FCC RF Test Report

APPLICANT	: Nokia Shanghai Bell Co., Ltd.
EQUIPMENT	: Nokia FastMile 5G Receiver High Gain
BRAND NAME	: Nokia
MODEL NAME	: 5G16-A
FCC ID	: 2ADZR5G16A
STANDARD	: 47 CFR Part 2, 27(M), 27(H), 27(F)
CLASSIFICATION	: PCS Licensed Transmitter (PCB)
TEST DATE(S)	: Apr. 26, 2023 ~ Jun. 21, 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

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG341901B	Rev. 01	Initial issue of report	Jun. 21, 2023

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power (Band 12) (Band 13)	-	Report Only	-
	§2.1046 §27.50(h)(2)	Conducted Output Power (Band 7) (Band 38) (Band 41)	< 2Watt	PASS	-
	§27.50(b)(4) §27.50(c)(3)	Effective Radiated Power (Band 12) (Band 13)	ERP < 1000 Watt	PASS	-
3.5	N/A	Peak-to-Average Ratio	<13 dB	PASS	-
3.6	§2.1049	Occupied Bandwidth	-	Report Only	-
3.7	§2.1051 §27.53(c)(2)(4) §27.53(g) §27.53(m)(2)(v)	Conducted Band Edge Measurement (Band 12) (Band 13) (Band 7) (Band 38) (Band 41)	< 43+10log10(P[Watts])	PASS	-
3.8	§2.1051 §27.53(c)(2) §27.53(g) §27.53(m)(2)(v)	Conducted Spurious Emission (Band 12) (Band 13) (Band 7) (Band 38) (Band 41)	< 43+10log10(P[Watts])	PASS	-
3.9	§2.1055 §27.54	Frequency Stability Temperature & Voltage	Within Authorized Band	PASS	-
4.4	§2.1053 §27.53(c)(2) §27.53(f) §27.53(g) §27.53(m)(2)(v)	Radiated Spurious Emission (Band 12) (Band 13) (Band 7) (Band 38) (Band 41)	< 43+10$\log_{10}$(P[Watts])	PASS	Under limit 4.19 dB at 1560.00 MHz

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section “Measurement Uncertainty”

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

1 General Description

1.1 Applicant

Nokia Shanghai Bell Co., Ltd.
388#, Ningqiao Road, China (Shanghai) Pilot Free Trade Zone, Shanghai 201206, China

1.2 Manufacturer

Nokia Solutions and Networks Oy
Karakaari 7, 02610 Espoo, Finland

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Nokia FastMile 5G Receiver High Gain
Brand Name	Nokia
Model Name	5G16-A
FCC ID	2ADZR5G16A
IMEI Code	Conducted: 355231280005192 Radiation: 355231280005010
HW Version	3TG02369Axxx, x:A~Z
SW Version	5GReceiver-HG-2_D230200B31T0001E0147
EUT Stage	Identical Prototype

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	LTE Band 7 : 2500 MHz ~ 2570 MHz LTE Band 12 : 699 MHz ~ 716 MHz LTE Band 13 : 777 MHz ~ 787 MHz LTE Band 38 : 2570 MHz ~ 2620 MHz LTE Band 41 : 2496 MHz ~ 2690 MHz
Rx Frequency	LTE Band 7 : 2620 MHz ~ 2690 MHz LTE Band 12 : 729 MHz ~ 746 MHz LTE Band 13 : 746 MHz ~ 756 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41 : 2496 MHz ~ 2690 MHz
Bandwidth	LTE Band 7 : 5MHz/ 10MHz / 15MHz / 20MHz LTE Band 12 : 1.4MHz / 3MHz / 5MHz / 10MHz LTE Band 13 : 5MHz / 10MHz LTE Band 38 : 5MHz / 10MHz / 15MHz / 20MHz LTE Band 41 : 5MHz / 10MHz / 15MHz / 20MHz
Maximum Output Power to Antenna	<Ant. 0> LTE Band 7 : 22.93 dBm <Ant. 1> LTE Band 38 : 25.61 dBm LTE Band 41 : 25.69 dBm

	LTE Band 41C : 24.93 dBm <Ant. 4> LTE Band 12 : 22.93 dBm LTE Band 13 : 22.80 dBm
Antenna Gain	<Ant. 0> LTE Band 7 : 15.89 dBi <Ant. 1> LTE Band 38 : 16.41 dBi LTE Band 41 : 16.41 dBi <Ant. 4> LTE Band 12 : 1.25 dBi LTE Band 13 : 1.45 dBi
Type of Modulation	QPSK / 16QAM / 64QAM / 256QAM

Note: LTE Band 38/41/41C support for HPUE mode. LTE B41C does not support 256QAM modulation.

1.5 Modification of EUT

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

1.6 Maximum ERP or Conducted Power and Emission Designator

LTE Band 7		QPSK		16QAM/64QAM/256QAM	
BW (MHz)	**Frequency Range (MHz)**	**Maximum Conducted power (W)**	**Emission Designator (99%OBW)**	**Maximum Conducted power (W)**	**Emission Designator (99%OBW)**
5	2502.5 ~ 2567.5	0.1892	4M49G7D	0.1603	4M51W7D
10	2505.0 ~ 2565.0	0.1945	9M01G7D	0.1618	9M05W7D
15	2507.5 ~ 2562.5	0.1941	13M4G7D	0.1614	13M5W7D
20	2510.0 ~ 2560.0	0.1963	17M9G7D	0.1633	17M9W7D
LTE Band 12		**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	699.7 ~ 715.3	0.1589	1M09G7D	0.1321	1M09W7D
3	700.5 ~ 714.5	0.1592	2M72G7D	0.1318	2M73W7D
5	701.5 ~ 713.5	0.1585	4M49G7D	0.1343	4M50W7D
10	704.0 ~ 711.0	0.1596	9M05G7D	0.1358	9M03W7D
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	0.1622	4M47G7D	0.1368	4M49W7D
10	782.0	0.1614	8M95G7D	0.1365	8M99W7D

LTE Band 38		QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum Conducted power (W)	Emission Designator (99%OBW)	Maximum Conducted power (W)	Emission Designator (99%OBW)
5	2572.5 ~ 2617.5	0.3540	4M49G7D	0.3020	4M50W7D
10	2575.0 ~ 2615.0	0.3639	9M07G7D	0.2958	9M07W7D
15	2577.5 ~ 2612.5	0.3631	13M5G7D	0.2992	13M5W7D
20	2580.0 ~ 2610.0	0.3631	17M9G7D	0.3076	17M9W7D
LTE Band 41		QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum Conducted power (W)	Emission Designator (99%OBW)	Maximum Conducted power (W)	Emission Designator (99%OBW)
5	2498.5 ~ 2687.5	0.3707	4M49G7D	0.3170	4M50W7D
10	2501.0 ~ 2685.0	0.3664	9M07G7D	0.3126	9M07W7D
15	2503.5 ~ 2682.5	0.3648	13M5G7D	0.3148	13M5W7D
20	2506.0 ~ 2680.0	0.3664	17M9G7D	0.3112	17M9W7D
LTE Band 41 CA		QPSK		16QAM/64QAM	
BW (MHz)		Maximum Conducted power (W)	Emission Designator (99%OBW)	Maximum Conducted power (W)	Emission Designator (99%OBW)
5MHz+20MHz		0.3083	23M3G7D	0.2280	23M2W7D
10MHz+20MHz		0.2999	27M9G7D	0.2280	28M1W7D
10MHz+15MHz		0.3062	23M5G7D	0.2254	23M4W7D
15MHz+15MHz		0.3097	28M5G7D	0.2286	28M8W7D
15MHz+20MHz		0.3034	32M6G7D	0.2228	32M8W7D
15MHz+10MHz		0.3062	23M6G7D	0.2270	23M4W7D
20MHz+5MHz		0.3041	23M4G7D	0.2265	23M4W7D
20MHz+10MHz		0.2979	28M0G7D	0.2213	28M1W7D
20MHz+15MHz		0.3055	32M9G7D	0.2193	32M9W7D
20MHz+20MHz		0.3112	37M2G7D	0.2259	37M7W7D

Note:

1. LTE Band 41 overlaps the entire frequency range of LTE Band 38. Therefore, the test results provided in this report covers Band 41 as well as Band 38.
2. LTE B41C does not support 256QAM modulation.
3. All modulations have been tested, only the worst test results of PSK & QAM are shown in the report.

1.7 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		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH04-KS TH01-KS	CN1257	314309

1.8 Test Software

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

1.9 Applicable Standards

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

- 47 CFR Part 2, 27(M), 27(H), 27(F)
- 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.

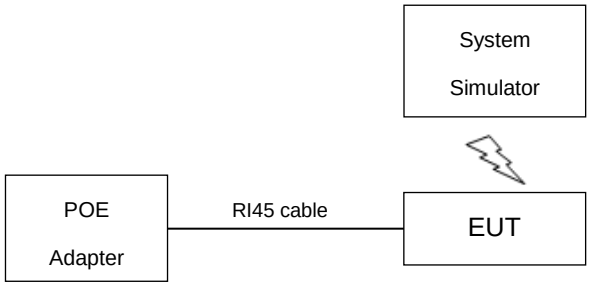
Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission. (Y Plane)

Test Items	Band	Bandwidth (MHz)						Modulation				RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	256 QAM	1	Half	Full	L	M	H
Max. Output Power	7	-	-	v	v	v	v	v	v	v	v	v		v	v	v	v
	12	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
	38	-	-	v	v	v	v	v	v	v	v	v		v	v	v	v
	41	-	-	v	v	v	v	v	v	v	v	v		v	v	v	v
Peak-to-Average Ratio	7	-	-				v	v	v	v	v			v		v	
	12				v	-	-	v	v	v	v			v		v	
	13	-	-		v	-	-	v	v	v	v			v		v	
	41	-	-				v	v	v	v	v			v		v	
26dB and 99% Bandwidth	7	-	-	v	v	v	v	v	v	v	v			v		v	
	12	v	v	v	v	-	-	v	v	v	v			v		v	
	13	-	-	v	v	-	-	v	v	v	v			v		v	
	41	-	-	v	v	v	v	v	v	v	v			v		v	
Conducted Band Edge	7	-	-	v	v	v	v	v	v	v	v	v		v	v		v
	12	v	v	v	v	-	-	v	v	v	v	v		v	v		v
	13	-	-	v	v	-	-	v	v	v	v	v		v	v		v
	41	-	-	v	v	v	v	v	v	v	v	v		v	v		v
Conducted Spurious Emission	7	-	-	v	v	v	v	v	v	v	v	v			v	v	v
	12	v	v	v	v	-	-	v	v	v	v	v			v	v	v
	13	-	-	v	v	-	-	v	v	v	v	v			v	v	v
	41	-	-	v	v	v	v	v	v	v	v	v			v	v	v
Frequency Stability	7	-	-		v			v						v		v	
	12				v	-	-	v						v		v	
	13	-	-		v	-	-	v						v		v	
	41	-	-		v			v						v		v	
E.R.P	12	v	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	256 QAM	1	Half	Full	L	M	H
	13	-	-	v	v	-	-	v	v	v	v	v		v	v	v	v
Radiated Spurious Emission	7	Worst Case														v	
	12	Worst Case														v	
	13	Worst Case														v	
	41	Worst Case														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.																

Test Items	Band	Bandwidth (MHz)										Modulation				RB #			Test Channel		
		20+20	20+15	15+20	20+10	10+20	20+5	5+20	15+15	15+10	10+15	QPSK	16QAM	64QAM	256 QAM	1	Half	Full	L	M	H
Max. Output Power	41C_CA	v	v	v	v	v	v	v	v	v	v	v	v	v	-	v			v	v	v
26dB and 99% Bandwidth	41C_CA	v	v	v	v	v	v	v	v	v	v	v	v	v	-			v		v	
Conducted Band Edge	41C_CA	v	v	v	v	v	v	v	v	v	v	v	v	v	-	v		v	v		v
Conducted Spurious Emission	41C_CA	v	v	v	v	v	v	v	v	v	v	v	v	v	-	v			v	v	v
Frequency Stability	41C_CA	v										v			-			v		v	
Radiated Spurious Emission	41C_CA	Worst Case																		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.																				

2.2 Connection Diagram of Test System



This example is connection diagram of EUT test configurations.

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

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 6.0 dB.

Example :

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

= 6.0 (dB)

2.5 Frequency List of Low/Middle/High Channels

LTE Band 7 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
20	Channel	20850	21100	21350
	Frequency	2510	2535	2560
15	Channel	20825	21100	21375
	Frequency	2507.5	2535	2562.5
10	Channel	20800	21100	21400
	Frequency	2505	2535	2565
5	Channel	20775	21100	21425
	Frequency	2502.5	2535	2567.5

LTE Band 12 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
10	Channel	23060	23095	23130
	Frequency	704	707.5	711
5	Channel	23035	23095	23155
	Frequency	701.5	707.5	713.5
3	Channel	23025	23095	23165
	Frequency	700.5	707.5	714.5
1.4	Channel	23017	23095	23173
	Frequency	699.7	707.5	715.3

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 38 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
20	Channel	37850	38000	38150
	Frequency	2580	2595	2610
15	Channel	37825	38000	38175
	Frequency	2577.5	2595	2612.5
10	Channel	37800	38000	38200
	Frequency	2575	2595	2615
5	Channel	37775	38000	38225
	Frequency	2572.5	2595	2617.5

LTE Band 41 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
20	Channel	39750	40620	41490
	Frequency	2506	2593	2680
15	Channel	39725	40620	41515
	Frequency	2503.5	2593	2682.5
10	Channel	39700	40620	41540
	Frequency	2501	2593	2685
5	Channel	39675	40620	41565
	Frequency	2498.5	2593	2687.5

LTE Band 41C_CA Channel and Frequency List					
BW [MHz]	Channel/Frequency(MHz)		Lowest	Middle	Highest
20 + 20	PCC	Channel	39750	40521	41292
		Frequency	2506.0	2583.1	2660.2
	SCC	Channel	39948	40719	41490
		Frequency	2525.8	2602.9	2680.0
20 + 15	PCC	Channel	39750	40546	41341
		Frequency	2506.0	2585.6	2665.1
	SCC	Channel	39921	40717	41512
		Frequency	2523.1	2602.7	2682.2
15 + 20	PCC	Channel	39728	40523	41319
		Frequency	2503.8	2593.3	2662.9
	SCC	Channel	39899	40694	41490
		Frequency	2520.9	2600.4	2680.0
20 + 10	PCC	Channel	39750	40571	41391
		Frequency	2506.0	2588.1	2670.1
	SCC	Channel	39894	40715	41535
		Frequency	2520.4	2602.5	2684.5
10 + 20	PCC	Channel	39705	40526	41346
		Frequency	2501.5	2583.6	2665.6
	SCC	Channel	39849	40670	41490
		Frequency	2515.9	2598.0	2680.0

LTE Band 41C_CA Channel and Frequency List					
20 + 5	PCC	Channel	39750	40595	41440
		Frequency	2506.0	2590.5	2675.0
	SCC	Channel	39867	40712	41557
		Frequency	2517.7	2602.2	2686.7
5 + 20	PCC	Channel	39683	40528	41373
		Frequency	2499.3	2583.8	2668.3
	SCC	Channel	39800	40645	41490
		Frequency	2511.0	2595.5	2680.0
15 + 15	PCC	Channel	39725	40545	41365
		Frequency	2503.5	2585.5	2667.5
	SCC	Channel	39875	40695	41515
		Frequency	2518.5	2600.5	2682.5
10 + 15	PCC	Channel	39703	40549	41395
		Frequency	2501.3	2585.9	2670.5
	SCC	Channel	39823	40669	41515
		Frequency	2513.3	2597.9	2682.5
15 + 10	PCC	Channel	39725	40571	41417
		Frequency	2503.5	2588.1	2672.7
	SCC	Channel	39845	40691	41537
		Frequency	2515.5	2600.1	2684.7

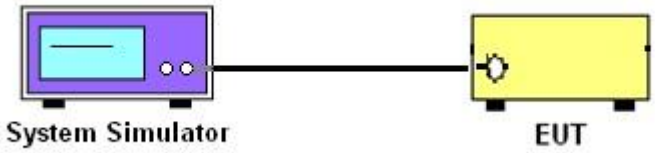
3 Conducted Test Items

3.1 Measuring Instruments

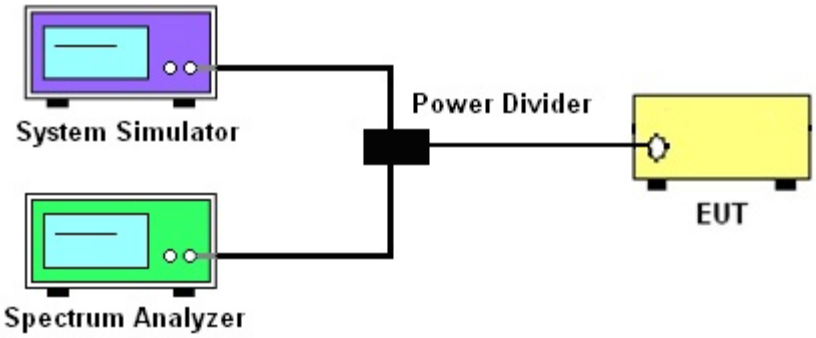
See list of measuring instruments of this test report.

3.2 Test Setup

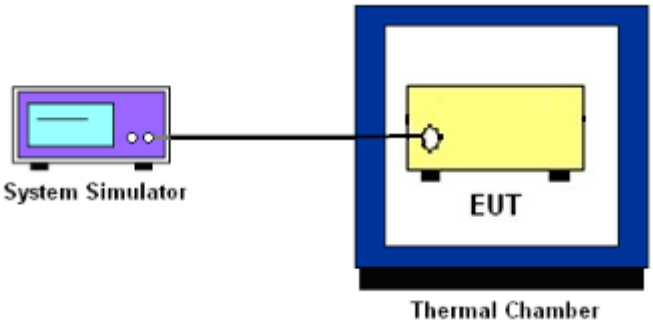
3.2.1 Conducted Output Power



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

3.4.1 Description of the Conducted Output Power Measurement and ERP 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.

All user stations are limited to 2.0 watts transmitter output power for Band 7 and Band 38 and Band 41.

The ERP of Fixed transmitters must not exceed 1000 Watts for LTE Band 12, Band 13.

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

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 76 + 10 log10 p(watts), dB, for fixed 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(m)(2)(v)

For all fixed digital user stations, the attenuation factor shall be not less than 43 + 10 log (P) dB at the channel edge.

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 10^{th} 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.

