



FCC RF Test Report

APPLICANT : Sonim Technologies, Inc.
EQUIPMENT : Mobile Hotspot
BRAND NAME : Sonim
MODEL NAME : H700B
FCC ID : WYPH700B
STANDARD : 47 CFR Part 27(M)
CLASSIFICATION : PCS Licensed Transmitter (PCB)
TEST DATE(S) : Aug. 17, 2024 ~ Apr. 18, 2025

We, Sporton International Inc. (ShenZhen), 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. (ShenZhen), the test report shall not be reproduced except in full.

Fly Liang



Approved by: Fly Liang

Sportun International Inc. (ShenZhen)

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People's Republic of China



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REVISION HISTORY



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	-	Report Only	-
	§27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 7) (Band 38) (Band 41)	EIRP < 2Watt		-
3.5	N/A	Peak-to-Average Ratio	<13 dB	PASS	-
3.6	§2.1049	Occupied Bandwidth	-	Report Only	-
3.7	§27.53(m)(4)	Conducted Band Edge Measurement (Band 7) (Band 38) (Band 41)	§27.53(m)(4)	PASS	-
3.8	§2.1051 §27.53(m)(4)	Conducted Spurious Emission (Band 7) (Band 38) (Band 41)	< 55+10log ₁₀ (P[Watts])	PASS	-
3.9	§2.1055 §27.54	Frequency Stability Temperature & Voltage	Within Authorized Band	PASS	-
4.4	§2.1053 §27.53(m)(4)	Radiated Spurious Emission (Band 7) (Band 38) (Band 41)	< 55+10log ₁₀ (P[Watts])	PASS	Under limit 27.08 dB at 10104.36 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

Sonim Technologies, Inc.

4445 Eastgate Mall, Suite200, San Diego, CA92121, USA

1.2 Manufacturer

Sonim Technologies, Inc.

4445 Eastgate Mall, Suite200, San Diego, CA92121, USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Hotspot
Brand Name	Sonim
Model Name	H700B
FCC ID	WYPH700B
IMEI Code	Conducted: 351393280000468 Radiation: 351393280007273
HW Version	V3.0
SW Version	H70.0-01-22.3.0-10.25.00
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 38 : 2570 MHz ~ 2620 MHz LTE Band 41 : 2496 MHz ~ 2690 MHz
Rx Frequency	LTE Band 7 : 2620 MHz ~ 2690 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 38 : 5MHz / 10MHz / 15MHz / 20MHz LTE Band 41 : 5MHz / 10MHz / 15MHz / 20MHz
Maximum Output Power to Antenna	<ANT0> LTE Band 7 : 23.35 dBm LTE Band 38 : 23.15 dBm LTE Band 41 : 23.25 dBm
Antenna Gain	<External Antenna> <ANT0> LTE Band 7/38/41 : 4.50 dBi <Internal Antenna> <ANT0> LTE Band 7/38/41 : 1.10 dBi



Type of Modulation	QPSK / 16QAM / 64QAM / 256QAM
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Note:

1. The device supports two types of WWAN antennas: Internal Antenna and External Antenna, they share the same RF test port, and the two antennas cannot work at the same time. After evaluation, the antenna difference does not affect the Conducted measurement. For RSE, only the test results of the worse External Antenna are shown.
2. The maximum EIRP is calculated from max output power and max antenna gain, so only the maximum EIRP of External Antenna are shown in the report.

1.5 Modification of EUT

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

1.6 Maximum EIRP Power and Emission Designator

LTE Band 7		QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
5	2502.5 ~ 2567.5	0.6012	4M48G7D	0.4764	4M52W7D
10	2505.0 ~ 2565.0	0.6012	9M01G7D	0.4753	9M05W7D
15	2507.5 ~ 2562.5	0.6012	13M5G7D	0.4753	13M4W7D
20	2510.0 ~ 2560.0	0.6095	17M9G7D	0.4775	17M9W7D
LTE Band 38		QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
5	2572.5 ~ 2617.5	0.5781	4M50G7D	0.4416	4M47W7D
10	2575.0 ~ 2615.0	0.5768	9M05G7D	0.4426	9M11W7D
15	2577.5 ~ 2612.5	0.5741	13M5G7D	0.4426	13M5W7D
20	2580.0 ~ 2610.0	0.5821	17M9G7D	0.4446	17M9W7D
LTE Band 41		QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
5	2498.5 ~ 2687.5	0.5623	4M50G7D	0.4365	4M47W7D
10	2501.0 ~ 2685.0	0.5623	9M05G7D	0.4355	9M11W7D
15	2503.5 ~ 2682.5	0.5598	13M5G7D	0.4375	13M5W7D
20	2506.0 ~ 2680.0	0.5957	17M9G7D	0.4406	17M9W7D

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. All modulations have been tested, and only the worst test results of PSK & QAM are shown in the report.

1.7 Testing Location

Sportun International Inc. (ShenZhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sportun International Inc. (ShenZhen)		
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City, Guangdong Province 518103 People's Republic of China TEL: +86-755-86066985		
Test Site No.	Sportun Site No.	FCC Designation No.	FCC Test Firm Registration No.
	TH01-SZ 03CH02-SZ	CN1256	421272

1.8 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH02-SZ	AUDIX	E3	6.2009-8-24a

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 27(M)
- 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

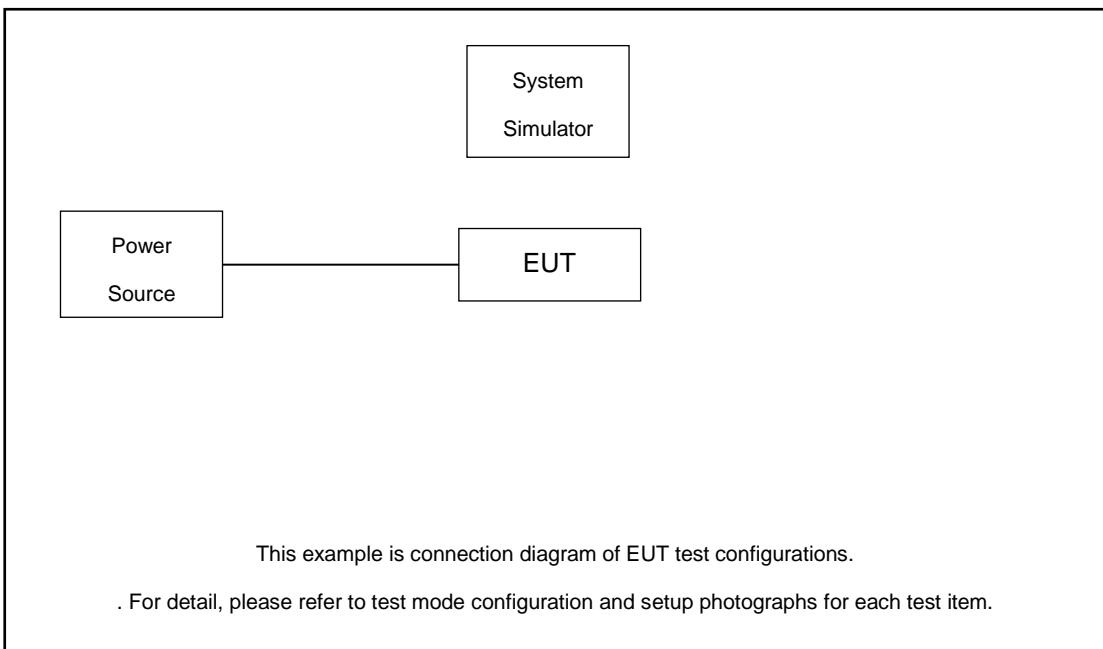
2.1 Test Mode

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	7	-	-	v	v	v	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	v
	41	-	-	v	v	v	v	v	v	v	v	v	v	v	v	v	v
Peak-to-Average Ratio	7	-	-					v	v	v	v				v	v	
	41	-	-					v	v	v	v				v	v	
26dB and 99% Bandwidth	7	-	-	v	v	v	v	v	v	v					v	v	
	41	-	-	v	v	v	v	v	v	v					v	v	
Conducted Band Edge	7	-	-	v	v	v	v	v	v	v			v		v	v	v
	41	-	-	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
	41	-	-	v	v	v	v	v	v			v		v	v	v	v
Frequency Stability	7	-	-		v			v							v	v	
	41	-	-		v			v							v	v	
E.I.R.P	7	-	-	v	v	v	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	v
	41	-	-	v	v	v	v	v	v	v	v	v	v	v	v	v	v
Radiated Spurious Emission	7	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. 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



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
3.	External Antenna	N/A	N/A	N/A	N/A	N/A

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 and attenuator factor 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 and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 5.0 dB and 10dB attenuator.

Example :

$$\begin{aligned} \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 5.0 + 10 = 15.0 \text{ (dB)} \end{aligned}$$



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 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

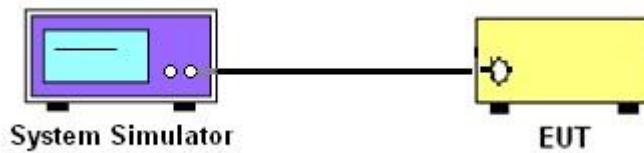
3 Conducted Test Items

3.1 Measuring Instruments

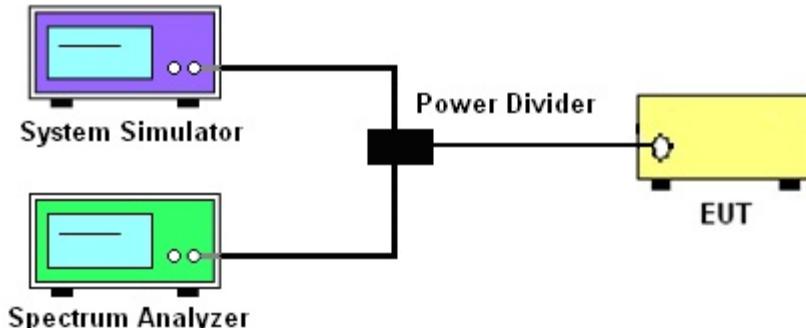
See list of measuring instruments of this test report.

3.2 Test Setup

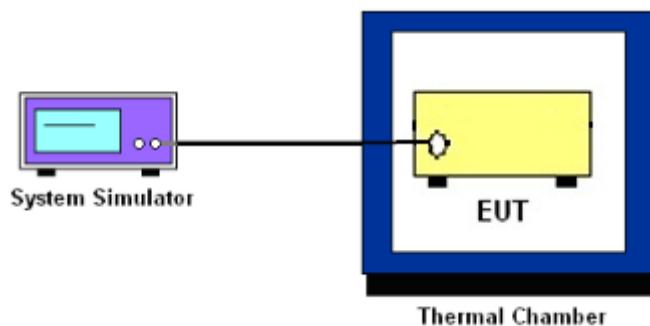
3.2.1 Conducted Output Power



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 EIRP

3.4.1 Description of the Conducted Output Power Measurement and 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 EIRP of mobile transmitters must not exceed 2 Watts for LTE Band 7 and Band 38 and Band 41.

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(m)(4)

For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

3.7.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured.
3. Set RBW $\geq 1\% / 2\%$ EBW in the 1MHz band immediately outside and adjacent to the band edge.
4. Beyond the 1 MHz band from the band edge, RBW=1MHz was used.
5. Set spectrum analyzer with RMS detector.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. Checked that all the results comply with the emission limit line.

Example:

$$\begin{aligned} \text{The limit line is derived from } & 43 + 10\log(P)\text{dB below the transmitter power } P(\text{Watts}) \\ & = P(\text{W}) - [43 + 10\log(P)] \text{ (dB)} \\ & = [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)} = -13\text{dBm}. \end{aligned}$$

8. For LTE Band 7, 38, 41, the other 40 dB, and 55 dB have additionally applied same calculation above.
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.

For Band 7,38,41:

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 $55 + 10 \log (P)$ 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 $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)]$ (dB)
 $= [30 + 10\log(P)]$ (dBm) - $[43 + 10\log(P)]$ (dB)
 $= -13$ dBm.
11. For Band 7, 38, 41
The limit line is derived from $55 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [55 + 10\log(P)]$ (dB)
 $= [30 + 10\log(P)]$ (dBm) - $[55 + 10\log(P)]$ (dB)
 $= -25$ dBm.



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.

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 $20\pm 5^{\circ}\text{C}$ 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.

