FCC Test Report

Report Reference No.:	HK2411207047-14E
FCC ID :	2A4FR-LS4G-6-G
Compiled by (position+printed name+signature) . :	Testing Engineer Len Liao
Supervised by (position+printed name+signature) . :	Technical Manager Sliver Wan
Approved by (position+printed name+signature) . :	Authorized Signatory Jason Zhou
Date of issue ..... :	Dec. 24, 2024
Testing Laboratory Name..... :	**Shenzhen HUAK Testing Technology Co., Ltd.**
Address ..... :	1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Applicant's name ..... :	**IGEN TECH CO.,Ltd.**
Address ..... :	Block F4, No. 200, Linghu Avenue, Wuxi, Jiangsu, P. R. China 225400
Test specification ..... :	
Standard ..... :	**FCC Part 22 & 90**

Test item description ..... :	Stick Logger(4G)
Trade Mark ..... :	N/A
Manufacturer ..... :	**IGEN TECH CO.,Ltd.**
Model/Type reference ..... :	LS4G-6-G
Series Models ..... :	LS4G-6, LS4G-6-D, LS4G-6-C, LS4G-6K-D
Ratings ..... :	DC 5~12V 4W
Modulation ..... :	BPSK, QPSK
Hardware version ..... :	V2.0
Software version ..... :	V2.0
Frequency	LTE Band 18
Result ..... :	**PASS**

TEST REPORT

Test Report No. :	HK2411207047-14E	Dec. 24, 2024 Date of issue

Equipment under Test	:	Stick Logger(4G)
Model /Type	:	LS4G-6-G
Series Models	:	LS4G-6, LS4G-6-D, LS4G-6-C, LS4G-6K-D
Applicant	:	**IGEN TECH CO.,Ltd.**
Address	:	Block F4, No. 200, Linghu Avenue, Wuxi, Jiangsu, P. R. China 225400
Manufacturer	:	**IGEN TECH CO.,Ltd.**
Address	:	Block F4, No. 200, Linghu Avenue, Wuxi, Jiangsu, P. R. China 225400

Test result	**Pass**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Table of Contents

** Modified History **

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	Dec. 24, 2024	Jason Zhou

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Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

1. Summary

1.1 Test Standards

The tests were performed according to following standards:
FCC Part 90 : PRIVATE LAND MOBILE RADIO SERVICES

FCC Part 22Subpart H:PRIVATE LAND MOBILE RADIO SERVICES.

TIA/EIA 603 D June 2010:Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.
47 CFR FCC Part 15 Subpart B: - Unintentional Radiators

FCC Part 2: FREQUENCY ALLOCA-TIONS AND RADIO TREATY MAT-TERS; GENERAL RULES AND REG-ULATIONS

KDB971168 D01:v03r01 Measurement Guidance For Certification Of Licensed Digital Transmitters.

1.2 Test Description

Mode 1:

Requirement	CFR 47 Section	Result
Conducted Output Power	§2.1046; §90.635	PASS
Effective(Isotropic) Radiated Output Power	§2.1046; §90.20(d)(32)	PASS
Peak-to-Average Ratio	§2.1046;	PASS
Effective Radiated Power	§2.1046; §90.635	PASS
Occupied Bandwidth	§2.1049;	PASS
Band Edge	§2.1051; §90.691	PASS
Conducted Spurious Emission	§2.1051; §90.691	PASS
Field Strength of Spurious Radiation	§2.1053; §90.691	PASS
Frequency Stability for Temperature & Voltage	§2.1055; §90.213	PASS

Mode 2:

Requirement	CFR 47 Section	Result
Conducted Output Power	§2.1046; §22.913	PASS
Effective(Isotropic) Radiated Output Power	§2.1046; §22.913(a)(2)	PASS
Peak-to-Average Ratio	§2.1046;	PASS
Effective Radiated Power	§2.1046;§22.535	PASS
Occupied Bandwidth	§2.1049;	PASS
Band Edge	§2.1051; §22.917	PASS
Conducted Spurious Emission	§2.1051; §22.917(b)	PASS
Field Strength of Spurious Radiation	§2.1053; §22.917(b)	PASS
Frequency Stability for Temperature & Voltage	§2.1055; §22.355	PASS

Note:

1. PASS: Test item meets the requirement.

2. Fail: Test item does not meet the requirement.

3. N/A: Test case does not apply to the test object.

4. The test result judgment is decided by the limit of test standard.

2. EUT Description

Product Name:	Stick Logger(4G)
Model :	LS4G-6-G
Series Models:	LS4G-6, LS4G-6-D, LS4G-6-C, LS4G-6K-D
Model Difference:	All model's the function, software and electric circuit are the same, only with model named different. Test sample model: LS4G-6-G.
Trade Mark:	N/A
Tx Frequency:	LTE Band 18: 815 MHz ~ 830 MHz
Bandwidth:	LTE Band 18: 3.75KHz / 15KHz
Type of Modulation:	BPSK, QPSK
Antenna Type:	External Antenna
Antenna Gain:	LTE Band 18: 2dBi
Power Supply:	DC 5~12V 4W
Note: 1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. 2. Antenna gain Refer to the antenna specifications. 3. The cable loss data is obtained from the supplier. 4. The test results in the report only apply to the tested sample.	

3. General Information

3.1. Test environment and mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Operation mode:	Keep the EUT in continuous transmitting with modulation
The sample was placed 0.8m above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.	

Description Operation Frequency

Mode A:

TX Channel Bandwidth	Frequency (MHz)	channel
3.75KHz	815.1	23851
	819.5	23895
	823.9	23939
15KHz	815.1	23851
	819.5	23895
	823.9	23939

Mode B:

TX Channel Bandwidth	Frequency (MHz)	channel
3.75KHz	824.1	23941
	827.0	23970
	829.9	23999
15KHz	824.1	23941
	827.0	23970
	829.9	23999

3.2. Test Mode

All modes and data rates and positions were investigated.
Test modes are chosen to be reported as the worst case configuration below:

Test Mode		
Band	**Radiated TCs**	**Conducted TCs**
LTE Band 18	BPSK Link (3.75KHz/ 15KHz)	QPSK Link (3.75KHz/ 15KHz)

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas License Digital Systems v03 with maximum output power. Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission.

3.3. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

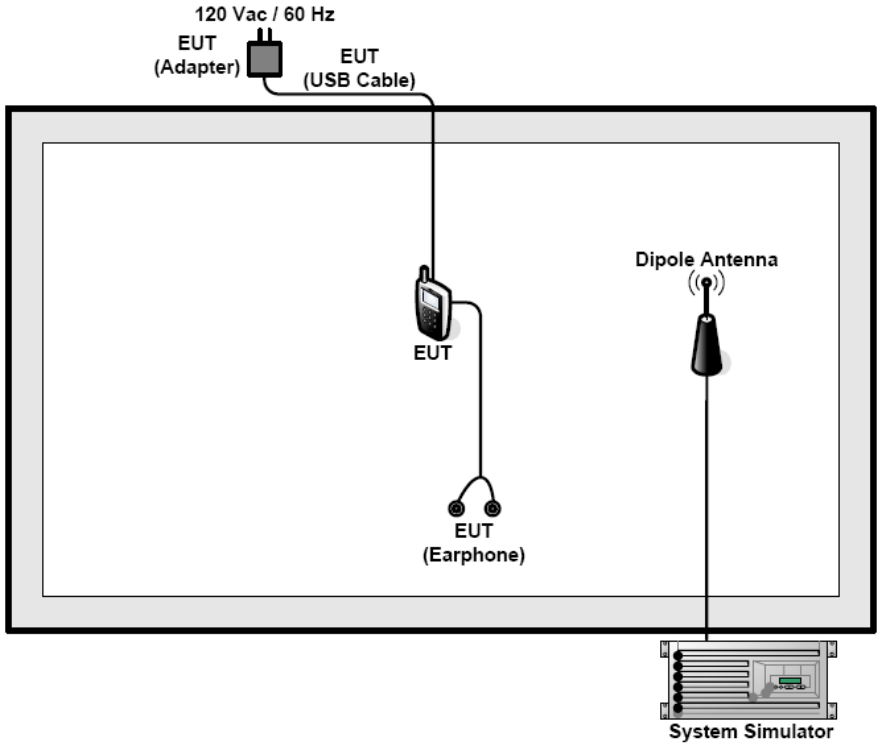
Equipment	Model No.	Serial No.	FCC ID	Trade Name
/	/	/	/	/

