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Report On

Application for Grant of Equipment Authorization of the
Novatel Wireless Inc.
MIFI8800L Wireless Hotspot Modem

FCC CFR 47 Part 2, Part 22 and Part 24: 2017
RSS-132 issue 3: 2013 and RSS-133 issue 6: 2018

Report No. 72139211A **August 2018**

REPORT ON	Radio Testing of the Novatel Wireless Inc. MIFI8800L Wireless Hotspot Modem
TEST REPORT NUMBER	72139211A
PREPARED FOR	Novatel Wireless Inc. 9605 Scranton Road, Suite 300 San Diego, CA 92121 USA
CONTACT PERSON	Roman Olmos Senior Regulatory Engineer (858) 812-3400 rolmos@nvtl.com
PREPARED BY	 Xiaoying Zhang **Name** Authorized Signatory Title: EMC/Wireless Test Engineer
APPROVED BY	 Ferdinand S. Custodio **Name** Authorized Signatory Title: Senior EMC Test Engineer/Wireless Team Lead
DATED	August 27, 2018

Revision History

72139211A Novatel Wireless Inc. MIFI8800L Wireless Hotspot Modem					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
08/27/2018	Initial Release				Ferdinand Custodio

CONTENTS

SECTION 1

REPORT SUMMARY

Radio Testing of the
Novatel Wireless Inc.
MIFI8800L Wireless Hotspot Modem

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Novatel Wireless Inc. MIFI8800L Wireless Hotspot Modem to the requirements of the following:

- FCC CFR 47 Part 2, Part 22 and Part 24: 2017
- RSS-132 issue 3: 2013 and RSS-133 issue 6: 2018

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	Novatel Wireless Inc.
Product Trademark/Brand	Inseego
Product Marketing Name	MiFi 8800L
Model Number(s)	MIFI8800L
FCC ID Number	PKRNVWMIFI8800
IC Number	3229A-MIFI8800
Serial Number(s)	AZ280418A00044
Number of Samples Tested	1
Test Specification/Issue/Date	• FCC CRF 47 Part 2, Part 22 and Part 24 (October 1, 2017) • KDB412172 D01 Determining ERP and EIRP v01r01 August 07, 2015: Guidelines for determining the Effective Radiated Power (ERP) and Equivalent Isotropically Radiated Power (EIRP) of an RF transmitting system • KDB971168 D01 Power Meas License Digital Systems v03r01: April 9 2018: Measurement guidance for certification of licensed digital transmitters • RSS-132 issue 3 January 2013: Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz • RSS-133 issue 6 January 2018 Amendment: 2 GHz Personal Communications Services • RSS-Gen Issue 5: April 2018 - General Requirements for Compliance of Radio Apparatus • ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
Start of Test	June 06, 2018
Finish of Test	July 18, 2018
Name of Engineer(s)	Xiaoying Zhang
Related Document(s)	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: 2017 with cross-reference to the corresponding ISED RSS standard is shown below.

Section	FCC Part Sections(s)	ISED Sections	Test Description	Result
2.1	2.1046	RSS-132: 5.4 RSS-133: 6.4	Transmitter Conducted Output Power	Compliant
2.2	2.1046 22.913(a)(5)	-	Effective Radiated Power	Compliant
2.3	2.1046 24.232(c)	RSS-132: 5.4 RSS-133: 6.4	Equivalent Isotropic Radiated Power	Compliant
2.4	24.232(d)	RSS-132: 5.4, RSS-133: 6.4	Peak-Average Ratio	Compliant
2.5	2.1049 22.917(b) 24.238(b)	RSS-GEN 6.7	Occupied Bandwidth	Compliant
2.6	2.1051, 22.917(a)(b) 24.238(a)(b)	RSS-132: 5.5 RSS-133: 6.5	Band Edge	Compliant
2.7	2.1051 22.917(a)(b) 24.238(a)(b)	RSS-132: 5.5 RSS-133: 6.5	Conducted Spurious Emissions	Compliant
2.8	2.1053 22.917(a) 24.238(a)	RSS-132: 5.5 RSS-133: 6.5	Field Strength of Spurious Radiation	Compliant
2.9	2.1055 22.355 24.235	RSS-132: 5.3 RSS-133: 6.3	Frequency Stability	Compliant
2.10	-	RSS-132: 5.6 RSS-133: 6.6 RSS-Gen 7.4	Receiver Spurious Emissions	Compliant
2.11	-	RSS-GEN 8.8	Power Line Conducted Emissions	Compliant

1.3 PRODUCT INFORMATION

1.3.1 EUT General Description

The Equipment Under Test (EUT) was a Novatel Wireless Inc. MIFI8800L Wireless Hotspot Modem. The EUT is a Wireless Hotspot Modem supporting 2G/3G/4G Technologies. The EUT comes with a USB Port.

1.3.2 Technical Description

EUT Description	Wireless Hotspot Modem
Product Marketing Name	MiFi 8800L
Model Number(s)	MIFI8800L
Rated Voltage	3.8V, 4500mAh (Rechargeable Li-Ion battery pack) Input 100-240VAC, Output 5V (External AC-DC Power Adapter)
Mode Verified (Frequency Bands)	WCDMA Band 2: 1850-1910 MHz WCDMA Band 5: 824-849 MHz LTE Band 2: 1850-1910 MHz LTE Band 5: 824-849 MHz
Capability	WCDMA Band 2, 5, LTE Band 2, 4, 5, 7, 13, 14, 46, 48, 66 and 802.11 a/b/g/n/ac
Primary Unit (EUT)	☐ Production ☒ Pre-Production ☐ Engineering
Frequency Tolerance	±0.00025% (2.5 ppm)

(Client declaration, max. antenna gain covered under this test report)

Technologies / Bands	Frequency	Antenna Gains
WCDMA/LTE Band 2	1850-1910 MHz	0.5 dBi
WCDMA/LTE Band 5	824-849 MHz	-0.5 dBi

1.3.3 Transmit Frequency Table

Technology / Band	Tx Frequency (MHz)	Emission Designator	ERP (Part 22) / EIRP (RSS-132 and Part 24/RSS-133)	
			ERP Max. Power (dBm)	EIRP Max. Power (dBm)
WCDMA Band 2	1850-1910	4M14F9W	—	23.97
WCDMA Band 5	824-849	4M22F9W	21.32	23.47

Technology / Band	Modulation	Bandwidth (MHz)	Tx Frequency (MHz)	Emission Designator	ERP (Part 22) / EIRP (RSS-132 and Part 24/RSS-133)	
					ERP Max. Power (dBm)	EIRP Max. Power (dBm)
LTE Band 2	QPSK	1.4	1850-1910	1M09G7D	—	24.44
		3	1850-1910	2M69G7D	—	24.41
		5	1850-1910	4M49G7D	—	24.5
		10	1850-1910	8M95G7D	—	24.5
		15	1850-1910	13M4G7D	—	24.42
		20	1850-1910	17M8G7D	—	24.46
	16QAM	1.4	1850-1910	1M09W7D	—	23.56
		3	1850-1910	2M69W7D	—	23.61
		5	1850-1910	4M49W7D	—	23.68
		10	1850-1910	8M95W7D	—	23.82
		15	1850-1910	13M4W7D	—	23.69
		20	1850-1910	17M9W7D	—	23.7
LTE Band 5	QPSK	1.4	824-849	1M09G7D	21.33	23.48
		3	824-849	2M69G7D	21.27	23.42
		5	824-849	4M49G7D	21.34	23.49
		10	824-849	8M94G7D	21.33	23.48
	16QAM	1.4	824-849	1M09W7D	20.37	22.52
		3	824-849	2M69W7D	20.4	22.55
		5	824-849	4M47W7D	20.63	22.78
		10	824-849	8M93W7D	20.53	22.68

1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

Test Configuration	Description
A	Conducted antenna port measurement. EUT Transmits at max power and is powered by the internal battery and/or USB via AC Adapter.
B	Radiated test setup / case spurious emissions. Antenna port terminated by the call box.
C	Conducted antenna port measurement. EUT in receive mode and is powered by the internal battery and/or USB via AC Adapter.

1.4.2 EUT Exercise Software

EUT is controlled by a CMW 500 Wideband Radio Communication Tester. There are no other test software used during verification.

1.4.3 Support Equipment and I/O cables

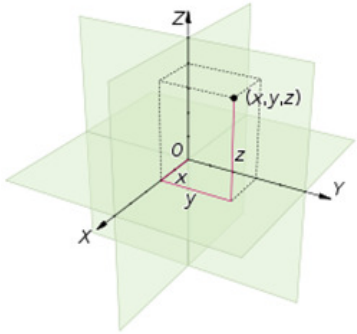
Manufacturer	Equipment/Cable	Description
Novatel Wireless	USB Cable	Type A to Type C USB Cable. M/N: NOV7000USB
Novatel Wireless	External AC-DC Power Adapter	Model: SSW-2783, PN: 40123126.01 Input: 100-240VAC, 50/60Hz, 0.5A Output: 5VDC, max. 2A

1.4.4 Worst Case Configuration

Worst-case configuration used in this test report:

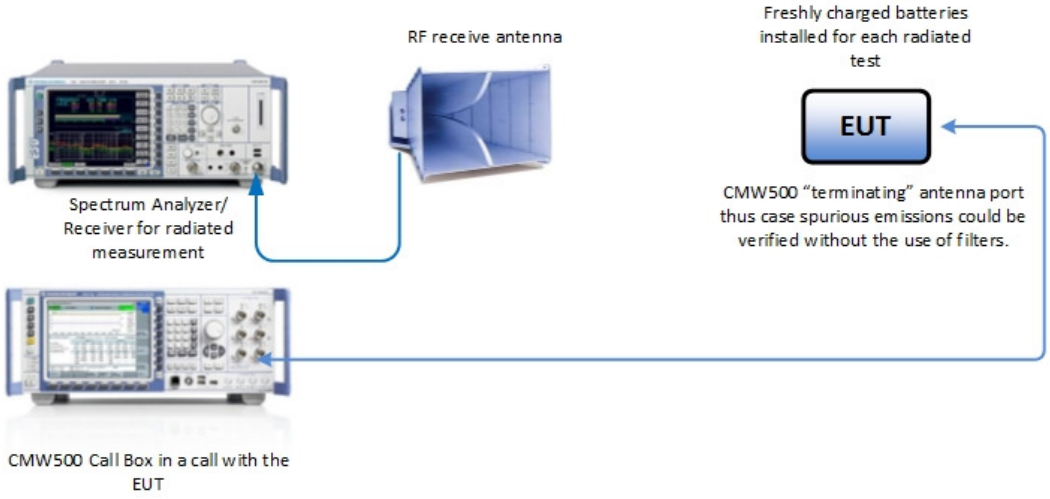
Technology / Band	Test Configuration
WCDMA Band 2 and 5	Connection Setup: Test Mode, Type: RMC, Test Mode: Loop Mode 2
LTE Band 2 and 5	Modulation: QPSK

For radiated measurements X, Y, and Z orientations were verified. The verification was determined “Y” as worst case configuration.

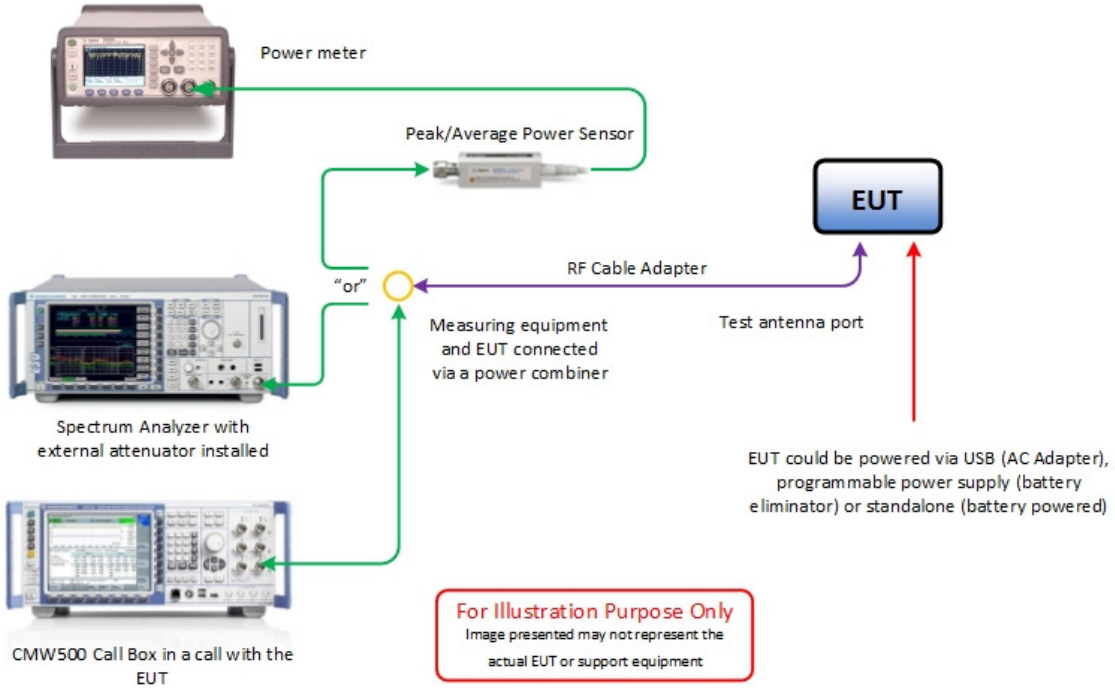


1.4.5 Simplified Test Configuration Diagram

Radiated Test Configuration



Conducted (Antenna Port) Test Configuration



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: AZ280418A00044		
None	—	—

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 and radiated emissions the equipment under test (EUT) was configured to measure its highest possible emission level. 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 – Designation 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 Designation is US1146.

1.9.2 Innovation, Science and Economic Development Canada (IC) Registration No.: 3067A-1 & 22806-1

The 10m Semi-anechoic chamber of TUV SUD America Inc. (San Diego Rancho Bernardo) has been registered by Certification and Engineering Bureau of Innovation, Science and Economic Development Canada for radio equipment testing with Registration No. 3067A-1.

The 3m Semi-anechoic chamber of TUV SUD America Inc. (San Diego Mira Mesa) has been registered by Certification and Engineering Bureau of Innovation, Science and Economic Development Canada for radio equipment testing with Registration No. 22806-1.

1.9.3 BSMI – Laboratory Code: SL2-IN-E-028R (US0102)

TUV Product Service Inc. (San Diego) is a recognized EMC testing laboratory by the BSMI under the MRA (Mutual Recognition Arrangement) with the United States. Accreditation includes CNS 13438 up to 6GHz.

1.9.4 NCC (National Communications Commission - US0102)

TUV SUD America Inc. (San Diego) is listed as a Foreign Recognized Telecommunication Equipment Testing Laboratory and is accredited to ISO/IEC 17025 (A2LA Certificate No.2955.13) which under APEC TEL MRA Phase 1 was designated as a Conformity Assessment Body competent to perform testing of equipment subject to the Technical Regulations covered under its scope of accreditation including RTTE01, PLMN01 and PLMN08 for TTE type of testing and LP002 for Low-Power RF Device type of testing.

1.9.5 VCCI – Registration No. A-0280 and A-0281

TUV SUD America Inc. (San Diego) is a VCCI registered measurement facility which includes radiated field strength measurement, radiated field strength measurement above 1GHz, mains port interference measurement and telecommunication port interference measurement.

1.9.6 RRA – Identification No. US0102

TUV SUD America Inc. (San Diego) is National Radio Research Agency (RRA) recognized laboratory under Phase I of the APEC Tel MRA.

1.9.7 OFCA – U.S. Identification No. US0102

TUV SUD America Inc. (San Diego) is recognized by Office of the Communications Authority (OFCA) under Appendix B, Phase I of the APEC Tel MRA.

1.10 SAMPLE CALCULATIONS

1.10.1 GSM Emission Designator

Emission Designator = 250KGXW
GSM BW = 250 kHz
G = Phase Modulation
X = Cases not otherwise covered
W = Combination (Audio/Data)

1.10.2 WCDMA Emission Designator

Emission Designator = 4M15F9W
WCDMA BW = 4.15 MHz
F = Frequency Modulation
9= Composite Digital Info
W = Combination (Audio/Data)

1.10.3 CDMA Emission Designator

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

1.10.4 LTE Emission Designator (QPSK)

Emission Designator = 4M51G7D
G = Phase Modulation
7= Quantized/Digital Info
D = Combination (Audio/Data)

1.10.5 LTE Emission Designator (16QAM)

Emission Designator = 4M52W7D
W = Frequency Modulation
7= Quantized/Digital Info
D = Combination (Audio/Data

1.10.6 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**

1.10.7 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
Novatel Wireless Inc.
MIFI8800L Wireless Hotspot Modem

2.1 TRANSMITTER CONDUCTED POWER MEASUREMENTS

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 mesurements were made in accordance to FCC Part 2 Clasue 2.1046 and RSS-132 Clause 5.4 and RSS-133 Clause 6.4.

FCC 47 CFR Part 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.

2.1.3 Equipment Under Test and Modification State

Serial No: AZ280418A00044 / Test Configuration A

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

June 16 and 18, 2018 / 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	24.0 - 26.3 °C
Relative Humidity	44.0 - 52.5 %
ATM Pressure	98.4 - 99.1 kPa

2.1.7 Additional Observations

- This is a conducted test using Power Meter.
- The path loss was measured and entered as a level offset.
- Low, Middle and High channels for all bandwidths with different RB size and RB offset and modulations were verified and reported.

2.1.8 Test Results

Band	Channel	Frequency (MHz)	Average Max Power (dBm)	Peak Max Power (dBm)
WCDMA Band 2	9262	1852.4	23.22	26.51
	9400	**1880.0**	**23.47**	**26.17**
	9538	1907.6	23.07	25.83
WCDMA Band 5	**4132**	**826.4**	**23.97**	**26.75**
	4183	836.6	23.66	25.21
	4233	846.6	23.74	26.26

LTE Band 2							
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**No. RB**	**RB Start**	**Average Power (dBm)**	**Peak Power (dBm)**
1.4	18607	1850.7	QPSK	**1**	**0**	**23.87**	**27.0**
				1	3	23.87	26.86
				1	5	23.77	26.87
				6	0	23.06	27.39
			16QAM	1	0	22.89	27.33
				1	**3**	**22.92**	**27.25**
				1	5	22.85	27.2
				6	0	22.17	27.80
	18900	1880	QPSK	1	0	23.88	27.38
				1	**3**	**23.94**	**27.29**
				1	5	23.86	27.34
				6	0	23.08	27.87
			16QAM	1	0	22.99	27.96
				1	**3**	**23.06**	**28.05**
				1	5	22.98	27.98
				6	0	22.12	28.17
	19193	1909.3	QPSK	**1**	**0**	**23.11**	**26.04**
				1	3	22.75	25.59
				1	5	22.38	25.33
				6	0	21.77	25.1
			16QAM	**1**	**0**	**21.56**	**25.57**
				1	3	21.3	25.3
				1	5	21.01	25.03
				6	0	21.3	25.51

LTE Band 2							
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**No. RB**	**RB Start**	**Average Power (dBm)**	**Peak Power (dBm)**
3	18615	1851.5	QPSK	**1**	**0**	**23.91**	**26.99**
				1	8	23.91	26.91
				1	14	23.78	28.80
				15	0	23.11	27.31
			16QAM	**1**	**0**	**22.96**	**27.38**
				1	8	22.94	27.32
				1	14	22.88	27.2
				15	0	22.14	27.57
	18900	1880	QPSK	**1**	**0**	**23.91**	**27.23**
				1	8	23.91	27.21
				1	14	23.86	27.16
				15	0	23.07	27.86
			16QAM	**1**	**0**	**23.11**	**28.02**
				1	8	23.1	28.01
				1	14	23.07	27.99
				15	0	22.09	28.13
	19185	1908.5	QPSK	**1**	**0**	**22.96**	**25.78**
				1	8	22.29	25.13
				1	14	21.52	24.4
				15	0	22.4	25.62
			16QAM	**1**	**0**	**22.4**	**26.26**
				1	8	21.8	25.66
				1	14	21.1	25.07
				15	0	21.87	26.06

LTE Band 2							
Bandwidth (MHz)	Channel	Frequency (MHz)	Modulation	No. RB	RB Start	Average Power (dBm)	Peak Power (dBm)
5	18625	1852.5	QPSK	1	0	23.81	27.26
				1	**13**	**23.82**	**27.06**
				1	24	23.85	27.04
				25	0	22.92	27.57
			16QAM	1	0	23.17	27.89
				1	**13**	**23.18**	**27.53**
				1	24	23.04	27.42
				25	0	22.1	27.91
	18900	1880	QPSK	1	0	23.97	27.36
				1	**13**	**24.0**	**27.26**
				1	24	23.9	27.38
				25	0	23.01	27.28
			16QAM	1	0	23.08	28.17
				1	**13**	**23.1**	**28.04**
				1	24	22.96	28.1
				25	0	21.99	27.39
	19175	1907.5	QPSK	**1**	**0**	**23.9**	**27.0**
				1	13	23.08	25.81
				1	24	21.76	24.70
				25	0	22.98	27.06
			16QAM	**1**	**0**	**23.15**	**27.76**
				1	13	22.83	26.43
				1	24	21.63	25.45
				25	0	22.05	27.35

LTE Band 2							
Bandwidth (MHz)	Channel	Frequency (MHz)	Modulation	No. RB	RB Start	Average Power (dBm)	Peak Power (dBm)
10	18650	1855	QPSK	**1**	**0**	**23.97**	**27.08**
				1	25	23.86	26.9
				1	49	22.92	26.27
				50	0	23.15	27.57
			16QAM	**1**	**0**	**23.19**	**27.77**
				1	25	23.11	27.46
				1	49	22.33	27.2
				50	0	22.25	27.54
	18900	1880	QPSK	**1**	**0**	**23.94**	**27.25**
				1	25	23.82	27.19
				1	49	23.92	27.2
				50	0	23.09	28.01
			16QAM	1	**0**	**23.32**	**28.38**
				1	25	23.2	28.12
				1	49	23.17	28.02
				50	0	22.1	28.03
	19150	1905	QPSK	**1**	**0**	**24.0**	**27.12**
				1	25	23.9	26.9
				1	49	21.76	24.77
				50	0	23.13	27.54
			16QAM	**1**	**0**	**23.11**	**27.63**
				1	25	23.0	27.63
				1	49	21.28	25.42
				50	0	22.14	27.8

LTE Band 2							
Bandwidth (MHz)	Channel	Frequency (MHz)	Modulation	No. RB	RB Start	Average Power (dBm)	Peak Power (dBm)
15	18675	1857.5	QPSK	**1**	**0**	**23.68**	**26.73**
				1	38	22.73	25.99
				1	74	23.63	26.76
				75	0	23.17	27.16
			16QAM	**1**	**0**	**22.91**	**27.17**
				1	38	21.93	26.67
				1	74	23.07	28
				75	0	22.26	27.22
	18900	1880	QPSK	**1**	**0**	**23.91**	**27.20**
				1	38	23.89	27.08
				1	74	23.42	26.44
				75	0	23.08	28.01
			16QAM	***1***	***0***	***23.16***	***28.12***
				1	38	23.1	27.89
				1	74	22.78	26.98
				75	0	22.15	28.23
	19125	1902.5	QPSK	1	0	23.46	26.47
				1	**38**	**23.92**	**27.19**
				1	74	22.53	25.51
				75	0	23.16	28.14
			16QAM	1	0	22.66	26.8
				1	**38**	**23.19**	**28.25**
				1	74	22.03	26.12
				75	0	22.19	28.14

LTE Band 2							
Bandwidth (MHz)	Channel	Frequency (MHz)	Modulation	No. RB	RB Start	Average Power (dBm)	Peak Power (dBm)
20	18700	1860	QPSK	1	0	23.62	26.77
				1	50	22.93	26.24
				1	**99**	**23.91**	**27.13**
				100	0	23.01	27.81
			16QAM	1	0	22.80	27.23
				1	50	22.13	26.86
				1	**99**	**22.87**	**27.97**
				100	0	22.05	27.64
	18900	1880	QPSK	**1**	**0**	**23.95**	**27.27**
				1	50	23.94	27.29
				1	99	22.56	25.91
				100	0	23.06	27.7
			16QAM	**1**	**0**	**23.2**	**28.25**
				1	50	23.14	28.01
				1	99	21.97	26.69
				100	0	22.1	28.22
	19100	1900	QPSK	1	0	22.63	25.65
				1	**50**	**23.96**	**26.87**
				1	99	21.6	24.69
				100	0	23.2	28.04
			16QAM	1	0	22.01	26.21
				1	**50**	**23.09**	**27.21**
				1	99	21.16	25.44
				100	0	22.4	28.53

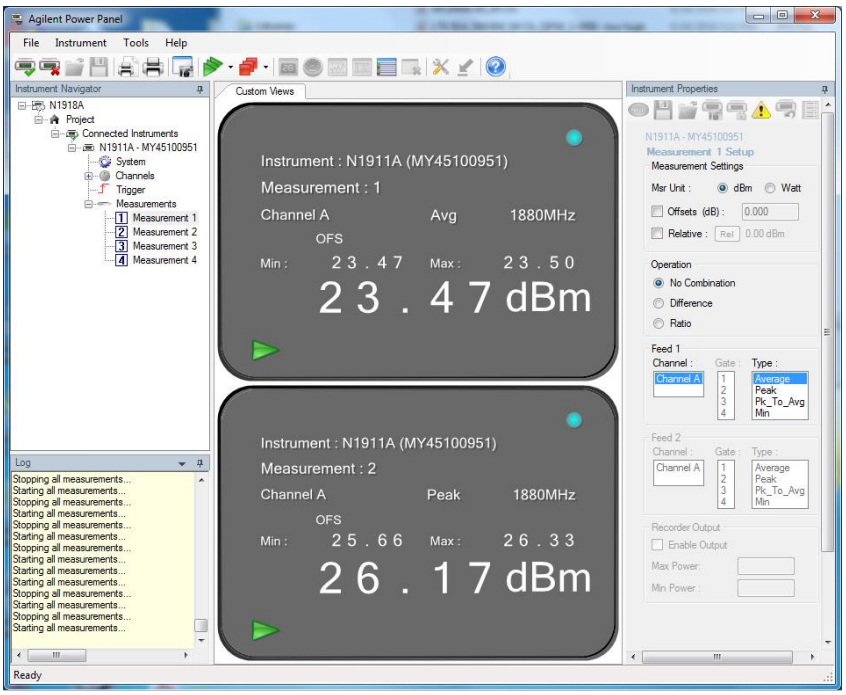
LTE Band 5							
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**No. RB**	**RB Start**	**Average Power (dBm)**	**Peak Power (dBm)**
1.4	20407	824.7	QPSK	1	0	23.91	27.47
				1	**3**	**23.98**	**27.32**
				1	5	23.91	27.39
				6	0	23.11	27.82
			16QAM	1	0	22.97	28.06
				1	**3**	**23.02**	**27.93**
				1	5	22.95	28.1
				6	0	22.14	28.26
	20525	836.5	QPSK	1	0	23.76	27.47
				1	**3**	**23.79**	**27.24**
				1	5	23.73	27.45
				6	0	22.77	27.25
			16QAM	1	0	22.83	28.07
				1	**3**	**22.87**	**27.87**
				1	5	22.8	27.94
				6	0	21.78	27.31
	20643	848.3	QPSK	1	0	23.65	27.14
				1	**3**	**23.69**	**26.87**
				1	5	23.63	26.72
				6	0	22.63	27.31
			16QAM	1	0	22.74	27.62
				1	**3**	**22.78**	**27.39**
				1	5	22.68	27.19
				6	0	21.65	27.59

LTE Band 5							
Bandwidth (MHz)	Channel	Frequency (MHz)	Modulation	No. RB	RB Start	Average Power (dBm)	Peak Power (dBm)
3	20415	825.5	QPSK	**1**	**0**	**23.92**	**27.19**
				1	8	23.89	27.12
				1	14	23.88	27.16
				15	0	23.12	27.53
			16QAM	**1**	**0**	**22.97**	**27.92**
				1	8	22.92	27.72
				1	14	22.92	27.83
				15	0	22.16	27.97
	20525	836.5	QPSK	**1**	**0**	**23.82**	**27.3**
				1	8	23.79	27.21
				1	14	23.77	27.25
				15	0	22.82	27.19
			16QAM	**1**	**0**	**23.05**	**28.15**
				1	8	23.0	27.9
				1	14	22.97	27.82
				15	0	21.86	27.29
	20635	847.5	QPSK	**1**	**0**	**23.77**	**27.04**
				1	8	23.72	26.98
				1	14	23.71	26.71
				15	0	22.67	27.42
			16QAM	**1**	**0**	**22.84**	**27.73**
				1	8	22.81	27.59
				1	14	22.76	27.11
				15	0	21.73	27.65

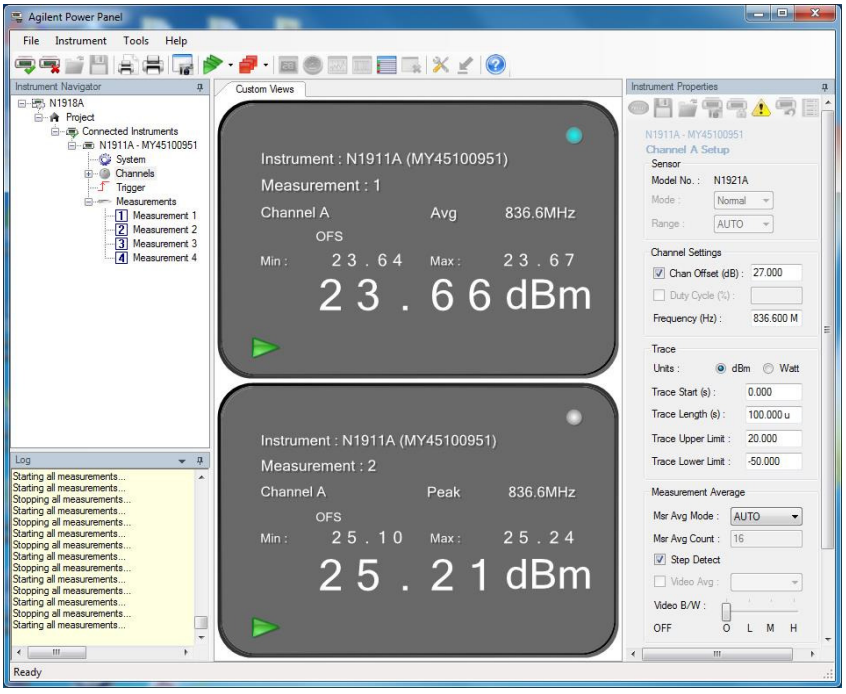
LTE Band 5							
Bandwidth (MHz)	Channel	Frequency (MHz)	Modulation	No. RB	RB Start	Average Power (dBm)	Peak Power (dBm)
5	20425	826.5	QPSK	1	0	23.98	27.29
				1	**13**	**23.99**	**27.18**
				1	24	23.93	27.22
				25	0	23.07	27.6
			16QAM	1	0	23.26	28.07
				1	**13**	**23.28**	**27.94**
				1	24	23.19	27.95
				25	0	22.13	28.08
	20525	836.5	QPSK	**1**	**0**	**23.85**	**27.32**
				1	13	23.85	27.14
				1	24	23.75	26.94
				25	0	22.78	27.12
			16QAM	**1**	**0**	**22.94**	**28.0**
				1	13	22.89	27.54
				1	24	22.8	27.14
				25	0	21.77	27.12
	20625	846.5	QPSK	**1**	**0**	**23.78**	**27.1**
				1	13	23.77	27.02
				1	24	23.66	26.91
				25	0	22.68	27.54
			16QAM	**1**	**0**	**23.0**	**27.65**
				1	13	22.99	27.63
				1	24	22.89	27.38
				25	0	21.27	26.08

