FCC RF TEST REPORT

Report No.:	R201811007
Model No.:	JA32
Grant No.:	JOY
FCC ID:	JOYJA32
Date of Receipt:	Oct 10,2018
Date of Test:	Oct 10,2018~ Nov 19,2018
Date of Issue:	Nov 26,2018
Test Result:	PASS

Applicant:	KYOCERA CORPORATION
Manufacturer:	KYOCERA CORPORATION
Factory:	KYOCERA CORPORATION
Product Name	SMART PHONE
Trade Mark	KYOCERA
Address:	Yokohama Office 2-1-1 Kagahara,Tsuzuki-ku Yokohama-shi,Kanagawa,Japan
Issued By:	BYD Precise Manufacture Co., Ltd.
Lab Location:	No. 3001, Baohe Road, Baolong Longgang, Shenzhen, 518116, People's Republic of China

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1 REPORT ISSUED HISTORY

Version	Description	Issued Data
Rev. 01	Original issue	Nov 26,2018

2 CERTIFICATION

PRODUCT:	Smart Phone
MODEL:	JA32
BRAND:	KYOCERA
APPLICANT:	KYOCERA
TEST SAMPLE:	ENGINEERING SAMPLE
SN.:	JA32125479850089K0036/ JA32125479850089K0021
HW Version:	JA32
SW Version:	Sdm660_64-userdebug 9
TESTED:	Oct 10,2018~ Nov 26,2018
STANDARDS:	FCC 47 CFR Part2,22 (H) ,24(E),27(L),27(H),27(M)

The above equipment has been tested by **BYD Precise Manufacture Co., Ltd.,** and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

PREPARED BY : _____ , **DATE:** 2018-11-26
(Fen Lu / Engineer)

TECHNICAL ACCEPTANCE : _____ , **DATE:** 2018-11-26
Responsible for EMS (Zhaohui Feng / Manager)

APPROVED BY : _____ , **DATE:** 2018-11-26
(Jie Yan / Director)

3 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

SN.:	FCC RULE	Description	RESULT	REMARK
JA3212547985 0089K0036	§2.1046	Conducted Output Power	Pass	Reporting Only
	§24.232(d)	Peak-to-Average Ratio	Pass	<13dB
	§2.1049 §22.917 (b) §24.238(b) §27.53(h)(3) §27.53(m)(6)	Occupied Bandwidth	Pass	Reporting Only
	§2.1051 §22.917(a) §24.238(a) §27.53(g) §27.53(h) §27.53(m)(4)	Conducted Band Edges	Pass	(Band2/4/5/12/17/25/26) : <43+10log(P[Watts]) (band7/41): §27.53(m)(4))
	§2.1051 §22.917(a) §24.238(a) §27.53(f) §27.53(g) §27.53(h) §27.53(m)(4)	Conducted Spurious Emission	Pass	(Band2/4/5/12/17/25/26) : <43+10log(P[Watts]) (band7/41): <55+10log(P[Watts])
	§2.1055 §22.355 §24.235 §27.54	Frequency Stability Temperature & Voltage	Pass	<2.5ppm for Part22 Within Authorized Band
	§22.913(a)(2) §27.50(c)(10) §24.232(c) §27.50(h)(2) §27.50(d)(4)	Effective Radiated Power/Equivalent Isotropic Radiated Power	Pass	(band5/26):EPR<7W (band12/17):ERP<3W (band2/25/7/41):EIRP<2W (band4):EIRP<1W
JA3212547985 0089K0021	§2.1051 §22.917(a) §24.238(a) §27.53(g)	Radiated Spurious Emission	Pass	(Band2/4/5/12/17/25/26) : <43+10log(P[Watts]) (band7/41): <55+10log(P[Watts])

	§27.53(h) §27.53(m)(4)			

3.1 Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5%
RF output power, Conducted	±0.59dB
Bandwidth, conducted	±1.78kHz
Unwanted Emissions, conducted	±0.9dB
Temperature	±1℃
Humidity	±5%
DC and low frequency voltages	±0.4%

4 GENERAL INFORMATION.

4.1 Test Equipment List

Description & Manufacturer	MODEL NO.	SERIAL NO.	Next Calibration date
WIDEBAND RADIO COMMUNICATION TESTER ROHDE & SCHWARZ	CMW500	148277	2019/10/16
SIGNAL ANALYZER ROHDE & SCHWARZ	FSQ26	200393	2019/4/9
CMU200 ROHDE & SCHWARZ	CMU200	117747	2018/5/30
Temperature Chamber WEISS	Temperature Chamber	'58226087670060	2019/3/5
DC Power Supply Agilent	E3632A	MY40029031	2019/3/5
RF cable	Huber Suhner SUCOFLEX 104PE	-	-
PC	-	30008979	-
Power Divider	-	C279810-01	-
Universal radio communication tester	CMW 500	148351	2019.4.9
Antenna	ETS 3142C	00079888	2019.1.29
Antenna	ETS 3117	00057412	2019.1.25
EMI test receiver	ESU	100041	2019.4.9
EMC32 software	R&S	-	-
ETS 3M Semi-Anechoic Chamber	9.47m*6.59m*5.91m (L*W*H)	A88030002609000010071	2019.1.22

NOTE: Calibration cycle 12 months.

4.2 Description of Test Modes

Test Items	Band	Bandwidth(MHz)						Modulation		RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Conducted Output Power	17	–	–	V	V	–	–	V	V	V	V	V	V	V	V
Peak-to-Average Ratio	17	–	–		V	–	–		V	V		V	V	V	V
Occupied Bandwidth	17	–	–	V	V	–	–	V	V			V	V	V	V
Conducted Band Edges	17	–	–	V	V	–	–	V	V	V		V	V		V
Conducted Spurious Emission	17	–	–	V	V	–	–	V	V	V			V	V	V
Frequency Stability Temperature & Voltage	17	–	–		V	–	–	V				V		V	
Effective Radiated Power/Equivalent Isotropic Radiated Power	17	–	–	V	V	–	–	V	V	V	V	V	V	V	V
Radiated Spurious Emission	17	–	–	V	V	–	–	V		V				V	

4.3 Test Environment and List of Software and Parts

Test Items	Software	Parts	Environment
Conducted Output Power	-	USB Cable、Fake battery、Power Divider	Temp.:25℃±3
			Humi:30%~60%
			Volt.:3.8V
peak-to-average ratio	-	USB Cable、Fake battery、Power Divider	Temp.:25℃±3
			Humi:30%~60%
			Volt.:3.8V
Bandwidth	-	USB Cable、Fake battery、Power Divider	Temp.:25℃±3
			Humi:30%~60%
			Volt.:3.8V
Conducted Band Edges	-	USB Cable、Fake battery、Power Divider	Temp.:25℃±3
			Humi:30%~60%
			Volt.:3.8V
Conducted Spurious Emission	-	USB Cable、Fake battery、Power Divider	Temp.:-20℃~60℃
			Humi:30%~60%
			Volt.:3.8V
Frequency Stability	-	USB Cable、Fake battery、Power Divider	Temp.:-20℃~60℃
			Humi:30%~60%
			Volt.:3.8、3.42、4.18V
Effective Radiated Power/Equivalent Isotropic Radiated Power	-	USB Cable、Fake battery、Power Divider	Temp.:-20℃~60℃
			Humi:30%~60%
			Volt.:3.8V
Radiated Spurious Emission	-	Charger: AC-10UC(NOKIA) Headset: HSEJ03JY(Mi)	Temp.:-20℃~60℃
			Humi:30%~60%
			Volt.:3.8V

4.4 Testing Location

Test Site	BYD Precise Manufacture Co., Ltd.
Test Site Location	No. 3001, Baohe Road, Baolong Longgang, Shenzhen, 518116, People's Republic of China
Post Code	518116
Telephone	+86-755 8489 8888 55501
Fax	+86-755 8964 3771

4.5 Test Facility

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

- **A2LA (Certificate No. 4886.01)**

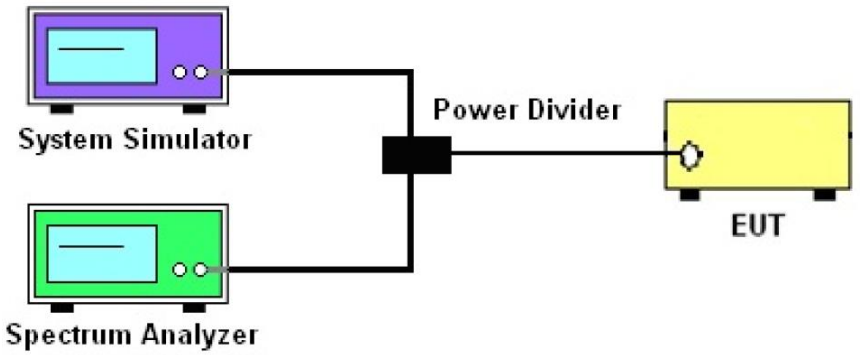
BYD Precise Manufacture Co., Ltd., Baolong Shenzhen Laboratory is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 4886.01.

- **FCC –Designation Number: CN1232**

BYD Precise Manufacture Co., Ltd., Baolong Shenzhen Laboratory has been recognized as an accredited testing laboratory.
Designation Number: CN1232.

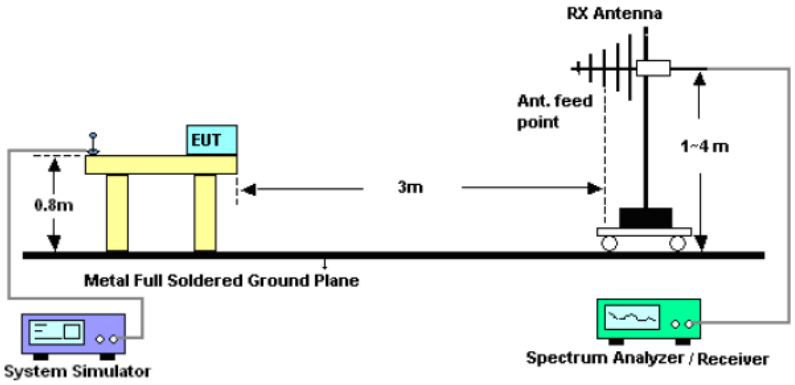
4.6 Configuration of System Under Test

Conducted:

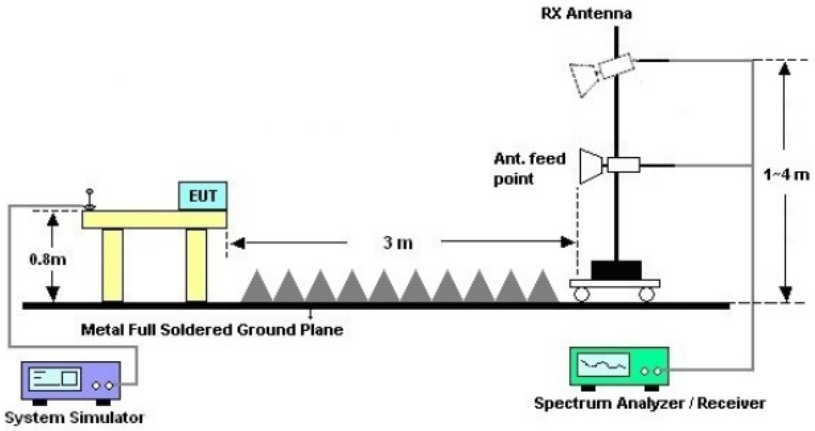


Radiated:

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



4.7 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part2, 22(H), 24(E), 27(L), 27(M), 27(H)

ANSI/TIA/EIA-603-D-2010

FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02

All test items have been performed and recorded as per the above standards.

5 TEST TYPES AND RESULTS

5.1 Conducted Output Power (Reporting Only) and ERP/EIRP

5.1.1 Description

A system simulator was used to establish communication with the EUT. Its parameters were set to force EUT transmitting at the maximum power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

5.1.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

5.1.3 Test Procedure

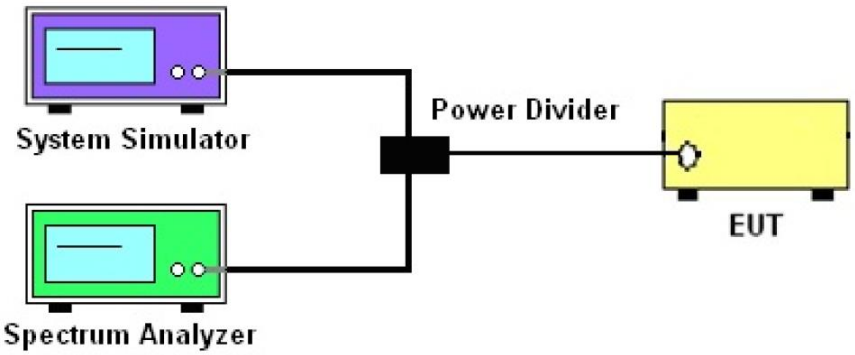
a. The transmitter output port was connected to the system simulator.

b. Set EUT at maximum power through system simulator.

c. Select lowest, middle, and highest channels for each band and different modulation.

d. Measure and record the power level from the system simulator.

5.1.4 Test Setup



5.1.5 Test Results

BW [MHz]	Modulation	RB Size	RB Offset	Power(dBm) Low Ch./Freq.	Power(dBm) Middle Ch./Freq.	Power(dBm) High Ch./Freq.
Channel				23780	23790	23800
Frequency(MHz)				709	710	711
10	QPSK	1	0	23.16	23.11	23.16
10	QPSK	1	24	23.04	23.25	23.19
10	QPSK	1	49	23.14	23.18	23.18
10	QPSK	25	0	22.30	22.23	22.24
10	QPSK	25	12	22.31	22.31	22.36
10	QPSK	25	24	22.25	22.24	22.24
10	QPSK	50	0	22.25	22.33	22.36
10	16QAM	1	0	22.38	22.03	22.39
10	16QAM	1	24	22.35	22.29	22.37
10	16QAM	1	49	22.43	22.35	22.42
10	16QAM	25	0	21.33	21.34	21.33
10	16QAM	25	12	21.39	21.45	21.35
10	16QAM	25	24	21.35	21.34	21.33
10	16QAM	50	0	21.31	21.32	21.35

Channel				23755	23790	23825
Frequency(MHz)				706.5	710	713.5
5	QPSK	1	0	23.07	23.11	23.28
5	QPSK	1	12	23.13	23.25	23.29
5	QPSK	1	24	23.21	23.34	23.23
5	QPSK	12	0	22.28	22.25	22.27
5	QPSK	12	6	22.31	22.32	22.35
5	QPSK	12	11	22.30	22.29	22.33
5	QPSK	25	0	22.33	22.25	22.35
5	16QAM	1	0	22.48	22.38	22.14
5	16QAM	1	12	22.46	22.41	22.53
5	16QAM	1	24	22.41	22.73	22.46
5	16QAM	12	0	21.16	21.36	21.39
5	16QAM	12	6	21.41	21.35	21.52
5	16QAM	12	11	21.41	21.32	21.39
5	16QAM	25	0	21.35	21.39	21.42

5.2 Peak-to-Average Ratio

5.2.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

5.2.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

5.2.3 Test Procedure

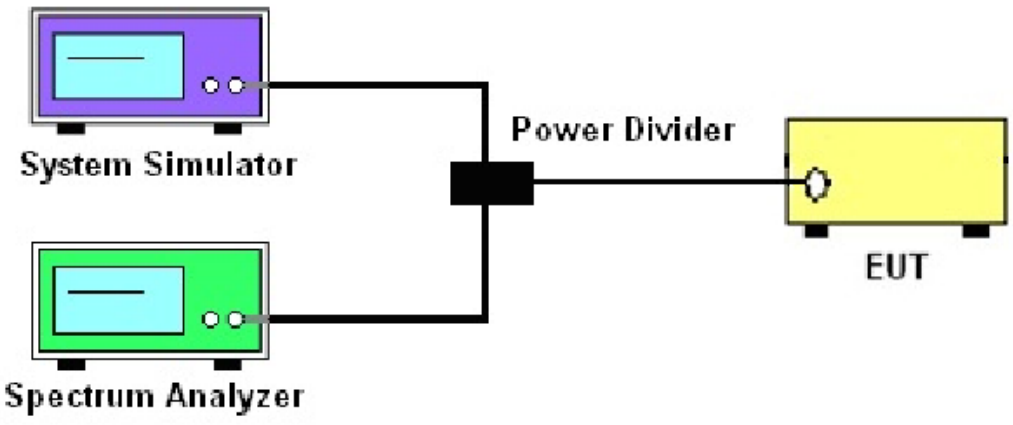
a. The EUT was connected to the spectrum analyzer and system simulator via a power divider.

b. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.

c. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1%.

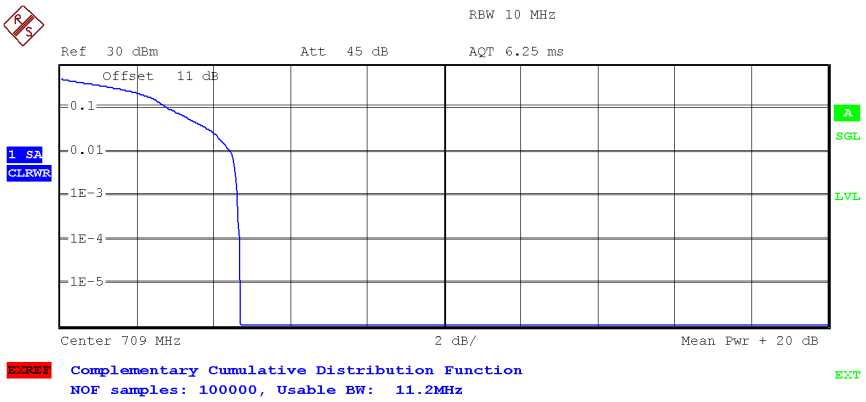
d. Record the deviation as Peak to Average Ratio.

