FCC RF Test Report

APPLICANT	:	ZTE CORPORATION
EQUIPMENT	:	CDMA /LTE Multi-Mode Digital Mobile Phone
BRAND NAME	:	ZTE
MODEL NAME	:	Z3001S
FCC ID	:	SRQ-Z3001S
STANDARD	:	47 CFR Part 2, 22(H), 24(E), 27(M), 27(F)
CLASSIFICATION	:	PCS Licensed Transmitter Held to Ear (PCE)

The product was received on Nov. 16, 2017 and completely tested on Dec. 20, 2017. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI/TIA-603-E and the testing has shown the tested sample to be in 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.

James Huang

Approved by: James Huang / Manager

NVLAP®
TESTING
NVLAP LAB CODE 600155-0

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG7N1618B	Rev. 01	Initial issue of report	Dec. 27, 2017

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)(2)	Effective Radiated Power (Band 26)	ERP < 7 Watt	PASS	-
	§27.50(b)(10)	Effective Radiated Power (Band 13)	ERP < 3 Watt	PASS	-
	§24.232(c) §27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 25)(Band 41)	EIRP < 2Watt	PASS	-
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)	Conducted Band Edge Measurement (Band 13) (Band 25) (Band 26)	< 43+10log10(P[Watts])	PASS	-
	§27.53(m)(4)	Conducted Band Edge Measurement (Band 41)	§27.53(m)(4)		
3.8	§2.1051 §22.917(a) §24.238(a) §27.53(c)(2)	Conducted Spurious Emission (Band 12) (Band 25) (Band 26)	< 43+10log10(P[Watts])	PASS	-
	§2.1051 §27.53(m)(4)	Conducted Spurious Emission (Band 41)	< 55+10log$_{10}$(P[Watts])		
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		
4.4	§2.1053 §22.917(a) §24.238(a) §27.53(c)(2) §27.53(f)	Radiated Spurious Emission (Band 12) (Band 25) (Band 26)	< 43+10log$_{10}$(P[Watts])	PASS	Under limit 9.94 dB at 1560.00 MHz
	§2.1053 §27.53(m)(4)	Radiated Spurious Emission (Band 41)	< 55+10log$_{10}$(P[Watts])		

1 General Description

1.1 Applicant

ZTE CORPORATION
ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District,Shenzhen, Guangdong, 518057, P.R.China

1.2 Manufacturer

ZTE CORPORATION
ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District,Shenzhen, Guangdong, 518057, P.R.China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	CDMA /LTE Multi-Mode Digital Mobile Phone
Brand Name	ZTE
Model Name	Z3001S
FCC ID	SRQ-Z3001S
EUT supports Radios application	CDMA/EV-DO/LTE WLAN2.4GHz 802.11b/g/n HT20/HT40 Bluetooth v3.0+EDR/ Bluetooth v4.0 LE/ Bluetooth v4.1 LE
IMEI/MEID Code	Conducted: 990008980001080 Radiation: 99000898000216
HW Version	Z3001SHW1.0
SW Version	Z3001SV1.0.0B02
EUT Stage	Identical Prototype

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	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 41 : 2498.5 MHz ~ 2687.5 MHz
Rx Frequency	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 41 : 2498.5 MHz ~ 2687.5 MHz
Bandwidth	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 41 : 5MHz / 10MHz / 15MHz / 20MHz
Maximum Output Power to Antenna	LTE Band 13 : 23.83 dBm LTE Band 25 : 23.37 dBm LTE Band 26 : 23.38 dBm LTE Band 41 : 22.99 dBm
Antenna Gain	LTE Band 13 : -3.00 dBi LTE Band 25 : -2.49 dBi LTE Band 26 : -0.32 dBi LTE Band 41 : -2.60 dBi
Type of Modulation	QPSK / 16QAM

1.5 Modification of EUT

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

1.6 Emission Designator

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	1M10G7D	-	0.1151	1M10W7D	-	0.0914
3	1851.5 ~ 1913.5	2M75G7D	-	0.1099	2M73W7D	-	0.0906
5	1852.5 ~ 1912.5	4M51G7D	-	0.1156	4M50W7D	-	0.0838
10	1855.0 ~ 1910.0	9M07G7D	0.0015	0.1183	9M01W7D	-	0.0873
15	1857.5 ~ 1907.5	13M4G7D	-	0.1225	13M4W7D	-	0.0916
20	1860.0 ~ 1905.0	18M3G7D	-	0.1114	18M3W7D	-	0.0935
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	4M51G7D	-	0.0738	4M49W7D	-	0.0562
10	782.0	8M99G7D	0.0090	0.0718	8M99W7D	-	0.0597
LTE Band 26		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	824.7 ~ 848.3	1M10G7D	-	0.1159	1M09W7D	-	0.0964
3	825.5 ~ 847.5	2M73G7D	-	0.1135	2M74W7D	-	0.0951
5	826.5 ~ 846.5	4M50G7D	-	0.1167	4M51W7D	-	0.0916
10	829.0 ~ 844.0	9M07G7D	0.0039	0.1175	9M05W7D	-	0.0942
15	831.5 ~ 841.5	13M4G7D	-	0.1233	13M5W7D	-	0.1012
CH26765	821.5	13M3G7D	-	0.1132	13M4W7D	-	0.0832
LTE Band 41		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)
5	2498.5 ~ 2687.5	4M50G7D	-	0.1052	4M51W7D	-	0.0813
10	2501.0 ~ 2685.0	9M11G7D	0.0017	0.1072	8M99W7D	-	0.0759
15	2503.5 ~ 2682.5	13M5G7D	-	0.1084	13M4W7D	-	0.0839
20	2506.0 ~ 2680.0	18M5G7D	-	0.1094	18M3W7D	-	0.0815

1.7 Testing Location

Sporton International (Kunshan) Inc. is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600155-0) and the FCC designation No is CN5013.

Test Site	Sporton International (Kunshan) Inc.		
Test Site Location	No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335 China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	**Sporton Site No.**		**FCC Test Firm Registration No.**
	TH01-KS	03CH03-KS	630927

Note: The test site complies with ANSI C63.4 2014 requirement.

1.8 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(M), 27(F)
- ANSI/TIA-603-E
- FCC KDB 971168 D01 Power Meas License Digital Systems v03
- 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

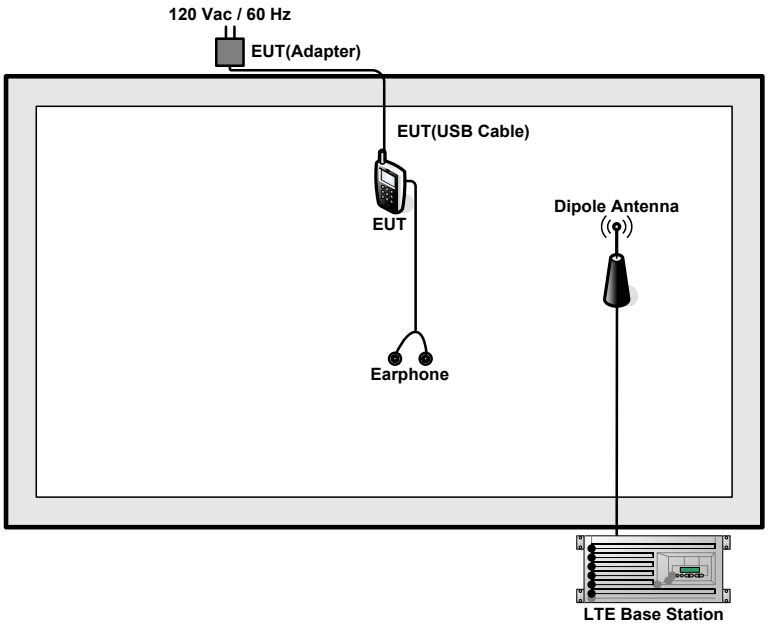
Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas License Digital Systems v03 with maximum output power.

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	1	Half	Full	L	M	H
Max. Output Power	13	-	-	v		-	-	v	v	v	v	v	v	v	v
	13	-	-		v	-	-	v	v	v	v	v		v	
	25	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
	41	-	-	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
	25						v	v	v	v		v	v	v	v
	26					v	-	v	v	v		v	v	v	v
	41	-	-				v	v	v	v		v	v	v	v
26dB and 99% Bandwidth	13	-	-	v		-	-	v	v			v	v	v	v
	13	-	-		v	-	-	v	v			v		v	
	25	v	v	v	v	v	v	v	v			v	v	v	v
	26	v	v	v	v	v	-	v	v			v	v	v	v
	41	-	-	v	v	v	v	v	v			v	v	v	v
Conducted Band Edge	13	-	-	v		-	-	v	v	v		v	v		v
	13	-	-		v	-	-	v	v	v		v		v	
	25	v	v	v	v	v	v	v	v	v		v	v		v
	26	v	v	v	v	v	-	v	v	v		v	v		v
	41	-	-	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	1	Half	Full	L	M	H
Conducted Spurious Emission	13	-	-	v		-	-	v	v	v			v	v	v
	13	-	-		v	-	-	v	v	v				v	
	25	v	v	v	v	v	v	v	v	v			v	v	v
	26	v	v	v	v	v	-	v	v	v			v	v	v
	41	-	-	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	
	41	-	-		v			v				v		v	
E.R.P./ E.I.R.P.	13	-	-	v	v			v	v	v			v	v	v
	25	v	v	v	v	v	v	v	v	v			v	v	v
	26	v	v	v	v	v	-	v	v	v			v	v	v
	41	-	-	v	v	v	v	v	v	v			v	v	v
Radiated Spurious Emission	13	-	-	v	v	-	-	v		v				v	
	25	v	v	v	v	v	v	v		v				v	
	26	v	v	v	v	v	-	v		v				v	
	41	-	-	v	v	v	v	v		v				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.	Power Supply	GW	GPS-3030D	N/A	N/A	Unshielded, 1.8 m
2.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
3.	Earphone	Lenovo	SH100	N/A	Unshielded,1.2m	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 4.5 dB.

Example :

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

= 4.5 (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

LTE Band 41 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	39750	40620	41490
	Frequency	2506	2593	2680
15	Channel	39725	40620	41515
	Frequency	2503.5	2593	2682.5
10	Channel	39700	40620	41540
	Frequency	2501	2593	2685
5	Channel	39675	40620	41565
	Frequency	2498.5	2593	2687.5

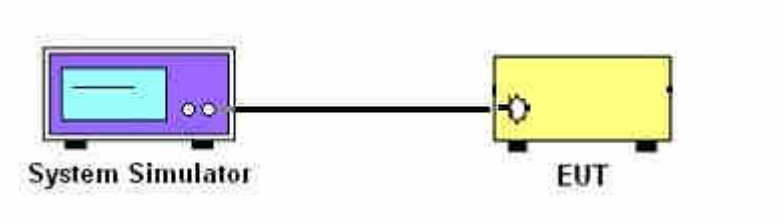
3 Conducted Test Items

3.1 Measuring Instruments

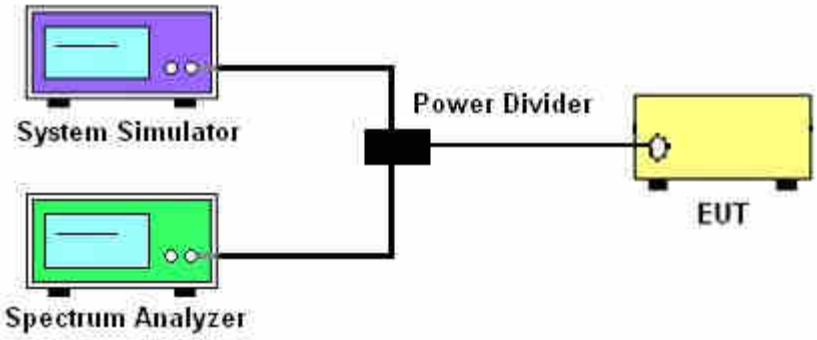
See list of measuring instruments of this test report.

3.2 Test Setup

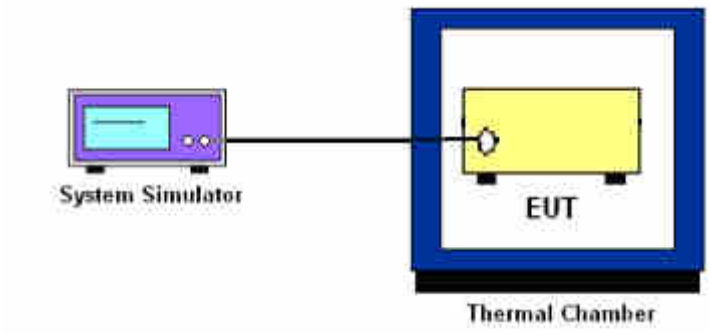
3.2.1 Conducted Output Power



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/EIRP

3.4.1 Description of the Conducted Output Power Measurement and ERP/EIRP 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 and Band 41.

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 transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through the system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. 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 FCC KDB 971168 v03 Section 5.7.1.
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 FCC KDB 971168 v03 Section 4.1 and 4.2.
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.

27.53(m)(4)

For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz 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 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. 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.

3.7.2 Test Procedures

1. The testing follows FCC KDB 971168 v03 Section 6.0.
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.
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.
9. For LTE Band 41, the other 40 dB, and 55 dB have additionally applied same calculation above.

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.

For Band 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 + 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 FCC KDB 971168 v03 Section 6.0.
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.
11. For Band 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.

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 FCC KDB 971168 v03 Section 9.0.
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 FCC KDB 971168 v03 Section 9.0.
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 measured at the input to the EUT.
4. The variation in frequency was measured for the worst case.

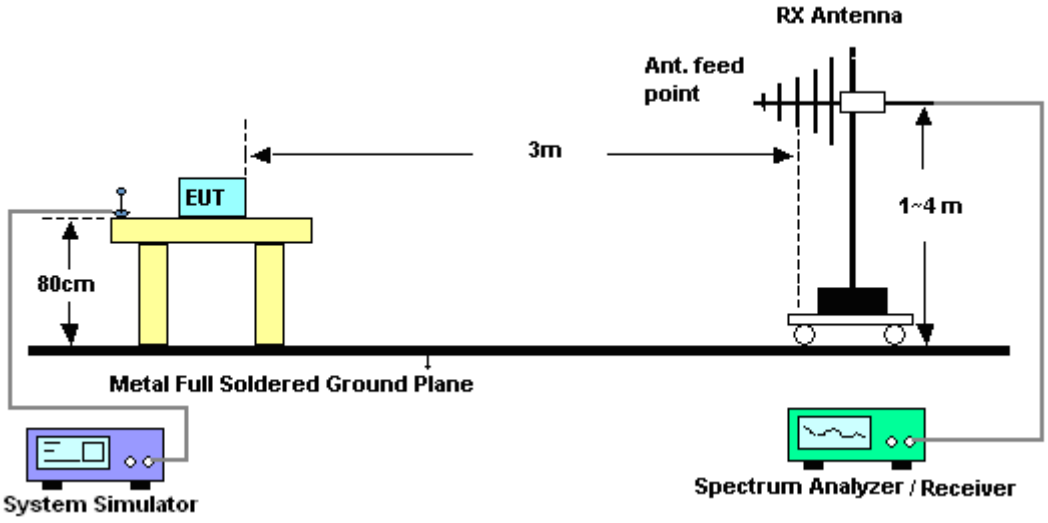
4 Radiated Test Items

4.1 Measuring Instruments

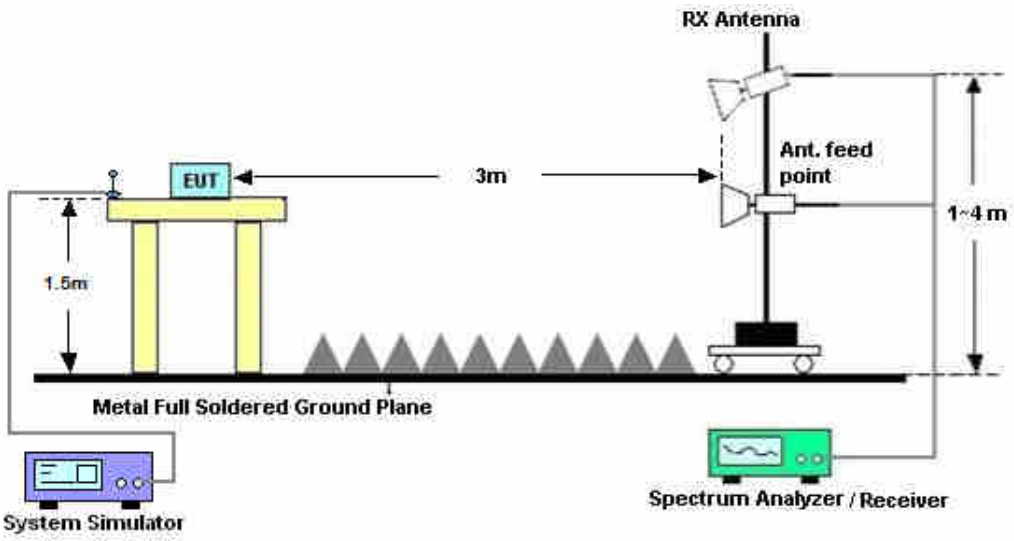
See list of measuring instruments of this test report.

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/TIA-603-E. 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 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 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 FCC KDB 971168 v03 Section 5.8 and ANSI/TIA-603-E Section 2.2.12.
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.
13. For Band 41:
    The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)
    EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
    ERP (dBm) = EIRP - 2.15

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. 08, 2017	Dec. 01, 2017~ Dec. 05, 2017	Aug. 07, 2018	Conducted (TH01-KS)
Radio communication analyzer	Anritsu	MT8820C	6201300652	2G/3G/LTE_ full band	Aug. 08, 2017	Dec. 01, 2017~ Dec. 05, 2017	Aug. 07, 2018	Conducted (TH01-KS)
Thermal Chamber	Hongzhan	LP-150U	HZ014011440	-40~+150°C 20%~95%RH	Apr.18, 2017	Dec. 01, 2017~ Dec. 05, 2017	Apr. 17, 2018	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz~44GHz	Apr. 18, 2017	Dec. 20, 2017	Apr. 17, 2018	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	35406	25MHz~2GHz	Apr. 22, 2017	Dec. 20, 2017	Apr. 21, 2018	Radiation (03CH03-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1356	1GHz~18GHz	Apr. 22, 2017	Dec. 20, 2017	Apr. 21, 2018	Radiation (03CH03-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Feb. 15, 2017	Dec. 20, 2017	Feb. 14, 2018	Radiation (03CH03-KS)
Amplifier	com-power	PA-103A	161069	1MHz~1000MHz / 32 dB	Apr. 18, 2017	Dec. 20, 2017	Apr. 17, 2018	Radiation (03CH03-KS)
Amplifier	MITEQ	TTA1840-35 -HG	1887435	18GHz~40GHz	Oct. 12, 2017	Dec. 20, 2017	Oct. 11, 2018	Radiation (03CH03-KS)
high gain Amplifier	MITEQ	AMF-7D-00 101800-30-1	2025788	1GHz~18GHz	Apr. 18, 2017	Dec. 20, 2017	Apr. 17, 2018	Radiation (03CH03-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Oct. 12, 2017	Dec. 20, 2017	Oct. 11, 2018	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Dec. 20, 2017	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Dec. 20, 2017	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Dec. 20, 2017	NCR	Radiation (03CH03-KS)

NCR: No Calibration Required

6 Uncertainty of Evaluation

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

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

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

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

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		23.34	
10	1	25			23.71	
10	1	49			23.28	
10	25	0			22.57	
10	25	12			22.55	
10	25	25			22.56	
10	50	0			22.58	
10	1	0	16-QAM		22.83	
10	1	25			22.91	
10	1	49			22.21	
10	25	0			21.48	
10	25	12			21.65	
10	25	25			21.48	
10	50	0			21.67	
5	1	0	QPSK	23.44	23.37	23.57
5	1	12		23.59	23.83	23.81
5	1	24		23.31	23.39	23.71
5	12	0		22.75	22.67	22.57
5	12	7		22.63	22.59	22.75
5	12	13		22.59	22.61	22.66
5	25	0		22.63	22.66	22.68
5	1	0	16-QAM	22.56	21.89	22.22
5	1	12		22.13	22.21	22.65
5	1	24		21.95	21.94	22.60
5	12	0		21.52	21.56	21.65
5	12	7		21.42	21.59	21.79
5	12	13		21.38	21.54	21.75
5	25	0		21.51	21.66	21.66

LTE Band 25 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
20	1	0	QPSK	22.70	22.49	22.81
20	1	49		22.96	22.92	22.95
20	1	99		22.44	22.77	22.88
20	50	0		22.10	21.99	22.04
20	50	24		21.93	22.06	22.09
20	50	50		21.92	21.99	22.13
20	100	0		22.01	22.00	21.98
20	1	0	16-QAM	21.71	21.65	21.84
20	1	49		22.17	21.58	22.20
20	1	99		21.62	21.69	21.66
20	50	0		21.12	20.87	20.98
20	50	24		21.00	20.93	21.06
20	50	50		21.00	21.16	21.22
20	100	0		20.95	21.20	21.05
15	1	0	QPSK	22.79	22.69	22.84
15	1	37		23.37	22.96	23.13
15	1	74		22.87	22.85	23.01
15	36	0		22.07	22.07	21.90
15	36	20		22.06	22.09	22.14
15	36	39		22.03	22.00	22.12
15	75	0		22.10	22.09	22.00
15	1	0	16-QAM	21.57	21.75	21.56
15	1	37		21.81	22.00	22.07
15	1	74		22.11	21.46	21.68
15	36	0		21.12	21.04	20.97
15	36	20		21.23	21.07	21.20
15	36	39		21.01	20.99	21.26
15	75	0		21.16	21.16	21.18

