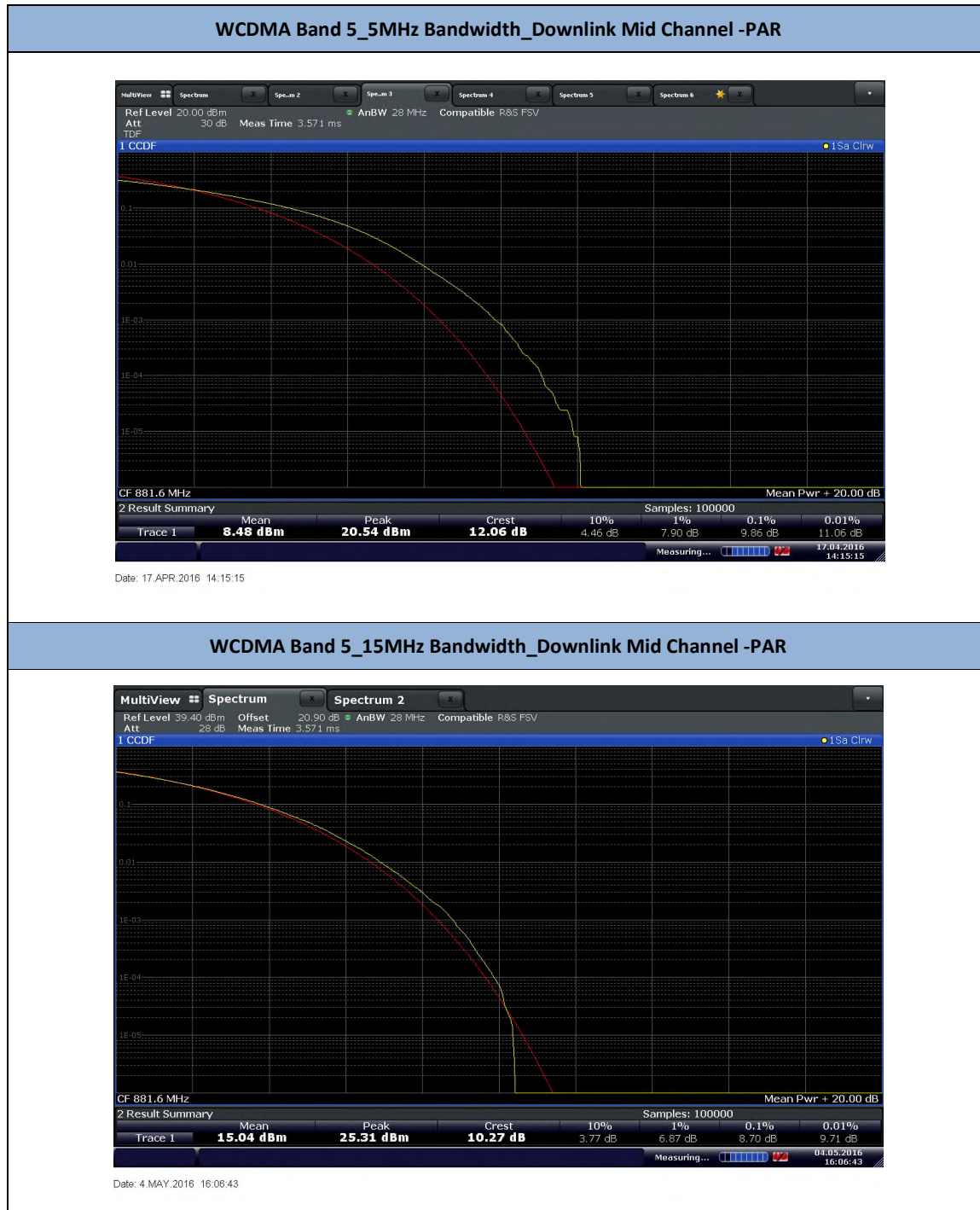
WCDMA Downlink				
Band	Bandwidth (MHz)	Channel	Frequency (MHz)	PAR (dB)
Band 5	5	4357	871.4	9.91
		4408	881.6	12.06
		4458	891.6	10.28
	15	4357+4382+4407	871.4+876.4+881.4	10.63
		4383+4408+4433	876.6+881.6+886.6	10.27
		4408+4433+4458	881.6+886.6+891.6	10.15
Band 2	5	9662	1932.4	11.23
		9800	1960.0	11.71
		9938	1987.6	10.99
	20	9662+9687+9712+9737	1932.4+1937.4+1942.4+1947.4	10.09
		9775+9800+9825+9850	1955+1960+1965+1970	11.43
		9863+9888+9913+9938	1972.6+1977.6+1982.6+1987.6	10.50

FCC ID: NU: YETQ34-251366NU
 CU: YETQ34-251366CU
 IC: NU: 9298A-Q34251366NU
 CU: 9298A-Q34251366CU
 Report No. SD72121022-1016E



WCDMA Uplink				
Band	Bandwidth (MHz)	Channel	Frequency (MHz)	PAR (dB)
Band 5	5	4132	826.4	10.75
		4183	836.6	10.67
		4233	846.6	11.13
Band 2	5	9262	1852.4	10.53
		9400	1880.0	10.66
		9538	1907.6	10.28

2.5.9 Sample Test Plot



WCDMA Band 2_5MHz Bandwidth_Downlink Mid Channel -PAR



Date: 17 APR 2016 13:54:17

WCDMA Band 2_20MHz Bandwidth_Downlink Mid Channel -PAR



Date: 4 MAY 2016 15:51:19

WCDMA Band 5_5MHz Bandwidth_Uplink Mid Channel -PAR



WCDMA Band 2_5MHz Bandwidth_Uplink Mid Channel -PAR



2.6 BAND EDGE

2.6.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1051
FCC 47 CFR Part 22, Clause 22.917(a)
FCC 47 CFR Part 24, Clause 24.238(a)
RSS-132, Clause 5.5
RSS-133, Clause 6.5

2.6.2 Standard Applicable

In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} P$ (watts).

2.6.3 Equipment Under Test and Modification State

Serial No: 258602000335 (NU) and 25955100346 (CU) / Test Configuration A and B

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

April 11, 13, 14, 29 and May 2, 2016/XYZ

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.

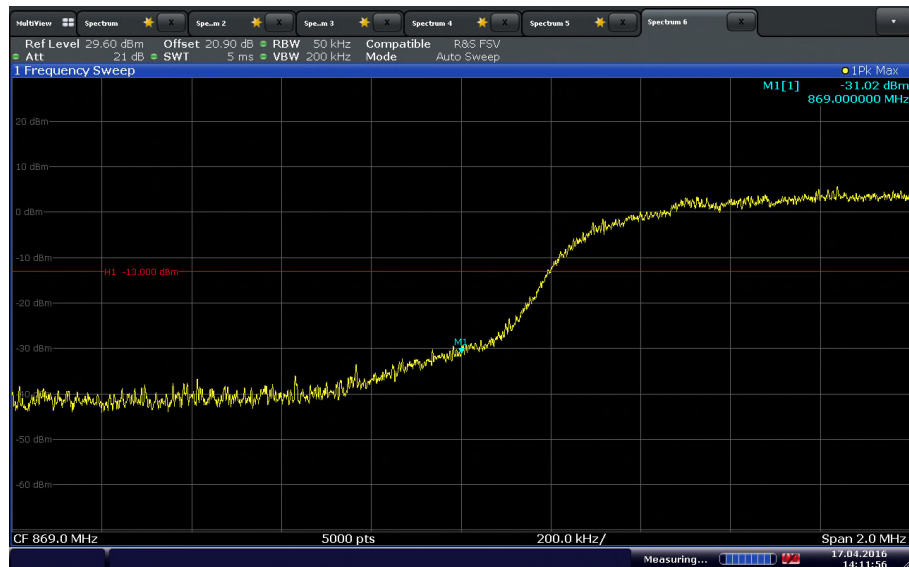
Ambient Temperature	23.5 - 26.9°C
Relative Humidity	35.9 - 49.8%
ATM Pressure	98.7 - 99.3kPa

2.6.7 Additional Observations

- 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.