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

3.4. Configuration of Tested System



3.5. 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 RF conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level will be exactly the RF output level. The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

3.6. Equipments Used during the Test

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1	L.I.S.N.	R&S	ENV216	HKE-002	2024/02/20	2025/02/19
2	L.I.S.N.	R&S	ENV216	HKE-059	2024/02/20	2025/02/19
3	EMI Test Receiver	R&S	ESR	HKE-005	2024/02/20	2025/02/19
4	Spectrum analyzer	Agilent	N9020A	HKE-117	2024/02/20	2025/02/19
5	Spectrum analyzer	R&S	FSV3044	HKE-126	2024/02/20	2025/02/19
6	Preamplifier	EMCI	EMC051845 S	HKE-006	2024/02/20	2025/02/19
7	Preamplifier	Schwarzbeck	BBV 9743	HKE-016	2024/02/20	2025/02/19
8	Preamplifier	A.H. Systems	SAS-574	HKE-182	2024/02/20	2025/02/19
9	6d Attenuator	Pasternack	6db	HKE-184	2024/02/20	2025/02/19
10	EMI Test Receiver	Rohde & Schwarz	ESR-7	HKE-010	2024/02/20	2025/02/19
11	Broadband Antenna	Schwarzbeck	VULB9168	HKE-167	2024/02/21	2026/02/20
12	Loop Antenna	COM-POWER	AL-130R	HKE-014	2024/02/21	2026/02/20
13	Horn Antenna	Schwarzbeck	9120D	HKE-013	2024/02/21	2026/02/20
14	EMI Test Software	Tonscend	JS32-CE 2.5.0.6	HKE-081	/	/
15	EMI Test Software	Tonscend	JS32-RE 5.0.0	HKE-082	/	/
16	RF Automatic control unit	Tonscend	JS0806-1	HKE-096	2024/02/20	2025/02/19
17	High pass filter unit	Tonscend	JS0806-F	HKE-055	2024/02/20	2025/02/19
18	Wireless Communication Test Set	R&S	CMU200	HKE-026	2024/02/20	2025/02/19
19	Wireless Communication Test Set	R&S	CMW500	HKE-027	2024/02/20	2025/02/19
20	High-low temperature chamber	Guangke	HT-80L	HKE-118	2024/06/10	2025/06/09
21	Temperature and humidity meter	Boyang	HTC-1	HKE-075	2024/06/10	2025/06/09

22	RF Test Software	Tonscend	JS1120 Version 3.1.46	HKE-183	/	/
23	RSE Test Software	Tonscend	JS36-RSE 5.0.0	HKE-184	/	/

4. Facilities and Accreditations

4.1. Information of The Test Laboratory

Shenzhen HUAK Testing Technology Co., Ltd.
Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Testing Laboratory Authorization：

A2LA Accreditation Code is 4781.01.
FCC Designation Number is CN1229.
Canada IC CAB identifier is CN0045.
CNAS Registration Number is L9589.

4.2. Measurement Uncertainty

The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

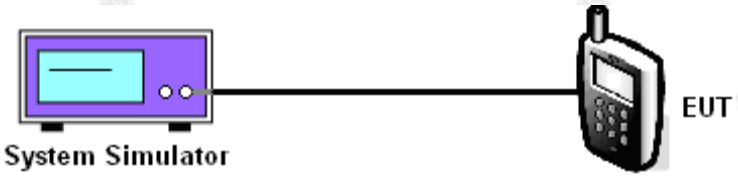
Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	Above 1GHz	4.32dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95%
confidence level using a coverage factor of k=2.

5. Test Results and Measurement Data

5.1. Conducted Output Power Measurement

5.1.1. Test Specification

Test Requirement:	FCC part 90.635
Test Method:	FCC part 2.1046
Limits:	LTE Band 18: 100W
Test Setup:	
Test Procedure:	1. The transmitter output port was connected to the system simulator. 2. Set EUT at maximum power through system simulator. 3. Select lowest, middle, highest channels for each band and different modulation. 4. Measure and record the power level from the system simulator.
Test Result:	PASS

TEST RESULTS

Conducted Measurement:

Mode A:

LTE FDD Band 18				
Modulation	Sub-carrier spacing (KHz)	Tones	Frequency (MHz)	Average Power [dBm]
BPSK	3.75	1@0	815.1	23.08
		1@47	815.1	23.02
		1@0	819.5	23.11
		1@47	819.5	23.06
		1@0	823.9	23.06
		1@47	823.9	22.94
	15	1@0	815.1	23.41
		1@11	815.1	22.40
		12@0	815.1	23.22
		1@0	819.5	22.48
		1@11	819.5	22.38
		12@0	819.5	23.34
		1@0	823.9	22.39
		1@11	823.9	22.29
		12@0	823.9	23.21
QPSK	3.75	1@0	815.1	23.13
		1@47	815.1	23.00
		1@0	819.5	23.09
		1@47	819.5	23.03
		1@0	823.9	23.09
		1@47	823.9	22.99
	15	1@0	815.1	23.55
		1@11	815.1	22.48
		12@0	815.1	23.30
		1@0	819.5	22.59
		1@11	819.5	22.51
		12@0	819.5	23.28
		1@0	823.9	23.46
		1@11	823.9	22.49
		12@0	823.9	23.32

Mode B:

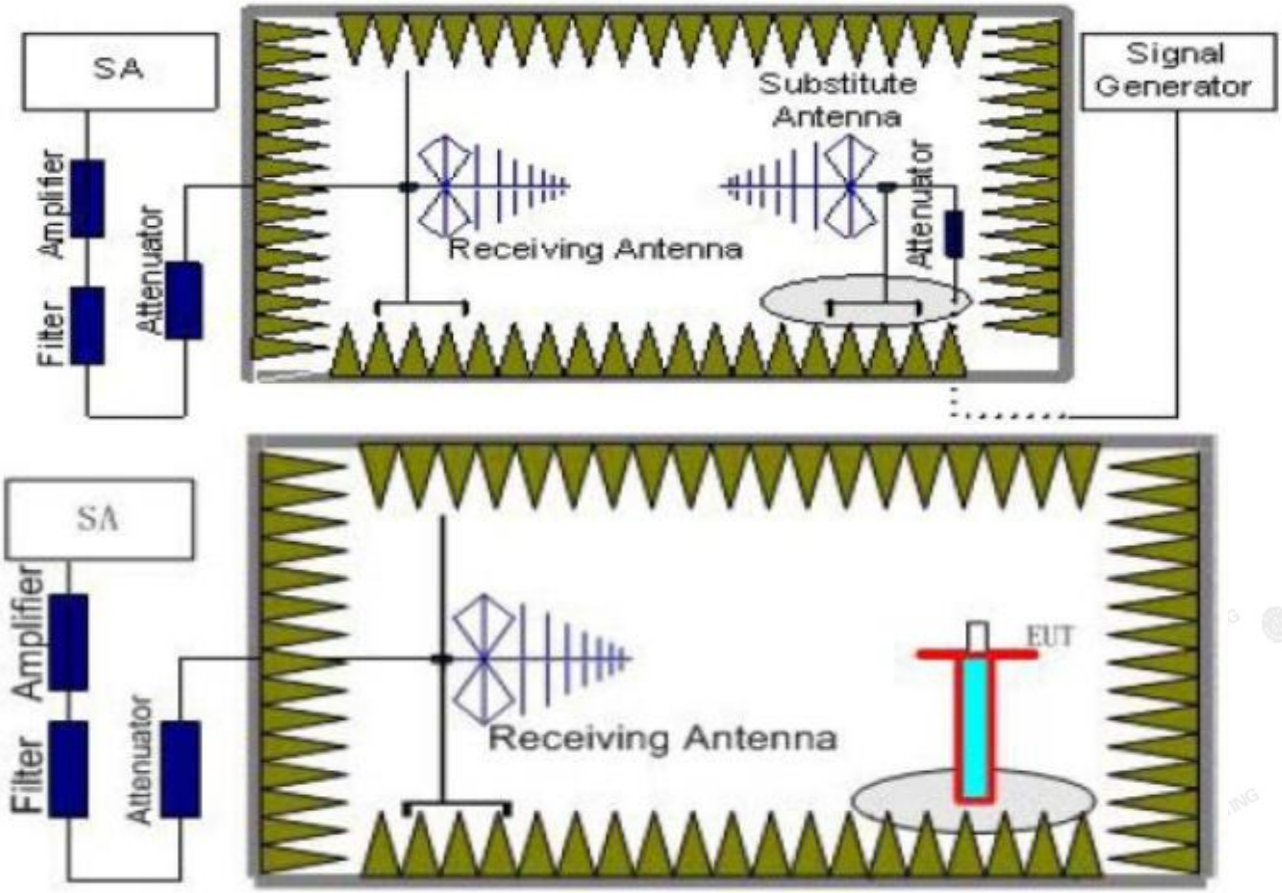
LTE FDD Band 18				
Modulation	Sub-carrier spacing (KHz)	Tones	Frequency (MHz)	Average Power [dBm]
BPSK	3.75	1@0	824.1	22.95
		1@47	824.1	22.88
		1@0	827.0	22.92
		1@47	827.0	22.89
		1@0	829.9	23.08
		1@47	829.9	23.04
	15	1@0	824.1	22.16
		1@11	824.1	22.16
		12@0	824.1	23.16
		1@0	827.0	22.26
		1@11	827.0	22.17
		12@0	827.0	23.17
		1@0	829.9	22.45
		1@11	829.9	22.29
		12@0	829.9	23.34
QPSK	3.75	1@0	824.1	22.93
		1@47	824.1	22.91
		1@0	827.0	22.98
		1@47	827.0	22.95
		1@0	829.9	23.14
		1@47	829.9	23.01
	15	1@0	824.1	22.33
		1@11	824.1	22.28
		12@0	824.1	23.18
		1@0	827.0	22.39
		1@11	827.0	22.32
		12@0	827.0	23.19
		1@0	829.9	22.56
		1@11	829.9	22.48
		12@0	829.9	23.35

