FCC RF Test Report

APPLICANT	:	**HMD Global Oy**
EQUIPMENT	:	**Mobile Phone**
BRAND NAME	:	**Nokia**
MODEL NAME	:	**TA-1221, TA-1231**
FCC ID	:	**2AJOTTA-1221**
STANDARD	:	**47 CFR Part 2, 22(H), 24(E), 27(F), 27(L), 27(H)**
CLASSIFICATION	:	**PCS Licensed Transmitter Held to Ear (PCE)**

The product was received on Dec. 31, 2019 and completely tested on Feb. 25, 2020. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.

Jason Jia

Reviewed by: Jason Jia / Supervisor

James Huang

Approved by: James Huang / Manager

ACCREDITED
Cert #5145.02

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APPENDIX A. TEST RESULTS OF CONDUCTED TEST

APPENDIX B. TEST RESULTS OF RADIATED TEST

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG9D3106B	Rev. 01	Initial issue of report	Apr. 14, 2020

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	Reporting Only	PASS	-
	§22.913(a)(5)	Effective Radiated Power (Band 5) (Band 26)	ERP < 7 Watt		
	§27.50(b)(10) §27.50(c)(10)	Effective Radiated Power (Band 12) (Band 13)	ERP < 3 Watt		
	§24.232(c)	Equivalent Isotropic Radiated Power (Band 2) (Band 25)	EIRP < 2Watt		
	§27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4) (Band 66)	EIRP < 1Watt		
3.5	§24.232(d)	Peak-to-Average Ratio	<13 dB	PASS	-
3.6	§2.1049	Occupied Bandwidth	Reporting Only	PASS	-
3.7	§2.1051 §22.917(a) §24.238(a) §27.53(c)(2)(4) §27.53(g) §27.53(h)	Conducted Band Edge Measurement (Band 2) (Band 4) (Band 5) (Band 12) (Band 13) (Band 25) (Band 26) (Band 66)	< 43+10log10(P[Watts])	PASS	-
3.8	§2.1051 §22.917(a) §24.238(a) §27.53(c)(2) §27.53(g) §27.53(h)	Conducted Spurious Emission (Band 2) (Band 4) (Band 5) (Band 12) (Band 13) (Band 25) (Band 26) (Band 66)	< 43+10log10(P[Watts])	PASS	-
3.9	§2.1055 §22.355	Frequency Stability Temperature & Voltage	< 2.5 ppm for Part 22	PASS	-
	§2.1055 §24.235 §27.54		Within Authorized Band		

Report Section	FCC Rule	Description	Limit	Result	Remark
4.4	§2.1053 §22.917(a) §24.238(a) §27.53(c)(2) §27.53(f) §27.53(g) §27.53(h)	Radiated Spurious Emission (Band 2) (Band 4) (Band 5) (Band 12) (Band 13) (Band 25) (Band 26) (Band 66)	< 43+10log$_{10}$(P[Watts])	PASS	Under limit 36.83 dB at 7482.000 MHz

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Applicant

HMD Global Oy
Bertel Jungin aukio 9, 02600 Espoo, Finland

1.2 Manufacturer

HMD Global Oy
Bertel Jungin aukio 9, 02600 Espoo, Finland

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Phone
Brand Name	Nokia
Model Name	TA-1221, TA-1231
FCC ID	2AJOTTA-1221
EUT supports Radios application	GSM/WCDMA/LTE WLAN 2.4GHz 802.11b/g/n HT20 Bluetooth BR/EDR/LE FM Receiver, GNSS
IMEI Code	Conducted: N/A Radiation: 355786100000962
HW Version	V1.0
SW Version	00VPO_1_100
EUT Stage	Production Unit

Note: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	LTE Band 2 : 1850.7 MHz ~ 1909.3 MHz LTE Band 4 : 1710.7 MHz ~ 1754.3 MHz LTE Band 5 : 824.7 MHz ~ 848.3 MHz LTE Band 12 : 699.7 MHz ~ 715.3 MHz LTE Band 13 : 779.5 MHz ~ 784.5 MHz LTE Band 25 : 1850.7MHz ~ 1914.3 MHz LTE Band 26 : 824.7MHz ~ 848.3 MHz LTE Band 66 : 1710.7 MHz ~ 1779.3 MHz
Rx Frequency	LTE Band 2 : 1930.7 MHz ~ 1989.3 MHz LTE Band 4 : 2110.7 MHz ~ 2154.3 MHz LTE Band 5 : 869.7 MHz ~ 893.3 MHz LTE Band 12 : 729.7 MHz ~ 745.3 MHz LTE Band 13 : 748.5 MHz ~ 753.5 MHz LTE Band 25 : 1930.7MHz ~ 1994.3 MHz LTE Band 26 : 869.7MHz ~ 893.3MHz LTE Band 66 : 2110.7 MHz~ 2179.3 MHz LTE Band 71: 619.5 MHz ~ 649.5MHz
Bandwidth	LTE Band 2 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 4 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 5 : 1.4MHz / 3MHz / 5MHz / 10MHz LTE Band 12 : 1.4MHz / 3MHz / 5MHz / 10MHz LTE Band 13 : 5MHz / 10MHz LTE Band 25 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 26 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz LTE Band 66 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz
Maximum Output Power to Antenna	LTE Band 13 : 22.79 dBm LTE Band 25 : 22.70 dBm LTE Band 26 : 22.95 dBm
Antenna Gain	LTE Band 13 : -0.6 dBi LTE Band 25 : 1.00 dBi LTE Band 26 : -0.50 dBi
Type of Modulation	QPSK / 16QAM / 64QAM

1.5 Modification of EUT

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

1.6 Re-use of Measured Data

1.6.1 Introduction Section

This application re-uses data collected on a similar device. The subject device of this application (Model: TA-1221, TA-1231, FCC ID: 2AJOTTA-1221) is electrically identical to the reference device (Model: TA-1218, TA-1226, FCC ID: 2AJOTTA-1226) for the portions of the circuitry corresponding to the data being re-used, as treated by KDB Publication 484596 D01.

1.6.2 Difference Section

For details concerning the similarity with respect to component placement, mechanical/electrical design etc., please refer to the Product Equality Declaration.

The re-used RF data includes the following bands provided in Appendix B (Sporton RF Report No. FG9D3105B for the reference device Model: TA-1218, TA-1226, FCC ID: 2AJOTTA-1226).

1.6.3 Reference detail Section:

Equipment Class	Reference FCC ID	Folder Test	Report Title/Section
PCE (LTE)	2AJOTTA-1226	Part22H.24E.27L.27H (FG9D3105B)	All sections applicable for LTE Band 2/4/5/12/66

1.6.4 Spot Check Verification Data Section

In order to confirm hardware similarity of the subject device with the reference device, spot check measurements were performed on the subject device for the following test items, the test result were consistent with FCC ID: 2AJOTTA-1226.

Assertions concerning the similarity of these devices are based on representations by the applicant. The applicant accepts full responsibility for the validity of the similarity claim, and for the determination that verification test data are sufficient to support it.

Test Item	Mode	2AJOTTA-1226 Worst Result	2AJOTTA-1221 Worst Result	Difference (dB)
Average Conducted Power (dBm)	LTE Band 2	22.78	22.41	-0.37
	LTE Band 4	22.62	22.46	-0.16
	LTE Band 5	23.06	22.95	-0.11
	LTE Band 12	22.78	22.62	-0.16
	LTE Band 66	22.65	22.46	-0.19
Radiated Spurious Emission (dBm)	LTE Band 5	-63.19	-63.2	-0.01
	LTE Band 12	-63.19	-63.31	-0.12
	LTE Band 66	-52.01	-52.33	-0.32

1.7 Maximum ERP/ EIRP, Frequency Tolerance, and Emission Designator

LTE Band 13		QPSK			16QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum ERP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum ERP(W)
5	779.5 ~ 784.5	4M53G7D	-	0.1007	4M52W7D	-	0.0881
10	782.0	8M99G7D	0.0062	0.1009	9M03W7D	-	0.0875

LTE Band 13		64QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum ERP(W)
5	779.5 ~ 784.5	4M51W7D	-	0.0656
10	782.0	9M05W7D	-	0.0652

LTE Band 25		QPSK			16QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)
1.4	1850.7 ~ 1914.3	1M09G7D	-	0.2333	1M09W7D	-	0.2084
3	1851.5 ~ 1913.5	2M72G7D	-	0.2339	2M72W7D	-	0.2118
5	1852.5 ~ 1912.5	4M50G7D	-	0.2275	4M51W7D	-	0.1905
10	1855.0 ~ 1910.0	9M05G7D	0.0024	0.2323	9M05W7D	-	0.1986
15	1857.5 ~ 1907.5	13M5G7D	-	0.2270	13M5W7D	-	0.1959
20	1860.0 ~ 1905.0	18M5G7D	-	0.2344	18M3W7D	-	0.2028

LTE Band 25		64QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)
1.4	1850.7 ~ 1914.3	1M09W7D	-	0.1567
3	1851.5 ~ 1913.5	2M73W7D	-	0.1581
5	1852.5 ~ 1912.5	4M51W7D	-	0.1574
10	1855.0 ~ 1910.0	9M11W7D	-	0.1614
15	1857.5 ~ 1907.5	13M5W7D	-	0.1500
20	1860.0 ~ 1905.0	18M5W7D	-	0.1556

LTE Band 26		QPSK			16QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum ERP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum ERP(W)
1.4	824.7 ~ 848.3	1M10G7D	-	0.1062	1M10W7D	-	0.0899
3	825.5 ~ 847.5	2M72G7D	-	0.1038	2M71W7D	-	0.0899
5	826.5 ~ 846.5	4M49G7D	-	0.1067	4M51W7D	-	0.0948
10	829.0 ~ 844.0	9M11G7D	0.0037	0.1067	9M03W7D	-	0.0918
15	831.5 ~ 841.5	13M5G7D	-	0.1072	13M5W7D	-	0.0933
CH26765	821.5	13M4G7D	-	0.1069	13M5W7D	-	0.0933

LTE Band 26		64QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum ERP(W)
1.4	824.7 ~ 848.3	1M09W7D	-	0.0710
3	825.5 ~ 847.5	2M72W7D	-	0.0693
5	826.5 ~ 846.5	4M50W7D	-	0.0701
10	829.0 ~ 844.0	9M07W7D	-	0.0710
15	831.5 ~ 841.5	13M5W7D	-	0.0719
CH26765	821.5	13M4W7D	-	0.0706

1.8 Testing Location

Sporton International (Kunshan) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International (Kunshan) Inc.		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH04-KS TH01-KS	CN1257	314309

1.9 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH04-KS	AUDIX	E3	6.2009-8-24a

1.10 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 2, 22(H), 24(E), 27(F), 27(L), 27(H)
- ANSI C63.26-2015
- FCC KDB 971168 D01 Power Meas License Digital Systems v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

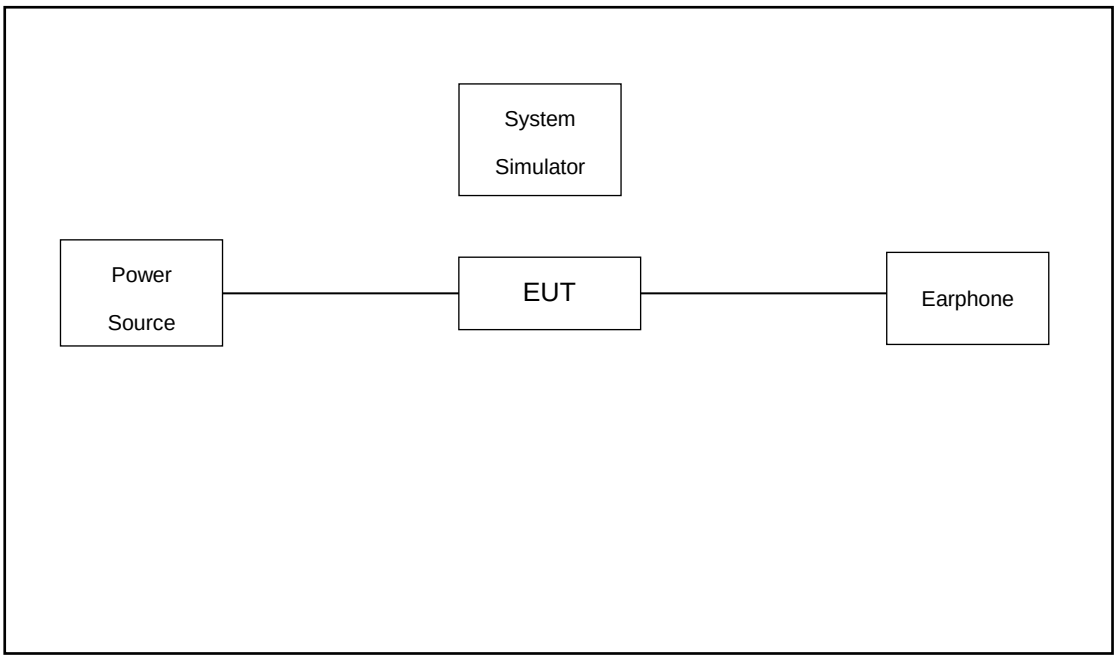
Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas License Digital Systems v03r01 with maximum output power.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission.

Test Items	Band	Bandwidth (MHz)						Modulation			RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Max. Output Power	13	-	-	v	v	-	-	v	v	v	v	v	v	v	v	v
	25	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	26	v	v	v	v	v	-	v	v	v	v	v	v	v	v	v
Peak-to-Average Ratio	13	-	-		v	-	-	v	v	v	v		v	v	v	v
	25						v	v	v	v	v		v	v	v	v
	26				v		-	v	v	v	v		v	v	v	v
26dB and 99% Bandwidth	13	-	-	v	v	-	-	v	v	v			v	v	v	v
	25	v	v	v	v	v	v	v	v	v			v	v	v	v
	26	v	v	v	v	v	-	v	v	v			v	v	v	v
Conducted Band Edge	13	-	-	v	v	-	-	v	v	v	v		v	v		v
	25	v	v	v	v	v	v	v	v	v	v		v	v		v
	26	v	v	v	v	v	-	v	v	v	v		v	v		v
Conducted Spurious Emission	13	-	-	v	v	-	-	v	v	v	v			v	v	v
	25	v	v	v	v	v	v	v	v	v	v			v	v	v
	26	v	v	v	v	v	-	v	v	v	v			v	v	v
Frequency Stability	13	-	-		v	-	-	v					v		v	
	25				v			v					v		v	
	26				v		-	v					v		v	
E.R.P	13	-	-	v	v	-	-	v	v	v	v			v	v	v
	25	v	v	v	v	v	v	v	v	v	v			v	v	v
	26	v	v	v	v	v	-	v	v	v	v			v	v	v

Test Items	Band	Bandwidth (MHz)						Modulation			RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Radiated Spurious Emission	13	Worst Case													v	
	25	Worst Case													v	
	26	Worst Case													v	
Note	1. The mark "**v** " means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.															

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	GW INSTEK	GPS-3030D	N/A	N/A	Unshielded, 1.8m
3.	Earphone	N/A	N/A	N/A	N/A	N/A

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 4.7 dB.

Example :

Offset(dB) = RF cable loss(dB).

= 4.7 (dB)

2.5 Frequency List of Low/Middle/High Channels

LTE Band 13 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
10	Channel	-	23230	-
	Frequency	-	782	-
5	Channel	23205	23230	23255
	Frequency	779.5	782	784.5

LTE Band 25 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	26140	26340	26590
	Frequency	1860	1880	1905
15	Channel	26115	26340	26615
	Frequency	1857.5	1880	1907.5
10	Channel	26090	26340	26640
	Frequency	1855	1880	1910
5	Channel	26065	26340	26665
	Frequency	1852.5	1880	1912.5
3	Channel	26055	26340	26675
	Frequency	1851.5	1880	1913.5
1.4	Channel	26047	26340	26683
	Frequency	1850.7	1880	1914.3

LTE Band 26 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
15	Channel	26865	26915	26965
	Frequency	831.5	836.5	841.5
10	Channel	26840	26915	26990
	Frequency	829	836.5	844
5	Channel	26815	26915	27015
	Frequency	826.5	836.5	846.5
3	Channel	26805	26915	27025
	Frequency	825.5	836.5	847.5
1.4	Channel	26797	26915	27033
	Frequency	824.7	836.5	848.3

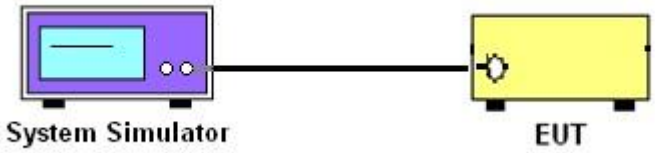
3 Conducted Test Items

3.1 Measuring Instruments

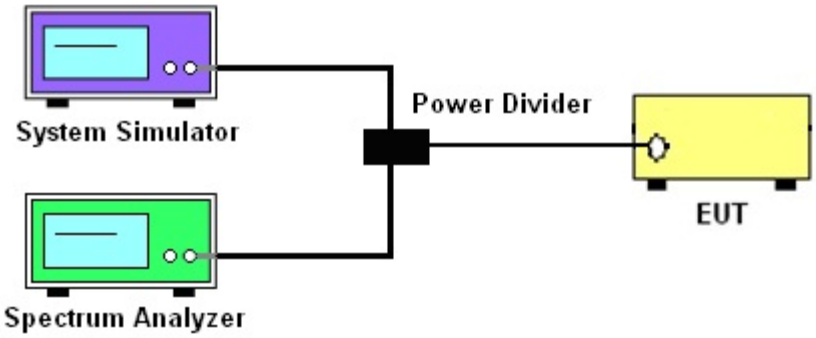
See list of measuring instruments of this test report.

3.2 Test Setup

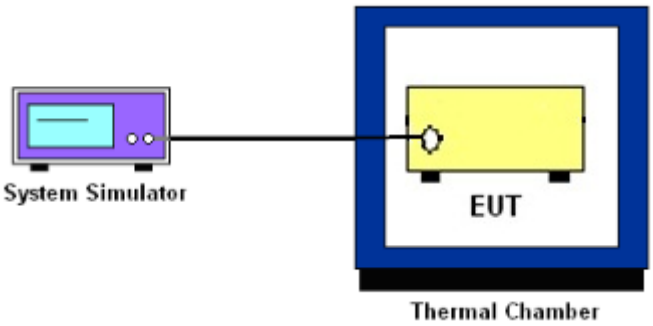
3.2.1 Conducted Output Power



3.2.2 Peak-to-Average Ratio, Occupied Bandwidth ,Conducted Band-Edge and Conducted Spurious Emission



3.2.3 Frequency Stability



3.3 Test Result of Conducted Test

Please refer to Appendix A.

3.4 Conducted Output Power and ERP

3.4.1 Description of the Conducted Output Power Measurement and ERP Measurement

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

The ERP of mobile transmitters must not exceed 7 Watts for LTE Band 26.

The ERP of mobile transmitters must not exceed 3 Watts for LTE Band 13.

The EIRP of mobile transmitters must not exceed 2 Watts for LTE Band 25.

According to KDB 412172 D01 Power Approach,

EIRP = $P_T + G_T – L_C$, ERP = EIRP -2.15, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

3.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2
2. The transmitter output port was connected to the system simulator.
3. Set EUT at maximum power through the system simulator.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure and record the power level from the system simulator.

