



Shenzhen Global Test Service Co.,Ltd.

No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road,  
Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

## FCC PART 24 TEST REPORT

### Part 24 Subpart E

Report Reference No.....: GTS20190929003-1-3-6

FCC ID ..... RQQLT-L553TA

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Date of issue ..... Oct.15, 2019

Testing Laboratory Name ..... Shenzhen Global Test Service Co.,Ltd.

Address..... No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative  
Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu  
Street, Longgang District, Shenzhen, Guangdong

Applicant's name ..... HYUNDAI CORPORATION

Address..... 25,Yulgok-ro 2-Gil, Jongno-gu, Seoul, South Korea

Test specification .....

Standard ..... FCC CFR Title 47 Part 2, Part 24E  
ASNI/TIA-603-E-2016  
KDB 971168 D01

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Test item description ..... Smart Phone

Trade Mark ..... HYUNDAI

Manufacturer ..... Shenzhen Tinno Mobile Technology Corp.

Model/Type reference..... L553

Listed Models ..... N/A

Modulation Type ..... QPSK, 16QAM

LTE Band 2..... 1850-1910MHz

ANT Gain ..... -1.0dBi

Rating ..... DC 3.8V From Battery and DC 5V from USB

Hardware version ..... K510AG20181130 V1.0

Software version ..... HYUNDAI\_L553\_V1.1.2\_20190923

Result.....: PASS

**TEST REPORT**

<b>Test Report No. :</b> <b>GTS20190929003-1-3-6</b>	Oct. 15, 2019 Date of issue
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Equipment under Test                    : Smart Phone

Model /Type                                : L553

Listed Models                             : N/A

**Applicant**                                 : **HYUNDAI CORPORATION**

Address                                     : 25,Yulgok-ro 2-Gil, Jongno-gu, Seoul, South Korea

**Manufacturer**                           : **Shenzhen Tinno Mobile Technology Corp.**

Address                                     : 4/F.,H-3 Building,OCT Eastern Industrial Park. NO.1 XiangShan  
East Road.,Nan Shan District,Shenzhen,P.R.China.

<b>Test result</b>	<b>Pass *</b>
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\* In the configuration tested, the EUT complied with the standards specified page 4.

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.

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# 1 SUMMARY

## 1.1 TEST STANDARDS

The tests were performed according to following standards:

[FCC Part 24](#) :PUBLIC MOBILE SERVICES

[ANSI/TIA-603-E-2016](#): Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

47 CFR FCC Part 15 Subpart B: - Unintentional Radiators

[FCC Part 2](#): FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

[KDB971168 D01: v02r02](#) MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS

[ANSI C63.26-2015](#): IEEE/ANSI Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

## 1.2 Test Description

Test Item	Section in CFR 47	Result
RF Output Power	Part 2.1046 Part 24.232 (c)	Pass
Peak-to-Average Ratio	Part 24.232 (d)	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 24.238	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 24.238 (a)	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 24.238 (a)	Pass
Out of band emission, Band Edge	Part 22.917 (a) Part 24.238 (a)	Pass
Frequency stability	Part 2.1055 Part 24.235	Pass

### 1.3 Test Facility

#### 1.3.1 Address of the test laboratory

**Shenzhen Global Test Service Co.,Ltd.**

No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

### 1.4 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Global Test Service Co.,Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Global Test Service Co.,Ltd. is reported:

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.

## **2 GENERAL INFORMATION**

### **2.1 General Remarks**

Date of receipt of test sample	:	Sep.15, 2019
Testing commenced on	:	Sep.15, 2019
Testing concluded on	:	Oct.15, 2019

### **2.2 Environmental conditions**

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25℃
Relative Humidity:	55 %
Air Pressure:	101 kPa

### **2.3 Description of Test Modes**

The EUT has been tested under typical operating condition. The CMW500 used to control the EUT staying in continuous transmitting and receiving mode for testing. Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.

Note:

1. For the ERP/EIRP and radiated emission test, every axis (X, Y, Z) was verified, and show the worst result on this report.
2. Test method and refer to 3GPP TS136521.

## 2.4 Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.08	2019/09/20	2020/09/19
LISN	R&S	ESH2-Z5	893606/008	2019/09/20	2020/09/19
Bilog Antenna	Schwarzbeck	VULB9163	976	2019/09/20	2020/09/19
Bilog Antenna	Schwarzbeck	VULB9163	979	2019/09/20	2020/09/19
EMI Test Receiver	R&S	ESCI7	101102	2019/09/20	2020/09/19
Spectrum Analyzer	Agilent	N9020A	MY48010425	2019/09/20	2020/09/19
Spectrum Analyzer	R&S	FSP40	100019	2019/09/20	2020/09/19
Controller	EM Electronics	Controller EM 1000	N/A	N/A	N/A
Horn Antenna	Schwarzbeck	BBHA 9120D	01622	2019/09/20	2020/09/19
Horn Antenna	Schwarzbeck	BBHA 9120D	01652	2019/09/20	2020/09/19
Active Loop Antenna	SCHWARZBEC K	FMZB1519	1519-037	2019/09/20	2020/09/19
Broadband Horn Antenna	SCHWARZBEC K	BBHA 9170	971	2019/09/20	2020/09/19
Amplifier	Schwarzbeck	BBV 9743	#202	2019/09/20	2020/09/19
Amplifier	EMCI	EMC051845B	980355	2019/09/20	2020/09/19
Temperature/Humidity Meter	Gangxing	CTH-608	02	2019/09/20	2020/09/19
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	KL142031	2019/09/20	2020/09/19
High-Pass Filter	K&L	41H10-1375/U12750-O/O	KL142032	2019/09/20	2020/09/19
RF Cable(below 1GHz)	HUBER+SUHNER	RG214	RE01	2019/09/20	2020/09/19
RF Cable(above 1GHz)	HUBER+SUHNER	RG214	RE02	2019/09/20	2020/09/19
Data acquisition card	Agilent	U2531A	TW53323507	2019/09/20	2020/09/19
Power Sensor	Agilent	U2021XA	MY5365004	2019/09/20	2020/09/19
EMI Test Software	R&S	ES-K1	V1.7.1	2019/09/20	2020/09/19
EMI Test Software	JS Tonscend	JS32-RE	2.0.1.5	2019/09/20	2020/09/19
EMI Test Software	Audix	E3	2..1.1	2019/09/20	2020/09/19

## 2.5 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: RQQHLT-L553TA filing to comply with of the FCC Part 24 Rules.

## 2.6 Modifications

No modifications were implemented to meet testing criteria.

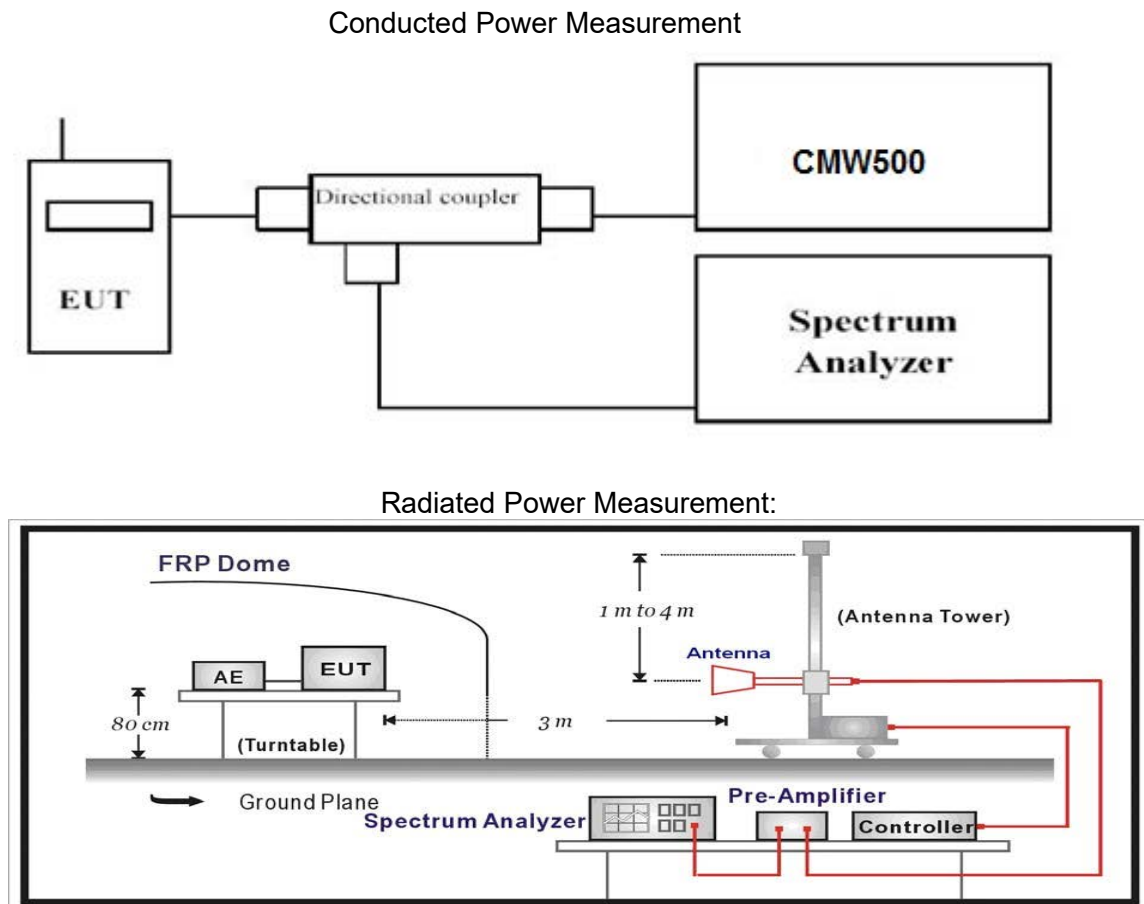
### 3 TEST CONDITIONS AND RESULTS

#### 3.1 Output Power

##### LIMIT

Rule Part 24.232(b) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p.

