FCC RF Test Report

FCC ID	:	**UZ7WCMTB**
EQUIPMENT	:	**Touch Computer**
BRAND NAME	:	**Zebra**
Model Name	:	**WCMTB**
APPLICANT	:	**Zebra Technologies Corporation 1 Zebra Plaza, Holtsville, NY 11742**
MANUFACTURER	:	**Zebra Technologies Corporation 1 Zebra Plaza, Holtsville, NY 11742**
STANDARD	:	**47 CFR Part 2, 22(H), 24(E), 27(L), 27(H), 27(F), 27(N)**
CLASSIFICATION	:	**PCS Licensed Transmitter Held to Ear (PCE)**
TEST DATE(S)	:	**Feb. 10, 2023 ~ Feb. 24, 2023**

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia

ACCREDITED Cert #5145.02

Sporton International Inc. (Kunshan)
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China

TABLE OF CONTENTS

REVISION HISTORY **3**

SUMMARY OF TEST RESULT **4**

1 GENERAL DESCRIPTION **5**

1.1 Product Feature of Equipment Under Test 5
1.2 Product Specification of Equipment Under Test 6
1.3 Modification of EUT 6
1.4 Maximum ERP/EIRP Power and Emission Designator 7
1.5 Testing Location 10
1.6 Test Software 10
1.7 Applicable Standards 10

2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST **11**

2.1 Test Mode 11
2.2 Connection Diagram of Test System 14
2.3 Support Unit used in test configuration and system 15
2.4 Measurement Results Explanation Example 15
2.5 Frequency List of Low/Middle/High Channels 15

3 CONDUCTED TEST ITEMS **21**

3.1 Measuring Instruments 21
3.2 Test Setup 21
3.3 Test Result of Conducted Test 21
3.4 Conducted Output Power and ERP/EIRP 22
3.5 Peak-to-Average Ratio 23
3.6 Occupied Bandwidth 24
3.7 Conducted Band Edge 25
3.8 Conducted Spurious Emission 27
3.9 Frequency Stability 28

4 RADIATED TEST ITEMS **29**

4.1 Measuring Instruments 29
4.2 Test Setup 29
4.3 Test Result of Radiated Test 30
4.4 Radiated Spurious Emission 31

5 LIST OF MEASURING EQUIPMENT **32**

6 UNCERTAINTY OF EVALUATION **33**

APPENDIX A. TEST RESULTS OF CONDUCTED TEST

APPENDIX B. TEST RESULTS OF RADIATED TEST

APPENDIX C. TEST SETUP PHOTOGRAPHS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG311601B	Rev. 01	Initial issue of report	Apr. 03, 2023

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	-	Report Only	-
	§22.913(a)(5)	Effective Radiated Power (Band 5)	ERP < 7 Watt	PASS	-
	§27.50(b)(10) §27.50(c)(10)	Effective Radiated Power (Band 13) (Band 17)(Band 71)	ERP < 3 Watt		-
	§24.232(c))	Equivalent Isotropic Radiated Power (Band 2)	EIRP < 2Watt		-
	§27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4) (Band 66)	EIRP < 1Watt		-
3.5	§24.232(d)	Peak-to-Average Ratio	<13 dB	PASS	-
3.6	§2.1049	Occupied Bandwidth	-	Report Only	-
3.7	§2.1051 §22.917(a) §24.238(a) §27.53(c)(2)(4) §27.53(g) §27.53(h)	Conducted Band Edge Measurement (Band 2) (Band 4) (Band 5) (Band 13) (Band 17)(Band 66) (Band 71)	< 43+10log10(P[Watts])	PASS	-
3.8	§2.1051 §22.917(a) §24.238(a) §27.53(c)(2) §27.53(g) §27.53(h)	Conducted Spurious Emission (Band 2) (Band 4) (Band 5) (Band 13) (Band 17)(Band 66) (Band 71)	< 43+10log10(P[Watts])	PASS	-
3.9	§2.1055 §22.355	Frequency Stability Temperature & Voltage	< 2.5 ppm for Part 22	PASS	-
	§2.1055 §24.235 §27.54		Within Authorized Band		
4.4	§2.1053 §22.917(a) §24.238(a) §27.53(c)(2) §27.53(f) §27.53(g) §27.53(h)	Radiated Spurious Emission (Band 2) (Band 4) (Band 5) (Band 13) (Band 17)(Band 66) (Band 71)	< 43+10$\log_{10}$(P[Watts])	PASS	Under limit 21.93 dB at 1560.00 MHz

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	Touch Computer
Brand Name	Zebra
Model Name	WCMTB
FCC ID	UZ7WCMTB
Sample 1	Scanner(SE4710)
Sample 2	Scanner(SE5500)
HW Version	DV
SW Version	13-09-16.00-TG-U00-STD-ATH-04
MFD	16MAR23
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

2. There are two types of EUT: the main difference between them is that the scanner model is different. According to the difference, we choose sample 1 with Battery 1 to perform full test and verify the worst mode for Sample 1 with Battery 2/3 and Sample 2.

Specification of Accessory				
Battery 1	**Brand Name**	Zebra	**Model Number**	BT-000473

Supported Unit used in test configuration and system				
Battery 2	**Brand Name**	Zebra	**Model Number**	BT-000473B
Battery 3	**Brand Name**	Zebra	**Model Number**	BT-000473E
AC Adapter	**Brand Name**	Zebra	**Part Number**	PWR-WUA5V12W0US
Earphone 1	**Brand Name**	Zebra	**Part Number**	HDST-35MM-PTT1-01
Earphone 2	**Brand Name**	Zebra	**Part Number**	HDST-USBC-PTT1-01
USB Cable (Type C to Type A)	**Brand Name**	Zebra	**Part Number**	CBL-TC5X-USBC2A-01
Type C-Audio Cable (Type C to 3.5mm)	**Brand Name**	Zebra	**Part Number**	ADP-USBC-35MM1-01
Trigger Handle	**Brand Name**	Zebra	**Part Number**	TRG-TC2L-SNP1-01
Hand Strap	**Brand Name**	Zebra	**Part Number**	SG-TC2L-HSTRP1-01
Soft Holster	**Brand Name**	Zebra	**Part Number**	SG-TC2L-HLSTR1-01

1.2 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	LTE Band 2 : 1850 MHz ~ 1910 MHz LTE Band 4 : 1710 MHz ~ 1755 MHz LTE Band 5 : 824 MHz ~ 849 MHz LTE Band 13 : 777 MHz ~ 787 MHz LTE Band 17 : 704 MHz ~ 716 MHz LTE Band 66 : 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz
Rx Frequency	LTE Band 2 : 1930 MHz ~ 1990 MHz LTE Band 4 : 2110 MHz ~ 2155 MHz LTE Band 5 : 869 MHz ~ 894 MHz LTE Band 13 : 746 MHz ~ 756 MHz LTE Band 17 : 734 MHz ~ 746 MHz LTE Band 66 : 2110 MHz~ 2200 MHz LTE Band 71: 617 MHz ~ 652 MHz
Bandwidth	LTE Band 2 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 4 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 5 : 1.4MHz / 3MHz / 5MHz / 10MHz LTE Band 13 : 5MHz / 10MHz LTE Band 17 : 5MHz / 10MHz LTE Band 66 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 71 : 5MHz / 10MHz / 15MHz / 20MHz
Maximum Output Power to Antenna	**<Ant. 0>:** LTE Band 5 : 23.05 dBm LTE Band 5B : 22.83 dBm LTE Band 13 : 22.93 dBm LTE Band 17 : 23.25 dBm LTE Band 71 : 22.91 dBm **<Ant. 1>:** LTE Band 2 : 22.49 dBm LTE Band 4 : 22.66 dBm LTE Band 66 : 22.69 dBm LTE Band 66B : 22.60 dBm LTE Band 66C : 22.49 dBm
Antenna Gain	**<Ant. 0>:** LTE Band 5 : -3 dBi LTE Band 13 : -2.5 dBi LTE Band 17 : -3 dBi LTE Band 71 : -2.7 dBi **<Ant. 1>:** LTE Band 2 : -0.6 dBi LTE Band 4 : -0.9 dBi LTE Band 66 : -0.9 dBi
Type of Modulation	QPSK / 16QAM / 64QAM / 256QAM

1.3 Modification of EUT

No modifications are made to the EUT during all test items.

1.4 Maximum ERP/EIRP Power and Emission Designator

LTE Band 2		QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
1.4	1850.7 ~ 1909.3	0.1510	1M10G7D	0.1225	1M09W7D
3	1851.5 ~ 1908.5	0.1517	2M71G7D	0.1216	2M73W7D
5	1852.5 ~ 1907.5	0.1531	4M51G7D	0.1199	4M51W7D
10	1855.0 ~ 1905.0	0.1496	9M09G7D	0.1197	9M05W7D
15	1857.5 ~ 1902.5	0.1521	13M5G7D	0.1199	13M4W7D
20	1860.0 ~ 1900.0	0.1545	18M0G7D	0.1233	17M9W7D
LTE Band 4		QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
1.4	1710.7 ~ 1754.3	0.1486	1M09G7D	0.1167	1M10W7D
3	1711.5 ~ 1753.5	0.1452	2M72G7D	0.1167	2M71W7D
5	1712.5 ~ 1752.5	0.1469	4M50G7D	0.1151	4M49W7D
10	1715.0 ~ 1750.0	0.1479	9M11G7D	0.1156	9M05W7D
15	1717.5 ~ 1747.5	0.1449	13M4G7D	0.1164	13M5W7D
20	1720.0 ~ 1745.0	0.1500	17M9G7D	0.1175	17M9W7D
LTE Band 5		QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum ERP(W)	Emission Designator (99%OBW)	Maximum ERP(W)	Emission Designator (99%OBW)
1.4	824.7 ~ 848.3	0.0608	1M09G7D	0.0479	1M10W7D
3	825.5 ~ 847.5	0.0604	2M73G7D	0.0467	2M71W7D
5	826.5 ~ 846.5	0.0600	4M50G7D	0.0474	4M50W7D
10	829.0 ~ 844.0	0.0617	9M03G7D	0.0484	9M05W7D
LTE Band 13		QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum ERP(W)	Emission Designator (99%OBW)	Maximum ERP(W)	Emission Designator (99%OBW)
5	779.5 ~ 784.5	0.0667	4M49G7D	0.0515	4M47W7D
10	782.0	0.0673	9M01G7D	0.0524	9M01W7D

LTE Band 17		QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum ERP(W)	Emission Designator (99%OBW)	Maximum ERP(W)	Emission Designator (99%OBW)
5	706.5 ~ 713.5	0.0627	4M48G7D	0.0490	4M49W7D
10	709.0 ~ 711.0	0.0646	9M03G7D	0.0497	9M01W7D
LTE Band 66		**QPSK**		**16QAM/64QAM/256QAM**	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
1.4	1710.7 ~ 1779.3	0.1476	1M09G7D	0.1183	1M10W7D
3	1711.5 ~ 1778.5	0.1479	2M72G7D	0.1191	2M71W7D
5	1712.5 ~ 1777.5	0.1489	4M50G7D	0.1167	4M49W7D
10	1715.0 ~ 1775.0	0.1466	9M11G7D	0.1178	9M05W7D
15	1717.5 ~ 1772.5	0.1483	13M4G7D	0.1191	13M5W7D
20	1720.0 ~ 1770.0	0.1510	17M9G7D	0.1205	17M9W7D
LTE Band 71		**QPSK**		**16QAM/64QAM/256QAM**	
BW (MHz)	Frequency Range (MHz)	Maximum ERP(W)	Emission Designator (99%OBW)	Maximum ERP(W)	Emission Designator (99%OBW)
5	665.5 ~ 695.5	0.0630	4M51G7D	0.0499	4M50W7D
10	668.0 ~ 693.0	0.0625	9M11G7D	0.0497	8M99W7D
15	670.5 ~ 690.5	0.0635	13M5G7D	0.0501	13M5W7D
20	673.0 ~ 688.0	0.0640	17M8G7D	0.0509	17M9W7D

LTE Band CA_5B	QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Maximum ERP(W)	Emission Designator (99%OBW)	Maximum ERP(W)	Emission Designator (99%OBW)
3MHz+5MHz	0.0574	7M58G7D	0.0461	7M59W7D
5MHz+3MHz	0.0583	7M51G7D	0.0466	7M59W7D
5MHz+10MHz	0.0577	13M9G7D	0.0461	13M9W7D
10MHz+5MHz	0.0562	13M9G7D	0.0451	13M9W7D
10MHz+10MHz	0.0586	18M7G7D	0.0472	18M7W7D

LTE Band CA_66B	QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
5MHz+5MHz	0.1442	9M39G7D	0.1119	9M35W7D
5MHz+10MHz	0.1435	13M6G7D	0.1112	13M9W7D
5MHz+15MHz	0.1455	18M1G7D	0.1151	18M3W7D
10MHz+5MHz	0.1449	13M9G7D	0.1127	13M9W7D
10MHz+10MHz	0.1479	18M6G7D	0.1153	18M7W7D
15MHz+5MHz	0.1361	18M2G7D	0.1079	18M2W7D

LTE Band CA_66C	QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
5MHz+20MHz	0.1390	23M2G7D	0.1081	23M3W7D
10MHz+15MHz	0.1355	23M4G7D	0.1067	23M3W7D
10MHz+20MHz	0.1337	27M9G7D	0.1094	28M0W7D
15MHz+10MHz	0.1361	23M4G7D	0.1028	23M4W7D
15MHz+15MHz	0.1374	28M6G7D	0.1064	28M7W7D
15MHz+20MHz	0.1346	33M1G7D	0.1104	33M0W7D
20MHz+5MHz	0.1403	23M4G7D	0.1102	23M2W7D
20MHz+10MHz	0.1416	28M3G7D	0.1091	28M1W7D
20MHz+15MHz	0.1330	32M9G7D	0.1102	32M9W7D
20MHz+20MHz	0.1442	37M8G7D	0.1119	37M8W7D

Note:

1. LTE Band 66 overlaps the entire frequency range of LTE Band 4. Therefore, the test results provided in this report covers Band 66 as well as Band 4.
2. All modulations have been tested, and only the worst test results of PSK & QAM are shown in the report.
3. The device supports two PAs for LTE Band 2, the maximum power of Main PA is higher than the other PA, therefore, we chose higher power of main PA to calculate the EIRP and show in the report.

1.5 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH04-KS TH01-KS	CN1257	314309

1.6 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH04-KS	AUDIX	E3	6.2009-8-24al

1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 2, 22(H), 24(E), 27(L), 27(H), 27(F), 27(N)
- ANSI C63.26-2015
- FCC KDB 971168 D01 Power Meas License Digital Systems v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas License Digital Systems v03r01 with maximum output power.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission.

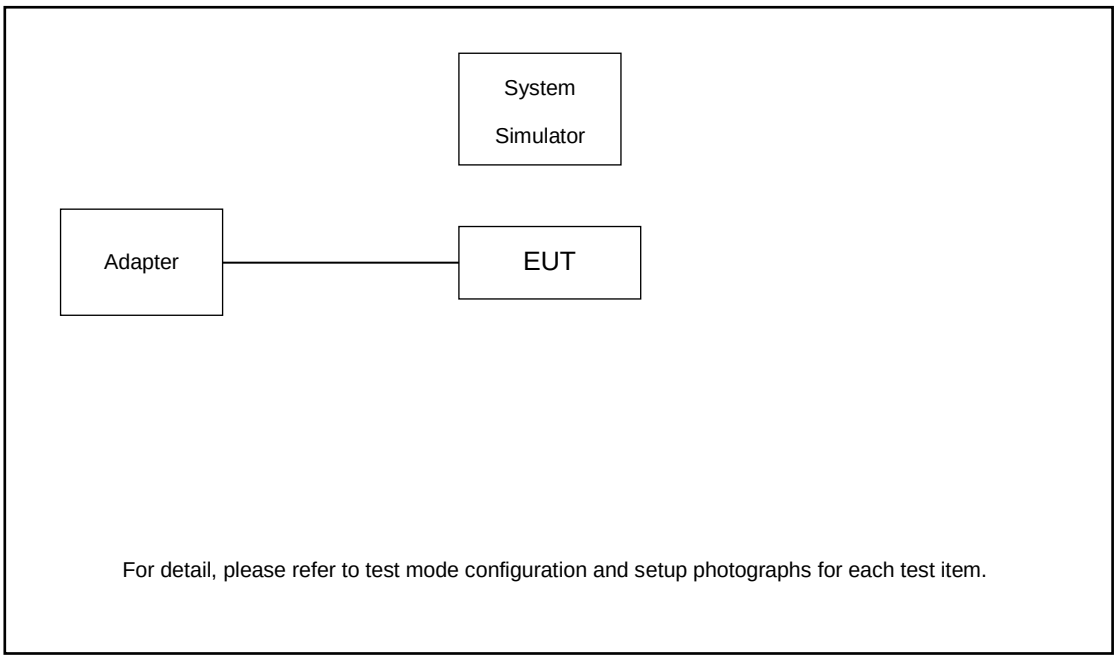
Test Items	Band	Bandwidth (MHz)						Modulation				RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	256QAM	1	Half	Full	L	M	H
Max. Output Power	2	v	v	v	v	v	v	v	v	v	v	v		v	v	v	v
	4	v	v	v	v	v	v	v	v	v	v	v		v	v	v	v
	5	v	v	v	v	-	-	v	v	v	v	v		v	v	v	v
	13	-	-	v	v	-	-	v	v	v	v	v		v	v	v	v
	17	-	-	v	v	-	-	v	v	v	v	v		v	v	v	v
	66	v	v	v	v	v	v	v	v	v	v	v		v	v	v	v
	71	-	-	v	v	v	v	v	v	v	v	v		v	v	v	v
Peak-to-Average Ratio	2						v	v	v	v	v			v		v	
	5				v	-	-	v	v	v	v			v		v	
	13	-	-		v	-	-	v	v	v	v			v		v	
	17	-	-		v	-	-	v	v	v	v			v		v	
	66						v	v	v	v	v			v		v	
	71	-	-				v	v	v	v	v			v		v	
26dB and 99% Bandwidth	2	v	v	v	v	v	v	v	v					v		v	
	5	v	v	v	v	-	-	v	v					v		v	
	13	-	-	v	v	-	-	v	v					v		v	
	17	-	-	v	v	-	-	v	v					v		v	
	66	v	v	v	v	v	v	v	v					v		v	
	71	-	-	v	v	v	v	v	v					v		v	
Conducted Band Edge	2	v	v	v	v	v	v	v	v	v	v	v		v	v		v
	5	v	v	v	v	-	-	v	v	v	v	v		v	v		v
	13	-	-	v	v	-	-	v	v	v	v	v		v	v		v
	17	-	-	v	v	-	-	v	v	v	v	v		v	v		v
	66	v	v	v	v	v	v	v	v	v	v	v		v	v		v
	71	-	-	v	v	v	v	v	v	v	v	v		v	v		v

Test Items	Band	Bandwidth (MHz)						Modulation				RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	256QAM	1	Half	Full	L	M	H
Conducted Spurious Emission	2	v	v	v	v	v	v	v				v			v	v	v
	5	v	v	v	v	-	-	v				v			v	v	v
	13	-	-	v	v	-	-	v				v			v	v	v
	17	-	-	v	v	-	-	v				v			v	v	v
	66	v	v	v	v	v	v	v				v			v	v	v
	71	-	-	v	v	v	v	v				v			v	v	v
Frequency Stability	2				v			v						v		v	
	5				v	-	-	v						v		v	
	13	-	-		v	-	-	v						v		v	
	17	-	-		v	-	-	v						v		v	
	66				v			v						v		v	
	71	-	-		v			v						v		v	
E.R.P / E.I.R.P	2	v	v	v	v	v	v	v	v	v	v	v			v	v	v
	4	v	v	v	v	v	v	v	v	v	v	v			v	v	v
	5	v	v	v	v	-	-	v	v	v	v	v			v	v	v
	13	-	-	v	v	-	-	v	v	v	v	v			v	v	v
	17	-	-	v	v	-	-	v	v	v	v	v			v	v	v
	66	v	v	v	v	v	v	v	v	v	v	v			v	v	v
	71	-	-	v	v	v	v	v	v	v	v	v			v	v	v
Radiated Spurious Emission	2	Worst Case													v	v	v
	5	Worst Case													v	v	v
	13	Worst Case													v	v	v
	17	Worst Case													v	v	v
	66	Worst Case													v	v	v
	71	Worst Case													v	v	v
Note	1. The mark "**v** " means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. 4. LTE Band 66 overlaps the entire frequency range of LTE Band 4. Therefore, the test results provided in this report covers Band 66 as well as Band 4.																