LTE Band 25 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	22.80	22.55	22.68
10	1	25		23.13	22.97	23.22
10	1	49		22.74	22.83	23.15
10	25	0		22.11	22.08	22.18
10	25	12		22.09	22.07	22.11
10	25	25		22.09	22.03	21.99
10	50	0		22.13	22.02	22.17
10	1	0	16-QAM	21.28	21.51	21.36
10	1	25		21.90	21.85	21.78
10	1	49		21.34	21.52	21.65
10	25	0		21.08	21.01	21.36
10	25	12		21.16	21.02	21.24
10	25	25		21.13	21.11	21.15
10	50	0		21.07	21.15	21.13
5	1	0	QPSK	22.72	22.85	22.75
5	1	12		23.02	22.87	23.12
5	1	24		22.81	22.68	22.78
5	12	0		21.97	22.04	22.12
5	12	7		22.09	21.97	21.95
5	12	13		21.99	21.96	22.06
5	25	0		22.04	22.02	21.99
5	1	0	16-QAM	21.44	21.27	21.54
5	1	12		21.62	21.61	21.69
5	1	24		21.72	21.18	21.51
5	12	0		20.93	21.02	21.26
5	12	7		20.95	21.16	20.84
5	12	13		20.96	20.95	20.90
5	25	0		21.11	21.01	20.90

LTE Band 25 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
3	1	0	QPSK	22.66	22.84	22.85
3	1	8		22.69	22.80	22.66
3	1	14		22.69	22.77	22.90
3	8	0		21.99	22.11	22.19
3	8	4		22.03	21.97	21.95
3	8	7		21.98	22.04	21.93
3	15	0		21.99	22.04	22.00
3	1	0	16-QAM	21.51	21.98	21.43
3	1	8		21.50	22.06	21.33
3	1	14		21.52	21.80	21.51
3	8	0		21.01	20.82	21.09
3	8	4		21.24	20.80	20.88
3	8	7		21.19	20.78	21.13
3	15	0		21.01	20.84	21.16
1.4	1	0	QPSK	22.94	23.04	22.84
1.4	1	3		23.07	22.89	22.80
1.4	1	5		22.97	22.83	22.84
1.4	3	0		22.90	22.76	22.84
1.4	3	1		22.96	22.80	23.10
1.4	3	3		22.98	22.86	22.81
1.4	6	0		21.93	21.89	21.90
1.4	1	0	16-QAM	21.53	21.22	21.81
1.4	1	3		21.82	21.47	21.71
1.4	1	5		21.88	21.25	21.76
1.4	3	0		21.54	21.58	22.10
1.4	3	1		21.86	21.92	21.91
1.4	3	3		21.86	21.83	21.86
1.4	6	0		20.74	20.75	20.96

LTE Band 26 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
15	1	0	QPSK	22.85	22.70	22.75
15	1	37		23.38	23.05	23.32
15	1	74		22.87	23.08	22.92
15	36	0		21.95	21.98	22.02
15	36	20		22.17	22.02	22.24
15	36	39		21.96	22.05	22.05
15	75	0		22.06	22.06	22.10
15	1	0	16-QAM	21.83	21.57	21.69
15	1	37		22.52	22.21	22.40
15	1	74		22.20	22.33	22.12
15	36	0		21.01	21.00	21.05
15	36	20		21.09	20.97	21.29
15	36	39		21.00	21.07	21.09
15	75	0		21.18	20.94	21.14
10	1	0	QPSK	22.95	22.84	22.84
10	1	25		22.86	23.17	23.06
10	1	49		22.71	23.15	22.62
10	25	0		22.01	22.01	22.09
10	25	12		21.90	22.01	21.99
10	25	25		21.99	21.97	21.99
10	50	0		21.90	22.15	21.96
10	1	0	16-QAM	22.21	21.54	21.82
10	1	25		22.17	21.56	22.15
10	1	49		21.84	21.57	21.58
10	25	0		21.05	21.12	21.00
10	25	12		21.31	20.96	21.07
10	25	25		20.94	21.04	21.02
10	50	0		20.97	21.01	21.04

LTE Band 26 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
5	1	0	QPSK	22.68	22.64	22.72
5	1	12		22.69	23.14	23.10
5	1	24		22.64	22.88	22.49
5	12	0		22.02	21.94	22.00
5	12	7		21.91	21.91	22.02
5	12	13		21.90	21.91	22.00
5	25	0		21.93	21.95	22.03
5	1	0	16-QAM	22.09	21.62	21.53
5	1	12		21.67	21.69	21.70
5	1	24		21.38	21.55	21.56
5	12	0		20.82	20.79	21.08
5	12	7		20.79	21.08	20.99
5	12	13		20.82	21.00	21.00
5	25	0		20.93	20.92	21.00
3	1	0	QPSK	23.02	22.72	22.76
3	1	8		22.98	22.84	22.68
3	1	14		22.82	22.83	22.58
3	8	0		22.15	21.99	22.13
3	8	4		21.95	21.97	22.02
3	8	7		21.93	21.98	21.97
3	15	0		22.03	22.00	22.00
3	1	0	16-QAM	21.50	21.88	21.97
3	1	8		21.58	22.25	22.19
3	1	14		21.46	22.19	21.45
3	8	0		20.98	20.98	21.29
3	8	4		20.96	21.15	21.03
3	8	7		20.92	21.06	20.99
3	15	0		21.01	20.96	20.89

LTE Band 26 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
1.4	1	0	QPSK	23.00	22.72	22.90
1.4	1	3		23.07	22.89	22.90
1.4	1	5		22.83	22.80	22.77
1.4	3	0		23.01	22.82	23.11
1.4	3	1		22.99	22.87	23.03
1.4	3	3		22.93	22.91	22.91
1.4	6	0		22.00	21.92	21.93
1.4	1	0	16-QAM	22.15	22.03	22.31
1.4	1	3		22.23	22.08	21.58
1.4	1	5		22.13	21.87	21.41
1.4	3	0		21.99	21.86	21.92
1.4	3	1		21.82	21.84	21.93
1.4	3	3		21.91	21.89	22.13
1.4	6	0		20.88	20.92	20.90

LTE Band 41 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
20	1	0	QPSK	22.45	22.29	22.81
20	1	49		22.99	22.71	22.98
20	1	99		22.69	22.34	22.58
20	50	0		21.78	21.49	21.97
20	50	24		21.91	21.72	21.98
20	50	50		21.80	21.65	21.77
20	100	0		21.88	21.39	21.89
20	1	0	16-QAM	21.31	21.02	21.71
20	1	49		21.66	21.36	21.55
20	1	99		21.45	21.09	21.20
20	50	0		20.86	20.46	20.96
20	50	24		20.92	20.73	20.93
20	50	50		20.91	20.67	20.84
20	100	0		20.97	20.69	20.98
15	1	0	QPSK	22.43	22.18	22.51
15	1	37		22.95	22.72	22.93
15	1	74		22.71	22.35	22.32
15	36	0		21.91	21.50	21.96
15	36	20		21.92	21.64	21.85
15	36	39		21.85	21.37	21.45
15	75	0		21.74	21.48	21.85
15	1	0	16-QAM	21.24	21.03	21.43
15	1	37		21.68	21.43	21.84
15	1	74		21.39	21.05	21.26
15	36	0		20.74	20.33	20.78
15	36	20		21.00	20.66	20.87
15	36	39		20.84	20.67	20.65
15	75	0		20.75	20.73	20.92

LTE Band 41 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	22.62	22.36	22.63
10	1	25		22.90	22.70	22.52
10	1	49		22.75	22.40	22.26
10	25	0		21.82	21.52	21.86
10	25	12		21.95	21.75	21.88
10	25	25		21.76	21.40	21.63
10	50	0		21.73	21.49	21.77
10	1	0	16-QAM	21.18	21.14	21.22
10	1	25		21.40	21.22	21.31
10	1	49		21.34	20.96	21.11
10	25	0		20.94	20.67	20.93
10	25	12		20.92	20.64	20.84
10	25	25		20.96	20.74	20.60
10	50	0		20.91	20.47	20.67
5	1	0	QPSK	22.55	22.05	22.34
5	1	12		22.82	22.41	22.52
5	1	24		22.62	22.13	22.29
5	12	0		21.75	21.31	21.76
5	12	7		21.90	21.43	21.79
5	12	13		21.64	21.26	21.74
5	25	0		21.63	21.51	21.81
5	1	0	16-QAM	21.35	21.05	21.19
5	1	12		21.70	21.26	21.37
5	1	24		21.44	21.05	21.08
5	12	0		20.71	20.33	20.62
5	12	7		20.84	20.51	20.65
5	12	13		20.75	20.37	20.50
5	25	0		20.96	20.57	20.71

ERP/EIRP

LTE Band 13 (G_T - L_C = -3.00 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)	23.59	23.83	23.81		23.71	
Conducted Power (Watts)	0.2286	0.2415	0.2404		0.2350	
ERP(dBm)	18.44	18.68	18.66		18.56	
ERP(Watts)	0.0698	0.0738	0.0735		0.0718	

LTE Band 13 (G_T - L_C = -3.00 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)	22.13	22.21	22.65		22.91	
Conducted Power (Watts)	0.1633	0.1663	0.1841		0.1954	
ERP(dBm)	16.98	17.06	17.50		17.76	
ERP(Watts)	0.0499	0.0508	0.0562		0.0597	

LTE Band 25 (G_T - L_C = -2.49 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)	22.96	22.80	23.10	22.69	22.77	22.90	23.02	22.87	23.12
Conducted Power (Watts)	0.1977	0.1905	0.2042	0.1858	0.1892	0.1950	0.2004	0.1936	0.2051
EIRP(dBm)	20.47	20.31	20.61	20.20	20.28	20.41	20.53	20.38	20.63
EIRP(Watts)	0.1114	0.1074	0.1151	0.1047	0.1067	0.1099	0.1130	0.1091	0.1156

LTE Band 25 (G_T - L_C = -2.49 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)	23.13	22.97	23.22	23.37	22.96	23.13	22.96	22.92	22.95
Conducted Power (Watts)	0.2056	0.1982	0.2099	0.2173	0.1977	0.2056	0.1977	0.1959	0.1972
EIRP(dBm)	20.64	20.48	20.73	20.88	20.47	20.64	20.47	20.43	20.46
EIRP(Watts)	0.1159	0.1117	0.1183	0.1225	0.1114	0.1159	0.1114	0.1104	0.1112

LTE Band 25 (G_T - L_C = -2.49 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)	21.54	21.58	22.10	21.50	22.06	21.33	21.72	21.18	21.51
Conducted Power (Watts)	0.1426	0.1439	0.1622	0.1413	0.1607	0.1358	0.1486	0.1312	0.1416
EIRP(dBm)	19.05	19.09	19.61	19.01	19.57	18.84	19.23	18.69	19.02
EIRP(Watts)	0.0804	0.0811	0.0914	0.0796	0.0906	0.0766	0.0838	0.0740	0.0798

LTE Band 25 (G_T - L_C = -2.49 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)	21.90	21.85	21.78	22.11	21.46	21.68	22.17	21.58	22.20
Conducted Power (Watts)	0.1549	0.1531	0.1507	0.1626	0.1400	0.1472	0.1648	0.1439	0.1660
EIRP(dBm)	19.41	19.36	19.29	19.62	18.97	19.19	19.68	19.09	19.71
EIRP(Watts)	0.0873	0.0863	0.0849	0.0916	0.0789	0.0830	0.0929	0.0811	0.0935

LTE Band 26 (G_T - L_C = -0.32 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)	23.01	22.82	23.11	23.02	22.72	22.76	22.69	23.14	23.10
Conducted Power (Watts)	0.2000	0.1914	0.2046	0.2004	0.1871	0.1888	0.1858	0.2061	0.2042
ERP(dBm)	20.54	20.35	20.64	20.55	20.25	20.29	20.22	20.67	20.63
ERP(Watts)	0.1132	0.1084	0.1159	0.1135	0.1059	0.1069	0.1052	0.1167	0.1156

LTE Band 26 (G_T - L_C = -0.32 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)	22.86	23.17	23.06	23.38	23.05	23.32	23.01
Conducted Power (Watts)	0.1932	0.2075	0.2023	0.2178	0.2018	0.2148	0.2000
ERP(dBm)	20.39	20.70	20.59	20.91	20.58	20.85	20.54
ERP(Watts)	0.1094	0.1175	0.1146	0.1233	0.1143	0.1216	0.1132

LTE Band 26 (G_T - L_C = -0.32 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)	22.15	22.03	22.31	21.58	22.25	22.19	22.09	21.62	21.53
Conducted Power (Watts)	0.1641	0.1596	0.1702	0.1439	0.1679	0.1656	0.1618	0.1452	0.1422
ERP(dBm)	19.68	19.56	19.84	19.11	19.78	19.72	19.62	19.15	19.06
ERP(Watts)	0.0929	0.0904	0.0964	0.0815	0.0951	0.0938	0.0916	0.0822	0.0805

LTE Band 26 (G_T - L_C = -0.32 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)	22.21	21.54	21.82	22.52	22.21	22.40	21.67
Conducted Power (Watts)	0.1663	0.1426	0.1521	0.1786	0.1663	0.1738	0.1469
ERP(dBm)	19.74	19.07	19.35	20.05	19.74	19.93	19.20
ERP(Watts)	0.0942	0.0807	0.0861	0.1012	0.0942	0.0984	0.0832

LTE Band 41 (G_T - L_C = -2.60 dB) QPSK									
Bandwidth	5M			10M			15M		
Channel	39675	40620	41565	39700	40620	41540	39725	40620	41515
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	2498.5	2593	2687.5	2501	2593	2685	2503.5	2593	2682.5
Conducted Power (dBm)	22.82	22.41	22.52	22.90	22.70	22.52	22.95	22.72	22.93
Conducted Power (Watts)	0.1914	0.1742	0.1786	0.1950	0.1862	0.1786	0.1972	0.1871	0.1963
EIRP(dBm)	20.22	19.81	19.92	20.30	20.10	19.92	20.35	20.12	20.33
EIRP(Watts)	0.1052	0.0957	0.0982	0.1072	0.1023	0.0982	0.1084	0.1028	0.1079

LTE Band 41 (G_T - L_C = -2.60 dB) QPSK			
Bandwidth	20M		
Channel	39750	40620	41490
	(Low)	(Mid)	(High)
Frequency (MHz)	2506	2593	2680
Conducted Power (dBm)	22.99	22.71	22.98
Conducted Power (Watts)	0.1991	0.1866	0.1986
EIRP(dBm)	20.39	20.11	20.38
EIRP(Watts)	0.1094	0.1026	0.1091

LTE Band 41 (G_T - L_C = -2.60 dB) 16QAM									
Bandwidth	5M			10M			15M		
Channel	39675	40620	41565	39700	40620	41540	39725	40620	41515
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	2498.5	2593	2687.5	2501	2593	2685	2503.5	2593	2682.5
Conducted Power (dBm)	21.70	21.26	21.37	21.40	21.22	21.31	21.68	21.43	21.84
Conducted Power (Watts)	0.1479	0.1337	0.1371	0.1380	0.1324	0.1352	0.1472	0.1390	0.1528
EIRP(dBm)	19.10	18.66	18.77	18.80	18.62	18.71	19.08	18.83	19.24
EIRP(Watts)	0.0813	0.0735	0.0753	0.0759	0.0728	0.0743	0.0809	0.0764	0.0839

LTE Band 41 (G_T - L_C = -2.60 dB) 16QAM			
Bandwidth	20M		
Channel	39750	40620	41490
	(Low)	(Mid)	(High)
Frequency (MHz)	2506	2593	2680
Conducted Power (dBm)	21.31	21.02	21.71
Conducted Power (Watts)	0.1352	0.1265	0.1483
EIRP(dBm)	18.71	18.42	19.11
EIRP(Watts)	0.0743	0.0695	0.0815

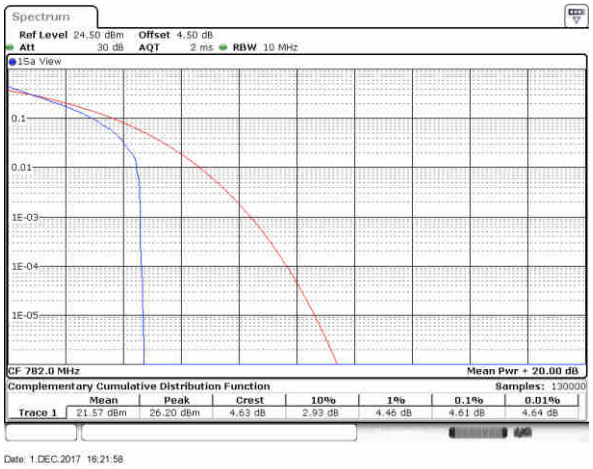
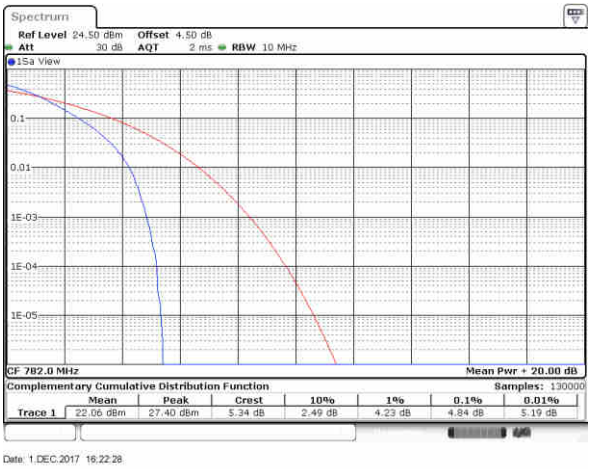
Peak-to-Average Ratio

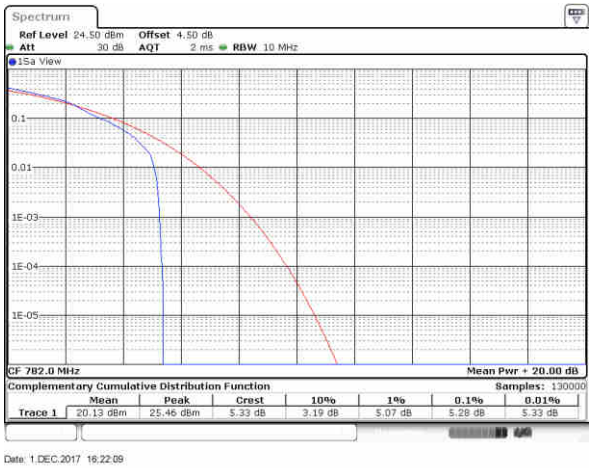
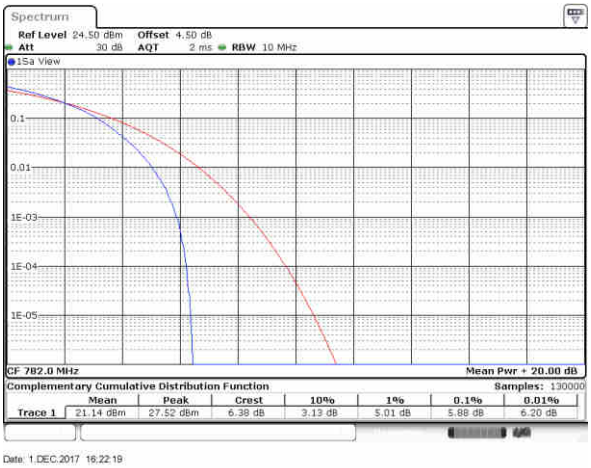
Mode	LTE Band 13 / 10MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	Full RB	Result
Lowest CH	-	-	-	-	PASS
Middle CH	4.61	4.84	5.28	5.88	
Highest CH	-	-	-	-	

Mode	LTE Band 25 / 20MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	Full RB	Result
Lowest CH	4.58	5.01	5.30	5.97	PASS
Middle CH	4.93	4.99	5.62	5.94	
Highest CH	4.84	4.72	5.97	5.88	

Mode	LTE Band 26 / 15MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	Full RB	Result
Lowest CH	3.51	5.19	4.20	6.14	PASS
Middle CH	3.62	5.01	4.35	6.06	
Highest CH	3.80	4.93	4.46	5.94	

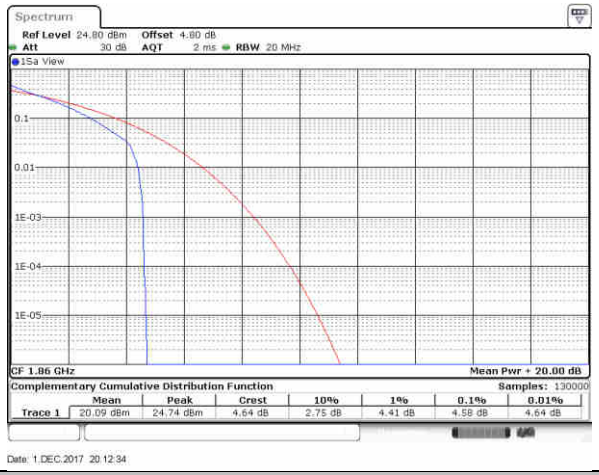
Mode	LTE Band 41 / 20MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	Full RB	Result
Lowest CH	5.42	5.65	5.97	5.59	PASS
Middle CH	6.06	5.10	5.51	5.94	
Highest CH	5.80	5.10	5.42	6.20	