##### TEST CONFIGURATION



##### TEST PROCEDURE

The EUT was setup according to EIA/TIA 603D

##### **Conducted Power Measurement:**

- Place the EUT on a bench and set it in transmitting mode.
- Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMW500 by a Directional Couple.
- EUT Communicate with CMW500, then select a channel for testing.
- Add a correction factor to the display of spectrum, and then test.

##### **Radiated Power Measurement:**

- The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
- The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
- The output of the test antenna shall be connected to the measuring receiver.
- The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
- The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.



- g. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
- h. The maximum signal level detected by the measuring receiver shall be noted.
- i. The transmitter shall be replaced by a substitution antenna.
- j. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
- k. The substitution antenna shall be connected to a calibrated signal generator.
- l. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- m. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
- n. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
- o. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
- p. The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
- q. Test site anechoic chamber refer to ANSI C63.4.

## **TEST RESULTS**

### **Conducted Measurement:**

<i>LTE FDD Band 2</i>				
TX Channel Bandwidth	Frequency (MHz)	RB Size/Offset	Average Power [dBm]	
			QPSK	16QAM
1.4 MHz	1850.7	1 RB low	23.08	22.27
		1 RB Mid	23.15	22.03
		1 RB high	22.92	22.06
		50% RB Low	22.95	22.05
		50% RB mid	22.87	21.86
		50% RB high	22.86	21.81
		100% RB	21.82	20.87
	1880.0	1 RB low	23.21	22.25
		1 RB Mid	23.25	22.32
		1 RB high	23.16	22.28
		50% RB Low	23.12	22.08
		50% RB mid	23.09	22.08
		50% RB high	23.26	22.12
		100% RB	22.14	21.75
	1909.3	1 RB low	23.06	21.91
		1 RB Mid	23.06	22.06
		1 RB high	23.00	21.85
		50% RB Low	22.81	21.83
		50% RB mid	22.86	21.76
		50% RB high	22.77	21.84
		100% RB	21.81	20.72
3 MHz	1851.5	1 RB low	22.92	21.85
		1 RB Mid	23.63	21.94
		1 RB high	23.72	21.82
		50% RB Low	22.98	21.89
		50% RB mid	22.83	21.81
		50% RB high	22.55	22.57
		100% RB	21.85	20.98
	1880.0	1 RB low	23.17	21.89
		1 RB Mid	23.18	22.12
		1 RB high	23.05	21.81
		50% RB Low	22.88	21.87
		50% RB mid	22.94	22.11
		50% RB high	22.97	21.84
		100% RB	22.07	21.15
	1908.5	1 RB low	22.94	22.67
		1 RB Mid	22.95	21.81

5 MHz		1 RB high	22.85	21.79
		50% RB Low	22.63	22.65
		50% RB mid	22.73	21.81
		50% RB high	22.72	21.78
		100% RB	21.90	20.43
	1852.5	1 RB low	22.99	22.20
		1 RB Mid	23.70	21.82
		1 RB high	23.66	22.16
		50% RB Low	22.82	21.87
		50% RB mid	22.85	21.82
		50% RB high	22.75	21.75
		100% RB	21.76	20.72
	1880.0	1 RB low	22.97	22.18
		1 RB Mid	23.18	22.41
		1 RB high	23.01	22.35
		50% RB Low	23.09	22.03
		50% RB mid	23.05	22.01
		50% RB high	23.10	22.15
		100% RB	22.04	21.17
	1907.5	1 RB low	22.91	22.53
		1 RB Mid	22.86	22.67
		1 RB high	22.85	22.52
		50% RB Low	22.72	21.76
		50% RB mid	22.75	21.85
		50% RB high	22.90	21.98
		100% RB	21.83	20.97
10 MHz	1855.0	1 RB low	23.25	22.10
		1 RB Mid	23.12	21.95
		1 RB high	22.97	21.98
		50% RB Low	21.91	21.82
		50% RB mid	21.87	21.92
		50% RB high	21.71	21.66
		100% RB	21.80	20.83
	1880.0	1 RB low	23.52	22.70
		1 RB Mid	23.56	22.78
		1 RB high	23.31	22.55
		50% RB Low	22.65	22.61
		50% RB mid	22.63	22.69
		50% RB high	22.38	22.38
		100% RB	22.53	21.57
	1905.0	1 RB low	23.50	22.71
		1 RB Mid	23.72	21.93
		1 RB high	23.63	22.37
		50% RB Low	22.55	22.66
		50% RB mid	22.51	22.41
		50% RB high	22.15	22.21
		100% RB	22.24	21.19
15 MHz	1857.5	1 RB low	23.37	22.60
		1 RB Mid	23.49	22.51
		1 RB high	23.20	22.42
		50% RB Low	22.62	22.62
		50% RB mid	22.68	22.67
		50% RB high	22.41	22.45
		100% RB	22.53	21.51
	1880.0	1 RB low	23.14	22.02
		1 RB Mid	23.02	21.91
		1 RB high	22.87	21.70
		50% RB Low	22.02	22.08
		50% RB mid	21.98	21.93
		50% RB high	21.71	21.79
		100% RB	22.16	21.09
	1902.5	1 RB low	22.96	22.12
		1 RB Mid	23.13	22.37

20 MHz		1 RB high	23.20	22.23
		50% RB Low	22.18	22.12
		50% RB mid	22.35	22.34
		50% RB high	22.22	22.32
		100% RB	22.30	21.19
	1860.0	1 RB low	23.29	22.32
		1 RB Mid	23.58	22.61
		1 RB high	23.01	22.15
		50% RB Low	22.43	22.40
		50% RB mid	22.42	22.48
		50% RB high	22.42	22.32
		100% RB	22.47	21.36
	1880.0	1 RB low	22.98	22.05
		1 RB Mid	23.09	22.27
		1 RB high	22.60	21.65
		50% RB Low	22.29	22.27
		50% RB mid	22.31	22.29
		50% RB high	21.90	21.92
		100% RB	22.21	21.19
	1900.0	1 RB low	22.82	21.82
		1 RB Mid	23.33	22.42
		1 RB high	23.17	22.10
		50% RB Low	22.08	22.07
		50% RB mid	22.13	22.17
		50% RB high	22.04	22.06
		100% RB	22.05	20.91

**Radiated Measurement:**

Remark:

1. We were tested all RB Configuration for the model L553 , the Mode refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 2; recorded worst case for each Channel Bandwidth of LTE FDD Band 2 at the H Polarization
2.  $EIRP = P_{Mea}(dBm) - P_{cl}(dB) + P_{Ag}(dB) + G_a(dBi)$

*LTE FDD Band 2\_Channel Bandwidth 1.4MHz\_QPSK 100%RB#0*

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	G <sub>a</sub> Antenna Gain(dB)	P <sub>Ag</sub> (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1850.7	-21.06	3.41	10.24	33.60	19.37	33.01	13.64	H
1880.0	-20.08	3.49	10.24	33.60	20.27	33.01	12.74	H
1909.3	-20.00	3.55	10.23	33.60	20.28	33.01	12.73	H

*LTE FDD Band 2\_Channel Bandwidth 3MHz\_QPSK 100%RB#0*

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	G <sub>a</sub> Antenna Gain(dB)	P <sub>Ag</sub> (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1851.5	-20.84	3.41	10.24	33.60	19.59	33.01	13.42	H
1880.0	-19.73	3.49	10.24	33.60	20.62	33.01	12.39	H
1908.5	-19.45	3.55	10.23	33.60	20.83	33.01	12.18	H

*LTE FDD Band 2\_Channel Bandwidth 5MHz\_QPSK 100%RB#0*

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	G <sub>a</sub> Antenna Gain(dB)	P <sub>Ag</sub> (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1852.5	-20.56	3.41	10.24	33.60	19.87	33.01	13.14	H
1880.0	-19.14	3.49	10.24	33.60	21.21	33.01	11.80	H
1907.5	-19.03	3.55	10.23	33.60	21.25	33.01	11.76	H

