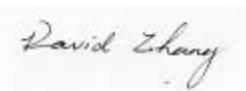


RF TEST REPORT



Report No.: FCC-IC_RF_SL14013101-SPC-001_0413 Rev1.0
Supersede Report No.: FCC-IC_RF_SL14013101-SPC-001_0413

Applicant	SpiderCloud Wireless, Inc.		
Product Name	SpiderCloud Radio Node		
Model No.	SCRN-310-0413		
Test Standard	47CFR Part27: 2013		
Test Method	ANSI C63.4: 2009 TIA-603-D: 2009		
Date of test	02/13/2014 - 03/17/2014		
Issue Date	3/28/2014		
Test Result	<u>Pass</u> Fail		
Equipment complied with the specification	[x]		
Equipment did not comply with the specification	[]		
			
David Zhang		Nima Molaei	
Test Engineer		Engineer Reviewer	
This test report may be reproduced in full only Test result presented in this test report is applicable to the tested sample only			

Issued By:
SIEMIC Laboratories
775 Montague Expressway, Milpitas, 95035 CA



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Laboratory Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Country/Region	Accreditation Body	Scope
USA	FCC, A2LA	EMC , RF/Wireless , Telecom
Canada	IC, A2LA, NIST	EMC, RF/Wireless , Telecom
Taiwan	BSMI , NCC , NIST	EMC, RF, Telecom , Safety
Hong Kong	OFTA , NIST	RF/Wireless ,Telecom
Australia	NATA, NIST	EMC, RF, Telecom , Safety
Korea	KCC/RRR, NIST	EMI, EMS, RF , Telecom, Safety
Japan	VCCI, JATE, TELEC, RFT	EMI, RF/Wireless, Telecom
Mexico	NOM, COFETEL, Caniety	Safety, EMC , RF/Wireless, Telecom
Europe	A2LA, NIST	EMC, RF, Telecom , Safety

Accreditations for Product Certifications

Country	Accreditation Body	Scope
USA	FCC TCB, NIST	EMC , RF , Telecom
Canada	IC FCB , NIST	EMC , RF , Telecom
Singapore	iDA, NIST	EMC , RF , Telecom
EU	NB	EMC & R&TTE Directive
Japan	MIC (RCB 208)	RF , Telecom
HongKong	OFTA (US002)	RF , Telecom

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1 Report Revision History

Report No.	Report Version	Description	Issue Date
FCC-IC_RF_SL14013101-SPC-001_0413	None	Original	03/17/2014
FCC-IC_RF_SL14013101-SPC-001_0413 Rev1.0	Rev1.0	Update Band Edge and OBW result	03/28/2014

2 Executive Summary

The purpose of this test program was to demonstrate compliance of following product

Company: SpiderCloud Wireless, Inc.
Product: SpiderCloud Radio Node
Model: SCRN-310-0413

against the current Stipulated Standards. The specified model product stated above has demonstrated compliance with the Stipulated Standard listed on 1st page.

3 Customer information

Applicant Name	SpiderCloud Wireless, Inc.
Applicant Address	408 E. Plumeria Drive, San Jose, CA 95134
Manufacturer Name	SpiderCloud Wireless, Inc.
Manufacturer Address	408 E. Plumeria Drive, San Jose, CA 95134

4 Test site information

Lab performing tests	SIEMIC Laboratories
Lab Address	775 Montague Expressway, Milpitas, CA 95035
FCC Test Site No.	881796
IC Test Site No.	4842D-2
VCCI Test Site No.	A0133

5 Modification

Index	Item	Description	Note
-	-	-	-

6 EUT Information

6.1 EUT Description

Product Name	SpiderCloud Radio Node
Model No.	SCRN-310-0413
Trade Name	SpiderCloud
Serial No.	13338A10454
Input Power	56VDC (PoE)
Power Adapter Manu/Model	POE36U-1AT-R
Power Adapter SN	-
Hardware version	-
Software version	-
Date of EUT received	2/10/2014
Equipment Class/ Category	PCB, TNB
Operating Frequencies	LTE: TX (746 MHz to 756 MHz), LTE: RX (777 MHz to 787 MHz) LTE: TX (2110 MHz to 2155 MHz), LTE: RX (1710 MHz to 1755 MHz)
Port/Connectors	RJ45 (PoE)
Remark	NONE

6.2 Radio Description

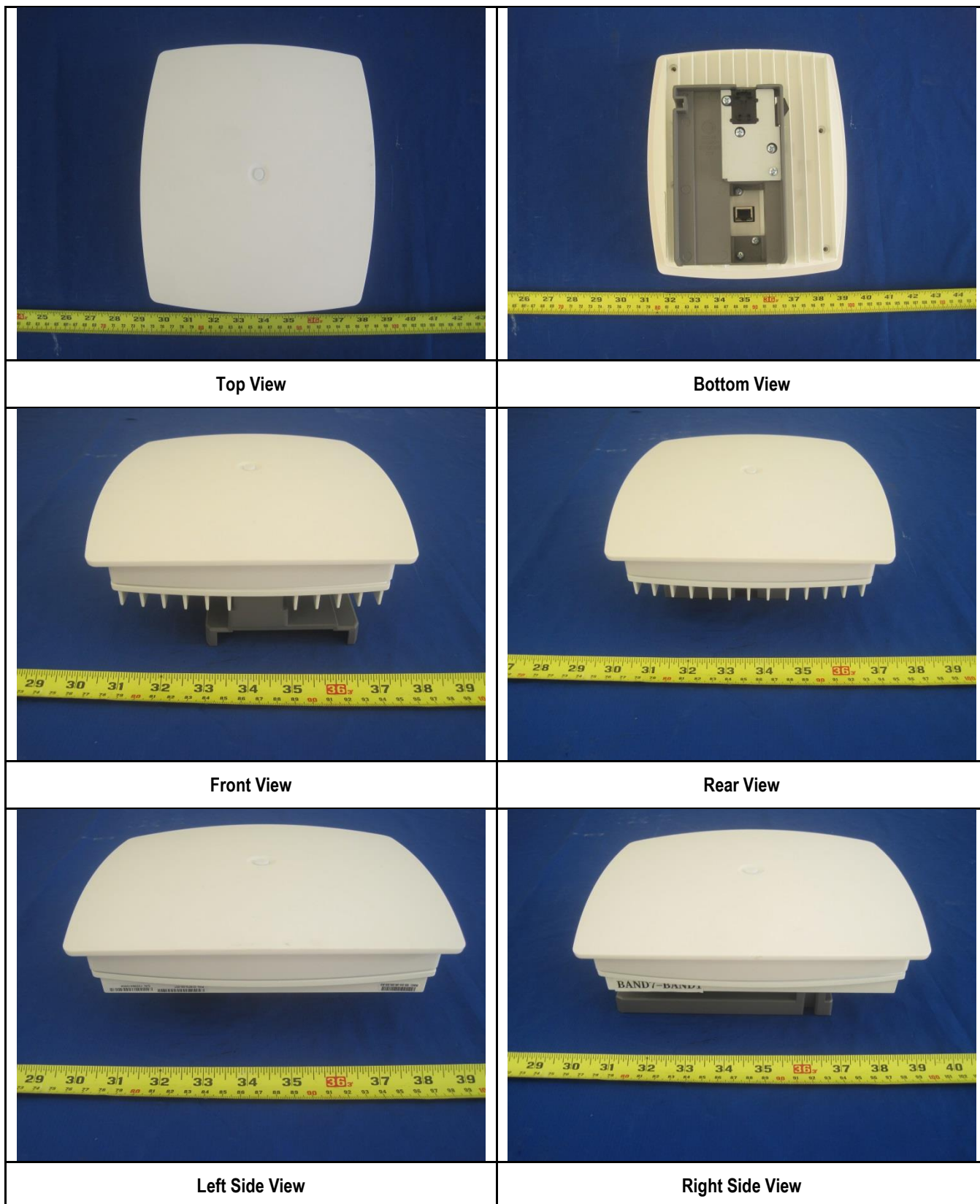
Item	LTE	LTE
Operating Band /Radio Type	LTE Band 4	LTE Band 13
Bandwidth	10 MHz, 20 MHz	10 MHz
Modulation	QPSK/16QAM/64QAM	QPSK/16QAM/64QAM
Antenna Type	Internal Omni-directional antenna	Internal Omni-directional antenna
Antenna Gain	3 dBi	3 dBi
Frequency TX(MHz)	TX: 2110 MHz to 2155 MHz RX: 1710 MHz to 1755 MHz	TX: 746 MHz to 756 MHz RX: 777 MHz to 787 MHz
Note: Only 1 single channel is used on LTE Band 13. It's mid channel with TX frequency at 751MHz.		

6.3 EUT test modes/configuration Description

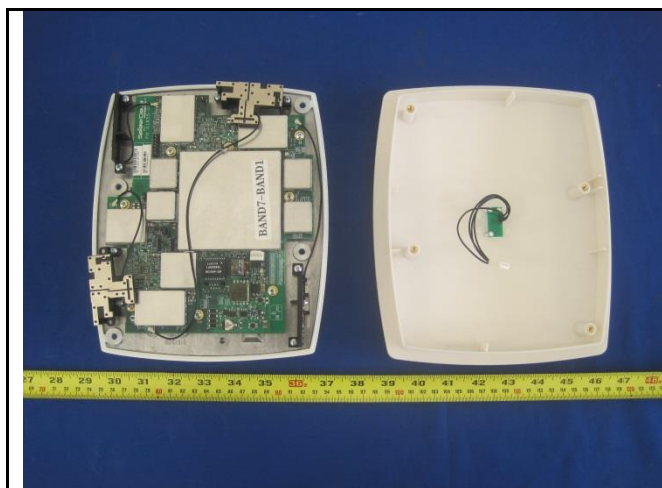
Test mode

Final Test Mode		Note
Final_test_mode_1	Continuous transmission, 10MHz, QPSK, Low CH	LTE-Band4
Final_test_mode_2	Continuous transmission, 10MHz, QPSK, Mid CH	LTE-Band4
Final_test_mode_3	Continuous transmission, 10MHz, QPSK, High CH	LTE-Band4
Final_test_mode_4	Continuous transmission, 20MHz, QPSK, Low CH	LTE-Band4
Final_test_mode_5	Continuous transmission, 20MHz, QPSK, Mid CH	LTE-Band4
Final_test_mode_6	Continuous transmission, 20MHz, QPSK, High CH	LTE-Band4
Final_test_mode_7	Continuous transmission, 10MHz, 16QAM, Low CH	LTE-Band4
Final_test_mode_8	Continuous transmission, 10MHz, 16QAM, Mid CH	LTE-Band4
Final_test_mode_9	Continuous transmission, 10MHz, 16QAM, High CH	LTE-Band4
Final_test_mode_10	Continuous transmission, 20MHz, 16QAM, Low CH	LTE-Band4
Final_test_mode_11	Continuous transmission, 20MHz, 16QAM, Mid CH	LTE-Band4
Final_test_mode_12	Continuous transmission, 20MHz, 16QAM, High CH	LTE-Band4
Final_test_mode_13	Continuous transmission, 10MHz, 64QAM, Low CH	LTE-Band4
Final_test_mode_14	Continuous transmission, 10MHz, 64QAM, Mid CH	LTE-Band4
Final_test_mode_15	Continuous transmission, 10MHz, 64QAM, High CH	LTE-Band4
Final_test_mode_16	Continuous transmission, 20MHz, 64QAM, Low CH	LTE-Band4
Final_test_mode_17	Continuous transmission, 20MHz, 64QAM, Mid CH	LTE-Band4
Final_test_mode_18	Continuous transmission, 20MHz, 64QAM, High CH	LTE-Band4
Final_test_mode_19	Continuous transmission, 10MHz, QPSK, Mid CH	LTE-Band13
Final_test_mode_20	Continuous transmission, 10MHz, 16QAM, Mid CH	LTE-Band13
Final_test_mode_21	Continuous transmission, 10MHz, 64QAM, Mid CH	LTE-Band13
Remark: NONE		

6.4 EUT Photos - External



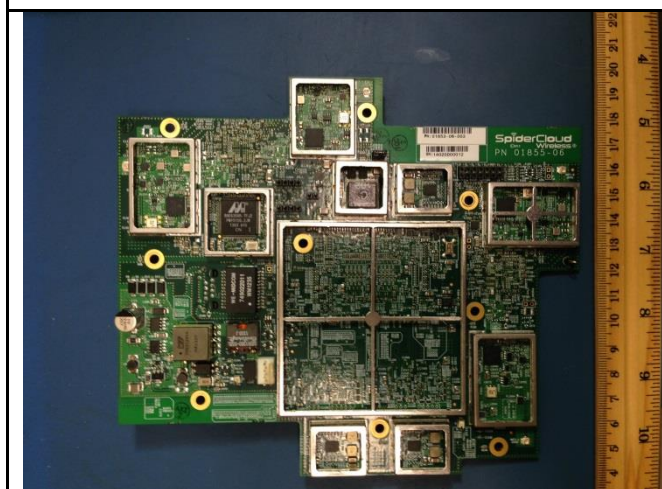
6.5 EUT Photos - Internal



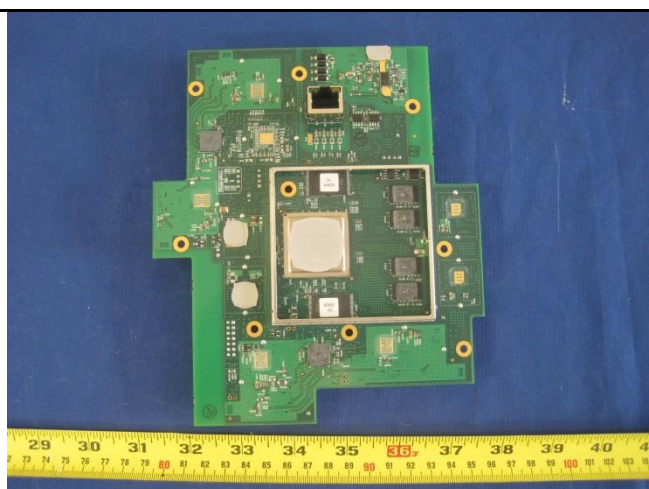
Top View Top Cover Open



Rear View Top Cover Off



Main PCB - Top View

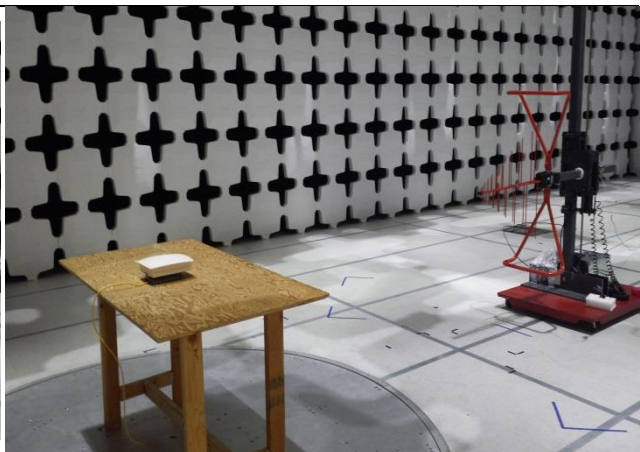


Main PCB - Bottom View

6.6 EUT Test Setup Photos



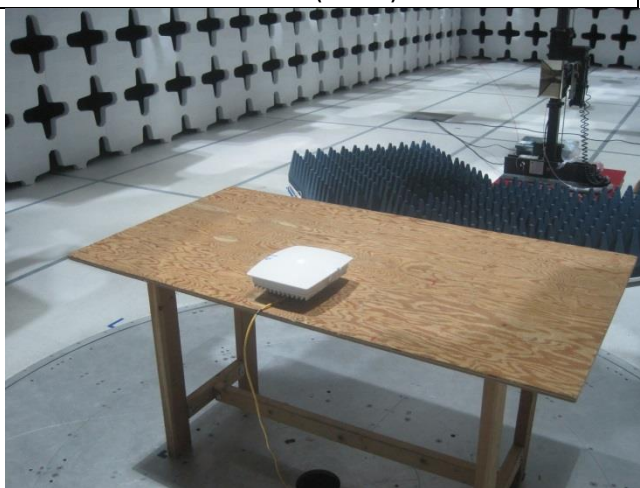
Radiated Emissions (<1GHz) – Front View



Radiated Emissions (<1GHz) – Rear View



Radiated Emissions (>1GHz) – Front View



Radiated Emissions (>1GHz) – Rear View

Note: The spurious emission in different EUT orientation was investigated, including the EUT standing up position and the laying down position. The EUT orientation shown in above setup photo is the worst case position.

7 Supporting Equipment/Software and cabling Description

7.1 Supporting Equipment

Item	Supporting Equipment Description	Model	Serial Number	Manufacturer	Note
1	PoE Adatper	POE36U-1AT-R	P90212324A1	Phihong	-

7.2 Test Software Description

Test Item	Software	Description
RF testing	ePview	Enable EUT continuous TX mode and change to different channel

8 Test Summary

Test Item	Test standard		Test Method/Procedure		Pass / Fail
E.R.P/ E.I.R.P	FCC	47CFR27.50	FCC	ANSI C63.4:2009, TIA-603-D: 2009	☒ Pass
	IC	RSS-139(6.4)	IC	RSS-Gen Issue3: 2010	☐ N/A
Occupied Bandwidth	FCC	47CFR27.53	FCC	ANSI C63.4:2009, TIA-603-D: 2009	☒ Pass
	IC	RSS-Gen(4.6)	IC	RSS-Gen Issue3: 2010	☐ N/A
Peak-Average Ratio	FCC	47CFR27.50	FCC	ANSI C63.4:2009, TIA-603-D: 2009	☒ Pass
	IC	RSS-139(6.4)	IC	RSS-Gen Issue3: 2010	☐ N/A
Spurious and harmonic Emission at antenna port	FCC	47CFR2.1051, 47CFR27.53	FCC	ANSI C63.4:2009, TIA-603-D: 2009	☒ Pass
	IC	RSS-133 (6.5), RSS-139 (6.5)	IC	RSS-Gen Issue3: 2010	☐ N/A
Band Edge	FCC	47CFR2.1053, 47CFR27.53	FCC	ANSI C63.4:2009, TIA-603-D: 2009	☒ Pass
	IC	RSS-139 (6.5)	IC	RSS-Gen Issue3: 2010	☐ N/A
Radiated spurious and harmonic emission	FCC	47CFR2.1053, 47CFR27.53	FCC	ANSI C63.4:2009, TIA-603-D: 2009	☒ Pass
	IC	RSS-139 (6.5)	IC	RSS-Gen Issue3: 2010	☐ N/A
Frequency stability	FCC	47CFR2.1055, 47CFR27.54	FCC	ANSI C63.4:2009, TIA-603-D: 2009	☒ Pass
	IC	RSS-139(6.3)	IC	RSS-Gen Issue3: 2010	☐ N/A
Receiver spurious emission	FCC	-	FCC	-	☒ Pass
	IC	RSS-Gen (6), RSS-139 (6.6)	IC	RSS-Gen Issue3: 2010	☐ N/A
Remark	- All measurement uncertainties do not take into consideration for all presented test results. - The applicant shall ensure frequency stability by showing that an emission is maintained within the band of operation under all normal operating conditions as specified in the user's manual.				