3.5 Peak-to-Average Ratio

3.5.1 Description of the PAR Measurement

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

3.5.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2.3.4 (CCDF).
2. The EUT was connected to spectrum and system simulator via a power divider.
3. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
4. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
5. Record the deviation as Peak to Average Ratio.

3.6 Occupied Bandwidth

3.6.1 Description of Occupied Bandwidth Measurement

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

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

3.6.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.4
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
4. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
5. Set the detection mode to peak, and the trace mode to max hold.
6. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace.
   (this is the reference value)
7. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
8. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “–X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
9. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.7 Conducted Band Edge

3.7.1 Description of Conducted Band Edge Measurement

22.917(a)

For operations in the 824 – 849 MHz 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 operations in the 1850-1910 and 1930-1990 MHz band, the FCC limit is 43 + $10\log_{10}$(P[Watts]) dB below the transmitter power P(Watts) in a 1MHz bandwidth. However, in the 1 MHz 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 (c)

For operations in the 776-788 MHz band, the FCC limit is 43 + $10\log_{10}$(P[Watts]) dB below the transmitter power P(Watts) in a 100 kHz bandwidth. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed. In addition, the power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least 65 + 10 log10 p(watts), dB, for mobile and portable equipment.

3.7.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured.
4. Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
5. 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.
6. Set spectrum analyzer with RMS detector.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
8. 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.

3.8 Conducted Spurious Emission

3.8.1 Description of Conducted Spurious Emission Measurement

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

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

3.8.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
7. Set spectrum analyzer with RMS detector.
8. Taking the record of maximum spurious emission.
9. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
10. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.

3.9 Frequency Stability

3.9.1 Description of Frequency Stability Measurement

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

3.9.2 Test Procedures for Temperature Variation

1. The testing follows ANSI C63.26 section 5.6.4
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.9.3 Test Procedures for Voltage Variation

1. The testing follows ANSI C63.26 section 5.6.5
2. The EUT was placed in a temperature chamber at 20±5°C and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value for other than hand carried battery equipment.
4. For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.
5. The variation in frequency was measured for the worst case.

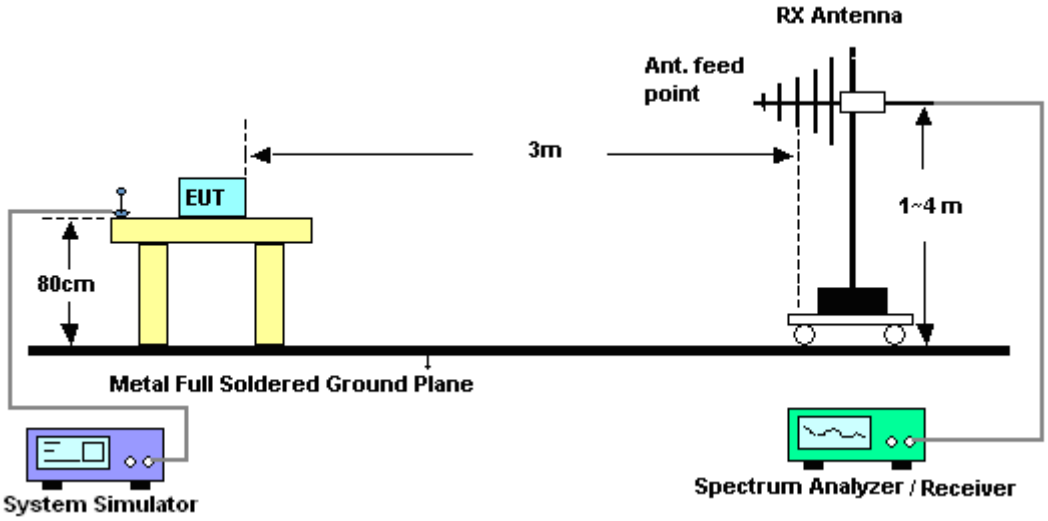
4 Radiated Test Items

4.1 Measuring Instruments

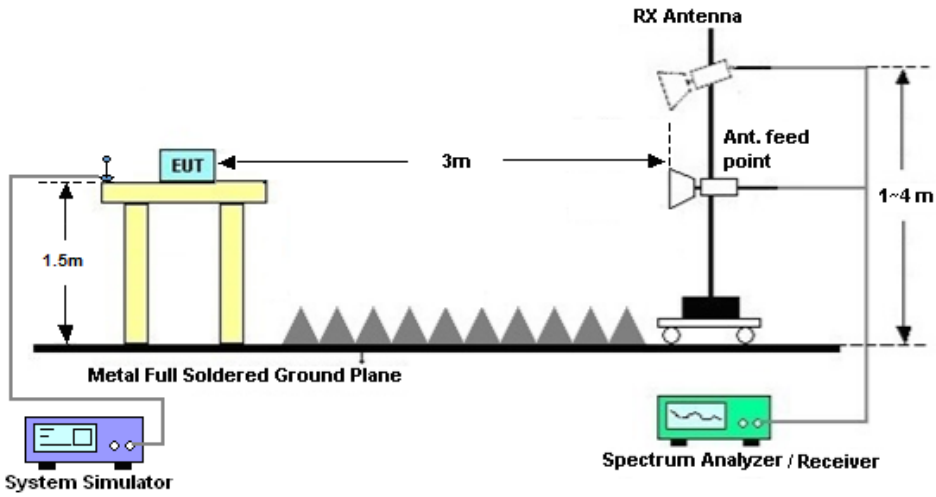
See list of measuring instruments of this test report.

4.2 Test Setup

4.2.1 For radiated test from 30MHz to 1GHz



4.2.2 For radiated test above 1GHz



4.3 Test Result of Radiated Test

Please refer to Appendix B.

4.4 Radiated Spurious Emission

4.4.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI C63.26. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

For LTE Band 13

For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) 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 10th harmonic.

4.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.5
2. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
6. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
7. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
8. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
9. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
10. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
11. ERP (dBm) = EIRP - 2.15
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
    The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Aug. 07, 2019	Feb. 17, 2020	Aug. 06, 2020	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Nov. 18, 2019	Feb. 17, 2020	Nov. 17, 2020	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101404	9kHz~7GHz	Apr. 18, 2019	Feb. 25, 2020	Apr. 17, 2020	Radiation (03CH04-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Apr. 18, 2019	Feb. 25, 2020	Apr. 17, 2020	Radiation (03CH04-SZ)
Bilog Antenna	TeseQ	CBL6111D	41909	30MHz~1GHz	Aug. 27, 2019	Feb. 25, 2020	Aug. 26, 2020	Radiation (03CH04-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1474	1GHz~18GHz	Apr. 01, 2019	Feb. 25, 2020	Mar. 31, 2020	Radiation (03CH04-SZ)
Horn Antenna	SCHWARZBECK	BBHA9170	9170#679	15GHz~40GHz	Apr.19，2019	Feb. 25, 2020	Apr. 18, 2020	Radiation (03CH04-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz ~3000MHz	Oct. 18, 2019	Feb. 25, 2020	Oct. 17, 2020	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	AMF-7D-00 101800-30-1	1943528	1GHz~18GHz	Oct. 18, 2019	Feb. 25, 2020	Oct. 17, 2020	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	TTA1840-35 -HG	1871923	18GHz~40GHz	Jul. 22, 2019	Feb. 25, 2020	Jul. 21, 2020	Radiation (03CH04-SZ)
Amplifier	Agilent Technologies	83017A	MY53270156	500MHz~26.5GHz	Aug. 26, 2019	Feb. 25, 2020	Aug. 25, 2020	Radiation (03CH04-SZ)
AC Power Source	Chroma	61601	N/A	N/A	NCR	Feb. 25, 2020	NCR	Radiation (03CH04-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Feb. 25, 2020	NCR	Radiation (03CH04-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Feb. 25, 2020	NCR	Radiation (03CH04-SZ)

NCR: No Calibration Required

6 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.3dB**

Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.8dB**

Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

LTE Band 13 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	-	22.79	-
10	1	25			22.75	
10	1	49			22.63	
10	25	0			21.76	
10	25	12			21.75	
10	25	25			21.69	
10	50	0			21.77	
10	1	0	16-QAM		21.68	
10	1	25			22.17	
10	1	49			21.93	
10	25	0			20.73	
10	25	12			20.75	
10	25	25			20.80	
10	50	0			20.74	
10	1	0	64-QAM		20.89	
10	1	25			20.73	
10	1	49			20.58	
10	25	0			19.64	
10	25	12			19.76	
10	25	25			19.73	
10	50	0			19.74	
5	1	0	QPSK	22.52	22.50	22.50
5	1	12		22.78	22.76	22.73
5	1	24		22.56	22.55	22.59
5	12	0		21.47	21.63	21.72
5	12	7		21.81	21.78	21.71
5	12	13		21.62	21.61	21.70
5	25	0		21.56	21.63	21.64

5	1	0		21.83	21.78	21.97
5	1	12		22.20	22.18	22.08
5	1	24		21.89	21.73	21.80
5	12	0	**16-QAM**	20.43	20.63	20.70
5	12	7		20.80	20.71	20.62
5	12	13		20.67	20.62	20.69
5	25	0		20.61	20.68	20.77
5	1	0		20.92	20.82	20.69
5	1	12		20.90	20.50	20.66
5	1	24		20.61	20.65	20.76
5	12	0	**64-QAM**	19.59	19.69	19.75
5	12	7		19.86	19.68	19.80
5	12	13		19.63	19.61	19.78
5	25	0		19.58	19.74	19.64

LTE Band 25 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
20	1	0	QPSK	22.35	22.70	22.54
20	1	49		22.55	22.63	22.52
20	1	99		22.27	22.29	22.41
20	50	0		21.48	21.65	21.61
20	50	24		21.51	21.60	21.63
20	50	50		21.54	21.64	21.38
20	100	0		21.49	21.51	21.50
20	1	0	16-QAM	21.61	21.79	21.70
20	1	49		22.07	22.04	21.74
20	1	99		21.72	21.65	21.70
20	50	0		20.49	20.58	20.65
20	50	24		20.52	20.66	20.61
20	50	50		20.52	20.60	20.45
20	100	0		20.55	20.56	20.48
20	1	0	64-QAM	20.71	20.68	20.65
20	1	49		20.62	20.92	20.67
20	1	99		20.73	20.44	20.49
20	50	0		19.55	19.71	19.56
20	50	24		19.51	19.63	19.64
20	50	50		19.45	19.60	19.40
20	100	0		19.43	19.64	19.43
15	1	0	QPSK	22.41	22.47	22.44
15	1	37		22.53	22.56	22.50
15	1	74		22.25	22.36	22.38
15	36	0		21.58	21.71	21.60
15	36	20		21.64	21.73	21.69
15	36	39		21.51	21.71	21.54
15	75	0		21.51	21.62	21.54
15	1	0	16-QAM	21.60	21.68	21.70
15	1	37		21.92	21.63	21.92
15	1	74		21.56	21.70	21.48
15	36	0		20.53	20.73	20.59
15	36	20		20.62	20.67	20.68

15	36	39		20.59	20.72	20.60
15	75	0		20.48	20.62	20.69
15	1	0	64-QAM	20.66	20.76	20.56
15	1	37		20.42	20.68	20.56
15	1	74		20.66	20.69	20.48
15	36	0		19.47	19.66	19.65
15	36	20		19.54	19.58	19.63
15	36	39		19.46	19.63	19.54
15	75	0		19.46	19.55	19.53

LTE Band 25 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	22.55	22.60	22.47
10	1	25		22.53	22.63	22.66
10	1	49		22.48	22.61	22.44
10	25	0		21.54	21.69	21.67
10	25	12		21.59	21.60	21.59
10	25	25		21.52	21.64	21.49
10	50	0		21.62	21.56	21.57
10	1	0	16-QAM	21.75	21.77	21.84
10	1	25		21.84	21.95	21.98
10	1	49		21.65	21.60	21.59
10	25	0		20.58	20.63	20.69
10	25	12		20.66	20.65	20.57
10	25	25		20.48	20.59	20.55
10	50	0		20.70	20.65	20.60
10	1	0	64-QAM	20.80	21.04	21.06
10	1	25		20.78	20.84	20.95
10	1	49		20.72	20.73	21.08
10	25	0		19.46	19.63	19.68
10	25	12		19.57	19.60	19.56
10	25	25		19.55	19.59	19.43
10	50	0		19.51	19.69	19.57
5	1	0	QPSK	22.36	22.35	22.45
5	1	12		22.51	22.57	22.51
5	1	24		22.41	22.52	22.43
5	12	0		21.45	21.58	21.54
5	12	7		21.56	21.61	21.62
5	12	13		21.51	21.50	21.47
5	25	0		21.58	21.62	21.58
5	1	0	16-QAM	21.72	21.49	21.65
5	1	12		21.54	21.80	21.71
5	1	24		21.58	21.69	21.63
5	12	0		20.44	20.68	20.66
5	12	7		20.61	20.70	20.61

5	12	13		20.54	20.57	20.56
5	25	0		20.49	20.70	20.57
5	1	0	64-QAM	20.72	20.97	20.66
5	1	12		20.83	20.92	20.83
5	1	24		20.61	20.71	20.72
5	12	0		19.40	19.60	19.62
5	12	7		19.65	19.66	19.63
5	12	13		19.55	19.47	19.69
5	25	0		19.58	19.62	19.54

LTE Band 25 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
3	1	0	QPSK	22.57	22.55	22.46
3	1	8		22.61	22.69	22.45
3	1	14		22.53	22.60	22.58
3	8	0		21.47	21.64	21.54
3	8	4		21.47	21.62	21.65
3	8	7		21.52	21.54	21.56
3	15	0		21.52	21.59	21.50
3	1	0	16-QAM	22.05	22.26	22.11
3	1	8		22.12	22.12	22.21
3	1	14		21.84	21.97	21.86
3	8	0		20.54	20.68	20.77
3	8	4		20.67	20.70	20.79
3	8	7		20.68	20.75	20.67
3	15	0		20.34	20.52	20.79
3	1	0	64-QAM	20.70	20.75	20.83
3	1	8		20.69	20.99	20.89
3	1	14		20.78	20.86	20.88
3	8	0		19.62	19.62	19.72
3	8	4		19.56	19.73	19.70
3	8	7		19.51	19.63	19.58
3	15	0		19.43	19.60	19.63
1.4	1	0	QPSK	22.41	22.56	22.37
1.4	1	3		22.51	22.55	22.63
1.4	1	5		22.38	22.56	22.38
1.4	3	0		22.49	22.62	22.53
1.4	3	1		22.68	22.65	22.55
1.4	3	3		22.45	22.55	22.48
1.4	6	0		21.49	21.55	21.56
1.4	1	0	16-QAM	21.74	22.19	21.80
1.4	1	3		21.80	22.16	22.14
1.4	1	5		21.73	21.82	21.90
1.4	3	0		21.47	21.50	21.58
1.4	3	1		21.62	21.72	21.67

1.4	3	3		21.53	21.48	21.43
1.4	6	0		20.69	20.75	20.75
1.4	1	0	64-QAM	20.82	20.72	20.83
1.4	1	3		20.64	20.84	20.84
1.4	1	5		20.63	20.89	20.95
1.4	3	0		20.46	20.88	20.71
1.4	3	1		20.72	20.94	20.67
1.4	3	3		20.60	20.68	20.78
1.4	6	0		19.51	19.72	19.62

LTE Band 26 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
15	1	0	QPSK	22.68	22.95	22.73
15	1	37		22.94	22.91	22.91
15	1	74		22.67	22.67	22.65
15	36	0		21.89	21.95	21.89
15	36	20		21.92	21.93	21.88
15	36	39		21.86	21.85	21.83
15	75	0		21.85	21.89	21.86
15	1	0	16-QAM	21.97	22.08	22.09
15	1	37		22.35	22.23	22.33
15	1	74		22.00	22.04	21.96
15	36	0		20.85	20.91	20.89
15	36	20		20.88	20.88	20.88
15	36	39		20.80	20.81	20.83
15	75	0		20.83	20.88	20.88
15	1	0	64QAM	20.93	20.91	20.99
15	1	37		21.14	21.14	21.22
15	1	74		20.84	20.90	20.87
15	36	0		19.88	19.91	19.89
15	36	20		19.90	19.92	19.86
15	36	39		19.83	19.82	19.83
15	75	0		19.84	19.86	19.87

LTE Band 26 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	22.81	22.81	22.67
10	1	25		22.93	22.84	22.85
10	1	49		22.78	22.76	22.79
10	25	0		21.92	22.03	21.82
10	25	12		21.90	21.97	21.82
10	25	25		21.86	21.77	21.79
10	50	0		21.90	21.93	21.87
10	1	0	16-QAM	21.90	21.98	22.13
10	1	25		22.28	22.19	22.21
10	1	49		21.78	22.01	21.88
10	25	0		21.05	20.99	20.91
10	25	12		20.95	20.97	20.87
10	25	25		20.98	20.84	20.84
10	50	0		20.96	20.95	20.84
10	1	0	64QAM	20.83	20.86	20.81
10	1	25		20.97	20.84	20.97
10	1	49		20.66	21.16	20.83
10	25	0		19.81	20.06	19.94
10	25	12		19.89	19.91	19.90
10	25	25		20.04	19.79	19.83
10	50	0		19.98	19.94	19.80
5	1	0	QPSK	22.68	22.69	22.64
5	1	12		22.93	22.87	22.89
5	1	24		22.67	22.68	22.64
5	12	0		21.80	21.94	21.86
5	12	7		21.88	21.89	21.96
5	12	13		21.87	21.85	21.85
5	25	0		21.78	21.82	21.78
5	1	0	16-QAM	21.95	21.96	22.42
5	1	12		22.22	22.36	22.40
5	1	24		22.01	22.04	21.99
5	12	0		20.73	20.91	20.92
5	12	7		20.94	20.88	20.85

5	12	13		20.76	20.70	20.85
5	25	0		20.90	20.93	20.87
5	1	0	64QAM	20.70	20.93	20.72
5	1	12		21.11	21.03	21.04
5	1	24		20.81	20.83	20.65
5	12	0		19.75	19.92	19.86
5	12	7		19.86	19.94	19.88
5	12	13		19.78	19.78	19.83
5	25	0		19.88	19.87	19.94

LTE Band 26 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
3	1	0	QPSK	22.73	22.81	22.75
3	1	8		22.75	22.81	22.75
3	1	14		22.79	22.80	22.75
3	8	0		21.80	21.86	21.85
3	8	4		21.87	21.88	21.85
3	8	7		21.83	21.86	21.83
3	15	0		21.82	21.88	21.82
3	1	0	16-QAM	21.97	22.19	22.10
3	1	8		22.11	21.98	22.09
3	1	14		22.00	22.03	22.07
3	8	0		20.86	20.92	20.94
3	8	4		20.91	20.93	20.93
3	8	7		20.90	20.90	20.92
3	15	0		20.83	20.87	20.84
3	1	0	64QAM	20.90	21.06	21.03
3	1	8		21.01	21.00	21.04
3	1	14		21.01	21.04	21.03
3	8	0		19.82	19.87	19.91
3	8	4		19.87	19.90	19.89
3	8	7		19.88	19.90	19.90
3	15	0		19.77	19.85	19.80
1.4	1	0	QPSK	22.67	22.75	22.72
1.4	1	3		22.85	22.88	22.87
1.4	1	5		22.68	22.74	22.72
1.4	3	0		22.77	22.83	22.83
1.4	3	1		22.86	22.91	22.90
1.4	3	3		22.84	22.83	22.81
1.4	6	0		21.82	21.89	21.89
1.4	1	0	16-QAM	21.96	22.00	22.00
1.4	1	3		22.04	22.10	22.19
1.4	1	5		22.01	21.94	22.13
1.4	3	0		21.79	21.84	21.85
1.4	3	1		21.83	21.94	21.91