*LTE FDD Band 2\_Channel Bandwidth 10MHz\_QPSK 100%RB#0*

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	G <sub>a</sub> Antenna Gain(dB)	P <sub>Ag</sub> (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1855.0	-20.71	3.41	10.24	33.60	19.72	33.01	13.29	H
1880.0	-19.49	3.49	10.24	33.60	20.86	33.01	12.15	H
1905.0	-19.27	3.55	10.23	33.60	21.01	33.01	12.00	H

*LTE FDD Band 2\_Channel Bandwidth 15MHz\_QPSK 100%RB#0*

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	G <sub>a</sub> Antenna Gain(dB)	P <sub>Ag</sub> (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1857.5	-21.21	3.41	10.24	33.60	19.22	33.01	13.79	H
1880.0	-20.41	3.49	10.24	33.60	19.94	33.01	13.07	H
1902.5	-19.87	3.55	10.23	33.60	20.41	33.01	12.60	H

*LTE FDD Band 2\_Channel Bandwidth 20MHz\_QPSK 100%RB#0*

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	G <sub>a</sub> Antenna Gain(dB)	P <sub>Ag</sub> (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1860.0	-21.35	3.41	10.24	33.60	19.08	33.01	13.93	H
1880.0	-20.73	3.49	10.24	33.60	19.62	33.01	13.39	H
1900.0	-20.23	3.55	10.23	33.60	20.05	33.01	12.96	H

*LTE FDD Band 2\_Channel Bandwidth 1.4MHz\_16QAM 100%RB#0*

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	G <sub>a</sub> Antenna Gain(dB)	P <sub>Ag</sub> (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1850.7	-22.57	3.41	10.24	33.60	17.86	33.01	15.15	H
1880.0	-21.82	3.49	10.24	33.60	18.53	33.01	14.48	H
1909.3	-21.24	3.55	10.23	33.60	19.04	33.01	13.97	H

*LTE FDD Band 2\_Channel Bandwidth 3MHz\_16QAM 100%RB#0*

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	G <sub>a</sub> Antenna Gain(dB)	P <sub>Ag</sub> (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1851.5	-23.13	3.41	10.24	33.60	17.30	33.01	15.71	H
1880.0	-21.82	3.49	10.24	33.60	18.53	33.01	14.48	H
1908.5	-21.63	3.55	10.23	33.60	18.65	33.01	14.36	H

*LTE FDD Band 2\_Channel Bandwidth 5MHz\_16QAM 100%RB#0*

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	G <sub>a</sub> Antenna Gain(dB)	P <sub>Ag</sub> (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1852.5	-22.90	3.41	10.24	33.60	17.53	33.01	15.48	H
1880.0	-21.59	3.49	10.24	33.60	18.76	33.01	14.25	H
1907.5	-21.36	3.55	10.23	33.60	18.92	33.01	14.09	H

*LTE FDD Band 2\_Channel Bandwidth 10MHz\_16QAM 100%RB#0*

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	G <sub>a</sub> Antenna Gain(dB)	P <sub>Ag</sub> (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1855.0	-22.94	3.41	10.24	33.60	17.49	33.01	15.52	H
1880.0	-21.76	3.49	10.24	33.60	18.59	33.01	14.42	H
1905.0	-21.41	3.55	10.23	33.60	18.87	33.01	14.14	H

*LTE FDD Band 2\_Channel Bandwidth 15MHz\_16QAM 100%RB#0*

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	G <sub>a</sub> Antenna Gain(dB)	P <sub>Ag</sub> (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1857.5	-23.04	3.41	10.24	33.60	17.39	33.01	15.62	H
1880.0	-22.01	3.49	10.24	33.60	18.34	33.01	14.67	H
1902.5	-21.57	3.55	10.23	33.60	18.71	33.01	14.30	H

*LTE FDD Band 2\_Channel Bandwidth 20MHz\_16QAM 100%RB#0*

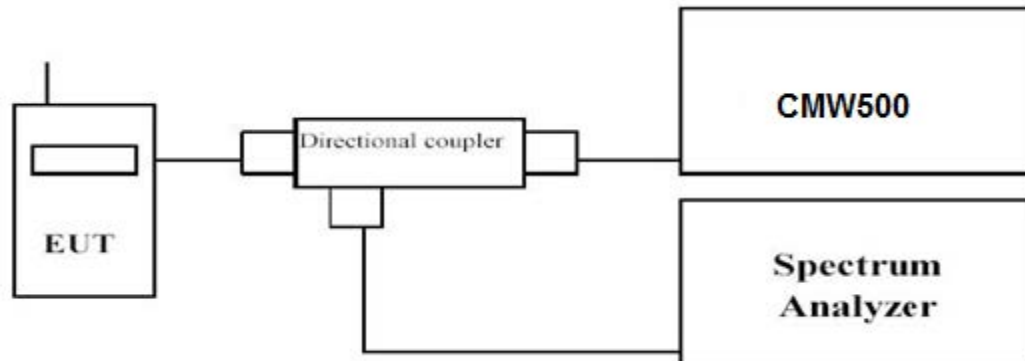
Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	G <sub>a</sub> Antenna Gain(dB)	P <sub>Ag</sub> (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1860.0	-23.45	3.41	10.24	33.60	16.98	33.01	16.03	H
1880.0	-22.60	3.49	10.24	33.60	17.75	33.01	15.26	H
1900.0	-22.30	3.55	10.23	33.60	17.98	33.01	15.03	H

### 3.2 Peak-to-Average Ratio (PAR)

#### LIMIT

The Peak-to-Average Ratio (PAR) of the transmission may not exceed 13 dB.

#### TEST CONFIGURATION



#### TEST PROCEDURE

1. Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
2. Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth;
3. Set the number of counts to a value that stabilizes the measured CCDF curve;
4. Set the measurement interval as follows:
  - 1). for continuous transmissions, set to 1 ms,
  - 2). for burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
5. Record the maximum PAPR level associated with a probability of 0.1%.

#### TEST RESULTS

Remark:

1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 2; recorded worst case for each Channel Bandwidth of LTE FDD Band 2 at 1RB#0 for L553

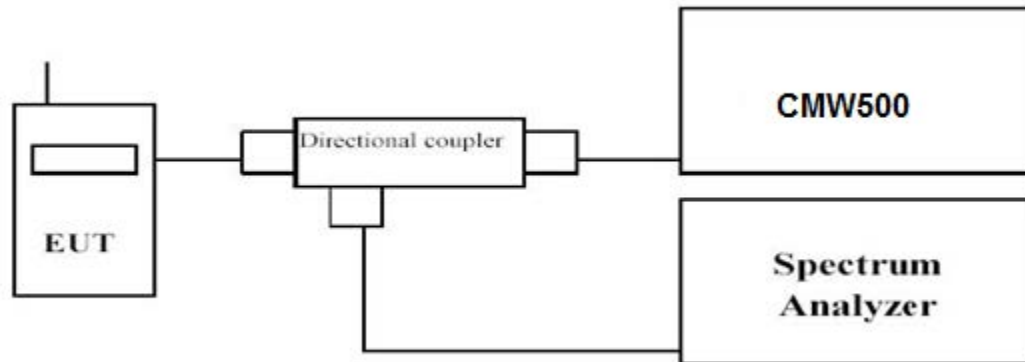
LTE FDD Band 2				
TX Channel Bandwidth	Frequency (MHz)	RB Size/Offset	PAPR (dB)	
			QPSK	16QAM
1.4 MHz	1850.7	1RB#0	4.31	5.19
	1880.0		4.25	5.23
	1909.3		4.43	5.05
3 MHz	1851.5	1RB#0	4.32	5.19
	1880.0		4.29	5.21
	1908.5		4.31	5.19
5 MHz	1852.5	1RB#0	4.29	5.17
	1880.0		4.35	5.15
	1907.5		4.36	5.23
10 MHz	1855.0	1RB#0	4.42	5.25
	1880.0		4.35	5.16
	1905.0		3.82	4.97
15 MHz	1857.5	1RB#0	4.42	5.28
	1880.0		4.22	5.01
	1902.5		3.68	4.97
20 MHz	1860.0	1RB#0	4.39	5.09
	1880.0		4.28	5.24
	1900.0		4.41	5.17

### 3.3 Occupied Bandwidth and Emission Bandwidth

#### LIMIT

N/A

#### TEST CONFIGURATION



#### TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at low, middle and high channel in each band. The -26dBc Emission bandwidth was also measured and recorded.

Set RBW was set to about 1% of emission BW, VBW $\geq$ 3 times RBW.

-26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

#### TEST RESULTS

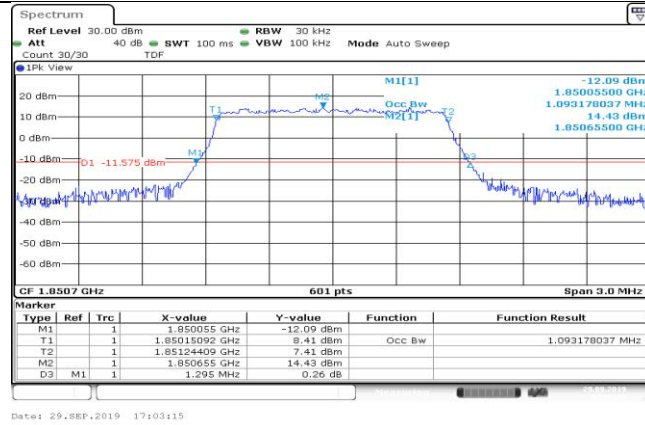
Remark:

1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 2; recorded worst case for each Channel Bandwidth of LTE FDD Band 2.

