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Test Report

Report No. : CQASZ20190500014EX-07

Applicant: Speedata Group Ltd

Address of Applicant: Room 2-308, building No. 25, No. 9 Anningzhuang Road West, Haidian district, Beijing, China

Manufacturer: Speedata Group Ltd

Address of Manufacturer: Room 2-308, building No. 25, No. 9 Anningzhuang Road West, Haidian district, Beijing, China

Equipment Under Test (EUT):

Product: PDA

Test Model No.: SD60

All Model No.: SD60, SD35, T35, PG35, SD55, T55, SD55LG, SD55MD, SD55UHF, SD55PTT, T55UHF, T55PPT, PG55, T60, SD60LG, SD60RT, SD60PRT, T60RT, Bio60, SD50, SN50, SD50RT, T50, PG50

Brand Name: N/A

FCC ID: 2AJO5SD60

Standards: 47 CFR Part 2
47 CFR Part 24 subpart E

Date of Test: Mar. 26, 2019 to Jun. 12, 2019

Date of Issue: Jun. 13, 2019

Test Result : PASS*

Tested By:

Daisy Qin

(Daisy Qin)

Reviewed By:

Aaron Ma

(Aaron Ma)

Approved By:

Jack Ai

(Jack Ai)



* In the configuration tested, the EUT complied with the standards specified above.

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CQA, this report can't be reproduced except in full.

1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20190500014EX-07	Rev.01	Initial report	Jun. 13, 2019

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2 SUMMARY

2.1 TEST STANDARDS

The tests were performed according to following standards:

FCC Part 24: PUBLIC MOBILE SERVICES

EIA/TIA-603-E: Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

FCC Part 2: FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

KDB971168 D01:v02r02 MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS

2.2 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

2.3 Test Location

Shenzhen Huaxia Testing Technology Co., Ltd.,

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

2.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L5785)**

CNAS has accredited Shenzhen Huaxia Testing Technology Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 4742.01)**

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4742.01.

- **FCC Registration No.: 522263**

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.:522263

2.5 Statement of the measurement uncertainty

No.	Item	Uncertainty	Notes
1	Radiated Emission (Below 1GHz)	±5.12dB	(1)
2	Radiated Emission (Above 1GHz)	±4.60dB	(1)
3	Conducted Disturbance (0.15~30MHz)	±3.34dB	(1)
4	Radio Frequency	3×10 ⁻⁸	(1)
5	Duty cycle	0.6 %.	(1)
6	Occupied Bandwidth	1.1%	(1)
7	RF conducted power	0.86dB	(1)
8	RF power density	0.74	(1)
9	Conducted Spurious emissions	0.86dB	(1)
10	Temperature test	0.8℃	(1)
11	Humidity test	2.0%	(1)
12	Supply voltages	0.5 %.	(1)
13	time	0.6 %.	(1)
14	Frequency Error	5.5 Hz	(1)

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

2.6 Test Equipment

Test Equipment	Manufacturer	Model No.	Instrument No.	Calibration Date	Calibration Due Date
EMI Test Receiver	R&S	ESR7	CQA-005	2018/9/26	2019/9/25
Spectrum analyzer	R&S	FSU26	CQA-038	2018/10/28	2019/10/27
Preamplifier	MITEQ	AFS4-00010300-18-10P-4	CQA-035	2018/9/26	2019/9/25
Preamplifier	MITEQ	AMF-6D-02001800-29-20P	CQA-036	2018/11/2	2019/11/1
Loop antenna	Schwarzbeck	FMZB1516	CQA-087	2018/10/28	2020/10/27
Bilog Antenna	R&S	HL562	CQA-011	2018/9/26	2020/9/25
Horn Antenna	R&S	HF906	CQA-012	2018/9/26	2020/9/25
Horn Antenna	Schwarzbeck	BBHA 9170	CQA-088	2018/9/26	2020/9/25
Coaxial Cable (Above 1GHz)	CQA	N/A	C019	2018/9/26	2019/9/25
Coaxial Cable (Below 1GHz)	CQA	N/A	C020	2018/9/26	2019/9/25
Antenna Connector	CQA	RFC-01	CQA-080	2018/9/26	2019/9/25
RF cable(9KHz~40GHz)	CQA	RF-01	CQA-079	2018/9/26	2019/9/25
Spectrum analyzer	Agilent	E4440A	CQA-103	2018/10/28	2019/10/27
Universal Radio Communication Tester	Rohde & Schwarz	CMW500	CQA-022	2018/9/26	2019/9/25
Power divider	MIDWEST	PWD-2533-02-SMA-79	CQA-067	2018/9/26	2019/9/25
H & T Chamber	Auchno	OJN-9606	CQA-CB2	2018/9/26	2019/9/25

3 GENERAL INFORMATION

3.1 Client Information

Applicant:	Speedata Group Ltd
Address of Applicant:	1F Zhiyuan Building, NO.28, ShangDi 6th Street HaiDian District, Beijing, China
Manufacturer:	Speedata Group Ltd
Address of Manufacturer:	1F Zhiyuan Building, NO.28, ShangDi 6th Street HaiDian District, Beijing, China

3.2 Environmental conditions

Environment Parameter	Selected Values During Tests	
Relative Humidity	52%	
Atmospheric Pressure:	1001mbar	
Temperature	TN	25 °C
Voltage :	VL	3.5V
	VN	4.2V
	VH	4.5V

NOTE: VL= lower extreme test voltage
 VN= nominal voltage
 VH= upper extreme test voltage
 TN= normal temperature

3.3 General Description of EUT

Product Name:	PDA
All Model No.:	SD60, SD35, T35, PG35, SD55, T55, SD55LG, SD55MD, SD55UHF, SD55PTT, T55UHF, T55PPT, PG55, T60, SD60LG, SD60RT, SD60PRT, T60RT, Bio60, SD50, SN50, SD50RT, T50, PG50
Test Model No.:	SD60
Trade Mark:	N/A
Hardware Version:	8.1.0
Software Version:	V.SD60.2.1.20.2019041909
Product Type:	☐ Mobile ☒ Portable ☐ Fix Location
Antenna Type:	Monopole antenna
Antenna Gain:	-3.2dBi.
EUT Power Supply:	DC 3.8V from Battery
Adapter Information:	Model: A138A-120150U-US2 Input: 100-240V-50/60Hz, 0.5A Output: 5V 2.5A/ 9V 2A/ 12V 1.5A

Note: 1. This report is only for FDD-LTE Band2.

2. For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

3. There are many products, Only the model SD60 was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being color of appearance and model name.

3.4 Technical Specification

Characteristics	Description	
Radio System Type	☐ GSM ☐ UMTS ☒ LTE	
Supported Frequency Range	LTE BAND2	Uplink: 1850 to 1910 MHz
		Downlink: 1930 to 1990 MHz
Power Class	Class 3	
Supported Channel Bandwidth	LTE BAND2	☒ 1.4MHz ☒ 3MHz ☒ 5MHz ☒ 10MHz ☒ 15 MHz ☒ 20 MHz
Designation of Emissions (Note: the necessary bandwidth of which is the worst value from the measured occupied bandwidths for each type of channel bandwidth configuration.)	LTE BAND2:	1.4M QPSK modulation 1.4MHz 16QAM modulation 3M QPSK modulation 3MHz 16QAM modulation 5M QPSK modulation 5MHz 16QAM modulation 10M QPSK modulation 10MHz 16QAM modulation 15M QPSK modulation 15MHz 16QAM modulation 20M QPSK modulation 20MHz 16QAM modulation

3.5 Test Mode

Test Mode	Test Modes Description
FDD-LTE	FDD-LTE system, QPSK modulation
	FDD-LTE system, 16QAM modulation

NOTE: The test mode(s) are selected according to relevant radio technology specifications.

4 TEST CONDITIONS AND RESULTS

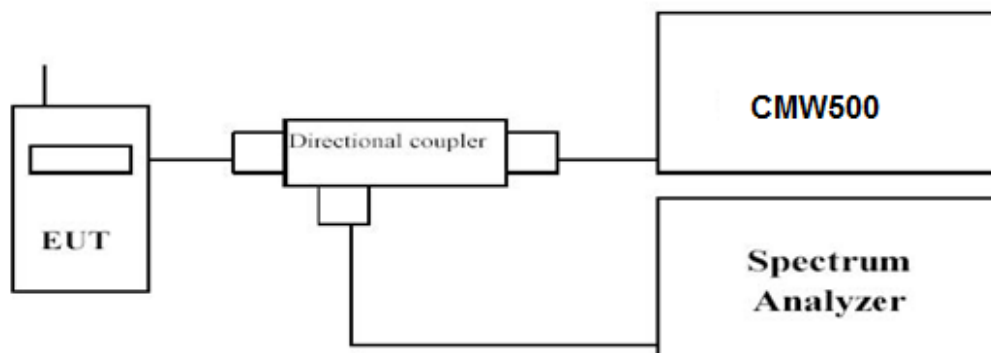
4.1 Output Power

LIMIT

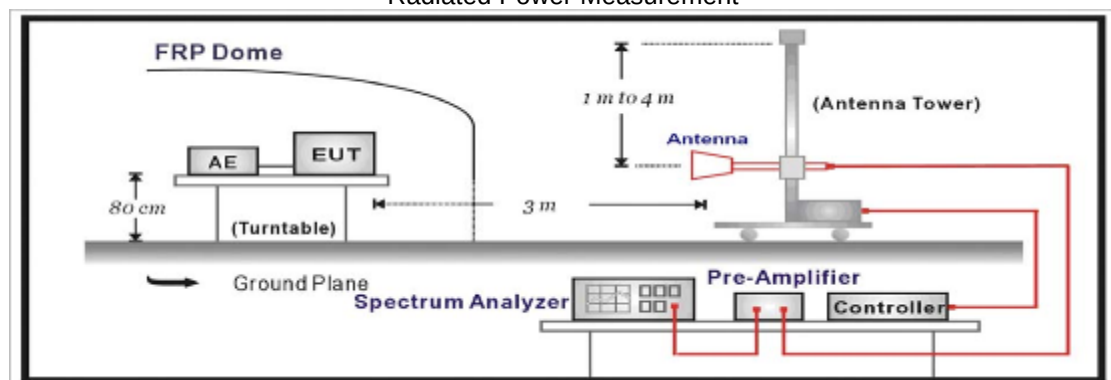
Rule Part 24.232(b) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p.

TEST CONFIGURATION

Conducted Power Measurement



Radiated Power Measurement



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603E

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 selects a channel for testing.
- Add a correction factor to the display of spectrum, and then test.

Radiated Power Measurement:

- a) The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
- b) The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
- c) The output of the test antenna shall be connected to the measuring receiver.
- d) The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- e) 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.
- f) 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:

LTE FDD Band 2				
TX Channel Bandwidth	Frequency (MHz)	RB Size/Offset	Average Power [dBm]	
			QPSK	16QAM
1.4 MHz	1850.7	1 RB low	21.86	21.18
		1 RB high	21.81	21.14
		50% RB mid	23.30	22.48
		100% RB	22.94	22.45
	1880.0	1 RB low	22.00	21.65
		1 RB high	22.07	21.36
		50% RB mid	22.27	21.59
		100% RB	22.44	21.85

	1909.3	1 RB low	23.15	22.48
		1 RB high	22.66	21.91
		50% RB mid	21.80	21.06
		100% RB	22.27	21.50
3 MHz	1851.5	1 RB low	22.21	21.75
		1 RB high	23.11	22.70
		50% RB mid	23.07	22.53
		100% RB	22.86	22.46
	1880.0	1 RB low	23.48	23.00
		1 RB high	23.48	22.95
		50% RB mid	22.92	22.13
		100% RB	22.38	21.91
	1908.5	1 RB low	23.16	22.32
		1 RB high	22.42	21.88
		50% RB mid	22.27	21.56
		100% RB	22.57	21.87
5 MHz	1852.5	1 RB low	22.00	21.21
		1 RB high	22.93	22.46
		50% RB mid	23.01	22.24
		100% RB	23.47	23.06
	1880.0	1 RB low	22.88	22.32
		1 RB high	23.34	22.52
		50% RB mid	21.79	21.16
		100% RB	23.43	22.71
	1907.5	1 RB low	22.09	21.53
		1 RB high	23.46	23.02
		50% RB mid	22.19	21.80
		100% RB	23.15	22.30
10 MHz	1855.0	1 RB low	21.86	21.11
		1 RB high	22.69	22.01
		50% RB mid	22.97	22.19
		100% RB	22.09	21.61
	1880.0	1 RB low	23.04	22.36
		1 RB high	23.00	22.55
		50% RB mid	23.37	22.72

	1905.0	100% RB	22.46	21.75
		1 RB low	21.72	20.91
		1 RB high	23.34	22.85
		50% RB mid	23.19	22.81
		100% RB	23.25	22.68
15 MHz	1857.5	1 RB low	22.04	21.54
		1 RB high	23.09	22.38
		50% RB mid	23.33	22.91
		100% RB	22.01	21.60
	1880.0	1 RB low	22.97	22.34
		1 RB high	23.49	22.87
		50% RB mid	23.35	22.82
		100% RB	23.37	22.95
	1902.5	1 RB low	22.32	21.51
		1 RB high	22.66	21.99
		50% RB mid	22.24	21.87
		100% RB	22.89	22.15
20 MHz	1860.0	1 RB low	22.40	22.01
		1 RB high	21.93	21.20
		50% RB mid	21.89	21.04
		100% RB	23.26	22.47
	1880.0	1 RB low	21.81	21.36
		1 RB high	21.80	20.97
		50% RB mid	22.05	21.46
		100% RB	23.01	22.47
	1900.0	1 RB low	22.76	22.37
		1 RB high	23.32	22.67
		50% RB mid	21.62	20.88
		100% RB	23.16	22.34

Radiated Measurement:

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.
2. $EIRP = P_{Mea}(dBm) - P_{cl}(dB) + P_{Ag}(dB) + G_a(dBi)$

LTE FDD Band 2_Channel Bandwidth 1.4MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	P _{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1850.7	-17.90	3.41	10.23	33.60	22.52	33.01	10.49	V
1880.0	-17.59	3.49	10.23	33.60	22.75	33.01	10.26	V
1909.3	-17.98	3.55	10.25	33.60	22.32	33.01	10.69	V

LTE FDD Band 2_Channel Bandwidth 3MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	P _{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1851.5	-18.01	3.41	10.23	33.60	22.41	33.01	10.60	V
1880.0	-17.46	3.49	10.23	33.60	22.88	33.01	10.13	V
1908.5	-18.06	3.55	10.25	33.60	22.24	33.01	10.77	V

LTE FDD Band 2_Channel Bandwidth 5MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	P _{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1852.5	-17.44	3.41	10.23	33.60	22.98	33.01	10.03	V
1880.0	-17.20	3.49	10.23	33.60	23.14	33.01	9.87	V
1907.5	-17.49	3.55	10.25	33.60	22.81	33.01	10.20	V

LTE FDD Band 2_Channel Bandwidth 10MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	P _{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1855.0	-18.19	3.41	10.23	33.60	22.23	33.01	10.78	V
1880.0	-17.87	3.49	10.23	33.60	22.47	33.01	10.54	V
1905.0	-17.61	3.55	10.25	33.60	22.69	33.01	10.32	V

LTE FDD Band 2_Channel Bandwidth 15MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dBi)	P _{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1857.5	-17.57	3.41	10.23	33.60	22.85	33.01	10.16	V
1880.0	-17.14	3.49	10.23	33.60	23.20	33.01	9.81	V
1902.5	-17.47	3.55	10.25	33.60	22.83	33.01	10.18	V

LTE FDD Band 2_Channel Bandwidth 20MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dBi)	P _{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1860.0	-18.28	3.41	10.23	33.60	22.14	33.01	10.87	V
1880.0	-17.48	3.49	10.23	33.60	22.86	33.01	10.15	V
1900.0	-17.66	3.55	10.25	33.60	22.64	33.01	10.37	V

LTE FDD Band 2_Channel Bandwidth 1.4MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dBi)	P _{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1850.7	-19.01	3.41	10.23	33.60	21.41	33.01	11.60	V
1880.0	-18.02	3.49	10.23	33.60	22.32	33.01	10.69	V
1909.3	-19.16	3.55	10.25	33.60	21.14	33.01	11.87	V

LTE FDD Band 2_Channel Bandwidth 3MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dBi)	P _{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1851.5	-19.17	3.41	10.23	33.60	21.25	33.01	11.76	V
1880.0	-18.80	3.49	10.23	33.60	21.54	33.01	11.47	V
1908.5	-18.67	3.55	10.25	33.60	21.63	33.01	11.38	V

