FCC RADIO TEST REPORT

FCC ID	:	**MSQZ01QD**
Equipment	:	**ASUS Phone (Mobile Phone)**
Brand Name	:	**ASUS**
Model Name	:	**ASUS_Z01QD**
Applicant	:	**ASUSTeK COMPUTER INC.** **4F, No. 150, LI-TE RD., PEITOU, TAIPEI, TAIWAN**
Manufacturer	:	**Arima Communications (Jiangsu) Co., LTD** **No.168,Jiao Tong North Road,Wu Jiang, Su Zhou,Jiang Su,PRC.**
Standard	:	**FCC 47 CFR Part 2, and 90(S)**

The product was received on May 24, 2018 and testing was started from Jun. 29, 2018 and completed on Jul. 26, 2018. We, SPORTON INTERNATIONAL 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 has been in compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Jones Tsai

Approved by: Jones Tsai

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

Table of Contents

History of this test report **3**
Summary of Test Result **4**
1 General Description **5**
1.1 Feature of Equipment Under Test 5
1.2 Modification of EUT 5
1.3 Testing Site 5
1.4 Applied Standards 6
2 Test Configuration of Equipment Under Test **7**
2.1 Test Mode 7
2.2 Connection Diagram of Test System 8
2.3 Support Unit used in test configuration and system 8
2.4 Measurement Results Explanation Example 8
2.5 Frequency List of Low/Middle/High Channels 9
3 Conducted Test Items **10**
3.1 Measuring Instruments 10
3.2 Conducted Output Power Measurement and ERP Measurement 11
3.3 Peak-to-Average Ratio 12
3.4 99% Occupied Bandwidth and 26dB Bandwidth Measurement 13
3.5 Emissions Mask Measurement 14
3.6 Emissions Mask – Out Of Band Emissions Measurement 15
3.7 Frequency Stability Measurement 16
3.8 Field Strength of Spurious Radiation Measurement 17
4 List of Measuring Equipment **19**
5 Uncertainty of Evaluation **21**
Appendix A. Test Results of Conducted Test
Appendix B. Test Results of ERP and Radiated Test

History of this test report

Report No.	Version	Description	Issued Date
FG852405C	01	Initial issue of report	Aug. 01, 2018

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046 §90.635	Conducted Output Power and Effective Radiated Power	Pass	-
3.3	-	Peak-to-Average Ratio	Reporting only	-
3.4	§2.1049 §90.209	Occupied Bandwidth and 26dB Bandwidth	Reporting only	-
3.5	§2.1051 §90.691	Emission masks – In-band emissions	Pass	-
3.6	§2.1051 §90.691	Emission masks – Out of band emissions	Pass	-
3.7	§2.1055 §90.213	Frequency Stability for Temperature & Voltage	Pass	-
3.8	§2.1053 §90.691	Field Strength of Spurious Radiation	Pass	Under limit 32.73 dB at 2464.000 MHz

Reviewed by: Joseph Lin

Report Producer: Polly Tsai

1 General Description

1.1 Feature of Equipment Under Test

GSM/WCDMA/LTE, Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n, Wi-Fi 5GHz 802.11a/n/ac, FM Receiver, NFC, WiGig, and GNSS

Product Specification subjective to this standard	
Antenna Type	WWAN: PIFA Antenna WLAN: PIFA Antenna Bluetooth: PIFA Antenna GPS/Glonass/Galileo/BDS: PIFA Antenna NFC: Loop Antenna WiGig: Patch Antenna FM: using earphone as antenna

1.2 Modification of EUT

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

1.3 Testing Site

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1190 and TW0007 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	**Sporton Site No.**
	TH05-HY

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

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	03CH13-HY

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

1.4 Applied Standards

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

- FCC 47 CFR Part 2, 90
- ANSI / TIA-603-E
- ANSI C63.26-2015
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01
- Interim Guidance for Equipment Authorization of Devices with Channel Bandwidths Combined Across Two Contiguous Service Rule Allocations OET/Lab/EACB, June 6, 2013

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

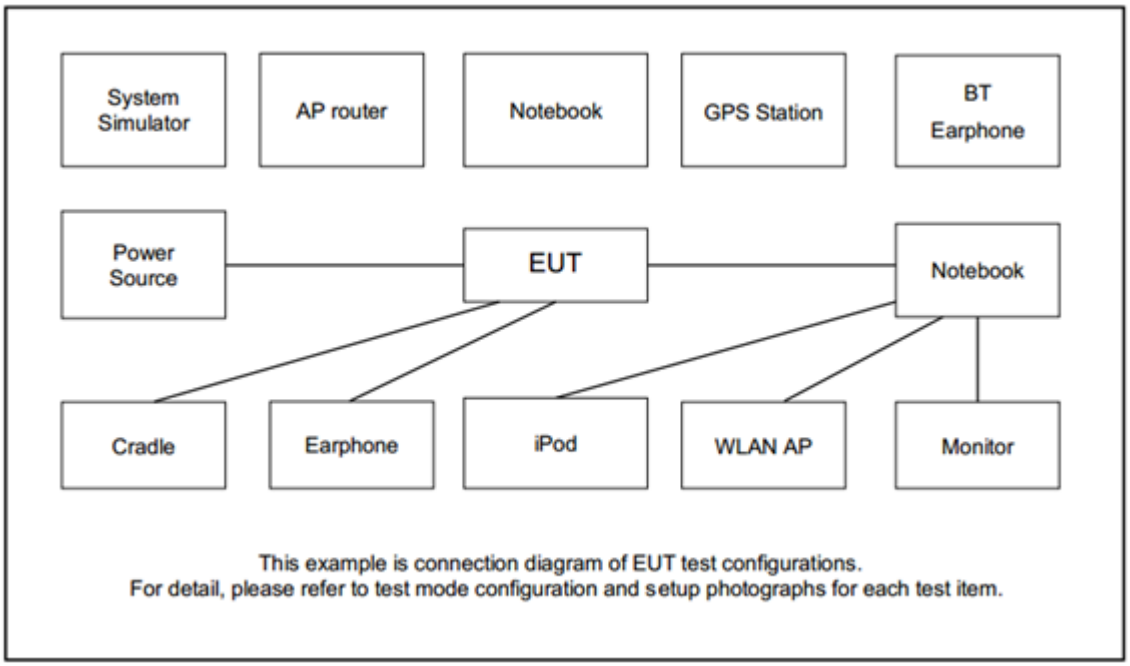
During all testing, EUT is in link mode with base station emulator at maximum power level.

For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Z plane) were recorded in this report.

Frequency range investigated for radiated emission is 30 MHz to 9000 MHz.

Conducted Test Cases	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	26	v	v	v	v	v	-	v	v	v	v	v	v	v	v	v
Peak-to-Average Ratio	26					v	-	v	v	v	v		v	v	v	v
26dB and 99% Bandwidth	26	v	v	v	v	v	-	v	v	v			v	v	v	v
Emission masks In-band emissions	26	v	v	v	v	v	-	v	v	v	v		v	v		v
Emission masks – Out of band emissions	26	v	v	v	v	v	-	v	v	v	v			v	v	v
Frequency Stability	26	-	-		v	v	-	v	v	v			v		v	
E.R.P.	26					v	-	v	v	v	v			v	v	v
Radiated Spurious Emission	26	Worst Case												v	v	v
Remark	1. The mark "**v** " means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. LTE Band26 transmit frequency for part22 rule is 824MHz-849MHz, for part90 rule is 814MHz-824MHz. ERP over 15MHz bandwidth complies the ERP limit line of part22 rule, therefore ERP of the partial frequency spectrum which falls within part 22 also complies.															

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

2.4 Measurement Results Explanation Example

For all conducted test items:

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

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

The following shows an offset computation example with RF cable loss 4.2 dB and a 10dB attenuator.

Example :

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.2 + 10 = 14.2 (dB)

2.5 Frequency List of Low/Middle/High Channels

LTE Band 26 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
15	Channel	26765	-	-
	Frequency	821.5	-	-
10	Channel	-	26740	-
	Frequency	-	819	-
5	Channel	26715	26740	26765
	Frequency	816.5	819	821.5
3	Channel	26705	26740	26775
	Frequency	815.5	819	822.5
1.4	Channel	26697	26740	26783
	Frequency	814.7	819	823.3

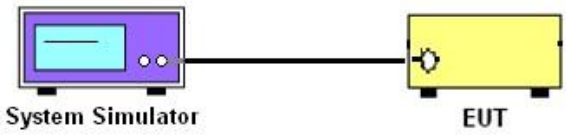
3 Conducted Test Items

3.1 Measuring Instruments

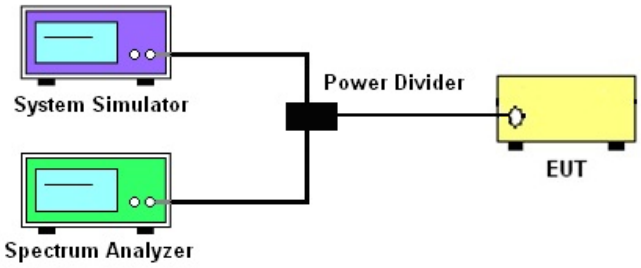
See list of measuring instruments of this test report.

3.1.1 Test Setup

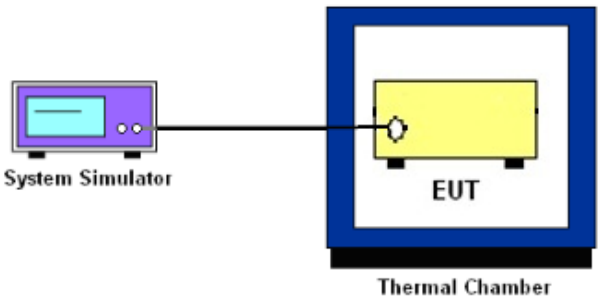
3.1.2 Conducted Output Power



3.1.3 Peak-to-Average Ratio, Occupied Bandwidth, Conducted Band-Edge, Emission Mask, Emissions Mask – Out Of Band Emissions, and Conducted Spurious Emission



3.1.4 Frequency Stability



3.1.5 Test Result of Conducted Test

Please refer to Appendix A.

3.2 Conducted Output Power Measurement and ERP Measurement

3.2.1 Description of the Conducted Output Power Measurement and ERP Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to enforce EUT transmitting at the maximum 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.

According to KDB 412172 D01 Power Approach,

EIRP = $P_T + G_T – L_C$, 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

3.2.2 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through 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.

3.3 Peak-to-Average Ratio

3.3.1 Description of the PAR Measurement

Reporting only

3.3.2 Test Procedures

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

3.4 99% Occupied Bandwidth and 26dB Bandwidth Measurement

3.4.1 Description of (Occupied) Bandwidth Limitations Measurement

The 99% 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 emission bandwidth is defined as the width of the signal between two points, located at the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

3.4.2 Test Procedures

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The 26dB and 99% occupied bandwidth (BW) of the middle channel for the highest RF power with full RB sizes were measured.

3.5 Emissions Mask Measurement

3.5.1 Description of Emissions Mask Measurement

Equipment used in this licensed to EA or non-EA systems shall comply with the emission mask provisions of FCC Part 90.691.(a)

(a) Out-of-band emission requirement shall apply only to the "outer" channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log_{10}(f/6.1) decibels or 50 + 10 Log_{10}(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + 10Log_{10}(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

3.5.2 Test Procedures

1. The EUT was connected to spectrum analyzer and base station via power divider.
2. The emissions mask of low and high channels for the highest RF powers were measured.
3. The measured RBW and the VBW set 3 times of RBW are then set in spectrum analyzer, and
4. the RBW correction factor 10log (1% of OBW/measured RBW)(dB) was compensated, if required.
5. The test results were shown below plots with a correction offset factor including cable loss, insertion loss of power divider.

3.6 Emissions Mask – Out Of Band Emissions Measurement

3.6.1 Description of Conducted Emissions Out of band emissions measurement

The power of any emission FCC Part 90.691 (a)(2) on any frequency removed from the assigned frequency by out of the authorized bandwidth at least 43 + 10 log (P) dB. It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

3.6.2 Test Procedures

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. 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.
3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)

3.7 Frequency Stability Measurement

3.7.1 Description of Frequency Stability Measurement

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

3.7.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.7.3 Test Procedures for Temperature Variation

1. The EUT was set up in the thermal chamber and connected with the base station.
1. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
2. 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.