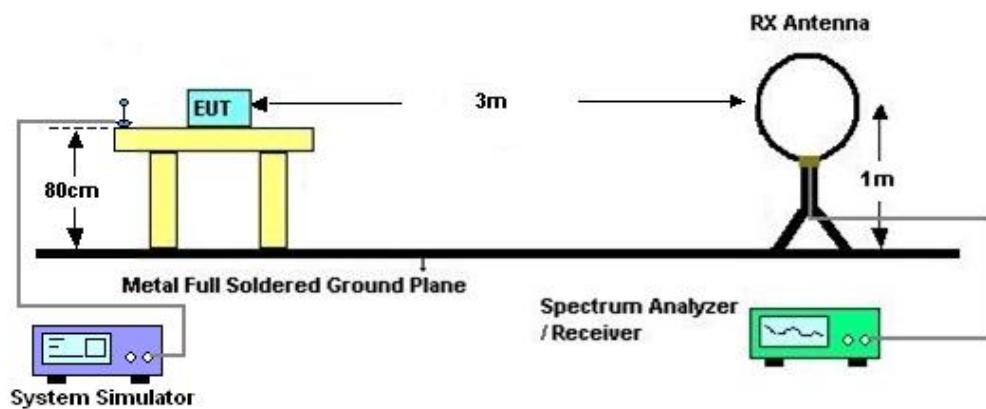
4 Radiated Test Items

4.1 Measuring Instruments

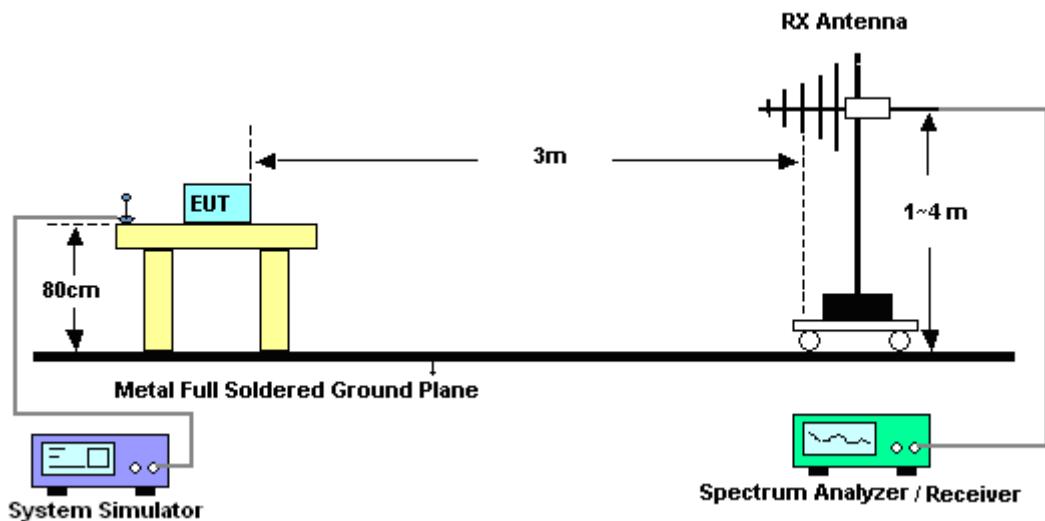
See list of measuring instruments of this test report.

4.2 Test Setup

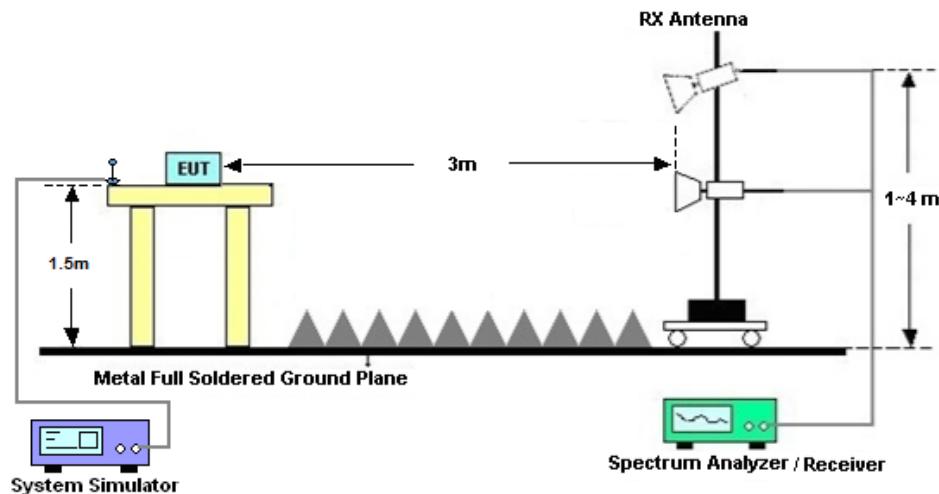
4.2.1 For radiated test below 30MHz



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 Band 7, 38, 41

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 $55 + 10 \log (P)$ dB.

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 $43 + 10\log(P)$ dB below the transmitter power P(Watts)

$$= P(W) - [43 + 10\log(P)] \text{ (dB)}$$

$$= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$$

$$= -13 \text{ dBm.}$$

13. For Band 7, 38, 41:

The limit line is derived from $55 + 10\log(P)$ dB below the transmitter power P(Watts)



5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 09, 2024	Aug. 17, 2024~Aug. 27, 2024	Apr. 08, 2025	Conducted (TH01-SZ)
DC Power Supply	TTI	PL330P	290070	Max 32V, 3A	Oct. 16, 2023	Aug. 17, 2024~Aug. 27, 2024	Oct. 15, 2024	Conducted (TH01-SZ)
Power Divider	TOJOIN	PS-2SM-04 265	60.06.020.007 7	0.4GHz~26.5GHz	Dec. 25, 2023	Aug. 17, 2024~Aug. 27, 2024	Dec. 24, 2024	Conducted (TH01-SZ)
Thermal Chamber	Ten Billion Hongzhangroup	LP-150U	H2014081803	-40~+150°C	Jul. 03, 2024	Aug. 17, 2024~Aug. 27, 2024	Jul. 02, 2025	Conducted (TH01-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Jul. 03, 2024	Apr. 18, 2025	Jul. 02, 2025	Radiation (03CH02-SZ)
Loop Antenna	R&S	HFH2-Z2E	101141	9kHz~30MHz	Dec. 28, 2024	Apr. 18, 2025	Dec. 27, 2025	Radiation (03CH02-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz-2GHz	Oct. 24, 2023	Apr. 18, 2025	Oct. 23, 2025	Radiation (03CH02-SZ)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00119436	1GHz~18GHz	Jul. 04, 2024	Apr. 18, 2025	Jul. 04, 2025	Radiation (03CH02-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 03, 2024	Apr. 18, 2025	Jul. 03, 2025	Radiation (03CH02-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Apr. 03, 2025	Apr. 18, 2025	Apr. 02, 2027	Radiation (03CH02-SZ)
LF Amplifier	EM Electronics	EM330	060788	20MHz-3GHz	Dec. 25, 2024	Apr. 18, 2025	Dec. 24, 2025	Radiation (03CH02-SZ)
HF Amplifier	KEYSIGHT	83017A	MY53270105	0.5GHz~26.5Ghz	Oct. 14, 2024	Apr. 18, 2025	Oct. 13, 2025	Radiation (03CH02-SZ)
AC Power Source	Chroma	61601	616010003043	N/A	Oct. 18, 2024	Apr. 18, 2025	Oct. 17, 2025	Radiation (03CH02-SZ)
Turn Table	Chaintek	T-200	N/A	0~360 degree	NCR	Apr. 18, 2025	NCR	Radiation (03CH02-SZ)
Antenna Mast	Chaintek	MBS-400	N/A	1 m~4 m	NCR	Apr. 18, 2025	NCR	Radiation (03CH02-SZ)

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 Spurious Emission & Bandedge	± 1.34 dB
Occupied Channel Bandwidth	± 0.012 MHz
Conducted Power	± 1.34 dB
Peak to Average Ratio	± 1.34 dB
Frequency Stability	± 1.3 Hz

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_{C(y)}$)	2.47 dB
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_{C(y)}$)	3.31 dB
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Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_{C(y)}$)	3.72 dB
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----- THE END -----



Appendix A. Test Results of Conducted Test

Test Engineer :	Nina Cheng	Temperature :	24~26°C
		Relative Humidity :	50~53%

Conducted Output Power(Average power) and EIRP

LTE Band 7:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	EIRP(W)		
Channel				20850	20850	21350			
Frequency (MHz)				2510	2535	2560	L	M	H
20	QPSK	1	0	22.88	23.35	23.33	0.5470	0.6095	0.6067
20	QPSK	1	49	22.86	23.29	23.30	0.5445	0.6012	0.6026
20	QPSK	1	99	22.87	23.34	23.29	0.5458	0.6081	0.6012
20	QPSK	50	0	21.85	22.23	22.21	0.4315	0.4710	0.4688
20	QPSK	50	24	21.79	22.20	22.15	0.4256	0.4677	0.4624
20	QPSK	50	50	21.82	22.18	22.20	0.4285	0.4656	0.4677
20	QPSK	100	0	21.83	22.20	22.18	0.4295	0.4677	0.4656
20	16QAM	1	0	22.22	22.29	22.23	0.4699	0.4775	0.4710
20	64QAM	1	0	21.28	21.35	21.32	0.3784	0.3846	0.3819
20	256QAM	1	0	18.08	18.21	18.12	0.1811	0.1866	0.1828
Channel				20825	21100	21375	EIRP(W)		
Frequency (MHz)				2507.5	2535	2562.5	L	M	H
15	QPSK	1	0	22.87	23.29	23.29	0.5458	0.6012	0.6012
15	16QAM	1	0	22.19	22.27	22.22	0.4667	0.4753	0.4699
Channel				20800	21100	21400	EIRP(W)		
Frequency (MHz)				2505	2535	2565	L	M	H
10	QPSK	1	0	22.83	23.29	23.29	0.5408	0.6012	0.6012
10	16QAM	1	0	22.16	22.27	22.19	0.4634	0.4753	0.4667
Channel				20775	21100	21425	EIRP(W)		
Frequency (MHz)				2502.5	2535	2567.5	L	M	H
5	QPSK	1	0	22.84	23.29	23.26	0.5420	0.6012	0.5970
5	16QAM	1	0	22.21	22.28	22.22	0.4688	0.4764	0.4699



LTE Band 38:

BW [MHz]	Modulation	RB Size	RB Offset	Power	Power	Power	EIRP(W)		
				Low Ch. / Freq.	Middle Ch. / Freq.	High Ch. / Freq.			
			Channel	37850	38000	38150			
			Frequency (MHz)	2580	2595	2610	L	M	H
20	QPSK	1	0	23.11	23.15	22.93	0.5768	0.5821	0.5534
20	QPSK	1	49	23.06	23.09	22.89	0.5702	0.5741	0.5483
20	QPSK	1	99	23.08	23.09	22.91	0.5728	0.5741	0.5508
20	QPSK	50	0	22.03	22.05	21.98	0.4498	0.4519	0.4446
20	QPSK	50	24	22.01	22.02	21.95	0.4477	0.4487	0.4416
20	QPSK	50	50	21.96	22.00	21.96	0.4426	0.4467	0.4426
20	QPSK	100	0	22.00	22.03	21.93	0.4467	0.4498	0.4395
20	16QAM	1	0	21.94	21.98	21.97	0.4406	0.4446	0.4436
20	64QAM	1	0	20.93	20.97	20.91	0.3491	0.3524	0.3475
20	256QAM	1	0	17.96	18.00	17.89	0.1762	0.1778	0.1734
			Channel	37825	38000	38175	EIRP(W)		
			Frequency (MHz)	2577.5	2595	2612.5	L	M	H
15	QPSK	1	0	23.04	23.09	22.86	0.5675	0.5741	0.5445
15	16QAM	1	0	21.88	21.94	21.96	0.4345	0.4406	0.4426
			Channel	37800	38000	38200	EIRP(W)		
			Frequency (MHz)	2575	2595	2615	L	M	H
10	QPSK	1	0	23.07	23.11	22.91	0.5715	0.5768	0.5508
10	16QAM	1	0	21.87	21.96	21.94	0.4335	0.4426	0.4406
			Channel	37775	38000	38225	EIRP(W)		
			Frequency (MHz)	2572.5	2595	2617.5	L	M	H
5	QPSK	1	0	23.07	23.12	22.86	0.5715	0.5781	0.5445
5	16QAM	1	0	21.88	21.93	21.95	0.4345	0.4395	0.4416



LTE Band 41:

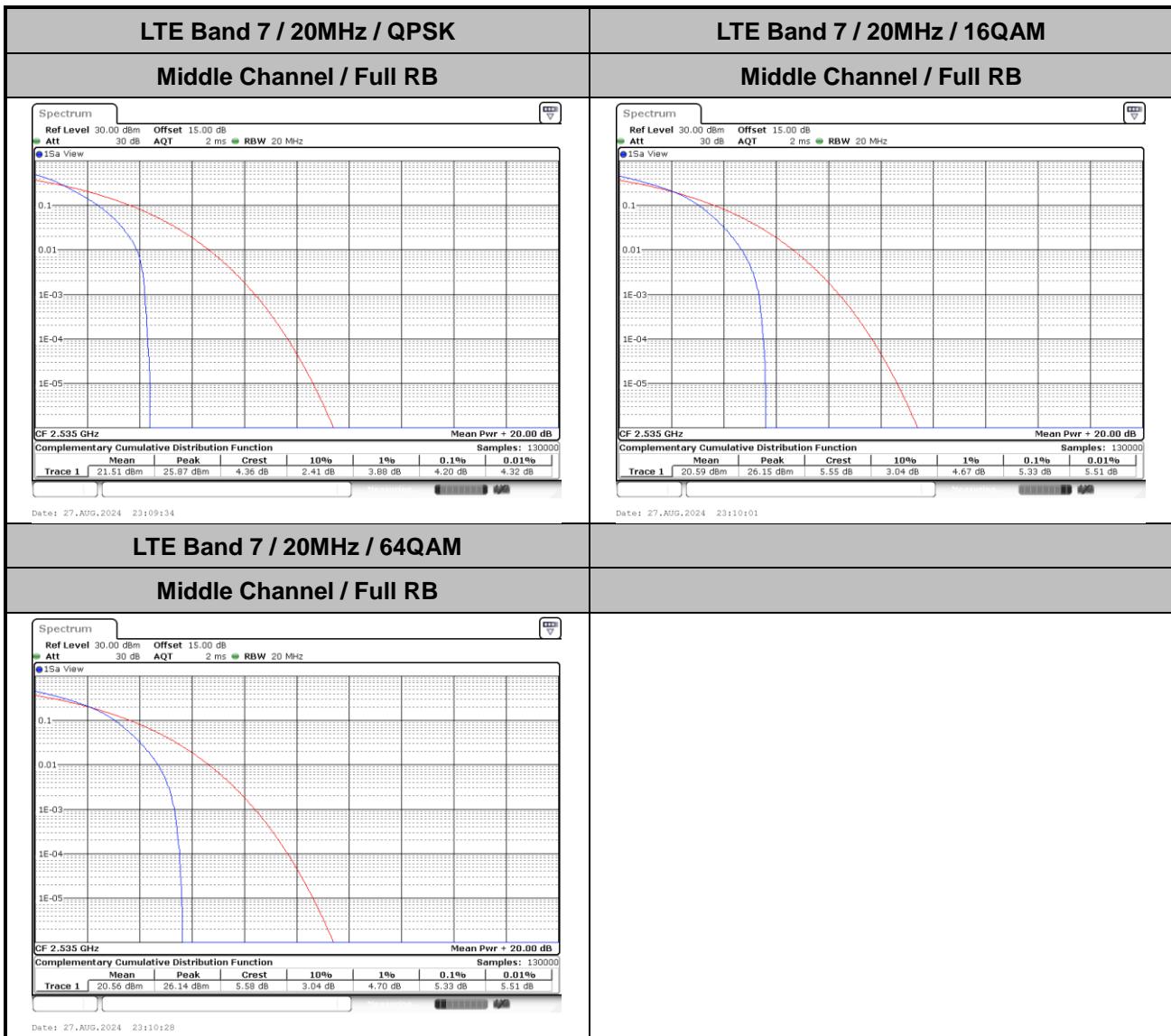
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	EIRP(W)		
							L	M	H
20	QPSK	1	0	23.25	22.95	22.93	0.5957	0.5559	0.5534
20	QPSK	1	49	23.01	22.92	22.86	0.5636	0.5521	0.5445
20	QPSK	1	99	23.02	22.93	22.89	0.5649	0.5534	0.5483
20	QPSK	50	0	22.01	21.96	21.95	0.4477	0.4426	0.4416
20	QPSK	50	24	21.99	21.95	21.91	0.4457	0.4416	0.4375
20	QPSK	50	50	21.99	21.94	21.90	0.4457	0.4406	0.4365
20	QPSK	100	0	21.95	21.90	21.88	0.4416	0.4365	0.4345
20	16QAM	1	0	21.94	21.89	21.94	0.4406	0.4355	0.4406
20	64QAM	1	0	20.96	20.96	20.92	0.3516	0.3516	0.3483
20	256QAM	1	0	18.02	17.99	17.91	0.1786	0.1774	0.1742
Channel				39725	40620	41515	EIRP(W)		
Frequency (MHz)				2503.5	2593	2682.5	L	M	H
15	QPSK	1	0	22.98	22.91	22.91	0.5598	0.5508	0.5508
15	16QAM	1	0	21.89	21.83	21.91	0.4355	0.4295	0.4375
Channel				39700	40620	41540	EIRP(W)		
Frequency (MHz)				2501	2593	2685	L	M	H
10	QPSK	1	0	23.00	22.90	22.87	0.5623	0.5495	0.5458
10	16QAM	1	0	21.88	21.86	21.89	0.4345	0.4325	0.4355
Channel				39675	40620	41565	EIRP(W)		
Frequency (MHz)				2498.5	2593	2687.5	L	M	H
5	QPSK	1	0	23.00	22.94	22.88	0.5623	0.5546	0.5470
5	16QAM	1	0	21.91	21.85	21.93	0.4375	0.4315	0.4395



LTE Band 7

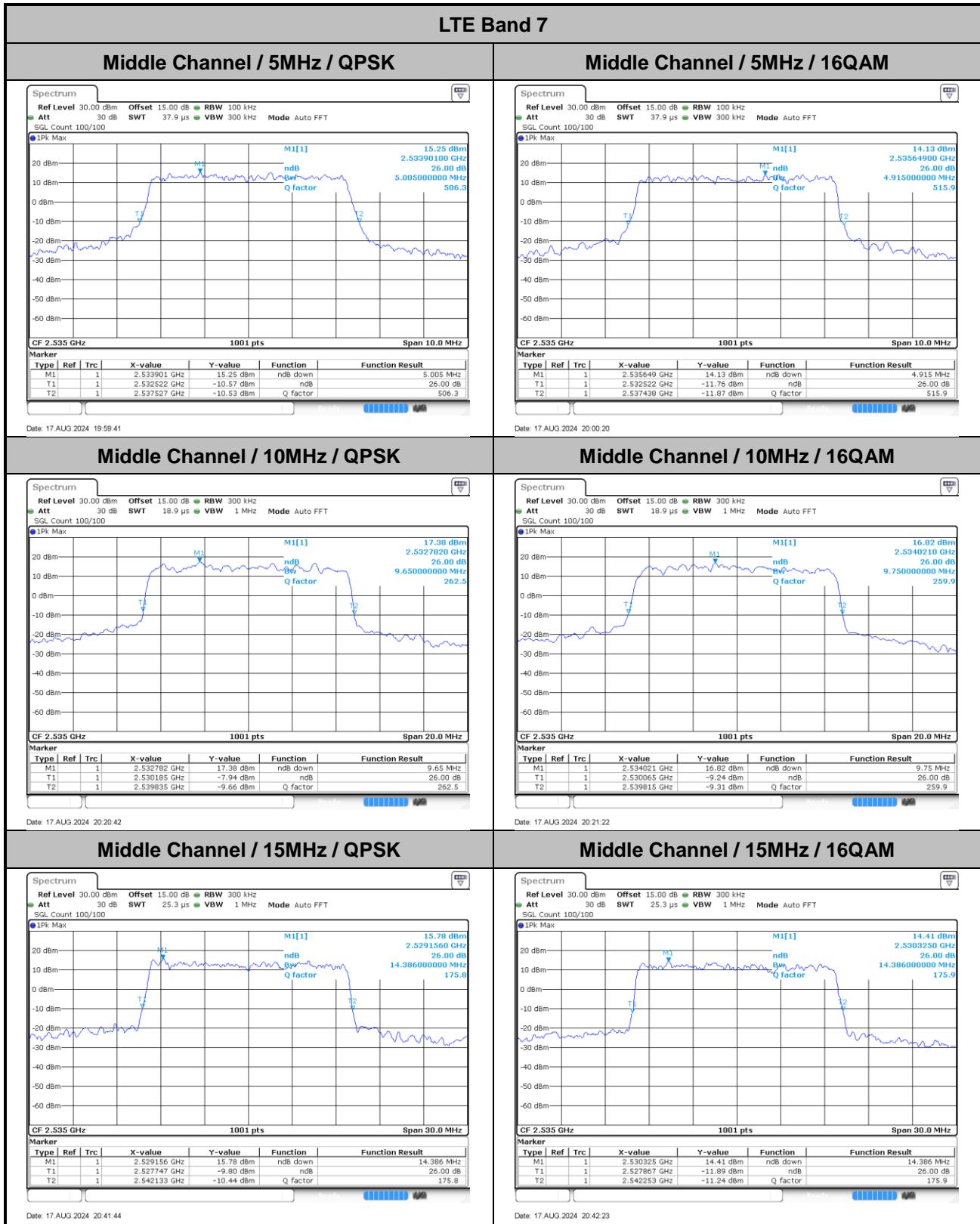
Peak-to-Average Ratio

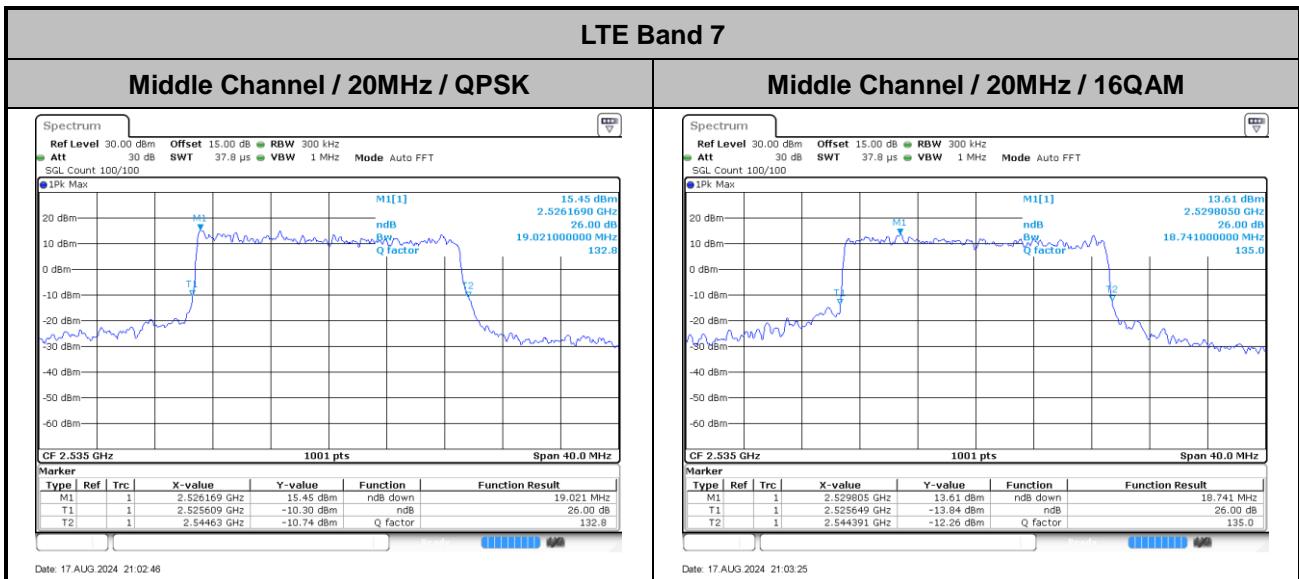
Mode	LTE Band 7 / 20MHz			
Mod.	QPSK	16QAM	64QAM	Limit: 13dB
RB Size	Full RB	Full RB	Full RB	Result
Middle CH	4.20	5.33	5.33	PASS



**26dB Bandwidth**

Mode	LTE Band 7 : 26dB BW(MHz)											
	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Middle CH	-	-	-	-	5.01	4.92	9.65	9.75	14.39	14.39	19.02	18.74