5.2.4 Test Setup

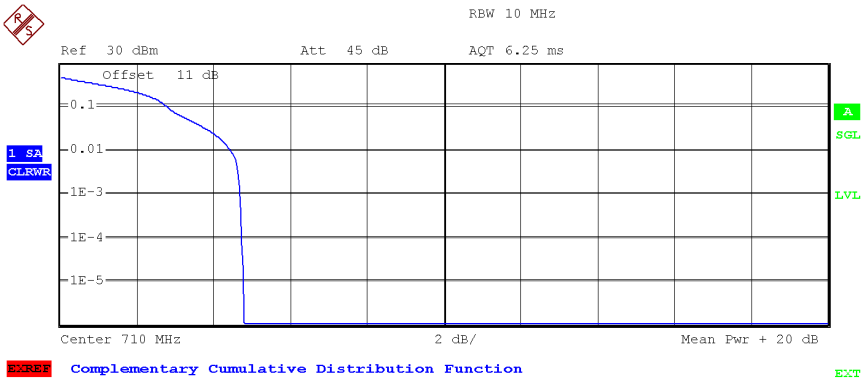


5.2.5 Test Result

LTE Band17						
BW [MHz]	Modulation	RB Size	RB Offset	Power(dB) Low Ch./Freq	Power(dB) Middle Ch./Freq	Power(dB) High Ch./Freq
Channel				23780	23790	23800
Frequency(MHz)				709	710	711
10	16QAM	1	0	4.62	4.71	4.55
10	16QAM	50	0	5.54	5.58	5.64



10MHz/16QAM in Ch.23780(1RB Size)



	Trace 1
Mean	20.44 dBm
Peak	25.23 dBm
Crest	4.79 dB
10 %	2.79 dB
1 %	4.42 dB
.1 %	4.71 dB
.01 %	4.74 dB

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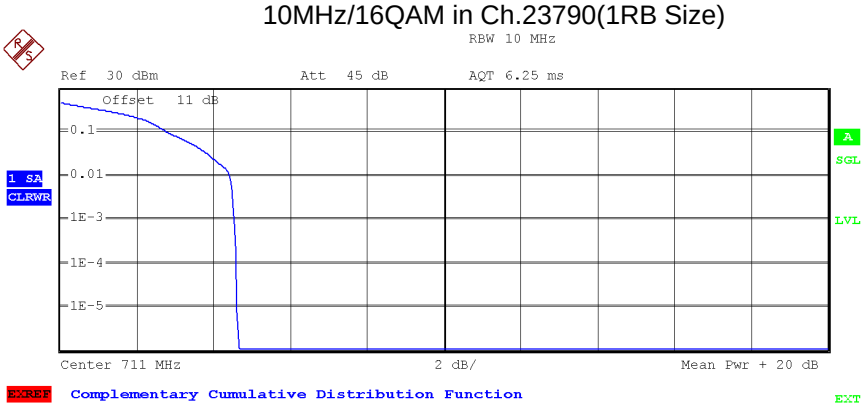
10MHz/16QAM in Ch.23790(1RB Size)



	Trace 1
Mean	20.64 dBm
Peak	25.30 dBm
Crest	4.66 dB
10 %	2.76 dB
1 %	4.42 dB
.1 %	4.55 dB
.01 %	4.62 dB

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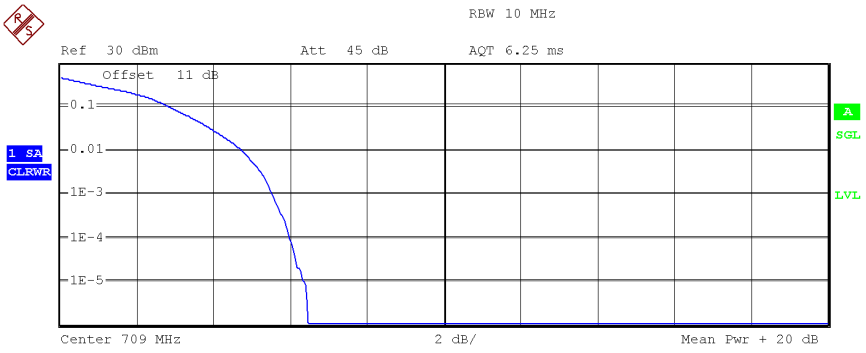
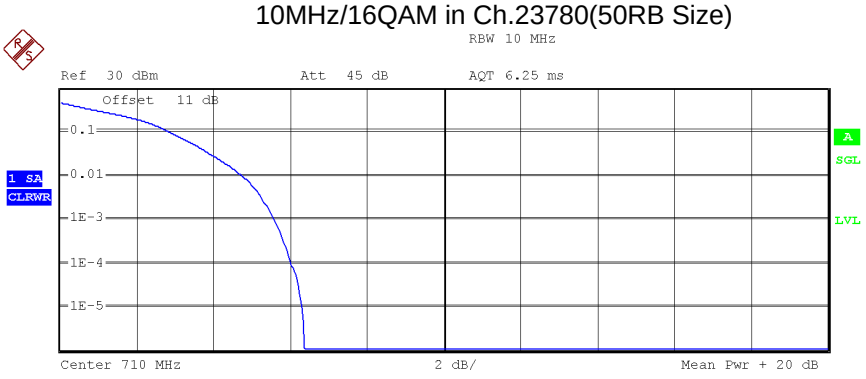
10MHz/16QAM in Ch.23800(1RB Size)



	Trace 1
Mean	19.76 dBm
Peak	26.22 dBm
Crest	6.46 dB
10 %	2.82 dB
1 %	4.71 dB
.1 %	5.54 dB
.01 %	5.99 dB

Date: 22.OCT.2018 17:53:51

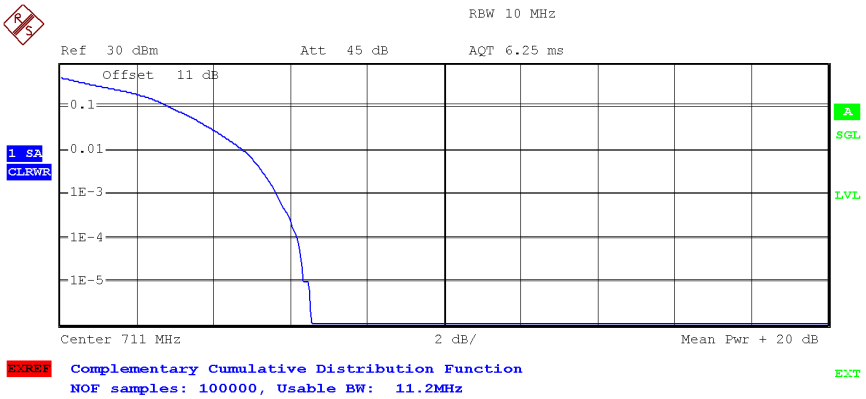
10MHz/16QAM in Ch.23780(50RB Size)



	Trace 1
Mean	19.78 dBm
Peak	26.15 dBm
Crest	6.37 dB
10 %	2.82 dB
1 %	4.71 dB
.1 %	5.58 dB
.01 %	6.03 dB

Date: 22.OCT.2018 17:52:52

10MHz/16QAM in Ch.23790(50RB Size)



	Trace 1
Mean	19.68 dBm
Peak	26.22 dBm
Crest	6.54 dB
10 %	2.85 dB
1 %	4.78 dB
.1 %	5.64 dB
.01 %	6.19 dB

Date: 22.OCT.2018 17:48:38

10MHz/16QAM in Ch.23800(50RB Size)

5.3 99% &26dB occupied Bandwidth (Reporting Only)

5.3.1 Description of 99% Occupied Bandwidth and 26dB Bandwidth Measurement

The 99% occupied band width is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The emission bandwidth is defined as the width of the signal between two points, located at the 2 sides of the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

5.3.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

5.3.3 Test Procedure

a. The EUT was connected to spectrum analyzer and system simulator via a power divider.

b. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.

c. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5% of the anticipated OBW, and the VBW shall be at least 3 times the RBW.

d. Set the detection mode to peak, and the trace mode to max hold.

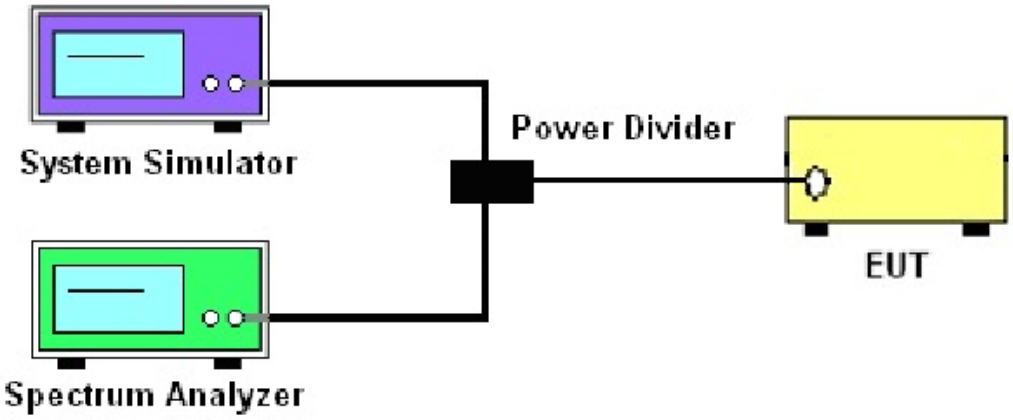
e. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace. (this is the reference value)

f. Determine the “-26 dB down amplitude” as equal to (Reference Value-X).

g. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “-X dB down amplitude” determined in step e. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.

h. Use the 99% power bandwidth function of the spectrum analyzer and report the measured bandwidth.

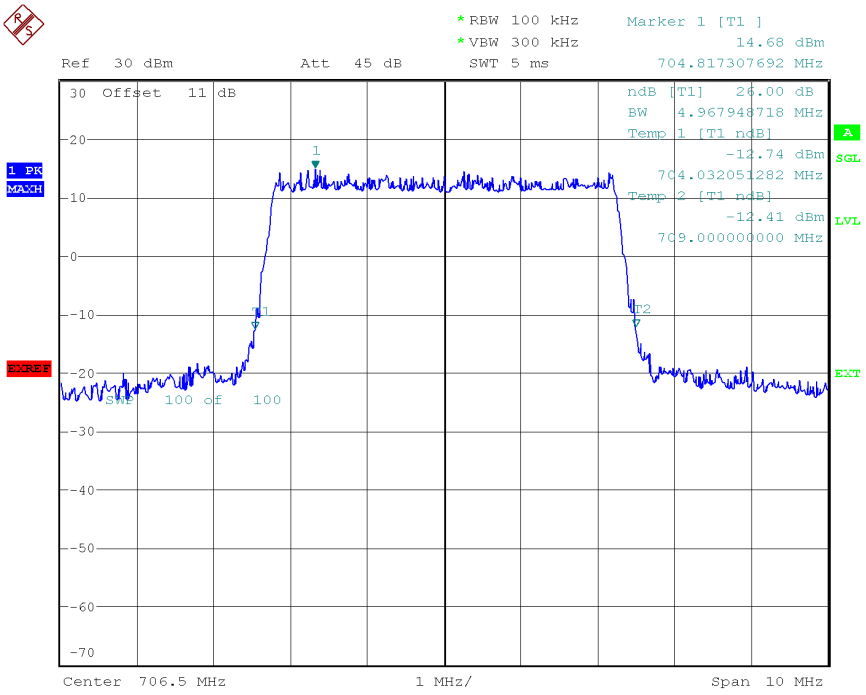
5.3.4 Test Setup



5.3.5 Test Result

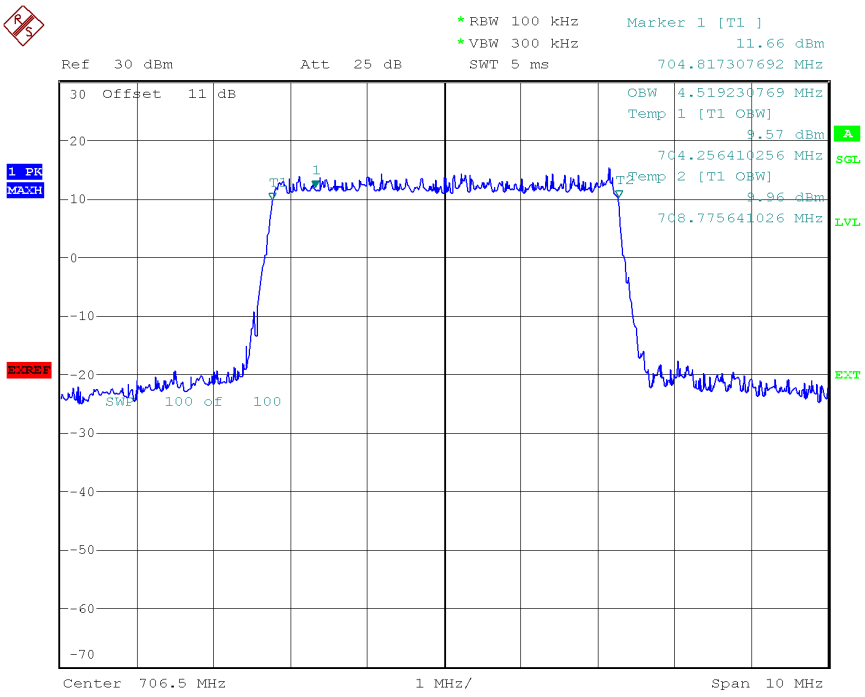
The maximum RB configurations of the 99% Occupied Bandwidth and 26dB

	LTE Band17					
	5MHz/QPSK			5MHz/16QAM		
	Low23755	Mid.23790	High23825	Low23755	Mid.	High23825
26dB	4.968	5.000	4.968	4.936	4.952	4.952
99%	4.519	4.519	4.535	4.519	4.535	4.519
	10MHz/QPSK			10MHz/16QAM		
	Low23780	Mid.23790	High23800	Low23780	Mid.	High23800
26dB	10.096	10.096	10.128	10.128	10.128	10.032
99%	9.071	9.135	9.103	9.103	9.103	9.103