LTE FDD Band 2_Channel Bandwidth 5MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dBi)	P _{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1852.5	-19.20	3.41	10.23	33.60	21.22	33.01	11.79	V
1880.0	-18.87	3.49	10.23	33.60	21.47	33.01	11.54	V
1907.5	-18.46	3.55	10.25	33.60	21.84	33.01	11.17	V

LTE FDD Band 2_Channel Bandwidth 10MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dBi)	P _{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1855.0	-18.84	3.41	10.23	33.60	21.58	33.01	11.43	V
1880.0	-18.22	3.49	10.23	33.60	22.12	33.01	10.89	V
1905.0	-18.20	3.55	10.25	33.60	22.10	33.01	10.91	V

LTE FDD Band 2_Channel Bandwidth 15MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dBi)	P _{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1857.5	-18.94	3.41	10.23	33.60	21.48	33.01	11.53	V
1880.0	-18.80	3.49	10.23	33.60	21.54	33.01	11.47	V
1902.5	-18.67	3.55	10.25	33.60	21.63	33.01	11.38	V

LTE FDD Band 2_Channel Bandwidth 20MHz_16QAM

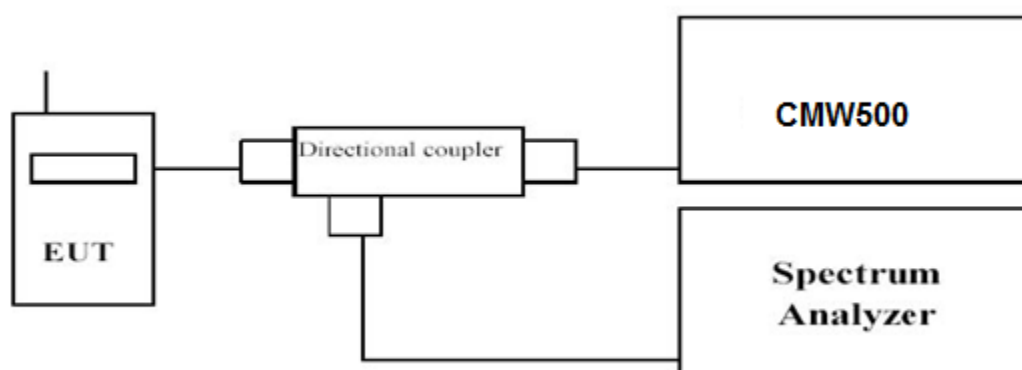
Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dBi)	P _{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1860.0	-19.30	3.41	10.23	33.60	21.12	33.01	11.89	V
1880.0	-19.09	3.49	10.23	33.60	21.25	33.01	11.76	V
1900.0	-19.06	3.55	10.25	33.60	21.24	33.01	11.77	V

4.2 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

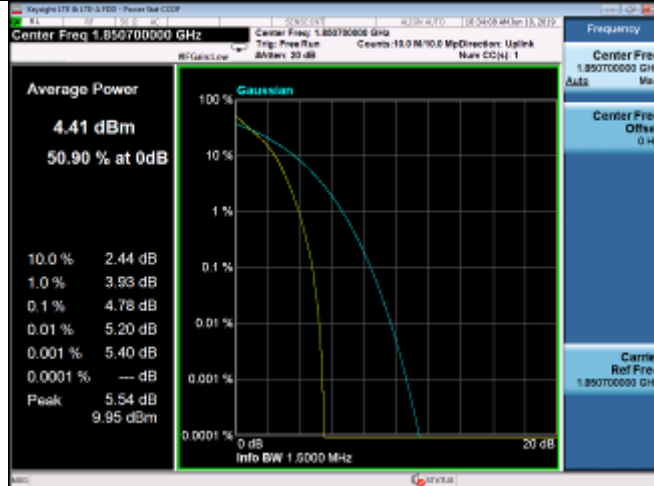
Remark:

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.

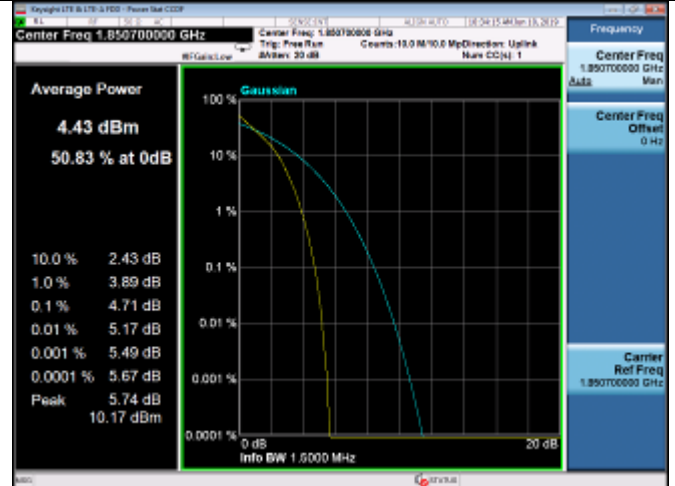
LTE FDD Band 2				
TX Channel Bandwidth	Frequency (MHz)	RB Size/Offset	PAPR (dB)	
			QPSK	16QAM
1.4 MHz	1850.7	1RB#0	4.78	4.71
	1880.0		5.47	5.46
	1909.3		5.01	5.00
3 MHz	1851.5	1RB#0	4.84	4.83
	1880.0		5.68	5.67
	1908.5		5.20	5.21
5 MHz	1852.5	1RB#0	4.82	4.84
	1880.0		5.71	5.70
	1907.5		5.31	5.30
10 MHz	1855.0	1RB#0	4.91	4.92
	1880.0		5.58	5.57
	1905.0		5.13	5.11
15 MHz	1857.5	1RB#0	4.97	4.97
	1880.0		5.37	5.38
	1902.5		5.05	5.06
20 MHz	1860.0	1RB#0	9.02	9.47
	1880.0		9.51	9.59
	1900.0		9.01	9.61

LTE FDD Band 2-1.4MHz Channel Bandwidth PAPR

QPSK



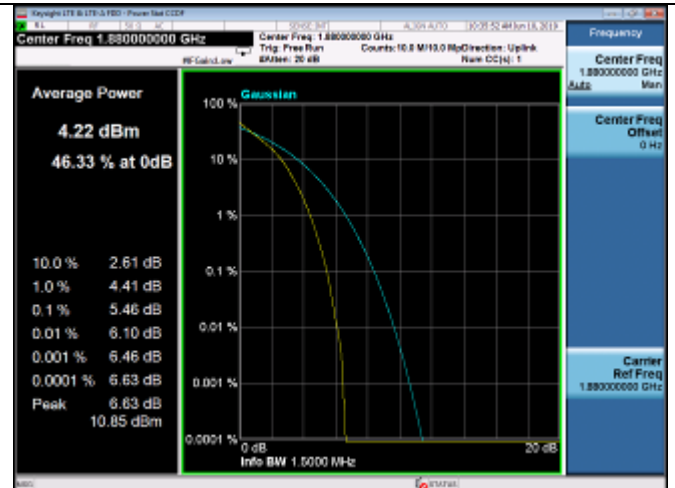
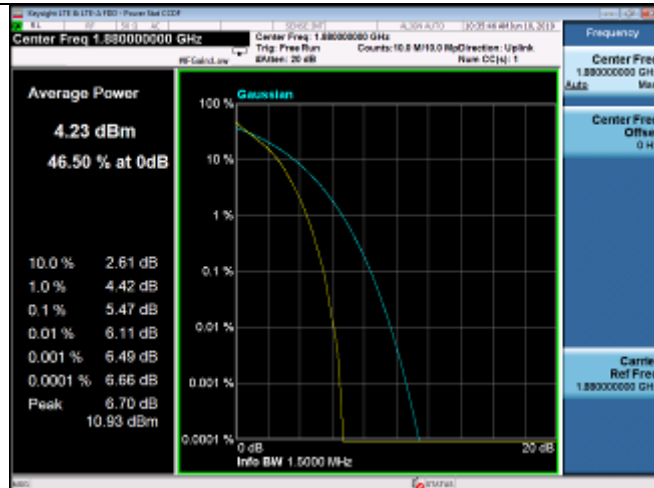
16QAM



1RB#0

1RB#0

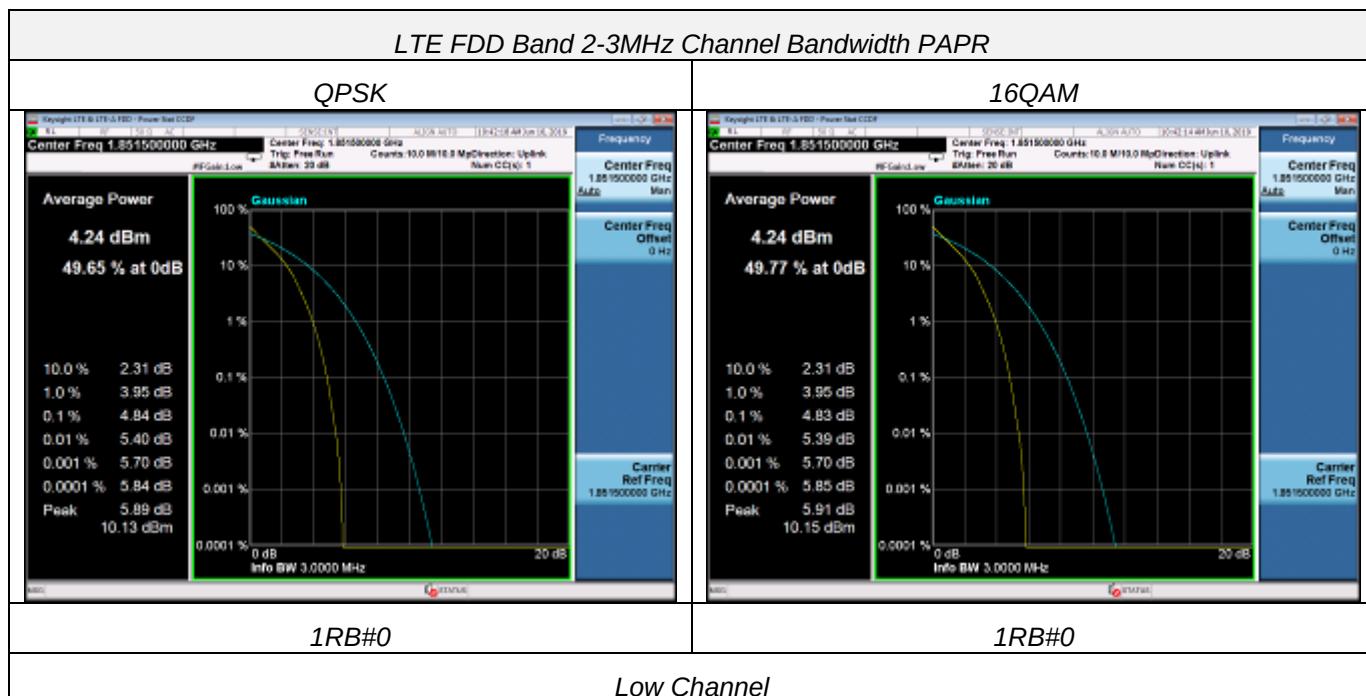
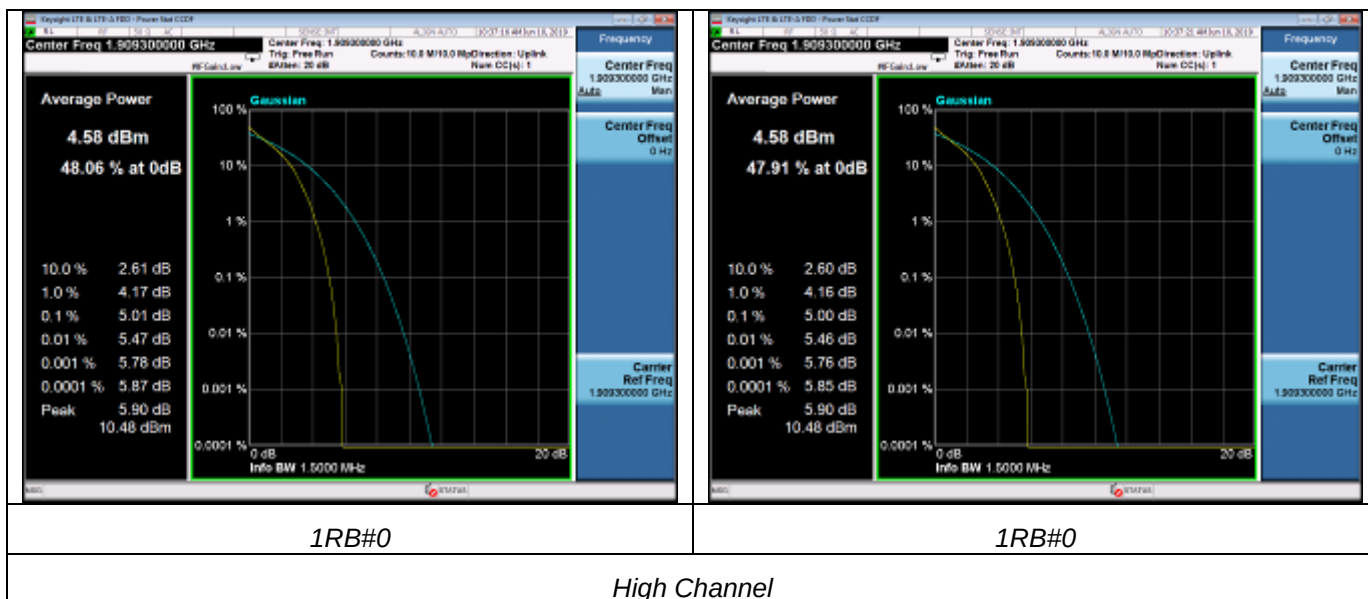
Low Channel