LTE Band 5							
Bandwidth (MHz)	Channel	Frequency (MHz)	Modulation	No. RB	RB Start	Average Power (dBm)	Peak Power (dBm)
10	20450	829	QPSK	**1**	**0**	**23.97**	**27.22**
				1	25	23.85	27.09
				1	49	23.69	27.08
				50	0	22.92	27.71
			16QAM	**1**	**0**	**23.01**	**27.9**
				1	25	22.87	27.75
				1	49	22.75	27.74
				50	0	21.93	28.0
	20525	836.5	QPSK	**1**	**0**	**23.98**	**27.29**
				1	25	23.84	27.25
				1	49	23.82	27.12
				50	0	22.83	27.29
			16QAM	**1**	**0**	**23.18**	**27.99**
				1	25	23.04	28.02
				1	49	23.0	27.77
				50	0	21.88	27.61
	20600	844	QPSK	**1**	**0**	**23.89**	**27.2**
				1	25	23.8	26.96
				1	49	23.72	26.91
				50	0	22.76	28.21
			16QAM	**1**	**0**	**23.03**	**27.82**
				1	25	22.87	27.59
				1	49	22.81	27.41
				50	0	21.76	27.15

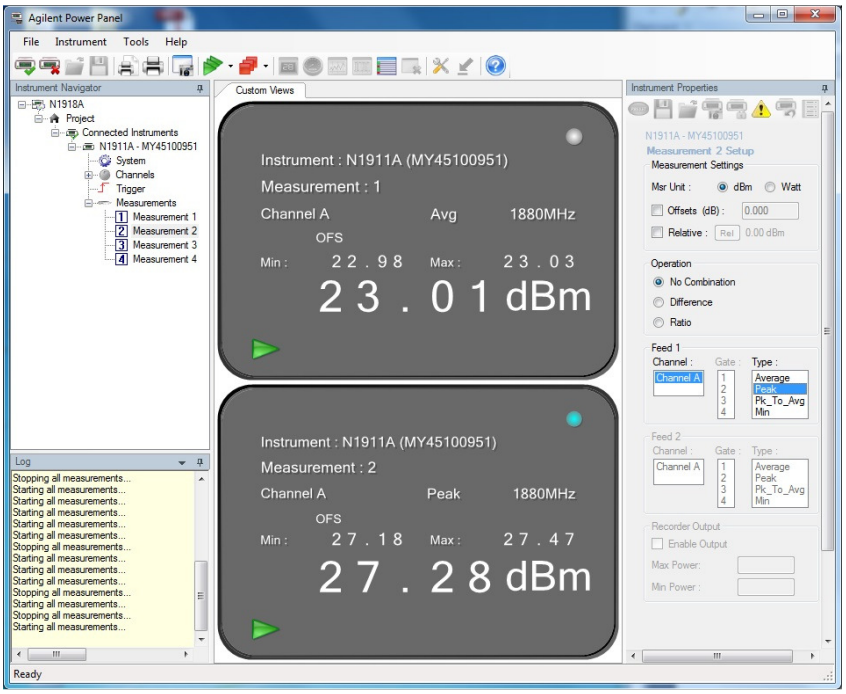
2.1.9 Sample Test Measurement Screen



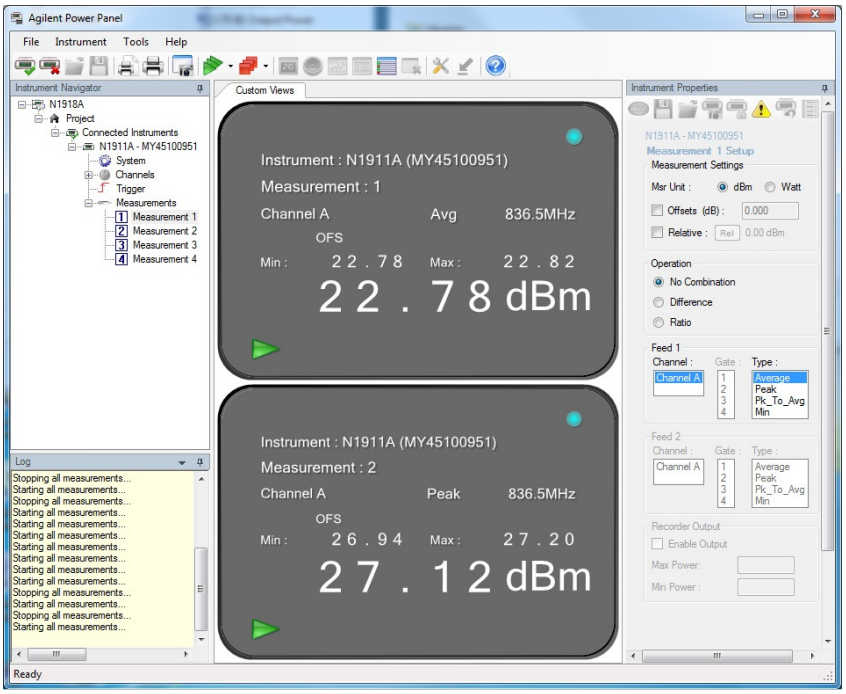
WCDMA Band 2 Middle Chanel



WCDMA Band 5 Middle Chanel



LTE Band 2_5M Bandwidth Middle Chanel QPSK Full RB



LTE Band 5_5M Bandwidth Middle Chanel QPSK Full RB

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)(5)

2.2.2 Standard Applicable

FCC 47 CFR Part 22.913(a):
(5) 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: AZ280418A00044 / Test Configuration (N/A, calculation only)

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

June 16 and 18, 2018 / 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 1.2 and 1.3 of KDB412172 D01 (Determining ERP and EIRP v01r01).
- Calculation formula in logarithmic terms:

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

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

WCDMA Band 5						
Frequency (MHz)	Max Power Average (dBm)	Antenna Gain (dBi)	ERP			
			(dBm)	(W)	ERP Limit (dBm)	Margin (dB)
826.4	**23.97**	**-0.5**	**21.32**	**0.14**	**38.45**	**17.13**
836.6	23.66	-0.5	21.01	0.13	38.45	17.44
846.6	23.74	-0.5	21.09	0.13	38.45	17.36

LTE Band 5									
Modulation	*Bandwidth (MHz)*	*RB Size/Offset*	*Channels*	*Frequency (MHz)*	*Tx Average Power (dBm)*	*Antenna Gain (dBi)*	*ERP (dBm)*	*Limit (dBm)*	*Margin (dBm)*
QPSK	1.4	1 / 3	20407	824.7	23.98	-0.5	21.33	38.45	17.13
		1 / 3	20525	836.5	22.79	-0.5	20.14	38.45	18.31
		1 / 3	20643	848.3	23.69	-0.5	21.04	38.45	17.41
	3	1 / 0	20415	825.5	23.92	-0.5	21.27	38.45	17.18
		1 / 0	20525	836.5	23.82	-0.5	21.17	38.45	17.13
		1 / 0	20635	847.5	23.77	-0.5	21.12	38.45	17.33
	5	**1 / 13**	**20425**	**826.5**	**23.99**	**-0.5**	**21.34**	**38.45**	**17.11**
		1 / 0	20525	836.5	23.85	-0.5	21.2	38.45	17.25
		1 / 0	20625	846.5	23.78	-0.5	21.13	38.45	17.32
	10	1 / 0	20450	829	23.97	-0.5	21.32	38.45	17.13
		1 / 0	20525	836.5	23.98	-0.5	21.33	38.45	17.12
		1 / 0	20600	844	23.89	-0.5	21.24	38.45	17.21
16QAM	1.4	1 / 3	20407	824.7	23.02	-0.5	20.37	38.45	18.08
		1 / 3	20525	836.5	22.87	-0.5	20.22	38.45	18.23
		1 / 3	20643	848.3	22.78	-0.5	20.13	38.45	18.32
	3	1 / 0	20415	825.5	22.97	-0.5	20.32	38.45	18.13
		1 / 0	20525	836.5	23.05	-0.5	20.4	38.45	18.05
		1 / 0	20635	847.5	22.84	-0.5	20.19	38.45	18.26
	5	**1 / 13**	**20425**	**826.5**	**23.28**	**-0.5**	**20.63**	**38.45**	**17.82**
		1 / 0	20525	836.5	22.94	-0.5	20.29	38.45	18.16
		1 / 0	20625	846.5	23.0	-0.5	20.35	38.45	18.1
	10	1 / 0	20450	829	23.01	-0.5	20.36	38.45	18.09
		1 / 0	20525	836.5	23.18	-0.5	20.53	38.45	17.92
		1 / 0	20600	844	23.03	-0.5	20.38	38.45	18.07

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, Clause 5.4:
The EIRP for mobile equipment shall not exceed 11.5 watts

FCC 47 CFR Part 24.232:
(c) 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, Clause 6.4:
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: AZ280418A00044 / Test Configuration (N/A, calculation only)

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

June 16 and 18, 2018 / XYZ

2.3.5 Test Equipment Used

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

2.3.6 Additional Observations

- EIRP was calculated as per Section 1.2 and 1.3 of KDB412172 D01 (Determining ERP and EIRP v01r01).
- Calculation formula in logarithmic terms:

$$EIRP = P_T + G_T - L_C$$

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 (EUT posees an internal Antenna. The loss between the EUT and the antenna port is considered negligible).

2.3.7 Test Results

WCDMA Band 2						
Frequency (MHz)	Max Power Average (dBm)	Antenna Gain (dBi)	EIRP			
			(dBm)	(W)	Limit (dBm)	Margin (dB)
1852.4	23.22	0.5	23.72	0.24	33	9.28
1880.0	**23.47**	**0.5**	**23.97**	**0.25**	**33**	**9.03**
1907.6	23.07	0.5	23.57	0.23	33	9.43

WCDMA Band 5						
Frequency (MHz)	Max Power Average (dBm)	Antenna Gain (dBi)	EIRP			
			(dBm)	(W)	EIRP Limit (dBm)	Margin (dB)
826.4	**23.97**	**-0.5**	**23.47**	**0.22**	**40.61**	**17.14**
836.6	23.66	-0.5	23.16	0.21	40.61	17.45
846.6	23.74	-0.5	23.24	0.21	40.61	17.37

LTE Band 2									
Modulation	Bandwidth (MHz)	RB Size/Offset	Channels	Frequency (MHz)	Tx Average Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dBm)
QPSK	1.4	1 / 0	18607	1850.7	23.87	0.5	24.37	33	8.63
		1 / 3	18900	1880.0	23.94	0.5	24.44	33	8.56
		1 / 0	19193	1909.3	23.11	0.5	23.61	33	10.39
	3	1 / 0	18615	1851.5	23.91	0.5	24.41	33	8.59
		1 / 0	18900	1880.0	23.91	0.5	24.41	33	9.59
		1 / 0	19185	1908.5	22.96	0.5	23.46	33	9.54
	5	1 / 13	18625	1852.5	23.82	0.5	24.32	33	9.63
		1 / 13	18900	1880.0	24.0	0.5	24.5	33	8.5
		1 / 0	19175	1907.5	23.9	0.5	24.4	33	8.6
	10	1 / 0	18650	1855.0	23.97	0.5	24.47	33	8.53
		1 / 0	18900	1880.0	23.94	0.5	24.44	33	9.56
		1 / 0	**19150**	**1905.0**	**24.0**	**0.5**	**24.5**	**33**	**8.5**
	15	1 / 0	18675	1857.5	23.68	0.5	24.18	33	8.82
		1 / 0	18900	1880.0	23.91	0.5	24.41	33	8.59
		1 / 0	19125	1902.5	23.92	0.5	24.42	33	8.58
	20	1 / 99	18700	1860.0	23.91	0.5	24.41	33	8.59
		1 / 0	18900	1880.0	23.95	0.5	24.45	33	8.55
		1 / 50	19100	1900.0	23.96	0.5	24.46	33	8.54

LTE Band 2									
Modulation	Bandwidth (MHz)	RB Size/Offset	Channels	Frequency (MHz)	Tx Average Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dBm)
16QAM	1.4	1 / 0	18607	1850.7	22.92	0.5	23.42	33	9.58
		1 / 3	18900	1880.0	23.06	0.5	23.56	33	9.44
		1 / 0	19193	1909.3	21.56	0.5	22.06	33	10.94
	3	1 / 0	18615	1851.5	22.96	0.5	23.46	33	9.54
		1 / 0	18900	1880.0	23.11	0.5	23.61	33	9.39
		1 / 0	19185	1908.5	22.4	0.5	22.9	33	10.1
	5	1 / 13	18625	1852.5	23.18	0.5	23.68	33	9.32
		1 / 13	18900	1880.0	23.1	0.5	23.6	33	9.4
		1 / 0	19175	1907.5	23.15	0.5	23.65	33	9.35
	10	1 / 0	18650	1855.0	23.19	0.5	23.69	33	9.31
		1 / 0	**18900**	**1880.0**	**23.32**	**0.5**	**23.82**	**33**	**9.18**
		1 / 0	19150	1905.0	23.11	0.5	23.61	33	9.39
	15	1 / 0	18675	1857.5	22.91	0.5	23.41	33	9.59
		1 / 0	18900	1880.0	23.16	0.5	23.66	33	9.34
		1 / 38	19125	1902.5	23.19	0.5	23.69	33	9.31
	20	1 / 99	18700	1860.0	22.87	0.5	23.37	33	9.63
		1 / 0	18900	1880.0	23.2	0.5	23.7	33	9.3
		1 / 50	19100	1900.0	23.09	0.5	23.59	33	9.41

LTE Band 5									
Modulation	Bandwidth (MHz)	RB Size/Offset	Channels	Frequency (MHz)	Tx Average Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dBm)
QPSK	1.4	1 / 3	20407	824.7	23.98	-0.5	23.48	40.61	17.13
		1 / 3	20525	836.5	22.79	-0.5	22.29	40.61	18.32
		1 / 3	20643	848.3	23.69	-0.5	23.19	40.61	17.42
	3	1 / 0	20415	825.5	23.92	-0.5	23.42	40.61	17.19
		1 / 0	20525	836.5	23.82	-0.5	23.32	40.61	17.29
		1 / 0	20635	847.5	23.77	-0.5	23.27	40.61	17.34
	5	**1 / 13**	**20425**	**826.5**	**23.99**	**-0.5**	**23.49**	**40.61**	**17.12**
		1 / 0	20525	836.5	23.85	-0.5	23.35	40.61	17.26
		1 / 0	20625	846.5	23.78	-0.5	23.28	40.61	17.33
	10	1 / 0	20450	829	23.97	-0.5	23.47	40.61	17.14
		1 / 0	20525	836.5	23.98	-0.5	23.48	40.61	17.13
		1 / 0	20600	844	23.89	-0.5	23.39	40.61	17.22
16QAM	1.4	1 / 3	20407	824.7	23.02	-0.5	22.52	40.61	18.09
		1 / 3	20525	836.5	22.87	-0.5	22.37	40.61	18.24
		1 / 3	20643	848.3	22.78	-0.5	22.28	40.61	18.33
	3	1 / 0	20415	825.5	22.97	-0.5	22.47	40.61	18.14
		1 / 0	20525	836.5	23.05	-0.5	22.55	40.61	18.06
		1 / 0	20635	847.5	22.84	-0.5	22.34	40.61	18.27
	5	**1 / 13**	**20425**	**826.5**	**23.28**	**-0.5**	**22.78**	**40.61**	**17.83**
		1 / 0	20525	836.5	22.94	-0.5	22.44	40.61	18.17
		1 / 0	20625	846.5	23.0	-0.5	22.5	40.61	18.11
	10	1 / 0	20450	829	23.01	-0.5	22.51	40.61	18.1
		1 / 0	20525	836.5	23.18	-0.5	22.68	40.61	17.93
		1 / 0	20600	844	23.03	-0.5	22.53	40.61	18.08

2.4 PEAK-AVERAGE RATIO

2.4.1 Specification Reference

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

2.4.2 Standard Applicable

FCC 47 CFR Part 24.232:
(d) 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.

2.4.3 Equipment Under Test and Modification State

Serial No: AZ280418A00044 / Test Configuration A

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

June 12 and 13, 2018 / 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 Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	24.9 - 25.7 °C
Relative Humidity	53.3 - 54.2%
ATM Pressure	98.5 kPa

2.4.7 Additional Observations

- This is a conducted test.
- As per FCC KDB 971168 D01 v03r01 clause 5.7, the PAPR was measured in accorance with ANSI C63.26 clause 5.2.3.4.
- 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. For GSM signals, an average and a peak trace are used to determine the largest deviation between the average and the peak power of the EUT in a bandwidth greater than the emission bandwidth.
- Low, Middle and High channels for all bandwidths and modulations were verified.
- The path loss for was measured and entered as a level offset.
- There are no measured PAPR levels greater than 13dB. EUT complies.

2.4.8 Test Results

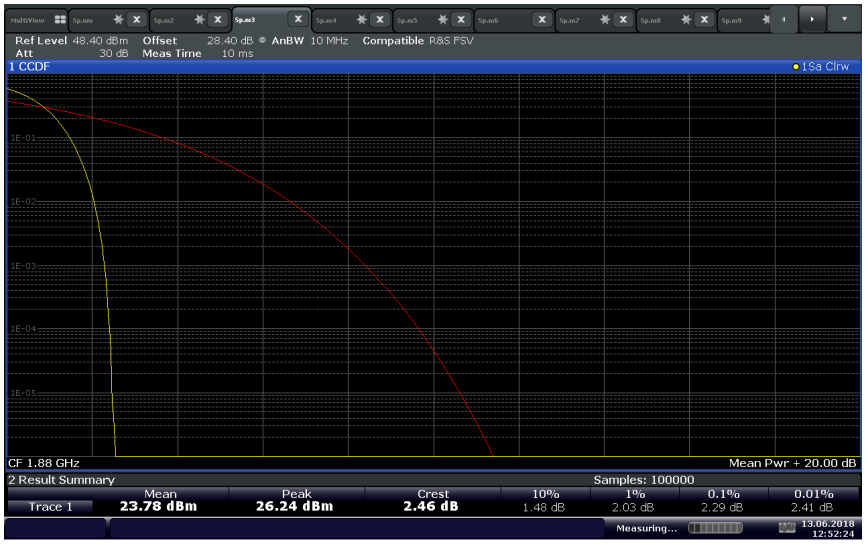
WCDMA				
Band	Channels	Frequency (MHz)	PAR (dB)	Limit for PAR (dB)
2	12	1852.5	3.5	13
	9400	1880	2.46	13
	287	1907.5	3.13	13
5	4132	826.4	2.04	13
	4183	836.6	1.76	13
	4233	846.6	2.83	13

LTE Band 2					
Modulation	*Bandwidth (MHz)*	Channels	Frequency (MHz)	PAR (dB)	Limit for PAR (dB)
QPSK	1.4	18607	1850.7	4.39	13
		18900	1880	4.35	13
		19193	1909.3	3.01	13
	3	18615	1851.5	4.34	13
		18900	1880	4.45	13
		19185	1908.5	2.99	13
	5	18625	1852.5	4.24	13
		18900	1880	4.59	13
		19175	1907.5	3.65	13
	10	18650	1855	4.83	13
		18900	1880	5.34	13
		19150	1905	4.5	13
	15	18675	1857.5	5.75	13
		18900	1880	5.47	13
		19125	1902.5	5.08	13
	20	18700	1860	6.57	13
		18900	1880	6.33	13
		19100	1900	6.61	13
16QAM	1.4	18607	1850.7	5.58	13
		18900	1880	5.44	13
		19193	1909.3	4.05	13
	3	18615	1851.5	5.47	13
		18900	1880	5.55	13
		19185	1908.5	4.28	13
	5	18625	1852.5	5.37	13
		18900	1880	5.61	13
		19175	1907.5	5.04	13
	10	18650	1855	5.88	13
		18900	1880	6.92	13
		19150	1905	5.82	13
	15	18675	1857.5	6.66	13
		18900	1880	7.0	13
		19125	1902.5	6.78	13
	20	18700	1860	7.95	13
		18900	1880	7.66	13
		19100	1900	7.82	13

LTE Band 5					
Modulation	***Bandwidth (MHz)***	**Channels**	**Frequency (MHz)**	**PAR (dB)**	**Limit for PAR (dB)**
QPSK	1.4	20407	824.7	4.83	13
		20525	836.5	4.6	13
		20643	848.3	3.9	13
	3	20415	825.5	4.66	13
		20525	836.5	5.09	13
		20635	847.5	4.76	13
	5	20425	826.5	4.91	13
		20525	836.5	4.97	13
		20625	846.5	5.41	13
	10	20450	829	5.24	13
		20525	836.5	4.98	13
		20600	844	5.7	13
16QAM	1.4	20407	824.7	6.2	13
		20525	836.5	5.05	13
		20643	848.3	5.07	13
	3	20415	825.5	6.08	13
		20525	836.5	6.16	13
		20635	847.5	5.93	13
	5	20425	826.5	6.1	13
		20525	836.5	6.27	13
		20625	846.5	6.28	13
	10	20450	829	6.42	13
		20525	836.5	6.39	13
		20600	844	6.79	13

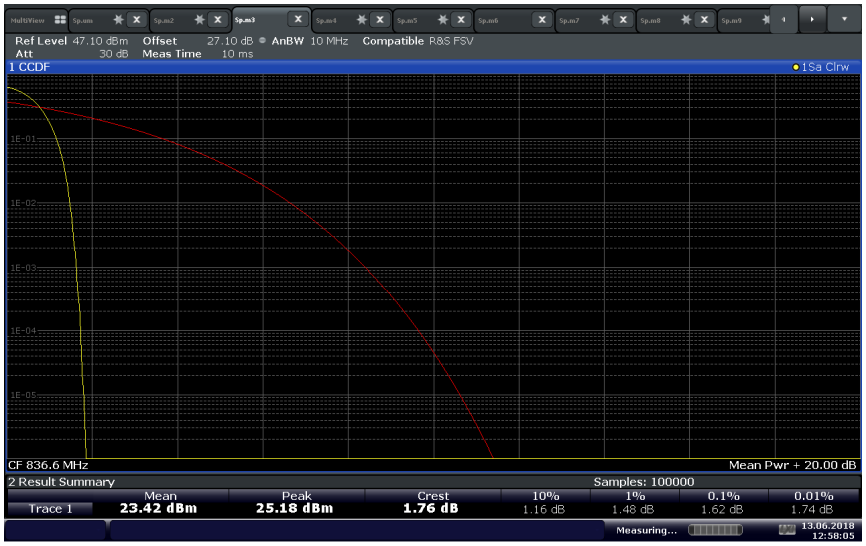
2.4.9 Example Test Plots

WCDMA – Band 2 Middle Channel 1880.0 MHz



12:52:25 13.06.2018

WCDMA – Band 5 Middle Chnnel 836.6 MHz



12:58:05 13.06.2018

LTE Band 2 (1.4 MHz BW) / Middle Channel 1880 MHz / QPSK
 16:17:35 12.06.2018
LTE Band 2 (1.4 MHz BW) / Middle Channel 1880 MHz / 16QAM
 16:17:01 12.06.2018

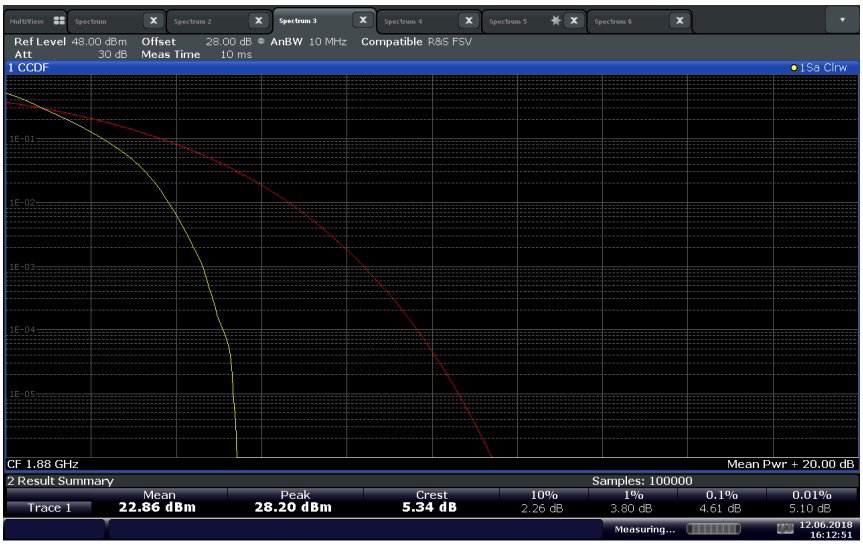
LTE Band 2 (3 MHz BW) / Middle Channel 1880 MHz / QPSK
 16:16:08 12.06.2018
LTE Band 2 (3 MHz BW) / Middle Channel 1880 MHz / 16QAM
 16:15:31 12.06.2018

LTE Band 2 (5 MHz BW) / Middle Channel 1880 MHz / QPSK

16:14:12 12.06.2018

LTE Band 2 (5 MHz BW) / Middle Channel 1880 MHz / 16QAM

16:14:43 12.06.2018

LTE Band 2 (10 MHz BW) / Middle Channel 1880 MHz / QPSK
 16:12:52 12.06.2018
LTE Band 2 (10 MHz BW) / Middle Channel 1880 MHz / 16QAM
 16:13:23 12.06.2018

LTE Band 2 (15 MHz BW) / Middle Channel 1880 MHz / QPSK


16:11:37 12.06.2018

LTE Band 2 (15 MHz BW) / Middle Channel 1880 MHz / 16QAM


16:12:13 12.06.2018

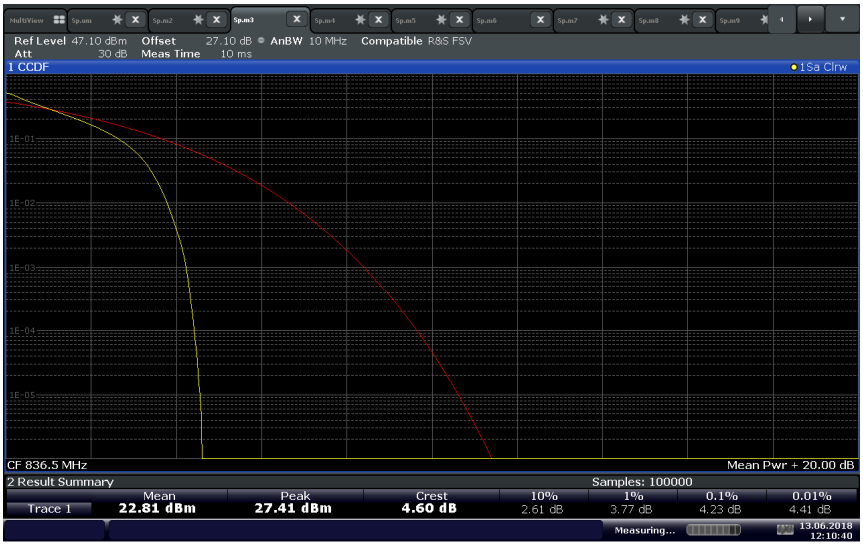
LTE Band 2 (20 MHz BW) / Middle Channel 1880 MHz / QPSK

16:10:01 12.06.2018

LTE Band 2 (20 MHz BW) / Middle Channel 1880 MHz / 16QAM

16:10:58 12.06.2018

LTE Band 5 (1.4 MHz BW) / Middle Channel 836.5 MHz / QPSK



12:10:41 13.06.2018

LTE Band 5 (1.4 MHz BW) / Middle Channel 836.5 MHz / 16QAM

10:18:06 13.06.2018

LTE Band 5 (3 MHz BW) / Middle Channel 836.5 MHz / QPSK

10:17:26 13.06.2018

LTE Band 5 (3 MHz BW) / Middle Channel 836.5 MHz / 16QAM

10:18:06 13.06.2018

LTE Band 5 (5 MHz BW) / Middle Channel 836.5 MHz / QPSK
 10:04:28 13.06.2018
LTE Band 5 (5 MHz BW) / Middle Channel 836.5 MHz / 16QAM
 10:06:32 13.06.2018

LTE Band 5 (10 MHz BW) / Middle Channel 836.5 MHz / QPSK

10:13:21 13.06.2018

LTE Band 5 (10 MHz BW) / Middle Channel 836.5 MHz / 16QAM

10:12:15 13.06.2018

2.5 OCCUPIED BANDWIDTH

2.5.1 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 6.7

2.5.2 Standard Applicable

The transmitted signal bandwidth shall be reported as the 99% emission bandwidth, that is the frequency bandwidth suuch that, below its lower and above its upper frequency limits, the mean powers radiated are eqch equal to 0.5 percent of the total mean power radiated by a give emission.

26dB 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 by at least 26 dB below the transmitter power.

2.5.3 Equipment Under Test and Modification State

Serial No: AZ280418A00044 / Test Configuration A

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

June 06, 11 , 2018 / 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 Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	24.8 – 25.7°C
Relative Humidity	46.4 – 51.3%
ATM Pressure	98.5 kPa

2.5.7 Additional Observations

- This is a conducted test. Both 26dB bandwidth and 99% bandwidth presented.
- Using the occupied bandwidth meansurement function in the spectrum analyzer, the 99% occupied bandwith was measured.
- The 26dB bandwidth was measured in accorance with ANSI C63.26 clause 5.4.3 using the ndB measurement function in the spectrum analyzer.
- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

- The resolution bandwidth (RBW) shall be in the range of 1% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be at least 3x RBW.
- Low, Mid and High channels for all bandwidths and modulations were verified. Test results of Mid channel were presented as representative.