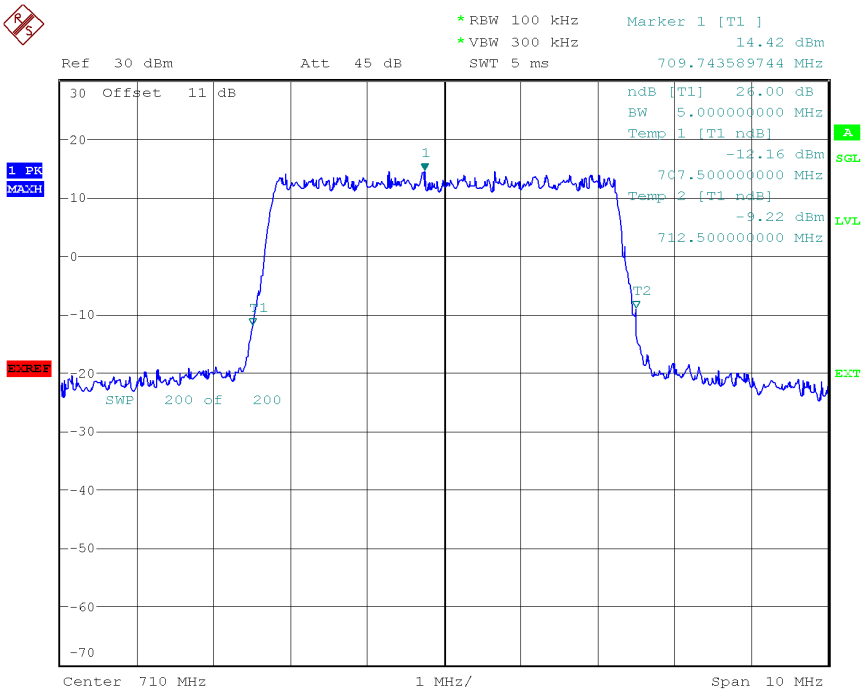
Date: 15.OCT.2018 10:42:49

FDD-LTE17 5M/QPSK Low Channel 26dB BW



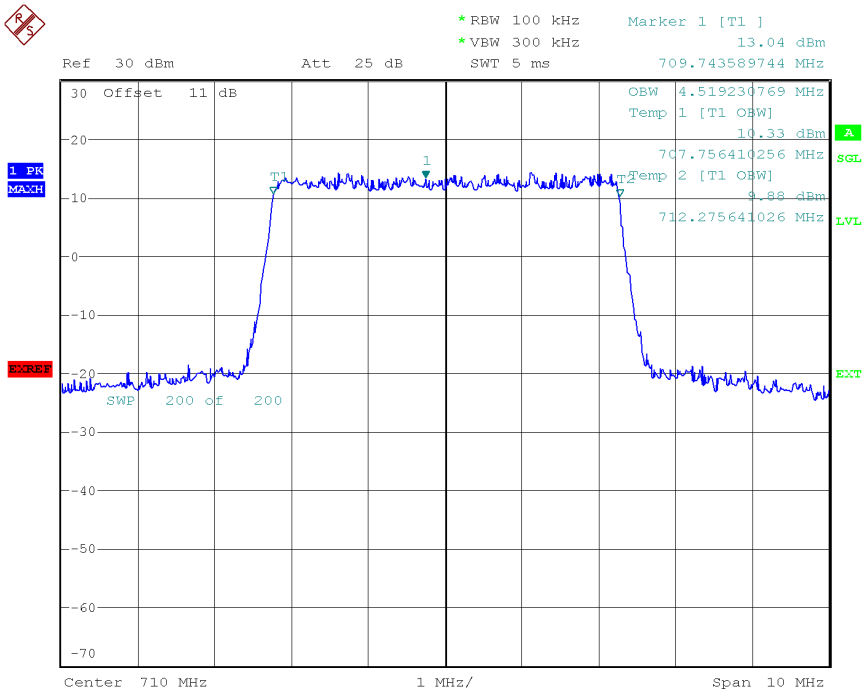
Date: 15.OCT.2018 10:45:28

FDD-LTE17 5M/QPSK Low Channel 99% OBW



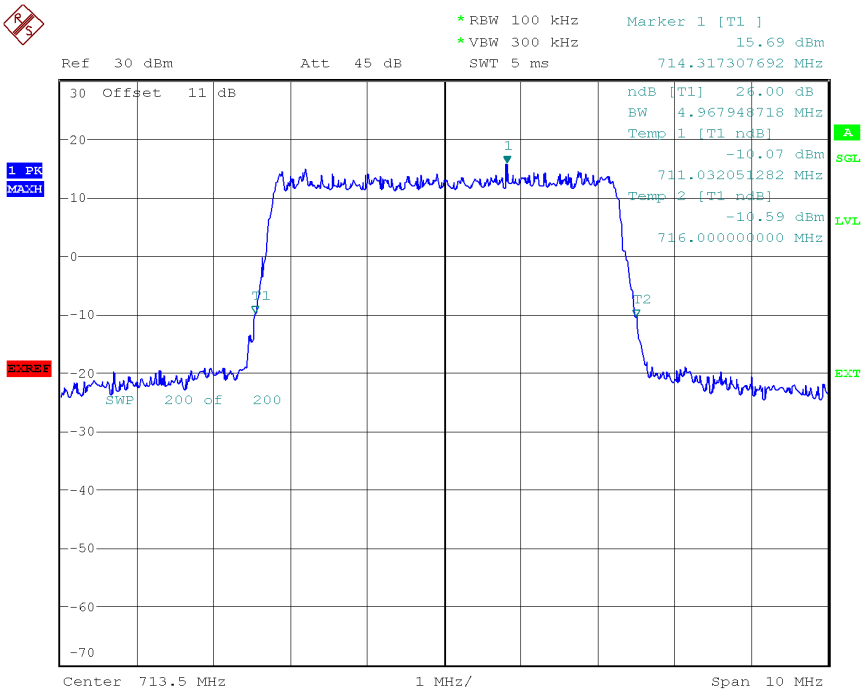
Date: 15.OCT.2018 10:59:13

FDD-LTE17 5M/QPSK Mid Channel 26dB BW



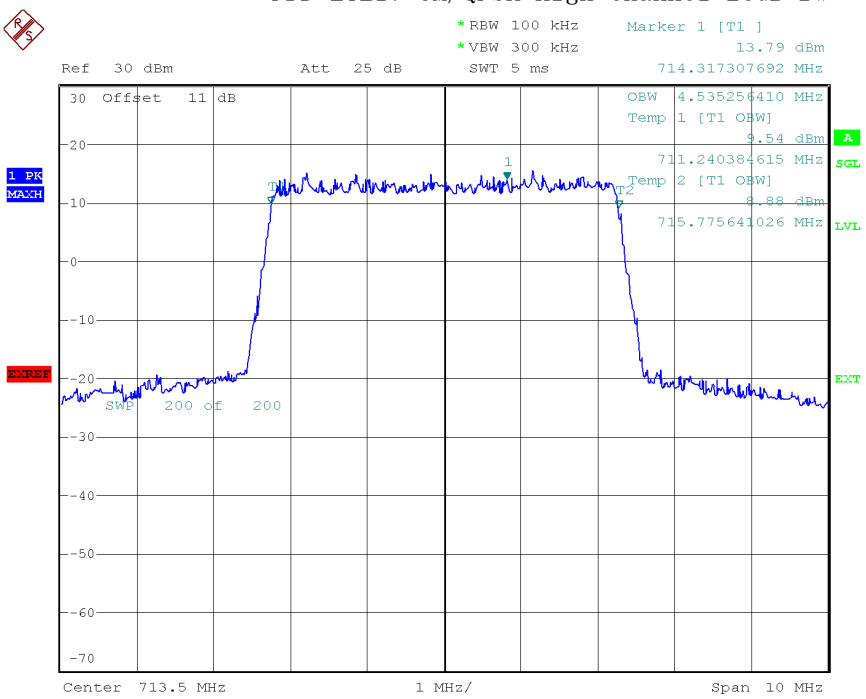
Date: 15.OCT.2018 11:00:15

FDD-LTE17 5M/QPSK Mid Channel 99% OBW



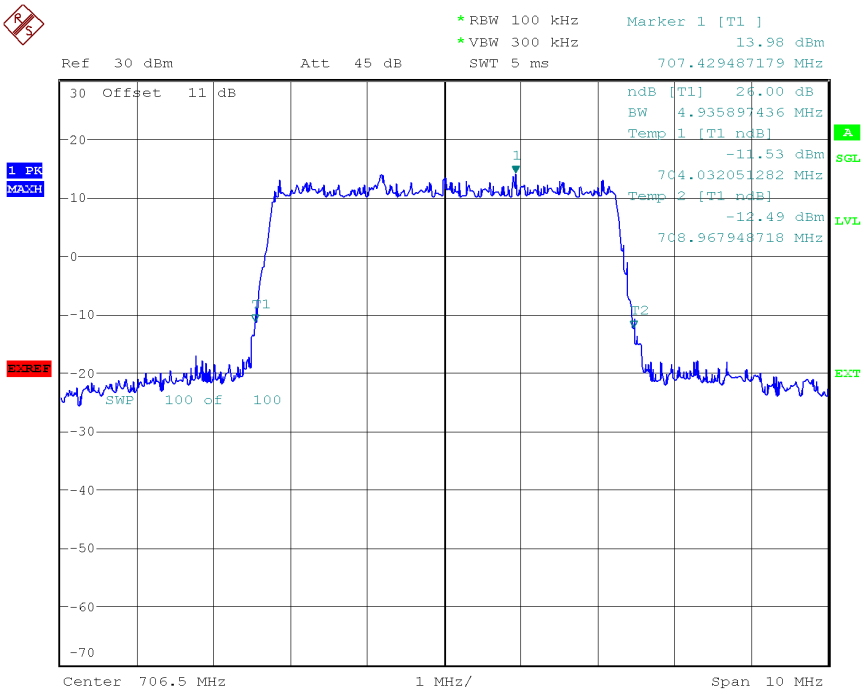
Date: 15.OCT.2018 10:53:24

FDD-LTE17 5M/QPSK High Channel 26dB BW



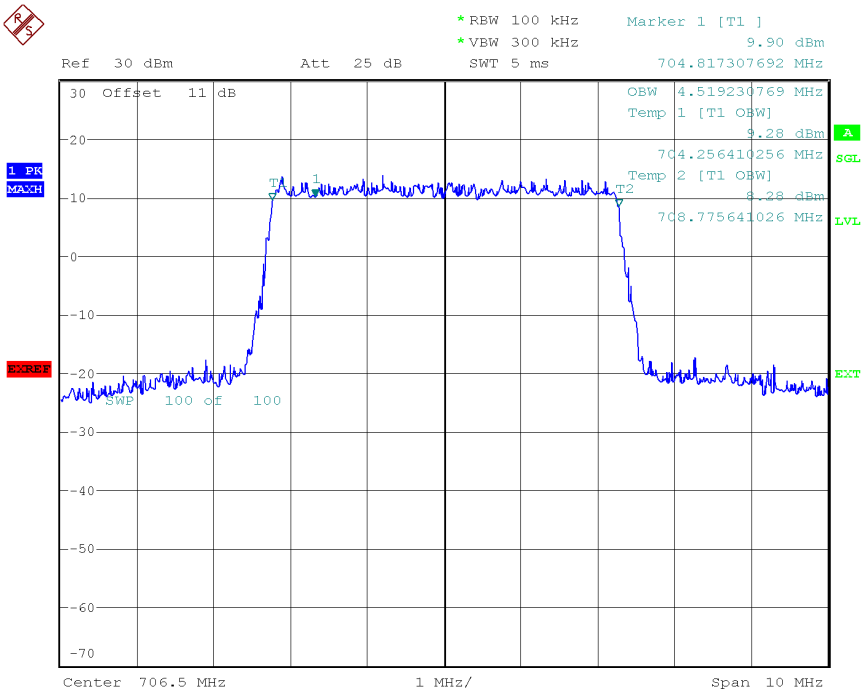
Date: 15.OCT.2018 10:54:48

FDD-LTE17 5M/QPSK High Channel 99% OBW



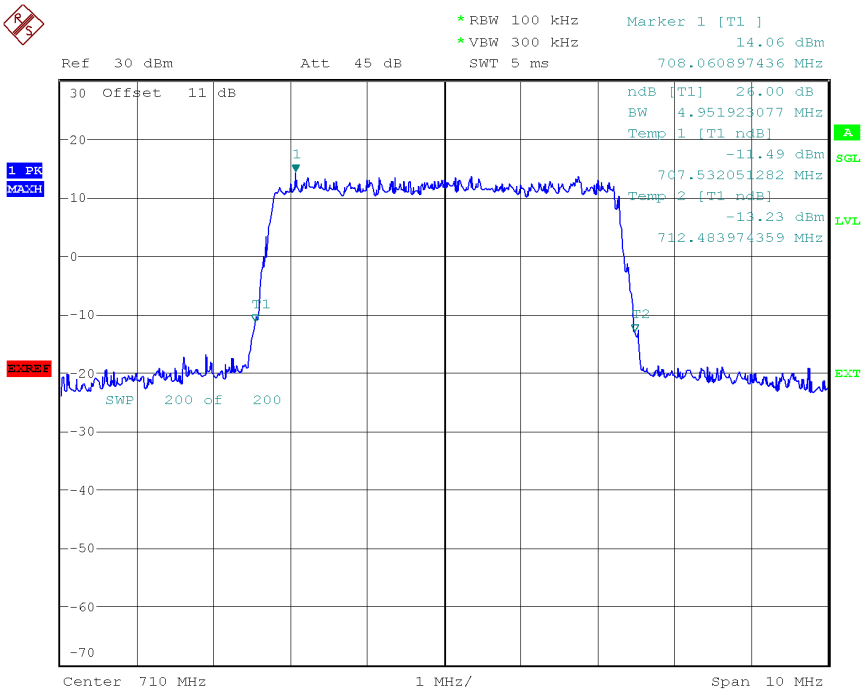
Date: 15.OCT.2018 10:48:12

FDD-LTE17 5M/16QAM Low Channel 26dB BW



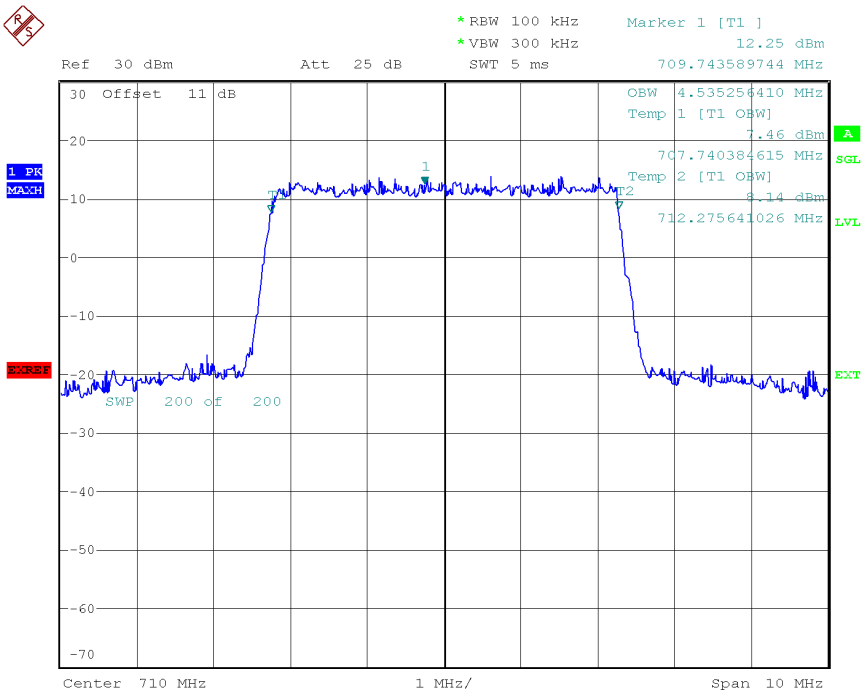
Date: 15.OCT.2018 10:46:55

FDD-LTE17 5M/16QAM Low Channel 99% OBW



Date: 15.OCT.2018 11:02:35

FDD-LTE17 5M/16QAM Mid Channel 26dB BW



Date: 15.OCT.2018 11:01:43

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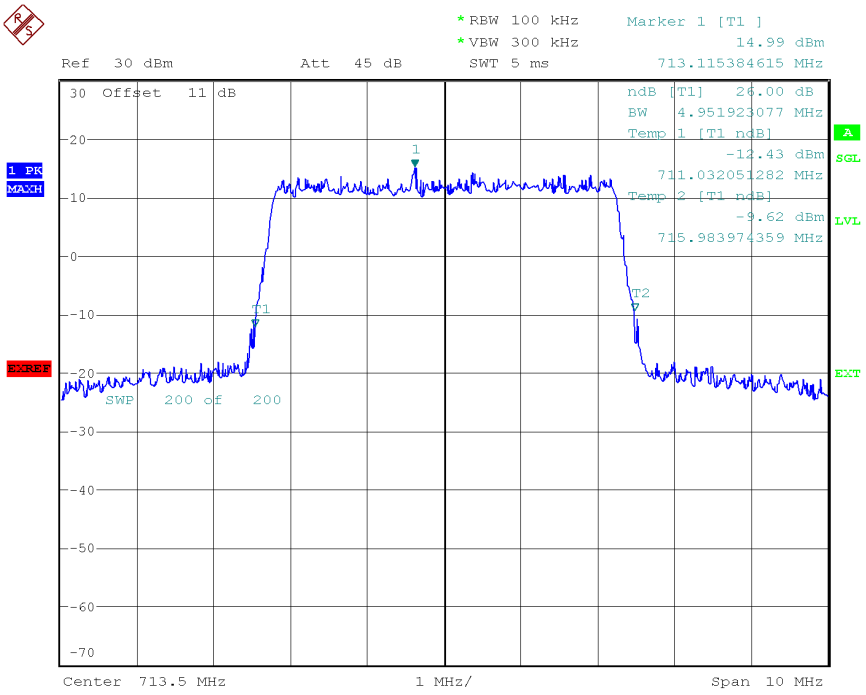

Date: 15.OCT.2018 10:56:38

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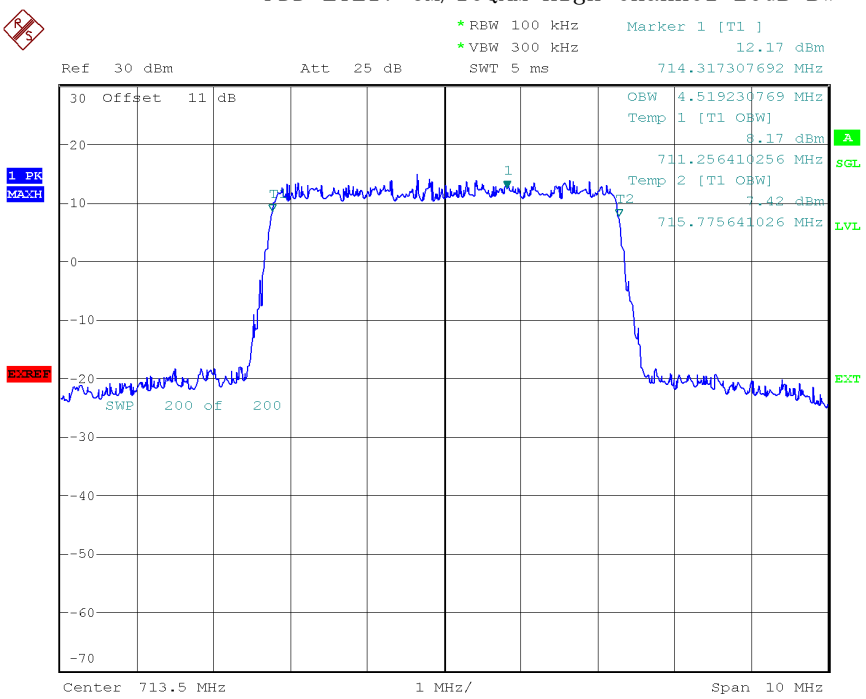

Date: 15.OCT.2018 10:55:39

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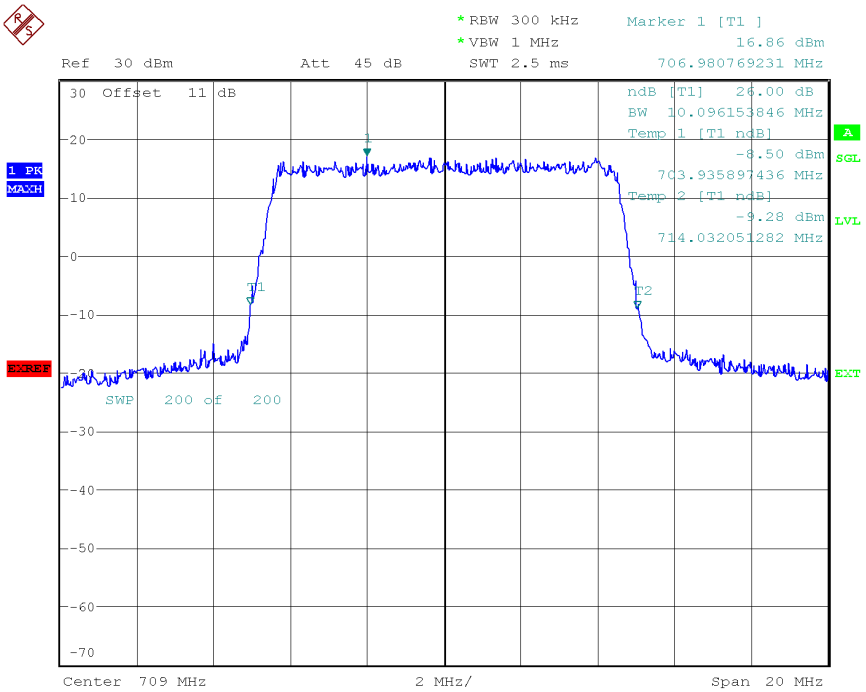
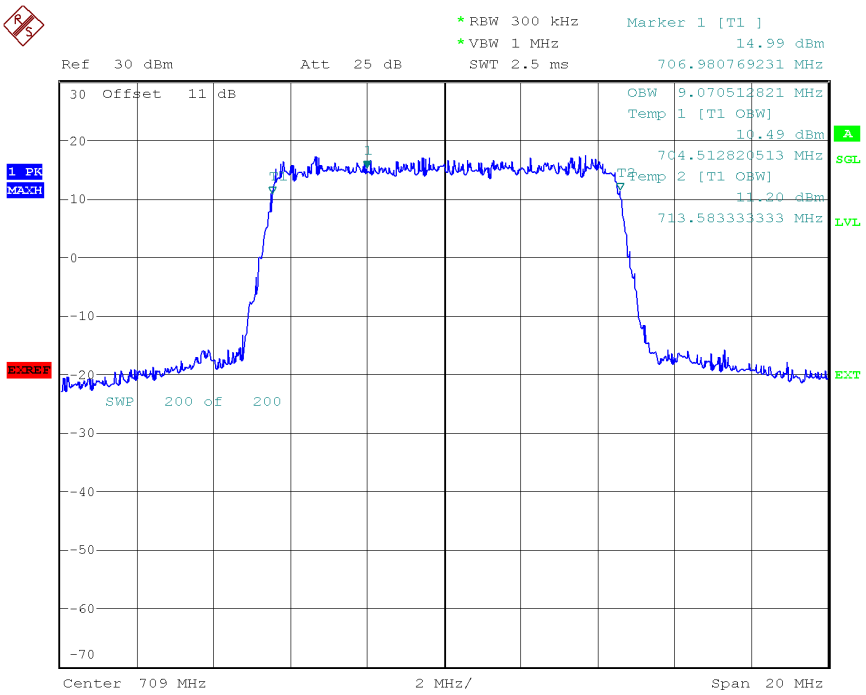


Date: 15.OCT.2018 11:19:39

FDD-LTE17 10M/QPSK Low Channel 26dB BW



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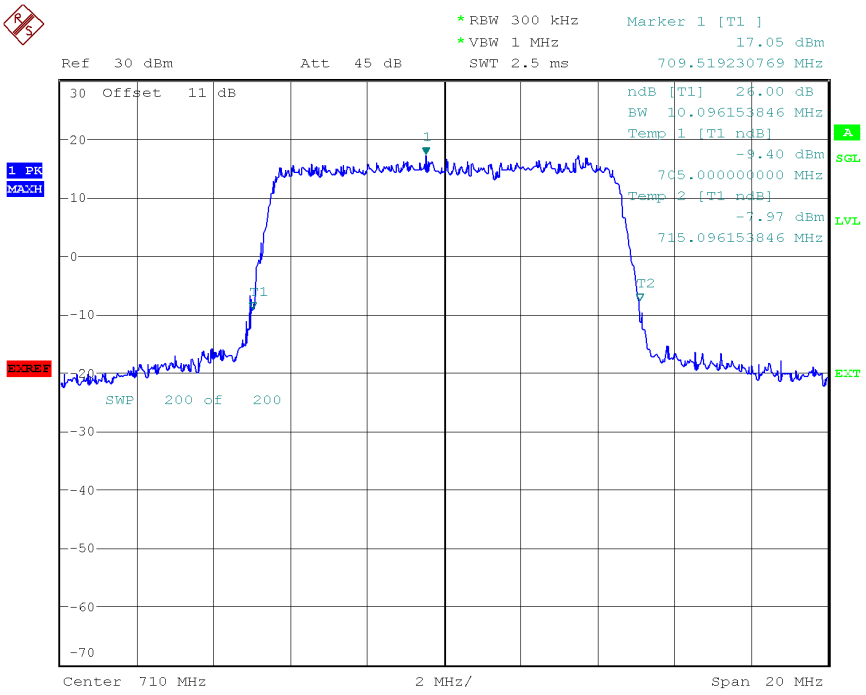
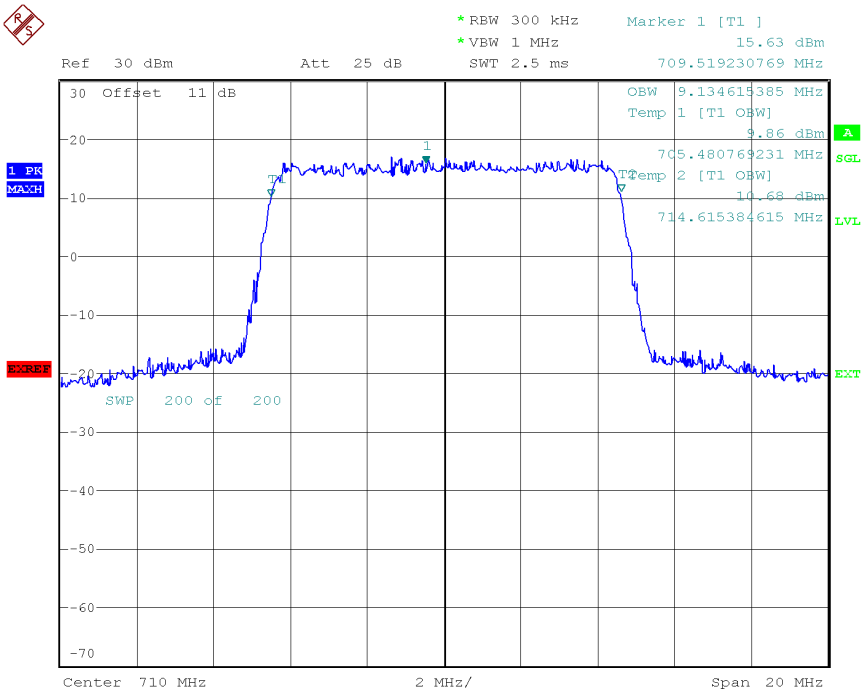
FDD-LTE17 10M/QPSK Low Channel 99% OBW