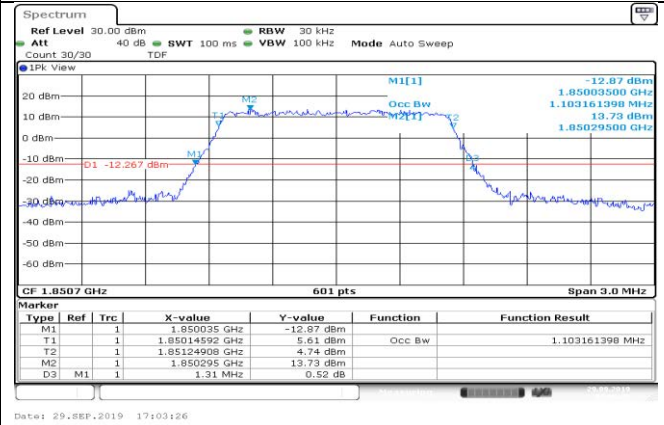
LTE FDD Band 2						
TX Channel Bandwidth	RB Size/Offset	Frequency (MHz)	-26dBc Emission bandwidth (MHz)		99% Occupied bandwidth (MHz)	
			QPSK	16QAM	QPSK	16QAM
1.4 MHz	6RB#0	1850.7	1.295	1.310	1.0932	1.1032
		1880.0	1.285	1.290	1.0932	1.0982
		1909.3	1.330	1.295	1.0982	1.0932
3 MHz	15RB#0	1851.5	2.920	2.930	2.6955	2.6855
		1880.0	2.900	2.920	2.6955	2.6755
		1908.5	2.930	2.930	2.6955	2.6855
5 MHz	25RB#0	1852.5	5.23	5.170	4.5355	4.5055
		1880.0	5.19	5.220	4.5055	4.5355
		1907.5	5.210	5.170	4.5155	4.5455
10 MHz	50RB#0	1855.0	10.333	10.167	9.0183	9.0183
		1880.0	10.267	10.200	9.0183	8.9580
		1905.0	10.133	10.167	9.0183	9.0183
15 MHz	75RB#0	1857.5	15.250	15.150	13.4775	13.5275
		1880.0	15.350	15.200	13.5275	13.5774
		1902.5	15.100	15.150	13.4276	13.5274
20 MHz	100RB#0	1860.0	20.000	20.200	18.0366	18.0366
		1880.0	20.133	20.200	18.1032	18.0366
		1900.0	19.933	20.200	18.0366	18.0366

## LTE FDD Band 2-1.4MHz Channel Bandwidth

## QPSK



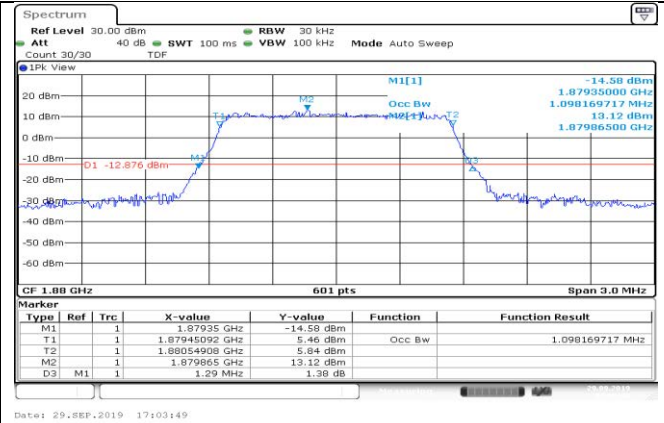
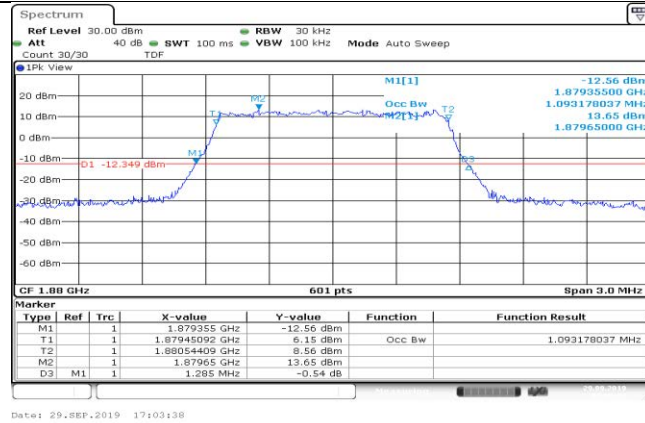
## 16QAM



## 6RB#0

## 6RB#0

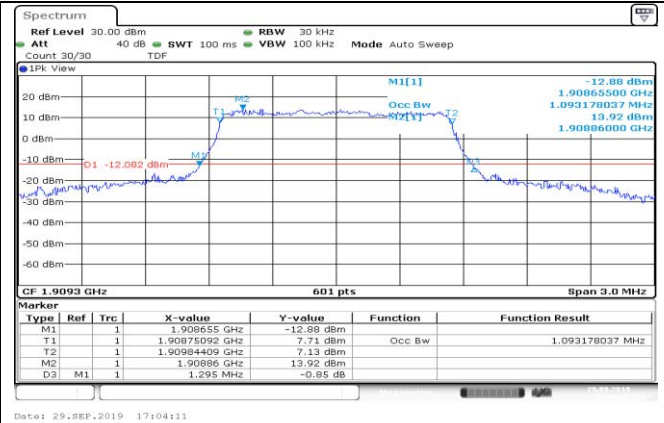
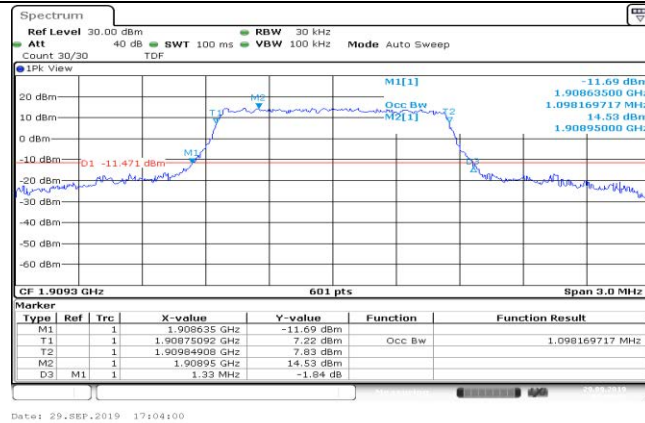
## Low Channel