5.2. Radiated Output Power

LIMIT

This is the test for the maximum radiated power from the EUT.
Rule Part 22H.913(a)(2) specifies, "Mobile/portable stations are limited to 7 watts ERP.

TEST CONFIGURATION



TEST PROCEDURE

1. EUT was placed on a 0.1 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 0.1m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.

3. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz, And the maximum value of the receiver should be recorded as (P_r).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver.
5. reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}) ,the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.
   The measurement results are obtained as described below: Power(EIRP)=P_{Mea}- P_{Ag} - P_{cl}+ G_a
   We used SMF100A micowave signal generator which signal level can up to 33dBm,so we not used power
   Amplifier for substituation test; The measurement results are amend as described below:
   Power(EIRP)=P_{Mea}- P_{cl}+ G_a
7. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
8. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

TEST RESULTS

Radiated Measurement:

Remark:

1. *We measured all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 18; recorded worst case for each Channel Bandwidth of LTE FDD Band 18.*
2. *EIRP=P_{Mea}(dBm)-P_{cl}(dB)+P_{Ag}(dB)+G_a(dBi)*
3. *Margin=Limit-ERP*
4. *We measured both Horizontal and Vertical direction, recorded worst case direction.*

Mode A:

LTE FDD Band 18-3.75KHz-BPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
815.1	-18	2.42	8.45	36.82	24.85	22.7	38.45	15.75	V
819.5	-16.42	3.46	8.45	36.82	25.39	23.24	38.45	15.21	V
823.9	-19.17	2.53	8.36	36.82	23.48	21.33	38.45	17.12	V

LTE FDD Band 18-15KHz-BPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
815.1	-18.52	2.42	8.45	36.82	24.33	22.18	38.45	16.27	V
819.5	-16.93	3.46	8.45	36.82	24.88	22.73	38.45	15.72	V
823.9	-17.81	2.53	8.36	36.82	24.84	22.69	38.45	15.76	V

LTE FDD Band 18-3.75KHz-QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
815.1	-17.83	2.42	8.45	36.82	25.02	22.87	38.45	15.58	V
819.5	-17.42	3.46	8.45	36.82	24.39	22.24	38.45	16.21	V
823.9	-19.51	2.53	8.36	36.82	23.14	20.99	38.45	17.46	V

LTE FDD Band 18-15KHz- QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
815.1	-19.21	2.42	8.45	36.82	23.64	21.49	38.45	16.96	V
819.5	-17.23	3.46	8.45	36.82	24.58	22.43	38.45	16.02	V
823.9	-19.01	2.53	8.36	36.82	23.64	21.49	38.45	16.96	V

Mode B:

LTE FDD Band 18-3.75KHz-BPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.1	-18.21	2.42	8.45	36.82	24.64	22.49	38.45	15.96	V
827.0	-17.44	3.46	8.45	36.82	24.37	22.22	38.45	16.23	V
829.9	-19.18	2.53	8.36	36.82	23.47	21.32	38.45	17.13	V

LTE FDD Band 18-15KHz-BPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.1	-18.71	2.42	8.45	36.82	24.14	21.99	38.45	16.46	V
827.0	-17.14	3.46	8.45	36.82	24.67	22.52	38.45	15.93	V
829.9	-18.19	2.53	8.36	36.82	24.46	22.31	38.45	16.14	V

LTE FDD Band 18-3.75KHz-QPSK

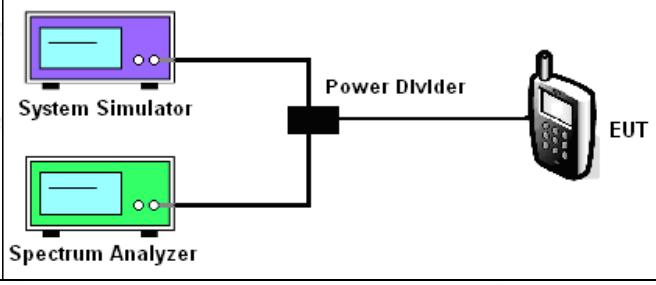
Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.1	-18.43	2.42	8.45	36.82	24.42	22.27	38.45	16.18	V
827.0	-16.24	3.46	8.45	36.82	25.57	23.42	38.45	15.03	V
829.9	-17.48	2.53	8.36	36.82	25.17	23.02	38.45	15.43	V

LTE FDD Band 18-15KHz- QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.1	-17.88	2.42	8.45	36.82	24.97	22.82	38.45	15.63	V
827.0	-16.95	3.46	8.45	36.82	24.86	22.71	38.45	15.74	V
829.9	-15.78	2.53	8.36	36.82	26.87	24.72	38.45	13.73	V

5.3. Peak to Average Ratio

5.3.1. Test Specification

Test Method:	FCC KDB 971168 D01v03
Limit:	The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.
Test Setup:	
Test Procedure:	1. The testing follows FCC KDB 971168 D01v03 Section 5.7.1. 2. The EUT was connected to spectrum analyzer and system simulator via a power divider. 3. Set EUT to transmit at maximum output power. 4. Set the CCDF (Complementary Cumulative Distribution Function) option of the spectrum analyzer. Record the maximum PAPR level associated with a probability of 0.1%.
Test Result:	PASS

TEST RESULTS

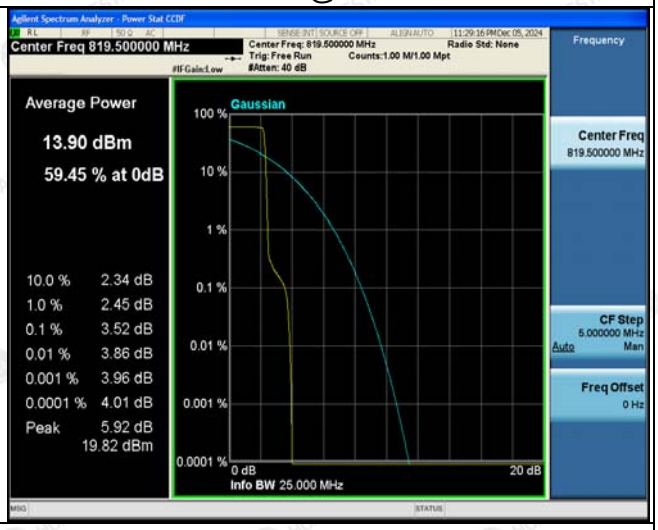
Remark:

1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 18; recorded worst case for each Channel Bandwidth of LTE FDD Band 18.*