9 Measurement Uncertainty

Test Item	Frequency Range	Description	Uncertainty
Band Edge and Radiated Spurious Emissions	30MHz – 1GHz	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
Band Edge and Radiated Spurious Emissions	1GHz – 40GHz	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+4.3dB/-4.1dB

10 Measurements, Examination and Derived Results

10.1 RF Output Power

Requirement(s):

Spec	Item	Requirement	Applicable
47CFR 22.913(a)	-	The maximum effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts.	☐
47CFR24.232	-	Mobile/portable stations are limited to 2 watts EIRP peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.	☐
47CFR27.50	-	The maximum effective radiated power (ERP) of fixed and base station must not exceed 1000 Watts.	☒
Test Setup			
Test Procedure	- EUT was set for low , mid, high channel with modulated mode and highest RF output power. - The spectrum analyzer was connected to the antenna terminal.		
Test Date	03/03/2014 – 03/10/2014	Environmental condition	Temperature 22°C Relative Humidity 48% Atmospheric Pressure 1008mbar
Remark	NONE		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

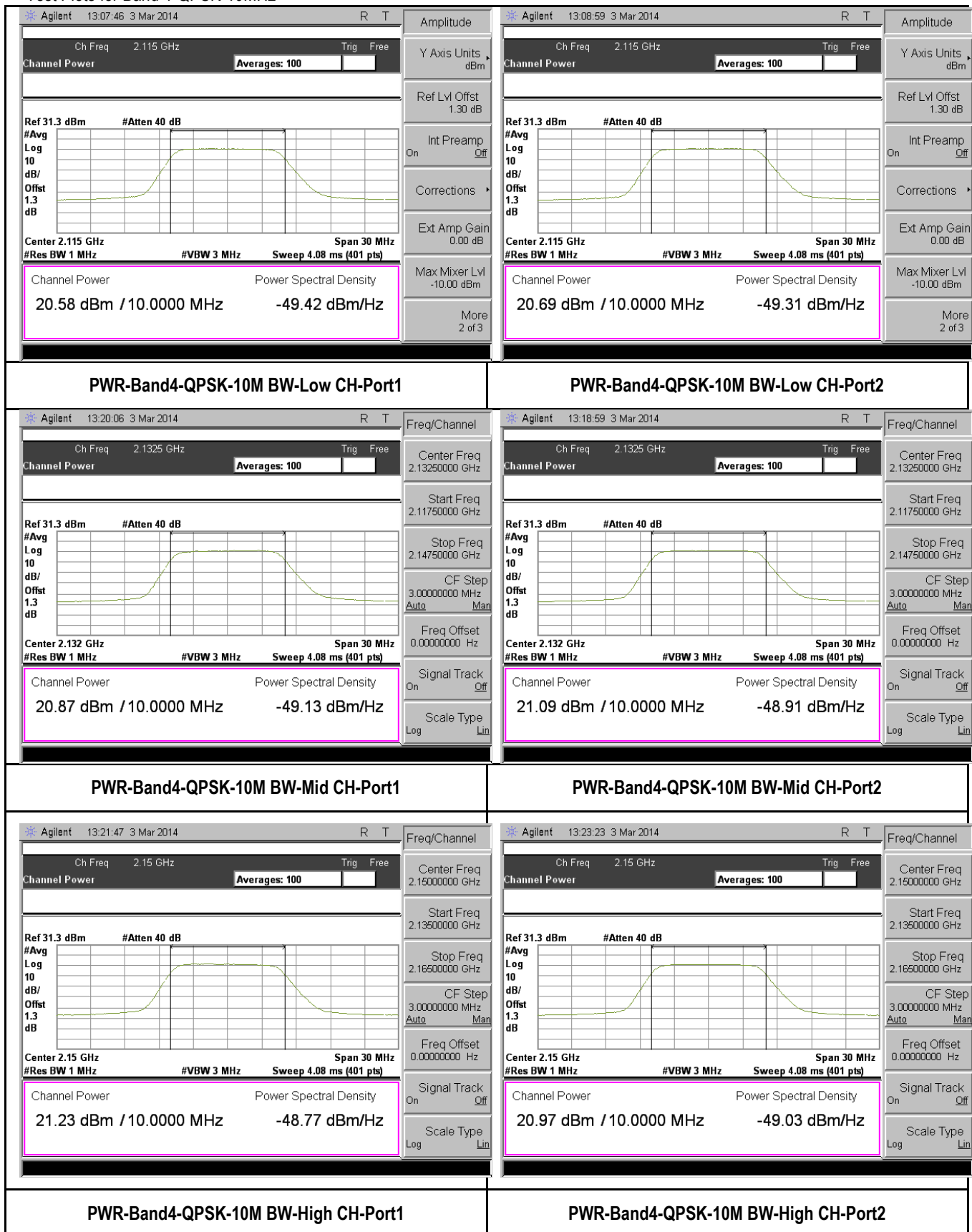
Test Data for LTE band 4

Type	Channel	Frequency (MHz)	Measured PW –Port 1(dBm)	Measured PW –Port 2(dBm)	Combined Power (dBm)	Antenna Gain (dBi)	E.I.R.P (dBm)
10MHz BW, QPSK	Low	2115	20.58	20.69	23.646	3	26.646
	Mid	2132	20.87	21.09	23.992	3	26.992
	High	2150	21.23	20.97	24.112	3	27.112
10MHz BW, 16QAM	Low	2115	20.79	20.87	23.840	3	26.840
	Mid	2132	21.01	21.20	24.116	3	27.116
	High	2150	20.98	20.69	23.848	3	26.848
10MHz BW, 64QAM	Low	2115	21.18	21.25	24.225	3	27.225
	Mid	2132	21.06	21.19	24.136	3	27.136
	High	2150	20.97	20.69	23.843	3	26.843
20MHz BW, QPSK	Low	2120	20.81	21.13	23.983	3	26.983
	Mid	2132	21.27	21.40	24.346	3	27.346
	High	2145	21.00	20.61	23.820	3	26.820
20MHz BW, 16QAM	Low	2120	20.80	21.15	23.989	3	26.989
	Mid	2132	21.23	21.32	24.286	3	27.286
	High	2145	21.16	20.76	23.975	3	26.975
20MHz BW, 64QAM	Low	2120	20.93	21.26	24.108	3	27.108
	Mid	2132	20.87	21.01	23.951	3	26.951
	High	2145	21.06	20.62	23.856	3	26.856

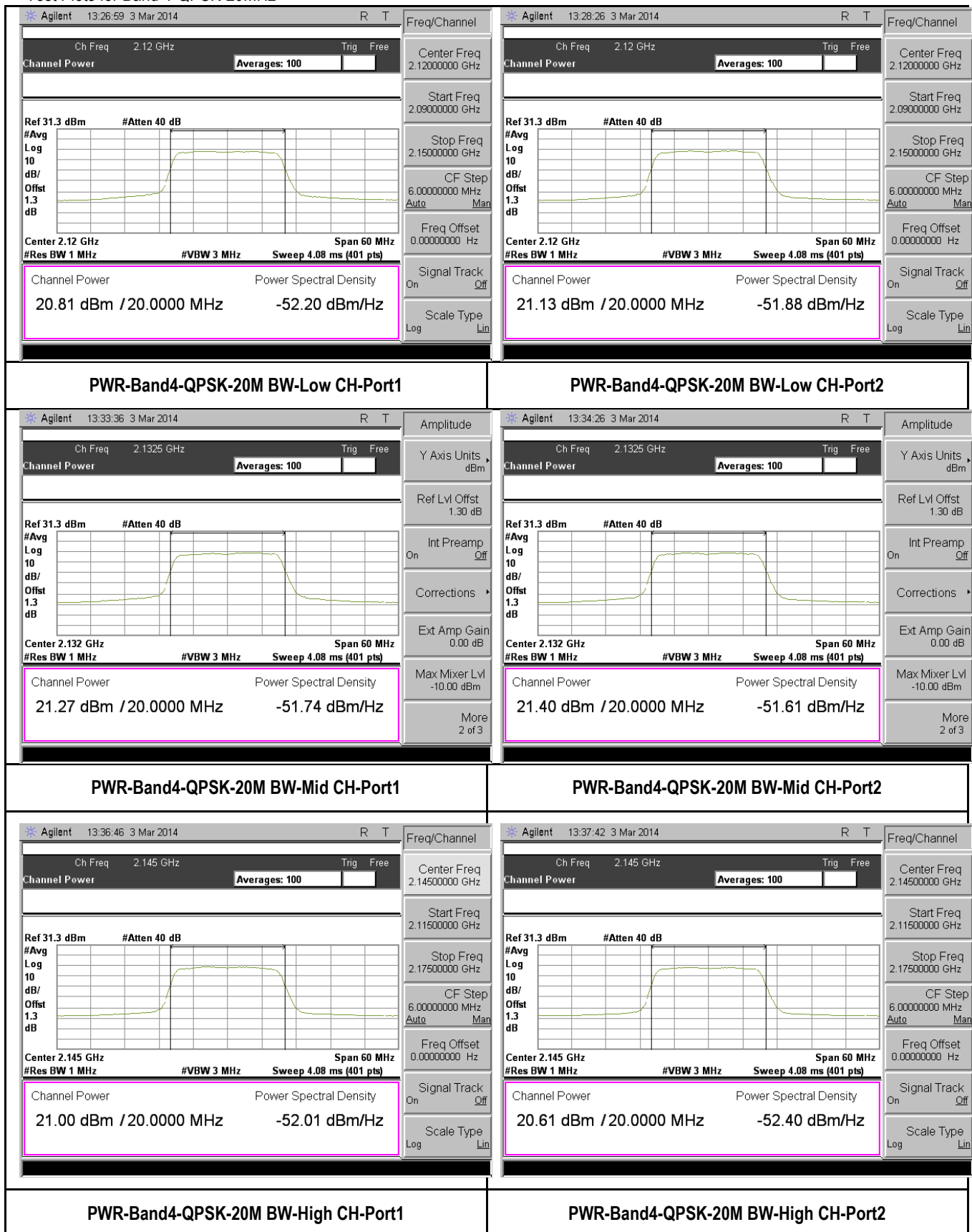
Test Data for LTE band 13

Type	Channel	Frequency (MHz)	Measured PW –Port 1(dBm)	Measured PW –Port 2(dBm)	Max Power (dBm)	Antenna Gain (dBi)	E.I.R.P (dBm)
10M BW, QPSK	Mid	751	20.89	20.64	23.78	3	26.78
10M BW, 16QAM	Mid	751	21.14	20.88	24.02	3	27.02
10M BW, 64QAM	Mid	751	21.15	20.87	24.02	3	27.02