2.5.8 Test Results

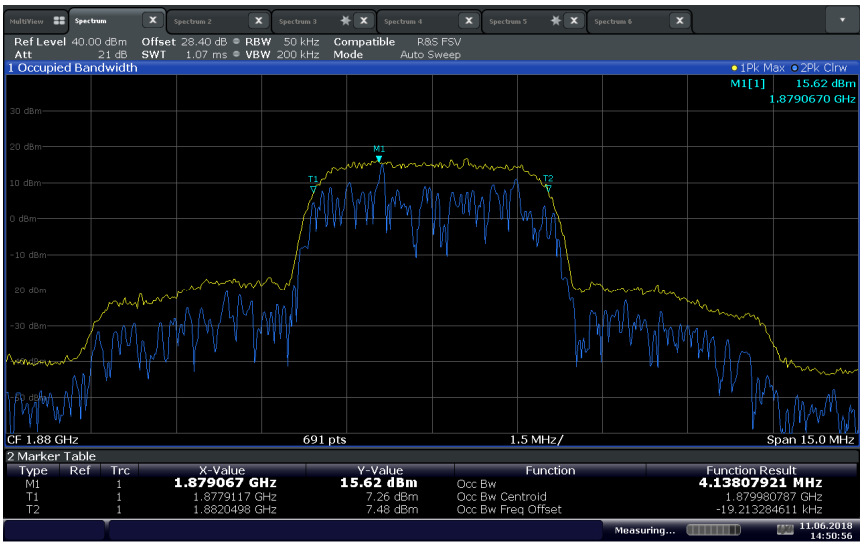
WCDMA				
Band	Channel	Frequency	99% OBW (MHz)	26dB BW (MHz)
Band 2	9400	1880.0	4.14	4.75
Band 5	4183	836.6	4.22	4.93

LTE Band 2					
Modulation	Bandwidth (MHz)	Channel	Frequency	99% OBW (MHz)	26dB BW (MHz)
QPSK	1.4	18900	1880.0	1.09	1.25
	3			2.69	3.02
	5			4.49	4.95
	10			8.95	9.86
	15			13.43	14.65
	20			17.84	19.19
16QAM	1.4	18900	1880.0	1.09	1.25
	3			2.69	3.00
	5			4.49	4.93
	10			8.95	9.64
	15			13.42	14.59
	20			17.89	19.19

LTE Band 5					
Modulation	Bandwidth (MHz)	Channel	Frequency	99% OBW (MHz)	26dB BW (MHz)
QPSK	1.4	20525	836.5	1.09	1.24
	3			2.69	3.0
	5			4.49	4.95
	10			8.94	9.72
16QAM	1.4	20525	836.5	1.09	1.24
	3			2.69	2.97
	5			4.47	4.93
	10			8.93	9.64

2.5.9 Example Test Plots

WCDMA Band 2 / Middle Channel 1880 MHz / 99% OBW

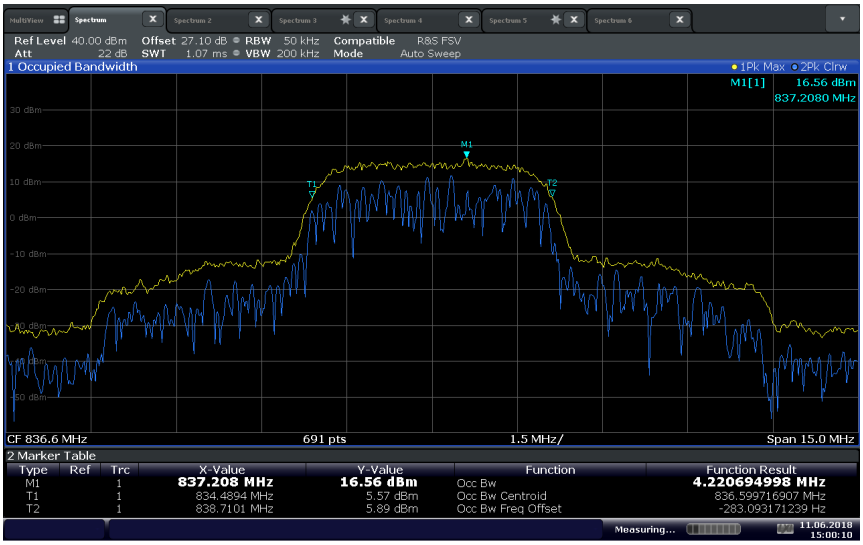


14:50:56 11.06.2018

WCDMA Band 2 / Middle Channel 1880 MHz / 26dB BW

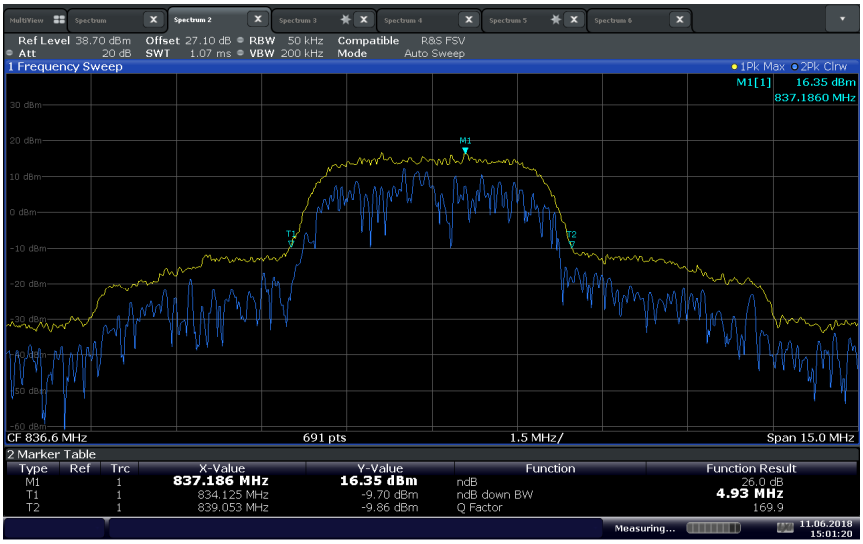
14:53:09 11.06.2018

WCDMA Band 5 / Middle Channel 836.6 MHz /99% OBW



15:00:11 11.06.2018

WCDMA Band 5 / Middle Channel 836.6 MHz / 26dB OBW



15:01:21 11.06.2018

LTE Band 2 (5 MHz BW) / Middle Channel 1880 MHz / QPSK / 99% OBW


17:23:45 06.06.2018

LTE Band 2 (5 MHz BW) / Middle Channel 1880 MHz / QPSK / 26dB BW


10:28:00 07.06.2018

LTE Band 5 (5 MHz BW) / Middle Channel 836.5 MHz / QPSK / 99% OBW

f 11:24:52 07.06.2018

LTE Band 5 (5 MHz BW) / Middle Channel 836.5 MHz / QPSK / 26dB BW

11:25:42 07.06.2018

2.6 SPURIOUS EMISSION AT BAND EDGE

2.6.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1051
FCC 47 CFR Part 22, Clause 22.917(a)(b)
FCC 47 CFR Part 24, Clause 24.238(a)(b)
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 log10 p(watts).

2.6.3 Equipment Under Test and Modification State

Serial No: AZ280418A00044 / Test Configuration A

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

July 16 and 17, 2018 / 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 Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

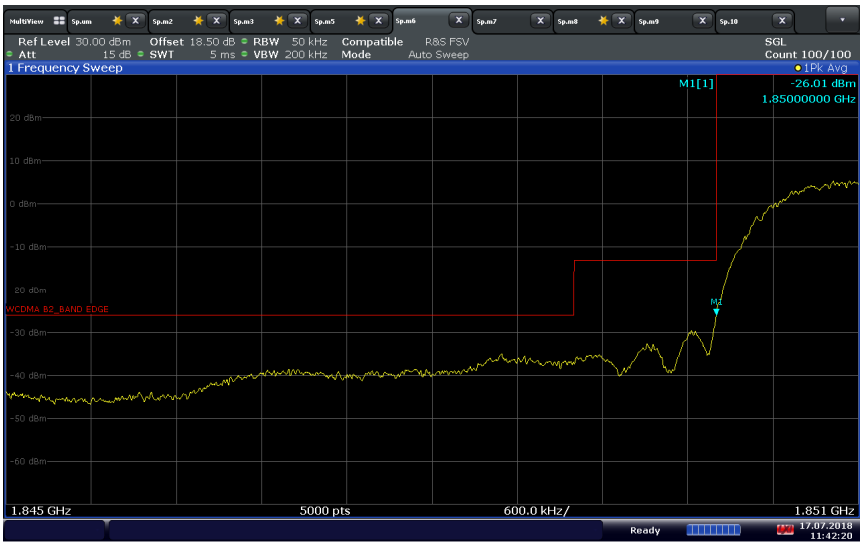
Ambient Temperature	24.9 - 25.1 °C
Relative Humidity	53.7 %
ATM Pressure	99.0 kPa

2.6.7 Additional Observations

- This is a conducted test.
- The path loss were measured and entered as a level offset.
- RBW is set to minimum 1% of EBW and VBW is set to >3 x RBW in the 1 MHz band immediately outside and adjacent to the channel edge.
- For WCDMA/LTE Band 5, RBW was set 1% of the Emission Bandwidth and for emissions more than 1.0 MHz outside the equipment's operating frequency block, the limit is set to:
  $-13 + 10\lg(RBW_{used}/100kHz)$ dBm.
- For WCDMA/LTE Band 2, RBW was set 1% of the Emission Bandwidth and for emissions more than 1.0 MHz outside the equipment's operating frequency block, the limit is set to:
  $-13 + 10\lg(RBW_{used}/1\ MHz)$ dBm.
- Only worst case configuration for all technologies presented in this test report.

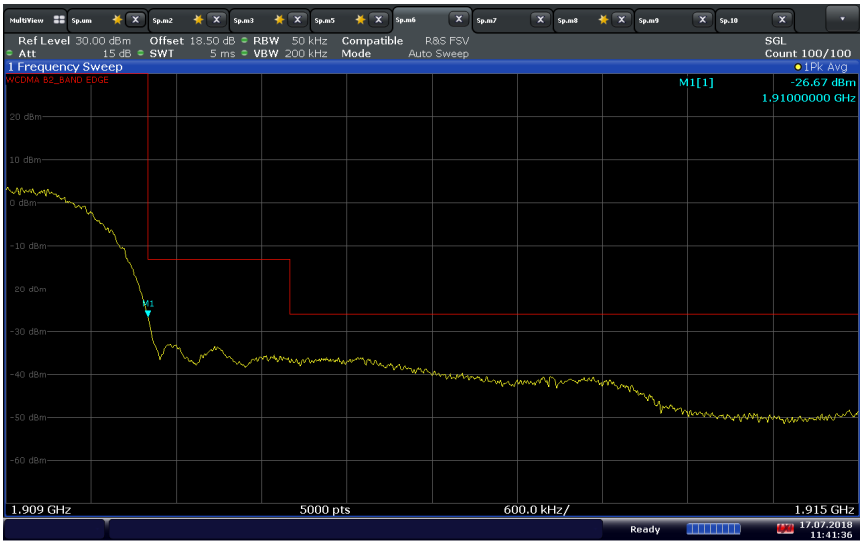
2.6.8 Test Results

WCDMA Band 2/Low Channel 1852.4 MHz / Band Edge @ 1850 MHz

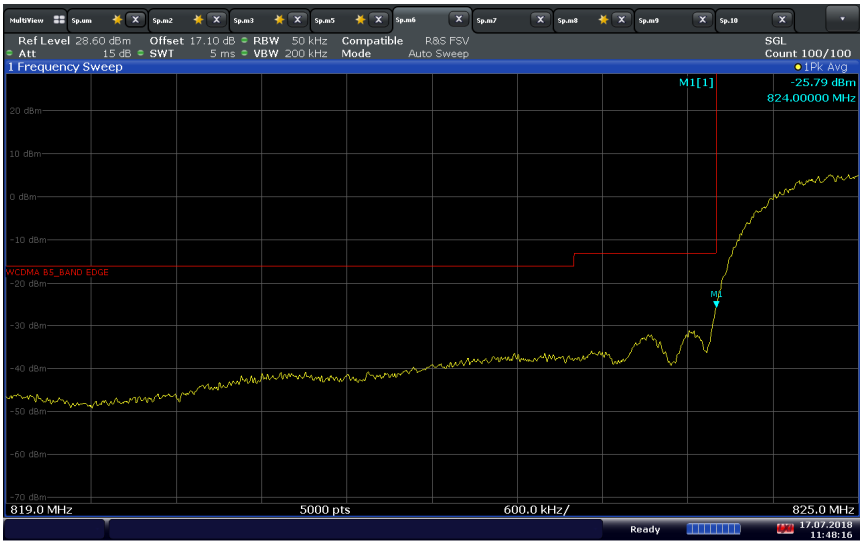


11:42:21 17.07.2018

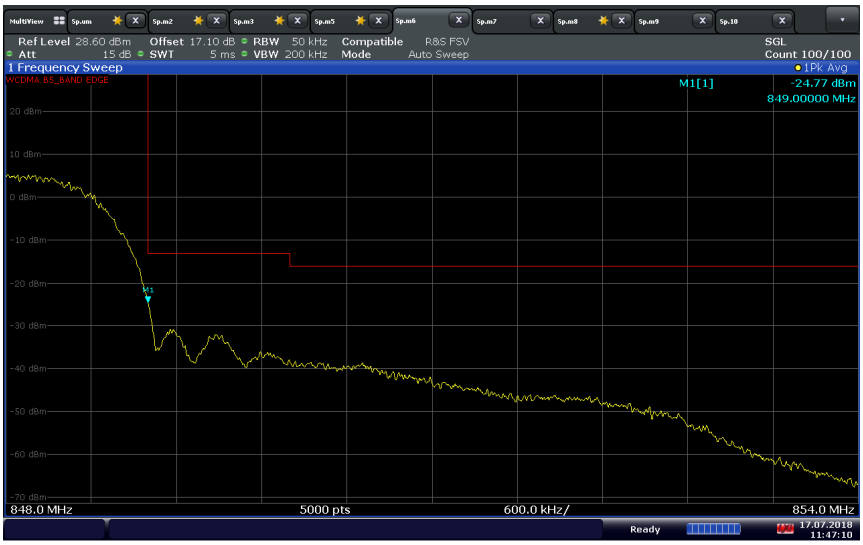
WCDMA Band 2/High Channel 1907.6 MHz / Band Edge @ 1910 MHz



11:41:36 17.07.2018

WCDMA Band 5/Low Channel 826.4 MHz / Band Edge @ 824 MHz


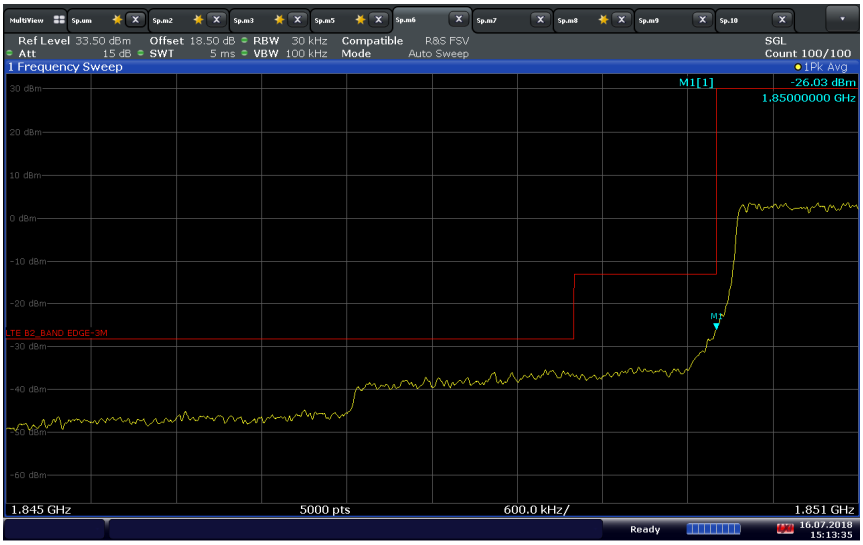
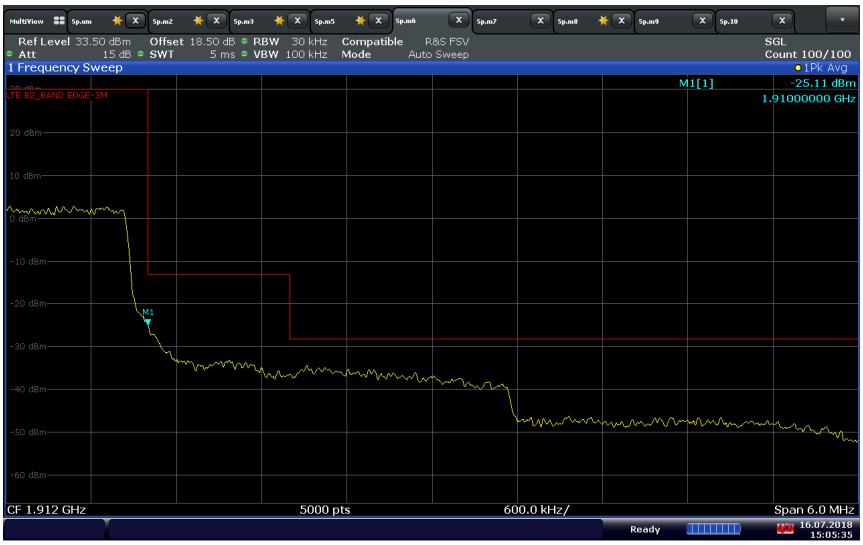
11:48:17 17.07.2018

WCDMA Band 5/High Channel 846.6 MHz / Band Edge @ 849 MHz


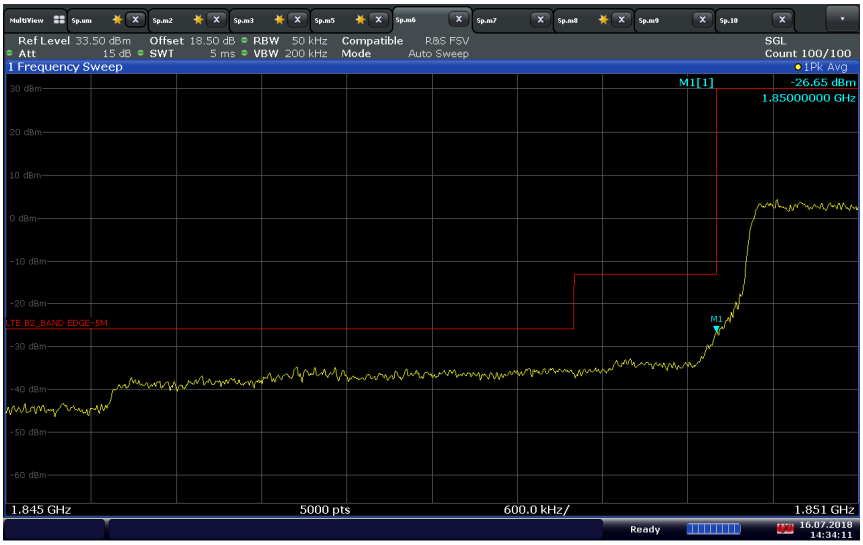
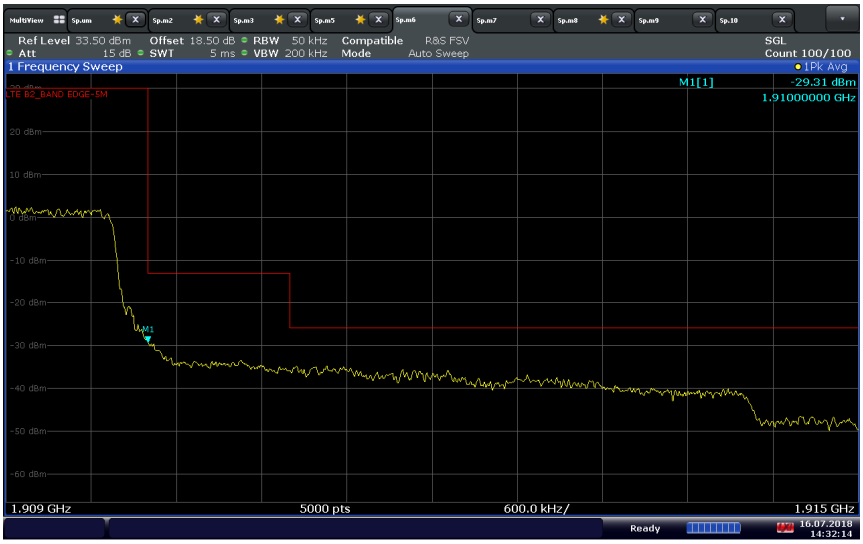
11:47:11 17.07.2018

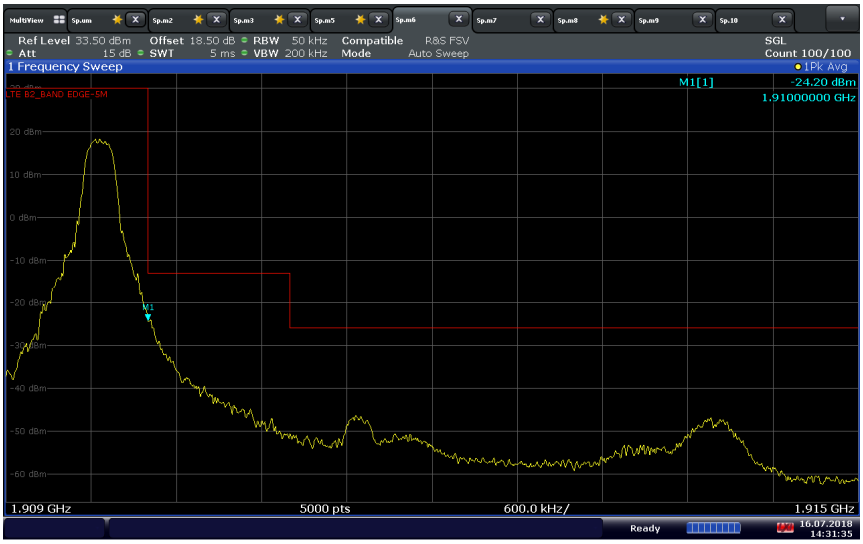
LTE Band 2 (1.4 MHz BW)/QPSK/Low Channel 1850.7 MHz/Full RB Band Edge @1850 MHz
 14:57:15 16.07.2018
LTE Band 2 (1.4 MHz BW)/QPSK/High Channel 1909.3 MHz/Full RB Band Edge @1910 MHz
 15:02:41 16.07.2018

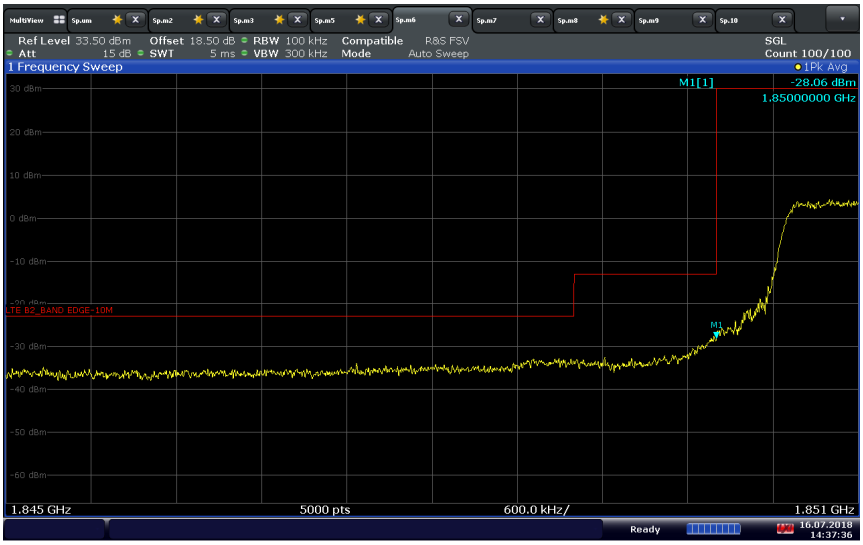
LTE Band 2 (1.4 MHz BW)/QPSK/Low Channel 1850.7 MHz/1 RB 0 offset Band Edge @1850 MHz
 14:57:41 16.07.2018
LTE Band 2 (1.4 MHz BW)/QPSK/High Channel 1909.3 MHz/1 RB 5 offset Band Edge @1910 MHz
 15:02:07 16.07.2018

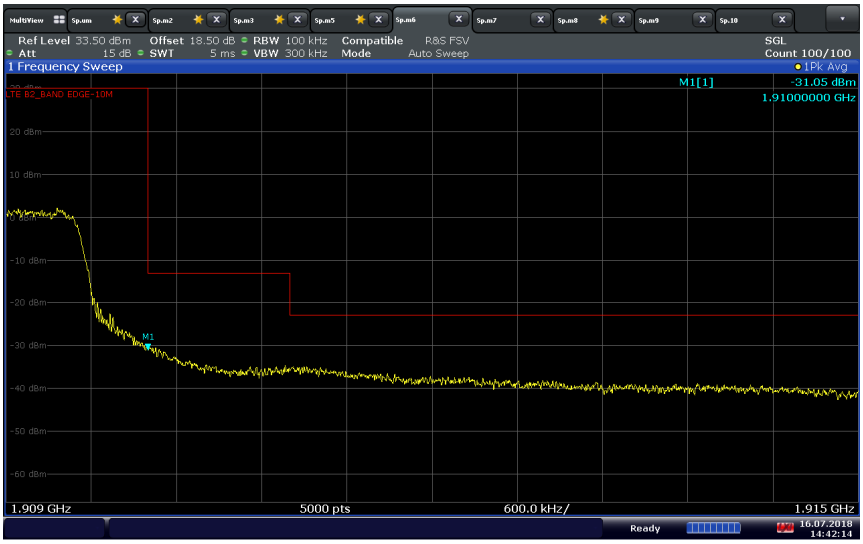
LTE Band 2 (3 MHz BW)/QPSK/Low Channel 1851.5 MHz/Full RB Band Edge @1850 MHz
 15:13:36 16.07.2018
LTE Band 2 (3 MHz BW)/QPSK/High Channel 1908.5 MHz/Full RB Band Edge @1910 MHz
 15:05:36 16.07.2018

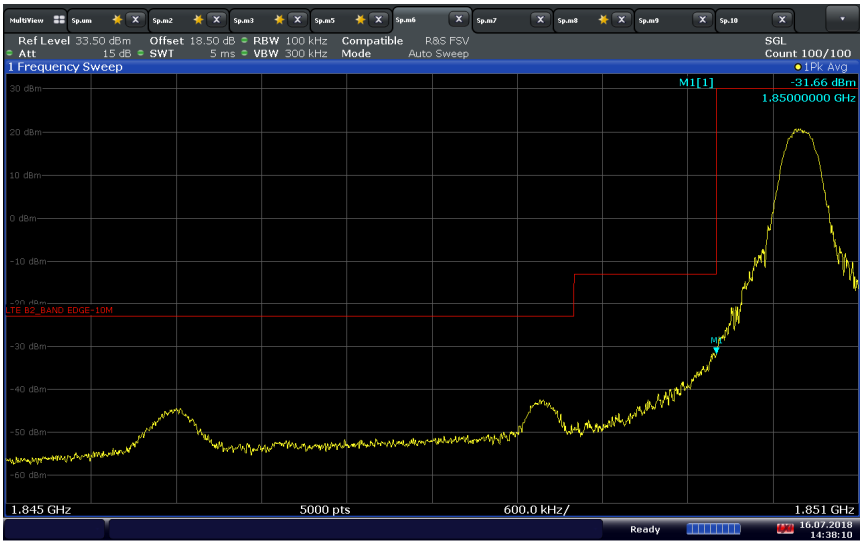
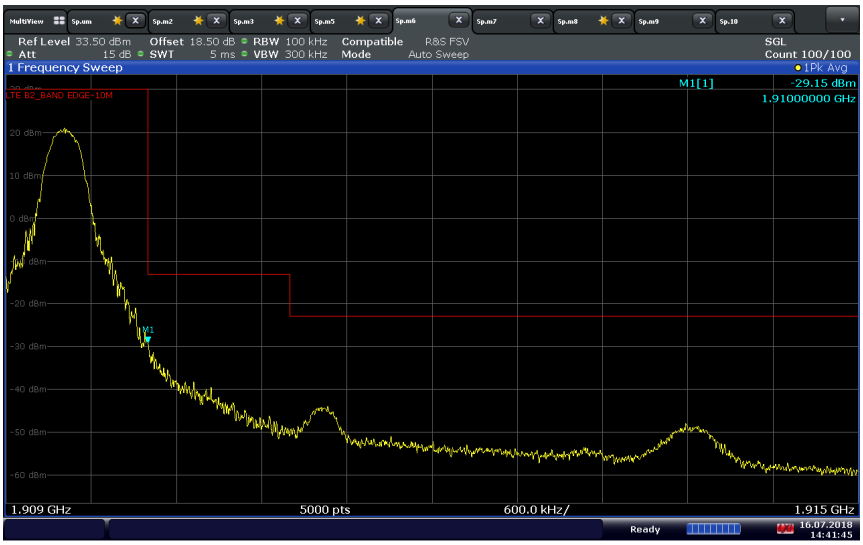
LTE Band 2 (3 MHz BW)/QPSK/Low Channel 1851.5 MHz/1 RB 0 offset Band Edge @1850 MHz
 15:13:59 16.07.2018
LTE Band 2 (3 MHz BW)/QPSK/High Channel 1908.5 MHz/1 RB 14 offset Band Edge @1910 MHz
 15:05:04 16.07.2018

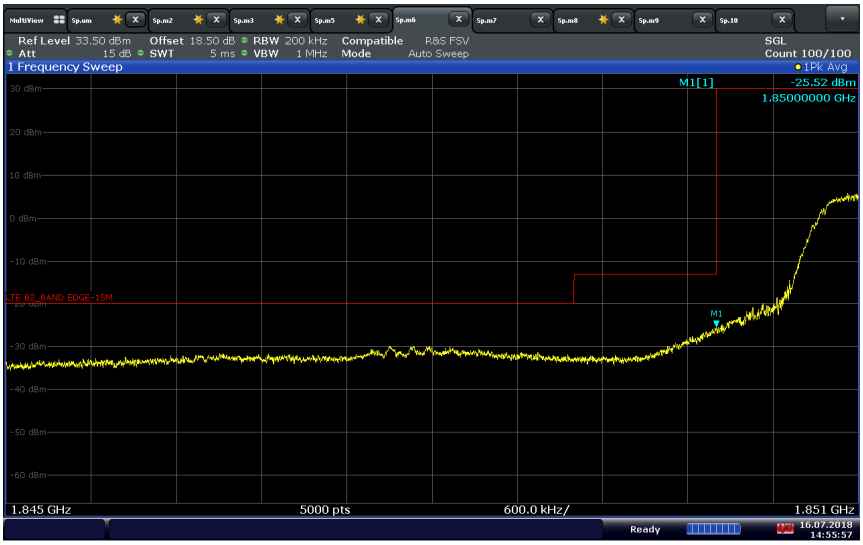
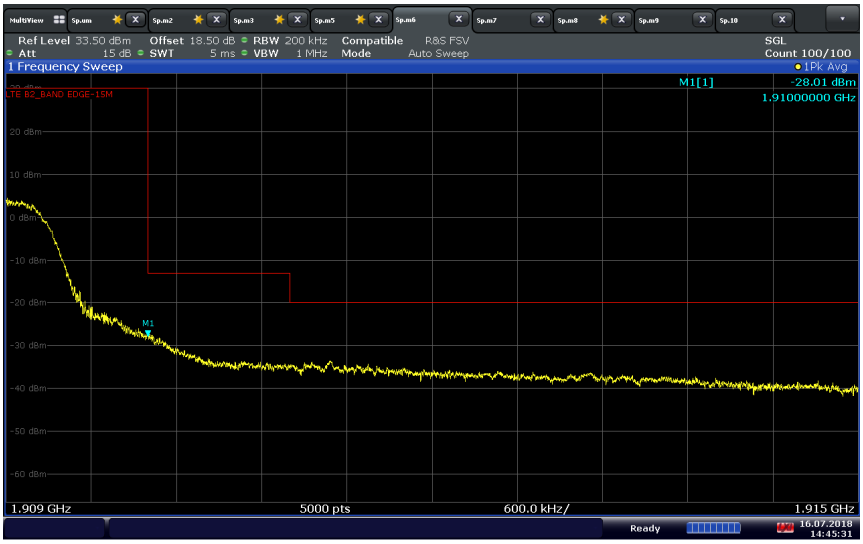
LTE Band 2 (5 MHz BW)/QPSK/Low Channel 1852.5 MHz/Full RB Band Edge @1850 MHz
 14:34:12 16.07.2018
LTE Band 2 (5 MHz BW)/QPSK/High Channel 1907.5 MHz/Full RB Band Edge @1910 MHz
 14:32:14 16.07.2018

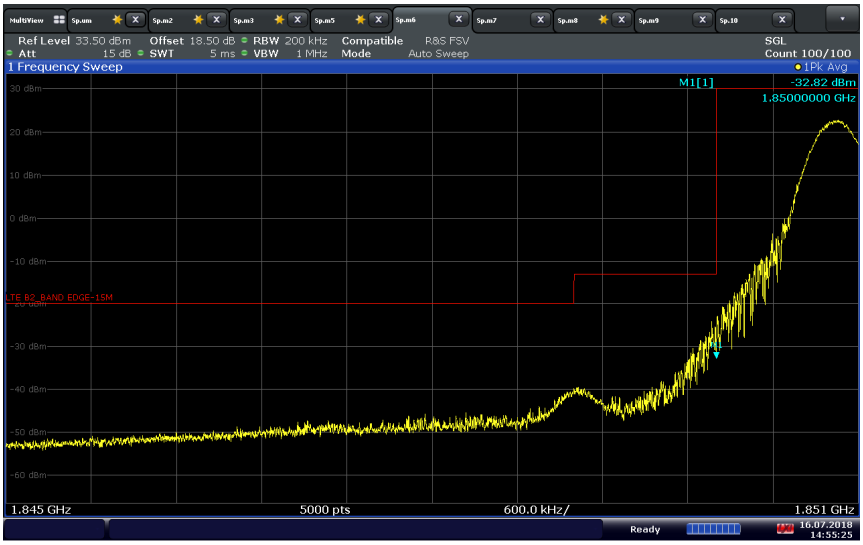
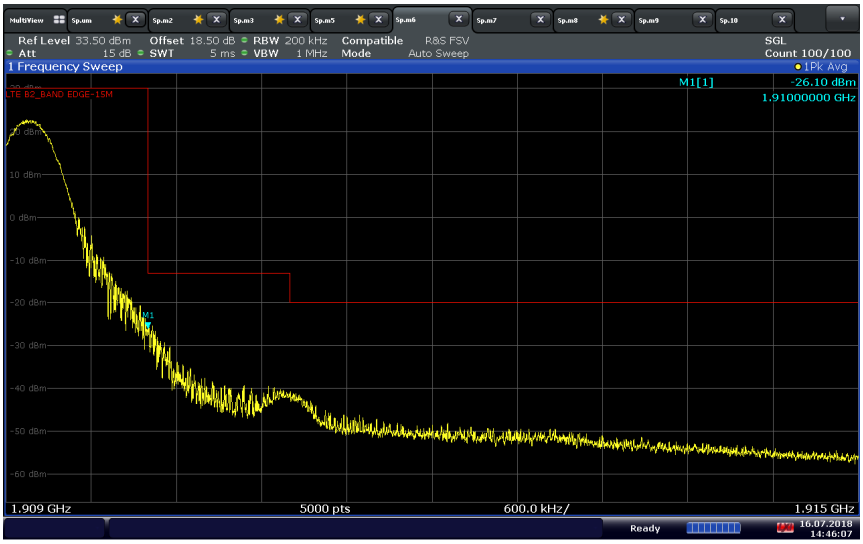
LTE Band 2 (5 MHz BW)/QPSK/Low Channel 1852.5 MHz/1 RB 0 offset Band Edge @1850 MHz
 14:34:48 16.07.2018
LTE Band 2 (5 MHz BW)/QPSK/High Channel 1907.5 MHz/1 RB 24 offfset Band Edge @1910 MHz
 14:31:35 16.07.2018