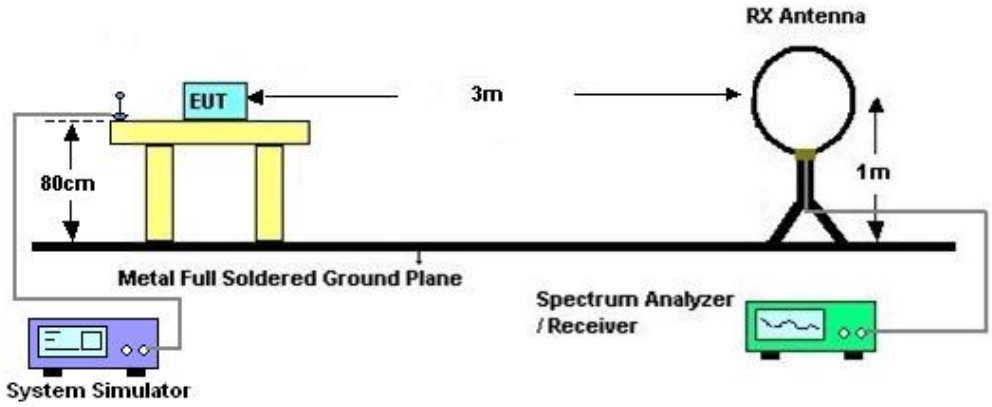
4 Radiated Test Items

4.1 Measuring Instruments

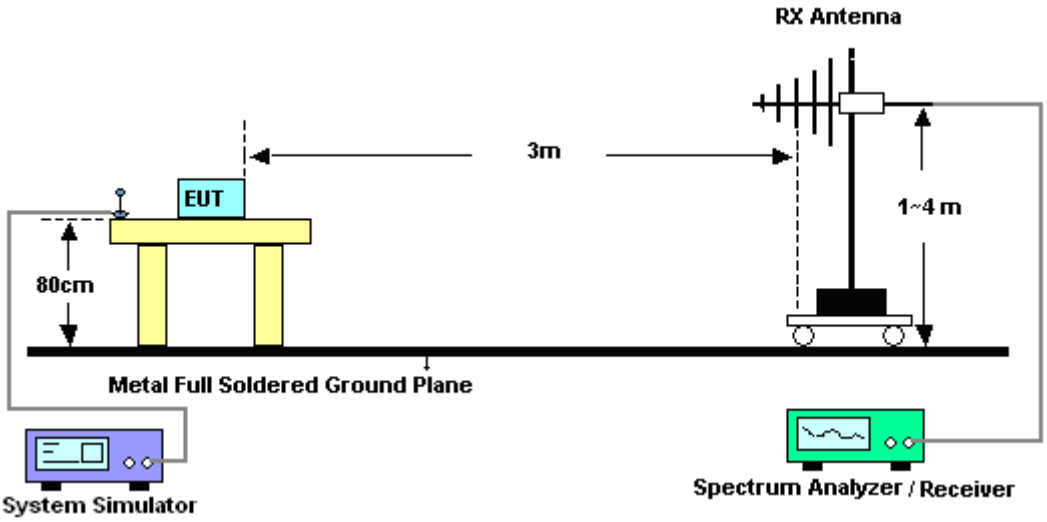
See list of measuring instruments of this test report.

4.2 Test Setup

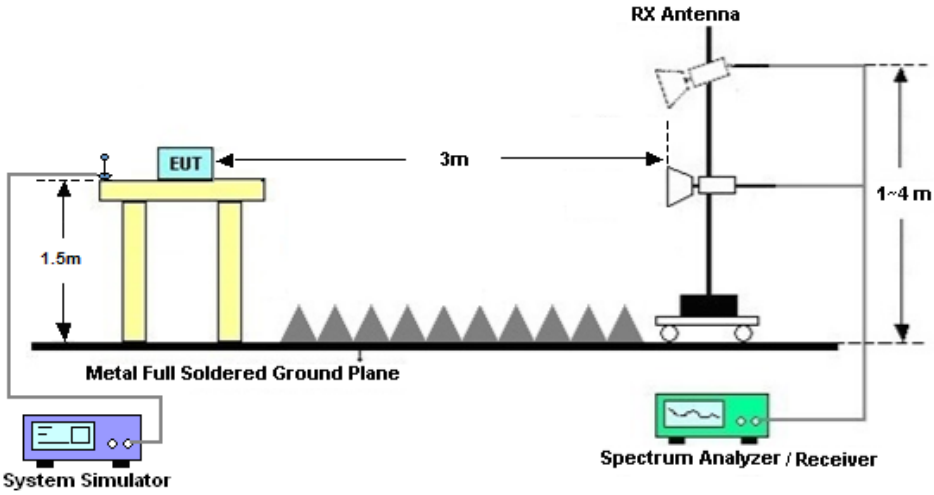
4.2.1 For radiated test below 30MHz



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	Apr. 26, 2023~ Jun. 21, 2023	Oct. 11, 2023	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	NCR	Apr. 26, 2023~ Jun. 21, 2023	NCR	Conducted (TH01-KS)
Temperature & humidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 15, 2022	Apr. 26, 2023~ Jun. 21, 2023	Jul. 14, 2023	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010B	MY57471079	10Hz-44G,MAX 30dB	Oct. 12, 2022	May 30, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 16, 2022	May 30, 2023	Oct. 15, 2023	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	Apr. 09, 2023	May 30, 2023	Apr. 08, 2024	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1284	1GHz~18GHz	Oct. 16, 2022	May 30, 2023	Oct. 15, 2023	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 08, 2023	May 30, 2023	Jan. 07, 2024	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	380827	9KHz-1GHz	Jul. 11, 2022	May 30, 2023	Jul. 10, 2023	Radiation (03CH04-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 05, 2023	May 30, 2023	Jan. 04, 2024	Radiation (03CH04-KS)
high gain Amplifier	EM	EM01G18GA	060840	1Ghz-18Ghz	Oct. 12, 2022	May 30, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
Amplifier	Agilent	8449B	3008A02370	1Ghz-18Ghz	Oct. 12, 2022	May 30, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	May 30, 2023	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	May 30, 2023	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	May 30, 2023	NCR	Radiation (03CH04-KS)

NCR: No Calibration Required

6 Measurement Uncertainty

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))	3.82 dB

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.56 dB

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.54dB

Appendix A. Test Results of Conducted Test

Test Engineer :	Simle Wang	Temperature :	22~23℃
		Relative Humidity :	40~42%

A1. Conducted Output Power(Average power) and ERP

LTE Band 7:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.
Channel				20850	20850	21350
Frequency (MHz)				2510	2535	2560
20	QPSK	1	0	22.80	22.91	22.93
20	QPSK	1	99	22.83	22.86	22.82
20	QPSK	100	0	21.76	21.86	21.87
20	16QAM	1	0	22.13	22.03	22.09
20	64QAM	1	0	21.03	21.11	21.07
20	256QAM	1	0	18.04	18.08	18.01
Channel				20825	21100	21375
Frequency (MHz)				2507.5	2535	2562.5
15	QPSK	1	0	22.68	22.88	22.75
15	16QAM	1	0	21.98	22.03	22.08
Channel				20800	21100	21400
Frequency (MHz)				2505	2535	2565
10	QPSK	1	0	22.68	22.89	22.84
10	16QAM	1	0	21.96	22.08	22.09
Channel				20775	21100	21425
Frequency (MHz)				2502.5	2535	2567.5
5	QPSK	1	0	22.69	22.73	22.77
5	16QAM	1	0	22.02	21.98	22.05

LTE Band 12:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	ERP(W)		
Channel				23060	23095	23130			
Frequency (MHz)				704	707.5	711	L	M	H
10	QPSK	1	0	22.91	22.83	22.93	0.1589	0.1560	0.1596
10	QPSK	1	49	22.80	22.91	22.84	0.1549	0.1589	0.1563
10	QPSK	50	0	21.97	21.84	21.91	0.1279	0.1242	0.1262
10	16QAM	1	0	22.23	22.19	22.06	0.1358	0.1346	0.1306
10	64QAM	1	0	21.30	21.16	21.13	0.1096	0.1062	0.1054
10	256QAM	1	0	18.10	18.26	17.98	0.0525	0.0545	0.0511
Channel				23035	23095	23155	ERP(W)		
Frequency (MHz)				701.5	707.5	713.5	L	M	H
5	QPSK	1	0	22.87	22.90	22.82	0.1574	0.1585	0.1556
5	16QAM	1	0	22.16	22.18	22.03	0.1337	0.1343	0.1297
Channel				23025	23095	23165	ERP(W)		
Frequency (MHz)				700.5	707.5	714.5	L	M	H
3	QPSK	1	0	22.92	22.86	22.87	0.1592	0.1570	0.1574
3	16QAM	1	0	22.10	22.02	21.97	0.1318	0.1294	0.1279
Channel				23017	23095	23173	ERP(W)		
Frequency (MHz)				699.7	707.5	715.3	L	M	H
1.4	QPSK	1	0	22.91	22.84	22.82	0.1589	0.1563	0.1556
1.4	16QAM	1	0	22.09	22.11	22.06	0.1315	0.1321	0.1306

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		22.72			0.1592	
10	QPSK	1	49		22.78			0.1614	
10	QPSK	50	0		21.76			0.1276	
10	16QAM	1	0		22.05			0.1365	
10	64QAM	1	0		21.02			0.1076	
10	256QAM	1	0		17.68			0.0499	
Channel				23205	23230	23255	ERP(W)		
Frequency (MHz)				779.5	782	784.5	L	M	H
5	QPSK	1	0	22.80	22.78	22.73	0.1622	0.1614	0.1596
5	16QAM	1	0	22.02	21.96	22.06	0.1355	0.1337	0.1368

LTE Band 38:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.
Channel				37850	38000	38150
Frequency (MHz)				2580	2595	2610
20	QPSK	1	0	25.40	25.60	25.57
20	QPSK	1	99	25.10	25.26	25.33
20	QPSK	100	0	24.30	24.41	24.50
20	16QAM	1	0	24.73	24.88	24.80
20	64QAM	1	0	23.30	23.55	23.48
20	256QAM	1	0	20.69	20.72	20.78
Channel				37825	38000	38175
Frequency (MHz)				2577.5	2595	2612.5
15	QPSK	1	0	25.45	25.55	25.60
15	16QAM	1	0	24.68	24.76	24.61
Channel				37800	38000	38200
Frequency (MHz)				2575	2595	2615
10	QPSK	1	0	25.40	25.51	25.61
10	16QAM	1	0	24.68	24.71	24.67
Channel				37775	38000	38225
Frequency (MHz)				2572.5	2595	2617.5
5	QPSK	1	0	25.37	25.49	25.42
5	16QAM	1	0	24.70	24.76	24.80

LTE Band 41:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.
Channel				39750	40620	41490
Frequency (MHz)				2506	2593	2680
20	QPSK	1	0	25.44	25.63	25.64
20	QPSK	1	99	25.22	25.40	25.35
20	QPSK	100	0	24.28	24.48	24.49
20	16QAM	1	0	24.62	24.93	24.86
20	64QAM	1	0	23.38	23.62	23.72
20	256QAM	1	0	20.66	20.83	20.87
Channel				39725	40620	41515
Frequency (MHz)				2503.5	2593	2682.5
15	QPSK	1	0	25.33	25.62	25.61
15	16QAM	1	0	24.65	24.80	24.98
Channel				39700	40620	41540
Frequency (MHz)				2501	2593	2685
10	QPSK	1	0	25.36	25.57	25.64
10	16QAM	1	0	24.67	24.82	24.95
Channel				39675	40620	41565
Frequency (MHz)				2498.5	2593	2687.5
5	QPSK	1	0	25.38	25.62	25.69
5	16QAM	1	0	24.67	24.84	25.01

LTE Band 41C_CA:

Combination 20MHz+20MHz (100RB+100RB)						
Channel	Modulation	PCC		SCC		Measured Power
		RB Size	RB offset	RB Size	RB offset	
L	QPSK	1	Max	1	0	24.89
M	QPSK	1	Max	1	0	24.93
H	QPSK	1	Max	1	0	24.74
L	16QAM	1	Max	1	0	23.45
M	16QAM	1	Max	1	0	23.54
H	16QAM	1	Max	1	0	23.47
L	64QAM	1	Max	1	0	21.72
M	64QAM	1	Max	1	0	21.62
H	64QAM	1	Max	1	0	21.53
Combination 20MHz+15MHz (100RB+75RB)						
Channel	Modulation	PCC		SCC		Measured Power
		RB Size	RB offset	RB Size	RB offset	
M	QPSK	1	Max	1	0	24.85
M	16QAM	1	Max	1	0	23.41
Combination 15MHz+20MHz (75RB+100RB)						
Channel	Modulation	PCC		SCC		Measured Power
		RB Size	RB offset	RB Size	RB offset	
M	QPSK	1	Max	1	0	24.82
M	16QAM	1	Max	1	0	23.48
Combination 15MHz+15MHz (75RB+75RB)						
Channel	Modulation	PCC		SCC		Measured Power
		RB Size	RB offset	RB Size	RB offset	
M	QPSK	1	Max	1	0	24.91
M	16QAM	1	Max	1	0	23.59
Combination 20MHz+10MHz (100RB+50RB)						
Channel	Modulation	PCC		SCC		Measured Power
		RB Size	RB offset	RB Size	RB offset	
M	QPSK	1	Max	1	0	24.74
M	16QAM	1	Max	1	0	23.45
Combination 10MHz+20MHz (50RB+100RB)						
Channel	Modulation	PCC		SCC		Measured Power
		RB Size	RB offset	RB Size	RB offset	
M	QPSK	1	Max	1	0	24.77
M	16QAM	1	Max	1	0	23.58
Combination 15MHz+10MHz (75RB+50RB)						
Channel	Modulation	PCC		SCC		Measured Power
		RB Size	RB offset	RB Size	RB offset	
M	QPSK	1	Max	1	0	24.86
M	16QAM	1	Max	1	0	23.56

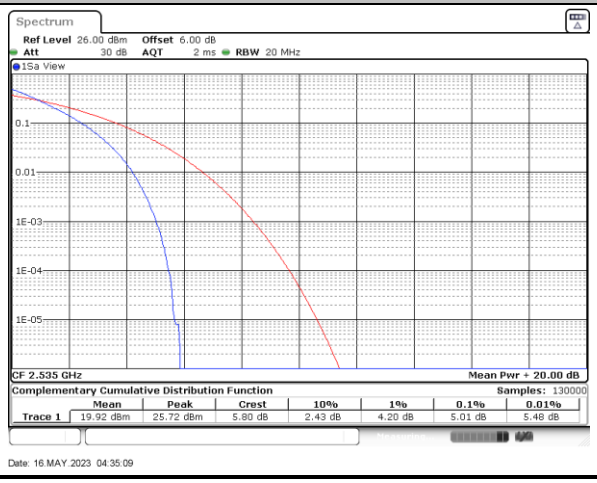
Combination 10MHz+15MHz (50RB+75RB)						
Channel	Modulation	PCC		SCC		Measured Power
		RB Size	RB offset	RB Size	RB offset	
M	QPSK	1	Max	1	0	24.86
M	16QAM	1	Max	1	0	23.53
Combination 20MHz+5MHz (100RB+25RB)						
Channel	Modulation	PCC		SCC		Measured Power
		RB Size	RB offset	RB Size	RB offset	
M	QPSK	1	Max	1	0	24.83
M	16QAM	1	Max	1	0	23.55
Combination 5MHz+20MHz (25RB+100RB)						
Channel	Modulation	PCC		SCC		Measured Power
		RB Size	RB offset	RB Size	RB offset	
M	QPSK	1	Max	1	0	24.89
M	16QAM	1	Max	1	0	23.58

A2. LTE Band 7

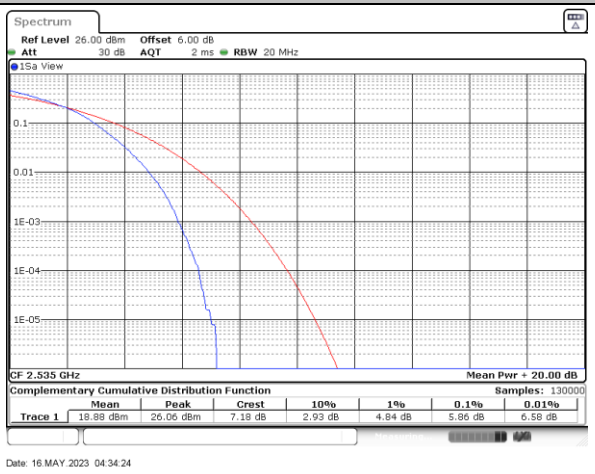
A2.1 Peak-to-Average Ratio

Mode	LTE Band 7 / 20MHz			
Mod.	QPSK	16QAM	64QAM	Limit: 13dB
RB Size	Full RB	Full RB	Full RB	Result
Middle CH	5.01	5.86	6.35	PASS
Mode	LTE Band 7 / 20MHz			
Mod.	256QAM			Limit: 13dB
RB Size	Full RB	Full RB	Full RB	Result
Middle CH	6.61			PASS

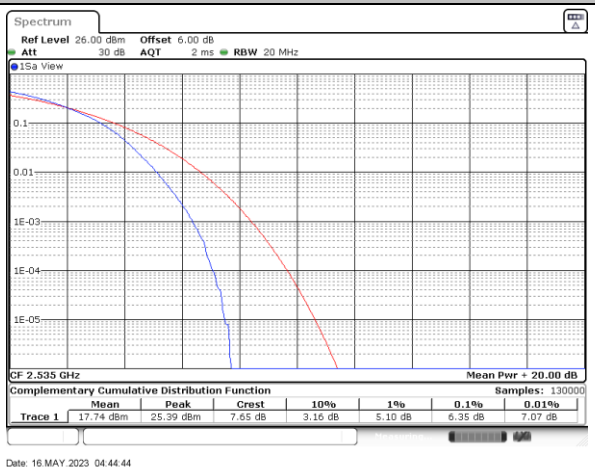
LTE Band 7 / 20MHz
Middle Channel / Full RB/ QPSK



