FCC RF Test Report

APPLICANT	: Nokia Shanghai Bell Co., Ltd.
EQUIPMENT	: FastMile 4G Receiver
BRAND NAME	: NOKIA
MODEL NAME	: 4G05-A
FCC ID	: 2ADZR4G05A
STANDARD	: 47 CFR Part 2, 27(M)
CLASSIFICATION	: Licensed Non-Broadcast Station Transmitter (TNB)

The product was received on Jul. 10, 2019 and completely tested on Jul. 30, 2019. 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

Sporton International (Kunshan) Inc.
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG951001	Rev. 01	Initial issue of report	Sep. 06, 2019

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§27.50(h)(2)	Conducted Output Power	< 2Watt	PASS	-
3.5	N/A	Peak-to-Average Ratio	<13 dB	PASS	-
3.6	§2.1049	Occupied Bandwidth	Reporting Only	PASS	-
3.7	§27.53(m)(2)	Conducted Band Edge Measurement (Band 41)	< $43+10\log_{10}$(P[Watts])	PASS	-
3.8	§2.1051 §27.53(m)(2)	Conducted Spurious Emission (Band 41)	< $43+10\log_{10}$(P[Watts])	PASS	-
3.9	§2.1055 §27.54	Frequency Stability Temperature & Voltage	Within Authorized Band	PASS	-
4.4	§2.1053 §27.53(m)(2)	Radiated Spurious Emission (Band 41)	< $43+10\log_{10}$(P[Watts])	PASS	Under limit 26.46 dB at 5172.000 MHz

1 General Description

1.1 Applicant

Nokia Shanghai Bell Co., Ltd.
388#, Ningqiao Road, China (Shanghai) Pilot Free Trade Zone, Shanghai 201206, China

1.2 Manufacturer

Nokia Shanghai Bell Co., Ltd.
388#, Ningqiao Road, China (Shanghai) Pilot Free Trade Zone, Shanghai 201206, China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	FastMile 4G Receiver
Brand Name	NOKIA
Model Name	4G05-A
FCC ID	2ADZR4G05A
EUT supports Radios application	LTE, Bluetooth
HW Version	3TG00171AA
SW Version	FMR2003 E0115
EUT Stage	Identical Prototype

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	LTE Band 41 : 2498.5 MHz ~ 2687.5 MHz
Rx Frequency	LTE Band 41 : 2498.5 MHz ~ 2687.5 MHz
Bandwidth	LTE Band 41 : 5MHz / 10MHz / 15MHz / 20MHz
Maximum Output Power to Antenna	LTE Band 41 : 22.42 dBm
Antenna Gain	LTE Band 41 : 11.00 dBi
Type of Modulation	QPSK/16QAM/64QAM

Remark：This product is a fixed station

1.5 Modification of EUT

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

1.6 Maximum Conducted Power, Frequency Tolerance, and Emission Designator

LTE Band 41		QPSK			16QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum Conduced Power(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum Conduced Power (W)
5	2498.5 ~ 2687.5	4M54G7D	-	0.1629	4M52W7D	-	0.1611
10	2501.0 ~ 2685.0	9M07G7D	0.0022	0.1648	9M07W7D	-	0.1600
15	2503.5 ~ 2682.5	13M6G7D	-	0.1734	13M5W7D	-	0.1718
20	2506.0 ~ 2680.0	18M5G7D	-	0.1734	18M6W7D	-	0.1738

LTE Band 41		64QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum Conduced Power (W)
5	2498.5 ~ 2687.5	4M55W7D	-	0.1592
10	2501.0 ~ 2685.0	9M11W7D	-	0.1746
15	2503.5 ~ 2682.5	13M5W7D	-	0.1710
20	2506.0 ~ 2680.0	18M7W7D	-	0.1734

1.7 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

1.8 Applicable Standards

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

- 47 CFR Part 2, 27(M)
- 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

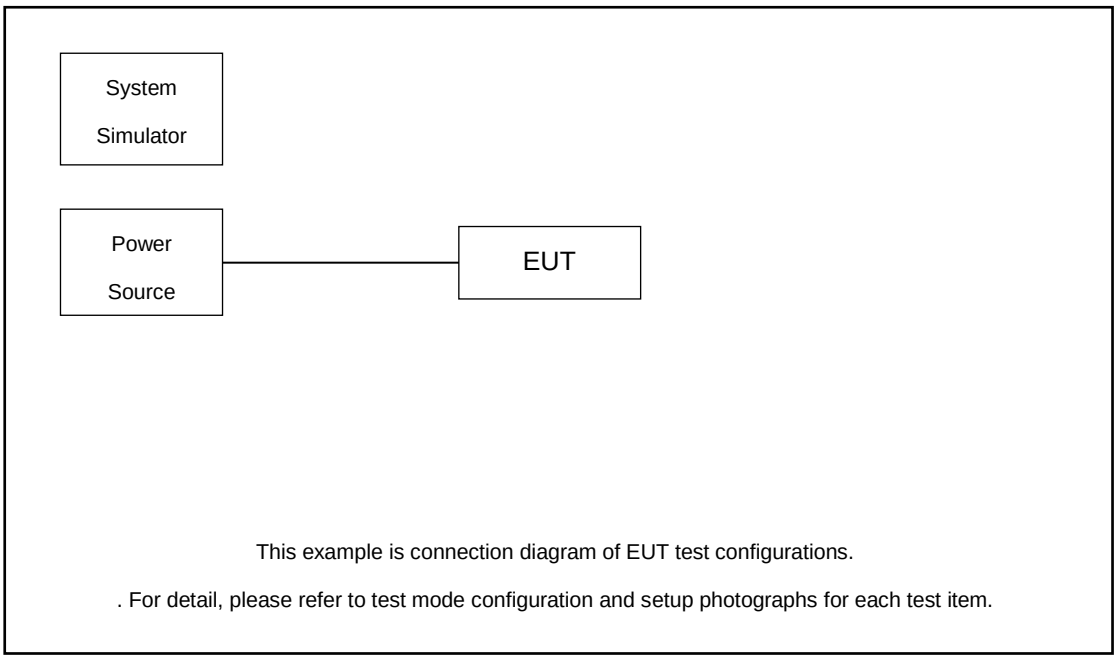
2.1 Test Mode

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	41	-	-	v	v	v	v	v	v	v	v	v	v	v	v	v
Peak-to-Average Ratio	41	-	-				v	v	v	v	v		v	v	v	v
26dB and 99% Bandwidth	41	-	-	v	v	v	v	v	v	v			v	v	v	v
Conducted Band Edge	41	-	-	v	v	v	v	v	v	v	v		v	v		v
Conducted Spurious Emission	41	-	-	v	v	v	v	v	v	v	v			v	v	v
Frequency Stability	41	-	-		v			v					v		v	
Radiated Spurious Emission	41	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.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	GW INSTEK	GPS-3030D	N/A	N/A	Unshielded, 1.8 m

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 8.22 dB.

Example :

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

= 8.22 (dB)

2.5 Frequency List of Low/Middle/High Channels

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

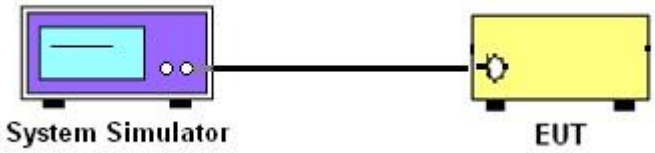
3 Conducted Test Items

3.1 Measuring Instruments

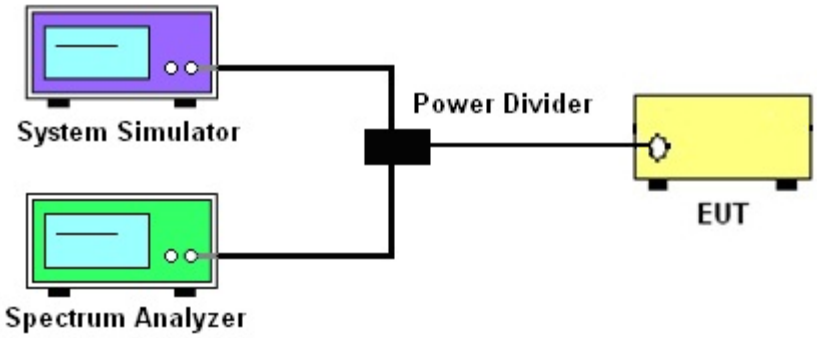
See list of measuring instruments of this test report.

3.2 Test Setup

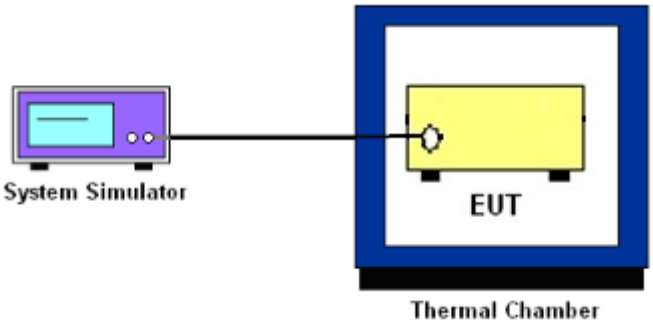
3.2.1 Conducted Output Power



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

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

Engineer test tool was used to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power

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

For all fixed digital user stations, the attenuation factor shall be not less than 43 + 10 log (P) dB at the channel edge.

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 10^{th} 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 sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

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.

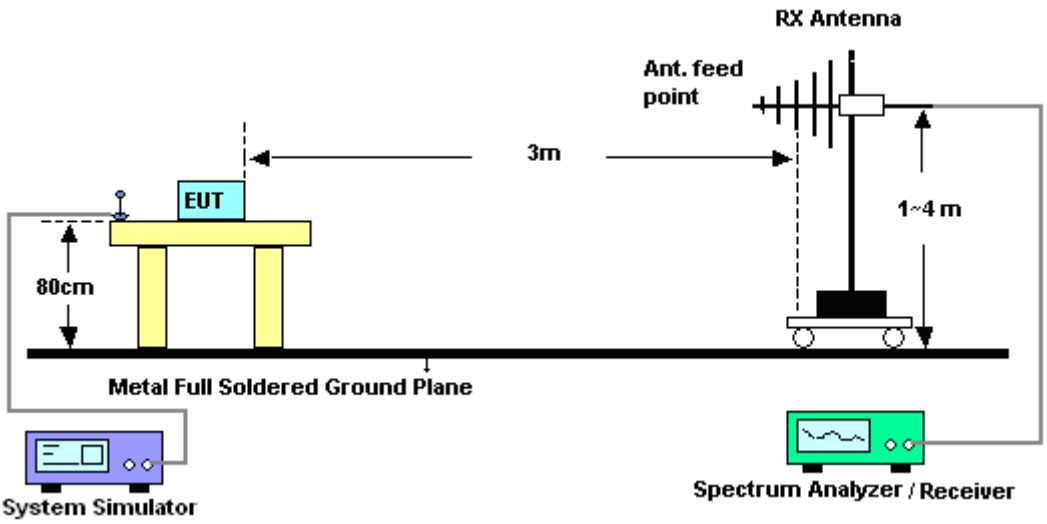
4 Radiated Test Items

4.1 Measuring Instruments

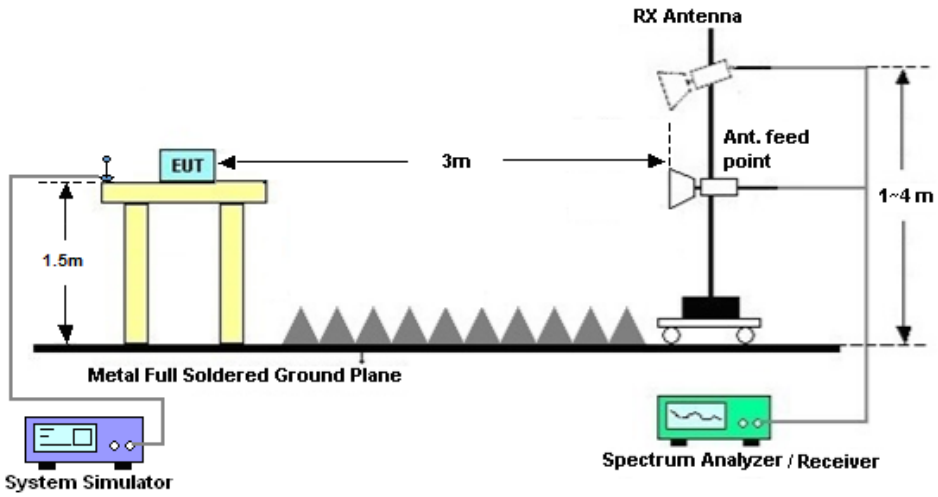
See list of measuring instruments of this test report.

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.

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, 2018	Jul. 18, 2019~ Jul. 30, 2019	Aug. 06, 2019	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Nov. 19, 2018	Jul. 18, 2019~ Jul. 30, 2019	Nov. 18, 2019	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz-44G,MAX 30dB	Apr.16, 2019	Jul. 17, 2019	Apr. 15, 2020	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	44483	30MHz-1GHz	Dec. 28, 2018	Jul. 17, 2019	Dec. 27, 2019	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1648	1GHz~18GHz	Jan. 27, 2019	Jul. 17, 2019	Jan. 26, 2020	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2019	Jul. 17, 2019	Jan. 04, 2020	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Aug. 06, 2018	Jul. 17, 2019	Aug. 05, 2019	Radiation (03CH04-KS)
Amplifier	MITEQ	TTA1840-35-HG	2014749	18~40GHz	Jan. 14, 2019	Jul. 17, 2019	Jan. 13, 2020	Radiation (03CH04-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	1Ghz-18Ghz	Aug. 16, 2018	Jul. 17, 2019	Aug.15, 2019	Radiation (03CH04-KS)
Amplifier	Keysight	83017A	MY53270319	500MHz~26.5GHz	Oct. 12, 2018	Jul. 17, 2019	Oct. 11, 2019	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Jul. 17, 2019	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Jul. 17, 2019	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Jul. 17, 2019	NCR	Radiation (03CH04-KS)