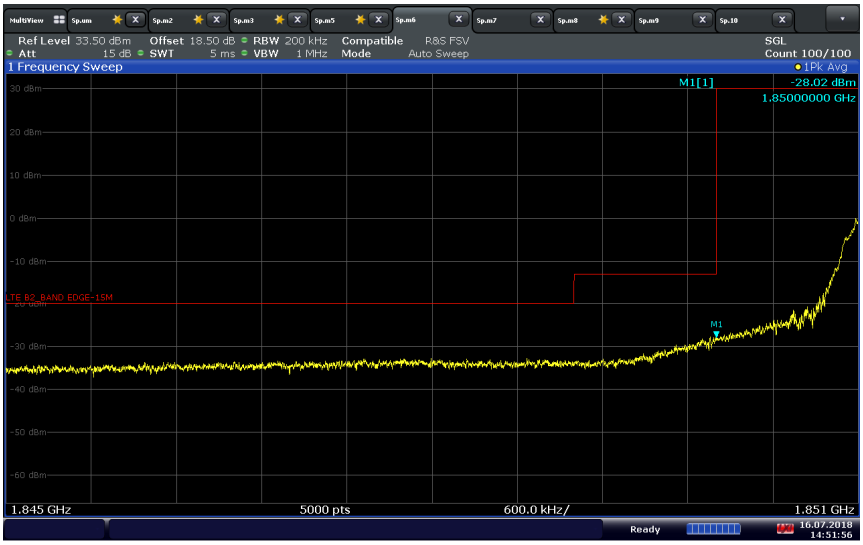
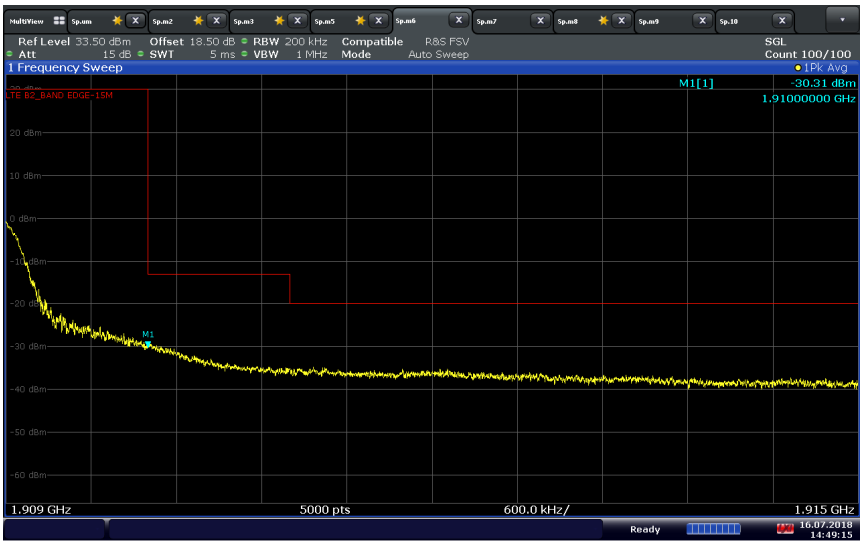
LTE Band 2 (10 MHz BW)/QPSK/Low Channel 1855 MHz/Full RB Band Edge @1850 MHz
 14:37:36 16.07.2018

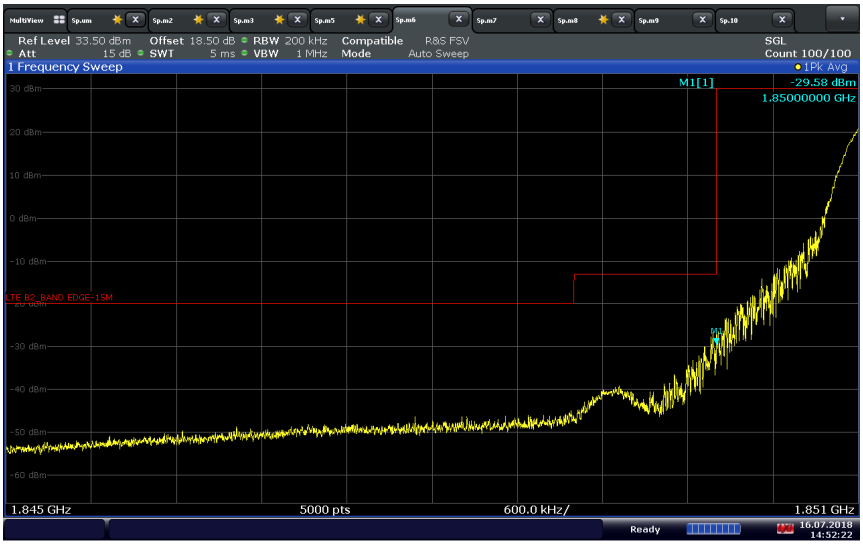
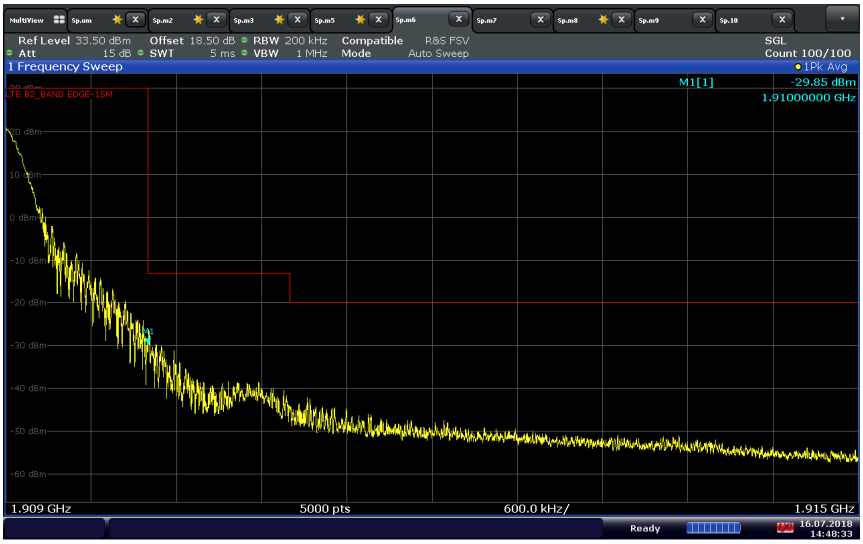
LTE Band 2 (10 MHz BW)/QPSK/High Channel 1905 MHz/Full RB Band Edge @1910 MHz
 14:42:15 16.07.2018

LTE Band 2 (10 MHz BW)/QPSK/Low Channel 1855 MHz/1 RB 0 offset Band Edge @1850 MHz
 14:38:10 16.07.2018
LTE Band 2 (10 MHz BW)/QPSK/High Channel 1905 MHz/1 RB 49 offset Band Edge @1910 MHz
 14:41:45 16.07.2018

LTE Band 2 (15 MHz BW)/QPSK/Low Channel 18575 MHz/Full RB Band Edge @1850 MHz
 14:55:57 16.07.2018
LTE Band 2 (15 MHz BW)/QPSK/High Channel 19025 MHz/Full RB Band Edge @1910 MHz
 14:45:31 16.07.2018

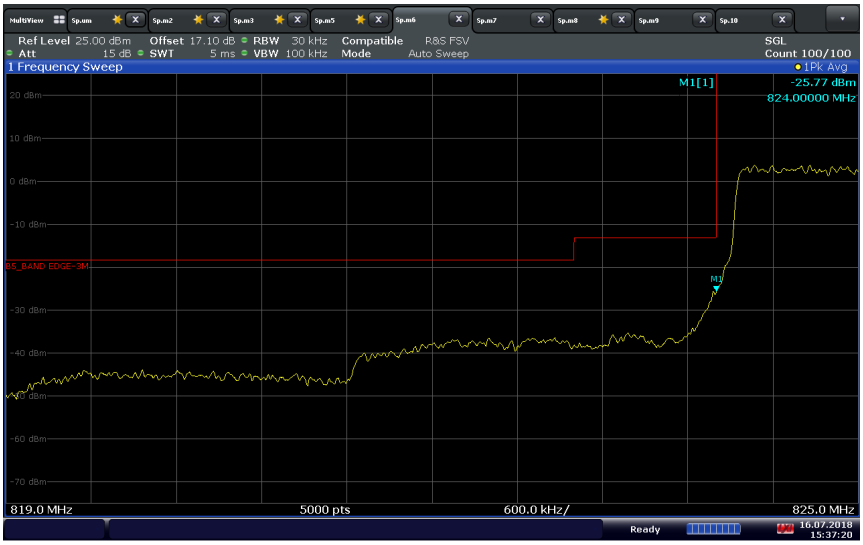
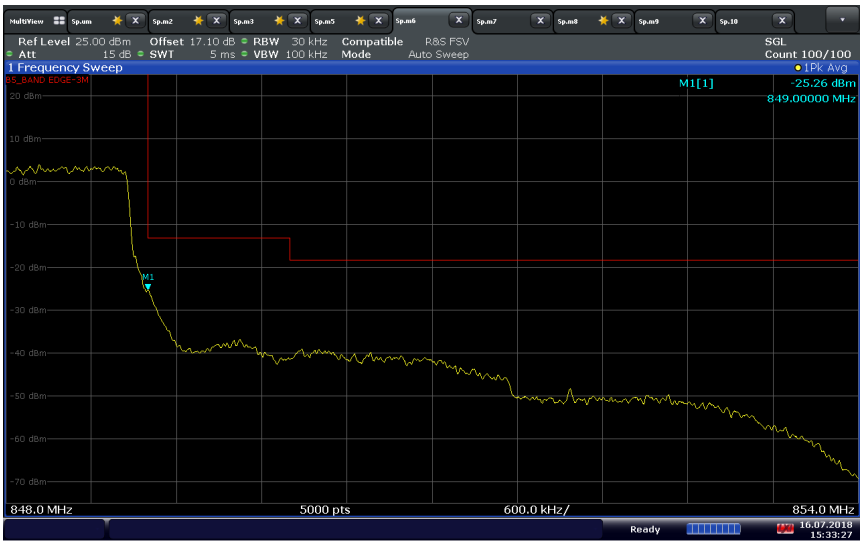
LTE Band 2 (15 MHz BW)/QPSK/Low Channel 1857.5 MHz/1 RB 0 offset Band Edge @1850 MHz
 14:55:26 16.07.2018
LTE Band 2 (15 MHz BW)/QPSK/High Channel 1902.5 MHz/1 RB 74 offset Band Edge @1910 MHz
 14:46:08 16.07.2018

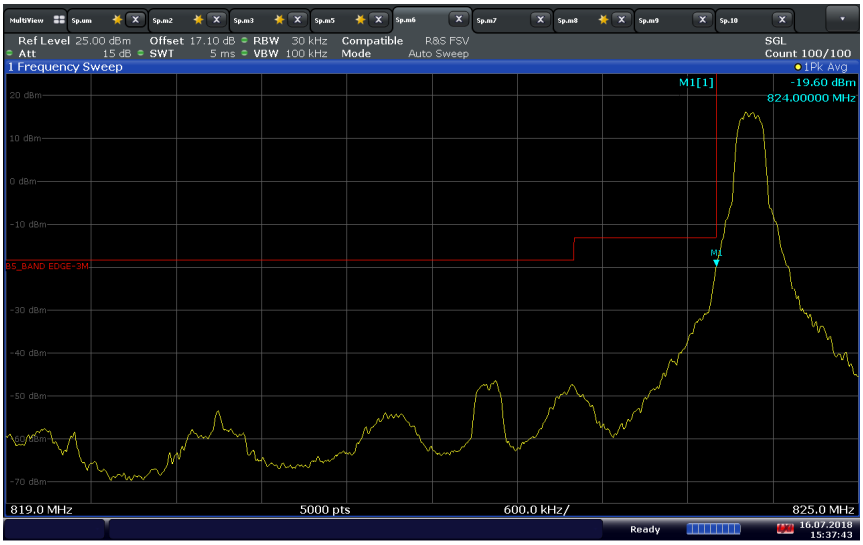
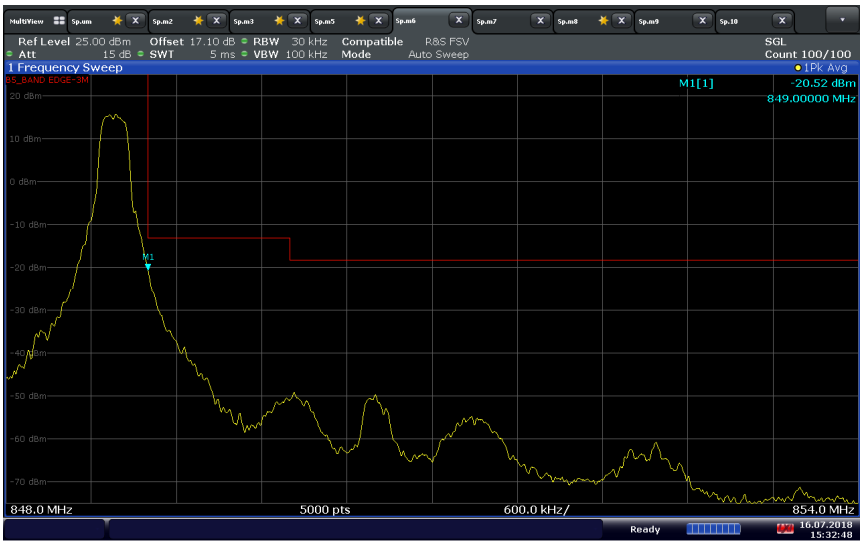
LTE Band 2 (20 MHz BW)/QPSK/Low Channel 1860 MHz/Full RB Band Edge @1850 MHz
 14:51:57 16.07.2018
LTE Band 2 (20 MHz BW)/QPSK/High Channel 1900 MHz/Full RB Band Edge @1910 MHz
 14:49:15 16.07.2018

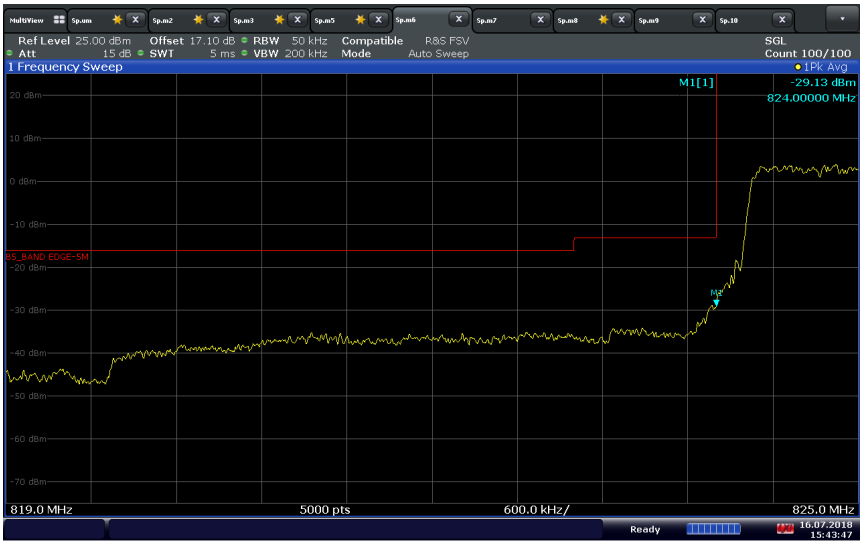
LTE Band 2 (20 MHz BW)/QPSK/Low Channel 1860 MHz/1 RB 0 offset Band Edge @1850 MHz
 14:52:23 16.07.2018
LTE Band 2 (20 MHz BW)/QPSK/High Channel 1900 MHz/1 RB 99 offset Band Edge @1910 MHz
 14:48:34 16.07.2018

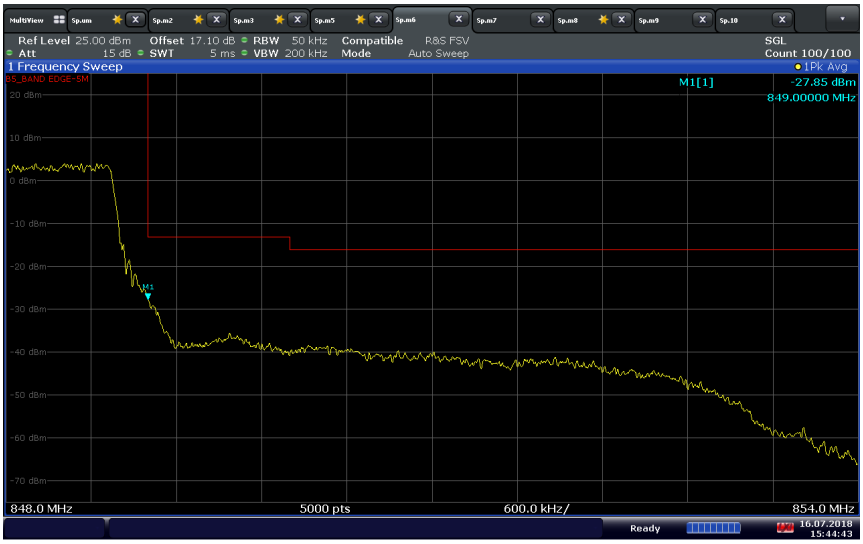
LTE Band 5 (1.4 MHz BW)/QPSK/Low Channel 824.7 MHz/Full RB Band Edge @824 MHz
 15:27:03 16.07.2018
LTE Band 5 (1.4 MHz BW)/QPSK/High Channel 848.3 MHz/Full RB Band Edge @849 MHz
 15:29:57 16.07.2018

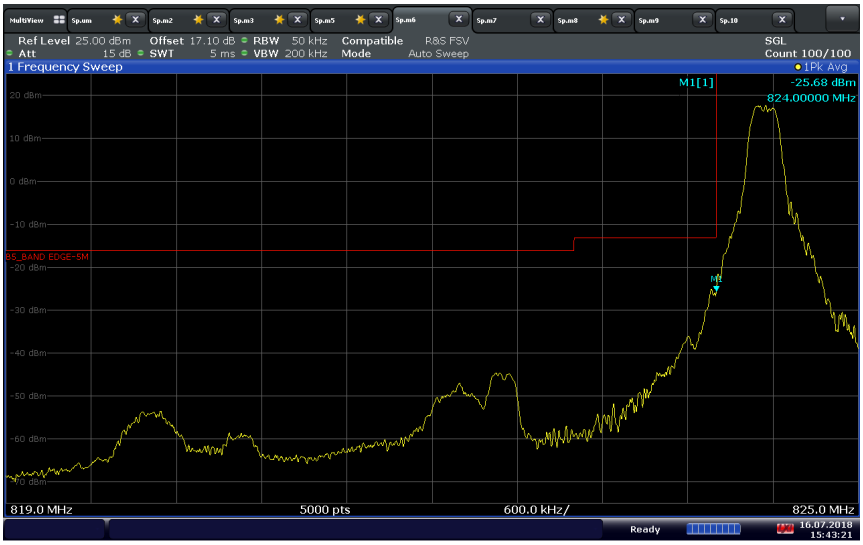
LTE Band 5 (1.4 MHz BW)/QPSK/Low Channel 824.7 MHz/1 RB 0 offset Band Edge @824 MHz
 15:26:24 16.07.2018
LTE Band 5 (1.4 MHz BW)/QPSK/High Channel 848.3 MHz/1 RB 5 offset Band Edge @849 MHz
 15:30:26 16.07.2018

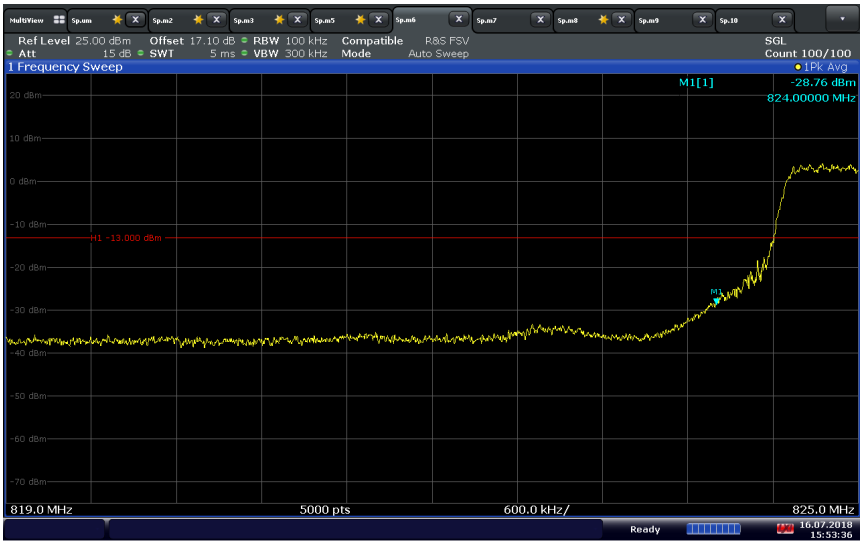
LTE Band 5 (3 MHz BW)/QPSK/Low Channel 825.5 MHz/Full RB Band Edge @824 MHz
 15:37:20 16.07.2018
LTE Band 5 (3 MHz BW)/QPSK/High Channel 836.5 MHz/Full RB Band Edge @849 MHz
 15:33:27 16.07.2018

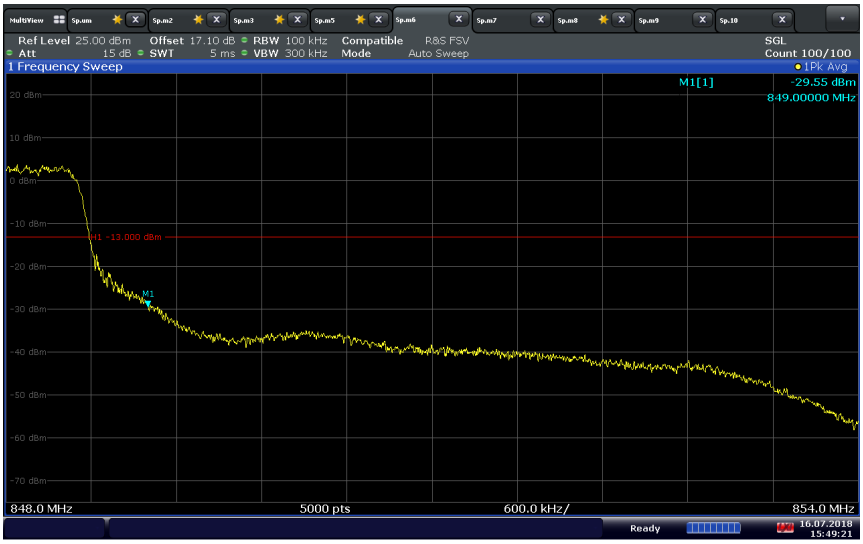
LTE Band 5 (3 MHz BW)/QPSK/Low Channel 825.5 MHz/1 RB 0 offset Band Edge @824 MHz
 15:37:43 16.07.2018
LTE Band 5 (3 MHz BW)/QPSK/High Channel 836.5 MHz/1 RB 14 offset Band Edge @849 MHz
 15:32:48 16.07.2018

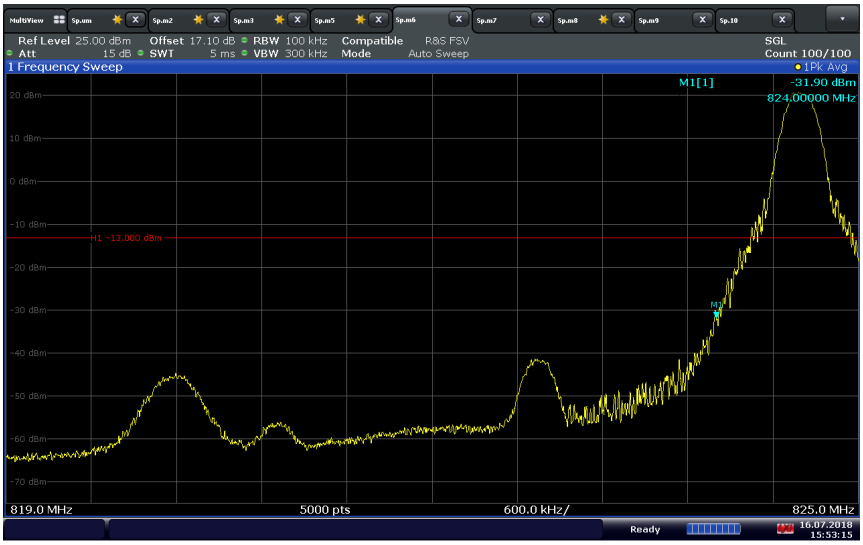
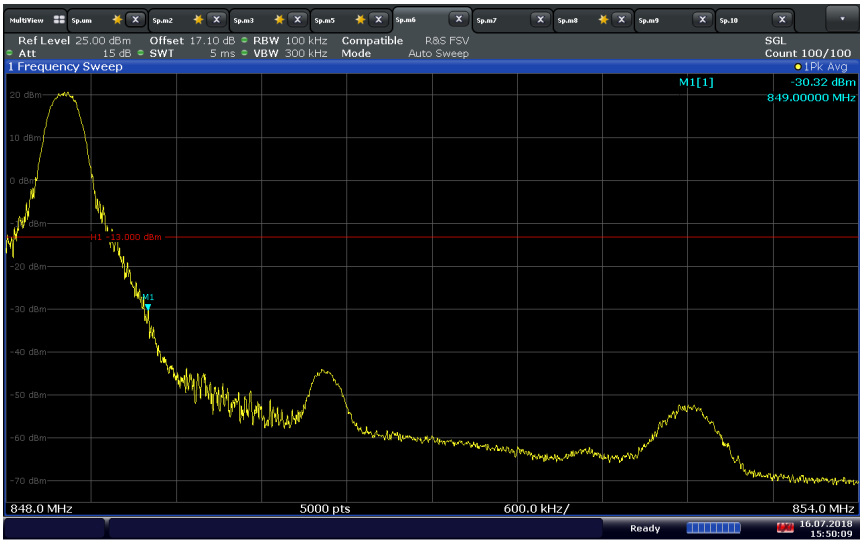
LTE Band 5 (5 MHz BW)/QPSK/Low Channel 826.5 MHz/Full RB Band Edge @824MHz
 15:43:48 16.07.2018

LTE Band 5 (5 MHz BW)/QPSK/High Channel 846.5 MHz/Full RB Band Edge @849 MHz
 15:44:43 16.07.2018

LTE Band 5 (5 MHz BW)/QPSK/Low Channel 826.5 MHz/1 RB 0 offset Band Edge @824 MHz
 15:43:21 16.07.2018
LTE Band 5 (5 MHz BW)/QPSK/High Channel 846.5 MHz/1 RB 24 offset Band Edge @849 MHz
 15:45:14 16.07.2018

LTE Band 5 (10 MHz BW)/QPSK/Low Channel 829 MHz/Full RB Band Edge @825 MHz
 15:53:37 16.07.2018

LTE Band 5 (10 MHz BW)/QPSK/High Channel 844 MHz/Full RB Band Edge @849 MHz
 15:49:21 16.07.2018

LTE Band 5 (10 MHz BW)/QPSK/Low Channel 829 MHz/1 RB 0 offset Band Edge @825 MHz
 15:53:15 16.07.2018
LTE Band 5 (10 MHz BW)/QPSK/High Channel 844 MHz/1 RB 49 offset Band Edge @849 MHz
 15:50:10 16.07.2018

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

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 + 10log(P) dB.

2.7.3 Equipment Under Test and Modification State

Serial No: AZ280418A00044 / Test Configuration A

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

June 18 and 21, 2018 / 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 Location

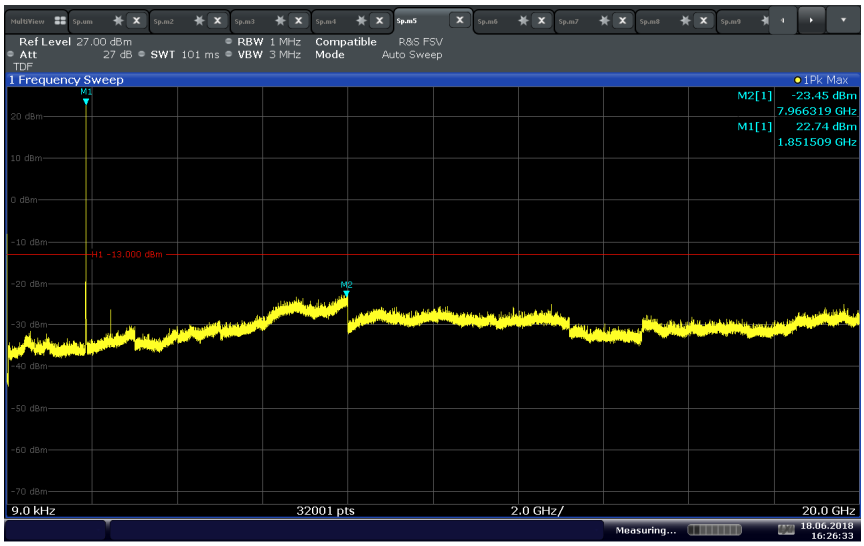
Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	24.0 - 24.3 °C
Relative Humidity	44.0 - 55.9%
ATM Pressure	99.0 - 99.1kPa

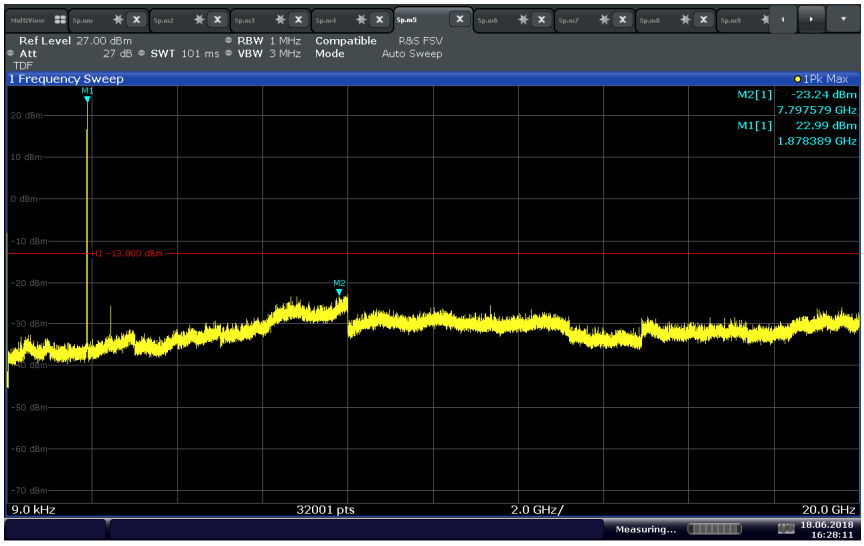
2.7.7 Additional Observations

- This is a conducted test.
- The spectrum was searched from 9 kHz to the 10th harmonic.
- The path loss was measured and entered as a transducer factor (TDF).
- For WCDMA/LTE Band 5, RBW was set to 100kHz.
- For WCDMA/LTE Band 2, RBW was set to 1 MHz.
- Low, Middle and High channels on all channel bandwidth and modulation are verified. Only worst case configuration for all technologies presented in this test report.