LTE FDD Band 18				
Mode A				
Frequency (MHz)	Sub-carrier spacing (KHz)	Tones	Modulation PAPR (dB)	
			BPSK	QPSK
819.5	3.75	1@0	3.31	3.95
		1@47	2.69	3.52
819.5	15	1@0	5.12	6.10
		1@11	4.44	6.71

LTE FDD Band 18				
Mode B				
Frequency (MHz)	Sub-carrier spacing (KHz)	Tones	Modulation PAPR (dB)	
			BPSK	QPSK
827.0	3.75	1@0	2.73	3.16
		1@47	2.59	3.40
827.0	15	1@0	4.54	6.52
		1@11	3.75	6.14

Mode A:

LTE FDD Band 18-3.75KHz	
BPSK	*QPSK*
	
1@0	1@0
	
1@47	1@47

LTE FDD Band 18-15KHz	
BPSK	*QPSK*
	
1@0	1@0
	
1@11	1@11

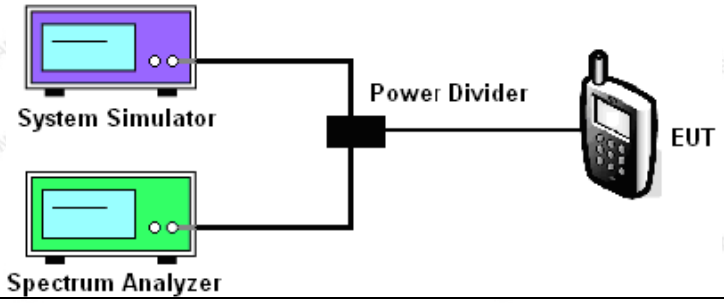
Mode B:

LTE FDD Band 18-3.75KHz	
BPSK	*QPSK*
	
1@0	1@0
	
1@47	1@47

LTE FDD Band 18-15KHz	
BPSK	*QPSK*
	
1@0	1@0
	
1@11	1@11

5.4. 99% Occupied Bandwidth and 26dB Bandwidth Measurement

5.4.1. Test Specification

Test Method:	FCC part 2.1049
Limit:	N/A
Test Setup:	
Test Procedure:	1. The testing follows FCC KDB 971168 D01v03 Section 4.2. 2. The EUT was connected to the spectrum analyzer and system simulator via a power divider. 3. The RF output of the 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 99% occupied bandwidth were measured, set RBW= 1% of OBW, VBW= 3*RBW, sample detector, trace maximum hold. 5. The 26dB bandwidth were measured, set RBW= 1% of EBW, VBW= 3*RBW, peak detector, trace maximum hold.
Test Result:	PASS

TEST RESULTS

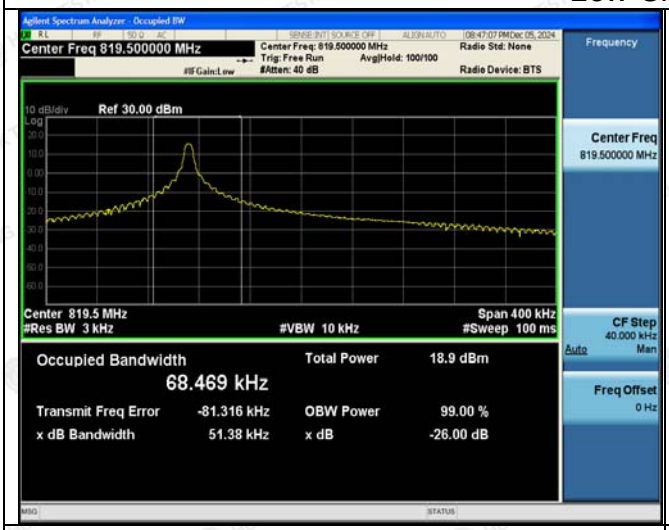
Remark:

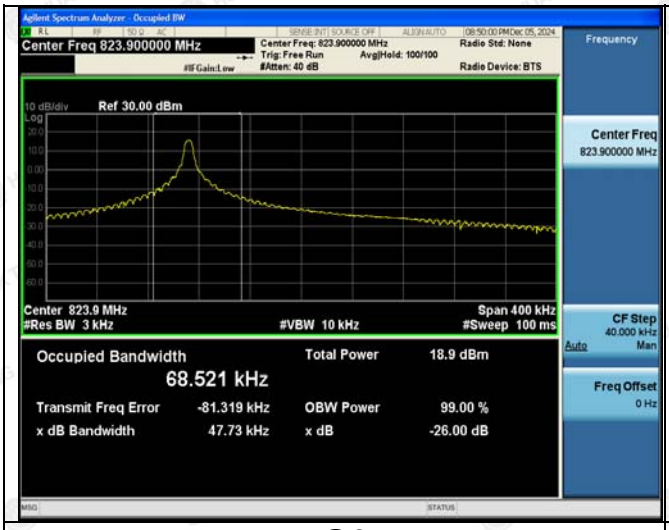
1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 18; recorded worst case for each Channel Bandwidth of LTE FDD Band 18.*

LTE FDD Band 18						
Mode A						
Sub-carrier spacing (KHz)	Tones	Frequency (MHz)	-26dBc Emission bandwidth (KHz)		99% Occupied bandwidth (KHz)	
			BPSK	QPSK	BPSK	QPSK
3.75	1@0	815.1	47.78	51.20	69.000	81.203
	1@0	819.5	51.38	50.61	68.469	80.849
	1@0	823.9	47.73	50.34	68.521	80.324
15	1@0	815.1	113.6	114.3	127.43	123.20
	1@0	819.5	113.4	116.3	125.61	125.62
	1@0	823.9	106.5	115.2	126.18	126.79
	12@0	815.1	249.3	246.4	184.65	185.24
	12@0	819.5	246.1	249.2	188.26	185.25
	12@0	823.9	239.2	248.7	185.70	186.52

LTE FDD Band 18						
Mode B						
Sub-carrier spacing (KHz)	Tones	Frequency (MHz)	-26dBc Emission bandwidth (KHz)		99% Occupied bandwidth (KHz)	
			BPSK	QPSK	BPSK	QPSK
3.75	1@0	824.1	47.48	50.35	68.100	81.180
	1@0	827.0	46.97	50.55	67.821	81.373
	1@0	829.9	47.45	49.79	67.805	80.677
15	1@0	824.1	104.9	116.2	125.57	129.16
	1@0	827.0	113.7	116.5	128.76	121.92
	1@0	829.9	104.6	118.0	124.94	120.59
	12@0	824.1	248.5	247.4	186.77	185.36
	12@0	827.0	248.1	244.5	188.63	189.60
	12@0	829.9	239.1	245.0	181.15	186.62

Mode A

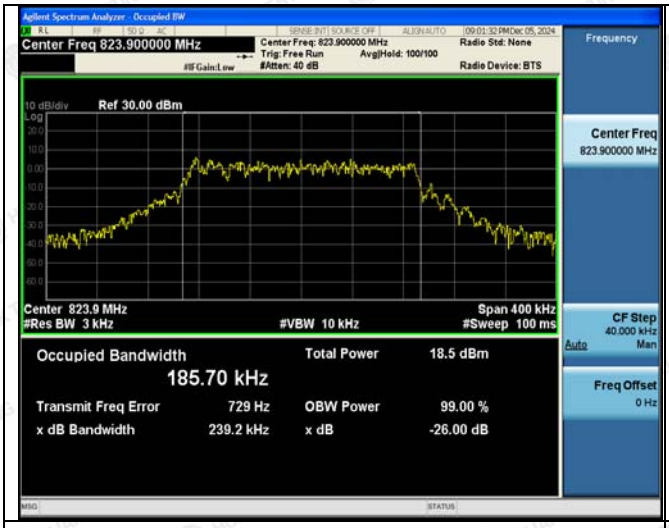
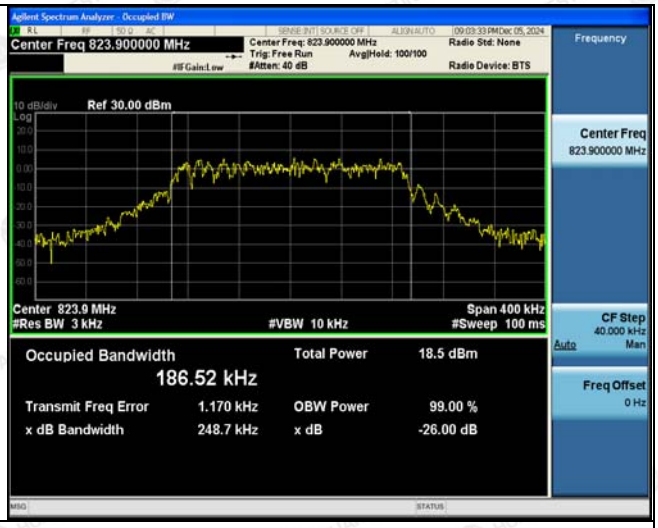
LTE FDD Band 18-3.75KHz	
BPSK	*QPSK*
	