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

A.1 SISO Antenna 1

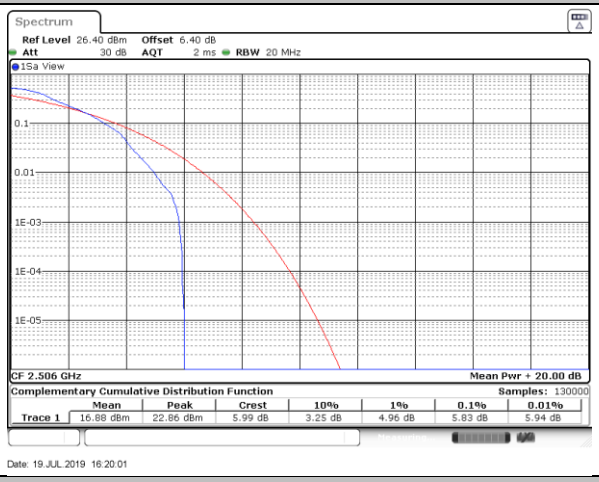
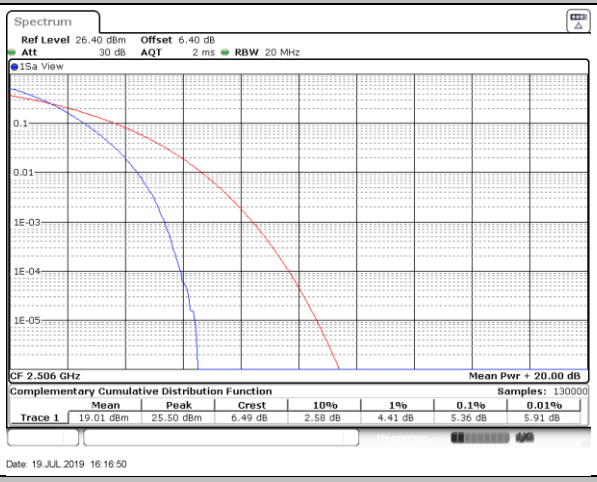
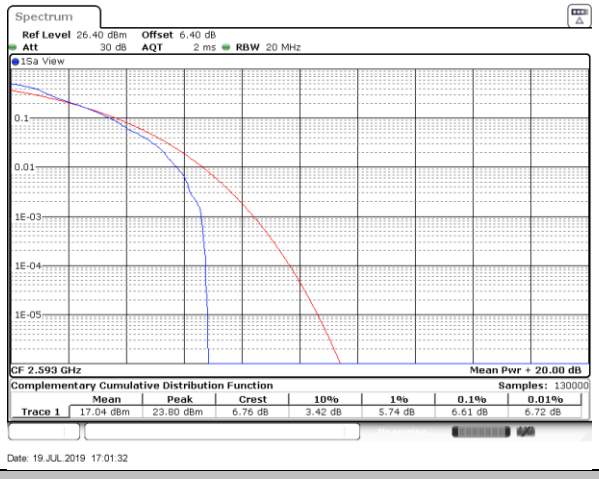
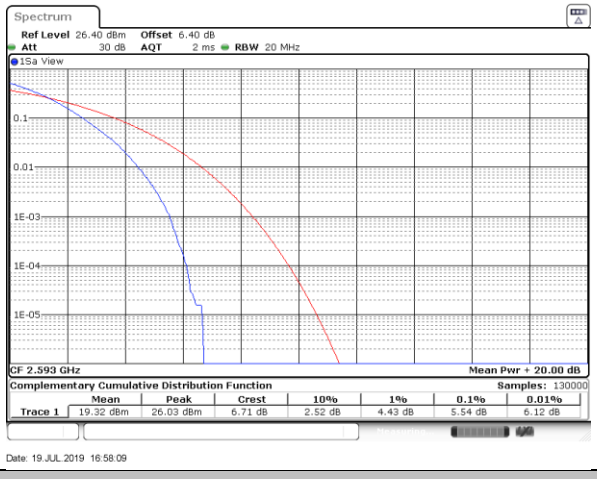
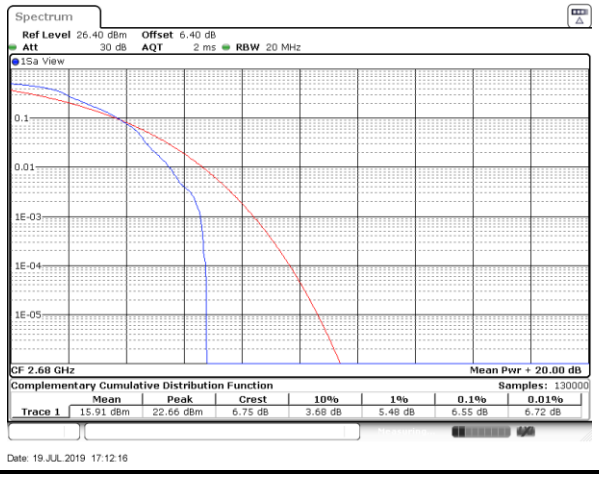
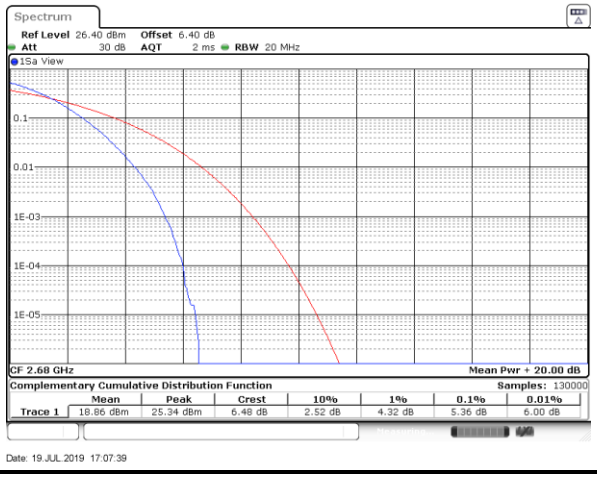
A.1.1 Conducted Output Power(Average power)

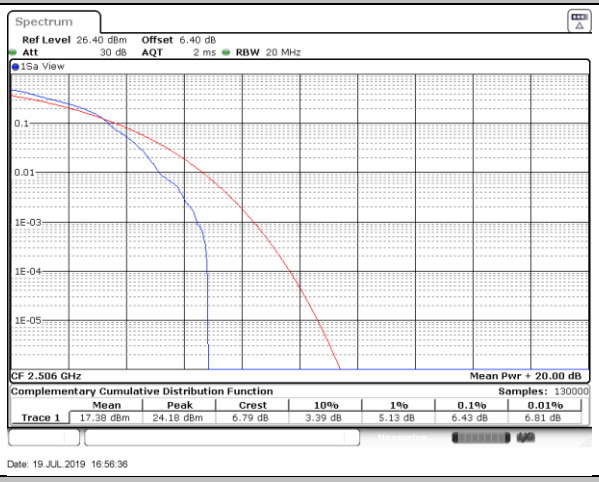
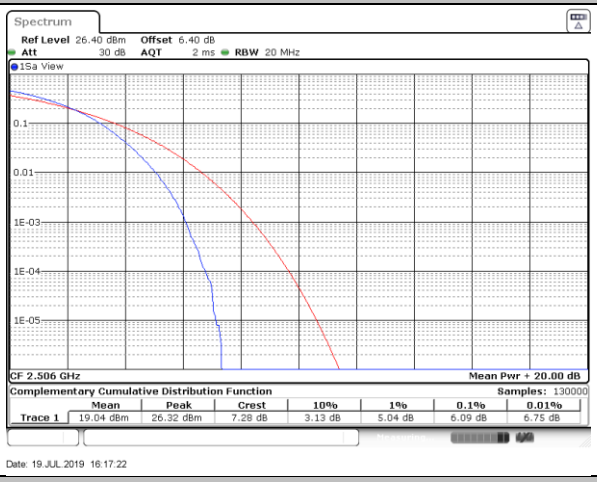
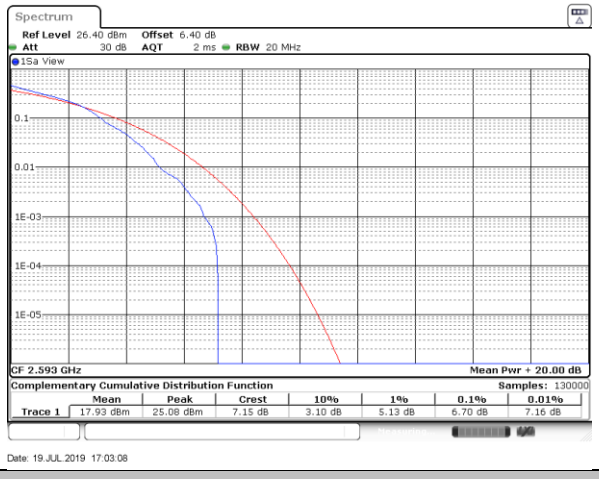
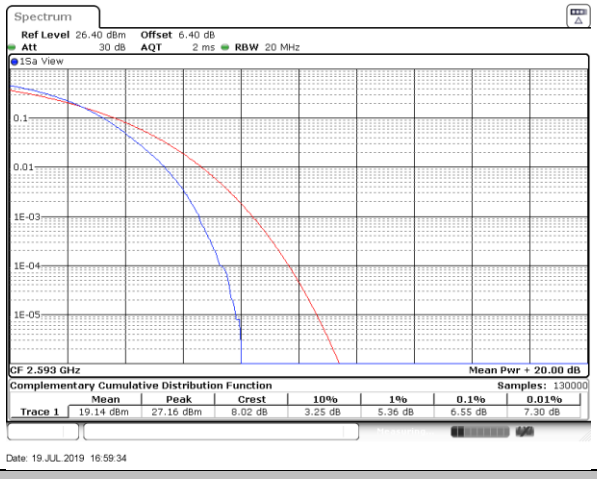
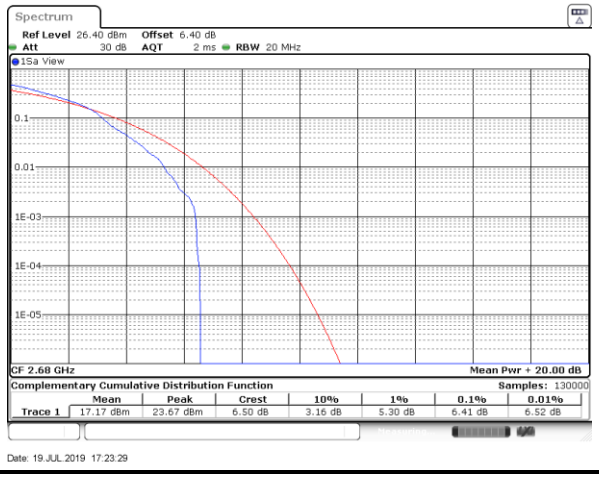
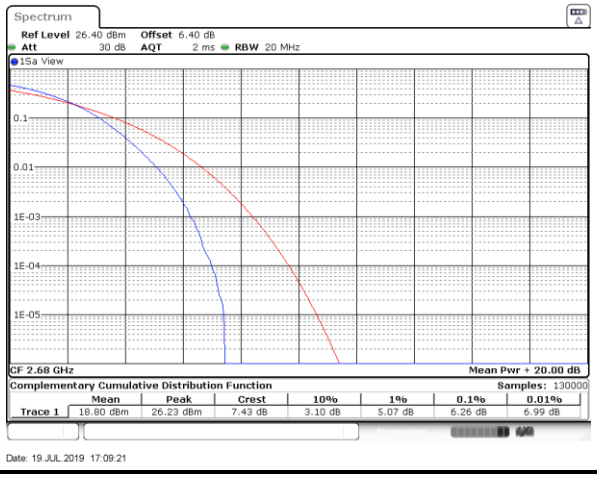
LTE Band 41 Maximum Average Power [dBm]							Limit [dBm]	Test Result
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest		
20	1	0	QPSK	20.26	20.09	19.91	33.01	Pass
20	1	99		19.81	20.21	19.92		
20	18	0		19.73	19.66	19.54		
20	18	82		19.53	19.97	19.63		
20	100	0		19.55	19.68	19.52		
20	1	0	16-QAM	19.99	19.89	19.69		
20	1	99		19.61	20.15	19.74		
20	18	0		19.69	19.70	19.49		
20	18	82		19.54	19.97	19.61		
20	100	0		19.55	19.66	19.62		
20	1	0	64-QAM	20.27	20.13	19.95		
20	1	99		19.88	20.28	20.09		
20	18	0		19.68	19.67	19.50		
20	18	82		19.59	19.94	19.61		
20	100	0		19.56	19.62	19.49		
15	1	0	QPSK	19.97	19.68	19.67		
15	1	74		19.48	19.92	19.73		
15	16	0		19.25	18.98	19.01		
15	16	59		19.35	19.53	19.43		
15	75	0		19.33	19.23	19.32		
15	1	0	16-QAM	19.79	19.41	19.44		
15	1	74		19.45	19.74	19.55		
15	16	0		19.27	19.08	18.98		
15	16	59		19.33	19.56	19.42		
15	75	0		19.31	19.34	19.31		
15	1	0	64-QAM	20.04	19.68	19.71		
15	1	74		19.56	20.03	19.83		
15	16	0		19.25	18.99	19.03		
15	16	59		19.37	19.61	19.46		
15	75	0		19.29	19.22	19.29		

LTE Band 41 Maximum Average Power [dBm]							Limit [dBm]	Test Result
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest		
10	1	0	QPSK	20.16	19.78	19.79	33.01	Pass
10	1	49		19.81	20.01	19.91		
10	12	0		19.89	19.51	19.52		
10	12	38		19.62	19.80	19.63		
10	50	0		19.68	19.44	19.56		
10	1	0	16-QAM	19.99	19.53	19.63		
10	1	49		19.62	19.82	19.72		
10	12	0		19.87	19.53	19.49		
10	12	38		19.63	19.83	19.61		
10	50	0		19.79	19.46	19.55		
10	1	0	64-QAM	20.24	19.79	19.76		
10	1	49		19.89	20.07	19.96		
10	12	0		19.87	19.54	19.61		
10	12	38		19.66	19.84	19.65		
10	50	0		19.63	19.45	19.54		
5	1	0	QPSK	19.87	19.54	19.57		
5	1	24		19.29	19.38	19.45		
5	8	0		20.11	19.82	19.86		
5	8	17		19.36	19.37	19.49		
5	25	0		19.49	19.39	19.43		
5	1	0	16-QAM	19.78	19.23	19.36		
5	1	24		19.21	19.17	19.25		
5	8	0		20.09	19.83	19.81		
5	8	17		19.35	19.36	19.48		
5	25	0		19.46	19.40	19.37		
5	1	0	64-QAM	19.92	19.52	19.62		
5	1	24		19.41	19.43	19.56		
5	8	0		20.16	19.79	19.82		
5	8	17		19.34	19.32	19.48		
5	25	0		19.47	19.37	19.41		

A.1.2 Peak-to-Average Ratio

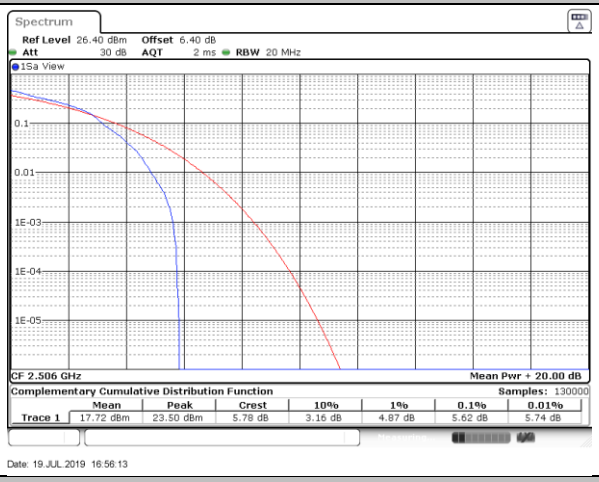
Mode	LTE Band 41 / 20MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	Full RB	Result
Lowest CH	5.83	5.36	6.43	6.09	PASS
Middle CH	6.61	5.54	6.70	6.55	
Highest CH	6.55	5.36	6.41	6.26	
Mod.	64QAM				Limit: 13dB
RB Size	1RB	Full RB	1RB	Full RB	Result
Lowest CH	5.62	6.58			PASS
Middle CH	6.14	6.96			
Highest CH	5.88	6.75			

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**
	

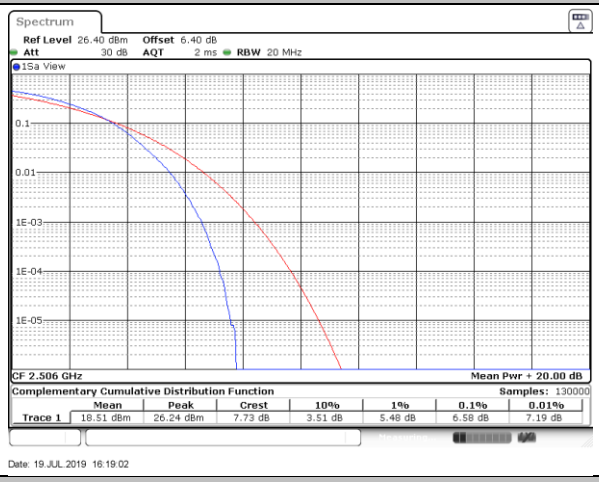
LTE Band 41 / 20MHz / 16QAM	
Lowest Channel / 1RB	**Lowest Channel / Full RB**
	