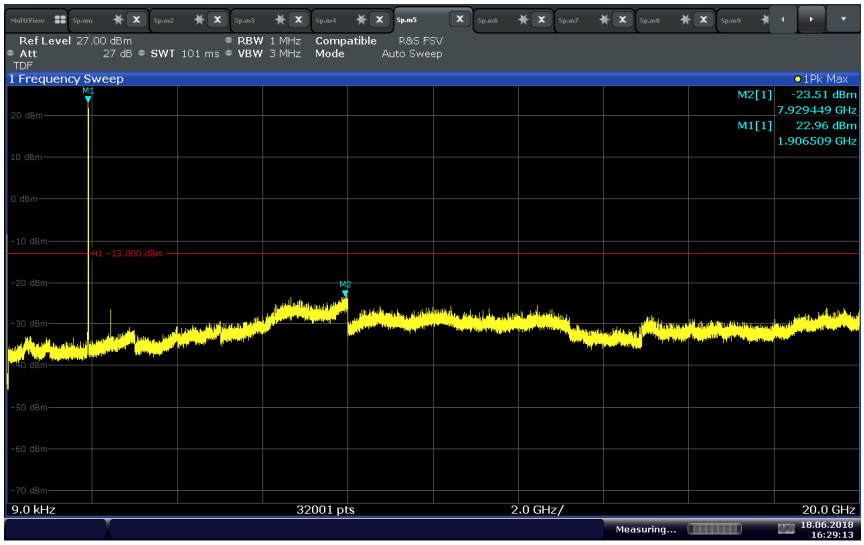
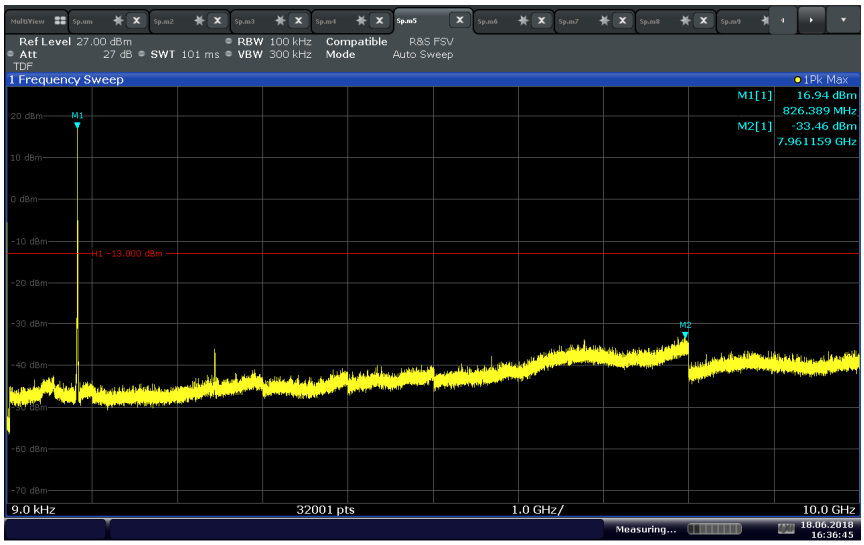
2.7.8 Test Results

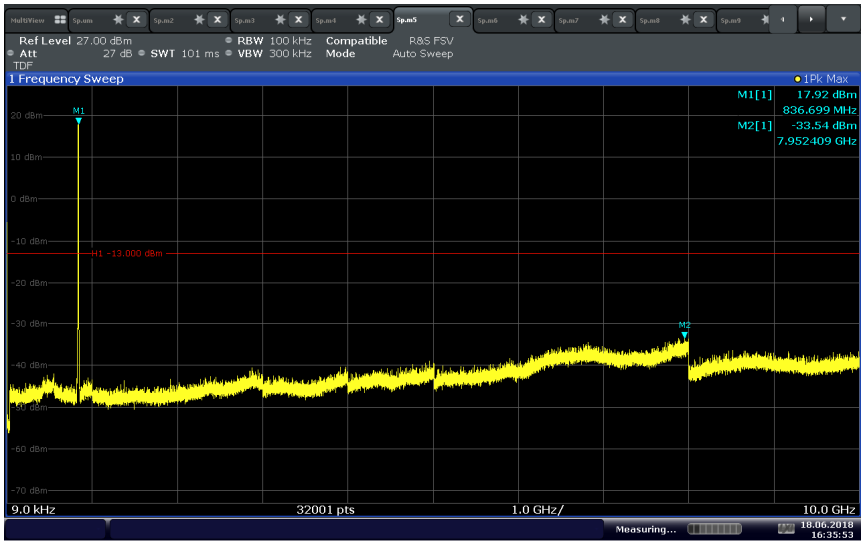
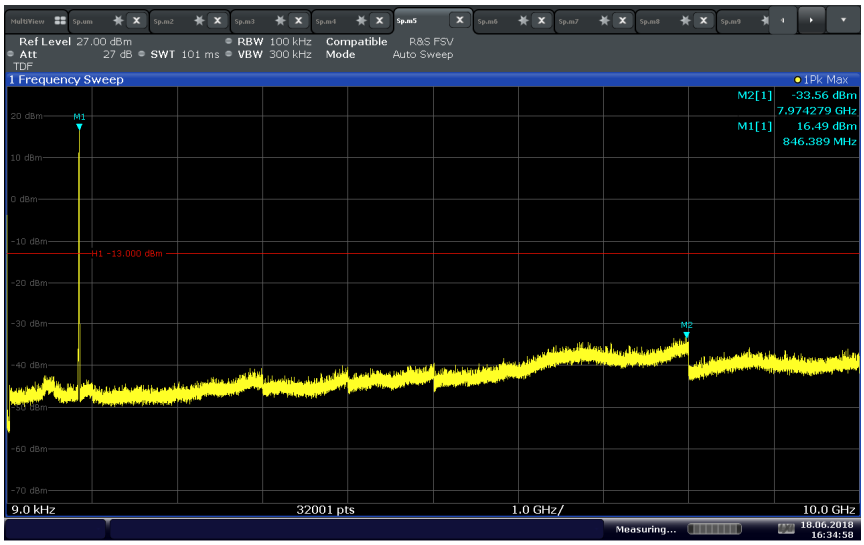
WCDMA Band 2/Low Channel 1852.4 MHz


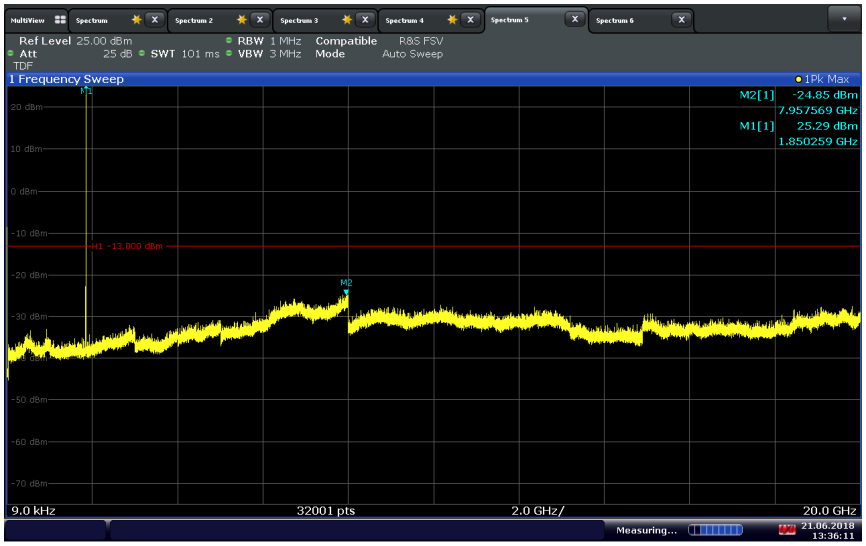
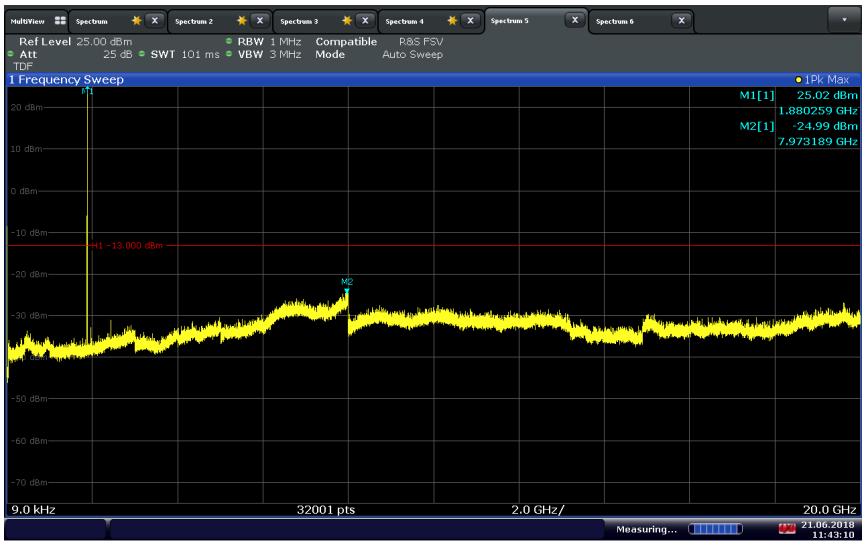
16:26:33 18.06.2018

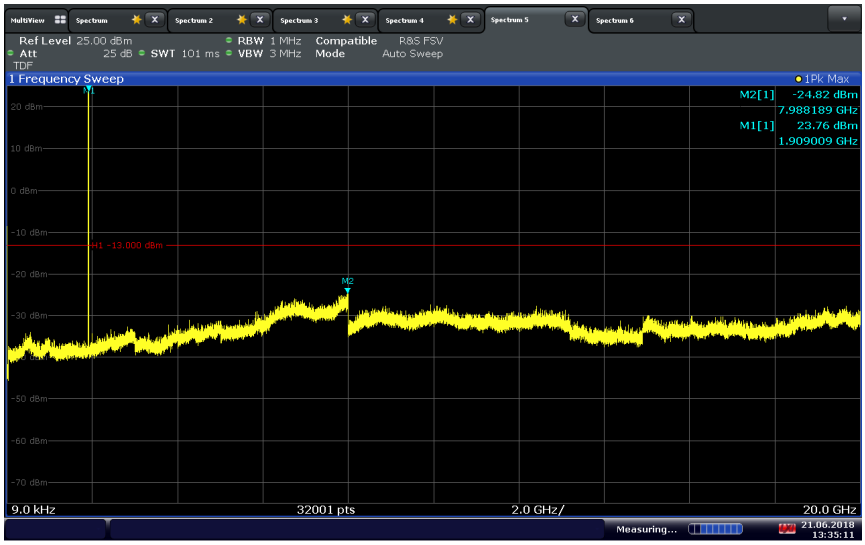
WCDMA Band 2/Mid Channel 1880.0 MHz


16:28:12 18.06.2018

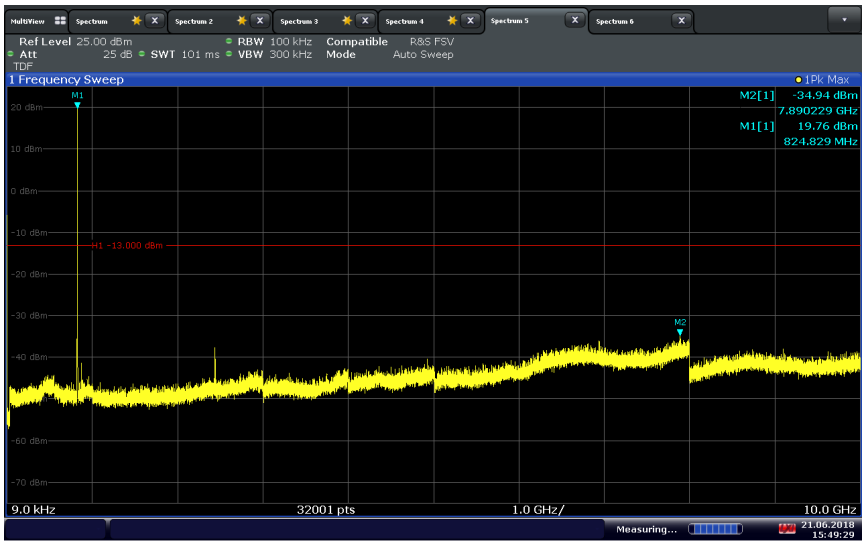
WCDMA Band 2/High Channel 1907.6 MHz
 16:29:14 18.06.2018
WCDMA Band 5/Low Channel 826.4 MHz
 16:36:46 18.06.2018

WCDMA Band 5/Mid Channel 836.6 MHz
 16:35:53 18.06.2018
WCDMA Band 5/High Channel 846.6 MHz
 16:34:58 18.06.2018

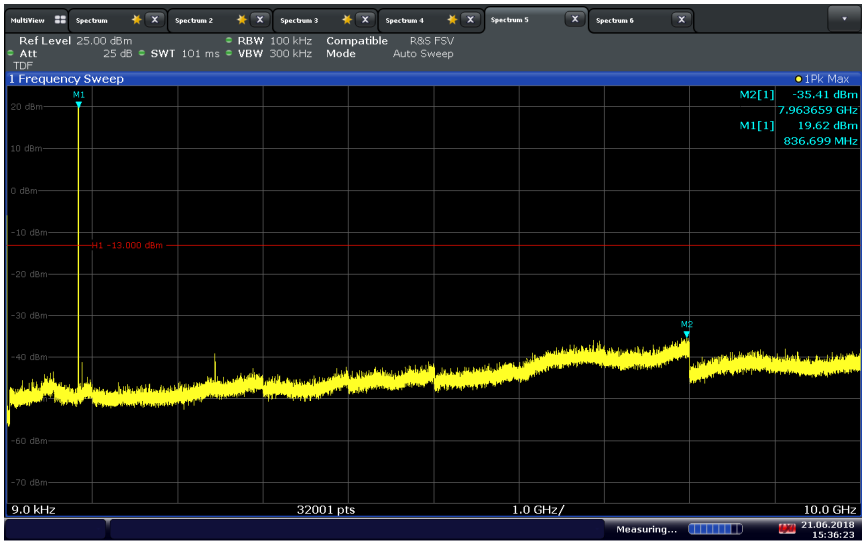
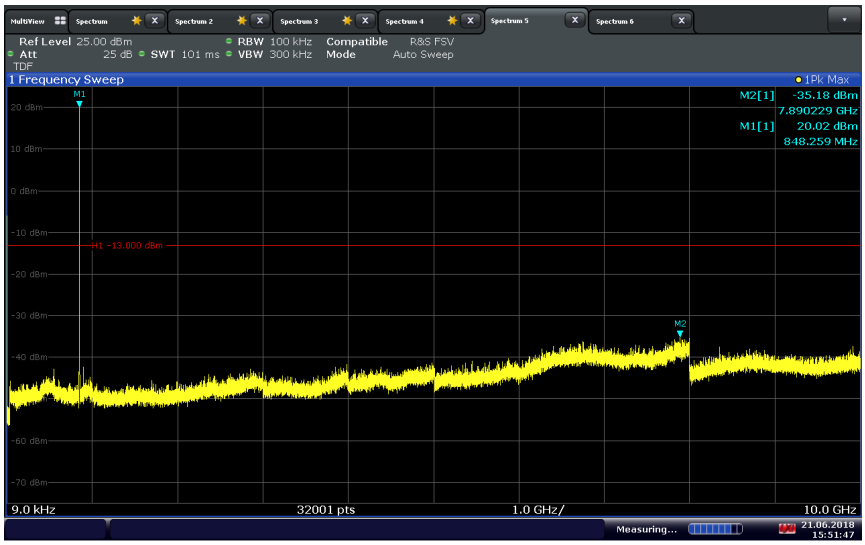
LTE Band 2 (1.4 MHz BW)/QPSK/Low Channel 1850.7 MHz
 13:36:12 21.06.2018
LTE Band 2 (1.4 MHz BW)/QPSK/Mid Channel 1880.0 MHz
 11:43:11 21.06.2018

LTE Band 2 (1.4 MHz BW)/QPSK/High Channel 1909.3 MHz


13:35:12 21.06.2018

LTE Band 5 (1.4 MHz BW)/QPSK/Low Channel 824.7 MHz


15:49:30 21.06.2018

LTE Band 5 (1.4 MHz BW)/QPSK/Mid Channel 836.5 MHz
 15:36:25 21.06.2018
LTE Band 5 (1.4 MHz BW)/QPSK/High Channel 848.3 MHz
 15:51:48 21.06.2018

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: AZ280418A00044 / Test Configuration B

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

July 6 to 18, 2018 / 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 Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	25.7 - 26.0 °C
Relative Humidity	45.7 - 57.2 %
ATM Pressure	98.7 - 99.0 kPa

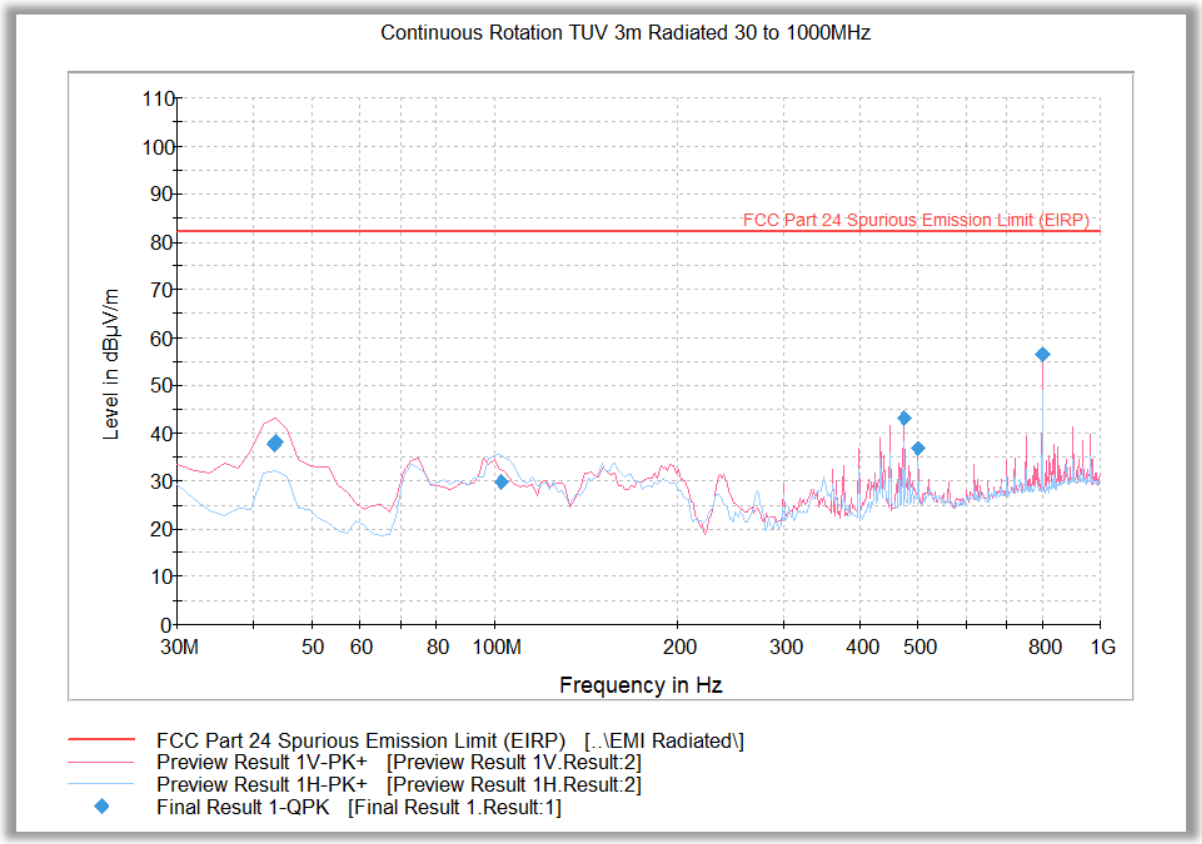
2.8.7 Additional Observations

- 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.
- Emissions within 6dB of the limit will be proven by substitution method.
- This is cabinet spurious emissions testing. Main antenna port was terminated during the test. Fundamental frequency measurement will be ignored for this test.
- Only the worst case configuration presented in this test report.
- Only noise floor measurements observed above 18GHz.
- Measurement was done using EMC32 V8.52 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

Compliant. See attached plots.

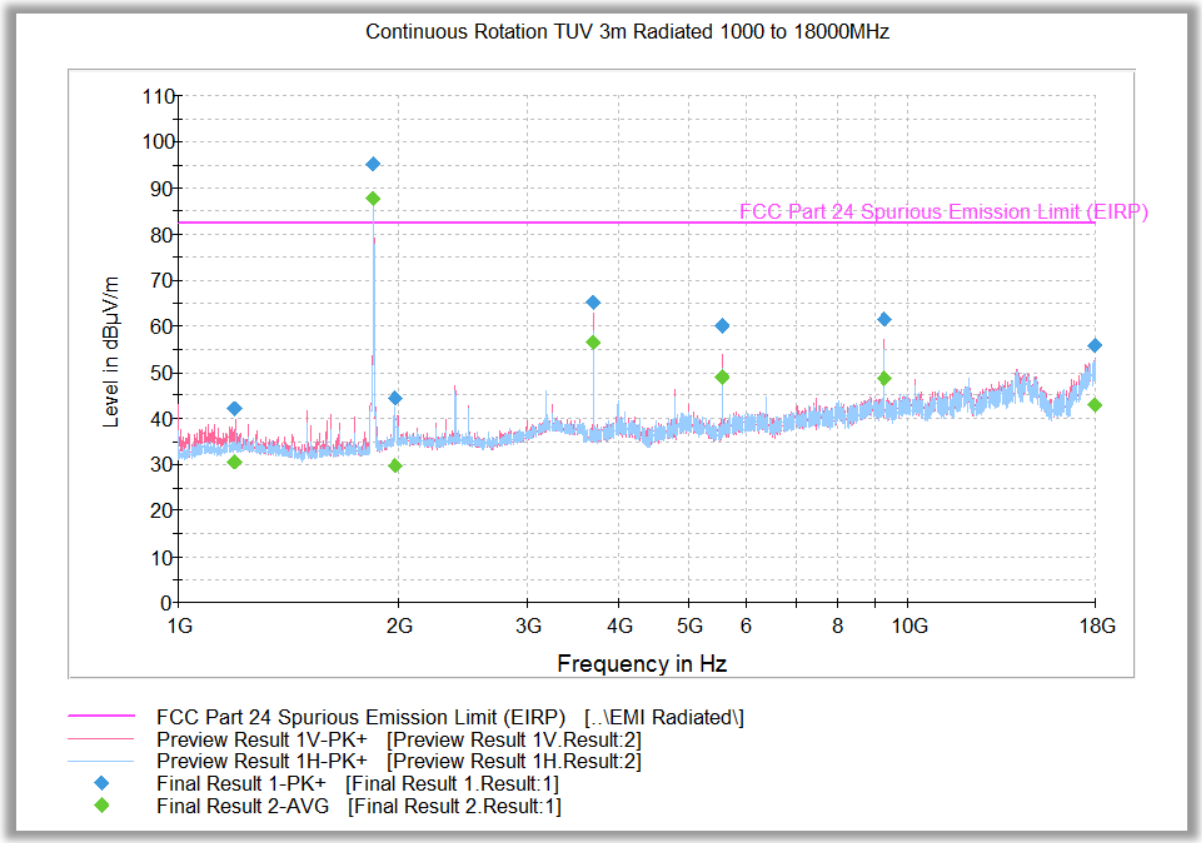
2.8.9 Radiated Emission Test Results Below 1GHz_Worst Case Configuration_WCDMA Band 2 Mid Channel



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)
43.287214	37.6	1000.0	120.000	100.0	V	126.0	-13.6	44.6	82.2
43.463327	38.1	1000.0	120.000	100.0	V	198.0	-13.6	44.2	82.2
102.643848	29.8	1000.0	120.000	220.0	H	191.0	-14.9	52.5	82.2
474.990301	43.0	1000.0	120.000	196.0	V	113.0	-1.4	39.2	82.2
499.980842	36.8	1000.0	120.000	170.0	V	131.0	-1.6	45.4	82.2
800.003447	56.4	1000.0	120.000	105.0	V	178.0	4.1	25.9	82.2

2.8.10 Radiated Emission Test Results Above 1GHz_ Worst Case Configuration_WCDMA Band 2 Low Channel



Peak Data

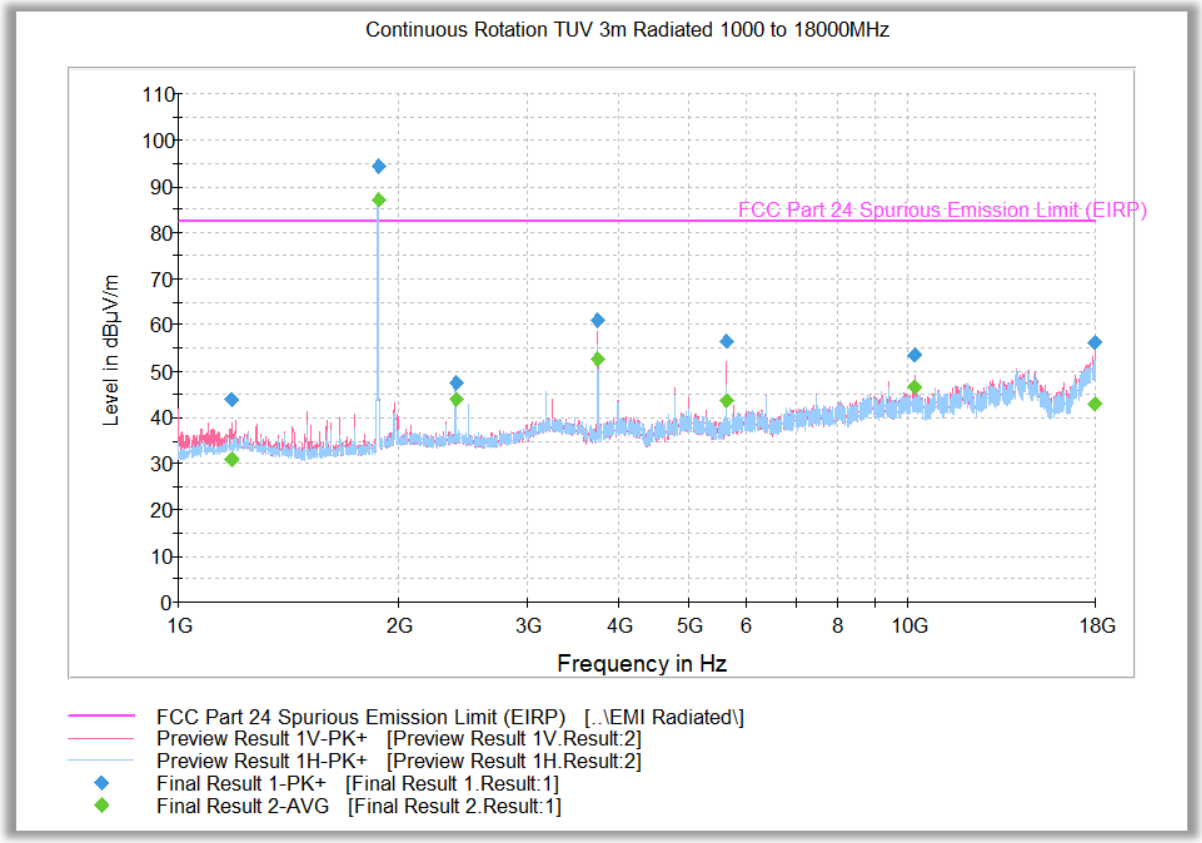
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1195.366667	42.1	1000.0	1000.000	170.6	V	194.0	-9.5	40.2	82.2
1853.433333	95.3	1000.0	1000.000	103.7	V	208.0	-6.8	Fundamental Carrier*	
1981.466667	44.6	1000.0	1000.000	99.7	V	313.0	-6.1	37.6	82.2
3703.200000	65.2	1000.0	1000.000	102.7	V	154.0	0.4	17.1	82.2
5559.833333	60.1	1000.0	1000.000	228.4	V	163.0	4.1	22.2	82.2
9265.366667	61.7	1000.0	1000.000	242.4	V	184.0	9.6	20.5	82.2
17999.233333	55.9	1000.0	1000.000	151.2	V	106.0	21.4	26.3	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)
1195.366667	30.6	1000.0	1000.000	170.6	V	194.0	-9.5	51.6	82.2
1853.433333	87.7	1000.0	1000.000	103.7	V	208.0	-6.8	Fundamental Carrier*	
1981.466667	29.7	1000.0	1000.000	99.7	V	313.0	-6.1	52.5	82.2
3703.200000	56.6	1000.0	1000.000	102.7	V	154.0	0.4	25.6	82.2
5559.833333	49.0	1000.0	1000.000	228.4	V	163.0	4.1	33.3	82.2
9265.366667	48.6	1000.0	1000.000	242.4	V	184.0	9.6	33.7	82.2
17999.233333	42.8	1000.0	1000.000	151.2	V	106.0	21.4	39.4	82.2

***** This is the fundamental frequency not part of spurious emission evaluation. Data provided for information purpose only.

2.8.11 Radiated Emission Test Results Above 1GHz_ Worst Case Configuration_WCDMA Band 2 Middle Channel



Peak Data

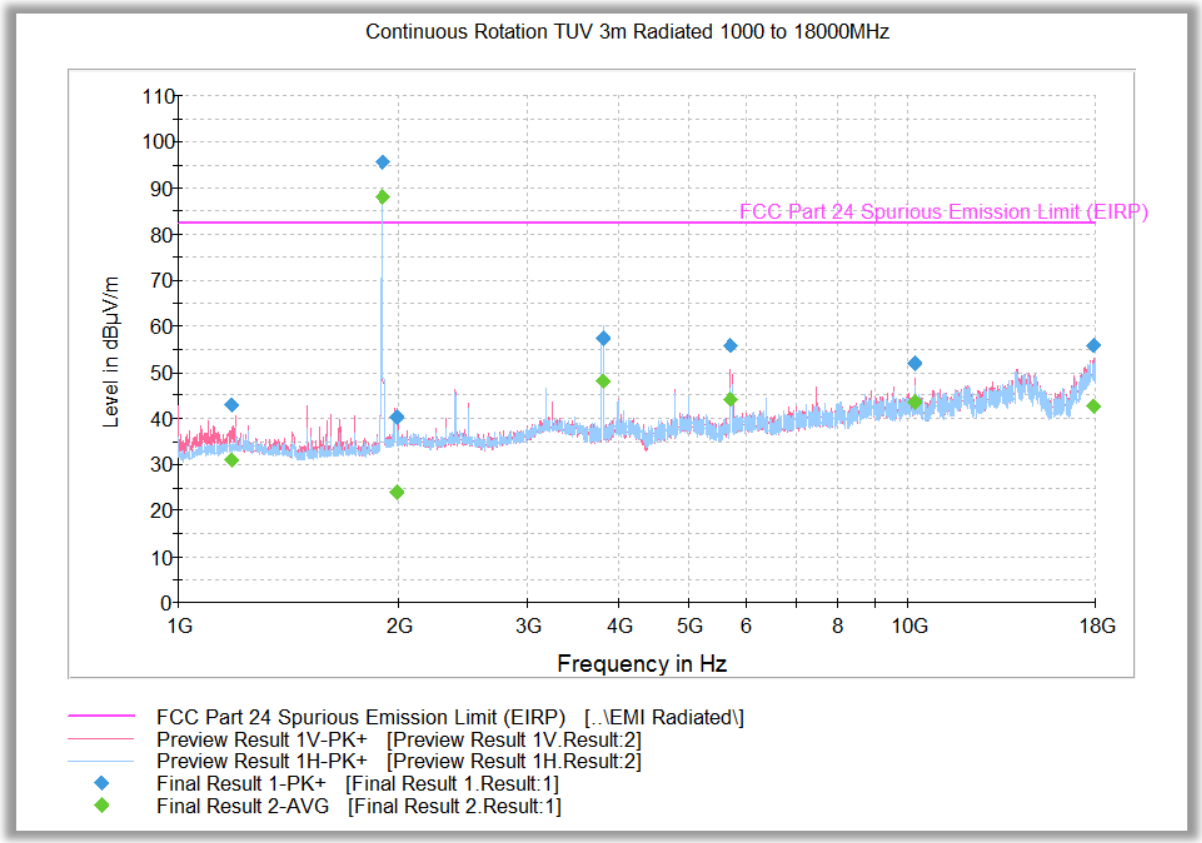
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1185.533333	43.9	1000.0	1000.000	151.6	V	189.0	-9.6	38.3	82.2
1880.800000	94.4	1000.0	1000.000	123.7	H	-1.0	-6.5	Fundamental Carrier*	
2399.866667	47.5	1000.0	1000.000	102.7	H	217.0	-4.8	34.7	82.2
3761.566667	61.0	1000.0	1000.000	103.7	V	152.0	0.9	21.2	82.2
5643.866667	56.6	1000.0	1000.000	337.1	V	178.0	4.1	25.6	82.2
10199.833333	53.4	1000.0	1000.000	209.4	V	98.0	10.6	28.8	82.2
17996.733333	56.1	1000.0	1000.000	112.7	V	196.0	21.4	26.1	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)
1185.533333	31.0	1000.0	1000.000	151.6	V	189.0	-9.6	51.2	82.2
1880.800000	87.2	1000.0	1000.000	123.7	H	-1.0	-6.5	Fundamental Carrier*	
2399.866667	43.8	1000.0	1000.000	102.7	H	217.0	-4.8	38.5	82.2
3761.566667	52.5	1000.0	1000.000	103.7	V	152.0	0.9	29.7	82.2
5643.866667	43.7	1000.0	1000.000	337.1	V	178.0	4.1	38.6	82.2
10199.833333	46.7	1000.0	1000.000	209.4	V	98.0	10.6	35.5	82.2
17996.733333	42.8	1000.0	1000.000	112.7	V	196.0	21.4	39.4	82.2

***** This is the fundamental frequency not part of spurious emission evaluation. Data provided for information purpose only.