3.7.4 Test Procedures for Voltage Variation

1. The EUT was placed in a temperature chamber at 20±5° C and connected with the base station.
2. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

3.8 Field Strength of Spurious Radiation Measurement

3.8.1 Description of Field Strength of Spurious Radiated Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E. The power of any emission FCC Part 90.691 on any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth at least 43 + 10 log (P) dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

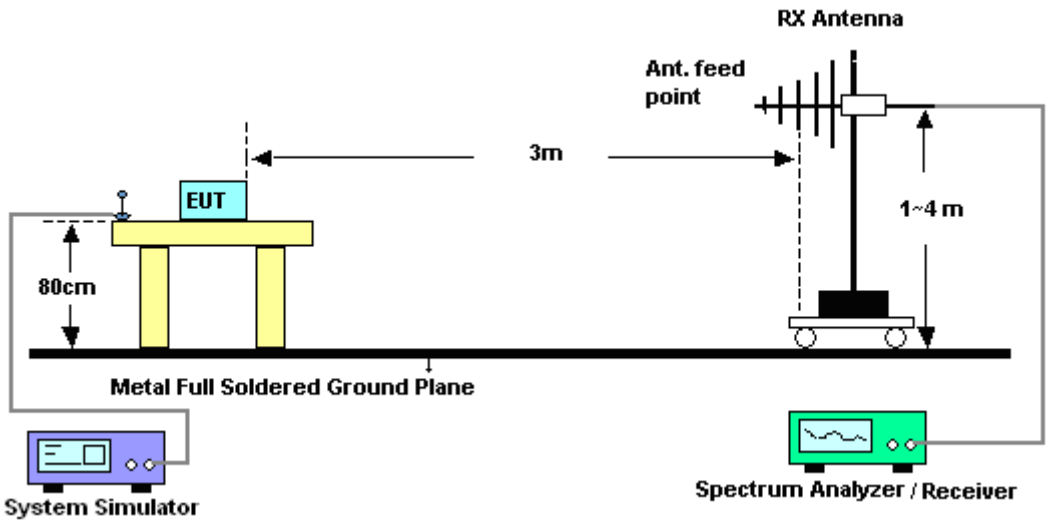
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43+10\log_{10}(P[\text{Watts}])$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

3.8.2 Test Procedures

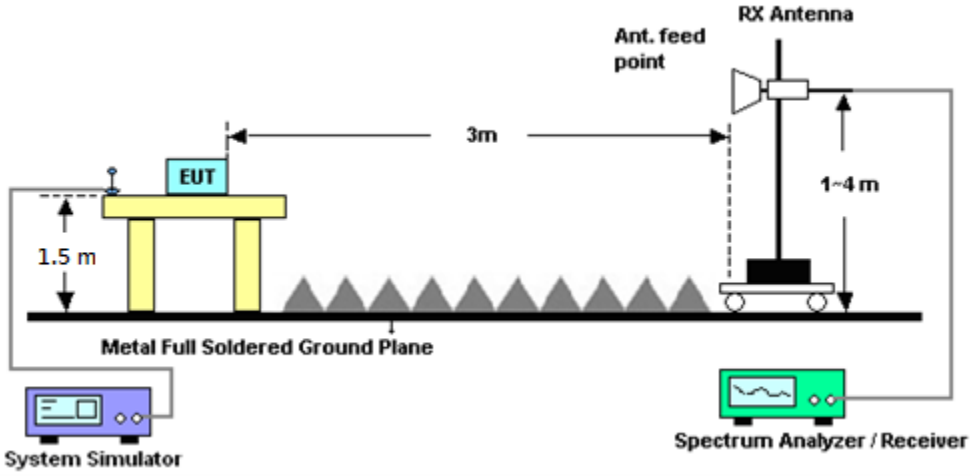
1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, Sweep = 500ms, Taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
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.
13. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

3.8.3 Test Setup

For radiated test from 30MHz to 1GHz



For radiated test above 1GHz



3.8.4 Test Result of Field Strength of Spurious Radiated

Please refer to Appendix B.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
LTE Base Station	Anritsu	MT8820C	6201432821	GSM/GPRS /WCDMA/LTE	Oct. 13, 2017	Jul. 01, 2018~ Jul. 26, 2018	Oct. 12, 2018	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV40	101397	10Hz~40GHz	Nov. 07, 2017	Jul. 01, 2018~ Jul. 26, 2018	Nov. 06, 2018	Conducted (TH05-HY)
Temperature Chamber	ESPEC	SH-641	92013720	-30℃~70℃	Aug. 28, 2017	Jul. 01, 2018~ Jul. 26, 2018	Aug. 27, 2018	Conducted (TH05-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL890001	1V~20V 0.5A~5A	Oct. 06, 2017	Jul. 01, 2018~ Jul. 26, 2018	Oct. 05, 2018	Conducted (TH05-HY)
Coupler	Warison	1-18GHz 20dB 25WSMA Directional Coupler	#B	1G~18GHz	Dec. 04, 2017	Jul. 01, 2018~ Jul. 26, 2018	Dec. 03, 2018	Conducted (TH05-HY)
Base Station (Measure)	Anritsu	MT8821C	6201664755	GSM / GPRS /WCDMA / LTE FDD/TDD with 44) /LTE-3CC DLCA,2CC ULCA	Mar. 26, 2018	Jul. 01, 2018~ Jul. 26, 2018	Mar. 25, 2019	Conducted (TH05-HY)
Amplifier	Sonoma-Instrument	310 N	187282	9KHz~1GHz	Dec. 21, 2016	Jun. 29, 2018~ Jul. 21, 2018	Dec. 20, 2018	Radiation (03CH13-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800N1D01N-06	40103&07	30MHz to 1GHz	Jan. 10, 2018	Jun. 29, 2018~ Jul. 21, 2018	Jan. 09, 2019	Radiation (03CH13-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1241	1GHz ~ 18GHz	Jun. 29, 2018	Jun. 29, 2018~ Jul. 21, 2018	Jun. 28, 2019	Radiation (03CH13-HY)
Preamplifier	Keysight	83017A	MY53270147	1GHz~26.5GHz	Feb. 02, 2018	Jun. 29, 2018~ Jul. 21, 2018	Feb. 01, 2019	Radiation (03CH13-HY)
Spectrum Analyzer	Keysight	N9010A	MY55370526	10Hz~44GHz	Mar. 15, 2018	Jun. 29, 2018~ Jul. 21, 2018	Mar. 14, 2019	Radiation (03CH13-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Jun. 29, 2018~ Jul. 21, 2018	N/A	Radiation (03CH13-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Jun. 29, 2018~ Jul. 21, 2018	N/A	Radiation (03CH13-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1522	1G~18GHz	May 10, 2018	Jun. 29, 2018~ Jul. 21, 2018	May 09, 2019	Radiation (03CH13-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 27, 2017	Jun. 29, 2018~ Jul. 21, 2018	Nov. 26, 2018	Radiation (03CH13-HY)
Signal Generator	Anritsu	MG3694C	163401	0.1Hz~40GHz	Jan. 15, 2018	Jun. 29, 2018~ Jul. 21, 2018	Jan. 14, 2019	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0030/126E	30M-18G	Jan. 22, 2018	Jun. 29, 2018~ Jul. 21, 2018	Jan. 21, 2019	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	335041/4	30M-18G	Jan. 22, 2018	Jun. 29, 2018~ Jul. 21, 2018	Jan. 21, 2019	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24961/4	30M~18GHz	Jan. 22, 2018	Jun. 29, 2018~ Jul. 21, 2018	Jan. 21, 2019	Radiation (03CH13-HY)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30M~40GHz	Oct. 17, 2017	Jun. 29, 2018~ Jul. 21, 2018	Oct. 16, 2018	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30M~40GHz	Oct. 17, 2017	Jun. 29, 2018~ Jul. 21, 2018	Oct. 16, 2018	Radiation (03CH13-HY)
Software	AUDIX	E3 6.2009-8-24c	RK-001124	N/A	N/A	Jun. 29, 2018~ Jul. 21, 2018	N/A	Radiation (03CH13-HY)
Preamplifier	Jet-Power	JPA0118-55-303	1710001800054001	1GHz~18GHz	Apr. 16, 2018	Jun. 29, 2018~ Jul. 21, 2018	Apr. 15, 2019	Radiation (03CH13-HY)
Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 16, 2018	Jun. 29, 2018~ Jul. 21, 2018	Jul. 15, 2019	Radiation (03CH13-HY)
Filter	Wainwright	WLKS1200-8SS	SN3	1.2G Low Pass	Nov. 21, 2017	Jun. 29, 2018~ Jul. 21, 2018	Nov. 20, 2018	Radiation (03CH13-HY)
Filter	Wainwright	WHKX12-1080-1200-1500-60SS	SN2	1.2G High Pass	Sep. 18, 2017	Jun. 29, 2018~ Jul. 21, 2018	Sep. 17, 2018	Radiation (03CH13-HY)
Filter	Wainwright	WHKX12-2700-3000-18000-60SS	SN3	2.7G High Pass	Sep. 18, 2017	Jun. 29, 2018~ Jul. 21, 2018	Sep. 17, 2018	Radiation (03CH13-HY)
Notch Filter	Wainwright	WRCD1710-1980-10-40-10SSK	SN1	1710-1980	Nov. 03, 2017	Jun. 29, 2018~ Jul. 21, 2018	Nov. 02, 2018	Radiation (03CH13-HY)
Notch Filter	Wainwright	WTRCT5-824-849-20-70-60SSK	SN1	824-849	May 22, 2018	Jun. 29, 2018~ Jul. 21, 2018	May 21, 2019	Radiation (03CH13-HY)
Notch Filter	Wainwright	WTRCT10-2500-2570-20-40-40SS	SN1	2500-2570	May 22, 2018	Jun. 29, 2018~ Jul. 21, 2018	May 21, 2019	Radiation (03CH13-HY)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.07

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.48

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.92

Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

LTE Band 26 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
15	1	0	QPSK	24.35	-	-
15	1	37		**24.46**	-	-
15	1	74		24.32	-	-
15	36	0		23.33	-	-
15	36	20		23.34	-	-
15	36	39		23.36	-	-
15	75	0		23.35	-	-
15	1	0	16-QAM	23.43	-	-
15	1	37		23.44	-	-
15	1	74		23.35	-	-
15	36	0		22.32	-	-
15	36	20		22.30	-	-
15	36	39		22.50	-	-
15	75	0		22.38	-	-
15	1	0	64-QAM	22.46	-	-
15	1	37		22.31	-	-
15	1	74		22.38	-	-
15	36	0		21.34	-	-
15	36	20		21.33	-	-
15	36	39		21.32	-	-
15	75	0		21.37	-	-
10	1	0	QPSK	-	24.43	-
10	1	25		-	24.25	-
10	1	49		-	24.19	-
10	25	0		-	23.32	-
10	25	12		-	23.29	-
10	25	25		-	23.28	-
10	50	0		-	23.29	-
10	1	0	16-QAM	-	23.35	-
10	1	25		-	23.38	-
10	1	49		-	23.32	-
10	25	0		-	22.44	-
10	25	12		-	22.41	-
10	25	25		-	22.31	-
10	50	0		-	22.38	-

10	1	0	64-QAM	-	22.34	-
10	1	25		-	22.30	-
10	1	49		-	22.34	-
10	25	0		-	21.49	-
10	25	12		-	21.50	-
10	25	25		-	21.43	-
10	50	0		-	21.47	-

LTE Band 26 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
5	1	0	QPSK	24.44	24.34	24.22
5	1	12		24.41	24.26	24.15
5	1	24		24.45	24.24	24.15
5	12	0		23.38	23.30	23.20
5	12	7		23.35	23.32	23.19
5	12	13		23.49	23.27	23.16
5	25	0		23.34	23.29	23.18
5	1	0	16-QAM	23.41	23.38	23.48
5	1	12		23.38	23.39	23.50
5	1	24		23.36	23.30	23.41
5	12	0		22.38	22.42	22.26
5	12	7		22.36	22.38	22.30
5	12	13		22.39	22.32	22.24
5	25	0		22.31	22.39	22.29
5	1	0	64-QAM	22.47	22.37	22.49
5	1	12		22.44	22.37	22.39
5	1	24		22.40	22.30	22.35
5	12	0		21.37	21.31	21.30
5	12	7		21.36	21.50	21.33
5	12	13		21.32	21.45	21.28
5	25	0		21.39	21.47	21.29
3	1	0	QPSK	**24.46**	24.31	24.17
3	1	8		24.45	24.24	24.14
3	1	14		24.45	24.23	24.12
3	8	0		23.32	23.32	23.17
3	8	4		23.35	23.33	23.19
3	8	7		23.33	23.27	23.17
3	15	0		23.32	23.27	23.16
3	1	0	16-QAM	23.48	23.38	23.42
3	1	8		23.41	23.38	23.39
3	1	14		23.46	23.37	23.42
3	8	0		22.44	22.42	22.31
3	8	4		22.37	22.46	22.32
3	8	7		22.35	22.40	22.30
3	15	0		22.30	22.38	22.27
3	1	0	64-QAM	22.40	22.36	22.35
3	1	8		22.42	22.32	22.38
3	1	14		22.39	22.35	22.34
3	8	0		21.33	21.45	21.29
3	8	4		21.37	21.50	21.30
3	8	7		21.39	21.45	21.26
3	15	0		21.39	21.45	21.22

LTE Band 26 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
1.4	1	0	QPSK	24.11	23.90	23.75
1.4	1	3		24.19	23.96	23.82
1.4	1	5		24.10	23.85	23.73
1.4	3	0		24.17	23.95	23.81
1.4	3	1		24.22	23.95	23.83
1.4	3	3		24.15	23.93	23.80
1.4	6	0		23.15	22.91	22.82
1.4	1	0	16-QAM	23.36	23.26	23.12
1.4	1	3		23.48	23.28	23.23
1.4	1	5		23.36	23.18	23.08
1.4	3	0		23.21	23.01	22.87
1.4	3	1		23.21	23.00	22.94
1.4	3	3		23.22	22.93	22.81
1.4	6	0		22.30	22.09	21.93
1.4	1	0	64-QAM	22.31	22.09	22.01
1.4	1	3		22.42	22.22	22.07
1.4	1	5		22.29	22.08	22.02
1.4	3	0		22.34	22.13	21.98
1.4	3	1		22.36	22.17	22.01
1.4	3	3		22.35	22.08	21.99
1.4	6	0		21.24	21.00	20.87

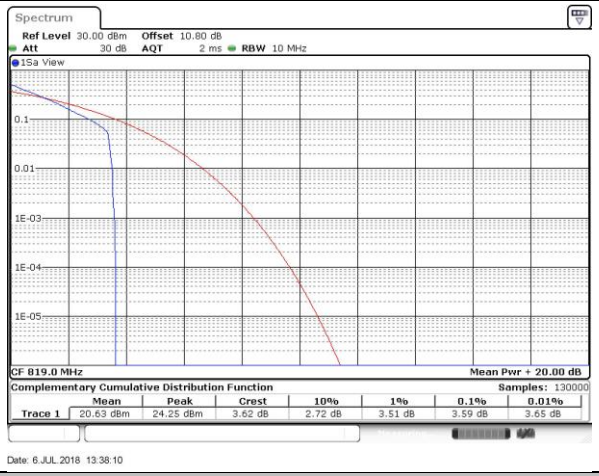
LTE Band 26_Part 90S

Peak-to-Average Ratio

Mode	LTE Band 26 / 10MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	Full RB	Result
Lowest CH	-	-	-	-	PASS
Middle CH	3.59	4.67	5.42	5.91	
Highest CH	-	-	-	-	
Mode	LTE Band 26 / 10MHz				
Mod.	64QAM				Limit: 13dB
RB Size	1RB	Full RB			Result
Lowest CH			-	-	PASS
Middle CH	5.10	6.00	-	-	
Highest CH			-	-	