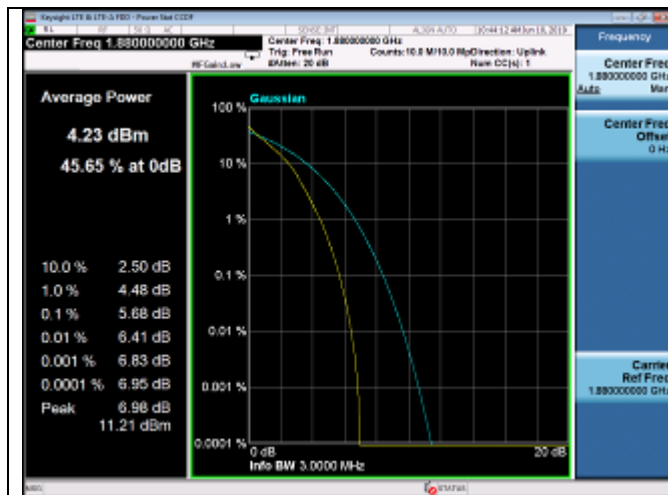


1RB#0

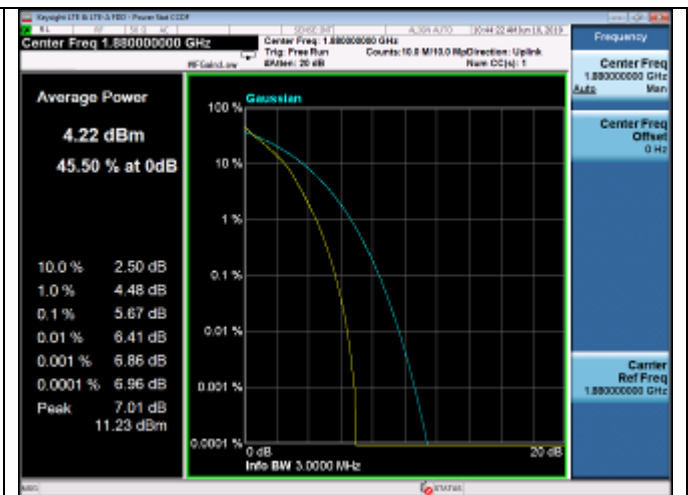
1RB#0

Middle Channel



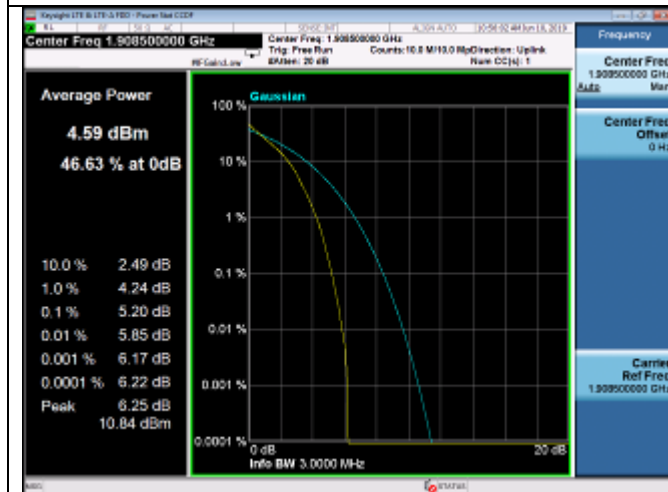


1RB#0

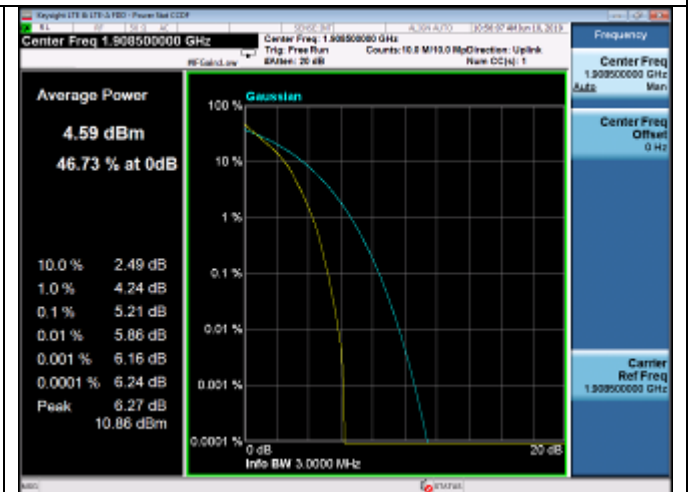


1RB#0

Middle Channel



1RB#0

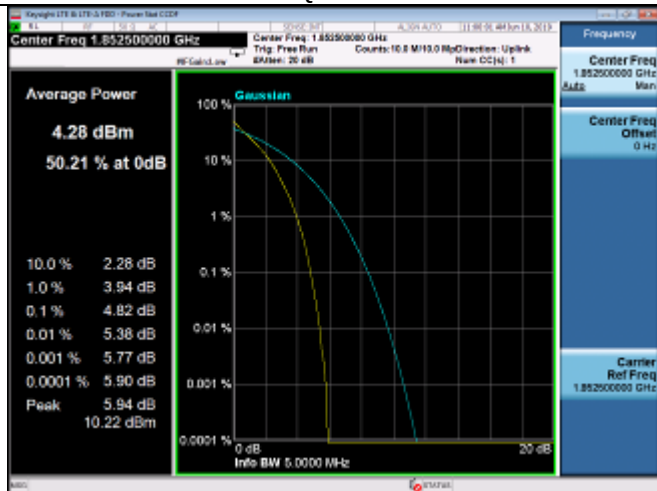


1RB#0

High Channel

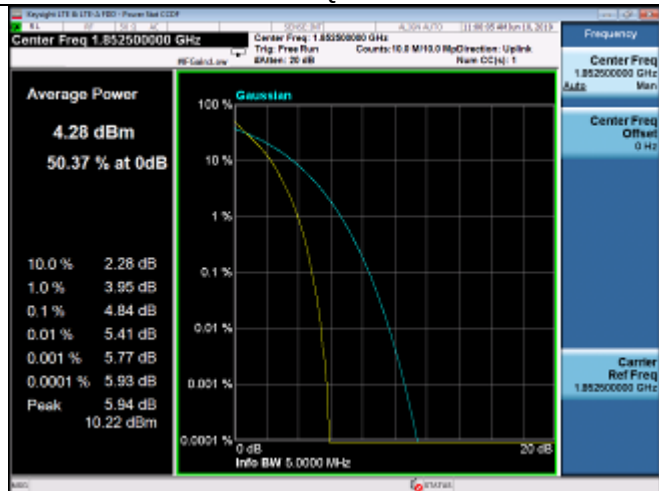
LTE FDD Band 2-5MHz Channel Bandwidth PAPR

QPSK



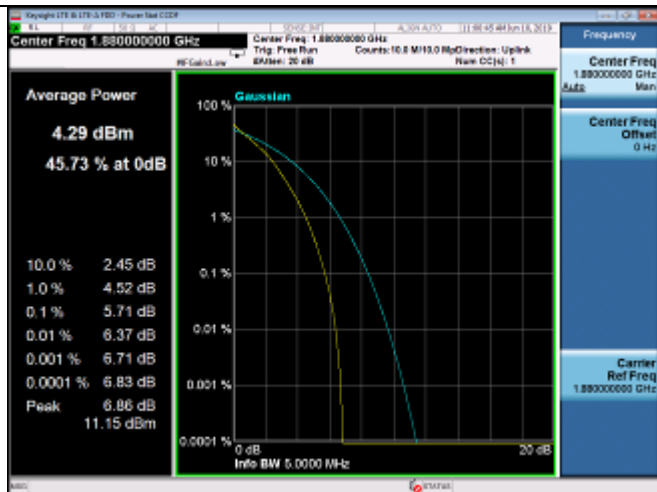
1RB#0

16QAM

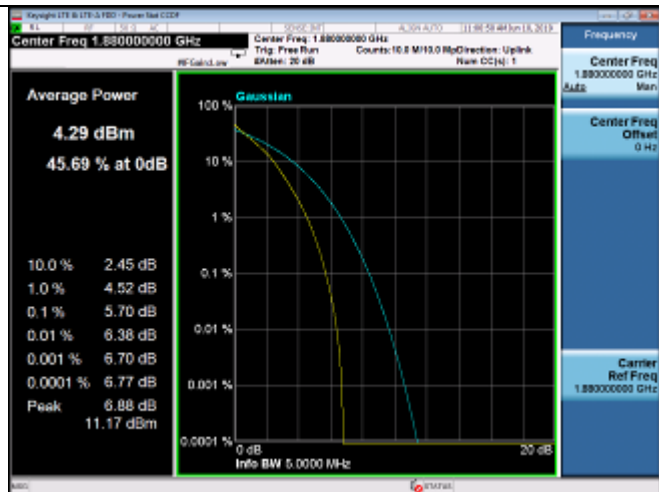


1RB#0

Low Channel

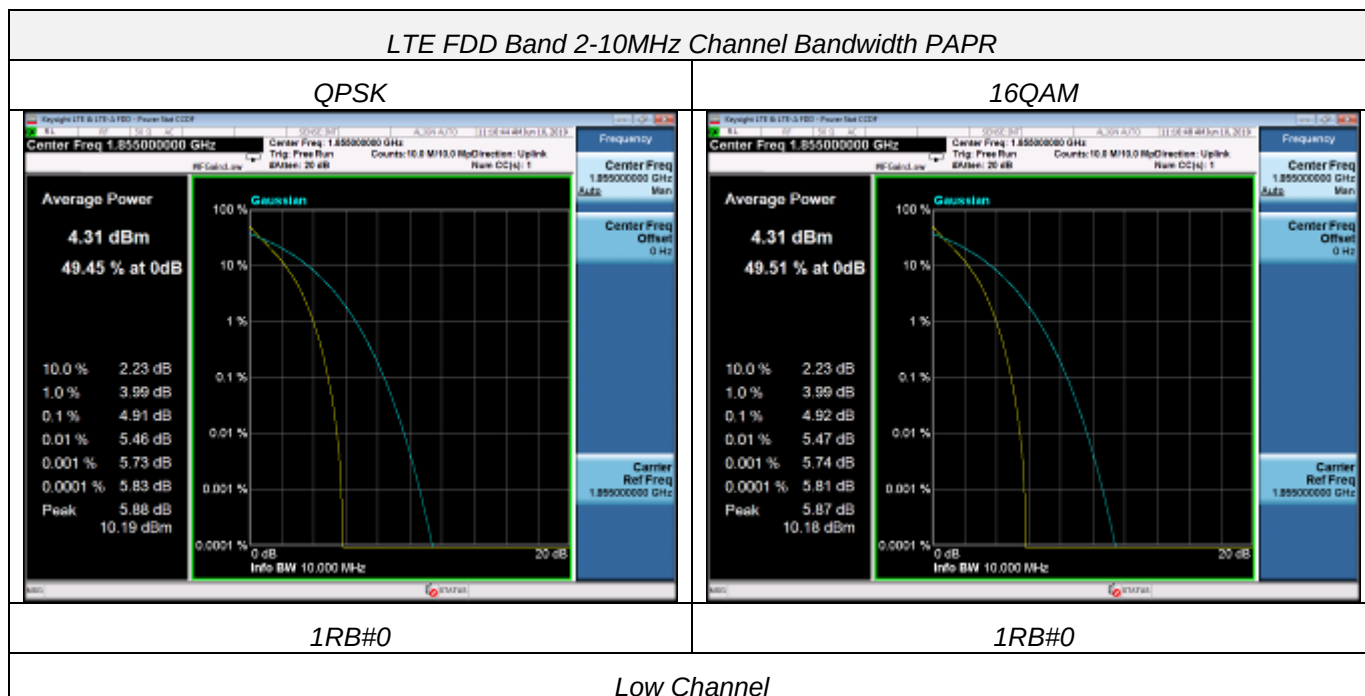
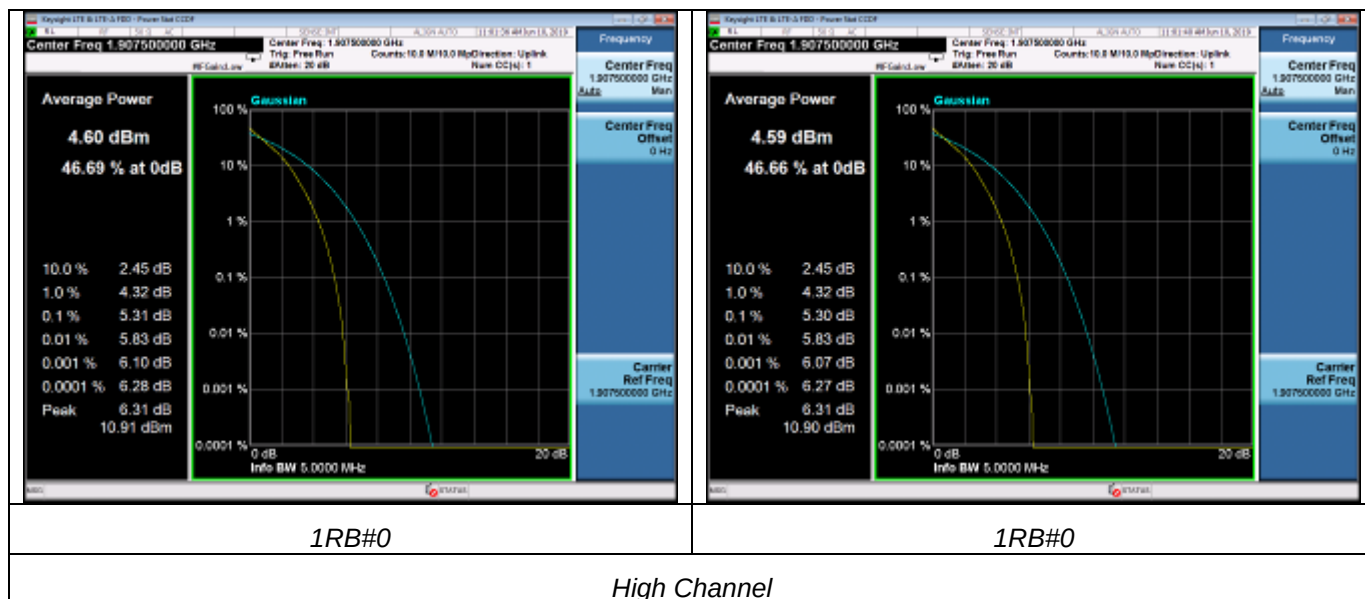


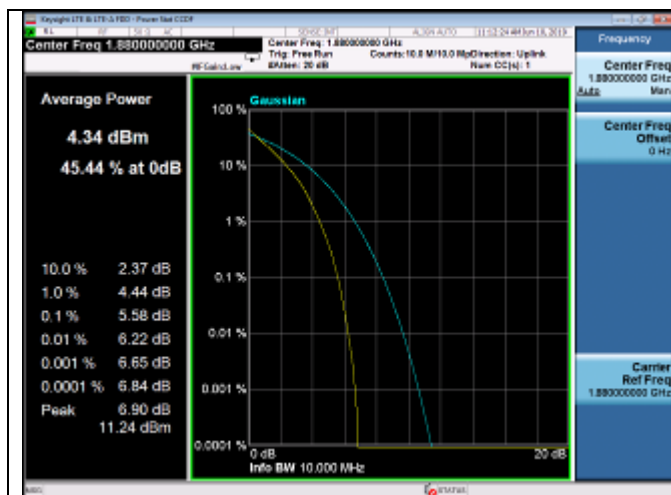
1RB#0



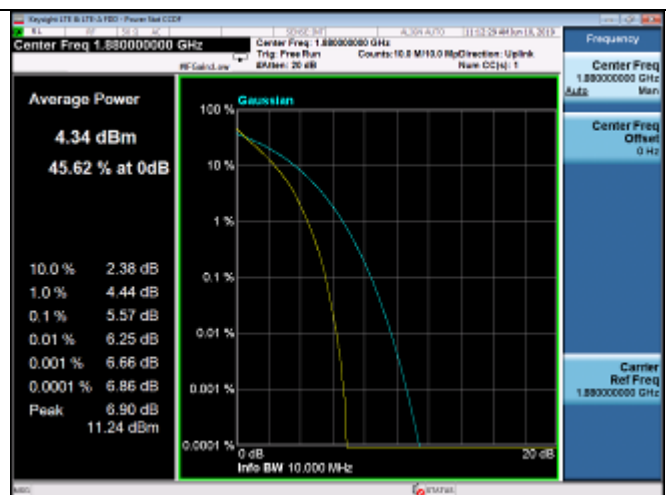
1RB#0

Middle Channel



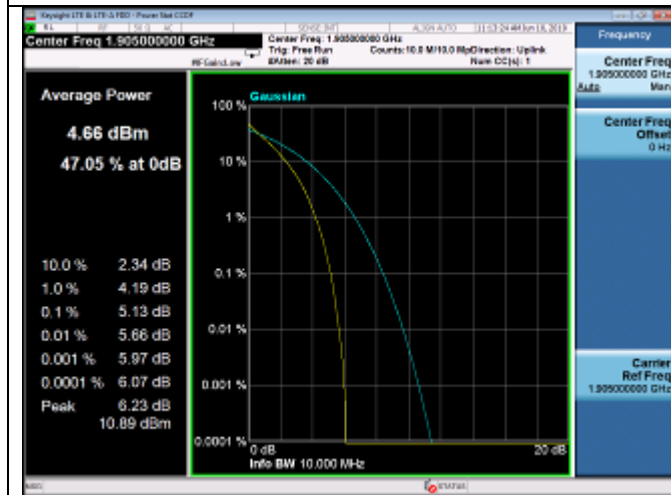


1RB#0

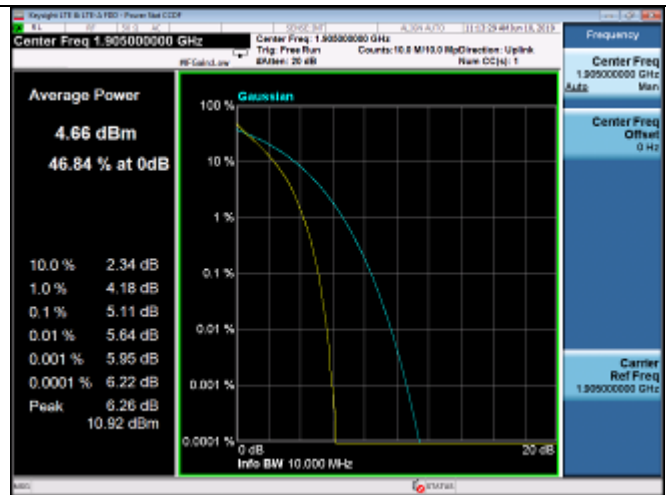


1RB#0

Middle Channel



1RB#0

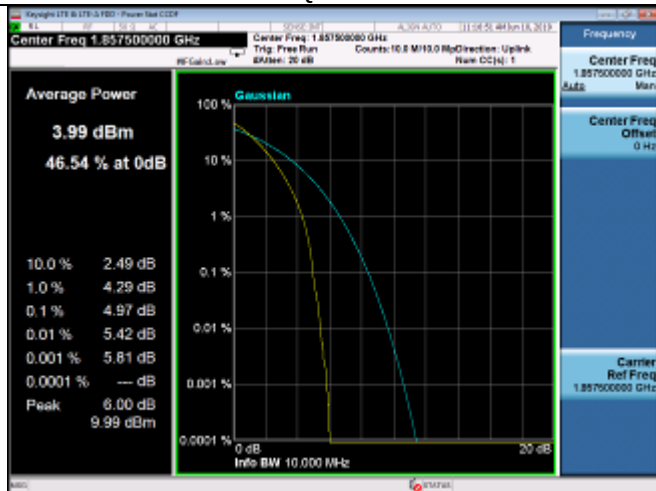


1RB#0

High Channel

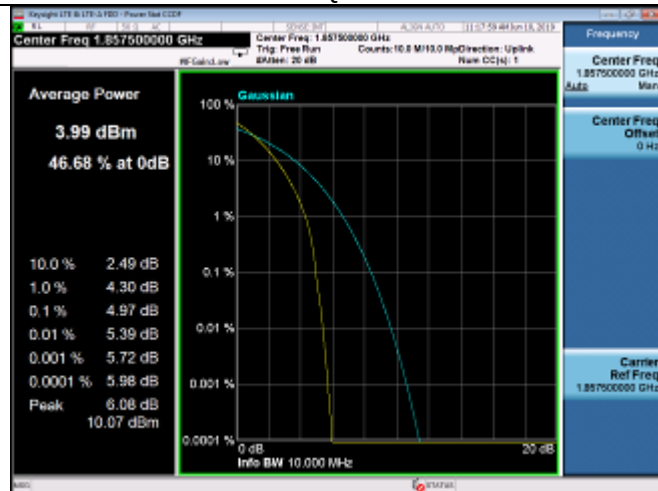
LTE FDD Band 2-15MHz Channel Bandwidth PAPR