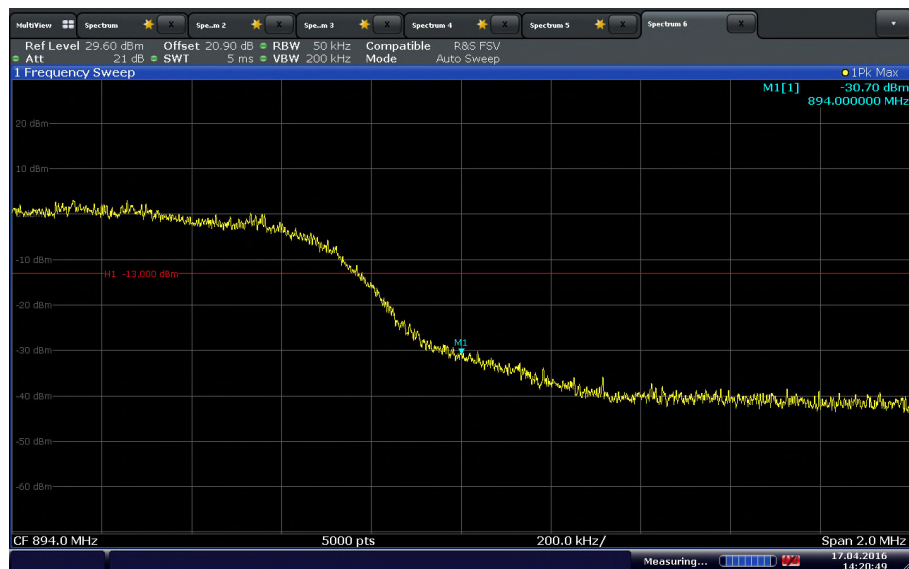
2.6.8 Test Results

WCDMA Band 5_5MHz Bandwidth_Downlink Low Channel Band Edge



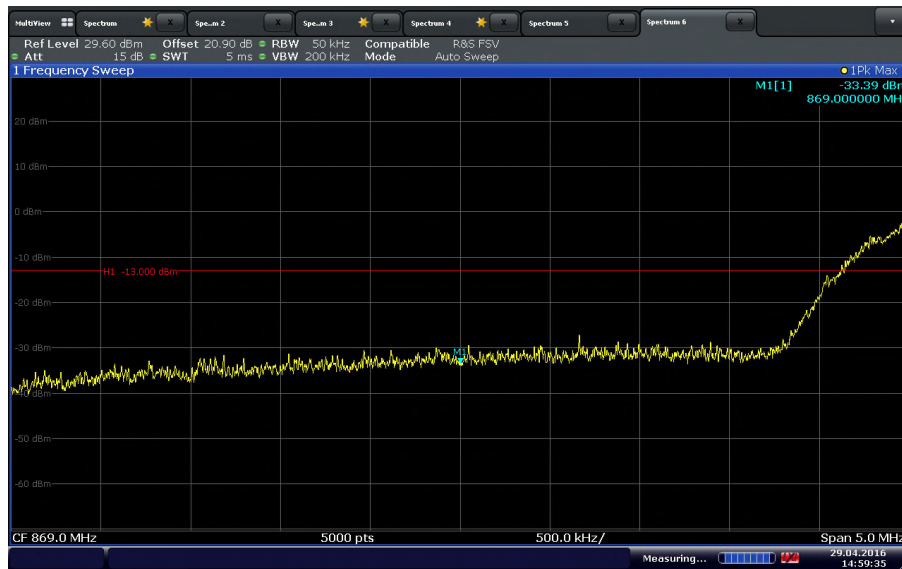
Date: 17.APR.2016 14:11:56

WCDMA Band 5_5MHz Bandwidth_Downlink High Channel Band Edge



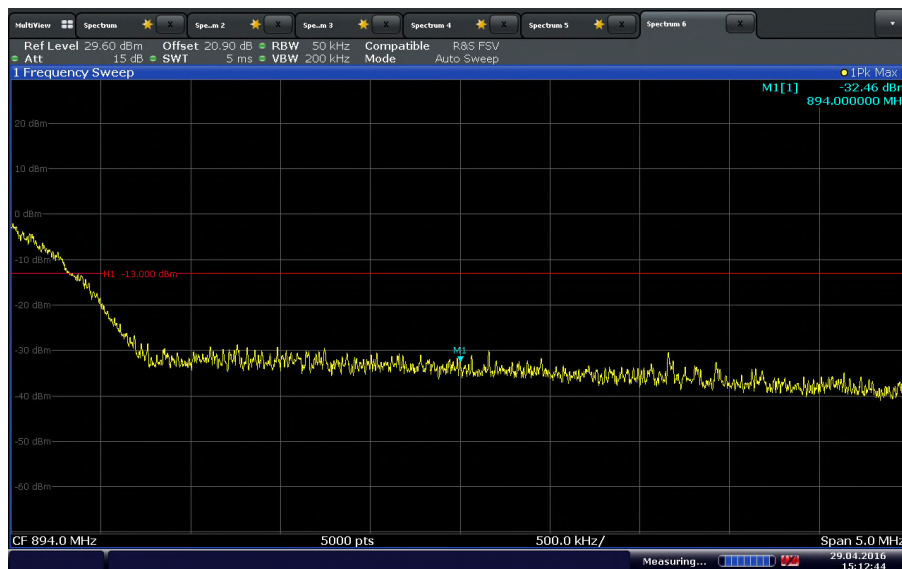
Date: 17.APR.2016 14:20:49

WCDMA Band 5_15MHz Bandwidth_Downlink Low Channel Band Edge



Date: 29.APR.2016 14:59:36

WCDMA Band 5_15MHz Bandwidth_Downlink High Channel Band Edge



Date: 29.APR.2016 15:12:44

WCDMA Band 2_5MHz Bandwidth_Downlink Low Channel Band Edge



Date: 17.APR.2016 13:50:39

WCDMA Band 2_5MHz Bandwidth_Downlink High Channel Band Edge



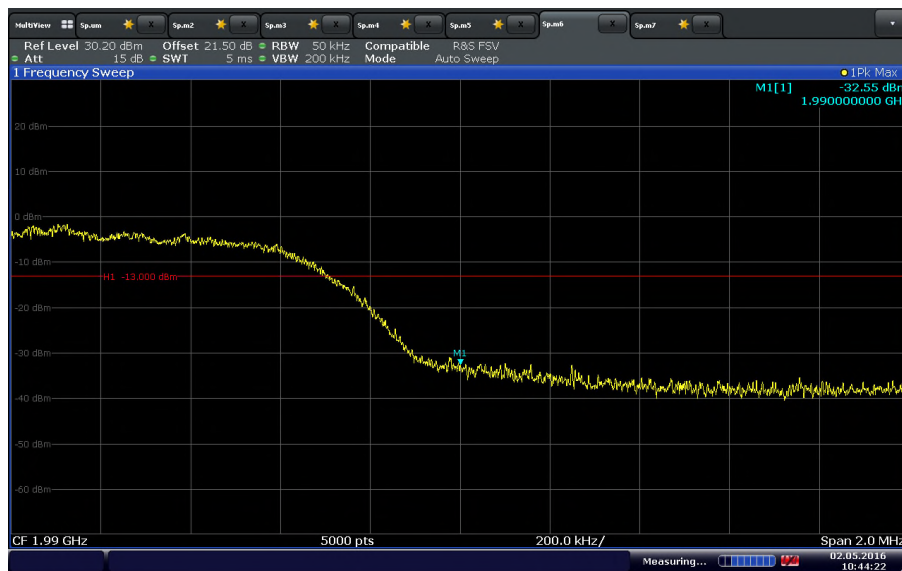
Date: 17.APR.2016 14:00:14

WCDMA Band 2_20MHz Bandwidth_Downlink Low Channel Band Edge



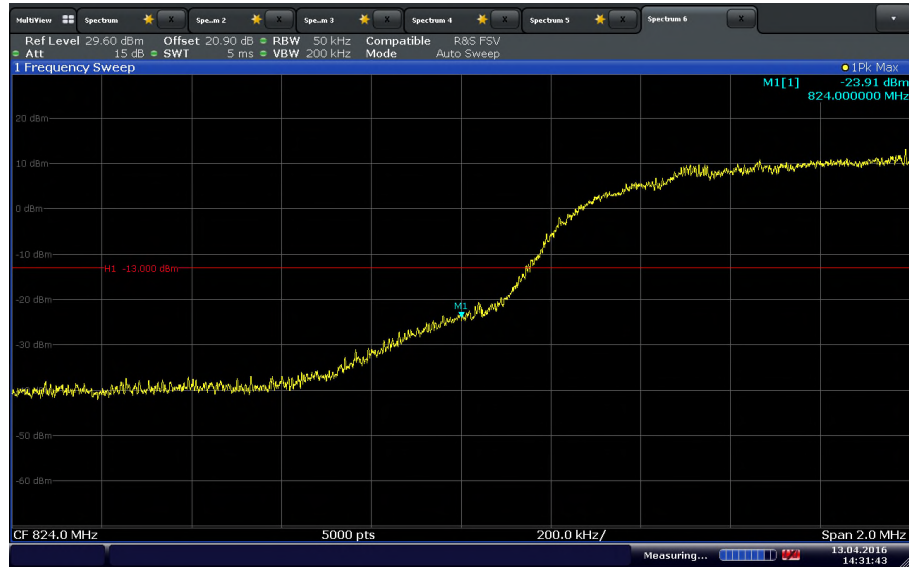
Date: 2 MAY 2016 10:28:45

WCDMA Band 2_20MHz Bandwidth_Downlink High Channel Band Edge



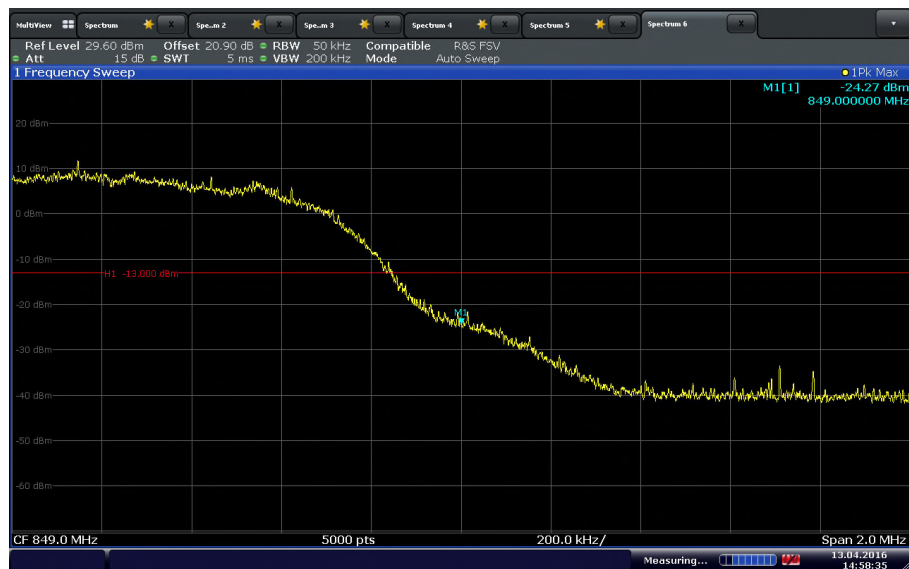
Date: 2 MAY 2016 10:44:22

WCDMA Band 5_5MHz Bandwidth_Uplink Low Channel Band Edge



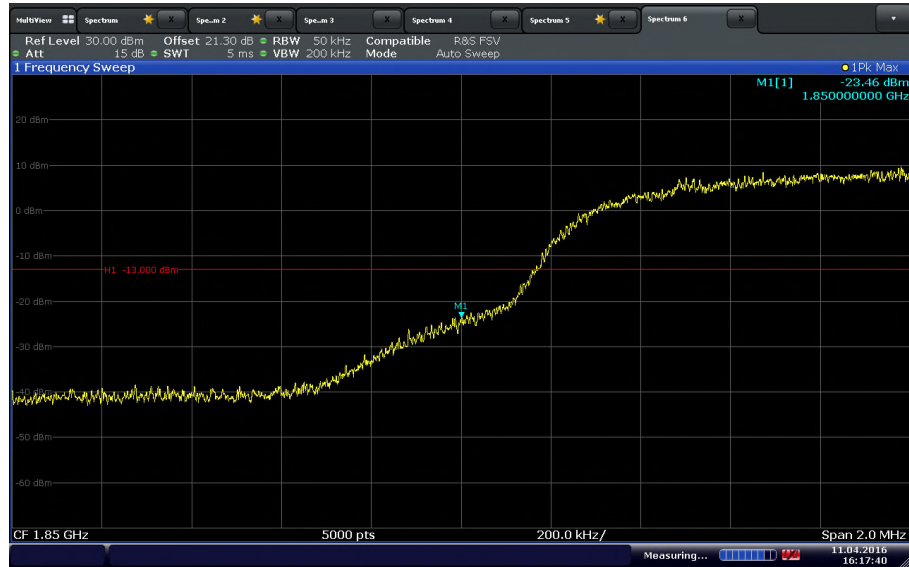
Date: 13.APR.2016 14:31:43

WCDMA Band 5_5MHz Bandwidth_Uplink High Channel Band Edge

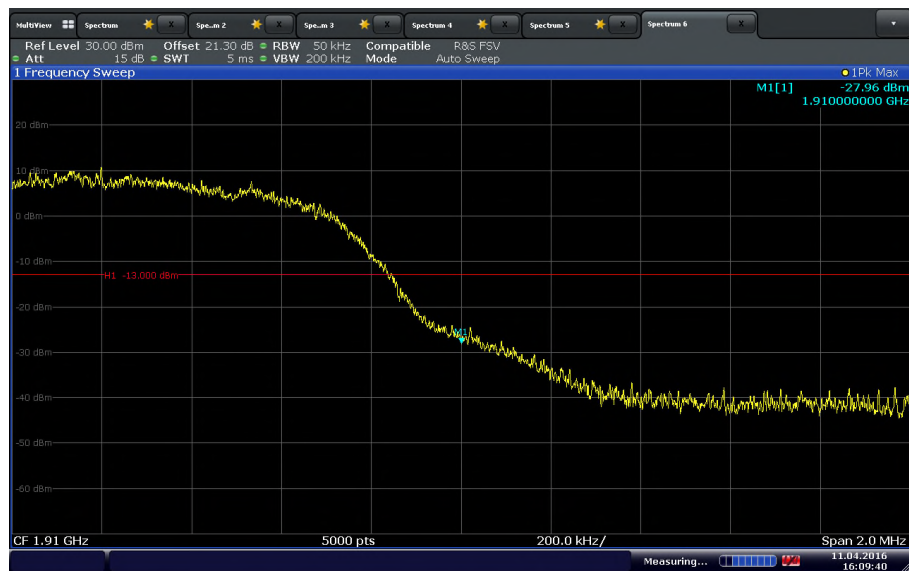


Date: 13.APR.2016 14:38:35

WCDMA Band 2_5MHz Bandwidth_Uplink Low Channel Band Edge



WCDMA Band 2_5MHz Bandwidth_Uplink High Channel Band Edge





2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1051
FCC 47 CFR Part 22, Clause 22.917(a)
FCC 47 CFR Part 24, Clause 24.238(a)
RSS-132, Clause 5.5
RSS-133, Clause 6.5

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: 258602000335 (NU) and 25955100346 (CU) / Test Configuration A and B

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

April 11, 13, 14, 29 and May 2, 2016/XYZ

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.

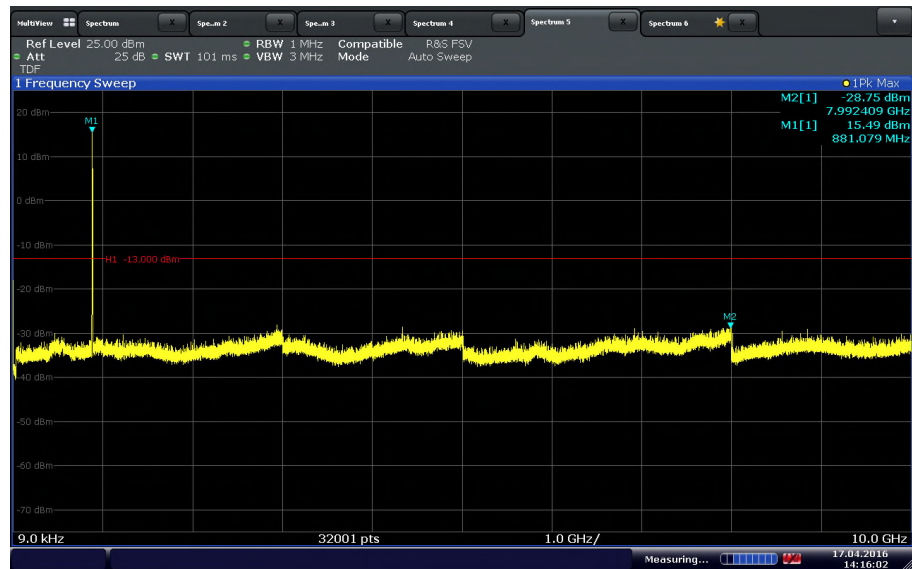
Ambient Temperature	23.5 - 26.9°C
Relative Humidity	35.9 - 49.8%
ATM Pressure	98.7 - 99.3kPa

2.7.7 Additional Observations

- This is a conducted test.
- The transducer factor (TDF) used is from the external attenuators and cables used.
- A resolution bandwidth of 1MHz was used.
- The limit is set to -13dBm.
- Only test plots for middle channel were presented as the representative configuration.