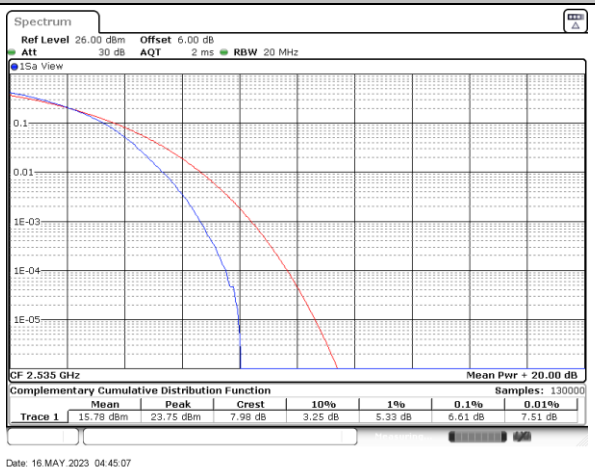
Middle Channel / Full RB/ 16QAM



Middle Channel / Full RB/ 64QAM



Middle Channel / Full RB/ 256QAM

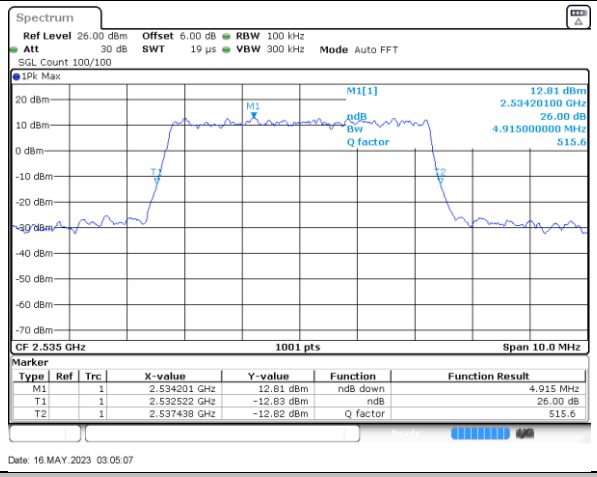


A2.2 26dB Bandwidth

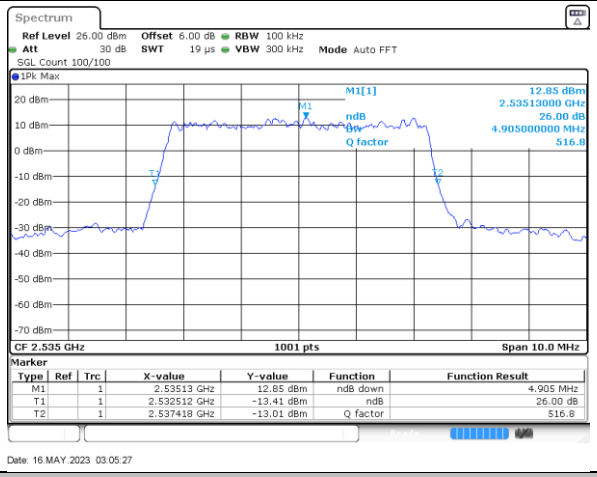
Mode	LTE Band 7 : 26dB BW(MHz)	
BW	5MHz	
Mod.	QPSK	16QAM
Middle CH	4.92	4.91
Mod.	64QAM	256QAM
Middle CH	4.90	4.91
BW	10MHz	
Mod.	QPSK	16QAM
Middle CH	9.79	9.73
Mod.	64QAM	256QAM
Middle CH	9.75	9.75
BW	15MHz	
Mod.	QPSK	16QAM
Middle CH	14.30	14.63
Mod.	64QAM	256QAM
Middle CH	14.21	14.24
BW	20MHz	
Mod.	QPSK	16QAM
Middle CH	18.86	18.94
Mod.	64QAM	256QAM
Middle CH	19.02	18.82

LTE Band 7

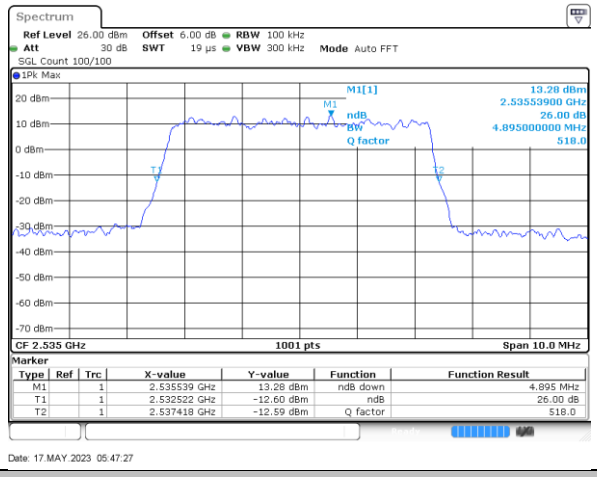
Middle Channel / 5MHz / QPSK



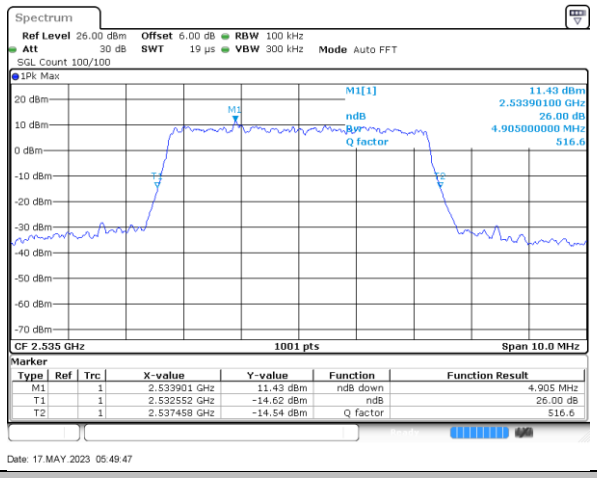
Middle Channel / 5MHz / 16QAM



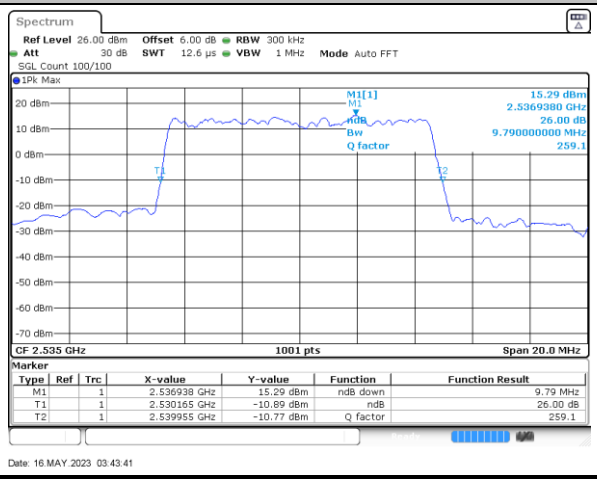
Middle Channel / 5MHz / 64QAM



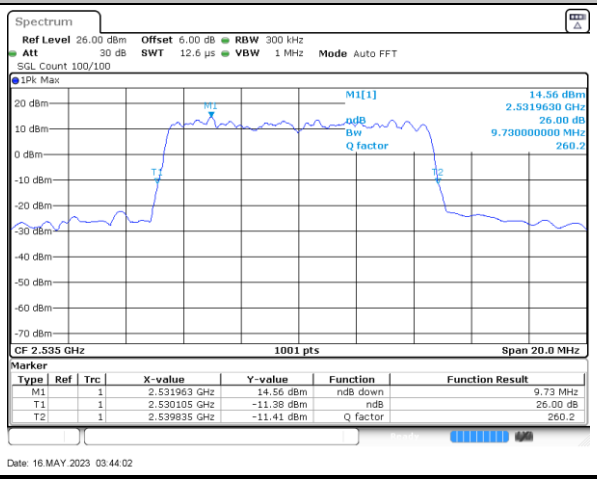
Middle Channel / 5MHz / 256QAM



Middle Channel / 10MHz / QPSK

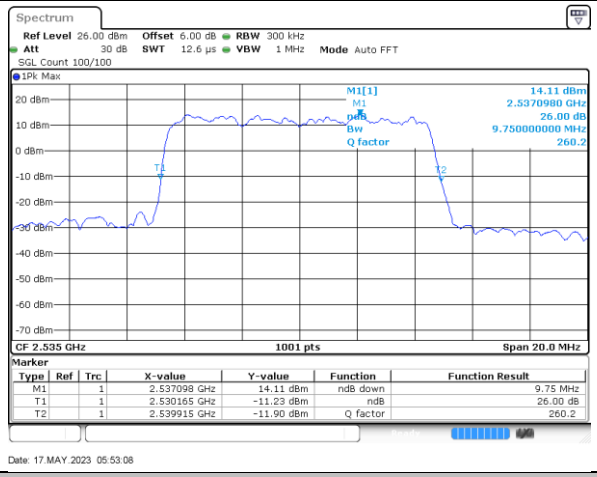


Middle Channel / 10MHz / 16QAM

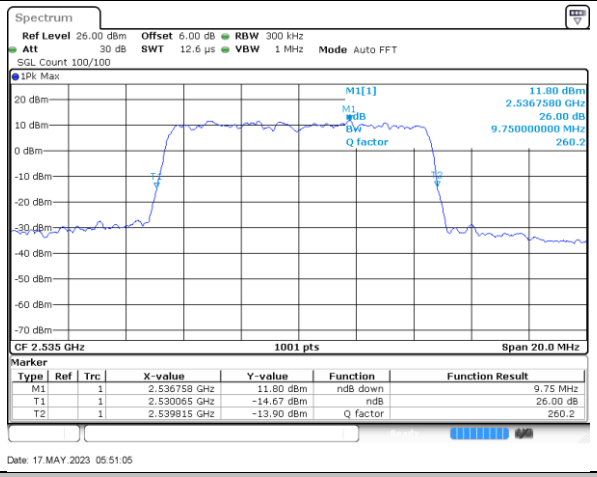


LTE Band 7

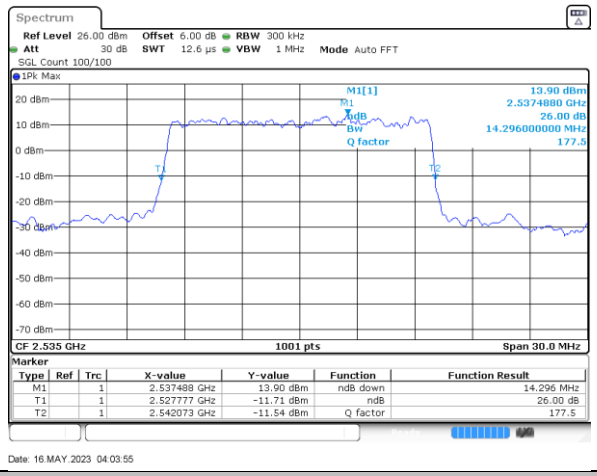
Middle Channel / 10MHz / 64QAM



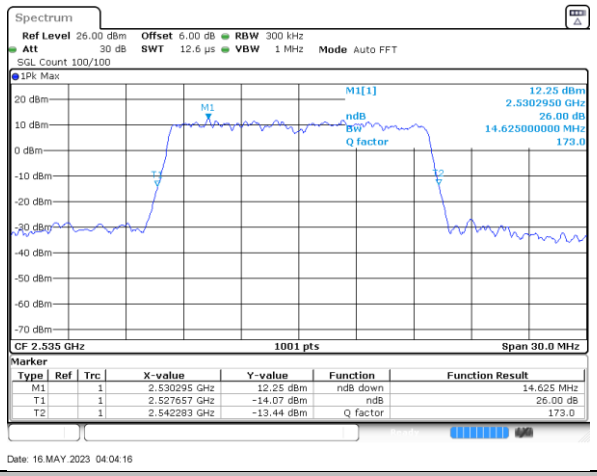
Middle Channel / 10MHz / 256QAM



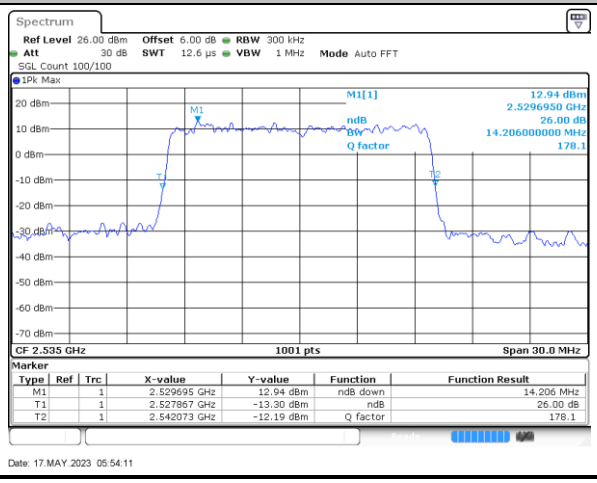
Middle Channel / 15MHz / QPSK



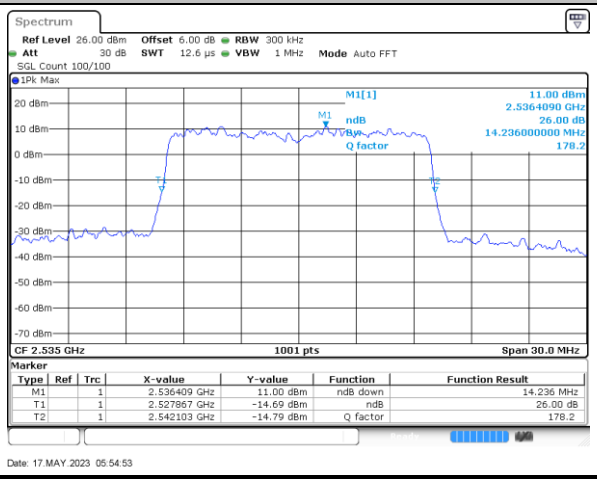
Middle Channel / 15MHz / 16QAM

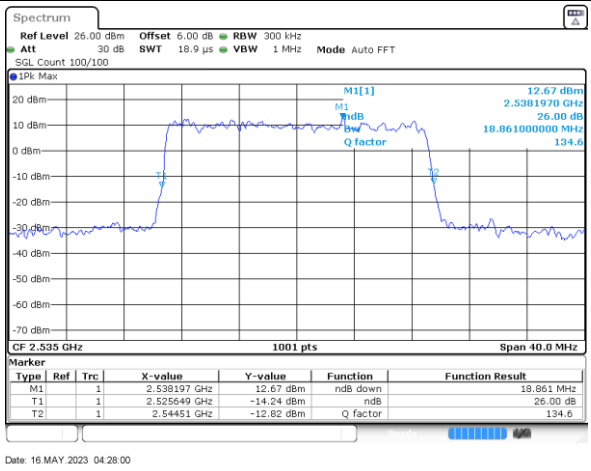
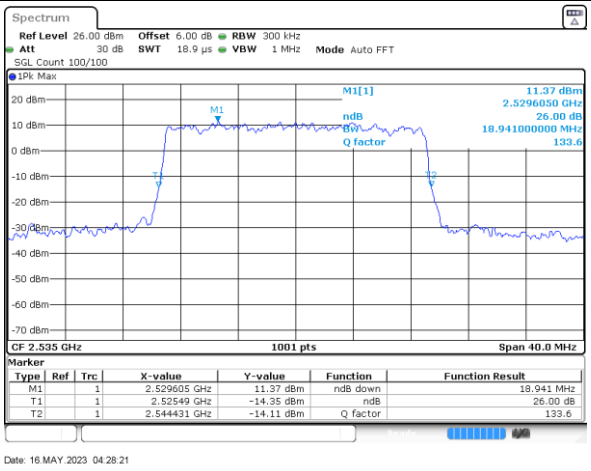
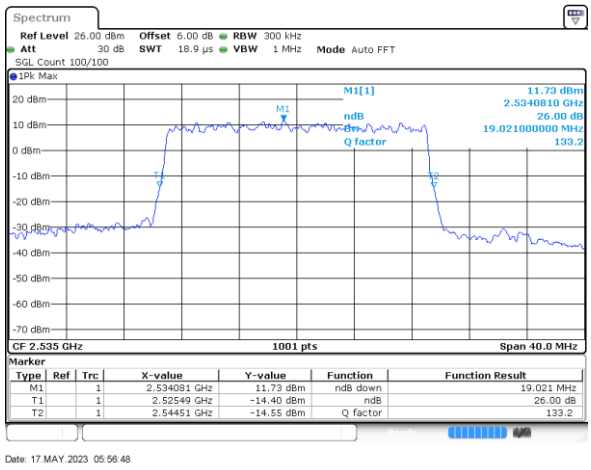
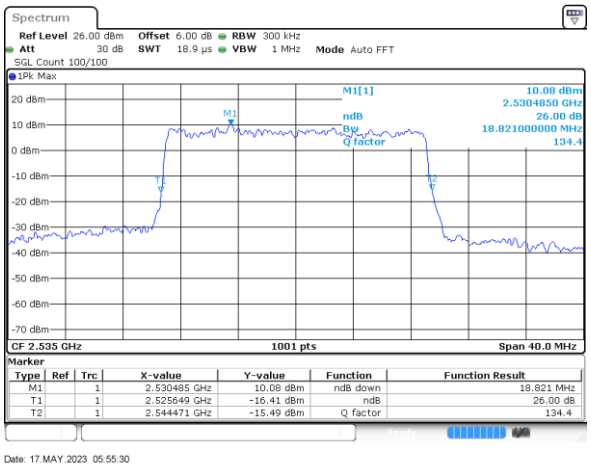


Middle Channel / 15MHz / 64QAM



Middle Channel / 15MHz / 256QAM



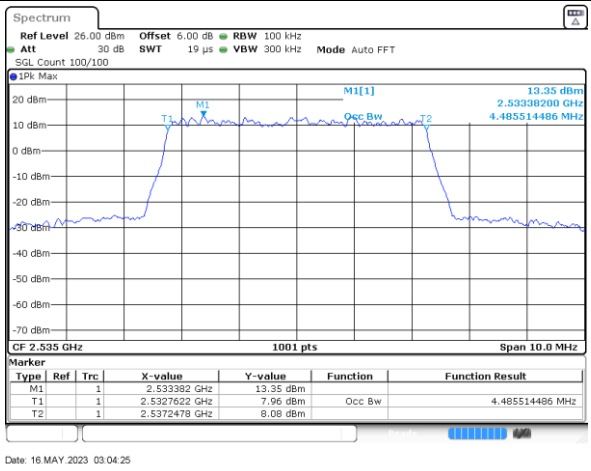
LTE Band 7	
Middle Channel / 20MHz / QPSK	**Middle Channel / 20MHz / 16QAM**
	
Middle Channel / 20MHz / 64QAM	**Middle Channel / 20MHz / 256QAM**
	

A2.3 Occupied Bandwidth

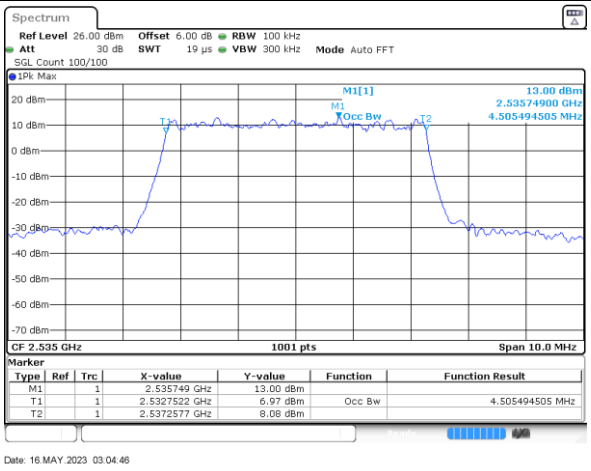
Mode	LTE Band 7 : 99%OBW(MHz)	
BW	5MHz	
Mod.	QPSK	16QAM
Middle CH	4.49	4.51
Mod.	64QAM	256QAM
Middle CH	4.48	4.49
BW	10MHz	
Mod.	QPSK	16QAM
Middle CH	9.01	9.05
Mod.	64QAM	256QAM
Middle CH	9.03	9.03
BW	15MHz	
Mod.	QPSK	16QAM
Middle CH	13.43	13.43
Mod.	64QAM	256QAM
Middle CH	13.46	13.46
BW	20MHz	
Mod.	QPSK	16QAM
Middle CH	17.94	17.90
Mod.	64QAM	256QAM
Middle CH	17.86	17.94