1.4	3	3		21.73	21.87	21.91
1.4	6	0		20.91	20.97	20.99
1.4	1	0	64QAM	20.80	21.00	21.02
1.4	1	3		21.07	21.09	21.16
1.4	1	5		20.91	20.89	20.99
1.4	3	0		20.86	20.98	21.06
1.4	3	1		20.90	21.01	21.02
1.4	3	3		20.89	20.94	20.99
1.4	6	0		19.78	19.82	19.83

ERP/EIRP

LTE Band 13 (GT - LC = -0.60 dB) QPSK						
Bandwidth	5M			10M		
Channel	23205	23230	23255	23230		
	(Low)	(Mid)	(High)	-	(Mid)	-
Frequency (MHz)	779.5	782	784.5	-	782	-
Conducted Power (dBm)	22.78	22.76	22.73		22.79	
Conducted Power (Watts)	0.1897	0.1888	0.1875		0.1901	
ERP(dBm)	20.03	20.01	19.98		20.04	
ERP(Watts)	0.1007	0.1002	0.0995		0.1009	

LTE Band 13 (GT - LC = -0.60 dB) 16QAM						
Bandwidth	5M			10M		
Channel	23205	23230	23255	23230		
	(Low)	(Mid)	(High)	-	(Mid)	-
Frequency (MHz)	779.5	782	784.5	-	782	-
Conducted Power (dBm)	22.20	22.18	22.08		22.17	
Conducted Power (Watts)	0.1660	0.1652	0.1614		0.1648	
ERP(dBm)	19.45	19.43	19.33		19.42	
ERP(Watts)	0.0881	0.0877	0.0857		0.0875	

LTE Band 13 (GT - LC = -0.60 dB) 64QAM						
Bandwidth	5M			10M		
Channel	23205	23230	23255	23230		
	(Low)	(Mid)	(High)	-	(Mid)	-
Frequency (MHz)	779.5	782	784.5	-	782	-
Conducted Power (dBm)	20.92	20.82	20.69		20.89	
Conducted Power (Watts)	0.1236	0.1208	0.1172		0.1227	
ERP(dBm)	18.17	18.07	17.94		18.14	
ERP(Watts)	0.0656	0.0641	0.0622		0.0652	

LTE Band 25 (GT - LC = 1.00 dB) QPSK									
Bandwidth	1.4M			3M			5M		
Channel	26407	26340	26683	26055	26340	26675	26065	26340	26665
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	1850.7	1880	1914.3	1851.5	1880	1913.5	1852.5	1880	1912.5
Conducted Power (dBm)	22.68	22.65	22.55	22.61	22.69	22.45	22.51	22.57	22.51
Conducted Power (Watts)	0.1854	0.1841	0.1799	0.1824	0.1858	0.1758	0.1782	0.1807	0.1782
EIRP(dBm)	23.68	23.65	23.55	23.61	23.69	23.45	23.51	23.57	23.51
EIRP(Watts)	0.2333	0.2317	0.2265	0.2296	0.2339	0.2213	0.2244	0.2275	0.2244

LTE Band 25 (GT - LC = 1.00 dB) QPSK									
Bandwidth	10M			15M			20M		
Channel	26090	26340	26640	26115	26340	26615	26140	26340	26590
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	1855	1880	1910	1857.5	1880	1907.5	1860	1880	1905
Conducted Power (dBm)	22.53	22.63	22.66	22.53	22.56	22.50	22.35	22.70	22.54
Conducted Power (Watts)	0.1791	0.1832	0.1845	0.1791	0.1803	0.1778	0.1718	0.1862	0.1795
EIRP(dBm)	23.53	23.63	23.66	23.53	23.56	23.50	23.35	23.70	23.54
EIRP(Watts)	0.2254	0.2307	0.2323	0.2254	0.2270	0.2239	0.2163	0.2344	0.2259

LTE Band 25 (GT - LC = 1.00 dB) 16QAM									
Bandwidth	1.4M			3M			5M		
Channel	26407	26340	26683	26055	26340	26675	26065	26340	26665
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	1850.7	1880	1914.3	1851.5	1880	1913.5	1852.5	1880	1912.5
Conducted Power (dBm)	21.74	22.19	21.80	22.05	22.26	22.11	21.54	21.80	21.71
Conducted Power (Watts)	0.1493	0.1656	0.1514	0.1603	0.1683	0.1626	0.1426	0.1514	0.1483
EIRP(dBm)	22.74	23.19	22.80	23.05	23.26	23.11	22.54	22.80	22.71
EIRP(Watts)	0.1879	0.2084	0.1905	0.2018	0.2118	0.2046	0.1795	0.1905	0.1866

LTE Band 25 (GT - LC = 1.00 dB) 16QAM									
Bandwidth	10M			15M			20M		
Channel	26090	26340	26640	26115	26340	26615	26140	26340	26590
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	1855	1880	1910	1857.5	1880	1907.5	1860	1880	1905
Conducted Power (dBm)	21.84	21.95	21.98	21.92	21.63	21.92	22.07	22.04	21.74
Conducted Power (Watts)	0.1528	0.1567	0.1578	0.1556	0.1455	0.1556	0.1611	0.1600	0.1493
EIRP(dBm)	22.84	22.95	22.98	22.92	22.63	22.92	23.07	23.04	22.74
EIRP(Watts)	0.1923	0.1972	0.1986	0.1959	0.1832	0.1959	0.2028	0.2014	0.1879

LTE Band 25 (GT - LC = 1.00 dB) 64QAM									
Bandwidth	1.4M			3M			5M		
Channel	26407	26340	26683	26055	26340	26675	26065	26340	26665
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	1850.7	1880	1914.3	1851.5	1880	1913.5	1852.5	1880	1912.5
Conducted Power (dBm)	20.63	20.89	20.95	20.69	20.99	20.89	20.72	20.97	20.66
Conducted Power (Watts)	0.1156	0.1227	0.1245	0.1172	0.1256	0.1227	0.1180	0.1250	0.1164
EIRP(dBm)	21.63	21.89	21.95	21.69	21.99	21.89	21.72	21.97	21.66
EIRP(Watts)	0.1455	0.1545	0.1567	0.1476	0.1581	0.1545	0.1486	0.1574	0.1466

LTE Band 25 (GT - LC = 1.00 dB) 64QAM									
Bandwidth	10M			15M			20M		
Channel	26090	26340	26640	26115	26340	26615	26140	26340	26590
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	1855	1880	1910	1857.5	1880	1907.5	1860	1880	1905
Conducted Power (dBm)	20.72	20.73	21.08	20.66	20.76	20.56	20.62	20.92	20.67
Conducted Power (Watts)	0.1180	0.1183	0.1282	0.1164	0.1191	0.1138	0.1153	0.1236	0.1167
EIRP(dBm)	21.72	21.73	22.08	21.66	21.76	21.56	21.62	21.92	21.67
EIRP(Watts)	0.1486	0.1489	0.1614	0.1466	0.1500	0.1432	0.1452	0.1556	0.1469

LTE Band 26 (GT - LC = -0.50 dB) QPSK									
Bandwidth	1.4M			3M			5M		
Channel	26797	26915	27033	26805	26915	27025	26815	26915	27015
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	824.7	836.5	848.3	825.5	836.5	847.5	826.5	836.5	846.5
Conducted Power (dBm)	22.86	22.91	22.90	22.75	22.81	22.75	22.93	22.87	22.89
Conducted Power (Watts)	0.1932	0.1954	0.1950	0.1884	0.1910	0.1884	0.1963	0.1936	0.1945
ERP(dBm)	20.21	20.26	20.25	20.10	20.16	20.10	20.28	20.22	20.24
ERP(Watts)	0.1050	0.1062	0.1059	0.1023	0.1038	0.1023	0.1067	0.1052	0.1057

LTE Band 26 (GT - LC = -0.50 dB) QPSK							
Bandwidth	10M			15M			15M
Channel	26840	26915	26990	26865	26915	26965	26765
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)
Frequency (MHz)	829	836.5	844	831.5	836.5	841.5	821.5
Conducted Power (dBm)	22.93	22.84	22.85	22.68	22.95	22.73	22.94
Conducted Power (Watts)	0.1963	0.1923	0.1928	0.1854	0.1972	0.1875	0.1968
ERP(dBm)	20.28	20.19	20.20	20.03	20.30	20.08	20.29
ERP(Watts)	0.1067	0.1045	0.1047	0.1007	0.1072	0.1019	0.1069

LTE Band 26 (GT - LC = -0.50 dB) 16QAM									
Bandwidth	1.4M			3M			5M		
Channel	26797	26915	27033	26805	26915	27025	26815	26915	27015
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	824.7	836.5	848.3	825.5	836.5	847.5	826.5	836.5	846.5
Conducted Power (dBm)	22.04	22.10	22.19	21.97	22.19	22.10	21.95	21.96	22.42
Conducted Power (Watts)	0.1600	0.1622	0.1656	0.1574	0.1656	0.1622	0.1567	0.1570	0.1746
ERP(dBm)	19.39	19.45	19.54	19.32	19.54	19.45	19.30	19.31	19.77
ERP(Watts)	0.0869	0.0881	0.0899	0.0855	0.0899	0.0881	0.0851	0.0853	0.0948

LTE Band 26 (GT - LC = -0.50 dB) 16QAM							
Bandwidth	10M			15M			15M
Channel	26840	26915	26990	26865	26915	26965	26765
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)
Frequency (MHz)	829	836.5	844	831.5	836.5	841.5	821.5
Conducted Power (dBm)	22.28	22.19	22.21	22.35	22.23	22.33	22.35
Conducted Power (Watts)	0.1690	0.1656	0.1663	0.1718	0.1671	0.1710	0.1718
ERP(dBm)	19.63	19.54	19.56	19.70	19.58	19.68	19.70
ERP(Watts)	0.0918	0.0899	0.0904	0.0933	0.0908	0.0929	0.0933

LTE Band 26 (GT - LC = -0.50 dB) 64QAM									
Bandwidth	1.4M			3M			5M		
Channel	26797	26915	27033	26805	26915	27025	26815	26915	27015
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	824.7	836.5	848.3	825.5	836.5	847.5	826.5	836.5	846.5
Conducted Power (dBm)	21.07	21.09	21.16	20.90	21.06	21.03	21.11	21.03	21.04
Conducted Power (Watts)	0.1279	0.1285	0.1306	0.1230	0.1276	0.1268	0.1291	0.1268	0.1271
ERP(dBm)	18.42	18.44	18.51	18.25	18.41	18.38	18.46	18.38	18.39
ERP(Watts)	0.0695	0.0698	0.0710	0.0668	0.0693	0.0689	0.0701	0.0689	0.0690

LTE Band 26 (GT - LC = -0.50 dB) 64QAM							
Bandwidth	10M			15M			15M
Channel	26840	26915	26990	26865	26915	26965	26765
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)
Frequency (MHz)	829	836.5	844	831.5	836.5	841.5	821.5
Conducted Power (dBm)	20.66	21.16	20.83	21.14	21.14	21.22	21.14
Conducted Power (Watts)	0.1164	0.1306	0.1211	0.1300	0.1300	0.1324	0.1300
ERP(dBm)	18.01	18.51	18.18	18.49	18.49	18.57	18.49
ERP(Watts)	0.0632	0.0710	0.0658	0.0706	0.0706	0.0719	0.0706

LTE Band 13

Peak-to-Average Ratio

Mode	LTE Band 13 / 10MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	Full RB	Result
Lowest CH					PASS
Middle CH	4.64	5.42	5.39	6.32	
Highest CH					
Mode	LTE Band 13 / 10MHz				
Mod.	64QAM				Limit: 13dB
RB Size	1RB	Full RB			Result
Lowest CH					PASS
Middle CH	6.09	6.58			
Highest CH					

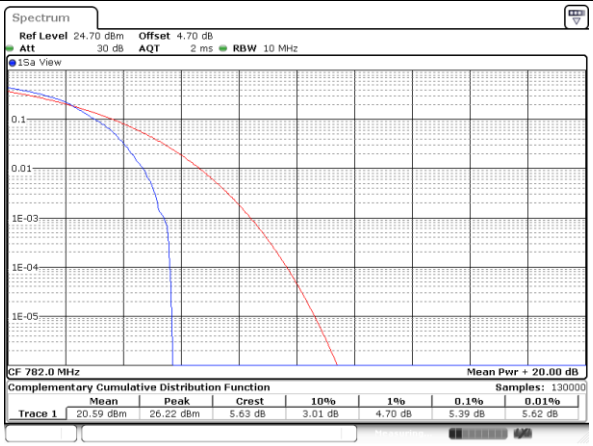
LTE Band 13 / 10MHz / QPSK

Middle Channel / 1RB

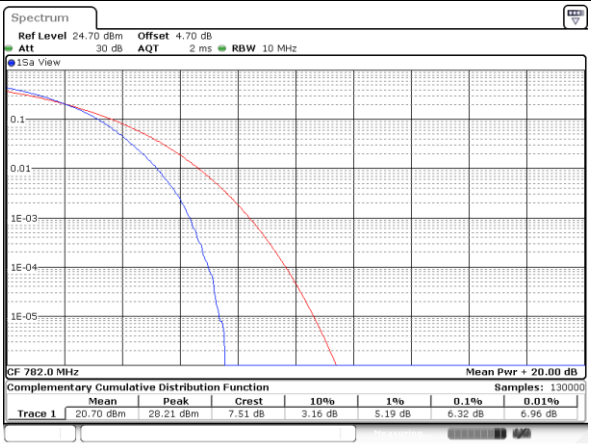
Middle Channel / Full RB

LTE Band 13 / 10MHz / 16QAM

Middle Channel / 1RB

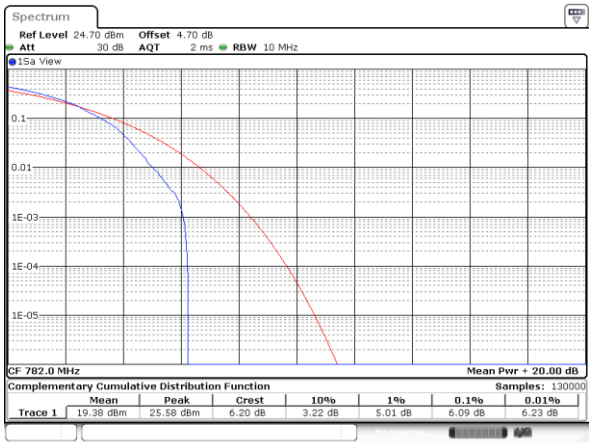


Middle Channel / Full RB

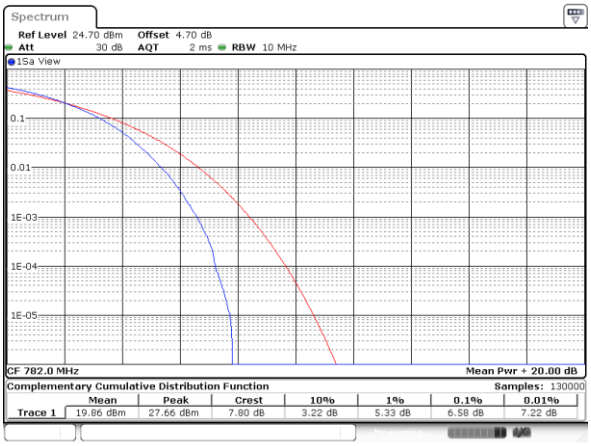


LTE Band 13 / 10MHz / 64QAM

Middle Channel / 1RB



Middle Channel / Full RB

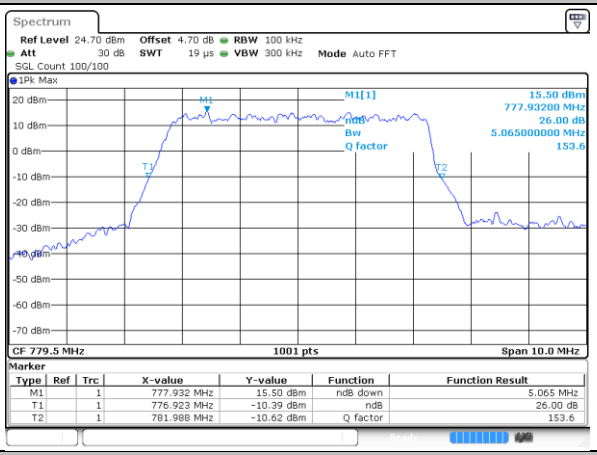


26dB Bandwidth

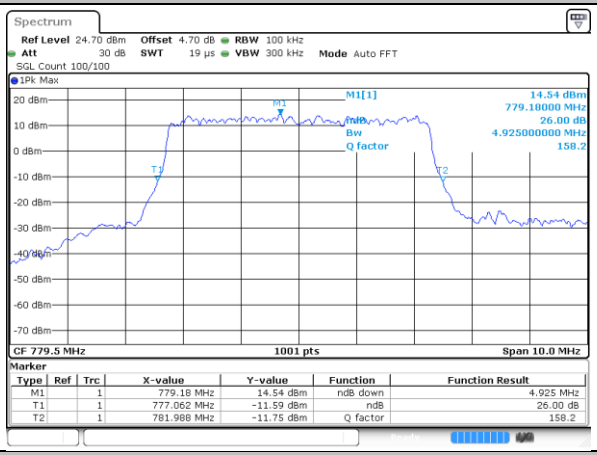
Mode	LTE Band 13 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH					5.07	4.93						
Middle CH					5.02	4.94	9.73	9.99				
Highest CH					5.14	4.95						
Mode	LTE Band 13 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH					5.07							
Middle CH					4.90		9.75					
Highest CH					5.10							