LTE Band 26 / 10MHz / QPSK

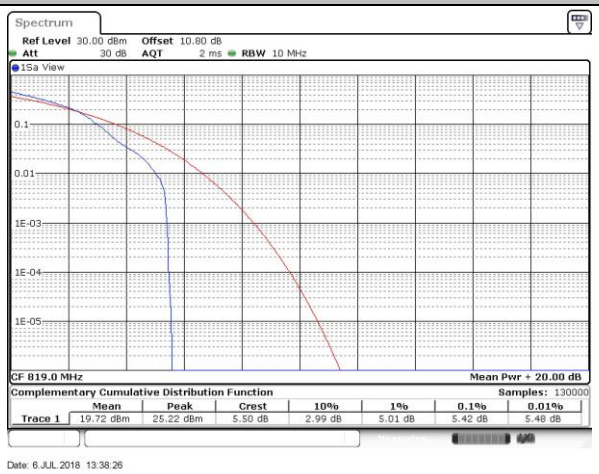
Middle Channel / 1RB



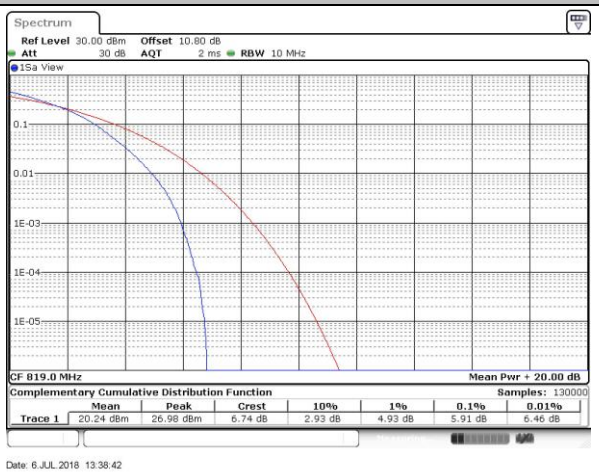
Middle Channel / Full RB

LTE Band 26 / 10MHz / 16QAM

Middle Channel / 1RB



Middle Channel / Full RB



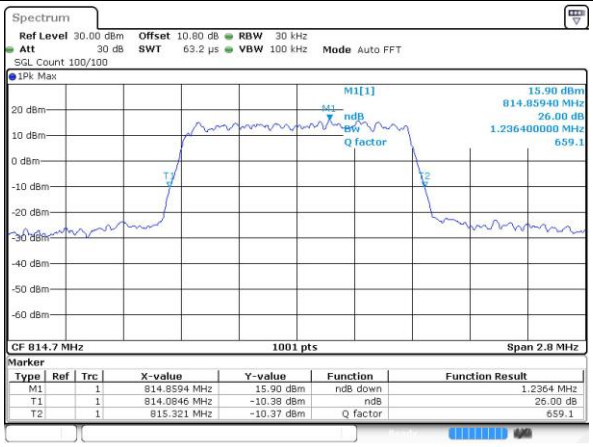
LTE Band 26 / 10MHz / 64QAM	
Middle Channel / 1RB	**Middle Channel / Full RB**

26dB Bandwidth

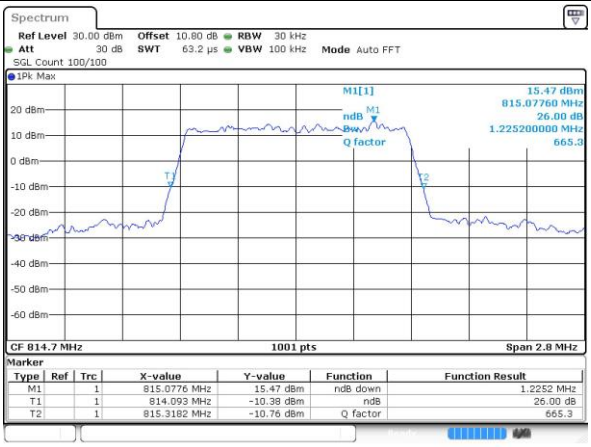
Mode	LTE Band 26 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	1.24	1.23	3.03	3.04	4.94	4.90	-	-	14.69	14.42	-	-
Middle CH	1.22	1.24	3.02	3.06	4.92	4.92	9.83	9.83	-	-	-	-
Highest CH	1.23	1.22	2.97	3.02	4.86	4.78	-	-	-	-	-	-
Mode	LTE Band 26 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH	1.22	-	3.02	-	4.88	-	-	-	14.36	-	-	-
Middle CH	1.23	-	3.03	-	4.81	-	9.87	-	-	-	-	-
Highest CH	1.22	-	3.02	-	4.93	-	-	-	-	-	-	-