2.8.12 Radiated Emission Test Results Above 1GHz_ Worst Case Configuration_WCDMA Band 2 High Channel



Peak Data

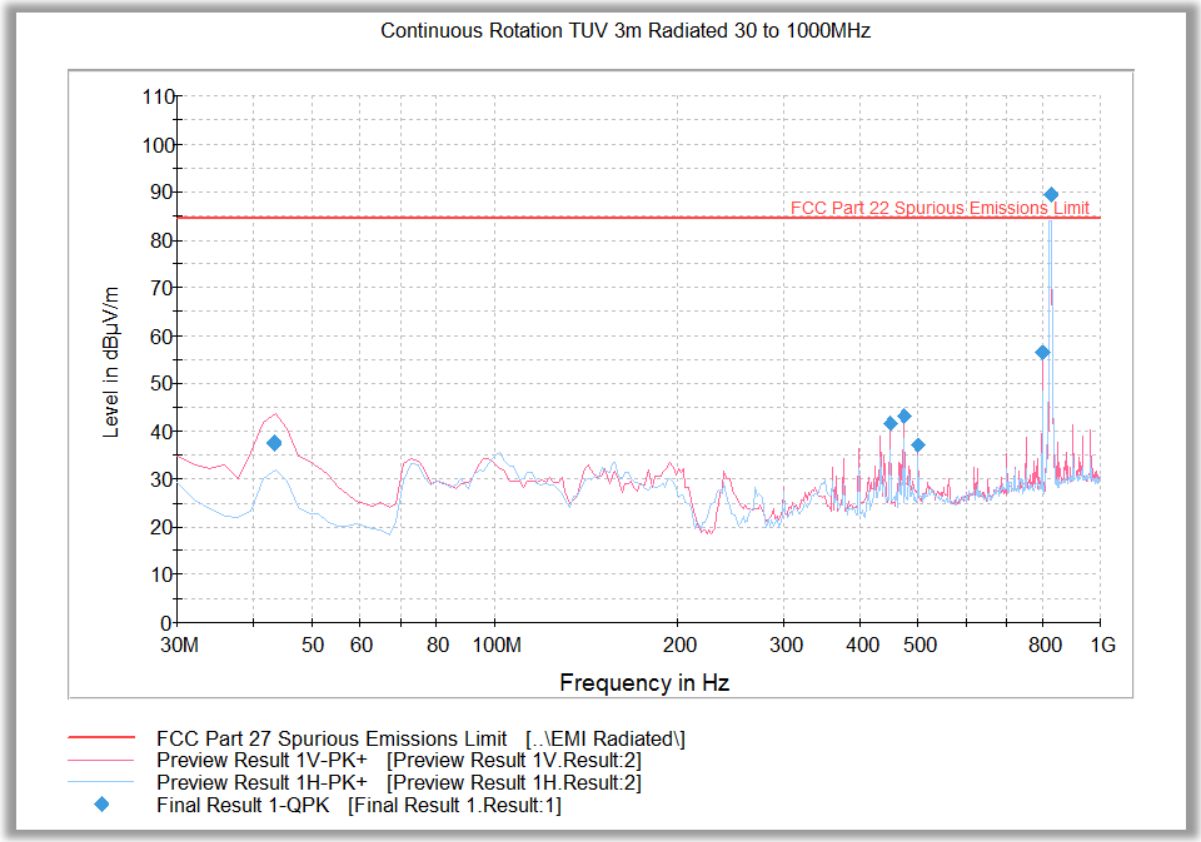
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1185.100000	43.1	1000.0	1000.000	182.6	V	190.0	-9.6	39.2	82.2
1906.866667	95.5	1000.0	1000.000	115.7	V	0.0	-6.3	Fundamental Carrier*	
1990.100000	40.4	1000.0	1000.000	102.7	V	-19.0	-6.1	41.8	82.2
3816.700000	57.5	1000.0	1000.000	137.7	H	196.0	1.1	24.8	82.2
5719.166667	55.8	1000.0	1000.000	242.4	V	177.0	3.9	26.4	82.2
10200.200000	52.0	1000.0	1000.000	204.5	V	97.0	10.6	30.3	82.2
17956.900000	55.9	1000.0	1000.000	102.7	V	164.0	21.4	26.3	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)
1185.100000	30.8	1000.0	1000.000	182.6	V	190.0	-9.6	51.4	82.2
1906.866667	88.2	1000.0	1000.000	115.7	V	0.0	-6.3	Fundamental Carrier*	
1990.100000	24.2	1000.0	1000.000	102.7	V	-19.0	-6.1	58.0	82.2
3816.700000	48.2	1000.0	1000.000	137.7	H	196.0	1.1	34.0	82.2
5719.166667	44.2	1000.0	1000.000	242.4	V	177.0	3.9	38.1	82.2
10200.200000	43.6	1000.0	1000.000	204.5	V	97.0	10.6	38.6	82.2
17956.900000	42.7	1000.0	1000.000	102.7	V	164.0	21.4	39.5	82.2

***** This is the fundamental frequency not part of spurious emission evaluation. Data provided for information purpose only.

2.8.13 Radiated Emission Test Results Below 1GHz_ Worst Case Configuration_WCDMA Band 5 Low Channel

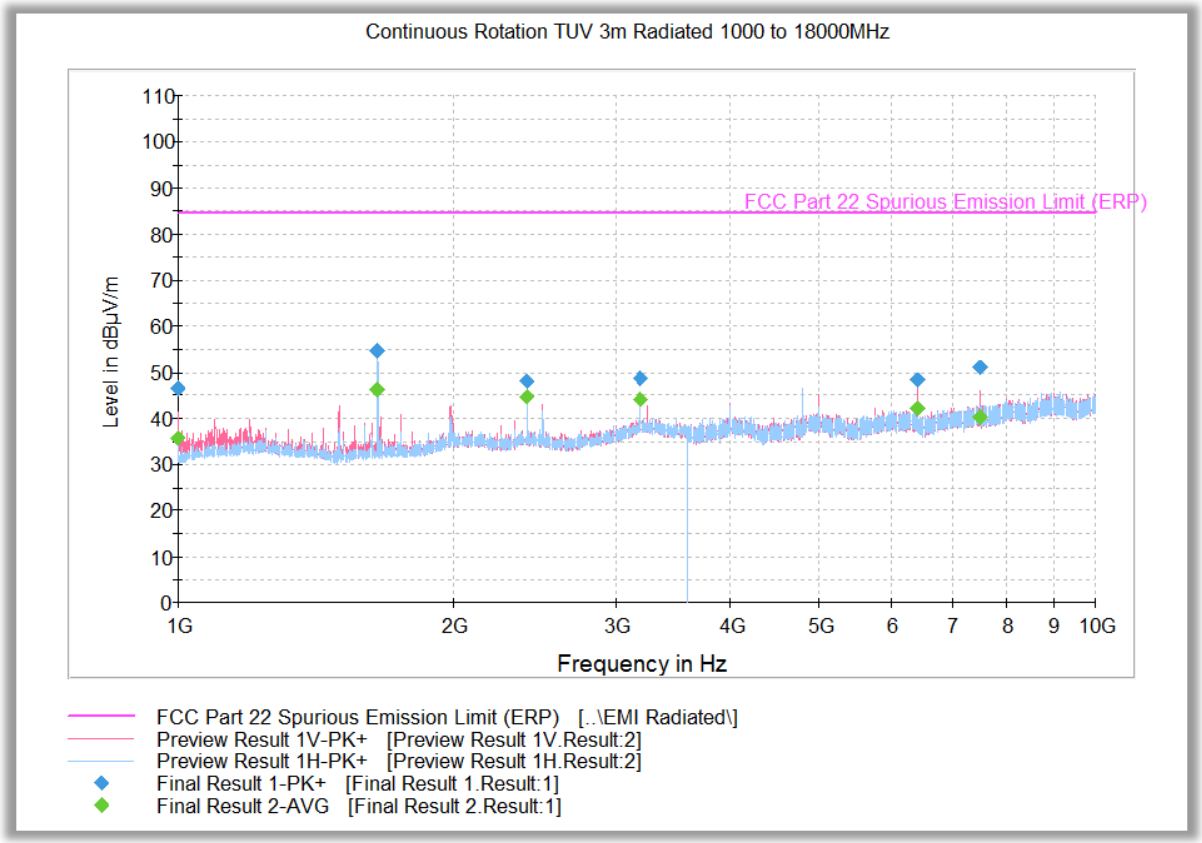


Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
43.247214	37.4	1000.0	120.000	100.0	V	106.0	-13.6	47.0	84.4
43.383327	37.6	1000.0	120.000	100.0	V	227.0	-13.6	46.8	84.4
449.999760	41.6	1000.0	120.000	202.0	V	100.0	-3.1	42.8	84.4
474.990301	43.0	1000.0	120.000	206.0	V	113.0	-1.4	41.4	84.4
500.020842	37.0	1000.0	120.000	196.0	V	122.0	-1.6	47.4	84.4
800.003447	56.5	1000.0	120.000	100.0	V	183.0	4.1	27.9	84.4
825.553988	89.6	1000.0	120.000	100.0	H	188.0	4.5	Fundamental Carrier*	

***** This is the fundamental frequency not part of spurious emission evaluation. Data provided for information purpose only.

2.8.14 Radiated Emission Test Results Above 1GHz_Worst Case Configuration_WCDMA Band 5 Low Channel



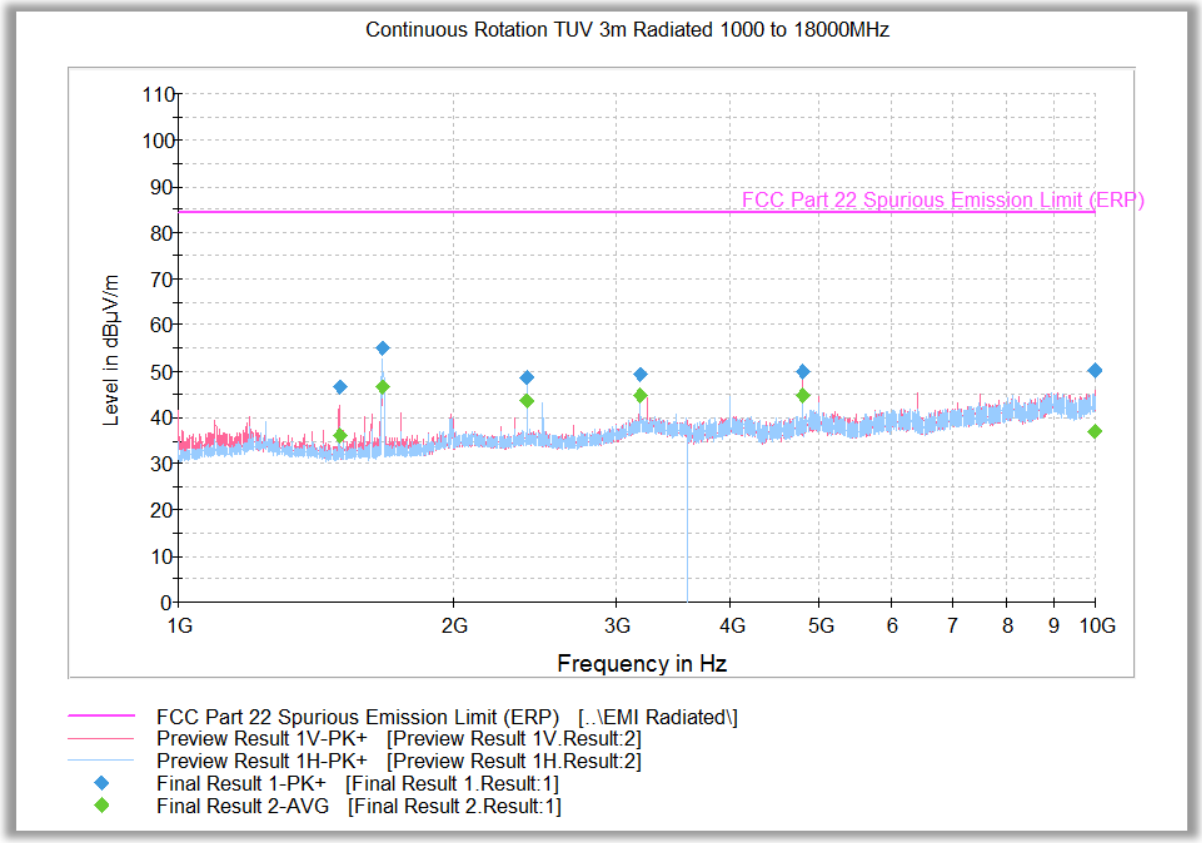
Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	46.6	1000.0	1000.000	205.5	V	181.0	-10.7	37.8	84.4
1651.100000	54.8	1000.0	1000.000	102.7	H	203.0	-8.5	29.5	84.4
2400.000000	48.1	1000.0	1000.000	103.7	H	270.0	-4.8	36.3	84.4
3200.100000	48.8	1000.0	1000.000	291.2	H	320.0	-1.1	35.6	84.4
6399.800000	48.4	1000.0	1000.000	307.2	V	229.0	4.6	35.9	84.4
7499.800000	51.1	1000.0	1000.000	312.2	V	151.0	7.3	33.3	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)
1000.000000	35.8	1000.0	1000.000	205.5	V	181.0	-10.7	48.6	84.4
1651.100000	46.2	1000.0	1000.000	102.7	H	203.0	-8.5	38.1	84.4
2400.000000	44.7	1000.0	1000.000	103.7	H	270.0	-4.8	39.6	84.4
3200.100000	44.2	1000.0	1000.000	291.2	H	320.0	-1.1	40.2	84.4
6399.800000	42.0	1000.0	1000.000	307.2	V	229.0	4.6	42.3	84.4
7499.800000	40.3	1000.0	1000.000	312.2	V	151.0	7.3	44.1	84.4

2.8.15 Radiated Emission Test Results Above 1GHz_Worst Case Configuration_WCDMA Band 5 Middle Channel



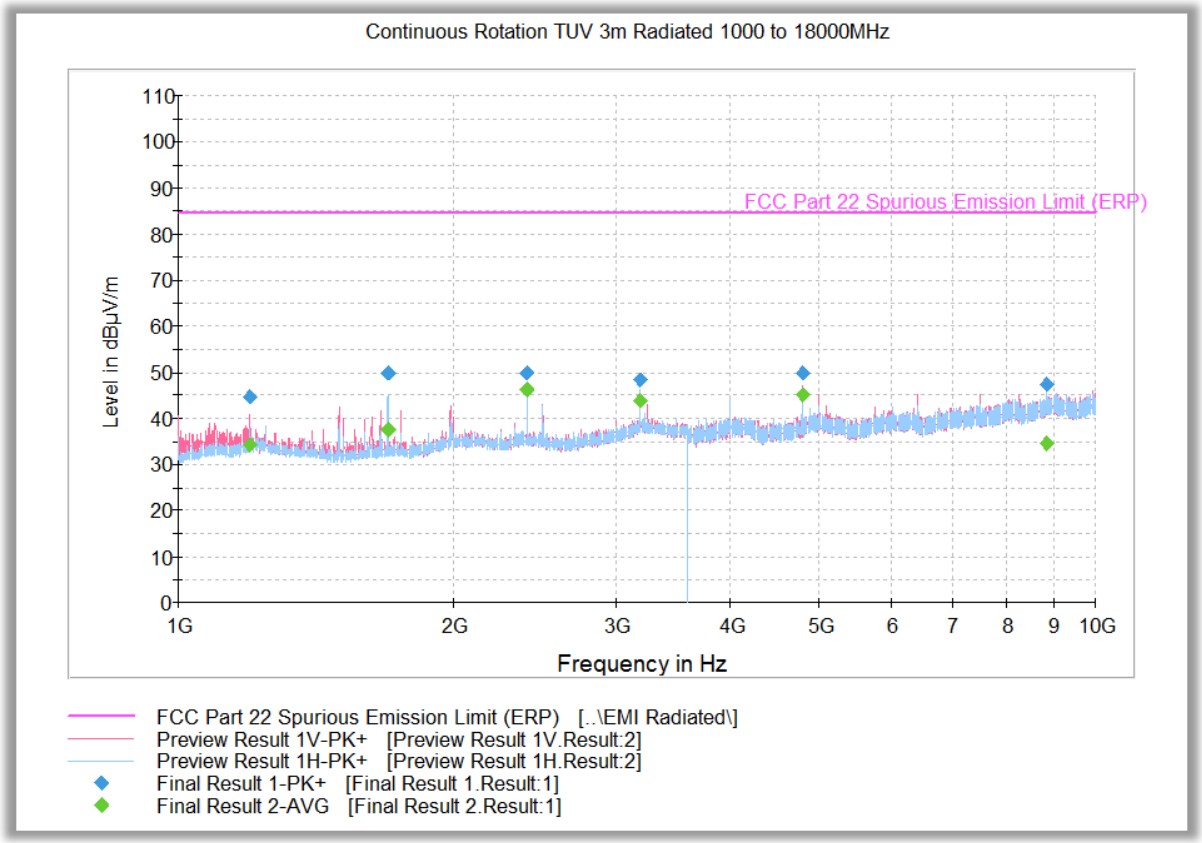
Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1500.000000	46.5	1000.0	1000.000	237.4	V	191.0	-9.0	37.9	84.4
1674.800000	54.9	1000.0	1000.000	102.7	H	208.0	-8.2	29.4	84.4
2400.000000	48.6	1000.0	1000.000	281.3	V	134.0	-4.8	35.8	84.4
3200.100000	49.2	1000.0	1000.000	302.2	H	316.0	-1.1	35.2	84.4
4799.800000	49.9	1000.0	1000.000	204.5	V	311.0	2.2	34.5	84.4
9999.100000	50.1	1000.0	1000.000	195.5	V	202.0	10.3	34.3	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)
1500.000000	36.0	1000.0	1000.000	237.4	V	191.0	-9.0	48.4	84.4
1674.800000	46.5	1000.0	1000.000	102.7	H	208.0	-8.2	37.9	84.4
2400.000000	43.5	1000.0	1000.000	281.3	V	134.0	-4.8	40.9	84.4
3200.100000	44.8	1000.0	1000.000	302.2	H	316.0	-1.1	39.6	84.4
4799.800000	44.9	1000.0	1000.000	204.5	V	311.0	2.2	39.5	84.4
9999.100000	37.0	1000.0	1000.000	195.5	V	202.0	10.3	47.4	84.4

2.8.16 Radiated Emission Test Results Above 1GHz_Worst Case Configuration_WCDMA Band 5 High Channel



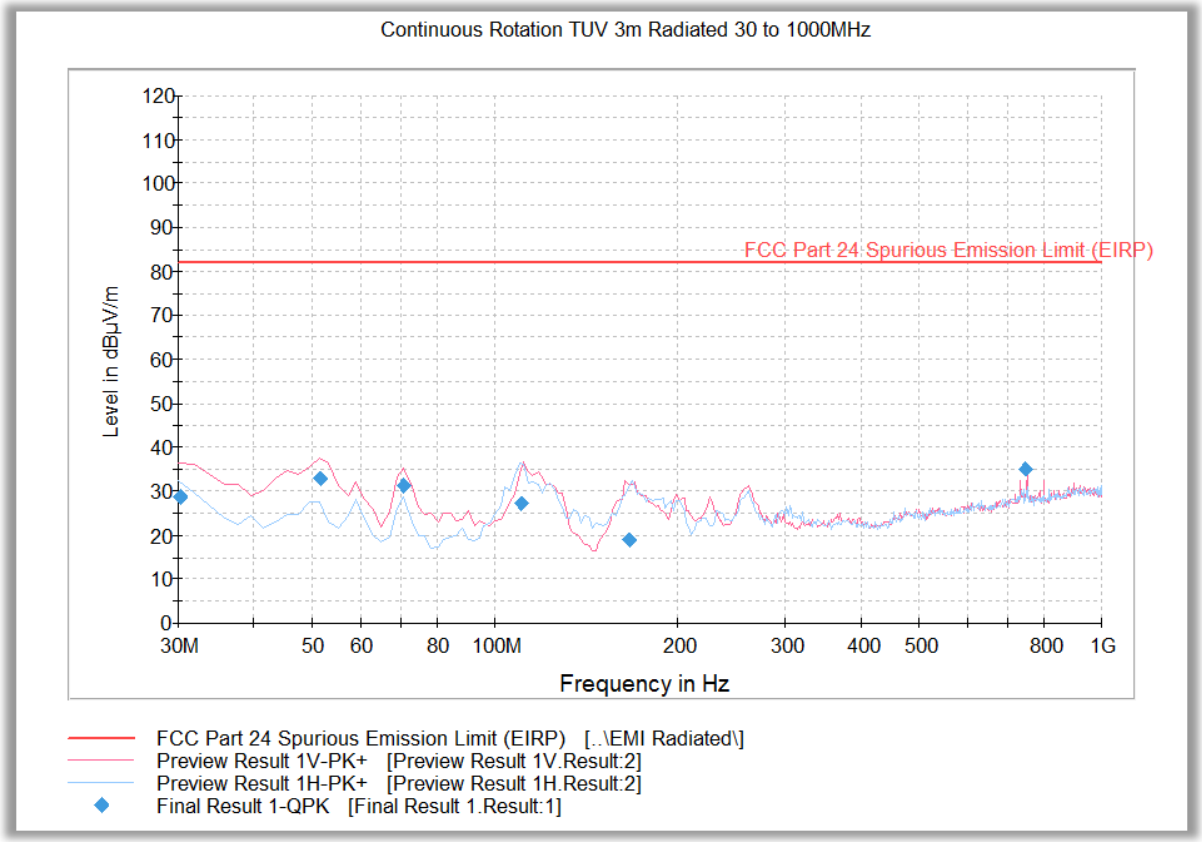
Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1200.000000	44.9	1000.0	1000.000	161.6	V	199.0	-9.4	39.5	84.4
1695.800000	49.8	1000.0	1000.000	102.7	H	208.0	-7.9	34.6	84.4
2400.000000	49.8	1000.0	1000.000	182.6	V	242.0	-4.8	34.6	84.4
3200.100000	48.5	1000.0	1000.000	219.4	H	236.0	-1.1	35.9	84.4
4799.900000	49.9	1000.0	1000.000	200.5	V	305.0	2.2	34.4	84.4
8850.900000	47.5	1000.0	1000.000	151.2	H	186.0	9.4	36.8	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)
1200.000000	34.4	1000.0	1000.000	161.6	V	199.0	-9.4	50.0	84.4
1695.800000	37.5	1000.0	1000.000	102.7	H	208.0	-7.9	46.9	84.4
2400.000000	46.3	1000.0	1000.000	182.6	V	242.0	-4.8	38.1	84.4
3200.100000	43.9	1000.0	1000.000	219.4	H	236.0	-1.1	40.5	84.4
4799.900000	45.1	1000.0	1000.000	200.5	V	305.0	2.2	39.3	84.4
8850.900000	34.5	1000.0	1000.000	151.2	H	186.0	9.4	49.9	84.4

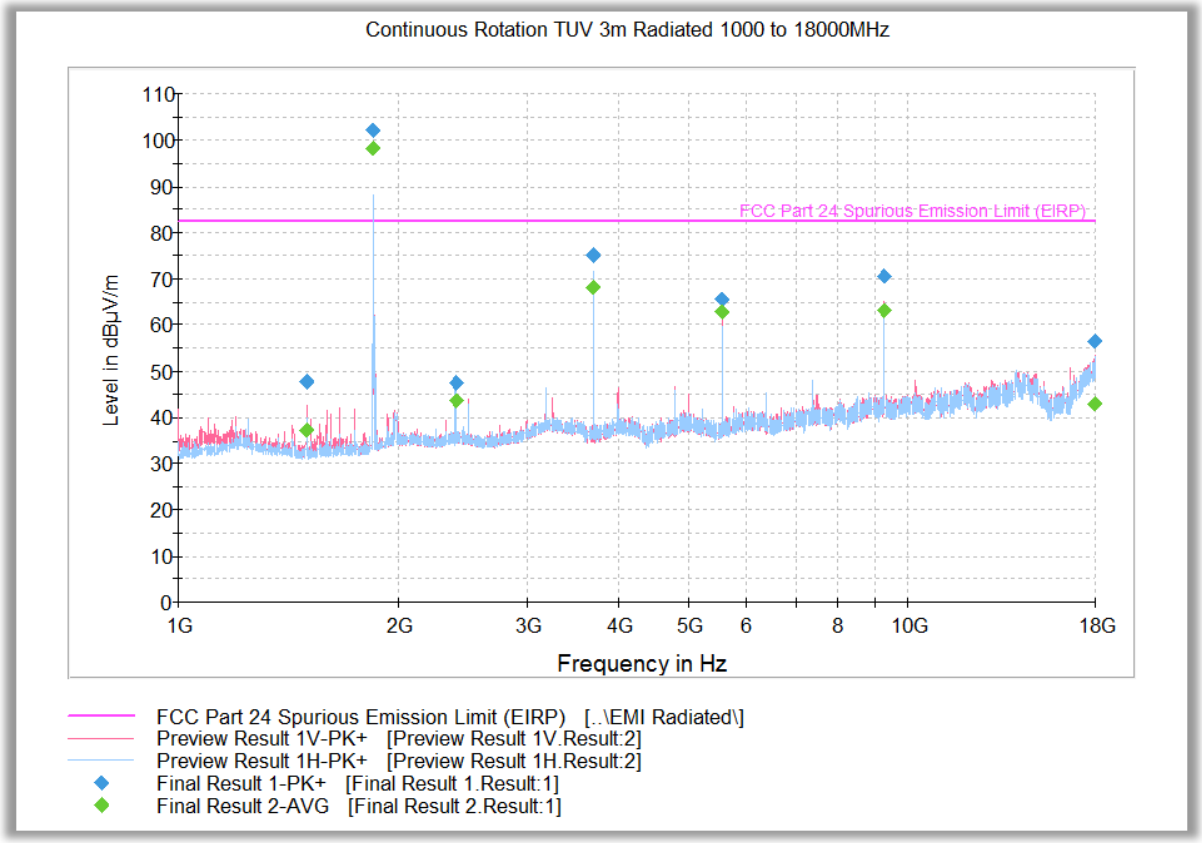
2.8.17 Radiated Emission Test Results Below 1GHz_Worst Case Configuration_LTE Band 2_10 MHz Bandwidth_High Channel_1 RB 0 offset_QPSK



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)
30.240000	28.7	1000.0	120.000	150.0	V	197.0	-6.6	53.6	82.2
51.622766	33.0	1000.0	120.000	100.0	V	166.0	-15.1	49.3	82.2
70.541643	31.4	1000.0	120.000	100.0	V	254.0	-17.2	50.8	82.2
110.363287	27.3	1000.0	120.000	100.0	V	15.0	-15.6	55.0	82.2
166.128257	19.0	1000.0	120.000	100.0	V	318.0	-12.6	63.3	82.2
749.982365	35.1	1000.0	120.000	100.0	V	341.0	4.0	47.1	82.2

2.8.18 Radiated Emission Test Results Above 1GHz_Worst Case Configuration_LTE Band 2_10 MHz Bandwidth_Low Channel_1 RB 0 offset_QPSK



Peak Data

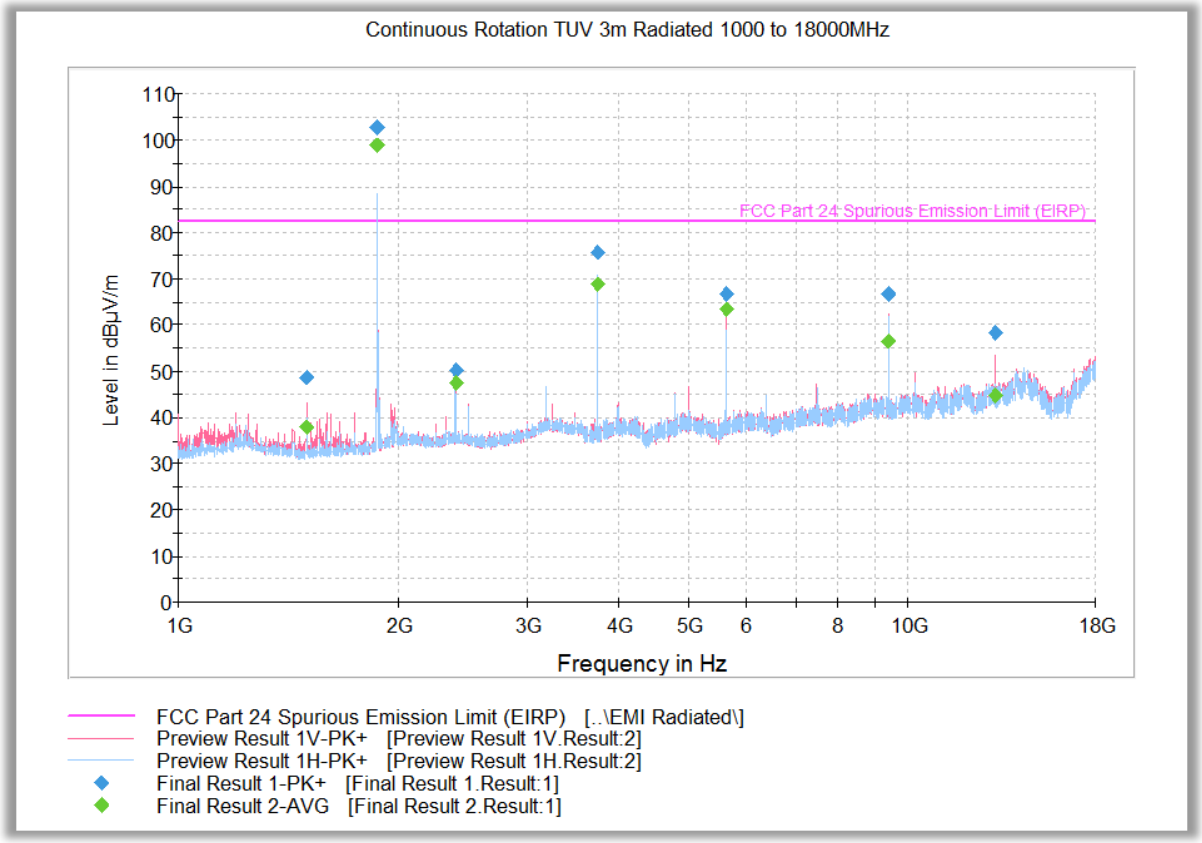
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1500.000000	47.9	1000.0	1000.000	252.3	V	204.0	-9.0	34.3	82.2
1850.766667	102.3	1000.0	1000.000	152.2	V	222.0	-6.9	Fundamental Carrier*	
2399.866667	47.5	1000.0	1000.000	103.7	H	217.0	-4.8	34.8	82.2
3701.100000	75.2	1000.0	1000.000	102.7	H	152.0	0.4	7.0	82.2
5551.666667	65.5	1000.0	1000.000	227.4	V	194.0	4.0	16.7	82.2
9252.733333	70.7	1000.0	1000.000	233.4	V	204.0	9.6	11.6	82.2
17997.166667	56.6	1000.0	1000.000	322.2	V	176.0	21.4	25.7	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)
1500.000000	37.2	1000.0	1000.000	252.3	V	204.0	-9.0	45.0	82.2
1850.766667	98.3	1000.0	1000.000	152.2	V	222.0	-6.9	Fundamental Carrier*	
2399.866667	43.5	1000.0	1000.000	103.7	H	217.0	-4.8	38.8	82.2
3701.100000	68.2	1000.0	1000.000	102.7	H	152.0	0.4	14.0	82.2
5551.666667	62.9	1000.0	1000.000	227.4	V	194.0	4.0	19.3	82.2
9252.733333	63.0	1000.0	1000.000	233.4	V	204.0	9.6	19.2	82.2
17997.166667	43.0	1000.0	1000.000	322.2	V	176.0	21.4	39.3	82.2

***** This is the fundamental frequency not part of spurious emission evaluation. Data provided for information purpose only.