LTE Band 13 / 10MHz / QPSK	
Middle Channel/ 1RB	**Middle Channel / Full RB**
	

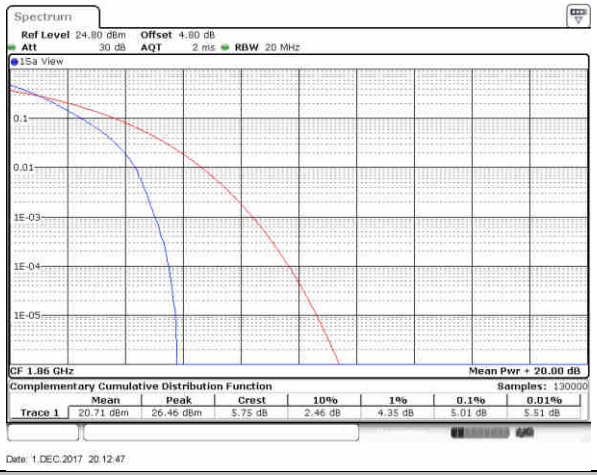
LTE Band 13 / 10MHz / 16QAM	
Middle Channel/ 1RB	**Middle Channel / Full RB**
	

LTE Band 25 / 20MHz / QPSK

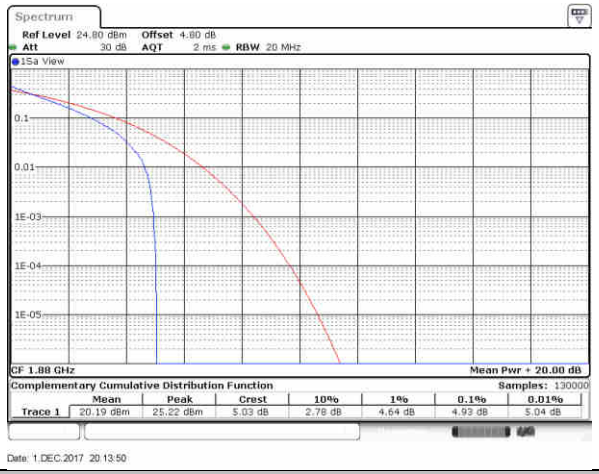
Lowest Channel / 1RB



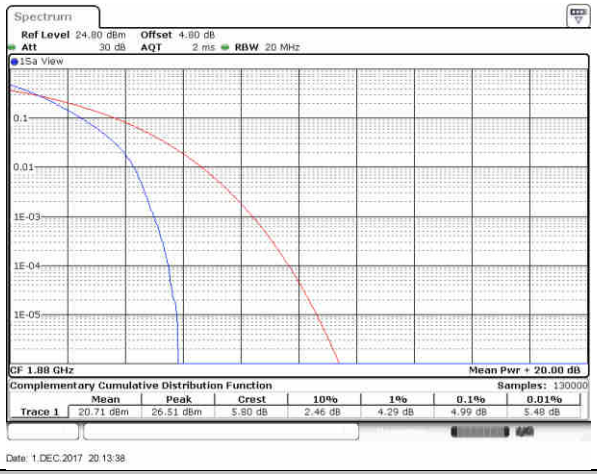
Lowest Channel / Full RB



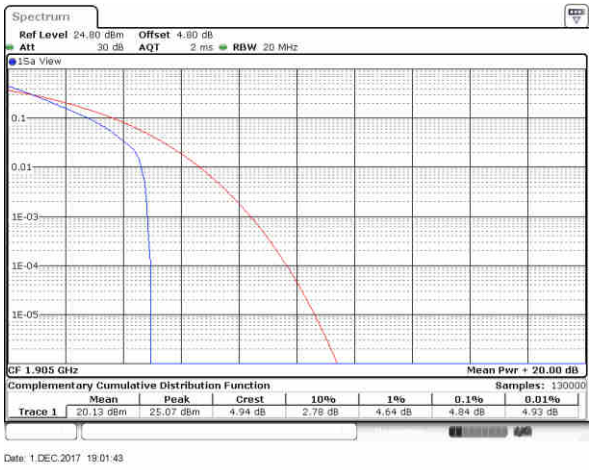
Middle Channel / 1RB



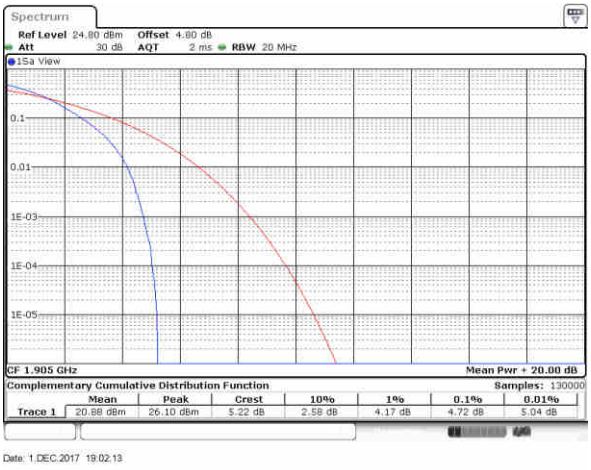
Middle Channel / Full RB



Highest Channel / 1RB

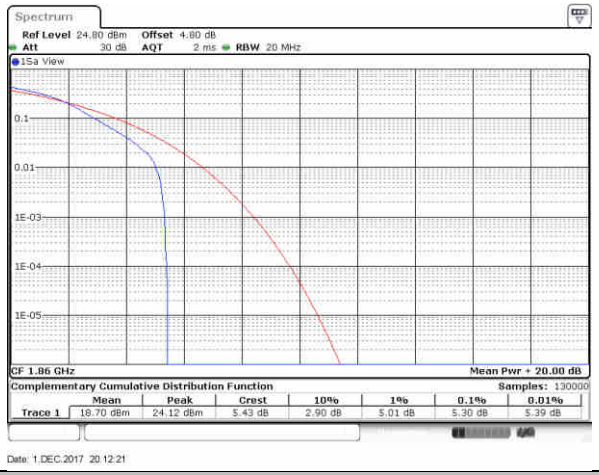


Highest Channel / Full RB

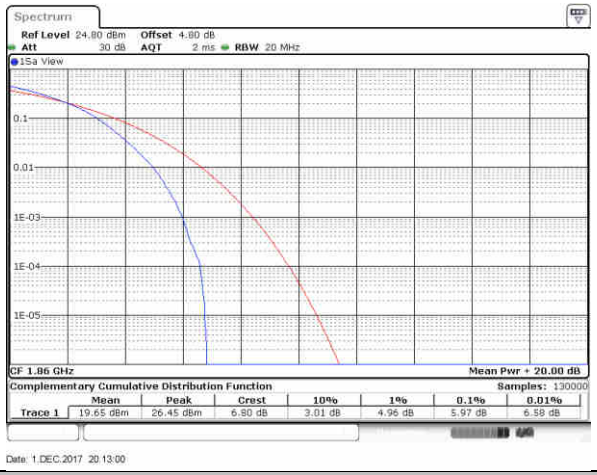


LTE Band 25 / 20MHz / 16QAM

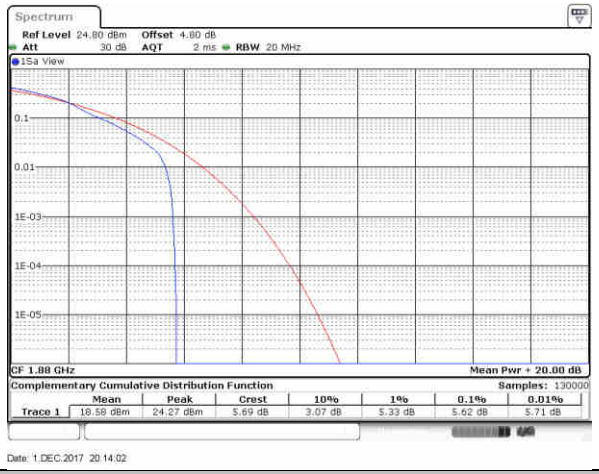
Lowest Channel / 1RB



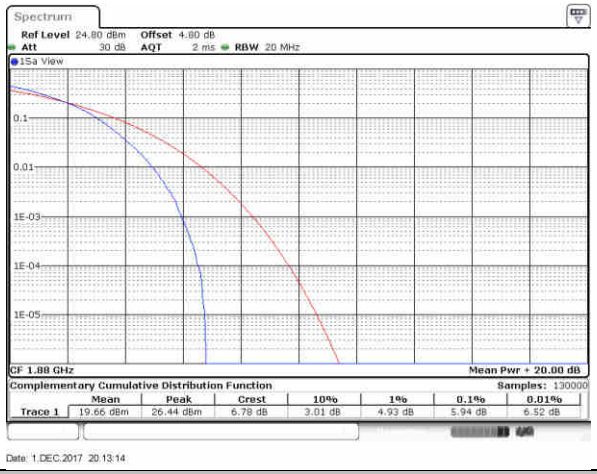
Lowest Channel / Full RB



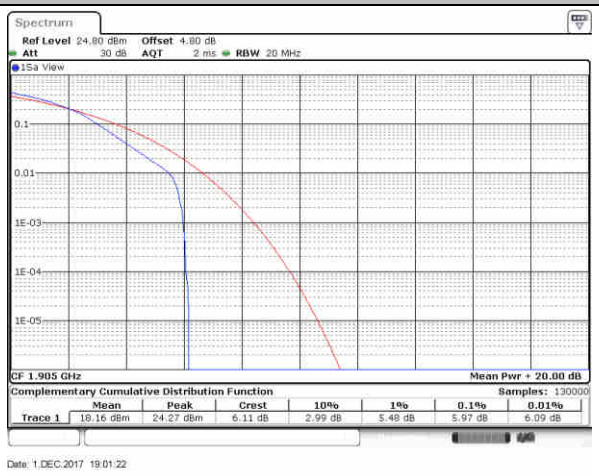
Middle Channel / 1RB



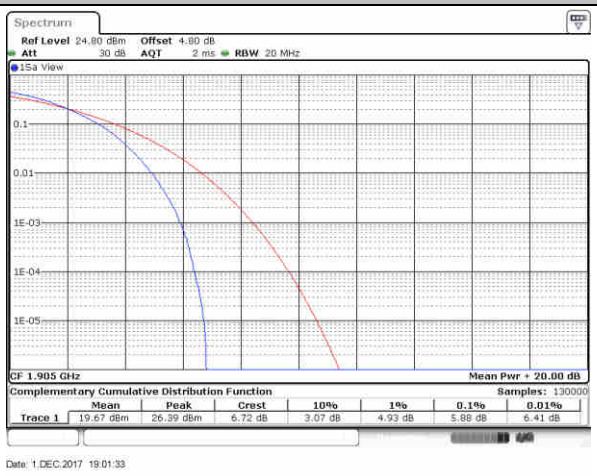
Middle Channel / Full RB



Highest Channel / 1RB

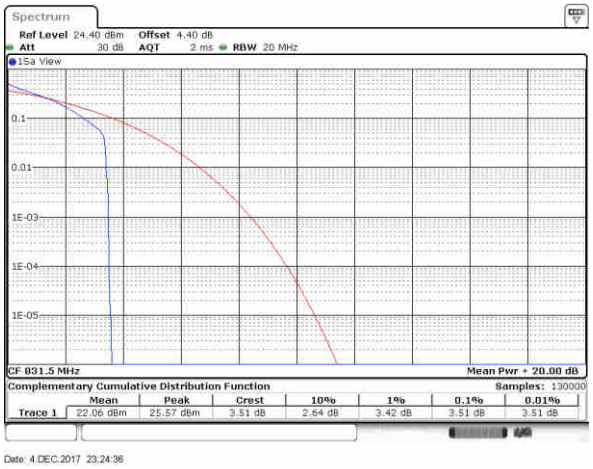


Highest Channel / Full RB

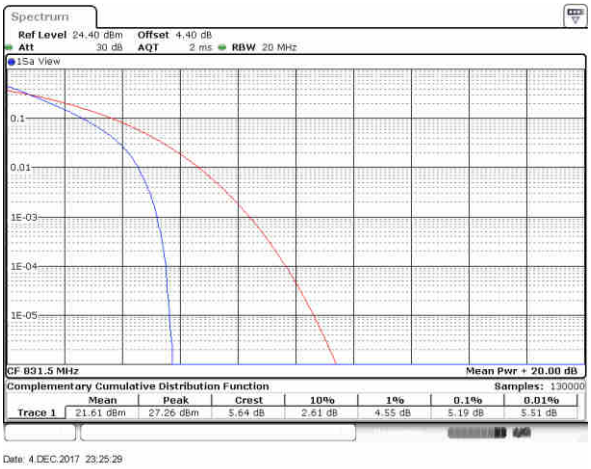


LTE Band 26 / 15MHz / QPSK

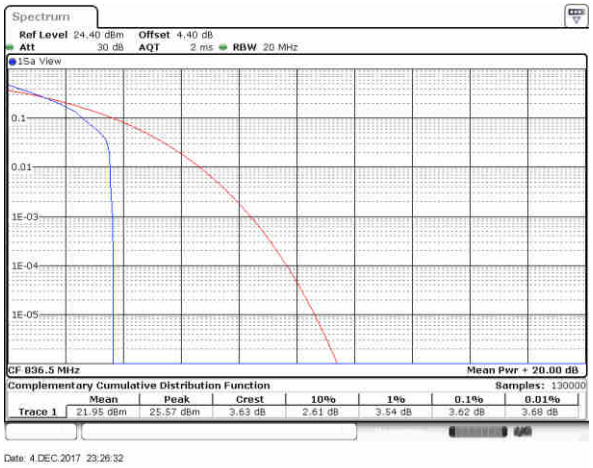
Lowest Channel / 1RB



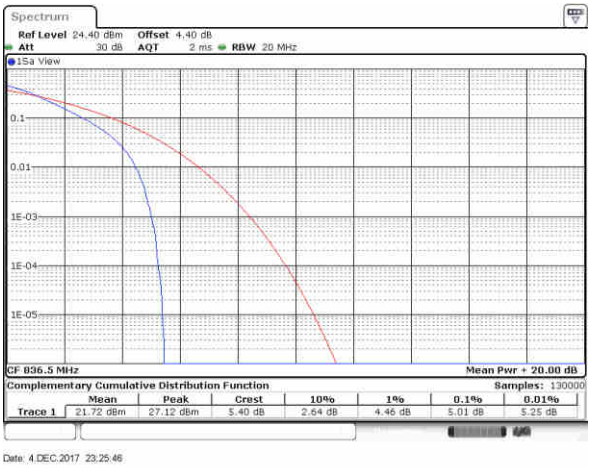
Lowest Channel / Full RB



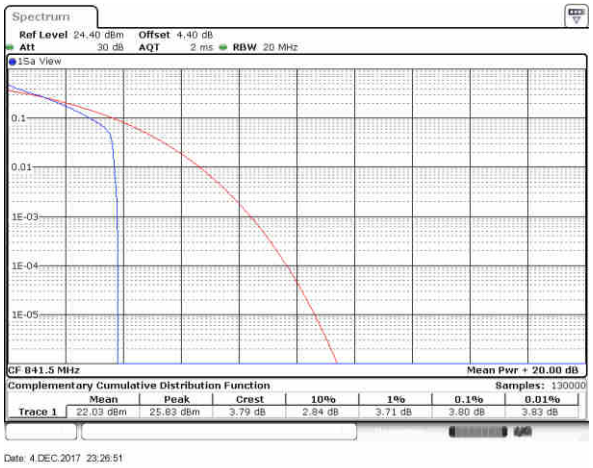
Middle Channel / 1RB



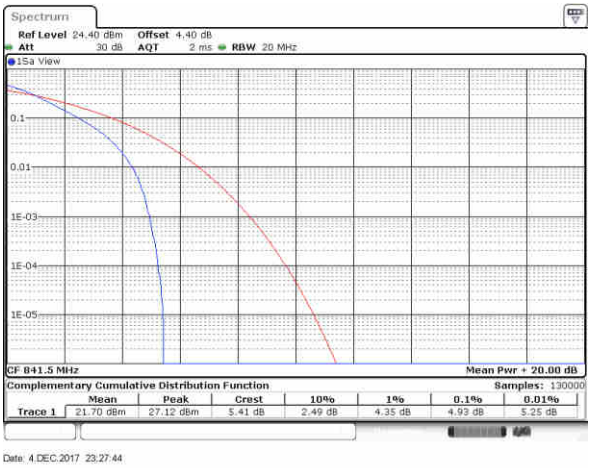
Middle Channel / Full RB



Highest Channel / 1RB

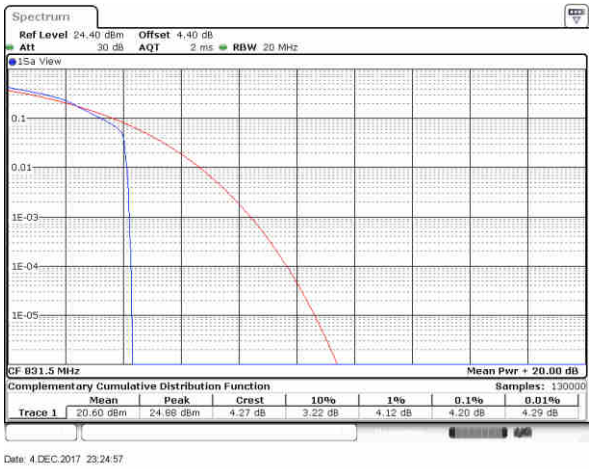


Highest Channel / Full RB

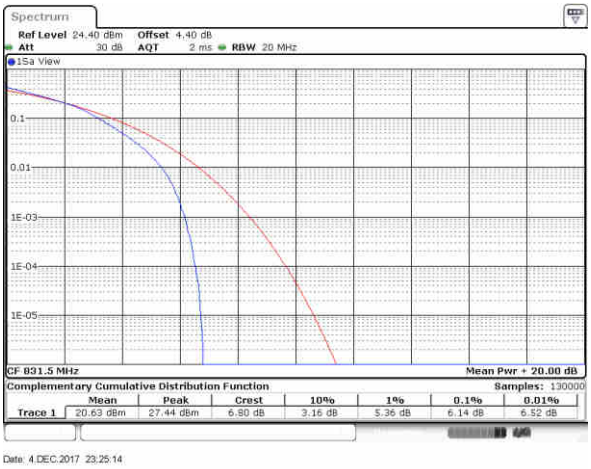


LTE Band 26 / 15MHz / 16QAM

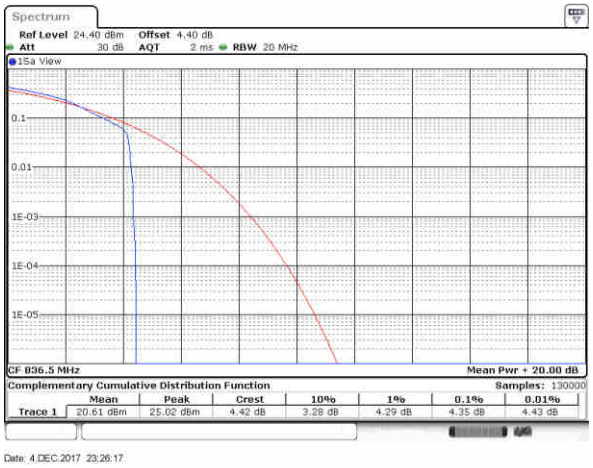
Lowest Channel / 1RB



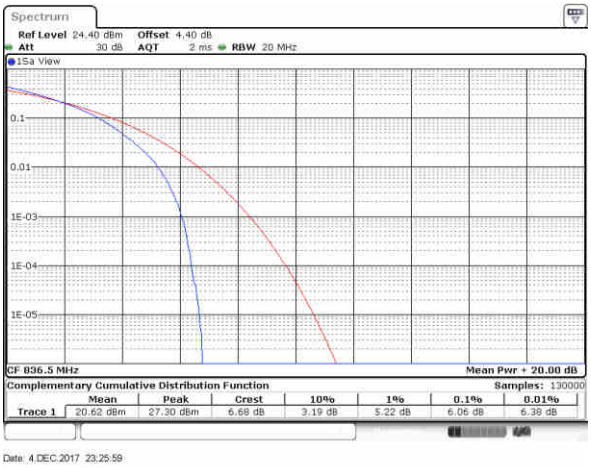
Lowest Channel / Full RB



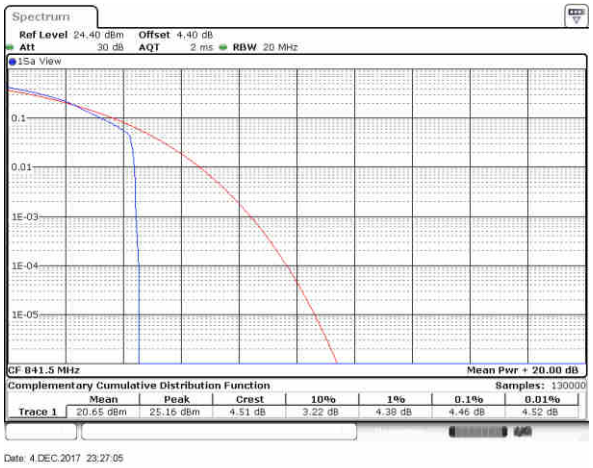
Middle Channel / 1RB



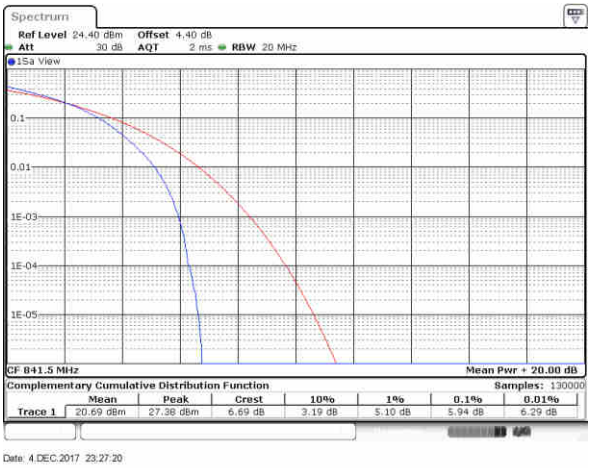
Middle Channel / Full RB



Highest Channel / 1RB

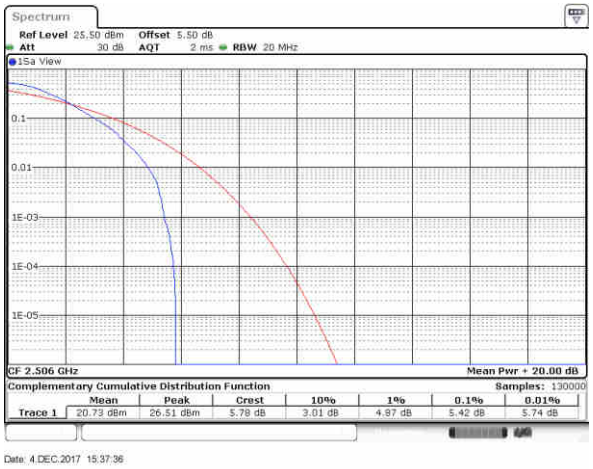


Highest Channel / Full RB

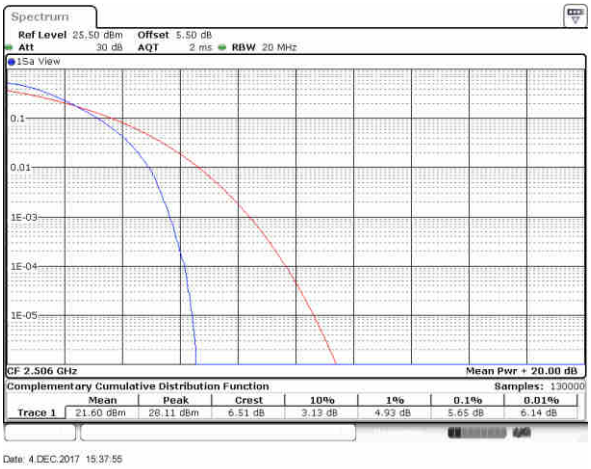


LTE Band 41 / 20MHz / QPSK

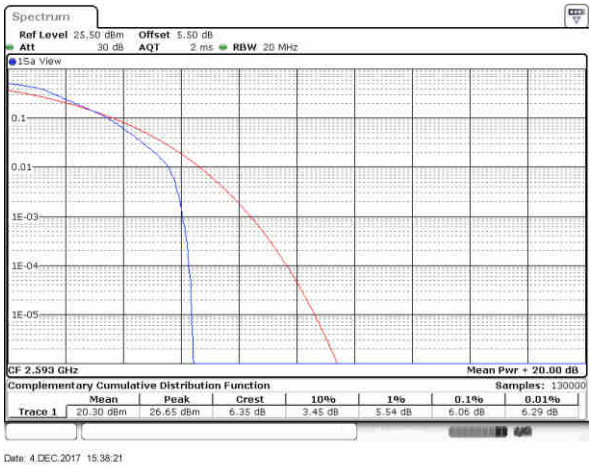
Lowest Channel / 1RB



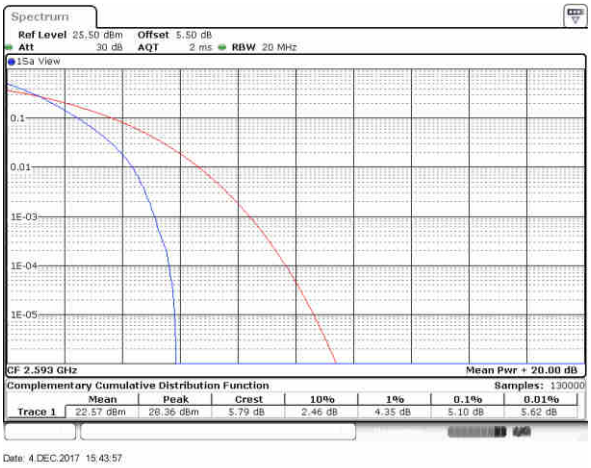
Lowest Channel / Full RB



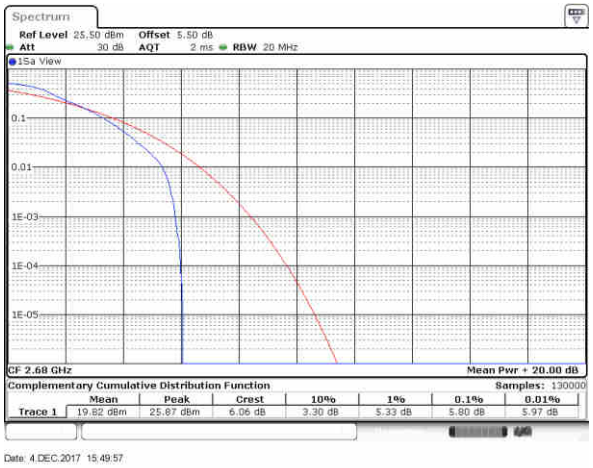
Middle Channel / 1RB



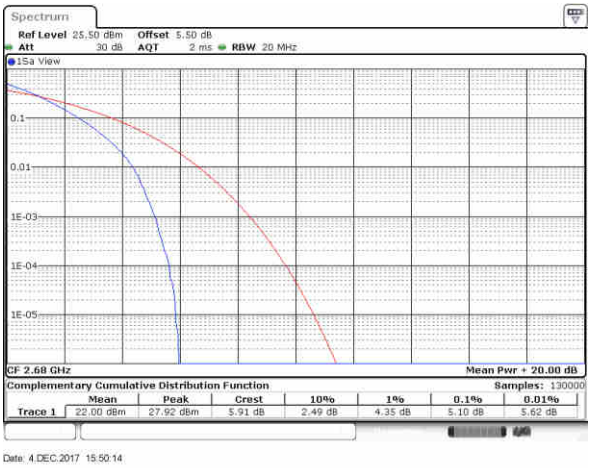
Middle Channel / Full RB



Highest Channel / 1RB