## 6RB#0

## 6RB#0

## Middle Channel



## 6RB#0

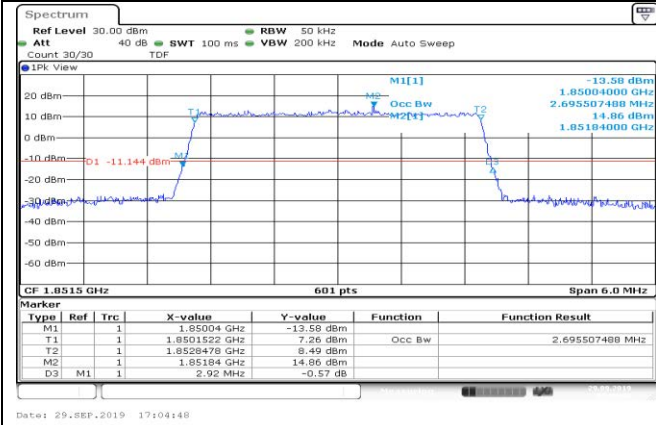
## 6RB#0

## High Channel

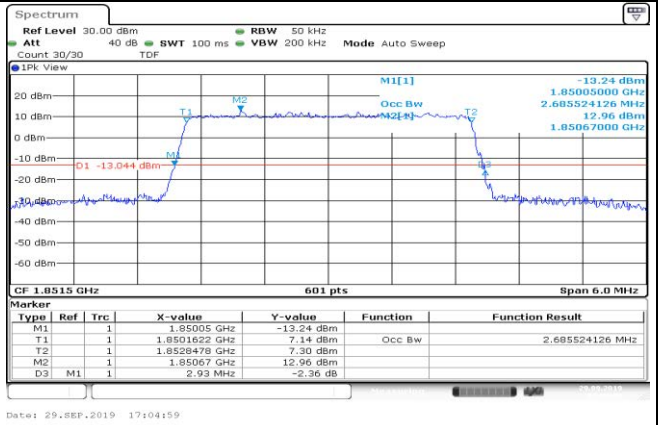


LTE FDD Band 2-3MHz Channel Bandwidth

QPSK



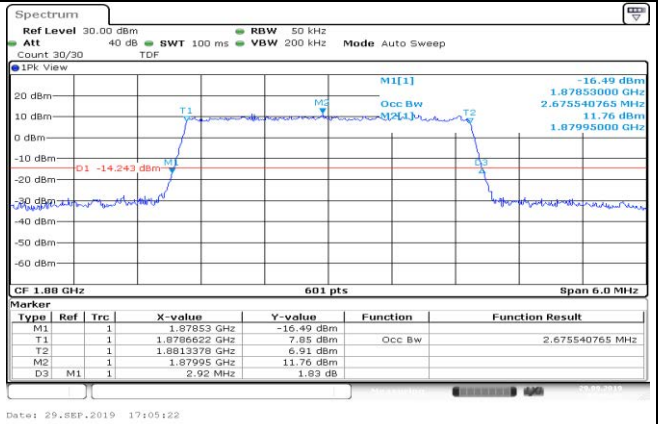
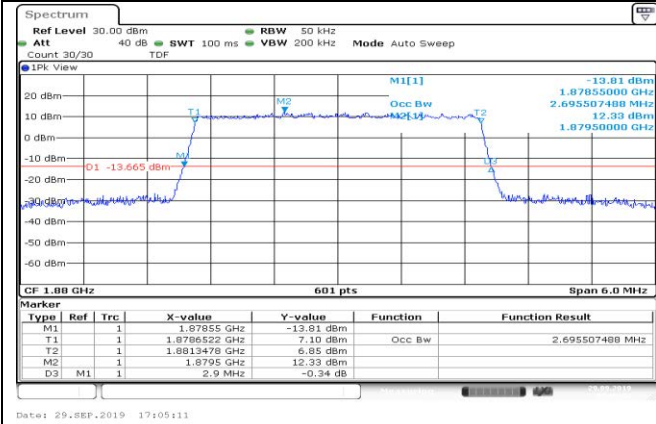
16QAM



15RB#0

15RB#0

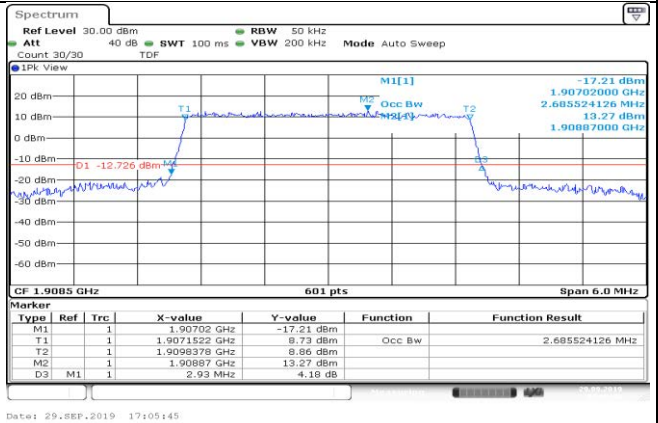
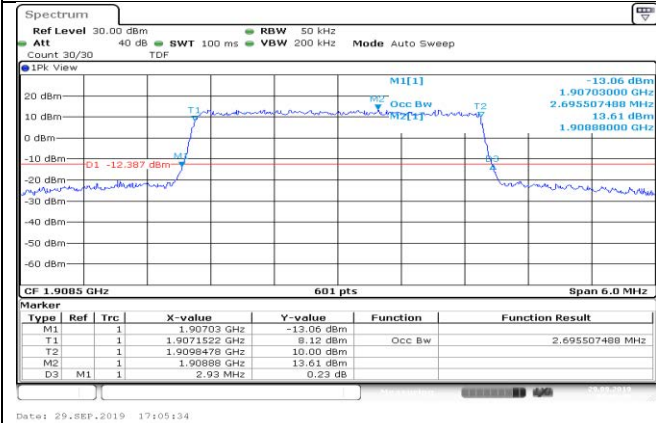
Low Channel



15RB#0

15RB#0

Middle Channel



15RB#0

15RB#0

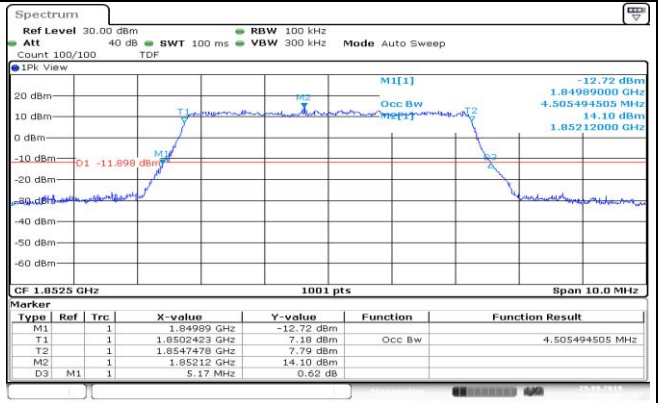
High Channel

LTE FDD Band 2-5MHz Channel Bandwidth

QPSK



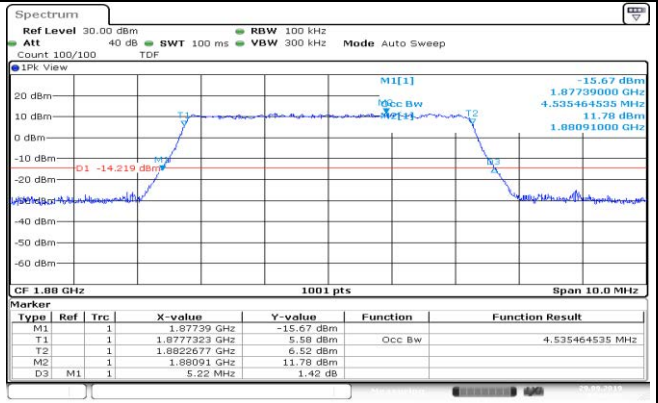
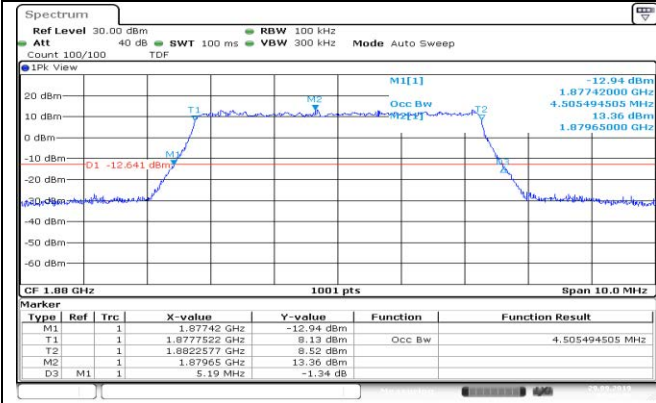
16QAM



25RB#0

25RB#0

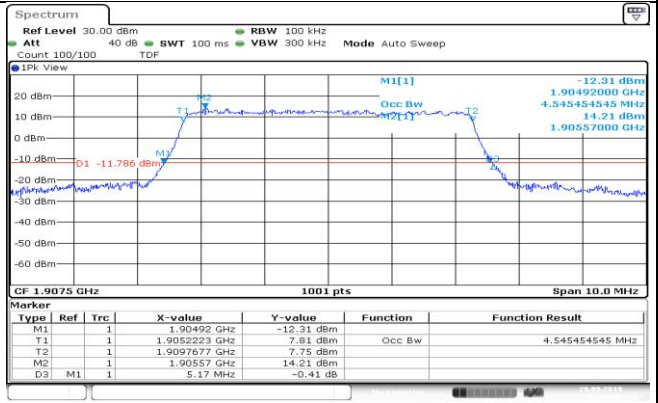
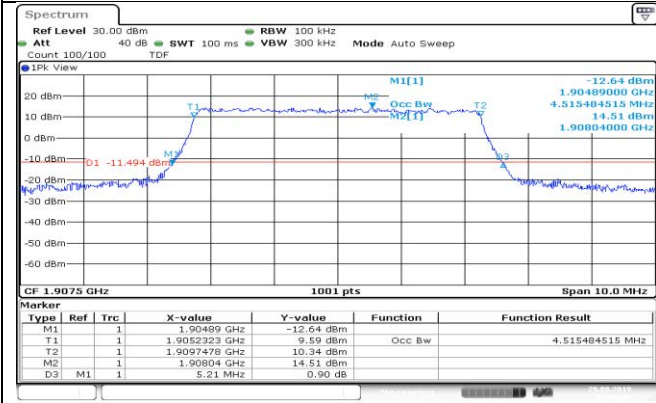
Low Channel