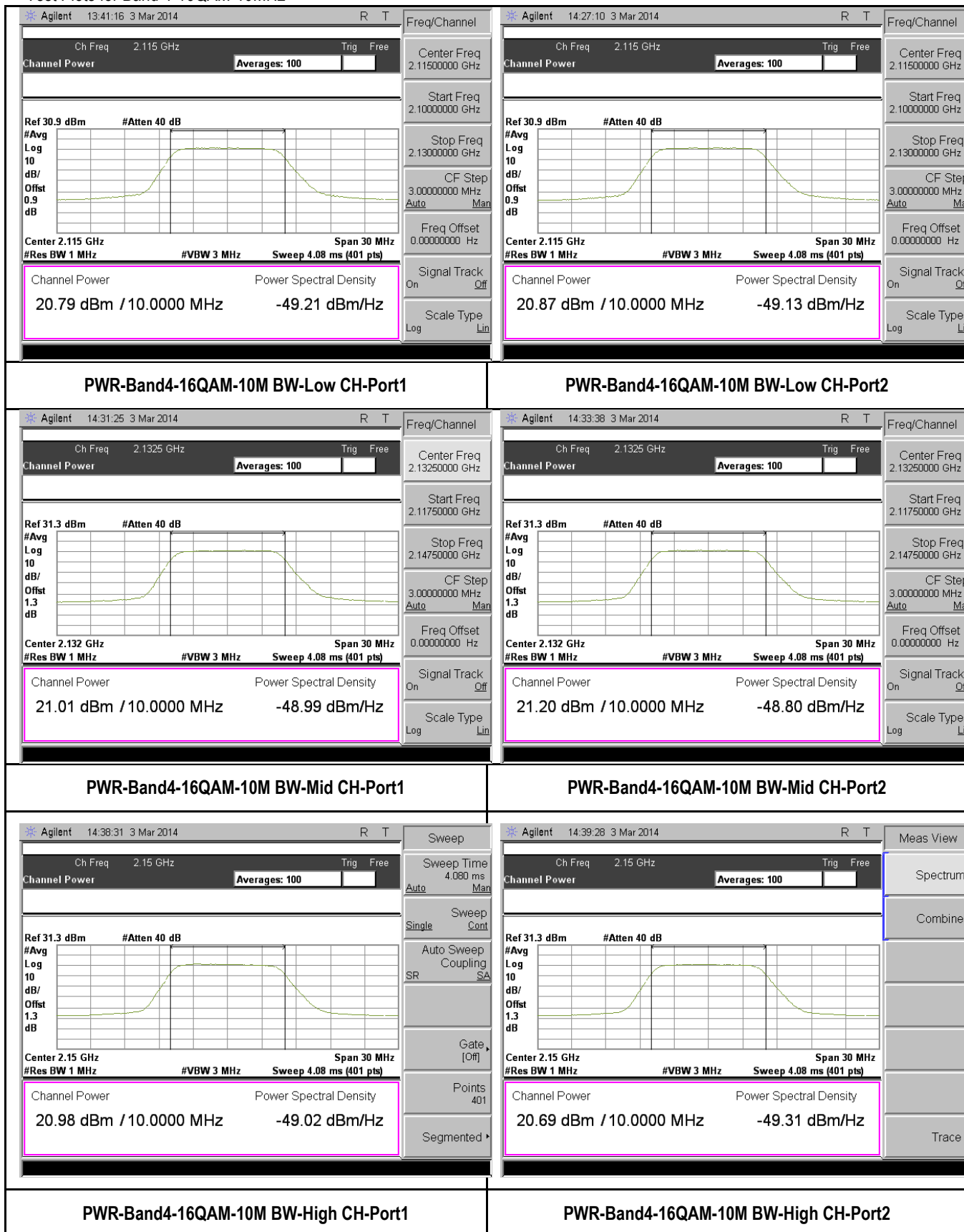
Test Plots for Band 4-QPSK-10MHz



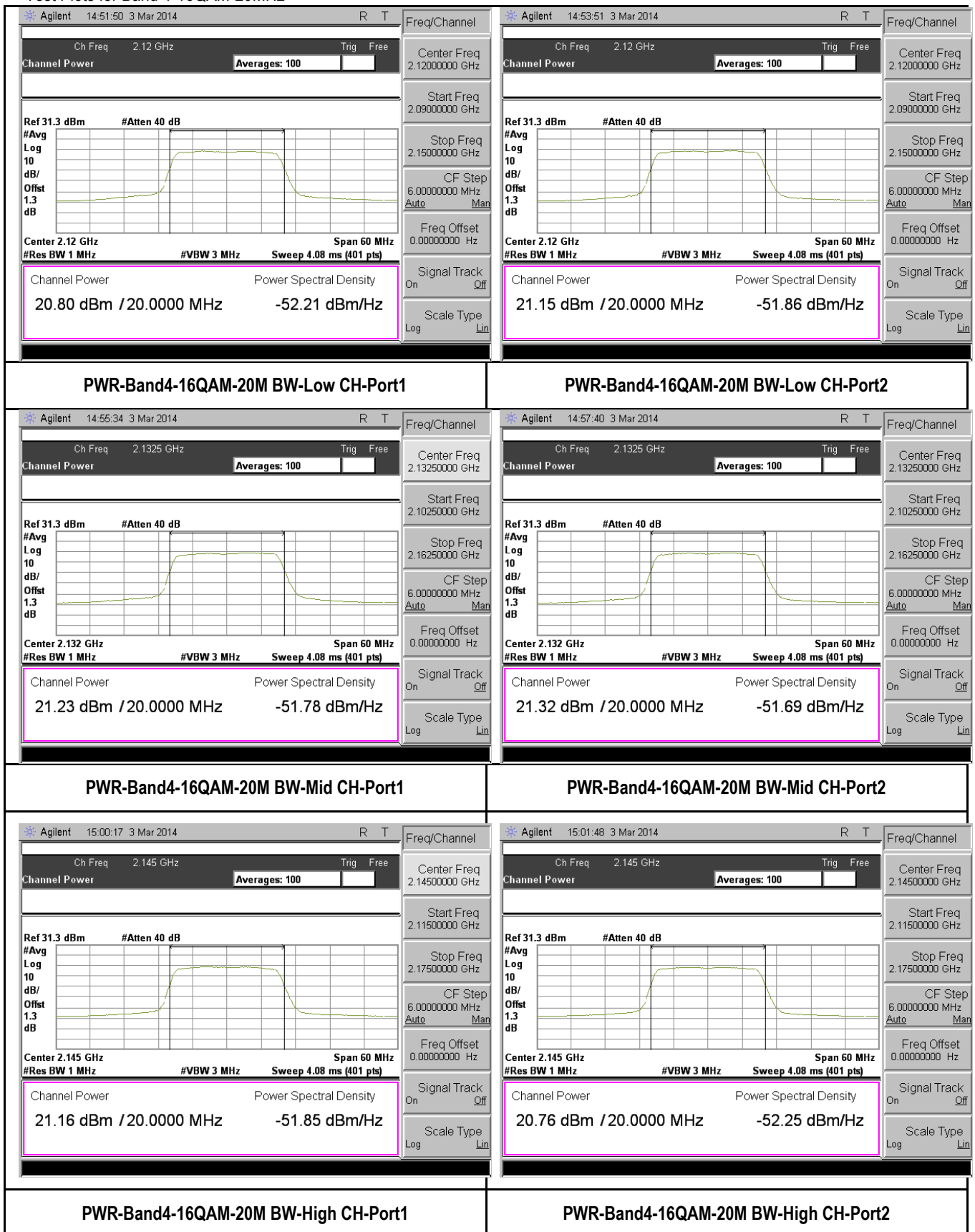
Test Plots for Band 4-QPSK-20MHz



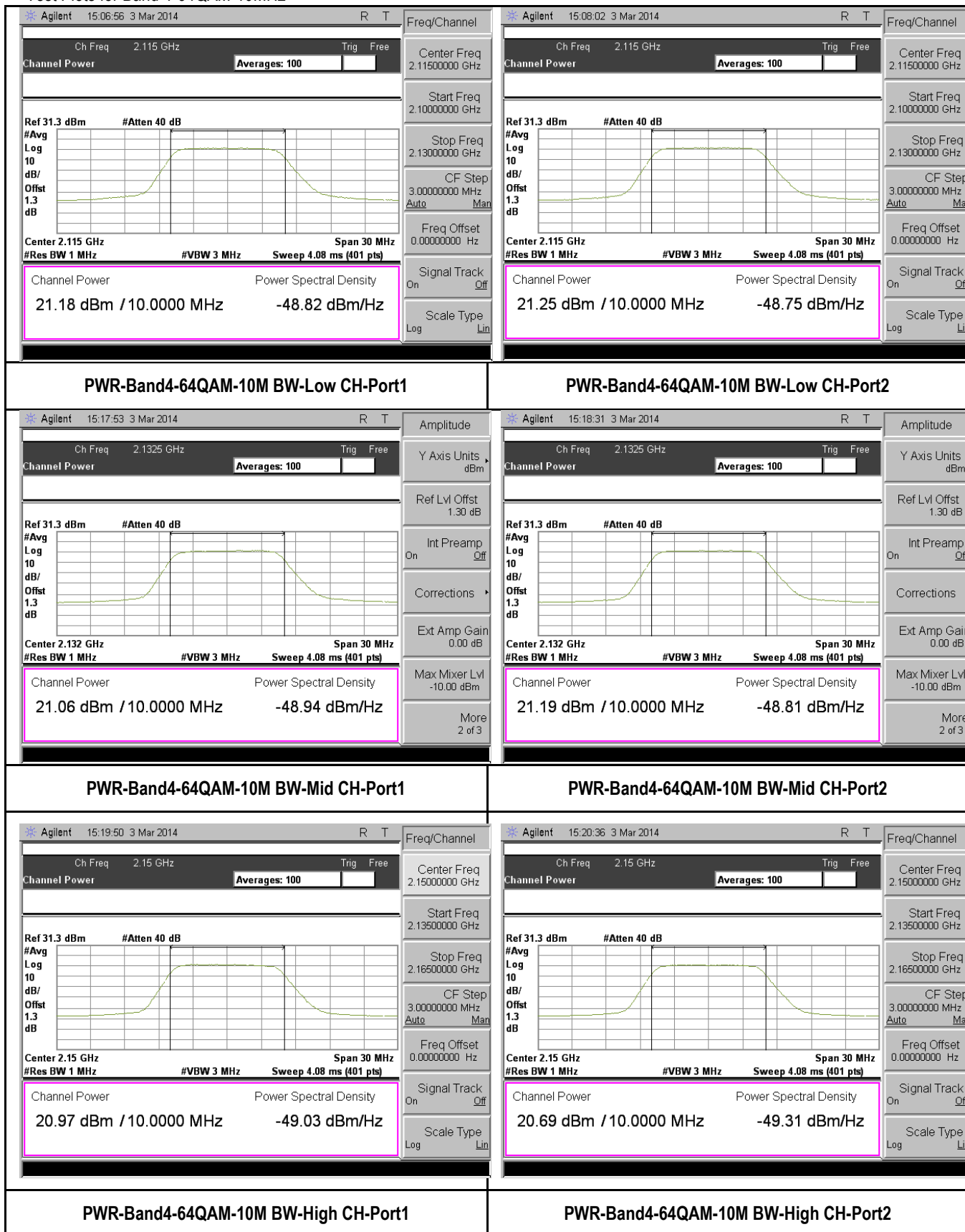
Test Plots for Band 4-16QAM-10MHz



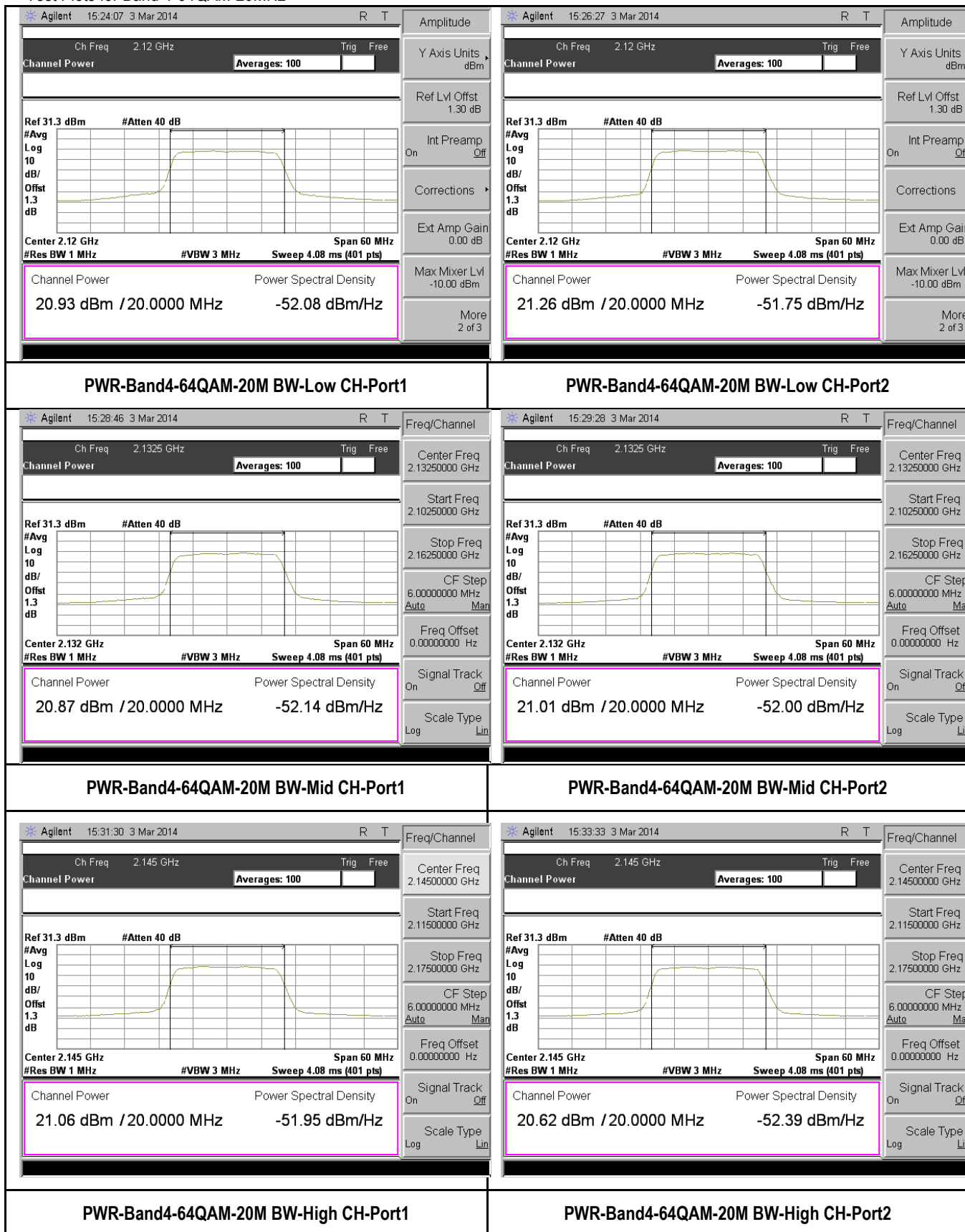
Test Plots for Band 4-16QAM-20MHz



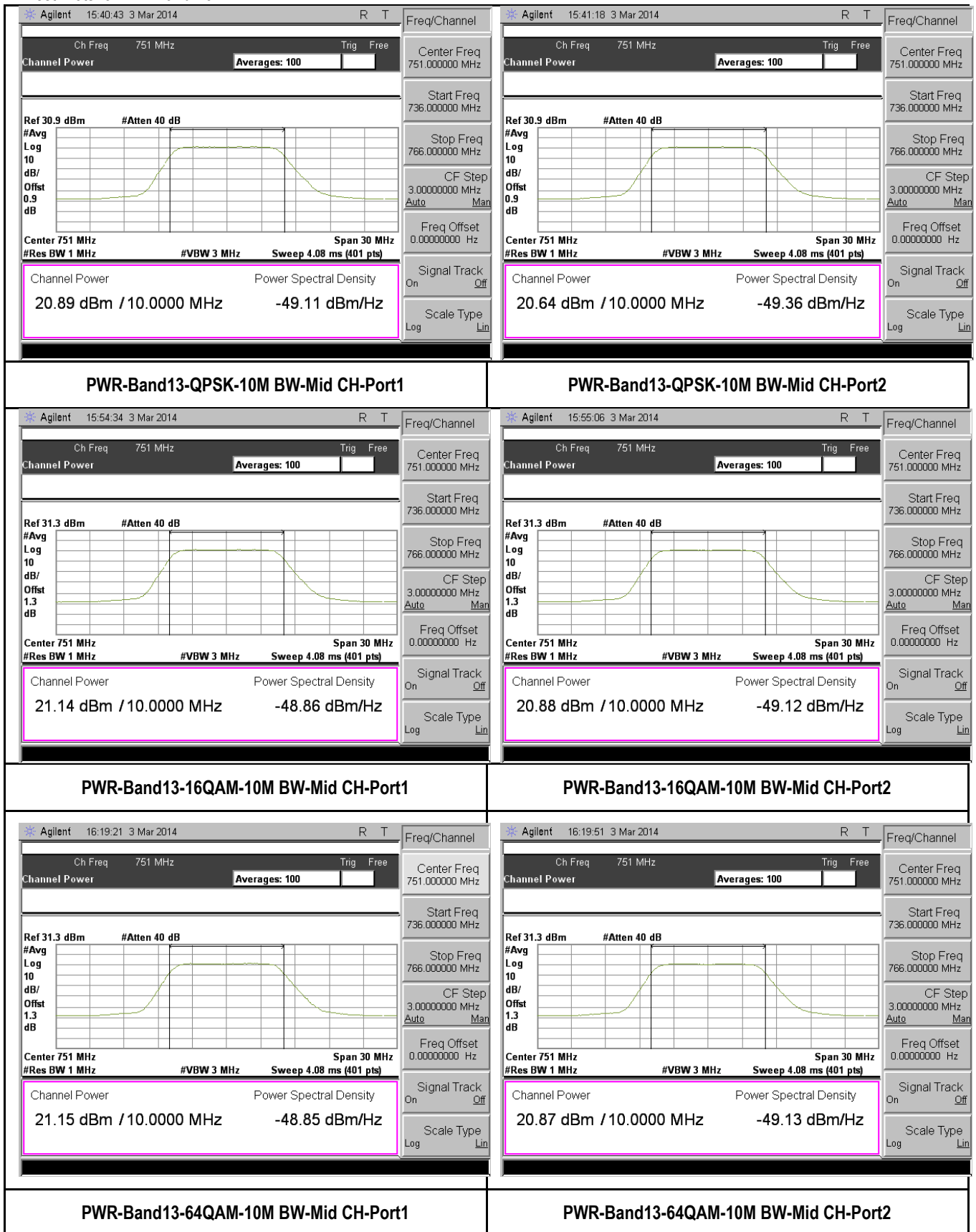
Test Plots for Band 4-64QAM-10MHz



Test Plots for Band 4-64QAM-20MHz



Test Plots for LTE Band 13



10.2 Peak-Average Ratio

Requirement(s):

Spec	Item	Requirement	Applicable
47CFR24.232	(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 13 dB.	☐
47CFR27.50	(B)	The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.	☒
RSS 133, 6.4	-	The average equivalent isotropically radiated power (e.i.r.p.) for transmitters shall not exceed the limits given in SRSP-510. Moreover, base station transmitters operating in the band 1930-1995 MHz shall not have output power exceeding 100 watts. In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.	☒
Test Setup			
Test Procedure	- EUT was set for low , mid, high channel with modulated mode and highest RF output power. - The spectrum analyzer was connected to the antenna terminal.		
Test Date	03/10/2014	Environmental condition	Temperature 23°C Relative Humidity 48% Atmospheric Pressure 1008mbar
Remark	NONE		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

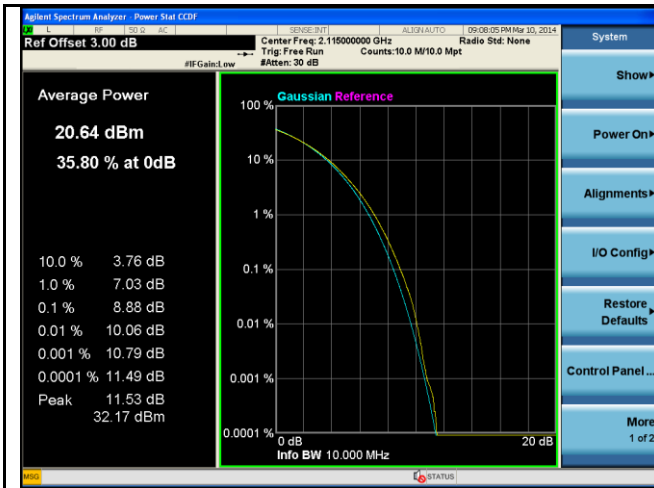
Test Data for LTE band 4

Type	Channel	Frequency (MHz)	Peak-Average Ratio (dB)	Peak-Average Ratio (dB)
10MHz BW, QPSK	Low	2115	8.88	13
	Mid	2132	8.89	13
	High	2150	8.85	13
10MHz BW, 16QAM	Low	2115	8.83	13
	Mid	2132	8.80	13
	High	2150	8.81	13
10MHz BW, 64QAM	Low	2115	8.77	13
	Mid	2132	8.76	13
	High	2150	8.76	13
20MHz BW, QPSK	Low	2120	8.84	13
	Mid	2132	8.84	13
	High	2145	8.83	13
20MHz BW, 16QAM	Low	2120	8.76	13
	Mid	2132	8.76	13
	High	2145	8.76	13
20MHz BW, 64QAM	Low	2120	9.36	13
	Mid	2132	9.33	13
	High	2145	9.36	13

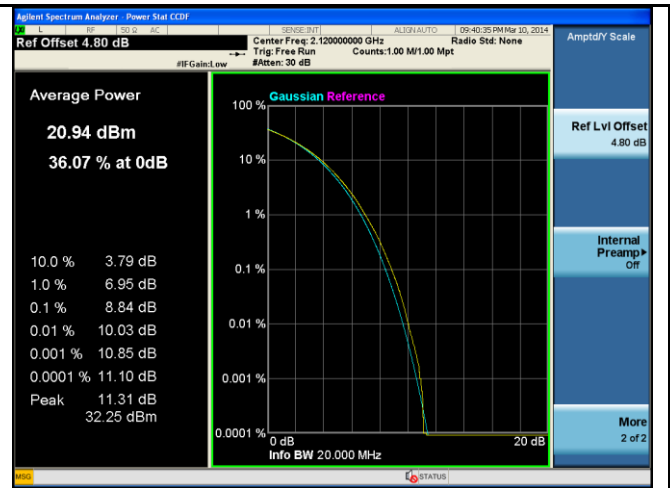
Test Data for LTE band 13

Type	Channel	Frequency (MHz)	Peak-Average Ratio (dB)	Peak-Average Ratio (dB)
10MHz, QPSK	Mid	751	8.63	13
10MHz, 16QAM	Mid	751	8.63	13
10MHz, 64QAM	Mid	751	8.64	13