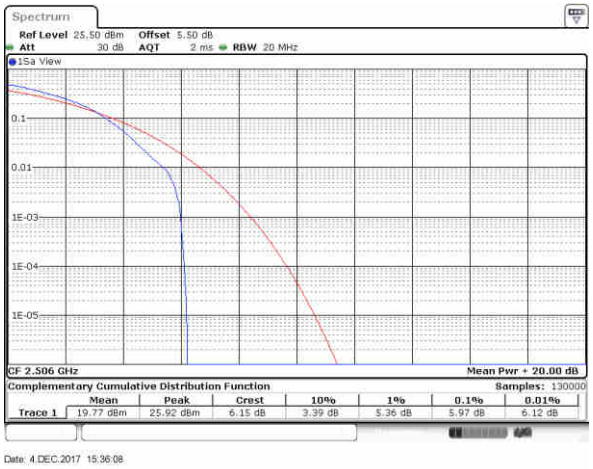


Highest Channel / Full RB

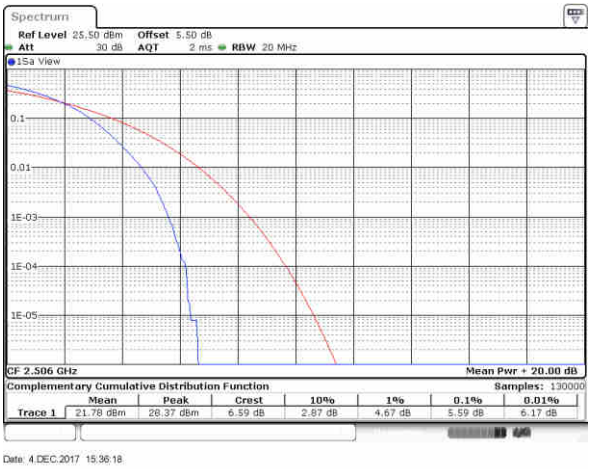


LTE Band 41 / 20MHz / 16QAM

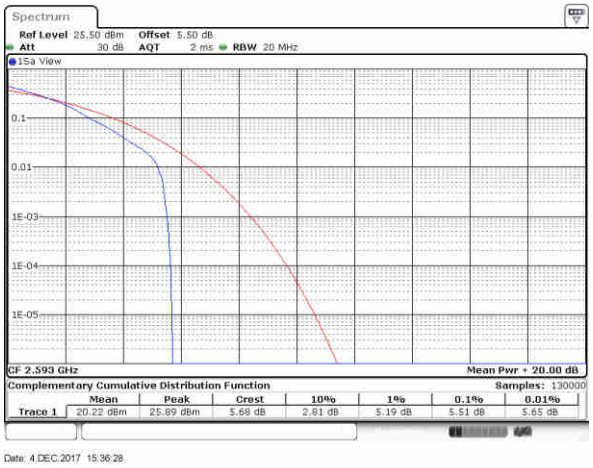
Lowest Channel / 1RB



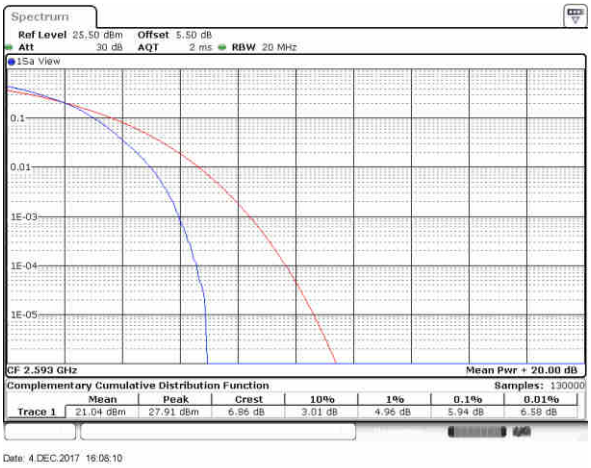
Lowest Channel / Full RB



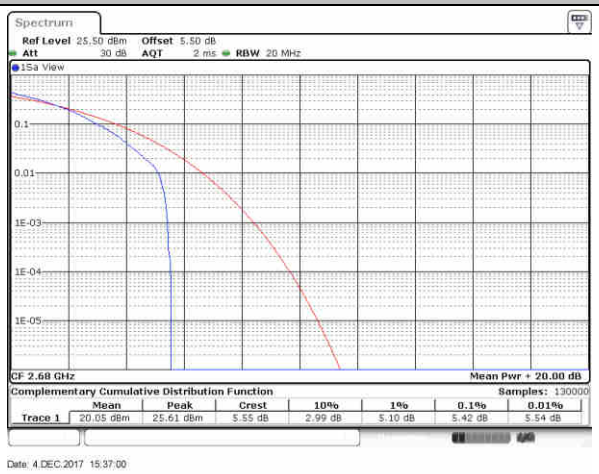
Middle Channel / 1RB



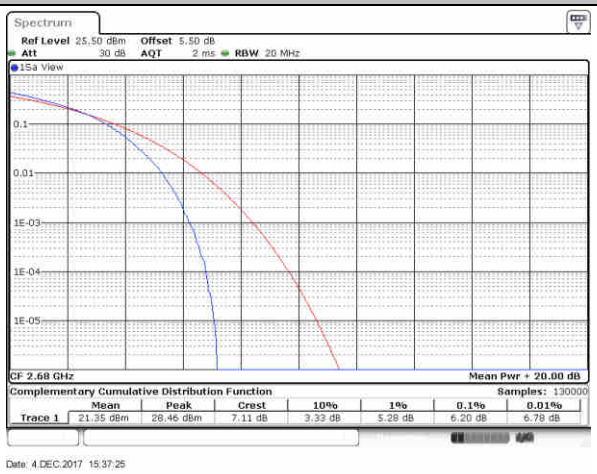
Middle Channel / Full RB



Highest Channel / 1RB



Highest Channel / Full RB



26dB Bandwidth

Mode	LTE Band 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	-	-	-	-	4.985	4.915	-	-	-	-	-	-
Middle CH	-	-	-	-	4.895	4.935	9.65	9.95	-	-	-	-
Highest CH	-	-	-	-	4.815	4.825	-	-	-	-	-	-

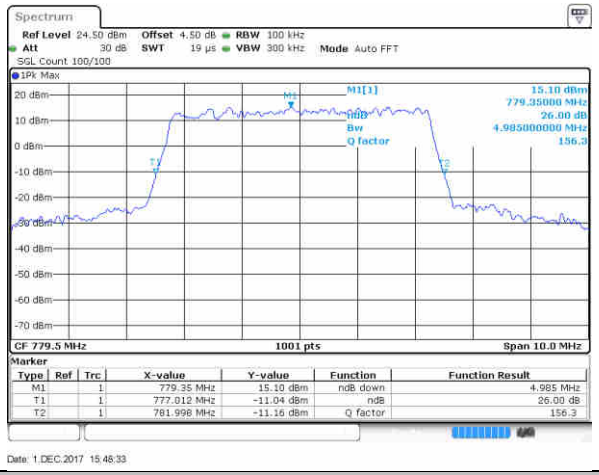
Mode	LTE Band 25 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	1.276	1.309	2.991	3.015	4.885	4.905	9.75	9.87	14.416	14.236	20.10	20.06
Middle CH	1.287	1.298	2.979	3.045	4.925	4.865	9.75	9.65	14.326	14.356	20.06	20.02
Highest CH	1.273	1.281	3.021	2.997	4.945	4.915	9.71	9.71	14.296	14.565	20.06	20.06

Mode	LTE Band 26 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		CH26765	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	1.270	1.292	3.051	3.033	4.935	4.955	9.77	9.75	14.236	14.476	14.326	14.386
Middle CH	1.276	1.276	3.021	3.003	4.945	4.955	9.61	9.75	14.326	14.505	-	-
Highest CH	1.290	1.273	3.021	3.003	4.845	4.875	9.71	9.77	14.326	14.356	-	-

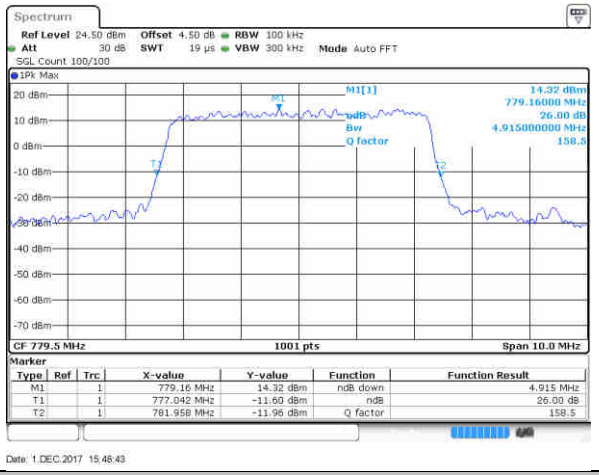
Mode	LTE Band 41 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	4.895	4.915	9.65	9.73	14.416	14.176	20.14	20.18
Middle CH	-	-	-	-	4.965	5.055	9.73	9.75	14.206	14.296	20.10	20.30
Highest CH	-	-	-	-	4.905	4.925	9.63	9.69	14.715	14.236	20.22	20.10

LTE Band 13

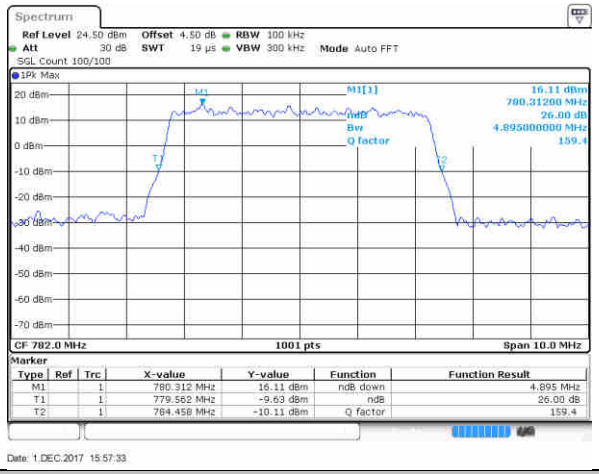
Lowest Channel / 5MHz / QPSK



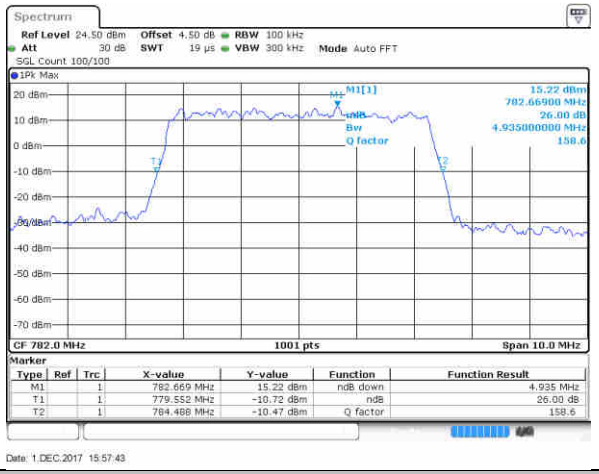
Lowest Channel / 5MHz / 16QAM



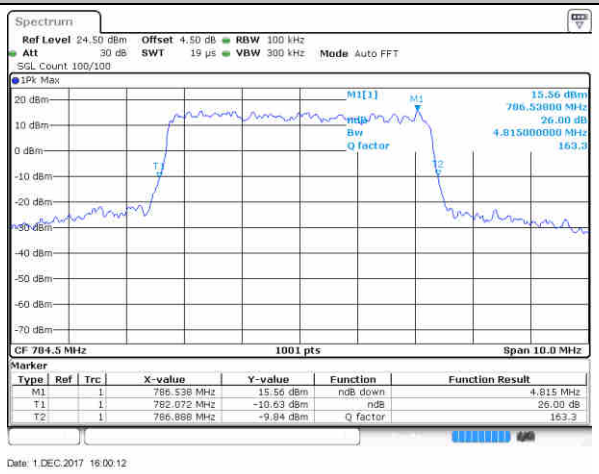
Middle Channel / 5MHz / QPSK



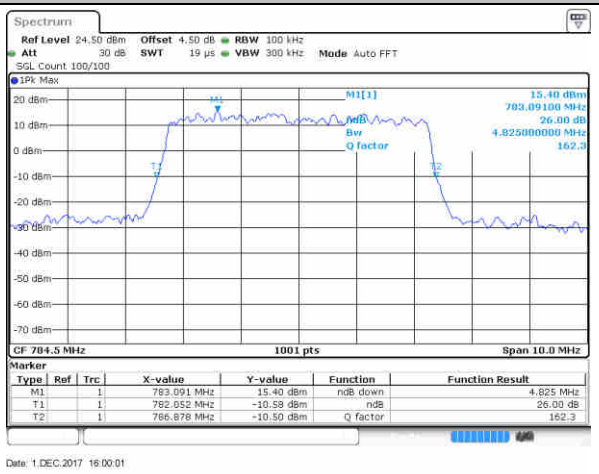
Middle Channel / 5MHz / 16QAM

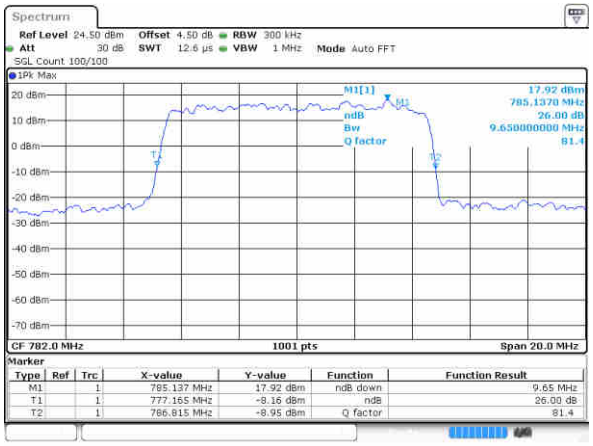
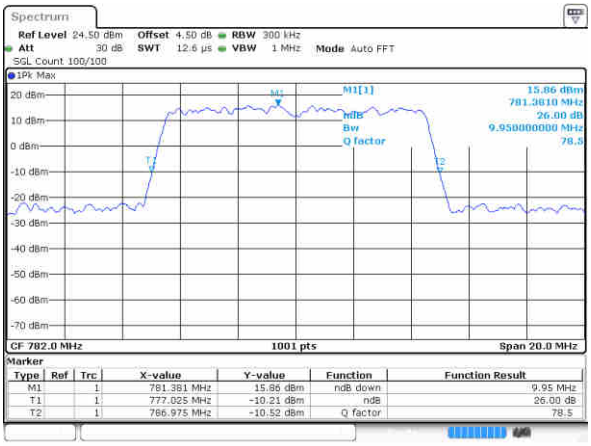


Highest Channel / 5MHz / QPSK



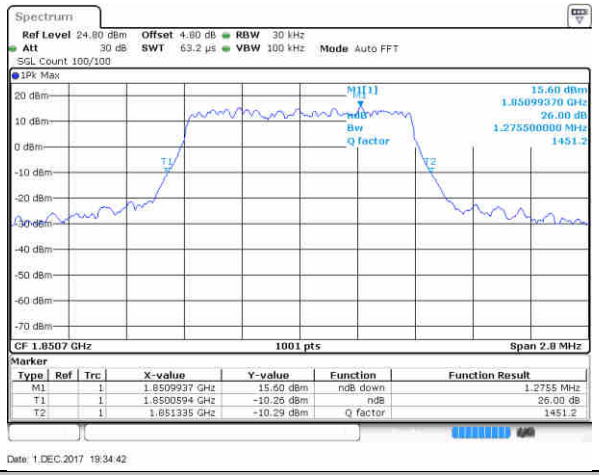
Highest Channel / 5MHz / 16QAM



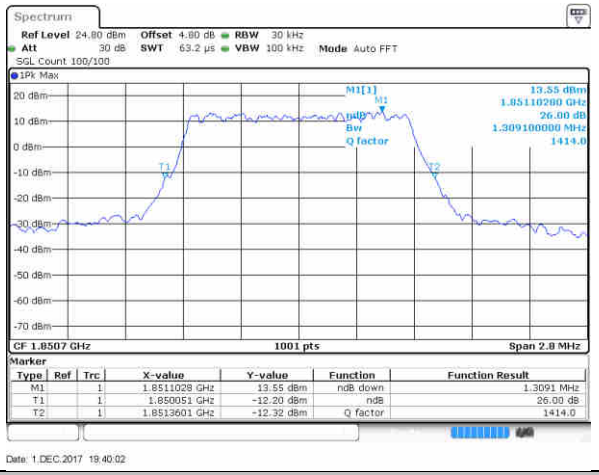
LTE Band 13	
Middle Channel / 10MHz / QPSK	Middle Channel / 10MHz / 16QAM
	