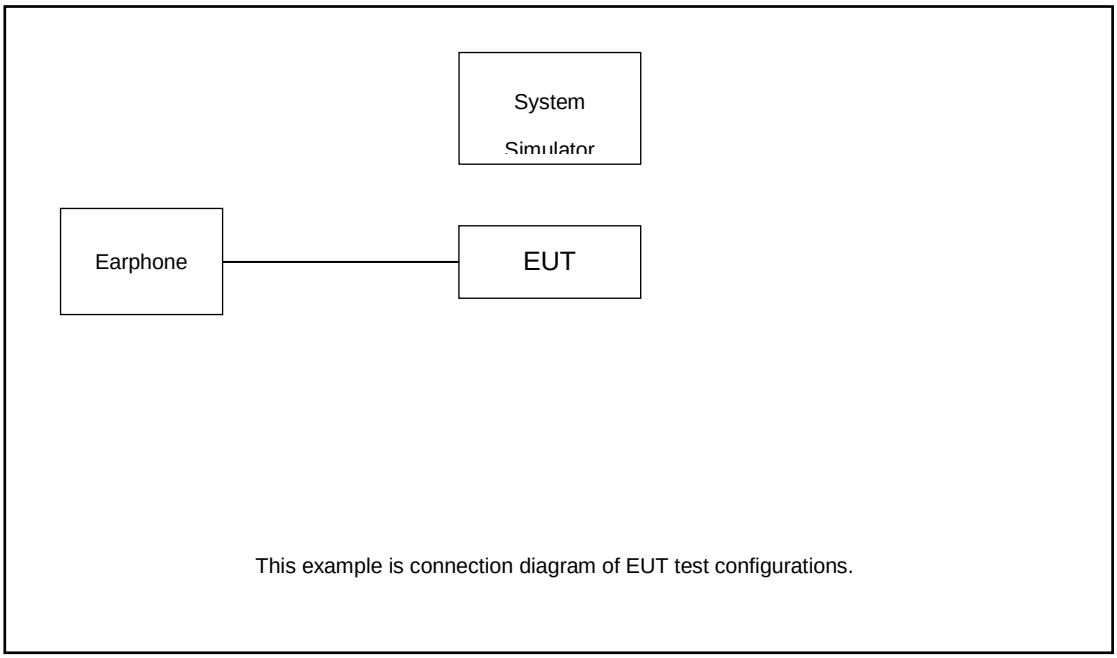
Test Items	Band	Bandwidth (MHz)								Modulation				RB #			Test Channel		
		10+10	15+5	5+15	10+5	5+10	5+5	5+3	3+5	QPSK	16QAM	64QAM	256QAM	1	Half	Full	L	M	H
Max. Output Power	5B_CA	v	-	-	v	v	-	v	v	v	v	v	v	v			v	v	v
	66B_CA	v	v	v	v	v	v	-	-	v	v	v	v	v			v	v	v
26dB and 99% Bandwidth	5B_CA	v	-	-	v	v	-	v	v	v	v					v		v	
	66B_CA	v	v	v	v	v	v	-	-	v	v					v		v	
Conducted Band Edge	5B_CA	v	-	-	v	v	-	v	v	v	v	v	v	v		v	v		v
	66B_CA	v	v	v	v	v	v	-	-	v	v	v	v	v		v	v		v
Conducted Spurious Emission	5B_CA	v	-	-	v	v	-	v	v	v				v			v	v	v
	66B_CA	v	v	v	v	v	v	-	-	v				v			v	v	v
E.I.R.P.	5B_CA	v	-	-	v	v	-	v	v	v	v	v	v	v			v	v	v
	66B_CA	v	v	v	v	v	v	-	-	v	v	v	v	v			v	v	v
Radiated Spurious Emission	5B_CA	Worst Case															v	v	v
	66B_CA	Worst Case															v	v	v
Note	1. The mark "**v** " means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. 4. All test items are based on engineering evaluation. 5. For QAM modulation mode, the whole testing has assessed 16QAM&64QAM mode by referring to the higher conducted power																		

Test Items	Band	Bandwidth (MHz)									Modulation				RB #			Test Channel		
		20+20	20+15	20+10	20+5	15+20	15+15	15+10	10+20	10+15	5+20	QPSK	16QAM	64QAM	256QAM	1	Half	Full	L	M	H
Max. Output Power	66C_CA	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v			v	v	v
26dB and 99% Bandwidth	66C_CA	v	v	v	v	v	v	v	v	v	v	v	v							v	
Conducted Band Edge	66C_CA	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v		v	v		v
Conducted Spurious Emission	66C_CA	v	v	v	v	v	v	v	v	v	v	v				v			v	v	v
E.I.R.P.	66C_CA	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v			v	v	v
Radiated Spurious Emission	66C_CA	Worst Case																	v	v	v
Note	1. The mark "**v** " means that this configuration is chosen for testing 2. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. 3. All test items are based on engineering evaluation. 4. For QAM modulation mode, the whole testing has assessed 16QAM&64QAM mode by referring to the higher conducted power																				

2.2 Connection Diagram of Test System



For detail, please refer to test mode configuration and setup photographs for each test item.



This example is connection diagram of EUT test configurations.

2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	Power Supply	GWINSTEK	PSS-2002	N/A	N/A	Unshielded, 1.8 m
2.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 5.4 dB.

Example :

Offset(dB) = RF cable loss(dB).

= 5.4 (dB)

2.5 Frequency List of Low/Middle/High Channels

LTE Band 2 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
20	Channel	18700	18900	19100
	Frequency	1860	1880	1900
15	Channel	18675	18900	19125
	Frequency	1857.5	1880	1902.5
10	Channel	18650	18900	19150
	Frequency	1855	1880	1905
5	Channel	18625	18900	19175
	Frequency	1852.5	1880	1907.5
3	Channel	18615	18900	19185
	Frequency	1851.5	1880	1908.5
1.4	Channel	18607	18900	19193
	Frequency	1850.7	1880	1909.3

LTE Band 4 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
20	Channel	20050	20175	20300
	Frequency	1720	1732.5	1745
15	Channel	20025	20175	20325
	Frequency	1717.5	1732.5	1747.5
10	Channel	20000	20175	20350
	Frequency	1715	1732.5	1750
5	Channel	19975	20175	20375
	Frequency	1712.5	1732.5	1752.5
3	Channel	19965	20175	20385
	Frequency	1711.5	1732.5	1753.5
1.4	Channel	19957	20175	20393
	Frequency	1710.7	1732.5	1754.3

LTE Band 5 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
10	Channel	20450	20525	20600
	Frequency	829	836.5	844
5	Channel	20425	20525	20625
	Frequency	826.5	836.5	846.5
3	Channel	20415	20525	20635
	Frequency	825.5	836.5	847.5
1.4	Channel	20407	20525	20643
	Frequency	824.7	836.5	848.3

LTE Band 13 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
10	Channel	-	23230	-
	Frequency	-	782	-
5	Channel	23205	23230	23255
	Frequency	779.5	782	784.5

LTE Band 17 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
10	Channel	23780	23790	23800
	Frequency	709	710	711
5	Channel	23755	23790	23825
	Frequency	706.5	710	713.5

LTE Band 66 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	132072	132322	132572
	Frequency	1720	1745	1770
15	Channel	132047	132322	132597
	Frequency	1717.5	1745	1772.5
10	Channel	132022	132322	132622
	Frequency	1715	1745	1775
5	Channel	131997	132322	132647
	Frequency	1712.5	1745	1777.5
3	Channel	131987	132322	132657
	Frequency	1711.5	1745	1778.5
1.4	Channel	131979	132322	132665
	Frequency	1710.7	1745	1779.3

LTE Band 71 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	133222	133322	133372
	Frequency	673.0	680.5	688.0
15	Channel	133197	133297	133397
	Frequency	670.5	680.5	690.5
10	Channel	133172	133272	133422
	Frequency	668.0	678.0	693.0
5	Channel	133147	133247	133447
	Frequency	665.5	675.5	695.5

LTE Band 5B_CA Channel and Frequency List					
BW [MHz]	Channel/Frequency(MHz)		Lowest	Middle	Highest
3 + 5	PCC	Channel	20416	20501	20586
		Frequency	825.6	834.1	842.6
	SCC	Channel	20455	20540	20625
		Frequency	829.5	838.0	846.5
5 + 3	PCC	Channel	20425	20510	20595
		Frequency	826.5	835.0	843.5
	SCC	Channel	20464	20549	20634
		Frequency	830.4	838.9	847.4
5 + 10	PCC	Channel	20428	20478	20528
		Frequency	826.8	831.8	836.8
	SCC	Channel	20500	20550	20600
		Frequency	834	839	844
10 + 5	PCC	Channel	20450	20500	20550
		Frequency	829	834	839
	SCC	Channel	20522	20572	20622
		Frequency	836.2	841.2	846.2
10 + 10	PCC	Channel	20450	20476	20501
		Frequency	829	831.6	834.1
	SCC	Channel	20549	20575	20600
		Frequency	838.9	841.5	844

LTE Band 66C_CA Channel and Frequency List					
BW [MHz]	Channel/Frequency(MHz)		Lowest	Middle	Highest
10 + 15	PCC	Channel	132025	132351	132477
		Frequency	1715.3	1747.9	1760.5
	SCC	Channel	132145	132471	132597
		Frequency	1727.3	1759.9	1772.5
15 + 10	PCC	Channel	132047	132373	132499
		Frequency	1717.5	1750.1	1762.7
	SCC	Channel	132167	132493	132619
		Frequency	1729.5	1762.1	1774.7
10 + 20	PCC	Channel	132027	132328	132428
		Frequency	1715.5	1745.6	1755.6
	SCC	Channel	132171	132472	132572
		Frequency	1729.9	1760	1770
20 + 10	PCC	Channel	132072	132373	132473
		Frequency	1720	1750.1	1760.1
	SCC	Channel	132216	132517	132617
		Frequency	1734.4	1764.5	1774.5
15 + 15	PCC	Channel	132047	132347	132447
		Frequency	1717.5	1747.5	1757.5
	SCC	Channel	132197	132497	132597
		Frequency	1732.5	1762.5	1772.5
15 + 20	PCC	Channel	132050	132325	132401
		Frequency	1717.8	1745.3	1752.9
	SCC	Channel	132221	132496	132572
		Frequency	1734.9	1762.4	1770
20 + 15	PCC	Channel	132072	132348	132423
		Frequency	1720	1747.6	1755.1
	SCC	Channel	132243	132519	132594
		Frequency	1737.1	1764.7	1772.2
20 + 5	PCC	Channel	132072	132397	132522
		Frequency	1720	1752.5	1765
	SCC	Channel	132189	132514	132639
		Frequency	1731.7	1764.2	1776.7
5 + 20	PCC	Channel	132005	132330	132455

		Frequency	1713.3	1745.8	1758.3
	SCC	Channel	132122	132447	132572
		Frequency	1725	1757.5	1770
20 + 20	PCC	Channel	132072	132323	132374
		Frequency	1720	1745.1	1750.2
	SCC	Channel	132270	132521	132572
		Frequency	1739.8	1764.9	1770

LTE Band 66B_CA Channel and Frequency List					
BW [MHz]	**Channel/Frequency(MHz)**		**Lowest**	**Middle**	**Highest**
5 + 5	PCC	Channel	131997	132398	132599
		Frequency	1712.5	1752.6	1772.7
	SCC	Channel	132045	132446	132647
		Frequency	1717.3	1757.4	1777.5
5 + 10	PCC	Channel	132000	132375	132550
		Frequency	1712.8	1750.3	1767.8
	SCC	Channel	132072	132447	132622
		Frequency	1720	1757.5	1775
10 + 5	PCC	Channel	132022	132397	132572
		Frequency	1715	1752.5	1770
	SCC	Channel	132094	132469	132644
		Frequency	1722.2	1759.7	1777.2
5 + 15	PCC	Channel	132002	132353	132504
		Frequency	1713	1748.1	1763.2
	SCC	Channel	132095	132446	132597
		Frequency	1722.3	1757.4	1772.5
15 + 5	PCC	Channel	132047	132398	132549
		Frequency	1717.5	1752.6	1767.7
	SCC	Channel	132140	132491	132642
		Frequency	1726.8	1761.9	1777
10 + 10	PCC	Channel	132022	132373	132523
		Frequency	1715	1750.1	1765.1
	SCC	Channel	132121	132472	132622
		Frequency	1724.9	1760	1775

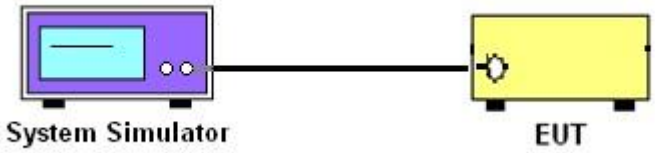
3 Conducted Test Items

3.1 Measuring Instruments

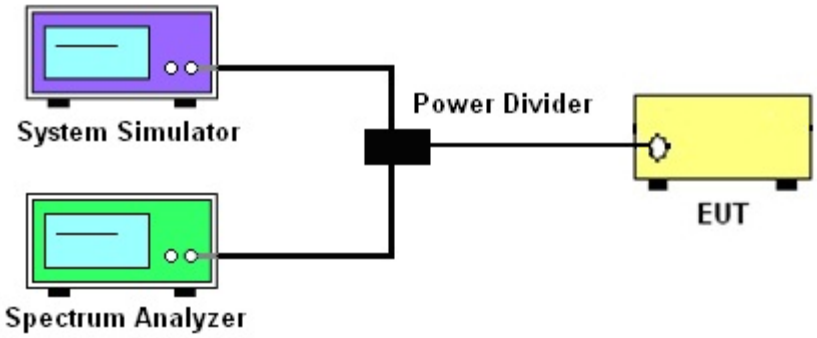
See list of measuring instruments of this test report.

3.2 Test Setup

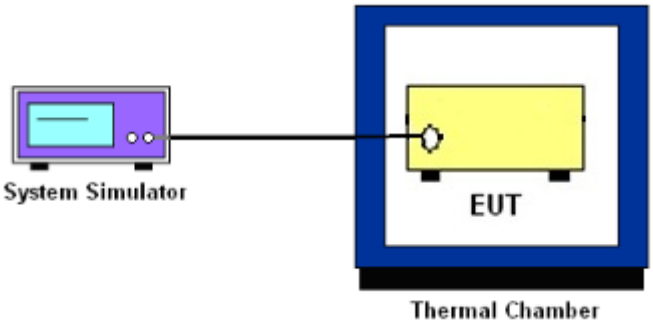
3.2.1 Conducted Output Power



3.2.2 Peak-to-Average Ratio, Occupied Bandwidth ,Conducted Band-Edge and Conducted Spurious Emission



3.2.3 Frequency Stability



3.3 Test Result of Conducted Test

Please refer to Appendix A.

3.4 Conducted Output Power and ERP/EIRP

3.4.1 Description of the Conducted Output Power Measurement and ERP/EIRP Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The ERP of mobile transmitters must not exceed 7 Watts for LTE Band 5.

The ERP of mobile transmitters must not exceed 3 Watts for Band 13 and Band 17 and Band 71.

The EIRP of mobile transmitters must not exceed 2 Watts for LTE Band 2

The EIRP of mobile transmitters must not exceed 1 Watts for LTE Band 4 and Band 66.

According to KDB 412172 D01 Power Approach,

EIRP = $P_T + G_T – L_C$, ERP = EIRP -2.15, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

3.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2
2. The transmitter output port was connected to the system simulator.
3. Set EUT at maximum power through the system simulator.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure and record the power level from the system simulator.

3.5 Peak-to-Average Ratio

3.5.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. 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.

3.5.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2.3.4 (CCDF).
2. The EUT was connected to spectrum and system simulator via a power divider.
3. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
4. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
5. Record the deviation as Peak to Average Ratio.

3.6 Occupied Bandwidth

3.6.1 Description of Occupied Bandwidth Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

3.6.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.4
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
4. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
5. Set the detection mode to peak, and the trace mode to max hold.
6. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace. (this is the reference value)
7. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
8. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “–X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
9. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.7 Conducted Band Edge

3.7.1 Description of Conducted Band Edge Measurement

22.917(a)

For operations in the 824 – 849 MHz band, the FCC limit is 43 + $10\log_{10}$(P[Watts]) dB below the transmitter power P(Watts) in a 100kHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

24.238 (a)

For operations in the 1850-1910 and 1930-1990 MHz band, the FCC limit is 43 + $10\log_{10}$(P[Watts]) dB below the transmitter power P(Watts) in a 1MHz bandwidth. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

27.53 (c)

For operations in the 776-788 MHz band, the FCC limit is 43 + $10\log_{10}$(P[Watts]) dB below the transmitter power P(Watts) in a 100 kHz bandwidth. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed. In addition, the power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least 65 + 10 log10 p(watts), dB, for mobile and portable equipment.

27.53 (g)

For operations in the 600MHz band and 698 -746 MHz band, the FCC limit is 43 + 10log10(P[Watts]) dB below the transmitter power P(Watts) in a 100 kHz bandwidth. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

27.53 (h)

For operations in the 1710 – 1755 MHz band, the FCC limit is 43 + $10\log_{10}$(P[Watts]) dB below the transmitter power P(Watts) in a 1 MHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

3.7.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured.
4. Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
5. Beyond the 1 MHz band from the band edge, RBW=1MHz was used
6. Set spectrum analyzer with RMS detector.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
8. Checked that all the results comply with the emission limit line.
   Example:
   The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
   = P(W)- [43 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB) = -13dBm.
9. When using the integration method, the starting frequency of the integration shall be centered at one-half of the RBW away from the band edge.

3.8 Conducted Spurious Emission

3.8.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

3.8.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
7. Set spectrum analyzer with RMS detector.
8. Taking the record of maximum spurious emission.
9. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
10. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.

3.9 Frequency Stability

3.9.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency.

3.9.2 Test Procedures for Temperature Variation

1. The testing follows ANSI C63.26 section 5.6.4
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.9.3 Test Procedures for Voltage Variation

1. The testing follows ANSI C63.26 section 5.6.5
2. The EUT was placed in a temperature chamber at 20±5°C and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value for other than hand carried battery equipment.
4. For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.
5. The variation in frequency was measured for the worst case.

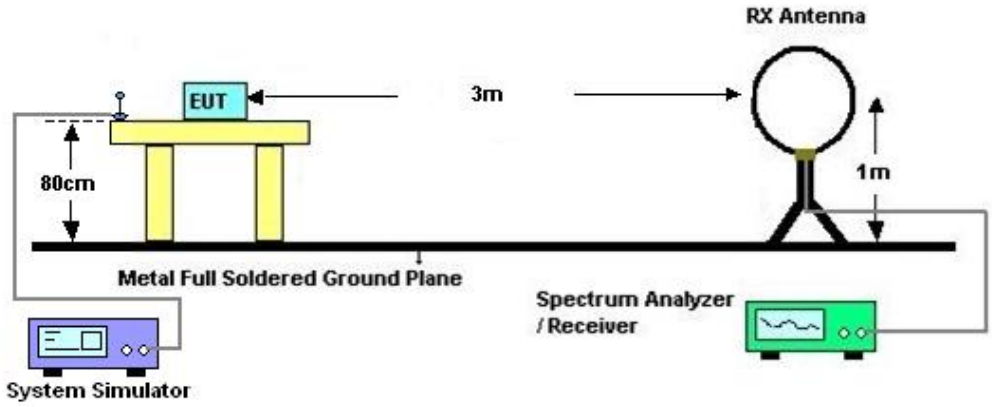
4 Radiated Test Items

4.1 Measuring Instruments

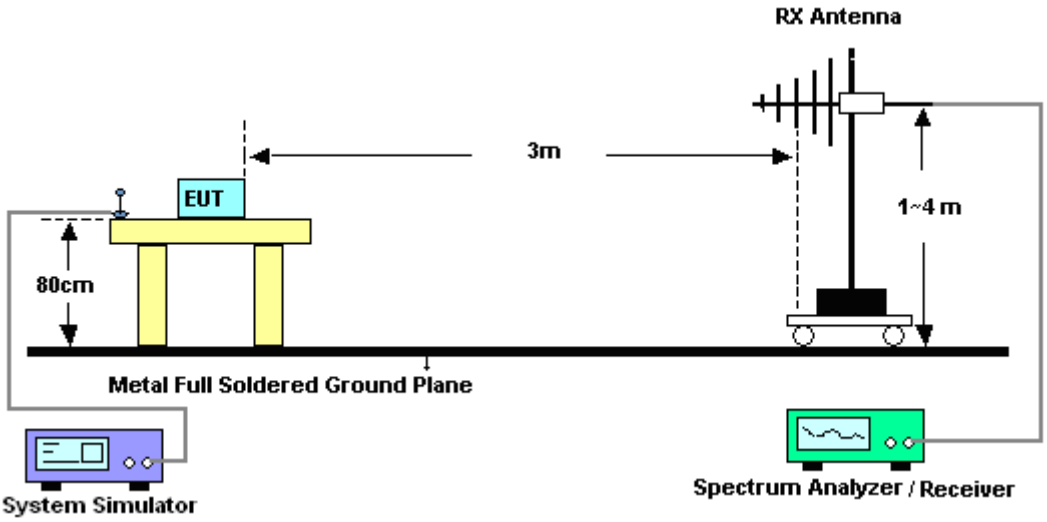
See list of measuring instruments of this test report.

4.2 Test Setup

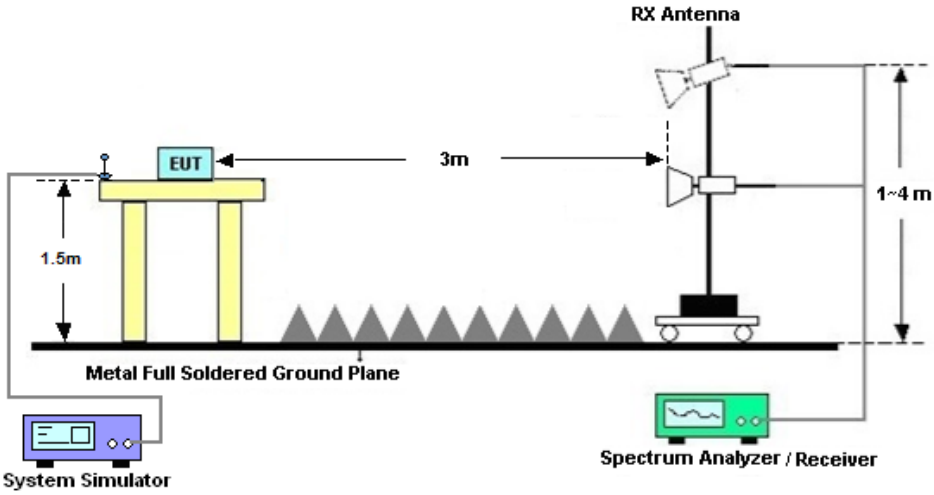
4.2.1 For radiated test below 30MHz



4.2.2 For radiated test from 30MHz to 1GHz



4.2.3 For radiated test above 1GHz



4.3 Test Result of Radiated Test

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

Please refer to Appendix B.