QPSK



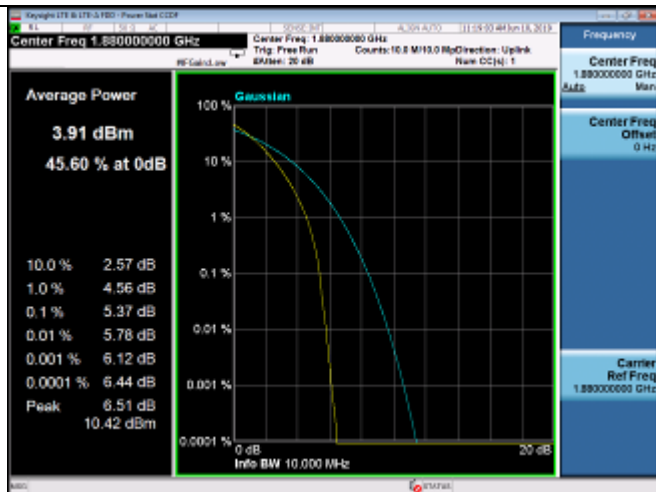
1RB#0

16QAM

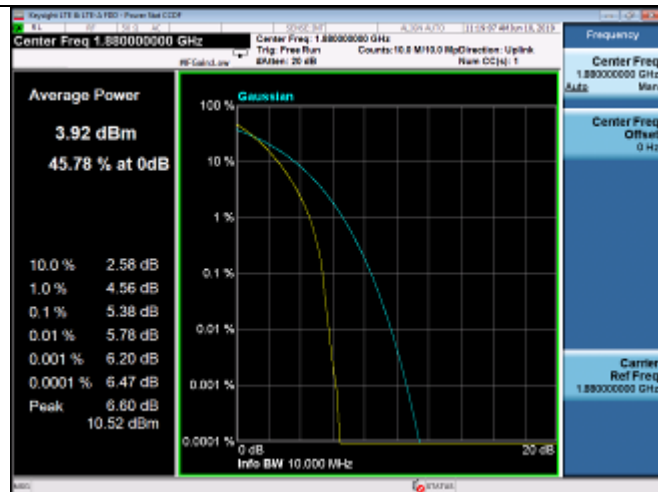


1RB#0

Low Channel

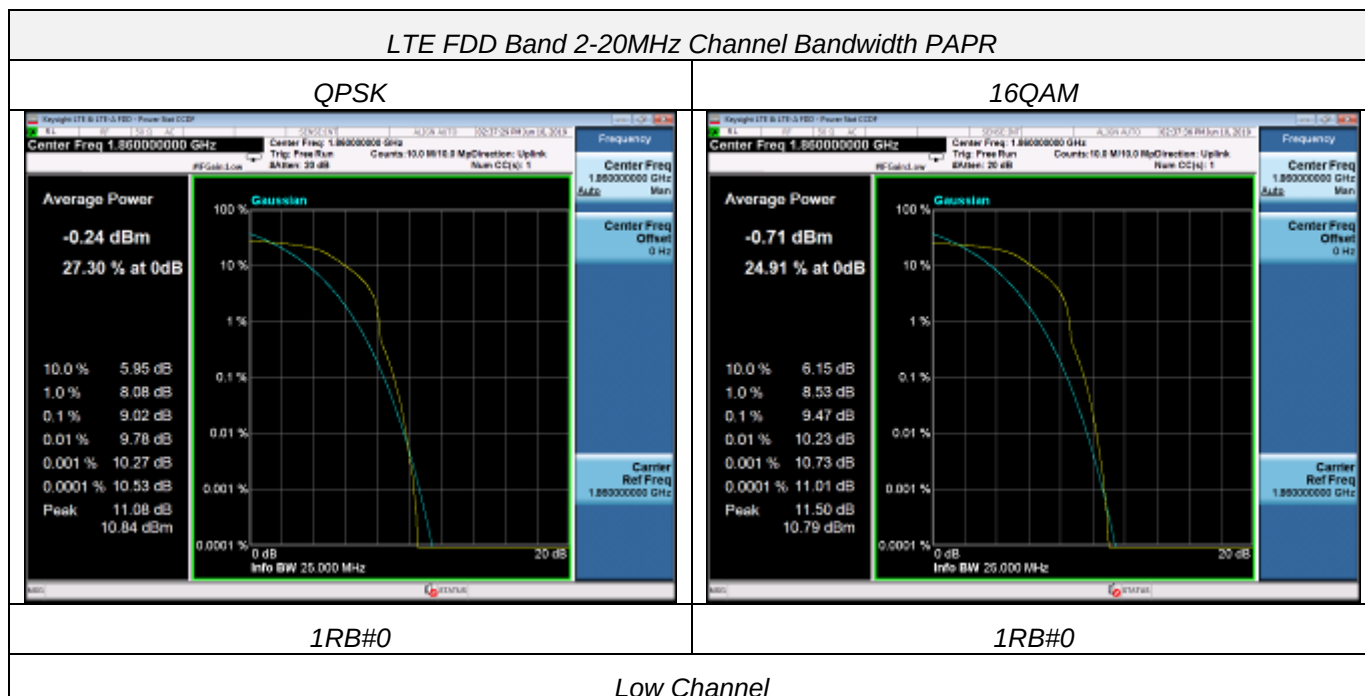
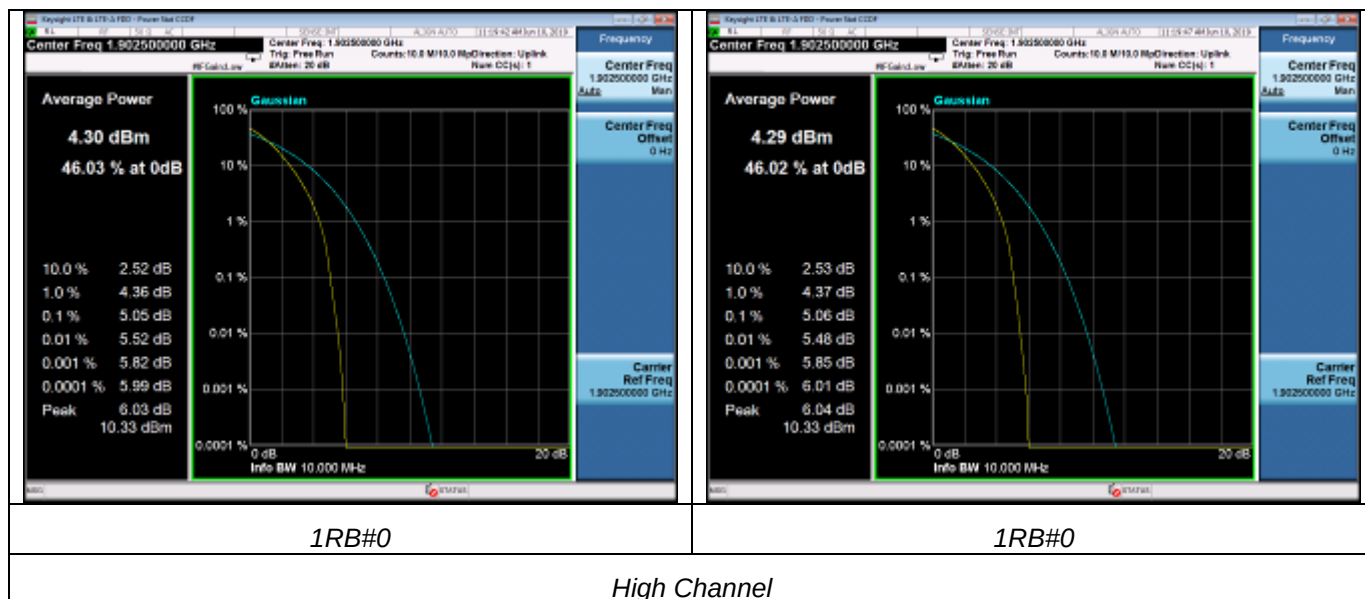


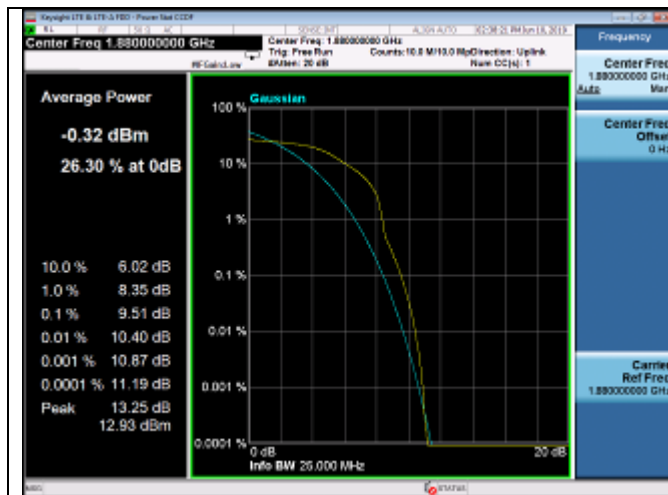
1RB#0



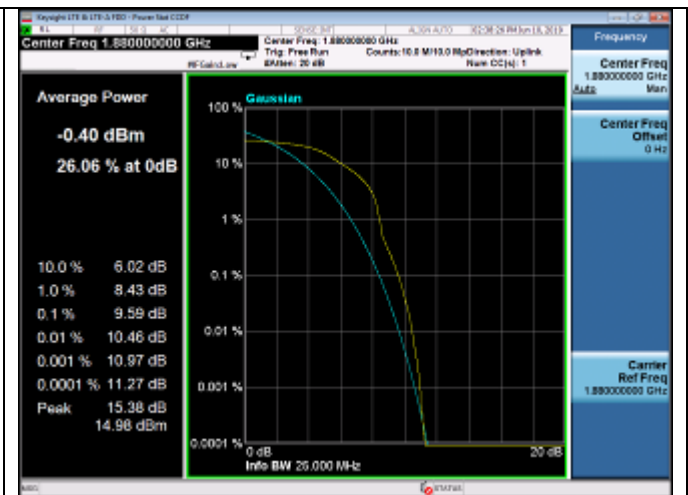
1RB#0

Middle Channel



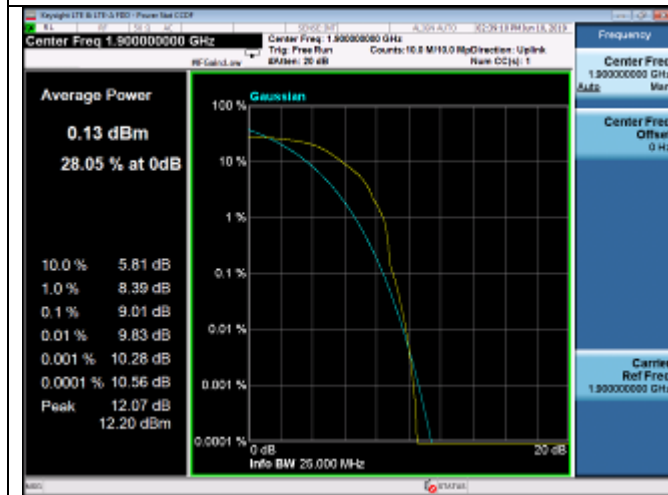


1RB#0

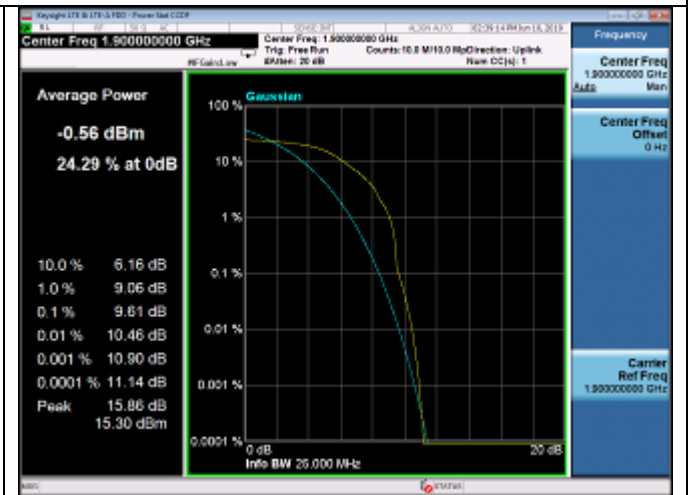


1RB#0

Middle Channel



1RB#0



1RB#0

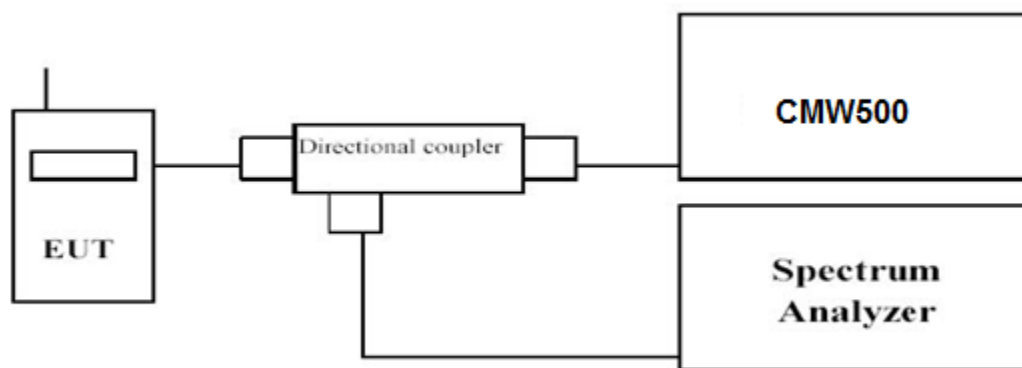
High Channel

4.3 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:

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	1.325	1.325	1.0806	1.0808
		1880.0	1.224	1.222	1.0731	1.0730

		1909.3	1.244	1.245	1.0767	1.0766
3 MHz	15RB#0	1851.5	2.880	2.930	2.6834	2.6836
		1880.0	2.862	2.862	2.6699	2.6702
		1908.5	2.851	2.851	2.6781	2.6779
5 MHz	25RB#0	1852.5	5.143	5.138	4.4788	4.4787
		1880.0	5.087	5.087	4.5011	4.5009
		1907.5	4.999	4.999	4.4809	4.4813
10 MHz	50RB#0	1855.0	10.02	10.03	8.9612	8.9606
		1880.0	9.881	9.879	8.9535	8.9519
		1905.0	9.992	9.992	8.9616	8.9616
15 MHz	75RB#0	1857.5	14.79	14.84	13.432	13.431
		1880.0	14.70	14.64	13.431	13.432
		1902.5	14.89	14.90	13.475	13.477
20 MHz	100RB#0	1860.0	18.43	18.43	17.725	17.731
		1880.0	18.35	18.35	17.737	17.735
		1900.0	18.41	18.41	17.682	17.687