LTE Band 25

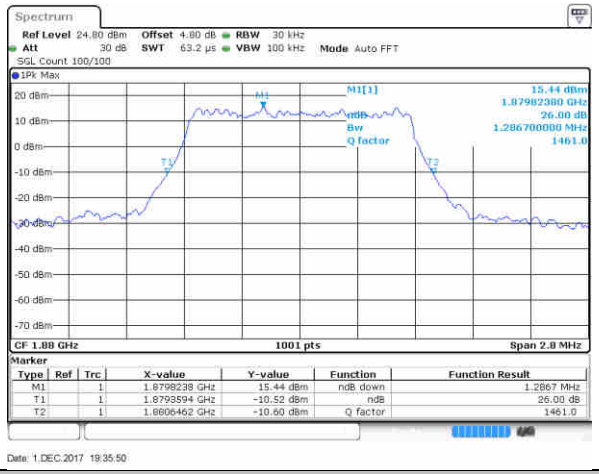
Lowest Channel / 1.4MHz / QPSK



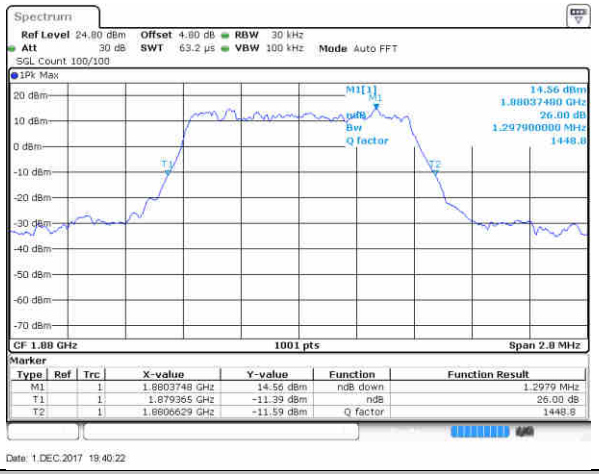
Lowest Channel / 1.4MHz / 16QAM



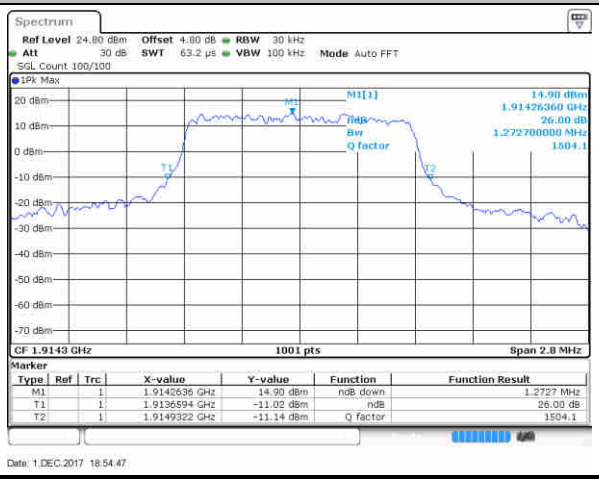
Middle Channel / 1.4MHz / QPSK



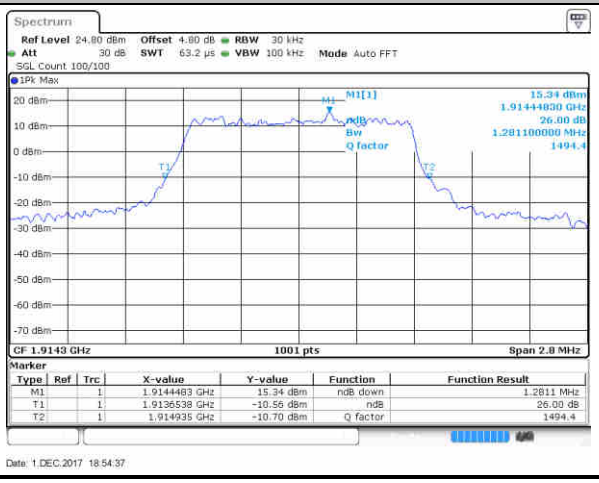
Middle Channel / 1.4MHz / 16QAM



Highest Channel / 1.4MHz / QPSK

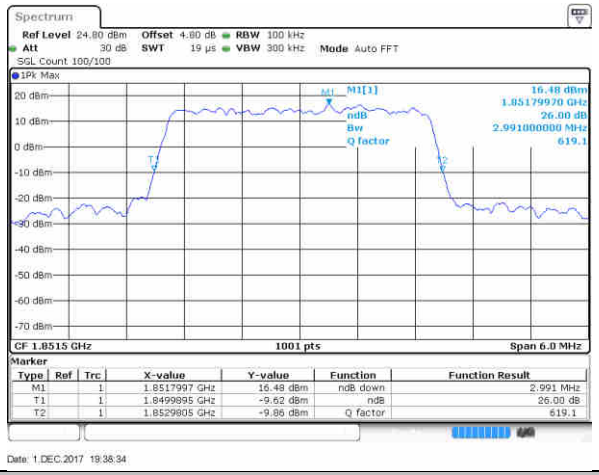


Highest Channel / 1.4MHz / 16QAM

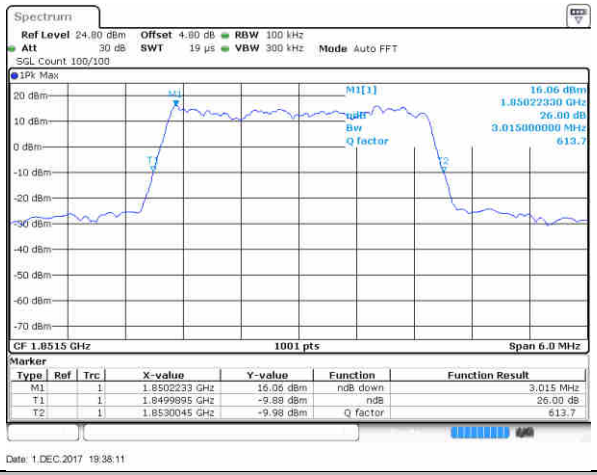


LTE Band 25

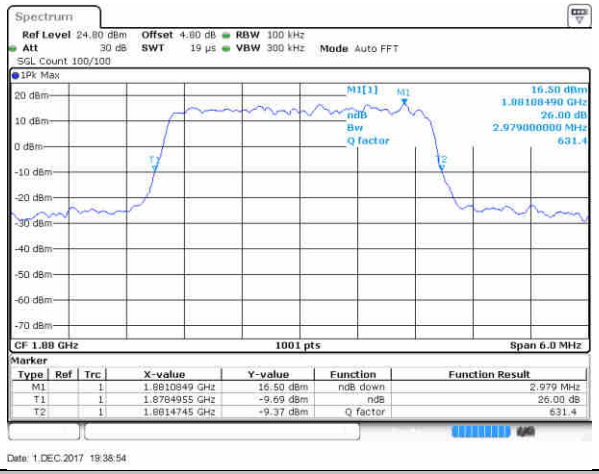
Lowest Channel / 3MHz / QPSK



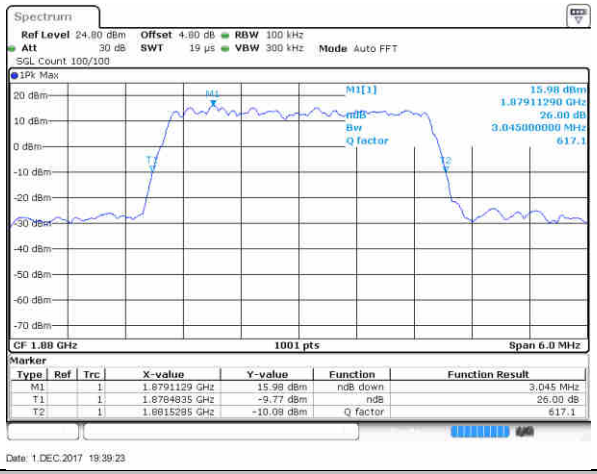
Lowest Channel / 3MHz / 16QAM



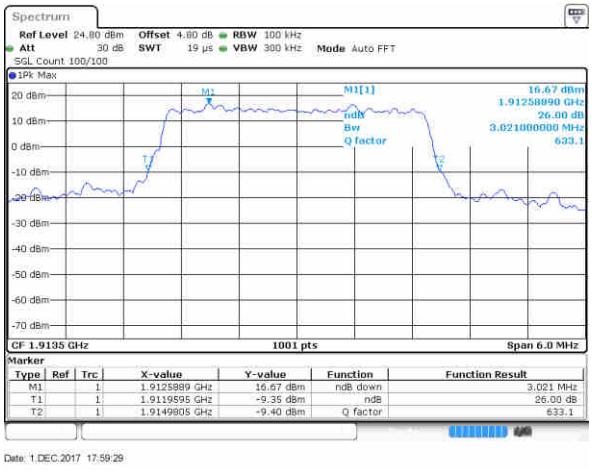
Middle Channel / 3MHz / QPSK



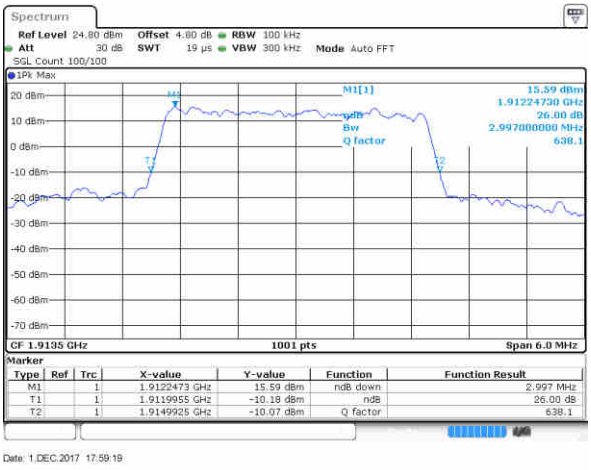
Middle Channel /3MHz / 16QAM



Highest Channel /3MHz / QPSK

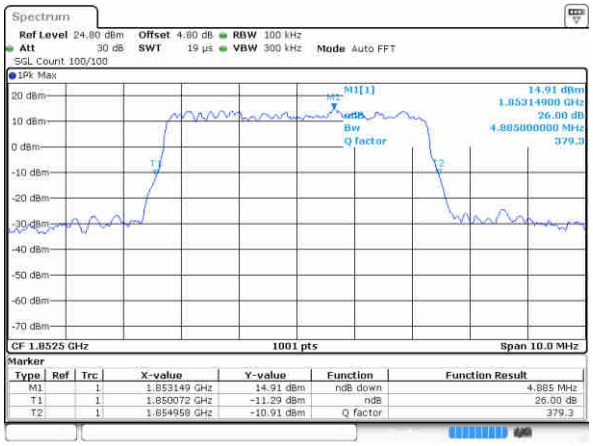


Highest Channel /3MHz / 16QAM

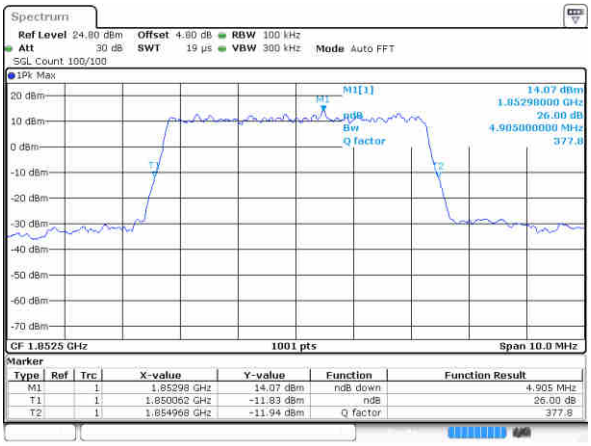


LTE Band 25

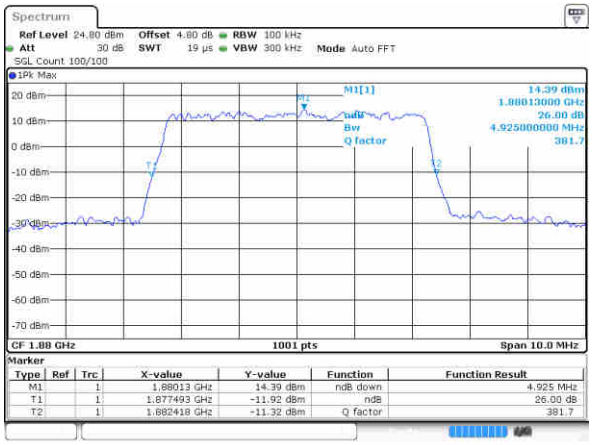
Lowest Channel / 5MHz / QPSK



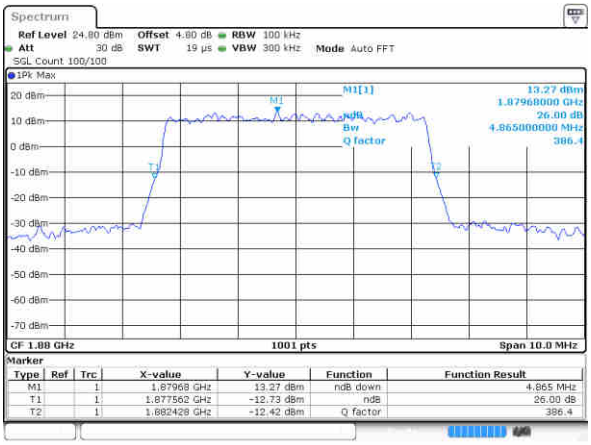
Lowest Channel / 5MHz / 16QAM



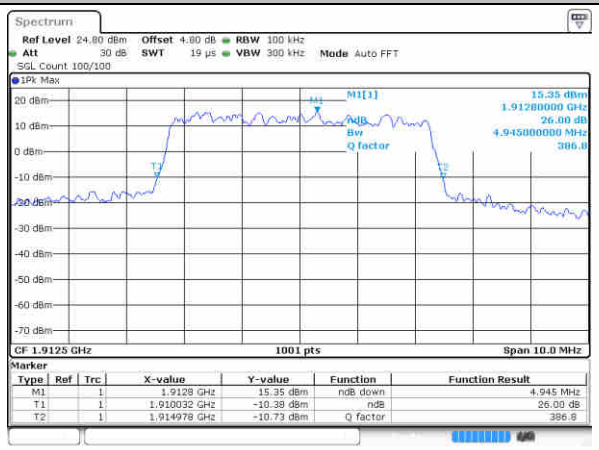
Middle Channel / 5MHz / QPSK



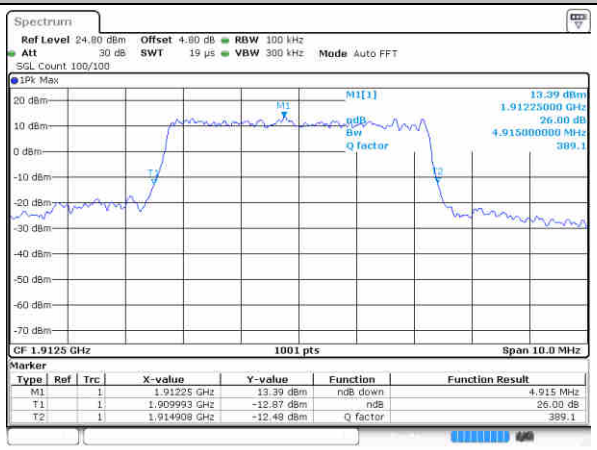
Middle Channel / 5MHz / 16QAM



Highest Channel / 5MHz / QPSK

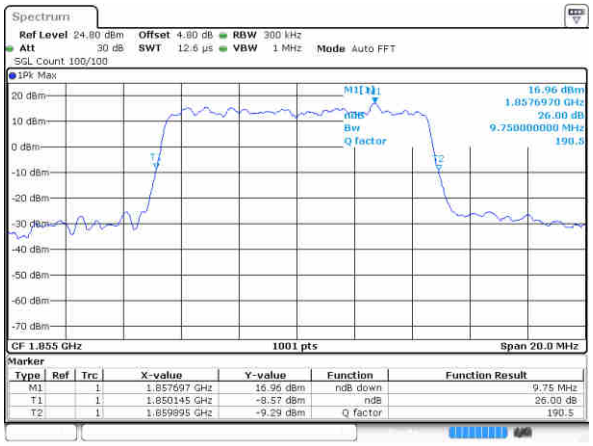


Highest Channel / 5MHz / 16QAM

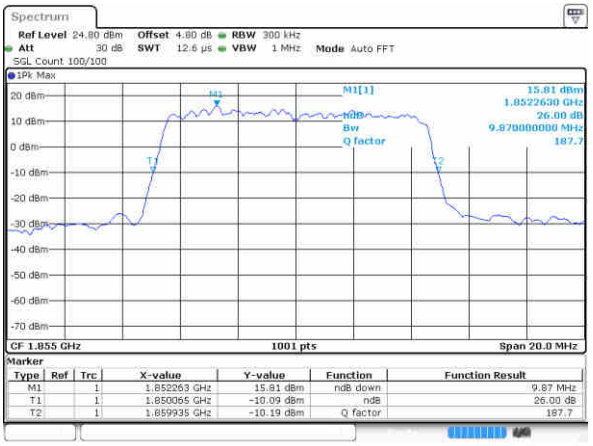


LTE Band 25

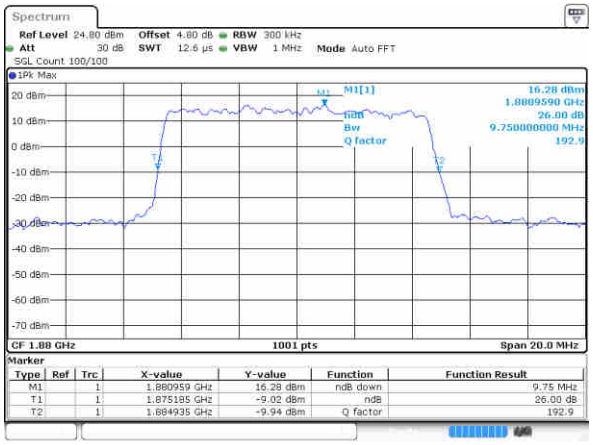
Lowest Channel / 10MHz / QPSK



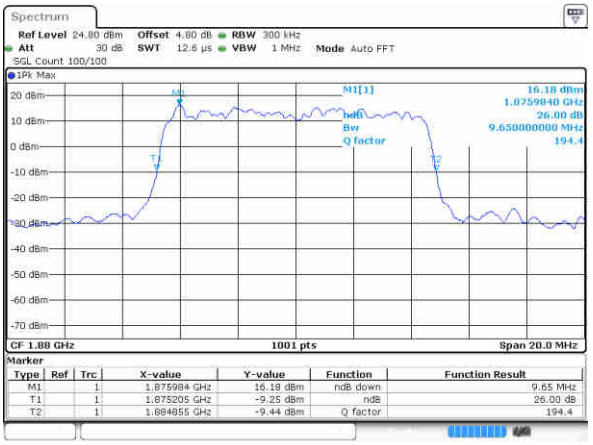
Lowest Channel / 10MHz / 16QAM



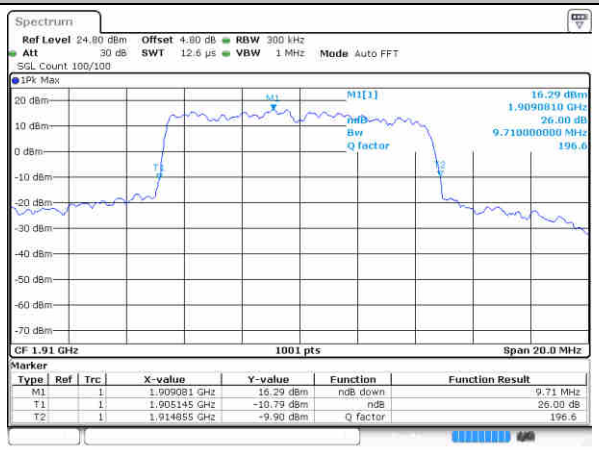
Middle Channel / 10MHz / QPSK



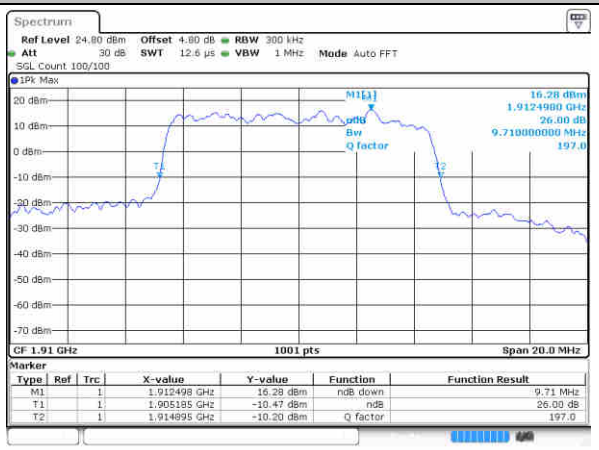
Middle Channel / 10MHz / 16QAM



Highest Channel / 10MHz / QPSK