LTE Band 7

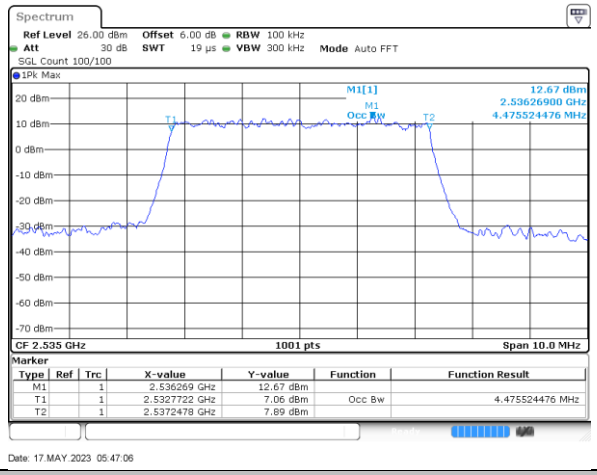
Middle Channel / 5MHz / QPSK



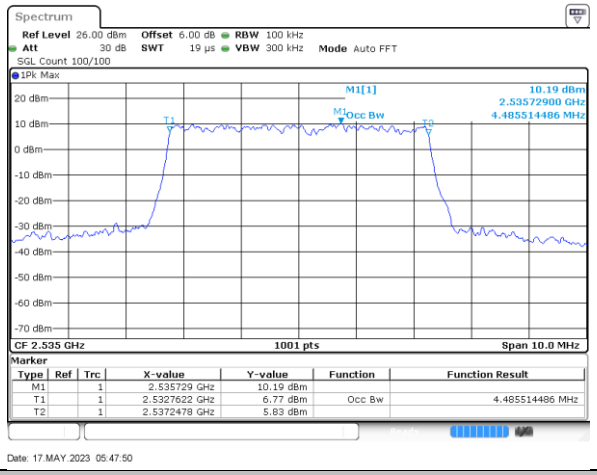
Middle Channel / 5MHz / 16QAM



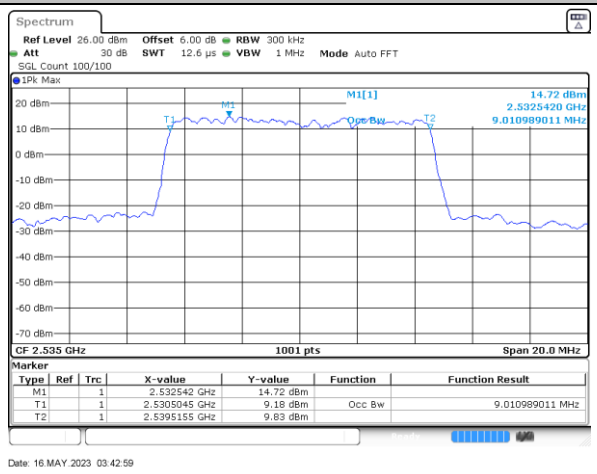
Middle Channel / 5MHz / 64QAM



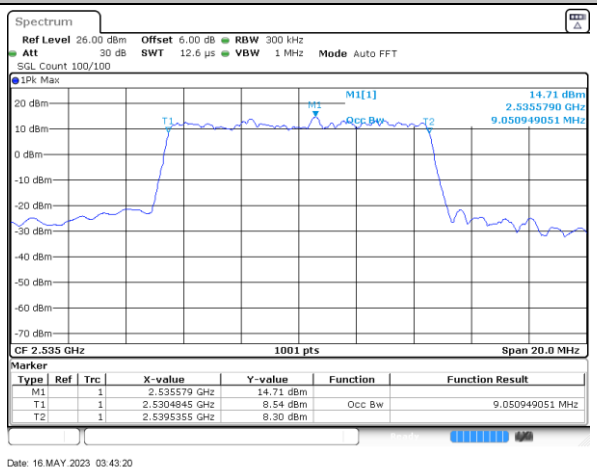
Middle Channel / 5MHz / 256QAM



Middle Channel / 10MHz / QPSK

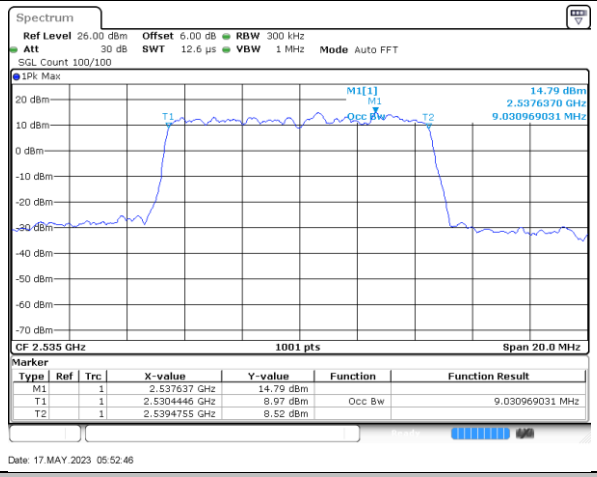


Middle Channel / 10MHz / 16QAM

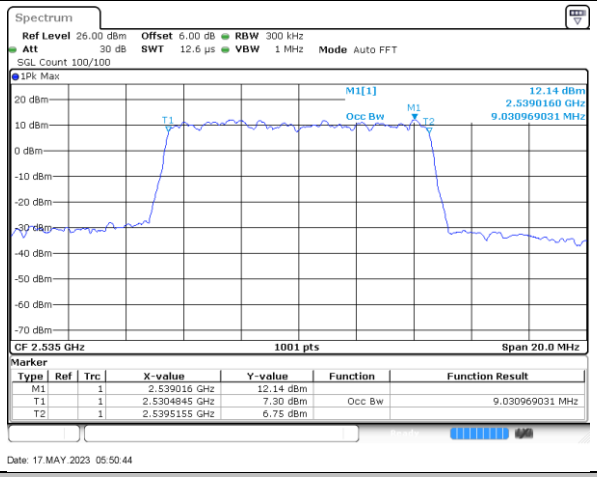


LTE Band 7

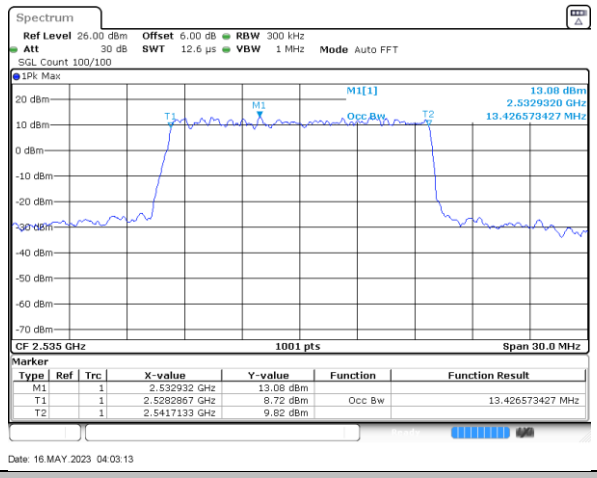
Middle Channel / 10MHz / 64QAM



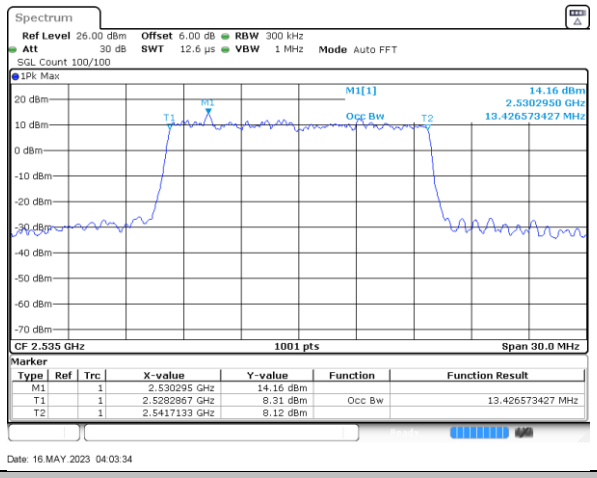
Middle Channel / 10MHz / 256QAM



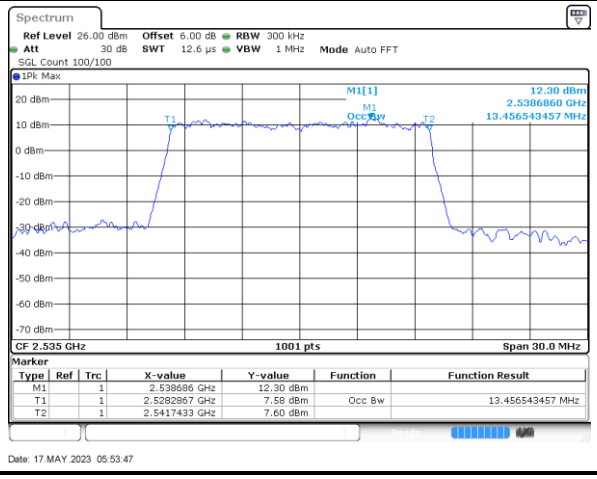
Middle Channel / 15MHz / QPSK



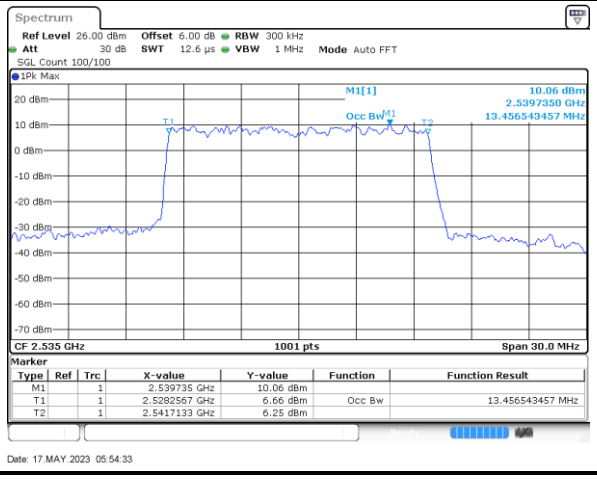
Middle Channel / 15MHz / 16QAM

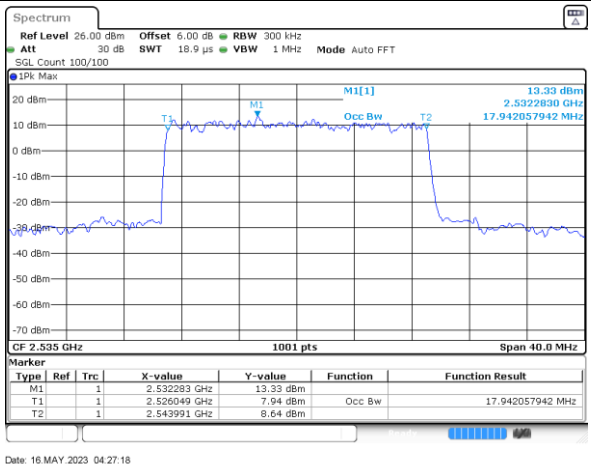
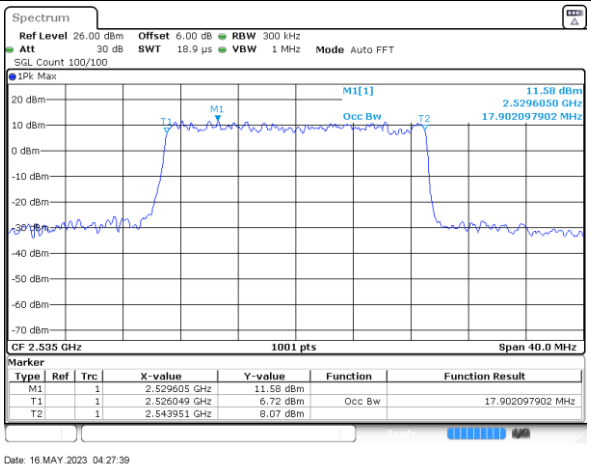
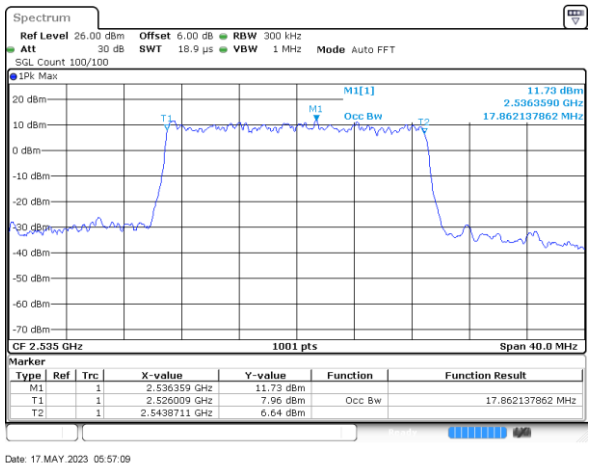
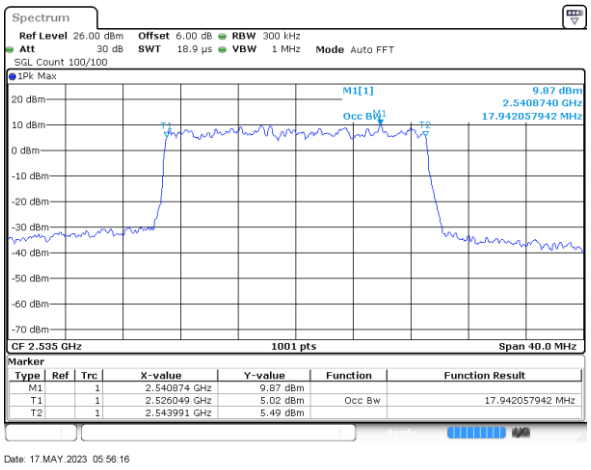


Middle Channel / 15MHz / 64QAM

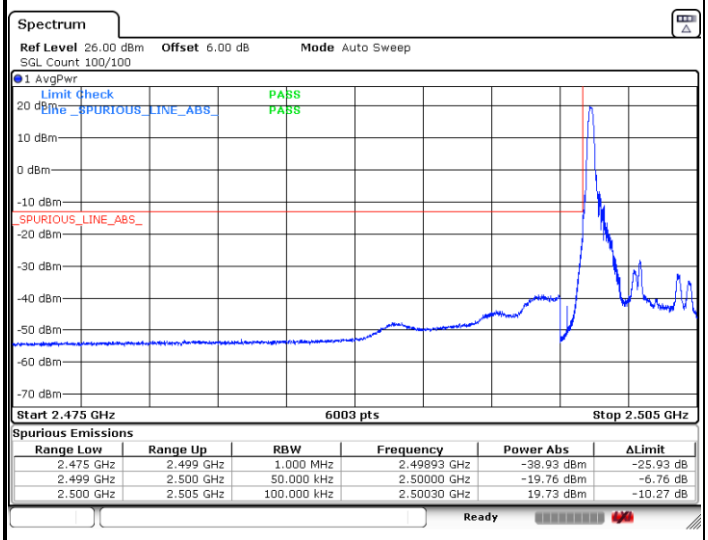
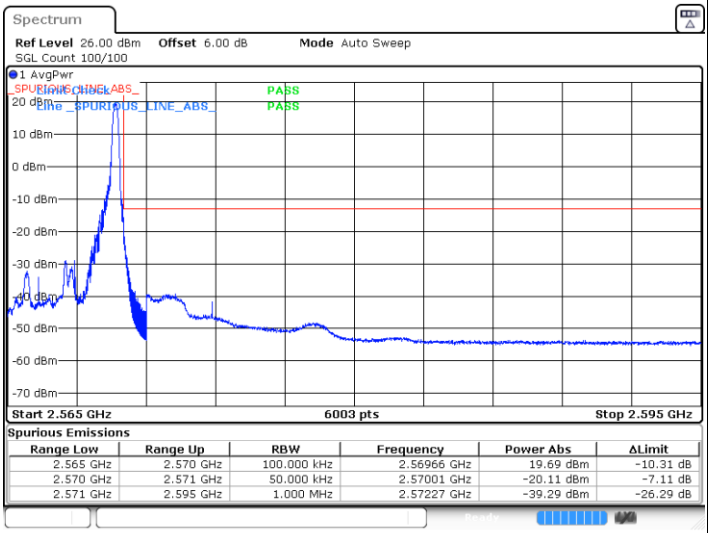
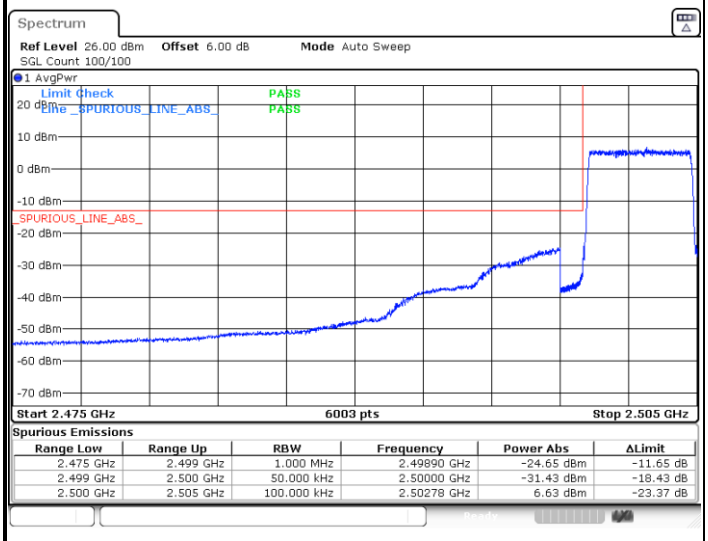
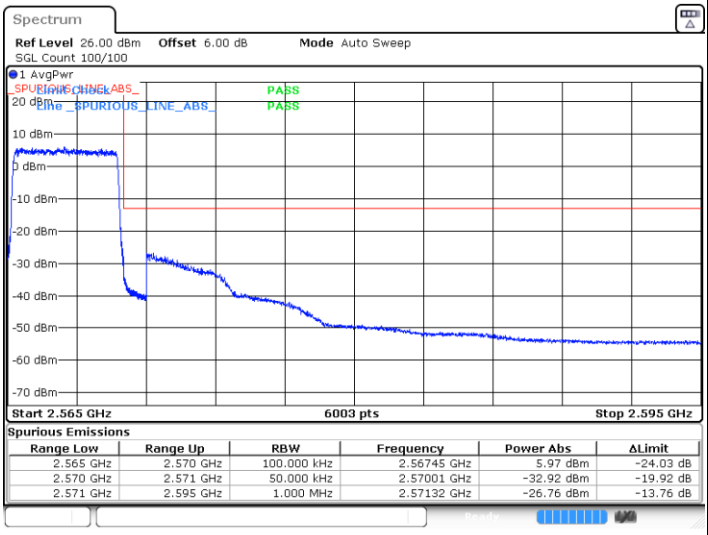