1@0	1@0
Low Channel	
	
1@0	1@0
Middle Channel	

	
1@0	1@0
High Channel	

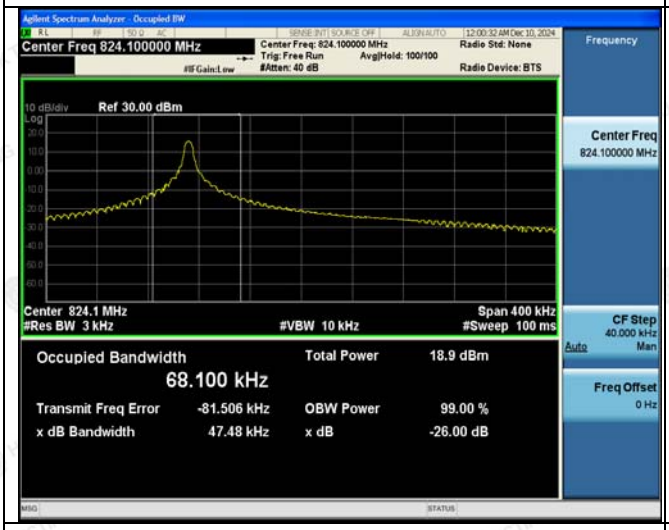
LTE FDD Band 18-15KHz	
BPSK	*QPSK*
	
1@0	1@0
Low Channel	

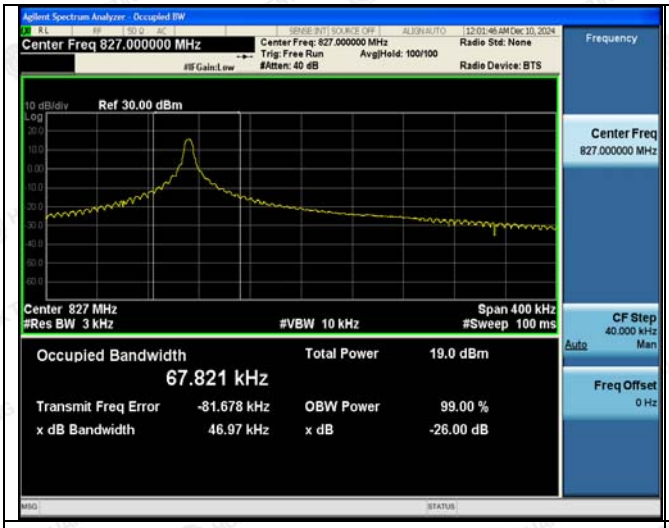
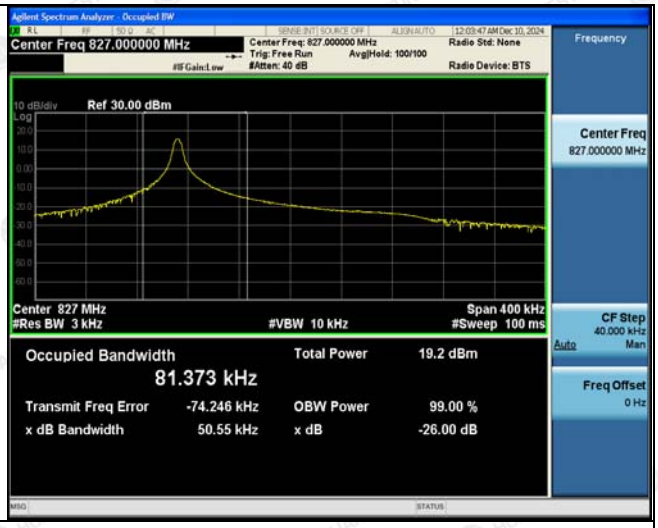
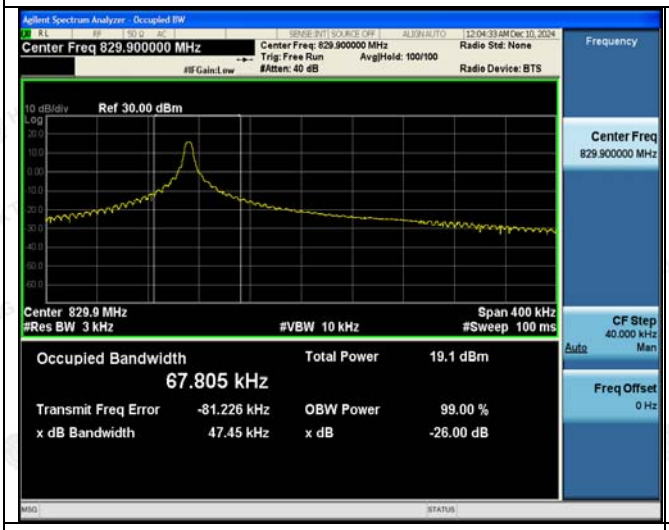
	
1@0	1@0
Middle Channel	
	
1@0	1@0
High Channel	

LTE FDD Band 18-15KHz	
BPSK	*QPSK*
	
12@0	12@0
Low Channel	
	
12@0	12@0
Middle Channel	

	
12@0	12@0
High Channel	

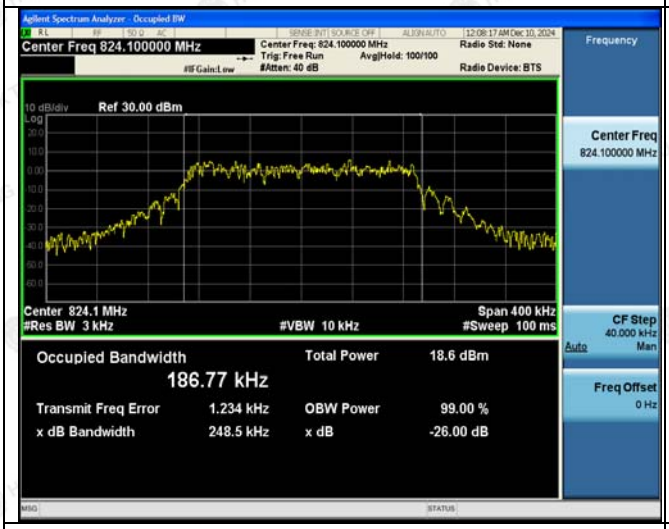
Mode B:

LTE FDD Band 18-3.75KHz	
BPSK	*QPSK*
	
1@0	1@0
Low Channel	

	
1@0	1@0
Middle Channel	
	
1@0	1@0
High Channel	

LTE FDD Band 18-15KHz	
BPSK	QPSK
	
1@0	1@0
Low Channel	
	
1@0	1@0
Middle Channel	

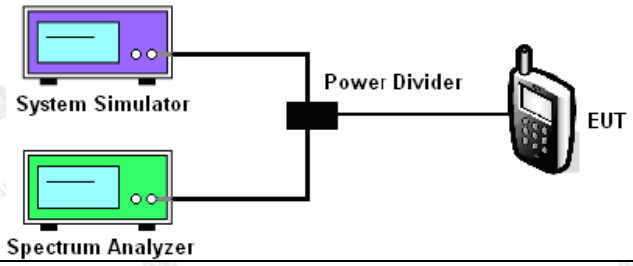
	
1@0	1@0
High Channel	

LTE FDD Band 18-15KHz	
BPSK	*QPSK*
	
12@0	12@0
Low Channel	

	
12@0	12@0
Middle Channel	
	
12@0	12@0
High Channel	

5.5. Band Edge and Conducted Spurious Emission Measurement

5.5.1. Test Specification

Test Requirement:	FCC part 90.691
Test Method:	FCC part2.1051
Limit:	For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 $Log_{10}(f/6.1)$ decibels or 50 + 10 $Log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.
Test Setup:	
Test Procedure:	1. The testing follows FCC KDB 971168 D01v03 Section 6.0. 2. The EUT was connected to the spectrum analyzer and system simulator via a power divider. 3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement. 4. The band edges of low and high channels for the highest RF powers were measured. 5. The conducted spurious emission for the whole frequency range was taken. 6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
Test Result:	PASS