LTE Band 13

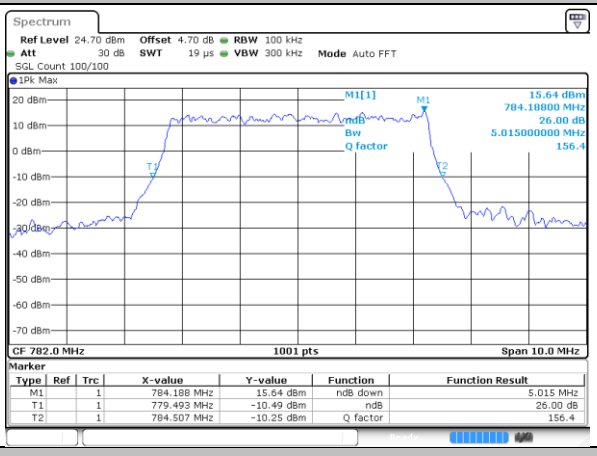
Lowest Channel / 5MHz / QPSK



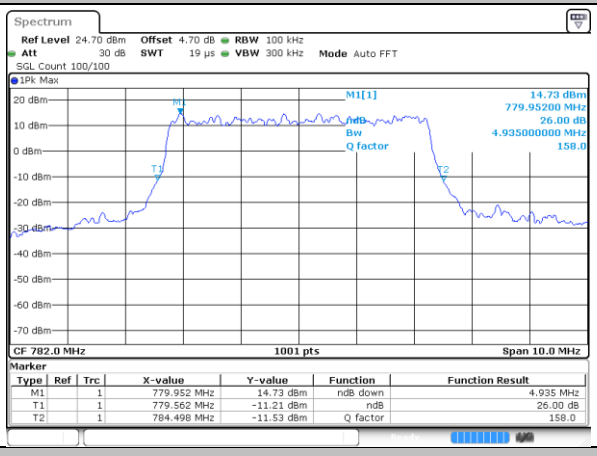
Lowest Channel / 5MHz / 16QAM



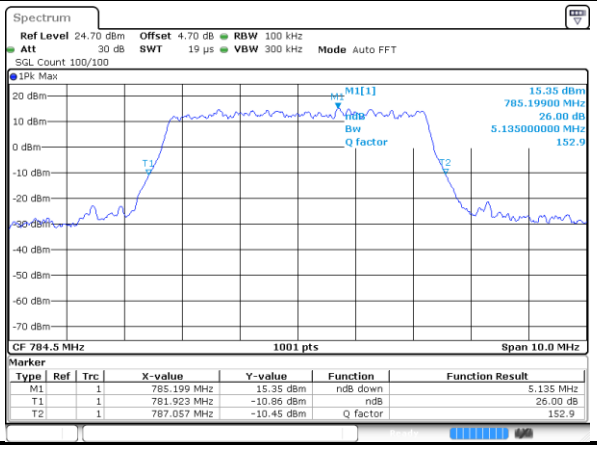
Middle Channel / 5MHz / QPSK



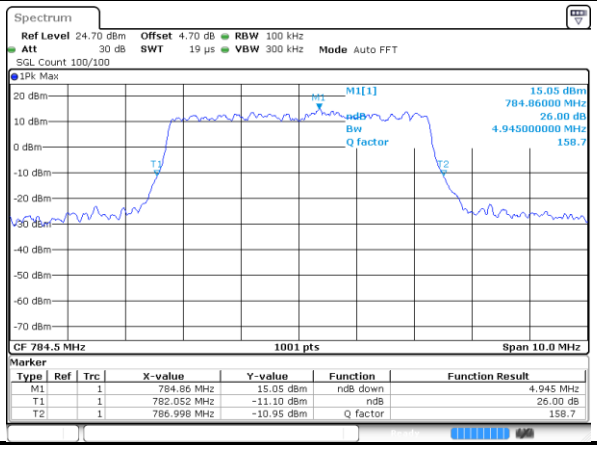
Middle Channel / 5MHz / 16QAM



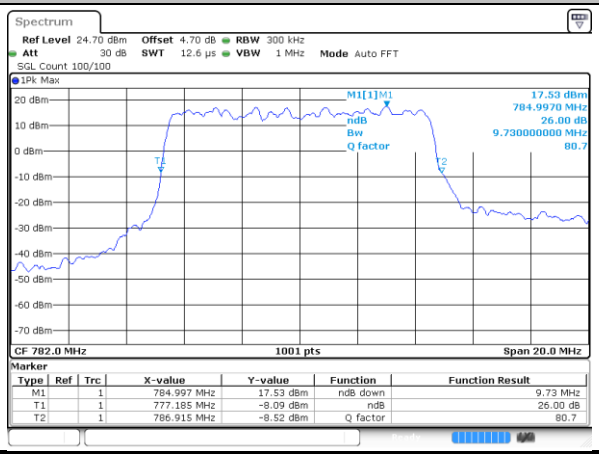
Highest Channel / 5MHz / QPSK

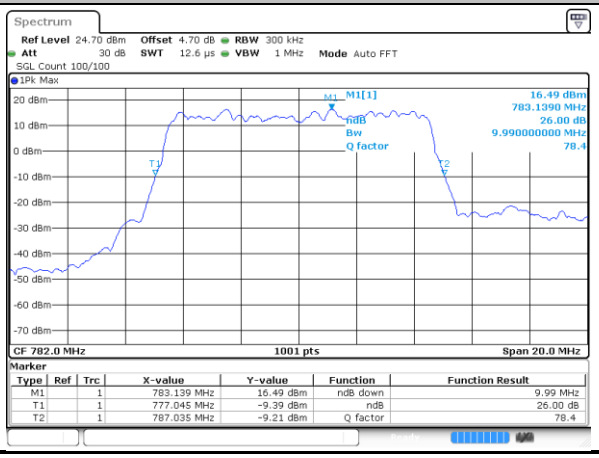


Highest Channel / 5MHz / 16QAM



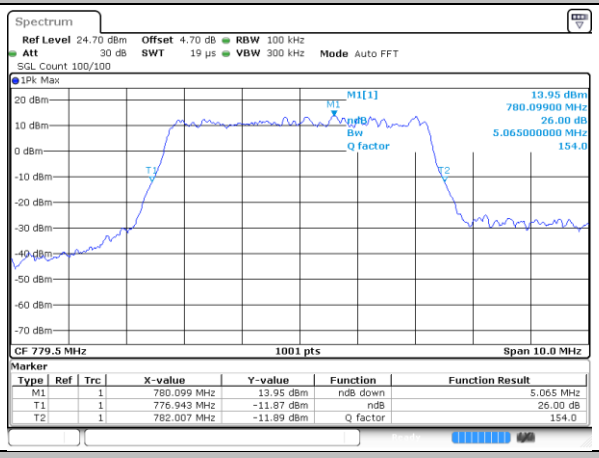
LTE Band 13	
Middle Channel / 10MHz / QPSK	**Middle Channel / 10MHz / 16QAM**



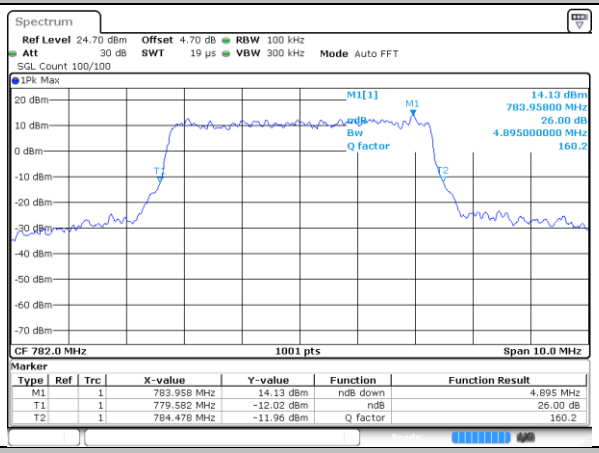


LTE Band 13

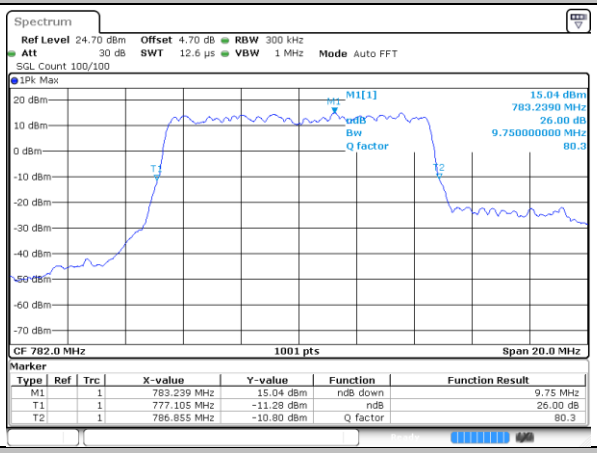
Lowest Channel / 5MHz / 64QAM



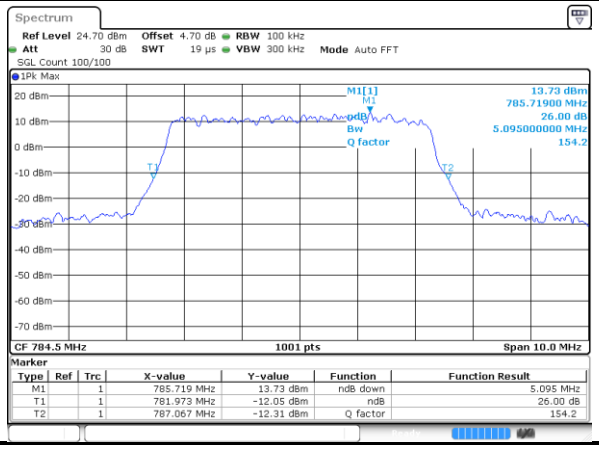
Middle Channel / 5MHz / 64QAM



Middle Channel / 10MHz / 64QAM



Highest Channel / 5MHz / 64QAM

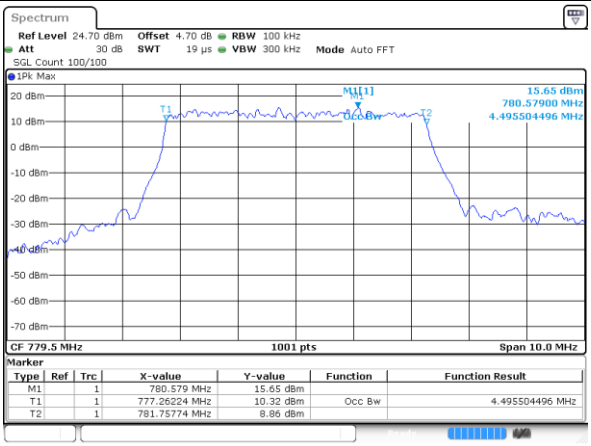


Occupied Bandwidth

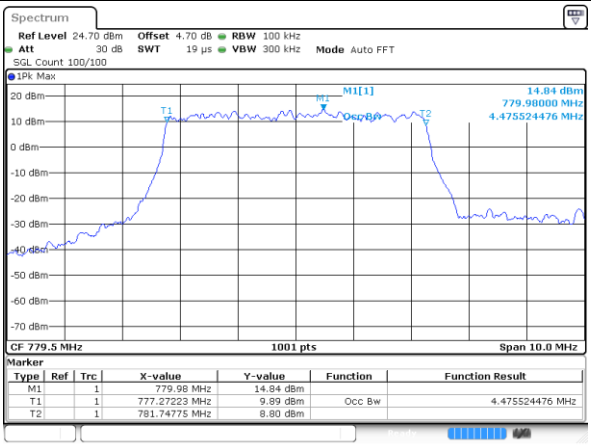
Mode	LTE Band 13 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH					4.496	4.476						
Middle CH					4.525	4.515	8.991	9.031				
Highest CH					4.476	4.505						
Mode	LTE Band 13 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH					4.466							
Middle CH					4.505		9.051					
Highest CH					4.486							

LTE Band 13

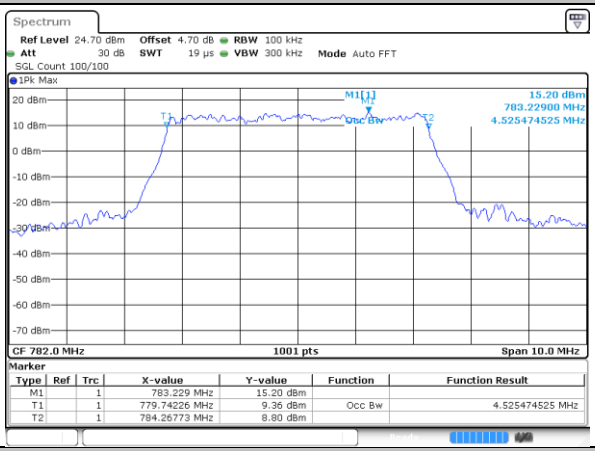
Lowest Channel / 5MHz / QPSK



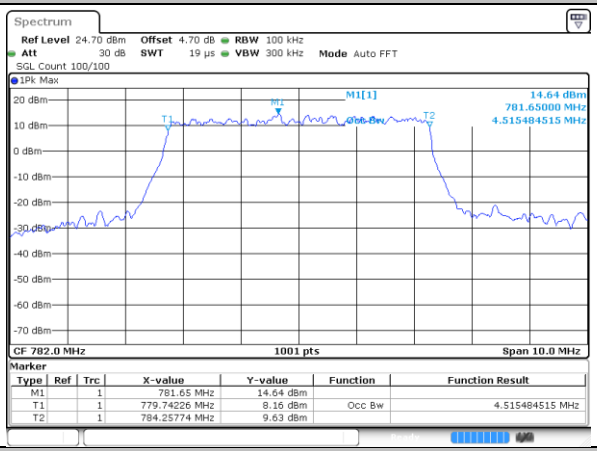
Lowest Channel / 5MHz / 16QAM



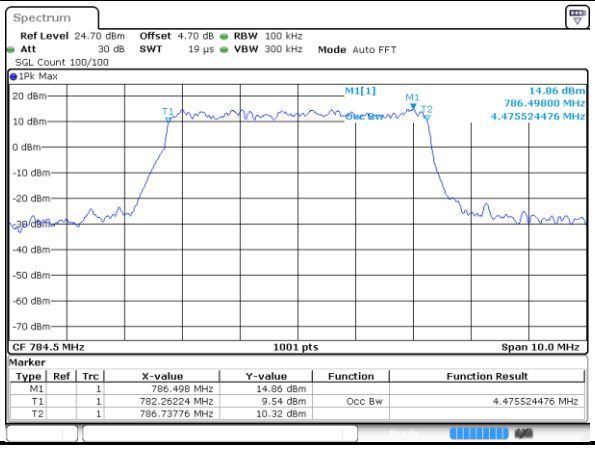
Middle Channel / 5MHz / QPSK



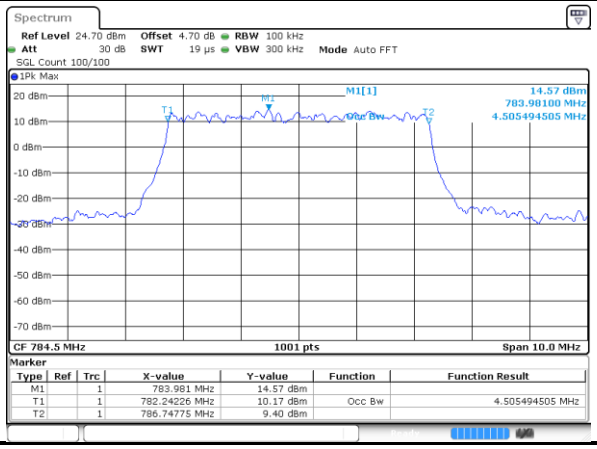
Middle Channel / 5MHz / 16QAM

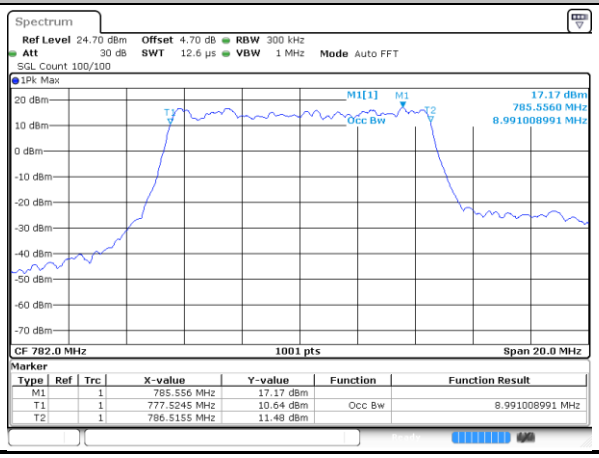
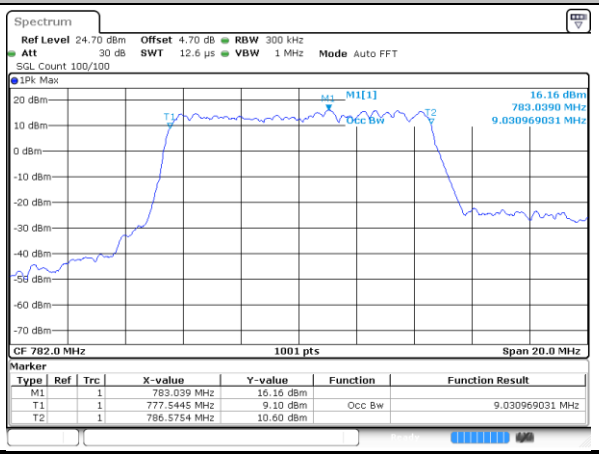


Highest Channel / 5MHz / QPSK



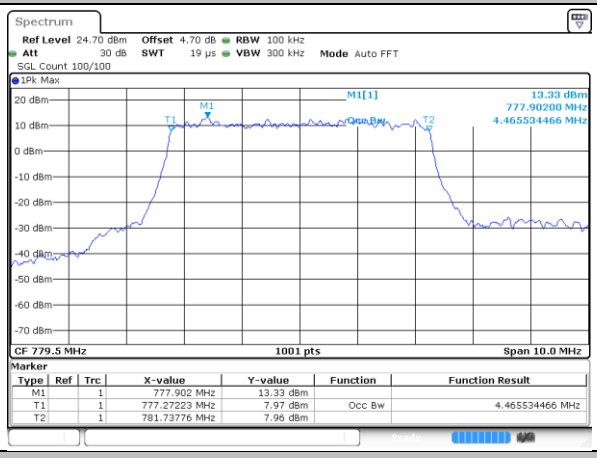
Highest Channel / 5MHz / 16QAM



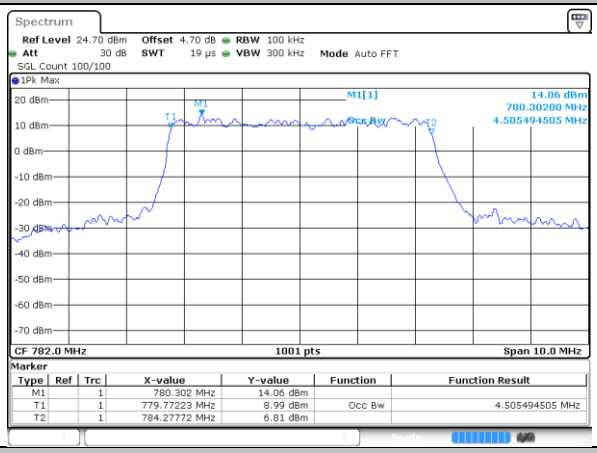
LTE Band 13	
Middle Channel / 10MHz / QPSK	**Middle Channel / 10MHz / 16QAM**
	