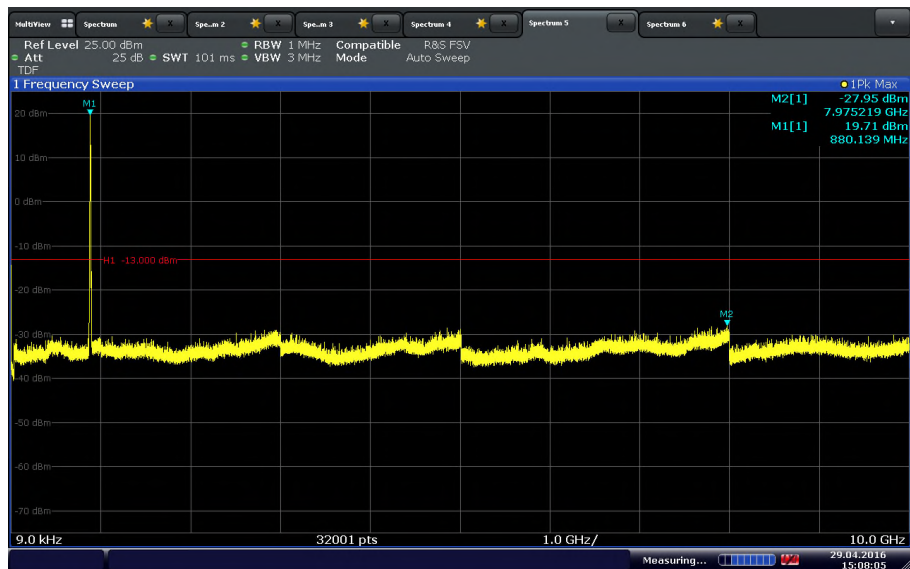
2.7.8 Test Results

WCDMA Band 5_5MHz Bandwidth_Downlink Mid Channel Conducted Spurious Emissions



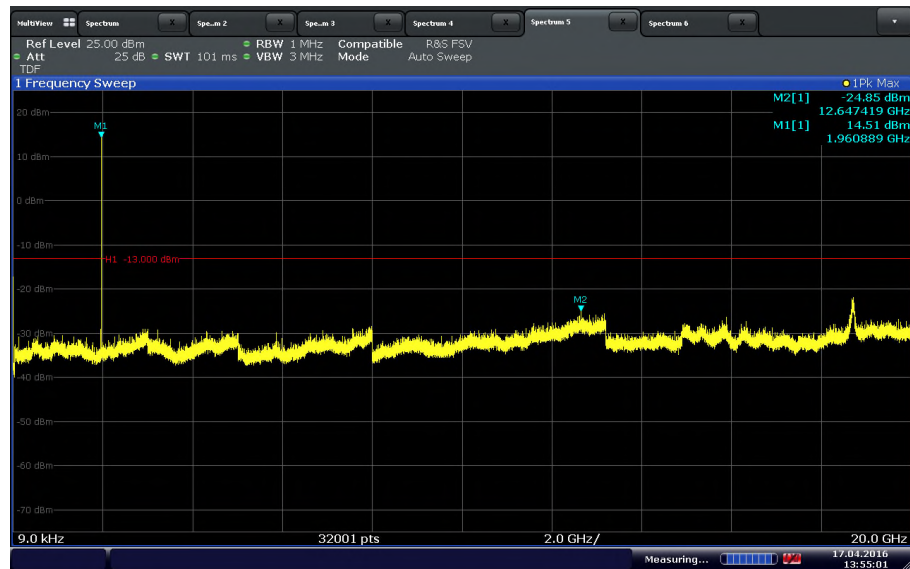
Date: 17.APR.2016 14:16:02

WCDMA Band 5_15MHz Bandwidth_Downlink Mid Channel Conducted Spurious Emissions

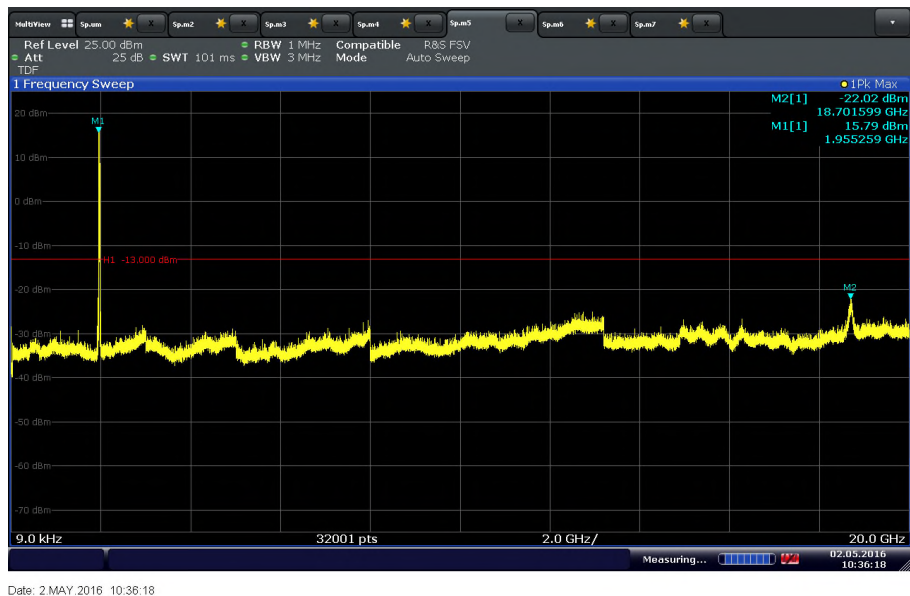


Date: 29.APR.2016 15:08:06

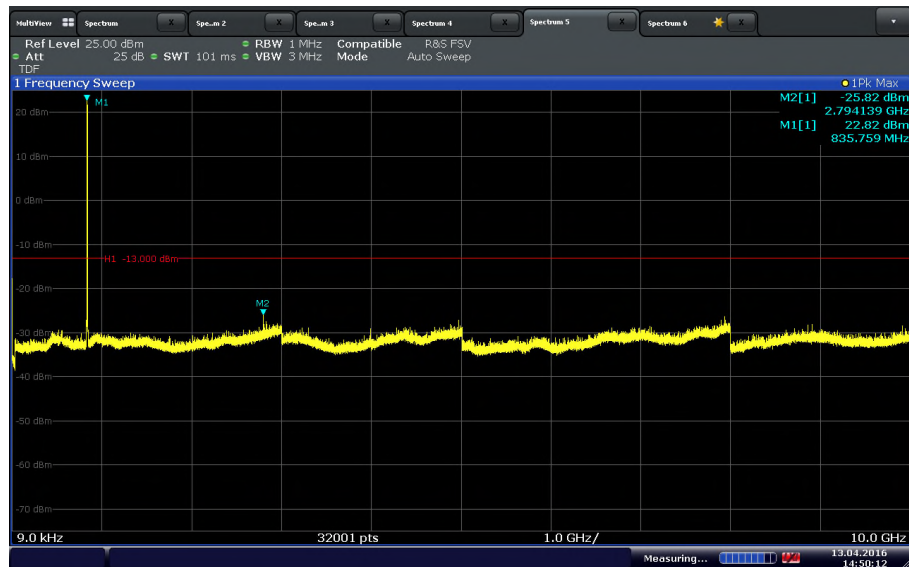
WCDMA Band 2_5MHz Bandwidth_Downlink Mid Channel Conducted Spurious Emissions



WCDMA Band 2_20MHz Bandwidth_Downlink Mid Channel Conducted Spurious Emissions

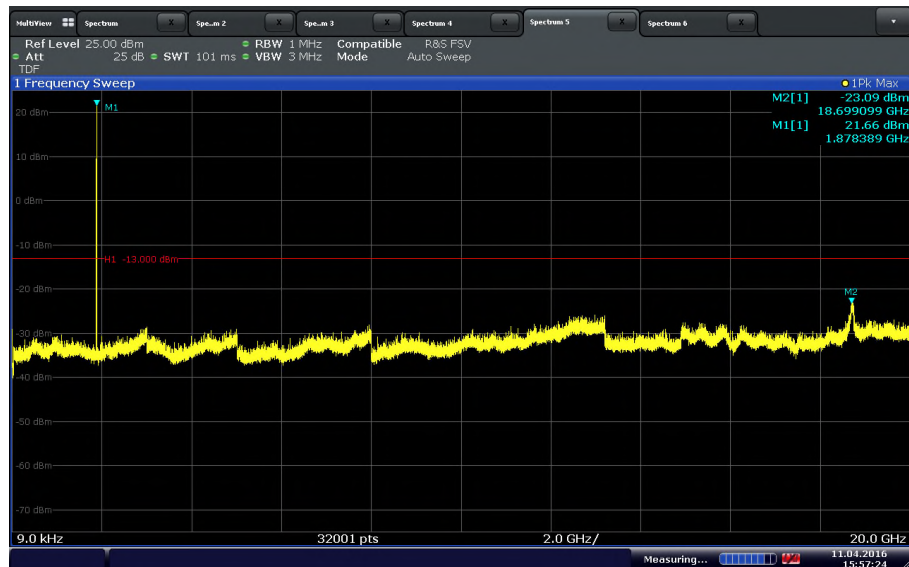


WCDMA Band 5_5MHz Bandwidth_Uplink Mid Channel Conducted Spurious Emissions



Date: 13.APR.2016 14:50:11

WCDMA Band 2_5MHz Bandwidth_Uplink Mid Channel Conducted Spurious Emissions



Date: 11.APR.2016 15:57:25

2.8 FIELD STRENGTH OF SPURIOUS RADIATION

2.8.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1053
FCC 47 CFR Part 22, Clause 22.917(a)
FCC 47 CFR Part 24, Clause 24.238(a)
RSS-132, Clause 5.5
RSS-133, Clause 6.5

2.8.2 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.

2.8.3 Equipment Under Test and Modification State

Serial No: 258602000335 (NU) and 25955100346 (CU) / Test Configuration C and D

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

April 19 and May 05, 2016/XYZ

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

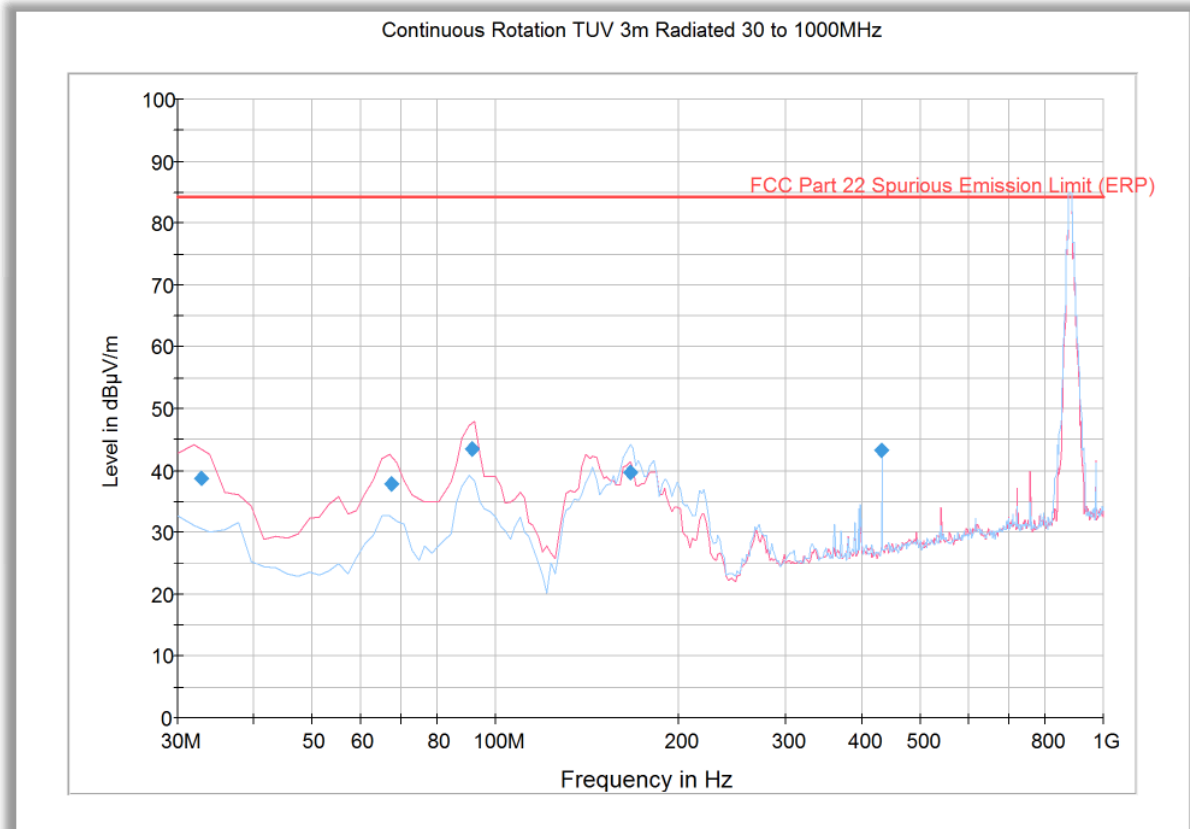
Test performed at TÜV SÜD America Inc. Rancho Bernardo facility.