4.4 Radiated Spurious Emission

4.4.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI C63.26. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

For LTE Band 13

For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.5
2. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
6. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
7. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
8. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
9. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
10. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
11. ERP (dBm) = EIRP - 2.15
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
    The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 12, 2022	Feb. 10, 2023~ Feb. 24, 2023	Oct. 11, 2023	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	NCR	Feb. 10, 2023~ Feb. 24, 2023	NCR	Conducted (TH01-KS)
Temperature &humidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 15, 2022	Feb. 10, 2023~ Feb. 24, 2023	Jul. 14, 2023	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010B	MY57471079	10Hz-44G,MAX 30dB	Oct. 12, 2022	Feb. 13, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 30, 2021	Feb. 13, 2023	Oct. 29, 2022	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	May 24, 2022	Feb. 13, 2023	May 23, 2023	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1284	1GHz~18GHz	Oct. 16, 2022	Feb. 13, 2023	Oct. 15, 2023	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 08, 2023	Feb. 13, 2023	Jan. 07, 2024	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	May 24, 2022	Feb. 13, 2023	May 23, 2023	Radiation (03CH04-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 05, 2023	Feb. 13, 2023	Jan. 04, 2024	Radiation (03CH04-KS)
high gain Amplifier	EM	EM01G18GA	060840	1Ghz-18Ghz	Oct. 12, 2022	Feb. 13, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
Amplifier	Agilent	8449B	3008A02370	1Ghz-18Ghz	Oct. 12, 2022	Feb. 13, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Feb. 13, 2023	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Feb. 13, 2023	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Feb. 13, 2023	NCR	Radiation (03CH04-KS)

NCR: No Calibration Required

6 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Measurement

Test Item	Uncertainty
Conducted Power	±0.46 dB
Conducted Emissions	±0.48 dB
Occupied Channel Bandwidth	±0.1 %

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.3dB

Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.8dB

Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power) and ERP/EIRP

LTE Band 2:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	EIRP(W)		
Channel				18700	18900	19100			
Frequency (MHz)				1860	1880	1900	L	M	H
20	QPSK	1	0	22.43	22.49	22.37	0.1524	0.1545	0.1503
20	QPSK	1	99	22.29	22.39	22.29	0.1476	0.1510	0.1476
20	QPSK	100	0	21.45	21.51	21.43	0.1216	0.1233	0.1211
20	16QAM	1	0	21.38	21.51	21.42	0.1197	0.1233	0.1208
20	64QAM	1	0	20.51	20.62	20.57	0.0979	0.1005	0.0993
20	256QAM	1	0	17.68	17.75	17.71	0.0511	0.0519	0.0514
Channel				18675	18900	19125	EIRP(W)		
Frequency (MHz)				1857.5	1880	1902.5	L	M	H
15	QPSK	1	0	22.37	22.42	22.25	0.1503	0.1521	0.1462
15	16QAM	1	0	21.25	21.39	21.30	0.1161	0.1199	0.1175
Channel				18650	18900	19150	EIRP(W)		
Frequency (MHz)				1855	1880	1905	L	M	H
10	QPSK	1	0	22.31	22.35	22.32	0.1483	0.1496	0.1486
10	16QAM	1	0	21.33	21.38	21.31	0.1183	0.1197	0.1178
Channel				18625	18900	19175	EIRP(W)		
Frequency (MHz)				1852.5	1880	1907.5	L	M	H
5	QPSK	1	0	22.28	22.45	22.32	0.1472	0.1531	0.1486
5	16QAM	1	0	21.30	21.39	21.26	0.1175	0.1199	0.1164
Channel				18615	18900	19185	EIRP(W)		
Frequency (MHz)				1851.5	1880	1908.5	L	M	H
3	QPSK	1	0	22.39	22.41	22.34	0.1510	0.1517	0.1493
3	16QAM	1	0	21.33	21.45	21.27	0.1183	0.1216	0.1167
Channel				18607	18900	19193	EIRP(W)		
Frequency (MHz)				1850.7	1880	1909.3	L	M	H
1.4	QPSK	1	0	22.35	22.39	22.32	0.1496	0.1510	0.1486
1.4	16QAM	1	0	21.38	21.48	21.37	0.1197	0.1225	0.1194

LTE Band 4:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	EIRP(W)		
Channel				20050	20175	20300			
Frequency (MHz)				1720	1732.5	1745	L	M	H
20	QPSK	1	0	22.57	22.66	22.53	0.1469	0.1500	0.1455
20	QPSK	1	99	22.45	22.54	22.42	0.1429	0.1459	0.1419
20	QPSK	100	0	21.54	21.68	21.52	0.1159	0.1197	0.1153
20	16QAM	1	0	21.55	21.60	21.51	0.1161	0.1175	0.1151
20	64QAM	1	0	20.58	20.74	20.70	0.0929	0.0964	0.0955
20	256QAM	1	0	17.73	17.77	17.69	0.0482	0.0486	0.0478
Channel				20025	20175	20325	EIRP(W)		
Frequency (MHz)				1717.5	1732.5	1747.5	L	M	H
15	QPSK	1	0	22.45	22.51	22.40	0.1429	0.1449	0.1413
15	16QAM	1	0	21.40	21.56	21.43	0.1122	0.1164	0.1130
Channel				20000	20175	20350	EIRP(W)		
Frequency (MHz)				1715	1732.5	1750	L	M	H
10	QPSK	1	0	22.43	22.60	22.49	0.1422	0.1479	0.1442
10	16QAM	1	0	21.33	21.53	21.40	0.1104	0.1156	0.1122
Channel				19975	20175	20375	EIRP(W)		
Frequency (MHz)				1712.5	1732.5	1752.5	L	M	H
5	QPSK	1	0	22.47	22.57	22.45	0.1435	0.1469	0.1429
5	16QAM	1	0	21.30	21.51	21.44	0.1096	0.1151	0.1132
Channel				19965	20175	20385	EIRP(W)		
Frequency (MHz)				1711.5	1732.5	1753.5	L	M	H
3	QPSK	1	0	22.49	22.52	22.45	0.1442	0.1452	0.1429
3	16QAM	1	0	21.49	21.57	21.45	0.1146	0.1167	0.1135
Channel				19950	20175	20393	EIRP(W)		
Frequency (MHz)				1710	1732.5	1754.3	L	M	H
1.4	QPSK	1	0	22.49	22.62	22.41	0.1442	0.1486	0.1416
1.4	16QAM	1	0	21.44	21.57	21.39	0.1132	0.1167	0.1119

LTE Band 5:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	ERP(W)		
Channel				20450	20525	20600			
Frequency (MHz)				829	836.5	844	L	M	H
10	QPSK	1	0	22.90	23.05	22.98	0.0596	0.0617	0.0607
10	QPSK	1	49	22.87	22.95	22.84	0.0592	0.0603	0.0587
10	QPSK	50	0	21.90	22.02	21.94	0.0473	0.0486	0.0478
10	16QAM	1	0	21.81	22.00	21.91	0.0463	0.0484	0.0474
10	64QAM	1	0	21.06	21.15	21.08	0.0390	0.0398	0.0392
10	256QAM	1	0	18.12	18.16	18.03	0.0198	0.0200	0.0194
Channel				20425	20525	20625	ERP(W)		
Frequency (MHz)				826.5	836.5	846.5	L	M	H
5	QPSK	1	0	22.87	22.93	22.88	0.0592	0.0600	0.0593
5	16QAM	1	0	21.67	21.91	21.82	0.0449	0.0474	0.0465
Channel				20415	20525	20635	ERP(W)		
Frequency (MHz)				825.5	836.5	847.5	L	M	H

3	QPSK	1	0	22.76	22.96	22.93	0.0577	0.0604	0.0600
3	16QAM	1	0	21.77	21.84	21.77	0.0459	0.0467	0.0459
Channel				20407	20525	20643	ERP(W)		
Frequency (MHz)				824.7	836.5	848.3	L	M	H
1.4	QPSK	1	0	22.83	22.99	22.84	0.0586	0.0608	0.0587
1.4	16QAM	1	0	21.84	21.95	21.88	0.0467	0.0479	0.0471

LTE Band 13:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	ERP(W)		
Channel					23230				
Frequency (MHz)					782			M	
10	QPSK	1	0		22.93			0.0673	
10	QPSK	1	49		22.83			0.0658	
10	QPSK	50	0		21.93			0.0535	
10	16QAM	1	0		21.84			0.0524	
10	64QAM	1	0		21.00			0.0432	
10	256QAM	1	0		18.17			0.0225	
Channel				23205	23230	23255	ERP(W)		
Frequency (MHz)				779.5	782	784.5	L	M	H
5	QPSK	1	0	22.82	22.89	22.78	0.0656	0.0667	0.0650
5	16QAM	1	0	21.77	21.71	21.71	0.0515	0.0508	0.0508

LTE Band 17:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	ERP(W)		
Channel				23780	23790	23800			
Frequency (MHz)				709	710	711	L	M	H
10	QPSK	1	0	23.17	23.25	23.11	0.0634	0.0646	0.0625
10	QPSK	1	49	23.03	23.15	23.01	0.0614	0.0631	0.0611
10	QPSK	50	0	22.15	22.21	22.20	0.0501	0.0508	0.0507
10	16QAM	1	0	21.96	22.11	22.08	0.0480	0.0497	0.0493
10	64QAM	1	0	21.30	21.36	21.23	0.0412	0.0418	0.0406
10	256QAM	1	0	18.26	18.30	18.22	0.0205	0.0207	0.0203
Channel				23755	23790	23825	ERP(W)		
Frequency (MHz)				706.5	710	713.5	L	M	H
5	QPSK	1	0	23.05	23.12	23.06	0.0617	0.0627	0.0618
5	16QAM	1	0	21.93	22.05	21.97	0.0476	0.0490	0.0481

LTE Band 66:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	EIRP(W)		
Channel				132072	132322	132572			
Frequency (MHz)				1720	1745	1770	L	M	H
20	QPSK	1	0	22.64	22.69	22.59	0.1493	0.1510	0.1476
20	QPSK	1	99	22.48	22.57	22.52	0.1439	0.1469	0.1452
20	QPSK	100	0	21.60	21.70	21.57	0.1175	0.1202	0.1167
20	16QAM	1	0	21.55	21.71	21.56	0.1161	0.1205	0.1164
20	64QAM	1	0	20.58	20.77	20.74	0.0929	0.0971	0.0964
20	256QAM	1	0	17.67	17.82	17.71	0.0475	0.0492	0.0480
Channel				132047	132322	132597	EIRP(W)		
Frequency (MHz)				1717.5	1745	1772.5	L	M	H
15	QPSK	1	0	22.58	22.61	22.51	0.1472	0.1483	0.1449
15	16QAM	1	0	21.48	21.66	21.41	0.1143	0.1191	0.1125
Channel				132022	132322	132622	EIRP(W)		
Frequency (MHz)				1715	1745	1775	L	M	H
10	QPSK	1	0	22.52	22.56	22.52	0.1452	0.1466	0.1452
10	16QAM	1	0	21.41	21.61	21.47	0.1125	0.1178	0.1140
Channel				131997	132322	132647	EIRP(W)		
Frequency (MHz)				1712.5	1745	1777.5	L	M	H
5	QPSK	1	0	22.58	22.63	22.47	0.1472	0.1489	0.1435
5	16QAM	1	0	21.50	21.57	21.44	0.1148	0.1167	0.1132
Channel				131987	132322	132657	EIRP(W)		
Frequency (MHz)				1711.5	1745	1778.5	L	M	H
3	QPSK	1	0	22.56	22.60	22.47	0.1466	0.1479	0.1435
3	16QAM	1	0	21.43	21.66	21.42	0.1130	0.1191	0.1127
Channel				131979	132322	132665	EIRP(W)		
Frequency (MHz)				1710.7	1745	1779.3	L	M	H
1.4	QPSK	1	0	22.46	22.59	22.42	0.1432	0.1476	0.1419
1.4	16QAM	1	0	21.45	21.63	21.40	0.1135	0.1183	0.1122

LTE Band 71:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	ERP(W)		
Channel				133222	133322	133372			
Frequency (MHz)				673	683	688	L	M	H
20	QPSK	1	0	22.85	22.91	22.79	0.0631	0.0640	0.0622
20	QPSK	1	99	22.69	22.83	22.76	0.0608	0.0628	0.0618
20	QPSK	100	0	21.84	21.92	21.80	0.0500	0.0509	0.0495
20	16QAM	1	0	21.81	21.92	21.73	0.0497	0.0509	0.0488
20	64QAM	1	0	20.78	21.00	20.87	0.0392	0.0412	0.0400
20	256QAM	1	0	18.01	18.08	17.94	0.0207	0.0210	0.0204
Channel				133197	133297	133397	EIRP(W)		
Frequency (MHz)				670.5	680.5	690.5	L	M	H
15	QPSK	1	0	22.75	22.88	22.70	0.0617	0.0635	0.0610
15	16QAM	1	0	21.74	21.85	21.52	0.0489	0.0501	0.0465
Channel				133172	133272	133422	EIRP(W)		

Frequency (MHz)				668	678	693	L	M	H
10	QPSK	1	0	22.76	22.81	22.71	0.0618	0.0625	0.0611
10	16QAM	1	0	21.69	21.71	21.81	0.0483	0.0485	0.0497
Channel				133147	133247	133447	EIRP(W)		
Frequency (MHz)				665.5	675.5	695.5	L	M	H
5	QPSK	1	0	22.73	22.84	22.73	0.0614	0.0630	0.0614
5	16QAM	1	0	21.76	21.83	21.59	0.0491	0.0499	0.0472

LTE Band 5B:

Combination 10MHz+10MHz (50RB+50RB)							
Channel	Modulation	PCC		SCC		Measured Power	ERP(W)
		RB Size	RB offset	RB Size	RB offset		
L	QPSK	1	Max	1	0	22.77	0.0578
M	QPSK	1	Max	1	0	22.83	0.0586
H	QPSK	1	Max	1	0	22.71	0.0570
L	16QAM	1	Max	1	0	21.83	0.0466
M	16QAM	1	Max	1	0	21.89	0.0472
H	16QAM	1	Max	1	0	21.79	0.0461
L	64QAM	1	Max	1	0	21.03	0.0387
M	64QAM	1	Max	1	0	21.11	0.0394
H	64QAM	1	Max	1	0	21.01	0.0385
L	256QAM	1	Max	1	0	18.04	0.0195
M	256QAM	1	Max	1	0	18.19	0.0201
H	256QAM	1	Max	1	0	18.12	0.0198
Combination 10MHz+5MHz (50RB+25RB)							
Channel	Modulation	PCC		SCC		Measured Power	ERP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	22.65	0.0562
M	16QAM	1	Max	1	0	21.69	0.0451
Combination 5MHz+10MHz (25RB+50RB)							
Channel	Modulation	PCC		SCC		Measured Power	ERP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	22.76	0.0577
M	16QAM	1	Max	1	0	21.79	0.0461
Combination 5MHz+3MHz (25RB+15RB)							
Channel	Modulation	PCC		SCC		Measured Power	ERP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	22.81	0.0583
M	16QAM	1	Max	1	0	21.83	0.0466
Combination 3MHz+5MHz (15RB+25RB)							
Channel	Modulation	PCC		SCC		Measured Power	ERP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	22.74	0.0574
M	16QAM	1	Max	1	0	21.79	0.0461

LTE Band 66B:

Combination 10MHz+10MHz (50RB+50RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
L	QPSK	1	Max	1	0	22.55	0.1462
M	QPSK	1	Max	1	0	22.60	0.1479
H	QPSK	1	Max	1	0	22.39	0.1409
L	16QAM	1	Max	1	0	21.43	0.1130
M	16QAM	1	Max	1	0	21.52	0.1153
H	16QAM	1	Max	1	0	21.42	0.1127
L	64QAM	1	Max	1	0	20.71	0.0957
M	64QAM	1	Max	1	0	20.81	0.0979
H	64QAM	1	Max	1	0	20.73	0.0962
L	256QAM	1	Max	1	0	17.83	0.0493
M	256QAM	1	Max	1	0	17.86	0.0497
H	256QAM	1	Max	1	0	17.79	0.0489
Combination 15MHz+5MHz (75RB+25RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	22.24	0.1361
M	16QAM	1	Max	1	0	21.23	0.1079
Combination 5MHz+15MHz (25RB+75RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	22.53	0.1455
M	16QAM	1	Max	1	0	21.51	0.1151
Combination 10MHz+5MHz (50RB+25RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	22.51	0.1449
M	16QAM	1	Max	1	0	21.42	0.1127
Combination 5MHz+10MHz (25RB+50RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	22.47	0.1435
M	16QAM	1	Max	1	0	21.36	0.1112
Combination 5MHz+5MHz (25RB+25RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	22.49	0.1442
M	16QAM	1	Max	1	0	21.39	0.1119

LTE Band 66C:

Combination 20MHz+20MHz (100RB+100RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
L	QPSK	1	Max	1	0	22.42	0.1419
M	QPSK	1	Max	1	0	22.49	0.1442
H	QPSK	1	Max	1	0	22.42	0.1419
L	16QAM	1	Max	1	0	21.32	0.1102
M	16QAM	1	Max	1	0	21.39	0.1119
H	16QAM	1	Max	1	0	21.26	0.1086
L	64QAM	1	Max	1	0	20.17	0.0845
M	64QAM	1	Max	1	0	20.27	0.0865
H	64QAM	1	Max	1	0	20.29	0.0869
L	256QAM	1	Max	1	0	17.65	0.0473
M	256QAM	1	Max	1	0	17.63	0.0471
H	256QAM	1	Max	1	0	17.60	0.0468
Combination 20MHz+15MHz (100RB+75RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	22.14	0.1330
M	16QAM	1	Max	1	0	21.32	0.1102
Combination 15MHz+20MHz (75RB+100RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	22.19	0.1346
M	16QAM	1	Max	1	0	21.33	0.1104
Combination 15MHz+15MHz (75RB+75RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	22.28	0.1374
M	16QAM	1	Max	1	0	21.17	0.1064
Combination 20MHz+10MHz (100RB+50RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	22.41	0.1416
M	16QAM	1	Max	1	0	21.28	0.1091
Combination 10MHz+20MHz (50RB+100RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	22.16	0.1337
M	16QAM	1	Max	1	0	21.29	0.1094
Combination 15MHz+10MHz (75RB+50RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	22.24	0.1361
M	16QAM	1	Max	1	0	21.02	0.1028
Combination 10MHz+15MHz (50RB+75RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	22.22	0.1355

M	16QAM	1	Max	1	0	21.18	0.1067
Combination 20MHz+5MHz (100RB+25RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	22.37	0.1403
M	16QAM	1	Max	1	0	21.32	0.1102
Combination 5MHz+20MHz (25RB+100RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	22.33	0.1390
M	16QAM	1	Max	1	0	21.24	0.1081

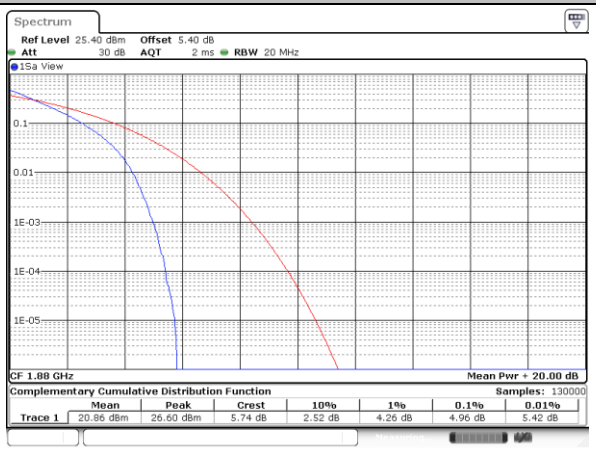
LTE Band 2

Peak-to-Average Ratio

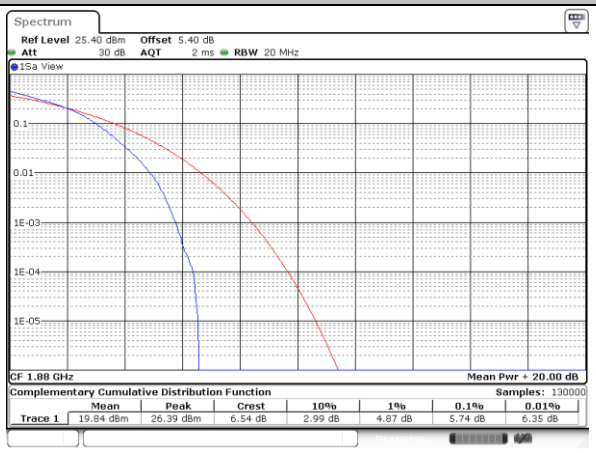
Mode	LTE Band 2 / 20MHz				
Mod.	QPSK	16QAM	64QAM	256QAM	Limit: 13dB
RB Size	Full RB	Full RB	Full RB	Full RB	Result
Middle CH	4.96	5.74	6.52	6.46	PASS