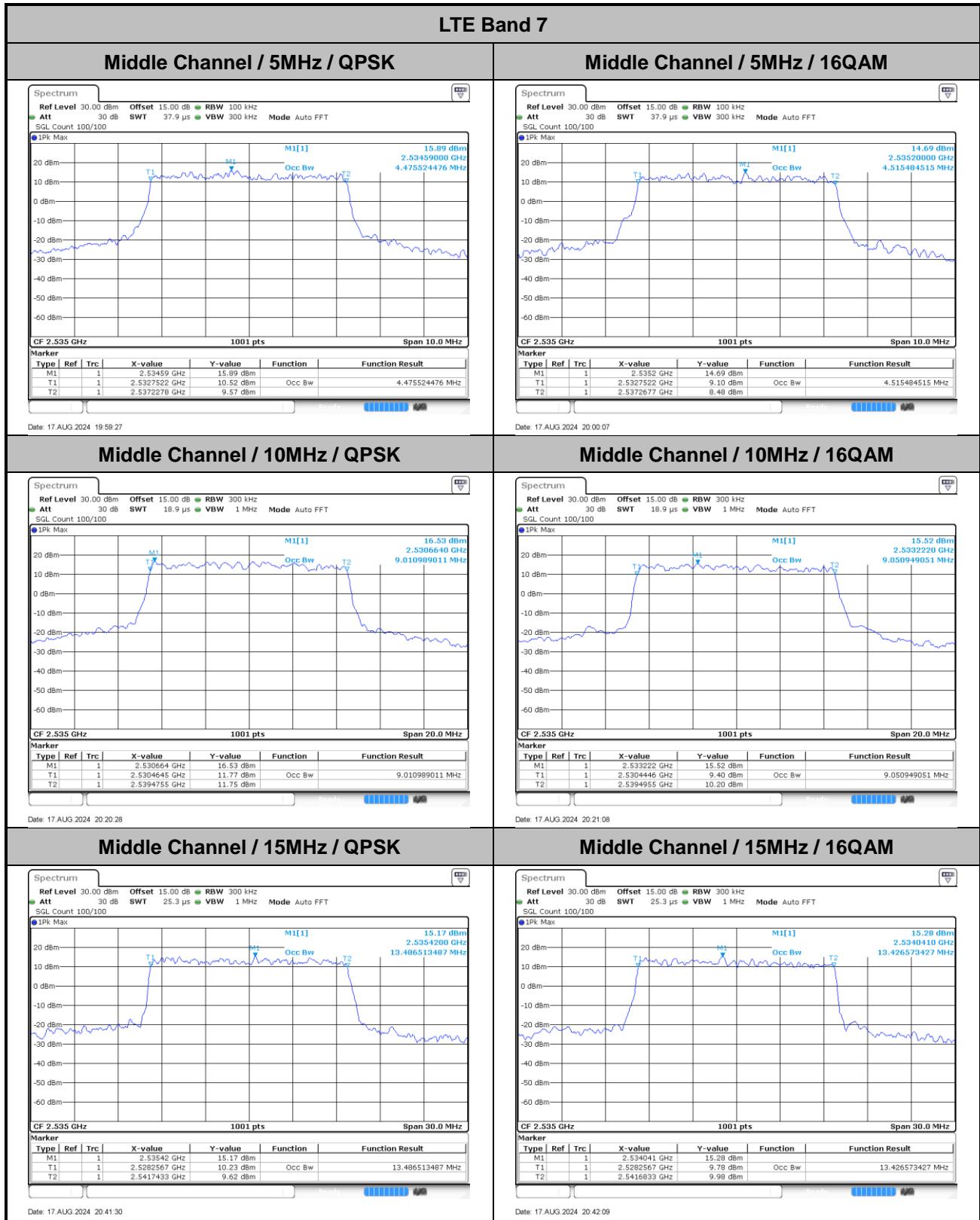


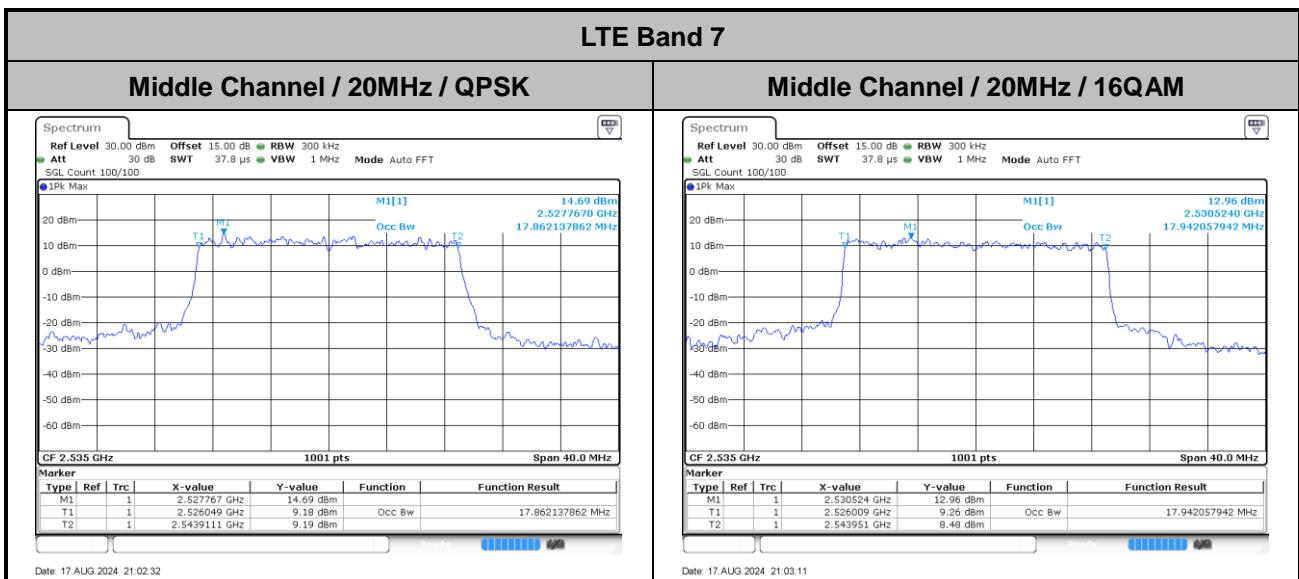




Occupied Bandwidth

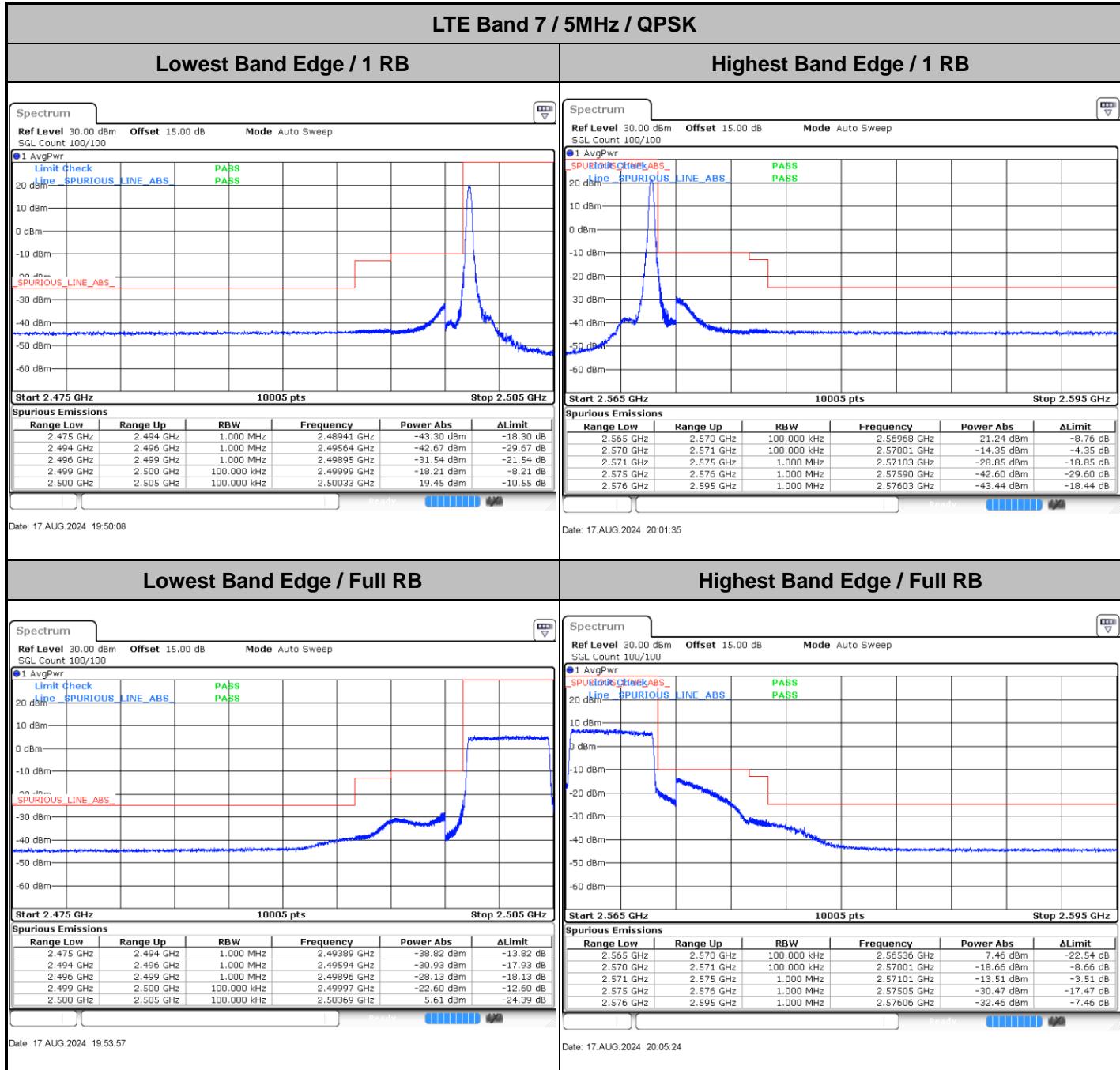
Mode	LTE Band 7 : 99%OBW(MHz)											
	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Middle CH	-	-	-	-	4.48	4.52	9.01	9.05	13.49	13.43	17.86	17.94