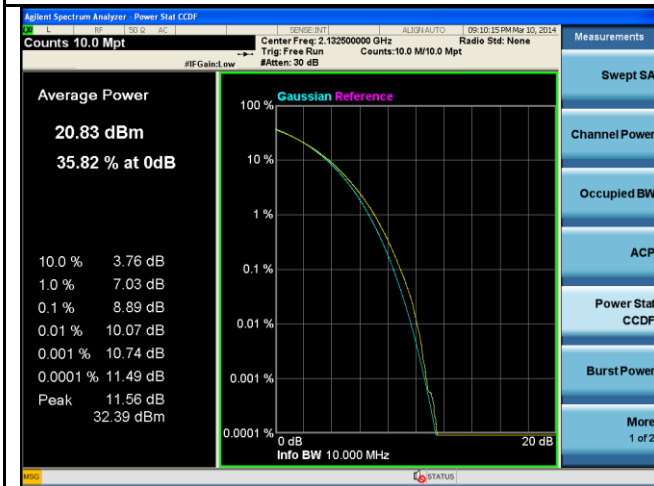
Test Plots



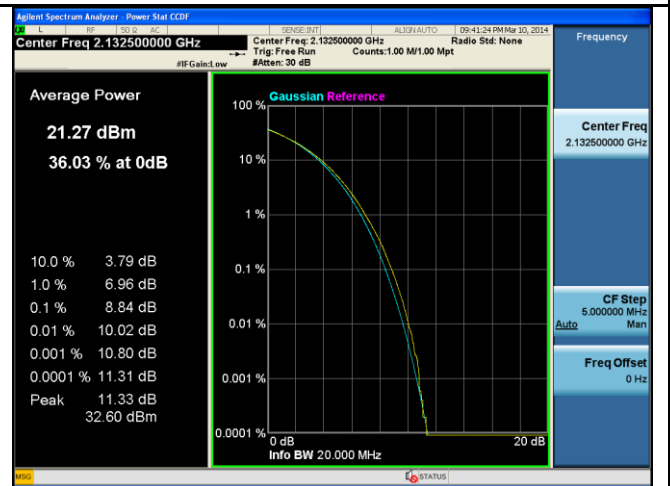
PK-AV-Ratio-Band4-QPSK-10M BW-Low



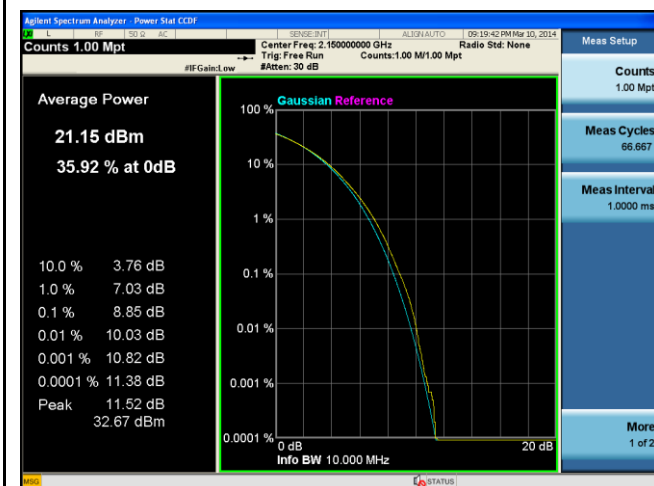
PK-AV-Ratio-Band4-QPSK-20M BW-Low



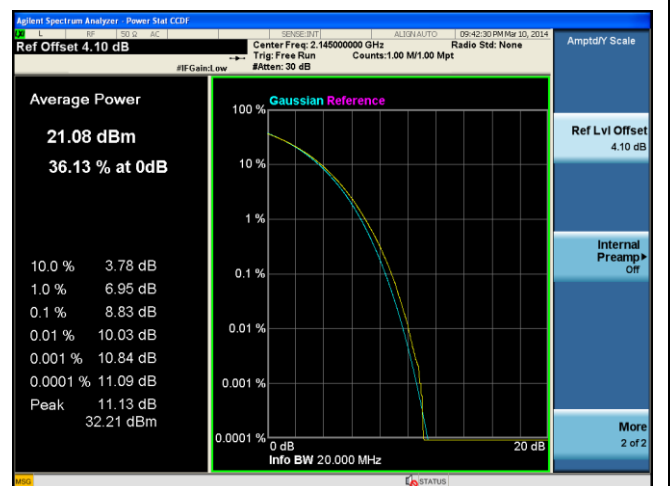
PK-AV-Ratio-Band4-QPSK-10M BW-Mid



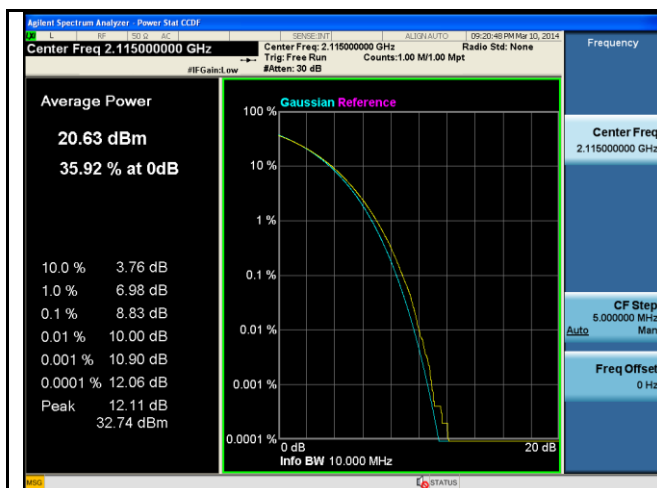
PK-AV-Ratio-Band4-QPSK-20M BW-Mid



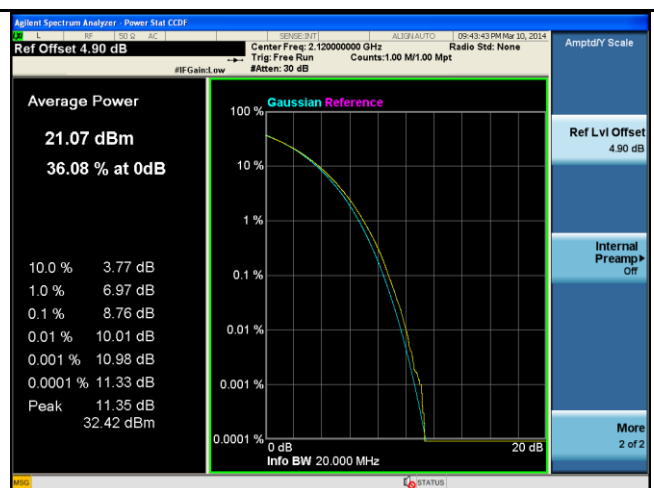
PK-AV-Ratio-Band4-QPSK-10M BW-High



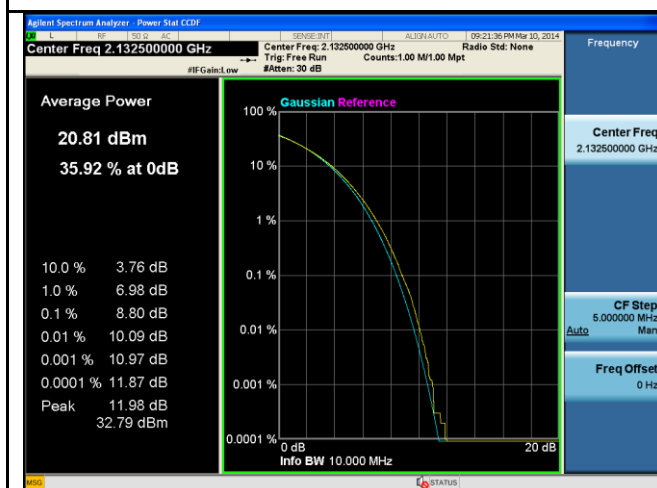
PK-AV-Ratio-Band4-QPSK-20M BW-High



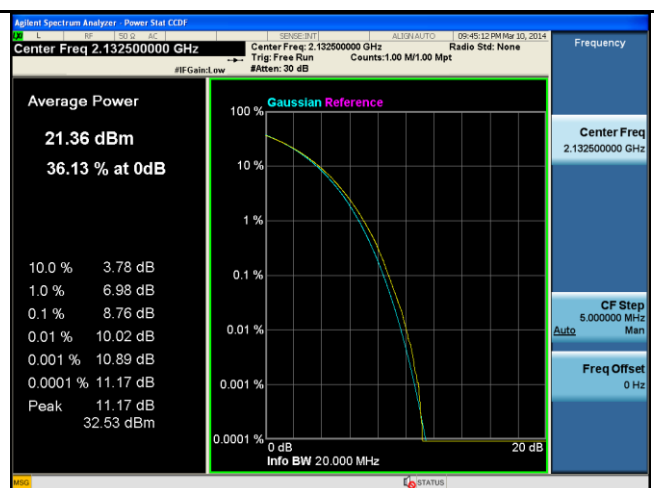
PK-AV-Ratio-Band4-16QAM-10M BW-Low



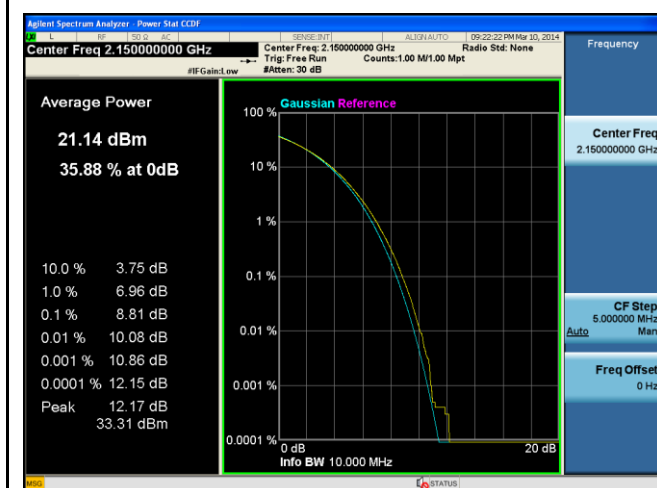
PK-AV-Ratio-Band4-16QAM-20M BW-Low



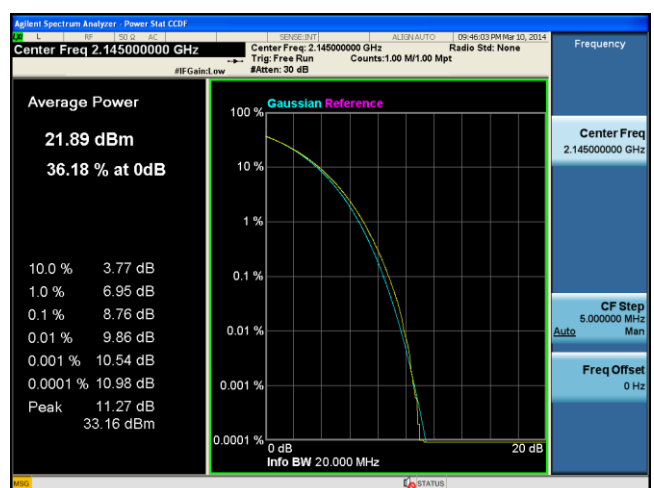
PK-AV-Ratio-Band4-16QAM-10M BW-Mid



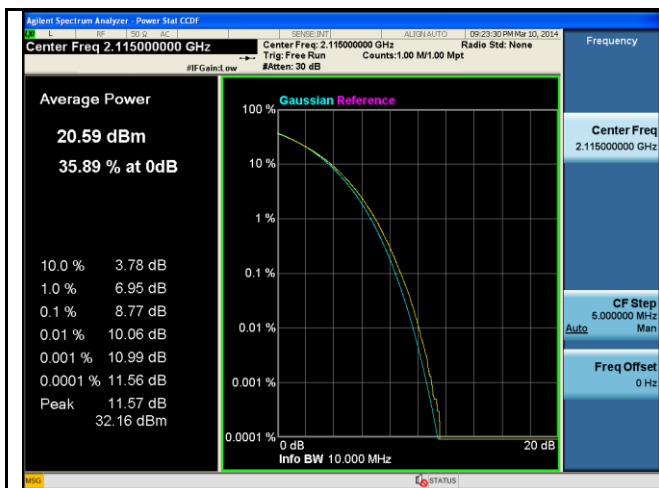
PK-AV-Ratio-Band4-16QAM-20M BW-Mid



PK-AV-Ratio-Band4-16QAM-10M BW-High



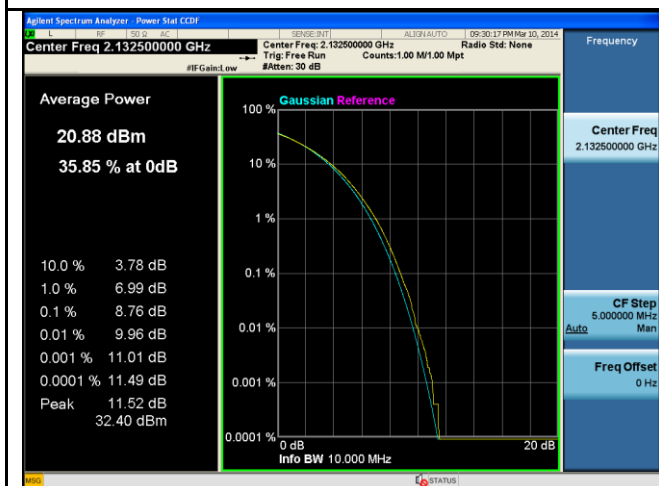
PK-AV-Ratio-Band4-16QAM-20M BW-High



PK-AV-Ratio-Band4-64QAM-10M BW-Low



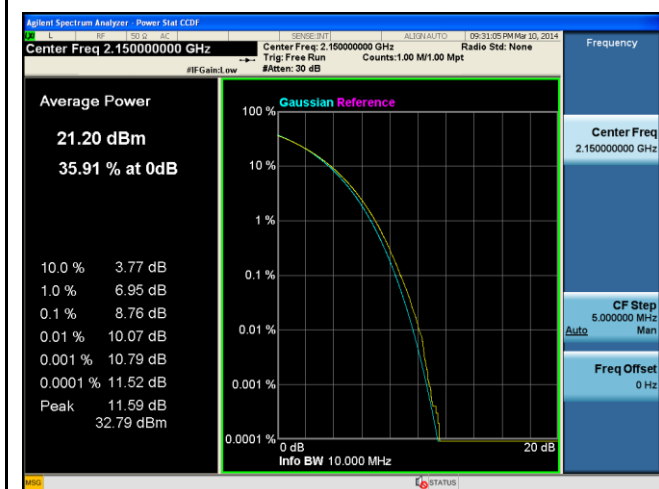
PK-AV-Ratio-Band4-64QAM-20M BW-Low



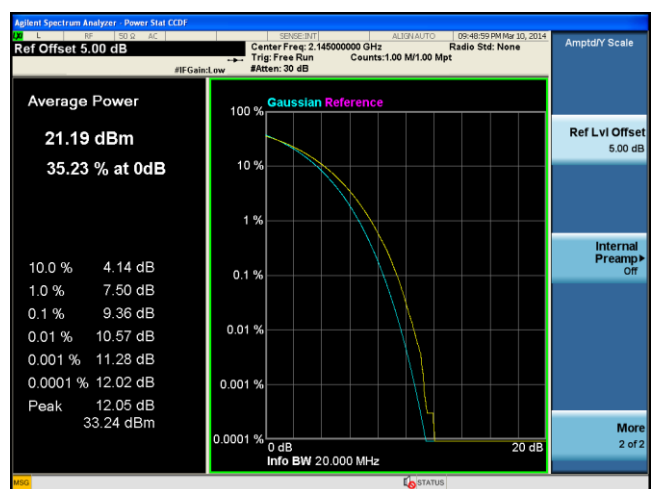
PK-AV-Ratio-Band4-64QAM-10M BW-Mid



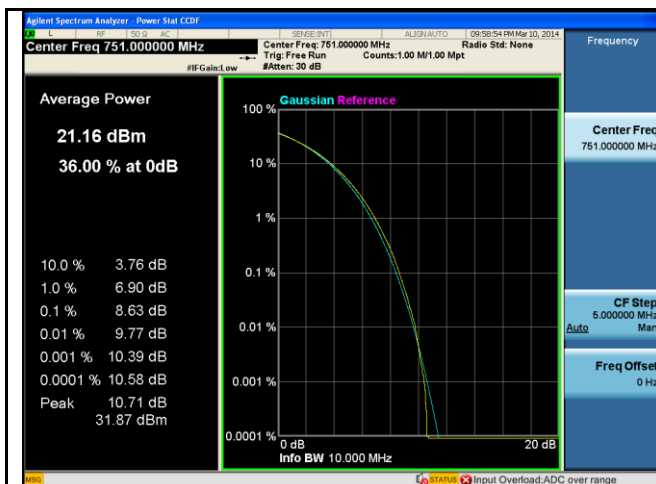
PK-AV-Ratio-Band4-64QAM-20M BW-Mid



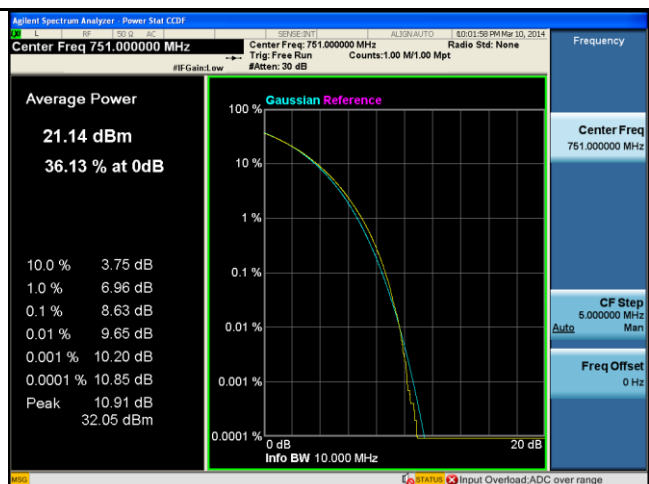
PK-AV-Ratio-Band4-64QAM-10M BW-High



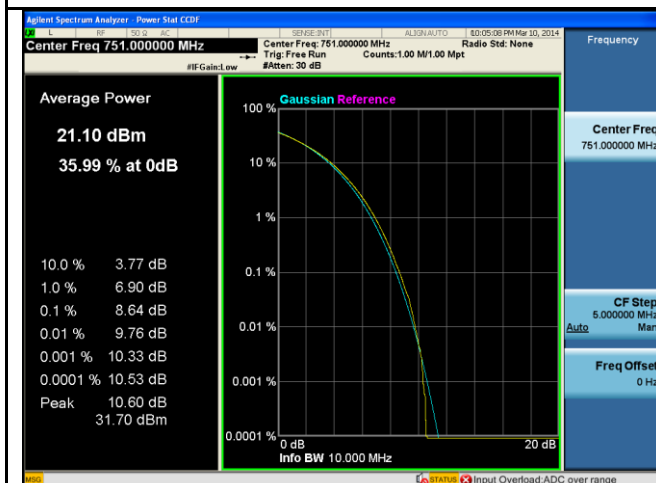
PK-AV-Ratio-Band4-64QAM-20M BW-High



PK-AV-Ratio-Band13-QPSK-10M BW-Mid



PK-AV-Ratio-Band13-16QAM-10M BW-Mid



PK-AV-Ratio-Band13-64QAM-10M BW-Mid

10.3 Occupied Bandwidth

Requirement(s):

Spec	Requirement	Applicable
47 CFR §2.1049; RSS-GEN, 4.6	The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions of § 2.1049 (a) through (i)	☒
Test Setup		
Procedure	1. EUT was set for low , mid, high channel with modulated mode and highest RF output power. 2. The spectrum analyzer was connected to the antenna terminal. 3. The 99% bandwidths are measured using spectrum analyzer's internal meas function.	
Test Date	02/27/2014 – 03/202014	Environmental condition Temperature 23°C Relative Humidity 48% Atmospheric Pressure 1008mbar
Remark	NONE	
Result	☒ Pass ☐ Fail	

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test Data

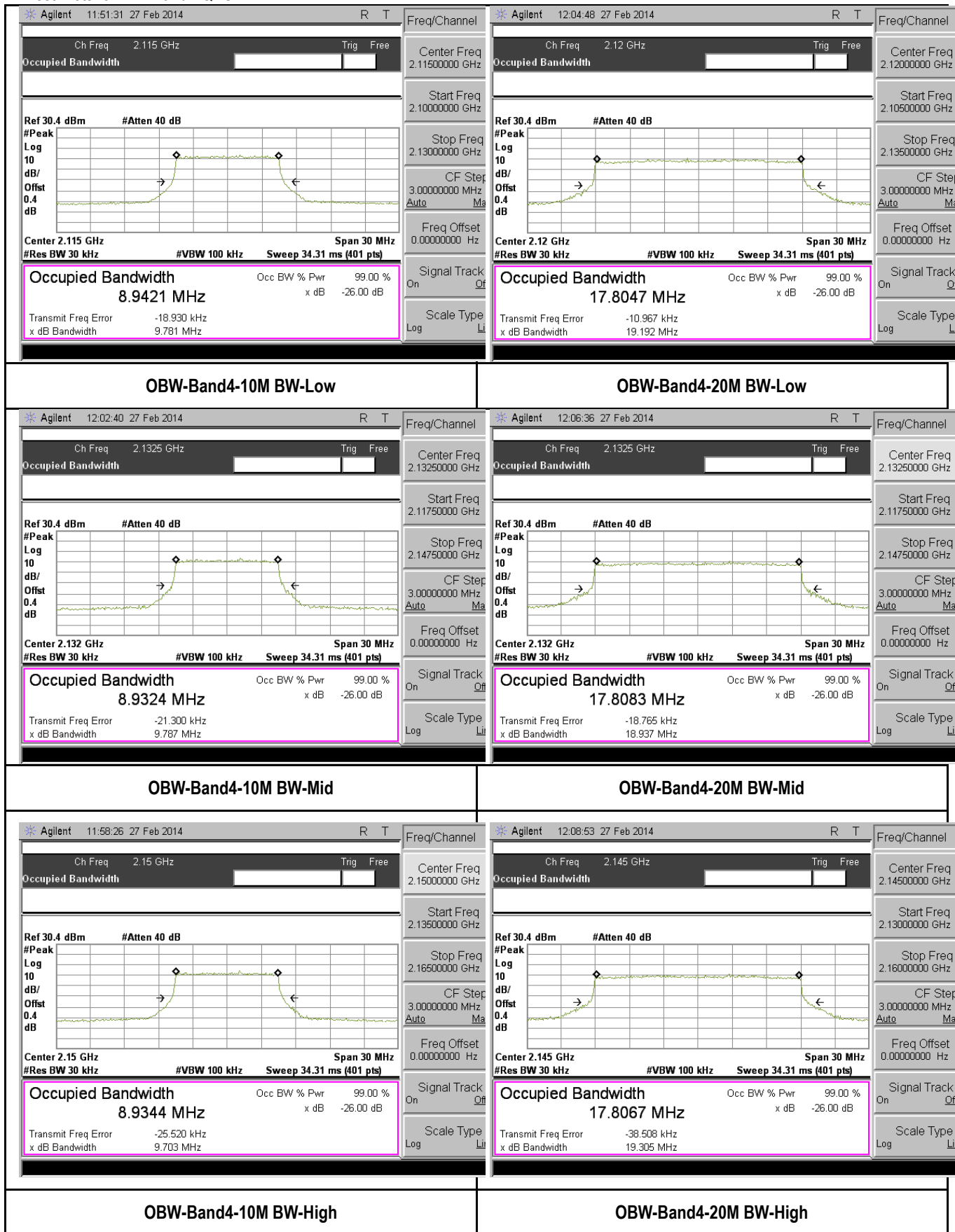
99% Bandwidth measurement result for LTE band4

Type	Channel	Channel Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
10MHz BW, QPSK	Low	2115	8.94	9.78
	Mid	2132	8.93	9.79
	High	2150	8.93	9.70
10MHz BW, 16QAM	Low	2115	8.95	9.83
	Mid	2132	8.92	9.77
	High	2150	8.93	9.72
10MHz BW, 64QAM	Low	2115	8.96	9.29
	Mid	2132	8.94	9.25
	High	2150	8.93	9.90
20MHz BW, QPSK	Low	2120	17.80	19.19
	Mid	2132	17.81	18.94
	High	2145	17.81	19.31
20MHz BW, 16QAM	Low	2120	17.78	18.91
	Mid	2132	17.79	19.02
	High	2145	17.80	19.09
20MHz BW, 64QAM	Low	2120	17.82	18.66
	Mid	2132	17.79	18.61
	High	2145	17.81	18.83

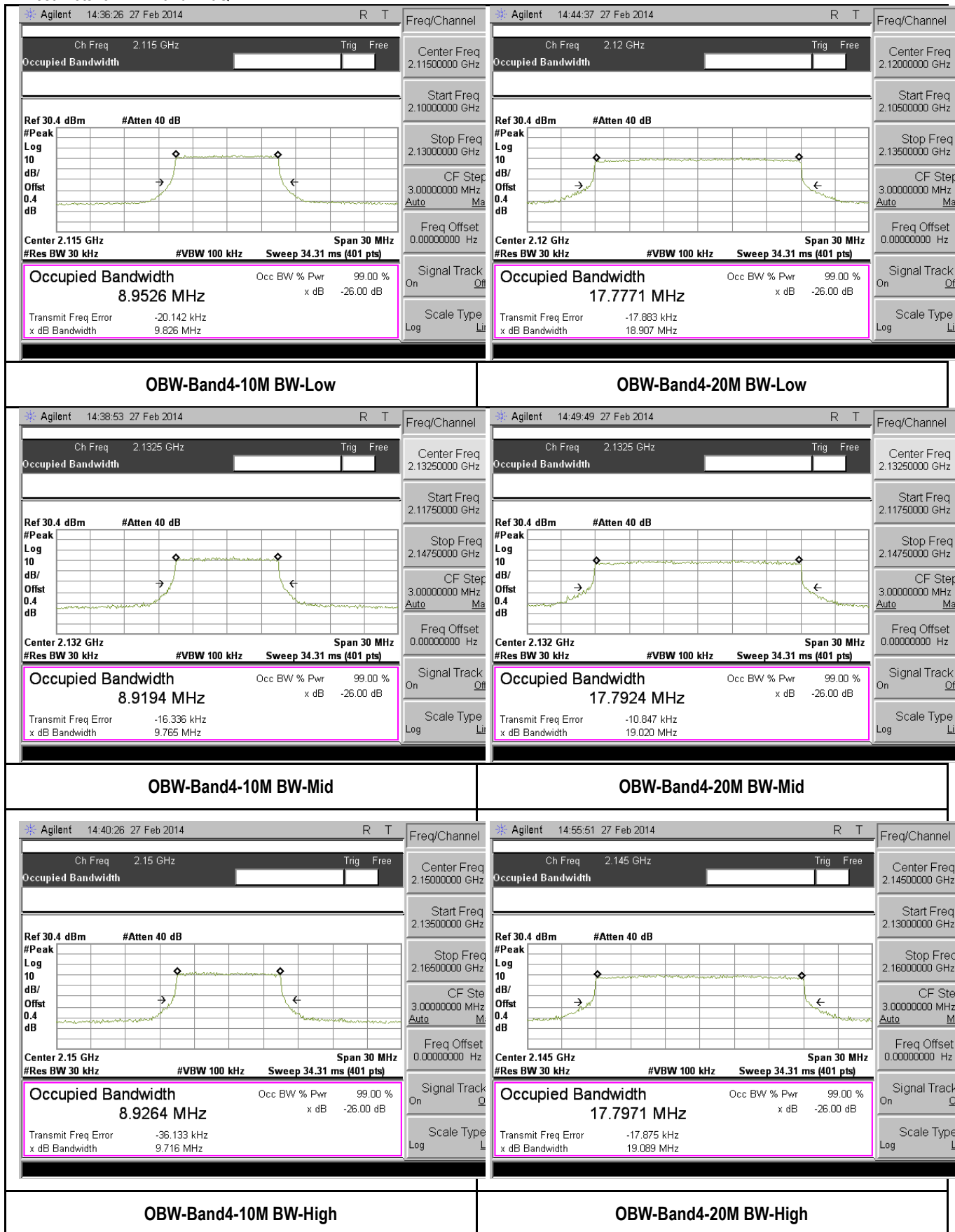
99% Bandwidth measurement result for LTE band 13

Type	Channel	Channel Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
10MHz BW, QPSK	Mid	751	8.95	9.79
10MHz BW, 16QAM	Mid	751	8.94	9.79
10MHz BW, 64QAM	Mid	751	8.96	9.84

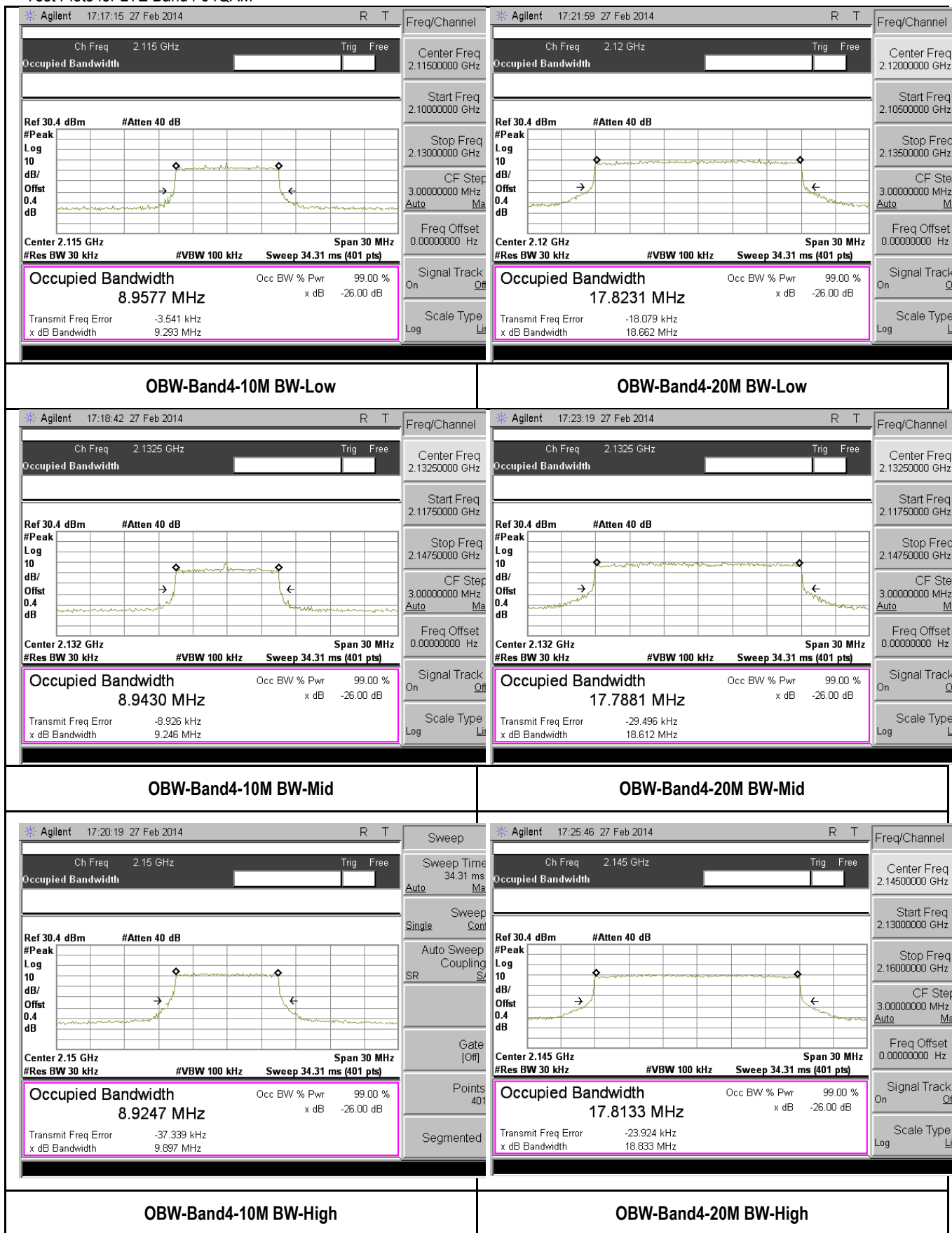
Test Plots for LTE Band4 QPSK



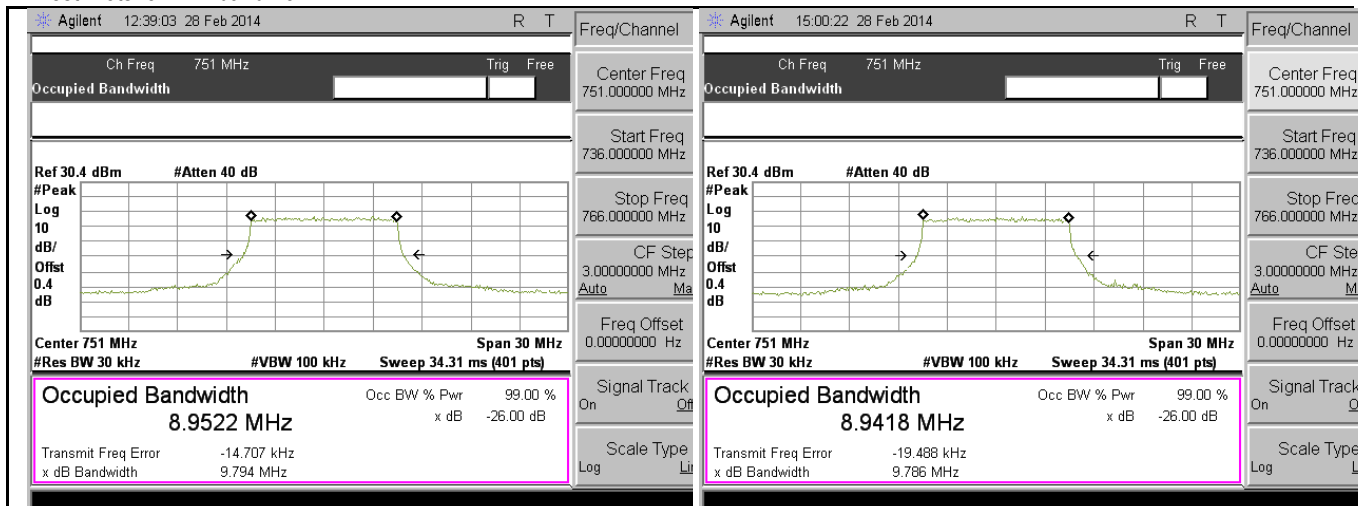
Test Plots for LTE Band4 16QAM



Test Plots for LTE Band4 64QAM

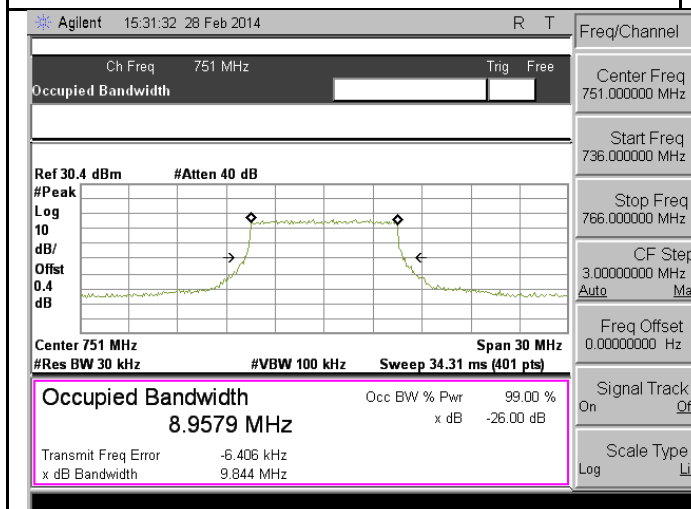


Test Plots for LTE band 13



OBW-Band13-Mid-QPSK

OBW-Band13-Mid-16QAM



OBW-Band13-Mid-64QAM

10.4 Antenna Port Spurious Emission

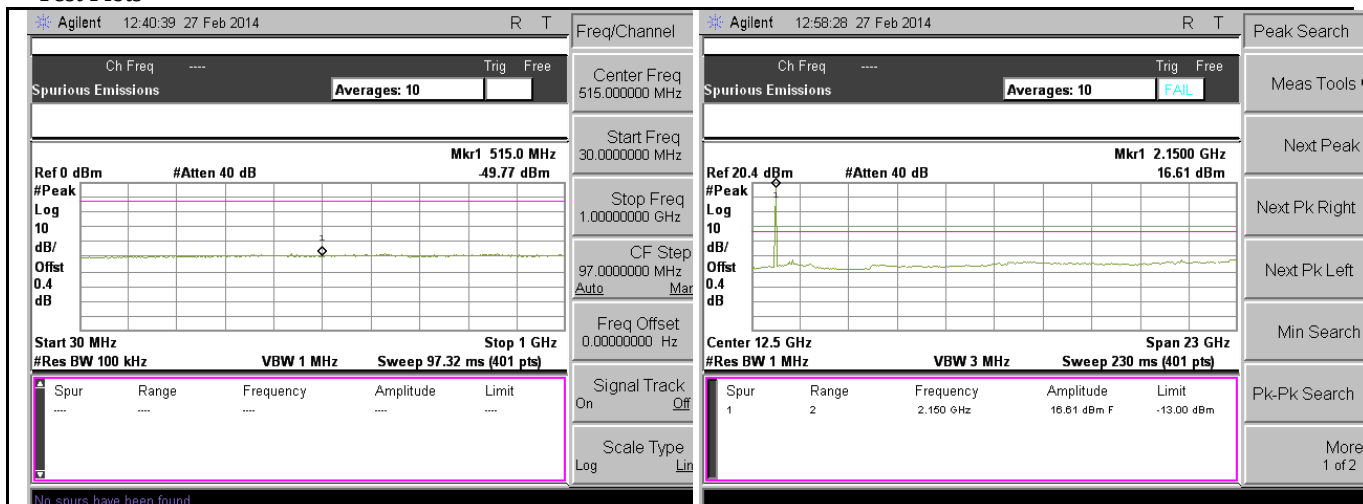
Requirement(s):