LTE Band 26

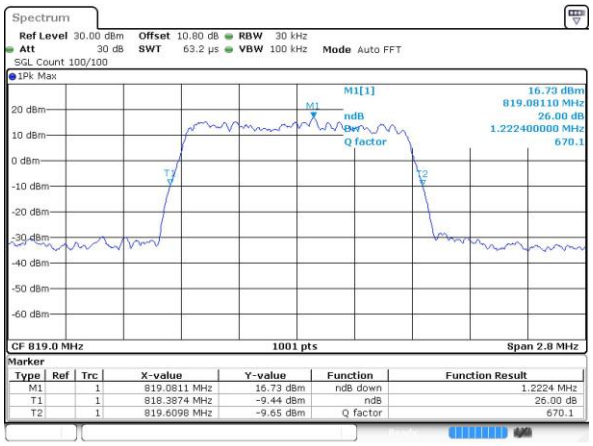
Lowest Channel / 1.4MHz / QPSK



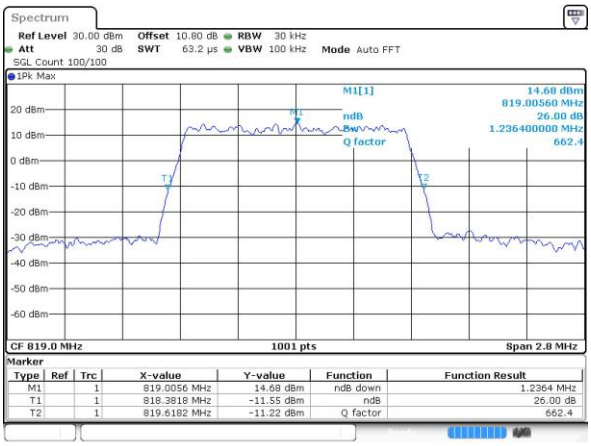
Lowest Channel / 1.4MHz / 16QAM



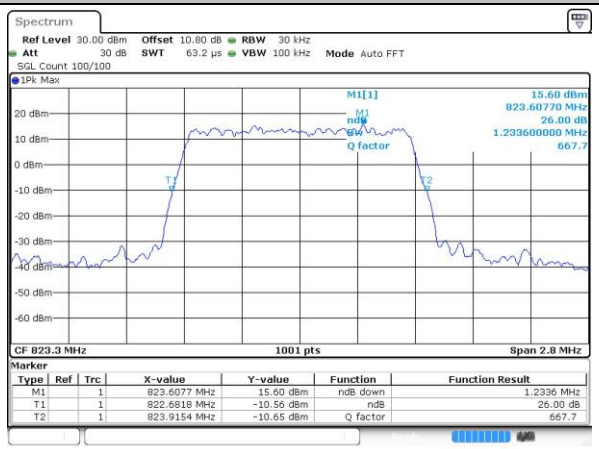
Middle Channel / 1.4MHz / QPSK



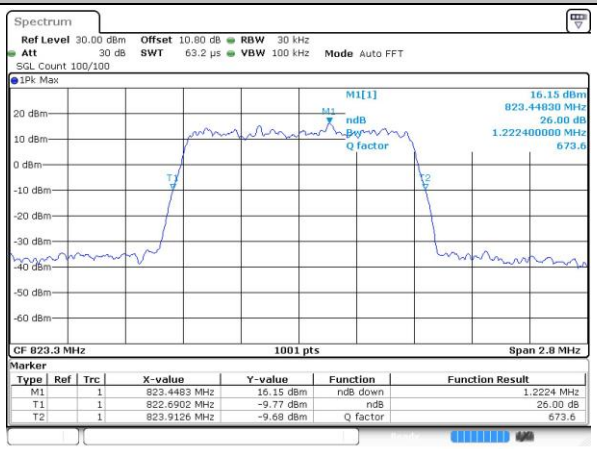
Middle Channel / 1.4MHz / 16QAM



Highest Channel / 1.4MHz / QPSK

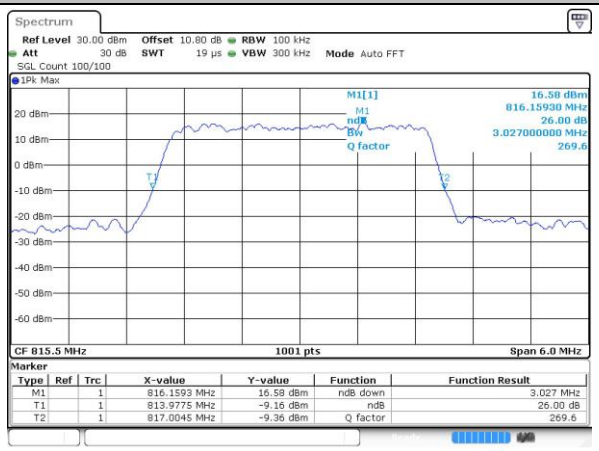


Highest Channel / 1.4MHz / 16QAM

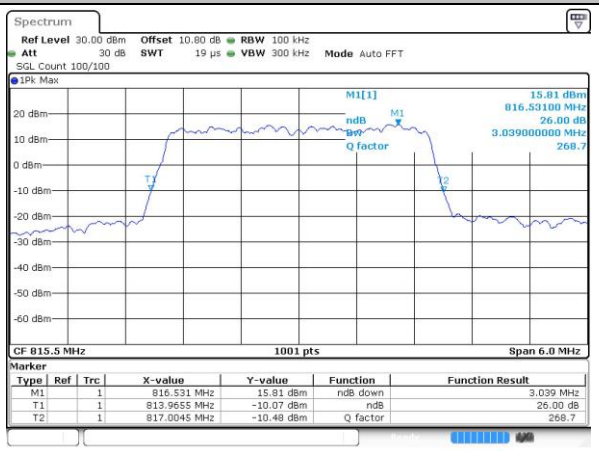


LTE Band 26

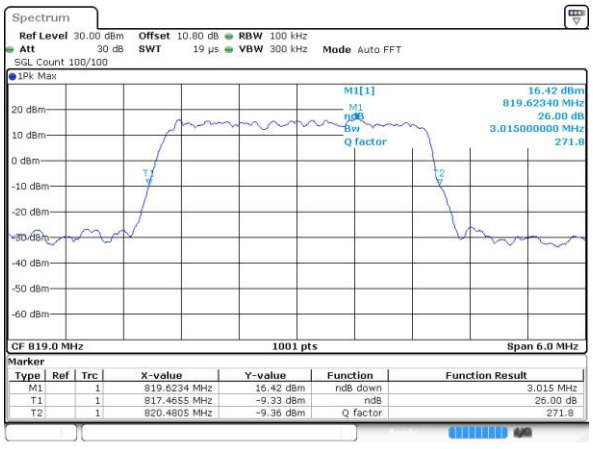
Lowest Channel / 3MHz / QPSK



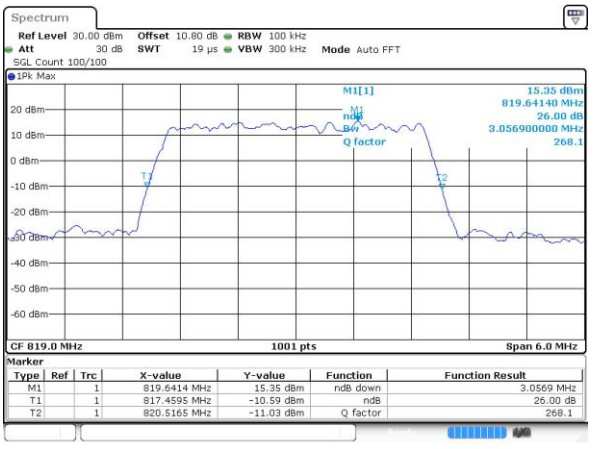
Lowest Channel / 3MHz / 16QAM



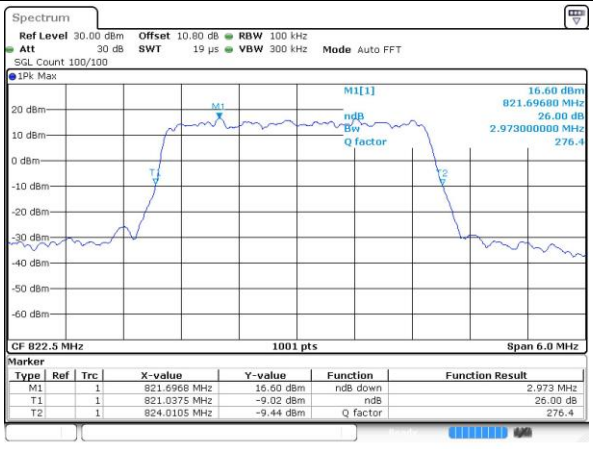
Middle Channel / 3MHz / QPSK



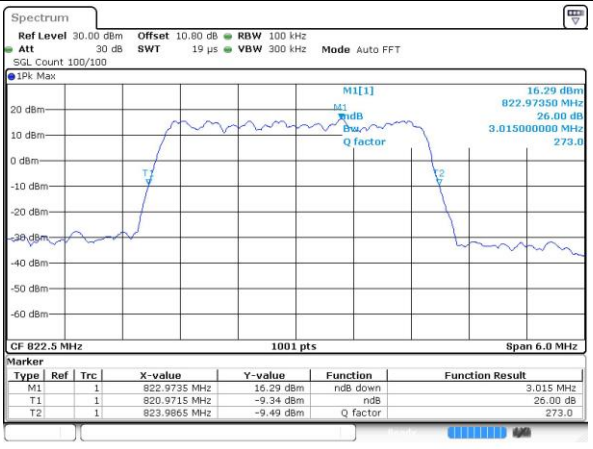
Middle Channel / 3MHz / 16QAM



Highest Channel / 3MHz / QPSK

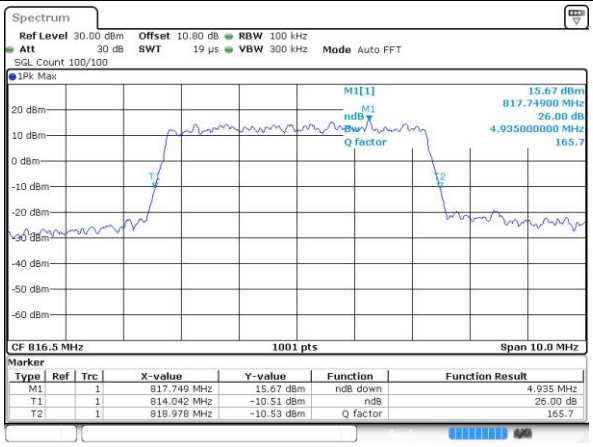


Highest Channel / 3MHz / 16QAM

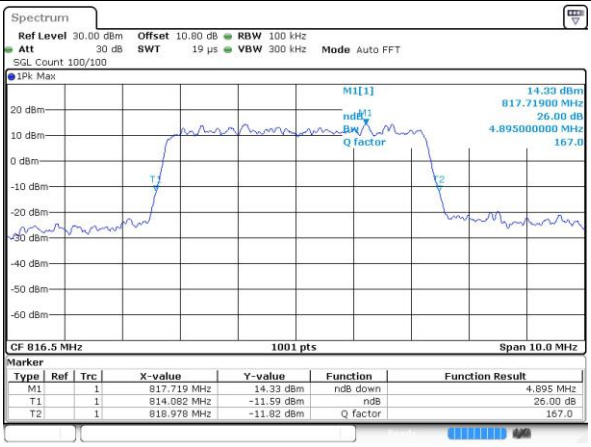


LTE Band 26

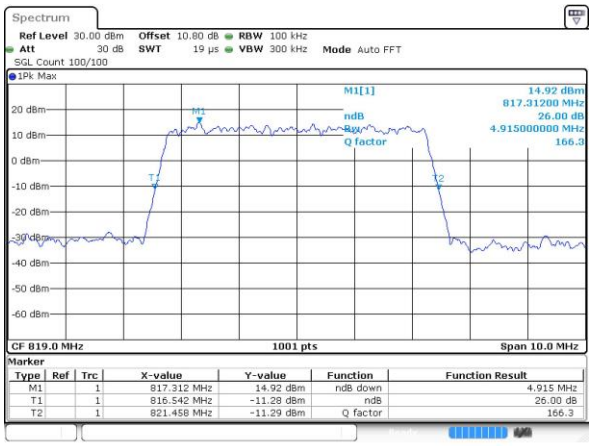
Lowest Channel / 5MHz / QPSK



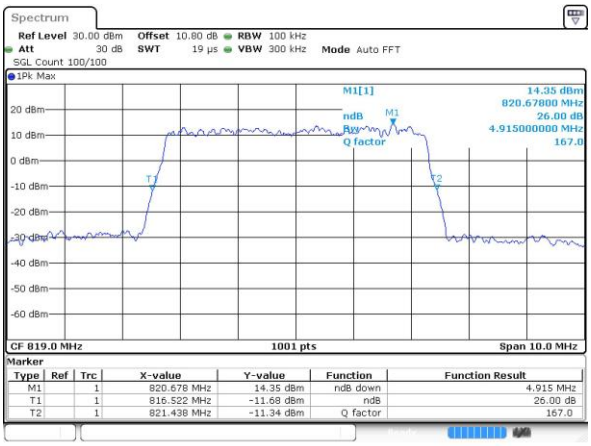
Lowest Channel / 5MHz / 16QAM



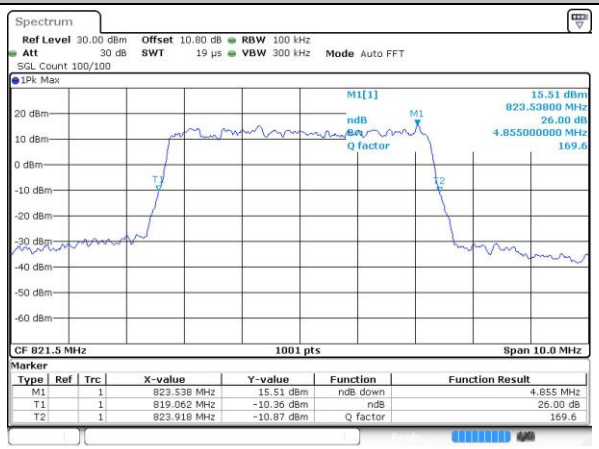
Middle Channel / 5MHz / QPSK



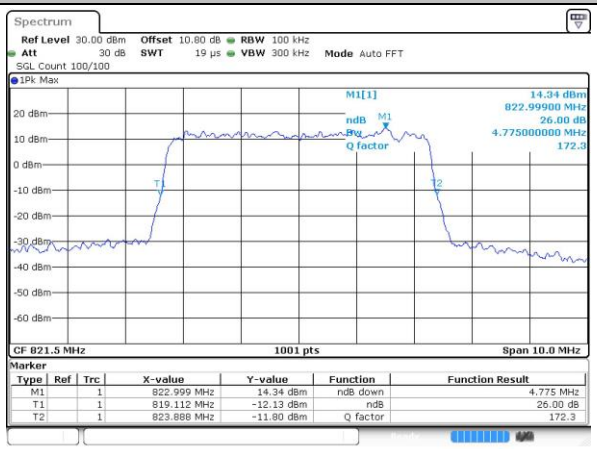
Middle Channel / 5MHz / 16QAM



Highest Channel / 5MHz / QPSK

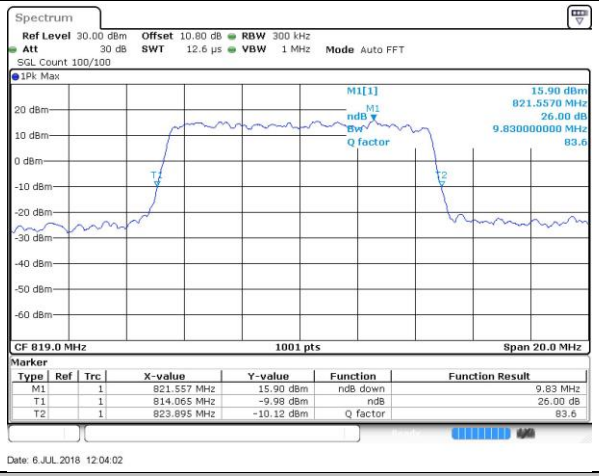


Highest Channel / 5MHz / 16QAM

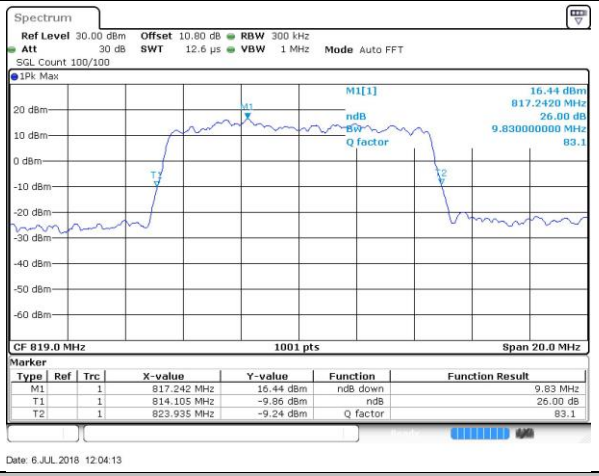


LTE Band 26

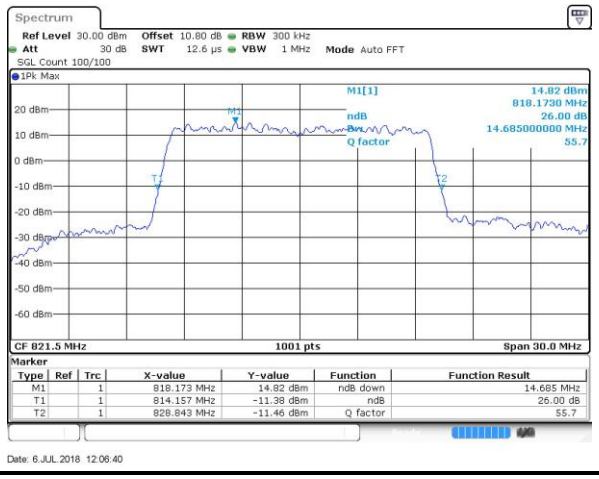
Middle Channel / 10MHz / QPSK



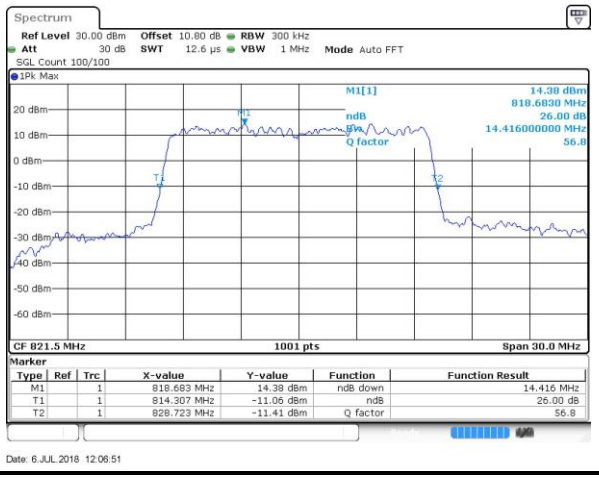