LTE Band 2 / 20MHz

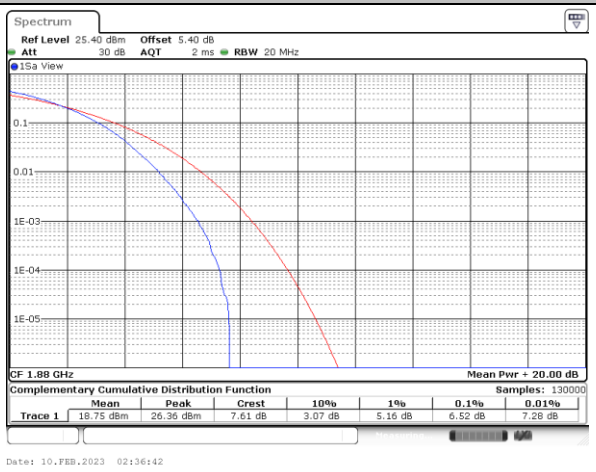
Middle Channel / Full RB/ QPSK



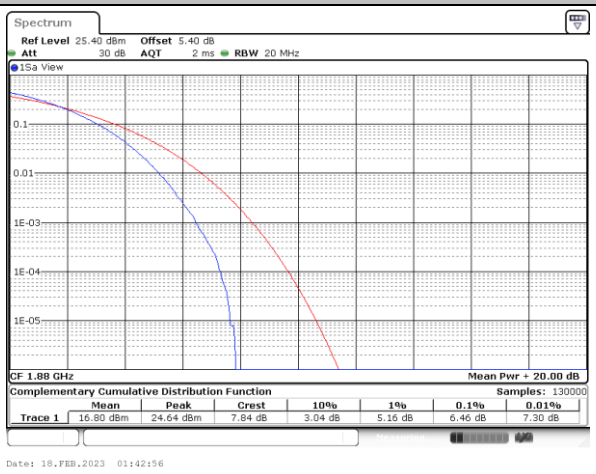
Middle Channel / Full RB/ 16QAM



Middle Channel / Full RB/ 64QAM



Middle Channel / Full RB/ 256QAM

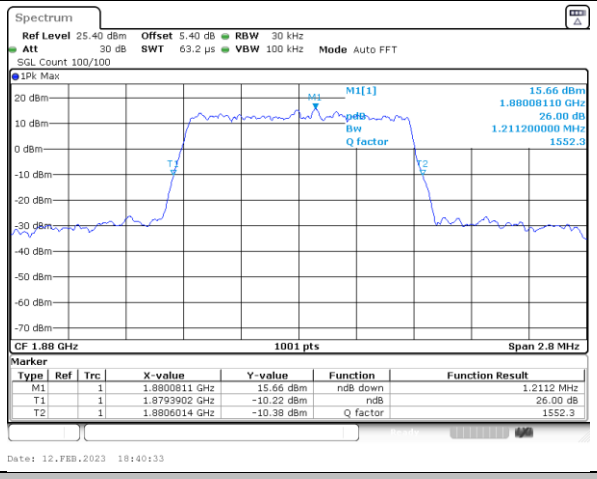


26dB Bandwidth

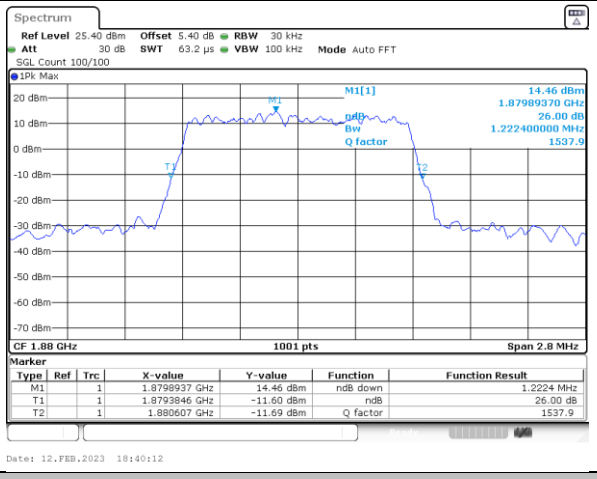
Mode	LTE Band 2 : 26dB BW(MHz)	
BW	1.4MHz	
Mod.	QPSK	16QAM
Middle CH	1.21	1.22
BW	3MHz	
Mod.	QPSK	16QAM
Middle CH	3.05	2.99
BW	5MHz	
Mod.	QPSK	16QAM
Middle CH	4.87	4.90
BW	10MHz	
Mod.	QPSK	16QAM
Middle CH	9.93	9.79
BW	15MHz	
Mod.	QPSK	16QAM
Middle CH	14.51	14.45
BW	20MHz	
Mod.	QPSK	16QAM
Middle CH	19.26	19.26

LTE Band 2

Middle Channel / 1.4MHz / QPSK

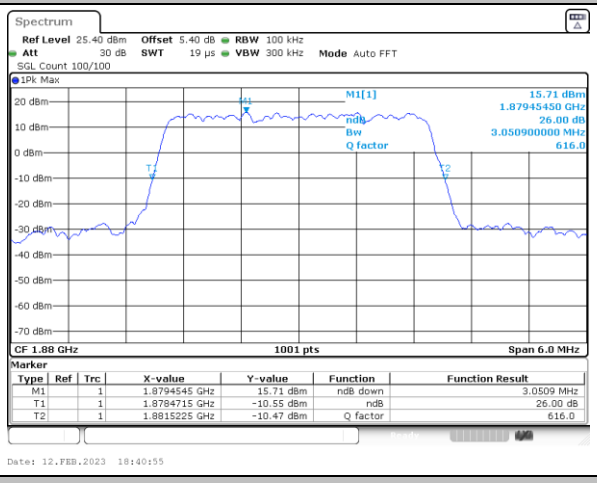


Middle Channel / 1.4MHz / 16QAM

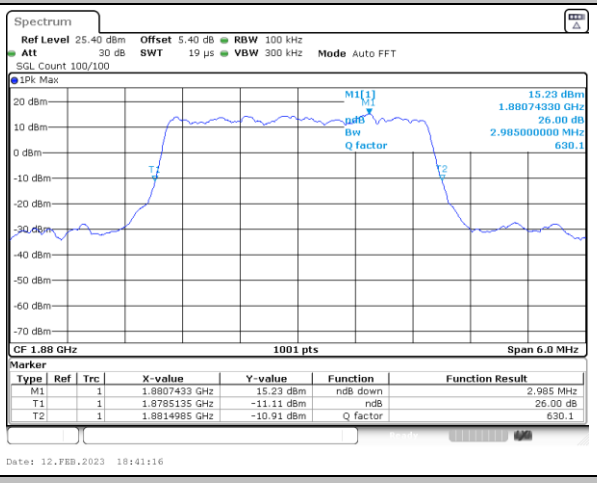


LTE Band 2

Middle Channel / 3MHz / QPSK

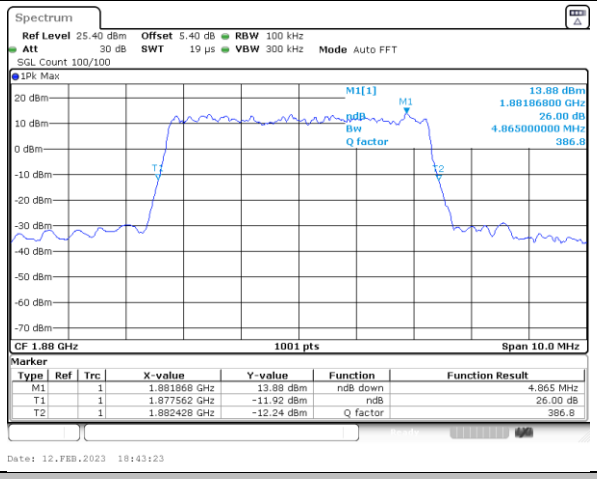


Middle Channel / 3MHz / 16QAM

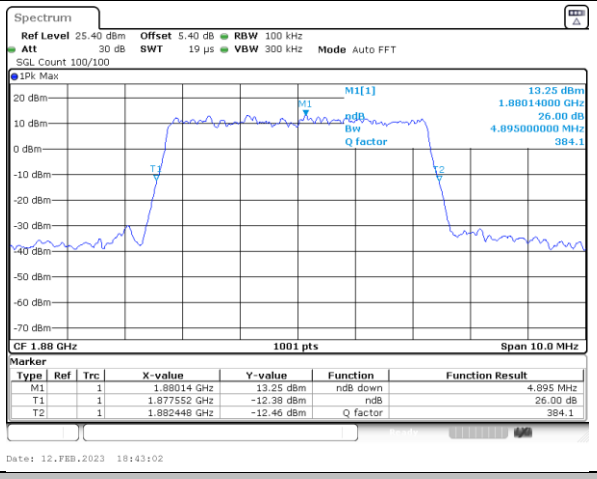


LTE Band 2

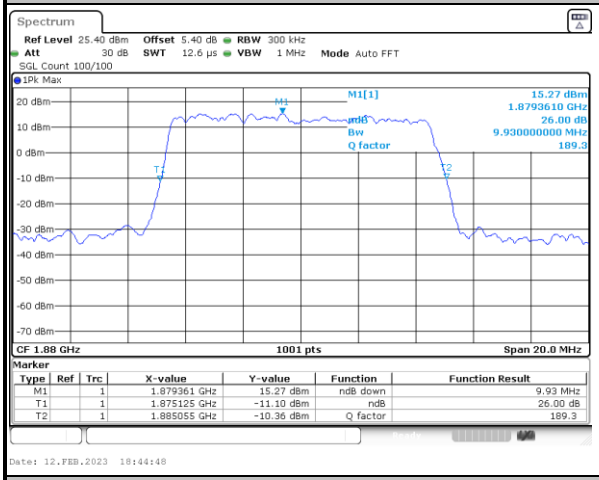
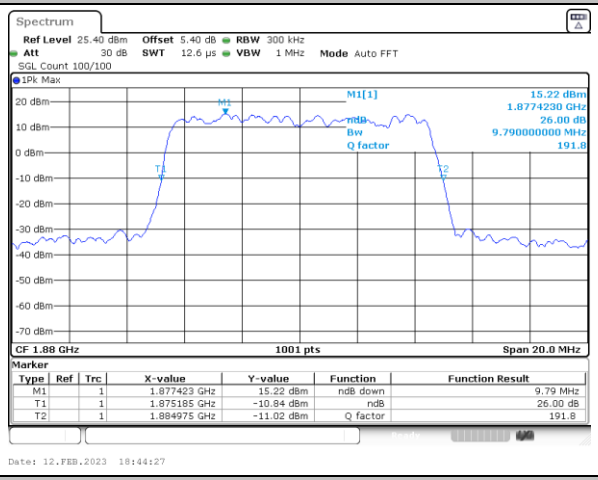
Middle Channel / 5MHz / QPSK



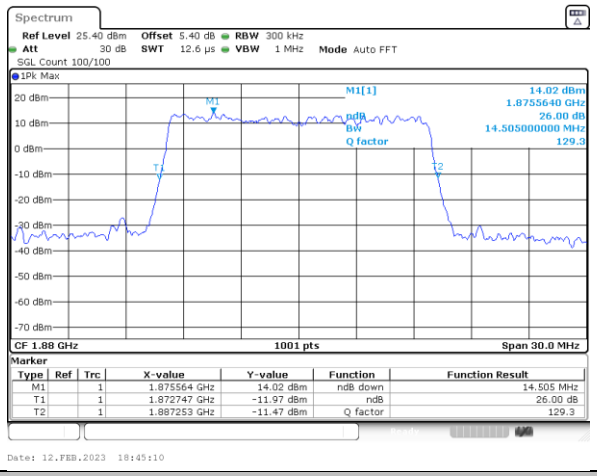
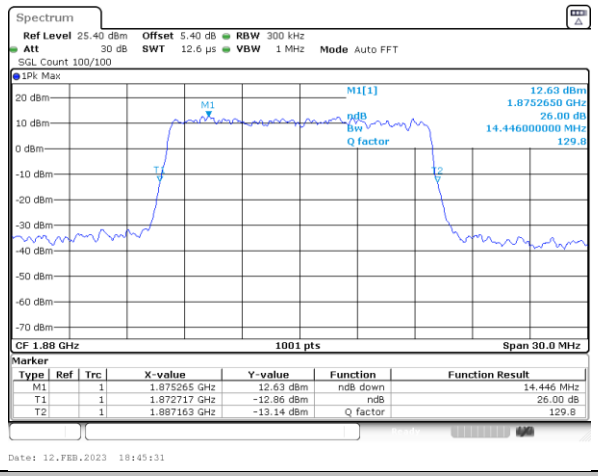
Middle Channel / 5MHz / 16QAM



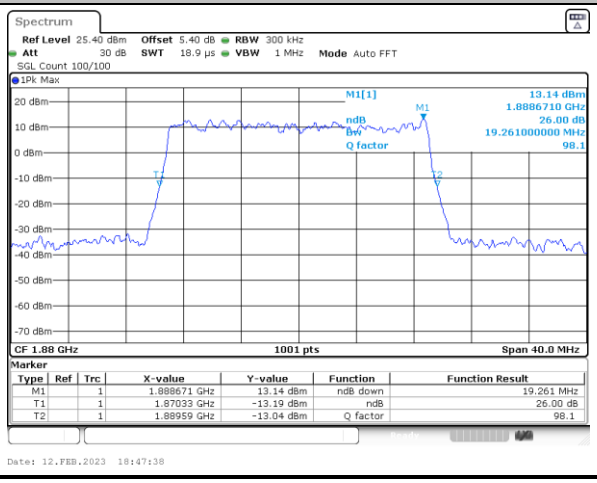
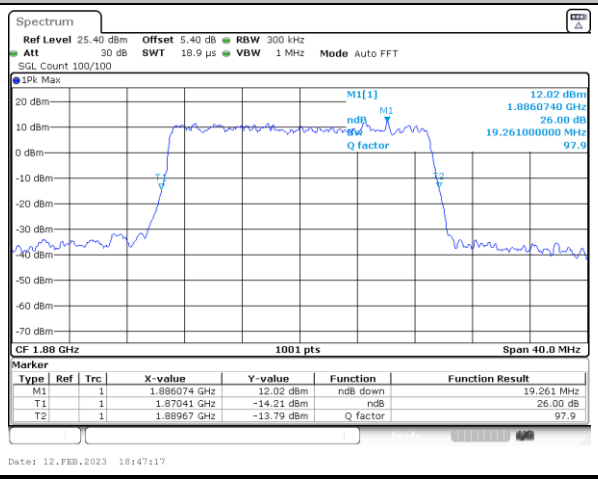
LTE Band 2

Middle Channel / 10MHz / QPSK	Middle Channel / 10MHz / 16QAM
	

LTE Band 2

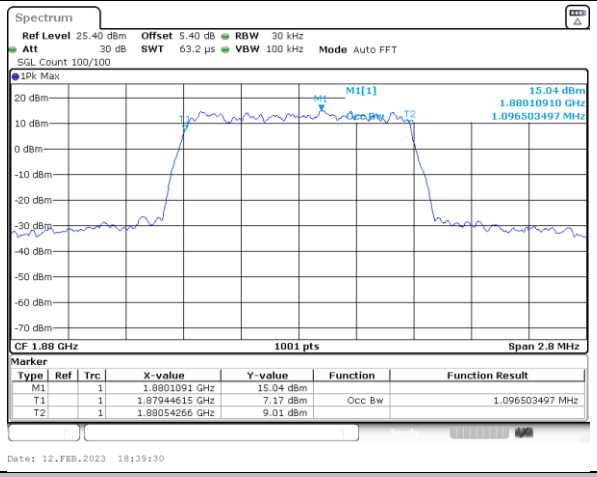
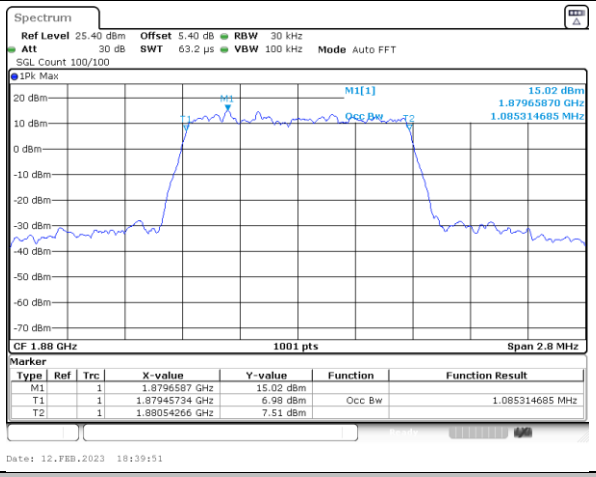
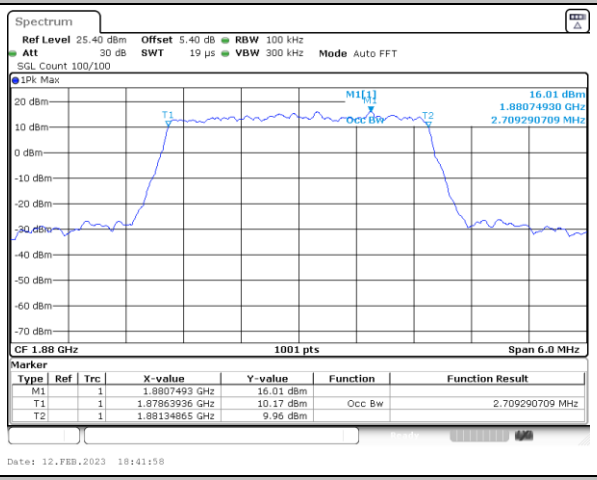
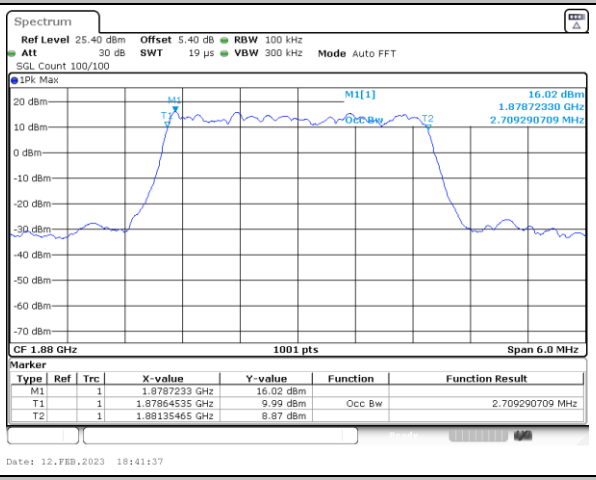
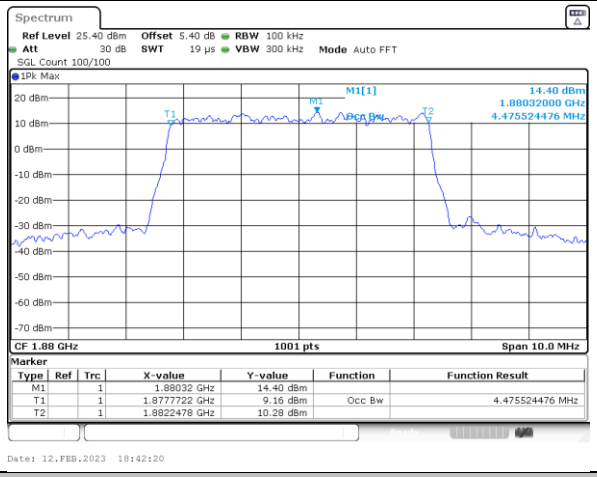
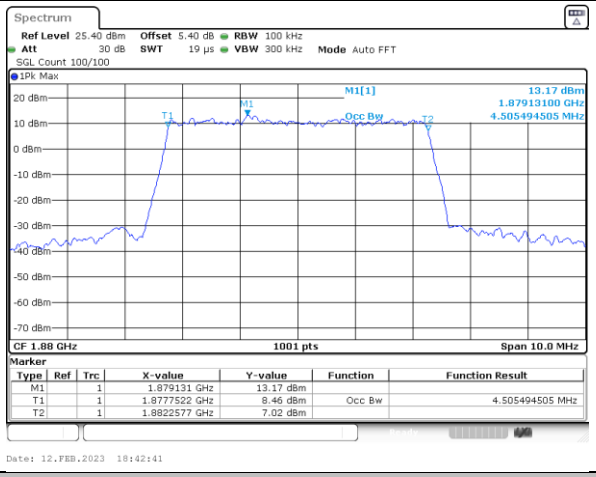
Middle Channel / 15MHz / QPSK	Middle Channel / 15MHz / 16QAM
	

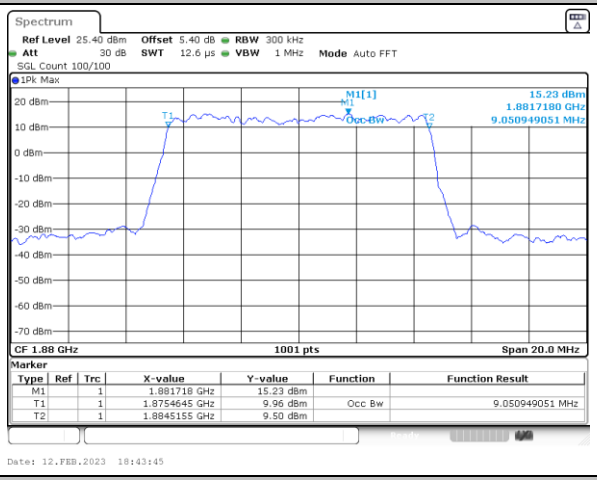
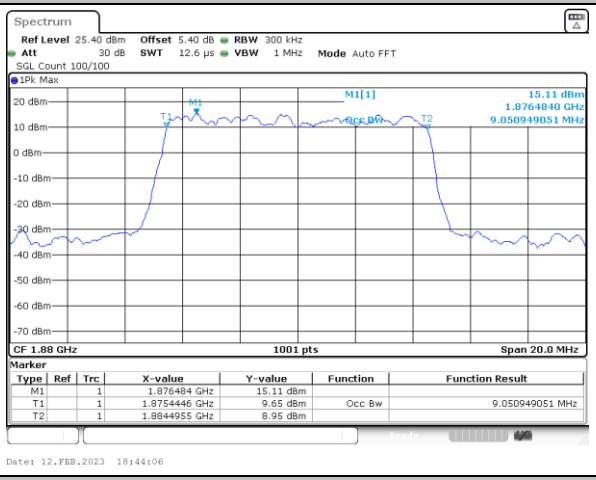
LTE Band 2

Middle Channel / 20MHz / QPSK	Middle Channel / 20MHz / 16QAM
	

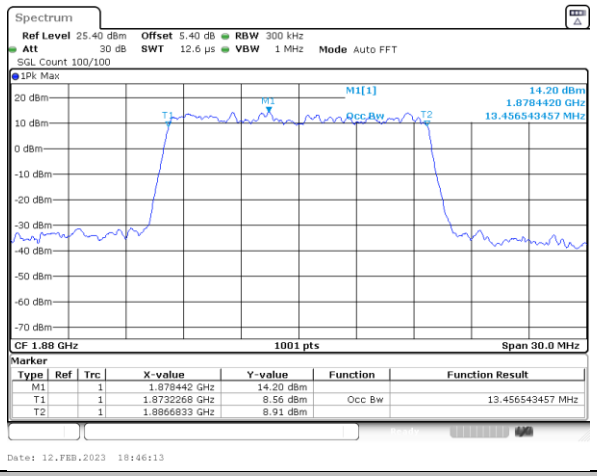
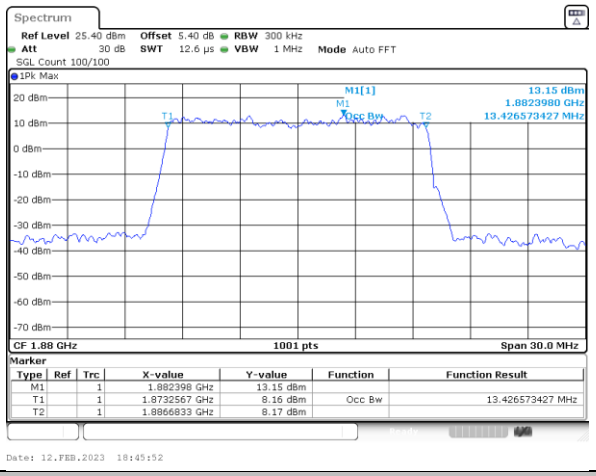
Occupied Bandwidth