Spec	Item	Requirement	Applicable
47CFR22.917	-	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.	☐
47CFR24.238	-	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.	☐
47CFR27.53	-	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.	☒
Test Setup			
Test Procedure	- EUT was set for low , mid, high channel with modulated mode and highest RF output power. - The spectrum analyzer was connected to the antenna terminal.		
Test Date	02/27/2014 – 03/10/2014	Environmental condition	Temperature 23°C Relative Humidity 48% Atmospheric Pressure 1008mbar
Remark	NONE		
Result	☒ Pass ☐ Fail		

Test Data ☐ Yes ☒ N/A

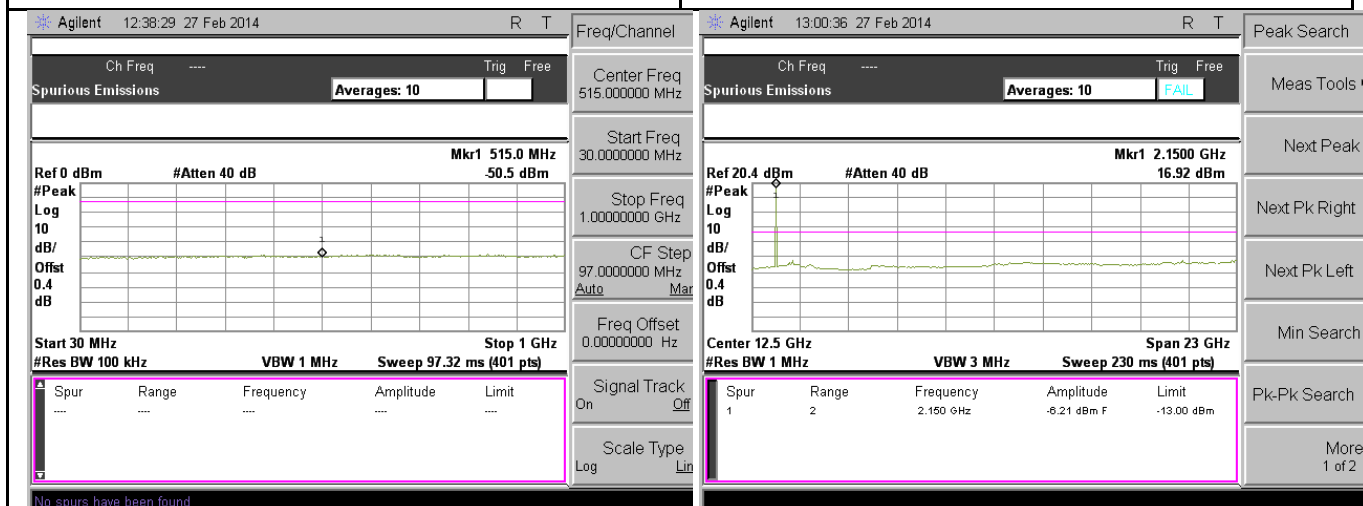
Test Plot ☒ Yes (See below) ☐ N/A

Test Plots



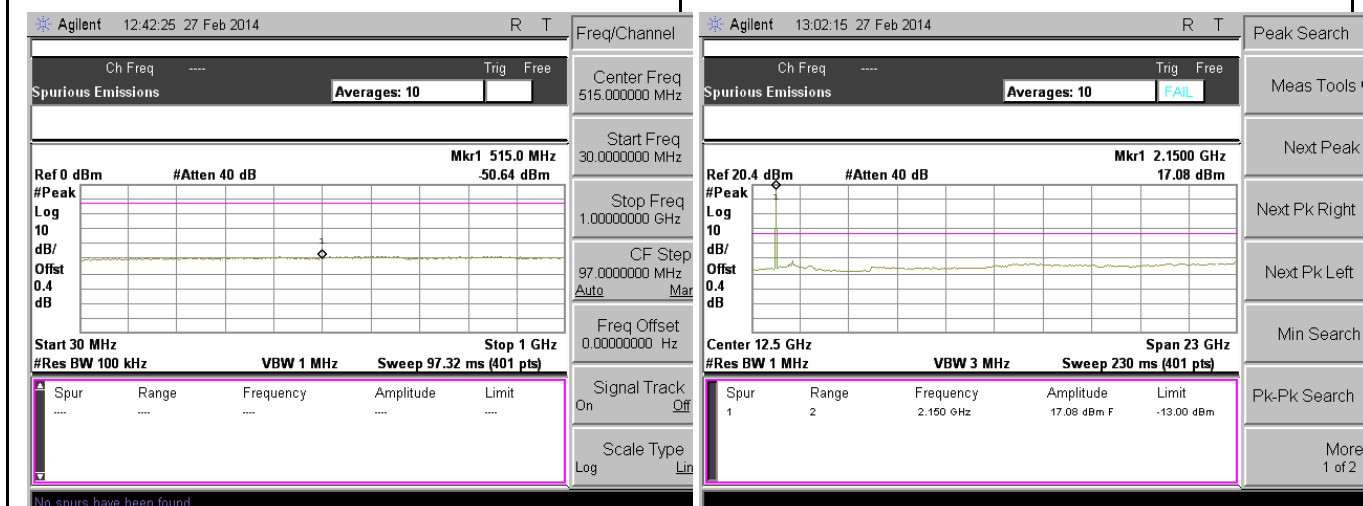
TX CSE-Band4-QPSK-10M BW-Low CH-below 1G

TX CSE-Band4-QPSK-10M BW-Low CH-above 1G



TX CSE-Band4-QPSK-10M BW-Mid CH-below 1G

TX CSE-Band4-QPSK-10M BW-Mid CH-above 1G



TX CSE-Band4-QPSK-10M BW-High CH-below 1G

TX CSE-Band4-QPSK-10M BW-High CH-above 1G



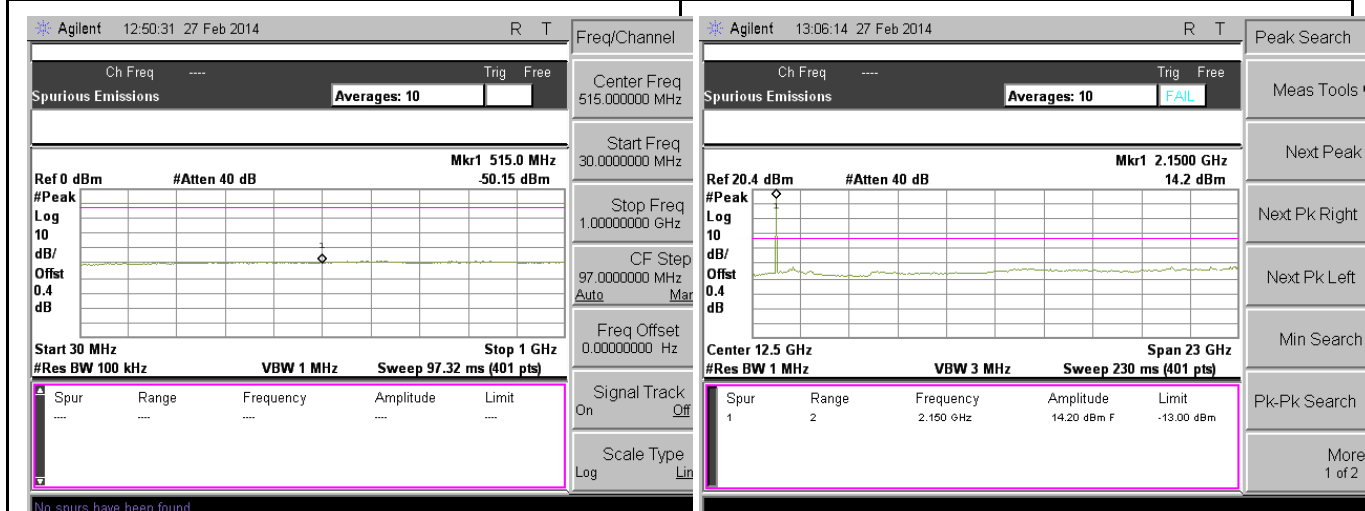
TX CSE-Band4-QPSK-20M BW-Low CH-below 1G

TX CSE-Band4-QPSK-20M BW-Low CH-above 1G



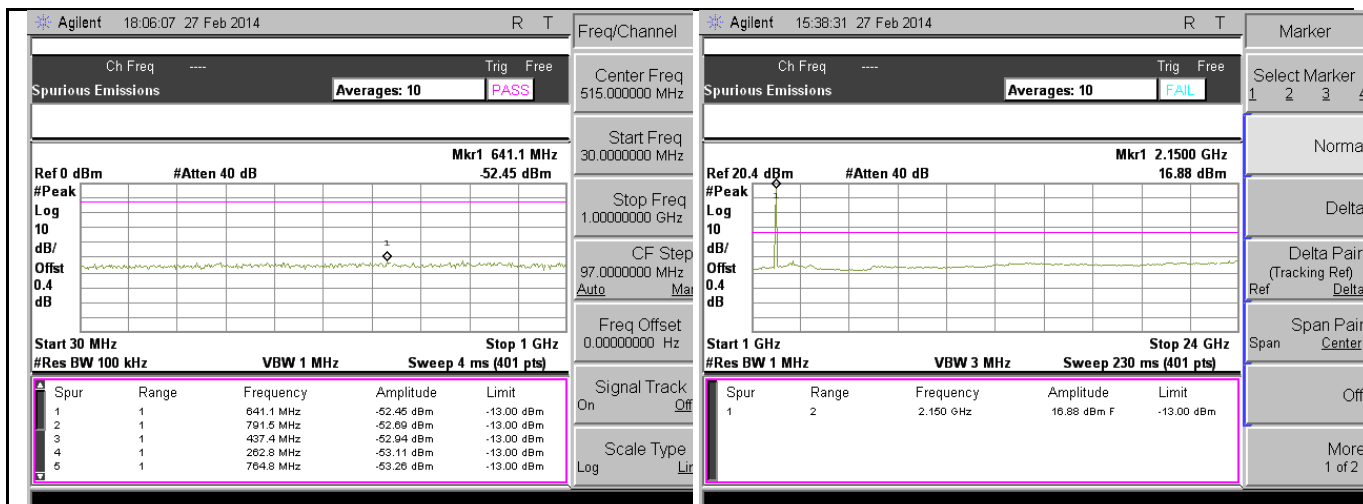
TX CSE-Band4-QPSK-20M BW-Mid CH-below 1G

TX CSE-Band4-QPSK-20M BW-Mid CH-above 1G



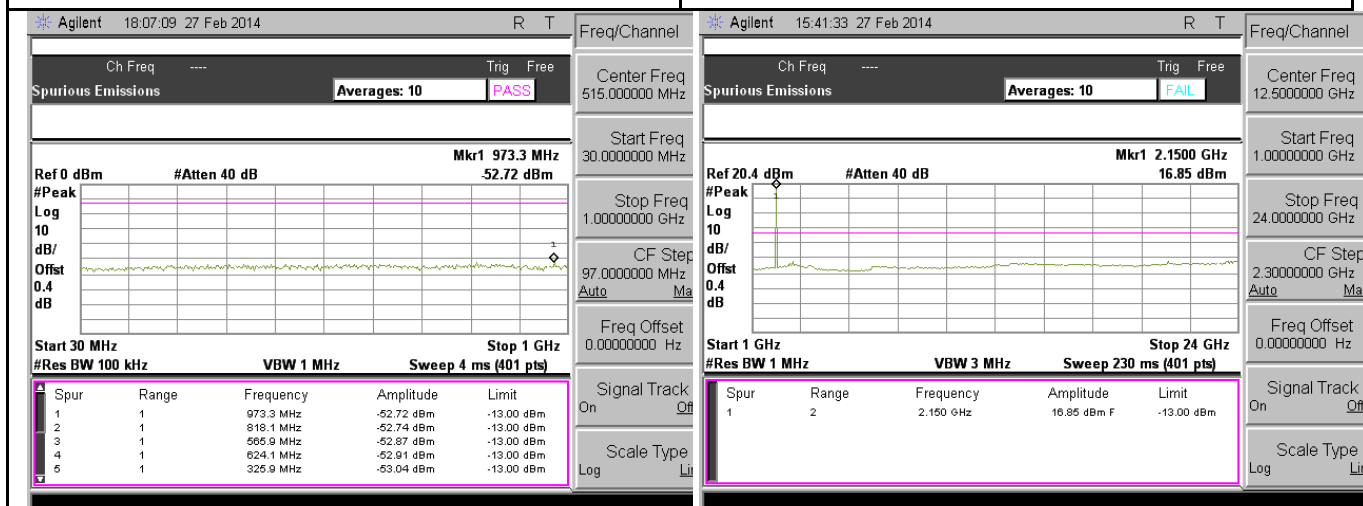
TX CSE-Band4-QPSK-20M BW-High CH-below 1G

TX CSE-Band4-QPSK-20M BW-High CH-above 1G



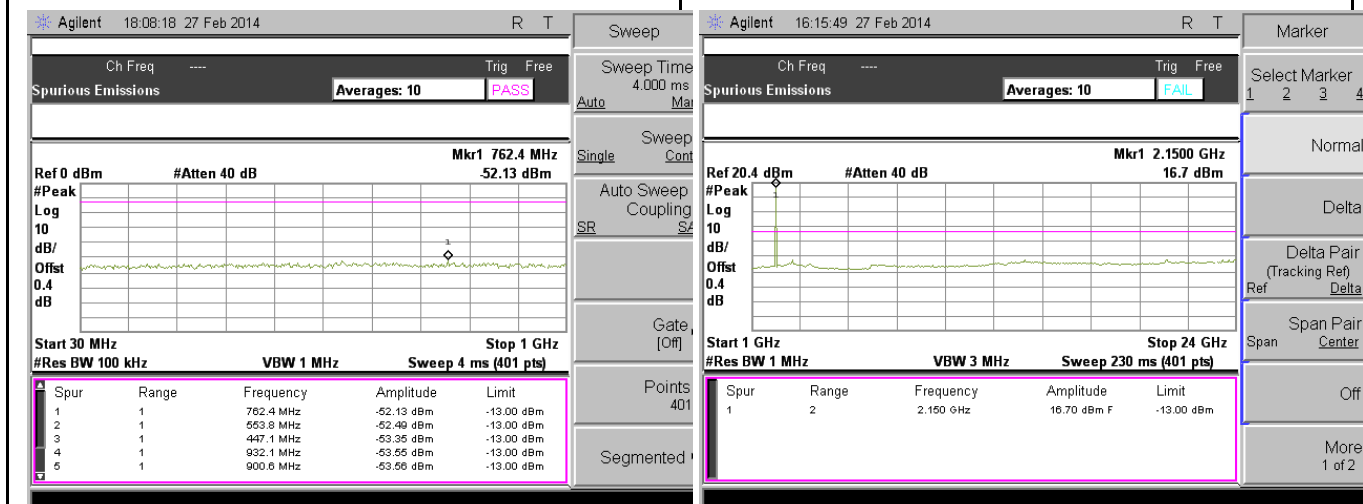
TX CSE-Band4-16QAM-10M BW-Low CH-below 1G

TX CSE-Band4-16QAM-10M BW-Low CH-above 1G



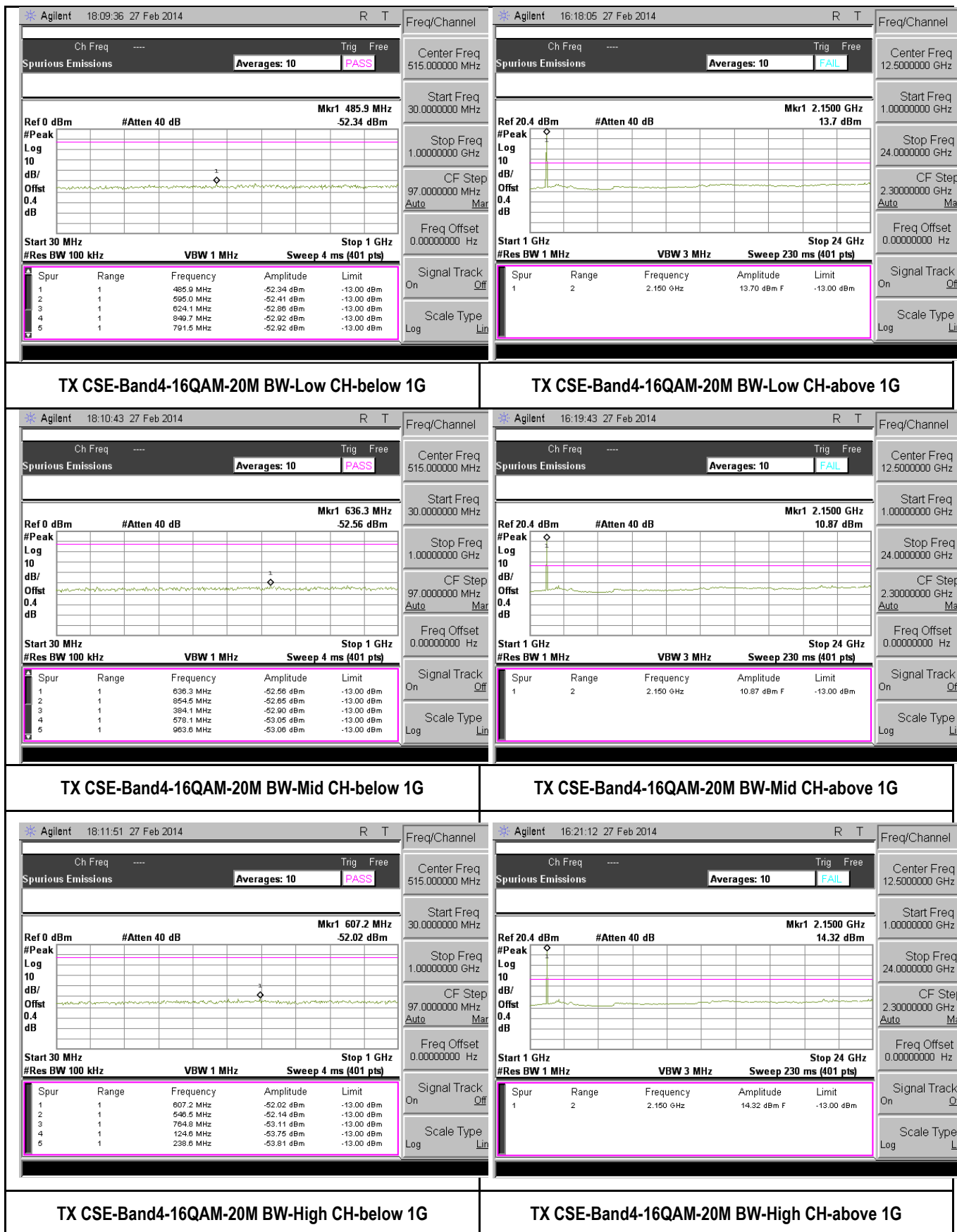
TX CSE-Band4-16QAM-10M BW-Mid CH-below 1G