Middle Channel / 15MHz / 256QAM



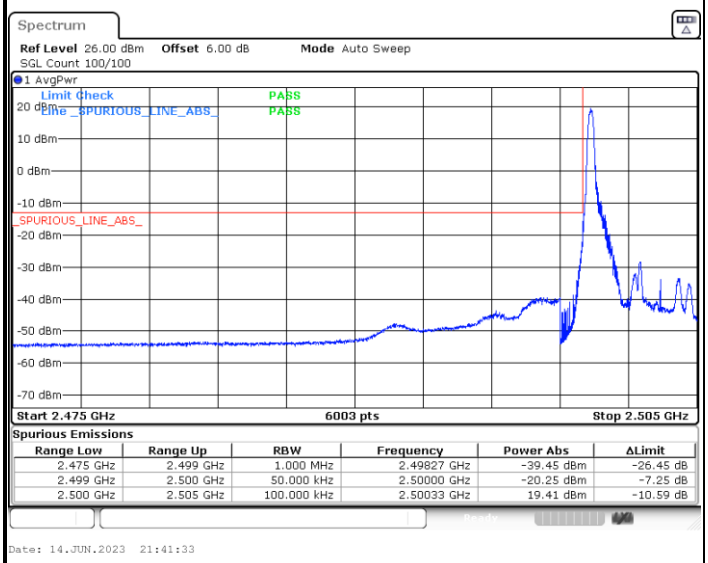
LTE Band 7	
Middle Channel / 20MHz / QPSK	**Middle Channel / 20MHz / 16QAM**
	
Middle Channel / 20MHz / 64QAM	**Middle Channel / 20MHz / 256QAM**
	

A2.4 Conducted Band Edge

LTE Band 7 / 5MHz / QPSK	
Lowest Band Edge / 1 RB	**Highest Band Edge / 1 RB**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

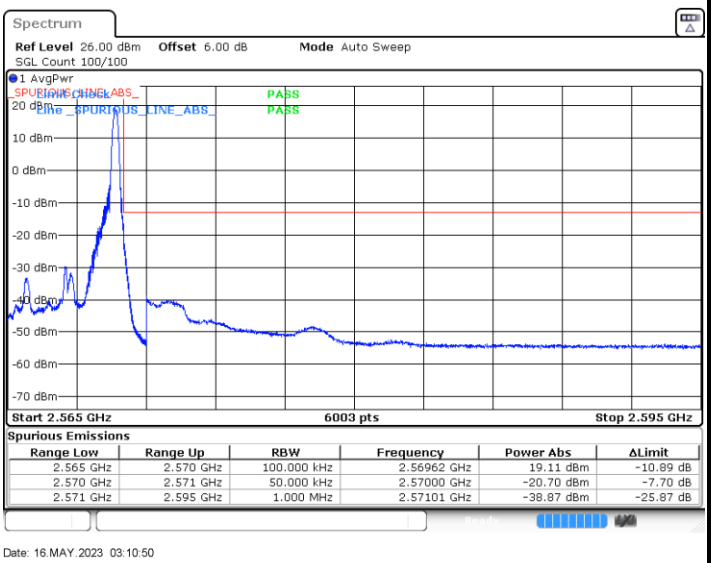
LTE Band 7 / 5MHz / 16QAM

Lowest Band Edge / 1RB



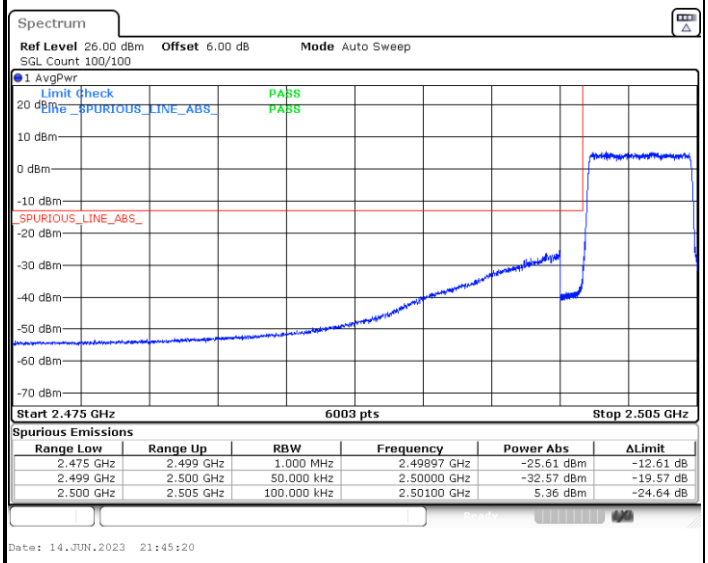
Date: 14.JUN.2023 21:41:33

Highest Band Edge / 1 RB



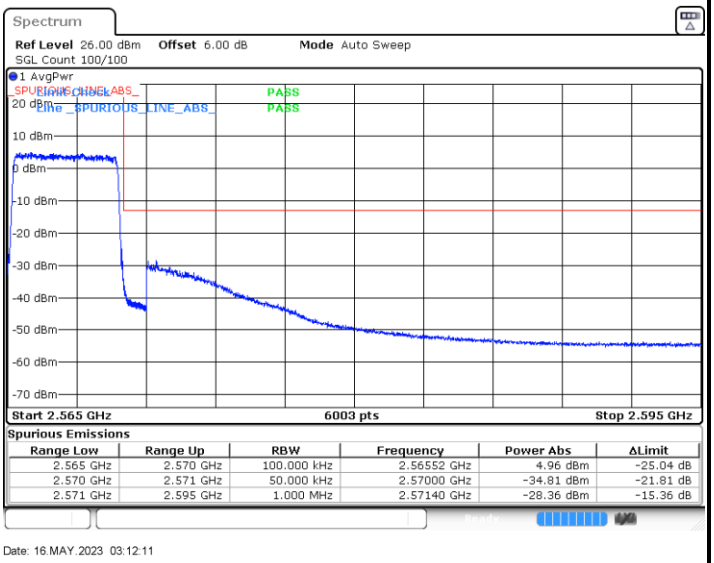
Date: 16.MAY.2023 03:10:50

Lowest Band Edge / Full RB

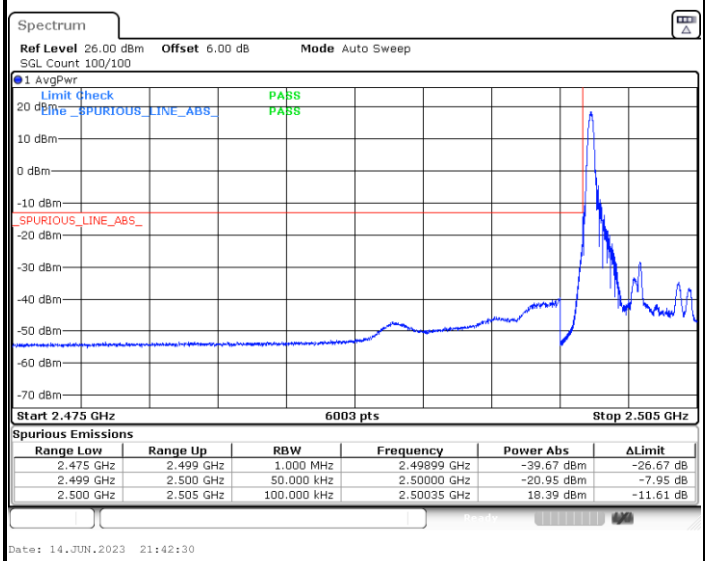
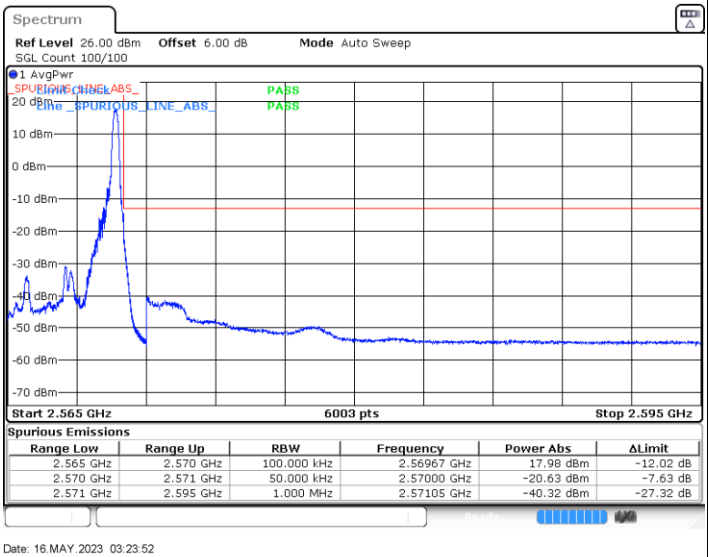
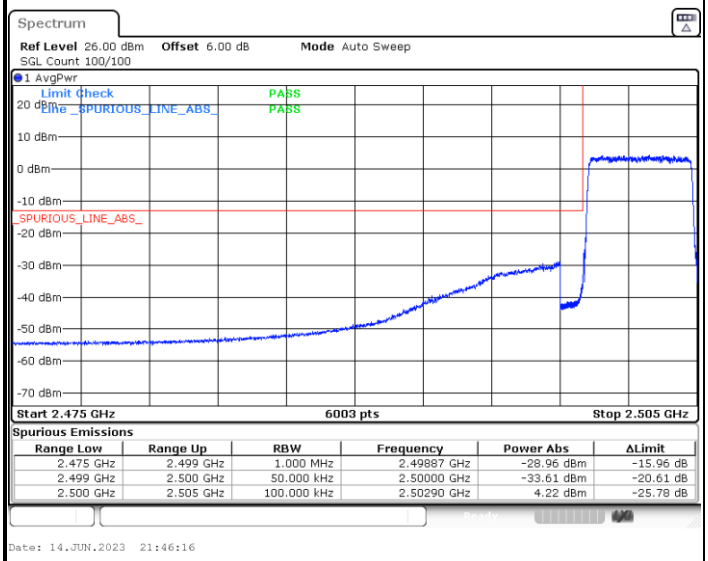
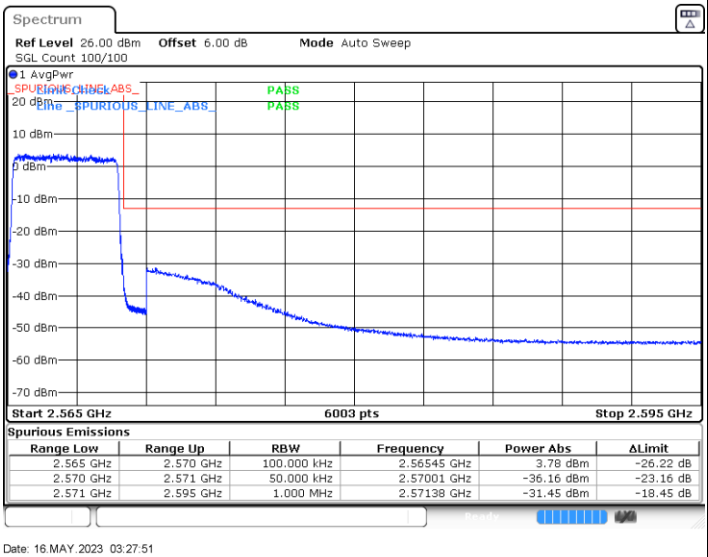


Date: 14.JUN.2023 21:45:20

Highest Band Edge / Full RB

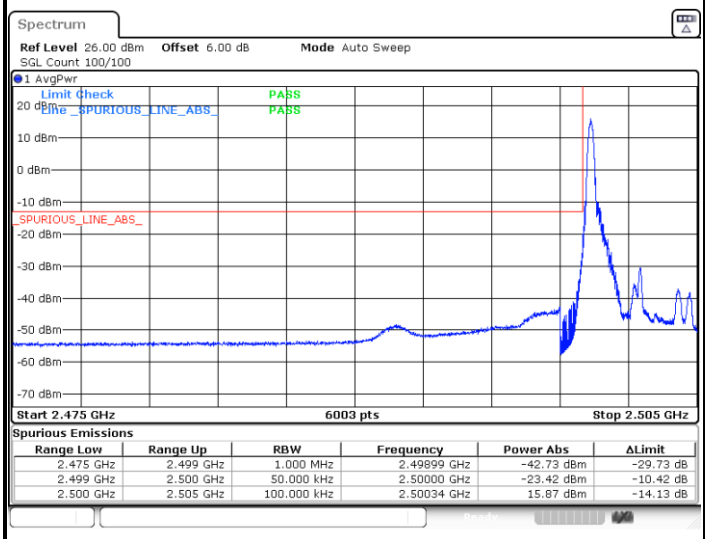


Date: 16.MAY.2023 03:12:11

LTE Band 7 / 5MHz / 64QAM	
Lowest Band Edge / 1RB	**Highest Band Edge / 1 RB**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

LTE Band 7 / 5MHz / 256QAM

Lowest Band Edge / 1RB

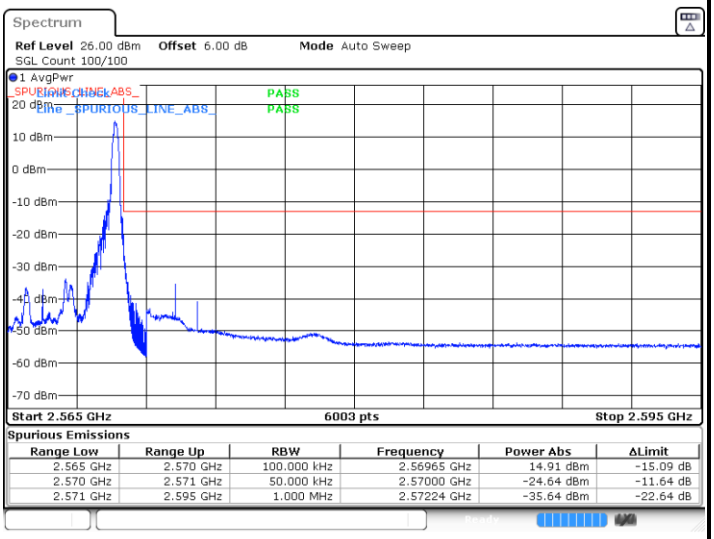


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.475 GHz	2.499 GHz	1.000 MHz	2.49899 GHz	-42.73 dBm	-29.73 dB
2.499 GHz	2.500 GHz	50.000 kHz	2.50000 GHz	-23.42 dBm	-10.42 dB
2.500 GHz	2.505 GHz	100.000 kHz	2.50034 GHz	15.87 dBm	-14.13 dB

Date: 14.JUN.2023 21:43:26

Highest Band Edge / 1 RB

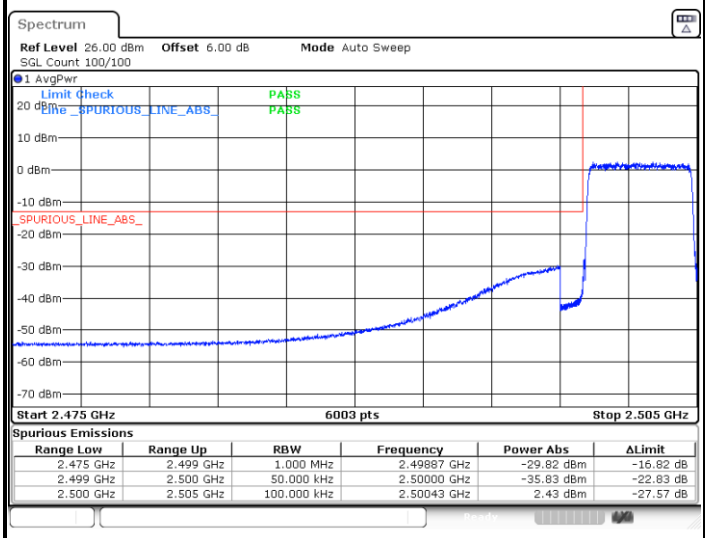


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.565 GHz	2.570 GHz	100.000 kHz	2.56965 GHz	14.91 dBm	-15.09 dB
2.570 GHz	2.571 GHz	50.000 kHz	2.57000 GHz	-24.64 dBm	-11.64 dB
2.571 GHz	2.595 GHz	1.000 MHz	2.57224 GHz	-35.64 dBm	-22.64 dB

Date: 16.MAY.2023 03:24:33

Lowest Band Edge / Full RB

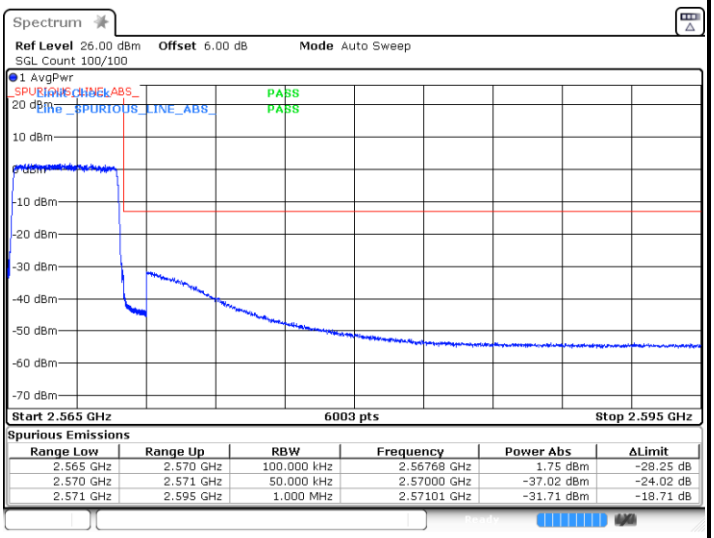


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.475 GHz	2.499 GHz	1.000 MHz	2.49887 GHz	-29.82 dBm	-16.82 dB
2.499 GHz	2.500 GHz	50.000 kHz	2.50000 GHz	-35.83 dBm	-22.83 dB
2.500 GHz	2.505 GHz	100.000 kHz	2.50043 GHz	2.43 dBm	-27.57 dB

Date: 14.JUN.2023 21:47:13

Highest Band Edge / Full RB



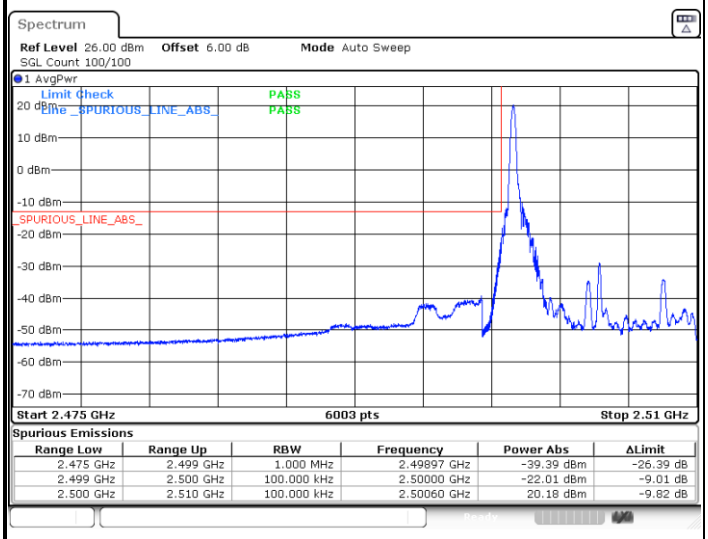
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.565 GHz	2.570 GHz	100.000 kHz	2.56768 GHz	1.75 dBm	-28.25 dB
2.570 GHz	2.571 GHz	50.000 kHz	2.57000 GHz	-37.02 dBm	-24.02 dB
2.571 GHz	2.595 GHz	1.000 MHz	2.57101 GHz	-31.71 dBm	-18.71 dB