Middle Channel / 1RB	**Middle Channel / Full RB**
	
Highest Channel / 1RB	**Highest Channel / Full RB**
	

LTE Band 41 / 20MHz / 64QAM

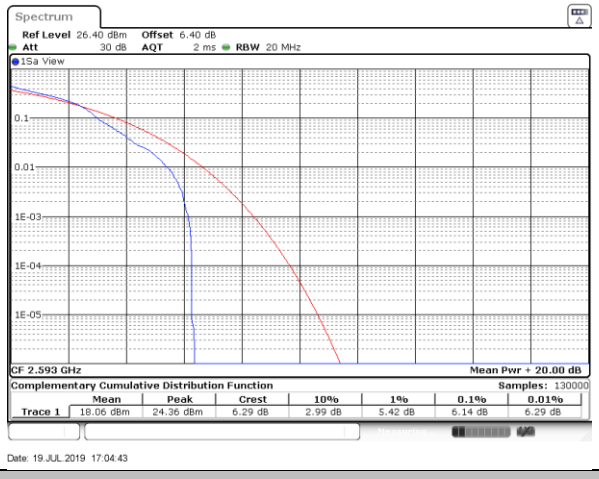
Lowest Channel / 1RB



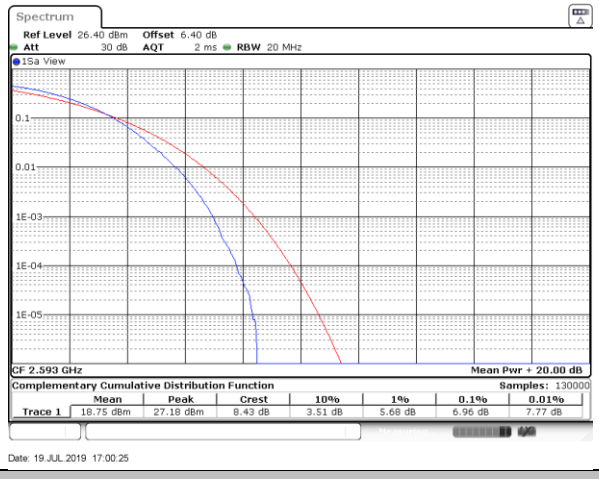
Lowest Channel / Full RB



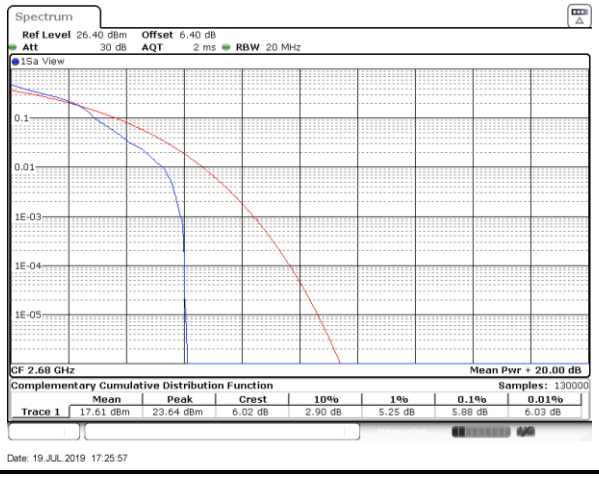
Middle Channel / 1RB



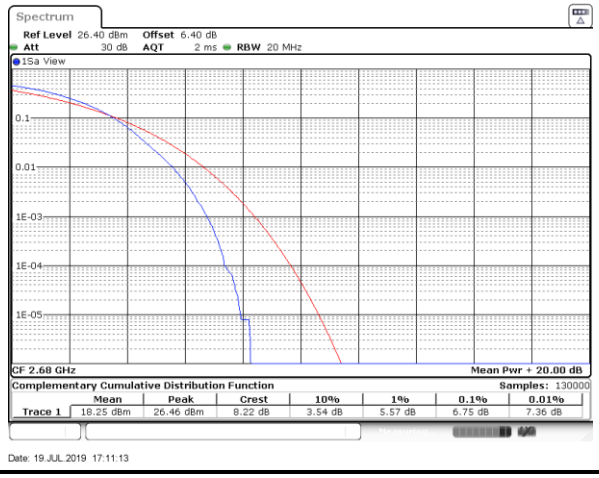
Middle Channel / Full RB



Highest Channel / 1RB



Highest Channel / Full RB

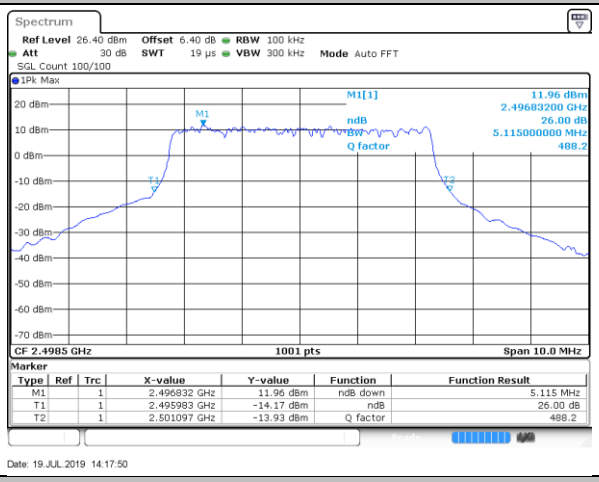


A.1.3 26dB Bandwidth

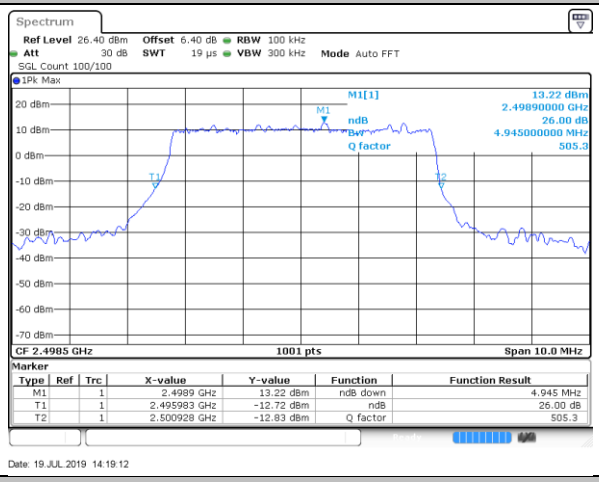
Mode	LTE Band 41 : 26dB BW(MHz)											
BW	5MHz		10MHz		15MHz		20MHz		5MHz	10MHz	15MHz	20MHz
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	64QAM	64QAM	64QAM	64QAM
Lowest CH	5.12	4.95	9.71	9.77	14.18	14.42	20.14	20.22	5.28	9.89	14.15	20.22
Middle CH	5.14	4.74	9.89	9.65	14.12	14.18	20.14	20.14	5.06	9.91	14.18	20.10
Highest CH	5.10	4.99	9.79	9.99	14.15	14.12	20.10	20.06	5.30	9.91	14.42	20.22