LTE Band 13

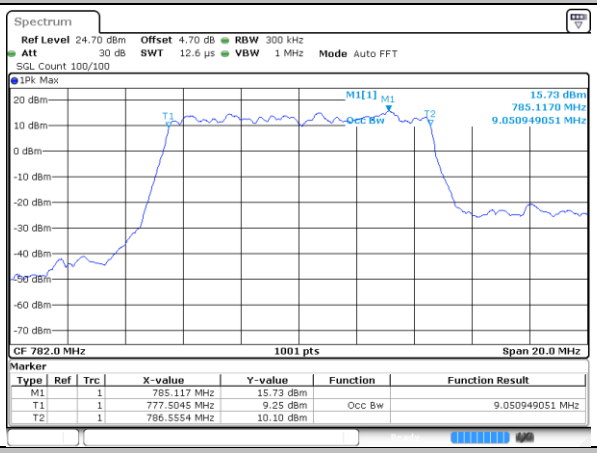
Lowest Channel / 5MHz / 64QAM



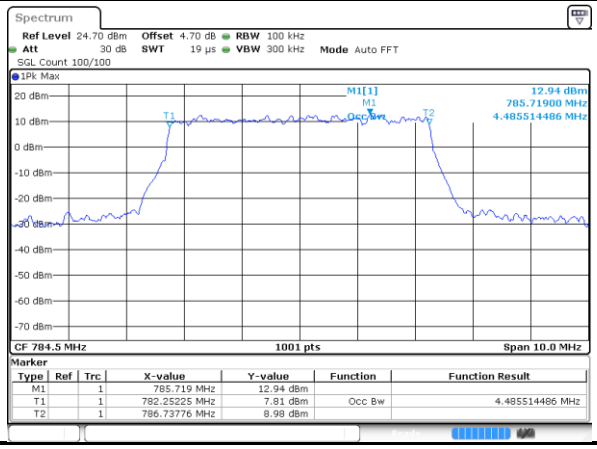
Middle Channel / 5MHz / 64QAM



Middle Channel / 10MHz / 64QAM



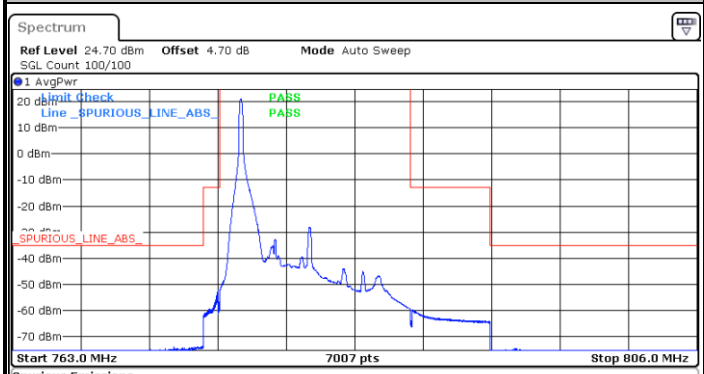
Highest Channel / 5MHz / 64QAM



Conducted Band Edge

LTE Band 13 / 5MHz / QPSK

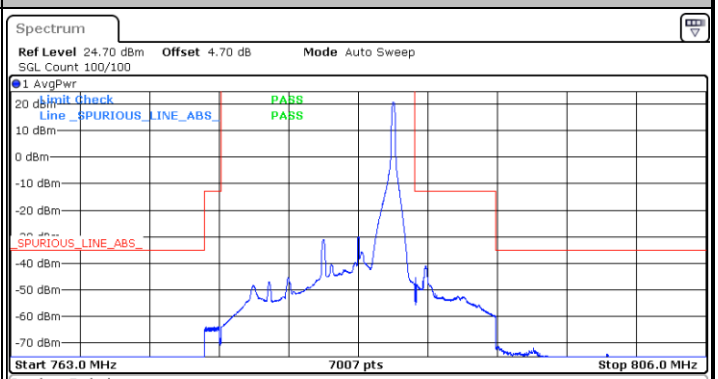
Lowest Band Edge / 1 RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	774.95804 MHz	-73.67 dBm	-38.67 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.89146 MHz	-52.27 dBm	-39.27 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.98397 MHz	-56.45 dBm	-43.45 dB
776.000 MHz	788.000 MHz	100.000 kHz	777.37263 MHz	21.00 dBm	-9.00 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.07008 MHz	-63.84 dBm	-50.84 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.15629 MHz	-59.80 dBm	-46.80 dB
793.000 MHz	806.000 MHz	6.250 kHz	794.65584 MHz	-74.50 dBm	-39.50 dB

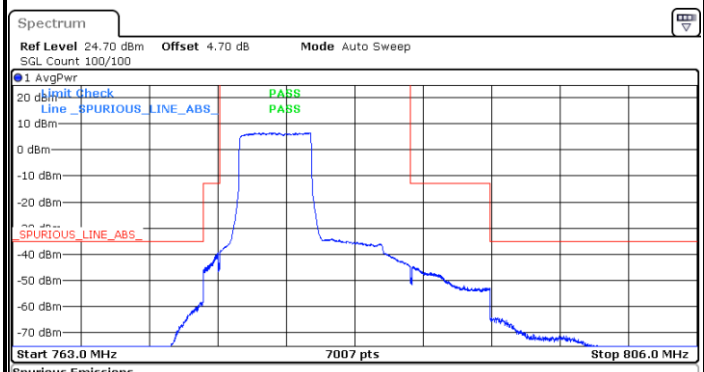
Highest Band Edge / 1 RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	764.36064 MHz	-75.93 dBm	-40.93 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.79705 MHz	-64.00 dBm	-51.00 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.98896 MHz	-68.29 dBm	-55.29 dB
776.000 MHz	788.000 MHz	100.000 kHz	786.65135 MHz	20.84 dBm	-9.16 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.04860 MHz	-45.55 dBm	-32.55 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.64580 MHz	-41.04 dBm	-28.04 dB
793.000 MHz	806.000 MHz	6.250 kHz	793.17532 MHz	-71.18 dBm	-36.18 dB

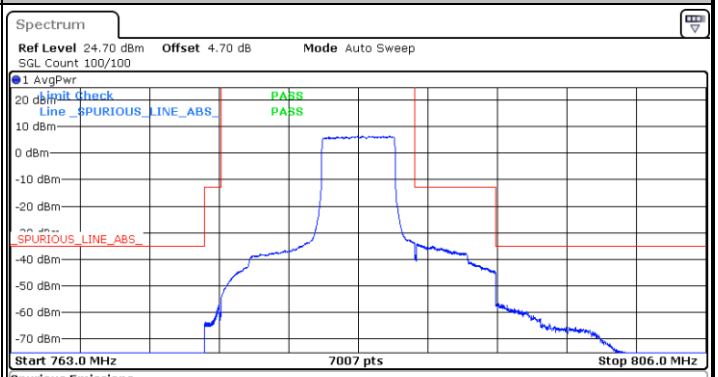
Lowest Band Edge / Full RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	774.97003 MHz	-57.74 dBm	-22.74 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.87438 MHz	-39.30 dBm	-26.30 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.98177 MHz	-43.45 dBm	-30.45 dB
776.000 MHz	788.000 MHz	100.000 kHz	779.15884 MHz	6.54 dBm	-23.46 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.03591 MHz	-48.94 dBm	-35.94 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.20035 MHz	-44.78 dBm	-31.78 dB
793.000 MHz	806.000 MHz	6.250 kHz	793.30519 MHz	-64.23 dBm	-29.23 dB

Highest Band Edge / Full RB

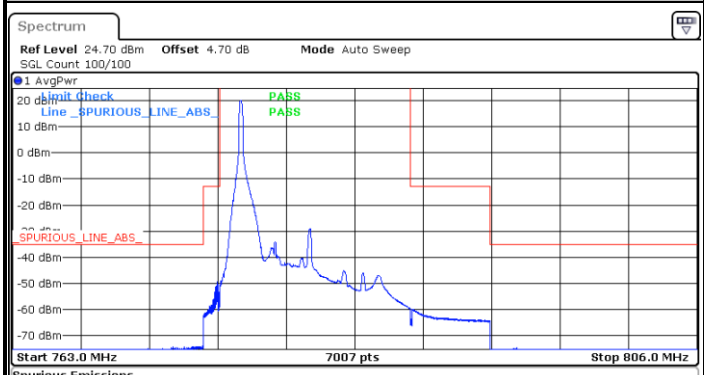


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	774.75425 MHz	-75.35 dBm	-40.35 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.88606 MHz	-56.95 dBm	-43.95 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.99915 MHz	-59.53 dBm	-46.53 dB
776.000 MHz	788.000 MHz	100.000 kHz	785.12887 MHz	6.37 dBm	-23.63 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.00794 MHz	-38.27 dBm	-25.27 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.13671 MHz	-34.16 dBm	-21.16 dB
793.000 MHz	806.000 MHz	6.250 kHz	793.14935 MHz	-56.74 dBm	-21.74 dB

LTE Band 13 / 5MHz / 16QAM

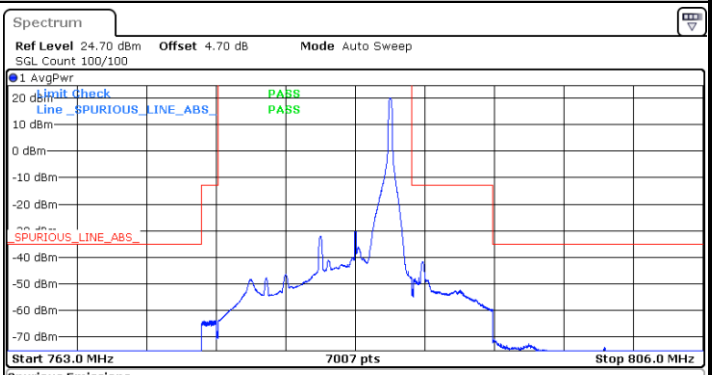
Lowest Band Edge / 1 RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	774.91009 MHz	-74.07 dBm	-39.07 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.85549 MHz	-49.33 dBm	-36.33 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.99605 MHz	-51.52 dBm	-38.52 dB
776.000 MHz	788.000 MHz	100.000 kHz	777.31269 MHz	20.09 dBm	-9.91 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.03262 MHz	-63.52 dBm	-50.52 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.12203 MHz	-59.92 dBm	-46.92 dB
793.000 MHz	806.000 MHz	6.250 kHz	794.65584 MHz	-74.79 dBm	-39.79 dB

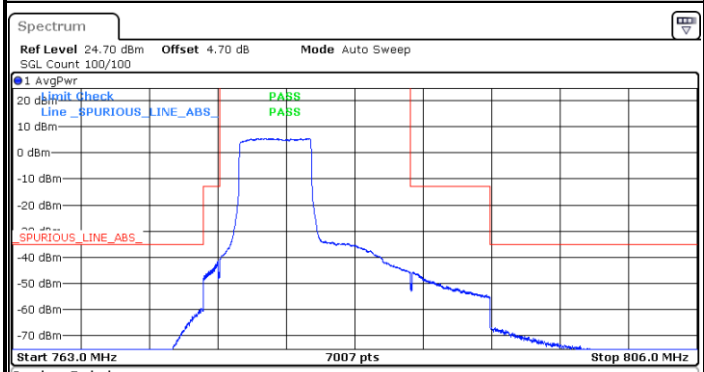
Highest Band Edge / 1 RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	773.59141 MHz	-75.68 dBm	-40.68 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.89865 MHz	-63.89 dBm	-50.89 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.96518 MHz	-68.10 dBm	-55.10 dB
776.000 MHz	788.000 MHz	100.000 kHz	786.63936 MHz	20.10 dBm	-9.90 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.09715 MHz	-48.40 dBm	-35.40 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.67028 MHz	-41.78 dBm	-28.78 dB
793.000 MHz	806.000 MHz	6.250 kHz	793.09740 MHz	-71.07 dBm	-36.07 dB

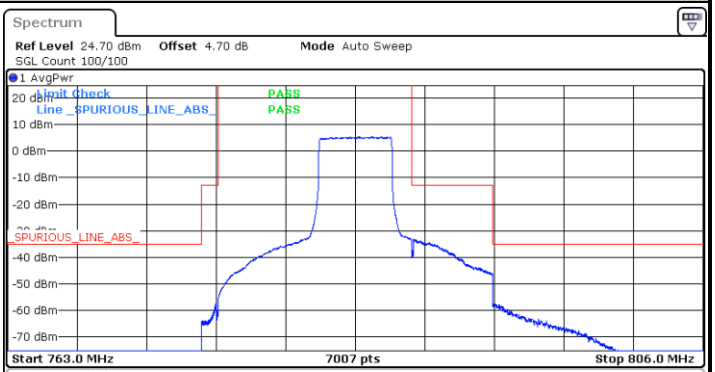
Lowest Band Edge / Full RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	774.99401 MHz	-59.54 dBm	-24.54 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.88876 MHz	-41.53 dBm	-28.53 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.99755 MHz	-44.90 dBm	-31.90 dB
776.000 MHz	788.000 MHz	100.000 kHz	781.54446 MHz	5.58 dBm	-24.42 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.03442 MHz	-49.88 dBm	-36.88 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.21014 MHz	-45.82 dBm	-32.82 dB
793.000 MHz	806.000 MHz	6.250 kHz	793.00649 MHz	-66.79 dBm	-31.79 dB

Highest Band Edge / Full RB

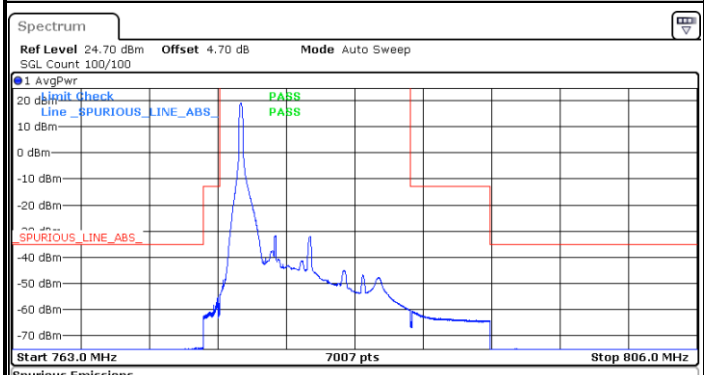


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	774.52647 MHz	-75.77 dBm	-40.77 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.86808 MHz	-57.57 dBm	-44.57 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.99635 MHz	-59.72 dBm	-46.72 dB
776.000 MHz	788.000 MHz	100.000 kHz	786.07592 MHz	5.47 dBm	-24.53 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.07268 MHz	-37.37 dBm	-24.37 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.10734 MHz	-33.15 dBm	-20.15 dB
793.000 MHz	806.000 MHz	6.250 kHz	793.16234 MHz	-57.56 dBm	-22.56 dB

LTE Band 13 / 5MHz / 64QAM

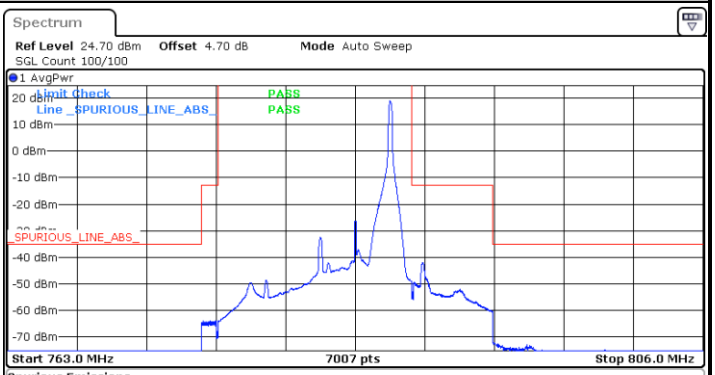
Lowest Band Edge / 1 RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	774.88611 MHz	-74.56 dBm	-39.56 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.89865 MHz	-55.42 dBm	-42.42 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.93032 MHz	-57.55 dBm	-44.55 dB
776.000 MHz	788.000 MHz	100.000 kHz	777.32468 MHz	19.06 dBm	-10.94 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.01204 MHz	-64.74 dBm	-51.74 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.11224 MHz	-60.54 dBm	-47.54 dB
793.000 MHz	806.000 MHz	6.250 kHz	794.56494 MHz	-74.95 dBm	-39.95 dB

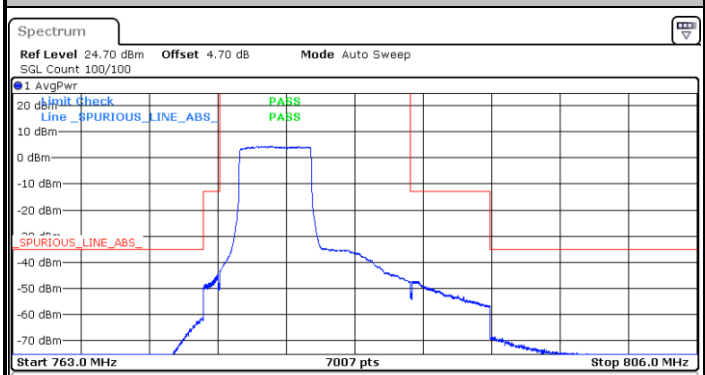
Highest Band Edge / 1 RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	765.22378 MHz	-75.95 dBm	-40.95 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.88786 MHz	-63.87 dBm	-50.87 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.96558 MHz	-68.15 dBm	-55.15 dB
776.000 MHz	788.000 MHz	100.000 kHz	786.63936 MHz	18.91 dBm	-11.09 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.03941 MHz	-53.03 dBm	-40.03 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.69965 MHz	-41.97 dBm	-28.97 dB
793.000 MHz	806.000 MHz	6.250 kHz	793.00649 MHz	-72.26 dBm	-37.26 dB

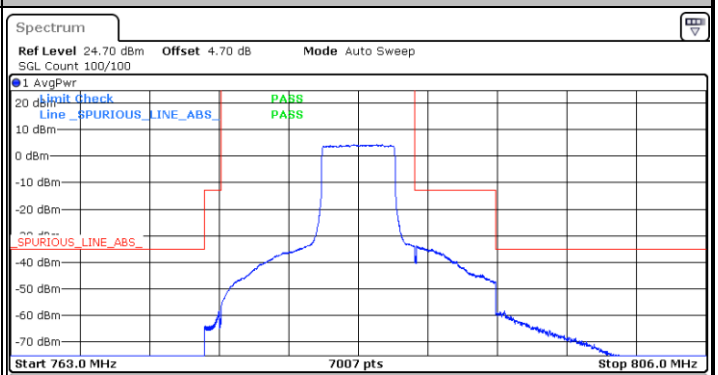
Lowest Band Edge / Full RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	774.86214 MHz	-61.28 dBm	-26.28 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.89955 MHz	-44.31 dBm	-31.31 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.97507 MHz	-47.93 dBm	-34.93 dB
776.000 MHz	788.000 MHz	100.000 kHz	778.37962 MHz	4.45 dBm	-25.55 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.08706 MHz	-51.55 dBm	-38.55 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.29336 MHz	-47.28 dBm	-34.28 dB
793.000 MHz	806.000 MHz	6.250 kHz	793.26623 MHz	-68.66 dBm	-33.66 dB

Highest Band Edge / Full RB

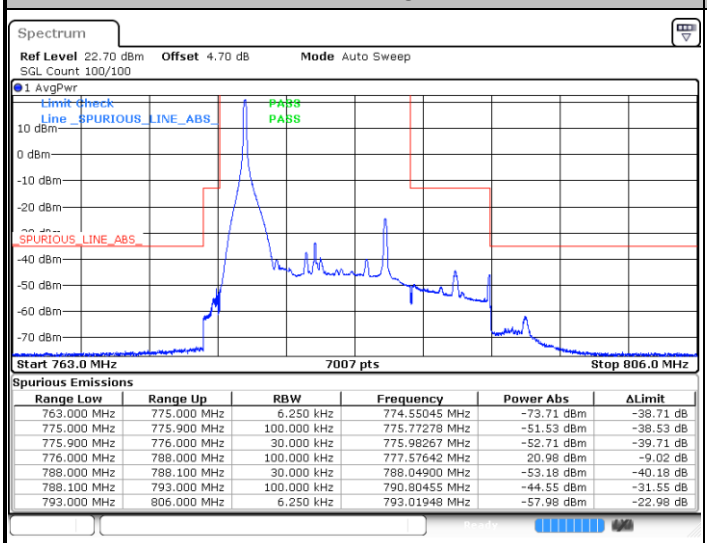


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	774.75425 MHz	-75.73 dBm	-40.73 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.89056 MHz	-58.22 dBm	-45.22 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.99735 MHz	-61.10 dBm	-48.10 dB
776.000 MHz	788.000 MHz	100.000 kHz	785.98002 MHz	4.36 dBm	-25.64 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.02752 MHz	-37.60 dBm	-24.60 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.10245 MHz	-33.86 dBm	-20.86 dB
793.000 MHz	806.000 MHz	6.250 kHz	793.52597 MHz	-58.45 dBm	-23.45 dB