25RB#0

25RB#0

Middle Channel



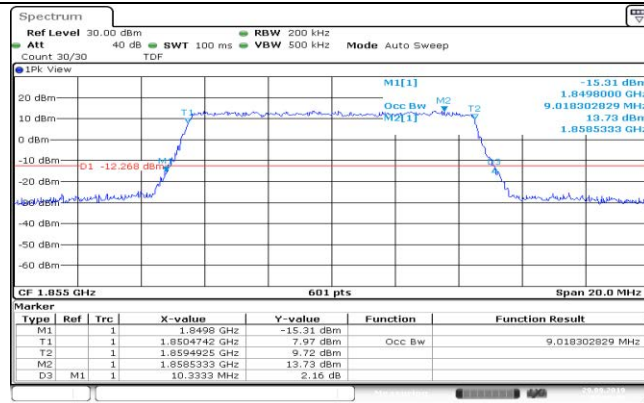
25RB#0

25RB#0

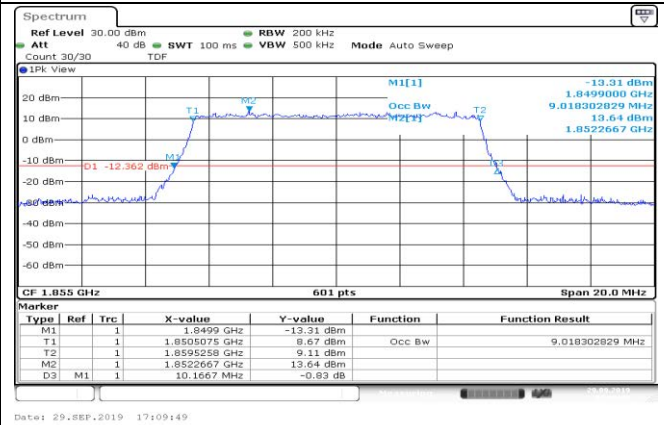
High Channel

## LTE FDD Band 2-10MHz Channel Bandwidth

## QPSK



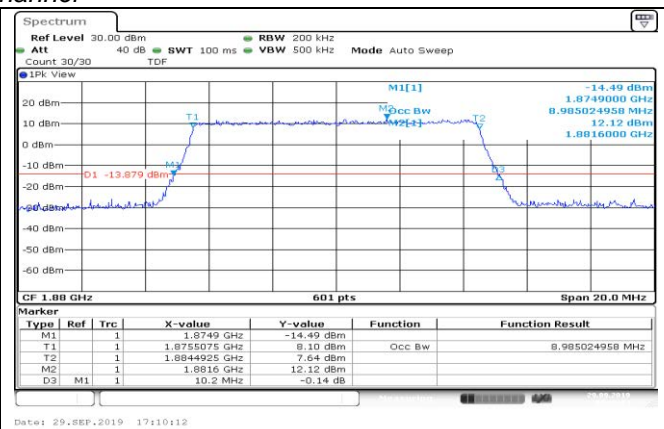
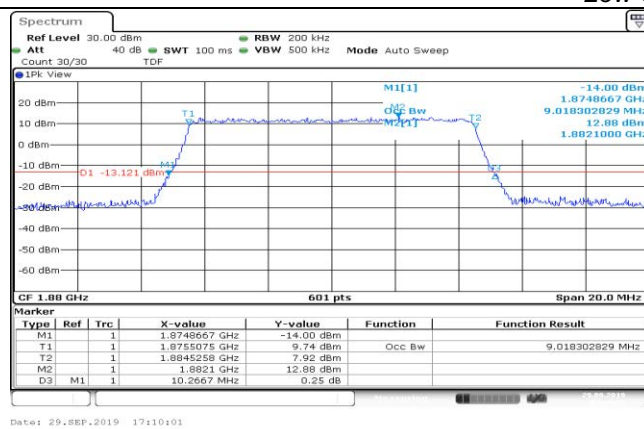
## 16QAM



## 50RB#0

## 50RB#0

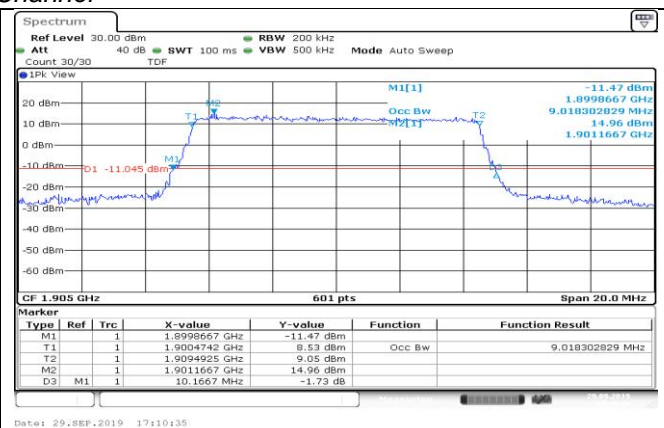
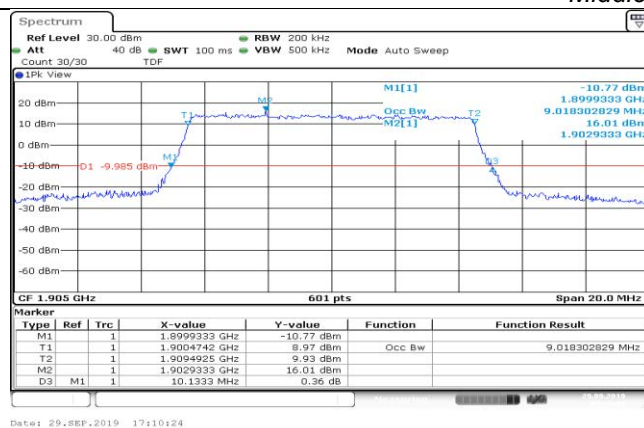
## Low Channel



## 50RB#0

## 50RB#0

## Middle Channel



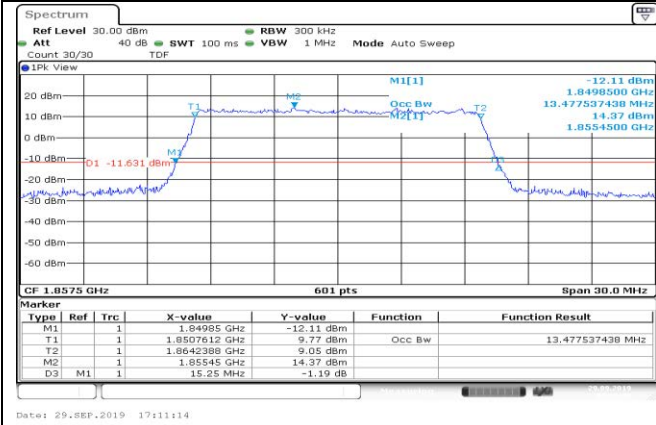
## 50RB#0

## 50RB#0

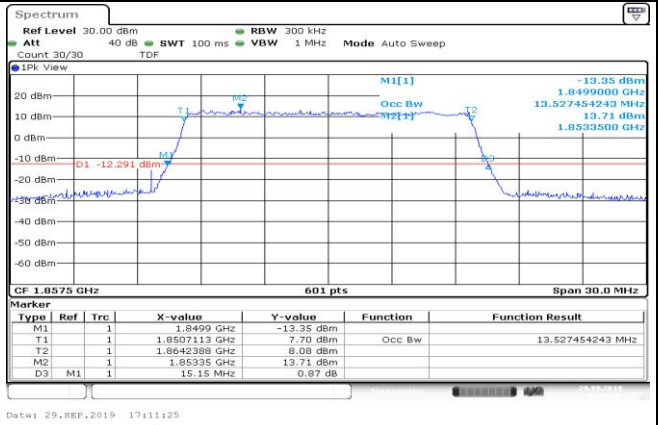
## High Channel

LTE FDD Band 2-15MHz Channel Bandwidth

QPSK



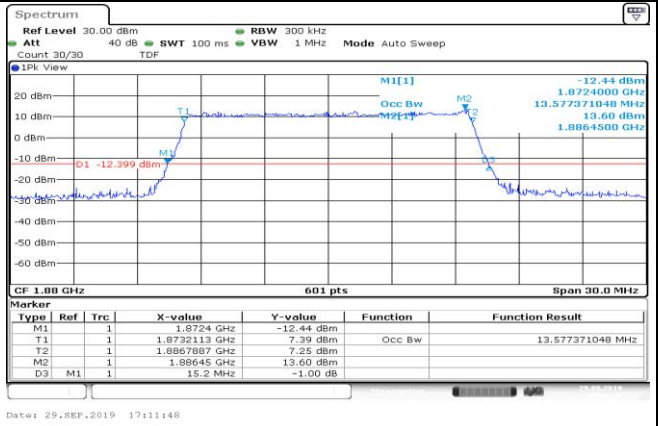
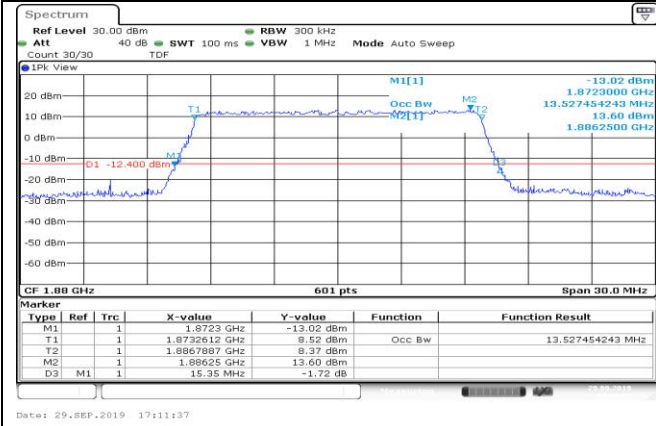
16QAM