Middle Channel / 10MHz / 16QAM



Lowest Channel / 15MHz / QPSK

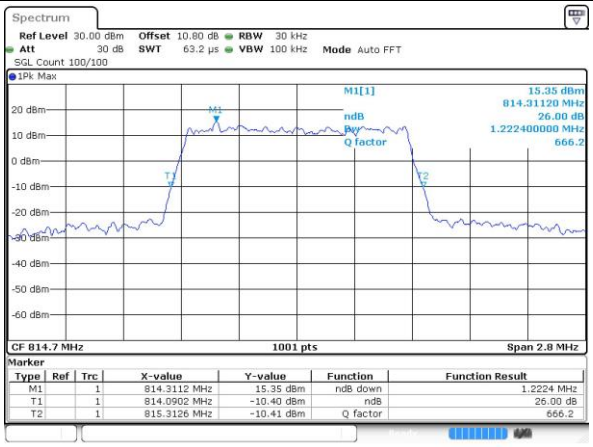


Lowest Channel / 15MHz / 16QAM

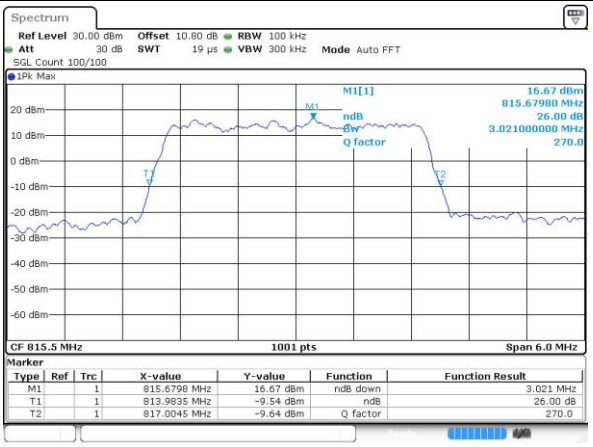


LTE Band 26

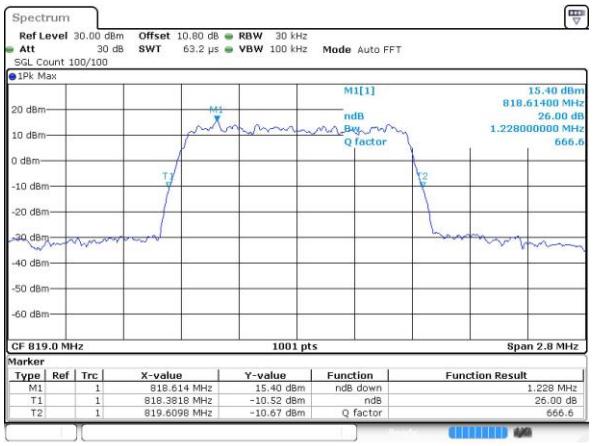
Lowest Channel / 1.4MHz / 64QAM



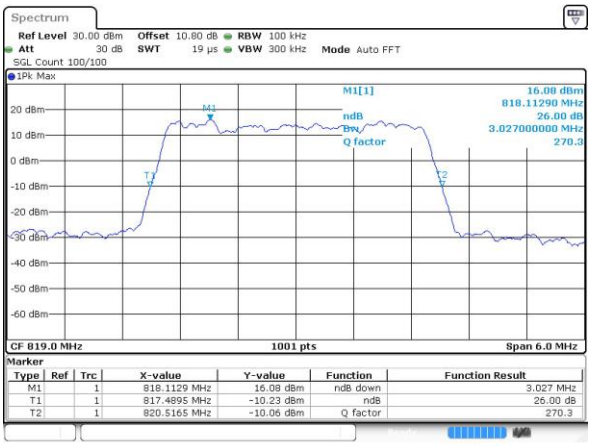
Lowest Channel / 3MHz / 64QAM



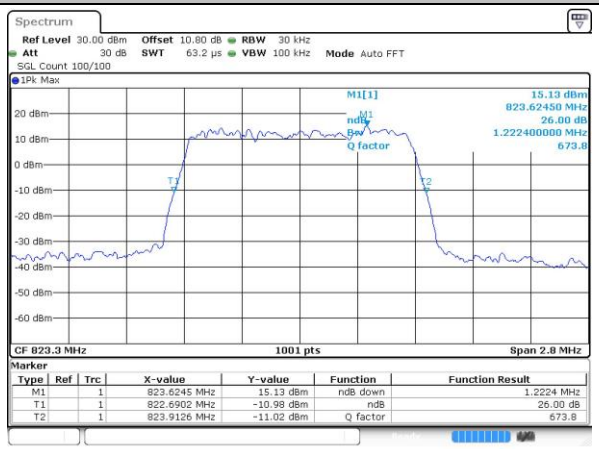
Middle Channel / 1.4MHz / 64QAM



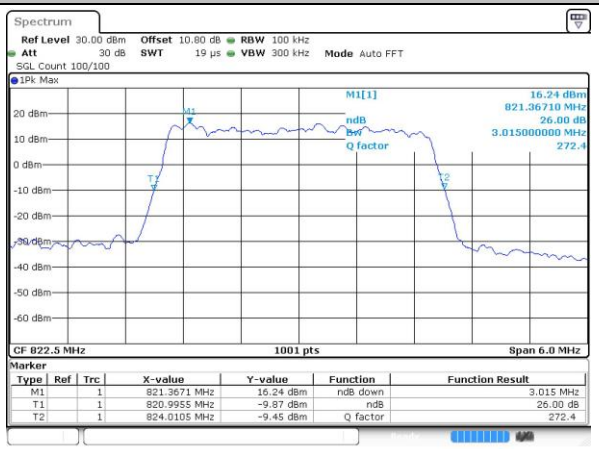
Middle Channel / 3MHz / 64QAM



Highest Channel / 1.4MHz / 64QAM

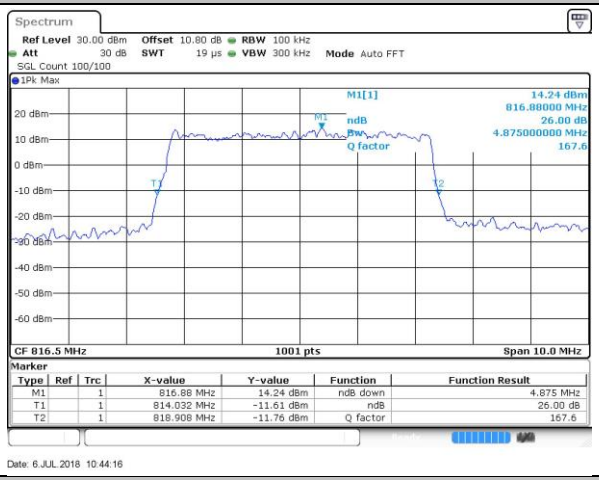


Highest Channel / 3MHz / 64QAM

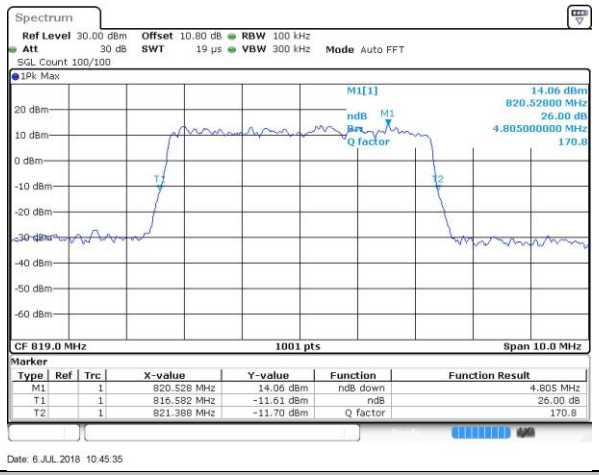


LTE Band 26

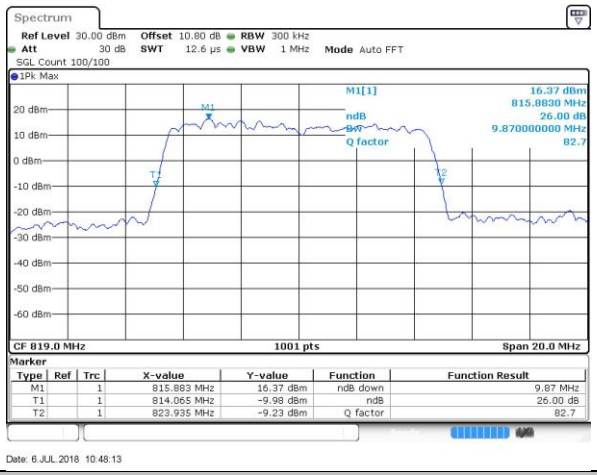
Lowest Channel / 5MHz / 64QAM



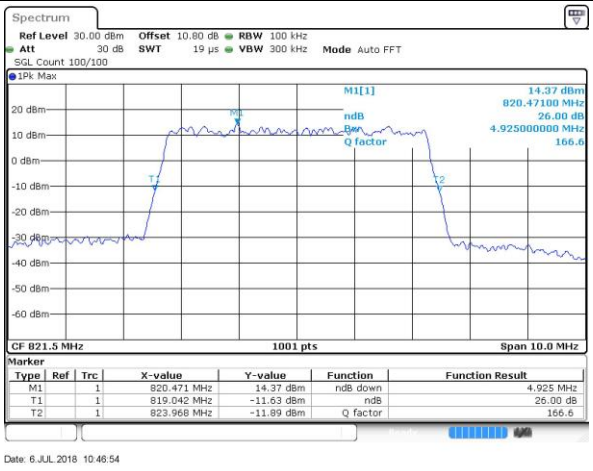
Middle Channel / 5MHz / 64QAM

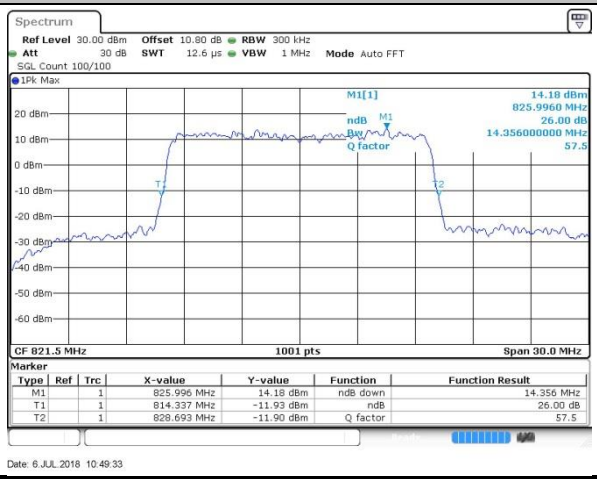


Middle Channel / 10MHz / 64QAM



Highest Channel / 5MHz / 64QAM



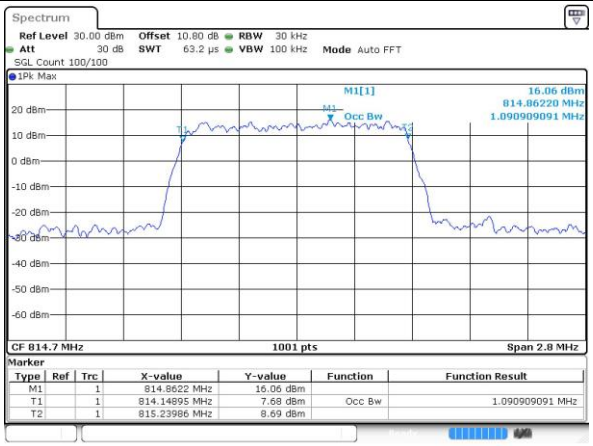
LTE Band 26	
Middle Channel / 15MHz / 64QAM	
	

Occupied Bandwidth

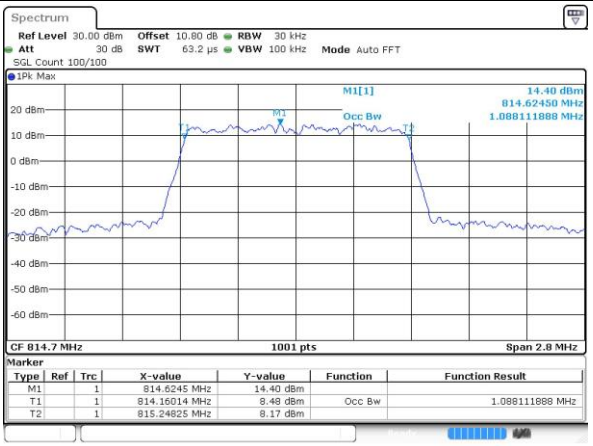
Mode	LTE Band 26 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	1.09	1.09	2.72	2.72	4.50	4.49	-	-	13.43	13.46	-	-
Middle CH	1.09	1.09	2.72	2.70	4.49	4.49	9.01	9.01	-	-	-	-
Highest CH	1.09	1.09	2.72	2.71	4.51	4.47	-	-	-	-	-	-
Mode	LTE Band 26 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH	1.10	-	2.73	-	4.49	-	-	-	13.43	-	-	-
Middle CH	1.09	-	2.72	-	4.48	-	9.03	-	-	-	-	-
Highest CH	1.09	-	2.72	-	4.48	-	-	-	-	-	-	-