LTE Band 41

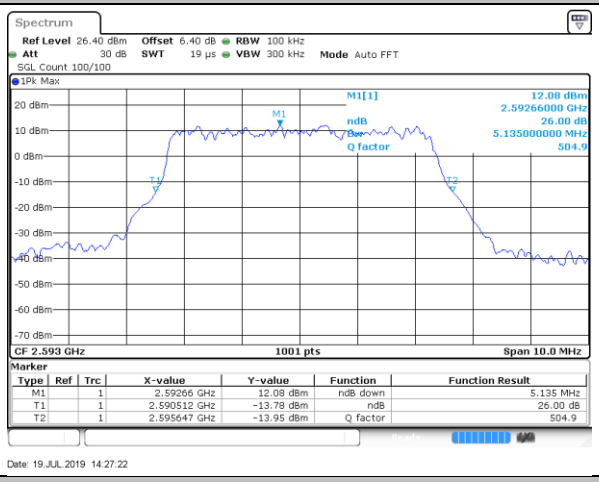
Lowest Channel / 5MHz / QPSK



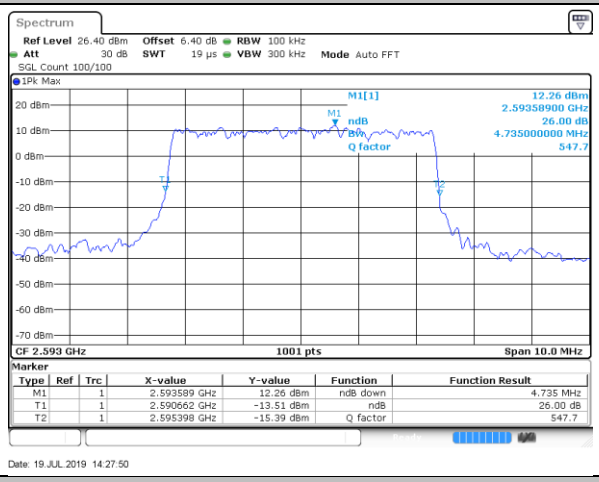
Lowest Channel / 5MHz / 16QAM



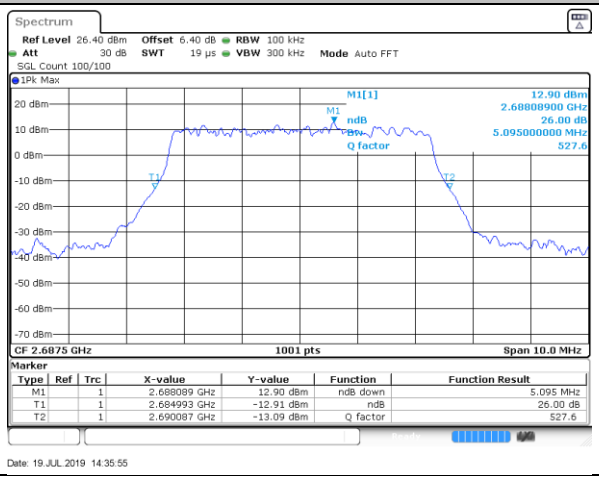
Middle Channel / 5MHz / QPSK



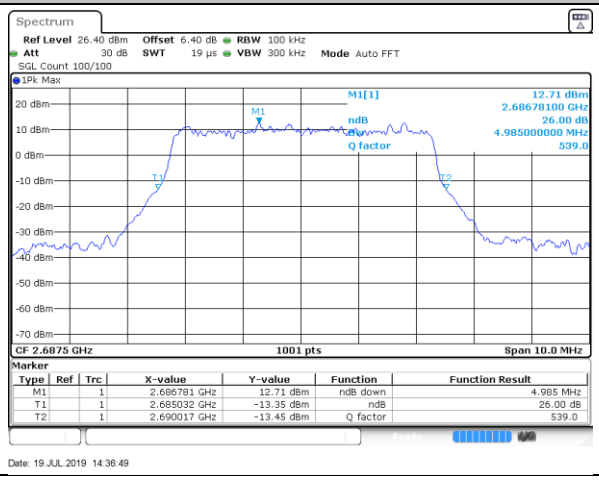
Middle Channel / 5MHz / 16QAM



Highest Channel / 5MHz / QPSK

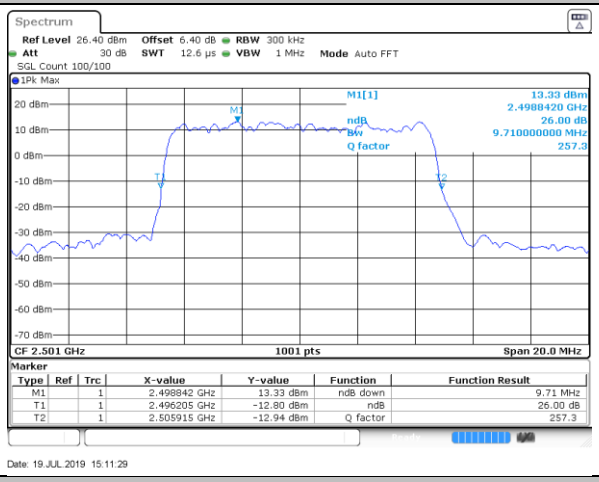


Highest Channel / 5MHz / 16QAM

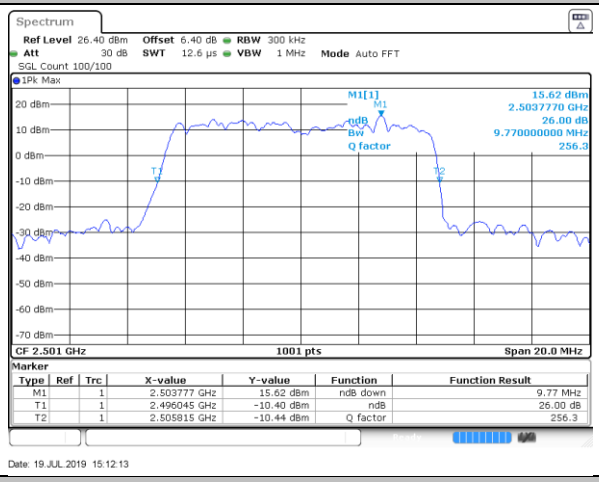


LTE Band 41

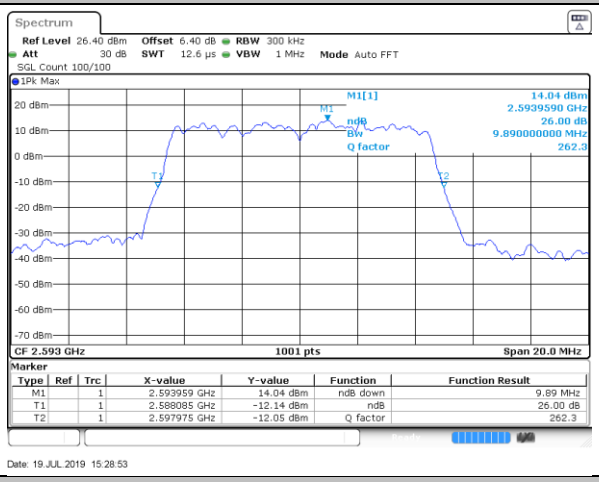
Lowest Channel / 10MHz / QPSK



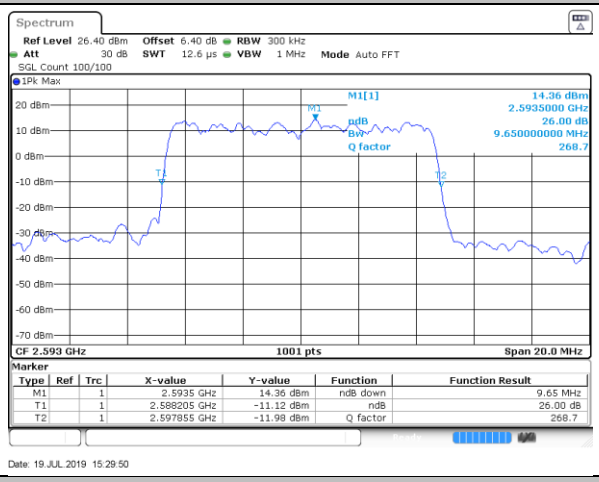
Lowest Channel / 10MHz / 16QAM



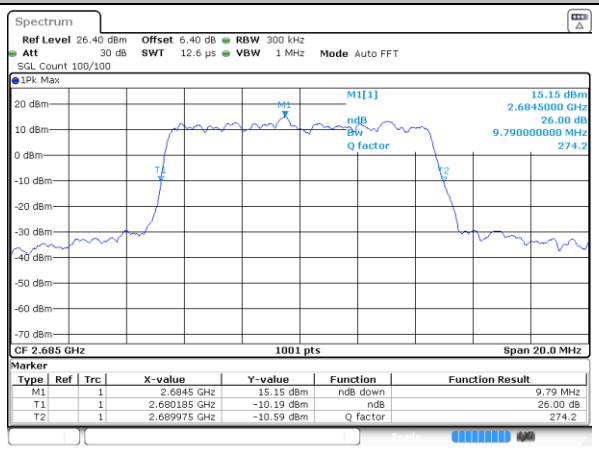
Middle Channel / 10MHz / QPSK



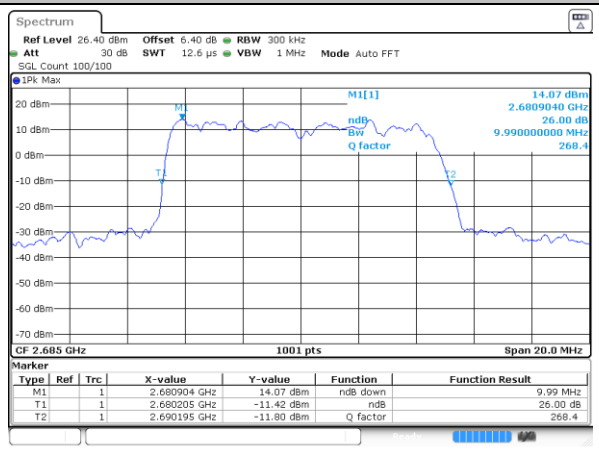
Middle Channel / 10MHz / 16QAM



Highest Channel / 10MHz / QPSK

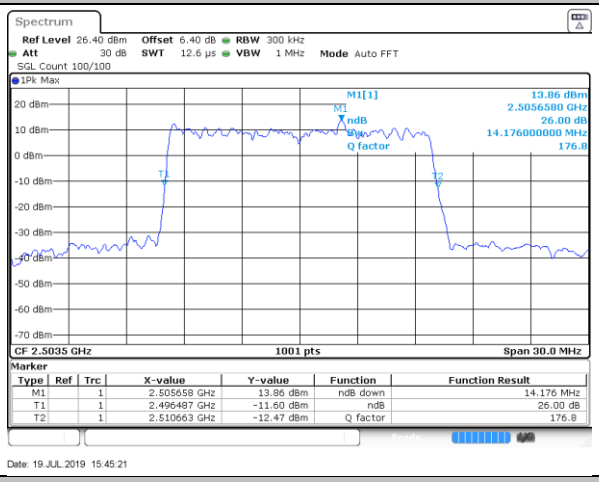


Highest Channel / 10MHz / 16QAM

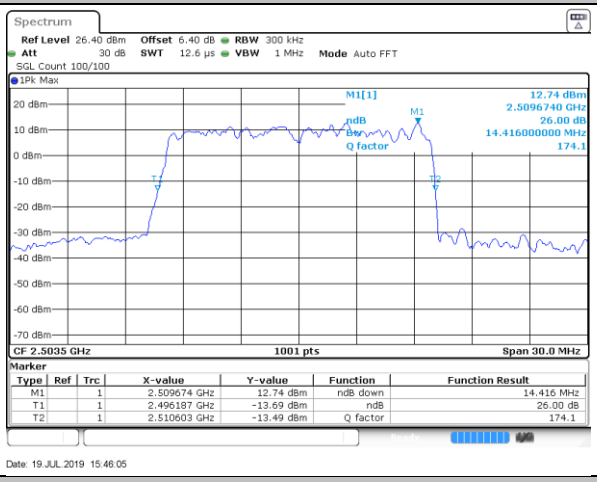


LTE Band 41

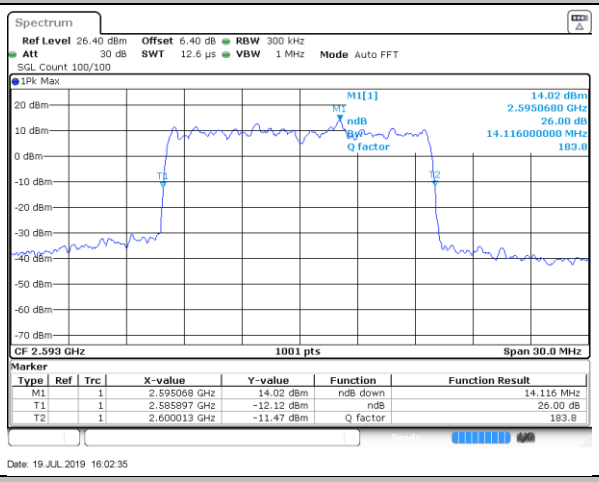
Lowest Channel / 15MHz / QPSK



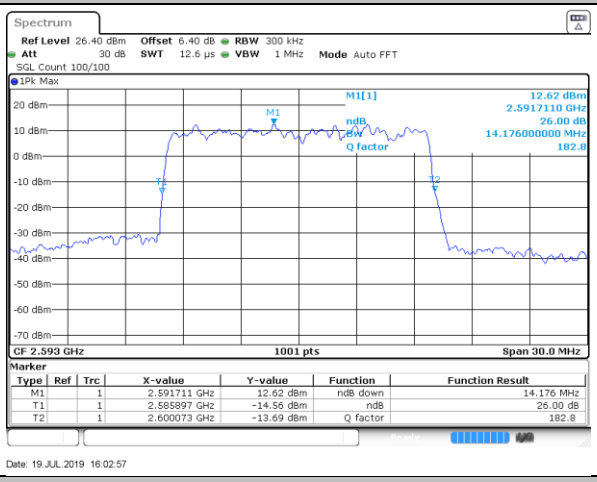
Lowest Channel / 15MHz / 16QAM



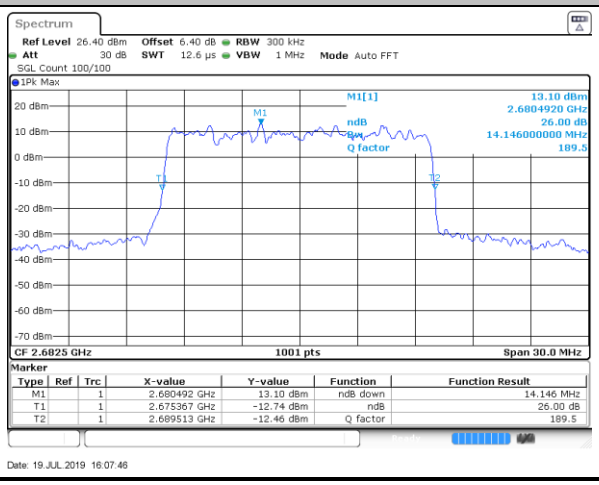
Middle Channel / 15MHz / QPSK



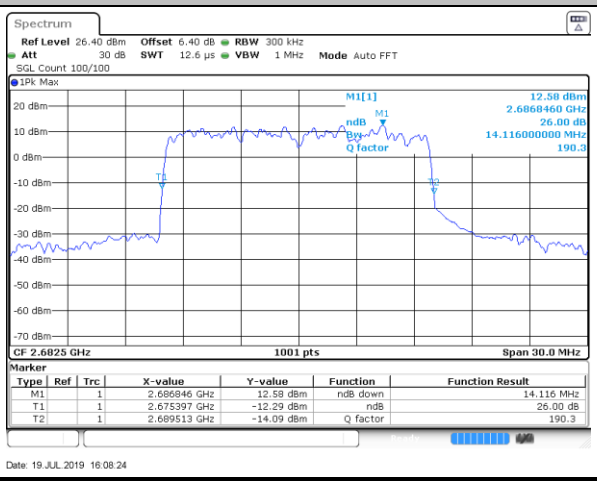
Middle Channel / 15MHz / 16QAM



Highest Channel / 15MHz / QPSK

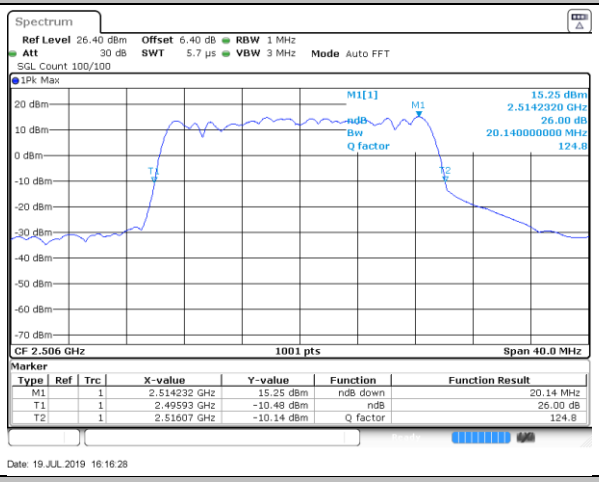


Highest Channel / 15MHz / 16QAM

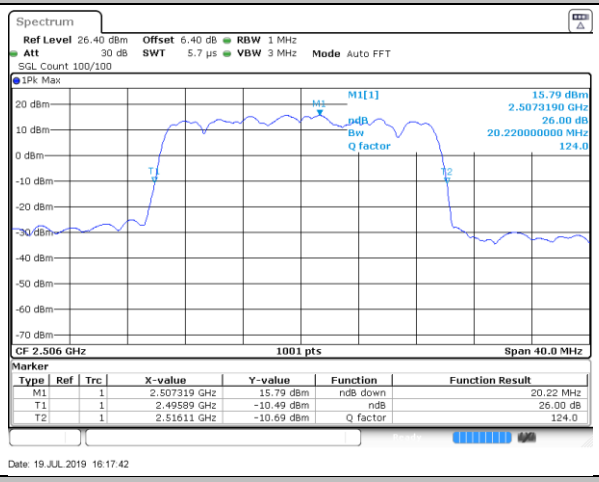


LTE Band 41

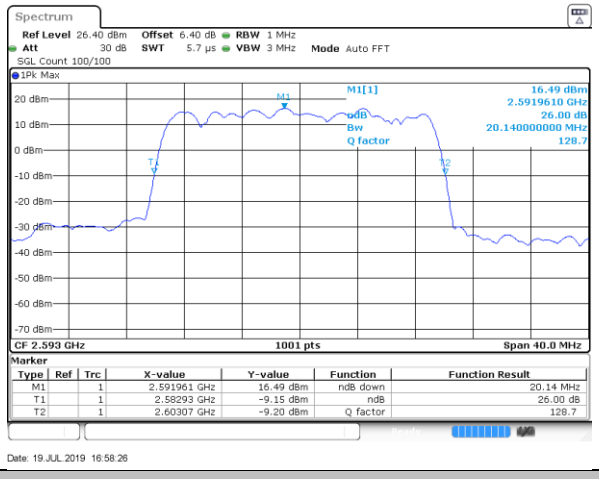
Lowest Channel / 20MHz / QPSK



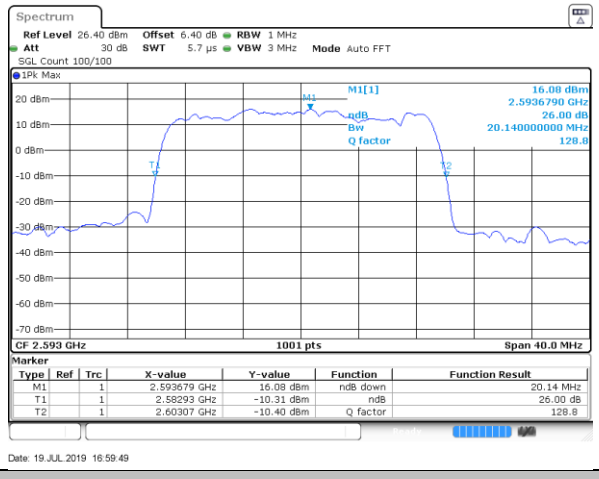
Lowest Channel / 20MHz / 16QAM



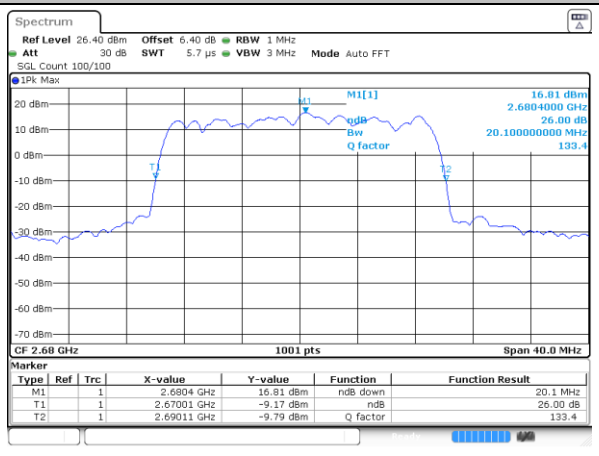