2.8.19 Radiated Emission Test Results Above 1GHz_Worst Case Configuration_LTE Band 2_10 MHz Bandwidth_Middle Channel_1 RB 0 offset_QPSK



Peak Data

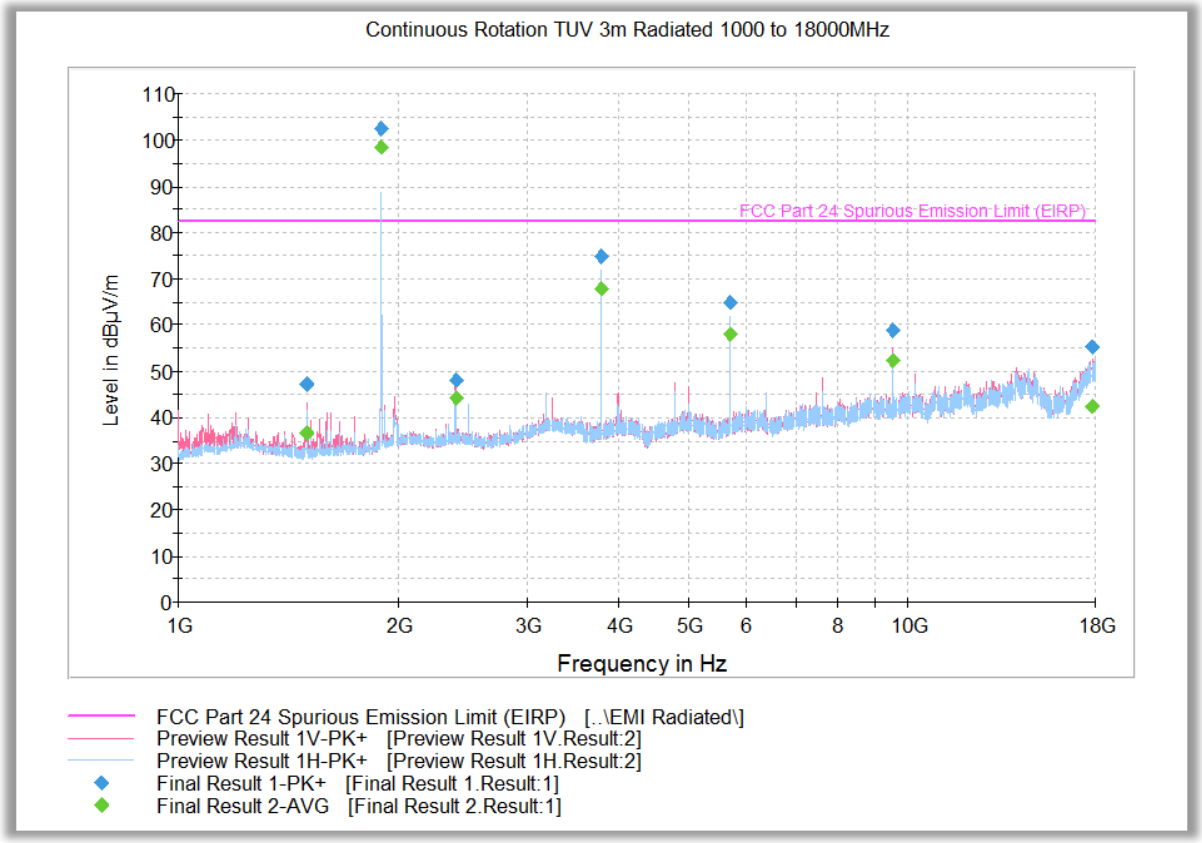
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1500.000000	48.8	1000.0	1000.000	228.4	V	187.0	-9.0	33.5	82.2
1875.700000	102.6	1000.0	1000.000	165.6	V	38.0	-6.6	Fundamental Carrier*	
2399.866667	50.2	1000.0	1000.000	204.4	V	243.0	-4.8	32.0	82.2
3751.000000	75.7	1000.0	1000.000	132.7	V	162.0	0.8	6.5	82.2
5626.633333	66.6	1000.0	1000.000	338.1	V	198.0	4.2	15.6	82.2
9377.966667	66.8	1000.0	1000.000	281.2	V	213.0	9.8	15.4	82.2
13128.733333	58.2	1000.0	1000.000	112.7	V	207.0	13.9	24.0	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)
1500.000000	38.0	1000.0	1000.000	228.4	V	187.0	-9.0	44.3	82.2
1875.700000	98.8	1000.0	1000.000	165.6	V	38.0	-6.6	Fundamental Carrier*	
2399.866667	47.4	1000.0	1000.000	204.4	V	243.0	-4.8	34.9	82.2
3751.000000	68.9	1000.0	1000.000	132.7	V	162.0	0.8	13.3	82.2
5626.633333	63.4	1000.0	1000.000	338.1	V	198.0	4.2	18.8	82.2
9377.966667	56.5	1000.0	1000.000	281.2	V	213.0	9.8	25.8	82.2
13128.733333	44.7	1000.0	1000.000	112.7	V	207.0	13.9	37.6	82.2

***** This is the fundamental frequency not part of spurious emission evaluation. Data provided for information purpose only.

2.8.20 Radiated Emission Test Results Above 1GHz_Worst Case Configuration_LTE Band 2_10 MHz Bandwidth_High Channel_1 RB 0 offset_QPSK



Peak Data

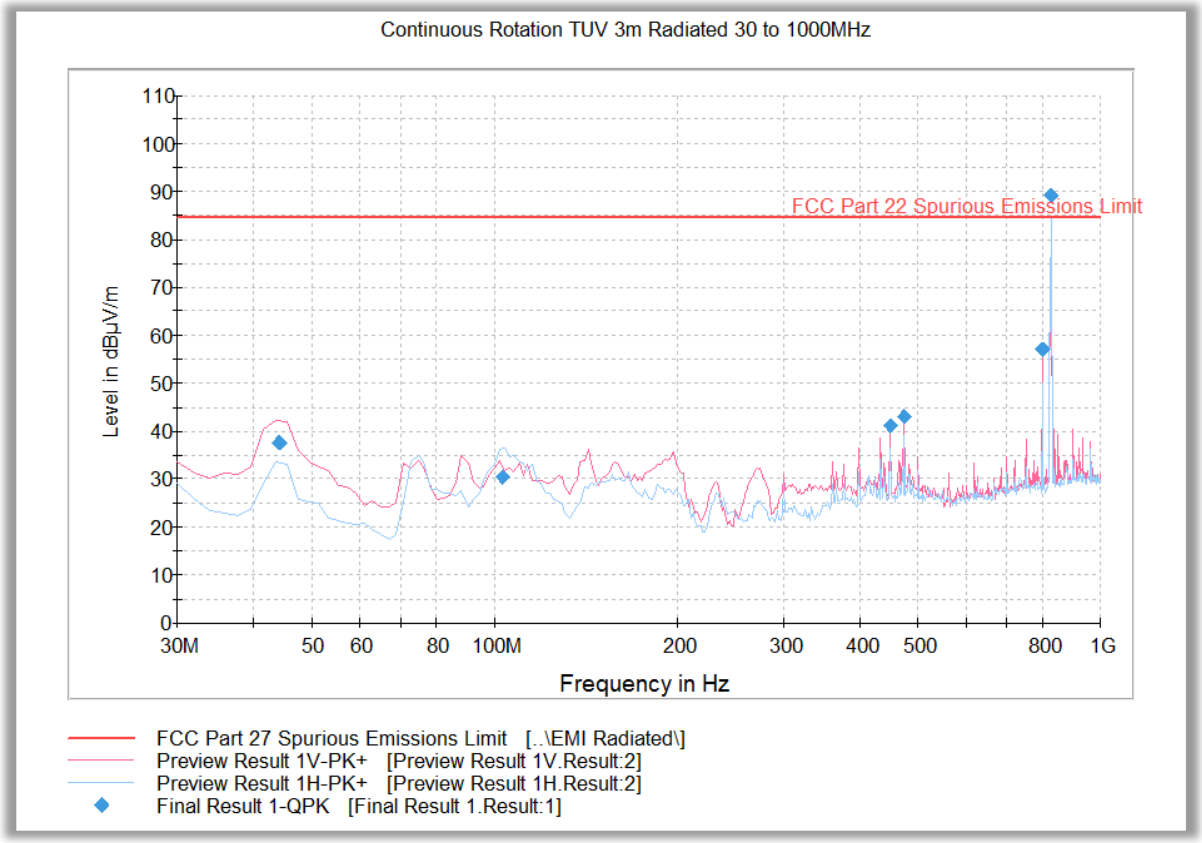
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1500.000000	47.3	1000.0	1000.000	228.4	V	179.0	-9.0	34.9	82.2
1900.633333	102.4	1000.0	1000.000	352.7	V	277.0	-6.3	Fundamental Carrier*	
2400.033333	48.1	1000.0	1000.000	103.7	H	218.0	-4.8	34.2	82.2
3801.233333	74.8	1000.0	1000.000	307.2	H	311.0	1.1	7.5	82.2
5701.833333	65.0	1000.0	1000.000	102.7	H	197.0	3.9	17.2	82.2
9503.033333	58.8	1000.0	1000.000	250.4	V	199.0	9.8	23.5	82.2
17862.500000	55.4	1000.0	1000.000	240.4	V	51.0	21.1	26.8	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)
1500.000000	36.5	1000.0	1000.000	228.4	V	179.0	-9.0	45.7	82.2
1900.633333	98.4	1000.0	1000.000	352.7	V	277.0	-6.3	Fundamental Carrier*	
2400.033333	44.3	1000.0	1000.000	103.7	H	218.0	-4.8	37.9	82.2
3801.233333	67.8	1000.0	1000.000	307.2	H	311.0	1.1	14.4	82.2
5701.833333	58.1	1000.0	1000.000	102.7	H	197.0	3.9	24.1	82.2
9503.033333	52.4	1000.0	1000.000	250.4	V	199.0	9.8	29.8	82.2
17862.500000	42.5	1000.0	1000.000	240.4	V	51.0	21.1	39.8	82.2

***** This is the fundamental frequency not part of spurious emission evaluation. Data provided for information purpose only.

2.8.21 Radiated Emission Test Results Below 1GHz_Worst Case Configuration_LTE Band 5_5 MHz Bandwidth Low Channel_1 RB 13 offset_QPSK

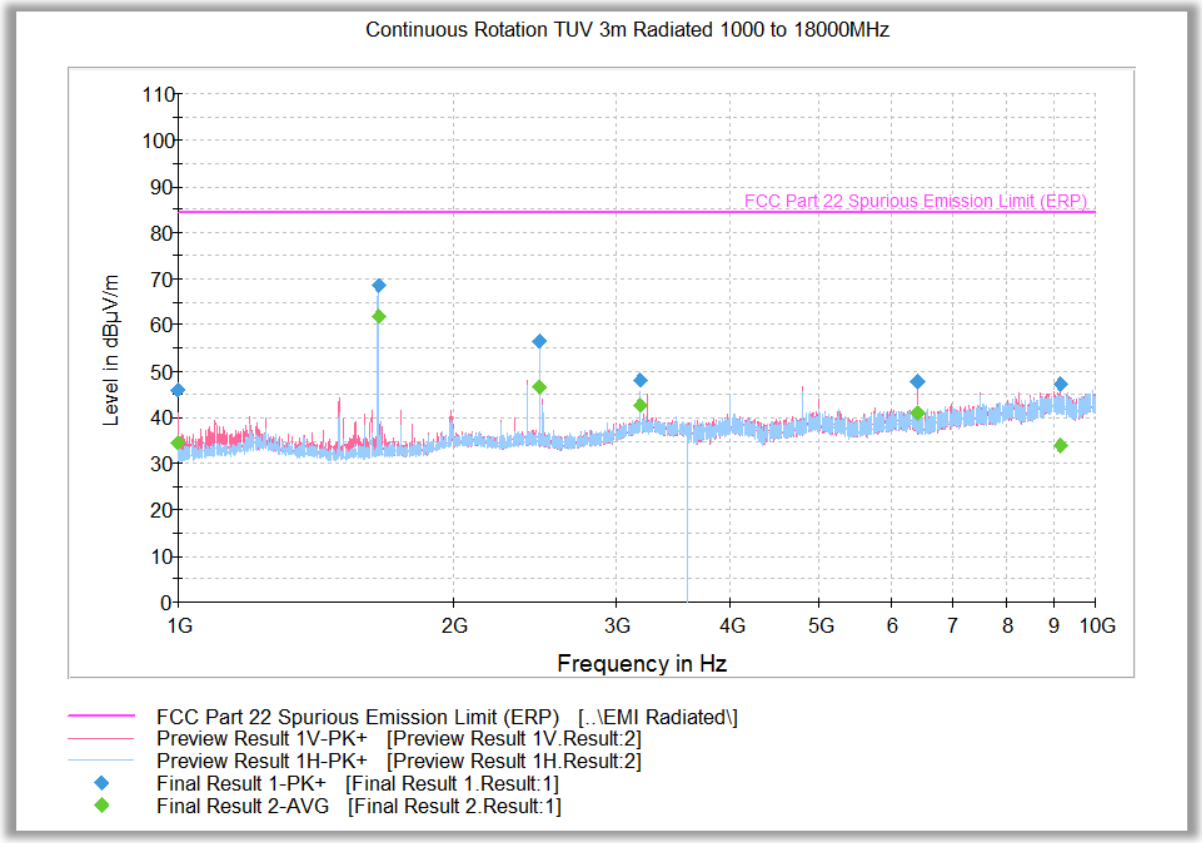


Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
44.063327	37.7	1000.0	120.000	100.0	V	129.0	-13.8	46.7	84.4
44.167214	37.6	1000.0	120.000	100.0	V	92.0	-13.8	46.8	84.4
103.387735	30.4	1000.0	120.000	346.0	H	184.0	-15.0	54.0	84.4
449.999760	41.1	1000.0	120.000	212.0	V	94.0	-3.1	43.3	84.4
474.990301	43.3	1000.0	120.000	211.0	V	113.0	-1.4	41.1	84.4
800.003447	56.9	1000.0	120.000	109.0	V	180.0	4.1	27.5	84.4
826.673988	89.3	1000.0	120.000	383.0	H	184.0	4.6	Fundamental Carrier*	

***** This is the fundamental frequency not part of spurious emission evaluation. Data provided for information purpose only.

2.8.22 Radiated Emission Test Results Above 1GHz_Worst Case Configuration_LTE Band 5_5 MHz Bandwidth Low Channel_1 RB 13 offset_QPSK



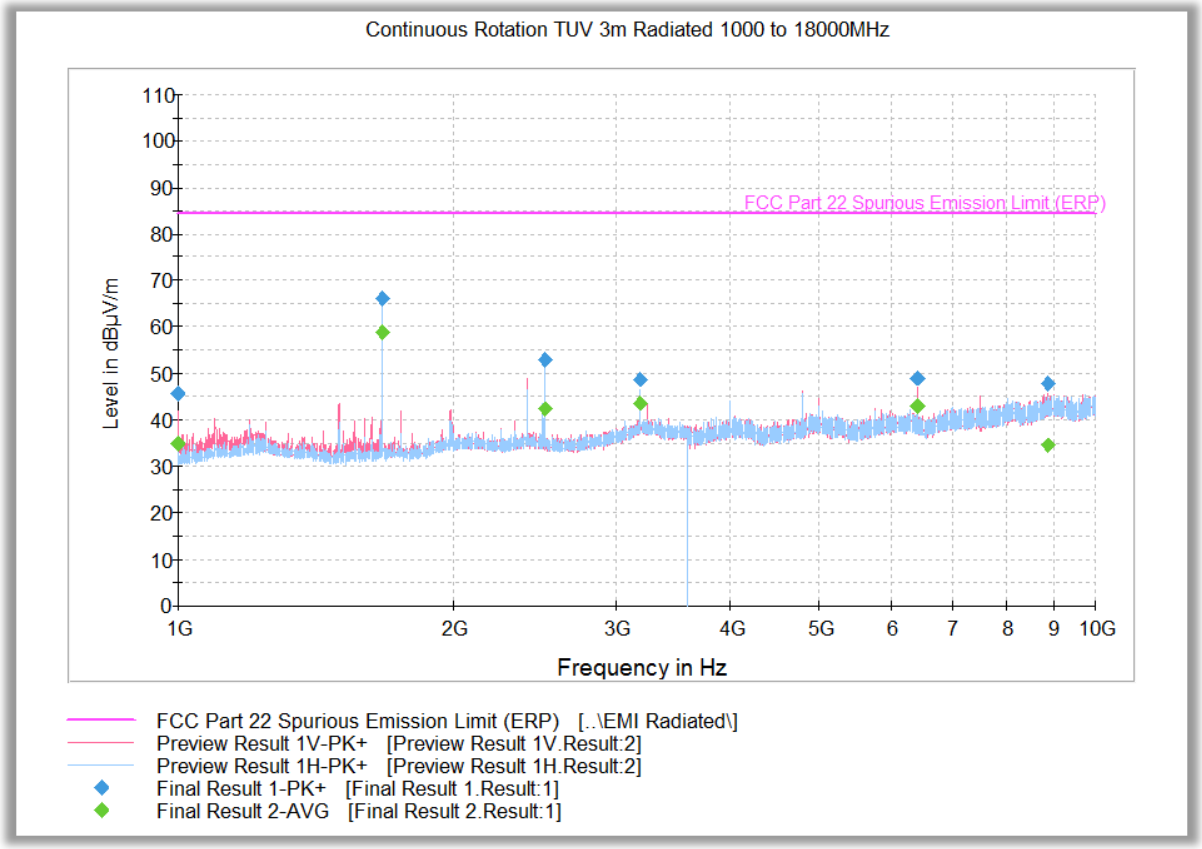
Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	46.0	1000.0	1000.000	214.4	V	170.0	-10.7	38.4	84.4
1653.300000	68.6	1000.0	1000.000	102.7	H	193.0	-8.5	15.8	84.4
2480.100000	56.5	1000.0	1000.000	103.7	H	197.0	-4.7	27.9	84.4
3200.100000	48.0	1000.0	1000.000	302.2	H	315.0	-1.1	36.4	84.4
6400.100000	47.9	1000.0	1000.000	322.2	V	227.0	4.6	36.5	84.4
9160.900000	47.1	1000.0	1000.000	280.2	V	322.0	9.4	37.3	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)
1000.000000	34.6	1000.0	1000.000	214.4	V	170.0	-10.7	49.7	84.4
1653.300000	61.8	1000.0	1000.000	102.7	H	193.0	-8.5	22.6	84.4
2480.100000	46.7	1000.0	1000.000	103.7	H	197.0	-4.7	37.7	84.4
3200.100000	42.8	1000.0	1000.000	302.2	H	315.0	-1.1	41.6	84.4
6400.100000	40.7	1000.0	1000.000	322.2	V	227.0	4.6	43.6	84.4
9160.900000	34.1	1000.0	1000.000	280.2	V	322.0	9.4	50.3	84.4

2.8.23 Radiated Emission Test Results Above 1GHz_Worst Case Configuration_LTE Band 5_5 MHz Bandwidth Middle Channel_1 RB 13 offset_QPSK



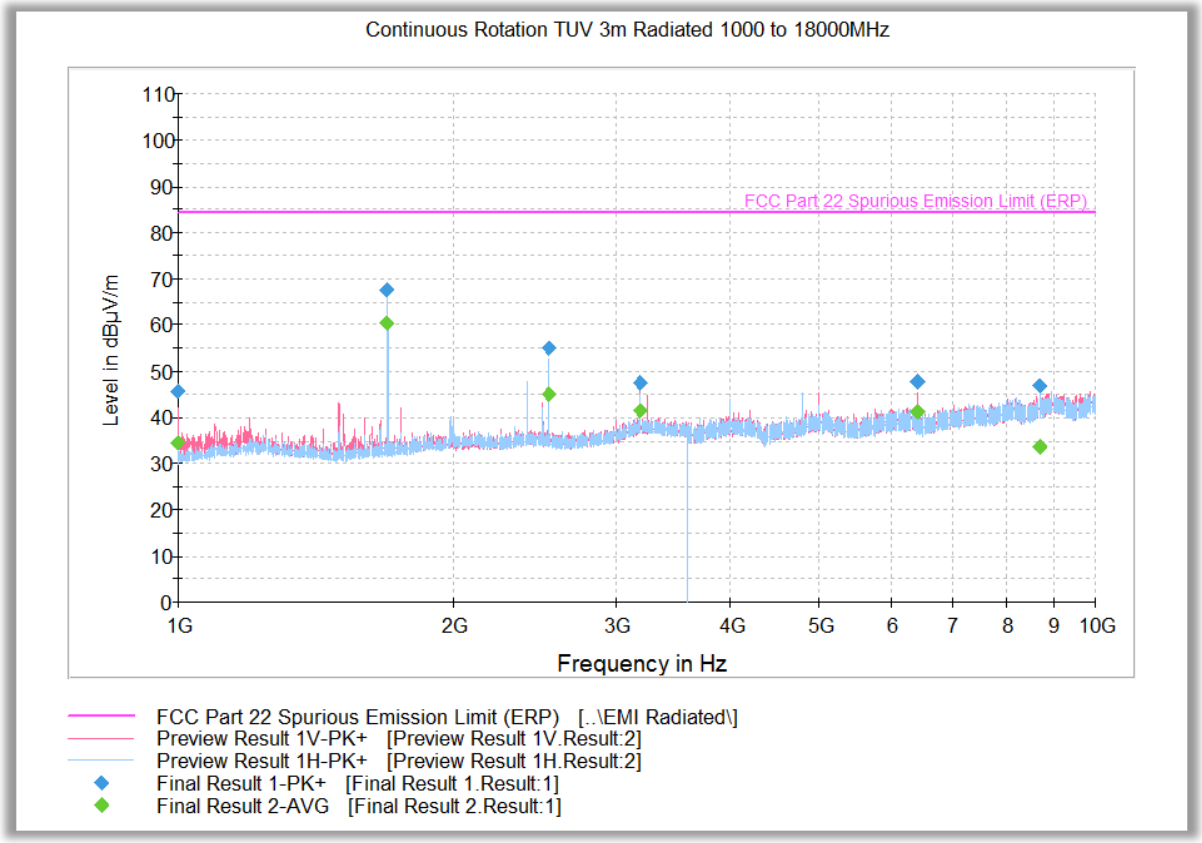
Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	45.8	1000.0	1000.000	182.5	V	181.0	-10.7	38.6	84.4
1673.400000	66.1	1000.0	1000.000	104.7	H	199.0	-8.3	18.3	84.4
2510.000000	52.8	1000.0	1000.000	103.7	H	200.0	-4.6	31.5	84.4
3200.100000	48.7	1000.0	1000.000	252.3	H	22.0	-1.1	35.7	84.4
6400.100000	49.0	1000.0	1000.000	312.1	V	229.0	4.6	35.3	84.4
8880.400000	47.9	1000.0	1000.000	174.6	V	317.0	9.4	36.5	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)
1000.000000	34.9	1000.0	1000.000	182.5	V	181.0	-10.7	49.5	84.4
1673.400000	59.0	1000.0	1000.000	104.7	H	199.0	-8.3	25.4	84.4
2510.000000	42.4	1000.0	1000.000	103.7	H	200.0	-4.6	41.9	84.4
3200.100000	43.5	1000.0	1000.000	252.3	H	22.0	-1.1	40.9	84.4
6400.100000	43.1	1000.0	1000.000	312.1	V	229.0	4.6	41.3	84.4
8880.400000	34.6	1000.0	1000.000	174.6	V	317.0	9.4	49.7	84.4

2.8.24 Radiated Emission Test Results Above 1GHz_Worst Case Configuration_LTE Band 5_5 MHz Bandwidth High Channel_1 RB 13 offset_QPSK



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	45.5	1000.0	1000.000	204.5	V	183.0	-10.7	38.8	84.4
1693.500000	67.5	1000.0	1000.000	151.2	H	204.0	-8.0	16.8	84.4
2540.100000	55.0	1000.0	1000.000	151.2	H	203.0	-4.5	29.4	84.4
3200.000000	47.4	1000.0	1000.000	305.2	V	343.0	-1.1	37.0	84.4
6399.800000	47.8	1000.0	1000.000	251.5	V	180.0	4.6	36.6	84.4
8708.300000	46.8	1000.0	1000.000	152.7	H	291.0	9.0	37.6	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)
1000.000000	34.6	1000.0	1000.000	204.5	V	183.0	-10.7	49.8	84.4
1693.500000	60.4	1000.0	1000.000	151.2	H	204.0	-8.0	24.0	84.4
2540.100000	45.2	1000.0	1000.000	151.2	H	203.0	-4.5	39.2	84.4
3200.000000	41.6	1000.0	1000.000	305.2	V	343.0	-1.1	42.8	84.4
6399.800000	41.1	1000.0	1000.000	251.5	V	180.0	4.6	43.3	84.4
8708.300000	33.7	1000.0	1000.000	152.7	H	291.0	9.0	50.7	84.4

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, Clause 22.355:
Except as otherwise provided in this part, 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)	Mobile ≤3 watts (ppm)
821 to 896	2.5

FCC Part 24, Clause 24.235:
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

RSS-132, Clause 5.3:
The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.

RSS-133, Clasue 6.3:
The carrier frequency shall not depart from the reference frequency, in excess of ±2.5 ppm for mobile stations.

2.9.3 Equipment Under Test and Modification State

Serial No: AZ280418A00044 / Test Configuration A

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

July 11, 2018 / 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 Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	25.7 °C
Relative Humidity	54.1 %
ATM Pressure	98.7 kPa

2.9.7 Additional Observations

- This is a conducted test. The EUT was operated at 3.7VDC nominal voltage and was placed in the temperature chamber for this evaluation. The EUT was controlled by a CMW500 and utilizing a spectrum analyzer for measurement.
- Test performed in 5 MHz Bandwidth Middle channel as the representative configuration.
- Measurement was done using the CMW 500 measurement function.
- The EUT was tested over the temperature -30℃ to +50℃ in 10°C steps and allowed to sit for 1 hour to allow the equipment and chamber temperature to stabilize. The measurements were then performed.
- Voltage variation was also performed at voltage 3.3VDC and higher 4.3VDC of the nominal voltage at 20℃.

2.9.8 Test Results

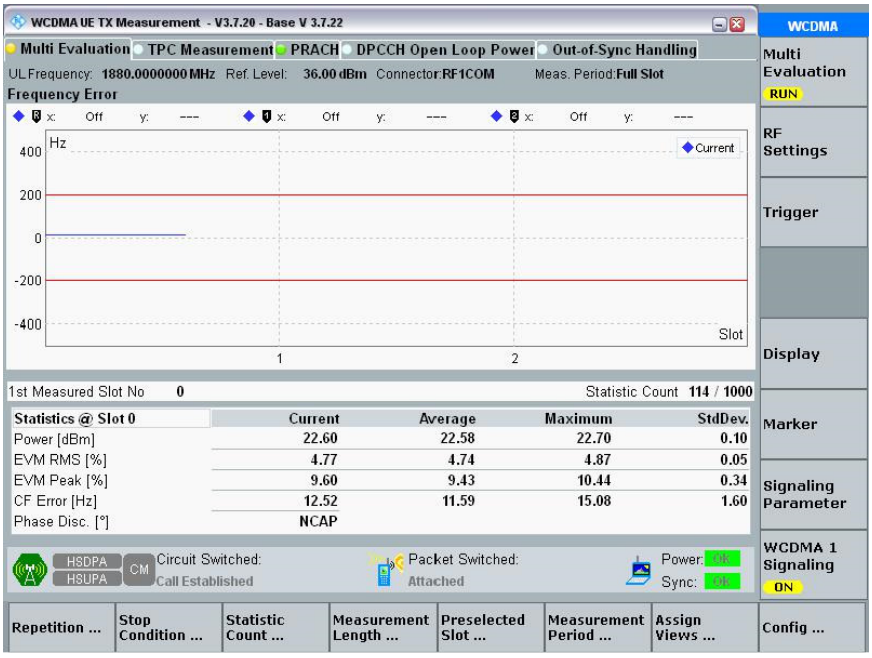
WCDMA Band 2 – QPSK 5 MHz BW-Middle Channel 1880 MHz				
Voltage (VDC)	**Temperature (℃)**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)***
3.7	-30	16.47	0.0088	± 2.5
	-20	16.76	0.0089	± 2.5
	-10	16.92	0.009	± 2.5
	0	16.24	0.0086	± 2.5
	+10	15.94	0.0085	± 2.5
	+20	17.02	0.009	± 2.5
	+30	18.3	0.0097	± 2.5
	+40	16.58	0.0088	± 2.5
	+50	17.02	0.009	± 2.5
3.3	20	17.72	0.009	± 2.5
4.3		16.54	0.008	± 2.5

WCDMA Band 5 – QPSK 5 MHz BW-Middle Channel 836.5 MHz				
Voltage (VDC)	Temperature (°C)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
3.7	-30	-2.99	-0.0036	± 2.5
	-20	-3.81	-0.0046	± 2.5
	-10	-3.62	-0.0043	± 2.5
	0	-3.73	-0.0045	± 2.5
	+10	-2.82	-0.0034	± 2.5
	+20	-3.58	-0.0043	± 2.5
	+30	-3.75	-0.0045	± 2.5
	+40	-4.1	-0.0049	± 2.5
	+50	-2.8	-0.0034	± 2.5
3.3	20	-3.6	-0.0043	± 2.5
4.3		-3.07	-0.0037	± 2.5

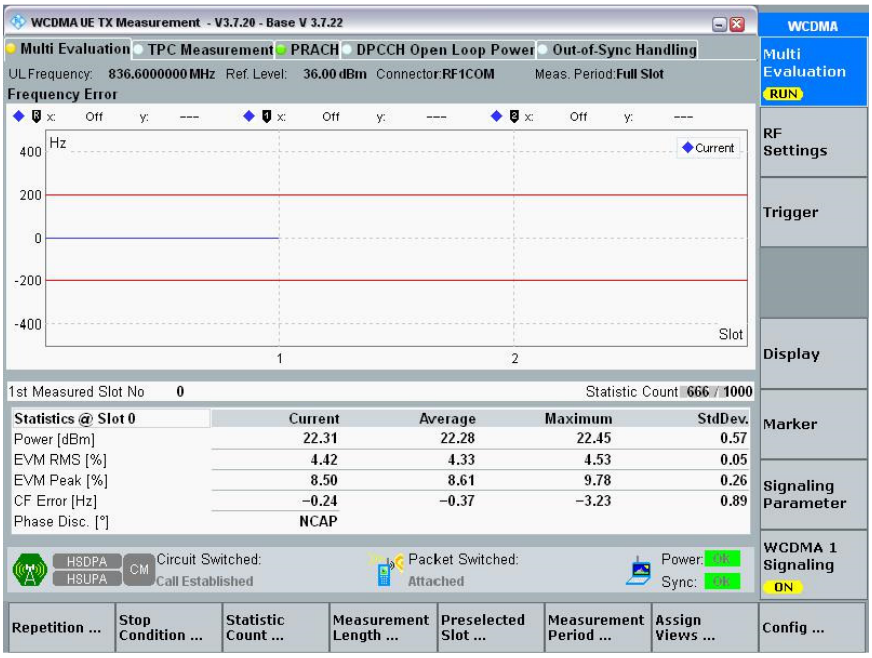
LTE Band 2 – QPSK 5 MHz BW-Middle Channel 1880 MHz				
Voltage (VDC)	Temperature (°C)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
3.7	-30	24.06	0.0128	± 2.5
	-20	21.62	0.0115	± 2.5
	-10	22.72	0.0121	± 2.5
	0	22.07	0.0117	± 2.5
	+10	22.16	0.0118	± 2.5
	+20	21.09	0.0112	± 2.5
	+30	19.34	0.0103	± 2.5
	+40	19.37	0.0103	± 2.5
	+50	18.08	0.0096	± 2.5
3.3	20	17.34	0.0092	± 2.5
4.3		17.48	0.0093	± 2.5