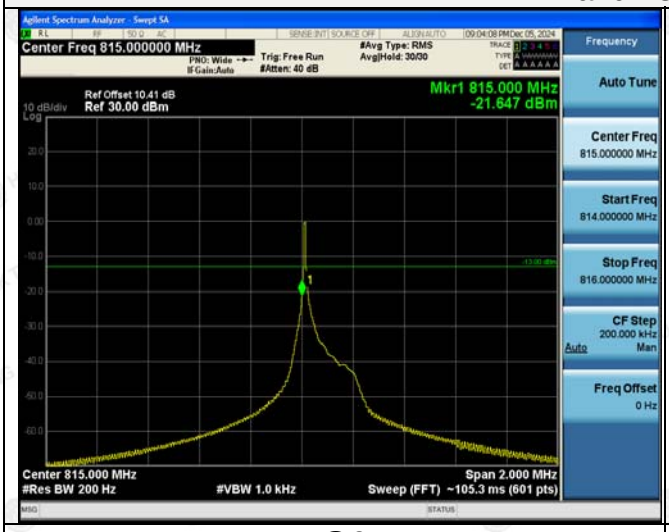
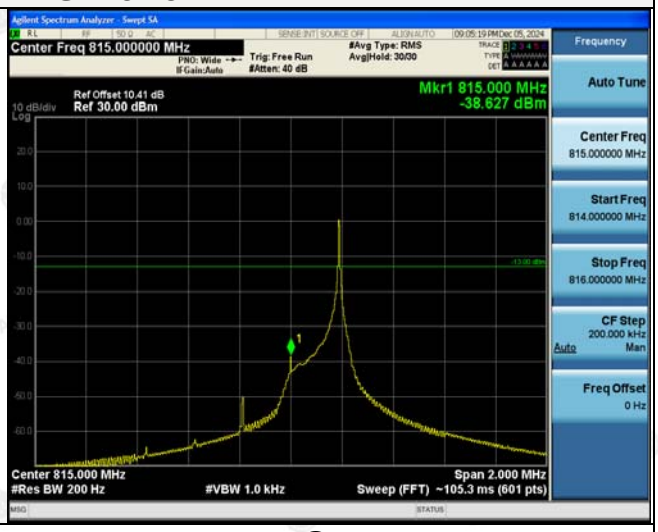
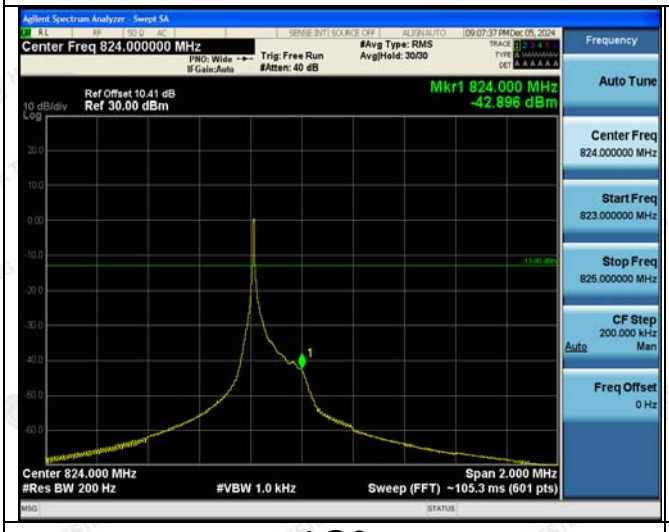
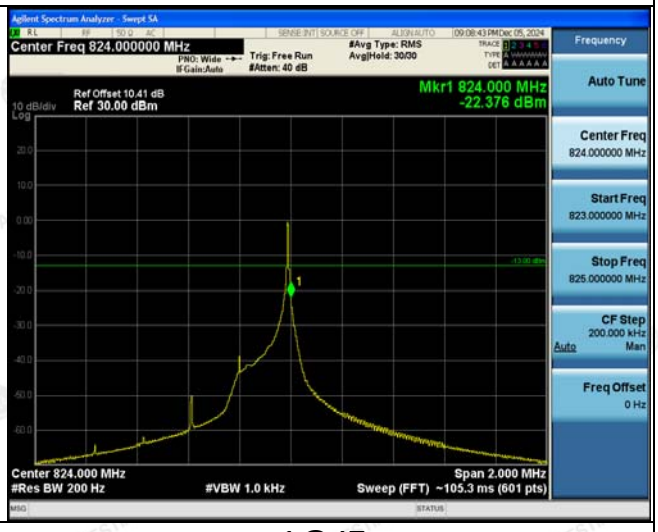
.

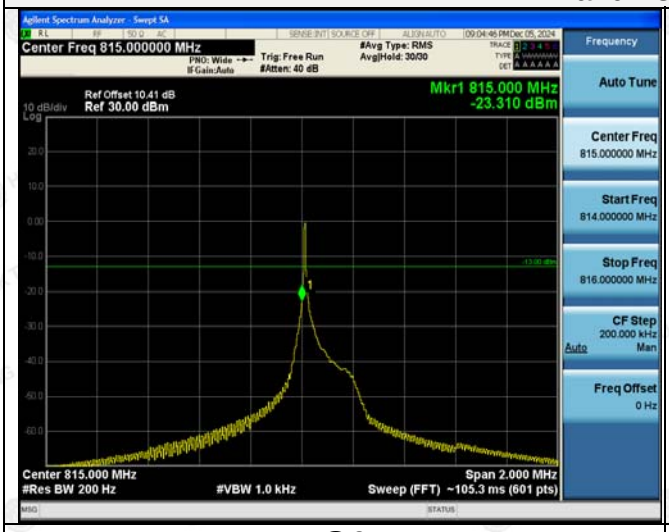
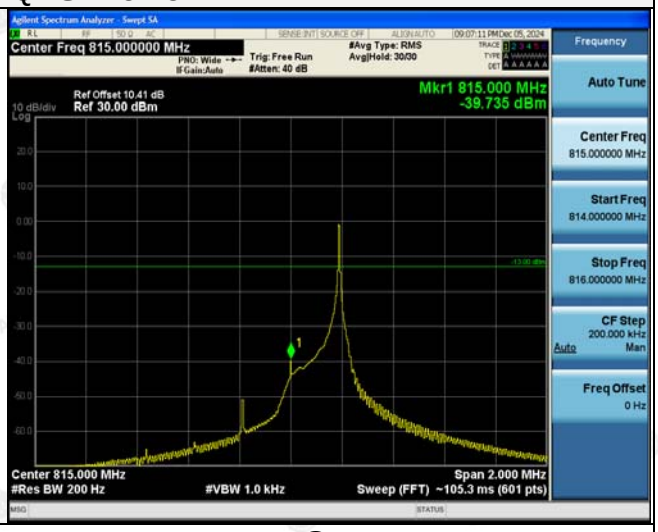
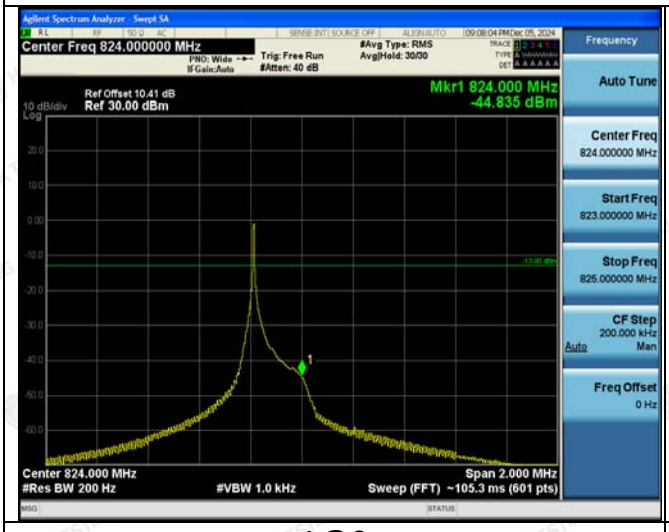
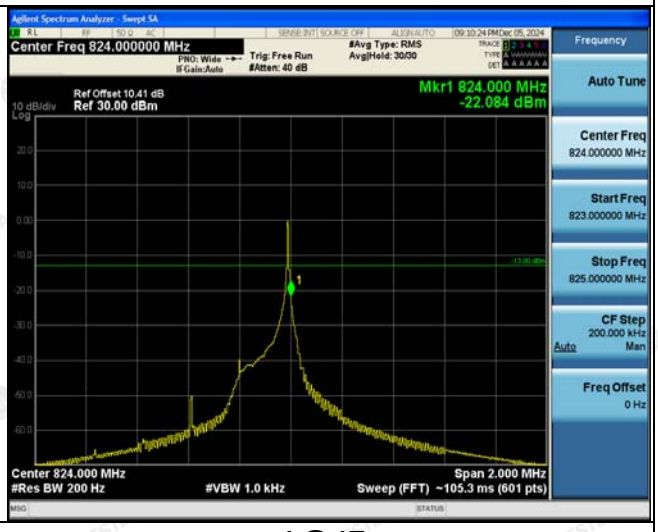
TEST RESULTS