Middle Channel / 20MHz / QPSK



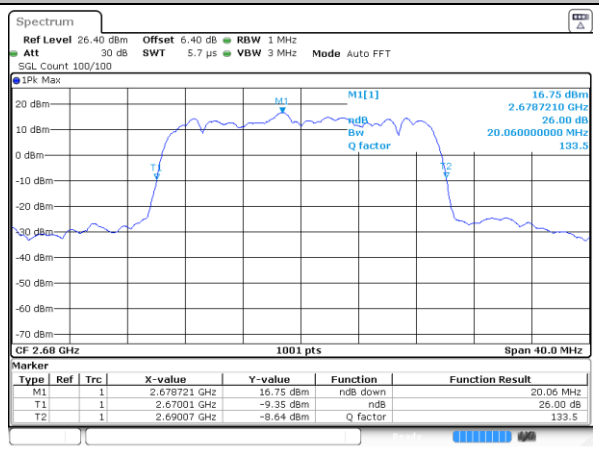
Middle Channel / 20MHz / 16QAM



Highest Channel / 20MHz / QPSK

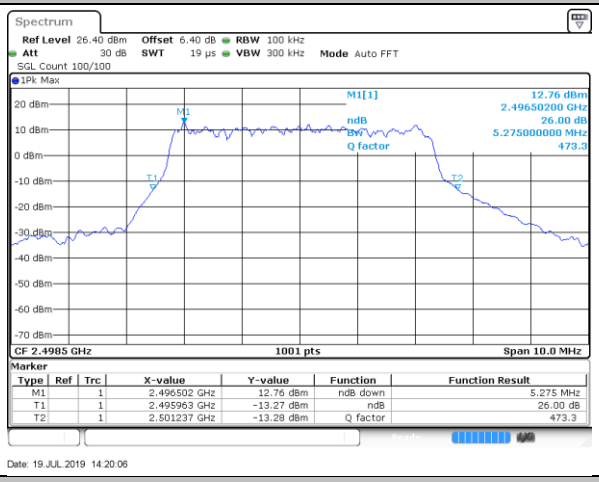


Highest Channel / 20MHz / 16QAM

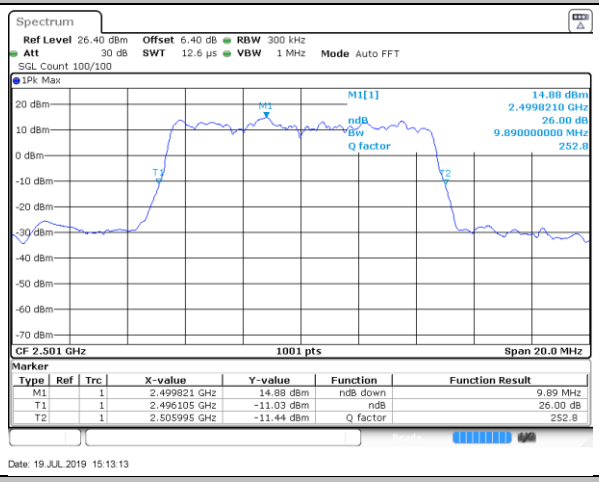


LTE Band 41

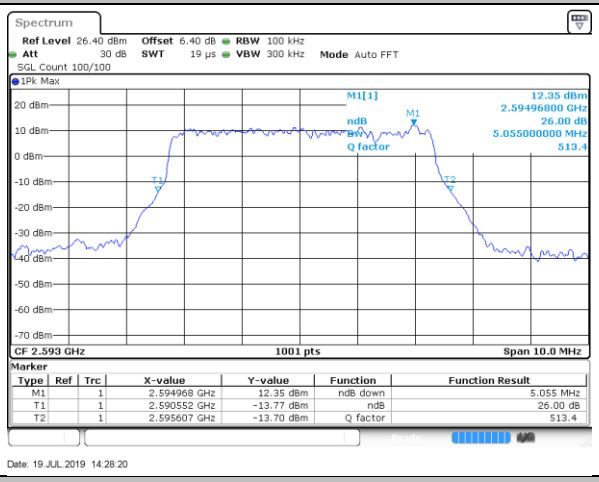
Lowest Channel / 5MHz / 64QAM



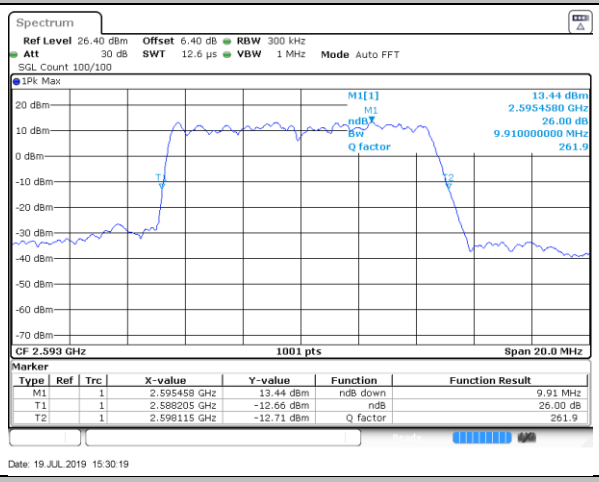
Lowest Channel / 10MHz / 64QAM



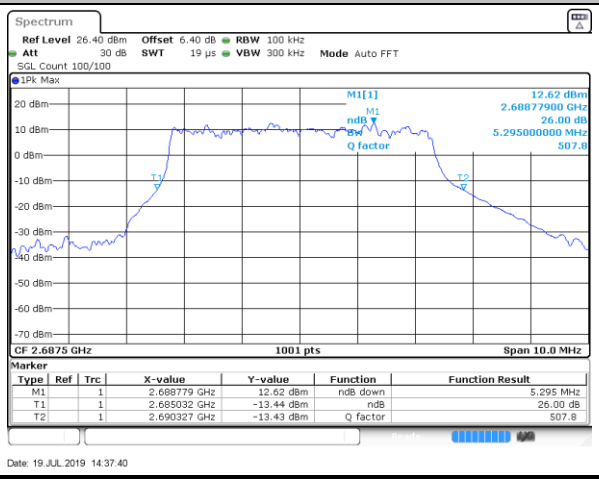
Middle Channel / 5MHz / 64QAM



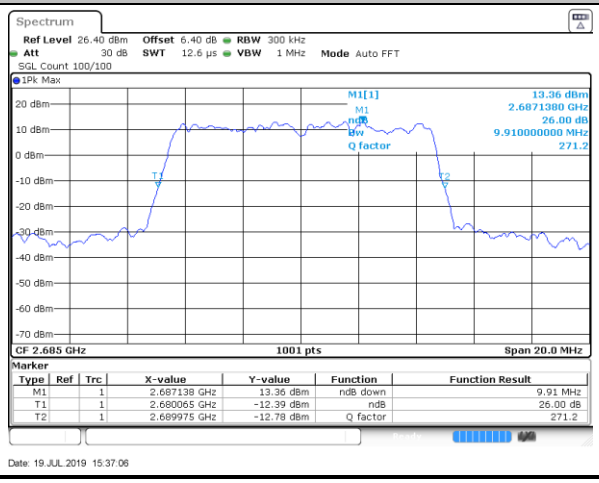
Middle Channel / 10MHz / 64QAM



Highest Channel / 5MHz / 64QAM

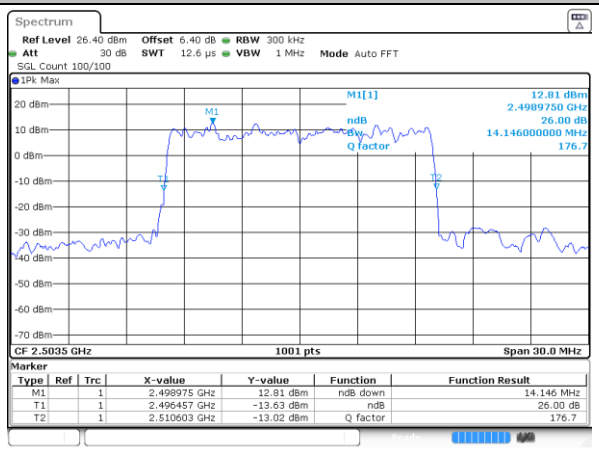


Highest Channel / 10MHz / 64QAM

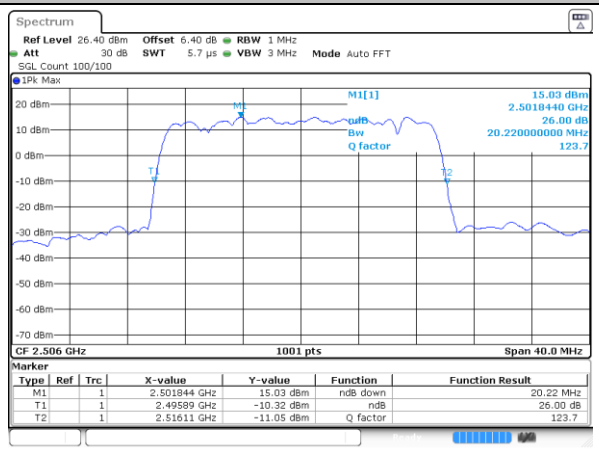


LTE Band 41

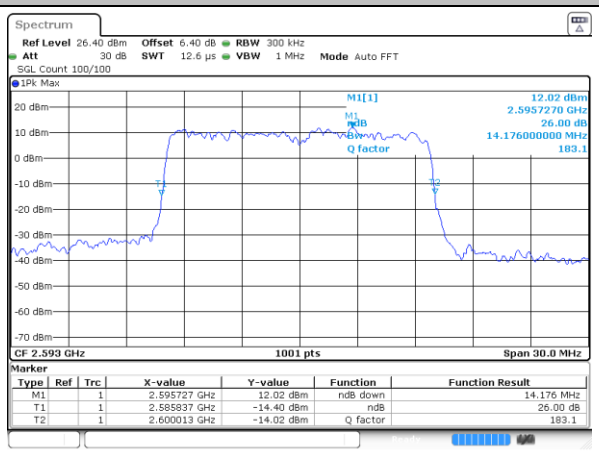
Lowest Channel / 15MHz / 64QAM



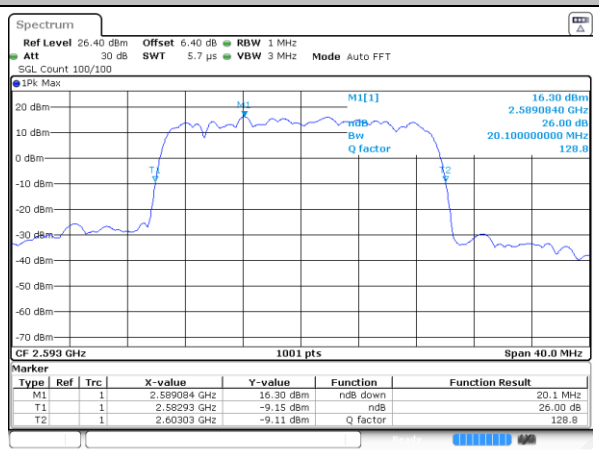
Lowest Channel / 20MHz / 64QAM



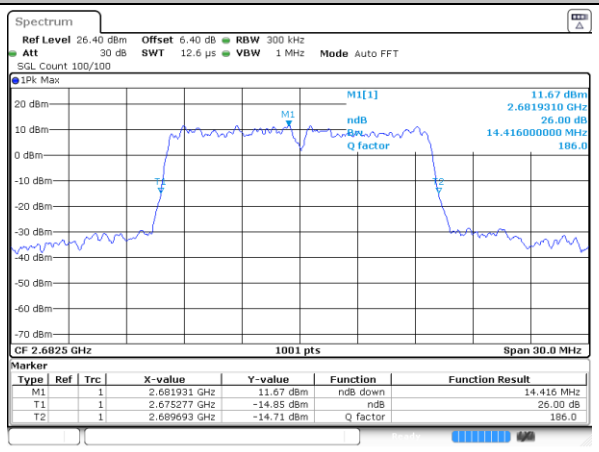
Middle Channel / 15MHz / 64QAM



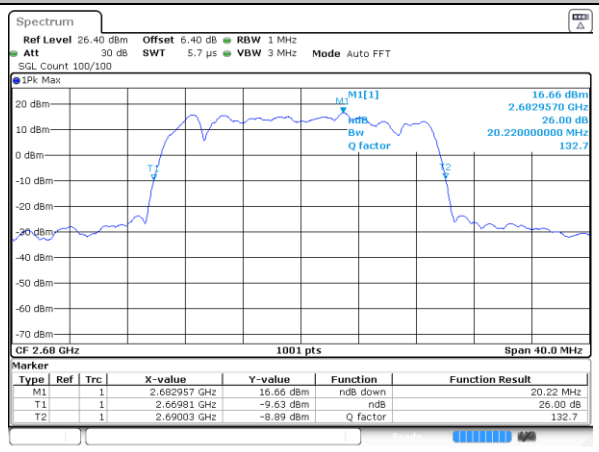
Middle Channel / 20MHz / 64QAM



Highest Channel / 15MHz / 64QAM



Highest Channel / 20MHz / 64QAM

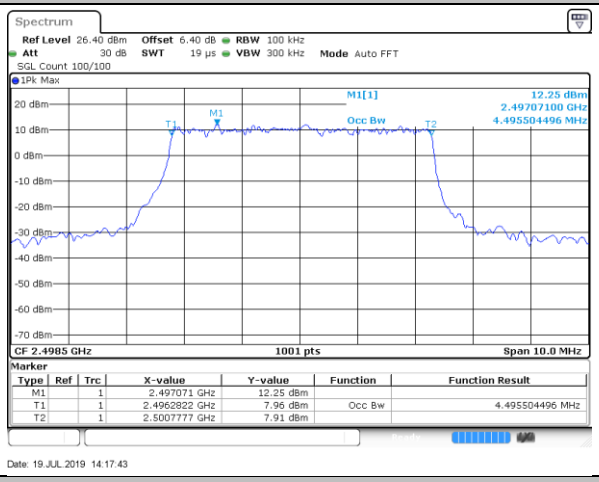


A.1.4 Occupied Bandwidth

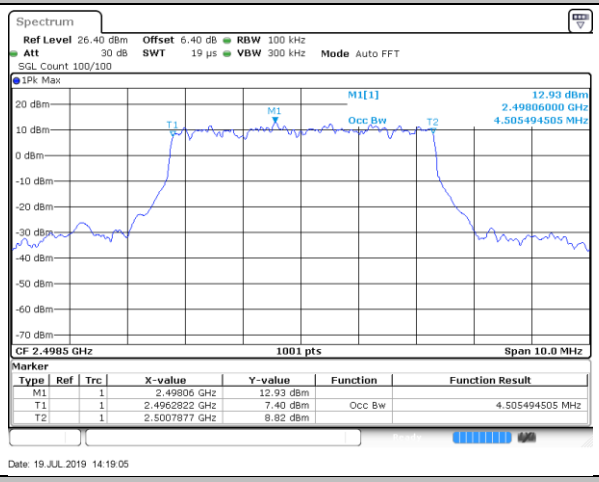
Mode	LTE Band 41 : 99%OBW(MHz)											
BW	5MHz		10MHz		15MHz		20MHz		5MHz	10MHz	15MHz	20MHz
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	64QAM	64QAM	64QAM	64QAM
Lowest CH	4.50	4.51	9.07	9.05	13.49	13.43	18.46	18.34	4.50	9.09	13.43	18.66
Middle CH	4.48	4.48	8.99	9.03	13.46	13.49	18.46	18.34	4.46	9.05	13.40	18.14
Highest CH	4.50	4.51	9.05	9.05	13.46	13.43	18.50	18.22	4.55	9.11	13.46	18.26