LTE Band 26

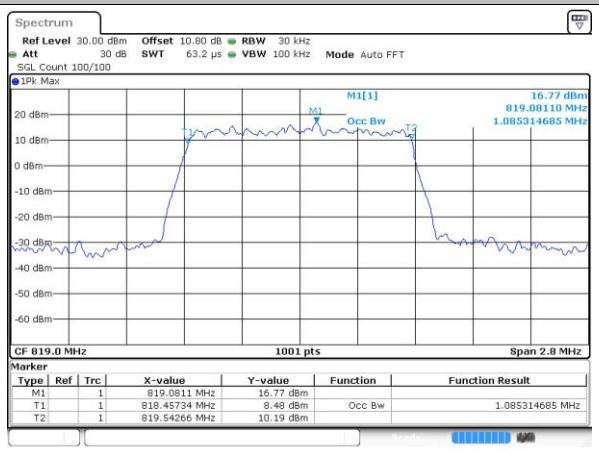
Lowest Channel / 1.4MHz / QPSK



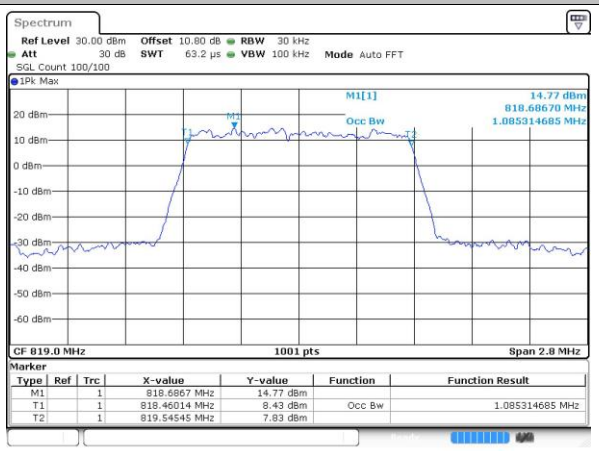
Lowest Channel / 1.4MHz / 16QAM



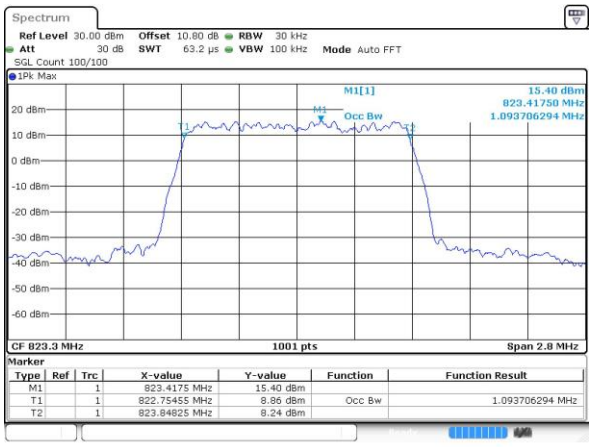
Middle Channel / 1.4MHz / QPSK



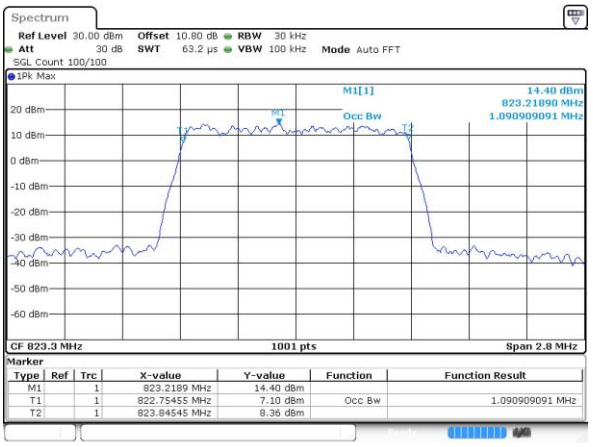
Middle Channel / 1.4MHz / 16QAM



Highest Channel / 1.4MHz / QPSK

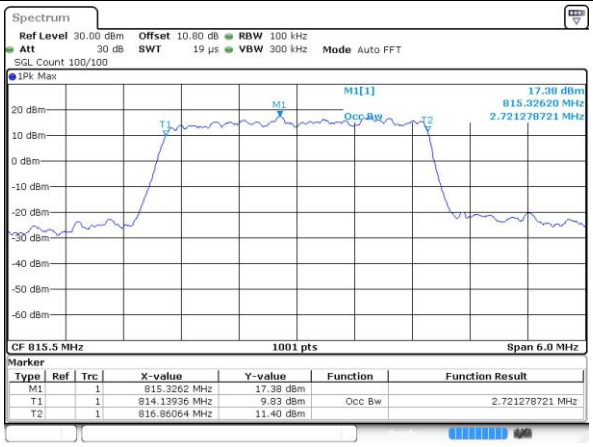


Highest Channel / 1.4MHz / 16QAM

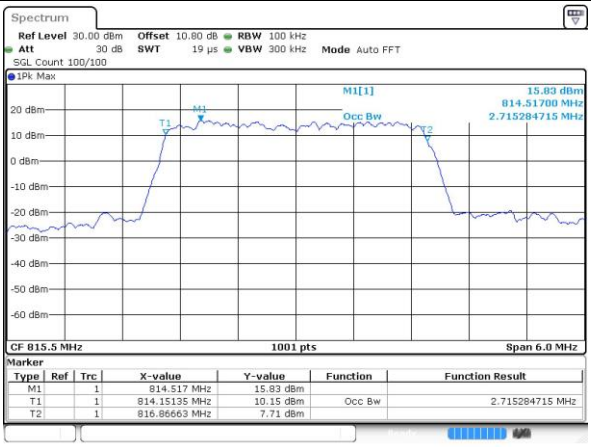


LTE Band 26

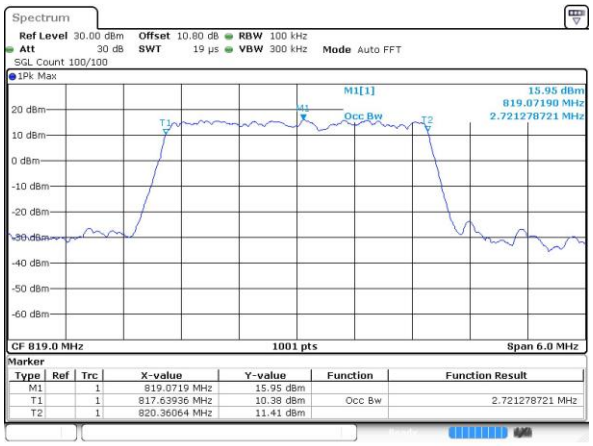
Lowest Channel / 3MHz / QPSK



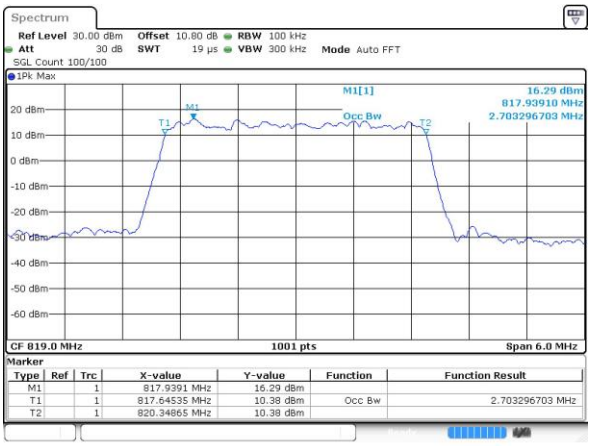
Lowest Channel / 3MHz / 16QAM



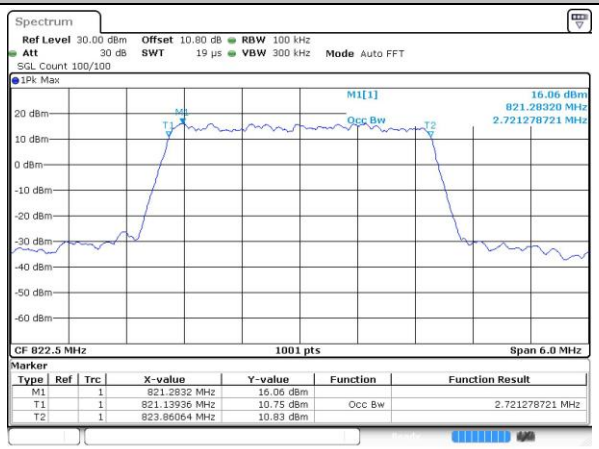
Middle Channel / 3MHz / QPSK



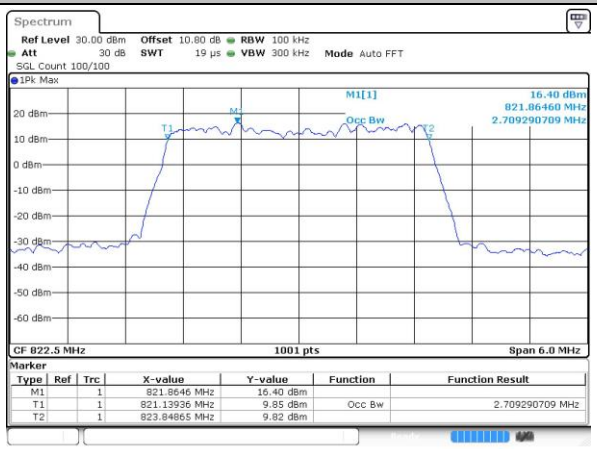
Middle Channel / 3MHz / 16QAM



Highest Channel / 3MHz / QPSK

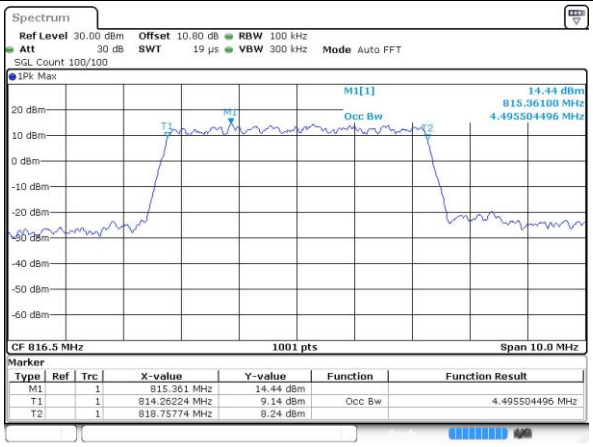


Highest Channel / 3MHz / 16QAM

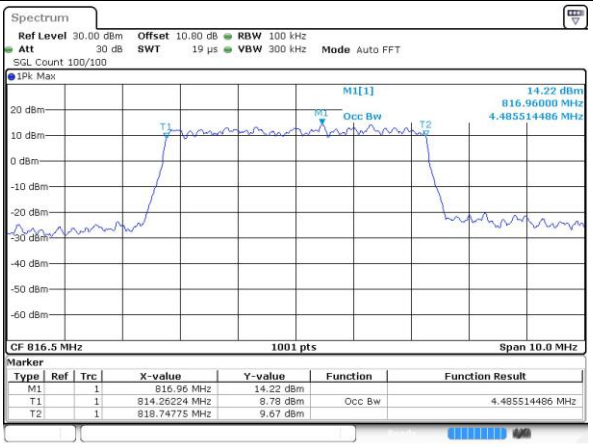


LTE Band 26

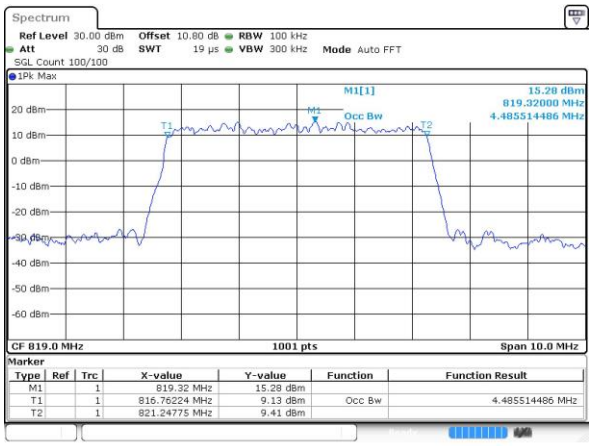
Lowest Channel / 5MHz / QPSK



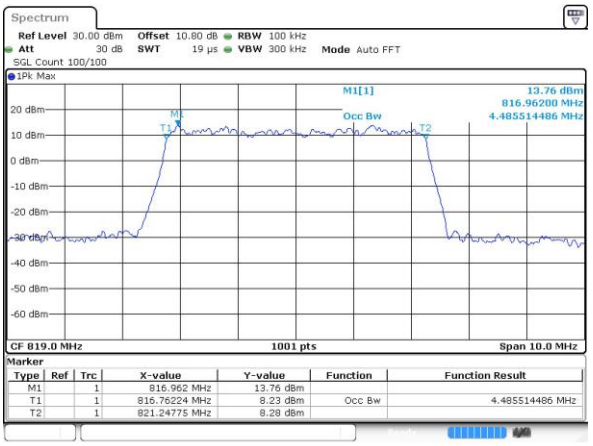
Lowest Channel / 5MHz / 16QAM



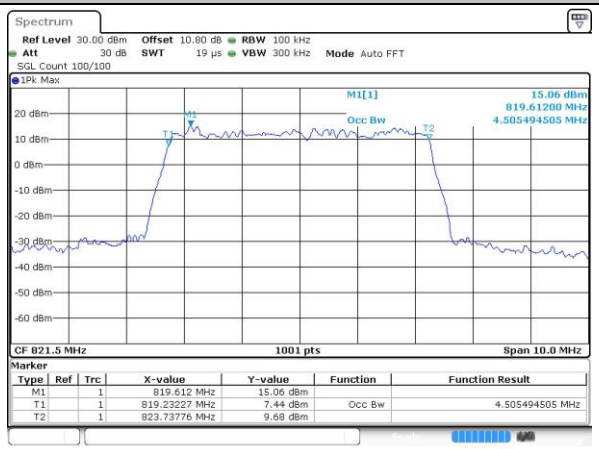
Middle Channel / 5MHz / QPSK



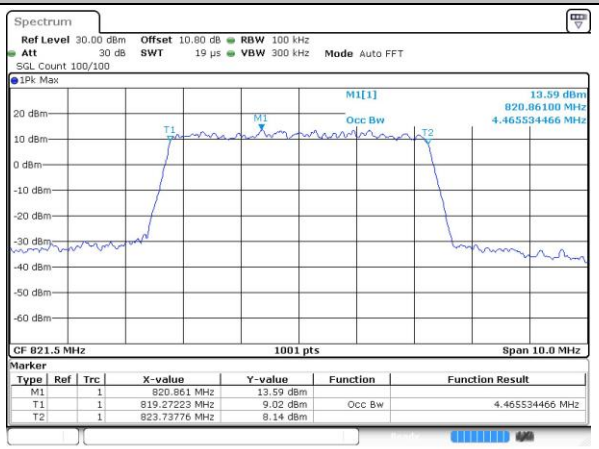
Middle Channel / 5MHz / 16QAM



Highest Channel / 5MHz / QPSK

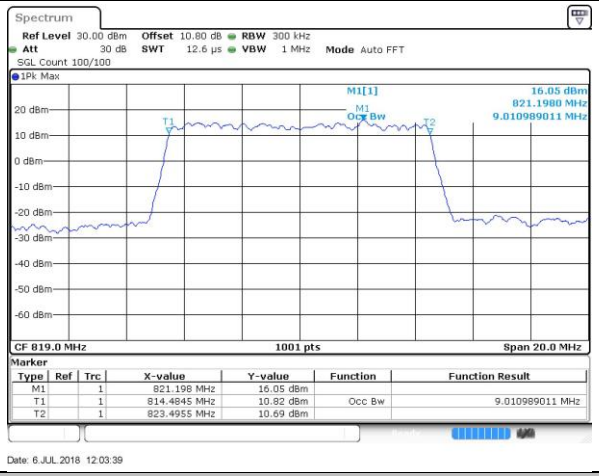


Highest Channel / 5MHz / 16QAM

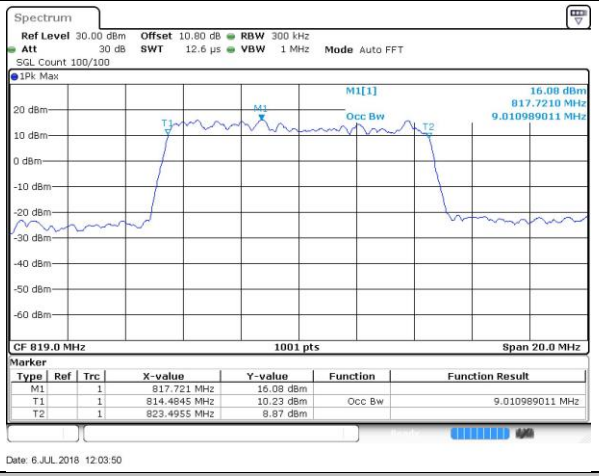


LTE Band 26

Middle Channel / 10MHz / QPSK

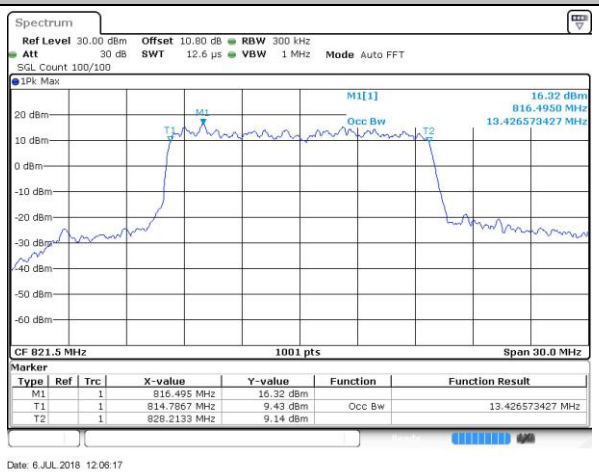


Middle Channel / 10MHz / 16QAM

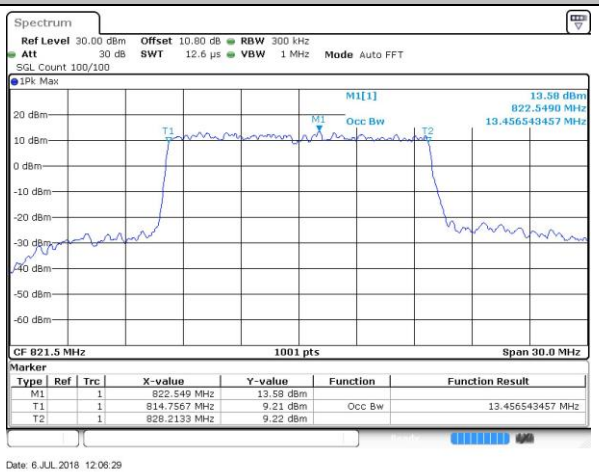


LTE Band 26