Mode	LTE Band 2 : 99%OBW(MHz)	
BW	1.4MHz	
Mod.	QPSK	16QAM
Middle CH	1.10	1.09
BW	3MHz	
Mod.	QPSK	16QAM
Middle CH	2.71	2.71
BW	5MHz	
Mod.	QPSK	16QAM
Middle CH	4.48	4.51
BW	10MHz	
Mod.	QPSK	16QAM
Middle CH	9.05	9.05
BW	15MHz	
Mod.	QPSK	16QAM
Middle CH	13.46	13.43
BW	20MHz	
Mod.	QPSK	16QAM
Middle CH	17.90	17.94

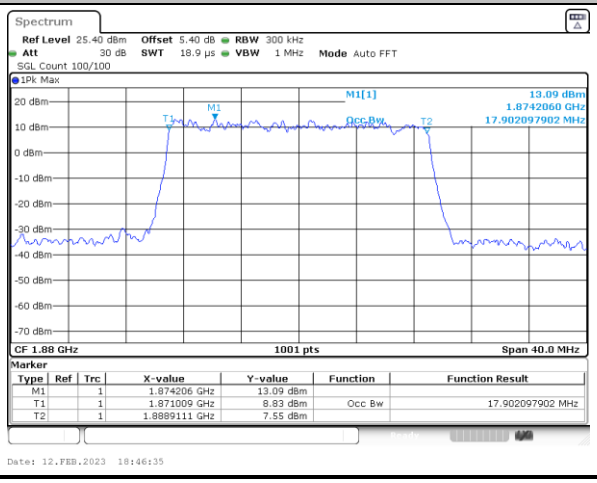
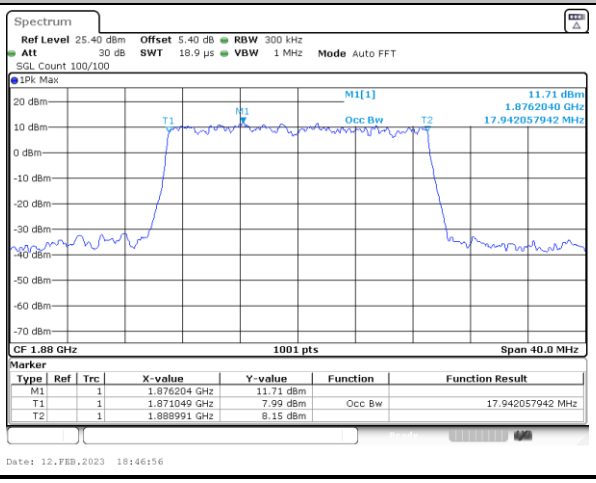
LTE Band 2	
Middle Channel / 1.4MHz / QPSK	**Middle Channel / 1.4MHz / 16QAM**
	