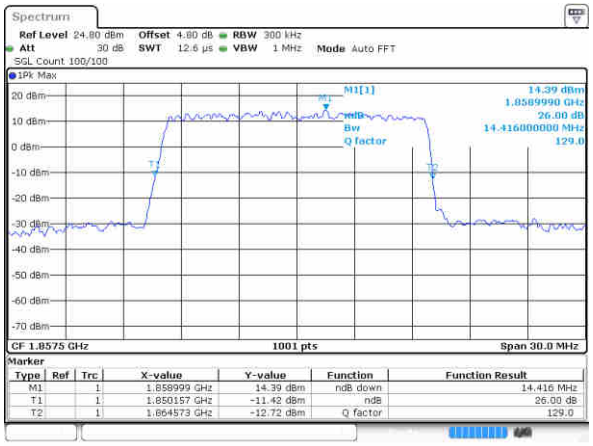


Highest Channel / 10MHz / 16QAM

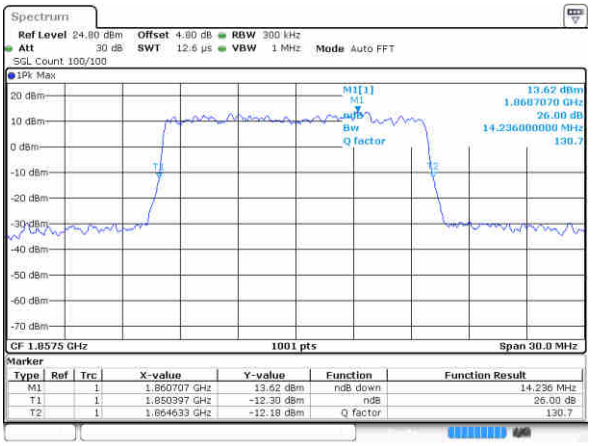


LTE Band 25

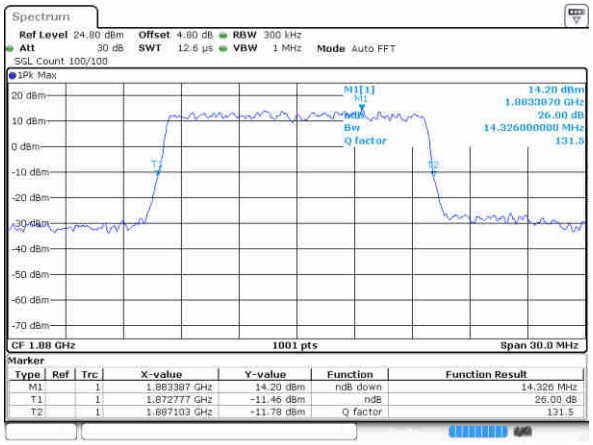
Lowest Channel / 15MHz / QPSK



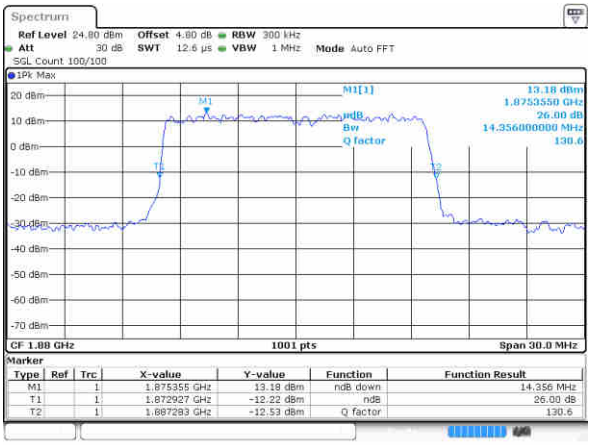
Lowest Channel / 15MHz / 16QAM



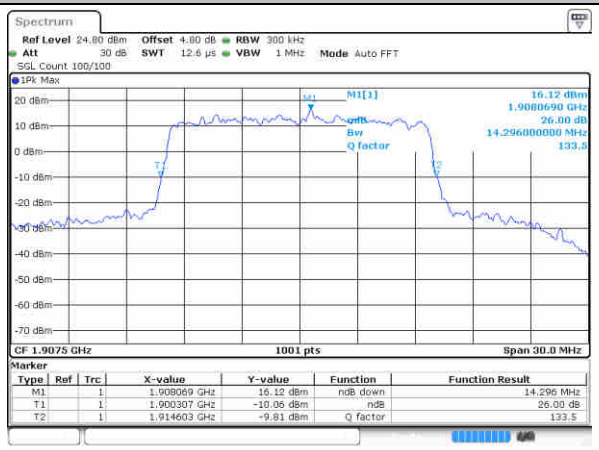
Middle Channel / 15MHz / QPSK



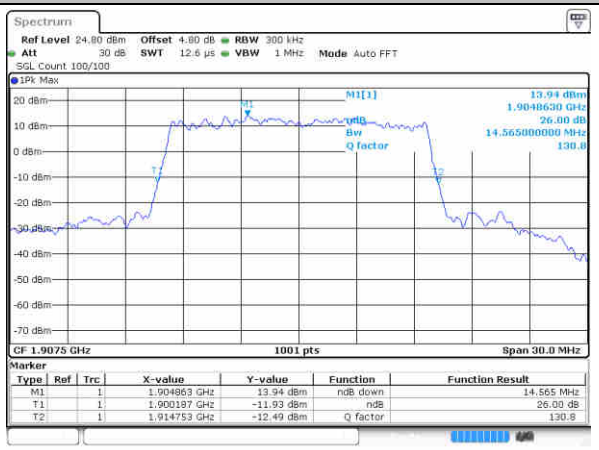
Middle Channel / 15MHz / 16QAM



Highest Channel / 15MHz / QPSK

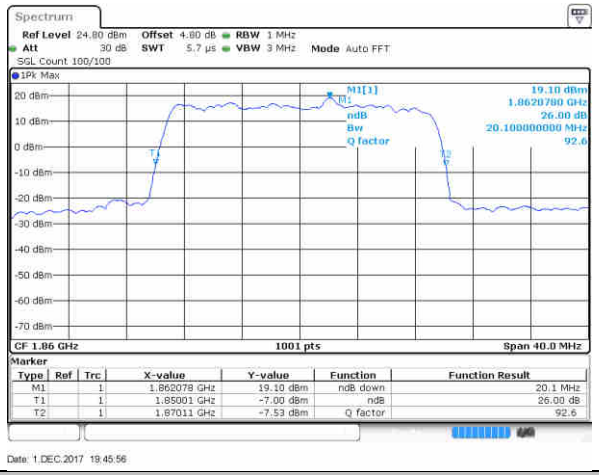


Highest Channel / 15MHz / 16QAM

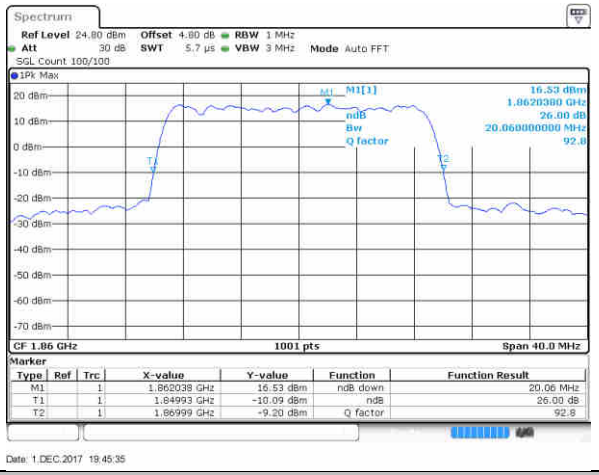


LTE Band 25

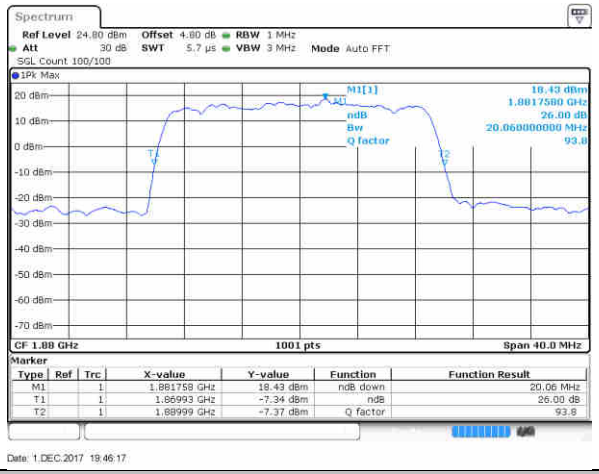
Lowest Channel / 20MHz / QPSK



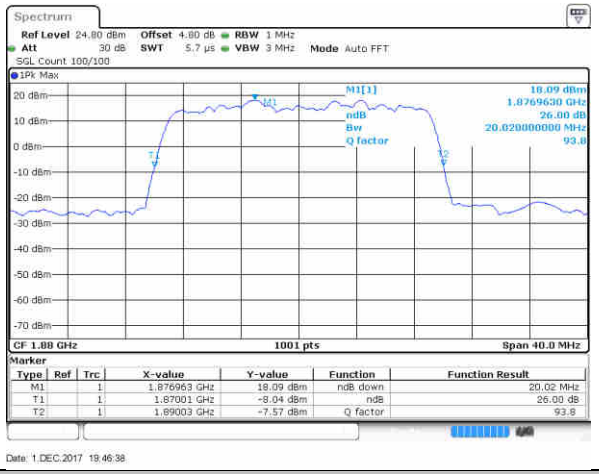
Lowest Channel / 20MHz / 16QAM



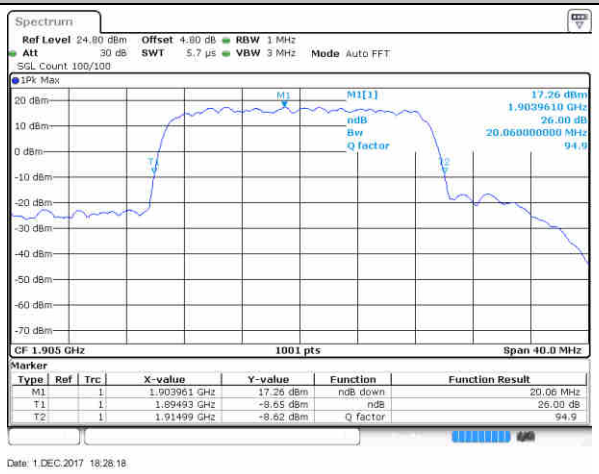
Middle Channel / 20MHz / QPSK



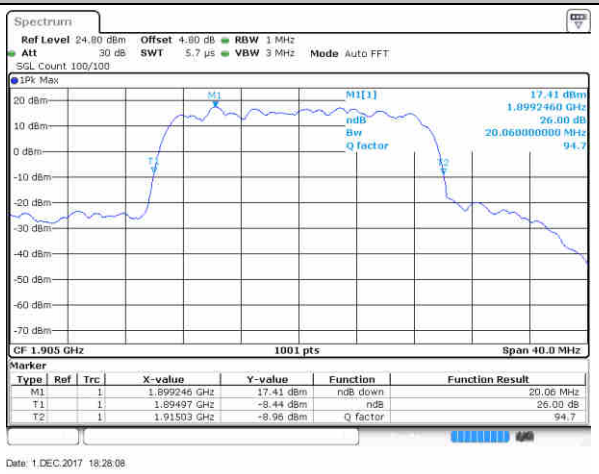
Middle Channel / 20MHz / 16QAM



Highest Channel / 20MHz / QPSK

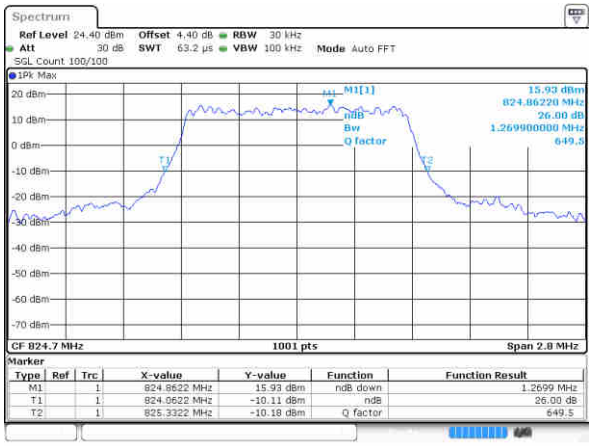


Highest Channel / 20MHz / 16QAM

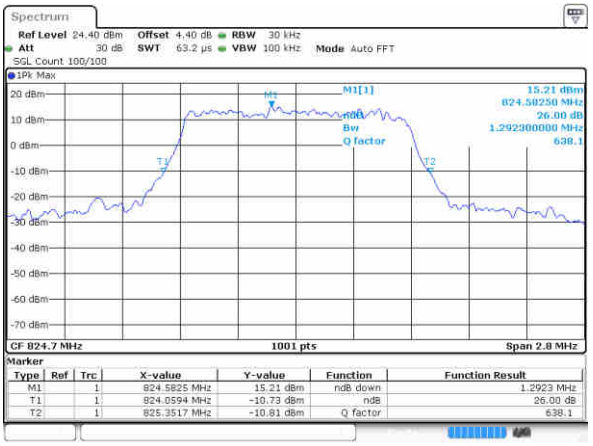


LTE Band 26

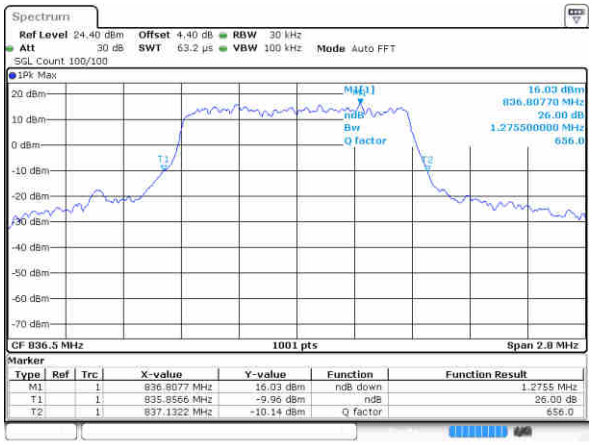
Lowest Channel / 1.4MHz / QPSK



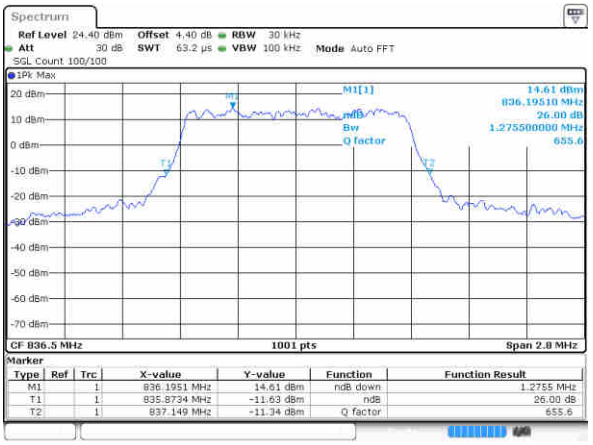
Lowest Channel / 1.4MHz / 16QAM



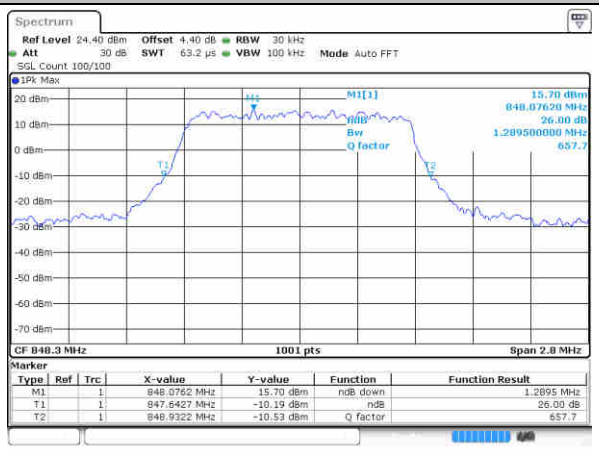
Middle Channel / 1.4MHz / QPSK



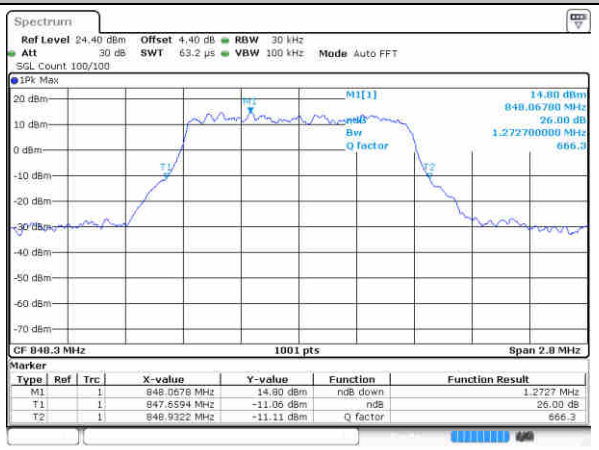
Middle Channel / 1.4MHz / 16QAM



Highest Channel / 1.4MHz / QPSK

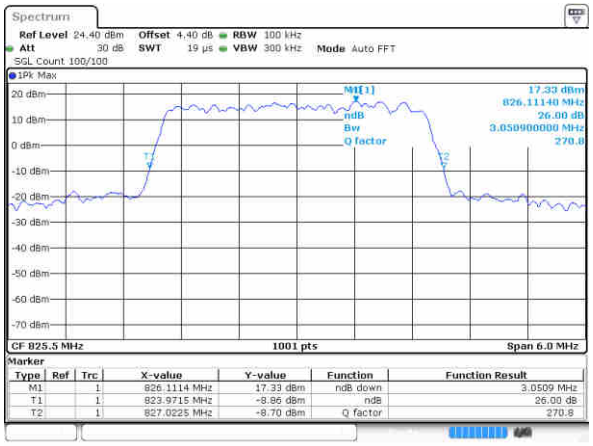


Highest Channel / 1.4MHz / 16QAM

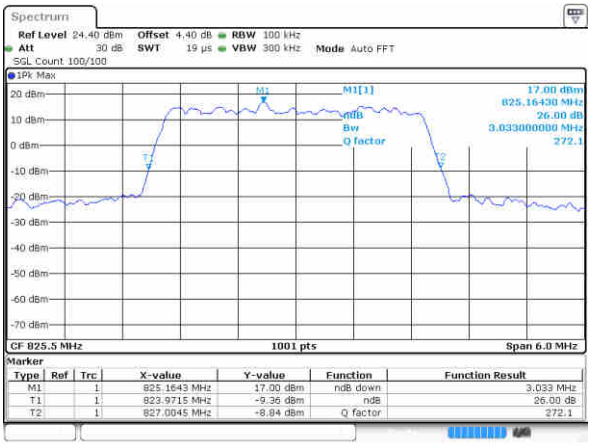


LTE Band 26

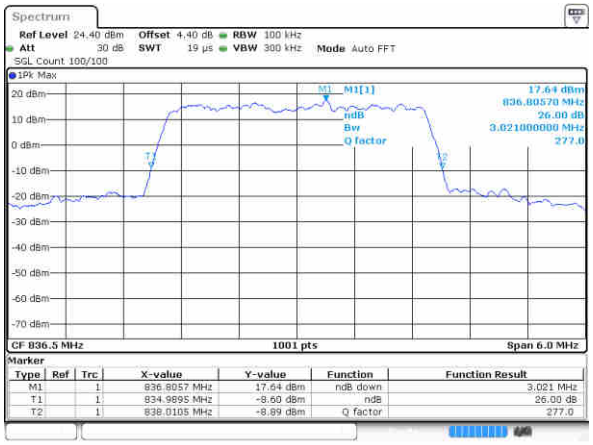
Lowest Channel / 3MHz / QPSK



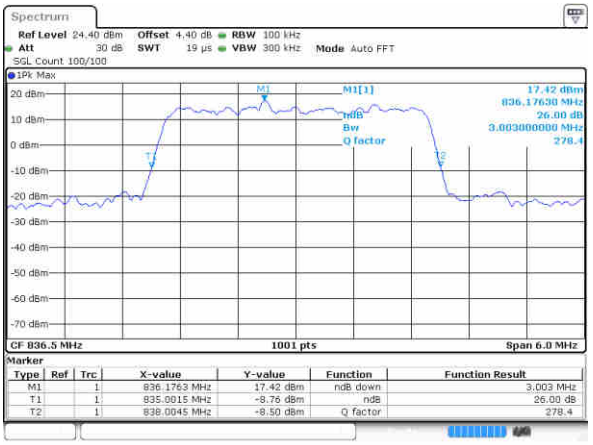
Lowest Channel / 3MHz / 16QAM



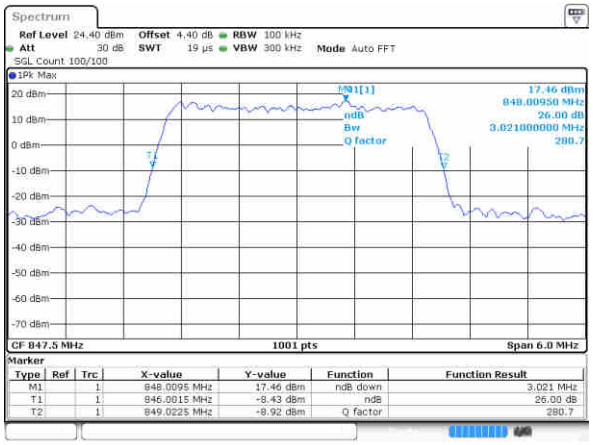
Middle Channel / 3MHz / QPSK