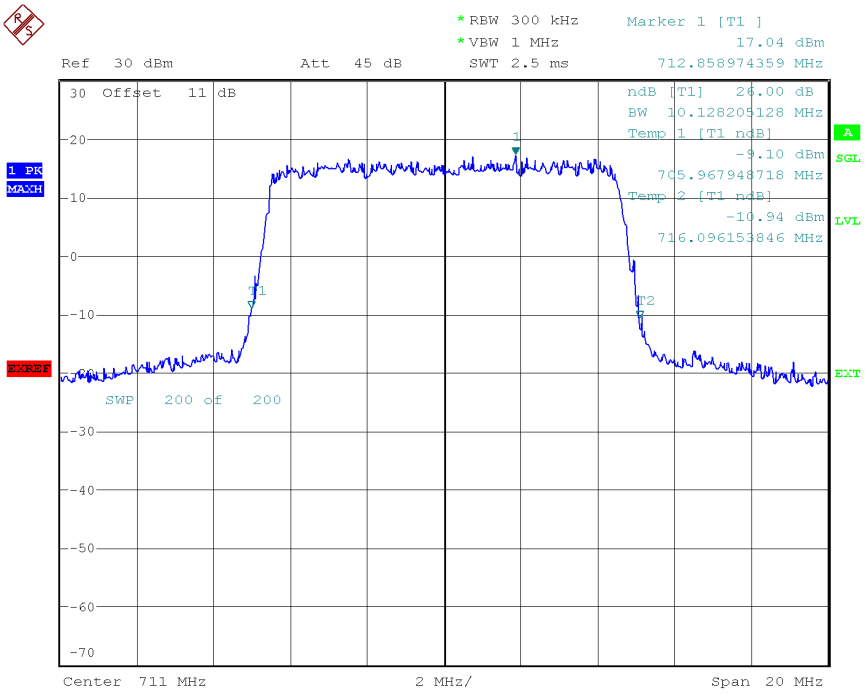
Date: 15.OCT.2018 11:15:34

FDD-LTE17 10M/QPSK Mid Channel 26dB BW



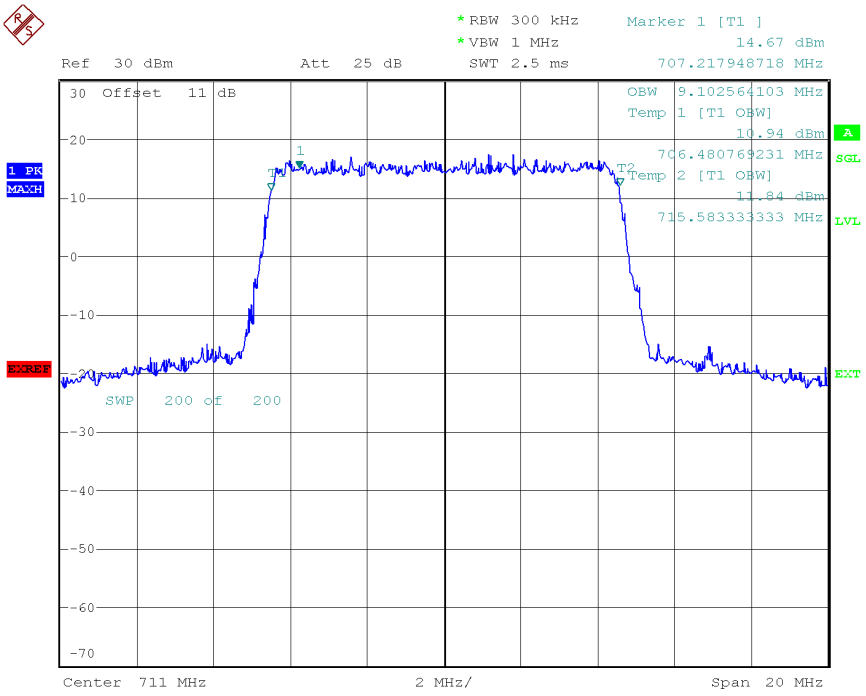
Date: 15.OCT.2018 11:16:56

FDD-LTE17 10M/QPSK Mid Channel 99% OBW



Date: 15.OCT.2018 11:32:42

FDD-LTE17 10M/QPSK High Channel 26dB BW



Date: 15.OCT.2018 11:31:49

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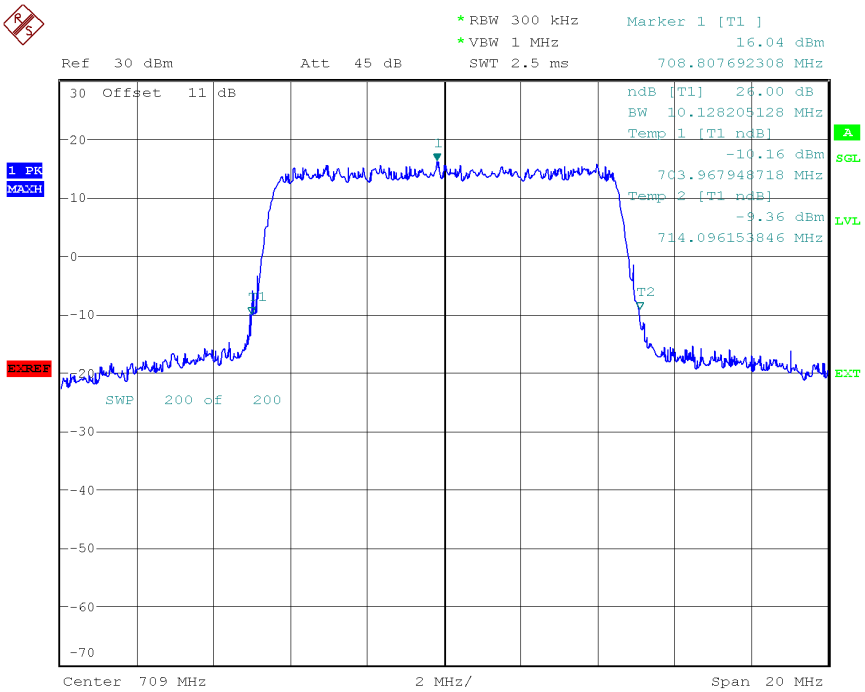
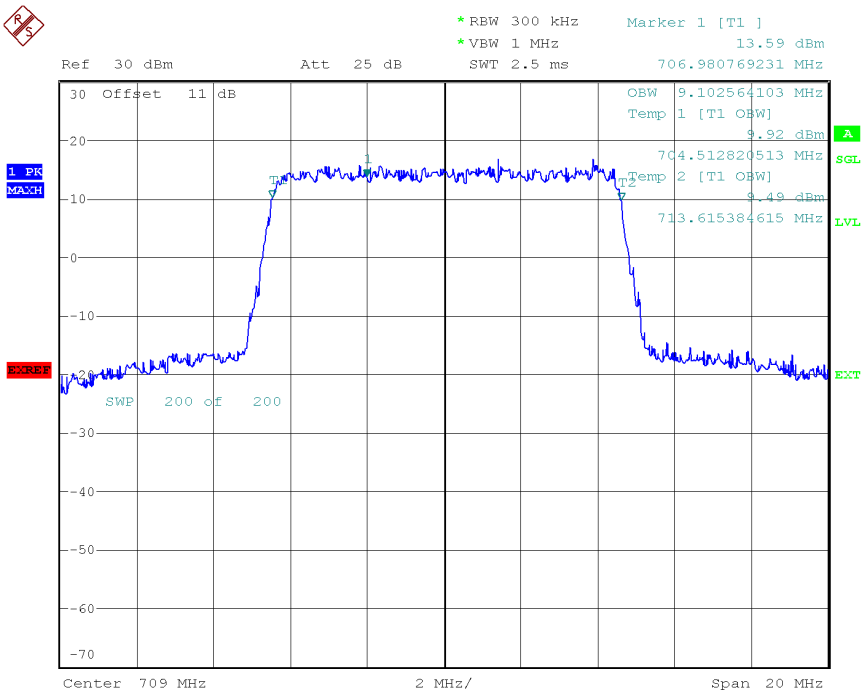


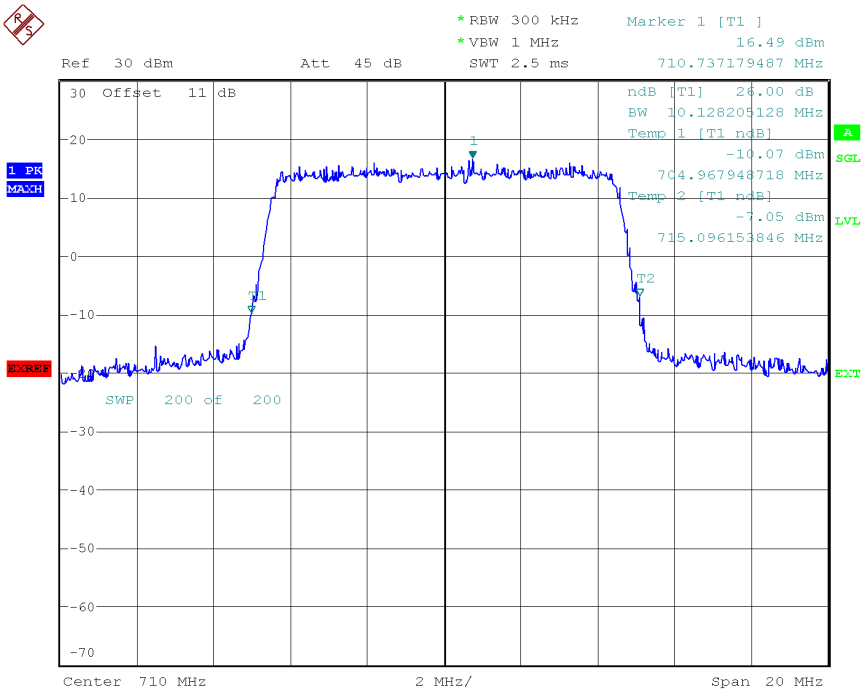
Date: 15.OCT.2018 11:23:17

FDD-LTE17 10M/16QAM Low Channel 26dB BW



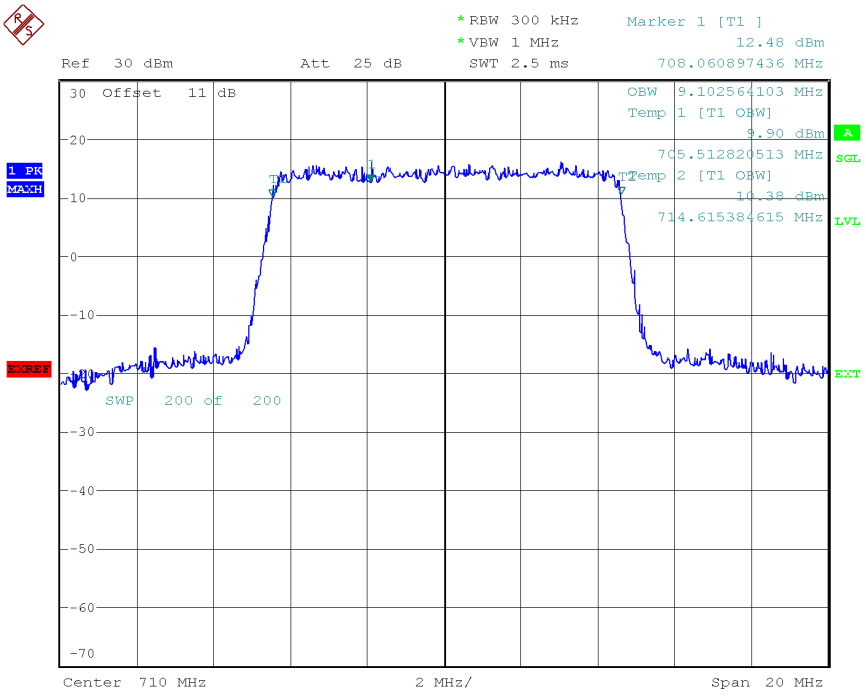
Date: 15.OCT.2018 11:22:31

FDD-LTE17 10M/16QAM Low Channel 99% OBW



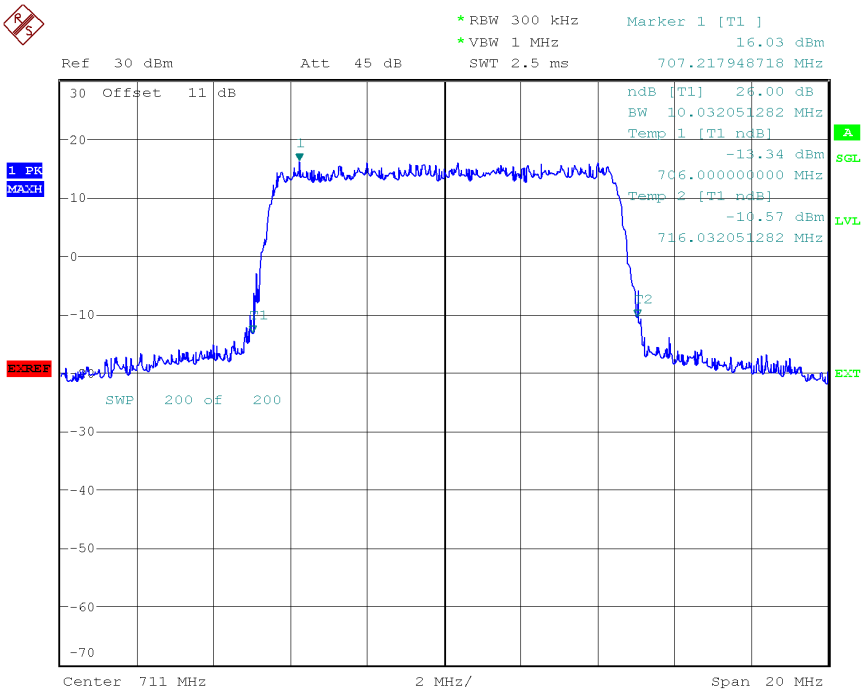
Date: 15.OCT.2018 11:10:13

FDD-LTE17 10M/16QAM Mid Channel 26dB BW



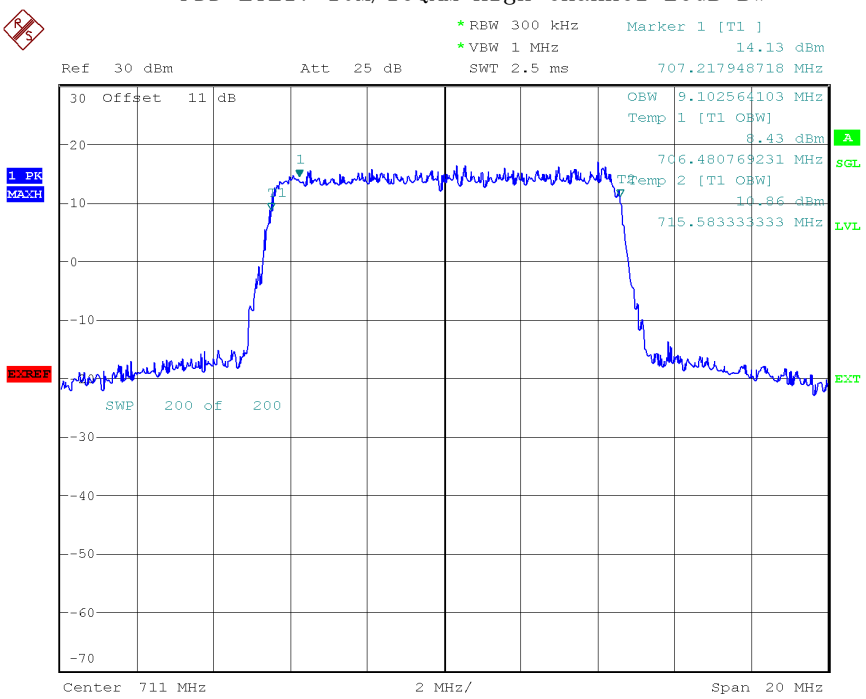
Date: 15.OCT.2018 11:09:10

FDD-LTE17 10M/16QAM Mid Channel 99% OBW



Date: 15.OCT.2018 11:25:24

FDD-LTE17 10M/16QAM High Channel 26dB BW



Date: 15.OCT.2018 11:26:38

FDD-LTE17 10M/16QAM High Channel 99% OBW

5.4 Band Edge

5.4.1 Description of Conducted Band Edge Measurement

22.917(a) for Band5.

For operations in the 824-849MHz band, the FCC limit is $43+10\log_{10}$ (P[Watts]) dB below the transmitter power P(Watts) in a 100kHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

24.238(a) for Band2, 25

For operations in the 1850-1910MHz band and 1930-1990MHz, the FCC limit is $43+10\log_{10}$(P[Watts]) dB below the transmitter power P(Watts) in a 1MHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

27.53(g) for Band12, 17

For operations in the 698-746MHz band, the FCC limit is 43+10log(P[Watts]) dB below the transmitter power P(Watts) in a 100kHz bandwidth. However, in the 100kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30kHz may be employed.

27.53 (h) for Band4

For operations in the 1710-1755MHz band, the FCC limit is 43+10log(P[Watts]) dB below the transmitter power P(Watts) in a 1MHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

27.53 (m)(4) for FCC Band7, 41

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

5.4.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

5.4.3 Test Procedure

a. The EUT was connected to the spectrum analyzer and system simulator via a power divider.

b. The band edges of low and high channels for the highest RF powers were measured.

c. Set RBW>=1% EBW in the 1MHz band immediately outside and adjacent to the band edge.

d. Beyond the 1 MHz band from the band edge, RBW=1MHz was used or a narrower RBW was used and the measured power was integrated over the full required measurement bandwidth of 1 MHz.

e. Set spectrum analyzer with RMS detector.

f. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

g. Checked that all the results comply with the emission limit line.

   Example:

   The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)

   =P(W)-[43+10log(P)](dB)

   =[30 + 10log(P)](dBm)-[43+10log(P)](dB) = -13dBm.

h. For LTE Band7, the other 40 dB, and 55 dB have additionally applied same calculation above. The limit line is derived from 40 + 10log(P)dB below the transmitter power P(Watts)

   =P(W)-[40+10log(P)](dB)

   =[30+10log(P)](dBm)-[40+10log(P)](dB)

   =-10dBm

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

   =P(W)-[43+10log(P)](dB)

   =[30+10log(P)](dBm)-[43+10log(P)](dB)

   =-13dBm

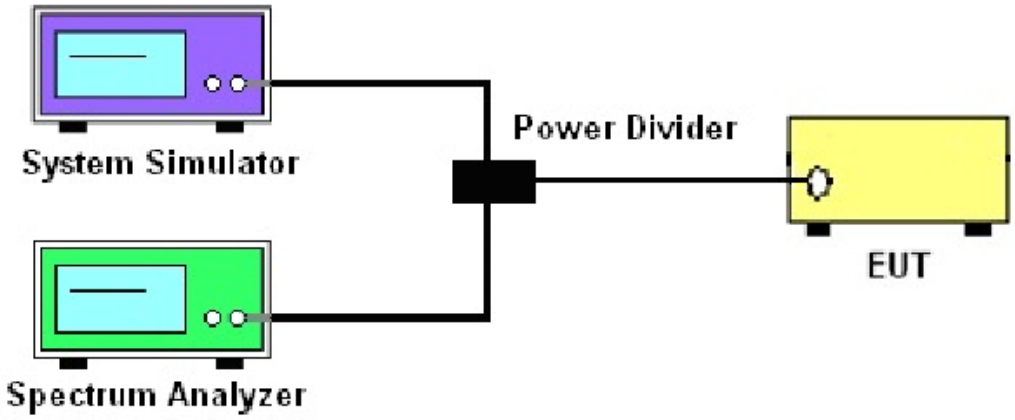
   The limit line is derived from 55+10log(P)dB below the transmitter power P(Watts)

   = P(W)-[55+10log(P)](dB)

   =[30+10log(P)](dBm)-[55+10log(P)](dB)

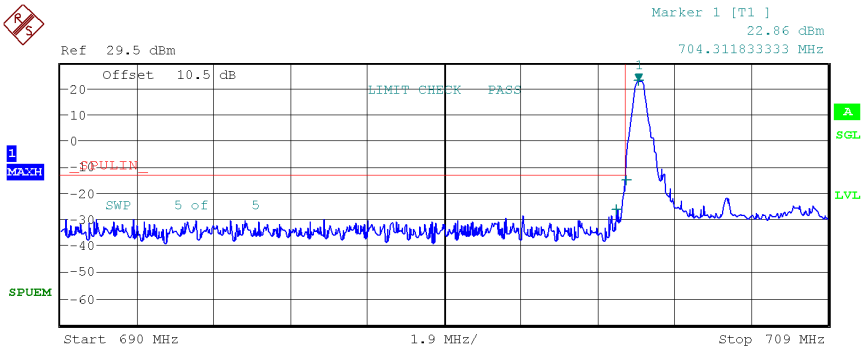
   =-25dBm

5.4.4 Test Setup



5.4.5 Test Result

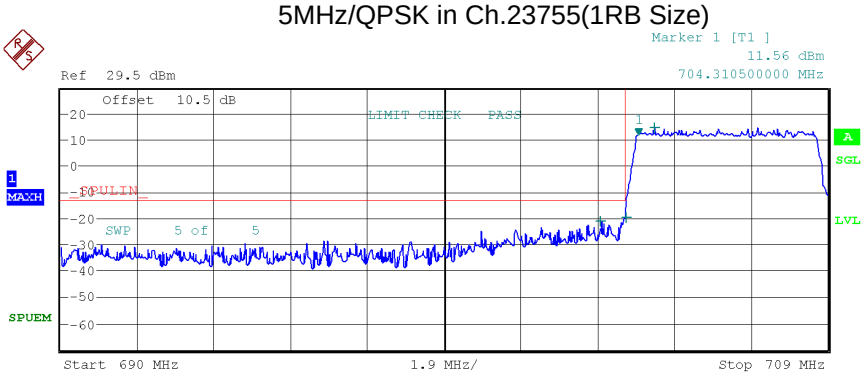
	LTE Band17			
	5MHz/QPSK		5MHz/16QAM	
	Low23755	High23825	Low23755	High23825
Bandedge 1RB	PASS	PASS	PASS	PASS
Bandedge FRB	PASS	PASS	PASS	PASS
	10MHz/QPSK		10MHz/16QAM	
	Low23780	High23800	Low23780	High23800
Bandedge 1RB	PASS	PASS	PASS	PASS
Bandedge FRB	PASS	PASS	PASS	PASS



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
690.000 M	703.900 M	100.00 k	703.766346 M	-26.59	-13.59
703.900 M	704.000 M	30.00 k	703.998290 M	-15.49	-2.49
704.000 M	709.000 M	100.00 k	704.311833 M	22.86	-7.14