LTE Band 13 / 10MHz / QPSK

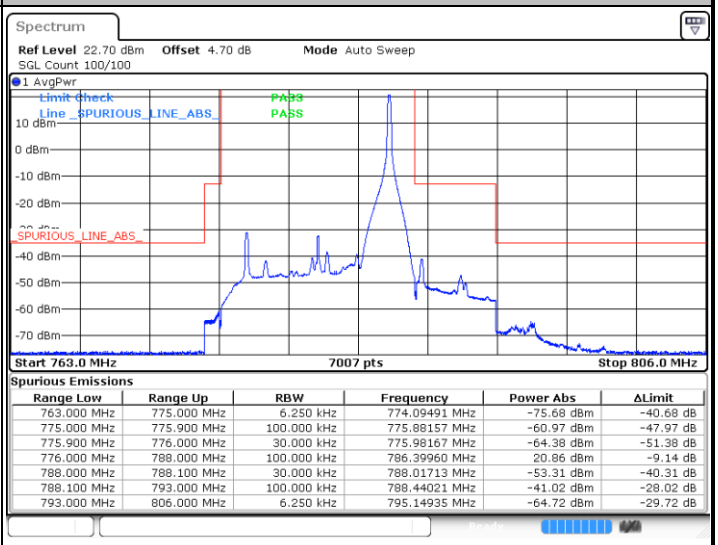
Lowest Band Edge / 1 RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	774.55045 MHz	-73.71 dBm	-38.71 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.77278 MHz	-51.53 dBm	-38.53 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.98267 MHz	-52.71 dBm	-39.71 dB
776.000 MHz	788.000 MHz	100.000 kHz	777.57642 MHz	20.98 dBm	-9.02 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.04900 MHz	-53.18 dBm	-40.18 dB
788.100 MHz	793.000 MHz	100.000 kHz	790.80455 MHz	-44.55 dBm	-31.55 dB
793.000 MHz	806.000 MHz	6.250 kHz	793.01948 MHz	-57.98 dBm	-22.98 dB

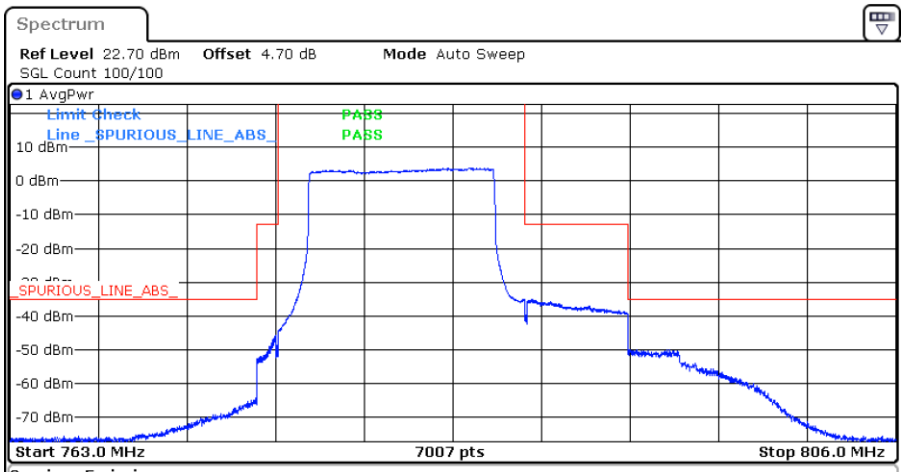
Highest Band Edge / 1 RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	774.09491 MHz	-75.68 dBm	-40.68 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.88157 MHz	-60.97 dBm	-47.97 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.98167 MHz	-64.38 dBm	-51.38 dB
776.000 MHz	788.000 MHz	100.000 kHz	786.39960 MHz	20.86 dBm	-9.14 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.01713 MHz	-53.31 dBm	-40.31 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.44021 MHz	-41.02 dBm	-28.02 dB
793.000 MHz	806.000 MHz	6.250 kHz	795.14935 MHz	-64.72 dBm	-29.72 dB

Band Edge / Full RB

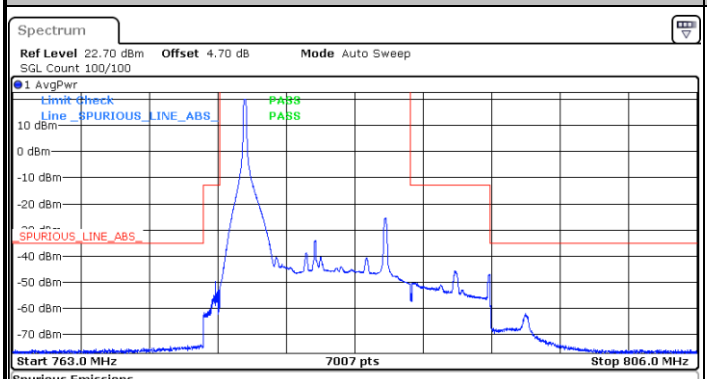


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	774.94605 MHz	-64.49 dBm	-29.49 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.89865 MHz	-45.76 dBm	-32.76 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.97388 MHz	-48.87 dBm	-35.87 dB
776.000 MHz	788.000 MHz	100.000 kHz	785.24875 MHz	3.90 dBm	-26.10 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.00914 MHz	-39.57 dBm	-26.57 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.31783 MHz	-35.22 dBm	-22.22 dB
793.000 MHz	806.000 MHz	6.250 kHz	793.08442 MHz	-50.10 dBm	-15.10 dB

LTE Band 13 / 10MHz / 16QAM

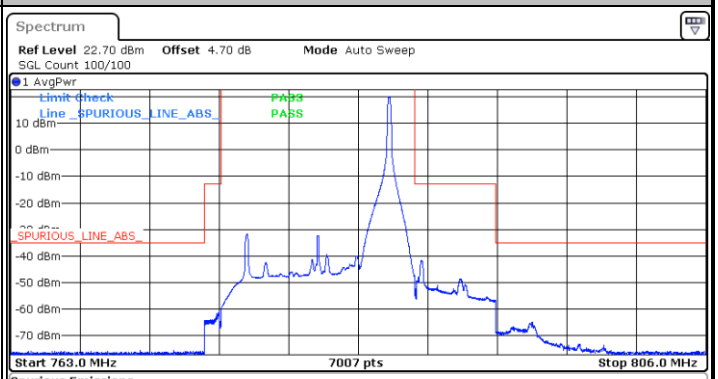
Lowest Band Edge / 1 RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	774.83816 MHz	-74.08 dBm	-39.08 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.72063 MHz	-49.70 dBm	-36.70 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.97917 MHz	-53.07 dBm	-40.07 dB
776.000 MHz	788.000 MHz	100.000 kHz	777.58841 MHz	20.13 dBm	-9.87 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.09605 MHz	-54.02 dBm	-41.02 dB
788.100 MHz	793.000 MHz	100.000 kHz	790.78497 MHz	-45.72 dBm	-32.72 dB
793.000 MHz	806.000 MHz	6.250 kHz	793.03247 MHz	-59.16 dBm	-24.16 dB

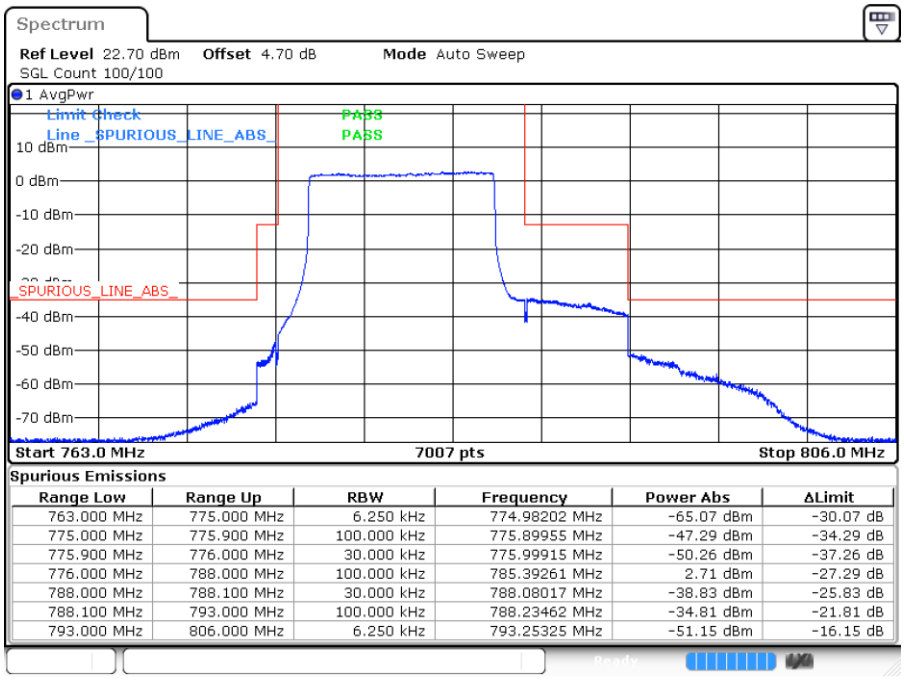
Highest Band Edge / 1 RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	771.01399 MHz	-75.69 dBm	-40.69 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.88516 MHz	-61.01 dBm	-48.01 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.99236 MHz	-64.28 dBm	-51.28 dB
776.000 MHz	788.000 MHz	100.000 kHz	786.38761 MHz	20.08 dBm	-9.92 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.01314 MHz	-52.38 dBm	-39.38 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.39615 MHz	-41.76 dBm	-28.76 dB
793.000 MHz	806.000 MHz	6.250 kHz	795.22727 MHz	-65.01 dBm	-30.01 dB

Band Edge / Full RB

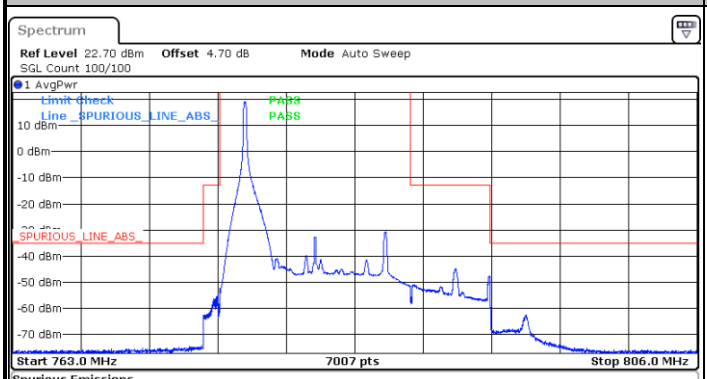


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	774.98202 MHz	-65.07 dBm	-30.07 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.89955 MHz	-47.29 dBm	-34.29 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.99915 MHz	-50.26 dBm	-37.26 dB
776.000 MHz	788.000 MHz	100.000 kHz	785.39261 MHz	2.71 dBm	-27.29 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.08017 MHz	-38.83 dBm	-25.83 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.23462 MHz	-34.81 dBm	-21.81 dB
793.000 MHz	806.000 MHz	6.250 kHz	793.25325 MHz	-51.15 dBm	-16.15 dB

LTE Band 13 / 10MHz / 64QAM

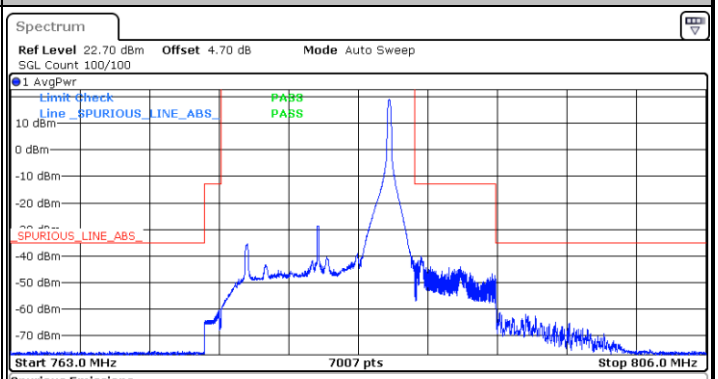
Lowest Band Edge / 1 RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	774.87413 MHz	-74.23 dBm	-39.23 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.87707 MHz	-54.57 dBm	-41.57 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.97188 MHz	-58.35 dBm	-45.35 dB
776.000 MHz	788.000 MHz	100.000 kHz	777.60040 MHz	19.11 dBm	-10.89 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.09126 MHz	-54.72 dBm	-41.72 dB
788.100 MHz	793.000 MHz	100.000 kHz	790.83392 MHz	-44.91 dBm	-31.91 dB
793.000 MHz	806.000 MHz	6.250 kHz	793.01948 MHz	-59.61 dBm	-24.61 dB

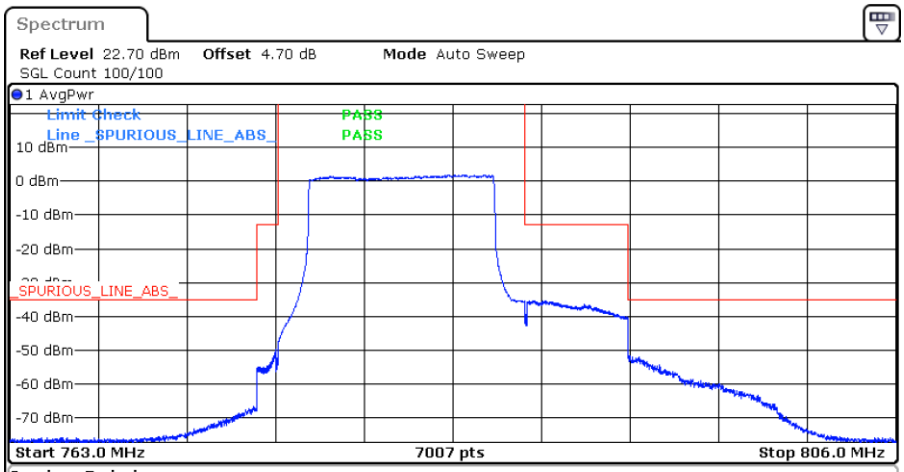
Highest Band Edge / 1 RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	769.47952 MHz	-75.84 dBm	-40.84 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.89595 MHz	-60.33 dBm	-47.33 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.99326 MHz	-63.20 dBm	-50.20 dB
776.000 MHz	788.000 MHz	100.000 kHz	786.39960 MHz	19.00 dBm	-11.00 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.04540 MHz	-42.70 dBm	-29.70 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.37657 MHz	-40.03 dBm	-27.03 dB
793.000 MHz	806.000 MHz	6.250 kHz	793.00649 MHz	-59.61 dBm	-24.61 dB

Band Edge / Full RB



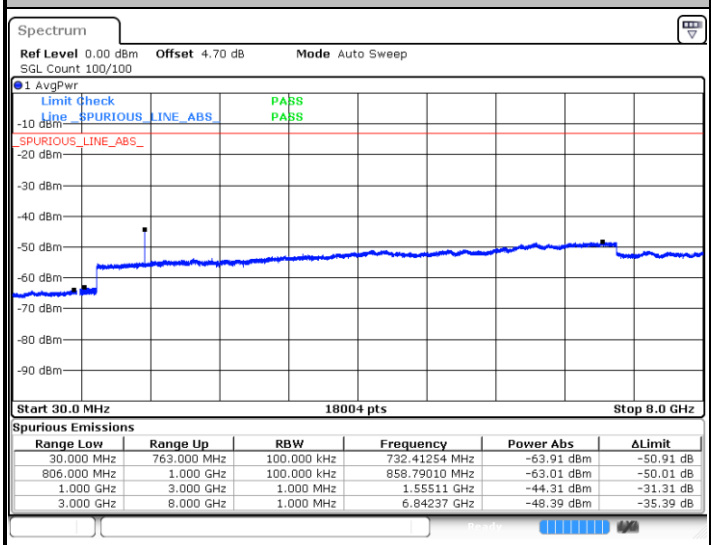
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	774.81419 MHz	-66.80 dBm	-31.80 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.89236 MHz	-49.81 dBm	-36.81 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.99216 MHz	-52.11 dBm	-39.11 dB
776.000 MHz	788.000 MHz	100.000 kHz	785.02098 MHz	1.87 dBm	-28.13 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.03332 MHz	-39.42 dBm	-26.42 dB
788.100 MHz	793.000 MHz	100.000 kHz	789.03741 MHz	-35.44 dBm	-22.44 dB
793.000 MHz	806.000 MHz	6.250 kHz	793.03247 MHz	-51.80 dBm	-16.80 dB

Conducted Spurious Emission

LTE Band 13 / 5MHz

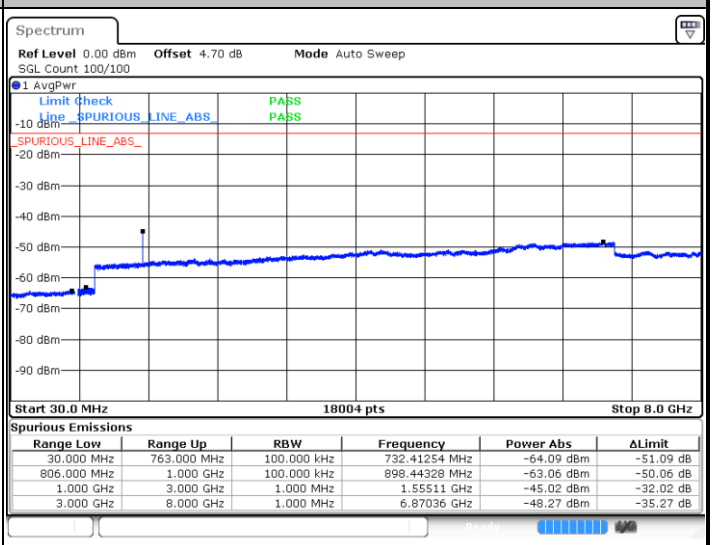
Lowest Channel / QPSK



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	763.000 MHz	100.000 kHz	732.41254 MHz	-63.91 dBm	-50.91 dB
806.000 MHz	1.000 GHz	100.000 kHz	858.79010 MHz	-63.01 dBm	-50.01 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.55511 GHz	-44.31 dBm	-31.31 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.84237 GHz	-48.39 dBm	-35.39 dB