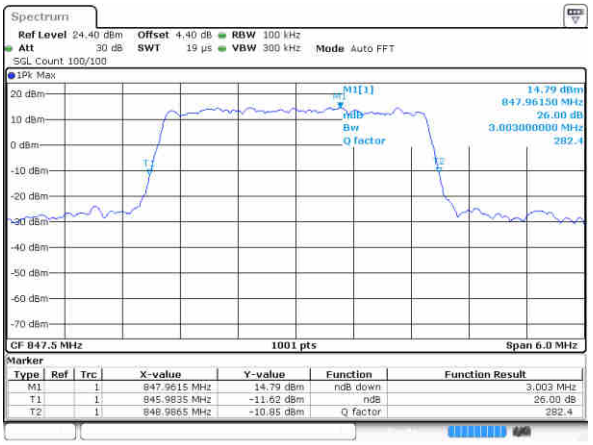
Middle Channel /3MHz / 16QAM



Highest Channel /3MHz / QPSK

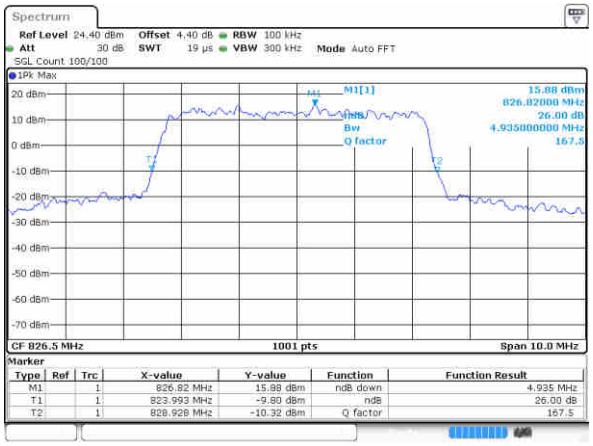


Highest Channel /3MHz / 16QAM

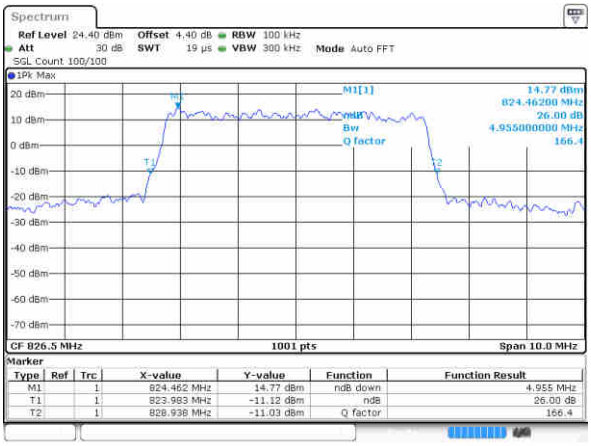


LTE Band 26

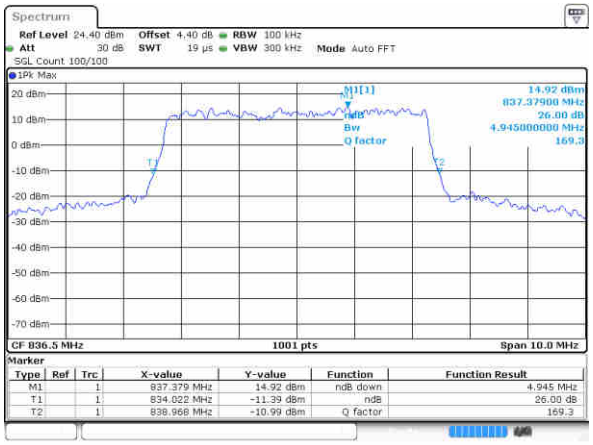
Lowest Channel / 5MHz / QPSK



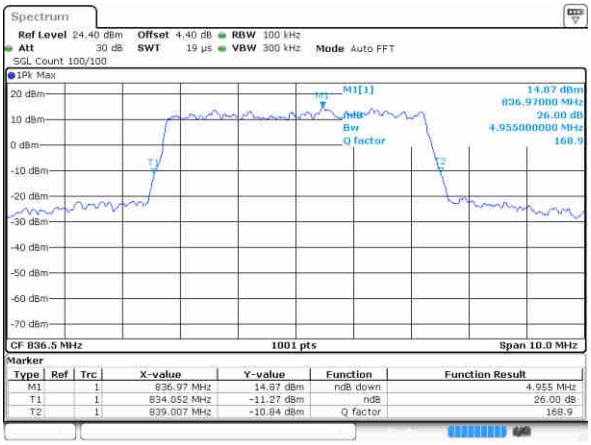
Lowest Channel / 5MHz / 16QAM



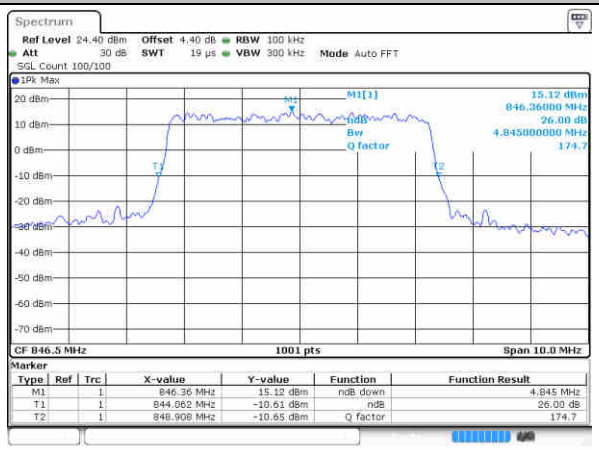
Middle Channel / 5MHz / QPSK



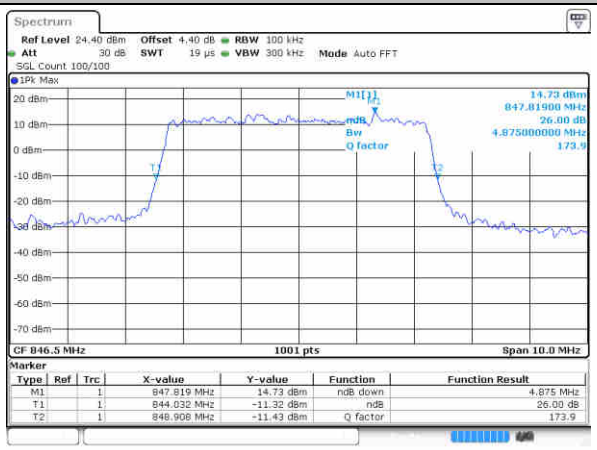
Middle Channel / 5MHz / 16QAM



Highest Channel / 5MHz / QPSK

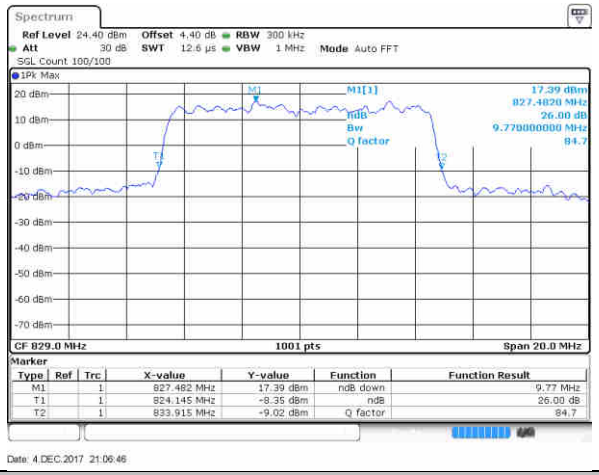


Highest Channel / 5MHz / 16QAM

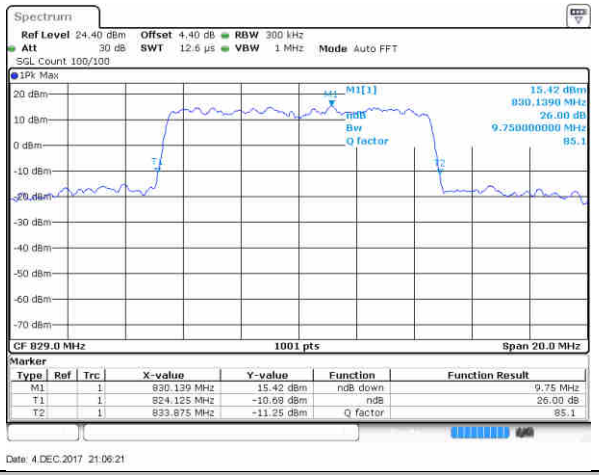


LTE Band 26

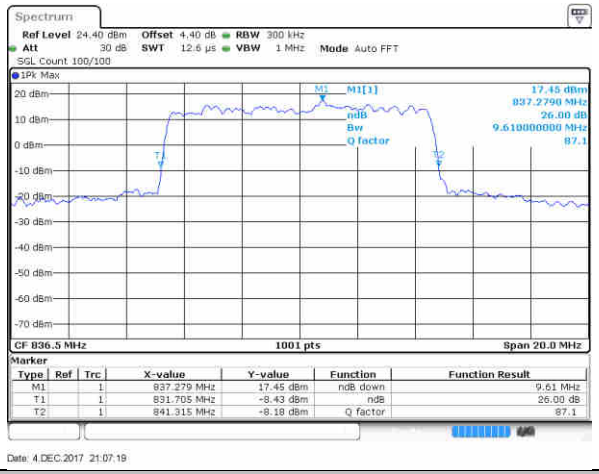
Lowest Channel / 10MHz / QPSK



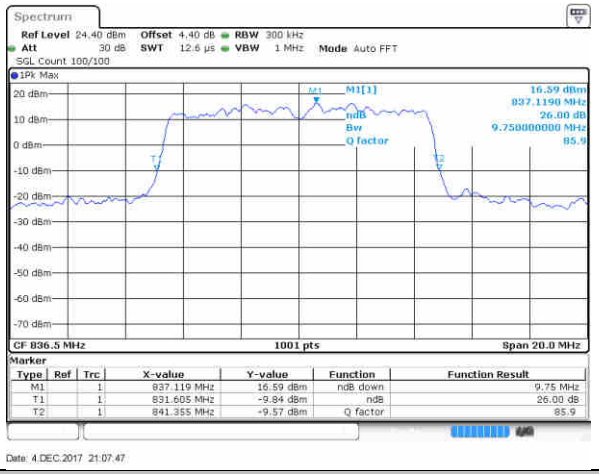
Lowest Channel / 10MHz / 16QAM



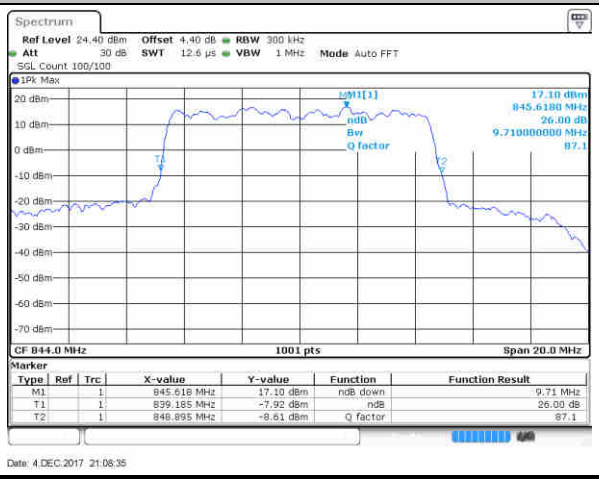
Middle Channel / 10MHz / QPSK



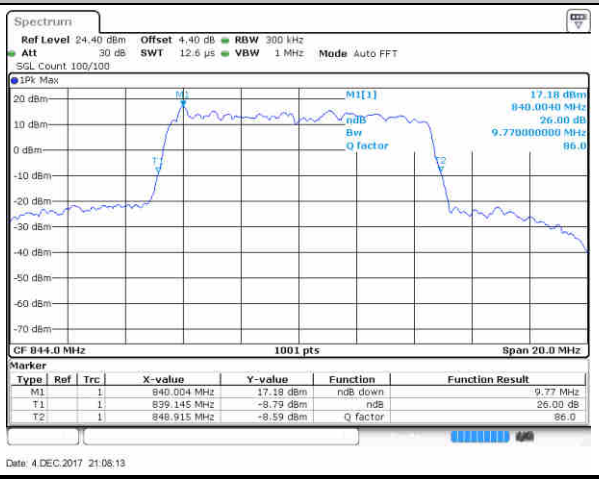
Middle Channel / 10MHz / 16QAM



Highest Channel / 10MHz / QPSK

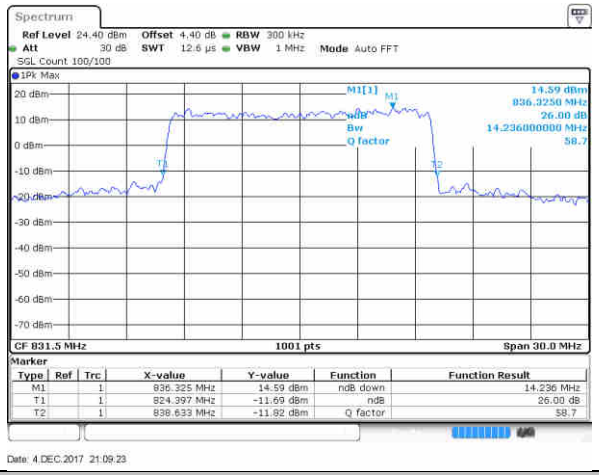


Highest Channel / 10MHz / 16QAM

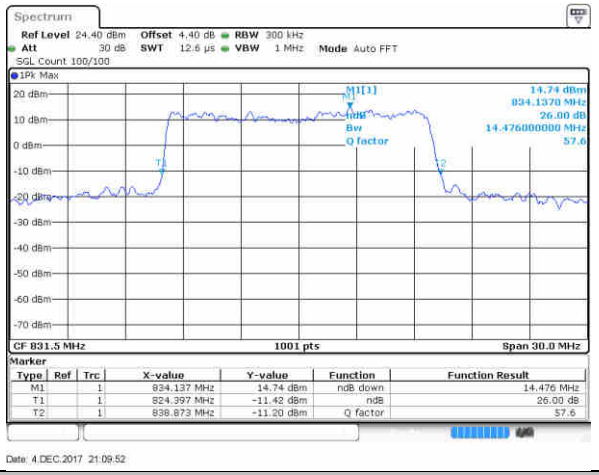


LTE Band 26

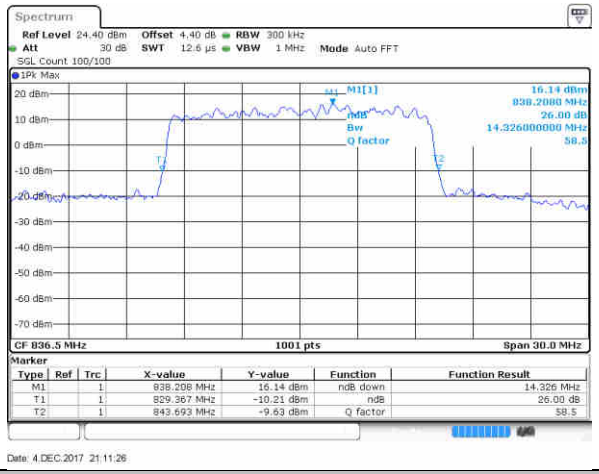
Lowest Channel / 15MHz / QPSK



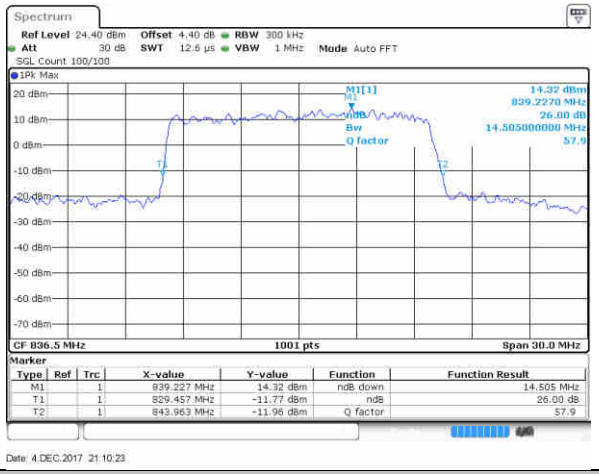
Lowest Channel / 15MHz / 16QAM



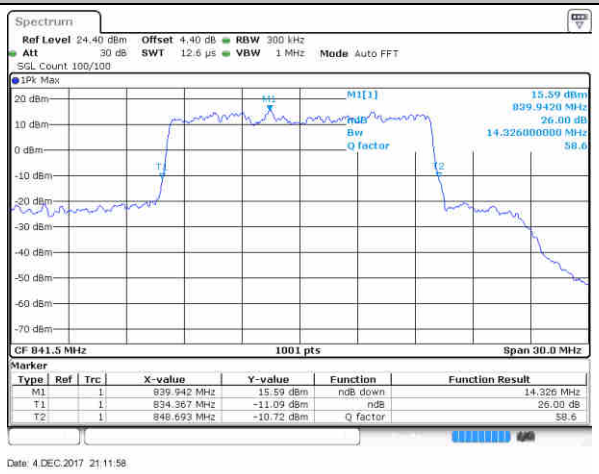
Middle Channel / 15MHz / QPSK



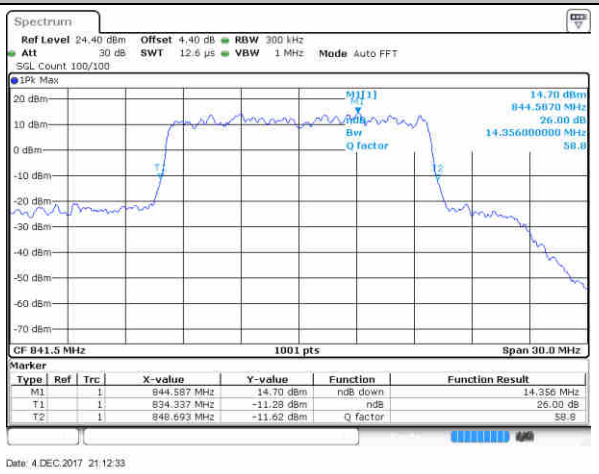
Middle Channel / 15MHz / 16QAM

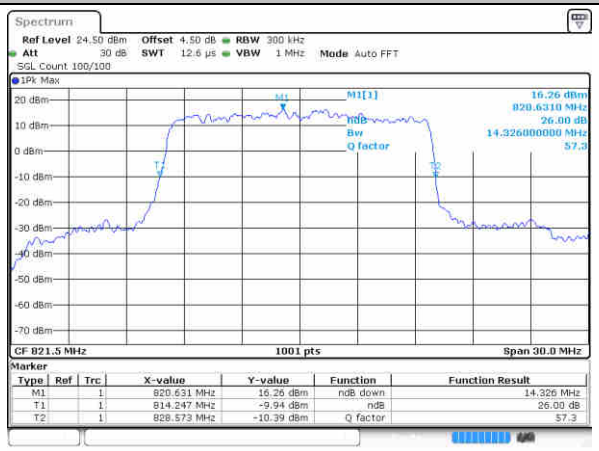
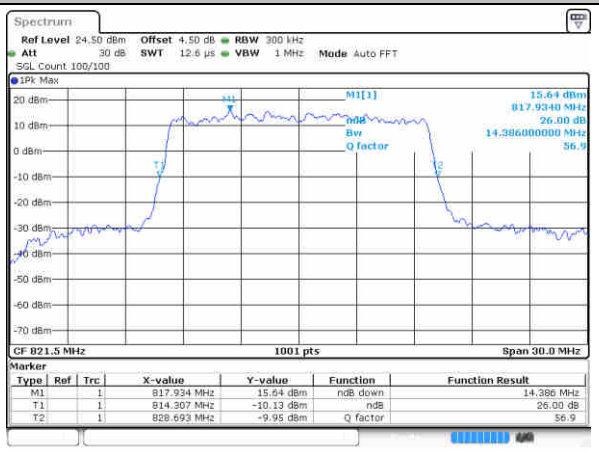


Highest Channel / 15MHz / QPSK



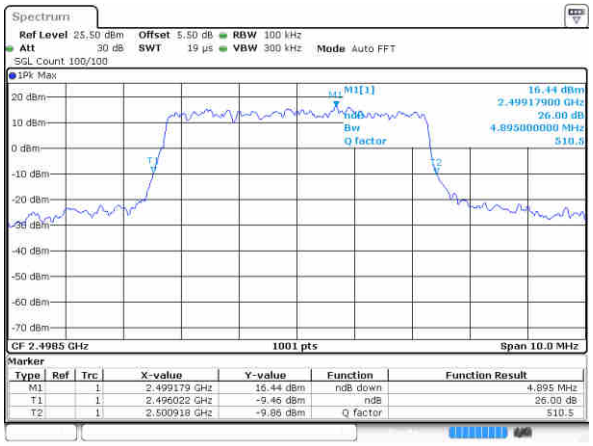
Highest Channel / 15MHz / 16QAM



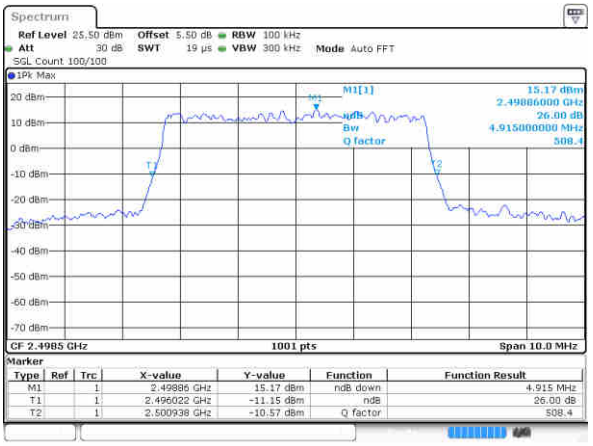
LTE Band 26	
CH26765 / 15MHz / QPSK	CH26765 / 15MHz / 16QAM
	