Date: 16.MAY.2023 03:31:32

LTE Band 7 / 10MHz / QPSK

Lowest Band Edge / 1 RB

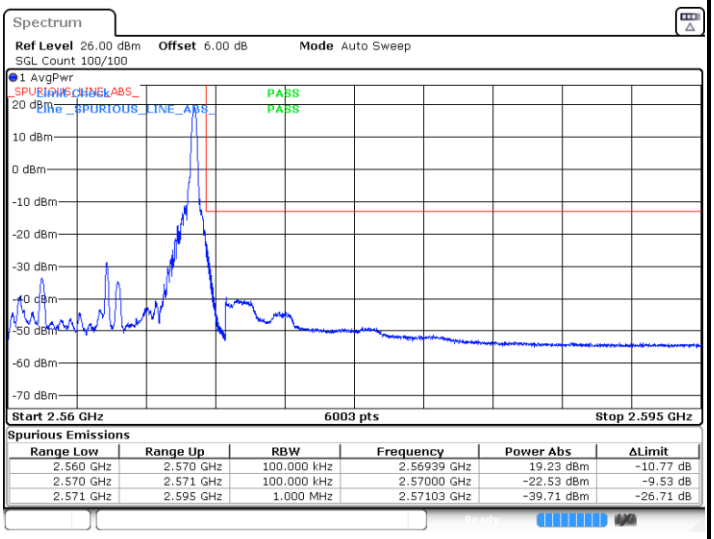


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.475 GHz	2.499 GHz	1.000 MHz	2.49897 GHz	-39.39 dBm	-26.39 dB
2.499 GHz	2.500 GHz	100.000 kHz	2.50000 GHz	-22.01 dBm	-9.01 dB
2.500 GHz	2.510 GHz	100.000 kHz	2.50060 GHz	20.18 dBm	-9.82 dB

Date: 14.JUN.2023 21:49:17

Highest Band Edge / 1 RB

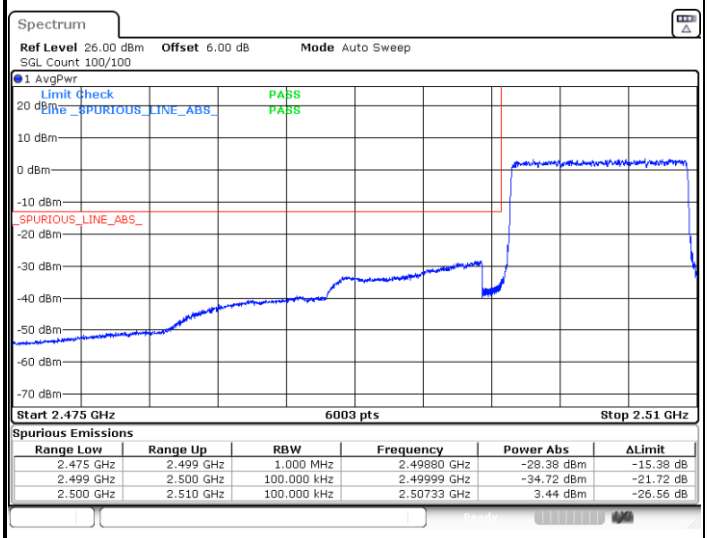


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.560 GHz	2.570 GHz	100.000 kHz	2.56939 GHz	19.23 dBm	-10.77 dB
2.570 GHz	2.571 GHz	100.000 kHz	2.57000 GHz	-22.53 dBm	-9.53 dB
2.571 GHz	2.595 GHz	1.000 MHz	2.57103 GHz	-39.71 dBm	-26.71 dB

Date: 16.MAY.2023 03:46:01

Lowest Band Edge / Full RB

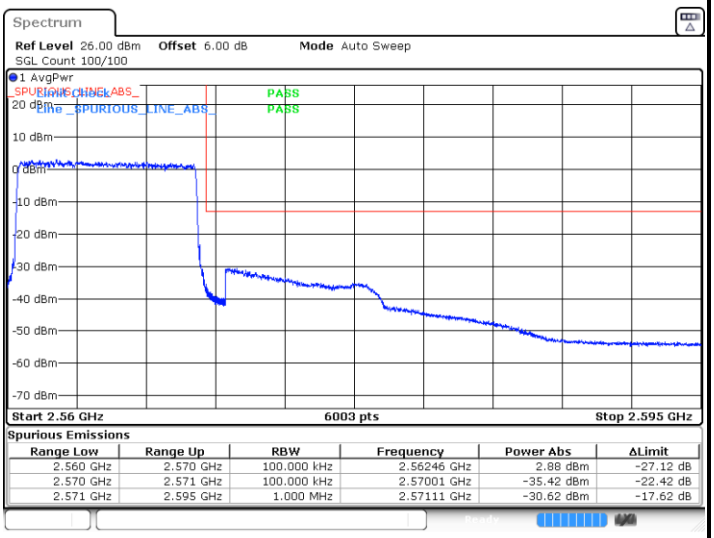


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.475 GHz	2.499 GHz	1.000 MHz	2.49880 GHz	-28.38 dBm	-15.38 dB
2.499 GHz	2.500 GHz	100.000 kHz	2.49999 GHz	-34.72 dBm	-21.72 dB
2.500 GHz	2.510 GHz	100.000 kHz	2.50733 GHz	3.44 dBm	-26.56 dB

Date: 14.JUN.2023 21:53:02

Highest Band Edge / Full RB



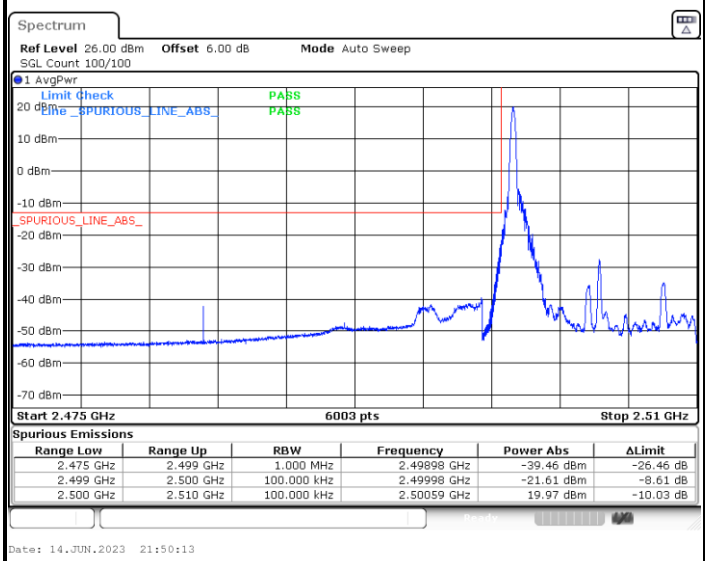
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.560 GHz	2.570 GHz	100.000 kHz	2.56246 GHz	2.88 dBm	-27.12 dB
2.570 GHz	2.571 GHz	100.000 kHz	2.57001 GHz	-35.42 dBm	-22.42 dB
2.571 GHz	2.595 GHz	1.000 MHz	2.57111 GHz	-30.62 dBm	-17.62 dB

Date: 16.MAY.2023 03:47:22

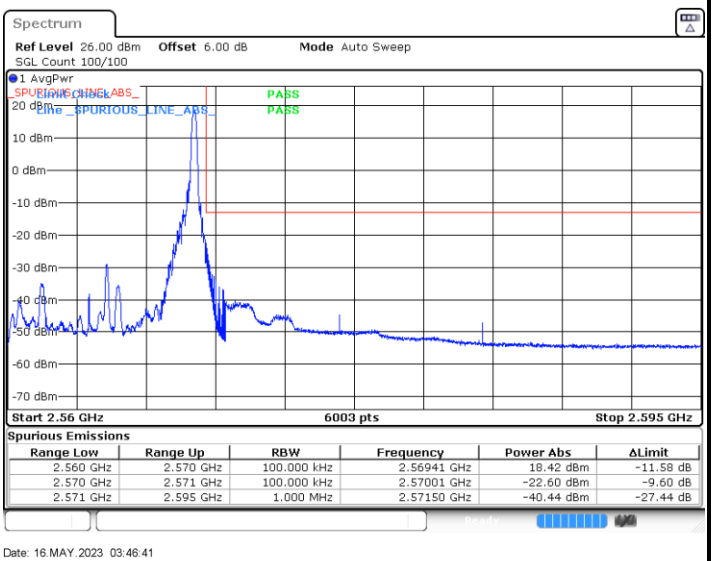
LTE Band 7 / 10MHz / 16QAM

Lowest Band Edge / 1 RB



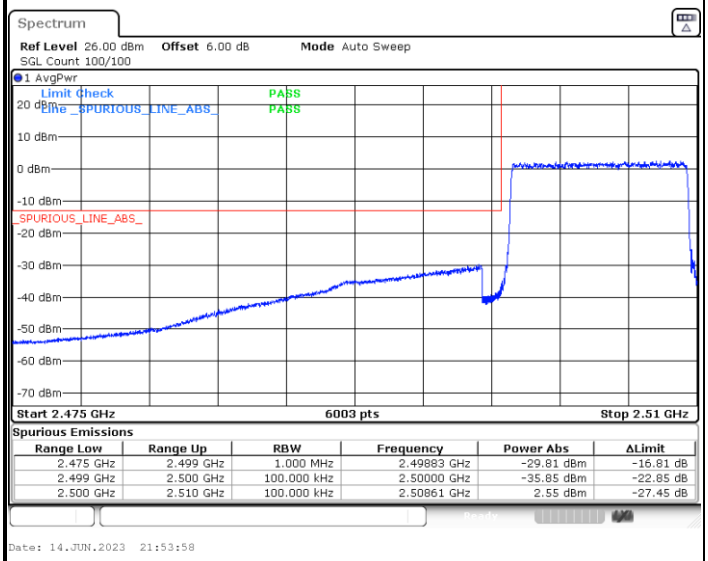
Date: 14.JUN.2023 21:50:13

Highest Band Edge / 1 RB



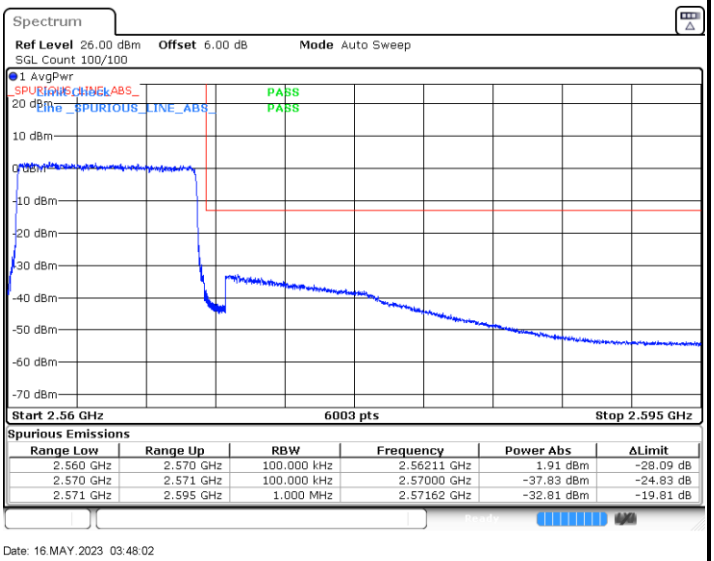
Date: 16.MAY.2023 03:46:41

Lowest Band Edge / Full RB

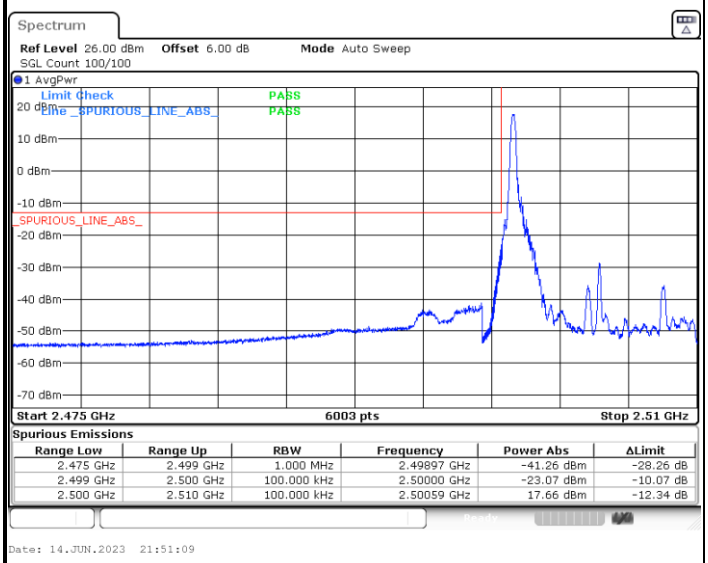
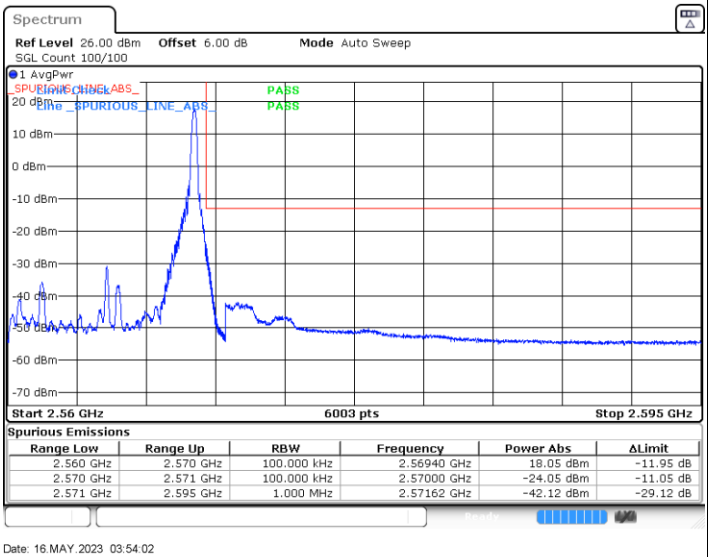
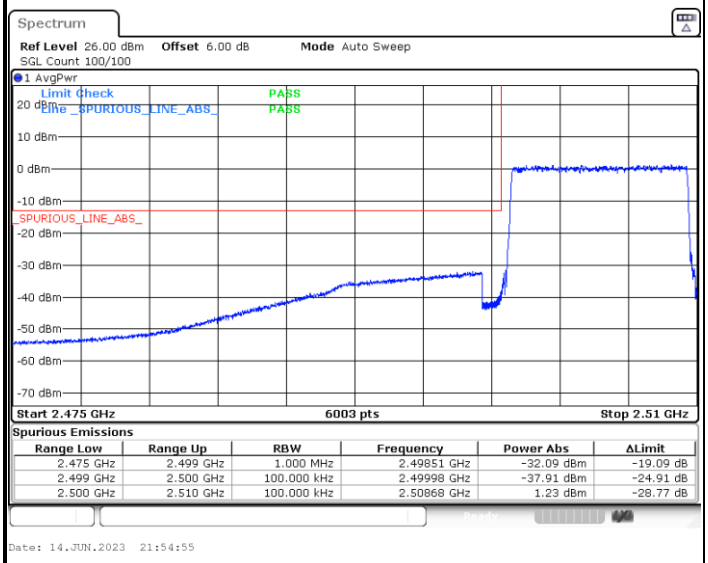
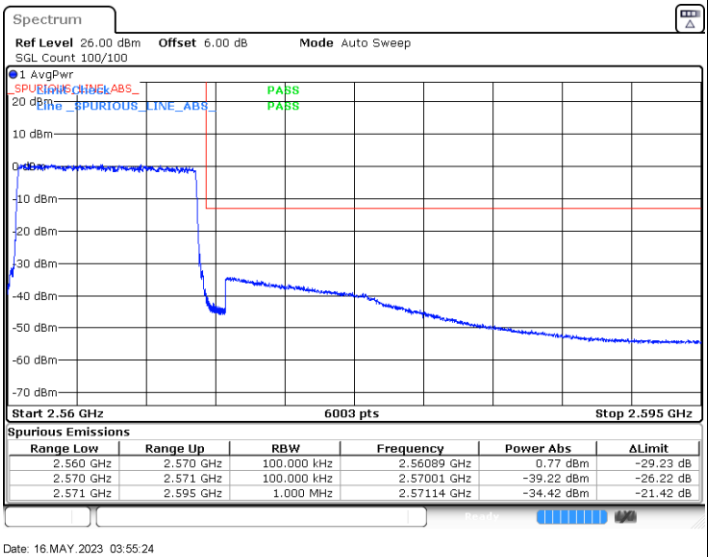


Date: 14.JUN.2023 21:53:58

Highest Band Edge / Full RB

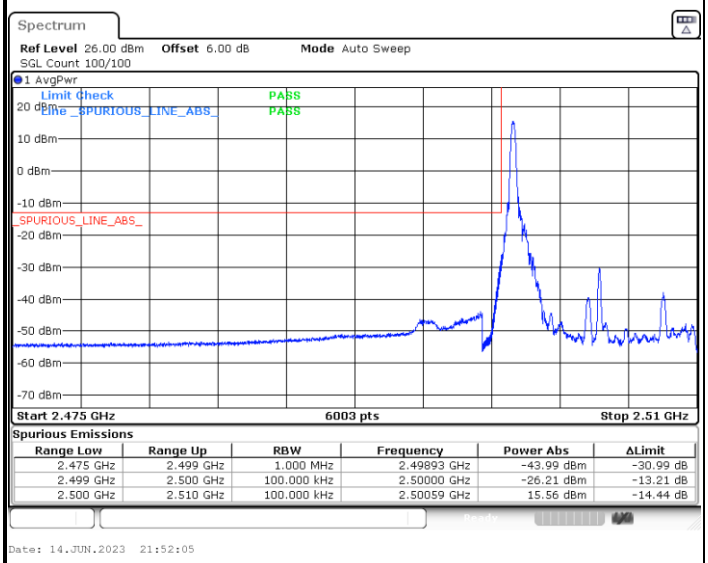


Date: 16.MAY.2023 03:48:02

LTE Band 7 / 10MHz / 64QAM	
Lowest Band Edge / 1 RB	**Highest Band Edge / 1 RB**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