LTE Band 2	
Middle Channel / 3MHz / QPSK	**Middle Channel / 3MHz / 16QAM**
	
LTE Band 2	
Middle Channel / 5MHz / QPSK	**Middle Channel / 5MHz / 16QAM**
	
LTE Band 2	

Middle Channel / 10MHz / QPSK	Middle Channel / 10MHz / 16QAM
	

LTE Band 2

Middle Channel / 15MHz / QPSK	Middle Channel / 15MHz / 16QAM
	

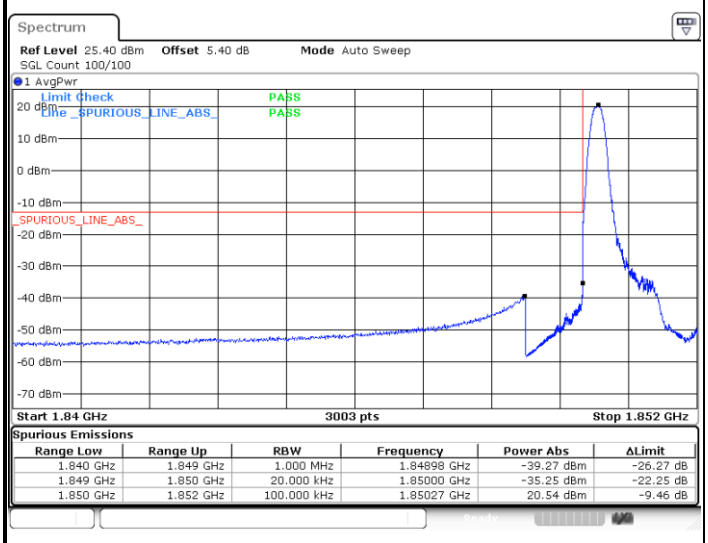
LTE Band 2

Middle Channel / 20MHz / QPSK	Middle Channel / 20MHz / 16QAM
	

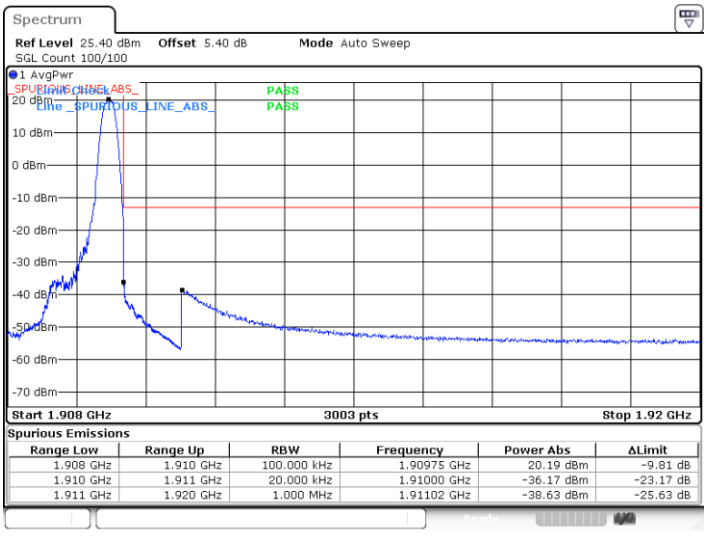
Conducted Band Edge

LTE Band 2 / 1.4MHz / QPSK

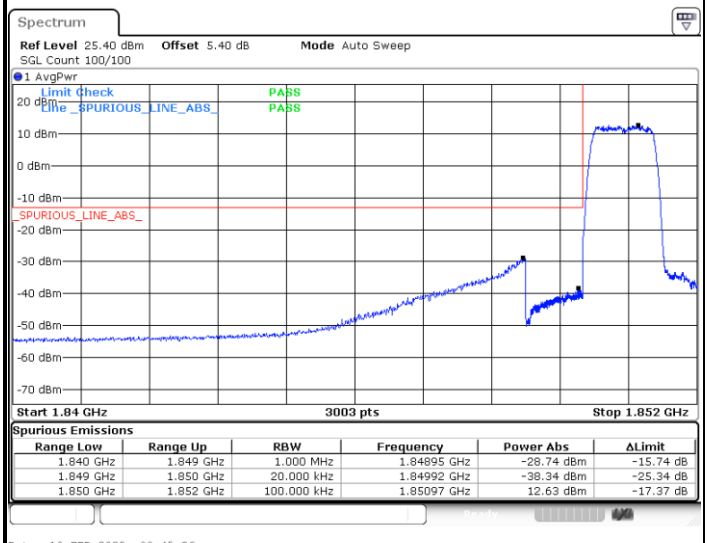
Lowest Band Edge / 1RB



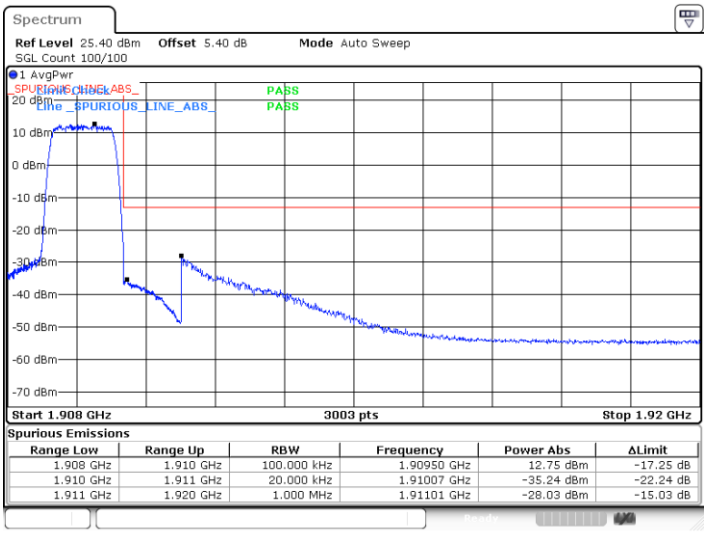
Highest Band Edge / 1RB



Lowest Band Edge / Full RB

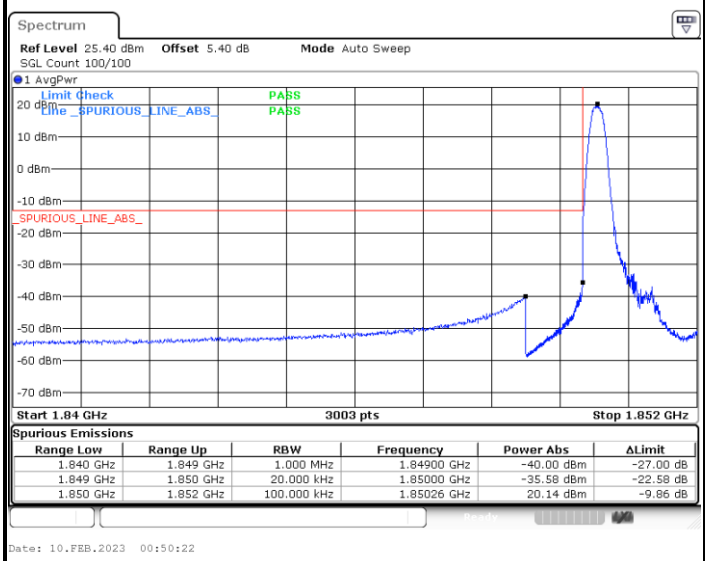


Highest Band Edge / Full RB

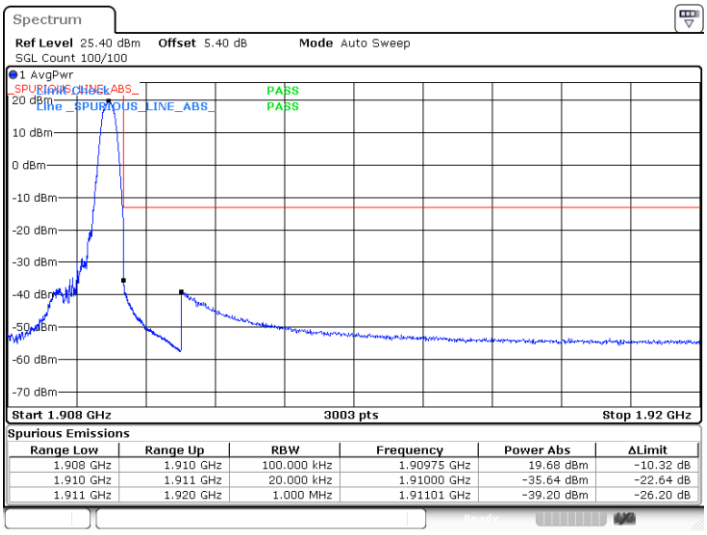


LTE Band 2 / 1.4MHz / 16QAM

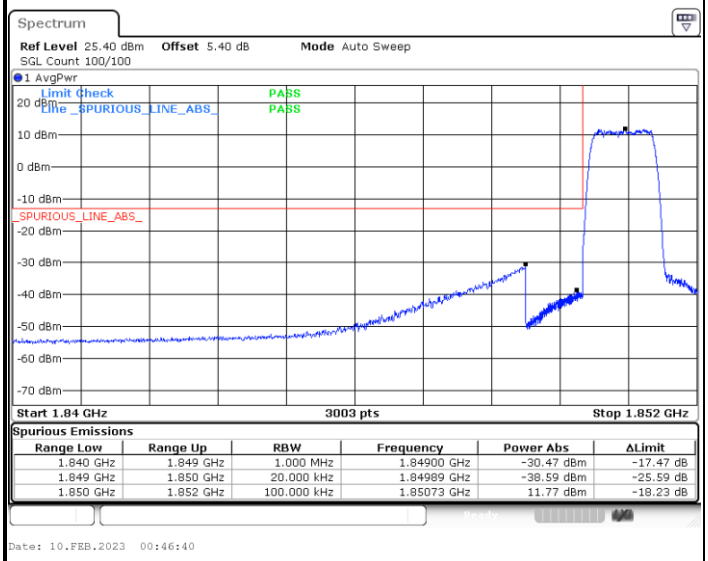
Lowest Band Edge / 1 RB



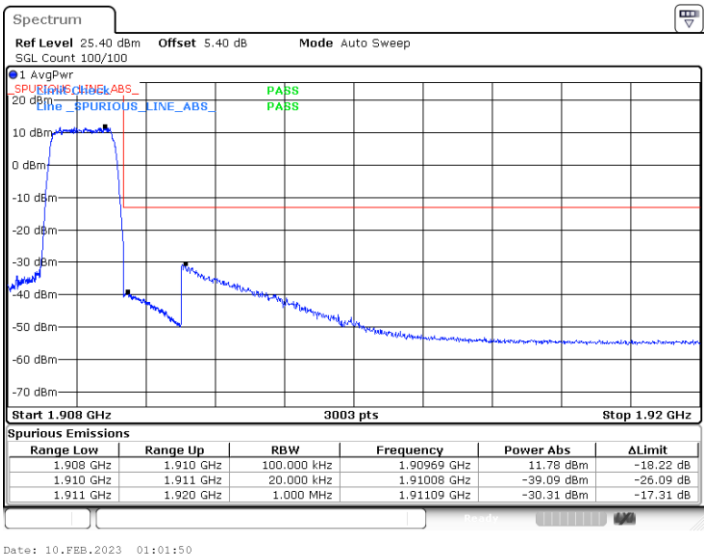
Highest Band Edge / 1 RB



Lowest Band Edge / Full RB

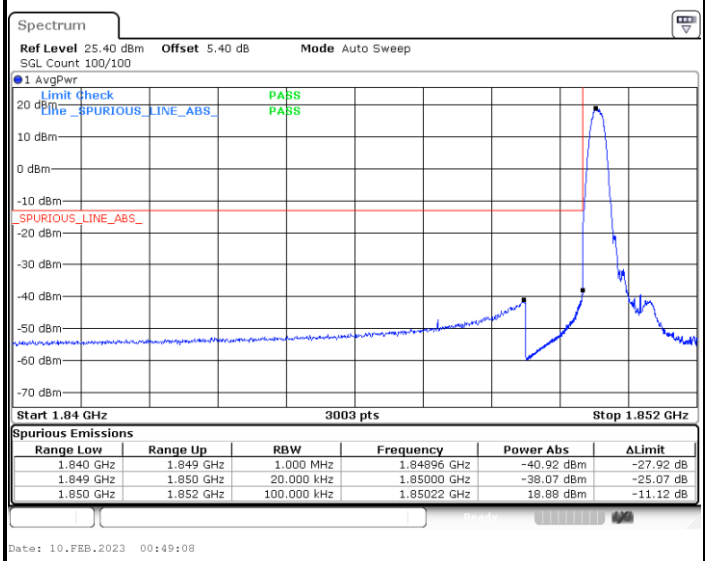


Highest Band Edge / Full RB



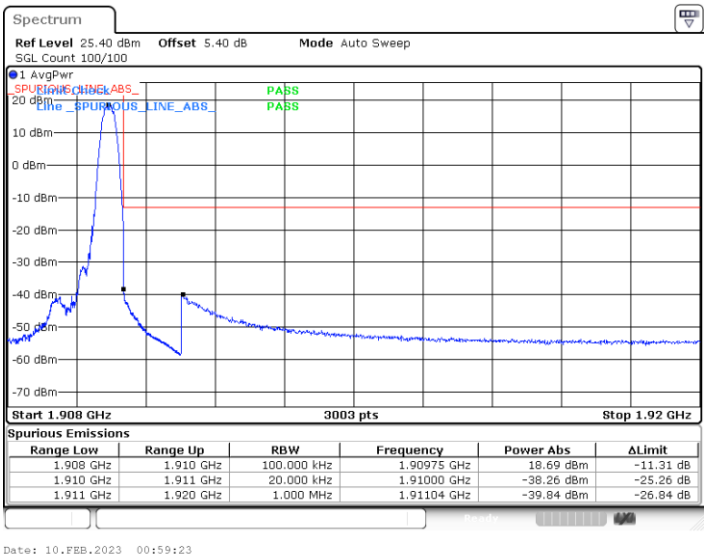
LTE Band 2 / 1.4MHz / 64QAM

Lowest Band Edge / 1 RB



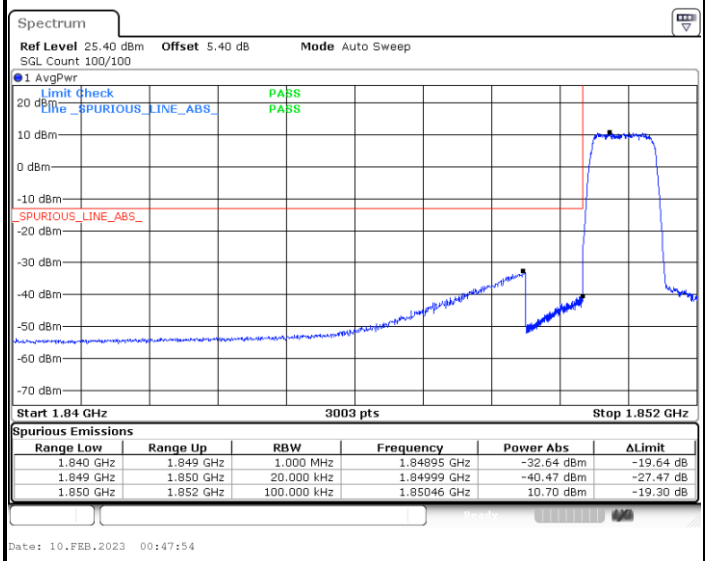
Date: 10.FEB.2023 00:49:08

Highest Band Edge / 1 RB



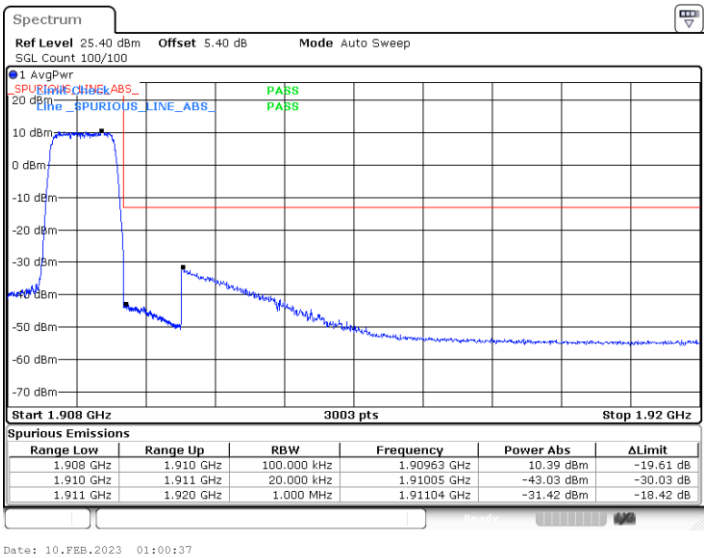
Date: 10.FEB.2023 00:59:23

Lowest Band Edge / Full RB



Date: 10.FEB.2023 00:47:54

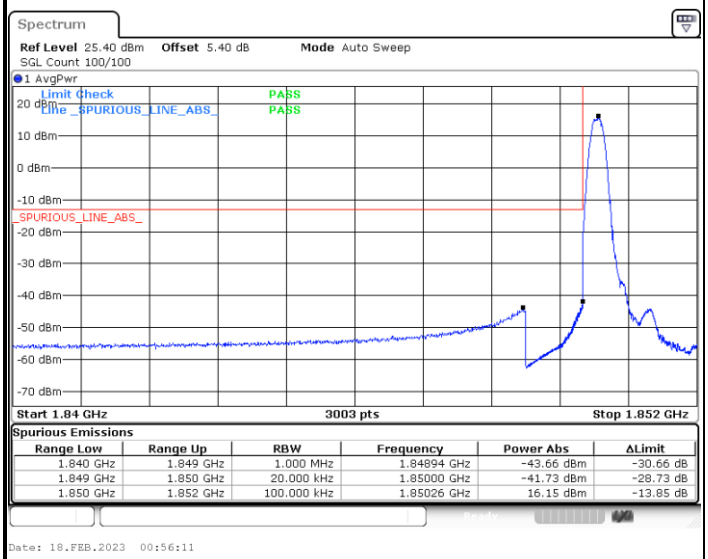
Highest Band Edge / Full RB



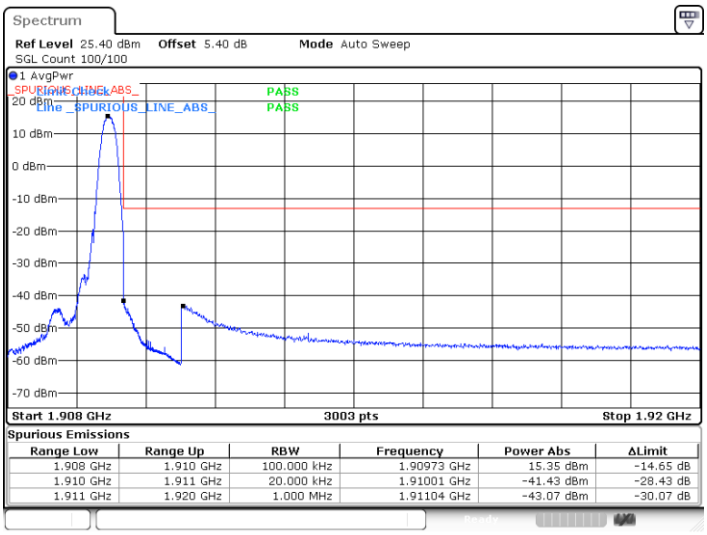
Date: 10.FEB.2023 01:00:37

LTE Band 2 / 1.4MHz / 256QAM

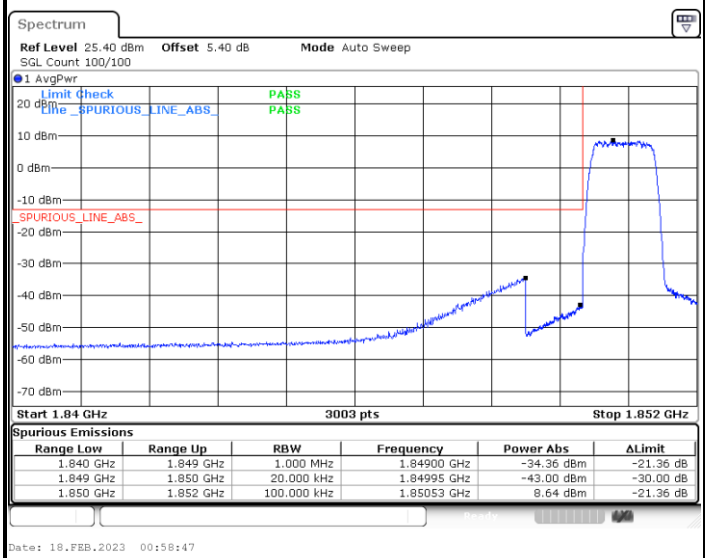
Lowest Band Edge / 1 RB



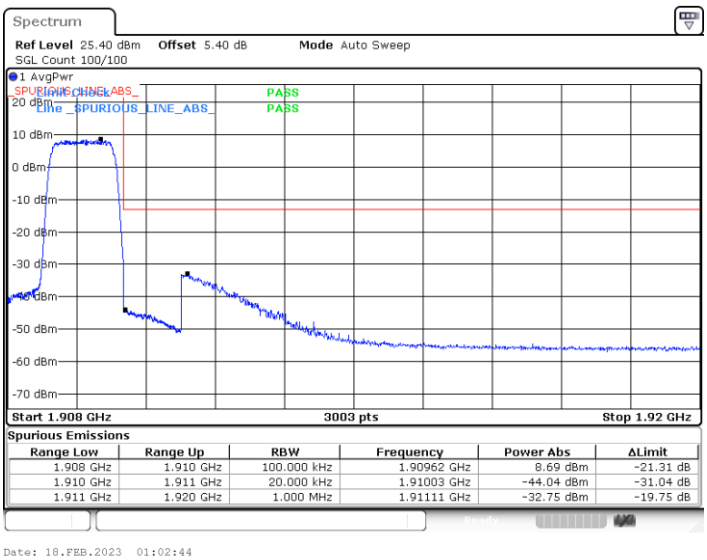
Highest Band Edge / 1 RB



Lowest Band Edge / Full RB

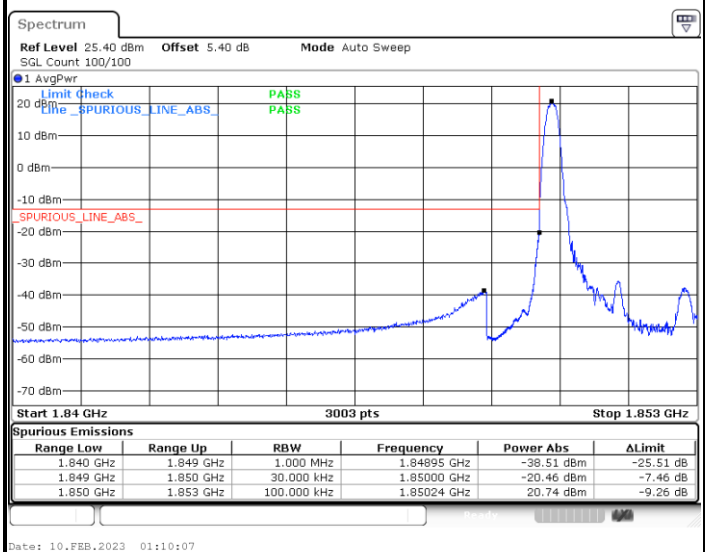


Highest Band Edge / Full RB



LTE Band 2 / 3MHz / QPSK

Lowest Band Edge / 1RB

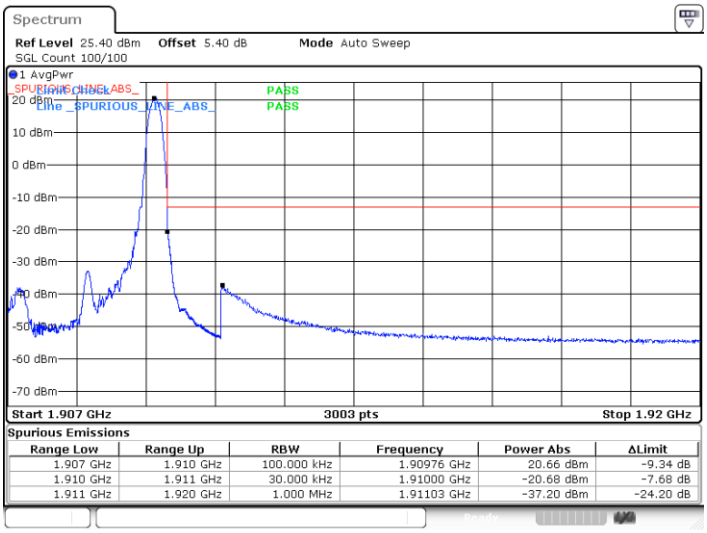


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.840 GHz	1.849 GHz	1.000 MHz	1.84895 GHz	-38.51 dBm	-25.51 dB
1.849 GHz	1.850 GHz	30.000 kHz	1.85000 GHz	-20.46 dBm	-7.46 dB
1.850 GHz	1.853 GHz	100.000 kHz	1.85024 GHz	20.74 dBm	-9.26 dB

Date: 10.FEB.2023 01:10:07

Highest Band Edge / 1 RB

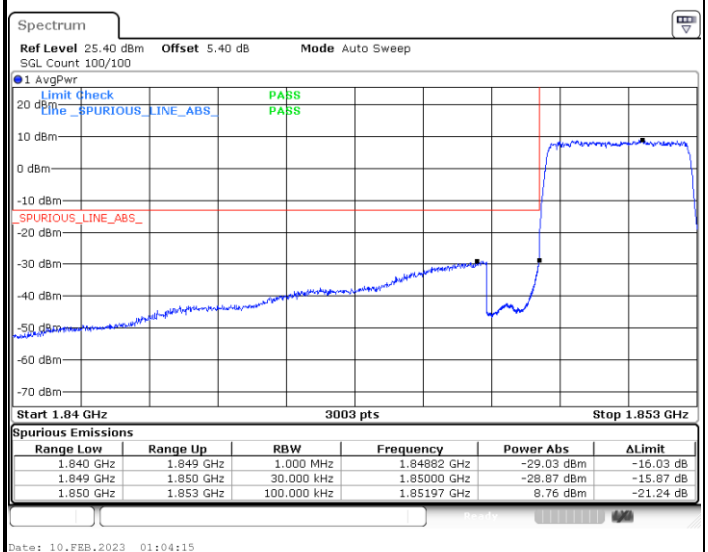


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.907 GHz	1.910 GHz	100.000 kHz	1.90976 GHz	20.66 dBm	-9.34 dB
1.910 GHz	1.911 GHz	30.000 kHz	1.91000 GHz	-20.68 dBm	-7.68 dB
1.911 GHz	1.920 GHz	1.000 MHz	1.91103 GHz	-37.20 dBm	-24.20 dB

Date: 10.FEB.2023 01:15:24

Lowest Band Edge / Full RB

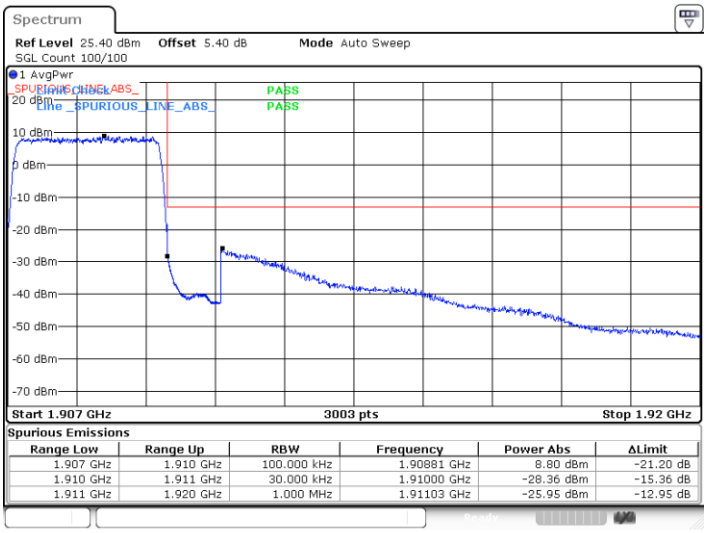


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.840 GHz	1.849 GHz	1.000 MHz	1.84882 GHz	-29.03 dBm	-16.03 dB
1.849 GHz	1.850 GHz	30.000 kHz	1.85000 GHz	-28.87 dBm	-15.87 dB
1.850 GHz	1.853 GHz	100.000 kHz	1.85197 GHz	8.76 dBm	-21.24 dB

Date: 10.FEB.2023 01:04:15

Highest Band Edge / Full RB



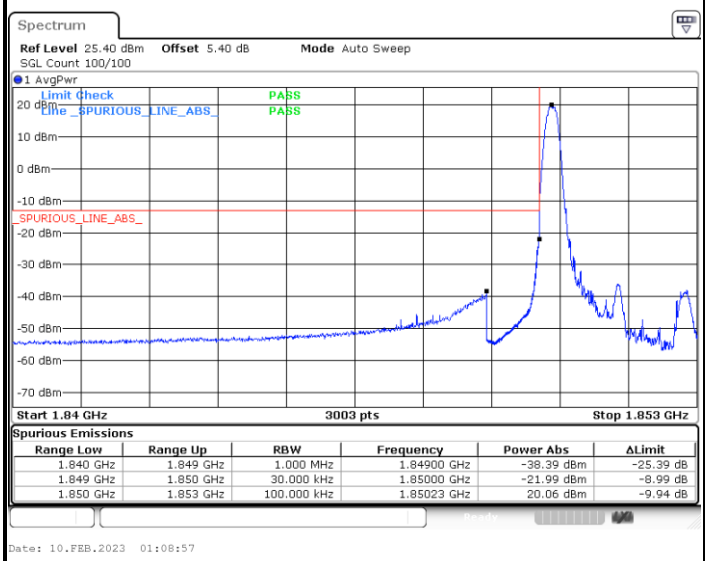
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.907 GHz	1.910 GHz	100.000 kHz	1.90881 GHz	8.80 dBm	-21.20 dB
1.910 GHz	1.911 GHz	30.000 kHz	1.91000 GHz	-28.36 dBm	-15.36 dB
1.911 GHz	1.920 GHz	1.000 MHz	1.91103 GHz	-25.95 dBm	-12.95 dB