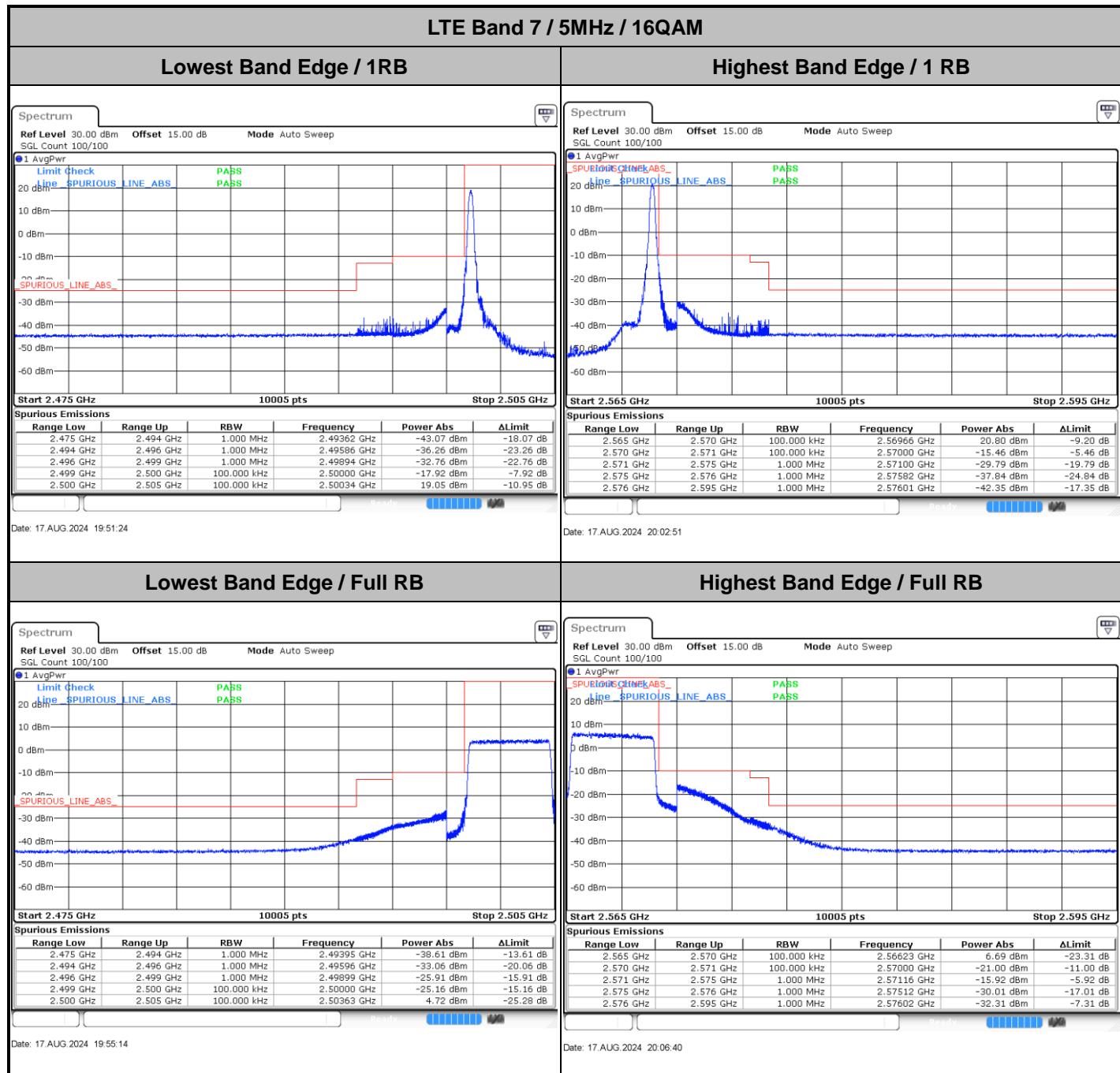


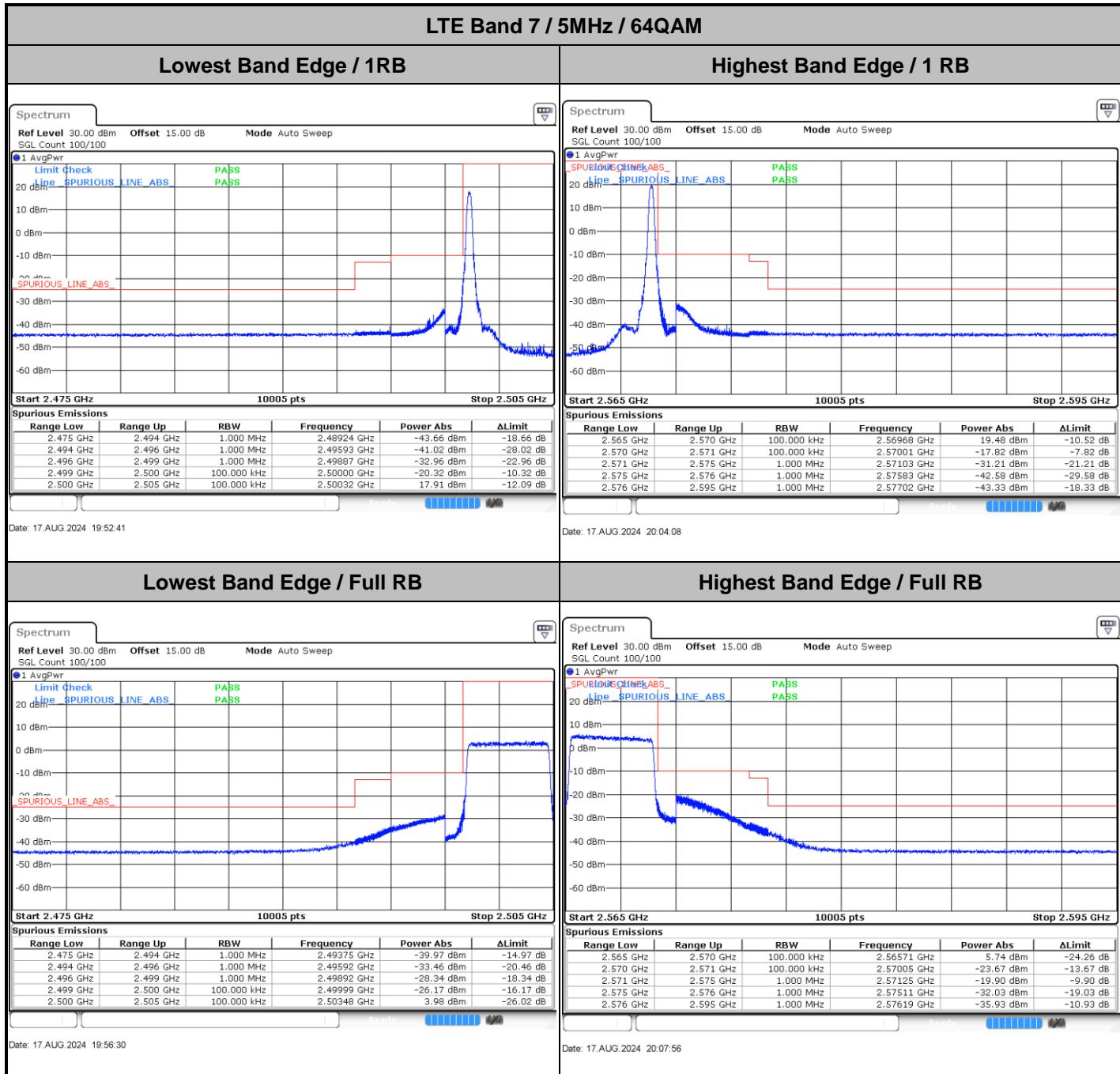


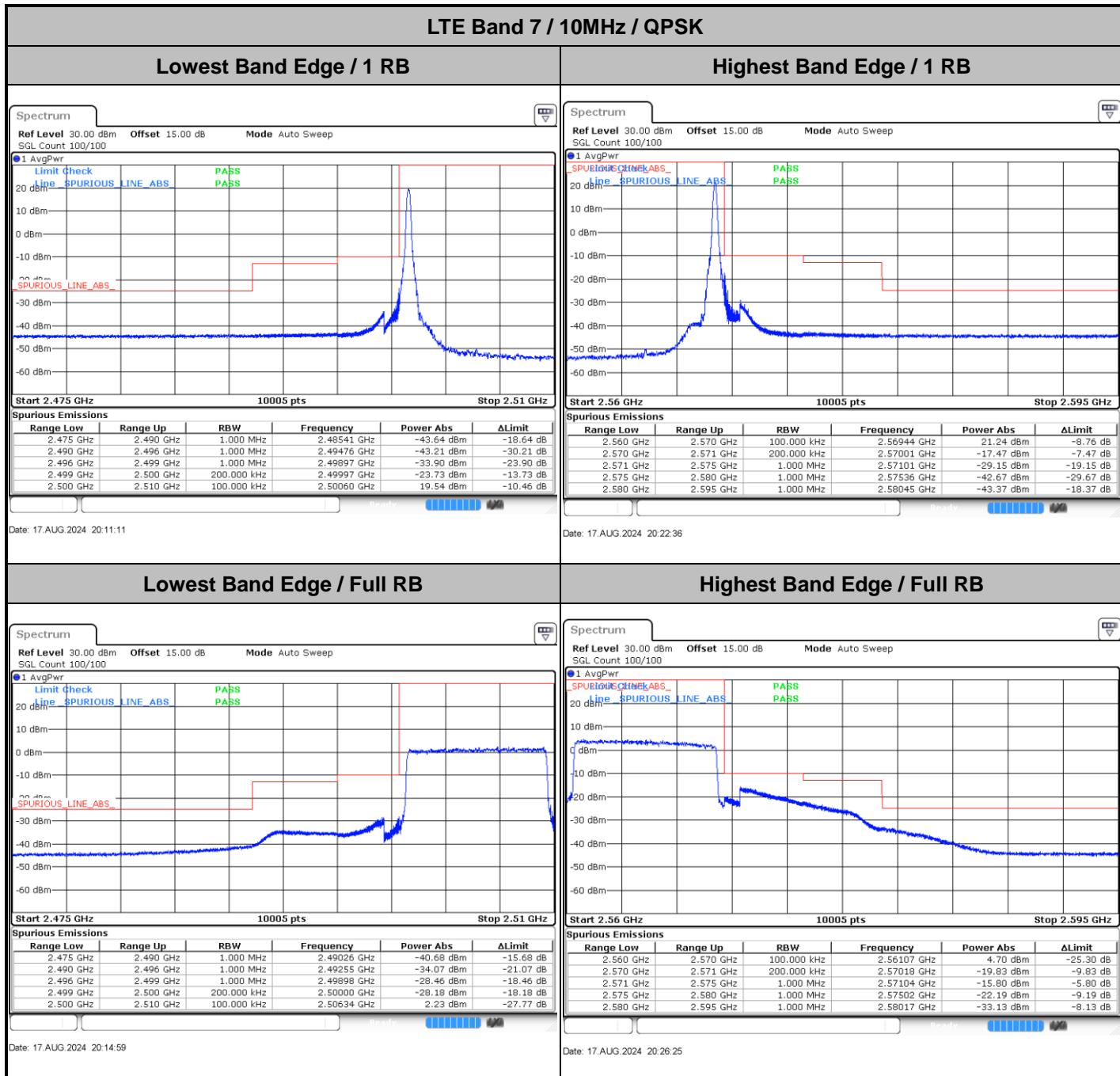


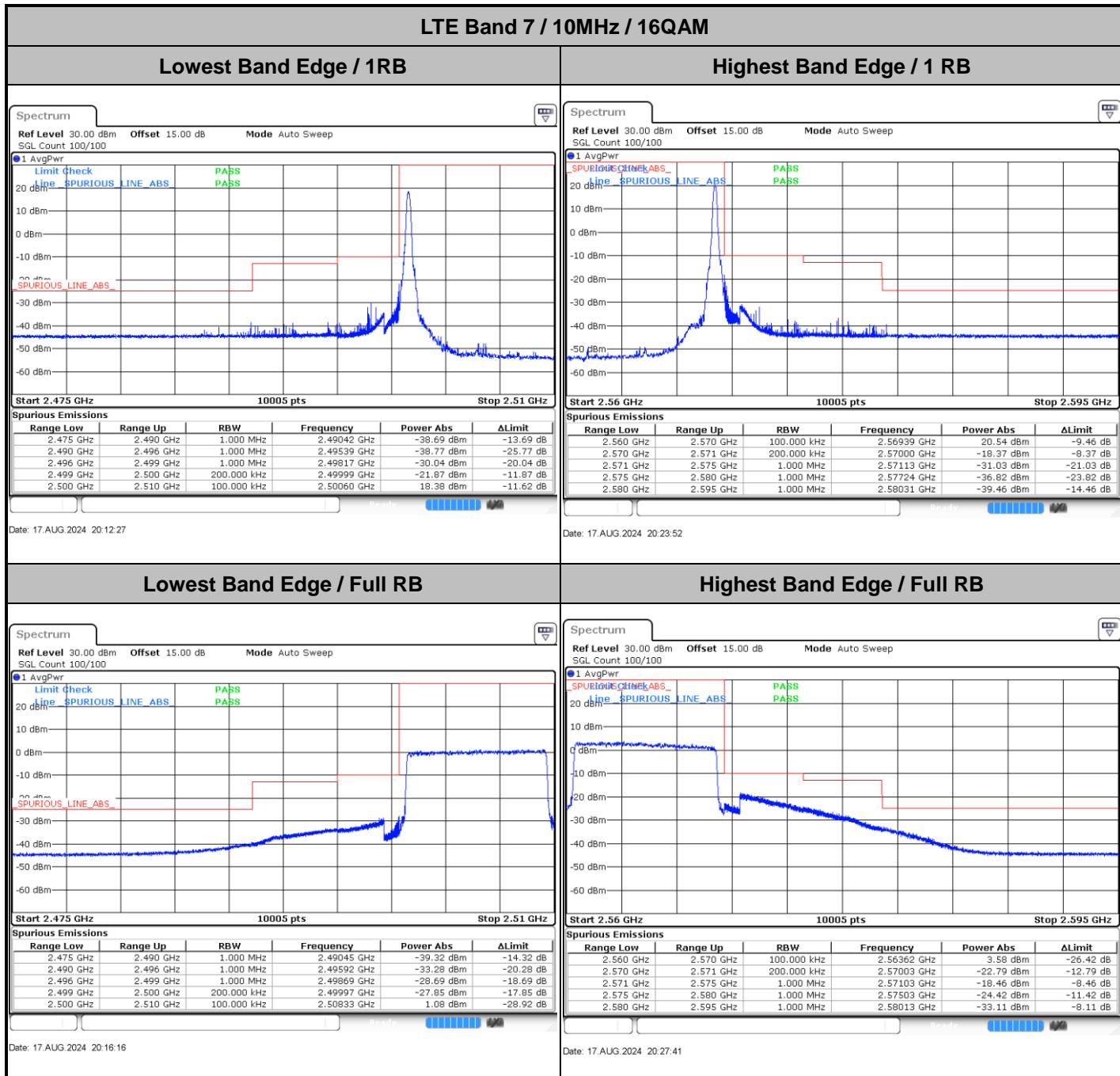
Conducted Band Edge

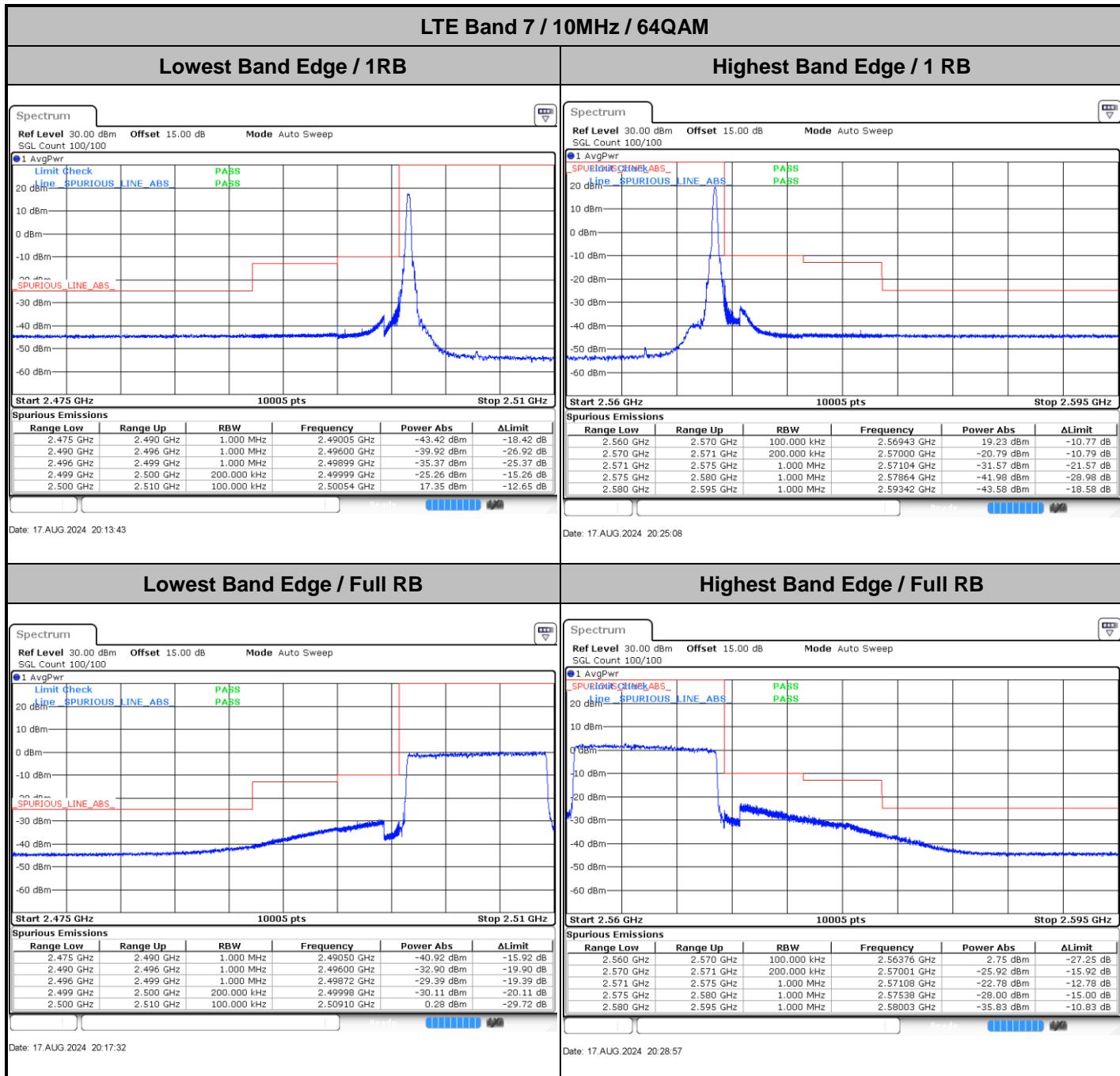


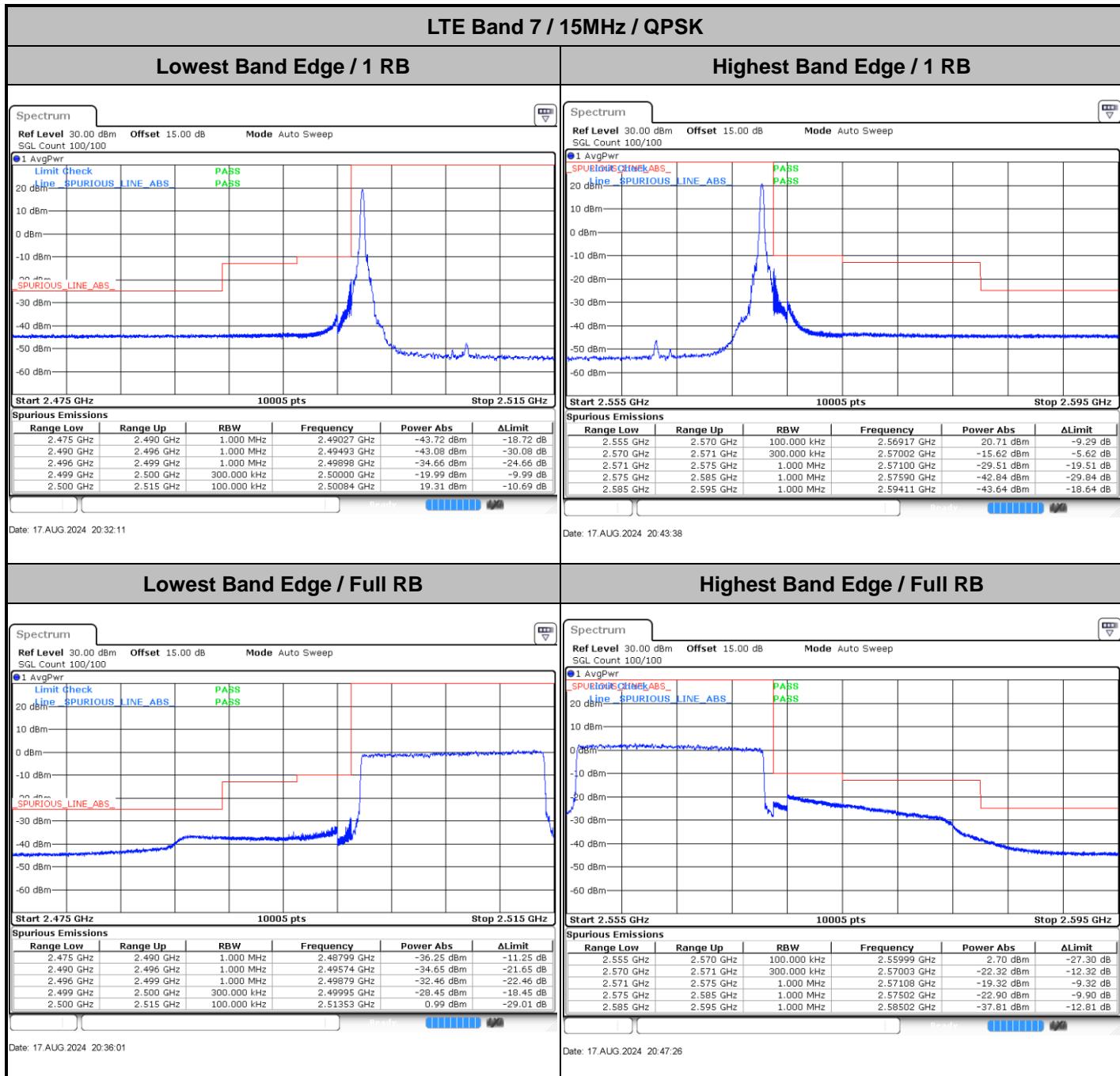


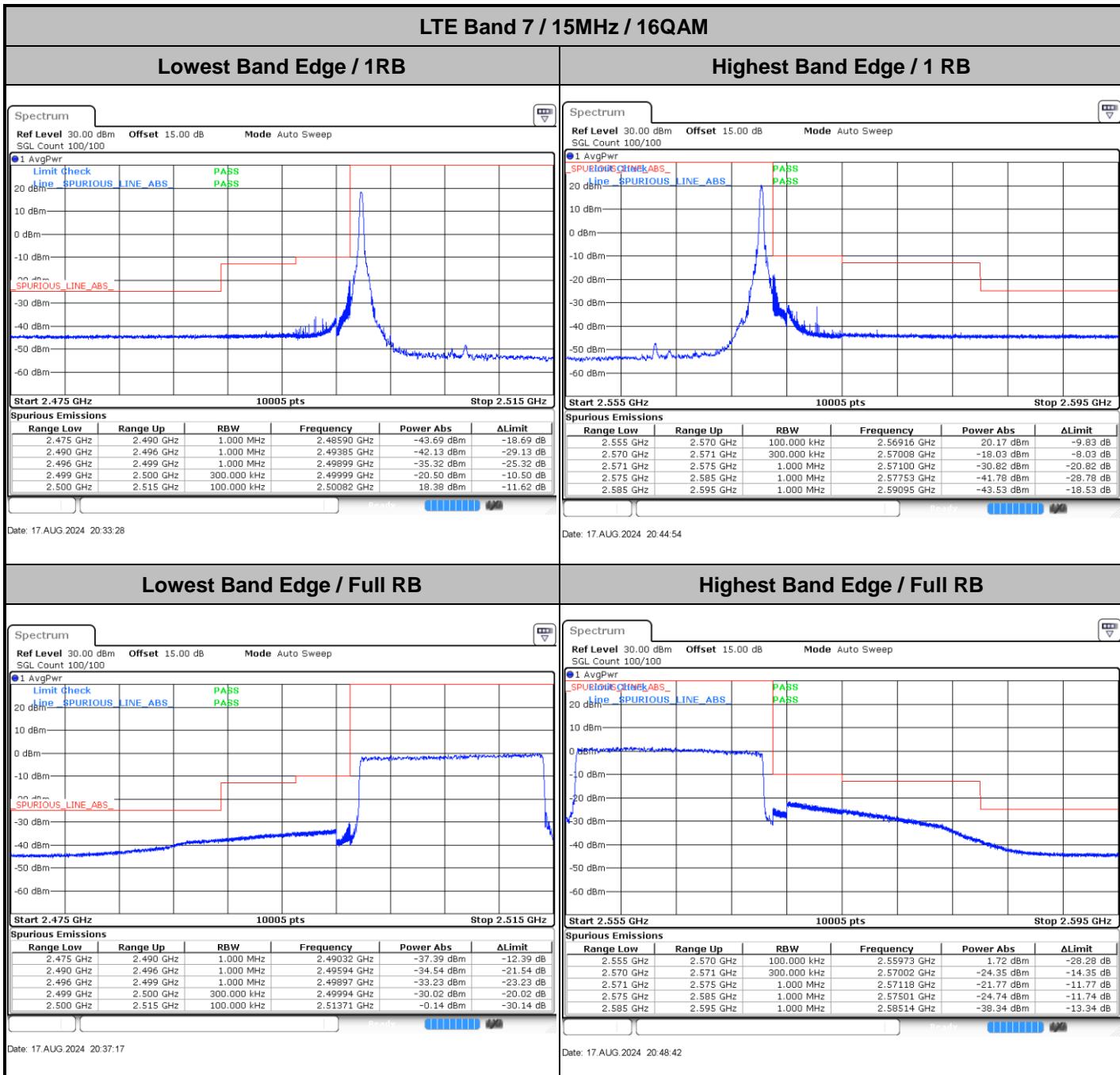


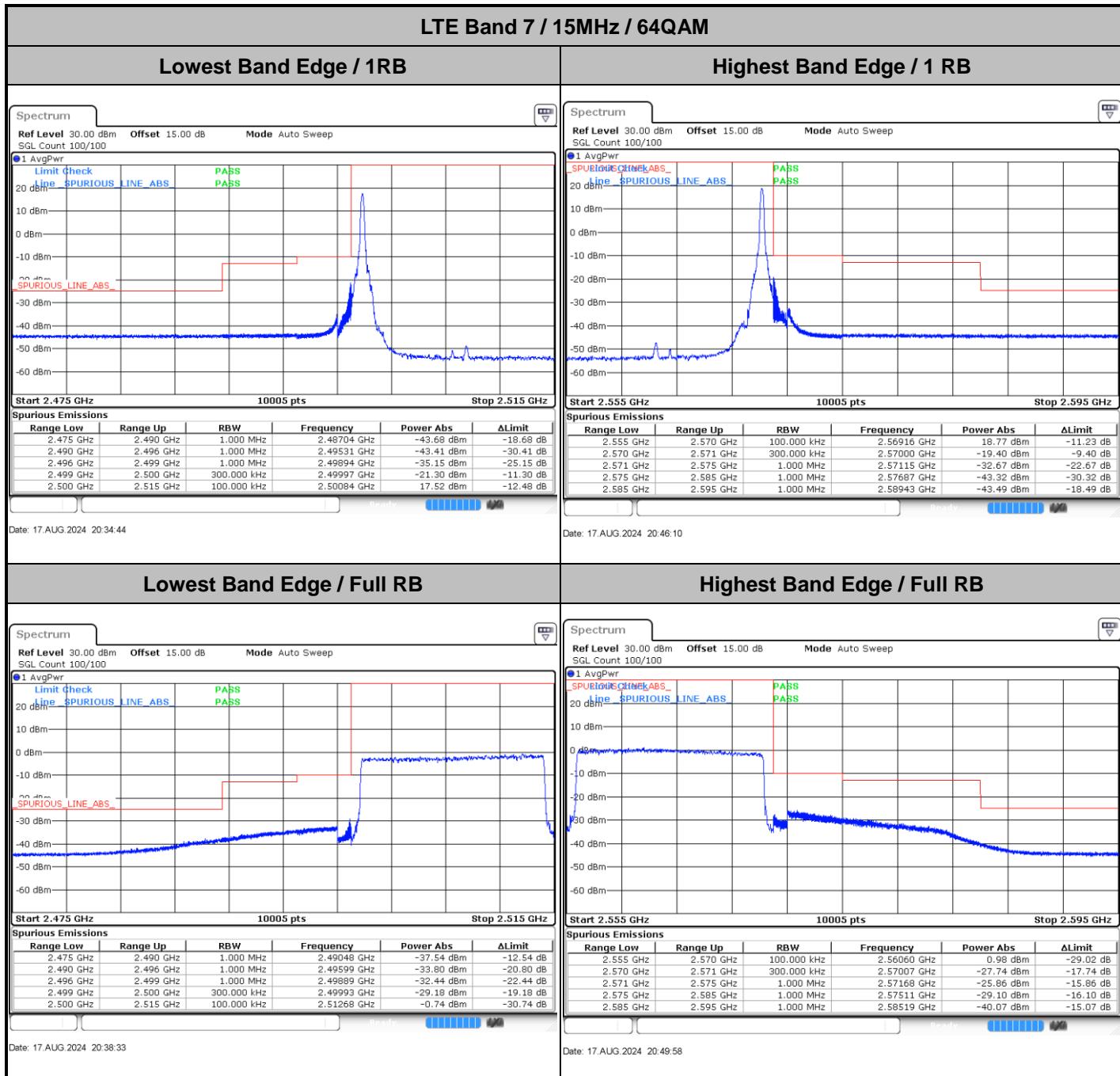


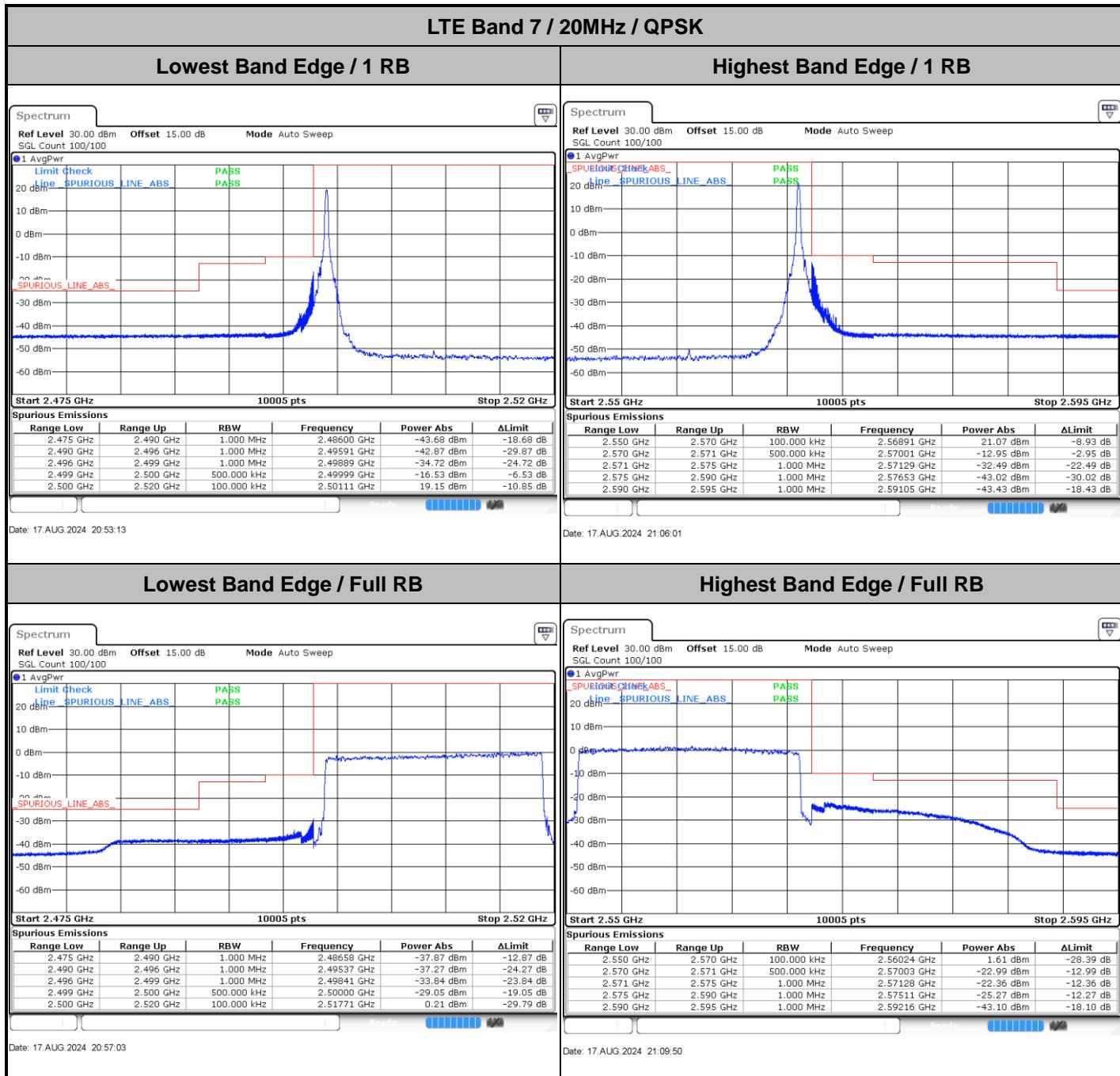


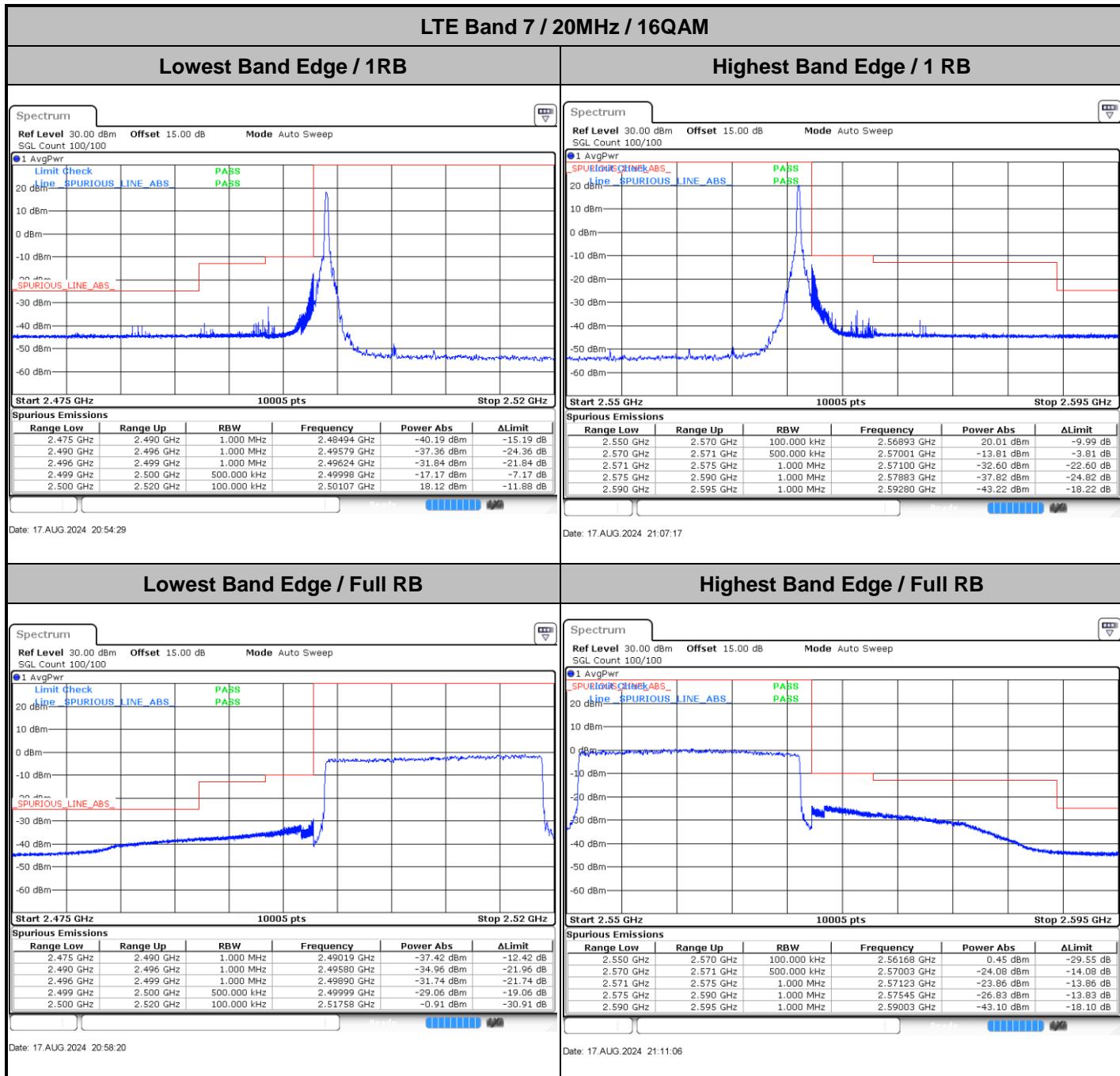