Ambient Temperature	22.3 - 26.6°C
Relative Humidity	32.5 - 43.7%
ATM Pressure	98.9 - 99.6kPa

2.8.7 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.

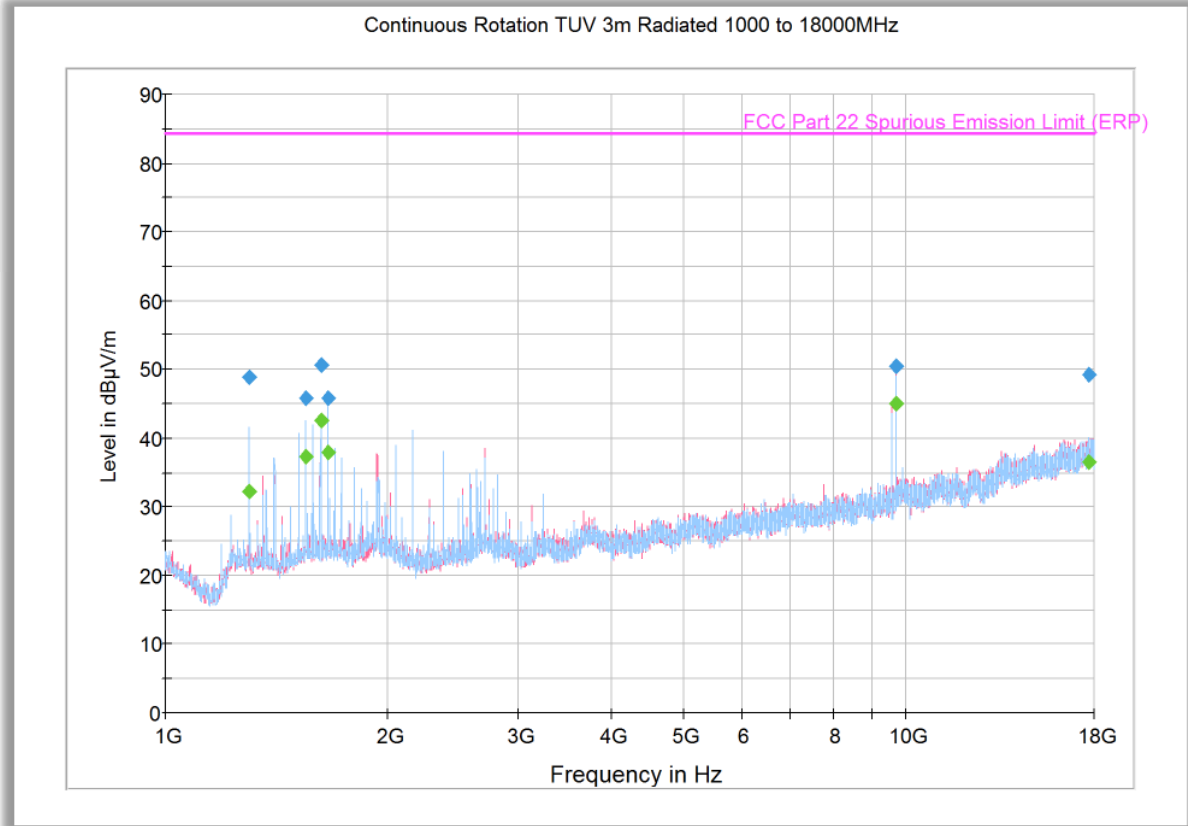
2.8.8 Test Results Below 1GHz (B5 Downlink Worst Case Configuration) - 15MHz Bandwidth Middle Channel



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)
32.800000	38.7	1000.0	120.000	115.0	V	197.0	-7.4	45.6	84.4
67.533868	38.0	1000.0	120.000	150.0	V	219.0	-16.7	46.4	84.4
91.364409	43.5	1000.0	120.000	100.0	V	207.0	-15.2	40.8	84.4
166.272144	39.7	1000.0	120.000	201.0	H	194.0	-13.0	44.7	84.4
431.984770	43.3	1000.0	120.000	150.0	H	105.0	-3.7	41.0	84.4
885.094509	102.9	1000.0	120.000	100.0	H	189.0	5.6	Fundamental	

2.8.9 Test Results Above 1GHz (B5 Downlink Worst Case Configuration) - 15MHz Bandwidth Middle Channel



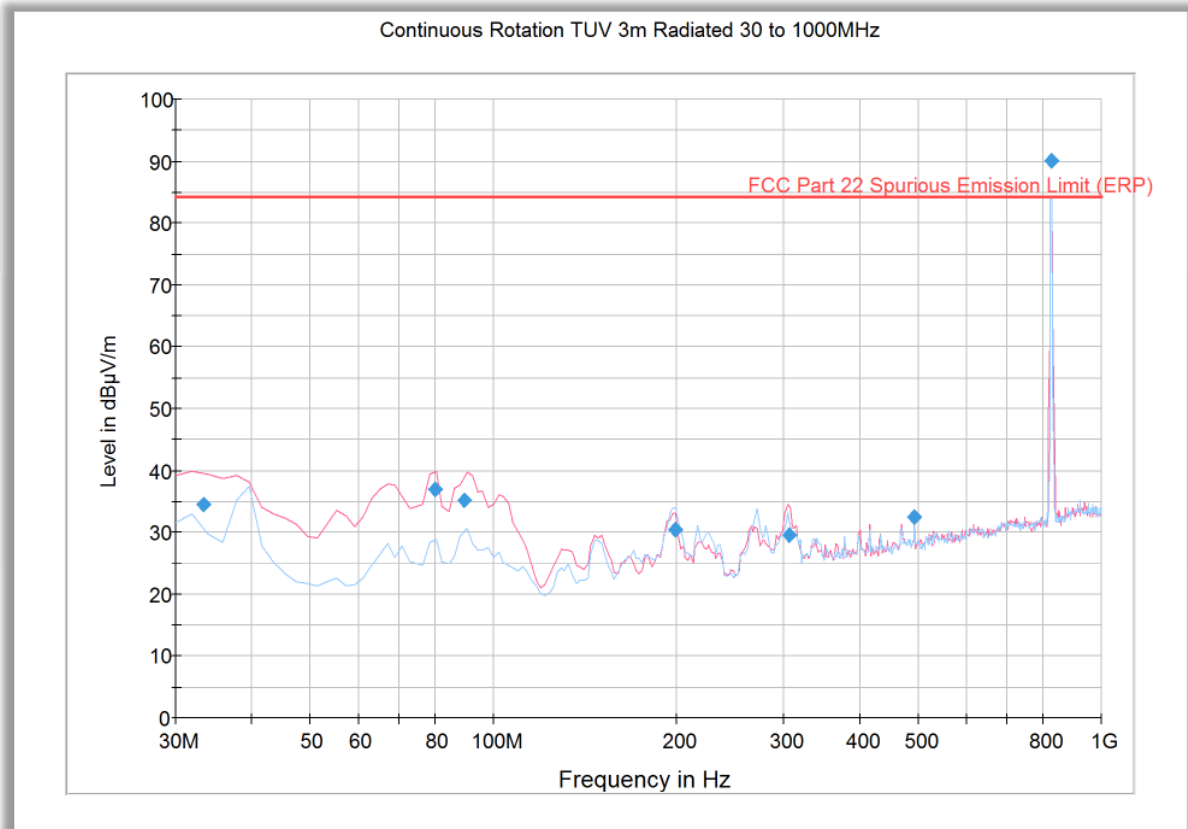
Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1296.000000	48.9	1000.0	1000.000	149.6	H	186.0	-8.4	35.5	84.4
1548.166667	45.8	1000.0	1000.000	117.7	H	338.0	-8.5	38.5	84.4
1620.133333	50.6	1000.0	1000.000	311.2	H	33.0	-8.4	33.8	84.4
1656.033333	45.9	1000.0	1000.000	201.5	H	-9.0	-8.1	38.5	84.4
9702.266667	50.4	1000.0	1000.000	345.1	V	315.0	7.3	34.0	84.4
17660.766667	49.3	1000.0	1000.000	141.7	H	143.0	16.3	35.1	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)
1296.000000	32.3	1000.0	1000.000	149.6	H	186.0	-8.4	52.1	84.4
1548.166667	37.4	1000.0	1000.000	117.7	H	338.0	-8.5	47.0	84.4
1620.133333	42.7	1000.0	1000.000	311.2	H	33.0	-8.4	41.7	84.4
1656.033333	37.9	1000.0	1000.000	201.5	H	-9.0	-8.1	46.5	84.4
9702.266667	45.0	1000.0	1000.000	345.1	V	315.0	7.3	39.3	84.4
17660.766667	36.6	1000.0	1000.000	141.7	H	143.0	16.3	47.8	84.4

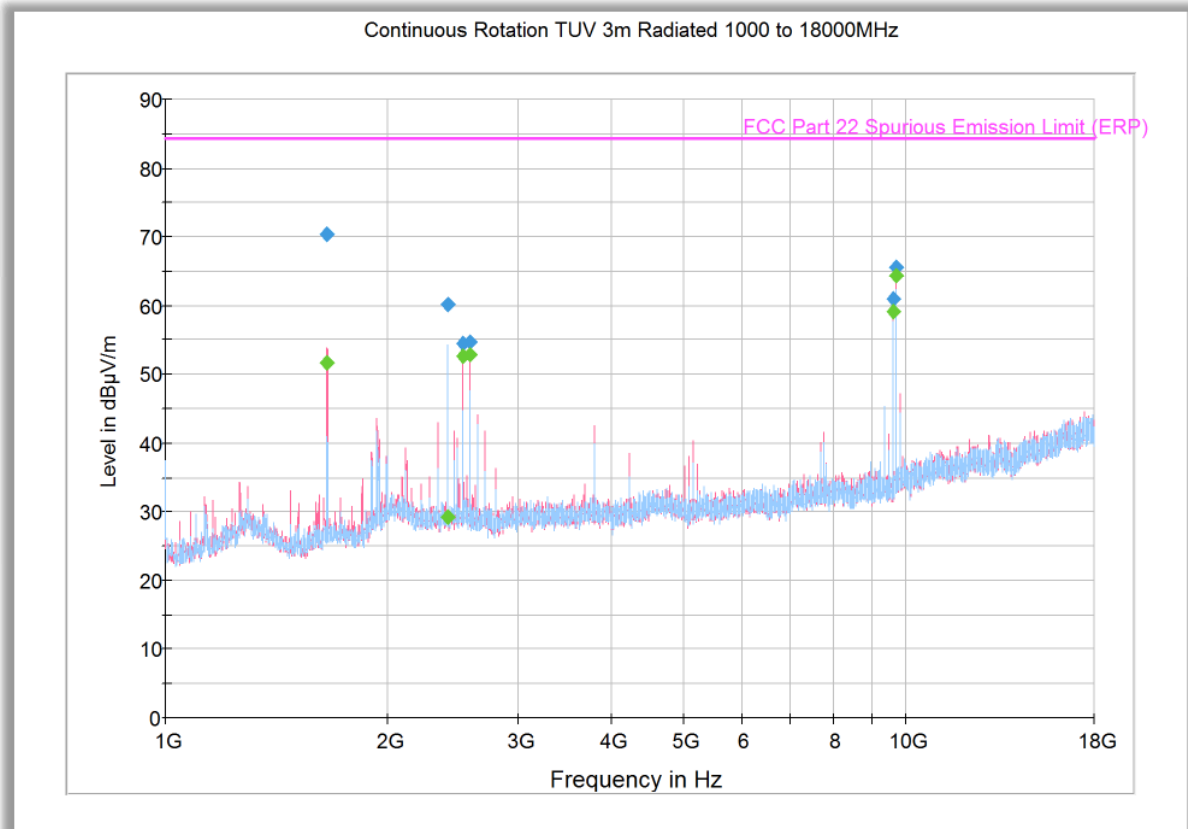
2.8.10 Test Results Below 1GHz (B5 Uplink Worst Case Configuration) - 5MHz Bandwidth Low Channel



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)
33.320000	34.6	1000.0	120.000	115.0	V	221.0	-7.6	49.7	84.4
80.021082	37.0	1000.0	120.000	106.0	V	18.0	-16.6	47.4	84.4
89.620521	35.1	1000.0	120.000	115.0	V	260.0	-15.5	49.3	84.4
199.438236	30.6	1000.0	120.000	250.0	H	16.0	-11.5	53.8	84.4
306.848176	29.6	1000.0	120.000	109.0	V	357.0	-6.8	54.8	84.4
491.525291	32.6	1000.0	120.000	100.0	V	138.0	-1.8	51.8	84.4
826.097876	90.1	1000.0	120.000	110.0	V	252.0	4.6	Fundamental	