Date: 10.FEB.2023 01:21:16

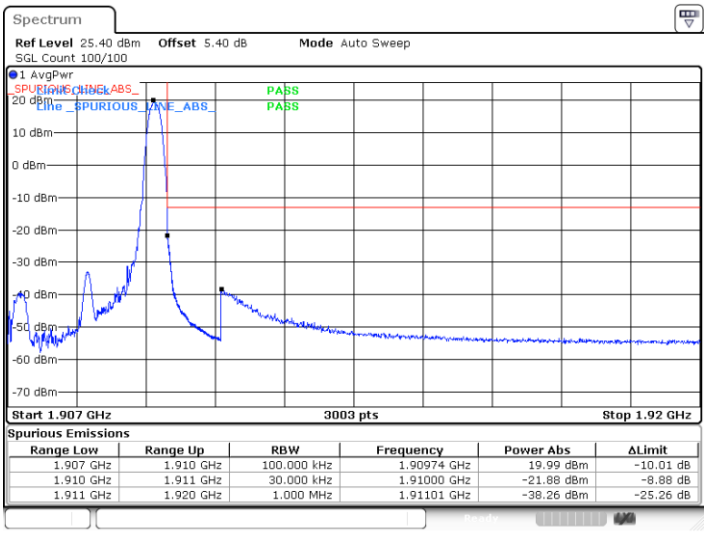
LTE Band 2 / 3MHz / 16QAM

Lowest Band Edge / 1 RB



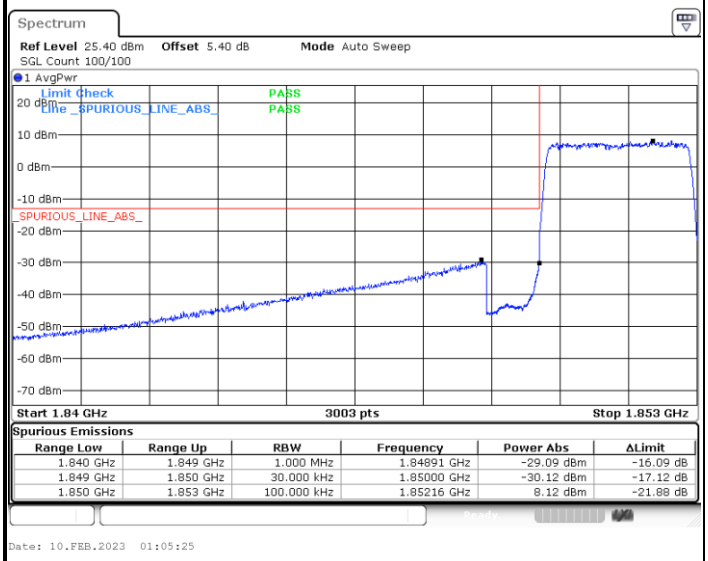
Date: 10.FEB.2023 01:08:57

Highest Band Edge /1 RB



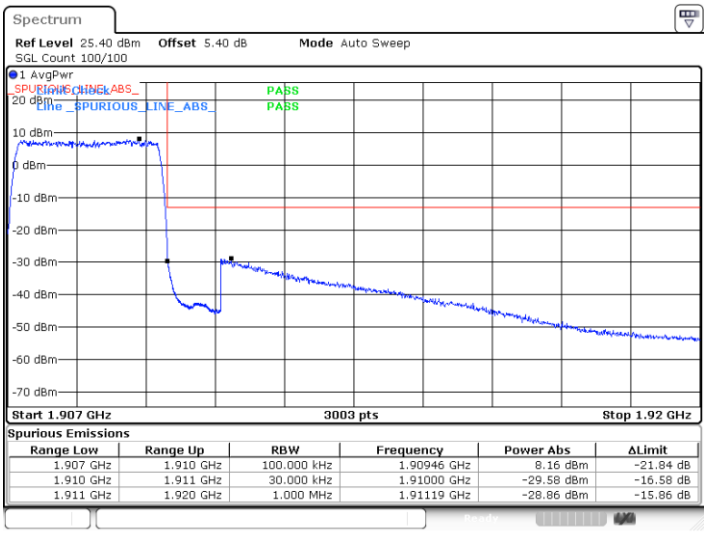
Date: 10.FEB.2023 01:16:34

Lowest Band Edge / Full RB



Date: 10.FEB.2023 01:05:25

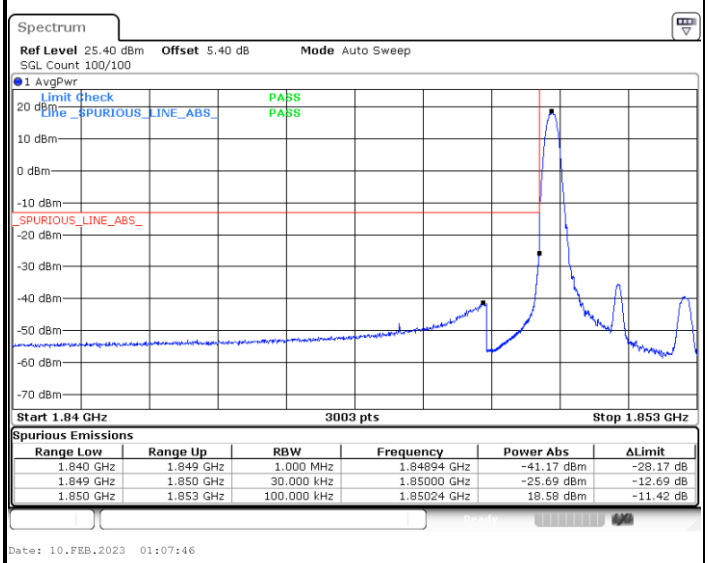
Highest Band Edge / Full RB



Date: 10.FEB.2023 01:20:05

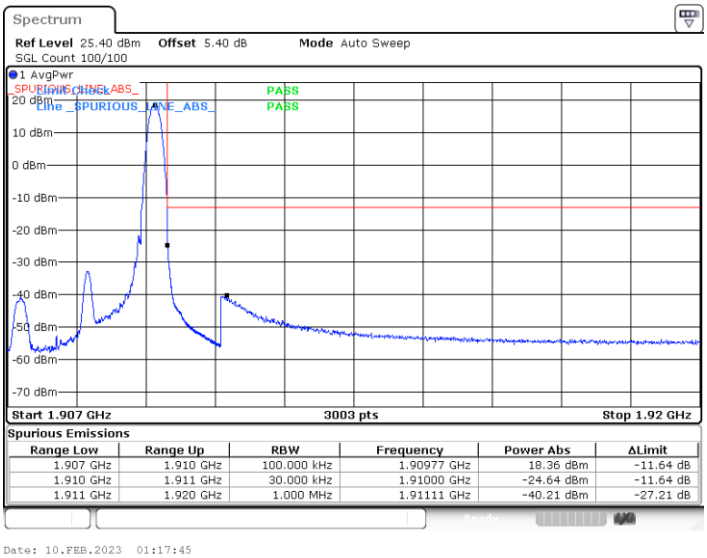
LTE Band 2 / 3MHz / 64QAM

Lowest Band Edge / 1 RB



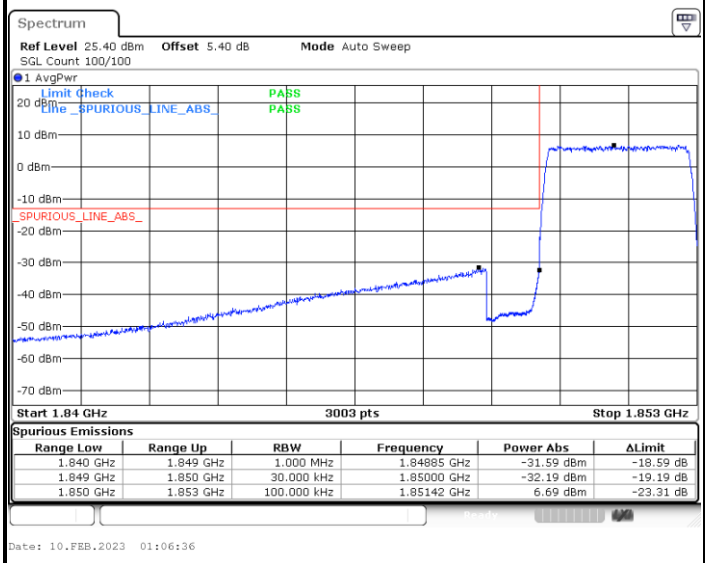
Date: 10.FEB.2023 01:07:46

Highest Band Edge /1 RB



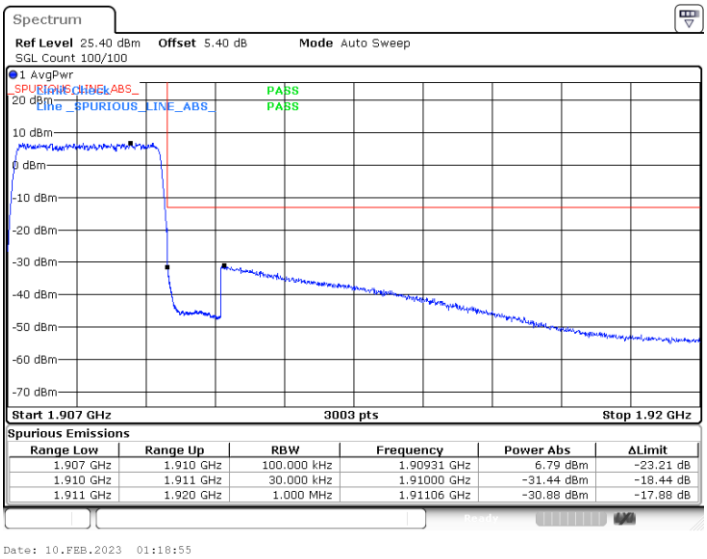
Date: 10.FEB.2023 01:17:45

Lowest Band Edge / Full RB



Date: 10.FEB.2023 01:06:36

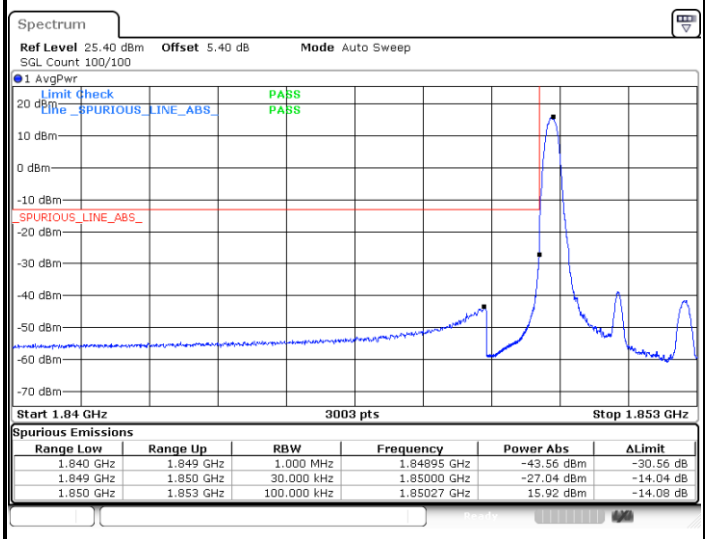
Highest Band Edge / Full RB



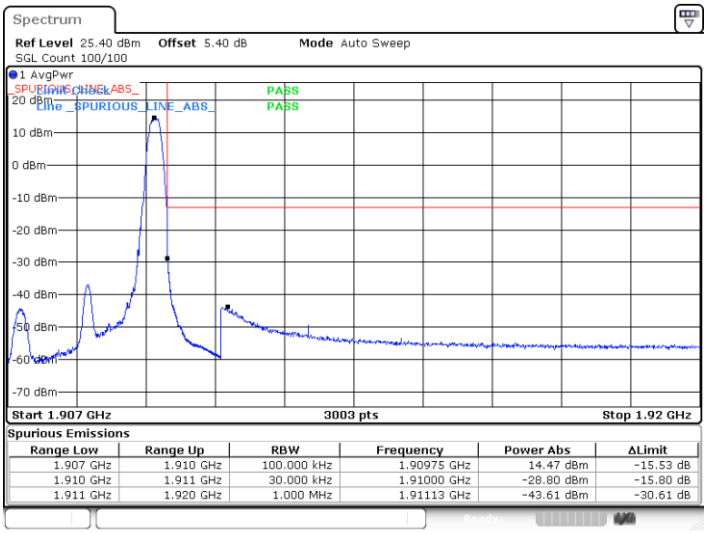
Date: 10.FEB.2023 01:18:55

LTE Band 2 / 3MHz / 256QAM

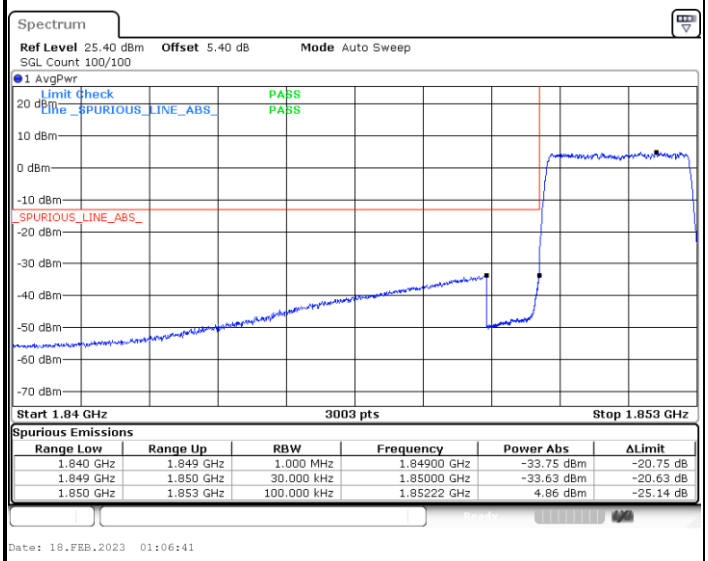
Lowest Band Edge / 1 RB



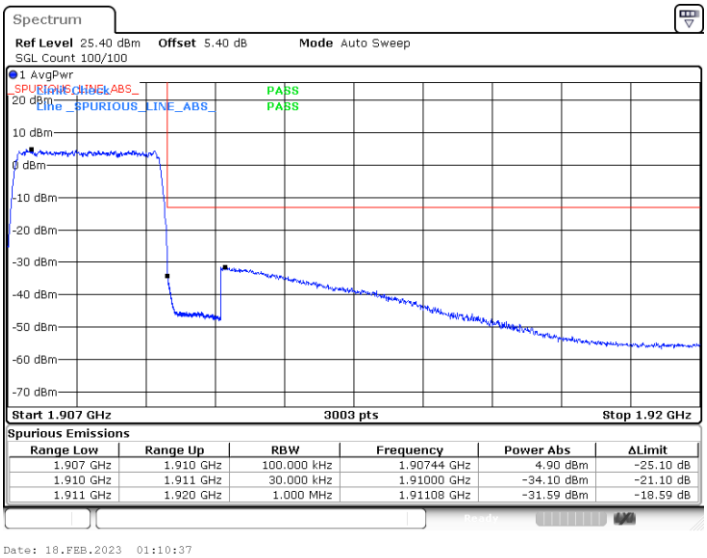
Highest Band Edge /1 RB



Lowest Band Edge / Full RB

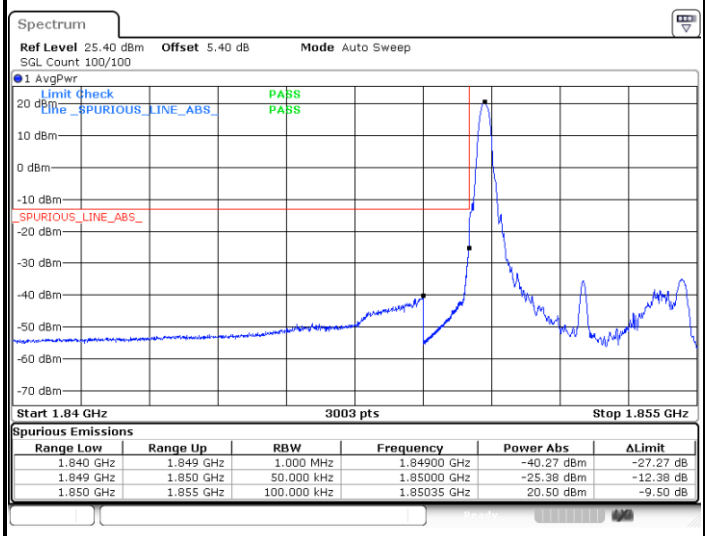


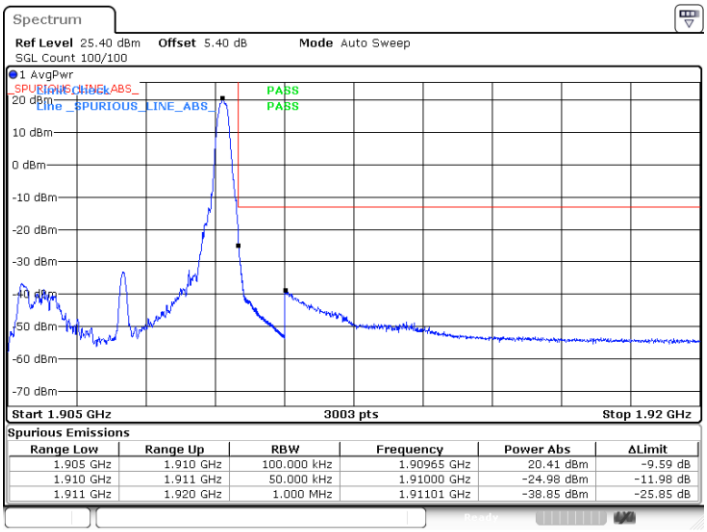
Highest Band Edge / Full RB



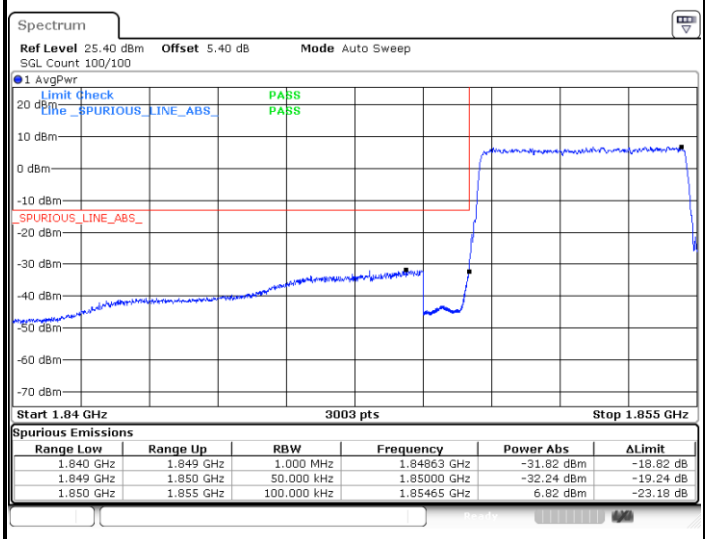
LTE Band 2 / 5MHz / QPSK

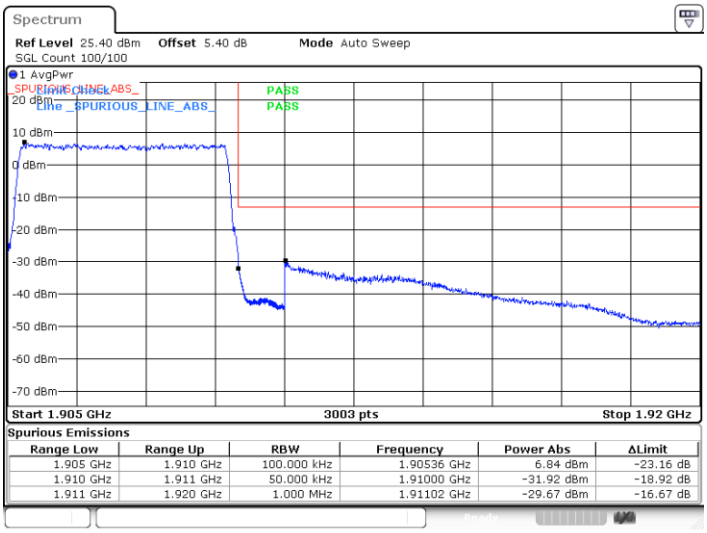
Lowest Band Edge / 1 RB	Highest Band Edge / 1 RB





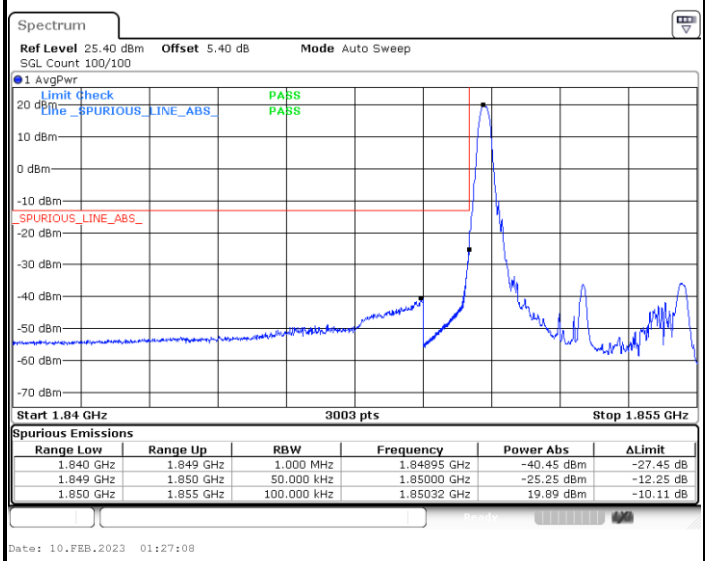
Lowest Band Edge / Full RB	Highest Band Edge / Full RB





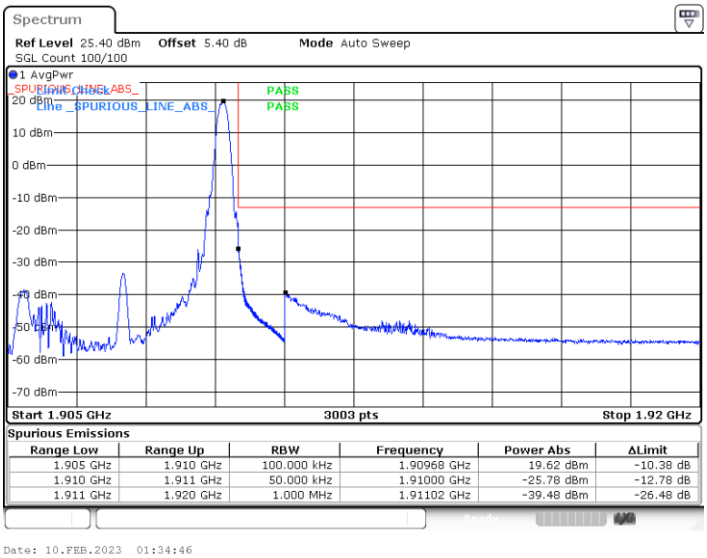
LTE Band 2 / 5MHz / 16QAM

Lowest Band Edge / 1RB



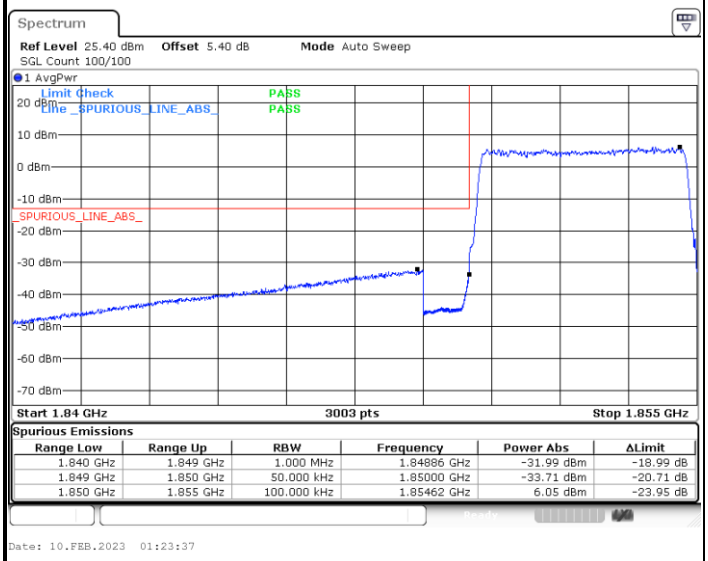
Date: 10.FEB.2023 01:27:08

Highest Band Edge / 1 RB



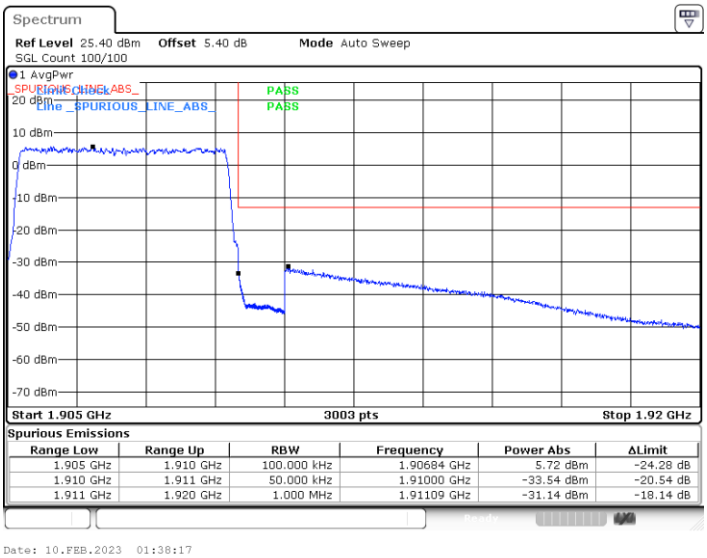
Date: 10.FEB.2023 01:34:46

Lowest Band Edge / Full RB



Date: 10.FEB.2023 01:23:37

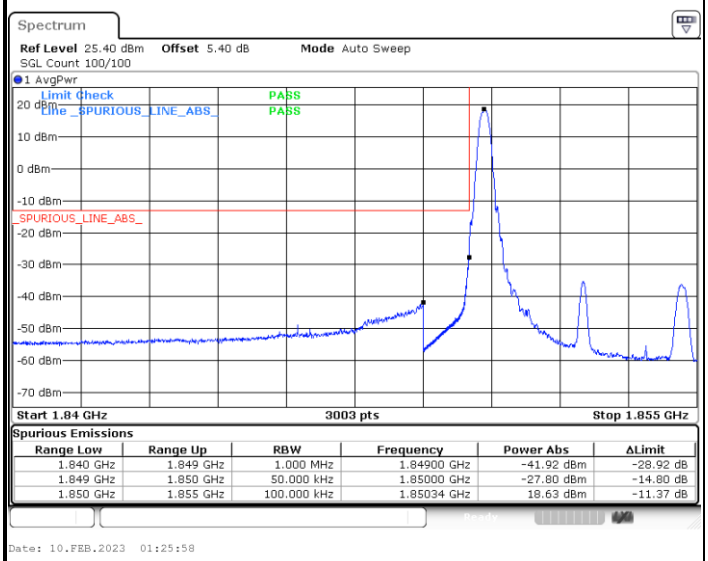
Highest Band Edge / Full RB



Date: 10.FEB.2023 01:38:17

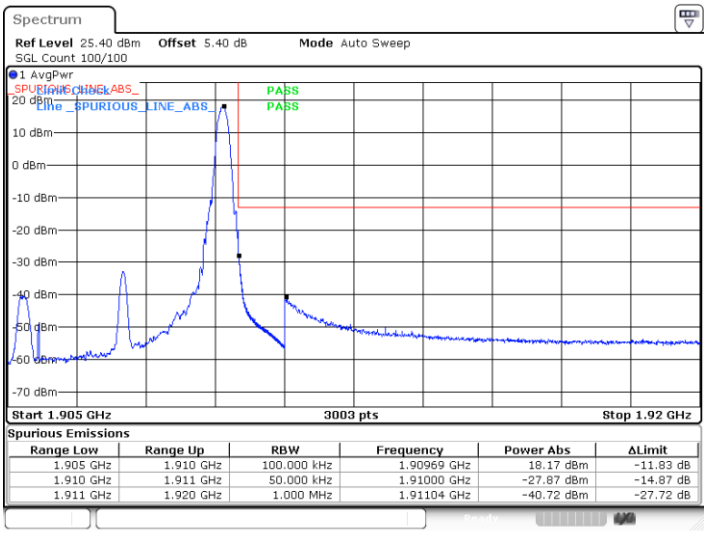
LTE Band 2 / 5MHz / 64QAM

Lowest Band Edge / 1RB



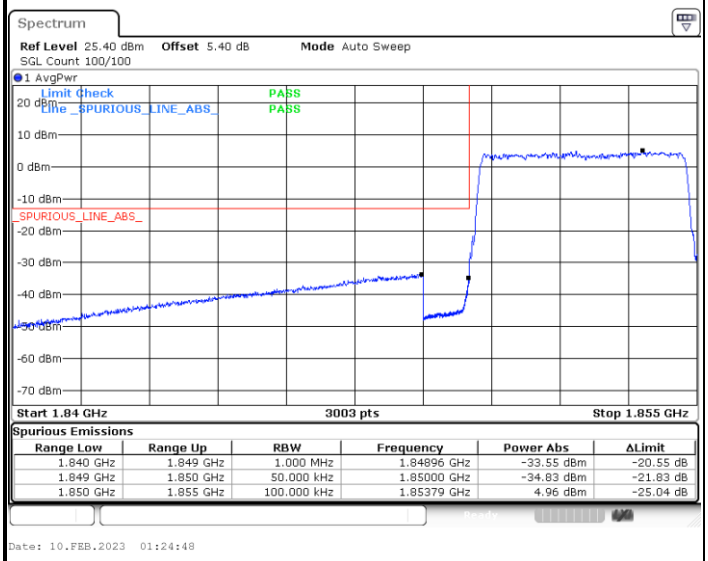
Date: 10.FEB.2023 01:25:58

Highest Band Edge / 1 RB



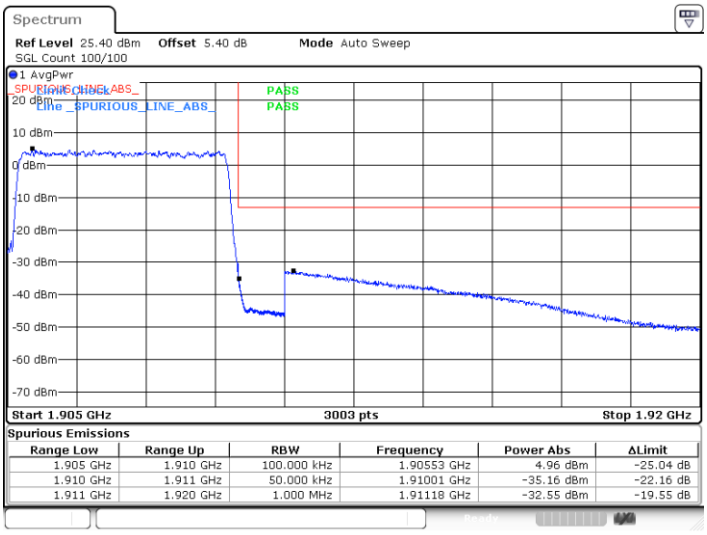
Date: 10.FEB.2023 01:35:56

Lowest Band Edge / Full RB



Date: 10.FEB.2023 01:24:48

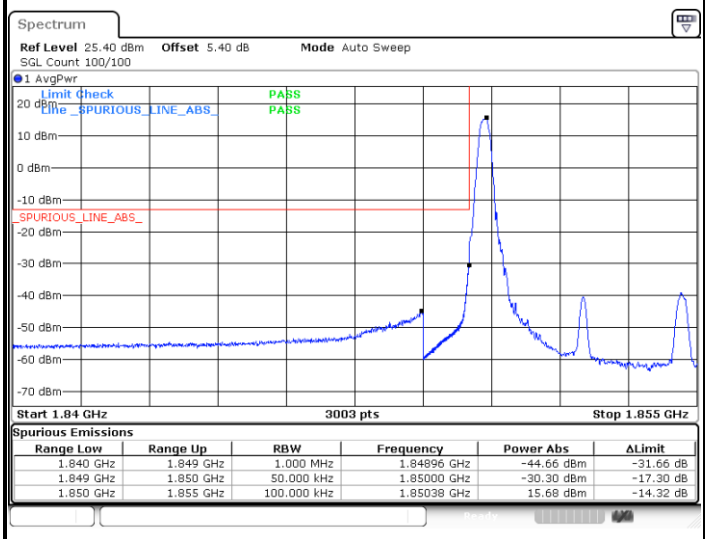
Highest Band Edge / Full RB



Date: 10.FEB.2023 01:37:07

LTE Band 2 / 5MHz / 256QAM

Lowest Band Edge / 1RB

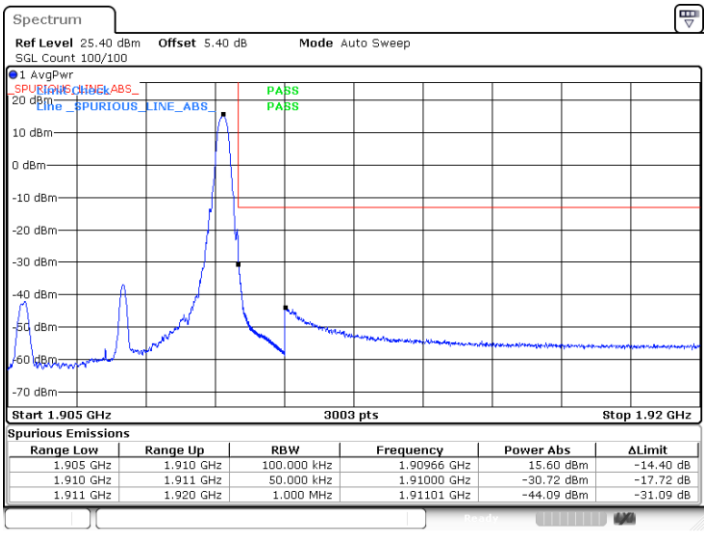


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.840 GHz	1.849 GHz	1.000 MHz	1.84896 GHz	-44.66 dBm	-31.66 dB
1.849 GHz	1.850 GHz	50.000 kHz	1.85000 GHz	-30.30 dBm	-17.30 dB
1.850 GHz	1.855 GHz	100.000 kHz	1.85038 GHz	15.68 dBm	-14.32 dB