75RB#0

75RB#0

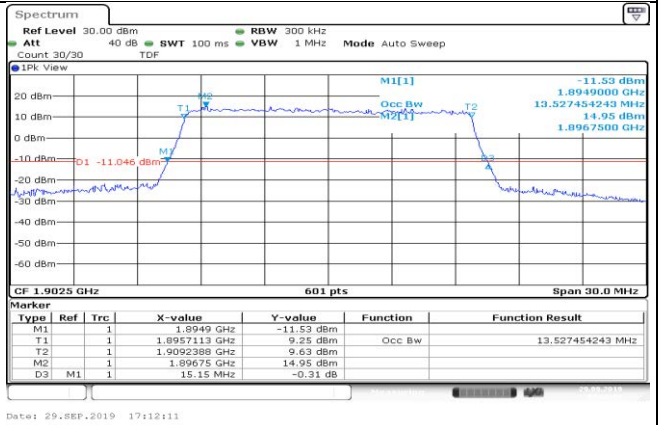
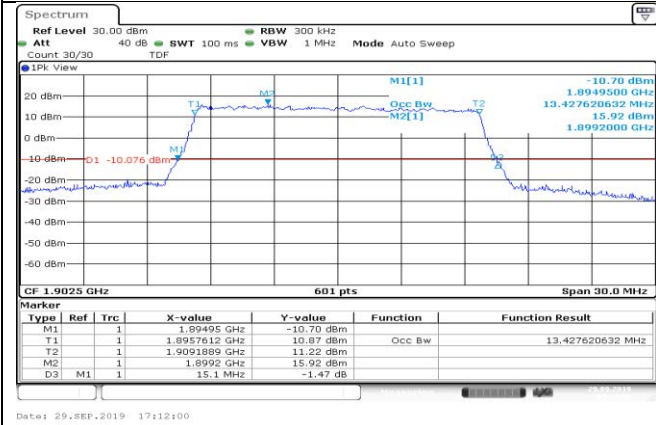
Low Channel



75RB#0

75RB#0

Middle Channel



75RB#0

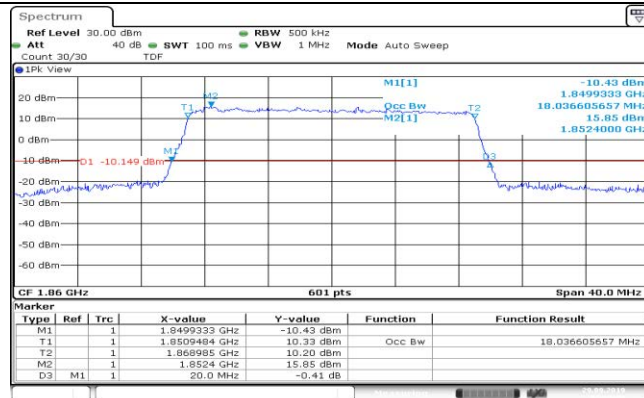
75RB#0

High Channel

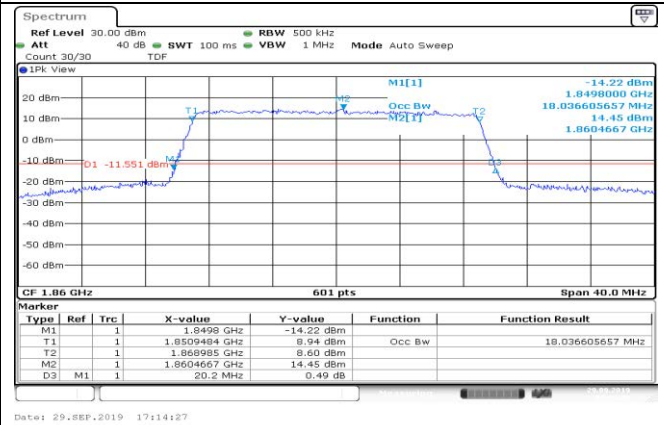


## LTE FDD Band 2-20MHz Channel Bandwidth

QPSK



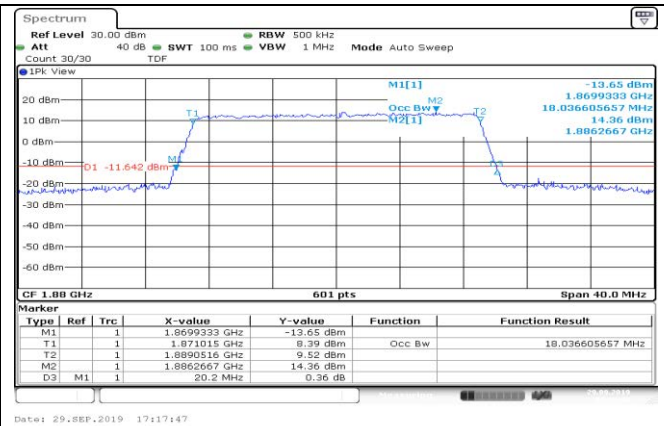
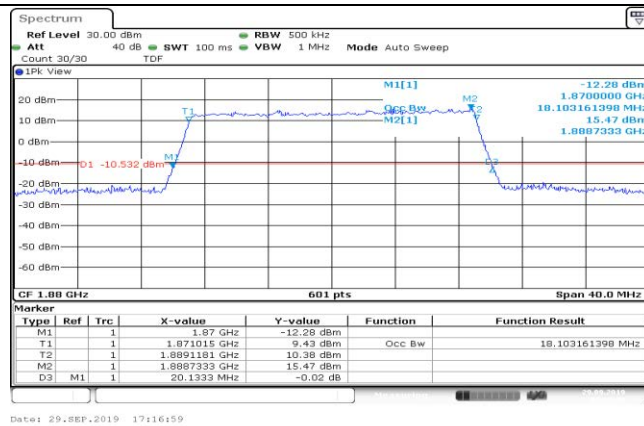
16QAM



100RB#0

100RB#0

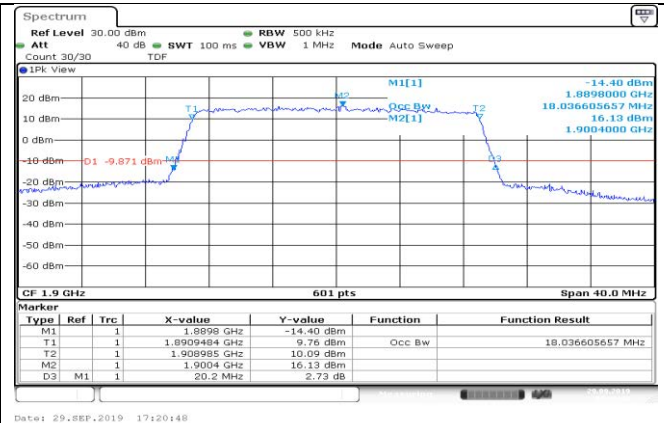
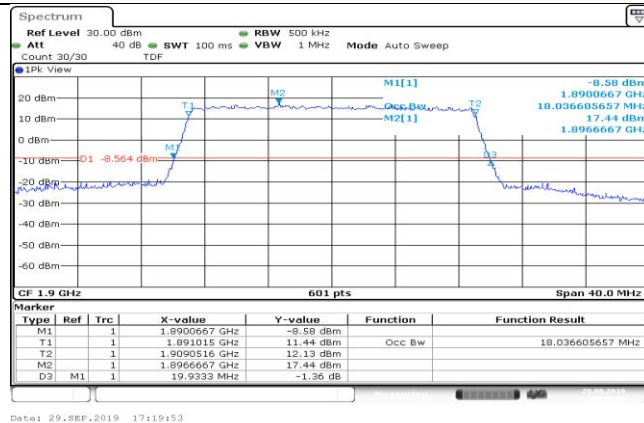
## Low Channel



100RB#0

100RB#0

## Middle Channel



100RB#0

100RB#0

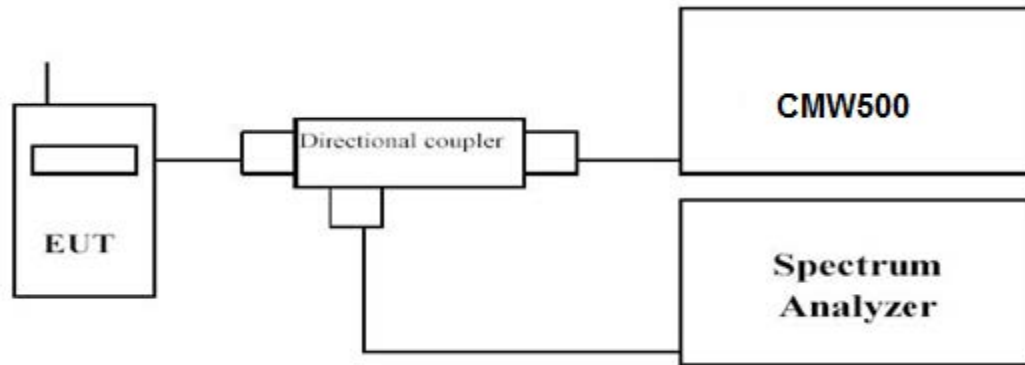
## High Channel

### 3.4 Band Edge compliance

#### LIMIT

Per FCC §24.238 the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10\log(P)$  dB.