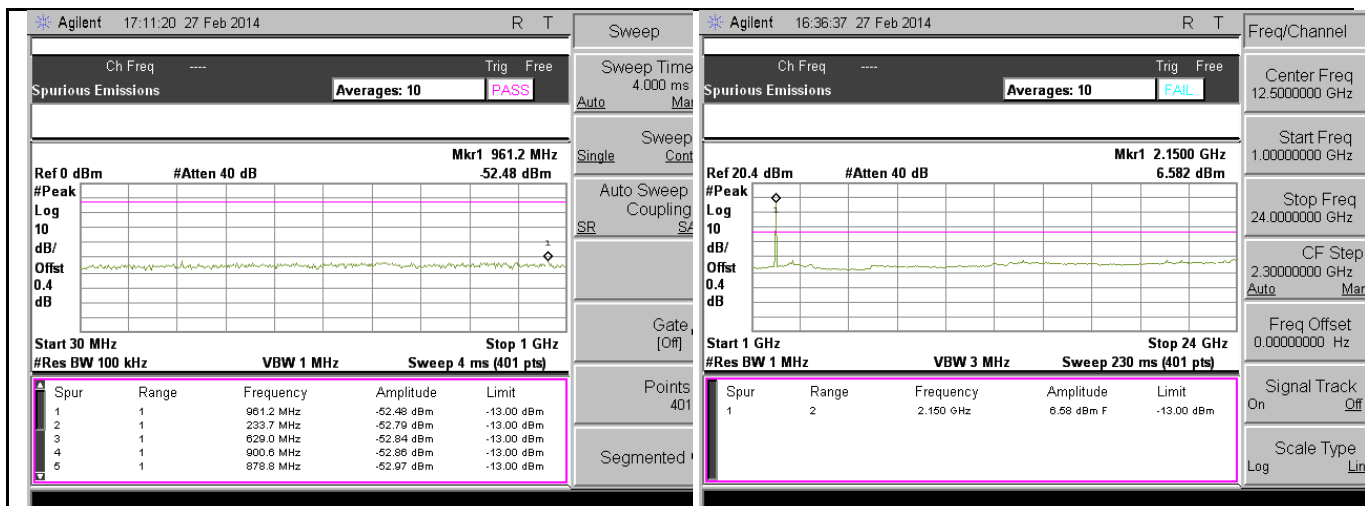
TX CSE-Band4-16QAM-10M BW-Mid CH-above 1G



TX CSE-Band4-16QAM-10M BW-High CH-below 1G

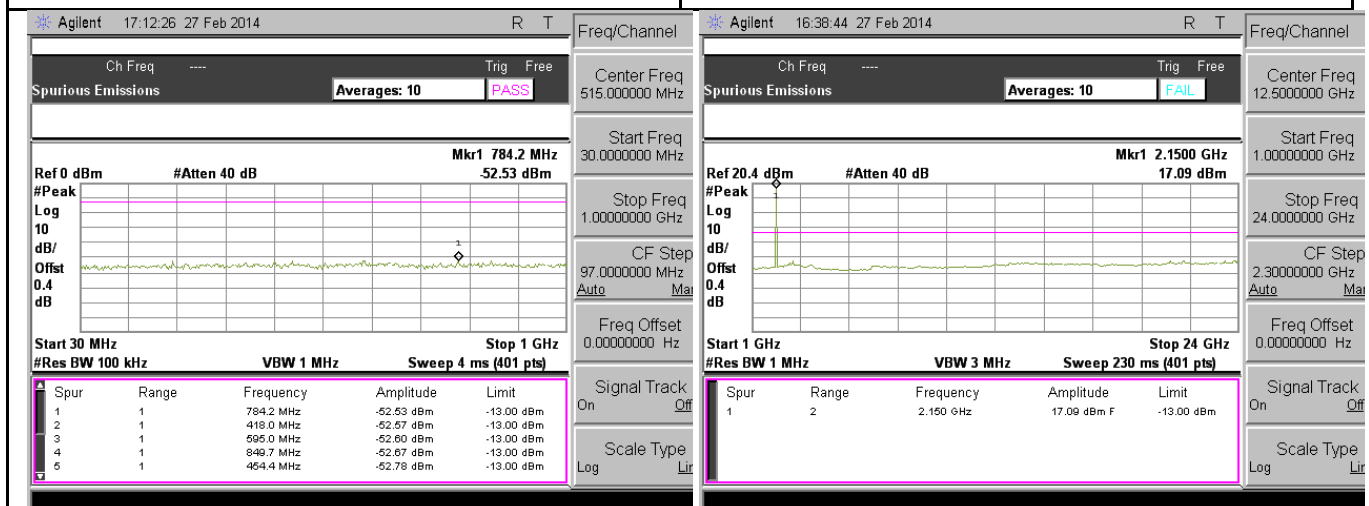
TX CSE-Band4-16QAM-10M BW-High CH-above 1G





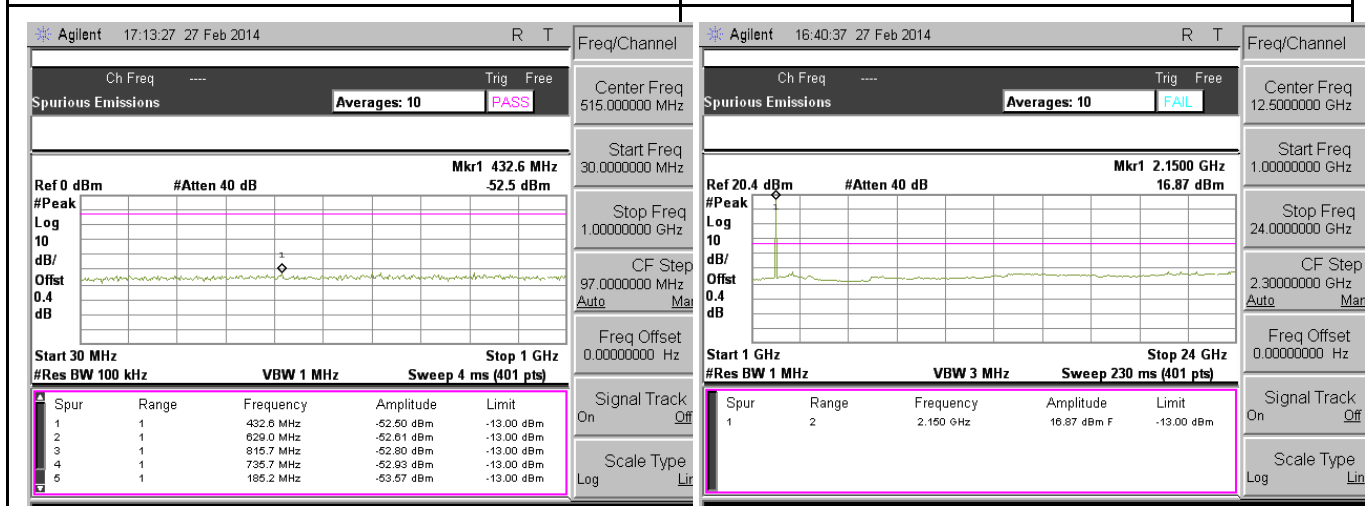
TX CSE-Band4-64QAM-10M BW-Low CH-below 1G

TX CSE-Band4-64QAM-10M BW-Low CH-above 1G



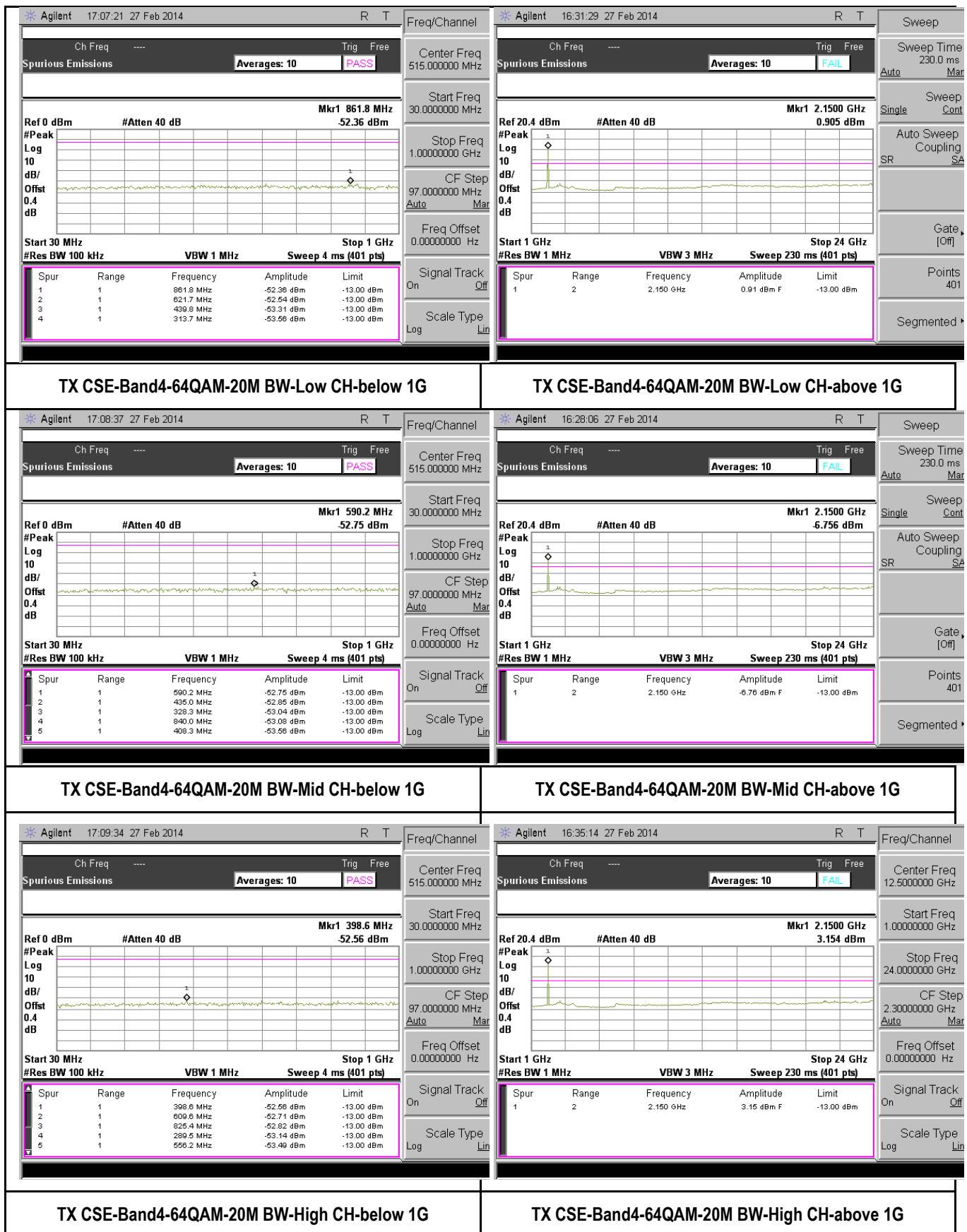
TX CSE-Band4-64QAM-10M BW-Mid CH-below 1G

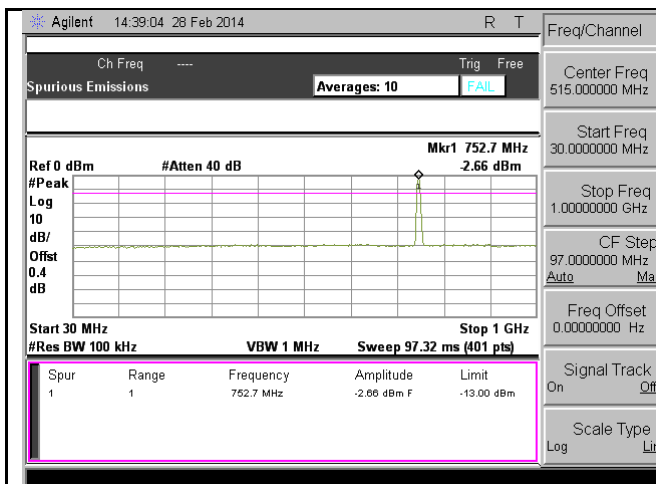
TX CSE-Band4-64QAM-10M BW-Mid CH-above 1G



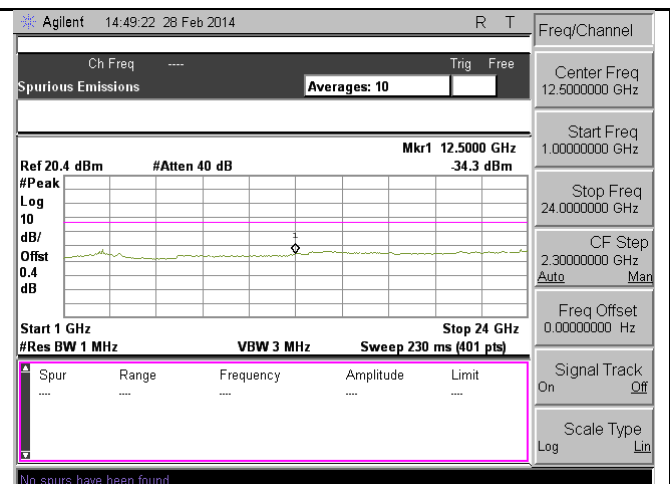
TX CSE-Band4-64QAM-10M BW-High CH-below 1G

TX CSE-Band4-64QAM-10M BW-High CH-above 1G

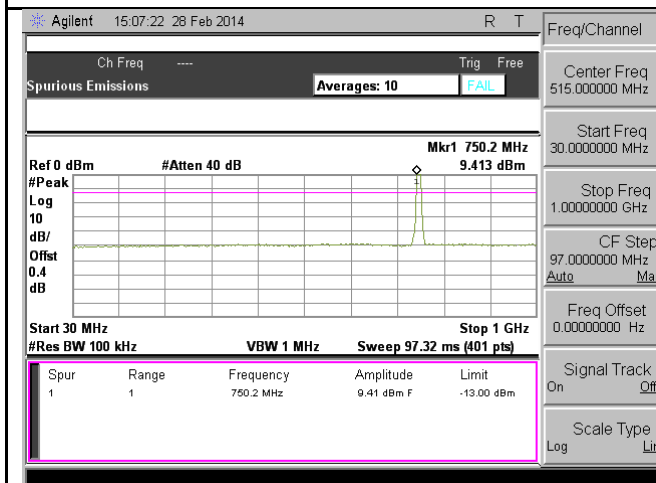




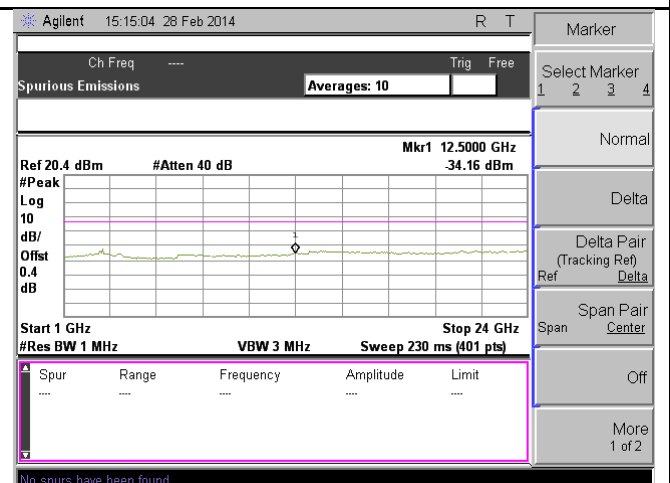
TX CSE-Band13-QPSK-10M BW-Mid CH-below 1G



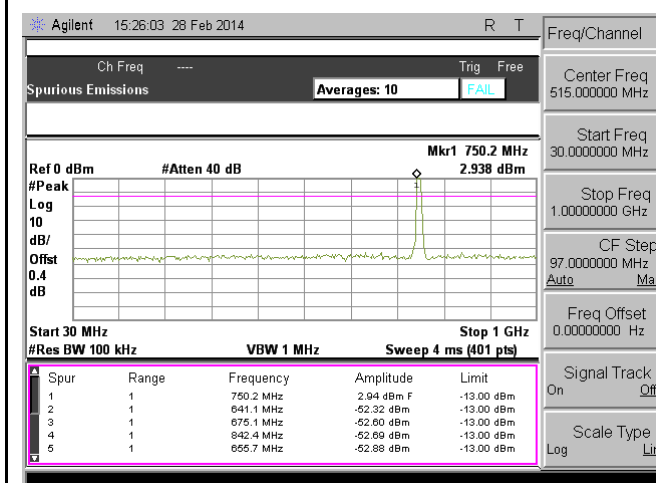
TX CSE-Band13-QPSK-10M BW-Mid CH-above 1G



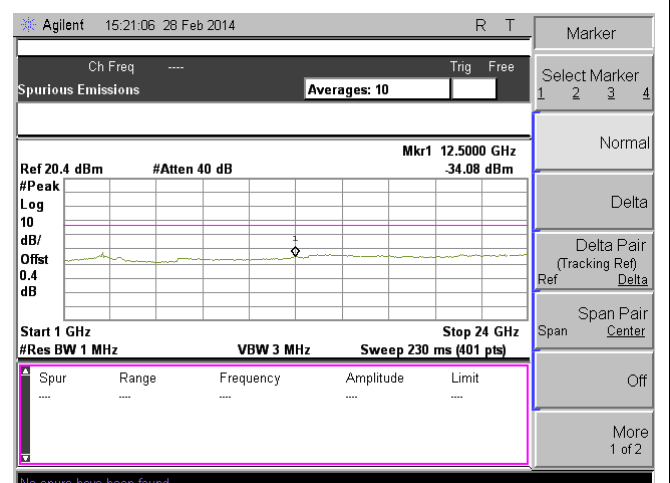
TX CSE-Band13-16QAM-10M BW-Mid CH-below 1G



TX CSE-Band13-16QAM-10M BW-Mid CH-above 1G



TX CSE-Band13-64QAM-10M BW-Mid CH-below 1G



TX CSE-Band13-64QAM-10M BW-Mid CH-above 1G

10.5 Band Edge

Requirement(s):

Spec	Item	Requirement	Applicable
47CFR22.917	-	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.	☐
47CFR24.238	-	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.	☐
47CFR27.53	-	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.	☒
Test Setup			
Test Procedure	- EUT was set for low, mid, high channel with modulated mode and highest RF output power. - The spectrum analyzer was connected to the antenna terminal. - A RBW of 1% greater than the 26 dB emission bandwidth should be used for band edge measurement or if narrower RBW is used, a correct factor calculated with formula $10 \cdot \log(EBW/BW_{meas})$ will be added to the result.		
Test Date	03/17/2014	Environmental condition	Temperature 22°C Relative Humidity 48% Atmospheric Pressure 1008mbar
Remark	100KHz RBW was used to make measurement for LTE Band 4 with 20MHz BW, so the correction factor will be added to correct the result to be using 200 KHz RBW.		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

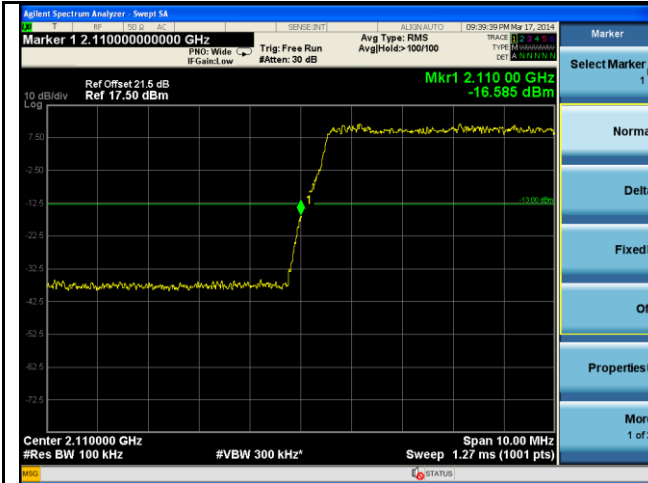
Band Edge Measurement Data for LTE band 4

Type	Channel	Channel Frequency (MHz)	Measurement Band Edge (dBm)	RBW Correction factor (dB)	Corrected Band Edge (dBm)	Limit (dBm)
10MHz BW, QPSK	Low	2115	-16.585	0	-16.585	-13
	High	2150	-16.782	0	-16.782	-13
10MHz BW, 16QAM	Low	2115	-17.332	0	-17.332	-13
	High	2150	-17.579	0	-17.579	-13
10MHz BW, 64QAM	Low	2115	-17.989	0	-17.989	-13
	High	2150	-18.330	0	-18.33	-13
20MHz BW, QPSK	Low	2120	-23.696	3.01	-20.686	-13
	High	2145	-25.753	3.01	-22.743	-13
20MHz BW, 16QAM	Low	2120	-23.764	3.01	-20.754	-13
	High	2145	-22.657	3.01	-19.647	-13
20MHz BW, 64QAM	Low	2120	-21.896	3.01	-18.886	-13
	High	2145	-20.486	3.01	-17.476	-13

Band Edge Measurement Data for LTE band 13

Type	Channel	Channel Frequency (MHz)	Measurement Band Edge (dBm)	RBW Correction factor (dB)	Corrected Band Edge (dBm)	Limit (dBm)
10MHz BW, QPSK	Low	751	-16.224	0	-16.224	-13
10MHz BW, QPSK	High	751	-36.463	0	-36.463	-13
10MHz BW, 16QAM	Low	751	-16.691	0	-16.691	-13
10MHz BW, 16QAM	High	751	-39.017	0	-39.017	-13
10MHz BW, 64QAM	Low	751	-17.485	0	-17.485	-13
10MHz BW, 64QAM	High	751	-37.717	0	-37.717	-13