Date: 15.OCT.2018 14:24:05

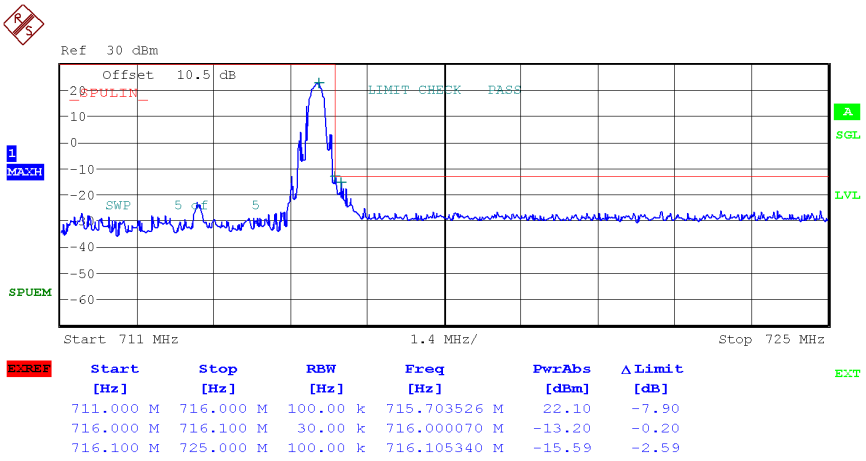
5MHz/QPSK in Ch.23755(1RB Size)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
690.000 M	703.900 M	100.00 k	703.365385 M	-21.29	-8.29
703.900 M	704.000 M	30.00 k	703.997950 M	-20.02	-7.02
704.000 M	709.000 M	100.00 k	704.720667 M	14.05	-15.95

Date: 15.OCT.2018 14:25:21

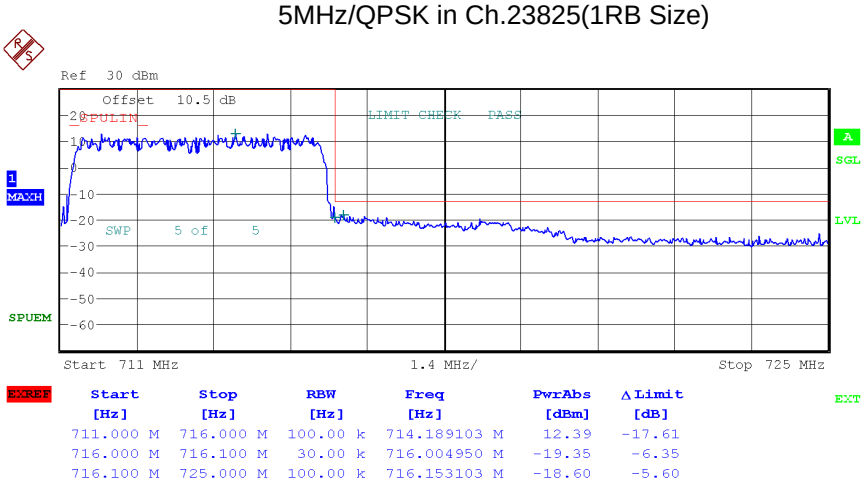
5MHz/QPSK in Ch.23755(25RB Size)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
711.000 M	716.000 M	100.00 k	715.703526 M	22.10	-7.90
716.000 M	716.100 M	30.00 k	716.000070 M	-13.20	-0.20
716.100 M	725.000 M	100.00 k	716.105340 M	-15.59	-2.59

Date: 15.OCT.2018 14:36:25

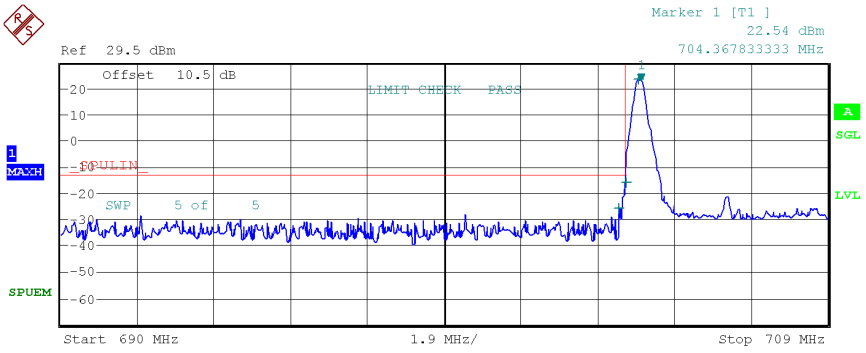
5MHz/QPSK in Ch.23825(1RB Size)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
711.000 M	716.000 M	100.00 k	714.189103 M	12.39	-17.61
716.000 M	716.100 M	30.00 k	716.004950 M	-19.35	-6.35
716.100 M	725.000 M	100.00 k	716.153103 M	-18.60	-5.60

Date: 15.OCT.2018 14:37:10

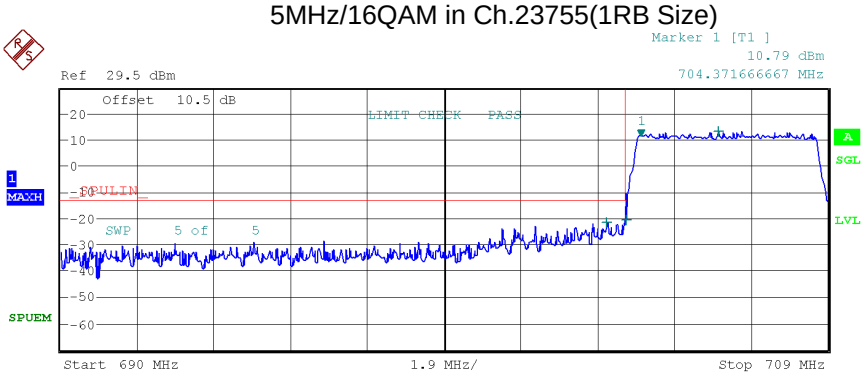
5MHz/QPSK in Ch.23825(25RB Size)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
690.000 M	703.900 M	100.00 k	703.833173 M	-26.15	-13.15
703.900 M	704.000 M	30.00 k	703.998820 M	-16.20	-3.20
704.000 M	709.000 M	100.00 k	704.297167 M	23.10	-6.90

Date: 15.OCT.2018 14:27:54

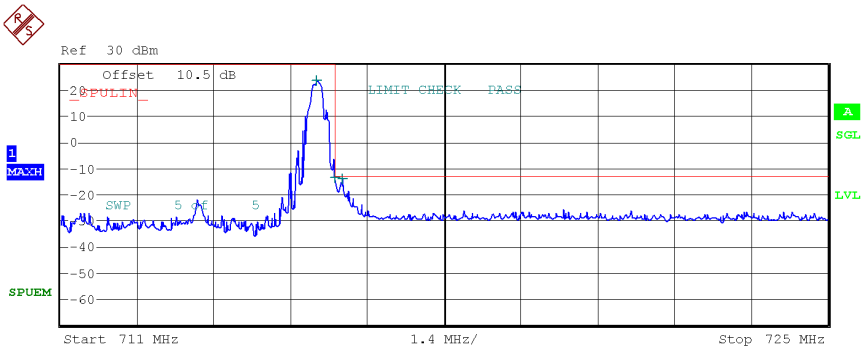
5MHz/16QAM in Ch.23755(1RB Size)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
690.000 M	703.900 M	100.00 k	703.521314 M	-22.13	-9.13
703.900 M	704.000 M	30.00 k	703.998000 M	-20.99	-7.99
704.000 M	709.000 M	100.00 k	706.304500 M	12.85	-17.15

Date: 15.OCT.2018 14:27:11

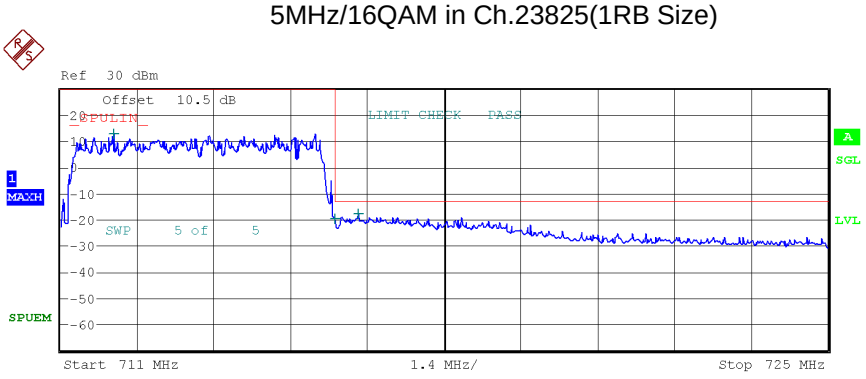
5MHz/16QAM in Ch.23755(25RB Size)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
711.000 M	716.000 M	100.00 k	715.671474 M	23.23	-6.77
716.000 M	716.100 M	30.00 k	716.012790 M	-14.07	-1.07
716.100 M	725.000 M	100.00 k	716.142127 M	-14.53	-1.53

Date: 15.OCT.2018 14:39:37

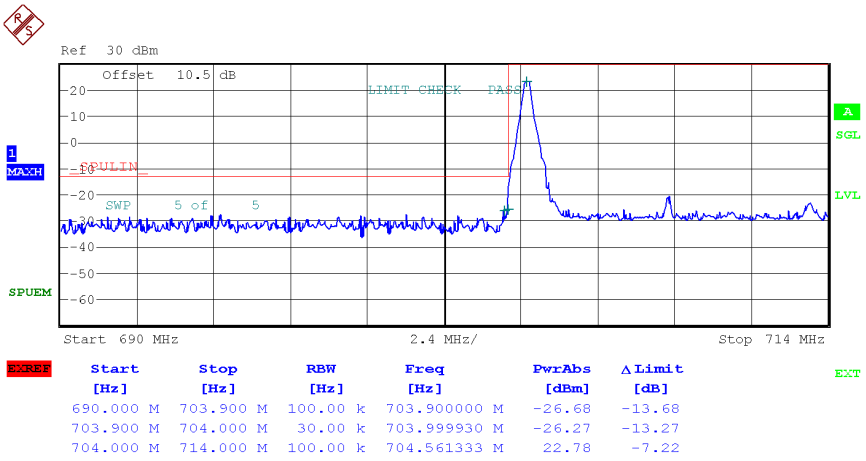
5MHz/16QAM in Ch.23825(1RB Size)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
711.000 M	716.000 M	100.00 k	711.953526 M	12.30	-17.70
716.000 M	716.100 M	30.00 k	716.010710 M	-20.17	-7.17
716.100 M	725.000 M	100.00 k	716.429597 M	-18.24	-5.24

Date: 15.OCT.2018 14:38:02

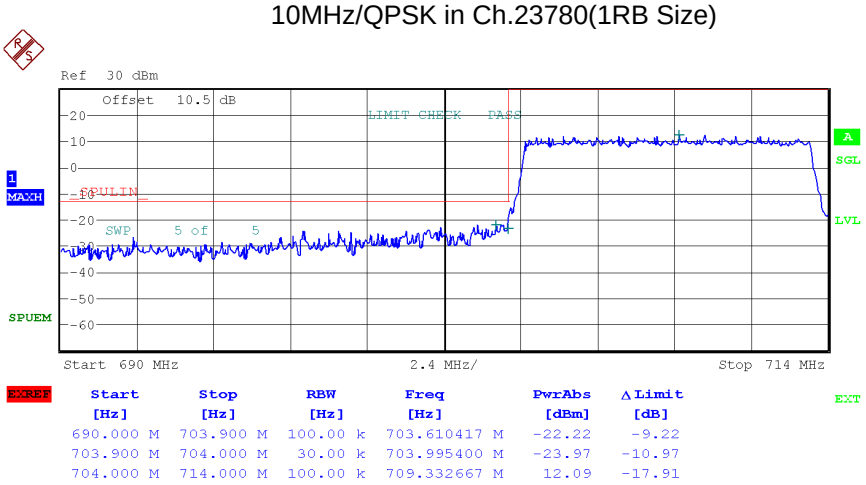
5MHz/16QAM in Ch.23825(25RB Size)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
690.000 M	703.900 M	100.00 k	703.900000 M	-26.68	-13.68
703.900 M	704.000 M	30.00 k	703.999930 M	-26.27	-13.27
704.000 M	714.000 M	100.00 k	704.561333 M	22.78	-7.22

Date: 15.OCT.2018 14:46:37

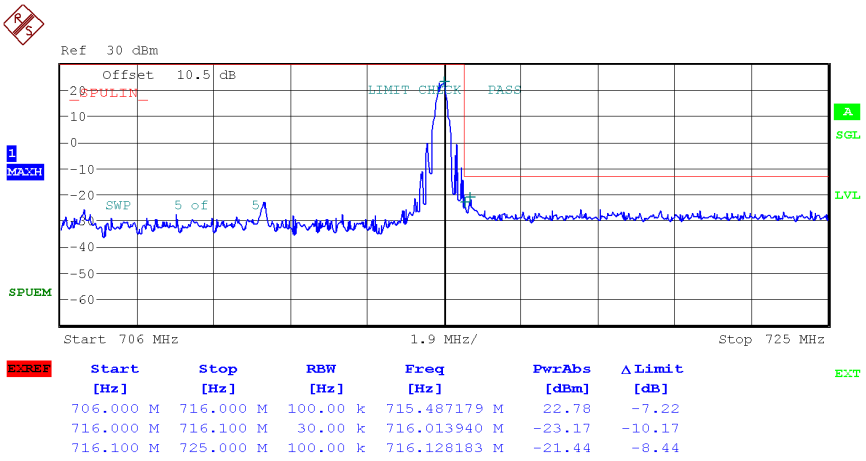
10MHz/QPSK in Ch.23780(1RB Size)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
690.000 M	703.900 M	100.00 k	703.610417 M	-22.22	-9.22
703.900 M	704.000 M	30.00 k	703.995400 M	-23.97	-10.97
704.000 M	714.000 M	100.00 k	709.332667 M	12.09	-17.91

Date: 15.OCT.2018 14:46:00

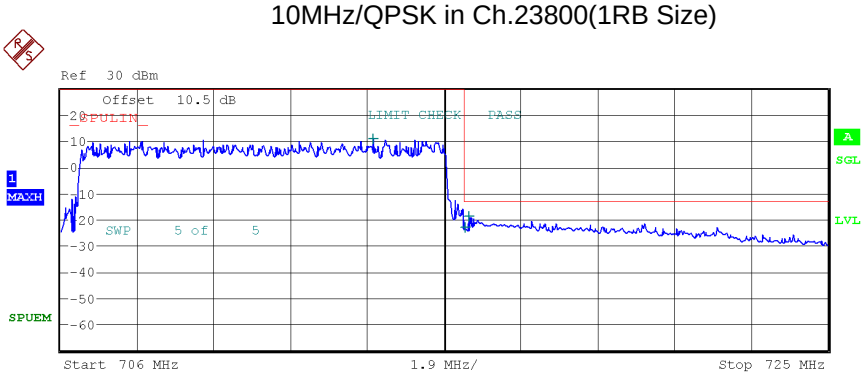
10MHz/QPSK in Ch.23780(50RB Size)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
706.000 M	716.000 M	100.00 k	715.487179 M	22.78	-7.22
716.000 M	716.100 M	30.00 k	716.013940 M	-23.17	-10.17
716.100 M	725.000 M	100.00 k	716.128183 M	-21.44	-8.44

Date: 15.OCT.2018 14:56:30

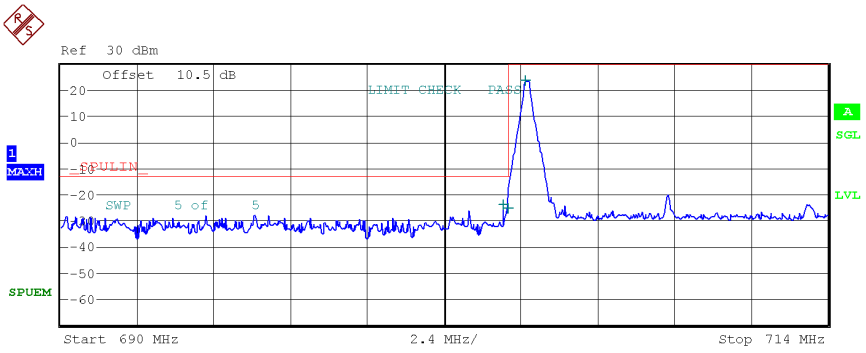
10MHz/QPSK in Ch.23800(1RB Size)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
706.000 M	716.000 M	100.00 k	713.724359 M	10.35	-19.65
716.000 M	716.100 M	30.00 k	716.020750 M	-23.15	-10.15
716.100 M	725.000 M	100.00 k	716.100000 M	-19.17	-6.17

Date: 15.OCT.2018 14:57:20

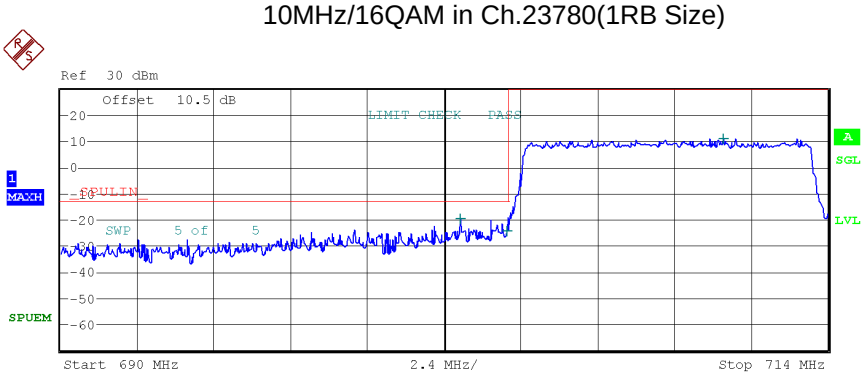
10MHz/QPSK in Ch.23800(50RB Size)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
690.000 M	703.900 M	100.00 k	703.855449 M	-24.40	-11.40
703.900 M	704.000 M	30.00 k	703.994450 M	-25.73	-12.73
704.000 M	714.000 M	100.00 k	704.533333 M	23.02	-6.98

Date: 15.OCT.2018 14:47:18

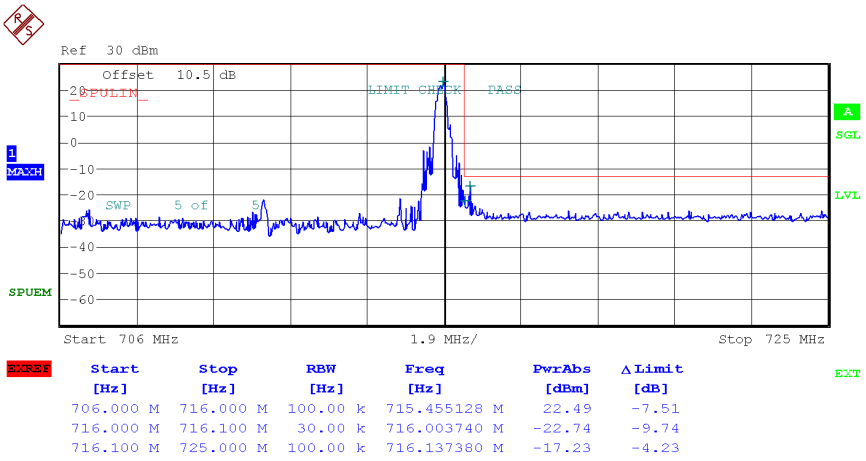
10MHz/16QAM in Ch.23780(1RB Size)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
690.000 M	703.900 M	100.00 k	702.496635 M	-20.01	-7.01
703.900 M	704.000 M	30.00 k	703.970060 M	-24.78	-11.78
704.000 M	714.000 M	100.00 k	710.725667 M	10.48	-19.52

Date: 15.OCT.2018 14:47:58

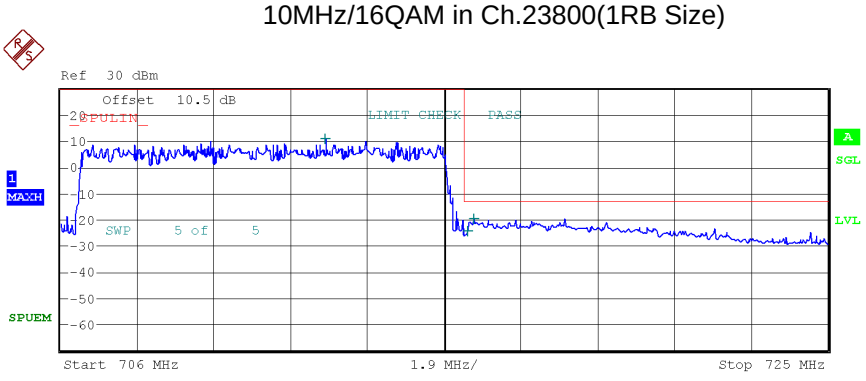
10MHz/16QAM in Ch.23780(50RB Size)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
706.000 M	716.000 M	100.00 k	715.455128 M	22.49	-7.51
716.000 M	716.100 M	30.00 k	716.003740 M	-22.74	-9.74
716.100 M	725.000 M	100.00 k	716.137380 M	-17.23	-4.23

Date: 15.OCT.2018 14:55:47

10MHz/16QAM in Ch.23800(1RB Size)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
706.000 M	716.000 M	100.00 k	712.554487 M	10.57	-19.43
716.000 M	716.100 M	30.00 k	716.067220 M	-24.67	-11.67
716.100 M	725.000 M	100.00 k	716.218963 M	-19.78	-6.78

Date: 15.OCT.2018 14:55:11

10MHz/16QAM in Ch.23800(50RB Size)

5.5 Conducted Spurious Emissions

5.5.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power(P) by a factor of at least 43+10log(P) dB.