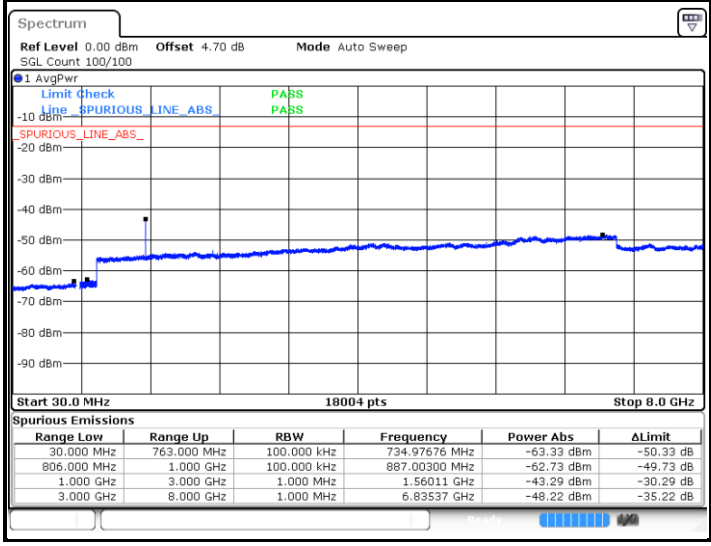
Lowest Channel / 16QAM



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	763.000 MHz	100.000 kHz	732.41254 MHz	-64.09 dBm	-51.09 dB
806.000 MHz	1.000 GHz	100.000 kHz	898.44328 MHz	-63.06 dBm	-50.06 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.55511 GHz	-45.02 dBm	-32.02 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.87036 GHz	-48.27 dBm	-35.27 dB

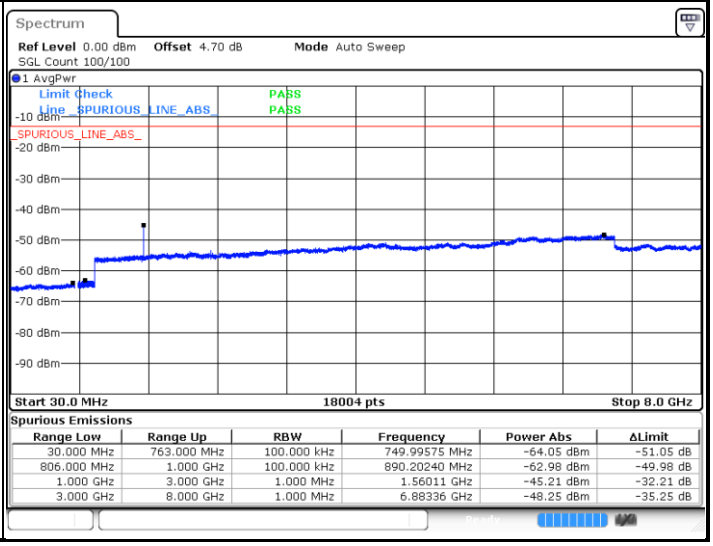
Middle Channel / QPSK



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	763.000 MHz	100.000 kHz	734.97676 MHz	-63.33 dBm	-50.33 dB
806.000 MHz	1.000 GHz	100.000 kHz	887.00300 MHz	-62.73 dBm	-49.73 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.56011 GHz	-43.29 dBm	-30.29 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.83537 GHz	-48.22 dBm	-35.22 dB

Middle Channel / 16QAM

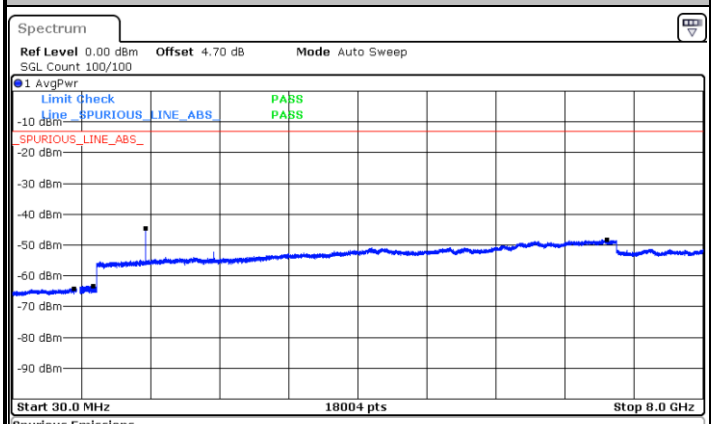


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	763.000 MHz	100.000 kHz	749.99575 MHz	-64.05 dBm	-51.05 dB
806.000 MHz	1.000 GHz	100.000 kHz	890.20240 MHz	-62.98 dBm	-49.98 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.56011 GHz	-45.21 dBm	-32.21 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.88336 GHz	-48.25 dBm	-35.25 dB

LTE Band 13 / 5MHz

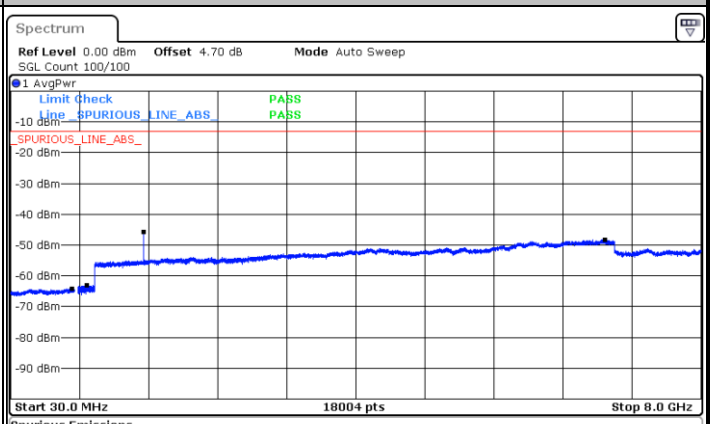
Highest Channel / QPSK



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	763.000 MHz	100.000 kHz	737.54098 MHz	-64.08 dBm	-51.08 dB
806.000 MHz	1.000 GHz	100.000 kHz	956.51724 MHz	-63.22 dBm	-50.22 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.56511 GHz	-44.67 dBm	-31.67 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.88836 GHz	-48.34 dBm	-35.34 dB

Highest Channel / 16QAM

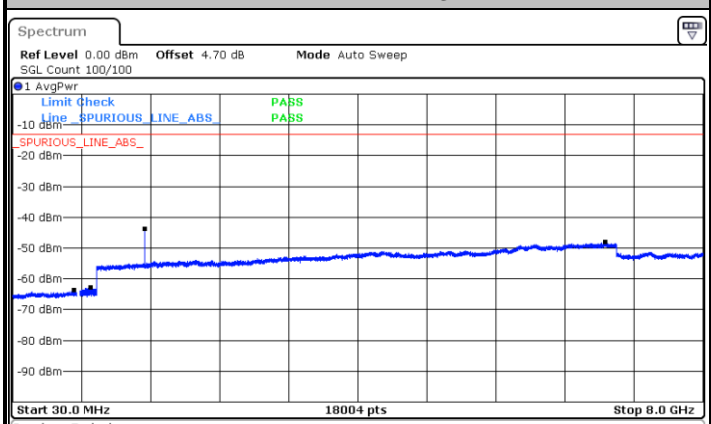


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	763.000 MHz	100.000 kHz	737.54098 MHz	-64.12 dBm	-51.12 dB
806.000 MHz	1.000 GHz	100.000 kHz	911.43478 MHz	-63.02 dBm	-50.02 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.56511 GHz	-45.70 dBm	-32.70 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.88636 GHz	-48.27 dBm	-35.27 dB

LTE Band 13 / 10MHz

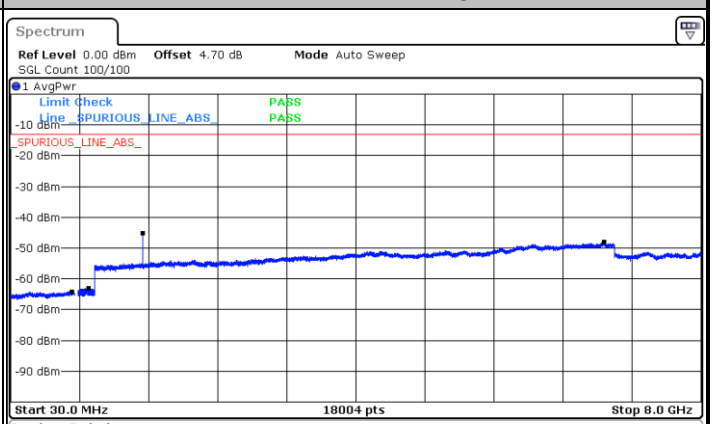
Middle Channel / QPSK



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	763.000 MHz	100.000 kHz	732.77886 MHz	-63.72 dBm	-50.72 dB
806.000 MHz	1.000 GHz	100.000 kHz	927.52874 MHz	-62.88 dBm	-49.88 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.55561 GHz	-43.67 dBm	-30.67 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.87486 GHz	-47.88 dBm	-34.88 dB

Middle Channel / 16QAM

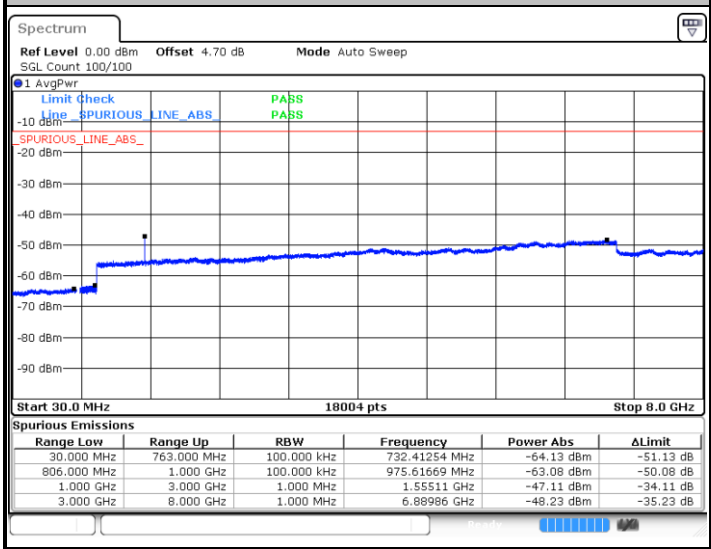


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	763.000 MHz	100.000 kHz	736.44203 MHz	-64.09 dBm	-51.09 dB
806.000 MHz	1.000 GHz	100.000 kHz	929.07996 MHz	-62.97 dBm	-49.97 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.55561 GHz	-45.08 dBm	-32.08 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.87836 GHz	-47.93 dBm	-34.93 dB

LTE Band 13 / 5MHz

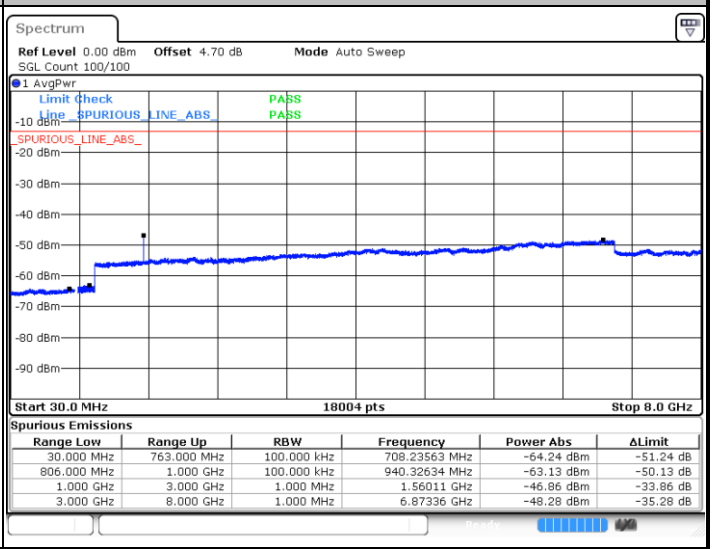
Lowest Channel / 64QAM



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	763.000 MHz	100.000 kHz	732.41254 MHz	-64.13 dBm	-51.13 dB
806.000 MHz	1.000 GHz	100.000 kHz	975.61669 MHz	-63.08 dBm	-50.08 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.55511 GHz	-47.11 dBm	-34.11 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.88986 GHz	-48.23 dBm	-35.23 dB

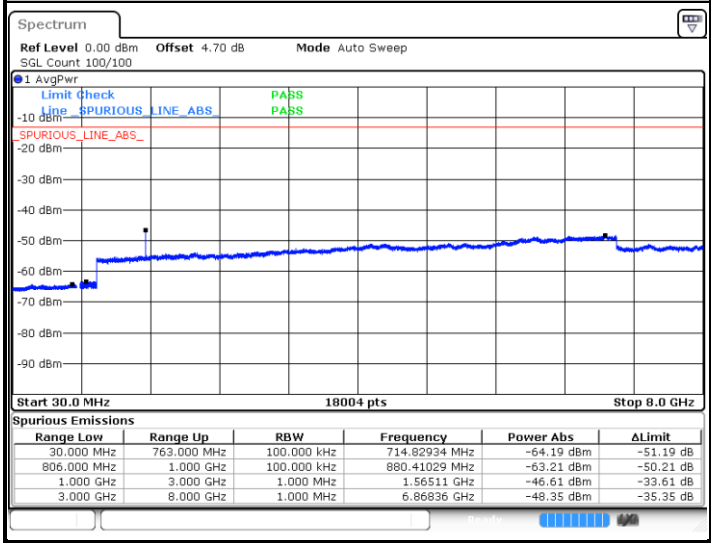
Middle Channel / 64QAM



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	763.000 MHz	100.000 kHz	708.23563 MHz	-64.24 dBm	-51.24 dB
806.000 MHz	1.000 GHz	100.000 kHz	940.32634 MHz	-63.13 dBm	-50.13 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.56011 GHz	-46.86 dBm	-33.86 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.87336 GHz	-48.28 dBm	-35.28 dB

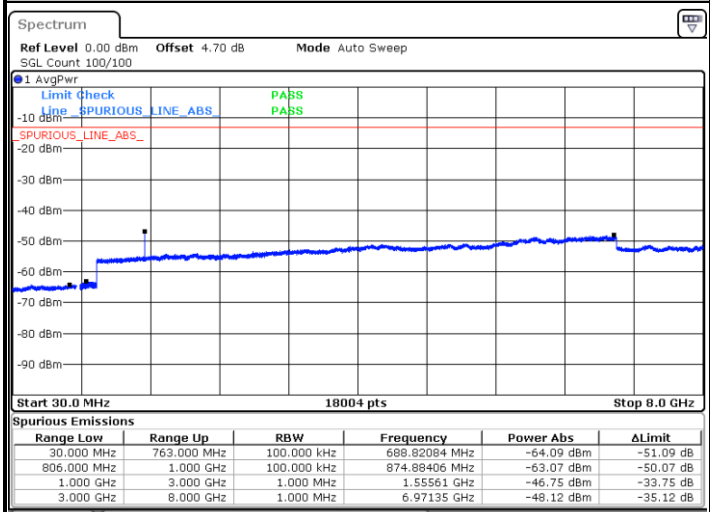
Highest Channel / 64QAM



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	763.000 MHz	100.000 kHz	714.82934 MHz	-64.19 dBm	-51.19 dB
806.000 MHz	1.000 GHz	100.000 kHz	880.41029 MHz	-63.21 dBm	-50.21 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.56511 GHz	-46.61 dBm	-33.61 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.86836 GHz	-48.35 dBm	-35.35 dB

LTE Band 13 / 10MHz	
Middle Channel / 64QAM	



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	763.000 MHz	100.000 kHz	688.82084 MHz	-64.09 dBm	-51.09 dB
806.000 MHz	1.000 GHz	100.000 kHz	874.88406 MHz	-63.07 dBm	-50.07 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.55561 GHz	-46.75 dBm	-33.75 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.97135 GHz	-48.12 dBm	-35.12 dB

Frequency Stability

Test Conditions		LTE Band 13 (QPSK) / Middle Channel	Limit
Temperature (°C)	Voltage (Volt)	BW 10MHz	Note 2.
		Deviation (ppm)	Result
50	Normal Voltage	0.0016	PASS
40	Normal Voltage	0.0002	
30	Normal Voltage	0.0045	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0052	
0	Normal Voltage	0.0016	
-10	Normal Voltage	0.0012	
-20	Normal Voltage	0.0058	
-30	Normal Voltage	0.0062	
20	Maximum Voltage	0.0009	
20	Normal Voltage	0.0007	
20	Battery End Point	0.0042	

Note:

1. Normal Voltage =4 V.；Battery End Point (BEP) =3.7 V.；Maximum Voltage =4.3 V.
2. Note: The frequency fundamental emissions stay within the authorized frequency block.

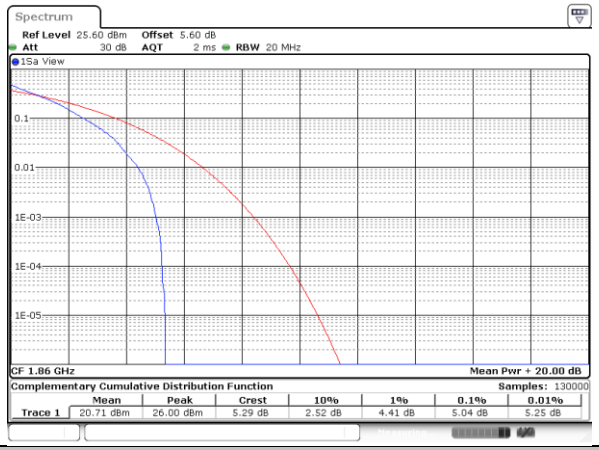
LTE Band 25

Peak-to-Average Ratio

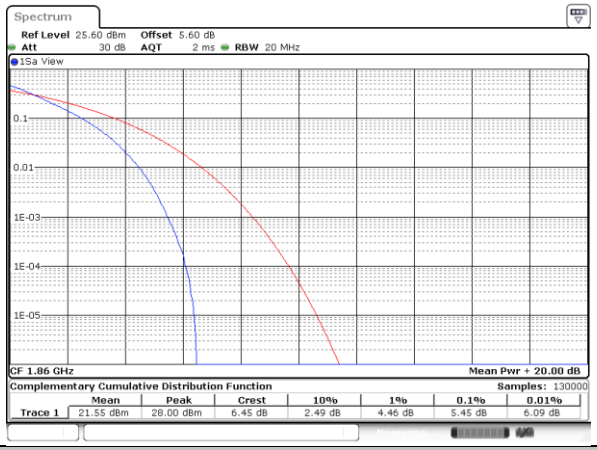
Mode	LTE Band 25 / 20MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	Full RB	Result
Lowest CH	5.04	5.45	6.03	6.29	PASS
Middle CH	5.54	5.68	6.84	6.58	
Highest CH	5.39	5.54	6.41	6.46	
Mode	LTE Band 25 / 20MHz				
Mod.	64QAM				Limit: 13dB
RB Size	1RB	Full RB			Result
Lowest CH	6.49	6.55			PASS
Middle CH	6.43	6.64			
Highest CH	6.75	6.55			