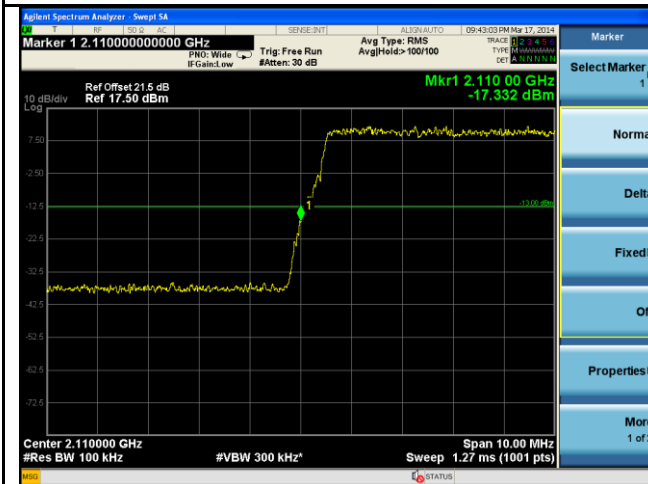
Test Plots



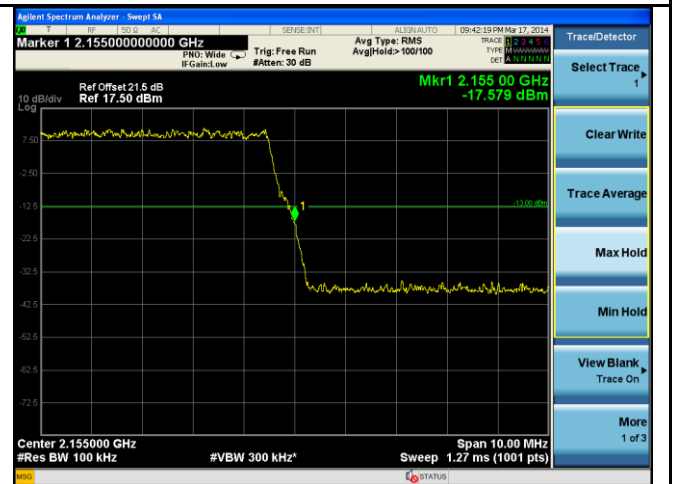
BandEdge-LTE-Band4-10MHz-QPSK-Low



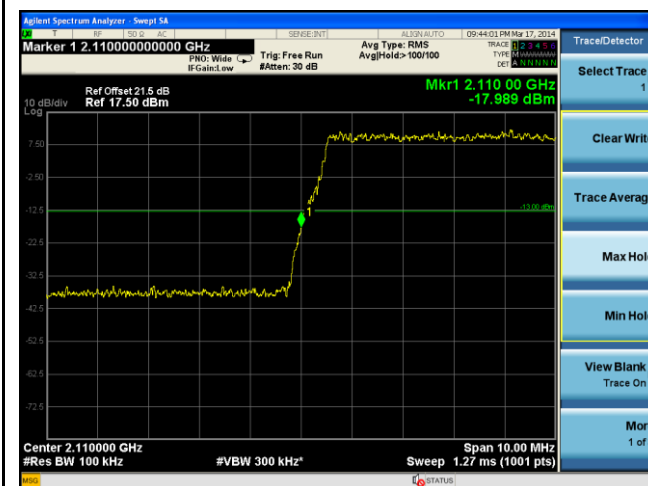
BandEdge-LTE-Band4-10MHz-QPSK-High



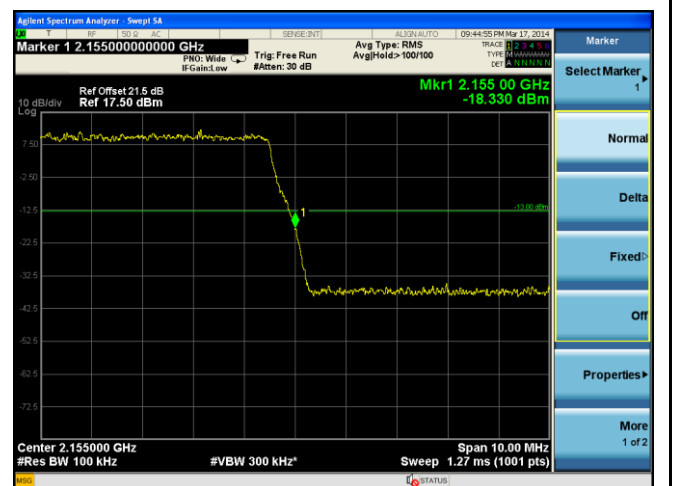
BandEdge-LTE-Band4-10MHz-16QAM-Low



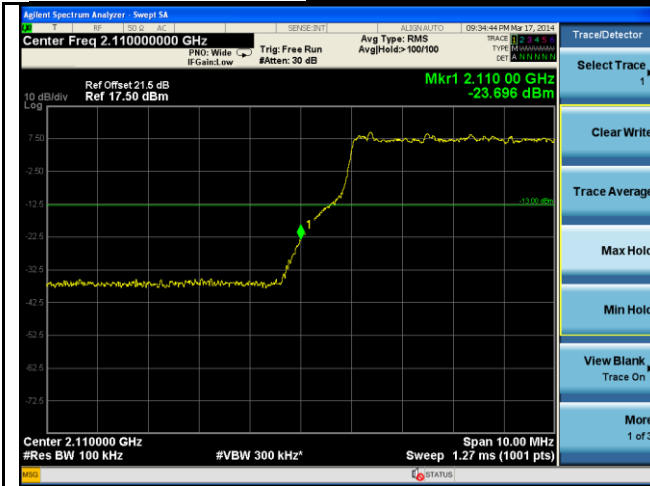
BandEdge-LTE-Band4-10MHz-16QAM-High



BandEdge-LTE-Band4-10MHz-64QAM-Low



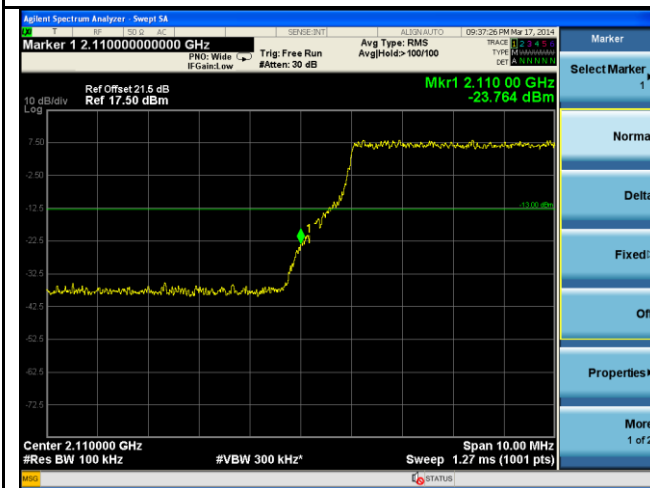
BandEdge-LTE-Band4-10MHz-64QAM-High



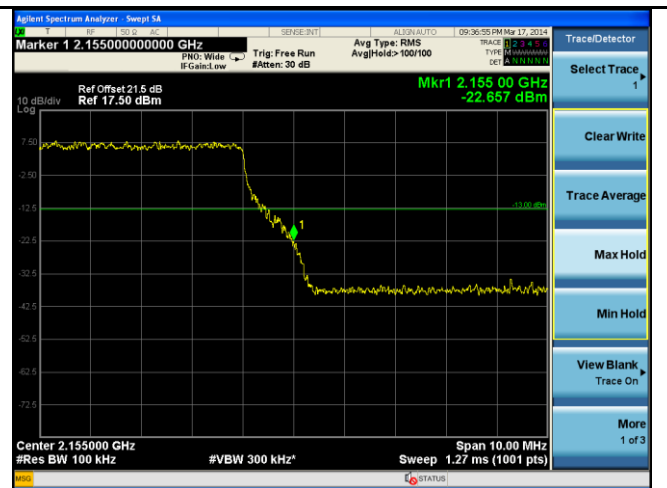
BandEdge-LTE-Band4-20MHz-QPSK-Low



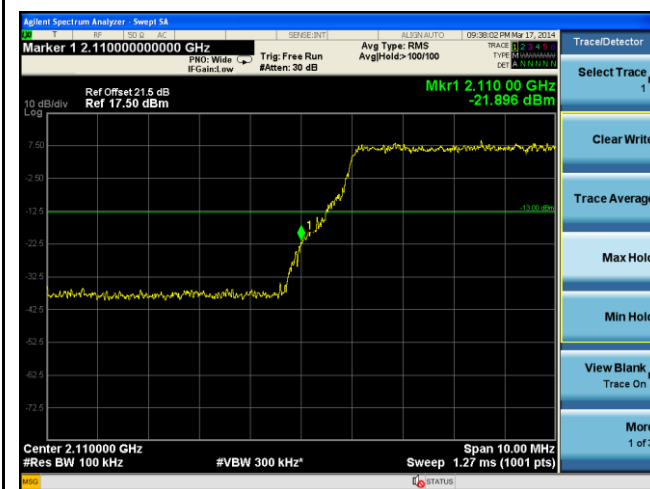
BandEdge-LTE-Band4-20MHz-QPSK-High



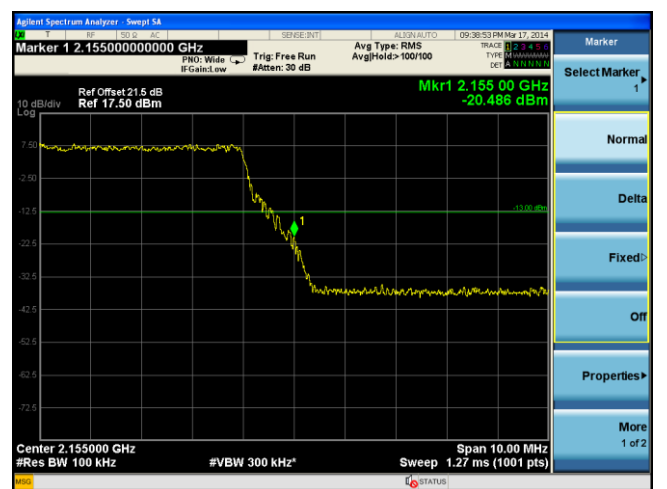
BandEdge-LTE-Band4-20MHz-16QAM-Low



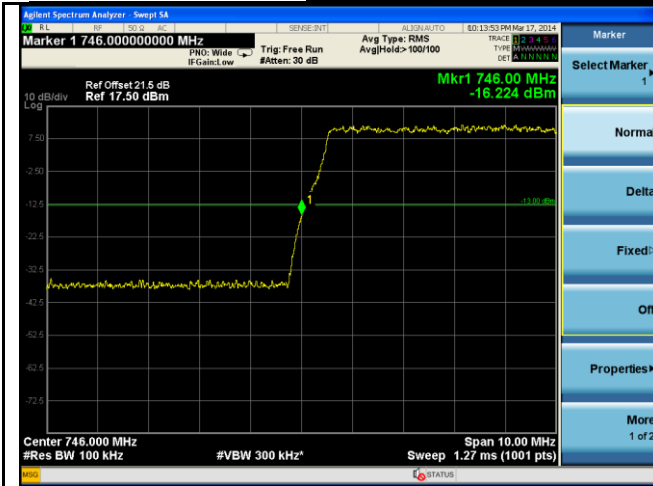
BandEdge-LTE-Band4-20MHz-16QAM-High



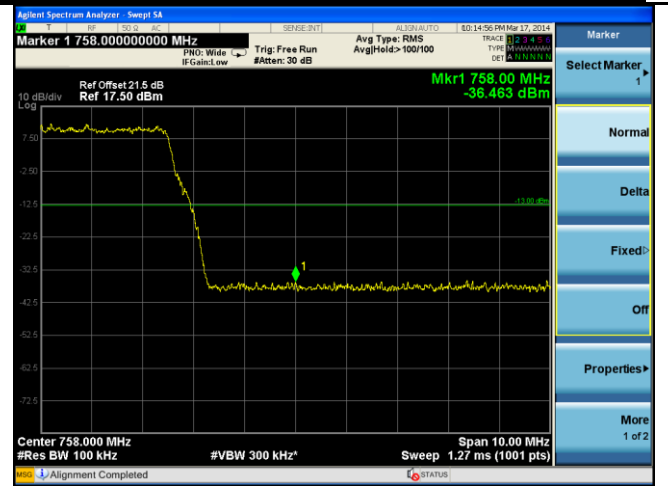
BandEdge-LTE-Band4-20MHz-64QAM-Low



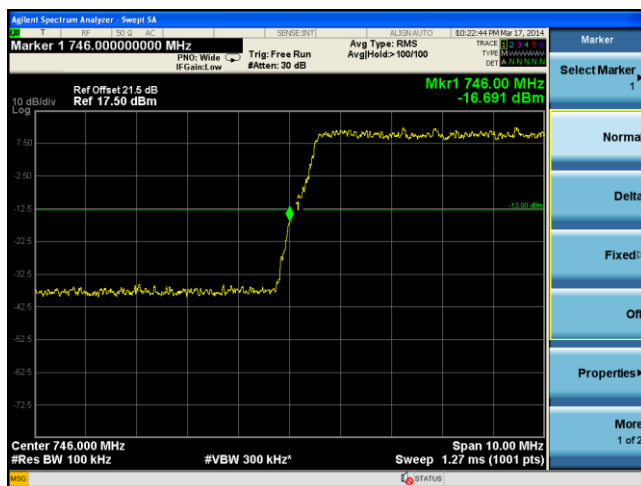
BandEdge-LTE-Band4-20MHz-64QAM-High



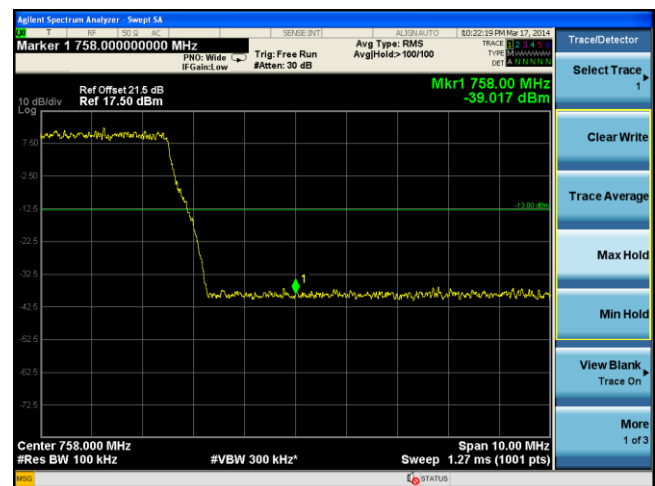
BandEdge-LTE-Band13-10MHz-QPSK-Low



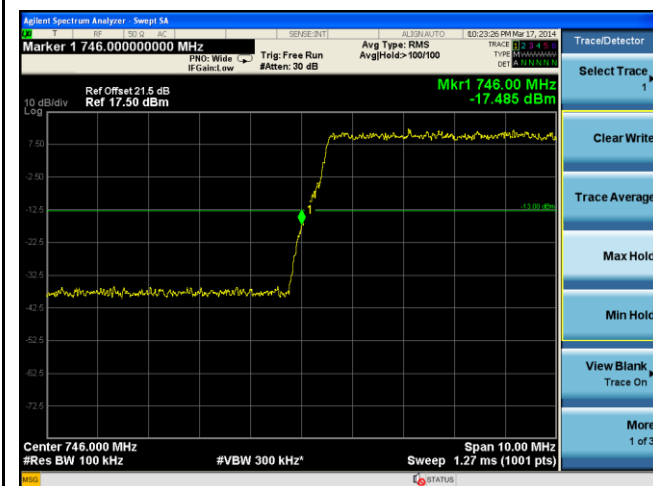
BandEdge-LTE-Band13-10MHz-QPSK-High



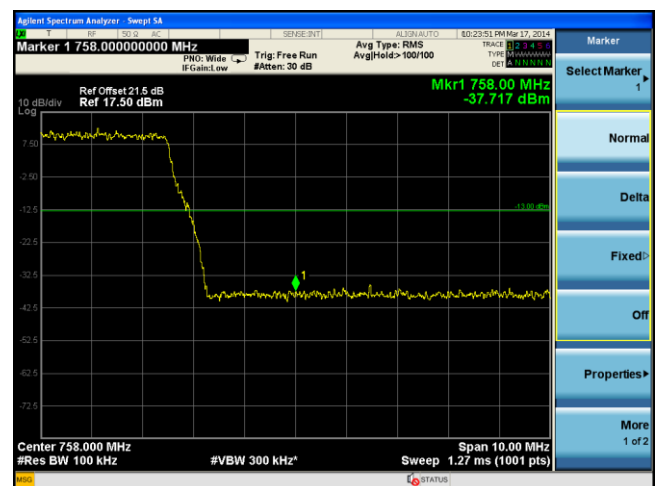
BandEdge-LTE-Band13-10MHz-16QAM-Low



BandEdge-LTE-Band13-10MHz-16QAM-High



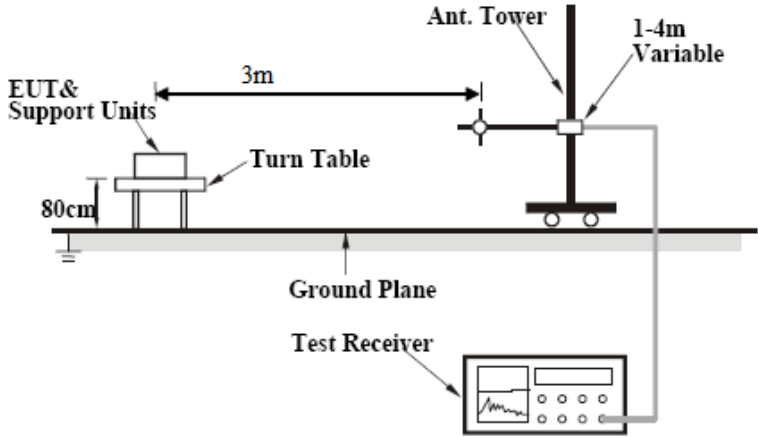
BandEdge-LTE-Band13-10MHz-64QAM-Low



BandEdge-LTE-Band13-10MHz-64QAM-High

10.6 Radiated Spurious Emission below 1GHz

Requirement(s):

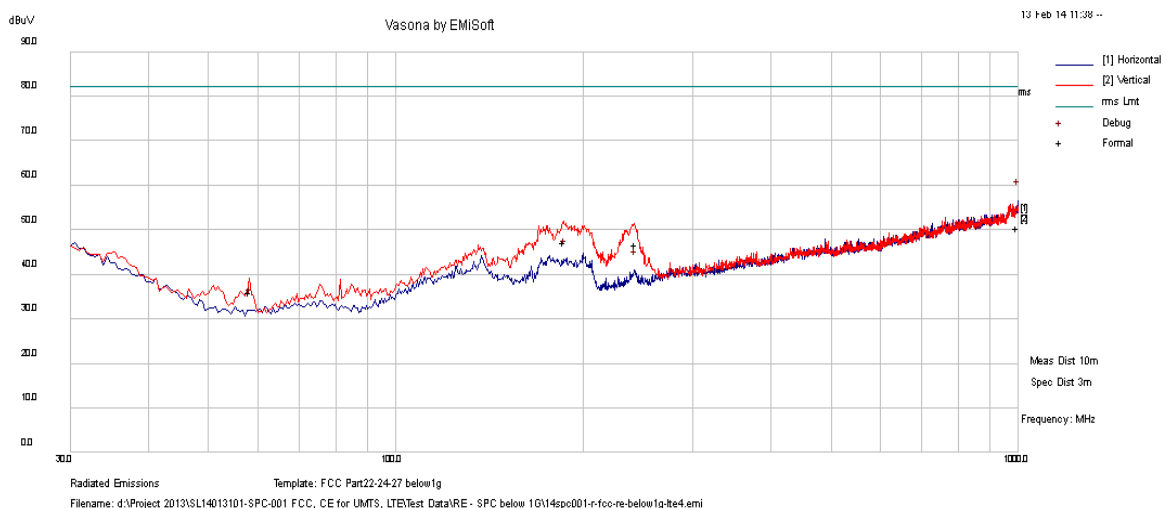
Spec	Item	Requirement	Applicable
47CFR22.917	-	Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.	☐
47CFR24.238	-	Out of band emissions. The power of any 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.	☐
47CFR27.53	-	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.	☒
Test Setup			
Procedure	- The EUT was switched on and allowed to warm up to its normal operating condition. - The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: - Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. - The EUT was then rotated to the direction that gave the maximum emission. - Finally, the antenna height was adjusted to the height that gave the maximum emission. - A peak measurement was then made for that frequency point. - Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.		
Remark	All different modulation and bandwidth configuration has been verified and only the test data of worst case with QPSK modulation and greatest bandwidth was presented in this report.		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

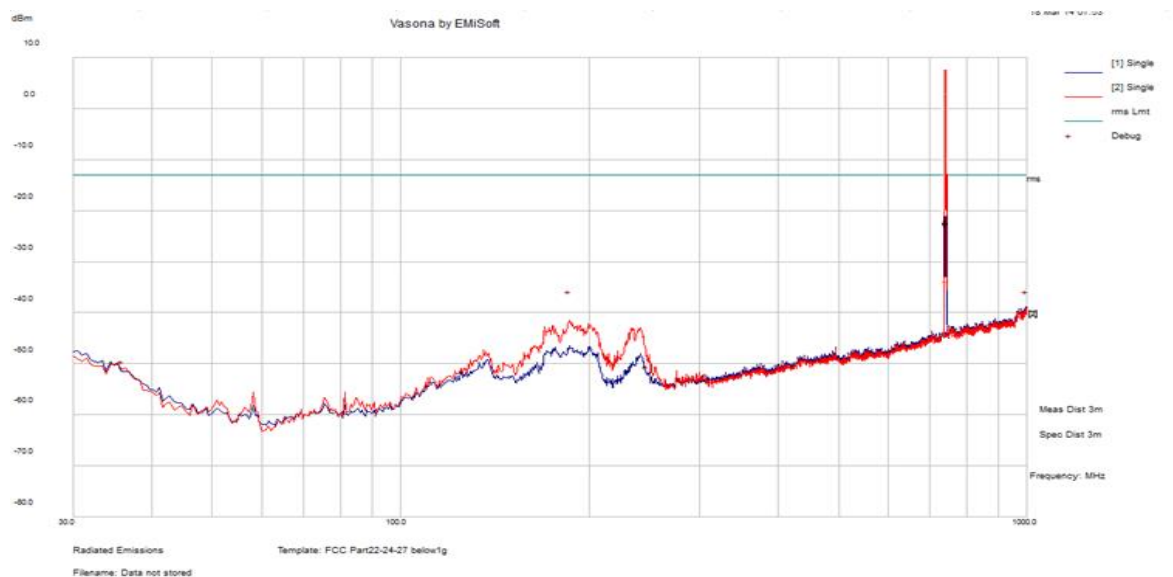
Radiated Emission Test Results

Test specification	below 1GHz		Result	Pass
Environmental Conditions:	Temp (°C):	22		
	Humidity (%)	45		
	Atmospheric (mbar):	1008		
Mains Power:	56VDC PoE			
Tested by:	David Zhang			
Test Date:	02/13/2014			
Remarks:	LTE band4-Mid CH, QPSK			