LTE FDD Band 2-1.4MHz Channel Bandwidth

QPSK



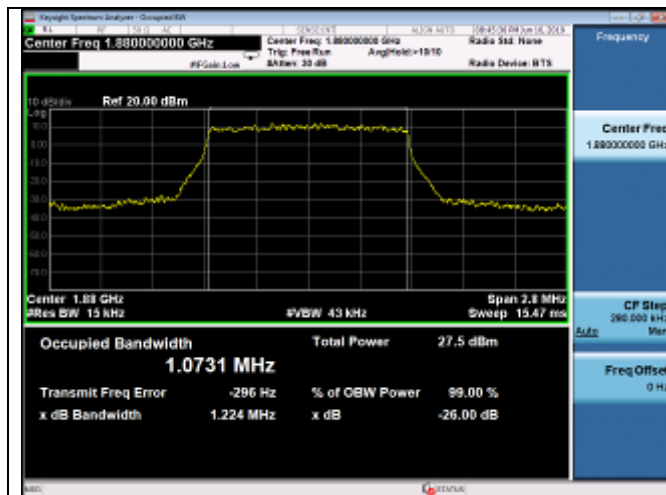
6RB#0

16QAM

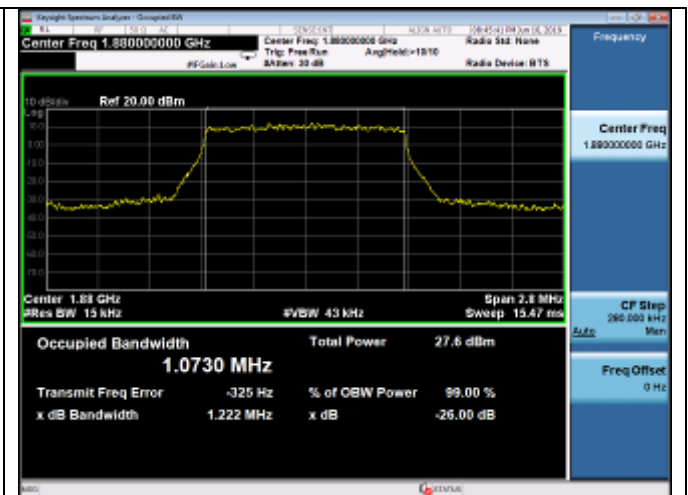


6RB#0

Low Channel

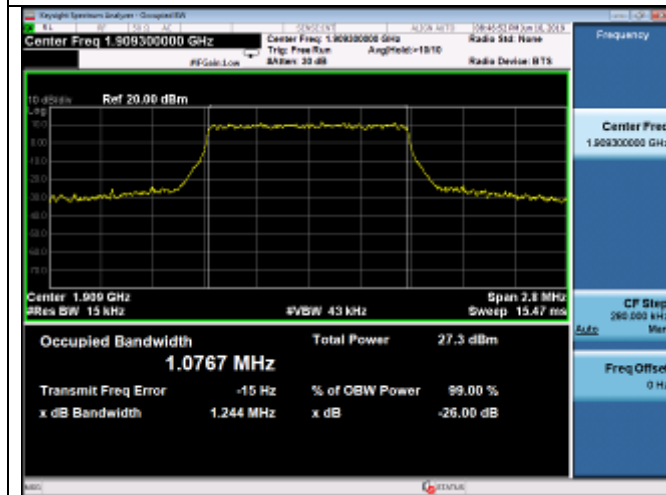


6RB#0

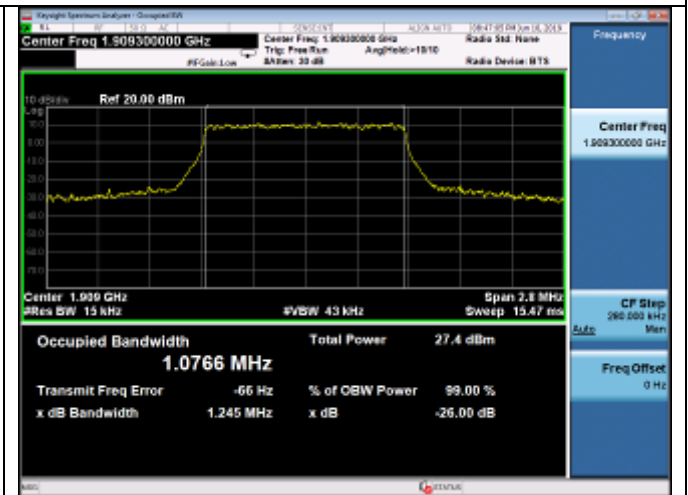


6RB#0

Middle Channel



6RB#0

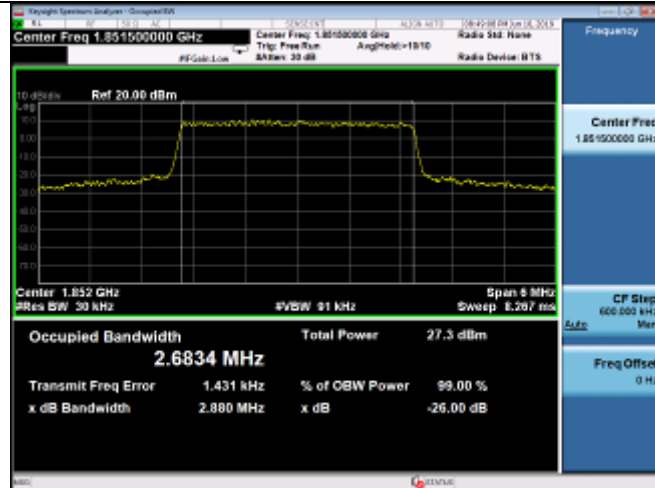


6RB#0

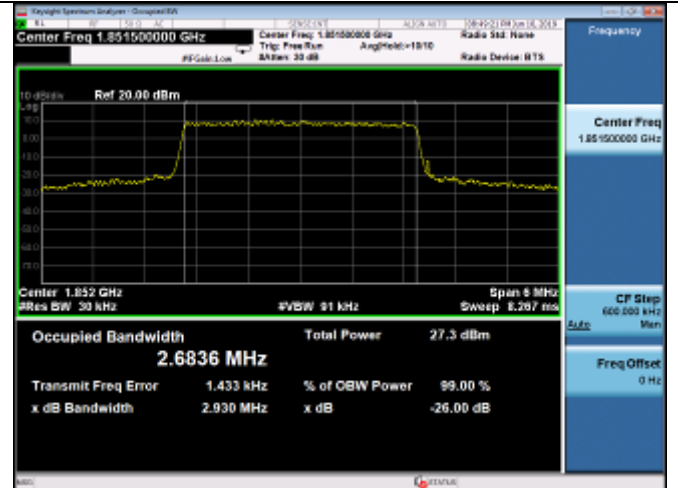
High Channel

LTE FDD Band 2-3MHz Channel Bandwidth

QPSK



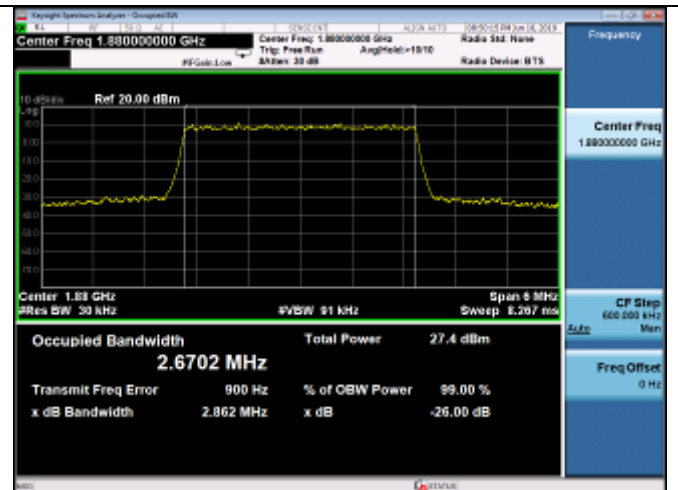
16QAM



15RB#0

15RB#0

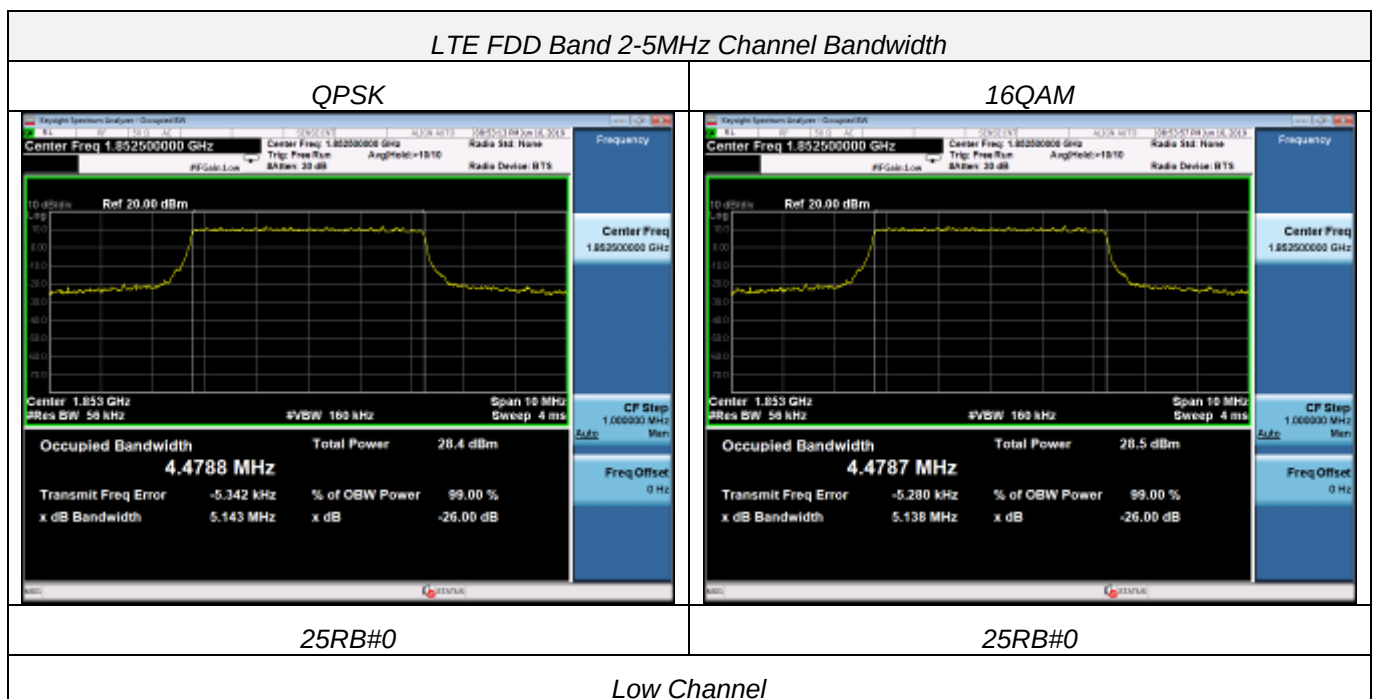
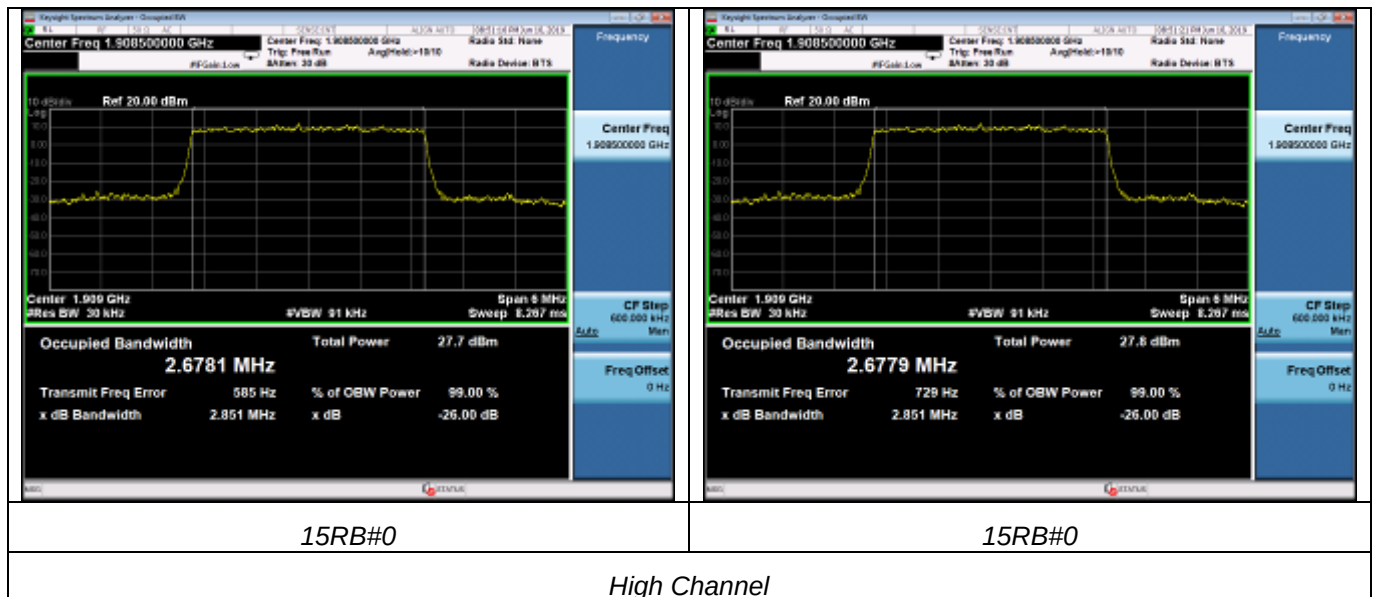
Low Channel