#### TEST CONFIGURATION



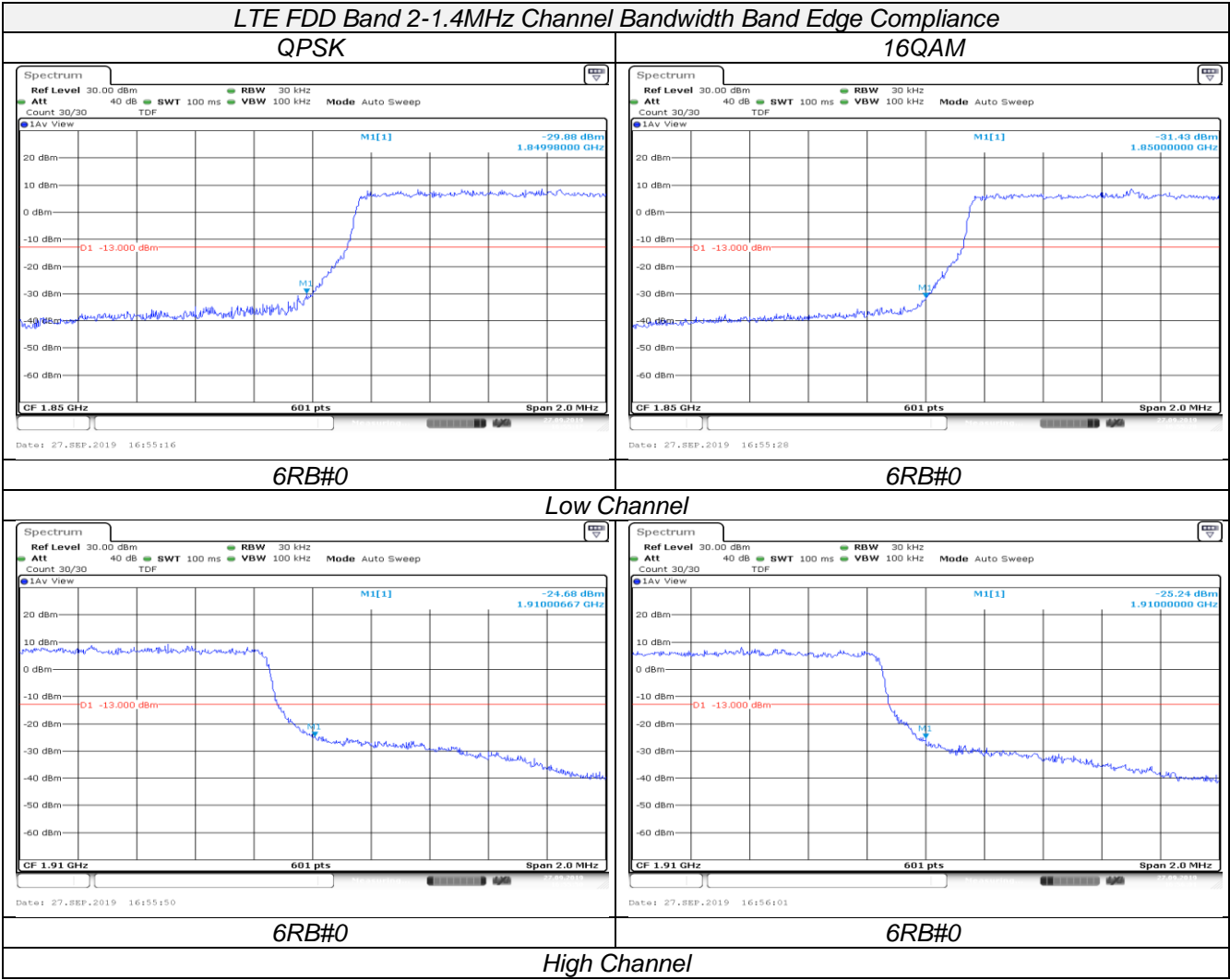
#### TEST PROCEDURE

1. The transmitter output port was connected to base station.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement.
3. Set EUT at maximum power through base station.
4. Select lowest and highest channels for each band and different modulation.
5. Measure Band edge using RMS (Average) detector by spectrum

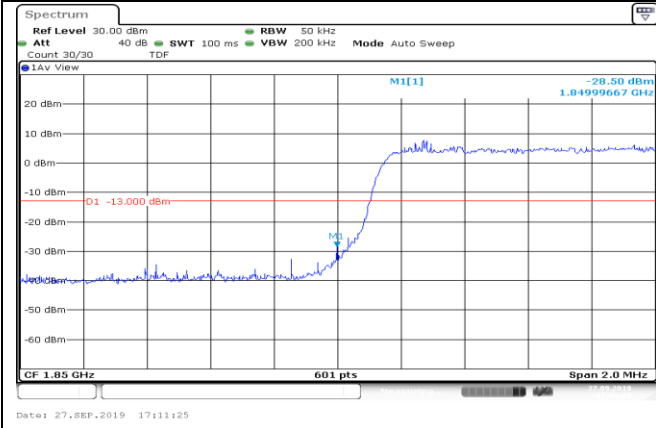
#### TEST RESULTS

Remark:

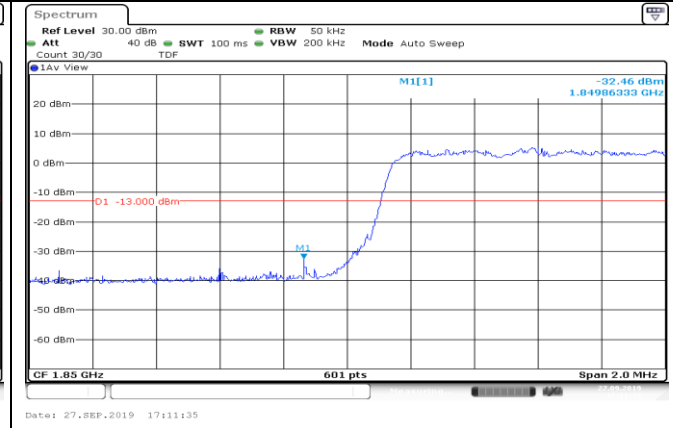
1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 2; recorded worst case for each Channel Bandwidth of LTE FDD Band 2



LTE FDD Band 2-3MHz Channel Bandwidth Band Edge Compliance  
QPSK 16QAM

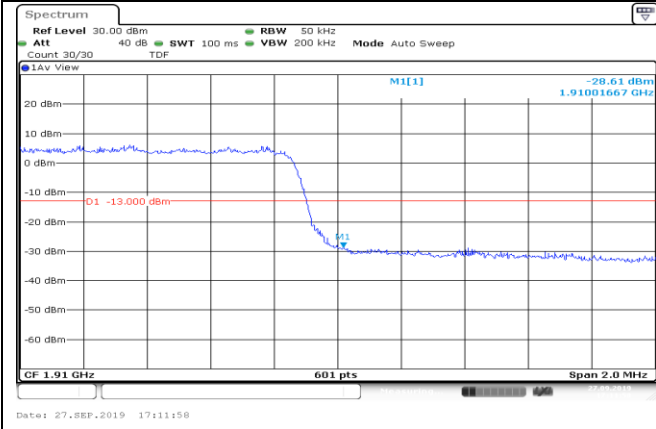


15RB#0

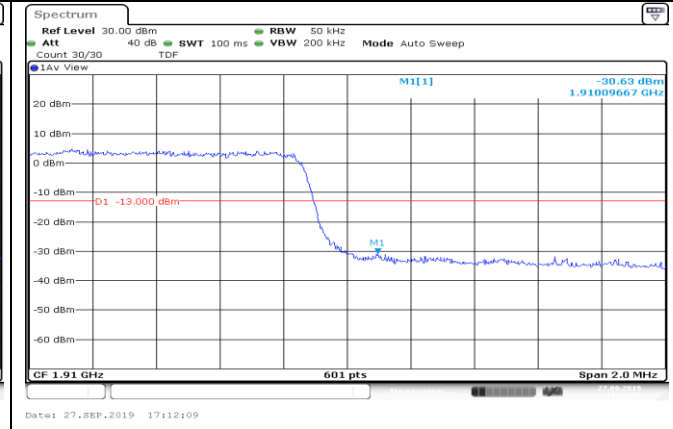


15RB#0

Low Channel



15RB#0



15RB#0

High Channel