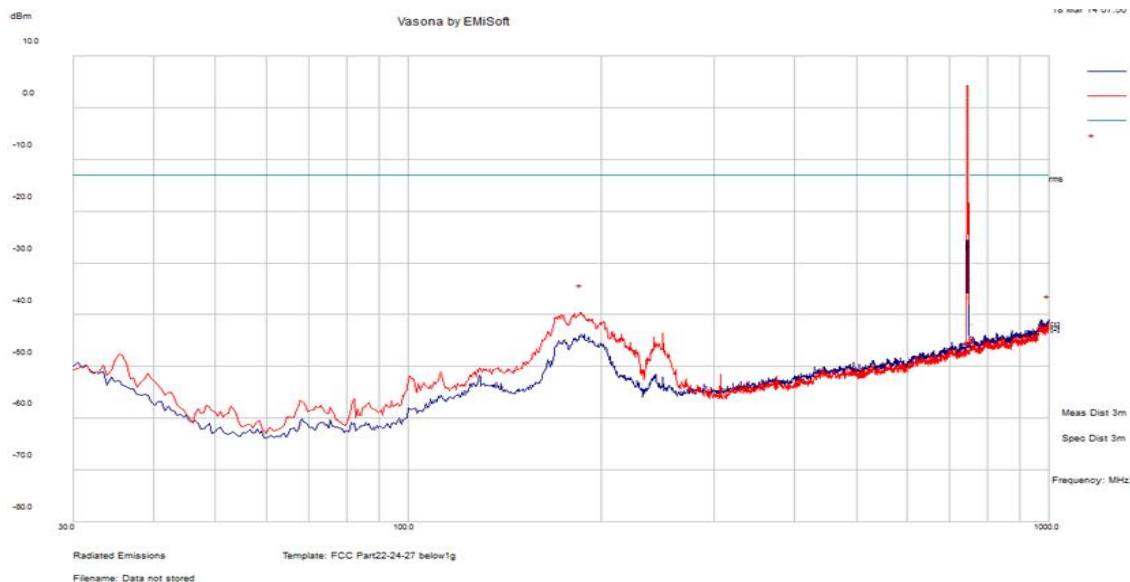
Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Polarization	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass/Fail
996.89	-63.80	6.58	12.52	-44.70	RMS Max	H	359.00	357.00	-13.00	-31.70	Pass
186.40	-50.86	2.67	0.06	-48.13	RMS Max	V	100.00	356.00	-13.00	-35.13	Pass
242.88	-51.91	2.99	0.32	-48.60	RMS Max	V	100.00	9.00	-13.00	-35.60	Pass
58.24	-57.04	1.64	-3.92	-59.32	RMS Max	V	100.00	291.00	-13.00	-46.32	Pass

Test specification	below 1GHz		Result	Pass
Environmental Conditions:	Temp (°C):	22		
	Humidity (%)	45		
	Atmospheric (mbar):	1008		
Mains Power:	56VDC PoE			
Tested by:	David Zhang			
Test Date:	02/13/2014			
Remarks:	LTE Band 13 Mid CH, QPSK			



Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass /Fail
999.52	-59.61	18.36	2.09	-39.15	RMS Max	H	103.00	45.00	-13.00	-26.15	Pass
185.69	-45.49	14.44	-10.43	-41.48	RMS Max	V	105.00	354.00	-13.00	-28.48	Pass
240.98	-47.51	14.75	-10.18	-42.94	RMS Max	H	281.00	102.00	-13.00	-29.94	Pass
58.61	-59.13	13.41	-14.34	-60.06	RMS Max	V	100.00	14.00	-13.00	-47.06	Pass
82.36	-59.82	13.65	-13.87	-60.05	RMS Max	V	100.00	291.00	-13.00	-47.05	Pass

Test specification	below 1GHz		Result	Pass
Environmental Conditions:	Temp (°C):	22		
	Humidity (%)	45		
	Atmospheric (mbar):	1008		
Mains Power:	56VDC PoE			
Tested by:	David Zhang			
Test Date:	02/13/2014			
Remarks:	LTE band4 & LTE band 13 transmit simultaneously at Mid CH, QPSK			

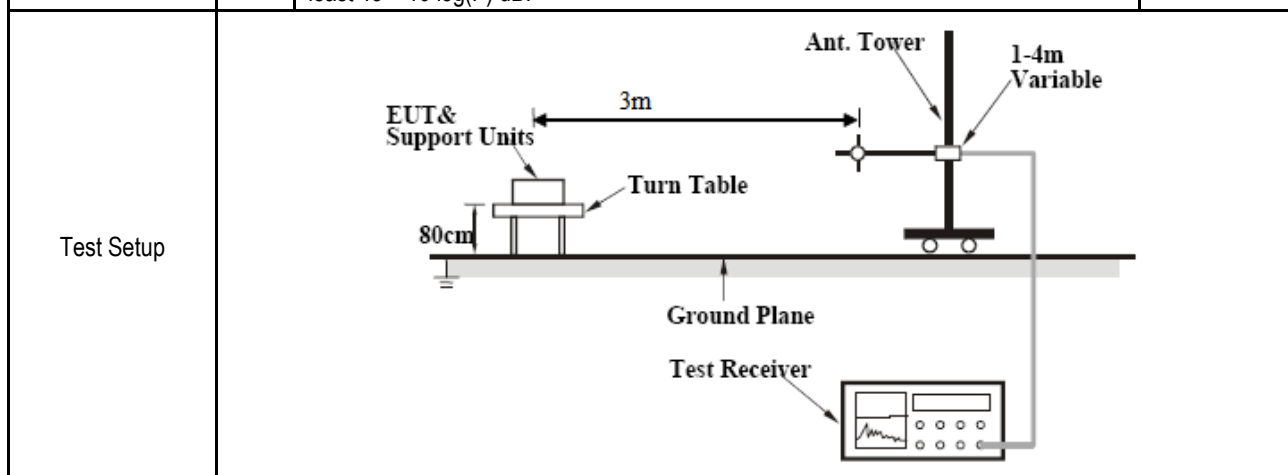


Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass /Fail
185.20	-43.56	14.44	-10.48	-39.60	RMS Max	V	100.00	22.00	-13.00	-26.60	Pass
995.64	-62.10	18.34	2.04	-41.71	RMS Max	H	182.00	291.00	-13.00	-28.71	Pass
100.23	-60.65	13.78	-11.25	-58.12	RMS Max	V	100.00	102.00	-13.00	-45.12	Pass
36.06	-62.02	13.12	-4.91	-53.81	RMS Max	V	100.00	100.00	-13.00	-40.81	Pass
756.71	-61.77	17.22	-1.10	-45.65	RMS Max	H	221.00	24.00	-13.00	-32.65	Pass
253.39	-59.25	14.81	-9.93	-54.37	RMS Max	V	100.00	162.00	-13.00	-41.37	Pass

10.7 Radiated Spurious Emissions above 1GHz

Requirement(s):

Spec	Item	Requirement	Applicable
47CFR22.917	-	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.	☐
47CFR24.238	-	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.	☒
47CFR27.53	-	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.	☒



Procedure	- The EUT was switched on and allowed to warm up to its normal operating condition. - The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: - Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. - The EUT was then rotated to the direction that gave the maximum emission. - Finally, the antenna height was adjusted to the height that gave the maximum emission. - A peak measurement was then made for that frequency point. - Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.		
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Test Date	02/13/2014 – 03/17/2014	Environmental condition	Temperature 23°C Relative Humidity 48% Atmospheric Pressure 1008mbar
Remark	All different modulation and bandwidth configuration has been verified and only the test data of worst case with QPSK modulation and greatest bandwidth was presented in this report.		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Radiated Emission Test Results (Above 1GHz)

LTE band 4 Low Channel, 20MHz BW, QPSK

Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass /Fail
4218.353	-62.30	14.74	-0.23	-47.79	RMS Max	H	125	350	-13.00	-34.79	Pass
6849.014	-74.76	16.23	2.55	-55.98	RMS Max	V	107	243	-13.00	-42.98	Pass
2110.337	-58.55	13.74	-4.24	-49.04	RMS Max	H	100	29	-13.00	-36.04	Pass
8441.214	-77.36	15.81	5.30	-56.25	RMS Max	V	194	211	-13.00	-43.25	Pass

LTE band 4 Mid Channel, 20MHz BW, QPSK

Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass /Fail
4266.415	-63.43	14.76	-0.24	-48.91	RMS Max	H	142	102	-13.00	-35.91	Pass
6935.074	-74.21	16.31	2.64	-55.26	RMS Max	V	145	175	-13.00	-42.26	Pass
8525.015	-77.04	15.82	5.42	-55.80	RMS Max	V	100	89	-13.00	-42.80	Pass
4266.415	-63.43	14.76	-0.24	-48.91	RMS Max	H	142	102	-13.00	-35.91	Pass

LTE band 4 High Channel, 20MHz BW, QPSK

Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass /Fail
4310.894	-62.71	14.77	-0.25	-48.19	RMS Max	H	153	102	-13.00	-35.19	Pass
6934.573	-74.21	16.31	2.64	-55.26	RMS Max	V	146	14	-13.00	-42.26	Pass
8525.925	-77.24	15.82	5.42	-56.00	RMS Max	V	170	174	-13.00	-43.00	Pass

LTE Band 13 Mid Channel, 10MHz BW, QPSK

Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass /Fail
4532.93	-59.88	14.55	1.5	-43.83	RMS Max	H	122.00	109.00	-13.00	-30.83	Pass
1491.34	-72.84	13.19	-6.29	-65.94	RMS Max	V	103.00	312.00	-13.00	-52.94	Pass
1624.44	-58.22	13.33	-5.8	-50.69	RMS Max	V	183.00	28.00	-13.00	-37.69	Pass

LTE Band 4 and band 13 Mid Channel transmit simultaneously, QPSK

Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass /Fail
8118.33	-75.56	15.51	4.88	-55.18	RMS Max	V	118.00	109.00	-13.00	-42.18	Pass
6888.76	-75.22	16.07	2.69	-56.47	RMS Max	H	109.00	107.00	-13.00	-43.47	Pass
5739.20	-75.24	15.04	1.33	-58.87	RMS Max	V	198.00	310.00	-13.00	-45.87	Pass
4054.83	-75.70	14.45	-0.21	-61.46	RMS Max	V	126.00	110.00	-13.00	-48.46	Pass

10.8 Frequency Stability

Requirement(s):

Spec	Item	Requirement	Applicable																																
47 CFR 2.1055, 47 CFR 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 at below, <table border="1"> <thead> <tr> <th>Frequency range (MHz)</th><th>Base, fixed (ppm)</th><th>Mobile ≤3 watts (ppm)</th><th>Mobile ≤3 watts (ppm)</th></tr> </thead> <tbody> <tr> <td>25 to 50</td><td>20</td><td>20</td><td>50</td></tr> <tr> <td>50 to 450</td><td>5</td><td>5</td><td>50</td></tr> <tr> <td>450 to 512</td><td>2.5</td><td>5</td><td>5</td></tr> <tr> <td>821 to 896</td><td>1.5</td><td>2.5</td><td>2.5</td></tr> <tr> <td>928 to 929</td><td>5</td><td>n/a</td><td>n/a</td></tr> <tr> <td>929 to 960</td><td>1.5</td><td>n/a</td><td>n/a</td></tr> <tr> <td>2110 to 2220</td><td>10</td><td>n/a</td><td>n/a</td></tr> </tbody> </table>	Frequency range (MHz)	Base, fixed (ppm)	Mobile ≤3 watts (ppm)	Mobile ≤3 watts (ppm)	25 to 50	20	20	50	50 to 450	5	5	50	450 to 512	2.5	5	5	821 to 896	1.5	2.5	2.5	928 to 929	5	n/a	n/a	929 to 960	1.5	n/a	n/a	2110 to 2220	10	n/a	n/a	☐
Frequency range (MHz)	Base, fixed (ppm)	Mobile ≤3 watts (ppm)	Mobile ≤3 watts (ppm)																																
25 to 50	20	20	50																																
50 to 450	5	5	50																																
450 to 512	2.5	5	5																																
821 to 896	1.5	2.5	2.5																																
928 to 929	5	n/a	n/a																																
929 to 960	1.5	n/a	n/a																																
2110 to 2220	10	n/a	n/a																																
47 CFR 2.1055, 47 CFR 24.135(a)	-	The frequency stability of the transmitter shall be maintained within ± 0.0001 percent (± 1 ppm) of the center frequency over a temperature variation of -30°C to $+50^{\circ}\text{C}$ at normal supply voltage, and over a variation in the primary supply voltage of 85 percent to 115 percent of the rated supply voltage at a temperature of 20°C .	☐																																
47 CFR 2.1055, 47 CFR 27.54	-	The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.	☒																																
Test Setup																																			
Test Procedure	The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference). - The equipment is turned on in a "standby" condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter. - Frequency measurements are made at 10°C intervals ranging from -30°C to $+50^{\circ}\text{C}$. A period of at least one half hour is provided to allow stabilization of the equipment at each temperature level.																																		
Test Date	03/10/2014	Environmental condition	Temperature 23°C Relative Humidity 48% Atmospheric Pressure 1008mbar																																
Remark	NONE																																		
Result	☒ Pass ☐ Fail																																		

Test Data ☒ Yes ☒ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Test Data for LTE band2

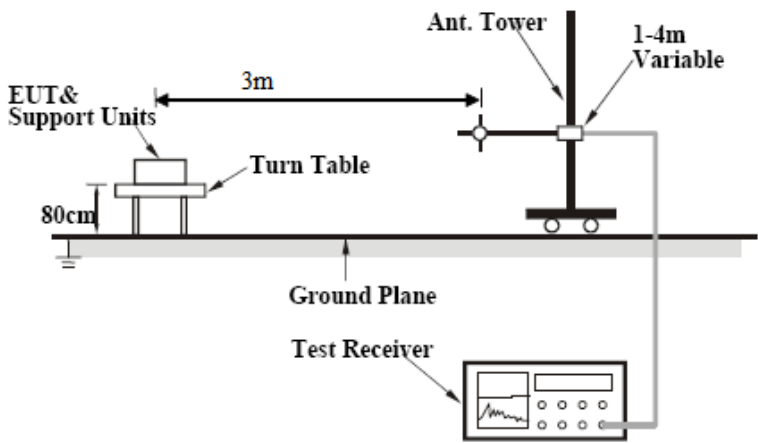
Voltage (%)	Power (VDC)	Temp. (°)	Frequency (KHz)	Frequency Error (Hz)	Deviation (ppm)
100%	56	20 (ref)	2132000.012	0	0.000
100%		-30	2132000.001	-11	-0.005
100%		-20	2132000.003	-9	-0.004
100%		-10	2132000.01	-2	-0.001
100%		0	2132000.01	-2	-0.001
100%		10	2132000.021	9	0.004
100%		30	2132000.019	7	0.003
100%		40	2132000.015	3	0.001
100%		50	2132000.026	14	0.007
115%	64.4	20	2132000.02	8	0.004
85%	47.6	20	2132000.019	7	0.003

Test Data for LTE band 13

Voltage (%)	Power (VDC)	Temp. (°)	Frequency (KHz)	Frequency Error (Hz)	Deviation (ppm)
100%	56	20 (ref)	751000.042	0	0.000
100%		-30	751000.012	-30	-0.040
100%		-20	751000.023	-19	-0.025
100%		-10	751000.015	-27	-0.036
100%		0	751000.036	-6	-0.008
100%		10	751000.034	-8	-0.011
100%		30	751000.045	3	0.004
100%		40	751000.028	-14	-0.019
100%		50	751000.046	4	0.005
115%	64.4	20	751000.041	-1	-0.001
85%	47.6	20	751000.040	-2	-0.003

10.9 Receiver Spurious Emissions

Requirement(s):

Spec	Item	Requirement	Applicable
RSS-Gen 6.1	-	Receivers shall comply with the limits of spurious emissions set out in this section, measured over the frequency range determined in accordance with Section 4.10.	☒
Test Setup			
Procedure	1. 2. 3. 4.	The EUT was switched on and allowed to warm up to its normal operating condition. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: - Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. - The EUT was then rotated to the direction that gave the maximum emission. - Finally, the antenna height was adjusted to the height that gave the maximum emission. A peak measurement was then made for that frequency point. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.	
Remark	No outstanding emission except the noise floor was found.		
Result	☒ Pass ☐ Fail		

Test Data ☐ Yes (See below) ☒ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Conducted Emissions						
R & S Receiver	ESIB 40	100179	04/20/2013	1 Year	04/20/2014	☐
R&S LISN	ESH2-Z5	861741/013	05/18/2013	1 Year	05/18/2014	☐
CHASE LISN	MN2050B	1018	07/24/2013	1 Year	07/24/2014	☐
Sekonic Hygro Hermograph	ST-50	HE01-000092	05/25/2013	1 Year	05/25/2014	☐
Radiated Emissions						
R & S Receiver	ESL6	100178	03/01/2013	1 Year	03/01/2014	☒
R & S Receiver	ESIB 40	100179	04/20/2013	1 Year	04/20/2014	☒
ETS-Lingren Loop Antenna	6512	00049120	05/13/2013	1 Year	05/13/2014	☒
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	02/09/2013	1 Year	02/09/2014	☒
Amplifier (100kHz - 1.3GHz)	8447F	1937A01160	04/24/2014	1 Year	04/24/2015	☒
Horn Antenna (1-26.5GHz)	3115	10SL0059	04/26/2013	1 Year	04/26/2014	☒
Horn Antenna (18-40 GHz)	AH-840	101013	04/23/2013	1 Year	04/23/2014	☒
Pre-Amplifier (1-26.5GHz)	8449B	3008A00715	05/30/2013	1 Year	05/30/2014	☒
Microwave Preamplifier (18-40 GHz)	PA-840	181251	05/30/2013	1 Year	05/30/2014	☒
3 Meters SAC	3M	N/A	10/13/2013	1 Year	10/13/2014	☒
10 Meters SAC	10M	N/A	06/05/2013	1 Year	06/05/2014	☒
Sekonic Hygro Hermograph	ST-50	HE01-000092	05/25/2013	1 Year	05/25/2014	☒
RF Conducted Measurement						
Spectrum Analyzer	N9010A	MY50210206	05/30/2013	1 Year	05/30/2014	☒
Spectrum Analyzer	E4407B	US88441016	05/31/2013	1 Year	05/31/2014	☒
R & S Receiver	ESIB 40	100179	04/20/2013	1 Year	04/20/2014	☒

Annex B. USER MANUAL, BLOCK & CIRCUIT DIAGRAM

Please see attachment

Annex C. SIEMIC Accreditation

Accreditations	Document	Scope / Remark
ISO 17025 (A2LA)		Please see the documents for the detailed scope
ISO Guide 65 (A2LA)		Please see the documents for the detailed scope
TCB Designation		A1, A2, A3, A4, B1, B2, B3, B4, C
FCC DoC Accreditation		FCC Declaration of Conformity Accreditation
FCC Site Registration		3 meter site
FCC Site Registration		10 meter site
IC Site Registration		3 meter site
IC Site Registration		10 meter site
EU NB		Radio & Telecommunications Terminal Equipment: EN45001 – EN ISO/IEC 17025
		Electromagnetic Compatibility: EN45001 – EN ISO/IEC 17025
Singapore iDA CB(Certification Body)		Phase I, Phase II
Vietnam MIC CAB Accreditation		Please see the document for the detailed scope
HongKong OFCA		(Phase II) OFCA Foreign Certification Body for Radio and Telecom
		(Phase I) Conformity Assessment Body for Radio and Telecom
Industry Canada CAB		Radio: Scope A – All Radio Standard Specification in Category I
		Telecom: CS-03 Part I, II, V, VI, VII, VIII

Japan Recognized Certification Body Designation		Radio : A1. Terminal equipment for purpose of calling Telecom : B1. Specified radio equipment specified in Article 38-2, Paragraph 1, Item 1 of the Radio Law
Korea CAB Accreditation		EMI: KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI KN22: Test Method for EMI EMS: KCC Notice 2008-38, RRL Notice 2008-4: CA Procedures for EMS KN24, KN61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8, -4-11: Test Method for EMS Radio: RRL Notice 2008-26, RRL Notice 2008-2, RRL Notice 2008-10, RRL Notice 2007-49, RRL Notice 2007-20, RRL Notice 2007-21, RRL Notice 2007-80, RRL Notice 2004-68 Telecom: President Notice 20664, RRL Notice 2007-30, RRL Notice 2008-7 with attachments 1, 3, 5, 6; President Notice 20664, RRL Notice 2008-7 with attachment 4
Taiwan NCC CAB Recognition		LP0002, PSTN01, ADSL01, ID0002, IS6100, CNS14336, PLMN07, PLMN01, PLMN08
Taiwan BSMI CAB Recognition		CNS 13438
Japan VCCI		R-3083: Radiation 3 meter site C-3421: Main Ports Conducted Interference Measurement T-1597: Telecommunication Ports Conducted Interference Measurement
Australia CAB Recognition		EMC: AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4 Radiocommunications: AS/NZS 4281, AS/NZS 4268, AS/NZS 4280.1, AS/NZS 4280.2, AS/NZS 4295, AS/NZS 4582, AS/NZS 4583, AS/NZS 4769.1, AS/NZS 4769.2, AS/NZS 4770, AS/NZS 4771 Telecommunications: AS/ACIF S002:05, AS/ACIF S003:06, AS/ACIF S004:06 AS/ACIF S006:01, AS/ACIF S016:01, AS/ACIF S031:01, AS/ACIF S038:01, AS/ACIF S040:01, AS/ACIF S041:05, AS/ACIF S043.2:06, AS/ACIF S60950.1
Australia NATA Recognition		AS/ACIF S002, AS/ACIF S003, AS/ACIF S004, AS/ACIF S006, AS/ACIF S016, AS/ACIF S031, AS/ACIF S038, AS/ACIF S040, AS/ACIF S041, AS/ACIF S043.2