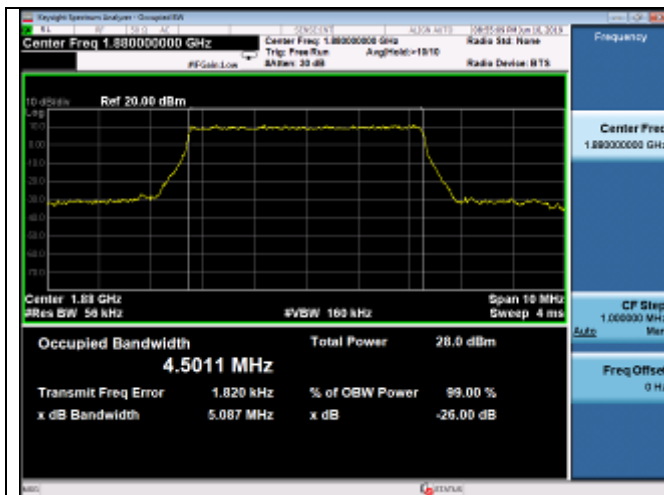


15RB#0

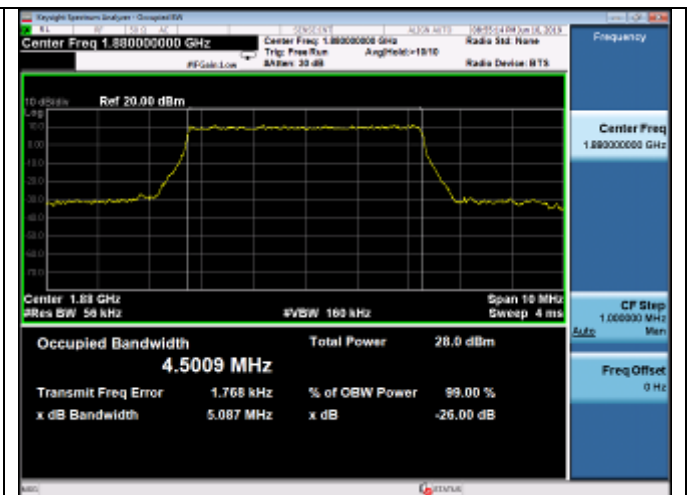
15RB#0

Middle Channel



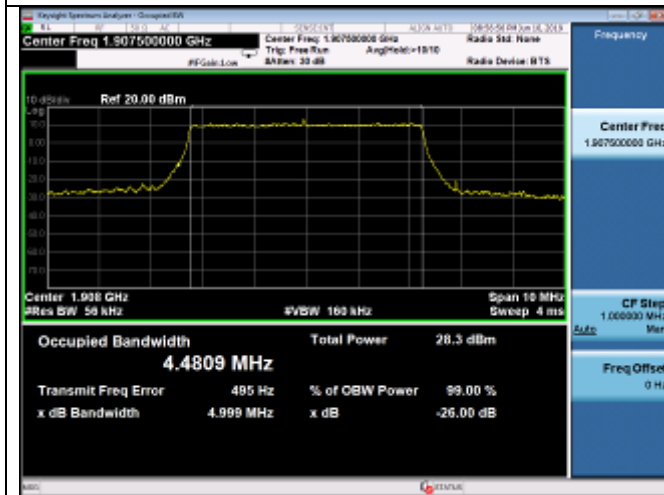


25RB#0

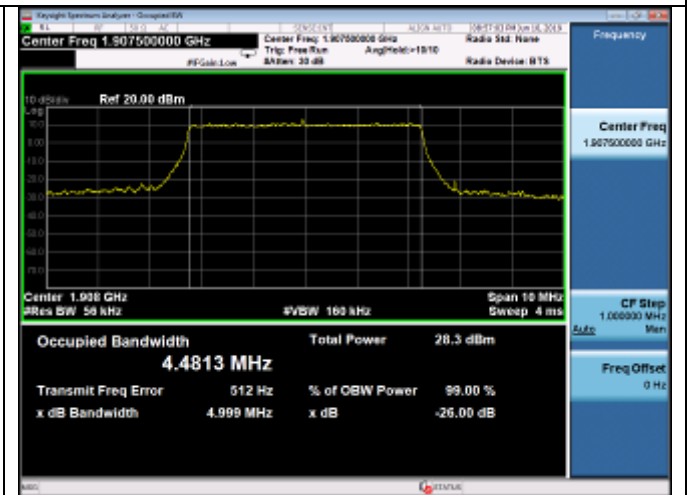


25RB#0

Middle Channel



25RB#0

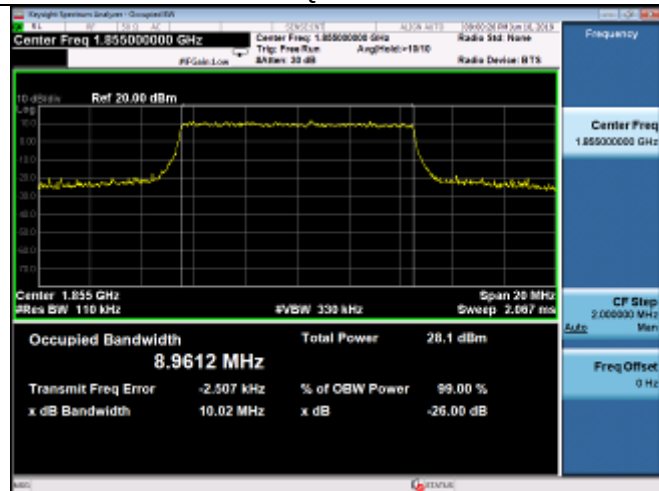


25RB#0

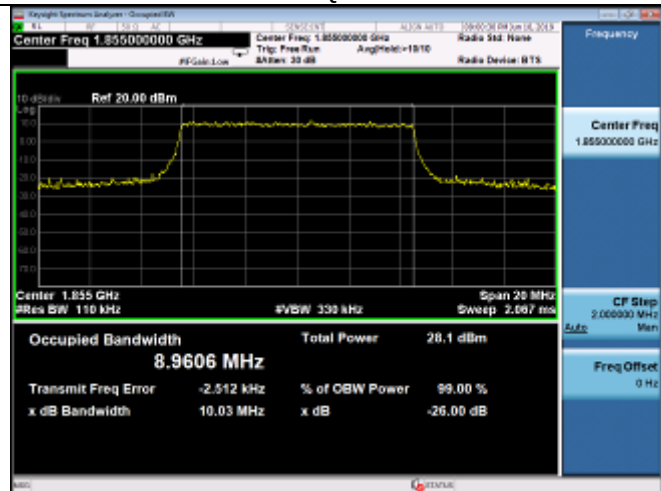
High Channel

LTE FDD Band 2-10MHz Channel Bandwidth

QPSK



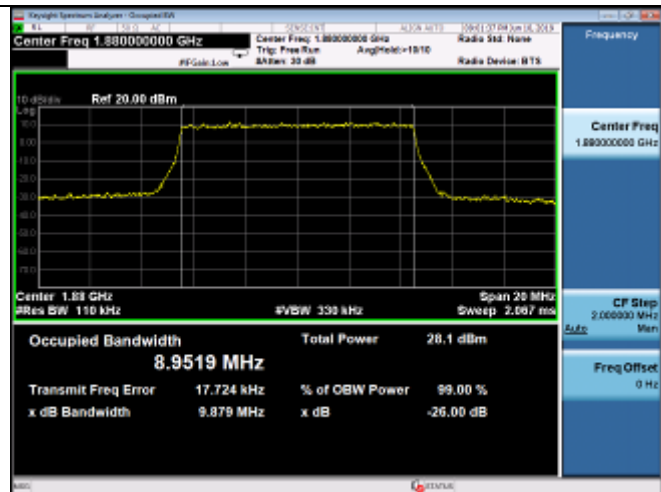
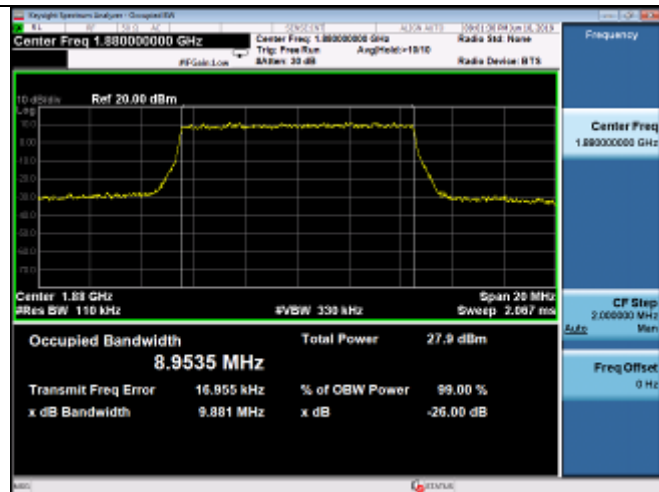
16QAM



50RB#0

50RB#0

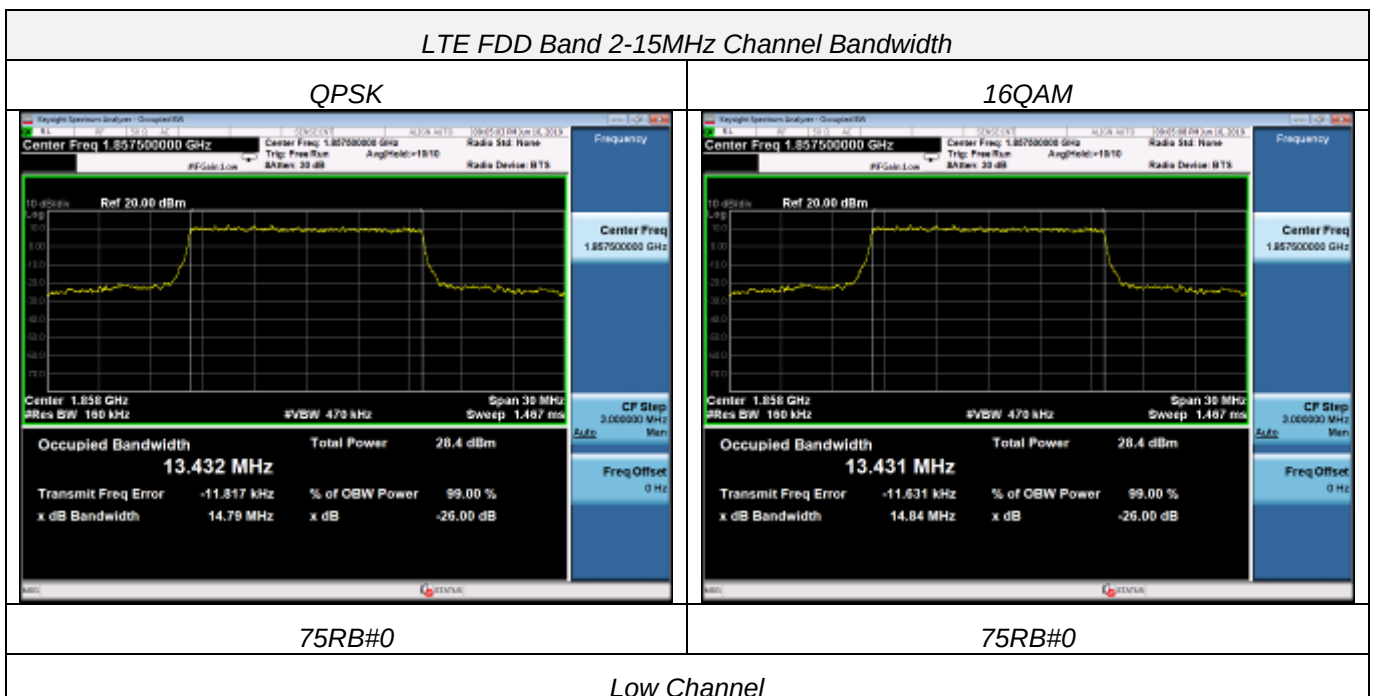
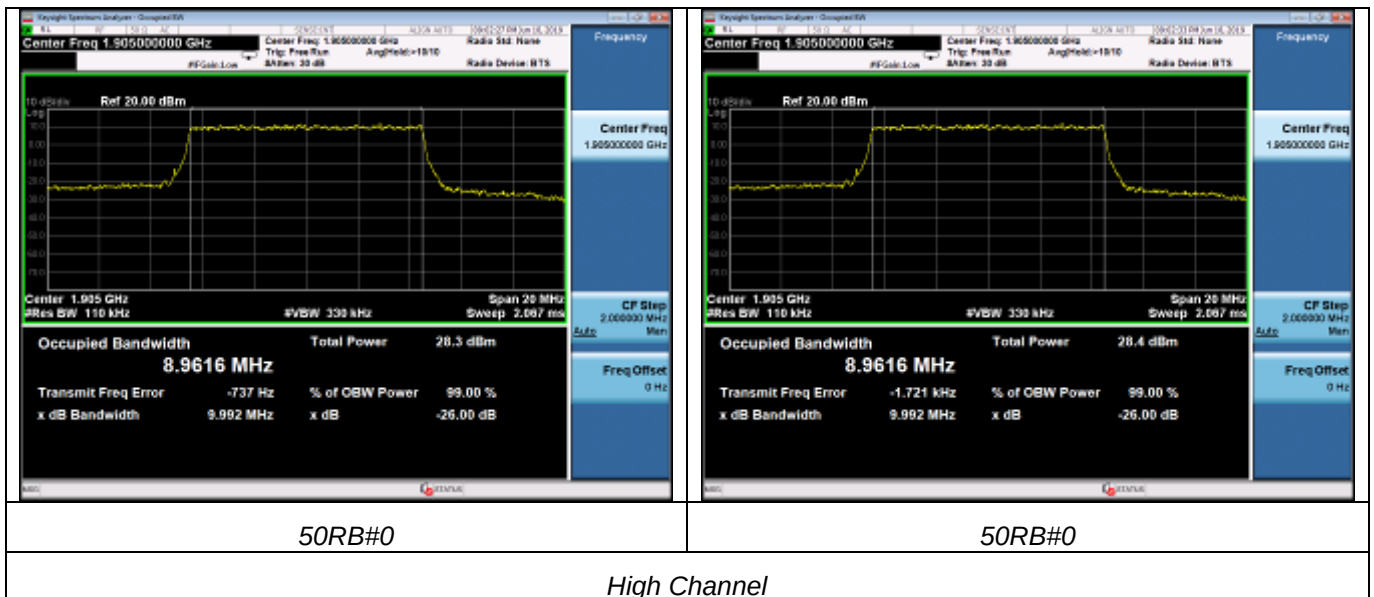
Low Channel