LTE Band 41

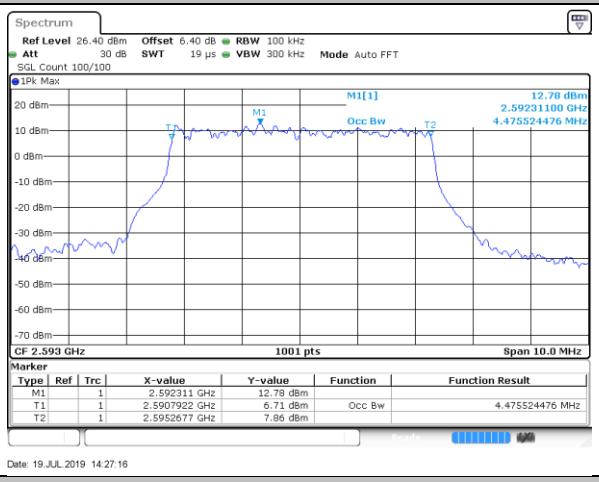
Lowest Channel / 5MHz / QPSK



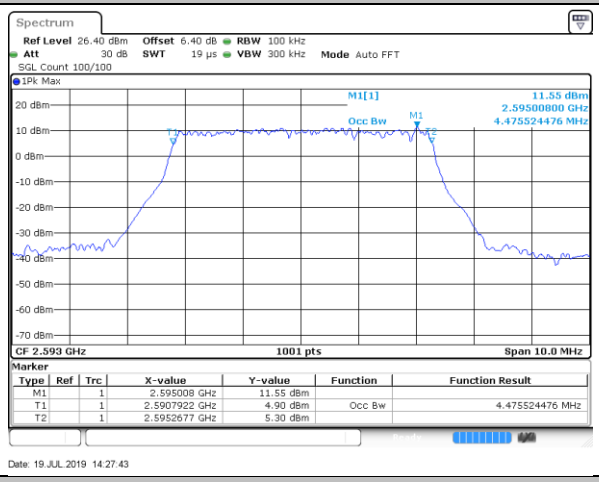
Lowest Channel / 5MHz / 16QAM



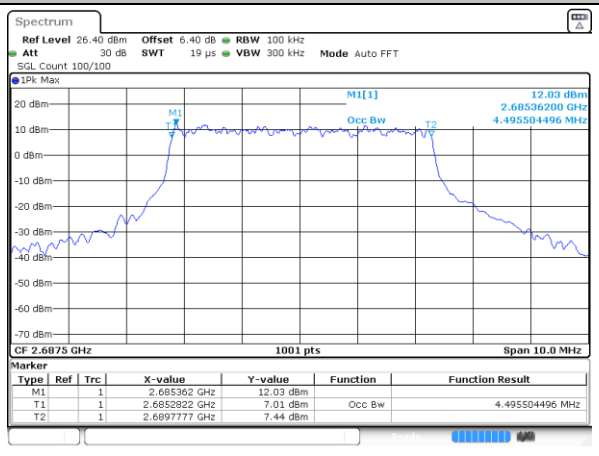
Middle Channel / 5MHz / QPSK



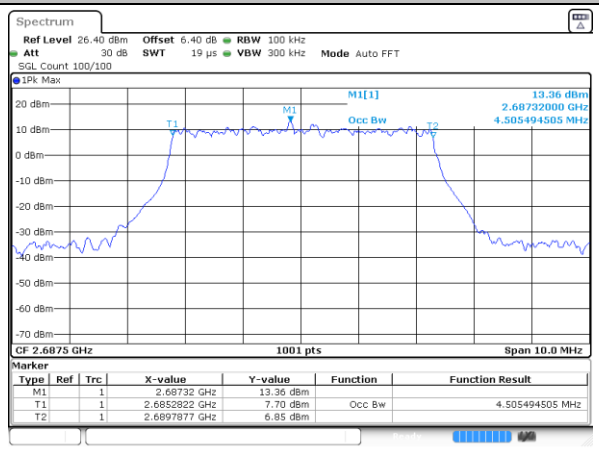
Middle Channel / 5MHz / 16QAM



Highest Channel / 5MHz / QPSK

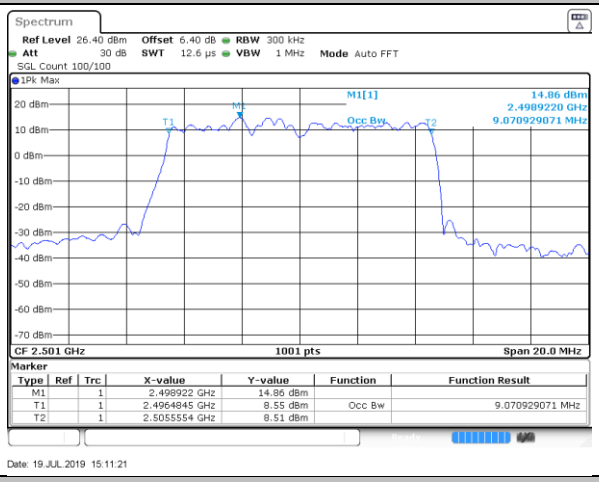


Highest Channel / 5MHz / 16QAM

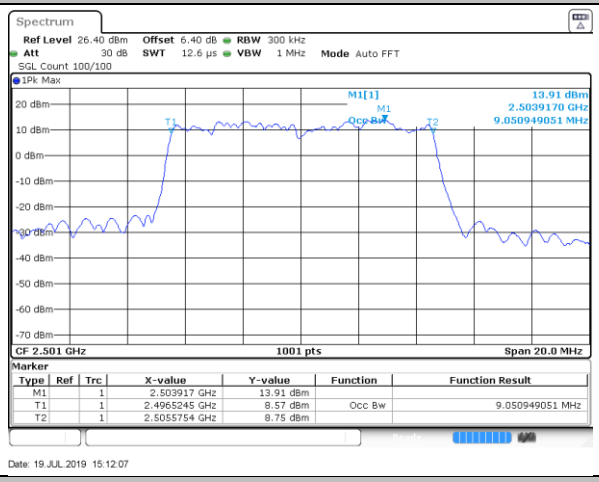


LTE Band 41

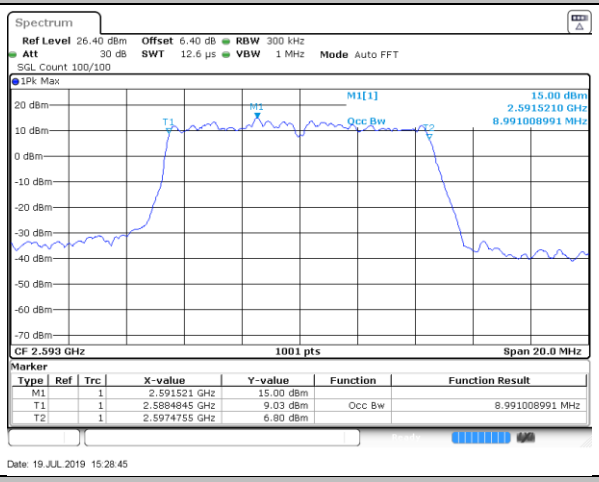
Lowest Channel / 10MHz / QPSK



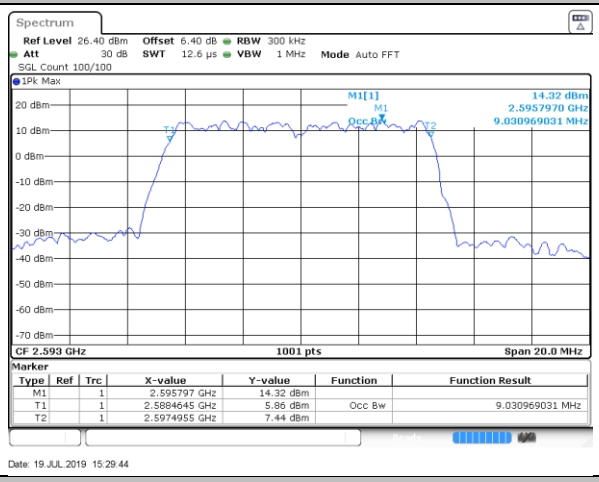
Lowest Channel / 10MHz / 16QAM



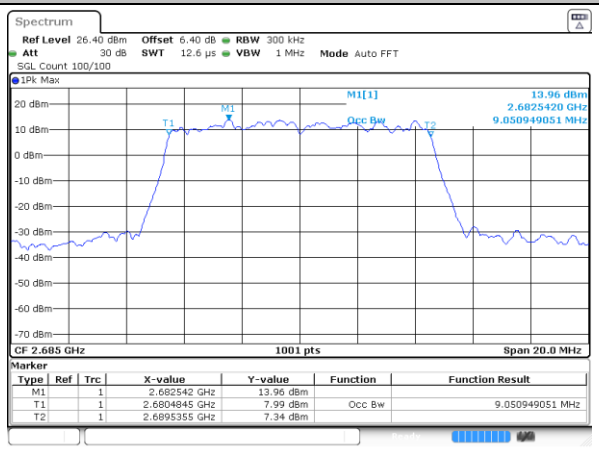
Middle Channel / 10MHz / QPSK



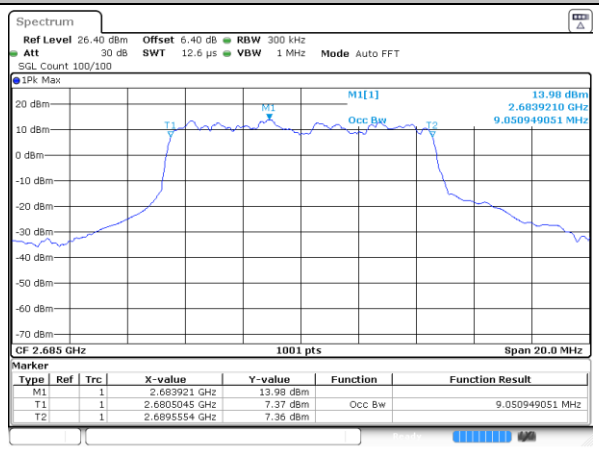
Middle Channel / 10MHz / 16QAM



Highest Channel / 10MHz / QPSK

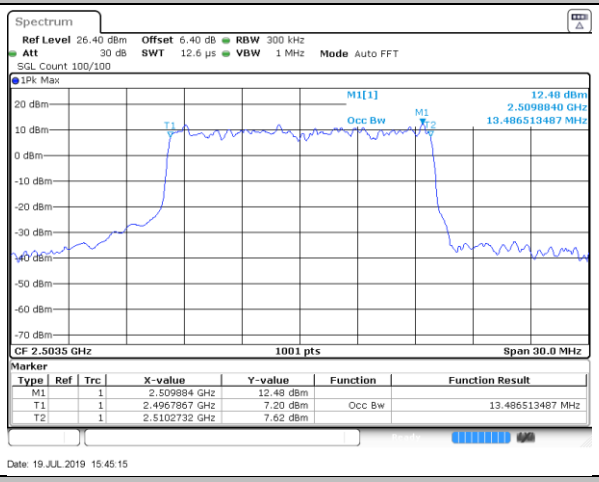


Highest Channel / 10MHz / 16QAM

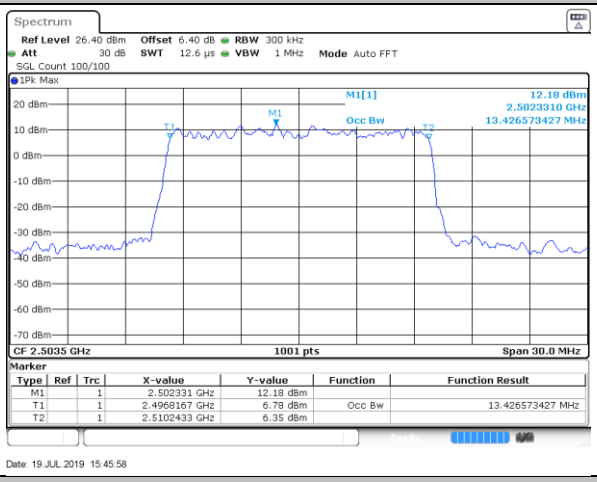


LTE Band 41

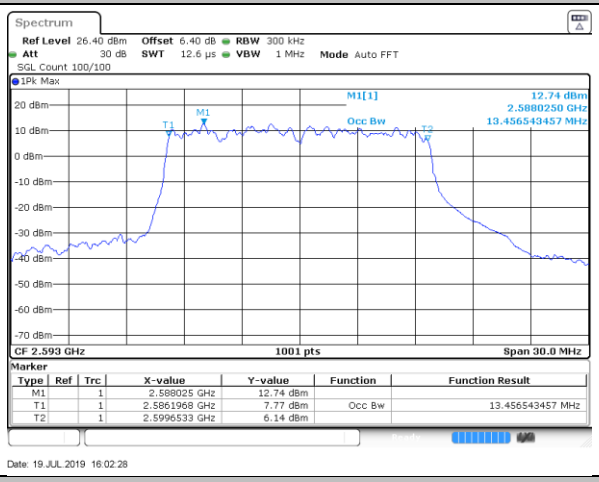
Lowest Channel / 15MHz / QPSK



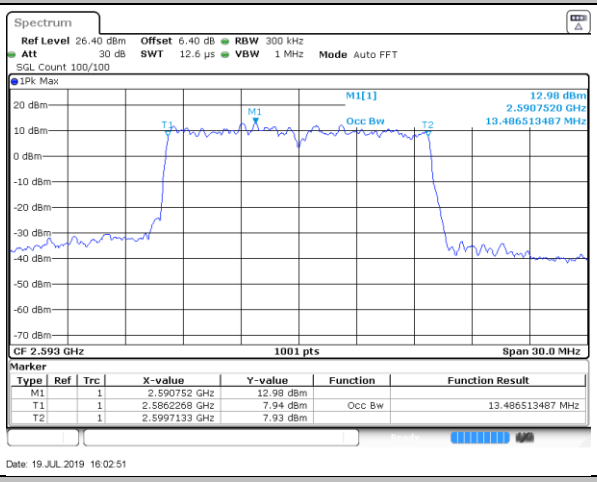
Lowest Channel / 15MHz / 16QAM



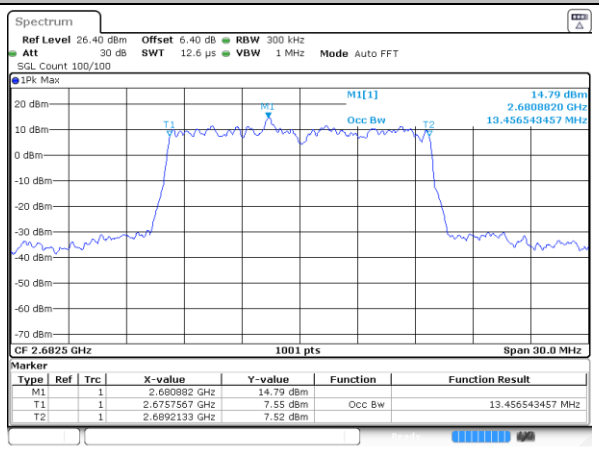
Middle Channel / 15MHz / QPSK



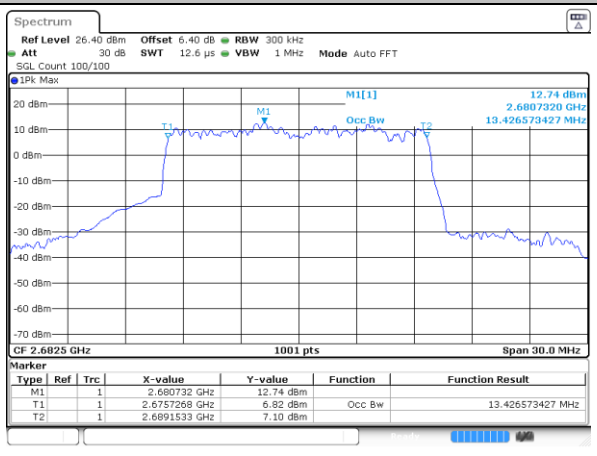
Middle Channel / 15MHz / 16QAM



Highest Channel / 15MHz / QPSK

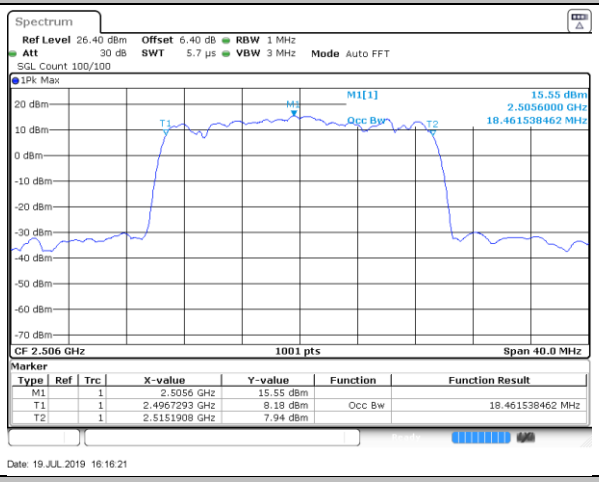


Highest Channel / 15MHz / 16QAM

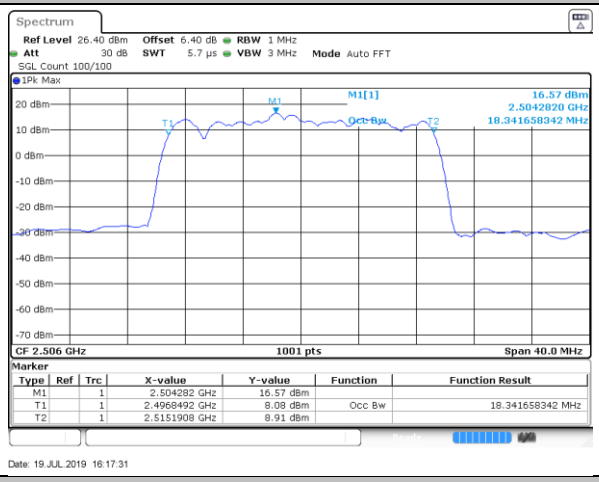


LTE Band 41