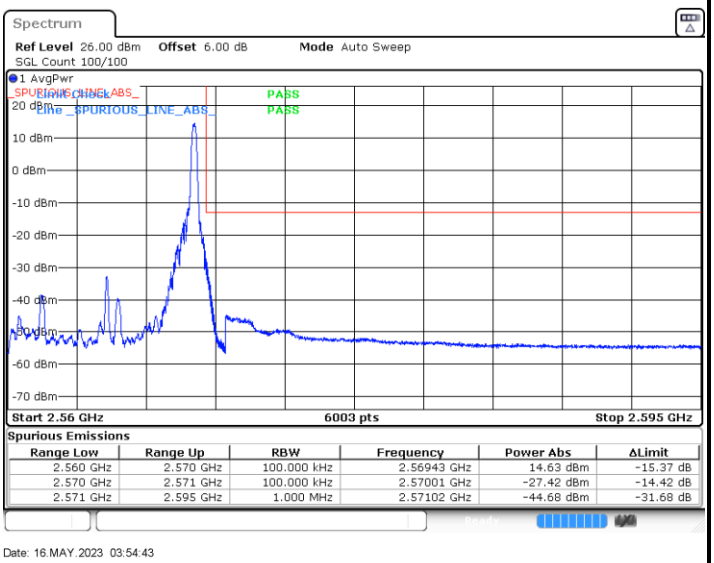
LTE Band 7 / 10MHz / 256QAM

Lowest Band Edge / 1 RB



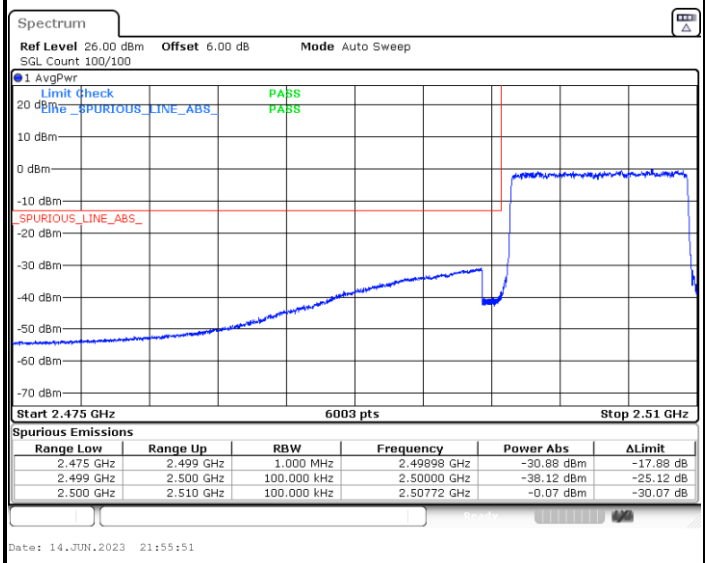
Date: 14.JUN.2023 21:52:05

Highest Band Edge / 1 RB



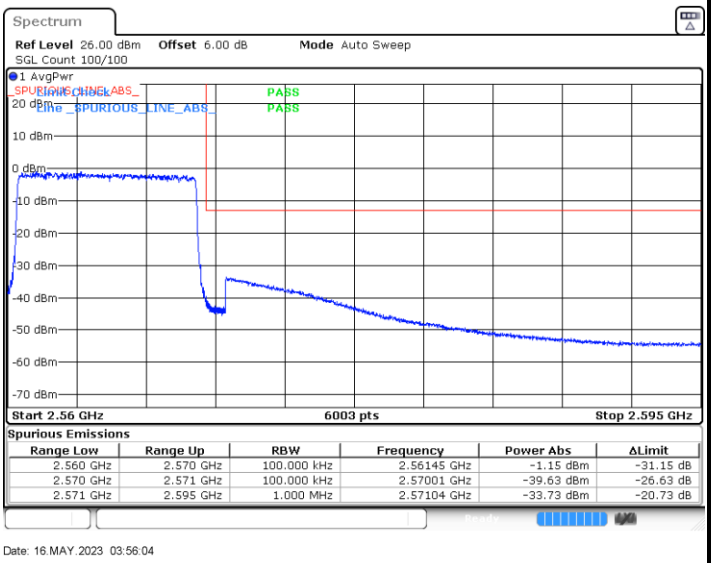
Date: 16.MAY.2023 03:54:43

Lowest Band Edge / Full RB



Date: 14.JUN.2023 21:55:51

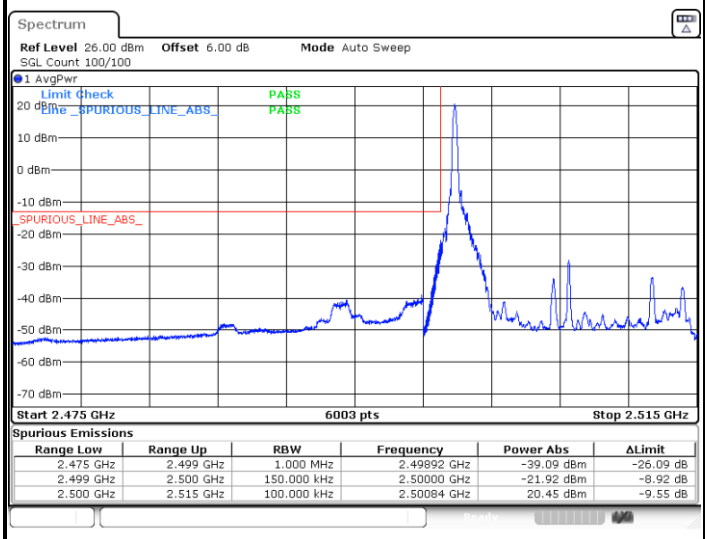
Highest Band Edge / Full RB



Date: 16.MAY.2023 03:56:04

LTE Band 7 / 15MHz / QPSK

Lowest Band Edge / 1 RB

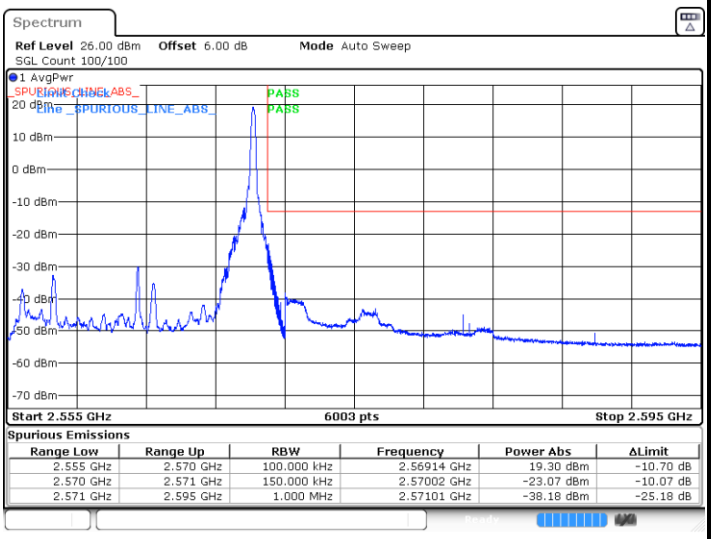


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.475 GHz	2.499 GHz	1.000 MHz	2.49892 GHz	-39.09 dBm	-26.09 dB
2.499 GHz	2.500 GHz	150.000 kHz	2.50000 GHz	-21.92 dBm	-8.92 dB
2.500 GHz	2.515 GHz	100.000 kHz	2.50084 GHz	20.45 dBm	-9.55 dB

Date: 14.JUN.2023 21:57:05

Highest Band Edge / 1 RB

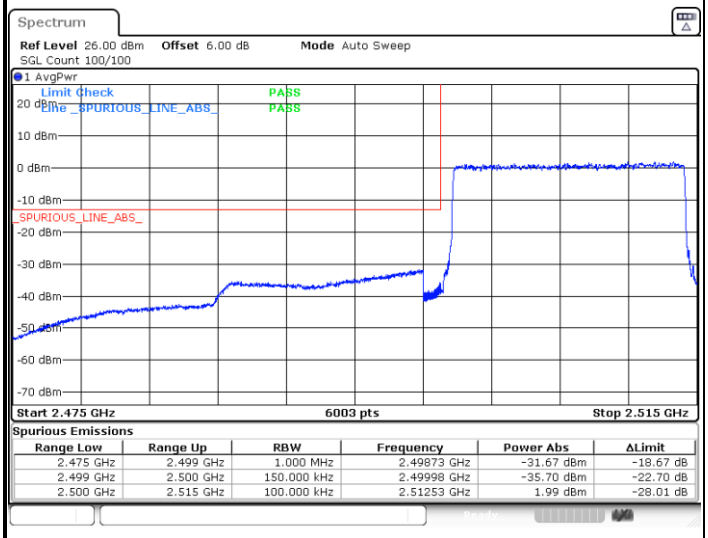


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.555 GHz	2.570 GHz	100.000 kHz	2.56914 GHz	19.30 dBm	-10.70 dB
2.570 GHz	2.571 GHz	150.000 kHz	2.57002 GHz	-23.07 dBm	-10.07 dB
2.571 GHz	2.595 GHz	1.000 MHz	2.57101 GHz	-38.18 dBm	-25.18 dB

Date: 16.MAY.2023 04:06:14

Lowest Band Edge / Full RB

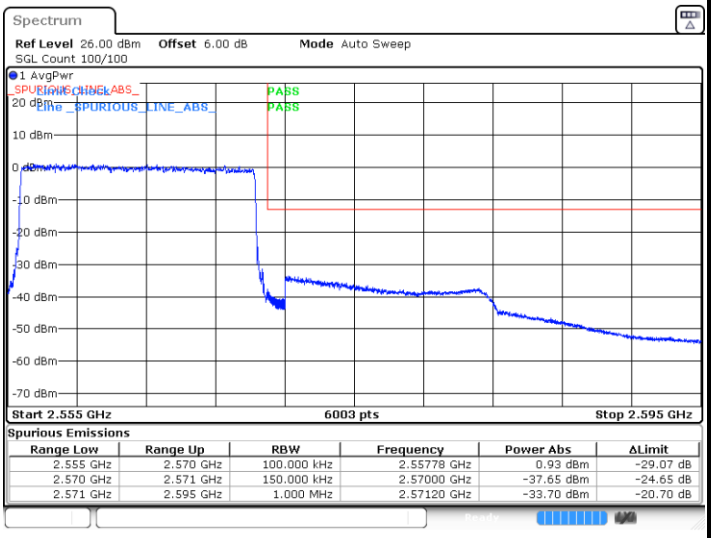


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.475 GHz	2.499 GHz	1.000 MHz	2.49873 GHz	-31.67 dBm	-18.67 dB
2.499 GHz	2.500 GHz	150.000 kHz	2.49998 GHz	-35.70 dBm	-22.70 dB
2.500 GHz	2.515 GHz	100.000 kHz	2.51253 GHz	1.99 dBm	-28.01 dB

Date: 14.JUN.2023 22:00:50

Highest Band Edge / Full RB



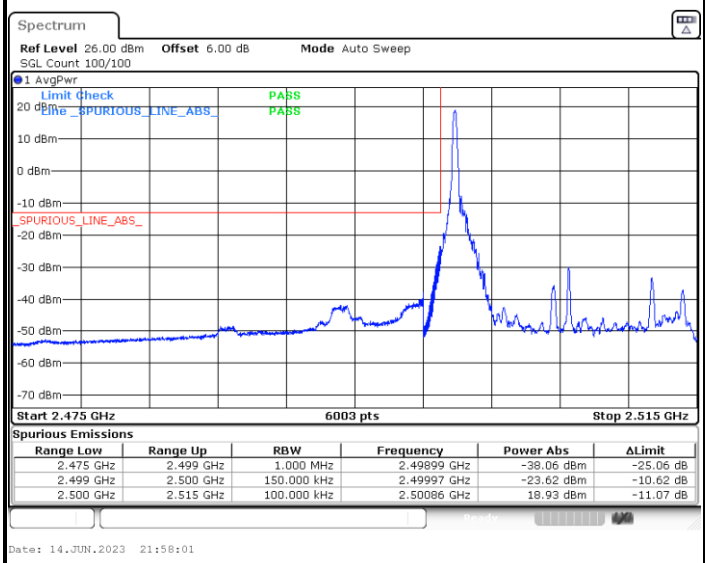
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.555 GHz	2.570 GHz	100.000 kHz	2.55778 GHz	0.93 dBm	-29.07 dB
2.570 GHz	2.571 GHz	150.000 kHz	2.57000 GHz	-37.65 dBm	-24.65 dB
2.571 GHz	2.595 GHz	1.000 MHz	2.57120 GHz	-33.70 dBm	-20.70 dB

Date: 16.MAY.2023 04:07:35

LTE Band 7 / 15MHz / 16QAM

Lowest Band Edge / 1 RB

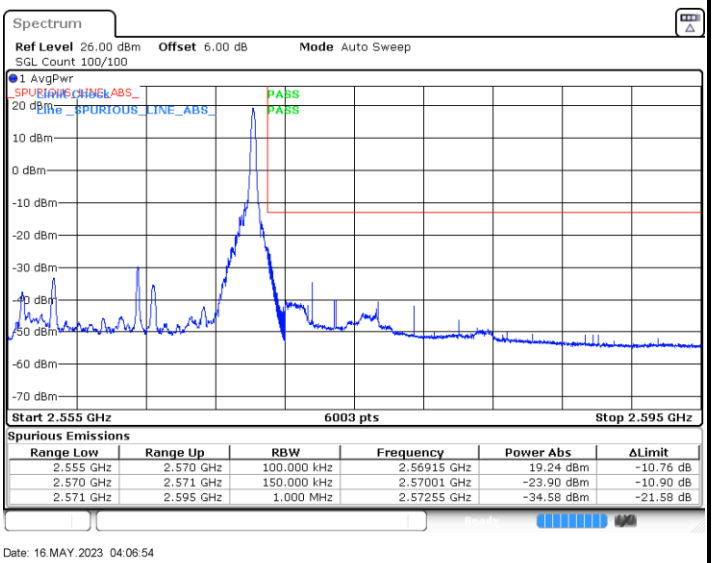


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.475 GHz	2.499 GHz	1.000 MHz	2.49899 GHz	-38.06 dBm	-25.06 dB
2.499 GHz	2.500 GHz	150.000 kHz	2.49997 GHz	-23.62 dBm	-10.62 dB
2.500 GHz	2.515 GHz	100.000 kHz	2.50086 GHz	18.93 dBm	-11.07 dB

Date: 14.JUN.2023 21:58:01

Highest Band Edge / 1 RB

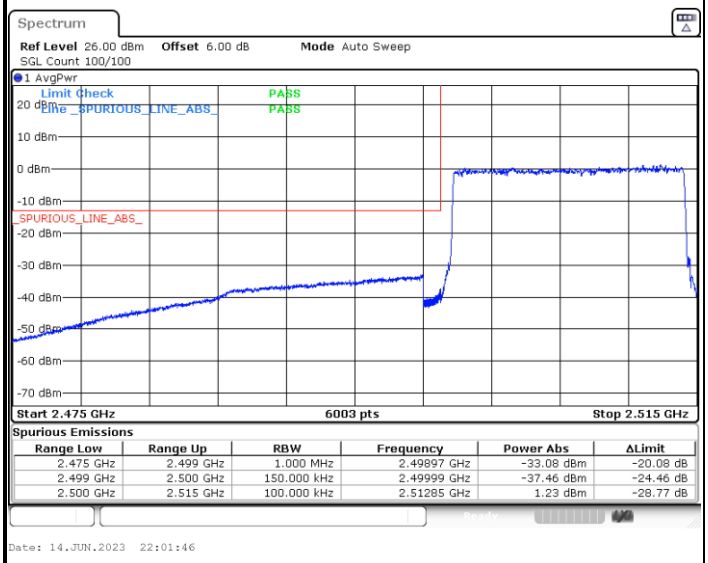


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.555 GHz	2.570 GHz	100.000 kHz	2.56915 GHz	19.24 dBm	-10.76 dB
2.570 GHz	2.571 GHz	150.000 kHz	2.57001 GHz	-23.90 dBm	-10.90 dB
2.571 GHz	2.595 GHz	1.000 MHz	2.57255 GHz	-34.58 dBm	-21.58 dB

Date: 16.MAY.2023 04:06:54

Lowest Band Edge / Full RB

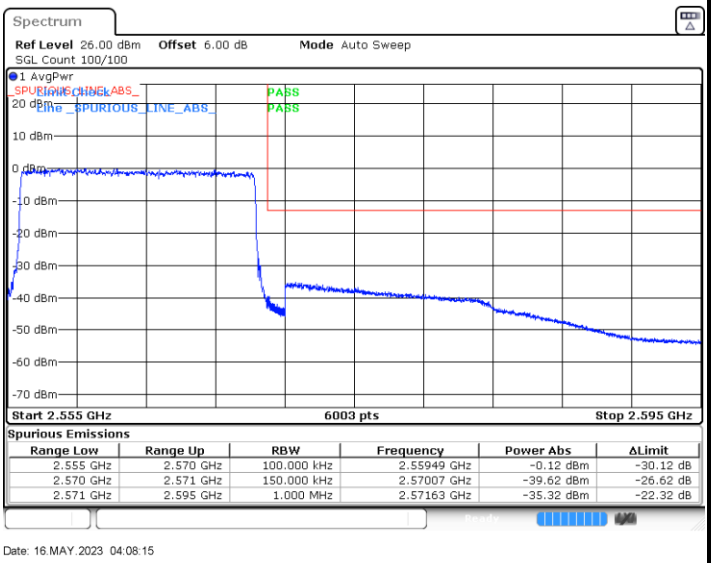


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.475 GHz	2.499 GHz	1.000 MHz	2.49897 GHz	-33.08 dBm	-20.08 dB
2.499 GHz	2.500 GHz	150.000 kHz	2.49999 GHz	-37.46 dBm	-24.46 dB
2.500 GHz	2.515 GHz	100.000 kHz	2.51285 GHz	1.23 dBm	-28.77 dB

Date: 14.JUN.2023 22:01:46

Highest Band Edge / Full RB



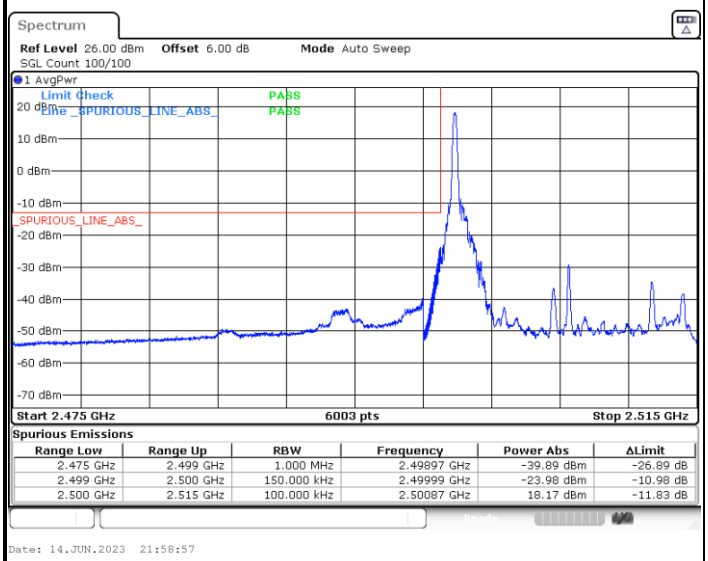
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.555 GHz	2.570 GHz	100.000 kHz	2.55949 GHz	-0.12 dBm	-30.12 dB
2.570 GHz	2.571 GHz	150.000 kHz	2.57007 GHz	-39.62 dBm	-26.62 dB
2.571 GHz	2.595 GHz	1.000 MHz	2.57163 GHz	-35.32 dBm	-22.32 dB