2.8.11 Test Results Above 1GHz (B5 Uplink Worst Case Configuration) - 5MHz Bandwidth Low Channel



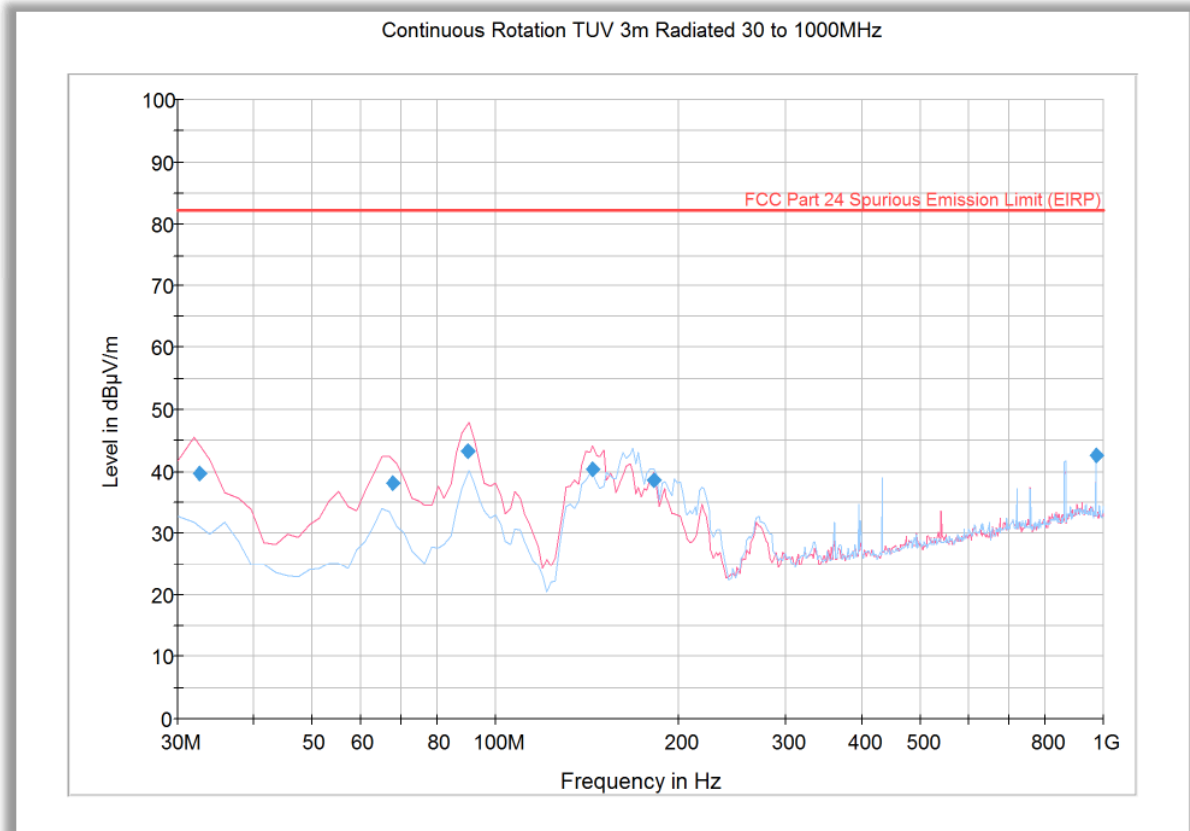
Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1652.233333	70.4	1000.0	1000.000	103.7	V	87.0	-5.0	14.0	84.4
2402.133333	60.1	1000.0	1000.000	290.2	H	94.0	-1.1	24.3	84.4
2519.066667	54.5	1000.0	1000.000	99.7	V	139.0	-0.6	29.9	84.4
2580.633333	54.7	1000.0	1000.000	103.7	V	153.0	-0.6	29.7	84.4
9603.500000	60.9	1000.0	1000.000	387.0	V	134.0	10.1	23.5	84.4
9714.566667	65.6	1000.0	1000.000	153.7	V	152.0	10.3	18.8	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)
1652.233333	51.7	1000.0	1000.000	103.7	V	87.0	-5.0	32.7	84.4
2402.133333	29.2	1000.0	1000.000	290.2	H	94.0	-1.1	55.2	84.4
2519.066667	52.6	1000.0	1000.000	99.7	V	139.0	-0.6	31.7	84.4
2580.633333	52.9	1000.0	1000.000	103.7	V	153.0	-0.6	31.5	84.4
9603.500000	59.1	1000.0	1000.000	387.0	V	134.0	10.1	25.3	84.4
9714.566667	64.4	1000.0	1000.000	153.7	V	152.0	10.3	20.0	84.4

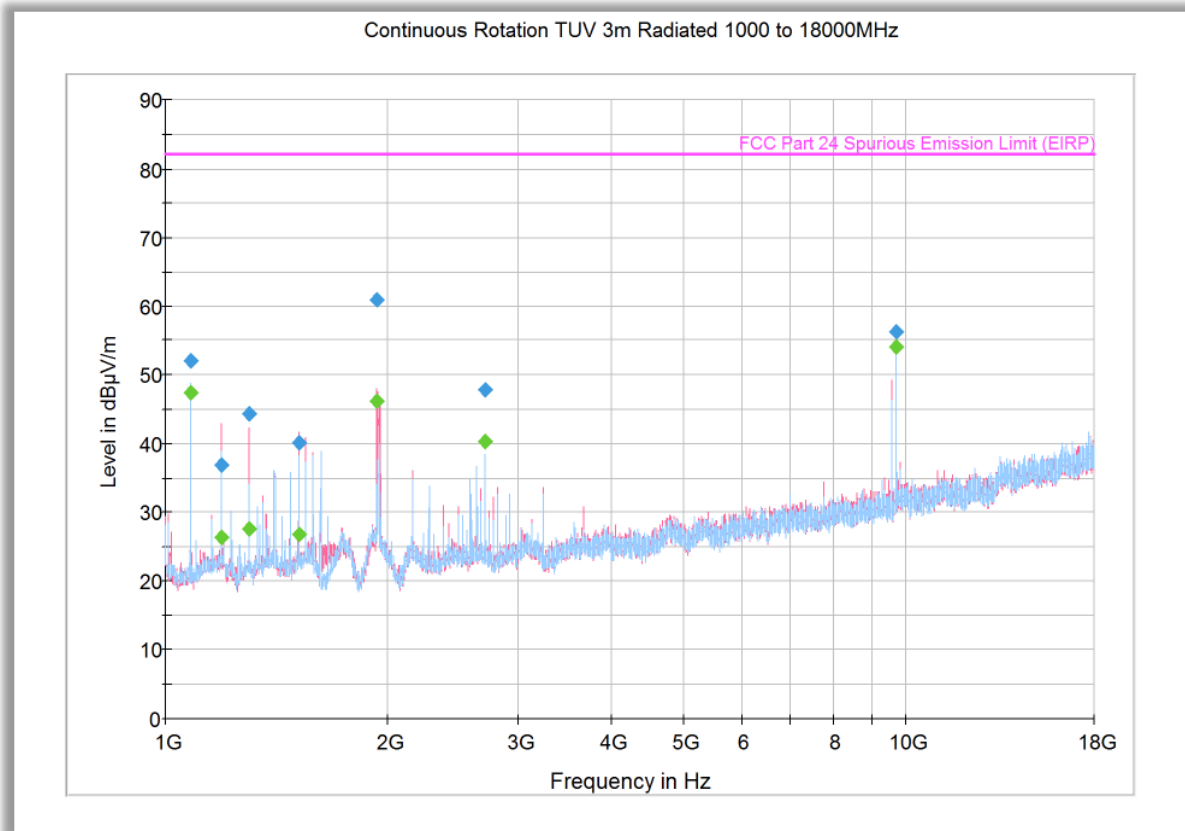
2.8.12 Test Results Below 1GHz (B2 Downlink Worst Case Configuration) - 20MHz Bandwidth Low Channel



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)
32.680000	39.6	1000.0	120.000	100.0	V	111.0	-7.3	42.6	82.2
67.669980	38.0	1000.0	120.000	115.0	V	186.0	-16.7	44.2	82.2
90.140521	43.3	1000.0	120.000	100.0	V	205.0	-15.4	39.0	82.2
144.569379	40.5	1000.0	120.000	100.0	V	103.0	-13.9	41.8	82.2
181.983246	38.6	1000.0	120.000	179.0	H	188.0	-12.1	43.6	82.2
971.985571	42.6	1000.0	120.000	100.0	H	228.0	6.0	39.6	82.2

2.8.13 Test Results Above 1GHz (B2 Downlink Worst Case Configuration) - 20MHz Bandwidth Low Channel



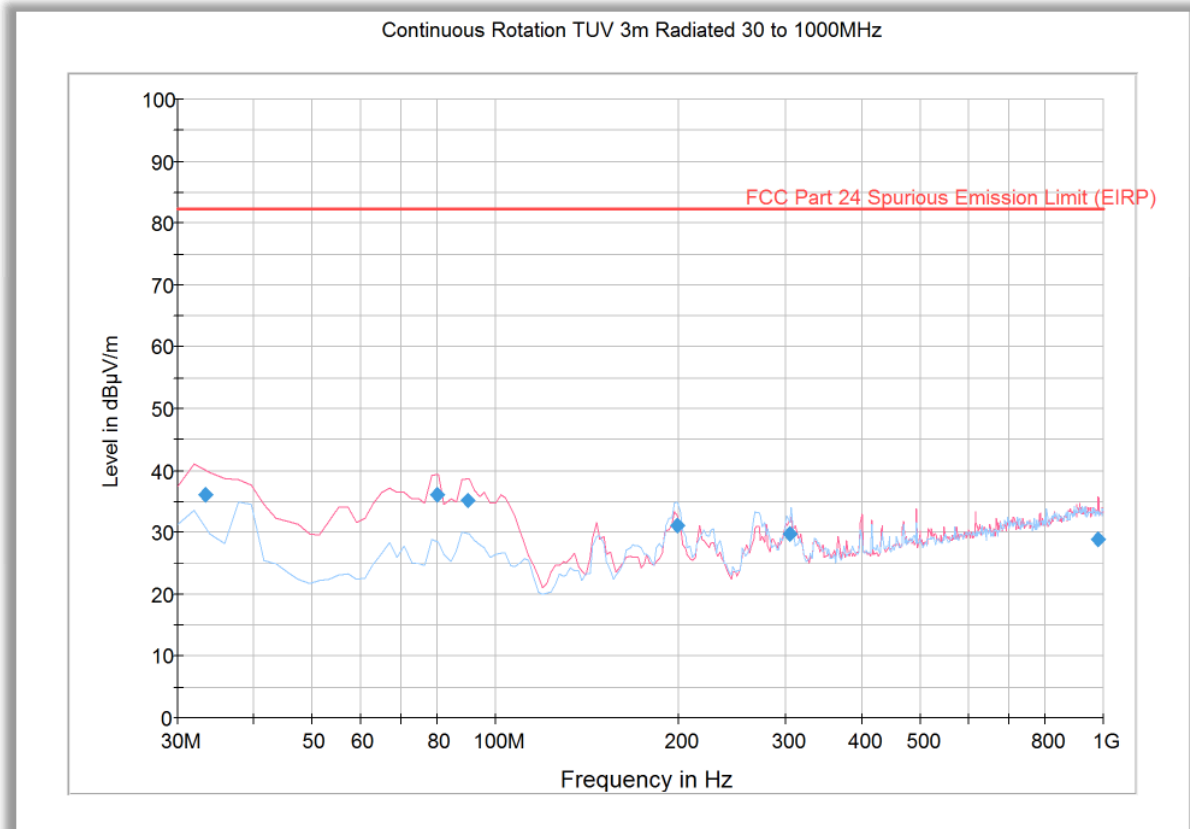
Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1079.700000	52.0	1000.0	1000.000	139.7	H	159.0	-10.5	30.3	82.2
1188.366667	37.0	1000.0	1000.000	182.6	V	233.0	-10.1	45.2	82.2
1296.000000	44.4	1000.0	1000.000	148.7	V	292.0	-8.4	37.9	82.2
1511.500000	40.1	1000.0	1000.000	132.7	V	301.0	-9.1	42.1	82.2
1931.266667	61.0	1000.0	1000.000	333.1	V	242.0	-6.5	Fundamental	
2700.033333	47.8	1000.0	1000.000	117.7	H	99.0	-6.0	34.4	82.2
9703.233333	56.4	1000.0	1000.000	200.5	H	0.0	7.3	25.9	82.2