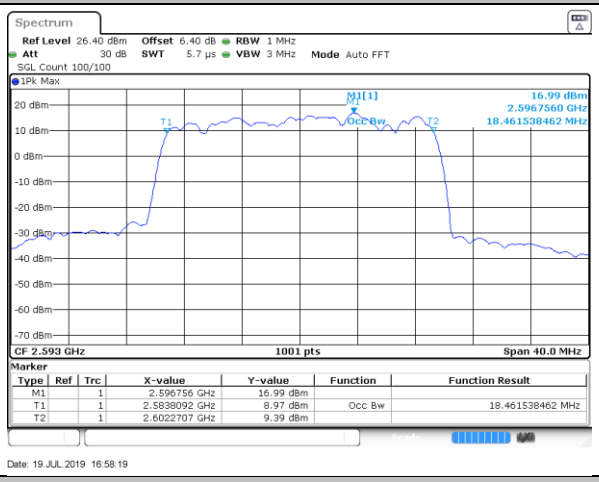
Lowest Channel / 20MHz / QPSK



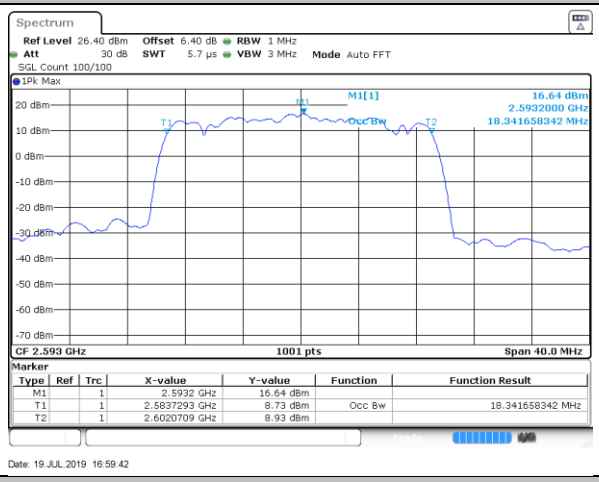
Lowest Channel / 20MHz / 16QAM



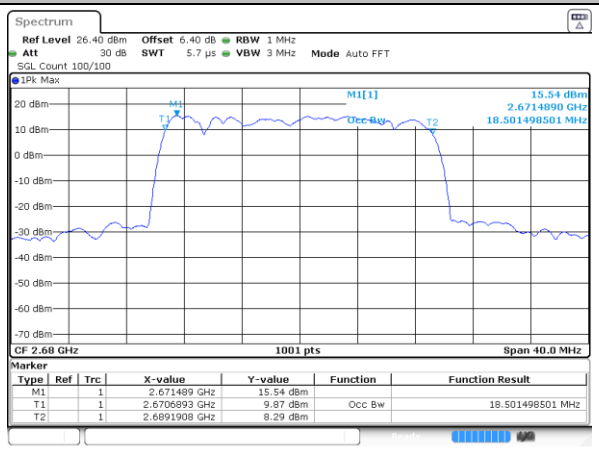
Middle Channel / 20MHz / QPSK



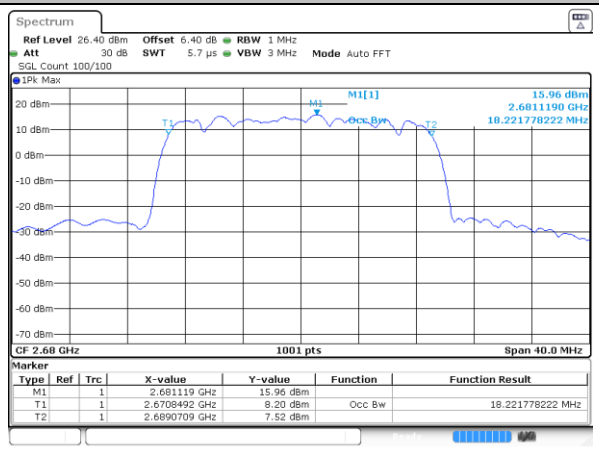
Middle Channel / 20MHz / 16QAM



Highest Channel / 20MHz / QPSK

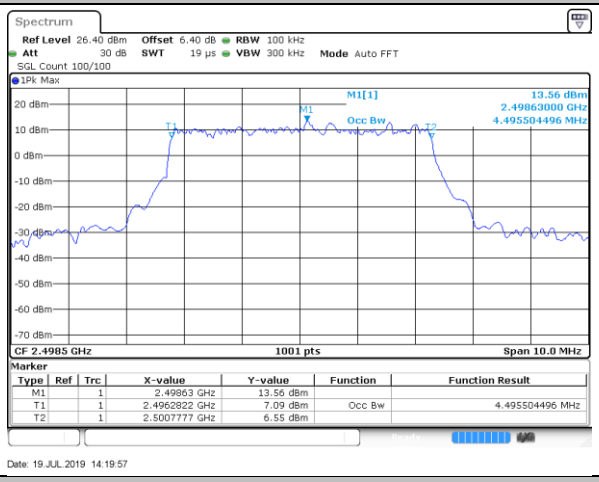


Highest Channel / 20MHz / 16QAM

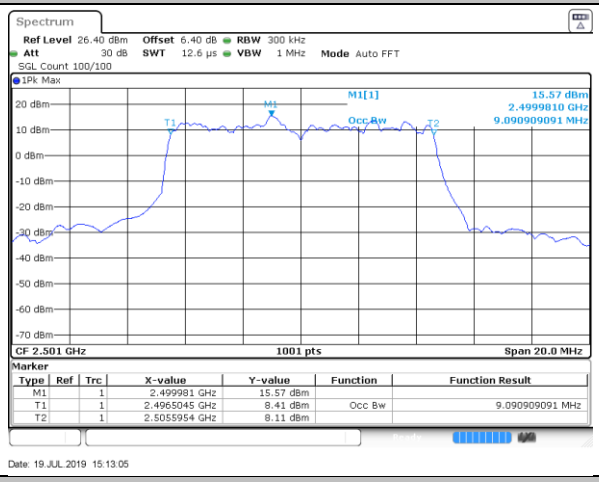


LTE Band 41

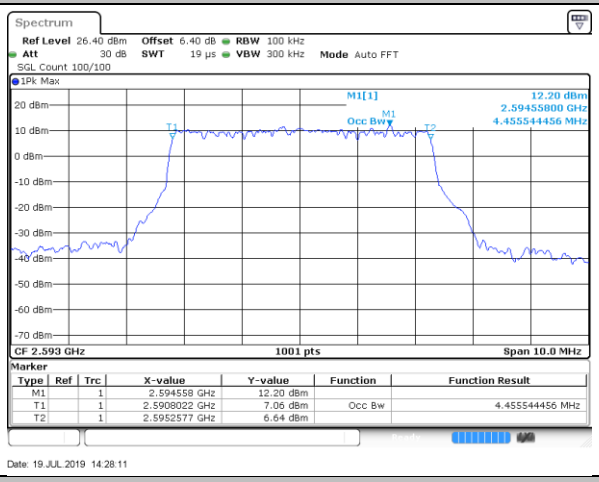
Lowest Channel / 5MHz / 64QAM



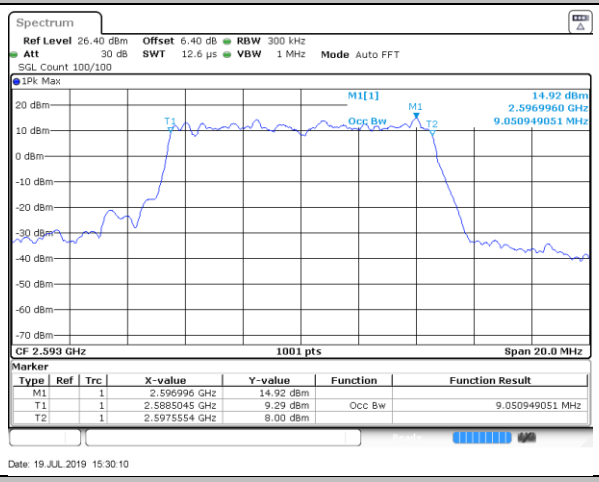
Lowest Channel / 10MHz / 64QAM



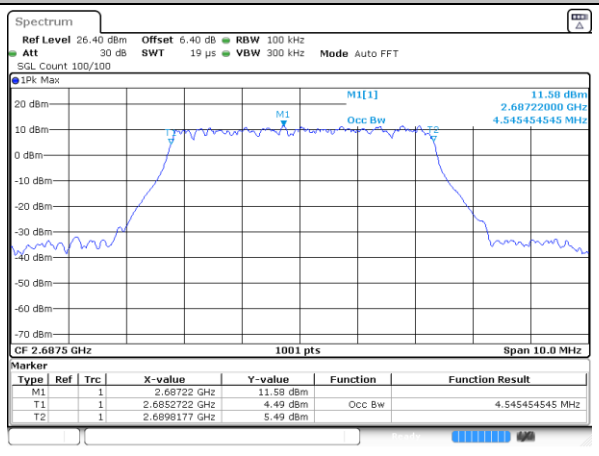
Middle Channel / 5MHz / 64QAM



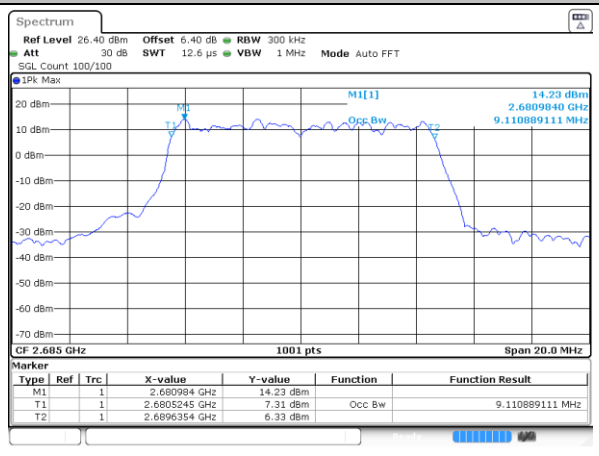
Middle Channel / 10MHz / 64QAM



Highest Channel / 5MHz / 64QAM

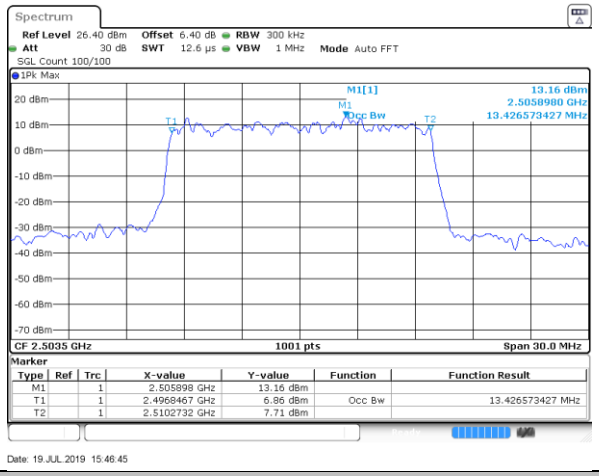


Highest Channel / 10MHz / 64QAM

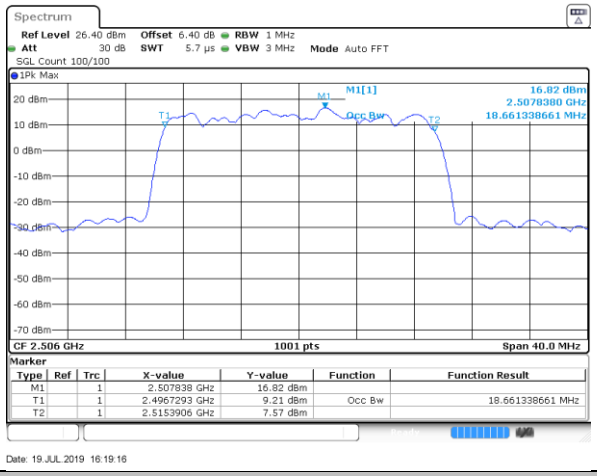


LTE Band 41

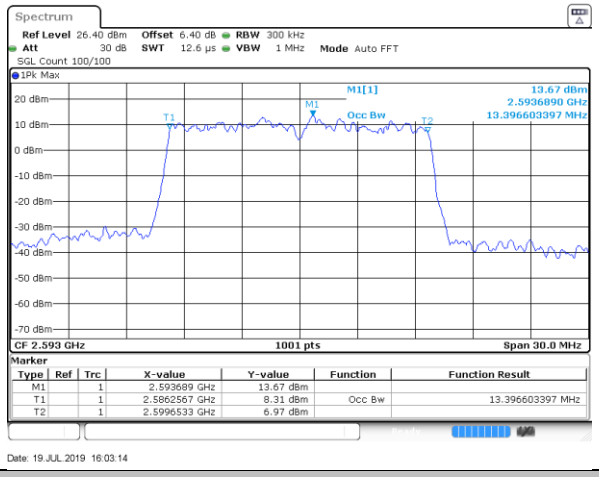
Lowest Channel / 15MHz / 64QAM



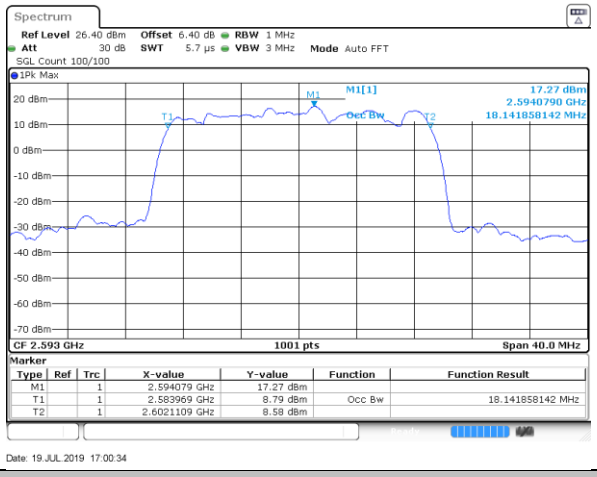
Lowest Channel / 20MHz / 64QAM



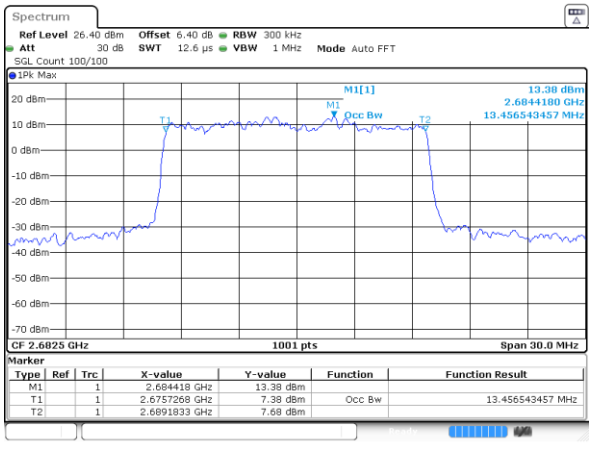
Middle Channel / 15MHz / 64QAM



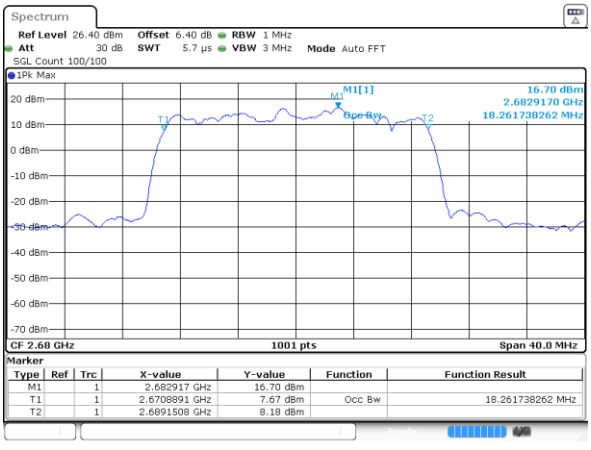
Middle Channel / 20MHz / 64QAM



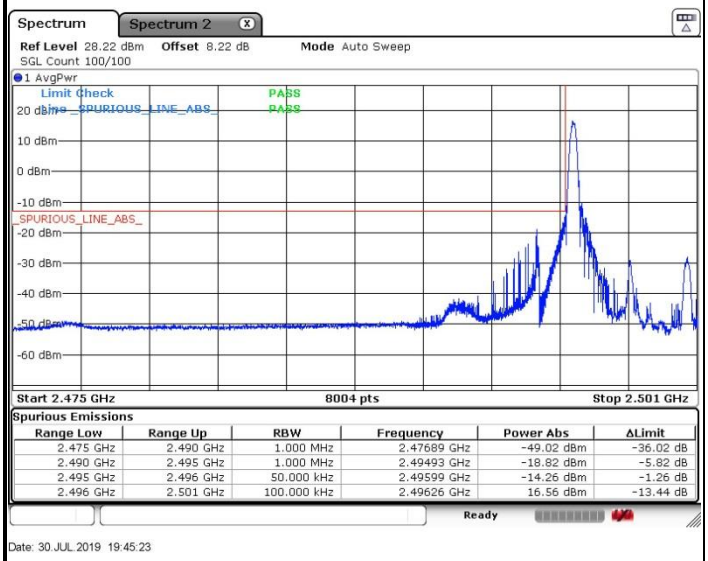
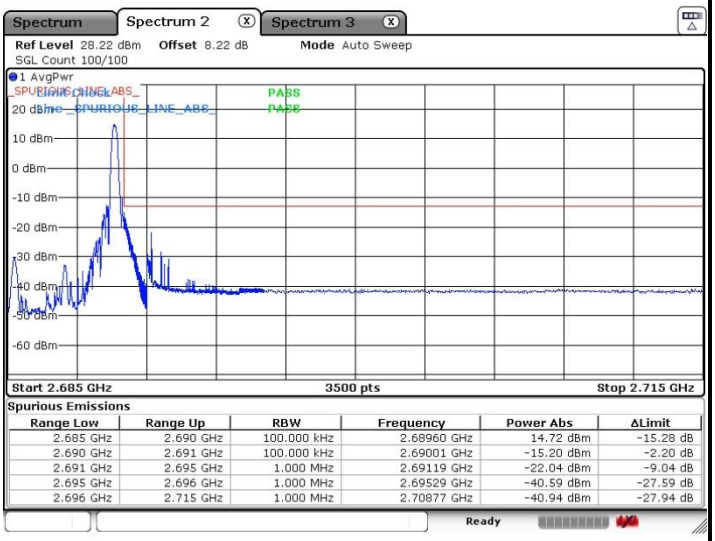
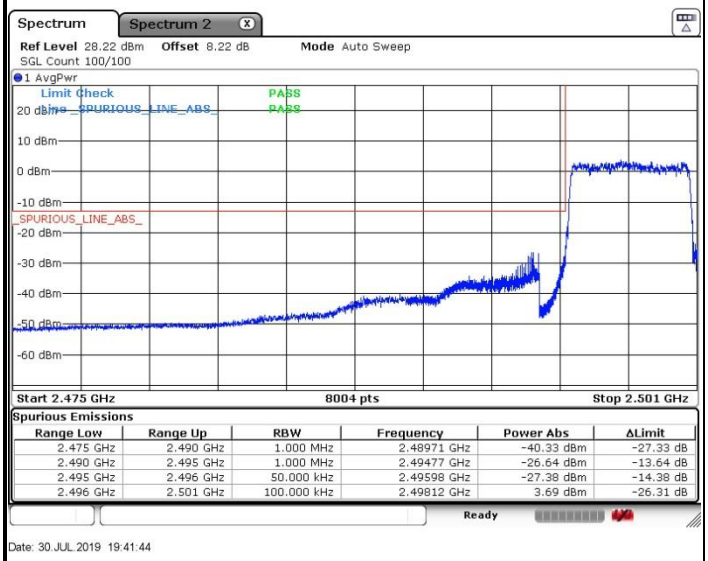
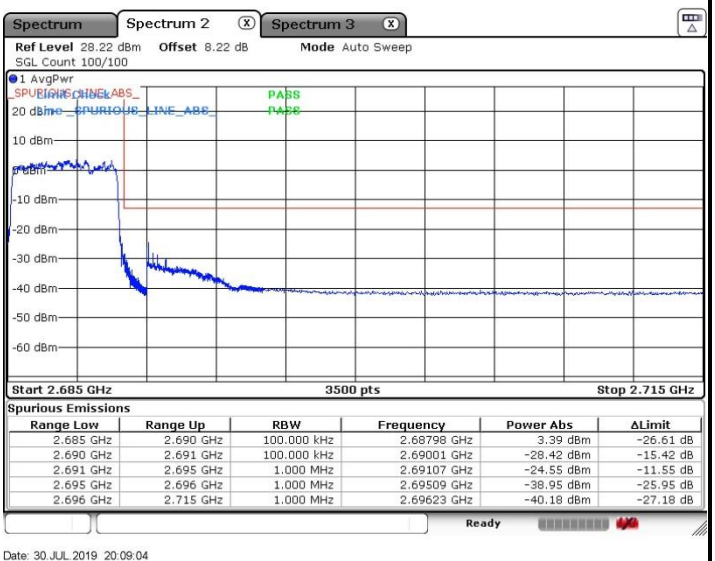
Highest Channel / 15MHz / 64QAM