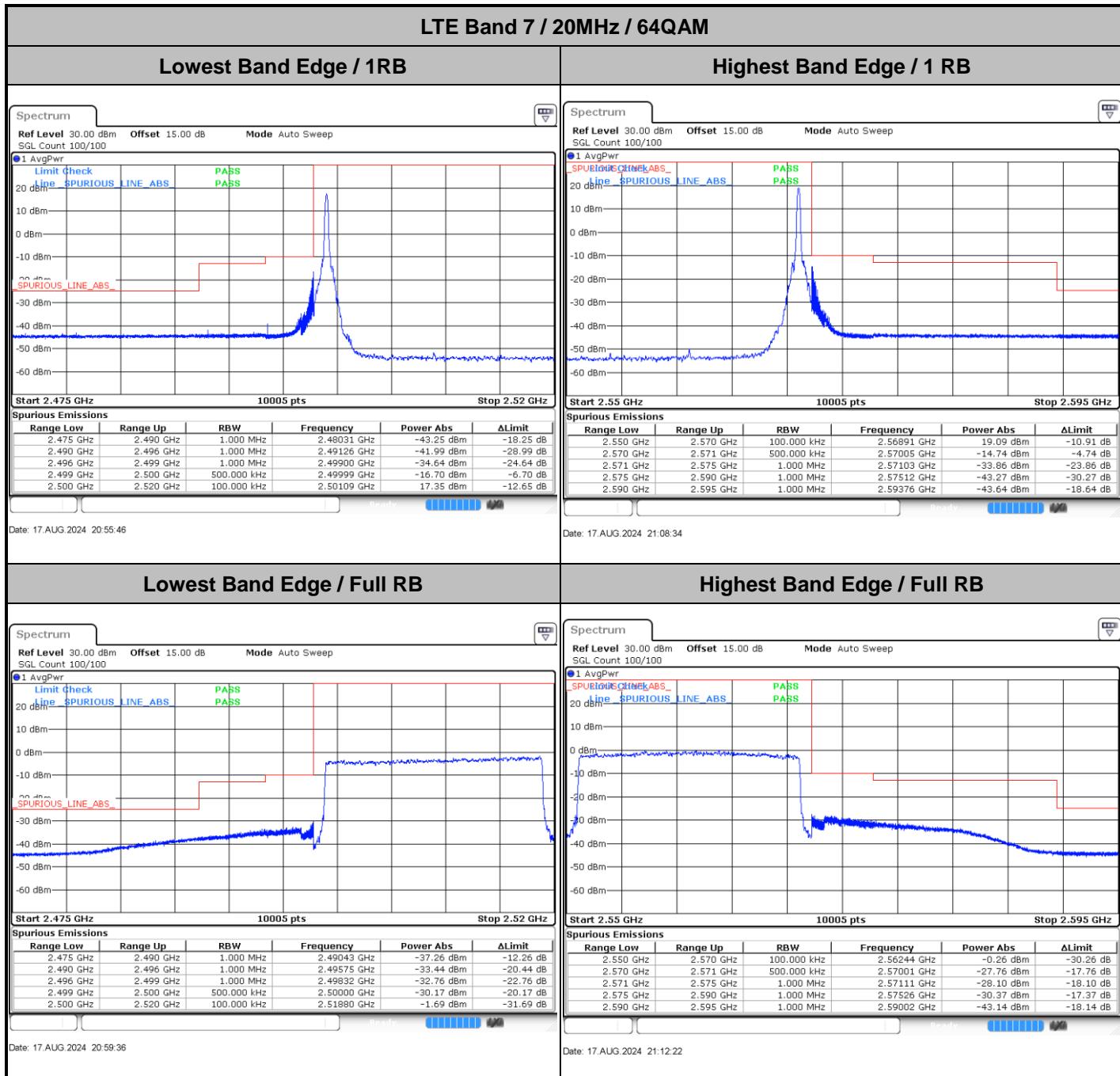










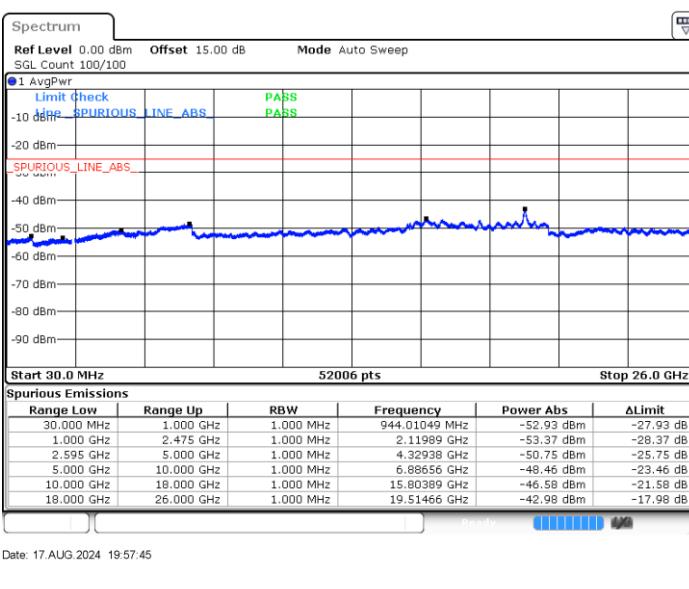




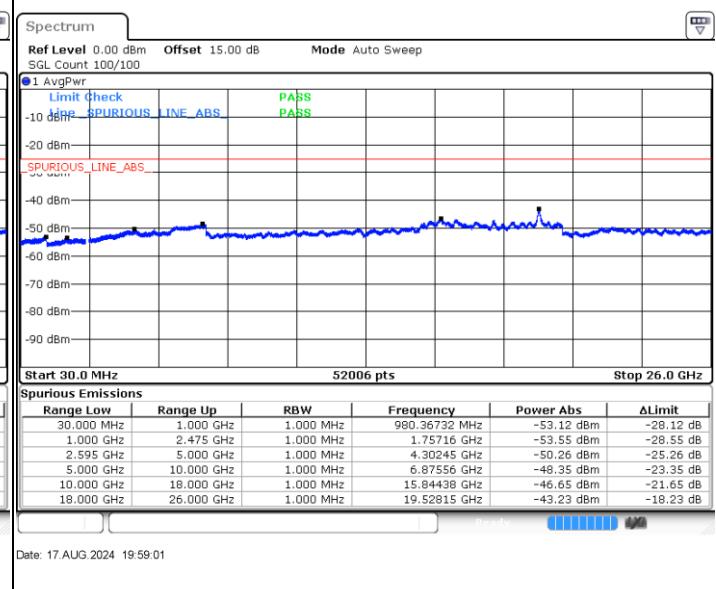
Conducted Spurious Emission

LTE Band 7 / 5MHz

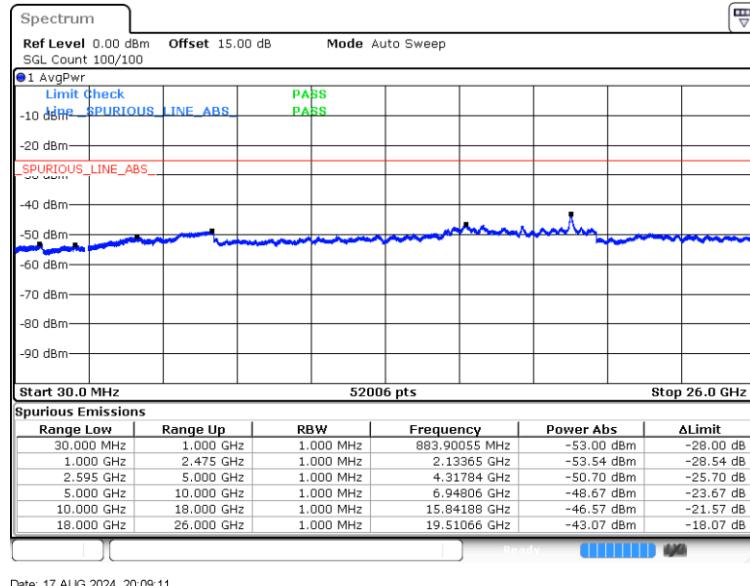
Lowest Channel / QPSK



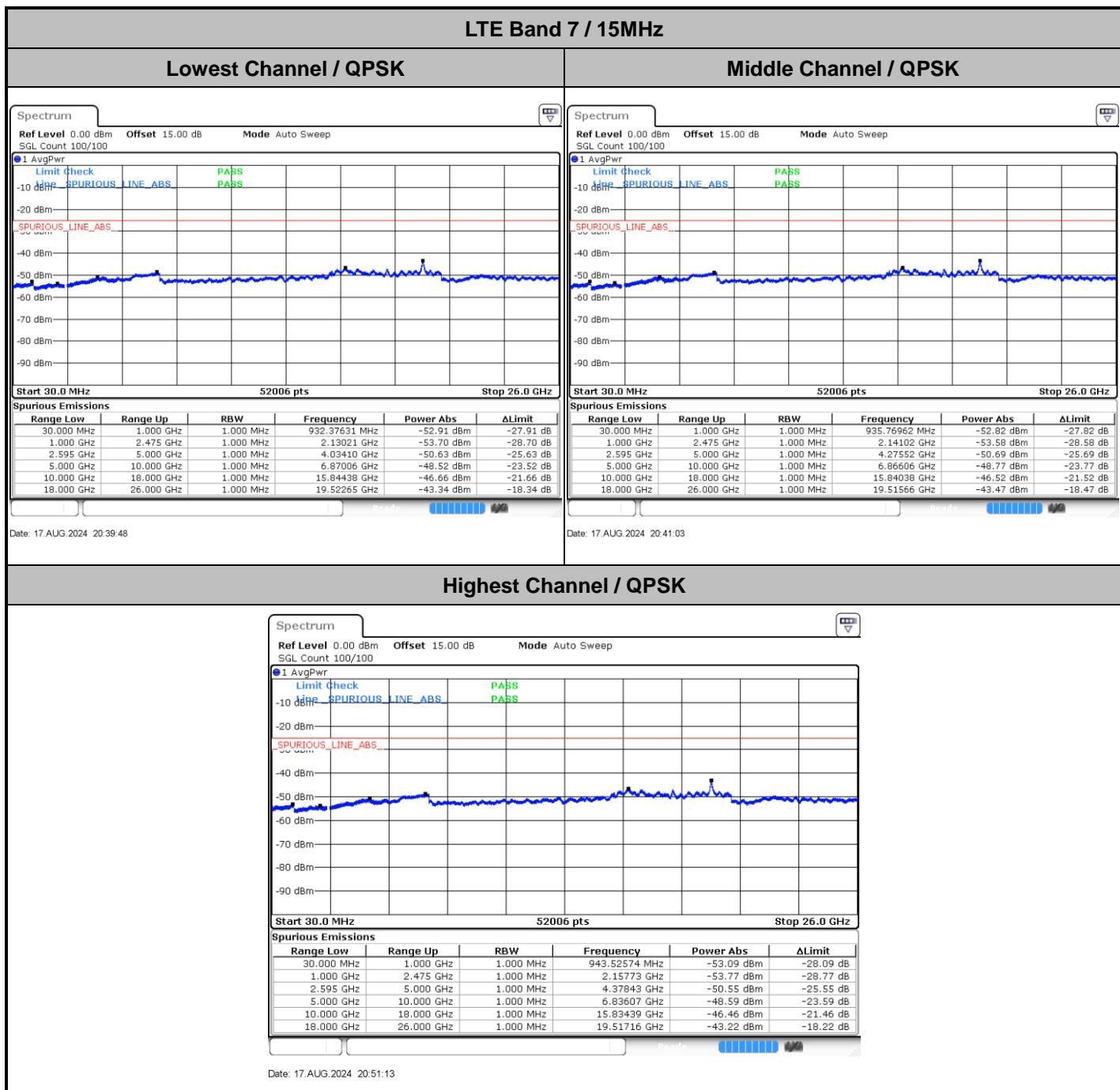
Middle Channel / QPSK



Highest Channel / QPSK











Frequency Stability

Test Conditions		LTE Band 7 (QPSK) / Middle Channel	Limit
Temperature (°C)	Voltage (Volt)	BW 10MHz	Note 2.