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1079.700000	47.4	1000.0	1000.000	139.7	H	159.0	-10.5	34.8	82.2
1188.366667	26.5	1000.0	1000.000	182.6	V	233.0	-10.1	55.8	82.2
1296.000000	27.7	1000.0	1000.000	148.7	V	292.0	-8.4	54.5	82.2
1511.500000	26.9	1000.0	1000.000	132.7	V	301.0	-9.1	55.3	82.2
1931.266667	46.3	1000.0	1000.000	333.1	V	242.0	-6.5	Fundamental	
2700.033333	40.3	1000.0	1000.000	117.7	H	99.0	-6.0	41.9	82.2
9703.233333	54.1	1000.0	1000.000	200.5	H	0.0	7.3	28.1	82.2

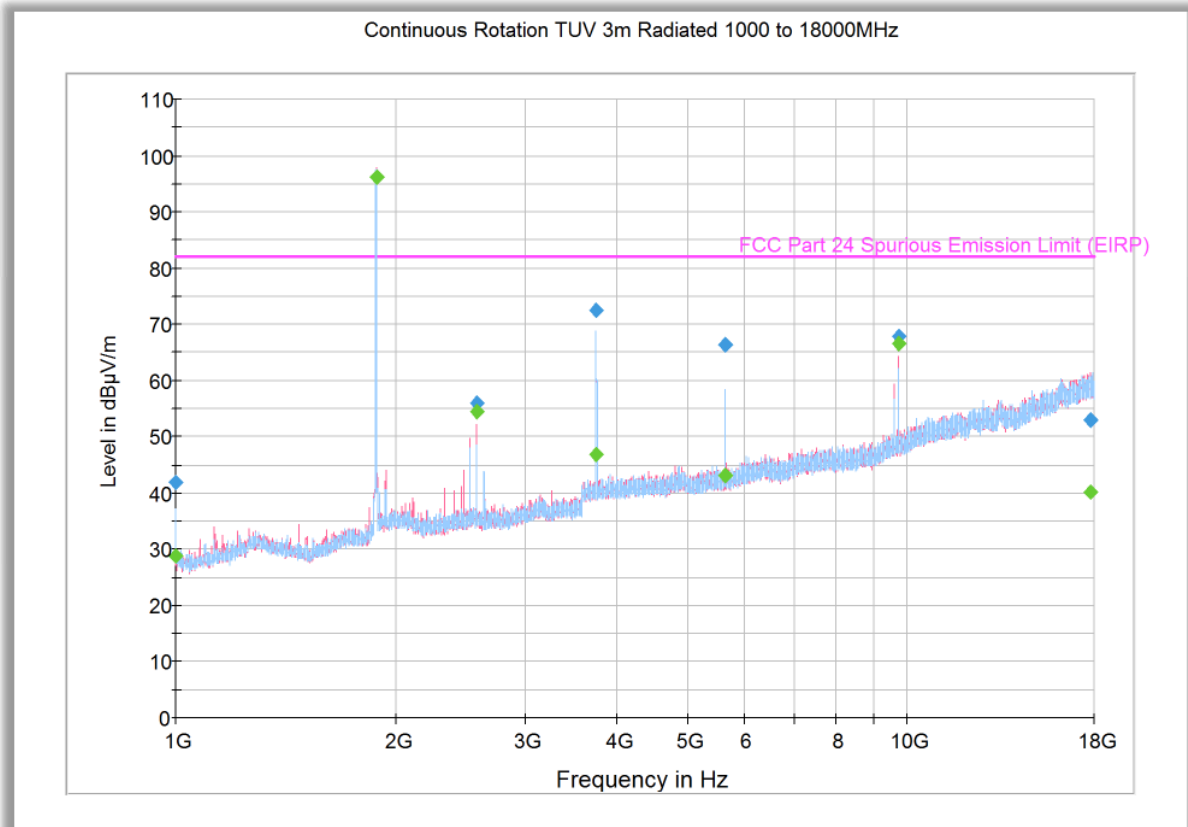
2.8.14 Test Results Below 1GHz (B2 Uplink Worst Case Configuration) - 5MHz Bandwidth Middle Channel



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)
33.280000	36.2	1000.0	120.000	100.0	V	324.0	-7.6	46.0	82.2
80.021082	36.2	1000.0	120.000	109.0	V	20.0	-16.6	46.0	82.2
90.020521	35.1	1000.0	120.000	109.0	V	241.0	-15.4	47.1	82.2
199.478236	31.2	1000.0	120.000	220.0	H	334.0	-11.5	51.1	82.2
305.312064	29.9	1000.0	120.000	100.0	H	122.0	-6.7	52.3	82.2
980.881122	28.9	1000.0	120.000	373.0	V	221.0	5.9	53.4	82.2
33.280000	36.2	1000.0	120.000	100.0	V	324.0	-7.6	46.0	82.2

2.8.15 Test Results Above 1GHz (B2 Uplink Worst Case Configuration) - 5MHz Bandwidth Middle 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)
1000.000000	42.0	1000.0	1000.000	290.2	H	-10.0	-7.8	40.2	82.2
1880.966667	111.7	1000.0	1000.000	215.5	V	-10.0	-2.0	Fundamental	
2580.633333	56.1	1000.0	1000.000	124.7	V	150.0	-0.6	26.1	82.2
3757.833333	72.6	1000.0	1000.000	197.5	H	110.0	1.6	9.6	82.2
5639.700000	66.3	1000.0	1000.000	198.5	H	122.0	4.3	16.0	82.2
9714.200000	67.7	1000.0	1000.000	219.4	V	140.0	10.3	14.5	82.2

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	28.8	1000.0	1000.000	290.2	H	-10.0	-7.8	53.4	82.2
1880.966667	96.3	1000.0	1000.000	215.5	V	-10.0	-2.0	Fundamental	
2580.633333	54.5	1000.0	1000.000	124.7	V	150.0	-0.6	27.8	82.2
3757.833333	46.8	1000.0	1000.000	197.5	H	110.0	1.6	35.5	82.2
5639.700000	43.2	1000.0	1000.000	198.5	H	122.0	4.3	39.0	82.2
9714.200000	66.6	1000.0	1000.000	219.4	V	140.0	10.3	15.7	82.2

2.9 FREQUENCY STABILITY

2.9.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1055
 FCC 47 CFR Part 22, Clause 22.355
 FCC 47 CFR Part 24, Clause 24.235
 RSS-132, Clause 5.3
 RSS-133, Clause 6.3

2.9.2 Standard Applicable

FCC Part 22.355:
 The carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table C-1 of this section.

TABLE C-1—FREQUENCY TOLERANCE FOR
TRANSMITTERS IN THE PUBLIC MOBILE SERVICES

Frequency range (MHz)	Base, fixed (ppm)	Mobile >3 watts (ppm)	Mobile ≤3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929	5.0	n/a	n/a
929 to 960	1.5	n/a	n/a
2110 to 2220	10.0	n/a	n/a

FCC Part 24.235:
 The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

RSS-132:
 The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations and ± 1.5 ppm for base stations.

RSS-133
 The carrier frequency shall not depart from the reference frequency, in excess of ± 2.5 ppm for mobile stations and ± 1.0 ppm for base stations.

2.9.3 Equipment Under Test and Modification State

Serial No: 258602000335 (NU) and 25955100346 (CU) / Test Configuration A and B

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

April 21 and 22, 2016/XYZ



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

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

Ambient Temperature	28.4 - 28.6°C
Relative Humidity	23.0 - 34.7%
ATM Pressure	98.8 - 99.0kPa

2.9.7 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.
- 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 analyser.
- 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.
- Middle Channel was tested as the representative configuration.

2.9.8 Test Results Summary

WCDMA B2 Downlink		
<i>Voltage (VAC)</i>	<i>Temperature (°C)</i>	<i>Frequency Deviation (Hz/ppm)</i>
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

WCDMA B2 Downlink		
<i>Temperature (°C)</i>	<i>Voltage (VAC)</i>	<i>Frequency Deviation (Hz/ppm)</i>
20	102	0 / 0
	138	0 / 0

WCDMA B2 Uplink		
<i>Voltage (VAC)</i>	<i>Temperature (°C)</i>	<i>Frequency Deviation (Hz/ppm)</i>
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

WCDMA B2 Uplink		
<i>Temperature (°C)</i>	<i>Voltage (VAC)</i>	<i>Frequency Deviation (Hz/ppm)</i>
20	102	0 / 0
	138	0 / 0

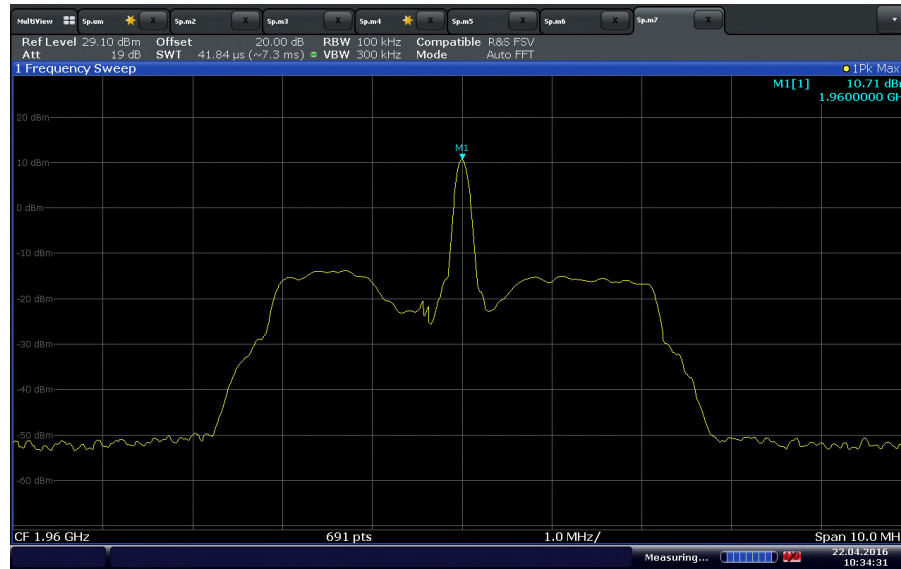
WCDMA B5 Downlink		
<i>Voltage (VAC)</i>	<i>Temperature (°C)</i>	<i>Frequency Deviation (Hz/ppm)</i>
120	-30	0 / 0
	-20	0 / 0
	-10	0 / 0
	0	0 / 0
	+10	0 / 0
	+20	0 / 0
	+30	0 / 0
	+40	0 / 0
	+50	0 / 0

WCDMA B5 Downlink		
<i>Temperature (°C)</i>	<i>Voltage (VAC)</i>	<i>Frequency Deviation (Hz/ppm)</i>
20	102	0 / 0
	138	0 / 0

WCDMA B5 Uplink		
<i>Voltage (VAC)</i>	<i>Temperature (°C)</i>	<i>Frequency Deviation (Hz/ppm)</i>
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

WCDMA B5 Uplink		
<i>Temperature (°C)</i>	<i>Voltage (VAC)</i>	<i>Frequency Deviation (Hz/ppm)</i>
20	102	0 / 0
	138	0 / 0