Date: 18.FEB.2023 01:12:00

Highest Band Edge / 1 RB

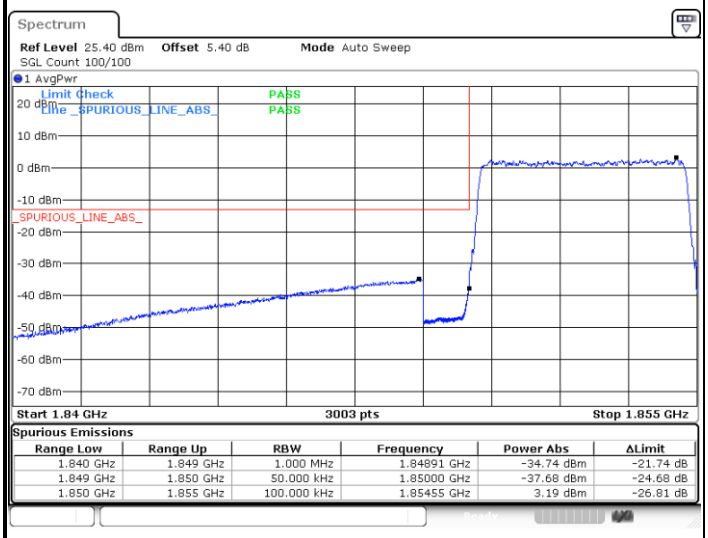


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.905 GHz	1.910 GHz	100.000 kHz	1.90966 GHz	15.60 dBm	-14.40 dB
1.910 GHz	1.911 GHz	50.000 kHz	1.91000 GHz	-30.72 dBm	-17.72 dB
1.911 GHz	1.920 GHz	1.000 MHz	1.91101 GHz	-44.09 dBm	-31.09 dB

Date: 18.FEB.2023 01:16:05

Lowest Band Edge / Full RB

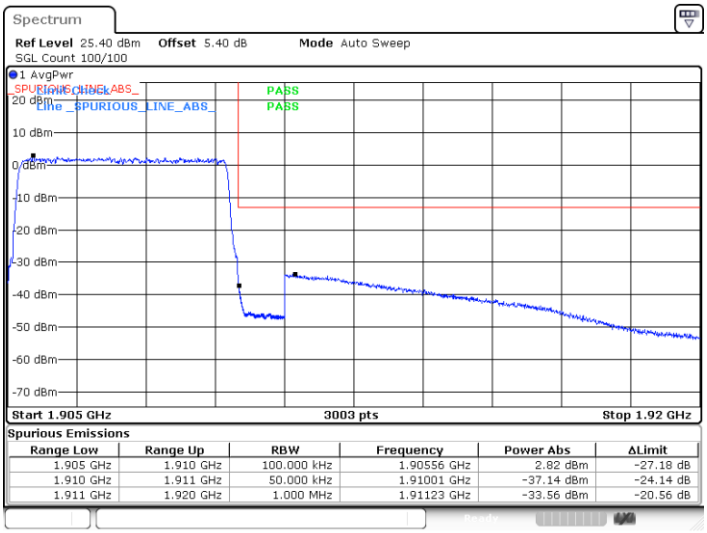


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.840 GHz	1.849 GHz	1.000 MHz	1.84891 GHz	-34.74 dBm	-21.74 dB
1.849 GHz	1.850 GHz	50.000 kHz	1.85000 GHz	-37.68 dBm	-24.68 dB
1.850 GHz	1.855 GHz	100.000 kHz	1.85455 GHz	3.19 dBm	-26.81 dB

Date: 18.FEB.2023 01:14:42

Highest Band Edge / Full RB



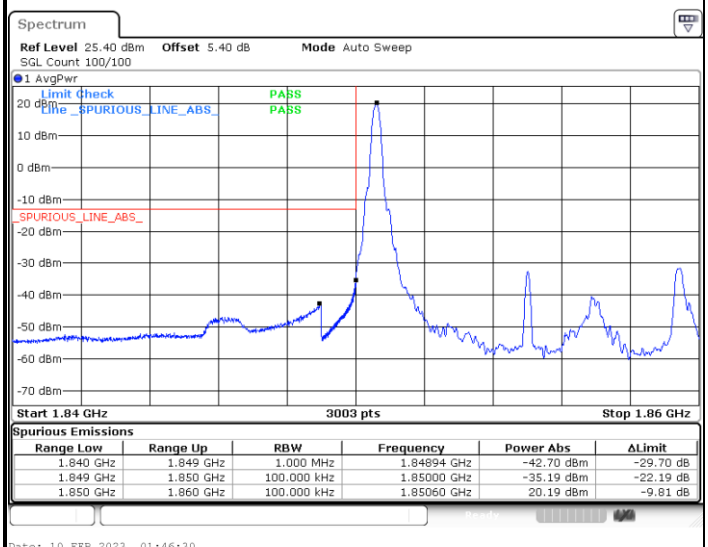
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.905 GHz	1.910 GHz	100.000 kHz	1.90556 GHz	2.82 dBm	-27.18 dB
1.910 GHz	1.911 GHz	50.000 kHz	1.91001 GHz	-37.14 dBm	-24.14 dB
1.911 GHz	1.920 GHz	1.000 MHz	1.91123 GHz	-33.56 dBm	-20.56 dB

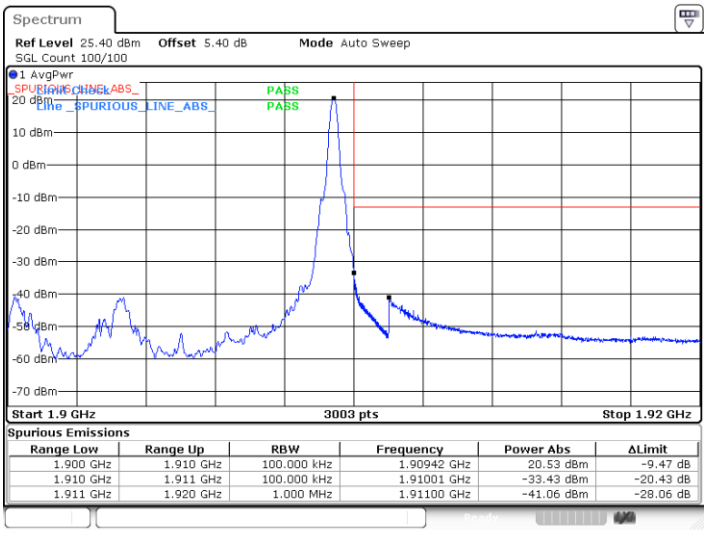
Date: 18.FEB.2023 01:18:39

LTE Band 2 / 10MHz / QPSK

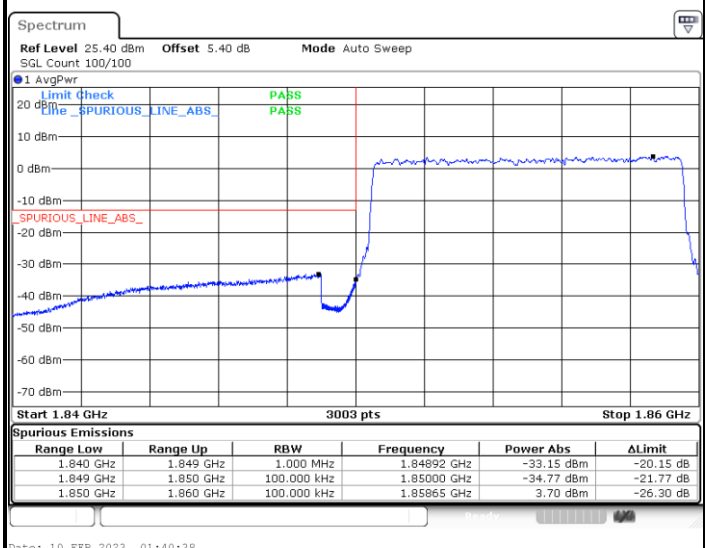
Lowest Band Edge / 1 RB



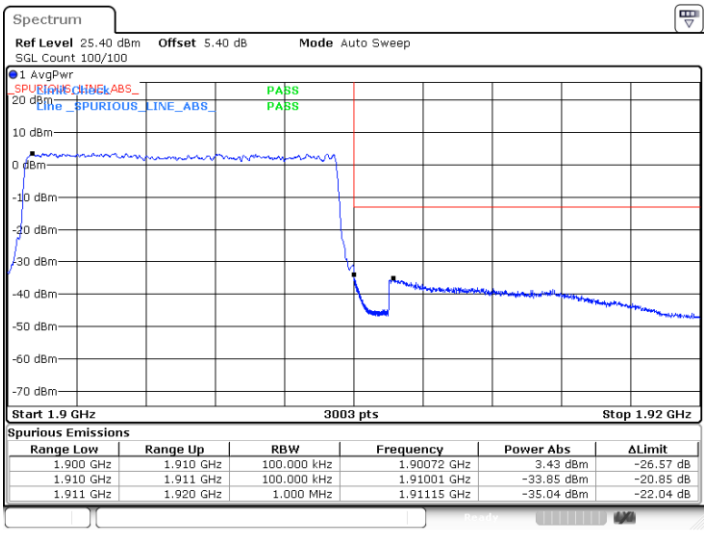
Highest Band Edge / 1 RB



Lowest Band Edge / Full RB

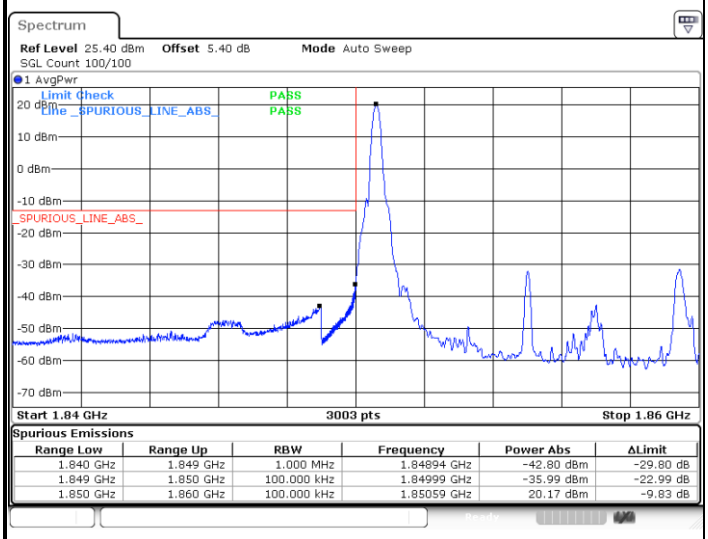


Highest Band Edge / Full RB



LTE Band 2 / 10MHz / 16QAM

Lowest Band Edge / 1 RB

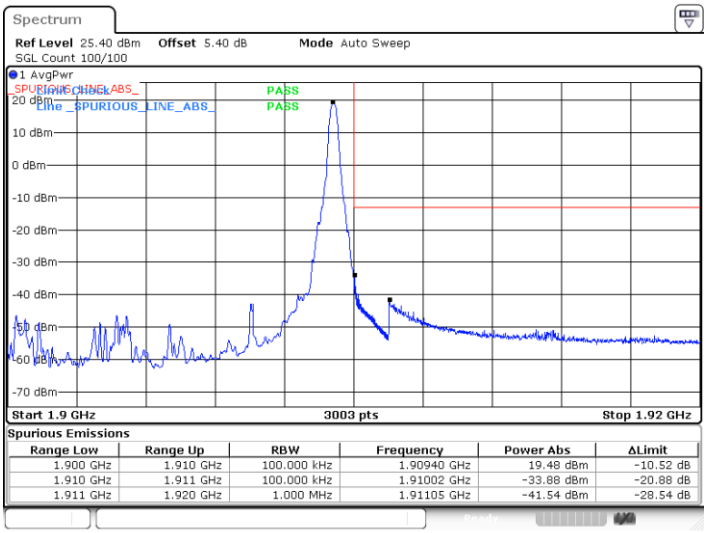


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.840 GHz	1.849 GHz	1.000 MHz	1.84894 GHz	-42.80 dBm	-29.80 dB
1.849 GHz	1.850 GHz	100.000 kHz	1.84999 GHz	-35.99 dBm	-22.99 dB
1.850 GHz	1.860 GHz	100.000 kHz	1.85059 GHz	20.17 dBm	-9.83 dB

Date: 10.FEB.2023 01:45:19

Highest Band Edge / 1 RB

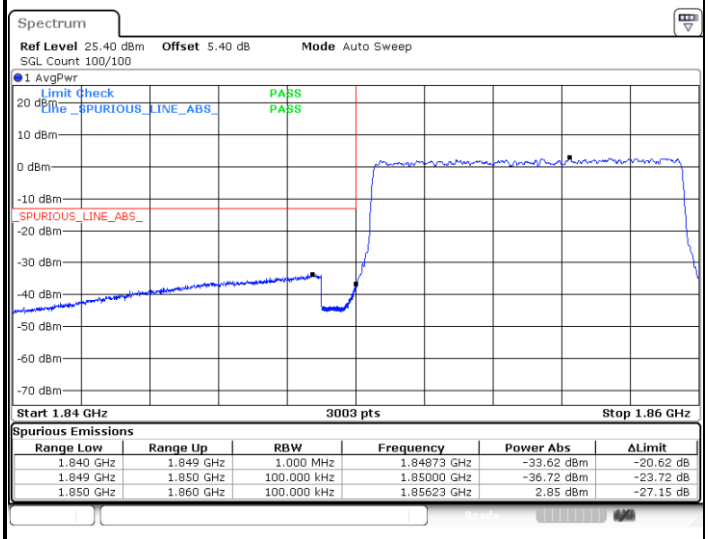


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.900 GHz	1.910 GHz	100.000 kHz	1.90940 GHz	19.48 dBm	-10.52 dB
1.910 GHz	1.911 GHz	100.000 kHz	1.91002 GHz	-33.88 dBm	-20.88 dB
1.911 GHz	1.920 GHz	1.000 MHz	1.91105 GHz	-41.54 dBm	-28.54 dB

Date: 10.FEB.2023 01:52:57

Lowest Band Edge / Full RB

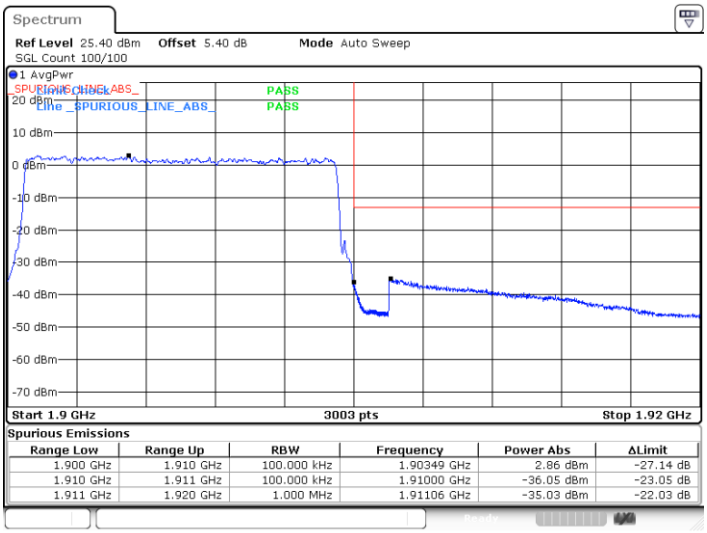


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.840 GHz	1.849 GHz	1.000 MHz	1.84873 GHz	-33.62 dBm	-20.62 dB
1.849 GHz	1.850 GHz	100.000 kHz	1.85000 GHz	-36.72 dBm	-23.72 dB
1.850 GHz	1.860 GHz	100.000 kHz	1.85623 GHz	2.85 dBm	-27.15 dB

Date: 10.FEB.2023 01:41:49

Highest Band Edge / Full RB



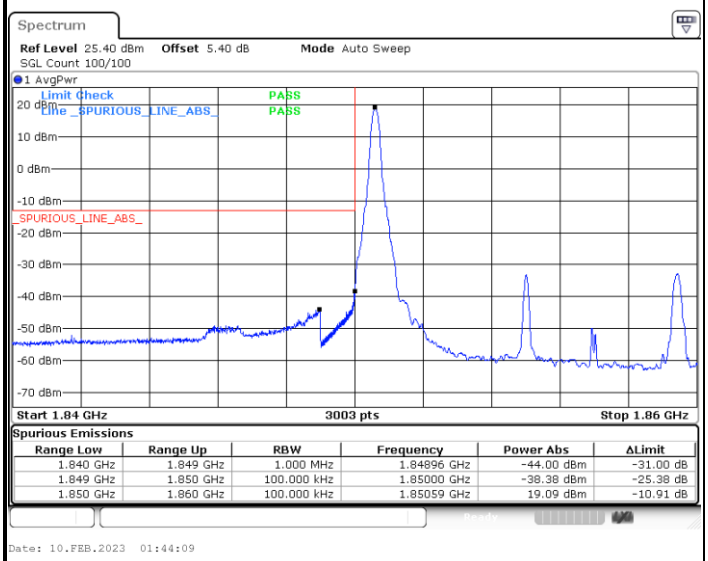
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.900 GHz	1.910 GHz	100.000 kHz	1.90349 GHz	2.86 dBm	-27.14 dB
1.910 GHz	1.911 GHz	100.000 kHz	1.91000 GHz	-36.05 dBm	-23.05 dB
1.911 GHz	1.920 GHz	1.000 MHz	1.91106 GHz	-35.03 dBm	-22.03 dB

Date: 10.FEB.2023 01:56:28

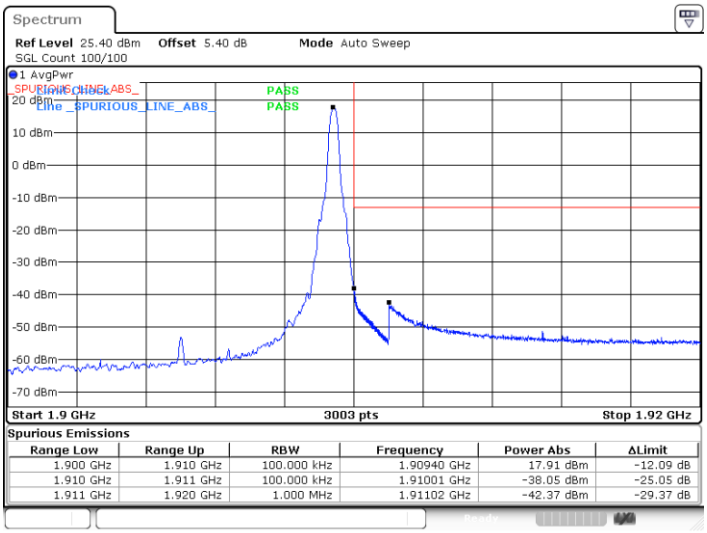
LTE Band 2 / 10MHz / 64QAM

Lowest Band Edge / 1 RB



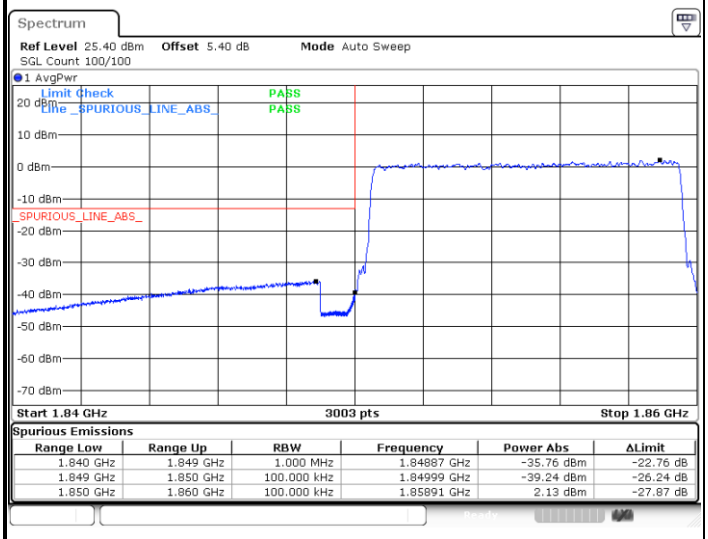
Date: 10.FEB.2023 01:44:09

Highest Band Edge / 1 RB



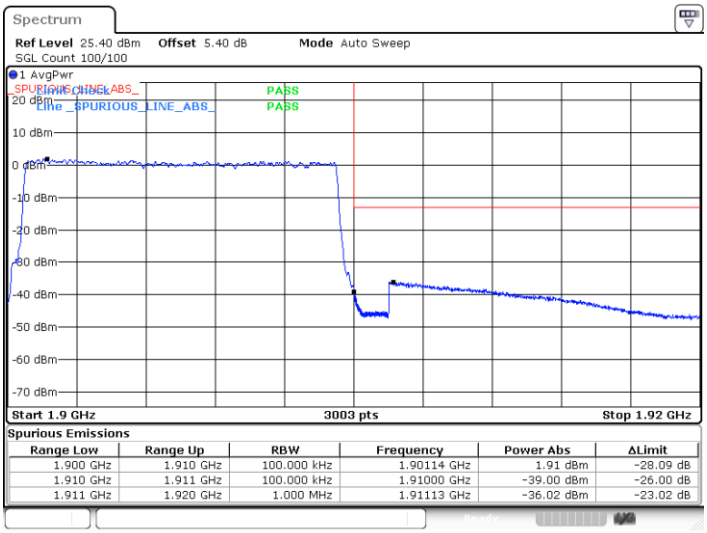
Date: 10.FEB.2023 01:54:07

Lowest Band Edge / Full RB



Date: 10.FEB.2023 01:42:59

Highest Band Edge / Full RB



Date: 10.FEB.2023 01:55:18