Lowest Channel / 15MHz / QPSK

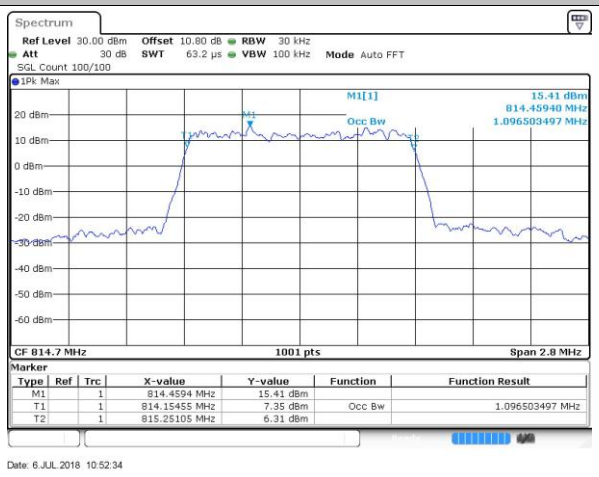


Lowest Channel / 15MHz / 16QAM

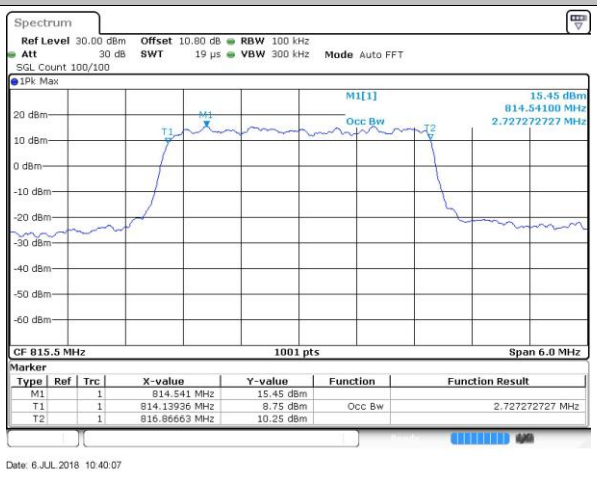


LTE Band 26

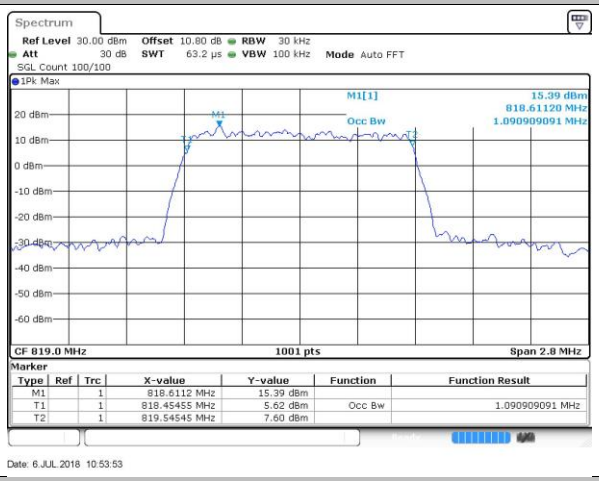
Lowest Channel / 1.4MHz / 64QAM



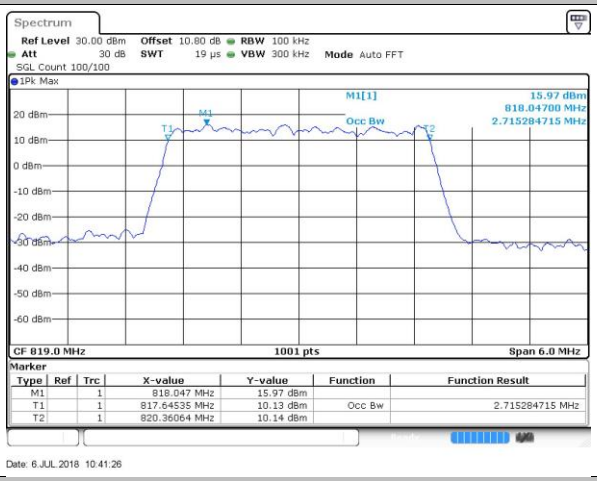
Lowest Channel / 3MHz / 64QAM



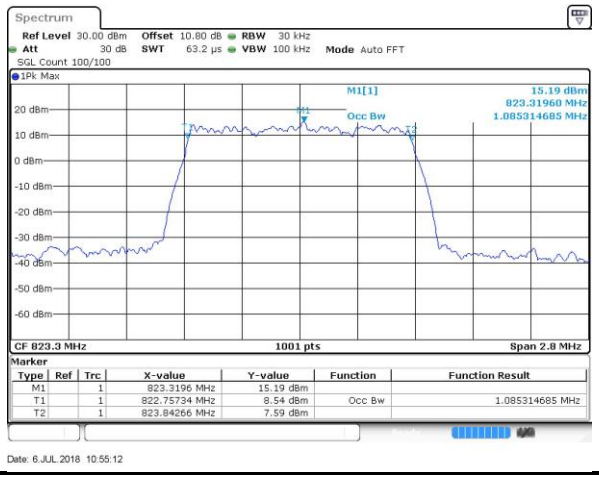
Middle Channel / 1.4MHz / 64QAM



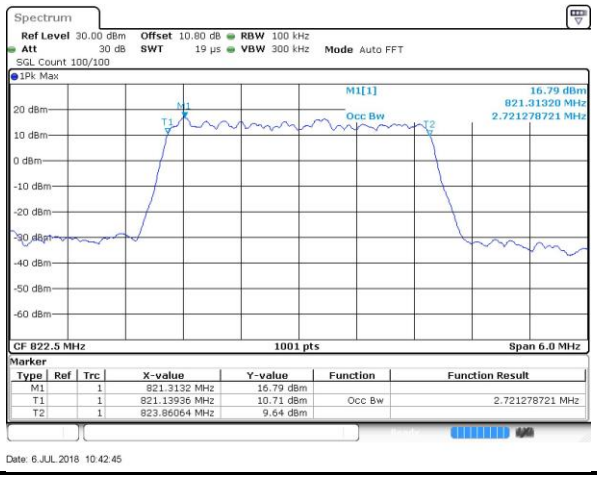
Middle Channel / 3MHz / 64QAM



Highest Channel / 1.4MHz / 64QAM

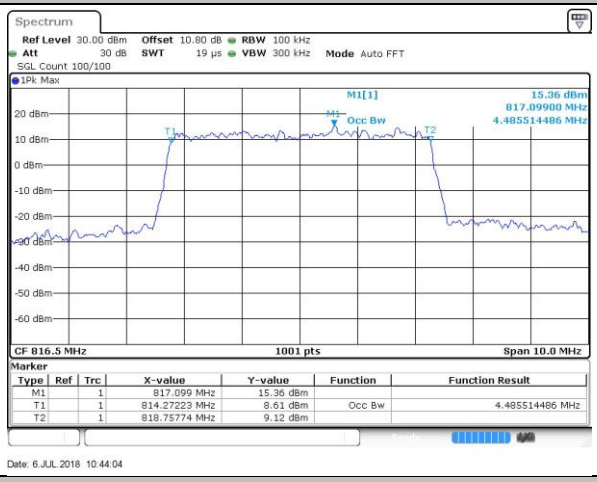


Highest Channel / 3MHz / 64QAM

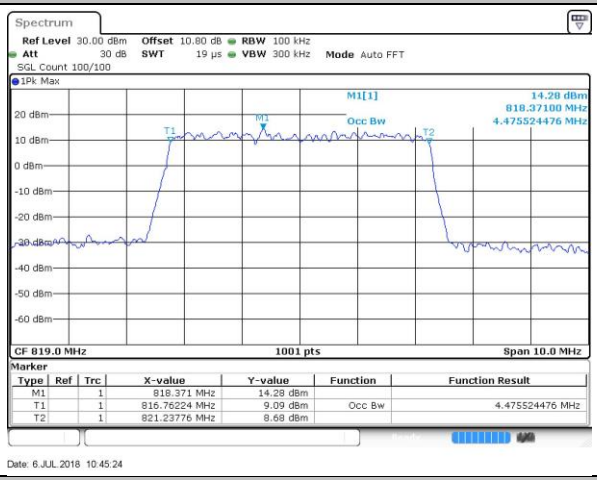


LTE Band 26

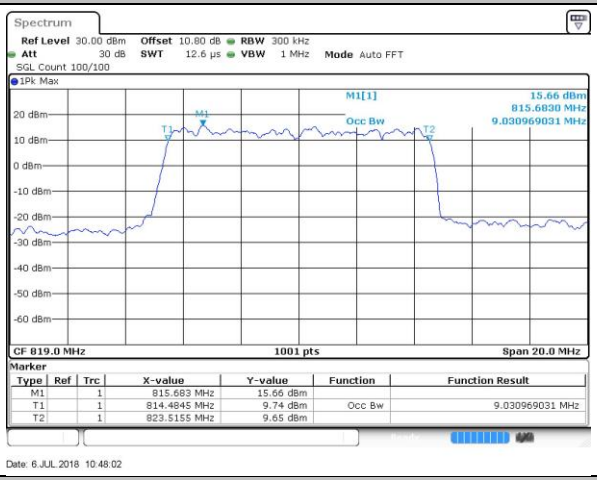
Lowest Channel / 5MHz / 64QAM



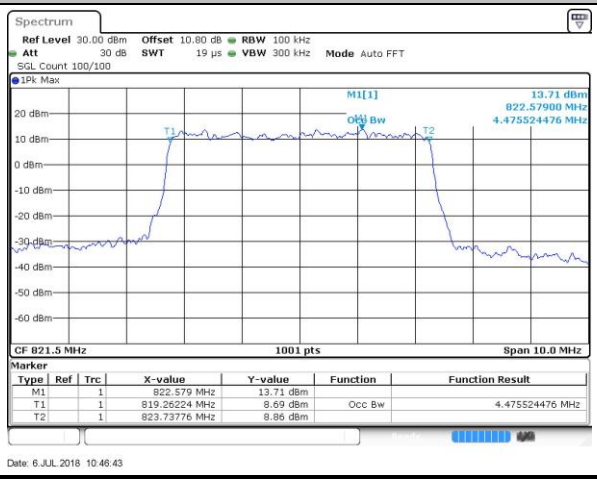
Middle Channel / 5MHz / 64QAM

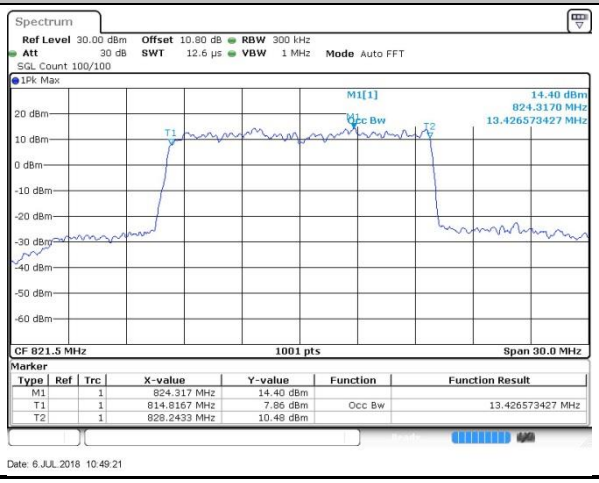


Middle Channel / 10MHz / 64QAM



Highest Channel / 5MHz / 64QAM

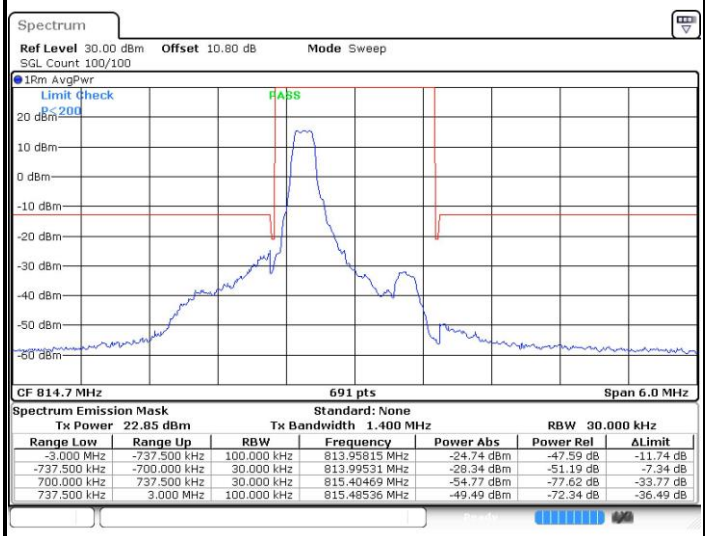


LTE Band 26	
Middle Channel / 15MHz / 64QAM	
	

Conducted Band Edge

LTE Band 26 / 1.4MHz / QPSK

Lowest Band Edge / 1RB

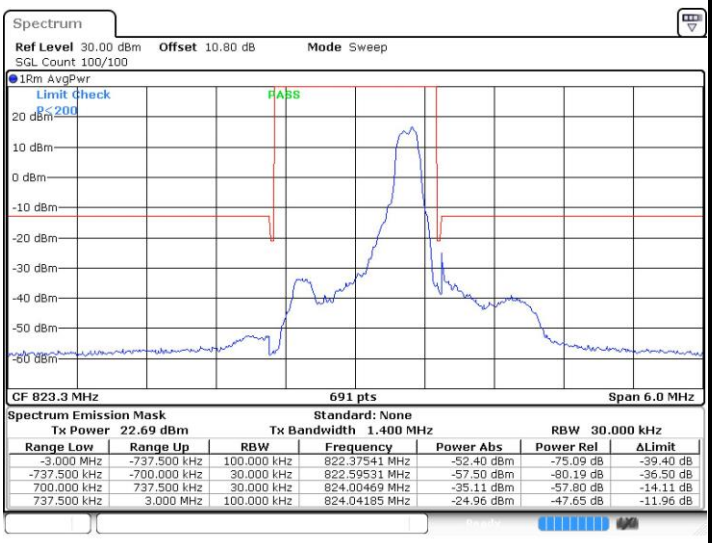


Spectrum Emission Mask Standard: None
Tx Power 22.85 dBm Tx Bandwidth 1.400 MHz RBW 30.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-3.000 MHz	-737.500 kHz	100.000 kHz	813.95815 MHz	-24.74 dBm	-47.59 dB	-11.74 dB
-737.500 kHz	-700.000 kHz	30.000 kHz	813.99531 MHz	-28.34 dBm	-51.19 dB	-7.34 dB
700.000 kHz	737.500 kHz	30.000 kHz	815.40469 MHz	-54.77 dBm	-77.62 dB	-33.77 dB
737.500 kHz	3.000 MHz	100.000 kHz	815.48536 MHz	-49.49 dBm	-72.34 dB	-36.49 dB