LTE Band 41

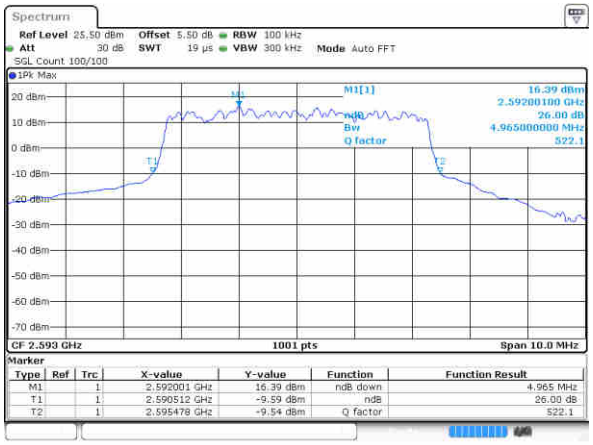
Lowest Channel / 5MHz / QPSK



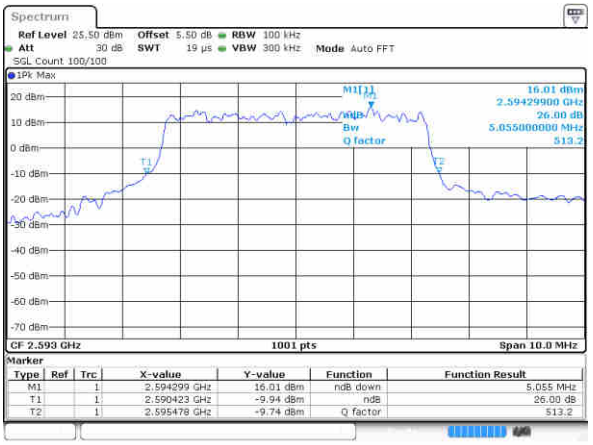
Lowest Channel / 5MHz / 16QAM



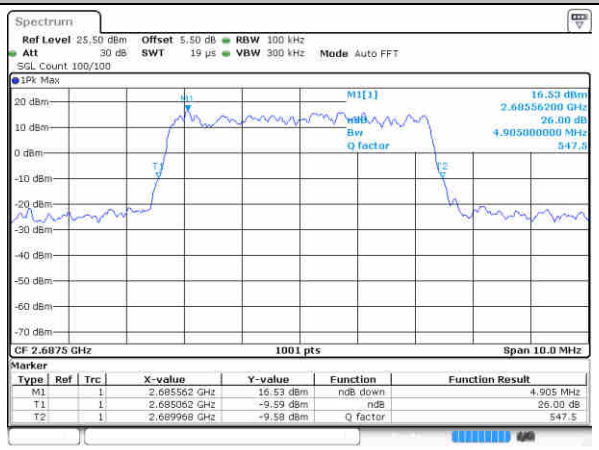
Middle Channel / 5MHz / QPSK



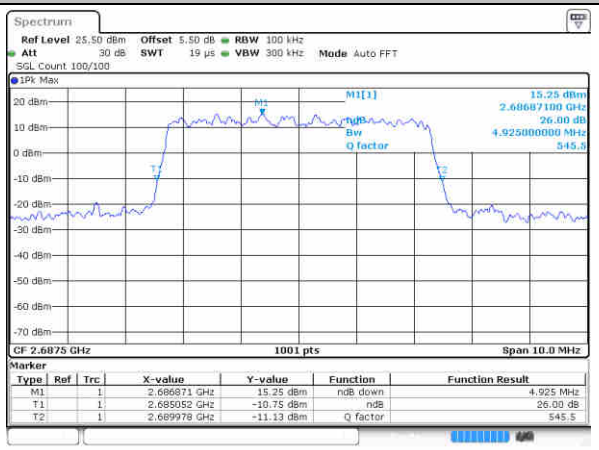
Middle Channel / 5MHz / 16QAM



Highest Channel / 5MHz / QPSK

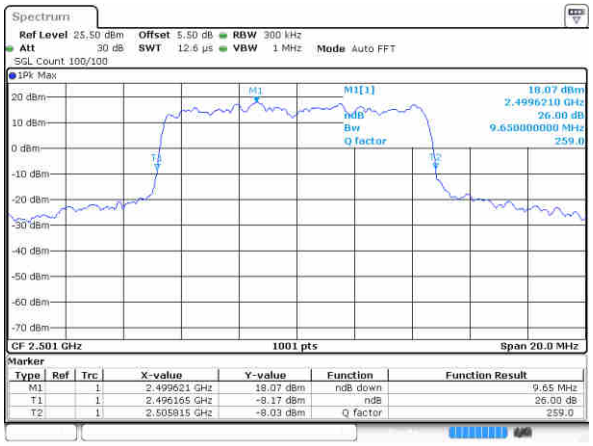


Highest Channel / 5MHz / 16QAM

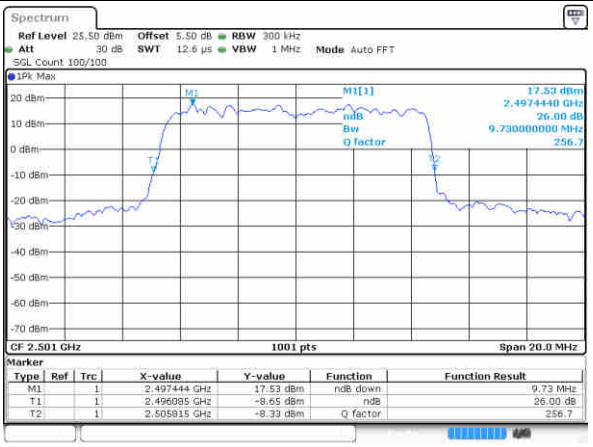


LTE Band 41

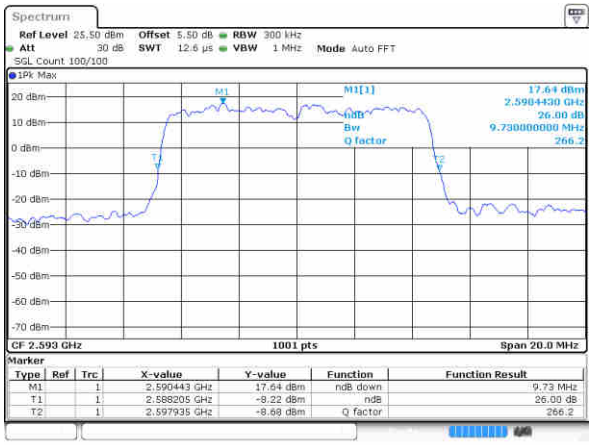
Lowest Channel / 10MHz / QPSK



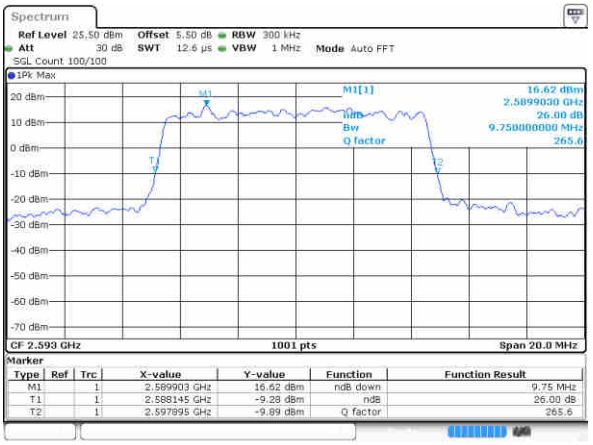
Lowest Channel / 10MHz / 16QAM



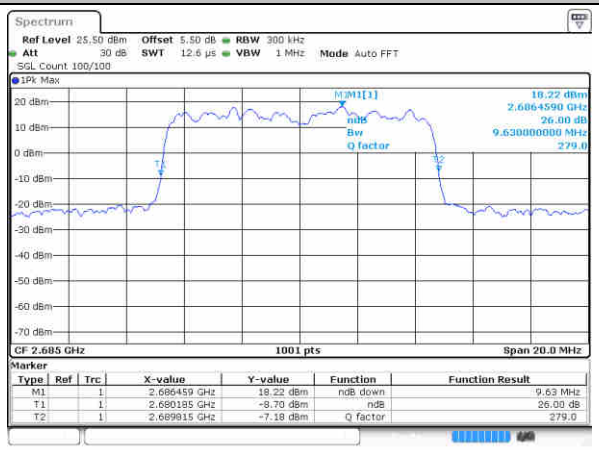
Middle Channel / 10MHz / QPSK



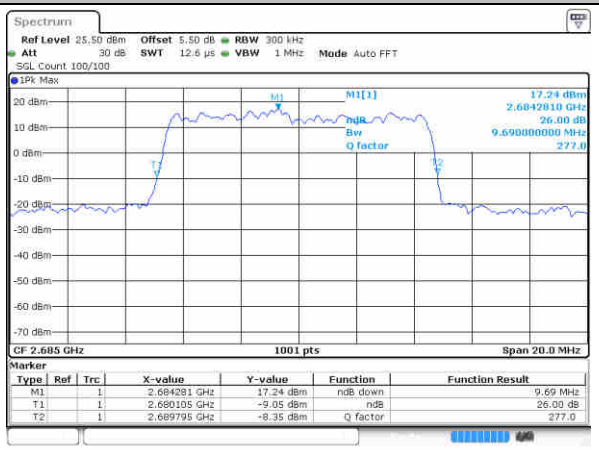
Middle Channel / 10MHz / 16QAM



Highest Channel / 10MHz / QPSK

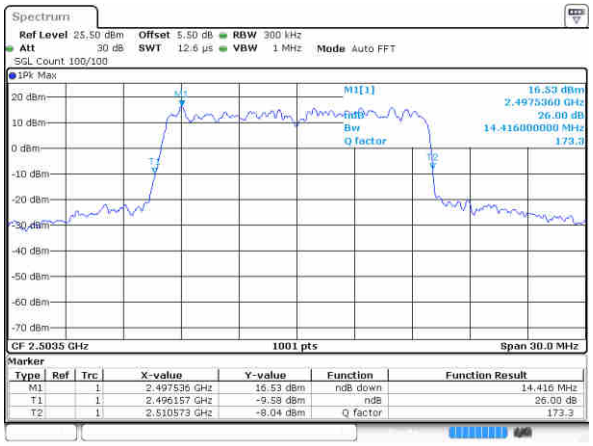


Highest Channel / 10MHz / 16QAM

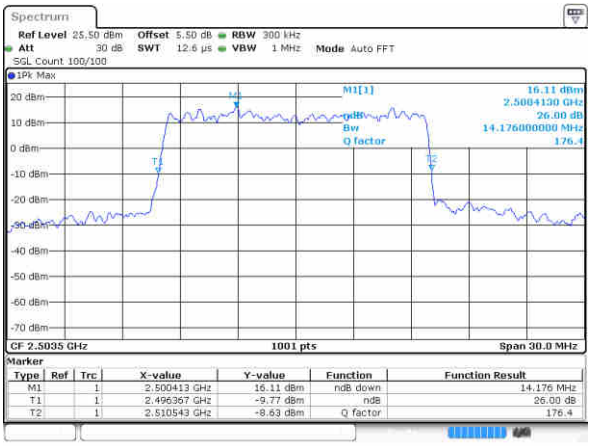


LTE Band 41

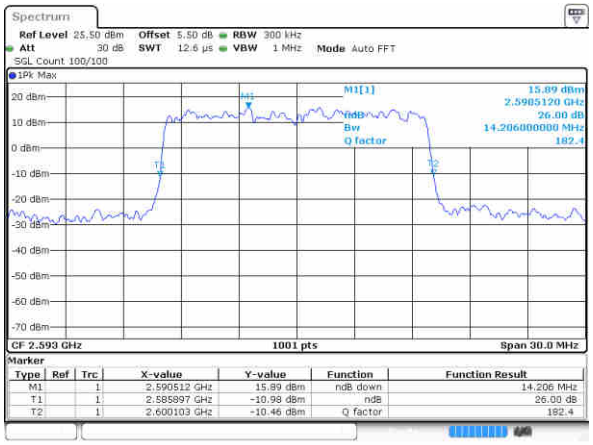
Lowest Channel / 15MHz / QPSK



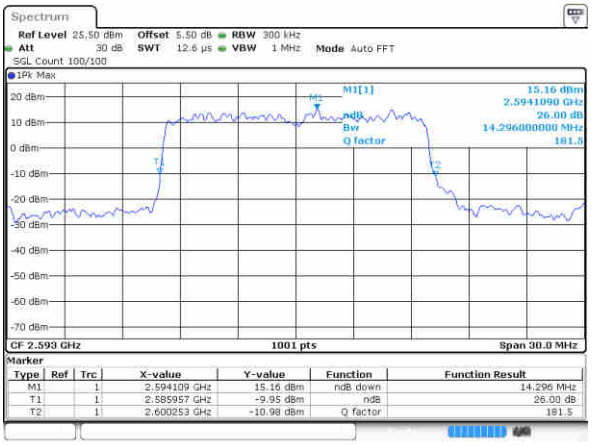
Lowest Channel / 15MHz / 16QAM



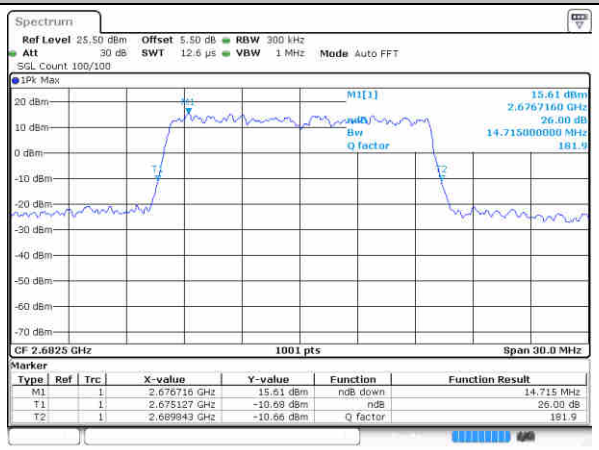
Middle Channel / 15MHz / QPSK



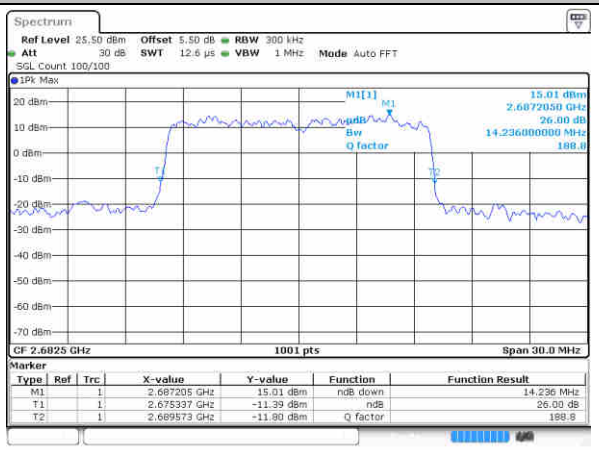
Middle Channel / 15MHz / 16QAM



Highest Channel / 15MHz / QPSK

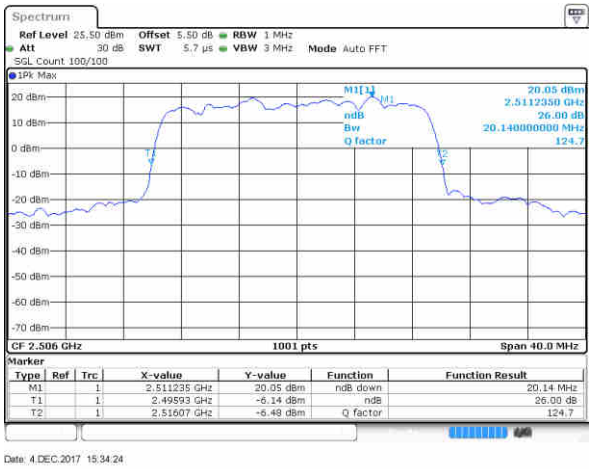


Highest Channel / 15MHz / 16QAM

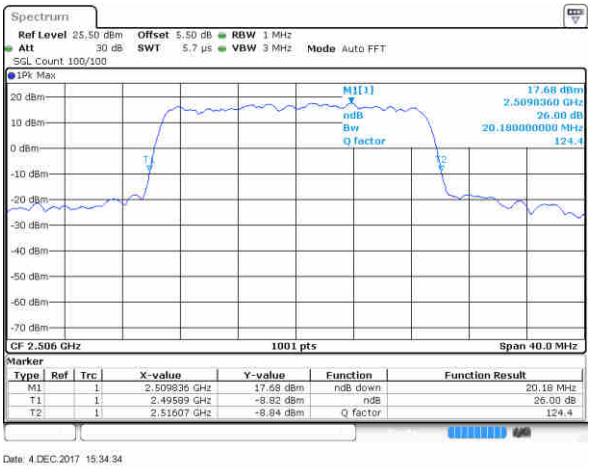


LTE Band 41

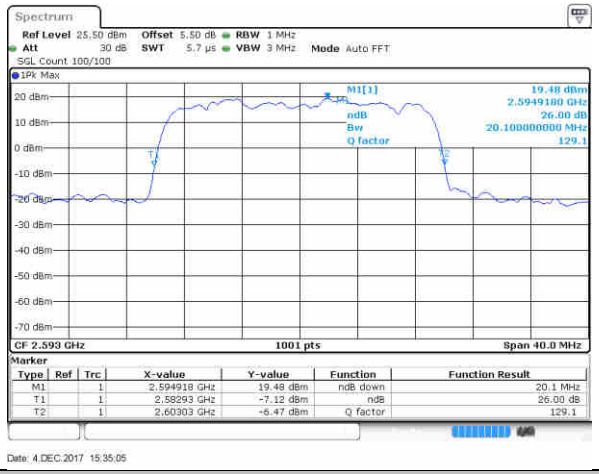
Lowest Channel / 20MHz / QPSK



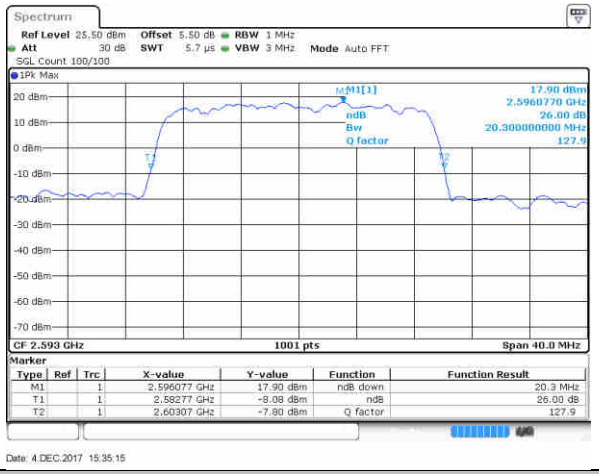
Lowest Channel / 20MHz / 16QAM



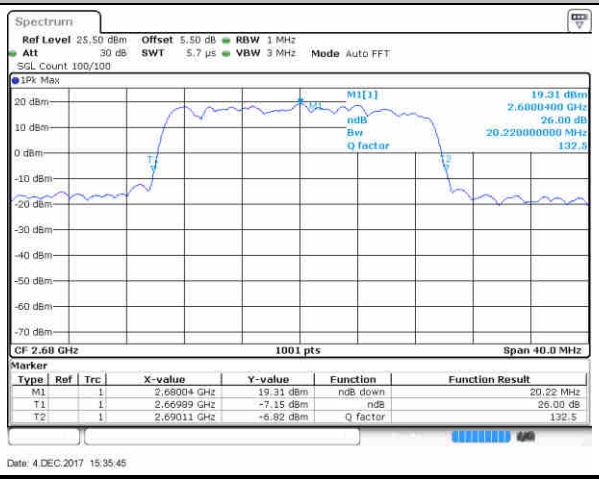
Middle Channel / 20MHz / QPSK



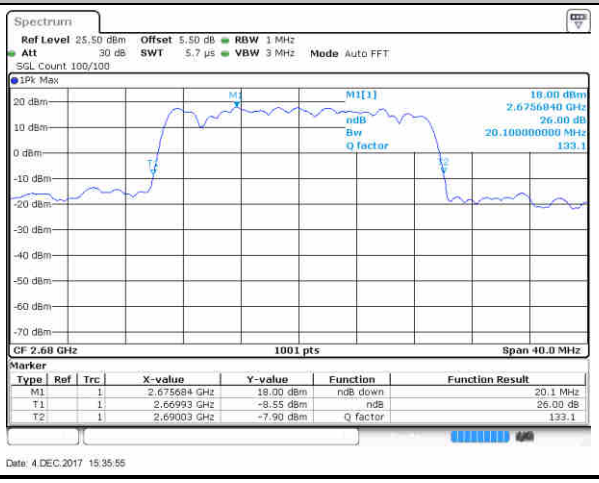
Middle Channel / 20MHz / 16QAM



Highest Channel / 20MHz / QPSK



Highest Channel / 20MHz / 16QAM



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	-	-	-	-	4.51	4.49	-	-	-	-	-	-
Middle CH	-	-	-	-	4.49	4.49	8.99	8.99	-	-	-	-
Highest CH	-	-	-	-	4.49	4.48	-	-	-	-	-	-

Mode	LTE Band 25 : 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	1.09	1.09	2.73	2.72	4.48	4.50	9.07	9.01	13.40	13.40	18.30	18.34
Middle CH	1.09	1.10	2.75	2.73	4.50	4.50	8.95	8.99	13.37	13.37	18.22	18.30
Highest CH	1.10	1.09	2.72	2.73	4.51	4.47	8.99	8.95	13.31	13.40	18.22	18.14

Mode	LTE Band 26 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		CH26765	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	1.10	1.09	2.73	2.71	4.50	4.50	9.07	9.05	13.40	13.46	13.34	13.40
Middle CH	1.09	1.09	2.71	2.74	4.49	4.49	9.03	9.01	13.37	13.37	-	-
Highest CH	1.09	1.09	2.72	2.70	4.48	4.51	9.01	9.01	13.34	13.40	-	-

Mode	LTE Band 41 : 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	-	-	-	-	4.49	4.46	9.03	8.97	13.43	13.43	18.34	18.30
Middle CH	-	-	-	-	4.49	4.49	9.11	8.99	13.46	13.37	18.22	18.22
Highest CH	-	-	-	-	4.50	4.51	9.03	8.99	13.46	13.37	18.50	18.22