2.9.9 Sample Test Plots



Date: 22 APR 2016 10:34:32

WCDMA B2 Downlink Mid Channel 120VAC @ 20°C

2.10 POWER LINE CONDUCTED EMISSIONS

2.10.1 Specification Reference

RSS-Gen, Clause 8.8

2.10.2 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.*

2.10.3 Equipment Under Test and Modification State

Serial No: 258602000335 (NU) and 25955100346 (CU) / Test Configuration D

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

April 17, 2016/XYZ

2.10.5 Test Equipment Used

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

2.10.6 Environmental Conditions

Ambient Temperature	27.4°C
Relative Humidity	24.8%
ATM Pressure	99.0kPa

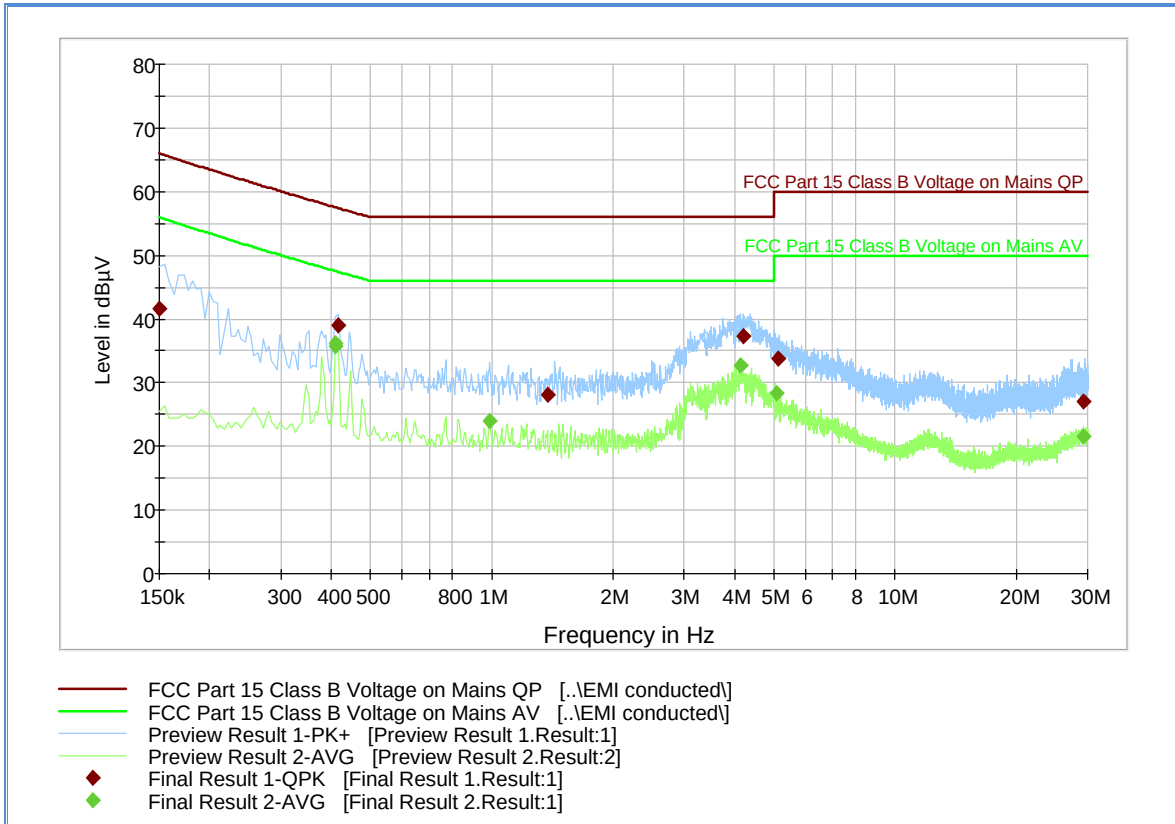
2.10.7 Additional Observations

- The EUT was verified using AC adapter supplied by the manufacturer..
- EUT (NU) 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 2.2.8 for sample computation.

2.10.8 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

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



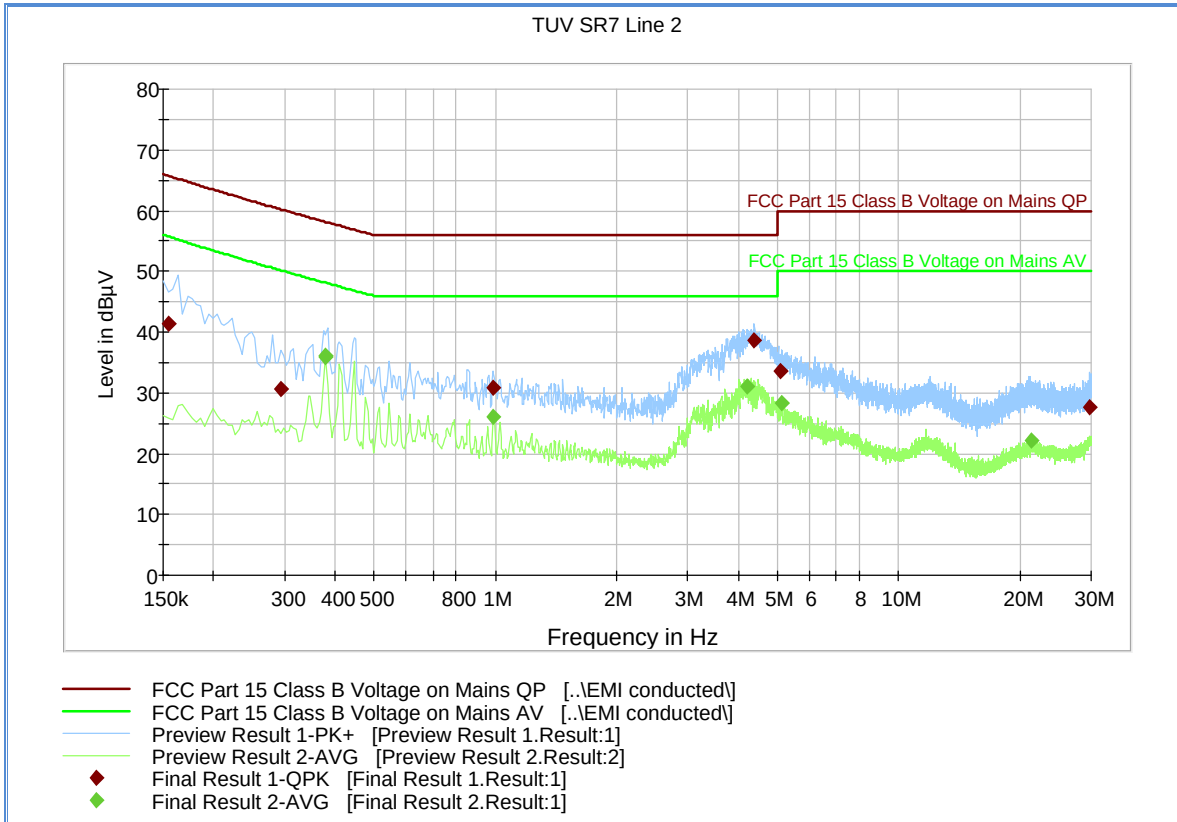
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.150000	41.7	1000.0	9.000	Off	L1	20.2	24.3	66.0
0.415500	39.0	1000.0	9.000	Off	L1	20.0	18.4	57.4
1.378500	28.1	1000.0	9.000	Off	L1	20.0	27.9	56.0
4.204500	37.2	1000.0	9.000	Off	L1	20.1	18.8	56.0
5.122500	33.7	1000.0	9.000	Off	L1	20.1	26.3	60.0
29.391000	27.0	1000.0	9.000	Off	L1	20.5	33.0	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.411000	35.8	1000.0	9.000	Off	L1	20.0	11.7	47.5
0.411000	36.3	1000.0	9.000	Off	L1	20.0	11.2	47.5
0.991500	24.0	1000.0	9.000	Off	L1	20.0	22.0	46.0
4.137000	32.7	1000.0	9.000	Off	L1	20.1	13.3	46.0
5.082000	28.3	1000.0	9.000	Off	L1	20.1	21.7	50.0
29.359500	21.6	1000.0	9.000	Off	L1	20.5	28.4	50.0

2.10.10 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)
0.154500	41.5	1000.0	9.000	Off	N	20.2	24.2	65.7
0.294000	30.6	1000.0	9.000	Off	N	20.0	29.6	60.2
0.991500	30.8	1000.0	9.000	Off	N	20.0	25.2	56.0
4.384500	38.6	1000.0	9.000	Off	N	20.1	17.4	56.0
5.109000	33.6	1000.0	9.000	Off	N	20.1	26.4	60.0
29.791500	27.7	1000.0	9.000	Off	N	20.5	32.3	60.0

Average

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBμV)
0.379500	36.0	1000.0	9.000	Off	N	20.0	12.1	48.1
0.379500	35.9	1000.0	9.000	Off	N	20.0	12.2	48.1
0.991500	26.0	1000.0	9.000	Off	N	20.0	20.0	46.0
4.204500	31.0	1000.0	9.000	Off	N	20.1	15.0	46.0
5.118000	28.5	1000.0	9.000	Off	N	20.1	21.5	50.0
21.336000	22.1	1000.0	9.000	Off	N	20.4	27.9	50.0

FCC ID: NU: YETQ34-251366NU
CU: YETQ34-251366CU
IC: NU: 9298A-Q34251366NU
CU: 9298A-Q34251366CU
Report No. SD72121022-1016E



SECTION 3

3TEST 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						
7569	P-Series Power Meter	N1911A P-	MY45100625	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	CMU200	114536	Rhode & Schwarz	For signalling	
7610	DFS Radar Simulator and Analyzer*	Aeroflex 3005	30050A/09L	Aeroflex international LTD. UK	For signalling	
-	ESG Vector Signal Generator	E4438C	MY47271033	Agilent	01/27/2016	01/27/2018
8825	20dB Attenuator	46-20-34	BK5773	Weinschel Corp.	Verified by 7582 and 7608	
Radiated Emissions						
1002	Bilog Antenna	3142C	00058717	ETS-Lindgren	11/06/15	11/06/17
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.	03/20/16	03/20/17
1040	EMI Test Receiver	ESIB40	100292	Rhode & Schwarz	09/29/15	09/29/16
1049	EMI Test Receiver	ESU	100133	Rhode & Schwarz	03/11/16	03/11/17
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	

FCC ID: NU: YETQ34-251366NU
CU: YETQ34-251366CU
IC: NU: 9298A-Q34251366NU
CU: 9298A-Q34251366CU
Report No. SD72121022-1016E



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

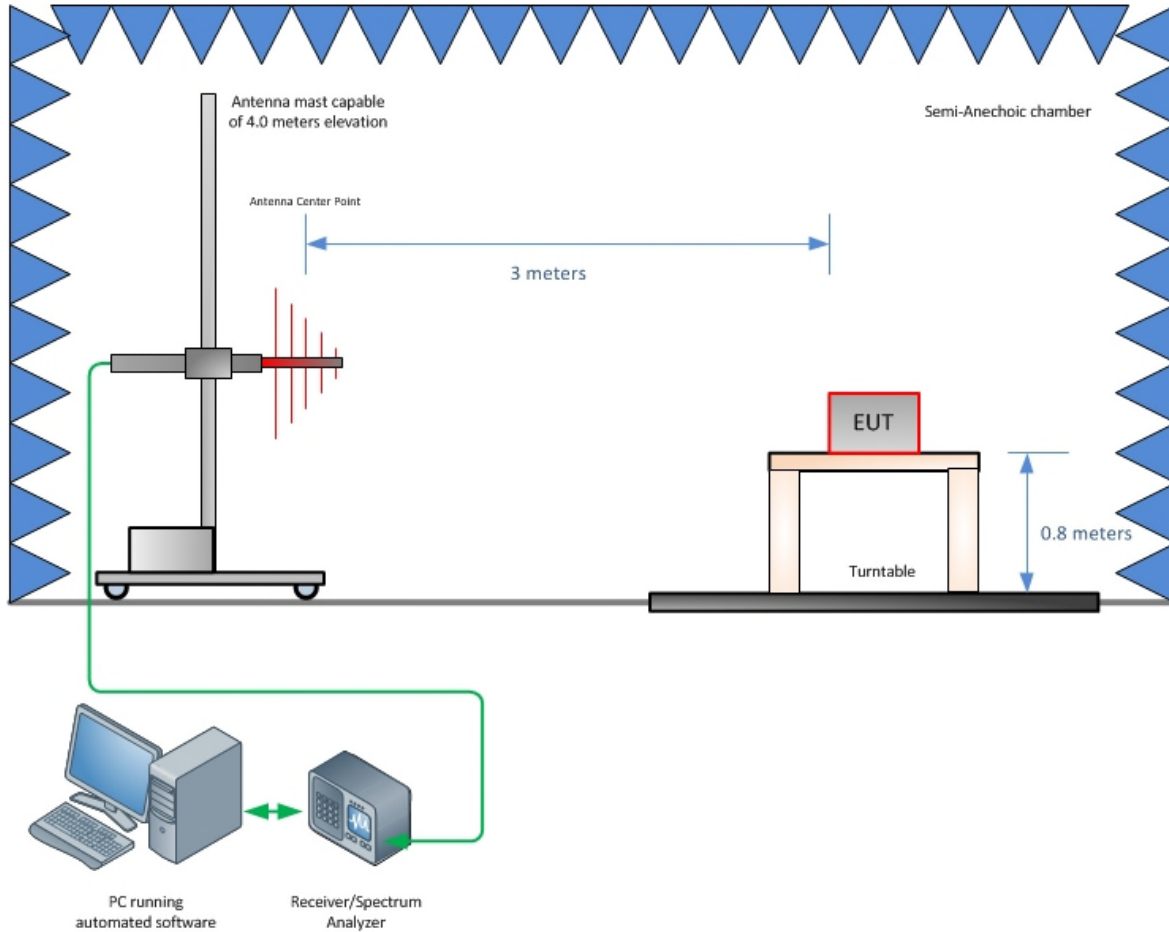
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CU: YETQ34-251366CU
IC: NU: 9298A-Q34251366NU
CU: 9298A-Q34251366CU
Report No. SD72121022-1016E