LTE Band 5 – QPSK 5 MHz BW-Middle Channel 836.5 MHz				
Voltage (VDC)	**Temperature (°C)**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
3.7	-30	-10.83	-0.013	± 2.5
	-20	-8.33	-0.01	± 2.5
	-10	-9.11	-0.0109	± 2.5
	0	-8.78	-0.0105	± 2.5
	+10	-9.44	-0.0113	± 2.5
	+20	-11.59	-0.0139	± 2.5
	+30	-10.46	-0.0125	± 2.5
	+40	-10.5	-0.0126	± 2.5
	+50	-9.83	-0.0118	± 2.5
3.3	20	8.98	-0.0107	± 2.5
4.3		-7.7	-0.0092	± 2.5

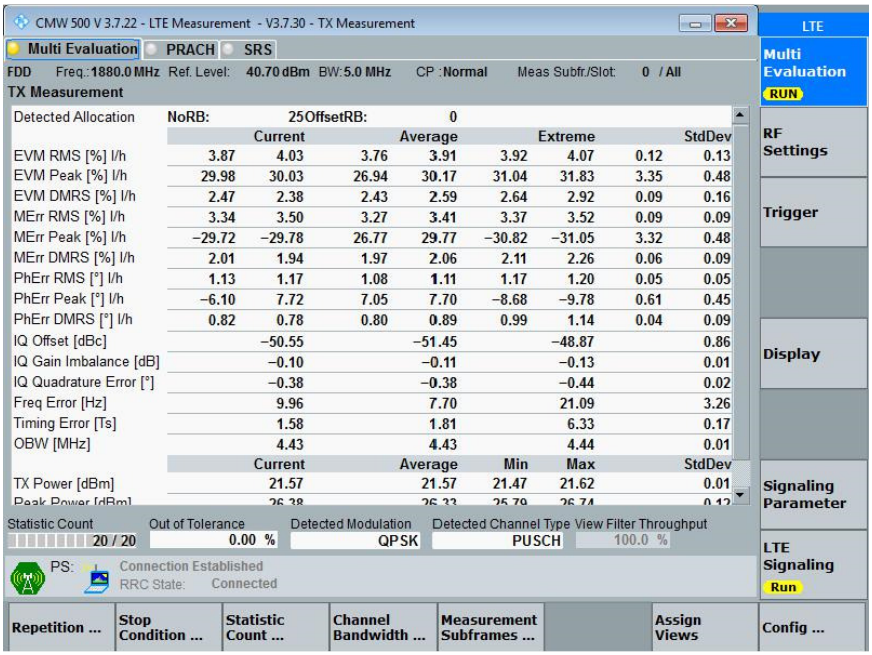
2.9.9 Sample Test plot



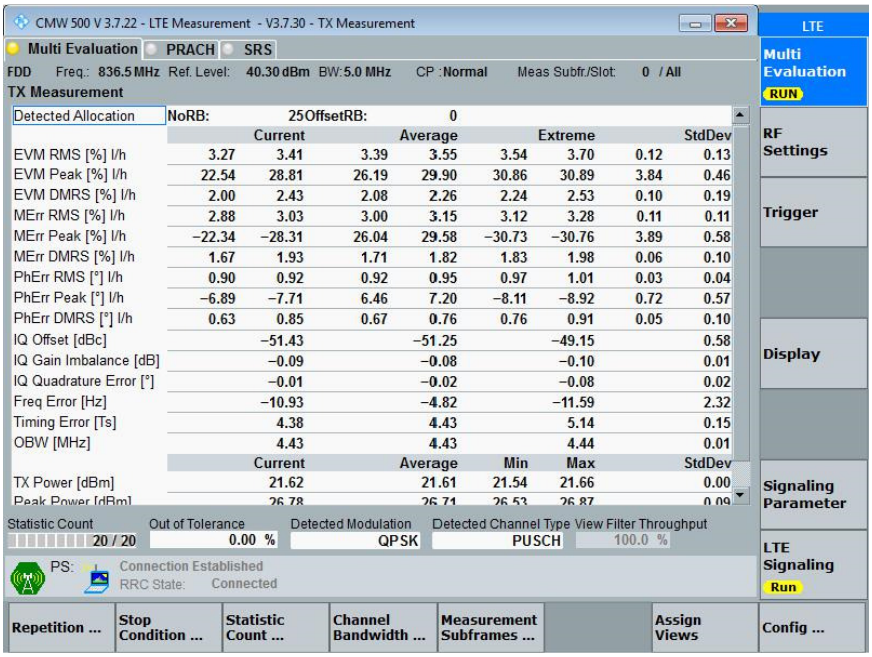
WCDMA Band 2_Middle Channel @20°C



WCDMA Band 5_Middle Channel @20°C



LTE Band 2_5 MHz Bandwidth_Middle Channel @20°C



LTE Band 5_5 MHz Bandwidth_Middle Channel @20°C

2.10 RECEIVER SPURIOUS EMISSIONS

2.10.1 Specification Reference

RSS-132, Clause 5.6
RSS-133, Clause 6.6
RSS-GEN, Clause 7.4

2.10.2 Standard Applicable

Receiver spurious emissions shall comply with the limits specified in RSS-Gen:

RSS-Gen, Clause 7.4

If the receiver has a detachable antenna of known impedance, an antenna-conducted spurious emissions measurement is permitted as an alternative to radiated measurement. However, the radiated method of section 7.3 is preferred.

The antenna-conducted test shall be performed with the antenna disconnected and with the receiver antenna port connected to a measuring instrument having equal input impedance to that specified for the antenna. The RF cable connecting the receiver under test to the measuring instrument shall also have the same impedance to that specified for the receiver's antenna.

The spurious emissions from the receiver at any discrete frequency, measured at the antenna port by the antenna-conducted method, shall not exceed 2 nW (-57dBm) in the frequency range 30-1000 MHz and 5 nW (-53dBm) above 1 GHz.

2.10.3 Equipment Under Test and Modification State

Serial No: AZ280418A00044 / Test Configuration C

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

July 26, 2018 / 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/ Test Location

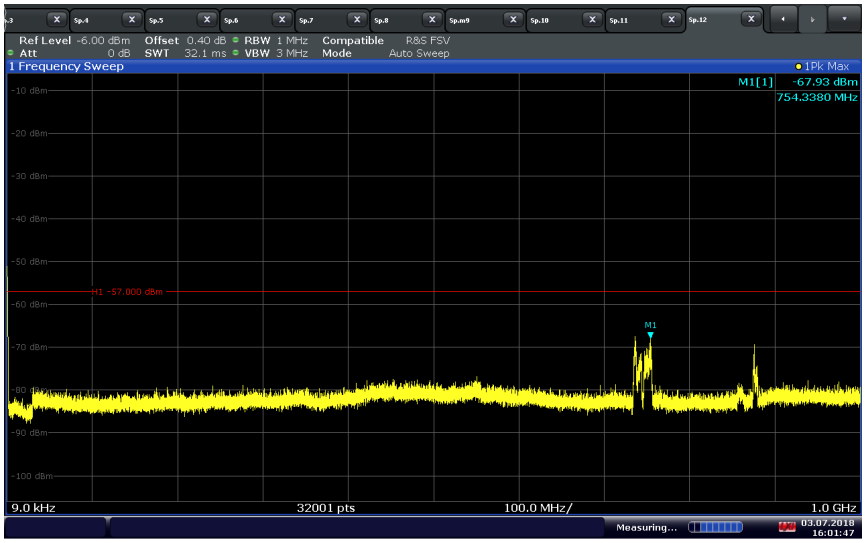
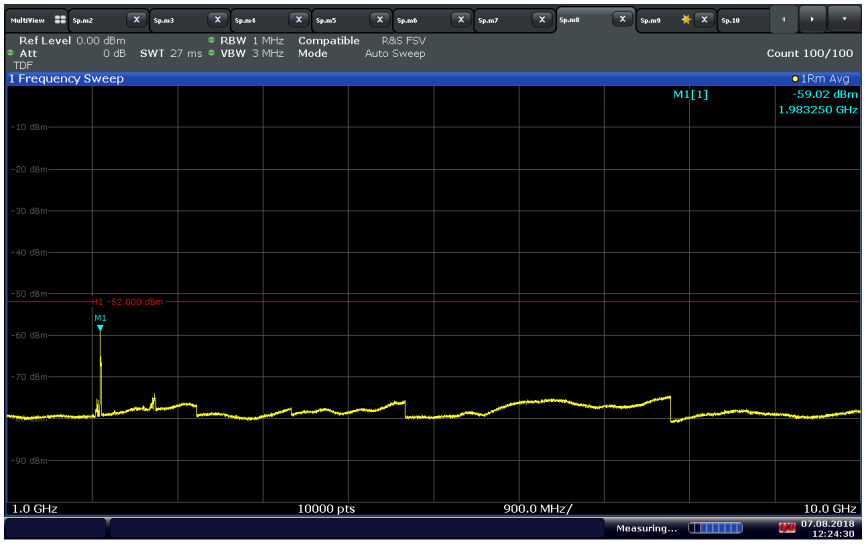
Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	25.9 °C
Relative Humidity	56.1 %
ATM Pressure	99.7 kPa

2.10.7 Additional Observations

- This is a conducted test per Clause 7.4 of RSS-Gen.
- Test performed on RX only antenna port of the EUT.

2.10.8 Test Results

Receiver Spurious below 1 GHz
 16:01:48 03.07.2018
Receiver Spurious Above 1 GHz
 12:24:30 07.08.2018

2.11 CONDUCTED EMISSIONS

2.11.1 Specification Reference

FCC CFR 47 Part 15, Clause 15.207(a)
RSS-Gen, Section 8.8

2.11.2 Standard Applicable

An intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN).

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.*

2.11.3 Equipment Under Test and Modification State

Serial No: AZ280418A00044 / Test Configuration B

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

July 16, 2018/XYZ

2.11.5 Test Equipment Used

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

2.11.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	25.1 °C
Relative Humidity	53.7 %
ATM Pressure	99.0 kPa

2.11.7 Additional Observations

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. See Section 2.1.8 for sample computation.

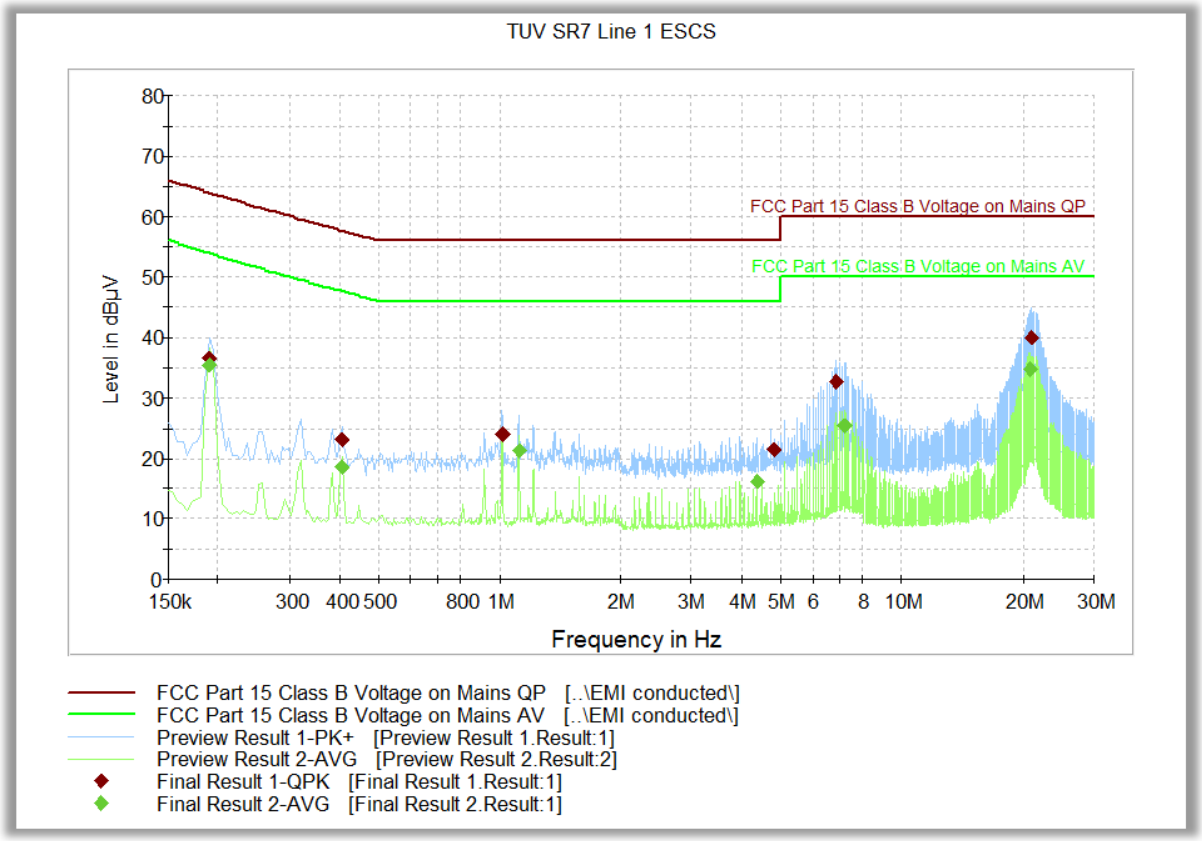
2.11.8 Sample Computation (Conducted Emission – Quasi Peak)

Measuring equipment raw measurement (dbµV) @ 150kHz			5.5
Correction Factor (dB)	Asset# 8607 (20dB attenuator)	19.9	20.7
	Asset# 1177 (cable)	0.15	
	Asset# 1176 (cable)	0.35	
	Asset# 7568 (LISN)	0.30	
Reported QuasiPeak Final Measurement (dbµV) @ 150kHz			**26.2**

2.11.9 Test Results

Compliant. See attached plots and tables.

2.11.10 MIFI8800L 120VAC 60Hz (Line 1)



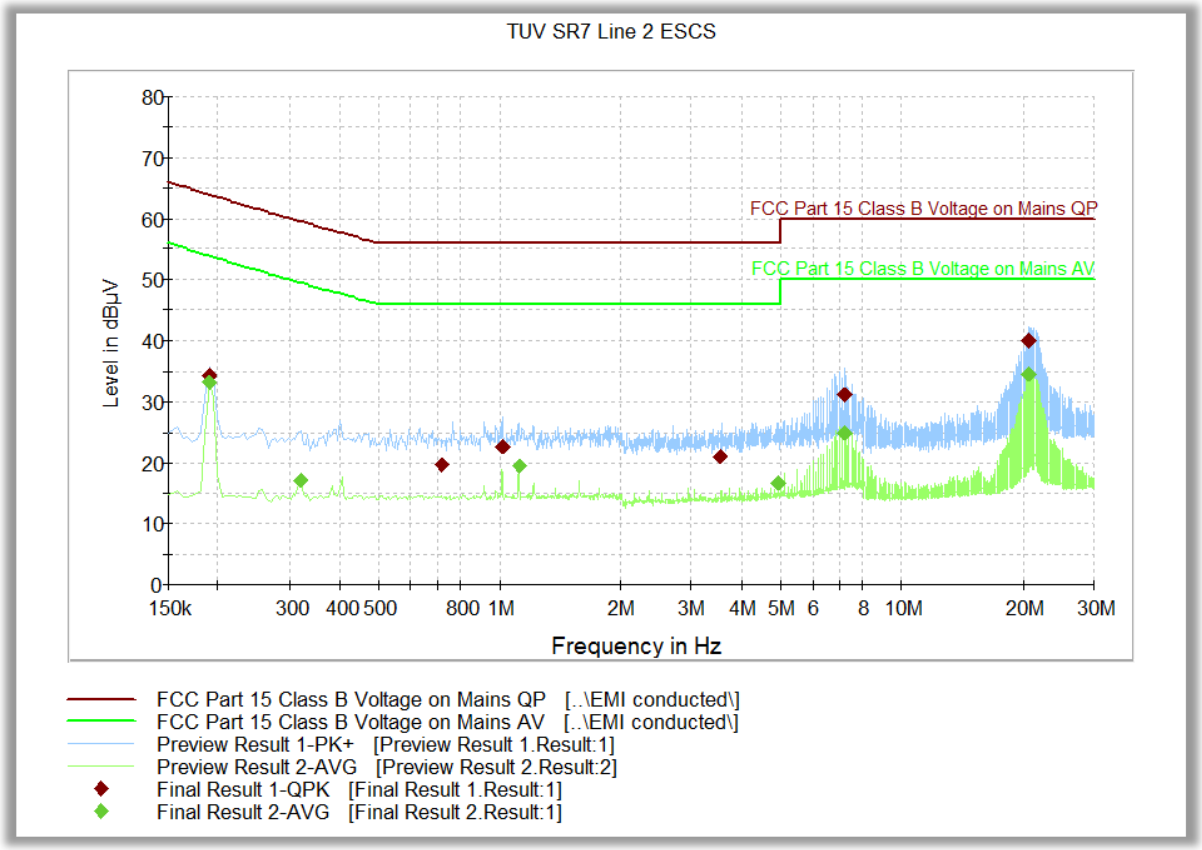
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.190500	36.6	1000.0	9.000	Off	L1	20.2	27.3	63.9
0.406500	23.1	1000.0	9.000	Off	L1	20.2	34.6	57.6
1.018500	23.9	1000.0	9.000	Off	L1	20.2	32.1	56.0
4.830000	21.4	1000.0	9.000	Off	L1	20.4	34.6	56.0
6.900000	32.6	1000.0	9.000	Off	L1	20.5	27.4	60.0
20.998500	40.1	1000.0	9.000	Off	L1	20.8	19.9	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.190500	35.4	1000.0	9.000	Off	L1	20.2	18.4	53.9
0.406500	18.6	1000.0	9.000	Off	L1	20.2	29.0	47.6
1.117500	21.3	1000.0	9.000	Off	L1	20.2	24.7	46.0
4.366500	16.2	1000.0	9.000	Off	L1	20.4	29.8	46.0
7.197000	25.4	1000.0	9.000	Off	L1	20.5	24.6	50.0
20.800500	34.7	1000.0	9.000	Off	L1	20.7	15.3	50.0

2.11.11 MIFI8800L 120VAC 60Hz (Line 2)



Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.190500	34.3	1000.0	9.000	Off	N	20.2	29.6	63.9
0.717000	19.5	1000.0	9.000	Off	N	20.2	36.5	56.0
1.018500	22.7	1000.0	9.000	Off	N	20.2	33.3	56.0
3.547500	21.0	1000.0	9.000	Off	N	20.4	35.0	56.0
7.197000	31.0	1000.0	9.000	Off	N	20.4	29.0	60.0
20.701500	39.9	1000.0	9.000	Off	N	20.7	20.1	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.190500	33.1	1000.0	9.000	Off	N	20.2	20.8	53.9
0.321000	17.1	1000.0	9.000	Off	N	20.3	32.4	49.5
1.117500	19.5	1000.0	9.000	Off	N	20.3	26.5	46.0
4.929000	16.6	1000.0	9.000	Off	N	20.5	29.4	46.0
7.197000	24.9	1000.0	9.000	Off	N	20.4	25.1	50.0
20.701500	34.4	1000.0	9.000	Off	N	20.7	15.6	50.0

SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT USED

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

ID Number (SDGE/SDRB)	Test Equipment	Type	Serial Number	Manufacturer	Cal Date	Cal Due Date
Antenna Conducted Port Setup						
7662	P-Series Power Meter	N1911A	MY45100951	Agilent	06/15/18	06/15/19
7661	50MHz-18GHz Wideband Power Sensor	N1921A	MY45241383	Agilent	06/15/18	06/15/19
7608	Vector Signal Generator	SMBV100A	259021	Rhode & Schwarz	09/19/17	09/19/19
7582	Signal/Spectrum Analyzer	FSW26	101614	Rhode & Schwarz	12/14/17	12/14/18
-	Wideband Radio Communication Tester	CMW 500	158164	Rhode & Schwarz	04/04/18	04/04/19
8825	20dB Attenuator	46-20-34	BK5773	Weinschel Corp.	Verified by 7608 and 7582	
-	10dB Attenuator	VAT-10W2+2W	N/A	MCL	Verified by 7608 and 7582	
AC Conducted Emissions Test Setup						
1024	EMI Test Receiver	ESCS 30	847793/001	Rhode & Schwarz	09/15/17	09/15/18
7567	LISN	FCC-LISN-50-25-2	120304	Fischer Custom Comm.	12/14/17	12/14/19
8822	20dB Attenuator	34-20-34	N/A	MCE / Weinschel	Verified by 7608 and 7582	
8824	20dB Attenuator	34-20-34	N/A	MCE / Weinschel	Verified by 7608 and 7582	
7582	Signal/Spectrum Analyzer	FSW26	101614	Rhode & Schwarz	12/14/17	12/14/18
7608	Vector Signal Generator	SMBV100A	259021	Rhode & Schwarz	09/19/17	09/19/19
-	Wideband Radio Communication Tester	CMW 500	158164	Rhode & Schwarz	04/04/18	04/04/19
Radiated Test Setup						
7582	Signal/Spectrum Analyzer	FSW26	101614	Rhode & Schwarz	12/14/17	12/14/18
7608	Vector Signal Generator	SMBV100A	259021	Rhode & Schwarz	09/19/17	09/19/19
1033	Bilog Antenna	3142C	00044556	EMCO	10/11/16	10/11/18
7575	Double-ridged waveguide horn antenna	3117	00155511	EMCO	06/16/18	06/16/20
1193	Pre-amplifier	PAM-0202	185	A.H. Systems, Inc.	04/11/18	04/11/19
8921	High-frequency cable	SucoFlex 100 SX	N/A	Suhner	Verified by 7608 and 7582	
8923	High-frequency cable	Micropore 19057793	N/A	United Microwave Products	Verified by 7608 and 7582	
1040	EMI Test Receiver	ESIB40	100292	Rhode & Schwarz	10/25/17	10/25/18
1049	EMI Test Receiver	ESU	100133	Rhode & Schwarz	07/13/18	07/13/19
8628	Pre-amplifier	QLI-01182835-JO	8986002	Quinstar	02/06/18	02/06/19
-	Wideband Radio Communication Tester	CMW 500	158164	Rhode & Schwarz	04/04/18	04/04/19

Miscellaneous						
6708	Multimeter	34401A	US36086974	Hewlett Packard	07/18/18	07/18/19
7579	Temperature Chamber	115	151617	TestQuity	08/22/17	08/22/18
11312	Mini Environmental Quality Meter	850027	CF099-56010-340	Sper Scientific	02/26/18	02/26/19
	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 Radiated Emission 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	3.52	1.44	2.07
6	EUT Setup	Rectangular	1.00	0.58	0.33
				Combined Uncertainty (u_c):	1.68
				Coverage Factor (k):	2
				Expanded Uncertainty:	3.36

3.2.2 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	3.00	1.22	1.50
6	EUT Setup	Rectangular	1.00	0.58	0.33
				Combined Uncertainty (u_c):	1.49
				Coverage Factor (k):	2
				Expanded Uncertainty:	2.99

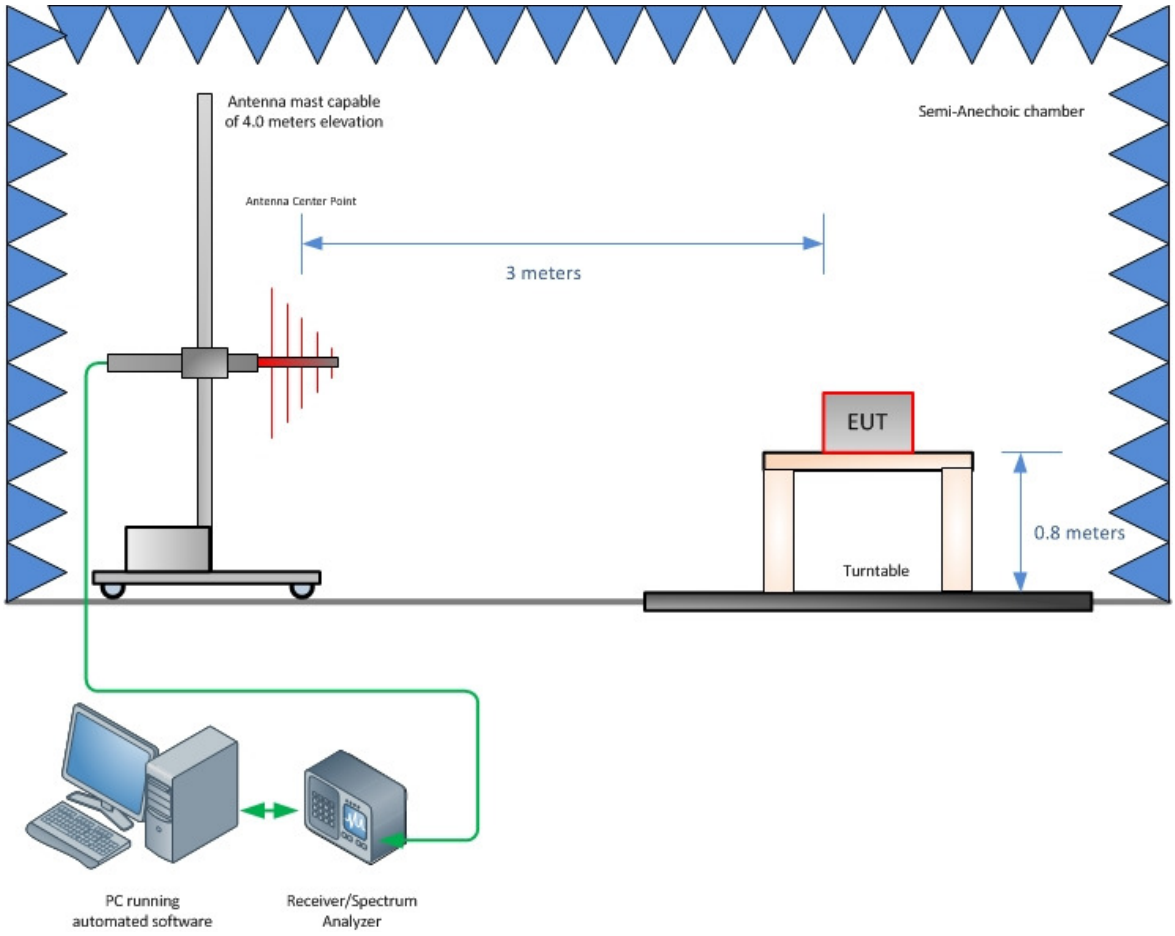
3.2.3 Conducted Antenna Port Measurement

	Contribution	Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	Receiver/Spectrum Analyzer	Rectangular	0.34	0.20	0.04
2	Cables	Rectangular	0.30	0.17	0.03
3	EUT Setup	Rectangular	0.50	0.29	0.08
				Combined Uncertainty (u_c):	0.39
				Coverage Factor (k):	1.96
				Expanded Uncertainty:	0.76

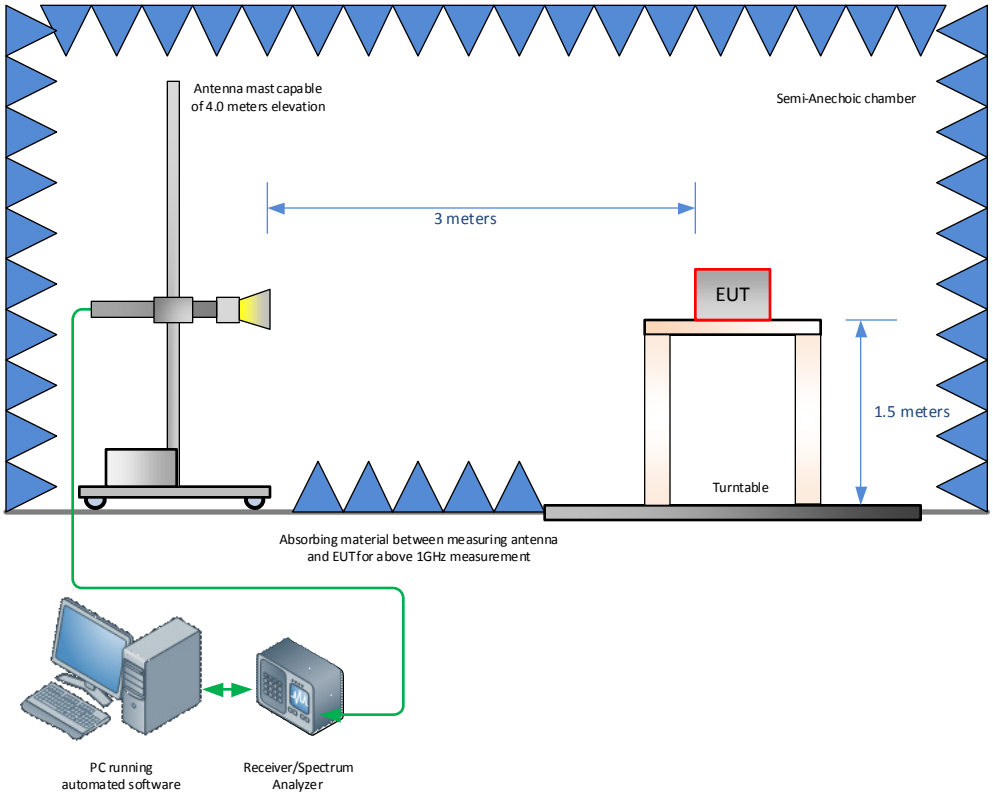
SECTION 4

DIAGRAM OF TEST SETUP

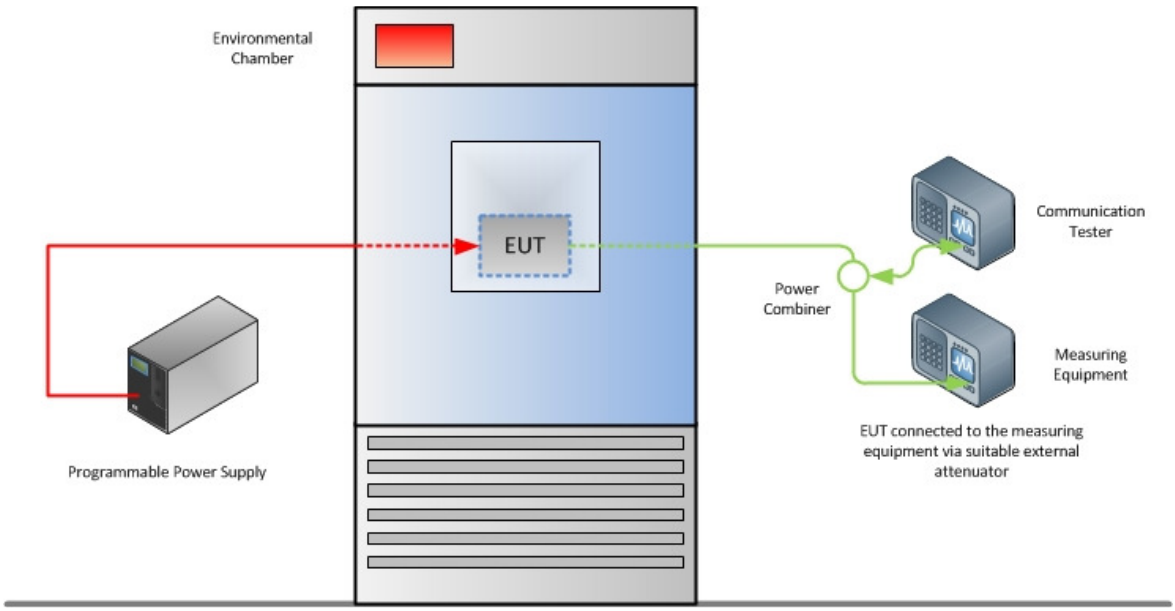
4.1 TEST SETUP DIAGRAM



Radiated Emission Test Setup (Below 1GHz)



Radiated Emission Test Setup (Above 1GHz)



Frequency Stability Test Comfiguration

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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