For band7, 41:
The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power(P) by a factor of at least 55+10log(P) dB.
It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10^{th} harmonic.

5.5.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

5.5.3 Test Procedure

a. The EUT was connected to the spectrum analyzer and system simulator via a power divider.

b. 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.

c. The middle channel for the highest RF power within the transmitting frequency was measured.

d. The conducted spurious emission for the whole frequency range was taken.

e. Make the measurement with the spectrum analyzer's RBW=1MHz, VBW=3MHz.

f. Set spectrum analyzer with RMS detector.

g. Taking the record of maximum spurious emission.

i. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

j. The limit line is derived from 43+10log(P) dB below the transmitter power P(Watts).
=P(W)-[43+10log(P)](dB)

=[30+10log(P)](dBm)-[43+10log(P)](dB)

=-13dBm.

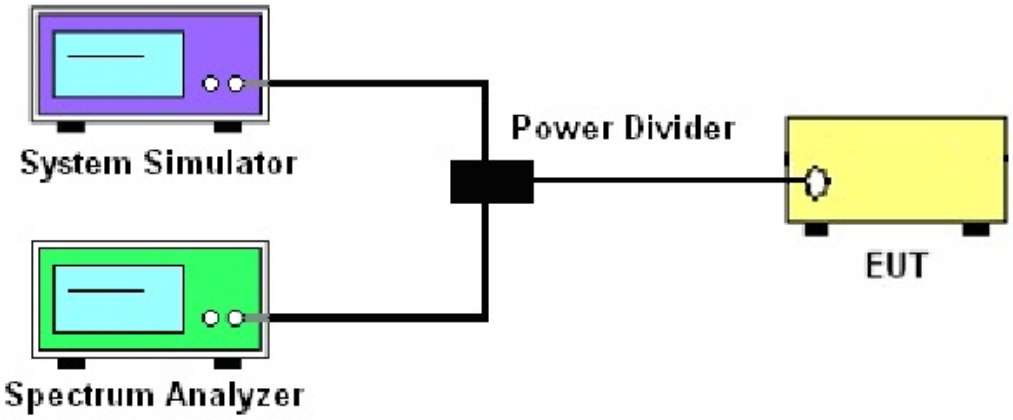
For Band7, 41

The limit line is derived from 55+10log(P) dB below the transmitter power P(Watts).
=P(W)-[55+10log(P)](dB)

=[30+10log(P)](dBm)-[55+10log(P)](dB)

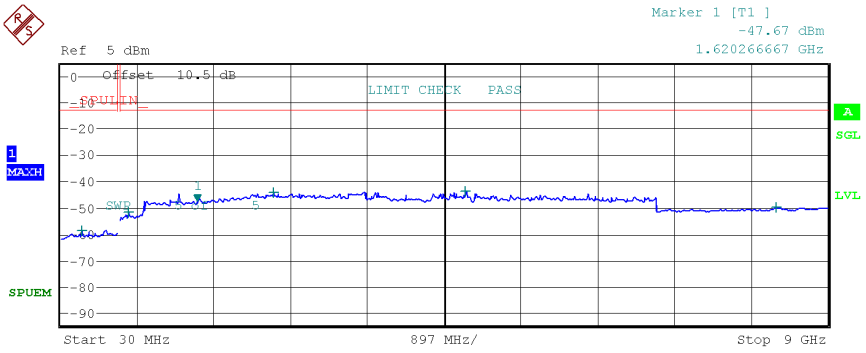
=-25dBm.

5.5.4 Test Setup



5.5.5 Test Result

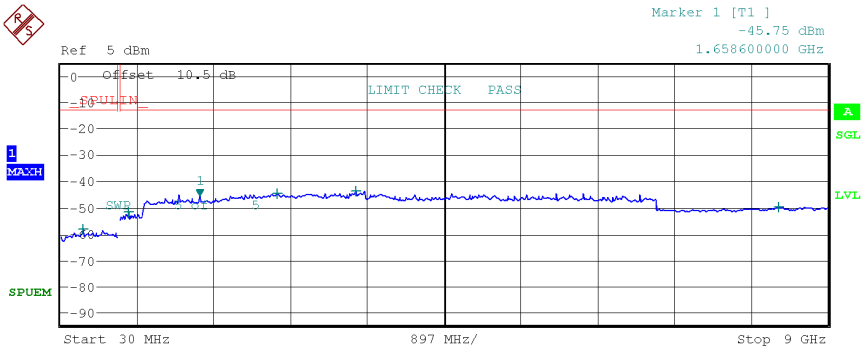
	LTE Band17					
	5MHz/QPSK			5MHz/16QAM		
	23755	23790	23825	23755	23790	23825
1RB	PASS	PASS	PASS	PASS	PASS	PASS
	10MHz/QPSK			10MHz/16QAM		
	23780	23790	23800	23780	23790	23800
1RB	PASS	PASS	PASS	PASS	PASS	PASS



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	690.000 M	100.00 k	273.269231 M	-59.16	-46.16
725.000 M	1.000 G	100.00 k	820.122500 M	-52.12	-39.12
1.000 G	3.000 G	1.00 M	2.516733 G	-44.72	-31.72
3.000 G	7.000 G	1.00 M	4.766533 G	-44.08	-31.08
7.000 G	9.000 G	1.00 M	8.389610 G	-50.38	-37.38

Date: 15.OCT.2018 15:55:48

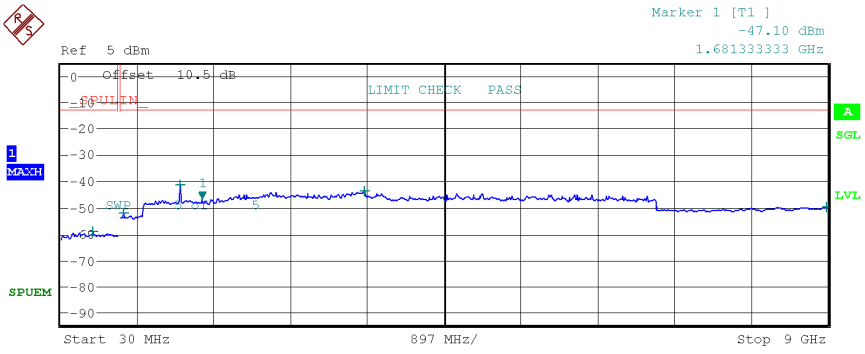
Band: FDD-LTE17 Channel: 23755(Low) Bandwidth:5M/QPSK



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	690.000 M	100.00 k	292.307692 M	-58.65	-45.65
725.000 M	1.000 G	100.00 k	827.740000 M	-51.89	-38.89
1.000 G	3.000 G	1.00 M	2.561267 G	-45.23	-32.23
3.000 G	7.000 G	1.00 M	3.486800 G	-43.99	-30.99
7.000 G	9.000 G	1.00 M	8.428571 G	-50.31	-37.31

Date: 15.OCT.2018 15:59:34

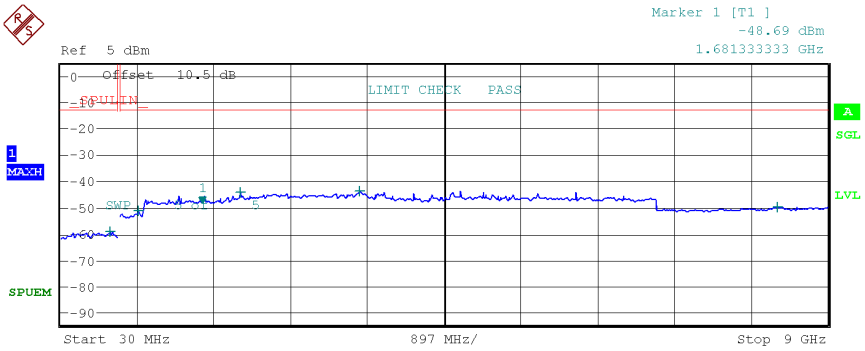
Band: FDD-LTE17 Channel: 23790(Mid) Bandwidth:5M/QPSK



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	690.000 M	100.00 k	408.653846 M	-59.75	-46.75
725.000 M	1.000 G	100.00 k	764.847500 M	-52.50	-39.50
1.000 G	3.000 G	1.00 M	1.422867 G	-41.76	-28.76
3.000 G	7.000 G	1.00 M	3.577200 G	-43.95	-30.95
7.000 G	9.000 G	1.00 M	8.987013 G	-50.30	-37.30

Date: 15.OCT.2018 16:00:32

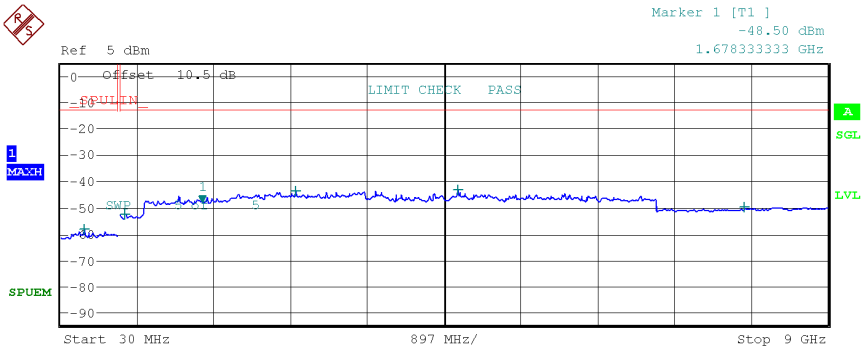
Band: FDD-LTE17 Channel: 23825(High) Bandwidth:5M/QPSK



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	690.000 M	100.00 k	605.384615 M	-59.56	-46.56
725.000 M	1.000 G	100.00 k	931.332500 M	-51.65	-38.65
1.000 G	3.000 G	1.00 M	2.125267 G	-44.45	-31.45
3.000 G	7.000 G	1.00 M	3.518133 G	-44.08	-31.08
7.000 G	9.000 G	1.00 M	8.415584 G	-50.15	-37.15

Date: 15.OCT.2018 15:58:00

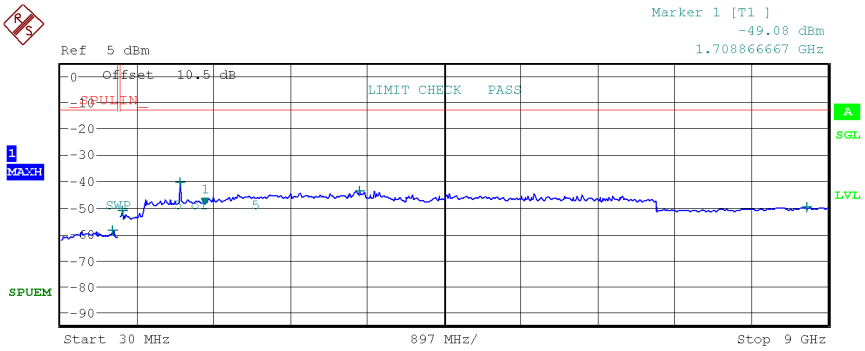
Band: FDD-LTE17 Channel: 23755(Low) Bandwidth:5M/16QAM



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	690.000 M	100.00 k	303.942308 M	-58.56	-45.56
725.000 M	1.000 G	100.00 k	772.162500 M	-52.86	-39.86
1.000 G	3.000 G	1.00 M	2.772333 G	-43.92	-30.92
3.000 G	7.000 G	1.00 M	4.668667 G	-43.46	-30.46
7.000 G	9.000 G	1.00 M	8.025974 G	-50.24	-37.24

Date: 15.OCT.2018 15:58:55

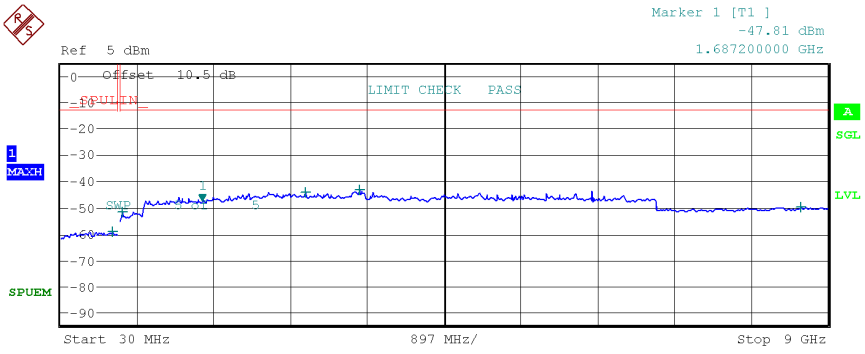
Band: FDD-LTE17 Channel: 23790(Mid) Bandwidth:5M/16QAM



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	690.000 M	100.00 k	629.711538 M	-59.06	-46.06
725.000 M	1.000 G	100.00 k	746.422500 M	-51.53	-38.53
1.000 G	3.000 G	1.00 M	1.422733 G	-40.67	-27.67
3.000 G	7.000 G	1.00 M	3.522533 G	-44.03	-31.03
7.000 G	9.000 G	1.00 M	8.753247 G	-50.30	-37.30

Date: 15.OCT.2018 16:01:37

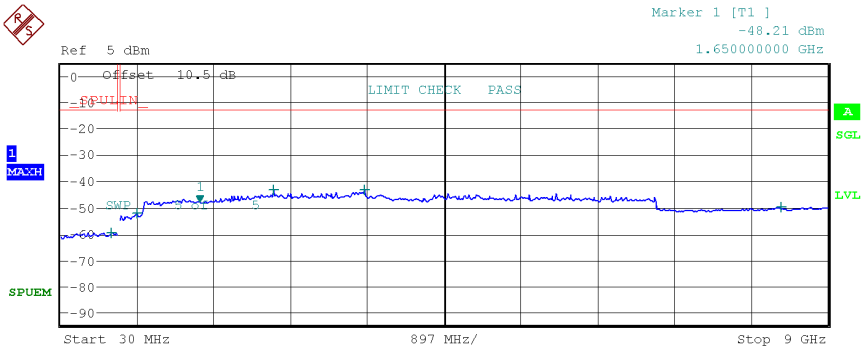
Band: FDD-LTE17 Channel: 23825(High) Bandwidth:5M/16QAM



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	690.000 M	100.00 k	638.173077 M	-59.33	-46.33
725.000 M	1.000 G	100.00 k	749.420000 M	-52.04	-39.04
1.000 G	3.000 G	1.00 M	2.883933 G	-44.63	-31.63
3.000 G	7.000 G	1.00 M	3.526400 G	-43.70	-30.70
7.000 G	9.000 G	1.00 M	8.688312 G	-50.39	-37.39

Date: 15.OCT.2018 16:07:33

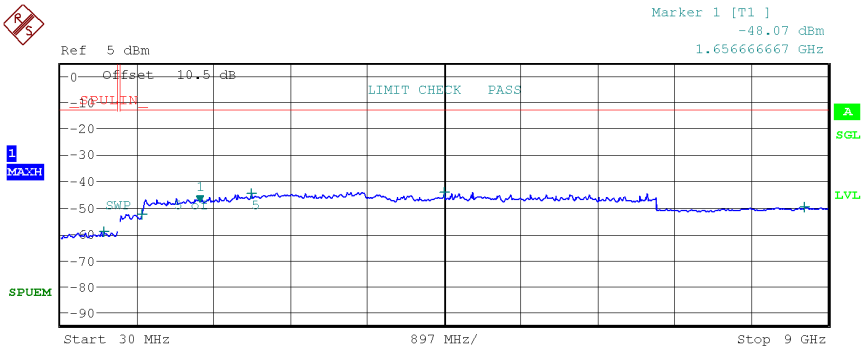
Band: FDD-LTE17 Channel: 23780(Low) Bandwidth:10M/QPSK



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	690.000 M	100.00 k	618.076923 M	-59.79	-46.79
725.000 M	1.000 G	100.00 k	914.145000 M	-52.63	-39.63
1.000 G	3.000 G	1.00 M	2.517267 G	-43.55	-30.55
3.000 G	7.000 G	1.00 M	3.585600 G	-43.40	-30.40
7.000 G	9.000 G	1.00 M	8.454545 G	-50.32	-37.32

Date: 15.OCT.2018 16:08:46

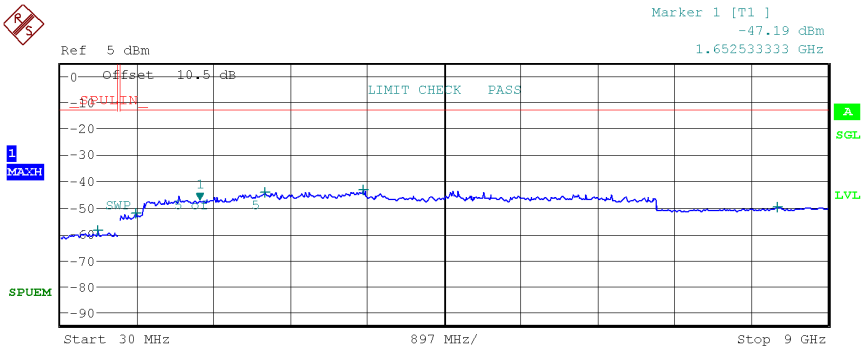
Band: FDD-LTE17 Channel: 23790(Mid) Bandwidth:10M/QPSK



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	690.000 M	100.00 k	532.403846 M	-59.74	-46.74
725.000 M	1.000 G	100.00 k	971.867500 M	-52.75	-39.75
1.000 G	3.000 G	1.00 M	2.263667 G	-44.79	-31.79
3.000 G	7.000 G	1.00 M	4.516800 G	-44.44	-31.44
7.000 G	9.000 G	1.00 M	8.727273 G	-50.32	-37.32

Date: 15.OCT.2018 16:10:44

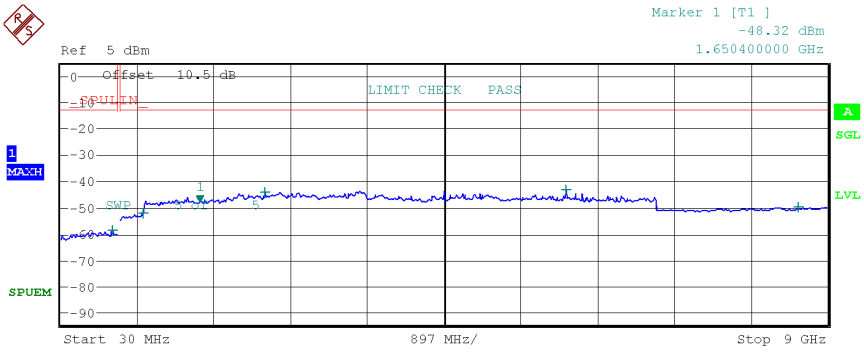
Band: FDD-LTE17 Channel: 23800(High) Bandwidth:10M/QPSK



EXREF	Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
	30.000 M	690.000 M	100.00 k	457.307692 M	-59.30	-46.30
	725.000 M	1.000 G	100.00 k	909.140000 M	-52.28	-39.28
	1.000 G	3.000 G	1.00 M	2.417933 G	-44.62	-31.62
	3.000 G	7.000 G	1.00 M	3.560800 G	-43.67	-30.67
	7.000 G	9.000 G	1.00 M	8.415584 G	-50.38	-37.38

Date: 15.OCT.2018 16:04:57

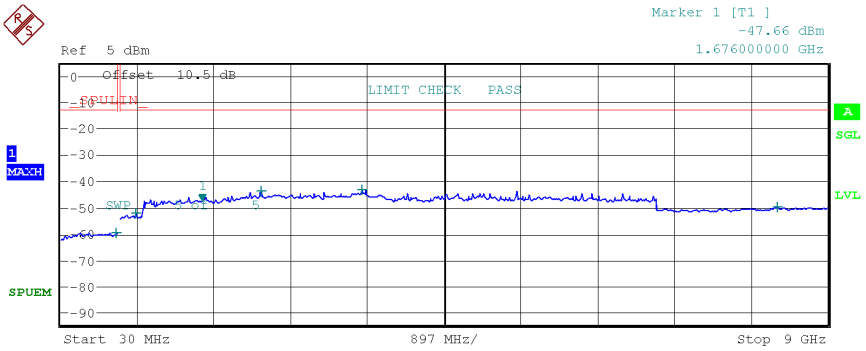
Band: FDD-LTE17 Channel: 23780(Low) Bandwidth:10M/16QAM



EXREF	Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
	30.000 M	690.000 M	100.00 k	627.596154 M	-59.23	-46.23
	725.000 M	1.000 G	100.00 k	986.580000 M	-52.28	-39.28
	1.000 G	3.000 G	1.00 M	2.419933 G	-44.57	-31.57
	3.000 G	7.000 G	1.00 M	5.943333 G	-43.59	-30.59
	7.000 G	9.000 G	1.00 M	8.649351 G	-50.24	-37.24

Date: 15.OCT.2018 16:09:29

Band: FDD-LTE17 Channel: 23790(Mid) Bandwidth:10M/16QAM



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	690.000 M	100.00 k	678.365385 M	-59.82	-46.82
725.000 M	1.000 G	100.00 k	911.230000 M	-52.39	-39.39
1.000 G	3.000 G	1.00 M	2.368733 G	-44.25	-31.25
3.000 G	7.000 G	1.00 M	3.552400 G	-43.39	-30.39
7.000 G	9.000 G	1.00 M	8.415584 G	-50.29	-37.29

Date: 15.OCT.2018 16:10:08

Band: FDD-LTE17 Channel: 23800(High) Bandwidth:10M/16QAM

5.6 Frequency Stability

5.6.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency.