Highest Channel / 20MHz / 64QAM

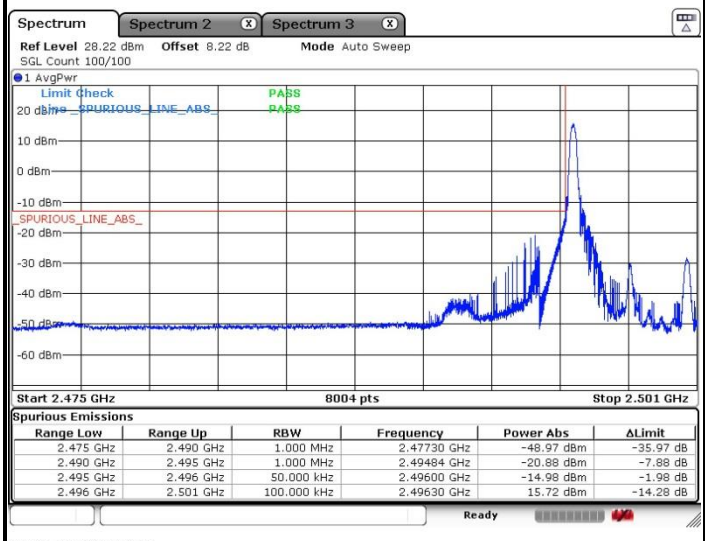


A.1.5 Conducted Band Edge

LTE Band 41 / 5MHz / QPSK	
Lowest Band Edge / 1 RB	**Highest Band Edge / 1 RB**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

LTE Band 41 / 5MHz / 16QAM

Lowest Band Edge / 1RB

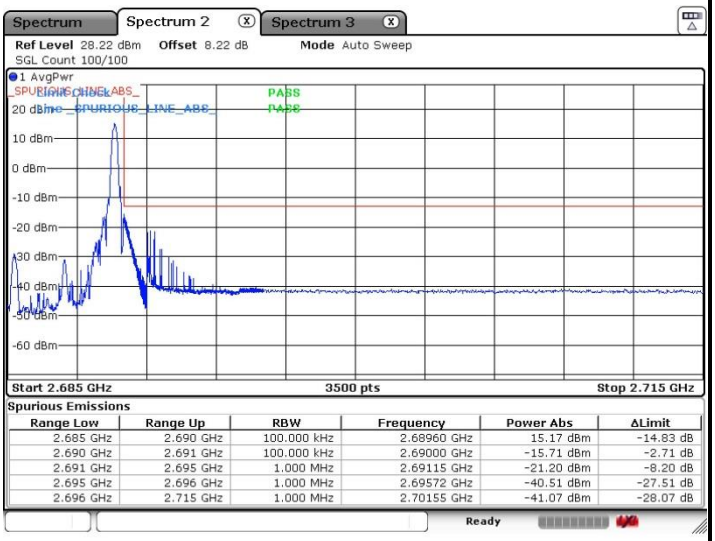


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.475 GHz	2.490 GHz	1.000 MHz	2.47730 GHz	-48.97 dBm	-35.97 dB
2.490 GHz	2.495 GHz	1.000 MHz	2.49484 GHz	-20.88 dBm	-7.88 dB
2.495 GHz	2.496 GHz	50.000 kHz	2.49600 GHz	-14.98 dBm	-1.98 dB
2.496 GHz	2.501 GHz	100.000 kHz	2.49630 GHz	15.72 dBm	-14.28 dB

Date: 30.JUL.2019 19:51:15

Highest Band Edge / 1 RB

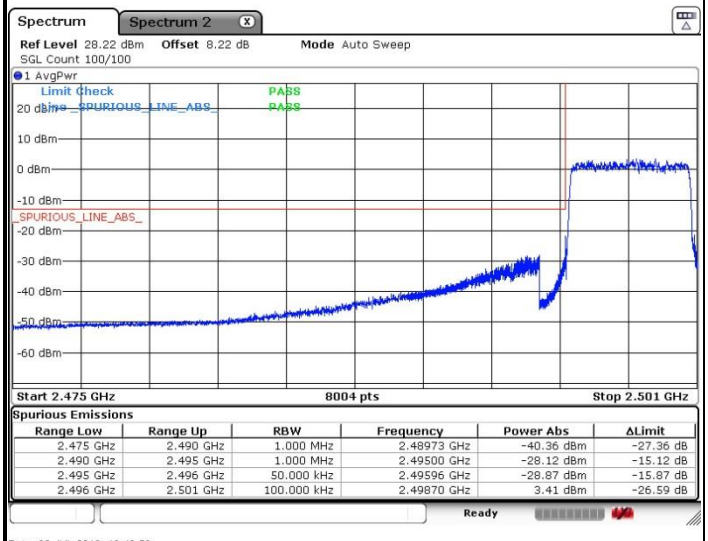


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.685 GHz	2.690 GHz	100.000 kHz	2.68960 GHz	15.17 dBm	-14.83 dB
2.690 GHz	2.691 GHz	100.000 kHz	2.69000 GHz	-15.71 dBm	-2.71 dB
2.691 GHz	2.695 GHz	1.000 MHz	2.69115 GHz	-21.20 dBm	-8.20 dB
2.695 GHz	2.696 GHz	1.000 MHz	2.69572 GHz	-40.51 dBm	-27.51 dB
2.696 GHz	2.715 GHz	1.000 MHz	2.70155 GHz	-41.07 dBm	-28.07 dB

Date: 30.JUL.2019 20:15:19

Lowest Band Edge / Full RB

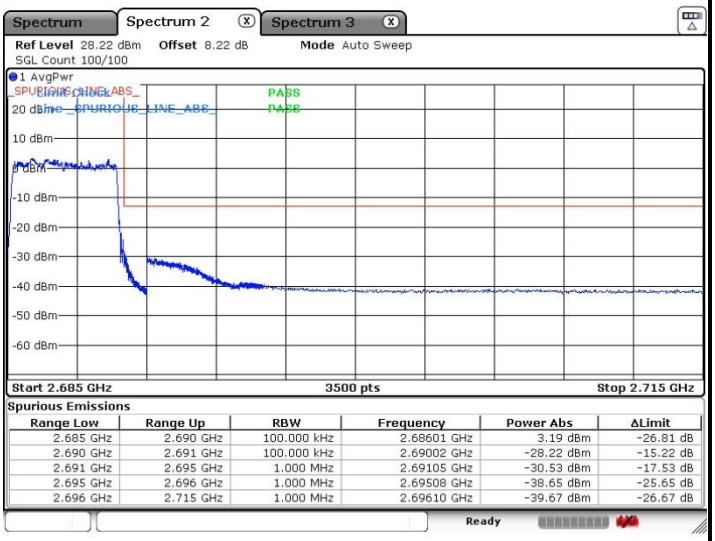


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.475 GHz	2.490 GHz	1.000 MHz	2.48973 GHz	-40.36 dBm	-27.36 dB
2.490 GHz	2.495 GHz	1.000 MHz	2.49500 GHz	-28.12 dBm	-15.12 dB
2.495 GHz	2.496 GHz	50.000 kHz	2.49596 GHz	-28.87 dBm	-15.87 dB
2.496 GHz	2.501 GHz	100.000 kHz	2.49870 GHz	3.41 dBm	-26.59 dB

Date: 30.JUL.2019 19:43:59

Highest Band Edge / Full RB



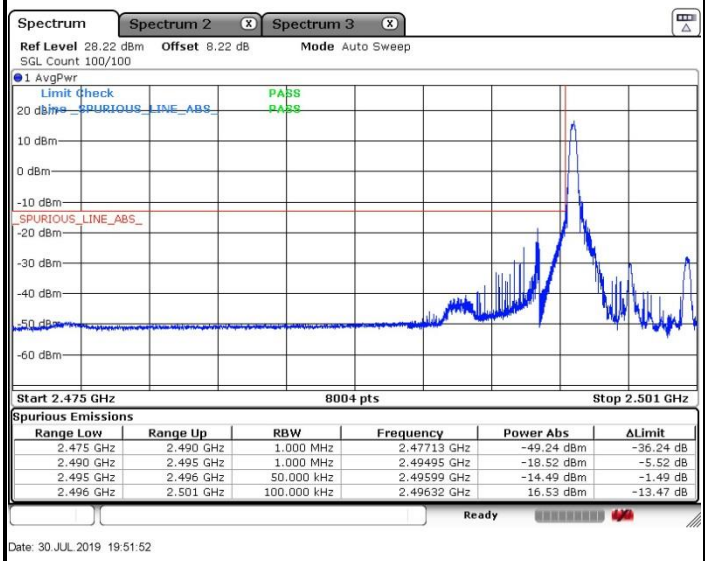
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.685 GHz	2.690 GHz	100.000 kHz	2.68601 GHz	3.19 dBm	-26.81 dB
2.690 GHz	2.691 GHz	100.000 kHz	2.69002 GHz	-28.22 dBm	-15.22 dB
2.691 GHz	2.695 GHz	1.000 MHz	2.69105 GHz	-30.53 dBm	-17.53 dB
2.695 GHz	2.696 GHz	1.000 MHz	2.69508 GHz	-38.65 dBm	-25.65 dB
2.696 GHz	2.715 GHz	1.000 MHz	2.69610 GHz	-39.67 dBm	-26.67 dB

Date: 30.JUL.2019 20:09:39

LTE Band 41 / 5MHz / 64QAM

Lowest Band Edge / 1RB

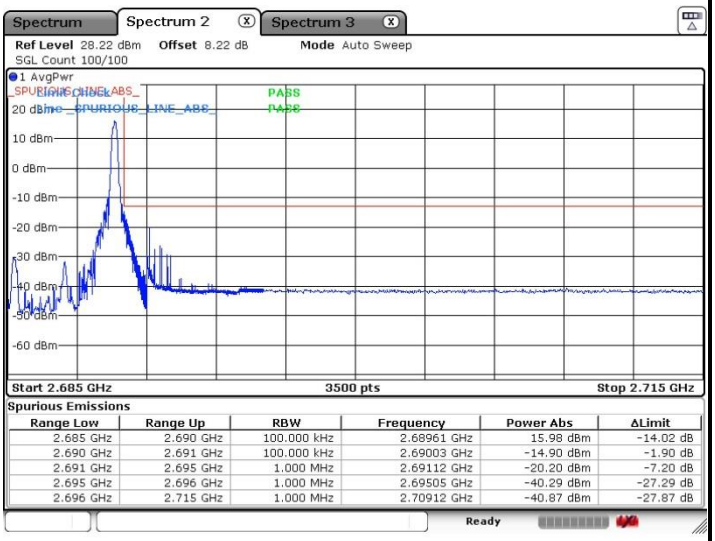


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.475 GHz	2.490 GHz	1.000 MHz	2.47713 GHz	-49.24 dBm	-36.24 dB
2.490 GHz	2.495 GHz	1.000 MHz	2.49495 GHz	-18.52 dBm	-5.52 dB
2.495 GHz	2.496 GHz	50.000 kHz	2.49599 GHz	-14.49 dBm	-1.49 dB
2.496 GHz	2.501 GHz	100.000 kHz	2.49632 GHz	16.53 dBm	-13.47 dB

Date: 30.JUL.2019 19:51:52

Highest Band Edge / 1 RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.685 GHz	2.690 GHz	100.000 kHz	2.68961 GHz	15.98 dBm	-14.02 dB
2.690 GHz	2.691 GHz	100.000 kHz	2.69003 GHz	-14.90 dBm	-1.90 dB
2.691 GHz	2.695 GHz	1.000 MHz	2.69112 GHz	-20.20 dBm	-7.20 dB
2.695 GHz	2.696 GHz	1.000 MHz	2.69505 GHz	-40.29 dBm	-27.29 dB
2.696 GHz	2.715 GHz	1.000 MHz	2.70912 GHz	-40.87 dBm	-27.87 dB

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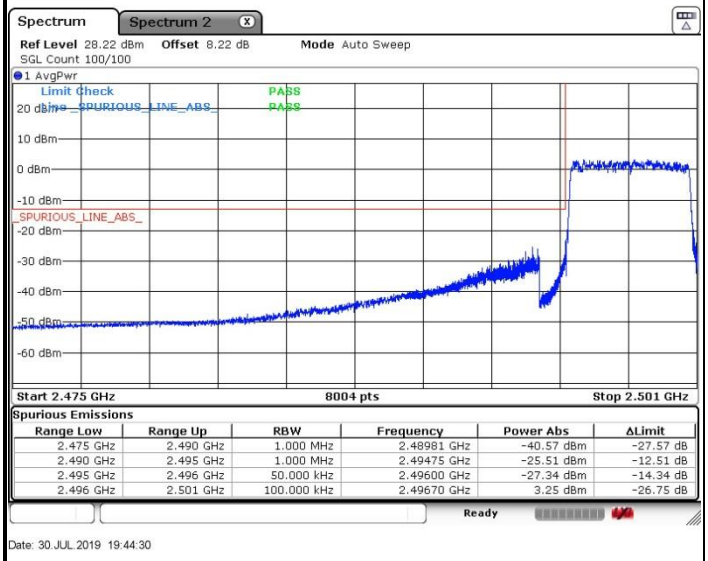
Lowest Band Edge / Full RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.475 GHz	2.490 GHz	1.000 MHz	2.48981 GHz	-40.57 dBm	-27.57 dB
2.490 GHz	2.495 GHz	1.000 MHz	2.49475 GHz	-25.51 dBm	-12.51 dB
2.495 GHz	2.496 GHz	50.000 kHz	2.49600 GHz	-27.34 dBm	-14.34 dB
2.496 GHz	2.501 GHz	100.000 kHz	2.49670 GHz	3.25 dBm	-26.75 dB

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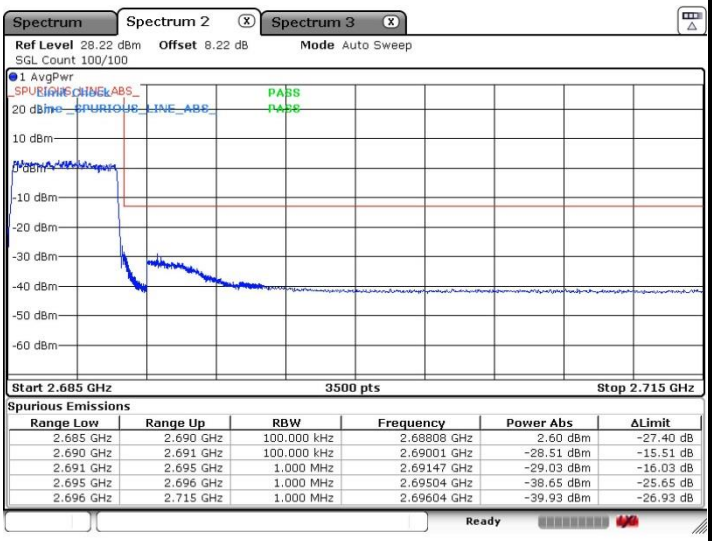
Highest Band Edge / Full RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.685 GHz	2.690 GHz	100.000 kHz	2.68808 GHz	2.60 dBm	-27.40 dB
2.690 GHz	2.691 GHz	100.000 kHz	2.69001 GHz	-28.51 dBm	-15.51 dB
2.691 GHz	2.695 GHz	1.000 MHz	2.69147 GHz	-29.03 dBm	-16.03 dB
2.695 GHz	2.696 GHz	1.000 MHz	2.69504 GHz	-38.65 dBm	-25.65 dB
2.696 GHz	2.715 GHz	1.000 MHz	2.69604 GHz	-39.93 dBm	-26.93 dB

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