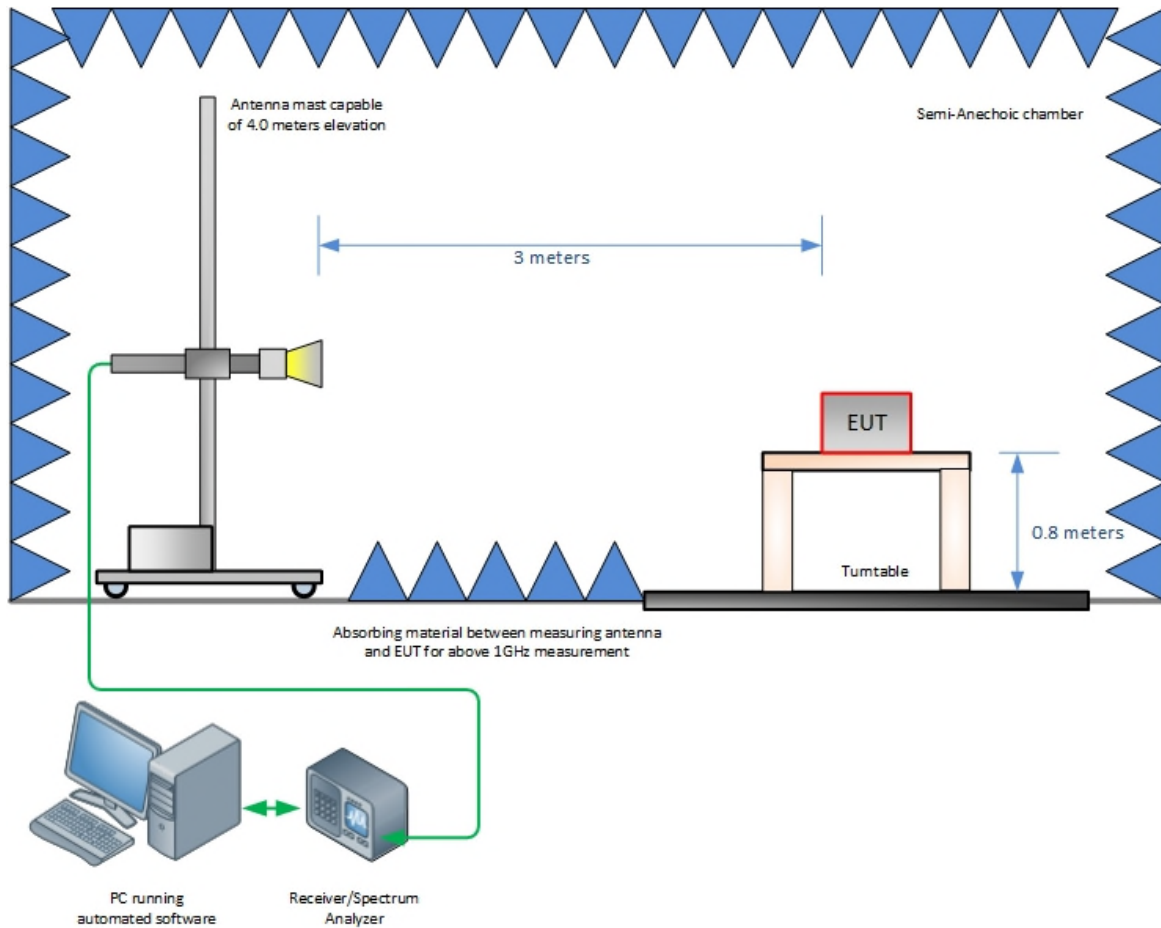
SECTION 4

4DIAGRAM OF TEST SETUP

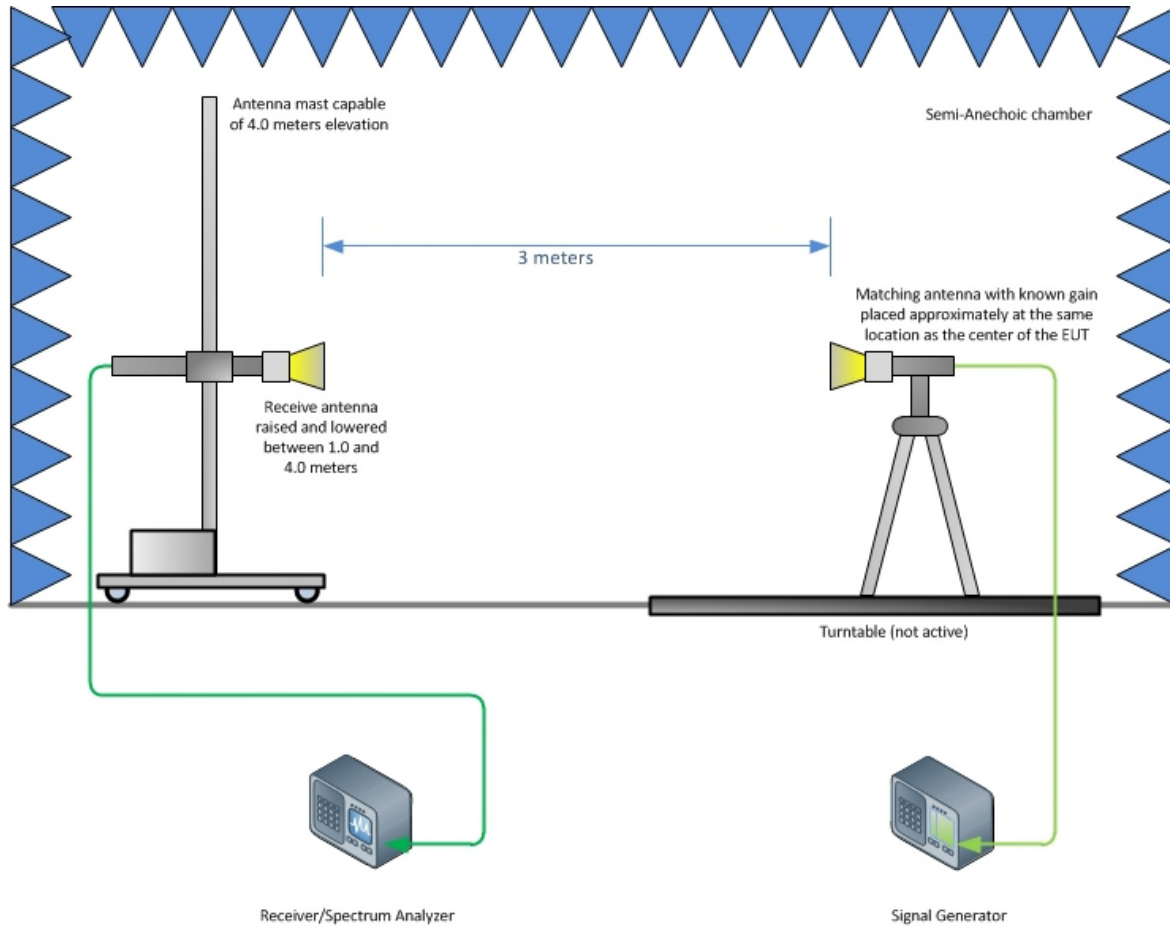
4.1 TEST SETUP DIAGRAM



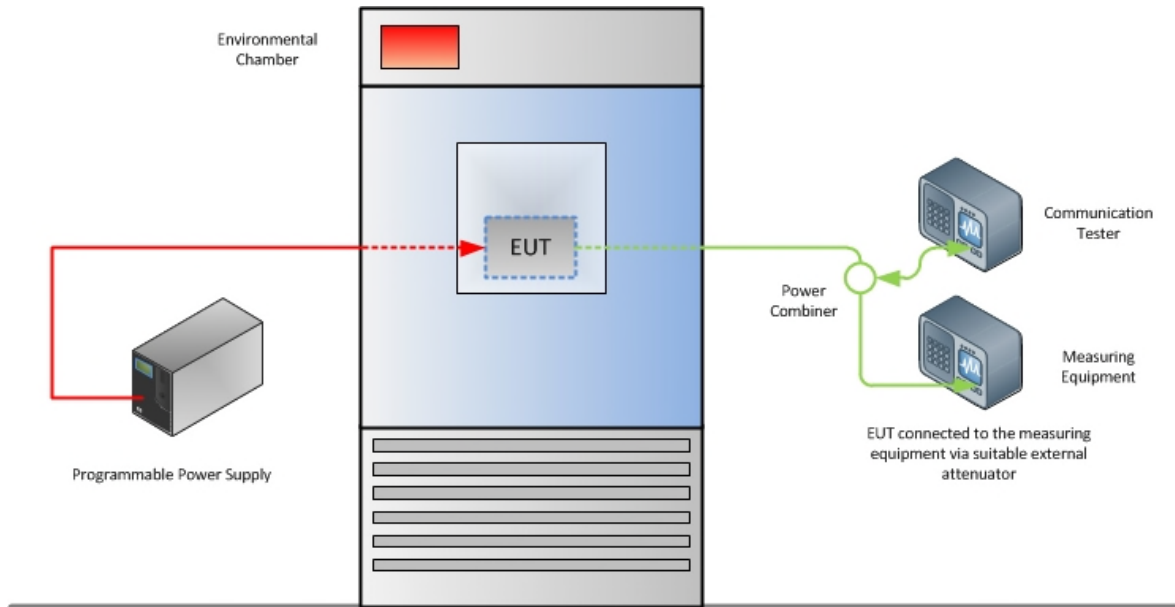
Radiated Emission Test Setup (Below 1GHz)



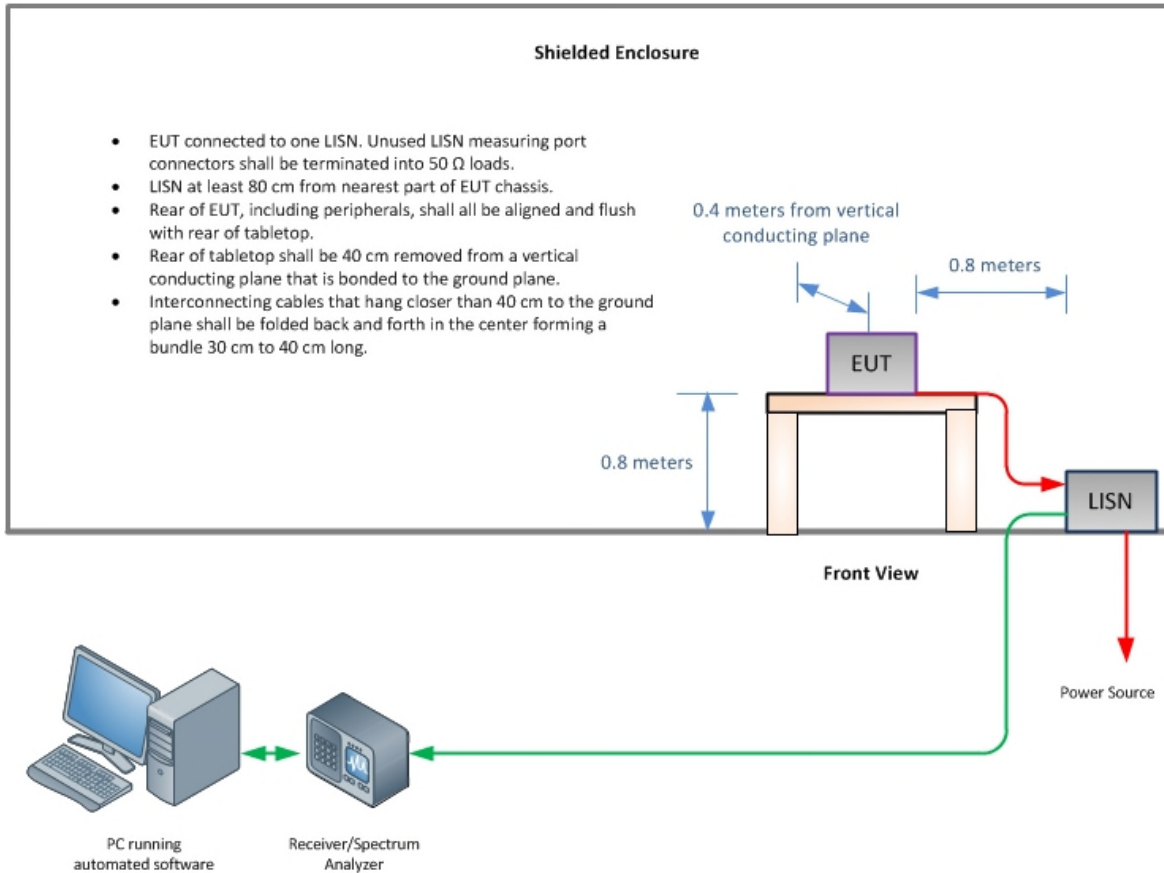
Radiated Emission Test Setup (Above 1GHz)



Substitution Test Method (Above 1GHz, if applicable)



Frequency Stability Test Configuration



Conducted Emissions Test Configuration (if applicable)

FCC ID: NU: YETQ34-251366NU
CU: YETQ34-251366CU
IC: NU: 9298A-Q34251366NU
CU: 9298A-Q34251366CU
Report No. SD72121022-1016E



SECTION 5

5ACCREDITATION, DISCLAIMERS AND COPYRIGHT



5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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