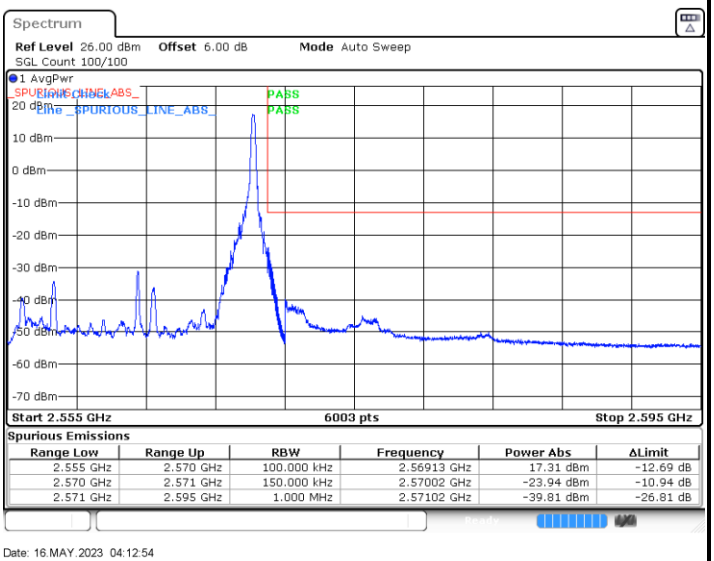
Date: 16.MAY.2023 04:08:15

LTE Band 7 / 15MHz / 64QAM

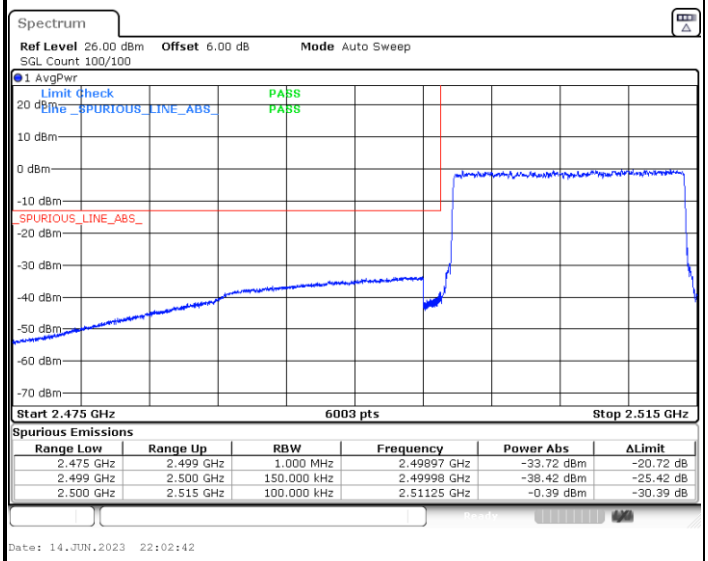
Lowest Band Edge / 1 RB



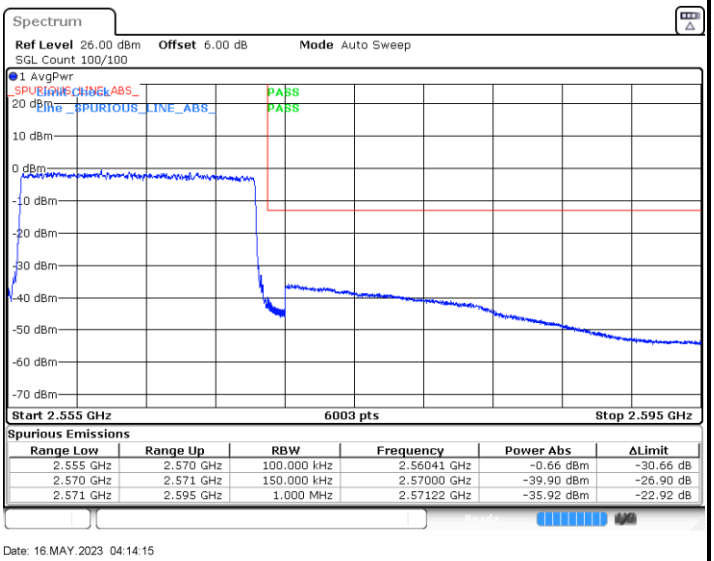
Highest Band Edge / 1 RB



Lowest Band Edge / Full RB

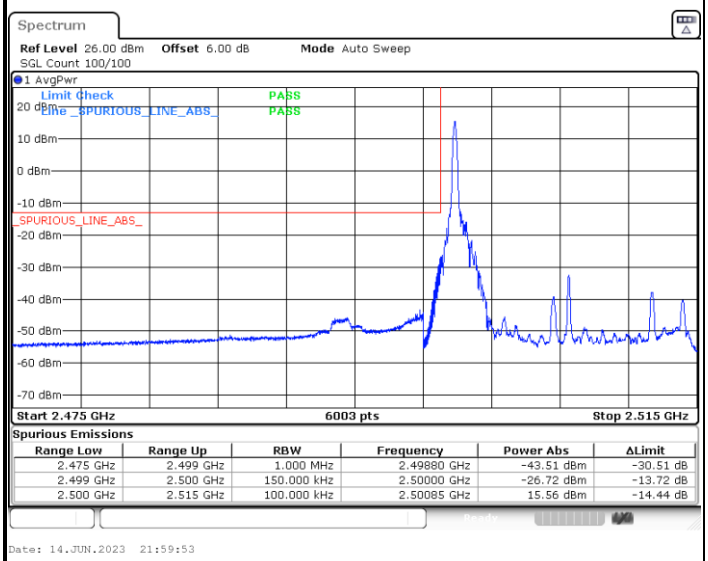


Highest Band Edge / Full RB



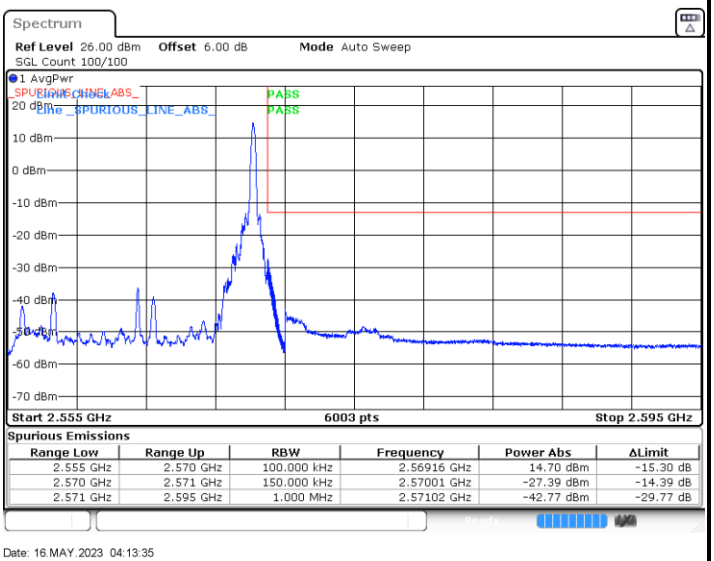
LTE Band 7 / 15MHz / 256QAM

Lowest Band Edge / 1 RB



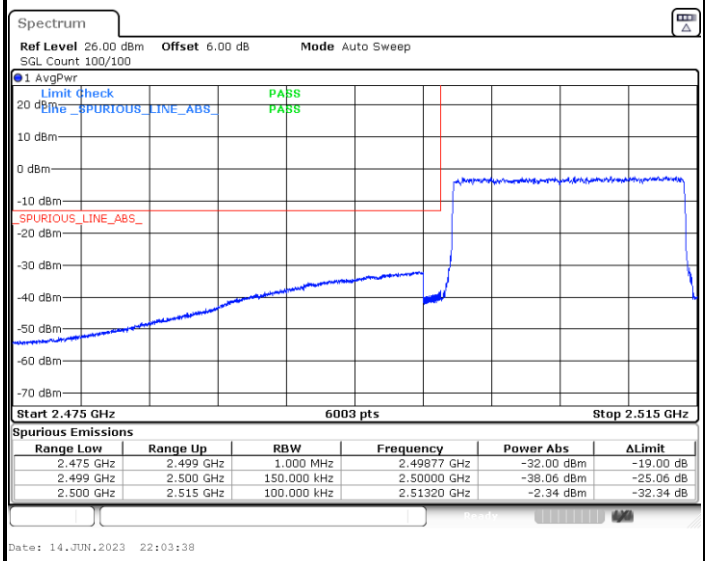
Date: 14.JUN.2023 21:59:53

Highest Band Edge / 1 RB



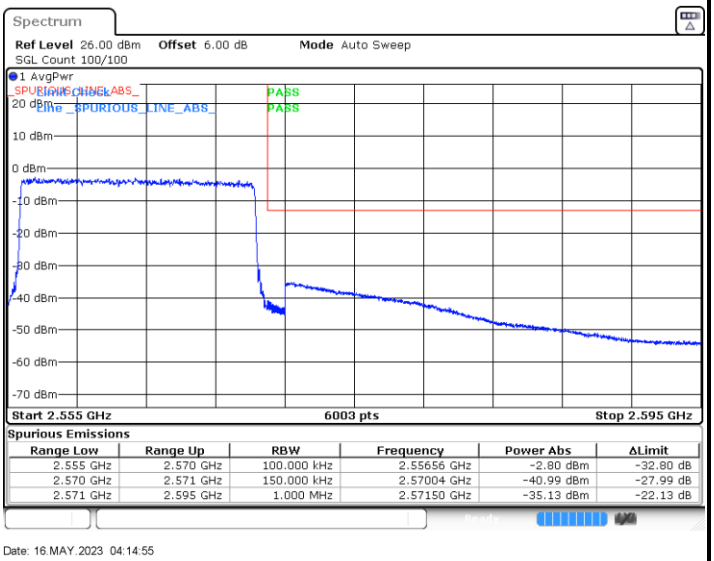
Date: 16.MAY.2023 04:13:35

Lowest Band Edge / Full RB



Date: 14.JUN.2023 22:03:38

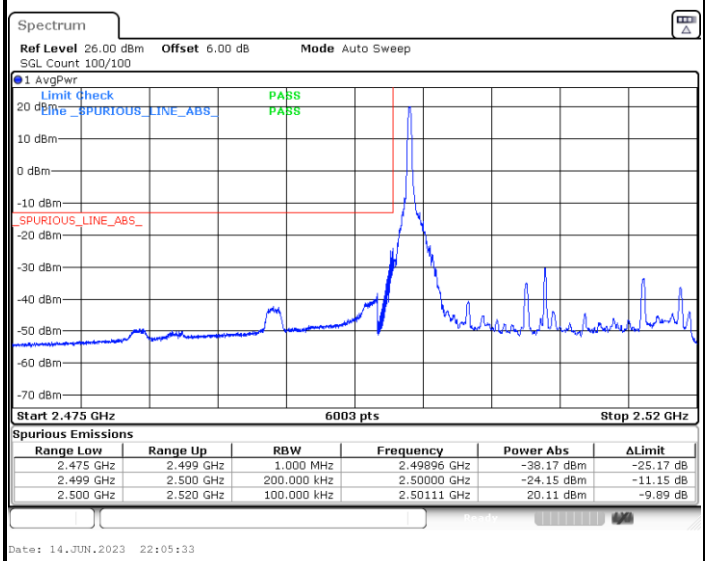
Highest Band Edge / Full RB



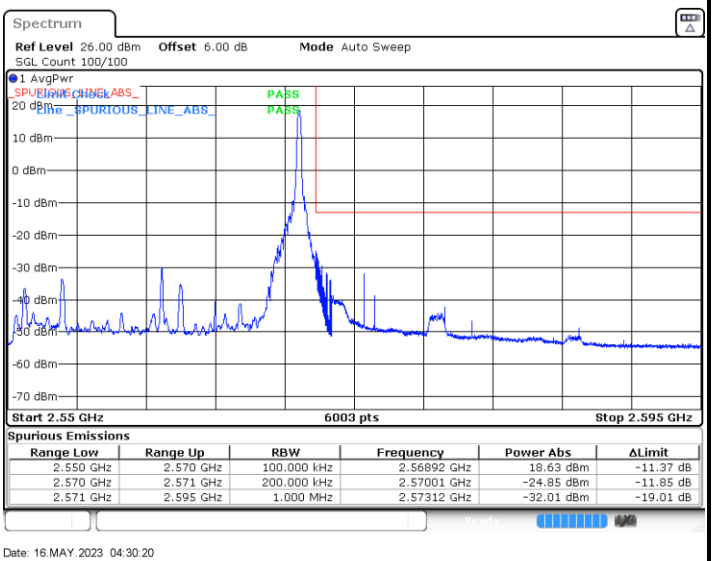
Date: 16.MAY.2023 04:14:55

LTE Band 7 / 20MHz / QPSK

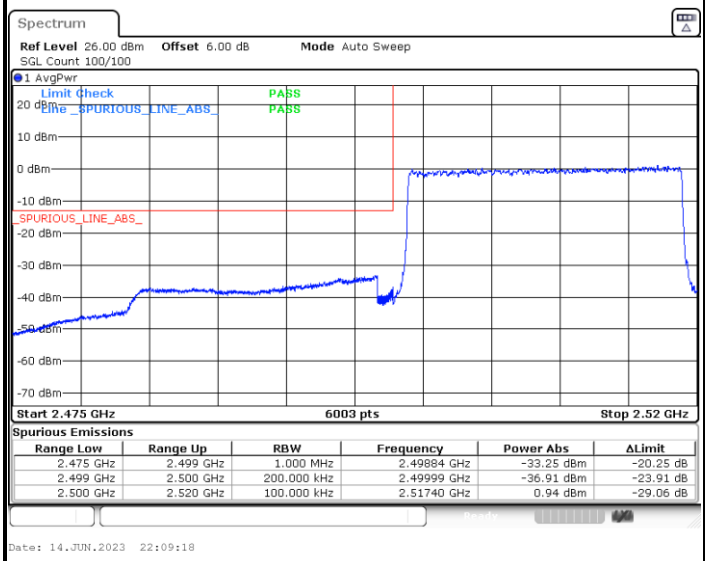
Lowest Band Edge / 1 RB



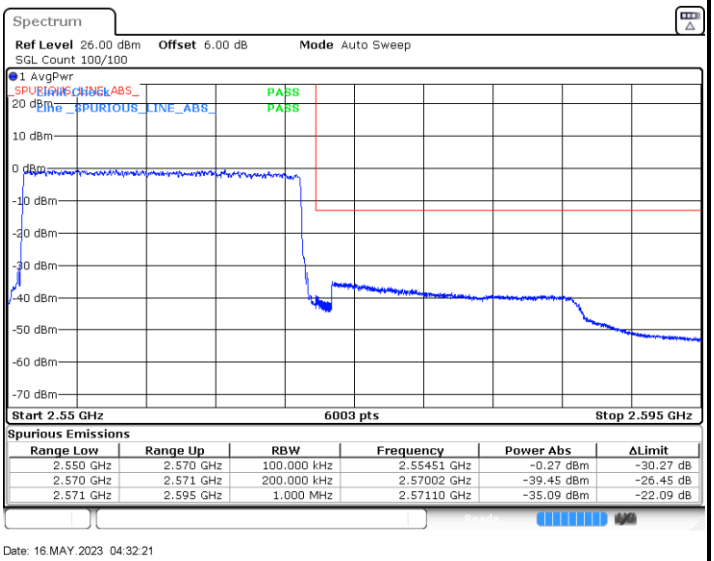
Highest Band Edge / 1 RB



Lowest Band Edge / Full RB

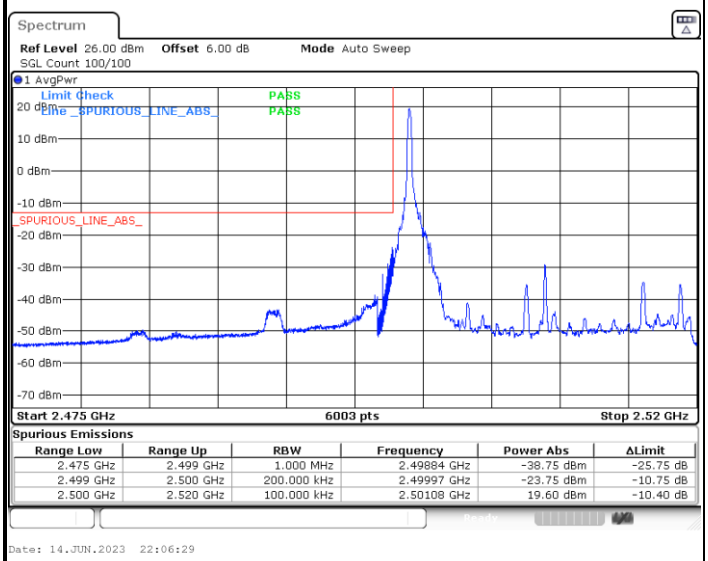


Highest Band Edge / Full RB

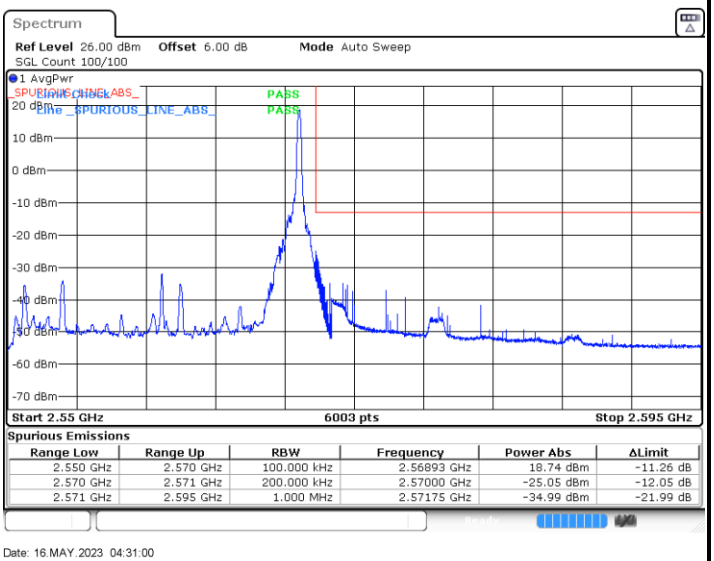


LTE Band 7 / 20MHz / 16QAM

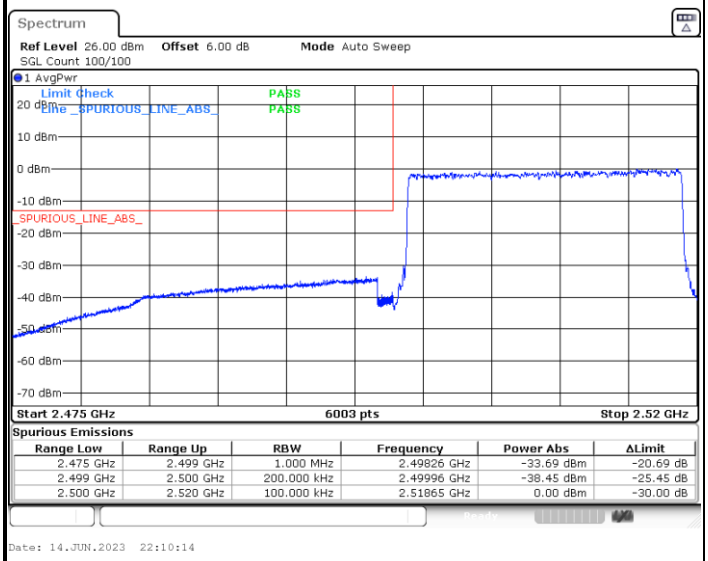
Lowest Band Edge / 1 RB



Highest Band Edge / 1 RB



Lowest Band Edge / Full RB



Highest Band Edge / Full RB