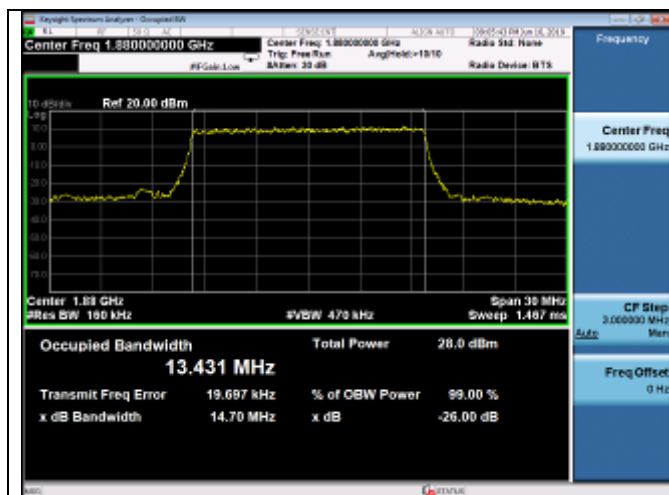


50RB#0

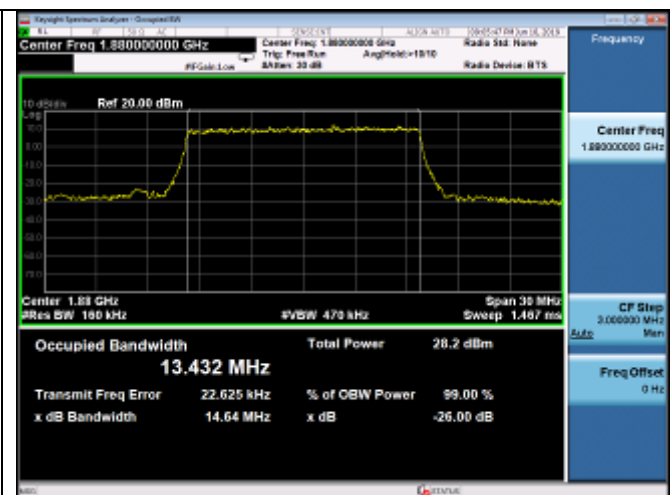
50RB#0

Middle Channel



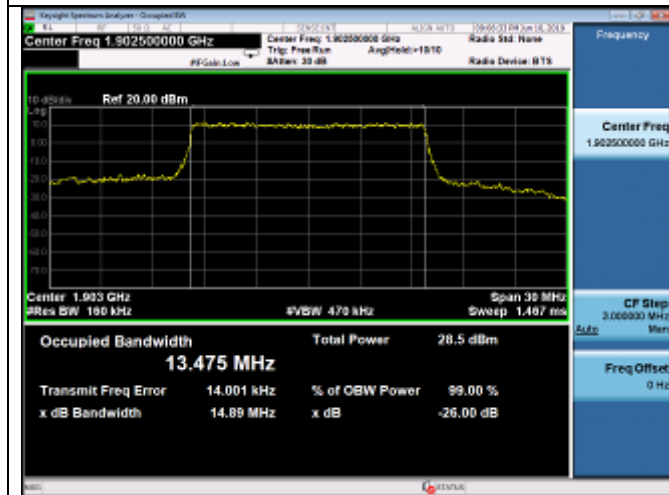


75RB#0

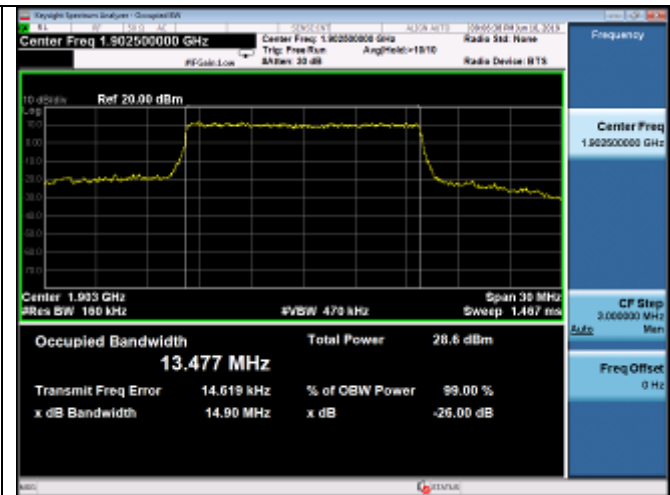


75RB#0

Middle Channel



75RB#0

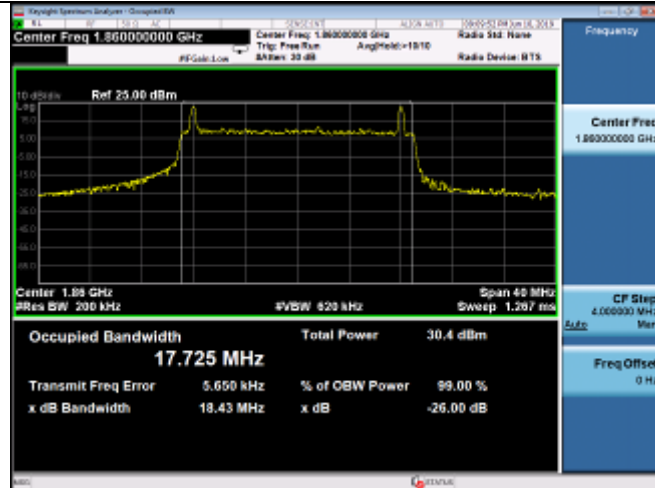


75RB#0

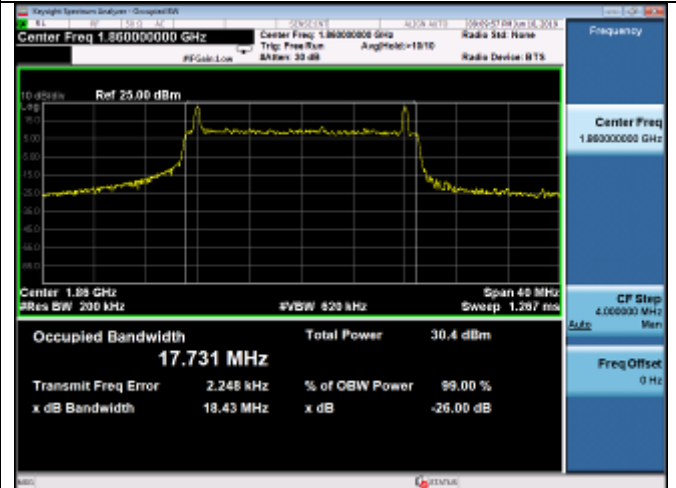
High Channel

LTE FDD Band 2-20MHz Channel Bandwidth

QPSK



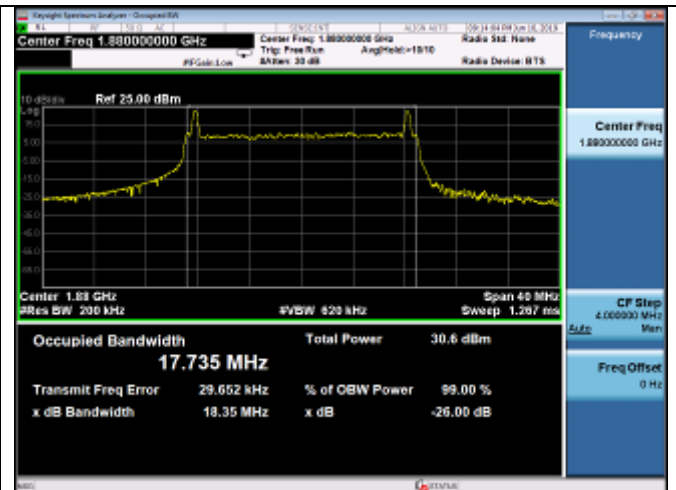
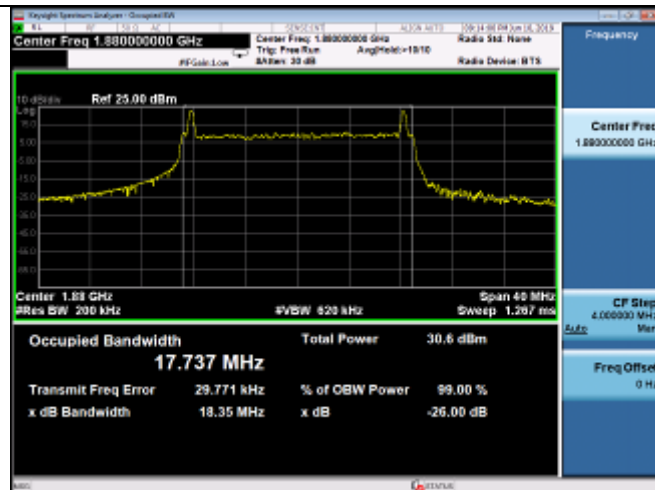
16QAM



100RB#0

100RB#0

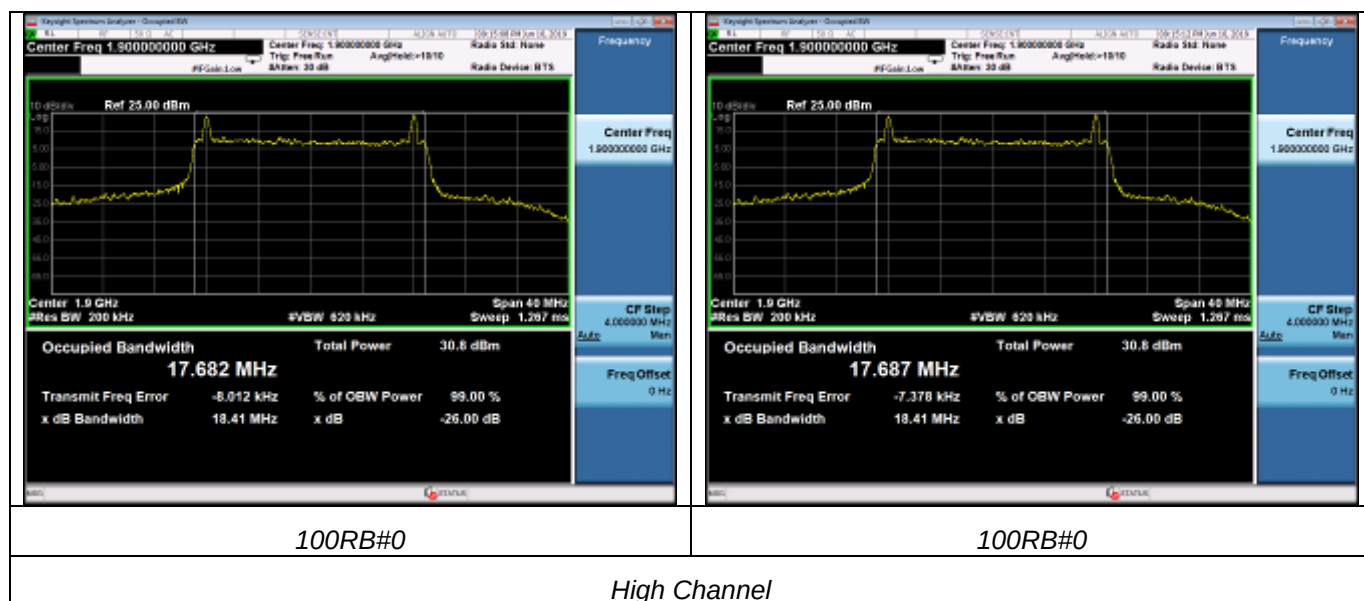
Low Channel



100RB#0

100RB#0

Middle Channel

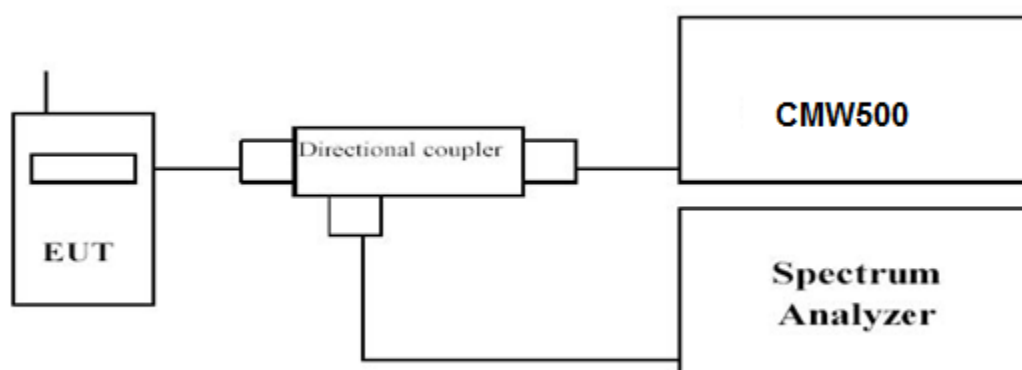


4.4 Band Edge compliance

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

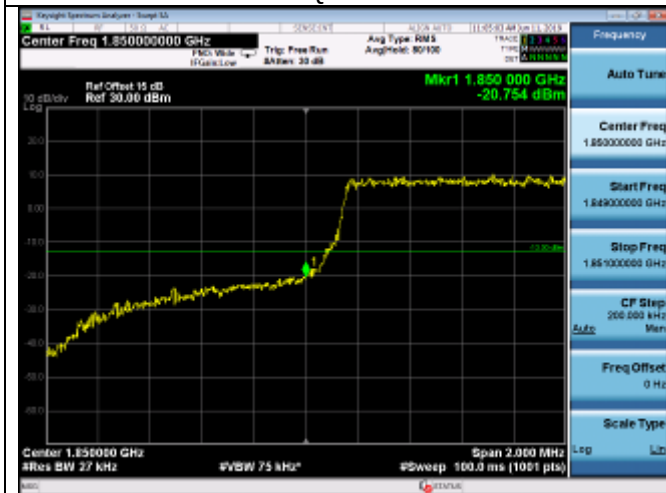
TEST RESULTS

Remark:

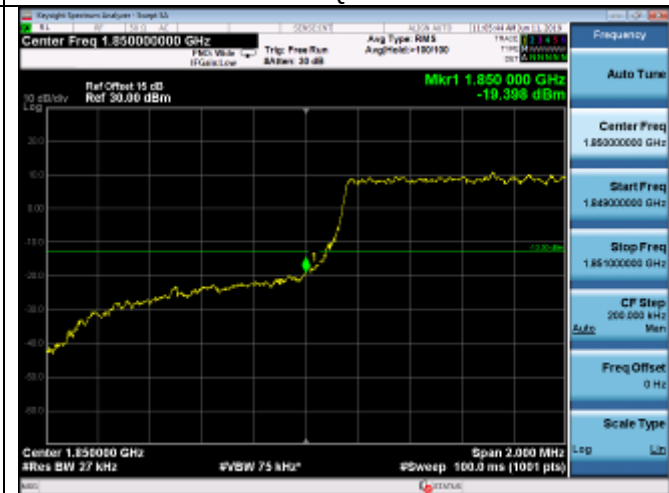
We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 2; recorded worst case for each Channel Bandwidth of LTE FDD Band 2.

LTE FDD Band 2-1.4MHz Channel Bandwidth Band Edge Compliance

QPSK



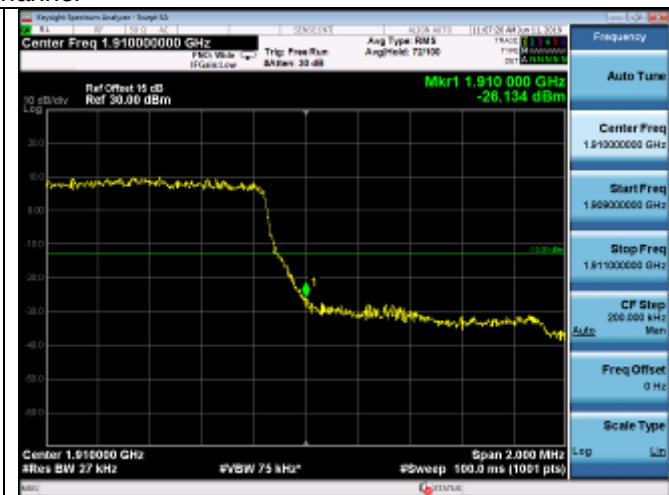
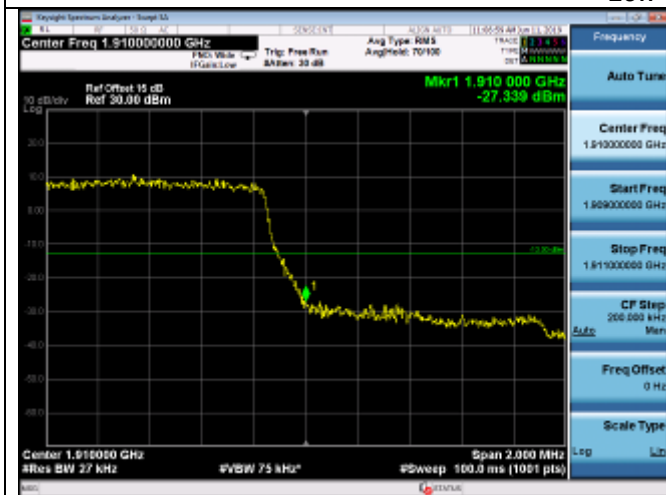
16QAM