5.6.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

5.6.3 Test Procedure for Temperature Variation

a. The EUT was set up in the thermal chamber and connected with the system simulator.

b. With power OFF, the temperature was decreased to -20℃ and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.

c. With power OFF, the temperature was raised in 10℃ steps up to 60℃. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

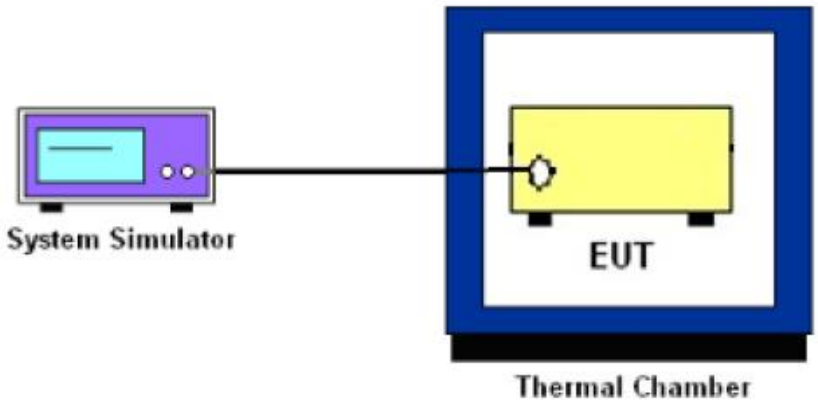
5.6.4 Test Procedure for Voltage Variation

a. The EUT was placed in a temperature chamber at 25±5℃ and connected with the system simulator.

b. The power supply voltage to the EUT was varied from 3.42V to 4.18V of the nominal value measured at the input to the EUT.

c. The variation in frequency was measured for the worst case.

5.6.5 Test Setup



5.6.6 Test Result

Test Result of Temperature Variation

Band :	LTE Band 17 (QPSK)	Limit(ppm) :	2.5
Temperature	BW 10MHz Deviation(ppm)	Result	
-20	+0.0031	PASS	
-10	+0.0037		
0	+0.0085		
10	+0.0054		
20(Ref.)	+0.0065		
30	+0.0044		
40	+0.0032		
50	+0.0061		
60	+0.0096		

Test Result of Voltage Variation (FCC)

Band	Bandwidth	Voltage(Volt)	Deviation(ppm)	Limit(ppm)	Result
LTE Band 17(QPSK)	10M	LV	+0.0083	2.5	PASS
		NV	+0.0074		
		HV	+0.0080		

5.7 Effective Radiated Power/Equivalent Isotropic Radiated Power

5.7.1 Description of ERP/EIRP Measurement

Mobile and portable (hand-held) stations operating are limited to average ERP of 7 watts with LTE band 5 and 3 watts with LTE band 12/17.

Mobile and portable (hand-held) stations operating are limited to average EIRP of 2 watts with LTE band 2/25/7 and 1 watt with LTE band 4.

5.7.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

5.7.3 Test Procedures

Effective Isotropic Radiated Power (EIPR) was calculated with the correction factor, EIPR=Conducted Output Power + Substitution antenna gain. ERP=EIRP-2.15.

5.7.4 Test Result

BW [MHz]	Modulation	RB Size	RB Offset	ERP(dBm) Low Ch./Freq.	ERP(dBm) Middle Ch./Freq.	ERP(dBm) High Ch./Freq.
Channel				23780	23790	23800
Frequency(MHz)				709	710	711
Antenna Gain(dBi)				-2.47		
10	QPSK	1	0	18.54	18.49	18.54
10	QPSK	1	24	18.42	18.63	18.57
10	QPSK	1	49	18.52	18.56	18.56
10	QPSK	25	0	17.68	17.61	17.62
10	QPSK	25	12	17.69	17.69	17.74
10	QPSK	25	24	17.63	17.62	17.62
10	QPSK	50	0	17.63	17.71	17.74
10	16QAM	1	0	17.76	17.41	17.77
10	16QAM	1	24	17.73	17.67	17.75
10	16QAM	1	49	17.81	17.73	17.8
10	16QAM	25	0	16.71	16.72	16.71
10	16QAM	25	12	16.77	16.83	16.73
10	16QAM	25	24	16.73	16.72	16.71
10	16QAM	50	0	16.69	16.7	16.73
Channel				23755	23790	23825
Frequency(MHz)				706.5	710	713.5
Antenna Gain(dBi)				-2.47		
5	QPSK	1	0	18.45	18.49	18.66
5	QPSK	1	12	18.51	18.63	18.67

5	QPSK	1	24	18.59	18.72	18.61
5	QPSK	12	0	17.66	17.63	17.65
5	QPSK	12	6	17.69	17.7	17.73
5	QPSK	12	11	17.68	17.67	17.71
5	QPSK	25	0	17.71	17.63	17.73
5	16QAM	1	0	17.86	17.76	17.52
5	16QAM	1	12	17.84	17.79	17.91
5	16QAM	1	24	17.79	18.11	17.84
5	16QAM	12	0	16.54	16.74	16.77
5	16QAM	12	6	16.79	16.73	16.9
5	16QAM	12	11	16.79	16.7	16.77
5	16QAM	25	0	16.73	16.77	16.8

5.8 Radiated Spurious Emission

5.8.1 Description of Radiated Spurious Emission

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

For Band 7, 41

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 55 + 10 log (P) dB.

For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emission in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIPR) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

The spectrum is scanned from 30 MHz up to a frequency including its 10^{th} harmonic.

5.8.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

5.8.3 Test Procedures

a. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.

b. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.

c. The table was rotated 360 degrees to determine the position of the highest spurious emission.

d. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.

e. Make the measurement with the spectrum analyzers RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.

f. A horn antenna was substituted in place of the EUT and was driven by a signal generator.

g. Tune the output power of signal generator to the same emission level with EUT

maximum spurious emission.

h. Taking the record of output power at antenna port.

i. Repeat step f to step g for another polarization.

j. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

The limit line is derived from 43 + 10 log(P)dB below the transmitter power P(Watts)

=P(W)-[43+10log(P)](dB)

=[30+10log(P)](dBm)-[43+10log(P)](dB)

=-13dBm.

For Band7, 38, 41

The limit line is derived from 55+10log(P) dB below the transmitter power P(Watts).
=P(W)-[55+10log(P)](dB)

=[30+10log(P)](dBm)-[55+10log(P)](dB)

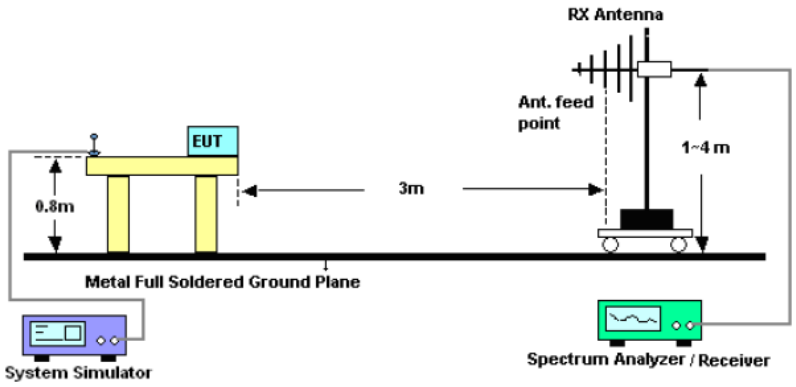
=-25dBm.

k. EIPR (dBm) = S.G.Power – Tx Cable Loss + Tx Antenna Gain.

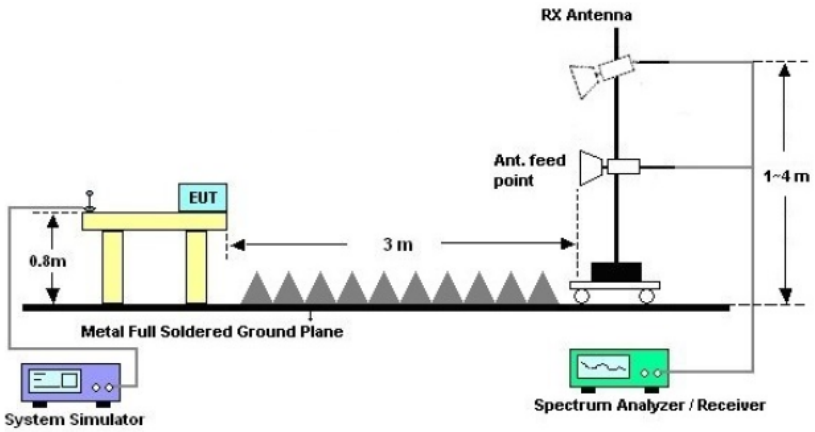
l. ERP (dBm) = EIRP-2.15.

5.8.4 Test Setup

For radiated emissions from 30MHz to 1GHz

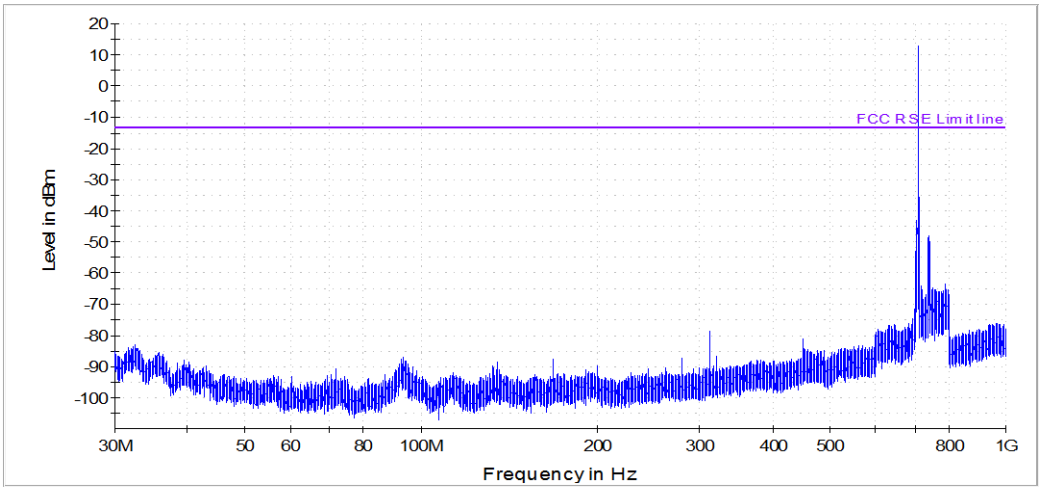


For radiated emissions above 1GHz

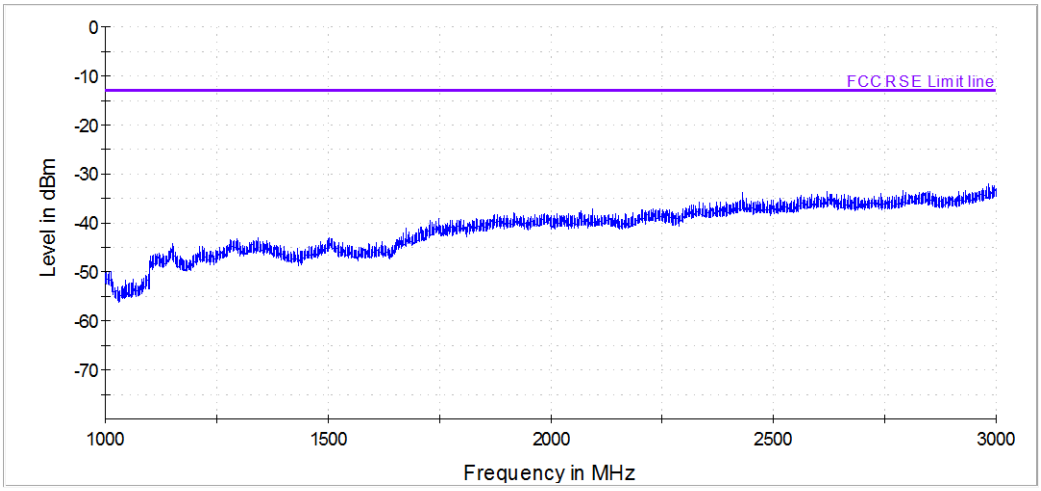


5.8.5 Test Result

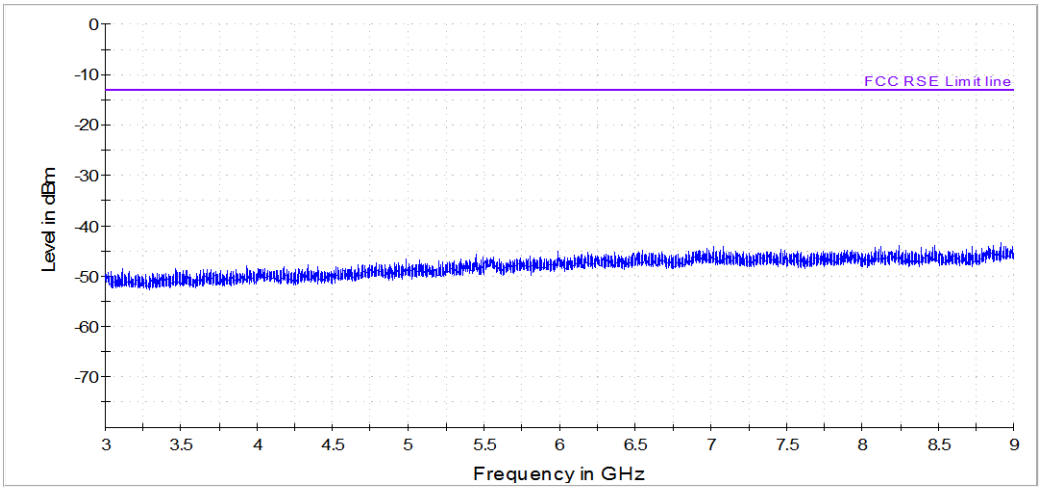
LTE Band17 TX, BW=5MHz
Position 1
(30MHz~1GHz)



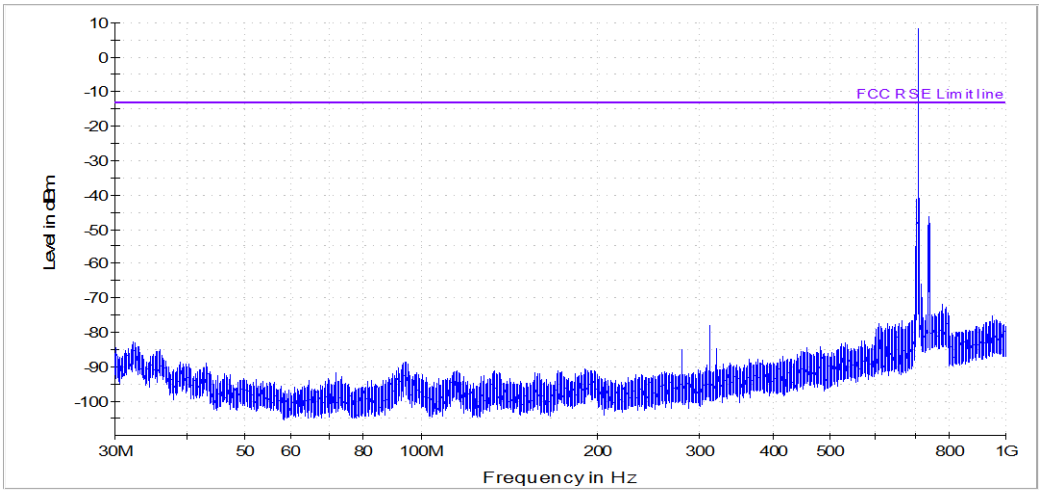
(1GHz~3GHz)



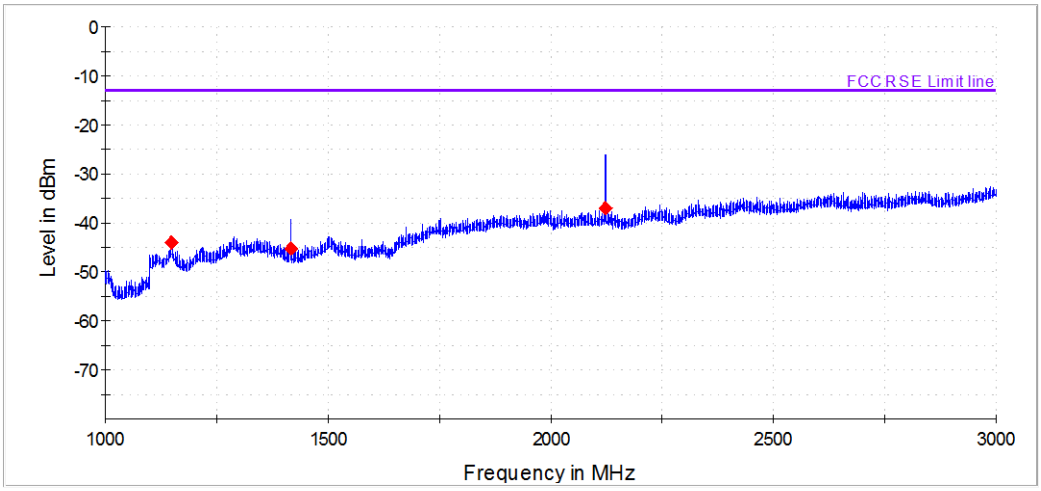
(3GHz~9GHz)



Position 2
(30MHz~1GHz)



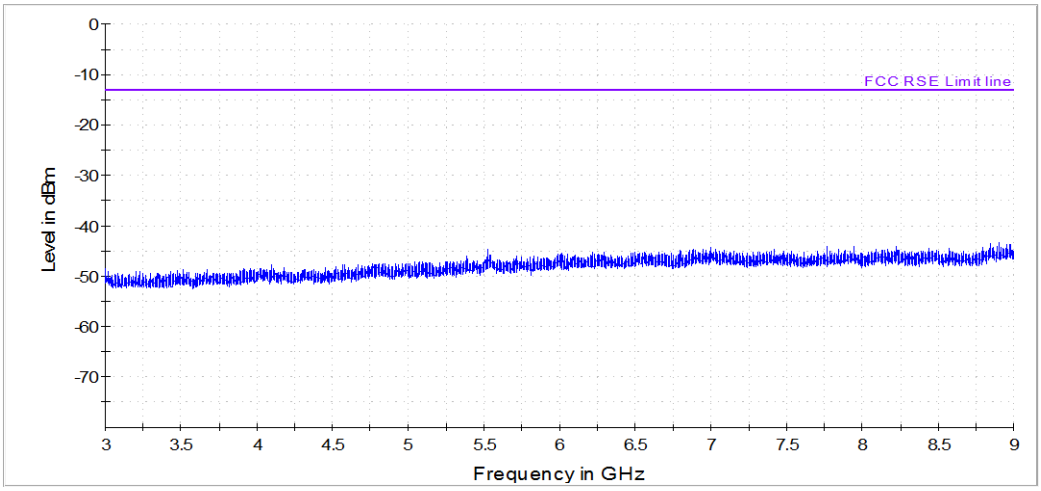
(1GHz~3GHz)