LTE Band 25 / 20MHz / QPSK

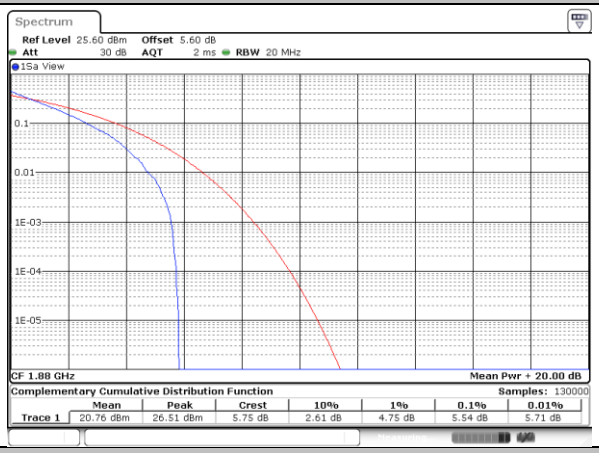
Lowest Channel / 1RB



Lowest Channel / Full RB



Middle Channel / 1RB



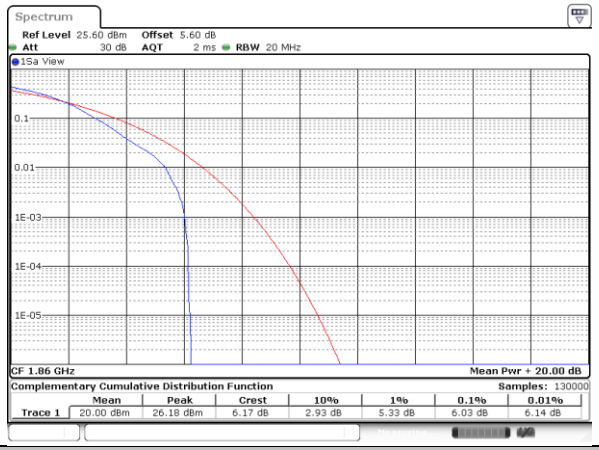
Middle Channel / Full RB

Highest Channel / 1RB

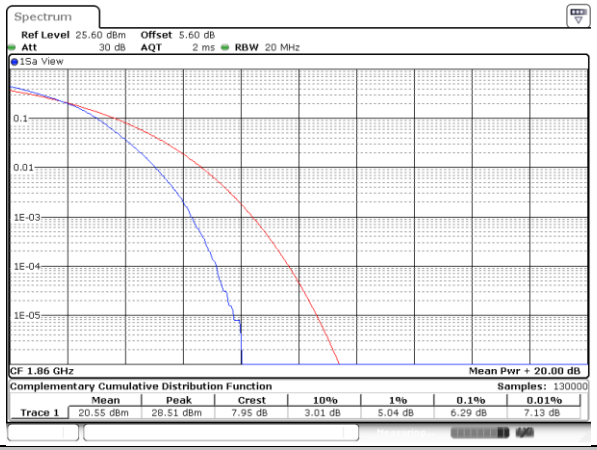
Highest Channel / Full RB

LTE Band 25 / 20MHz / 16QAM

Lowest Channel / 1RB



Lowest Channel / Full RB

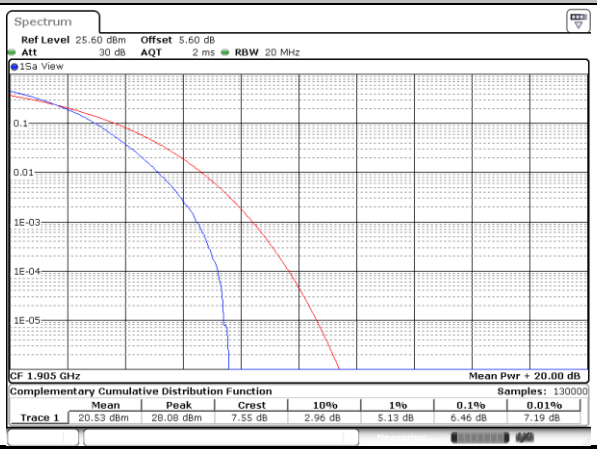


Middle Channel / 1RB

Middle Channel / Full RB

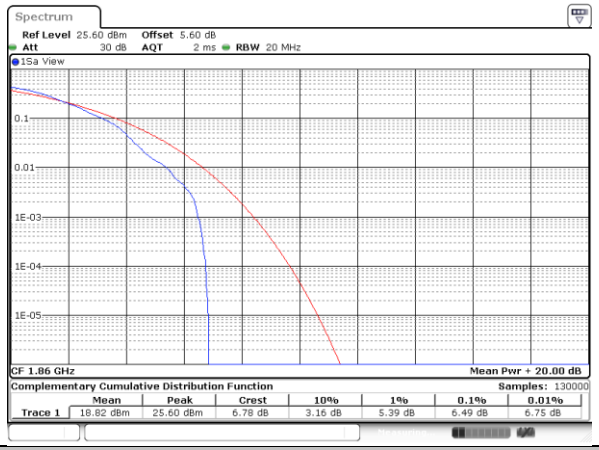
Highest Channel / 1RB

Highest Channel / Full RB

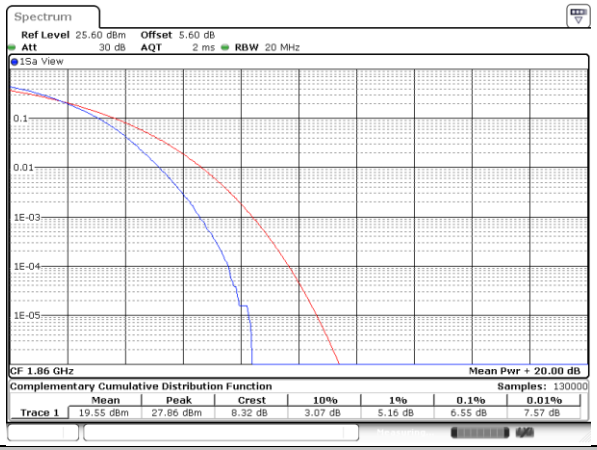


LTE Band 25 / 20MHz / 64QAM

Lowest Channel / 1RB

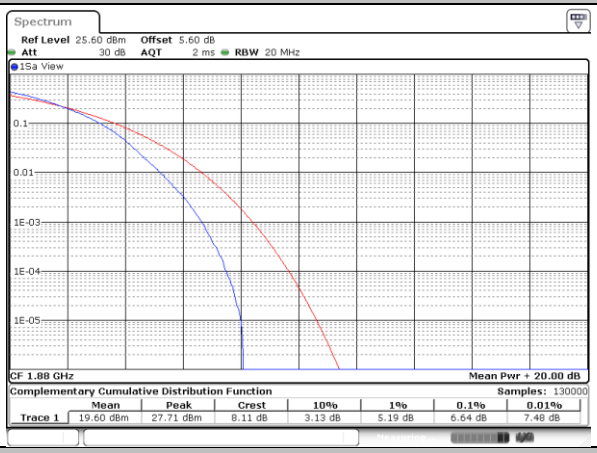


Lowest Channel / Full RB



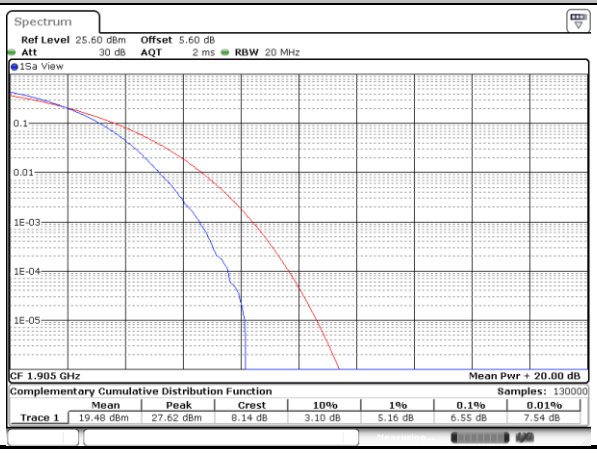
Middle Channel / 1RB

Middle Channel / Full RB



Highest Channel / 1RB

Highest Channel / Full RB

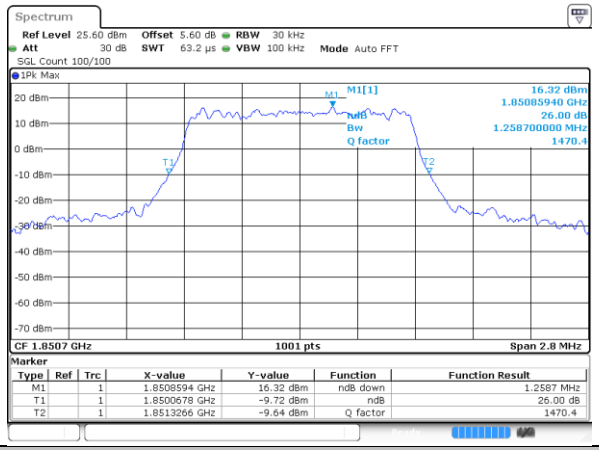


26dB Bandwidth

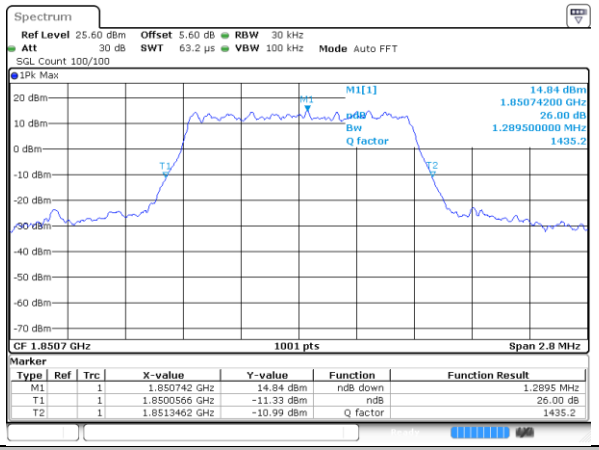
Mode	LTE Band 25 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	1.26	1.29	2.92	2.95	5.09	4.94	9.95	9.71	14.45	14.60	20.14	20.38
Middle CH	1.27	1.25	2.98	2.96	5.22	4.95	10.05	9.95	14.63	14.69	20.22	20.10
Highest CH	1.27	1.29	2.94	2.97	5.03	4.89	10.03	9.85	14.51	14.51	20.22	20.54
Mode	LTE Band 25 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH	1.31		2.96		5.04		9.63		14.51		20.30	
Middle CH	1.29		2.93		5.12		9.89		14.45		20.18	
Highest CH	1.28		2.96		5.00		10.01		14.42		20.22	

LTE Band 25

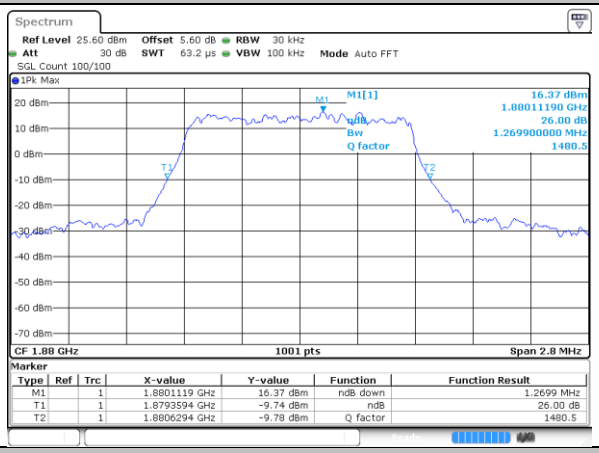
Lowest Channel / 1.4MHz / QPSK



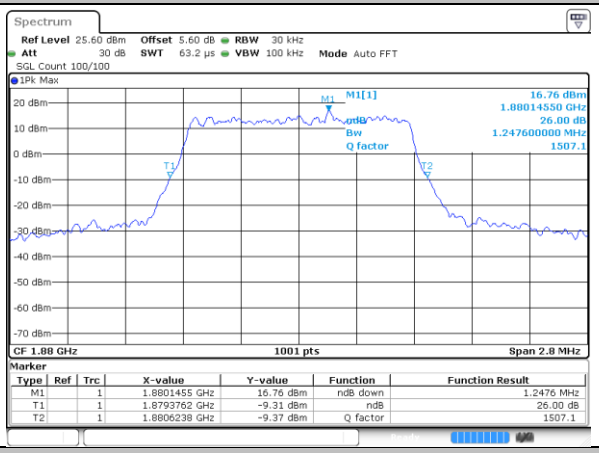
Lowest Channel / 1.4MHz / 16QAM



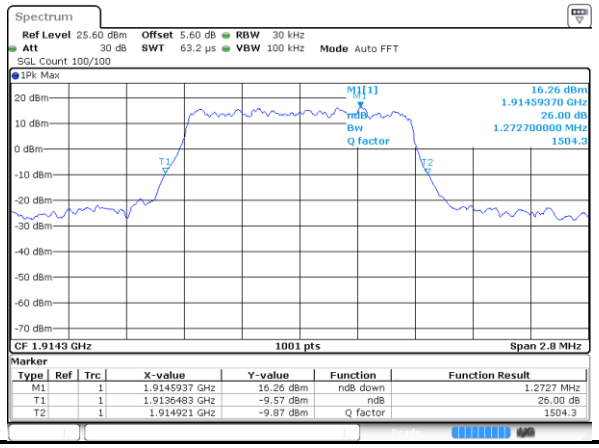
Middle Channel / 1.4MHz / QPSK



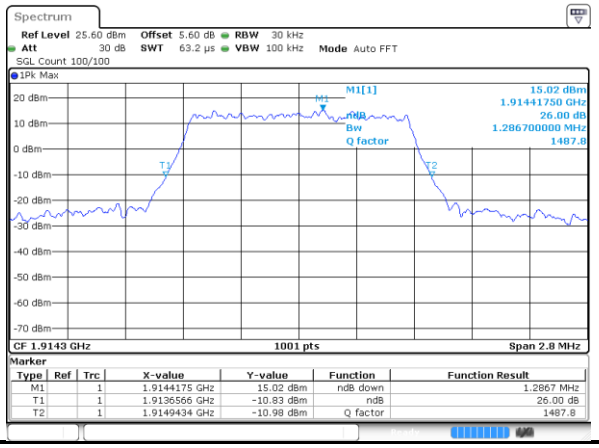
Middle Channel / 1.4MHz / 16QAM



Highest Channel / 1.4MHz / QPSK

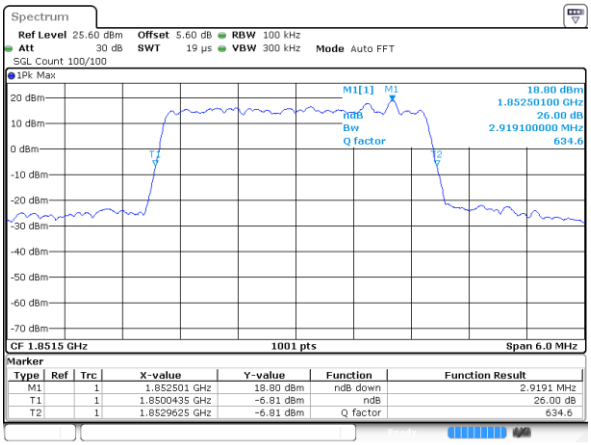


Highest Channel / 1.4MHz / 16QAM

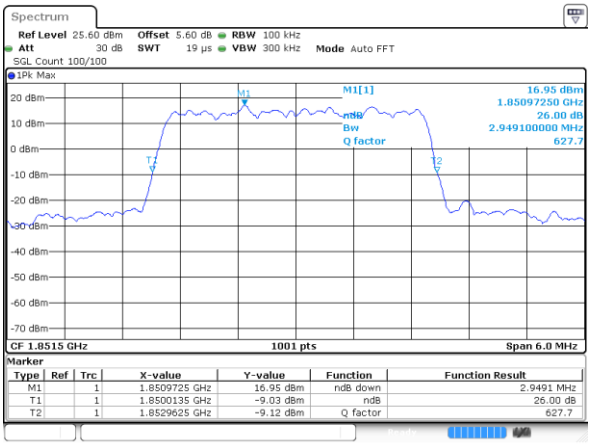


LTE Band 25

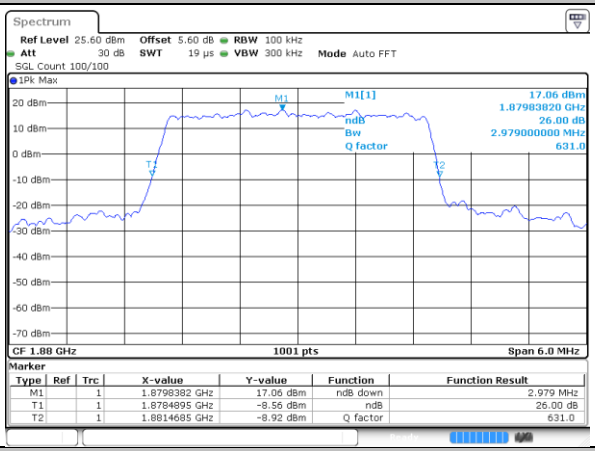
Lowest Channel / 3MHz / QPSK



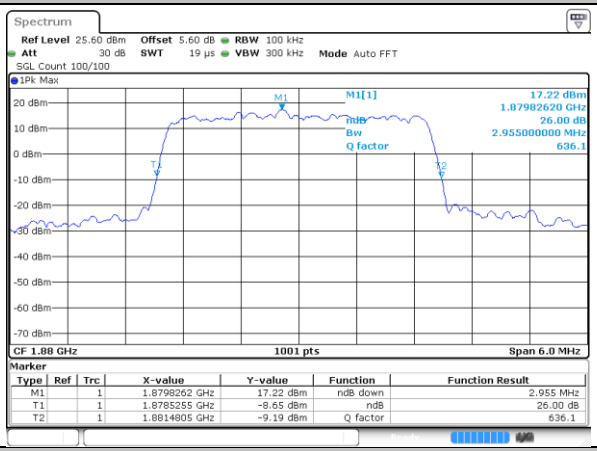
Lowest Channel / 3MHz / 16QAM



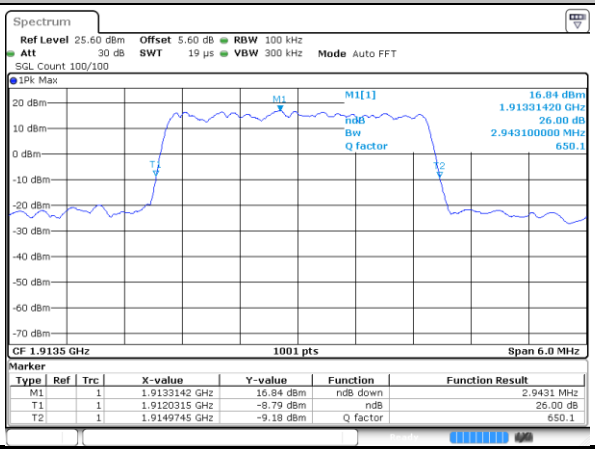
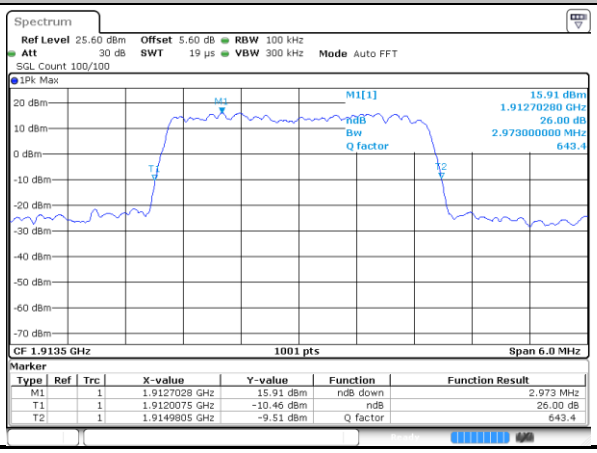
Middle Channel / 3MHz / QPSK



Middle Channel / 3MHz / 16QAM



Highest Channel / 3MHz / QPSK



Highest Channel / 3MHz / 16QAM