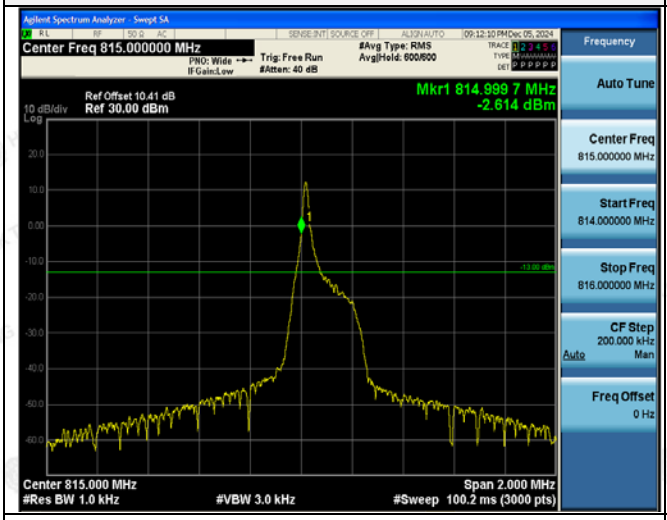
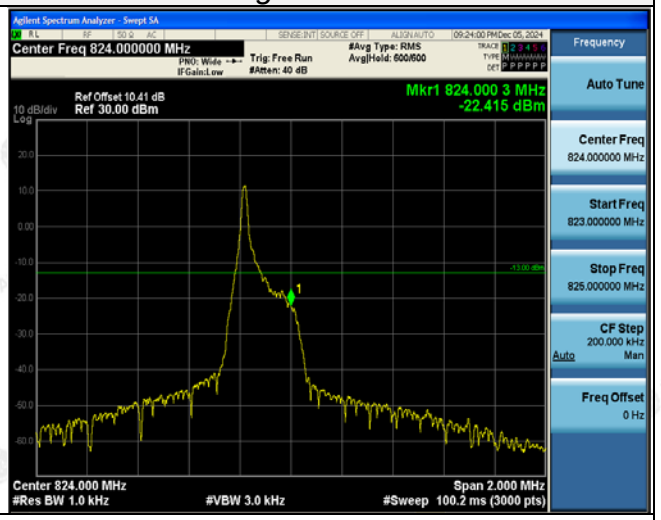
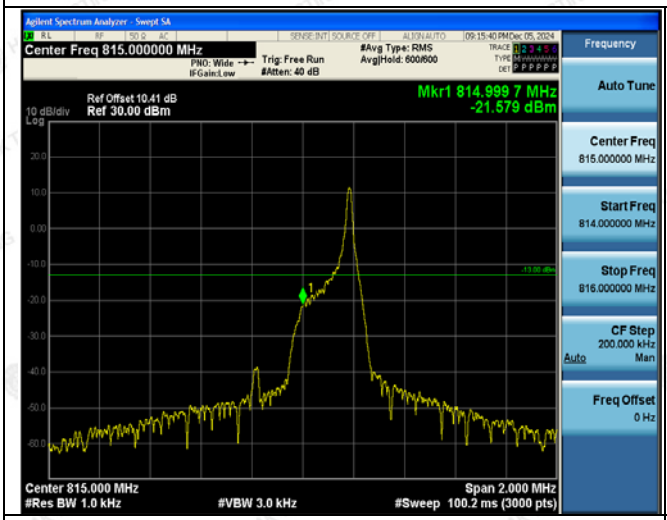
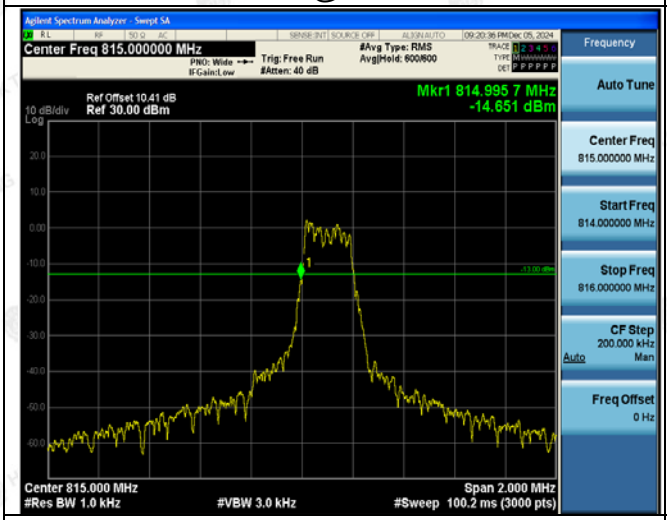
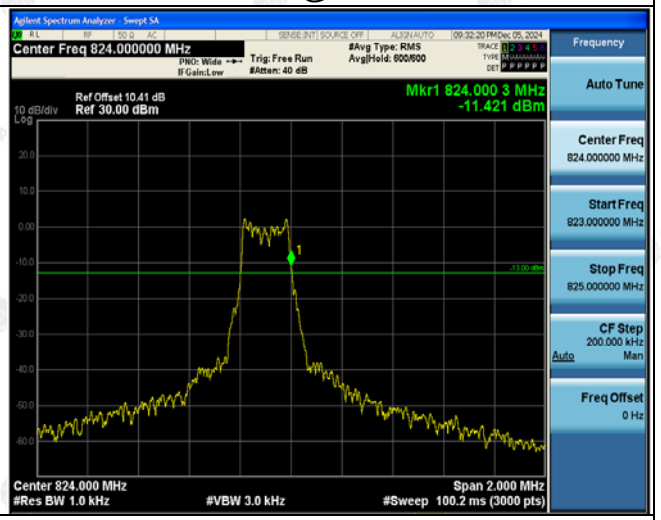
Remark:

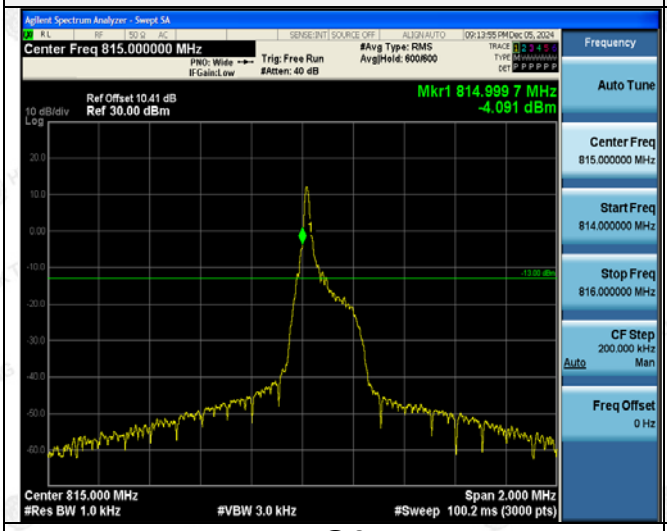
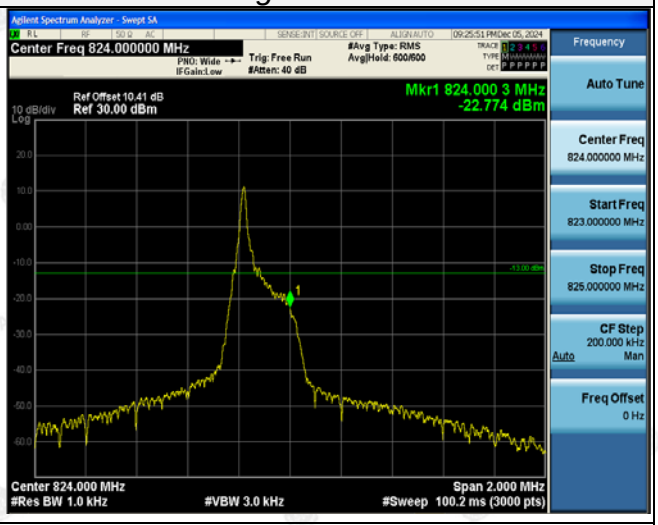
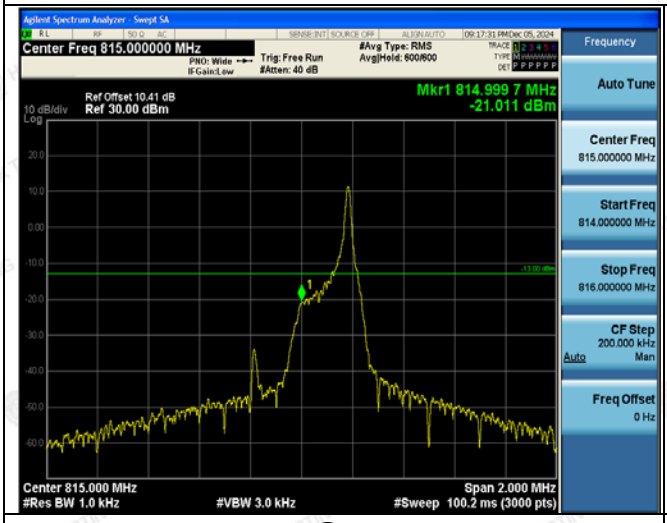
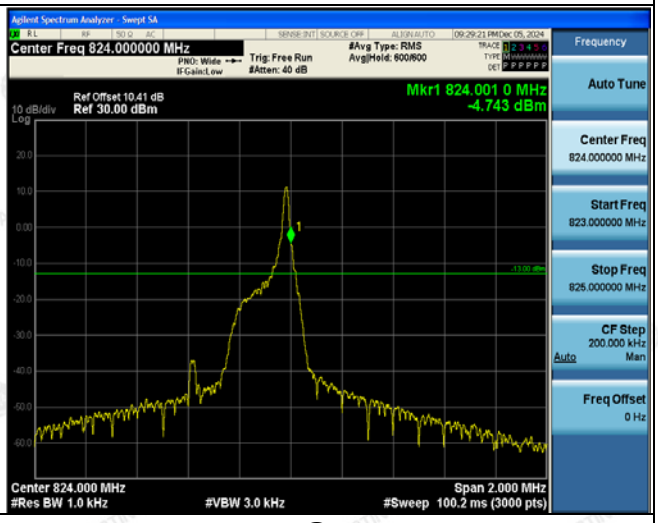
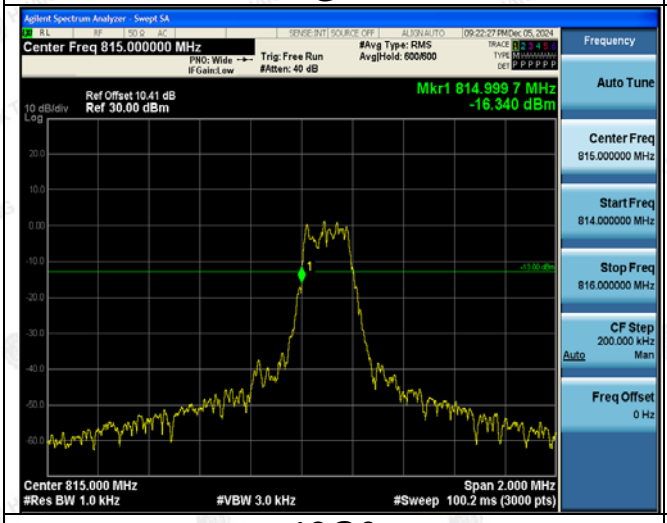
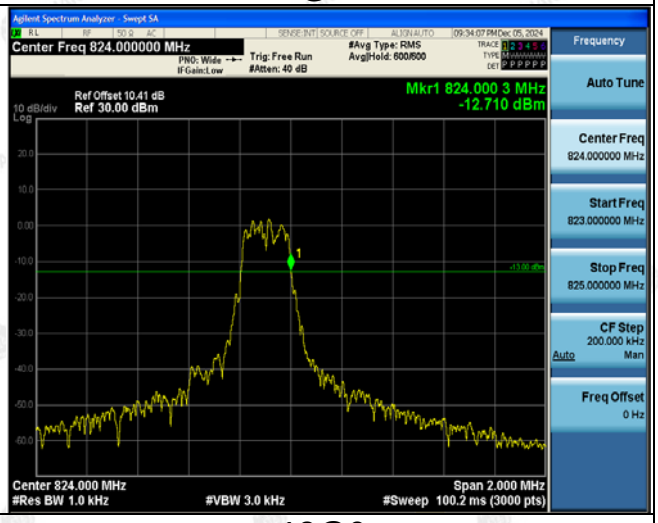
1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 18; recorded worst case for each Channel Bandwidth of LTE FDD Band 18.*

Mode A:

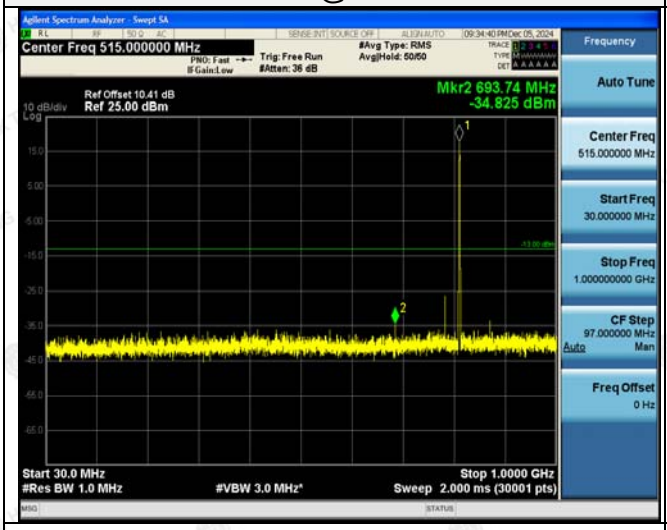
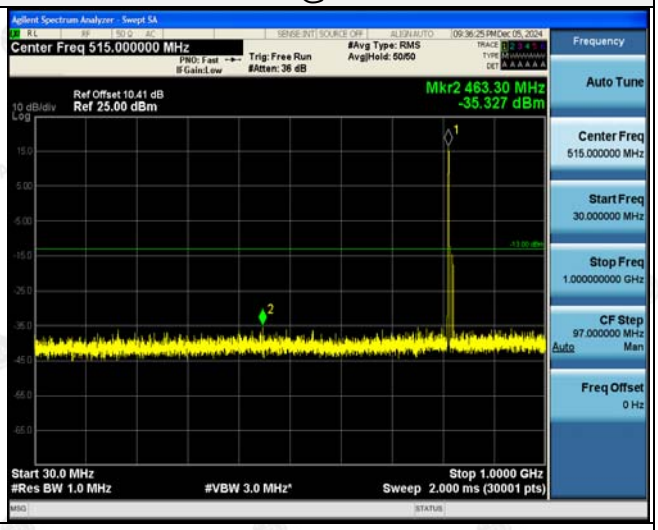
LTE FDD Band 18-BPSK- 3.75KHz	
	
1@0	1@47
Low Channel	
	
1@0	1@47
High Channel	

LTE FDD Band 18-QPSK- 3.75KHz	
	
1@0	1@47
Low Channel	
	
1@0	1@47
High Channel	

LTE FDD Band 18-BPSK- 15KHz	
Low Channel	*High Channel*
	
1@0	1@0
	
1@11	1@11
	
12@0	12@0

LTE FDD Band 18-QPSK- 15KHz	
Low Channel	*High Channel*
	
1@0	1@0
	
1@11	1@11
	
12@0	12@0

Conducted Measurement:

LTE FDD Band 18-QPSK-3.75KHz	
Low Channel	
1@0	1@47
	
30MHz~1GHz	*30MHz~1GHz*
	
1GHz ~5GHz	*1GHz ~5GHz*