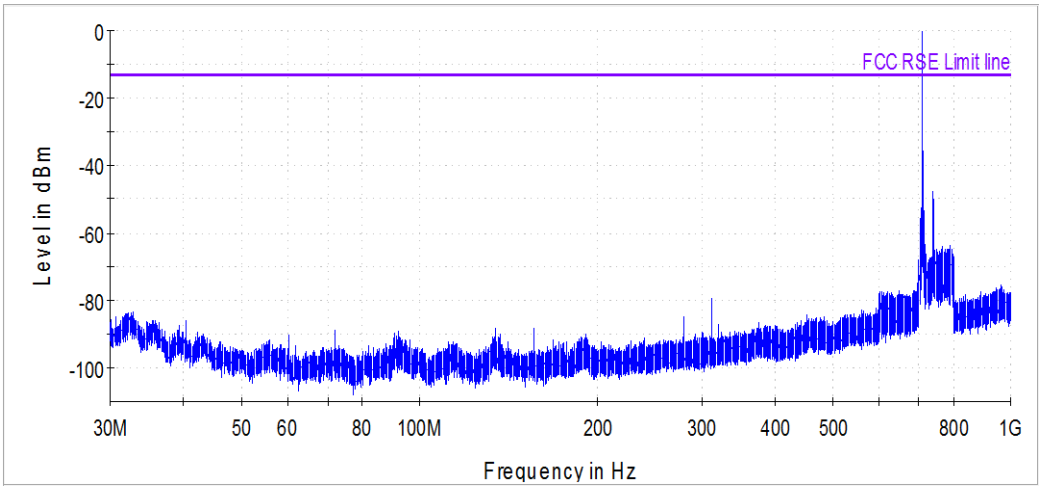
Frequency	MaxPeak	Limit	Margin	Read	SG	Cable loss	TX ant gain	Azimuth	Pol
MHz	dBm	dBm	dB	dBuV	dBm	dB	dBi	deg	
1147.910500	-44.08	-13.00	31.08	33.12	-43.8	1.23	3.1	248.0	V
1416.222000	-45.30	-13.00	32.30	32.50	-47.7	1.65	6.2	106.0	V
2123.144250	-36.95	-13.00	23.95	32.65	-38.1	1.70	5.0	200.0	V

EIRP=SG Power - cable loss + Tx ant gain
ERP=EIRP-2.15

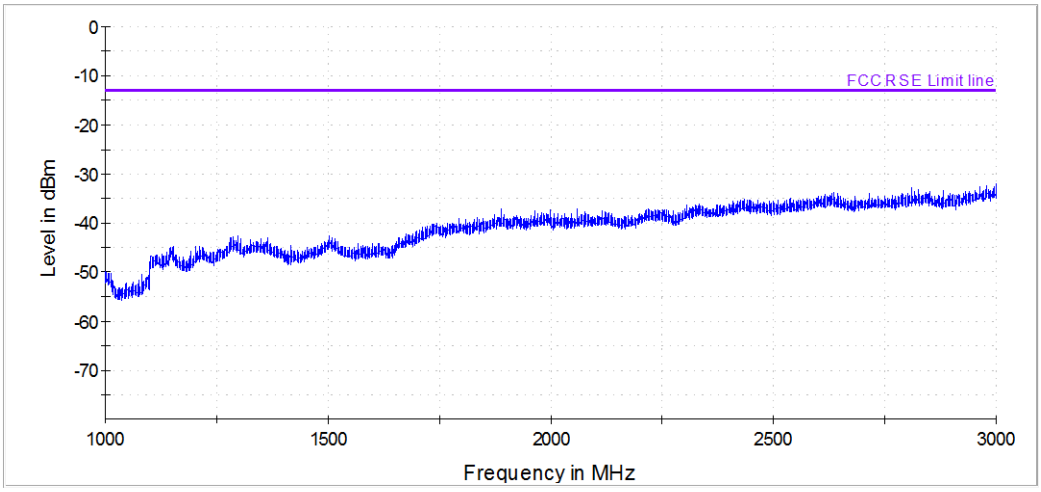
(3GHz~9GHz)



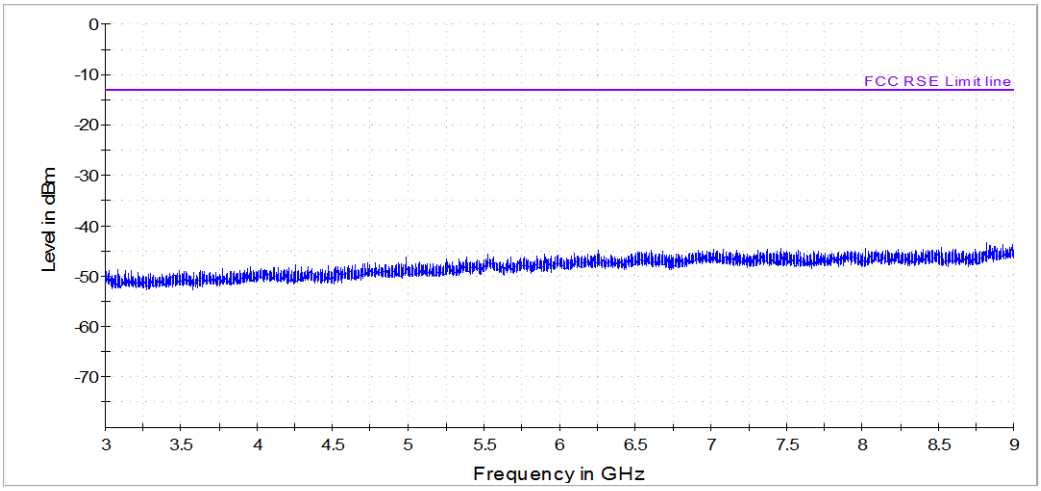
Position 3
(30MHz~1GHz)



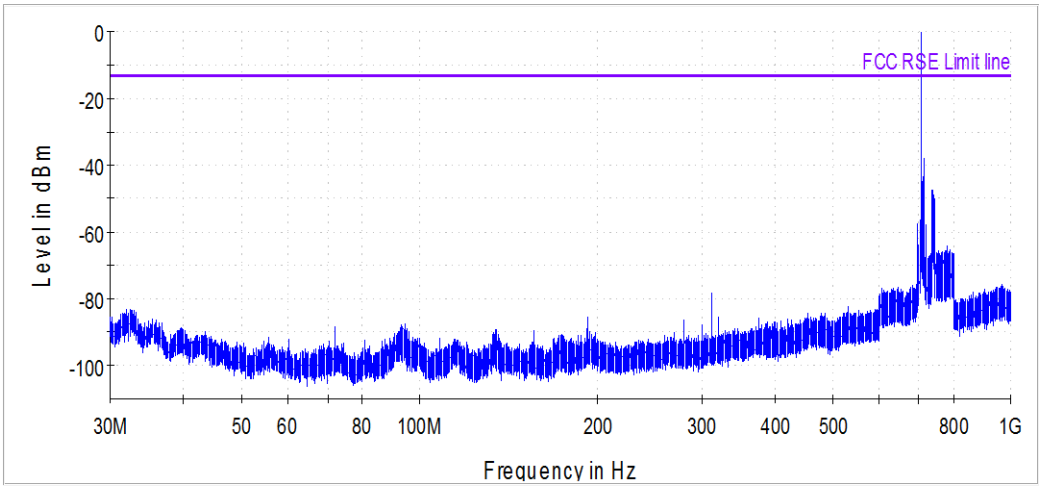
(1GHz~3GHz)



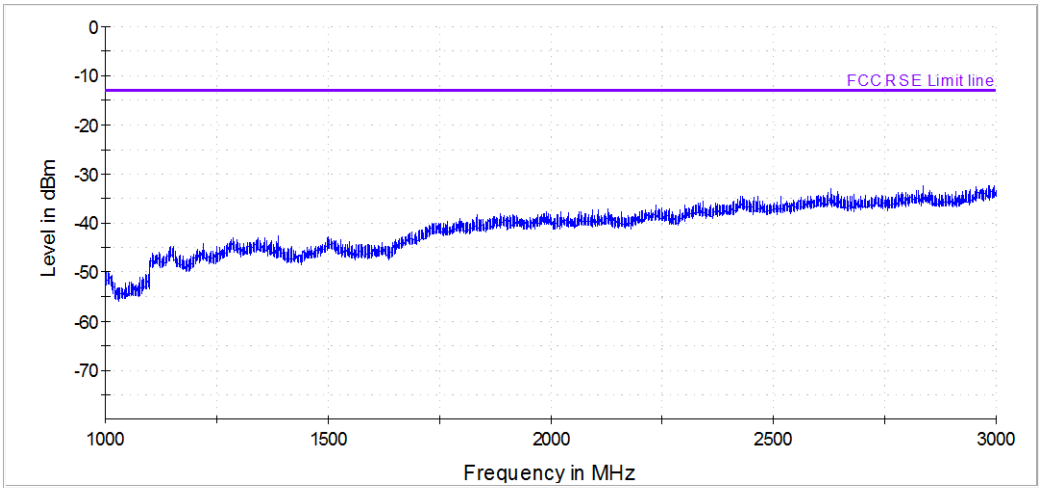
(3GHz~9GHz)



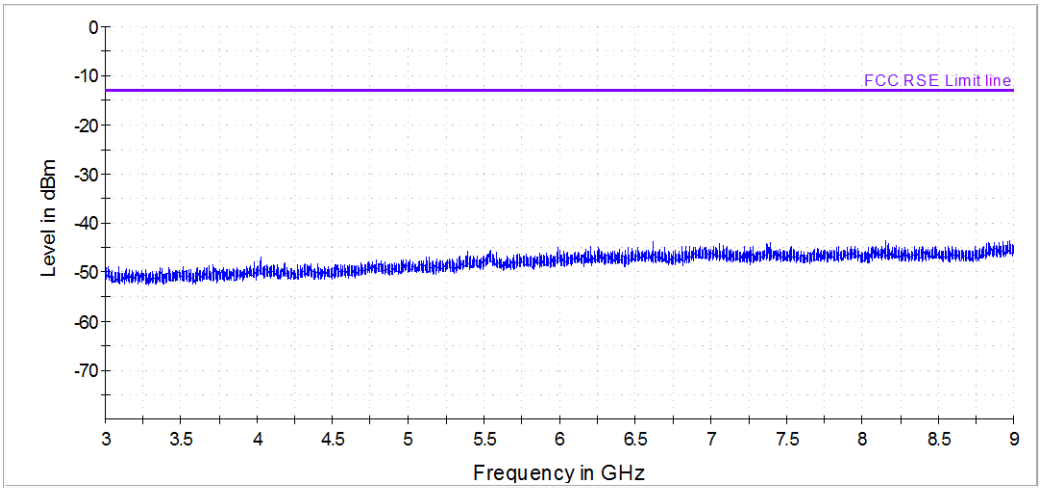
LTE Band17 TX, BW=10MHz
Position 1
(30MHz~1GHz)



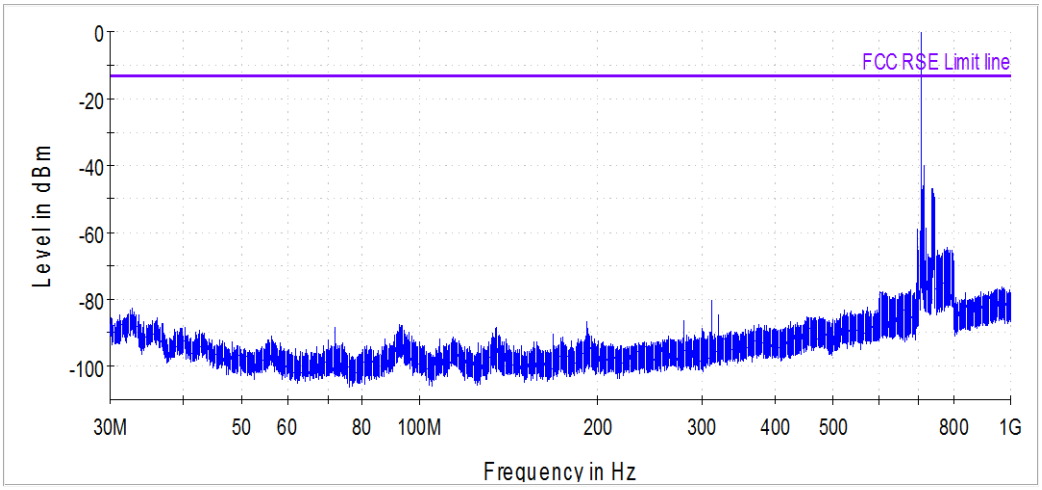
(1GHz~3GHz)



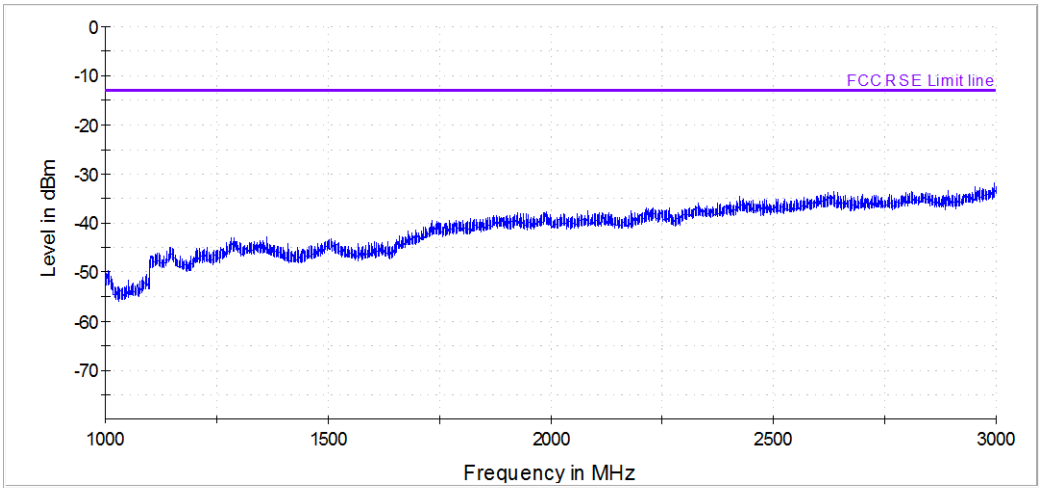
(3GHz~9GHz)



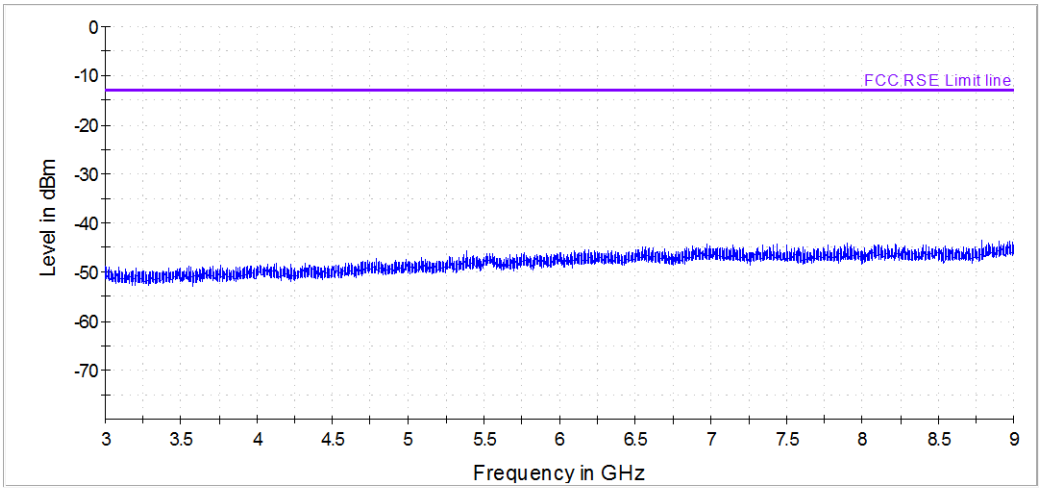
Position 2
(30MHz~1GHz)



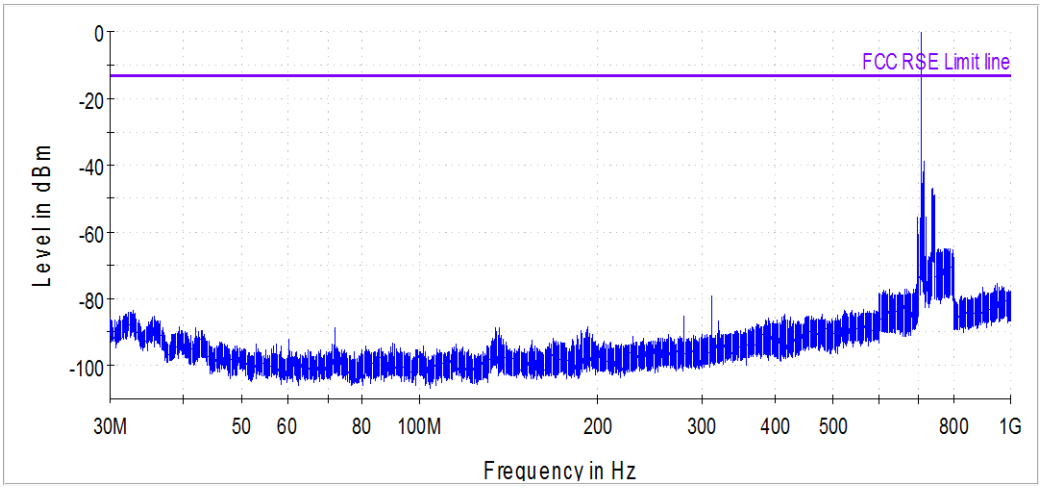
(1GHz~3GHz)



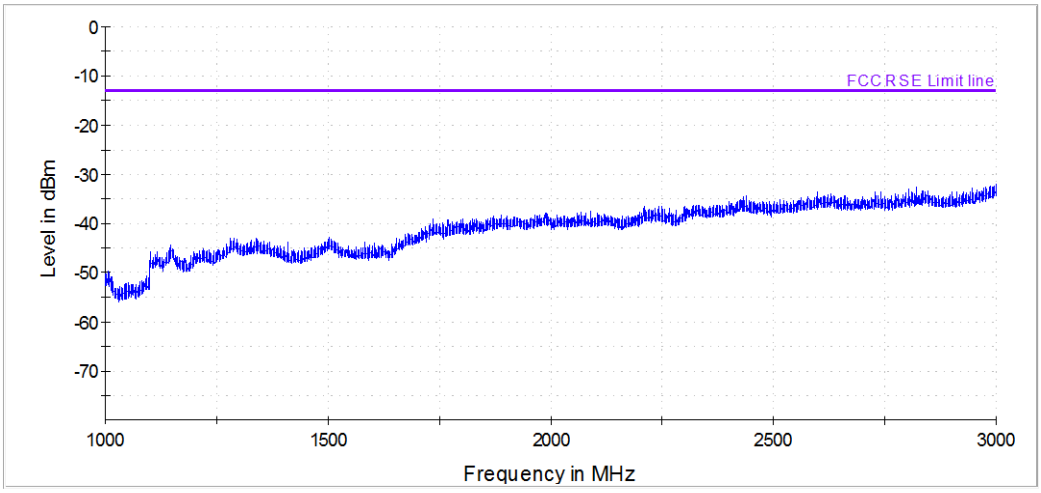
(3GHz~9GHz)



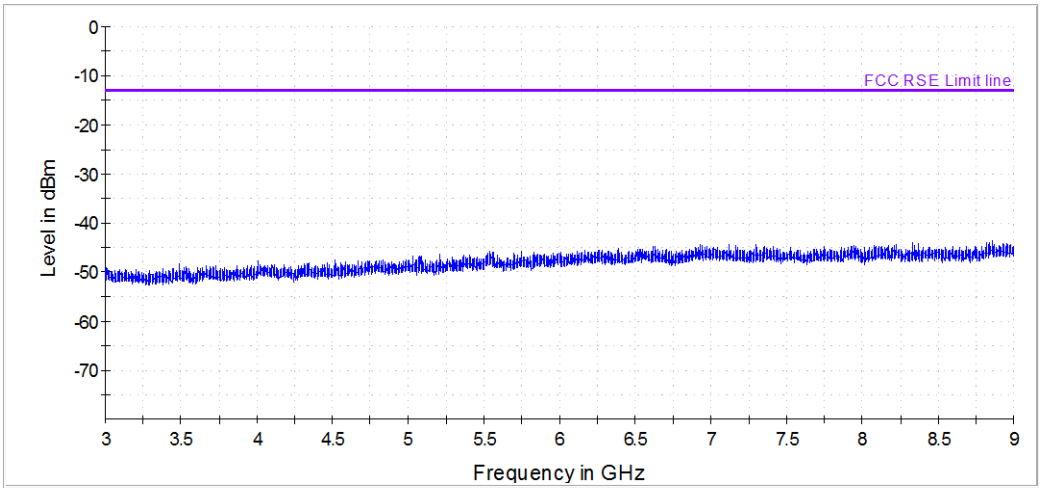
Position 3
(30MHz~1GHz)



(1GHz~3GHz)



(3GHz~9GHz)



6 SAMPLE PICTURE

Reference attachment : Test Setup Photos_2

7 APPENDIX - INFORMATION ON THE TESTING LABORATORIES

We, BYD Precise Manufacture Co., Ltd., were founded in 2007 to provide our best service in RF, Radio consultation. Our laboratories are accredited by the following accreditation bodies according to ISO/IEC 17025 (2005) .

USA	A2LA Certificate No.: 4886.01

Copies of accreditation certificates could be inquired from our office. If you have any comments, please feel free to contact us at the following:

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Tel: +86-755 8489 8888 55501
Fax: +86-755 8964 3771

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