		Deviation (ppm)	Result
50	Normal Voltage	0.0018	PASS
40	Normal Voltage	0.0013	
30	Normal Voltage	0.0017	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0007	
0	Normal Voltage	0.0046	
-10	Normal Voltage	0.0045	
-20	Normal Voltage	0.0043	
-30	Normal Voltage	0.0000	
20	Maximum Voltage	0.0044	
20	Normal Voltage	0.0000	
20	Battery End Point	0.0040	

Note:

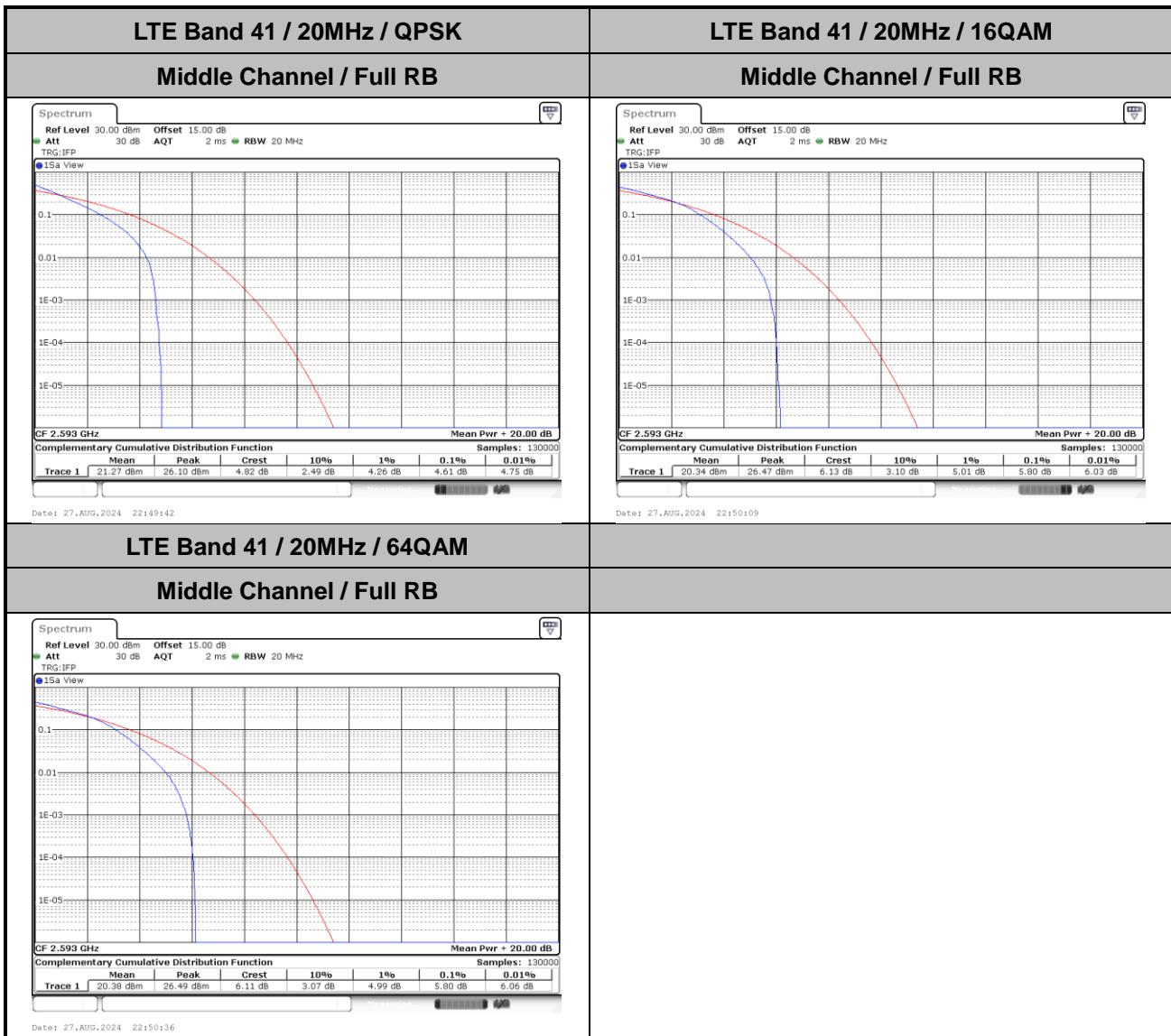
1. Normal Voltage = 3.8 V.; Battery End Point = 3.5 V.; Maximum Voltage = 4.3 V.
2. The frequency fundamental emissions stay within the authorized frequency block.



LTE Band 41

Peak-to-Average Ratio

Mode	LTE Band 41 / 20MHz			
Mod.	QPSK	16QAM	64QAM	Limit: 13dB
RB Size	Full RB	Full RB	Full RB	Result
Middle CH	4.61	5.80	5.80	PASS



**26dB Bandwidth**

Mode	LTE Band 41 : 26dB BW(MHz)											
	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Middle CH	-	-	-	-	5.04	4.89	9.61	9.77	14.15	14.27	18.62	19.82