Date: 6.JUL.2018 11:06:31

Highest Band Edge / 1RB

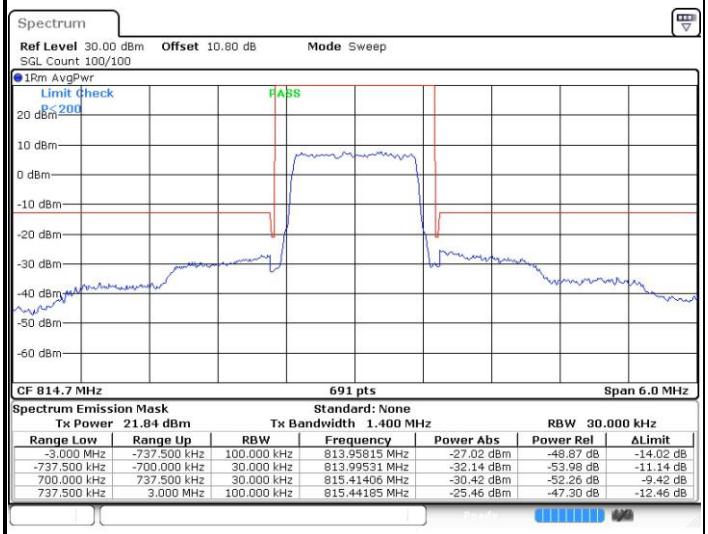


Spectrum Emission Mask Standard: None
Tx Power 22.69 dBm Tx Bandwidth 1.400 MHz RBW 30.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-3.000 MHz	-737.500 kHz	100.000 kHz	822.37541 MHz	-52.40 dBm	-75.09 dB	-39.40 dB
-737.500 kHz	-700.000 kHz	30.000 kHz	822.59531 MHz	-57.50 dBm	-80.19 dB	-36.50 dB
700.000 kHz	737.500 kHz	30.000 kHz	824.00469 MHz	-35.11 dBm	-57.80 dB	-14.11 dB
737.500 kHz	3.000 MHz	100.000 kHz	824.04185 MHz	-24.96 dBm	-47.65 dB	-11.96 dB

Date: 6.JUL.2018 11:11:12

Lowest Band Edge / Full RB

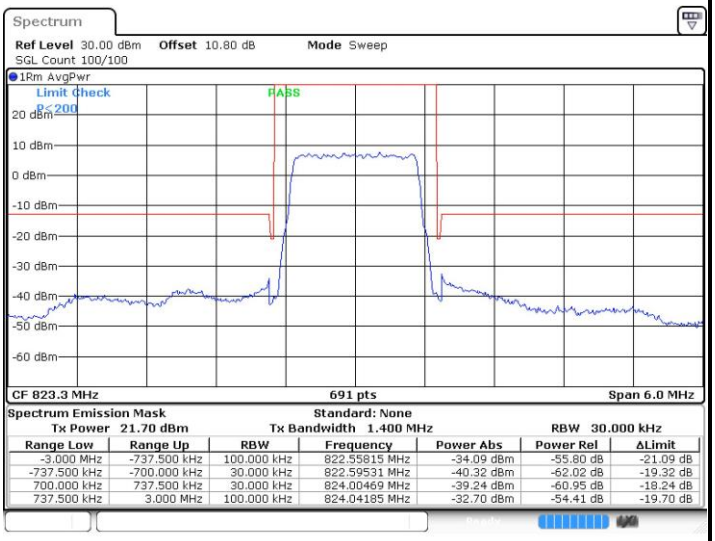


Spectrum Emission Mask Standard: None
Tx Power 21.84 dBm Tx Bandwidth 1.400 MHz RBW 30.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-3.000 MHz	-737.500 kHz	100.000 kHz	813.95815 MHz	-27.02 dBm	-48.87 dB	-14.02 dB
-737.500 kHz	-700.000 kHz	30.000 kHz	813.99531 MHz	-32.14 dBm	-53.98 dB	-11.14 dB
700.000 kHz	737.500 kHz	30.000 kHz	815.41406 MHz	-30.42 dBm	-52.26 dB	-9.42 dB
737.500 kHz	3.000 MHz	100.000 kHz	815.44185 MHz	-25.46 dBm	-47.30 dB	-12.46 dB

Date: 6.JUL.2018 11:08:52

Highest Band Edge / Full RB



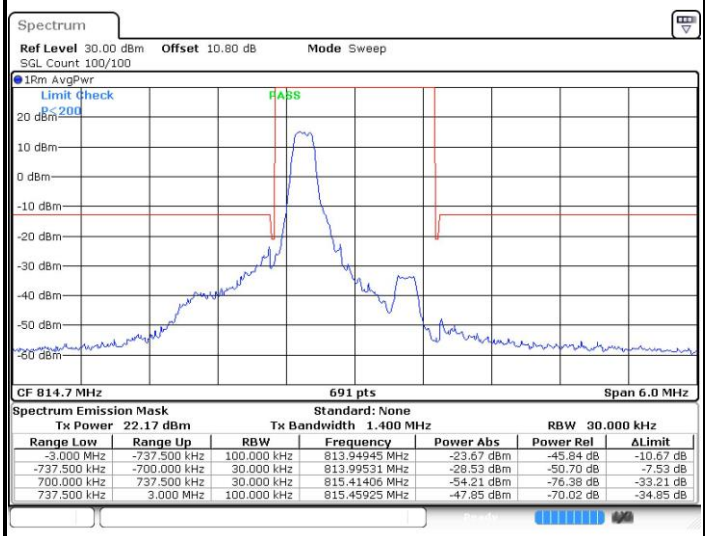
Spectrum Emission Mask Standard: None
Tx Power 21.70 dBm Tx Bandwidth 1.400 MHz RBW 30.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-3.000 MHz	-737.500 kHz	100.000 kHz	822.55815 MHz	-34.09 dBm	-55.80 dB	-21.09 dB
-737.500 kHz	-700.000 kHz	30.000 kHz	822.59531 MHz	-40.32 dBm	-62.02 dB	-19.32 dB
700.000 kHz	737.500 kHz	30.000 kHz	824.00469 MHz	-39.24 dBm	-60.95 dB	-18.24 dB
737.500 kHz	3.000 MHz	100.000 kHz	824.04185 MHz	-32.70 dBm	-54.41 dB	-19.70 dB

Date: 6.JUL.2018 11:13:33

LTE Band 26 / 1.4MHz / 16QAM

Lowest Band Edge / 1 RB

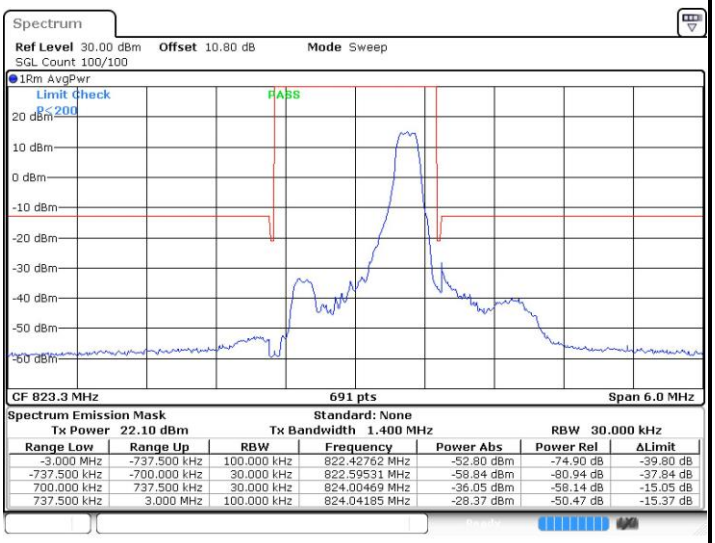


Spectrum Emission Mask Standard: None
Tx Power 22.17 dBm Tx Bandwidth 1.400 MHz RBW 30.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-3.000 MHz	-737.500 kHz	100.000 kHz	813.94945 MHz	-23.67 dBm	-45.84 dB	-10.67 dB
-737.500 kHz	-700.000 kHz	30.000 kHz	813.99531 MHz	-28.53 dBm	-50.70 dB	-7.53 dB
700.000 kHz	737.500 kHz	30.000 kHz	815.41406 MHz	-54.21 dBm	-76.38 dB	-33.21 dB
737.500 kHz	3.000 MHz	100.000 kHz	815.45925 MHz	-47.85 dBm	-70.02 dB	-34.85 dB

Date: 6.JUL.2018 11:07:41

Highest Band Edge / 1 RB

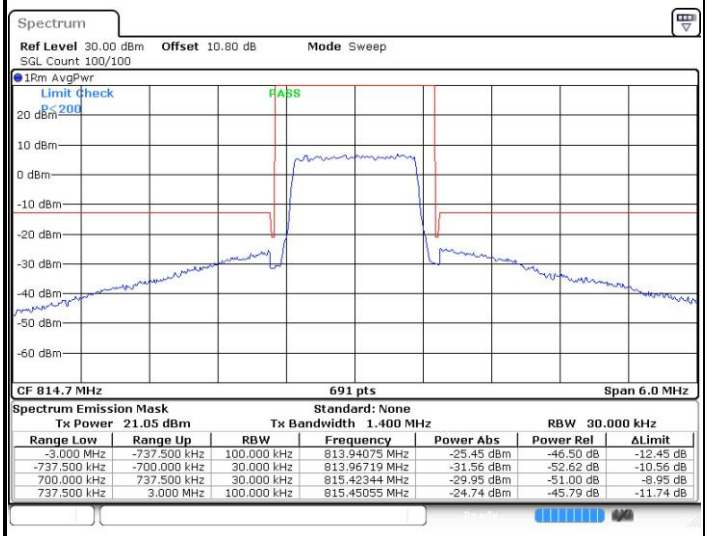


Spectrum Emission Mask Standard: None
Tx Power 22.10 dBm Tx Bandwidth 1.400 MHz RBW 30.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-3.000 MHz	-737.500 kHz	100.000 kHz	822.42762 MHz	-52.80 dBm	-74.90 dB	-39.80 dB
-737.500 kHz	-700.000 kHz	30.000 kHz	822.59531 MHz	-58.84 dBm	-80.94 dB	-37.84 dB
700.000 kHz	737.500 kHz	30.000 kHz	824.00469 MHz	-36.05 dBm	-58.14 dB	-15.05 dB
737.500 kHz	3.000 MHz	100.000 kHz	824.04185 MHz	-28.37 dBm	-50.47 dB	-15.37 dB

Date: 6.JUL.2018 11:12:23

Lowest Band Edge / Full RB

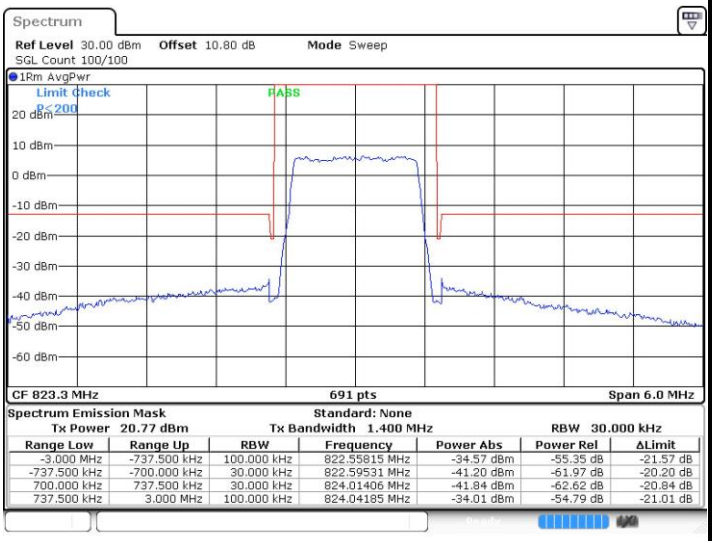


Spectrum Emission Mask Standard: None
Tx Power 21.05 dBm Tx Bandwidth 1.400 MHz RBW 30.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-3.000 MHz	-737.500 kHz	100.000 kHz	813.94075 MHz	-25.45 dBm	-46.50 dB	-12.45 dB
-737.500 kHz	-700.000 kHz	30.000 kHz	813.96719 MHz	-31.56 dBm	-52.62 dB	-10.56 dB
700.000 kHz	737.500 kHz	30.000 kHz	815.42344 MHz	-29.95 dBm	-51.00 dB	-8.95 dB
737.500 kHz	3.000 MHz	100.000 kHz	815.45055 MHz	-24.74 dBm	-45.79 dB	-11.74 dB

Date: 6.JUL.2018 11:10:02

Highest Band Edge / Full RB



Spectrum Emission Mask Standard: None
Tx Power 20.77 dBm Tx Bandwidth 1.400 MHz RBW 30.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-3.000 MHz	-737.500 kHz	100.000 kHz	822.55815 MHz	-34.57 dBm	-55.35 dB	-21.57 dB
-737.500 kHz	-700.000 kHz	30.000 kHz	822.59531 MHz	-41.20 dBm	-61.97 dB	-20.20 dB
700.000 kHz	737.500 kHz	30.000 kHz	824.01406 MHz	-41.84 dBm	-62.62 dB	-20.84 dB
737.500 kHz	3.000 MHz	100.000 kHz	824.04185 MHz	-34.01 dBm	-54.79 dB	-21.01 dB

Date: 6.JUL.2018 11:14:44