1RB#0

1RB#0

Low Channel



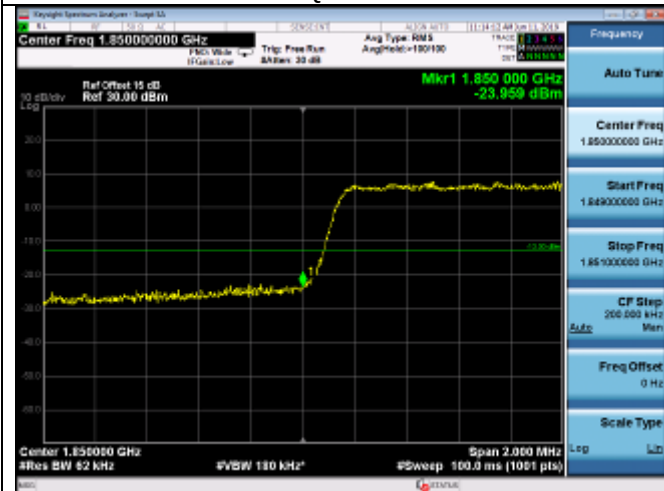
1RB#0

1RB#0

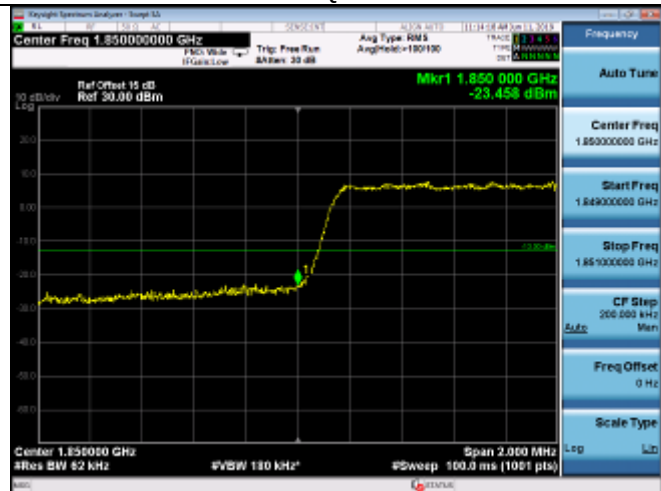
High Channel

LTE FDD Band 2-3MHz Channel Bandwidth Band Edge Compliance

QPSK



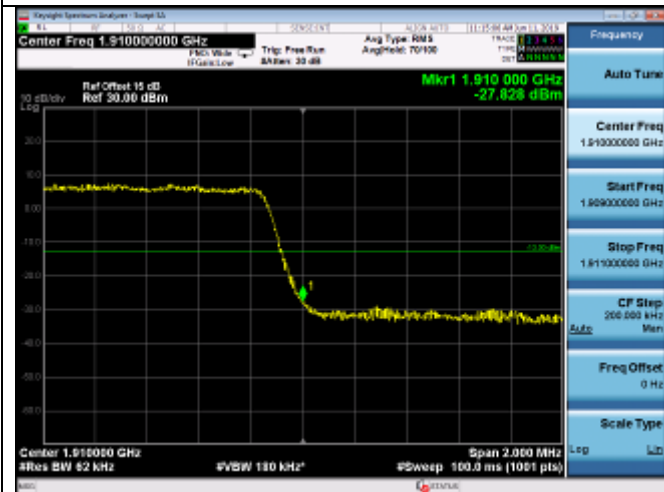
16QAM



1RB#0

1RB#0

Low Channel



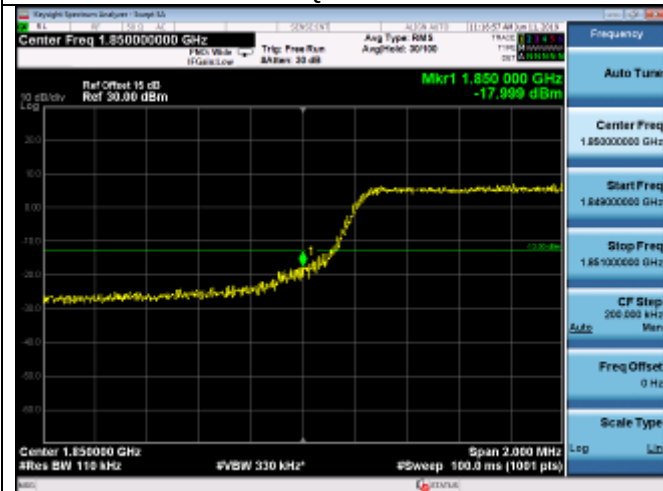
1RB#0

1RB#0

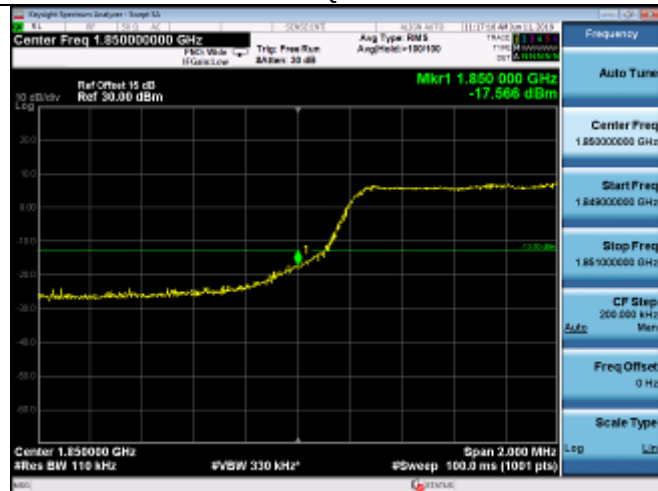
High Channel

LTE FDD Band 2-5MHz Channel Bandwidth Band Edge Compliance

QPSK



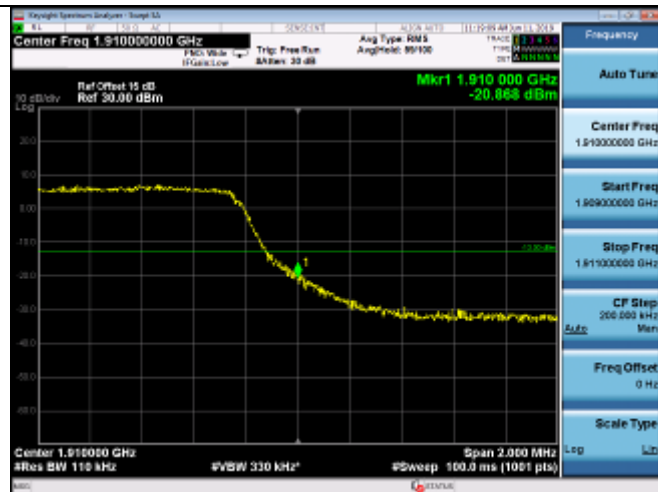
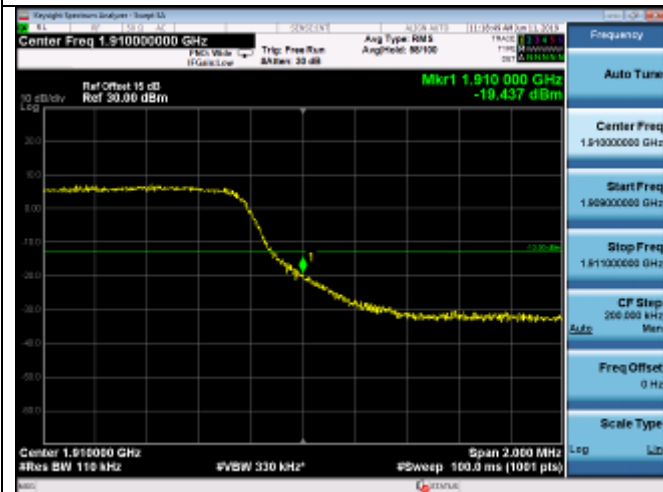
16QAM



1RB#0

1RB#0

Low Channel



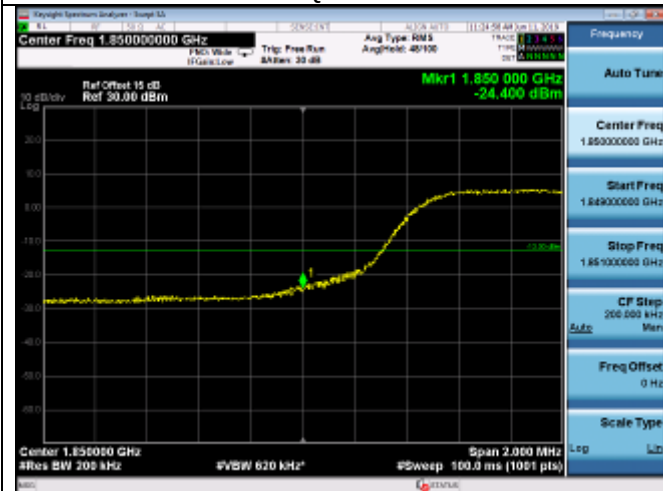
1RB#0

1RB#0

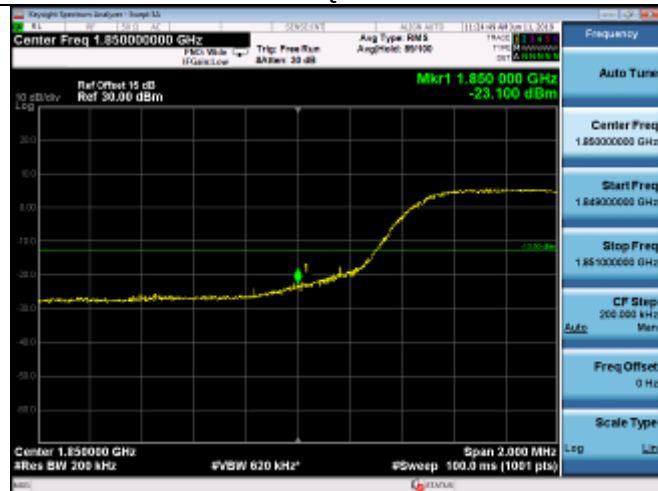
High Channel

LTE FDD Band 2-10MHz Channel Bandwidth Band Edge Compliance

QPSK



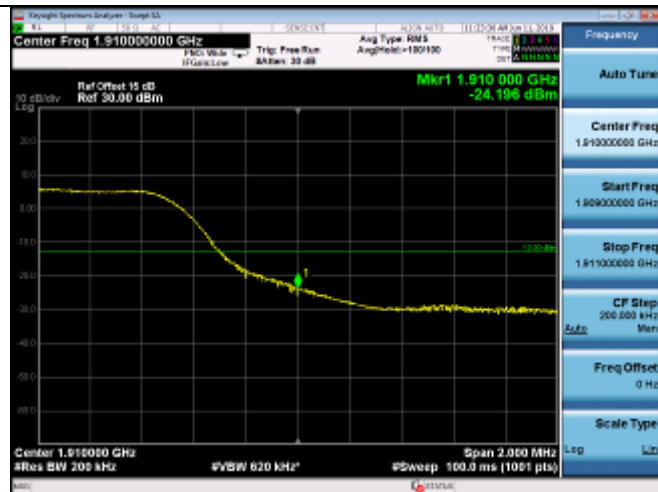
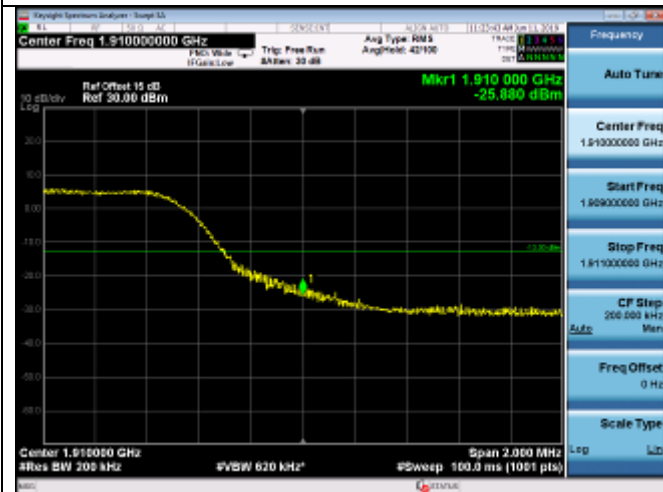
16QAM



1RB#0

1RB#0

Low Channel



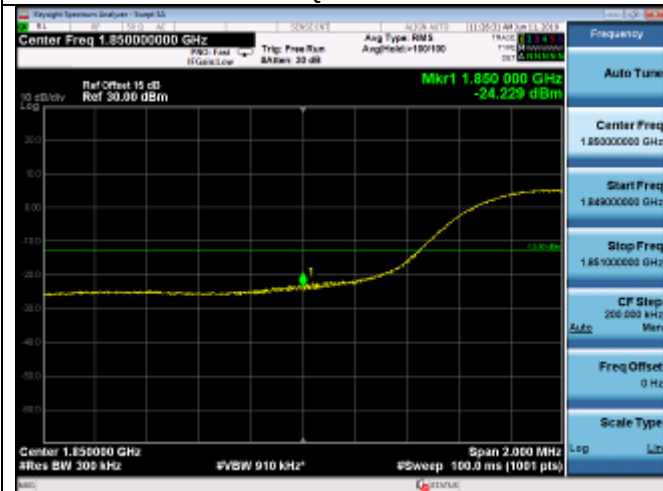
1RB#0

1RB#0

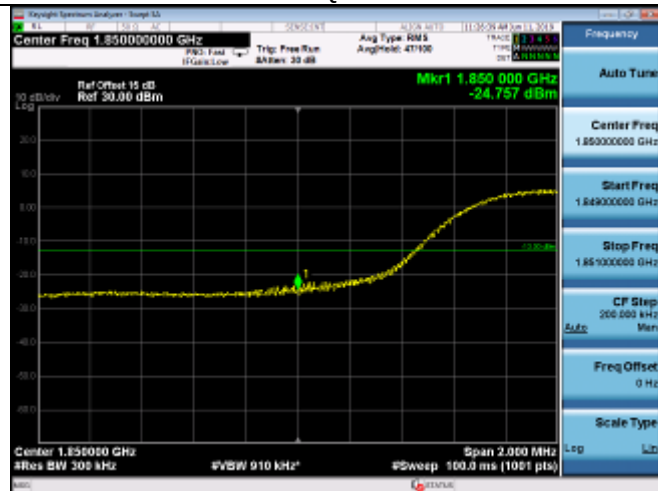
High Channel

LTE FDD Band 2-15MHz Channel Bandwidth Band Edge Compliance

QPSK



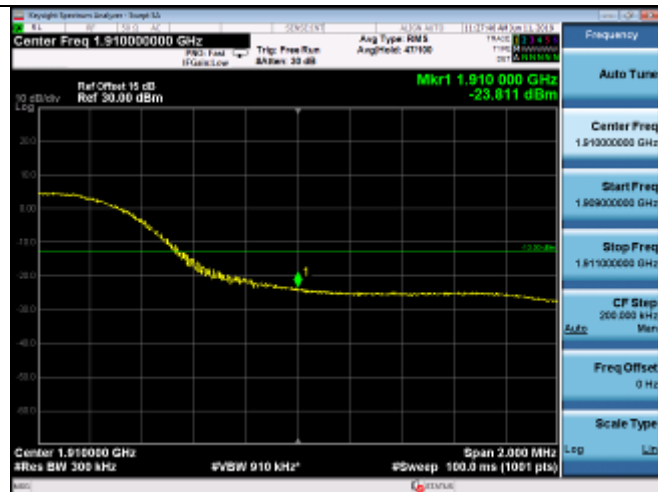
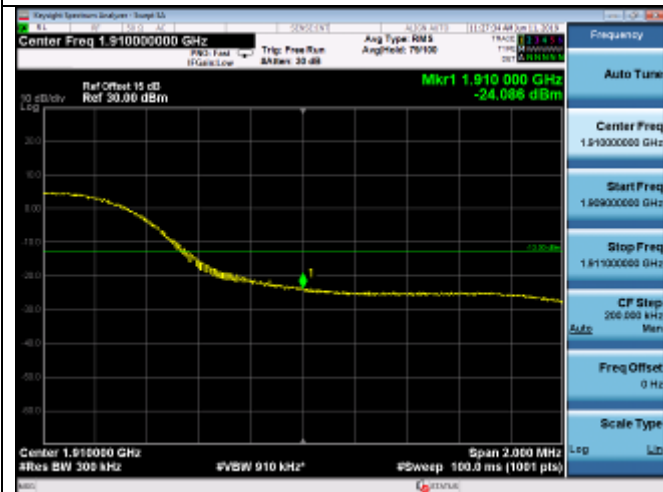
16QAM



1RB#0

1RB#0

Low Channel



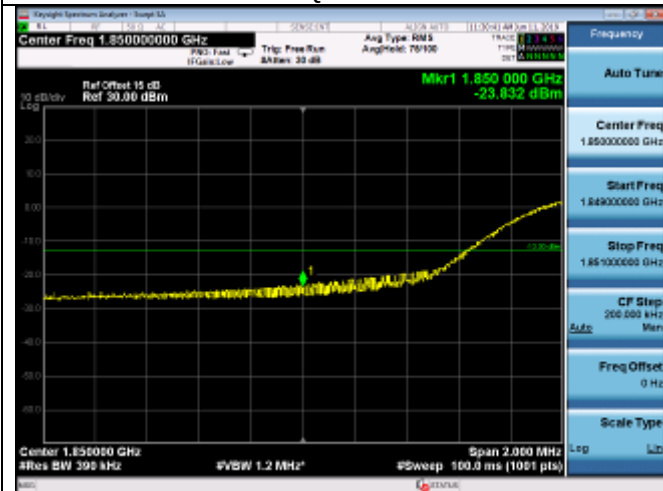
1RB#0

1RB#0

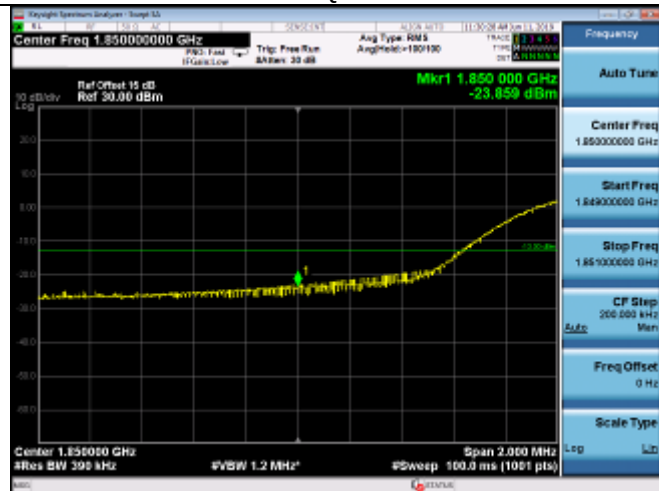
High Channel

LTE FDD Band 2-20MHz Channel Bandwidth Band Edge Compliance

QPSK



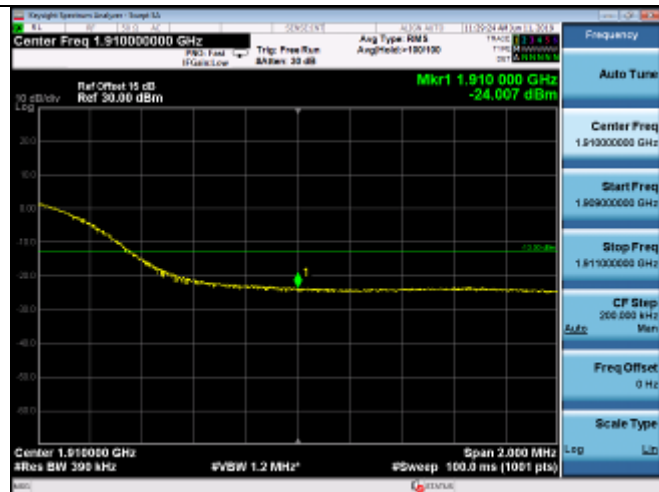
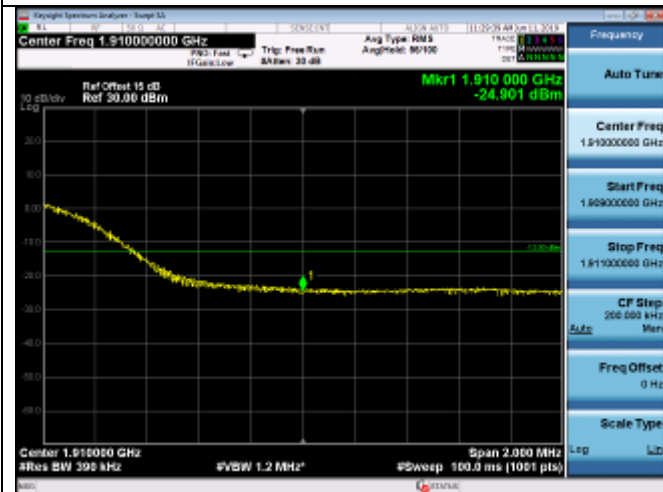
16QAM



1RB#0

1RB#0

Low Channel



1RB#0

1RB#0

High Channel